Decision Modeling for Analyzing Fire Action Outcomes

Donald G. MacGregor[1]

and

Armando González-Cabán[2]

ABSTRACT

A methodology for incident decomposition and reconstruction is developed based on the concept of an "event-frame model." The event-frame model characterizes a fire incident in terms of (a) environmental events that pertain to the fire and the fire context (e.g., fire behavior, weather, fuels) and (b) management events that represent responses to the fire environment. The model defines a sequential set of event frames according to temporal and contextual factors (e.g., management processes) that yield a visual representation of an incident decomposition. The set of event frames decomposes an incident into discrete units of analysis that can incorporate other models or processes (e.g., decision analysis) to describe decision elements of a fire incident. Based on the reconstructions reported here, we find that decision processes differ according to the incident and its events. From the reconstruction of the Old Fire, we identified how some incident decisions are actually legacy decisions. These are for anticipated incidents–ones for which even extreme occurrences have been envisioned and action contingencies established. From the reconstruction of the Fork Fire, decision modeling revealed that local knowledge plays a key role in early management stages as well as in management decision making several days into an incident. Our analysis reaffirms that although fire is a continuous, exponential process that changes seamlessly, if abruptly at times, management is a discrete process that changes linearly and in discontinuous stages with the intention of avoiding a purely reactionary management response. However, this fundamental incompatibility between fire as a nonlinear, continuous process and management as a linear and discontinuous one means that discontinuities in management processes may impede management performance.

---

[1] Senior Scientist, MacGregor-Bates, Inc., 1010 Villard Ave., PO Box 276, Cottage Grove, OR 97424 Email: donald@macgregorbates.com

[2] Research Economist, USDA Forest Service, Pacific Southwest Research Station, 4955 Canyon Crest Drive, Riverside, CA 92507; Email: agonzalezcaban@fs.fed.us