Oregon Climate Change- Future Implications

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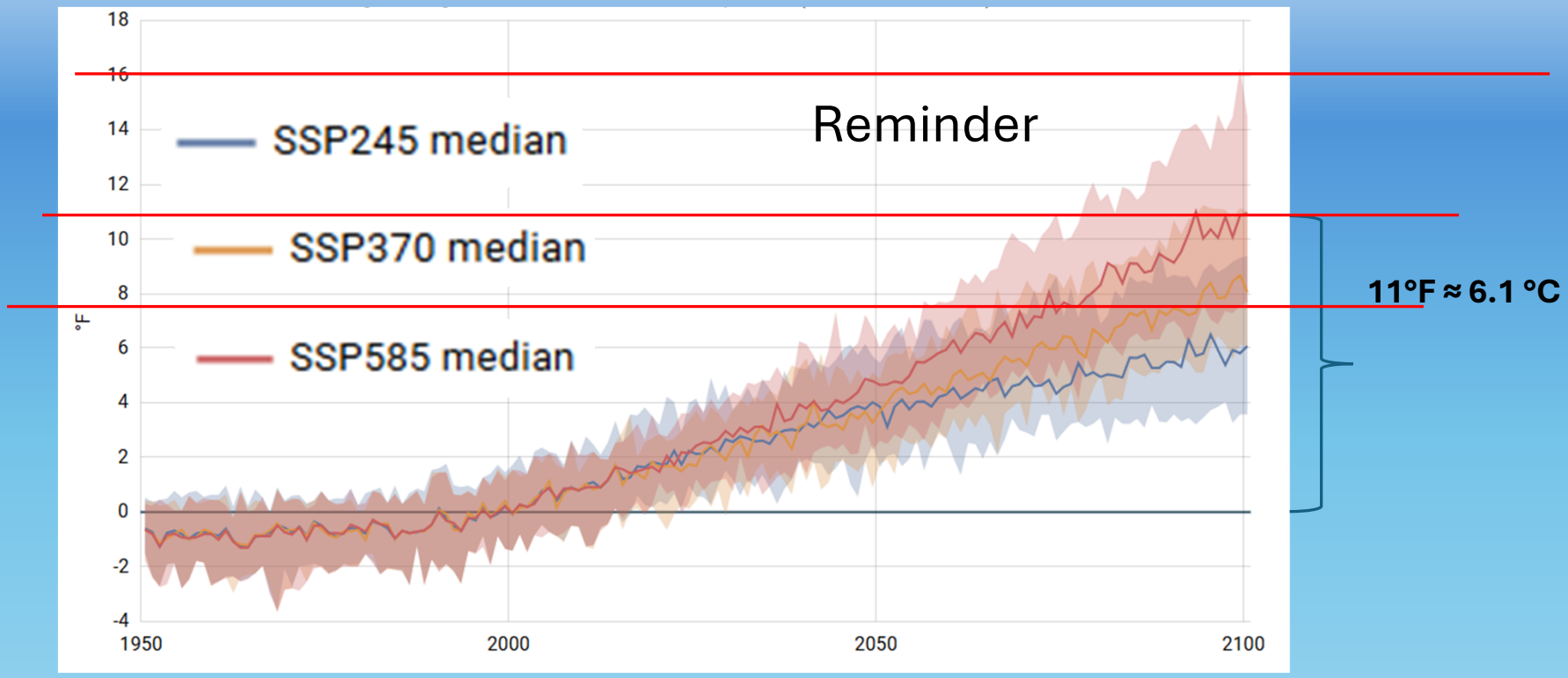
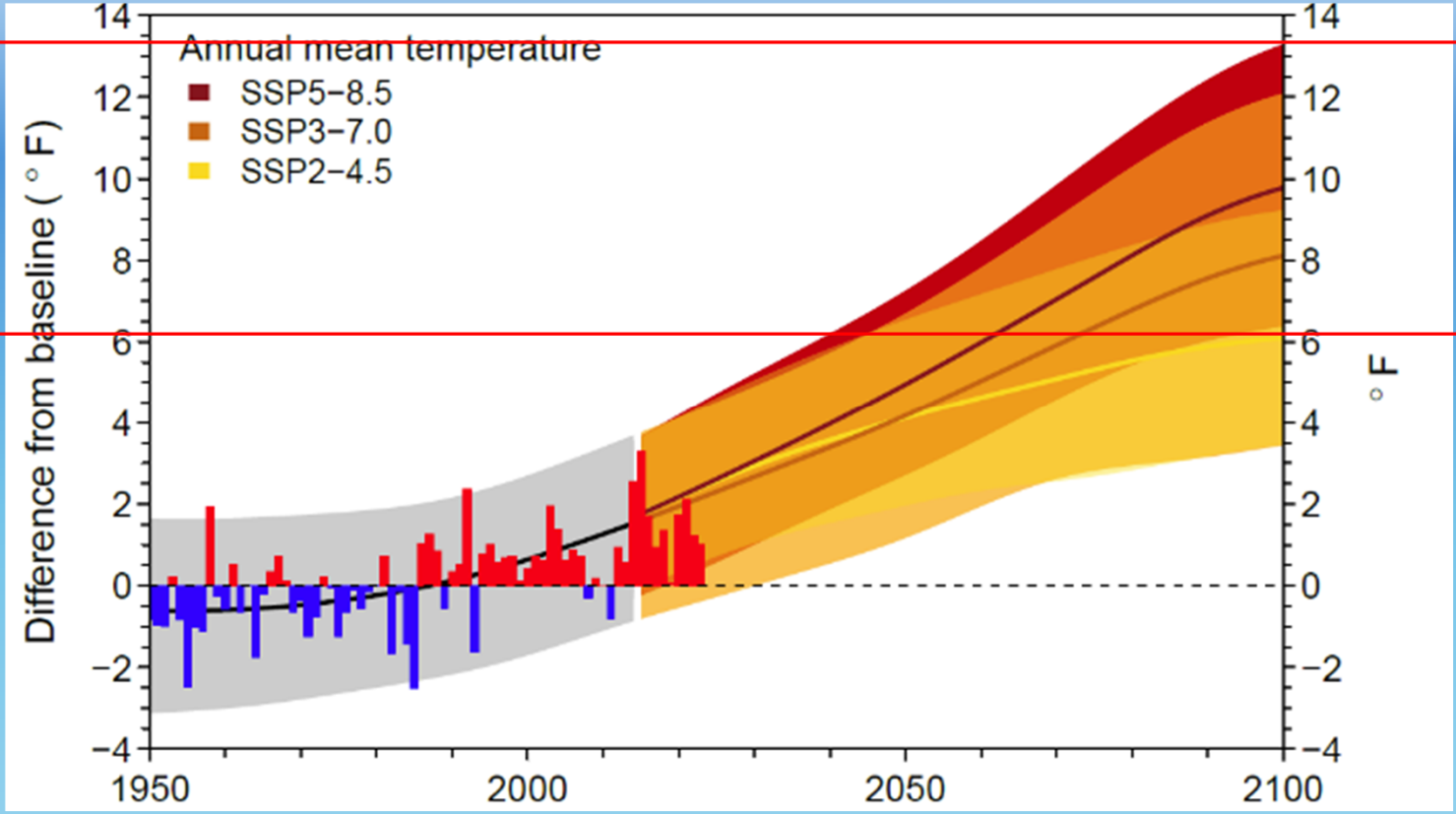
Oregon Average Temperature Δ Projections to 2100: Baseline 1981-2010



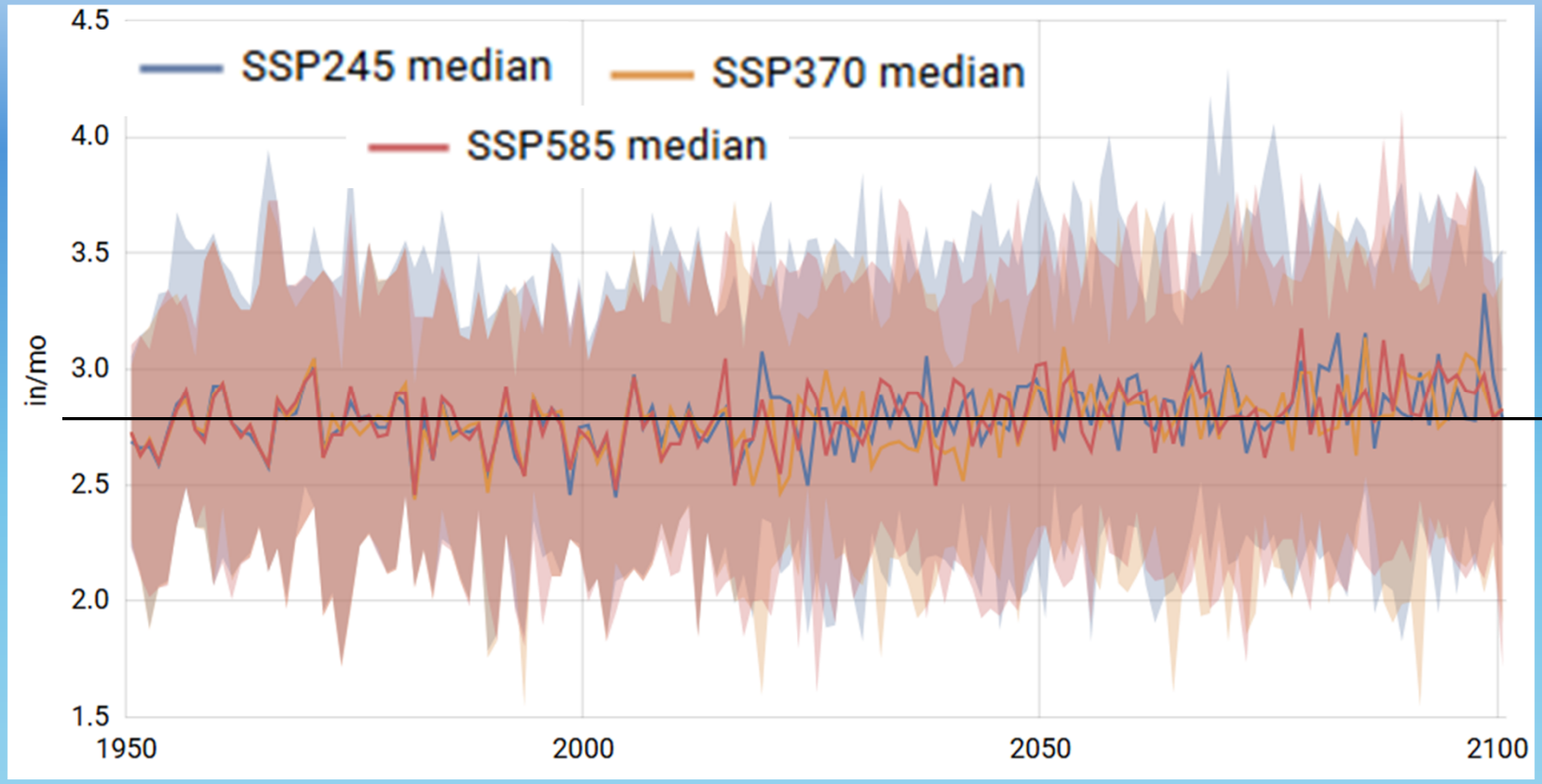
https://apps.usgs.gov/nccv/loca2/nccv2_loca2_counties.html

