



Economic Impact of the Recreational Fisheries on Local County Economies in Cordell Bank National Marine Sanctuary 2010, 2011 and 2012

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Abstract

This report estimates the economic impact or contribution of recreational fishing within the Cordell Bank National Marine Sanctuary (CBNMS). The methodology applies the IMPLAN input-output model to estimates of total annual expenditures derived by taking estimates of person-days by mode of access (e.g. shore, private/rental boat and commercial passenger fishing vessels) from the State of California's Recreational Fishing Statistics Program and multiplying by NOAA's National Marine Fisheries Service's (NMFS or NOAA Fisheries) expenditure profiles by mode of access. The IMPLAN model is then used to calculate output, income, value-added and employment for the collection of three counties (study area) where most of the economic impact takes place. Economic impacts/contributions are estimated for 2010, 2011, 2012 and the three-year average. Expenditure impacts are estimated separately for trip expenditures and durable good expenditures. Trip expenditures' impacts are appropriate for analyzing regulations or other policy/management alternatives that involve small or marginal changes in fishing effort. This report also presents the trends in person-days of recreational fishing by mode from 2004 through 2012.

The three-year average for 2010 to 2012 finds the total economic impact/contribution from marine recreational fishing in CBNMS to be more than \$342.5 thousand in output, \$217.9 thousand in value-added, \$129.0 thousand in income and 3 jobs. During the study period, 2010 saw the lowest levels of output, value added, income and jobs. Annually on average, CBNMS accounted for 0.7% of the total person-days of marine recreational fishing from California District 4 and 0.02% of the entire State of California's total recreational fishing effort. Recreational private-rental boat fishing accounted for an average of .5% of person-days and commercial fishing passenger boats accounted for 0.7% of all person-days in District 4. Private-rental boat fishing in CBNMS accounted for 0.1% and commercial passenger fishing vessels also accounted for 0.1% of the total State of California's fishing effort.

Key Words

Economic impact, income, jobs, California, recreational fishing, Cordell Bank, output, value-added, person-days.

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Chapter 1 Introduction

This report is part of the Socioeconomic Research & Monitoring Program for Cordell Bank National Marine Sanctuary (CBNMS). Socioeconomic priorities were established for all West Coast Region (WCR) sanctuaries in the “*Office of National Marine Sanctuaries West Coast Region Socioeconomic Plan FY2013 – FY2014* (Office of National Marine Sanctuaries, 2012)”. This report also supports a “national” Office of National Marine Sanctuaries (ONMS) priority to document the connection between the national marine sanctuary resource uses and local, regional and national economies.

Sources of Information and Estimation of Effort

This report addresses magnitude of recreational fishing in CBNMS and the resulting economic impacts/contributions from 2010-2012. The data used to estimate the number of recreational fishing person-days in CBNMS comes from the California Department of Fish and Wildlife (CDFW). The data are available from the Pacific RecFIN public site or via written request to the CDFW. Data presented in this report are from years 2004-2012, and the economic analysis is for years 2010 -2012. The RecFIN data are used to show trends in the number of recreational fishing person-days within the sanctuary by resident and non-resident status.

In CBNMS there is no shore-mode fishing. For boat modes, the amount of fishing effort that takes place in national marine sanctuaries is based on the best overlay of CDFW ten-minute by ten-minute blocks on sanctuary boundaries. See Chen, Leeworthy and Schwarzmann (2015) for detailed methods of estimation.

The next step is to determine what counties should be included in the CBNMS study area. If the sanctuary was adjacent to the full coastal boundary of a county it was included in the study area. Then, data from the American Community Survey (U.S. Department of Commerce, Bureau of the Census) was used to determine the percentage of workers from neighboring counties that worked within the coastal counties. If more than one percent of workers in a non-adjacent county worked in an adjacent coastal county, the non-adjacent county was included in the study area. This inclusion was made to account for the majority of multiplier impacts from spending in local area counties.

The study area counties for CBNMS are listed in Table 1.1 below. Figure 1.1 presents the map of the study area and fishing block IDs that are included in the study area. Additionally, the CDFW district is also presented on the map. CDFW districts are used to geographically identify different regions along the coast. A more detailed description of this process can be found in Chen, Leeworthy and Schwarzmann (2015).

