# White Seabass Fishery Management Plan
# 2020-2021 Annual Review

**White Seabass, *Atractoscion nobilis*.**
**(Photo Credit: Scott Aalbers, Pfleger Institute of Environmental Research (PIER).**

**Prepared by**

**California Department of Fish and Wildlife**
**Marine Region**
**May 2022**

# White Seabass Fishery Management Plan
# 2020-2021 Annual Review

## Executive Summary

The California Fish and Game Commission (Commission) adopted the White Seabass Fishery Management Plan (WSFMP) in June 2002. The WSFMP includes a provision for annual monitoring and assessment of the white seabass fisheries. The White Seabass Scientific and Constituent Advisory Panel (WSSCAP) was established to assist the California Department of Fish and Wildlife (Department) and the Commission with the review of the fishery assessments, management proposals, and plan amendments. Although the WSFMP designates the WSSCAP as having seven members representing the scientific community, recreational and commercial fishing industries, and environmental groups, the WSFMP does not identify specific members for the WSSCAP. Therefore, the Department invites stakeholders interested in white seabass management to participate in the annual review. The annual review includes fishery-dependent data (e.g., commercial and recreational landings and length frequencies), and fishery-independent data (e.g., recruitment information) if available, as well as documented changes within the social and economic structure of the recreational and commercial industries that utilize the white seabass resource within California. The review also includes information on the harvest of white seabass from Mexican waters and other relevant data. Based on the results of the annual review, in cooperation with the WSSCAP, the Department will provide management recommendations, if needed, to the Commission.

To assist the Commission in determining if management measures need to be modified or added, the WSFMP framework includes, and the Commission adopted, points of concern criteria to help determine when management measures are needed to address resource issues. The points of concern are:

1. Catch is expected to exceed the current harvest guideline or quota.
2. Any adverse or significant change in the biological characteristics of white seabass (age composition, size composition, age at maturity or recruitment) is discovered.
3. An overfishing condition exists or is imminent.
4. Any adverse or significant change in the availability of white seabass forage or in the status of a dependent species is discovered.
5. New information on the status of white seabass is discovered.
6. An error in data or stock assessment is detected that significantly changes estimates of impacts due to current management.

The Department and WSSCAP met on April 27, 2022, to review the 2020-2021 fishery season (September 1 to August 31). After analyzing and discussing the available data, the WSSCAP agreed that none of the points of concern were met. Additional social and economic information along with the catch information from Mexico support this conclusion. As a result, the Department does not recommend any changes to the management of white seabass or to the WSFMP at this time.

## Background

The Department and the WSSCAP annually reviews current information to evaluate the status of the white seabass resource based on six points of concern adopted to implement the WSFMP and to consider whether current management measures provide adequate protection for the resource. The annual review process is intended to foster a continuous review of white seabass stocks and fisheries to prevent overfishing or other resource damage. If a resource conservation issue is found, the WSSCAP will provide its recommendation, rationale, and analysis to the Department. The Department will evaluate the recommendation from the WSSCAP and all available information and will recommend to the Commission management measure(s) to address the issue(s).

## Analysis and Results

Analysis and results of the WSFMP six points of concern to review the 2020-2021 fishery season are described below, including an overall summary (Table 1), and section on each point of concern. None of the criteria were met in 2020-2021.

### 1. Catch is expected to exceed the current harvest guideline or quota.

The Commission established a fishing season of September 1 through August 31 of the following year. The Commission also adopted an optimum yield (OY) that serves as the harvest guideline or quota. The OY is based on a maximum sustainable yield proxy of the unfished biomass and is currently set at 1.2 million pounds. In the 2020-2021 season, the total recreational and commercial harvest was 367,657 pounds, 31 percent of the allowable catch; thus, the criterion for this point of concern was not met (Appendix A, Table 1).

Table 1. Overall summary of the WSFMP six points of concern for the 2020-2021 fishing season.

| Criteria | Analysis | Result |
|---|---|---|
| Catch is expected to exceed the current harvest guideline or quota. | Total catch for 2020-2021 = 367,657 pounds.<br>Optimum Yield = 1.2 million pounds.<br>Total catch is below Optimum Yield. | Criterion not met |
| Any adverse or significant change in the biological characteristics of white seabass (age composition, size composition, age at maturity or recruitment) is discovered. | Recreational and commercial fishery length-frequencies showed no significant change that would indicate a problem in the fishery.<br>No new published information on age composition, age at maturity, or age at recruitment. | Criterion not met |
| An overfishing condition exists or is imminent. | No overall overfishing condition noted. See analysis in Table 2. | Criterion not met |
| Any adverse or significant change in the availability of white seabass forage or in the status of a dependent species is discovered. | Of the four fisheries analyzed, landings increased for one fishery while landings declined for the other three, and one fishery remained closed in the 2020-21 season.<br>Biomass estimates for Pacific mackerel declined and Pacific sardine remained the same. White seabass, however, are opportunistic feeders and are known to feed on a variety of pelagic fish and invertebrate species when available. | Criterion not met |
| New information on the status of white seabass is discovered. | The Department is currently analyzing samples to investigate length at maturity. Preliminary results indicate white seabass may mature at a larger size than previously understood. | Criterion not met |
| An error in data or stock assessment is detected that significantly changes estimates of impacts due to current management. | A stock assessment, which was completed in May 2016, determined that the stock was not overfished or depressed but the current optimum yield may be too high. | Criterion not met |

**2. Any adverse or significant change in the biological characteristics of white seabass (age composition, size composition, age at maturity or recruitment) is discovered.**

The criterion for this point of concern was not met because no significant changes were found in the length composition of sampled white seabass that would indicate a need to consider changes in management measures in the fishery.

