

# Connected Science

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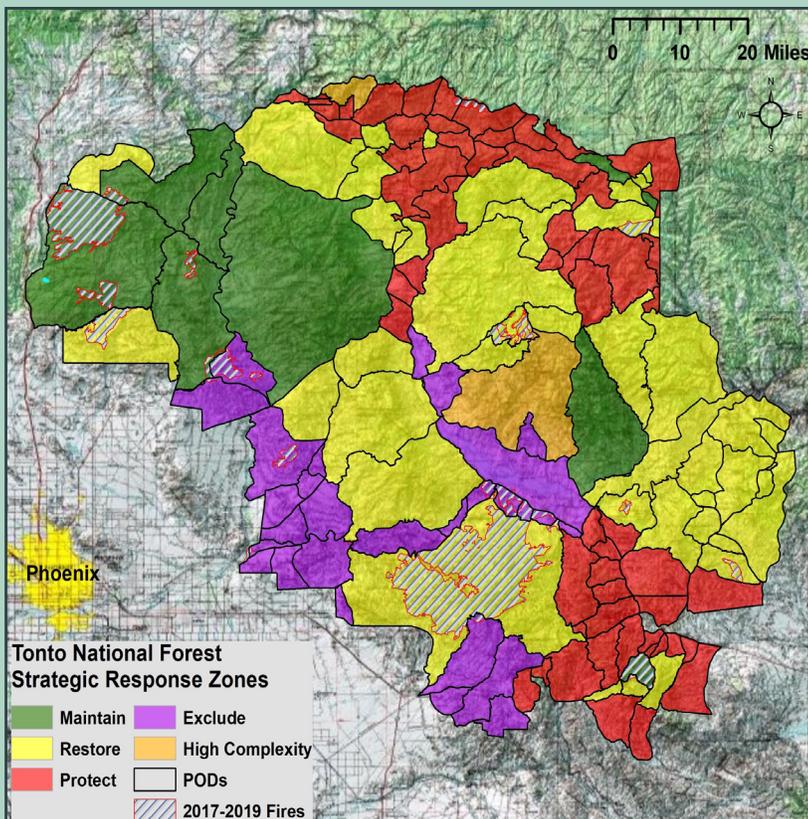


## When the Fire Starts: A Science-Based Framework for Risk-Based Incident Response

Potential Operational Delineations (PODs) is a spatial wildfire planning framework that brings together operational fire responses and landscape management goals from Forest Planning documents. It was developed by scientists at the Rocky Mountain Research Station (RMRS) [Wildfire Risk Management Science Team](#), [Colorado Forest Restoration Institute \(CFRI\)](#) and [Oregon State University College of Forestry](#), and forest and fire managers.

The PODs risk-based framework helps managers weigh a portfolio of landscape values, including human assets and natural resources, current conditions, responder safety, and likely fire outcomes to identify appropriate fire management objectives. When values are likely to benefit, the right kind of fire can be managed for restoration objectives rather than be immediately suppressed. When values are likely to be harmed, a network of available opportunities for fire engagement

### How it all comes together: PODs on the Tonto National Forest



POD boundaries follow suppression opportunities and may cross ownerships.

The POD boundaries shown here on the Tonto National Forest are identified by local fire managers as places they would use to impact and change fire behavior. The next step is to assign a strategic response to each POD, depending on the values there, and how they are likely to respond to fire. Where PODs are preplanned, they give managers mutually agreed upon information about what their initial response should be in the event of an ignition within the POD.

On the Tonto National Forest, managers identified the following types of PODs:

**Maintain:** areas that are predicted to experience a positive outcome from fire, such as fire-adapted forest.

**Restore:** areas where fire under the right conditions could convert an area to the “maintain” class.

**Protect:** areas that are predicted to experience a negative outcome from fire, such as homes or other infrastructure.

**Exclude:** areas where invasive grasses are converting fire-resistant Sonoran Desert into fire-prone savannah.

**High Complexity:** dominated by naturally fire-adapted ecosystems interspersed with sensitive infrastructure; where fuel treatments or other actions are needed to separate values sensitive to fire from values that benefit from fire.



are already defined and can be leveraged for rapid containment. Developing and implementing the PODs framework can also get fire managers, landscape level planners, and surrounding communities on the same page about how they intend to respond to ignitions before the fire season even begins.

