

Earth system perspective on Resiliency in Appalachia

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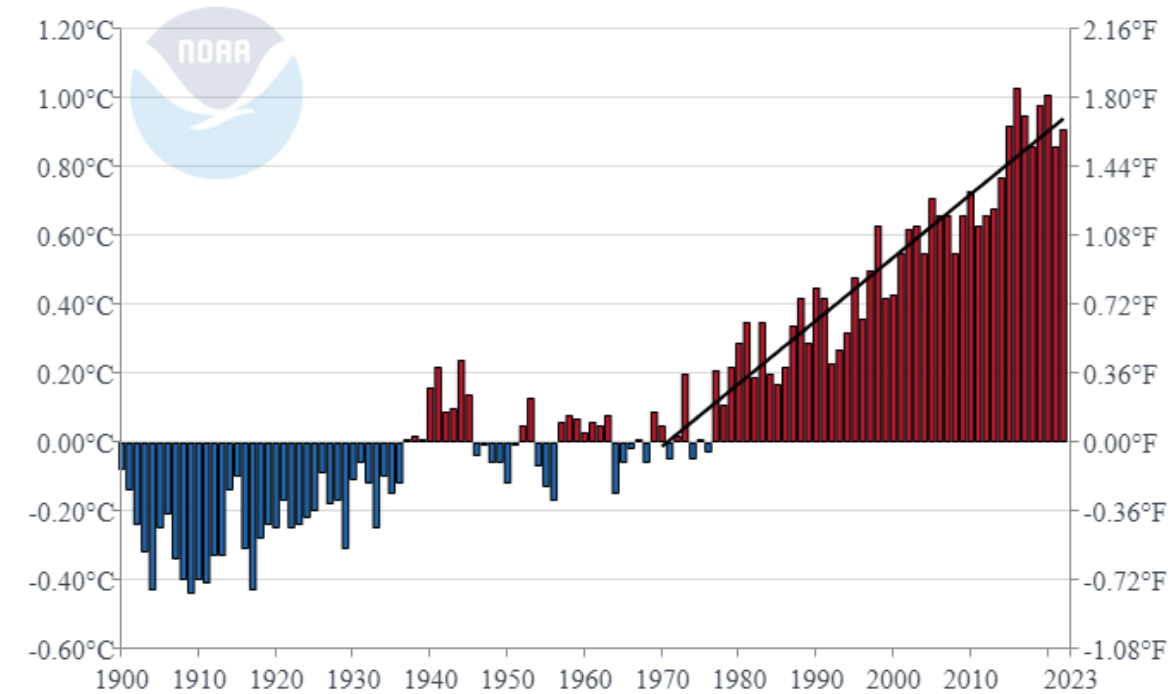
Appalachian Carbon Forum, 8 March 2024

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Appalachian climate change: **global** context

