The Economic Performance of U.S. Non-Catch Share Programs

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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
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Executive Summary

Nationwide, some fisheries are managed using catch share management; while others are managed using a broad range of management controls exclusive of catch shares. Catch share programs are a fishery management tool that dedicates a secure share of quota to allowing individual fishermen, fishing cooperatives, fishing communities, or other entities to harvest a specific amount of fish. This report provides data on the economic performance of selected fisheries not managed using catch share management As such, this report is an extension and companion to NOAA Fisheries' report on the economic performance of catch share programs (Brinson and Thunberg, 2013).

This report provides data on the selected non-catch share fisheries listed in Box 1. Although these fisheries are only a partial list of all such fisheries managed by Fishery Management Councils, they are fisheries that are of social and/or economic significance in each region and are distinct fisheries managed under a single Fishery Management Plan. In this report, a snapshot of the economic performance of these fisheries is provided including trends over time. Indicators for most programs span the years from 2002 to 2012. Indicators for Alaskan fisheries managed by the North Pacific Fishery Management Council are reported from 2003 to 2012.

Box 1. Selected U.S. Non-Catch Share Managed Fisheries By NOAA Fisheries Region

Greater Atlantic Region
Limited Access Atlantic Sea Scallops
Monkfish

South Atlantic Region
Gulf of Mexico Vermillion Snapper

West Coast Region
West Coast Salmon Troll
West Coast Sardines
West Coast Squid
West Coast Albacore
West Coast Swordfish

Alaska Region
Weathervane Scallops
Gulf of Alaska Other Rockfish

Pacific Islands Region
Hawaiʻi Longline
Hawaiʻi Bottomfish
American Samoa Longline

The fisheries reported here have adopted a wide array of management measures including, among other things, effort controls on days at sea, trip limits, gear restrictions, temporal and spatial controls. All but three fisheries (West Coast Albacore, West Coast Squid, and Hawaiʻi Bottomfish) are limited access fisheries. As of 2012, all but four fisheries had specified Annual Catch Limits or were quota-managed. Of the four fisheries that currently do not have Annual Catch Limits, three are fisheries for highly migratory species subject to international agreements, namely the West Coast Swordfish, West Coast Albacore, and American Samoa Longline Fisheries.

Methods

The selected indicators used to evaluate economic performance include metrics for quota and landings, effort (number of active vessels, trips, and fishing days), economic measures such as

revenues from species in the fishery, total revenue, average prices for landed catch, revenue per vessel, revenue per trip, revenue per day, and the Gini coefficient, which is a measure of the distribution of fishery revenues among active vessels.

Results

Each fishery described in this report has different management objectives, different regulatory frameworks, and markedly different operational characteristics. These differences complicate any direct comparisons of performance trends across fisheries except in terms of assessing trends in economic performance over time. For this reason, the Spearman rank-order correlation coefficients (for individual performance indicators and time) were estimated to determine whether any dominant upward (positive correlation coefficient) or downward (negative correlation coefficient) time trends were evident, and whether these trends were shared across fisheries. In doing so, it is important to keep in mind that correlation coefficients may not detect shorter term or cyclical trends. That is, correlations with time will be statistically significant only if the time trend is consistently up or down. This does not necessarily mean that inter-annual changes are strictly unidirectional, only that annual changes fluctuate around a distinct longer-term trend. Correlation coefficients do not indicate causality or any underlying structural reasons for change, nor do they reveal more complex relationships that may exist among multiple performance indicators.

Landings and Quota

There was no discernible long-term trend in aggregate landings of fishery species for seven of the 13 fisheries included in this report. Of the six fisheries where a long-term trend was evident, landings increased in two fisheries (West Coast Squid and Hawai'i Longline) and decreased in four (West Coast Swordfish, West Coast Salmon Troll, Monkfish, and Gulf of Alaska Other Rockfish).

Evaluating trends in aggregate quota of all species in the fishery, whether specified as a target, harvest guideline, or Annual Catch Limit, was complicated by the fact that these management instruments have been implemented at different times across fisheries. In eight fisheries, some type of quota was specified during at least the most recent six years. Of these, positive trends were detected in the Atlantic Limited Access Sea Scallop, Hawai'i Longline, and Hawai'i Bottomfish Fisheries. Downward trends were detected in the Gulf of Alaska Other Rockfish, Monkfish, West Coast Salmon Troll, West Coast Sardine, and Weathervane Scallop Fisheries.

Assessing whether catch targets have been exceeded was complicated by the fact that quotas for several fisheries have limits that apply to multiple management units in the fishery. A catch limit or quota for one species or sub-component of a fishery may be exceeded while the aggregate quota is not. Fisheries with multiple management units include the Gulf of Alaska Other Rockfish, Hawai'i Longline, West Coast Salmon Troll, Monkfish, and Weathervane Scallops Fisheries. In 2009-2012, overages occurred in 20-80% of the fisheries that were managed with some form of catch limit.

Active Vessels, Trips, and Days Absent

One component of fishery performance is the number of active participants. To examine participation over time, the number of active vessels was evaluated throughout the study period. A statistically significant trend in the number of active vessels in the fishery was detected in seven of the 13 fisheries included in the report, six of which exhibited a downward trend. An upward trend in active vessels was detected in only the Hawaiʻi Longline fishery.

Of the 11 fisheries where data were available, a statistically significant correlation between the number of trips and time was not detected for four fisheries (Squid, West Coast Albacore, Hawai'i Longline, and Hawaiʻi Bottomfish). For the remaining seven fisheries, the number of trips exhibited a statistically significant downward trend in the fishery.

For the eight fisheries where days absent data were available, a statistically significant positive trend was detected in two fisheries (West Coast Albacore and Hawaiʻi Longline); whereas, a statistically significant negative time trend was evident for American Samoa Longline, Limited Access Atlantic Sea Scallops, and Monkfish fisheries.

Revenues, Prices, Revenue per Vessel, Revenue per Trip, and Revenue per Day

A statistically significant correlation between fishery species revenue and time was detected in nine of the 13 fisheries included in this report. The majority, five of these nine fisheries, exhibited an increasing trend in fishery revenue, while in four (American Samoa Longline, Monkfish, West Coast Salmon Troll, and West Coast Swordfish) fisheries a downward trend was evident. A statistically significant positive correlation between average fishery species price per unit (pound or metric ton) and time was detected in nine fisheries.

A statistically significant correlation between fishery species revenue per vessel and time was detected for 10 of the 13 fisheries included in this report. In all but three of these 10 fisheries (West Coast Swordfish, West Coast Salmon Troll, and Monkfish), an upward trend in fishery revenue per vessel was evident. In general, the time trend for both fishery species revenue per trip and fishery revenue per day at sea were also positive for most fisheries.

Distribution of Fishery Revenue

The relative distribution of fishery revenues among active vessels was measured by the Gini coefficient. The Gini coefficient is based on the difference between the actual cumulative distribution of share of species revenue among active vessels and the cumulative distribution of revenue shares that would result if revenue among all active vessels was the same. As such, the Gini coefficient is a measure of the degree of concentration in the distribution of fishery species revenue among participating vessels. A low Gini coefficient indicates that revenues are relatively evenly distributed among active vessels, whereas a high Gini coefficient indicates that revenues are more concentrated among fewer vessels. There was no statistically significant correlation between the Gini coefficient and time in six of the 13 fisheries included in this report. Of the seven fisheries where a statistically significant trend was evident, the trend was negative (indicating a reduction in concentration in fishery revenues) in five fisheries, whereas the Gini coefficient was increasing in both the Gulf of Alaska Other Rockfish and the West Coast Swordfish fisheries.

Overall, the results of the correlations with the performance indicators and time revealed significant trends in some fisheries. Fishery revenue, average price, revenue per trip, and revenue per vessel tended to have significant correlations in at least 70% of the fisheries. Evidence of shared correlations with time for both relative distribution of fishery revenue shares as measured by the Gini coefficient and aggregate fishery landings were less definitive (less than 54% of fisheries). There were significant negative correlations for time and the number of trips for the seven fisheries where data were available.

Introduction

In the United States, some fisheries are managed under catch share programs, which is a fishery management tool that dedicates a secure share of quota allowing individual fishermen, fishing cooperatives, fishing communities, or other entities to harvest a specific amount of fish (Brinson and Thunberg, 2013). As of January 2015, there were 15 catch share programs in the United States (Table 1). This report provides data on indicators of fishery performance for 13 selected fisheries not managed on the basis of catch shares (Table 2), including trends over time. As such, the report is an extension and companion to NOAA Fisheries' report on economic performance of catch share programs (Brinson and Thunberg, 2013).

The indicators of performance developed by NOAA Fisheries economists, anthropologists, policy analysts, and resource managers for catch share programs were adapted to non-catch share fisheries and reported in this report. Many of these indicators such as quota[1] and landings, effort, and revenue are relevant indicators of fishery performance regardless of management approach. Fisheries included in this report were selected based on their social and/or economic significance in each region, and because they are distinct fisheries managed under a single Fishery Management Plan.

The report first describes the process used to identify and develop the performance indicators, then details, the definition and measurement method for each indicator. Next, the performance indicators for each non-catch share fishery are reported, and trends through time are identified and discussed. Finally, non-catch share fishery performance is compared across programs for selected economic indicators.

Fishery Performance Indicators

The NOAA Fisheries Office of Science and Technology initiated the development of a national set of performance indicators for catch share fisheries by convening a series of workshops from 2009 to 2012 with NOAA Fisheries' regional economists, anthropologists, policy analysts and resource managers. Regional experts identified a large number of potential indicators, many of which were noted as being appropriate for both catch share and non-catch share fisheries. These indicators were subsequently classified as being Tier 1, Tier 2, or Tier 3 metrics based on data availability and relative ease in quantifying each indicator. Tier 1 indicators were defined as metrics for which data were readily available, could be routinely produced and updated, and could be provided for all catch share programs. Tier 2 indicators were defined as metrics that could be produced using available data, but which required additional research before they could be routinely produced. Tier 3 indicators were determined to be measures that would require large investments in research or new data collection programs. As methods improve and new data become available, performance indicators in Tier 2 and Tier 3 will be moved up to Tier 1. Adaptation of these metrics to non-catch share fisheries was undertaken during 2012. In November 2012, each region was requested to supply the data defined by the final set of Tier 1 performance indicators for non-catch share programs; these data form the basis for this report.

[1] In each of the regional sections, we use the term appropriate for that region; however, for purposes of simplicity, the term quota is used as a generic term to include guideline harvest limit, quota, or catch limit.

Table 1. U.S. Catch Share Programs as of January 2013

Catch Share Program	Year Implemented
Greater Atlantic Region	
Atlantic Surfclam and Ocean Quahog ITQ	1990
Mid-Atlantic Golden Tilefish IFQ[a]	2009
Northeast Multispecies Sectors	2010
Northeast General Category Atlantic Sea Scallop IFQ	2010
Southeast Region	
South Atlantic Wreckfish ITQ[b]	1992
Gulf of Mexico Red Snapper IFQ	2007
Gulf of Mexico Grouper-Tilefish IFQ	2010
West Coast Region	
Pacific Coast Sablefish Permit Stacking	2001
Pacific Groundfish Trawl Rationalization	2011
Alaska Region	
Western Alaska Community Development Quota[b]	1992
Alaska Halibut and Sablefish IFQ	1995
American Fisheries Act (AFA) Pollock Cooperatives	1999
Bering Sea and Aleutian Islands (BSAI) Crab Rationalization Program	2005
Non-Pollock Trawl Catcher/Processor Groundfish Cooperatives (Amendment 80)	2008
Bering Sea and Aleutian Islands Pacific Cod Hook and Line Cooperative[c]	2010
Central Gulf of Alaska Rockfish Cooperatives	2012

ITQ/IFQ denotes Individual Transferable/Fishing Quota

[a]Implemented in November, 2009 at the start of the 2010 fishing year.

[b]Program not included in Catch Share Program report.

[c]Vessels began fishing cooperatively on August 15, 2010.

Tier 1 performance indicators include metrics for landings, fishing effort, and revenue (Table 3). Landings indicators include the quota allocated to the program or Annual Catch Limit (ACL), landings, whether the quota allocated to the program has been exceeded, and the percentage of the available quota that has been utilized. These indicators are measured in units (*e.g.*, live or whole weight, gutted weight, bushels, meat weight, or product weight) commensurate with the non-catch share fishery monitoring program. For non-catch share programs that include more than one species or stock, reported quota, landings, and percent utilization are based on the combined quantities for all species in the fishery. However, whether any quota may have been exceeded is determined on a species-by-species basis.

Table 2. Selected U.S. Non-Catch Share Fisheries Included in Report

Fishery	Fishery Management Plan (FMP)	Reported Years
Alaska		
Weathervane Scallops	Scallop Fishery off Alaska FMP	2003-2012
Gulf of Alaska Other Rockfish	Gulf of Alaska Groundfish FMP	2003-2012
Pacific Coast		
West Coast Salmon Troll	Pacific Coast Salmon Fishery FMP	2002–2012
West Coast Sardine	Coastal Pelagics FMP	2002-2012
West Coast Squid	Coastal Pelagics FMP	2002-2012
West Coast Albacore	Highly Migratory Species FMP	2002-2012
West Coast Swordfish	Highly Migratory Species FMP	2002-2012
Pacific Islands		
Hawai'i Longline	Pacific Pelagic FEP[a]	2002-2012
Hawai'i Bottomfish	Hawaiian Archipelago FEP[a]	2002-2012
American Samoa Longline	Pacific Pelagic FEP[a]	2002-2011
Greater Atlantic		
Monkfish	Monkfish FMP	2002-2012
Limited Access Atlantic Sea Scallops[b]	Atlantic Sea Scallop FMP	2007-2012
Southeast		
Vermilion Snapper	Gulf of Mexico Reef Fish FMP	2002-2012

[a]FEP denotes Fishery Ecosystem Plan

[b]Refers to the limited access days-at-sea scallop fishery

Effort indicators include number of permits issued, number of active vessels, season length, number of trips, and days absent (Table 3). Since permits may be issued or reissued throughout the year, the number of permits was taken as the number issued at the start of the fishing year as defined for each fishery. An active vessel is defined as any vessel that lands one or more pounds of any of the species included in the non-catch share fishery on a fishing trip. Summing all such trips for the year provides the annual number of trips where non-catch share species are landed. This approach was taken to minimize double counting. Similarly, total annual days at sea are the sum of the duration of all fishing trips taken where non-catch share fishery species were landed. Season length is defined as the number of days in a year that a non-catch share fishery remains open. This may be 365 days in cases where the established annual quota or ACL has not been exceeded.

Revenue indicators included total annual revenues from all species in the fishery, as well as aggregate revenues from all species jointly caught with the non-catch share species. Several fishing revenue indicators were calculated using estimates of landings or effort. These derived indicators, which are based on combined non-catch share fishery species, include the average price for non-catch share species, revenue per vessel, revenue per trip, and revenue per day.

Other indicators include whether or not the fishery is under limited entry management and revenue distribution across vessels, measured by the Gini coefficient. The Gini coefficient is a measure of the degree of inequality in the distribution of non-catch share revenue among active vessels. Mathematically, the Gini coefficient is based on the difference between the Lorenz curve, which is the cumulative distribution of revenue shares among active vessels and the cumulative distribution of revenue shares that would result if revenues among all active vessels were the same. A low Gini coefficient indicates that revenues are relatively evenly distributed among active vessels, whereas a high Gini coefficient indicates that revenues are more concentrated among fewer vessels.

Table 3. Definitions for Tier 1 Performance Indicators of Non-Catch Share Programs

Indicator	Definition
Landings	
Non-Catch Share Quota	Annual quota of combined non-catch share program species, in terms of weight.
Aggregate landings	Annual total weight of all species in the fishery landed on trips attributed to the fishery.
Annual Catch Limit (ACL) exceeded	Was the ACL exceeded for any species/stock within the non-catch share fishery? (Y/N)
Utilization (%)	Portion of target species quota that is caught and retained within a fishing year. Landings/Quota attributed to the non-catch share fishery.
Fishing Effort	
Number of permits	Number of uniquely permitted vessels for the fishery at a given point in a year.
Limited entry	Is the non-catch share fishery under a limited entry program? (Y/N)
Limited entry components	List the components of the fishery that are under a limited entry program.
Active vessels	Number of vessels with landings from trips attributed to the fishery in a given year.
Season length	Number of days the fishery is open in a given year.
Trips	Number of trips attributed to the fishery in a given year.
Days at sea	Number of days absent on trips attributed to the fishery in a given year.
Landings Revenue	
Fishery species revenue	Aggregate ex-vessel revenue from species in the fishery landed on trips attributed to the fishery in a given year.
Other species revenue	Aggregate ex-vessel revenue from species **not** in the fishery landed on trips attributed to the fishery in a given year.
Average price	Aggregate revenue from species in the fishery landed on trips attributed to the fishery, divided by aggregate landings
Fishery species revenue per active vessel	Fishery species revenue divided by the number of active vessels
Other species revenue per active vessel	Other species revenue divided by the number of active vessels
Fishery species revenue per trip	Fishery species revenue divided by the number of trips
Other species revenue per trip	Other species revenue divided by the number of trips
Revenue per day at sea	Fishery species revenue divided by the number of days at sea
Other species revenue per active day at sea	Other species revenue divided by the number of days at sea
Other	
Gini coefficient	The Gini coefficient is a measure of distribution of revenue among active vessels in a fishery. The coefficient ranges between 0 and 1, where 0 indicates all vessels have the same revenue while 1 indicates that all revenue is earned by a single vessel. The Gini coefficient is calculated as $(\sum(2*i-n-1)x^{i})/n^{2}u$ where ∑ denotes the sum from i = 1 to n vessels; i is the vessel's rank in ascending order; x is annual revenue of species in the fishery for vessel i; n is the total number of vessels; and u is mean revenue.

Alaska Region

The Alaska Region includes the fisheries in the Exclusive Economic Zone (EEZ) of the North Pacific off the state of Alaska. The region spans nearly three million square miles and comprises waters in the Gulf of Alaska, Bering Sea, Aleutian Islands, and Arctic Ocean. The area contains four Large Marine Ecosystems which support some of the most commercially important fisheries in the world. Federal fisheries in the region are managed by NOAA Fisheries and the North Pacific Fishery Management Council under six Fishery Management Plans. Seven catch share programs operate in the Alaska Region. Due to the international range of Pacific halibut and Pacific salmon stocks, two Regional Fishery Management Organizations are also involved in the management of these stocks. The International Pacific Halibut Commission conducts biological assessments of halibut and establishes catch limits. The Pacific Salmon Commission establishes catch limits for the salmon stocks covered under the Pacific Salmon Treaty. The North Pacific Fishery Management Council has delegated salmon management to the State of Alaska through the Salmon Fishery Management Plan. Commercially important species from Alaska include five species of salmon, five species of crab, walleye pollock, Pacific halibut, Pacific cod, sablefish, herring, weathervane scallops, four species of shrimp, several species of flatfish and rockfish, lingcod, geoducks, sea cucumbers, and sea urchins.

The Alaska Region also includes the Western Alaska Community Development Quota (CDQ) Program, which is unique to Alaska. This Program was originally implemented in 1992 as part of a restructuring of the Bering Sea and Aleutian Islands groundfish fishery. Under the CDQ Program, a percentage of the Total Allowable Catch (TAC) for groundfish, prohibited species, halibut, and crab is apportioned to coastal western Alaska native communities. The purpose of the CDQ Program is to provide western Alaska communities the opportunity to participate and invest in Bering Sea and Aleutian Islands fisheries, to support local economic development, to alleviate poverty and provide economic and social benefits for residents, and to achieve sustainable and diversified local economies.

A snapshot of the performance indicators for two fisheries (Weathervane Scallops and Gulf of Alaska Other Rockfish) for the 2012 fishing year appear in Table 4. More detailed data for each of these fisheries is reported in the sections to follow. In addition, a synopsis of each fishery is provided including gears used, target and component species, products sold, current management approach, and key changes affecting the fishery.

Table 4. Alaska Fishery Performance Measures by Fishery for 2012.

Catch and Landings	Weathervane Scallops	Gulf of Alaska Other Rockfish
Catch limit[a]	417,500 lb	14,628 mt
Aggregate landings[a]	417,551 lb	7,999 mt
Utilization	100%	55%
Catch limit/TAC exceeded	Y	N
Effort		
Number of permits (number)	9	1,640
Active vessels (number)	4	729
Trips (number)[ab]	N/A	N/A
Days at sea (days)[ab]	N/A	N/A
Season length (days)	176[c]	32
Revenue ($)[c]		
Fishery species revenue	$4,181,649	$4,593,651
Other species revenue	N/A	N/A
Total revenue	$4,181,649	$4,593,651
Average fishery species price[a]	$10.01	$574.28
Fishery species revenue per vessel	$1,045,412	$6,301
Other species revenue per vessel	N/A	N/A
Total revenue per vessel	$1,045,412	$6,301
Other		
Limited entry	Y	Y
Gini coefficient	0.21[d]	0.90

[a] Weight is given in pounds of shucked meat for scallops and in metric tons for rockfish.

[b] Number of trips, days at sea, and related revenue metrics are not available because the Alaska Region does not manage fisheries by trips or days at sea.

[c] Revenue and price data have been adjusted by the Gross Domestic Product deflator, indexed for 2010.

[d] Data for 2012/2013 are not yet available for this metric; this is the 2011/2012 value.

N/A = not applicable or not available

TAC = Total Allowable Catch

A. Weathervane Scallops

Commercial scallop fishing began in Alaska during 1967 when two vessels harvested weathervane scallops from fishing grounds east of Kodiak Island. The scallop fishery was managed without a defined Fishery Management Plan until early 1993. Management measures prior to 1993 included seasonal area closures to protect crabs and crab habitat. Fishermen would switch to new fishing grounds as scallop catches declined in one bed. Participation fluctuated in the Alaska Weathervane Scallop Fishery until the early 1990's when the fishery expanded rapidly due to an influx of boats from the U.S. East Coast. Concerns about the overharvest of scallops and bycatch of crabs prompted the State of Alaska and the North Pacific Fishery Management Council to implement a management plan, summarized below. The scallop fishery is currently prosecuted from Southeast Alaska out to the Aleutian Islands and the Eastern Bering Sea, an area totaling approximately 200 nautical square miles over the entire state.

1. Fishery synopsis
   a. Gear used

Vessels harvesting scallops use metal dredges consisting of a frame and bag that contact the ocean floor. State regulations limit all vessels fishing inside the Cook Inlet Registration Area to the use of a single dredge not more than six feet wide. Unless restricted by Federal License Limitation Program permit endorsements, vessels fishing outside the Cook Inlet Registration Area and elsewhere in state and federal waters are allowed two dredges, each not more than 15 feet wide. An average 15-foot dredge weighs about 2,600 pounds, while a six-foot dredge weighs about 900 pounds. Vessel lengths in this fishery range from 58 - 124 feet in total length.

   b. Target/component species

Although the Fishery Management Plan covers all scallop stocks off the coast of Alaska, including weathervane, pink or reddish, spiny, and rock scallops, the weathervane scallop is the only commercially exploited stock at this time. Weathervane scallops are distributed from Point Reyes, California to the Pribilof Islands, Alaska. The highest known densities in Alaska have been found along the eastern Gulf of Alaska coast from Cape Spencer to Cape St. Elias, off Kodiak Island, and in the Bering Sea. Weathervane scallops are found from intertidal waters to depths of 300 meters, but abundance tends to be greatest between depths of 40 and 130 meters on beds of mud, clay, sand, and gravel. Adult scallops are filter feeders, feeding on plankton and other organic materials. Growth occurs rapidly during the first few years of life and is minimal after age 10. In general, weathervane scallops are long lived, and individuals with shell heights of 250 millimeters and an average age of 28 years have been reported.

   c. Market channels

Weathervane scallops caught in Alaskan waters are shucked, graded by size, and frozen on board. They are sold primarily to domestic seafood markets, with a smaller amount going to foreign markets. Three vessels participating in the fishery have formed a marketing group in order to promote the size, flavor, freshness, and sustainability of weathervane scallops to potential online customers.

2. Management Program

a. Current management controls

NOAA Fisheries and the North Pacific Fishery Management Council manage weathervane scallops under the Fishery Management Plan for the Scallop Fishery off Alaska. The Fishery Management Plan delegates management authority in Federal waters to the State of Alaska, except for the development and implementation of limited access management measures. The North Pacific Fishery Management Council developed a scallop License Limitation Program to limit access in the scallop fishery to nine vessels. This Program was implemented by NOAA Fisheries in 2001. Under the Fishery Management Plan for the Scallop Fishery off Alaska, the State of Alaska establishes management measures including harvest level regulations in different scallop registration areas, season length, area closures, the observer program, bycatch limits, gear restrictions, and measures to limit processing efficiency. The regulatory fishing season for weathervane scallops in Alaska is July 1 - February 15, except in the Cook Inlet Registration Area. In the Kamishak District of Cook Inlet, the season is August 15 - October 31, while all other areas in the Cook Inlet are open year-round for exploratory fishing. While the state vessel permit system for state waters expired at the end of 2013, the Alaska Board of Fisheries has adopted the State-Waters Weathervane Scallop Management Plan (5 AAC 38.078) which became effective on April 1, 2014, prior to the start of the scallop fishing season. Throughout the season, onboard observers monitor the fishery and transmit data to the Alaska Department of Fish and Game. These observers are required on all vessels fishing for scallops in Alaska outside of Cook Inlet. The Alaska Department of Fish and Game may close fishing in any area before the guideline harvest level is reached due to concerns about localized depletion, trends in catch per unit effort, or bycatch rates. In-season data collected by observers are also used by the scallop industry to avoid areas of high bycatch.

b. Key changes from past management controls

In May 2000, six of the nine License Limitation Program permit owners formed the North Pacific Scallop Cooperative under the authority of the Fishermen's Collective Marketing Act 1934 (15 U.S.C. 521). The Cooperative is self-regulated, and is neither endorsed nor managed by the Alaska Department of Fish and Game or NOAA Fisheries. The Cooperative regulates individual vessel allocations within the Guideline Harvest Level as well as crab bycatch caps under the terms of a cooperative contract. The Cooperative does not receive an exclusive allocation of the scallop harvest. Some owners opted to remove their boats from the fishery and arranged for their shares to be caught by other members of the Cooperative. Since the formation of the Cooperative, harvest rates have slowed and fishing effort now occurs over a longer period of time during each fishing season. Vessels owners who have opted not to join the Cooperative are not bound by any contract provisions.

3. Management Objectives

In addition to the National Standards established under the Magnuson-Stevens Act, the objectives of the Fishery Management Plan for the Scallop Fishery off Alaska are to prevent localized overfishing of scallop stocks and protect the long-term productivity of the resource to allow for the achievement of optimum yield on a continuing basis. Seven specific objectives have been laid out within this larger goal. These objectives relate to biological, economic, and social concerns and include the following:

1) Ensure the long-term reproductive viability of scallop populations.
2) Maximize economic and social benefits to the nation over time.
3) Minimize gear conflict among fisheries.
4) Protect, conserve, and enhance adequate quantities of essential fish habitat to support scallop populations and maintain a healthy ecosystem.
5) Provide public access to the regulatory process for vessel safety considerations.
6) Ensure that access to the regulatory process and opportunities for redress are available to all interested parties.
7) Provide fisheries research, data collection, and analysis to ensure a sound information base for management decisions.

4. <u>Recent Trends</u>

a. Landings

Data for the Alaska Weathervane Scallop Fishery are reported by fishing year (*e.g.*, 2003 refers to the 2003/2004 fishing year). The Guideline Harvest Level for the Alaska Weathervane Scallop Fishery averaged 575,000 pounds of scallop meat (shucked) from 2003/2004 – 2012/2013 (Figure 1). In this time period, utilization of the available quota has been 63% – 1000% (Figure 2). Landings in this time period have averaged 560,000 pounds of scallop meat.

The statewide Federal ACL for the entire fishery was only exceeded in 2012/2013, however, some area-specific Guideline Harvest Levels were exceeded from 2003 – 2012. In the aggregate, these overages were not large, ranging from a low of 35 pounds (2009/2010) to a high of 3,472 pounds (2012/2013; 0.35% of the Federal ACL).

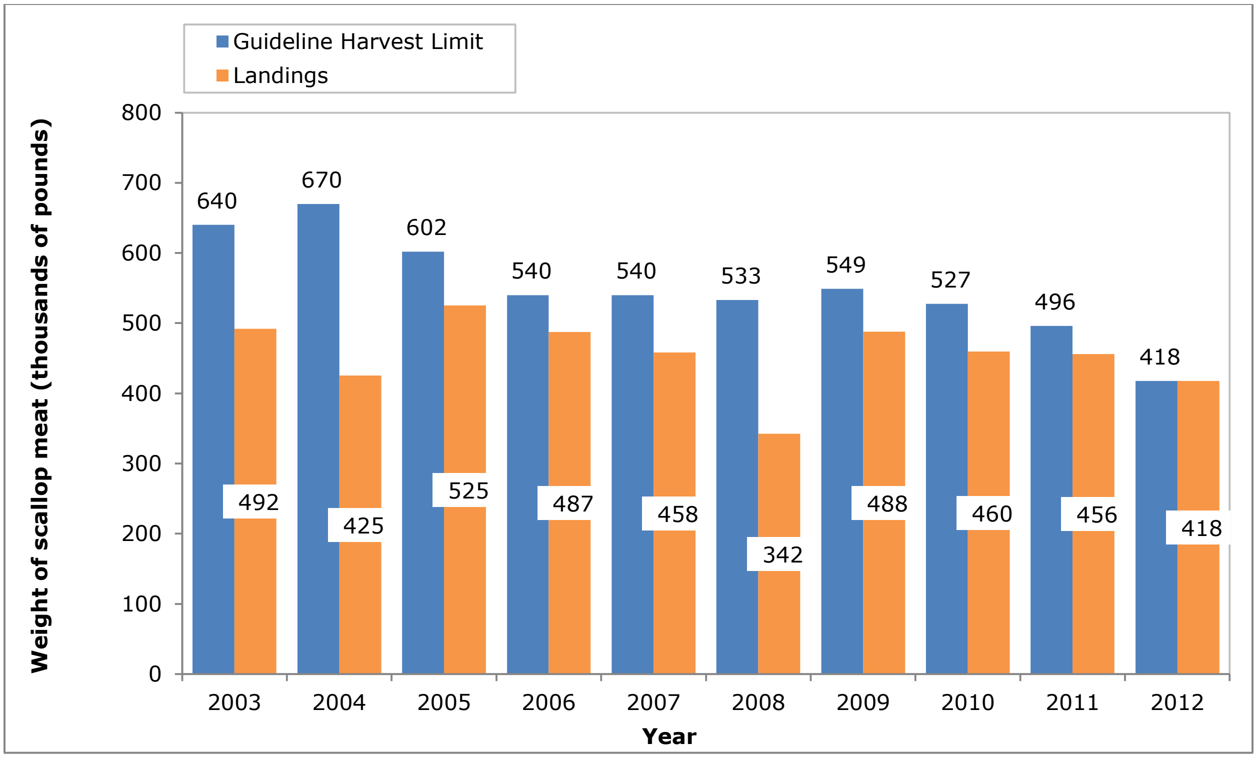

Figure 1. Annual catch limit and landings in the Alaska Weathervane Scallop Fishery.

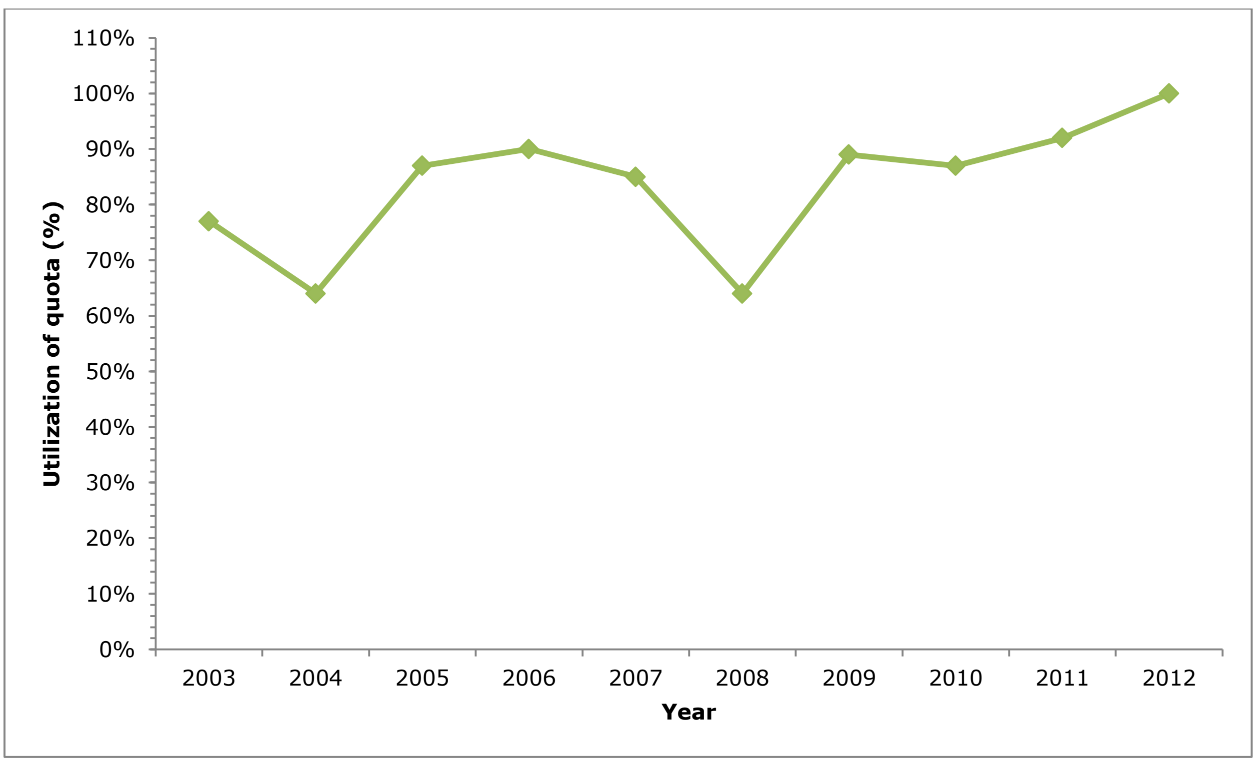

Figure 2. Utilization of available annual catch limit in the Alaska Weathervane Scallop Fishery.

b. Effort

Participation in the Alaska Weathervane Scallop Fishery is limited to nine vessels by the License Limitation Program. In the fishing seasons from 2003/2004 and 2008/2009, there were four or five active vessels except in 2009/2010 and 2010/2011, when only three vessels actively participated in the fishery (Figure 3).

Season length is the number of days during the open regulatory season when any vessel was operating in the fishery. During the 2003/2004 to 2007/2008 fishing years, the scallop season typically lasted approximately 200 days, except for 2006/2007 when the season was limited to 170 days (Figure 4). In 2008/2009-2011/2012 years, the season length ranged from 105 – 176 days. The Alaska Region does not manage fisheries by trips or days at sea; therefore, these metrics are not reported.

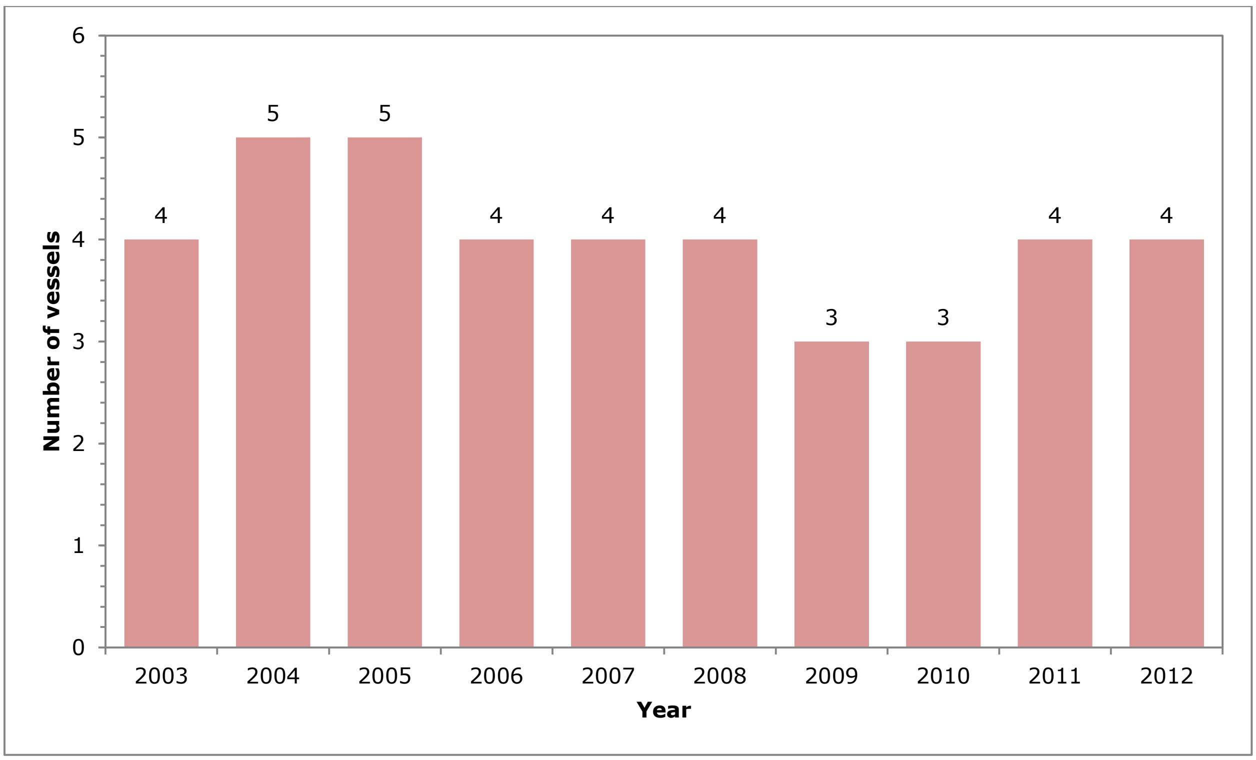

Figure 3. Number of active vessels participating in the Alaska Weathervane Scallop Fishery.

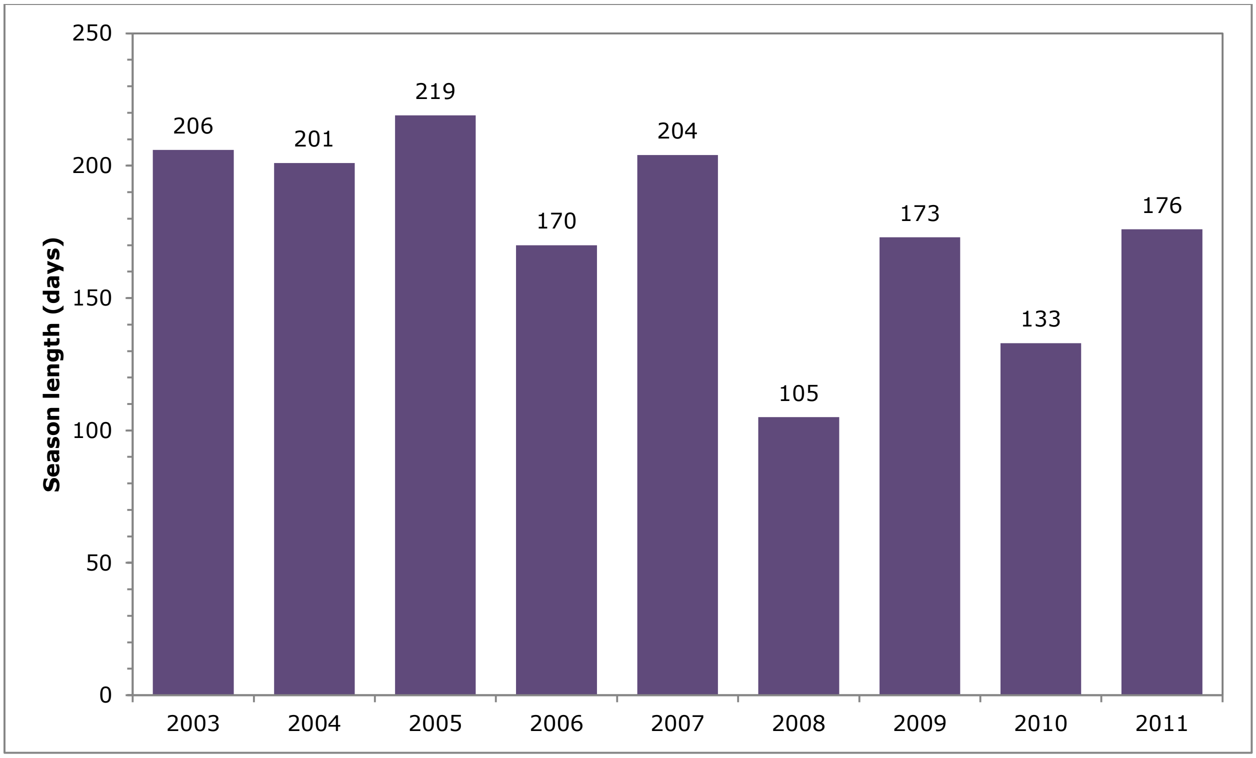

Figure 4. Number of days during the open regulatory season that any vessel was operating in the Alaska Weathervane Scallop Fishery.

c. Revenue

All revenue and price data have been adjusted by the GDP deflator indexed for 2010. Revenue refers to the first wholesale price for shucked scallop meat. Revenue for weathervane scallops ranged from $2.2 million to $4.6 million between the 2003/2004 and 2012/2013 fishing seasons (Figure 5). Revenue was lowest in 2008/2009, coinciding with the lowest scallop landings. Average prices for weathervane scallops were $6.00 per pound in 2003/2004 and 2004/2005, increasing to nearly $8.50 in 2005/2006 and 2006/2007, decreasing again in 2007/2008 – 2009/2010; however, average scallop prices were greatest in 2011/2012 at $10.00 per pound (Figure 6). Revenue per vessel averaged $727,000 between 2003/2004 and 2005/2006 (Figure 7). Revenue per vessel increased to $1 million in 2006/2007, a year in which there was one fewer active vessel. Revenue per vessel decreased for the next two years to a low of $555,000, but increased in 2009/2010 and 2010/2011 to a high of $1.3 million in 2010/2011. These last two years of increased revenue per vessel also coincided with a decrease in the number of active vessels in the fishery.

Data are not available to calculate landings (or, therefore, revenue) of other species on scallop trips. Also, since the Alaska Region does not manage fisheries by trips or days at sea, the associated metrics cannot be calculated.

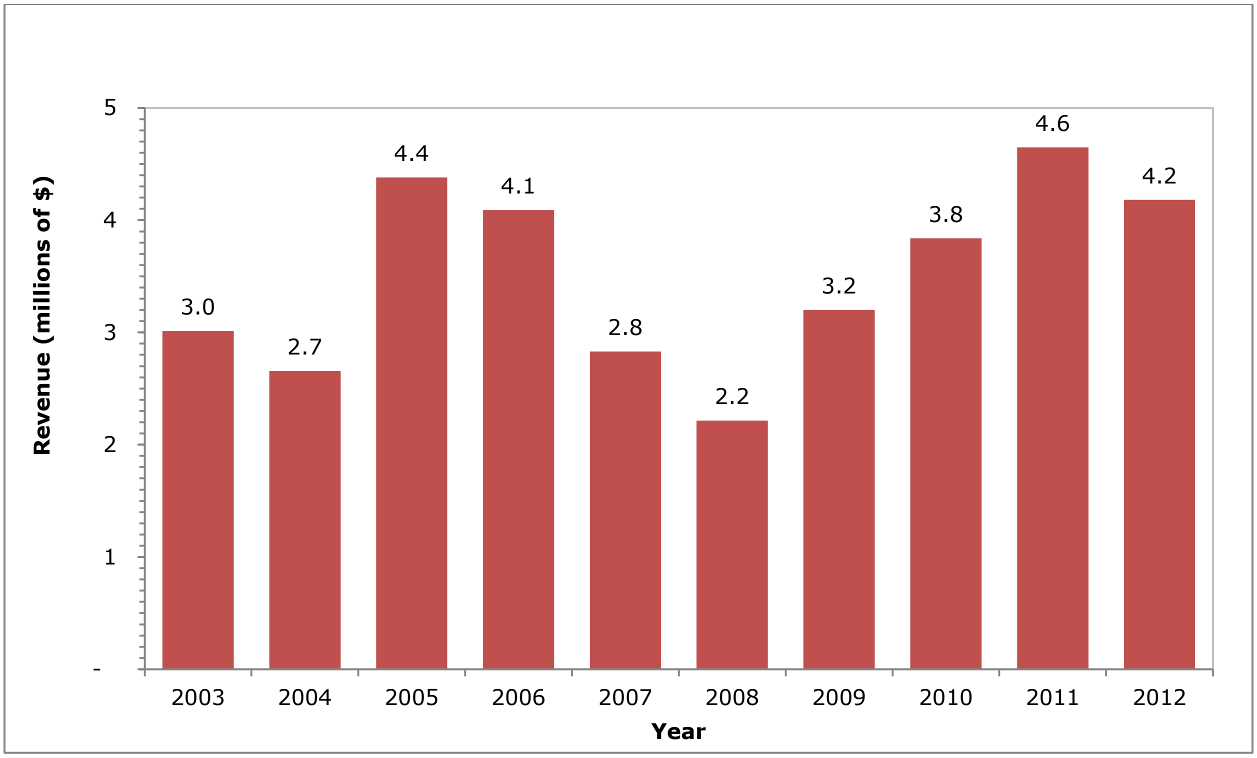

Figure 5. Revenue (inflation-adjusted 2010 dollars) in the Alaska Weathervane Scallop Fishery.

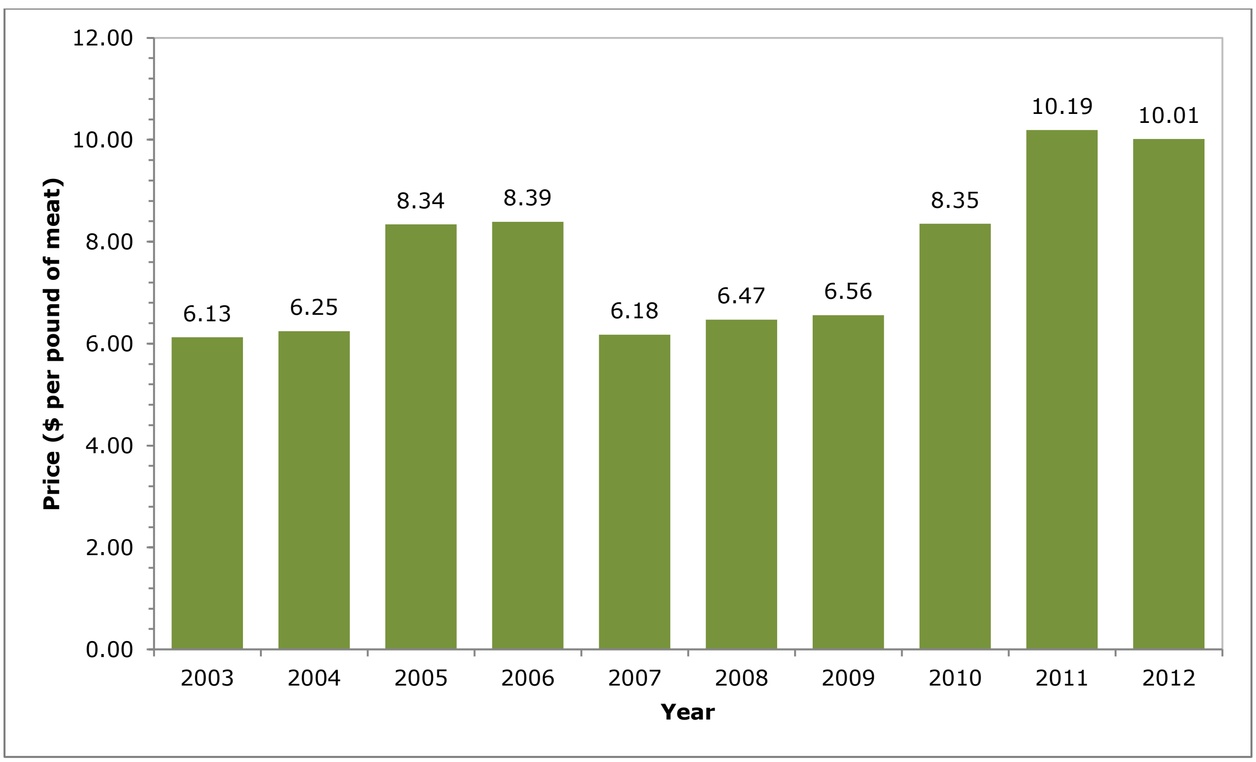

Figure 6. Average prices (inflation-adjusted 2010 dollars) per pound scallop meat in the Alaska Weathervane Scallop Fishery.

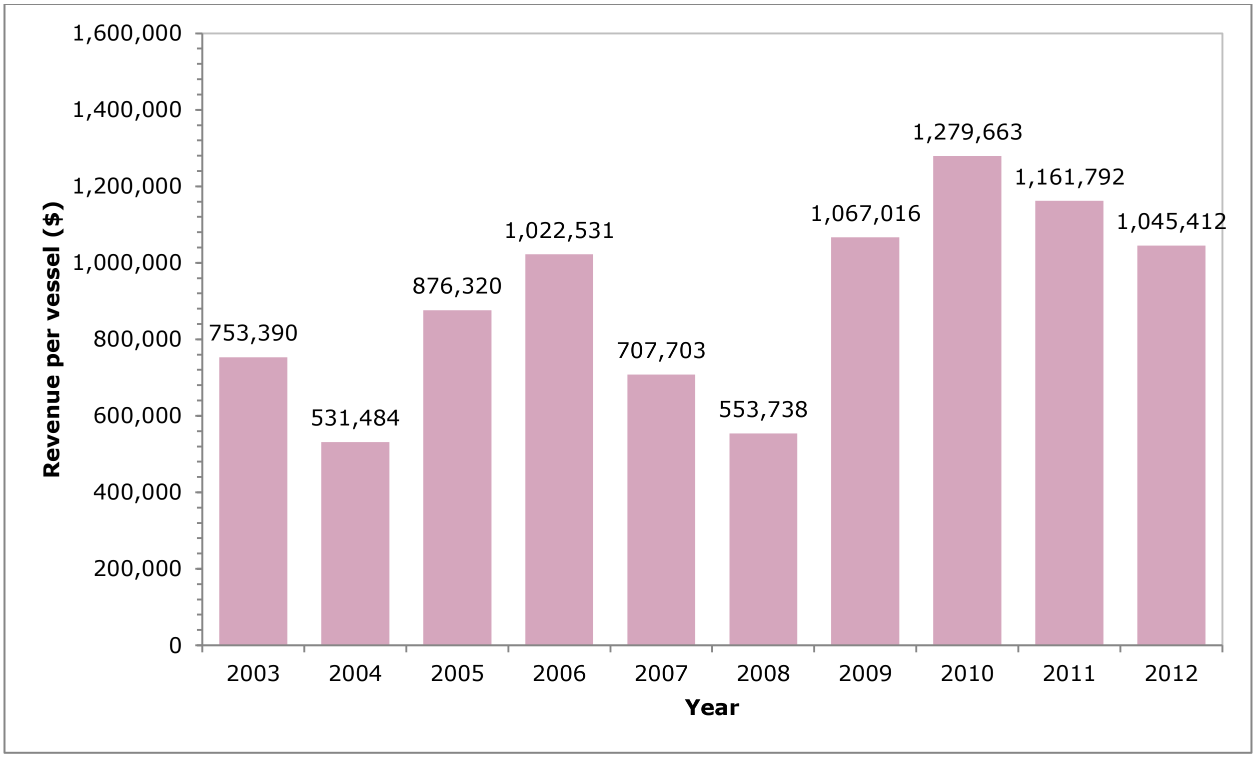

Figure 7. Revenue (inflation-adjusted 2010 dollars) per active vessel in the Alaska Weathervane Scallop Fishery.

The Gini was employed to characterize the distribution of revenue among active vessels in the Alaska Weathervane Scallop Fishery. A value of zero represents a perfectly equal distribution of revenue amongst the vessels, whereas, a value of one represents a perfectly unequal distribution. The Gini coefficient is calculated using landings data, while the majority of the other metrics are reported in the 2012 Scallop Stock Assessment and Fishery Evaluation document that uses Alaska Observer data. Landings data have one fewer vessel in the fishery for 2006/2007 and 2007/2008 and one more vessel in 2009/2010 and 2010/2011. While one vessel is a small amount, there were only three active vessels in those years; therefore, there may be substantial changes in the Gini coefficient as a result of the number of vessels included in the calculation. In 2003/2004, the Gini coefficient was 0.50 and increased to 0.66 in 2004/2005 (Figure 8). Since then, the Gini coefficient has been decreasing. In 2011/2012, the Gini coefficient was at a low of 0.21, suggesting an increasingly equal distribution of landings revenue among active vessels.

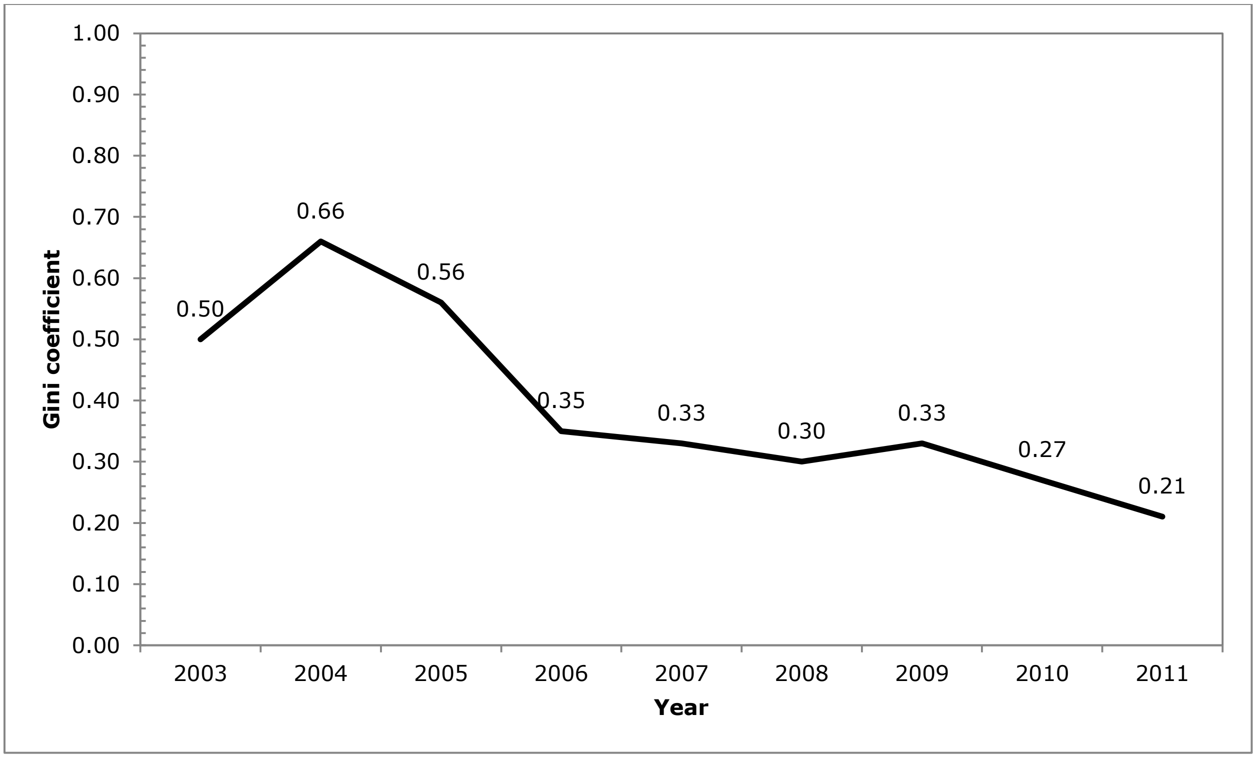

Figure 8. The Gini coefficient for vessels participating in the Alaska Weathervane Scallop Fishery.

d. Synopsis of recent trends

In 1997, prior to the Federal License Limitation Program for scallops that restricts federal permits to nine vessels, the State of Alaska instituted a vessel entry moratorium in the state-waters Weathervane Scallop Fishery. In 2002, the moratorium was replaced with a vessel-based limited entry program that was intended to expire on December 30, 2008. In June 2008, the deadline was extended until December 30, 2013, but this deadline passed without any new legislation. In February 2014, the Alaska Board of Fisheries adopted the State-Waters Weathervane Scallop Management Plan (5 AAC 38.078), which became effective on April 1, 2014 and reverted the state-waters fishery to a nearly open access fishery for the 2014/2015 season. The management plan requires vessels to pre-register prior to April 1 to show their intent to participate in the state-waters fishery, and allows for spatial and temporal closures and trip limits to manage effort exerted on the resource. Vessels are also required to obtain observer coverage to participate in the fishery, and only participants holding Federal License Limitation Program scallop licenses completed the required registration process for the 2014/2015 season.

