Establishing a Spatial and Economic Baseline and Assessing Initial Changes in the California South Coast CPFV Fisheries

Report to the California Sea Grant College Program

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EXECUTIVE SUMMARY

The primary goal of this project was to inform long-term MPA monitoring efforts by summarizing up-to-date information to illustrate historical trends, establish a MPA baseline, and assess initial changes since MPA implementation for the commercial passenger fishing vessel (CPFV) fleet in the South Coast region of California. To do so we utilized CPFV logbooks data from 2000 to 2012 obtained under a non-disclosure agreement with the California Department of Fish and Wildlife. This study is a part of the baseline marine protected area monitoring effort to characterize the ecological and socioeconomic conditions and changes within the South Coast Region since MPA implementation. As part of the baseline marine protected area monitoring effort, this report provides two sets of primary findings:

1. A baseline characterization of the spatial fishing patterns and economic status of commercial passenger fishing vessel fleet in the South Coast region; and
2. An assessment of historical economic trends and initial economic changes in the commercial passenger fishing vessel fleet following MPA implementation.

Originally, this project included conducting interviews with the South Coast CPFV community to gather socioeconomic data and map the fleet's post MPA fishing grounds. Outreach efforts to CPFV port communities were initiated at the project's inception and continued throughout the project. However, due to several factors such as: distrust in how information will be used; dissatisfaction with the MPA network planning process and its outcome; and unclear benefits and outcomes of participating in the project, the CPFV fleet of the South Coast were reticent to participate in any in-person interviews.

Given the above, this project instead focused on summarizing CPFV logbook data obtained from the CDFW to establish an economic and spatial baseline immediately following MPA implementation and examine historical changes over time. This report thus focuses upon summarizing CPFV logbook data from 2000 to 2012 and we do not provide interpretation as to why changes have occurred over time. In an effort to provide this data interpretation as well as establish mutually beneficial and collaborative working relationships into the future, the California Ocean Science Trust is working with CPFV leadership and operators in the region to review this report and data interpretation will be provided in a separate report.

On average annually across the South Coast region, 416,384 anglers took a total of 19,184 trips serviced by 225 vessels which each made approximately 85 trips each and carried 22 anglers per trip. Across South Coast region port groupings, San Diego and Redondo Beach/San Pedro/Long Beach were the largest/most active in terms of the numbers of CPFV anglers, trips, and vessels over the study period. For example, the average South Coast regional port alone serviced 61,205 CPFV anglers who took a total of 2,748 with 30 vessels each making approximately 90 trips and carrying 22 anglers on average annually. San Diego's annual average was far higher at 174,772 anglers taking a total of 8,141 trips serviced by 94 vessels. Redondo Beach/San Pedro/Long Beach followed San Diego, with 121,189 CPFV anglers taking 5,230 trips by 53 vessels on average annually. In these terms, the smallest port in the region over the study period was Oceanside, servicing 17,491 CPFV anglers who took a total of 817 trips on 9 from the port on average annually.

Over the study period most South Coast region ports experienced a decline in CPFV activity, with 2010 often being the poorest year, however this was followed by a slight upswing in 2011 and 2012. Despite this, most port groupings have not recovered to prior activity levels. The number of CPFV anglers the South Coast region fell by 22.9 percent from 2000 to 2012 overall, though this decline was heavier in some ports groupings than others, like Oceanside which experienced -62.5 percent change in anglers. Los Angeles was the only port grouping with a positive change in the number of anglers from 2000 to 2012, though barely so at 0.9 percent. While the economic recession beginning in 2008-2009 may be associated with the observed declines, it is notable that in many cases the levels of anglers and associated CPFV trips began decreasing in the period prior, then declining faster during and in the immediate years afterwards.

In the beginning years of the of the study period target CPFV fisheries per trip were largely not specified in the South Coast region; over time, South Coast CPFV anglers increasingly indicated they targeted rockfish on their trips (5.6 percent in 2000 compared with 16.6 percent in 2012.). However, the

“miscellaneous coastal” fishery remains the largest target in the region, indicated 42.3 percent of the time as the target fishery per trip on average annually over the study period; “miscellaneous offshore” was also popular. Unlike in other South Coast region ports, San Diego CPFV anglers often targeted the tuna fishery, though decreasingly so over the study period.

Rockfish were caught most prevalently in Santa Barbara/Ventura, Oxnard/Port Hueneme, and Los Angeles while Oceanside specialized in barred sand bass, Dana Point in kelp bass, and San Diego CPFV anglers caught tuna and yellowtail in large number compared with other South Coast region port groupings.

In CPFV logbooks, operators are asked to indicate the 10 by 10 nautical mile fishing block they caught the most fish in for each trip and all fishing trip data are then associated with this fishing block location. Using this data, we developed two series of heat maps: the first set are maps depicting the number of anglers fishing in specific CDFW fishing blocks and the second series of maps depict the number of fish caught in specific CDFW fishing blocks.
Within these two series of heat maps we created both pre MPA (2000 to 2011) maps that depict annual average values and post MPA (2012) maps. Furthermore, a spatial change map was created depicting the change in value between pre MPA and post MPA periods that depict increases or decreases in the number of anglers or fish caught in CDFW fishing block areas. In total we created 274 maps and spatial data sets to illustrate historical fishing patterns, a baseline of fishing patterns immediately following MPA implementation, and initial change in fishing patterns between pre and post MPA periods.

Included in this report are also lessons learned, future recommendations, and recommendations of key metrics for long-term monitoring within the CPFV sector. We would like to emphasize that the purpose of this report is not to measure or assess the economic impact of MPAs on the CPFV fleet in the region. To quantitatively measure the impact of MPAs requires robust long term economic data sets in both pre and post MPA periods that enable analyses to account or control for the complex interplay of regulatory, environmental, and economic factors that drive economic change in CPFV operations. Such a study was beyond the scope of this project but it is our hope that the data summarized and lessons learned through this project will be applied to future MPA monitoring efforts to build a time series data set on how human uses and the socioeconomic health of fishing communities are changing over time. Such a robust and longitudinal data set that provides both socioeconomic characterization and spatial fishing patterns on consumptive human uses could be used for a wide array of marine spatial planning application including the monitoring of MPAs into the future.

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The South Coast MPA Baseline Program

This study is a part of a larger baseline marine protected areas monitoring effort, entitled the South Coast (SC) MPA Baseline Program, tasked with characterizing the ecological and socioeconomic conditions within the SC region. Specifically, this study addresses the Baseline Program objectives by describing human use patterns across the study region and establishing initial data points for long-term tracking of conditions and trends in the South Coast. This study is also a part of a three-part study conducted by Point 97 to provide baseline estimates of the quantity, spatial distribution, and economic value of human uses—specifically human use in three specific sectors: coastal recreation, commercial fishing, and commercial passenger fishing vessels in the South Coast region.

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1. INTRODUCTION

The coastal and ocean waters of the California South Coast region, which spans from Point Conception to the north and the California/Mexico border to the south (Figure 1), is home to a confluence of two major ocean currents that mix nutrient rich waters from the north with warm waters from the south. This convergence zone forms a dynamic and highly biodiverse ocean ecosystem that has long supported a rich cultural and economic history of fishing in the region. Indeed, fisheries exemplify the interdependencies between the natural environment and coastal communities that have characterized California since well before statehood.

On January 1, 2012, as part of the Marine Life Protection Act (MLPA) Initiative, the California Fish and Wildlife Commission (CFWC) designated 50 marine protected areas (MPAs) within the South Coast state waters of California. This study is a part of the baseline marine protected area monitoring effort to characterize the ecological and socioeconomic conditions and changes within the South Coast Region since MPA implementation.

As part of the baseline marine protected area monitoring effort, this report provides two sets of primary findings:

1. A baseline characterization of the spatial fishing patterns and economic status of commercial passenger fishing vessel fleet in the South Coast region; and
2. An assessment of historical economic trends and initial economic changes in the commercial passenger fishing vessel fleet following MPA implementation.

Commercial Passenger Fishing Vessels (CPFV) are often called party-boats or charter fishing boats and make a business taking members of the public to recreationally fish and, more recently, to enjoy non-consumptive types of trips such as whale watching or leisure cruises. In a study conducted by Responsive Management in 2007, the majority of Californian's (84 percent) agree that CPFV opportunities are important to maintain as they provide opportunities for people to experience coastal resources who otherwise would not be able to as they cannot afford a boat of their own.

Establishing a baseline characterization of the CPFV fleet of the California South Coast provides a better understanding of the current economic health of the South Coast fishing communities and provides a benchmark of economic conditions and spatial fishing patterns against which future MPA impacts and benefits can be measured. Furthermore, assessing historical trends along with initial changes in economic conditions and spatial fishing patterns that followed MPA implementation will help inform how MPAs and other driving factors may interplay to influence observed changes.

This project will directly inform the 5-year management review of the South Coast MPAs in which the California Department of Fish and Wildlife (CDFW) will make management recommendation to the California Fish and Wildlife Commission based on findings from the baseline MPA monitoring projects and other sources of information. This project was developed in close coordination with the MPA Monitoring Enterprise (Monitoring Enterprise), a program of the California Ocean Science Trust, in partnership the CDFW, and supported by the California Sea Grant College Program and the California Ocean Protection Council (OPC).

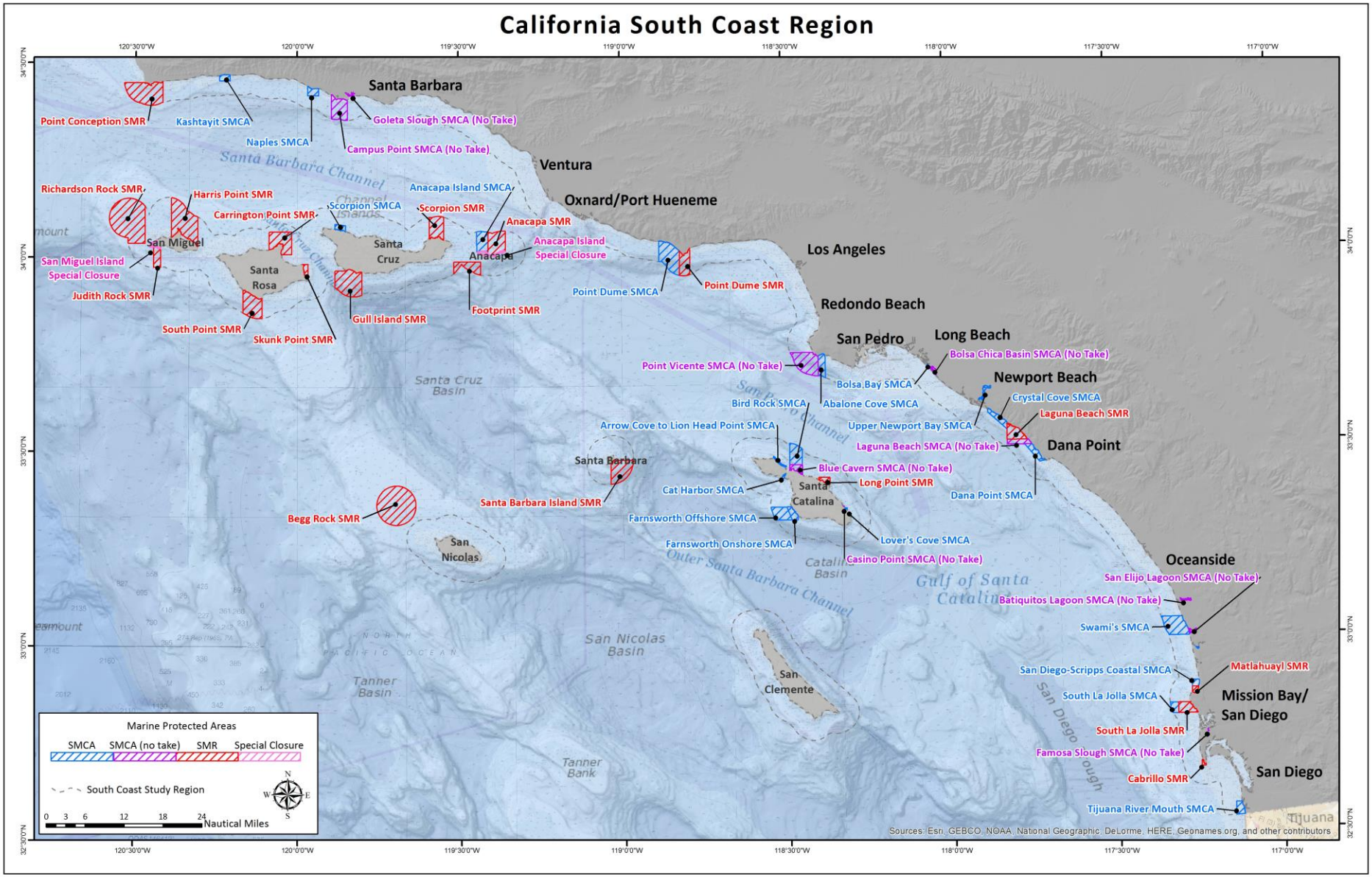
The primary goal of this project was to inform long-term MPA monitoring efforts by summarizing up-to-date information to illustrate historical trends, establish a baseline, and assess initial changes since MPA implementation for the commercial passenger fishing vessel ("party-boat") fleet in the South Coast region of California.

To accomplish this goal our research team conducted extensive community outreach in the region and collaborated with the CDFW staff to summarize CPFV logbook data gathered in the region. The main body of this report consists of two main sections: 1) a region-wide profile of the CPFV fleet, and 2) profiles for each port. Furthermore, a separate appendix of map products are provided that depict the spatial use patterns of CPFV operators during a pre MPA period, post MPA period, and well as spatial changes between pre and post MPA periods (see separate Map Appendix document).

Originally, this project included conducting interviews with the South Coast CPFV community to gather socioeconomic data and map the fleet's post MPA fishing grounds. Outreach efforts to CPFV port communities were initiated at the project's inception and continued throughout the project. However, due to several factors such as: distrust in how information will be used; dissatisfaction with the MPA network planning process and its outcome; and unclear benefits and outcomes of participating in the project, the CPFV fleet of the South Coast were reticent to participate in any in-person interviews. Understandably, the CPFV fleet needed more time to establish trust and the working relationships necessary to engage in a well-supported and successful data collection effort.

Given the above, this project instead focused on summarizing CPFV logbook data obtained from the CDFW to establish an economic and spatial baseline immediately following MPA implementation and examine historical changes over time. As stated in the introduction, this report thus focuses upon summarizing CPFV logbook data from 2000 to 2012 and we do not provide interpretation as to why changes have occurred over time. This data interpretation should be done in collaboration with CPFV operators and the CDFW staff whom are most knowledgeable as to the factors that influence change in the CPFV fleet over the years. In an effort to provide this data interpretation as well as establish mutually beneficial and collaborative working relationships into the future, the California Ocean Science Trust is working with CPFV leadership and operators in the region to review this report and data interpretation will be provided in a separate report.

Figure 1. South Coast study region, ports, and marine protected areas



2. DATA ANALYSIS METHODS

2.1. South Coast Region: Primary CPFV Fisheries and Ports of Interest

To focus efforts upon information which may be most useful and cost effective in informing a 5-year management review of the South Coast MPAs, this project identified the Commercial Passenger Fishing Vessel (CPFV) user group and associated fisheries in which to target our data analysis efforts. According to California Department of Fish and Wildlife (CDFW), the following are the primary CPFV fisheries conducted in the South Coast Region over the study period of 2000–2012. For a crosswalk listing of the specific fish species grouped into these fishery categories please see the MS Excel data file associated with this report.

1. Barracuda, California
2. Bass, barred sand
3. Bass, kelp
4. Bonito, Pacific
5. Flounder
6. Mackerel
7. Rockfish
8. Sanddab
9. Scallop
10. Scorpionfish, California
11. Shark
12. Sheephead, California
13. Squid, jumbo
14. Surfperch
15. Tuna
16. Whitefish, ocean
17. Yellowtail

The CPFV ports groupings of interest for this project are listed below. These port groupings were developed in collaboration with staff at the CDFW. For a crosswalk listing of the smaller ports grouped into these port categories, please see the MS Excel data file associated with this report:

1. Santa Barbara/Ventura
2. Oxnard/Port Hueneme
3. Los Angeles
4. Redondo Beach/San Pedro/Long Beach
5. Newport Beach
6. Dana Point
7. Oceanside
8. San Diego/Mission Bay

2.2. CPFV Logbook Data Analysis Methods

Under a non-disclosure agreement with the California Department of Fish and Wildlife (CDFW), the Commercial Passenger Fishing Vessel (CPFV) logbook data from 2000 to 2012 presented throughout this report was transmitted to Point 97/Ecotrust on April 10, 2013 and summarized in collaboration with CDFW staff.

CPFV operators are required to complete and submit a log to the CDFW for each fishing trip (see Appendix A). This log includes information on the target species of the trip, catch (number caught by species), and effort (number of anglers) for each trip as well as the port of landing and the Fish and Wildlife Block location in which most of the fishing occurs. As seen in Appendix A, targeted species on CPFV trips are a predetermined list which include rockfish, miscellaneous offshore and coastal fish, tuna, and lingcod among others. Furthermore, only a certain number of species are listed on the log. Operators can write in species that are not listed, or combine species into a group species category, such as “Unidentified Rockfish”. Some species, such as several of the nearshore rockfishes, are listed on the log, but operators may still choose to put these into a group category. Consequently, species summaries are provided at the most accurate level, which for the nearshore rockfish is the group rockfish.

It should be noted that the data provided in this report is only for trips in which fish were landed in South Coast ports and does not include vessels which fished in South Coast region waters but who returned to ports outside the South Coast region. Furthermore, the CPFV logbook data presented only includes data

on fishing trips as logbook data does not include information on non-consumptive trips such as whale watching.

The following sections of the report provides a summary and analysis of the CPFV logbook data from 2000 to 2012 to provide historical trends, establish a baseline, and assess initial changes immediately following MPA implementation in CPFV fishing characteristics in the region. The following types of information listed below are the analyses presented in the following sections found at the region and port level throughout the report:

- Total number of vessels, anglers, and trips
- Average number of anglers per trip and per vessel
- Average number of trips per vessel
- Total number of fish caught for select species/fisheries
- Total number of trips for each target species/fishery
- Percent change in total number of vessels, trips, and anglers across pre and post MPA years
- Map products depicting the number of anglers and number of fish caught in pre MPA years, post MPA years, and initial spatial changes between pre and post MPA years at the region and port levels (see Section 5 and separate Map Appendix)

Finally, following CDFW protocol we suppressed all data points with fewer than three CPFV operators; however, in the study period from 2000–2012 all data points for each port grouping had three or more CPFV operators and thus we did not conduct any data suppression. We also strived to summarize the CPFV logbook data in the most compelling and visual formats. We have consistently color-coded fisheries and ports throughout the report and presented data in consistently formatted and scaled graphs in order to facilitate quick reference and comparison across ports. We avoid repetition whenever possible and recognize there are many more ways to query and analyze the data, however, throughout this report we aimed to present the most relevant and informative analyses possible.

3. SOUTH COAST CPFV REGIONAL PROFILE

On average annually from 2000 to 2012 across the whole region, there were 416,384 anglers taking a total of 19,184 trips serviced by 225 vessels each making on average 85 trips and carrying 22 anglers per trip.

The total number of vessels working out of South Coast California ports was slightly greater at the end of the study period, from 229 in 2000 to 264 in 2012, though varied in between, see Figure 2. Decreases in vessels occurred between 2004 to 2008; increases then were observed at most ports after 2010. Most ports experienced only slight variations in the number of vessels operating over the study period, notable is the larger relative increase in the port of San Diego from 77 vessels in 2000 to 112 by 2012. It should be noted that the number of vessels does not reveal the size of the vessel operation as this may range from small six-pack boats to larger vessel that can hold dozens of passengers. The average number of trips per vessel decreased from 2000 to 2004, picked up again until 2006 and then steadily decreased again thereafter. The highest number of average trips per vessel occurred at the beginning in 2000 at 112 trips and reached a low of 80 trips by 2012.

The total number of CPFV trips in the region varied slightly over the study period, generally declining from 2000 to 2012 by about 17.7 percent (Figure 3) with the exception of occasional increases observed in 2004, 2006, 2008, 2011, and 2011. A low was observed in 2010 at only 17,528 trips across the region The average number of CPFV anglers remained relatively consistent from 2000 to 2012 at 21 to 23 anglers per trip each year, while the total number of anglers per trip (Figure 4) decreased by 22.9 percent from 596,364 anglers in 2000 to 460,074 anglers by 2012. The average number of anglers per vessel decreased by 49.4 percent over the study period, from 2,604 in 2000 to 1,743 by 2012.
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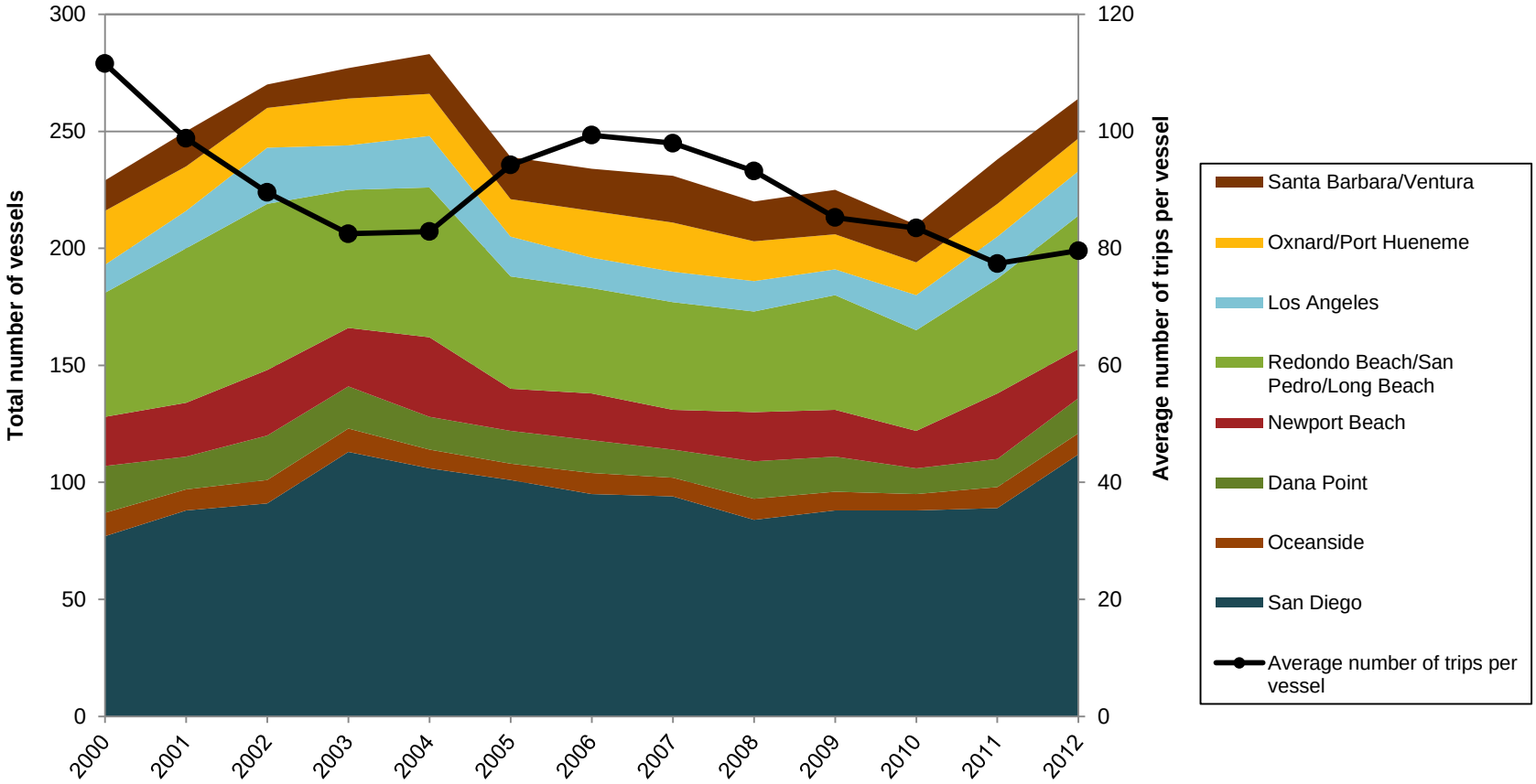
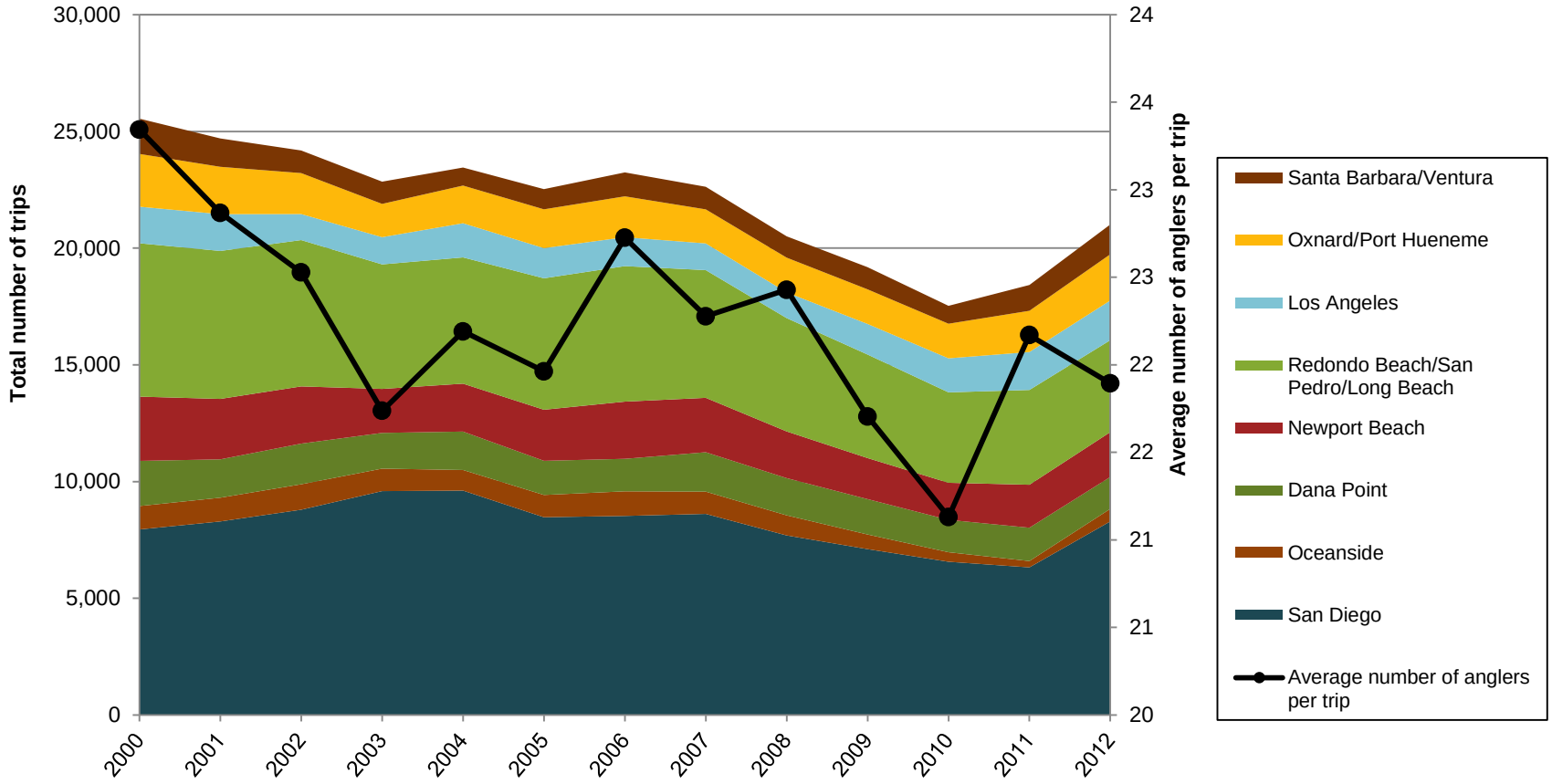
Figure 2. Total number of CPFV vessels and average number of trips per vessel, South Coast Region, 2000–2012