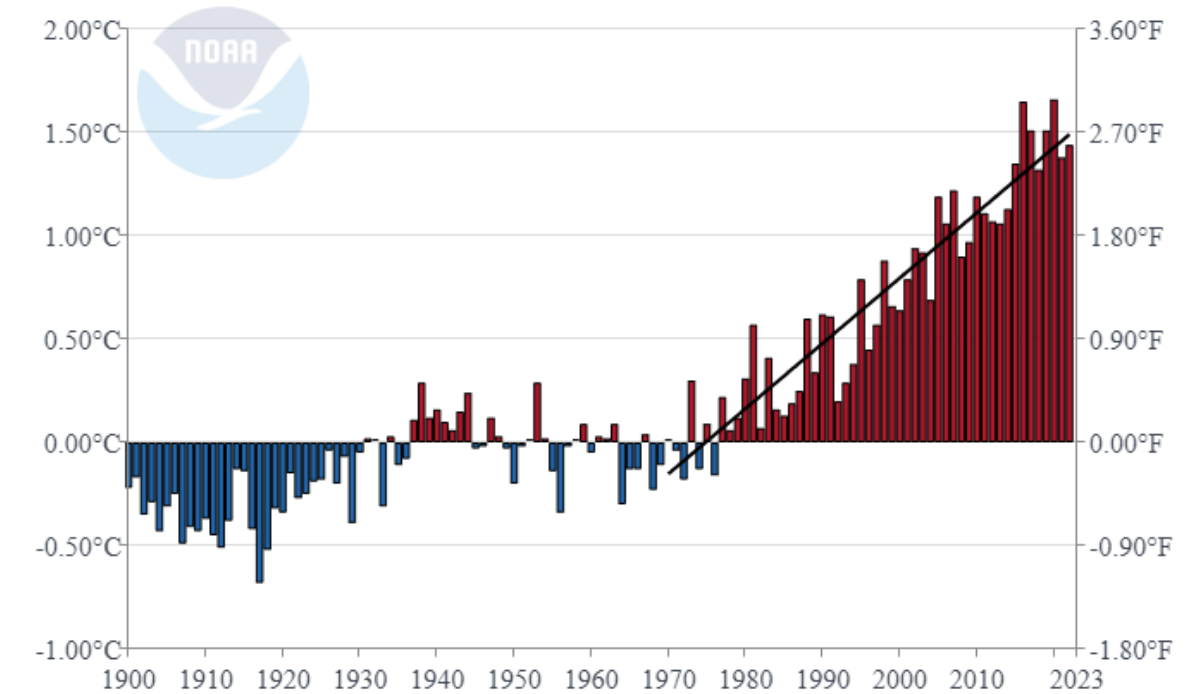
Global Land and Ocean

January-December Temperature Anomalies



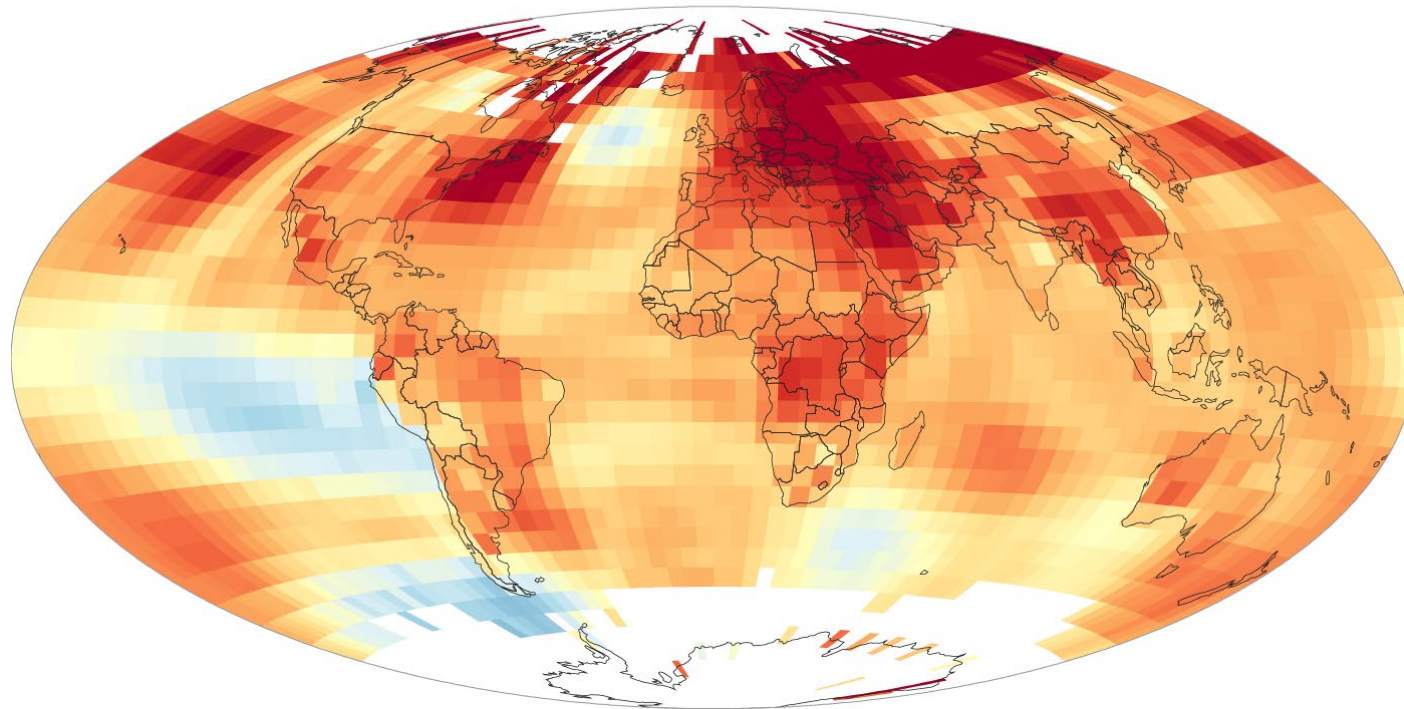
Global Land

January-December Temperature Anomalies

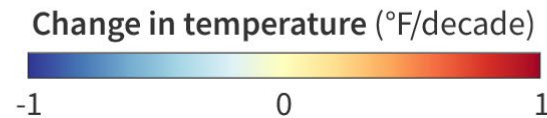


Appalachian climate change: **global** context

RECENT TEMPERATURE TRENDS (1993-2022)



