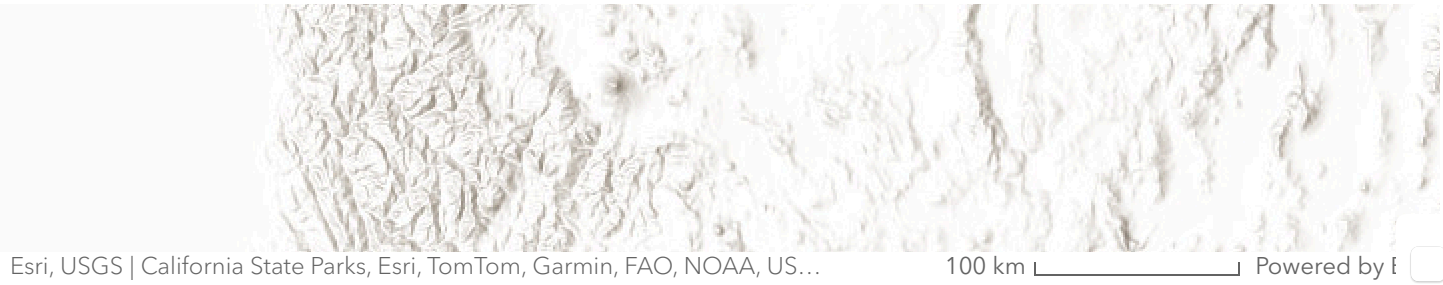
Case Study by CART and the Drought Learning Network

Nature-Based Solutions for Community-Level Preparedness to Wildfire

A Case Study on Fire Management
February 28, 2024



Introduction

Wildfire is a natural process in the forests of California's Sierra Nevada Mountains, but fire suppression, prolonged drought, and rising temperatures are increasing fire frequency and severity. Historically, and in recent years, Maidu, Yana, and Pit River Tribes routinely ignited low tree-mortality wildfires (Lake, 2013). This practice decreases the likelihood of larger wildfires by clearing dead vegetation and leaf litter. In the 20th century, the U.S. Forest Service replaced the low-mortality ignitions with active wildfire suppression. This change in the pattern of wildfires resulted in the accumulation of fuels in densely vegetated forests, prompting more frequent and intense wildfires. Consequently, increased wildfire frequency and severity threatens human life and infrastructure in towns like Paradise, California. For example, the Camp Fire destroyed 11,000 homes in Paradise in only 8 hours, indicating the speed and intensity of the spread of wildfire (Siegler, 2019).

To reduce the damage of future wildfires, the Paradise Recreation and Park District (PRPD) plans to establish multi-benefit greenspaces, or natural areas for recreational and aesthetic purposes (e.g. parks), within Paradise's eastern and southern borders. Establishing greenspaces on the outskirts of town will provide nature-based solutions to help reduce the spread of wildfires to the town's urban center by providing a break in the fuel load. The greenspaces will also protect the natural environment to support habitat and wildlife conservation, enhance community water and air quality, and improve

community wellbeing by increasing opportunities for positive experiences with nature, such as exercise and mental restoration. PRPD will acquire land parcels from local landowners through easements, donation, or purchase to establish the greenspaces.

Key Issues Addressed

Local topography exacerbates the risk of severe wildfire caused by active wildfire suppression. The ridges and valleys surrounding Paradise provide momentum for wildfires as they build upslope because heat rises and warms uphill fuels. Due to the pre-warmed fuels at the top of slopes, wildfires build in intensity as they advance. Since Paradise sits on top of slopes on its southern, eastern, and western borders, the town's urban center is vulnerable to intense and rapid wildfires.