Length frequency data collected by the Department from the commercial fish markets in California for the past six seasons are presented in Appendix A, Figure 1. In the 2020-2021 season, Department staff measured a total of 404 fish for length. Most samples were taken from gill net landings. The commercial fishery continues to harvest white seabass across a wide size range. In 2020-21, all but one fish sampled were larger than the minimum size limit of 28 inches (711 mm) and 59 percent of the fish sampled were larger than 45 inches (1,143 mm). Based on previous age-at-length information from reading otoliths and from a previously calculated weight/length relationship, those fish larger than 45 inches are likely more than 11 years old and weigh more than 30 pounds.

Recreational anglers tend to land smaller fish than those from the commercial fishery; this is in part due to the selectivity of commercial gill nets which tend to capture larger fish because of the mesh size. Length frequency data for the past six seasons are presented in Appendix A, Figure 2. In the 2020-2021 season, Department staff measured a total of 31 fish for length; over 70 percent sampled were from private/rental boats. Of the 31 fish measured, seven were less than the minimum size limit of 28 inches (711 mm); however, four of these fish were released alive immediately after being measured. The remaining 24 fish measured were legal sized with 21 percent larger than 40 inches (1,016 mm) total length. Based on previous age-at-length information from reading otoliths and from a previously calculated weight/length relationship, those fish larger than 40 inches are likely more than nine years old and weigh more than 24 pounds.

**3. An overfishing condition exists or is imminent.**

Three criteria (Table 2), all of which must be met to establish the point of concern, determine if an overfishing condition exists or is imminent. Meeting the criteria in one sector may mean overfishing is occurring in that sector and further investigation may be warranted. The criteria for this point of concern were not met.

Following are the results for each of the three overfishing sub-criteria.

A. *A 20 percent decline in the total annual commercial landings of white seabass for the past 2 consecutive seasons, compared to the prior 5-season average of landings, based on fish landing receipt data.*

The WSSCAP and the Department agreed that the overfishing criterion for the commercial fishery was not met because the commercial landings of white seabass decreased by 15 percent when compared to the prior 5-season average for the past two consecutive seasons. In the previous 2019-2020 season, commercial landings totaled 138,537 pounds, a 34 percent decrease compared to the prior 5-season running average of 228,592 pounds. In the 2020-2021 season, commercial landings of white seabass (Appendix A, Table 2) totaled 168,934 pounds, which is a 15 percent decrease when compared to the prior 5-season running average of 210,079 pounds.

The set and drift gill net fisheries have consistently landed most of the white seabass each season (Appendix A, Table 2). The trawl fishery and other incidental gears

continue to be minor components of the commercial fishery. In the 2020-2021 season, landings increased from the previous season for all major gear types.

Table 2. Analysis to determine if the white seabass resource is overfished (Criteria taken from Section 51.01 (b), Title 14, California Code of Regulations).

| **Criteria** | **Analysis** | **Result** |
|---|---|---|
| A 20 percent decline in the total annual commercial landings of white seabass for the past two consecutive seasons compared to the prior 5-season running average of landings, based on landing receipt data. | 2020-2021: 168,934 pounds = 15% decrease; 5-season average = 198,482 pounds.<br><br>2019-2020: 138,537 pounds = 34% decrease. 5-season average = 210,079 pounds. | Criterion not met |
| A 20 percent decline in both the number of fish and the average weight of white seabass caught in the recreational fishery for the same two consecutive seasons, as determined by the best available data. | 2020-2021: 9,761 fish = 99% increase; 18.8 pound average = 1% decrease.<br><br>2019-2020: 4,898 fish = 23% decrease. 19.0 pound average = 5% decrease. | Criterion not met |
| A 30 percent decline in recruitment indices for juvenile white seabass compared to prior 5-season running average of recruitment, as determined by the best available data. | 2020-2021: Criterion not analyzed | N/A |

*B. A 20 percent decline in both the number of fish and average weight of white seabass caught in the recreational fishery for the same 2 consecutive seasons as determined based on the best available data.*

The WSSCAP and the Department agreed that the overfishing criterion for the recreational fishery was not met because both the number of fish and average weight did not show a 20 percent decline for two consecutive seasons (Appendix A, Table 3). In the recreational fishery, the number of fish caught in the 2020-2021 season increased by 99 percent when compared to the previous season. The estimated average weight of fish caught in the 2018-2019 decreased by 13 percent in the 2018-2019 season and continued to decline by 5 percent in the 2019-2020 season and 1 percent in the 2020-2021 season (Appendix A, Table 3).

*C. A 30 percent decline in recruitment indices for juvenile white seabass compared to the prior 5-season average of recruitment, as determined by the best available data.*

The Ocean Resources Enhancement and Hatchery Program (OREHP) previously conducted standardized field studies four times a year (August, October, April and

June) for juvenile recruitment. However, reductions in funding curtailed survey effort, and the Ocean Enhancement Stamp fund was insufficient to cover all the OREHP activities as well as the gill net recruitment surveys. Consequently, there was no gill net sampling between 2009 and 2011. In October 2012, gill net sampling, similar to previous surveys, was reinstated. The objective of the sampling design resumed the prior gill net sampling plan but included more embayment sites and less coastal sites than previously sampled. Gill net sampling continued through the 2018-2019 season, but because of administrative and operational changes with the OREHP, no white seabass recruitment surveys occurred in the 2019-2020 season. Thus, this criterion could not be addressed in this report.

