Use of Risk Management Assistance on the 2022 Cedar Creek Fire, Oregon

Incident Management Teams (IMTs), Agency Administrators (AAs), and other local fire management personnel used Risk Management Assistance (RMA) tools during the 2022 Cedar Creek Fire to develop Strategic Risk Assessments (now part of the Incident Strategic Alignment Process, or ISAP[1]) and create a common operating picture between IMT members, local land managers, and other stakeholders. RMA tools helped managers plan for an anticipated high-intensity fire weather event and identify containment features that allowed managers to protect the community of Oakridge, OR. Interviews with IMT members, AAs, and local fire managers on the incident – primarily those involved during the early stages of 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.

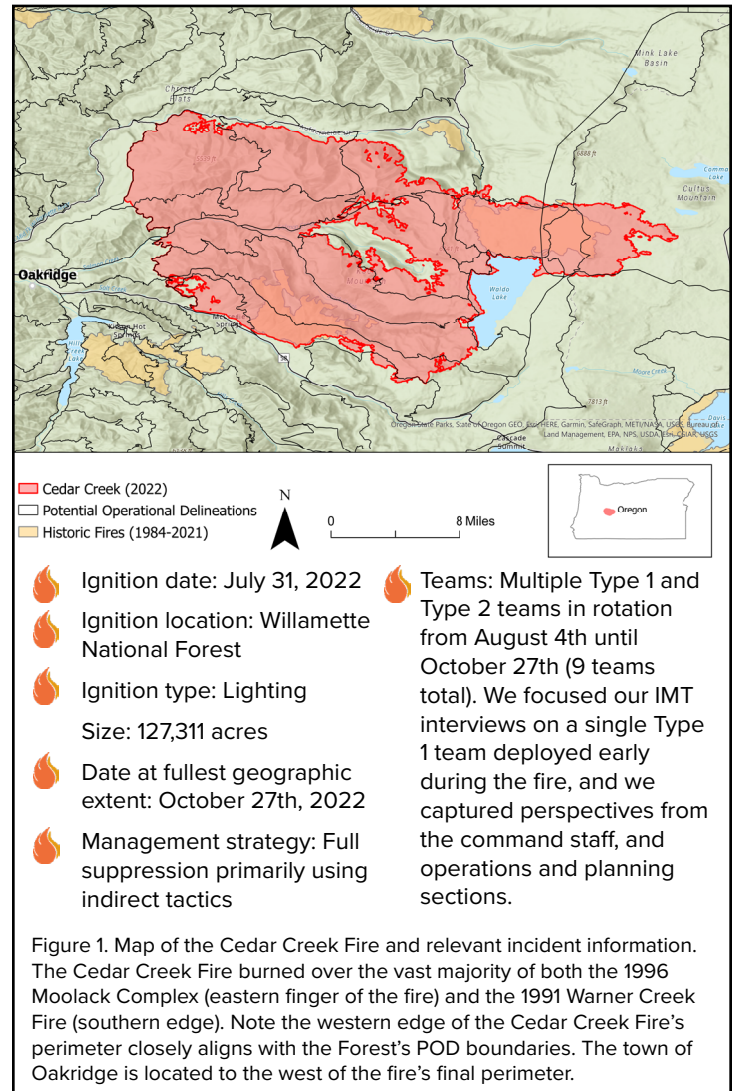## What is RMA?

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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, Suppression Difficulty Index, Potential Control Locations) 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 Cedar Creek Fire

The Cedar Creek Fire began in late July 2022 on the Willamette National Forest in west-central Oregon (Figure 1). Local fire managers quickly realized the fire was likely to be a large, long-duration incident due to the challenging, mountainous terrain and heavy fuel loads, and thus requested a Type 1 IMT. To protect the adjacent town of Oakridge, OR, from the threat of an east wind event similar to the one that had led to catastrophic outcomes during the 2020 Labor Day Fires, the first Type 1 IMT deployed a long-term indirect strategy to strengthen containment features near the community to the west of the fire. Fire managers' fears were realized in early September when a large east wind event and significant fire growth threatened the town. However, interviewees reported that firefighters held fire spread along strengthened containment features.

Fire managers also considered creating containment lines on the eastern edge of the fire. Yet, the potential negative ecological impacts to the Waldo Lake Wilderness and high ground evacuation times outweighed the potential opportunities for containment to the east. The fire eventually expanded

Cedar Creek (2022)
Potential Operational Delineations
Historic Fires (1984-2021)

N
0   8 Miles

Oregon

🔥 Ignition date: July 31, 2022

🔥 Ignition location: Willamette National Forest

🔥 Ignition type: Lighting

Size: 127,311 acres

🔥 Date at fullest geographic extent: October 27th, 2022

🔥 Management strategy: Full suppression primarily using indirect tactics

🔥 Teams: Multiple Type 1 and Type 2 teams in rotation from August 4th until October 27th (9 teams total). We focused our IMT interviews on a single Type 1 team deployed early during the fire, and we captured perspectives from the command staff, and operations and planning sections.

