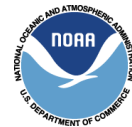




Economic Impact of the Commercial Fisheries on Local County Economies from Catch in the Channel Islands National Marine Sanctuary 2010, 2011 and 2012.

U.S. Department of Commerce
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Cover

Top Left: Trawling vessels like this one, can be used to harvest a variety of the marine resources within the Channel Islands National Marine Sanctuary's waters. (photo: Channel Islands NMS)

Top Right: Both lobsters and crabs are within the subphylum Crustacea of the phylum Arthropoda. California spiny lobsters (*Panulirus interruptus*) lack the large pinching claws of their Maine lobster relatives. (photo: Shane Anderson)

Bottom Left: A common resident found in kelp beds, rocky shores, and coral reefs is the sea urchin. It has a healthy appetite for organic material and feeds on kelp as pieces drift by. Sea urchins like this Purple Sea Urchin (*Strongylocentrotus purpuratus*) can be harmful to kelp forests and can destroy reefs when their populations multiply rapidly and overpopulate an area. They damage kelp forests by chewing through kelp holdfasts in search of food. (photo: Laura Francis)

Bottom Right: One may be surprised to learn that commercial and recreational fishing are permitted within the marine sanctuary boundaries. As the commercial fishing industry is one of the largest industries in the Santa Barbara area, access to the sanctuary is vital to the livelihood of local fishermen. (photo: Glenn Allen)

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Abstract

This report estimates the economic impact of commercial fishing within the Channel Islands National Marine Sanctuary (CINMS) according to the California Ocean Fish Harvester Economic Model. The methodology applies county multipliers to estimates of harvest revenue from the CINMS in order to calculate output, income, value added and employment. This report also describes a profile of the commercial fish industry in the CINMS. In addition, this report explores special issues related to trends in the wetfish fishery. Special issues represent specific requests from sanctuary management for queries of the data.

The three year average for 2010 to 2012 finds that landings of catch from CINMS generated \$27,275,539 in harvest revenue, \$45,396,225 in output, \$30,894,393 in value added, \$27,836,552 in total income and 659 full and part-time jobs across five counties. During the study period harvest revenue demonstrated a continual decrease, ranging from \$38,330,066 in 2010 to only \$18,417,163 in 2012. The top five species/species groups caught in CINMS were *Market Squid*, *Urchin*, *Spiny Lobster*, *Anchovies & Sardines*, and *Crab*. These top five species/species groups accounted for over 87% of CINMS landings in 2012.

In 2012, the gear types associated with highest percent of total value include “Purse Seine,” “Pots & Traps,” “Hooka-Diving,” and “Other Seine-Dip Net.” The top four ports where catch from MBNMS was landed are Santa Barbara Harbor, Ventura, Port Hueneme, and Oxnard. These ports had varying dependency on the sanctuary for their catch value, ranging from 67% and 64% for Oxnard and Santa Barbara Harbor, respectively, to 35% and 30% for Port Hueneme and Ventura.

Key Words

Economic impact, income, jobs, California, commercial fishing, harvest revenue, wetfish, output, multiplier, port dependence.

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Introduction

This report is part of the Socioeconomic Research & Monitoring Program for the Channel Islands National Marine Sanctuary (CINMS). 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.

This report addresses the commercial fisheries in the CINMS. The data used to estimate how much of the commercial catch in California landed at California Ports comes from the California Fishery Information System (CFIS) from the California Department of Fish and Wildlife (CDFW). Data presented here is from years 2000 through 2012. For estimating economic impacts on local county economies, the California Ocean Fish Harvester Economic (COFHE) Model was used (Hackett et al. 2009).

Economic impact here is limited to the impacts of commercial fishing operations and the multiplier impacts from the spending in conducting their fishing operations. The estimates underestimate the total economic impact because the COFHE Model used here did not include the processing, wholesaling, retail and restaurant market channels and market markups of the fish landed in each county. Only the costs of production from commercial fishing operations was included and the associated indirect and induced economic impacts (i.e. the ripple or multiplier impacts) of this spending. Although information on market channels and market-markups are presented in Hackett et al (2009), the information was not available at the county level to include in the COFHE Model.

The economic impacts estimated here relative to the “full” economic impacts will vary greatly by fishery and county of landings. For fisheries characterized by little processing, wholesaling, local retail sales and local restaurant sales, the differences will be small. In these cases, most of the landings are exported out of the county with little added value locally. Estimating the market channels and market mark-ups by county should be a high priority for the next version of the COFHE Model. In the peer review of this document, one of the authors in Hackett et al, 2009 argued that the COFHE Model was designed to estimate the impacts of management strategies and regulations and the effects on processing, wholesaling, retail and restaurant markets would be minimal since these sectors can easily substitute lost catch from other places and therefore there would be little, if any, impacts on local economies. The reviewer also admitted that this might be less true for some processors.

In Leeworthy et al, 2005, the Fishery Economic Assessment Model (FEAM) developed by the Pacific Fishery Management Council (PFMC 1999) was used to estimate the potential economic impacts of the network of marine reserves (no-take areas) in the Channel Islands National Marine Sanctuary (CINMS). FEAM multipliers were very similar to the COFHE Model’s in that the IMPLAN input-output model was used to derive multipliers defined in terms of income to harvest revenues. The FEAM multipliers were only done for income in each county by

species/species groups instead of OCs as in the COFHE Model and the FEAM multipliers included all market channels (e.g. processing, wholesaling, retailing and restaurant sales). In 1998, the CINMS multipliers for income to harvest revenue (ratio of income generated at all market levels divided by harvest revenue) ranged from 1.2 for most *Finfish* to 4.5 for *Market Squid*, while for *Crab* it was 2.8. The overall average was about 3.1, which was heavily influenced by *Market Squid* which accounted for 59% of CINMS harvest revenue. In comparison, the COFHE Model income multipliers for CINMS averaged about 1.00 for years 2010 through 2012. So the total economic impact could be three times higher than was estimated here using the COFHE Model for the CINMS. We don't have the FEAM multipliers for the other ONMS sites in California, but given the dominance of *Market Squid* and *Dungeness crab* in MBNMS, the total economic impact for MBNMS could also be about three times higher than estimated here. For CBNMS and GFNMS, which are more dominated by *Finfish* catch, the multipliers for total economic impact are likely lower, probably less than 2.0, so the estimates of total economic impact for these sanctuaries could be double that estimated here for total income generated.

Chapter 1 provides the results of applying the COFHE Model to landings from the CINMS. Harvest revenue (what the fishermen receive when they land their catch at various California ports) is converted to estimates of total output, value added, income and employment (measured in number of full- and part-time jobs) using the multipliers in the COFHE Model for each county. Results are presented for years 2010, 2011, 2012 and the 3-year average. Details of the COFHE Model are presented in a separate technical appendix report (Leeworthy et al, 2013).

Chapter 2 provides a profile of the commercial fishery for CINMS. Profile elements include: the distribution of catch (pounds and value or harvest revenue converted to 2013 dollars using the consumer price index) for year 2012 by species/species groups; trends in catch for the top five species/species groups for years 2000 through 2012; catch by gear type for years 2010, 2011, and 2012; dependence of ports on catch from CINMS (i.e. the percent of total fishing harvested landings at the port from CINMS); and the dependence of fishing vessels on their catch from the CINMS (i.e. the percent of a vessels total fishing revenues from all of California from CINMS).

Chapter 3 is devoted to "*Special Issues*". Sanctuary management submitted several requests for special views of the commercial fishing catch from the CINMS to support management efforts. Here, CINMS management requested special tabulations of the Anchovy and Sardine populations and trends, to attempt to explain an issue with the Pelican population.

Table 1.1 Definition of CINMS for Where Fish are Caught using CDFW-CFIS Blocks

Sanctuary/Full or Partial Blocks	CDFW-CFIS 10-minute by 10-minute Blocks ¹
CINMS (22)	
Full Blocks (3)	690, 687, 711
Partial Blocks (19)	691, 689, 688, 686, 685, 684, 683, 706, 707, 708, 709, 710, 712, 713, 714, 744, 745, 764, 765

1. See Figure 1.1 for map with CINMS boundaries overlaid on CDFW-CFIS Blocks.

For where the catch is landed, catch is reported by port where landed. CDFW-CFIS also provides documentation for county location of each port, so landings can be summarized by port and county where landed. This is important for economic impact analysis since the multipliers in the COFHE Model are county multipliers.

Operational Categories.

The COFHE Model is based on organizing the fisheries into 20 operational categories (OCs). OCs are either based on gear types or a combination of gear types and species and each has different production functions (i.e. different combinations of inputs of productions such as gear, labor, fuel, bait, ice, etc.) and some such as the *Salmon & Dungeness crab* and *Dungeness crab* are differentiated by size of the vessel (vessel length). Table 1.2 lists the 20 OCs in the COFHE Model. Details on the harvest revenue by OC and the associated multipliers by county for translating harvest revenue into estimates of output, value added, income and employment by county are in the technical appendix report (Leeworthy et al 2013). Not all catch is included in the 20 OCs. Thus, economic impacts are slightly under estimated. In 2010, 0.017% was not included, while 0.084% was excluded in 2011, and 0.20% was excluded in 2012. In addition, small amounts of catch from CINMS were landed at far distant ports and these amounts were also excluded from the analysis.

Table 1.2 Operational Categories for the COFHE Model

Number	Operational Category
1	Trawl - Northern California
2	Trawl - Southern California
3	CPS Seine
4	Herring Gillnet
5	Other Gillnet
6	Salmon
7	Salmon & Albacore
8	Salmon & Dungeness Crab - Small Vessels
9	Salmon & Dungeness Crab - Mid to Large Vessels
10	Dungeness Crab - Small Vessels
11	Dungeness Crab - Mid to Large Vessels
12	Longline
13	Harpoon - Spear
14	Hook & Line
15	Hook & Line - Live
16	Lobster & Crab
17	Nearshore & Groundfish Trap
18	Prawn Trap
19	Sea Urchin
20	Tuna - Other Seine

Source: Hackett et al, 2009.

