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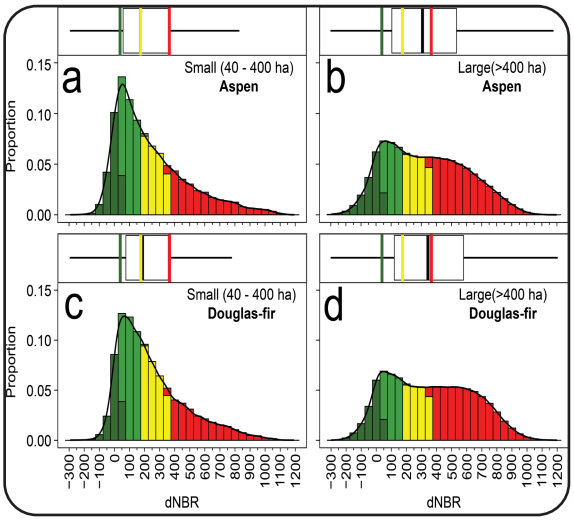

Medium-sized fires burn less severely than large fires

Key results

1 Medium or super-sized?

In Utah medium-sized fires (100 - 1000 acres) had lower burn severity than large fires (>1000 acres).

2 Some burn hotter

Forests burned at much higher severity than non-forests and sagebrush and shrubland accounted for 50% of all area burned in Utah.

3 Changed patterns of burn area

The annual area burned is being increasingly concentrated in a few, very large fires (**Fig. 1**).

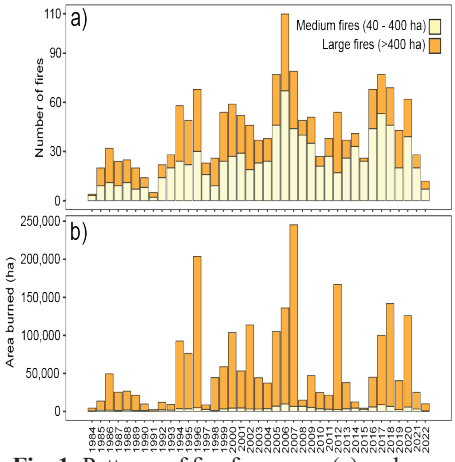

Fig. 1: Patterns of fire frequency (a) and area burned (b) in Utah from 1984 - 2022.

Management implications

Non-forested vegetation types comprised the majority of Utah's burn area and had lower severity and interannual variability - suggesting that fire effects may generally be homogeneous and predictable. In contrast, forested vegetation had higher severity and more variability, highlighting the difficulty in predicting forest fire effects.

The conditions under which fires can be contained to < 1000 acres are likely associated with more favorable outcomes (lower burn severity) and foster recovery. Most area burned occurs in large fires (> 1000 acres) which are likely influenced by drought and weather more so than medium-sized fires. It is likely that a smaller number of fires will burn a larger proportion of the annual total area - possibly exceeding historical norms and decreasing the ability of forests to "bounce back". Prescribed fire and fuel reductions may reduce the risk of catastrophic fire.

Prescribed fires that are as large as practically manageable may have effects exemplified by the data on medium-sized fires in each vegetation type (**Fig. 2**).

Study design

Satellite monitoring of fire effects is widespread, but often satellite-derived values are considered without respect to the characteristic severity of fires in different vegetation types or fire areas. We assessed burn severity using remote-sensing for all medium-sized (100 - 1000 acres) and large fires (>1000 acres) in Utah 1984 — 2022.

✓ Assessed all Utah fires >100 acres from 1984 — 2022.

✓ Calculated burn severity (delta normalized burn ratio [dNBR]) by vegetation type (**Fig. 2**).

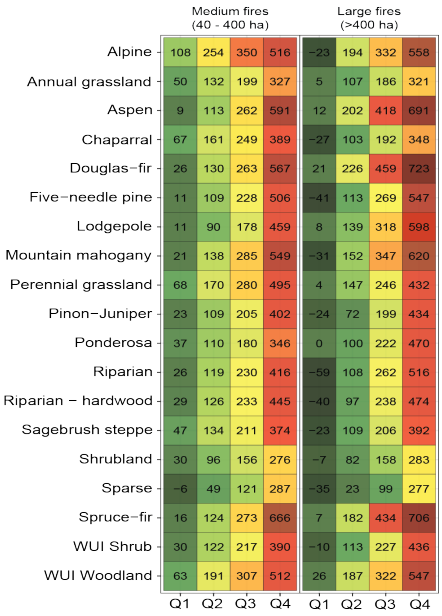

Fig. 2: The quartiles of burn severity (dNBR) for medium sized and large fires in Utah. Higher dNBR values indicate greater severity

See the study here:

Related reading:

Birch, J. D., Dickinson, M., Reiner, A., Knapp, E., Lutz, J. A., Ewell, C., and J. Miesel. 2023. Heading and backing fire behaviors mediate the influence of fuels on wildfire energy. International Journal of Wildland Fire. https://doi.org/10.1071/WF22010

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