1993-2022

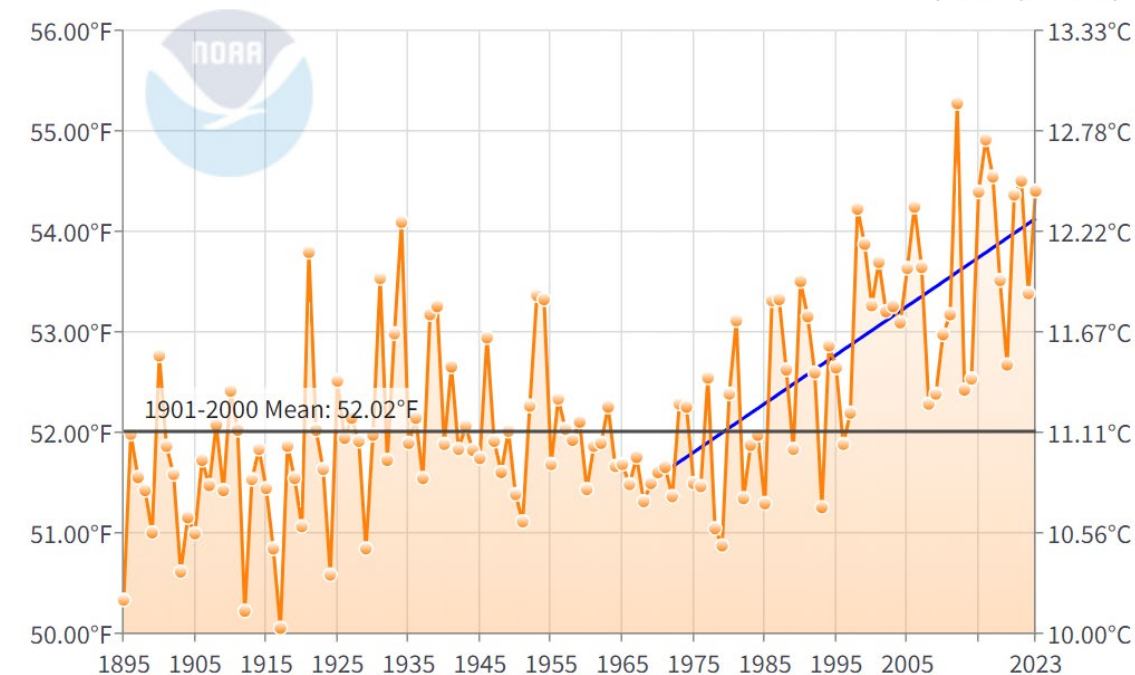


NOAA Climate.gov
Data: NCEI

Appalachian climate change: **national** context

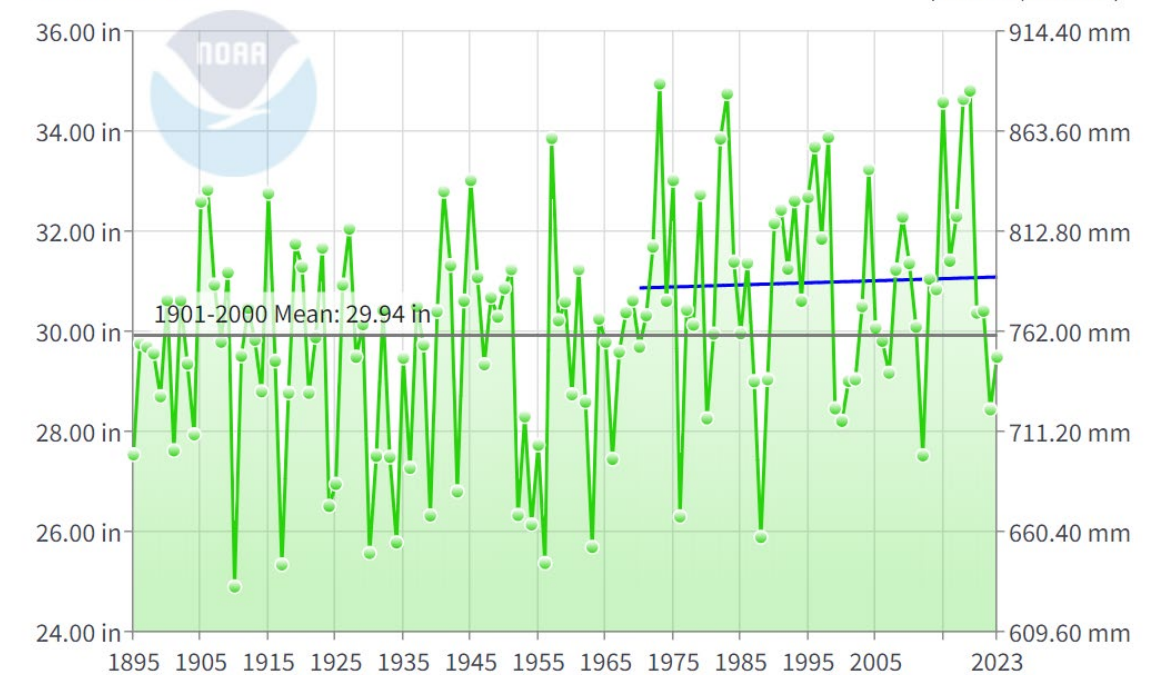
Contiguous U.S. Average Temperature

January-December



