Marine Sanctuaries Conservation Series ONMS-14-02

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

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
Office of National Marine Sanctuaries

January 2014

About the Marine Sanctuaries Conservation Series

The Office of National Marine Sanctuaries, part of the National Oceanic and Atmospheric Administration, serves as the trustee for a system of 14 marine protected areas encompassing more than 170,000 square miles of ocean and Great Lakes waters. The 13 national marine sanctuaries and one marine national monument within the National Marine Sanctuary System represent areas of America's ocean and Great Lakes environment that are of special national significance. Within their waters, giant humpback whales breed and calve their young, coral colonies flourish, and shipwrecks tell stories of our maritime history. Habitats include beautiful coral reefs, lush kelp forests, whale migrations corridors, spectacular deep-sea canyons, and underwater archaeological sites. These special places also provide homes to thousands of unique or endangered species and are important to America's cultural heritage. Sites range in size from one square mile to almost 140,000 square miles and serve as natural classrooms, cherished recreational spots, and are home to valuable commercial industries.

Because of considerable differences in settings, resources, and threats, each marine sanctuary has a tailored management plan. Conservation, education, research, monitoring and enforcement programs vary accordingly. The integration of these programs is fundamental to marine protected area management. The Marine Sanctuaries Conservation Series reflects and supports this integration by providing a forum for publication and discussion of the complex issues currently facing the sanctuary system. Topics of published reports vary substantially and may include descriptions of educational programs, discussions on resource management issues, and results of scientific research and monitoring projects. The series facilitates integration of natural sciences, socioeconomic and cultural sciences, education, and policy development to accomplish the diverse needs of NOAA's resource protection mandate. All publications are available on the Office of National Marine Sanctuaries Web site (http://www.sanctuaries.noaa.gov).

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

Vernon R. Leeworthy[1], Desiree Jerome[2], Kelsey Schueler[3]

1. NOAA, National Ocean Service, Office of National Marine Sanctuaries
2. Clark University, NOAA Summer Fellow
3. Monterey Institute of International Studies, Center for the Blue Economy Summer Fellow

U.S. Department of Commerce
Penny Pritzker, Acting Secretary

National Oceanic and Atmospheric Administration
Kathryn Sullivan, Ph.D.
Acting Under Secretary of Commerce for Oceans and Atmosphere

National Ocean Service
Holly Bamford, Ph.D., Assistant Administrator

Office of National Marine Sanctuaries
Daniel J. Basta, Director

Silver Spring, Maryland
January 2014

Disclaimer

Report content does not necessarily reflect the views and policies of the Office of National Marine Sanctuaries or the National Oceanic and Atmospheric Administration, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

Report Availability

Electronic copies of this report may be downloaded from the Office of National Marine Sanctuaries web site at http://sanctuaries.noaa.gov. Hard copies may be available from the following address:

National Oceanic and Atmospheric Administration
Office of National Marine Sanctuaries
SSMC4, N/ORM62
1305 East-West Highway
Silver Spring, MD 20910

Cover

Upper Left: For many years, the productivity around Cordell Bank has attracted the attention of commercial fishermen (Gulf of the Farallones NMS). Upper Right: A salmon fishing boat the "Bounty" that fishers in the GFNMS (Mary Jane Schramm). Lower Left: Dungeness crabs are common in the Gulf of the Farallones and are a favorite menu item at Fishermen's Wharf in San Francisco (Gulf of the Farallones NMS). Lower Right: The seasonal catch of herring in Tomales Bay (Richard Allen).

Suggested Citation

Vernon, R. Jerome, D. Schueler, K. 2014. Economic Impact of the Commercial Fisheries on Local County Economies from Catch in the Gulf of Farallones National Marine Sanctuary 2010, 2011 and 2012. Marine Sanctuaries Conservation Series ONMS-14-02. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 24 pp.

Contact

Dr. Vernon R. (Bob) Leeworthy
Chief Economist
Office of National Marine Sanctuaries
1305 East West Highway, SSMC4, 11th floor
Silver Spring, MD 20910
Telephone: (301) 713-7261
Fax: (301) 713-0404
E-mail: Bob.Leeworthy@noaa.gov

Abstract

This report estimates the economic impact of commercial fishing within the Gulf of Farallones National Marine Sanctuary (GFNMS) on 10 local county economies according to the California Ocean Fish Harvester Economic Model (COFHE). The report also provides a profile of various aspects of the fishing industry in the GFNMS.

The economic impact of commercial fishing in GFNMS on the local economy, according to a three-year average, was $15,019,461 in harvest revenue generated. This then drove $24,878,544 in output, $16,287,514 in value added, $15,110,782 in total income and 291 full- and part-time jobs in 10 counties. During the study period of 2010 to 2012, harvest revenue ranged from a low of $11,615,008 in 2010 to a high of $17,362,715 in 2011. The top five species/species groups caught in GFNMS were *Dungeness Crab*, *Salmon*, *CA Halibut*, *Sablefish Non-Trawl*, and *Coonstriped Shrimp*. Together, these species/species groups accounted for almost 99% of total value landed from GFNMS in 2012. *Dungeness Crab* was by far the predominant species landed, representing over 83% of total value or $13,426,125 in 2012. Consequently, the gear type "Pots & Traps" accounted for 84% of total value in 2012. Other gear types used include "Troll," "Trawl," "Longlines," "Purse Seine," and "Hook & Line." 97% of catch from GFNMS was landed at the following top four ports: San Francisco, Bodega Bay, Vallejo and Princeton-Half Moon. Three of the four ports depended on the sanctuary for 40% or more of total value with a high of 97% at Vallejo and a low of 3% at Princeton-Half Moon.

Key Words

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

Table of Contents

List of Figures and Tables

Figure/Table Number and Title ***Page***

Introduction

This report is part of the Socioeconomic Research and Monitoring Program for the Gulf of Farallones National Marine Sanctuary (GFNMS). 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 national marine sanctuary resource uses and local, regional and national economies.

This report addresses the commercial fisheries in GFNMS. California Fishery Information System (CFIS) from the California Department of Fish and Wildlife (CDFW) provides data for estimates of how much California commercial catch landed at California ports comes from the GFNMS. 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 multipliers inform estimated economic impact on local county economies (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 GFNMS, the total economic impact for GFNMS 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 GFNMS. 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 three-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 commercial fisheries in GFNMS. Profile elements include: 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; port dependence on catch from GFNMS (i.e. the percent of total harvested fish landings at the port from GFNMS); and fishing vessel dependence on their catch from the GFNMS (i.e. catch from the GFNMS catch as a percent of total fishing revenues from all California waters).

Chapter 1: Economic Impacts of the Commercial Catch in the GFNMS

To obtain estimates of the commercial catch from the GFNMS the first step is to define the "best" spatial area from the CDFW-CFIS that "best" approximates the area within the GFNMS. CDFW-CFIS maintains commercial landings by where the fish is caught and where it is landed. 10-minute by 10-minute blocks (100 nautical square mile cells) describe where the fish is caught. Latitude and longitude coordinates define these blocks. Figure 1.1 shows the overlay of GFNMS boundaries on the CDFW-CFIS blocks. Each block has a three digit database code. Table 1.1 shows the 15 blocks included in our definition of GFNMS.

