

Climate Change and the Rogue Basin: The Climate-Forest Interface

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Co-Facilitator

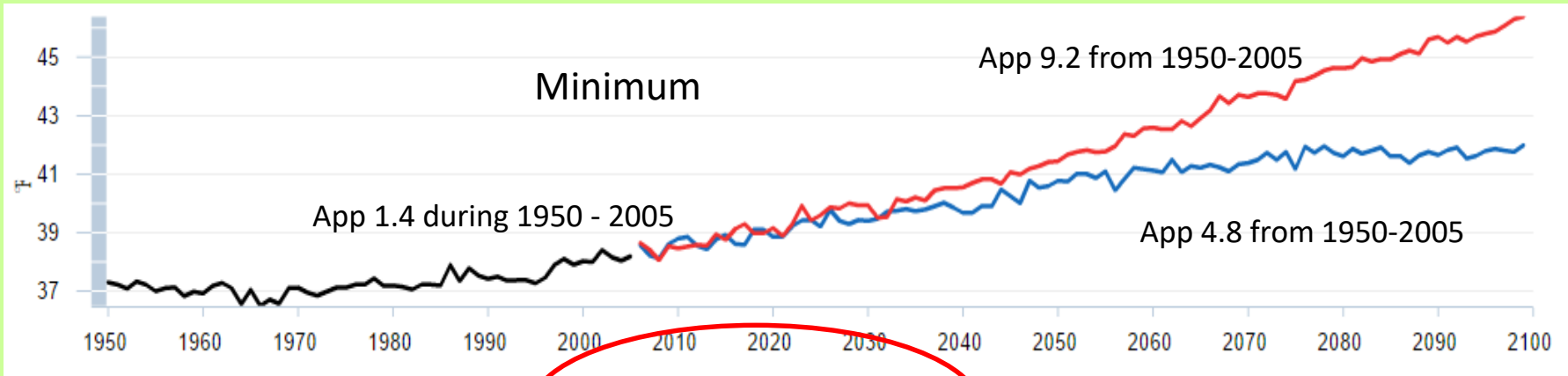
Southern Oregon Climate Action Now

<http://socan.info>

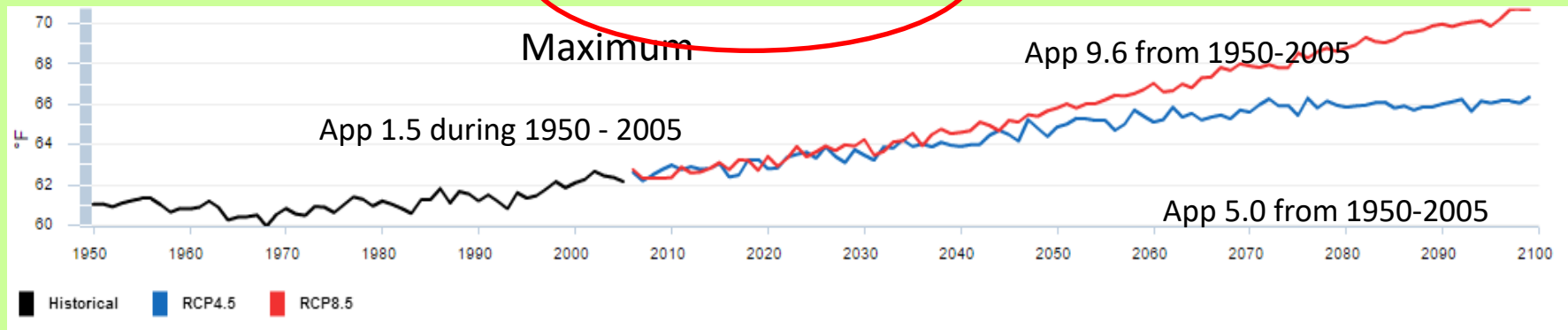
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Jackson County Summary - USGS Based on IPCC 2013 & 28 models

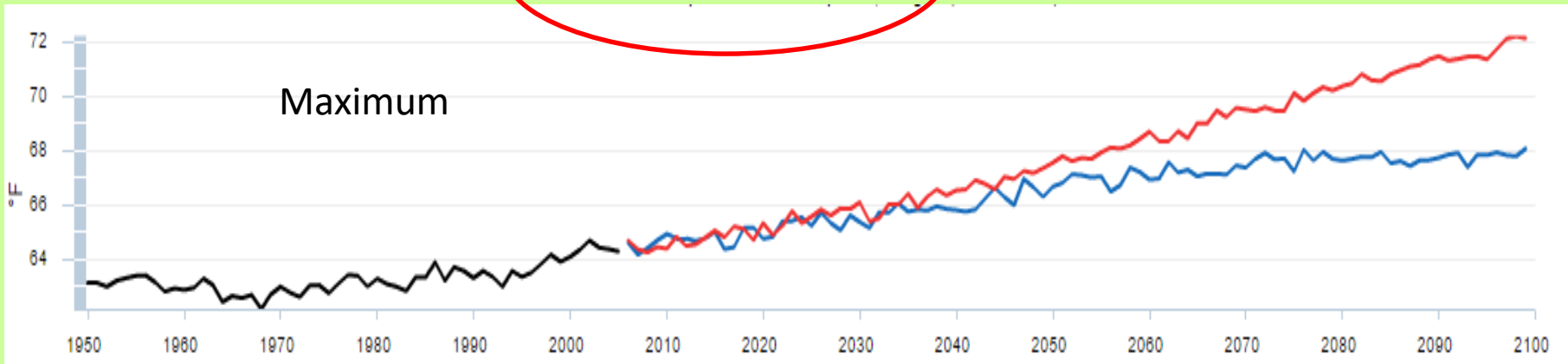
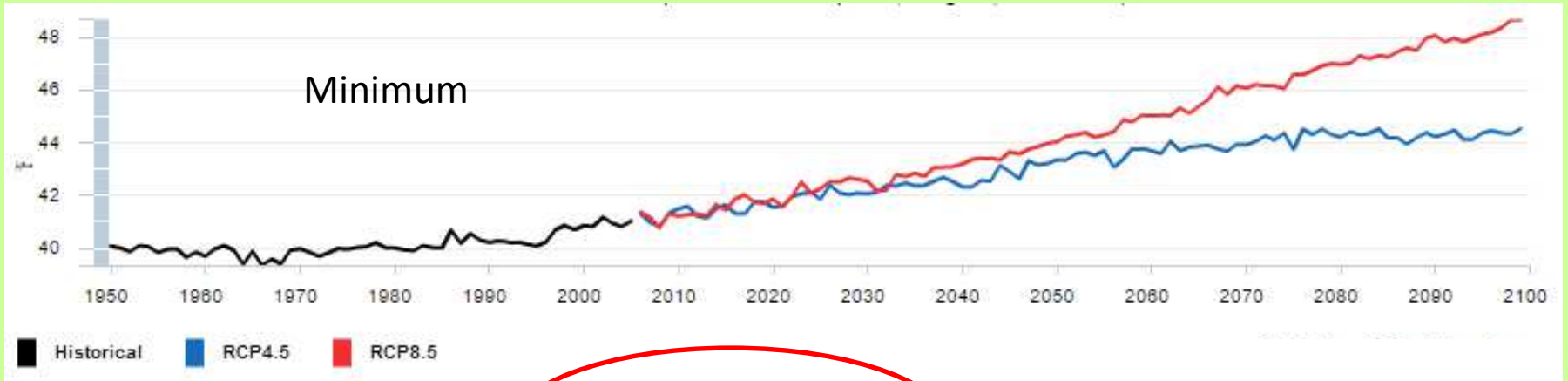


