Fire Behavior Triangle

Topography
• Slope
• Aspect

Weather
• Wind
• Temperature
• Humidity

Fuel
• Fine or Heavy
• Arrangement and Amount
• Moisture
Weather
Average summer temperature (June - August) per year in California

Source: Western Regional Climate Center
Weather (+Topography)

Diablo Winds (katabatic winds)

Winds originate inland in areas of high pressure. The winds travel down to lower-pressure, coastal areas, picking up speed and becoming hotter. Winds may speed up more as they squeeze through canyons and narrow mountain spaces.

Source: Times reporting, Mapzen, OpenStreetmap.
“Approximately 1.8 million ha burned annually in California prehistorically (pre 1800). Our estimate of prehistoric annual area burned in California is 88% of the total annual wildfire area in the entire US during a decade (1994–2004) characterized as “extreme” regarding wildfires. The idea that US wildfire area of approximately two million ha annually is extreme is certainly a 20th or 21st century perspective. Skies were likely smoky much of the summer and fall in California during the prehistoric period. Increasing the spatial extent of fire in California is an important management objective.”
“Impacts of Native American burning ... [were] highest near larger population centers in Coastal California and the Central Valley where lighting ignitions were rare (Keeley, 1982, 2002, 2005; Stephens and Libby, 2005).”

Fig. 3. Variation in strength of fire-moisture (60) relationships (i.e., PDSI) and population size of Native Americans (16) (triangle) and others (19) (circles) in California. The fire regime periods are indicated by shading as in Fig. 2. The $r$-values are 51-yr running Pearson product-moment correlation coefficients of PDSI (inverted for presentation) and fire index is plotted on the 26th year of the window. Statistical significance ($P < 0.05, P < 0.01, P < 0.001$) is shown by increasingly dark dashed lines.
<table>
<thead>
<tr>
<th>Plant Community</th>
<th>Median FRI</th>
<th>High FRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Oak</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Oak Woodlands</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Fescue Oatgrass</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Coastal Sagebrush/Woodland</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Redwood</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Mixed Evergreen</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Riparian Corridors</td>
<td>13</td>
<td>47</td>
</tr>
<tr>
<td>Coastal Sagebrush</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Chaparral</td>
<td>30</td>
<td>70</td>
</tr>
</tbody>
</table>

“When fires were allowed to burn over the last 31 years in upper elevation mixed conifer forests, fires became ‘self-limiting,’ even under high fire weather conditions.” (Collins et al. 2009; from Illhouette); aligned with findings from Scholl and Taylor 2010

Figure 1. Interactions between successive fires resulting in the latter fire: (1) being constrained in spatial extent by the previous fire or lessened fire severity if the previously burned area is reburned, (2) no spatial constraint of the previous fire on either the extent or severity of the latter fire. We propose the dominant factors controlling...
Upper Wildcat Canyon (Tilden) – circa 1900

Same View Today – About 100 Years Later

