



School of Natural Resources
and the Environment

Seminar Series: Fall 2022

**CLIMATE CHANGE IMPACTS ON SOUTHWESTERN U. S. FORESTS:
INSIGHTS FROM SPATIAL NETWORKS OF TREE-RING TIME SERIES DATA**

SPEAKER: Margaret Evans, UA SNRE and LTRR

DATE: Wednesday, November 2nd

TIME: 3:00-4:00 pm

LOCATION: ENR2 S107 & [Zoom](#)

ABSTRACT:

Given the importance of climate in determining the geographic distribution of forests as well as their functioning, it is expected that climate variability and change will affect where forests are found and forest health. Using two examples from the U. S. southwest, I'll show the unique and valuable contribution that spatial networks of tree-ring time series data can make towards detecting, anticipating, and mitigating the effects of changing climate on forests. First, I'll compare the climate responses detected for an aridland pine (*Pinus edulis*) using a climate envelope (or species distribution) modeling approach against climate responses detected using tree rings. The climate envelope approach predicts leading edge-trailing edge range dynamics with warming, whereas tree-ring data suggest that all populations are on the trailing edge (will decline). A spatial network of time series data makes it possible to detect the scale dependence of climate responses, questioning the climate envelope approach. Second, I'll describe a collaboration with the Navajo Forestry Department (NFD), in which NFD's ongoing monitoring of forest health in its Continuous Forest Inventory plot network is enhanced by sampling tree rings. The data show that multiple factors influence tree-level productivity simultaneously, that productivity has been declining during the last several decades, and that landscape-scale synchronicity may be increasing (a leading indicator of forest ecosystem instability). Our next step is incorporating tree-ring data into the Forest Vegetation Simulator, an important forest management tool, to support NFD's efforts at mitigating climate stress.