Average: = 9.4°F / or 4.9 °F

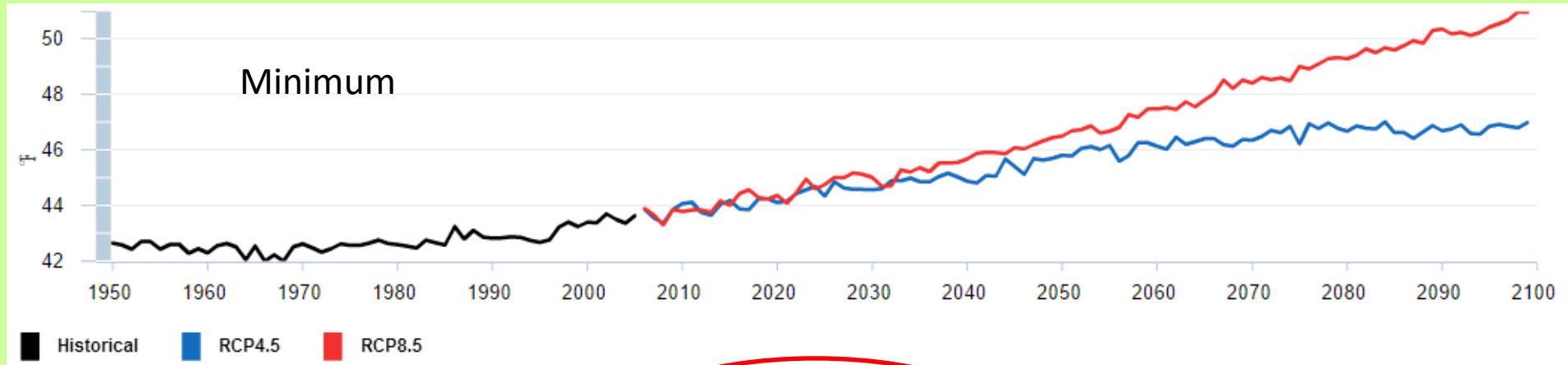


http://www.usgs.gov/climate_landuse/clu_rd/apps/nccv_viewer.asp

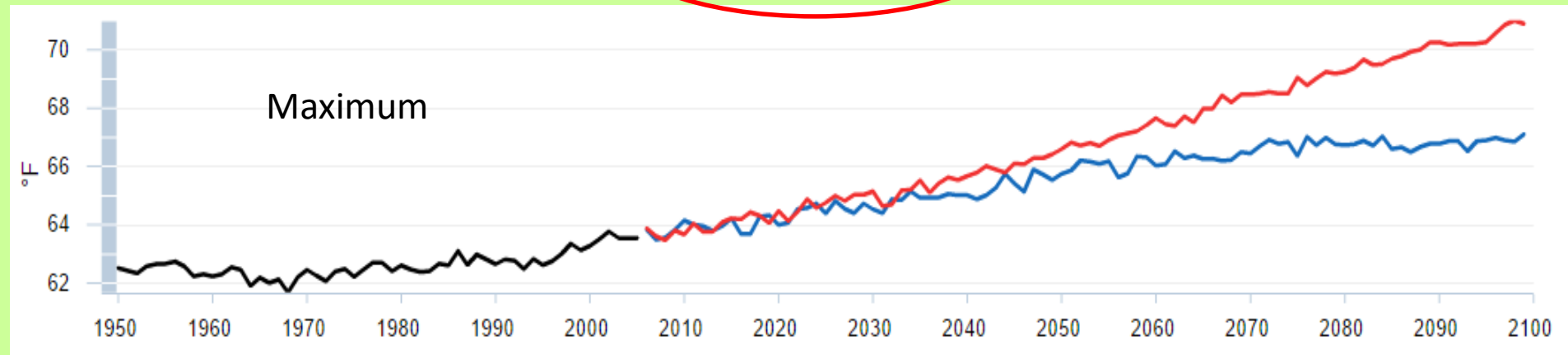
Josephine County Summary - USGS Based on IPCC 2013: 28 models



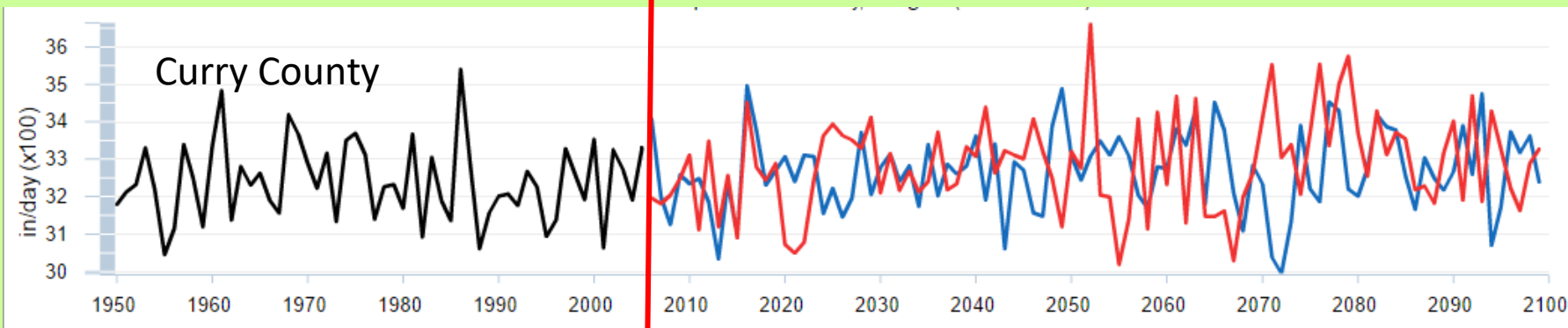
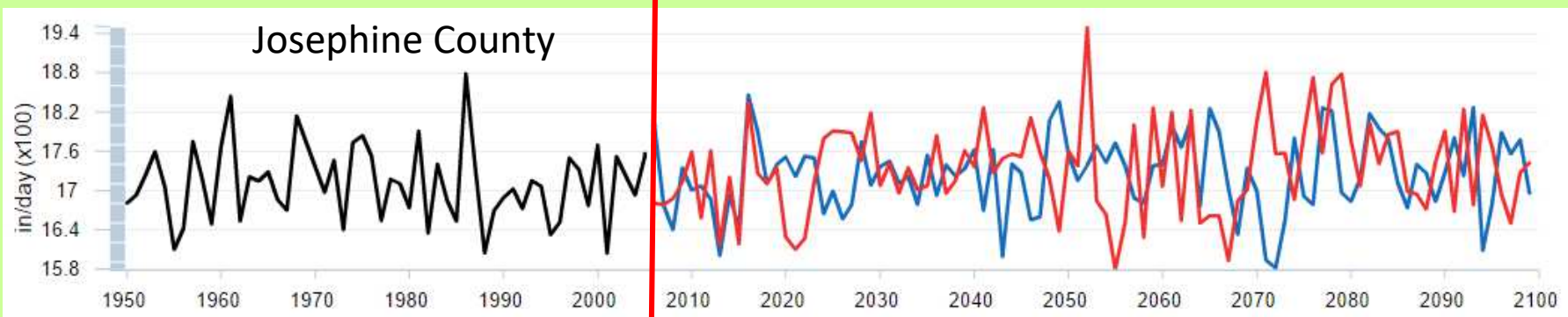
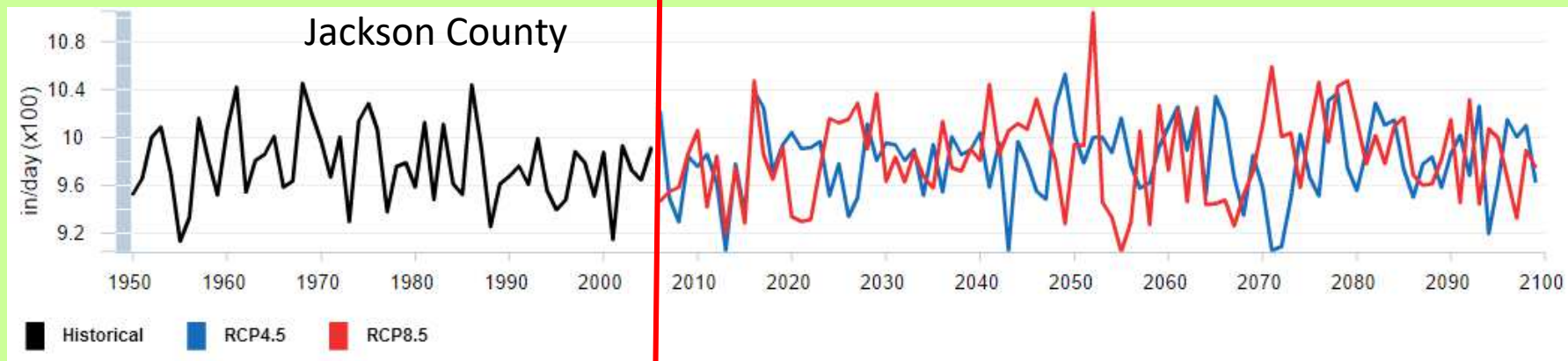
Curry County Temperature