Federal and state agency-recommended community wildfire adaptation methods place responsibility on the landowner, and

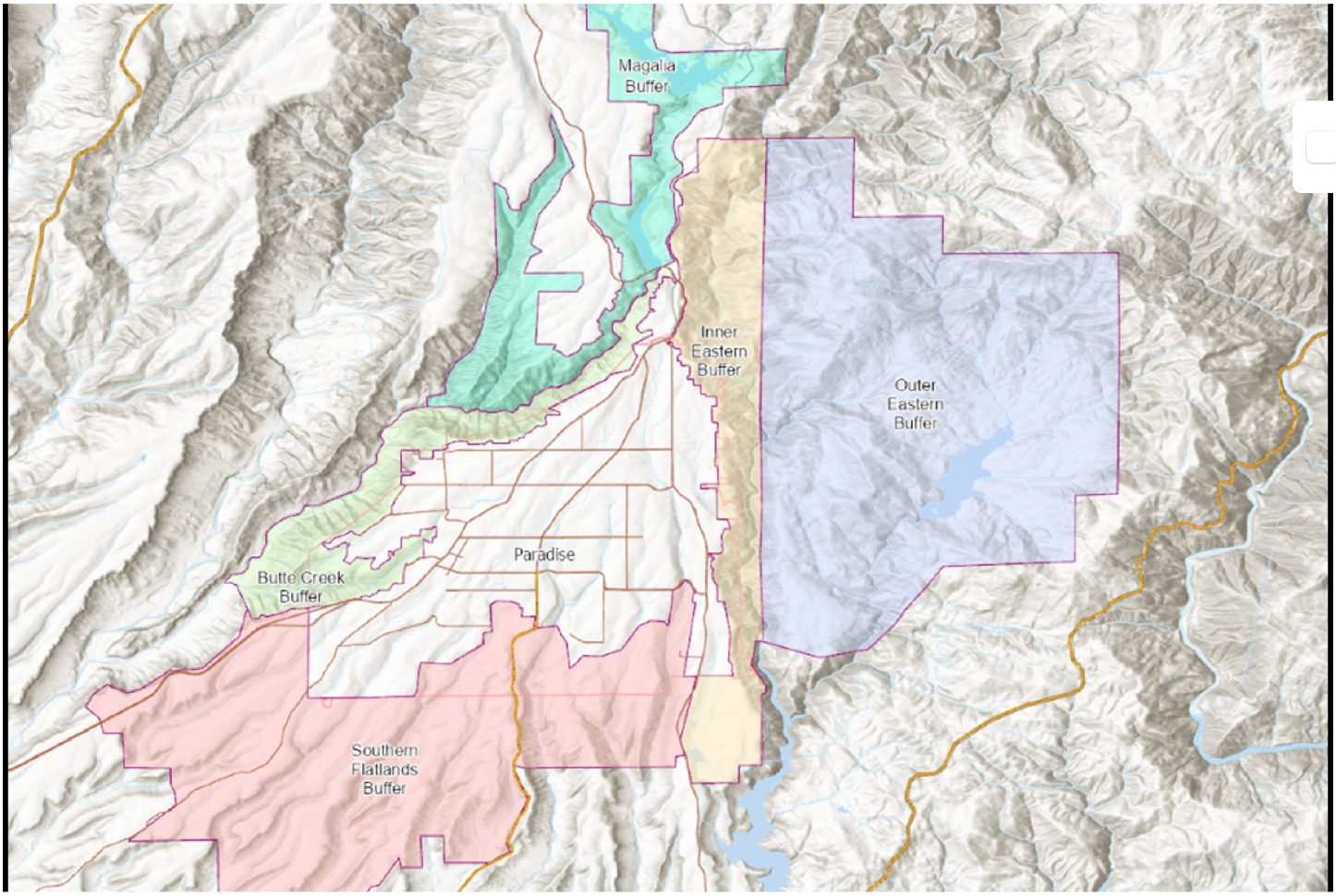
are often too costly or difficult to implement. Common recommendations include home hardening methods, such as retrofitting houses with more fire-resistant materials and removing combustible plants in close proximity to structures. These recommendations are particularly difficult for renters and landowners who own property that extends down steep and forested slopes, such as on Paradise's eastern and western borders. In addition, even though building standards have been made more protective of individual homes, the uncertainty and increasing costs of the insurance market means that residents in Paradise have a lot of financial challenges in increased premiums and difficulty in getting financing. Because there are few effective community-wide approaches, PRPD wants to scale up wildfire mitigation to the community level to address the disparity in mitigation at the property level.