Definitions of Terms (Adapted from Hackett et al. 2006)

Harvest Revenue: What fishermen receive when they land their catch at various CA ports.

Output: Total industry production, equal to shipments plus net additions to inventory.

Value Added: The value added during production to all purchased intermediate goods and services. This is equal to employee compensation plus proprietor's income plus other property income plus indirect business taxes.

Total Income: Sum of employee compensation, proprietor's income, corporate income, rental income, interest and corporate transfer payments.

Employment: Full- and part-time jobs.

Results.

The COFHE Model was used to estimate the economic impact by county of harvest revenue from the CINMS for years 2010, 2011, and 2012 plus the 3-year average. This was done since some influential fisheries have been very volatile, fluctuating greatly from year to year (see trends of top six species/species groups in Chapter 2).

Catch from CINMS was landed at 45 ports in six counties in years 2010 to 2012. Due to insignificant landings at distant ports, we only included the landings in five counties (Tables 1.3, 1.4, 1.5 and 1.6).

In 2010, about \$38.3 million was harvested by the 20 OCs from CINMS, which generated more than \$64 million in total output, \$45.4 million in value added, \$41.3 million in income and 800 full- and part-time jobs in the five counties (Table 1.3).

Table 1.3 Economic Impact on Local County Economies from Commercial Fishing in the CINMS, 2010 (2013 \$)

County	Harvest Revenue	Output	Value Added	Total Income	Employment ¹
Los Angeles	2,041,230	3,953,790	2,867,624	2,620,995	25.76
Orange	0	0	0	0	0.00
San Luis Obispo	14,326	23,693	12,545	11,130	0.57
Santa Barabra	5,434,766	8,954,264	4,674,694	3,996,809	227.89
Ventura	30,839,744	51,108,030	37,929,816	34,738,684	545.60
<i>Total²</i>	<i>38,330,066</i>	<i>64,039,777</i>	<i>45,484,678</i>	<i>41,367,617</i>	<i>800</i>

1. Number of full and part-time jobs.

2. \$6,558 or 0.017% not counted because catch did not map into one of the 20 Operational Categories in the COFEH Model; \$138 in Santa Barbara and \$6,420 in Ventura.

In 2011, about \$25 million was harvested by the 20 OCs from CINMS, which generated more than \$41 million in total output, \$28 million in value added, \$25 million in income and 618 full- and part-time jobs in the five counties (Table 1.4).

Table 1.4 Economic Impact on Local County Economies from Commercial Fishing in the CINMS, 2011 (2013 \$)

County	Harvest Revenue	Output	Value Added	Total Income	Employment ¹
Los Angeles	573,245	1,116,310	791,474	724,433	9.10
Orange	32,408	63,930	48,076	45,196	0.51
San Luis Obispo	31,696	51,982	29,496	26,123	1.24
Santa Barabra	6,138,492	10,114,935	5,337,735	4,575,177	265.24
Ventura	18,303,546	30,291,134	21,831,937	19,774,759	341.91
<i>Total²</i>	<i>25,079,387</i>	<i>41,638,291</i>	<i>28,038,717</i>	<i>25,145,688</i>	<i>618</i>

1. Number of full and part-time jobs.

2. \$20,982 or 0.084% not counted. \$15,576 not counted because catch did not map into one of the 20 Operational Categories in the COFEH Model; \$19 in Santa Barbara and \$15,557 in Ventura. In addition, \$5,406 landed in San Diego not counted because San Diego was not in the main study area for economic impact analysis.

In 2012, about \$18.4 million was harvested by the 20 OCs from CINMS, which generated more than \$30 million in total output, \$19 million in value added, \$16.9 million in income and 559 full- and part-time jobs in the five counties (Table 1.5).

Table 1.5 Economic Impact on Local County Economies from Commercial Fishing in the CINMS, 2012 (2013 \$)

County	Harvest Revenue	Output	Value Added	Total Income	Employment ¹
Los Angeles	286,063	556,791	357,175	319,736	6.90
Orange	7,528	13,556	8,621	7,554	0.12
San Luis Obispo	24,009	4,797	2,357	1,962	0.39
Santa Barbara	6,803,434	11,206,507	5,839,820	4,987,577	288.22
Ventura	11,296,129	18,728,955	12,951,809	11,679,523	263.83
<i>Total</i> ²	<i>18,417,163</i>	<i>30,510,606</i>	<i>19,159,782</i>	<i>16,996,352</i>	<i>559</i>

1. Number of full and part-time jobs.

2. \$37,787 or 0.20% not counted. \$20,522 not counted because catch did not map into one of the 20 Operational Categories in the COFEH Model; \$17,531 in Santa Barbara and \$2,991 in Ventura. In addition, \$17,265 not included because catch landed at distant ports outside the study area for economic impact analysis; \$233 from Humboldt, \$16,760 from San Diego, and \$1,272 from Mendocino.

The three-year average for CINMS was \$27.2 million in harvest revenue, \$45.3 million in output, almost \$30.9 million in value added, \$27.8 million in total income, and 659 full- and part-time jobs (Table 1.6)

Table 1.6 Economic Impact on Local County Economies from Commercial Fishing in the CINMS, 3-year average 2010, 2011, and 2012 (2013 \$)

County	Harvest Revenue	Output	Value Added	Total Income	Employment ¹
Los Angeles	966,846	1,875,630	1,338,758	1,221,721	13.92
Orange	13,312	25,829	18,899	17,583	0.21
San Luis Obispo	23,344	26,824	14,799	13,072	0.73
Santa Barbara	6,125,564	10,091,902	5,284,083	4,519,854	260.45
Ventura	20,146,473	33,376,040	24,237,854	22,064,322	383.78
<i>Total</i>	<i>27,275,539</i>	<i>45,396,225</i>	<i>30,894,393</i>	<i>27,836,552</i>	<i>659</i>

1. Number of full and part-time jobs.

The majority of this economic impact was concentrated in Ventura and Santa Barbara counties. For the three-year average, Ventura County accounted for almost 74% of harvest revenue and output, 79% of value added and income and 58% of employment. Santa Barbara County accounted for 23% of harvest revenue, 22% of output, 17% of value added, 16% of income and almost 40% of employment. Over the three-year study period, harvest revenue in Santa Barbara increased by 25%. Conversely, harvest revenues in Ventura decreased by almost 71% over the same period.

Table 1.7 Local/Regional Dependence on the CINMS Fishing Industry, 2010 and 2011

County	Commercial Fishing		Income by Place of Residence (\$000)	Income by Place of Work (\$000)	Total Employment
	Income	Employment			
2010					
Los Angeles	\$2,620,995	25.76	\$403,144,483	\$317,660,189	5,414,763
%			0.0007%	0.0008%	0.0005%
Orange	\$0	0.00	\$147,138,449	\$110,971,524	1,870,491
%			0.00%	0.00%	0.00%
San Luis Obispo	\$11,130	0.57	\$10,436,017	\$6,346,739	147,720
%			0.0001%	0.0002%	0.0004%
Santa Barbara	\$3,996,809	227.89	\$18,309,874	\$12,507,607	246,968
%			0.02%	0.03%	0.09%
Ventura	\$34,738,684	545.60	\$36,506,222	\$22,313,520	416,794
%			0.10%	0.16%	0.13%
<i>Total</i>	<i>\$41,367,617</i>	<i>799.8</i>	<i>\$615,535,045</i>	<i>\$469,799,579</i>	<i>\$8,096,736</i>
<i>% of Total from Commercial Fishing</i>			<i>0.007%</i>	<i>0.009%</i>	<i>0.01%</i>
2011					
Los Angeles	\$724,433	9.10	\$420,913,463	\$329,102,308	4,322,993
%			0.0002%	0.0002%	0.0002%
Orange	\$45,196	0.51	\$154,131,535	\$115,381,941	1,460,050
%			0.00003%	0.00004%	0.00003%
San Luis Obispo	\$26,123	1.24	\$10,966,438	\$6,610,972	126,318
%			0.0002%	0.0004%	0.001%
Santa Barbara	\$4,575,177	265.24	\$19,303,120	\$13,065,357	205,602
%			0.02%	0.04%	0.13%
Ventura	\$154,131,535	341.91	\$38,141,164	\$23,091,225	392,262
%			0.40%	0.67%	0.09%
<i>Total</i>	<i>\$159,502,464</i>	<i>618</i>	<i>\$643,455,720</i>	<i>\$487,251,803</i>	<i>6,507,225</i>
<i>% of Total from Commercial Fishing</i>			<i>0.02%</i>	<i>0.03%</i>	<i>0.009%</i>

Source: U.S. Department of Commerce, Bureau of Economic Analysis (BEA) and
U.S. Department of Labor, Bureau of Labor Statistics (BLS).

The commercial fisheries directly (and indirectly through the multiplier process) accounted for 0.03% of the total income by place of work and 0.02% of the total income by place of residence in the five-county study area. In terms of jobs, the commercial fisheries accounted for 0.009% of all jobs in the five-county study area.

Chapter 2: Profiles of the Commercial Fisheries in the CINMS

In addition to where catch is caught and landed, CDFW-CFIS database includes vessel and fisherman identification codes for who caught the fish and gear types for how the catch was made.

Catch by Species/Species Groups

Species are identified by three-digit codes. We have combined species into species/species groups. For CINMS, we originally defined 28 species/species groups, including an “All Other” group. After processing the data, we discovered that some predetermined groups were not significant and placed them in the “All Other” group and pulled some species/species groups that were originally in the “All Other” group and broke them out separately. A \$1,000 revenue cut-off was chosen to determine what was broken out for the *All Other* group. We ended up with 22 species/species groups, including the “All Other” group for 2012. The “All Other” group accounted for only 0.12% of all landings from CINMS in 2012 (Table 2.1).