B. Gulf of Alaska Other Rockfish

Approximately 74 species of rockfish are found in the Northeast Pacific and comprise an important component of commercial catches in the Bering Sea and Aleutian Islands as well as the Gulf of Alaska. Along with other groundfish species in the Northeast Pacific, rockfish were harvested by Japan and the Soviet Union beginning in the 1960's, and high fishing effort in these years caused precipitous declines in abundance and catches until the fishery was restricted to U.S. vessels in 1985. Most rockfish in the Gulf of Alaska are caught by vessels participating in the Central Gulf of Alaska Rockfish Program (a catch share program). The Gulf of Alaska Other Rockfish Fishery includes a number of rockfish species in the Western and Eastern (West Yakutat and Southeast Outside) Gulf of Alaska, as well as the small minor rockfish species in the Central Gulf of Alaska that are not included in the Rockfish Program.

1. <u>Fishery synopsis</u>

   a. Gear used

Vessels participating in the Gulf of Alaska Other Rockfish Fishery may use any gear type to target rockfish, though most use trawl gear and may be catcher vessels or catcher/processors. Whereas catcher/processors process and freeze their catch onboard, catcher vessels deliver their catch to a processor.

   b. Target/component species

In the Gulf of Alaska, the primary targeted rockfish species include Pacific Ocean perch, northern rockfish, dusky rockfish, and a group of "other" rockfish consisting of 17 species. Secondarily targeted species include Pacific cod, blackspotted/rougheye rockfish, shortraker rockfish, and sablefish. The directed fisheries are open for Pacific Ocean perch, northern rockfish and dusky rockfish, but the others are taken as incidental catch in other target fisheries. The catch of shortraker, blackspotted/rougheye, and "other" rockfish is restricted. The suite of rockfish species in the North Pacific is relatively long-lived, with lifespans ranging from 50 - 200 years.

   c. Market channels

Rockfish caught by catcher vessels in the Gulf of Alaska have traditionally been delivered to Kodiak Island processors. All targeted rockfish that are processed onboard catcher/processors are sold as whole or headed and gutted fish since most catcher/processors are not equipped to produce more complex products. Most, if not all, of this product is delivered to Asia, where whole fish are typically sold to the local market. Headed and gutted products are generally reprocessed into other products. On the whole, it is difficult to assess the distribution of the sector's production among consumer markets, as much of the reprocessed fish enters the international seafood market.

2. Management Program

a. Current management controls

NOAA Fisheries and the North Pacific Fishery Management Council manage rockfish in the Gulf of Alaska under the Fishery Management Plan for Groundfish of the Gulf of Alaska. Most of the Central Gulf of Alaska rockfish Total Allowable Catch (TAC) is allocated to the Central Gulf of Alaska Rockfish Program. The Central Gulf of Alaska Rockfish Program catcher vessels fishing under an annual cooperative fishing quota are also allowed to participate in the entry level longline fishery provided the catcher vessel cooperative's designated representative submits a check out report for the vessel. In the Western and Eastern Gulf of Alaska, any gear type can be used to target rockfish in the federal fisheries except in the demersal shelf rockfish fishery in the Southeast Outside district. Unless they are exempt from Gulf of Alaska License Limitation Program requirements, participants in the rockfish fishery must hold a License Limitation Program license. Licenses are endorsed with area, gear, vessel type, and vessel length designations. The fishery season is from January 1 to December 31 of each year except for trawl gear, the season is July 1 to December 31, and harvesters are not required to submit an application to NOAA Fisheries in order to participate. In the Southeast Outside district of the Gulf of Alaska, the demersal shelf rockfish fishery is managed by the State of Alaska with oversight from the North Pacific Fishery Management Council. Vessels fishing for demersal shelf rockfish in this area are not required to hold a Federal License Limitation Program license.

b. Key changes from past management controls

The North Pacific Fishery Management Council adopted the Central Gulf of Alaska Rockfish Program and NOAA Fisheries implemented the Program in 2012. Since its inception, the Rockfish Program has received at least 95% of the TAC for rockfish species in the Central Gulf of Alaska. However, two TAC set asides of primary rockfish species are made prior to allocations to Rockfish Program cooperatives. One of these set asides is reserved for the entry-level longline fishery, which is considered part of the Rockfish Program. The Gulf of Alaska Other Rockfish Fishery consists of the remaining portion of the TAC set aside, an allowance to support the incidental catch of rockfish by participants in non-rockfish directed fisheries.

Groundfish stock groupings for establishing catch limits have evolved over time as new scientific information became available and new markets developed for certain species. Through the years, several rockfish species have been separated from multispecies complexes and assigned their own catch limits. Figure 9 depicts this progression in the Gulf of Alaska.

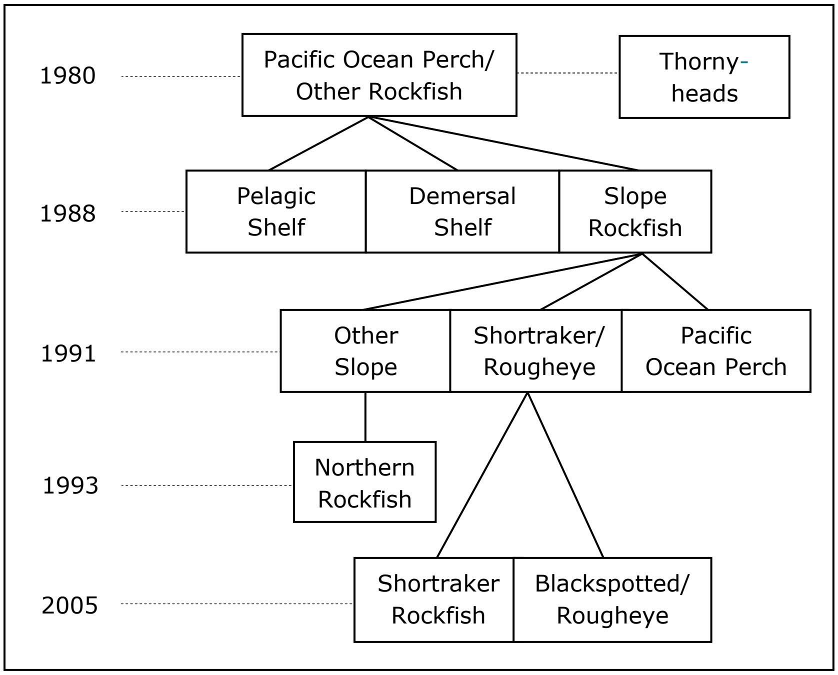

Figure 9. Gulf of Alaska Historical Rockfish Species Groupings. (Groundfish Species Profiles, North Pacific Fishery Management Council, 2011)

3. Management Objectives

The Groundfish Fishery Management Plans for both of the Gulf of Alaska and the Bering Sea and Aleutian Islands identify several management objectives in addition to the National Standards established under the Magnuson-Stevens Act. The North Pacific Fishery Management Council established 45 specific objectives that fall under ten primary goal areas for the management of the Groundfish Fisheries in the Gulf of Alaska and the Bering Sea and Aleutian Islands. These goals are to:

A. Prevent overfishing.
B. Promote sustainable fisheries and communities.
C. Preserve the food web.
D. Manage incidental catch.
E. Reduce bycatch and waste.
F. Avoid impacts to seabirds and marine mammals.
G. Reduce and avoid impacts to habitat.
H. Promote equitable and efficient use of fishery resources.
I. Increase Alaska Native consultation.
J. Improve data quality, monitoring, and enforcement.

4. Recent Trends

a. Landings

Prior to 2007, TAC and landings included all Gulf of Alaska allocations for all rockfish species, including those managed as bycatch in other targeted fisheries. In 2003-2006, TAC allocation averaged 29,000 metric tons per year (Figure 10). In 2004, the TAC decreased by 9% relative to 2003; in 2005 and 2006 it increased by 4% and 10%, respectively, compared to the previous year.

The Central Gulf of Alaska Rockfish Pilot Program, a catch share program in effect from 2007 to 2011 (replaced by the Rockfish Program for 2012 onward), allocated quota of Central Gulf of Alaska rockfish species to trawl vessels and an entry-level longline sector. To account for the Rockfish Pilot Program, indicators for 2007 and later exclude allocations for the Central Gulf of Alaska primary (targeted) rockfish species groups, except for incidental catch allowances caught by vessels outside the Rockfish Pilot Program, and allocations of secondary (incidental catch) rockfish species to the Rockfish Program Cooperatives. This change accounts for the significant decrease (-44%) in TAC between 2006 and 2007. From 2007-2012, the average annual TAC was 16,300 metric tons; the average TAC in 2012 was 11% lower than the average TAC in 2011.

Landings for the Gulf of Alaska Other Rockfish fishery followed a similar trend as the TAC until 2007, when the utilization of the TAC began to decrease from about 70% to 56% per year (largely a result of moving many of the targeted rockfish species into the Rockfish Program). In 2012, the utilization of the TAC was 55% (Figure 11). Utilization is low in this fishery because there are multiple rockfish species included in this fishery and many of these species do not have a target fishery. Species that do not have a target fishery are managed as incidental catch in other target rockfish fisheries. In the event that fishermen exceed the allocation for some rockfish species, there are many other species in the fishery that are not caught near their allocation and could be targeted. Based on Figure 10, the difference between the allocation and catch was relatively stable throughout the entire time period (averages 8,491 metric tons from 2003-2006 and 7,540 from 2007-2011), which is constant despite the 50% decreased allocation between 2003-2006 and 2007-2011.

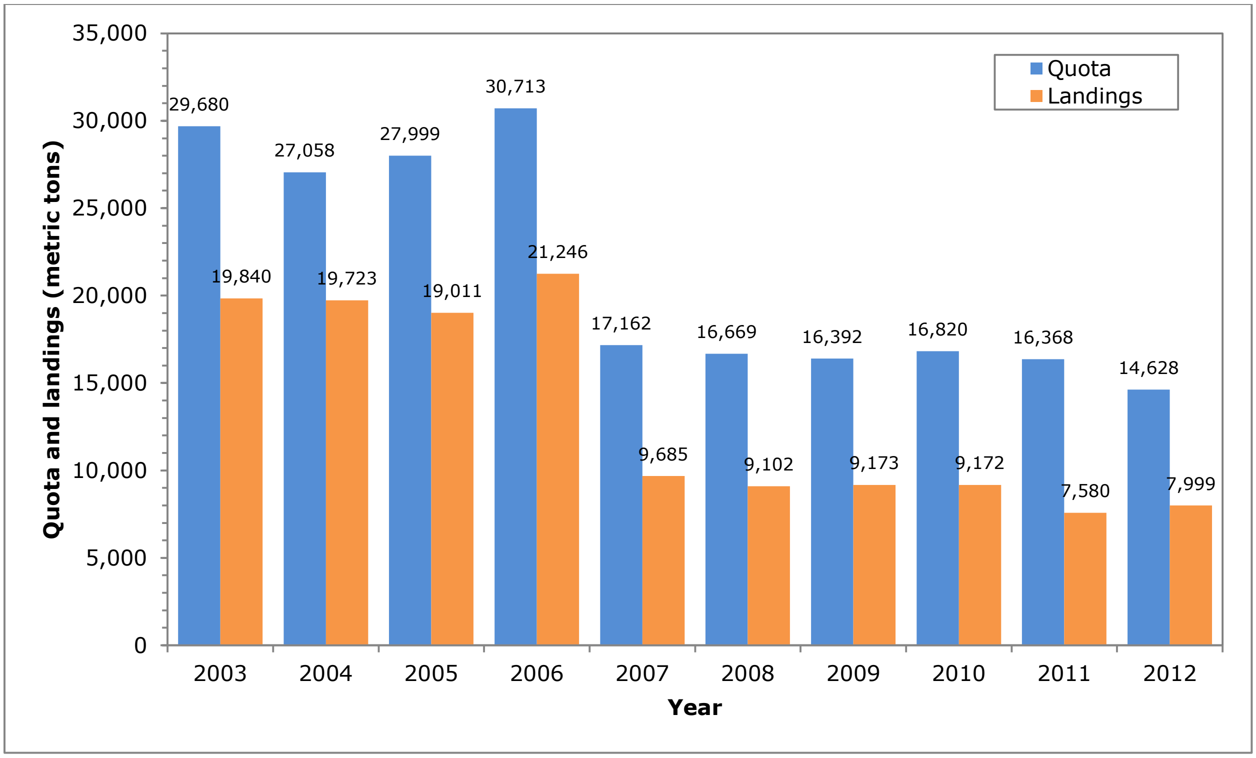

Figure 10. The TAC and landings for the Gulf of Alaska Other Rockfish Fishery.

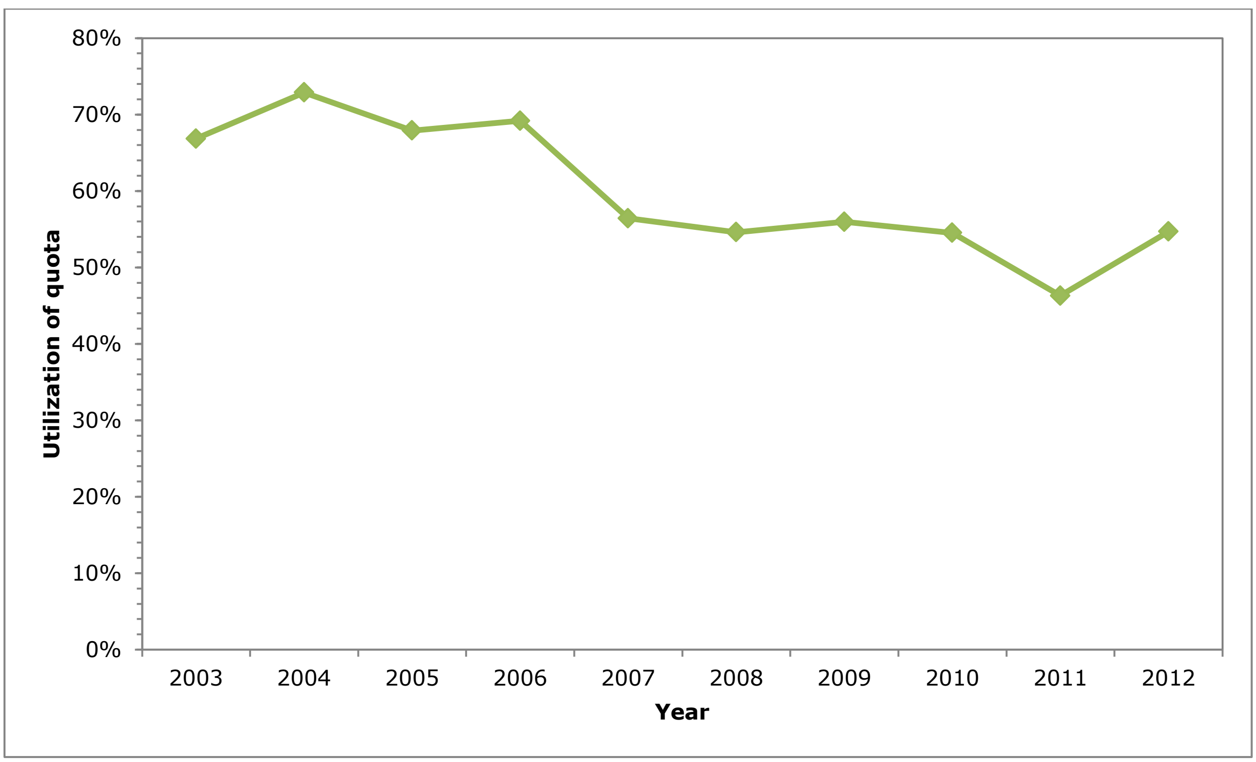

Figure 11. Percent utilization of available TAC in the Gulf of Alaska Other Rockfish Fishery.

b. Effort

The number of permits for the Gulf of Alaska Other Rockfish Fishery represents the number of License Limitation Program groundfish licenses with endorsements for any Gulf of Alaska management area, which is the total number of potential entrants into any segment of the fishery. Between 2003 and 2012, there have been as many as 1,718 (2003) License Limitation Program licenses issued and as few as 1,617 (2010) (Figure 12). The number of License Limitation Program holders has been decreasing by less than 1% each year from 2003 until 2008. In 2009, the number of holders decreased by 3% relative to 2008. Since 2009, the number of License Limitation Program holders has been slightly increasing. Active vessels are the number of vessels with retained catch attributed from Gulf of Alaska Other Rockfish Fishery allocations. There were 785 active vessels participating in the Gulf of Alaska Other Rockfish Fishery in 2003 (Figure 13). In 2005, there was a low of 703 vessels actively participating in the fishery. Since then, there have been as many as 734 active vessels and in 2012, there were 729 vessels actively participating in the fishery.

The season length is the number of days per calendar year any Gulf of Alaska rockfish species in any regulatory area was open to directed fishing using trawl gear. The regulatory season for rockfish directed fishing using trawl gear is defined as the first day of the third quarterly reporting period of a fishing year (July 1) through December 31st. The actual number of days open to directed fishing for a given species and area may be less than the full regulatory season and is dependent on utilization of the species-area allocation and halibut prohibited species catch limits.

Seasons for rockfish directed fishing using pot, jig, and hook-and-line gear open January 1 and remain open throughout the year, subject to attainment of TACs and prohibited species catch limits. From 2003 to 2011, non-trawl fishing has accounted for no more than 12% of retained Gulf of Alaska rockfish landings in a given year. In 2003, directed fishing was open for 109 days (Figure 14). In 2004 and 2005, directed fishing was open for less than one month; however, in the following year, the fishery was open for 100 days. In 2007, the season length increased to 169 days and again increased to 184 days for 2008 - 2011. In 2012, the fishery was open for 32 days. The Alaska Region does not manage fisheries by trips or days at sea; therefore, these metrics are not reported.

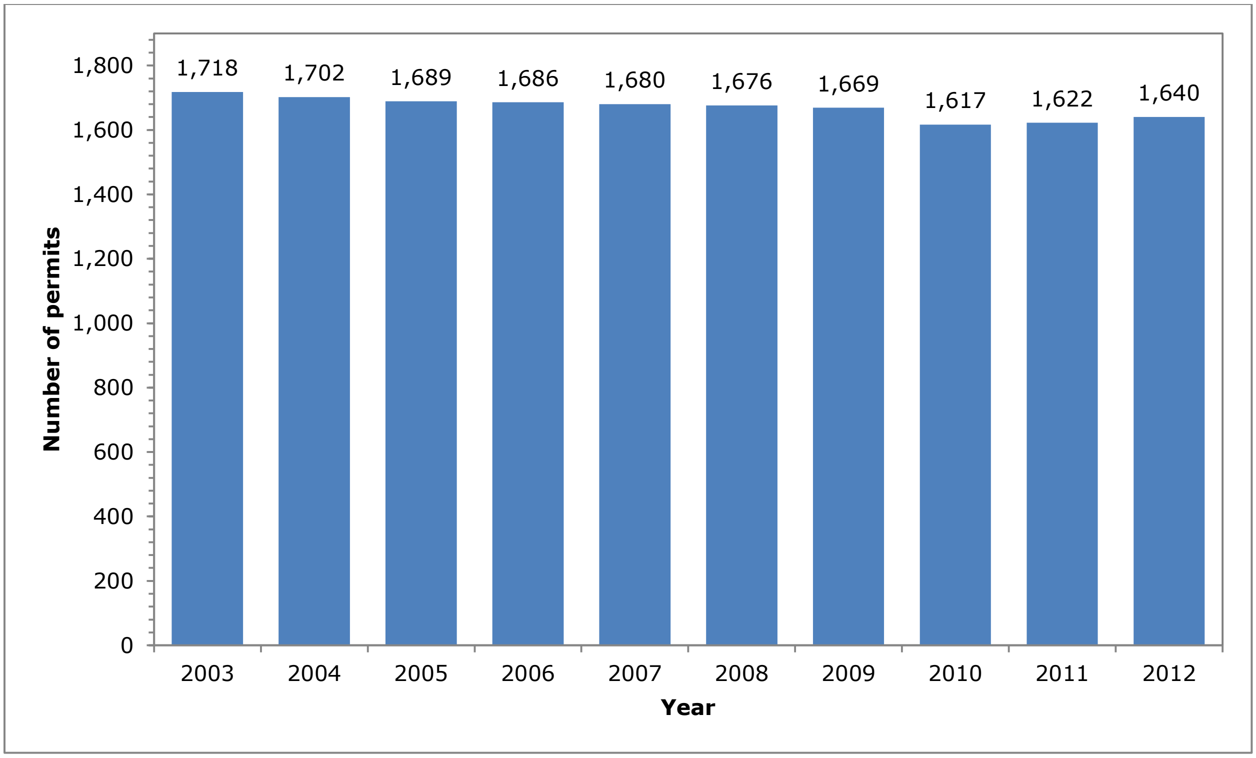

Figure 12. Number of License Limitation Program holders in the Gulf of Alaska Other Rockfish Fishery.

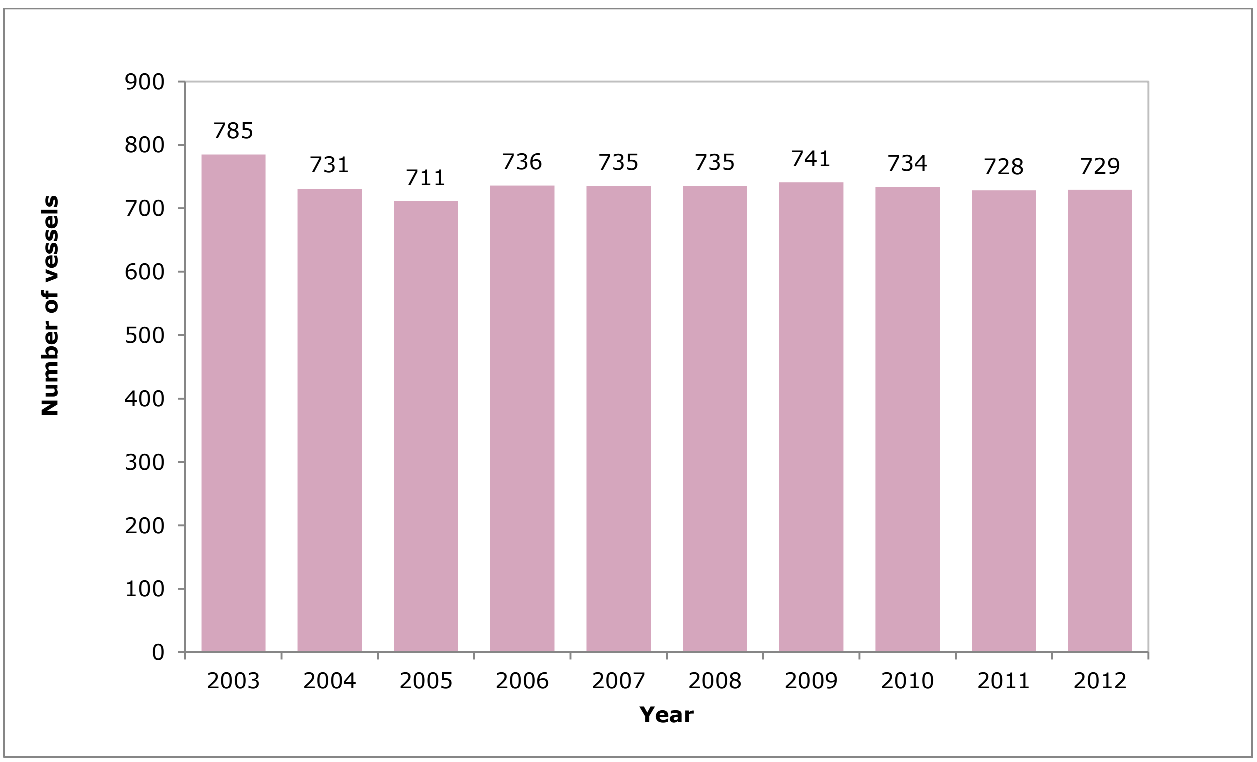

Figure 13. Active vessels in the Gulf of Alaska Other Rockfish Fishery.

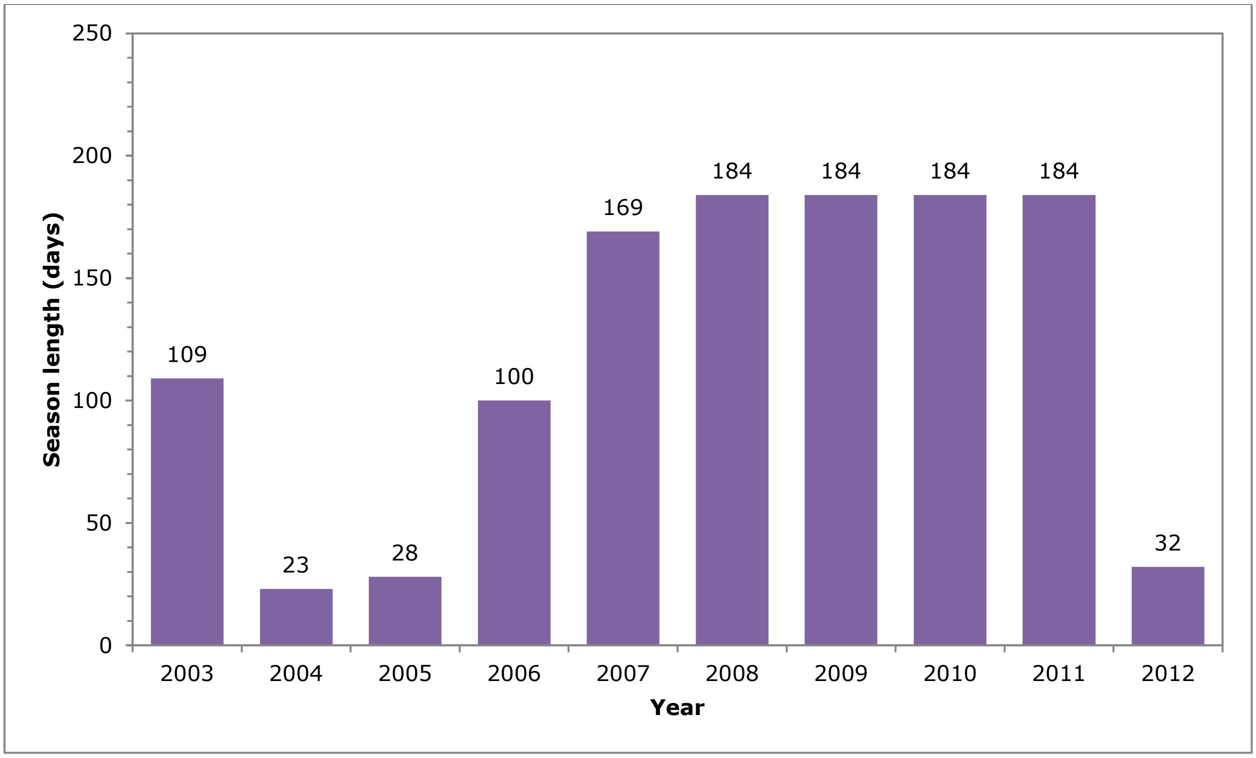

Figure 14. Number of days when fishing was open in the Gulf of Alaska Other Rockfish Fishery.

c. Revenue

Fishery revenue (inflation adjusted with the GDP deflator, indexed for 2010) is the estimated ex-vessel value of retained catch, priced using annual weighted average shore-side processor purchase prices for the Gulf of Alaska by species and gear type (fixed and trawl gear). The revenue values do not include any premium for catch harvested and processed on board by catcher/processors. Revenue from landings of Gulf of Alaska Other Rockfish has been as high as $4.9 million (2007; Figure 15). Revenue has been as low as $2.7 million (2003), however, average annual revenue from 2003-2012 was $3.7 million.

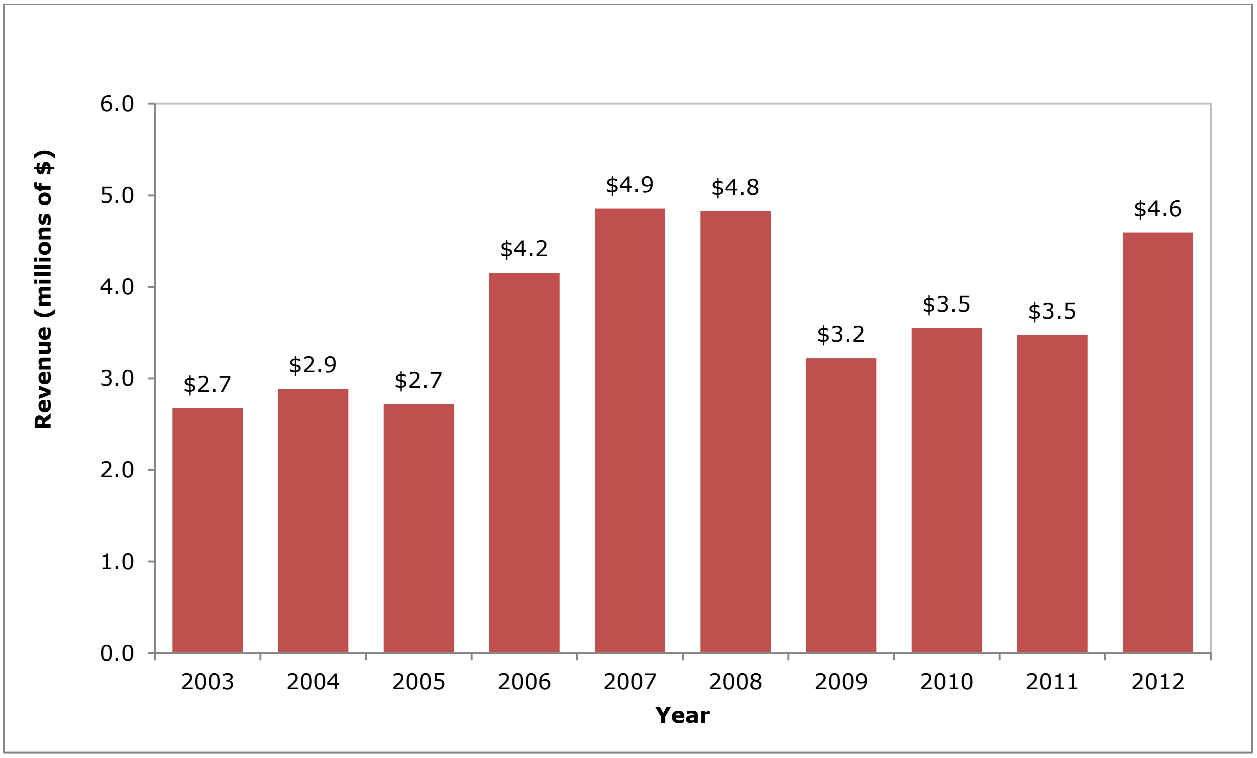

Figure 15. Revenue (inflation-adjusted 2010 dollars) in the Gulf of Alaska Other Rockfish Fishery

The average price for Gulf of Alaska Other rockfish was about $340 per metric ton in 2003 and 2004, steadily increasing each year to a high of $531 per metric ton in 2008 (Figure 16). In 2009, the average price of this harvest decreased (by 34%) to $351 per metric ton relative to 2008. This decrease in price occurred when revenues were at their lowest, but landings were still stable. Compared to the previous year, average prices increased for the next three years (by 10% in 2010, 19% in 2011 and 25% in 2012) to a high of $574 per metric ton. Revenue per vessel was $3,411 in 2003; it increased annually until 2007 to $6,605. Revenue per vessel was most likely greatest in 2007 because revenues were substantially greater but the number of active vessels was constant. Between 2007 and 2011, revenue per vessel was on a downward trend (Figure 17). However, revenue per vessel in 2012 was 32% greater than revenue per vessel in 2011.

Data are not currently available to calculate landings of other species on trips in this fishery. Also, since the Alaska Region does not manage fisheries by trips or days at sea, the associated metrics cannot be calculated.

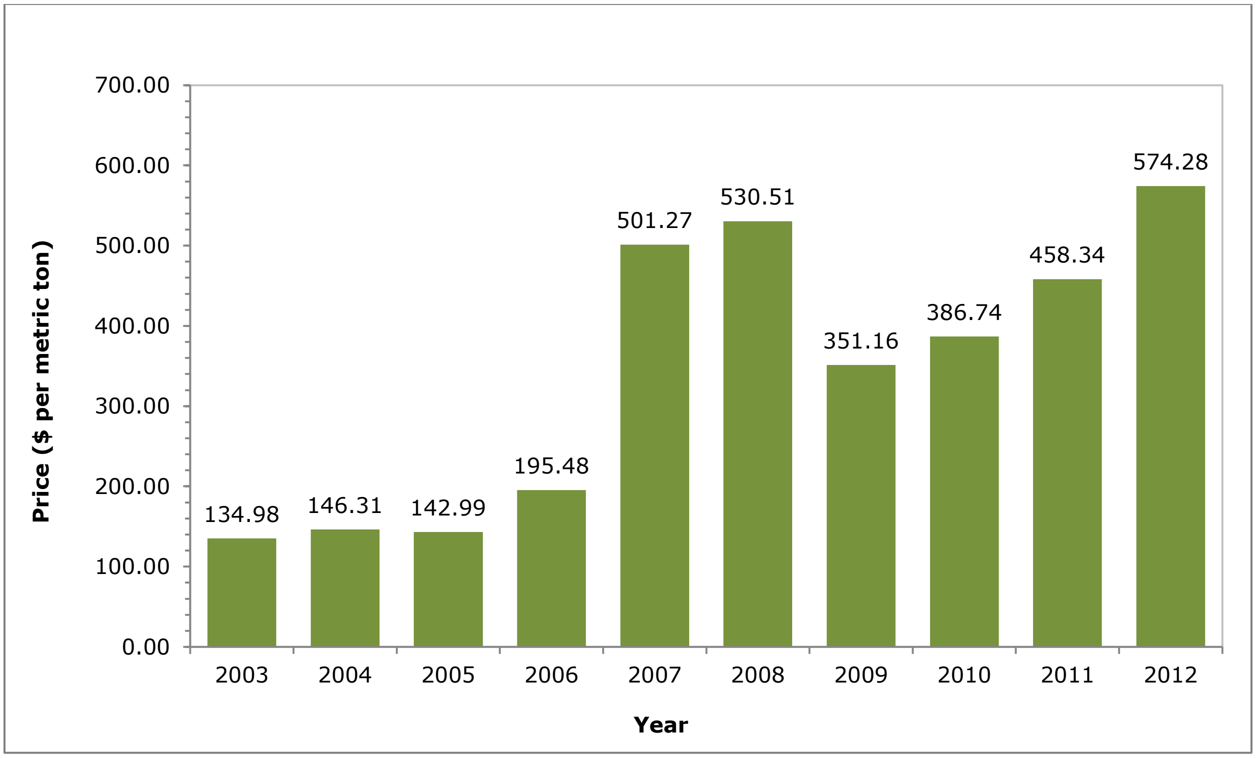

Figure 16. Average price (inflation-adjusted 2010 dollars) per metric ton in the Gulf of Alaska Other Rockfish Fishery.

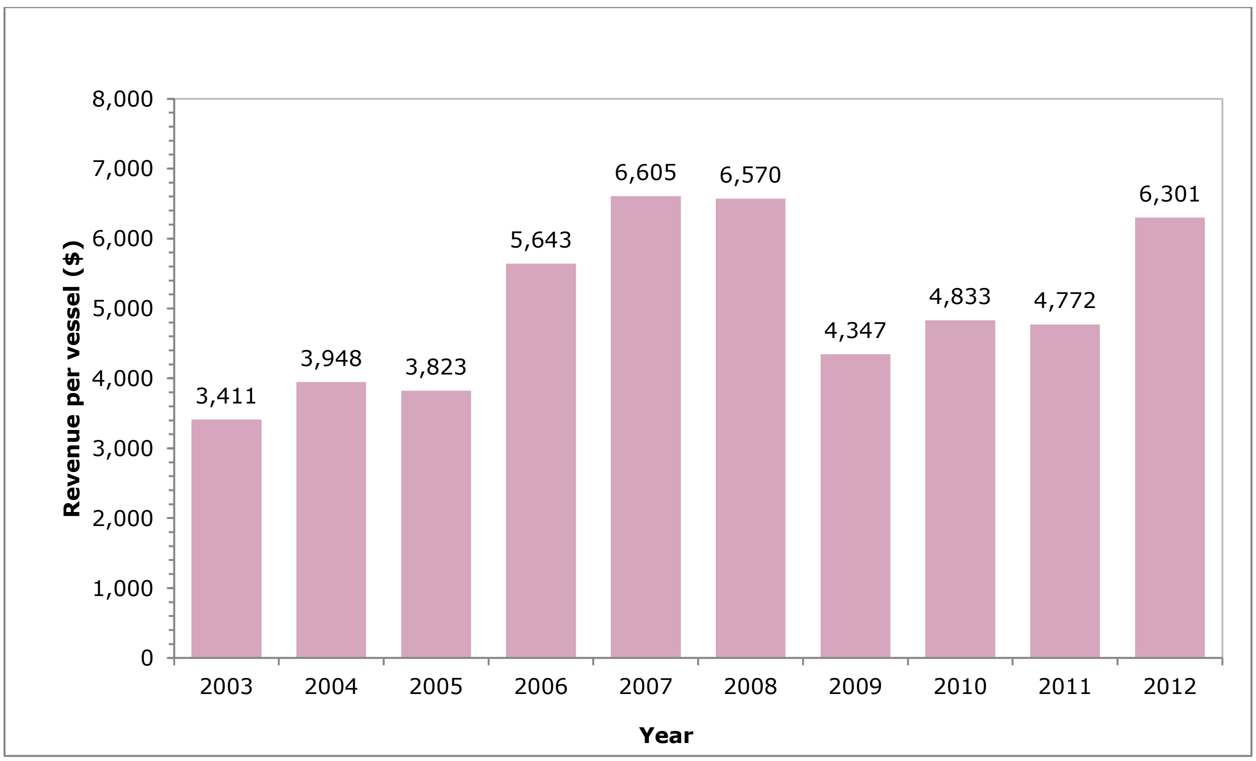

Figure 17. Revenue (inflation-adjusted 2010 dollars) per vessel in the Gulf of Alaska Other Rockfish Fishery.

The Gini coefficient measures the equality of a distribution and is used here to measure the distribution of revenue among active vessels in the Gulf of Alaska Other Rockfish Fishery. A value of zero represents a perfectly equal distribution of revenue amongst the vessels, whereas, a value of one represents a perfectly unequal distribution. The Gini coefficient has been greater than 0.8 for the entire period reported (Figure 18), which may suggest a very unequal distribution of revenue. However, the revenue of active vessels includes those vessels that participate in other fisheries (IFQ Halibut and Sablefish), but are required to retain their catch of rockfish. This means that when calculating the Gini coefficient, the number of active vessels most of which have very small revenue shares is much higher than the actual number of vessels that target rockfish in this fishery. Therefore, the calculated Gini coefficient ends up being much higher than expected.

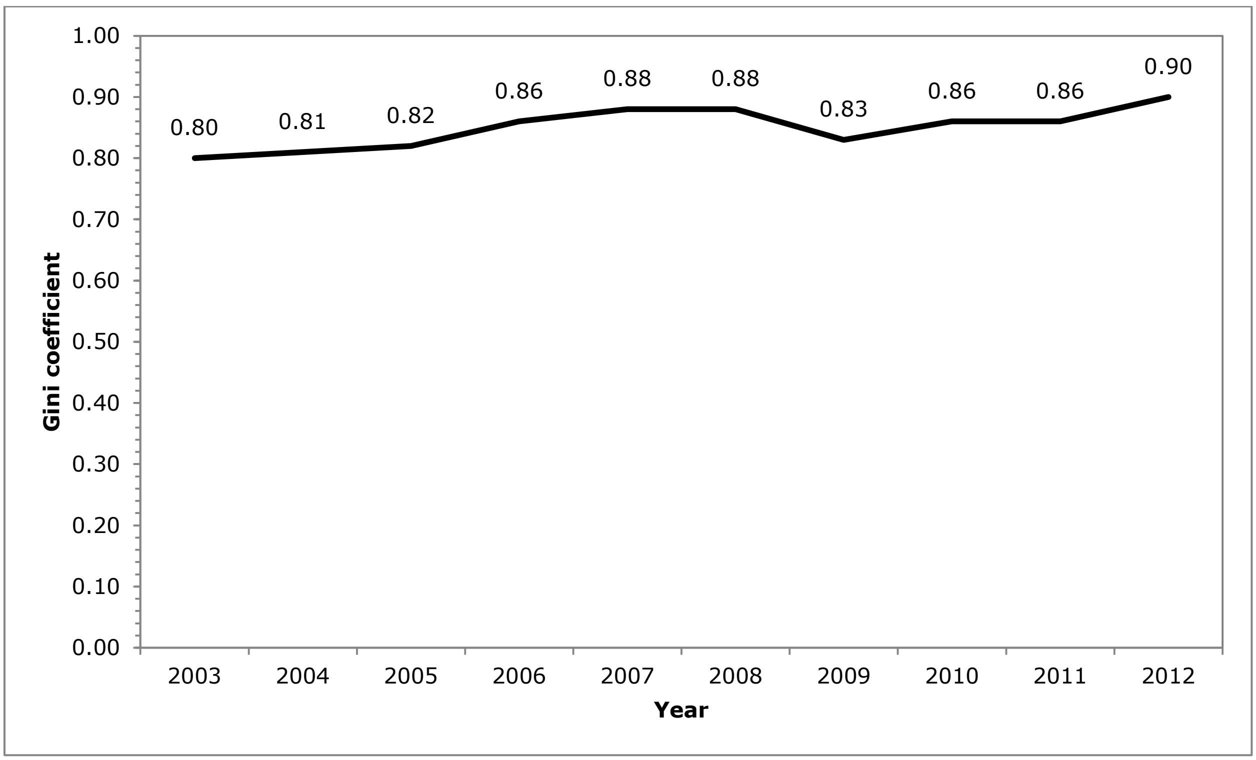

Figure 18. The Gini coefficient of those active vessels in the Gulf of Alaska Other Rockfish Fishery.

d. Synopsis of recent trends

The North Pacific Fishery Management Council is currently discussing plans to create a Gulf of Alaska trawl bycatch management plan, which may allocate quota to individuals, cooperatives, or community entities. Depending on the final configuration and completion of the program, it may be considered a catch share program. The Council, in their October 5, 2013 motion, stated that "The primary objective of this action is to improve incentives for prohibited species catch reduction and management, achieved in several ways through this program design." In addition to minimizing chinook salmon bycatch and more efficient use of halibut prohibited species catch, the primary target species of interest in the program are walleye pollock and Pacific cod (hereafter pollock and cod). However, many other rockfish and flatfish species are also targeted by vessels targeting pollock and cod, and therefore some participants are concerned that allocating quota to pollock and cod will increase effort in these other trawl fisheries. Depending on how that program evolves over the next year(s), the likely result will be changes in the Other Rockfish fishery and its participants.

West Coast Region

The West Coast Region manages over 90 species of groundfish, coastal pelagics, highly migratory species, and 30 threatened or endangered fish and marine mammal species, including certain stocks of Pacific salmon.

Federal fisheries in this region are managed by the Pacific Fishery Management Council and NOAA Fisheries under five fishery management plans: groundfish, salmon, Pacific Halibut, coastal pelagic species and highly migratory species (HMS). Coastal pelagic species are highly variable, environmentally sensitive stocks that provide forage for marine mammals, birds, and other fish. Highly migratory species include larger, pelagic fish inhabiting vast geographical ranges that span international borders. As such, highly migratory species require coordinated management between countries with fishing interests in the Pacific Ocean. Even though the domestic portions of both the coastal pelagic and HMS fisheries occur off the entire West Coast, the primary management, enforcement, and research priorities have traditionally fallen under the scope of the NOAA Fisheries Southwest Regional Office and Southwest Fisheries Science Center.

A number of species including sardines and market squid are manged under Coastal Pelagic Species Fishery Management Plan. However, directed fisheries have developed for market squid and sardines where either squid or sardines are targeted with very low incidental landings of the other. Trips that land market squid land very little of any other species an trips that land sardines land little else other than sardines. This is also true of albacore and swordfish, which are both managed under the Highly Migratory Species Fishery Management Plan. That is, trips landing alabacore almost exclusievely land albacore and trips that land swordfiany land only incidental landings of other species. Since distinct fisheries have developed around these four species, performance characteristics may be differ. For this reason, indicators of fishery performance are reported separately for the sardine, market squid, albacore, and swordfish fisheries (Table 5).

A synopsis of each fishery is provided here, including gears used, target and component species, products sold, current management approach, and key changes affecting the fishery. In addition, trends are reported for the most recent 11 years from 2002 to 2012. All price and revenue data have been adjusted for inflation to 2010 equivalent dollars using the Gross Domestic Product price deflator. Except for salmon, which is reported in numbers of fish, all quantities for quotas and landings are reported in metric tons.

Table 5. West Coast Region Fishery Performance Measures by Fishery in 2012.

		Coastal Pelagics		Highly Migratory Species	
Catch and Landings	**Salmon Troll**	**Sardines**	**Squid**	**Albacore**	**Swordfish**
Quota allocated to fishery[a]	70,603	109,409	N/A	N/A	N/A
Aggregate landings[a]	59,699	100,407	97,644	13,873	403
Utilization	84.6%	91.8%	N/A	N/A	N/A
Quota exceeded	N	N	N/A	N/A	N/A
Effort					
Number of permits (number)	2,310	N/A	N/A	N/A	87
Active vessels (number)	1,093	99	136	854	41
Trips (number)	22,727	2,236	4,293	3,383	370
Days at sea (days)	22,727[b]	2,236[b]	4,293[b]	34,242	N/A
Season length (days)	240	365	365	365	276
Revenue ($)[c]					
Fishery species revenue	$18,939,410	$20,617,583	$61,654,806	$43,957,024	$1,008,983
Other species revenue	$1,620,488	N/A	N/A	$60,435	$188,920
Total revenue	$20,559,898	$20,617,583	$61,654,806	$44,017,459	$1,197,903
Average price (per pound or metric ton)[d]	$5.09	$205	$631	$3,169	$2,504
Fishery species revenue per vessel	$17,328	$208,258	$453,334	$51,472	$24,609
Other species revenue per vessel	$1,483	N/A	N/A	$71	$4,608
Total revenue per vessel	$18,811	$208,258	$453,344	$515443	$29,217
Fishery species revenue per trip	$833	$9,221	$14,362	$12,994	$2,720
Other species revenue per trip	$71	N/A	N/A	$18	$511
Total revenue per trip	$904	$9,221	$14,362	$13,012	$3,238
Fishery species revenue per day at sea	$833[b]	$9,221[b]	$14,362[b]	$1,284	N/A
Other species revenue per day at sea	$71[b]	N/A	N/A	$2	N/A
Total revenue per day at sea	$904[b]	$9,221[b]	$14,362[b]	$1,286	N/A
Other					
Limited entry	Y	Y	N	N	Y[e]
Gini coefficient	0.60	0.64	0.63	0.74	0.73

[a] Quota and landings are in number of fish for salmon troll and metric tons for sardines, squid, albacore, and swordfish.
[b] Days at sea is equal to the number of trips because all trips are less than 24 hours in duration.
[c] Revenue and price data have been adjusted by the GDP deflator indexed for 2010.
[d] Average price per pound (for salmon) and per metric ton (for sardines, squid, albacore, and swordfish).
[e] Permits for vessels using harpoon gear are open access.
N/A = not applicable or not available

A. West Coast Salmon Troll

The West Coast commercial fishery for Pacific salmon includes the coastal waters of Washington, Oregon, and California and waters off these states in the Exclusive Economic Zone (from 3 to 200 miles offshore; EEZ). Fisheries that operate in the EEZ have been managed by the Pacific Fishery Management Council and NOAA Fisheries since 1977. Commercial fisheries in the EEZ focus on chinook and coho salmon. Small numbers of pink salmon are also harvested, especially in odd-numbered years. Although sockeye, chum, and steelhead salmon are landed in coastal waters, there are no directed fisheries for these species in federally-managed waters. Several different gears are used in coastal salmon fisheries including gillnets, seine nets, set nets, and hook gear whereas only hook and line gear is permitted in the EEZ (hereafter referred to as the "ocean troll" or "salmon troll fishery"). During 2012, the combined value of all salmon species landed in the Northwest Region was $48.2 million, of which about 41% was from the ocean troll fishery. Salmon are an important source of cultural and physical sustenance for Northwest Native American tribes, and they are symbolically important to many other residents of the Northwest. Management of salmon species is complex due to the fact that salmon are affected by a wide variety of factors both oceanic and terrestrial, including oceanic and climatic conditions, dams, habitat loss, urbanization, agricultural and logging practices, water diversion, and predators.

1. <u>Fishery synopsis</u>

a. Gear used

Only hook-and-line gear is allowed in ocean salmon fisheries. Commercial troll vessels catch salmon by "trolling" lines with bait or lures through groups of feeding fish. Four to six main wire lines are fished, each of which may have a cast iron sinker of up to 50 pounds on its terminal end and eight to twelve nylon leaders spaced out along its length, each of which ends in either a lure or baited hook. To retrieve hooked fish, the lines are wound on spools hydraulically or by hand, and the fish are gaffed when alongside the vessel. The troll fishery produces low-volume, high-quality products. Troll gear does not contact the ocean floor and therefore, causes no habitat impact. Bycatch is also low and usually consists of other salmon species. Further gear restrictions specify that vessels may use only single point, single shank, barbless hooks. From Cape Falcon, Oregon, to the Oregon/California border, no more than four lines are allowed per vessel. From the Oregon/California border to the U.S./Mexico border, no more than six lines are allowed per vessel.

b. Target/component species

Chinook salmon, also called king salmon, are the largest of the Pacific salmon. Like all Pacific salmon, chinook are anadromous, meaning that they hatch in freshwater streams and rivers, migrate to the ocean for feeding and growth, and return to their natal waters to spawn. The life history traits of chinook can be very diverse. Their spawning environments range from just above tidewater to over 3,200 kilometers upriver from the ocean. In the ocean, chinook from Washington, Oregon and California range widely throughout the Pacific Ocean and the Bering Sea, and as far south as the U.S. border with Mexico. Several evolutionarily significant units have been listed or proposed for listing as at risk for extinction under the Endangered Species Act. Chinook salmon are highly prized by commercial, sport, and subsistence fishers. The natural range of chinook in North America is from the Venture River in California to Kotzebue Sound in Alaska. On average, mature chinook salmon are three feet long and weigh 30 pounds.

In North America, coho or "silver" salmon are most abundant from central Oregon to southeast Alaska. Coho are also anadromous and have a life history similar to chinook. However, the time they spend in fresh and saltwater is relatively fixed, compared to the more variable life history of chinook. Coho spend one to three winters in streams and may spend up to five winters in lakes before migrating to the sea as smolt. North of central British Columbia, coho tend to spend two years in the ocean, while south of this point they spend only one year in the ocean. Coho spawn in small tributaries from the San Lorenzo River in Monterey Bay, California to Point Hope, Alaska, and throughout the Aleutian Islands. Coho salmon typically grow to be 24 – 30 inches long and 8 – 12 pounds in weight.

In North America, pink salmon are found from the Arctic coast in Alaska to central California, although they do not reproduce in significant numbers south of Puget Sound in Washington. Like other Pacific salmon, pink salmon are anadromous; however, unlike chinook and coho, pink salmon fry migrate out to sea soon after they are born, returning to spawn after about 18 months. Independent populations spawn in even and odd years because the pink salmon life cycle is so regular. Pink salmon are the smallest of the Pacific salmon found in North America, growing to an average length of 20 – 25 inches and an average weight of 3.5 – 5 pounds.

c. Market channels

Chinook and coho are considered highly valuable among salmon species, and as such are sold primarily as fresh or frozen filets. Chinook salmon are destined primarily for domestic markets. A significant portion of frozen coho salmon is sold to Japan. Most often, pink salmon is processed into canned products. Due to domestic demand trends, production of canned salmon products is declining, while demand for fresh and frozen fillets is on the rise in U.S. markets.

2. Management Program

a. Current management controls

The Pacific Coast Salmon Fishery Management Plan guides management of salmon fisheries in federal waters (from 3 to 200 nautical miles) off the coasts of Washington, Oregon, and California. The Fishery Management Plan covers the coastwide aggregate of natural and hatchery salmon encountered in ocean salmon fisheries, but only has management objectives and allocation provisions for chinook, coho, and pink salmon, as other salmon species are rarely encountered in oceanic fisheries. Management tools such as season length, quotas, minimum harvest lengths, and fishing gear restrictions vary depending on natural fluctuations in salmon abundance. In addition, specific control rules exist for specific stocks. Accountability measures are required for all stocks and stock complexes in the Fishery Management Plan that are required to have Annual Catch Limits. Annual Catch Limits were implemented for the 2012 fishing season for two salmon stocks: Sacramento River fall chinook salmon and Klamath River fall chinook salmon. However, prior to 2012 limits on catch were based on quotas and/or harvest guidelines that were set for specified components of chinook and coho salmon in each management unit, which includes Horse Mountain to the U.S./Mexico Border, Humbug Mountain to Horse Mountain, Cape Falcon to Humbug Mountain, and the U.S./Canada Border to Cape Falcon.

Since 1977, the Pacific Fishery Management Council has adopted special measures for the Treaty Native American oceanic troll fisheries off the Washington Coast. The Makah, Quileute, Hoh, and Quinault tribes are entitled to exercise their treaty rights in certain oceanic areas; in addition, Lower S'Klallam, Jamestown S'Klallam, and Port Gamble S'Klallam tribes are entitled by federal judicial determination to exercise their treaty rights in oceanic salmon Area 4B, the entrance to the Strait of Juan de Fuca. Fishery performance measures for the tribal component of the troll fishery are not included in this report.

b. Key changes from past management controls

The primary management issues since 1984 have included:

- Specific spawner escapement goals for Oregon coastal natural coho and Klamath River fall chinook (Amendments 7, 9, 11, 13, and 15)
- Non-Native American harvest allocation (Amendments 7, 9, 10, and 14)
- In-season management criteria (Amendment 7)
- Habitat and Essential Fish Habitat definition (Amendments 8 and 14)
- Safety at sea (Amendment 8)
- Fishery status determination criteria (Amendments 10, 14, 16, and 17)
- Management objectives for stocks listed under the Endangered Species Act (Amendments 12 and 14)
- Bycatch reporting and priorities for avoiding bycatch (Amendment 14)
- Selective fisheries (Amendment 14 and 17)
- Stock classification (Amendment 16 and 17)
- Annual Catch Limits and Accountability Measures (Amendment 16).

3. <u>Management Objectives</u>

In addition to the National Standards established under the Magnuson-Stevens Act, the Pacific Fishery Management Council is guided by the principle that there should be no net loss of the productive capacity of marine, estuarine, and freshwater habitats that sustain commercial, recreational, and tribal salmon fisheries beneficial to the nation. The following objectives guide the Council in establishing fisheries in a framework of ecological, social, and economic considerations.

1) Establish ocean exploitation rates for commercial and recreational salmon fisheries that are consistent with requirements for stock conservation objectives and Annual Catch Limits.
2) Fulfill obligations to provide for Native American harvest opportunity as provided in treaties with the United States.
3) Maintain ocean salmon fishing seasons supporting the continuance of established recreational and commercial fisheries while meeting salmon harvest allocation objectives such that recreational and commercial fishery allocations are fair and equitable.
4) Minimize fishery mortalities for those fish not landed from all ocean salmon fisheries as consistent with achieving optimum yield and the bycatch management specifications of Section 3.5.

5) Manage and regulate fisheries so that the optimum yield encompasses the quantity and value of food produced, the recreational value, and the social and economic values of the fisheries.
6) Develop fair and creative approaches to managing fishing effort and evaluate and apply effort management systems as appropriate to achieve these management objectives.
7) Support the enhancement of salmon stock abundance in conjunction with fishing effort management programs to facilitate economically viable and socially acceptable commercial, recreational, and tribal seasons.
8) Achieve long-term coordination with the member states of the Council, Native American tribes with federally-recognized fishing rights, Canada, the North Pacific Fishery Management Council, Alaska, and other management entities that are responsible for salmon habitat or production. Manage the fishery to be consistent with the Pacific Salmon Treaty and other international treaty obligations.
9) In recommending seasons, to the extent practicable, promote the safety of human life at sea.

4. <u>Recent Trends</u>
   a. Quota, catch, landings

The West Coast Salmon Troll Fishery predominantly harvests chinook and coho salmon. Limits on catch in the form of either quotas or harvest guidelines, specified by management area and species, cover some, but not all of the chinook or coho salmon landed in the states of Washington, Oregon, and California. The combined quotas for chinook and coho salmon were set at 121,000 fish in 2002 (Figure 19). The aggregate quota limit was increased to 164,000 fish in 2003, but due to declining return rates was reduced in five consecutive years to just 23,500 fish in 2008. The quota was increased to 75,000 fish in 2009 and was increased again to 94,000 fish in 2010 before falling to about 50,000 fish in 2011. During 2012, the first year for which an ACL was set, the ACL was just over 70,000 fish. From 2002 to 2012, the aggregate quota varied considerably by management area and species and in some years catch was prohibited. For coho salmon, the only management unit where catches were allowed was Cape Falcon to Humbug Mountain and then only in 2007 and 2009. For chinook salmon, catches were not allowed from Humbug Mountain to the Oregon/California Border in 2006, 2008, and 2009; from the Oregon/California border to Humboldt South Jetty in 2006 and 2008-2010; from Horse Mountain to Point Arena 2003 to 2005, 2008, 2009, and 2011; and from Point Arena to Pigeon Point in all years except 2006.

