The South Zone Gifford Pinchot Fire Crew at the 2020 annual preparedness review. All levels of fire management gather annually to show proficiency in wildland firefighting preparedness, operations, and safety; in 2020, proficiency in COVID-19 mitigation strategies was added. Some of the proceeds from each mask worn in the photo went to the Wildland Firefighter Foundation, which provides logistical support to wildland firefighters and their families in times of need. Photo: USDA Forest Service.

An Applied Process for Learning During the COVID-19 Pandemic

David Flores, Jim Gumm, and Theodore Adams

Wildland fire management is an extraordinary work environment highly influenced by environmental, social, economic, cultural, political, and psychological conditions (Putnam 1995). The office of Human Performance and Innovation and Organizational Learning (HP&IOL) focuses a critical lens on learning and how the multiagency wildland fire community can learn from significant events. HP&IOL is tasked with capturing, analyzing, and describing the complexities that unfold during fire operations and with turning the outcomes into learning opportunities for improving the interagency fire organization. The primary focus is on learning from unintended outcomes.

Beginning in March 2020, the COVID-19 pandemic changed the meaning of work for HP&IOL (fig. 1). The pandemic was bound to complicate wildland fire management during what promised to be a difficult fire year, and the Interagency Wildfire Risk Management Assistance (RMA) team and senior leaders in the Forest Service needed information from the field to help make executive-level decisions and mitigate COVID-19 risk. Given the uncertainty associated with a novel and highly contagious virus, leaders wanted data about field conditions; changing situations; and the impacts of executive direction, both intended

David Flores is a research social scientist and Jim Gumm is the director of Innovation and Organizational Learning for the Forest Service, Rocky Mountain Research Station, Fort Collins, CO; and Ted Adams is a supervisory forest technician for the Forest Service on the Bend–Fort Rock Ranger District, Deschutes National Forest, Bend, OR.

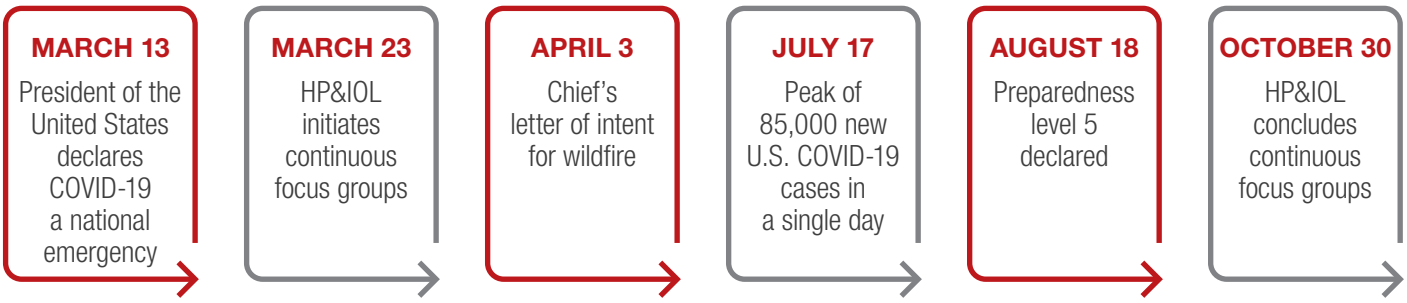

***Figure 1**—Sequence of significant events during the 2020 fire year.*

and unintended. The RMA suggested developing a continuous feedback loop to ensure that information could flow quickly and directly in realtime between leaders in the wildland fire organization and field-level employees.

VARIOUS LEVELS OF LEARNING

To provide continuous feedback in realtime, HP&IOL built on its experience in collecting information to produce learning reviews and the wildland fire meta-review (see HP&IOL publications). Continuous feedback can flow in multiple ways and with varying levels of reliability, depending on time and available resources. To meet the demand, HP&IOL developed an applied process for communication, learning, and decision making. The process includes information collection, data analysis, and report writing, with reliability ranging from low (with limited time) to high (with unlimited time and resources) (fig. 2).

