Trends that can’t continue won’t. But, at what cost?

“Trends that can’t continue won’t.” This paraphrasing of the Yogi Berra-esque axiom by the economist Herbert Stein can be applied to forests of the Southwest. That is, current (unhealthy) forest conditions, characterized by high conifer densities, cannot continue (thanks to high-intensity crown fires as well as insect and disease epidemics). But at what cost? Wildfires in particular will continue to occur despite the best intentions of Smokey the Bear, who successfully mislead all who listened with “only you can prevent wildfires.” Forest stakeholders now understand and appreciate that fire is a natural part of forests in the Southwest and in fact “only we can postpone wildfires.” As evidence of this, and in great irony, the cause of the Las Conchas wildfire (the largest in recorded history in New Mexico) was a decadent aspen tree falling on a power line which ignited the 150,000+ acre blaze. This is ironic because aspen is an early successional and shade intolerant species that historically relied on fire to kill shade-tolerant conifers that through time would outcompete aspen for sunlight.

Historically, southwestern forests, particularly those dominated by ponderosa pine, developed under the influence of frequent fire (Sackett and et al. 1993). Reported mean fire intervals for southwestern ponderosa pine forests range between two to 12 years (Weaver 1951; Cooper 1960; Dieterich 1980). Over the last 10,000 years, frequent fire shaped vegetation composition, stand development, and structure in pine-grassland communities (Weaver 1943, 1964, 1967; Biswell 1959, 1972; Cooper 1960, 1961; Pyne 1982; Covington and Moore 1994). Frequent fires, characterized as light to moderately severe, were largely understory fires and killed few overstory pines. Fire acted as a natural thinning agent by reducing litter build-up, burning small trees, and thinning ladder fuels. Resulting forests were open and park-like with invigorated herbaceous understories providing the surface fuel for the fire cycle to repeat itself (Ahlgren and Ahlgren 1960; Moir et al. 1997). Due to their open nature and lack of ladder fuels, stand replacement fires were historically uncommon in southwestern ponderosa pine forests (Woolsey 1911; Cooper 1960; Pyne 1996).

A number of factors combined to change forest structure, understory and overstory composition, fuel biomass conditions, and the historic natural fire regime in southwestern forests over the last 120 years. Early contributing factors around the turn of the 20th century included logging practices (Habeck 1990) that removed overstory trees allowing for prolific conifer regeneration (Cooper 1960; Schubert 1974) and heavy grazing by sheep and cattle, which removed fine surface fuels necessary for fire spread (Baker et al. 2004). Moreover, throughout the last 90 years fire suppression efforts and exclusion policies contributed significantly to extreme fuel buildup. Although early ecologists opposed to the 10 a.m. policy (the 10 a.m. policy was introduced and adhered to by the U.S. Forest Service in 1935; the policy stipulated a reported fire was to be contained by 10 a.m. the following day, and failing that, controlled by 10 a.m. the next day, and so on) and later others such as H. Weaver (1943) warned of increasing fire danger based on increasing fuel loads due to lack of frequent surface fire, little attention was heeded. As a result, high-
intensity crown fires have replaced low-intensity fires in southwestern pine-grassland stands threatening not only those communities at the wildland-urban interface, but also the ecological integrity of vast areas throughout the West. Following high-intensity crown fires, timber resources are damaged or destroyed; wildlife habitat is altered or destroyed; nutrient stores are depleted; soil hydrology is altered; and duff, litter, and vegetation layers are removed exposing soil to rapid erosion events which in turn overwhelm riparian areas, streams, and rivers (Campbell et al. 1977). In addition to ecological disruption, crown fires threaten lives, threaten property, and are notoriously expensive.

In a recent study (Cram et al. 2006) we examined whether forest stands treated recently using silvicultural practices would be less susceptible to stand-replacing crown fires as compared to adjacent untreated stands. We compared fire severity indices, fireline intensity (btu/ft/s), stand characteristics including canopy bulk density (lbs/ft³), and post-fire recovery indices in silviculturally treated vs. untreated forest stands in New Mexico and Arizona. Results indicated fire severity in pine-grassland forests was lowered when surface and aerial fuel loads were reduced. Specifically, as density (stems/ac) and basal area (ft²/ac) decreased and mean tree diameter (in) increased, fire severity and fireline intensity decreased. Mechanical treatment followed by prescribed fire had the greatest impact toward mitigating fire severity (i.e., aerial and surface fuels were reduced). The more aggressive the treatment (i.e., where the canopy bulk density was reduced), the less susceptible forest stands were to crown fire.

1[Stein originally expressed "If something cannot go on forever, it will stop," by which he meant that if a trend (balance of payments deficits in his example) cannot go on forever, there is no need for action or regulation to make it stop, much less to make it stop immediately; it will stop of its own accord.]

Literature Cited


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