

FIRE MANAGEMENT

Prescription Slope Burns at Grand Canyon National Park Build Landscape Resilience



Southwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE



Area 14 of the North Slopes of GRCA Undergoing Test Fire in December 2021/Jimmy Flanagan/NPS

INTRODUCTION

Grand Canyon National Park (GRCA) spans over 1.2 million acres in northwestern Arizona. Human activities and fire suppression policies have degraded the ecosystem and led to fuel load build-up. Increased fuel load combined with climate change impacts has increased the risk of severe wildfire. The National Park Service (NPS) now employs fire as an effective landscape-scale restoration tool in GRCA, including in the Roost project block, which spans 30,350 acres of the North Rim Slopes. Prescribed burning protects native biodiversity and enhances landscape resilience to climate change impacts.

KEY ISSUES ADDRESSED

The Roost project block is a continuous landscape devoid of many boundary features that would usually buffer fire such as roads, large changes in topography or elevation, canyons, or drainages which could prevent a wildfire from spreading. This area therefore lacks resilience, and if it was subject to a large fire under unfavorable weather conditions, it could result in the loss of this entire habitat, destroying its structural integrity. A number of seasonal trends must align for conditions to be right for a burn on the North Rim slopes, including shorter days and cooler nights, increasing the likelihood of a fire slowing down within a few days. However, climate change is driving shifts in seasonality, making weather factors more difficult to track and predict. Over the last century, fire suppression has been the dominant fire management strategy, leading to fuel buildup which increases potential for large, high-intensity wildfires which endanger human safety and could result in irreversible changes to vegetation composition.

PROJECT GOALS

- Utilize topography to identify entry points where fire can be introduced safely
- Track precise environmental conditions to implement fire at ideal times
- Explore innovative ways to reintroduce fire despite limited road access



PROJECT HIGHLIGHTS

Backburning Down Canyon Slopes Protects Landscape Integrity and Resilience: Due to the lack of natural boundary features in the Roost project block, managers light burns along ridgetops of the North Rim, so fires burn downslope against the prevailing wind, which contains the burn. This reduces the risk of fire escaping the target area. They light small (i.e. 100-500 acres), low severity fires during the tourism shoulder season instead of waiting multiple years to implement one large burn which would be harder to control. After three burns they have covered 30-40% of the area.

Incident Meteorologists Improve Weather Forecasting Confidence: In 2024, fire managers began working with incident meteorologists who provide localized weather forecasting and decision support. Monitoring weather trends is critical to keep burns within the prescribed area and prevent fires from burning for too long, especially as weather becomes less predictable.

Aerial Ignition Reduces Risk and Improves Access: Managers fly rotor-wing helicopters over the Roost project block and drop plastic ping-pong balls filled with powdered chemical igniter that burn and spread into nearby fuels. Aerial ignition limits exposure of staff to fire and smoke and covers 750-2,000 acres in a few hours, which would take days for staff covering the difficult terrain on foot.



LESSONS LEARNED

Fire managers have learned it is important to **clearly communicate with the public about the use of prescribed fire** in a popular national park like GRCA. The NPS and the Arizona Department of Environmental Quality (ADEQ) **collaborate on public outreach efforts** to educate visitors, residents, and park stakeholders about impacts of smoke from prescribed burns. Safety measures such as road closures and signage prioritize staff and visitor health during these restoration efforts. By engaging in transparent communication and collaborative decision-making, NPS and ADEQ seek to **alleviate concerns and foster understanding of the benefits of prescribed fire** for ecosystem health and climate resilience.

The Roost project block demonstrates how **placement and maintenance of infrastructure affects fire fighting ability**. Before aerial ignition, lack of accessible roads was one major issue preventing proper fire management in this area, which led to dangerous levels of fuel buildup. The Roost project block therefore presents an opportunity to consider how fire and infrastructure might interact in the future. For example, **future outdoor recreation areas can be designed strategically by considering accessibility for prescribed fire**.

NEXT STEPS

- Expand this type of data-driven burning to other areas without boundary features
- Search for new tools to provide higher confidence weather data
- Explore unmanned aerial surveillance (UAS) drone technology to implement targeted fire

PARTNERS

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