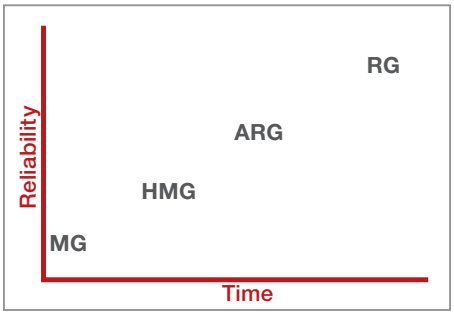

***Figure 2**—Levels of reliability and time for HP&IOL research to support communication, learning, and decision making, from low (management grade, MG) to high (research grade, RG). The intermediate levels are high management grade (HMG) and acceptable research grade (ARG).*

Figure 2 depicts the various possible levels of communication, learning, and decision making in response to the COVID-19 pandemic during the 2020 fire year. The y-axis represents the level of reliability of data collection, analysis, and decision making. The x-axis reflects the amount of time available for data collection, analysis, and report writing for decision making. The following four categories outline the structure adopted by HP&IOL to collect, analyze, and distribute information for learning and decision making during the COVID-19 pandemic:

1. Management grade (MG) is the simplest form of data collection and decision making. The director of HP&IOL asks the longest tenured employee for an opinion based on the information collected, and the director makes a decision based on experience. MG is quick and inexpensive; depending on level of expertise and the complexity of the issue, the outcomes are often positive. However, MG is low in reliability because data is limited.
2. High-management-grade (HMG) data collection and decision making involve HP&IOL employees in collecting information, conducting a brief analysis, and writing a rough draft of the results. We increased the reliability of the information by conducting 9 focus groups (with 8 to 15 participants), and we included note takers, reviewers, and writers who developed the HMG document. Reports were provided within very short timeframes, and data collection and communication were as close to realtime as possible.
3. Acceptable-research-grade (ARG) data collection and analysis were conducted by the HP&IOL sensemaking branch, a group of fully trained social scientists who were given more time than the HMG group but significantly less time than a normal research project would entail. This group either confirmed or refuted HMG findings and also discovered "hidden gems" of information and learning through a deeper analysis. The sensemaking branch also teased out the issues unheard and/or voices missed during earlier analysis. Findings were close enough to realtime to offer valuable insight into next steps in the decision-making process.
4. Research grade (RG) is the gold standard, entailing data collection, analysis, and writing with unlimited time and resources. The benefits of RG are extremely diverse; deep thought is invested in an issue, with rigorous learning objectives. Though not infallible, RG has the highest reliability possible in a complex environment. However, the financial cost of RG and the time it takes are both very great.

During the 2020 fire year, HP&IOL determined that reliable information was often needed beyond the MG level. However, limited time restricted the amount of analysis and review available for a full RG level of reliability in weekly reports. To increase the level of reliability and learning, additional research social scientists were invited to provide ongoing long-term data analysis at the RG level. Though not carried out during the 2020 fire year, RG analysis and writing are now being applied to long-term organizational communication, learning, and decision making.

The importance of virtual meeting applications cannot be overstated: recent advances in video telecommunications have greatly improved the capacity for networking and organizing.

FOCUS GROUPS

To support each of the four categories, HP&IOL initiated ongoing focus groups, which were active through October (fig. 1). We reached out to a network of lower level and midlevel Forest Service employees who work in wildland fire management, deliberately seeking participants who represented wildland fire personnel from each Forest Service region and from a variety of occupations. Though broadly representative, the focus groups were not a sample of all Forest Service employees working in wildland fire. A total of 194 focus groups were convened. Notably, no single occupational perspective was under- or overrepresented.

The focus group is a social science method for collecting information from a subset of the population (Krueger and Casey 2009). HP&IOL adopted the focus group approach to collect data with higher reliability than MG. Focus groups were beneficial in collecting HMG data for several reasons:

- Focus groups gather indepth knowledge about a particular "focus," problem, or issue. In this endeavor, the focus groups conducted indepth conversations about new challenges that COVID-19 posed in the everyday work environment of wildland fire management.
- Focus group participants can be recruited to represent either uniform or diverse perspectives. In this case, participants represented diverse experiences, occupational roles, and management positions within the Forest Service's fire organization. The variety of organizational positions exposed participants to different perspectives across the organization.
- Focus group participants express multiple perspectives and a nuanced understanding of a topic or issue, and they typically have multifaceted responses to a particular issue. Because the focus group is an interactive conversation, participants also cue one another to create additional or enhanced insights. In this case, focus groups provided rich feedback to RMA members and senior agency leaders, helping them understand how COVID-19 challenges—and ways of mitigating the associated risks—unfolded in the field and how they might incorporate the knowledge into their executive direction.
- Focus groups often benefit the participants themselves. In this case, the focused conversations let participants voice their beliefs and concerns in a safe setting among colleagues and share their respective lessons from the field with one another. They shared their experiences without a direct supervisor present, empowering them to engage in meaningful conversations.