The aggregate catch of chinook and coho salmon subject to quota was 120,800 fish in 2002 (Figure 19). Aggregate catches followed quotas with time-series high (2002) and lows (2008) corresponding to highs and lows in quota. The combined utilization rate for all management units subject to quotas was nearly 100% in 2002 and was about 96% in 2004 (Figure 20). From 2005 to 2012, the utilization rate averaged nearly 77% and ranged from a low of 68.5% in 2008 to a high of 84.6% in 2012. This means the combined management unit quotas for chinook and coho salmon were not exceeded, catch limits for specific management units were exceeded. These include overages in the chinook salmon quota for North of Cape Falcon in 2003 and 2005 and in the coho quota North of Cape Falcon in 2004. South of Cape Falcon, no overages occurred for coho salmon, but chinook overages occurred in the Oregon/California Border management area in 2004, 2005, 2007, and 2011; and in the Horse Mountain to Point Arena management area in 2002 and 2005.

Aggregate landings in the ocean troll fishery for chinook and coho salmon landed in Washington, Oregon, or California, including both natural and hatchery salmon totaled 9.2 million pounds gutted weight in 2002 (Figure 21).This figure increased to 10.9 million pounds the next year, but then declined in two consecutive years reaching 7.5 million pounds in 2005. Total landings fell precipitously to a low of 184,000 pounds of fish in 2008. In 2009-2012, total landings recovered to 3.7 million pounds in 2012.

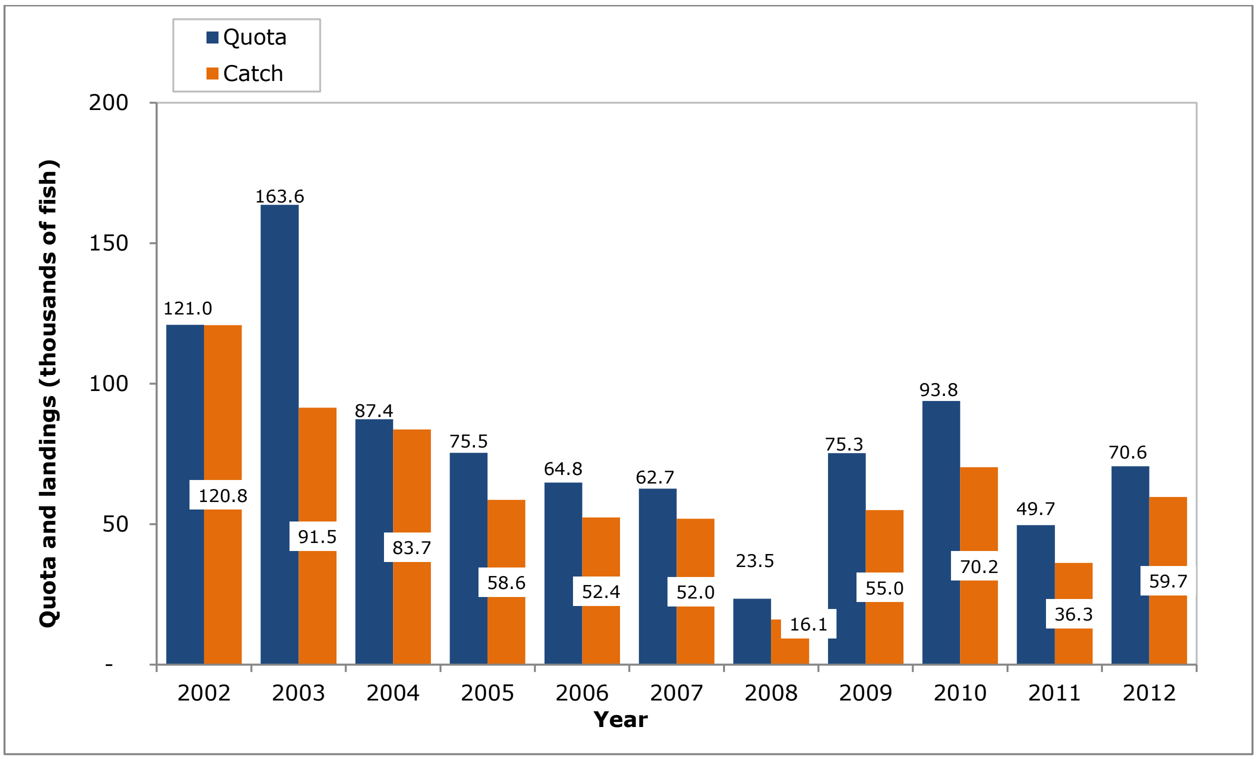

Figure 19. Combined non-tribal commercial Pacific salmon quotas and catch in numbers of fish for the West Coast Salmon Troll Fishery

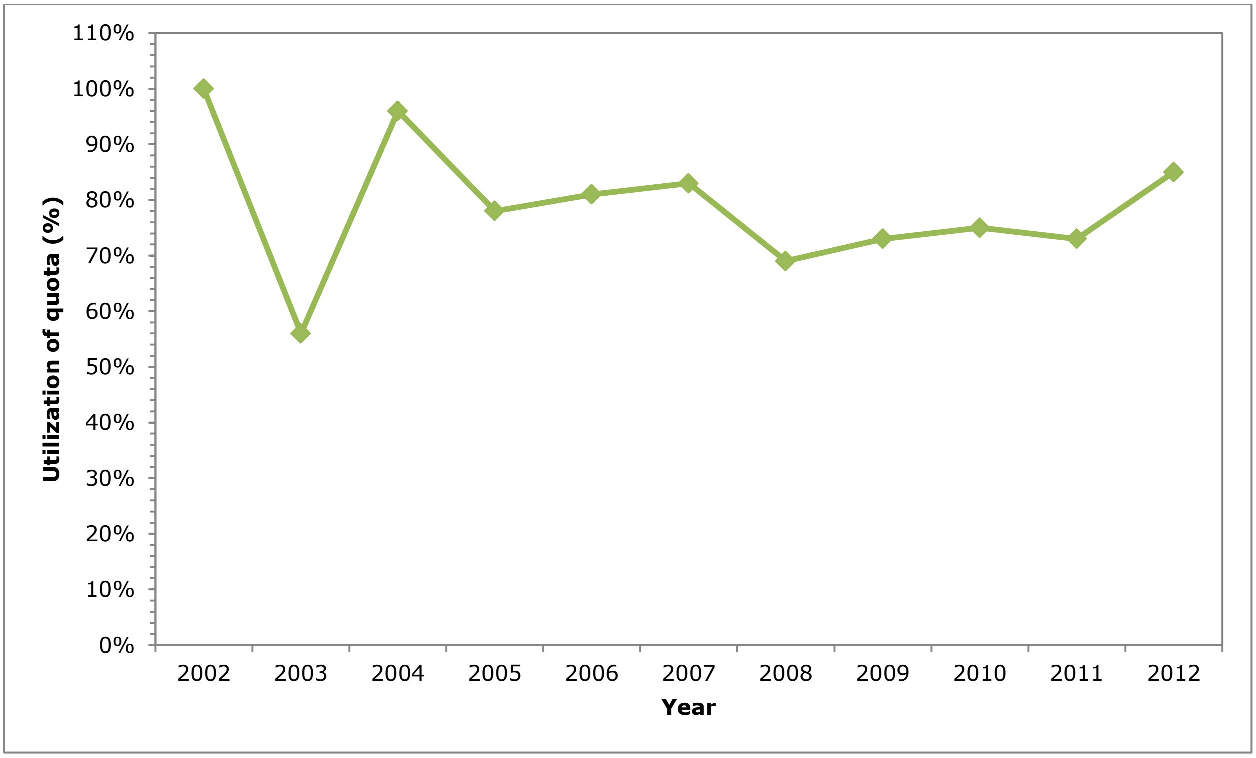

Figure 20. Annual quota utilization rate in the non-tribal commercial West Coast Salmon Troll Fishery.

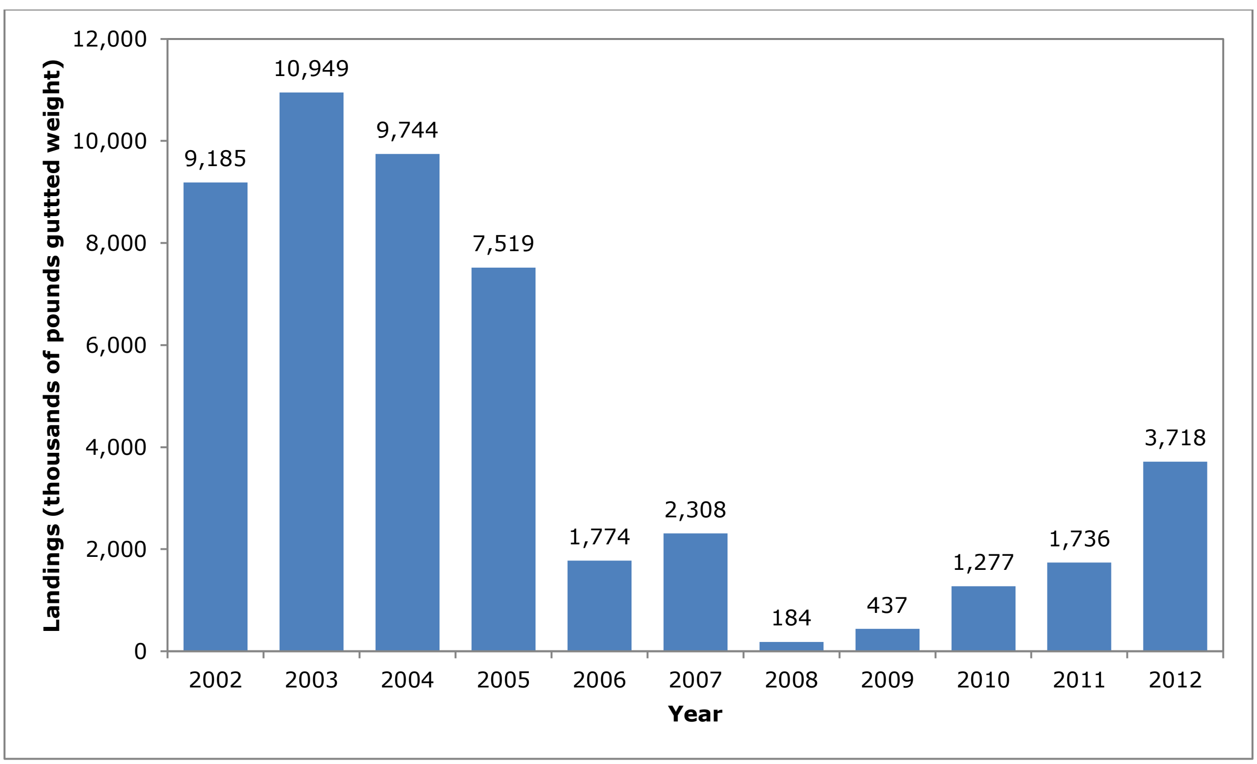

Figure 21. Total non-tribal commercial landed pounds (gutted weight) of natural and hatchery Pacific salmon in the West Coast Salmon Troll Fishery.

b. Effort

Permits required to land salmon for commercial sale are issued on a limited access basis by the states of Washington, Oregon, and California. In 2002, a total of 2,926 permits were issued by the three states (Figure 22). Over time, the number of permits has been on a gradual downward trend, declining by about 58 permits per year to 2,310 permits in 2012. The number of vessels that participated in the Pacific Coast salmon ocean troll fishery was 1,251 vessels in 2002 (Figure 23). The number of active vessels was at least 900 vessels through 2007, but dropped to only 224 active vessels in 2008 as the annual quota reached a low in that year. The number of active vessels increased to 322 vessels in 2009 and has increased relatively rapidly as higher catch limits were implemented, reaching 1,093 vessels in 2012.

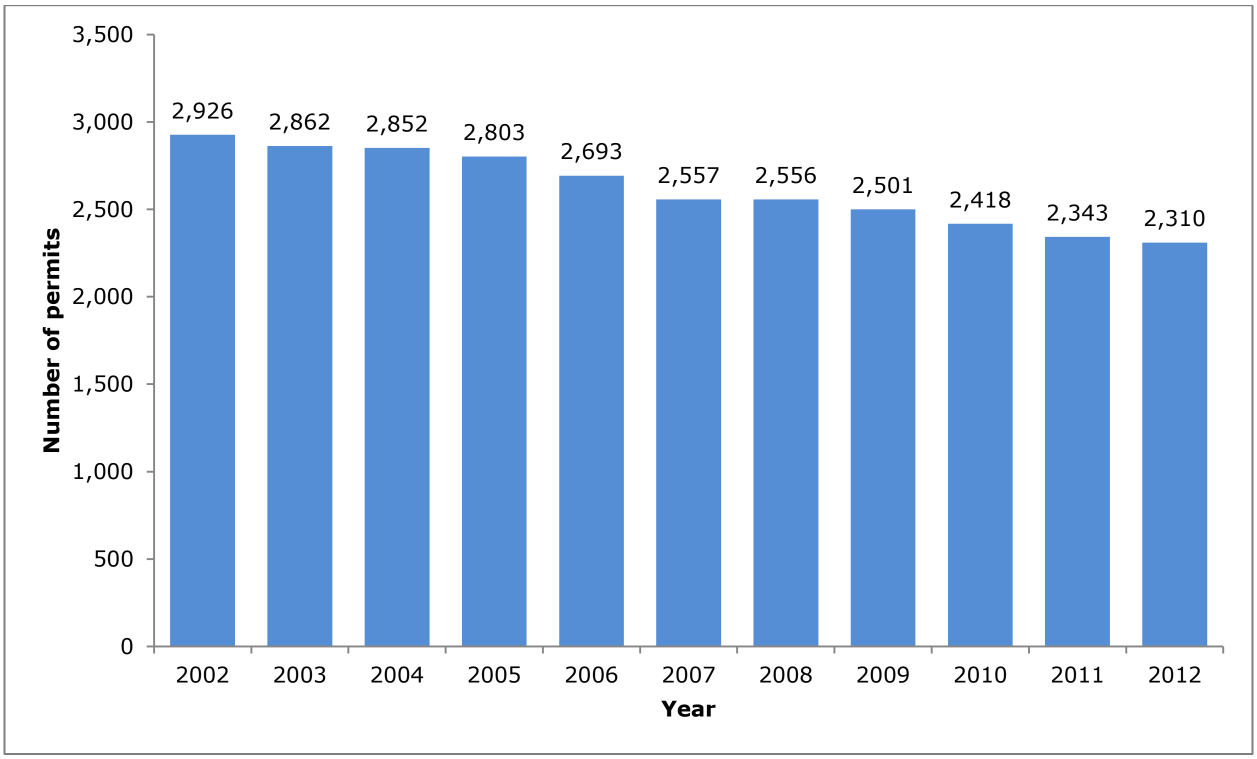

Figure 22. Number of permits in the non-tribal commercial West Coast Salmon Troll Fishery.

The West Coast Salmon Troll Fishery is a day fishery in which the duration of a fishing trip is less than 24 hours. Data are not collected that would make it possible to reliably estimate time spent fishing, and therefore aggregate effort is measured by the number of trips taken in the fishery where a trip was defined based on a reported landing assuming that vessel do not offload fish at more than one site. At least 30,000 trips were taken in each year from 2002 to 2005 (Figure 24). The number of trips taken during 2006 (14,225) was less than half that taken during 2006 (30,079). The number of trips was just over 2,000 during 2008 as the catch limit was low in that year. As was the case for active vessels, the number of trips taken in the fishery increased along with higher catch limits from 3,210 trips in 2009 to 22,727 trips taken during 2012.

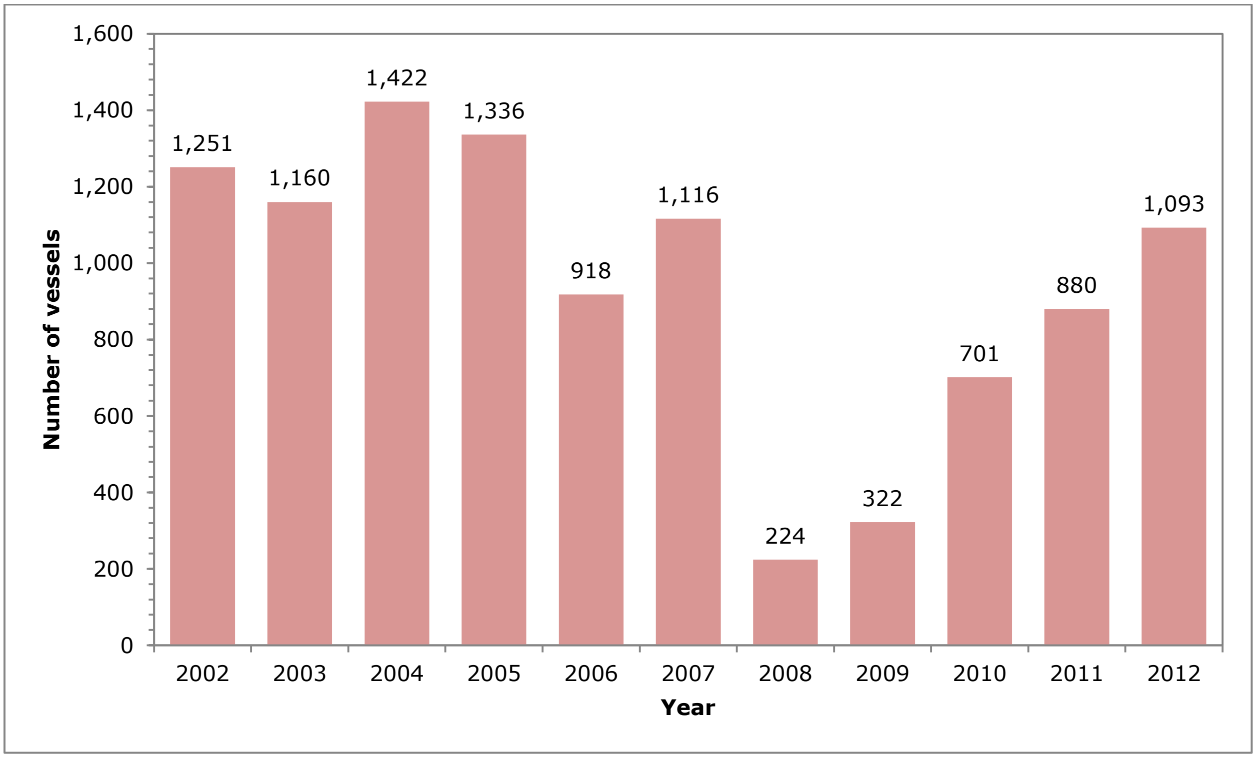

Figure 23. Number of active vessels in the non-tribal commercial West Coast Salmon Troll Fishery.

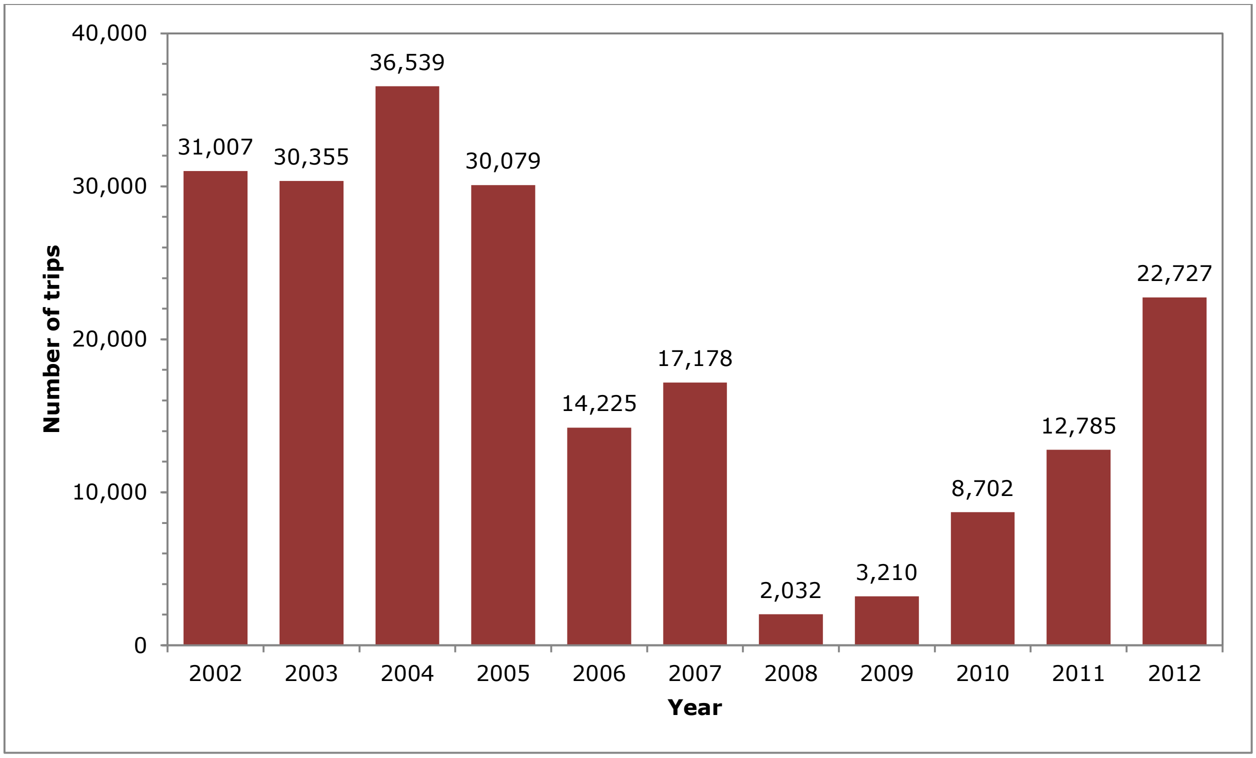

Figure 24. Number of trips taken in the non-tribal commercial West Coast Salmon Troll Fishery.

Salmon management involves a number of different openings and closures depending on management area. For purposes of reporting, the season length is measured as the number of days available on which catch from at least some component of the salmon ocean troll fishery may be landed for commercial sale. Defined in this manner, the fishery was open for 300 days in each fishing year from 2002 to 2005 (Figure 25). The ocean troll fishery was open for 240 days during 2006 and was open for 270 days in 2007 after which the season was reduced in both 2008 and 2009 to 180 days where it remained for both 2009 and 2010. The fishery returned to 240 days in 2011 and remained at 240 days during 2012.

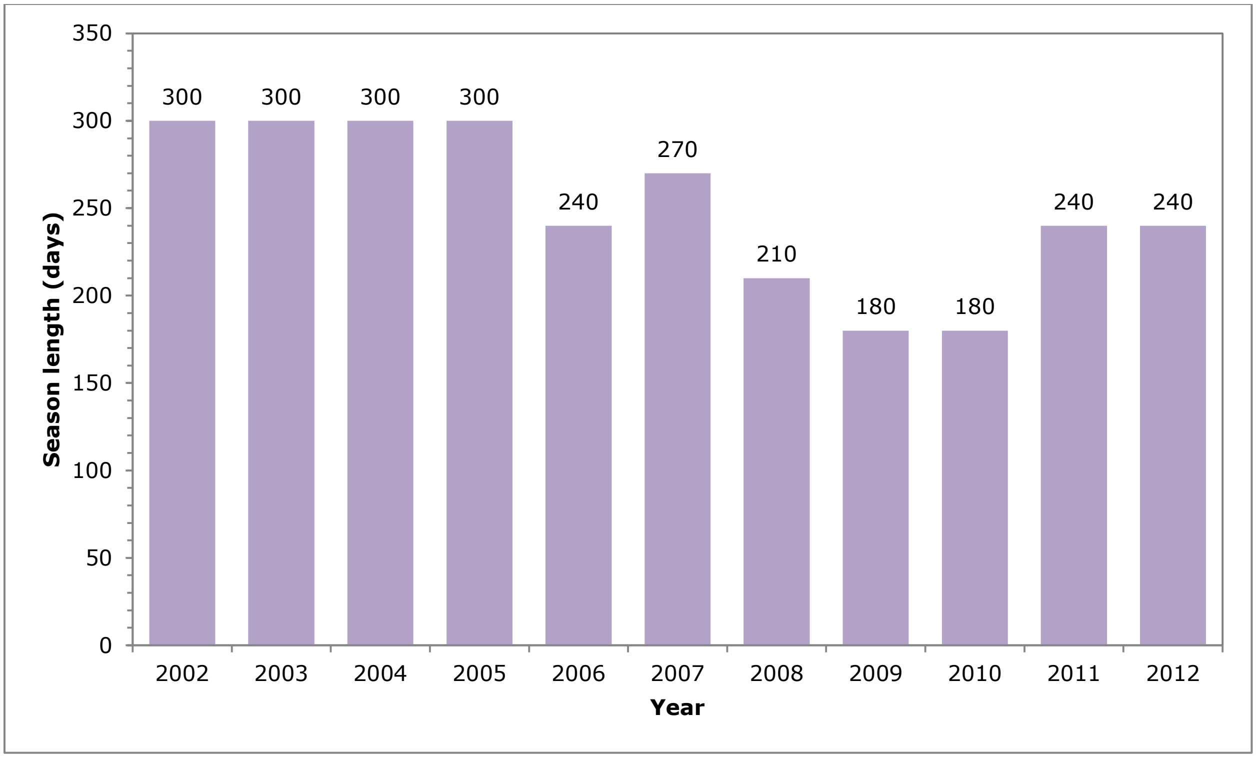

Figure 25. Season length in the non-tribal commercial West Coast Salmon Troll Fishery.

c. Revenue

All revenue and pricing data have been adjusted the GDP deflator, indexed for 2010. Aggregate revenue from all species sold on trips that landed either chinook or coho salmon on the West Coast was $17.6 million in 2002 (Figure 26), of which 94% was from chinook or coho salmon. Aggregate revenue increased in both 2003 and 2004 to $35.5 million before declining steadily to a low of $1.4 million in 2008. Since 2008, aggregate fishery revenues have been increasing and were $20.6 million in 2012. Since the fishery primarily targets chinook and coho salmon, earnings as a share of aggregate revenue from other species remained relatively low (less than 10% in all years except for 2008 and 2010 where revenue earned from species other than salmon were about 12% of total revenue).

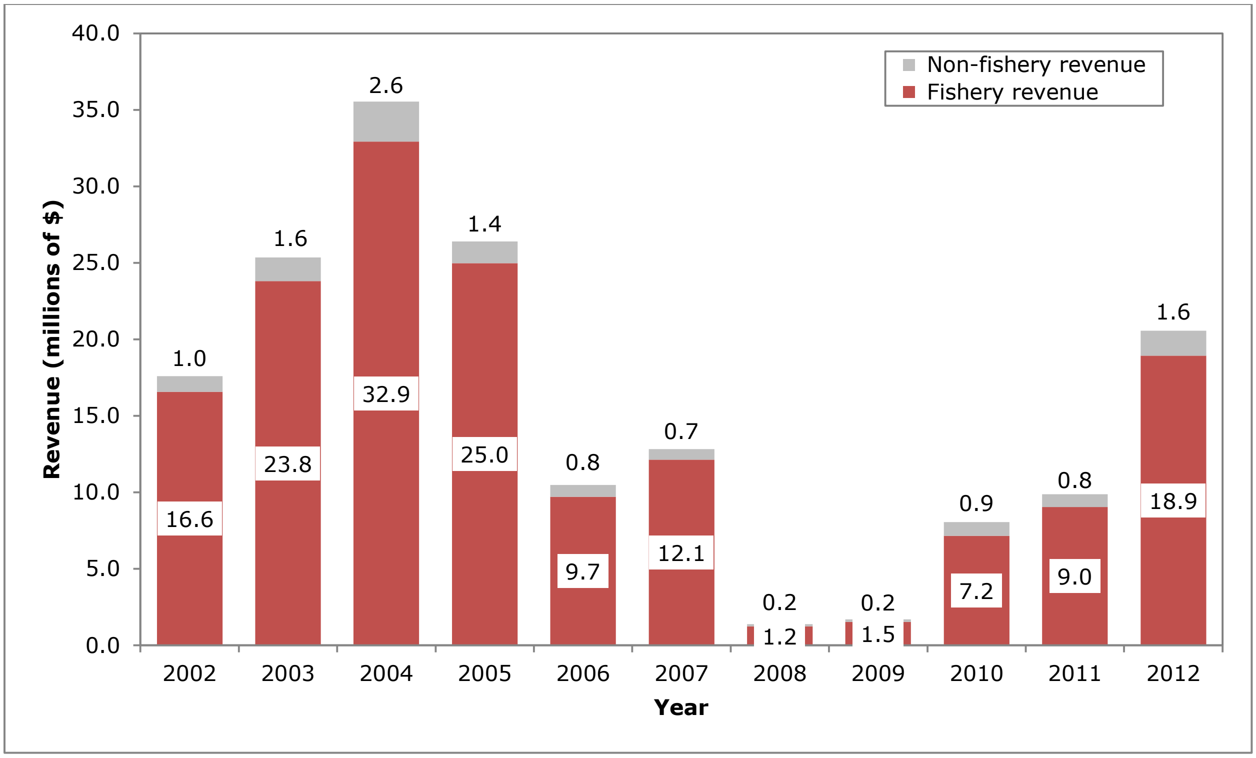

Figure 26. Revenue (inflation-adjusted 2010 dollars) from Pacific salmon and all other species combined in the non-tribal West Coast Salmon Troll Fishery.

The inflation-adjusted average price for all chinook and coho salmon sold was $1.80 per pound (gutted weight) in 2002 (Figure 27). Prices in following years increased at an average annual rate of 26.8% reaching $6.67 per pound gutted weight in 2008. This trend is consistent with market response to the general downward trend in landings over these years. As landed quantities increased in 2009, the average gutted price declined to $3.50 per pound. However, the average price was above $5.00 per pound in each year from 2010 to 2012, although prices declined in each of these years as landed quantities were trending downward.

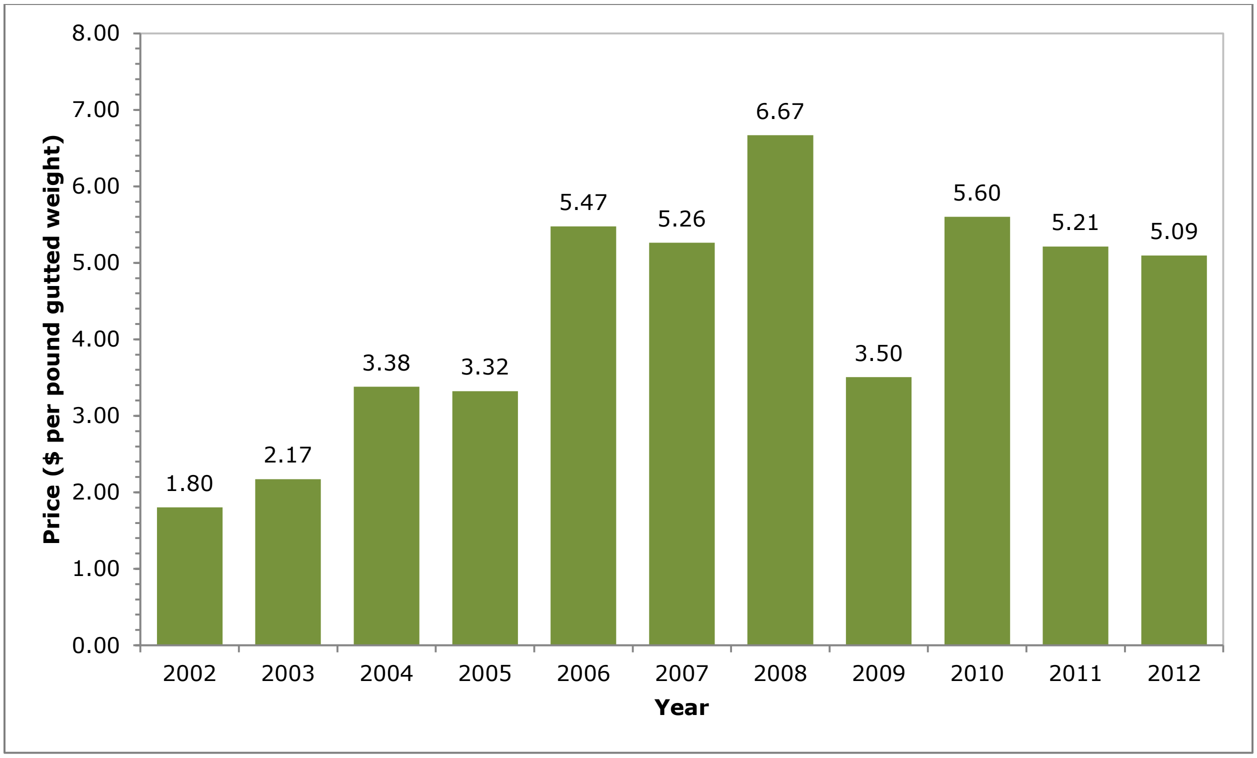

Figure 27. Average gutted weight price per pound (inflation-adjusted 2010 dollars) for Pacific salmon in the non-tribal West Coast Salmon Troll Fishery.

Total fishing revenue per active vessel was increasing from 2002 to 2004 from $14,062 per vessel to $24,985 per vessel (Figure 28). Note that these revenues exclude any revenue that may be received from Alaskan fisheries or other non-fishing sources such as salmon disaster payments. This upward trend in revenue per vessel reversed itself as revenue per vessel declined from 2005 through 2009 at which time total revenue per vessel reached a low of just $5,253. During 2010 and 2011 revenue per active vessel was nearly constant at just over $11,000, but increased to $18,811 per vessel in 2012. On a per trip basis, total revenue follows a pattern similar to that of revenue per vessel, although the inter-annual differences in revenue per trip are less pronounced (Figure 29). That is, revenue per trip increased from 2002 through 2004 followed by a downward trend in revenue per trip from 2005 to 2009. Over the most recent three years, total revenue per trip has increased averaging nearly $900 per trip and was $905 during 2012.

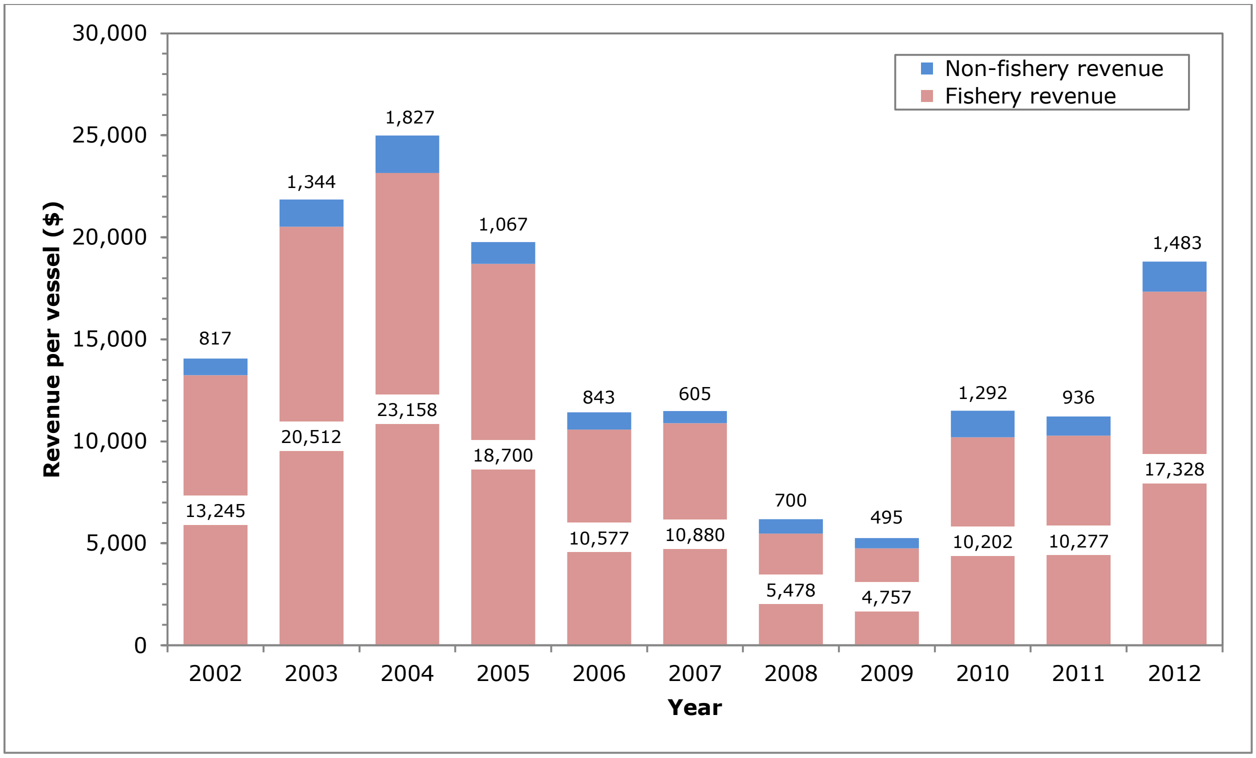

Figure 28. Revenue (inflation-adjusted 2010 dollars) per vessel from Pacific salmon and all other species combined in the non-tribal West Coast Salmon Troll Fishery.

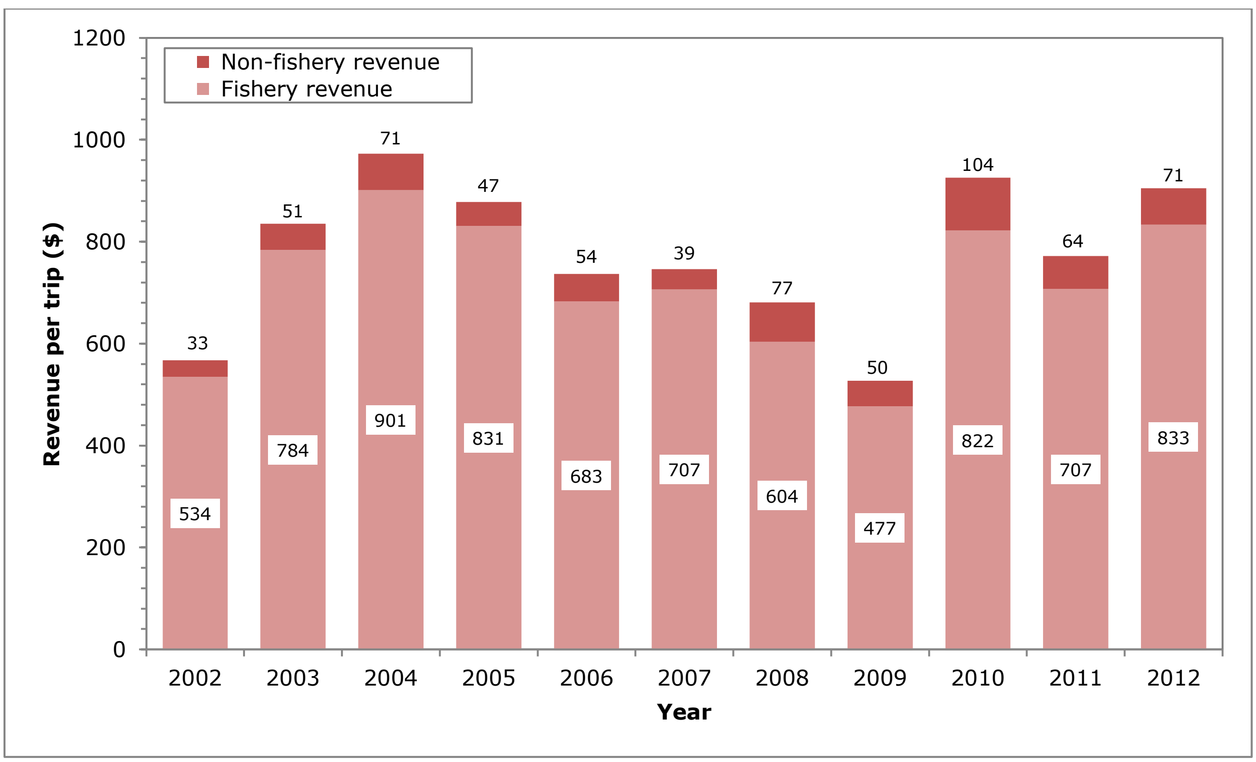

Figure 29. Revenue (inflation-adjusted 2010 dollars) per trip from Pacific salmon and all other species combined in the non-tribal West Coast Salmon Troll Fishery.

The Gini coefficient for the West Coast Salmon Troll Fishery was 0.56 in 2002 (Figure 30). As an indicator of the relative distribution of revenue among active vessels, the Gini coefficient was nearly constant ranging between 0.54 in 2005 to 0.60 in 2003 suggesting that there was relatively little change in how fishery revenues were distributed among vessels that participated in the fishery. The Gini coefficient was a time-series high of 0.64 during 2009, but has since declined over three consecutive years to 0.54 in 2012.

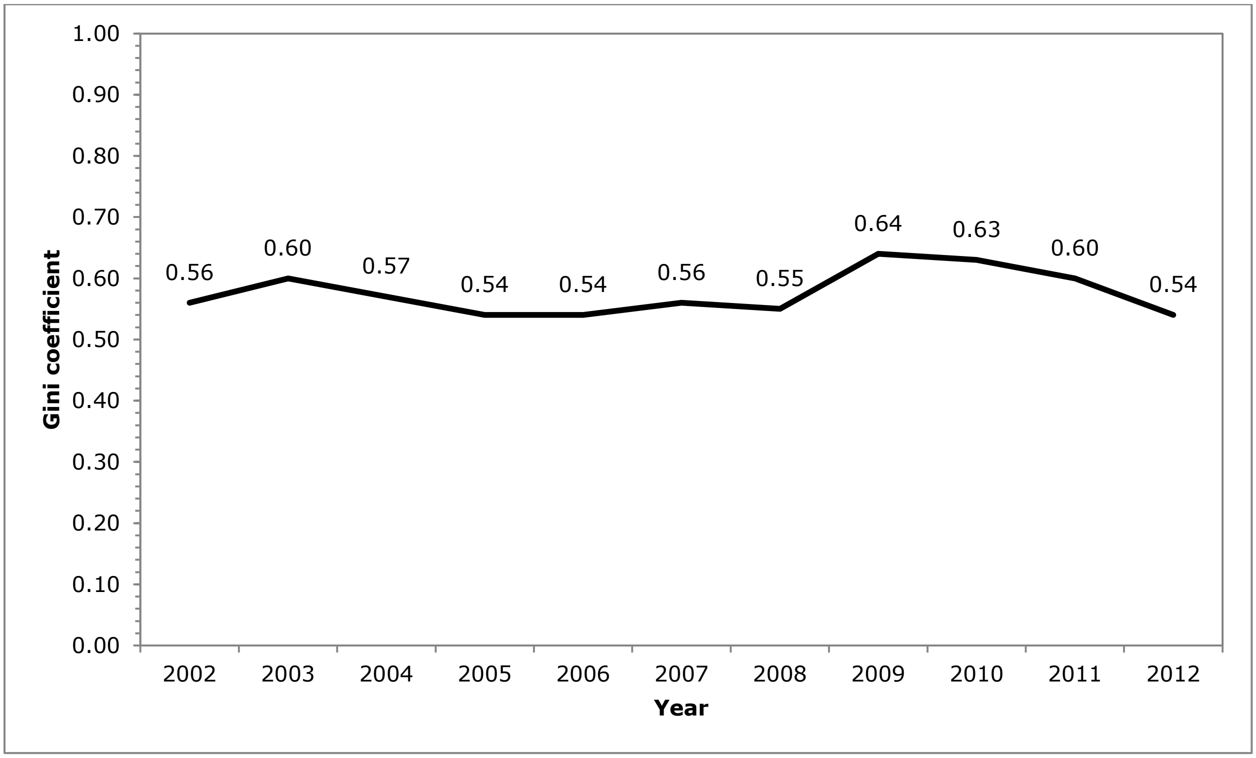

Figure 30. The Gini coefficient for vessels participating in the non-tribal commercial West Coast Salmon Troll Fishery.

d. Synopsis of recent trends

Chinook salmon stocks that spawn in California and Oregon rivers intermingle in the ocean and are harvested together off the coasts of the two states. Klamath River fall chinook and Sacramento River fall chinook are key stocks with respect to landings and regulation of the salmon fishery. The steep decline in chinook salmon landings in 2006 and persistently low landings levels through 2011 were driven by two sequential Commercial Fisheries Disasters affecting these key stocks.[2] The first disaster was the result of low returns of Klamath River fall chinook due to natural causes, including drought and poor ocean conditions. Although a complete closure of the fishery was avoided, landings in 2006 and 2007 were well below recent year averages. This situation was immediately followed by complete closure of commercial and sport fisheries off California and most of Oregon in 2008 due to collapse of the Sacramento River fall chinook run, again largely due to unfavorable ocean conditions. Under this second disaster, the commercial fishery remained closed through 2009. Commercial salmon harvests began to be

[2] See: http://www.nmfs.noaa.gov/sfa/sf3/disaster_determinations.htm

allowed again in 2010 and 2011, although landings were still near historically low levels. By 2012, salmon landings were back above 2006 levels although still less than half of the amount (by weight) landed in 2005 (Figure 21). However, due to relatively high average landings prices observed during the period (Figure 27), total 2012 commercial fishery revenue was somewhat less negatively affected than landings at 22% below its inflation-adjusted 2005 level (Figure 26).

B. Coastal Pelagics (Sardines and squids)

1. Fishery synopsis

   a. Gear used

The Coastal Pelagic Species Fishery Management Plan authorizes the use of net gear, hook-and-line, pots (traps), longlines, and any other type of gear as legal gear for the commercial harvest of coastal pelagic species, unless such gear is specifically prohibited by state law. Generally, coastal pelagic species are targeted with "round-haul" gear including purse seines, drum seines, lampara nets, and dip nets. They are also taken incidentally with mid-water trawl, pelagic trawl, gillnet, trammel net, troll, pot, hook-and-line, and jig gear.

   b. Target/component species

Stocks managed under the Coastal Pelagic Species Fishery Management Plan include Pacific sardine, Pacific (chub) mackerel, northern anchovy, market squid, jack mackerel, and all krill species. Of these, Pacific sardine is the most commonly targeted coastal pelagic finfish species. Given that the Pacific Fishery Management Council intends to continue to expand its consideration of ecological factors when developing management measures for coastal pelagic species, Pacific herring and jacksmelt are managed as ecosystem component species to ensure continued monitoring of their incidental catch and bycatch in coastal pelagic species fisheries.

   c. Market channels

Revenues from the Coastal Pelagic Species Fishery Management Plan are primarily from sardines (51%) and market squid (43%). Most processors and buyers of coastal pelagic species on the West Coast are located in California, mainly in Los Angeles, Santa Barbara, Ventura, and Monterey. Some are also located in the Columbia River port areas of Oregon and Washington. Most of the market squid and Pacific sardines caught in the United States are exported. Market squid are mainly exported to China, the United Kingdom, Japan, and Spain, while sardines are mainly exported to Japan, where they are used for human consumption and as bait for longline fisheries. Sardines are also exported to Australia, where they are used to feed farmed bluefin tuna. A very small amount of sardines landed in Oregon and Washington are sold to local restaurants. Mackerel are exported to Japan, the Philippines, and Malta for human consumption.

2. Management Program

   a. Current management controls

The Coastal Pelagic Species Fishery Management Plan includes three management categories or tiers for coastal pelagic species fish stocks: "active" management, "monitored" management, and "prohibited harvest" management. "Actively" managed stocks include those with biologically significant levels of catch and/or biological or socioeconomic considerations requiring relatively intense harvest management procedures. This management approach is designed in order to use available agency resources in the most efficient and effective manner while satisfying the goals and objectives of the Coastal Pelagic Species Fishery Management Plan. Active management may be characterized by periodic stock assessments and/or periodic adjustments of target harvest levels based on maximum sustainable yield control rules. “Monitored” management applies to stocks and fisheries not requiring intensive harvest management and where monitoring of landings and available abundance indices are considered sufficient to manage the stock. Monitored management involves tracking trends in landings and qualitative comparisons to available abundance data, but without periodic stock assessments or periodic adjustments to target harvest levels. Species in both categories may be subject to management measures such as catch allocations, gear regulations, closed areas, closed seasons, or other forms of active management. “Prohibited harvest” pertains to stocks that are prohibited to target, harvest or land in any fishery within the West Coast EEZ. Currently, this management category consists of all species of krill that occur in the West Coast EEZ.

b. Key changes from past management controls

In March 2006, the Pacific Fishery Management Council adopted Amendment 12 to the Coastal Pelagic Species Fishery Management Plan, which included a complete ban on commercial fishing for all species of krill in West Coast federal waters. This broad prohibition still applies to all vessels in waters managed by the Pacific Fishery Management Council and was intended to protect krill’s vital role in the marine ecosystem. Amendment 13 was initiated in 2009 to incorporate new National Standard 1 guidelines that were developed in response to the Magnuson-Stevens Reauthorization Act of 2006. These National Standard 1 guidelines require fishery management plans to establish a mechanism for specifying Annual Catch Limits to prevent and end overfishing. Amendment 13 thus adds sector-specific Annual Catch Limits, Annual Catch Targets, and Accountability Measures. In addition, the amendment accounts for uncertainty by including a buffer, or reduction, in Acceptable Biological Catch relative to the overfishing limit.

3. <u>Management Objectives</u>

In addition to the National Standards established under the Magnuson-Stevens Act, the specific goals and objectives of the Coastal Pelagic Species Fishery Management Plan include the following:

1) Promote efficiency and profitability in the fishery, including stability of catch.
2) Achieve optimum yield.
3) Encourage cooperative international and interstate management of coastal pelagic species.
4) Accommodate existing fishery segments.
5) Avoid discards.
6) Provide adequate forage for dependent species.
7) Prevent overfishing.
8) Acquire biological information and develop long-term research program.
9) Foster effective monitoring and enforcement.
10) Use resources spent on management of coastal pelagic species efficiently.
11) Minimize gear conflicts.

4. Recent Trends

a. Quota and landings – West Coast Sardines

Landings of sardines peaked at 127,800 metric tons in 2007, a 48% increase over average landings in the previous five years from 2002-2006 (Figure 31). Landings in 2008 declined to 87,200 metric tons and had been on a downward trend through 2011 in which landings were 46,700 metric tons before rebounding to 100.4 metric tons in 2012. From 2002 to 2010, the fishery operated with a harvest guideline that set a target harvest level for the fishery whereas 2011 was the first year in which a formal quota was established. The harvest guidelines were not exceeded in any year and utilization was generally increasing from 65% in 2003 to 100% of the harvest guideline in 2009 (Figure 32). The sardine quota was set at 50,500 metric tons in 2011 and 109,400 metric tons in 2012. In neither year was the quota exceeded with a quota utilization rate of about 92%.

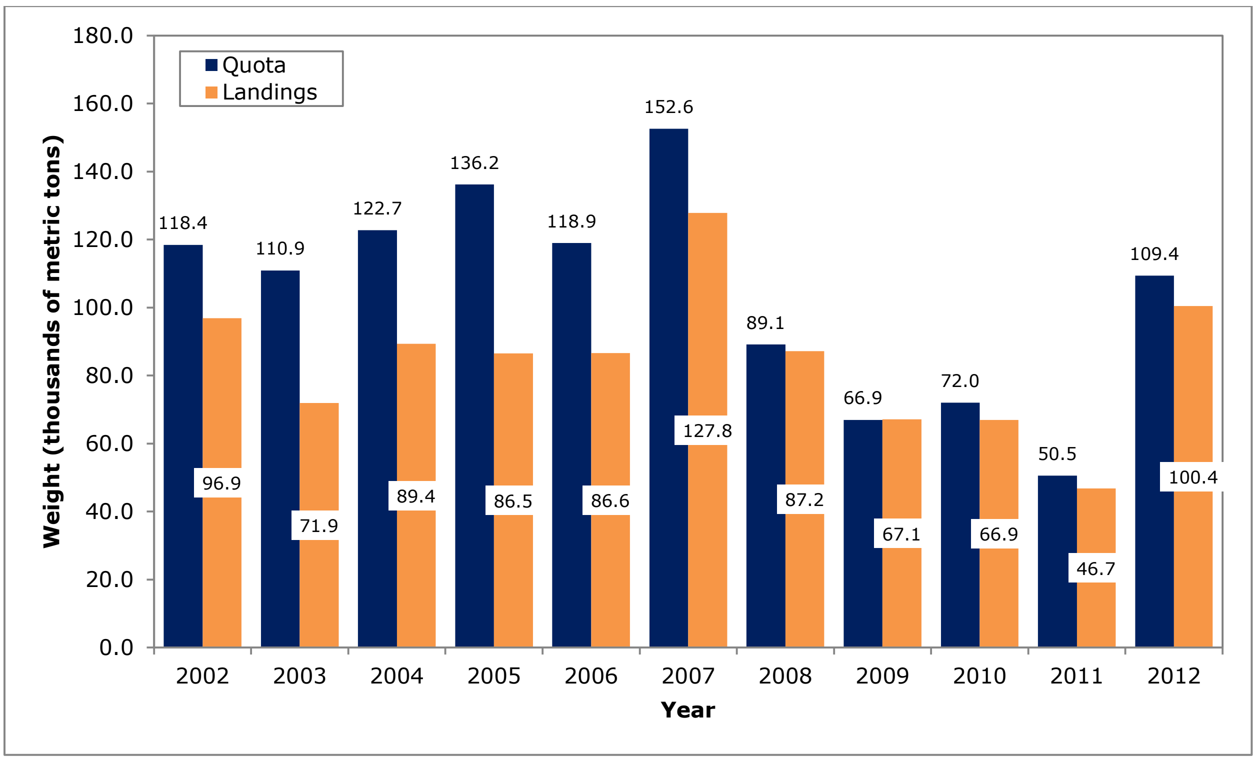

Figure 31. Quota and landings (metric tons) in the West Coast Sardine Fishery.

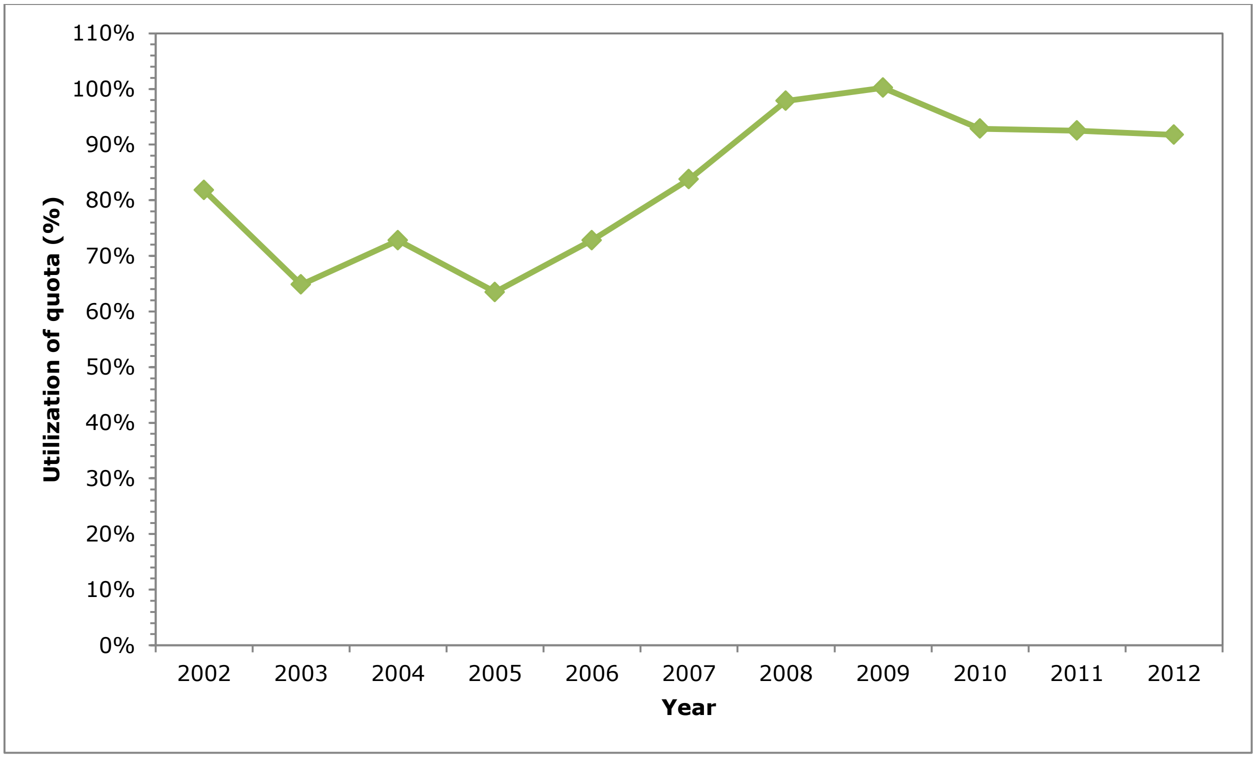

Figure 32. Utilization of Harvest Guideline or Quota in the West Coast Sardine Fishery

b. Effort – West Coast Sardines

The number of vessels that participated in the sardine fishery declined from 98 active vessels in 2002 to 83 active vessels in 2006 (Figure 33). However, the number of active vessels increased over the next three consecutive years reaching a high of 110 active vessels in 2009. Since 2009, the number of vessels participating in the sardine fishery declined to 103 vessels in 2010 and to 86 vessels in 2011, before increasing to 99 vessels in 2012.