Average: 8.3°F or 4.45°F



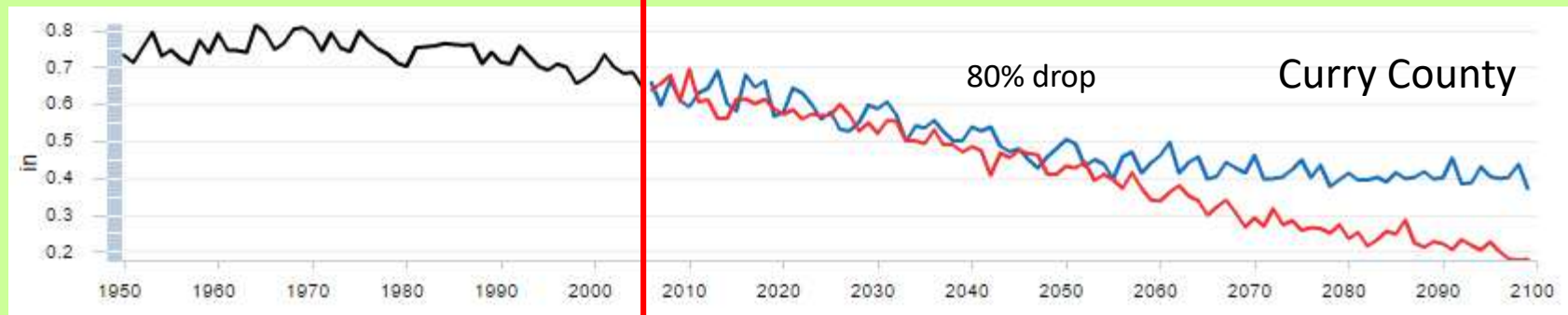
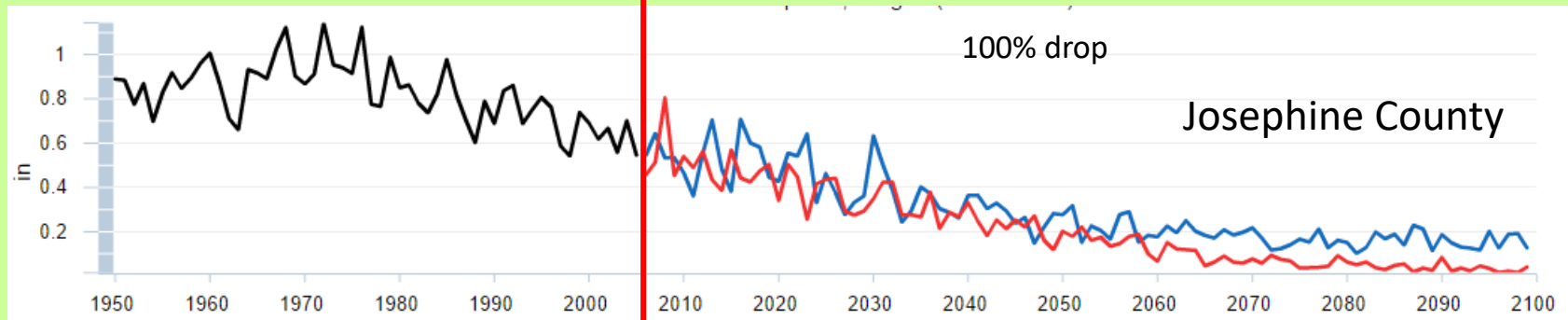
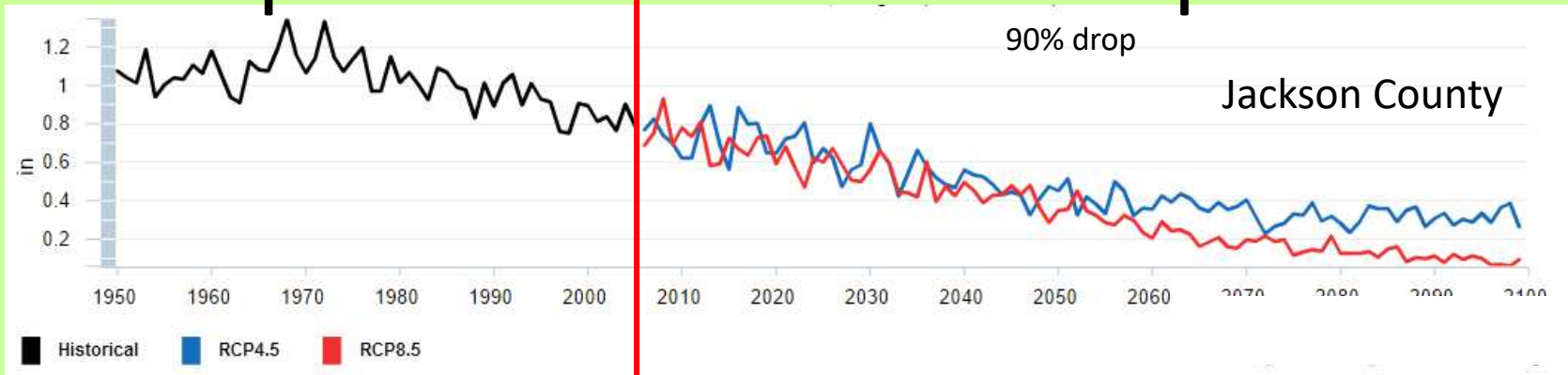
PRECIPITATION



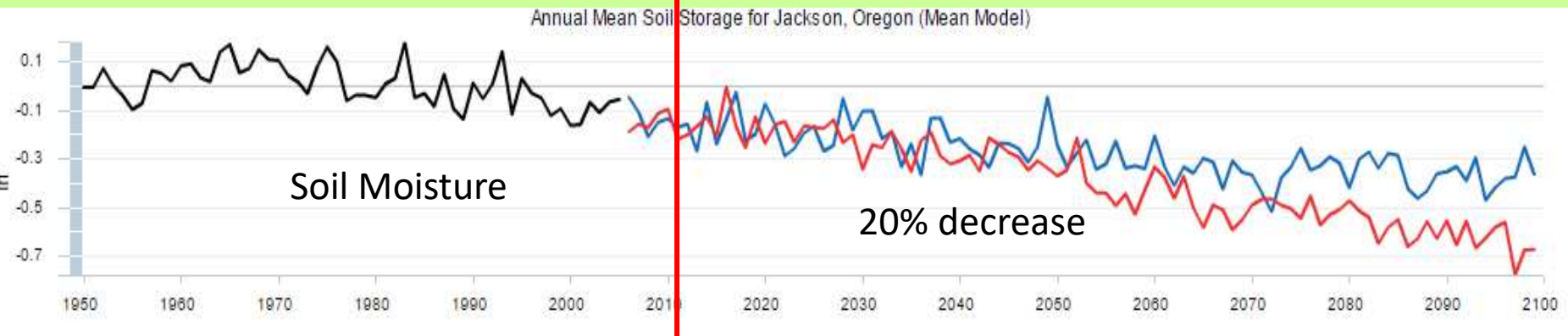
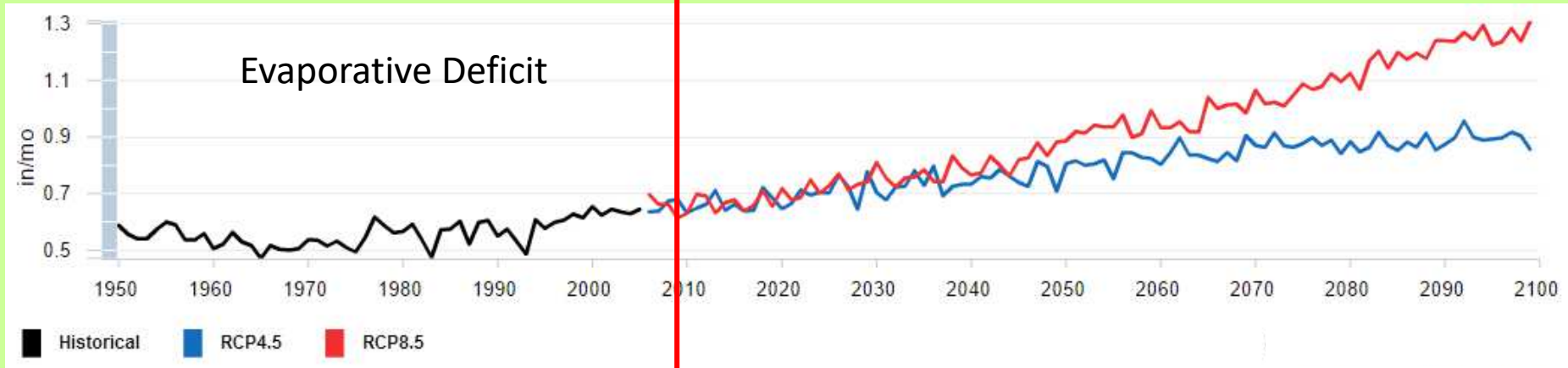
But