Figure 3—*The Eisenhower Decision Matrix.*

Focus groups are typically conducted in person. In this case, however, physical distancing guidelines and telework requirements motivated HP&IOL to conduct the focus groups virtually using the Forest Service's Microsoft Teams platform. The importance of virtual meeting applications cannot be overstated: recent advances in video telecommunications have greatly improved the capacity for networking and organizing.

PROTOCOL FOR HMG DATA COLLECTION

In March 2020, HP&IOL decided to conduct one focus group for each Forest Service region. Within 10 days, HP&IOL assembled a team of focus group facilitators, recruited participants from across the country, designed focus group questions, conducted nine regional focus groups, analyzed the data, and delivered a written report to RMA.

RMA wanted to know "what incentives would encourage the field to engage in COVID-19 mitigation strategies during the 2020 wildland fire season." Although mitigation strategies were indeed a concern, the open-ended nature of the focus groups allowed participants to make other observations about the pressures of dealing with COVID-19. Their insights exposed overlooked and emerging issues, pinch points, and weaknesses in Forest Service wildland fire management.

Following the first set of nine focus group reports, HP&IOL gathered all suggestions in the field and prioritized them using the Eisenhower Decision Matrix (fig. 3). The matrix helped HP&IOL separate immediate from long-term challenges (Krogerus and Tschäppeler 2012), providing a template for presenting focus group data to RMA.

RMA found the focus group information extremely valuable for decision making, so it asked HP&IOL to continue the HMG focus group process throughout the 2020 fire year. To develop a sustainable and ongoing focus group process, HP&IOL implemented a detailed production schedule (table 1). The schedule outlined roles, processes,

and protocols for convening nine weekly focus groups, conducting analysis, and writing a consolidated weekly report.

The focus group facilitators sent email invitations and reminders to their respective groups and led their respective sessions. A separate note taker initiated the Microsoft Teams recording, used a template to take notes on the session, conducted initial analysis of the notes, and posted a summary for the writer/editor. Each regional focus group session was scheduled for the same time each week. To the extent possible, facilitators and note takers remained with the same groups throughout the year. Incoming HP&IOL temporary assignment detailers who became facilitators spent at least one session as an observer before taking on the role of focus group facilitator.

DEVELOPING FOCUS GROUP QUESTIONS

The focus groups were designed to establish an HMG feedback loop between RMA, Forest Service senior leaders, and field-level employees. HP&IOL focus group facilitators expected to serve as a conduit for communication. After providing data from the field, the facilitators expected RMA and senior agency leaders to raise questions and give answers based on what they were hearing from colleagues and what they were learning from the weekly HP&IOL reports.

However, RMA and senior agency leaders rarely offered questions, comments, and answers to the field. Although HP&IOL provided a structure and process for a bidirectional information flow, information from leaders did not flow back to the field through the focus group process. Instead, senior leaders communicated with the field mainly through the national Office of Communication and through official letters from the Chief and Deputy Chiefs. Senior leaders often announced policy and issued guidance through "Inside the Forest Service," for example by posting weekly videos and writing "Leadership Corner" thought pieces.

As a result, HP&IOL assumed responsibility for developing focus group questions, adding it to the planning process. Questions were formulated based on new information, guidance, and policies related to:

- COVID-19 risk mitigation and wildland fire management,
- Items posted on the Wildland Fire Lessons Learned website, and
- Emerging themes and issues from previous focus group sessions.

