THE KEY DECISION LOG: FACILITATING HIGH RELIABILITY AND ORGANIZATIONAL LEARNING

Anne E. Black

If you were involved in the 2008 fire season in the West, you may have heard the term "Key Decision Log" or "KDL." This article describes the KDL concept, it's intent (past and present), how it was applied in 2008, and where the practice is heading.

The KDL's purpose is to facilitate continuous learning in fire management processes and outcomes. It arose out of a dual desire to continually improve organizational performance and to meet societal demands for transparency in decisionmaking. Its development is a story of innovation and feasibility: a mix of 'ivory tower,' grounded practice, learning theory, and hard, cold reality. KDL takes "applied research"—applying and developing research-based knowledge to understand a problem—into the realm of "action research"—an iterative, collaborative effort taken by researchers and managers to understand and improve organizational process and culture.

Concept Development

The content and structure of KDL stem from initial conversations among geographic area and national incident commanders (ICs), Forest Service fire staff, line officers, and researchers during the 2007 fire season in Idaho and Montana. We asked two questions: "How do you define success?" and

Anne Black is a social scientist/ecologist for the Forest Service's Aldo Leopold Wilderness Research Institute and the Rocky Mountain Research Station, Missoula, MT.

> We asked two questions: "How do you define success?" and "How do you know when you're achieving it?"

"How do you know when you're achieving it?" The most common response—meeting the line officer's objectives—was also acknowledged as difficult to impossible to assess because, in the current system, there often isn't a measurable objective to track, some measures are difficult to obtain in the midst of a multiteam incident, and it is difficult to assess or gain insight into the more-effective versus the less-effective choices and actions without also capturing the rationale behind them. Moreover, the key reasons for embarking on such an effort are to improve current incident outcomes, improve next year's actions, and provide a way to describe outcomes, not to grade participants in a given event. This requires a standardized and centralized process that promotes reflection and wide dissemination of lessons learned.

We combined our 2007 insights into a collaborative Joint Fire Science Project involving Forest Service researchers, academics, resource agencies' staffs, and board members of the Northern Rockies Coordination Group (NRCG) to develop and test a means for capturing, tracking, and understanding "progress" and "success" in incident management (see A Multidisciplinary Approach to Fire Management Strategy, Suppression Costs, Community Interaction, and Organizational Performance, in this issue). We grounded our thinking on concepts of high reliability, high performance, and organizational learning.

From organizational learning theory (Garvin 2000) comes the understanding that learning has two parts: attention and deliberation. It doesn't simply happen of itself. Organizations that learn successfully do so because they establish explicit protocols to document critical processes and then use these in structured reflection, such as in After Action Reviews, to uncover the root causes of successful and unsuccessful outcomes.

From high-performance theory comes the recognition that, while success depends on effective internal business practices (risk management), achieving and sustaining high performance also requires consistent and effective attention to financial management (operational efficiency and transparency), working relationships (communication and collaboration), and innovation and learning (experimentation, error detection, reflection, etc.) (Norton and Kaplan 2000).

Operating with high reliability (Weick and Sutcliffe 2007) requires noticing and acting quickly and

decisively on small deviations. High reliability theory reminds us to periodically question whether we are focusing on the most telling information and how well our interpretation of that information matches the actual situation. Organizational performance theories remind us that *where* we focus attention and how we frame the world are as much determined by organizational policies and culture as by individual experience. Thus, it becomes critical to track and periodically revisit both *operational effectiveness* ("Are we noticing all that we need to, and are we interpreting what we see effectively?") and *organizational effectiveness* ("What do our patterns of focus reveal about perceived organizational priorities and conflict resolution, and are these the most effective?").

Beyond this, we wanted to remain cognizant of "practical drift" in organizational life (Snook 2000): as experts of our local systems, we adapt corporate protocols and procedures to better match local conditions. This works well until local adaptations begin to collide or offset each other. Especially in multilevel and complex situations, periodically checking to ensure that all parts of the system are in alignment and not working at crosspurposes to each other becomes critically important.

Practical drift is particularly difficult to detect when "minor" adaptations cause mismatches across boundaries—geographic areas, functions, time, or organizational scales—because, by definition, a boundary marks the edge of our local expertise or attention. Assessing practical drift requires cultivating a corporate (broader)

perspective in which the context and behavior of individual and small group actors, the patterns that emerge from the interaction of these actors across boundaries, and the drivers of these patterns (some of which undoubtedly arise from outside the local context) are identified.

Theory suggests, then, a process that can track alignment among partners, reveal the focus of attention and patterns of focus, and capture the criteria used to interpret

what is noticed in terms of risk management, financial management, and partner/stakeholder relations. The process needs to be completed at the team, host, and incident levels but be consistent across incidents and centrally collected to allow for developing insights and lessons at both operational and organizational levels.

