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Use of Risk Management Assistance on the 2022 Bear Trap Fire, New Mexico

Incident Management Teams (IMTs) and Agency Administrators (AAs) used Risk Management Assistance (RMA) tools on the 2022 Bear Trap Fire to communicate and justify decisions and create a common operating picture within and between IMTs, local land managers, and the public. RMA tools helped identify viable opportunities and reduced wasted effort by focusing resources on locations most likely to contain the fire's spread. Interviews with IMTs and AAs on the incident illustrated how RMA was used to inform decisions, the benefits of RMA, facilitating and frustrating factors, and recommendations to improve the use and utility of RMA.

Case Study 1/3

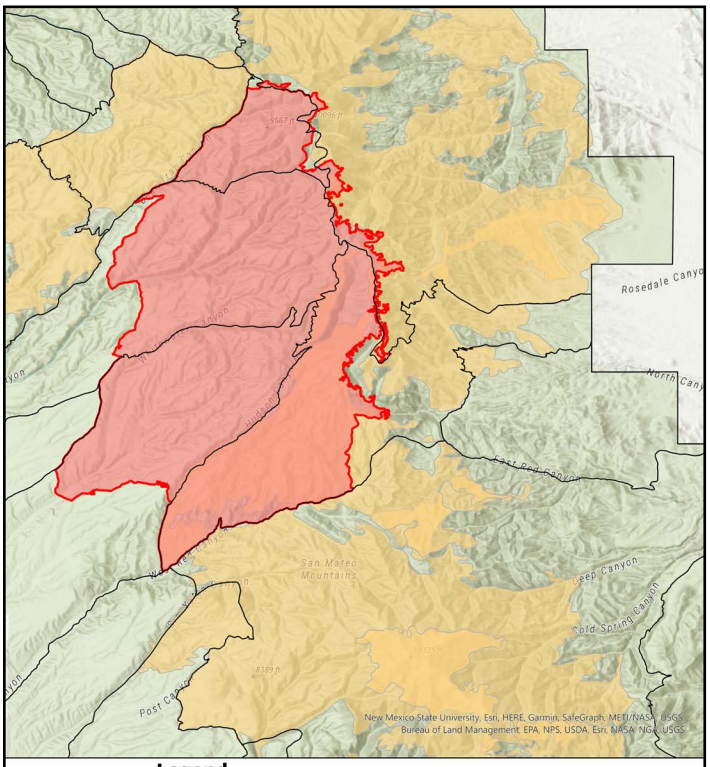
What is RMA?

The USDA Forest Service developed Risk Management Assistance (RMA) in 2016 to improve wildfire decision quality, increase accountability, and minimize firefighter risk (Calkin et al. 2021). RMA emphasizes pre- and post-fire training, on-incident support through a publicly-available online dashboard that houses advanced spatial analytics and fire weather behavior data, and line officer development. Strategic wildland fire management planning and implementation in the pre-season, during incidents, and after fires using local expertise and risk-informed spatial analytics like those found on the RMA Dashboard (e.g., Potential Operational Delineations, risk assessments) can facilitate safer, more effective decisions and outcomes (Stratton 2020).

The Southwest Ecological Restoration Institutes, in partnership with the USDA Forest Service Fire and Aviation Management, are leading a longitudinal assessment of RMA use in incident and non-incident management contexts. We conducted an initial assessment on RMA use during the 2021 fire season (Beeton et al. 2022). Through key informant interviews with AAs and IMTs, this case study series builds on our initial assessment and explores how RMA tools were used to inform wildfire decision-making on three incidents during the 2022 fire season.

Fire Progression: The Bear Trap Fire

The Bear Trap Fire began in early May 2022 on the Cibola National Forest, eventually reaching 38,225 acres. Due to exceptionally dry and windy conditions, managers attempted to quickly suppress the fire. However, there were insufficient resources to achieve this goal, and the fire grew quickly. As a result, fire managers implemented an indirect strategy that leveraged Potential Operational Delineation (POD) boundaries (e.g., fire scars, fuel treatments, roads, ridges) previously developed and vetted by local fire managers to control the fire. When the fire's furthest extent was achieved at the end of May, significant segments of the final perimeter largely aligned with established POD boundaries, particularly on the northern, eastern, and southern edges (Figure 1). Managers noted that there was local buy-in on using an indirect strategy within POD boundaries because there were few Values at Risk (VAR), limited resources, and high local acceptance of fire on the landscape.



- Ignition date: May 1, 2022
- Ignition location: Bear Trap Canyon, San Mateo Mountains, Magdalena Ranger District, Cibola National Forest and Grasslands
- Ignition type: Likely Human
- Size: 38,225 acres
- Date at fullest geographic extent: May 27, 2022
- Management strategy: Full suppression utilizing indirect tactics
- Teams: Initial Type 3 Team for 11 days (May 2 – May 12), followed by a Type 2 team for 14 days

Figure 1. Map of the Bear Trap Fire and relevant incident information. The Bear Trap Fire re-burned over the Red Canyon Fire (2015) to the east. The fire was contained along the perimeters of the Pot Fire (1994) to the southeast, North Fire (2016) to the north, and the Fisher prescribed fire (2010) to the northwest. The final fire perimeter generally aligned with POD boundaries.

