



National Estuarine Research Reserve System

Estuary Data Mystery

Title: Can weather data provide clues as to when fires will occur?

Reserve, State: San Francisco Bay Research Reserve, California

SWMP Station: Meteorological Station (MET) Rush Ranch

Parameters: Temperature, relative humidity

Start and End Dates: October 1-7, 2013, and October 4-10, 2018

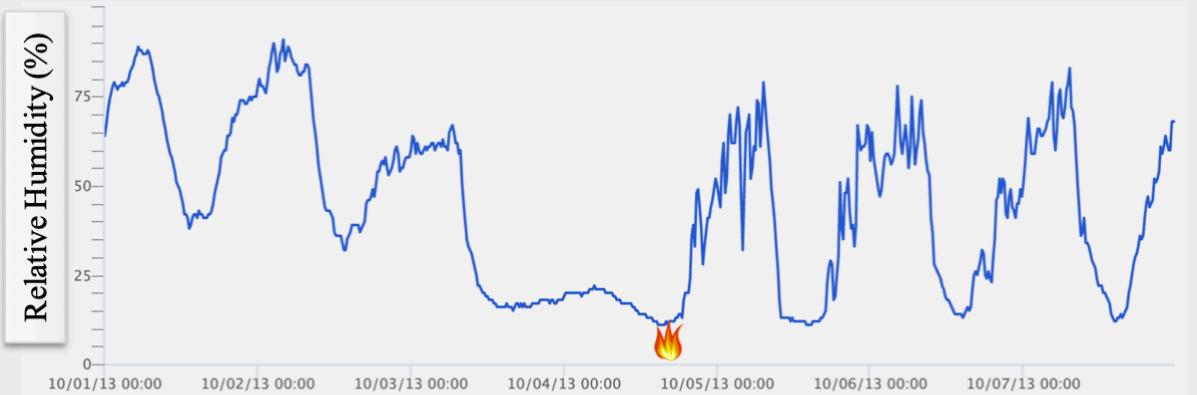
Data: Available and easy to graph at nerrsdata.org.

Investigate This: According to the Insurance Information Institute, in 2018 there were approximately 8,000 wildfires in California. During the late summer and fall, atmospheric conditions in California can become particularly hot and dry, creating an environment perfect for wildfires. One of the 2018 wildfires burned through grasslands near Rush Ranch in Solano County California, approximately 56 miles northwest of the Golden Gate Bridge. Rush Ranch is part of the San Francisco Bay Research Reserve; it protects 2,070 acres of tidal wetlands and surrounding grasslands, which are used as grazing pasture for cows. On October 7, 2018, the fire near Rush Ranch burned more than 4,500 acres. Interestingly, there was a fire in the same location 5 years before. The earlier fire occurred on October 4, 2013, and did approximately the same amount of damage. Both events are called the “Branscomb Fire.”

The two similar fires at Rush Ranch prompted scientists from the San Francisco Bay National Estuarine Research Reserve (NERR) to wonder about weather patterns before, during, and after both Rush Ranch fires. They speculated that data collected from the NERRS meteorological station at Rush Ranch might reveal insights into weather conditions that coincide with fires. To find out, they graphed [air temperature](#) and [relative humidity](#) around the time of these fires. Check out the graphs of the data below. Do you see a pattern?

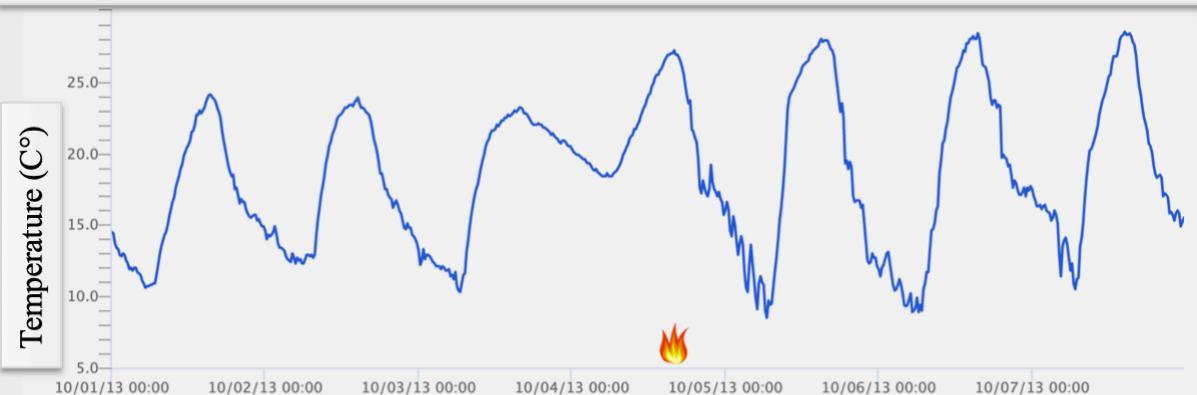
Figure 1: Relative humidity and temperature before, during, and after the 2013 Rush Ranch Fire