Market squid was the number one ranked fishery in CINMS in 2012 on the basis of both value and pounds, accounting for over \$7.4 million or 40.4% of all harvest value from CINMS. This was followed by *Urchin* at \$4.2 million (23%), *Spiny Lobsters* \$2.9 million (16.2%), *Crab* \$1.2 million (6.4%), and *Prawn & Shrimp* at \$721 thousand (4.6%). These top five species/species groups accounted for more than 89% of the 2012 harvest value from CINMS.

Table 2.1 Pounds and Value of Landings from the CINMS by Species/Species Groups 2012 (2013 \$)

Species/Species Groups	Pounds	Value	Percent of Total Value
Market Squid	25,447,604	\$7,463,746	40.44%
Urchin	6,294,324	\$4,238,338	22.96%
Spiny Lobsters	178,669	\$2,983,013	16.16%
Crab	763,156	\$1,175,611	6.37%
Prawn & Shrimp	60,371	\$721,228	3.91%
Sea Cucumber	121,494	\$537,207	2.91%
Flatfish	56,768	\$309,054	1.67%
Sablefish, Louvar, Whiting, Whitefish	81,051	\$258,290	1.40%
Sardines	1,783,262	\$191,297	1.04%
Rockfish	36,397	\$157,768	0.85%
CA Scorpionfish, Cabezon, Thornyheads	30,070	\$153,716	0.83%
Sculpin, Basses, Greenlings, Grenadier	25,193	\$77,369	0.42%
CA Sheephead	12,843	\$61,223	0.33%
Mackerel	215,024	\$33,422	0.18%
Anchovies	88,902	\$27,041	0.15%
Swordfish	1,255	\$20,567	0.11%
Shellfish	6,757	\$10,313	0.06%
Shark	5,146	\$7,231	0.04%
Yellowtail	1,123	\$2,663	0.01%
Tuna	1,413	\$2,584	0.01%
Salmon	377	\$2,281	0.01%
All Other ¹	6,552	\$21,991	0.12%
<i>Total</i>	<i>35,217,751</i>	<i>\$18,455,950</i>	<i>100.00%</i>

1. Species Groups "Rays & Skates", "Surfperch", "Octopus", and "Smelts" were added to "All Other" for having a value less than \$1,000

Source: California Fishing Information System, California Department of Fish and Wildlife

Catch by Gear Type and Number of Vessels by Gear Type

The CDFW-CFIS database contains 65 different gear codes. We combined gears into 12 gear types, plus an “All Other” category. If gear code was missing (not recorded) we classified this as “Unspecified”. For 2010 to 2012, very few landings were recorded as “All Other” or “Unspecified” (Table 2.2). Most of the pounds and value of catch from CINMS was caught with *Purse Seine* or *Other Seine Dip Nets*, *Hooka-Diving*, and *Pots & Traps*. There were between 204 and 260 vessels operating in the CINMS over the 2010 to 2012. Although most of the value of landings was caught by *Purse Seine* or *Other Seine Dip Nets*, *Hooka-Diving*, and *Pots & Traps* gears many vessels used *Hook-and-line* (Table 2.2).

Table 2.2 Number of Vessels, Pounds and Value by Gear Type in the CINMS, 2010 to 2012 (2013 \$)

Gear Type	Vessels	Pounds	Value	Percent of Total Value
2010				
Troll	1	161	\$272	0.001%
Pots and Traps	47	607,895	\$3,793,953	9.90%
Longlines	32	190,133	\$568,720	1.48%
Hook and Line	47	43,814	\$215,555	0.56%
Hooka - Diving	70	6,004,330	\$4,151,720	10.83%
Set Gill Nets	10	76,106	\$276,693	0.72%
Trawl	13	33,709	\$135,487	0.35%
Purse Seine	50	54,879,895	\$17,629,245	45.99%
Other Seine - Dip Net	31	29,649,563	\$11,445,451	29.86%
Drift Gill Net	7	54,142	\$117,610	0.31%
Harpoon / Spear	1	145	\$1,916	0.005%
All Other	0	0	\$0	0.00%
Unspecified	0	0	\$0	0.00%
<i>Total</i>	<i>240</i>	<i>91,539,894</i>	<i>\$38,336,620</i>	<i>100.00%</i>
2011				
Troll	2	43	\$128	0.001%
Pots and Traps	55	668,645	\$3,844,612	15.31%
Longlines	31	314,879	\$927,811	3.70%
Hook and Line	64	61,119	\$303,620	1.21%
Hooka - Diving	68	6,055,950	\$4,729,523	18.84%
Set Gill Nets	15	58,375	\$187,097	0.75%
Trawl	24	39,098	\$162,032	0.65%
Purse Seine	40	47,558,193	\$11,849,351	47.20%
Other Seine - Dip Net	30	11,595,373	\$3,026,012	12.05%
Drift Gill Net	7	18,877	\$60,866	0.24%
Harpoon / Spear	1	4,547	\$13,659	0.05%
All Other	1	15	\$19	0.0001%
Unspecified	0	0	\$0	0.00%
<i>Total</i>	<i>260</i>	<i>66,375,116</i>	<i>\$25,104,732</i>	<i>100.00%</i>
2012				
Troll	2	377	\$2,281	0.01%
Pots and Traps	63	1,006,064	\$4,925,891	26.69%
Longlines	26	128,896	\$446,690	2.42%
Hook and Line	69	56,098	\$264,782	1.43%
Hooka - Diving	67	6,408,996	\$4,765,618	25.82%
Set Gill Nets	8	41,846	\$164,164	0.89%
Trawl	13	24,096	\$115,929	0.63%
Purse Seine	39	19,158,289	\$5,358,884	29.04%
Other Seine - Dip Net	18	8,376,305	\$2,356,228	12.77%
Drift Gill Net	2	12,742	\$30,042	0.16%
Harpoon / Spear	2	1,255	\$20,567	0.11%
All Other	3	2,788	\$4,873	0.03%
Unspecified	0	0	\$0	0.00%
<i>Total</i>	<i>244</i>	<i>35,217,751</i>	<i>\$18,455,950</i>	<i>100.00%</i>

Source: California Fishing Information System, California Department of Fish and Wildlife.

Harvest Revenue Distribution by Number of Vessels

In the commercial fisheries, it is often maintained that 20% of the fishermen catch 80% of the fish i.e. the “20-80” rule. For 2012, we developed a summary view of the distribution of total harvest revenue. In CINMS, 64 of the 244 vessels or 26.23% accounted for 78.4% of the total value of catch, which is pretty close to the “20-80” rule. There is a skewed distribution of harvest revenue by vessels. Four vessels (1.64%) accounted for 11.4% of value. Each of these four vessels received over \$500,000 for their catch from the CINMS. Further, 18 vessels (7.38%) accounted for 38.1% of value, and each of these vessels received at least \$250,000 for their catch from the CINMS. On the lower end of the revenue distribution, 72 vessels (29.5%) accounted for only 0.60% of the value, and each of these vessels landed less than \$5,000 (Table 2.3).

Table 2.3 Vessel Distribution of Harvest Revenue from CINMS, 2012 (2013 \$)

Distribution Range	Number of Vessels	Percent of Vessels	Percent of Harvest Revenue
Greater than \$0	244	100.00%	100.00%
Greater than \$500,000	4	1.64%	11.40%
Greater than \$250,000	18	7.38%	38.10%
Greater than \$100,000	64	26.23%	78.40%
Greater than \$50,000	94	38.52%	90.10%
Greater than \$20,000	133	54.51%	97.10%
Greater than or Equal to \$5,000	172	70.49%	99.40%
Less than \$5,000	72	29.51%	0.60%
Less than \$1,000	34	13.93%	0.08%

Mean=\$76,549 ; Median=\$23,419; Minimum=\$58; Maximum=\$548,915; sum=\$18,455,950

Source: California Fishing Information System, California Department of Fish and Wildlife

Vessel Dependence on the CINMS for their Total California Fishing Revenues

Another way of looking at the distribution of harvest revenue is to look at how dependent vessels are on the CINMS for their total fishing revenues. We calculated the percent of a vessel's harvest revenue from their CINMS catch as a percent of all of their catch from all of California.

Table 2.4 shows the distribution for year 2012. For all 244 vessels that fished in the CINMS in 2012 harvest revenue was over \$18 million from CINMS or 24.25% of their total fishing revenues from all of California waters. The four vessels earning over \$500,000 in harvest revenue were the most dependent on resources in the sanctuary at 51%. As the threshold for harvest revenue declines, so too does the percent of total CA revenues from the CINMS. The 34 vessels earning less than \$1,000 were least dependent on the sanctuary with 1.34% of their revenues coming from fish caught inside sanctuary boundaries.

Table 2.4 Vessel Dependence on Harvest Revenue from CINMS, 2012 (2013 \$)

Number of Vessels	Percent of Vessels	Revenue from CINMS	Percent Distribution of CINMS Revenue	Total Harvest Revenue from All of CA	Percent of All CA Revenue From CINMS ¹
244	100.00%	\$18,448,385	100.00%	\$76,101,582	24.24%
4	1.64%	\$2,111,112	11.44%	\$4,138,307	51.01%
18	7.38%	\$7,028,804	38.10%	\$17,017,357	41.30%
64	26.23%	\$14,473,384	78.45%	\$40,301,834	35.91%
94	38.52%	\$16,621,429	90.10%	\$63,924,361	26.00%
133	54.51%	\$17,916,282	97.12%	\$69,436,120	25.80%
172	70.49%	\$18,343,328	99.43%	\$72,903,308	25.16%
72	29.51%	\$105,056	0.57%	\$3,198,274	3.28%
34	13.93%	\$14,764	0.08%	\$1,102,633	1.34%

1. Due to missing vessel ID, dependence is not calculated for 3 vessels and \$7,566 of revenue
Source: California Fishing Information System, California Department of Fish and Wildlife

Port Dependence on Catch from the CINMS

Another way of looking at economic dependence is port dependence measured as the percent of total port landings from CINMS. We calculated the percent of pounds and value by species/species groups for the top four ports where catch from the CINMS was landed: Santa Barbara Harbor, Ventura, Port Hueneme, and Oxnard. These four ports accounted for 98.1 percent of the total value of landings from CINMS in 2012.