Based on the analysis of all three overfishing criteria, the WSSCAP and the Department agreed that the overfishing point of concern for the fishery was not met. However, the Department and the WSSCAP have concerns regarding these analyses and will continue to proactively manage the white seabass fishery and to evaluate the criteria outlined in the WSFMP. Should any of the points of concern be passed and additional management measures are required, the Department may consider using the stock assessment and updating the WSFMP to evaluate alternative management actions.

**4. Any adverse or significant change in the availability of white seabass forage or in the status of a dependent species is discovered.**

White seabass are known to be opportunistic feeders on a variety of pelagic fish and invertebrate species. Certain prey species [northern anchovy (*Engraulis mordax*), jack mackerel (*Trachurus symmetricus*), market squid (*Doryteuthis opalescens*), Pacific mackerel (*Scomber japonicus),* and Pacific sardine (*Sardinops sagax*)] are highly mobile, and their distributions are affected by oceanographic conditions. A review of these white seabass forage species (Appendix A, Figures 3, 4, 5, 6, and 7) revealed some changes in availability.

A formal stock assessment is not conducted for northern anchovy, but data is collected to monitor the population. In 2014 and 2015, northern anchovy landings increased, but then decreased in 2016 and 2017. In 2018, there was a substantial increase in northern anchovy landings, but then landings began to decline in 2019 and continued to do so through 2021 (Appendix A, Figure 3).

Jack mackerel have not been significantly targeted off California, and most landings are caught incidentally to other fisheries. Therefore, regular stock assessments or efforts to collect biological information on jack mackerel have not been a priority. In 2014 and 2015, jack mackerel landings were high but then decreased each consecutive year from 2016 through 2019. In 2020, jack mackerel landings increased slightly, but then declined slightly in 2021 (Appendix A, Figure 4).

There are currently no estimates of population abundance in California for market squid, but recruitment varies substantially from year to year in response to environmental factors, causing natural fluctuations in abundance. During the 2018-2019 season, market squid landings decreased from the previous season and continued to decline

during the 2019-2020 season. However, landings increased slightly during the 2020-2021 season (Appendix A, Figure 5).

Both Pacific mackerel and Pacific sardine landings have remained low over the past seven seasons. Since the 2013-2014 season, Pacific mackerel landings have not exceeded 5,000 mt per season (Appendix A, Figure 6), and Pacific sardine landings have not exceeded 4,000 mt (Appendix A, Figure 7). Additionally, the directed fishery for Pacific sardine has been closed since the end of the 2014-2015 season.

Both Pacific mackerel and Pacific sardine have stock assessments conducted by the National Marine Fisheries Service and these stock assessments include biomass estimates. Since 2008, Pacific mackerel biomass estimates have been conducted every two years (Appendix A, Figure 8). Pacific sardine biomass estimates are conducted every year (Appendix A, Figure 9). The biomass estimates for Pacific mackerel remained at approximately the same level for the past four seasons but declined sharply for the 2019-2020 and 2020-2021 seasons. Meanwhile, the Pacific sardine biomass estimate for the 2020-2021 season remains similarly low as compared to biomass estimates from prior stock assessments.

Although this criterion relates to a single forage species, it is more appropriate to consider in aggregate all five of the primary forage species for white seabass. However, it is not a simple matter of summing up annual catch or biomass estimates in determining if there is a problem with overall prey availability. Prey species are highly mobile, and their distributions are also affected by oceanographic conditions. Additionally, many of the same fishing vessels fish for all five species depending on market factors and availability. Based on the analysis of all the prey species, the WSSCAP and the Department agreed that this point of concern was not met; however, there is concern about what appears to be an overall reduced prey availability, and the Department will continue to monitor these species.

**5. New information on the status of white seabass and an error in data or stock assessment is detected that significantly changes estimates of impacts due to current management.**

No new information on the status of white seabass has been discovered; however, the Department is currently collaborating with the Pfleger Institute of Environmental Research, in analyzing gonad histology slides. Preliminary results indicate white seabass may mature at a larger size than previously understood.

No errors in the current stock assessment have been found.

### Additional Information

The Department has used two basic socioeconomic information indicators to characterize the commercial fishery and has provided those summaries to the WSSCAP (Appendix A, Table 4). As a social information indicator, the number of commercial vessels landing white seabass has been tracked over time. In the 2020-2021 season, the number of vessels fishing for white seabass increased by 8 percent (14 vessels).

This increase in the number of vessels mostly occurred in the hook-and-line fishery in southern California. As an economic information indicator, the most frequent ex-vessel price per pound has also been tracked over time. The most common ex-vessel price per pound for the 2020-2021 season was at $4.00 per pound for all gears combined, a decrease of $2.00 from the previous season. No similar social or economic data are available for the recreational fleet.