Trip duration in the sardine fishery is almost exclusively less than 24 hours. This means that the annual number of trips and annual days at sea are equivalent metrics for this fishery. For this reason, only the number of trips is reported herein. Vessels participating in the sardine fishery took more trips (3,849) in 2002 than in any other year (Figure 34). Since 2002, the number of trips taken in the sardine fishery has exceeded 3,000 in only 2004 (3,315) and in 2007 (3,603). In fact, the number of trips taken in the sardine fishery was on a downward trend reaching a time-series low of 1,235 trips in 2011. However, the number of trips taken in the sardine fishery increased to 2,236 trips in 2012. In terms of fishing season, the sardine fishery has not been closed to the harvesting of sardines in any year. Although this does not necessarily mean that sardines were landed on every day, it does mean that the fishery has been open for a full calendar year in every year from 2002 to 2012.

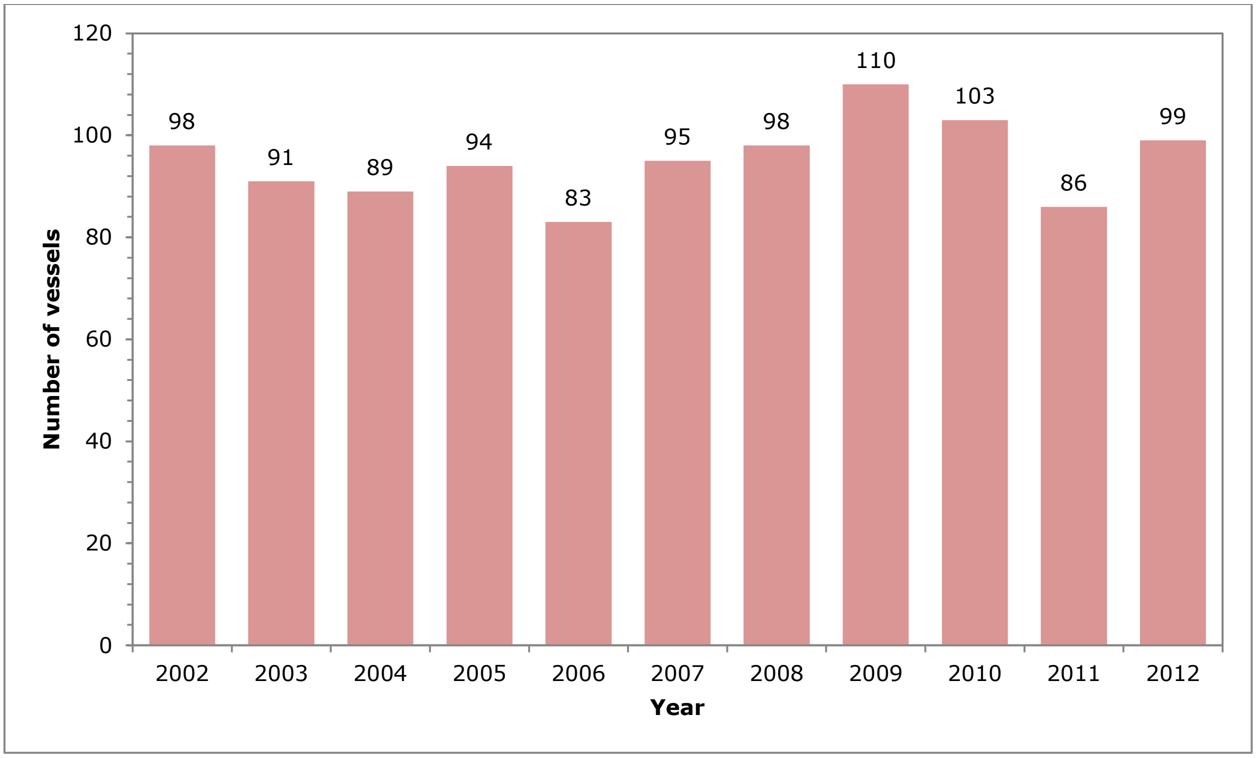

Figure 33. Number of active vessels participating in the West Coast Sardine Fishery.

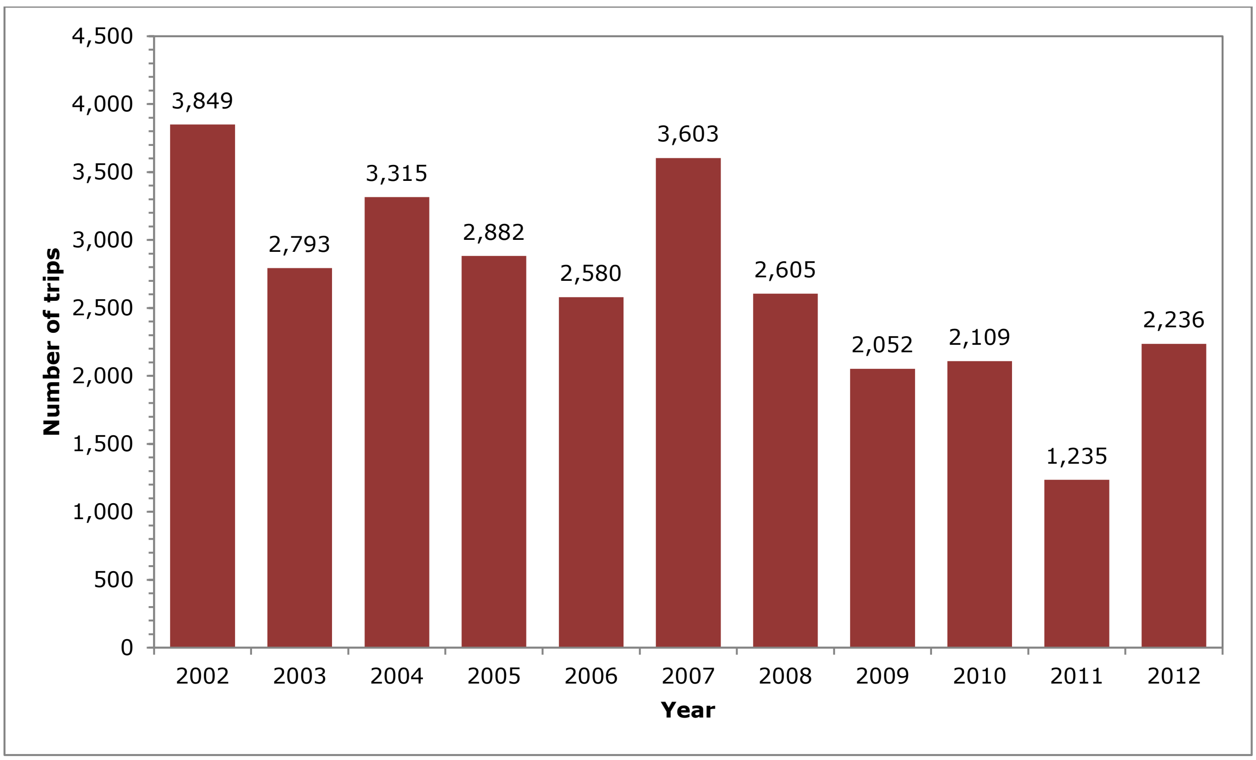

Figure 34. Number of trips taken by those participating in the West Coast Sardine Fishery.

c. Revenue – West Coast Sardines

Revenue from species other than sardines is effectively zero since trips taken in the sardine fishery land little else. Inflation-adjusted revenue (adjusted by the GDP 2010 deflator) from the sardine fishery was $16.5 million in 2002 (Figure 35). Sardine revenues declined to $10.8 million in 2003, rebounded to $14.1 million in 2004 then declined gradually to $11.6 million in 2006. Sardine revenues increased to $14.6 million in 2007, an increase that corresponded with the time-series high in landings that occurred in 2007. However, sardine revenues in 2008 ($15.8 million) were higher than that of 2007 even though landings were lower by about 41,000 metric tons. The lower landings were offset by an increase in the average price per metric ton from $117.10 in 2007 to $181.25 in 2008 (Figure 36). Prices were also higher in both 2009 and 2010, which led to sardine revenues that were only 2% lower than the 2002-2006 average even though landings in 2009 and 2010 were 22% (about 19,000 metric tons) lower than average landings during 2002-2006. In 2011, the average price reached a time-series high of $207.87 per metric ton, which was enough to generate $9.7 million at a level of landings that was 30% lower than 2009 or 2010 and 46% less than the 2002-2006 average. In 2012, the average price remained relatively high at $205.34 even though landings more than doubled resulting in a time-series high of $20.6 million in sardine fishery revenue.

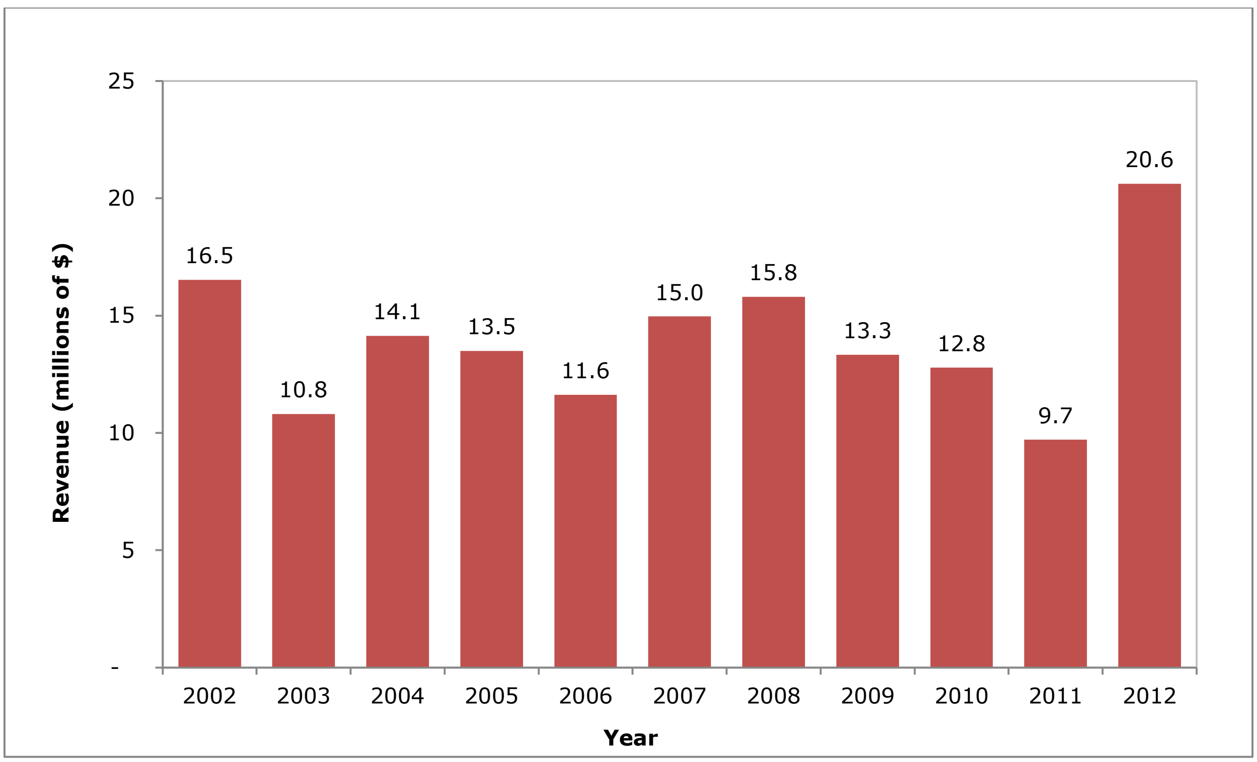

Figure 35. Revenue (inflation-adjusted 2010 dollars) in the West Coast Sardine Fishery.

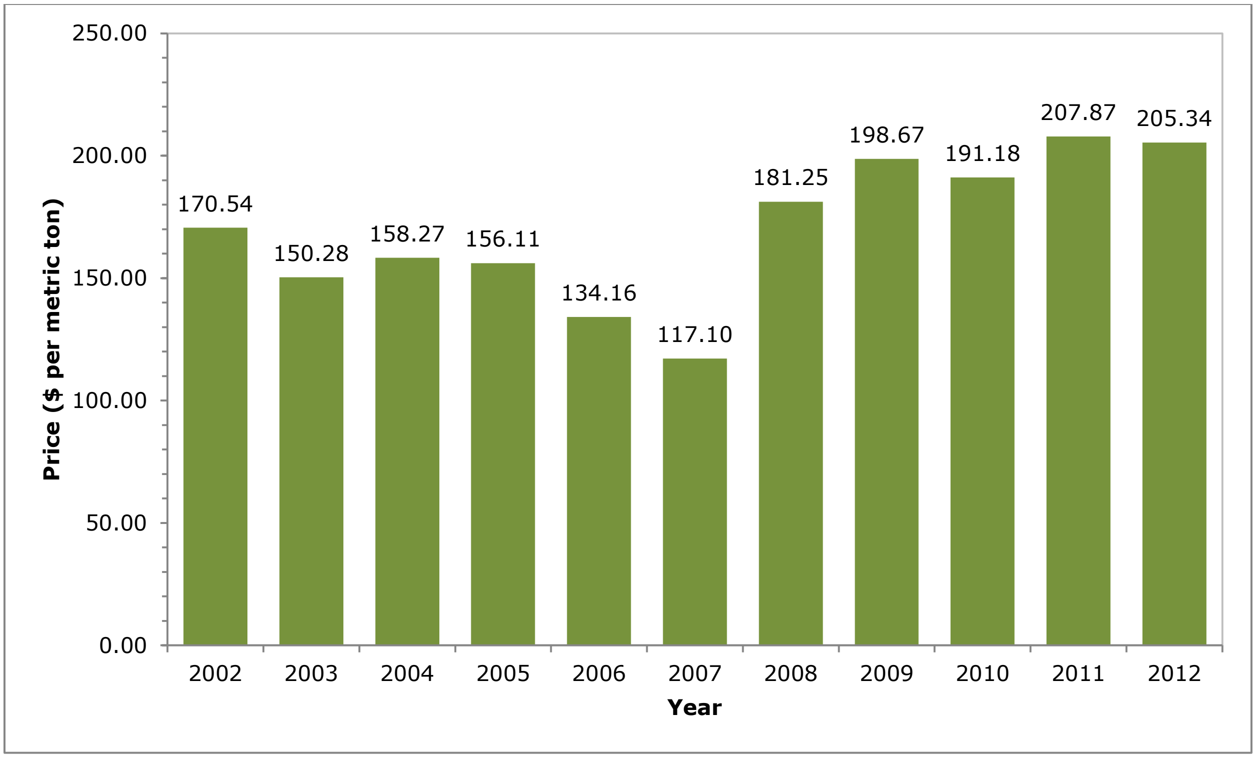

Figure 36. Average prices (inflation-adjusted 2010 dollars) earned in the West Coast Sardine Fishery.

Revenue per vessel in the sardine fishery was $168,600 in 2002 (Figure 37). After declining to $118,800 per vessel in 2003, revenue per vessel rose to $161,300 per vessel in 2008. Revenue per vessel declined to $121,200 per vessel in 2009 and was $113,000 per vessel in 2011 before increasing to a time-series high of $208,300 per vessel in 2012.

The trend in sardine revenue per trip reflects the number of trips, as revenue per trip has been on an increasing trend from $4,293 in 2002 to $9,221 per trip in 2012 (Figure 38). This increasing trend is due to the fact that declines in number of trips is more than offset by changes in aggregate revenue from sardines.

The Gini coefficient was stable from 2002-2007, averaging 0.62 and ranging from 0.58 in 2002 to 0.65 in 2005 (Figure 39). The Gini coefficient dropped to 0.49 in 2008, but increased to 0.58 in 2009. From 2009 to 2011, the Gini coefficient averaged 0.57, which was 8% below the 2002-2007 average. The lower Gini coefficient from 2009 to 2011 means that sardine revenue was more evenly distributed among active vessels during those years as compared to the 2002-2007 average. However, in 2012 the Gini coefficient increased to 0.64, which is similar to that of the 2002-2007 average.

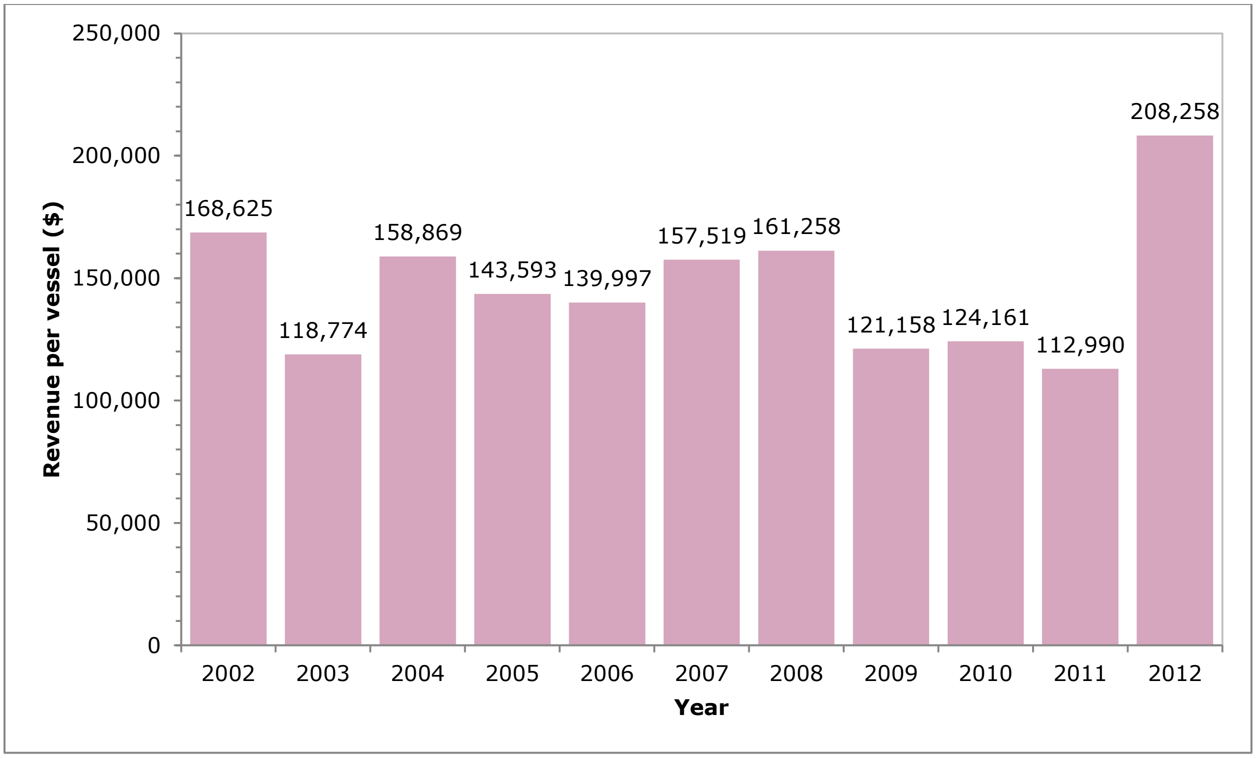

Figure 37. Revenue (inflation-adjusted 2010 dollars) per vessel participating in the West Coast Sardine Fishery.

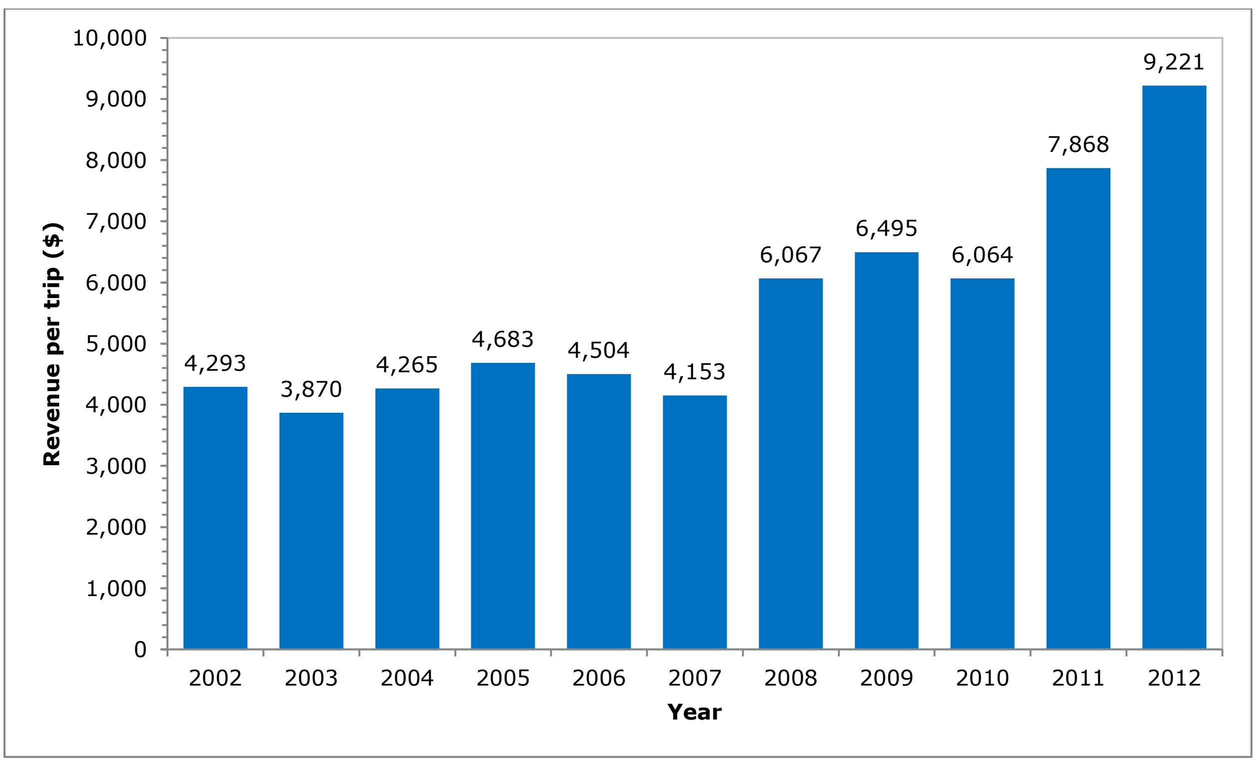

Figure 38. Revenue (inflation-adjusted 2010 dollars) per trip in the West Coast Sardine Fishery.

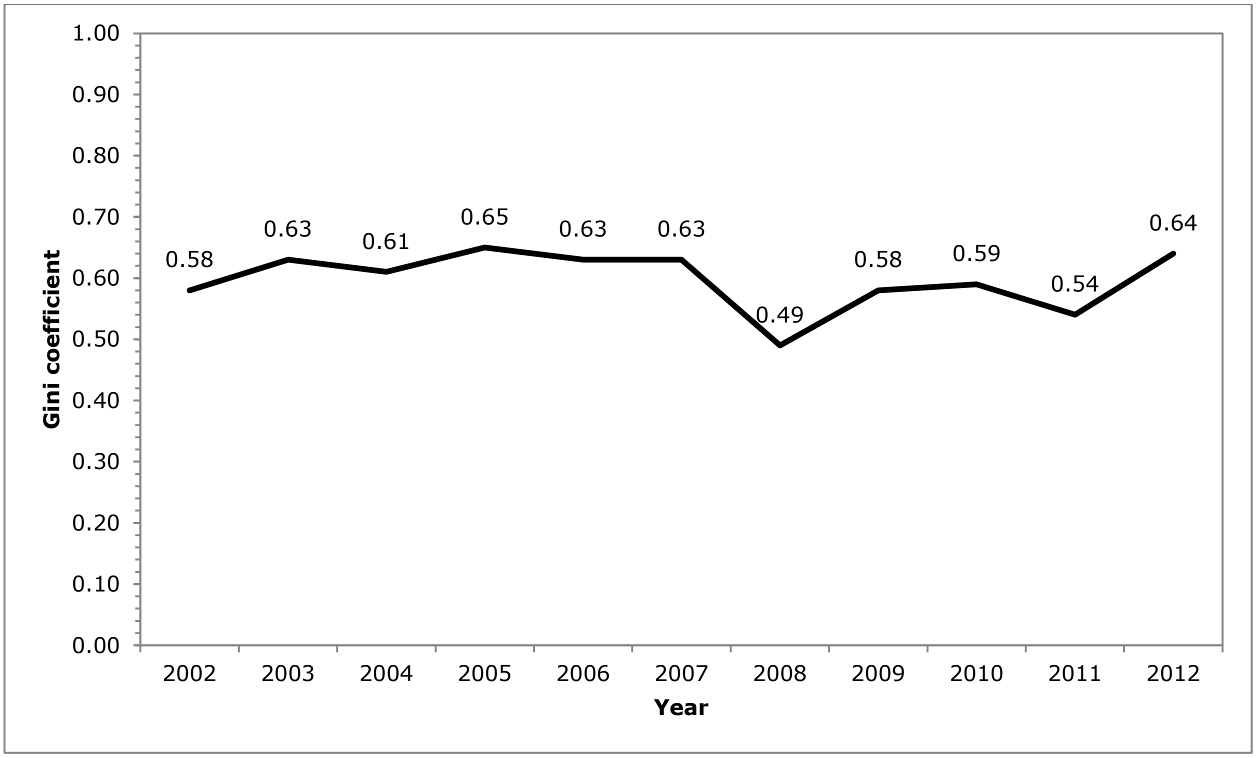

Figure 39. The Gini Coefficient for vessels earning revenue in the West Coast Sardine Fishery.

d. Synopses of recent trends – West Coast Sardines

Based on recent trends in revenue (Figure 35), average price (Figure 36), inflation-adjusted revenue per vessel (Figure 37) and inflation-adjusted revenue per trip (Figure 38), the Sardine Fishery appears to be stable. However, the number of trips taken by participating fishermen has declined in recent years (Figure 34), shrinking from a high of 3,849 in 2002 to a series low of 1,235 trips in 2011 before bouncing back up to 2,236 trips in 2012.The fishery has operated much closer to the harvest guidelines since 2008 than it did over the preceding six years (Figure 31), reflecting recent assessements of sardine stock levels which warranted lower harvest guidelines compared to preceding years.

e. Landings – West Coast Squid

Market squid landings were 72,900 metric tons in 2002, then dropped to 45,100 metric tons in 2003 (Figure 40). In 2004 – 2008, they ranged from a high of 55,800 metric tons in 2005 to a low of 38,100 metric tons in 2008. From 2009 to 2011, squid landings in metric tons increased dramatically to 93,100 in 2009, increased further to 130,900 in 2010, then decreased to 121,600 in 2011 and to 97,600 in 2012.

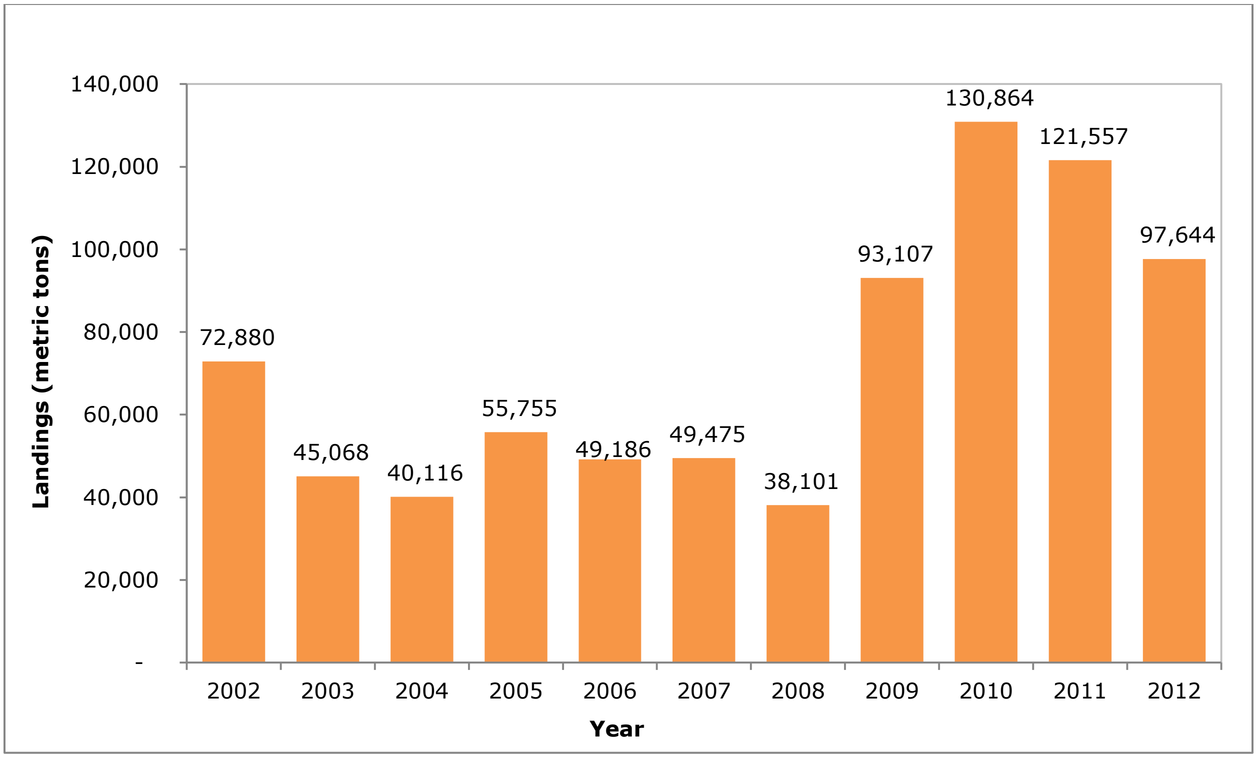

Figure 40. Landings in the West Coast Squid Fishery.

f. Effort – West Coast Squid

From 2002 to 2006, the number of vessels participating in the squid fishery ranged from 127 in 2005 to 150 in 2003 (Figure 41). The number of active vessels dropped to 109 in 2007, and fell slightly lower in 2008 and 2009, to 105 and 107, respectively. More recently, the number has been increasing, from 120 in 2010 to 136 vessels in 2012.

As was the case for the sardine fishery, the squid fishery is primarily a day fishery, meaning that the number of trips and days absent are equivalent metrics. For this reason, only the number of trips is reported here. The number of trips taken by vessels that were active in the commercial squid fishery exceeded 3,000 in both 2002 and 2003 (Figure 42). The number of squid fishery trips was on a declining trend from 2004 to 2008, from 2,661 in 2004 to 2,101 in 2008, corresponding with a similar declining trend in landings. However, as for landings, the number of trips increased dramatically in 2009 to 4,157 and again in both 2010 and 2011 to 4,324 and 4,724 trips, respectively. More recently, the number of trips went down to 4,293 during 2012.

The squid season was not subject to a closure in any year. Thus, while squid are not necessarily landed year-round, there were no limitations on when squid could have been landed over an entire calendar year.

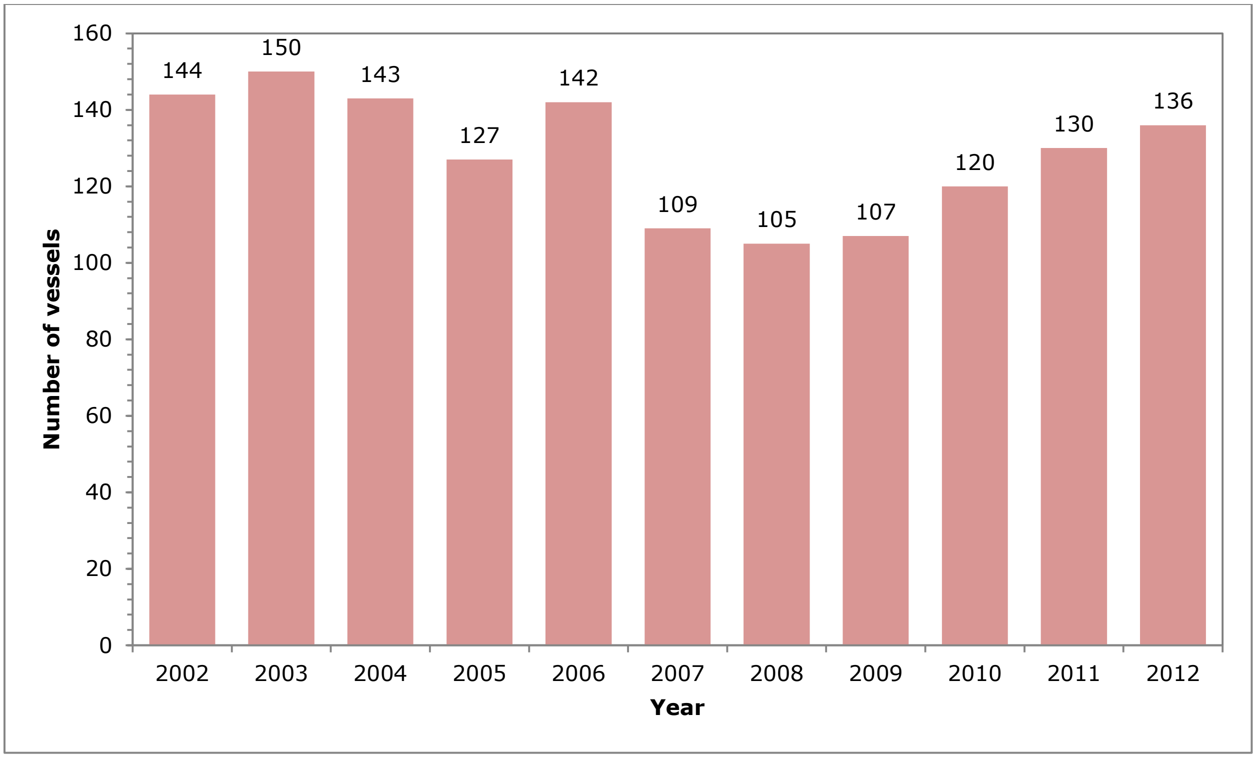

Figure 41. Number of active vessels participating in the West Coast Squid Fishery.

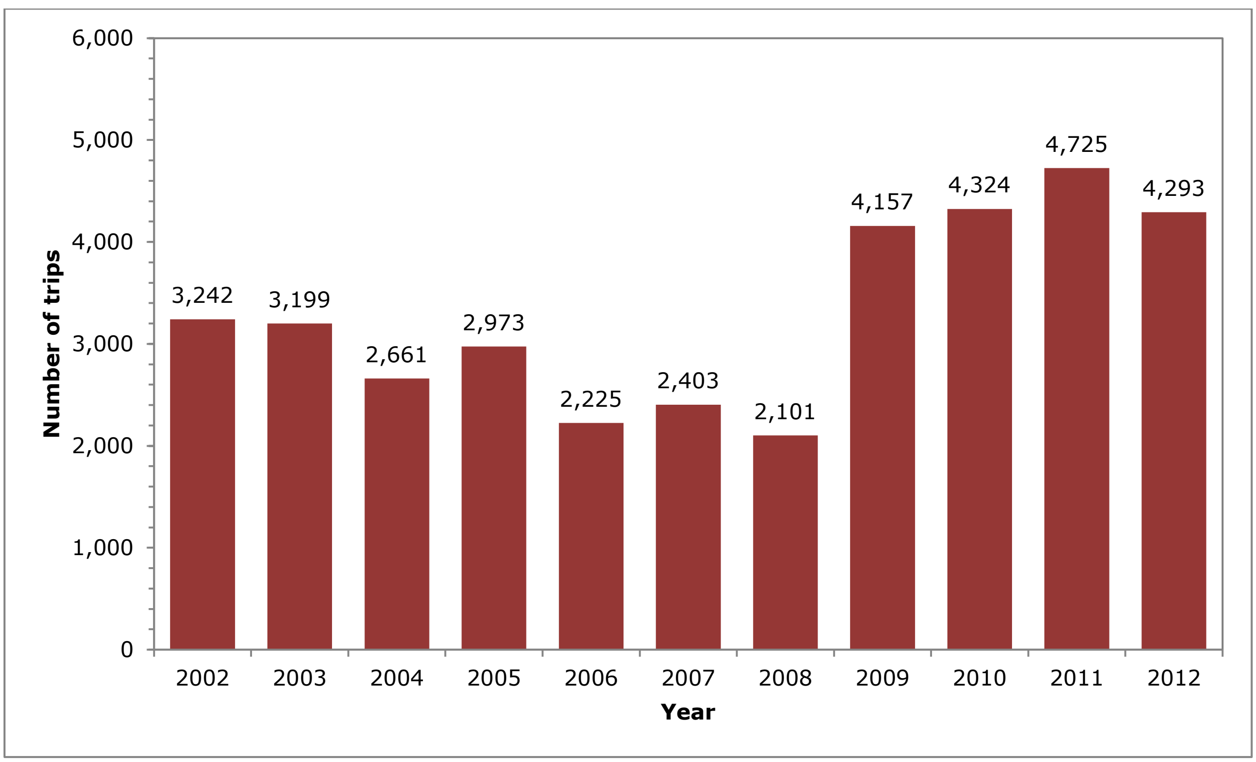

Figure 42. Number of trips taken by those participating in the West Coast Squid Fishery.

g. Revenue – West Coast Squid

Catch of species other than squid in the squid fishery is very low so all performance indicators based on revenue are reported for gross sales from squid alone. Inflation-adjusted revenue (adjusted by the GDP deflator indexed for 2010) from the commercial squid fishery was about $22 million in 2002 (Figure 43). Squid revenue fluctuated without a trend from 2003 to 2008, averaging about $29 million and ranging from a high of $35 million in 2005 to a low of $22 million in 2004. Just as landings increased in 2009 so, too, did squid revenue, jumping from $27 million in 2008 to $58 million in 2009. Revenue reached a time-series high of $71 million in 2010 before declining in both 2011 and 2012 to $65 million and $62 million, respectively.

The average price of squid was $298.14 per metric ton in 2002 (Figure 44). That was the time-series low, 42-56% of the average price in any other year, and accounted for 2002 also being the time-series low in aggregate revenue, even though squid landings were higher that year than in any other year prior to 2009. From 2003 to 2008, the average price of squid fluctuated without trend, averaging $624 per metric ton and ranging from a low of $560.52 in 2004 to a time-series high of $708.44 in 2008. In 2009-2011, the average price for squid declined each year from $618.26 per metric ton in 2009 to $537.07 in 2011; it then increased to $631.42 in 2012.

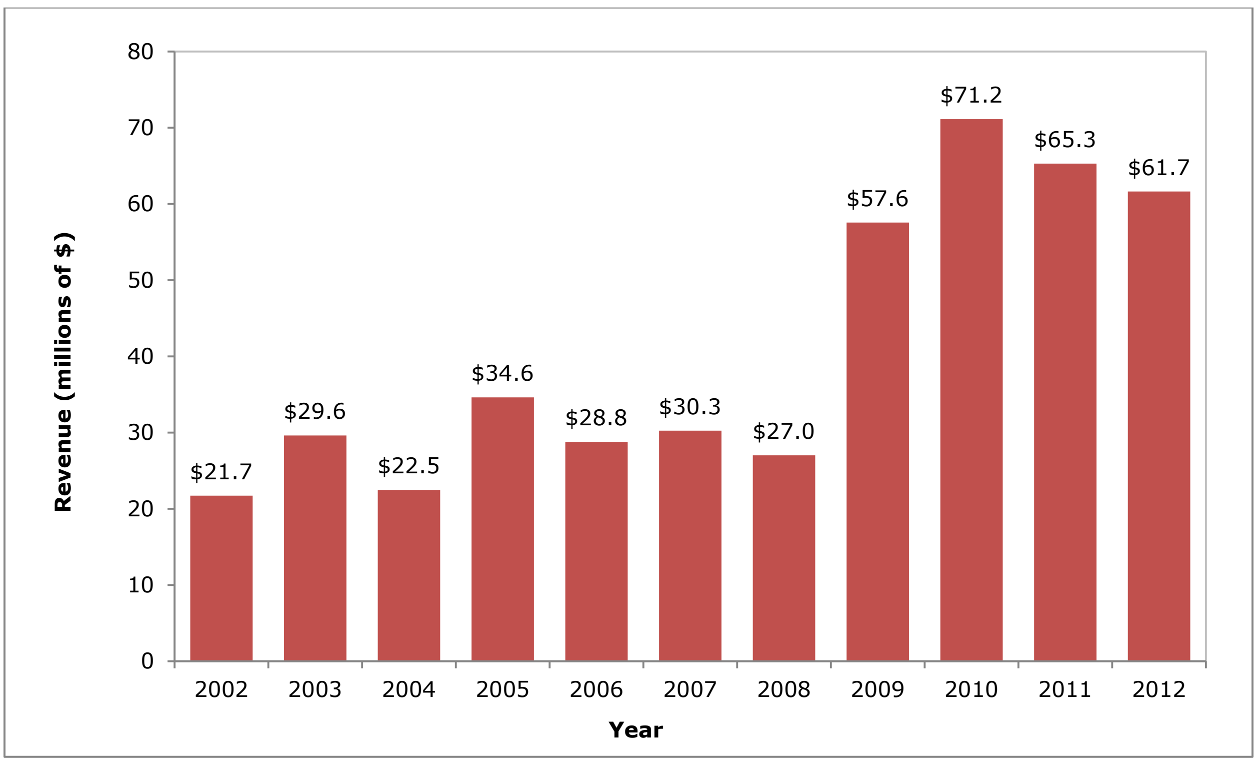

Figure 43. Revenue (inflation-adjusted 2010 dollars) in the West Coast Squid Fishery

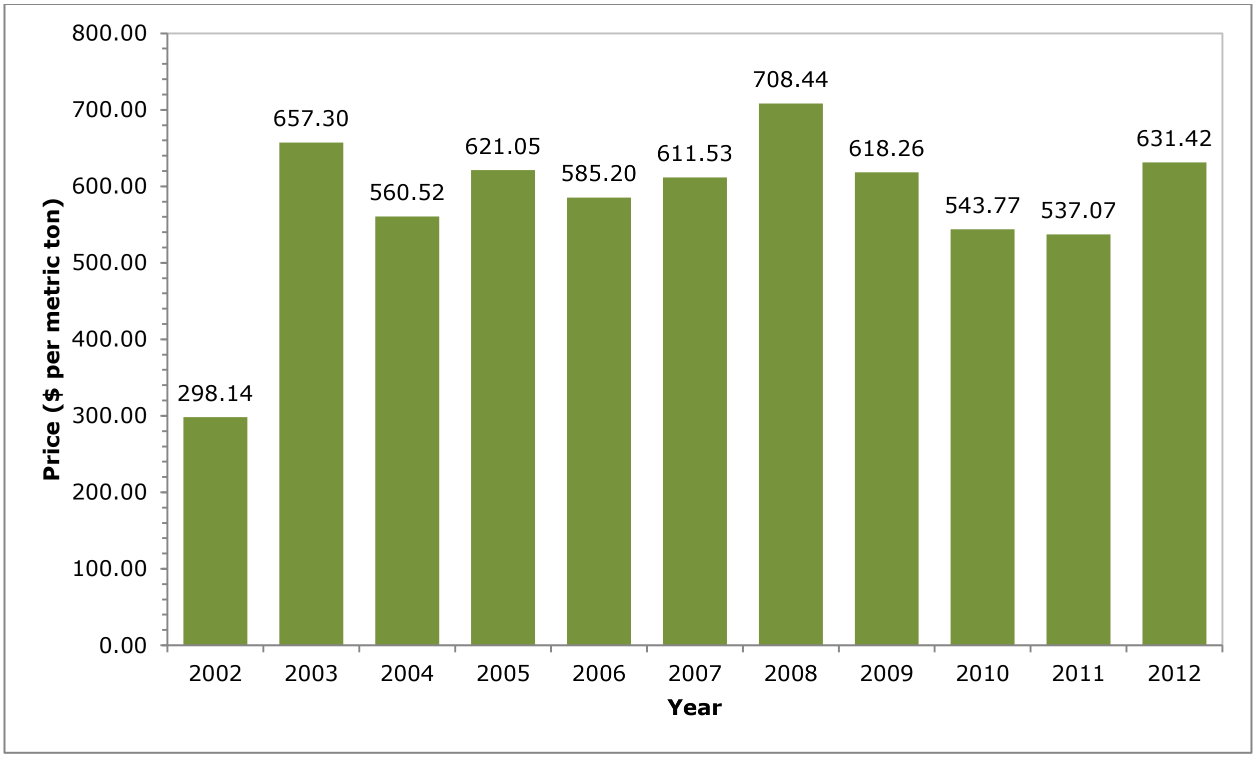

Figure 44. Average price per metric ton (inflation-adjusted 2010 dollars) in the West Coast Squid Fishery

Revenue per vessel participating in the commercial squid fishery was $150,800 in 2002 (Figure 45). Although revenue per vessel increased and decreased in alternating years during 2002-2008, it also trended upward at an average annual rate of 14%. This upward trend was largely due to the general decline in the number of vessels participating in the commercial squid fishery (Figure 41). Thus, while aggregate revenues did not exhibit any particular trend in 2002-2008, the declining number of vessels over these years produced increasing revenue per vessel. Compared to 2008, revenue per vessel more than doubled in 2009, from $257,000 to $538,000. Revenue per vessel increased again in 2010, to $593,000 in 2010 before declining in 2011 and 2012, to $506,100 and $453,300, respectively. Note that, compared to 2010, the lower revenue per vessel in 2011 and 2012 was primarily due to the lower aggregate revenue in these two years (Figure 43), but was exacerbated by the increase in participating vessels from 120 in 2010, to 130 in 2011, and to 136 in 2012 (Figure 41).

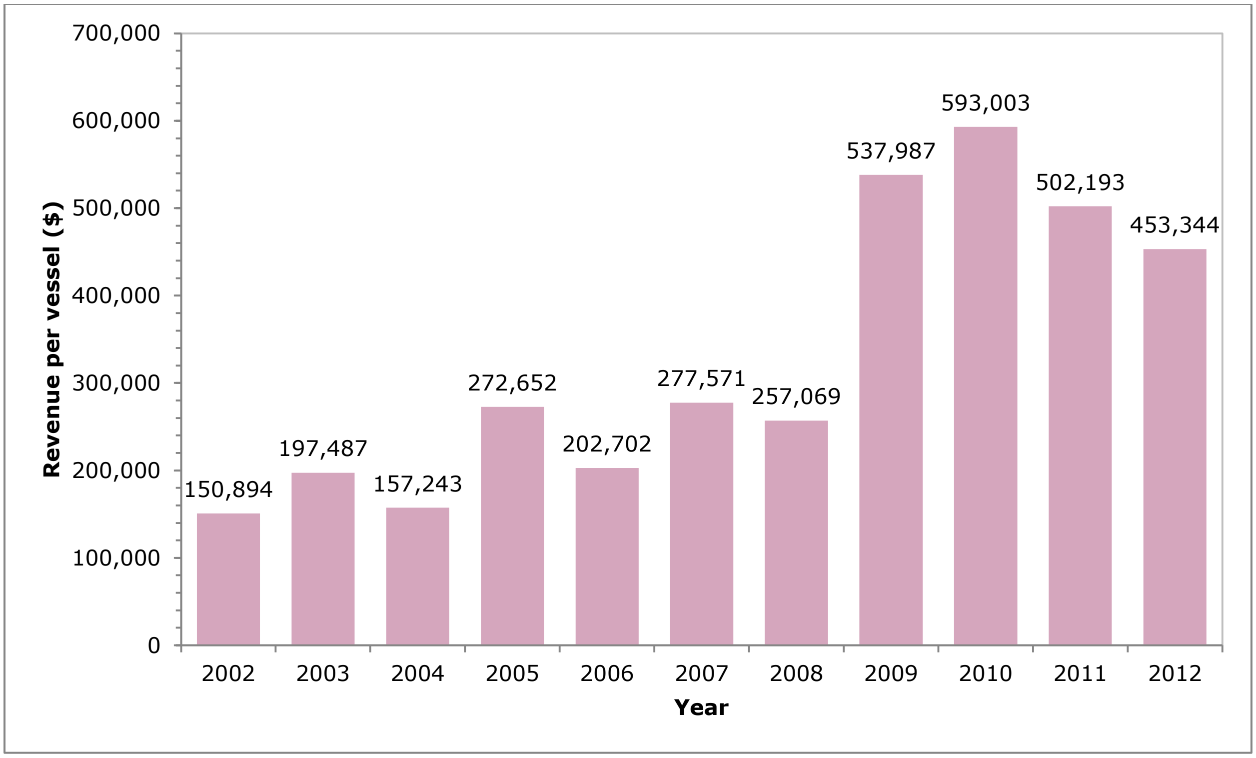

Figure 45. Revenue (inflation-adjusted 2010 dollars) per vessel participating in the West Coast Squid Fishery.

Average revenue per trip taken in the commercial squid fishery was $6,702 in 2002 (Figure 46). Revenue per trip generally increased until 2006 and then stabilized at about $13,000 through 2008. Trip revenue then rose, peaked in 2010 ($16,457), and then dropped to between $13,000 and $14,000 in 2011 and 2012.

The distribution of squid revenue among vessels participating in the West Coast Squid Fishery became less evenly distributed in 2002-2004, shown by a rise in the Gini coefficient from 0.67 to a time-series maximum of 0.74 (Figure 47). Since 2004, the Gini coefficient was trending downward to 0.55 in both 2009 and 2010. This means that the distribution of squid revenue among vessels participating in the West Coast Squid Fishery was becoming more even. Since 2009, the Gini coefficient increased slightly (5%) to 0.58 in 2011 and increased again to 0.63 in 2012. This means that the share of fishery revenue among active vessels is becoming less even, although levels of concentration are still below that of the 2002 to 2007 average.

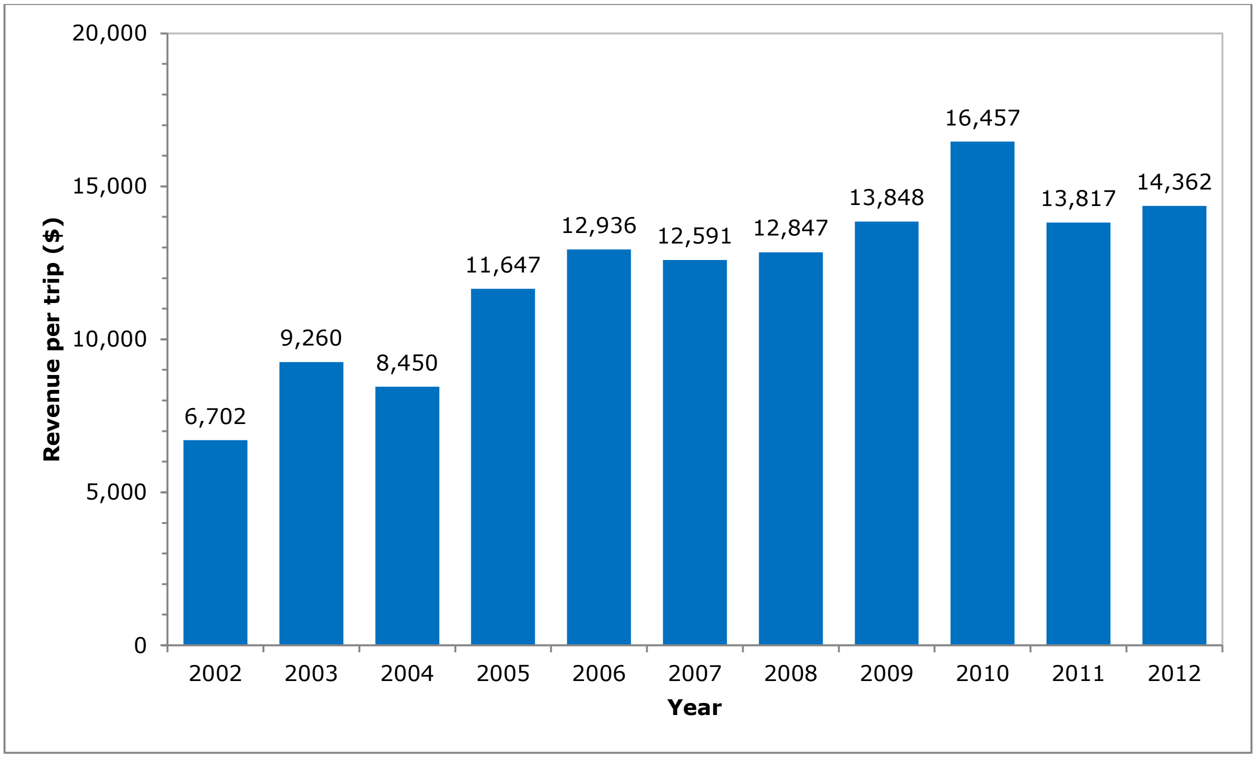

Figure 46. Revenue (inflation-adjusted 2010 dollars) per trip in the West Coast Squid Fishery.

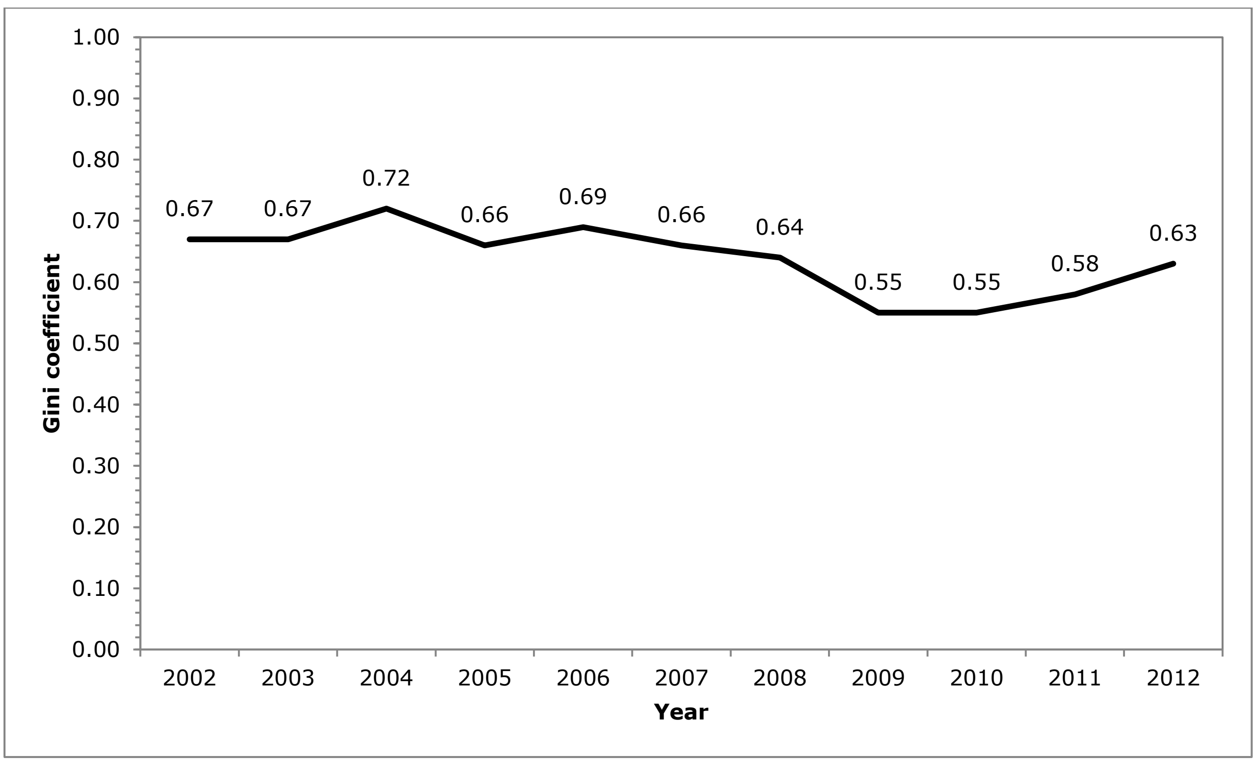

Figure 47. The Gini Coefficient for those vessels earning revenue in the West Coast Squid Fishery.

h. Synopsis of recent trends

The West Coast Squid Fishery exhibited a pattern of decline during the first half of the study period (2002-2008) in terms of landings (Figure 40), number of active vessels (Figure 41), and trips taken (Figure 42). This situation changed drastically with a substantial increase in numbers of landings, trips, and inflation-adjusted revenue over the remaining years of the study period. Interestingly, the number of active vessels trended up slightly after 2008 but not proportional to the increase in effort (Figure 42) or revenue (Figure 43). The large proportional increase in landings after 2008 was reflected in a relatively smaller proportional decrease in price over the period (Figure 44).

C. Highly Migratory Species (albacore and swordfish)

Highly migratory species are wide-ranging fish, caught by multi-national fleets beyond U.S. waters. Thus, their management generally requires international cooperation. As such, the United States participates in numerous international agreements with implications for highly migratory species management in the Pacific Ocean. Management of these species is further challenged due to the facts that their potential productivity ranges from very low to very high, and they are difficult to directly survey for abundance. Over the years 1981-1999, the most important highly migratory species in terms of ex-vessel revenue were albacore and swordfish, except for yellowfin and skipjack tunas in the early 1980's.