OCCRI Projections - Baseline 1950-2014 average



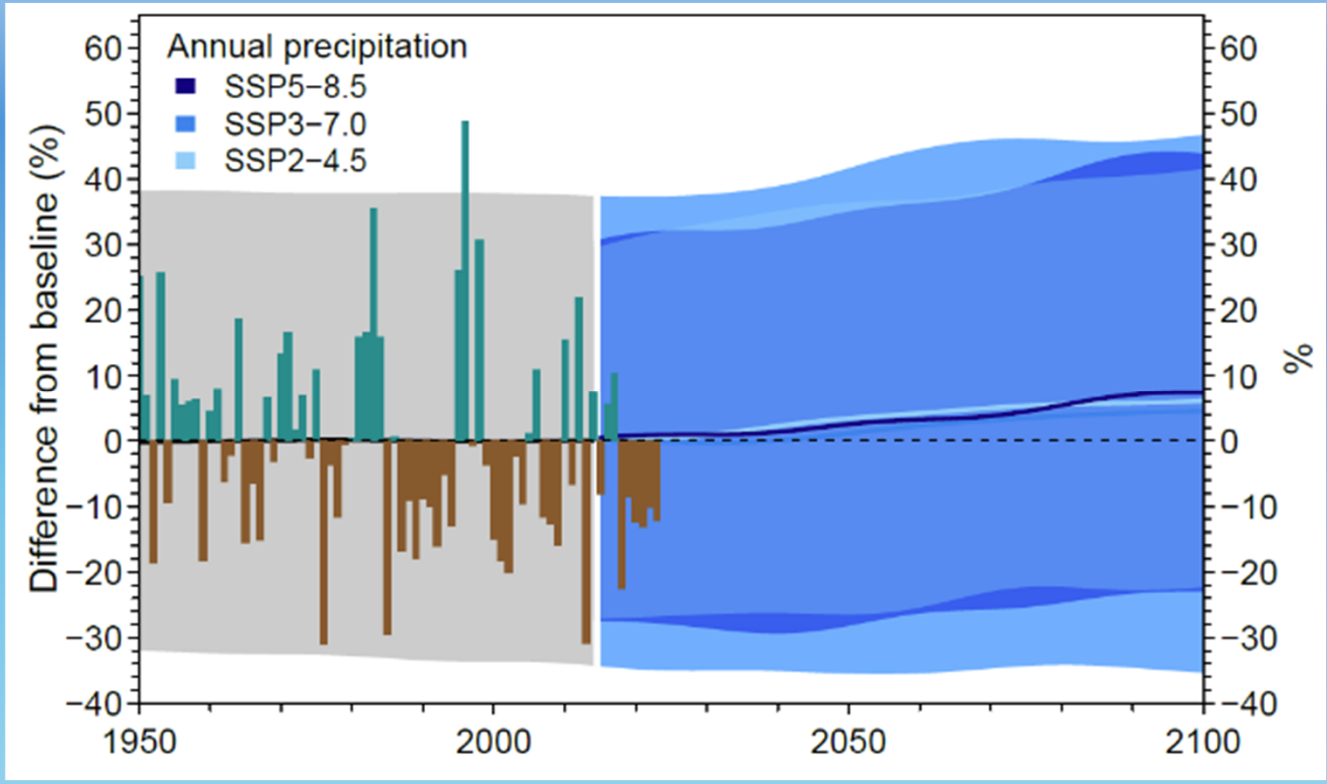
https://oregonstate.app.box.com/s/ziqc1kisxkup45147phjp526kheugqnb

Oregon Precipitation Projections to 2075-2099



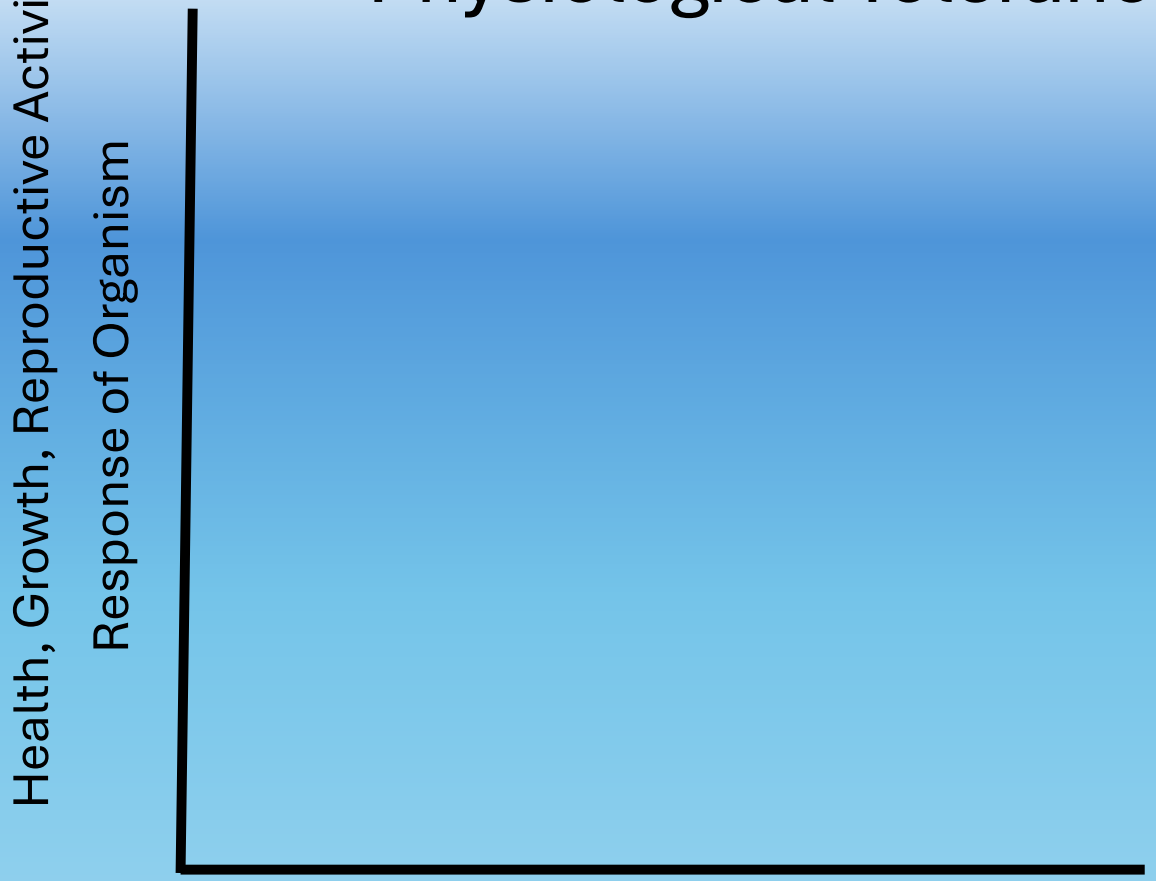
https://apps.usgs.gov/nccv/loca2/nccv2_loca2_counties.html