Table 1.1 The CBNMS Study Area

<i>County</i>	<i>Coastal</i>
Marin	Coastal
San Mateo	Coastal
Sonoma	Coastal

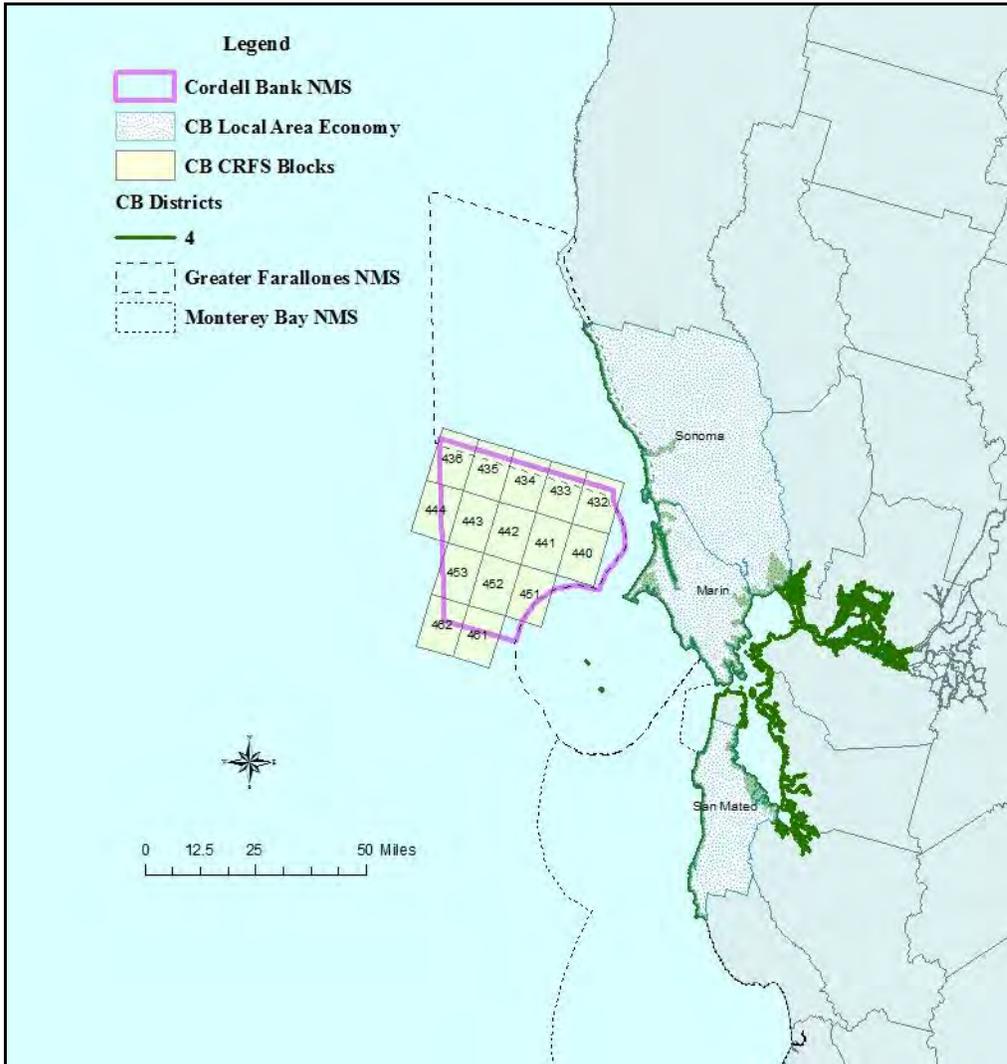


Figure 1.1 CBNMS Study Area Map

If a person lives within the study area they were considered a resident of the CBNMS. If the person lived outside of one of the three counties in the study area, then they were considered a non-resident.

To estimate the economic impacts/contributions on the local counties of CBNMS, CDFW data from years 2010-2012 was used in conjunction with Angler Expenditure Profiles developed by the National Oceanic and Atmospheric Administration’s (NOAA) National Marine Fisheries Service (NMFS) (Lovell et al., 2013).

The IMPLAN model was used to estimate the market economic impacts/contributions of recreational fishing to the CBNMS study area. IMPLAN is an input-output model developed to estimate the impacts/contributions of changes in a specified region (Day, 2011). The 2009 IMPLAN data set was used to estimate the economic impacts/contributions of recreational fishing to the CINMS study area. These economic estimates take into account recreational fin-fishing and recreational invertebrate fishing.

The economic estimates in this report include both the direct and indirect impacts of recreational fishermen’s expenditures throughout the economy. The direct effect considers the initial expenditures made by fishermen. The indirect effect considers the initial expenditures’ backward linkages in other industries; the flow of spending is traced back through the supply chain. They are called indirect effects because spending by fishermen is stimulating increased production in other industries within the study area. Lastly, induced effects account for increased employee income, and consequently employee spending, resulting from the directly and indirectly affected industries within the study area (Day, 2011). The addition of the indirect and induced impacts is what is generally referred to as the “multiplier” impacts. The break-out of these impacts is not presented here. For those details, see Chen, Leeworthy and Schwarzmann (2015).

Chapter 2 focuses on trends in person-days of recreational fishing within the sanctuary. For the CBNMS, there are two types of fishing that were analyzed; private/rental boat and commercial passenger fishing vessels. It is customary to group together private boats and rental boats, both the State of California CDFW and NOAA Fisheries analyze these two forms of boating as a unit. Private boats are defined as boats belonging to an individual not for rent or with paying passengers. Rental boat is defined as a boat that is rented without crew or a guide. The last section of Chapter 2 reviews Commercial Passenger Fishing Vessels (CPFV). There are two types of boats that fall into the CPFV category. The first is a charter boat, which is operating under charter for a specified price, time, etc. It usually means the boat is closed to anyone not in the group hiring the charter boat. The second type, a party boat, is a boat on which fishing space and privilege are provided for a fee per angler and are often referred to as head-boats (RecFIN, 2014). The terminology to describe person-days and mode of access is presented in Table 1.2.

Table 1.2 Definition of Key Terms (adapted from RecFin, 2014)

Term	Definition
Person-Days	The number of days (not trips) a person fishes
Private-Rental Boat Fishing	Private boats are defined as belonging to an individual not for rent or with paying passengers. Rental boats are defined as a boat that is rented without crew or a guide.
Commercial Passenger Vehicle Fishing (CPFV)	There are two categories. The first is a charter boat, operating under charter for a specified price, time, etc. A party boat, is a boat on which fishing space and privilege are provided for a fee per angler.

Chapter 3 presents and discusses expenditure profiles of recreational anglers in California. NOAA produces estimates of expenditures by person-day, the types of

recreational fishing and resident status. In addition, the annual expenditures on durable goods are also estimated.

Chapter 4 presents the results of the IMPLAN model. These results include total output, value added, income and employment (measured in number of full and part-time jobs) resulting from recreational fishing in the sanctuary. Results are estimated by mode for each year from 2010-2012 and a three-year average.

Chapter 5 presents a summary and conclusions.

Chapter 2 Recreational Fishing Person-days

Private/rental Boat Person-days

Person-days are defined as the number of days a person fishes. If a person takes a one week trip and fishes for five days, then that would be counted as five person-days. Raw survey data was extrapolated from the CDFW, RecFIN website and used to make population estimates of person-days in the CBNMS. A more detailed explanation of the process can be found in Chen, Leeworthy and Schwarzmann (2015). The person-day trends account for recreational fin-fishing from 2004 through 2012, but beginning in 2010 through 2012 the CRFS data includes invertebrate recreational fishing person-day effort too.

As previously discussed private boats are defined as boats belonging to an individual not for rent or with paying passengers. A rental boat is defined as a boat that is rented without crew or a guide. Figure 2.1 shows the number of person-days from 2004 to 2012. From 2005 through 2012, private-rental person days peaked in 2010.

Over the three-year period 2010 to 2012, residents accounted for, on average, 65.5% of the private/rental boat person-days of activity in the CBNMS. In 2010, residents accounted for 87.5% of the private/rental boat person-days (Figure 2.1).

For the three years 2010 to 2012, person-days of private-rental boat fishing in CBNMS as a proportion of District 4 total person-days averaged 0.5% (Table 2.2).

