Rotational Grazing Plan for Leavey Ranch

BY: HECTOR ALVAREZ AND LESLY CABALLERO GARCIA

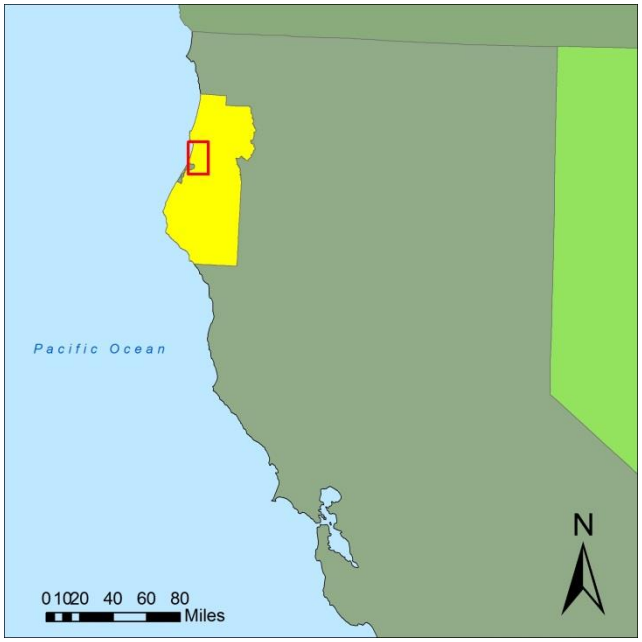
12TH DECEMBER, 2016

Abstract

The Leavey Ranch consists of 240 acres in Blue Lake, California. In this study we take a look at open land available on the property and evaluated which parcel of land is ideal for a rotational grazing plan. We examined slope and vegetation type on the Leavey Ranch property in order to find the ideal land parcel. We found various areas ideal for rotational grazing and selected a parcel and digitized what the plan could be. The digitized plan is set up to maximize the consumption of grass by allowing different grazing intervals.

Introduction

Rotational grazing plans are constructed to make the maximum of grassland systems in a sustainable way that allows resting of the land. The analysis will serve as the first rotational grazing plan for the Leavey Ranch. The Leavey Ranch consists of 240 acres of land along the Mad River and on both linear feet of West End Road, southwest of Blue Lake, California (Figure 1). The property consists of pasture land utilized for grazing, and 110 acres of forest that is not to be managed in any way. There are four connected duck ponds on the upper terrace of the property, each of which is fed by a solar powered well. A short portion of Kelly Creek cuts through the



property with resident cutthroat runs. The site is designated as a wildlife and fisheries reserve, and is to be managed as private property not open to the public. The current management consists of the entire property being used for grazing pasture, without designated grazing areas. Due to ranch manager concerns this analysis is set to identify an ideal parcel for a rotational grazing plan. The parcel constraints are that the slope should be less than 10% to maximize grazing capacity (Holechek, 1988) and must be a land use classified as herbaceous to avoid area that are not adequate conditions.

Methods

A standardized project file folder structure was created. Data including was acquired from online websites including CalFire, USDA Aerial Photography and the National Elevation Dataset. Standardized Quality Assurance Quality Control (QAQC) procedures were performed for each data set. All layers were projected to the same coordinate system, NAD 1983, UTM Zone 10 North.

In order to help determine the ideal location for the rotational grazing area, a slope raster was created from a digital elevation model (DEM). The "Raster Calculator" was used to create a Boolean raster where the cells between one and ten percent slope were assigned a value of 1, this was determined to be the most ideal areas for the cattle grazing. Raster data assigned a value of 1 was reclassified using the reclassify tool in order to separate it from the values not needed.

Next we looked at the vegetation types to find the ideal vegetation for grazing. CalFire raster data was used to get land use areas for the analysis. First we used the "Select by Attribute" tool to create a new raster containing only herbaceous life form from the vegetation raster. This was to differentiate between agriculture, barren/other, conifer, hardwood, shrub, urban, water life

forms. We selected herbaceous attribute in table and then converted the raster to vector using the "Raster to Polygon" tool to create the new herbaceous shapefile. The final slope raster and vegetation polygon were clipped using the "Extract by mask" tool creating a final slope vegetation file. A polygon shapefile of the ranch boundary was provided by the ranch manager. Lastly, that file was clipped with the ranch boundary polygon file using the "Extract by Mask" tool creating a final raster of ideal land within the ranch boundary.