The dependence of the four ports on CINMS in 2012 ranged from 30.38% to 66.94%. Oxnard had the highest dependency, 66.94%, followed by Santa Barbara Harbor, 64.21%, Port Hueneme, 35.45%, and Ventura, 30.38%. Dependency for many species was above 90%. Santa Barbara's most valuable species, *Urchin*, had a 98.5% dependency on the sanctuary.

Table 2.5 Landings by Port and Species/Species Groups from Catch in the CINMS, 2012 (2013 \$)

Port/Species/Species Group	Catch from CINMS		Total Port Landings		Percent of Total Port Landings from CINMS	
	Pounds	Value	Pounds	Value	Pounds	Value
Santa Barbara Harbor						
Urchin	4,464,181	\$3,155,577	4,522,037	\$3,203,069	98.72%	98.52%
Spiny Lobster	117,495	\$1,988,441	160,720	\$2,624,278	73.11%	75.77%
Crab	643,495	\$984,176	1,190,551	\$1,757,903	54.05%	55.99%
Sablefish, Louvar, Whiting, Whitefish	73,377	\$235,539	349,053	\$1,081,763	21.02%	21.77%
Sea Cucumber	20,581	\$77,296	187,265	\$724,691	10.99%	10.67%
CA Scorpionfish, Cabezon, Thornyheads	19,568	\$112,228	70,217	\$396,975	27.87%	28.27%
Sculpin, Basses, Greenlings, Grenadier	17,566	\$49,963	64,522	\$228,456	27.22%	21.87%
Flatfish	8,518	\$43,135	35,686	\$192,672	23.87%	22.39%
Rockfish	18,039	\$109,653	27,546	\$176,073	65.49%	62.28%
Prawn & Shrimp	110	\$1,341	8,401	\$62,985	1.31%	2.13%
Salmon	377	\$2,281	7,884	\$55,042	4.78%	4.14%
Shellfish	5,597	\$7,082	29,079	\$26,150	19.25%	27.08%
Swordfish	910	\$17,069	2,001	\$21,599	45.47%	79.03%
CA Sheephead	4,553	\$17,058	4,789	\$18,234	95.08%	93.55%
Shark	1,128	\$1,268	12,973	\$15,577	8.69%	8.14%
Tuna	1,413	\$2,584	5,820	\$12,177	24.28%	21.22%
Yellowtail	816	\$1,768	953	\$2,027	85.70%	87.22%
Other ¹	3,685	\$11,473	8,177	\$18,870	45.06%	60.80%
<i>Total</i>	<i>5,401,408</i>	<i>\$6,817,933</i>	<i>6,687,674</i>	<i>\$10,618,541</i>	<i>80.77%</i>	<i>64.21%</i>
Ventura						
Squid	12,945,735	\$3,660,932	28,274,018	\$8,123,852	45.79%	45.06%
Shellfish	442	\$442	109,363	\$3,310,907	0.40%	0.01%
Spiny Lobster	24,596	\$389,776	67,462	\$1,099,313	36.46%	35.46%
Prawn & Shrimp	424	\$5,217	178,850	\$681,516	0.24%	0.77%
Tuna	0	\$0	107,154	\$372,365	0.00%	0.00%
Sea Cucumber	36,427	\$166,254	81,337	\$313,788	44.79%	52.98%
Flatfish	25,940	\$134,945	63,624	\$240,395	40.77%	56.13%
Crab	19,362	\$29,294	139,571	\$187,268	13.87%	15.64%
Sculpin, Basses, Greenlings, Grenadier	1,860	\$6,486	47,912	\$168,933	3.88%	3.84%
Urchin	76,117	\$50,094	114,148	\$67,989	66.68%	73.68%
CA Scorpionfish, Cabezon, Thornyheads	1,905	\$8,826	7,840	\$40,281	24.30%	21.91%
Sardines	353,474	\$31,040	364,245	\$31,222	97.04%	99.42%
Sablefish, Louvar, Whiting, Whitefish	3,363	\$10,456	11,292	\$30,865	29.78%	33.88%
Shark	1,632	\$2,576	15,224	\$20,807	10.72%	12.38%
CA Sheephead	95	\$216	2,528	\$9,213	3.75%	2.34%
Swordfish	0	\$0	1,512	\$7,765	0.00%	0.00%
Yellowtail	28	\$50	2,794	\$5,821	1.00%	0.85%
Mackerel	59,401	\$5,190	68,675	\$5,335	86.50%	97.28%
Rockfish	0	\$0	1,095	\$3,290	0.00%	0.00%
Rays & Skates	275	\$552	2,928	\$2,753	9.41%	20.05%
Other ²	222	\$720	48,539	\$99,311	0.46%	0.73%
<i>Total</i>	<i>13,551,297</i>	<i>\$4,503,065</i>	<i>29,710,108</i>	<i>\$14,822,990</i>	<i>45.61%</i>	<i>30.38%</i>

Source: California Fishing Information System, California Department of Fish and Wildlife.

1. Species Groups "Rays & Skates", "Squid", "Mackerel", "Octopus", "Surfperch", and "Sardines" were added to "All Other" for having a value less than \$1,000

2. Species Groups "Octopus" and "Surfperch" were added to "All Other" for having a value less than \$1,000

Table 2.6 Landings by Port and Species/Species Groups from Catch in the CINMS, 2012 (2013 \$) Continued

Port/Species/Species Group	Catch from CINMS		Total Port Landings		Percent of Total Port Landings from CINMS	
	Pounds	Value	Pounds	Value	Pounds	Value
Port Hueneme						
Squid	11,939,936	\$3,636,275	34,690,597	\$10,553,280	34.42%	34.46%
Sardines	1,194,502	\$142,329	1,749,974	\$206,659	68.26%	68.87%
Anchovies	88,902	\$27,041	125,887	\$38,291	70.62%	70.62%
Mackerel	60,177	\$20,699	64,577	\$21,145	93.19%	97.89%
Prawn & Shrimp	1,379	\$16,571	1,534	\$18,348	89.90%	90.32%
Rockfish	0	\$0	4,109	\$5,615	0.00%	0.00%
Flatfish	272	\$1,418	284	\$1,424	95.77%	99.57%
Sculpin, Basses, Greenlings, Grenadier	114	\$568	114	\$568	100.00%	100.00%
Sablefish, Louvar, Whiting, Whitefish	0	\$0	329	\$563	0.00%	0.00%
All Other ¹	0	\$0	659	\$405	0.00%	0.00%
<i>Total</i>	<i>13,285,282</i>	<i>\$3,844,901</i>	<i>36,638,064</i>	<i>\$10,846,297</i>	<i>36.26%</i>	<i>35.45%</i>
Oxnard						
Urchin	1,751,596	\$1,031,033	2,144,834	\$1,243,299	81.67%	82.93%
Spiny Lobster	34,406	\$567,106	67,096	\$1,047,694	51.28%	54.13%
Prawn & Shrimp	57,158	\$683,354	79,346	\$925,601	72.04%	73.83%
Sea Cucumber	48,021	\$219,764	80,056	\$362,617	59.98%	60.60%
Sculpin, Basses, Greenlings, Grenadier	5,301	\$19,275	93,517	\$265,929	5.67%	7.25%
Crab	93,098	\$151,963	145,023	\$162,432	64.20%	93.55%
Flatfish	21,895	\$128,679	31,143	\$149,606	70.31%	86.01%
Rockfish	18,174	\$47,881	27,850	\$61,344	65.26%	78.05%
CA Sheephead	8,194	\$43,949	10,078	\$53,958	81.31%	81.45%
CA Scorpionfish, Cabezon, Thornyheads	8,522	\$32,238	11,014	\$44,065	77.37%	73.16%
Sablefish, Louvar, Whiting, Whitefish	4,250	\$12,043	14,657	\$37,211	29.00%	32.36%
Swordfish	0	\$0	5,003	\$25,939	0.00%	0.00%
Shark	2,386	\$3,387	12,342	\$12,342	19.33%	27.44%
Sardines	18	\$37	7,037	\$2,171	0.26%	1.68%
Tuna	0	\$0	1,038	\$1,579	0.00%	0.00%
Yellowtail	279	\$845	548	\$1,254	50.90%	67.38%
Surfperch	129	\$526	134	\$554	96.26%	94.97%
All Other ²	2,383	\$9,076	5,792	\$10,935	41.14%	83.00%
<i>Total</i>	<i>2,055,810</i>	<i>\$2,951,155</i>	<i>2,736,508</i>	<i>\$4,408,529</i>	<i>75.13%</i>	<i>66.94%</i>

Source: California Fishing Information System, California Department of Fish and Wildlife.

1. Species Groups "Crab", "CA Scorpionfish, Cabezon, Thornyheads", and "Shark" were added to "All Other" for having a value less than \$500

2. Species Groups "Squid", "Shellfish", "Mackerel", "Rays & Skates", and "Smelts" were added to "All Other" for having a value less than \$500

Trends in Catch for the Top Five Species/Species Groups

In CINMS, the top five species/species groups in terms of value of landings was *Market Squid*, *Urchin*, *Spiny Lobster*, *Crab*, and *Prawn & Shrimp*.

Many of these trends display dips and spikes for which the reason is not immediately obvious. Each spotlighted species will include possible explanations, if available, which will contain ecological events that coincide in time with some of the extremes of the data. This report does not claim any of these to be causal, only time-associated events that may offer some explanation.