Relative Humidity (%) before, during, and after the 2013 Rush Ranch Fire.



The relative humidity recorded by Rush Ranch weather station before, during, and after the 2013 Rush Ranch fire is graphed above. The image of the fire on the graph coincides with the *October 4th, 2013* Rush Ranch fire.

Temperature (C°) before, during, and after the 2013 Rush Ranch Fire.



The temperature recorded by Rush Ranch weather station before, during, and after the 2013 Rush Ranch fire is graphed above. The image of the fire on the graph coincides with the *October 4th, 2013* Rush Ranch fire.

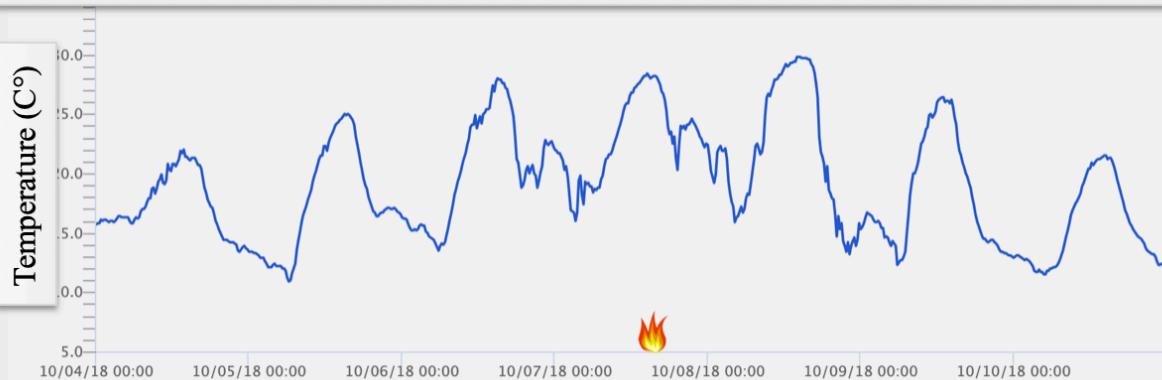
Figure 2: Relative humidity and temperature before, during, and after the 2018 Rush Ranch Fire

Relative Humidity (%) before, during, and after the 2018 Rush Ranch Fire.



The relative humidity recorded by Rush Ranch weather station before, during, and after the 2018 Rush Ranch fire is graphed above. The image of the fire on the graph coincides with the *October 7th, 2018* Rush Ranch fire.

Temperature (C°) before, during, and after the 2018 Rush Ranch Fire.



The temperature recorded by Rush Ranch weather station before, during, and after the 2018 Rush Ranch fire is graphed above. The image of the fire on the graph coincides with the *October 7th, 2018* Rush Ranch fire.

Based on what you see in the graphs, what weather conditions should people watch for so they can be prepared for fire? Are there other weather parameters that you think would add to or decrease the risk of a wildfire? You can explore more data at nerrsdata.org.

This data mystery was prepared by Sarah Ferner and is based on a “[Data Nugget](#)” written by Nicholas Carver, a graduate student intern working with the San Francisco Bay Research Reserve, and a blog post written by Anna Deck, a research technician working with San Francisco Bay Research Reserve.

*This Data Mystery supports Next Generation Science Standards of “Analyzing and Interpreting Data” and “Making Argument from Evidence.” It can also provide a launching off point to discuss “Weather and Climate” topics in middle or high school.