

# Kelp Bass Data Report

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## Metadata

Two main sources of fishery data were available for the Kelp Bass fishery: catch-per-unit-effort (CPUE) information from the commercial passenger fishing vessel (CPFV) fleet, and size composition data that is collected as part of the Recreational Fisheries Information Network (RecFIN).

Beginning in 1935, CPFV operators were required to keep daily catch logs and submit them monthly to the Department. These data have been collected continuously, except for during World War II (1941 to 1946) when most CPFVs were not fishing (Hill and Schneider 1999). Logbook data have always included the date fishing occurred, port code, boat name, Department fishing block, angler effort and the number of fish kept by species, and after 1994 included discarded fish, bait type and sea surface temperature. However, Barred Sand Bass were initially recorded within the broader “rock bass” category (which also included Barred Sand Bass and Spotted Sand Bass) and were not consistently reported by species until 1975.

In addition, the California Recreational Fisheries Survey (CRFS) also collects size (length and weight) information on kept fish. Numbers of discards are also recorded for all modes and discard lengths are obtained opportunistically on CPFVs. Estimates from CRFS and the Marine Recreational Fishery Statistics Survey (MRFSS) are not directly comparable due to differences in methodology, so only CRFS data are presented in this report. CRFS data on catch estimates and mortality are available electronically to the public within 40 days of collection on the updated RecFIN website (<https://www.recfin.org>).

Table 1: Table 1. Summary of metadata

Name	Kelp Bass Recreational Data Object
Common Name	Kelp Bass
Species	Paralabrax clathratus
Region	CA
Last Historical Year	2018
Last TAC	NA
Units	mt
Last TAE	1
Number of areas	2

## Biology

The biology of Kelp Bass is well-studied, and peer reviewed studies are available to inform mortality, growth, and maturity. The Enhanced Status Report (CDFW 2019) summarizes the best available information for each of the biological parameters used in management.

Figure 1. Density plots of biological parameters

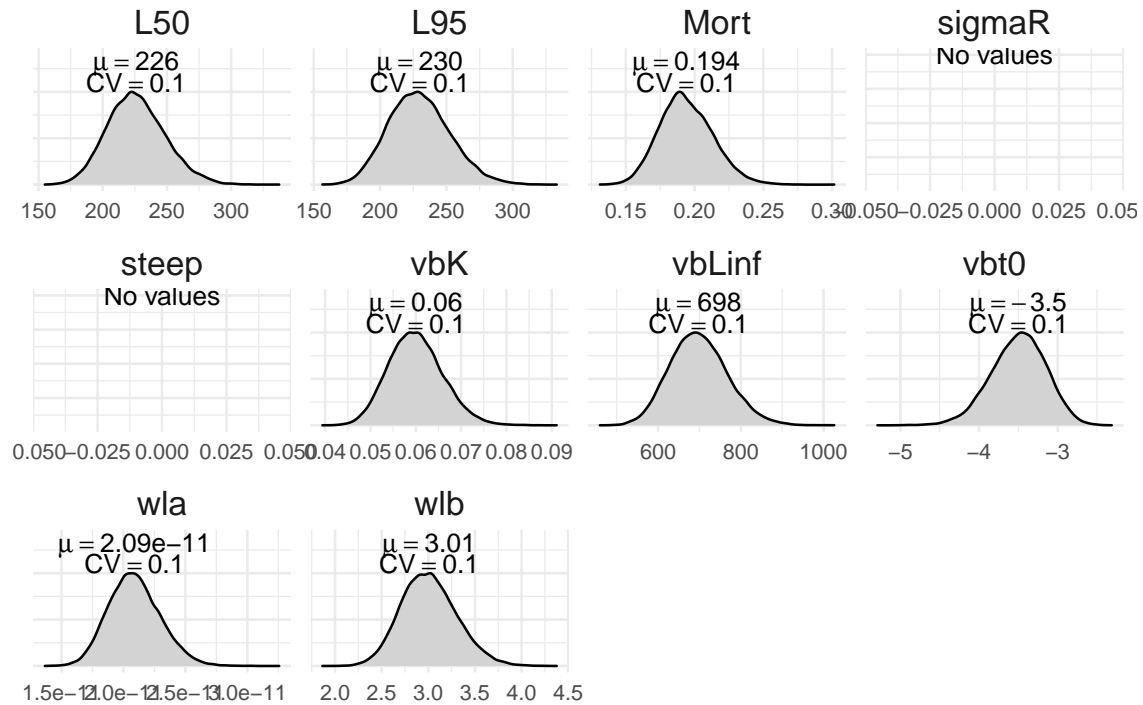
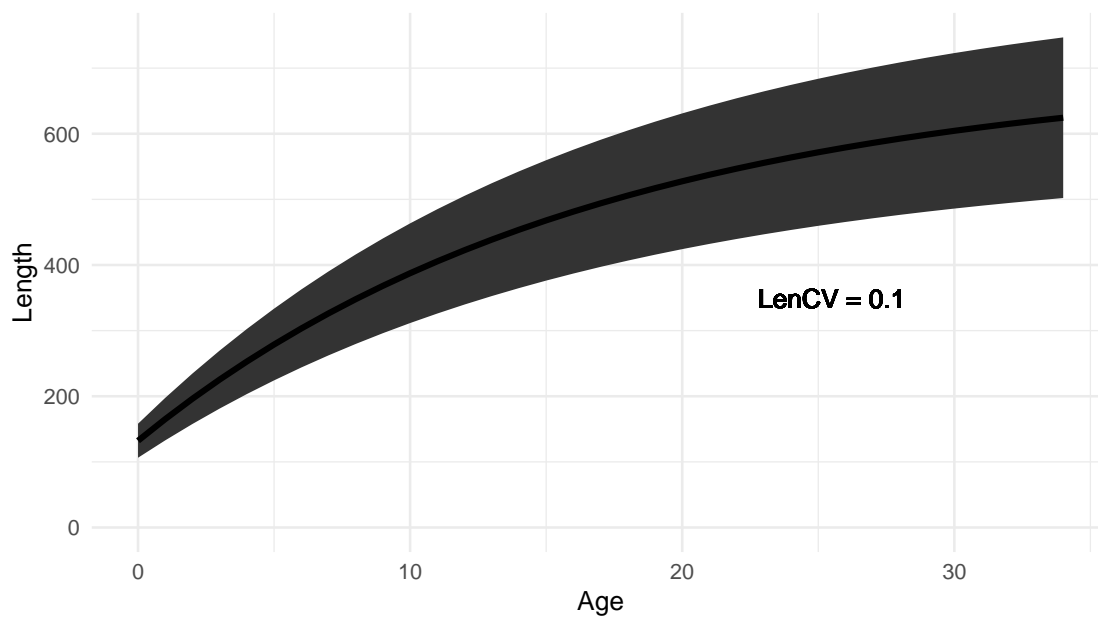