OCCRI Precipitation Projections - Baseline 1950-2014 average



https://oregonstate.app.box.com/s/ziqc1kisxkup45147phjp526kheugqnb

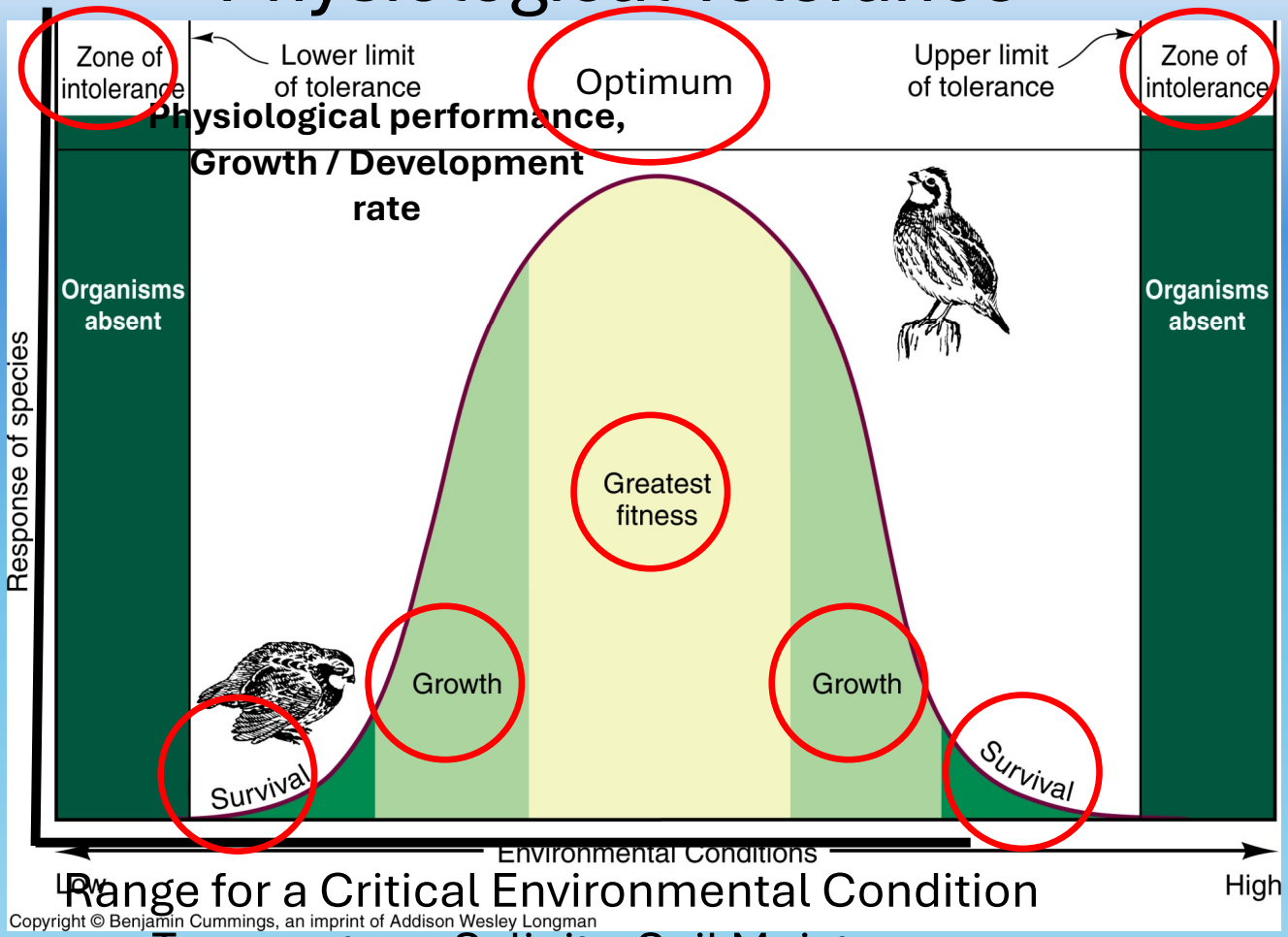
Physiological Tolerance



Physiological Tolerance

Health, Growth, Reproductive Activity

Response of Organism



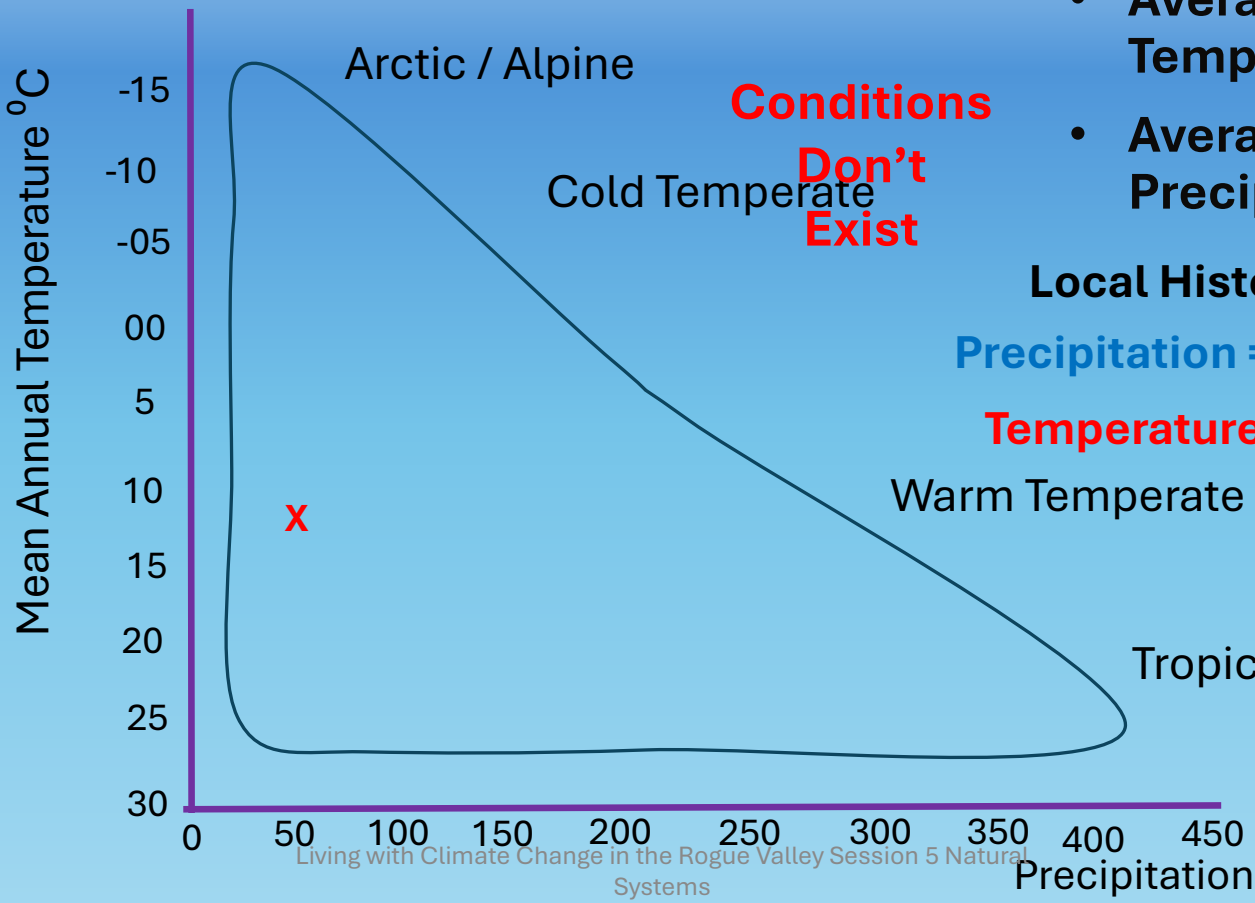
Population Density

Range for a Critical Environmental Condition

Temperature, Salinity, Soil Moisture

What Determines Biome Location?

Whittaker's Biome Chart



- **Average Temperature**
- **Average Precipitation**

Local Historic 1901 – 2000:

Precipitation = 21.1 inches; 53.5cm

Temperature = 52.7°F = 11.5°C

Modified from

Whittaker Biome Diagram
Originally from RH Whittaker
Communities and Ecosystems
1975;
Modified from RE Ricklefs
The Economy of Nature
2000

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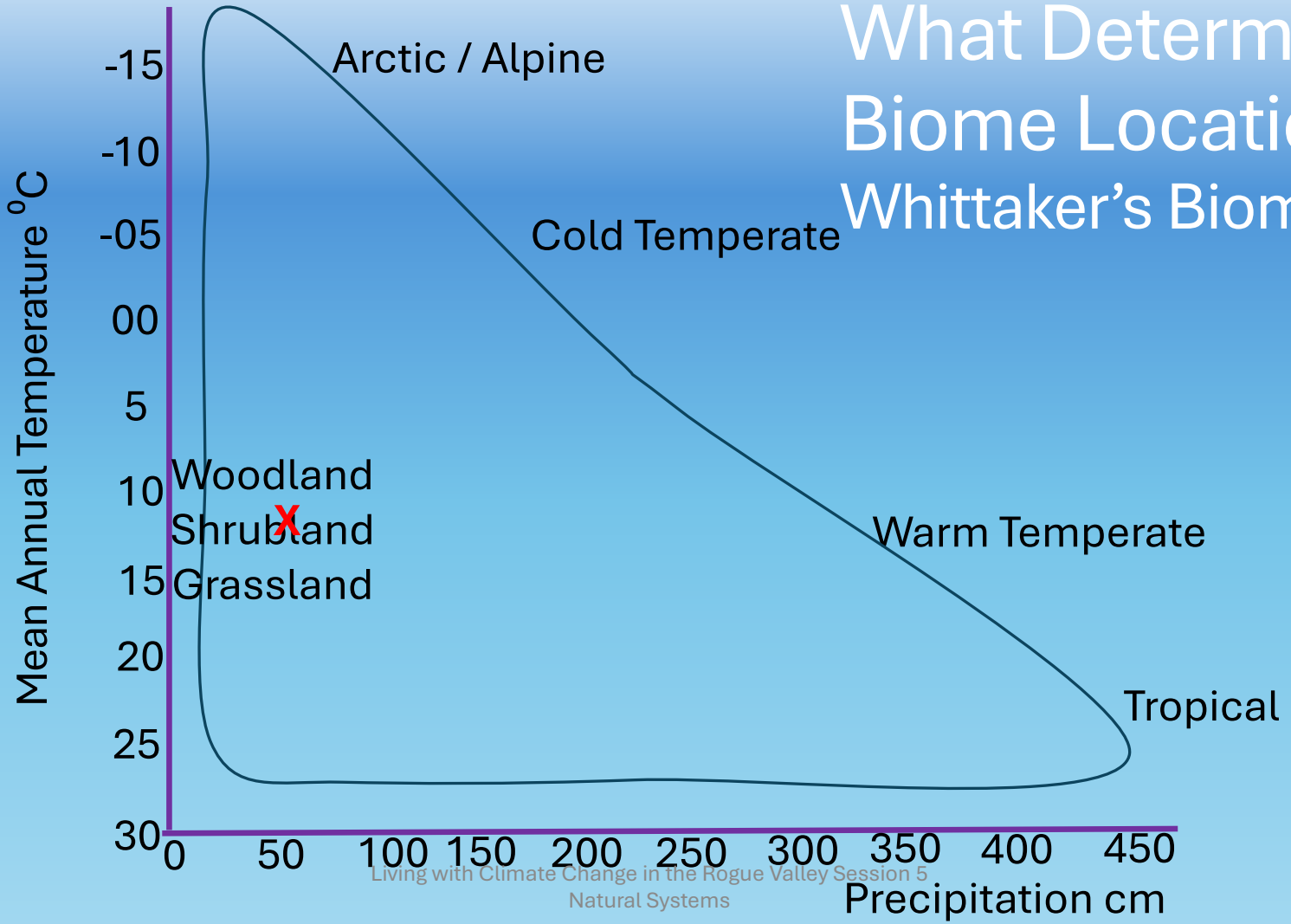

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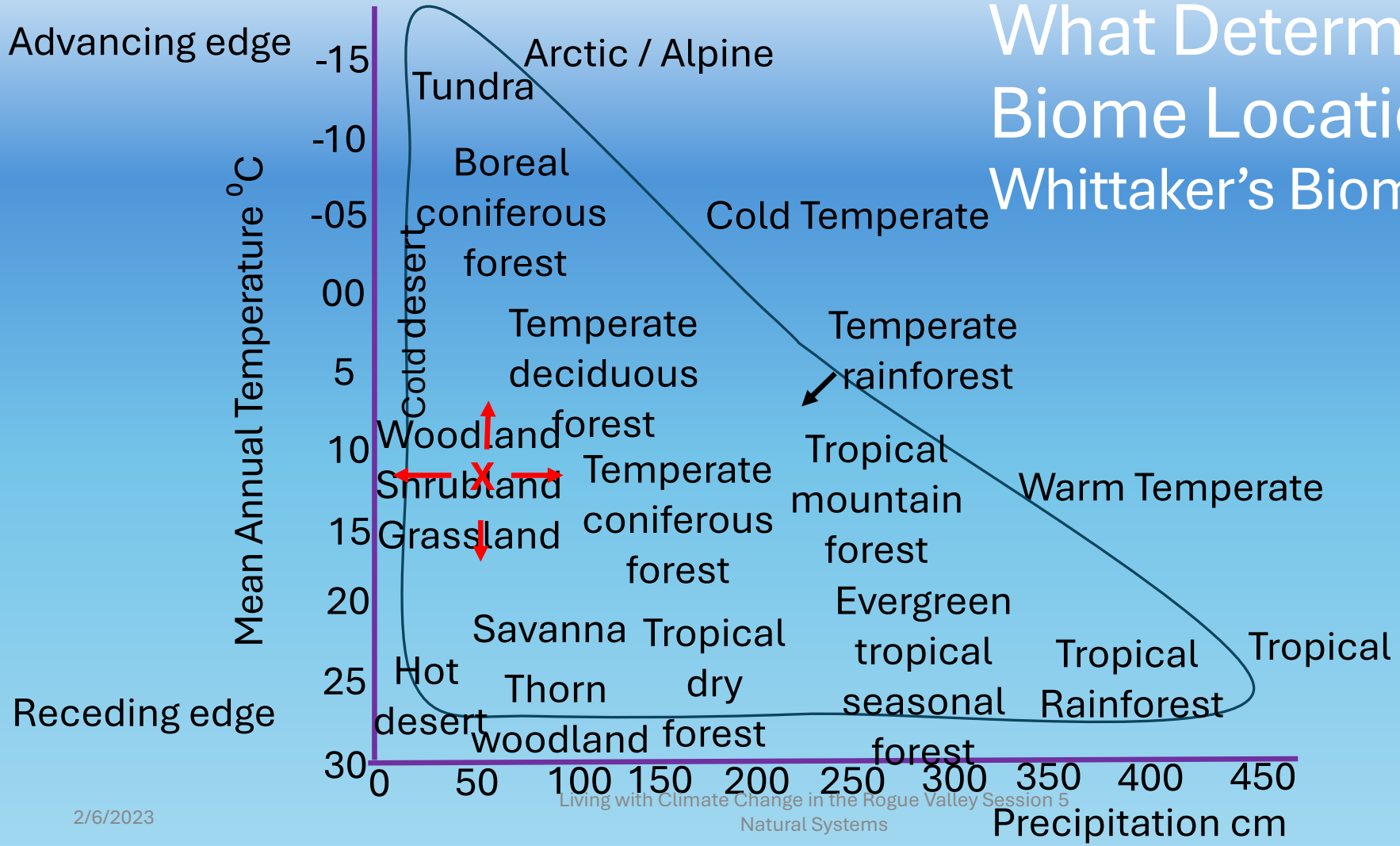
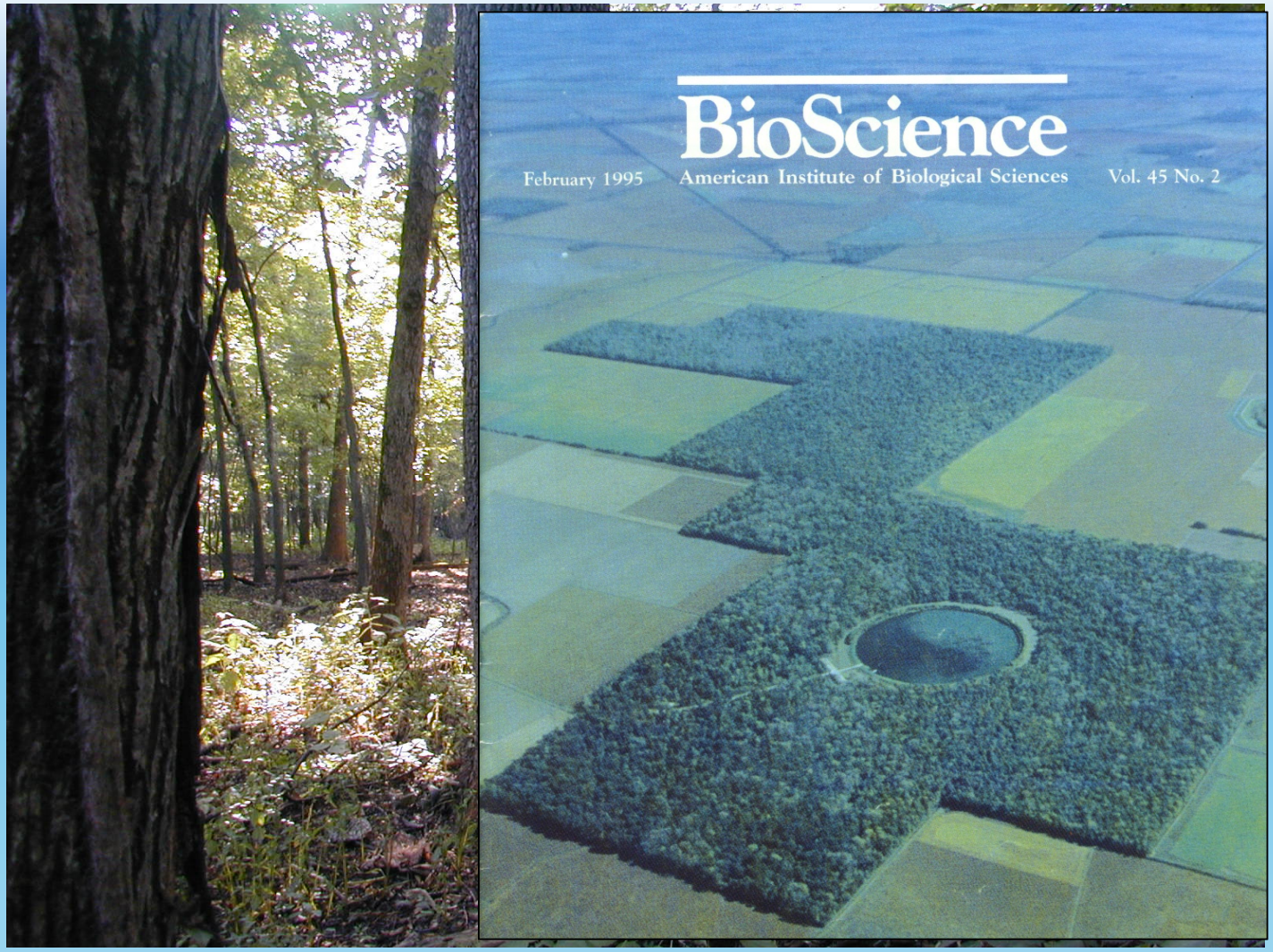


Can biomes easily adjust range?

