# Santa Barbara Channel Sea Otters and Urchins

⚔

with xaringan

Halina Do-Linh, Allie Cole, and Marie Rivers
UCSB Bren School and Environmental Science & Management
2016/12/12 (updated: 2021-10-26)

# Question

How MPA's affect sea otter populations

(or how sea otter populations and urchin populations are correlated)

# Data Management Plan

Time: ~50% of the total project time for managing data

- making sure data is clean and accessible **Marie**
- uploading relevant files to a repository **Halina**
- making sure all individual data sets can be used together **Allie**

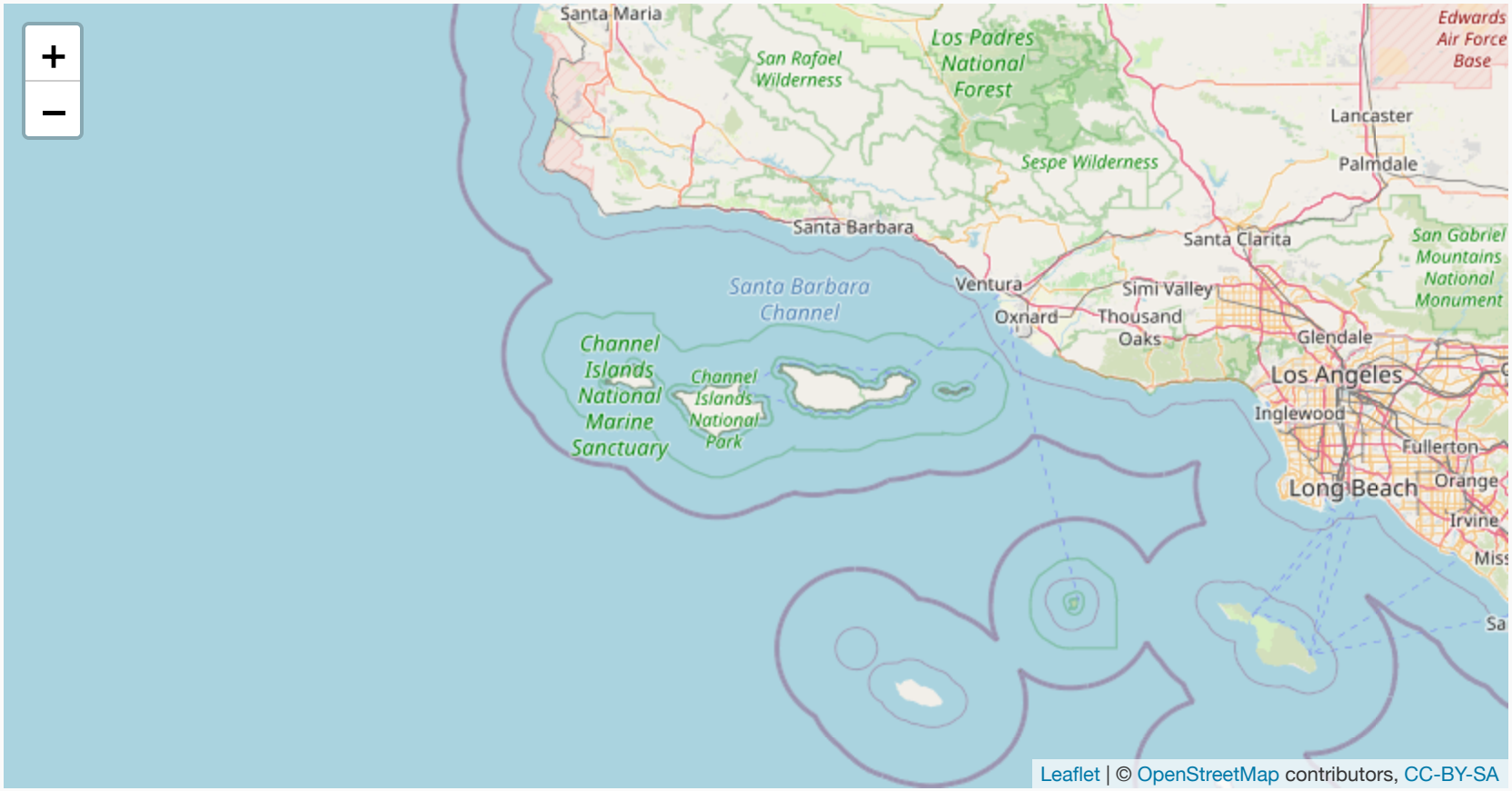
There are no legal constraints associated with acquiring, using and sharing project data.