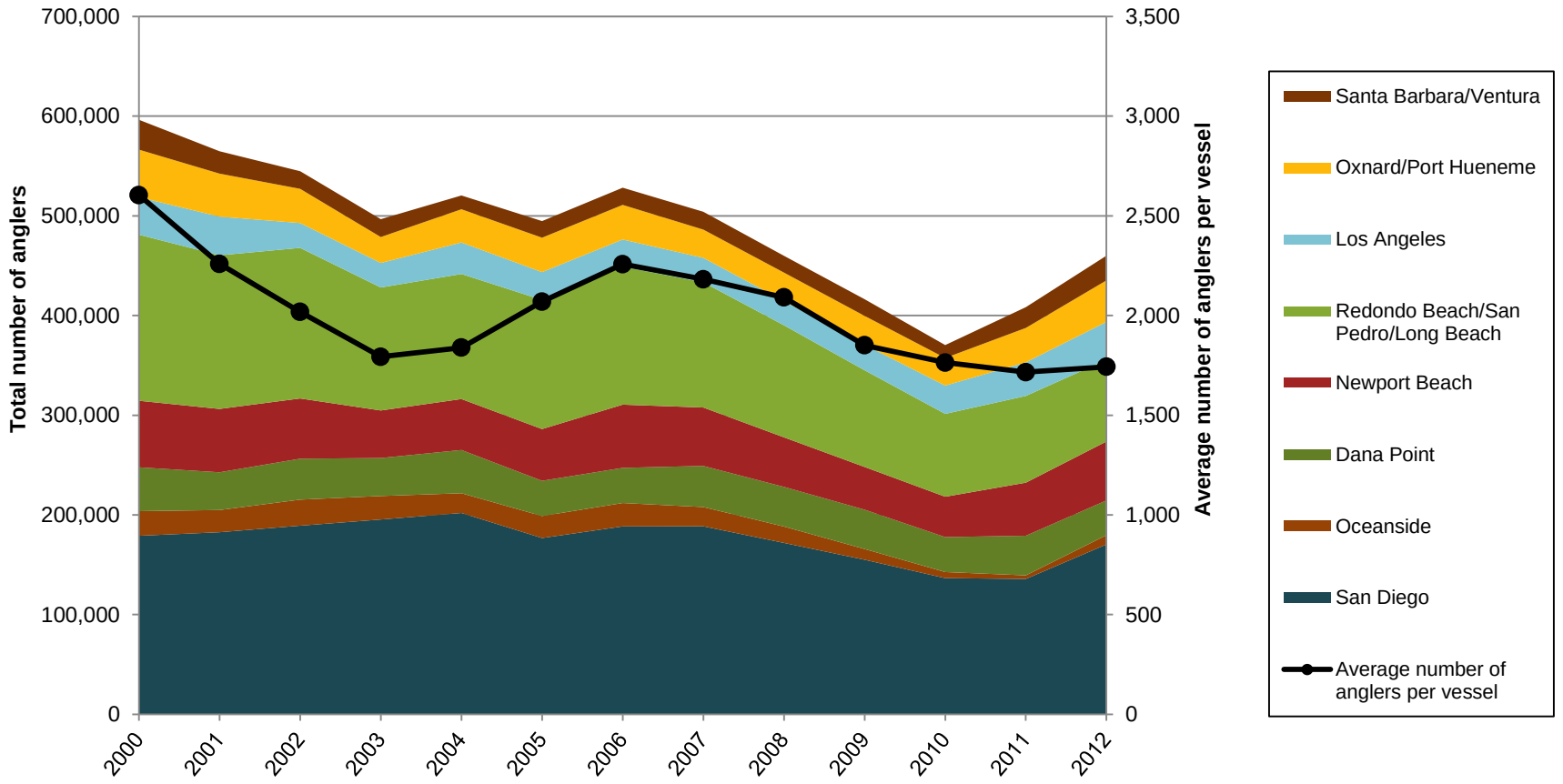
Source: CDFW CPFV logbook data

Figure 3. Total number of CPFV trips and average number of anglers per trip, South Coast Region, 2000–2012



Source: CDFW CPFV logbook data

Figure 4. Total number of CPFV anglers and average number of anglers per vessel, South Coast Region, 2000–2012



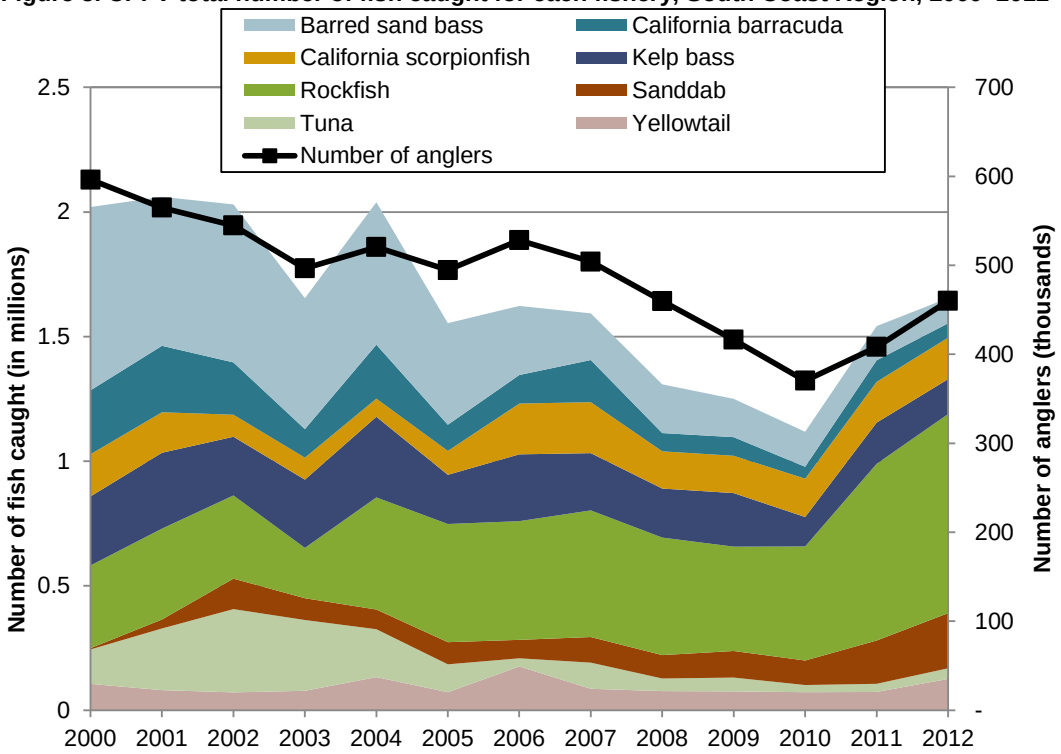
Source: CDFW CPFV logbook data

As seen in Figure 5 below, the majority of the number of fish caught in the region shifted over the study period. While barred sand bass was the majority fishery in the first half of the study period (constituting just under a third of all fish caught annually), increasing numbers of rockfish were caught in the latter half, coming to represent the majority of fish caught (45.2 percent) by 2012. The total number of fish caught declined overall from 2000–2012, with a maximum observed in 2000 at 2.5 million fish (not all fisheries are displayed in Figure 5); the lowest number of fish caught occurred in 2010 at 1.3 million fish.

In regards to target fisheries, see Figure 6, most trips at the beginning of the study period did not have a specified target; from 2003 onwards, targets were miscellaneous coastal fish. It is unknown if this large change was due to a change in CPFV logbooks in 2003 or a potential database error in 2002 and 2001. Furthermore consultation with CDFW staff is needed to clarify.

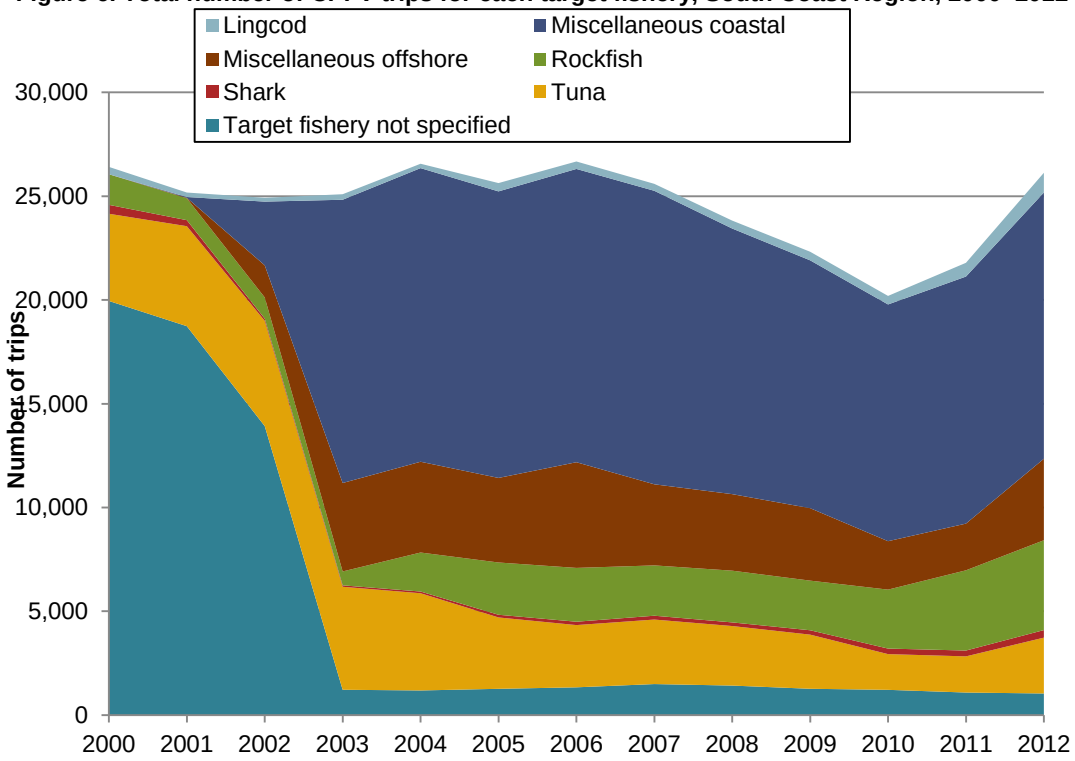
Figure 7 investigates average yearly change in the number of vessels, trips, and anglers over time. The number of vessels increased until 2004, decreased from 2005 to about 2010, but increased again in the last two years of the study period. This general trend was also observed for the total number of trips and anglers observed in the South Coast region overall from about 2004 onwards. In 2012 (the only post MPA year in the study period), the total number of vessels, anglers, and trips increased by 10 percent, 12 percent, and 11 percent respectively from 2011.

Figure 5. CPFV total number of fish caught for each fishery, South Coast Region, 2000–2012



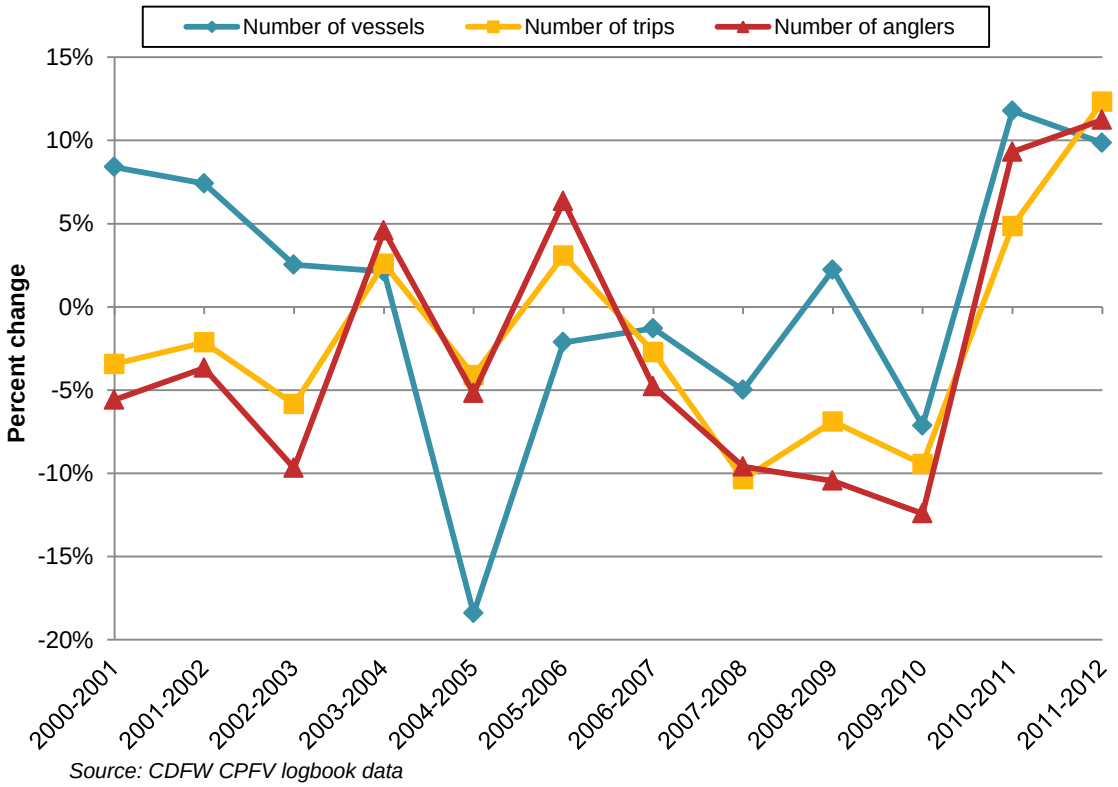
Source: CDFW CPFV logbook data

Figure 6. Total number of CPFV trips for each target fishery, South Coast Region, 2000–2012



Source: CDFW CPFV logbook data

Figure 7. Percent change in CPFV vessels, trips, and anglers per port and region wide, 2000–2012



Source: CDFW CPFV logbook data

4. SOUTH COAST CPFV PORT PROFILES

4.1. Santa Barbara/Ventura

The Santa Barbara port group is the northernmost group in the South Coast region and includes the ports of Santa Barbara Harbor, Gaviota Beach, and Goleta Beach. The City of Santa Barbara is located 95 miles northwest of Los Angeles. According to the 2010 Census, the population of Santa Barbara was 88,410 and the estimated per capita income (2007–2011) was $37,087. Goleta neighbors Santa Barbara to the west and according to the 2010 Census had a population of 29,888 and a per capita income of $34,263 (US Census Bureau, 2010). Gaviota Beach is an unincorporated town with about 35 residents located about 30 miles west of Santa Barbara near Gaviota State Park (Santa Barbara Real Estate Guide 2013).

The Santa Barbara Harbor area offers shopping and dining, as well as a variety of recreational activities including surfing, kayaking, pier fishing, and CPFV fishing (City of Santa Barbara, 2013). Facilities at Santa Barbara Harbor include a breakwater, marina, loading dock, hoist, fueling dock, ice machine, and space for 1,100 recreational and commercial vessels (Norman et al., 2007; Pomeroy et al., 2007).

Ventura is in the northern part of the Los Angeles metro region, just 27 miles south of Santa Barbara. According to the 2010 Census, the population of Ventura was 106,433 and the estimated per capita income (2007–2011) was $31,775 (US Census Bureau, 2010). The Ventura Harbor was not developed until the 1950s when the state excavated the harbor to acquire fill material for highway construction. The city of Ventura maintained the harbor until 1968 when the Army Corps of Engineers took over this responsibility. The harbor is currently owned and operated by the Ventura Port District (Ventura Harbor). The harbor offers berths for about 200 commercial vessels and 1,600 recreational vessels. In addition, the harbor has a marina, resort, boat yard, and a commercial fish processing facility. The Ventura Harbor also houses the headquarters for the Channel Islands National Park, a popular tourist destination.

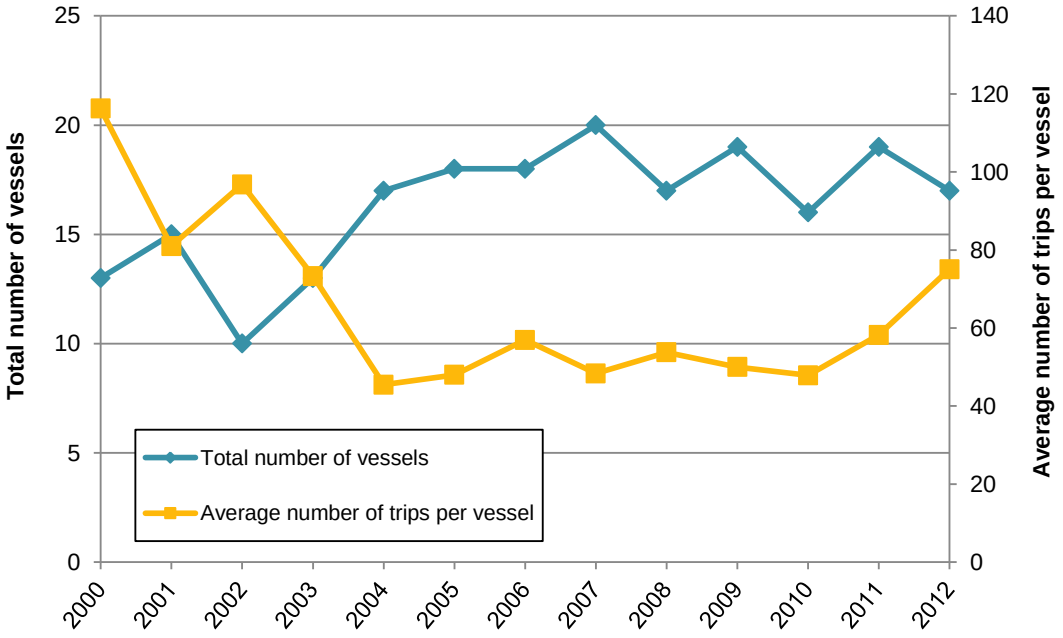
In the port grouping of Santa Barbara/Ventura, on average annually from 2000–2012 there were 18,887 total CPFV anglers taking a total of 1,022 trips, serviced by 16 vessels each making 63 trips over the year and carrying 18 anglers per trip on average annually.

The total number of CPFV fishing trips from Santa Barbara/Ventura hovered between 10 to 20 vessels between 2000 to 2012, averaging about 16 vessel a year annually, see Figure 8. The average number of trips per vessel fell from 116 in 2000 to 48 in 2010, but picked back up in the last two years of the study period, ending 2012 with approximately 75 trips per vessel on average.

Figure 9 displays the total number of CPFV trips and the average number of anglers per trip, which followed similar trends. In 2000 there were 1,511 trip out of Santa Barbara/Ventura with an average of 20 anglers per trip. The total number of vessel trips dropped to a low in 2008 at 914 total, but picked back up to 1,276 by 2012.

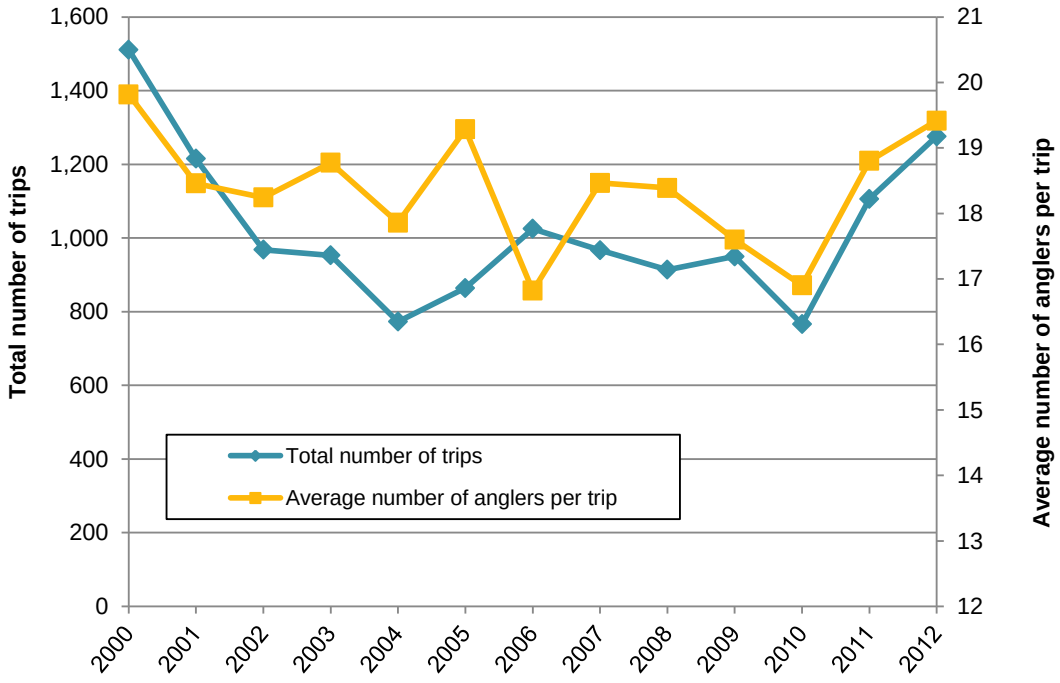
The total number of CPFV anglers in Santa Barbara/Ventura as well as the average number of anglers per vessel followed similar generally decreasing trends from 2000 to 2010, with an increase observed in 2011 and 2012. The total number of anglers was at its highest point in the study period in 2000 (29,944 anglers) and at its lowest in 2009 (12,947 anglers), see Figure 10. The average number of anglers per vessel was 1,212 annually over the study period.

