Rapid Lesson Sharing

Event Type: Spot Weather Forecasts

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Location: California

What Do You Do When Your Weather Isn't What Was Forecasted?

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Taking advantage of recent wet weather and a forecasted major rain event, a National Forest in the Sierra Nevada Mountains of California burned 80 acres of higher-elevation mixed conifer forest near a small mountain town.

Previous experience burning on this Forest had convinced fire and fuels managers of the necessity of placing one of their portable Remote Access Weather Stations (RAWS) near the site to collect weather observations before, during and after ignitions.

The station's ability to transmit its hourly observations to a satellite and from there to a publicly available website made it easy for these managers to get a quick snapshot of conditions on the unit without driving 50 miles to the site.

Figure 1 – Fire behavior in huckleberry oak brush on the first day of ignitions.

Each day of ignitions and for days afterward, the Burn Boss submitted Spot weather forecast requests to the National Weather Service (NWS). Comparing these forecasts to weather collected onsite by firefighters and with

the portable RAWS observations, a strange divergence was repeated three nights in a row:

Operational Period	Spot Forecast Predicted Nighttime Relative Humidity	RAWS Actual Observed Relative Humidity
Night of Oct 21-22	50%	29%
Night of Oct 22-23	83%	41%
Night of Oct 23-24	56%	39%
Night of Oct 24-25	84%	96%

Table 1 – Spot Forecast Nighttime RH Recoveries vs. Observed RH from Portable RAWS. Three nights of significant disagreement are highlighted. All RHs were predicted for or taken at 0200 hours.

On October 22, Day 2 of planned ignitions, resources arrived on scene to active smoldering. The qualified Burn Boss, who had spent the night camped near the unit, reported that the first day's ignitions had burned actively all night. Indeed, the unit burned more completely than it had during the day.

Over the following days, the discrepancies between the Spot forecasts and the observed RH recoveries became a point of some confusion and frustration. It led some to question whether the predicted rain at the end of the week was actually going to arrive as predicted.

After the third night (October 23 to 24th), the forecasts accurately predicted relative humidity recovery, and early the following morning a prolonged rainstorm began.

As is turned out, the prescribed fire produced desired fire effects in this part of the Forest, which has had no recorded fire history. The poor RH recovery at night may ultimately have helped to extend the burning period and consume more of the heavy fuels in the unit. Nevertheless, our confusion over the Spot weather forecasts sparked the desire to contact the NWS to discuss the possible causes of this repeated discrepancy.

It wasn't until after all ignitions were completed and mop-up was occurring that the Burn Boss Trainee submitted feedback to the NWS office. The office immediately followed-up with a phone call. Next, in an informative and friendly conversation, a Meteorologist and the Burn Boss Trainee discussed the conditions at the unit.

The Meteorologist speculated that due to a microclimate on the ridgetops in this area, humidity would start to recover in the late afternoon and peak a few hours after sunset— only to drop again for the remainder of the late night and early morning (Figure 2).

This is a great example of a strong inversion developing that causes ridges and peaks to deviate from the usual near-dawn timing of peak RH recovery. The Burn Bosses began to believe that whatever weather phenomenon they were witnessing was likely to keep repeating itself until a pattern change

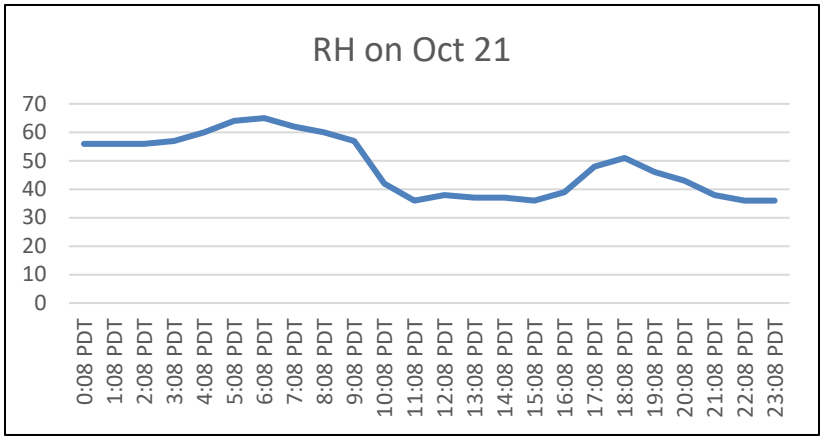

Figure 2 – Relative Humidity values on Day 1 of the prescribed burn, from midnight until 2300. Note the brief RH recovery from 1700 to 2000, followed by drying overnight. All times are 8 minutes after the hour because that is the portable RAWS' transmit time to the satellite.

arrived (i.e. when the rain came early on Day 5). However, this was independent of expert consultation and purely speculative.

Lessons Learned

- A weather station or a cheaper analog like a Kestrel Drop can provide prescribed fire practitioners with critical information about weather conditions on the unit when no one is on scene to record observations.
- When forecasts disagree with onsite observations, reaching out to the NWS office by email or phone can help explain the discrepancy and dial-in future forecasts.
- NWS offices differ in overnight staffing from place to place. Regardless, Meteorologists have other duties besides completing Spot weather forecasts. They don't have the time to do a deep dive on every Spot forecast request if a particular question or concern isn't communicated to them.
- If you find that weather forecasts aren't capturing what you are experiencing on the ground, the least productive response is to become annoyed and lose trust in the forecast. Being proactive and providing feedback and seeking further information is by far a better solution.

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