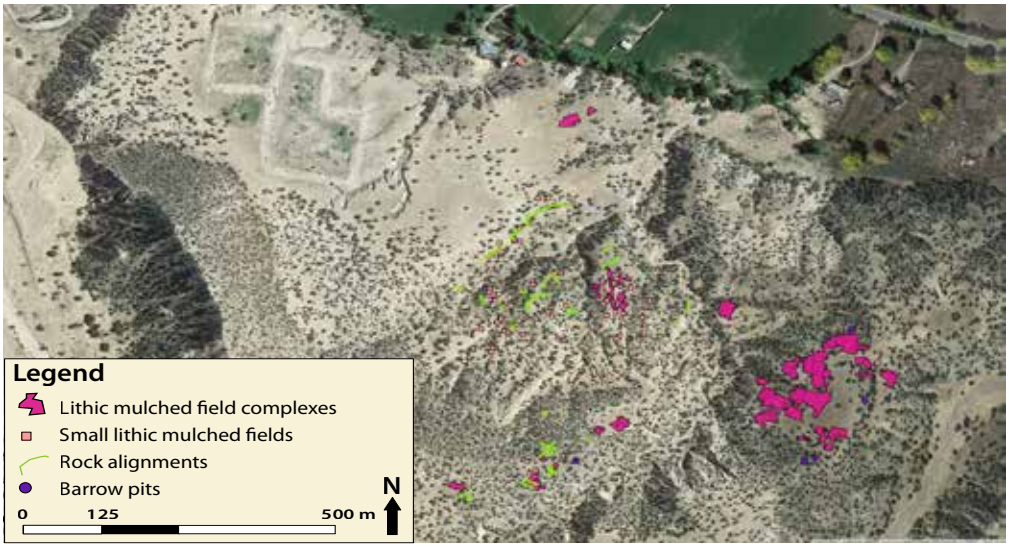

Figure 5. Extent of surveyed and mapped agricultural features around the site of Poshu'ownigeh (upper left). The mapped extent of dryland agricultural fields is a fraction of the actual extent.

Figure 7. Due to their multi-stem habit, one seed juniper biomass is estimated via root collar diameter in an allometric equation. Obtaining diameter and circumference measurements from these low growing shrubs is not usually an enjoyable endeavor.

BEHIND THE WOODSHED: TREES IN THE DESERT

by Steve Leavitt

Wait...What? A Tree-Ring Lab in the southern Arizona desert?

On occasion I have gotten into casual conversations with new acquaintances during which I mention my association with tree-ring studies at UA, and a common response is "Oh, so you must be in the forestry department?" This seems to be a reasonable first impulse, as forests are troupes of trees, each of which invariably has growth rings or growth bands to be studied. Hence, a tree-ring laboratory would logically be associated with a university forestry department such as those found in Oregon, Colorado, and even northern Arizona. However, our department is not located in a forest (unless maybe you consider the armies of iconic saguaro cacti to be a forest in the Sonoran Desert). In fact, we are in a desert lacking the collections of trees that are usually thought of as forests. The biggest exception is that the scattered lofty mountain ranges in southern Arizona (known as "sky islands") indeed support patches of conifer and deciduous forests.

The curious location of the Laboratory of Tree-Ring Research (LTRR) in the desert is a consequence of its founder, Andrew Ellicott Douglass (an astronomer with particular interest in activity of our star, the Sun) joining the University of Arizona Astronomy department. He brought with him an enduring interest in tree rings acquired while working at the Lowell Observatory in Flagstaff. There he reasoned that solar activity (sunspots) was related to climate on Earth, and that proxy climate records could be derived from the variable year-to-year growth of tree rings. In Flagstaff, Douglass had developed some of the methods and principles of dendrochronology, which were then expanded and honed at the University of Arizona where he promoted tree-ring research, education, and dissemination of findings.

However, upon further review, with the exception of the sky island forests, is the immediate landscape of the LTRR really devoid of trees? Although we might not think much about it, the answer is a resounding "NO". We are surrounded by thousands of trees including those found in natural environments at low elevation in the Sonoran Desert (e.g., mesquite, palo verde, ironwood), as well as those same trees and non-native variants along with a myriad of other non-native trees planted around the city (e.g., Aleppo pine, Canary Island pine, eucalyptus, olive, fruit trees). The biodiversity of trees is even greater on our campus where a wide range of exotic trees has been planted over the last century, now part of a formal Campus Arboretum (https://arboretum.arizona.edu/).

Many of these trees have scarcely been studied with respect to growth rings, so they can be considered a bit of a "frontier" in tree-ring studies. Prof. Wes Ferguson of LTRR worked on dendrochronology of several semi-arid species in the 1950s and 1960s, with some successes but with other tree species showing little or no value (at least as determined by standard dendrochronological methods). Recently, dendrochronology was employed in an experiment to assess irrigation water needs of trees commonly used for arid urban forestry in Arizona (https://repository.arizona.edu/handle/10150/625295). In various cities around the world, urban dendrochronology has been practiced to reveal growth in response to urban climate and pollution stresses. Thus depending on the research question, the trees growing in our vicinity are a potentially important resource to address environment and environmental change questions for our area. All told, these overlooked forests can be likened to the myriad of unintelligible announcements on the flea market PA system, whose garbled static we usually don't pay much attention to, but which might contain a bounty of vital information… if only we could decipher it.