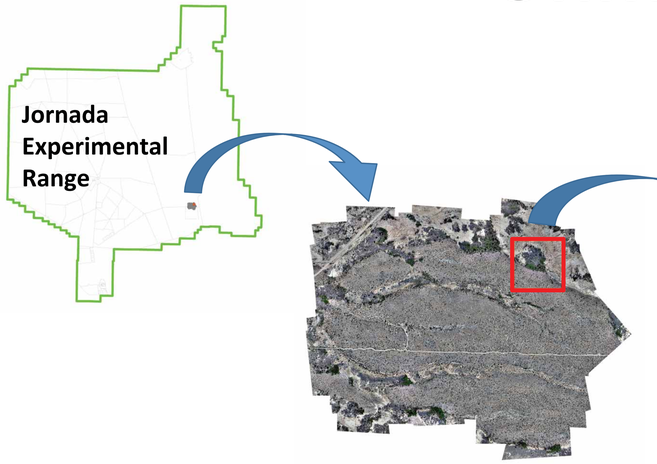
Unmanned Aircraft Systems – Data Applications

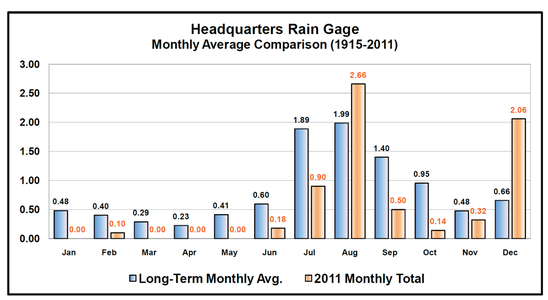
Watching grass grow



Tromble Weir Research Site

May 25, 2011

The upper series of images are derived from data acquired on May 25, 2011. As shown in the rainfall chart below, May of 2011 was the third consecutive month without rain, and followed five months with only 1/10" of rain.

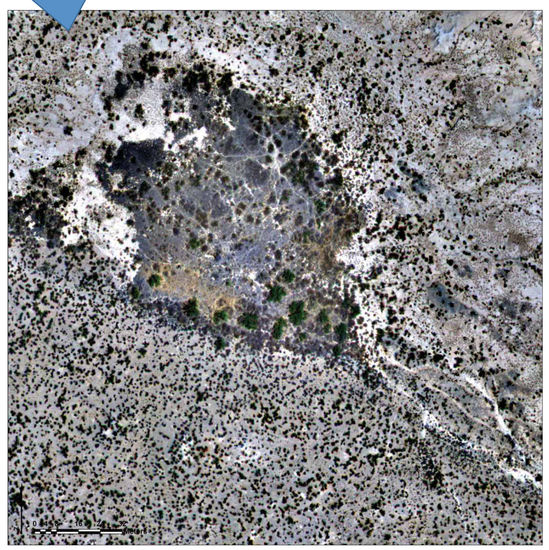


August 24, 2011

The lower series if images are derived from data acquired on August 24, 2011. As shown in the rainfall chart above, August of 2011 has above average rainfall at 2.66" in addition to an inch of rain in the preceding two months. The data were acquired toward the end of August and shows the result of the recent rainfall.

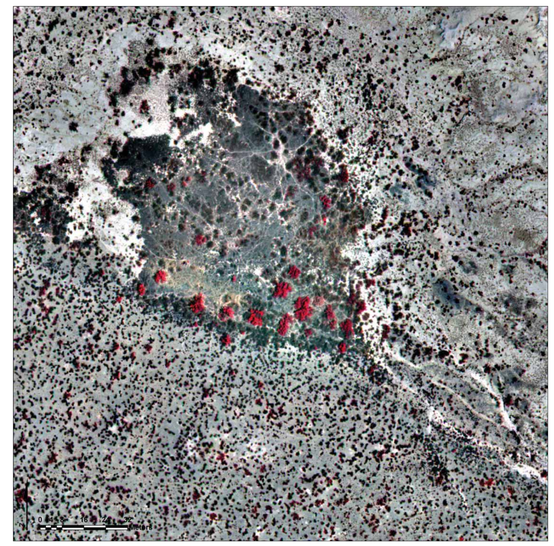
- Aerial imagery collected by the Jornada Experimental Range UAS team and prepared by Craig Winters and Amy Slaughter.
- Precipitation data collected by the Jornada Experimental Range staff and prepared by Dave Thatcher.