“This year, in light of COVID-19, using a risk-based framework will be critical,” says Mike Caggiano, a researcher with CFRI. “While many fires will be suppressed as soon as possible, resource constraints may result in some large fires. In those cases, identifying effective control lines, assessing firefighter exposure, and predicting the impact those fires will have on the landscape will be particularly important.”

Dan Dallas adds “Both as a Forest Supervisor [on the Rio Grande National Forest] and Agency Administrator, and as a Type 1 Incident Commander I’ve come to depend on the advance knowledge I gain from the [potential control location, suppression difficulty index](#), snag hazard, and evacuation map analytics that have been developed by our research branch and analysts as I consider objectives, strategy, and tactics on any fire I manage.”

## Using Local Knowledge and Science-Based Models to Develop PODs

The process of developing PODs is not much different from the long-standing practice of firefighters identifying landscape features that could give them an advantage on the ground and be used as potential control points for a fire (e.g., roads, ridgelines,

drainages, previous fuel treatment boundaries, recent burns). RMRS and CFRI researchers have combined this valuable on-the-ground knowledge with advanced wildfire modeling and spatial analysis, and with Quantitative Risk Assessment data, to help identify hazards and values at risk across the landscape. “We are learning and improving this methodology as we go. Pairing scientists, managers and stakeholders yields powerful locally relevant outcomes,” says Kit O’Connor with the RMRS Wildfire Risk Management Science Team.

## The PODs Framework Facilitates Shared Stewardship

Across the country, more than 30 National Forests have begun developing and implementing this planning framework with local partners, complementing the Shared Stewardship efforts. This approach is also being used to make real-time decisions on wildfire incidents and fuel treatment planning. The process of creating the PODs is collaborative and PODs are effective communication tools both within the USFS and with external partners. Through the process of developing PODs, agencies and communities have opportunities to generate broad support for their decision-making by giving stakeholders the opportunity to provide input to the pre-fire season plan. Agencies can also clarify their own internal and external priorities, while addressing concerns outside of the pressure of an emergency response situation. Scientific tools like the co-produced PODs framework enable the work of risk management and shared stewardship in a tangible way.

## FURTHER READING

Thompson, M.P.; Bowden, P.; Brough, A.; Scott, J.H.; Gilbertson-Day, J.; Taylor, A.; Anderson, J.; Haas, J.R. 2016. Application of wildfire risk assessment results to wildfire response planning in the southern Sierra Nevada, California, USA. *Forests*. 7(3): 64. <https://www.fs.usda.gov/rmrs/publications/application-wildfire-risk-assessment-results-wildfire-response-planning-southern-sierra>

Dunn, C. et al. Wildfire risk science facilitates adaptation of fire-prone social-ecological systems to the new fire reality. 2020. *Environ. Res. Lett.* 15 025001. <https://www.fs.usda.gov/rmrs/publications/wildfire-risk-science-facilitates-adaptation-fire-prone-social-ecological-systems-new>

Caggiano, MD, O’Connor, CD, & Sack, RB (2020). Potential Operational Delineations and Northern New Mexico’s 2019 Fire Season. CFRI-2002. [https://cfri.colostate.edu/wp-content/uploads/sites/22/2020/02/Caggiano\\_PODs-New-Mexico-Case-Study-2.14.20.pdf](https://cfri.colostate.edu/wp-content/uploads/sites/22/2020/02/Caggiano_PODs-New-Mexico-Case-Study-2.14.20.pdf)

Rocky Mountain Research Station researchers work at the forefront of science to improve the health and use of our Nation’s forests and grasslands. More information about Forest Service research in the Rocky Mountain Region can be found here: <https://www.fs.usda.gov/rmrs/>.

The Colorado Forest Restoration Institute is a science-based outreach and engagement organization hosted by Colorado State University, established by Congress through the Southwest Forest Health and Wildfire Prevention Act of 2004 to serve as a bridge between researchers, managers, and stakeholders. <https://cfri.colostate.edu/>



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