Contiguous U.S. Precipitation

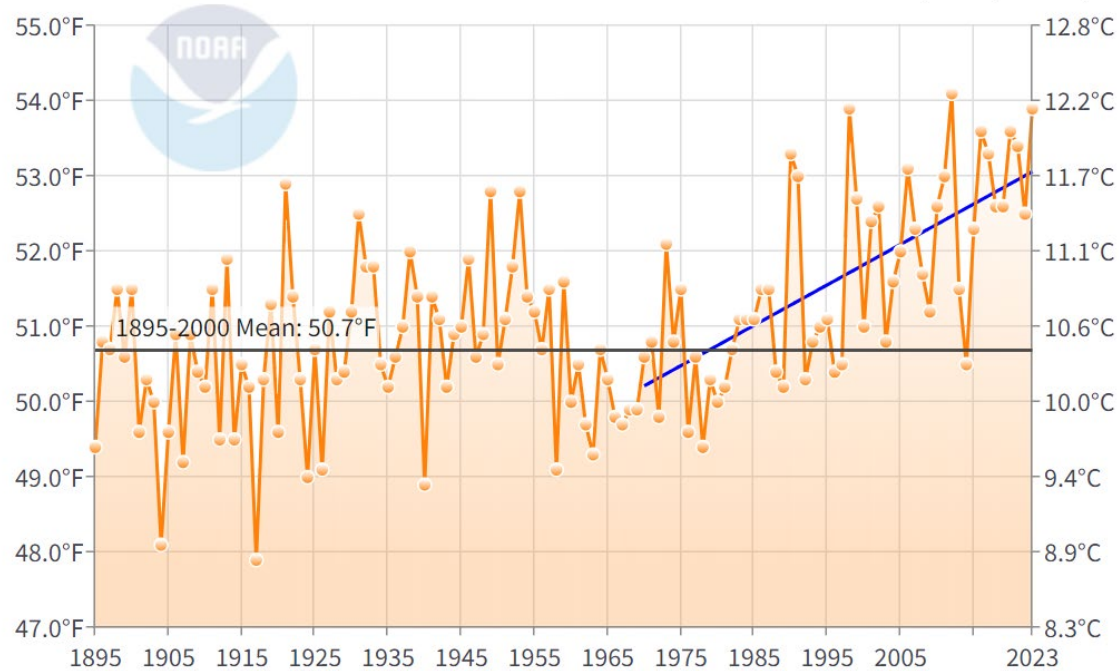
January-December



Appalachian climate change: **regional** context

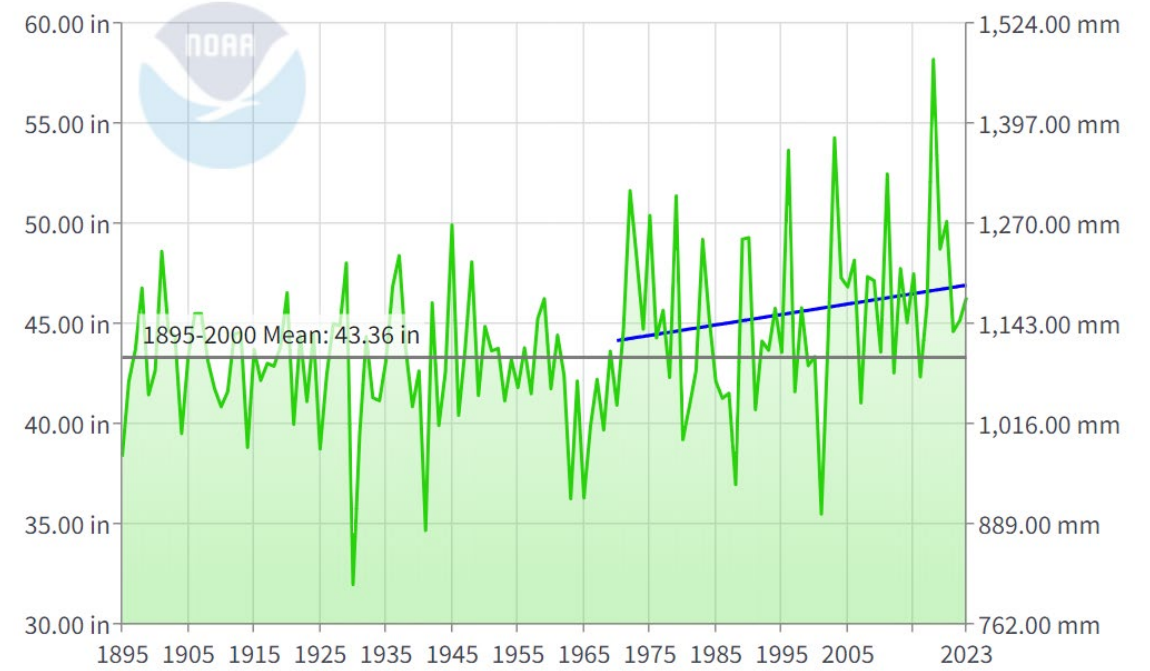
Eastern NWS Region Average Temperature

January-December