Big Oak Tree State Park SE Missouri

Imagine a pine tree

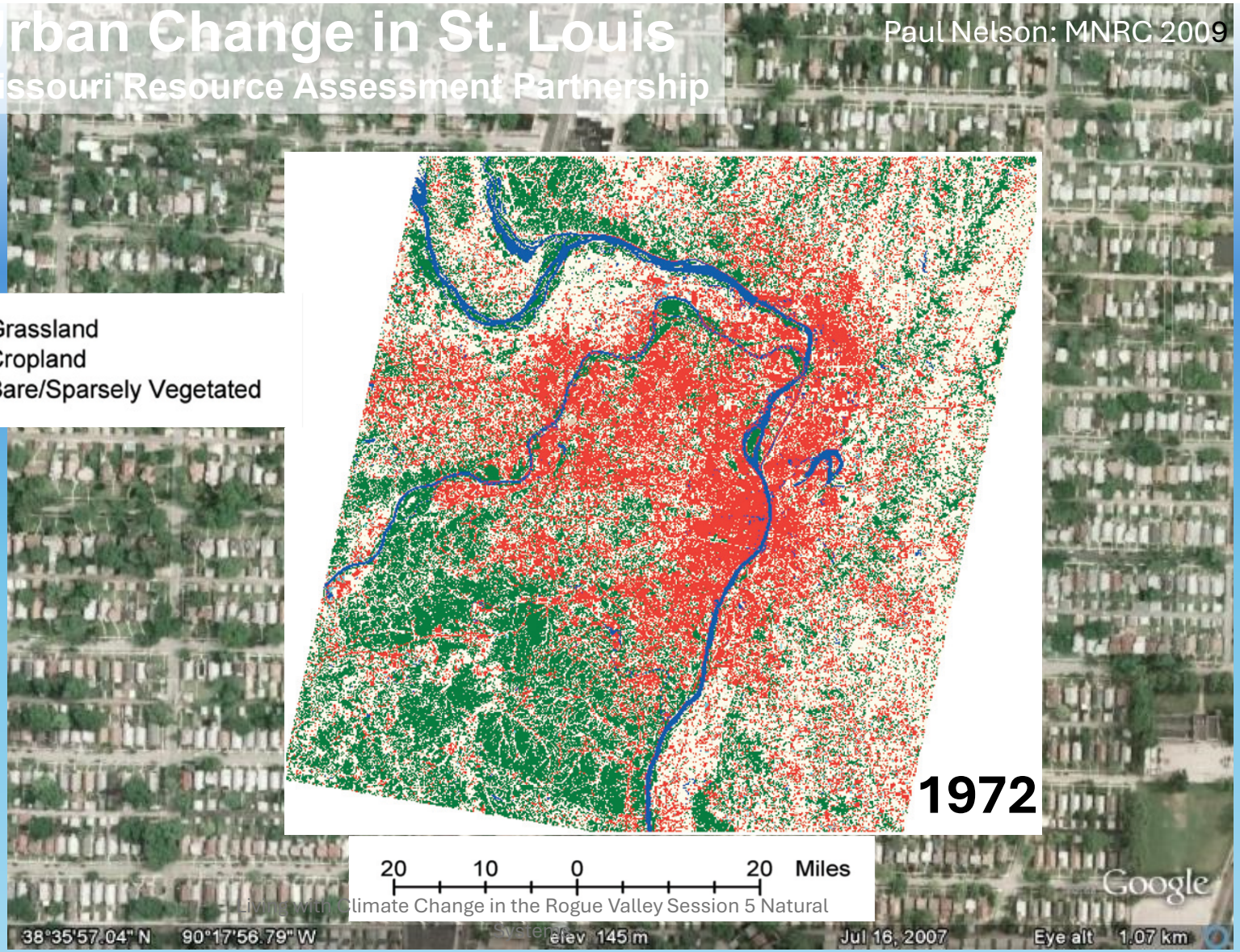


Barriers to Range Adjustment – 1 Dispersal range

Urban Change in St. Louis

Missouri Resource Assessment Partnership

Paul Nelson: MNRC 2009



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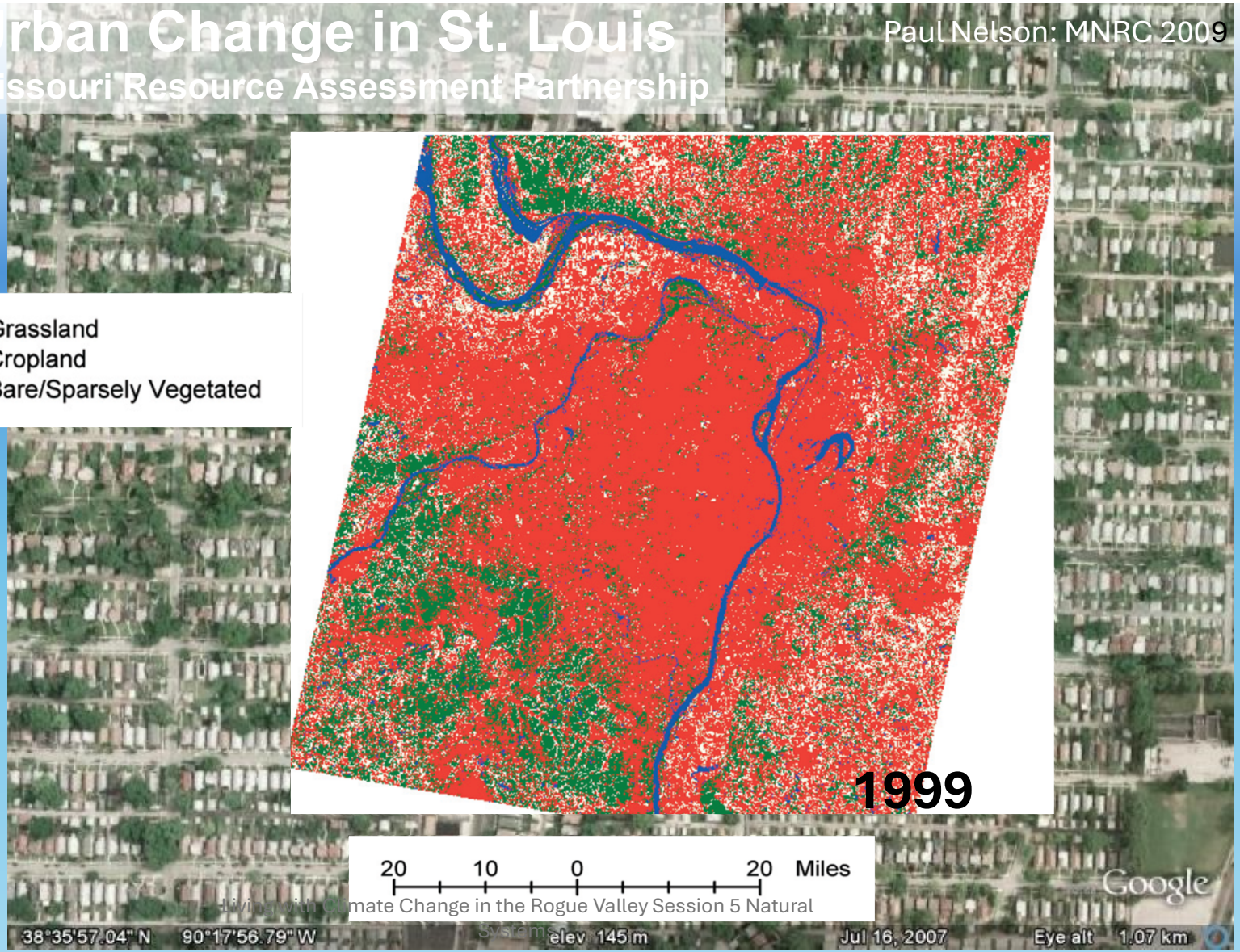
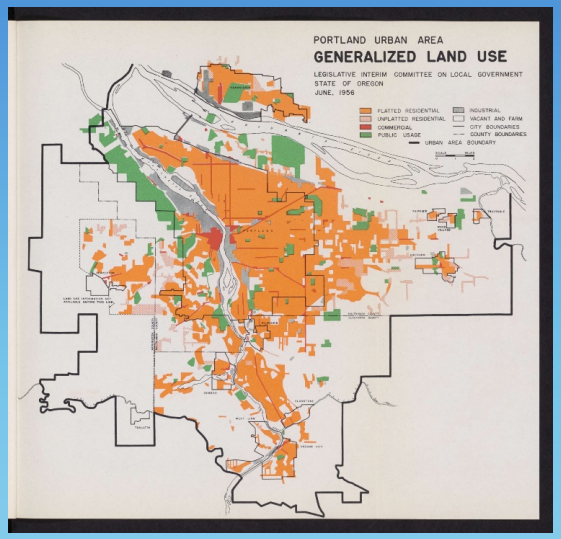