Table 1—*Weekly report production schedule, March 23, 2020, to October 30, 2020.*

Day	Team	Task	Purpose
Monday	Focus group facilitators & writer/editors	Group status check-in and discussion	Organize personnel and discuss administrative issues.
Monday and Tuesday	Focus group facilitators	Administer focus groups	Facilitators administer one focus group per region to capture information from the field.
Wednesday	Focus group facilitators & writer/editors	Debrief among facilitators, note takers, and the writer/editor	Resolve procedural issues and identify initial broad themes that emerge. Note takers complete analysis and summary.
Thursday	Focus group facilitators	Facilitator meeting	Develop focus group questions for the following week.
Thursday	Focus group facilitators & writer/editors	Content analysis and writing	Conduct a broad analysis of the data and identification of general themes for the weekly report.
Friday	Focus group facilitators & writer/editors	Writing and editing	The writer/editor leads the writing for the weekly report, with assistance from the facilitators and note takers.
Following Monday and Tuesday	Sensemaking	Sensemaking team analysis	Sensemaking team members analyze previous week's focus groups.
Following Tuesday	Writer/editors	Deliver weekly report to HP&IOL director	Deadline for final edits and completion of weekly reports.
Following Wednesday	Sensemaking	Sensemaking team leader consolidates analysis	Consolidate and edit all individual team member analyses into one report.
Following Thursday	HP&IOL director	HP&IOL director presentation to RMA	Deliver report results at the weekly RMA meeting and disseminate to other Forest Service leaders and focus group participants.
Following Friday	Sensemaking	Sensemaking team meeting	Finalize weekly sensemaking report and deliver to director of HP&IOL.

REGIONAL FORESTER AND SUBJECT MATTER EXPERT INTERVIEWS

To support HMG communication, data collection, and decision making, HP&IOL scheduled individual interviews with the Forest Service's nine Regional Foresters, some of whom were interviewed multiple times. Each received the weekly report from the focus groups. The Regional Forester interviews were facilitated by the HP&IOL director and assistant director.

The interviewers asked the Regional Foresters to comment in general on the weekly reports. They also inquired specifically about recent challenges, unaddressed issues, innovations, and learning opportunities from peers. In addition, the interviewers asked the Regional Foresters what they wanted the field to know, and they raised open-ended questions about the wildland fire organization and COVID-19.

Although the interviews offered a higher level perspective, the Regional Foresters were also dealing with many of the same issues as the field: uncertainty, communication challenges, challenges with direction, and not having time to pause and think more deeply about issues. Identifying Regional Forester challenges in realtime furnished data for comparing how events were unfolding at the level of senior leadership with how they were affecting the field. For example, it helped to determine how guidance was being interpreted and how it was useful, and it also helped in identifying gaps in perspectives and understanding of issues and priorities as well as of doctrine versus direction.

Subject matter expert interviews were conducted with incident commanders, medical doctors, and specialists in human resources, critical incident stress management, and risk management. The interviews shed light on how specialized groups in the agency were thinking about wildland fire management in the context of COVID-19. In addition, the subject matter experts helped answer specific questions from the field, which allowed focus group facilitators to loop information back to focus group participants.

As of June 2021, the sensemaking team was producing high-reliability research grade reports for peer-reviewed publication in academic outlets.

Even as subject matter experts were advising senior decision makers, focus group facilitators were using their advice to develop weekly focus group questions. For example, interviews with human resources specialists and medical doctors helped in formulating questions about COVID-19 testing guidance and compensation, and interviews with specialists in critical incident stress management and risk management were used to develop questions about how additional fire management resources were or were not being used.

HMG DATA PROCESSING AND REPORT WRITING

To make sense of the large amount of data collected each week, facilitators, note takers, and writer/editors identified the most pressing challenges and concerns from focus group participants. Focus group facilitators and note takers adopted a coding scheme to filter information into four categories (Richards 2009):

1. Specialized concerns,
2. Suggested actions,
3. Lessons learned from focus group participants, and
4. Operational innovations.

Facilitators, note takers, and writer/editors worked collaboratively to key in on creative topics in the focus groups, separating notes into complaints, legitimate concerns, and actual innovations. After separating the notes, more time was spent thinking and writing about creative thoughts than on complaints in developing the weekly reports. Writer/editors also created headers, which outlined the report and became the stable template for the following weekly writeups.