Information about the take of white seabass in Mexican waters was considered by the WSSCAP. California commercial fishermen are prohibited by Mexican law to fish in the territorial seas of Mexico, and no landings of white seabass from Mexico by California commercial fishermen were reported in 2020-2021. Recreational anglers may fish in Mexico under the authority of a Mexican sport fishing license. During the 2020-2021 season, Commercial Passenger Fishing Vessel logbook data reported 143 white seabass taken in Mexico and landed in California, an increase of 133 fish from the 10 reported taken during the prior season. No additional information about either the recreational or commercial catch of white seabass in Mexico is available.

Appendix A – Data Analyses

Table 1. Total catch (pounds) of white seabass, 2011-2012 to 2020-2021. Source: Department's Marine Landings Database System (MLDS) and California Recreational Fisheries Survey (CRFS) data extracted from the Recreational Fisheries Information Network (RecFIN) database at http://www.recfin.org. In 2020, COVID-19 pandemic health safety guidelines prevented CRFS sampling from April - June and restricted observing and collecting biological data on anglers' catch from July - August.

| Season | Recreational | Commercial | Total |
|---|---|---|---|
| 2011/12 | 259,028 | 406,746 | 665,774 |
| 2012/13 | 265,816 | 315,533 | 581,349 |
| 2013/14 | 219,116 | 262,441 | 481,557 |
| 2014/15 | 63,125 | 196,521 | 259,646 |
| 2015/16 | 100,406 | 247,195 | 347,601 |
| 2016/17 | 177,582 | 217,915 | 395,497 |
| 2017/18 | 129,195 | 220,687 | 349,882 |
| 2018/19 | 93,747 | 168,077 | 261,824 |
| 2019/20 | 73,408 | 138,537 | 211,945 |
| 2020/21 | 198,482 | 168,934 | 367,657 |

Table 2. Commercial white seabass landings (pounds) by gear type, 2011-2012 to 2020-2021. Source: Department's MLDS.

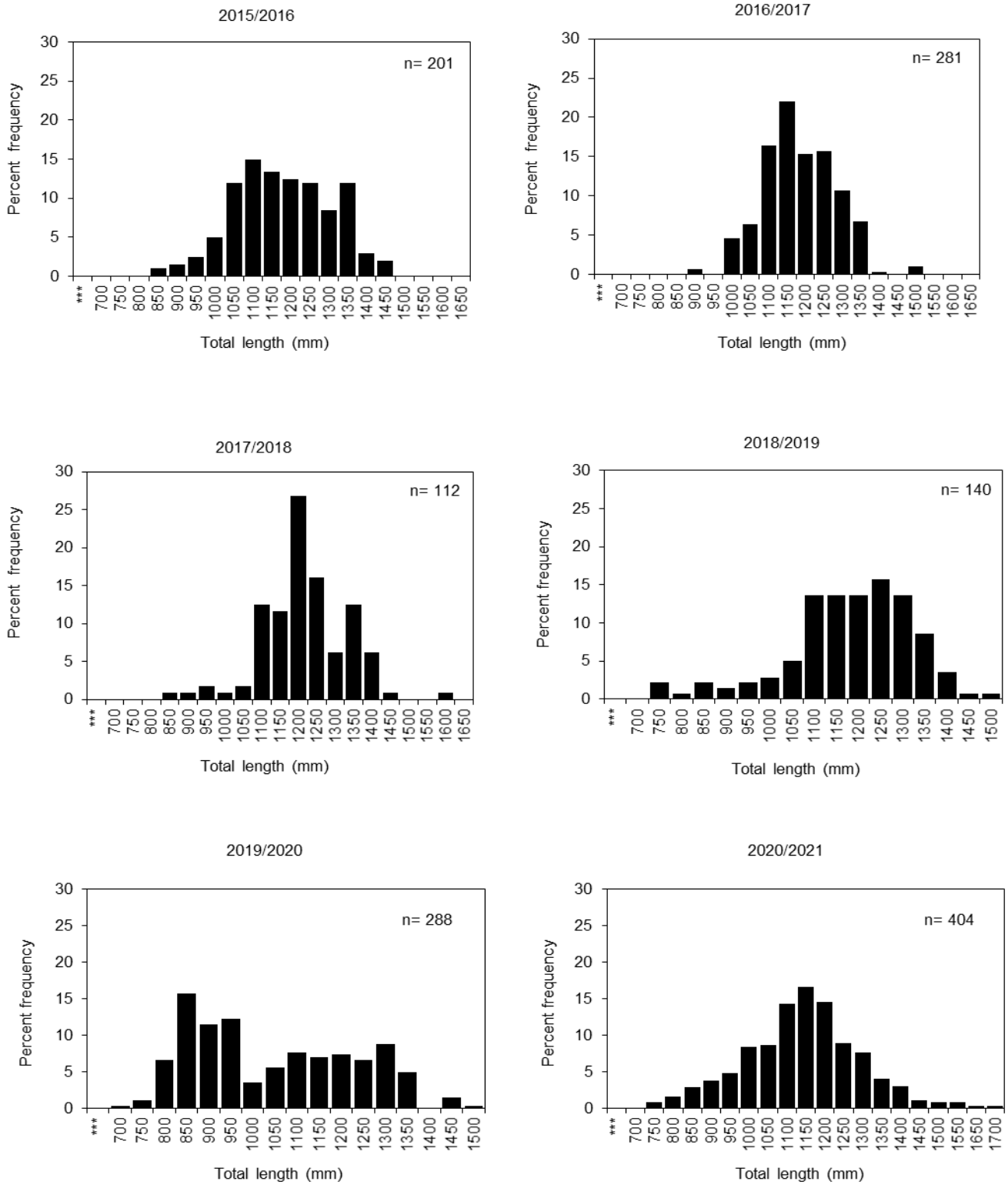
| Season | Gill Net | Hook-and-line | Trawl | Other Gears | All Gears Combined | Prior 5-season Average | Percent Change from Previous 5-season Average |
|---|---|---|---|---|---|---|---|
| 2011/12 | 243,617 | 161,171 | 1,958 | | 406,746 | 502,347 | -19 |
| 2012/13 | 193,194 | 120,500 | 1,839 | | 315,533 | 499,419 | -37 |
| 2013/14 | 183,575 | 76,373 | 2,237 | 256 | 262,441 | 431,873 | -39 |
| 2014/15 | 153,001 | 38,508 | 4,909 | 103 | 196,521 | 401,469 | -51 |
| 2015/16 | 202,946 | 36,182 | 7,404 | 662 | 247,195 | 340,369 | -27 |
| 2016/17 | 195,642 | 19,143 | 2,924 | 205 | 217,915 | 285,687 | -24 |
| 2017/18 | 183,900 | 32,371 | 2,535 | 1,880 | 220,687 | 247,921 | -11 |
| 2018/19 | 112,840 | 48,995 | 5,852 | 389 | 168,077 | 229,196 | -27 |
| 2019/20 | 99,255 | 34,108 | 1,926 | 3,248 | 138,537 | 210,079 | -34 |
| 2020/21 | 120,089 | 42,590 | 5,022 | 1,234 | 168,934 | 198,482 | -15 |