Figure 2. Distribution of length-at-age

Mean length-at-age (solid line) and 2 standard deviations (shaded region)



## Selectivity

Selectivity was estimated by fitting a logistic model to CRFS data on both retained and discarded fish collected between 2004-2012 (prior to a change in the legal size limit). Retention was calculated similarly except the model was fit to retained fish only including data collected up to the present.

Figure 3. Density plots of selectivity parameters

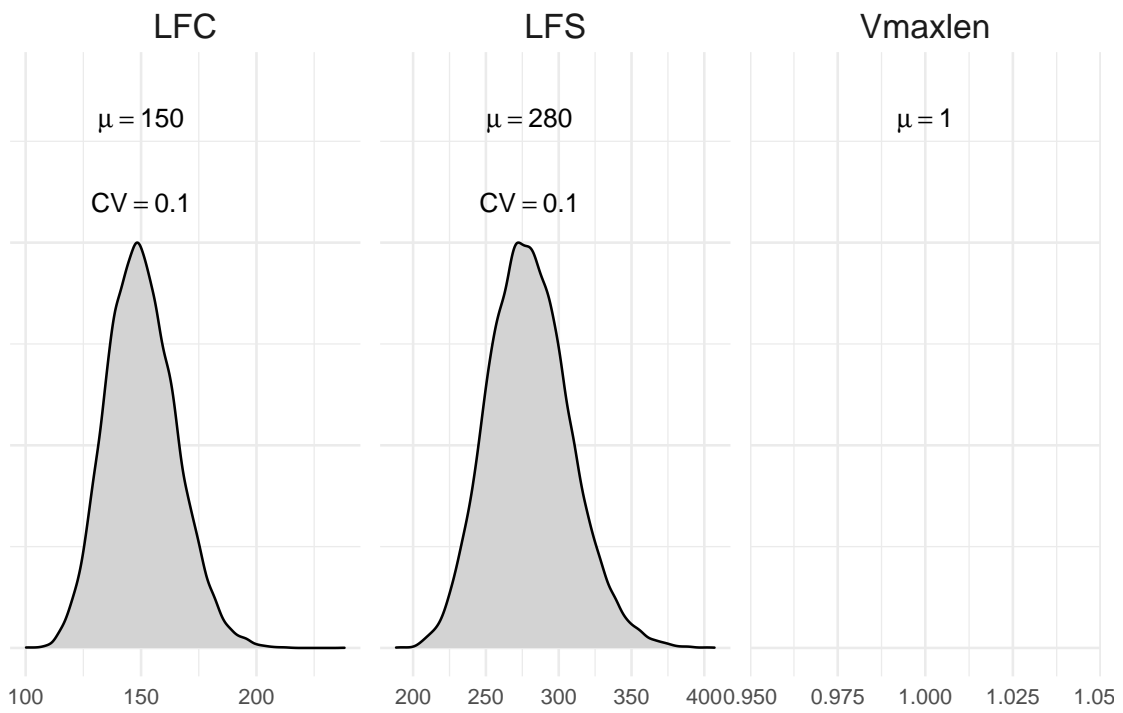


Figure 4. Selectivity-at-age

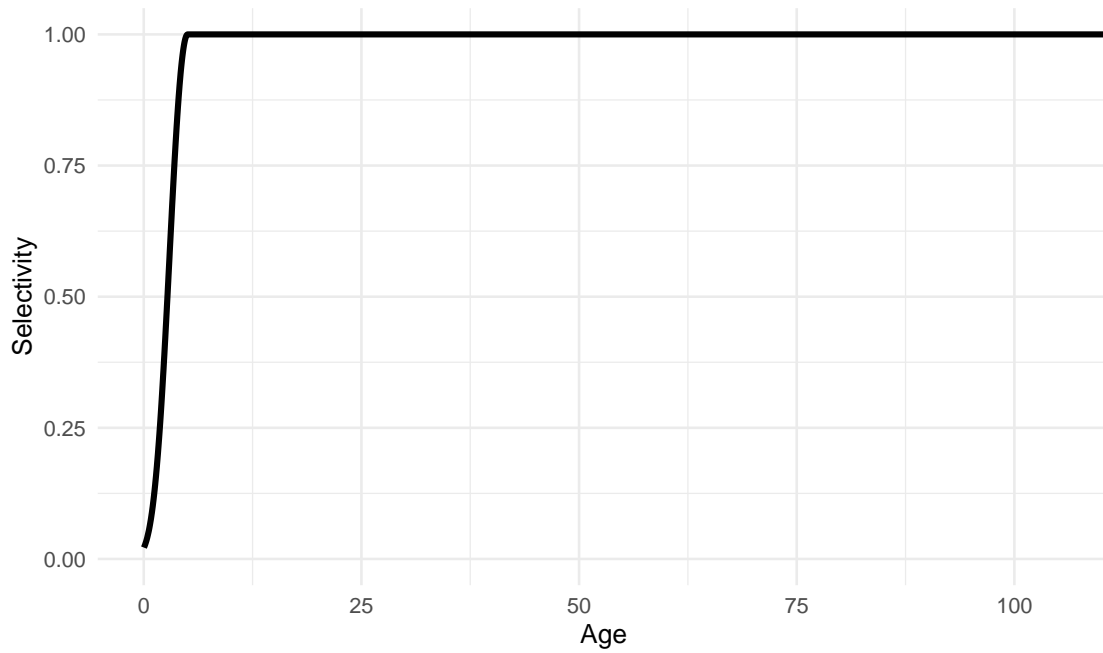
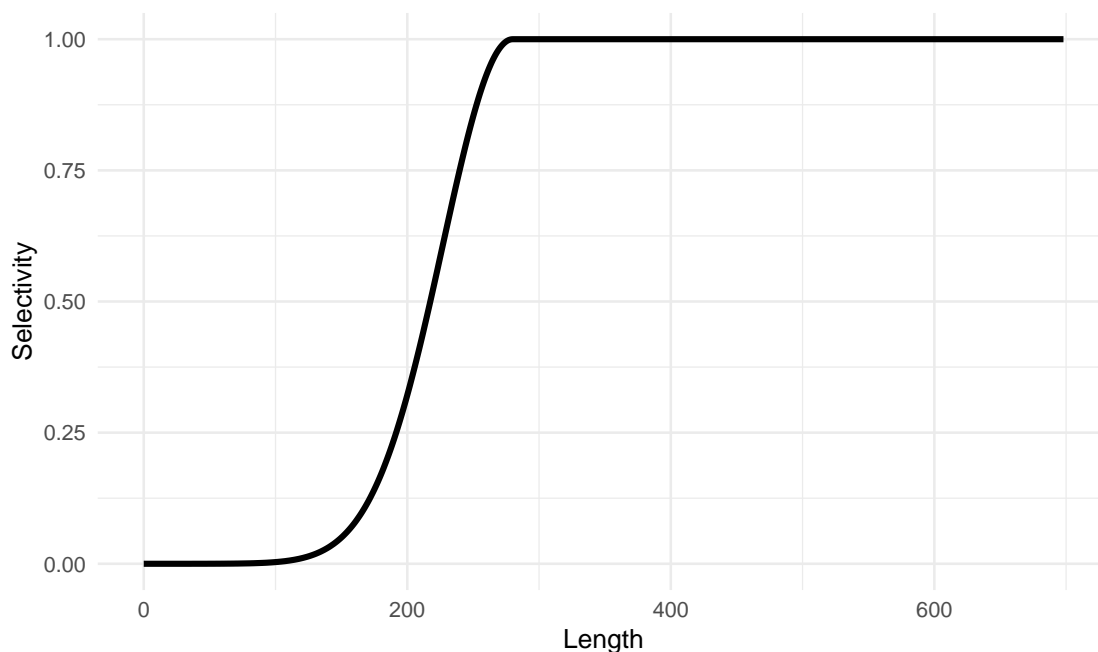