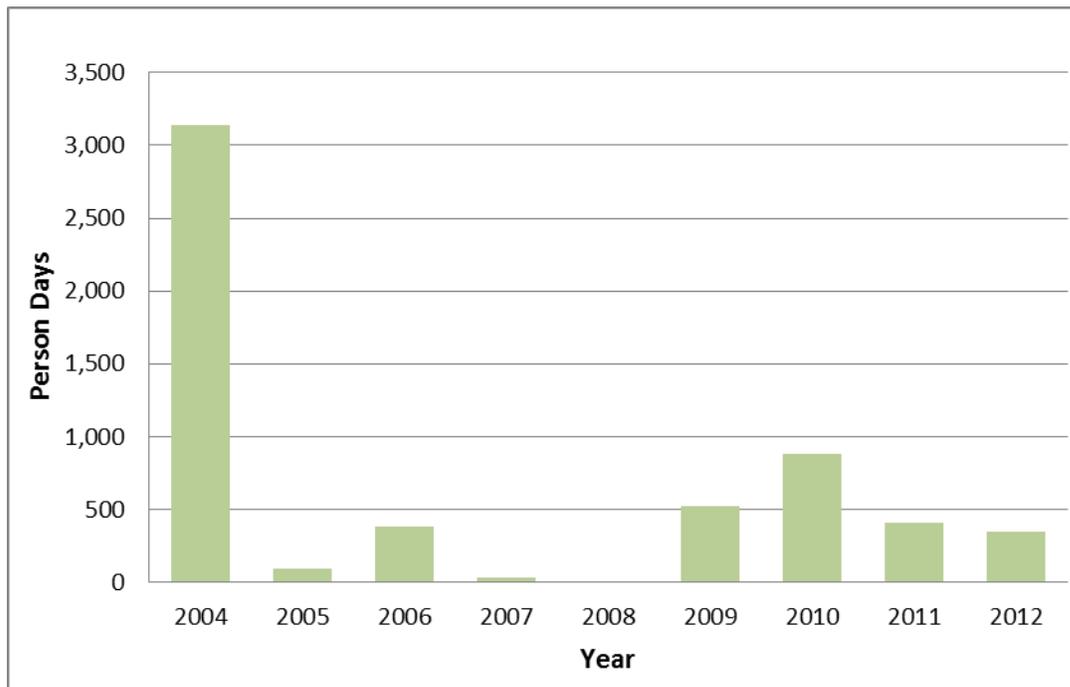


Figure 2.1 CBNMS Private/rental Boat Fishing Person-days

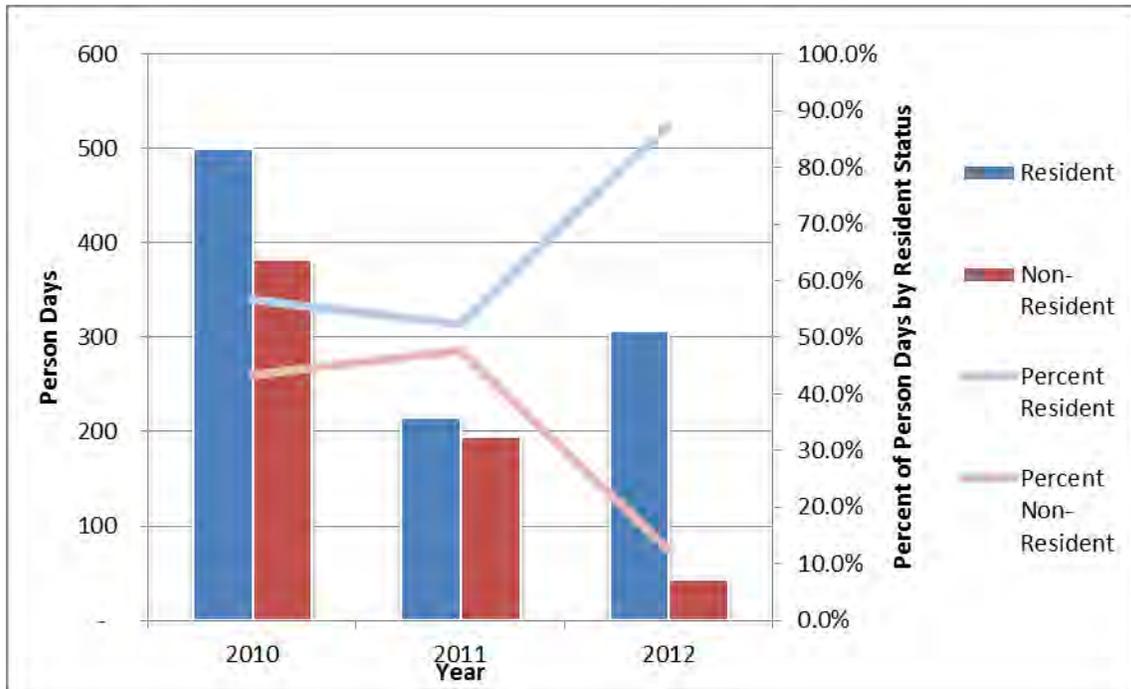


Figure 2.2 CBNMS Private/rental Boat Fishing Person-days by Resident Status

Table 2.1 CBNMS Private/rental Boat Fishing Person-days in District 4 by Resident Status

Year	Resident	Non-Resident	Total
2010	500	382	882
% in CBNMS ¹			0.7%
2011	215	195	410
% in CBNMS ²			0.4%
2012	324	46	371
% in CBNMS ³			0.3%
Average	346	208	554
% in CBNMS ⁴			0.5%

Commercial Passenger Fishing Vessels – Person-days

From 2004 through 2012 the number of CPFV fishing person-days declined, but from 2011 through 2012 the number of person-days slightly increased.

¹ This is the 2010 number of total private-rental boating person-days in District 4. The value is 122,253 person-days.

² This is the 2011 number of total private-rental boating person-days in District 4. The value is 108,854 person-days.

³ This is the 2012 number of total private-rental boating person-days in District 4. The value is 105,971 person-days.

⁴ This is the average number of total private-rental boating person-days in years 2010, 2011 and 2012 in District 4. The value is 112,359 person-days.