El Niño

La Nina & El Nino		El Niño is oscillation of the ocean-atmosphere system in the tropical Pacific. El Niño is characterized by unusually warm ocean temperatures in the Equatorial Pacific, while La Niña is characterized by unusually cold temperatures. El Niño causes changes in weather around the globe.
Began	Ended	
Jun-1998	Apr-2001	Of relevance to this study, El Niño causes a reduction in coastal upwelling, which is essential for providing nutrients to many fish. This reduction has an adverse effect on commercial fisheries. The impacts of La Niña tend to be opposite those of El Niño. (CPC, 2013)
Apr-2002	Mar-2003	
Jun-2004	Feb-2005	
Oct-2005	Apr-2006	
Aug-2006	Feb-2007	
Jul-2007	Jul-2008	
Dec-2008	Apr-2009	
Jun-2009	May-2010	
Jun-2010	May-2011	
Aug-2011	Apr-2012	

Source: NOAA Climate Prediction Center

Market Squid

California market squid are extremely sensitive to the warm water trends of El Niño. Overall catch decreases in the warm-water phases, and then rebound in the cooler La Niña phases which bring increased upwelling. In the southern fishery, market squid landings are minimal in El Niño years. Landings in the northern fishery often increase, then decrease for several years after El Niño. During these warm water events with nutrient poor water, landings can disappear entirely in some areas (CDFW 2006, 1-2).

The Market Squid Fishery Management Plan was instituted by CDFW in 2005. Under this plan, commercial fishing for market squid is limited by fishery control rules. These rules include requiring permits to land or possess over 1.8 tons, an annual catch limit, time and spatial closures, and lighting restrictions (Sweetnam 2011, 18).

In 2012, *Market Squid* was first in terms of value of catch, but catch of *Market Squid* was volatile over the 2000 to 2012 time period ranging from a low of 13 million pounds and \$3.8 million in 2006 to a high catch of 142.8 million pounds in 2000 and a high value of \$29.4 million in 2009. The catch has not approached the 2000 high in the last decade, and there has been a steady decline in catch for the last four years (2009-2012). Value per pound has generally increased over this time period. (Table 2.7 and Figure 2.1).

Table 2.7 Trends in Market Squid Caught in CINMS, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	142,843,960	\$19,931,016
2001	76,495,952	\$8,106,759
2002	38,351,059	\$5,940,703
2003	38,440,789	\$12,319,412
2004	52,974,651	\$15,675,706
2005	50,227,776	\$14,599,750
2006	13,736,329	\$3,897,861
2007	81,791,274	\$24,129,278
2008	45,273,142	\$15,569,425
2009	99,099,873	\$29,403,954
2010	79,492,403	\$23,876,515
2011	58,734,804	\$14,760,626
2012	25,447,604	\$7,463,746

Source: California Fishing Information System, California Department of Fish and Wildlife

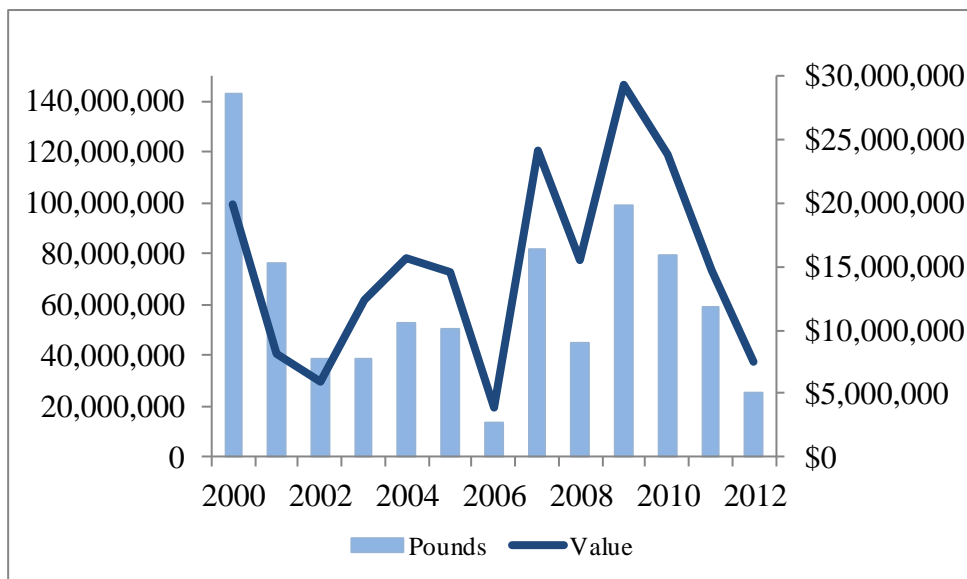


Figure 2.1 Trends in Market Squid Caught in CINMS, 2000 to 2012 (2013 \$)

Urchin

In 2012, *Urchin* had the second highest value of catch. *Urchin* catch has remained relatively steady from 2000 to 2012, ranging from 2.7 million to 7.5 million in pounds of catch, and from \$3.3 million to \$5.6 million in value. From 2000 through 2003 price was over \$0.90 per pound; when catch rose in 2004 price settled around \$0.60 per pound, suggesting that supply grew to meet demand. (Table 2.8 and Figure 2.2)

Table 2.8 Trends in Urchin Caught in CINMS, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	3,706,561	\$5,342,507
2001	2,757,152	\$3,283,131
2002	4,149,954	\$4,201,491
2003	5,640,801	\$5,281,731
2004	7,486,778	\$5,631,006
2005	7,577,752	\$4,967,052
2006	7,126,670	\$3,869,114
2007	7,148,217	\$3,620,364
2008	5,264,254	\$3,366,392
2009	6,128,754	\$3,782,034
2010	5,790,126	\$3,699,705
2011	5,834,853	\$3,818,123
2012	6,294,324	\$4,238,338

Source: California Fishing Information System,
California Department of Fish and Wildlife

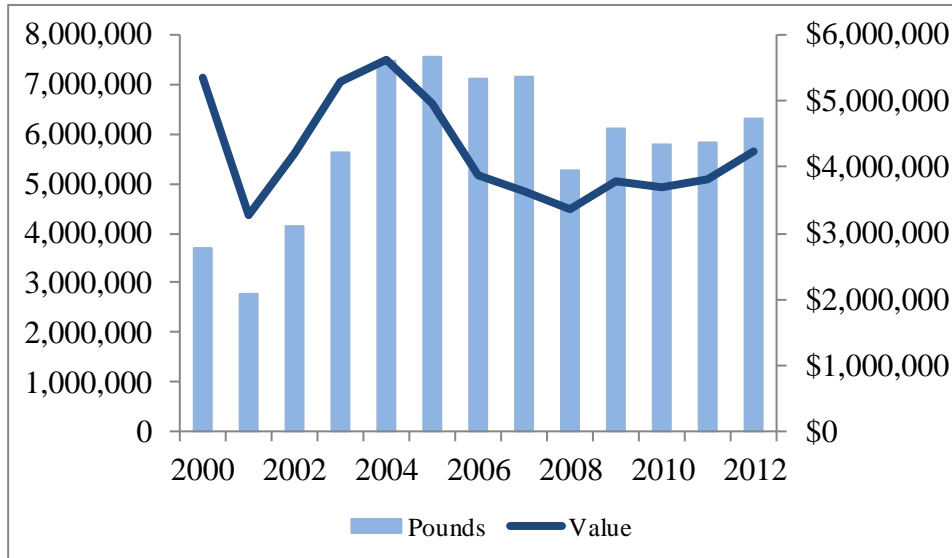


Figure 2.2 Trends in Urchin Caught in CINMS, 2000 to 2012 (2013 \$)

Spiny Lobsters

In 2012, Spiny Lobsters had the third highest value of catch, with just under \$3 million. Catch of *Spiny Lobsters* has remained relatively steady from 2000 to 2012, while price per pound of catch has climbed steadily. Catch was almost identical in 2004 and 2012, yet the 2004 catch had a value of \$1.6 million, and the 2012 catch had a value of nearly \$3 million. This price increase is likely the result of increased exports of *Spiny Lobster* catch to Asian countries (CDFW 2011, 1-3). High value was in 2012, at just under \$3 million, with low value in 2000 at \$1.2 million. Low catch was in 2000 as well, at 124 thousand pounds; high catch was in 2002, with just under 200 thousand pounds. (Table 2.9 and Figure 2.3)

Table 2.9 Trends in Spiny Lobster Caught in CINMS, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	124,410	\$1,192,607
2001	161,992	\$1,389,069
2002	199,863	\$1,784,678
2003	176,369	\$1,633,062
2004	178,352	\$1,645,045
2005	137,981	\$1,360,754
2006	143,957	\$1,606,081
2007	119,700	\$1,440,498
2008	144,903	\$1,695,769
2009	142,151	\$1,766,207
2010	163,987	\$2,756,883
2011	137,509	\$2,473,073
2012	178,669	\$2,983,013

Source: California Fishing Information System,
California Department of Fish and Wildlife

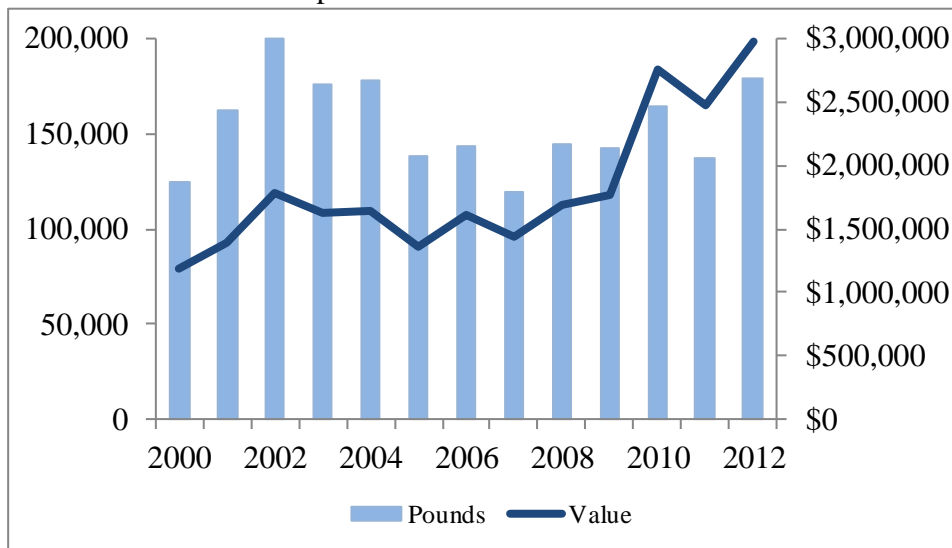


Figure 2.3 Trends in Spiny Lobster Caught in CINMS, 2000 to 2012 (2013 \$)