Results

The areas suggested by the analysis rendered us with a variety of space on the property to work with. The map (Figure 2) highlights the areas of interest for rotational grazing plan. The parcel selected (Figure 3) was the most adequate site. The fencing was digitized to illustrate how the rotational grazing plan could look. The plan could consist of six fields with three water troughs. The rotational grazing plan arrangement will be at land owners consent.

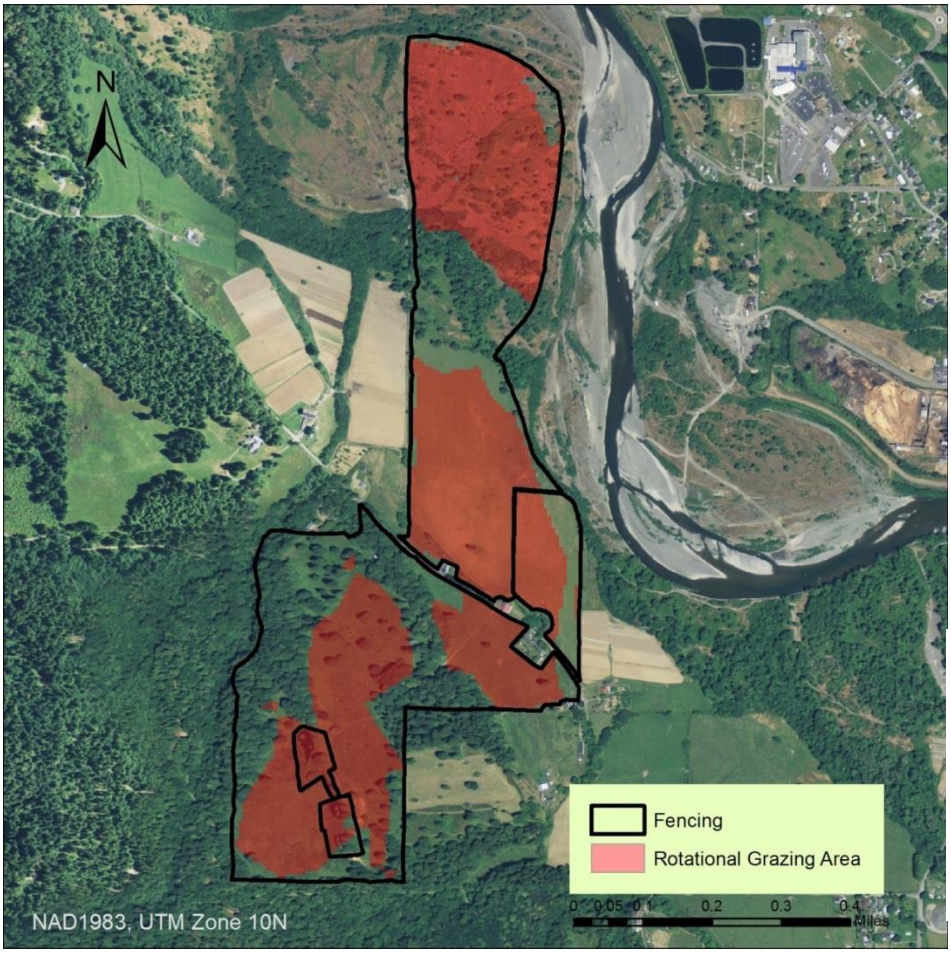


Figure 2. The map shows the area of land that could be used for a rotational grazing plan based on constraints.