1. <u>Fishery synopsis</u>

   a. Gear used

In the U.S. West Coast-based fisheries, highly migratory species are harvested by five major commercial gear groups: surface hook and line, pelagic drift gillnet, pelagic longline, purse seine, and harpoon. These gears are employed in state waters, in the U.S. EEZ, and on the high seas. The West Coast-based U.S. albacore fishery comprises vessels that predominately troll for albacore using jigs and, to a lesser extent, live bait. These gears, known as surface hook-and-line gear, account for the majority of West Coast landings and ex-vessel revenues of albacore tuna. Juvenile albacore (2-5 years old) in the upper portions of the water column are caught with these surface hook-and-line gears, while adult albacore (6-12 years old) from deeper waters are caught using longline gear. Swordfish are principally harvested within the U.S. EEZ by drift gillnet and harpoon gear. In California, set lines are legal in open ocean waters but may not be used for swordfish. Oregon has provisions for developmental longline fisheries for swordfish more than 25 miles offshore.

   b. Target/component species

National Standard 1 Guidelines state that if a stock is identified in more than one fishery, Fishery Management Councils should choose which Fishery Management Plan will serve as the primary management reference. Conservation measures in the Fishery Management Plan that is not the primary Fishery Management Plan should be consistent, to the extent practicable, with those established in the primary Fishery Management Plan. The Pacific Fishery Management Council and the Western Pacific Fishery Management Council coordinate to identify the primary Fishery Management Plans for Pacific stocks of the managed species.

Highly-migratory species are defined by the Magnuson-Stevens Act as tunas, billfish (marlin, sailfish, and swordfish), and oceanic sharks. The Highly Migratory Species Fishery Management Plan includes provisions for tunas, billfish, and pelagic sharks. Tuna species include North Pacific albacore, yellowfin, bigeye, skipjack, and northern bluefin. The billfish category encompasses striped marlin and Pacific swordfish. Shark species include common thresher, shortfin mako, and blue sharks. Mahi-mahi (dolphinfish) are also managed under the Highly Migratory Species Fishery Management Plan. Great white sharks, megamouth sharks, basking sharks, Pacific halibut, and all species of salmon (Pacific, pink, chinook, chum, coho, and sockeye) are designated as prohibited species within this fishery.

c. Market channels

Revenues earned from species under the Highly Migratory Species Fishery Management Plan are primarily from albacore tuna (85%) and, to a lesser extent, swordfish (12%). The United States annually takes less than 22% of the north Pacific albacore landed by all nations. The bulk of the U.S. catch is canned as white meat tuna at canneries in American Samoa and Puerto Rico. A small amount (up to 10%) of the albacore catch is sold directly to the public in the fresh fish market. In recent years, more fishermen are marketing their catches directly from their vessels to the public to increase their earnings from albacore landings. In order to meet U.S. demand, swordfish products come from both U.S. landings and foreign imports. Harpooned fish tend to receive higher market prices than swordfish harvested using drift gillnets because harpoon vessels targeting swordfish are a low-volume fishery and spend less time on the water, so their catch is often fresher than drift-gillnet-caught fish.

2. Management Program

a. Current management controls

According to the National Standard 1 Guidelines established under the Magnuson-Stevens Act, an Acceptable Biological Catch and a related Annual Catch Limit must be set for stocks managed under a Fishery Management Plan. However, the guidelines include an exception to this requirement for stocks subject to management under an international agreement. The Pacific Fishery Management Council has determined that all of the managed stocks in the Highly Migratory Species Fishery Management Plan meet this criterion. Therefore, the Council does not normally set Acceptable Biological Catches and Annual Catch Limits for managed highly migratory species stocks. While no quotas exist for highly migratory species, harvest guidelines do exist. These guidelines are general objectives whose attainment does not necessarily require a regulatory response. Under the precautionary principle, the optimum yield for vulnerable species under the Highly Migratory Species Fishery Management Plan was set at 75% of maximum sustainable yield. Several federal statutes also affect highly migratory species. These include the High Seas Fishing Compliance Act, the Tuna Conventions Act, the Marine Mammal Protection Act, the Migratory Bird Treaty Act, and the Endangered Species Act. In addition, the Western Pacific Pelagics Fishery Management Plan manages several highly migratory species (mahi-mahi or dolphinfish, sailfish, swordfish, oceanic sharks, and tunas), as well as providing for the protection of certain marine mammals, sea turtles, and seabirds in the Western Pacific Region.

The Highly Migratory Species Fishery Management Plan recognizes that, due to the widespread distribution of highly migratory species, unilateral action taken by the United States will likely provide little or no biological benefit to most of the stocks of interest. Therefore, concerted international efforts are required in order to achieve rebuilding goals, and species currently managed under the Highly Migratory Species Fishery Management Plan fall under the purview of several international agreements. The United States is a member of the Inter-American Tropical Tuna Commission, which recommends management measures that must be approved by the Department of State before NOAA Fisheries begins the implementation process. Through the U.S.-Canadian Albacore Treaty, U.S. vessels are allowed to fish in Canadian waters and land in certain Canadian ports, and a reciprocal arrangement holds for Canadian vessels. The Fishery Management Plan may also provide a mechanism for implementing U.S. responsibilities under the Western and Central Pacific Fisheries Commission, the U.N. Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks under the Law of the Sea Treaty, the U.N. Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, and Treaty Indian Fishing Rights. Other international entities that make recommendations concerning species included in the Highly Migratory Species Fishery Management Plan include the Standing Committee on Tuna and Billfish and the Interim Scientific Committee. Management Unit Species are managed with an aim for consistency in both regional and international measures. Due to scientific uncertainty and challenges associated with international management, controls are designed to be precautionary and multidimensional in approach.

b. Key changes from past management controls

Prior to 2004, highly migratory species were managed by the States of Washington, Oregon and California, although some federal laws also applied. The lack of a single federal Fishery Management Plan covering all U.S. vessels in the Pacific created a situation where U.S. vessels fishing on the high seas may have been subject to different regulations depending on where they began their trip or where they landed their catch. The inequities and management challenges that arose from this situation led to the creation of the Highly Migratory Species Fishery Management Plan. The Fishery Management Plan has been amended twice. Amendment 1, approved in 2007, addressed overfishing of bigeye tuna and reorganized the Plan into a more concise document. Amendment 2, approved in 2011, made provisions consistent with the revised Magnuson-Stevens Act's National Standard 1 Guidelines.

3. <u>Management Objectives</u>

The Highly Migratory Species Fishery Management Plan is intended to ensure conservation and promote the achievement of optimum yield of highly migratory species throughout their ranges, both within and beyond the U.S. EEZ, to the extent practicable. In addition to the National Standards established under the Magnuson-Stevens Act, the objectives of the Highly Migratory Species Fishery Management Plan include:

1) Promote and actively contribute to international efforts for the long-term conservation and sustainable use of highly migratory species fisheries that are utilized by West Coast-based fishers, while recognizing that these fishery resources contribute to the food supply, economy, and health of the nation.
2) Provide a long-term, stable supply of high-quality, locally caught fish to the public.
3) Minimize economic waste and adverse impacts on fishing communities to the extent practicable when adopting conservation and management measures.
4) Provide viable and diverse commercial fisheries and recreational fishing opportunity for highly migratory species based in ports in the area of the Pacific Council's jurisdiction, and give due consideration to traditional participants in the fisheries.
5) Implement harvest strategies that achieve optimum yield for long-term sustainable harvest levels.
6) Provide foundation of support for the State Department in cooperative international management of highly migratory species fisheries.
7) Promote inter-regional collaboration in management of fisheries for species that occur in the Pacific Council's managed area and other Councils' areas.

8) Minimize inconsistencies among federal and state regulations for highly migratory species fisheries.
9) Minimize bycatch and avoid discard and implement measures to adequately account for total bycatch and discard mortalities.
10) Prevent overfishing and rebuild overfished stocks, working with international organizations as necessary.
11) Acquire biological information and develop a long-term research program.
12) Promote effective monitoring and enforcement.
13) Minimize gear conflicts.
14) Maintain, restore, or enhance the current quantity and productive capacity of habitats to increase fishery productivity for the benefit of the resource and commercial and recreational fisheries for highly migratory species.
15) Establish procedures to facilitate rapid implementation of future management actions, as necessary.

4. <u>Recent Trends</u>

a. Landings – West Coast Albacore

Landings of albacore in the United States by U.S. and Canadian vessels were 9,999 metric tons in 2002 (Figure 48). Albacore landings then peaked in 2003 (16,611 metric tons), but declined in consecutive years to 14,524 metric tons in 2004, and 9,028 metric tons in 2005. Landings increased in 2006 (to 12,773 metric tons), but generally declinined in the following years, reaching 10,935 metric tons in 2011. The next year, 2012, saw an increase to 13,873 metric tons as a result of a change in the management by which Canadian vessels were no longer allowed to operate in U.S. waters. This change affected nearly every 2012 performance indicator for this fishery.

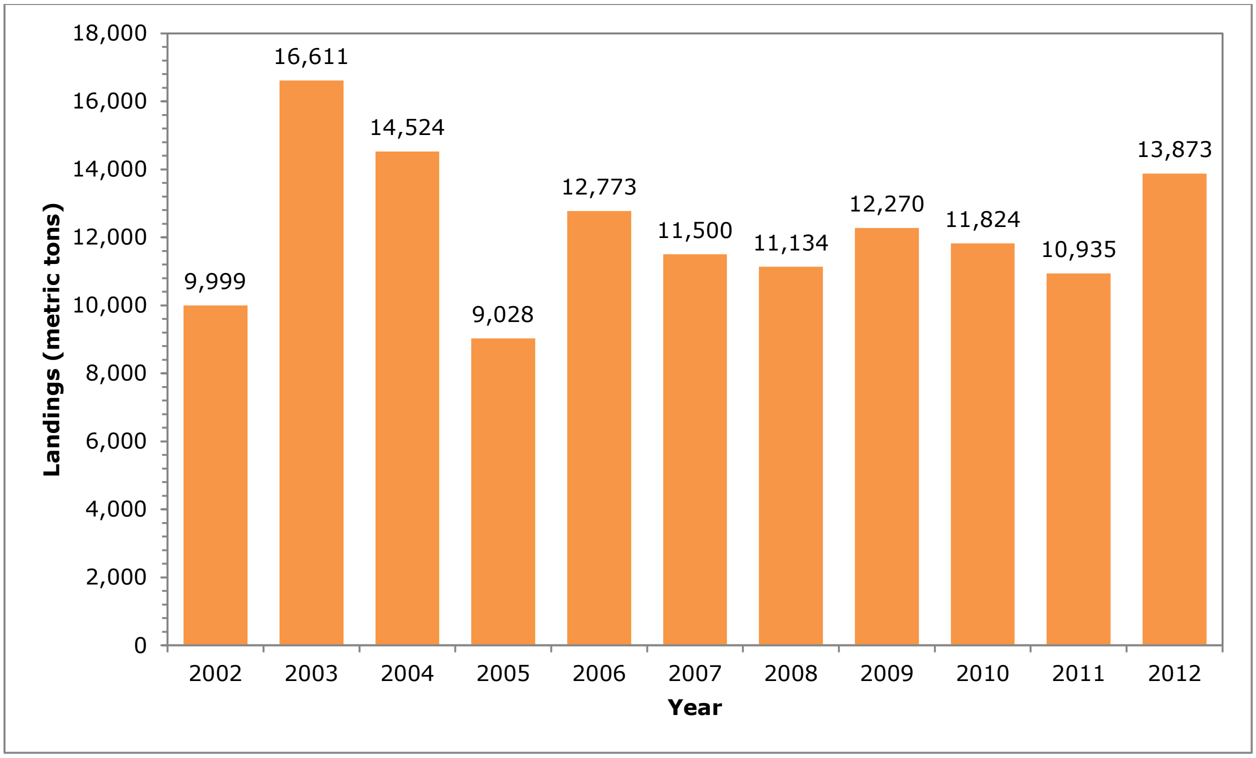

Figure 48. Landings (metric tons) in the West Coast Albacore Fishery.

b. Effort – West Coast Albacore

There were 736 vessels participating in the West Coast Albacore Fishery in 2002 (Figure 49). The number of active vessels peaked the next year, at 888 vessels, then declined to 599 vessels by 2005. With the exception of 2008, vessels participating in the albacore fishery in 2006-2011 averaged 666, ranging between 687 vessels (2011) and 635 (2006). In 2012, active vessels increased in number by 24% (to 854 vessels) over the previous year. The albacore fishery was not subject to any regulatory closures duing 2002-2012, resulting in a year-round fishery in which vessels were free to operate 365 days a year throughout the entire time period.

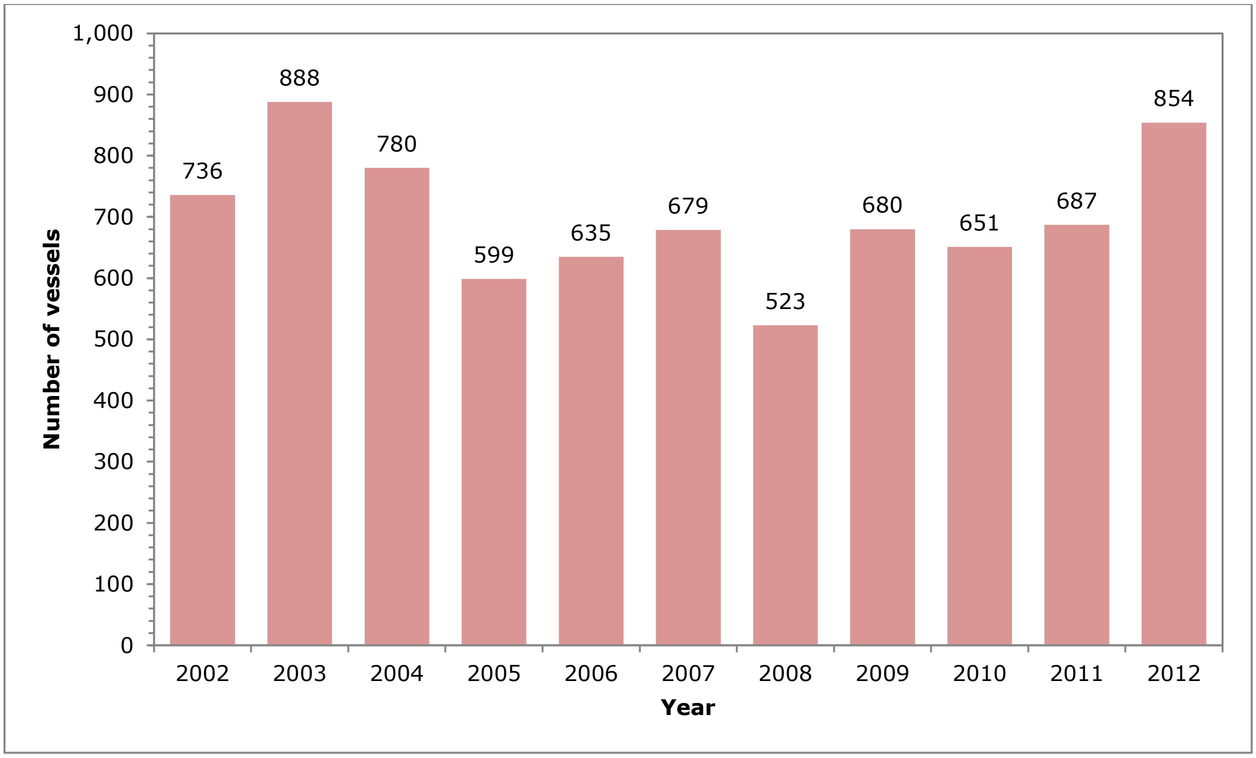

Figure 49. Number of active vessels participating in the West Coast Albacore Fishery.

Over the period 2002-2011, the lowest annual number of trips in the West Coast Albacore Fishery was 1,932 trips in 2005, and the highest was 3,249 trips in 2003 (Figure 50). During 2009-2011, the number of trips was relatively stable, averaging 2,664 trips. With the barring of Canadian vessels from the to harvest of albacore in U.S. waters, the number of trips reached a high of 3,383 trips in 2012.

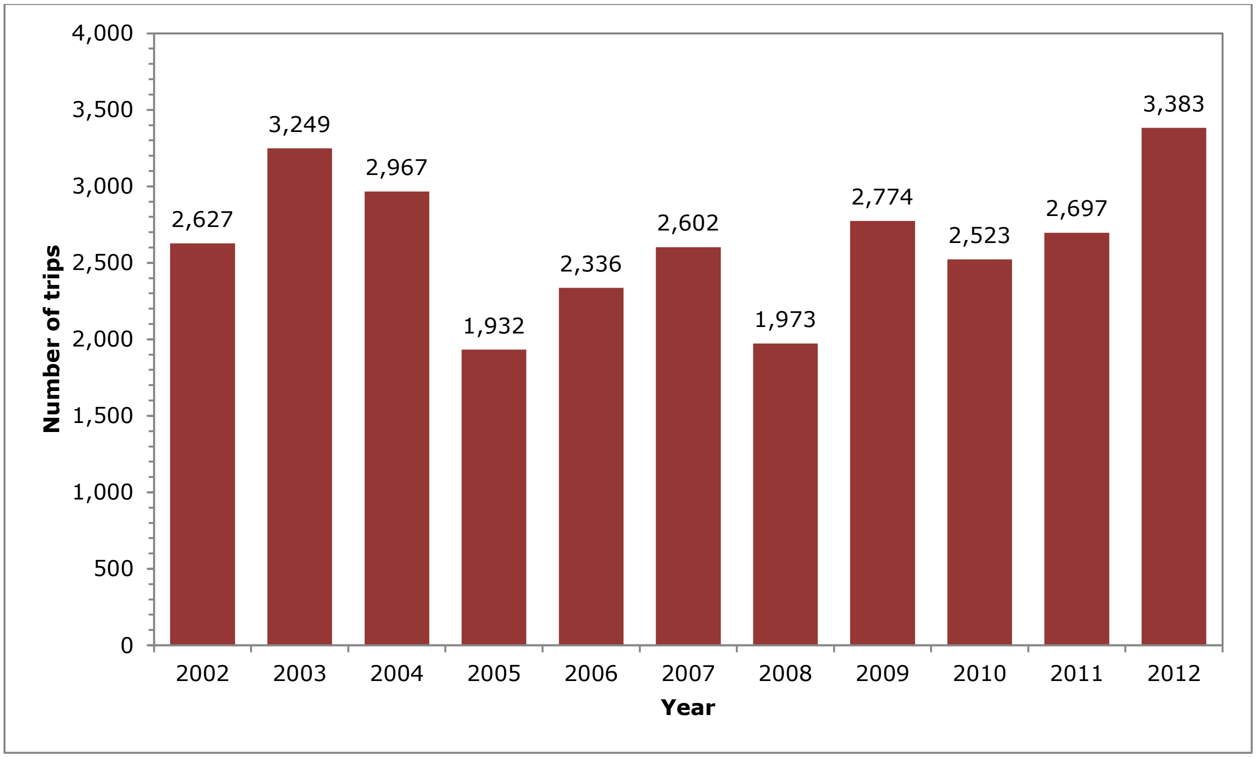

Figure 50. Number of trips taken in the West Coast Albacore Fishery.

The number of days at sea in the West Coast Albacore Fishery was substantially lower in 2002 (4,638 days) and 2003 (4,281 days), compared to any year during 2004-2011 (Figure 51). Days at sea averaged 9,390 days in 2005-2008, but increased to 11,736 days in 2009 and was at least 10,700 days in both 2010 and 2011. Although the number of days spent fishing has increased, particularly in recent years, the average trip duration has been much more stable. Albacore trip duration ranged from a high of 5.1 days in 2005 to a low of 3.4 days in 2007, but closer to 4.2 – 4.4 days in most years. The expulsion of Canadian vessels in 2012 resulted in a large increase in total days spent fishing for albacore that year, to 34,242 days, nearly three times the previous time-series high of 11,736 days (2009). This also resulted in an average trip duration of just over 10 days, more than twice that of the 2005-2011 average of 4.3 days.

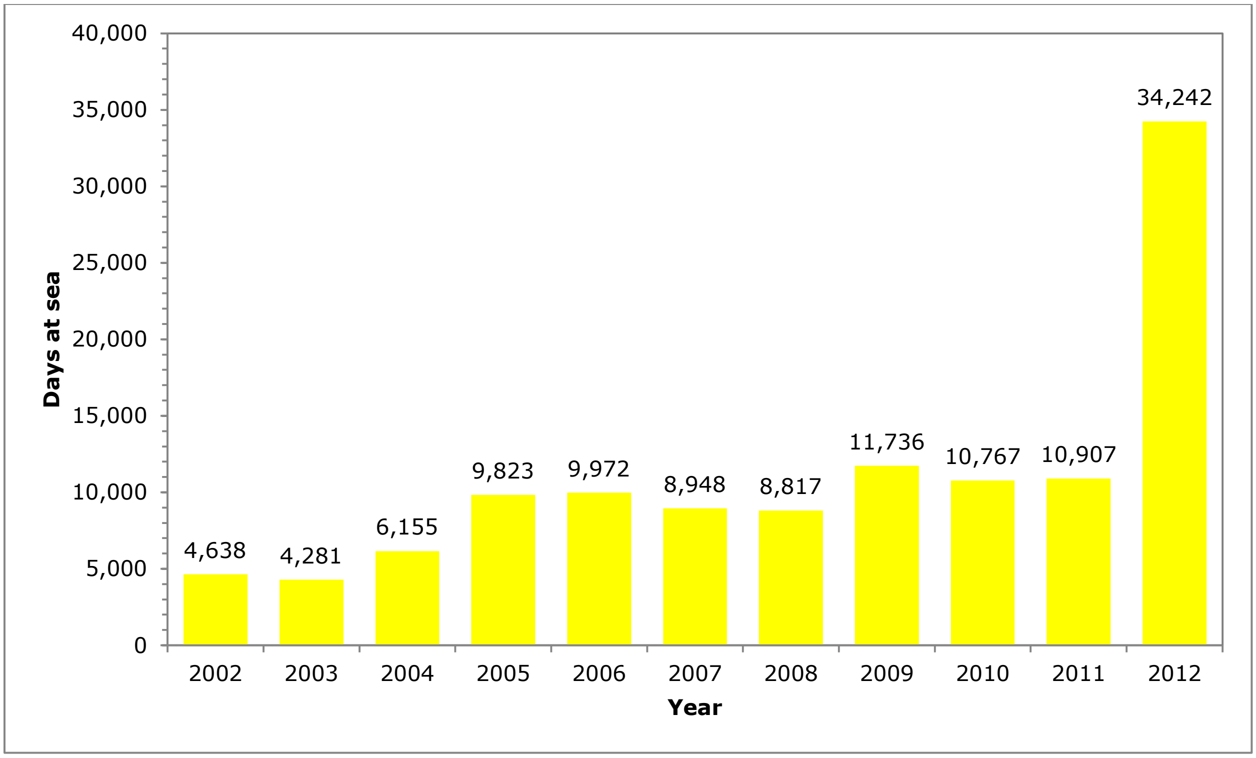

Figure 51. Total number of days at sea fishing in the West Coast Albacore Fishery.

c. Revenue – West Coast Albacore

Aggregate revenue in the West Coast Albacore Fishery comes almost exclusively from albacore, with less than 1% of revenues from other species on albacore fishing trips. For this reason, this discussion deals only with revenues received from the sale of albacore. Albacore revenue (inflation-adjusted using the GDP deflator indexed for 2010) was $14.2 million in 2002 (Figure 52). Revenue increased in both 2003 and 2004, reaching $27.4 million, and were relatively stable at around $21 million during 2005-2007. Revenue ranged from $27.5 to $29.5 million during 2008-2010, before increasing to $43 million in 2011, and again to $45.6 million in 2012.

Average albacore price per metric ton was on an upwards trend from $1,693 in 2002 to $2,531in 2005, before falling to about $1,900 in both 2006 and 2007 (Figure 53). Since 2008, average price has been above $2,200 per metric ton; it reached a time-series high of $3,858 in 2011. The increase in albacore landings led to a 2012 decline in average price to $3,169.

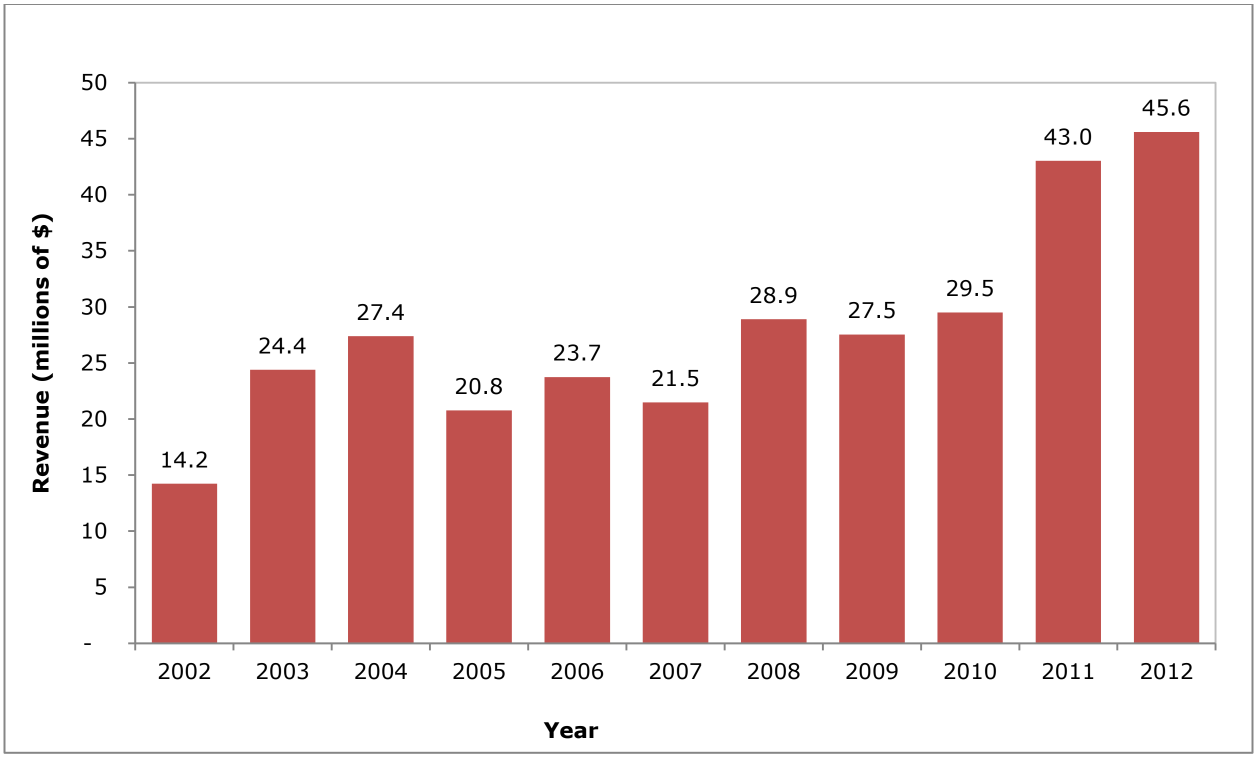

Figure 52. Revenue (inflation-adjusted 2010 dollars) in the West Coast Albacore Fishery.

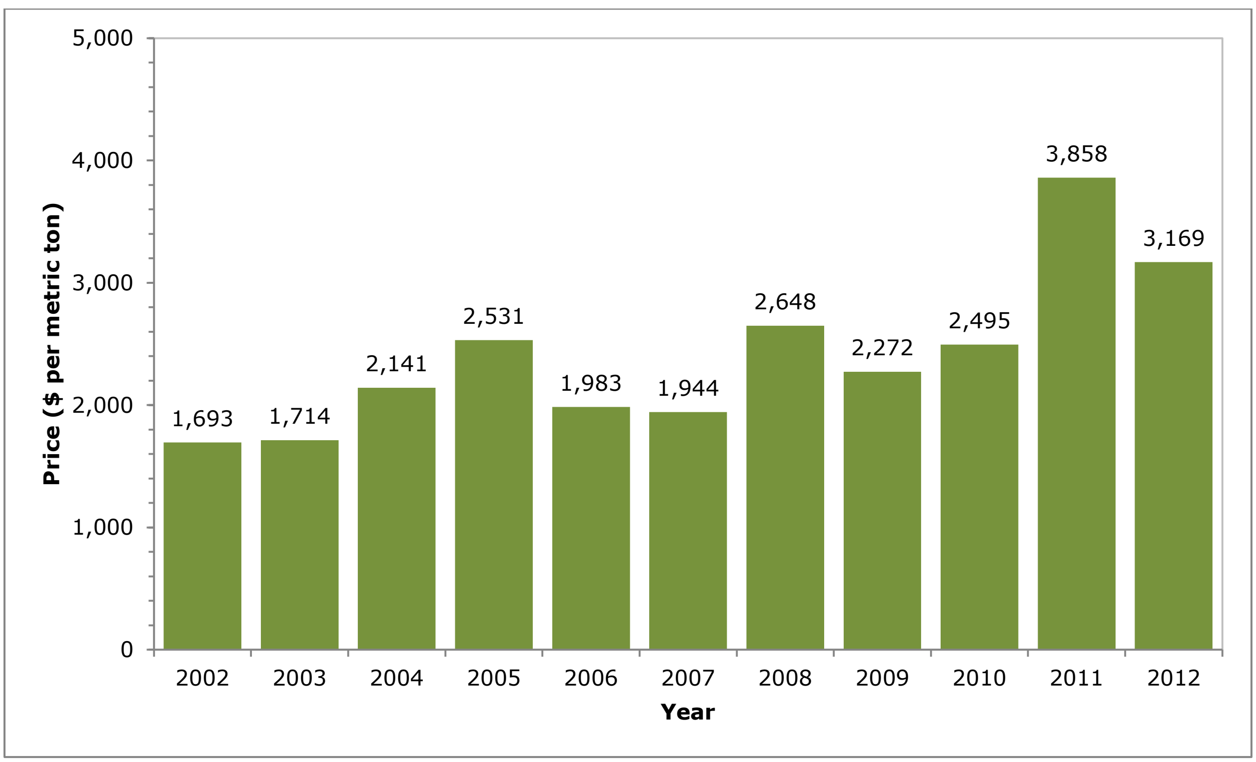

Figure 53. Average price (inflation-adjusted 2010 dollars) per metric ton earned in the West Coast Albacore Fishery.

Inflation-adjusted albacore revenue per participating vessel rose from $23,004 in 2002 to $39,861 in 2004 (Figure 54). Revenue per vessel was stable until 2006, but fell to $32,918 in 2007 before climbing to $56,374 in 2008. Subsequently, revenue per vessel declined to $40,995 in 2009 and then trended up again, to a time-series high of $61,408 in 2011. Revenue per vessel declined in 2012 to $51,472 due to the increase in participating vessels caused by a change in management policy, which stopped Canadian vessels from operating in U.S. waters.

Revenue per trip in the West Coast Albacore Fishery increased from $6,445 in 2002 to $10,749 in 2004, leveled off at around $11,500 from 2004 to 2006, then fell $8,590 in 2007 (Figure 55). Albacore revenue per trip was second highest in 2008, declined in 2009 but recovered to a time-series high of $15,642 in 2011. Per-trip revenue declined in 2012 to $12,994. Trends in revenue per trip in this fishery were almost identical to those in revenue per vessel (Figure 54) because the average number of trips taken per active vessel changed very little over the years 2002-2012, ranging between 3.2 and 4.1 trips. In contrast, the average number of days at sea per vessel was about 60% lower during 2002-2004 (about 6.4 days) compared to the average in 2005-2011 (16.0). This difference in time at sea accounted for the higher revenue per day during 2002-2004 (an average of $5,117) compared to lower earnings in 2005-2011 ($2,813 per day; Figure 56). In 2012, the average number of days that each vessel fished jumped to 40 days (Figure 51), accounting for the time-series low in revenue per day of $1,284 in that year.

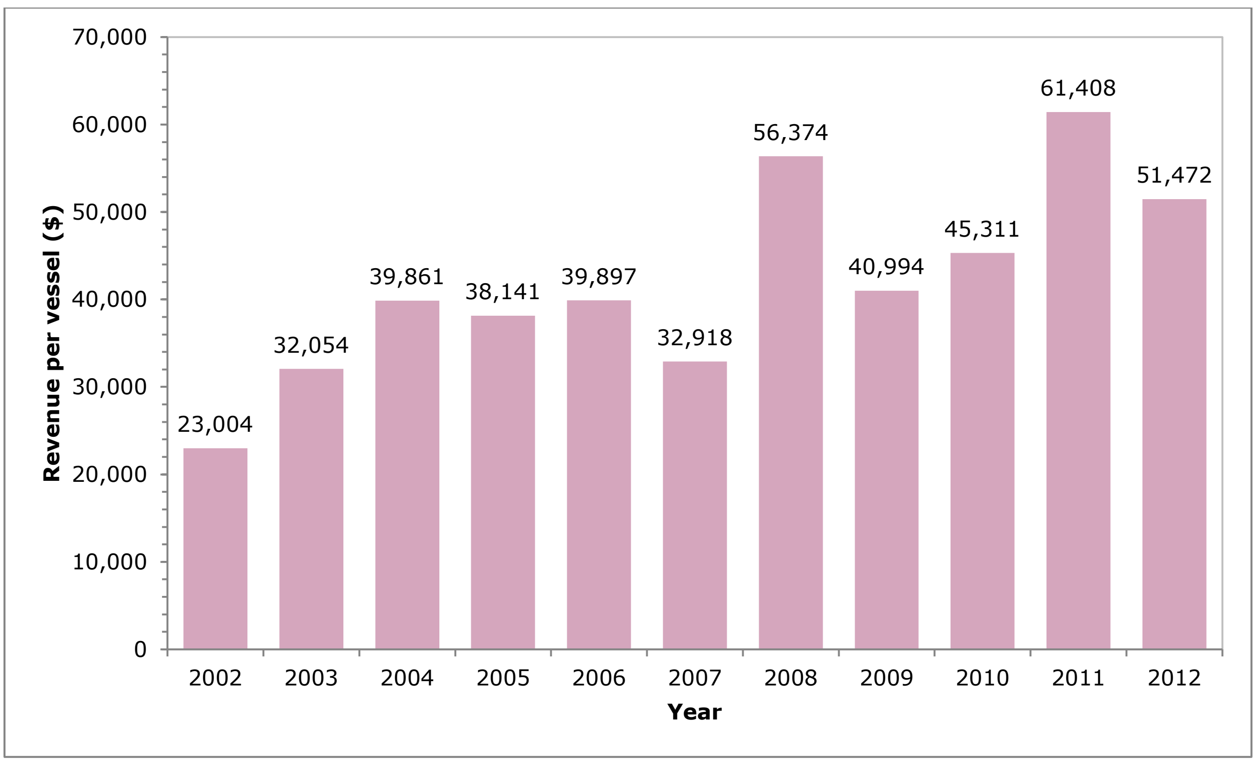

Figure 54. Revenue (inflation-adjusted 2010 dollars) per vessel in the West Coast Albacore Fishery.

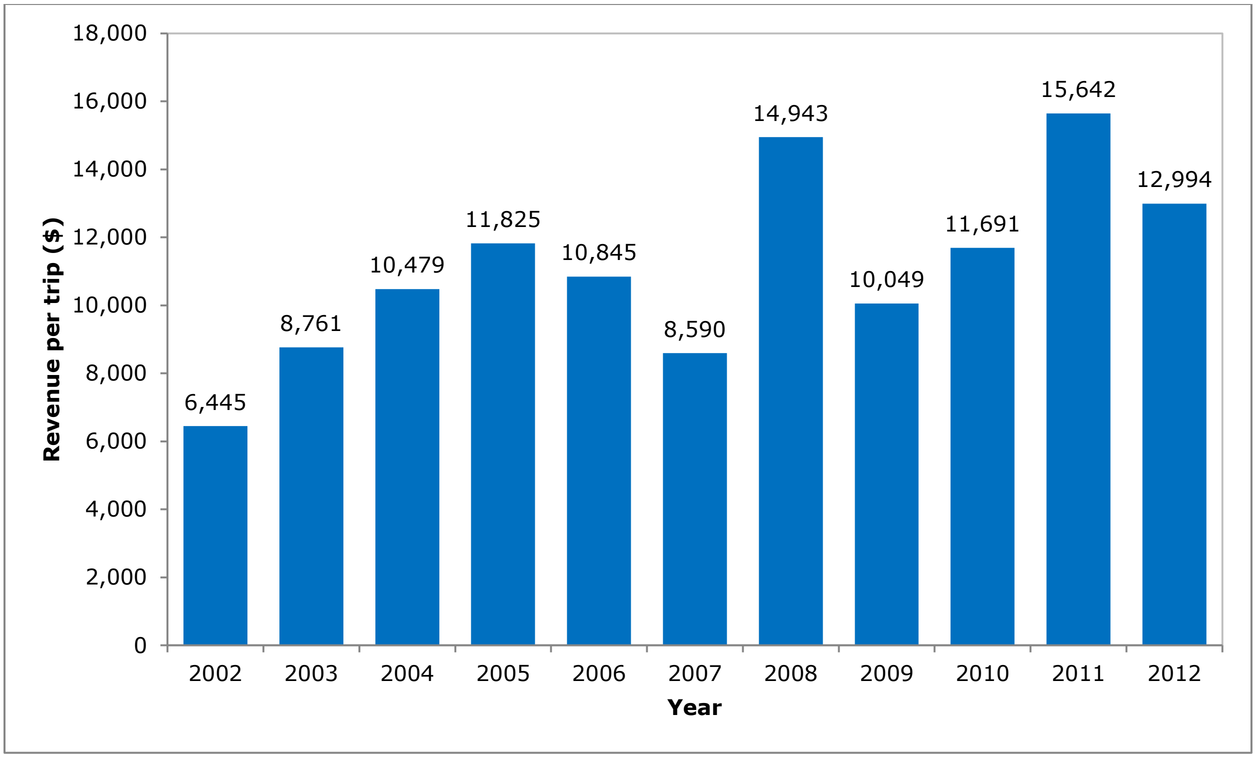

Figure 55. Revenue (inflation-adjusted 2010 dollars) per trip in the West Coast Albacore Fishery.

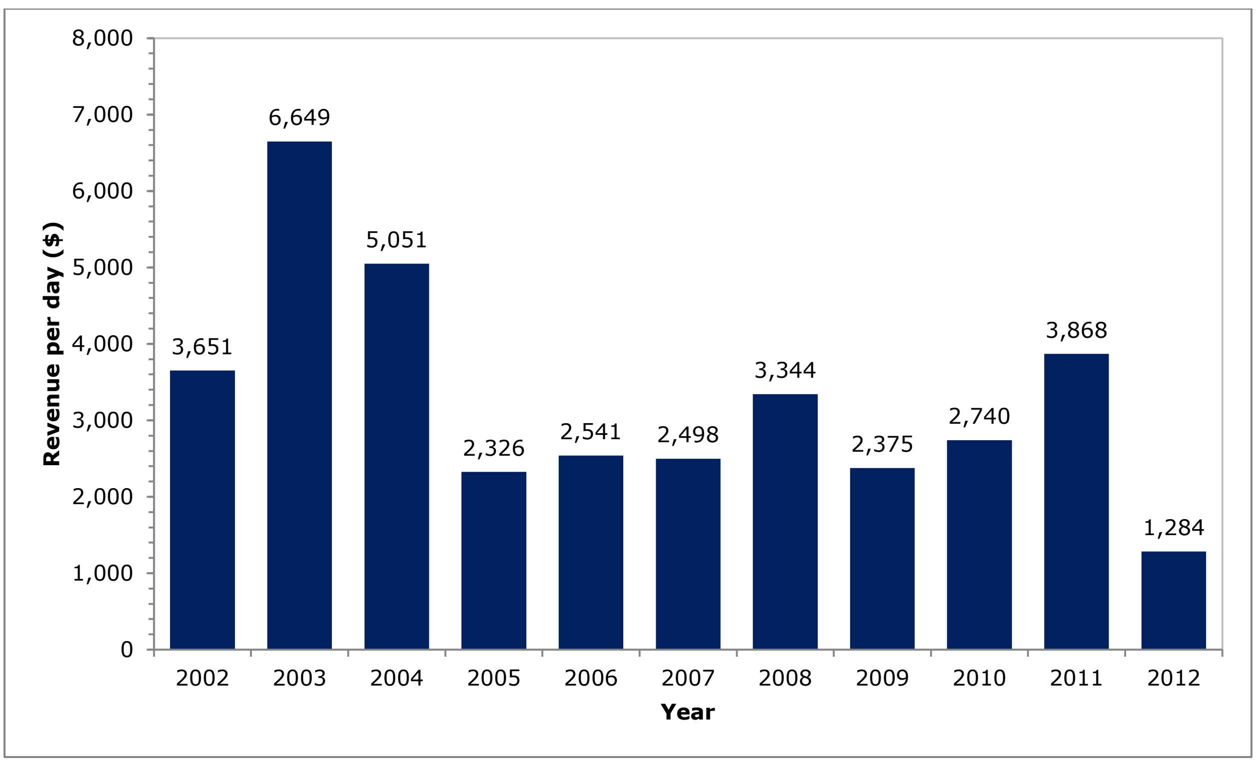

Figure 56. Revenue (inflation-adjusted 2010 dollars) per day at sea in the West Coast Albacore Fishery.

Albacore fishery revenues among vessels active in the West Coast Albacore Fishery have been somewhat concentrated among a portion of the fleet (Figure 57). This means that a disproportionally larger share of albacore fishery revenues has been harvested by a smaller number of vessels. The Gini coefficient has been virtually constant throughout the entire time-series, ranging between 0.71 and 0.74 from 2002 to 2012, indicating that the level of revenue concentration in the fishery has not changed over time.

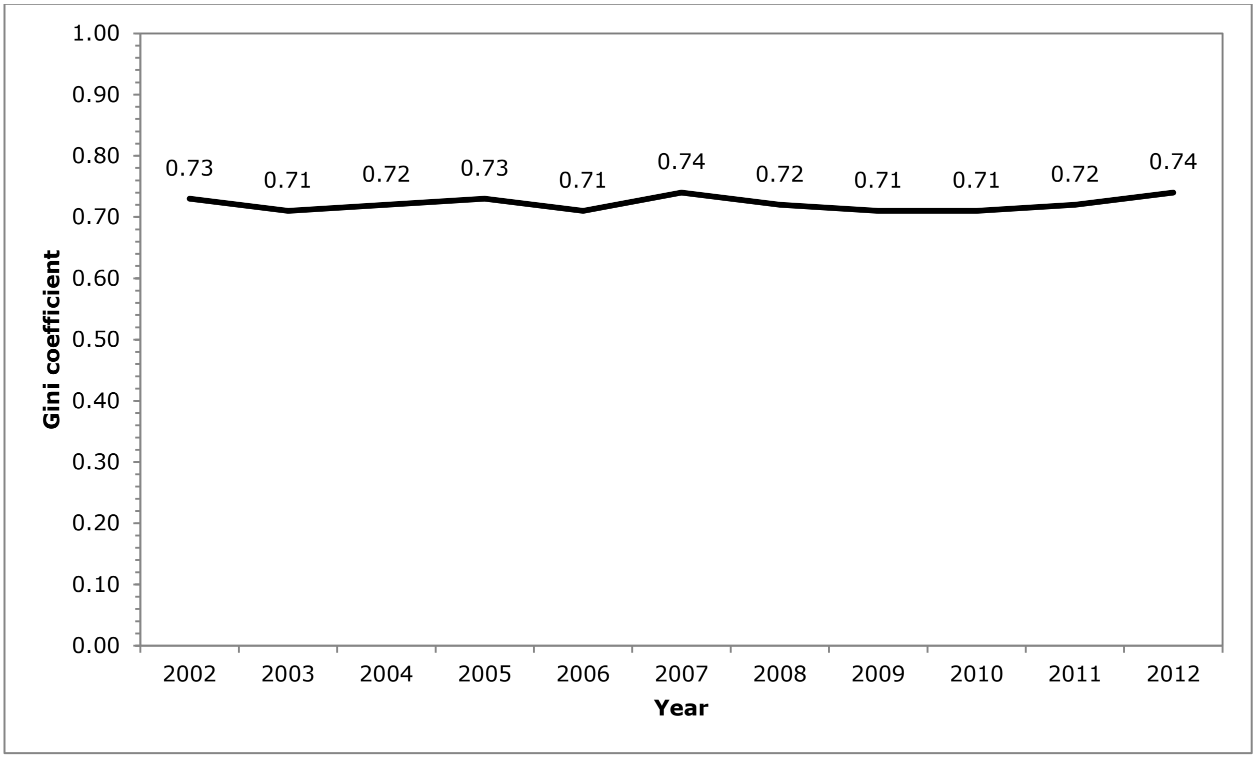

Figure 57. The Gini coefficient for active vessels participating in the West Coast Albacore Fishery.

d. Synopsis of recent trends

The West Coast Albacore Fishery has been the most economically important highly migratory species fishery on the West Coast in recent years. Since the mid-1990s, the fishery has been relatively stable with respect to levels of fishery participation and standard measures of economic performance. The Gini coefficient over the period was extremely stable, suggesting no major new development in the distribution of revenues among participants. Though the assessment in 2006 indicated a potential developing problem of overfishing, the most recent assessment indicated the stock was healthy, with no overfishing, suggesting no pressing need for additional management measures to limit mortality in the near-term. Aggregate revenue and revenue per vessel have trended up over the past ten years, likely reflecting an increase in the average price of albacore; however, revenues per day at sea dropped after the early years in the decade, calling into question whether the increase in per-vessel revenues translated into higher profitability.

e. Landings – West Coast Swordfish

Combined landings in the West Coast Swordfish Fishery using drift gillnet and harpoon gear totaled 1,725 metric tons in 2002 (Figure 58). Swordfish landings increased to 2,135 metric tons in 2003 then declined in consecutive years to a time-series low of 297 metric tons in 2005. Since 2005, swordfish landings have remained below 2002-2004 levels, ranging between 370 metric tons in 2010 and 619 metric tons in 2011.

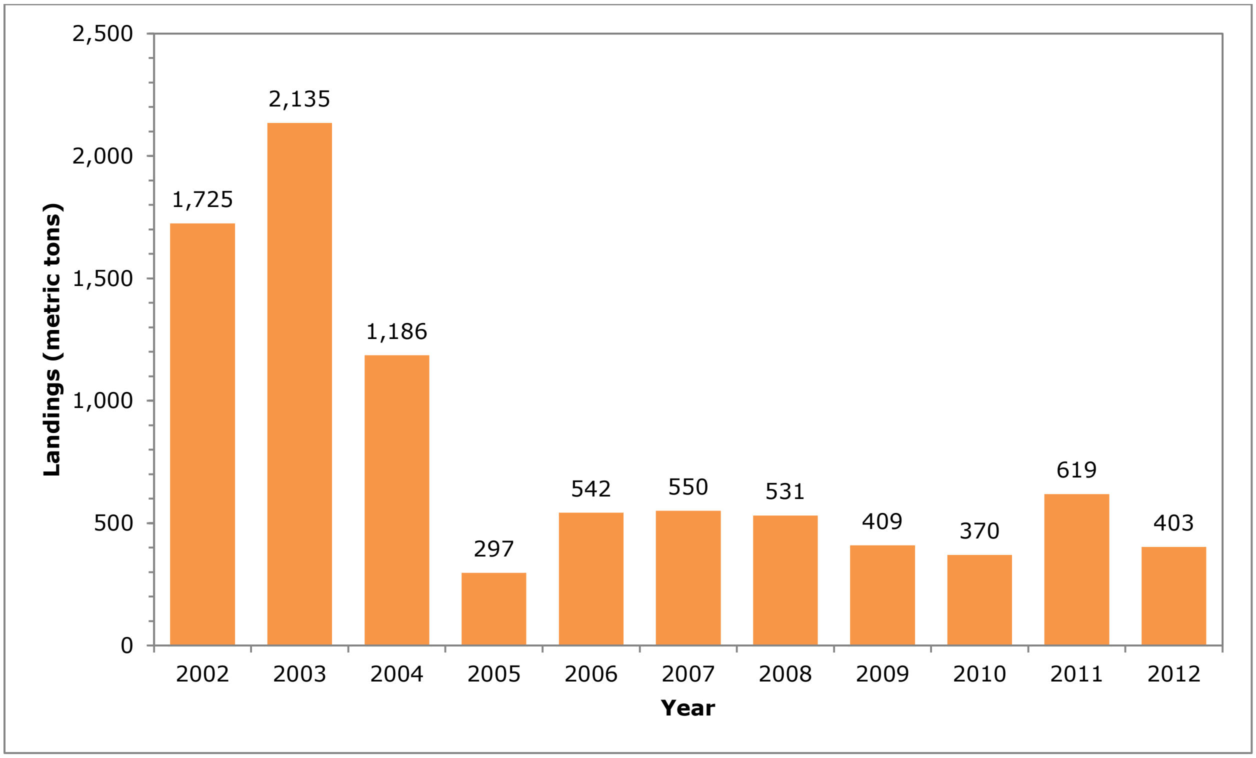

Figure 58. Landings in the West Coast Swordfish Fishery.

f. Effort – Swordfish

The drift gillnet fishery for swordfish is subject to limited entry, whereas the harpoon fishery is open access. For this reason, the annual total number of swordfish permits was estimated as the sum of limited entry gillnet permits, plus the number of harpoon vessels that fished. There were a total of 169 swordfish permits issued in 2002 (Figure 59). The number of permitted vessels declined through 2005, to 115, then remained virtually constant through 2009, but declined in 2010-2012. As of 2014, a total of 104 permits were issued in 2010, 99 were issued in 2011, and only 87 were issued in 2012.

The number of active vessels includes all vessels that used gillnet gear or harpoon gear in any given year. This may result in some double counting since a small number of vessels may use both gillnet and harpoon gear in the same year. With this caveat in mind, the number of vessels participating in the West Coast Swordfish Fishery was highest in 2002 when 155 vessels landed swordfish on at least one occasion (Figure 60). The number of active vessels declined in consecutive years, to 73 in 2005, and although numbers increased to 92 in 2008, the fleet has since contracted to 41 in 2012, about one-quarter the size of the swordfish fleet in 2002.

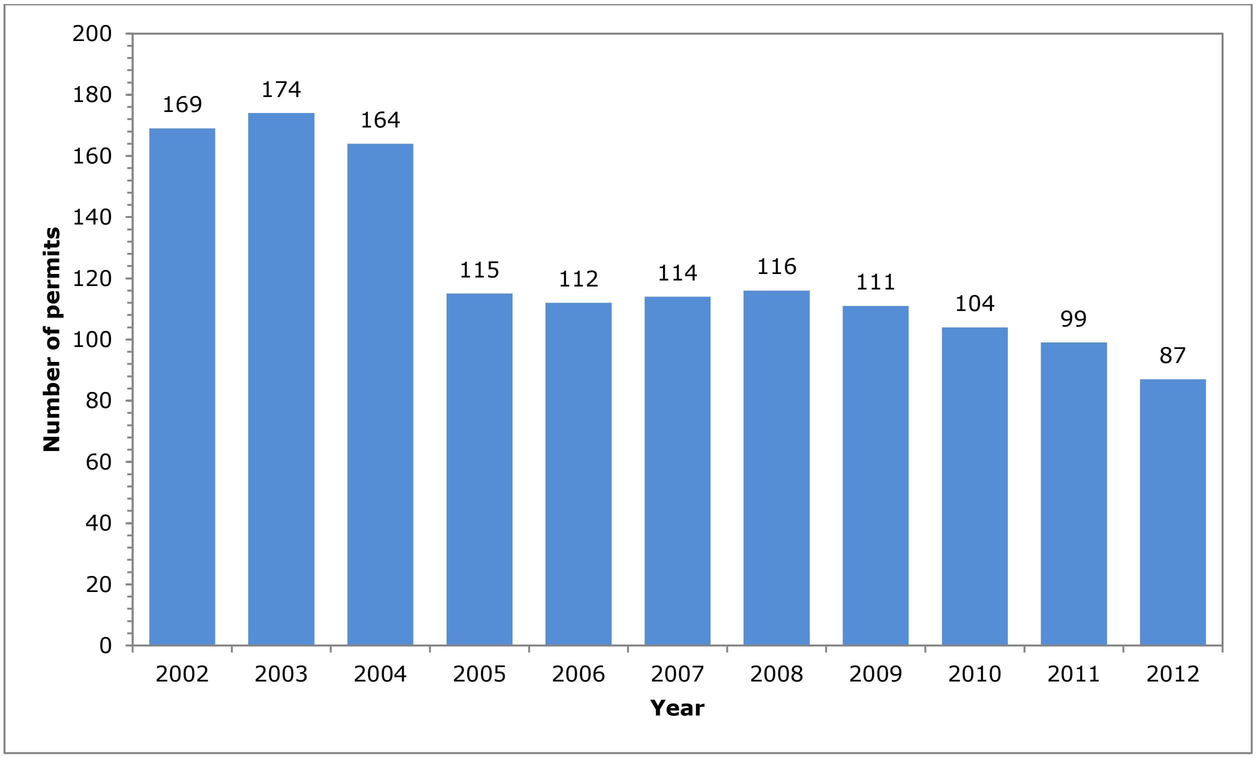

Figure 59. Number of permits issued in the West Coast Swordfish Fishery.

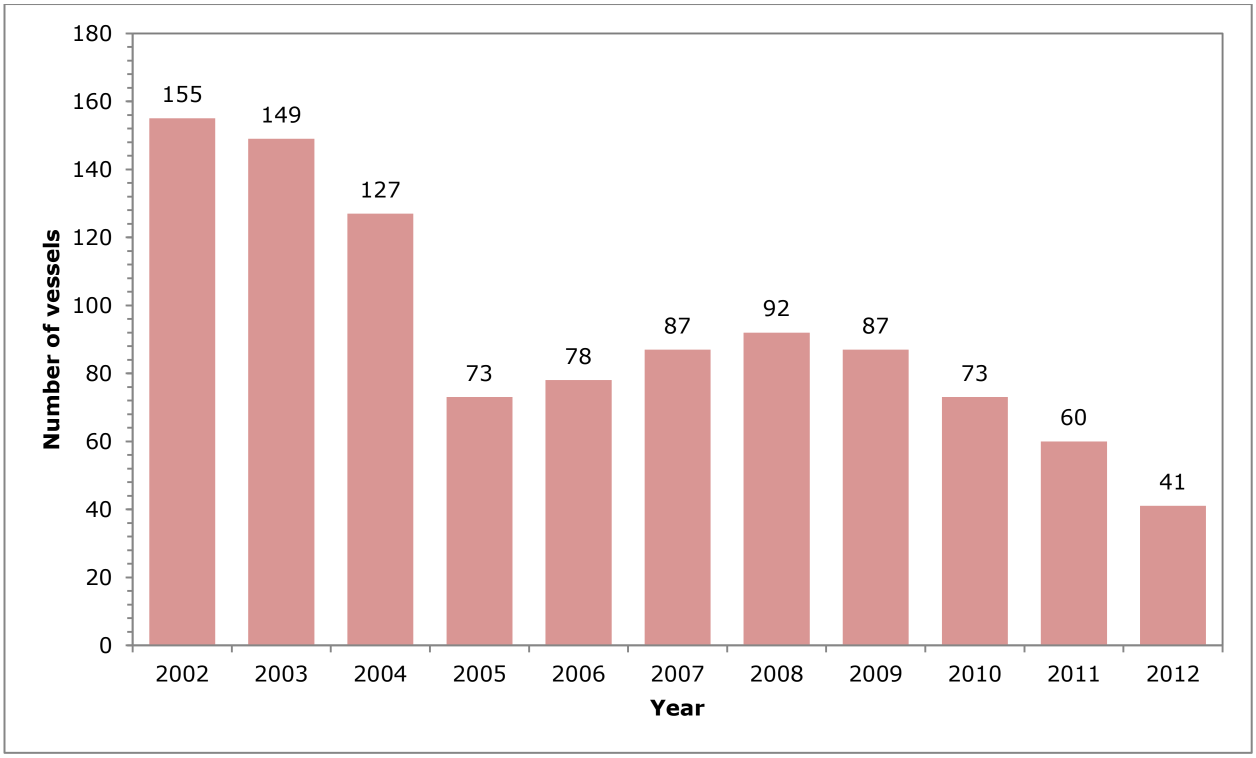

Figure 60. Number of active vessels participating in the West Coast Swordfish Fishery.

The annual number of trips taken in the West Coast Swordfish Fishery was estimated as the annual number of discrete occasions on which swordfish were landed using either drift gillnet or harpoon gear. The number of swordfish trips declined from 858 in 2002 to 694 trips in 2005 (Figure 61). In 2006, the number of swordfish trips reached a time-series high of 902. However, following that year, the number of trips declined steadily at an average annual rate of almost 13% to 445 trips in 2011 and 370 trips in 2012.

The regulatory season for the drift gillnet fishery opens in May and closes in January, for a total of 276 days. Although, fishing does not take place throughout the open season, the fishery has remained open for the entire length of the regulatory season in all years from 2002 to 2012.

