

Data Documentation - Southern California Red Sea Urchin

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Metadata

There are both fishery-dependent and fishery-independent data available for the southern California Red Sea Urchin fishery. Landings data are available from landings receipts. Self-reported catch and effort data are also available via logbooks, but this information requires a further analysis in order to be informative, and was not used in this study. Fishery-independent data is available from multiple organizations that monitor size and density information for Red Sea Urchin around the state. For this analysis we used the longest time series of fishery-independent data, which comes from the Channel Islands Kelp Forest Monitoring Program (KFMP). Since 1985 size frequency and density information has been collected for Red Sea Urchin using quadrat surveys at 37 sites around the Channel Islands National Park. Many of these sites are located within no-take Marine Protected Areas.

Table 1: Table 1. Summary of metadata

Name	RSU Dive Fishery - Soothern California
Common Name	Red Sea Urchin
Species	Mesocentrotus franciscanus
Region	Southern California
Last Historical Year	2019
Last TAC	NA
Units	million pounds
Last TAE	1
Number of areas	2

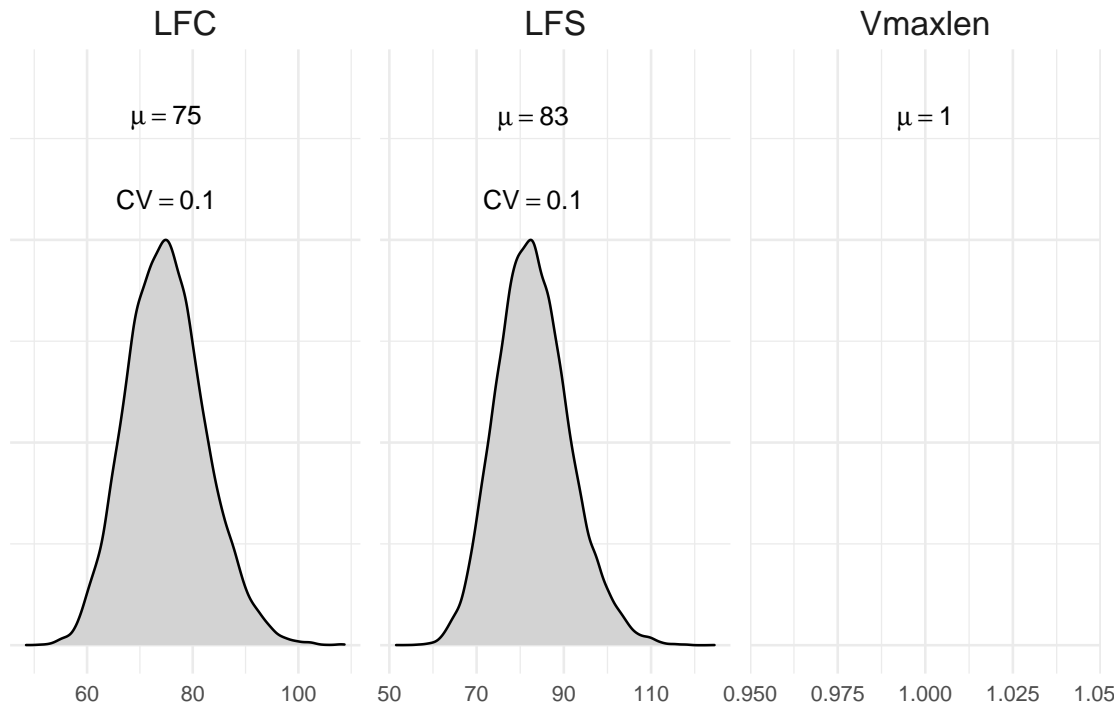
Biology

Much of the biological information for the Red Sea Urchin is well understood, and the Enhanced Status Report (CDFW 2019) summarizes the best available information for each of the biological parameters used in management. However, the estimates of natural mortality, growth, age, recruitment, and size at sexual maturity come from northern populations. This lack of estimates directly from the southern California population represents a source of uncertainty.

Selectivity

Because there is no catch-at-length data available for this fishery, and because urchin are harvested by hand, we assumed a knife-edged selectivity at the size limit.

Figure 1. Density plots of selectivity parameters



Time-Series

This section describes the time series data available for use in management of the Red Sea Urchin fishery.

Catch

Records of total landings of red sea urchin were available from the landing receipts database (1973 - 2018), and were filtered to only include landings from southern California. Landings are reported in millions of pounds.