Figure 1.1. Definition of GFNMS using CDFW-CFIS Blocks

Table 1.1. Definition of the GFNMS using CDFW-CFIS Blocks

Sanctuary/Full or Partial Blocks	CDFW-CFIS 10-minute by 10-minute Blocks
GFNMS (15)	
Full Blocks (8)	430, 438, 447, 448, 449, 457, 458, 459
Partial Blocks (7)	431, 439, 450, 456, 460, 466, 467

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 because COFHE multipliers 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. Each OC has a different production function (i.e. production input combinations such as gear, labor, fuel, bait, ice, etc.). Some OCs, such as "Salmon & Dungeness crab" and "Dungeness crab," are differentiated by vessel size (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). However, not all catch is included in the 20 OCs. Thus, economic impacts are slightly under estimated. In 2010 0.03% was not included, 0.0096% was not included in 2011 and 0.40% was excluded in 2012. In addition, small amounts of catch from GFNMS were landed at far distant ports. These amounts were also excluded from this 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. 2009)

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 GFNMS for years 2010, 2011, 2012 and the three-year average. This was done due to volatile fluctuation in some influential fisheries from year to year (see trends of top five species/species groups in Chapter 2).

Catch from the GFNMS was landed at 51 ports in 10 counties in years 2010 to 2012. Insignificant landings at far distant ports were excluded, thus are analysis includes only the 10 counties in Tables 1.3, 1.4, 1.5 and 1.6. In 2010, almost $11.62 million was harvested by the 20 OCs from GFNMS, which generated over $19.07 million in total output, almost $12.7 million in value added, $11.4 million in income and 202 full- and part-time jobs in the ten counties (Table 1.3).

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

County	Harvest Revenue	Output	Value Added	Total Income	Employment[1]
Alameda	14,943	26,369	14,864	13,004	0.52
Contra Costa	13,632	23,922	15,145	13,543	0.45
Marin	920,895	1,423,647	939,818	837,603	31.29
Mendocino	19,028	29,096	20,320	18,346	0.26
Monterey	7,964	13,110	8,127	7,217	0.15
San Francisco	7,158,882	11,571,455	7,796,285	7,011,009	108.79
San Mateo	625,062	1,002,864	669,788	601,390	11.50
Santa Cruz	0	0	0	0	0.00
Solano	0	0	0	0	0.00
Sonoma	2,854,602	4,982,707	3,232,068	2,899,426	49.17
Total[2]	*11,615,008*	*19,073,170*	*12,696,416*	*11,401,537*	*202*

1. Number of full- and part-time jobs.
2. $35,638 or 0.03% not included because landings were made in distant ports from the main study area for economic impact analysis. This included $26,592 in Del Norte, $8,043 in Humboldt and $1,003 in San Luis Obispo.

In 2011, harvest revenue from commercial fish catch from the GFNMS increased to over $17.36 million. This generated almost $28.99 million in output, $19.11 million in value added, $17.95 million in total income and 319 full- and part-time jobs in the 10 counties (Table 1.4). Much of the economic impact was concentrated in San Francisco County, accounting for 46% of harvest revenue, almost 45% of output, 45% of value added, 43% of total income and 41% of employment. A large portion of economic impact was also concentrated in Sonoma County, accounting for almost 37% of harvest revenue, almost 39% of output, 37% of value added, almost 36% of total income and 35% of employment. There was no recorded economic impact in Monterey income for 2011.

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

County	Harvest Revenue	Output	Value Added	Total Income	Employment[1]
Alameda	44,821	75,257	34,271	35,577	2.67
Contra Costa	1,582	2,592	608	827	0.44
Marin	406,923	623,781	537,138	463,629	32.50
Mendocino	183,479	280,536	190,517	171,593	2.66
Monterey	0	0	0	0	0.00
San Francisco	8,015,466	12,973,505	8,636,212	7,753,682	131.02
San Mateo	353,490	569,800	361,949	326,059	10.22
Santa Cruz	1,648	2,810	1,713	1,522	0.03
Solano	1,995,303	3,235,607	2,234,712	2,824,606	26.92
Sonoma	6,360,003	11,125,717	7,113,967	6,373,726	112.77
Total[2]	*17,362,715*	*28,889,606*	*19,111,088*	*17,951,221*	*319*

1. Number of full- and part-time jobs.
2. $1,673 or 0.0096% not included because catch was landed in distant ports for the main study area for economic analysis. Ths included $528 in Orange, $678 in San Luis Obispo, and $467 in Santa Clara.

In 2012, harvest revenue decreased slightly from the previous year. The commercial fish catch from GFNMS earned $16.08 million in revenue, generating $26.67 million in output, almost $17.06 million in value added, just under $15.98 million in total income and 353 full- and part-time jobs in the 10 counties (Table l.5). Again, San Francisco County accounted for the majority of economic impact with almost 51% of harvest revenue and value added, 50% of output, 49% of total income and over 41% of total employment.

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

County	Harvest Revenue	Output	Value Added	Total Income	Employment[1]
Alameda	84,558	143,307	60,692	68,318	4.93
Contra Costa	10,851	17,615	3,531	6,697	1.30
Marin	289,249	440,387	206,620	170,901	19.81
Mendocino	38,216	57,358	31,419	27,486	1.68
Monterey	5,829	9,384	5,090	4,379	0.42
San Francisco	8,178,502	13,228,457	8,689,775	7,793,774	145.86
San Mateo	471,940	758,184	454,455	442,458	16.19
Santa Cruz	20,206	34,333	19,613	17,215	0.79
Solano	1,671,507	2,712,136	1,866,304	2,354,840	22.70
Sonoma	5,309,802	9,271,696	5,717,538	5,093,521	139.16
Total[2]	*16,080,660*	*26,672,857*	*17,055,038*	*15,979,588*	*353*

1. Number of full- and part-time jobs.
2. $65,248 or 0.40% not included. A total of $56,406 not included because the catch did not map into one of the 20 OCs in the COFHE Model; $2,388 in Marin, $40,635 in San Francisco, $1,277 in San Mateo, and $12,106 in Sonoma. In addtion, $8,842 was not included because catch was landed in distant ports from the main study area for economic analysis; $4,979 in Santa Barbara, $1,006 in Humboldt, and $2,857 in San Diego.

For the three-year average, harvest revenue was almost $15.02 million, output was just under $24.88 million in output, almost $16.289million in value added, $15.11 million in total income and 291 full- and part-time jobs (Table 1.6).