Figure 5. Selectivity-at-length



## Time-Series

Data from RecFIN comes from two different surveys. All modes of recreational fishing (private rental, CPFV, beach and bank, and manmade structures) were surveyed by MRFSS for size samples and estimates of catch and effort between 1979 and 2003. The Pacific States Marine Fisheries Commission ran these surveys with both federal and state funding. A combination of dockside surveys, CPFV sampling and phone interviews were used to generate the estimates. In January 2004, the Department implemented its own sampling survey, CRFS, to replace the MRFSS surveys using similar but different methods. Because of the difference between these methods, catch and effort estimates before and after 2004 are not considered a continuous, comparable time series. More information on each time series is provided below.

## Catch

Catch information begins in 2005 with the creation of the CRFS program. Some recreational data was collected prior to 2005 but cannot be included due to a difference between the MRFSS and CRFS sampling methods. Estimates are in metric tons. The RecFIN query included retained fish caught using all fishing modes from all water areas except Mexico.

## Effort

The CRFS program develops effort estimates for each of the four fishing modes sampled, but due to the multi-species nature of recreational fishing in California, it is not possible to use this information to estimate the fishing effort targeting Kelp Bass specifically. Instead, we used CPFV log book data to determine the number of trips targeting Kelp Bass, and from that created a relative index of historical fishing effort (more fully described in the OM report). However, because yearly measures of effort are not routinely produced in this fishery, effort was not considered one of the types of data available for management and was not included in the data object.

## **Abundance**

CPFV log book data was used to develop a standardized index of abundance based on CPUE for the Kelp Bass stock since 1980. An associated species model was used to determine trips that were likely targeting Kelp Bass (see the OM report for methods), and the CPFV logbook data set was then filtered to include only these trips. The dataset was filtered by removing all records with reported catches greater than the 99th percentile of recorded catch. The effort data was filtered in a similar way. Records which reported zero fishers were removed from the data set. Catch was calculated as the sum of the number kept, number released and number lost to sea lions on each trip. Effort was calculated as the number of fishers for each trip.

A generalized linear model (GLM) was fit to the CPUE data. Region was used as a covariate, in addition to year and month. Each trip was assigned to either the San Diego, Los Angeles, or Santa Barbara region based on reported CDFW block number. Figure 1 shows the CPUE index for Kelp Bass from 1980 to 2018 for each region, as well as the composite index (weighted by region).

## **Recruitment**

A time series of larval abundance for three species of southern California basses combined is available from California Cooperative Fisheries Investigations (CalCOFI) oceanographic cruises. We used this to generate a recruitment index for 1980-2018.

## **Length**

Mean length, modal length, and the mean length above modal length were calculated using RecFIN data for all fish sampled from the commercial passenger fishing vessel (CPFV) and private boat modes. We did not include Mexican waters. We combined data from sampling programs implementing different methods before and after 2005.