Table 3. Recreational white seabass catch and estimated average weight (pounds) for recreational caught white seabass, 2011-2012 to 2020-2021. Source: CRFS data extracted from the RecFIN database at http://www.recfin.org. In 2020, COVID-19 pandemic health safety guidelines prevented CRFS sampling from April - June and restricted observing and collecting biological data on anglers' catch from July - August.

| Season | Total number of fish caught | Percent change in number of fish from prior season | Average weight in pounds | Percent in weight from prior season |
|---|---|---|---|---|
| 2011/12 | 9,876 | -22 | 26.9 | -8 |
| 2012/13 | 10,634 | 8 | 19.3 | -28 |
| 2013/14 | 9,567 | -10 | 22.4 | 16 |
| 2014/15 | 3,136 | -67 | 18.9 | -15 |
| 2015/16 | 3,793 | 21 | 23.1 | 22 |
| 2016/17 | 5,675 | 50 | 22.9 | -1 |
| 2017/18 | 4,874 | -14 | 23.0 | 0 |
| 2018/19 | 6,349 | 30 | 20.1 | -13 |
| 2019/20 | 4,898 | -23 | 19.0 | -5 |
| 2020/21 | 9,761 | 99 | 18.8 | -1 |

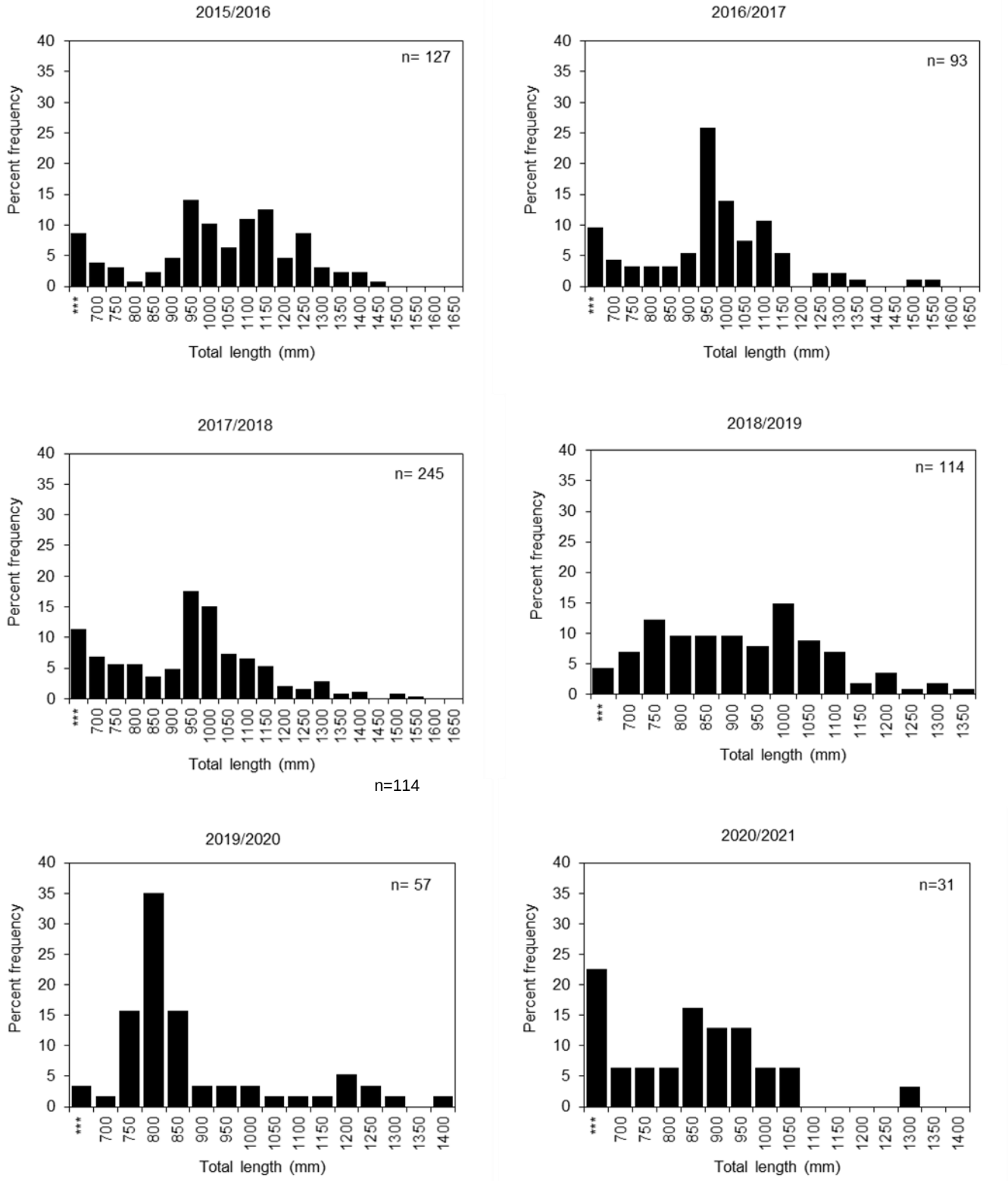
Table 4. Number of commercial vessels landing white seabass by principal gear and most common ex-vessel price per pound paid for white seabass, 2011-2012 to 2020-2021. Source: Department's MLDS.