Figure 8. Total number of CPFV vessels and average number of trips per vessel, Santa Barbara/Ventura, 2000–2012



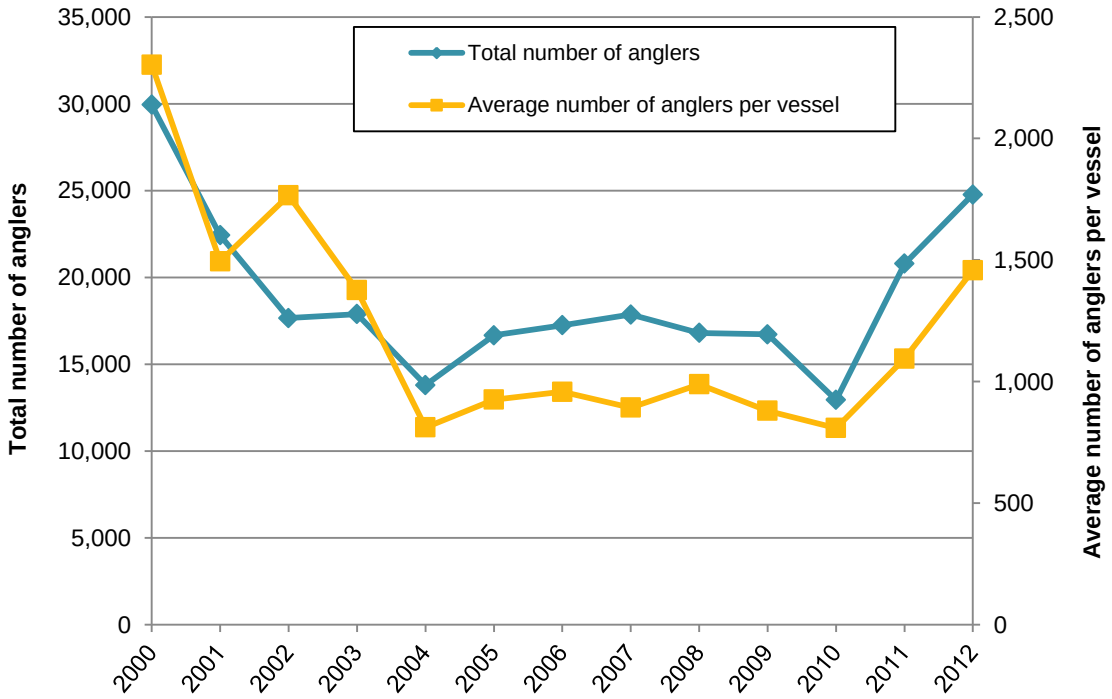
Source: CDFW CPFV logbook data

Figure 9. Total number of CPFV trips and average number of anglers per trip, Santa Barbara/Ventura, 2000–2012



Source: CDFW CPFV logbook data

Figure 10. Total number of CPFV anglers and average number of anglers per vessel, Santa Barbara/Ventura, 2000–2012

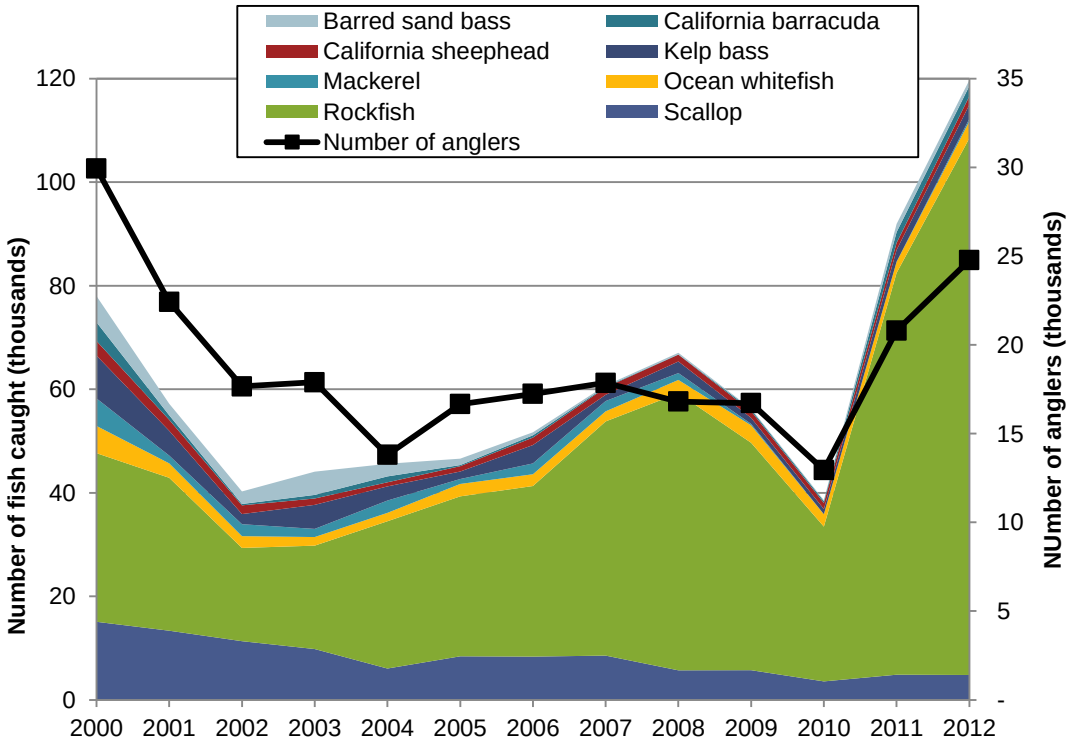


Source: CDFW CPFV logbook data

As seen in Figure 11 the vast majority of the total number of fish caught in Santa Barbara/Ventura were rockfish which constituted approximately 64.5 percent of total fish caught on average annually from 2000 to 2012 in this port. The increase was notable, in 2000 only 39.8 percent of total fish caught annually was rockfish, by 2012 this percentage increased to 85.1 percent. The total number of fish caught increased from 2000 onwards, despite a low of 38,909 of fish in 2010 by 12,947 anglers, reaching a high in 2012 of a total of 121,809 fish were caught by 24,773 anglers out of Santa Barbara/Ventura.

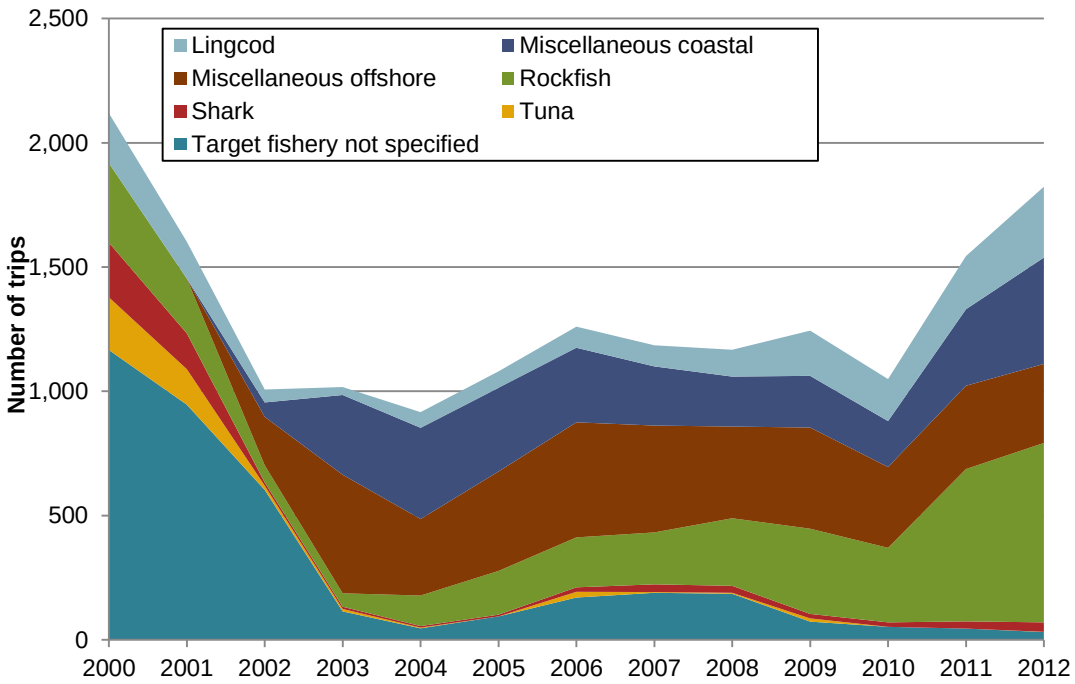
Despite rockfish's dominance in the total number of fish caught, only approximately 20.2 percent of trips on average target rockfish annually, see Figure 12. This percentage has been increasing over the study period however, from 15.1 percent in 2000 to 39.6 percent of all trips out of Santa Barbara/Ventura targeting rockfish. Other popular 2012 target fisheries included miscellaneous coastal and offshore fisheries, together these types of trips are approximately nearly half of all CPFV trips that year.

Figure 11. CPFV total number of fish caught for each fishery, Santa Barbara/Ventura, 2000–2012



Source: CDFW CPFV logbook data

Figure 12. Total number of CPFV trips for each target fishery, Santa Barbara/Ventura, 2000–2012



Source: CDFW CPFV logbook data

4.2. Oxnard/Port Hueneme

The Channel Islands Harbor in Oxnard and the Port Hueneme Harbor in Port Hueneme are located a short distance from each other in Ventura County, and are about 60 miles northwest of Los Angeles and 40 miles south of Santa Barbara (Norman et al., 2007). According to the 2010 Census, the population of Oxnard was much larger than that of Port Hueneme, 197,899 as compared to 21,723, respectively. The estimated per capita income (2007–2011) in Oxnard was $20,612 while in Port Hueneme the reported per capita income was $23,391(US Census Bureau, 2010).

The Channel Islands Harbor is owned by Ventura County while the Port Hueneme Harbor is owned and operated by the Oxnard Harbor District. The Channel Islands Harbor is a popular tourist destination with dive centers, yacht clubs, shopping, dining, and nine marinas. Both Oxnard and Port Hueneme have resident CPFV operations offering full day and overnight trips. In addition to fishing trips, CPFV operators offer whale watching and other marine life viewing trips (Norman et al., 2007).

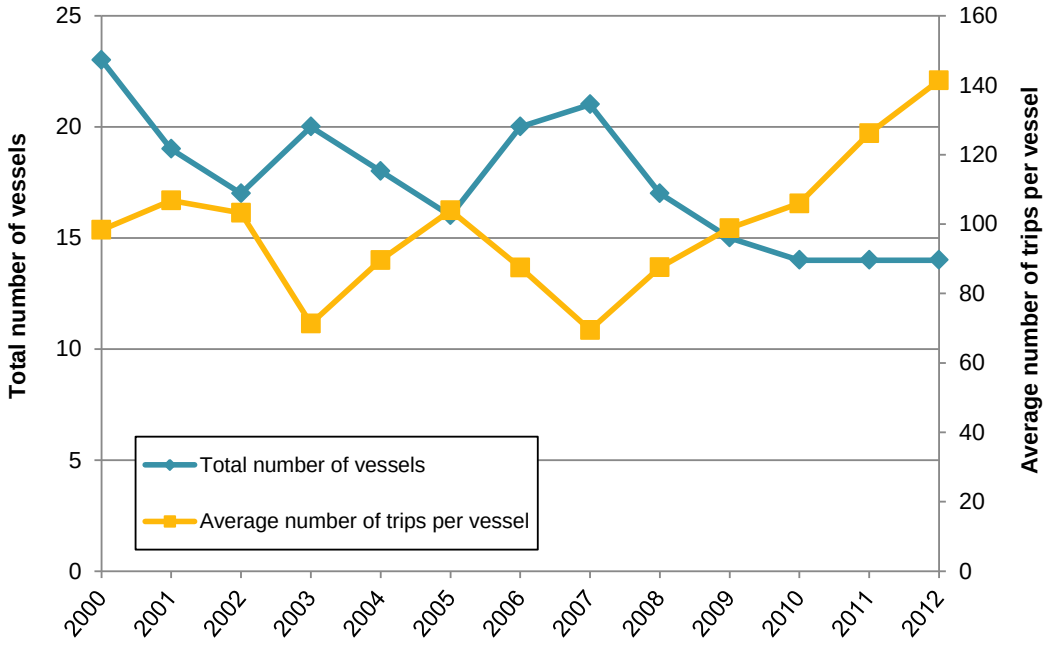
On average annually over 2000–2012, there were 34,117 total CPFV anglers taking a total of 1,704 trips, serviced by 18 vessels each making an average of 97 trips and with an average of 20 anglers per trip out of the port grouping of Oxnard/Port Hueneme.

The number of vessels operating out of Oxnard/Port Hueneme decreased over the study period, beginning with 23 in 2000 and ending 2012 with 14 vessels despite two periods of increase observed in 2003 and 2006–2007. The average number of trips per vessel, however, increased as fewer vessels made more trips; rising from a low of 69 trips per vessel out of this port in 2007, vessels made the highest average number of trips observed in 2012 at 141, see Figure 13.

Figure 14 displays the total number of CPFV trips and the average number of anglers per trip over the study period from Oxnard/Port Hueneme. Despite a large dip at the beginning of the study period from 2000–2003, the total number of trips by 2012 (1,979) almost recovered to 2000 levels (2,261). The average number of anglers per trip stayed relatively unchanged over the study period ranging from 18–21 overall.

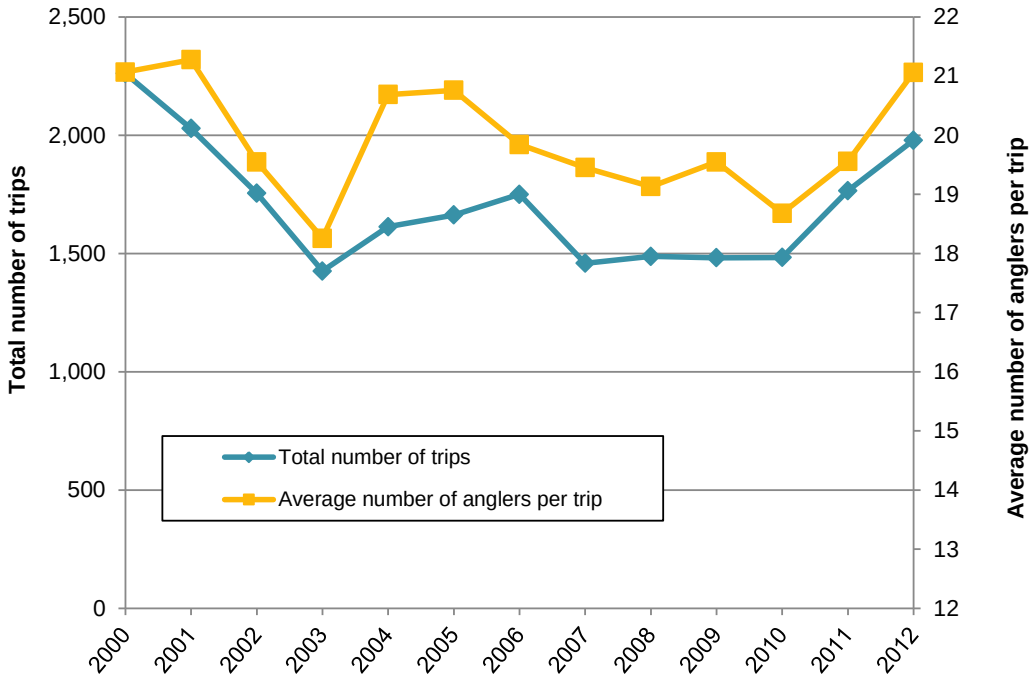
The total number of CPFV anglers in Oxnard/Port Hueneme as well as the average number of anglers per vessel followed similar initial descent and subsequent recovery trends over 2000–2012. The total number of anglers was at its highest point in the beginning of the study period in 2000 (47,635 anglers) and at its lowest in 2003 (26,035 anglers); by 2012 there were 41,683 anglers (Figure 15). The average total number of anglers per vessel annually in Oxnard/Port Hueneme was 1,984 over the study period, with the highest observation occurring in 2012 at 2,977 anglers.

Figure 13. Total number of CPFV vessels and average number of trips per vessel, Oxnard/Port Hueneme, 2000–2012



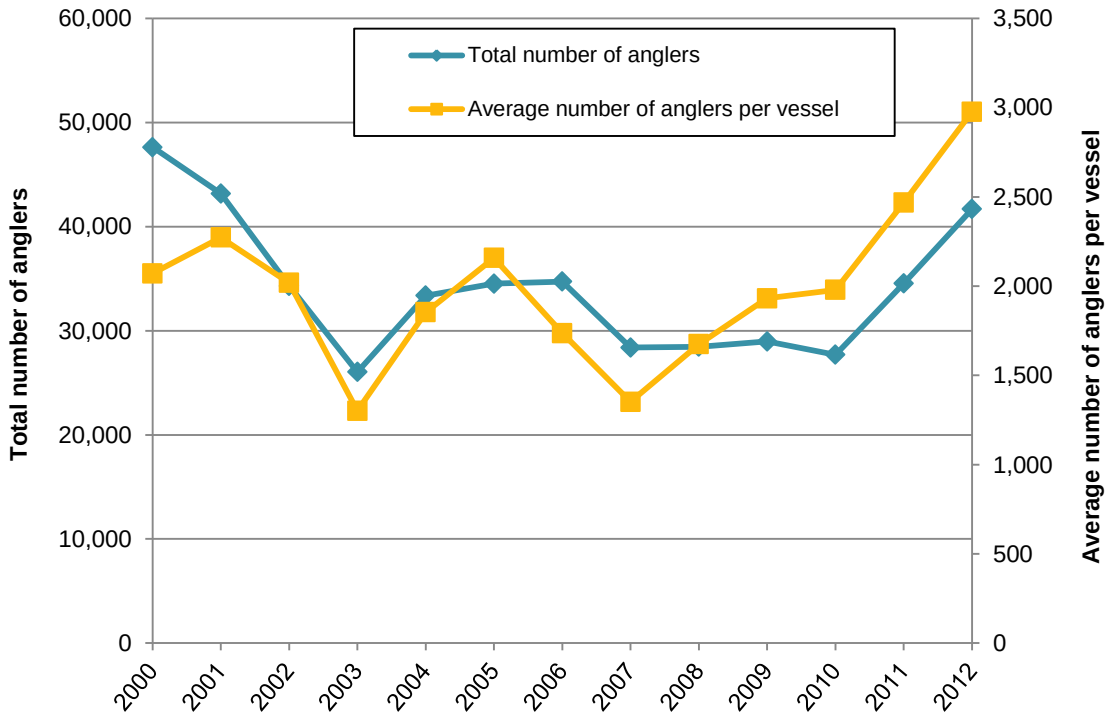
Source: CDFW CPFV logbook data

Figure 14. Total number of CPFV trips and average number of anglers per trip, Oxnard/Port Hueneme, 2000–2012



Source: CDFW CPFV logbook data

Figure 15. Total number of CPFV anglers and average number of anglers per vessel, Oxnard/Port Hueneme, 2000–2012

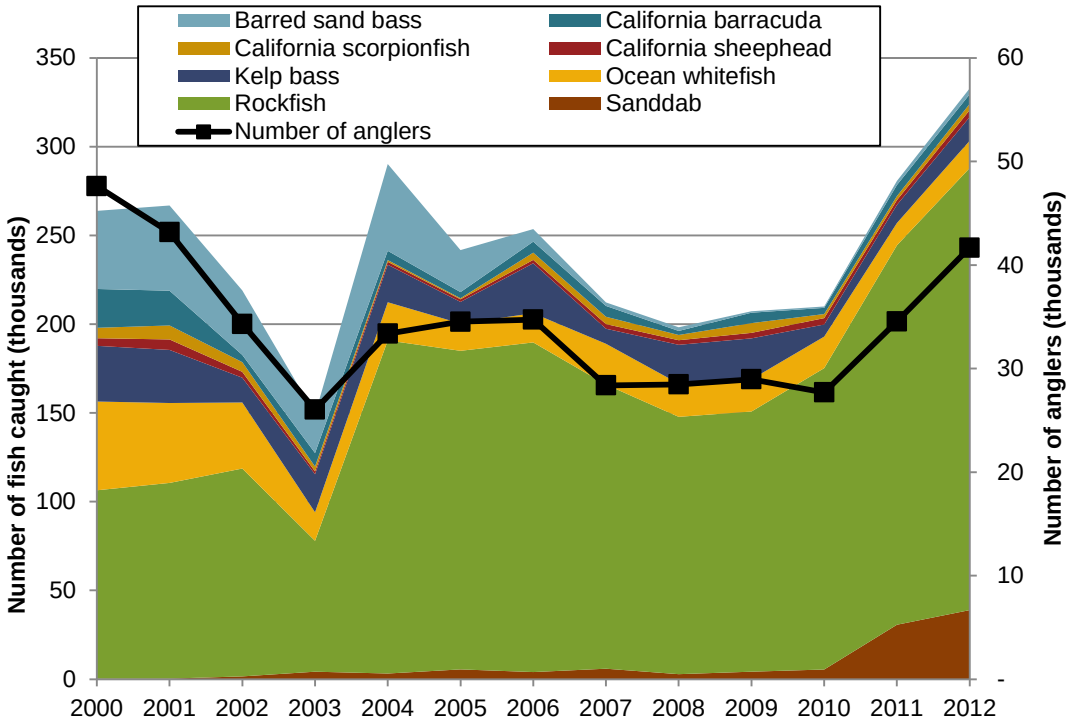


Source: CDFW CPFV logbook data

As seen in Figure 16, the vast majority of the total number of fish caught in Oxnard/Port Hueneme were rockfish, which initially constituted approximately 40 percent of fish caught in 2000 increasing to a full 70 percent by 2012. The total number of fish caught increased from 2000 to 2012 by approximately 23.9 percent overall. Numbers of barred sand bass, peaking in 2001 at 47,999 fish caught, decreased by 2012 to only 3,309 fish caught in Oxnard/Port Hueneme.

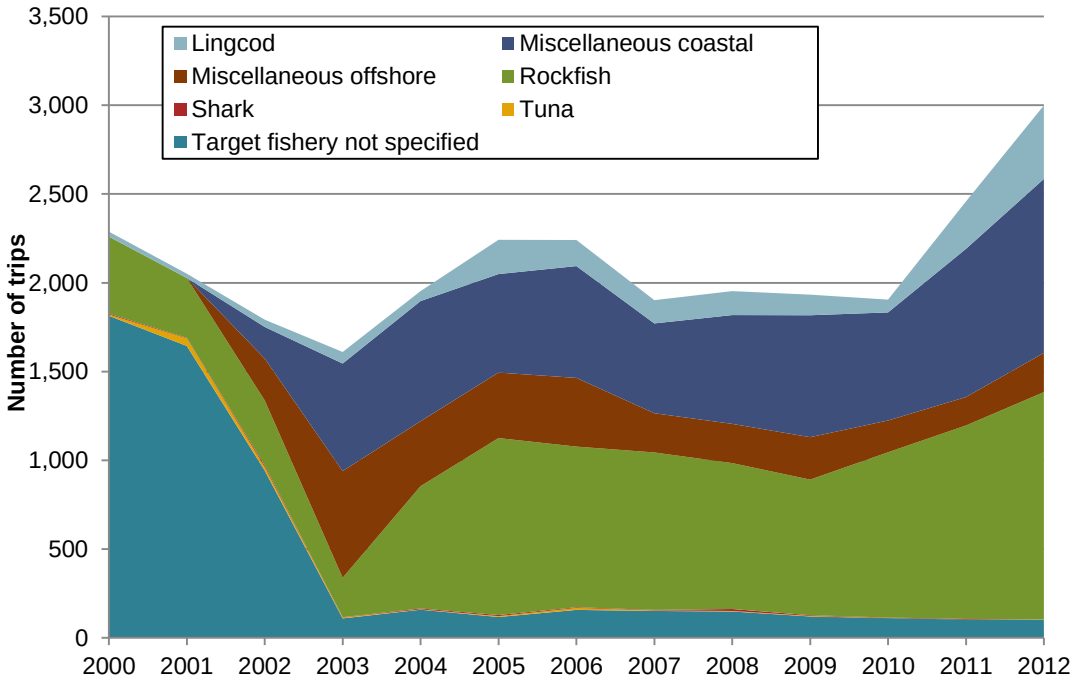
Since 2004 the number of trips targeting rockfish has risen steadily over the study period, see Figure 17; by 2012, 42.7 percent of trips from this port were targeting rockfish. Notable is the small increase in the number of vessels targeting lingcod from Oxnard/Port Hueneme; from 1.2 percent in 2000 to 13.8 percent by 2012.

Figure 16. CPFV total number of fish caught for each fishery, Oxnard/Port Hueneme, 2000–2012



Source: CDFW CPFV logbook data

Figure 17. Total number of CPFV trips for each target fishery, Oxnard/Port Hueneme, 2000–2012



Source: CDFW CPFV logbook data

4.3. Los Angeles

The city of Los Angeles is the second largest city in the United States; according to the 2010 Census, the population of was 3.8 million and the estimated per capita income (2007–2011) was $28,222 (US Census Bureau, 2010). The Los Angeles port group includes Santa Monica, Malibu (and Point Dume), Marina Del Rey, and Avalon; according to the 2010 Census the populations of these cities were 89,736, 12,645, 8,866, and 3,728 respectively. Of these three cities Malibu had the highest estimated per capita income (2007–2011) ($99,692), followed by Marina Del Rey ($70,228), Santa Monica ($59,933) and Avalon ($24,296). The neighborhood of Point Dume lies within Malibu and is therefore included within the above statistics.

Avalon is located on the eastern side of Catalina Island which is 22 miles south west of Los Angeles Harbor (City of Avalon, 2013). The remaining ports in the Los Angeles port group (besides Los Angeles proper) are located to the west of the city of Los Angeles. Malibu and Santa Monica are popular tourist destinations well known for their piers and beaches. Marina Del Rey is the primary sport fishing port within this group and offers various types of water based activities including boat rentals, pier fishing, and CPFV trips (Marina Del Rey Convention and Visitors Bureau, 2013).