Metro Portland 1956 - 2023

1956

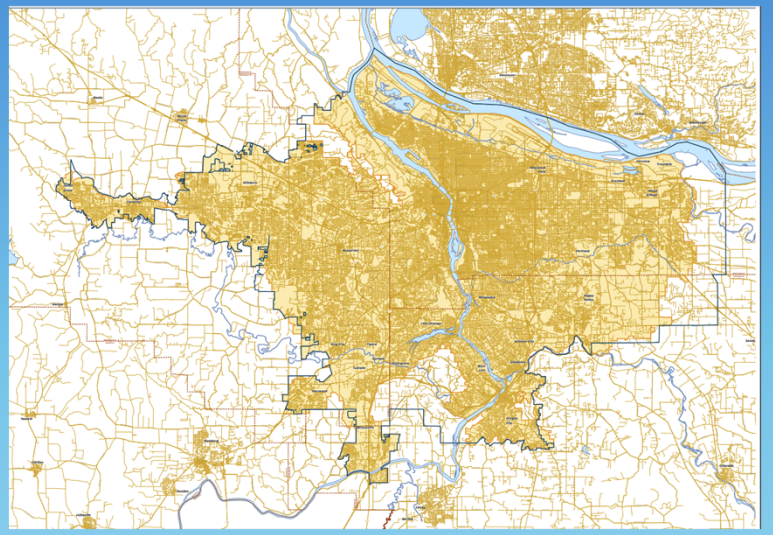


https://gallery.multcolib.org/image/portland-urban-area-generalized-land-use

1979

https://pdxscholar.library.pdx.edu/oscdl_ugb/93/

2023



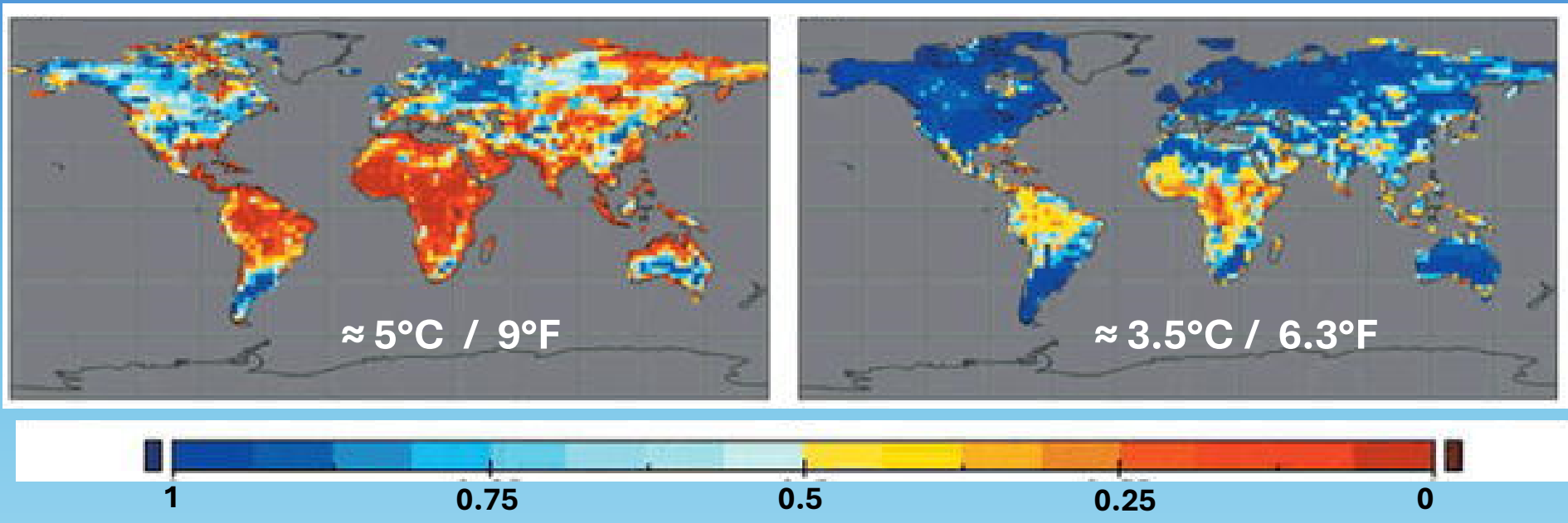
https://www.oregonmetro.gov/urban-growth-boundary

POTENTIAL GLOBAL FUTURE (TO 2100) OF CURRENT NATURAL COMMUNITIES

A2: Business as usual CO_2 → 850ppm **B1: Some redress: CO_2 → 550ppm**

Probability of appropriate climate existing: Red = 0; Blue = 1

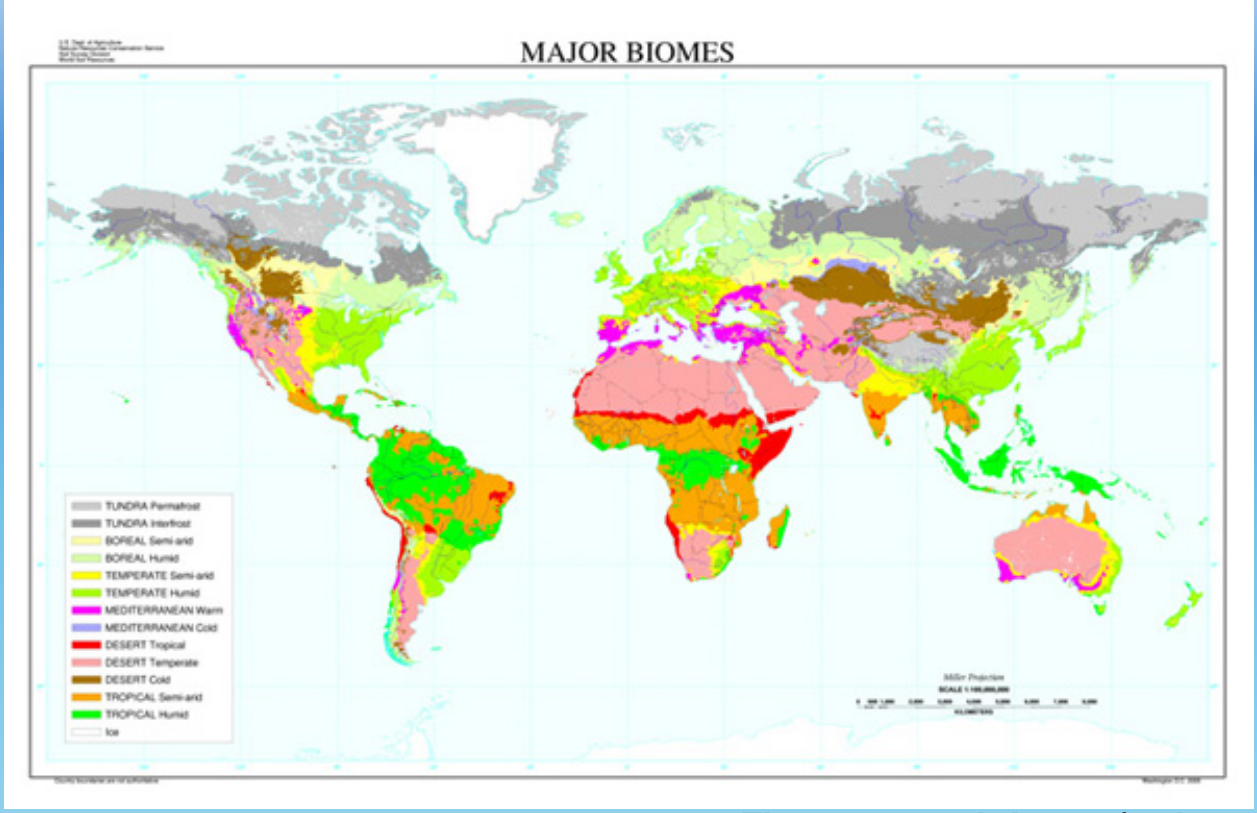
Within 500 km = 310 miles of current locations



Williams & Jackson 2007: https://esajournals.onlinelibrary.wiley.com/doi/10.1890/070037

So what, you might ask?

Natural Ecosystems /Biomes of the world



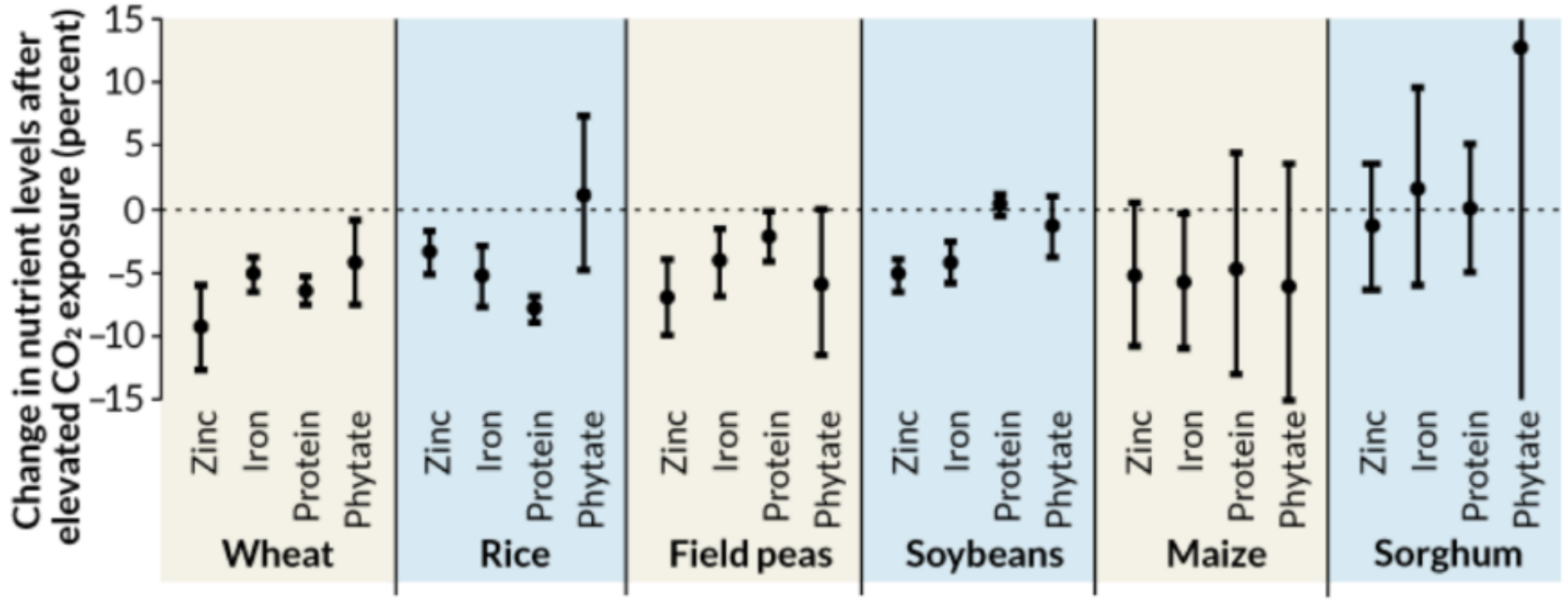
Not only do these represent where our flora and fauna live…but

These control the agricultural and forestry potential of our land

http://passel.unl.edu/pages/informationmodule.php?idinformationmodule=1130447033&topicorder=6&maxto=7

Future of Agriculture

CO_2 and Human Nutrition: at ≈ 550 ppm



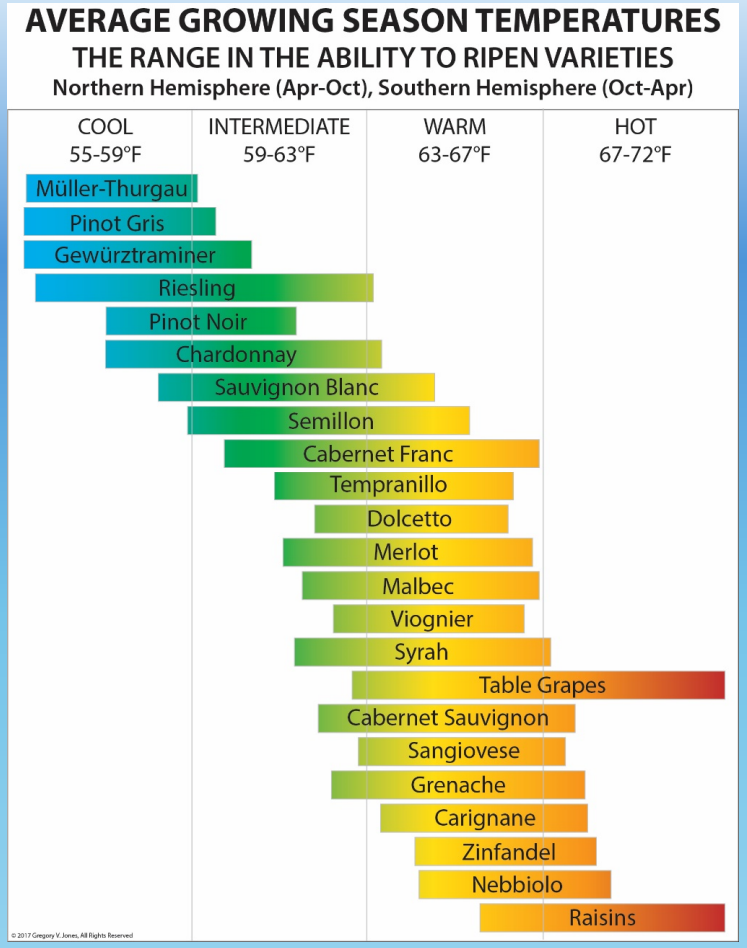
Phytate sabotages our ability to uptake Zn