From Theory to Practice

The fire community is not starting at ground zero; there are a number of practices in place that support organizational learning. For instance, unit or incident logs often capture key decisions, we've begun to build After Action Reviews (AARs) into our business model, and there are a number of ways in which key players communicate

and check alignment and progress during an incident (daily check-ins between line officers and ICs, for example).

However, many of these procedures are not consistently practiced, particularly as a means to compare intentions for specific incident outcomes. Recent investigations into who conducts AARs, for instance, indicate that AARs aren't consistently conducted (at least in frequency; "quality" is a separate topic), nor is there a way to build

> Continuous improvement in decisionmaking considers both the cultural frame of reference that focuses decisionmakers' attention on specific aspects of a situation more than others and the way in which this information is interpreted, weighed, and integrated to arrive at a particular decision.

these individual and small group insights into a corporate or collective perspective. So the need is to build on current practice by defining a common practice, consistent method, and central location so that we can better see how (and why) our system operates to produce the outcomes it does at team, incident, and organizational levels. The KDL is intended to do this.

The 2008 Pilot

Working with members of the NRCG, we developed data collection forms for a "balanced scorecard," capturing information on intent (in-brief), actions (daily), and outcomes (closeout) from members of the host agency (agency administrator, fire staff, resource advisor, or public affairs officer) and Incident Management Team (IC, operations

staff, or public information personnel).

In May 2008, the Forest Service's Washington Office asked the research team if we could also capture key decisions and decision rationales. After initial testing on the Indians Fire in California, the resulting "significant cost KDL" focused on decisions with significant financial implications using a simple, table-based form to be completed as key decisions were made. The concept was quickly adopted—and locally adapted—and numerous, slightly different versions began circulating. To address this, we created a Web page at the Lessons Learned Centers' Incident Management Team (IMT) site (<http://www.wildfirelessons.net>) in an attempt to establish a consistent format.

The KDL process was presented as part of the Forest Services' Accountable Cost Management rollout, not only to the Northern Rockies, but also to the Forest Service's Regions 2, 4, and 6 and to all four National Incident Management Organization (NIMO) teams. Presentation emphasis was placed on the KDL, but regions were encouraged to help us test the full suite of "balanced scorecard" forms as well. Further discussion with Forest Service Northern Region resulted in a hybrid form, capturing decisionmaking, key elements of the "balanced scorecard," and information needed for large fire cost reviews. All forms were available for download on both an internal Forest Service Web site and the Wildland Fire Lessons Learned Center Web site and for Web-based data entry on the Forest Service Web site.

Despite the numerous variations of the form, all KDLs included six basic questions:
- "Who was the decisionmaker?"
- "What was the decision?"
- "What alternatives/risks were considered?"
- "What was the rationale for the decision?"
- "What were the cost implications?" and
- "With whom was the decision shared or discussed?"

Depending upon the version used, the definitions of a "key decision" included:
- A decision that has a significant impact on cost, sociopolitical conditions, or resource allocation;
- Strategic and tactical incident management decisions that influence the resources allocated to and final cost of the complexes and/or fires; and
- Those strategic and tactical incident management decisions that heavily influence the resources expended on the fire.

The intent of the last of these is to focus on the "20 percent of the decisions that result in 80 percent of the expenditures." Focus was on the "big chunks": the decisions that have implications from hundreds of thousands to multiple millions of dollars. Throughout the process, critical feedback and input have come from all levels of the fire community: the NIMO teams, the Forest Service National Leadership Team, users of the system, and members of the interagency High Reliability Organizing community of practice.

Results and Discussion

KDLs were submitted for 28 incidents, including those managed

> Throughout the process, critical feedback and input have come from all levels of the fire community: the NIMO teams, the Forest Service National Leadership Team, users of the system, and members of the interagency High Reliability Organizing community of practice.

as type 1, 2, 3, 4, and 5; prescribed fire events; incidents under single and home unit jurisdiction; and unified command, area command, and theater of operations. Teams completing KDLs included host units; type 1, 2, and 3 incident management teams; NIMO; area command; and the National Multi-Agency Coordinating Group. These incidents occurred on a variety of agency lands, including national forests (Northern, Rocky Mountain, Southwestern, Intermountain, Pacific Southwest, and Pacific Northwest Regions), U.S. Fish and Wildlife Service, and Bureau of Indian Affairs. Most KDLs include information from only one team, so there are relatively few instances of a complete decision log in 2008. In addition to the submitted KDLs, we also actively solicited feedback on the forms, the content, and the process of completion. From this, we learned of a number of additional KDLs that were created but not submitted. These included KDLs for large fires but also for initial attack, extended attack, and type 4 and 5 events.