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

County	Harvest Revenue	Output	Value Added	Total Income	Employment[1]
Alameda	48,107	81,644	36,609	38,966	2.71
Contra Costa	8,688	14,710	6,428	7,022	0.73
Marin	539,022	829,272	561,192	490,711	27.87
Mendocino	80,241	122,330	80,752	72,475	1.53
Monterey	4,598	7,498	4,406	3,865	0.19
San Francisco	7,784,283	10,938,459	8,374,091	7,519,488	128.56
San Mateo	483,497	776,949	495,398	456,635	12.64
Santa Cruz	7,285	12,381	7,109	6,246	0.27
Solano	1,222,270	1,982,581	1,367,005	1,726,482	16.54
Sonoma	4,841,469	8,460,040	5,354,525	4,788,891	100.37
Total	*15,019,461*	*24,878,544*	*16,287,514*	*15,110,782*	*291*

1. Number of full and part-time jobs.

The majority of economic impact was concentrated in San Francisco and Sonoma counties. According to the three-year average, San Francisco accounted for 52% of harvest revenue, 44% of output, 51% of value added, 50% of total income and 44% of full- and part-time jobs generated by commercial fishing catch from the GFNMS. Sonoma County accounted for 32% of harvest revenue, 34% of output, 33% of value added, 32% of total income and 34% of full- and part-time jobs. Solano County was the third most economically impacted county, accounting for 8% of harvest revenue, output and value added; 11% of total income and 6% of employment.

In 2010, the commercial fisheries catch from GFNMS directly (and indirectly through the multiplier process) accounted for 0.0035% of total income by place of residence in the study area, 0.0049% of total income by place of work in the study area and 0.007% of total employment in the 10 county study area. In 2011, GFNMS catch accounted for 0.005% of total income by place of residence, 0.007% of total income by place of work and 0.011% of total employment in the 10 county study area.

By county and excluding years of $0 harvest revenue in 2010 for Santa Cruz and Solano counties and 2011 for Monterey County, the percent of income by place of residence ranged from a low of 0.000001% in Contra Costa County in 2011 to a high of 0.029% on Sonoma County in 2011. Percent of income by place of work ranged from a low of 0.000003% in Contra Costa County in 2011 to a high of 0.05% in Sonoma County in 2011. Percent of total employment ranged from a low of 0.0002% in Santa Cruz County in 2011 to a high of 0.049% in Sonoma County in 2011 (Table 1.7).

Table 1.7. Local/ Regional Dependence on the GFNMS Fishing Industry, 2010 to 2012

County	Commercial Fishing Income	Commercial Fishing Employment	Income by Place of Residence ($000)	Income by Place of Work ($000)	Total Employment
2010					
Alameda	$13,004	0.52	$72,024,822	$55,762,084	676,047
%			0.000018%	0.000023%	0.000076%
Contra Costa	$13,543	0.45	$57,700,398	$29,351,680	465,486
%			0.000023%	0.000046%	0.000096%
Marin	$837,603	31.29	$20,854,466	$9,895,696	122,558
%			0.004016%	0.008464%	0.025529%
Mendocino	$18,346	0.26	$3,049,993	$1,644,157	38,461
%			0.000601%	0.001116%	0.000668%
Monterey	$7,217	0.15	$16,677,674	$11,640,804	193,111
%			0.0000433%	0.000062%	0.000076%
San Francisco	$7,011,009	108.79	$55,850,894	$62,256,151	413,291
%			0.012553%	0.011262%	0.026323%
San Mateo	$601,390	11.50	$47,946,507	$35,037,442	342,370
%			0.001254%	0.001716%	0.003359%
Santa Cruz	$0	0.00	$12,246,607	$6,276,809	131,123
%			0.00%	0.00%	0.00%
Solano	$0	0.00	$15,293,223	$9,080,662	188,959
%			0.00%	0.00%	0.00%
Sonoma	$2,899,426	49.17	$20,975,353	$12,387,049	229,466
%			0.013823%	0.023407%	0.021428%
Total	*$11,401,537*	*202*	*$322,619,937*	*$233,332,534*	*$2,800,872*
% of Total from Commercial Fishing			*0.00353%*	*0.00489%*	*0.00722%*
2011					
Alameda	$35,577	2.67	$75,908,145	$57,401,672	686,091
%			0.000047%	0.000062%	0.000389%
Contra Costa	$827	0.44	$60,778,675	$30,600,694	473,938
%			0.000001%	0.000003%	0.000093%
Marin	$463,629	32.50	$21,871,623	$10,249,177	126,292
%			0.002120%	0.004524%	0.025736%
Mendocino	$171,593	2.66	$3,170,419	$1,686,462	38,077
%			0.005412%	0.010175%	0.006975%
Monterey	$0	0.00	$17,355,940	$11,904,437	193,977
%			0.00%	0.00%	0.00%
San Francisco	$7,753,682	131.02	$60,432,766	$67,017,958	425,479
%			0.012830%	0.011570%	0.030795%
San Mateo	$326,059	10.22	$50,596,839	$36,930,765	353,431
%			0.000644%	0.000883%	0.002892%
Santa Cruz	$1,522	0.03	$12,919,550	$6,496,062	131,168
%			0.000012%	0.000023%	0.00002%
Solano	$2,824,606	26.92	$15,858,521	$9,226,093	231,203
%			0.017811%	0.030615%	0.011642%
Sonoma	$6,373,726	112.77	$22,126,957	$12,840,293	231,203
%			0.028805%	0.049638%	0.048776%
Total	*$17,951,221*	*319*	*$341,019,435*	*$244,353,613*	*$2,890,859*
% of Total from Commercial Fishing			*0.00526%*	*0.00735%*	*0.01104%*

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

Chapter 2: Profiles of the Commercial Fisheries in the GFNMS

In addition to where the catch is caught and landed, the CDFW-CFIS database includes vessels 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 the GFNMS, we originally defined 24 species/species groups, including an "All Other" group. After initial data processing, we found some species/species groups insignificant and moved them into the "All Other" group. In addition, we extracted those species/species groups originally in "All Other" if their harvest revenue exceeded $1,000. Ultimately, there are 21 species/species groups, including "All Other", for our analysis in 2012. "All Other" accounted for 0.01% of harvest revenue in 2012 (Table 2.1)

Table 2.1. Pounds and Value of Landings from the GFNMS by Species/Species Groups, 2012 (2013 $)

Species/Species Groups	Pounds	Value	Percent of Total Value
Dungeness Crab	4,146,874	$13,426,125	83.15%
Salmon	410,054	$2,072,072	12.83%
CA Halibut	45,111	$213,830	1.32%
Sablefish Non-Trawl	31,514	$112,611	0.70%
Coonstriped Shrimp[2]	25,265	$102,716	0.64%
Market Squid	204,282	$61,113	0.38%
Other Flatfish	26,664	$38,587	0.24%
Tuna	11,105	$24,777	0.15%
Shelf Rockfish	17,689	$21,477	0.13%
Rock Crab, Unspecified[2]	4,105	$12,294	0.08%
Deeper Nearshore Rockfish	1,938	$12,202	0.08%
Spot Prawn	672	$9,539	0.06%
White Seabass[2]	1,965	$8,653	0.05%
Sanddabs	7,440	$7,554	0.05%
Pacific Herring - Roe on Kelp[2]	1,995	$6,513	0.04%
Lingcod	2,589	$5,319	0.03%
Smelts	802	$3,189	0.02%
Shortspine Thornyhead[2]	2,359	$2,592	0.02%
Shallow Nearshore Rockfish	209	$1,681	0.01%
Sharks - Rays not White Shark or Big Skate	1,754	$1,113	0.01%
All Other[1]	9,145	$1,950	0.01%
Total	*4,953,533*	*$16,145,908*	*100.00%*

1. Species Groups *Dover Sole-Thorneyheads-Sablefish Trawl* , *Herring* , *Hagfish* and *Dover Sole Non-Trawl* were grouped into *All Other* for having a value less than $1,000
2. Species Groups broken out of *All Other* because their value exceeded $1,000.

