Measuring soil moisture and how it can help determine fire danger

Why

Soil moisture and soil temperature are among the key contributing factors controlling the seasonal changes occurring in grasslands. This is important as these changes can increase not only fire risk but also the rate at which this risk changes.

This research tested the use of soil sensors on Fire and Emergency weather stations to see if they were collecting accurate and useful data to aid prediction of grass fire hazard, as well as fire danger in other live vegetation and soil organic layers.

As an organisation we have been collecting this information for a while, but there had not been any previous analysis into the quality and use of this data.

What we found

The research found that our weather stations were able to collect good data on both soil moisture and temperature with few irregularities. Soil sensors were sensitive enough to show changes in response to weather events.

A comprehensive literature review that was part of this research also identified opportunities to use data collected from other sources such as satellites to estimate seasonal grass curing, grass fuel loads and moisture contents.

This research also highlighted a number of ways we could get even more accurate data, such as standardising our sensor types and their installation depth.

Next steps

Overall, this research endorses the continuation of commissioning soil sensors on FENZ weather stations on an ongoing basis. Further research is required to progress each of the potential fire danger and grass fire hazard applications and the report outlines several recommendations as to how they might each be achieved.

Sensors pictured above measure soil moisture and temperature every 10-30 minutes

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Implications for future work

We could combine these measurements with other sources like satellite data to:

- Improve grass curing assessments
- Pasture fuel load modelling
- Grass fuel moisture estimation

To see the full report **click here.**