Here is our data log:

| A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|
| **Name of Data set** | **URL or identifier to the data source** | **Short Data Description** | **Date the data was last accessed** | **Data Provider's Name (person or institution)** | **Data Creator/Owner's Email/contact** | **downloaded File location (cloud drive, path on server; e.g. google drive link)** | **Filename (as stored on your Shared Drive)** | **Team member who got the data (email)** | **Used in your analysis? (Y/N)** |
| Santa Barbara Coastal LTER Sea Otter Counts | https://search.dataone.org/view/https%3A%2F%2Fpasta.lternet.edu%2Fpackage%2Fmetadata%2Feml%2Fknb-lter-sbc%2F61%2F7 | Sightings of sea otters near Santa Barbara and Channel Islands ongoing since 2007. | 2021/10/04 | Santa Barbara LTER | sbclter@msi.ucsb.edu | https://drive.google.com/drive/f | sea-otter-counts-2007.csv | halina@ucsb.edu | Y |
| Sea Otter Foraging Data | https://knb.ecoinformatics.org/view/urn:uuid:bbf026b7-ce66-412e-9243-33532506c4e0 | Sightings of sea otters foraging in Prince of Wales, Alaska | 2021/10/13 | Nicole LaRoche, Sydney King, and Heidi Pearson | nlaroche@alaska.edu, sydneyleeking@gmail.com | https://drive.google.com/drive/f | sea-otter-foraging.csv | mrivers@bren.ucsb.edu | N |
| Alaska Sea Otter Counts | https://knb.ecoinformatics.org/view/urn%3Auuid%3Ab910f74b-171b-4d2b-b065-fb21823a8e84 | Counts of individual sea otters that were observed at 21 sites at the Prince of Wales Island in Southeast Alaska in 2017 and 2018. | 2021/10/13 | Tiffany Stephens, Ginny Eckert | tiffanybot@gmail.com, gleckert@alaska.edu | https://drive.google.com/drive/f | sea-otter-counts-alaska.cs | halina@ucsb.edu | N |
| Santa Barbara Coastal LTER Urchin Count | https://search.dataone.org/view/https%3A%2F%2Fpasta.lternet.edu%2Fpackage%2Fmetadata%2Feml%2Fknb-lter-sbc%2F52%2F10 | Biweekly data on invertebrate settlement at six sites in Southern California, and one site in Northern California. The study began in early 1990 and is ongoing. Main focus is on urchins. | 2021/10/18 | Santa Barbara LTER, Steven C Schroeter | sbclter@msi.ucsb.edu, schroete@lifesci.ucsb.edu | https://drive.google.com/drive/f | urchin-invert-counts.csv | icole@ucsb.edu | Y |
| USGS Annual Sea Otter Census | https://www.sciencebase.gov/catalog/item/5601b6dae4b03bc34f5445ec | Sea otter surveys from 1985 and ongoing from Half Moon Bay south to Santa Barbara. | 2021/10/04 | M. Tim Tinker, Julie L Yee | sciencebase@usgs.gov | https://drive.google.com/drive/f | sea-otter-counts-usgs.csv | mrivers@bren.ucsb.edu | N |
| USGS Bird Density and Marine Mammal Counts | https://search.dataone.org/view/56597045-d710-4c97-b10e-830f9a48053d | Bird density and marine mammal counts in southern California from 1999 to 2002. | 2021/10/04 | Western Ecological Research Center, Humboldt State University | john_takekawa@usgs.gov | https://drive.google.com/drive/f | marine-bird-counts-usgs.cs | icole@ucsb.edu | N |

# API and Data Retrieval

Datasets are from DataOne and the Santa Barbara Coastal Long Term Monitoring Ecological Research (LTER) project



