ALASKA FIRE SCIENCE CONSORTIUM

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AFSC Research Brief
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What is the moisture content of standing dead grass?

By Randi Jandt & Eric Miller

Eric Miller, BLM Alaska Fire Service Fire Ecologist, assists with a lot of prescribed burns on military training ranges in Alaska where the primary fuel is standing dead grass (photo) and this question was often on his mind. He found that existing fine dead fuel moisture tables underestimated the moisture content in dead grass. Six years and 74 prescribed burn days later he had collected 409 grass samples and 285 weather observations, enough to build several empirical- and process-based fuel moisture models. He gave a presentation on his findings at the [Alaska Fire Science workshop] in April 2015. Unlike live fuels, DEAD grass only varies between about 6% and 16% moisture content under typical burn period weather conditions. No fuel ever dries completely under field conditions because of the way water molecules are sorbed into cellular structure. Eric found that, since dead grass has a very short drying time-lag--2 hours under field conditions--moisture content was generally close to equilibrium and could be predicted from an *equilibrium moisture content* (EMC) function. EMC functions are sigmoidal with relative humidity and linear with temperature. Coefficients were fit to several EMC functions, some from the food engineering and agriculture industries, to produce models of moisture content for standing dead grass (Fig. 1). A more complex process-based model (similar to that underlying the FFMC) did not yield better results. Notice on Fig. 1 that between 15-60% rH, a linear equation is not a bad fit to the data (red line), which led Eric to a simple "Rule of Thumb" for predicting dead grass moisture content in the field:

MC = rH/5 + 4

Coupled to the results of a separate project looking at ignition probability, the dead grass moisture content models link weather directly to an estimate of the likelihood that a firebrand will take and spread. You can find the new fuel moisture and ignition probability calculators based on Eric's field campaign, along with other useful tools like a **dead grass fuel loading photoseries** and **CFFDRS calculator**, on his website:

http://www.taigafire.org/

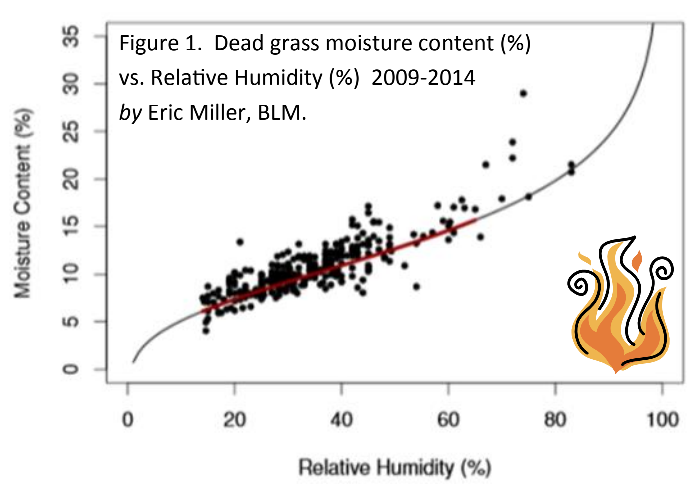

Figure 1. Dead grass moisture content (%) vs. Relative Humidity (%) 2009-2014 *by* Eric Miller, BLM.

Rule-of-thumb:

MC = (rH/5) + 4

Want to learn more about the theory and development behind the models? Watch a 20-minute presentation on AFSC Vimeo Channel or download Eric's slides from our Workshop event page.

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