

ArcBurn: Linking field-based and experimental methods to quantify, predict, and manage fire effects on cultural resources (JFSP 12-1-04-5)

An innovative, multi-disciplinary project that provides tools and guidelines for reducing damages to cultural resources from wildfires and fire management activities. ArcBurn serves as a model across agencies, tribes, and regions. Information generated is especially critical as climate changes alter wildfire patterns and fire behavior.

ArcBurn team: PI: Dr. Rachel Loehman, USGS Alaska Science Center; Co-Is: Dr. Bret Butler and Jim Reardon, USFS RMRS Fire Lab; Dr. Jennifer Dyer and Dr. Connie Constan, USFS; Dr. Alexander Evans, The Forest Guild; Dr. Ana Steffen and Jamie Civitello, Valles Caldera National Preserve

Recent activities:

PRESCRIBED FIRE INSTRUMENTATION

- Developed protocols for monitoring fire behavior, heat flux, and fire effects on archaeological sites during prescribed fires and wildfires
- Instrumented 8 archaeological sites on the San Juan Rx fire (7,300 acres, 10/2013) and Pino wildfire (4,300 acres, 9/2014) in partnership with the southwest Jemez Mountains CFLRP, NM
- Post-fire analysis showed varying levels of fuel treatment effectiveness
- Suggested improvements: larger ignition buffers around archaeological sites, tailored ignition patterns, off-site removal of slash and heavy fuels, minimal treatment of live fuels (*less is better*)

LABORATORY TESTING

- Outdoor 'crib' burns – measured effects of radiant and convective heating on architectural stone
- Muffle furnaces, smoldering beds, and open flame beds measure effects on prehistoric ceramics, lithics (stone tools) and architectural stone
- Results: wide range of fire sensitivity among artifact types (*no "one size fits all" treatment*); crown fire environment less damaging than ground or surface fires; heat fluxes and artifact damages from 20th and 21st century fires likely much greater than occurred the past 500-1000 years

TECH TRANSFER AND OUTREACH

- Project website: <http://www.forestguild.org/Arcburn>
- We convened a multi-agency advisory team of 13 experts to discuss the biggest gaps in knowledge around fire and cultural resources.
- We have interviewed 17 fire and cultural resource managers about best practices and research needs for protecting cultural resources from fire and fire related activities in the southwest.
- In collaboration with FRAMES, a new portal for fire and cultural resources was created to house useful but not well distributed reports and papers on fire effects on cultural resources www.frames.gov/partner-sites/arcburn/