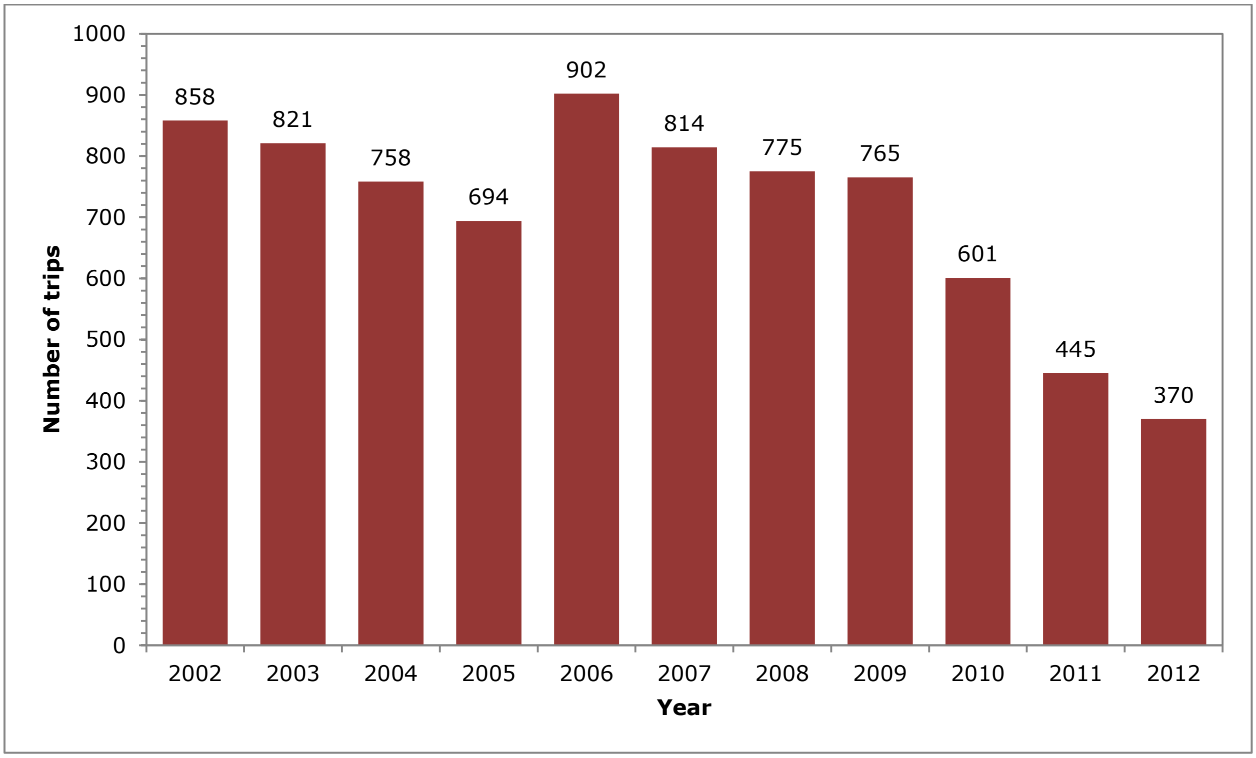

Figure 61. Number of trips taken in the West Coast Swordfish Fishery.

g. Revenue – West Coast Swordfish

Data on total revenue for swordfish trips, which has been adjusted by the GDP deflator indexed for 2010, includes revenue from both swordfish and species incidentally landed while fishing for swordfish. Revenue from species other than swordfish was less than 10% of total revenue from 2002 to 2004, but was 10% or more in all other years (Figure 62). More recently (2008-2012), revenue from species other than swordfish was around 15% of aggregate revenue, but was as high as 26% in 2010.

Revenues received from the sale of swordfish are a function of both landings and prices. The general trends in swordfish revenues largely follow those in swordfish landings (Figure 58), where aggregate revenues fell from 2003 to 2005, rose in 2006 and 2007, then fell again through 2010 (Figure 62). In some years, change in swordfish revenue was offset by change in price. For example, swordfish landings declined by 44% from 2003 to 2004, but swordfish revenues declined by 40% because average price increased by 8% (Figure 63). Similarly, while landings increased by 80% from 2005 to 2006, prices declined by 29%, resulting in a net increase in swordfish revenue of 20%. These examples represent what would be expected as markets respond to changes in swordfish supply. However, average swordfish prices in the West Coast Swordfish Fishery were only weakly correlated with swordfish supplies as there were as many instances where prices increased with increased supply as there were instances where price increased with reduced supplies. In general, average swordfish prices were relatively constant during 2002-2004, averaging $4,446 per metric ton, followed by higher prices during 2005-2007, before returning to around $4,500 in 2008 and 2009 (Figure 63). Over the most recent three years, average swordfish prices have averaged less than $2,500.

In 2002, combined aggregate revenue per vessel from all species averaged $51,003 of which $49,160 was from swordfish (Figure 64). Total revenue per vessel peaked in 2003 at $62,878, but then followed a declining trend reaching a time-series low of $16,942 in 2010, before increasing in both 2011 and 2012 to $23,911 and $29,217 per vessel, respectively. Combined revenue per trip followed a trend similar to that of revenue per vessel. Total revenue per trip was $9,214 in 2002, of which $8,881 was from swordfish and $333 was from species other than swordfish (Figure 65). Total revenue per trip peaked in 2003 at $11,410 but has declined ever since, from $7,512 in 2004 to a time-series low of $2,058 per trip in 2010, with the exception of a modest increase in 2007 to $5,060. Total revenue per trip increased somewhat in 2011 and 2012, to about $3,230 in each year.

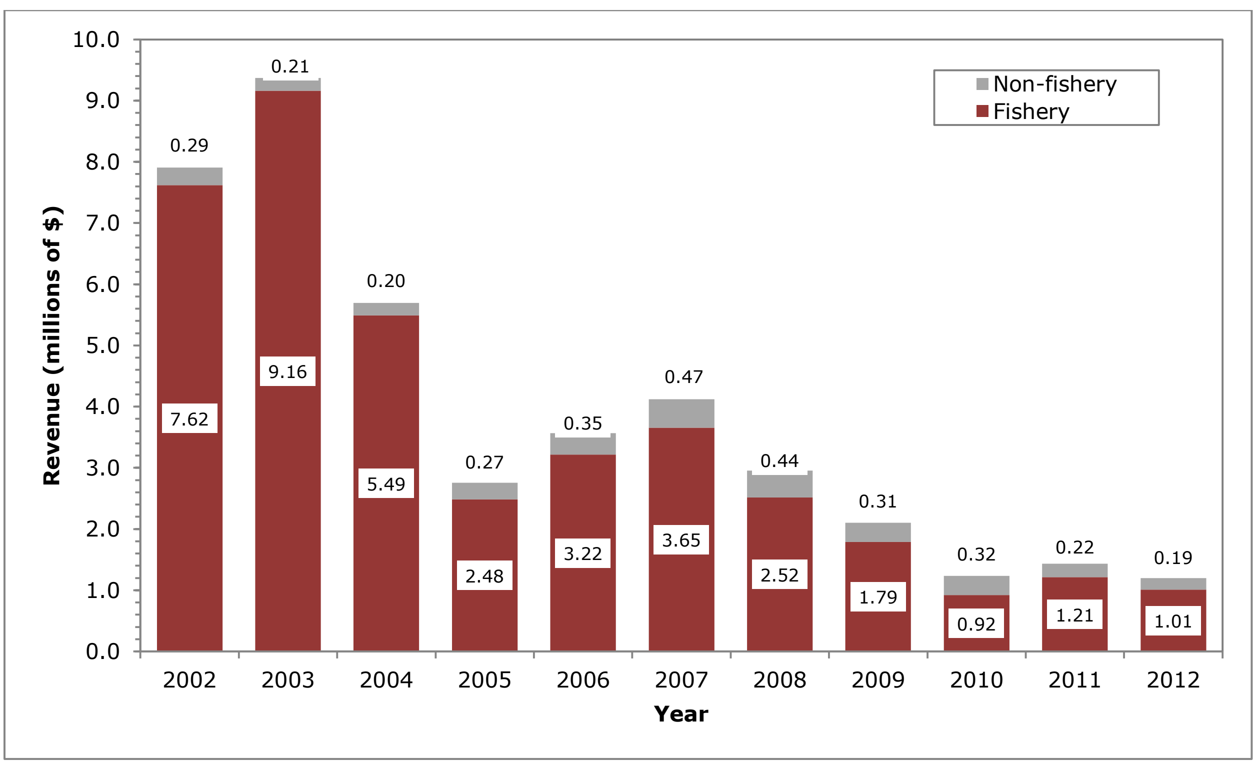

Figure 62. Revenue (inflation-adjusted 2010 dollars) in the West Coast Swordfish Fishery.

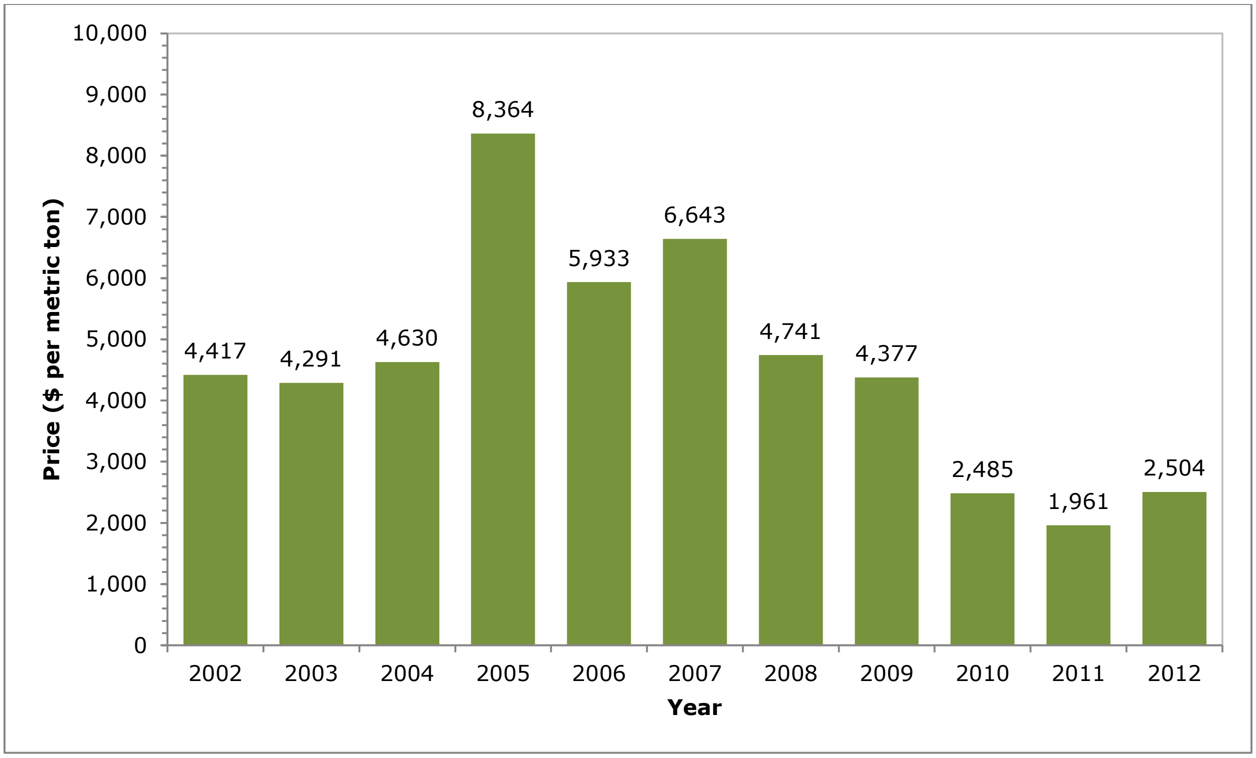

Figure 63. Average prices (inflation-adjusted 2010 dollars) in the West Coast Swordfish Fishery.

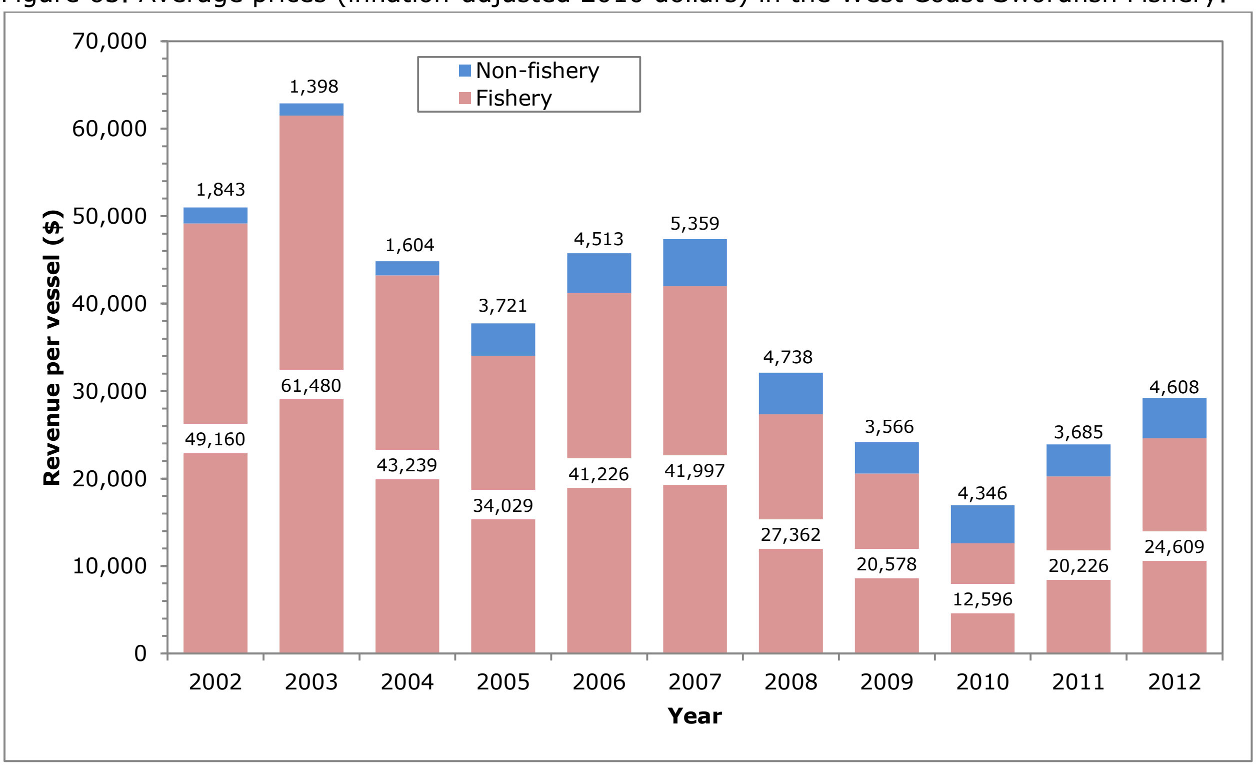

Figure 64. Revenue (inflation-adjusted 2010 dollars) per vessel in the West Coast Swordfish Fishery.

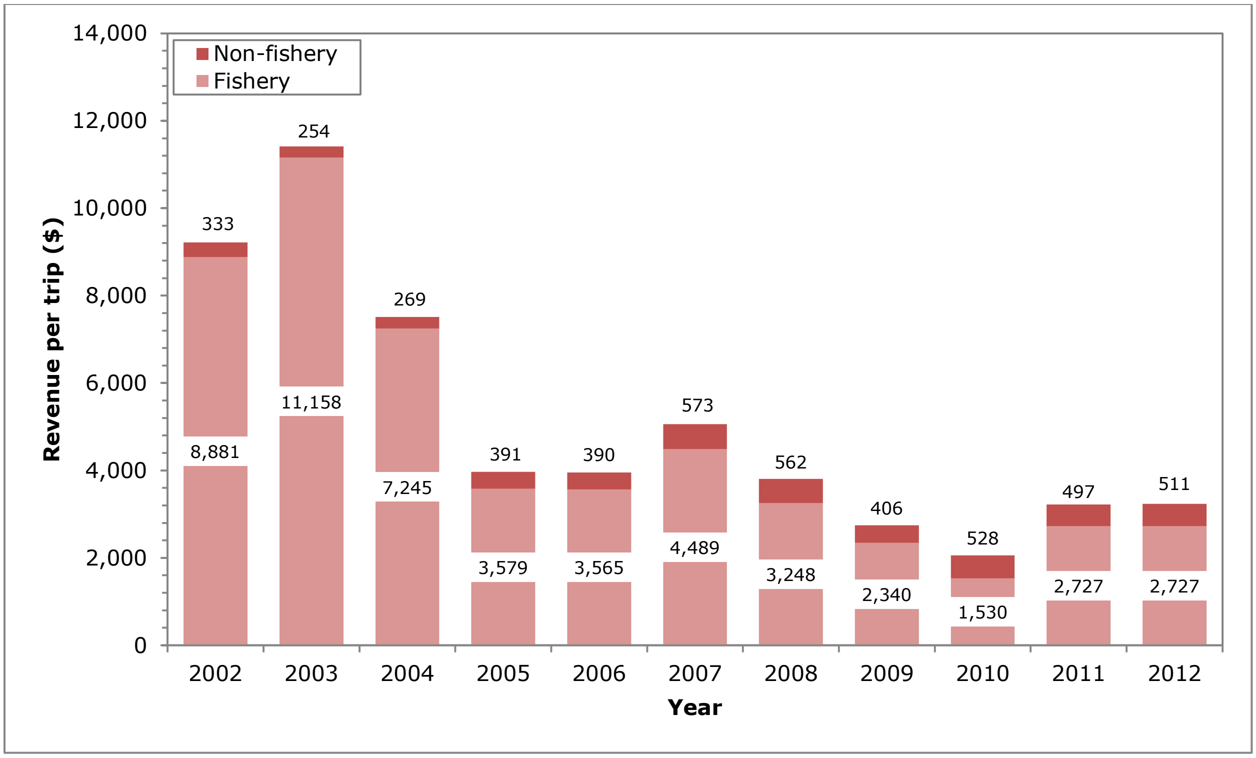

Figure 65. Revenue (inflation-adjusted 2010 dollars) per trip in the West Coast Swordfish Fishery.

The relative distribution of swordfish revenue among vessels in the West Coast Swordfish Fishery was nearly constant from 2002 to 2008, based on the Gini coefficient, which ranged from 0.61 to 0.64 (Figure 66). Since 2008, the Gini coefficient has been increasing and reached 0.72 in 2012, indicating that revenue has become more concentrated among a portion of the fleet over more more recent years.

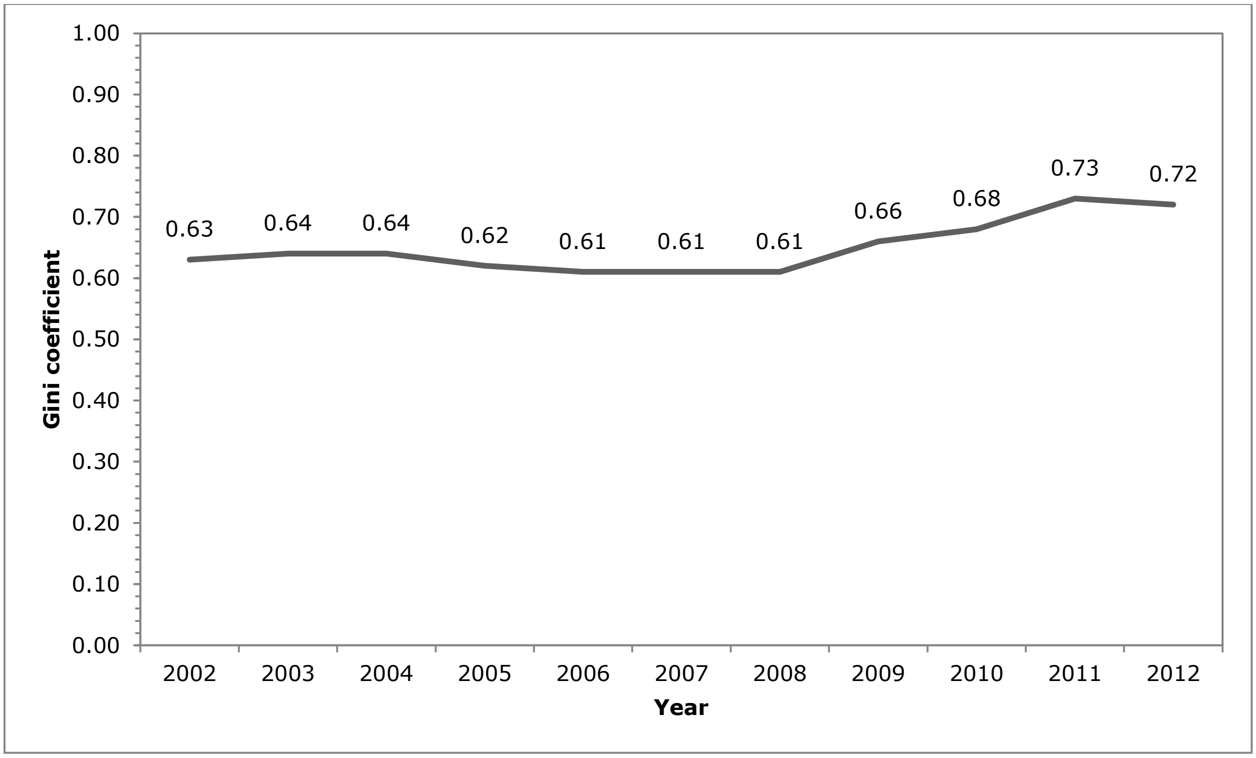

Figure 66. The Gini coefficient for active vessels participating in the West Coast Swordfish Fishery.

h. Synopsis of recent trends

The West Coast Swordfish Fishery has undergone a pattern of decline since the 1990s in terms of revenues, landings, participation, and fishing effort. This partially reflects a series of regulations that have resulted in dwindling participation in the drift gillnet and longline swordfish fisheries, which provided the largest share of swordfish landings and revenues during the 1990s. A large closure of the drift gillnet fishery north of Pt. Conception, to protect endangered sea turtles, is correlated with a pattern of decline in that portion of the swordfish fishery, while longline gear was not authorized for use on the West Coast when the Highly Migratory Species Fishery Management Plan went into effect in 2004. Though the harpoon portion is an open access fishery, inherent technical limitations and low catch rates have prevented it from substituting for the decrease in West Coast drift gillnet and longline landings. Despite the declining pattern of participation, effort, landings, and revenues, the portion of the West Coast drift gillnet swordfish fishery that remains in operation continues to serve as an economically profitable local supply of fresh swordfish to the West Coast.

Pacific Islands Region

The archipelagos of Hawaiʻi, American Samoa, and the Northern Mariana Islands (Guam and the Commonwealth of the Northern Mariana Islands) contain a variety of marine environments ranging from the deep ocean to coral reef to estuarine. As isolated landmasses, their fishing histories are accordingly rich. Federal fisheries in the Pacific Islands Region are managed by NOAA Fisheries and the Western Pacific Fishery Management Council under five Fishery Ecosystem Plans, which cover the American Samoa, Hawaiʻi, and Mariana archipelagos; Pacific Remote Island Areas, and Pacific Pelagic Fisheries of the Western Pacific Region. The Council replaced the former Fishery Management Plans for Bottomfish, Pelagics, Coral Reef Ecosystems, Crustaceans, and Precious Corals with these five Fishery Ecosystem Plans in 2010. Fishery Ecosystem Plans manage marine resources from a place-based rather than a species-based perspective. In addition to management oversight provided by the Western Pacific Fishery Management Council and NOAA Fisheries, highly migratory species such as bigeye and yellowfin tunas are also managed internationally by two Regional Fishery Management Organizations. The Western and Central Pacific Fisheries Commission (WCPFC) oversees pelagic fisheries management in the Pacific Islands Region and NOAA Fisheries West Coast Region implements regulations developed through the Inter-American Tropical Tuna Commission (IATTC) to manage pelagic fisheries in the Eastern Pacific Ocean. Species under the purview of these Regional Fishery Management Organizations migrate across international boundaries; thus, effective management requires coordination between countries with fishing interests in the Pacific Ocean.

Performance indicators for three main fisheries (the Hawaiʻi-based Longline; the Main Hawaiian Islands Bottomfish; and the American Samoa Longline Fisheries) for the most recent fishing year are reported in Table 6. Detailed trend data for each of these fisheries is reported below, following a synopsis of each fishery is provided including gears used, target and component species, products sold, current management approach, and key changes in the fishery.

Table 6. Pacific Islands Regions Fishery Performance Measures for 2012.

Catch and Landings	Hawai'i-based Longline	Hawai'i Deep 7[a]	American Samoa[b]
	Whole Pounds	Whole Pounds	Whole Pounds
Catch limits in management areas[c]	1,102,300; 8,295,995[d]	325,000	N/A
Landings in Management area[c]	650,357; 8,055,608[d]	N/A	N/A
Aggregate landings[b]	23,915,012[e]	240,044	7,269,292
Utilization	59%, 97%[d]	74%	N/A
Quota exceeded	No	No	N/A
Effort			
Number of permits (number)	164	458	60
Active Vessels (number)	129	465	24
Trips (number)	1,443	2,988	285
Days at sea (days)	32,772	3,189	5,476
Season length (days)	366	365	365
Revenue ($)[f]			
Fishery species revenue	$86,223,888	$1,580,814	$8,086,426
Other species revenue	$0	$841,225	$0
Total Revenue	$86,223,888	$2,422,040	$8,086,426
Average fishery species price (per pound)	$3.61	$6.59	$1.11
Fishery species revenue per vessel	$668,402	$3,400	$336,934
Other species revenue per vessel	$0	$1,809	$0
Total revenue per vessel	$668,402	$5,209	$336,934
Fishery species revenue per trip	$59,753	$529	$28,373
Other species revenue per trip	$0	$282	$0
Total revenue per trip	$59,753	$811	$28,373
Fishery species revenue per day at sea	$2,631	$496	$1,477
Other species revenue per day at sea	$0	$264	$0
Total revenue per day at sea	$2,631	$760	$1,477
Other			
Limited entry	Y	N	Y
Gini coefficient	0.21	0.72	0.29

[a] The main species in the Hawai'i bottomfish fishery are the Deep 7: opakapaka, onaga, hapu'upu'u, ehu, kalekale, gindai and lehi
[b] Data are not yet available for 2012, therefore these are 2011 values.
[c] Weights are given in whole pounds.
[d] Catch limits, landings, and utilization are presented separately for bigeye tuna in the Eastern Pacific Ocean and in the Western and Central Pacific Ocean, respectively.
[e] Aggregate landings of all pelagic species landed by the Hawai'i-based Longline Fishery.
[f] All revenue data have been adjusted by the GDP deflator indexed for 2010.
N/A = not applicable or not available

A. Hawai‘i-based Longline Fishery

The longline fishery has been active for many decades in Hawai‘i. The fishery expanded in the late 1980s due to the rapid development of local and U.S. mainland markets for fresh tuna and swordfish. In 1991, NOAA Fisheries implemented a moratorium on the issuance of new permits to provide a period of stability for the fishery while the Western Pacific Fishery Management Council and NOAA Fisheries developed a comprehensive, long-term management regime. Three years later, in 1994, a limited entry program was put in place that addressed potential and actual impacts of the expanded fishery on target stocks, and effects of longline catches on other fisheries. The longline fishery continues to be a limited entry fishery with a maximum of 164 permits allowed. Hawai‘i's pelagic fisheries also include troll, handline, and aku boat (pole and line) fisheries. Of all fisheries managed under the Pacific Pelagic Fishery Ecosystem Plan, the Hawai‘i-based Longline Fishery is the largest, accounting for the majority of Hawai‘i's commercial pelagic landings (about 78% in 2010).

1. <u>Fishery synopsis</u>

   a. Gear used

The Hawai‘i longline fleet has historically operated in two distinct modes based on gear deployment. Vessels that target deep-swimming bigeye tuna use deep-set longlines, whereas vessels targeting swordfish employ shallow-set longlines. On deep-set longlines, 20-30 hooks are typically deployed between floats and lines are allowed to sag in order to reach depths of up to 1,300 feet. On shallow-set longlines, only a few (approximately 4-6) hooks are deployed between floats, and the line is kept relatively taut so that it stays within the upper 100-300 feet of the water column. Whereas tuna are mainly targeted during the day, swordfish tend to be targeted at night with the use of luminescent light sticks.

   b. Target/component species

Tunas, billfishes, sharks, and other pelagic fishes are identified by the Western Pacific Fishery Management Council as Pelagic Management Unit Species (PMUS). The four main tunas in Hawai‘i's longline fishery are bigeye, yellowfin, skipjack and albacore. The majority of billfish landings (mostly swordfish) are from the shallow-set longline fishery that targets swordfish. Other billfish (including, blue marlin, and striped marlin) are caught and landed by both the deep-set and shallow-set fisheries. Other Pelagic Management Unit Species include mahimahi (dolphinfish), opah (moonfish), ono (wahoo), and monchong (pomfret).

   c. Market channels

The Hawai‘i Longline Fishery does not freeze its catch, almost all of which is sold fresh (ice chilled) at the United Fishing Agency auction in Honolulu. This auction is a major supplier to the sashimi market in Hawai‘i. Wholesale buyers at the auction purchase longline-caught fish directly from the auction, some of which may also be shipped to the U.S. Mainland, Japan and Canada. It is believed that very little of the longline catch is directly marketed to retailers or exported by fishermen. Tuna are purchased by both local and export wholesalers, whereas swordfish are mainly sold to export wholesalers and the catch is shipped by air to the U.S. Mainland, Japan, and Canada.

Longline-caught tunas are generally thought to be of higher quality than tunas caught using other types of gear because they are hooked in deeper, colder waters and do not struggle as much as those caught by vessels employing troll or handline gear. In addition, they may also have been chilled longer and more thoroughly than fish landed by handline and troll fishermen; and longline vessels tend to catch larger tunas than do trolling vessels. For these reasons, longline-caught tunas usually receive a premium price.

2. Management Program

a. Current management controls

The Hawaiʻi-based longline fishery is managed by NOAA Fisheries and the Western Pacific Fishery Management Council, in coordination with the objectives of two primary Regional Fishery Management Organizations: the Western and Central Pacific Fisheries Commission and the Inter-American Tropical Tuna Commission. The fleet fishes both inside and outside the U.S. Exclusive Economic Zone (EEZ), including the management areas of both Regional Fishery Management Organizations. Therefore, management is guided by the Highly Migratory Species Fishery Management Plan and the Pacific Pelagic Fishery Ecosystem Plan. Vessels fishing in the Hawaiʻi-based longline fishery must possess a Limited Entry Permit in order to fish.

While highly migratory species are exempted by the domestic Annual Catch Limit rules required by the Magnuson-Stevens Act, bigeye tuna was the first species in the Hawaiʻi Longline Fishery to be subject to international management measures addressing overfishing of bigeye tuna in the Pacific Ocean. Eastern Pacific Ocean (EPO) catch limits were implemented by the IATTC in 2004, while Western and Central Pacific Ocean (WCPO) catch limits were implemented by the Commission in 2009. Additionally, year-round and seasonal longline fishing are prohibited in several areas surrounding the Main Hawaiian Islands. Regulations are in place to limit the incidental bycatch of threatened and endangered species, including sharks, seabirds, sea turtles, and other marine mammals, specifically false killer whales. If the maximum annual limit on leatherback and loggerhead turtle interactions for the shallow-set longline fishery is reached, the fishery closes for the remainder of the calendar year. Observer requirements are mandated for both the deep-set and shallow-set fisheries; however, coverage requirements vary. A Vessel Monitoring System and observers on every shallow-set longline trip are in place to promote compliance with regulatory measures. One hundred percent observer coverage is not a mandated requirement for tuna (deep-set) trips, but the coverage rate is at least 20%. In addition, patrol vessels conduct routine inspections throughout the Pacific Ocean. The Western and Central Pacific Fisheries Commission also maintains a list of vessels that have engaged in illegal, unregulated, or unreported activities. Members of the Western and Central Pacific Fisheries Commission are prohibited from engaging in fishing activities or other related transactions with vessels on this list.

b. Key changes from past management controls

The Hawaiʻi shallow-set longline fishery for swordfish was closed by NOAA Fisheries in April 2001 due to a U.S. Federal Court order to reduce incidental sea turtle bycatch. After incorporating measures to reduce sea turtle bycatch, the fishery reopened in April 2004. These measures included annual limits on sea turtle bycatch of leatherback and loggerhead sea turtles, an annual fishing effort cap, the use of circle hooks (designed to reduce mortality in non-target species), the use of mackerel as bait instead of squid (to reduce the likelihood of attracting turtles), and 100% observer coverage on shallow-setting longline trips. Some turtle conservation measures were also adopted by the Hawaiʻi-based Deep-set Tuna Fishery. These measures led to a 90% reduction of bycatch of loggerhead and leatherback sea turtles by the Hawaiʻi shallow-set longline fishery. The Hawaiʻi shallow-set longline fishery experienced early closures in 2006 and again in 2011 upon reaching the limit on interaction with sea turtles. Bycatch rates of seabirds, such as several albatross species, have also been reduced in the Hawaiʻi longline fishery in recent years as a result of several seabird conservation measures. These include dyeing bait blue and attaching weights to baited hooks to make them sink faster. The False Killer Whale Take Reduction Plan for reducing mortality and serious injury to false killer whales around the Main Hawaiian Islands, as required by the Marine Mammal Protection Act, took effect on December 31, 2012, with gear requirements taking effect February 27, 2013.

Regular stock assessments of Pacific bigeye tuna are conducted by the Inter-American Tropical Tuna Commission and the Western and Central Pacific Fisheries Commission. Following assessments which determined that bigeye tuna were subject to overfishing in the Pacific Ocean, NOAA Fisheries established catch limits for U.S.-based longline fleets in the Eastern Pacific Ocean (EPO) in 2004 and Western and Central Pacific Ocean (WCPO) bigeye stocks in 2009. The limit in the WCPO reduced potential harvests of bigeye tuna to the amount landed by U.S. vessels in 2004, less 10%. The longline fishery operating in the WCPO closed early in 2009 and 2010 because the fleet was expected to reach the limit on bigeye tuna catch limit there. Landings of bigeye from the EPO have varied considerably. However, the bigeye tuna quota in the EPO has not yet restricted the Hawaiʻi-based Longline fishery, because the quota only applies to vessels longer than 24 meters. In the Hawaiʻi longline fleet, about 84% of the vessels are smaller than the 24 meters.

3. Management Objectives

The bottomfish fishery occurs in two separate geographical areas: the inhabited Main Hawaiian Islands with their surrounding reefs and offshore banks, and the Northwestern Hawaiian Islands. NOAA Fisheries closed the Northwestern Hawaiian Islands bottomfish fishery in accordance with Presidential Proclamation 8031, which established the Papahānaumokuākea Marine National Monument. Therefore, bottomfish fishing managed under the Hawaiʻi Fishery Ecosystem Plan occurs only in the Main Hawaiian Islands, where bottomfish habitat lies about half in state waters, and half in federal waters. Bottomfish fishing grounds within federal waters include Middle Bank, most of Penguin Bank and approximately 45 nautical miles of 100-fathom-deep bottomfish habitat in the Maui-Lanai-Molokai complex.

In addition to the National Standards established in the Magnuson-Stevens Act, the Pacific Pelagic Fishery Ecosystem Plan for the Western Pacific Region upholds the standards established in the original Pelagic Fishery Management Plan. The specific objectives in the Pacific Pelagic Fishery Ecosystem Plan include:

1) To maintain biologically diverse and productive marine ecosystems and foster the

long-term sustainable use of marine resources in an ecologically and culturally sensitive manner through the use of a science-based ecosystem approach to resource management.

2) To provide flexible and adaptive management systems that can rapidly address new scientific information and changes in environmental conditions or human use patterns.
3) To improve public and government awareness and understanding of the marine environment in order to reduce unsustainable human impacts and foster support for responsible stewardship.
4) To encourage and provide for the sustained and substantive participation of local communities in the exploration, development, conservation, and management of marine resources.
5) To minimize fishery bycatch and waste to the extent practicable.
6) To manage and co-manage protected species, protected habitats, and protected areas.
7) To promote the safety of human life at sea.
8) To encourage and support appropriate compliance and enforcement with all applicable local and federal fishery regulations.
9) To increase collaboration with domestic and foreign regional fishery management and other governmental and nongovernmental organizations, communities, and the public at large to successfully manage marine ecosystems.
10) To improve the quantity and quality of available information to support marine ecosystem management.

4. Recent Trends

a. Catch limits and landings

Landings of all species in the Hawaiʻi-based Longline Fishery were 17.2 million pounds in 2002, then steadily increased until 2005, when they totaled 21.3 million pounds (Figure 67). The next year, 2006, landings dropped by 6% to 20 million pounds. Landings increased for the following two years, reaching 23.9 million pounds in 2008, then decreased (by 17%) to 19.8 million pounds in 2009. Landings then trended upward to 24.2 million pounds in 2011, but dropped 1% in 2012 to 23.9 million pounds (Figure 67).

Since bigeye tuna catch limits differ in the EPO and WCPO, indicators for catch limits, landings and utilization are presented separately for the two regions. There were no bigeye catch limits in place for 2002, 2003, or 2008 in the EPO; catch limits were 330,693 pounds per year from 2004 to 2006 and 1.1 million pounds in 2007. From 2009 to 2011, the catch limit was 1.1 million pounds for all U.S. vessels greater than 24 meters. There were no catch limits for bigeye tuna in the WCPO for 2002 – 2008; the catch limit for U.S. longline vessels was 8.3 million pounds for 2009–2012 (Figure 68).

Landings of bigeye tuna in the EPO ranged between 291,000 pounds in 2002 and 1.1 million pounds in 2005. During 2002–2011, EPO bigeye landings were the lowest in 2006 at 108,000 pounds. In 2012, landings were 650,000 pounds, a 123% increase over 2002 landings. WCPO bigeye landings in 2002 were approximately 10 million pounds in 2002 and fell to 8 million pounds the following year, about a 20% decrease. For the next three years, WCPO bigeye tuna landings averaged 9.6 million pounds and rose to 11.9 million pounds in 2007. Since then, bigeye tuna landings have decreased at an average annual rate of 10% to 7.9 million pounds in

2011, but in 2012 landings increased by 2% to 8.1 million pounds, when compared to 2011 landings (Figure 68).

In 2005, bigeye tuna landings by the Hawaiʻi longline fleet in the EPO totaled 1.1 million pounds, which exceeded (by 230%) the EPO catch limit of 330,693 pounds for this fleet (Figure 69). EPO bigeye tuna catch limits were not exceeded in any other year during 2004–2012, with quota utilization of 33-90%. Utilization of the available bigeye tuna quota for the fleet in the WCPO has been near 100% for 2009–2012, but catch limits were not exceeded for any year during that period (Figure 69).

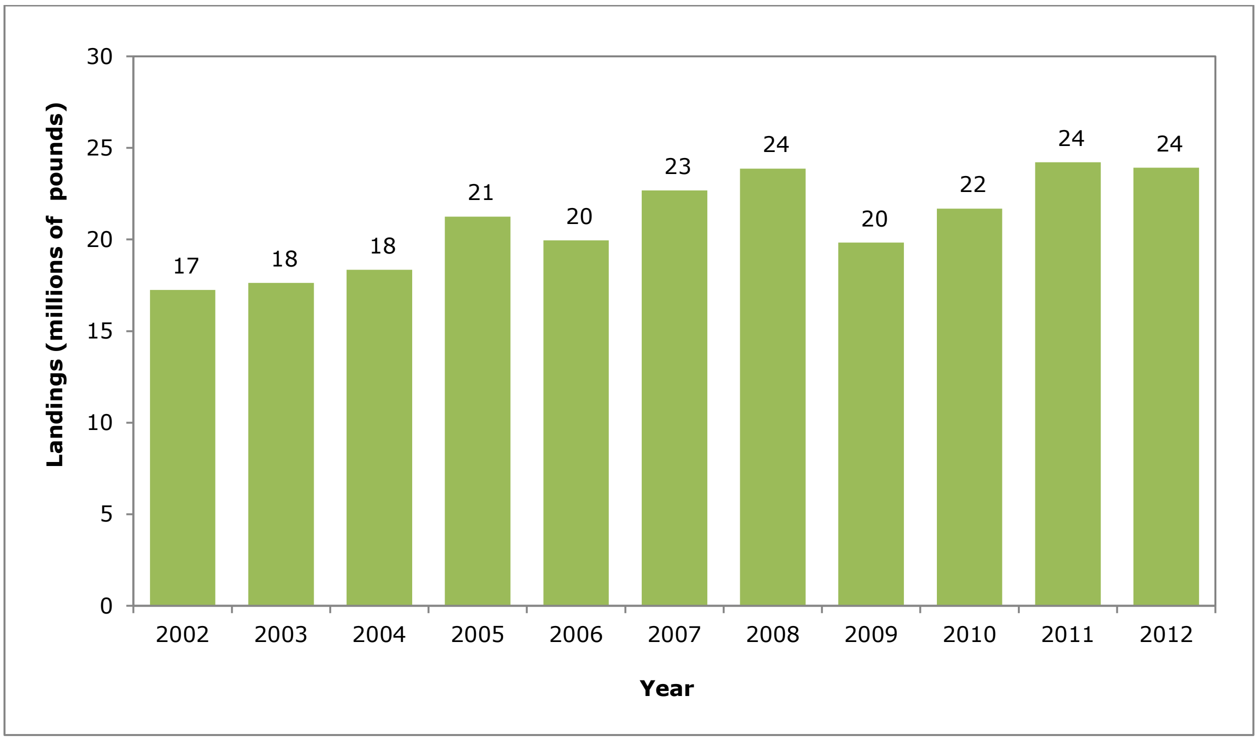

Figure 67. Landings of all species in the Hawaiʻi-based Longline Fishery.

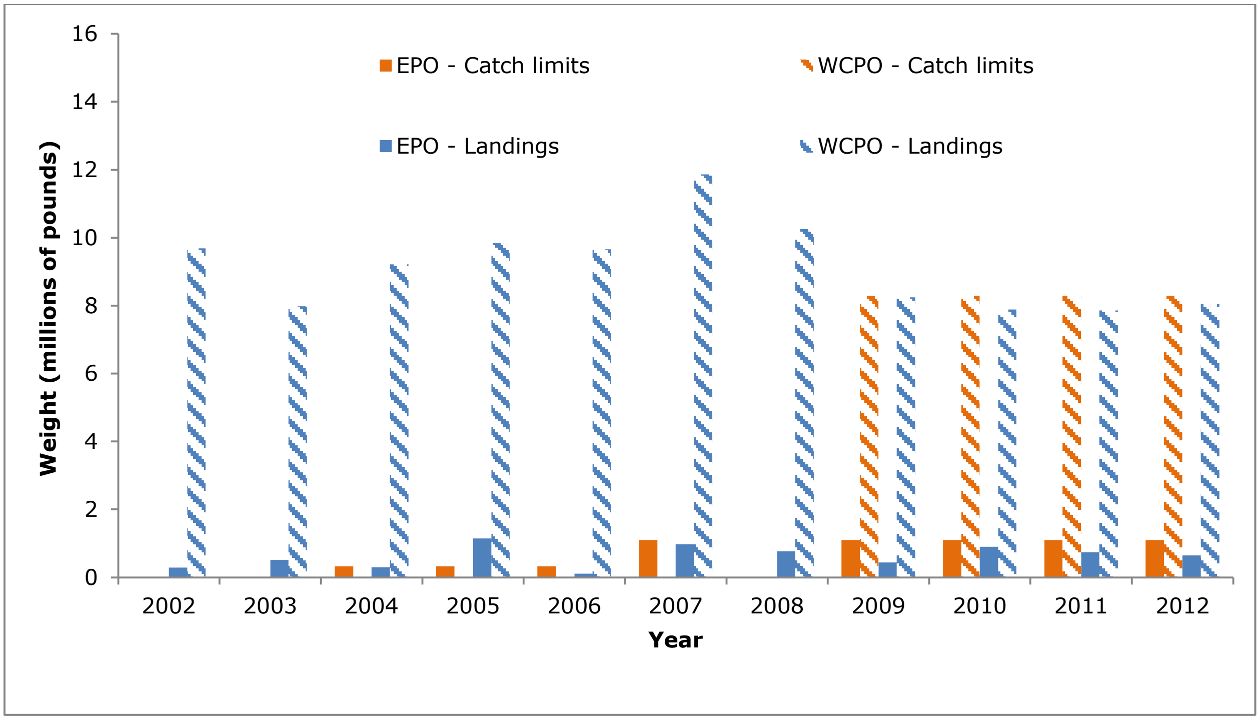

Figure 68. Eastern Pacific Ocean (EPO) and Western Central Pacific Ocean (WCPO) bigeye catch limits and landings in the Hawai‘i-based Longline Fishery. Note that there was no catch limit in the EPO for 2002, 2003, and 2008 and no catch limit in the WCPO for 2002 – 2008.

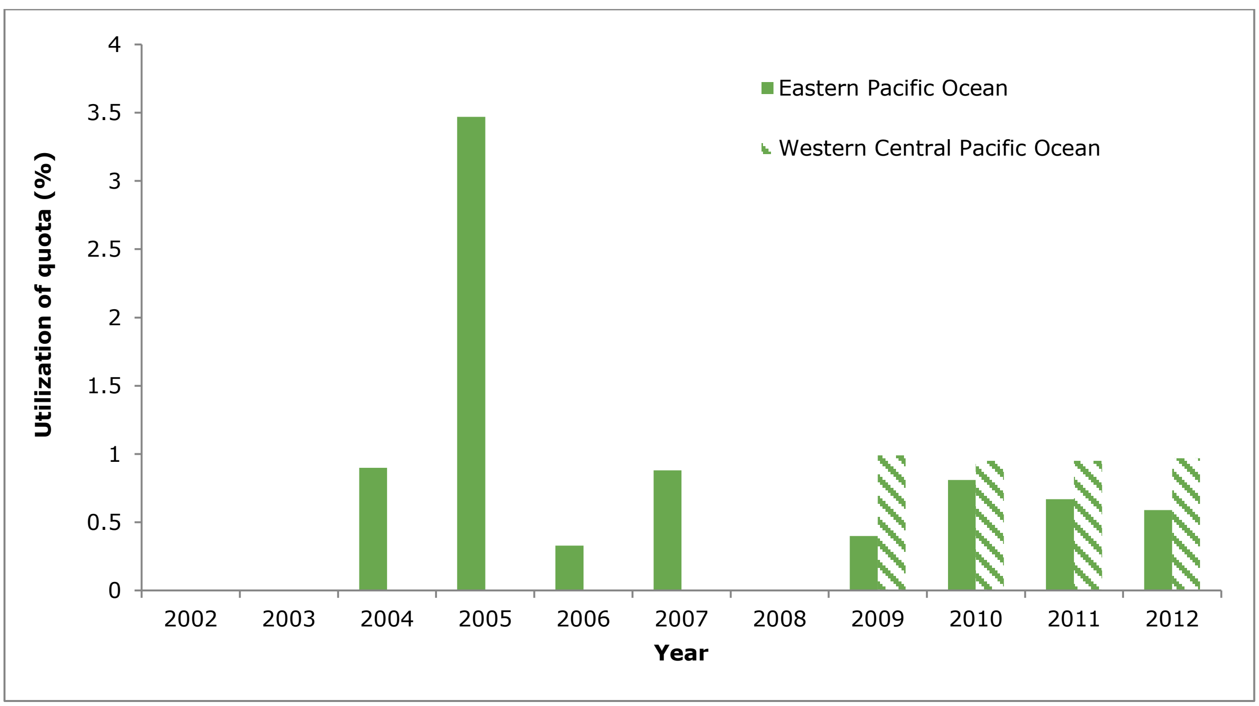

Figure 69. Utilization of the available bigeye tuna quota by the Hawai‘i-based Longline Fishery in the Eastern Pacific Ocean (EPO) and Western Central Pacific Ocean (WCPO). Note that there was no catch limit in the EPO for 2002, 2003, and 2008 and no catch limit in the WCPO for 2002 – 2008.

b. Effort

The Hawai'i Longline Fishery is a limited entry fishery with a maximum of 164 permits. No new permits can be issued because this is a limited entry fishery, but permits are renewable and freely transferable. The number of active vessels fluctuated between 102 and 129 during 2002-2012 (Figure 70). In 2002 and 2003, respectively, there were 102 and 110 active vessels in the fishery; since then, the number of active vessels has averaged 127.

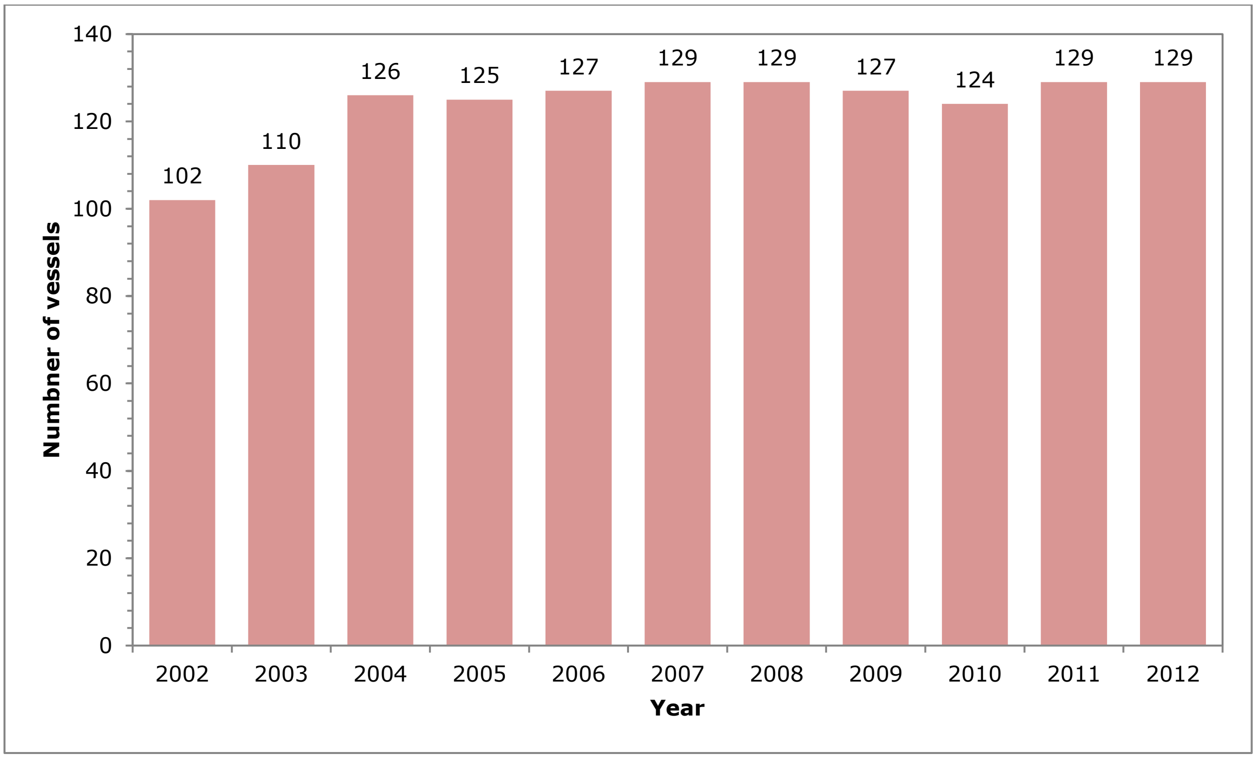

Figure 70. Number of active vessels participating in the Hawai'i-based Longline Fishery.

Season length for the Hawai'i-based Longline Fishery differs for the shallow-set swordfish and deep-set tuna components. Some segments of the longline fishery were closed in certain months in some years, usually due to interactions with prohibited species (Figure 71).

As noted above, the Hawai'i shallow-set longline fishery for swordfish was closed from April 2001 to April 2004, to reduce incidental sea turtle bycatch. This fishery also closed early in both 2006 and 2011 when the sea turtle bycatch limit was met. The closure on March 20, 2006, resulted from reaching the annual interaction limit of 17 loggerhead turtles; the closure on November 18, 2011, resulted from reaching the limit of 16 leatherback sea turtles.

In 2009, the Hawai'i deep-set longline fishery for bigeye tuna in the WCPO was closed from December 29, 2009 to January 1, 2010 because the bigeye tuna catch limit in the WCPO was expected to be reached by December 29, 2009. Therefore, the season length for this fishery was 362 days in 2009. In 2010, the Hawai'i deep-set longline fishery for bigeye tuna in the WCPO was closed from November 22, 2010 to January 1, 2011 because the bigeye tuna catch limit in the WCPO was expected to be reached by November 22, 2010. Therefore, the season length for

Hawaiʻi deep-set longline fishery for bigeye tuna in WCPO was 325 days in 2010. The Hawaiʻi deep-set longline fishery was open year-round in all other years between 2002 and 2012.

On average, between 2002 and 2012, there were 1,387 trips taken annually in the Hawaiʻi Longline Fishery (Figure 72). Between 2002 and 2005, the number of trips taken in this fishery increased at an average annual rate of 10%, peaking at 1,552 trips in 2005. Numbers of trips generally trended down from 2006 to 2010, reaching a low of 1,321 trips in 2010, then increased by 5% in 2011, and then by 4% in 2012 to 1,443 trips.

The Hawaiʻi longline fleet spent 22,648 days at sea fishing in 2002 (Figure 73). Days at sea in the fishery increased by an annual average of 6% between 2002 and 2006, peaked at 32,225 in 2008, and remained stable in 2009-2011, averaging 31,500 days annually during this time period. In 2012, the number of days at sea increased by 4% relative to 2011, to 32,800 days.

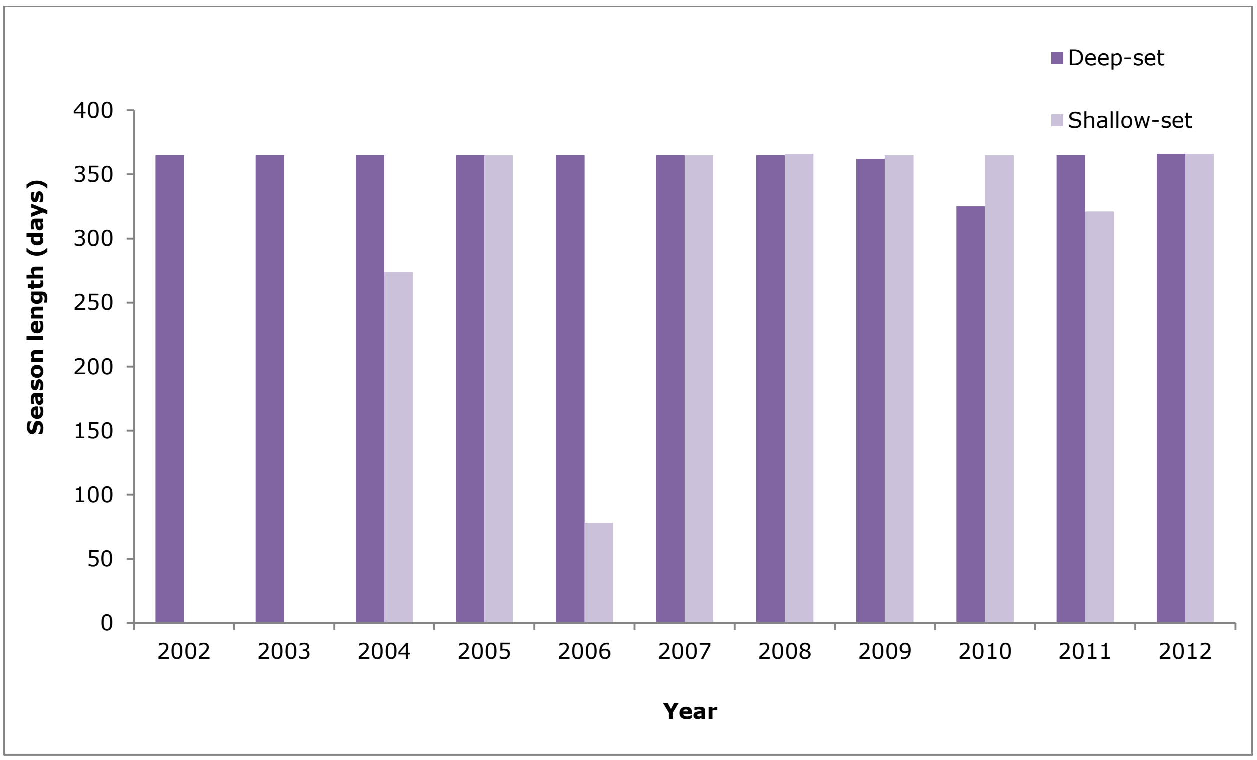

Figure 71. Season length for the deep-set tuna fishery and shallow-set swordfish fishery components of the Hawaiʻi-based Longline Fishery.

