



REGIONAL HOTSPOTS FOR CLIMATE CHANGE

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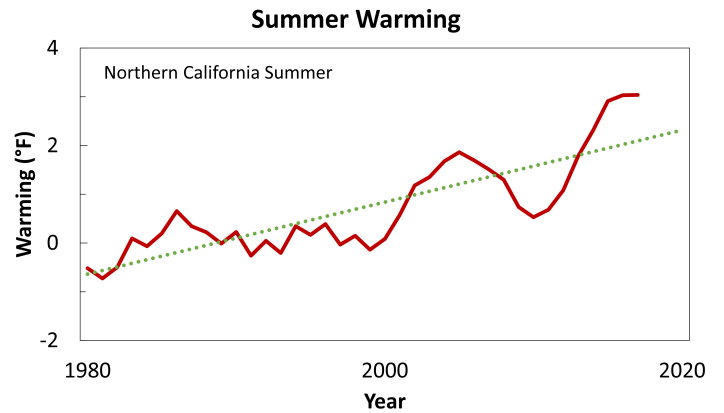
***Northern California:
Hotter & drier with shrinking wet
season, mega drought & fires***

In a recent study submitted for publication we have identified six regional climate change hotspots from around the world. This briefing is for one of the six hotspots. Others will follow soon.

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Hotter summers: Summer is now hotter by more than 3°F compared with early 1980s¹. (Superscripts refer to references.)



Drier summers: Drying is measured by vapor pressure deficit, VPD. In the last 40 years, summer VPD increased by more than 20%¹. Wildfires increase exponentially with VPD².

Delayed wet season: Over the last four decades, fall precipitation has decreased by more than 25% with moderate increases in winter precipitation¹, leading to an overall delay of rainy season by 27 days³.

Worsening fire season: The annual area burned per decade has increased fourfold from the 1970s to now. 10.9 million acres burned during the current decade to be compared with California's forested area of only 33 million acres^{2,4}. The area burned has doubled roughly every 23 years since the 1970s. The direct and indirect cost of the record breaking 2018 fires was \$150 billion; the 2018 record was broken by the 2020 fires⁵.

Water security: Accelerating summer warming, increasing vapor pressure deficit, a shrinking wet season, fourfold increase in burned area of forests, and a multi-decadal megadrought have serious implications for California's water security, particularly for its vital agricultural industry. Agriculture uses 80% of the total water use in California. California's agriculture accounts for 13% of the nation's production and is valued at \$54.8 billion (as of 2018) and is the nation's largest agriculture exporter⁶.

Global warming is predicted to increase by 50% from its 2015 levels by 2030⁷.

Recommendation: Within 10 years, California must prepare for at least a 50% worsening of the extremes witnessed thus far. Statewide plans and efforts are urgently needed to build resilience to safeguard the well-being of its people, including their mental⁸ and physical health⁹; protect their homes from fires; and prepare the agricultural industry and forest ecosystems to cope with and adapt to worsening warming, drying and water deficits.

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References:

1) Cole et al., 2021, submitted; 2) Williams et al., 2019, *Earth's Future*; 3) Lukovic et al., 2021, *Geophysical Research Letters*; 4) National Interagency Fire Center, 2021; 5) Wong et al., 2020, *Nature Sustainability*; 6) Cooley, 2020, *Pacific Institute*; 7) Xu et al., 2018, *Nature*; 8) Silveira et al., 2021, *Int. J. Environ. Res. Public Health*.

