**PR Number: R8227125006**

**Award Number:** **P12AC10173**

**Project Number: NAU-411**

**Park/NPS Unit:** Grand Canyon National Park

**Title of Project:** Comparing modern and historical high-elevation fire regimes at Grand Canyon

**Administered through the:** Colorado Plateau Cooperative Ecosystem Studies Unit Cooperative Agreement Number H1200-09-0005

**CESU Partner:** Northern Arizona University

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**Funding Information:**

**Amount Funded:** $98,400

**NPS Account Numbers (amounts in parentheses):** 9561-FSCI-W11 ($50,000), 8227-HEFR-W13 ($48,400)

**Fund Source (e.g., ONPS, FLREA, CRPP, CESU, etc.):** Fire (FMPC and IMR)

[x] NPS Funding

[ ]  Is this funded using a reimbursable account number? If yes, IMR contracting needs a copy of the Interagency Agreement.

**Project Dates:**

**Start Date:** 5/1/2012

**End Date:** 2/28/2014

**PROJECT ABSTRACT:**

Grand Canyon National Park has been a leader among NPS and other public land management agencies in restoring the ecological role of fire, but the ecologically important high-elevation ecosystems in the park are lacking strong scientific information on which to base management decisions. The high-elevation forests cover ~50,000 acres of Grand Canyon´s North Rim, with dense, contiguous fuels that have supported the most severe fires in the Park´s recorded history. Since 2000, 11,650 acres have burned with high severity, occasionally in large patches exceeding 1,000 acres (maximum ~2,500 acres). Compared to the limited information available, modern fires may have created uncharacteristically large patches of mortality, potentially limiting natural regeneration for seed-dependent species (*Picea*, *Abies*). Differences in modern fire seasonality, frequency, and landscape pattern may also raise concerns about the possibility of shifting these rare ecosystems into new stable states, as has been documented for nearby forests, as well as increasing susceptibility to invasive species and climate change. Detailed, site-specific information about the historical arrangement in time and space of severely burned forests would be valuable for comparison to the modern fire regime, allowing managers to confirm the ecological basis of current fire management or make adjustments if appropriate.

This project will develop a quantitative assessment of the historical fire regime in high-elevation forests of Grand Canyon´s North Rim using a combination of existing data and efficient, selective collection of new data. The objectives are to answer the following research questions:

(1) What is the best estimate of historic high-severity patch sizes, spatial arrangement, and temporal arrangement of fire dates in high elevation forests on the North Rim?

(2) What is the current high-severity patch size distribution?

(3) Under what climate and fire weather conditions were, and are, high-severity patches generated?

(4) What management strategies would best promote the heterogeneity characteristic of this system while also promoting resiliency into the future?