- Winters wetter and summers dryer
- Rain falling in more heavy downpours
- Precipitation falling lower as rain rather than higher as snow

Snowpack as Snow Water Equivalent



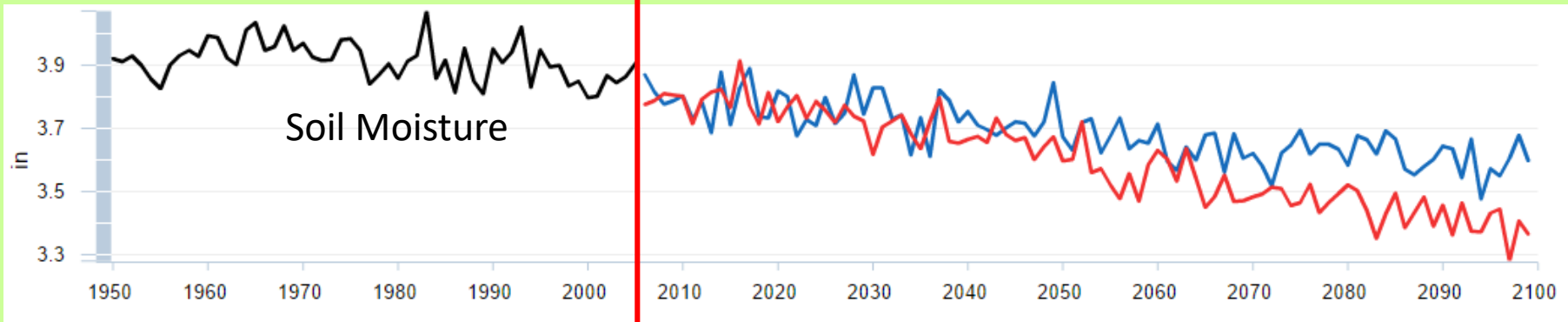
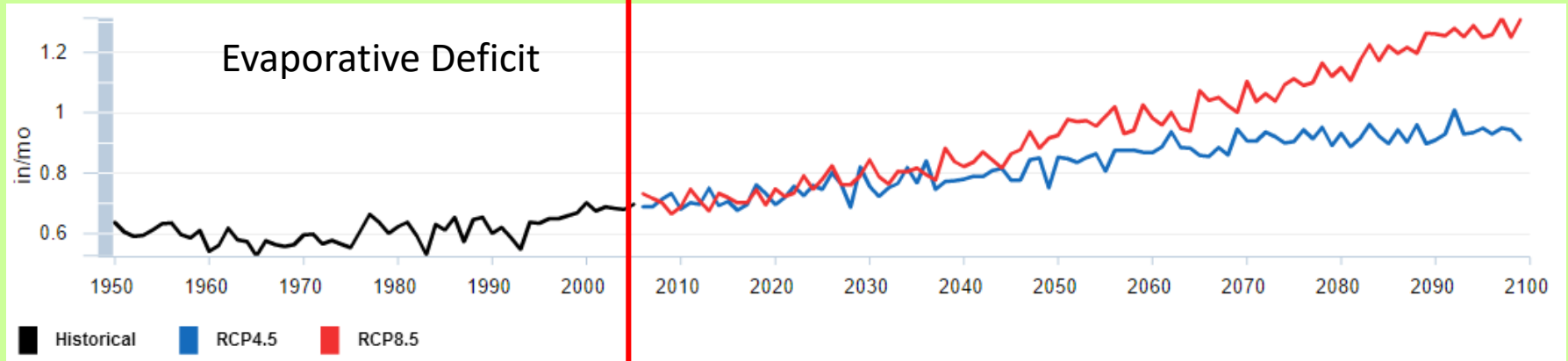
Evap Deficit and Soil Moisture Jackson County



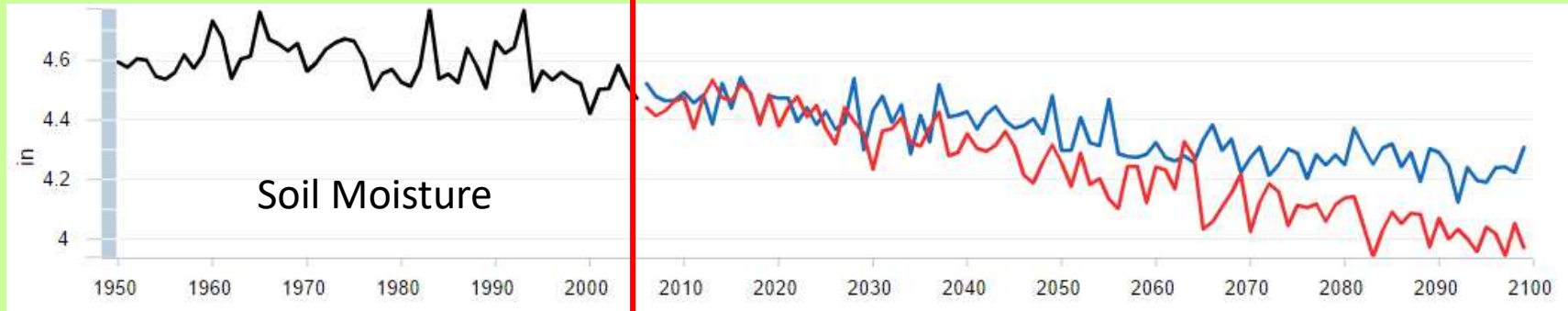
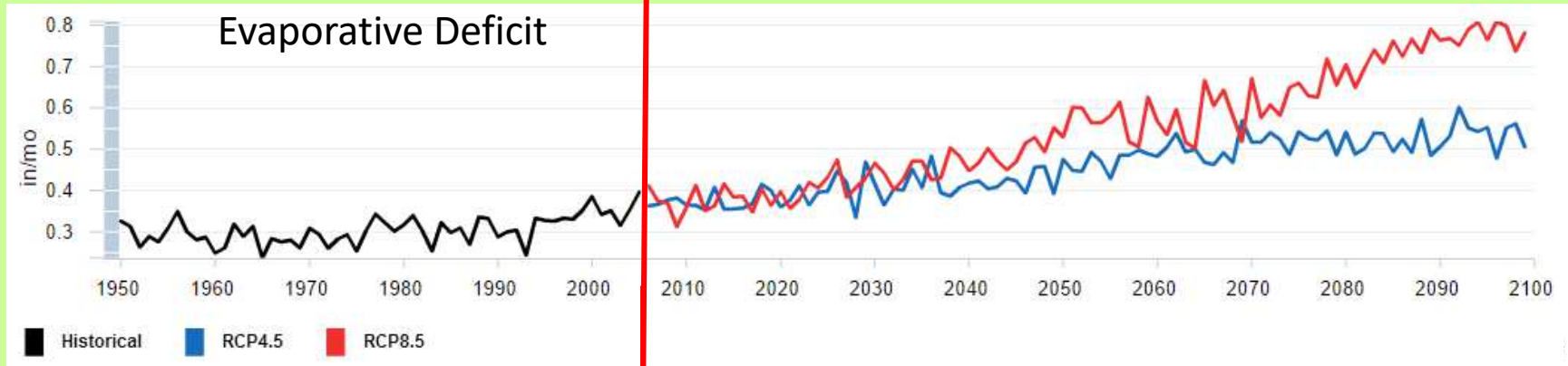
http://www.usgs.gov/climate/landuse/clu rd/apps/nccv_viewer.asp

Evaporative Deficit = Potential Evap (temp) – Actual Evaporation (moisture available)

