

Long-Term Wildfire Reconstruction: In Need of Focused and Dedicated Pre-Planning Efforts

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Abstract: Wildfire disasters in the United States impact lives and livelihoods by destroying private homes, businesses, community facilities, and infrastructure. Disaster victims suffer from damaged houses, inadequate shelters, inoperable civil infrastructure, and homelessness coupled with long-term recovery and reconstruction processes. Cities and their neighboring communities require an enormous commitment for a full recovery for as long as disaster recovery processes last. State, county, and municipal governments inherently have the responsibility to establish and provide governance and public services for the benefit and well being of community members. Municipal governments' comprehensive and emergency response plans are the artifacts of planning efforts that guide accomplishing those duties. Typically these plans include preparation and response to natural disasters, including wildfires. The standard wildfire planning includes and outlines (1) a wildfire hazard assessment, (2) response approaches to prevent human injury and minimize damage to physical property, and (3) near- and long-term recovery and reconstruction efforts. There is often a high level of detail in the assessment section, but the level of detail and specificity significantly lessons to general approaches in the long-term recovery subsection. This paper aims to document the extent of wildfire preparedness at the county level in general, focusing on the long-term recovery subsections of municipal plans. Based on the identified challenges, the researchers provide recommendations for better longer-term recovery and reconstruction opportunities: 1) building permit requirements, 2) exploration of the use of modular construction, 3) address through relief from legislative requirements, and 4) early, simple, funding, and the aid application process.

Key words: Smart Disaster Response, Modularization, Post-Disaster Reconstruction, Smart Buildings and Infrastructures, Smart Government, Operation of Smart Cities

1. INTRODUCTION

Wildfire disasters in the United States (and Canada) impact lives and livelihoods through the destruction of private homes, businesses, community facilities, and infrastructure [1]. However, a recent study, by Colletta et al. [2], highlighted that previous infrastructure resiliency policy for natural disasters focused more on earthquakes and flooding disasters, while wildfire disasters has been neglected. Efforts to reconstruct and establish normalcy is often delayed by the challenges to 1) prioritize and fund work efforts [3,4], 2) design and secure contractors for reconstruction projects [5] and 3) accomplish the work in a timely manner to restore community functions [6–8].

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This paper examines the extent of wildfire preparedness at the county level in general. A particular focus on the long-term recovery subsections of municipal plans. Based on the identified challenges, the researchers provide recommendations for better longer-term recovery and reconstruction opportunities.

2. RESEARCH METHODOLOGY

The critical review of literature consisted of (1) selecting appropriate counties of interest, (2) evaluating the comprehensive and emergency response plans addressing wildfire preparation and response, and (3) providing analysis and synthesis of the literature.

2.1. County Selection

For the selection of counties, this paper considered two key factors; (1) identification of municipalities exposed to significant wildfire threat and having a history of wildfires, combined with (2) multiple counties within a given state. Selecting counties having experienced wildfires is purposeful, as it should also lead to identifying counties with more developed response plans. Using this as a basis, the researchers selected multiple counties in the three Pacific West states of California, Oregon, and Washington, which have experienced devastation from wildfires repeatedly over the past two decades.

Individual counties were chosen using wildfire risk assessment results - only those counties with extreme or high wildfire hazard ratings were selected. Three counties of Los Angeles, San Diego, and Ventura were selected in California using the assessment results of the California Department of Forestry and Fire Prevention wildfire hazard severity studies [9]. In Oregon, four counties of Jackson, Jefferson, Josephine, and Wasco counties were chosen using the Oregon Explorer Natural Resources Digital Library [10]. Four counties were selected in Washington using the state's Enhanced Hazard Mitigation Plan; Island, Klickitat, Okanogan, and Stevens counties [11].

2.2. Review of County Planning Efforts

The community response plans to address wildfire hazards, identify fire mitigation goals and strategies, plan fire response, and address post-fire recovery activities are typically captured in multiple cross-referenced and mutually supporting plans. Civic jurisdictions also characteristically enter mutual aid agreements to pool resources for achieving synergistic capabilities to respond to

large-scale natural disasters. The review surfaced over a dozen differing plans that address wildfires to some degree. The three most common and collectively encompassing plans that address wildfire assessment, preparation, and response are:

- *Comprehensive or General Plan*: a future-looking document that provides a shared vision and goals for community development. These plans are typically focused on a decades look at long-term development and growth of a municipality. Most address natural hazards, including wildfires, at a high-level and reference other more specified plans and mutual support/aid agreements.
- *Wildfire Management Plan*: a focused document characteristically including (1) background data including multi-jurisdictional collaboration, (2) wildfire history and impact, (3) risk approach, methodology, and assessment divided into specific subareas of the region, (4) fire fighting capabilities of the involved parties and (5) mitigation goals and strategies including a cost/benefit analysis.
- *Operational Area Emergency Response Plan*: almost exclusively multi-jurisdictional documents aimed at the preparation and immediate response to large-scale disasters. These plans singularly focus on joint preparation, communications, and response to save lives and minimize injuries, curtail community and personal property damage and provide a response effort to support restoring normalcy to the community.

3. RESULTS

These three plans were almost exclusively used for this effort.

