

## ASPEN AS FIREBREAKS AT THE DEVELOPMENT FRINGE

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### Overview

Quaking aspen (*Populus tremuloides*) forests are widely known and prized for their numerous values—biodiversity, habitat, forage, recreation, aesthetics, and others—including as a deterrent to wildfire. This reputation for stopping or slowing flames is explored here, alongside measures that may be taken to facilitate thriving aspen communities near human developments. It is clear that science supporting the premise of aspen as an effective firebreak is far from complete. Yet, how can we benefit from what we do know on this topic to increase the *probability* of preventing structural fire damage, while also encouraging the valued characteristics of aspen ecosystems?

### Background

In recent years we have seen wildland fires burn into adjacent settlements in numerous locales worldwide. Many of these locations, sometimes called Wildland Urban Interface (WUI), tempt fate by allowing flammable buildings in highly fire-prone environments. Painful as this may be, human choices play a sizeable role in such catastrophic losses of life and property.

It stands to reason that if some vegetation types are flammable, likely others are less so (Fig. 1). A review of fire traits of aspen types in the



**Fig. 1** Smoke lingers where aspen slowed a fire near this Wyoming home; conifers nearby are charred (Photo: P. Rogers).

Rocky Mountain West splits montane communities between those that commonly burn and those that rarely burn (Shinneman et al. 2013). Generally, aspen itself isn't very flammable, although these forests have a higher propensity to burn as cover of more flammable coexisting confers increases. The archetypal fire cycle in stands that intermix

with conifers is that aspen typically dominate the site shortly after disturbance through profuse suckering and episodic seedling establishment. As post-fire time increases, so does the dominance of conifers, as well as the flammability of forests. Ultimately, the cycle is completed by a wildfire that kills most of aboveground biomass, queuing aspen resprouting and seeding and a new beginning to the fire cycle in aspen-conifer forests.

Where pure aspen forests thrive (without co-occurring conifers), fire is a much less important ecological factor. These “stable aspen” stands and their associated understory retain greater moisture which reduces their flammability. An understanding of these two basic aspen fire types can be useful to private landowners and managers facing potential fire impacts to structures.

### Aspen Firebreaks: Promise and Pitfalls

Quaking aspen have long been touted as “asbestos forests” due to their observed aversion to burning (Fechner & Barrows 1976). This idea has been reiterated by practitioners for decades, but carries scant empirical evidence. Theories concerning the lower flammability (and heat release) of aspen compared to conifers arise from increased live moisture content of aspen and its associated understory vegetation (Jones & DeByle 1985) and/or lack of the flammable resins and terpenes contained by conifers.

Recent work by Nesbit et al. (2023) has begun to investigate the theory that aspen carry fire resistant properties. While these researchers didn't directly measure aspen performance during fire, they conducted a survey of fire managers around the western U.S. In short, numerous first-hand observations seemed to qualitatively confirm decreased wildfire intensity once fires moved into aspen-dominant stands. For instance, about 75% of survey respondents noted a decrease in fire behavior once fire entered aspen from another vegetation type (Nesbit et al. 2023). Still, aspen's fire resistance had limits, particularly under extreme weather conditions and/or during late-season fires when fuel moistures are low, as indicated by dried out understory plants.

While aspen have aesthetic, wildlife, and probable fire protection values, they also come with drawbacks. First, wildlife, fungus, and insects readily consume aspen. These forests are dynamic, and while the clonal root system may live for centuries, individual stems are short-lived relative to other trees. Aspen are impacted by a number of fungi and insects; some remain localized, while others spread vigorously (see Brief #5). The good news is a healthy stand will usually resprout. The bad news: they will spread their root systems to undesired places which may impede lawns, driveways, gardens, foundations, and utility lines. Moreover, aspen die frequently, leaving dead stems that can attract birds and other wildlife, but may also present hazards near property and people.

### Suggested Practice in Developed Areas

The fire break concept is that a protective strip of aspen forest and accompanying moist understory within the defensible space of a structure could dampen the likelihood of ignition from lofted embers (potentially intercepted by a moist overstory of leaves), as well as slow or stop the spread of surface fires. The following are brief tips for maintaining aspen and related flora in these spaces:

- Initial establishment may come from aspen nursery stock, root plantings, or true seedlings. Caution is required in



**Fig. 2** Volunteers plant true aspen seedlings in an experimental fire break near Breckenridge, Colorado (photo: C. Schloegel).

commercial saplings as they may carry unintended invasive species (see Brief #8). Growing young stems from root cuttings in a greenhouse then transplanting them takes time, but ensures local origin. Growing aspen from seed is probably the most challenging, but

with patience can be achieved (Fig. 2).

- Browsing ungulates (wild or domestic) commonly eat juvenile aspen suckers. Develop a plan to protect regeneration with barriers, noisemakers, or dogs.
- Increase the efficacy of this protective strip by encouraging an understory of tall forbs. If practical, mowing and irrigating the understory can reduce fine fuels and make it easier to keep green, although this may detract from desired natural conditions.

### Management Implications

For those willing to embrace dynamic aspen forests, they can provide incredible beauty, diversity, and potential protection against wildfire. To date, observations and (limited) science suggest active management promoting aspen cover will decrease the probability of fire near structures. With this in mind, we suggest prioritizing intervention closer to developments, with concomitant passive approaches in roadless, wilderness, and otherwise undeveloped forested



**Fig. 3** Active-to-Passive management continuum. Background: prescribed burning in aspen (photo: P. Rogers)

landscapes (Fig. 3). Specifically, periodic thinning in aspen forests of young conifer “ladder fuels,” as well as mature conifers, within 30 meters (~100 ft.) of structures will allow aspen and related moist forest floor communities to release and thrive.

### Key Findings:

1. Aspen hold some beneficial role in reducing fire likelihood and/or intensity and impacts, although under certain conditions (hot/dry, windy) flammability rises.
2. Near structures, active management for aspen growth could increase the *probability* of fire protection.
3. Concomitant benefits related to promoting aspen near homes include increased plant and animal diversity.
4. Study of aspen as a fire deterrent is nascent; with more knowledge we anticipate further caveats.

### Sources

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