Analysis of the extensive narrative entries was facilitated by the central

database. The Web version populated our central Oracle database directly. KDLs submitted via email were manually copied into the Web database. It was then possible to use qualitative analysis procedures to categorize responses.

Narrative analysis of submissions indicates that the most frequent types of decisions entered can be classed into an intuitive and relatively small set: choice of tactic, choice of resource type, size (team size or number of a given resource, ramp up, or ramp down), and choice of strategy. Decisions made specifically to curb costs were less frequent, and most of these revealed consideration of small—but recurring—issues, such as decisions concerning camp caterers. Entries describe decisions and actions that increase as well as decrease costs. Few entrants were able to quantify short- or long-term cost implications, though most were able to predict whether these would be positive or negative.

Most frequently cited rationales for decisions and actions reveal a focus on (in no particular order):
• *Efficiency*—the decision is most efficient among alternatives;
• *"Right resource at right cost"*—matching the work with its cost (for example, considering "exclusive use" instead of "call-when-needed" or use of Federal crews instead of contract crews);
• *Safety*—limiting exposure, ensuring medical support, and reducing travel time;
• *Probability of success*—selecting options with the greatest probabilities of success and minimizing an insistence on holding a fire line when there is a probability that the line would be breached;

• *Accountability*—tracking or assigning responsibility appropriately; and
• *Task requirements*—identifying and addressing the current situation (for example, demobilizing crews when those resources are no longer needed or ramping up in response to changing fire behavior).

Less frequently cited rationales include (in no particular order):
• *Operations*—actions taken to influence incident duration or size (and thereby, costs) to protect values at risk, to achieve natural resource benefits, or to influence tactical impacts on natural resources;
• *Planning*—anticipating responses to potential fire development or obtaining information in order to make the next decision;
• *Policy*—following mandated procedures as they define (and sometimes limit) strategies;
• *Relationships and communication*—the quality of working relationships (poor or good) or communications as they influence coordination among staffs and personnel;
• *Availability and training*—"making do" with what's available and creating training opportunities; and
• *Complexity*—addressing multiple goals in tactics and number or type of resources selected.

Many teams recorded decisions made by staff members beyond ICs, line officers, and agency administrators, including decisions made by command staff and area command personnel. It was also stated that any decisions that affect cost should be noted, including those made by dispatch personnel and the regional office.

Discussion

An often-heard adage concerning decisionmaking is that decisions are only as good as the perception of reality behind them. We know from organizational theory that perception is profoundly influenced by organizational culture as refined by individual expertise and experience. Continuous improvement in decisionmaking considers both the cultural frame of reference that focuses decisionmakers' attention on specific aspects of a situation more than others and the way in which this information is interpreted, weighed, and integrated to arrive at a particular decision. KDLs capture a slice of this perception, offering the potential for both individual teams and the organization as a whole to reflect upon the conceptual models in use and how these influence what factors are considered and, of those, what factors are incorporated into the decisionmaking process.

When KDLs are uploaded to the central server, they provide the data necessary to cultivate an objective organizational perspective, facilitate organizational learning, and improve corporate effectiveness. They provide a window into the broader organizational culture and structures that create the operational "decisionspace" and attendant constraints within which the individual units and teams must operate. Results from 2008 provide a window into how fire managers see their decisionspace and the range of rationales upon which they based decisions.

In terms of the "balanced scorecard" concept, the KDL entries reveal a significant focus on operational efficiency. The expansion of entrants from the originally target-

ed ICs and agency administrators to all command and general staff areas and from an expected suite of line-based decisionmakers to general staff on both team and host units indicates a desire to record and communicate details of incident management.

Safety and probability of success were two of the highest profile aspects of risk management recorded. Much less is revealed about the role of working relationships (particularly external to the host IMT), experimentation, and learning opportunities. Whether these are systemwide patterns or particular to the few teams and units who participated in our pilot project cannot be answered until we get a more extensive dataset.

By creating one form in which key incident participants can note their decisions and subsequent actions, the KDL can help facilitate learning and improve operational effectiveness at the local level. Ideally, each KDL reveals the line of reasoning and choices seen and taken by the key players on an incident to achieve the desired outcomes captured in Delegations of Authority and strategic direction documents (Wildland Fire Situation Analysis [WFSA] or Wildland Fire Decision Support System [WFDSS]). As such, they can be used to link and improve alignment of incident objectives and intent to actual outcomes.