| Season | Gill net | Hook-and-line | Trawl | Other gears | Total number of vessels | Most common ex-vessel price |
|---|---|---|---|---|---|---|
| 2011/12 | 33 | 224 | 13 | 0 | 270 | $4.00 |
| 2012/13 | 30 | 209 | 9 | 0 | 248 | $5.00 |
| 2013/14 | 26 | 181 | 9 | 6 | 222 | $4.50 |
| 2014/15 | 29 | 164 | 8 | 17 | 218 | $6.00 |
| 2015/16 | 28 | 135 | 10 | 8 | 181 | $6.00 |
| 2016/17 | 28 | 92 | 10 | 5 | 135 | $4.00 |
| 2017/18 | 33 | 135 | 9 | 8 | 185 | $6.00 |
| 2018/19 | 28 | 140 | 11 | 4 | 183 | $5.00 |
| 2019/20 | 31 | 130 | 9 | 2 | 172 | $6.00 |
| 2020/21 | 32 | 141 | 11 | 2 | 186 | $4.00 |




***all sub-legal fish are grouped together

Figure 1. Commercial white seabass sampled length frequencies, 2015-2016 to 2020-2021. Source: California Department of Fish and Wildlife




n=114

***all sub-legal fish are grouped together

Figure 2. Recreational white seabass sampled length frequencies, 2015-2016 to 2020-2021. Source: CRFS data extracted from the RecFIN database at http://www.recfin.org.

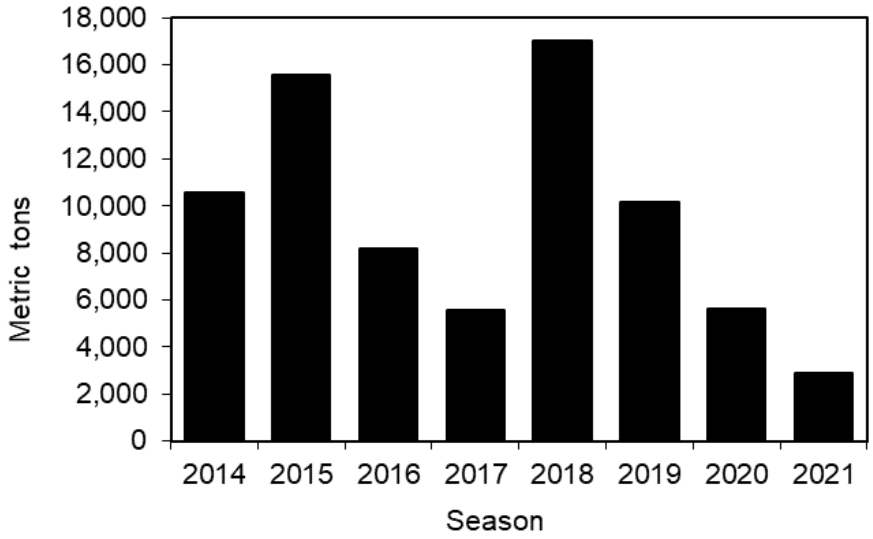



Figure 3. Commercial catch of northern anchovy, 2014 to 2021. Northern anchovy season is January 1 through December 31. Source: Department's MLDS.