Figure 6. Time-Series Data

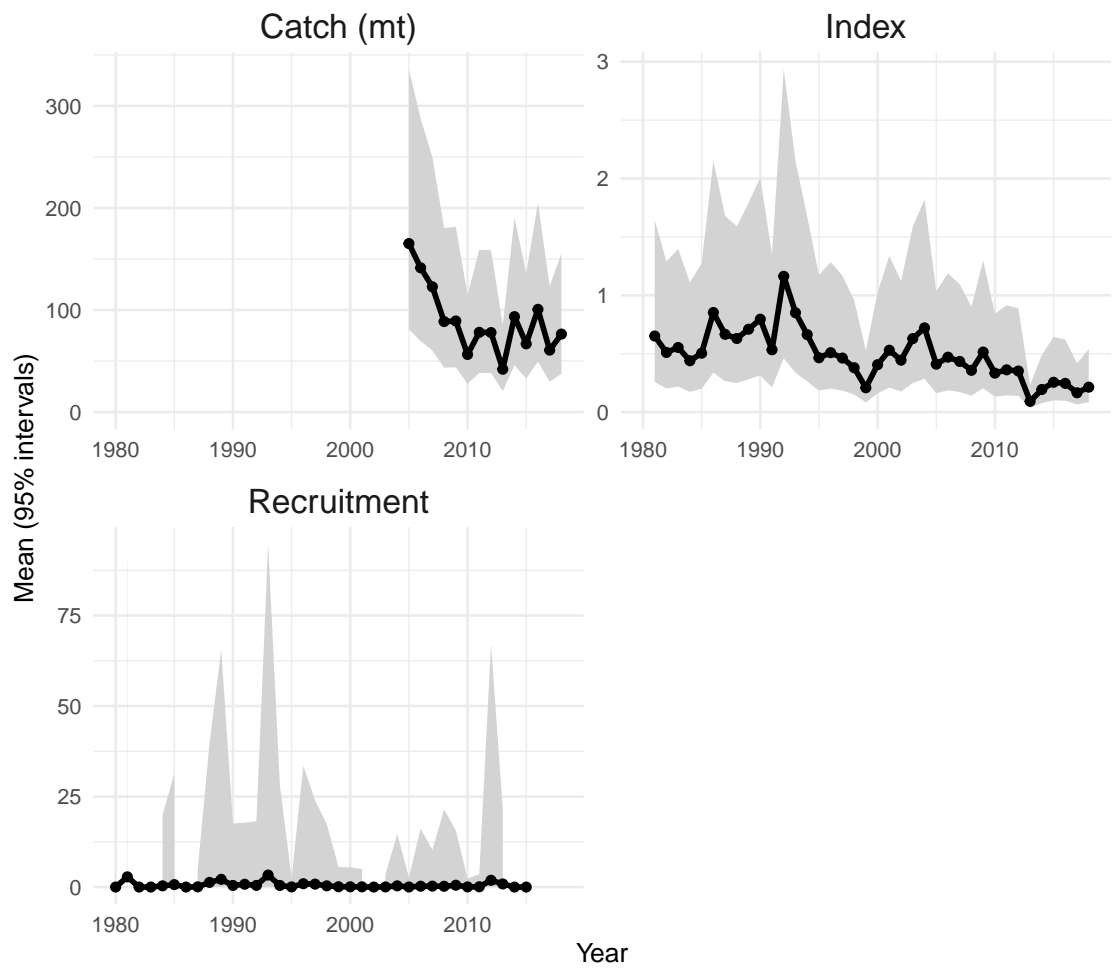
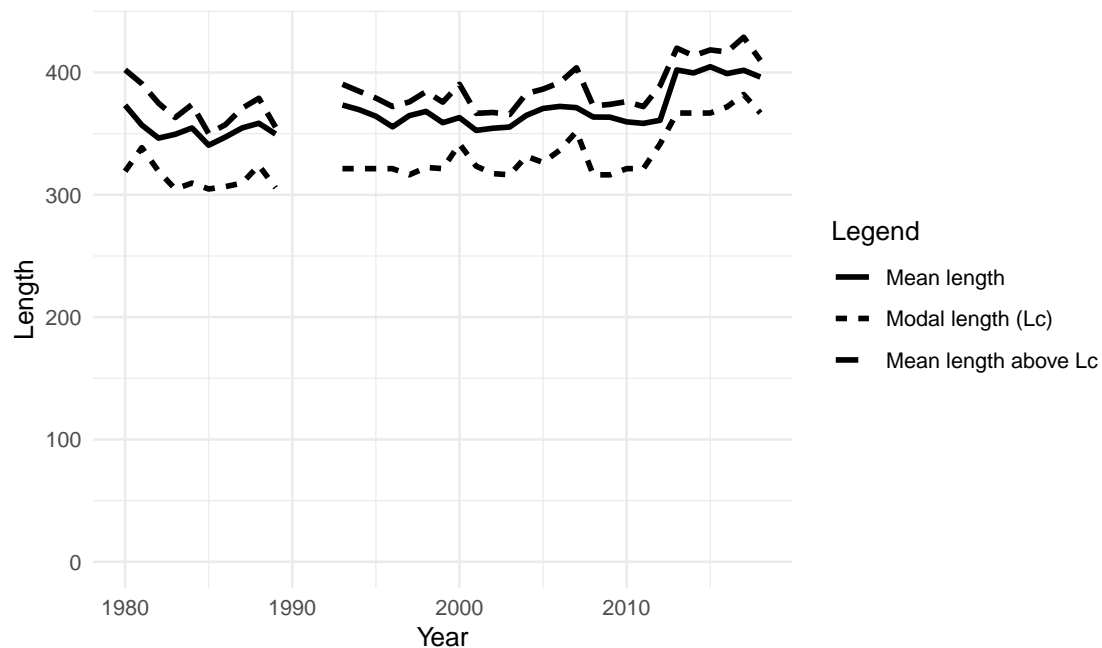


