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Use of Risk Management Assistance on the 2022 Windigo/Potter/Big Swamp Complex, Oregon

Incident Management Teams (IMTs) and Agency Administrators (AAs) used Risk Management Assistance (RMA) tools on the 2022 Windigo/Potter Big Swamp Complex to communicate and justify decisions and create a common operating picture within IMTs, between IMTs and local land managers, and the public. RMA tools helped visualize relevant Values at Risk (VAR), communicate potential strategic and operational actions, and facilitate dialogue among IMT members, and between the IMT, AAs and the public, for fires with significant jurisdictional complexity. Interviews with IMTs and AAs on the complex 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 2/3

What is RMA?

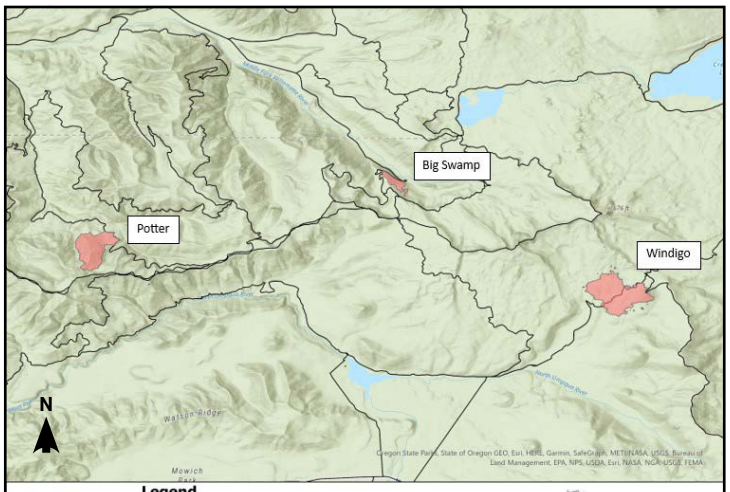
The USDA Forest Service developed Risk Management Assistance (RMA) in 2016 to improve wildfire decision quality, increase accountability, and minimize firefighter risk (Calkin et al. 2021). RMA emphasizes pre- and post-fire training, on-incident support through a publicly-available online dashboard that 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 Windigo/Potter/Big Swamp Complex

The Windigo/Potter/Big Swamp complex in southern Oregon was a group of small fires that ignited in late July/early August 2022 near the shared boundaries of the Umpqua, Deschutes, and Willamette National Forests (Figure 1). The largest of these fires was the Windigo complex (located on the Umpqua/Deschutes), followed by the Potter (Willamette), and Big Swamp (Willamette). The majority of each fire's growth occurred before the end of the first Type 2 IMT's initial deployment. All fires were categorized as full suppression for their duration and were declared contained in early September. The initial IMT opted to utilize indirect strategies on Potter due to dry fuel conditions and a lack of Values at Risk. On Windigo and Big Swamp, the team utilized direct and indirect strategies due to more favorable fuel moistures and threatened VAR.

Tragically, on August 10th, 2022, Collin Hagan of the Craig Interagency Hotshot crew was killed by a tree strike on the Big Swamp Fire. Though this loss was not the subject of our investigation, our interviewees acknowledged Hagan's death with reverence and respect as they shared their perspectives on the use of RMA during the complex.



- First fire ignition date: July 31, 2022
- Ignition locations: Near the shared borders of the Willamette, Umpqua, and Deschutes National Forests
- Ignition type: Lightning
- Sizes: 1,007 ac (Windigo), 632 ac (Potter), 110 ac (Big Swamp)
- Date at fullest geographic extent: August 26, 2022
- Management strategy: Full suppression using a combination of direct and indirect tactics
- Teams: Type 2 teams in rotation from August 2nd until September 11th (three teams total), then downgraded to Type 3 and handed off to local units.

Figure 1. Map of the Windigo-Potter-Big Swamp Complex in southern Oregon and relevant incident information.

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

The primary RMA tools used during the complex were Potential Operational Delineations (PODs), Suppression Difficulty Index (SDI), Potential Control Location (PCL) analysis, Estimated Ground Evacuation Time, and Snag Hazard. Direction to consider PODs and the RMA dashboard was included within the Delegation of Authority. On the Type 2 team initially assigned to the fire, an Operations Section Chief functioning as "Strategic Operations" and the Team's Safety Officer were the primary users of RMA tools. The team was familiar with the RMA dashboard as they had used it to pilot Strategic Risk Assessments (SRA) during incidents in 2021, now known as the Incident Strategic Alignment Process, or ISAP.

