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Rocky Mountain Research Station

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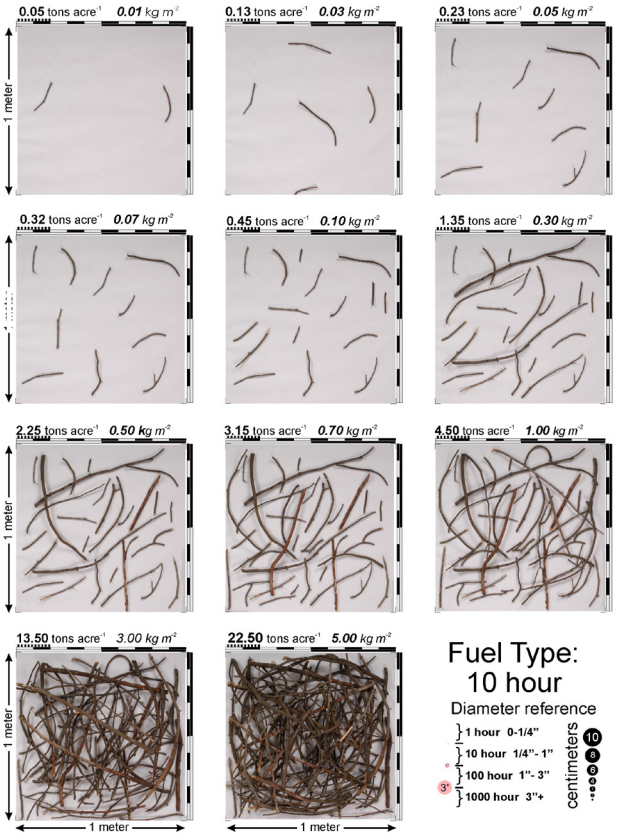
Simple, Fast, and Cheap: A New Photoload Sequence Building Technique for Fuel Load Estimates

Fast and efficient fuel loading estimates for fire-prone ecosystems are vital for accurately predicting fire behavior and effects. Fuel loads using photoload sequences are estimated by comparing the fuels on a landscape to a set of side- or downward-looking photos of simulated fuel beds with defined amounts of fuels. To create these photo sets in the past, researchers built simulated fuel beds by selecting, weighing, arranging, and photographing all materials and sequences in the lab. This process was time consuming and needed to be replicated for any new ecosystem.



An example of a finished photoload sequence for 10 hr downed dead woody fuels from Keane and Dickinson (2007). Each photo is compared to conditions in the field to visually estimate 10 hr woody fuel loading.

To improve accuracy and efficiency, Rocky Mountain Research Station (RMRS) scientists have developed a new method for creating photo sequences in the field. Using this new procedure, land managers will be able to more quickly create locally relevant photoload sequences to assess the fuel loads for their area.

The photoload technique provides a quick and accurate means of estimating the volume of wildland fuels on the landscape including 1-hour, 10-hour, 100-hour, and 1,000-hour downed dead woody, shrub, and herbaceous fuels. This is done by visually comparing conditions in the field with a set of photographed sequences. It has been implemented in multiple inventory and fuel monitoring projects worldwide. A new land manager-focused comprehensive handbook from RMRS details this new procedure for creating a set of photoload sequences in the field with minimal effort by photographing local fuel beds in situ.

The new method involves taking pictures of fuel components in the field, then collecting the photographed material and drying and weighing it to estimate the loading. The handbook details the 12 major steps involved in creating a set of photoload sequences, from finding representative sample locations to creating the final product—a set of field-ready photoload sequences. The photoload handbook

addresses some of the problems that are likely to arise during the sampling effort and how to resolve them. It also includes suggestions on how to train field crews to visually assess fuel component loadings using the photoload technique with the newly developed sequences. Finally, the handbook includes a list of all the equipment needed to create the photoload sequences.

Bob Keane, emeritus scientist and handbook author, says, "This publication is the fourth in a series to detail the critical steps needed to accurately estimate wildland fuel loadings using fast and effective methods based on comparative photography. With this publication, people can now create their own photoload sequences for any ecosystem in the world to account for local conditions. The visual estimates of fuel loadings can then be easily input into fire models that are used to manage ecosystems, save firefighters' lives, and protect property."

FURTHER READING

Stalling, Christine M.; Keane, Robert E. 2020. Creating photographic loading sequences in the field for the photoload sampling technique. Gen. Tech. Rep. RMRS-GTR-416. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 p.

Holley, Violet J.; Keane, Robert E. 2010. A visual training tool for the Photoload sampling technique. Gen. Tech. Rep. RMRS-GTR-242. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 235 p.

Introduction to the Photoload Sampling Technique. [VIDEO]. 2018. University of Idaho and the Wildland Fire Education & Training Collaborative (WETC); Heather Heward, Department of Forest, Rangeland, and Fire Sciences, University of Idaho; and Robert E. Keane, USDA Forest Service, Rocky Mountain Research Station. 18:49 minutes.

The researchers measure the fuels and then collect them for drying and weighing in the lab. USDA Forest Service photo by Ian Grob.

Key Findings/Management Implications

- The new photoload technique developed by RMRS provides a relatively inexpensive, fast, and accurate method to estimate loadings of major fuel components.
- This new technique allows land managers to create and use photoload sequences in any ecosystem worldwide for 1-hour, 10-hour, 100-hour, and 1,000-hour downed dead woody, shrub, and herbaceous fuels.
- The report provides a comprehensive protocol to create photoload sequences from field-sampled fuel beds, addresses common issues encountered in the field, and provides guidance for training field crews in the photoload sampling method.

LEAD SCIENTISTS

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Forest Service Research and Development (FS R&D) works with partners to deliver the knowledge and tools that land managers need to sustain the health, diversity, and productivity of our Nation's forests and grasslands for present and future generations. The Rocky Mountain Research Station (RMRS) is one of seven FS R&D units, rooted in the geography of the Interior West, and integrated into a national program with global applications. RMRS 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/rmrs/

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