Effort

The effort data for the red sea urchin fishery is available from dive logs books of the fishing fleet. However, the effort data is incomplete for many years, and needs to be QAQCed in order to produce a reliable effort time series. The number of landing receipts was considered as a proxy for the number of fishing trips each year, but this number does not represent the number of divers or the length of trips. As a result, we decided not to include yearly effort data in this analysis.

Abundance

Each year, the KFMP counts Red Sea Urchin at each site along a 100 m (328 ft) permanently fixed transect line. From each survey a density estimate (count per unit area) is produced. From this data we produced density estimate by weighting the average density and fished and MPA sites by the amount of habitat that is either fished or protected by MPAs, respectively. This index showed a decline in densities over the last five years.

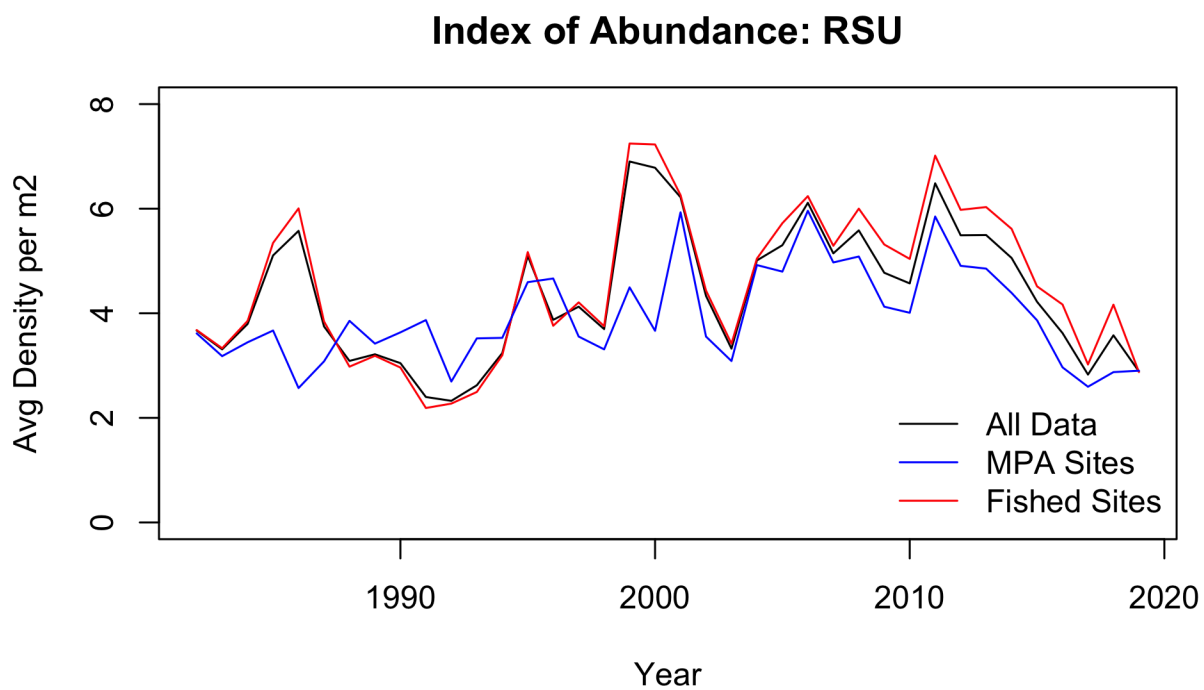


Figure 1: Red Sea Urchin Densities at KFMP Sites, 1985 to 2019

Recruitment

Recruitment of juvenile Sea (counts and size) in Artificial Recruitment Modules is collected by the KFMP in southern california. However, counts are low, and this was not used as an index of recruitment.