Crab

Crab was ranked fourth in value in 2012, at almost \$1.2 million. *Crab* has been relatively steady, with an increasing trend over the 2000-2012 time span. Low catch and value were both in 2000, with 300 thousand pounds at \$530 thousand. High catch and value were both in 2012, with 760 thousand pounds at \$1.2 million. Value per pound has remained pretty steady, experiencing a decline of only about 0.020\$ over the 12-year period. (Table 2.10 and Figure 2.4)

Table 2.10 Trends in Crab Caught in CINMS, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	301,709	\$529,938
2001	369,211	\$637,910
2002	446,461	\$745,279
2003	558,427	\$895,957
2004	487,195	\$772,047
2005	524,631	\$802,098
2006	542,931	\$830,905
2007	463,300	\$709,024
2008	386,385	\$608,222
2009	411,818	\$675,988
2010	395,974	\$629,608
2011	491,281	\$766,152
2012	763,156	\$1,175,611

Source: California Fishing Information System,
California Department of Fish and Wildlife

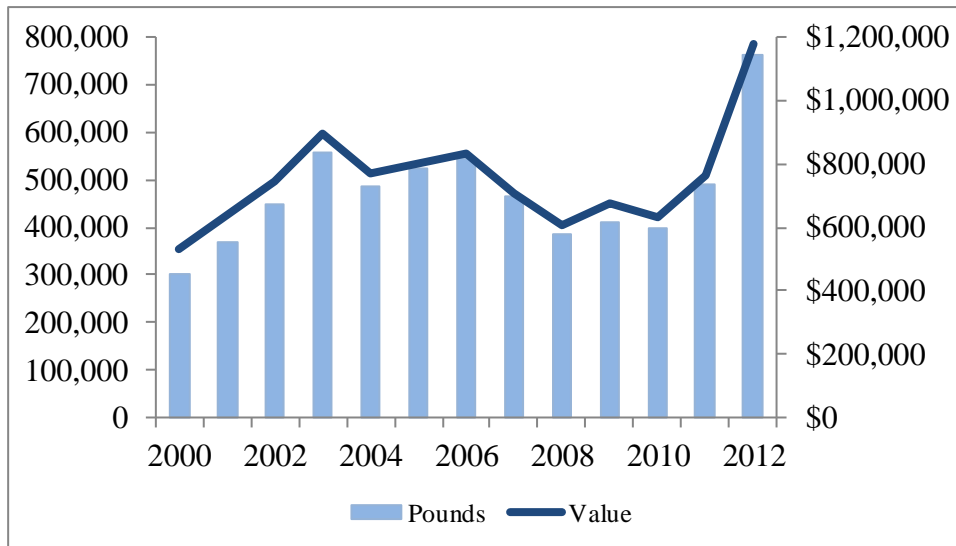


Figure 2.4 Trends in Crab Caught in CINMS, 2000 to 2012 (2013 \$)

Prawn & Shrimp

Prawn & Shrimp was fifth in rank in 2012, with a \$720 thousand value. High catch and value were both in 2000, at \$1.3 million for 230 thousand pounds. Since then, catch has not been above 75 thousand pounds. In 2003, catch and value hit a low of 21,631 pounds for \$267 thousand. From 2000-2006, the number of active *Pacific Ocean Shrimp* vessels have decreased fourfold (CDFW 2006, 3-2). Value of *Prawn & Shrimp* has increased since 2000, reaching nearly \$14 per pound in 2007. (Table 2.11 and Figure 2.5)

Table 2.11 Trends in Prawn & Shrimp Caught in CINMS, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	231,061	\$1,266,761
2001	74,613	\$821,707
2002	48,734	\$504,683
2003	21,631	\$266,958
2004	24,002	\$311,173
2005	37,385	\$488,465
2006	46,390	\$615,072
2007	37,948	\$522,431
2008	59,960	\$789,280
2009	57,038	\$657,898
2010	40,921	\$390,675
2011	58,962	\$637,559
2012	60,371	\$721,228

Source: California Fishing Information System,
California Department of Fish and Wildlife

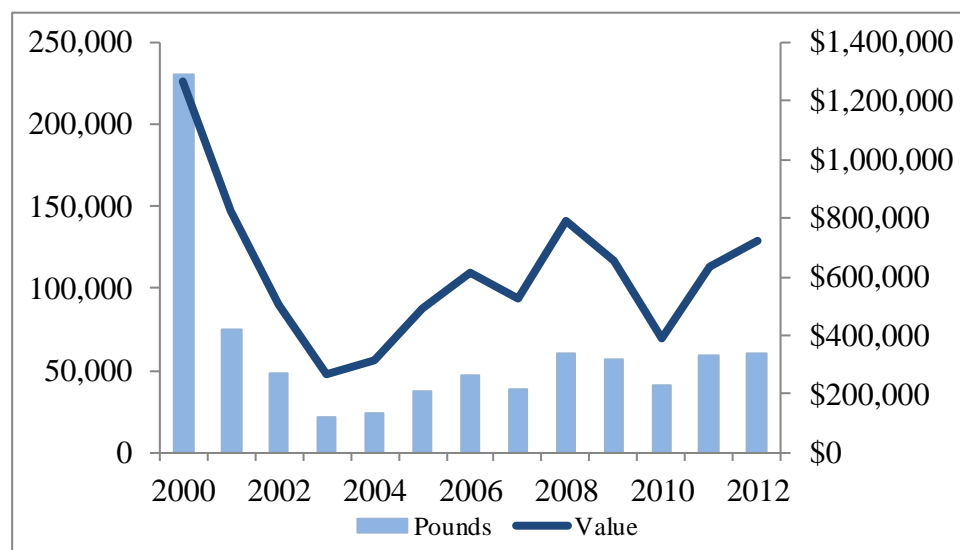


Figure 2.5 Trends in Prawns & Shrimp Caught in CINMS, 2000 to 2012 (2013 \$)

Chapter 3: Special Issues

In this chapter, we address special requests made by CINMS management for special queries of the data. The first major request was for details in trends in the wetfish fishery; sardine and anchovy.

Anchovy Catch from the CINMS, Southern Bight and California

Trends in *Anchovy* catch were compared for the CINMS, the Southern Bight and California. In the CINMS, highest catch was recorded in 2006 with almost 9.2 million pounds and almost \$721 in value. Minimum landings occurred in 2010 with just under 25 thousand pounds and \$8.6 thousand in value. In the Southern Bight, peak landings occurred in 2001 with almost 17 million pounds and over \$1 million in value. In 2012, landings reached a low of 466 thousand pounds and almost \$71 thousand in value. In California, the highest catch was also in 2001 with over 42 million pounds and almost \$1.8 million in value. The lowest landings were almost 2.3 million pounds in 2010 and \$345 thousand in value in 2003.

The percent of total Southern Bight Anchovy landings from the CINMS has ranged from a high of almost 90% in 2004 to a low of 2.5% in 2008 and 2009. The percent of Southern Bight landings from the CINMS was consistently above 30% through 2007, when it plummeted from 2008 to 2009. Recent years show an increase to 14% in 2011 and 19% in 2012.

The percent change in year over year landings show consistent increasing or decreasing trends in the CINMS, Southern Bight and CINMS. However, the CINMS experienced a much more dramatic increase from 2010 to 2011 at 900% compared to about 150% in California and the Southern Bight (Tables 3.1 to 3.3 and Figures 3.1 to 3.4).

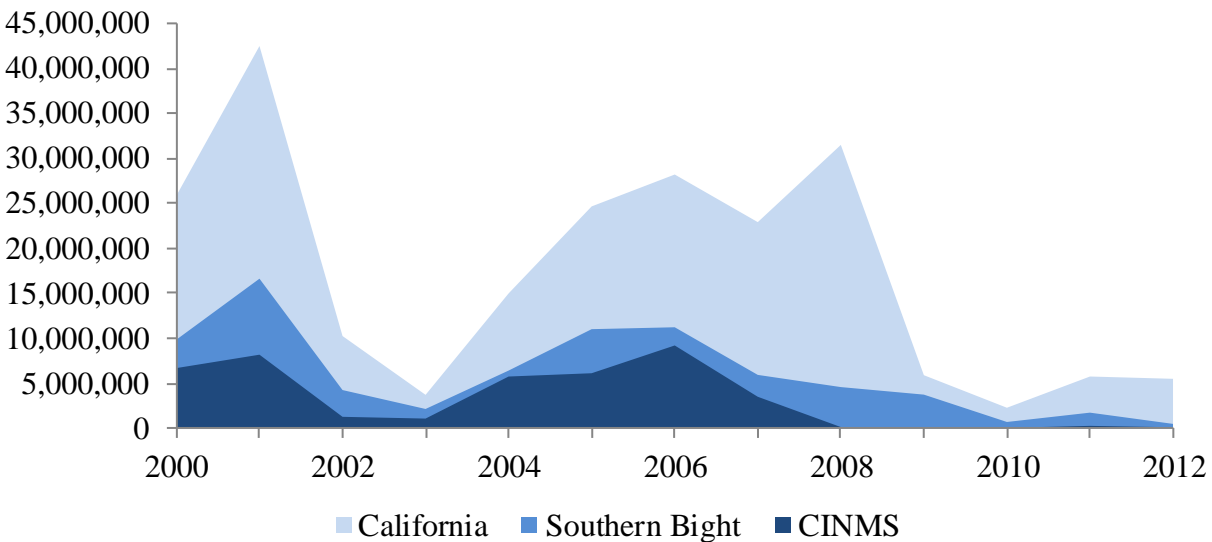


Figure 3.1. Trends in Anchovy Catch in California, the Southern Bight and the CINMS, 2000 to 2012 (pounds)\

Table 3.1 Trends in Anchovy Caught in CINMS, 2000-2012 (2013 \$)