Initially, members of the team and AAs used the dashboard as well as additional data layers provided by local land management units to discuss and prioritize relevant VAR. From there, the team used the analytics to craft strategies for each fire and communicate with AAs about potential management actions. The team's "Strategic Operations" Operations Section Chief used PODs, SDI, and PCL layers to develop a draft strategy. They then shared the draft strategy with the Safety Officer who overlayed the Snag Hazard and Estimated Ground Evacuation Time layers to consider overall risk to firefighters for each strategic action.

Benefits of RMA

Created a common operating picture between the Incident Management Team and local land management units: IMT interviewees explained that tools on the RMA dashboard helped them quickly orient to an unfamiliar landscape and narrow the range of viable strategies to consider, which streamlined the ground truthing process. Interviewees associated with local land management units described how the platform allowed IMTs to comprehensively describe potential management actions to those with limited fire management experience.

> *It made a measurable difference in my confidence in the actual actions that [the IMT] were taking on a daily basis...It was a really good way to talk about operations...It allowed me to have questions about operational tactics based on facts, based on all these data points at an appropriate time and at an appropriate level.*

Provided decision rationale: IMT interviewees reported the dashboard allowed them to justify their operational decisions. The dashboard and its analytics helped the IMT quantify its actions by providing information for Management Action Points, SRAs, and Wildland Fire Decision Support System documentation.

> *The benefit...is that you're able to quantify the decision making that we [firefighters] do in our heads. We're not changing anything on how we're fighting fire, we're just able to have a much better conversation about the 'why'.*

Key factors impacting RMA use

Previous experience: Those already familiar with the dashboard were more likely to be comfortable with its usage from the outset of the complex. On this complex, there appeared to be more experience using the dashboard among members of the first IMT than among AAs.

Internet connectivity: Some interviewees cautioned that poor internet connectivity reduced the dashboard's functionality. Specifically, the map viewer had trouble populating data layers when connection speeds were slow. This could be potentially problematic for Incident Command Posts with limited connectivity.

Disagreement around VAR data: The complex straddled three administrative units, and some interviewees reported disagreement about the relevant VAR to prioritize across units. Managers thought some of the VAR data on the RMA dashboard did not accurately or completely represent their landscape, thus representatives from each National Forest brought local VAR data layers to supplement data on the RMA dashboard. Although local data differed between forests, which resulted in a more time-intensive prioritization process, the supplemental layers were successfully uploaded to the dashboard and supported inter-unit dialogue on VAR prioritization.

Cultural acceptance: The willingness of the IMT, particularly the Incident Commander (IC), to accept RMA tool and model outputs was a key component facilitating the dashboard's use. Each tool on the dashboard comes with its own set of assumptions, and whether the IMT and IC trusted the outputs appeared to be key to their use on the complex.

> *You've got to have an IC that's supportive, who's progressive, and who's not afraid of new things. That's number one, because he or she sets the tone. If your IC's not really into it... that's going to be reflected in [the team's] participation.*

Recommendations to improve RMA adoption on wildfire incidents

Incorporate dynamic conditions into RMA tools: Interviewees recommended tools, such as the SDI and PCL, incorporate dynamic weather conditions and forecasts. They also recommended including firefighting resource availability on the dashboard. They said this would better reflect the changing conditions faced by fire managers and result in greater utility of the tools for managers.

Increased trainings and socialization: More trainings at multiple levels of authority and organization would improve awareness and use of RMA. According to our interviewees, awareness and acceptance of the accuracy of RMA tools appears to be inconsistent across IMTs. Enhancing training opportunities for Type 1 and Type 2 IMTs on how to use the tools, and exposing managers and firefighters not associated with Type 1 or Type 2 IMTs to the tools may increase RMA use.

Contextualize model outputs: Some managers recommended extra care in contextualizing the SDI and PCL results to temper expectations for success and better communicate viable fire management options. Dynamic weather conditions are not considered in SDI and PCL, and there are a host of other factors that dictate where and how to engage a fire (e.g., resource availability, VAR). IMT interviewees suggested the need to clearly articulate modeling assumptions and limitations. Otherwise, individuals with limited fire experience who interact with these tools may inaccurately assume some locations will hold a fire under all conditions, or that other areas would always be dangerous or ineffective areas for firefighters to engage.

Literature Cited

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