Evap Deficit and Soil Moisture Josephine County



Evap Deficit and Soil Moisture Curry County



Drought Risk

> 11 Year Drought Risk: 50 – 60%

35 Year Megadrought: 20 – 50%

Main Drivers of Trends

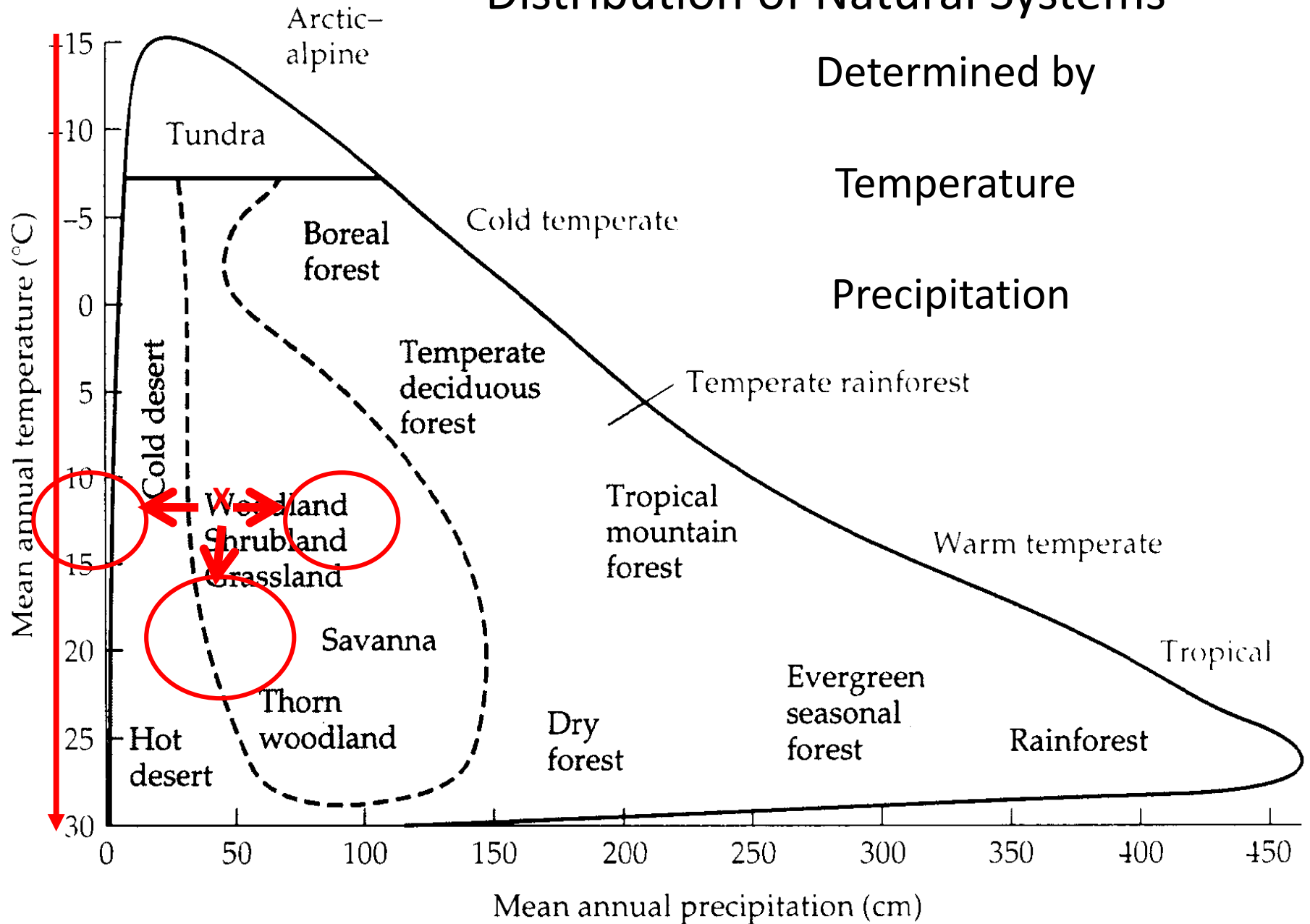
Greenhouse Gases

Carbon dioxide: Fossil fuels, deforestation, agriculture

Nitrous oxide: Fossil fuels, agriculture, wastewater, industrial processes

Methane: Natural gas, fossil fuel extraction, wetland, permafrost melt.

Distribution of Natural Systems

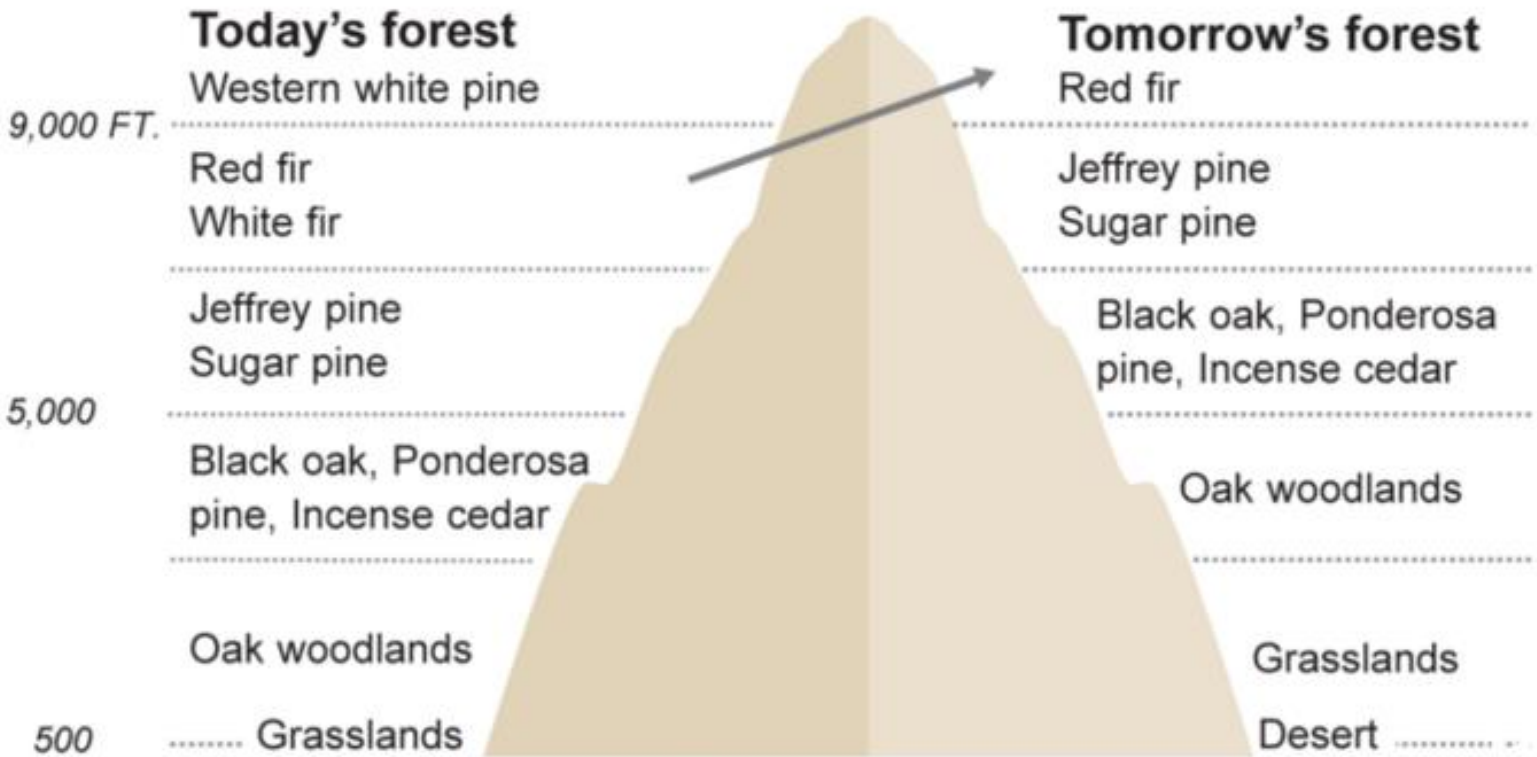


Precipitation = 21.1 inches; 53.5cm

Temperature = 52.7°F = 11.5°C

X-ray technology reveals California's forests are in for a radical transformation

