Extreme Heat in Minnesota: Enhancing Messaging with Interactive Tools

U-Spatial, the University of Minnesota's center for geospatial advancement, and the Minnesota Department of Health (MDH) partnered to create a campaign that included maps and dashboards to communicate heat vulnerability in Minnesota communities.

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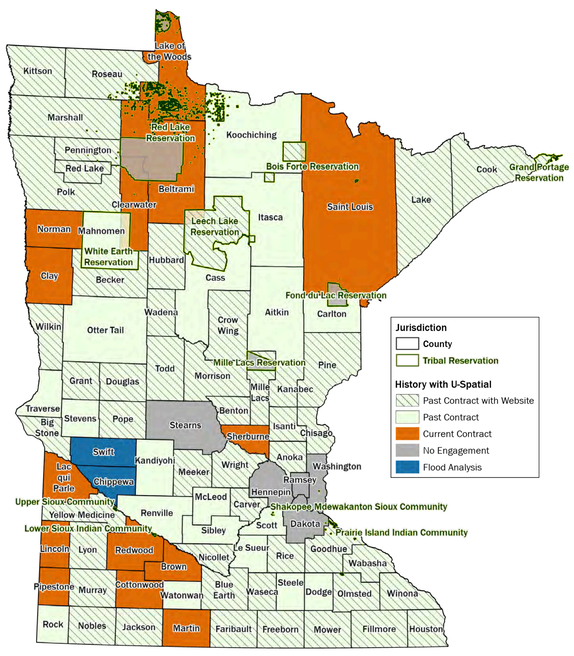
Extreme Heat in a Cold State

Across Minnesota, climate change is driving an increase in average temperatures, dangerously hot days, and warmer nights. Emergency managers, public health professionals, and other decision-makers need reliable data to help prepare for and respond to extreme heat events in a cold climate where extreme heat risk is often overlooked.



Map showing extent of U-Spatial's hazard mitigation planning work

Indicators

Partnering with public health professionals and climate scientists, we conducted a literature review to determine relevant indicators that demonstrate social, economic, and exposure vulnerability rank by census tract or zip code. The indicators below are listed with their relative rank in every county-level hazard mitigation plan.

Exposure Metrics

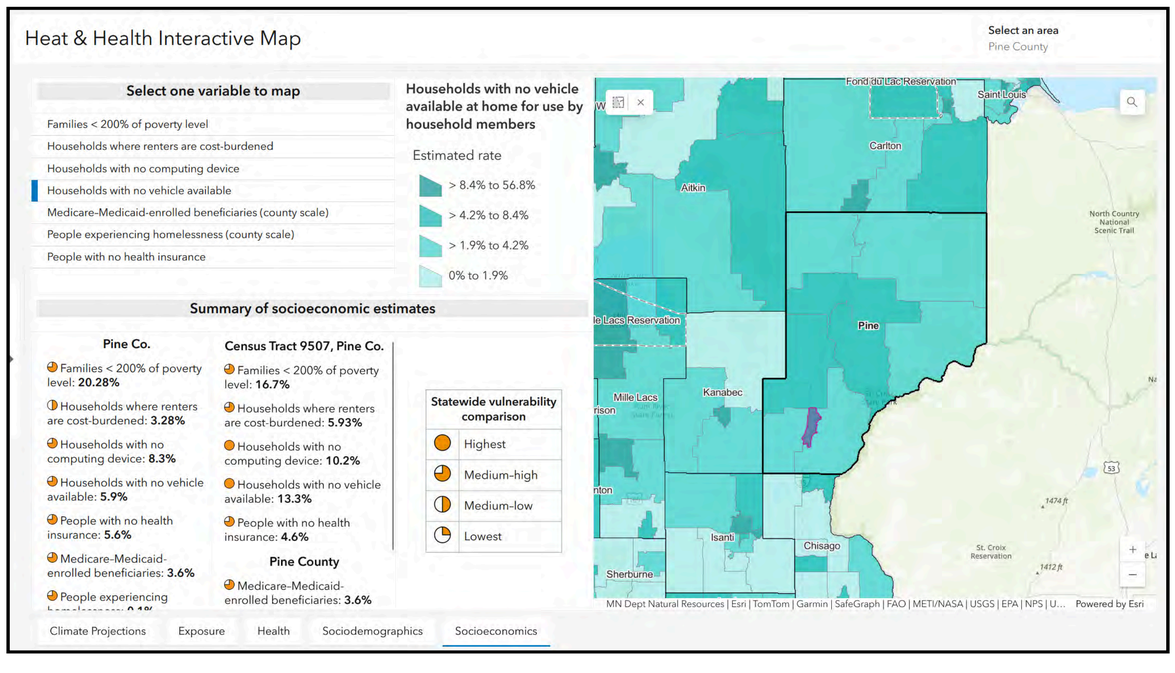
Climate change projection data demonstrate the average annual number of days that exceed 90 degrees by mid-century and percent of heat trapping surfaces in each city.