Eastern NWS Region Precipitation

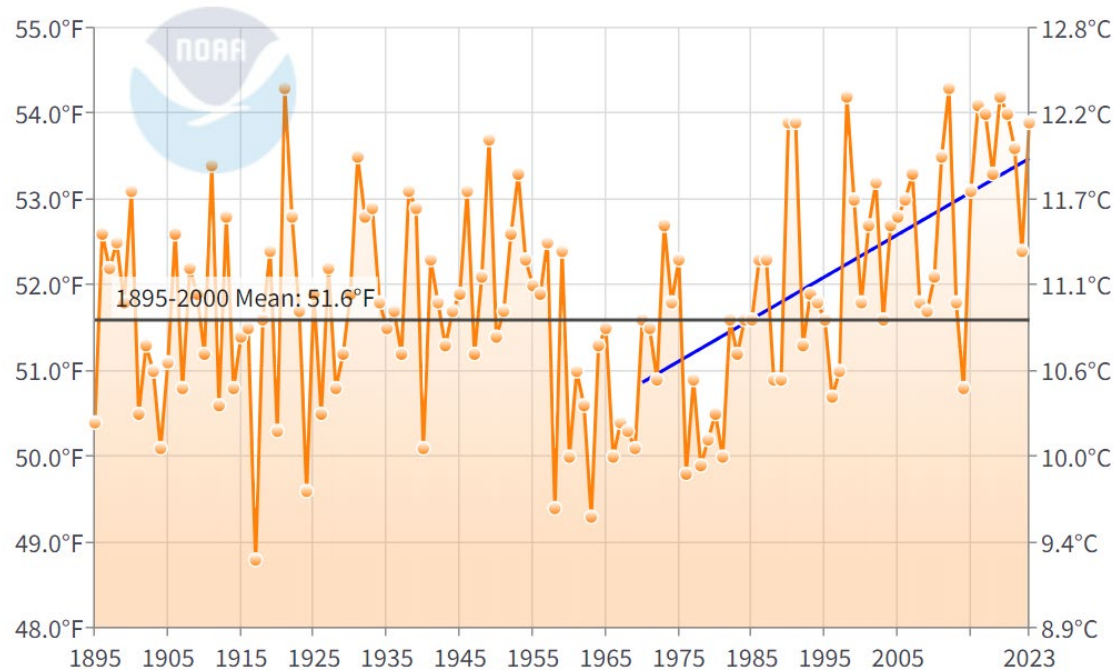
January-December



Appalachian climate change: **local** context

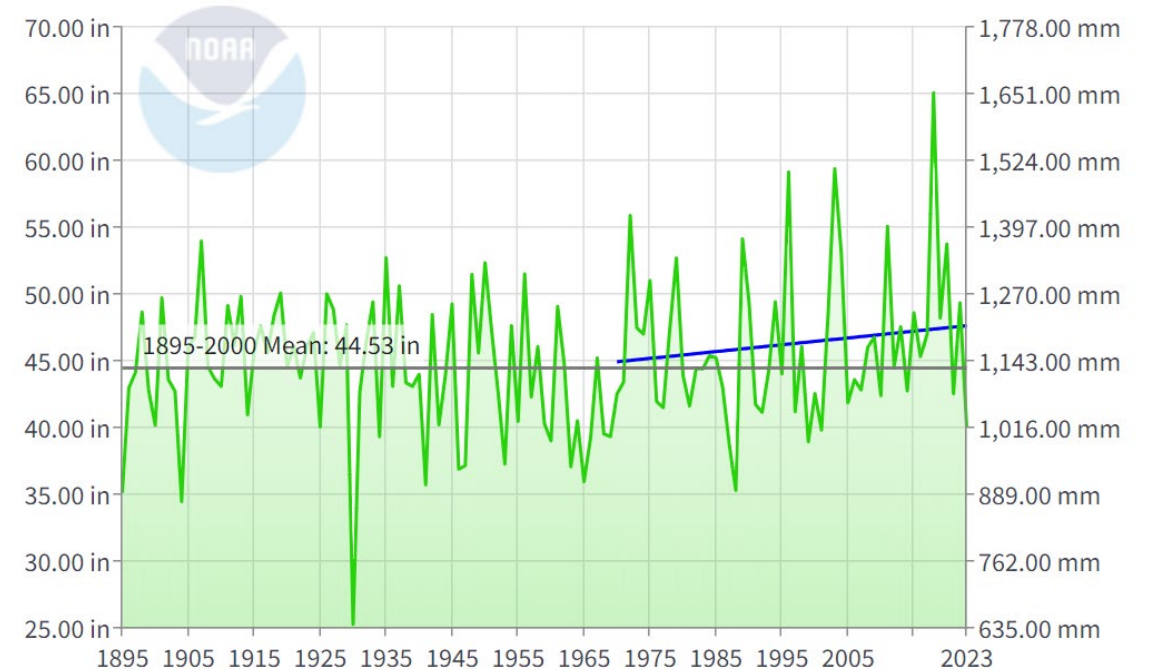
West Virginia Average Temperature

January-December

