CLIMATE CHANGE AND SOUTHERN CALIFORNIA FORESTS

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FOR TODAY

1. A look back at our climate
2. The future of climate change
3. Effects of a changing climate to resource and forest management
4. A primer to forest management through a filter of climate adaptation
5. Resources to support climate-informed decision-making
Atmospheric CO₂ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Earth System Research Laboratory

PARTS PER MILLION

YEAR
Historic Temperature Trends

Source: NOAA
Historic Temperature Trends

Source: NOAA
Historic Precipitation Patterns

Source: NOAA
CLIMATE MODELS AND GREENHOUSE GAS EMISSIONS
A WARMING FUTURE (2040-2050)

Future Max Temp: Four Climate Models & RCP 8.5 (San Bernardino)

Source: Cal Adapt accessed 2019
A WARMING FUTURE (2070-2080)

Future Max Temp: Four Climate Models & RCP 8.5 (San Bernardino)

Source: Cal Adapt accessed 2019
Projected Increases in Extreme Heat

Source: https://nca2018.globalchange.gov/chapter/25/

https://cal-adapt.org/tools/extreme-heat/
SIMILAR PROJECTED PRECIPITATION

Future Mean Precipitation: Four Climate Models & RCP 8.5 (San Bernardino)

With higher future temperatures increases in climatic water deficits maybe likely...

Source: Cal Adapt accessed 2019
SHIFT FROM SNOW TO RAIN

Snow Cover by 20–84%
WILDFIRE ACTIVITY

1.8°F increase = >300% increase in area burned

Source: CAL FIRE FRAP

Westerling 2016 Phil. Trans. R. Soc. B

National Research Council. 2011; Taylor and others 2016 PNAS
CLIMATE CHANGE AND EXTREMES DEMAND WILL FORCE CLIMATE ADAPTATION

Allen and others 2010 Forest Ecology and Management
SPECIES DISTRIBUTION HAS, IS & WILL CHANGE

Wet and Warm Future

Hot and Dry Future

James Thorne and others, 2017 Climatic Change
HEALTHY FORESTS
AND STABLE CARBON

MASS FIRES AND
CARBON SOURCES

Credit: Sierra Star

Credit: SNC
Sensitivity

Exposure

Adaptive Capacity

Vulnerability
Hypothetical management approaches to address climate change. It is widely accepted that actions that result in (1) **mitigation** are highly desirable but that (2) **adaptation** actions are necessary. Often there are (3) **co-benefits** where actions deemed critical to realize adaptation goals also meet mitigation interests as well, hence the term co-benefits. At the same time, efforts to advance a systems adaptive response could come at a carbon savings – these are considered (4) **tradeoffs** – where one climate change response goal comes at the sacrifice of another. Details around the various mitigation or adaptation strategies are addressed in the text.
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INCREASING TEMPERATURES – REGIONAL AND HISTORICAL