Figure 8. Mean Length Time-Series



## Catch-at-Age

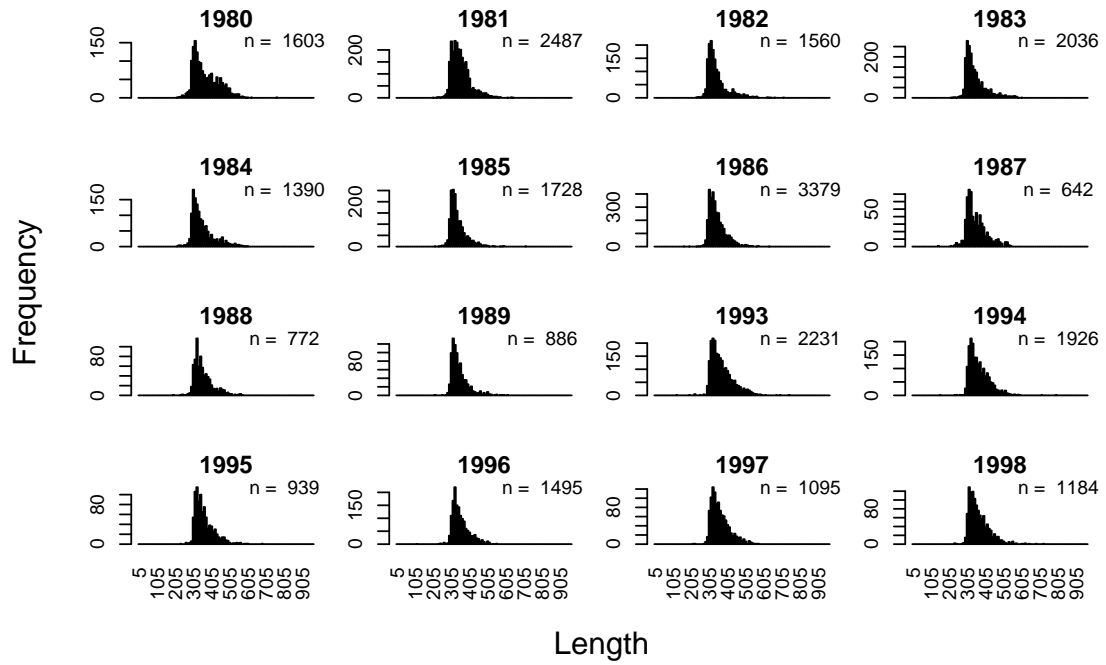
Catch-at-age is not consistently sampled, however, a dedicated study was conducted by CDFW staff between 2015 and 2018 to sample age, weight, length, and maturity. The purpose of this study was to update the estimates of biological parameters, and a paper describing these results is forthcoming. Because this data is not assumed to be routinely available for management it was not included in the data object.

