

7_Soil_Quality_Raster

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The purpose of this Rmarkdown document is to add soil quality data to the Kern County Agriculture Polygons. Soil Quality data is based on the Storie Index, which is a metric derived from SSURGO soil data. The shapefile was accessed from DataBasin.org

Notes:

- This Rmarkdown document uses a function in the “4_Soil_to_KernAg.R” file. The function reads in year-specific Kern County Ag shapefile, then extracts values from the soil raster into each polygon. The final Storie_Index value is the mean of any values that were extracted into the polygon

```
library(rgdal) # Gdal for R
```

```
## Loading required package: sp
```

```
## rgdal: version: 1.4-4, (SVN revision 833)
```

```
## Geospatial Data Abstraction Library extensions to R successfully loaded
```

```
## Loaded GDAL runtime: GDAL 2.4.2, released 2019/06/28
```

```
## Path to GDAL shared files: /Library/Frameworks/R.framework/Versions/3.6/Resources/library/rgdal/gdal
```

```
## GDAL binary built with GEOS: FALSE
```

```
## Loaded PROJ.4 runtime: Rel. 5.2.0, September 15th, 2018, [PJ_VERSION: 520]
```

```
## Path to PROJ.4 shared files: /Library/Frameworks/R.framework/Versions/3.6/Resources/library/rgdal/proj
```

```
## Linking to sp version: 1.3-1
```

```
library(tidyverse) # General data processing
```

```
## -- Attaching packages -----
```

```
## v ggplot2 3.2.1      v purrr  0.3.2
```

```
## v tibble  2.1.3      v dplyr  0.8.3
```

```
## v tidyr   1.0.0      v stringr 1.4.0
```

```
## v readr   1.3.1      v forcats 0.4.0
```

```
## -- Conflicts -----
```

```
## x dplyr::filter() masks stats::filter()
```

```
## x dplyr::lag()     masks stats::lag()
```

```
library(sf) # Need to change
```

```
## Linking to GEOS 3.7.2, GDAL 2.4.2, PROJ 5.2.0
```

```
library(sp) # Need for crs
```

```
library(raster) # Need for rasterize() and extract() functions
```

```
##
```

```
## Attaching package: 'raster'
```

```
## The following object is masked from 'package:dplyr':
```

```
##
```

```
##      select
```

```
## The following object is masked from 'package:tidyr':
```

```
##
```

```
##      extract
```

```

# Set working directory so relative file pathnames are functional.
setwd("~/Desktop/Organics_Final/Working/R_files/Rmarkdown")

source("../R/4_Soil_to_KernAg.R")

## Read in Storie Index Soil Info
soil_raw = readOGR("../R_input/spatial/KernSoilDataBasin/KernSoilData.shp")

## OGR data source with driver: ESRI Shapefile
## Source: "/Users/clairepowers/Desktop/Organics_Final/Working/R_files/R_input/spatial/KernSoilDataBasin"
## with 9224 features
## It has 14 fields

## Put into projection that makes it overlap with Kern Ag and ultimately all over spatial data
proj4string(soil_raw) = CRS("+proj=aea +lat_1=29.5 +lat_2=45.5 +lat_0=23 +lon_0=-96 +x_0=0 +y_0=0 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0")

## Warning in `proj4string<-`(`*tmp*`, value = new("CRS", projargs = "+proj=aea +lat_1=29.5 +lat_2=45.5 +lat_0=23 +lon_0=-96 +x_0=0 +y_0=0 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0",
## +proj=longlat +datum=WGS84 +no_defs +ellps=WGS84 +towgs84=0,0,0", proj4string(soil_raw)):
## without reprojecting.
## For reprojection, use function spTransform

## Filter to keep only the column with Storie Index Information and geometry (Geometry stays unless the
soil_sf = st_as_sf(soil_raw) %>%
  dplyr::select(StorInd)

## Add another column that gives a numeric value to the Storie Index soil rating. NA values given to va
soil_sf$SI_number <- ifelse(str_detect(soil_sf$StorInd,"One"),1,
  ifelse(str_detect(soil_sf$StorInd,"Two"),2,
    ifelse(str_detect(soil_sf$StorInd,"Three"),3,
      ifelse(str_detect(soil_sf$StorInd,"Four"),4,
        ifelse(str_detect(soil_sf$StorInd,"Five"),5,
          ifelse(str_detect(soil_sf$StorInd,"Six"),6,NA)))

## Change soil back into a shapefile. All of this could have been done to the attribute table, but nice
soil_shp = as(soil_sf,"Spatial")

# Initialize empty raster
ras = raster()

# Set the raster extent based on the soil shapefile
extent(ras) = extent(soil_raw)

# Set raster resolution
res(ras) = 25

# Rasterize Storie Index shapefile on the SI_number attribute column
soil_ras = rasterize(x = soil_shp, y = ras, field = "SI_number")

## Set the CRS again...for some reason it lost this
crs(soil_ras) = "+proj=aea +lat_1=29.5 +lat_2=45.5 +lat_0=23 +lon_0=-96 +x_0=0 +y_0=0 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0"

# Set years to be evaluated
years = 2017

# Apply function from the 4_SoilQuality_to_KernAg.R file to years specified.

```

```
for(i in years){
```

```
  Soil_to_KernAg_fun(i)
```

```
}
```

```
## OGR data source with driver: ESRI Shapefile
```

```
## Source: "/Users/clairepowers/Desktop/Organics_Final/Working/R_files/R_input/spatial/kern_AG_shp/kern"
```

```
## with 14287 features
```

```
## It has 23 fields
```

```
## Warning in .local(x, y, ...): Transforming SpatialPolygons to the CRS of
```

```
## the Raster
```