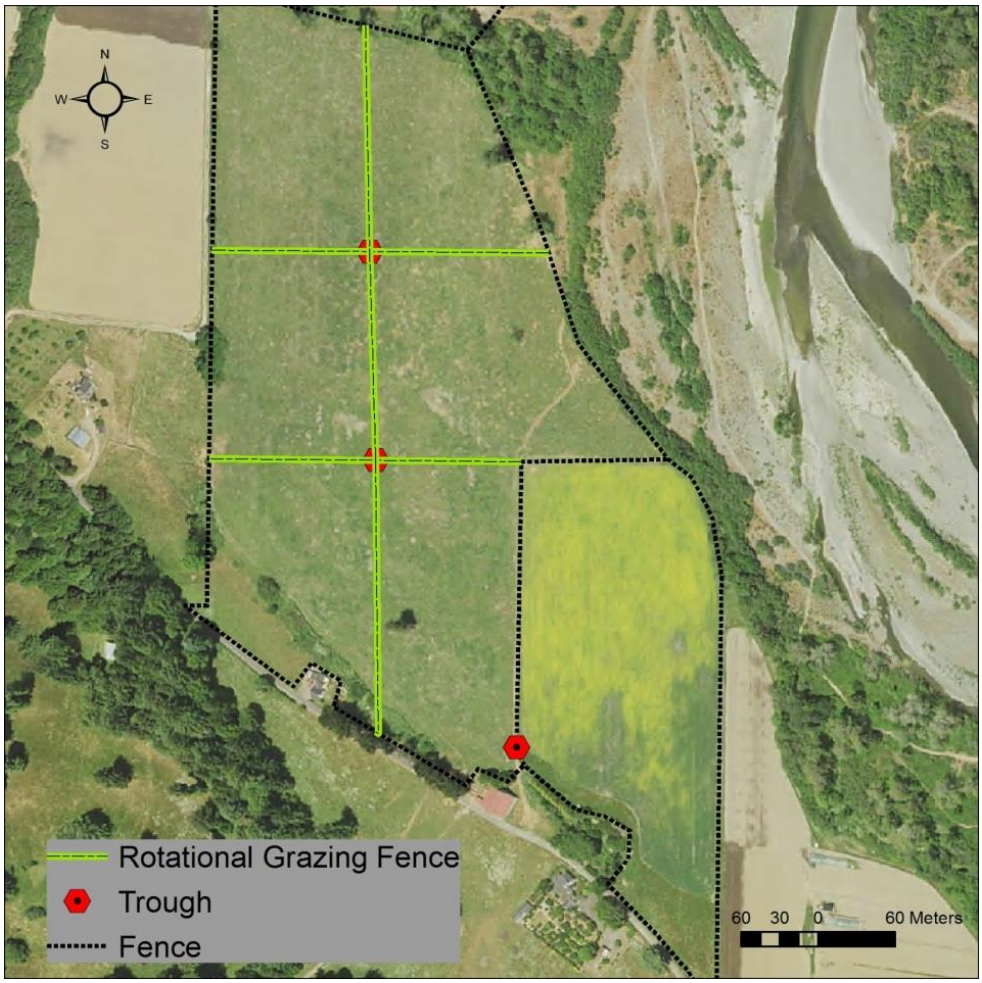


Figure 3. This map shows the digitized rotational grazing plan with fences and troughs.

Conclusion

The Leavey Ranch longed for a rotational grazing plan to assist them in organizing stocking rates. This analysis made it possible to provide the ranch with some spatial knowledge that can make it practical. The digitized plan is set up to maximize the consumption of grass. When the cattle have eaten all the available forage in one field they will be moved to the adjacent field to allow it to rest. We considered using water in our analysis but the ranch runs off of well located on property that we not accessible on spatial data. By marking the existing wells it would add to the depth of the analysis and could confirm a more certain areas for the rotational grazing plan.

Acknowledgements

The base map data used to create the maps in the analysis was downloaded from the National Agriculture Imagery Program (NAIP). Data used for vegetation was downloaded from CalFire website. Slope data extracted from DEM was downloaded from the USGS National Elevation Dataset (NED). The fence boundary was provided by the landowner to allow the analysis to be done.

Work Cited

Holechek, J. (1988). An approach for setting the stocking rate. *Rangelands, 10*(1), 10-14.