SWERI Southwest Ecological Restoration Institutes

TOPICS *in* RESTORATION & RESILIENCY

# Decision Support Tools

***Applying wildfire-risk science to guide planning, mitigation, and incident response***

## Introduction

The Southwest Ecological Restoration Institutes (SWERI) are widely recognized for working closely with practitioners, researchers, and policy makers on the development and application of wildfire risk science and spatial decision support tools (DSTs).

SWERI applies DSTs with collaborative groups to better integrate natural resource planning with fire response, while also evaluating the factors that influence DST use and sharing best practices for applying these tools in wildfire mitigation, response, and post-fire recovery.

Managers and communities face complex decisions about where to locate and prioritize forest and fire management actions. To support this work, SWERI helps develop and facilitate the use of DSTs that inform forest and fire management across jurisdictional boundaries. SWERI utilizes a Risk Assessment and Decision Support (RADS) framework that customizes and applies existing spatial DSTs—including Potential Operational Delineations (PODs), Quantitative Wildfire Risk Assessments (QWRA), and scenario investment tools—so they are useful for managers and partners within collaborative contexts.

SWERI staff work with collaborative groups and partners to situate DSTs within environmental analysis and decision-making (e.g., NEPA), community wildfire protection plans, and apply these platforms for outcomes-based monitoring.

### *Decision Support Tools*

- **Potential Operational Delineations (PODS)** PODS are a spatial planning framework that bring together fire responders and risk analytics to identify usable fire containment features before smoke is in the air.
- **Quantitative Wildfire Risk Assessments (QWRAs**) QWRAs help determine how local values will be impacted by fire, identify wildfire response strategies, and prioritize wildfire mitigation activities.
- **Risk Management Assistance (RMA)** The RMA dashboard provides forest and fire management with science-based risk analytics to facilitate risk-informed decisions, enhance safety, and improve outcomes.
- **Incident Strategic Alignment Process (ISAP)** ISAP is a structured framework that combines DSTs and collaborative dialogue to consider, and gain alignment on, risks and strategy during fire management.

### Before wildfires

DSTs help determine values at risk, delineate high-risk areas, and prioritize vegetation management using data driven scenarios.

### During wildfire

DSTs provide real-time situational awareness, predict fire spread, and support resource allocation for suppression efforts.

### After wildfire

DSTs guide post-fire recovery by assessing damage, planning rehabilitation, and prioritizing restoration to reduce future risk.

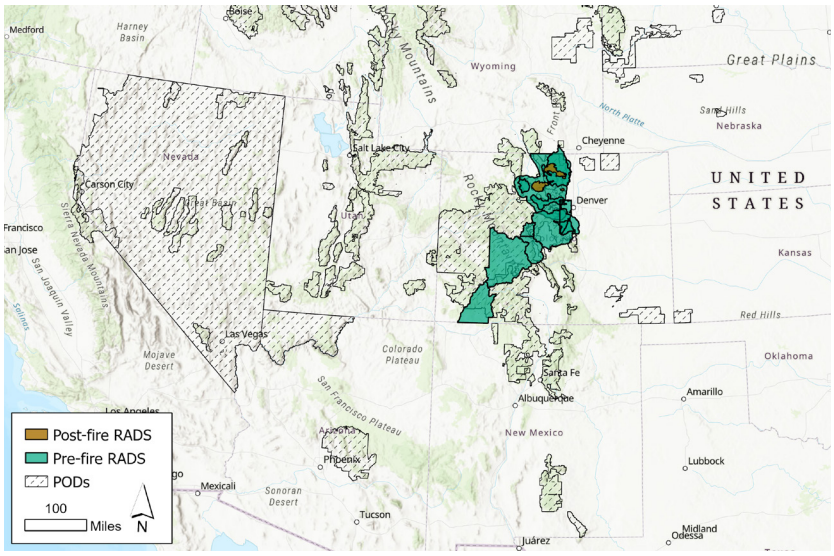


*Figure 1. SWERI Spatial Wildfire Decision Support across the West.*

SWERI plays a critical role in helping managers and communities make informed wildfire and forest management decisions by:

- Developing and customizing spatial wildfire decision support tools (DSTs) for practical use across 39 landscapes covering more than 140 million acres in the western US.
- Leading the development, application, and customization of PODs across 27 landscapes.
- Developing and applying 14 pre- and post-fire risk assessments and decision support (RADS) processes.
- Integrating DSTs into NEPA, community wildfire protection plans, and monitoring strategies.

## SWERI DST Impacts

**92** Wildland fire incidents where DST use has been evaluated by researchers

**14** Decision Support Tools (DSTs) and processes developed for pre- and post-fire contexts

**27** Landscapes where SWERI facilitated POD development and application across the West

**6** Wildfire incidents observed on-site to assess ISAP effectiveness and improve strategic alignment

**3** Major evaluations of Risk Management Assistance (RMA): surveys, case studies, and interviews

# Evaluating the Use of DSTs for Pre-fire Planning and Incident Response

SWERI social science documents lessons learned, opportunities, barriers, and innovations in DSTs in forest and fire management contexts, including the use of DSTs in wildfire incident response and pre-wildfire planning and mitigation.

## *DSTs in Wildfire Incident Response*

*Discovered on July 24, 2024, the Wapiti Fire in central Idaho grew to 129,062 acres, impacting the Boise and Sawtooth national forests and threatening nearby communities. SWERI researchers observed how the fire was managed by successive Complex Incident Management Teams. Photo/Scott Franz, SWERI*

SWERI works closely with the USDA Forest Service and fire managers to identify opportunities to improve DSTs during wildfire incidents.

To evaluate and enhance RMA, SWERI conducted a survey of its use during the 2021 fire season, case studies from 2022, and interviews with developers. Recommendations include developing new tools or refining existing ones, providing clear guidance on how RMA integrates with existing wildfire DSTs, and expanding opportunities for learning and socialization before, during, and after fires.

SWERI also assessed the Incident Strategic Alignment Process (ISAP), which integrates RMA and spatial analytics to support science-based incident planning. Through on-site observation of six wildfire incidents, SWERI identified needs for formal and experiential fire responder training, preseason socialization of concepts with local units and community partners, an expanded analytical workforce to deploy and interpret ISAP, and preseason identification of critical values at risk.

## *DSTs in Pre-Wildfire Planning and Mitigation*

*Fuel breaks in forested areas, as pictured here on the Okanogan–Wenatchee National Forest in Washington, are created by thinning and pruning trees to reduce the fire potential while preserving enough canopy cover to maintain a microclimate that is less favorable for surface fires. Photo/USDA Forest Service*

Research on DSTs for pre-wildfire planning highlights key barriers and solutions, including the need for capacity and funding to develop and use tools, education and communication on appropriate uses, leadership commitment, and user involvement in tool development.

Case studies show how PODs help prioritize strategic fuel breaks to reduce fire behavior, improve firefighter safety, and communicate the need for treatment internally and with landowners. Recommendations include strong leadership direction, early collaboration, staff training, and ongoing monitoring to ensure effective, adaptive use of these tools.

A study of value identification in QWRAs revealed misalignments in critical values and an underrepresentation of cultural and ecological values. To enhance the effectiveness of QWRA processes, researchers recommend incorporating diverse perspectives in collaborative settings and acknowledging the range of values and biases in valuation processes.

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*SWERI demonstrates and promotes the use of adaptive ecosystem management to reduce the risk of wildfires and restore the health of fire-adapted forest and woodland ecosystems of the Interior West. The institutes develop relevant knowledge and deliver best available restoration science to communities, stakeholders, and land managers to inform actionable decisions.*

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