



Southwest
Climate Adaptation
Science Center

Compound Events

If it's not one *\$&% thing it's another.

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USGS SW Climate Adaptation Science Center



$\Sigma(\text{Climate Extremes, Hazards}) \rightarrow$ Impacts \gg Individual Events

“Compound events result from the occurrence of multiple climate drivers or hazards either in an individual location or across multiple locations that, when combined, have greater impacts than isolated hazards on ecosystems, water resources, public health, energy infrastructure, transportation, food systems, and interconnected societal networks, often straining disaster response. Compound events can also result from the intersection of climate hazards with other environmental hazards like pollution, non-climate hazards such as wars and pandemics, or socioeconomic stressors like poverty and lack of adequate housing ...” NCA5, Focus on Compound Events

Multivariate: 2+ climate extremes



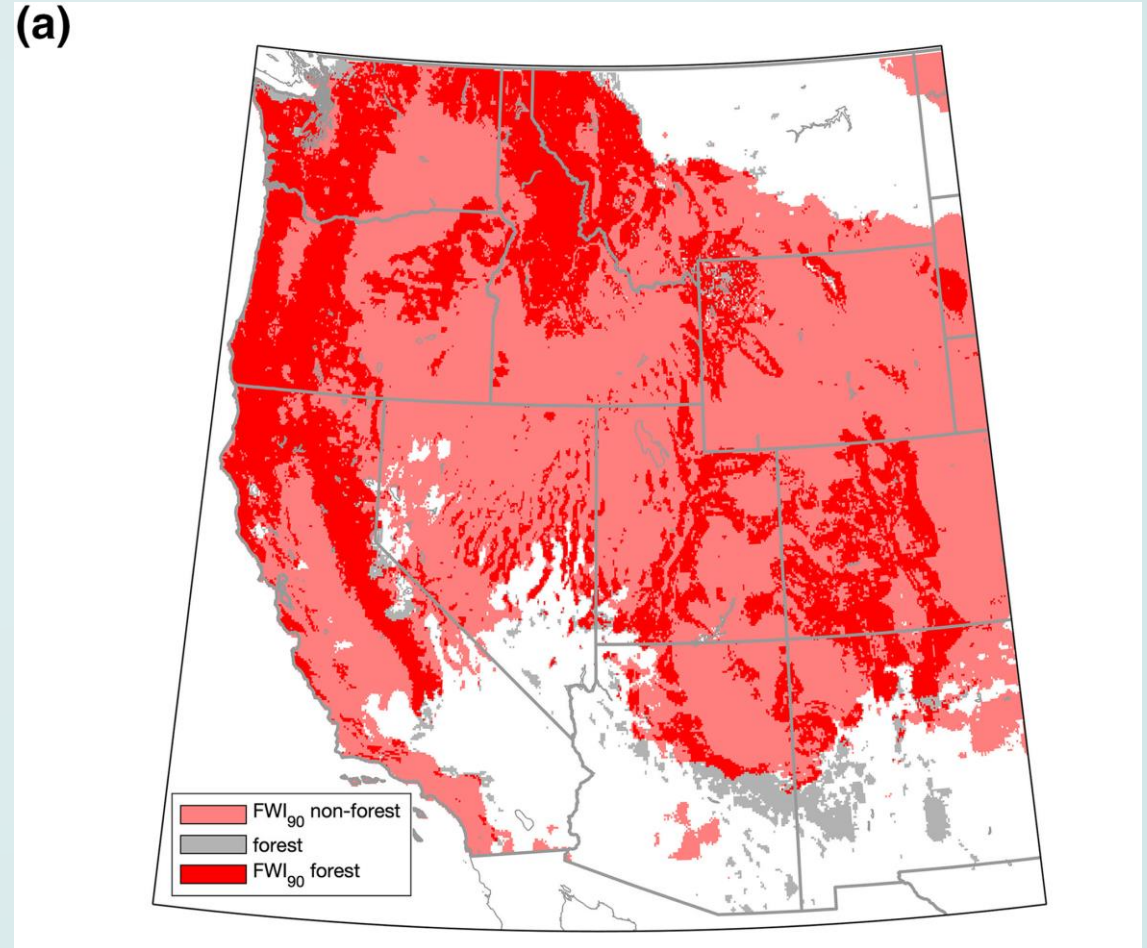
Temporally compounding: a series of unfortunate events