Year	Pounds	Value
2000	6,672,586	\$427,987
2001	8,160,958	\$496,163
2002	1,252,761	\$149,142
2003	1,057,081	\$93,481
2004	5,733,476	\$437,940
2005	6,100,239	\$528,950
2006	9,188,652	\$720,714
2007	3,480,382	\$245,085
2008	114,480	\$33,576
2009	93,638	\$12,009
2010	24,646	\$8,607
2011	246,460	\$76,870
2012	88,902	\$27,041

Source: California Fishing Information System,
California Department of Fish and Wildlife

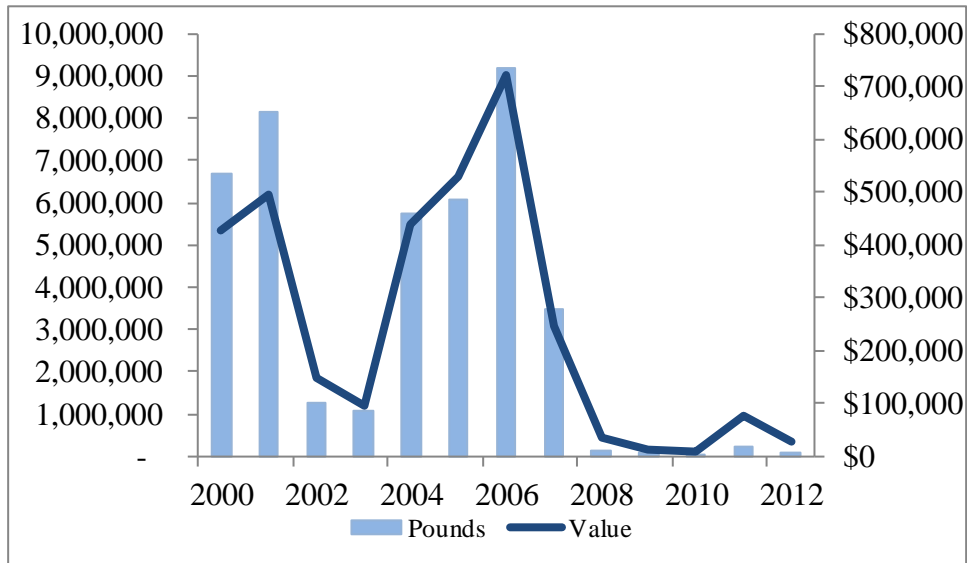


Figure 3.2 Trends in Anchovy Caught in CINMS, 2000-2012 (2013 \$)

Table 3.2 Trends in Anchovy Caught in Southern Bight, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	9,835,077	\$812,374
2001	16,612,245	\$1,019,981
2002	4,228,808	\$368,435
2003	2,124,523	\$240,905
2004	6,397,181	\$566,838
2005	10,999,850	\$861,483
2006	11,211,813	\$898,242
2007	5,914,506	\$369,496
2008	4,559,620	\$320,259
2009	3,720,539	\$309,937
2010	678,971	\$148,043
2011	1,716,631	\$338,786
2012	466,464	\$70,532

Source: California Fishing Information System, California Department of Fish and Wildlife

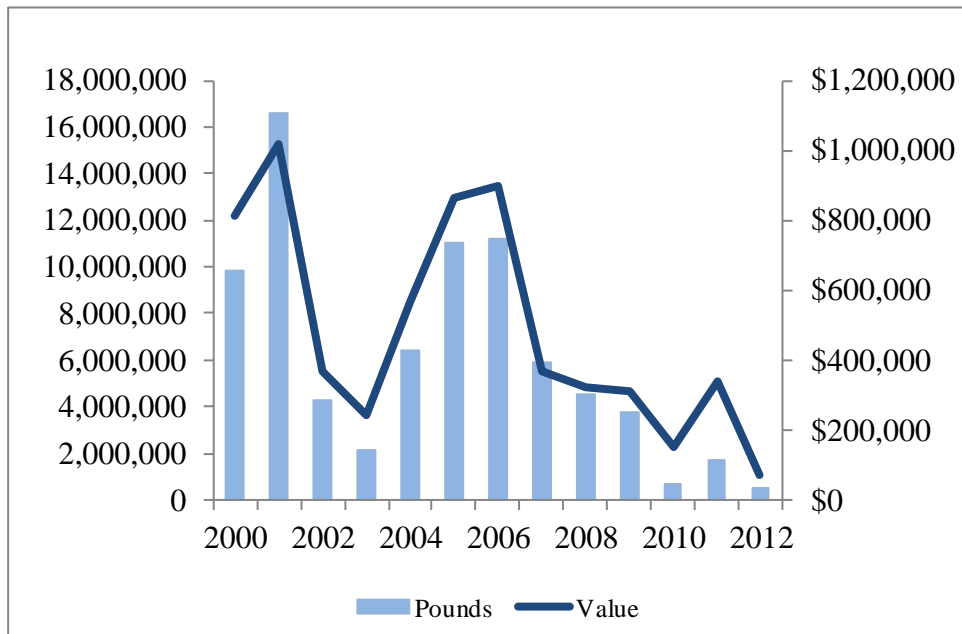


Figure 3.3 Trends in Anchovy Caught in Southern Bight, 2000 to 2012 (2013 \$)

Table 3.3 Trends in Anchovy Caught in California, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	25,856,547	\$2,319,674
2001	42,480,788	\$1,798,664
2002	10,236,588	\$712,938
2003	3,695,777	\$345,216
2004	14,974,412	\$925,031
2005	24,651,016	\$1,664,615
2006	28,198,077	\$1,555,231
2007	22,901,916	\$1,518,479
2008	31,490,223	\$1,732,533
2009	5,881,798	\$428,597
2010	2,260,848	\$497,799
2011	5,734,762	\$639,339
2012	5,478,559	\$376,420

Source: California Fishing Information System,
California Department of Fish and Wildlife

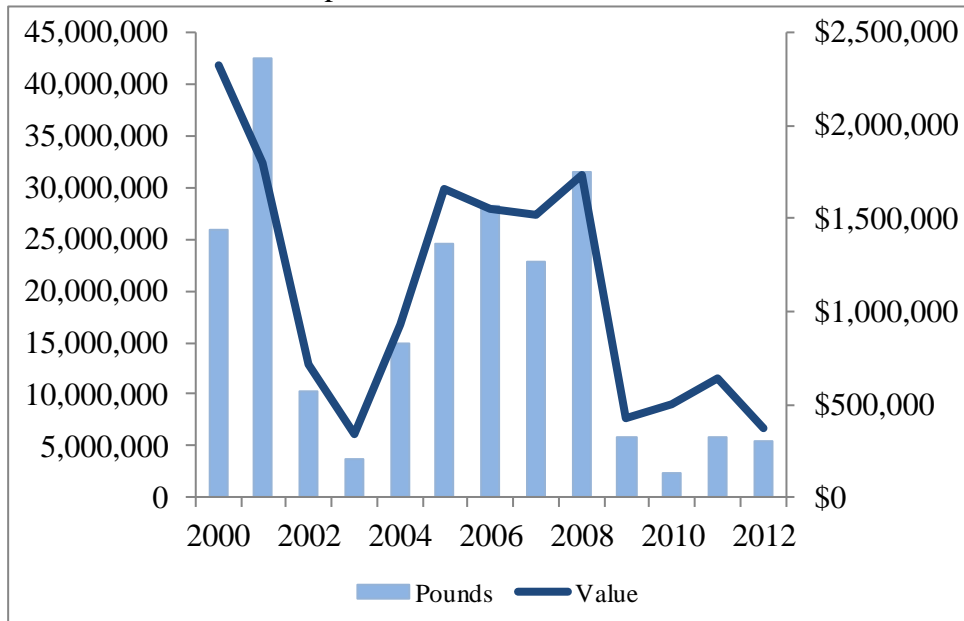


Figure 3.4 Trends in Anchovy Caught in California, 2000 to 2012

Sardine Catch from the CINMS, Southern Bight and California

Trends in *Sardines* were compared in the CINMS, Southern Bight and California. All three sites recorded peak harvest revenue in 2010. Almost \$5.2 million was landed from the CINMS, \$13.1 million was landed from the Southern Bight and almost \$13.7 million landed from all of California waters. Pounds landed peaked in the CINMS in 2001 with 11.2 million pounds. However, pounds landed peaked in the Southern Bight and California in 2007 with almost 102 million pounds and 178 million pounds, respectively.

Low catch in the sanctuary occurred in 2011 with almost 70 thousand pounds and \$15 thousand. In the Southern Bight, low catch was 27.7 million pounds in 2009 at \$2.5 million in value. In California, low catch occurred in 2012 with just under 50.8 million pounds. Low value for all of California *Sardine* landings occurred in 2003 with \$3.6 million in value.

Catch from the CINMS as a percent of the total Southern Bight ranged from a high of almost 17% in 2004 to a low of 0.18% in 2011. The CINMS accounted for over 5% of Southern Bight Sardine catch through 2006. Since then, the percent has only rebounded above 5% in 2010. The figure to below shows this in detail.

The percent change in year over year pounds landed from the CINMS, Southern Bight and California demonstrated variation between the sites. For example, from 2011 to 2012, *Sardine* catch decreased by almost 17% in all of California, increased by almost 7% in the Southern Bight, and increased by 2,450% in the CINMS. The only years with consistent trends are decreases from 2002 to 2003, 2004 to 2005 and 2007 to 2008 and increases from 2003 to 2004 and 2006 to 2007 (Tables 3.4 to 3.7 and Figures 3.5 to 3.8).