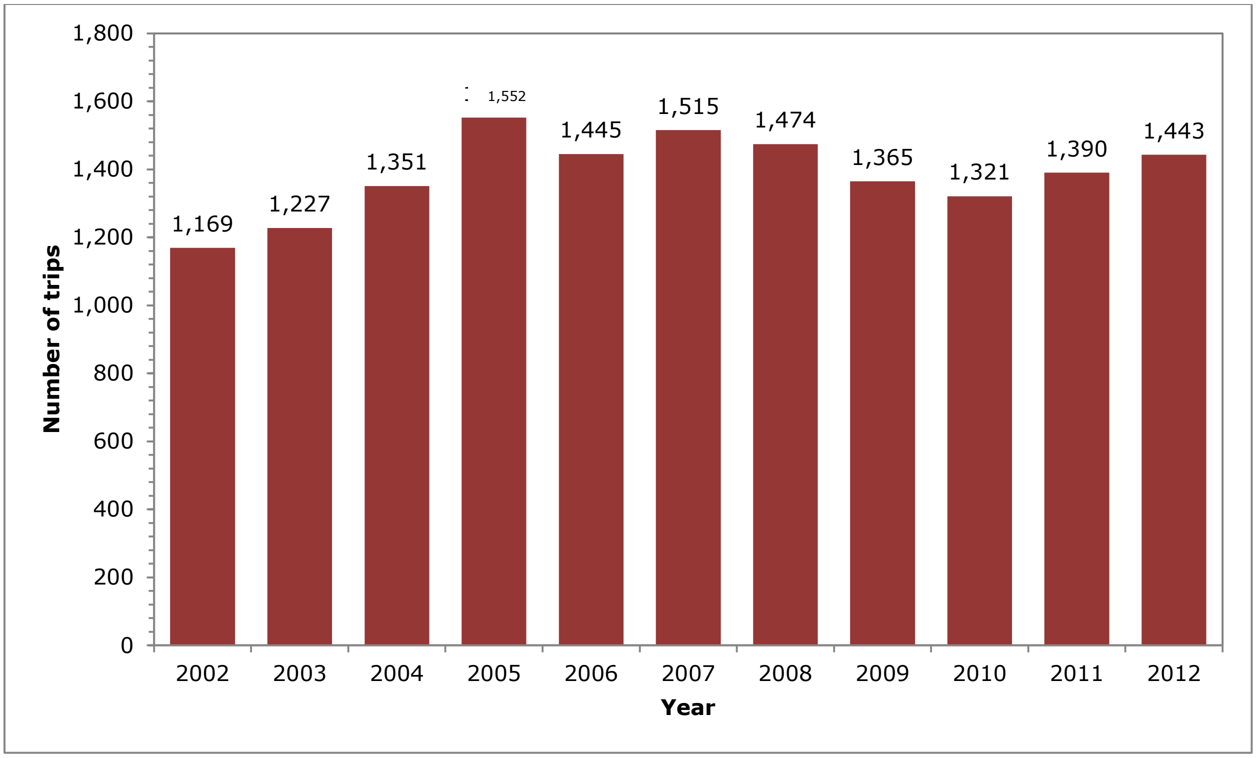

Figure 72. Number of trips taken in the Hawaiʻi-based Longline Fishery, including both shallow-set and deep-set fisheries.

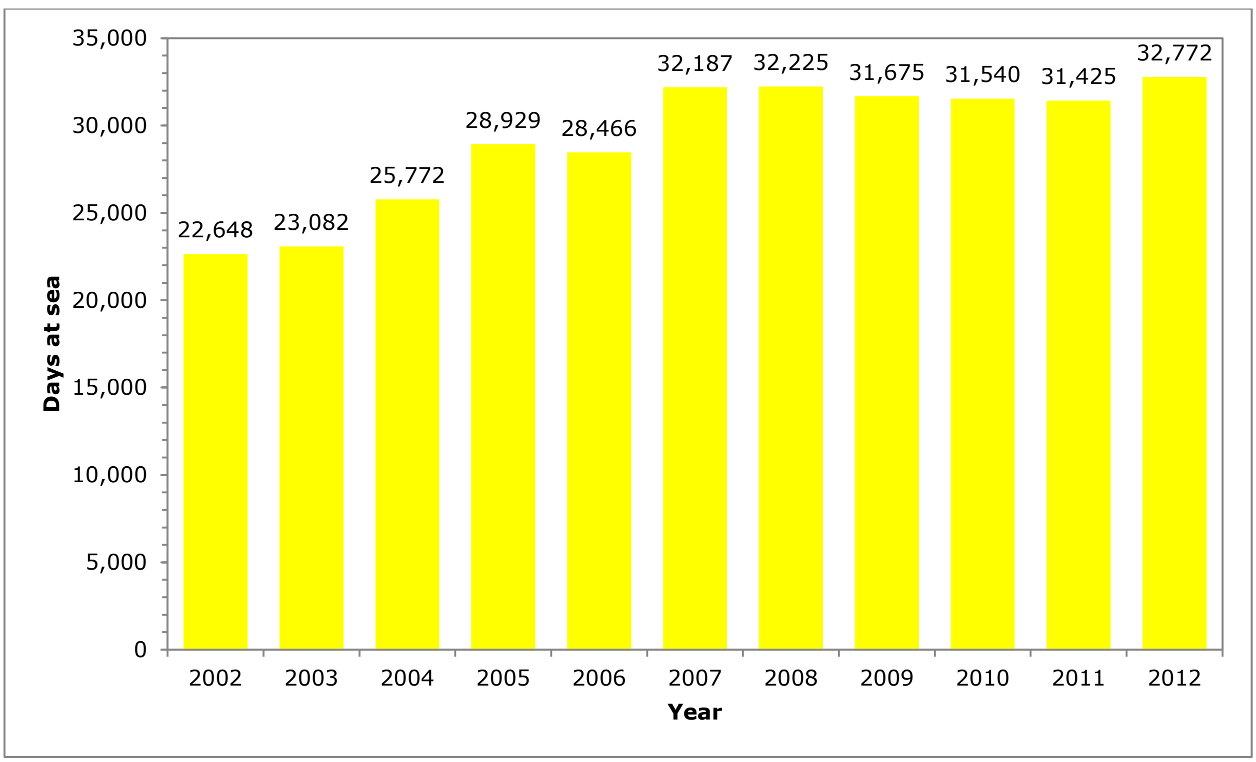

Figure 73. Number of days at sea fishing in the Hawaiʻi-based Longline Fishery.

c. Revenue

Figures for revenue presented here are inflation-adjusted, using the GDP deflator indexed for 2010. In the longline fishery, revenue was $46 million in 2002 (Figure 74), following which it increased over the next three years to $61 million in 2005. Revenue decreased in 2006 by 7%, relative 20 2005, to %57 million, but then showed an increasing trend until 2008, when it reached $71 million. The following year revenue decreased to $55 million, a 22% decrease from 2008. Since 2010, revenue has been increasing at an average annual rate of 16%, reaching a time-series high of $86 million in 2012, which was an 86% increase over 2002 revenue.

Average prices for all longline caught species were $2.68 in 2002 and 2003 (Figure 75). Prices fluctuated between $2.75 and $2.97 in the period 2004-2009, and then increased for the next two years to a high of $3.61 in 2012, a 35% gain over 2002.

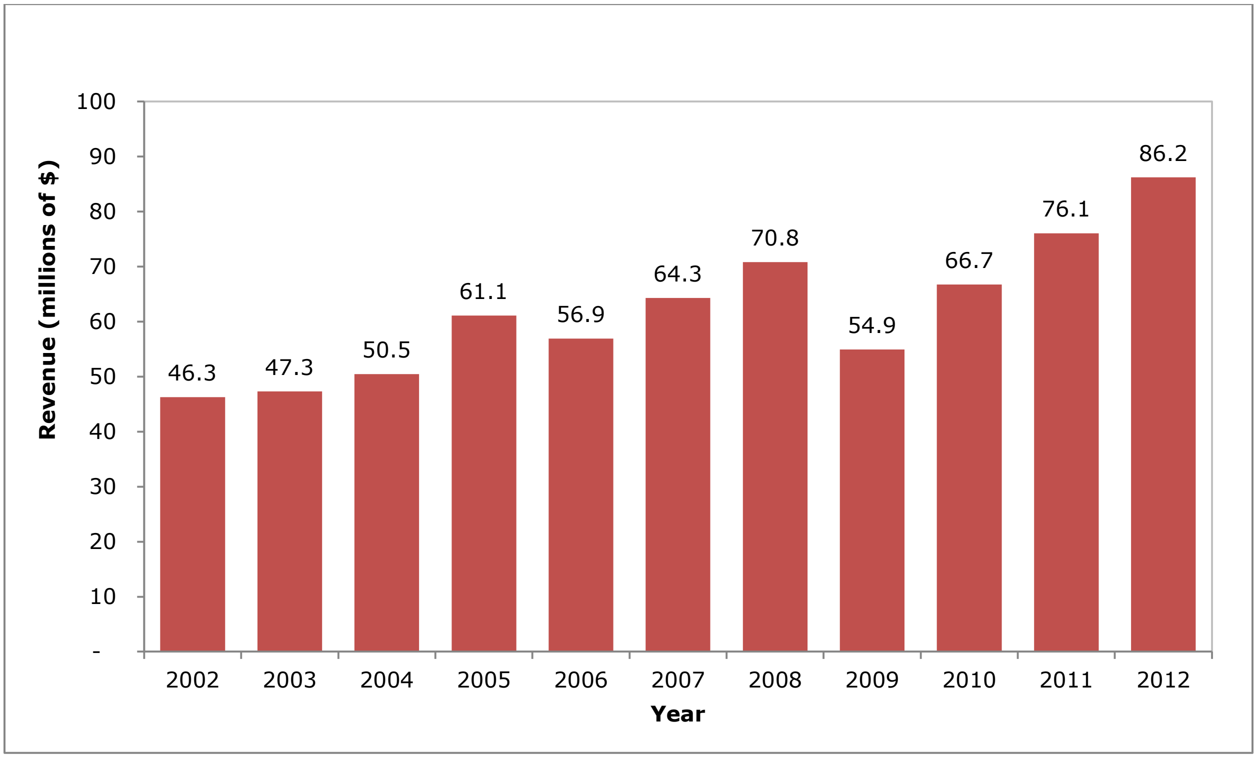

Figure 74. Revenue (inflation-adjusted 2010 dollars) in the Hawaiʻi-based Longline Fishery.

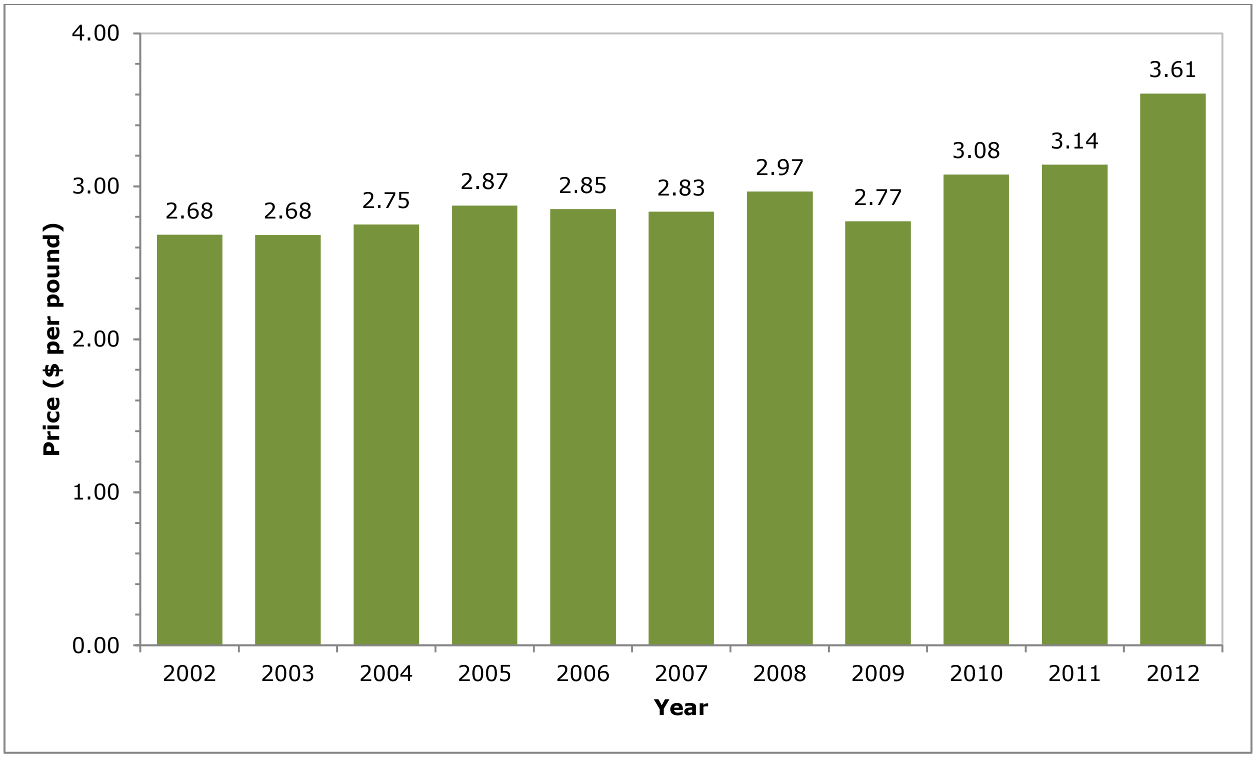

Figure 75. Average price (inflation-adjusted 2010 dollars) per pound for species landed in the Hawaiʻi-based Longline Fishery.

Revenue per vessel Hawaiʻi-based Longline Fishery was $454,000 in 2002 (Figure 76). The average revenue per vessel was $500,000 for 2002–2012, ranging from $401,000 in 2004 to $668,000 in 2012, the time-series maximum. Revenue per trip followed a similar trend as revenue per vessel (Figure 77). Revenue per trip was almost $45,000 in 2002–2012, ranging from a low of $37,000 in 2004 to a high of $60,000 in 2012.

Revenue per day at sea was about $2,040 in 2002 and 2003 (Figure 78). Revenue per day at sea declined in the next year by 4%. In 2005, revenue per day at sea increased by 8% to $2,112, but declined again for the next two years (5% and 0.1%, respectively) when compared to the previous year. In 2008, revenue per day at sea increased by 10% to $2,200, but declined (by 21%) in 2009 to $1,735. For the next three years, revenue per day at sea increased by 22%, 14% and 9%, respectively, when compared to the previous year. In 2012, revenue per day at sea was $2,630, which was the highest between 2002 and 2012 and a 29% increase over the 2002 value.

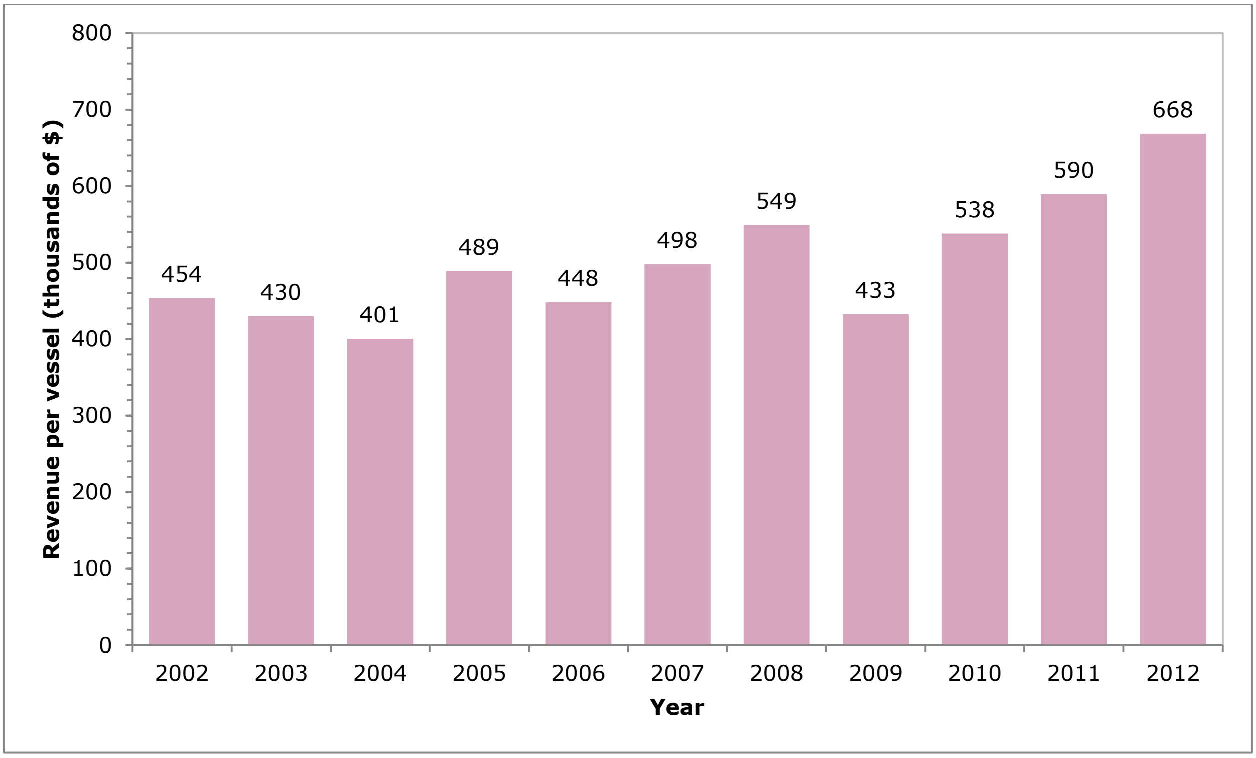

Figure 76. Revenue (inflation-adjusted 2010 dollars) per vessel participating in the Hawaiʻi-based Longline Fishery.

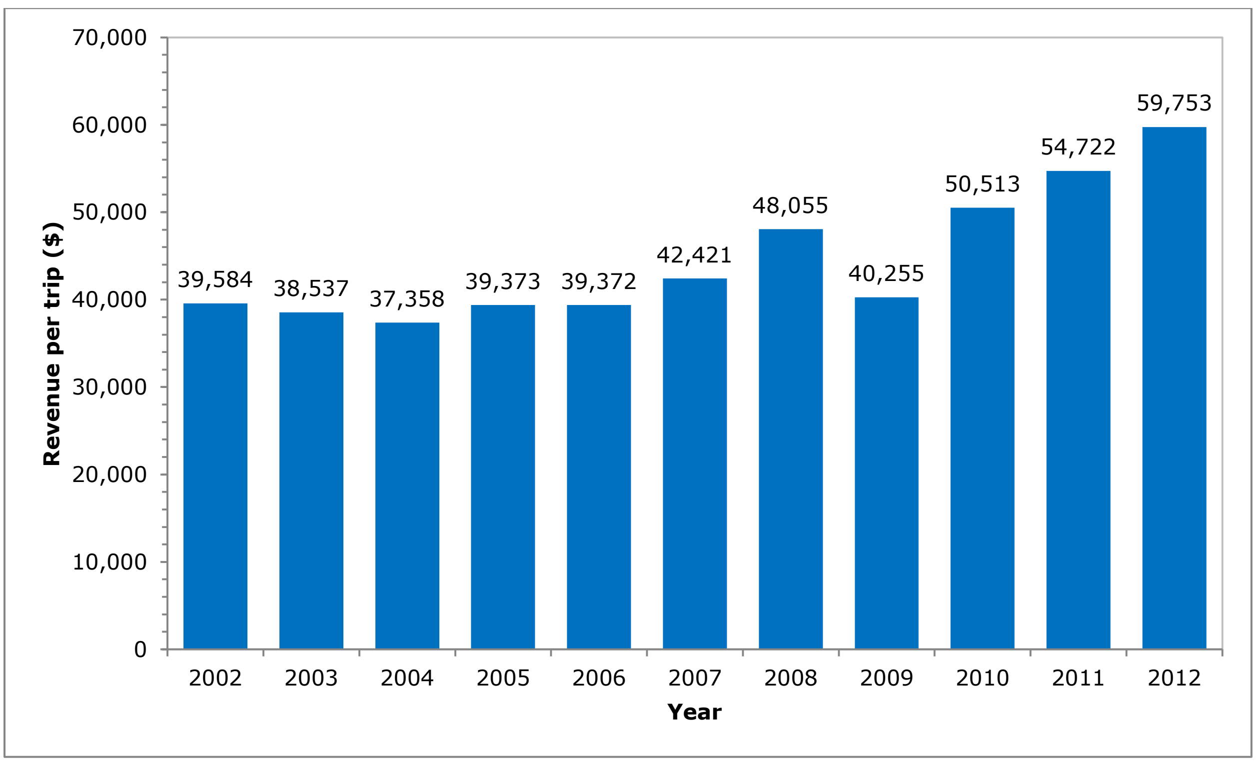

Figure 77. Revenue (inflation-adjusted 2010 dollars) per individual trip for the Hawaiʻi-based Longline Fishery.

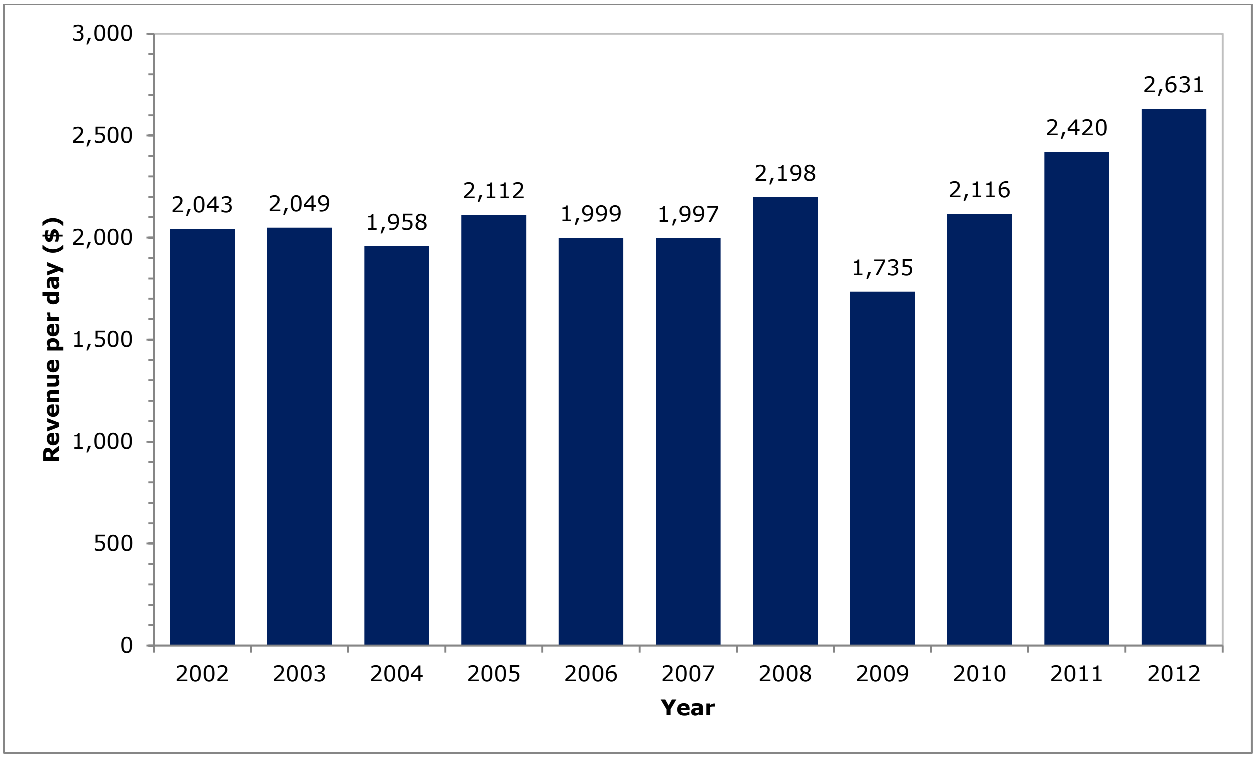

Figure 78. Revenue (inflation-adjusted 2010 dollars) per day at sea in the Hawaiʻi-based Longline Fishery.

The Gini coefficient was 0.22 in 2002 and increased to 0.27 in 2003. Since then, it fluctuated between 0.21 and 0.26, indicating that the distribution of revenue among vessels was stable during these years (Figure 79).

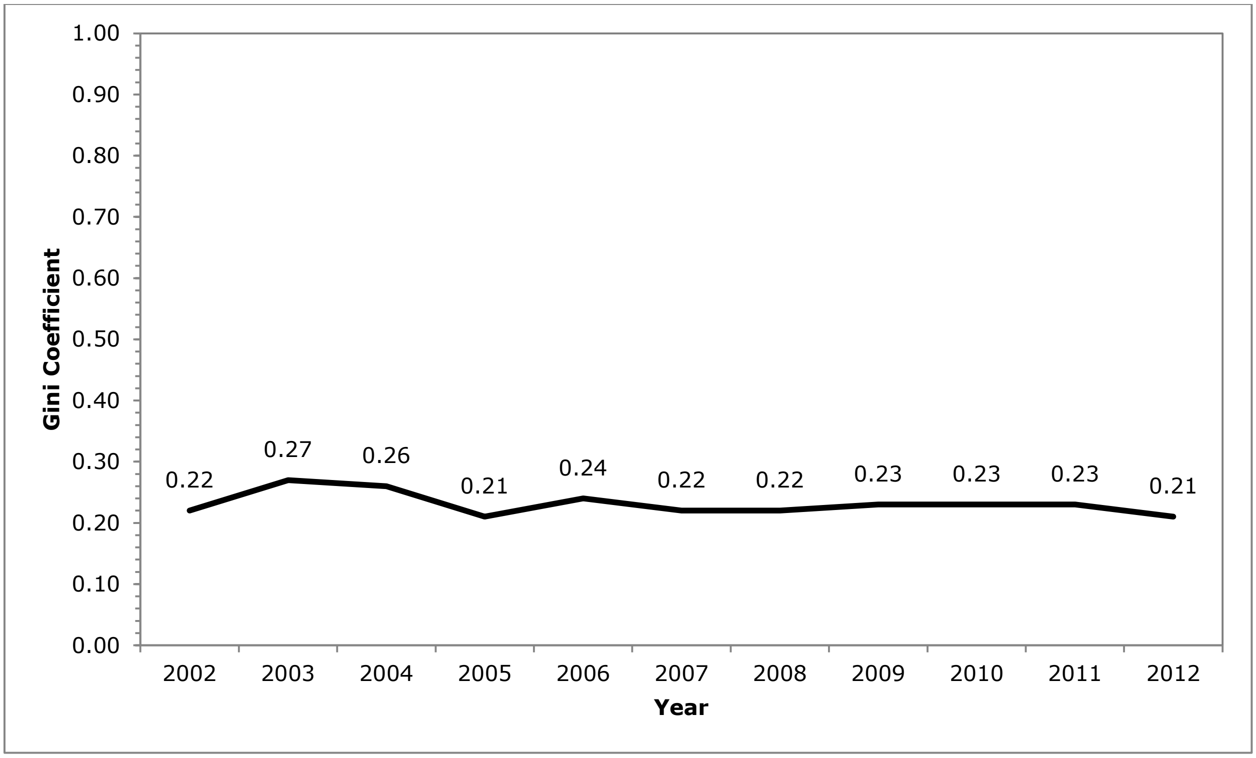

Figure 79. The Gini Coefficient for active vessels in the Hawaiʻi-based Longline Fishery.

d. Synopsis of recent trends

In Section 113 of the Consolidated and Further Continuing Appropriate Act of 2012, Congress had directed NOAA Fisheries to attribute bigeye tuna caught by the Hawaiʻi longline fishery to the U.S. Pacific Territories, subject to agreements that meet certain conditions. Congress had also directed the Council and NOAA Fisheries to develop and approve an appropriate amendment to the Fishery Ecosystem Plan which would make permanent the provisions of Section 113. On January 8, 2014, NOAA Fisheries published a proposed rule to establish a management framework for specifying annual catch and fishing effort limits and accountability measures for pelagic fisheries in the U.S. Pacific Territories, including authorization for the government of each territory to allocate a portion of its catch or fishing effort limit to a U.S. fishing vessel or vessels through a specified agreement. The proposed rule would also establish a limit for 2014 of 2,000 metric tons of longline-caught bigeye tuna for each territory, of which up to 1,000 metric tons may be allocated to U.S. longline fishing vessels though agreements subject to review and approval by the Council and NOAA Fisheries. If this action becomes final, then this would potentially allow the Hawaiʻi Longline Fishery, as a whole, to catch an additional 6.6 million pounds (3,000 mt) of bigeye tuna, although NOAA Fisheries anticipates the fishery will catch no more than about 2.2 million pounds (1,000 mt) annually, based on the previous three years' catches under Section 113 agreements. Those vessels that do not enter into agreements with territories might not directly benefit, but as any vessel or vessels sign on, the likelihood that the remaining fishery participants will not reach the Western and Central Pacific Fisheries Commission longline quota will increase. Any catch or fishing effort limits established by the Council and NOAA Fisheries would be consistent with applicable laws and agreements, and ensure sustainable harvest of fish stocks.

Bigeye tuna in the Western and Central Pacific has been experiencing overfishing for about two decades. A recent agreement approved by the Western and Central Pacific Fisheries Commission Working Group is to reduce the Hawaiʻi Longline Fishery's catch limit for bigeye tuna by 10%, in two increments in 2015 and 2017. This will reduce the catch limit for bigeye tuna available to Hawaiʻi-based Longline Fishery to about 7.4 million pounds in 2017. The goal of these catch reductions together with management of other countries' catches under the Western and Central Pacific Fisheries Commission agreement, is to eliminate overfishing on bigeye tuna by 2017. The proposed rule, discussed above, does not impede this objective.

B. Hawaiʻi Deep 7 Bottomfish Fishery

The bottomfish fishery occurs in two separate geographical areas: the inhabited Main Hawaiian Islands with their surrounding reefs and offshore banks, and the Northwestern Hawaiian Islands. NOAA Fisheries closed the Northwestern Hawaiian Islands bottomfish fishery in accordance with Presidential Proclamation 8031, which established the Papahānaumokuākea Marine National Monument. Therefore, bottomfish fishing managed under the Hawaiʻi FEP only occurs in the Main Hawaiian Islands, where about half of bottomfish habitat lies in State waters and other half lies in federal waters. Bottomfish fishing grounds within federal waters include Middle Bank, most of Penguin Bank and approximately 45 nautical miles of 100-fathom-deep bottomfish habitat in the Maui-Lanai-Molokai complex.

1. <u>Fishery synopsis</u>

   a. Gear used

Historically, bottomfish were targeted by Hawaiians using deep handlines from canoes. The modern fishery employs mechanical line haulers and other technology including fish finders and GPS navigational aids. Handlines are attached to terminal tackle with 6-8 circle hooks and a weight at the end. Federal requirements prohibit the use of bottom trawls, bottom gillnets, explosives, and poisons to target bottomfish.

   b. Target/component species

The Hawaiʻi bottomfish fishery targets snappers and groupers inhabiting reef slopes, seamounts, and banks at depths of up to 1,200 feet. The most desired species are known as the Deep 7: opakapaka (pink snapper), onaga (longtail snapper), hapuʻupuʻu (sea bass), ehu (squirrelfish snapper), kalekale (snapper), gindai (snapper), and lehi (silver jaw jobfish). Other important federally managed species are uku (gray jobfish, green jobfish), butaguchi (thick lipped trevally), kahala (amberjack), black ulua (black jack), white ulua (giant trevally), yellowtail kalekale (yellowtail snapper), and taʻape (blue stripe snapper).

   c. Market channels

In Hawaiʻi, bottomfish are an important part of the local culture and feature prominently in many traditional practices. Despite these traditions, locally-caught bottomfish make up a decreasing portion of the market. Declining local landings since the mid-1980s have been supplemented by increased foreign imports of species such as snapper and grouper from Tonga, New Zealand, Indonesia, Fiji, and Australia. In 2008, these imports accounted for more than 50% of the Hawaiʻi bottomfish market; however, in recent years the proportion of imports has decreased. The amount of imported fish is likely the combined result of many factors, including continued high levels of consumer demand and the closure of the Northwestern Hawaiian Islands commercial bottomfish fishery. The creation of the Papahānaumokuākea Marine National Monument in June 2006 closed the Northwestern Hawaiian Islands to commercial fishing, particularly affecting the bottomfish fishery. Initially, the creation of the National Monument included a date to phase out the Northwestern bottomfish fishery by June 15, 2011. NOAA Fisheries implemented a voluntary buyback program to compensate eligible permit holders in the bottomfish fishery (as well as the crustacean fishery), and the fishery was closed in November 2009.

2. Management Program

a. Current management controls

The harvest of bottomfish within the EEZ around the Main Hawaiian islands is jointly managed by NOAA Fisheries, the Western Pacific Fishery Management Council, and the Hawaiʻi Division of Aquatic Resources (HDAR) through the Hawaiian Archipelago Fishery Ecosystem Plan. Bottomfishing in the Main Hawaiian Islands is regulated through separate Annual Catch Limits for the Deep 7 Bottomfish and Non-Deep 7 Bottomfish Fisheries, as well as non-commercial permits (not limited entry), reporting (per state regulations), and a non-commercial bag limit of five Deep 7 bottomfish per trip. Gear restrictions prohibit the use of bottom trawls, bottom set gillnets, explosives, and poisons. The fishing season runs year-round, beginning September 1 and ending August 31; however, commercial and non-commercial fishing are closed in both federal and state waters if the commercial Annual Catch Limit is reached.

b. Key changes from past management controls

The Fishery Management Plan for Bottomfish and Seamount Groundfish Fisheries in the Western Pacific Region was implemented by NOAA Fisheries and the Western Pacific Fishery Management Council in 1986. In 2010, bottomfish species in the EEZaround the Main Hawaiian Islands became managed under the Hawaiian Archipelago Fishery Ecosystem Plan. While no new regulations were made at that time, the Hawaiian Archipelago Fishery Ecosystem Plan incorporated provisions from the Bottomfish and Seamount Groundfish Fishery Management Plan and represents a shift away from species-based management and towards place-based management. The Hawaiian Archipelago Fishery Ecosystem Plan has been amended three times since its implementation in 2010. The first amendment established eligibility requirements and procedures for reviewing and approving community development plans, to promote participation of island communities in fisheries that they traditionally depend on, but may not have the capability to support continued and substantial participation. The second amendment established the Hancock Seamounts Ecosystem Management Area and continued the moratorium on the harvest of certain stocks that are in the process of rebuilding. In line with the National Standards established under the Magnuson-Stevens Act, the third amendment incorporated a mechanism for specifying Annual Catch Limits.

3. Management Objectives

The Hawaiʻi Fishery Ecosystem Plan for the Western Pacific upholds the National Standards established under the Magnuson-Stevens Act, as well as the management objectives established in the original Bottomfish Fishery Management Plan. The objectives of the Hawaiʻi Fishery Ecosystem Plan are:

1) To maintain biologically diverse and productive marine ecosystems and foster the long-term sustainable use of marine resources in an ecologically and culturally sensitive manner through the use of a science-based ecosystem approach to resource management.

2) To provide flexible and adaptive management systems that can rapidly address new scientific information and changes in environmental conditions or human use patterns.
3) To improve public and government awareness and understanding of the marine environment in order to reduce sustainable human impacts and foster support for responsible stewardship.
4) To encourage and provide for the sustained and substantive participation of local communities in the exploration, development, conservation, and management of marine resources.
5) To minimize fishery bycatch and waste to the extent practicable
6) To manage and co-manage protected species, protected habitats, and protected areas.
7) To promote the safety of human life at sea.
8) To encourage and support appropriate compliance and enforcement with all applicable local and federal fishery regulations.
9) To increase collaboration with domestic and foreign regional fishery management and other governmental and non-governmental organizations, communities, and the public at large to successfully manage marine ecosystems.
10) To improve the quantity and quality of available information to support marine ecosystem management.

4. Recent Trends

The Deep 7 bottomfish species comprise onaga, ehu, opakapaka, kalekale, gindai, hapuʽupuʽu, and lehi. Non-Deep 7 bottomfish are uku (gray jobfish, green jobfish), butaguchi (thick lipped trevally), kahala (amberjack), black ulua (black jack), white ulua (giant trevally), yellowtail kalekale (yellowtail snapper), ta'ape (blue stripe snapper). Only Deep 7 species are defined as "in fishery" for purposes of data presentation in this analysis.

The Deep 7 operated under a calendar year up to and including 2006. In 2007, the Council recommended immediate closure of the fishery for bottomfish stocks that were experiencing overfishing. The fishery was under emergency closure from May 15 through September 30, 2007, and reopened on October 1, 2007. During the closure period, the Council, NOAA Fisheries, and the state of HawaiʻI developed long-term management measures to prevent overfising of HawaiʻI's bottomfish resources for the future. When the fishery reopened in 2007, it was under quota/Annual Catch Limit management, and fishing years were no longer identical with the calendar year. The fishing year in 2007 – 2008 was October 1, 2007 to April 15, 2008. The fishing year for 2008–2009 was November 15, 2008 to July 5, 2009; in 2009-2010, it was September 1, 2009 to April 19, 2010; in 2010–2011 it was September 1, 2010 to March 11, 2011; in 2011–2012 was September 1, 2011 to August 31, 2012; and in 2012–2013 it was September 1, 2012 to August 31, 2013.

a. Quota

Quotas were not used to manage the Deep 7 bottomfish fishery until the 2007-2008 fishing year. During 2007-2012, the average quota for the Deep 7 Fishery was 263,000 pounds, the largest being 325,000 pounds in 2011 and the smallest quota was 32,500 pounds in 20012 (Figure 80). Aggregate landings include the total estimated whole weight of Deep 7 bottomfish landed on trips attributed to the Main Hawaiian Islands Commercial Deep 7 Bottomfish Fishery. The data do not include unreported charter or unreported recreationally caught Deep 7 species. Landings of

Deep 7 species averaged 225,000 pounds over this time period, with the largest landings (265,000 pounds) in 2010. Landings of the Deep 7 exceeded the quota in 2007, 2008 and 2010, by 9%, 6%, and 4%, respectively. In 2009, 2011, and 2012, quota utilization was 81%, 71%, and 74%, respectively (Figure 81).

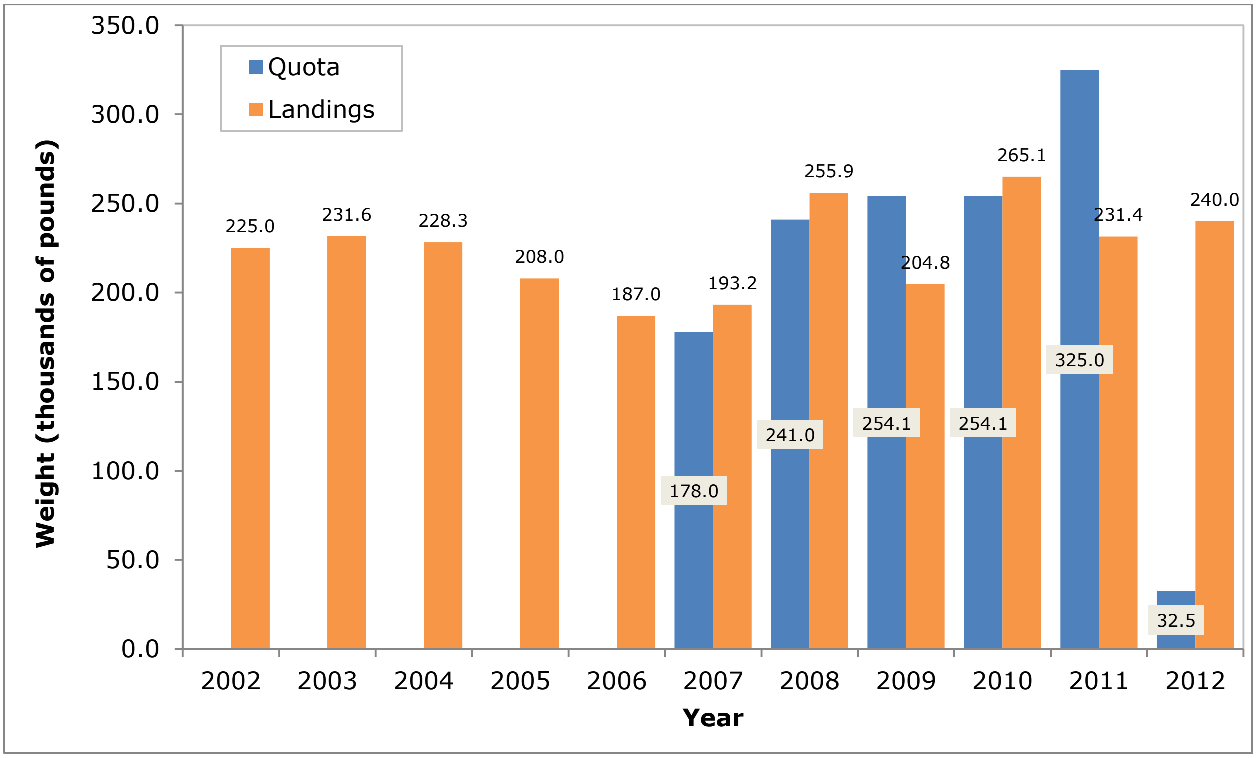

Figure 80. Quota and landings in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

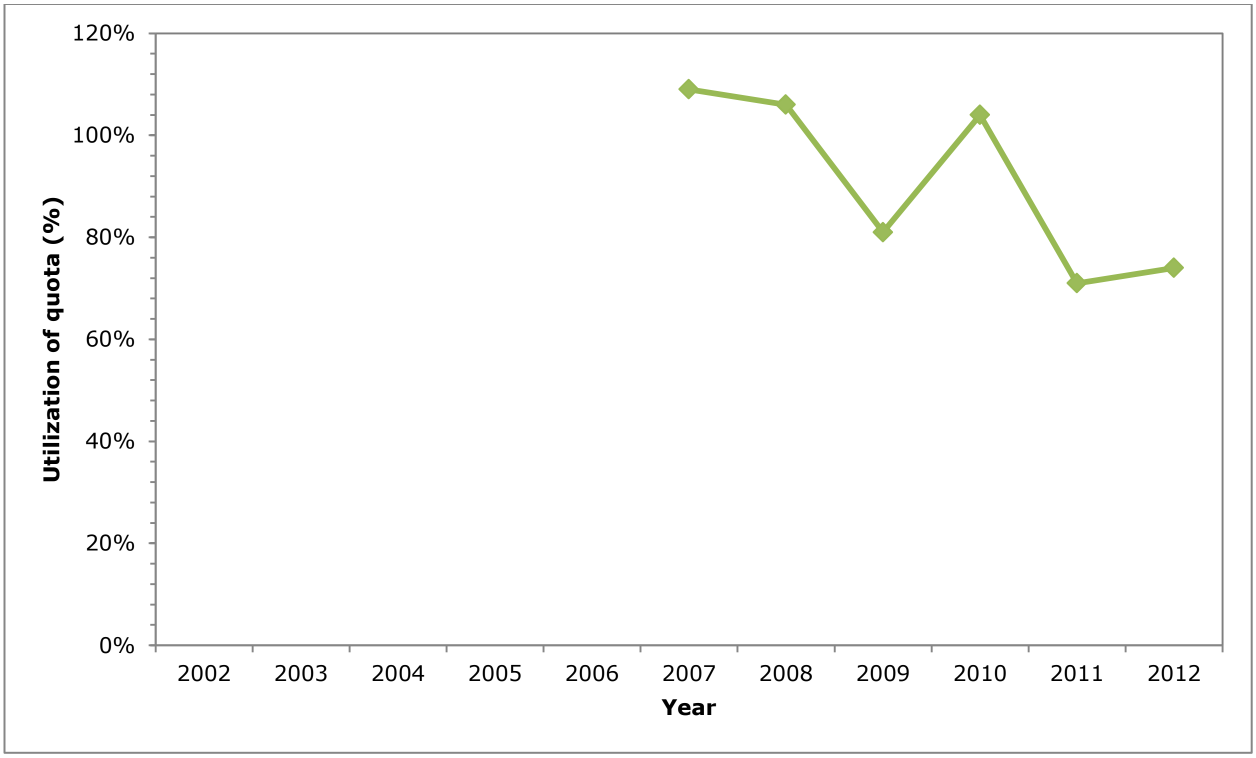

Figure 81. Utilization of the available quota in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

b. Effort

The number of permits issued was equivalent to the number of fishers who reported landing Deep 7 species while possessing a Hawaiʻi Commercial Marine License (CML). The number of permits in the Deep 7 Fishery averaged 408 permits in 2002-2012, with the most (479) issued in 2011 and the fewest (332) in 2006 (Figure 82). There were 551 active vessels participating in the Deep 7 Fishery in 2002; the number decreased by 16% to 465 vessels in 2012 (Figure 83). In 2008, the numbers of both permits and vessels increased 36%, mainly due to the new federal requirement to obtain a recreational bottomfish fishing permit, implemented in 2008. A bag limit (five Deep 7 bottomfish) applies to all recreational permit holders, while no bag limits apply to fishermen with a State of Hawaiʻi CML. This may have caused a surge of CML applications in 2008.

There is a wide range of effort and fisher motivation among participants in the Main Hawaiian Islands Bottomfish Fishery. At one end of the spectrum, a small number of highliners account for a large proportion of total effort and catch, as well as a large proportion of revenue, because they sell the majority of their catch. At the other end of the spectrum, a large number of participants fish only occasionally, selling some or none of their catch, thus accounting for a relatively small proportion of revenue. As a result, the figures for average revenue per vessel capture neither the nuances of fishery participation nor the diversity of the fleet; it is important to bear this in mind while interpreting the following figures.

Previous to the 2007 season, the Deep 7 Bottomfish Fishery was open year-round (Figure 84). Between 2007 and 2010, the fishery experienced closures, with the shortest fishing season being

192 days in 2010. In 2011 and 2012, the fishery was again open year-round since total landings did not reach the Annual Catch Limit.

Despite the fact that fishing was open for the fewest days in 2010, fishermen took the most trips (3,434 trips) in that year (Figure 85). On average, during 2002–2012, there were 2,868 trips taken in the Deep 7 Fishery. The season with the fewest number of days at sea (2,345) was 2007 and the most (3,434) was 2010 (Figure 86).

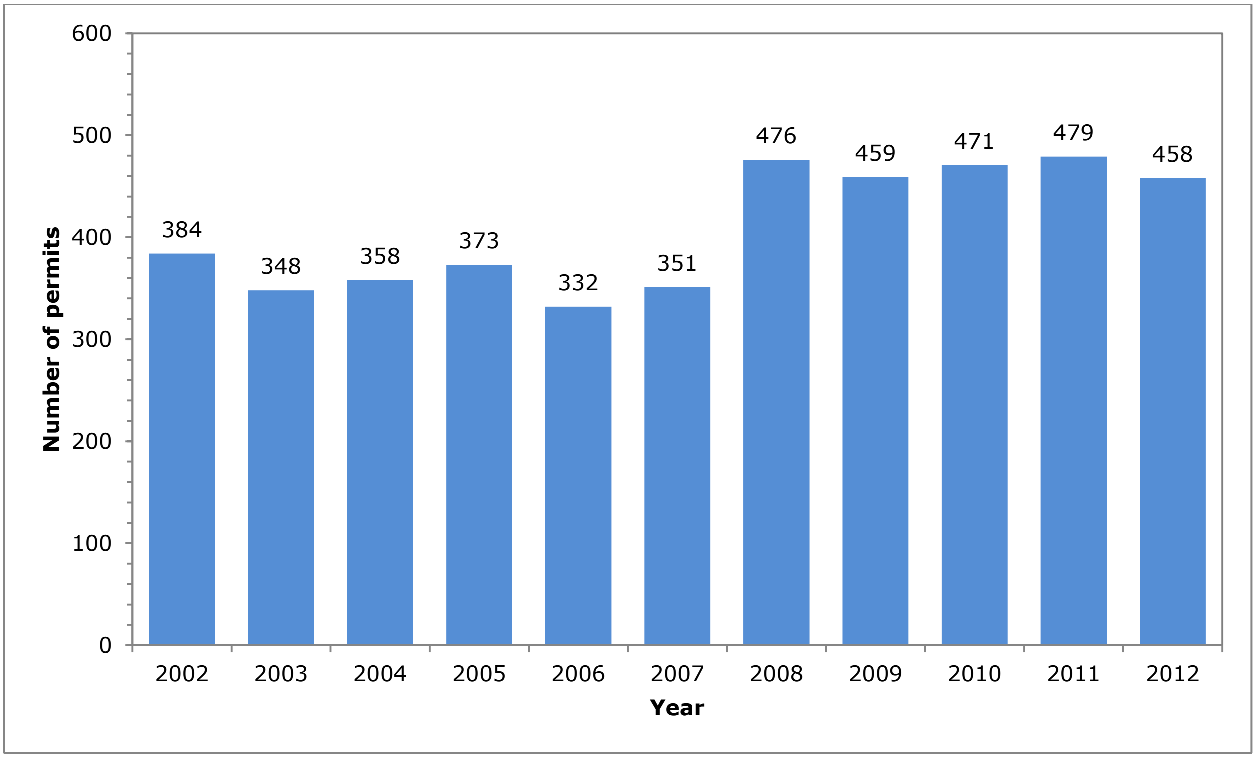

Figure 82. Number of permits in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

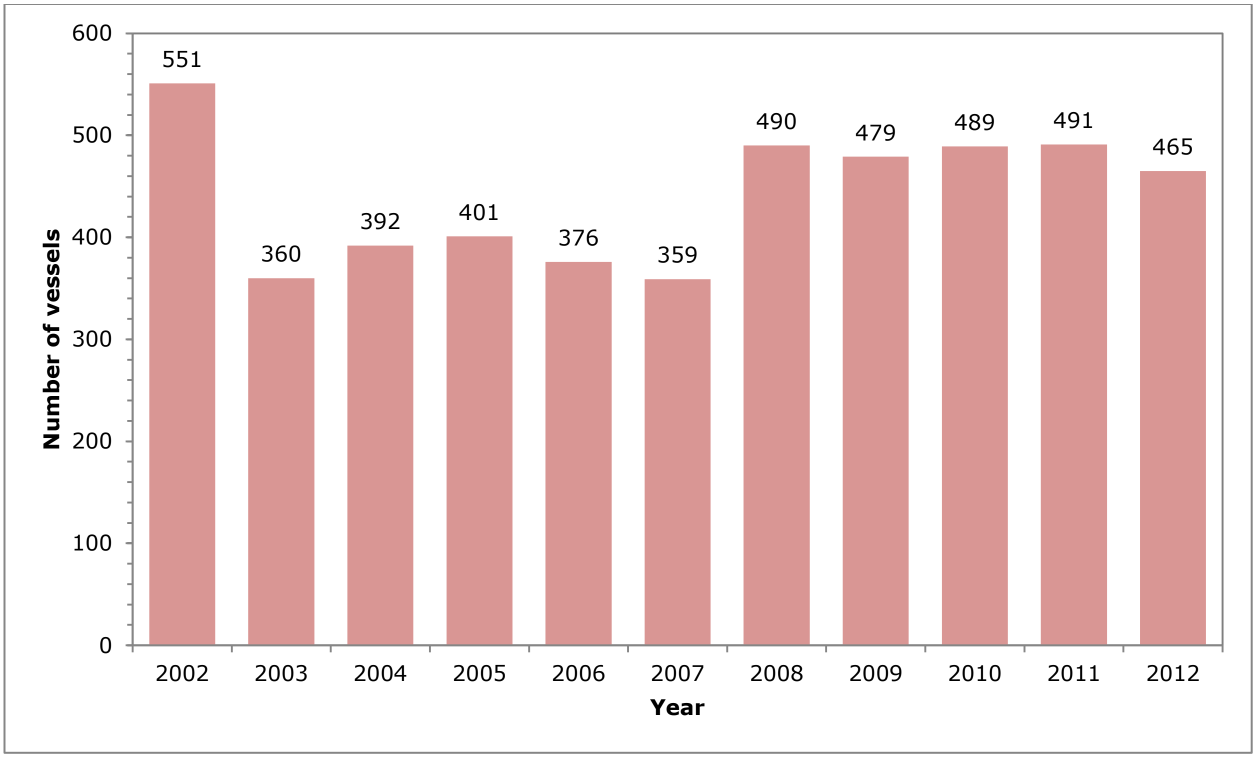

Figure 83. Number of active vessels participating in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

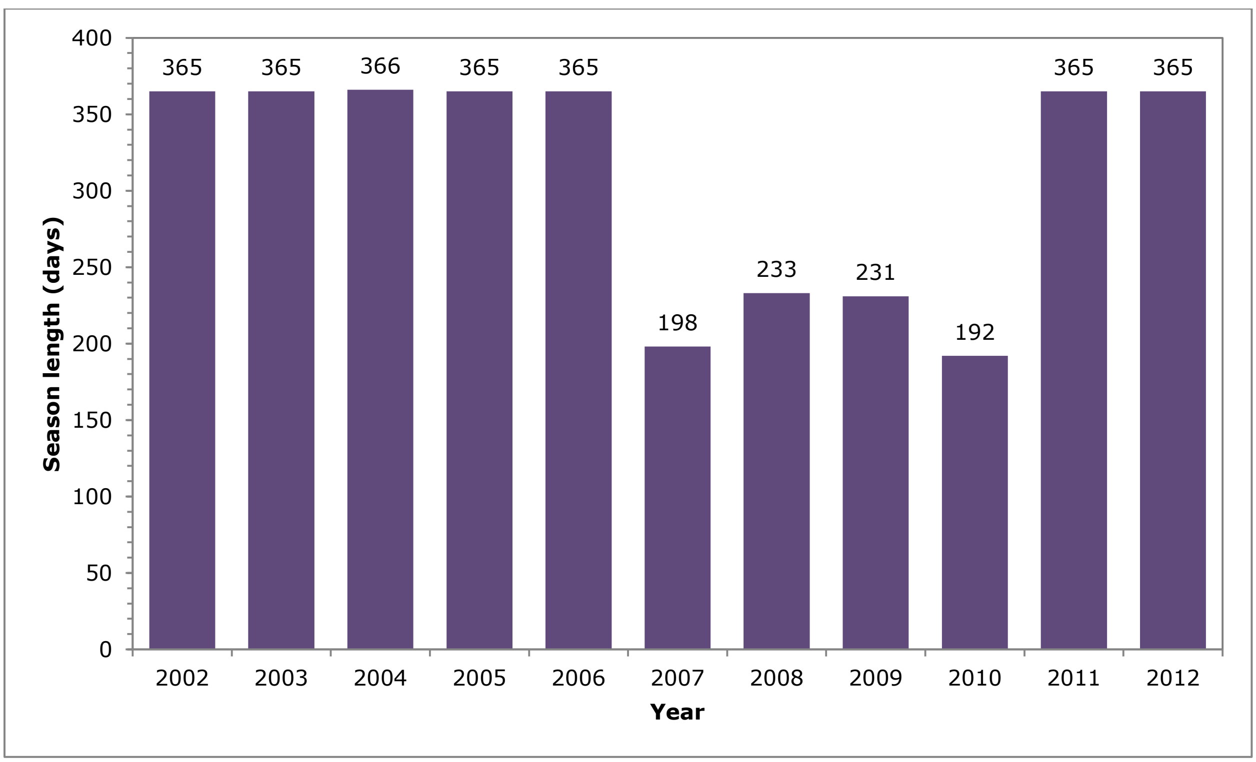

Figure 84. Number of days that fishing is allowed in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

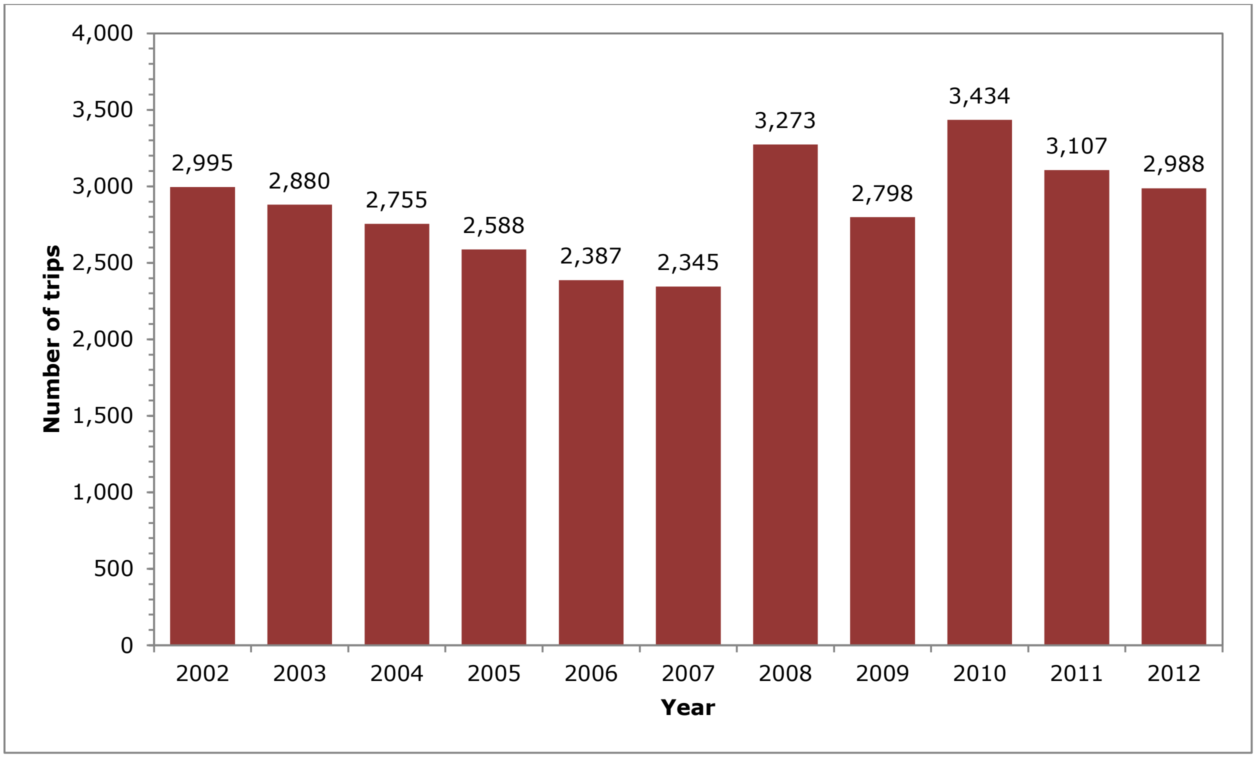

Figure 85. Number of trips taken in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

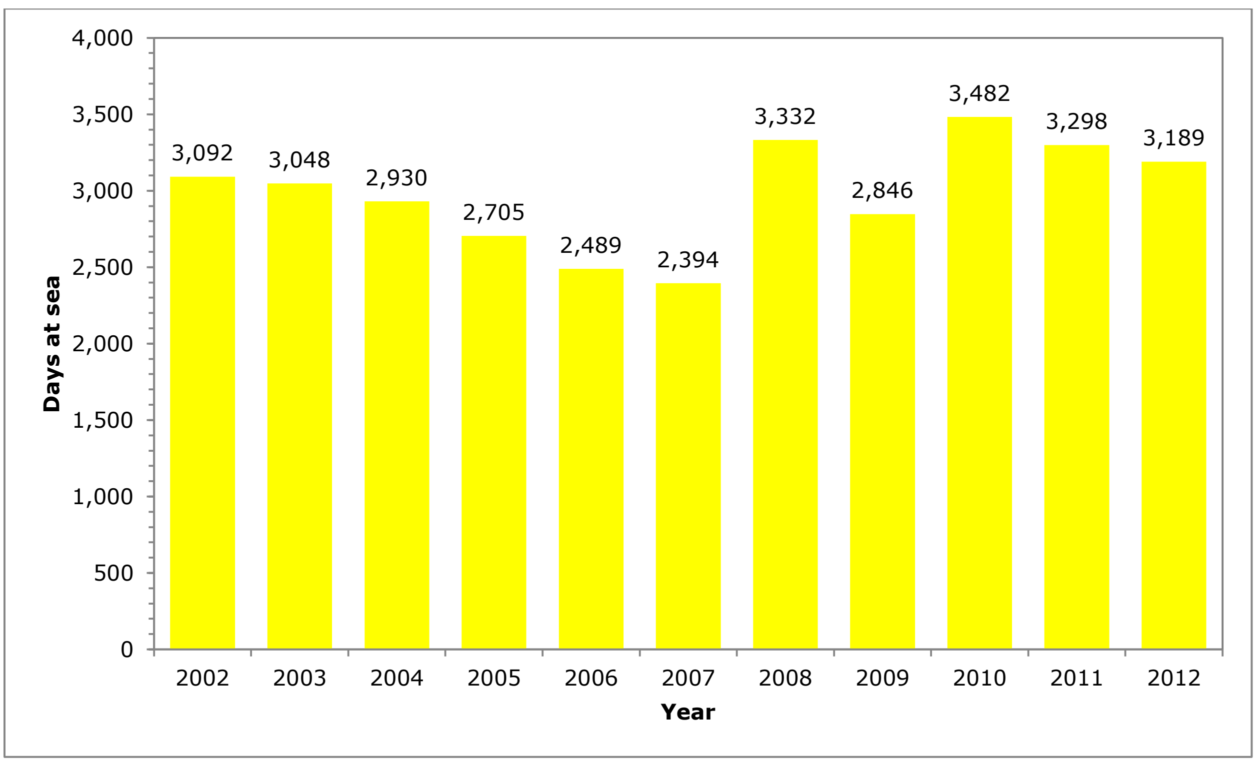

Figure 86. Number of days at sea spent fishing in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

c. Revenue

Revenue data reported here have been adjusted by the GDP deflator indexed for 2010. Revenue from Deep 7 species comprises the majority of the total revenue for vessels participating in the fishery (Figure 87). Total revenue averaged $1.8 million between 2002 and 2012; revenue for Deep 7 speies averaged $1.4 million and for non-Deep 7 species averaged $383,000. Total revenue was greatest in 2012 at $2.4 million; 2012 was also a peak year for Deep 7 revenue ($1.6 million). Non-Deep 7 species revenue peaked at $841,000 in 2012. Total revenue was at its lowest in 2007 at $1.5 million; Deep 7 revenue dipped its lowest that year ($1.2 million), while non-Deep 7 revenue was also the lowest ($115,000) in 2002.