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

In 2012, *Dungeness crab* was the predominant species landed by both pounds (4,416,874) and value ($13,426,125). The *Dungeness crab* landings from GFNMS accounted for 83.15% of total value from the sanctuary. *Salmon* was the secondary species landed from the GFNMS in 2012, representing 410,054 pounds and $2,072,072 of harvest revenue. *Salmon* accounted for 12.83% of total value landed from the sanctuary. Other prevalent species in the GFNMS commercial fish catch include *CA Halibut* with $213,830 (1.32%), *Sablefish Non-Trawl* with $112,611 (0.7%) and *Coonstriped Shrimp* with $102,716 (0.64%). Combined these five top species/species groups accounted for almost 99% of total value from GFNMS landings in 2012.

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." In 2012, 0.06% of harvest revenue from GFNMS was recorded caught with "Unspecified" and 0.04% was recorded caught with "All Other."

Over the study period, the vast majority of harvest revenue was recorded caught with "Pots & Traps," the gear type associated with *Dungeness crab.* The percent of total value for "Pots & Traps" declined from 2010 to 2012, ranging from a high of 97.01% in 2010 to a low of 84.15% in 2012. This decline in "Pots & Traps" percent of total value is largely explained by the growth of "Troll" over the study period. In 2010, "Troll" accounted for $5,401 in harvest revenue or 0.05% of total value. By 2012, "Troll" increased to $2,041,757 in harvest revenue or 12.65% of total value. The expansion of "Troll" is likely attributed to restrictions on the *Salmon* fishery in 2010 and 2011 (California Department of Fish and Wildlife [CDFW] 2013 5-5). "Trawl" also shows a steady increase in percent of total value with 0.73% in 2010 and 1.66% in 2012. Conversely, "Longlines" shows a steady decline over the study period from 1.67% in 2010 to 0.72% in 2012. "Hook & Line" remains relatively consistent, ranging from 0.33% in 2012 to 0.36% in 2010. Other gear types include "Hooka – Diving" and "Other Seine- Dip Net," which have not been used since 2010; and "Set Gill Nets" and "Purse Seine," which were both used in 2012 (Table 2.2).

Since 2010, the number of vessels active in the GFNMS commercial fishing industry has steadily increased. In 2010 there were 171 vessels operating, in 2011 there were 224, and in 2012 there were 341. While "Pots & Traps" percent of total value decreased over the study period, the number of vessels increased from 144 in 2010 to 152 in 2011 and to 155 in 2012. "Troll" vessels and "Hook & Line" vessels also increased over the study period. "Troll" increased by 1,300% from 15 in 2010 to 57 in 2011 and to 210 in 2012. "Hook & Line" experienced a less striking increase from 18 in 2010 to 31 in 2011 and to 22 in 2012. The number of vessels recording catch from "Longlines" decreased over the study period from 15 in 2010 to 14 in 2011 and to nine in 2012. In addition, six vessels recorded catch from "Trawl" in 2011 and five recorded catch from "Trawl" in 2012. Number of vessels by gear type is only reported here for those gear types with at least three vessels operating in a given year.

Table 2.2. Pounds and Value by Gear Type in the GFNMS, 2010 to 2012 (2013 $)

Gear Type	Pounds	Value	Percent of Total Value
2010			
Troll	1,302	$5,401	0.05%
Pots & Traps	5,996,161	$11,302,534	97.01%
Longlines	66,485	$194,946	1.67%
Hook & Line	10,157	$42,206	0.36%
Hooka - Diving	32,857	$18,972	0.16%
Set Gill Nets	2,433	$26	0.0002%
Trawl	36,635	$85,540	0.73%
Purse Seine	400	$854	0.01%
Other Seine - Dip Net	123	$164	0.001%
Drift Gill Net	0	$0	0.00%
Harpoon / Spear	0	$0	0.00%
Unspecified	0	$0	0.00%
All Other	0	$0	0.00%
Total	*6,146,553*	*$11,650,643*	*100.00%*
2011			
Troll	23,320	$151,531	0.87%
Pots & Traps	6,549,005	$16,647,029	95.87%
Longlines	59,738	$236,534	1.36%
Hook & Line	12,549	$64,904	0.37%
Hooka - Diving	0	$0	0.00%
Set Gill Nets	537	$138	0.001%
Trawl	118,288	$264,253	1.52%
Purse Seine	0	$0	0.00%
Other Seine - Dip Net	0	$0	0.00%
Drift Gill Net	0	$0	0.00%
Harpoon / Spear	0	$0	0.00%
Unspecified	0	$0	0.00%
All Other	0	$0	0.00%
Total	*6,763,437*	*$17,364,388*	*100.00%*
2012			
Troll	404,895	$2,041,757	12.65%
Pots & Traps	4,186,613	$13,586,791	84.15%
Longlines	35,583	$116,626	0.72%
Hook & Line	16,337	$53,389	0.33%
Hooka - Diving	0	$0	0.00%
Set Gill Nets	8,814	$2,391	0.01%
Trawl	94,168	$267,728	1.66%
Purse Seine	204,282	$61,113	0.38%
Other Seine - Dip Net	0	$0	0.00%
Drift Gill Net	0	$0	0.00%
Harpoon / Spear	0	$0	0.00%
Unspecified	1,780	$10,397	0.06%
All Other	1,061	$5,715	0.04%
Total	*4,953,533*	*$16,145,908*	*100.00%*

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 GFNMS, 77 of the 341 vessels (22.58%) accounted for 81.86% of total value, which closely follows the "20-80" rule.

Thus, distribution of harvest revenue by vessel is skewed. Four vessels (1.17%) account for over 14% of total harvest revenue. These four vessels received at least $500,000 for their GFNMS catch. 15 vessels or 4.40% account for over a third of all harvest revenue, receiving at least $250,000 each. Alternatively, 115 vessels (33.72%) account for just over 1% of total harvest revenue, receiving less than $5,000 each (Table 2.3).