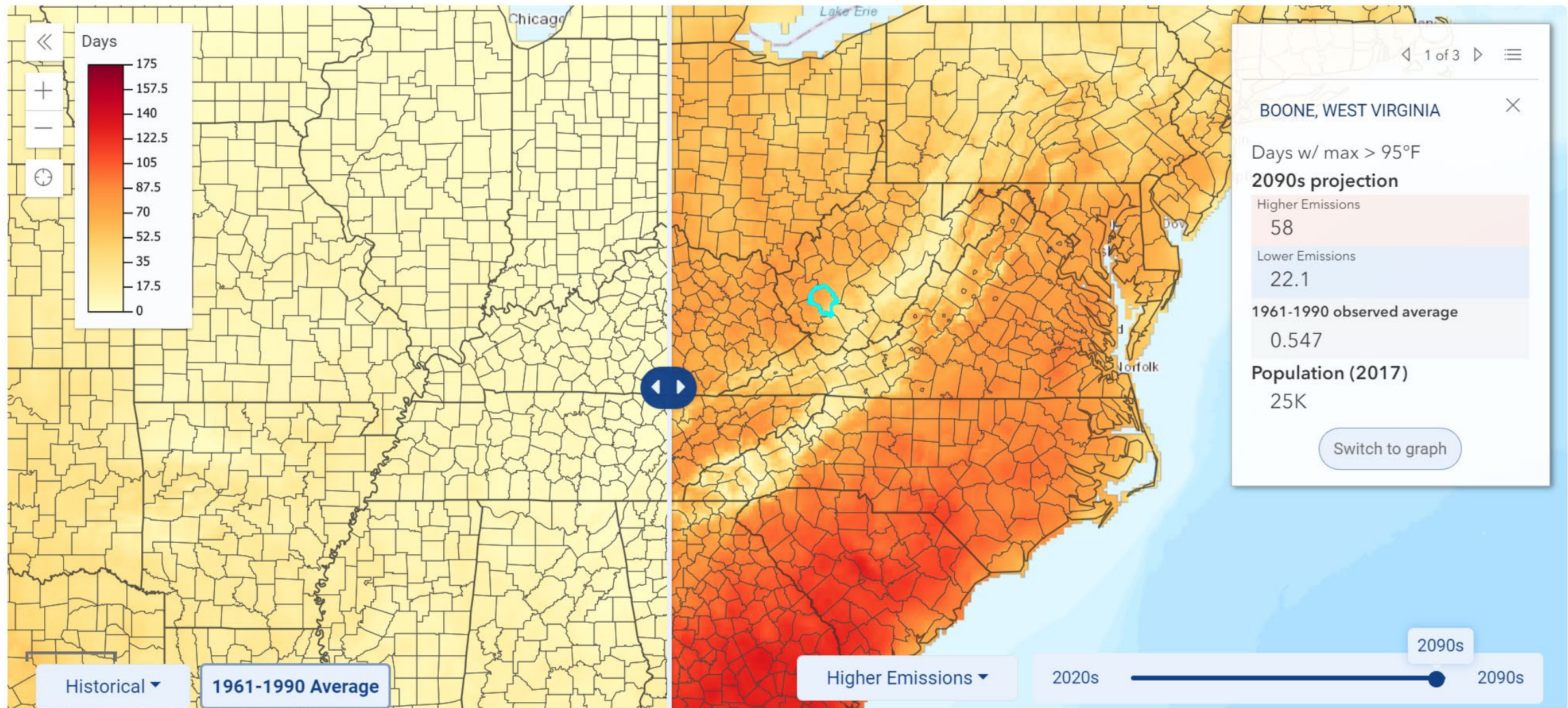


West Virginia Precipitation

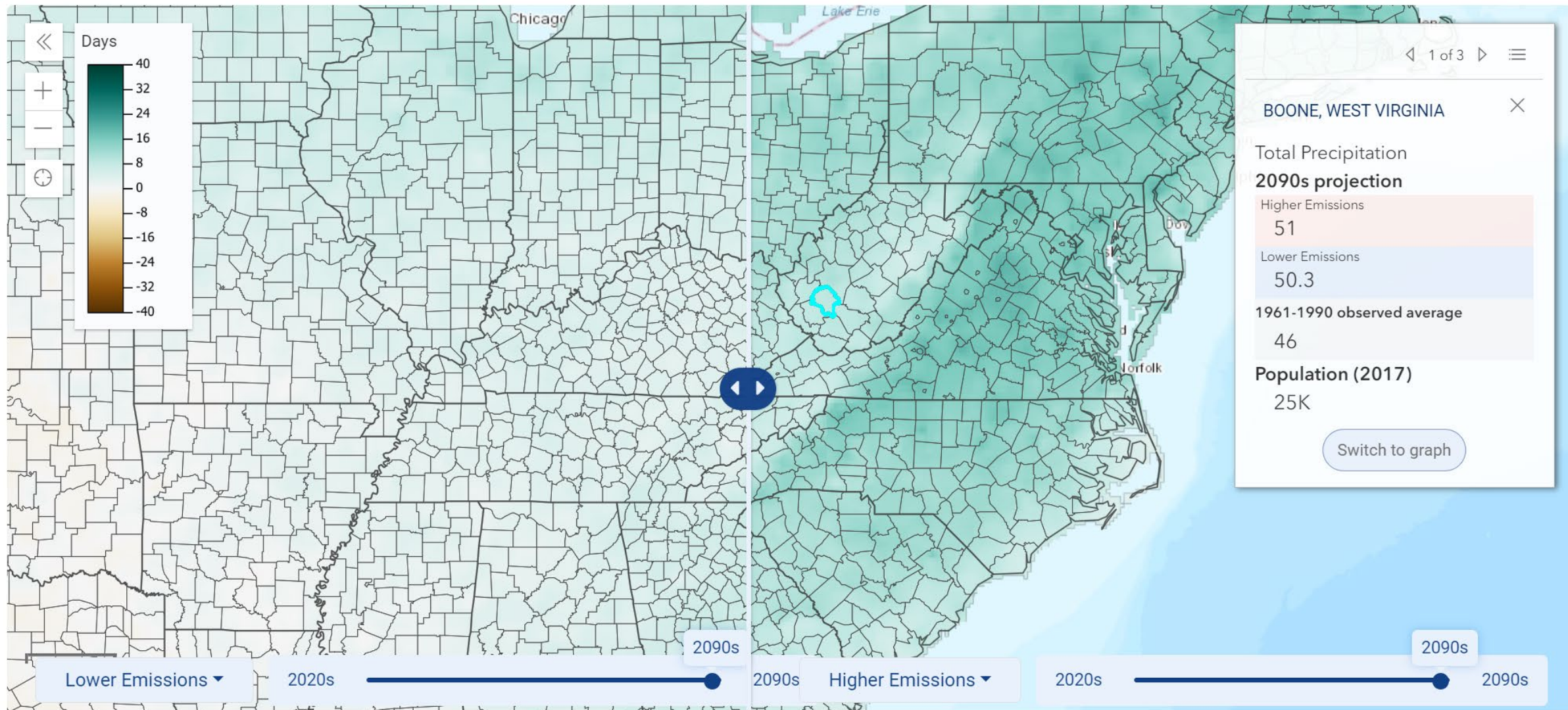
January-December



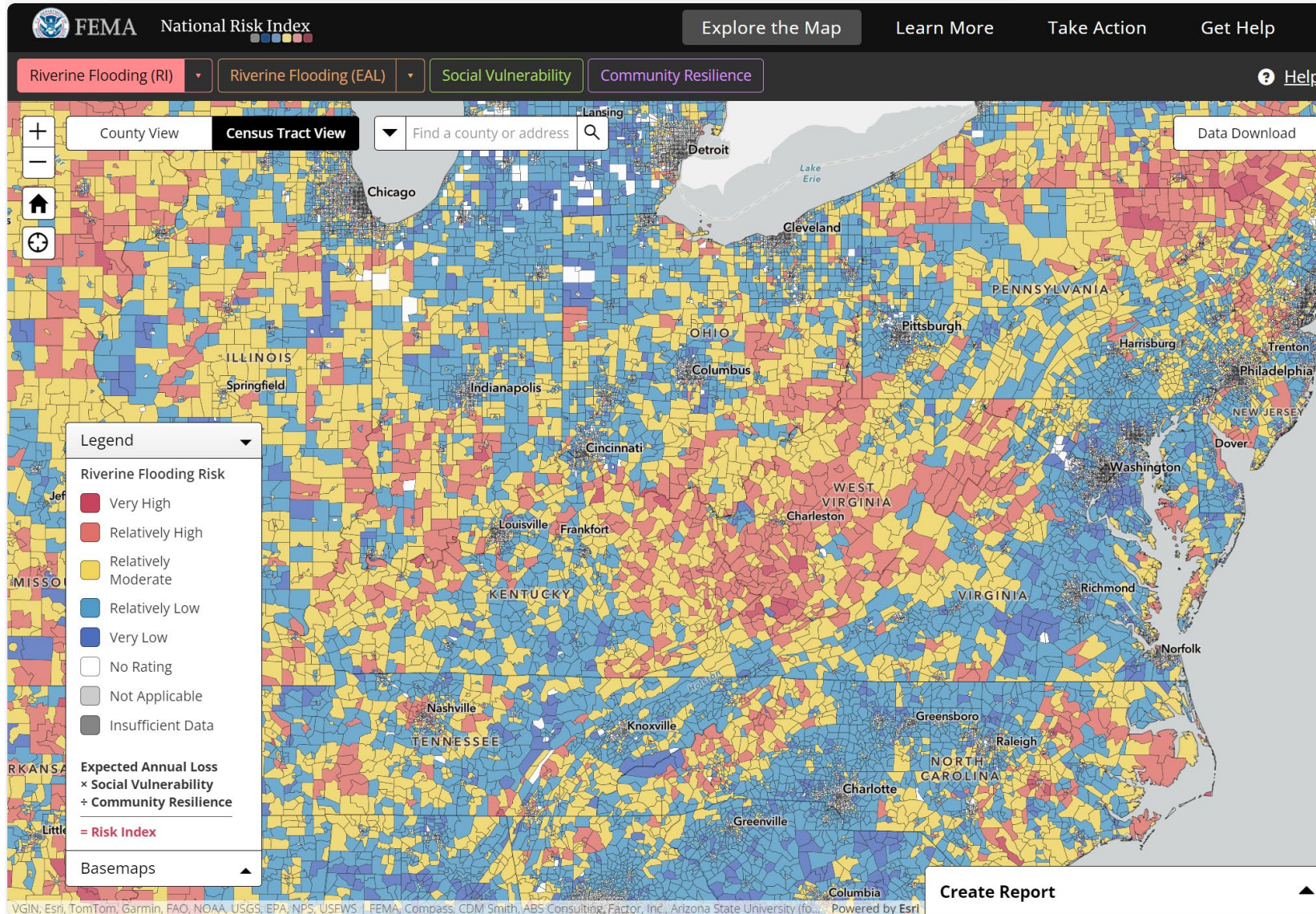
Appalachian climate change: **future projections**