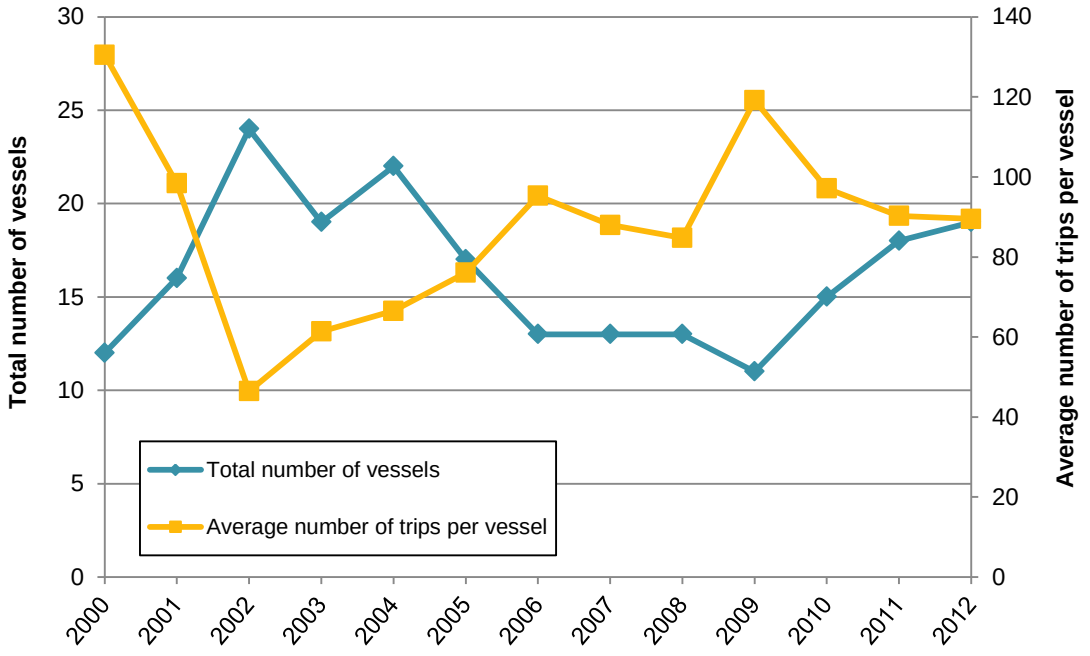
On average annually over 2000–2012, there were 29,799 total CPFV anglers taking a total of 1,366 trips, serviced by 16 vessels each making an average of 84 trips annually and carrying 22 anglers per trip out of the Los Angeles port grouping.

The number of vessels operating out of the Los Angeles port grouping doubled from 2000 (12 vessels) to 2002 (24 vessels), fell overall until 2009, and then rose again by 2012 to 19 vessels (Figure 18). The average number of trips per vessel fell initially from a high of 131 in 2000 to a low of 46 in 2002 before steadily increasing to an average of 87 trips annually in 2012.

The total number of CPFV trips over the study period rose overall by 8.6 percent in the Los Angeles port grouping, see Figure 19. Meanwhile, the average number of anglers per vessel decreased slightly over 2000–2010 from a study period high of 24 anglers in 2001 to a low of 19 in 2010.

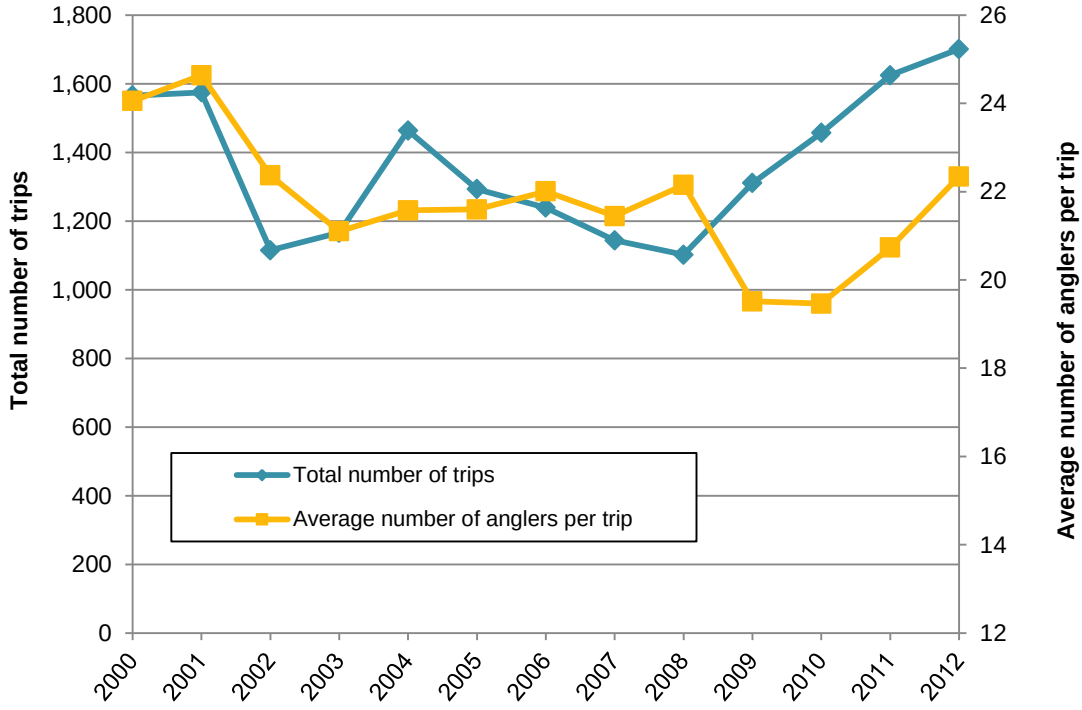
The total number of CPFV anglers and the average number of anglers per vessel in the Los Angeles port grouping followed regional trends with an initial decline and eventual recovery, see Figure 20. The highest number of anglers overall in Los Angeles was observed in 2001 at 38,804 anglers, the lowest in 2008 at 24,413 anglers. After large declines in 2000 and 2001, the average annual number of anglers per vessel over the year was 1,760 anglers in 2012.

Figure 18. Total number of CPFV vessels and average number of trips per vessel, Los Angeles, 2000–2012



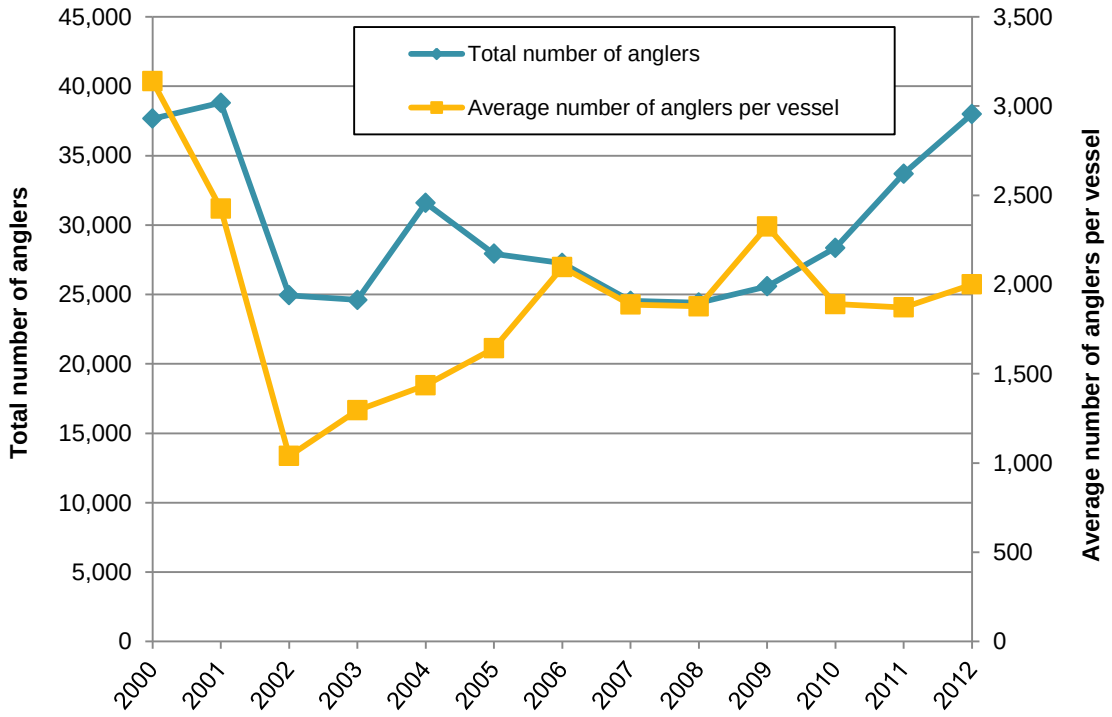
Source: CDFW CPFV logbook data

Figure 19. Total number of CPFV trips and average number of anglers per trip, Los Angeles, 2000–2012



Source: CDFW CPFV logbook data

Figure 20. Total number of CPFV anglers and average number of anglers per vessel, Los Angeles, 2000–2012

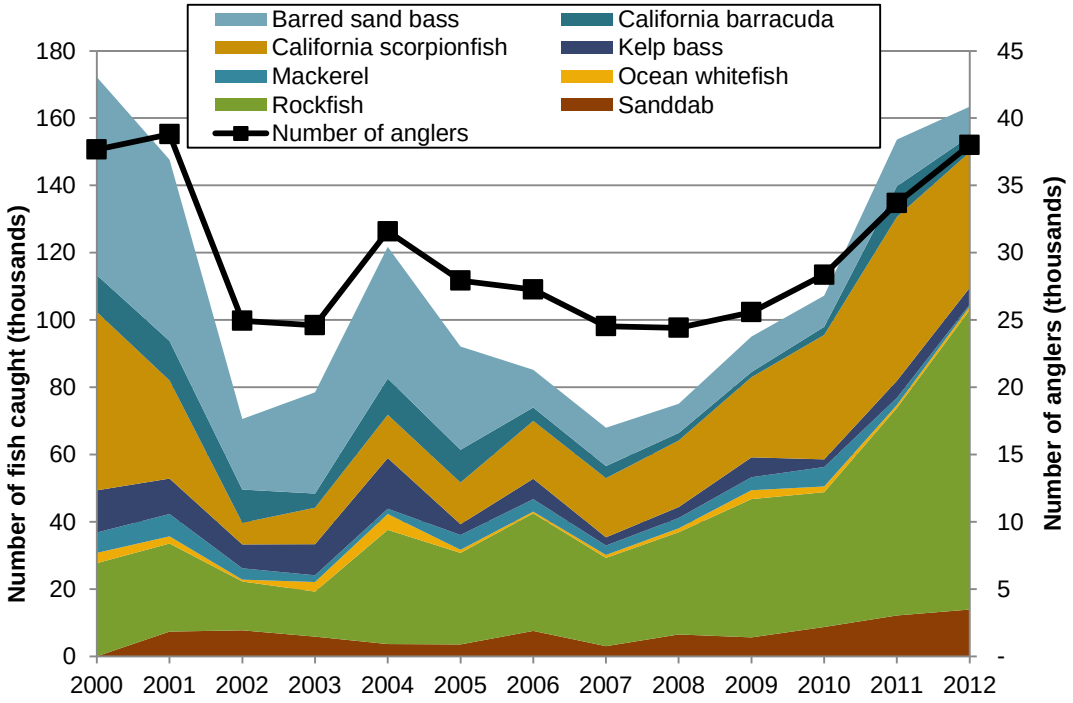


Source: CDFW CPFV logbook data

As seen in Figure 21, there is greater variety in the types of fish caught from CPFV vessel relative to previously mentioned South Coast region ports (Santa Barbara/Ventura and Oxnard/Port Hueneme). However, rockfish still constituted the majority of total fish caught by 2012 (53.9 percent) followed by California scorpionfish (24.4 percent) and barred sand bass (5.3 percent).

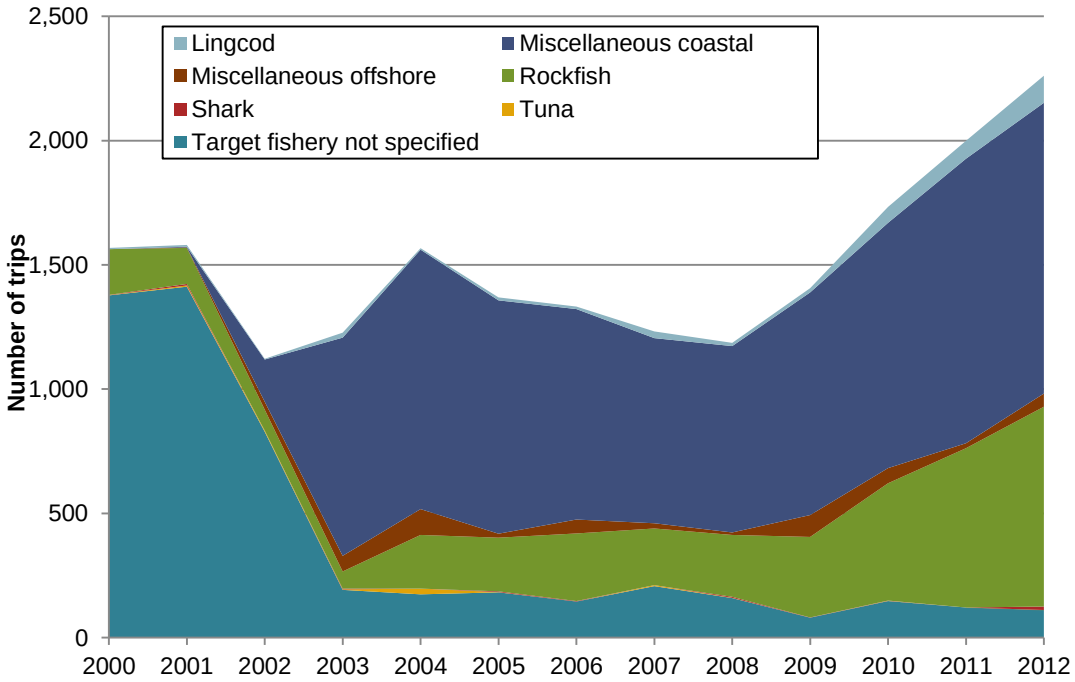
Figure 22 displays the total number of CPFV trips for each target fishery out of Los Angeles over the study period; the vast majority being the miscellaneous offshore fishery which constituted an annual average of 49.2 percent of total trips. Rockfish targeted trips also rose in the Los Angeles port grouping and in 2012 constituted 35.6 percent of total trips.

Figure 21. CPFV total number of fish caught for each fishery, Los Angeles, 2000–2012



Source: CDFW CPFV logbook data

Figure 22. Total number of CPFV trips for each target fishery, Los Angeles, 2000–2012



Source: CDFW CPFV logbook data

4.4. Redondo Beach/San Pedro/Long Beach

The Redondo Beach CPFV port includes the communities of Redondo Beach and Hermosa Beach, both of which are located in Los Angeles County. Redondo Beach is located just 20 miles from downtown Los Angeles and has a population of 66,748 and an estimated per capita income (2007–2011) of $51,703 (US Census Bureau, 2010). Hermosa Beach is located 17 miles southwest of Los Angeles on the southern end of Santa Monica Bay and has a small population of 19,506 and an estimated per capita income (2007–2011) of $69,857 (US Census Bureau, 2010).

The Redondo Harbor is owned by the city, which leases property to private entities (City of Redondo Beach, 2013). Both Redondo Beach and Hermosa Beach are popular tourist destinations with shopping and restaurants, a farmers market, and a vast array of recreational activities including diving, sailing, surfing, swimming, and recreational and charter fishing. CPFV's offer half day, full day, and overnight trips targeting a variety of species (Redondo Beach Resort, Hermosa Beach Chamber of Commerce, 2012).

The port of San Pedro includes the adjacent Wilmington which are both neighborhoods within the city of Los Angeles, located on the south side of the city near LA Harbor. San Pedro is home to a large portion of the Los Angeles commercial fishing fleet. The large Los Angeles area wetfish fleet is primarily located at San Pedro Harbor which is equipped to receive up to 300 tons of wetfish per day (Pomeroy et al., 2002). Additionally, San Pedro offers many attractions for residents and tourists alike including the Ports O'Call Village, the San Pedro Fish Market, Fishermen's Wharf, as well as dining and shopping establishments. There are several CPFV operations in San Pedro, which operate half day, full day, and multi day fishing trips targeting a wide array of species including various rockfish, flatfish, and bass species (Norman et al., 2007).

The CPFV port of Long Beach (which includes Terminal Island) is located south of Los Angeles near the LA Harbor. According to the 2010 Census, the population of Long Beach was 462,257 with an estimated per capita income (2007–2011) of $26,986 (US Census Bureau, 2010). There are several marinas located in the Long Beach area that offer a variety of services including mooring, boat launches, fuel docks, fishing piers and CPFV operations (City of Long Beach 2013). CPFV operations target multiple species including sea bass, rockfish, and flatfish. In the winter months many CPFV operators provide whale watching tours. As of 2000 there were no CPFV operations based on Terminal Island, although some CPFV vessels are moored at Fish Harbor on Terminal Island (Norman et al., 2007).

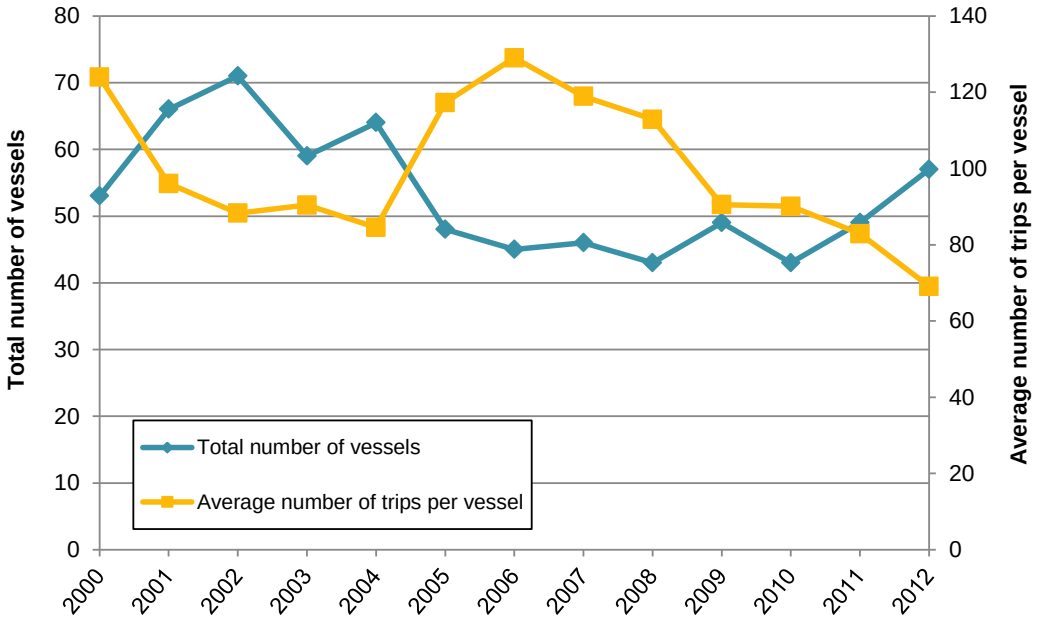
On average annually over 2000–2012, there were 121,189 total CPFV anglers taking a total of 5,230 trips, serviced by 53 vessels each making an average of 98 trips and carrying 23 anglers per trip out of the Redondo Beach/San Pedro/Long Beach port grouping. This port group was the second most popular CPFV port group in the South Coast after San Diego.

The number of vessels operating out of Redondo Beach/San Pedro/Long Beach has been relatively steady from 2000 to 2012, hovering just below and above an annual average of 53 vessels (Figure 23). The average number of trips per vessel, however, was more variable with a peak in 2006 of an average of 129 trips per vessel to a low of 69 trips per vessel at the end of the study period in 2012.

The total number of trips followed similar trends of decline decreasing by 40 percent overall from 6,570 trips out of Redondo Beach/San Pedro/Long Beach in 2000 to 3,393 trips made in 2012, see Figure 24. The average number of anglers per trip out of the port ranged between 21–25 over the study period.

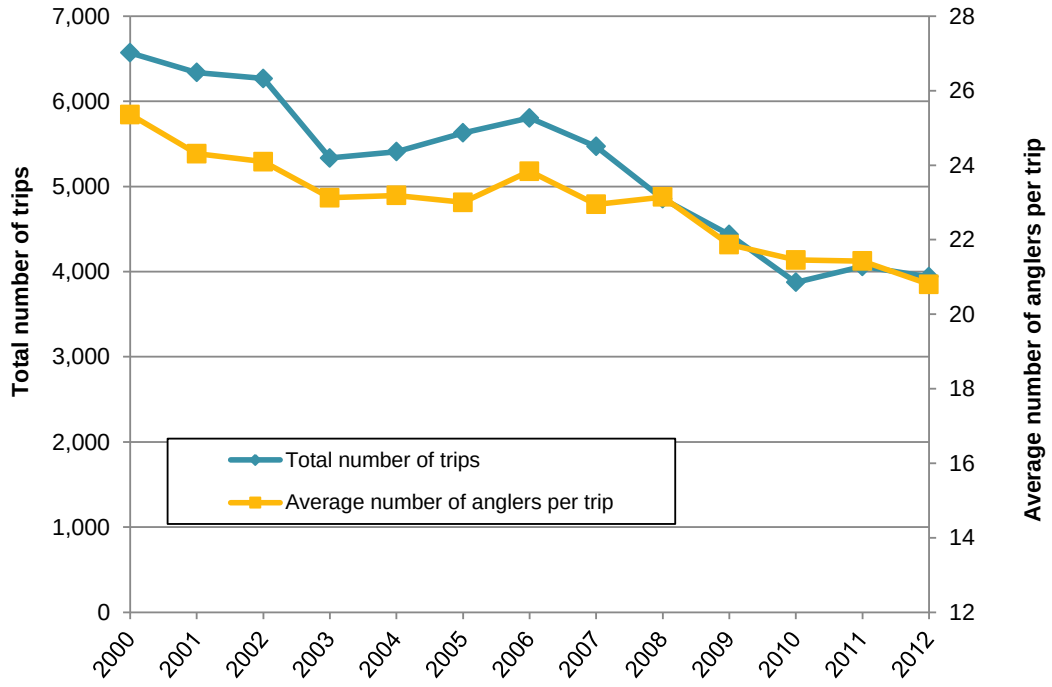
The total number of CPFV anglers in Redondo Beach/San Pedro/Long Beach as well as the average number of anglers per vessel followed similar variability but had an overall decreasing trend over the study period, see Figure 25. The total number of anglers was at its highest point in the study period in 2000 (166,605 anglers) and at its lowest in 2012 (81,940 anglers), falling by 50.8 percent. The average number of anglers per vessel also decreased by just over half from 2000 to 2012, 54.8 percent to be precise. There were 1,438 anglers per vessel in 2012 from 3,143 anglers per vessel in 2000 on average, despite an upswing observed in 2006 at 3,076 anglers per vessel on average.