Spatially compounding: everything, everywhere, all at once

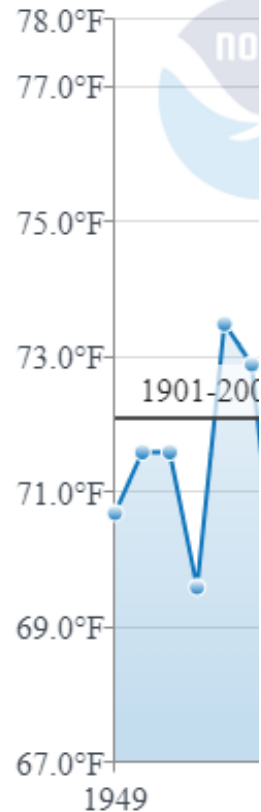
National resources are heavily committed, and additional measures are taken to support geographic areas. Active geographic areas must take emergency measures to sustain incident operations.



Abatzoglou et al. (2020) Increasing synchronous fire danger in forests of the western US.

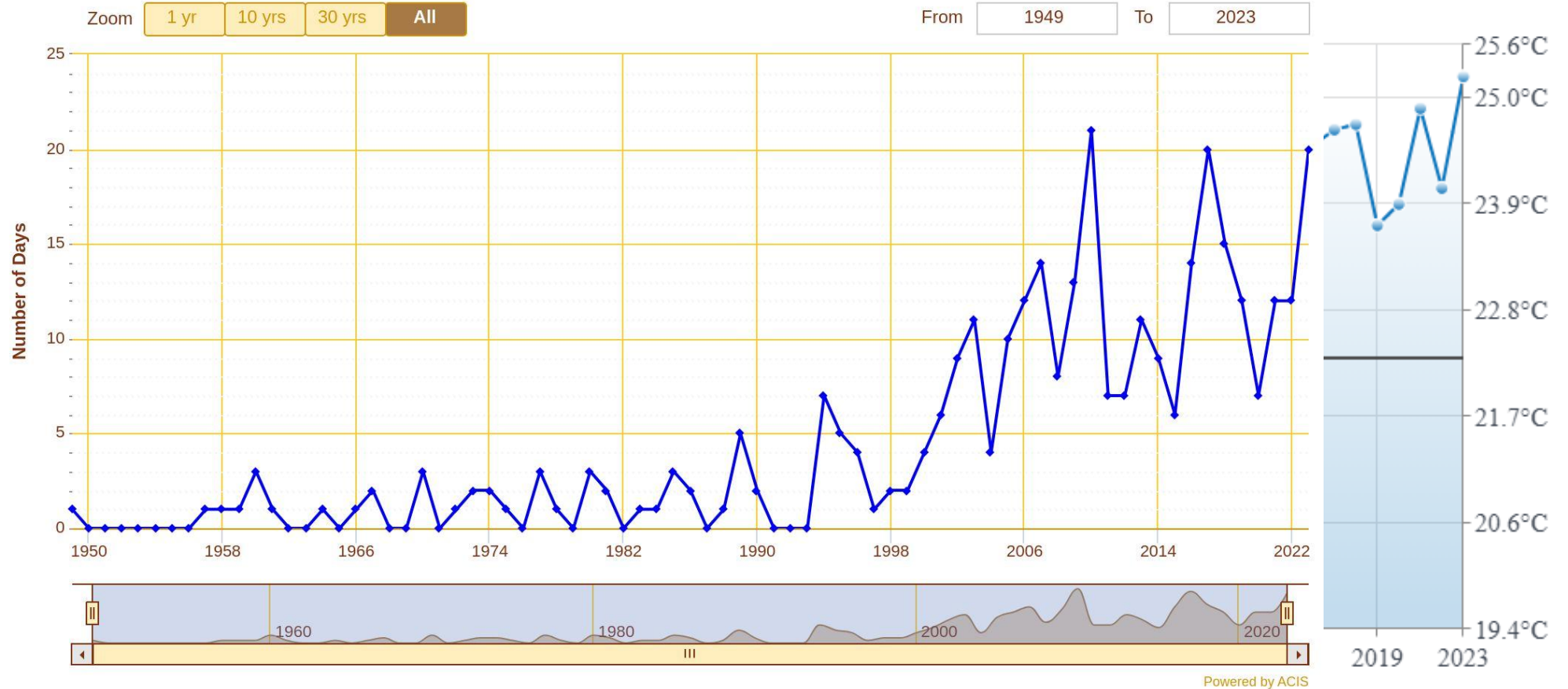
Preconditioned: a rising tide ... makes things worse