Milius, *Science News*, March 13 2017 https://www.sciencenews.org/article/changing-climate-could-worsen-foods-nutrition?mode=magazine&context=361

E.G., Grape varietals

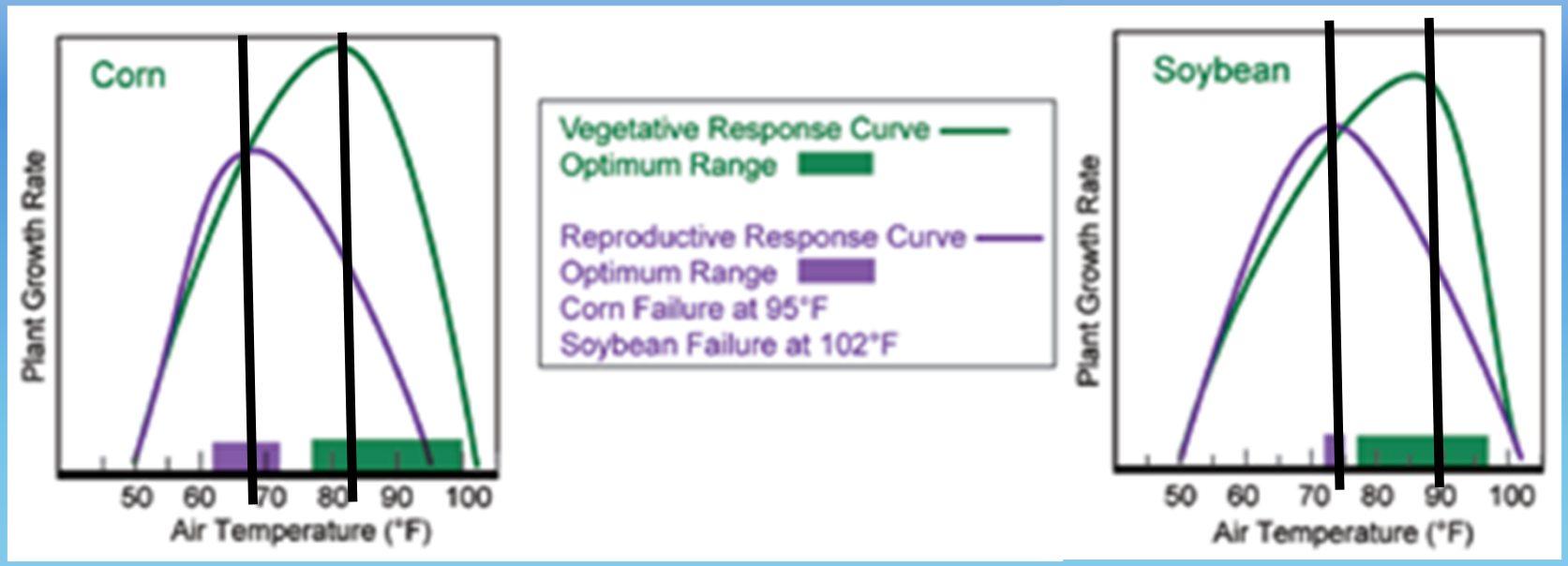
A Local Example

E.G., Grape varietals



https://www.guildsomm.com/public_content/features/articles/b/gregory_jones/posts/climate-grapes-and-wine

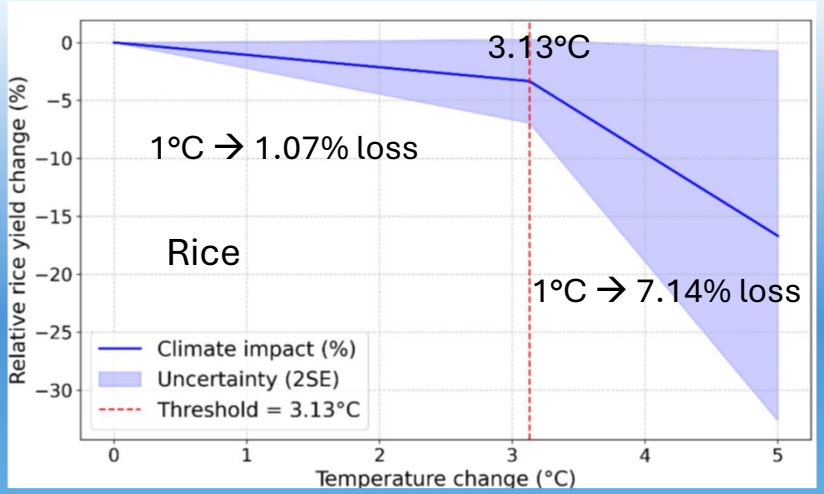
Temperature and Crop Production

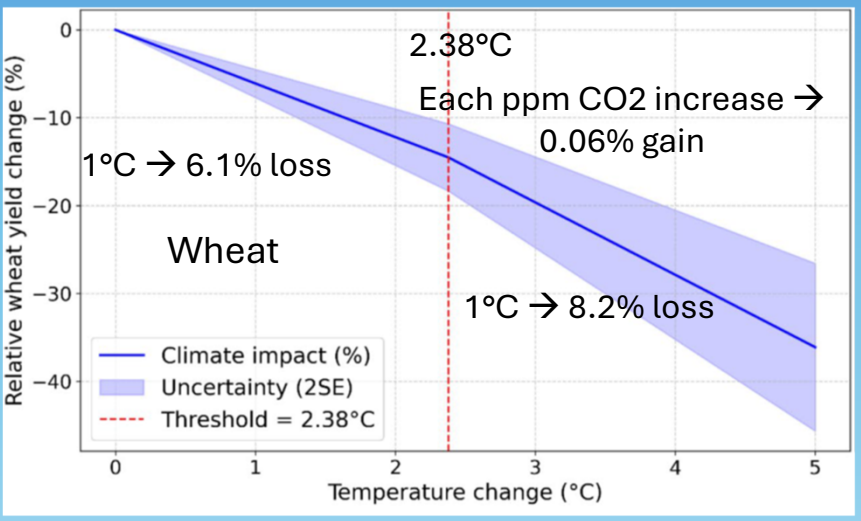


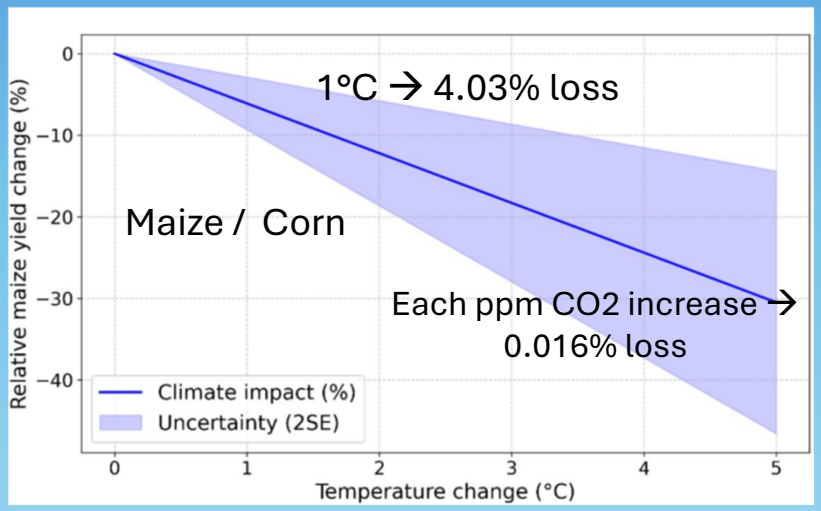
Increased CO_2 <u>may</u> be positive, but increased temp is negative.

https://www.climatehubs.usda.gov/hubs/northeast/topic/warmer-isnt-always-better-how-rising-temperatures-impact-crop-production

Crop Loss with Temperature







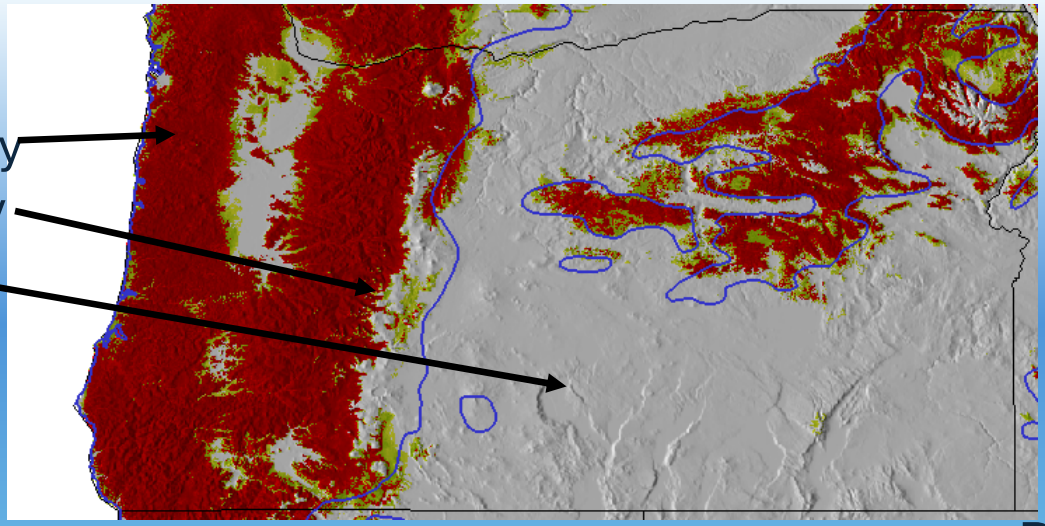
https://www.nature.com/articles/s41598-025-07405-8