3.1. California

The State of California directs counties to use a General Plan as the vision tool to assess the current status and chart a path to the future. The general plans include a chapter devoted to natural and human-made hazards and assessments, mitigation actions and goals and high-level response elements to each hazard. The majority of these chapters in California are devoted to flood, seismic, and wildfire hazards. General plans are developed and coordinated internally and with other local jurisdictions. [12–14]

The content of the general plan hazards chapter addressing fire is driven by state guidelines contained in “*Fire Hazard Planning - General Plan Technical Advice Series*.” The state guidance identifies federal and state requirements combined with the best practices to (1) understand fire history and hazards, (2) develop and implement fire mitigation strategies, (3) prepare response capabilities, (4) respond to fires, including the safety of community residents and (5) post-fire recovery. These components to be collectively addressed in general plans and supporting plans with the development and implementation of strategies and goals. [15]

Wildfire protection plans provide additional details to the general plans focusing on more localized and detailed risk evaluations and mitigation strategies [16]. The development of wildfire management plans vary in number from one to multiple per county, for instance, in San Diego County, there are twenty-five community-specific wildfire protection plans [17].

The California county emergency response plans provide for coordinated efforts to curtail injury to citizens and reduce property damage. The emergency response plans contain the most developed recovery plans with an emphasis on the near-term care and feeding of the affected populace. Long-term recovery and reconstruction either goes unmentioned or is discussed only at the broadest level. The Los Angeles County plan states the county “may activate the County Office of Recovery (COR) to address the mid-and long-term recovery of County government. COR will develop and implement a strategic plan for restoration of County government services...” [18]. There is no discussion of details or approaches to reconstruction efforts to a major disaster.

3.2. Oregon

Oregon counties consistently use the Comprehensive, Wildfire Management and Emergency Operations plan following a similar format from county to county. They mutually address the wildfire threat, mitigation and response planning, and near-term recovery efforts. The wildfire risk assessments follow the Oregon Department of Forestry Risk Assessment Model that includes holistic factors for understanding, such as topography, vegetation, and weather to evaluate subareas of a county and determine weighted hazard scores. The preparation activities are characterized with (1) coordinated strategies and goals to mitigate wildfire likelihood and impact, and (2) community outreach and education programs. [19,20]

The emergency operations plans address multi-organizational responses to large natural disasters and the immediate need to provide medical care, food, and shelter to displaced citizens. The long-term response is the least developed element of the plan noting the long term (years) nature of the response combined with the need for interaction of multiple funding sources that include governmental, insurance, business and private funding sources [21].

3.3. Washington

In the Washington counties of Island, Klickitat, Okanogan, and Stevens, the wildfire hazard topic is almost exclusively detailed in the wildfire management and multi-jurisdiction hazard mitigation plans. The county comprehensive plans focus on the land use, environment, and economic development of the community.

The comprehensive emergency management plans address responding to and recovery from natural disasters, including wildfires. Recovery operations focus on near-term actions to minimize personal injury and restore essential community services. These county plans appropriately place the majority of the responsibility on the local city/town jurisdictions. The Okanogan emergency management plan is a representative of the approach to long-term recovery planning in the statement that the “recovery and restoration phase of a disaster may last for years. The activities that take place during this phase will depend on the type of event that occurred.” [22] There are no details or general approaches discussed regarding long-term recovery.

4. DISCUSSION: OPPORTUNITIES FOR LONG-TERM RECOVERY AND RECONSTRUCTION EFFORTS

The current county plans in three western U.S. states, all having a history, and most likely a future, of wildfires, have essentially developed weak or no long-term recovery and reconstruction approaches. Opting instead to develop situation-specific responses when the need arises. Given the more probable “when,” not “if,” another wildfire occurs, a higher level of planning fidelity seems warranted to support community interests.

Early, pre-wildfire, community efforts to address complex topics like funding sources, building code requirements, and construction approaches may uncover opportunities to streamline recovery efforts. Recovery efforts in Washington State, following the Carlton Complex wildfires in 2014, identified a complex and bureaucratic process to apply for Federal Aid. As reported, this was complicated by a cultural bias to Eastern, not Western, states [7]. If the community had a full understanding of the process and steps before the Carlton wildfire, then the aid application process could have been accelerated, and a decision rendered sooner.

Opportunities may exist by considering/addressing:

- **Building permit requirements.** Which permits might be waived, accelerated through the approval process, or have fees waived.
- **Exploration of the use of modular construction.** This construction approach provides numerous benefits following a natural disaster to accelerate reconstruction and normalization of community functions [5,23].
- **Relief from Legislative Requirements.** Address through relief from legislative requirements to increase the use of design-build over a design-bid-build process to fast-track public facility and infrastructure recovery.
- **Early, simple, funding, and the aid application process that support the recovery efforts.** Lack of recovery funding in earlier phases of disaster recovery delays the decision and recovery, which leads to missing the opportunities.
- **Exploration of the use of new advanced technologies and management approaches.** [24] There are many new innovative technologies and management approaches that can help the reconstruction of damaged or destroyed buildings and facilities. Should promote its implementation.

5. CONCLUSION

Wildfires in the western United States are imminent that threats government officials, and private citizens need to address. Current recovery plans at the county level provide solid wildfire risk assessments combined with robust mitigation objectives. Likewise, response plans to natural disasters, including wildfires, are robust and multijurisdictional to synergistically minimize damage to communities and the environment. However, recovery-planning efforts lack details in both objectives and approaches.

Increased efforts to define the “how” and “what” of long-term reconstruction would provide a vision for a community. This could also support legislative action, where required, to provide relief from “normal operations” requirements and allow for accelerated approaches to restore community functions.

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