Clark County,
July



Number of Days Min Temperature >= 85 - Month of Jul - MCCARRAN INTERNATIONAL AIRPORT, NV

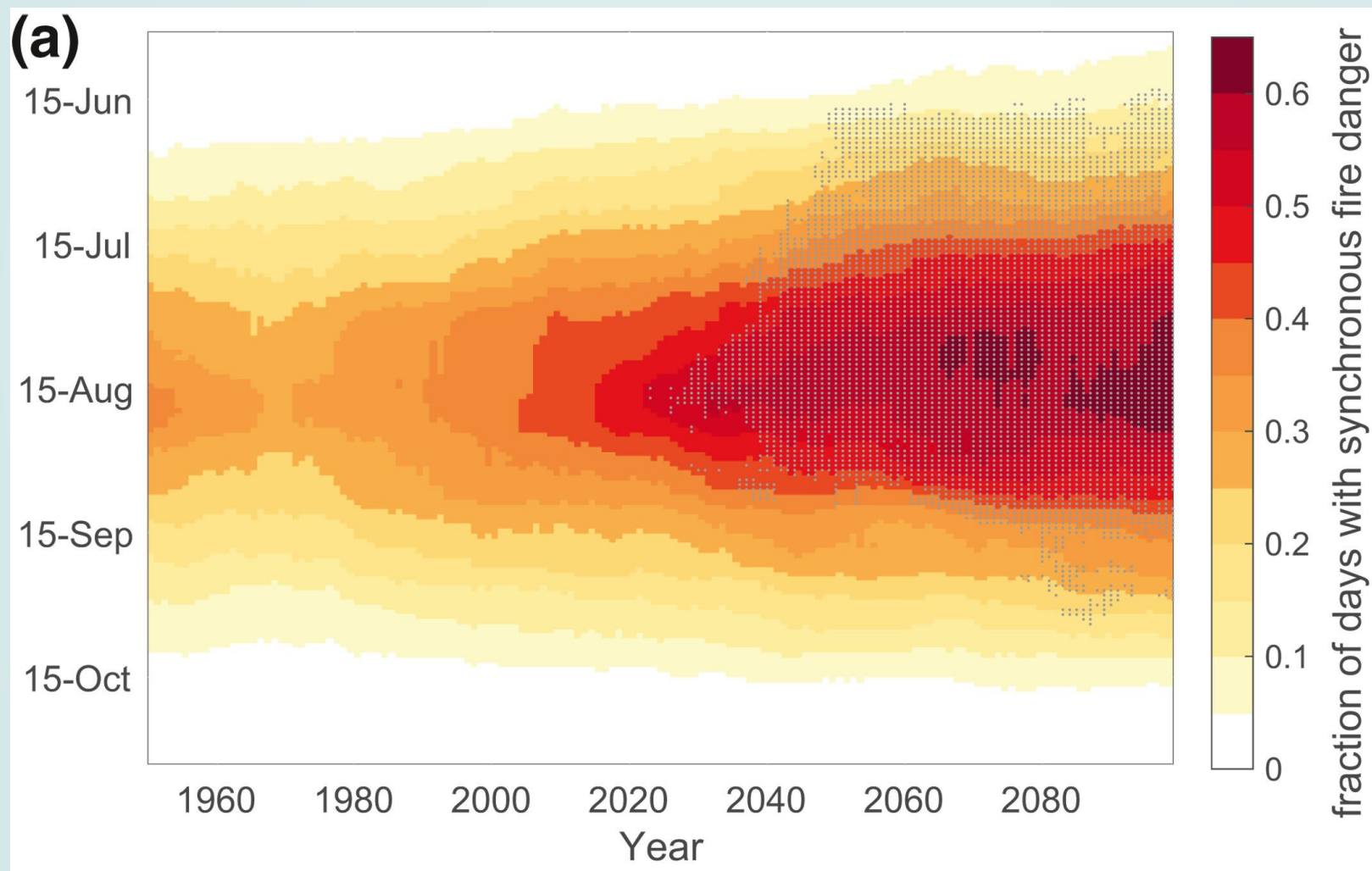
Use navigation tools above and below chart to change displayed range





