

Evaluating Soil Texture to Determine Water Retention Sites on the Rio Mora National Wildlife Refuge



Introduction

The Rio Mora National Wildlife Refuge (RMNWR) is located northeast of Santa Fe, in northern New Mexico. This grassland region of New Mexico has a long history of agriculture and livestock grazing and prior to management by the U.S. Fish and Wildlife Service and the Denver Zoo, the refuge also served this purpose. The Mora River that runs through the heart of the refuge has been altered extensively to accommodate the agricultural needs of the past including stream channel modification and the extension of the nutrient rich floodplain for farming purposes. Because of this, there has been considerable decrease in water storage within the soil, a lower water table, and the loss of critical riparian habitat and ephemeral wetlands. Areas that would typically be impacted by periodic flooding and store water show less productivity and are susceptible to erosion due to the dry soils and lack of vegetation.

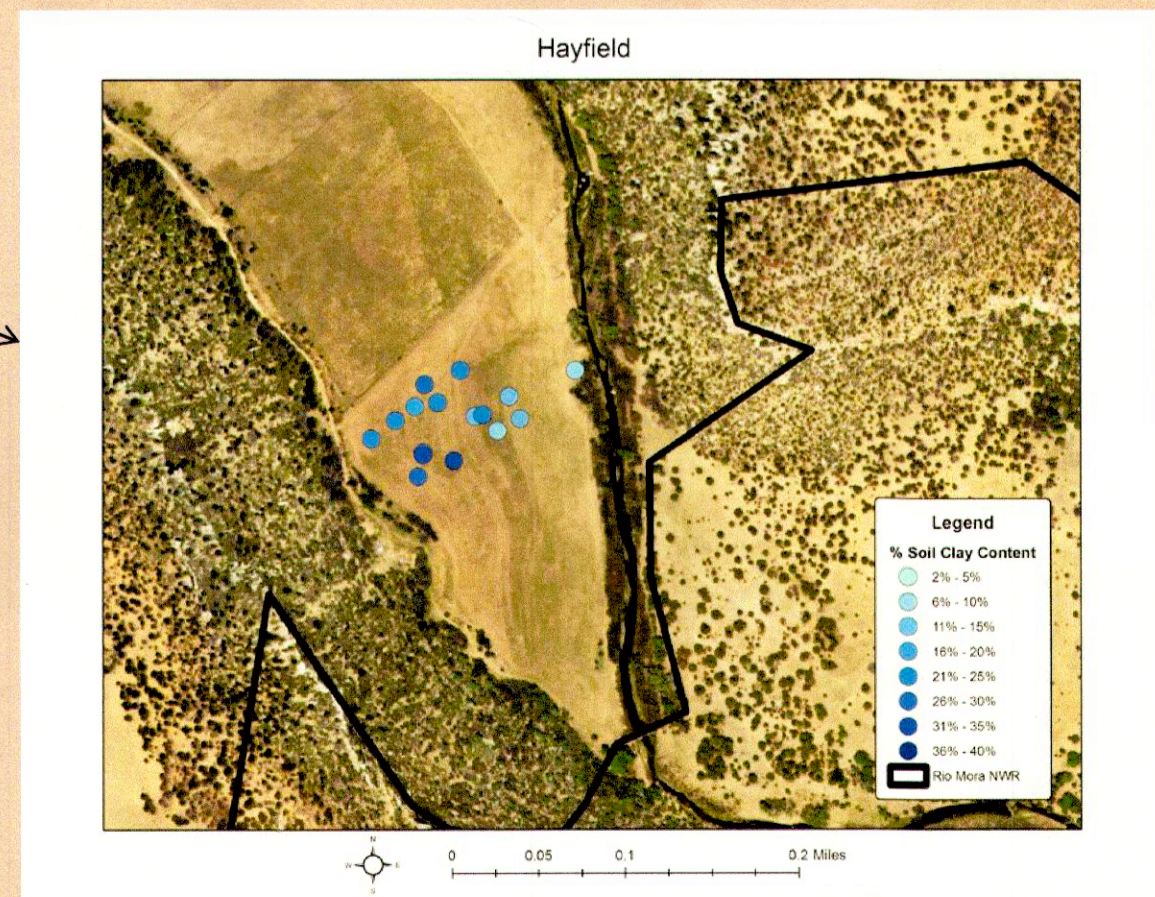
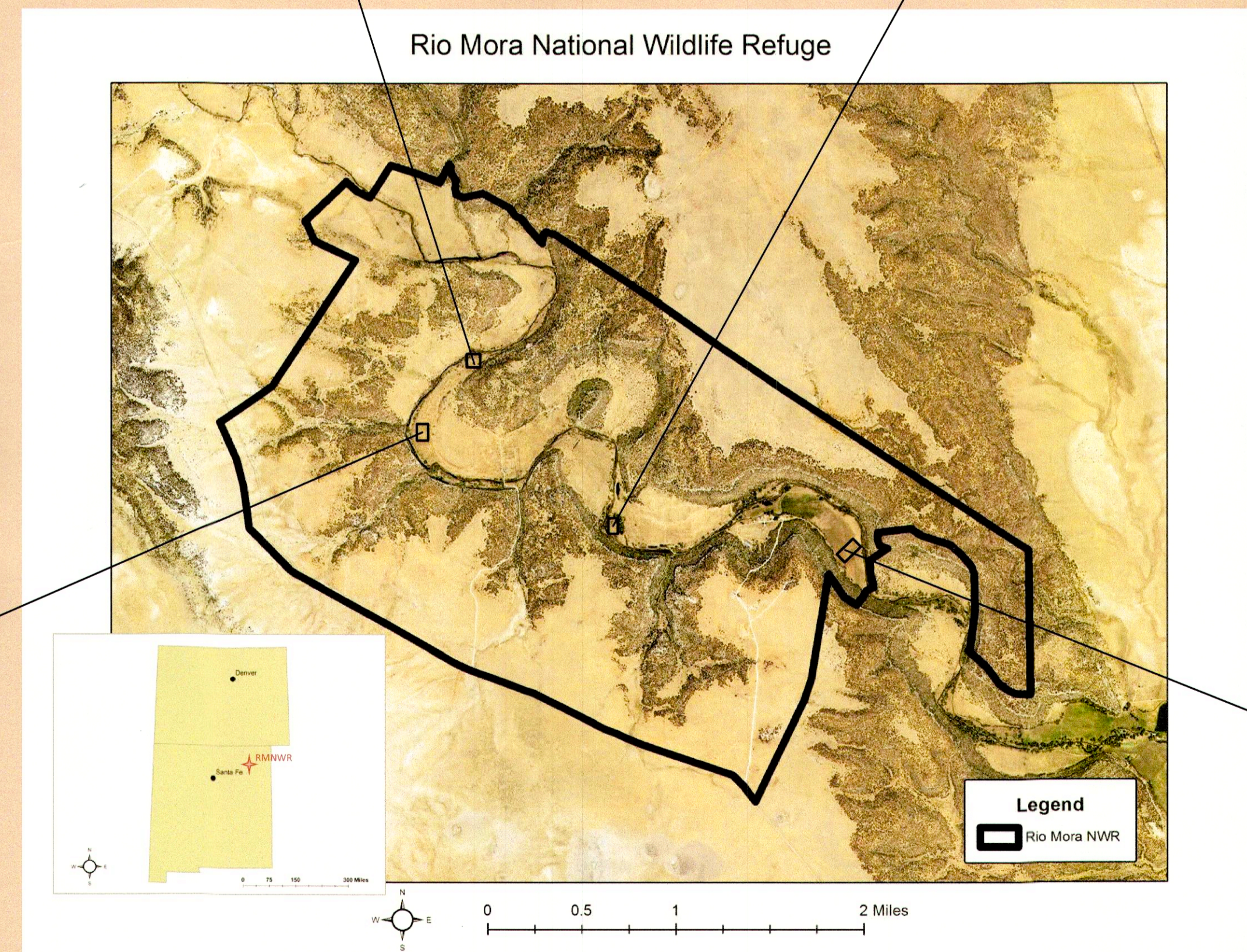
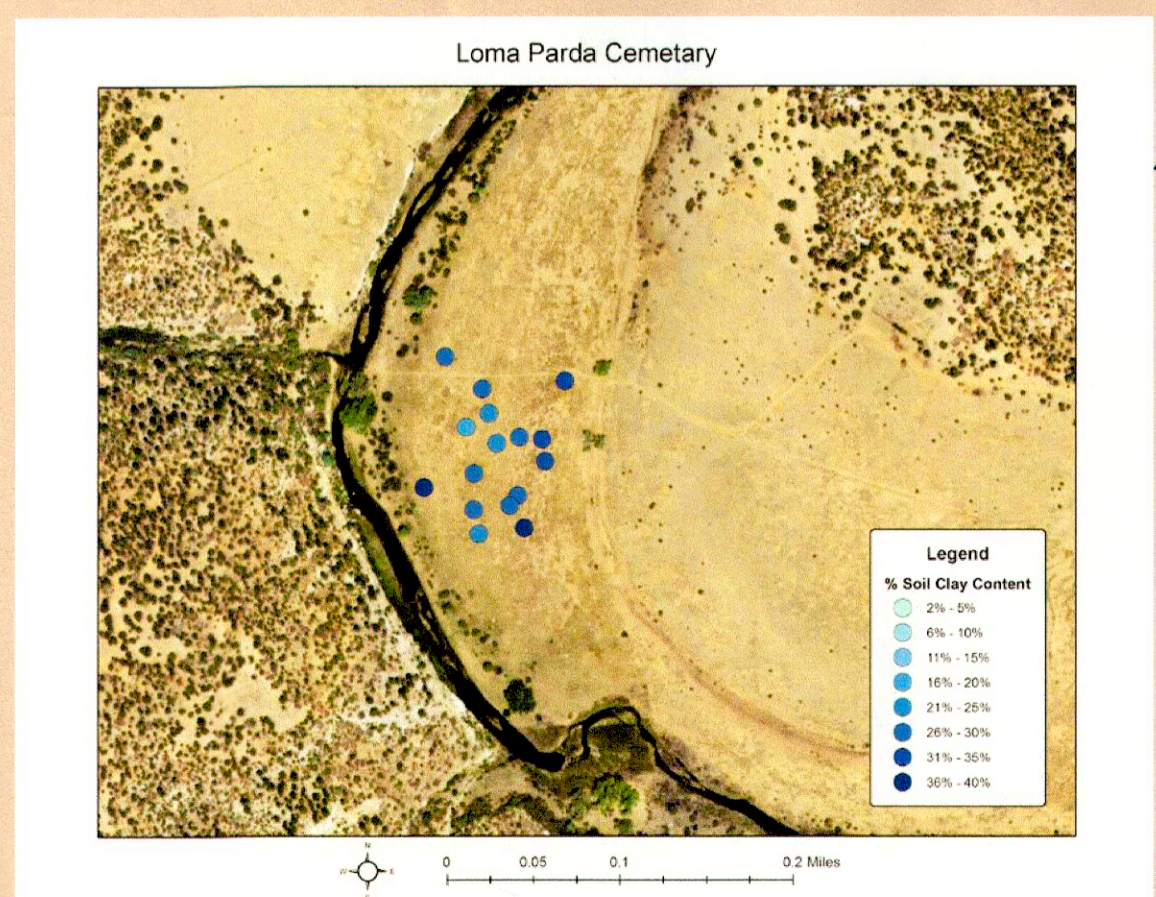
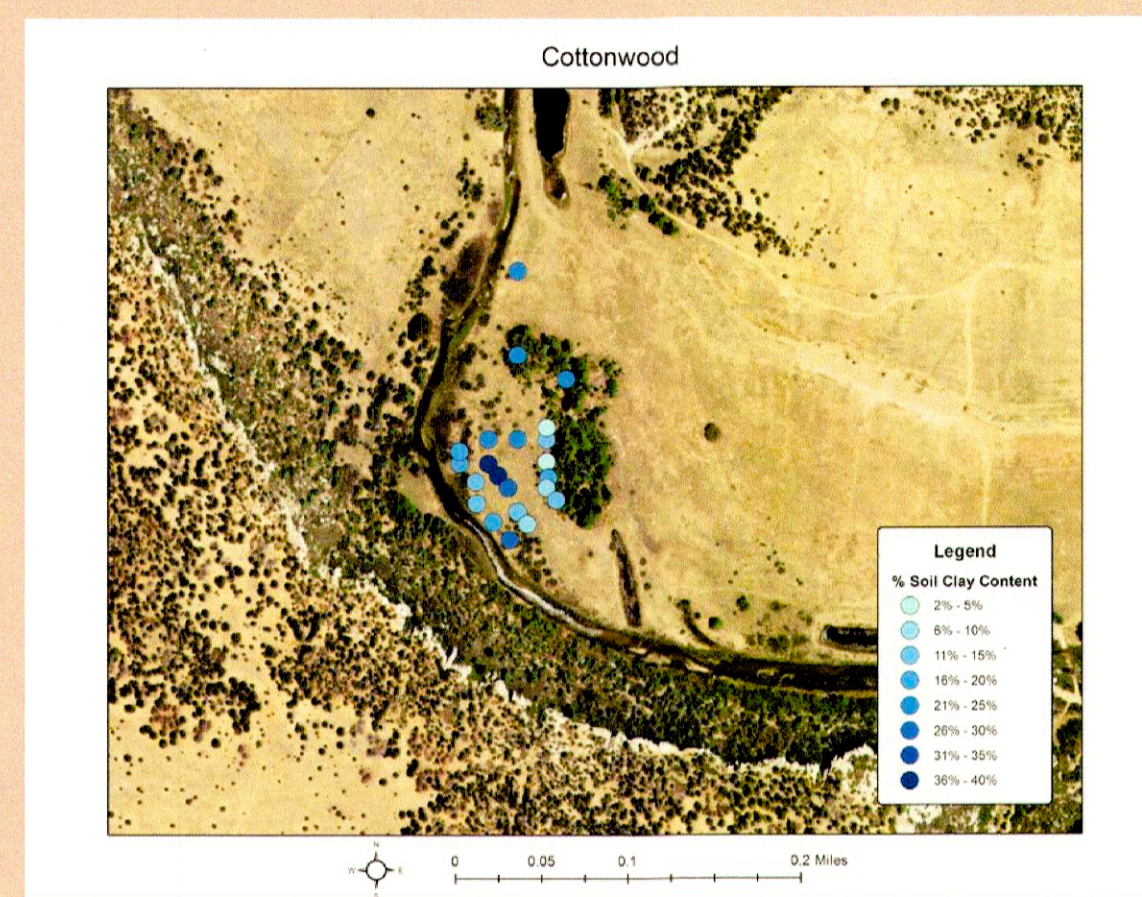
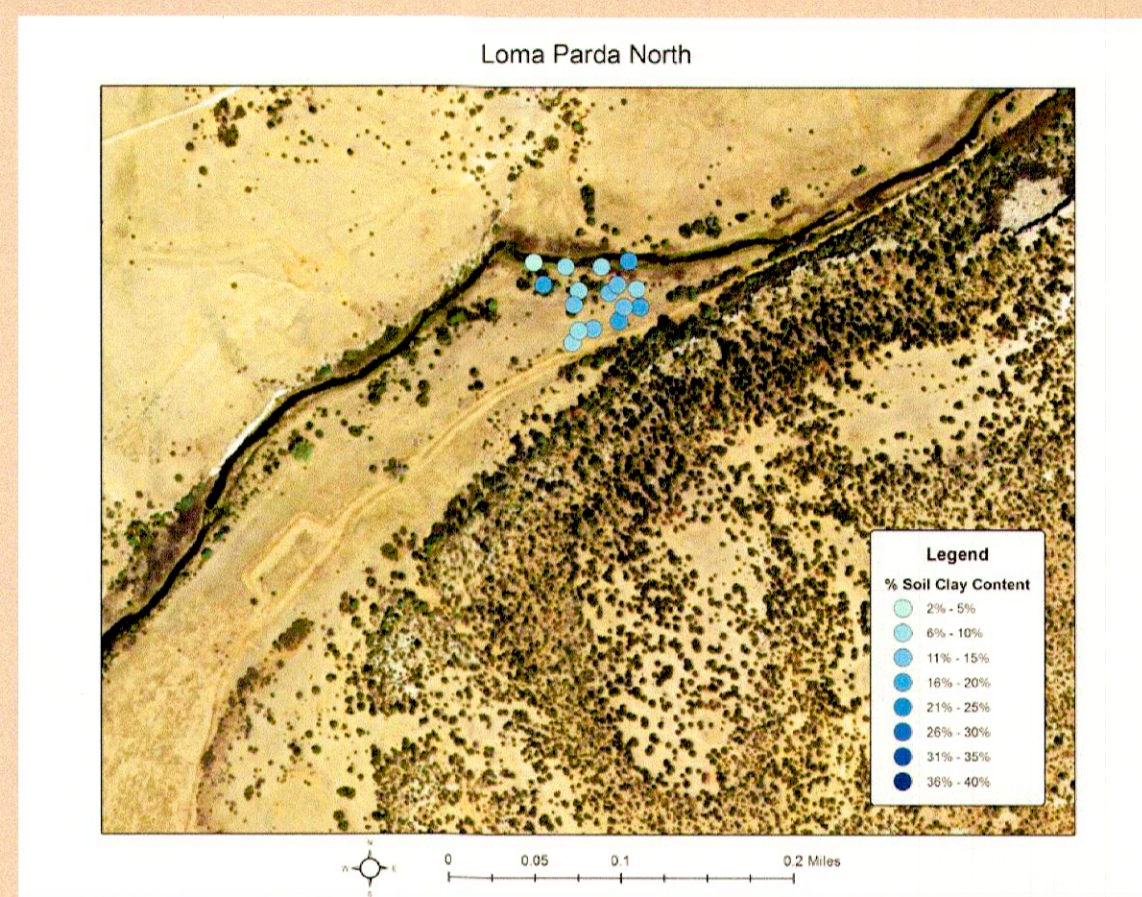
One of the major goals of the RMNWR is to restore riparian and wetland communities by securing and maintaining their Water Rights on the Mora River. By diverting water from the stream