Figure 2. Time-Series Data

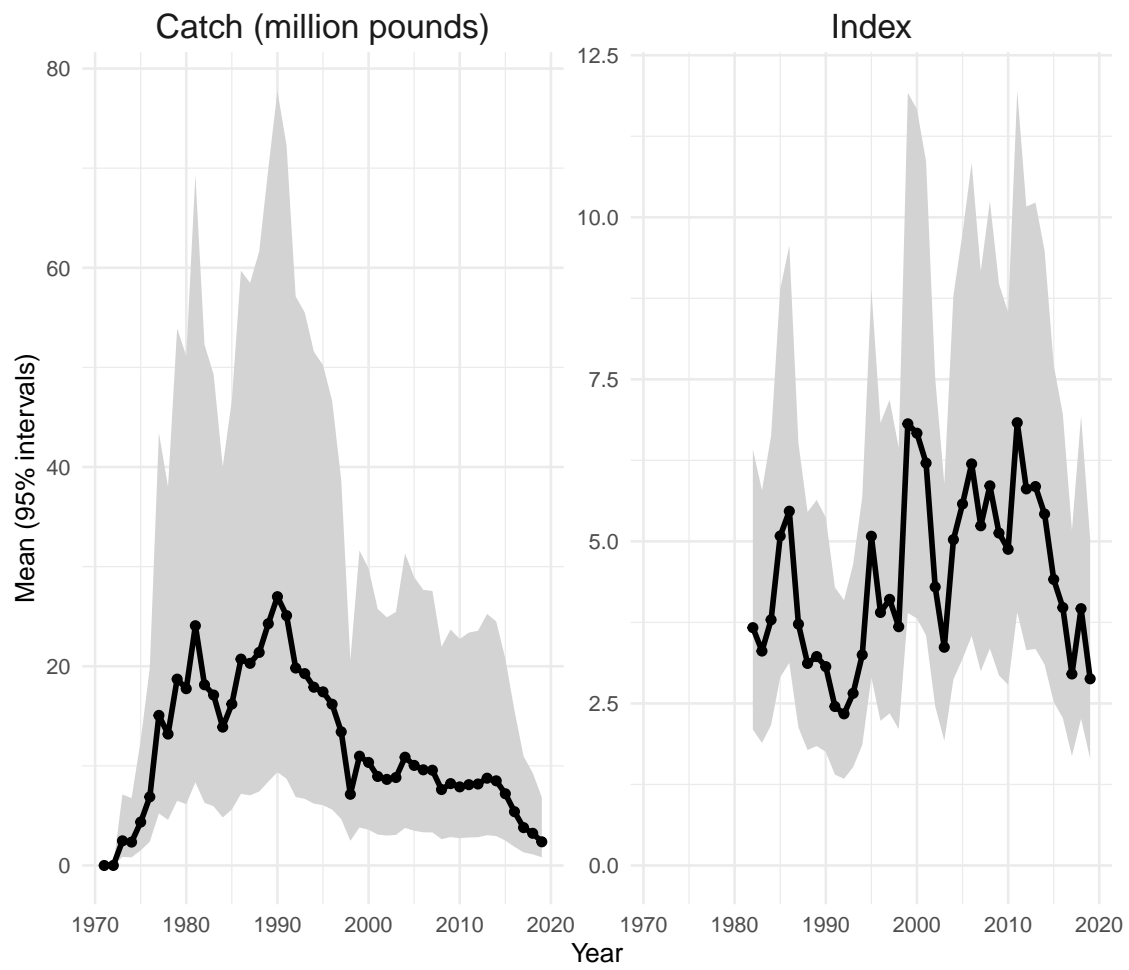
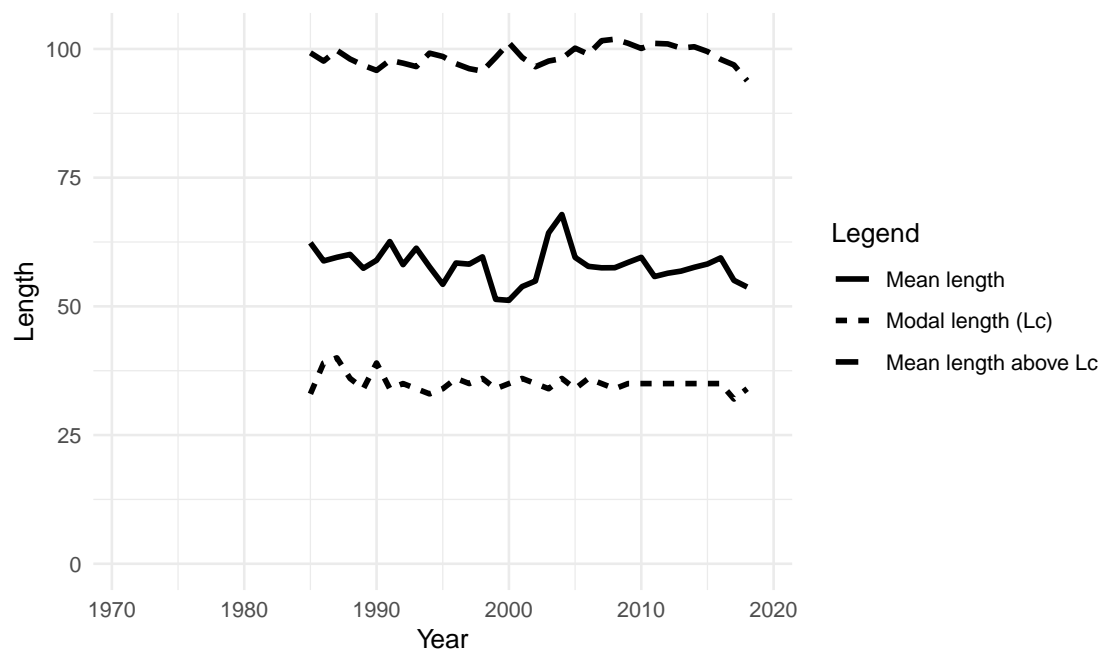