Table 2.3. Vessel Distribution of Harvest Revenue from GFNMS, 2012 (2013 $)

Distribution Range	Number of Vessels	Percent of Vessels	Percent of Harvest Revenue
Greater than $0	341	100.00%	100.00%
Greater than $500,000	4	1.17%	14.42%
Greater than $250,000	15	4.40%	37.04%
Greater than $100,000	51	14.96%	69.96%
Greater than $50,000	77	22.58%	81.86%
Greater than $25,000	116	34.02%	90.56%
Greater than $10,000	178	52.20%	96.52%
Greater than $5,000	226	66.28%	98.69%
Less than $5,000	115	33.72%	1.29%
Less than $1,000	45	13.20%	0.12%

Mean=$47,618; Median=$10,680; Minimum=$8.6; Maximum=$697,162; sum=$16,145,908
Source: California Fishing Information System, California Department of Fish and Wildlife

Vessel Dependence on the GFNMS for Their Total California Fishing Revenues

Another way to analyze harvest revenue distribution is vessel dependency on the GFNMS for their total fishing revenues. We calculated a vessel's harvest revenue from GFNMS catch as a percent of their total catch from all of California. Table 2.4 shows distribution for year 2012. For all 341 vessels, total 2012 revenue caught in GFNMS waters was $16,145,908. On average, 39% of the vessel's total harvest revenue was caught in the GFNMS. Dependence on catch from GFNMS steadily increases as the percent distribution of GFNMS revenue per vessel increases. For example, the 116 vessels accounting for 1.29% of GFNMS revenue depend on the GFNMS for only 5.13% of their total California revenues. On the other hand, the 116 vessels accounting for almost 91% of GFNMS revenue depend on GFNMS for 56.86% of their total California revenues. This trend continues up to the four vessels representing 14.42% of GFNMS revenue, which are most dependent on the GFNMS with 77.36% of their total California revenues coming from the sanctuary (Table 2.4).

Table 2.4. Vessel Dependence on Harvest Revenue from the GFNMS, 2012 (2013 $)

Number of Vessels	Percent of Vessels	Revenue from GFNMS	Percent Distribution of GFNMS Revenue	Total Harvest Revenue from All of CA	Percent of All CA Revenue From GFNMS[1]
341	100.00%	$16,145,908	100.00%	$41,612,515	38.80%
4	1.17%	$2,327,918	14.42%	$3,009,245	77.36%
15	4.40%	$5,980,366	37.04%	$8,338,672	71.72%
51	14.96%	$11,296,238	69.96%	$15,999,043	70.61%
116	34.02%	$14,620,975	90.56%	$25,715,805	56.86%
178	52.20%	$15,584,543	96.52%	$33,807,117	46.10%
226	66.28%	$15,933,693	98.69%	$37,546,872	42.44%
116	34.02%	$208,707	1.29%	$4,065,643	5.13%
40	11.73%	$18,959	0.12%	$649,042	2.92%

1. Due to missing vessel ID, dependence is not calculated for 3 vessels and $3,508 of revenue.
Source: California Fishing Information System, California Department of Fish and Wildlife.

Port Dependence on Catch from the GFNMS

Another indicator of economic dependence on sanctuary resources is port dependence, which is measured as GFNMS harvest revenues as a percent of total port revenues from all California waters. Table 2.5 provides analysis of the top four ports where catch from GFNMS was landed: San Francisco, Bodega Bay, Vallejo and Princeton-Half Moon. Combined catch from GFNMS at these four ports totaled $15,685,331 or 97% of GFNMS harvest revenue landed at all California ports. Three of the four ports depended on the GFNMS for at least 40% of port landings. Princeton-Half Moon was the least dependent on GFNMS with 3.02% of landings from the sanctuary. Vallejo was the most dependent with 97.3% of landings from the GFNMS. Dependency on the GFNMS by species/species group was varied across the ports.

Table 2.5. Landings by Port and Species/Species Groups from GFNMS Catch, 2012 (2013 $)

Port/Species/Species Group	Catch from GFNMS		Total Port Landings		Percent of Total Port Landings from GFNMS	
	Pounds	Value	Pounds	Value	Pounds	Value
San Francisco						
Spot Prawn	672	$9,539	672	$9,539	100.00%	100.00%
Smelts	770	$3,123	794	$3,184	96.98%	98.09%
Dungeness Crab	2,192,873	$7,082,352	3,065,851	$9,879,750	71.53%	71.69%
Deeper Nearshore Rockfish	1,703	$11,668	2,882	$19,636	59.09%	59.42%
Salmon	116,551	$664,126	275,155	$1,486,615	42.36%	44.67%
Lingcod	1,842	$2,728	3,726	$6,329	49.44%	43.11%
Sanddabs	7,434	$7,537	19,319	19,588	38.48%	38.48%
Coonstriped Shrimp	25,265	$102,716	30,392	126,123	83.13%	81.44%
Other Flatfish	26,425	$38,335	71,744	$105,361	36.83%	36.38%
CA Halibut	41,213	$193,940	111,405	$556,202	36.99%	34.87%
Sablefish Non-Trawl	19,057	$76,034	67,642	$255,904	28.17%	29.71%
Shallow Nearshore Rockfish	157	$1,187	630	$4,360	24.92%	27.22%
Shelf Rockfish	14,506	$18,023	67,202	$66,735	21.59%	27.01%
Sharks-Rays not White Shark or Big Skate	1,002	$815	21,884	$13,658	4.58%	5.97%
Tuna	1,074	$2,005	77,493	$185,468	1.39%	1.08%
Dover Sole-Thorneyheads-Sablefish Trawl	463	$469	189,386	$178,395	0.24%	0.26%
Herring	8,225	$417	3,268,606	$399,465	0.25%	0.10%
Surfperch	0	$0	966	$4,096	0.00%	0.00%
Swordfish	0	$0	412,079	$1,277,041	0.00%	0.00%
All Other	1,099	$4,122	74,754	$121,797	1.47%	3.38%
Total	*2,460,331*	*$8,219,138*	*7,762,583*	*$14,719,243*	*31.69%*	*55.84%*
Bodega Bay						
CA Halibut	515	$2,294	872	$4,021	59.09%	57.06%
Dungeness Crab	1,307,901	$4,164,422	2,683,738	$8,618,000	48.73%	48.32%
Salmon	247,004	$1,131,920	574,531	$2,816,346	42.99%	40.19%
Tuna	4,324	$7,657	17,153	$30,871	25.21%	24.80%
Deeper Nearshore Rockfish	157	$119	578	$2,082	27.18%	5.73%
Sablefish Non-Trawl	1,267	$1,899	89,263	$287,936	1.42%	0.66%
Hagfish	0	$0	90,805	$69,051	0.00%	0.00%
Red Urchin	0	$0	44,264	$31,440	0.00%	0.00%
Shelf Rockfish	0	$0	3,991	$20,772	0.00%	0.00%
Shallow Nearshore Rockfish	0	$0	2,945	$18,674	0.00%	0.00%
Coonstriped Shrimp	0	$0	2,104	$11,212	0.00%	0.00%
Swordfish	0	$0	2,011	$9,175	0.00%	0.00%
Lingcod	0	$0	704	$2,168	0.00%	0.00%
Other Flatfish	0	$0	10	$20	0.00%	0.00%
All Other	4,347	$13,596	8,448	$26,900	51.45%	50.54%
Total	*1,565,515*	*$5,321,907*	*3,521,417*	*$11,948,668*	*44.46%*	*44.54%*

Table 2.5 Continued. Landings by Port and Species/Species Groups from GFNMS Catch, 2012 (2013 $)