## Catch-at-Length

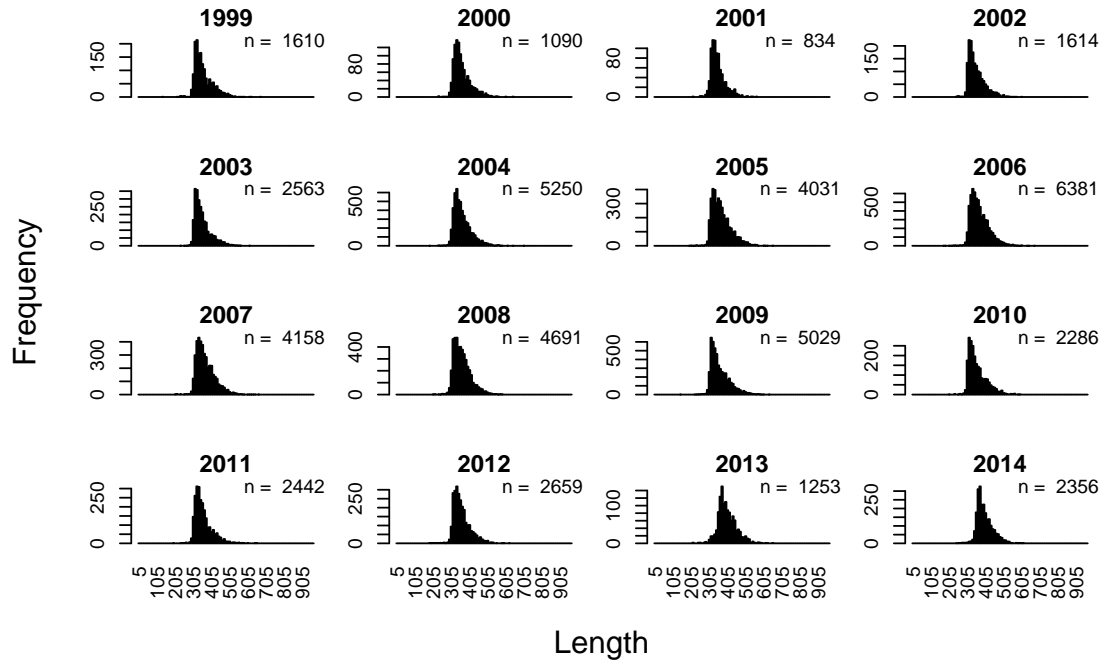
Catch-at-length data was available from RecFIN data for all fish sampled from the CPFV and private boat modes from 1980 to 2018 (there was no sampling in 1990-1992). We did not include Mexican waters. We combined data from sampling programs implementing different methods before and after 2005. Length bins were 10 mm.



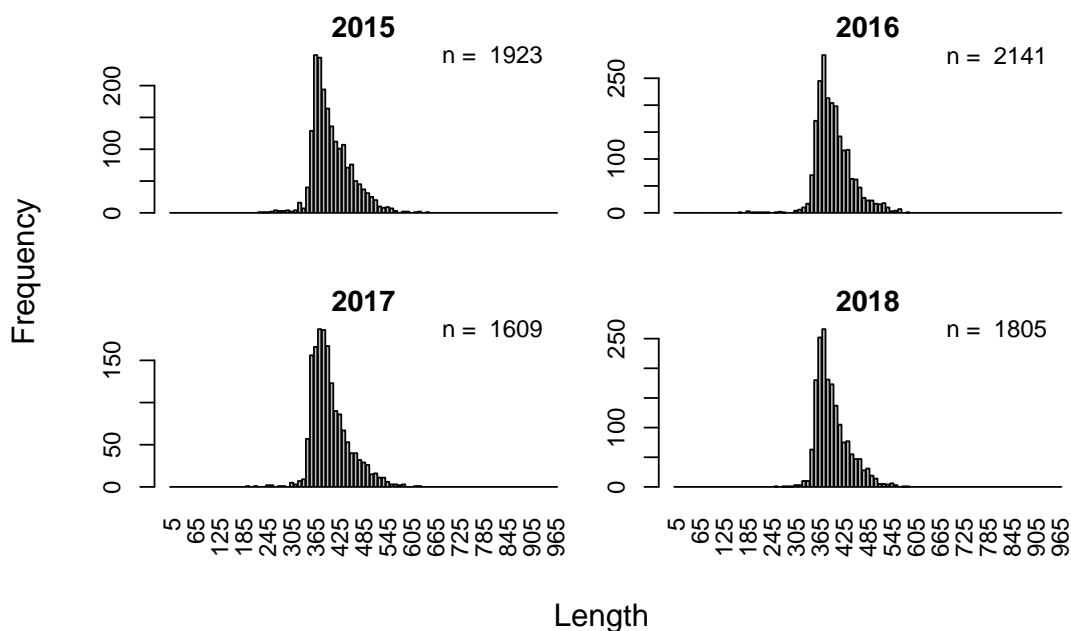
**Figure 9. Catch-at-Length (Years 1980 – 1998)**



