Vegetation

Sofie McComb

October 28, 2018

This R Markdown script can be used to classify the broad island-by-island vegetation types into more specific vegetation classification schemes that can be used to merge all the islands together and create a systematic raster of vegetation types to be inputted into MaxEnt.

**DO NOT RUN THIS SCRIPT ALL AT ONCE** It is an interactive script where you need to input your selected vegetation classifications in the middle. In other words it makes an output halfway that needs to be corrected in excel on the basis of selected broad vegetation classification schemes (user decided), and then brought back in to make the final shapefile that is joined with the vegetation classification information.

1. Load “necessary”" packages
2. Load in data

* Vegetation Map Shapefile including Santa Rosa, San Miguel, and Anacapa
* Vegetation Map Shapefile of Santa Catalina -Current 2007 Santa Cruz Vegetation Map

#Read in the northern Channel Islands Veg Map which is in a geodatabase  
  
require(rgdal)  
  
# The input file geodatabase  
vegni\_gdb <- "G:/data/islands/all\_islands/Channel\_Islands\_Veg\_Map\_2017/ChannelIslands\_Veg\_2017.gdb"  
  
# List all feature classes in a file geodatabase  
subset(ogrDrivers(), grepl("GDB", name))

## name long\_name write copy isVector  
## 47 OpenFileGDB ESRI FileGDB FALSE FALSE TRUE

vegni\_list <- ogrListLayers(vegni\_gdb)  
print(vegni\_list)

## [1] "ChannelIslandsVegetation"  
## attr(,"driver")  
## [1] "OpenFileGDB"  
## attr(,"nlayers")  
## [1] 1

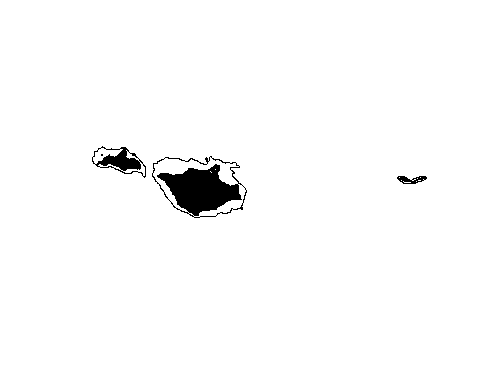
# Read the feature class  
vegni\_fc <- readOGR(dsn=vegni\_gdb,layer="ChannelIslandsVegetation",stringsAsFactors = FALSE)

## OGR data source with driver: OpenFileGDB   
## Source: "G:\data\islands\all\_islands\Channel\_Islands\_Veg\_Map\_2017\ChannelIslands\_Veg\_2017.gdb", layer: "ChannelIslandsVegetation"  
## with 13770 features  
## It has 15 fields

# Determine the FC extent, projection, and attribute information  
summary(vegni\_fc )

## Object of class SpatialPolygonsDataFrame  
## Coordinates:  
## min max  
## x 179537.6 282965.5  
## y 3754149.3 3776065.4  
## Is projected: TRUE   
## proj4string :  
## [+proj=utm +zone=11 +ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m  
## +no\_defs]  
## Data attributes:  
## MapCode NVCS Common ConCov   
## Min. :11111 Length:13770 Length:13770 Min. :0.00000   
## 1st Qu.:22160 Class :character Class :character 1st Qu.:0.00000   
## Median :32100 Mode :character Mode :character Median :0.00000   
## Mean :36792 Mean :0.09332   
## 3rd Qu.:41150 3rd Qu.:0.00000   
## Max. :99000 Max. :9.00000   
## HdwdCov ShrubCov HerbCov Comments   
## Min. :0.0000 Min. :0.000 Min. :1.000 Length:13770   
## 1st Qu.:0.0000 1st Qu.:1.000 1st Qu.:3.000 Class :character   
## Median :0.0000 Median :2.000 Median :3.000 Mode :character   
## Mean :0.1093 Mean :2.222 Mean :3.316   
## 3rd Qu.:0.0000 3rd Qu.:3.000 3rd Qu.:4.000   
## Max. :9.0000 Max. :9.000 Max. :9.000   
## Island All\_Equiv All\_NVCS AllCommon   
## Length:13770 Min. :11110 Length:13770 Length:13770   
## Class :character 1st Qu.:22160 Class :character Class :character   
## Mode :character Median :32100 Mode :character Mode :character   
## Mean :36791   
## 3rd Qu.:41150   
## Max. :99000   
## Acres SHAPE\_Length SHAPE\_Area   
## Min. : 0.02 Min. : 36.13 Min. : 79   
## 1st Qu.: 0.89 1st Qu.: 391.47 1st Qu.: 3604   
## Median : 1.79 Median : 643.07 Median : 7245   
## Mean : 8.90 Mean : 1138.54 Mean : 36030   
## 3rd Qu.: 3.91 3rd Qu.: 1146.57 3rd Qu.: 15830   
## Max. :44508.44 Max. :184929.09 Max. :180119257