Throughout the process of analysis, writing, and editing, HP&IOL and the sensemaking team worked diligently to stay true to the story and language of the participants, neither judging, correcting, nor editing them. Instead, separate reflection boxes in the weekly reports captured thoughts by HP&IOL that were not directly expressed by focus group participants.

ARG DATA ANALYSIS AND REPORT WRITING

A sensemaking team of outside social science researchers conducted additional data analysis of the weekly focus groups, comparing their own independent findings with themes from the HP&IOL weekly report. This ARG process of data analysis and report writing took place 1 week after production of weekly reports (table 1).

The sensemaking team met on a consistent weekly basis to validate report themes and findings, ensure reliability across the data, and explore broader systemic and cultural issues for longer term learning and decision making (Richards 2009). The sensemaking team consisted of Ph.D.-level social scientists with experience in risk management, communication, and qualitative data analysis.

Individual team members were assigned to specific focus groups. Each week, they read the full notes, analyzed the recordings of focus group sessions, and compared their findings to the HP&IOL report. The sensemaking team discussed common threads, identified innovations and outstanding questions, and delivered their own weekly report to the HP&IOL director. The team also consulted with the Forest Service's Washington Office and RMA leadership to assist in making ARG-informed decisions and strategize about ongoing communication techniques.

RG DATA ANALYSIS AND REPORT WRITING

RG data analysis and report writing began immediately upon completion of the focus group process on October 30, 2020. The sensemaking team produced an internal Forest Service report titled "Learning From Crisis: Making Sense of COVID-19 During Fire Year 2020." In the report, the sensemaking team identified common themes and lessons learned that were consistent throughout the 2020 fire year.

Hundreds of lessons learned emerged from the 194 focus group interviews, synthesized into 22 broad lessons learned and corresponding tactics suggested by field personnel. The sensemaking team grouped the 22 broad lessons learned into three overarching categories:

1. Communication (message quality and information flow as well as communication technology and tools);
2. Organizational culture (leadership, employee mental health and wellness, and employee work and staffing); and
3. Organizational learning (learning about COVID-19 safety and reflections on real-time learning).

Each category included a higher level discussion and long-term recommendations suggested by members of the sensemaking team.

As of June 2021, the sensemaking team was producing high-reliability RG reports for peer-reviewed publication in academic outlets. Preliminary findings reveal that decision uncertainty arising from the pandemic will likely have widespread and lasting impacts on wildland firefighters at all levels. Moreover, the pandemic introduced new uncertainties in three broad areas:

1. Policies and procedures, including a tension between guidance from the Centers for Disease Control and Prevention and the demands of wildland fire operations;
2. Decision space—the need to make decisions without clear administrative guidance; and
3. Personal life—the overlap of work with personal life.

The intersections between and among these three broad challenges created uncertainties and opportunities that are likely to shape wildland fire operations well into the future.

A FLEXIBLE AND VALUABLE TOOL

In 2020, the COVID-19 pandemic added complexities to the work environment for wildland fire management, including the need for information to be collected, synthesized, and communicated both vertically and horizontally throughout the Forest Service's wildland fire organization. Throughout the 2020 fire year, decision making was fraught with uncertainty.

However, the agency made significant efforts to base its decisions on the most reliable information at the time. The HP&IOL's applied process for communication, learning, and decision making serves as a flexible and highly valuable tool for the collection of information, data analysis, and report writing, with products at a range of reliability levels.

LITERATURE CITED

Krogerus, M.; Tschäppeler, R. 2012. The decision book: 50 models for strategic thinking. New York: WW Norton and Company. 126 p.

Krueger, R.A.; Casey, M.A. 2009. Focus groups: a practical guide for applied research. 4th ed. Thousand Oaks, CA: Sage Publications. 241 p.

Putnam, T. 1995. Findings from the Wildland Firefighters Human Factors Workshop: improving wildland firefighter performance under stressful, risky conditions—toward better decisions on the fireline and more resilient organizations. Tech. Rep. 9551–2855–MTDC. Missoula, MT: USDA Forest Service, Missoula Technology and Development Program. 74 p.

Richards, L. 2009. Handling qualitative data: a practical guide. 2nd ed. Thousand Oaks, CA: Sage Publications. 327 p.