

High-Resolution Satellite Imagery Analysis of Land Cover on the Ucross Ranch



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B



C

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Understanding land cover, or that which characterizes the Earth's surface at a given location, is essential for understanding the ecology of any landscape. Categorical land cover maps, such as that presented here, inform studies of vegetation, land-use change, animal habitat, animal movement, underlying soil conditions, and even hydrology. On the Ucross ranch, land cover assessment plays an important role in better understanding ranching practices, their influences on the landscape, and how they might benefit from a fine-scale knowledge of available water and grazing resources. This land cover map also contributes to watershed-wide hydrological assessment, the monitoring of bird populations, and pasture-based vegetative assessments. A map of this nature is developed by subjecting satellite imagery containing data from numerous electromagnetic wavebands (i.e. reflected light), to a statistical clustering algorithm. The algorithm groups reflective materials across the land surface according to shared spectral (light reflectance) properties. Categorical land cover maps are often assessed for accuracy using data derived from the field, or highly detailed images.

A UHPSI's land cover analysis relied on high-resolution (e.g. small pixel size) data. Here we consider rangeland, offering a visual comparison between our land cover map and that available from the U.S. Geological Survey (the National Land Cover Database), which was built using data 225 times coarser than the WorldView-2 imagery from which our map was derived.

B Here we provide a second comparison between UHPSI's land cover map and that available from the USGS. This scene highlights urban structures, mowed lawns, roadways, and even tree shadows, all detected using statistical clustering algorithms.

C The development of categorical maps relies on multi-band satellite imagery, as well as useful ancillary data. Here we show the wavebands from the WorldView-2 satellite used in this research, artificially colored to reflect their content. The two right-most, ancillary datasets, are treated as additional bands during analysis, but are not WV-2 products. Wavebands from left: Coastal Blue, Blue, Green, Yellow, Red, Red Edge, Near Infrared I, Near Infrared II, Mean Slope, Elevation.