Port/Species/Species Group	Catch from GFNMS		Total Port Landings		Percent of Total Port Landings from GFNMS	
	Pounds	Value	Pounds	Value	Pounds	Value
Vallejo						
Dungeness Crab	500,314	$1,671,507	500,423	$1,671,821	99.98%	99.98%
Salmon	0	$0	294	$1,833	0.00%	0.00%
Shallow Nearshore Rockfish	0	$0	6	$37	0.00%	0.00%
Deeper Nearshore Rockfish	0	$0	44	$231	0.00%	0.00%
Shelf Rockfish	0	$0	25	$101	0.00%	0.00%
Tuna	0	$0	102	$260	0.00%	0.00%
Surfperch	0	$0	65	$330	0.00%	0.00%
Lingcod	0	$0	33	$84	0.00%	0.00%
All Other	0	$0	10,853	$43,211	0.00%	0.00%
Total	*500,314*	*$1,671,507*	*511,846*	*$1,717,906*	*97.75%*	*97.30%*
Princeton-Half Moon						
Hagfish	12	$117	12	$117	100.00%	100.00%
Sablefish Non-Trawl	10,490	$33,208	90,295	$142,485	11.62%	23.31%
Sharks-Rays not White Shark or Big Skate	688	$204	10,982	$2,948	6.27%	6.90%
Salmon	17,643	$108,793	282,011	$1,704,353	6.26%	6.38%
Lingcod	349	$1,237	6,275	$20,932	5.57%	5.91%
Shallow Nearshore Rockfish	20	$198	665	$5,131	2.93%	3.85%
Dungeness Crab	81,861	$258,435	2,341,359	$7,615,840	3.50%	3.39%
Tuna	1,910	$3,785	54,699	$129,041	3.49%	2.93%
Market Squid	204,282	$61,113	16,709,087	$5,086,410	1.22%	1.20%
CA Halibut	469	$2,560	47,291	$229,355	0.99%	1.12%
Other Flatfish	153	$119	73,741	$73,985	0.21%	0.16%
Shelf Rockfish	61	$67	92,084	$65,898	0.07%	0.10%
Spot Prawn	0	$0	36,492	$459,289	0.00%	0.00%
Deeper Nearshore Rockfish	0	$0	6,167	$35,058	0.00%	0.00%
Coastal Pelagic	0	$0	1,634	$1,483	0.00%	0.00%
Coonstriped Shrimp	0	$0	164	$922	0.00%	0.00%
Dover Sole Non-Trawl	0	$0	268	$112	0.00%	0.00%
Smelts	0	$0	199	$64	0.00%	0.00%
Dover Sole-Thorneyheads-Sablefish Trawl	0	$0	209	$42	0.00%	0.00%
Surfperch	0	$0	2	$2	0.00%	0.00%
All Other	2,246	$2,946	71,734	$71,538	3.13%	4.12%
Total	*320,184*	*$472,779*	*19,825,368*	*$15,645,005*	*1.62%*	*3.02%*

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

Trends in Catch for the Top Five Species/Species Groups

In 2012, the top five species/species groups by value in the GFNMS were *Dungeness crab, Salmon, CA Halibut, Sablefish Non-Trawl* and *Coonstriped Shrimp.* Combined these five top species/species groups accounted for almost 99% of total value from GFNMS landings in 2012.

Dungeness crab. In 2012, *Dungeness crab* was the predominant species in terms of both value and pounds. Variation in *Dungeness crab* abundance is correlated with cool water ocean conditions according to the Pacific Decadal Oscillation (PDO) and a three-year lag time for larval maturation (CDFW 2013 2-7). Trends observed in GFNMS catch are consistent with state trends for the central California *Dungeness crab* fishery, including a record breaking year for the 2010-2011 season (CDFW 2013 2-3). A general increase in value for *Dungeness crab* landings follows the low of $432,353 recorded in 2000.

Table 2.6. Trends in *Dungeness Crab* Caught in the GFNMS, 2000 to 2012 (2013 $)

Year	Pounds	Value
2000	123,817	$432,353
2001	182,291	$601,982
2002	482,471	$1,256,919
2003	476,221	$1,060,645
2004	668,646	$1,515,018
2005	513,994	$1,129,863
2006	434,009	$1,069,124
2007	445,781	$1,232,311
2008	656,822	$2,341,408
2009	787,046	$2,093,247
2010	5,969,458	$11,238,932
2011	6,526,986	$16,560,257
2012	4,146,874	$13,426,125

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

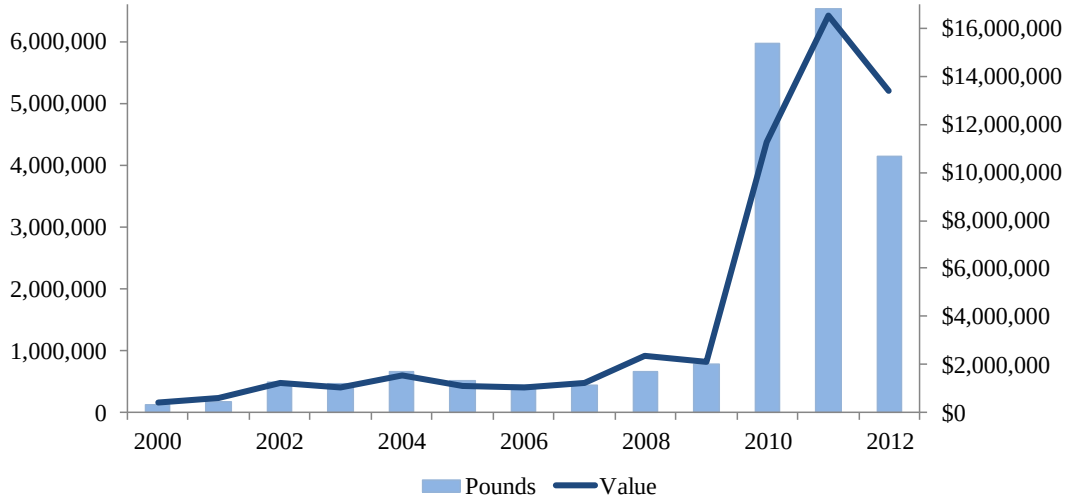

Figure 2.1. Trends in *Dungeness Crab* Caught in the GFNMS, 2000 to 2012 (2013 $)

Salmon. In 2012, *Salmon* was the second most valuable species caught in the GFNMS with $2,072,072 in harvest revenue and 410,054 pounds landed. In 2008, the Pacific *Salmon* fishery was closed in order to meet conservation goals. The fishery was reopened with strong restrictions in 2010 (Sweetnam 2011, 19). Excluding years when the fishery was closed, pounds landed and value reached a low of 1,034 pounds and $5,211 in 2010. Pounds landed peaked in 2004 at 513,231, however value peaked in 2012. This discrepancy in peak value and pounds is attributed to an almost doubling of per pound prices (CDFW 2013, 5-5).

