A Changing Fire Environment – Is Fire Program Development Matching Complexity?

Tom Zimmerman*
International Association of Wildland Fire, Kuna, Idaho, USA, tomzimmerma@gmail.com

Joe Stutler
Deschutes County, Bend Oregon, USA, Joe.Stutler@deschutes.org

Introduction

Today's societies exist in a continuum of weather, climate, vegetation, social and economic values, and political concerns that places overpowering influences on wildland fire. Numerous articles have been written providing powerful, thought-provoking, and insightful views of our changing wildfire situation. Changes happening now have been occurring for centuries and are not new, but the unevenness and speed of change now taking place are increasingly alarming. There is little doubt that we have entered a period of surging complexity typified by these changing conditions and outcomes.

This paper discusses the changing fire environment impacts on fire complexity, poses programmatic questions about capability, and provides thoughts on opportunities for wildland fire management program development.

What considerations should frame wildland fire planning and program development?

A number of areas have substantial influence on wildland fire management program development. These include the wildland fire framework of policies, strategic plans, land and resource management plans, and other guiding documents.

Two areas of this framework are of primary importance. First and foremost is wildland fire management policy. Fire policy in the US (Fire Executive Council 2009) has responded well to changing situational dynamics and has become the most inclusive and flexible policy to date. It advocates more sophisticated and thorough strategies, wider tactical spectrums, and supports implementation of multiple objectives. This is extremely important since a viable *one-size-fits-all* option does not exist and is not desirable.

Second in this framework is large-scale and long-term strategic planning. National level strategic planning has created the National Cohesive Wildland Fire Management Strategy (USDI-USDA 2014). This represents the most comprehensive wildland fire management strategy ever completed and presents a highly relevant, logical, and supportable vision for the next century, which is: *To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire*.

The Cohesive Strategy also recommends three goals in support, which in combination with guiding principles and core values in both the Federal Policy and Cohesive Strategy provide

*Tom Zimmerman, 11698 W. Touchrock Ln, Kuna, ID 83634. tomzimmerma@gmail.com

strong support for its national vision. A flexible policy and a clear comprehensive long-term strategic plan with a forward-looking vision, far-reaching goals, and sound guiding principles and core values provide a solid framework for wildland fire management.

Are we doing the right things to meet future challenges and match complexity?

Our policy and cohesive strategy give us the right tools, processes, and capabilities to efficiently respond to emerging challenges. We must, however, continually assess and evaluate progress to ensure that focus is not lost, energy is not wasted, efforts remain productive and efficient, and goals continue to be achieved. As we proceed, we must assess and evaluate such questions as:

- Are we passively letting changing conditions drive our decisions and actions or are we actively making decisions that can influence change and help field better responses before we are forced into a situation?
- Are we endorsing new capabilities, knowledge, opportunities?
- Are we recognizing new perspectives?
- Are fuels and fire behavior affecting society?
- Are we making full use of all available options?
- Are we balancing safety concerns with tactical objectives?
- Are our decisions reflecting commitment to safety by incorporating risk management?
- Are our planning and response efforts based on the best information?
- Where do we get information, are we making full use of it, and how do we apply it?
- Are we actively learning?
- Are we preparing land and resource management professionals to be better in their jobs?
- Are we advancing employee skills and agency capabilities?
- Are we anticipating and preparing for future skill, education, and training needs?
- Are we incorporating strategic thinking, precise tactical actions, full use of available options, optimal use of prescribed fire and fuel treatments, new science and technology, training commensurate with changing needs, and upgraded processes to improve decision-making and implementation?
- Are we actively incorporating risk management into decision-making?

Where can additional attention be directed?

We continue to talk much about wildland fire management. We know what the past shows us, where we are today, but only some of what the future holds. There are specific areas of wildland fire management where additional attention can be directed to ensure that the program continues to develop and keeps pace with increasing complexity. These areas include:

Strategic Thinking: The development of a National Strategy provides identification of the challenges of managing vegetation and fuels; protecting homes, communities, and other values; managing human-caused ignitions; and effectively and efficiently responding to wildfire (USDI-USDA 2014). This strategy represents a rock-hard starting point for meeting challenges of the future but implementation of it must be sustained and stepped up.

What can be done?

- Actively support and promote intensified implementation of the Cohesive Strategy.
- Communicate new strategic paradigms, recent advances, and lessons learned.
- Ensure that the best available information pertaining to fire history, current fuels conditions, fire management objectives, weather/climate analysis, and fire behavior analysis are considered in all preplanning activities and in developing decision on response actions.
- Promote more active risk management, use of firefighting and aviation exposure as decision support elements, and use of new strategic and tactical paradigms to improve management responses and decisions.
- Ensure sound risk management is the foundation for all fire management activities and increase emphasis on making safe, effective, risk-based wildfire management decisions.
- Improve community involvement in fuel and fire mitigation activities.
- Identify and address conflicts between fire-prone landscapes and people.
- Improve communications to remove negative perceptions of wildland fire in all segments of society and within management organizations.
- Improve recognition and acceptance of fire as a natural process necessary to the maintenance of ecosystems.
- Improve understanding of the importance of the full range of strategic alternatives – recognize that one size does not fit all and that all objectives cannot necessarily be successfully accomplished through the most aggressive suppression position.
- Continue to promote fire prevention programs to reduce human-caused ignitions.