Evacuation and damage from wildfires can be traumatic experiences, especially for children. Adverse childhood experiences have been linked to both mental and physical health conditions in adulthood, such as depression and heart disease (CDC, 2021). In addition, pervasive smoke from wildfires impacts residents' health and persists as an uncomfortable reminder of wildfire threat. Greenspaces not only aid in wildfire spread prevention, but also provide places of restoration for survivors.

Project Goals

- Identify and acquire land parcels around the town's urban center with high wildfire risk, specifically on top of slopes, to establish greenspaces
- Design greenspaces that scale-up wildfire mitigation and remove the burden from individuals
- Use greenspaces to increase community wellbeing and prevent trauma associated with wildfire by providing a multitude of recreational activities, conservation benefits, and local economic opportunity

Image Caption: *Brush clearance done near neighboring property lines in Oak Creek Park, Paradise.*



Project Highlights

Using Fire For Good — **PRPD will use controlled burns to reinstate the historic fire patterns essential to maintaining the local forest ecosystem. This project aims to facilitate safe and effective ways to live with fire.**

- **Partners Strategically Identify Land Parcels Ideal for Greenspaces:** The Conservation Biology Institute and The Nature Conservancy created a model to check the feasibility of the greenspaces. Researchers then identified key land parcels based on heightened wildfire risk, due to land cover and topography, and each key parcels' abilities to protect biodiversity and provide recreational opportunities. The parcels that met both criteria were grouped into buffer zones

based on their location. According to the model, if every identified land parcel is converted to greenspace, community wildfire risk will decrease by 60%. The open, noncombustible space will also provide firefighters the space necessary to fight wildfires when they do occur.

- **Greenspaces Provide Multi-Purpose Benefits:** In addition to creating a fuel break, the greenspaces will provide wildlife habitat, recreational activities, and other ecosystem services, including improved air and water quality. Some spaces may be converted to orchards or agricultural uses to provide economic opportunities and increase community food security.
- **Green Spaces Build Community Resilience to Future Trauma:** Plans for greenspaces include a demonstration forest and community center to provide positive childhood experiences and opportunities for children to gain resilience skills. For example, teaching children outdoor skills can boost their self confidence and show them how to work well in a team.
- **PRPD Offers Incentives to Landowners:** PRPD provides incentives to further encourage landowners to donate their land by providing assistance with relocation through grant funding. PRPD is also communicating the benefits of entering easements with landowners to allow PRPD to manage land parcels that pose the highest wildfire risk. Other incentives for landowners to protect their community include decreased home insurance premiums, and the new opportunities the greenspaces will provide.
- **Community Engagement Builds Understanding and Support for Greenspaces:** Community outreach focuses on gaining community support by sharing the multi-purpose design of the greenspaces. PRPD shared wildfire risk reduction maps with residents through Data Basin, an interactive mapping platform. By selecting key land parcels, residents were able to see how each contributed to decreasing wildfire risk. PRPD also conducts on-site tours to existing burned areas and burned areas that have been converted to greenspaces.

These tours provide first-hand experience with wildfire risk, and greenspace designs.

Image Caption: *PRPD Buffer Project, areas to concentrate efforts within PRPD boundaries that would best protect communities in the District.*

Lessons Learned

Small local agencies like PRPD will need to rely on grants and creative partnerships and approaches to implement nature-based, community-level approaches to wildfire mitigation. Factors to consider include the costs of acquiring land, the initial construction of the greenspaces, and the labor and costs for continued maintenance. PRPD is using FEMA grants to fund community outreach efforts.