Vulnerability Indicator	Percentage of Population	Percentile Rank Within Minnesota	Vulnerability Level
Adults with COPD	8.5%	94th	Highest
Adults with a self-care disability	4.1%	79th	High
Adults with coronary heart disease	8.8%	79th	High
Adults with diabetes	12.2%	66th	High
Families at less than 200% of poverty level	16.2%	26th	Low
Households where a person age 65 or over lives alone	13.4%	41st	Moderate
Households with no computing device	10.3%	94th	Highest
Households with no vehicle available	5.9%	65th	High
Households with rent over 50% of income	2.4%	17th	Lowest
Medicare beneficiaries who are electricity-dependent	4.0%	31st	Low
Medicare–Medicaid-enrolled beneficiaries	2.9%	37th	Low
People age 5 or over with limited English	2.6%	71st	High
People age 65 or over	21.8%	60th	Moderate
People over age 16 who work outdoors	10.2%	74th	High
People under age 5	5.7%	45th	Moderate
People who are experiencing homelessness	0.1%	29th	Low
People who are uninsured	7.8%	93rd	Highest
People who do not identify as "White alone, not Hispanic or Latino"	5.4%	2nd	Lowest

The table shows information for Fillmore County, Minnesota. These indicators are mapped in the Heat & Health Interactive dashboard.

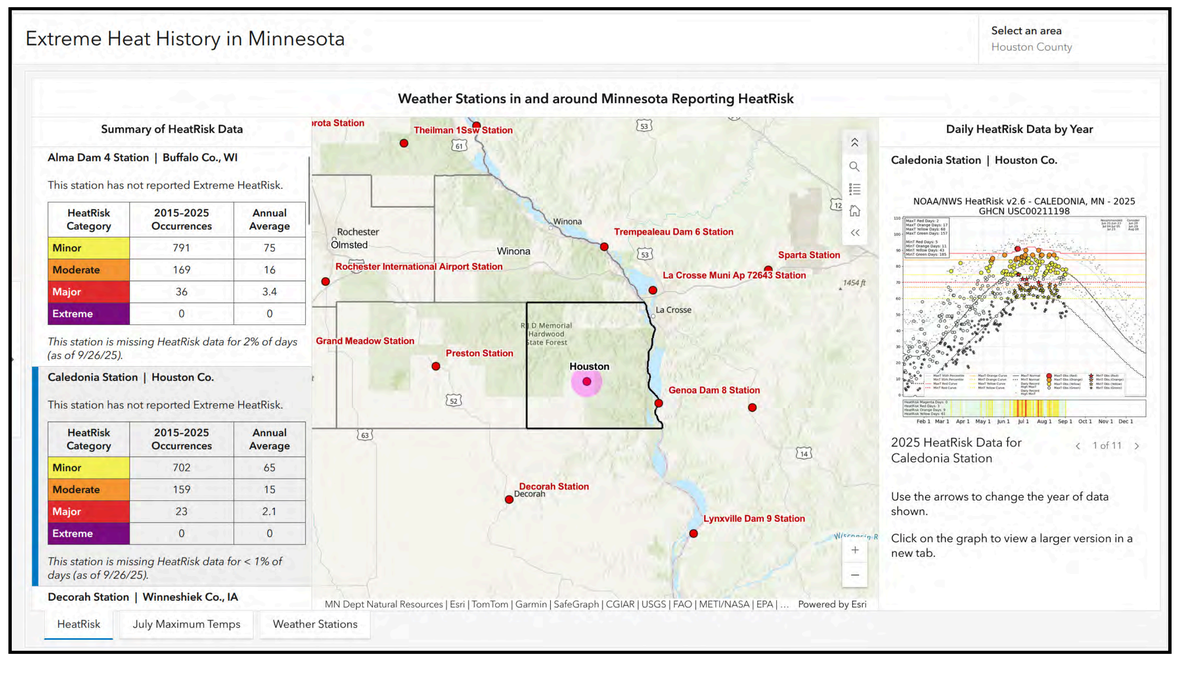
Connecting with a Relevant Audience

The Minnesota Department of Health approached U-Spatial to help with public health outreach related to extreme heat risk. U-Spatial's geospatial expertise and hazard mitigation planning program make us a natural partner to reach emergency managers, planners, and stakeholders in every county using their planning services. The interactive and accessible style of the resulting website and tools engage planners and concerned residents alike.



Heat & Health Interactive Map

The resulting tools and maps are featured both in the MDH Public Health "Stay Cool MN" campaign and all county hazard mitigation plans.. We deployed tutorials and provided many presentations to demonstrate use cases for diving into the rich map tools. The indicators were grouped into 5 categories, including climate projection data, heat exposure metrics, and health, sociodemographic, and socioeconomic indicators.



Extreme Heat History

The history dashboard demonstrates the frequency of extreme heat days for individual weather stations as calculated by the National Weather Service's HeatRisk tool. July maximum temperatures and maximum temperatures by weather station are included in separate tabs.

Scan to interact with dashboards (best on desktop)

Applications

- The resulting extreme heat dashboards are used in MDH's "Stay Cool MN" public health campaign.
- HeatRisk history and vulnerability indicators are included in every 2025-2027 hazard mitigation plan compiled by U-Spatial, exposing emergency managers and planners in nearly every Minnesota county and tribal community to specific heat information.

Stay Cool MN

HMP Hub

- The National Weather Service HeatRisk tool is leveraged to provide heat event history in a reliable, consistent format and is a better indicator of hazardous days than temperature alone.
- U-Spatial's partnership with MDH has resulted in uniform messaging in hazard mitigation plans, a larger audience for outreach, and a deeper understanding of extreme heat events for government leaders, local public health planners, emergency managers, and more.