Future of Our Forests

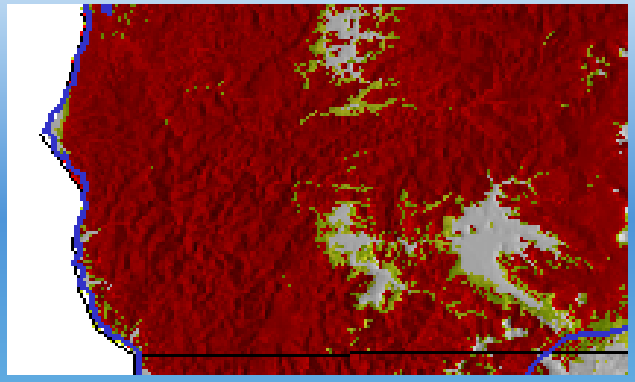
High viability

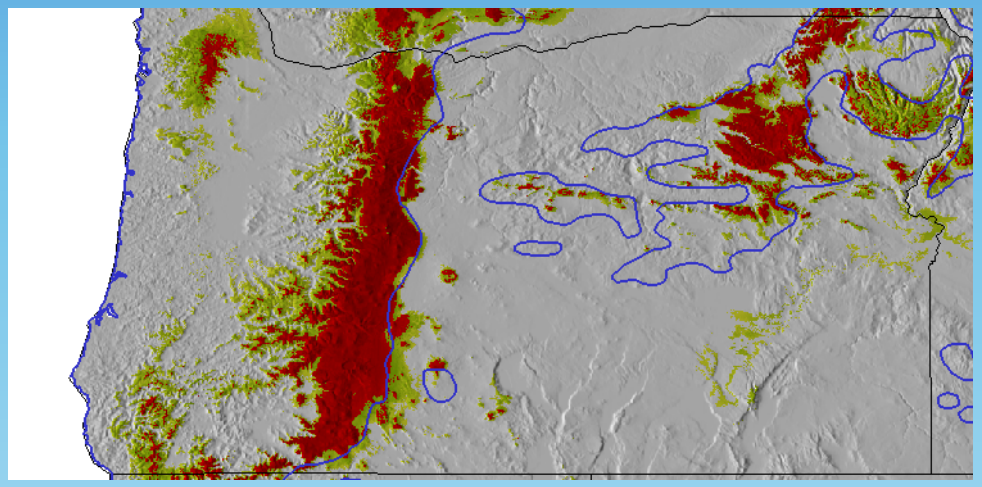
Low viability

Absent

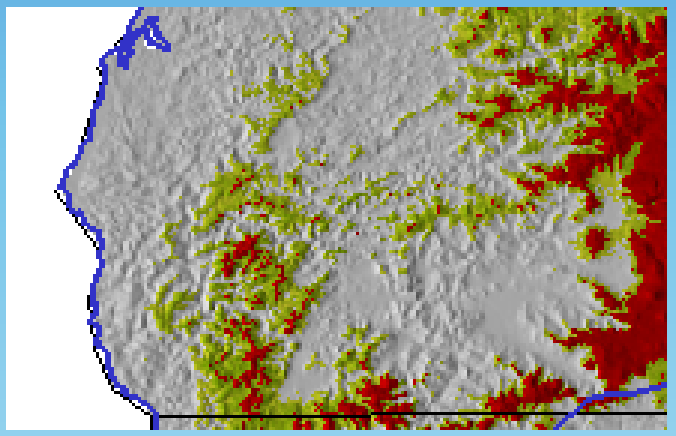


Douglas fir Now



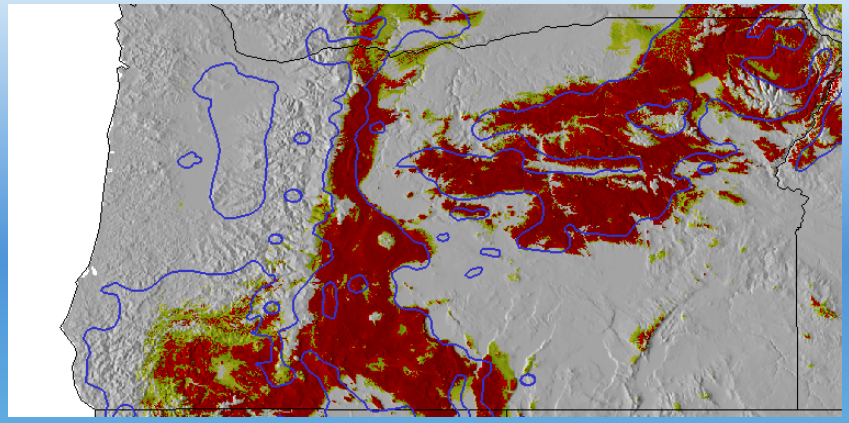


Douglas fir climate late century

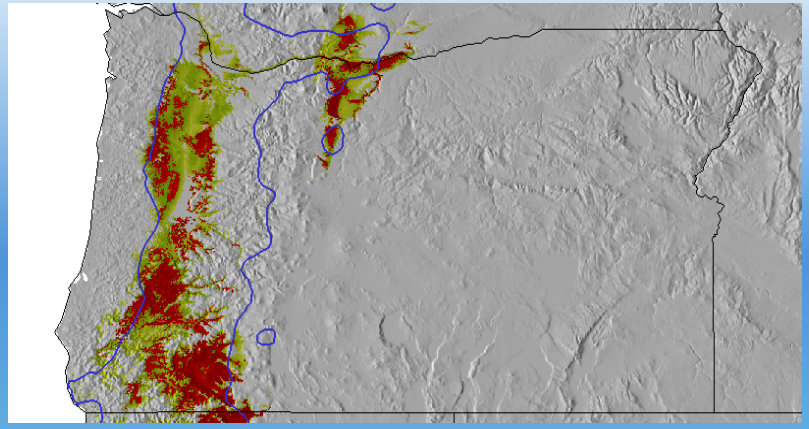


http://charcoal.cnre.vt.edu/climate/species/

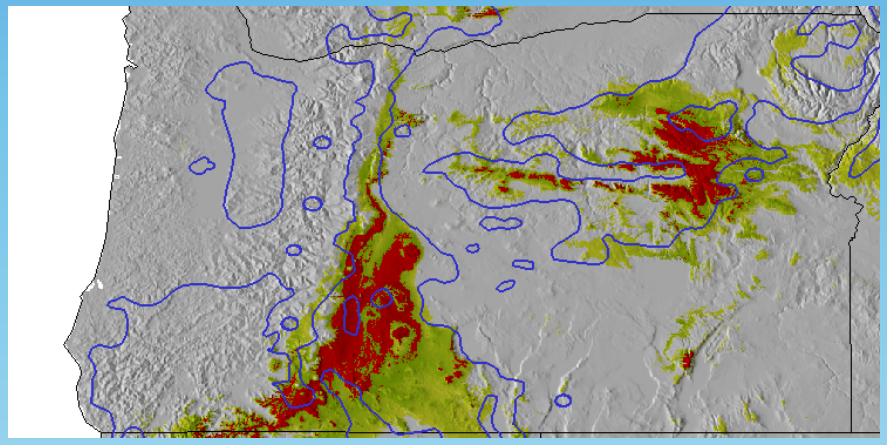
Ponderosa pine now



Garry oak now



Ponderosa pine climate late century



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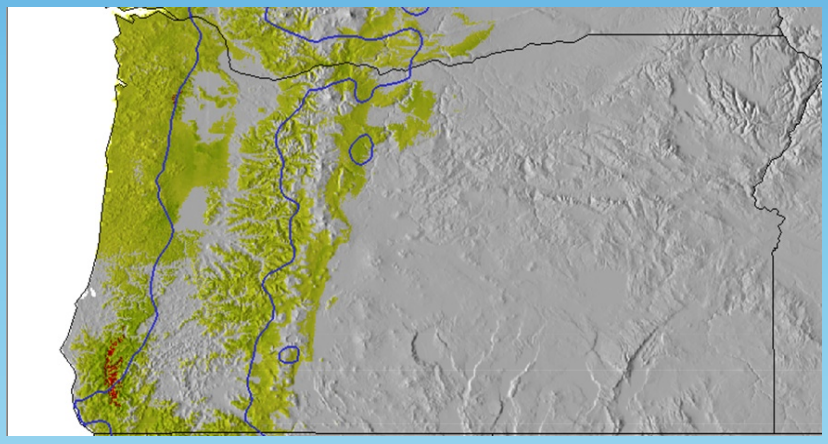
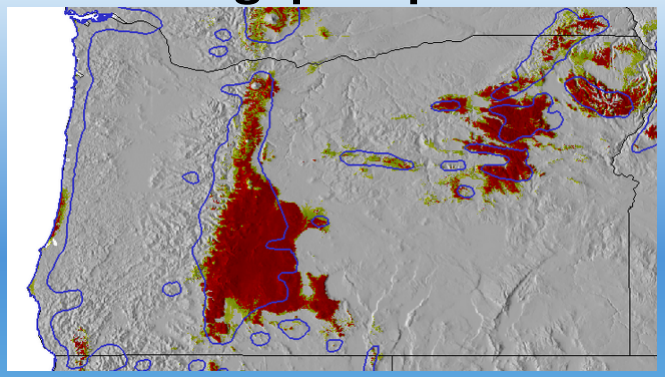
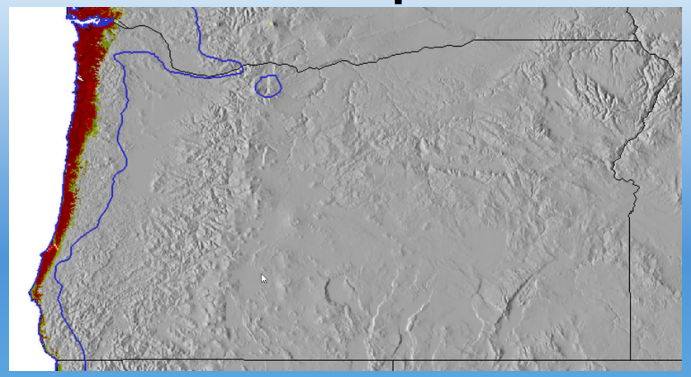


http://charcoal.cnre.vt.edu/climate/species/

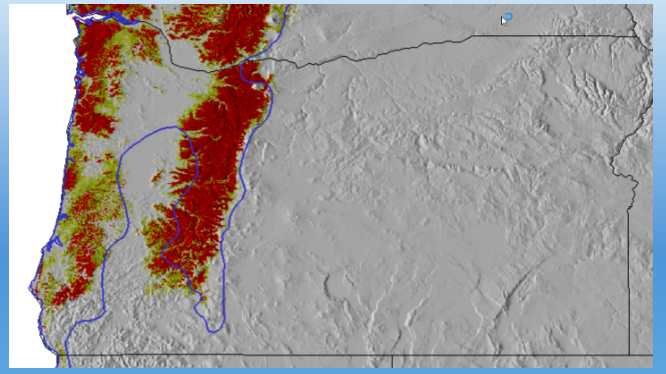
Lodgepole pine now



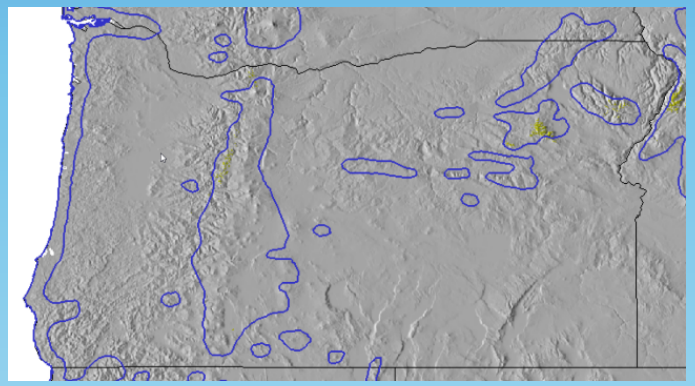
Sitka spruce now



Western hemlock now



Lodgepole pine climate late century



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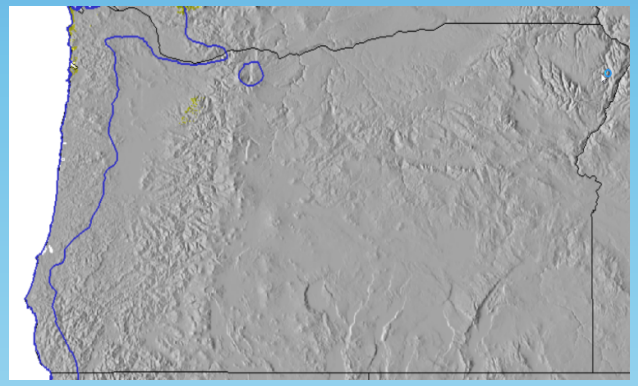

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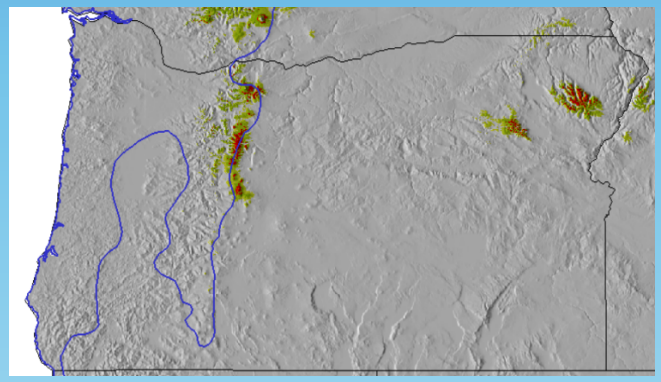