Appalachian climate change: **future projections**

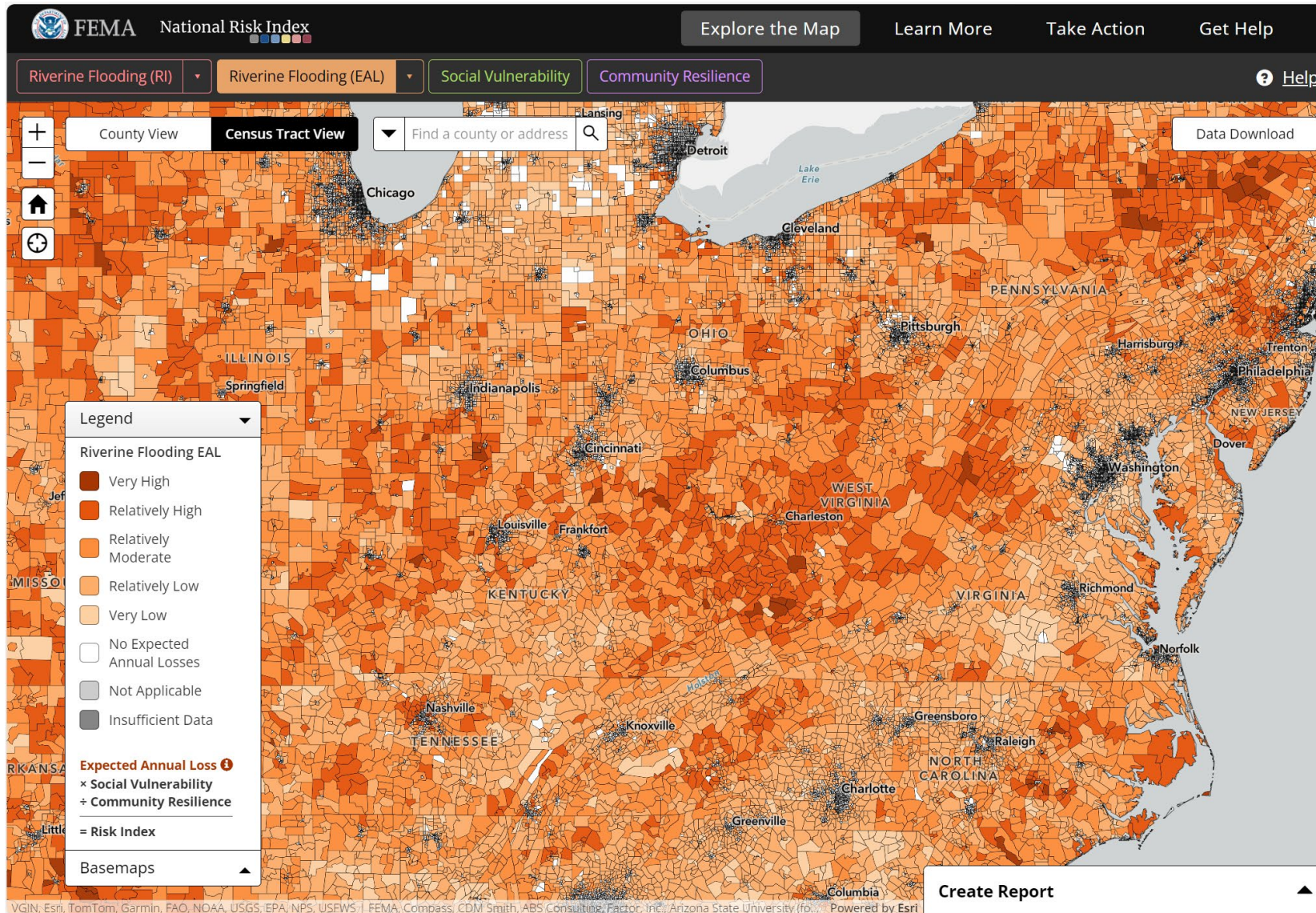


Quantifying historic risk: Riverine flooding



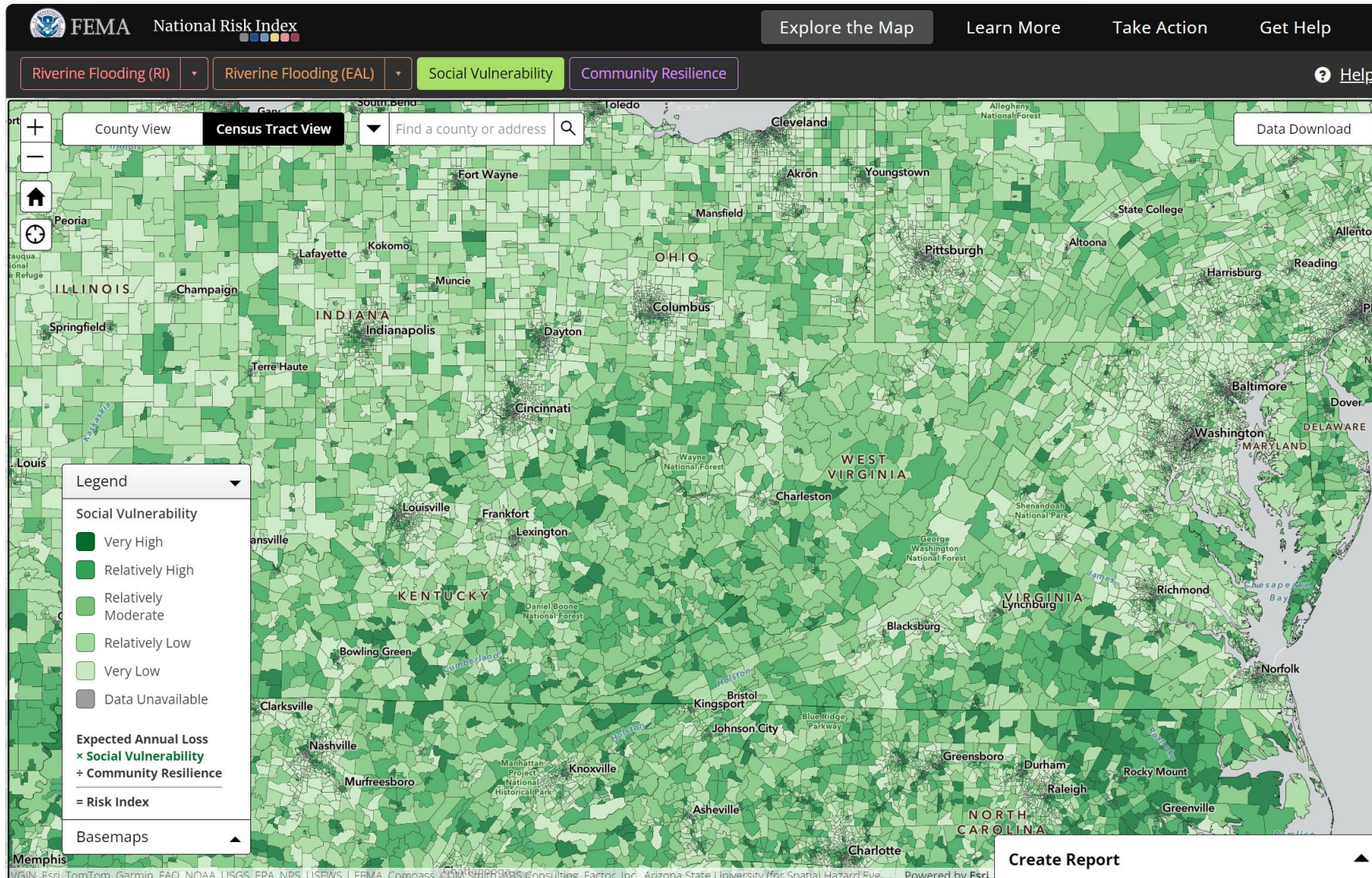
$$\begin{aligned} \text{Riverine Flooding Risk} = & \\ & \text{Expected Annual Loss} \\ & \times \text{Social Vulnerability} \\ & \div \text{Community Resilience} \end{aligned}$$