Several teams and at least one host unit report using their KDLs as input for AARs, and the NIMO teams used KDLs to build case studies of large fires for incorporation into 2009 training. Such exercises are particularly useful when the approach recognizes that there are multiple rational responses to

any set of circumstances and that all of these serve to improve understanding and promote learning. The NIMO exercises, for example, use the KDLs as a jumping-off point for discussions about effective risk management for future fire seasons.

KDL 2009— Next Steps

The 2008 effort provided significant information for identifying value and critical processes, as well as identifying weaknesses in the pilot effort. Feedback received from field users noted a variety of benefits in the process:
- Transparent documentation of decisions provides value, offering a way to review decisions made in realtime, identify trends, and make planning corrections.
- The process was useful for creating a final fire narrative, tracking large and small decisions, communicating between the agency administrator and IMT, and providing upper echelons with a more explicit record of the commitment to cost management.
- The process was valuable as a tool to capture IMT staff decisions, during the season to provide insight into consequences of alternatives and during postseason reviews.

Feedback also provides advice for further developing the process:
- Decisions made at national, regional, national forest, and IMT levels directly impact resource availability, strategy, tactics, duration, and costs of incidents. To meet the objective of improving organizational "Situational Awareness," KDL must capture the full spectrum of perspectives.
- KDL was useful for recording decisions on smaller fires (types

4 and 5), as well as on larger fires (types 1, 2, and 3).
- Including the KDL in a Letter of Delegation encouraged creation of a complete incident log. Key decisions were most often discussed and identified during evening planning meetings with command and general staffs, with one person given responsibility for data entry. Still, KDL efforts initiated during 2008 were sometimes preempted by higher priorities.
- The current KDL system should be streamlined, avoid duplicating other programs, and allow entrants editing capability. Future development must provide access to the interagency community and include a user's guide, more training, and outreach. KDL should also be linked to WFDSS and document implementation decisions.
- There is followup needed on the 2008 KDL decisions. The agency needs an analysis of project progress, including an assessment of working relationships, innovation and learning, financial management, and other intended outcomes of the KDL process.

Based on this feedback, analysis of entries, and lessons learned from 2008, a steering committee of representatives from research, National Forest System management (fire staff, IMTs, and line officers), and interagency partners has developed a revised version of the KDL. This second version combines the "balanced scorecard" and KDL efforts into a single, streamlined form that can be completed as needed during an incident. This effort is a stand-alone program built to capture decisions flowing from strategic decisions made and documented in an incident's guiding document (WFSA, Wildfire Implementation

Plan, or WFDSS). The 2009 version provides the opportunity for more rigorous analysis through use of structured responses in addition to narrative. Additionally, the combination of WFSA/WFDSS and KDL will capture the decision flow from land management direction to fire management plan, to incident objectives and strategy, and through implementation. As such, it builds a story:

I/we have made a decision, taken an action, or raised an issue in order to move towards meeting an objective. We need to do this now because of some pressing or emerging issues or concerns. We expect this to impact key

aspects of the incident (safety, ecology, cost). We expect this to affect our incident only, or other incidents as well.

The KDL can be accessed by authorized users through the **Fire** and Aviation **Management** Web Applications (FAMWEB) Web site, which provides secure access by interagency partners.

Acknowledgements

References

Garvin, D. 2000. Learning in action. Cambridge, MA: Harvard Business School Press.

Kaplan, R.S.; Norton, D.P. 1992. The balanced scorecard: measures that drive performance. Harvard Business Review. Jan.–Feb.: 71–80.

Reason, J. 1997. Managing the risks of organizational accidents. Burlington, VT: Ashgate Publishing. 252 p.

Snook, Scott A. 2000. Friendly fire: the accidental shootdown of U.S. Black Hawks over northern Iraq. Princeton, NJ: Princeton University Press. 257 p.

Weick, K.; Sutcliffe, K. 2007. Managing the unexpected: resilient performance in an age of uncertainty. 2nd ed. Hoboken, NJ: John Wiley & Sons, Inc. 194 p. ■

Web Site on Fire

A Hub for Fire Information

The Web site at <http://www.fs.fed.us/fire/> is a gathering place for information on all aspects of fire research, management, logistics, and news. A virtual kiosk, the site serves to inform professionals of the latest developments in equipment and methods, provide fire managers with a gateway to fire management tools, and give newcomers a glimpse of the breadth of fire operations.

Links in the Web site connect the viewer to specialized areas for indepth information. These include familiar topics and some unexpected resources: InciWeb is an interactive list of all recorded fire incidents throughout the United States over the last fire season, and back issues of Fire Management Today can be viewed and printed, from the latest to the first issue of December 1936.

The site serves as a comprehensive source of information on fire incidence and response from historic records up to the present and into the emerging future.