# View the feature class  
plot(vegni\_fc )



#Read in SCA veg map  
vegsca<-readOGR("G:/data/islands/sca/veg\_2000/veg\_2000.shp", stringsAsFactors = FALSE)

## OGR data source with driver: ESRI Shapefile   
## Source: "G:\data\islands\sca\veg\_2000\veg\_2000.shp", layer: "veg\_2000"  
## with 3149 features  
## It has 12 fields  
## Integer64 fields read as strings: OBJECTID ID

## Warning in readOGR("G:/data/islands/sca/veg\_2000/veg\_2000.shp",  
## stringsAsFactors = FALSE): Dropping null geometries: 3149

vegsca

## class : SpatialPolygonsDataFrame   
## features : 3148   
## extent : 350738, 378662.9, 3685243, 3705582 (xmin, xmax, ymin, ymax)  
## coord. ref. : +proj=utm +zone=11 +datum=NAD83 +units=m +no\_defs +ellps=GRS80 +towgs84=0,0,0   
## variables : 12  
## names : OBJECTID, SOURCETHM, ID, COMMUNITY, AREA, PERIMETER, ACRES, HECTARES, Shape\_Leng, Shape\_Area, COM\_GEN, COMM\_EXP   
## min values : 1, Vegavalon.shp, 0, B, 1.000437e+05, 238.463, 0.097, 0.039, 72.68372, 1.000596e+04, chaparral, Bare   
## max values : 999, Vegwbgully.shp, 95, VPR, 9.997114e+04, 1009168.924, 3863.409, 1563.473, 307595.30333, 9.999982e+03, scrub, Vernal Ponds and Reservoirs

#Read in SCR veg map  
vegscr<-readOGR("G:/data/islands/scr/scr\_veg\_aea/scr\_veg\_aea.shp", stringsAsFactors = FALSE)

## OGR data source with driver: ESRI Shapefile   
## Source: "G:\data\islands\scr\scr\_veg\_aea\scr\_veg\_aea.shp", layer: "scr\_veg\_aea"  
## with 13903 features  
## It has 25 fields  
## Integer64 fields read as strings: OBJECTID MapCode\_15 ConCov\_15 ShrubCov\_1 HerbCov\_15 All\_Equiv\_ MethodID\_1 MapCode\_05 ConCov\_05 ShrubCov\_0 All\_Equiv1

vegscr

## class : SpatialPolygonsDataFrame   
## features : 13903   
## extent : 2423.369, 46509.35, -453787.1, -435700.6 (xmin, xmax, ymin, ymax)  
## coord. ref. : +proj=aea +lat\_1=34 +lat\_2=40.5 +lat\_0=0 +lon\_0=-120 +x\_0=0 +y\_0=-4000000 +datum=NAD83 +units=m +no\_defs +ellps=GRS80 +towgs84=0,0,0   
## variables : 25  
## names : OBJECTID, MapCode\_15, NVCS\_15, Common\_15, ConCov\_15, ShrubCov\_1, HerbCov\_15, All\_Equiv\_, All\_NVCS\_1, AllCommon\_, Comments\_1, MethodID\_1, MapCode\_05, NVCS\_05, Common\_05, ...   
## min values : 1, 11110, Abronia latifolia - Ambrosia chamissonis Herbaceous Alliance, Alkali Heath Marsh Alliance, 0, 0, 1, 11110, Abronia latifolia - Ambrosia chamissonis Herbaceous Alliance, Alkali Heath Marsh Alliance,   
## Ceanothus megacarpus co-dominates to west; C. arborius to east., 10, 11110, Abronia latifolia - Ambrosia chamissonis Herbaceous Alliance, Alkali Heath Marsh Alliance, ...   
## max values : 9999, 99100, Water body Mapping Unit, Western Emergent Cattail Marsh Alliance, 9, 9, 9, 99100, Water body Mapping Unit, Western Emergent Cattail Marsh Alliance, Xeric expression with Arctostaphylos & Adenostoma  
## , 9, 99100, Water body Mapping Unit, Western Emergent Cattail Marsh Alliance, ...