Quantifying risk: Riverine flooding – Expected Annual Loss



$$\begin{aligned} \text{Expected Annual Loss} &= \\ &\text{Exposure} \\ &\times \text{Annualized} \\ &\text{Frequency} \\ &\times \text{Historic Loss Ratio} \end{aligned}$$

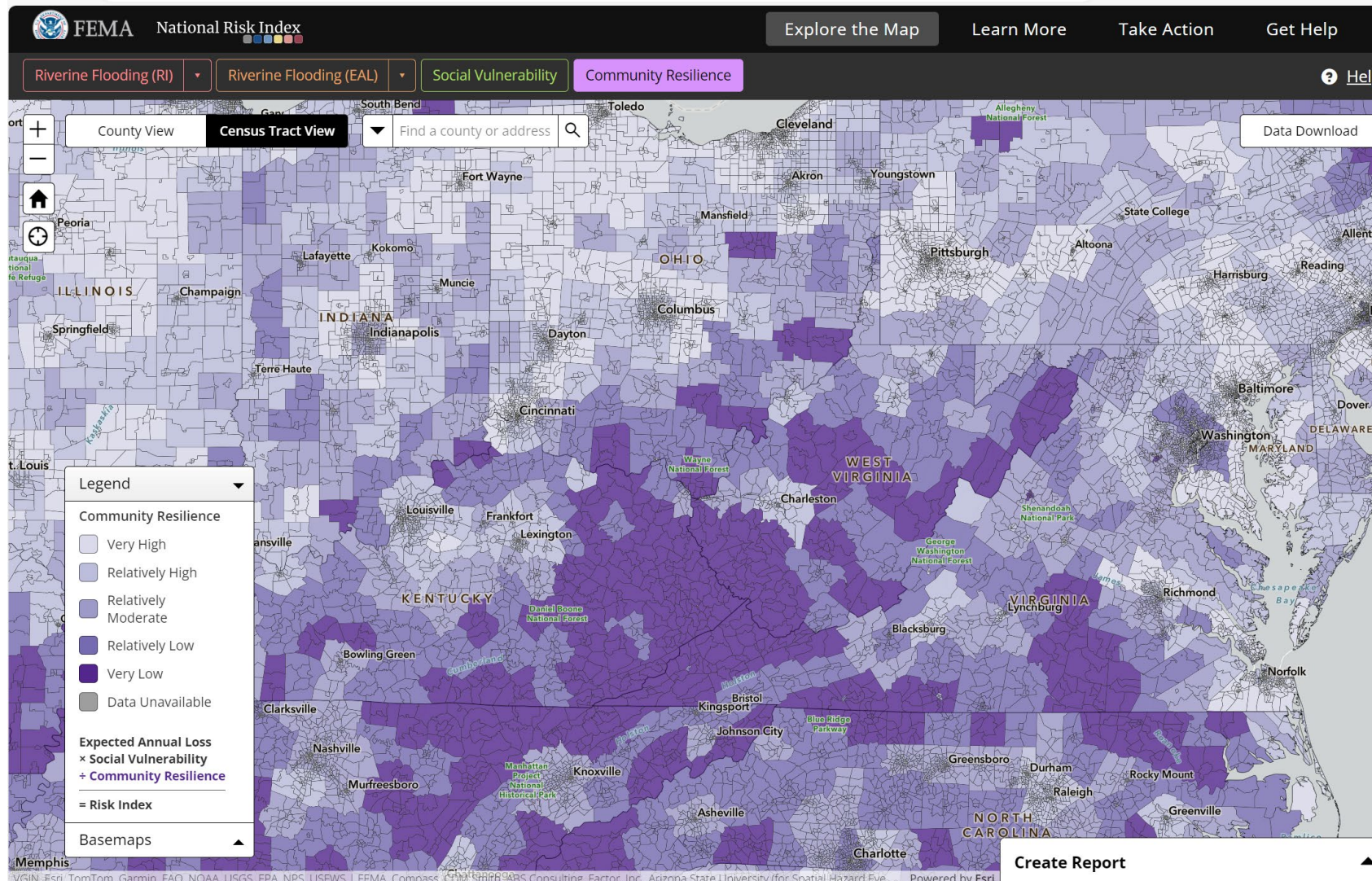
Quantifying risk: Social Vulnerability



Social Vulnerability:

“...susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood.”

Quantifying risk: Community Resilience



Community Resilience:

“...ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.”