Complex events: and
then there's everything
else

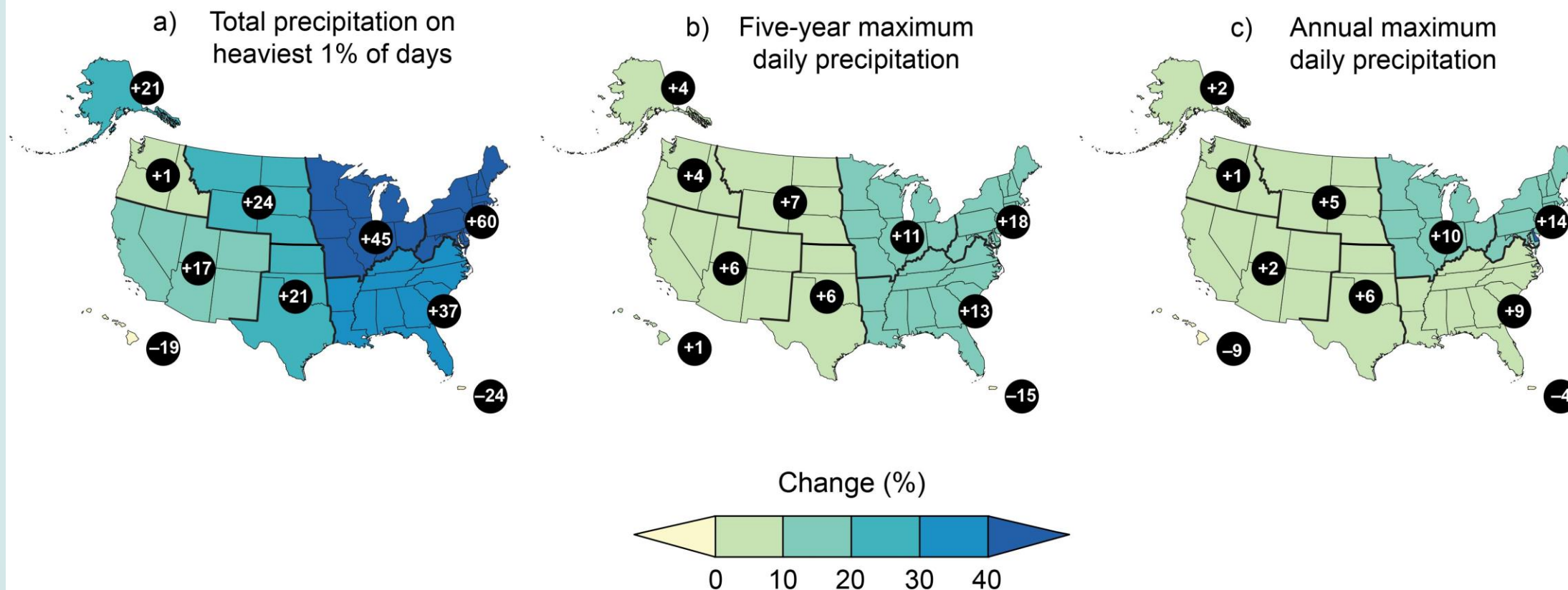
Risk of high fire danger West-wide.



Abatzoglou et al. (2020) Increasing synchronous fire danger in forests of the western US.

Risk of heavier precipitation.

Observed Changes in the Frequency and Severity of Heavy Precipitation Events



**More extremes →
More compound events**



We'll take 10 minutes

1. What's a plausible compound event?
2. What's your response?
3. How are you going to keep your team safe?