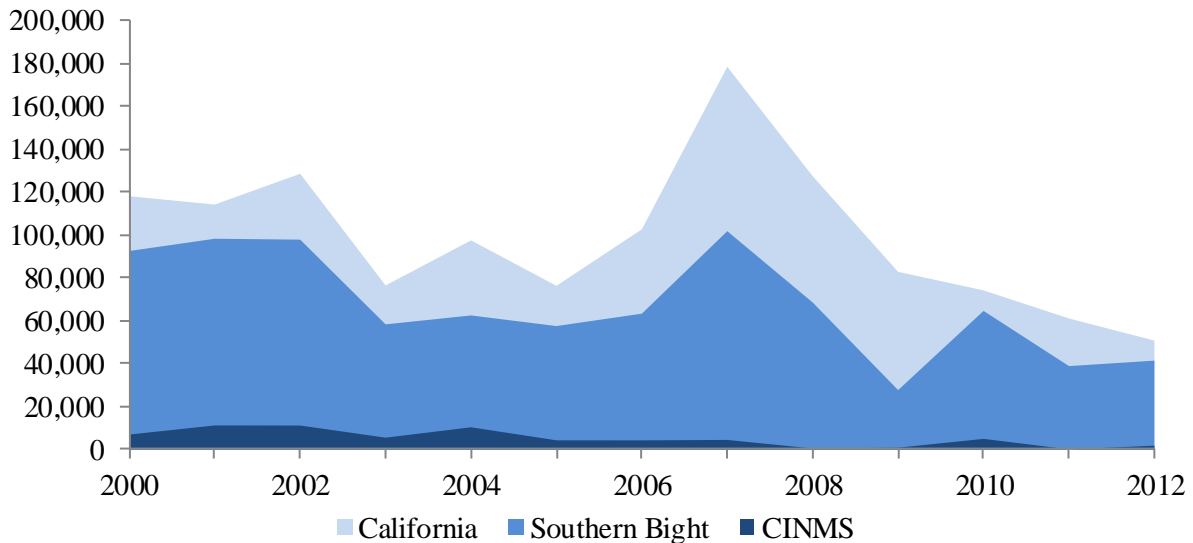


Figure 3.5. Trends in Sardine Catch for California, Southern Bight and the CINMS, 2000 to 2012 (pounds)

Table 3.4 Trends in Sardine Caught in CINMS, 2000-2012 (2013 \$)

Year	Pounds	Value
2000	6,977,114	\$405,167
2001	11,219,537	\$899,821
2002	11,181,527	\$850,134
2003	5,520,430	\$281,043
2004	10,355,476	\$622,504
2005	4,286,359	\$489,974
2006	4,273,320	\$230,536
2007	4,471,192	\$486,324
2008	479,106	\$307,954
2009	859,755	\$282,288
2010	4,962,428	\$5,154,821
2011	69,918	\$15,157
2012	1,783,262	\$191,297

Source: California Fishing Information System,
California Department of Fish and Wildlife

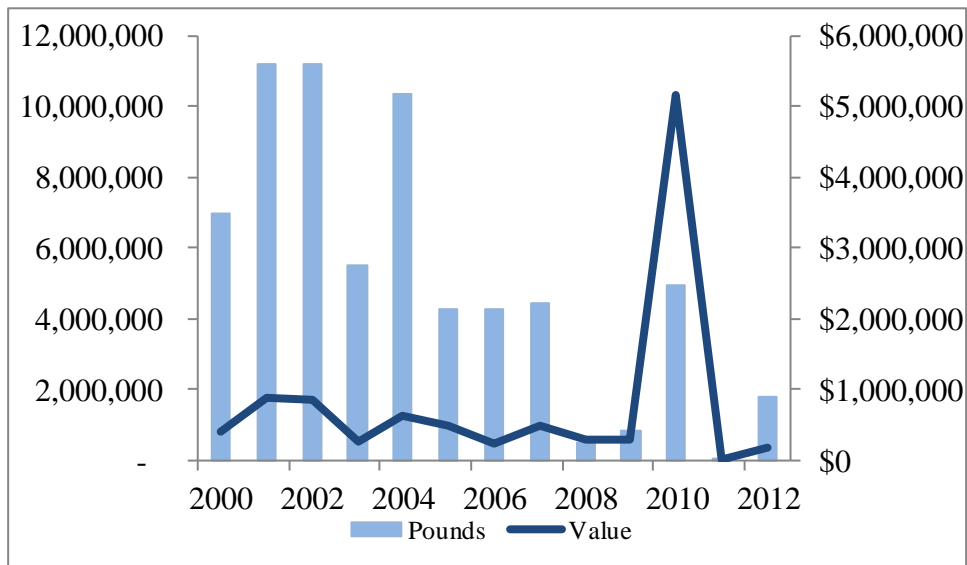


Figure 3.6 Trends in Sardine Caught in CINMS, 2000-2012 (2013 \$)

Table 3.5 Trends in Sardine Caught in Southern Bight, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	92,565,686	\$6,459,719
2001	98,283,039	\$7,309,807
2002	97,867,382	\$5,833,214
2003	58,349,238	\$2,751,889
2004	62,519,469	\$3,645,786
2005	57,565,523	\$3,534,445
2006	63,349,407	\$4,522,690
2007	101,801,942	\$6,018,354
2008	68,547,881	\$4,214,736
2009	27,701,308	\$2,524,568
2010	64,623,446	\$13,063,793
2011	38,891,609	\$3,591,622
2012	41,445,461	\$4,136,113

Source: California Fishing Information System,
California Department of Fish and Wildlife

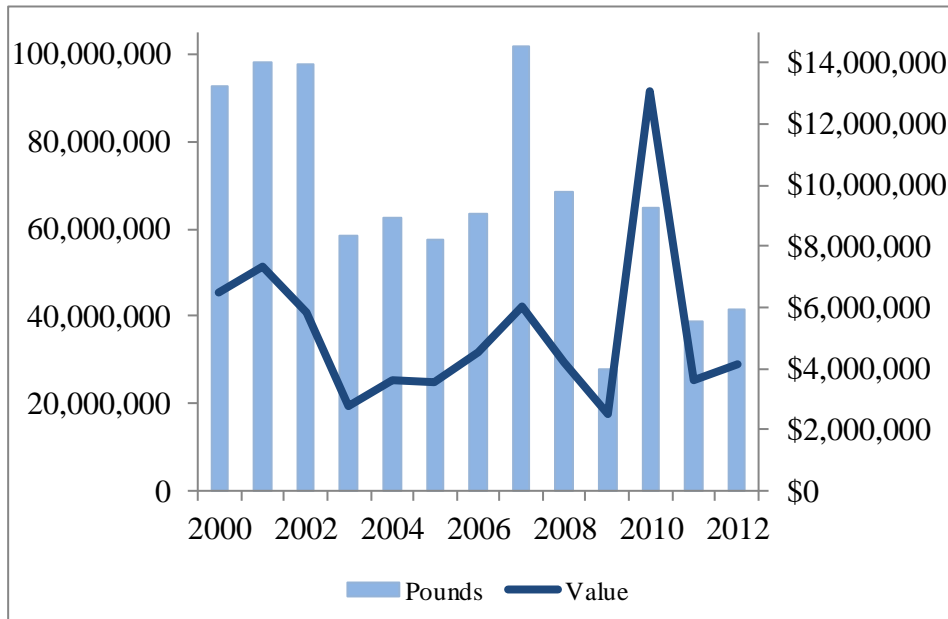


Figure 3.7 Trends in Sardine Caught in Southern Bight, 2000 to 2012 (2013 \$)

Table 3.6 Trends in Sardine Caught in California, 2000 to 2012 (2013 \$)

Year	Pounds	Value
2000	118,094,830	\$7,798,782
2001	114,235,237	\$9,225,153
2002	128,583,153	\$8,245,802
2003	76,499,204	\$3,634,821
2004	97,508,818	\$5,183,513
2005	76,324,334	\$4,250,833
2006	102,683,357	\$6,429,896
2007	178,479,503	\$9,604,391
2008	127,435,426	\$8,648,319
2009	82,842,337	\$7,953,566
2010	74,203,752	\$13,685,121
2011	61,097,426	\$5,656,489
2012	50,795,440	\$5,167,843

Source: California Fishing Information System,
California Department of Fish and Wildlife

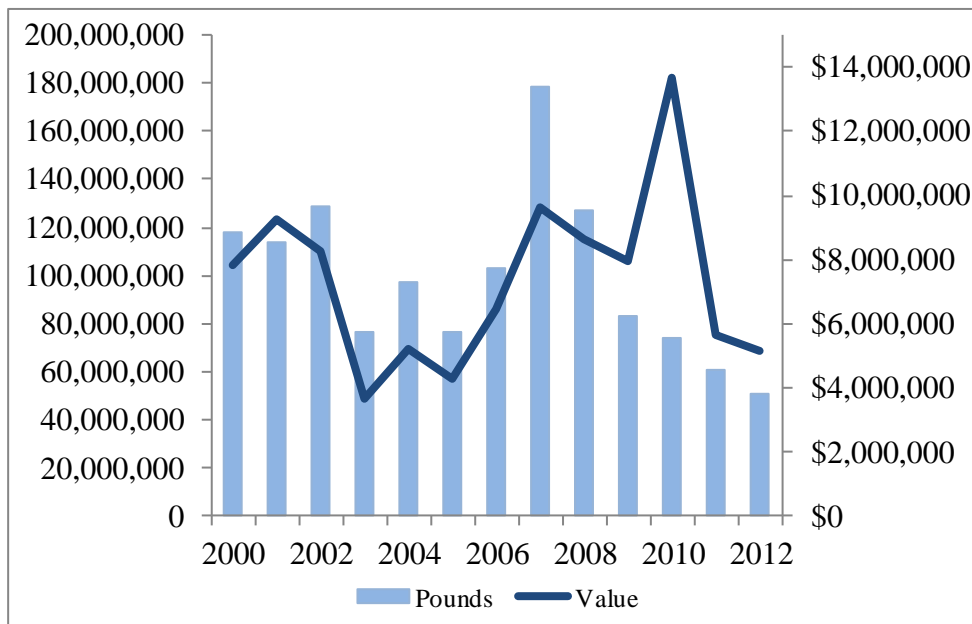


Figure 3.8 Trends in Sardine Caught in California, 2000 to 2012 (2013 \$)

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