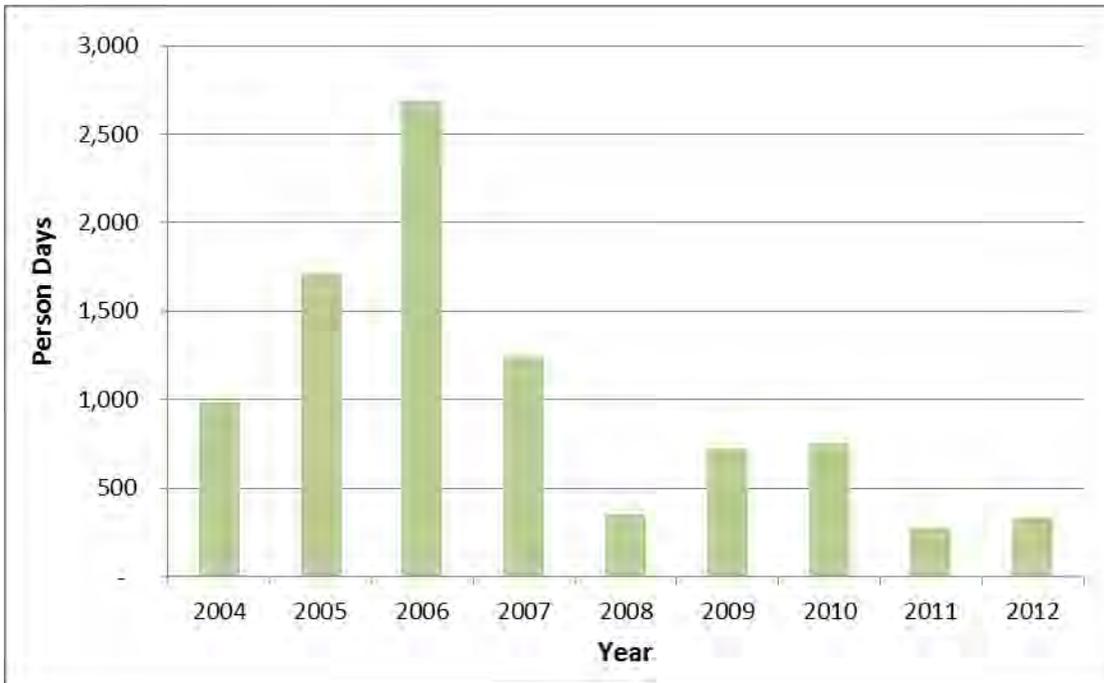


Figure 2.3 CBNMS CPFV Fishing Person-days

CPFV is the only mode of recreational fishing in Cordell Bank that non-residents participated in at greater numbers than residents. More than 50% of total CPFV person-days from 2010 through 2012 were accounted for by non-residents. Figure 2.4 shows the number of CPFV fishing trips by residential status.

Table 2.2 CBNMS CPFV Person-days in District 4 by Resident Status

Year	Resident	Non-Resident	Total
2010	241	513	754
% in CBNMS ⁵			1.7%
2011	76	201	277
% in CBNMS ⁶			0.7%
2012	120	211	331
% in CBNMS ⁷			0.8%
Average	145	309	454
% in CBNMS ⁸			1.1%

⁵ This is the 2010 number of total CPFV person-days in District 4. The value is 44,225 person-days.

⁶ This is the 2011 number of total CPFV person-days in District 4. The value is 39,145 person-days.

⁷ This is the 2012 number of total CPFV person-days in District 4. The value is 43,626 person-days.

⁸ This is the average number of total CPFV person-days in years 2010, 2011 and 2012 in District 4. The value is 42,332 person-days.

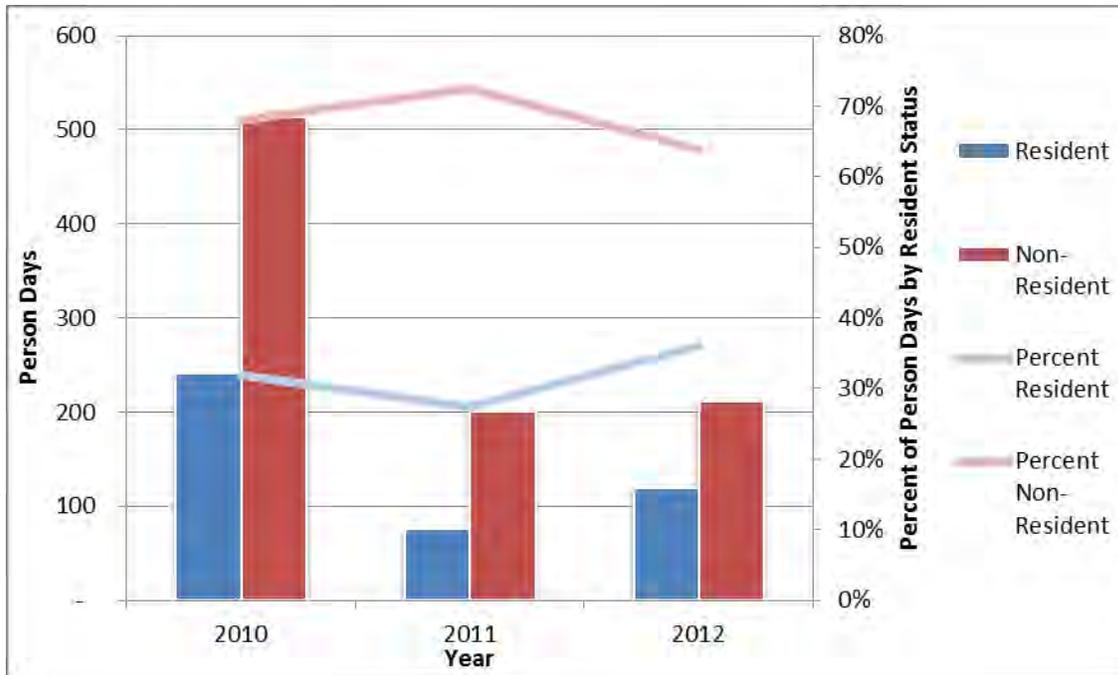


Figure 2.4 CBNMS CPFV Fishing Person-days by Resident Status

Summary

On average roughly 1% of total private-rental and CPFV recreational fishing person-days that occurred in District 4 occurred within the sanctuary (Table 2.3).