channel in the "off" season winter months and storing water in the soil, low lying topographical areas of the grassland collect water, form pools and prompt an increase in ecosystem biodiversity, decrease soil erosion, and increase water availability. These diversions however must be in proximity of the Mora River, require minimal engineering, infrastructure and resources to construct and maintain, and must mimic natural restorative processes. Existing irrigation canals, acequias and diversions already in place may also be used as a tool in water diversion.

Methods

The purpose of this study was to evaluate the soil texture and composition of four potential water retention sites on the refuge. Soil texture and composition determine the soil's water holding capacity and the likelihood of the proposed site to serve as a potential wetland restoration area. Soils with a clayey texture best facilitate water storage because clay particles are small, have a high surface tension, are compactable and have a high water holding capacity. A minimum of 16 samples at each location were taken using soil cores. Soil samples were then tested and evaluated using the Hydrometer method which separates soil particles according to size in solution.

Results & Conclusions

The data extrapolated in this study identified two of the four sites, the Loma Parda Cemetery and the Hayfield that had greater percentages of clay particles in the sampled soil. Based on the soil texture, these areas of the refuge could serve as water retention and wetland restoration sites with the Loma Parda Cemetery site having the most ideal conditions. However, both locations share a similar caveat; they are further in distance and/or uphill of the water source which requires more infrastructure and resources for the water to be diverted to these areas. Because of these limitations, neither site is suitable at this time as a storage site. As a result, this project may only move forward if future potential sites are closer to the water source in distance and at similar elevation.



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