Effective community-level wildfire protection requires every high-risk land parcel be converted to greenspace. Consequently, community dedication must be to the extent that landowners are willing to enter land-easements, or donate their land. As such, PRPD builds relationships with landowners to leverage their sense of dedication and responsibility to the community. In addition to raising awareness of wildfire risk, working with the landowners' strong sense of place and love for the community is key to acquiring every parcel necessary for community-level protection from wildfire. Knowing that their land could be used for wildfire protection and community well-being, landowners will be more likely to work with PRPD than sell their land to developers. Tours to sites already converted to parks can help motivate landowners and community members, and change their perspective of how they want their own land managed.

Image Caption: *California Conservation Corp brush clearing work at Coutolenc Park in Magalia, near Paradise Lake.*

Next Steps

- Continue outreach efforts that support landowners as they manage their property for community wellbeing and wildfire mitigation.
- Apply for FEMA and other funding sources to buy land from property owners to convert land to greenspaces. Continue to explore partnerships to find additional funding for acquiring land and maintaining greenspaces over time.
- Use the wildfire risk reduction maps used in parcel identification in communication with insurance firms to justify a decrease in residential home insurance premiums.

Image Caption: *Forested View near the Little Butte Creek drainage and upcoming Magalia Paradise Lake Loop Trail. Area was burned in the Camp Fire, but forest beyond was untouched.*

Resources

Collaborators

- Paradise Recreation and Park District
- The Nature Conservancy
- Conservation Biology Institute

Funding Partners

- FEMA Building Resilient Infrastructure and Communities
- Sierra Nevada Conservancy
- California Recreational Trails and Greenways Grant Program
- North Valley Community Foundation/Butte Strong Fund
- California State Park Development and Community Revitalization Program

Resources

- Centers for Disease Control and Prevention. (2021). Adverse childhood experiences (ACEs).
- Conservation Biology Institute. (2020). "Paradise Nature-Based Fire Resilience Project Final Report."
- Knapp et al. (2021). "Housing Arrangement and Vegetation Factors Associated with Single-Family Home Survival in the 2018 Camp Fire, California." *Fire Ecology* 17:25.
- Lake F. (2013). "Historical and cultural fires, tribal management and research issue in Northern California: Trails, fires, and tribulations." *Occasion: Interdisciplinary Studies in the Humanities* 5.
- Mohr K. (2022). "Protecting Neighborhoods from Future Flames." High Country News.
- Moody et al. (2006). "Fire History and Climate Influences from Forests in the Northern Sierra Nevada, USA." *Fire Ecology* 2: 115-141.
- Moore A. (2021). "Explainer: How wildfires start and spread." College of Natural Resource News. NC State University.

- Siegler K. (2019). "The Camp Fire Destroyed 11,000 Homes. A year Later Only 11 have been Rebuilt." National Public Radio.
- Skinner C. and C. Chang. (1996) "Fire Regimes, Past and Present." Wildland Resources Center Report No. 37. Centers for Water and Wildland Resources, University of California, Davis. 1041-1069.
- Smith L. (2022). "Could a Buffer Shield Californian Homes from Wildfire?" BBC Future Planet.
- Swan-Perkins S. (2018). "In our Own Backyard: Stories of Survival from the Camp Fire." News From Native California.

Photo Gallery

- Photo Album and Credits

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The DLN is a peer-to-peer knowledge exchange between climate service providers and resource managers, created to gather and share lessons learned from drought events to prepare for future events. The DLN partners with CART to develop Case Studies, with funding from the National Drought Mitigation Center for interns and coordination support from the USDA Southwest Climate Hub.

Suggested Citation

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Image Caption: *View of Sawmill Peak from the previously forested area prior to the Camp Fire on Lakeridge Circle in Magalia at the site of the upcoming Lakeridge Park.*

More Information on CART