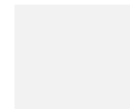


Enhancing Pile Burning Strategies in Alaska's Boreal Forest – A Comprehensive Approach (Research Permit)

Cultural Resource Report No. 2024-DENA-003

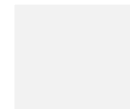
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ABSTRACT

Researchers from the Center for Ecosystem Science and Society (Northern Arizona University) are proposing a study that would quantify soil heating and the biophysical effects of pile burning on the boreal forest in Denali National Park and Preserve's (the Park's) front-country.

The undertaking would result in ground disturbance of previously surveyed areas in the Park where vegetation has been piled for burning. There are five cultural sites within the proposed area of potential effect (APE); no vegetation piles would be placed on and no ground disturbance would occur on or near (within 20m) these resources.

As designed, the project would not affect any historic properties. It is recommended that DENA approach National Historic Preservation Act, Section 106, consultation under 36 CFR Part 800.5(b) as "No Historic Properties Effectuated".

1 Description of Undertaking

The Center Ecosystem Science and Society, Northern Arizona University (NAU), is proposing a study of soil heating and the biophysical effects of pile burning, including the installation of temperature sensors and collection of samples within burn piles in Denali National Park and Preserve (the Park). Up to 40 burn piles could be selected for the study during this project, all within the front-country of the Park. The study provides an opportunity to conduct intensive research on fire management activities in an easily accessible location. The work proposed will address a known knowledge gap and capitalize on planned National Park Service (NPS) management actions to produce useable recommendations for Park Fire Managers and the broader Alaska fire science community.

The proposed undertaking would include drilling small (4mm diameter) bore holes up to 30cm in depth from the mineral soil surface under burn piles. These bore holes would be created to insert temperature sensors into the soil profile. As part of drilling these small holes into the mineral soil, a 15x 150 x 25cm (W x L x D) channel would be excavated through the radius of the piles below the organic soil layer in order to gain access to the mineral soil surface and protect sensors from excessive heat. The excavated material would immediately be replaced after sensors have been placed.

After burning is complete, soil profile samples would be collected (n = 200) using a SIPRE Corer at each site. This hand-auger device removes a 7cm diameter soil core to 30cm depth. Once cooled, charcoal and burned material would be collected from a randomly placed 30cm x 30cm quadrat within the burn scar of each sampled pile; approximately 3.6m² of surface charcoals are expected to be removed using this method. Piles would be approximately 6ft x 6ft in diameter before burning.

2 Legal location for the undertaking and Local Environment

The project area is located within the Healy C-4 USGS Quadrangle Map. The overall project area is located in the frontcountry of the Park; north and south of the Denali Park Road from mile post (MP) 0.3 to 1.5 and from MP 3 to MP 3.5 (Figure 2). The project area is located within sections 3, 4, 5, 7, and 8 of T14S, R7W of the Fairbanks Meridian.

The project area is within a portion of the state characterized as the northern foothills of the Alaska Range. This area as flat-topped east-trending ridges 610-1,370 m (2,000-4,500 ft) in altitude, 4.8-11.2 km (three to seven mi) wide, and 8-32 km (5-20 miles) long, separated by rolling lowlands, 215-460 m (700-1500 feet) in altitude and 3.2-1.6 km- (two to ten mi) wide. The area is comprised of upland glacial topography (kettle and kame) (Wahrhaftig 1965). Vegetation is mixed spruce with ericaceous shrub undergrowth.

3 Area of Potential Effect

The Area of Potential Effect (APE) are the fuels treatment units within which the piles would be placed and is 42.2 acres in size.

4 Results of Inventory and Records Check

DENA cultural resource records, previous cultural resource surveys reports from the area, GIS data, and Alaska Heritage Resource Survey (AHRS) information were reviewed previous to this project. There have been many surveys within the APE beginning in the 1980s with the most recent survey occurring in 2023 (Table 1). The entire 42.2 acres of the APE have been surveyed.

Table 1- Overview of Previous Surveys in APE

Report Name	Year	Reference	Method
Denali National Park Survey	1981	Davis	Survey
Fuels Management Survey FY22	2022	Caselman, Hruban, Gilbert	Survey
Fuels Treatment Survey FY23	2023	Pope, Gilbert, Scott, Jarquin, and Johnson	Survey
Monitoring the Pattern and Consequences of Spruce Bark Beetle Infestation on Denali White Spruce Forests - Archeological Investigation Report	2023	Gilbert, Gonzalez Negrete	Survey

4.1 AHRS Sites located within the Project Area

There are eight AHRS sites (HEA-00147, HEA-00429/MMK-0017/ HEA-00517/MMK-00195, HEA-00748, HEA-00749, HEA-00753, HEA-00758, HEA-00761, and HEA-00277) found within the APE.

provided wall tents with wood floors for summer housing. This site was found not eligible for the NR with SHPO concurrence in 2003.

