An overview of climate change studies and impacts for Sonoma wine grape growers

Kendall Lambert
Community Alliance with Family Farmers
7.17.2013

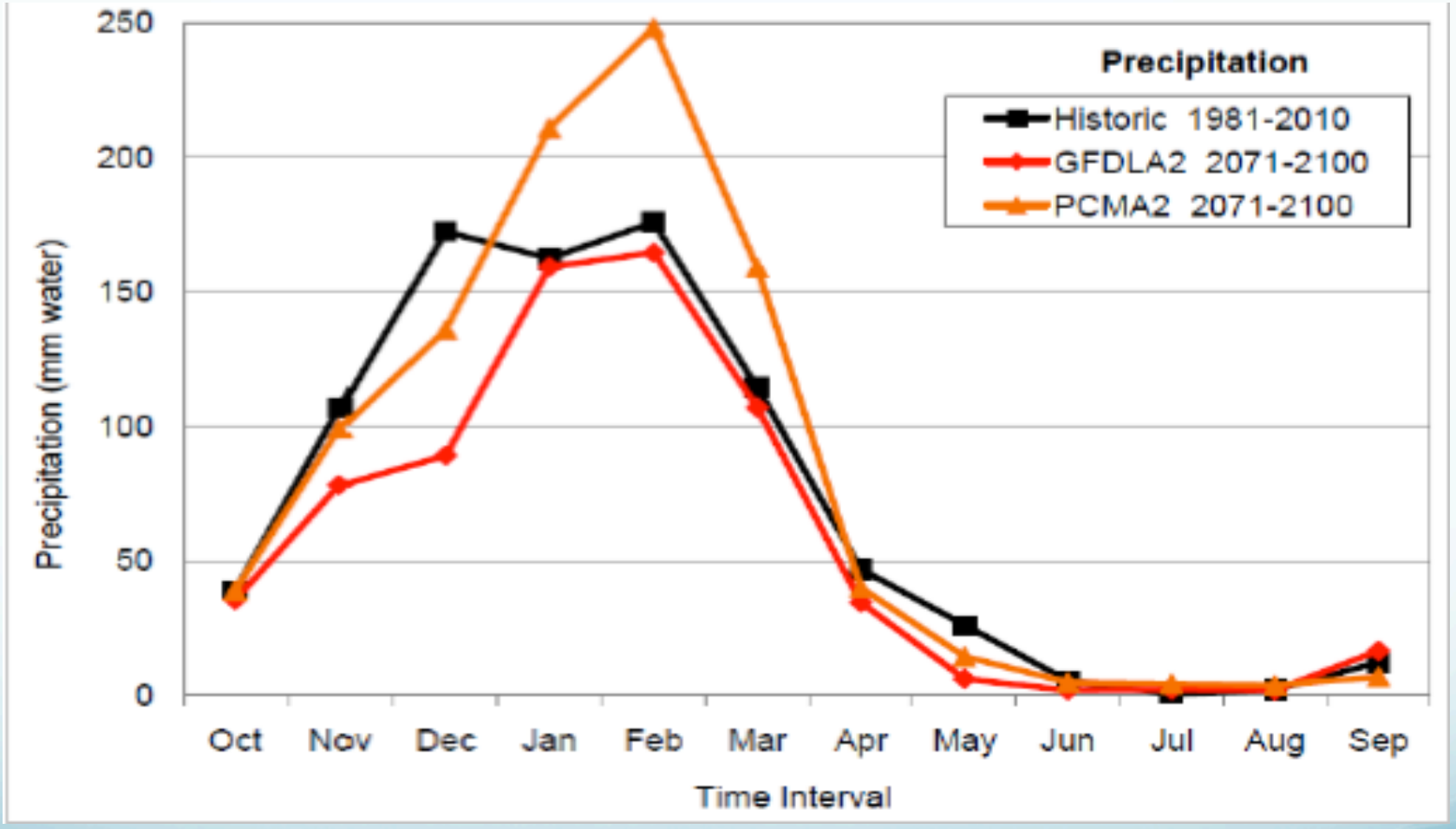
Adapting to Climate Change
State of Science for North Bay Watersheds
(Micheli et al., 2010)

- **Purpose of study:**

To asses the impacts of climate change on the hydrology of the North Bay Watersheds

- **Analysis indicates**
  - 2.7° F. increase in average maximum temp from 1900-2010
  - Additional increase of between 4° and 6° F. expected by 2100
  - Future precipitation patterns are the great unknown

North Bay Watershed Hydrology
Predicted precipitation patterns



Micheli et al. (2010)

North Bay Watershed Hydrology
Micheli et al. (2010)

- Future temperatures increases will affect plant water use
- Precipitation is not expected to meet future plant demand
- Drought stress on soils, increases 6 to 20% across the region and future scenarios.
- May increase the need to irrigate or implement techniques to reduce plant water demand