Figure 4. Mean Length Time-Series



Catch-at-Age

There is no catch-at-age data available for this fishery.

Catch-at-Length

The catch-at-length data used is from the KFMP, and is available from 1985-2018. The length data was processed by filtering out all records from within the MPA sites, and all individuals under the 82 mm minimum legal length. A time-series of the mean length of exploitable sea urchin, and the size composition of exploitable sea urchin was produced for each year and included in the DLM_data object.

Figure 5. Catch-at-Length (Years 1985 – 2000)

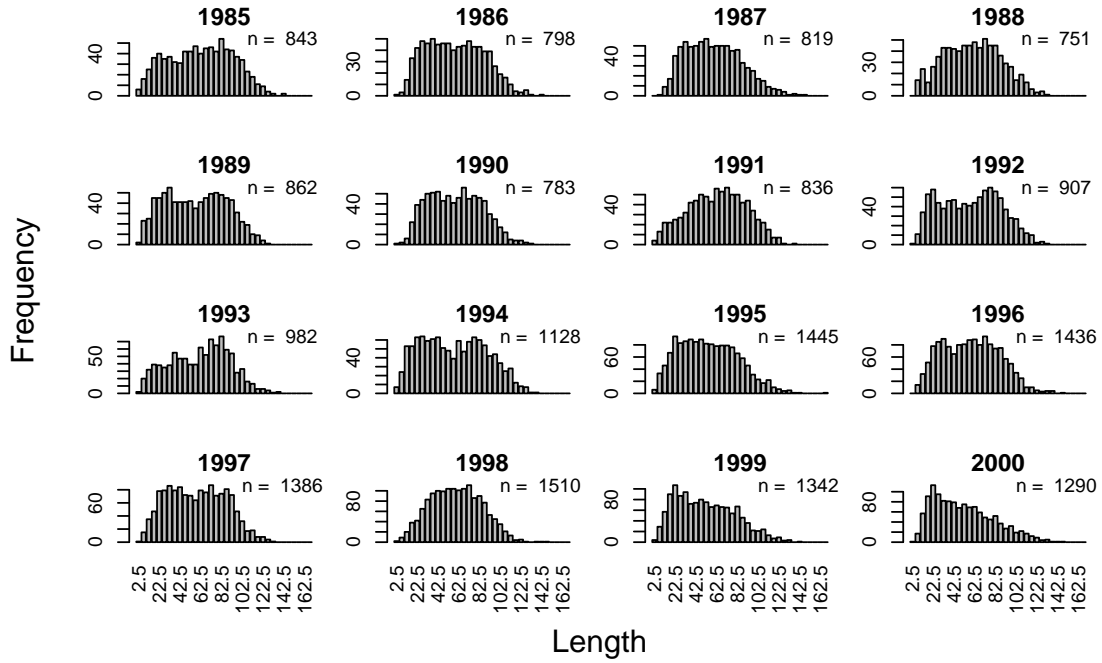


Figure 6. Catch-at-Length (Years 2001 – 2017)