Tactical actions and full use of available options: The Cohesive Strategy directs the safe and effective extinguishment of fire when needed; the use of fires where allowable; and management of our natural resources. Response to wildland fires needs to be coordinated, well thought out, and directed to safely accomplish desired objectives. Initial responses to accomplish protection objectives are successfully addressing the majority of wildfires but for those that escape initial actions, specific situational analysis and use of the full range of options must be considered and applied. In other cases where fires do not need to be suppressed, the full range of options are not always considered. More sophisticated and comprehensive tactical spectrums, along with implementation of multiple objectives is extremely important since a viable *one-size-fits-all* option does not exist and is not desirable.

What can be done?

- Communicate new strategic and tactical paradigms, recent advances, and lessons learned.
- Clarify reality versus perceptions; often, perceptions in fire management are not in line with reality (Rains and Harbour 2018).
- Increase awareness of the full range of tactical responses and the full benefits of each tactical response to specific objectives and situations.
- Maximize the use of unplanned ignitions to create landscape resiliency, reduce suppression for suppression sake and increase prescribed fire. Repurposing responses to unplanned ignitions will provide an important, if not essential, opportunity to restore landscape conditions and reduce future risk (Thompson et al. 2018).

- Expand fire management culture and practice to more fully encompass firefighter safety, risk management, and use of the full range of management options in operations while also embracing ecological risk and resource management.
- Ensure that the full level of exposure, hazard, and risk in the fire environment is being clearly articulated, understood, and factored into decision-making and responses.
- Make evaluation of exposure levels, human capital, and equipment commitment a fundamental part of decision-making and responses.
- Balance attention among exposure, risk, values to protect, and response intensity.
- Promote analysis of past experience as a part of decision making and subsequent identification of response tactics but avoid limiting perspectives and use of "one size fits all."
- Avoid overuse of single resource types and over commitment of those resources having low probability of success – stop over-committing valuable resources on low success fires.
- Combine resources, organizational or administrative capabilities, and tactics where appropriate.
- Match response efforts with other management options.
- Use the most appropriate resources for the situation.
    - Make complete use of ICS resources.
    - Use Area Command Teams to more efficiently manage highest complexity situations.
    - Increase understanding to dispel rumors, speculation, and misunderstanding regarding capabilities and value of various ICS resources, especially those infrequently used.
    - Clarify roles and responsibilities of ICS resources to eliminate misconceptions of loss of power, control, management and leadership and improve willingness to use all resources as appropriate.
- Prepare for large, long-duration wildfires; protect structures and target landscape fuels; and target prevention of ignitions
- Continue to strengthen initial response programs.
- Better prepare response personnel for working in the WUI.

Decision-making processes: The difficulty surrounding wildland fire decision making is increasing exponentially. Decisions carry enormous significance. Determining solutions in general is difficult but there are a number of factors that heighten the difficulty associated with fire management decision making.

What can be done?

- Evaluate and determine the major influences on wildfire response decision-making. (What factors dominate decision processes? Are things like reducing costs, hastening containment, reducing fire durations, responding in mass because available resources exist, assessing risk and evaluating threats to values, meeting land use objectives, addressing firefighter and public safety, avoiding over reliance on specific asset types, or replication of past experience considered and evaluated equitably?)
- Find ways to decrease burden of non-fire issues on Federal Agency Administrators so that adequate attention and focus can be given to understanding the risk associated with suppression, importance of fire adapted communities, landscape resiliency, and the Cohesive Strategy in general.

- Find ways to reduce pressure on Federal Agency Administrators Federal to be accountable for wildland fire management. Find ways to help them understand the value or importance of delegating authority to and seeking advice and counsel from Incident Management Teams or Fire Program Managers on their own unit.
- Assess if Federal Agency Administrators so entrenched in the multiple use/conservation missions of their respective agencies have the capability to fully address wildland fire issues. Review organizational structure to find ways to improve fire program efficiency.
- Make and continue support to decision-making and decision-makers as a high priority goal.
- Make support to specialists and decision support personnel an important priority to better prepare them to support decision makers.
- Improve understanding of available decision support tools.
- Improve understanding of appropriate levels of analytical assessment of information tools.
- Improve decision-maker understanding of the use of analytical information.
- Improve line officer understanding of the role of operational risk management in wildland fire management.
- Develop decision maker focused training.

Vegetation and fuels management: A significant number of research reports, national leader presentations, political hearings, accountability reports, strategic plans, and forward-looking plans state wildfire problems and actions for the future reflect that the most extensive and serious problem related to the health of wildland areas is the over-accumulation of vegetation and burnable fuels, which is causing an increasing number of large, intense, uncontrollable and highly destructive wildland fires (USDA-USDI 2014).

What can be done?