Figure 23. Total number of CPFV vessels and average number of trips per vessel, Redondo Beach/San Pedro/Long Beach, 2000–2012



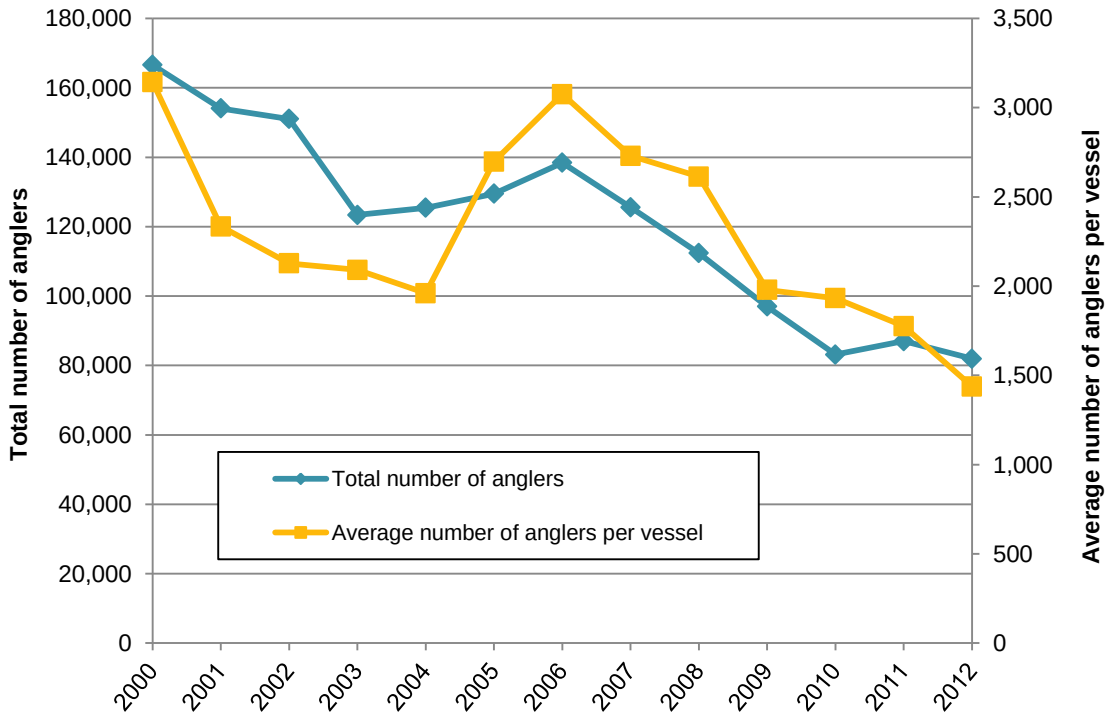
Source: CDFW CPFV logbook data

Figure 24. Total number of CPFV trips and average number of anglers per trip, Redondo Beach/San Pedro/Long Beach, 2000–2012



Source: CDFW CPFV logbook data

Figure 25. Total number of CPFV anglers and average number of anglers per vessel, Redondo Beach/San Pedro/Long Beach, 2000–2012

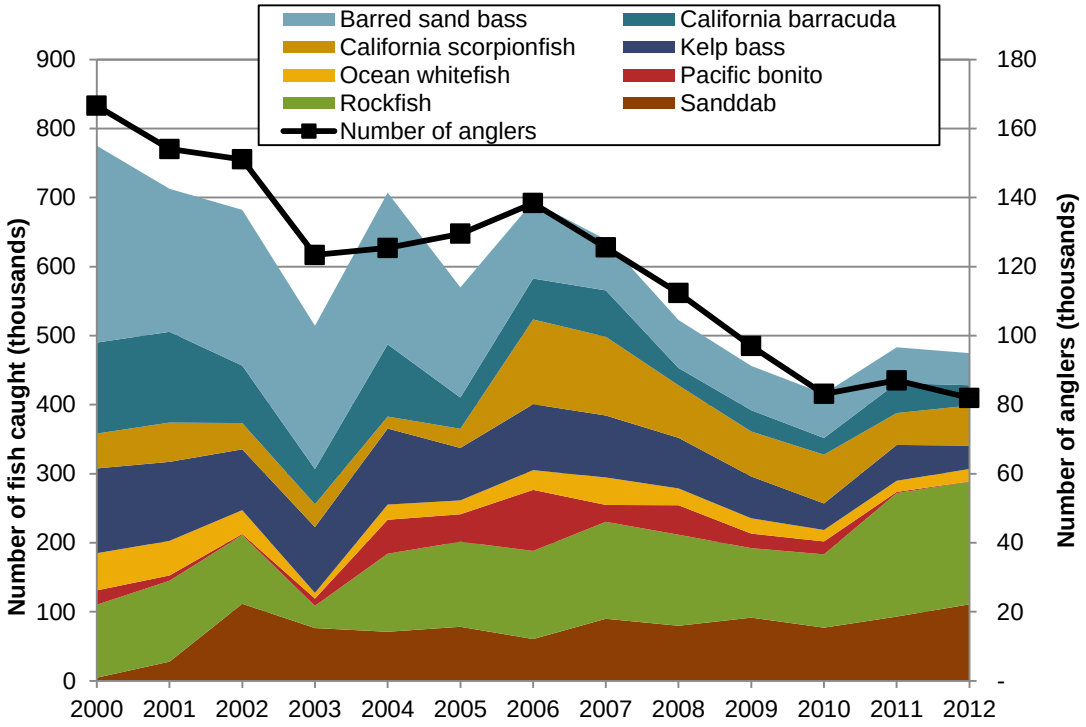


Source: CDFW CPFV logbook data

As seen in Figure 26, on average over the study period the top three fisheries caught in the Redondo Beach/San Pedro/Long Beach port grouping were barred sand bass (137,420 fish caught on average annually), rockfish (119,583 fish), and kelp bass (80,773 fish). Barred sand bass was more prevalent in the first half of the study period, constituting 29 percent of total fish caught in the port group from 2000–2005 on average annually and 12.1 percent over 2006–2012. In the meanwhile, rockfish caught were only 11.2 percent of total fish caught in 2000 and 35.3 percent in 2012. Simultaneously, the total number of anglers overall fell greatly (50.8 percent) from 166,605 anglers in 2000 to 81,940 anglers in 2012.

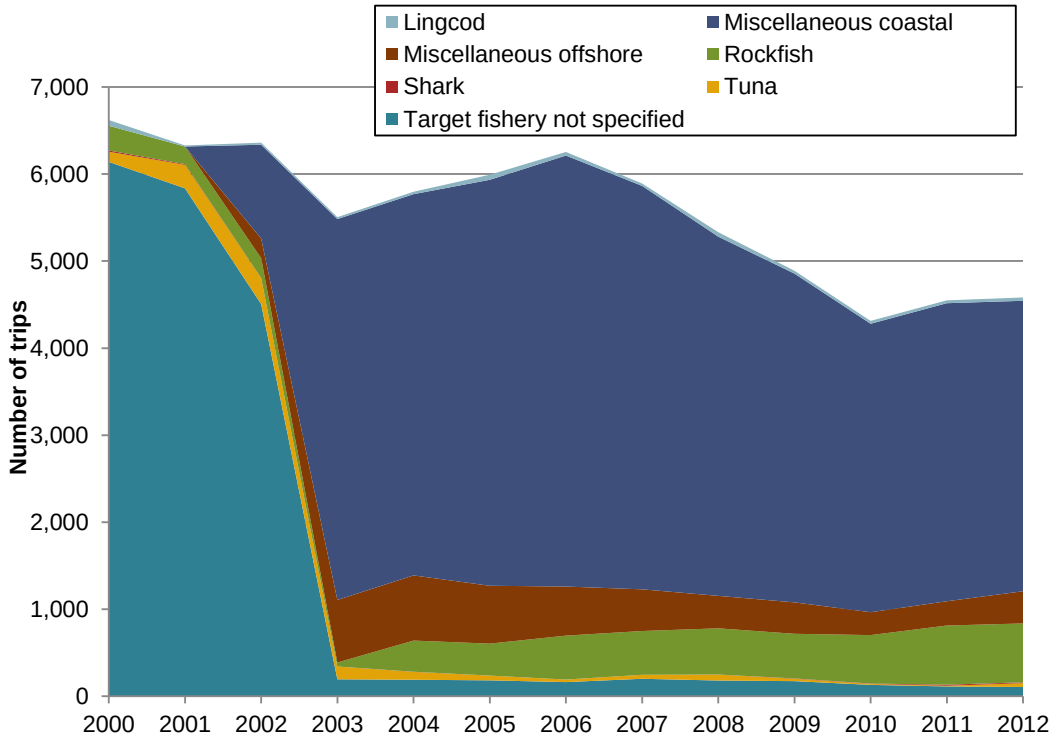
Figure 27 displays the total number of CPFV trips for each target fishery in this port over the study period. From 2003 onwards, once target fisheries were more specified, the vast majority of anglers (77.1 percent) targeted miscellaneous coastal fish out of Redondo Beach/San Pedro/Long Beach. In 2012, rockfish were the second most targeted fishery (14.8 percent) in this port group.

Figure 26. CPFV total number of fish caught for each fishery, Redondo Beach/San Pedro/Long Beach, 2000–2012



Source: CDFW CPFV logbook data

Figure 27. Total number of CPFV trips for each target fishery, Redondo Beach/San Pedro/Long Beach, 2000–2012



Source: CDFW CPFV logbook data

4.5. Newport Beach

The Newport Beach port group consists of the smaller CPFV ports of Newport Beach, Seal Beach, Balboa, and Huntington Beach all of which are located south of Los Angeles in Orange County. Newport Beach has a population of 85,186 with a relatively high estimated per capita income (2007–2011) of $80,872. Balboa Island and Peninsula are both part of the Newport Beach community. Seal Beach is a smaller community with 24,168 residents and an estimate per capita income (2007–2011) of $44,115. Lastly, Huntington Beach is the largest port within the group and has a population of 189,992 residents and an estimated per capita income (2007–2011) of $42,127 (US Census Bureau, 2010).

Newport Beach and its surrounding neighborhoods are popular tourist destinations with ample shopping, dining, and recreational opportunities. The harbor offers public and private slip rentals for all types of vessels (City of Newport Beach, 2013). Similarly, Huntington and Seal Beach communities offer recreational opportunities for tourists and locals including CPFV fishing trips (City of Seal Beach, 2011; Visit Huntington Beach, 2013). Additionally, Seal Beach has a public pier where recreational fishermen can fish for free, without needing to obtain a license.

On average annually over 2000–2012, there were 54,502 total CPFV anglers taking a total of 2,139 trips, serviced by 22 vessels each making an average of 95 trips over the year and carrying 25 anglers per trip out of the Newport Beach port grouping.

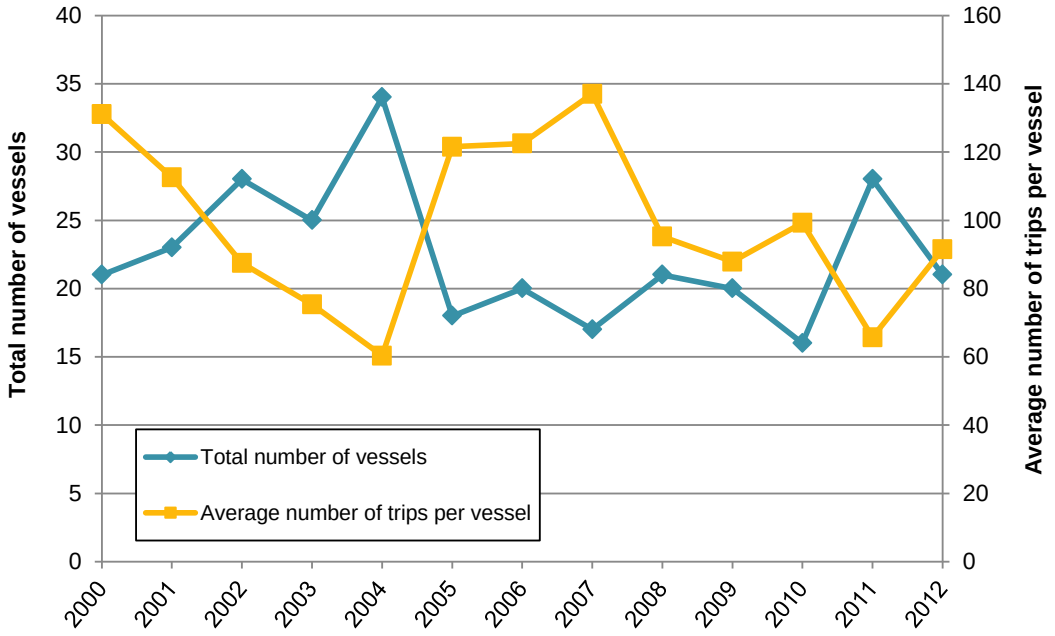
The number of vessels operating out of Newport Beach has been variable over the study period ranging from a high of 34 (2004) and a low of 16 (2010), see Figure 28. The average number of trips per vessel was similarly variable, beginning in 2000 at a higher level of 131 trips on average per vessel, falling to a low of 60 average trips in 2004 (when total vessel counts were highest), increasing again to a high of 137 in 2007 and ending 2012 at 91 average trips per vessel.

The total number of trips out of Newport Beach over the study period decreased overall from a high in 2000 of 2,753 total trips to a low of 1,588 trips in 2010, rising again slightly in the last two years to finish 2012 at 1,921, see Figure 29

Figure 29. The average number of anglers per trip, however, increased by 26.9 percent from 2000 (24 anglers) to 2012 (31 anglers).

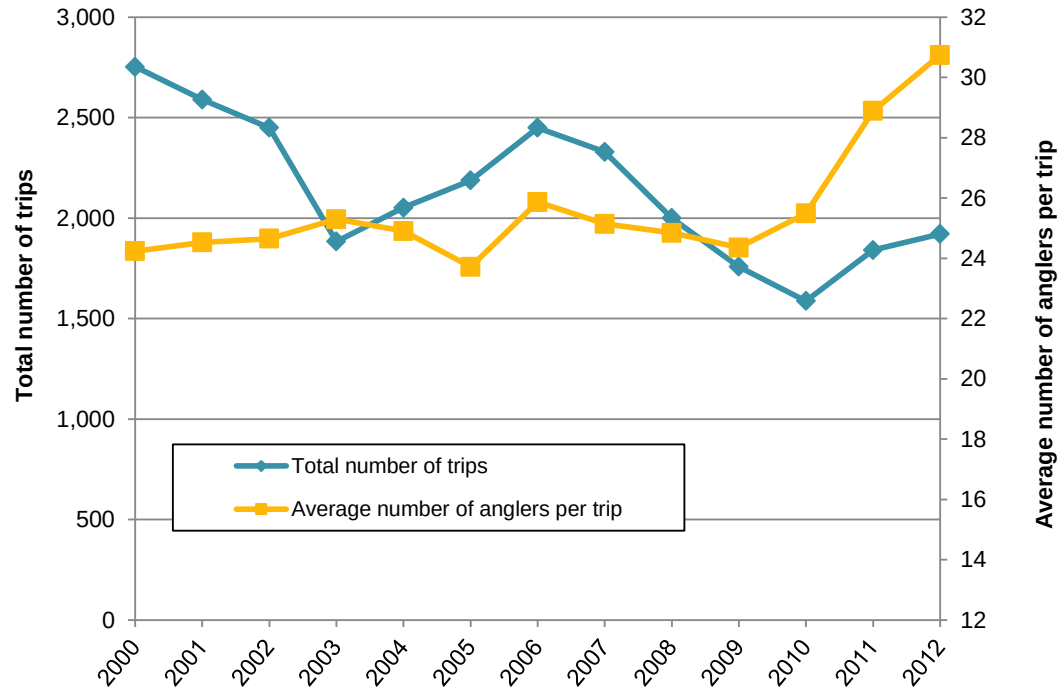
The total number of CPFV anglers in Newport Beach, as well as the average number of anglers per vessel, varied similarly finishing with a 11.5 percent decline from 2000 to 2012, see Figure 30. The total number of anglers out of Newport Beach was highest in 2000 at 66,728 anglers and lowest in 2010 with 40,476 anglers. The average total number of anglers per vessel fell to a low in 2004 of 1,503 but quickly maxed out at 3,446 just a few years later in 2007.

Figure 28. Total number of CPFV vessels and average number of trips per vessel, Newport Beach, 2000–2012



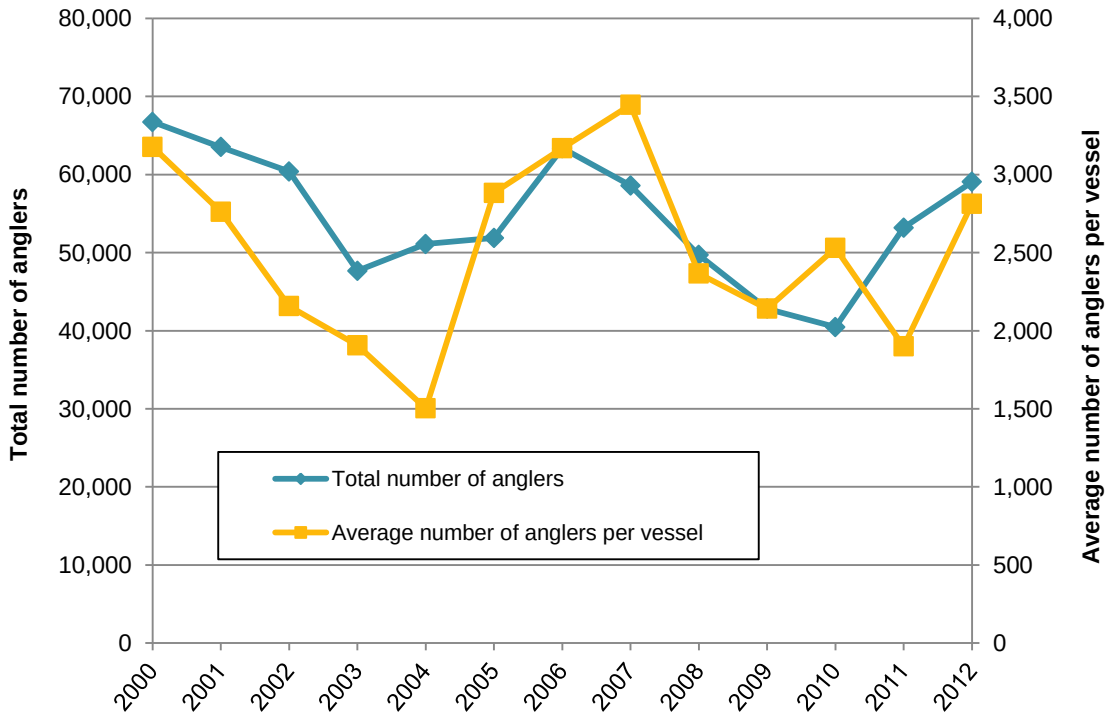
Source: CDFW CPFV logbook data

Figure 29. Total number of CPFV trips and average number of anglers per trip, Newport Beach, 2000–2012



Source: CDFW CPFV logbook data

Figure 30. Total number of CPFV anglers and average number of anglers per vessel, Newport Beach, 2000–2012

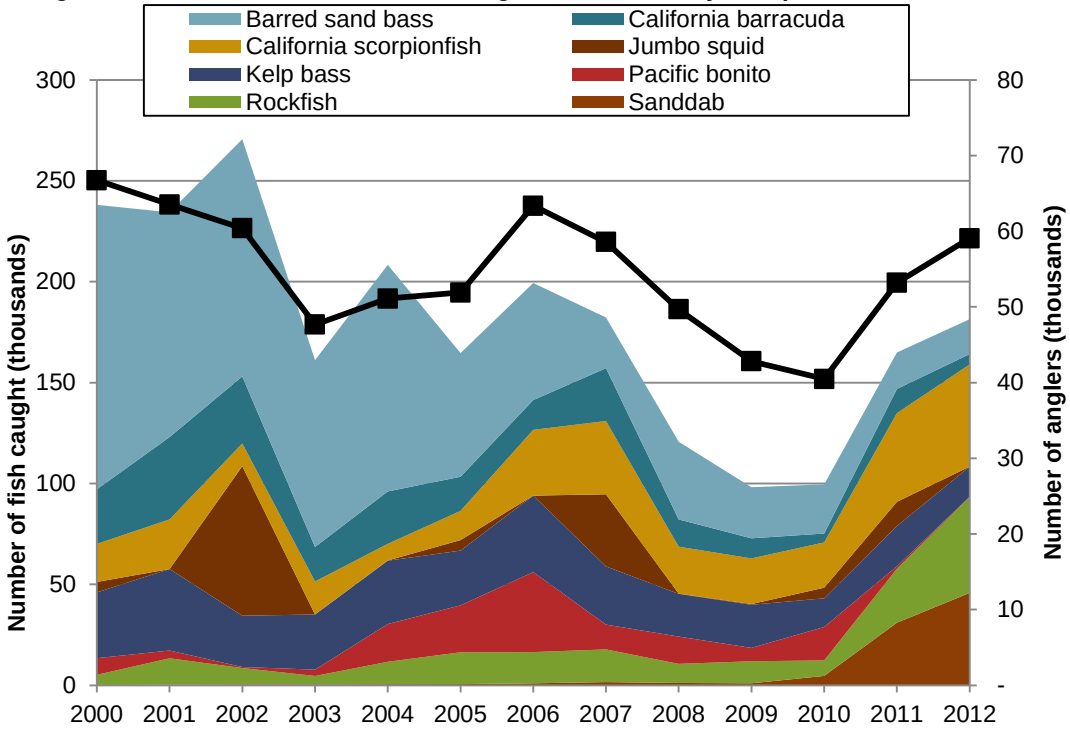


Source: CDFW CPFV logbook data

As seen in Figure 31, on average over the study period the top three fisheries caught in Newport Beach from 2000 to 2012 were barred sand bass (64,829 fish caught on average annually), kelp bass (26,347 fish), and California scorpionfish (25,038 fish). Barred sand bass was more prevalent in the first half of the study period, constituting 44.5 percent of total fish caught in the port group from 2000–2005 on average annually and 19.1 percent over 2006–2012. Meanwhile, California scorpionfish caught increased from 6.8 percent of total fish caught in 2000 to 26.4 percent in 2012. Simultaneously, the total number of anglers overall varied over the study period, declining slightly (by 11.5 percent) from 66,728 anglers in 2000 to 59,069 anglers in 2012.

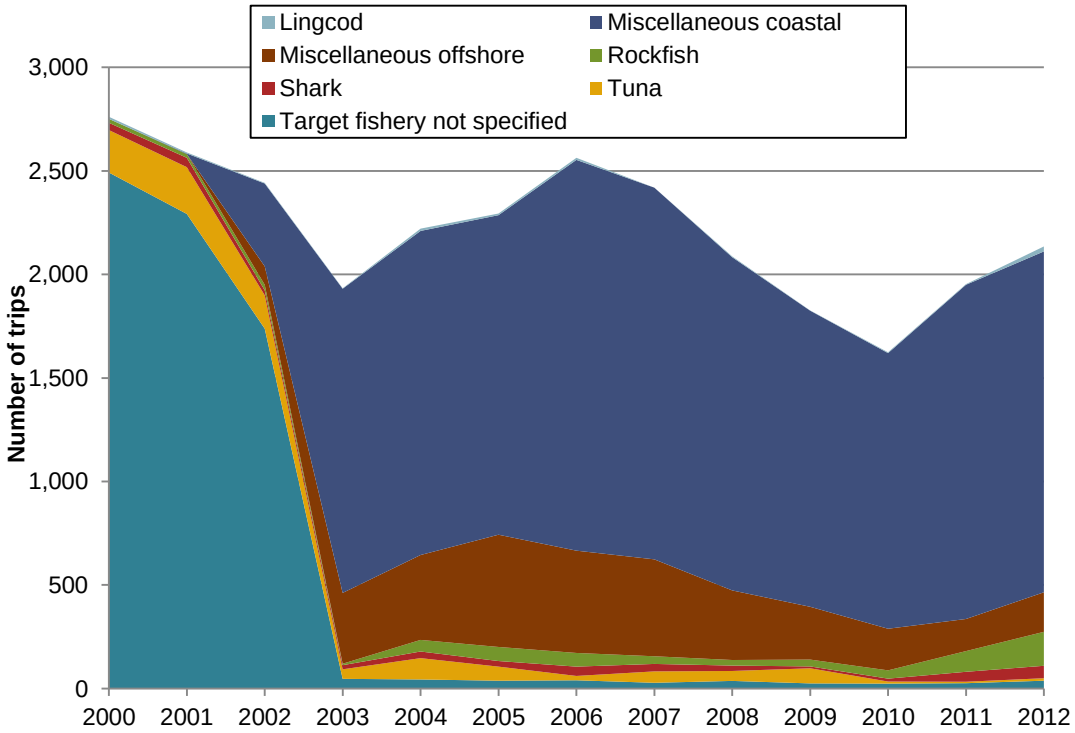
Figure 32 displays the total number of CPFV trips for each target fishery in this port over the study period. From 2003 onwards, once target fisheries were more specified, the vast majority of anglers (75.9 percent) targeted miscellaneous coastal fish out of Newport Beach. The second most targeted fishery over the same time period (2003–2012) was miscellaneous offshore, averaging 15.8 percent of all target trips in this port group, though falling to 8.9 percent by 2012.

Figure 31. CPFV total number of fish caught for each fishery, Newport Beach, 2000–2012



Source: CDFW CPFV logbook data

Figure 32. Total number of CPFV trips for each target fishery, Newport Beach, 2000–2012



Source: CDFW CPFV logbook data

4.6. Dana Point

Dana Pont is located in Orange County, 65 miles north of San Diego and 59 miles South of Los Angeles. According to the 2010 U.S. Census, the population of Dana Point was 33,351 with an estimated per capita income (2007–2011) of $51,431 (US Census Bureau, 2010). Dana Point is a tourist destination well known for its beaches and recreational activities. The Dana Point Harbor has two marinas with 2,500 slips, the majority of which are filled by recreational vessels. Additional facilities available include a marine fuel dock, three yacht clubs, dry boat storage hoist, fishing pier, a ten lane launch ramp, and CPFV operations (Dana Point Harbor, 2013).

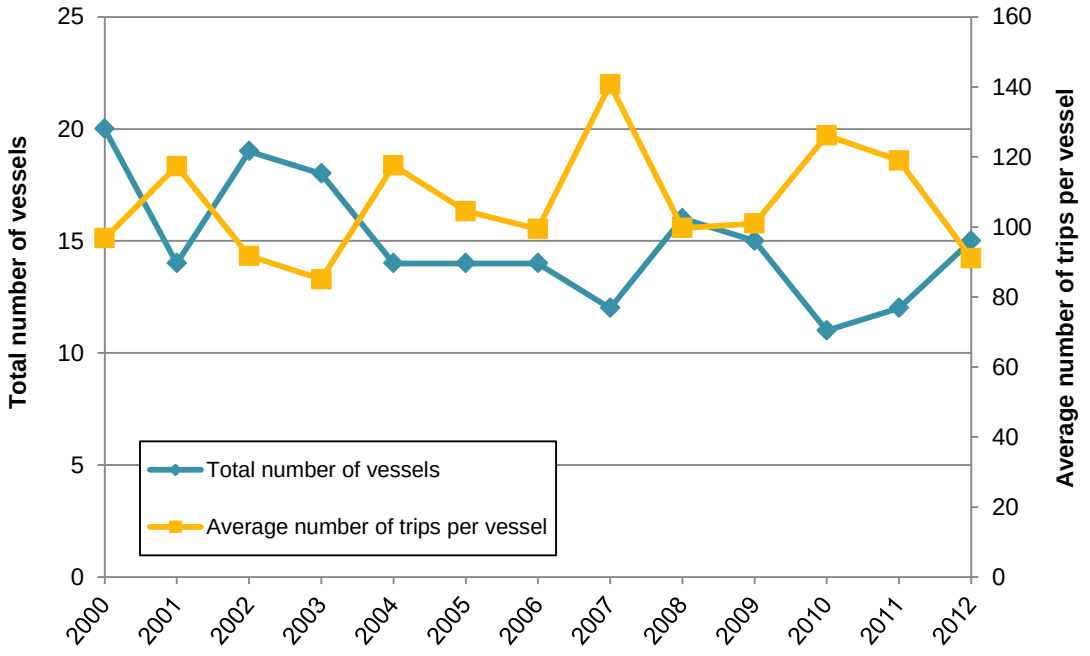
On average annually over 2000–2012, there were 38,882 total CPFV anglers taking a total of 1,564 trips, serviced by 15 vessels each making on average of 105 trips over the year and carrying and average of 25 anglers per trip out of Dana Point.