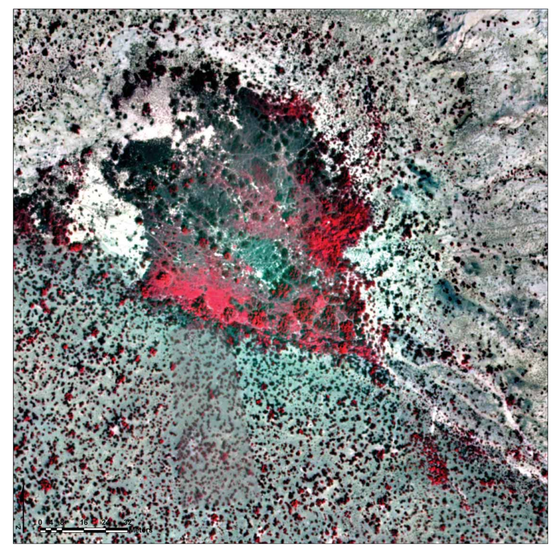
Red Green Blue



The red-green-blue (RGB) image presents data similar to what the human eye would see. In this view we see a widening section of a runoff channel flowing southeast to northwest. Scrub and grasses retard the runoff and benefit from increased soil moisture. Compare the brown senescent grasses in the upper image to the green new growth following August rains in the lower picture.

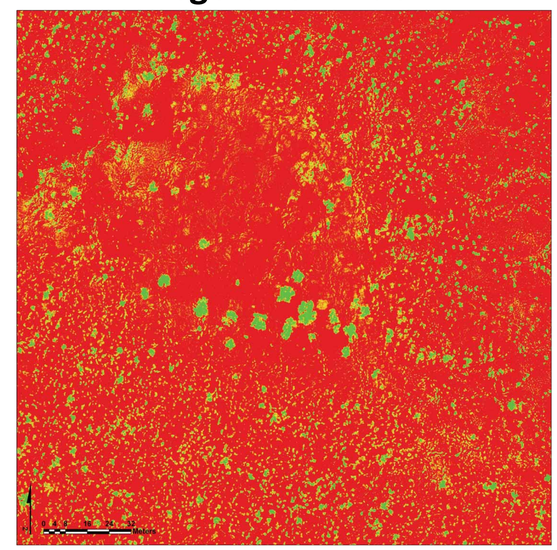
Color Infrared

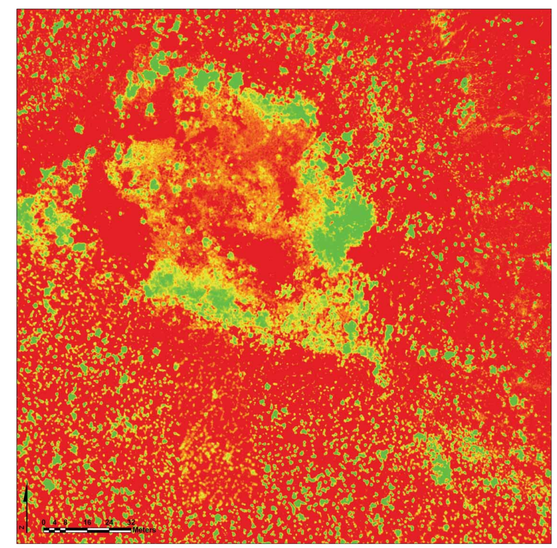




The color infrared (CIR) image shows the reflected near-infrared band (825-925nm) that is invisible to human eyesight. In this image infrared reflectance is presented in red and visible data is in green and blue. Infrared wavelengths are strongly reflected by chlorophyll in living plant material so growing plants show up as red in a CIR image. This section of the runoff channel shows the chlorophyll response to the August rains.

Vegetation Index





The above images present a normalized difference vegetation index (NDVI). NDVI is a widely used vegetation index used to quantify the presence of vegetation by exploiting the fact that chlorophyll both reflects infrared and absorbs red (which is why leaves are green). In this image green is a strong vegetation response (0.4 – 1.0), yellow is moderate (0.2 – 0.4), and red is low to no vegetation (0.0 – 0.2). In the May image we see that only the shrubs show active chlorophyll. By late August the channel bed has filled in with grasses and annuals in response to the August rains.