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# Publication Brief for Resource Managers


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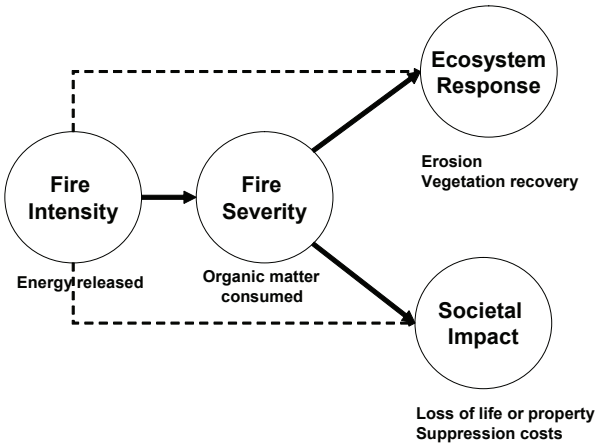
# Fire Intensity and Fire Severity Terminology

Recent critiques have suggested replacing the terminology of *fire intensity* and *fire severity*. In a February 2009 research paper in the *International Journal of Wildland Fire,* USGS scientist Jon Keeley evaluated the current usage of these terms and agrees the terminology requires clarification but advocates retention of these terms.

His paper draws attention to the problems encountered when clear distinctions are not made between fire intensity, fire severity, and ecosystem responses. He offers the figure below as an illustration of how these concepts are related to one another and to societal impacts.

*Fire intensity* is the energy output from a fire and depending on the need can be expressed as reaction intensity, fireline intensity, temperature, heating duration, or radiant energy. *Fire severity* (or sometimes referred to as burn severity) has in most studies been measured by organic matter loss, both aboveground and below ground. In recent years some confusion has arisen because fire severity measurements have included measures of ecosystem response. One of the central themes of this paper is recognizing the importance of separating fire/burn severity from such responses. *Ecosystem responses* include soil erosion, vegetative regeneration, restoration of community structure, faunal recolonization, and a plethora of related response variables.




## Management Implications:

- There is no single measure of fire intensity or energy output from a fire that can serve all research or management purposes.
- Fire severity and burn severity are for all practical purposes synonymous, but more narrow uses such as “soil burn severity” have management value.
- Separating ecosystem responses from fire severity is critical because operational measurements of fire severity may have positive and negative relationships to ecosystem responses.
- Fire severity per se is of value to resource managers only to the extent to which it can predict ecosystem responses.
- Further research is needed to understand how to translate fire severity or burn severity measures into useful predictions of vegetative recovery.

Although some ecosystem responses are correlated with measures of fire or burn severity, many important ecosystem processes have either not been demonstrated to be predicted by severity indices or have been shown in some vegetation types to be unrelated to severity. This is a critical issue because fire or burn severity are readily measurable parameters, both on the ground and with remote sensing, yet ecosystem responses are of most interest to resource managers.


*Keeley, J. E. 2008. Fire intensity, fire severity and burn severity: a brief review and suggested usage. International Journal of Wildland Fire 18:116–126.*
[Complete article can be downloaded from web site above.]