Utilizing Climate Models and Remote Sensing Data to Characterize Future Vegetation-Climate Feedbacks in Western US Ecosystems

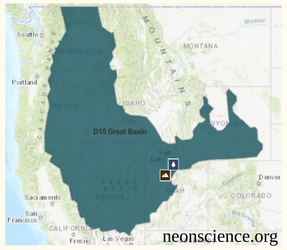
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1. Introduction

- Vegetated Land Surface and Climate have complex, interconnected relationship
- Climate models and remote sensing data provide insight into these relationships
- Intensifying climate change leads to greater impacts to these cycles
- Vegetation cover changes caused by several sources i.e. wildfires, woody plant encroachment etc.
- Great Basin can be utilized to show teleconnections across North America
- It is not always clear how tree cover will impact surface climate
  - Trees raise ET → lowering temp
  - Trees lower Albedo → raising temp

Great Basin NEON Domain

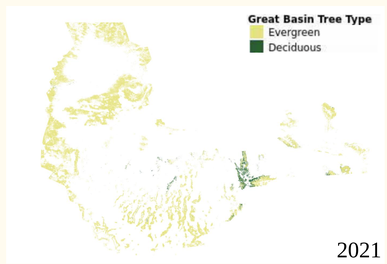


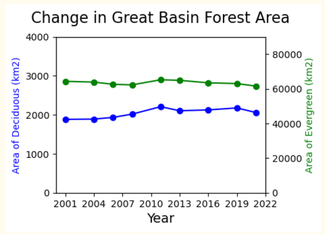
2. Methodology

- Utilize climate data generated from two coupled CESM simulations (Swann et al. 2018)
  - Simulation 1: Control climate scenario
  - Simulation 2: Deforested Great Basin
- Compare climate model outputs to RCMAP and NLCD remote sensing data

3. Results - Observations







- Observable changes in evergreen and deciduous tree cover from NLCD data
- Trend is declining in recent years

What if the Great Basin lost all its trees overnight?

VOTE WHAT YOU THINK!

IT BECOMES WARMER

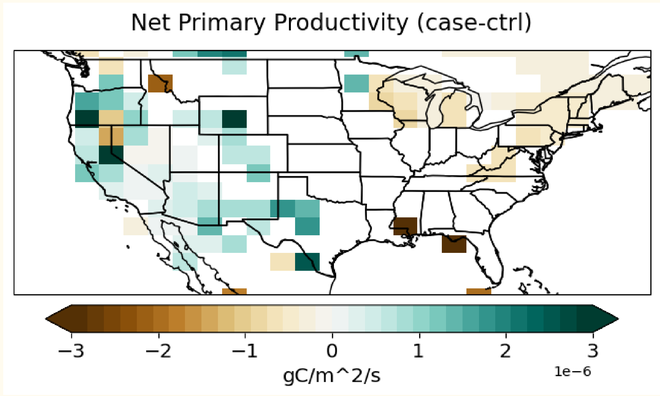
IT BECOMES COOLER

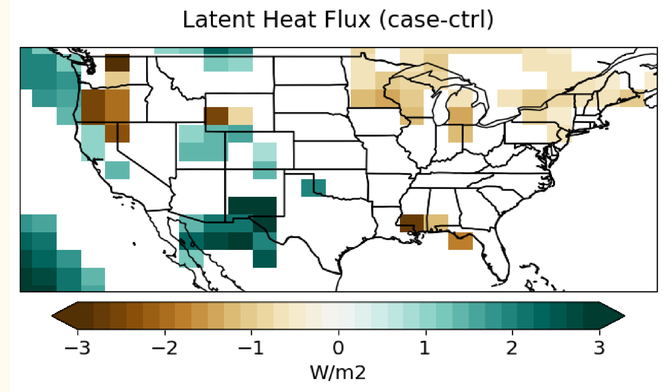


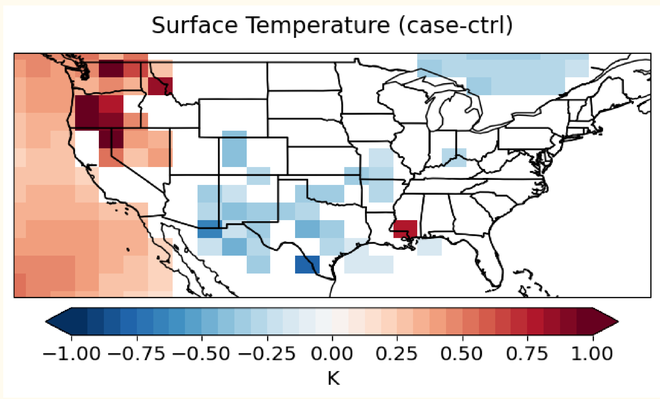
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3. Results – Climate Models







- Observable teleconnections between Great Basin deforestation and climate variables across the US
- Clear warming trend over Great Basin region when tree cover is lost

4. Conclusions

- Vegetation decline seen in both evergreen forests and deciduous forests in the observed data for Great Basin region
- Loss of vegetation cover leads to decrease in productivity, latent heat flux, and a net increase in the temperature in the region

5. Future Work

- Use photographic data to compare current Great Basin Conditions to historical conditions
- Rerun CESM using observed vegetation change

References:
Abigail L S Swann et al 2018 Environ. Res. Lett. 13 055014