GRTS Sampling Design for BPC 20198 Sampling

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# Load Libraries

We are working here with spsurvey version 4.1.4, which was updated September 15th, 2020.

library(tidyverse)  
#> -- Attaching packages --------------------------------------- tidyverse 1.3.0 --  
#> v ggplot2 3.3.2 v purrr 0.3.4  
#> v tibble 3.0.3 v dplyr 1.0.2  
#> v tidyr 1.1.2 v stringr 1.4.0  
#> v readr 1.3.1 v forcats 0.5.0  
#> -- Conflicts ------------------------------------------ tidyverse\_conflicts() --  
#> x dplyr::filter() masks stats::filter()  
#> x dplyr::lag() masks stats::lag()  
library(spsurvey)  
#>   
#> Version 4.1.0 of the spsurvey package was loaded successfully.

# Set Random Seed

To allow repetition of sampling design. If you run this code right before generating a sample, the computer will generate the same sequence of random numbers, and thus the same sample. If you forget, you’ll get another (also perfectly valid) sample.

set.seed(98765)

# Define a Simple Unstratified Design

With a ten to one oversample.

The sample is not drawn with regard to the Inspector Region. Information on the Inspector Region will be added later in ArcGIS after the sample and oversample are drawn.

SimpleDesign <- list(None=list(panel=c(PanelOne=50),  
 seltype="Equal",  
 over=500))

# Generate the Spatial Sample

## Generate Unique Filename

Since we are going to re-run this sometimes when output already exists, we want to come up with a filename for the shapefile that won’t conflict.

fn <- tempfile(pattern = "Blubry23RandomSD",  
 tmpdir = "GIS Source Files",  
 fileext = "")  
fn  
#> [1] "GIS Source Files\\Blubry23RandomSD2705bb9df3"

## Run GRTS Sample

This code generates pages of warnings. They are not important for our purposes, so I suppressed them here in the Word Document. If you run this file as an R markdown document, you will see them, and can evaluate them yourself.

SimpleSample <- grts(  
 SimpleDesign, # as defined above  
 DesignID="Pt", # Arbitrary string to start site codes  
 SiteBegin=1001, # number of first sample location  
 type.frame="area", # Must be one of following: "finite",  
 # "linear", or "area". Depends on the  
 # dimensionality of the support.  
 src.frame="shapefile", # Type of source of geographic data  
 # defining the support. Can be  
 # "shapefile", "sf.object",  
 # "sp.object" or "att.frame"  
   
 in.shape='GIS Source Files/Blubry23Final', # path to shapefile  
   
 maxlev=10, # maximum number of hierarchical levels to use  
   
 out.shape=fn, # name your output shapefile  
)  
#>   
#> Stratum: None   
#> Current number of levels: 5   
#> Current number of levels: 7   
#> Final number of levels: 7  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 1 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 7 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 9 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 16 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 17 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 21 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 32 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 37 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 53 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 69 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 71 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 80 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 81 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 85 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 101 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 115 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 117 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 135 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 144 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 145 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 149 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 165 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 179 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 181 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 192 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 208 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 209 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 213 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 229 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 243 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 245 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 252 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 259 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 264 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 267 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 284 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 298 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 300 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 318 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 332 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 334 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 352 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 358 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 376 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 383 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 400 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 410 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 429 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 434 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 444 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 455 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 462 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 464 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 480 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 496 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 497 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 500 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 501 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 506 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 524 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 528 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 308942439.17400002 of  
#> field Shape\_Area of feature 530 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 531 not successfully written. Possibly due to too  
#> larger number with respect to field width  
#> Warning in CPL\_write\_ogr(obj, dsn, layer, driver,  
#> as.character(dataset\_options), : GDAL Message 1: Value 180084648.96200001 of  
#> field Shape\_Area of feature 540 not successfully written. Possibly due to too  
#> larger number with respect to field width

# Check The Design

dsgnsum(SimpleSample)  
#>   
#>   
#> Design Summary: Number of Sites Classified by panel  
#>   
#> panel  
#> OverSamp PanelOne Sum   
#> 500 50 550