



Research Brief for Resource Managers

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Vegetation Succession & Fire in California's Bay Area

Russell, W.H. and J.R. McBride. 2003. Landscape scale vegetation-type conversion and fire hazard in the San Francisco bay area open spaces. Landscape and Urban Planning 64:201-208.

The grasslands of the San Francisco Bay area have become increasingly shrubby with less grazing in the later part of the 20th century. This 2003 study used aerial photos taken between 1939 and 1997 to quantify vegetation change in the landscape mosaic of grasslands, shrublands, woodlands and forests. Russell and McBride used fuel sampling in the field and FARSITE modeling to estimate how changes in vegetation would affect fire behavior. The characteristics they investigated included: rate of spread, fire line intensity, and average flame length for the different vegetation (fuel) types. Their study sites were located at six selected open spaces: three in the East Bay Regional Parks, one on Bolinas Ridge, one in Point Reyes, and one near the town of Woodside.

The authors found a significant decrease in grass cover and an increase in shrub cover. Considering all six sites together there was an average 70% decrease in grasslands and a 25% increase in shrublands. They coupled the results of their

Management Implications

- Shifts from grasslands to shrublands documented in the San Francisco Bay area also represent changes in fuel characteristics and potential fire behavior.
- Increased fire intensity associated with shrublands is presented as a dramatic increase in overall fire hazard, but slower rates of spread may prevent these changes from increasing the risk of resource damage or fire losses in local communities.

vegetation study with their fire behavior output to conclude that *“that the succession from grasslands to Baccharis shrublands indicates **dramatic increase in fire hazard** for those areas. Fire-line intensity, flame length, and total biomass were found to be significantly higher within the shrub-dominated areas. In the context of the landscape matrix as a whole this increased hazard indicates a **greater possibility of fire being spread into adjacent forested areas and residential communities.**”* Although woody vegetation produced the highest fire hazard, rate of spread was much slower than in grasslands (Table 2).

Table 2
Measured biomass and predicted fire characteristics using the FARSITE fire simulation model

	Grass	Shrub	Oak	Douglas-fir	Bishop pine	Monterey pine
Biomass (tonnes/ha)	1.51	18.73	3.67	37.45	48.35	40.69
Rate of spread (m/min)	3.77	1.60	0.6	0.56	0.56	0.57
Fire-line intensity (kW/m)	66.50	197.00	36.00	139.88	157.40	157.89
Average flame length (m)	0.47	0.8	0.4	0.69	0.74	0.73