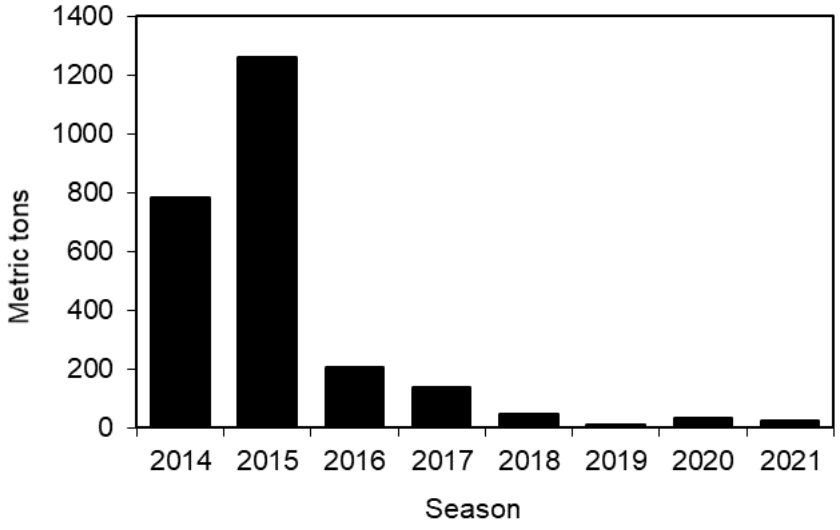



Figure 4. Commercial catch of jack mackerel, 2014 to 2021. Jack mackerel season is January 1 through December 31. Source: Department's MLDS.

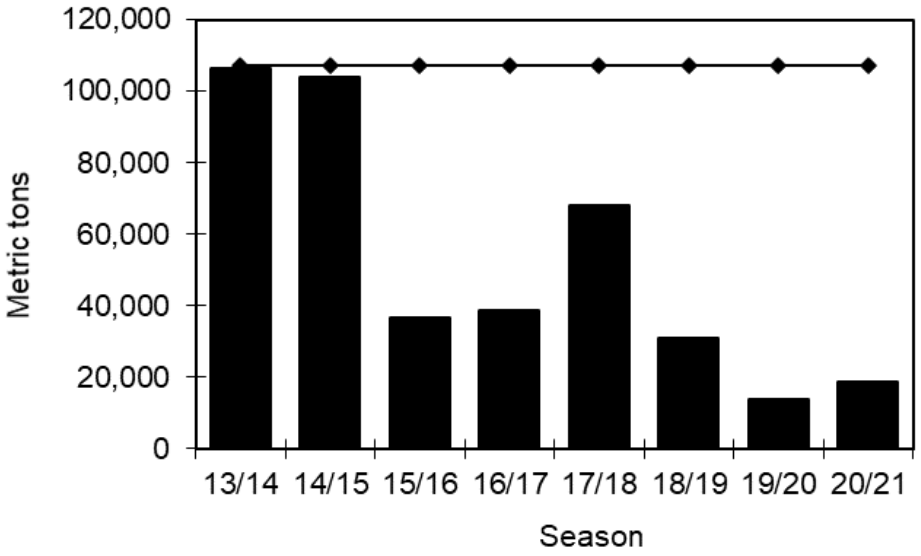



Figure 5. Commercial catch (bars) and harvest guideline (line) of market squid, 2013-2014 to 2020-2021. Market squid season is April 1 through March 31 of the following year. Source: Department's MLDS.

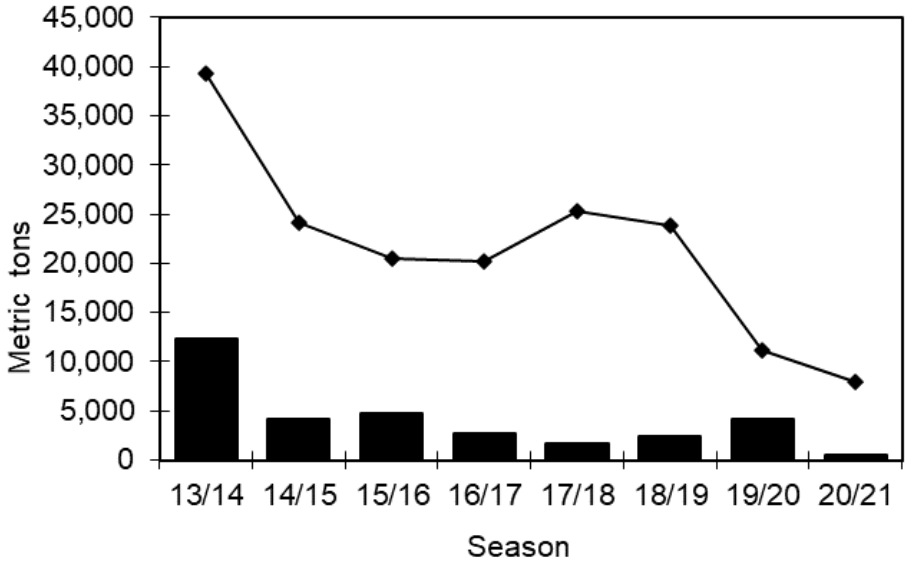



Figure 6. Commercial catch (bars) and harvest guidelines (line) of Pacific mackerel, 2013-2014 to 2019-2020. Pacific mackerel season is July 1 through June 30 of the following year. Source: Department's MLDS.