# API and Data Retrieval

### Sea Otter Data

Santa Barbara Coastal LTER, Daniel C Reed, Shannon Harrer, Clint J Nelson, and Robert J Miller. 2021. SBC LTER: Reef: Sightings of sea otters (Enhydra lutris) near Santa Barbara and Channel Islands, ongoing since 2007.

```
data_lter_url ← "https://cn.dataone.org/cn/v2/resolve/https%3A%2F%2Fpasta.lternet.edu
```

```
metajam::download_d1_data(data_lter_url, "data", "counts_sb")
```

### Urchin Data

Santa Barbara Coastal LTER, Steven C Schroeter, John Douglas Dixon, Thomas Ebert, and John Richards. 2021. SBC LTER: Settlement of urchins and other invertebrates, ongoing since 1990. LTER Network Member

```
data_urchins_url ← "https://cn.dataone.org/cn/v2/resolve/https%3A%2F%2Fpasta.lternet.
```

```
metajam::download_d1_data(data_urchins_url, "data", "urchins")
```

# Merging Data

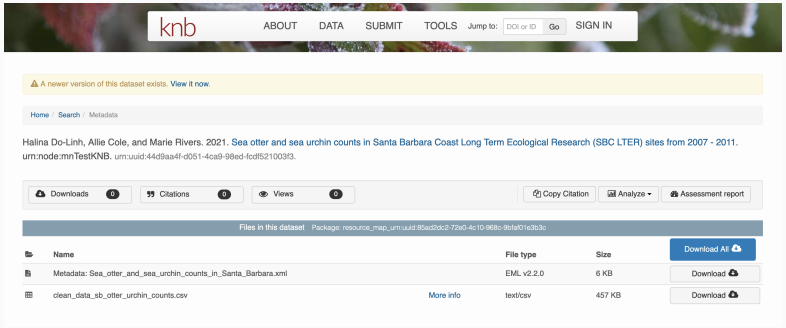
```
otter_LTER_data ← otter_LTER_data %>%
  filter(YEAR ⩽ 2020) %>%
  mutate(SITE = SBC_SITE) %>%
  mutate(SPECIES = "sea otter") %>%
  select(DATE, SITE, SPECIES, COUNT)
```

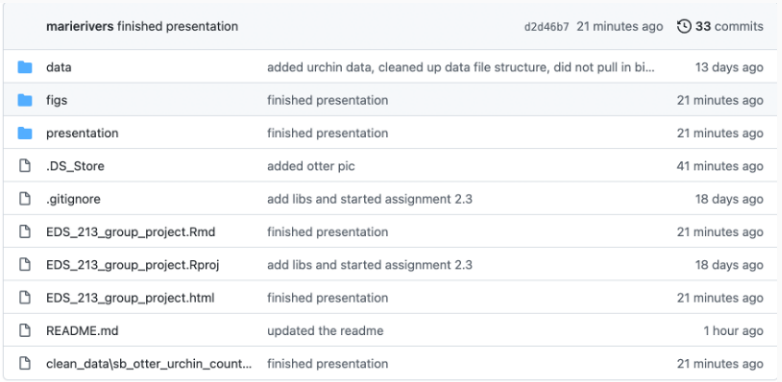
```
urchins ← read_csv("https://cn.dataone.org/cn/v2/resolve/https%3A%2F%2Fpasta.lternet.
  mutate(DATE = lubridate::mdy(DATE_RETRIEVED)) %>%
  filter(DATE ⩾ "2007-01-01") %>%
  mutate(SPECIES = "urchin") %>%
  mutate(COUNT = TOTAL_URCHINS) %>%
  select(DATE, SITE, SPECIES, COUNT)
```

# Results

# Preserved Data

**Where?** The data will be preserved on knb and GitHub




**Why?** knb and GitHub are robust sites that hosts a large number of repositories

**How?** relevant data will be saved as both a **csv** and **txt file**

- the csv (for now) is very accessible and can be quickly downloaded and used for analysis
- the txt file will most likely be able to withstand time for a longer period (can be opened by almost any program)

# Future Steps

- contact USGS for additional otter population data
- evaluate species counts before and after MPA was established
- evaluate species counts inside and outside of MPA