Figure 1. Map of the Cedar Creek Fire and relevant incident information. The Cedar Creek Fire burned over the vast majority of both the 1996 Moolack Complex (eastern finger of the fire) and the 1991 Warner Creek Fire (southern edge). Note the western edge of the Cedar Creek Fire's perimeter closely aligns with the Forest's POD boundaries. The town of Oakridge is located to the west of the fire's final perimeter.

significantly to the east, and though no Values at Risk were lost as a result, this eastern growth accounted for a large proportion of the total burned area. An east and a west zone for the fire – each with its own IMT – were designated during later stages of the incident to handle this complexity. The final fire footprint totaled 127, 311 acres.

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

The primary RMA tools used during the fire were Suppression Difficulty Index (SDI), Potential Control Location (PCL) analysis,

Potential Operational Delineations (PODs), Estimated Ground Evacuation Time, and Snag Hazard. The direction to use RMA tools was included in the incident's Delegation of Authority. RMA tools were used most frequently by an IMT Operations Section Chief serving as lead for "Strategic Operations," members of the IMT Planning Section, and local Willamette National Forest personnel as they worked together to develop Strategic Risk Assessments. These assessments utilized both fire behavior modeling and RMA tools to inform long-term strategic management actions. To develop the Strategic Risk Assessment, the IMT cross-referenced pre-identified PODs with SDI, PCL, and Fire Spread Probability (FSPro) modeling runs to determine where containment lines should be constructed and improved along the fire's western edge to best prepare for an east wind event. Estimated Ground Evacuation Time and Snag Hazard were then overlaid to better understand prospective firefighter risk exposure across the fire's entire planning area as teams considered where to engage. Our interviewees said using RMA tools within Strategic Risk Assessments to weigh risks and better understand the probability of success contributed to the decision not to engage as heavily on the fire's eastern edge. Once Strategic Risk Assessments were completed, fire managers then used them to communicate long-term strategies to forest and regional leadership, local responders, and other stakeholders.

Benefits of RMA

Created a common operating picture between IMTs and local land management units: Interviewees frequently reported that the RMA Dashboard allowed IMTs to rapidly orient to the landscape. RMA helped IMT members, AAs and other local fire managers quickly discuss the landscape on similar terms, eliminate bad options, and proceed with greater efficiency.

> *I think every tool in the toolbox is a marked benefit to how we're fighting fire now versus how we were fighting fire 20 years ago. Being able to demonstrate pretty readily when teams are coming in, why these areas are concerning, being able to look at the Suppression Difficulty Index, look at the snag layer [Snag Hazard], show the risk associated, and why we have concerns about putting people in certain areas is always a marked benefit. It expedites that process...*

RMA analytics accurately predicted where the fire stopped: Interviewees reported that the majority of features that eventually held the fire were POD lines and areas on the western flank that SDI and PCL layers predicted to be less risky, easier to access, and more likely to hold the fire. They said actions to improve these containment features during the incident - supported by Strategic Risk Assessments and RMA tools - contributed to the successful protection of Oakridge.

> *Pulling up SDI, PCL, all those, and really zooming in and looking at the landscapes through different lenses I think just helps [us] make a better-informed decision.*

Key factors impacting RMA use

RMA tools are easy to use and accurate: The RMA dashboard and tools were reportedly easy to use and interpret and accurately reflected conditions on the ground, insofar as users understood the underlying assumptions. Interviewees reported that because these tools were so easy to use, they helped to facilitate strategic dialogues among a diverse cadre of participants who might not otherwise be able to fully engage.

Knowledge of RMA tools is growing but remains limited: Regional- and Forest-level personnel and Type 1/Type 2 IMT members we interviewed were familiar with RMA. However, multiple interviewees cautioned that there is still variability in familiarity among potential users, particularly AAs and Type 3 organizations. They said they expected increased awareness and uptake among AAs and Type 3 IMTs as the firefighting community continues to be exposed to the RMA Dashboard and available tools.

Recommendations to improve RMA adoption on wildfire incidents

Training: Interviewees recommended two strategies for increasing familiarity with RMA. First, interviewees suggested including an incident simulation exercise emphasizing RMA during AA annual training. Second, interviewees said continued access to coaches and analytical support staff available to answer questions during incidents would allow users to better navigate RMA tools and the Strategic Risk Assessment process and promote consistency in their use and application.

Strategic plans that outlive individual IMTs: Interviewees indicated that incoming IMTs often opted to create their own Strategic Risk Assessments rather than utilize what previous teams developed. Those familiar with multiple assessments said new strategies did not differ significantly in substance, and the time it took to facilitate collaborative conversations and build consensus on revised strategies was inefficient. They recommended evolving and adapting a single Strategic Risk Assessment throughout an incident rather than completing new assessments as conditions change. They argued this would facilitate more effective and efficient decision-making.

> *You didn't have that carryover from team to team that made it a long-lasting discussion. It got very burdensome to sit in the same conversations and then restart every two weeks with a new team ... It just became more taxing than beneficial.*

Literature Cited

Beeton, T. A., Caggiano, M. D., & Colavito, M. M. (2022). Use of Risk Management Assistance During the 2021 Fire Season: A Technical Report.

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