Table 2.3 CBNMS Total Recreational Person-Days in District 4 by Fishing Mode and Year

Mode	2010	2011	2012	Average
Private/rental Boating	882	410	371	554
% in CBNMS ⁹	0.7%	0.4%	0.3%	0.5%
CPFV	754	277	331	454
% in CBNMS ¹⁰	1.7%	0.6%	0.7%	0.7%
Total of Both Modes	1,636	687	702	1,008
% in CBNMS ¹¹	1.0%	0.5%	0.5%	0.7%

⁹The 2010 number of total private-rental person-days in District 4 is 122,253, 2011 had 108,854 person-days, 2012 had 105,971 person-days, and the average number across the study period of 2010 through 2012 is 112,359 person-days.

¹⁰The 2010 number of total CPFV person-days in District 4 is 44,225, 2011 had 39,145 person-days, 2012 had 43,626 person-days, and the average number across the study period of 2010 through 2012 is 42,332 person-days.

¹¹The 2010 number of total private-rental boat and CPFV recreational fishing person-days in District 4 is 166,478, 2011 had 147,999 person-days, 2012 had 149,597 person-days, and the average number across the study period of 2010 through 2012 is 154,691 person-days.

Chapter 3 Recreational Fishing Expenditures

Total expenditures were estimated using the Angler Expenditure Profiles developed by NOAA Fisheries (Lovell et al., 2013). This is based on survey data collected by NOAA from anglers and is completed approximately every five years. The latest year Angler Expenditure Profiles were completed was 2011 and those estimates are used here. Total expenditures are estimated by fishing mode and residential status for years 2010, 2011, and 2012, plus the three-year average. In addition, estimates are made separately for trip-related expenditures and durable goods expenditures. Trip-related expenditures are made by fishing mode, while durable goods expenditures are made across all modes. Durable good expenditures are only estimated for residents, since non-residents are not likely to have made purchases within the CBNMS study area. Total expenditures are equal to person-days multiplied by expenditure per person-day and are converted to 2014 dollars for all years using the consumer price index (CPI). Gasoline expenditures were converted to 2014 dollars using the gasoline adjustment factor provided by the CPI to account for the increased volatility of prices relative to other goods and services (See Chen, Leeworthy and Schwarzmann 2015).

Table 3.1 shows how the percentage of trip-related expenditure by type has variation in both mode and residential status. For example, the percentage spent on auto-fuel by residential status does not vary much, but across modes of fishing the variation is greater. Shore fishermen spend a higher percentage of their total expenditures on auto fuel when compared to those who are using CPFVs. In regards to food purchases, residents spend a larger portion of their expenditures on grocery store purchases regardless of the mode of fishing. Alternatively, non-residents are spending a larger portion of their expenditures on food from restaurants when compared to residents of the sanctuary study area.

Table 3.1 Percent of Trip-related Expenditure by Fishing Mode

	Residents		Non-Residents	
	Private/Rental	CPFV	Private/Rental	CPFV
Auto Fuel	23.8%	12.7%	27.5%	13.4%
Auto Rental	-	0.3%	6.9%	7.4%
Bait	13.6%	2.2%	5.2%	0.6%
Boat Fuel	28.5%	-	10.3%	-
Boat Rental	0.7%	-	1.2%	-
Charter Fees	-	51.3%	-	35.9%
Crew Tips		8.0%	-	3.5%
Fish Processing	-	0.1%	-	0.0%
Food from Grocery Stores	16.9%	8.3%	11.0%	6.8%
Food from Restaurants	6.6%	7.9%	11.3%	7.3%
Gifts & Souvenirs	0.2%	0.9%	2.3%	7.9%
Ice	3.0%	1.1%	1.5%	0.5%
Lodging	1.4%	2.2%	10.4%	8.8%
Parking & Site Access	5.0%	1.9%	1.8%	2.4%
Public Transportation	0.0%	0.0%	10.5%	4.5%
Tournament Fees	0.3%	2.1%	0.1%	0.5%

Private/rental Boat Expenditures

Estimated expenditures are simply total person-days by mode of access and residential status multiplied by the expenditures per person-day by mode of access and residential status. Dollars for all years are converted to 2014 dollars using the consumer price index (see Chen, Leeworthy and Schwarzmann, 2015).

Non-residents are spending more on gifts and souvenirs than residents. Non-residents spend nearly ten times more money on lodging when compared to residents, with the exception of 2012 (Table 3.2).

Table 3.2 Private/rental Boat Annual Trip-related Expenditures, 2010-2012 (2014 Dollars)

<i>Private/rental</i>	<i>2010</i>		<i>2011</i>		<i>2012</i>	
	<i>Resident</i>	<i>Non-Resident</i>	<i>Resident</i>	<i>Non-Resident</i>	<i>Resident</i>	<i>Non-Resident</i>
Auto Fuel	\$14,700	\$20,064	\$6,324	\$10,261	\$9,020	\$2,300
Auto Rental	\$21	\$5,342	\$9	\$2,732	\$13	\$612
Bait	\$8,898	\$4,028	\$3,828	\$2,060	\$5,460	\$462
Boat Fuel	\$17,558	\$7,524	\$7,553	\$3,848	\$10,774	\$863
Boat Rental	\$470	\$941	\$202	\$481	\$289	\$108
Charter Fees	\$0	\$0	\$0	\$0	\$0	\$0
Fish Processing	\$0	\$0	\$0	\$0	\$0	\$0
Food from Grocery Stores	\$11,091	\$8,501	\$4,771	\$4,348	\$6,806	\$975
Food from Restaurants	\$4,312	\$8,796	\$1,855	\$4,499	\$2,646	\$1,008
Gifts & Souvenirs	\$116	\$1,806	\$50	\$924	\$71	\$207
Ice	\$1,950	\$1,168	\$839	\$597	\$1,196	\$134
Lodging	\$935	\$8,041	\$402	\$4,112	\$574	\$922
Parking & Site Access	\$3,250	\$1,374	\$1,398	\$703	\$1,994	\$157
Public Transportation	\$0	\$8,134	\$0	\$4,160	\$0	\$932
Tournament Fees	\$201	\$101	\$86	\$52	\$123	\$12
Trip Total	\$63,501	\$75,820	\$27,317	\$38,776	\$38,966	\$8,692

Commercial Passenger Fishing Vessels - Expenditures

CPFV expenditures are the only profiles with charter fees and crew tips. Although non-residents spend more total on charter fees, residents are spending more than 50% of their total expenditures on charter fees. Residents spend roughly 8% of their total expenditures on crew tips compared to less than 4% of non-residents total expenditures. Table 3.3 below presents expenditures by residential status for 2010 through 2012.

