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Publication Brief for Resource Managers

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San Francisco East Bay Fire History, Landscape Changes

The San Francisco East Bay region has long been characterized by a rich mosaic of coastal range grasslands, shrublands and woodlands. However, management activities during the latter half of the 20th century are thought to be responsible for changes that resulted in loss of grasslands to native woody plant invasion, creating a landscape with increased fire hazard from greater fuel loads. In the September issue of the *International Journal of Wildland Fire*, USGS researcher Dr. Jon E. Keeley examined the 20th century fire history on this landscape to understand to what extent fire management activities could account for changes in landscape patterns.

Using the complete fire record available in the annual fire statistics printed by the California Department of Forestry and Fire Protection since 1931 in Santa Clara County and since 1945 in Contra Costa and Alameda counties, Keeley found that this region has a largely anthropogenic fire regime with no lightning-ignited fires in the vast majority of years. Fire suppression policy has not excluded fire from this region but has been effective at maintaining roughly similar burning levels and at decreasing the size of fires. Fire frequency paralleled increasing population growth until the latter part of the 20th century, when it reached a plateau.

Changes in fire regime do not appear to have been a major factor in the shrub colonization of grasslands in this region, and cessation of grazing is a more likely immediate cause. Because grassland distribution appears to be disturbance-dependent, and natural lightning ignitions are rare in the region, it is hypothesized that prior to the entrance of people into the region grasslands were of limited extent. Native Americans played a major role in creation of grasslands through repeated burning. Early European settlers maintained the grasslands through overstocking of these rangelands with cattle and sheep, although they greatly changed the character of these grasslands through the introduction of alien grasses and forbs. Twentieth century reduction in grazing, coupled with a lack of natural fires and the effective suppression of anthropogenic fires, have all acted in concert to favor shrubland expansion. These changes are commonly referred to as shrub invasion or brush encroachment of grasslands. This is perhaps more accurately described as natural recolonization of grasslands that have been maintained by millennia of human disturbance.

Management Implications:

- Fire suppression activities do not appear to be a major factor in the shrubland invasion of East Bay grasslands.
- Livestock grazing appears to be effective at maintaining these grasslands; however, it cannot be justified on the basis that it is restoring natural biotic communities since most of these grasslands are anthropogenic in origin.

These landscape changes in vegetation are of major concern to fire managers since shrublands with their enhanced fuel loads have the potential for greatly increasing fire hazard. However, these woody fuels have a shorter window of time during the year in which they are easily ignited and thus present a much lower risk of fires being initiated. This area has had a long history of devastating wildfires, all of which have been relatively small fires that involved fuels at the wildland/urban interface. Fuels far removed from this interface zone played very little role in these conflagrations. Thus, questions remain as to the most cost-effective placement of fuel modification treatments in this region.

Keeley, J. E. 2005. Fire history of the San Francisco East Bay region and implications for landscape patterns. International Journal of Wildland Fire 14:285–296.