- Improve awareness of the value of prescribed fire and other fuel treatments.
- Improve capability to plan and implement prescribed fire and fuel treatments.
- Improve the ability to plan, implement, and evaluate ecological effects of prescribed fire treatments in achieving short- and long-term objectives at all spatial and temporal scales.
- Develop a better understanding of the relationship of prescribed fire to human values.
- Improve communication and collaboration activities among governmental units, the public, and partner organizations.
- Establish and maintain a strong and efficient link between research and management.
- Accelerate the application of prescribed fire, managing wildland fire for resource benefits, and non-fire fuel treatments in all applicable areas.
- Better prepare communities to withstand wildfire.

Research, science, and technology, and information systems*:* Throughout the history of fire management, research, through systematic investigation, information collection, and analysis, has communicated new science and technology that have positively informed action, validated policy development, supported management programs, and shaped our understanding of wildland fire. We are at a time where we cannot afford to decrease attention and focus to research (Cissel and Zimmerman 2018, Hall and others 2018).

What can be done?

- Present a strong and definitive leaders' intent regarding an emphasis on continuing and accelerating research to move wildland fire science forward as an organized body of knowledge and to improve the application of fire science for practical purposes.
- Increase research program budgets to support continued and accelerated work.
- Increase science delivery and translation across agency programs.
- Better define ways to make research outcomes more accessible, useful, and actionable.
- Continue innovation in the delivery of results and management tools available to managers.
- Update data sets, advance technology, and expand audiences so that wildland fire science can more readily support and improve planning, implementation, and decision-making processes.
- Continue research to identify ways to contain large wildfires more efficiently.
- Continue to identify and plan for where large, long-duration wildfires are likely to occur.

Learning: To better respond to a changing and challenging paradigm, it is important to advance knowledge levels, facilitate and take advantage of learning opportunities, and heighten all management capabilities. Wildland fire management must be a true knowledge and learning program where constant attention is given to emerging information, new knowledge, past experiences, historical documentation, and lessons learned.

What can be done?

- Strengthen the learning process. There is not a corporate system in place to ensure continuous learning through leading-edge instruction (Rains and Harbour 2018).
- Increase awareness of the importance of learning to management programs.
- Continue to make lessons learned and important experiences available to wildland fire management personnel in an accessible and applicable way.

Training and education: Better preparation of personnel to meet emerging challenges has to include providing classroom, web-based, or on-the-job training and education that contains the most current and relevant information

What can be done?

- Improve training and education by ensuring that courses provide current information; relate to current situations; match knowledge, technology, and practices with fire complexity; and that coursework in developed as situations warrant in a timely and proactive manner.
- Ensure that adequate attention is given to training and education in developing areas that include:
    - Decision support
    - Decision making
    - Risk management
    - Strategic thinking
    - Tactical applications in complex situations
    - Safe and efficient operations in the wildland-urban interface

Summary

This paper is by no means meant as a criticism of wildland fire management. In the course of program development, many successes have been realized, many milestones have been achieved, and all efforts and activities have been well-focused, passionate, and committed.

Trends indicative of tomorrow's wildland fire environment underscore a need to broaden the latitude of wildland fire management. Proactive measures are necessary. Increasingly frequent and damaging wildfires cannot simply be accepted as unavoidable events.

Wildland fire management program development is matching fire complexity currently. But, the program must continue to adjust accordingly. Without strong emphasis on active, progressive, and adaptable program development, it will not keep pace with changing conditions.

References

Cissel, John, and Tom Zimmerman (2018). A future without the Joint Fire Science Program? *Wildfire:* **27**(4):16-20.

Fire Executive Council (2009). Guidance for Implementation of Federal Wildland Fire Management Policy. National Interagency Fire Center (NIFC). Boise, ID, USA. 20 p.

Hall, John, Paul Steblein, and Colin Hardy (2018). Living with wildland fire in America. Building new bridges between policy, science, and management. *Wildfire:* **27**(3):16-18.

Rains, Michael and Thomas Harbour (2018). Restoring fire as a landscape tool. (In): 193 Million Acres: Toward a Healthier and More Resilient US Forest Service. (Ed) Steve Wilent (Society of American Foresters. Washington, D.C).

Thompson, Matthew P., Donald G. MacGregor, Christopher J. Dunn, David E. Calkin, and John Phipps (2018). Rethinking the wildland fire management system. *Journal of Forestry* **116**(4):382-390. https://doi.org/10.1093/jofore/fvy020

U.S. Department of the Interior and U.S. Department of Agriculture [USDI-USDA] (2014). The national strategy: the final phase in the development of the national cohesive management strategy. (Washington, D.C.) 101 p. http://www.forestsandrangelands.gov/strategy/documents/strategy/CSPhaseIIINationalStrategyApr2014. pdf.

USDA-USDI (2014). Quadrennial fire review. final report. Boise, ID. USDA Forest Service Fire and Aviation Management and USDI Office of Wildland Fire. (Washington, D.C.) 96 p. https://www.forestsandrangelands.gov/documents/qfr/2014QFRFinalReport.pdf