



NICHOLI BROWN

TUTORIAL DEMO

A VISUALIZATION OF LEOPARD SEAL
OBSERVATIONS IN TDF



PACKAGES UTILIZED

```
#Install Novel Packages
install.packages("ggmap") ← USED TO VISUALIZE MAP(S)
install.packages("ggplot2")
install.packages("readxl") ← USED TO LOAD EXCEL DATA
install.packages("viridis") ← COLOR BLIND ACCESIBILITY
```

```
#Load Packages
library(tidyverse)
library(maps)
library(ggmap)
library(ggplot2)
library(tidyr) ← USED TO TIDY DATA ;SEPARATE
library(readxl)
library(viridisLite)
```



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#Register Stadia Map with custom API key (see:<https://client.stadiamaps.com/dashboard/#/property/27810/>)

register_stadiamaps("60044334-4eea-43df-93fb-5f78c1e8c417", write = FALSE)

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[Click here to learn more](#)

maps.



<https://www.openstreetmap.org/export#map=14/24.2419/-78.0010>



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24.2613

-78.0366

-77.9654

24.2225

Manually select a different area

Licence

OpenStreetMap data is licensed under the [Open Data Commons Open Database License \(ODbL\)](#).

Export

If the above export fails, please consider using

```
#Load Stadia Map into R
mockseal_map <- get_stadiamap(
  bbox = c(left = -78.0616, bottom = 24.1912, right = -77.9193, top = 24.269),
  maptype = "stamen_terrain",
  zoom = 15
```

StreetMap contributors ♥ Make a Donation. [Website and API terms](#)



```
#Load Terrain Visualization of Research Area  
ggmap(mockseal_map)
```

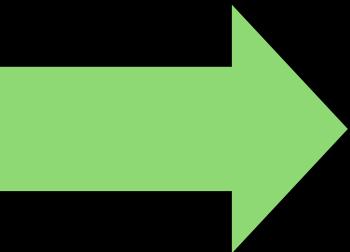
SELECTING DATA OF INTEREST

ID	Seal	Date	Shooter	Time	Location	Sex	Resident?	Sample Overview	Hair	Skin	Blubber	Feces	Drone	Photos	GPS Coordinates	
1	1	Shakira	Dec. 14, 2023	Joe, Jane	7:28pm	Ice	F	No	Full biopsy 2	2	2	2	0	N	Y	24.242500, -78.003333
2	2	Selena	Dec. 14, 2023	NA	8:00pm	Ice	F	No	No	0	0	0	0	N	Y	24.250740, -78.003333
3	3	JLo	Dec. 15, 2023	Susie	10:46am	Ice	F	No	Full biopsy 1	1	1	1	0	Y	Y	24.234260, -78.003333
4	4	Victoria	Dec. 15, 2023	Joe	1:17pm	Ice	F	Yes 2015	Full biopsy 1	1	1	1	0	Y	Y	24.242500, -77.994303
5	4	Victoria	Dec. 15, 2023	Jane	3:35pm	Ice	F	Yes 2015	Biopsy hair only	1	0	0	0	N	Y	24.242500, -78.012363
6	3	JLo	Dec. 15, 2023	NA	4:08pm	Ice	F	No	No	0	0	0	0	N	Y	24.250740, -77.994303
7	2	Selena	Dec. 16, 2023	Susie	10:10am	Ice	F	No	Full biopsy 1	1	1	1	0	N	Y	24.250740, -78.012363
8	3	JLo	Dec. 16, 2023	Joe	2:41pm	Ice	F	No	Biopsy hair only; poop	1	0	0	1	N	Y	24.234260, -77.994303
9	4	Victoria	Dec. 16, 2023	Jane	3:15pm	Ice	F	Yes 2015	No	0	0	0	0	Y	Y	24.234260, -78.012363
10	3	JLo	Dec. 17, 2023	NA	1:29pm	Ice	F	No	No	0	0	0	0	Y	Y	24.246620, -77.998818
11	2	Selena	Dec. 17, 2023	Susie	1:47pm	Ice	F	No	Full biopsy 1	1	1	1	0	Y	Y	24.246620, -78.007848
12	1	Shakira	Dec. 17, 2023	Jane	2:36pm	Ice	F	No	Full biopsy 1	1	1	1	0	Y	Y	24.238380, -77.998818
13	5	Alexandria	Dec. 17, 2023	Joe	7:28pm	Ice	F	No	Full biopsy 1	1	1	1	1	1	Y	24.238380, -78.007848
14	6	Paloma Mami	Dec. 18, 2023	Susie	1:41pm	Ice	F	Yes	Full biopsy 1	1	1	1	0	1	Y	24.247870, -78.000000
15	2	Selena	Dec. 18, 2023	Jane & Joe	1:41pm	Ice	F	No	No	0	0	0	0	1	Y	24.237130, -78.000000
16	3	JLo	Dec. 18, 2023	NA	1:41pm	Ice	F	No	No	0	0	0	0	0	Y	24.244000, -77.995500
17	4	Victoria	Dec. 18, 2023	NA	1:41pm	Ice	F	Yes 2015	No	0	0	0	0	1	Y	24.241000, -78.011166

```
#Create new Data set with relevant columns
Sealname_LocationMock <- Mock_Seal_Data [c("Seal", "Date", "GPS Coordinates")]
#View Data to Verify Accuracy
View(Sealname_LocationMock)
```