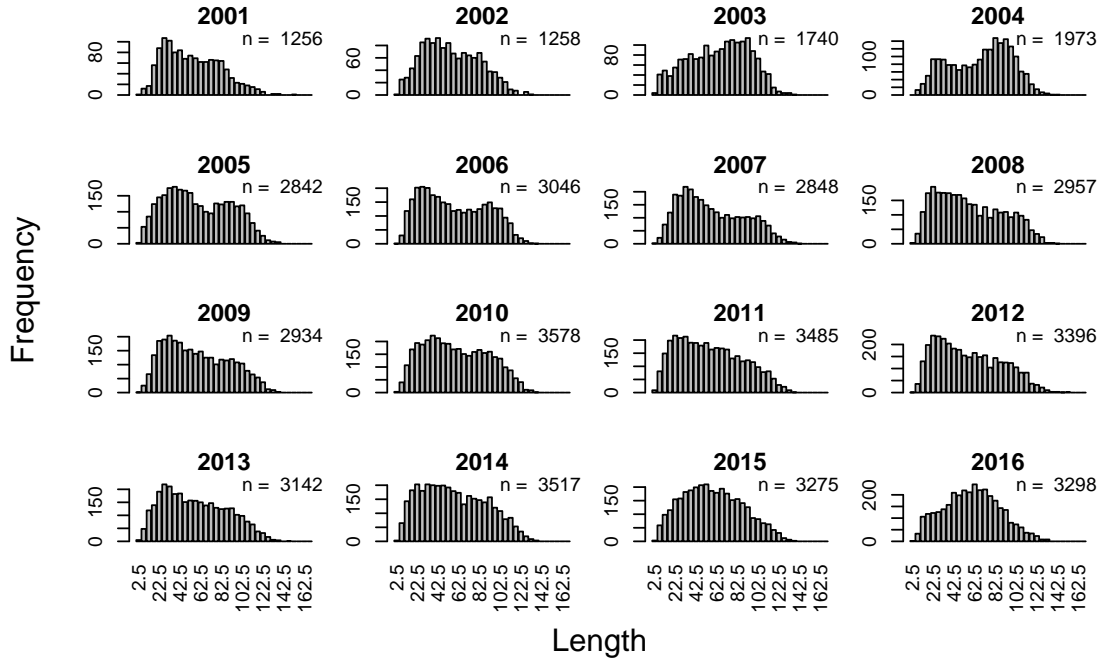
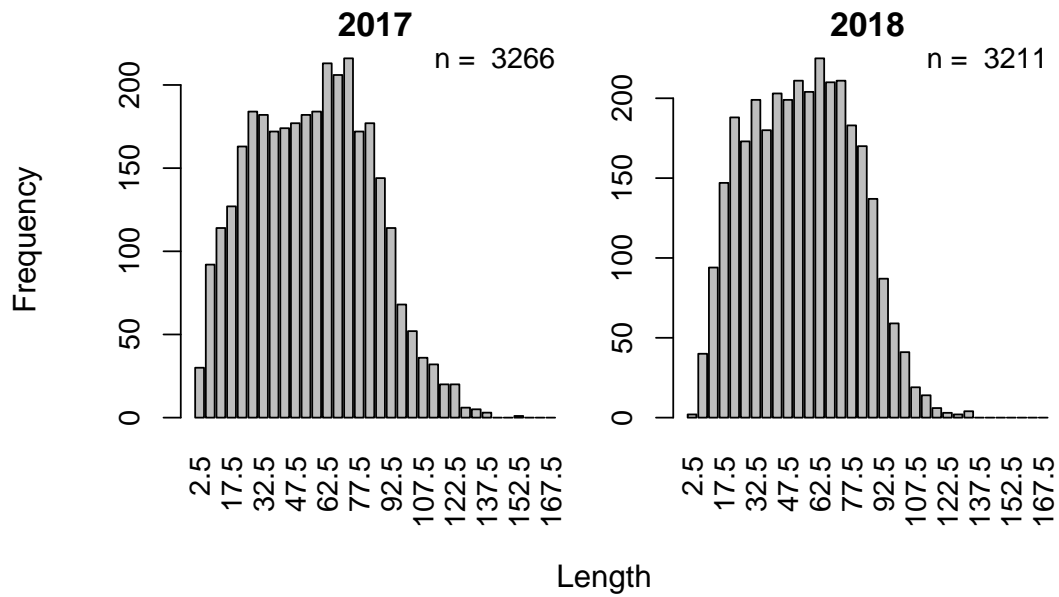


Figure 7. Catch-at-Length (Years 2017 – 2018)



Reference

Reference List

California Department of Fish and Wildlife. 2019. Red Sea Urchin, *Mesocentrotus franciscanus*. Enhanced Status Report.