Table 3.3 CPFV Annual Trip-related Expenditures, 2010-2012 (2014 Dollars)

<i>CPFV</i>	2010		2011		2012	
	Resident	Non-Resident	Resident	Non-Resident	Resident	Non-Resident
Auto Fuel	\$6,640	\$27,190	\$2,094	\$10,652	\$3,300	\$11,197
Auto Rental	\$160	\$15,905	\$51	\$6,231	\$80	\$6,550
Bait	\$1,229	\$1,200	\$388	\$470	\$611	\$494
Charter Fees	\$28,443	\$77,484	\$8,969	\$30,355	\$14,135	\$31,909
Crew Tips	\$4,440	\$7,643	\$1,400	\$2,994	\$2,207	\$3,148
Fish Processing	\$28	\$60	\$9	\$23	\$14	\$25
Food from Grocery Stores	\$4,606	\$14,667	\$1,452	\$5,746	\$2,289	\$6,040
Food from Restaurants	\$4,359	\$15,715	\$1,375	\$6,157	\$2,166	\$6,472
Gifts & Souvenirs	\$509	\$17,001	\$160	\$6,661	\$253	\$7,001
Ice	\$583	\$1,156	\$184	\$453	\$290	\$476
Lodging	\$1,206	\$18,874	\$380	\$7,394	\$599	\$7,773
Parking & Site Access	\$1,046	\$5,162	\$330	\$2,022	\$520	\$2,126
Public Transportation	\$0	\$9,738	\$0	\$3,815	\$0	\$4,010
Tournament Fees	\$1,191	\$1,102	\$376	\$432	\$592	\$454
Trip Total	\$54,439	\$212,898	\$17,167	\$83,406	\$27,055	\$87,674

Durable Good Expenditures

Durable good expenditures are only calculated for residents of the study area since it is unlikely that non-residents purchased them in the CBNMS study area. NMFS calculates the mean durable expenditures for all modes by participant. When estimating durable good expenditures they are not disaggregated by fishing mode, but presented as the expenditure value for all modes. We converted the mean durable good expenditures by participant to durable good expenditures by person-day and then multiplied this by the total person-days by year. Expenditures were then converted to 2014 dollars for all years using the consumer price index. See Chen, Leeworthy and Schwarzmann (2015) for detailed methods of this approach.

Total durable good expenditures were higher in 2010 and 2012 when compared to 2011. This is because there were more person-days in 2010 and 2012 than 2011. See Table 3.4 for a more detailed breakdown of durable goods for the study period.

Table 3.4 Durable Goods Expenditures, 2010-2012 (2014 Dollars)

	<i>2010</i>	<i>2011</i>	<i>2012</i>
Durable Tackle	\$16,310	\$6,408	\$9,390
Rods & Reels	\$21,870	\$8,592	\$12,591
Spearfishing Gear	\$0	\$0	\$0
Binoculars	\$659	\$259	\$379
Camping Equipment	\$1,925	\$756	\$1,108
Clothing	\$5,495	\$2,159	\$3,163
Club Dues	\$1,049	\$412	\$604
License Fees	\$5,740	\$2,255	\$3,304
Magazine Subscriptions	\$916	\$360	\$527
Taxidermy	\$226	\$89	\$130
New Boat Purchase	\$6,269	\$2,463	\$3,609
Used Boat Purchase	\$403	\$158	\$232
New Canoe Purchase	\$189	\$74	\$109
Used Canoe Purchase	\$0	\$0	\$0
New Accessory Purchase	\$3,600	\$1,414	\$2,073
Used Accessory Purchase	\$0	\$0	\$0
Boat Insurance	\$3,886	\$1,527	\$2,237
Boat Maintenance	\$8,113	\$3,187	\$4,671
Boat Registration	\$1,013	\$398	\$583
Boat Storage	\$14,186	\$5,573	\$8,167
Boat Purchase Fees	\$250	\$98	\$144
New Vehicle Purchase	\$5,587	\$2,195	\$3,216
Used Vehicle Purchase	\$5,490	\$2,157	\$3,160
Vehicle Insurance	\$4,131	\$1,623	\$2,378
Vehicle Maintenance	\$1,423	\$559	\$819
Vehicle Registration	\$1,306	\$513	\$752
Vehicle Purchase Fees	\$904	\$355	\$520
New Home Purchase	\$691	\$272	\$398
Second Home Property Taxes	\$9	\$3	\$5
Total	\$111,638	\$43,858	\$64,272

Summary

Trip-related Expenditures. Total expenditures for both private/rental boat and CPFV have been steadily declining from 2010 through 2012. The three-year average for all modes was \$245 thousand (Table 3.5). CPFV expenditures were higher than private-rental boat expenditures in each year. Trip-related expenditures are the appropriate expenditures to use in analyzing the impacts of regulations or policy/management strategies that are projected to have small (marginal changes) in fishing effort.

Durable Good Expenditures. Total durable good expenditures have also declined from 2010 through 2012. In 2012 total durable good expenditures were roughly 40% of 2010 durable good expenditures (Table 3.6). The average total durable good expenditures for the study period were more than \$73.2 thousand.

Total Expenditures. Total expenditures followed the same patterns as trip-related and durable goods expenditures, declining from 2010 to 2012. The average total expenditures for the study period were \$318.5 thousand annually (Table 3.7). This information is used to estimate the economic impacts/contributions associated with recreational fishing in Cordell Bank. The findings are presented in the following chapter.

Table 3.5 Trip-related Annual Expenditures by Mode of Access, 2010-2012 (2014 Dollars)

Mode of Access	2010	2011	2012	Average
Private/rental Boat	\$139,321	\$66,093	\$47,658	\$84,357
CPFV	\$267,337	\$100,573	\$114,729	\$160,880
Total	\$406,658	\$166,665	\$162,387	\$245,237

Table 3.6 Annual Durable Goods Expenditures by Mode of Access, 2010-2012 (2014 Dollars)

	2010	2011	2012	Average
Total	\$111,638	\$43,858	\$64,272	\$73,256

Table 3.7 Total Annual Expenditures by Expenditure Type, 2010-2012 (2014 Dollars)

Mode of Access	2010	2011	2012	Average
Trip-related	\$406,658	\$166,665	\$162,387	\$245,237
Durable Goods	\$111,638	\$43,858	\$64,272	\$73,256
Total	\$518,296	\$210,523	\$226,659	\$318,493

Chapter 4 Market Analysis of Recreational Fishing

Using the person-day estimates from Chapter 2 and the expenditures from Chapter 3, this data can be inputted to IMPLAN to estimate market benefits associated with recreational fishing in Cordell Bank by mode of fishing. First, it may be useful to discuss some IMPLAN terminology. Table 4.1 provides a more detailed explanation of the terminology used in this report, as defined by IMPLAN.