DATA SEPARATION

	Seal	Date	GPS Coordinates
1	Shakira	Dec. 14, 2023	24.242500, -78.003333
2	Selena	Dec. 14, 2023	24.250740, -78.003333
3	JLo	Dec. 15, 2023	24.234260, -78.003333
4	Victoria	Dec. 15, 2023	24.242500, -77.994303
5	Victoria	Dec. 15, 2023	24.242500, -78.012363
6	JLo	Dec. 15, 2023	24.250740, -77.994303
7	Selena	Dec. 16, 2023	24.250740, -78.012363
8	JLo	Dec. 16, 2023	24.234260, -77.994303
9	Victoria	Dec. 16, 2023	24.234260, -78.012363
10	JLo	Dec. 17, 2023	24.246620, -77.998818
11	Selena	Dec. 17, 2023	24.246620, -78.007848
12	Shakira	Dec. 17, 2023	24.238380, -77.998818
13	Alexandria	Dec. 17, 2023	24.238380, -78.007848
14	Paloma Mami	Dec. 18, 2023	24.247870, -78.000000
15	Selena	Dec. 18, 2023	24.237130, -78.000000
16	JLo	Dec. 18, 2023	24.244000, -77.995500
17	Victoria	Dec. 18, 2023	24.241000, -78.011166



	Seal	Date	GPS Coordinates
1	Shakira	Dec. 14, 2023	24.242500, -78.003333
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4	Victoria	Dec. 15, 2023	24.242500, -77.994303
5	Victoria	Dec. 15, 2023	24.242500, -78.012363
6	JLo	Dec. 15, 2023	24.250740, -77.994303
7	Selena	Dec. 16, 2023	24.250740, -78.012363
8	JLo	Dec. 16, 2023	24.234260, -77.994303
9	Victoria	Dec. 16, 2023	24.234260, -78.012363
10	JLo	Dec. 17, 2023	24.246620, -77.998818
11	Selena	Dec. 17, 2023	24.246620, -78.007848
12	Shakira	Dec. 17, 2023	24.238380, -77.998818
13	Alexandria	Dec. 17, 2023	24.238380, -78.007848
14	Paloma Mami	Dec. 18, 2023	24.247870, -78.000000
15	Selena	Dec. 18, 2023	24.237130, -78.000000
16	JLo	Dec. 18, 2023	24.244000, -77.995500
17	Victoria	Dec. 18, 2023	24.241000, -78.011166

