Hazard Planners Aren't Planning for Heat Hazards: Methods

Juanita Constible, Senior Climate & Health Advocate

As described in the December 2022 blog post "Hazard Planners Aren't Planning for Heat Hazards," NRDC investigated how states in the southeastern United States are incorporating heat in their federally mandated hazard mitigation plans (HMPs).

We analyzed the most recent FEMA-approved plans from 11 states in the Southeast: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. Note that FEMA requires plans to be updated every five years, meaning that most of these states are currently preparing a new plan.

The evaluation matrix we used (see next page) was refined from a pilot project conducted for NRDC by UCLA student Celia Patricia Sánchez Zelaya. The revised questions were informed by Ms. Zelaya's findings, as well as:

- Consultation with experts from NRDC and Punchard Consulting;
- Recent heat-health journal articles (examples here and here) and policy publications (examples here and here);
- FEMA's 2022 *State Mitigation Planning Policy Guide*;
- Sara Meerow and Sierra Woodruff's "Seven Principles of Strong Climate Change Planning"; and
- Two guides from the American Planning Association: *Hazard Mitigation Policy Guide* and *Planning for Urban Heat Resilience*.

There are 12 questions in the matrix to evaluate the quality of the heat risk assessments in the plans, and another six to evaluate the mitigation strategies. This imbalance reflects how important thorough risk assessments are to developing appropriate solutions. However, plans often fall short when it comes to outlining specific mitigation policies and actions, so we halved the score for the risk assessments to give it the same weight as the score for the mitigation strategies.

EVALUATION MATRIX: Incorporation of Heat in State Hazard Mitigation Plans, Southeast States, 2018-2019

Element	Why is This Important?	Possible Score
Risk Assessment		
1. The plan includes a standalone risk assessment for heat hazards in the state.	Heat hazards pose unique threats and therefore require unique mitigation strategies.	1 = The risk assessment has a dedicated section for heat; 0.5 = Heat is combined with cold, drought, or wildfire; 0 = No consideration of heat.
2a. The risk assessment includes an analysis of the jurisdictions in the state most exposed to heat hazards.	Heat hazards can vary a lot from one part of a state to another, particularly if the state is large or has mountain ranges or long coastlines.	1 = The heat risk assessment covers the entire state and is at the county scale or less; 0.5 = Only covers part of the state or uses a scale larger than county-level; 0 = No analysis of the jurisdictions most exposed to heat.
2b. The risk assessment considers the specific underserved or socially- or medically vulnerable populations in the state that experience the greatest heat-related health harms.	Consideration of specific underserved or vulnerable populations helps planners develop appropriate solutions and target help to the people who need it most.	1 = The risk assessment considers 4 or more categories of social or medical vulnerability, from this list: Mental or behavioral disorders, chronic illness, children, older adults, pregnancy, take certain medications, low-income, unhoused, people of color, disabled people, urban residents; 0.5 = Considers 1 to 3 categories of vulnerability; 0 = No analysis of underserved or vulnerable people.
2c. The risk assessment considers how the jurisdictions in the state most exposed to heat overlap spatially and/or temporally with the underserved and socially- or medically vulnerable populations.	Heat vulnerability is a combination of exposure to high temperatures, social and medical vulnerability to heat, and lack of capacity to respond to heat stress.	1 = Yes; 0 = No.

Element	Why is This Important?	Possible Score
3a. The risk assessment includes information about the historical, current, or expected heat-related health harms in the state.	Consideration of the direct and indirect health harms of heat helps planners more fully understand the scope and scale of the problem. Analyses that only consider classic heat-related illnesses can result in significant underestimates of health harms.	1 = The risk assessment considers classic heat-related illnesses (e.g., heat exhaustion and heat stroke) in addition to at least one of the following: Exacerbation of chronic illness (e.g., heart or kidney disease), Exacerbation of mental or behavioral health disorders (e.g., suicidality), Degraded sleep, Reduced worker productivity, or Pregnancy outcomes (e.g., stillbirth, pre-term birth); 0.5 = Only considers classic-related heat illnesses; 0 = Does not mention heat-related health harms.
3b. The risk assessment includes heat-related illness, injury, or death data collected by the U.S. Centers for Disease Control and Prevention (CDC), state agencies, and/or state health providers such as hospital systems.	Hazard mitigation planners frequently rely on National Weather Service statistics, which are easy to find online but vastly underestimate the health toll of heat. State and CDC data can give a more complete understanding of the health toll of heat, including during non-heat wave periods.	1 = Yes; 0 = No.
3c. The risk assessment attempts to quantify the historical, current, or expected health costs in dollars of heat-related health harms in the state.	Heat can damage infrastructure but is primarily a threat to health. Without attempting to estimate the financial costs associated with heat-related illnesses, injuries, and deaths, most jurisdictions will continue to regard heat as a minor problem and view heat mitigation strategies as insufficiently cost-effective.	1 = The risk assessment attempts to quantify health costs from illnesses, injuries, and deaths; 0.5 = The health costs include deaths only; 0 = No attempt to quantify health costs.
3d. The risk assessment includes a discussion of how heat hazards could interrupt continuity of health-protective operations and services in the state.	Heat can affect the power and water supply, transportation infrastructure, and the health of first responders, compounding harm during heat emergencies.	1 = Yes; 0 = No.