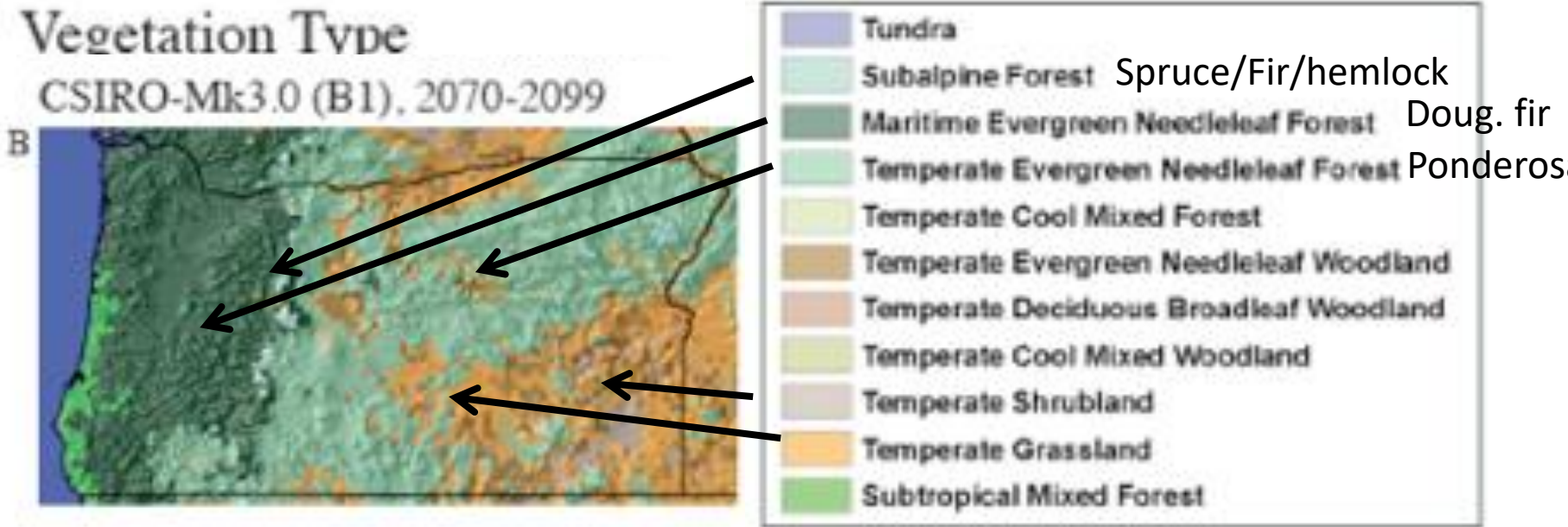
One scenario: Species migrate up mountains



Sources: Greg Asner, Carnegie Institution for Science

@latimesgraphics

Projected Vegetation Patterns



Potential reduction in Sub-alpine / Maritime Evergreen Needleleaf forest
Possible expansion of Temperate Evergreen Needleleaf forest
and grassland into eastern shrubland

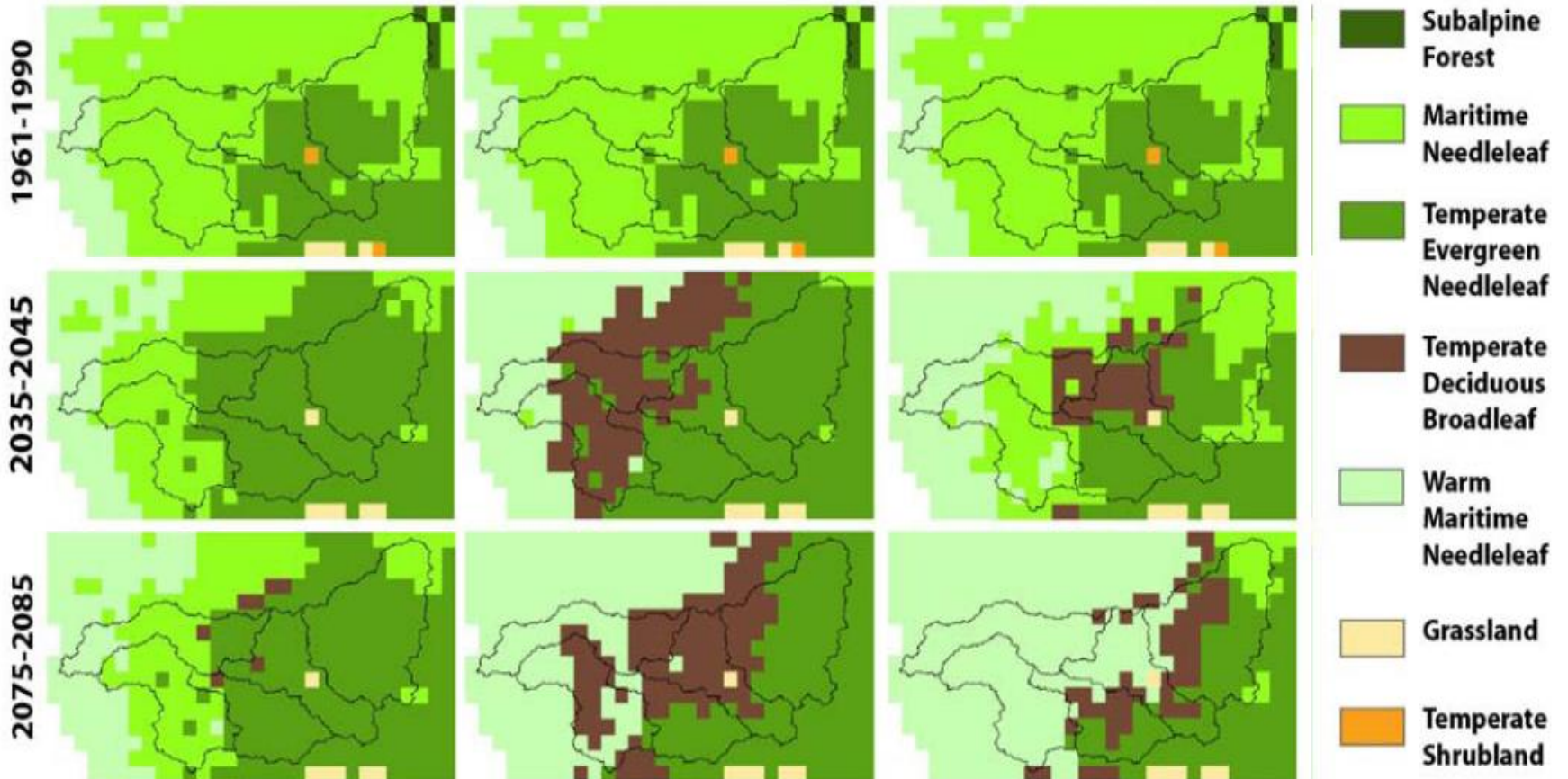
Conditions for Rogue Valley Vegetation Communities

Australia
CSIRO

Britain
HADLEY

Japan
MIROC

Legend



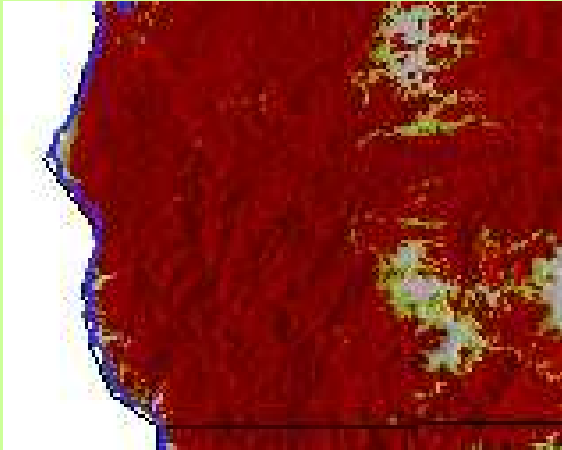
Natural Community Condition Trends

- 1 - Elimination of spruce/fir/hemlock forest,
- 2 - Reduction in Douglas fir dominated association,
- 3 - Possible expansion of Ponderosa pine association,
- 4 - Expansion of Oregon oak chaparral association,
- 5 - Expansion of shrubland and grassland.