**Figure 10. Catch-at-Length (Years 1999 – 2015)**



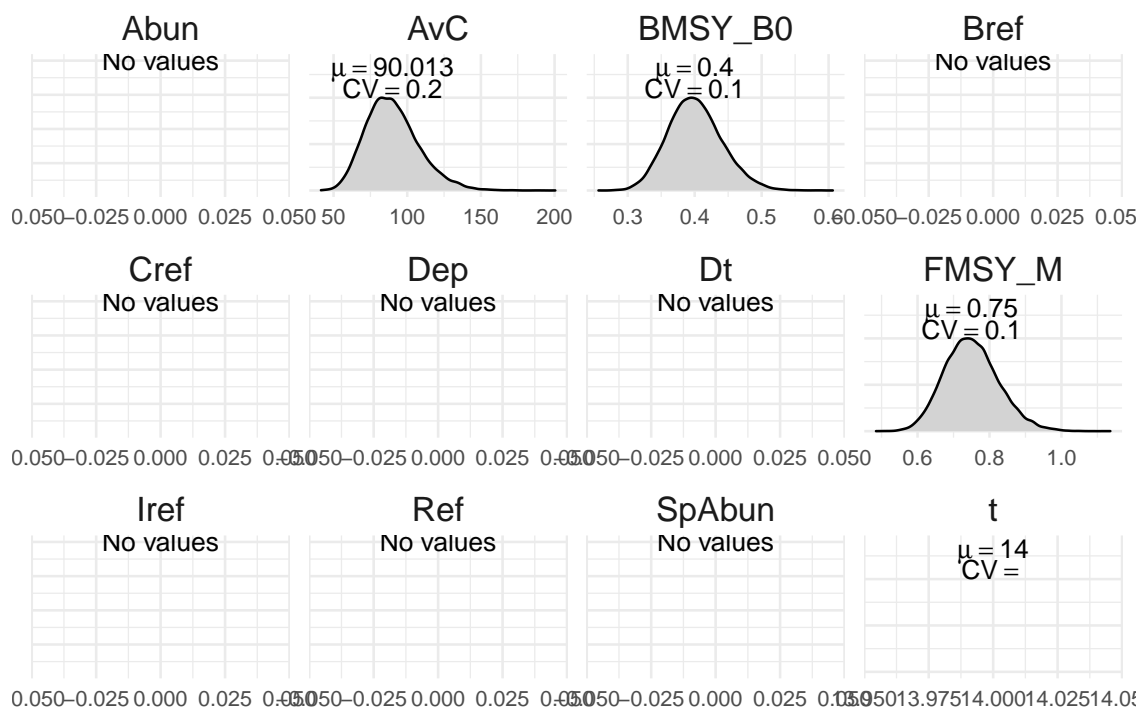
**Figure 11. Catch-at-Length (Years 2015 – 2018)**



## Reference

No formal reference points have been developed for Kelp Bass. However, we calculated the average catch over the 14 years of available data as a potential reference catch level. We have also included some commonly used reference points for finfish. The first is an assumed ratio of 0.75 between the fishing mortality rate that would achieve maximum sustainable yield (FMSY) and the natural mortality rate (M). For many years, the value of M was used as a proxy for the level of fishing mortality a stock could withstand. However, it has been acknowledged that the Fmsy/M value likely varies based both on taxonomic groups and geographic region (Francis 1974, Restrepo 1999), and values lower than 1 are now considered more precautionary, especially for data-poor species (Walters and Martell 2004). The second reference point used is the percent of unfished spawning biomass producing MSY. Following the reference points used for finfish managed by the Pacific Fisheries Management Council we assume a value of 0.4 as a proxy for BMSY. We assume a CV of 0.1 for both reference points.

Figure 12. Density plots of Reference parameters



## Reference List

- California Department of Fish and Game (CDFG). 2004. Annual Status of the Fisheries Report Through 2003. Chapter 11 Sea Bases. 182 p.
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- Restrepo VR, Powers JE. 1999. Precautionary control rules in US fisheries management: specification and performance. *ICES Journal of Marine Science* 56(6):846–52.
- Then AY, Hoenig JM, Hall NG, Hewitt DA. 2015. Evaluating the predictive performance of empirical estimators of natural mortality rate using information on over 200 fish species. *International Council for the Exploration of the Seas Journal of Marine Science* 72(1): 82–92.