



Forest Service  
U.S. DEPARTMENT OF AGRICULTURE



# Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*

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## Post-Fire Field Guide: Create and Use Post-Fire Soil Burn Severity Maps


In the weeks following the 2022 Cedar Creek Fire, an Interagency Burned Area Emergency Response (BAER) team was mobilized to identify and mitigate risks to human life and safety and critical water resources in the surrounding communities, including Oakridge, Oregon. During their assessment, the BAER team used a field guide developed by the Rocky Mountain Research Station to create a soil burn severity map and identify areas prone to elevated erosion. Their field work led to quick assessment of potential harm to water quality in Waldo Lake.

For nearly 12 years, the Field Guide for Mapping Post-Fire Soil Burn Severity has provided BAER teams with consistent methodologies, tools, and terminology to quickly and accurately identify post-fire conditions. RMRS Research Engineer Pete Robichaud and colleagues created the field guide, which is [now available in Spanish](#).

The guide helps BAER teams create a post-fire soil burn severity map and locate areas that may pose a risk to critical values within or downstream of the burned area.


Guide users can identify indicators of soil conditions that differentiate soil burn severity classes and identify fire effects that are directly related to post-fire soil conditions rather than to overstory or ecosystem conditions.

The Post-Fire Soil Burn Severity guide is a stand-alone resource for post-fire soil mapping needs. Users can reference the guide for ground conditions, soil characteristics, and vegetation density conditions that match the field setting.




### Mapping Soil Burn Severity


**Be Effective**  
Time should be spent in the moderate and high soil burn severity areas where the most valuable information will be gained.



**Get an Overview**  
Survey the area to develop a sense of how green, brown, and black are distributed in the burned area. Spend time on the ground, take notes, and collect GPS points.




**Classify the Conditions**  
Use the photo series in the [Field Guide for Mapping Post-fire Soil Burn Severity](#) to assess low, moderate, and high soil burn severity classes and vegetation conditions.

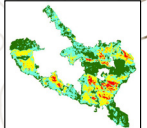




**Evaluate & Describe Area**

- Learn how terrain, vegetation, and field measured soil burn severity indicators describe each Soil Burn Severity Class.
- Develop a concept of how homogenous the soil burn severity classes are and include descriptions of the classes in the report.



**Create Final Soil Burn Severity Map**  
Correct the Burned Area Reflectance Classification breaks and edit misclassified areas such as water bodies and fields using the field observations.



GTR 243: Field guide for mapping post-fire soil burn severity

*Steps involved in mapping soil burn severity.*



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Observations can be compared with those in the tables and photos to determine the soil burn severity classification at a field location. Field indicators and classification guidelines are also provided for use in mapping. Components of the guide include:

- Terminology and definitions
- The role of remote sensing and GIS in BAER assessments
- Guidelines for identifying soil burn severity classes in the field
- Discussion on soil burn severity within general vegetation types and densities
- Photo series showing representative post-fire soil and ground conditions
- Field data sheets to assist in data collection for mapping soil burn severity

“This guide for mapping soil burn severity has helped BAER teams across the country create maps and mitigate flooding, erosion, and other issues for over 11 years,” says Robichaud. “Its continued popularity is a testament to its usefulness, and the recently published Spanish version will expand its use into even more local communities as well as globally.” Additionally, the spatial and temporal “snapshot” of soil burn severity often becomes a baseline for monitoring changes in soil and ground conditions and vegetation recovery in the years following fire.

### Lead Scientist

**Pete Robichaud** is a Research Engineer with the Rocky Mountain Research Station. His research and tools are used globally to help managers make better decisions based on today’s and future climates for improved management of our natural resources as well as impacts on life and property.

### Management Implication

- BAER teams are actively using the Field Guide for Mapping Post-Fire Soil Burn Severity to create consistent post-fire soil burn severity maps. These maps are reliable even with larger fires affecting multiple jurisdictions, agencies, and landowners.
- The methods outlined in the field guide help increase assessments’ efficiency, accuracy, and speed and allow specialists from different regions and disciplines to produce consistent products.
- Imagery from multiple remote sensing platforms, with varying spatial and temporal resolution, can be used to create soil burn severity maps; however, field validation is still necessary for accuracy.
- The [field guide is now available in Spanish](#) to provide these resources to more communities.
- The soil burn severity map can now be uploaded directly into the Forest Service [WEPPcloud](#) tool to predict the fire’s impacts on watershed response.



*A burned fir landscape on Lava Mountain in Shoshone National Forest, July 2016. USDA Forest Service photo by Kristen Honig*

### Further Reading

- Parsons, A.; Robichaud, P.R.; Lewis, S.A.; Napper, C.; Clark, J.T. 2022. [Guía decampo para elaborar un mapa de la severidad del incendio en el suelo después de un incendio](#) (Español). Gen. Tech. Rep. RMRS-GTR-243. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 69 p.
- Parsons, A.; Robichaud, P.R.; Lewis, S.A.; Napper, C.; Clark, J.T. 2010. [Field guide for mapping post-fire soil burn severity](#). Gen. Tech. Rep. RMRS-GTR-243. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 p.
- Robichaud, P.R.; Ashmun, L.E. 2013. [Tools to aid post-wildfire assessment and erosion-mitigation treatment decisions](#). *International Journal of Wildland Fire*. 22: 95–105.

The Rocky Mountain Research Station is one of seven units within USDA Forest Service Research & Development. RMRS maintains 14 field laboratories throughout a 12-state geography encompassing parts of the Great Basin, Southwest, Rocky Mountains, and the Great Plains. While anchored in the geography of the West, our research is global in scale. RMRS also administers and conducts research on 14 experimental forests, ranges and watersheds and maintains long-term research databases for these areas. Our science improves lives and landscapes. More information about Forest Service research in the Rocky Mountain Region can be found here: <https://www.fs.usda.gov/research/rmrs/>.

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