5 Recommendations

For the purposes of assessing the overall effect of this proposed undertaking on historic properties, all unevaluated cultural resources located within the APE are being treated as eligible for the NR. No vegetation piles will be constructed on or near (within 20m) any known cultural resource, and no ground disturbance or pile burning will occur on or near (within 20m) those historic properties eligible or potentially eligible for the NR.

If cultural resources or items protected by the Native American Graves Protection and Repatriation Act are discovered during project implementation, all project-related activities in the vicinity of the discovery will be stopped and the park archaeologist will be notified immediately. DENA in consultation with the State Historic Preservation Officer and other consulting parties would determine a course of action per 36 CFR Part 800.13.

Based on our review, as designed, the project will not affect any historic properties as no piles or ground disturbance would occur where there are historic properties or cultural resources potentially eligible for the NR. It is recommended that DENA approach National Historic Preservation Act, Section 106, consultation under 36 CFR Part 800.5(b) as “No Historic Properties Effected”.

6 Maps & Figures

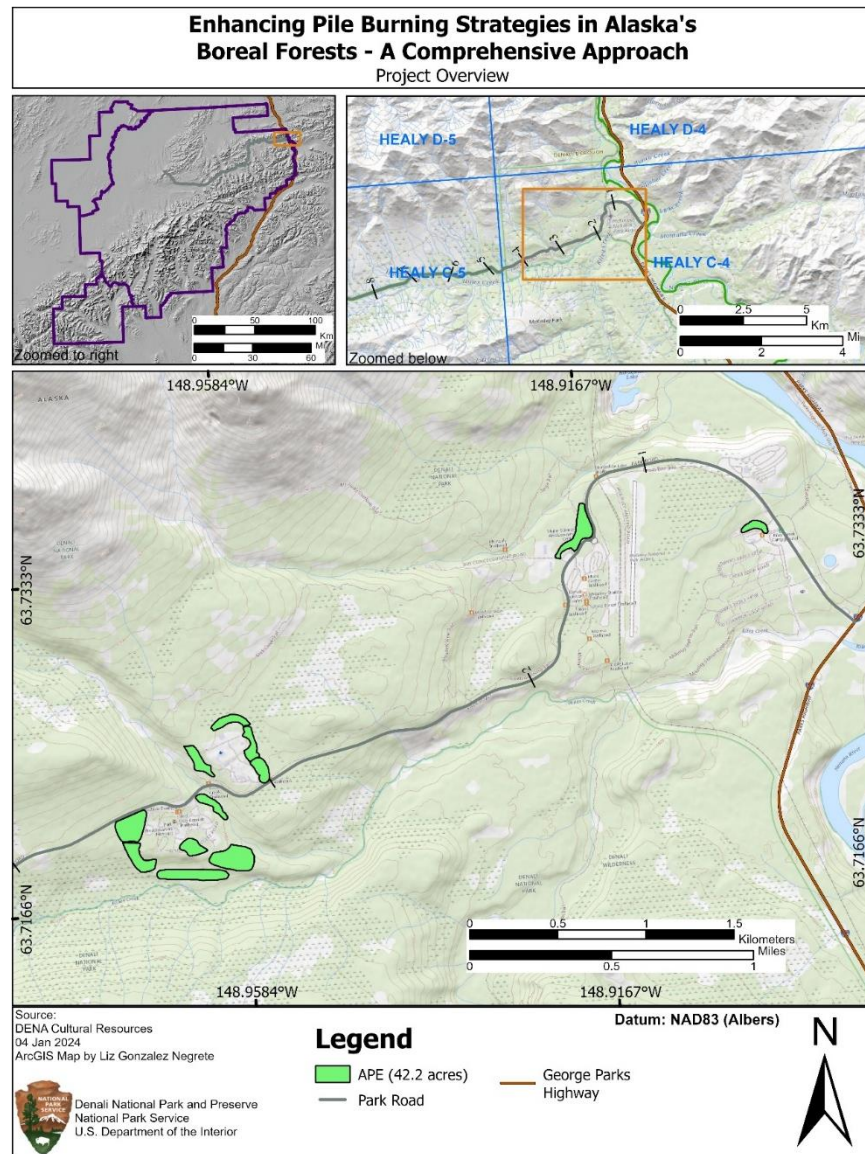


Figure 1- Overview of APE. APE is composed of fuels treatment units where the undertaking may take place.

7 References

Wahrhaftig, C.

1965 Physiographic divisions of Alaska. *U.S. Geological Survey Professional Paper* 482:23.

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