Table 4.1 IMPLAN Economic Indicators' Definitions

<i>Indicator</i>	<i>Definitions and Relationships</i>
Employment	Total annual average jobs. This includes self-employed and wage and salary employees, and all full-time, part-time and seasonal jobs, based on a count of full-time/part-time averages over twelve months
Labor Income	Defines the total value paid to local workers within a region. Labor income is the income source for induced household spending estimations. $\text{Labor Income} = \text{Employee Compensation} + \text{Proprietor Income}$
Value Added	Comprised of Labor Income, Indirect Business Taxes (IBT), and Other Property Type Income (OPTI), Value Added demonstrates an industry's value of production over the cost of its purchasing the goods and services required to make its products. Value Added is often referred to as Gross Regional Product (GRP). $\text{Value Added} = \text{Labor Income} + \text{IBT} + \text{OPTI}$
Output	The total value of an industry's production, comprised of the value of Intermediate Inputs and Value Added. In IMPLAN this is typically viewed as the value of a change in sales or the value of increased production. However, annual production is not always equal to annual sales. If production levels are higher than sales, surpluses become inventory. Because inventory does not drive additional impacts in the year it was produced, in IMPLAN Direct industry sales = Direct Output. $\text{Output} = \text{Intermediate Inputs} + \text{Value Added}$

Source: Day, 2011

Impacts/contributions are defined as direct, indirect or induced. In short, direct effects are those that occur within the sector of the expenditure. Indirect effects occur as a result of spending within the primary sector on goods and services from other sectors. Induced impacts result from the wage earners within the study area spending their money on goods and services within the region. The indirect plus induced make-up what is generally referred to as the "multiplier" effects. Table 4.2 explains these types of impacts in more detail.

Table 4.2 Impact Type Definitions

<i>Type of Impact</i>	<i>Definition</i>
Direct Effect	The effect of spending by recreational fishermen at each business they purchase goods or services from within the study area.
Indirect Effect	The result of a sector purchasing goods and services to produce their product from other industries located within the study area.
Induced Effect	Results from spending of employee wages that stem from both the Direct and Indirect effects within the study area.

Source: Day, 2011

Economic Impacts/Contributions

The economic impacts/contributions are limited to the study area defined by three local area counties (see Chapter 1). For each of the estimates of impacts/contributions on employment and income from recreational fishing in CBNMS, we provide estimates of what proportion of the study area's total employment and income are accounted for by recreational fishing in the CBNMS. Because the study area is very large, recreational fishing accounts for only fractions of a percent of the total study area's economy, however in absolute dollars the impacts are significant. Table 4.3 provides the estimates of the study area's employment and income for 2010 to 2012 and the three-year average.

The employment numbers presented here are the total full-time, part-time and seasonal jobs created each year within the study area. The percentages presented under Income and Employment are the percent of total income or employment that can be attributed to recreational fishing in the CBNMS study area (as defined in Table 1.1 and Figure 1.1).

Table 4.3 Employment and Income in CB study area

	2010	2011	2012	Average
Employment	903,681	921,559	945,916	923,719
Income	\$89,616,615,000	\$97,029,919,000	\$102,606,268,000	\$96,417,600,667

Source: Bureau of Economic Analysis

Total economic impacts/contributions steadily decreased over the three-year period. In 2010, CPFV accounts for the largest impact on output to the economy for the study period. Tables 4.4 through 4.7 present the economic impacts/contributions of trip-related expenditures.

Table 4.4 2010 Trip-related Economic Impacts (2014 Dollars)¹²

2010				
	Output	Value Added	Income	Employment
Private/rental	\$107,465	\$70,894	\$43,582	1
% of CB			0.00005%	0.0001%
CPFV	\$324,837	\$206,986	\$125,149	3
% of CB			0.0001%	0.0003%
Total	\$432,302	\$277,880	\$168,731	4
% of CB			0.0002%	0.0004%

Table 4.5 2011 Trip-related Economic Impacts (2014 Dollars)¹³

2011				
	Output	Value Added	Income	Employment
Private/rental	\$52,680	\$34,155	\$20,974	0.4
% of CB			0.00002%	0.00004%
CPFV	\$122,060	\$77,758	\$46,990	1
% of CB			0.00005%	0.0001%
Total	\$174,740	\$111,913	\$67,964	2
% of CB			0.0001%	0.0002%

Table 4.6 2012 Trip-related Economic Impacts (2014 Dollars)¹⁴

2012				
	Output	Value Added	Income	Employment
Private/rental	\$33,323	\$22,188	\$13,682	0.3
% of CB			0.00001%	0.00003%
CPFV	\$139,565	\$88,952	\$53,811	1
% of CB			0.0001%	0.0001%
Total	\$172,888	\$111,140	\$67,493	2
% of CB			0.0001%	0.0002%

¹² % of CB is the percent Income or Employment in the Cordell Bank study area (as defined by Table 1.1) that can be attributed to recreational fishing in the Cordell Bank National Marine Sanctuary.

¹³ % of CB is the percent Income or Employment in the Cordell Bank study area (as defined by Table 1.1) that can be attributed to recreational fishing in the Cordell Bank National Marine Sanctuary.

¹⁴ % of CB is the percent Income or Employment in the Cordell Bank study area (as defined by Table 1.1) that can be attributed to recreational fishing in the Cordell Bank National Marine Sanctuary.