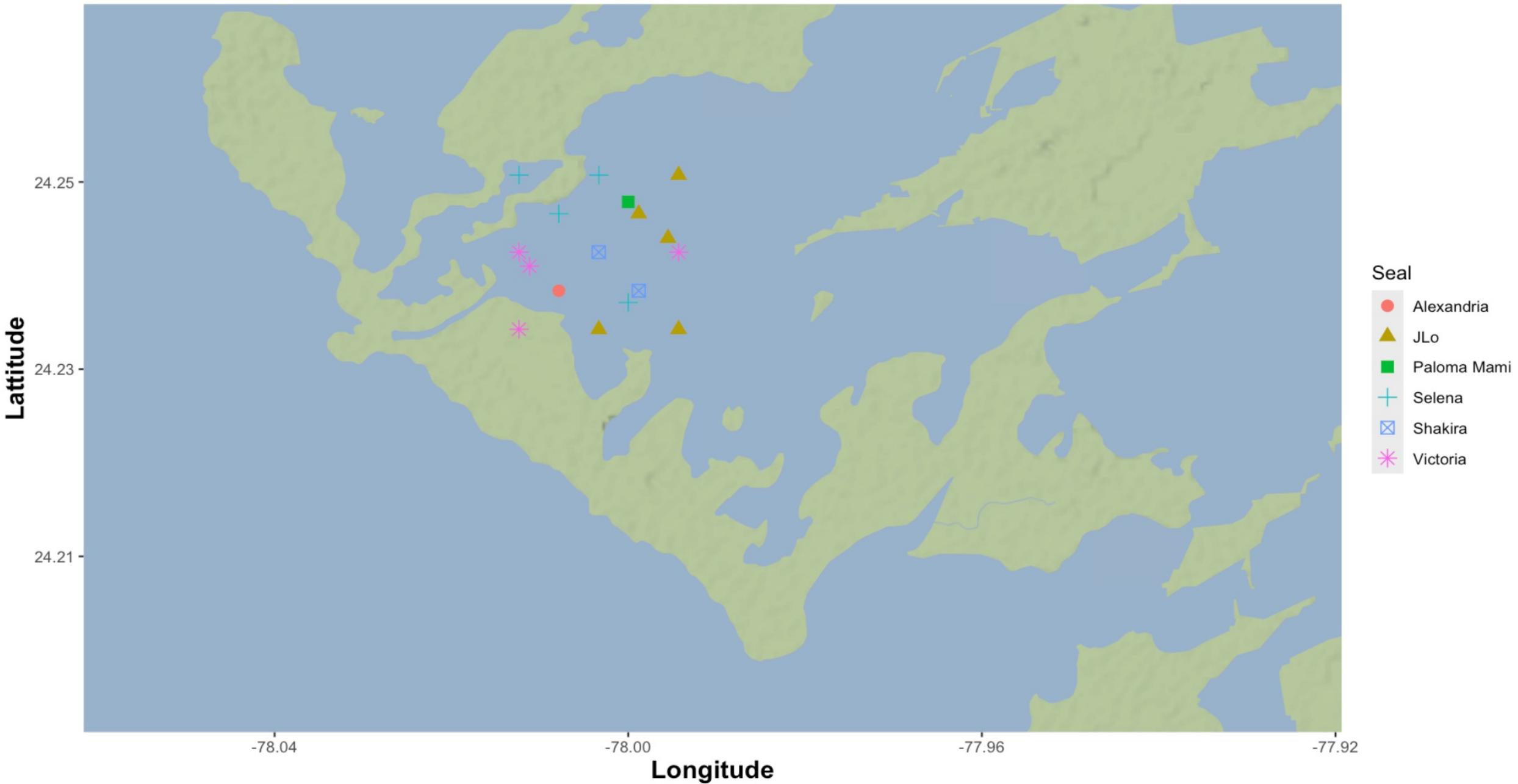
```
#Separate Latitude and Longitude into two new columns from the 'GPS Coordinates Column'
```

```
Sealname_Location_separatedMock <- separate(Sealname_LocationMock, col = `GPS Coordinates`, into = c("Latitude", "Longitude"), sep = ",")  
View(Sealname_Location_separatedMock)
```

FINAL VISUALIZATION

```
#Layer Latitude and Longitude data atop Terrain visualization
ggmap(mockseal_map) +
  geom_point(data =Sealname_Location_separatedMock,
             aes(x =Longitude, y =Latitude, color= Seal, shape= Seal),
             size = 3) +
  labs( title= "Leopard Seal Sightings as Observed", x = "Longitude", y= "Latitude" ) +
#scale_color_viridis_d() +
  theme(
    axis.title.x = element_text(size = 14, face = "bold"),
    axis.title.y = element_text(size = 14, face = "bold"),
    plot.title = element_text(size = 20, face = "bold", hjust = 0.5)
  )
  theme_minimal()
```

Leopard Seal Sightings as Observed



Leopard Seal Sightings as Observed

WITH VIRIDIS

