R Notebook

```
library(tidyverse)
library(rgdal)
#devtools::install_github("dkahle/ggmap")
library(ggmap)
```

Preprocessing

Import SWSN data.

```
swsn <- read_csv('attributes_orig.csv')
swsn
```

```
## # A tibble: 514 × 16
##     SWSN_ID        SWSN_Site     Macro     Micro  GKPM GKPMPZ Periods
##       <dbl>            <chr>     <chr>      <chr> <dbl>  <dbl>   <dbl>
## 1        2  Swingle's Sample San Pedro San Pedro     0      1       3
## 2        3      Bajada Site San Pedro San Pedro     0      0       3
## 3        5            Buzan San Pedro San Pedro     1      1       2
## 4        7      Ash Terrace San Pedro San Pedro     1      1       4
## 5        8       Lost Mound San Pedro San Pedro     1      1       3
## 6        9 Dudleyville Mound San Pedro San Pedro     0      0       3
## 7       10        Leaverton San Pedro San Pedro     1      1       3
## 8       11     Camp Village San Pedro San Pedro     1      1       3
## 9       12        High Mesa San Pedro San Pedro     1      1       3
## 10      13     Elliott Site San Pedro San Pedro     0      1       2
## # ... with 504 more rows, and 9 more variables: EASTING <int>,
## #   NORTHING <int>, P1room <dbl>, P2room <dbl>, P3room <dbl>,
## #   P4room <dbl>, P5room <dbl>, P6room <dbl>, NOS1 <int>
```

Pull the coordinates from the attribute map, reproject from UTM to Lat Lon.

```
swsn.pts <- read_csv('attributes_orig.csv') %>%
  select(easting = EASTING, northing = NORTHING) %>%
  SpatialPoints(proj4string=CRS("+proj=utm +zone=12 +datum=WGS84")) %>%
  spTransform(CRS("+proj=longlat +datum=WGS84")) %>%
  coordinates %>%
  data.frame
```

Download Stamen terrain basemap.

```
mapImage <- get_map(location = c(left = -113.5, right = -106.5, bottom = 31, top = 37.5),
  color = "color",
  source = "stamen",
  maptype = "terrain-background")
```

Plotting

```
ggmap(mapImage) +
  geom_point(aes(x = easting, y = northing), data = swsn.pts) +
  labs(x = "Longitude", y = "Latitude")
```