Fire regimes, pre- and post-settlement vegetation, and the modern expansion of western juniper at Lava Beds National Monument, California

Summary of Results
Fire maintained vegetation in a dynamic state across the Lava Beds National Monument and limited the encroachment of western juniper and curl-leaf mountain mahogany into grassland and sagebrush steppe plant communities. The broad range in structure and composition of historic vegetation was a result of a heterogeneous landscape, which supported a wide range of fire regimes. Differences in site potential, determined by soils, slope and aspect, and elevation, strongly influenced abundance and structure of fuels and fire behavior. Fire regimes varied from high frequency low severity to low frequency high severity most often burning in the late summer or fall. Mean fire return intervals ranged from 8-10 years on the north face of the cinder cones to over 150 years in the western juniper/mountain big sagebrush/western needlegrass plant association. Mean fire return intervals appeared to increase along a gradient of increasing moisture, which was expressed by a shift in dominance of diagnostic perennial grass. Changes in these species abundance and vegetation composition and structure can occur spatially very abruptly. An example is a change of a mean return interval of 10 years on Caldwell Butte where old growth juniper was absent to over 150 years in old growth juniper woodland lying at its base. However, there was an abrupt change in slope, aspect, soils, fuels, and vegetation structure and composition along the base of this butte. Western juniper establishment and the presence or absence of presettlement trees appeared to be closely associated with fire. Our data support the hypothesis that fire played a diverse role across this landscape creating a heterogeneous mosaic of plant communities. These data also strongly support the close association of fire with western juniper establishment.