Table 2.7. Trends in *Salmon* Caught in the GFNMS, 2000 to 2012 (2013 $)

Year	Pounds	Value
2000	138,090	$470,868
2001	179,416	$509,802
2002	258,380	$597,350
2003	132,720	$357,856
2004	513,231	$2,037,725
2005	383,969	$1,280,387
2006	53,527	$324,180
2007	110,234	$594,606
2008	0	$0
2009	0	$0
2010	1,034	$5,211
2011	23,782	$155,770
2012	410,054	$2,072,072

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

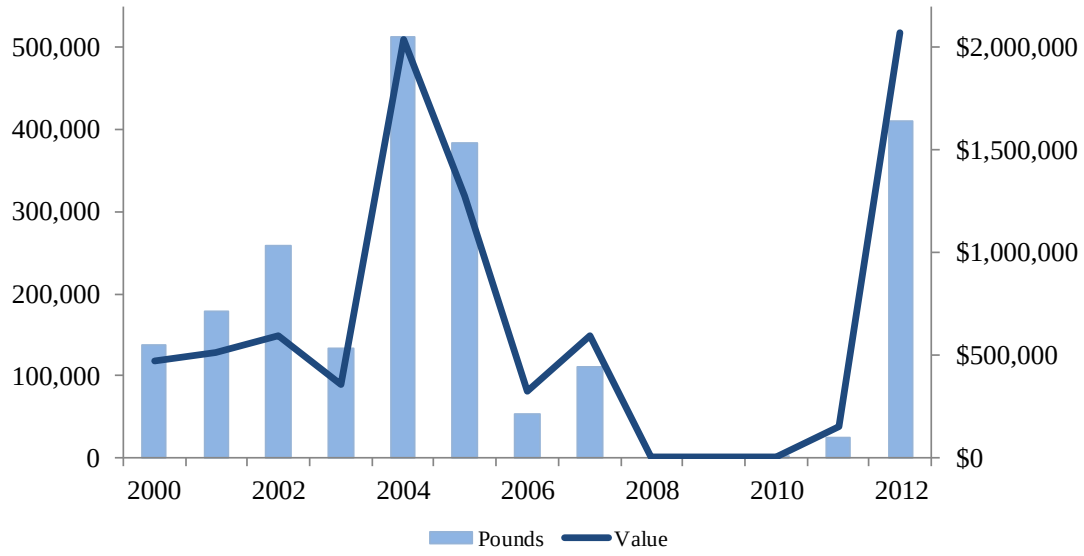

Figure 2.2. Trends in *Salmon* Caught in the GFNMS, 2000 to 2012 (2013 $)

CA Halibut. Rounding out the top three species/species groups, *CA Halibut* has experienced a recent surge in value and pounds landed from the GFNMS following a low of 7,382 pounds and $32,376 in harvest revenue in 2006. The decline in *CA Halibut* landings from 2003 to 2006 may be attributed in large part to the closures of coastal waters to bottom trawling, the most productive gear type for *CA Halibut* (Office of National Marine Sanctuary [ONMS] 2010 25 , Sweetnam 2011, 30). GFNMS *CA Halibut* landings by pound peaked in 2012 with 45,111 pounds. Harvest revenue peaked in 2011 at $217,233.

Table 2.8. Trends in *CA Halibut* Caught in the GFNMS, 2000 to 2012 (2013 $)

Year	Pounds	Value
2000	30,924	$110,324
2001	31,252	$110,758
2002	9,463	$35,627
2003	18,286	$61,707
2004	15,328	$55,594
2005	13,341	$49,945
2006	7,382	$32,376
2007	7,535	$36,243
2008	8,710	$46,204
2009	44,308	$178,950
2010	24,850	$105,959
2011	43,383	$217,233
2012	45,111	$213,830

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

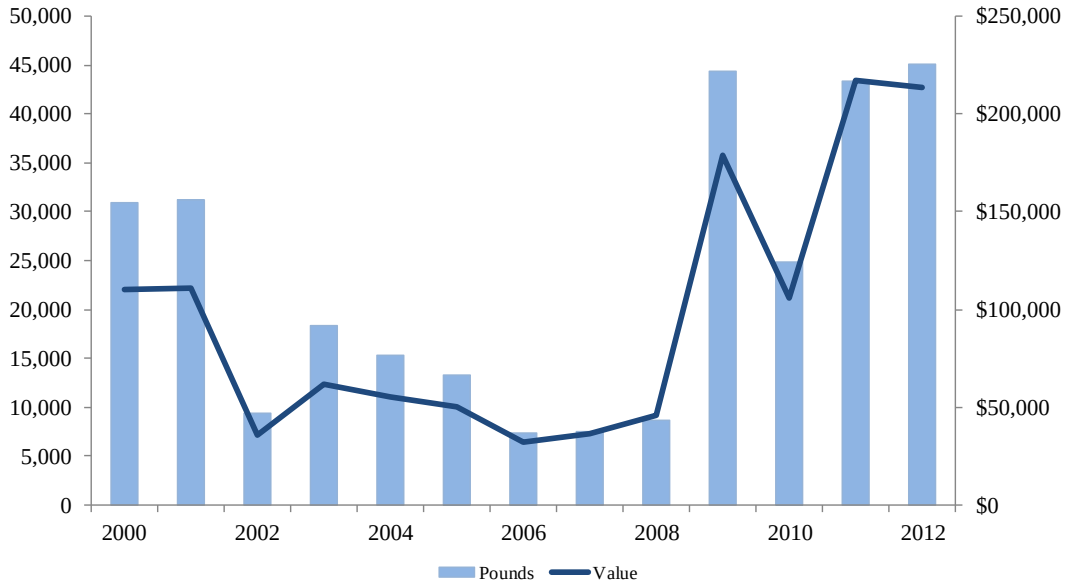

Figure 2.3. Trends in *CA Halibut* Caught in the GFNMS, 2000 to 2012 (2013 $)

Sablefish Non-Trawl. The fourth most valuable species in 2012 was *Sablefish Non-Trawl.* Both pounds landed and harvest revenue have varied over the study period, ranging from a low of 282 pounds and $466 in harvest revenue in 2000 to a high of 137,719 pounds and a high of $298,552 in harvest revenue in 2009. Catch increased steadily from 2006 to 2009. While pounds landed decreased in the subsequent years, an increase in price per pound held harvest revenue above $100,000 through 2012. The peak years for *Sablefish Non-Trawl* also correspond with the years that the *Salmon* fishery was closed. In 2011, implementation of the West Coast Individual Fishery Quota (IFQ) program began and many vessels traded trawl permits and switched gear for higher value quotas in *Sablefish Non-Trawl* fishery (CDFW 2013, 17-1).

Table 2.9. Trends in *Sablefish Non-Trawl* Caught in the GFNMS, 2000 to 2012 (2013 $)

Year	Pounds	Value
2000	282	$466
2001	1,017	$1,335
2002	14,725	$22,057
2003	39,807	$69,728
2004	38,660	$61,261
2005	43,179	$74,096
2006	23,067	$44,867
2007	29,614	$51,730
2008	81,526	$165,104
2009	137,719	$298,552
2010	71,991	$197,483
2011	73,448	$294,430
2012	31,514	$112,611