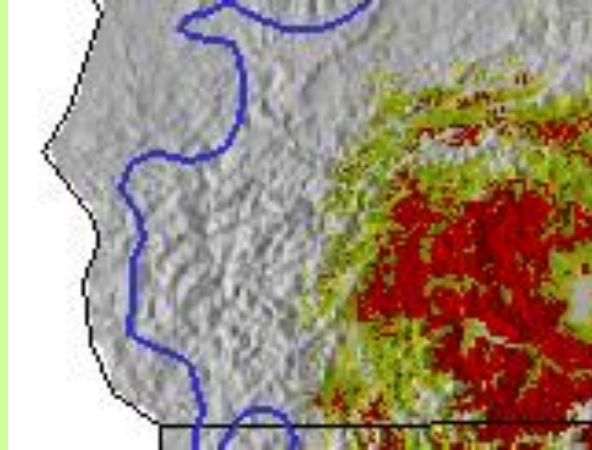
Alternative Analysis

- Rehfeldt climate envelopes.
- Examines where species currently occur, and identifies where conditions will be appropriate for them in the future.

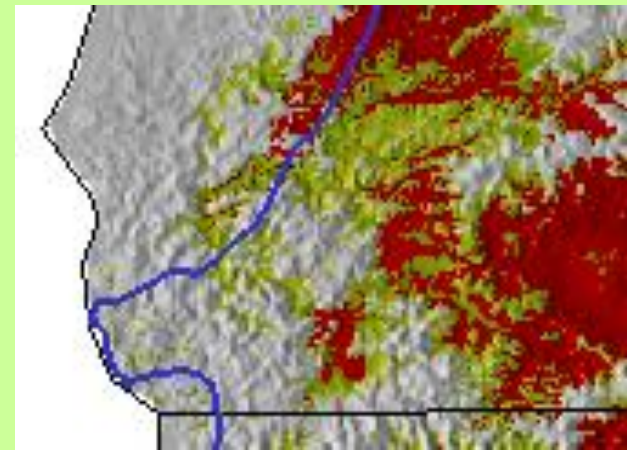
Douglas fir Now



Ponderosa pine now

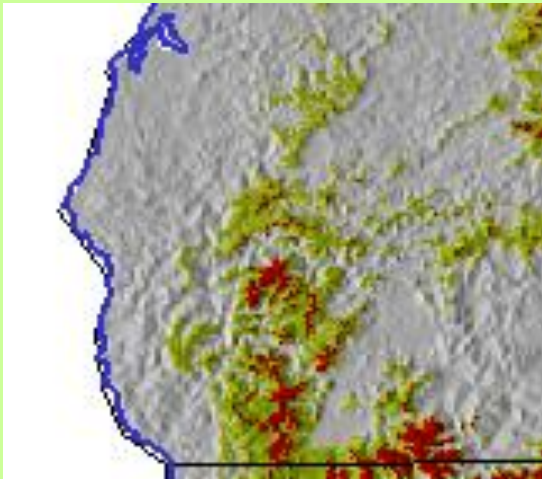


Garry oak now

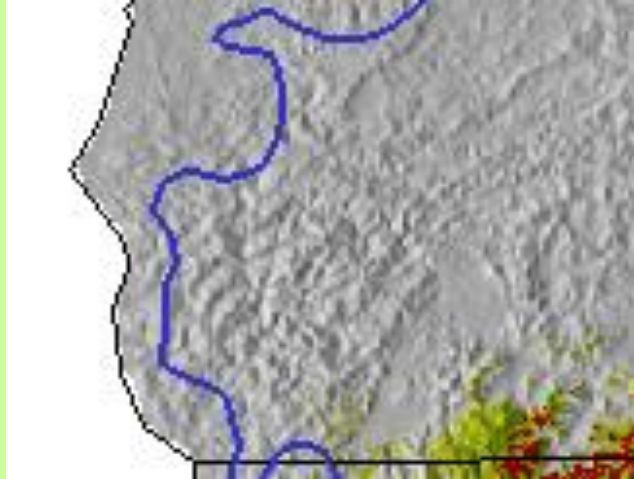


Red high viability; green medium viability.

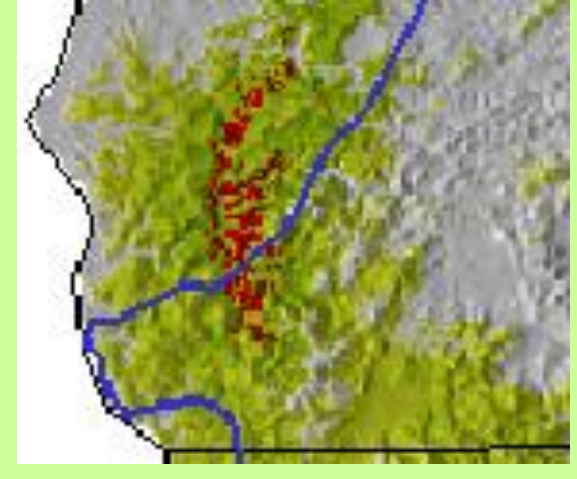
Douglas fir in 90 years



Ponderosa pine in 90 years



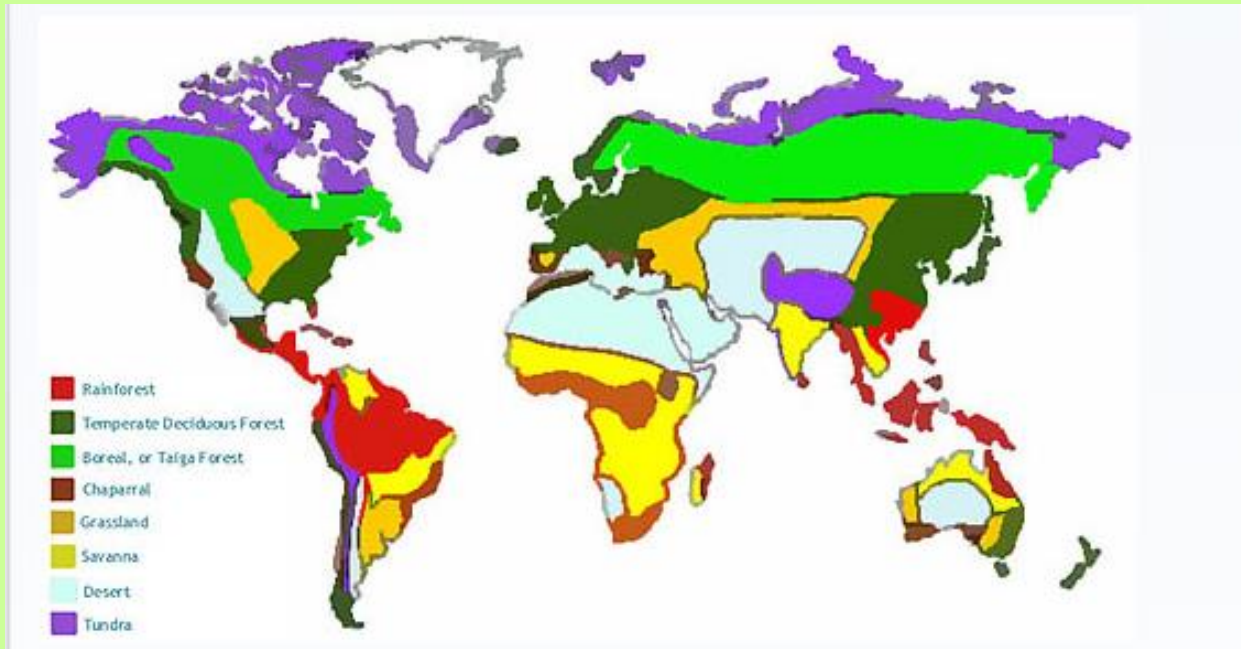
Garry oak in 90 years



After Disturbance

- What returns?
- The previous species
- Or
- Warmer / dryer species
- Particularly possible at S. edge of climatic range
- After Biscuit Forest → Manzanita Shrubland