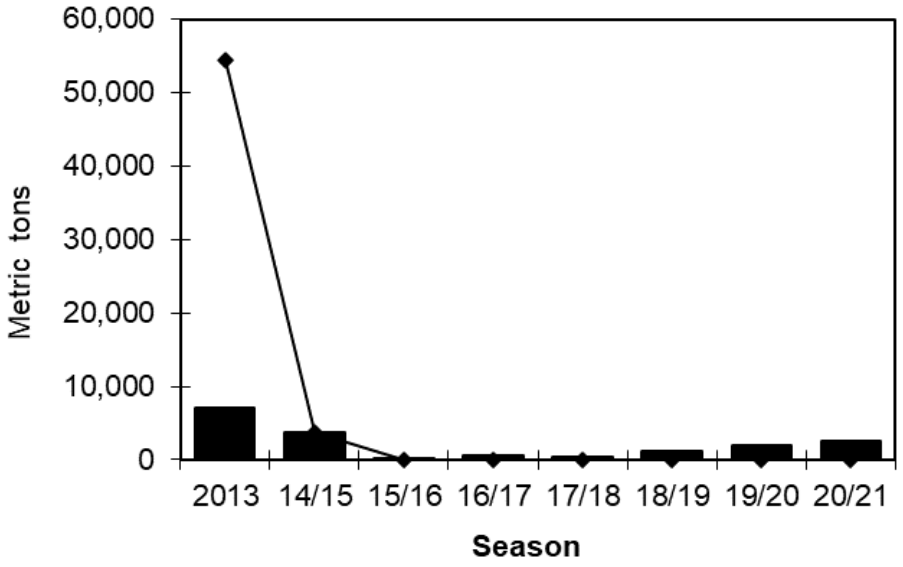



Figure 7. Commercial catch (bars) and harvest guidelines (line) of Pacific sardine, 2013 to 2020-2021. Pacific sardine season is July 1 through June 30 of the following year. Source: Department's MLDS.

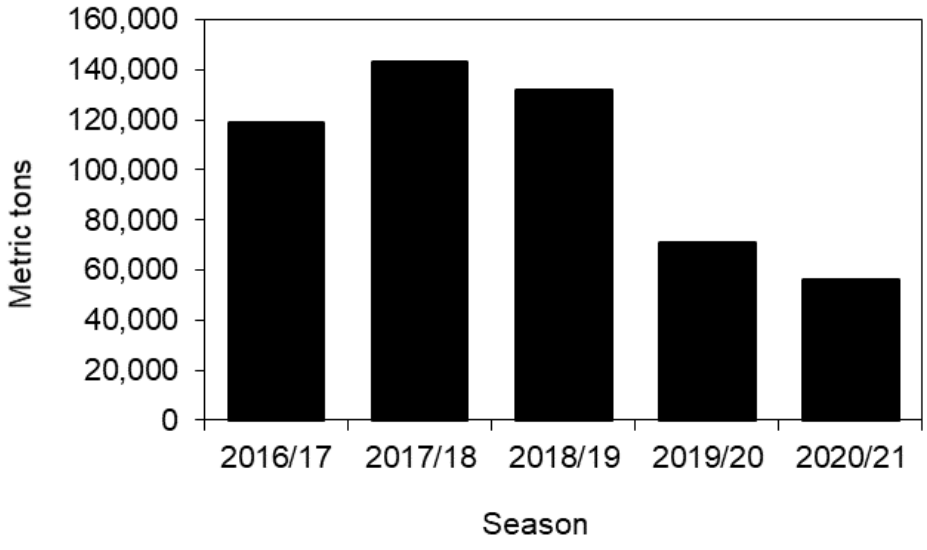



Figure 8. Biomass estimates for Pacific mackerel in short tons, 2016-2017 to 2020-2021 seasons. Source: Pacific Fishery Management Council CPS SAFE documents and PFMC proceedings.

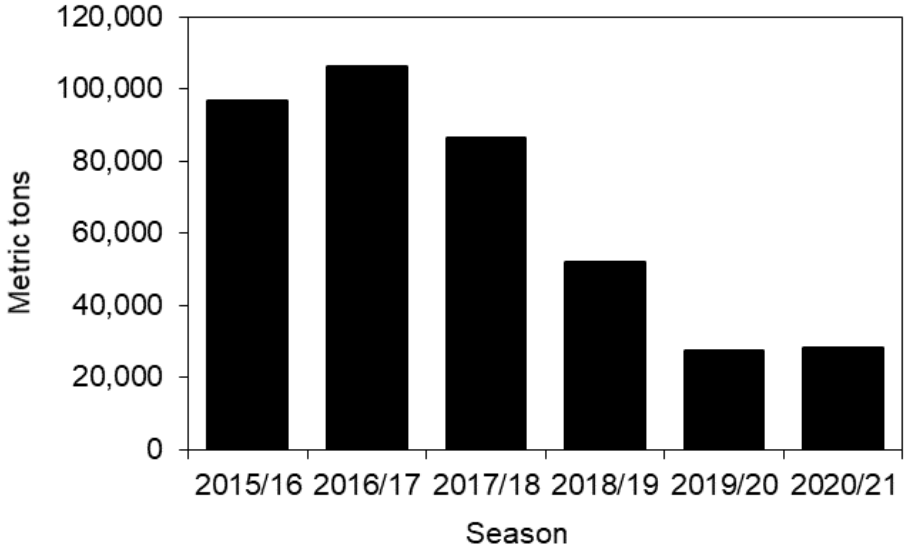



Figure 9. Biomass estimates for Pacific sardine in short tons, 2015-2016 to 2020-2021 seasons. Source: Pacific Fishery Management Council CPS SAFE documents and PFMC proceedings.