ABSTRACT

TITLE:	Fire History of the Turkey Spring Watershed: Fort Apache Reservation, AZ
AUTHOR(S):	Davis, Javis; Kenny , Ray
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ABSTRACT: The Turkey Spring (TS) watershed (approximately 0.27 mi2) is located in east-central Arizona south of the Mogollon Rim escarpment on the Fort Apache Indian Reservation. The 2002 Rodeo-Chediski wildfire burned over 280,000 acres of woodlands on the reservation, disrupted hydrologic systems, and triggered increased runoff and stream channel incision in the watershed. The channel incision exposed well-preserved, soil horizons, paleo-debris flow deposits and multiple charcoal layers. The purpose of this study was to: (1) measure a stratigraphic section within the TS watershed; (2) determine radiometric age dates from charcoal exposed in the channel cut; and, (3) establish a fire history for the watershed. Charcoal samples were collected from a 2.4 meter section (elevation 1855 meters, 572555E, 3780785.5N, Z12N) in the TS watershed. The channel cut exposed: (1) cobble-rich sandy loam to sandy loam soils; (2) four spatially distinct charcoal layers; and, (3) angular, poorly-sorted, gravels interpreted as debris flow, flood deposits. The soil and alluvial deposits overlie the Corduroy member of the Supai Formation. The upper section of the Corduroy member consists of fine-grained sandstone and siltstone; the lower section is composed of siltstone, gypsum, and limestone. Three of the four charcoal layers are interbedded with or occur stratigraphically below, angular to sub-rounded gravel to boulder-sized clasts. Organic material and excess soil were removed from the charcoal samples in the Fort Lewis College research lab, and three prepared samples were sent to the University of Arizona, Accelerator Mass Spectrometry (AMS) lab for 14C analysis. 14C dates from the AMS lab were converted to calendar age dates using the OxCal software, which yielded calendar age dates of: BC 6,235 140; AD 623 48; and AD 722 56. Because the charcoal samples were either within or below the coarse alluvial material, we suggest that wildfires likely induced the debris flow events. Two of the three 14C age dates (AD 623 48 and AD 722 56) correlate well with known drought conditions in the southwestern USA (Frechette, 2009). The oldest 14C sample (BC 6,235 140) is associated with a major debris flow event, and correlates with a transition between high and low effective moisture in southern Arizona, documented by Walters and Haynes (2001).