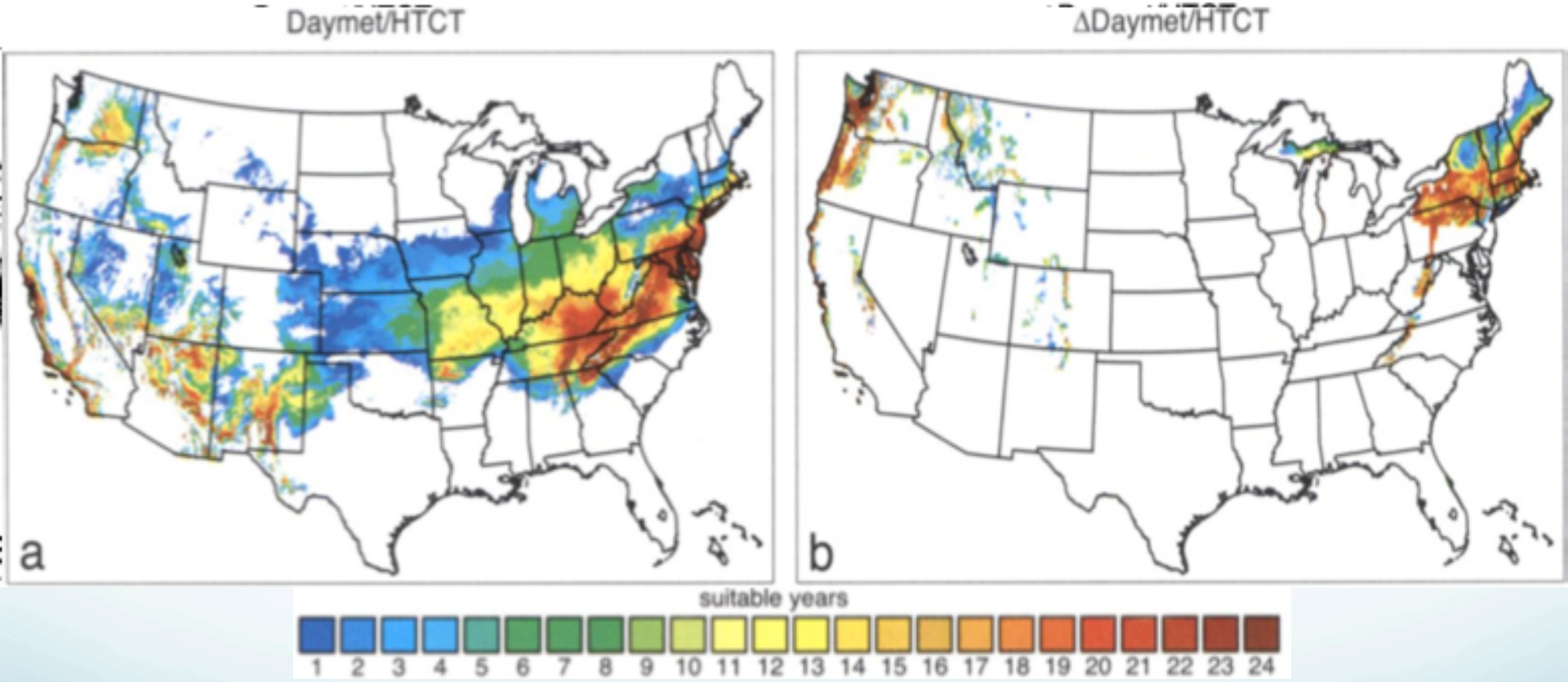
Extreme Heat Reduces and Shifts United States Premium Wine Production in the 21st Century (White el al., 2006)

- **Purpose of study:**

How will climate change and extreme temperatures affect current winegrowing regions by 2071-2099?

- **Results**
  - **Many current wine regions will become unsuitable due to:**
    - Increases in average growing season temperatures
    - Milder winters
    - Extreme heat events increase in duration by 3-8 weeks

Results
White et al. (2006)



- **Viable wine regions decrease 81% by the end of the century depending on the model parameters**

Climate change, wine and conservation

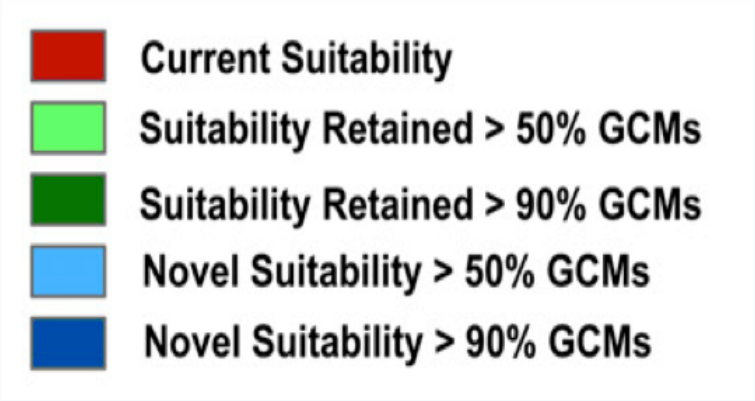
Hannah et al. (2013) Conservation International