Element	Why is This Important?	Possible Score
4a. The risk assessment includes an analysis of how climate change will affect future heat hazards in the state.	Planners need to prepare for the heat emergencies of the future, not the past. Otherwise, they may implement solutions that are insufficient at best and maladaptive at worst.	1 = Yes; 0 = No.
4b. The analysis of how heat hazards will change in the state includes both average temperatures and one or more clearly defined metric of extreme heat.	Rising average temperatures stress health, agriculture, infrastructure, and the economy. However, emergency or hazard mitigation planning often ignores the long-term increase in temperatures. There are also many ways to define heat extremes. Clear metrics will facilitate communication about the plan and future updates.	1 = The analysis includes both average temperatures and one or more clearly defined metrics for heat extremes; 0.5 = Only includes heat extremes and/or fails to clearly define the main metric; 0 = No analysis of averages or extremes.
4c. The analysis of how heat hazards will change in the state is conducted at a sufficiently granular spatial scale.	The rate of climate change can vary a lot from one part of a state to another, particularly if the state is large or has mountain ranges or long coastlines.	1 = The analysis presents averages and extremes for the entire state at a sub-state scale; 0.5 = Only extremes are presented at a sub-state scale; 0 = The spatial scale is at the state level or larger.
4d. The probability analysis of future heat extremes in the state considers climate projections or scenarios.	Failing to consider climate change in the probability analysis will lead to significant underestimates of risk.	1 = Yes; 0 = No.
Maximum Risk Assessment Subtotal		**12**
Maximum Adjusted Risk Assessment Subtotal		**6**
Mitigation Strategy		
5a. The mitigation strategy was informed by input from public health professionals.	Heat is primarily a health hazard, so planning should include public health professionals.	1 = Yes; 0 = No or unclear.

Element	Why is This Important?	Possible Score
5b. Non-governmental organizations or individuals representing the populations most vulnerable informed the mitigation strategy.	Meaningful engagement with underserved or vulnerable populations helps ensure that the people most affected by hazards can inform how planners prioritize risks and shape mitigation strategies that otherwise may have been missed or dismissed.	1 = Yes; 0 = No or unclear.
6a. The mitigation strategy includes actions, activities, or projects explicitly intended to reduce heat risks.	Heat requires specific strategies that may not be adequately covered by an "all hazards" or "extreme temperature" approach.	1 = Yes; 0 = No or unclear.
6b. The heat actions, activities, or projects in the mitigation strategy go beyond emergency preparedness and response.	Most emergency preparedness and response strategies are insufficient to cope with climate-driven increases in heat hazards. Larger-scale and longer-term strategies are needed to prepare for a hotter world.	1 = Yes, including one or more strategies in the categories of land use planning (e.g., urban development, land conservation), urban design (e.g., shade structures, building orientation), natural solutions (e.g., parks, water features such as ponds), heat-ready buildings (e.g., building codes, energy efficiency, cool roofs); 0 = No or unclear.
7. The mitigation strategy prioritizes actions, activities, or projects to reduce heat risks to the most vulnerable populations.	The health harms of heat are not felt equally, often because of structural or institutional inequities such as historical disinvestment in communities of color.	1 = Yes; 0 = No or unclear.
8. The mitigation strategy includes a timeline for implementation of heat actions, activities, or projects.	It is critical to get started early on heat mitigation strategies given how long many of them will take to implement and how quickly the climate is warming.	1 = Yes; 0 = No or unclear.
Maximum Mitigation Strategy Subtotal		**6**
MAXIMUM TOTAL SCORE		**12**