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

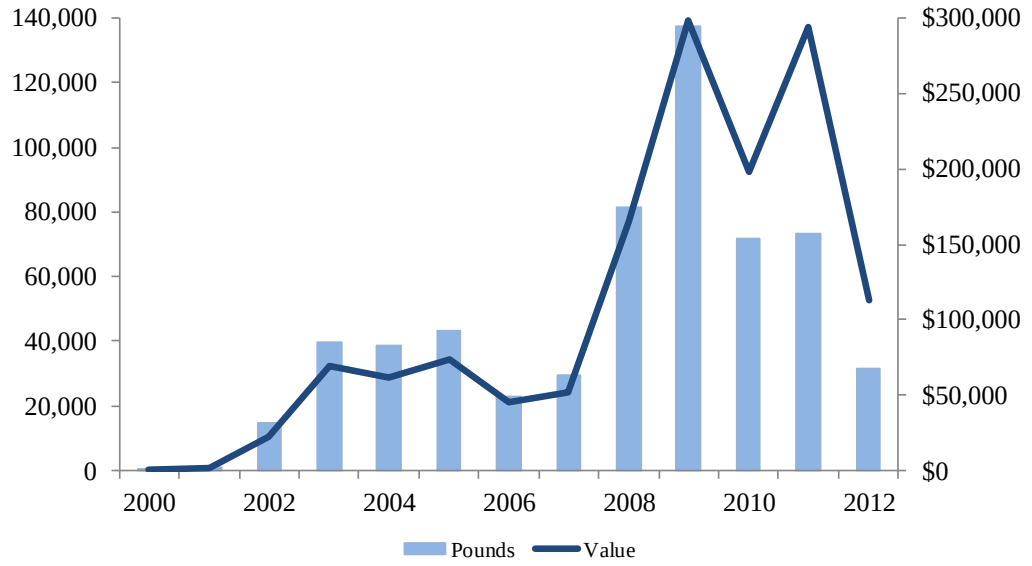

Figure 2.4. Trends in *Sablefish Non-Trawl* Caught in the GFNMS, 2000 to 2012 (2013 $)

Coonstriped Shrimp. The fifth most valuable species/species group in 2012 was *Coonstriped Shrimp*. Across the study period, landings of *Coonstriped Shrimp* appear to be a relatively recent development. From 2000 to 2008, 2002 was the only year *Coonstriped Shrimp* catch was recorded with 21 pounds and $186 in harvest revenue. Following a large catch in 2009, landings decreased through 2011. 2012 was the top year with 25,265 pounds and $102,716 in value. *Coonstriped Shrimp* trap vessels are permitted by the California Department of Fish and Wildlife (CDFW), however there are no restrictions on the fishery (CDFW 2012 8). Statewide there are not many participants in the fishery due to gear costs and high effort per unit of catch. The majority of the California *Coonstriped Shrimp* is caught near Crescent City (CDFW 2010 1-1).

Table 2.10. Trends in *Coonstriped Shrimp* Caught in the GFNMS, 2000 to 2012 (2013 $)

Year	Pounds	Value
2000	0	$0
2001	0	$0
2002	21	$186
2003	0	$0
2004	0	$0
2005	0	$0
2006	0	$0
2007	0	$0
2008	0	$0
2009	21,370	$96,428
2010	5,461	$23,625
2011	830	$3,651
2012	25,265	$102,716

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

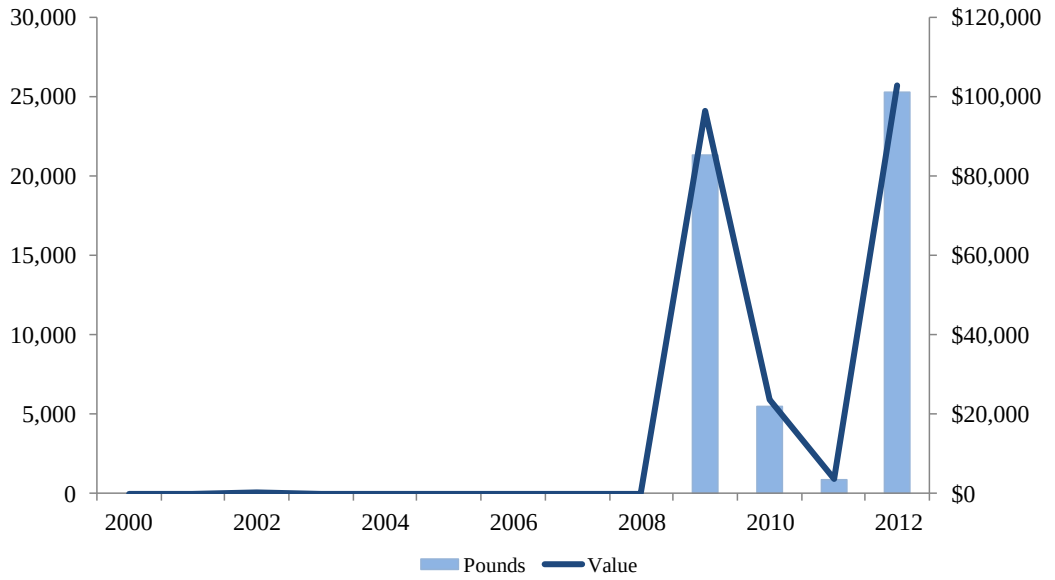

Figure 2.5. Trends in *Coonstriped Shrimp* Caught in the GFNMS, 2000 to 2012 (2013 $)

References

California Department of Fish and Wildlife, California Fishing Information System (CDFW-CFIS) 2013. Commercial fishing landings database for years 2000 to 2012. Terry Tillman, personal communications

California Department of Fish and Wildlife (CDFW), Marine Region. 2013. Status of the Fisheries Report an Update through 2011. 227 pp.

California Department of Fish and Wildlife (CDFW). 2012. Commercial Fishing Digest: California 2012-2013. 98pp.

California Department of Fish and Wildlife (CDFW), Marine Region. 2010. Status of the Fisheries Report an Update through 2008. 232 pp.

Hackett, S., King, D. Hansen, D.M., Price, E. The Economic Structure of California's Commercial Fisheries. 2009. 91 pp.

Leeworthy, Vernon R., Peter C. Wiley and Edward A. Stone. 2005. Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary. National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects, Silver Spring, MD, October 7, 2005. Available at http://sanctuaries.noaa.gov/science/socioeconomic/channelislands/pdfs/2005_analysis.pdf

Leeworthy, Vernon R, Desiree Jerome, and Kelsey Schueler. 2013. Technical Appendix: Economic Impact of Commercial Fisheries on Local County Economies from Catch in California National Marine Sanctuaries, 2010, 2011, and 2012. National Oceanic and Atmospheric Administration, National Ocean Service, Office of National Marine Sanctuaries, Silver Spring, MD.

Office of National Marine Sanctuaries (ONMS). 2010. Gulf of the Farallones National Marine Sanctuary Condition Report 2010. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 97 pp.

Pacific Fisheries Management Council (PFMC). 1999. Community Description Booklet, Appendix B, Port Revenue and Income Impact Tables.

Sweetnam, D. (Ed.). 2011. Review of Some California Fisheries for 2007: Coastal Pelagic Finish, Market Squid, Dungeness Crab, California Spiny Lobster, highly Migratory Species, Ocean Salmon, Groundfish, California Halibut, Hagfish, Pacific Herring, and Recreational. California Cooperative Oceanic Fisheries Investigations Reports 49: 15-38

United States Department of Commerce, Bureau of Economic Analysis (BEA)
http://www.bea.gov/regional/index.htm

United States Department of Labor. Bureau of Labor Statistics (BLS) http://www.bls.gov/data/