Carbon Storage



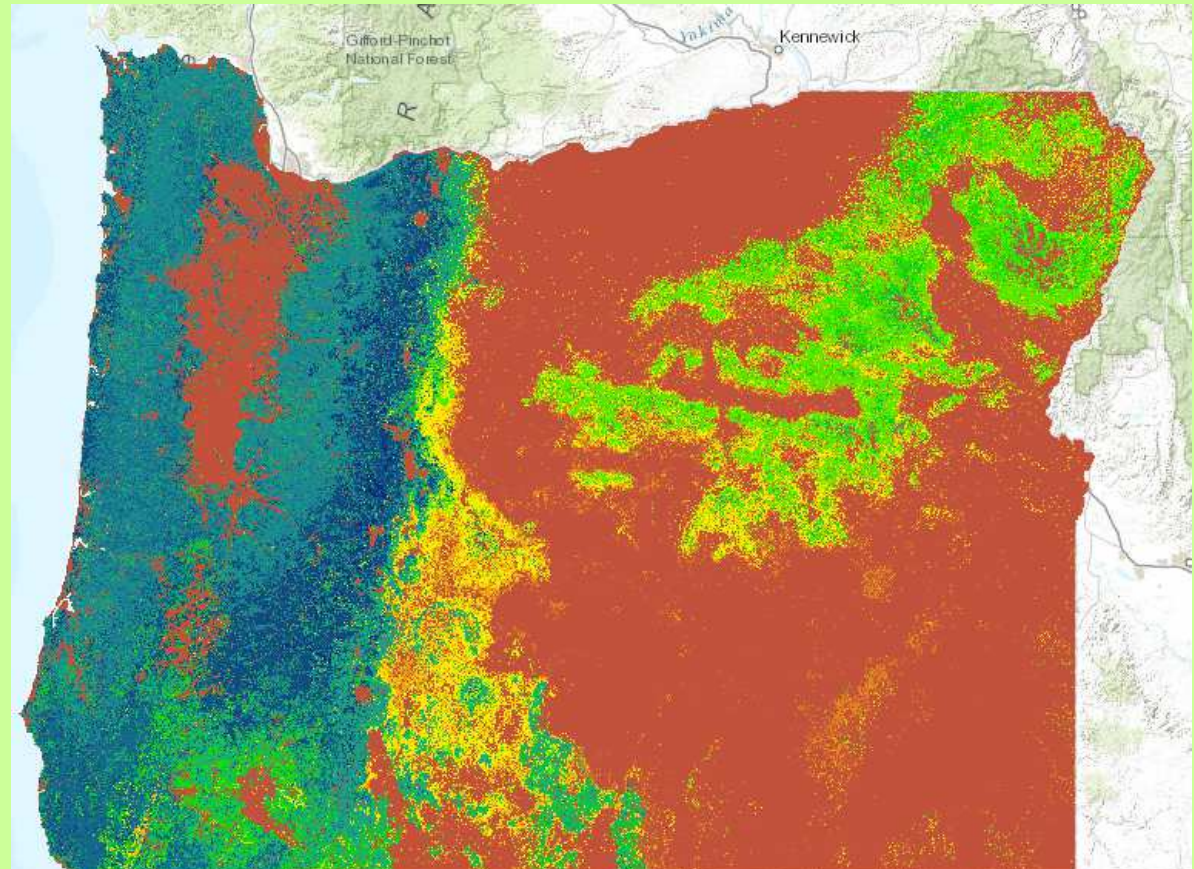
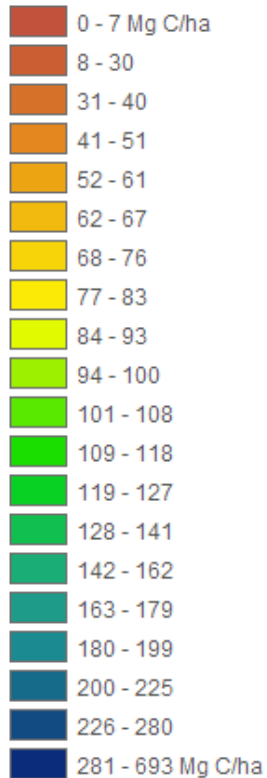
BIOME	AREA m km ²	Gt C Veg	Gt C Soil	GT C Per km ²
Rainforest	17.6	212	216	12.045 + 12.273 = 24.318
Temperate Forest	10.4	59	100	5.673 + 9.615 = 15.288
Taiga	13.7	88	471	6.423 + 34.379 = 40.802
Chaparral	12.5	9	295	0.720 + 23.600 = 24.320
Grassland	22.5	66	264	2.933 + 11.733 = 14.667
Cropland	16.0	3	128	0.188 + 8.000 = 8.188
Desert	45.5	8	191	176 + 4.197 = 4.373
Tundra	9.5	6	121	0.632 + 12.737 = 13.368

Veg + Soil = Total

Oregon Above-ground Forest Carbon (Mg C/ha)

Mg = 1,000 Kg

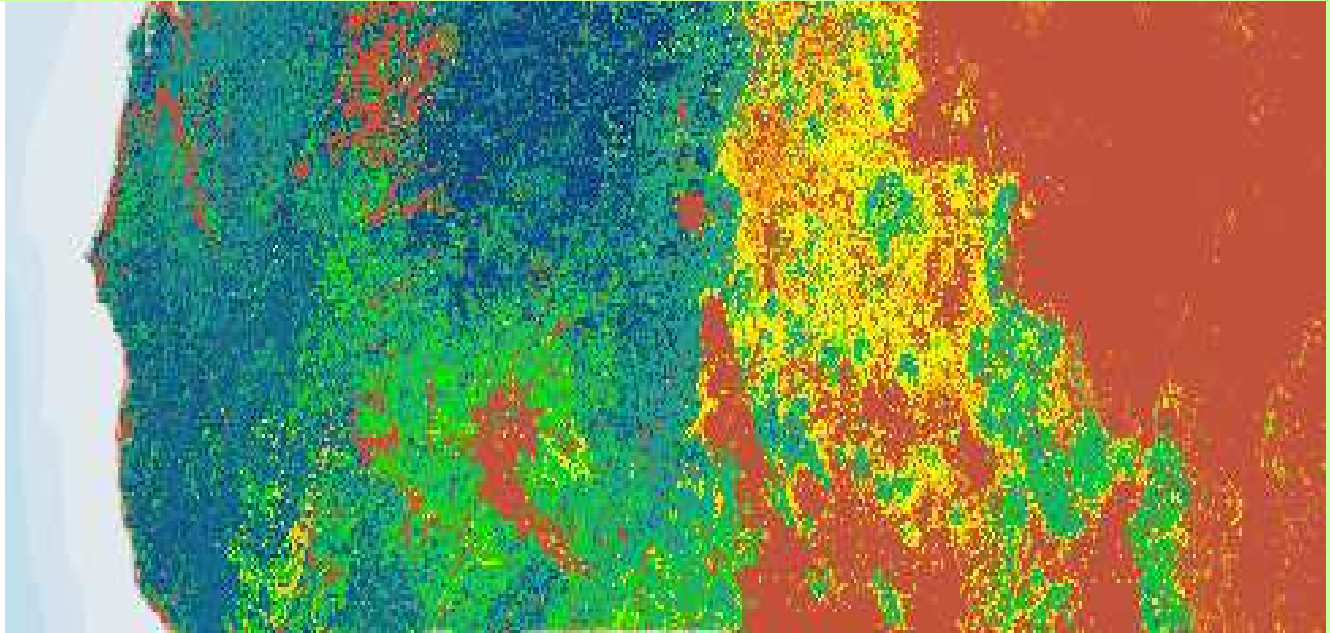
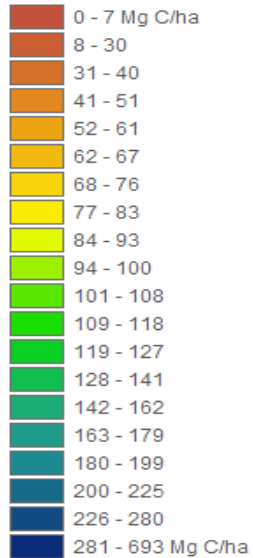
▼ Total aboveground forest biomass
(Mg C/ha) for Oregon, USA



Mg = Megagrams = millions of grams

SW Oregon

▼ Total aboveground forest biomass
(Mg C/ha) for Oregon, USA



Hudiberg, T., Law, B., Turner, D. Campbell, J., Donato, D., Duane, M. 2009. Carbon dynamics of Oregon and Northern California forests and potential land-based carbon storage. *Ecological Applications*, 19(1), pp. 163–180

<http://databasin.org/maps/new#datasets=00cfef5252c64f578fcd453ef253aaed>

Adaptation and Mitigation

Adaptation – promoting resistance to, or resilience under the impact of, climate change.

Mitigation – reducing the emissions into, or concentration of, atmospheric Greenhouse Gases.