The number of vessels operating out of Dana Point has been variable over the study period, beginning with a high in 2000 of 20 vessel which fell by a quarter to 15 vessels in 2012, see Figure 33. The average number of trips per vessel varied as well, though in opposite directions; in other words, when the total number of vessels increased, the number of trips per vessel decreased and vice versa. For example, when vessels were near their lowest at 12 vessels in 2007, the average number of trips per vessel maxed out over the entire study period at 141 trips each on average.

The total number of trips in Dana Point generally decreased (by 29.4 percent) from 2000 to 2012 while the average number of anglers per trips simultaneously increased overall, see Figure 34. From a high of 1,936 total trip in Dana Point in 2000 to a low of 1,366 by 2012, the average number of trips for any given year over the study period was 1,564 trips.

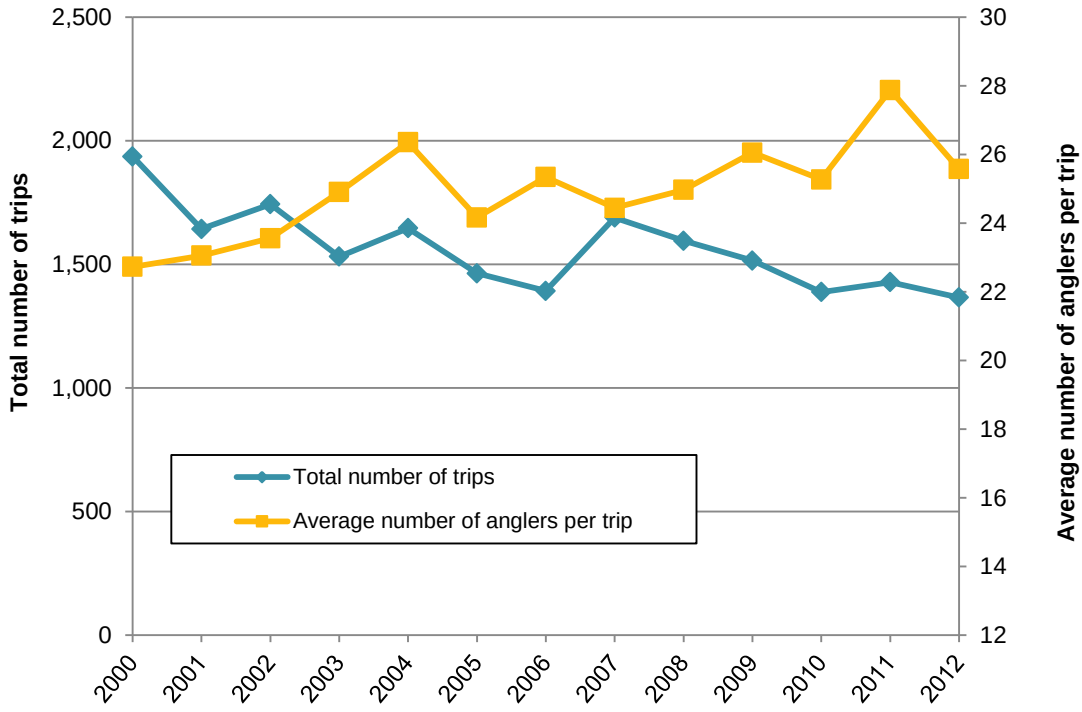
The total number of CPFV anglers in Dana Point followed a similar trend over the study period, see Figure 35, decreasing by 20.6 percent overall. In 2000 there were 43,996 total anglers (a study period high), which fell to a low of 34,931 by 2012; the average annual number of anglers out of Dana Point was 38,882.

Figure 33. Total number of CPFV vessels and average number of trips per vessel, Dana Point, 2000–2012



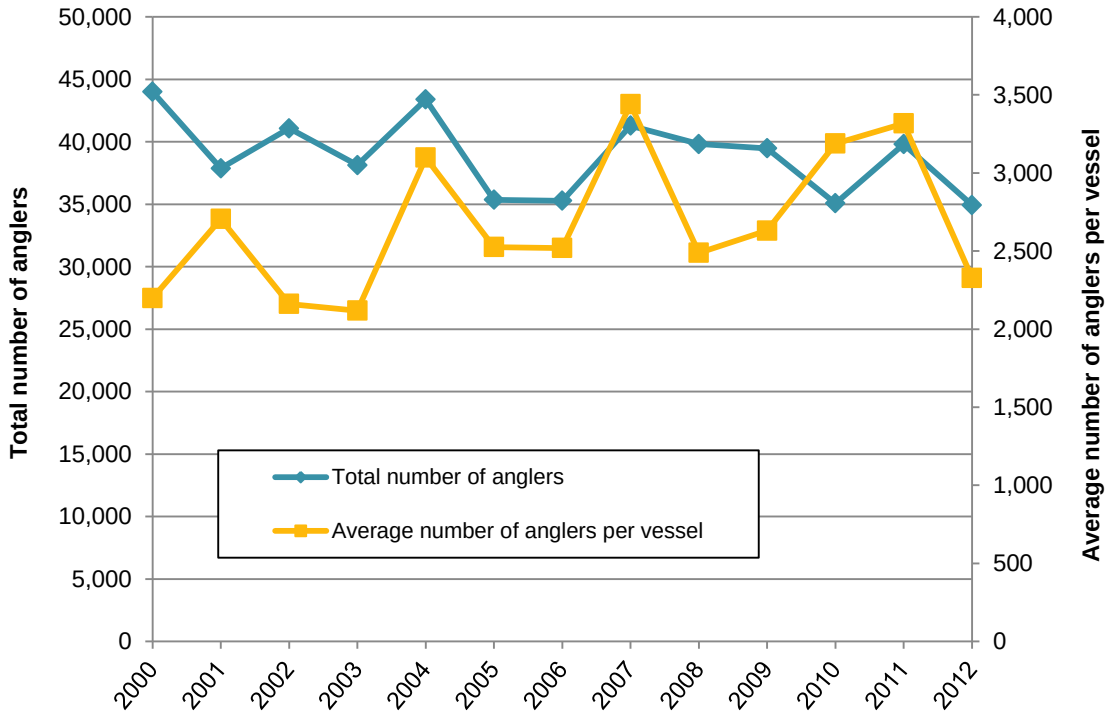
Source: CDFW CPFV logbook data

Figure 34. Total number of CPFV trips and average number of anglers per trip, Dana Point, 2000–2012



Source: CDFW CPFV logbook data

Figure 35. Total number of CPFV anglers and average number of anglers per vessel, Dana Point, 2000–2012

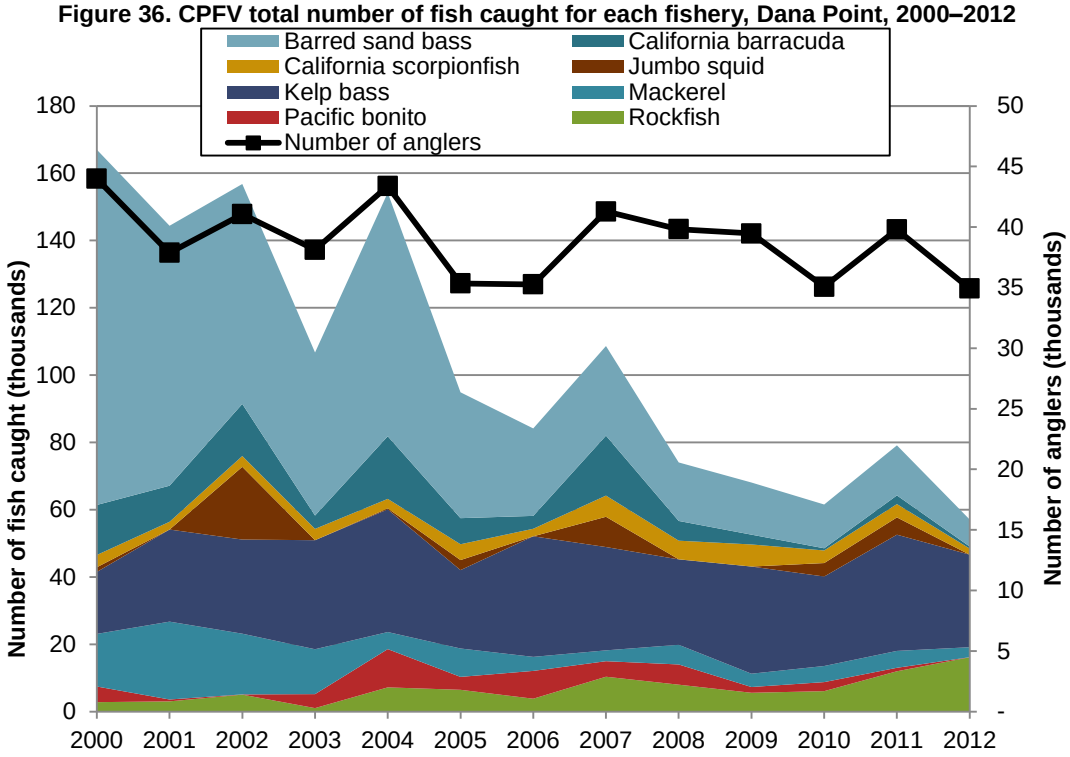


Source: CDFW CPFV logbook data

As seen in Figure 36, on average over the study period the top three fisheries caught in Dana Point were barred sand bass (40,608 fish caught on average annually), kelp bass (29,102 fish), and mackerel (8,741 fish). Barred sand bass was more prevalent in the first half of the study period, constituting 46.2 percent of total fish caught in the port group from 2000–2005 on average annually and 20.4 percent over 2006–2012. In the meanwhile, kelp bass caught became an increasing portion of total catch from 10.6 percent of total fish caught in 2000 to 40.6 percent in 2012. Rockfish caught also increased in the last few years of the study period as it constituted 23.8 percent of total catch in Dana Point by 2012. The total number of anglers overall varied over the study period, declining by 20.6 percent from 43,996 anglers in 2000 to 34,931 anglers in 2012.

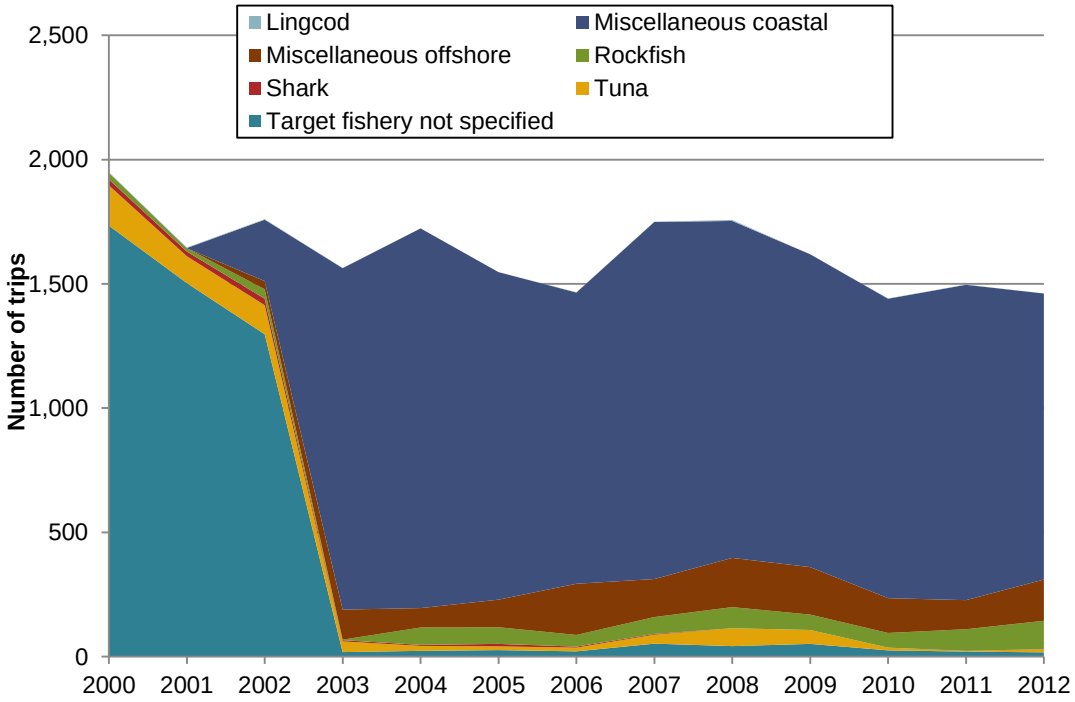
Figure 37 displays the total number of CPFV trips for each target fishery in this port over the study period. From 2003 onwards, once target fisheries were more specified, the vast majority of anglers (82.6 percent) targeted miscellaneous coastal fish out of Dana Point.

Figure 36. CPFV total number of fish caught for each fishery, Dana Point, 2000–2012



Source: CDFW CPFV logbook data

Figure 37. Total number of CPFV trips for each target fishery, Dana Point, 2000–2012



Source: CDFW CPFV logbook data

4.7. Oceanside

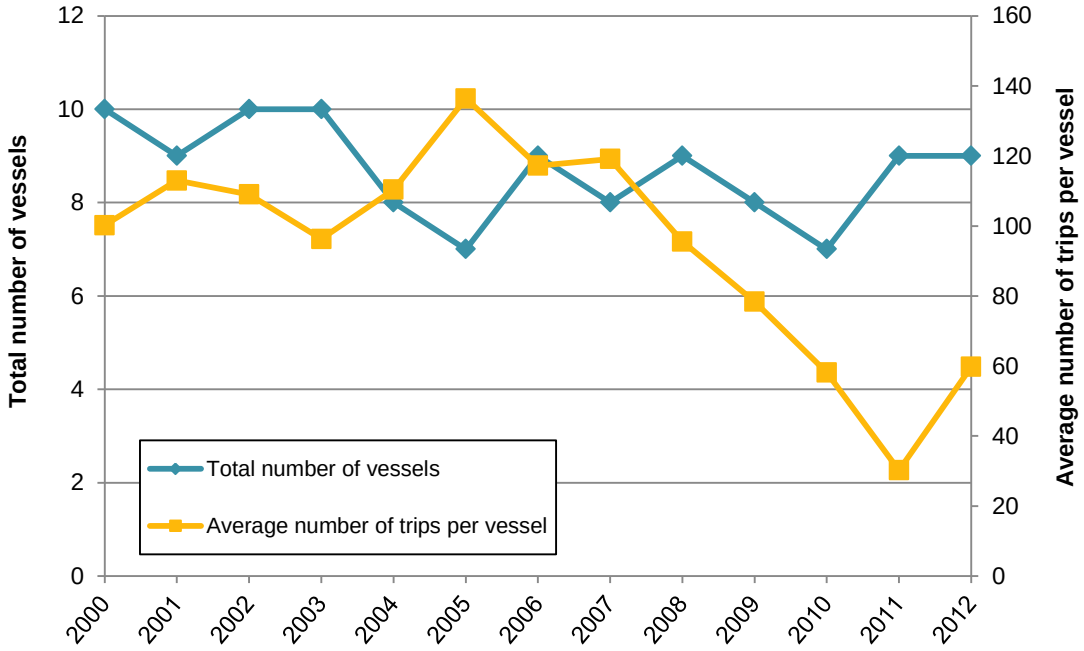
Oceanside is the northernmost city in San Diego County, located roughly 35 miles north of San Diego and 83 miles South of Los Angeles (City of Oceanside, 2013). According to the 2010 U.S. Census, the population of Oceanside was 167,086 with a median age of 35.2 years. The estimated per capita income (2007–2011) was $27,674 (US Census Bureau, 2010). Oceanside has over 900 permanent slips and 50 transient slip, all of which maintain a high occupancy rate. Both residents and tourists can fish without a license off the municipal pier. Additional facilities at Oceanside Harbor include a fuel dock, launch ramp, bait receiver, and CPFV businesses that operate day and overnight trips (San Diego Coast Life, 2013).

On average annually over 2000–2012, there were 17,491 total CPFV anglers taking a total of 817 trips, serviced by 9 vessels each making an average 94 trips with 21 anglers per trip out of Oceanside. The number of vessels operating out of Oceanside varied slightly over the study period, ranging from 7–10 overall, with an annual average of 9 vessel overall, see Figure 38. The average number of trips per vessel fluctuated in turn relatively consistently until 2009 onwards when trip numbers declined at a faster pace. Usually when vessel numbers decline the average number of trips per vessel increases, however 2010–2012 saw record lows from 30–60 trips per Oceanside CPFV vessel on average. However, general trends began increasing again in the final year of the study period (2012).

Figure 39 displays the decreasing total number of trips in Oceanside from 2000 to 2012, with great declines between study period highs and lows (with a high of 1,090 observed in 2002 and a low of only 272 trips made in 2011). The average number of anglers per trip experienced similar declines, falling to 13 (2011) from 25 (2000).

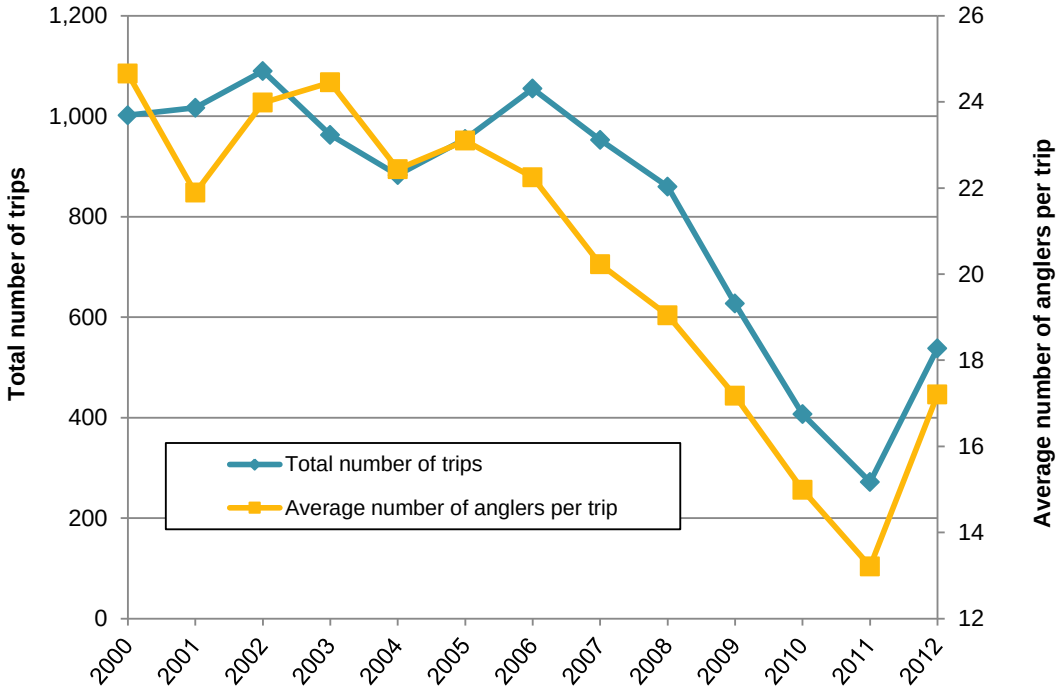
The total number of CPFV anglers in Oceanside also fell considerably, see Figure 40, with a high of 26,141 observed in 2002 to a low of 3,593 total anglers observed in 2011. This port experienced a relatively dramatic decline in the number of CPFV trips and anglers compared with other ports in the region. Consultation with the Oceanside CPFV should be made to determine the potential causes of the decline.

Figure 38. Total number of CPFV vessels and average number of trips per vessel, Oceanside, 2000–2012



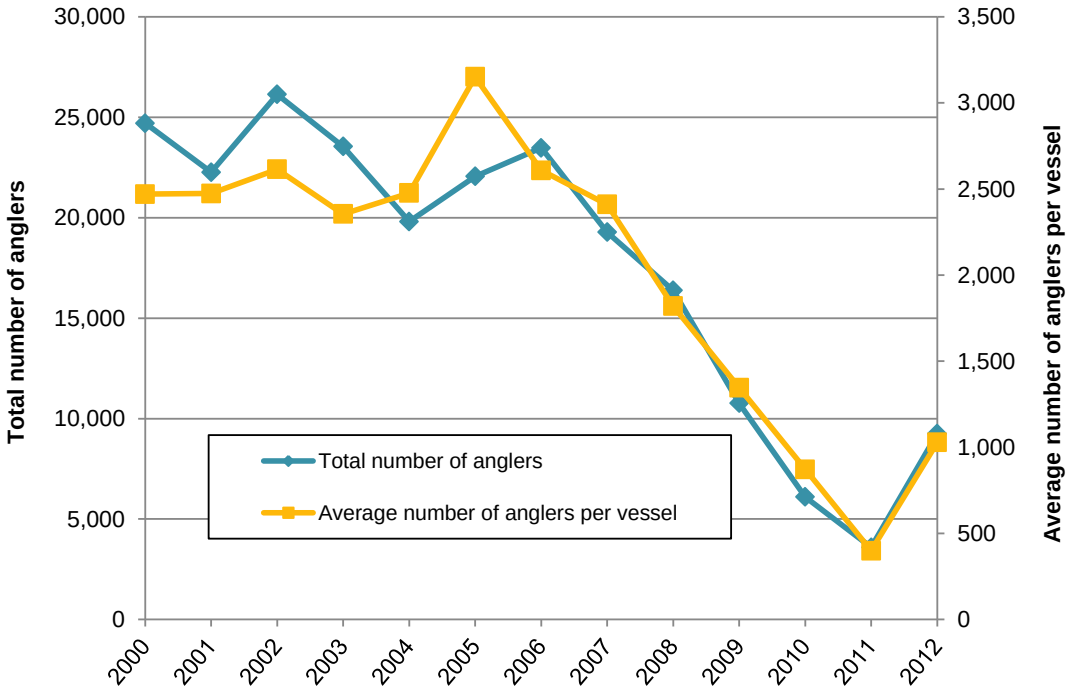
Source: CDFW CPFV logbook data

Figure 39. Total number of CPFV trips and average number of anglers per trip, Oceanside, 2000–2012



Source: CDFW CPFV logbook data

Figure 40. Total number of CPFV anglers and average number of anglers per vessel, Oceanside, 2000–2012

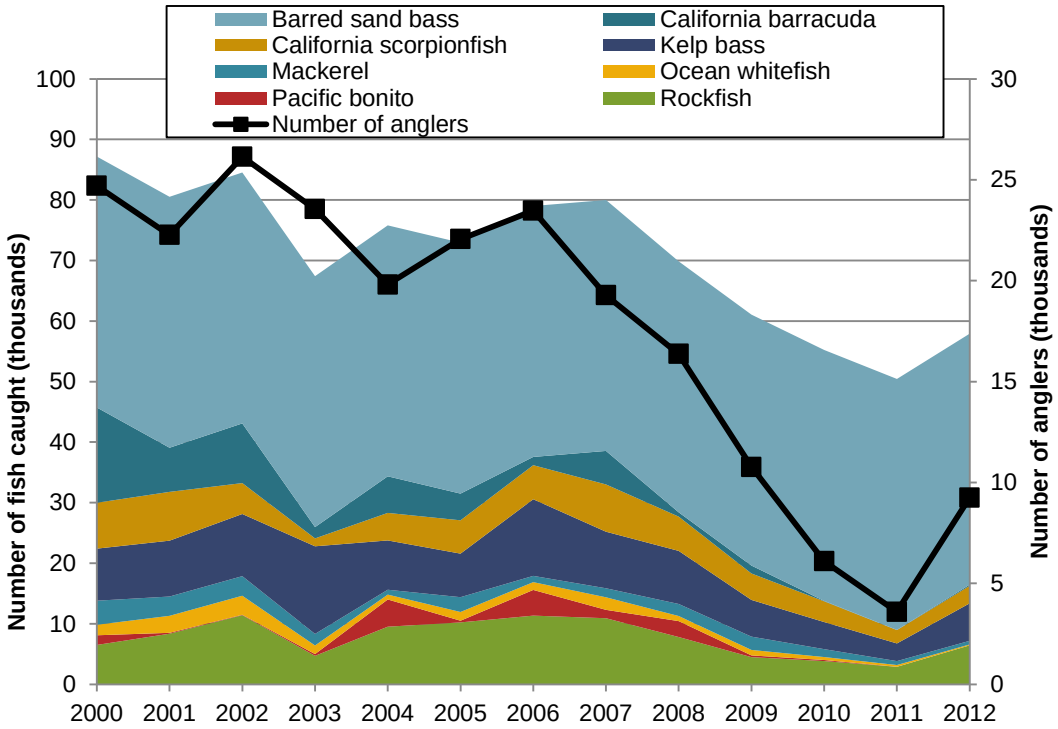


Source: CDFW CPFV logbook data

As seen in Figure 41, on average over the study period the top three fisheries caught in Oceanside were barred sand bass (41,451 fish caught on average annually), kelp bass (8,332 fish), and rockfish (7,572 fish). Unlike most South Coast ports which experienced a decline in the percent of barred sand bass caught over the study period relative to total catch, in Oceanside this fishery represented 45.4 percent of total catch in 2000 and grew to represent 66 percent by 2012. However, total numbers of fish overall dropped significantly in all fisheries over the study period overall by 31.2 percent. The total number of anglers overall declined by twice that amount, 62.5 percent, representing the largest decline among South Coast ports over this study period, as previously discussed.

