

**FIVE MILLENNIA OF POPULATION DYNAMICS IN A HIGH-ALTITUDE  
POPULATION OF BRISTLECONE PINE**

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Very few study systems offer the ability to examine the detailed population and community-level dynamics of longlived species on time-scales relevant to their life history, or to probe the climatic controls on population behavior over more than a few decades. The bristlecone pines (*Pinus longaeva*) of the White Mountain Range are not only the longest-living (non-clonal) species on record, but deceased individuals and relict wood can remain intact for millennia in their cold and dry high elevation environment. To better understand the forces promoting longevity and limited recruitment of long-lived trees, I used dendrochronological analyses to reconstruct the spatial and temporal history of a high-altitude Bristlecone population with a relict wood record spanning 7000 years. I found substantial variability in population growth rate, age distribution, and demographic rates of trees over this period of time. I also found considerable variation in mortality rates, some of which is correlated with climatic conditions. Trends in recent recruitment and investigation of old photographs show remarkably low juvenile mortality and a large increase in 20<sup>th</sup> century recruitment into juvenile classes for both bristlecone and limber pine (*Pinus flexilis*). Additionally, recent experiments and surveys have shown that recruitment of seedlings is episodic on a decadal scale. These disparate data sets will be used to construct stochastic demographic models, which can be used to predict the response of bristlecone pines to a changing climate. Understanding the population-level consequences of extreme longevity and the actual response of population vital rates to stochastic events can provide an important test of the applicability of normal demographic methods to long-lived species.