What RMA tools were used and how they were used to inform decision-making

Suppression Difficulty Index (SDI), PODs, Snag Hazard, Potential Control Locations (PCL), and Estimated Ground Evacuation Time were the primary tools from the RMA dashboard used during the incident. These tools were used by local district personnel and fire staff before and during the transition between the local Type 3 IMT and the incoming Type 2 IMT to determine relevant VAR, develop Management Action Points, and to complete a Strategic Risk Assessment (SRA) - now referred to as the Incident Strategic Alignment Process, or ISAP. The SRA analyzed VAR, developed strategic actions, evaluated risks to responders, weighed the probability of success, and facilitated communication between the Team, AAs, and local stakeholders. The primary user of RMA on the Type 2 IMT was their Long Term Fire Analyst/Strategic

Operational Planner who was in charge of overseeing updates to the SRA for the incident. However, other members of the IMT used RMA tools to orient themselves to the landscape and facilitate communication between entities.

Benefits of RMA

Communication: The primary benefit of RMA identified by our interviewees was the dashboard's usefulness for communication within teams, during team transitions, between IMTs and AAs, and with the general public. The use of RMA during the SRA process facilitated challenging but beneficial conversations on management options aimed at efficiently using resources and minimizing risk.

> *It [the RMA dashboard] is the single most powerful briefing tool I've ever come into contact with.*

Rapid orientation: The RMA dashboard allowed the Type 2 IMT to quickly increase their situational awareness. Members of the team said the dashboard provided useful context to the fire by orienting them quickly to an unfamiliar landscape.

Contextualizing decisions: Although managers reported RMA tools did not lead to changed actions, the tools helped confirm courses of action or helped determine if additional ground-truthing was needed. The RMA tools provided support for justifying their decisions in the Wildland Fire Decision Support System (WFDSS).

> *[RMA] really helps promote good conversation to, I would say specifically line officers, when you can pull it up on a monitor, show them when they're feeling the social political pressures of just wanting the smoke to go away, or you've got a public that's wondering why resources are doing what they're doing or not doing what they're doing.*

Key factors impacting RMA use

Supportive leadership: RMA use was facilitated by leadership who supported engaging fires in a way that accounted for longer-term risks, and who recognized the benefits of using fire to achieve resource management objectives when conditions are appropriate and the risks to firefighter and public safety have been considered and minimized. Supportive leadership also shared information and facilitated trainings on RMA for their teams.

> *For the most part [RMA's] fairly accurate. It just reinforces the reason why we're going to the places we're going with our containment lines.*

RMA ease of use and accuracy: The RMA dashboard was reportedly easy to access and use. The RMA tools largely aligned with the "gut instincts" of career fire managers and what was observed on the ground.

Cultural hesitancy: Interviewees noted some fire managers were hesitant to utilize RMA tools because they were reluctant to change their approaches, didn't feel the need to justify their actions using RMA tools, or were skeptical of the accuracy of the tools. These managers reportedly would rather rely exclusively on "boots on the ground" approaches. Others suggested the broader fire culture in the USDA Forest Service, which tends to value experiential knowledge over analytics, may have contributed to the slow adoption of RMA.

> *We're supposed to be an agency that's driven by science and, 99% of the time...we still manage fires in the manner very similar to how we did in 1980.*

Training: The lack of knowledge of the RMA dashboard, PODs, and SRA, particularly among Type 3 teams, limited RMA use. While some local personnel on the Type 3 organization for the Bear Trap Fire were familiar with the RMA dashboard and used it to develop strategic actions, our interviewees reported that this was uncommon for Type 3 teams.

Recommendations to improve RMA adoption on wildfire incidents

Functionality: Managers noted that there is a need to improve some RMA dashboard features, such as clarifying the process to create printable maps. They also commented that the dashboard symbology and color ramps could be improved to increase accessibility for colorblind individuals. One IMT member suggested adding a data layer that more clearly communicated fire's benefit over the long term. Risk assessments detailing fire's positive and negative impacts to highly valued resources and assets are currently available on the RMA dashboard for many landscapes. However, this interviewee said that these assessments were not often favored by IMTs when they determined management actions. While long-term risk was effectively considered by IMTs and AAs on the Bear Trap Fire, this interviewee remarked that suppression actions on fires were often greenlit if there weren't obvious safety risks to responders, and that considerations of longer-term risk tended to take a back seat. They recommended more clearly defining risk assessment outputs on the RMA dashboard to assist IMTs with their calculations of overall risk on future fires.

> *There is no discussion or tool or anything to point to that longer term risk of either having to put the same fire out every year for the next 20 years or not having to respond to a fire for the next 20 years.*

Training: Personnel on the Bear Trap Fire phoned national RMA leaders as needed during this incident to overcome knowledge gaps. Interviewees said further training opportunities would be needed not just for members of Type 1 and Type 2 teams, but also for local resources associated with Type 3 teams. Incident Management Response Roundtable (IMRR) meetings and National Incident Management Organization (NIMO) presentations have been key to introducing these RMA tools and processes to Type 1 and Type 2 organizations, and similar tactics were recommended for members of local Type 3 teams.

Literature Cited

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