- **Purpose of study:**

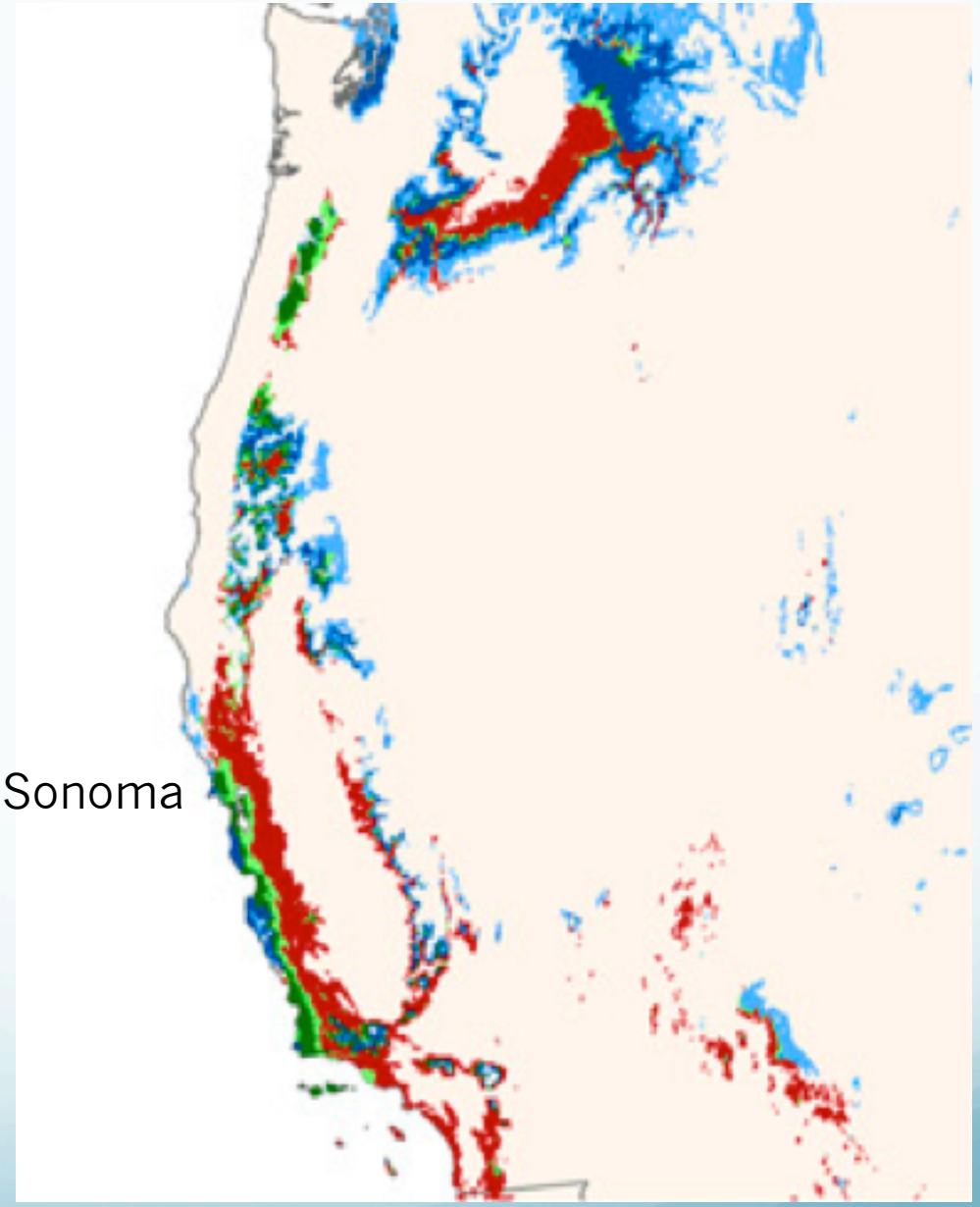
How will climate change alter the suitability of current wine regions throughout the world, and how will this impact natural resources and habitats?

- **Results**
  - **Current wine regions will shrink, while new regions open up. This will:**
    - Stress water resources
    - New vineyards encroach on wildlife habitats

Results
Hannah et al., 2013



Viable wine regions decline by 60% by 2050



Climate change impacts and viticulture

- Temperature increases:

  May alter timing of growing season and development, eg: budburst, veraison, harvest

- Temperature and precipitation changes may alter berry composition:
  - Higher alcohol wines
  - Degradation of color compounds
  - Changes in acidity

- Climate change will likely necessitate a change in varietals grown

The future impact of climate change on the California wine industry and actions that state of California should take to address it

Gatto el al. (2009) Stanford University

Water Supply

- Capitalize on drought tolerance of grapevines
- Expand water harvesting & retention systems
- Improve irrigation system, timing, efficiency

Temperatures

- Use canopy to shade grapes
- Trellis to limit light exposure
- Graft to heat tolerant varieties

- Provide tax incentives for adaptation
- Create Grape & Wine Adaptation Program
- Fund more research

Question or comments?

For a copy of any of the studies mentioned today:

Kendall@caff.org