1. Determine unique vegetation community names for each shapefile and export table of the names with numbers

#Create table of unique veg names and numbers for northern islands  
vegni\_uniqnum<-unique(vegni\_fc@data$All\_Equiv)  
vegni\_uniqname<-unique(vegni\_fc@data$AllCommon)  
  
vegni\_table<-data.frame(vegni\_uniqnum, vegni\_uniqname)  
  
  
#Create table of unique veg names and numbers for sca  
vegsca\_uniqnum<-unique(vegsca@data$ID)  
vegnsca\_uniqname<-unique(vegsca@data$COMMUNITY)  
  
vegsca\_table<-data.frame(vegsca\_uniqnum, vegnsca\_uniqname)  
  
  
#Create table of unique veg names and numbers for scr  
vegscr\_uniqnum<-unique(vegscr@data$MapCode\_05)  
vegnscr\_uniqname<-unique(vegscr@data$Common\_05)  
  
vegscr\_table<-data.frame(vegscr\_uniqnum, vegnscr\_uniqname)  
  
  
#Export tables as csv to Vegetation in Working All Folder to Make Excel Tables to Join  
  
#write.csv(vegni\_table, file="G:/working/all/Vegetation/vegni.csv")  
#write.csv(vegsca\_table, file="G:/working/all/Vegetation/vegsca.csv")  
#write.csv(vegscr\_table, file="G:/working/all/Vegetation/vegscr.csv")

1. In excel create match up table. Aka Master Table that establishes the major vegetation groups and numbers. And then in the exported table make a new column where you put this new number as well as the vegetation associated name (for loop through to add)

Did this by looking at the tables and creating overarching categories Used NLCD covers as big reference and Calscape to help define where things fall

Used papers to define between Chaparral and Coastal Shrub: <https://escholarship.org/uc/item/9rj6r9f1> <http://rangelandarchive.ucdavis.edu/Annual_Rangeland_Handbook/Ecology/> Calscape

VegCover Value Woodland 1 Chaparral 2 Coastal Shrub 3 Grassland 4 Riparian 5 Dune 6 Developed/Water 7

1. Join finished table with shapefiles (in R but GIS style join)

#Reading in the veg map connecting tables we designed to implement broader veg map groupings  
vegni\_csv<-read.csv("G:/working/all/Vegetation/vegni\_class.csv", stringsAsFactors = FALSE)  
vegsca\_csv<-read.csv("G:/working/all/Vegetation/vegsca\_class.csv", stringsAsFactors = FALSE)  
vegscr\_csv<-read.csv("G:/working/all/Vegetation/vegscr\_class.csv", stringsAsFactors = FALSE)  
  
require(sp) # the trick is that this package must be loaded!  
  
vegni\_join <- sp::merge(vegni\_fc,vegni\_csv, by="All\_Equiv")  
vegsca\_join<-sp::merge(vegsca,vegsca\_csv, by="ID")  
vegscr\_join<-sp::merge(vegscr,vegscr\_csv, by="MapCode\_05")

1. Export new updated shapefiles to same location where veg shapefiles originally exist

#Project spatial data frames into California Teale Albers  
  
ctalbers<-"+proj=aea +lat\_1=34 +lat\_2=40.5 +lat\_0=0 +lon\_0=-120 +x\_0=0 +y\_0=-4000000 +ellps=GRS80 +datum=NAD83 +units=m +no\_defs"  
vegni\_prj <- spTransform(vegni\_join, CRS(ctalbers))  
vegsca\_prj<- spTransform(vegsca\_join, CRS(ctalbers))  
vegscr\_prj<- spTransform(vegscr\_join, CRS(ctalbers))  
  
  
#Write SPDF as shapefile under veg folders  
  
#writeOGR(vegni\_prj, dsn = "G:/data/islands/all\_islands/Channel\_Islands\_Veg\_Map\_2017/NIVegMapClass", layer = "NIVegMapClass", driver="ESRI Shapefile")  
  
#writeOGR(vegsca\_prj, dsn = "G:/data/islands/sca/SCAVegMapClass", layer = "SCAVegMapClass", driver="ESRI Shapefile")  
  
#writeOGR(vegscr\_prj, dsn = "G:/data/islands/scr/SCRVegMapClass", layer = "SCRVegMapClass", driver="ESRI Shapefile")