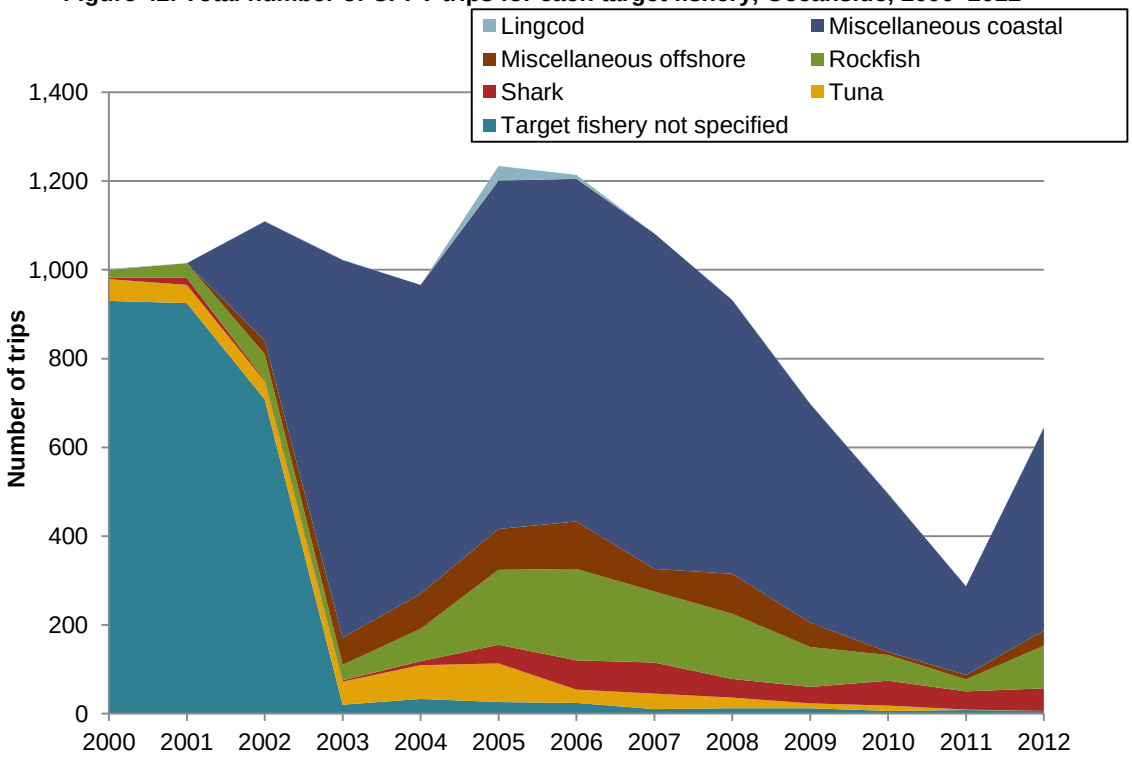
Figure 42 displays the total number of CPFV trips for each target fishery in this port over the study period. From 2003 onwards, once target fisheries were more specified, the vast majority of anglers (70.1 percent) targeted miscellaneous coastal fish out of Oceanside. Rockfish were also pursued for an average of 13.8 percent trips annually out of Oceanside from 2005–2012.

Figure 41. CPFV total number of fish caught for each fishery, Oceanside, 2000–2012



Source: CDFW CPFV logbook data

Figure 42. Total number of CPFV trips for each target fishery, Oceanside, 2000–2012



Source: CDFW CPFV logbook data

4.8. San Diego

The city of San Diego is the eighth largest city in the United States and according to the 2010 U.S. Census, the population of San Diego was 1.3 million and the estimated per capita income (2007–2011) was $33,135 (US Census Bureau, 2010). The ports of Point Loma, Mission Bay, and La Jolla all lie within San Diego and are therefore included within the above statistics. The San Diego port group also consists of Chula Vista, National City, and Imperial Beach, all of which are located around the San Diego Bay; according to the 2010 Census the population of these cities were 243,916, 58,852, and 26,324, respectively. Of these three cities Chula Vista had the highest estimated per capita income (2007–2011) ($25,419), followed by Imperial Beach ($20,175) and National City ($16,611) (US Census Bureau, 2010).

There are many options for recreational fishing in the San Diego area, including seven public piers, which require minimal gear and no fishing permit. Additionally, there are many CPFV operations that offer a range of fishing trips from half day to multiple day trips. Some operations also offer long range fishing trips that span up to three weeks and travel down the Baja coat as far as 1,000 miles from San Diego. Tourists can have their catch processed and preserved for them at Point Loma Seafood if they are unable to do so themselves (San Diego Tourism Authority, 2013). Mission Bay is a popular tourist destination and home to Sea World and Mission Bay Park, the largest man made aquatic park in the country. La Jolla's primary attractions are its beaches, which offer swimming, surfing, and snorkeling opportunities to tourists and locals alike. Mission bay offers sport fishing trips and several CPFV operations run half day, full day, and multi-day trips as well as winter whale watching tours (San Diego Tourism Authority, 2013).

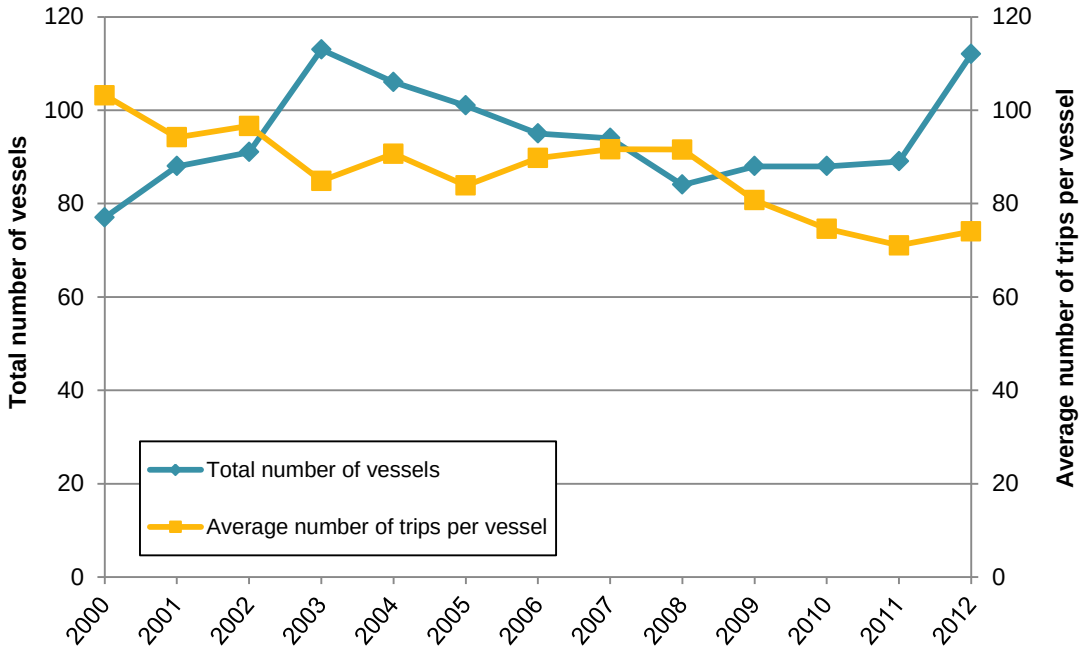
The San Diego port group was the most popular CPFV port in the South Coast over the study period. On average annually over 2000–2012, there were 174,772 total CPFV anglers taking a total of 8,141 trips, serviced by 94 vessels each making an average of 86 trips over the year and carrying an average of 21 anglers per trip out of the San Diego port area.

The number of vessels operating out of San Diego increased overall by 45.5 percent over the study period starting with 77 vessels operating in the port in 2000 to 112 vessels in operation by 2012, see Figure 43. The average number of trips per vessel however has been decreasing with from a peak in 2000 of an average of 103 trips per vessel to a low in 2011 of 71 trips per vessel.

The total number of trips in San Diego is variable from 2000 to 2012 with a peak in 2004 with 9,613 trips to a low in 2011 with 6,323 trips. Figure 44 also display that the average number of anglers per trip, which varied very little ranging from 20–23 over the study period.

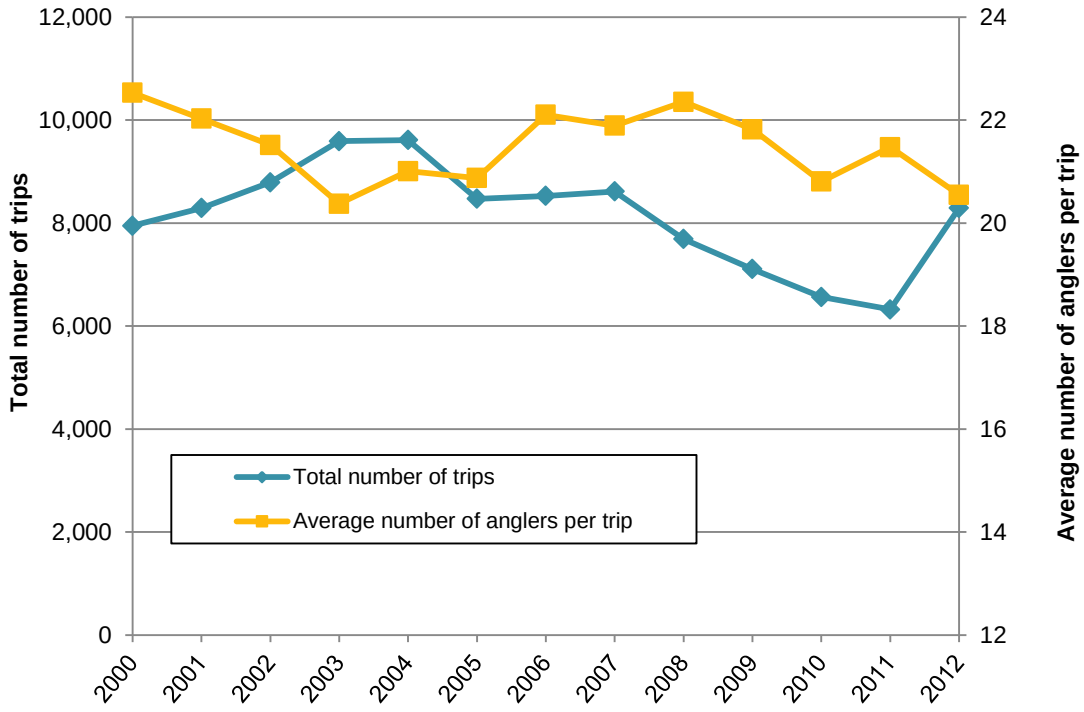
The total number of CPFV anglers in the San Diego port group, and subsequently the total average number of anglers per vessel, generally declined from 2000 to 2012, see Figure 45. In 2004, the total number of anglers in San Diego peaked at 201,949 then fell to a study period low of 135,776 by 2011. In 2012 there were a total of 170,419 anglers out of the San Diego port group averaging 1,522 anglers per vessel.

Figure 43. Total number of CPFV vessels and average number of trips per vessel, San Diego, 2000–2012



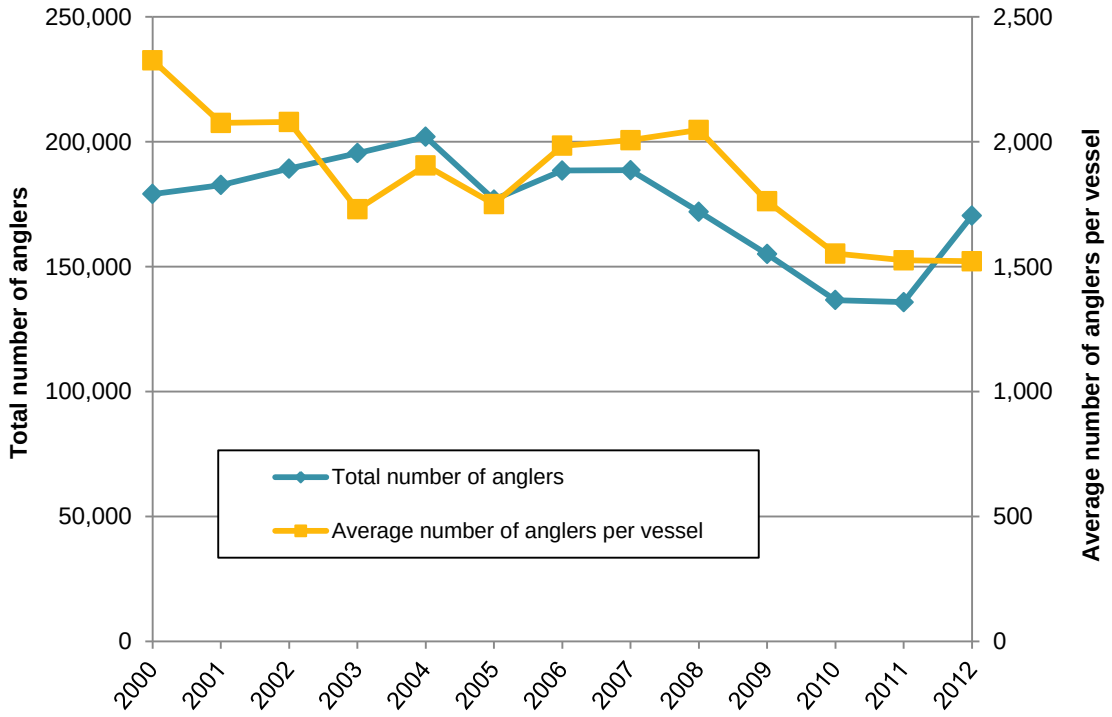
Source: CDFW CPFV logbook data

Figure 44. Total number of CPFV trips and average number of anglers per trip, San Diego, 2000–2012



Source: CDFW CPFV logbook data

Figure 45. Total number of CPFV anglers and average number of anglers per vessel, San Diego, 2000–2012

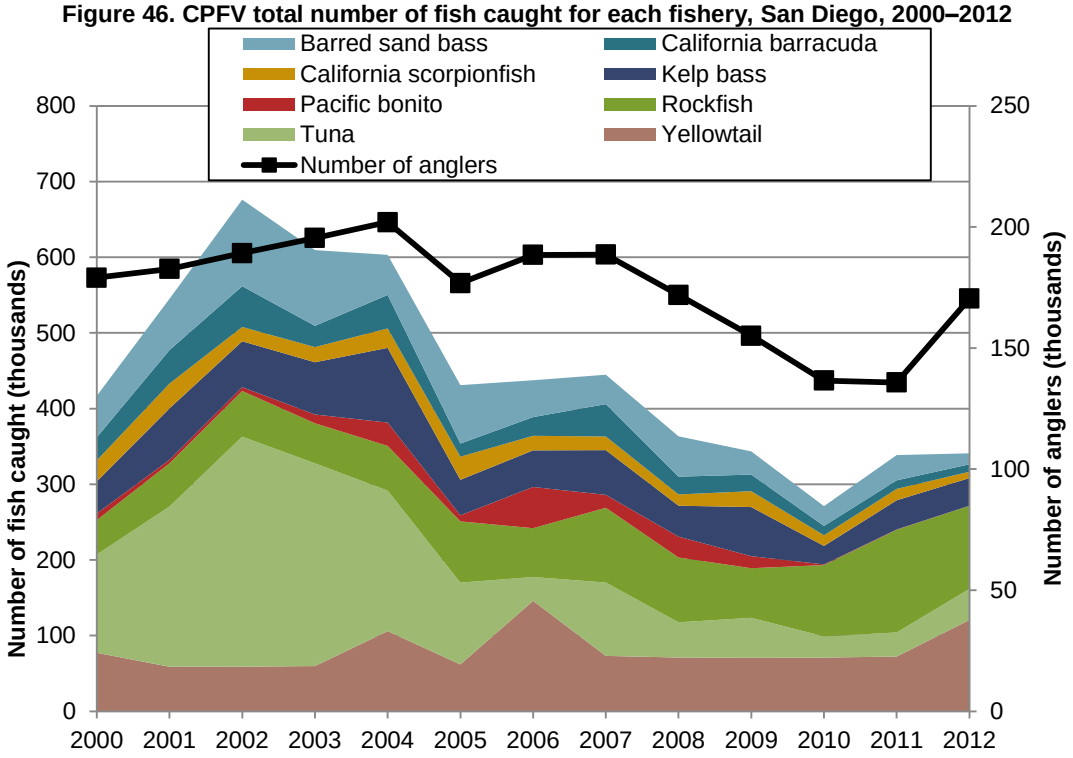


Source: CDFW CPFV logbook data

As seen in Figure 46, on average across the study period the two major fish caught by CPFV anglers in San Diego were tuna (21.9 percent of total catch, 118,150 fish on average annually) and yellowtail (18.3 percent of total catch, 80,606 fish on average annually). San Diego was unique among South Coast ports in the numbers of fish caught for these two specific fisheries. The total number of fish caught has been variable with a peak of 716,791 fish caught in 2002 and a low of 291,387 fish caught in 2010. By 2012, yellowtail (120,673 fish) represented 33.9 percent of total catch (355,742 fish), followed by rockfish (109,800 fish, 30.9 percent of total catch), tuna (41,072 fish, 11.4 percent of total catch), and kelp bass (36494 fish, 10.3 percent of total catch).

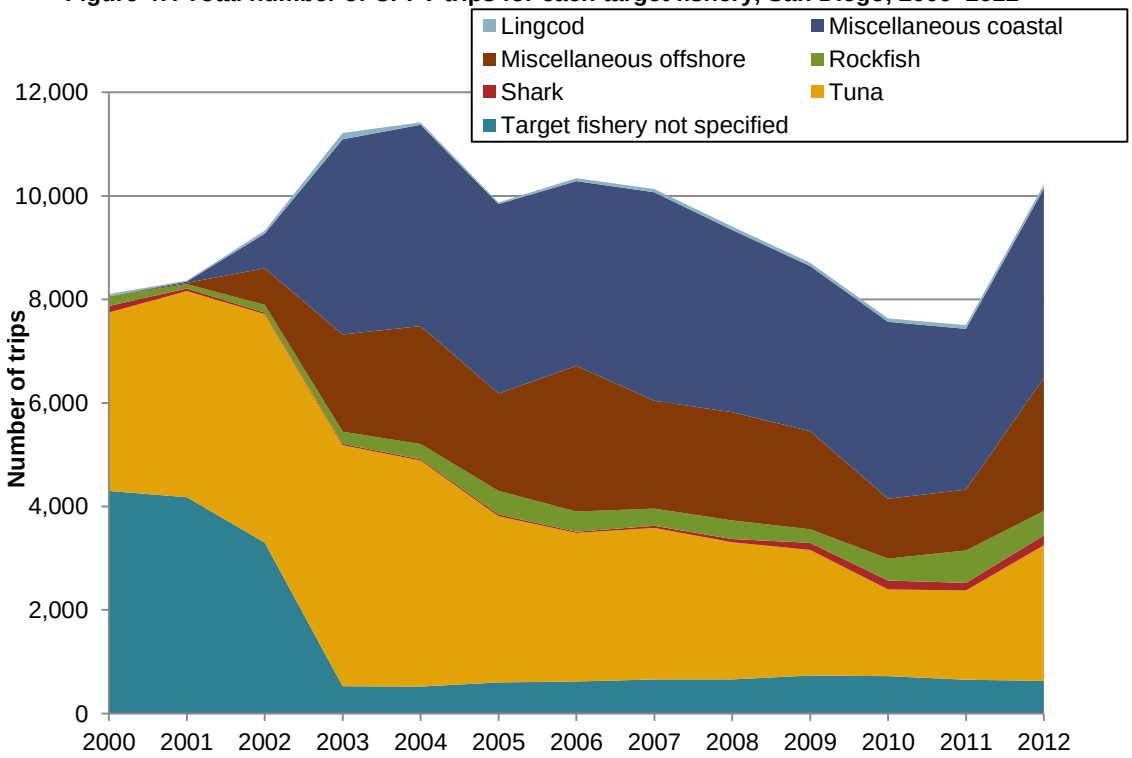
While most South Coast ports did not have a target fishery specified for the vast majority of their CPFV trips in the first two years of the study period, nearly half of San Diego trips were tuna trips (45.8 percent on average annually from 2000–2002), see Figure 47. Though tuna targeted trips declined by 2012 (25.6 percent of all trips), this fishery remained a consistent target throughout the study period. In 2012, other popular target fisheries included miscellaneous coastal (35.8 percent) and miscellaneous offshore (25.2 percent).

Figure 46. CPFV total number of fish caught for each fishery, San Diego, 2000–2012



Source: CDFW CPFV logbook data

Figure 47. Total number of CPFV trips for each target fishery, San Diego, 2000–2012



Source: CDFW CPFV logbook data

5. SOUTH COAST CPFV SPATIAL BASELINE AND INITIAL CHANGES

In this section we provide maps derived from CDFW CPFV logbook data to display spatial fishing patterns of specific CPFV fisheries at the port and region level. In CDFW CPFV logbooks, operators are asked to indicate the 10x10 nautical mile fishing block they caught the most fish in for each trip and all fishing trip data are then associated with this fishing block location. Using this data, we developed two series of heat maps: the first set are maps depicting the number of anglers fishing in specific CDFW fishing blocks and the second series of maps depict the number of fish caught in specific CDFW fishing blocks.

Within these two series of heat maps we created both pre MPA maps depicting average annual values over the time period of 2000–2011 and post MPA maps for the year 2012. Furthermore, we also created a spatial change map depicting the change in value between pre MPA and post MPA periods. These spatial change maps were developed by subtracting pre MPA values from post MPA values (e.g., post MPA – pre MPA) and depict increases or decreases in the number of anglers or fish caught in CDFW fishing block areas.

We would like to highlight that the pre MPA period is an average over 12 years (2000-2011) where much variability could have occurred year to year—yet here we simply utilize an average across these years. Furthermore, 2012 is but only one post MPA year. Many factors influence the number of anglers and fish caught in the CPFV sector year to year and thus with only one post MPA year available it is difficult to make any robust analyses as to the status of the CPFV sector from pre to post MPA periods. Furthermore, changes between pre and post MPA periods are not necessarily a direct impact from the implementation of MPAs and we would like to emphasize that these maps should not be interpreted as such. Instead the spatial change maps we present serve as an example of how spatial pre and post MPA data can be analyzed to assess initial spatial changes since MPA implementation but any causation as to these changes are not assessed.

In total we created 274 maps and spatial data sets to illustrate historical fishing patterns, a baseline of fishing patterns immediately following MPA implementation, and initial change in fishing patterns between pre and post MPA periods.

It is important to note that only one CDFW fishing block can be indicated on CPFV logbook for each trip. Therefore, fishing may have occurred in multiple blocks however the fish caught and the number of anglers on an entire trip are associated with this primary fishing block location. For example, if both tuna and rockfish were caught on a trip but the fishing block associated with that trip was the location in which tuna were caught; the same fishing block where tuna were caught will show that rockfish were caught in that location even if they were caught in a different location. This is a limitation of the CPFV logbook data, however, these data are the best available information to describe the spatial fishing patterns of the South Coast CPFV fleet.

Table 1 indicates if map products and spatial data sets depicting the number of anglers fishing in given CDFW fish blocks are available. These maps were developed for a given trip target species (or for all trip types combined) at the port and region level. Maps were made only if the trip target species made up at least 5 percent of the number of anglers in a given port.

Table 2 indicates if map products and spatial data sets depicting the number of fish caught in given CDFW fish blocks are available. These maps were developer for a given fishery (or for all fisheries combined) at the port and region level. Maps were made only if the given fishery made up at least 5 percent of the fish caught in a given port. All fisheries only include all the fisheries listed in Table 2. A detailed listing of the exact species included in fishery grouping (e.g., Rockfish) are detailed in the MS excel file associated with this report.

For all maps if a ‘yes’ is indicated this means that pre MPA, post MPA, and spatial change maps were all created. All PDFs of the map products are included in the separate Map Appendix of this report. The GIS data layers with associated metadata of these spatial data sets are also available and were included in the deliverables package of this project which can be found on the OceanSpaces website: (http://oceanspaces.org).

Overall between pre and post MPA periods the number of fish caught relatively increased the most around the Channel Islands—particularly on the north side of Anacapa Island. Other relatively large increases in the number of fish caught occurred in the coastal areas offshore at Port Hueneme, Point Magu state park, and at Huntington Beach between Long Beach and Newport. Relatively larger decreases in the number of fish were observed on the northeast side of Catalina Island, in the coastal areas between Dana Point and Oceanside, and in the south portion of Point Loma in San Diego. Overall an increase in the number of rockfish caught occurred through the coastal areas of the study region. However, the number of barred sandbass caught decreased throughout the coastal areas of the region.