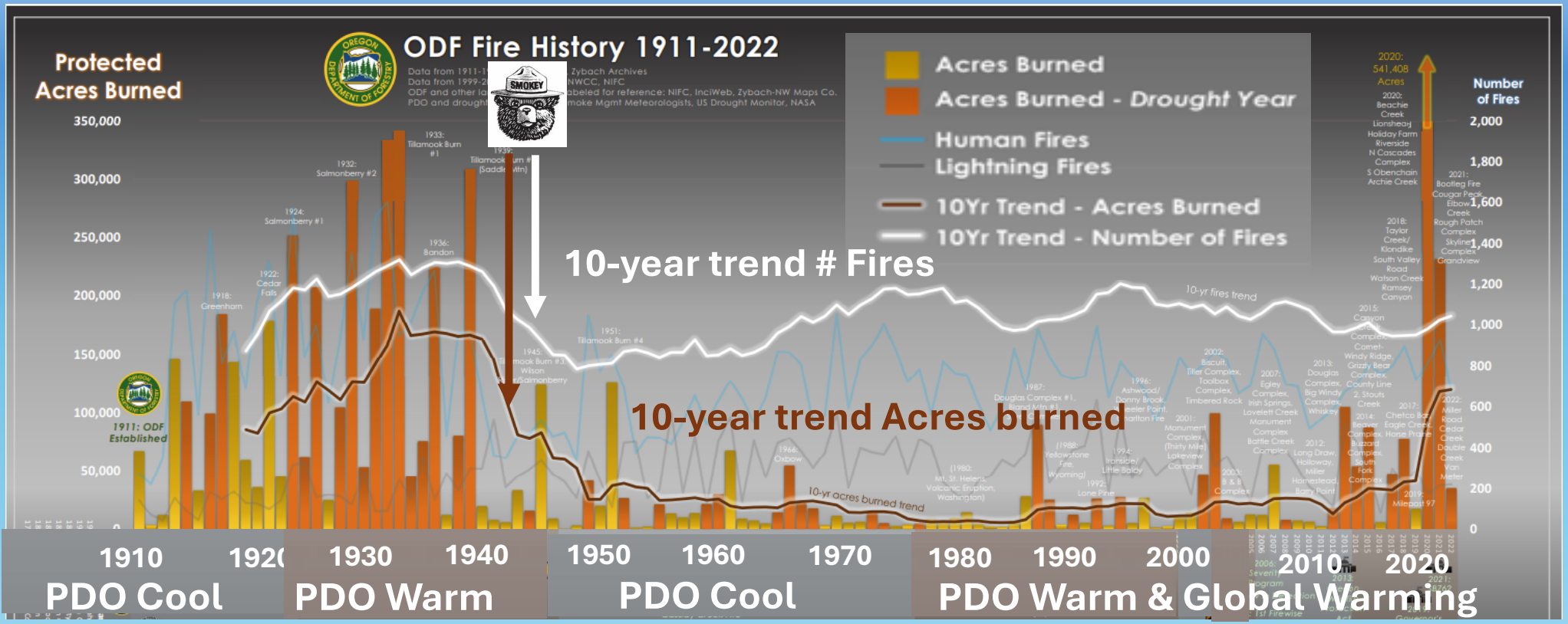
http://charcoal.cnre.vt.edu/climate/species/

The Future of Our Forests?

Wildfires?

Pacific Decadal Oscillation

ODF Fire History 1911- 2022

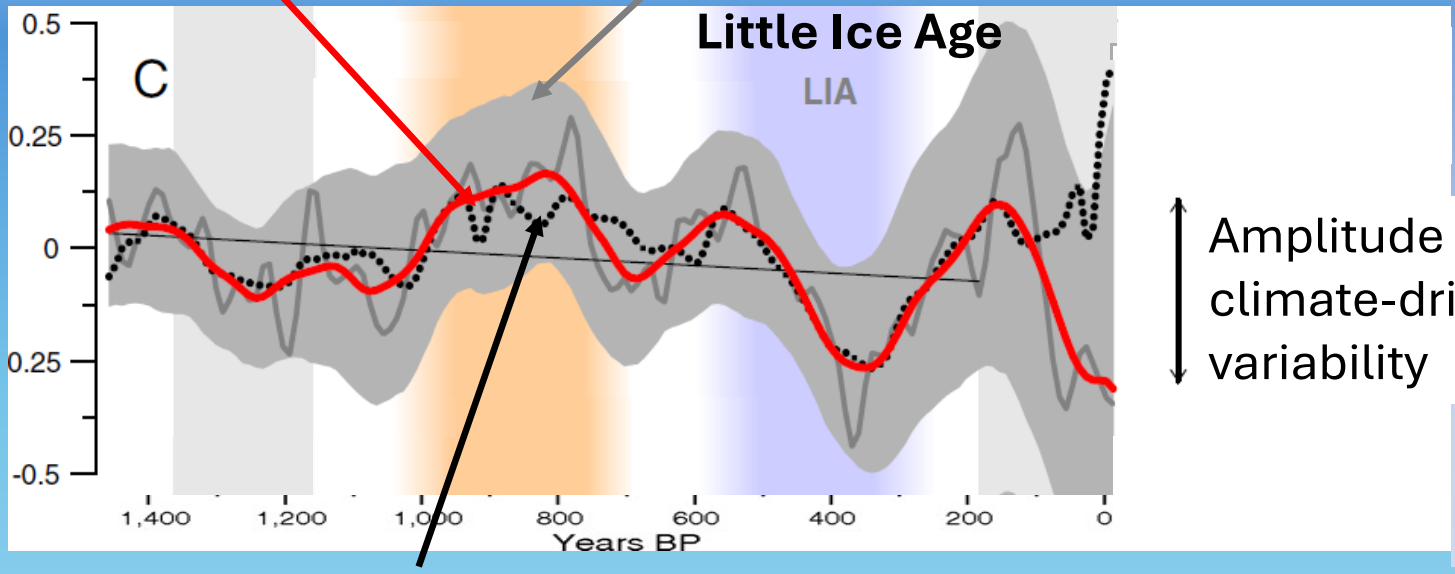


https://www.oregon.gov/odf/fire/documents/odf-century-fire-history-chart.pdf

Relative changes in forest area burning in the western United States: 1400 yrs.

Forest burning
100-year trendline (red)

Forest burning records (gray)



Amplitude of climate-driven variability

Modeled forest burning based on climate

Jennifer R. Marlon et al. PNAS 2012;109:E535-E543
https://www.pnas.org/doi/abs/10.1073/pnas.1112839109

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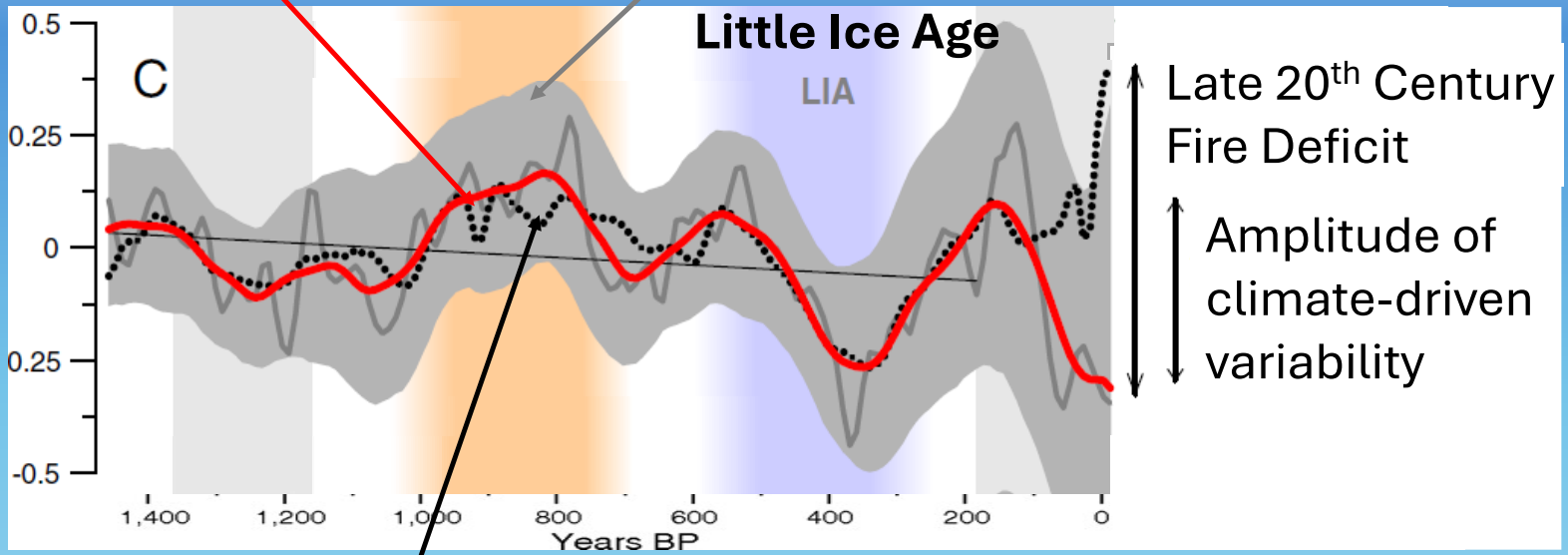

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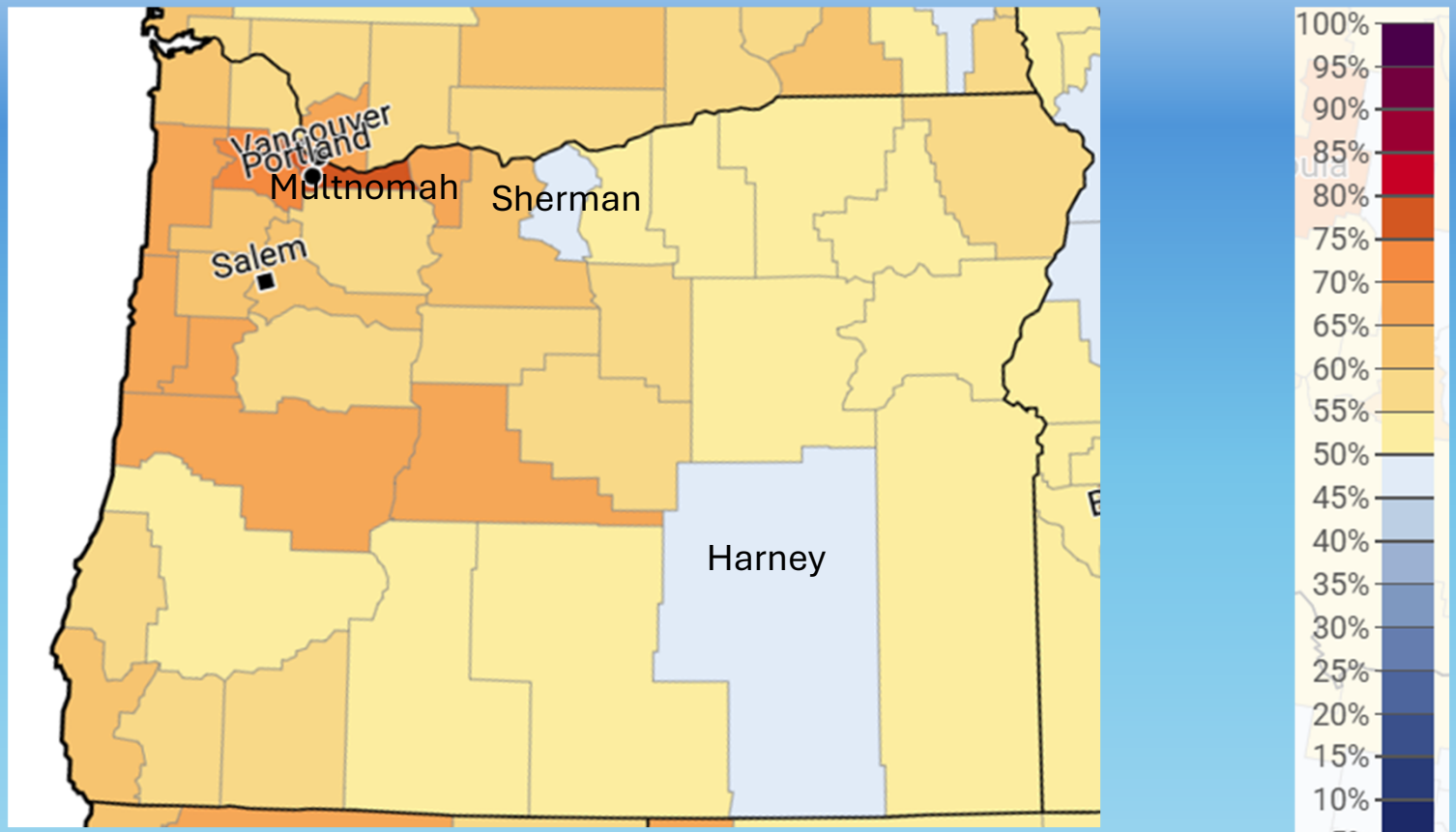
Climate Change is increasing the wildfire risk

Estimated % of Oregonian adults who are somewhat or very worried about global warming (nat'l avg. 63%), 2024



https://climatecommunication.yale.edu/visualizations-data/ycom-us/

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