



Research Brief for Resource Managers

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Do 1% of Fires Cause 99% of the Acres Burned?

Strauss, D., L. Bednar, and R. Mees. 1989. Do one percent of forest fires cause ninety-nine percent of the damage? Forest Science 35:319-328.

It's often said that 1% of the wildfires cause 99% of the damage. Empirical analysis of fire history data by David Strauss and colleagues confirmed that a relatively small number of forest fires are responsible for a very high proportion of the total area burned. In the three regions studied in the western United States, the proportion of area burned by 1% of the largest fires ranged from 80% (Region 9, east of the Cascades, west of the Rockies), 94% (Region 12, coastal Washington and Oregon) to 96% (Region 13, northern California).

Because the size of fires varies enormously, it takes special analytical tools to display and quantify this variability in order to compare differences among regions. Strauss et al. borrowed methods from the economics of income inequality where data are also heavily skewed with a small percentage of the population owning the majority of the wealth. Strauss et al. proposed a new measure for the magnitude of variability in fire size, the **extreme proportion function, EP(p)**, which describes "the proportion of the total acreage burned that is caused by the largest (p) percentage of the fires".

The authors used this approach to investigate the 1983 claim of unequal distribution of fires between southern California and Baja, Mexico (*Science 219:1287-1294*). When the proportion of total acreage burned by the largest fires was

Management Implications

- In three regions of the western US, 1% of the largest fires are responsible for the majority of the area burned - from 80% to 96% in the regions studied.
- The fire size distribution is different among regions with different fire regimes and can be compared using the extreme proportion function, EP(p).
- Comparing EP(p) for southern California and Baja California shows fire size distributions to be very similar between these regions (Figure 1).

plotted against the fraction p of fires (Figure 1), it was observed that curves north and south of the border were very similar, suggesting that the fire sizes in Minnich (1983) are much the same in both regions

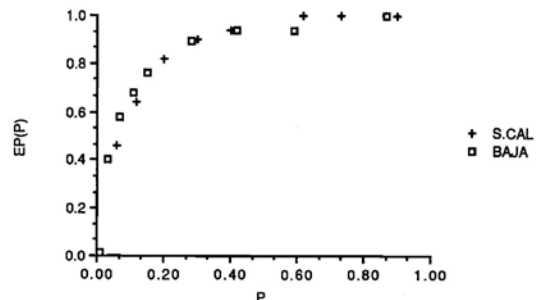


Figure 1. Size inequality of large fires is similar on both sides of the border in Minnich's (1983) data.