Table 4.7 Average Trip-related Economic Impacts from 2010-2012 (2014 Dollars)¹⁵

Average from 2010-2012				
	Output	Value Added	Income	Employment
Private/rental	\$64,489	\$42,412	\$26,079	1
% of CB			0.00003%	0.0001%
CPFV	\$195,487	\$124,565	\$75,317	2
% of CB			0.0001%	0.0002%
Total	\$259,977	\$166,978	\$101,396	2
% of CB			0.0001%	0.0002%

Economic Impact/Contribution by Type of Expenditure

When analyzing the economic impacts of regulations and policy/management strategies, it is important to distinguish between trip-related expenditures and durable good expenditures, and their associated impacts on the local area economies. For small or marginal changes in fishing effort, it is not appropriate to include durable goods expenditures and their associated impacts/contributions on the local area economies. So here we provide a break-down of the economic impacts/contributions by these two types of expenditures. By normalizing these estimates by person-days of activity one can derive multipliers for regulatory or policy/management analyses. (See Chen, Leeworthy and Schwarzmann, 2015).

Trip-related expenditures from recreational fishing in CBNMS, on average, generated annual impacts/contributions of over \$260 thousand in output, almost \$167 thousand in value-added, more than \$ 101 thousand in income, and 2 full and part-time jobs (Table 4.8). Table 4.9 presents the impacts/contributions from total durable good expenditures and Table 4.10 presents the economic impacts/contributions of total expenditures resulting from recreational fishing in CBNMS.

Table 4.8 Economic Impact of Annual Trip-related Expenditures, 2010-2012 (2014 Dollars)¹⁶

Measure	2010	2011	2012	Average
Output	\$432,302	\$174,740	\$172,888	\$259,977
Value Added	\$277,880	\$111,913	\$111,140	\$166,978
Labor Income	\$168,731	\$67,964	\$67,493	\$101,396
% of CB	0.0002%	0.0001%	0.0001%	0.0001%
Employment	4	2	2	2
% of CB	0.0004%	0.0002%	0.0002%	0.0002%

¹⁵ % of CB is the percent Income or Employment in the Cordell Bank study area (as defined by Table 1.1) that can be attributed to recreational fishing in the Cordell Bank National Marine Sanctuary.

¹⁶ % of CB is the percent Income or Employment in the Cordell Bank study area (as defined by Table 1.1) that can be attributed to recreational fishing in the Cordell Bank National Marine Sanctuary.

Table 4.9 Economic Impact of Annual Durable Goods Expenditures, 2010-2012 (2014 Dollars)¹⁷

Measure	2010	2011	2012	Average
Output	\$125,771	\$49,410	\$72,408	\$82,530
Value Added	\$77,617	\$30,493	\$44,685	\$50,932
Labor Income	\$42,036	\$16,514	\$24,201	\$27,584
% of CB	0.00005%	0.00002%	0.00002%	0.00003%
Employment	1	0.3	0.4	0.5
% of CB	0.0001%	0.00003%	0.00004%	0.0001%

Table 4.10 Economic Impact of Annual Total Expenditures, 2010-2012 (2014 Dollars)¹⁸

Measure	2010	2011	2012	Average
Output	\$558,073	\$224,150	\$245,296	\$342,506
Value Added	\$355,497	\$142,406	\$155,825	\$217,909
Labor Income	\$210,767	\$84,478	\$91,694	\$128,980
% of CB	0.0002%	0.0001%	0.0001%	0.0001%
Employment	5	2	2	3
% of CB	0.0005%	0.0002%	0.0002%	0.0003%

¹⁷ % of CB is the percent Income or Employment in the Cordell Bank study area (as defined by Table 1.1) that can be attributed to recreational fishing in the Cordell Bank National Marine Sanctuary.

¹⁸ % of CB is the percent Income or Employment in the Cordell Bank study area (as defined by Table 1.1) that can be attributed to recreational fishing in the Cordell Bank National Marine Sanctuary.

Chapter 5 Conclusion

This report presents the results of the recreational fishing study completed for Cordell Bank National Marine Sanctuary (CBNMS) from 2010 through 2012. In total CBNMS accounted for 0.7% of the total person-days of recreational fishing from District 4 and 0.02% of the entire State of California's total marine recreational fishing effort. Recreational private/rental boating accounted for 0.5% of person-days, and commercial fishing passenger boats 0.7% of person-days of all the person-days in District 4. Private-rental boat fishing in CBNMS accounted 0.1% and commercial passenger fishing vessels 0.1% of the total State of California's fishing effort by mode of access.

Chapter 3 discussed expenditures. Fuel was one of the largest expenditure categories for anglers, regardless of their mode of fishing. If the angler was fishing using a private/rental boat, then fuel expenditures composed more than half of their total expenditures. Additionally, residents tended to spend a larger percentage of total expenditures on grocery store food when compared to non-residents.

Lastly, Chapter 4 presented the economic impacts/contributions of recreational fishing in CBNMS. Although, employment and income compose a small percentage of total employment and income in the study area, recreational fishing in CBNMS still has a positive impact on the economy of the study area. In total, marine recreational fishing adds roughly \$342.5 thousand in economic output; almost \$217.9 thousand in value-added; more than \$129.0 thousand in income; and three full- and part-time jobs to the study area annually.

Glossary of Terms

(adapted from RecFin, 2014 and Day, 2011)

Commercial Passenger Fishing Vessel (CPFV) –There are two categories. The first is a charter boat, which operates under charter for a specified price, time, etc. A party boat is a boat on which fishing space and privilege are provided for a fee per angler.

Durable Goods –Goods that do not quickly wear out and typically last for a long period of time, such as a boat.

Employment –The total annual average jobs. This includes the self-employed in addition to wage and salary employees, and all full-time, part-time and seasonal jobs, based on a count of full-time and part-time job averages over twelve months.

Intermediate Inputs -Goods and service required to create a product.

Labor Income – Is equivalent to employee compensation + proprietor (business owner) income.

Output –The total value of an industry’s production, comprised of the value of intermediate inputs and value added.

Person-Days –The number of days (not trips) a person fishes.

Private-Rental Fishing –A private boat is defined as belonging to an individual; it is neither for rent nor for transporting paying passengers. A rental boat is defined as a boat that is rented without crew or a guide; it does not transport paying passengers.

Shore Mode Fishing –Fishing accessed on beaches, banks and man-made structures.

Trip-Related Expenditures – Expenditures on goods and services for specific trip, such as food or live bait.

Value Added –Value added demonstrates an industry’s value of production over the cost of the goods and services required to make its products. Value Added is often referred to as Gross Regional Product.

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