Spatial change in the number of anglers mainly occurred within the miscellaneous coastal target fishery. Similar to the spatial change in the number of fish caught, large relative increases in the number of anglers were observed around the Channel Islands—particularly the north side of Anacapa Island. Large relative increases were also observed off the coastal areas of Port Hueneme and Point Magu state park, in Santa Monica bay, off Huntington Beach, and the San Diego/Mission Bay area. Large relative decreases in the number of anglers occurred in the coastal waters directly offshore of Newport Beach where the Crystal Cove SMCA and Laguna Beach SMR are located.

Table 1. Number of anglers by trip target species: Pre MPA, post MPA, and spatial change map products and spatial data sets available

Port Group	TRIP TARGET SPECIES				
	Rockfish	Lingcod	Miscellaneous coastal fish	Miscellaneous offshore fish	All trip types combined
Santa Barbara	yes	yes	yes	yes	yes
Ventura	yes	yes	yes	yes	yes
Oxnard/Port Hueneme	yes	yes	yes	yes	yes
Los Angeles	yes	-	yes	-	yes
Redondo Beach	yes	-	yes	-	yes
Long Beach	yes	-	yes	yes	yes
San Pedro	yes	-	yes	yes	yes
Newport Beach	-	-	yes	yes	yes
Dana Point	-	-	yes	yes	yes
Oceanside	yes	-	yes	yes	yes
Mission Bay (San Diego)	yes	-	yes	yes	yes
San Diego	-	-	yes	yes	yes
South Coast region	yes	yes	yes	yes	yes

Source: Current study

Table 2. Number of fish caught by fishery: Pre MPA, post MPA, and spatial change map products and spatial data sets available

Port Group	Barred sand bass	California barracuda	California scorpion fish	Kelp bass	Mackerel	Ocean whitefish	Pacific bonito	Rockfish	Scallops	Sanddab	Yellowtail	All fisheries
Santa Barbara	-	-	-	yes	-	yes	-	yes	yes	-	-	yes
Ventura	-	-	-	-	-	-	-	yes	yes	-	-	yes
Oxnard/Port Hueneme	yes	-	-	yes	-	yes	-	yes	-	-	-	yes
Los Angeles	yes	yes	yes	yes	-	-	-	yes	-	yes	-	yes
Redondo Beach	yes	yes	yes	yes	yes	-	yes	yes	-	-	-	yes
Long Beach	yes	yes	yes	yes	-	-	-	yes	-	-	-	yes
San Pedro	yes	yes	yes	yes	-	-	yes	yes	-	yes	-	yes
Newport Beach	yes	yes	yes	yes	-	-	yes	yes	-	-	-	yes
Dana Point	yes	yes	-	yes	yes	-	-	yes	-	-	-	yes
Oceanside	yes	yes	yes	yes	yes	-	-	yes	-	-	-	yes
Mission Bay/San Diego	yes	yes	-	yes	-	-	-	yes	-	-	yes	yes
San Diego	yes	-	yes	yes	-	-	-	yes	-	-	yes	yes
South Coast region	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Source: Current study

6. LESSONS LEARNED AND FUTURE RECOMMENDATIONS

This section reflects on several methodological and overall project lessons learned and recommendations to inform future long-term MPA monitoring efforts.

6.1. Lessons Learned/Future Recommendations

Community Engagement
Originally, this project included conducting interviews with the South Coast CPFV community to gather socioeconomic data and map the fleet's post MPA fishing grounds. Outreach efforts to CPFV port communities were initiated at the project's inception and continued throughout the project. However, due to several factors such as: distrust in how information will be used; dissatisfaction with the MPA network planning process and its outcome; and unclear benefits and outcomes of participating in the project, the CPFV fleet of the South Coast were reticent to participate in any in-person interviews. Understandably, the CPFV fleet needed more time to establish trust and the working relationships necessary to engage in a well-supported and successful data collection effort.

Given the above, this project instead focused on summarizing CPFV logbook data obtained from the CDFW to establish an economic and spatial baseline immediately following MPA implementation and examine historical changes over time. As stated in the introduction, this report thus focuses upon summarizing CPFV logbook data from 2000 to 2012 and we do not provide interpretation as to why changes have occurred over time. This data interpretation should be done in collaboration with CPFV operators and the CDFW staff whom are most knowledgeable as to the factors that influence change in the CPFV fleet over the years. In an effort to provide this data interpretation as well as establish mutually beneficial and collaborative working relationships into the future, the California Ocean Science Trust is working with CPFV leadership and operators in the region to review this report and data interpretation will be provided in a separate report.

In future projects, these issues of trust, project intentions, incentives to participate, and how data will be used may be better addressed up front with strategic and early outreach efforts. Implementing efforts to engage fishermen early on, acknowledging and addressing to the extent possible their concerns, and incorporating fishermen in the overall MPA monitoring design process is key to building the fishing community relationships necessary to conduct long-term socioeconomic studies. This can be done by meaningfully incorporating fishermen into the design of MPA monitoring plans and MPA monitoring projects as this builds trust and transparency and foster a sense of ownership and legitimacy over the data, information, and process which may potentially impact their livelihoods.

A promising model of engaging the fishing community can be found in the approach used in the North Coast region of California in which community engagement began early on and occurred frequently. This proactive approach developed interest and support in MPA monitoring efforts as the community was engaged in shaping the MPA monitoring effort from the ground up and there was clear opportunity to develop community-based projects. This community-wide investment in MPA monitoring efforts from the beginning, even before the request for MPA monitoring proposals is developed is critical to garnering the community investment and support needed to carry out effective MPA monitoring, especially socioeconomic MPA monitoring efforts.

Existing Data Gaps and Future Recommendations
The strength of the CPFV logbook data is that it provides a continual census (or near census based on levels of compliance) of fishing activity. This removes the need for data extrapolation as observed in the recreational fishing or CRFS data, which limits the flexibility in ways the data can be summarized (by geographic extent or fishing location for example). Furthermore, CPFV logbook data are continually provided which enables a time series to be developed to examine historical trends, contextualize the current status of fisheries, and provide the necessary data to model possible future states.

CPFV logbook data is required to be submitted by CPFV vessel operators each month and data can be aggregated at the port as well as statewide level for specific fisheries and overall. In addition to the CPFV

logbook data there is a CDFW vessel registration database that contains additional information specific to vessels (e.g., vessel length, tonnage, etc.) that can supplement the CPFV logbook data. However, there are future improvements that can be made to the CPFV logbook data as well as existing data gaps that are necessary to address to improve long term MPA monitoring and fishery management efforts. These include:

Improve data on location of catch

The location of catch in CPFV logbooks is captured as a single 10x10 nautical mile fish block ID which can be problematic as fish may have been caught in more than one fish block location and also does not provide the fine-scale resolution of data needed to make informed management decision. Also on CPFV trips in which multiple fish species are caught the fish block ID may be misleading as some of the fish species caught on the trip (e.g., trips in which tuna and rockfish are caught on the same trip) may not be located in the same fish block, yet all fish caught on the trip are subsequently associated with the single fish block ID. A possible future improvement can include indicating separate fish block IDs for fish caught to ensure the spatial accuracy of the data.

Collect robust economic data

Comprehensive and continually updated spatially referenced economic data does not exist beyond what is collected in nationwide survey efforts for the CPFV sector. Data is needed on CPFV associated gross revenue, operating costs, employees, and economic multipliers that can be attributed to specific fisheries (or activities such as whale watching) and used to extrapolate the value of CPFV operations overall and specific fisheries/activities to the coastal and overall statewide economy. A significant limitation of current socioeconomic data is that they are collected at one moment in time, are not continually updated, or do not gather data on an operator's full economic portfolio (e.g., fishing and leisure/whale watching activities) and thus, at times, managers must rely upon out of date information to inform fishery management plans. This is not to suggest that all socioeconomic data must be collected each year, however, the establishment of standardized socioeconomic studies conducted over a regular interval, such as done with nationwide studies done by NOAA Fisheries, or incorporated into CPFV logbooks (e.g., such as the cost per angler for a given trip or number of crew) would provide the data needed to regularly and more comprehensively inform fisheries management decisions.

Explore factors that impact economic well being

In this report we largely utilize and aggregate individual CPFV operator data to develop port and region level analyses in order to establish a baseline data set. However, a future recommendation is to conduct more advanced analyses using individual CPFV operator data to explore typologies of CPFV operators such as the specific attributes of CPFV operators (e.g., CPFV operators whom have diversified the fisheries/activities they conduct) and how these types of operators are experiencing and coping with change over time. Specifically, some questions to explore include:

- What type of CPFV operators are doing better or worse over time?
- What attributes do these CPFV operators that are doing better or worse have in common—what do they fish for, have they diversified their activity profile (e.g., offer whale watching), how much do they fish, and what ports are they from?
- What type of fishermen have dropped out of the CPFV fleet over time and why?

We know that the impacts of economic change do not unfold evenly across CPFV operators; some operators are more or less able to cope with change depending on their adaptive capacity. The questions above help explore the CPFV operator attributes that may help us better understand what types of people are successfully coping with change and why they are successful. Understanding this can lead to identifying target areas in which to focus policy efforts that help CPFV operators cope with economic change, such as the change that follows MPA establishment, in order to better maintain viable livelihoods.

Promote consistent data collection across sectors

Ecosystem-based and adaptive management approaches to fisheries management requires robust spatially reference socioeconomic fisheries data in which data across fishing sectors can be readily

integrated and linkages across fishery sectors and across fisheries can be explored alongside biological and ecological data. To do so there is need to develop consistent and comparable data across fishing sectors. For example, the commercial fishing sector collects data on pounds of fish caught while the CPFV and recreational fishing sectors collects data on the number of fish caught which inhibits the ability to integrate the two data sets together. Furthermore, spatial data are often collected at different spatial scales (10x10 nm fish block vs. 1x1 nm fish block), which limits data integration to the use of 10x10 nm fish blocks, which provides a coarse scale spatial resolution on spatial fishing patterns. In order to promote data integration across fisheries and fishing sectors there is need to modify existing data collection programs to consistently collect comparable socioeconomic fisheries data.

Present Fisheries Data in a Dynamic Online Format

As exemplified in the length of this report, there is need to make socioeconomic data accessible, easier to explore, and enable the presentation of dynamic information. The CDFW maintains a large database on commercial, CPFV, and recreational fishing data that provide a wealth of knowledge on California state managed fisheries. To date, these data have largely been summarized to static tables or graphs presented in paper based reports and these reports are often lengthy and the data is presented in various summarized form (e.g. summarized to the fishery vs. the port).

To better enable more robust and dynamic presentation, exploration, and comparison of socioeconomic fisheries data a promising avenue is to develop a socioeconomic data portal in which CDFW socioeconomic fisheries data can be presented (and easily and cost-effectively updated each year) in a way so that researchers, members of the public, and MPA managers can easily explore time series data on key fishery performance indicators. Indeed, an online data portal would provide a format in which to dynamically present information such as flows and linkages that are difficult to present in paper report form. An online portal could also facilitate side-by-side comparison of fisheries, ports, or time periods---allowing technology to advance how we present and investigate large data sets. Furthermore, as better spatial data are collected for fisheries over time, additional time series spatial data could be integrated into this portal to facilitate the exploration of spatial trends and changes over time. An online data portal would provide a cost-effective means in which to continually update socioeconomic fisheries data and create a foundation in which to expand the socioeconomic knowledge base of fisheries.

Advance Digital Data Collection Systems

MPA managers are tasked with using ecosystem-based and adaptive management measures to maximize the ecological and economic benefits of MPA to coastal communities into the future. To do so, requires cost-effective and innovative approaches to collecting robust, fine-scale, and spatially explicit socioeconomic fisheries data that will better enable MPA managers to design, monitor, and adapt MPAs to effectively reach stated goals and objectives.

Current socioeconomic data on state-managed fisheries is fragmented and incomplete which limits the ability of managers to provide a comprehensive understanding of the historical, current, and potential future state of fisheries that surround MPAs. This understanding is necessary so that MPA managers can better develop effective management plans that minimize socioeconomic costs to fisherman livelihoods. Overall, there is great need to collect economic data across all fishing sectors and to conduct regular collection of economic data to continually inform MPA management efforts. Furthermore, significant improvements to spatially referenced catch and effort data can be made to address the limitations highlighted in this report and promote the comparability and utility of existing socioeconomic fisheries data.

Indeed, there is great need to advance current data collection programs toward more streamlined and cost-effective solutions. A promising direction in fisheries data collection is the use of mobile digital data collection technology. Fisheries across the globe are piloting digital logbooks or digital data collection applications using GPS enabled mobile phones or tablet devices. Through these mobile data collection applications, spatial fishing data can automatically be captured using a mobile phone or tablet's GPS unit and associated fishing trip characteristics and economic information may also be digitally captured. This data may then be uploaded to a data server via a cellular data connection after each fishing trip—making data available in near real-time to fisheries managers and fishermen themselves. This type of technology

would enable fisheries managers to closely and actively monitor and manage fisheries performance and effectively implement adaptive management approaches.

In California, digital fisheries data collection technology would benefit both long-term MPA monitoring as well as fisheries management. Both initiatives require cost-effective technology solutions that tighten the feedback loop between data collection and data analysis needed to support adaptive management measures. Together this would better enable innovative management approaches to be piloted, tested, and refined to advance the way we manage fisheries so that management costs are lowered, fish stocks are sustainable, and economic benefits to fishing communities are maximized.

Modernizing fisheries data collection programs will not only streamline data collection and delivery but also allow MPA and fishery managers to quickly update data collection forms to respond to changing information needs and emerging uses. Digital data collection allows for the flexibility needed to develop, test, and refine fisheries data collection programs that can be integrated across fishing sectors as well as with biological and ecological data. This ability to quickly and iteratively adapt data collection programs will be key to developing the robust socioeconomic fisheries data needed to explore bio-economic linkages and dynamics that are foundational to ecosystem-based and adaptive management approaches.

6.2. Recommendations on Key CPFV Monitoring Metrics

On the following page Table 3 presents Point 97's recommendations of key metrics for long-term monitoring within the CPFV sector. To inform the existing monitoring plan structure we included the key monitoring metrics recommended for consumptive uses detailed in the South Coast and South Coast MPA monitoring plans and added additional metrics with an associated rationale.

Table 3. Recommendations for key monitoring metrics in the CPFV sector

Metric	Purpose	Source
Landings (number of fish caught)	This metric is to monitor how many fish are being caught in key CPFV fisheries. This data may be analyzed at the port, region, and state scales so that nested comparisons may be made of trends over time.	CPFV logbook data
Average annual gross revenue from CPFV operations	This metric is to monitor how gross economic revenue levels may be changing over time.	Survey data
Average percent of revenue from key fisheries/activities	This metric is to monitor changes in the average proportion of CPFV operator gross economic revenue relies upon a specific fishery/activity.	Survey data
Operating costs (average yearly percentages)	This metric is to monitor how operating costs may be changing over time. This may be increases/decreases in fuel costs, equipment costs, maintenance costs, crew costs, etc. From this information changes in net revenue for individual CPFV operators may be calculated. These operating cost percentages may also be used to help estimate secondary economic impacts upon CPFV support industries.	Survey data
Total number of CPFV vessels operating	This metric is to monitor how many vessels are operating, each year. This data may be analyzed at the port, region, and state scales so that nested comparisons may be made of trends over time.	CPFV logbook data
Total number of CPFV fishing trips	This metric is to monitor changes in the number of CPFV fishing trips that are being conducted each year as this is an indicator of economic conditions. This data may be analyzed at the port, region, and state scales so that nested comparisons may be made of trends over time.	CPFV logbook data
Total number of anglers	This metric is to monitor how many anglers are taking CPFV trips each year as this is an indicator of economic conditions. This data may be analyzed at the port, region, and state scales so that nested comparisons may be made of trends over time.	CPFV logbook data
Catch per unit effort (CPUE)	This metric is to monitor the average amount of fish caught per unit of effort. This metric is useful in helping determine changes in fish abundance or the success of fishing trips which is related to customer satisfaction. This metric may be calculated by dividing the number of fish caught (landings) by the number of trips or the number of anglers.	CPFV logbook data
Number of anglers per trip	This metric is to monitor the average number of anglers participating in each CPFV fishing trip as this is an indicator of economic conditions. This metric may be calculated by dividing the total number of anglers by the total number of trips. This data may be analyzed at the port, region, and state scales so that nested comparisons may be made of trends over time.	CPFV logbook data
Spatial value of fishing area	This metric is to monitor changes in how coastal/ocean areas are being utilized and valued by CPFV operators. Data may be analyzed with previous spatial data sets to determine spatial shifts in the value of fishing areas for key fisheries	Survey data
Attitudes and perceptions	This information is to monitor and collect contextual information that may help identify key CPFV issues and factors driving the change observed in the metrics listed above.	Survey data/focus groups
Job satisfaction/ Well-being/ Quality of life	These social metrics are important to monitor as economic metrics may not reveal changes in personal well-being. For example, a fisherman may be making the same amount of revenue from one year to the next, but his/her quality of life may decline in increased work hours or travel time in order to do so.	Survey data/focus groups

7. CONCLUSION

We would like to emphasize again that the purpose of this report is not to measure or assess the economic impact of MPAs on the CPFV fleet in the region. The intention of this report was to provide data on historical trends, a MPA baseline characterization, and description of initial changes since MPA implementation of key target fisheries and ports of the CPFV sectors in the California South Coast region.

It is difficult to discern the effects of MPAs on fishing communities as they are confounded by a multitude of factors such as other regulatory constraints (e.g., area based closures, quota limits, and limited entry fisheries) and general economic downturn, environmental variability/change, market variability, and increasing competition for marine space. However, advancing our understanding of how humans utilize, value, and rely upon marine space will be critical to unraveling these interconnections as well as monitor how MPAs are benefitting or impacting fishing communities into the future. This information may then be used in adaptive management measures to improve the performance of MPAs towards meeting ecological and socioeconomic goals.

Similarly, it is our hope that the data summarized and lessons learned through this project will be applied to future MPA monitoring efforts to build a time series data set on how human uses and the socioeconomic health of fishing communities are changing over time. Such a robust and longitudinal data set that provides both socioeconomic characterization and spatial fishing patterns on consumptive human uses could be used for a wide array of marine spatial planning application including the monitoring of MPAs into the future.

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APPENDIX A: CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE CPFV LOGBOOK

SKIPPER'S LOG BOOK

ATTENTION

California laws and regulations state that the owner and license holder of a commercial passenger fishing vessel shall keep and submit a complete and accurate record of fishing activities on catch logs provided by the Department of Fish and Game. Catch logs shall be filled out before the end of each fishing trip, and original copies sent to the Department in postpaid envelopes provided with the catch logs. If no fishing is done during a month, the "I Did Not Fish During the Month of" block on the back of the postpaid envelope must be filled out and sent in. The logs or record of no fishing activity shall be forwarded to the Department on or before the 10th day of each month following the month to which the catch logs or record of no fishing pertain. (California Code of Regulations, Title 14, Section 190)

MARINE SPORT FISHING
SOUTHERN CALIFORNIA

NOTICE

1. Commercial Passenger Fishing Vessel catch information is collected by the California Department of Fish and Game pursuant to Fish and Game Code Section 7923 and CAC, Title 14 Section 225.7.

2. The maximum punishment for failure to comply with the above code sections is a fine of $500 or six months in county jail or both (Fish and Game Code Section 12002).

3. Commercial Passenger Fishing Vessel catch information is used for resource analysis, resource management, and is disseminated monthly and annually in a summarized form.

4. Commercial Passenger Fishing Vessel catch information is held in confidence in accordance with Fish and Game Code Section 8022.

5. Every individual has the right of access to his or her own information (Information Practices Act 1977, California Civil Code).

6. The information collected, processed, and filed pursuant to the above Fish and Game Code and CAC, Title 14 Sections is under the supervision of the Marine Fisheries Statistical Unit, telephone (562) 342-7130, located at:

CALIFORNIA DEPARTMENT OF FISH AND GAME
MARINE FISHERIES STATISTICAL UNIT
4665 Lampson Avenue, Suite C
Los Alamitos, California 90720

IMPORTANT INSTRUCTIONS

1. Please make out a separate log for **each trip** during a day or for **each day** of a multi-day trip. Please note that logs are required for all fishing trips into Mexican waters originating from California ports.
2. Please print neatly in black ink using block-style numbers and **CAPITAL LETTERS ONLY**. Print the vessel name, vessel number, port of landing, and port code clearly. Stay **entirely** within the boxes when filling in numbers or check marks.
3. Prior to departure, record the total number of crew members that will fish on the trip, including the skipper (operator), at the bottom right of the log, after the operator's signature.
4. Check the appropriate boxes for Target Species, Fishing Method, Bait, Trip Type, and Bird Interactions. Bird interactions consist of birds eating chum, bait on a hook or the hooked fish.
5. Departure and return times should be in military time, i.e. 06:20 hours, 23:15 hours, etc.. The date of the trip should be the day you departed the dock.
6. On multi-day trips, fill out a log for each day of the trip. Enter the appropriate date on each log. Record departure time only on the day of departure and enter a 25:99 in the return time box (unless an unscheduled return is made the same day). On the day of return, record return time only and enter a 25:99 in the departure time box. Between the day of departure and the day of return, enter a 25:99 in both the departure and return time boxes. Enter hours and minutes fished only on those days that fishing occurs.
7. Record the total number of fishers who **will** fish on the trip. This shall include passengers, operators, crew, and non-paying guests who will fish.
8. Record the Origin Block number, Depth in feet, and Sea Surface Temperature in degrees Fahrenheit (°F) where most of the fish are caught or if no catch is made, where most of the fishing takes place.
9. Record the total number of each species of fish taken, thrown back or lost to sea lions on each line item, regardless of who landed or released the fish.
10. Print the names and number of any miscellaneous species kept, thrown back or lost to sea lions.
11. Upon completion of the trip, the total number of fish caught and retained by the operator and crew must be recorded in the second space provided following the operator's signature. The fish do not need to be identified by species; all that is needed is the total number of fish taken by operator and crew.

THANK YOU FOR YOUR COOPERATION

CPFV PORT CODES
Southern California

Avalon	741	Marina del Rey	776	San Diego	880
Balboa	764	Mission Bay	869	San Pedro	770
Dana Point	767	Newport Beach	748	Santa Barbara Harbor	611
Huntington Beach	768	Oceanside	883	Santa Monica	747
La Jolla	888	Oxnard/Channel Is. Harbor	608	Seal Beach	760
Long Beach	743	Point Loma	881	Terminal Island	745
Los Angeles	744	Port Hueneme	605	Ventura	613
Malibu	729	Redondo Beach	742	Wilmington	746

OSP 12 127286

SOUTHERN CALIFORNIA

SERIAL #11 S 765251

VESSEL NAME | PORT OF LANDING

VESSEL ID NUMBER | PORT CODE

MONTH DAY YEAR

\- \-

DAY OF WEEK (must also fill in date boxes)

TRIP TYPE

Multi-Day Single Day

TARGET SPECIES
- TUNA
- SHARKS
- ROCKFISHES
- LINGCOD
- SALMON
- MISC. COASTAL
- MISC. OFFSHORE

FISHING METHOD
- TROLLING
- MOOCHING
- ANCHORED
- DRIFTING
- LIGHT TACKLE
- DIVING

BAIT
- ANCHOVIES
- SARDINES
- SQUID
- OTHER

LIVE DEAD

BIRD INTERACTION? YES NO

: : :

DEPARTURE TIME | RETURN TIME | HOURS & MINUTES FISHED | NUMBER OF FISHERS | BLOCK WHERE MOST FISH CAUGHT | DEPTH (FEET) | SEA SURFACE TEMP °F

SPECIES	NUMBER KEPT	NUMBER THROWN BACK	LOST TO SEA LIONS	SPECIES	NUMBER KEPT	NUMBER THROWN BACK	LOST TO SEA LIONS
BARRED 278 SAND BASS				ALBACORE 005			
CALIFORNIA 260 SCORPIONFISH				BARRACUDA 130			
CABEZON 261				BLUEFIN TUNA 004			
HALFMOON 478				DOLPHIN FISH 481			
KELP BASS 277				PACIFIC BONITO 003			
LINGCOD 195				PACIFIC 051 MACKEREL			
OCEAN 490 WHITEFISH				SKIPJACK 002			
SHEEPHEAD 145				WHITE 435 CROAKER			
BLUE 665 ROCKFISH				WHITE 400 SEABASS			
BOCACCIO ROCKFISH 253				YELLOWFIN TUNA 001			
CANARY 247 ROCKFISH				YELLOWTAIL 040			
COPPER 655 ROCKFISH				CALIFORNIA HALIBUT 222			
COWCOD 245 ROCKFISH				SANDDAB 225			
GOPHER 263 ROCKFISH				LOBSTER 820			
WIDOW 269 ROCKFISH				ROCK 718 SCALLOP			
YELLOWEYE 265 ROCKFISH							
UNSPECIFIED ROCKFISH 250							

OPERATOR'S NAME (PRINT) | OPERATOR'S SIGNATURE | Number of crew who fished | Number of fish caught by crew

F&G 656 (1/11)

ORIGINAL= DEPT. OF FISH & GAME COPY ******** DUPLICATE = SKIPPER'S COPY