Prices for onaga, ehu, opakapaka, kalekale, gindai, hapu‘upu‘u, and lehi have been as low as $5.77 and as high as $6.77, averaging $6.28 during 2002–2012 (Figure 88). Total revenue per active vessel averaged $4,000 over the time period (Figure 89). After a 67% increase in total revenue per vessel in 2003 due to a large decrease in number of active vessels from the previous year (Figure 83), total revenue per vessel has decreased or remained unchanged each year relative to the previous year, except in 2010 (Figure 89). Revenue increased in 2010 despite the fact that the number of active vessels also increased in that year (albeit slightly). Annual decreases were as little as 2% (2011) and as high as 7% (2008). Overall, total revenue per vessel increased by 92% from $2,700 in 2002 to $5,200 in 2012.

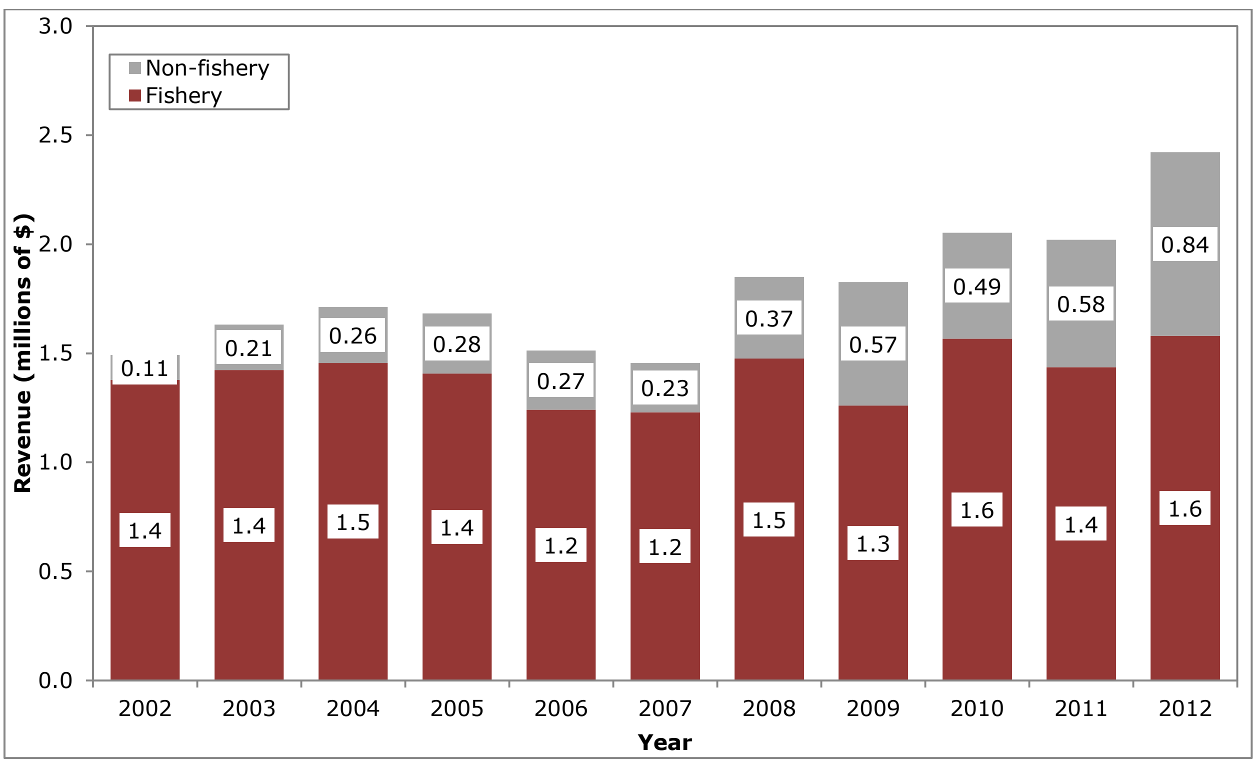

Figure 87. Revenue (inflation-adjusted 2010 dollars) from Deep 7 Bottomfish landings and non-Deep 7 Bottomfish landings. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

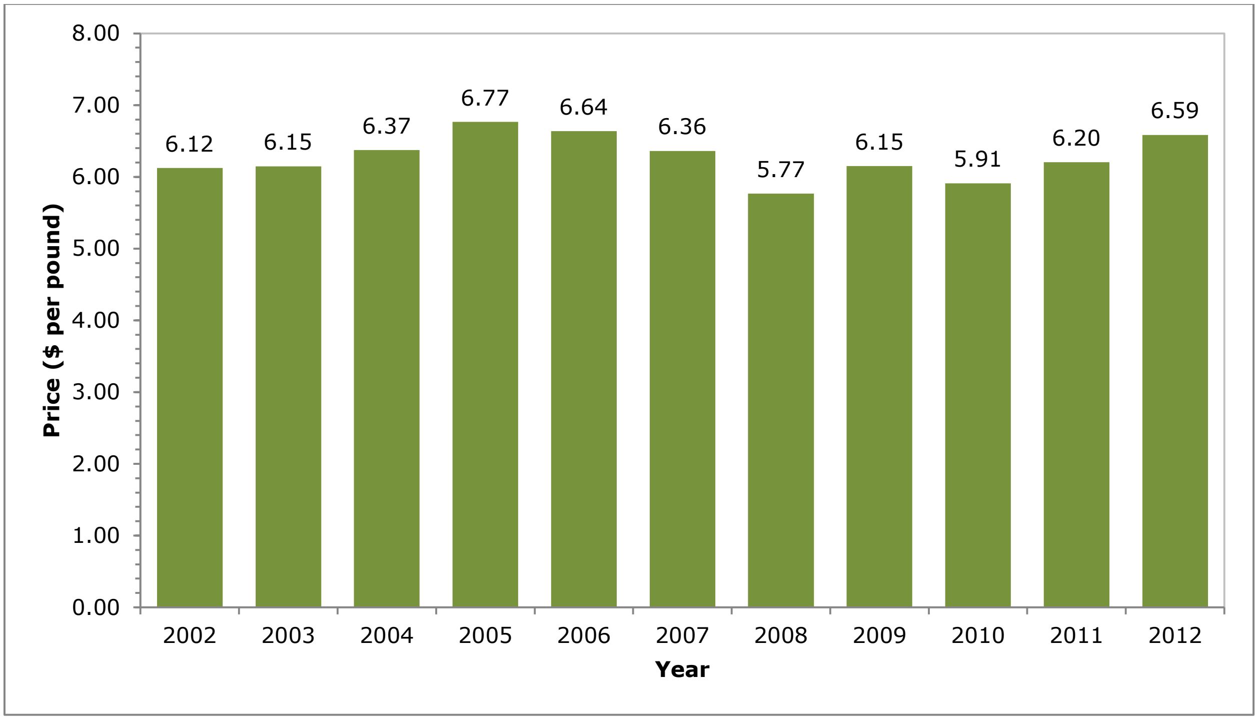

Figure 88. Average prices (inflation-adjusted 2010 dollars) paid for species caught in the Deep 7 Bottomfish Fishery. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

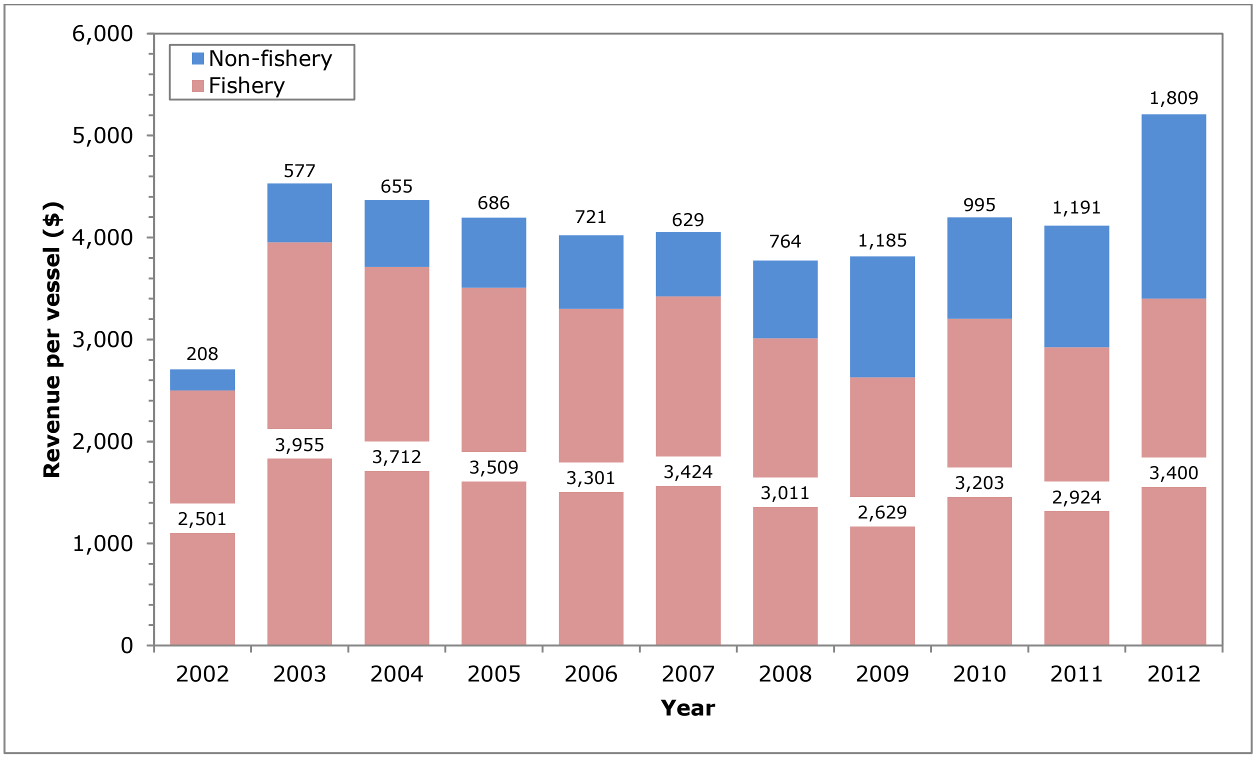

Figure 89. Revenue (inflation-adjusted 2010 dollars) per vessel for Deep 7 Bottomfish species and non-Deep 7 Bottomfish species. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

Total revenue per trip increased by 63% between 2002 and 2012, from $500 to $810 (Figure 90). From 2002 to 2005, total revenue per trip increased at an average annual rate of 9%; from 2006 to 2008, per trip revenue was on average 4% lower than the previous year; in 2009, total revenue per trip was up 16% to $653. Total revenue per trip was down by 8% in 2010 over the previous year, and up by 25% in 2012 to $811. The same trends were seen in total revenue per day at sea (Figure 91). Total revenue per day at sea increased at an average annual rate of 9% during 2002–2005 and then decreased for the following three years at 4% per year on average. Between 2009 and 2012, total revenue per day at sea fluctuated from $590 to $760.

Revenue in the Hawaiʻi Deep 7 Bottomfish Fishery was calculated for Commercial Marine License (CML) holders rather than for vessels, because fishermen report revenue by CML, not by vessel. Multiple fishermen can fish on the same vessel, but they report their revenue separately, by individual CML. The Gini coefficient was calculated to measure the equality of revenue distribution among CML holders in the fishery (Figure 92). The Gini coefficient stood was 0.78 in 2002, decreased to 0.69 in 2007, and since then has fluctuated between 0.71 and 0.76. The high Gini coefficient in this fishery, indicating that revenue is unequally distributed, is due to the fact that participants show a large range of effort levels, i.e., some participants whose motivations are primarily commercial participate at a high level of effort, while other participants are primarily non-commercial, although they hold a CML, and participate at a lower level of effort.

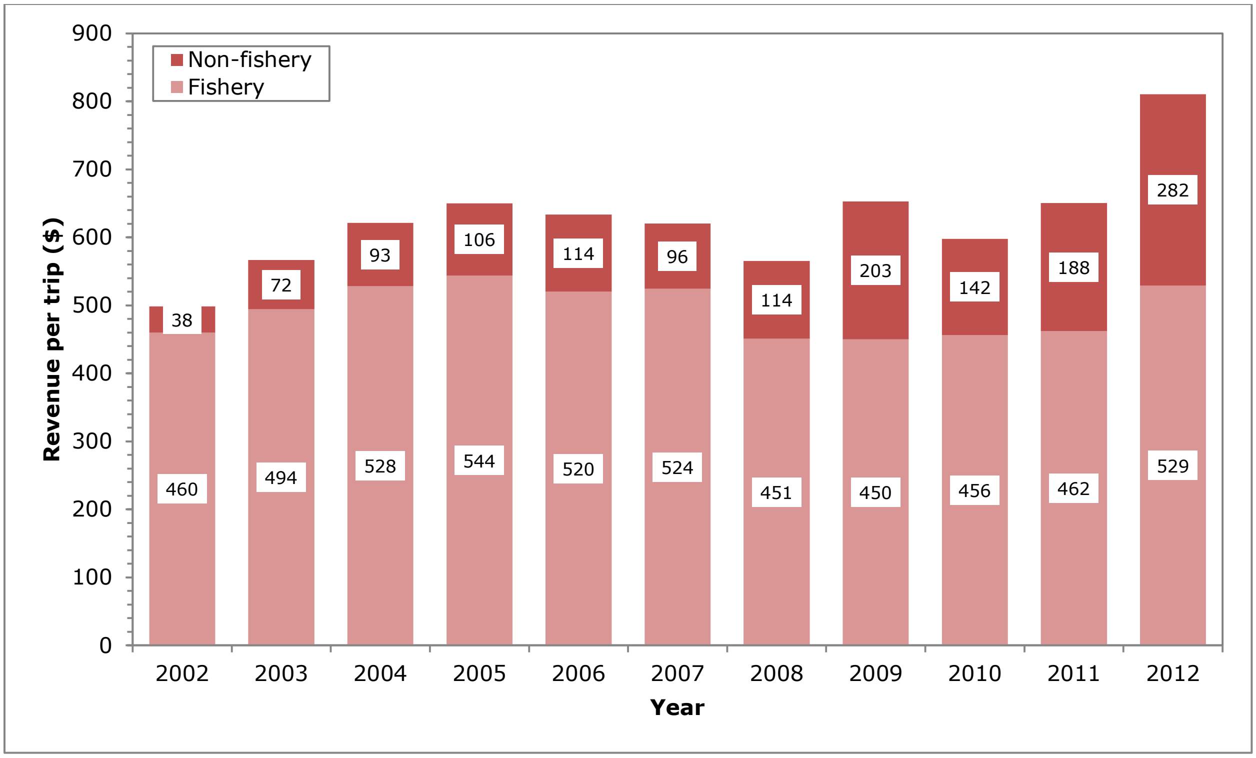

Figure 90. Revenue (inflation-adjusted 2010 dollars) per trip for Deep 7 Bottomfish species and non-Deep 7 Bottomfish species. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

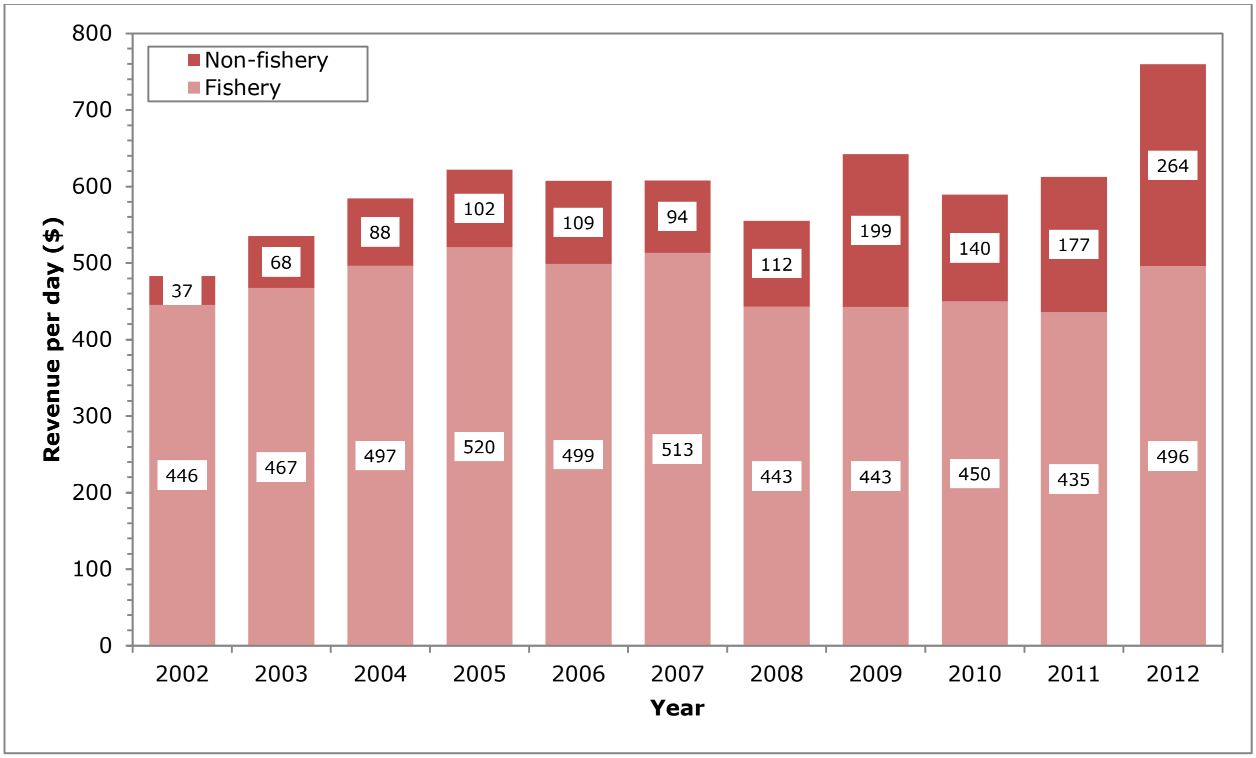

Figure 91. Revenue (inflation-adjusted 2010 dollars) per day at sea spent fishing for Deep 7 Bottomfish species and non-Deep 7 Bottomfish species. Note that the fishery operated under a calendar year for 2002 – 2006 and a fishing year for 2007 – 2012.

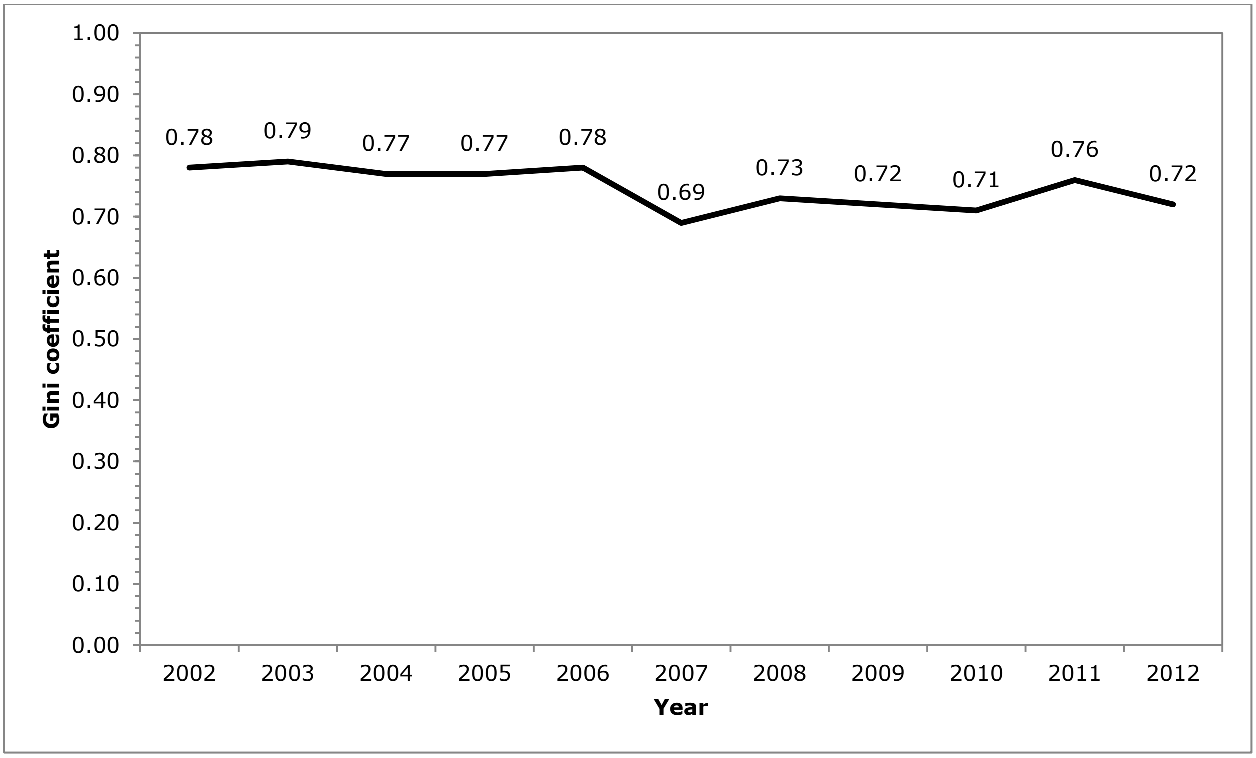

Figure 92. The Gini coefficient for Commercial Marine License holders in the Deep 7 Bottomfish Fishery.

d. Synopsis of recent trends

Enhancements in reporting and monitoring systems have improved the accuracy of landing data. Since September 2011, fishers who land Deep 7 bottomfish are required to submit a trip report to the State of Hawaiʻi within five days of the trip end date. An online reporting system for these submissions was implemented in September 2012. In addition, starting in September 2012, fishers who submit a late trip report receive a Civil Resource Violation notice with a $15 fine. Between September and December 2012, about 77% of trip reports were submitted on time; among the trips reported, 72% were filed online.

C. American Samoa Longline

The American Samoa archipelago is located in the South Pacific Ocean and consists of five islands and two atolls—Tutuila, Aunuu, Rose, Swains, and the Manua group of Tau, Olosega and Ofu. The total landmass of about 77 square miles is surrounded by just over 150,000 square miles of U.S. EEZ waters. Fishing has been a part of the way of life in the archipelago since the islands were first settled some 3,500 years ago. In 1995, small-scale longline fishing for albacore began in American Samoa following training initiated by the Secretariat of the Pacific Community. For the first several years, the small-scale domestic longline fishery mostly comprised American Samoans operating locally-built, twin-hulled vessels under 50 feet in length. In 2000, the American Samoa longline fleet began to expand rapidly with the influx of larger, conventionally manufactured monohull vessels, comprising some longliners from American Samoa as well as a large number of other U.S.-based longliners. Commercial ventures are now dominated by large-scale vessels targeting mainly albacore. The American Samoa longline fleet mostly fishes in the U.S. EEZ around American Samoa, since it is adjacent to the EEZ of other countries.

1. Fishery synopsis

   a. Gear used

Longlines are set by spooling the mainline off the reel and retrieved by hydraulically cranking or by hand cranking (in smaller vessels) the mainline back onto the reel; lines are usually set in the early morning and haulback generally occurs mid-day to afternoon. Trips in this fishery are typically one day long on small vessels and range from a few weeks to a couple of months on larger vessels. Large vessels are outfitted with modern electronic equipment for navigation, communications, and fish finding. Small vessels ice their catch onboard and then freeze it on shore, while larger vessels freeze their albacore catch onboard.

   b. Target/component species

The American Samoa longline fishery primarily targets albacore tuna, although smaller amounts of skipjack, yellowfin, and bigeye tunas, and other pelagic species are also caught. Albacore tuna are a highly migratory species, swimming long distances throughout the ocean and are found in tropical and warm temperate waters of the Pacific, Atlantic, and Indian Oceans. Temperature is a major factor in determining where Pacific albacore live. While the migration patterns of North Pacific albacore tuna are relatively well understood, less is known about the life cycle movements of South Pacific albacore. Albacore tuna initially grow rapidly but then grow more slowly with age; albacore tuna can grow up to almost 80 pounds and about 47 inches in length.

   c. Market channels

Currently, the pelagic fisheries of American Samoa are based on supplying frozen albacore and small amounts of other pelagic fish directly to the commercial cannery located in the capital city of Pago Pago. Canned albacore tuna is then marketed worldwide. Some of the catch is also sold to stores, restaurants, and local residents, or is consumed at home or donated for cultural functions.

2. Management Program

a. Current management controls

The American Samoa longline fishery is managed by NOAA Fisheries and the Western Pacific Fishery Management Council through the Pacific Pelagic Fishery Ecosystem Plan and the Western and Central Pacific Fisheries Commission of which the United States is a member. All American Samoa longline vessel owners and operators are required to obtain a limited entry permit and to submit logbooks containing detailed data on each of their sets and the resulting catch. Albacore tuna is not subject to an Annual Catch Limit under the Magnuson-Stevens Act, since it is subject to international fishery agreements in which the United States participates. The Western and Central Pacific Fisheries Commission has not established a quota for South Pacific albacore, although there are conservation and management measures that apply to the stock. Additional management tools include gear and vessel identification, vessel monitoring systems, area restrictions, at-sea observer coverage, sea turtle and seabird mitigation measures, and other bycatch mitigation measures.

b. Key changes from past management controls

In 2000, the longline fishery in American Samoa began to expand rapidly with the influx of large (greater than 50 feet) conventional mono-hull vessels. As a result, regulations implemented in 2002 prohibited any large vessels, including longline and purse seine, from fishing within 50 nautical miles around the islands of American Samoa. Further rapid expansion of longline fishing effort within the EEZ waters around American Samoa prompted the Western Pacific Fishery Management Council to develop a limited entry system for the American Samoa pelagic longline fishery in 2005. In line with an increasing understanding of the importance of ecosystem-based management, in 2009, the Western Pacific Fishery Management Council replaced the species-based approach to fishery management, previously implemented through the Pelagics Fishery Management Plan, with an ecosystem-based approach implemented through the Pacific Pelagic Fishery Ecosystem Plan. In 2011, NOAA Fisheries implemented amendments to the Fishery Ecosystem Plan that modified the longline gear configuration to reduce sea turtle bycatch, as well as a mechanism for establishing Annual Catch Limits, in line with the National Standards established in the Magnuson-Stevens Act.

3. Management Objectives

In addition to the National Standards established under the Magnuson-Stevens Act, the Western Pacific Fishery Management Council has identified ten objectives governing the management of species under the Pacific Pelagic Fishery Ecosystem Plan according to an ecosystem-based management approach. They are the following:

1) To maintain biologically diverse and productive marine ecosystems and foster the long-term sustainable use of marine resources in an ecologically and culturally sensitive manner through the use of a science-based ecosystem approach to resource management.
2) To provide flexible and adaptive management systems that can rapidly address new scientific information and changes in environmental conditions or human use patterns.

3) To improve public and government awareness and understanding of the marine environment in order to reduce unsustainable human impacts and foster support for responsible stewardship.
4) To encourage and provide for the sustained and substantive participation of local communities in the exploration, development, conservation, and management of marine resources.
5) To minimize fishery bycatch and waste to the extent practicable.
6) To manage and co-manage protected species, protected habitats, and protected areas.
7) To promote the safety of human life at sea.
8) To encourage and support appropriate compliance and enforcement with all applicable local and federal fishery regulations.
9) To increase collaboration with domestic and foreign regional fishery management and other governmental and nongovernmental organizations, communities, and the public at large to successfully manage marine ecosystems.
10) To improve the quantity and quality of available information to support marine ecosystem management.

4. Recent Trends

a. Quota

As mentioned above, no U.S. Annual Catch Limit or international quota is currently set for the American Samoa Longline Fishery. In 2002, the American Samoa Longline Fishery landed nearly 16 million pounds of fish. Landings were 7.4 million pounds (53% lower) in 2011 (Figure 93).

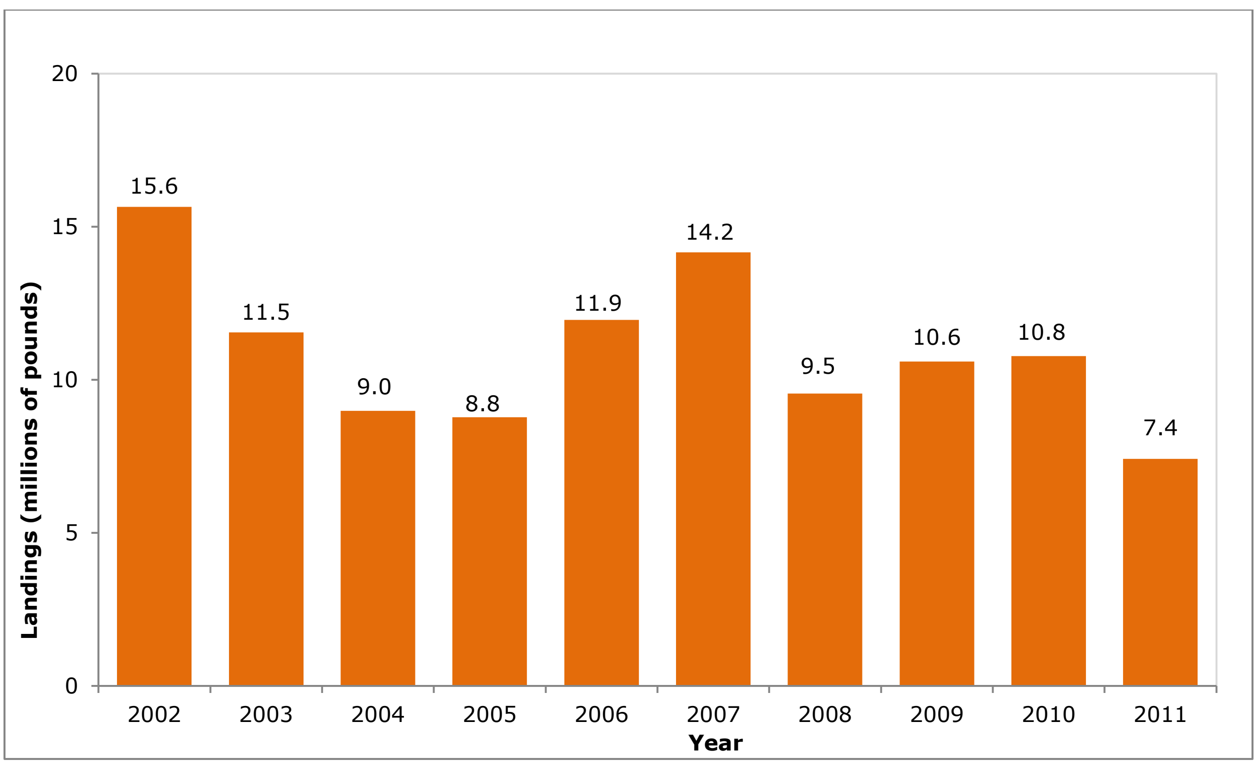

Figure 93. Landings of all species in the American Samoa Longline Fishery.

b. Effort

The American Samoa Longline Fishery is a limited entry fishery with a maximum of 60 permits. Under the limited access program, NOAA Fisheries issued a total of 60 initial longline limited entry permits starting from 2005 to qualified candidates (Figure 94). The American Samoa Longline limited entry permit is required for any vessel using longline gear to fish for pelagic species within the EEZ around American Samoa or anyone landing or transshipping pelagic species in American Samoa that were caught within the EEZ around American Samoa. The American Samoa Longline permit may be used to fish with longline gear in the EEZ around Guam, the Commonwealth of the Northern Mariana Islands, and the Pacific Remote Island Areas; and to land catches in those areas. The American Samoa longline permit may not be used to fish with longline gear in the EEZ around Hawaiʻi.

Permits are issued by vessel size class, and permit holders are restricted to using vessels within their size class or smaller. Permits may be transferred, but the person receiving the transfer must meet specific requirements, depending on their vessel size class. The permits expire three years from issuance, and renewal requires meeting minimum landings requirements and possessing a current Protected Species Workshop certificate.

In 2002, there were 60 active vessels in the American Samoa Longline Fishery; this number declined steadily, dropping to 24 active vessels in 2011, a 60% decline (Figure 95). The average annual decline in active vessels was 17% for 2002 – 2006. The sharp decline during this period was mainly due to the decline in the number of small vessels (those 50 feet or less in length). Between 2007 and 2011, the average annual decline in the number of active vessels slowed to 3%. The American Samoa Longline Fishery was open to fishing year-round from 2002 to 2011.

On average, fishermen took 543 trips per year in the American Samoa Longline Fishery in 2002–2011 (Figure 96). In 2002, there were 1,587 trips. The number of trips decreased by 42% from 2002 to 2003, and then declined at an average annual rate of 28% from 2003 to 2006. As with the number of active vessels, the downward trend in the number of trips in 2002–2006 was mainly due to declining numbers of small vessels—in general, smaller vessels make more, shorter trips compared to larger vessels. In 2007, the decline in annual trips reversed: trips increased by 16% to 402 trips that year, compared to 2006. However, annual trips declined for the next two years. In 2009, fishermen took 213 trips, a 28% decline from the previous year, and the lowest number of trips in this fishery over this time period. In 2011, there were 297 tripsfishery. On average, fishermen spent 7,128 days at sea fishing in the American Samoa Longline Fishery each year during this time period (Figure 97). Days at sea in a given year ranged from 9,199 (in 2002) toas low 5,865 (in 2011).

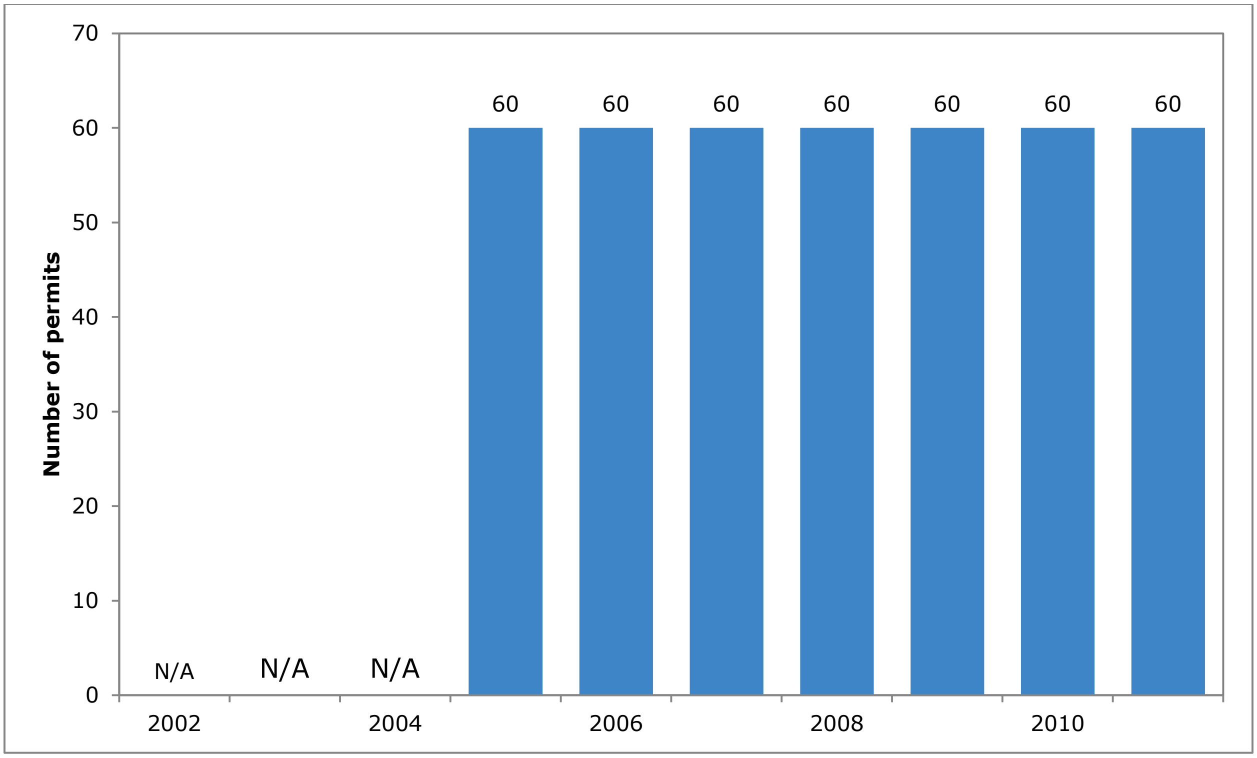

Figure 94. Number of permits issued in the American Samoa Longline Fishery.

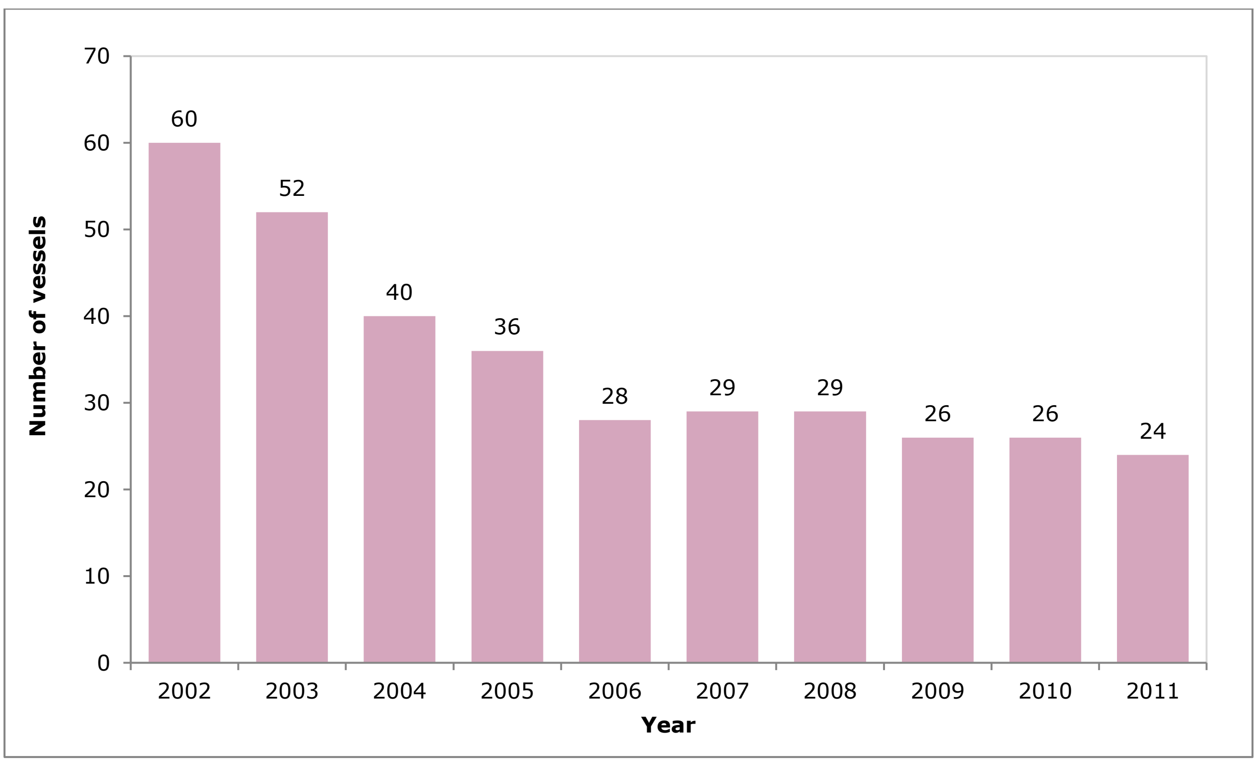

Figure 95. Number of active vessels in the American Samoa Longline Fishery.

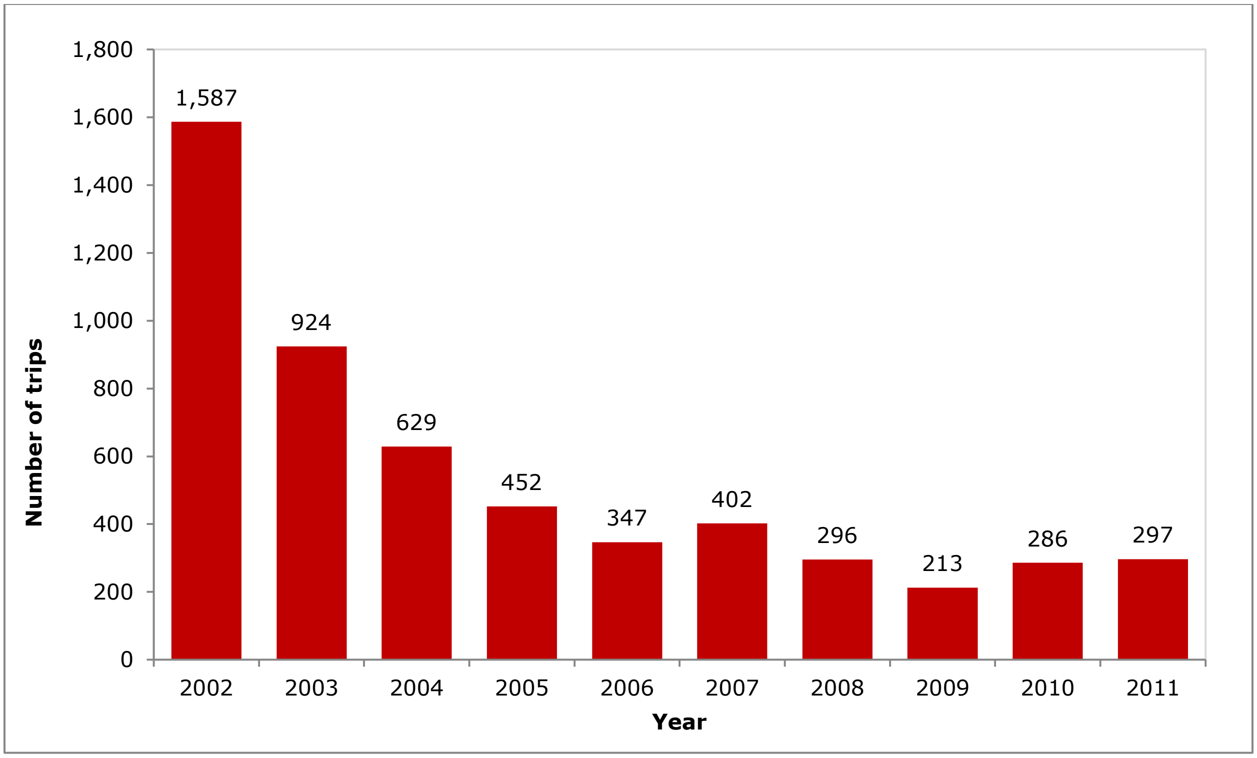

Figure 96. Number of trips taken in the American Samoa Longline Fishery.

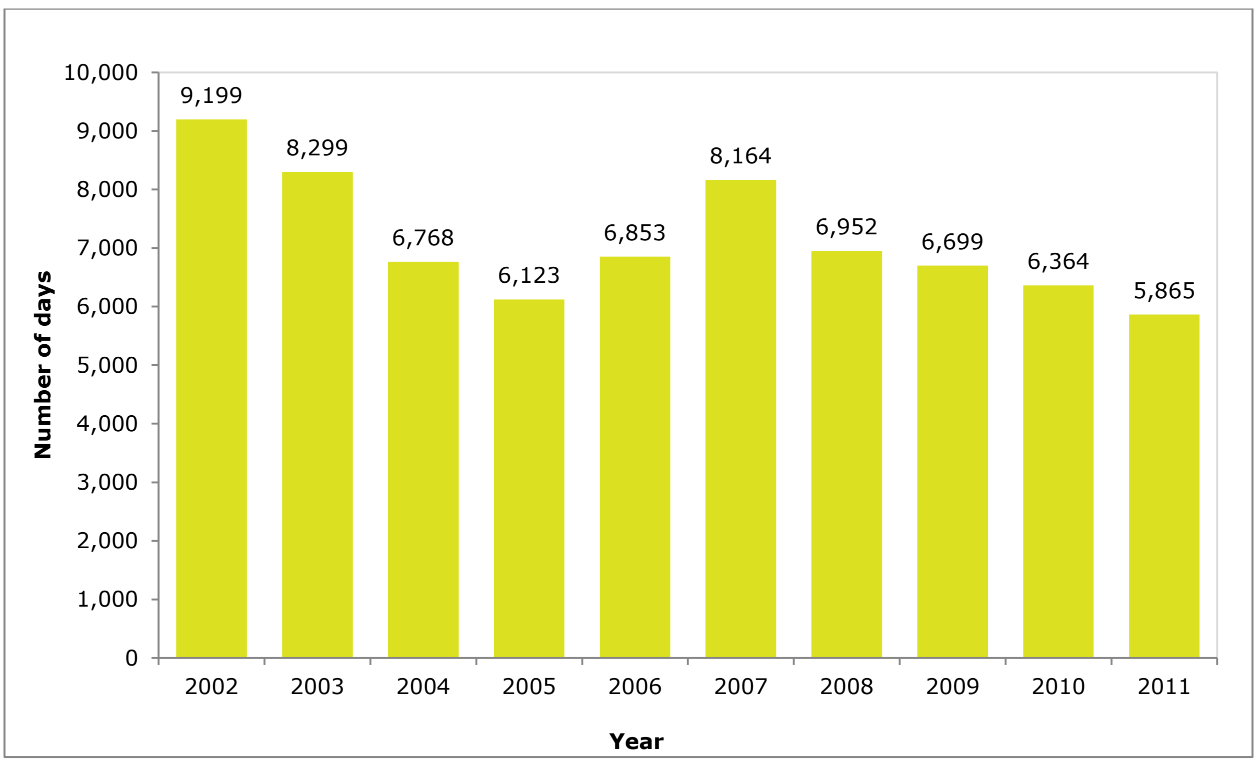

Figure 97. Number of days at sea spent fishing in the American Samoa Longline Fishery.

c. Revenue

Revenue in the American Samoa Longline Fishery, adjusted for inflation using the GDP deflator indexed for 2010, was $16 million in 2002 (Figure 98). Revenue decreased for the following three years by 23%, 18%, and 6%, respectively, relative to the previous year. In 2006, revenue increased by 28% over the previous year, to $12 million. Revenue increased again in 2007 by 17%, relative to the previous year. Since 2007, revenue has declined at an average annual rate of 11%. Price in the American Samoa Longline Fishery averaged $1.04 during 2002–2011 (Figure 99). Annual price was prices (per pound)as high as $1.13 (2004) and as low as $0.97 per pound (2010).

Revenue per vessel was $268,000 in 2002 and declined by 11% to $238,000 the following year (Figure 100). The year 2003 saw a times-series low in revenue per vessel most likely because more vessels actively fished that year than in most other years (Figure 100). After 2003, revenue per vessel steadily increased to a time-series high of $492,000 in 2007, a year in which there were relatively few active vessels. Revenue per vessel increased over the period 2007–2010, but decreased again in 2011 to $347,000.

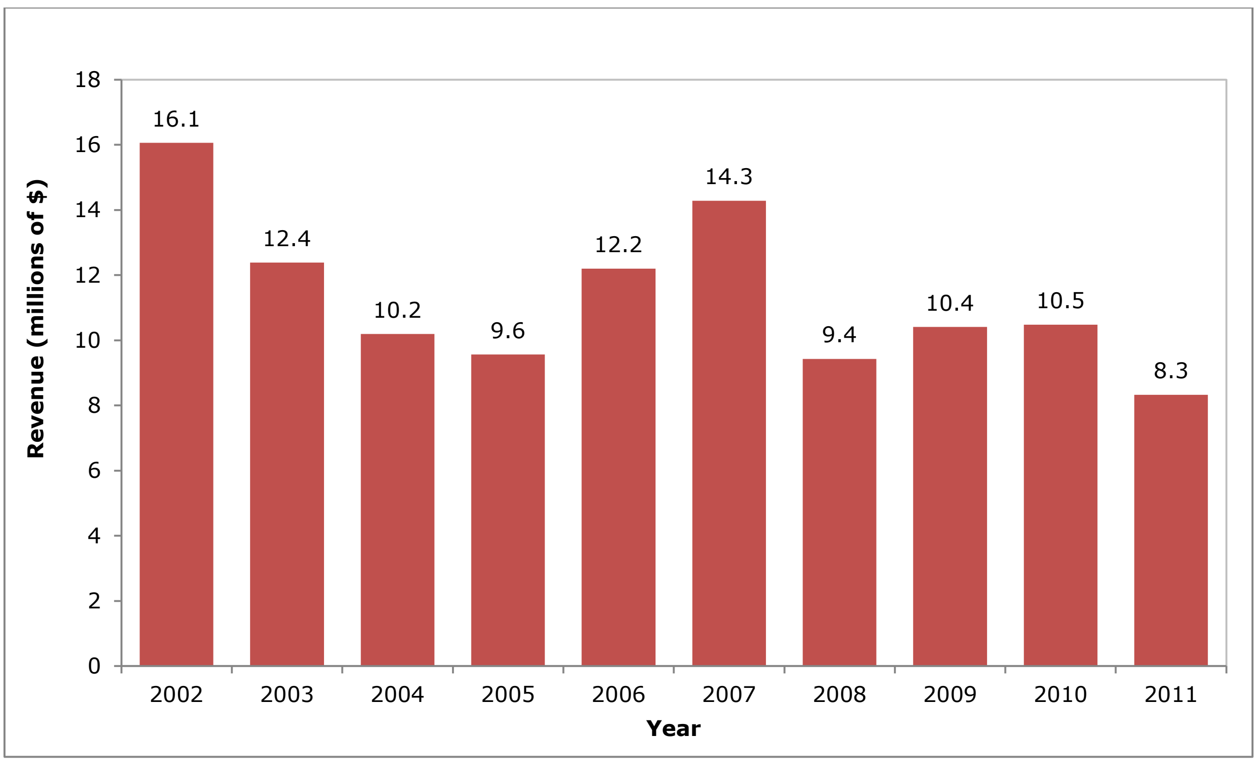

Figure 98. Revenue (inflation-adjusted 2010 dollars) in the American Samoa Longline Fishery.

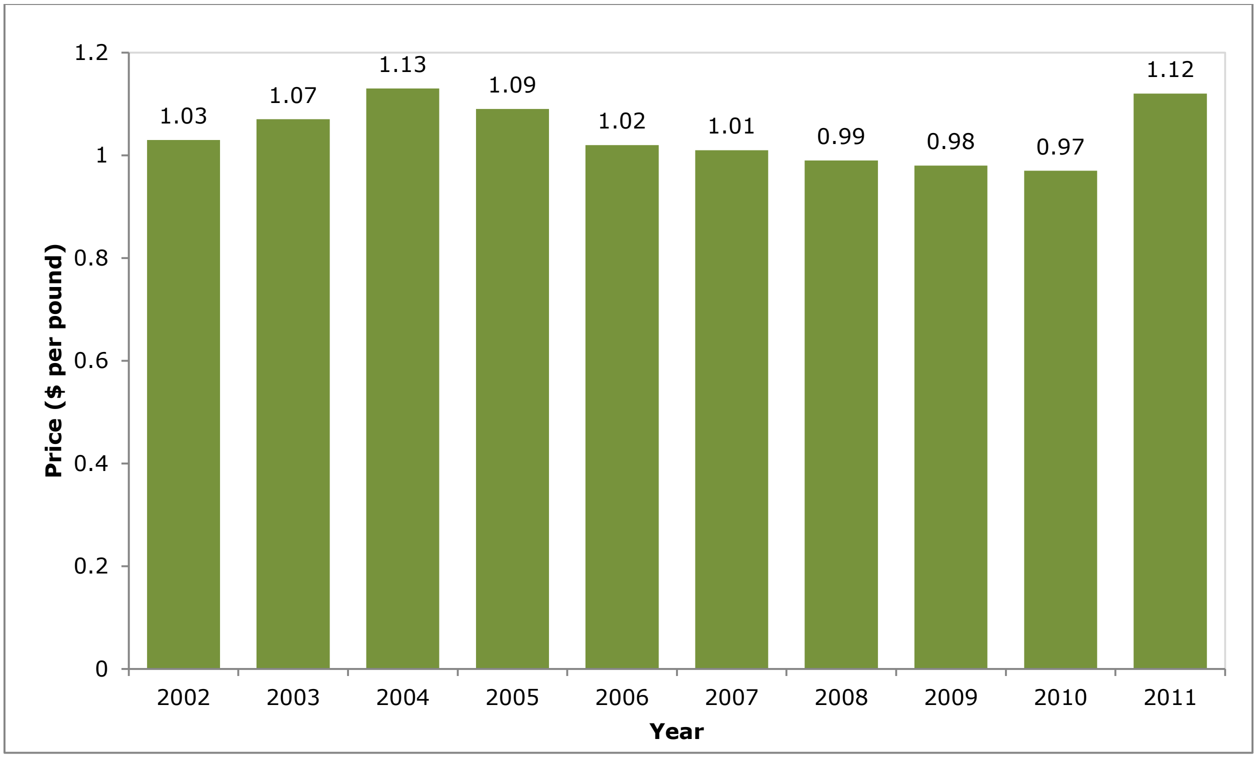

Figure 99. Average prices (inflation-adjusted 2010 dollars) paid for species caught in the American Samoa Longline Fishery.

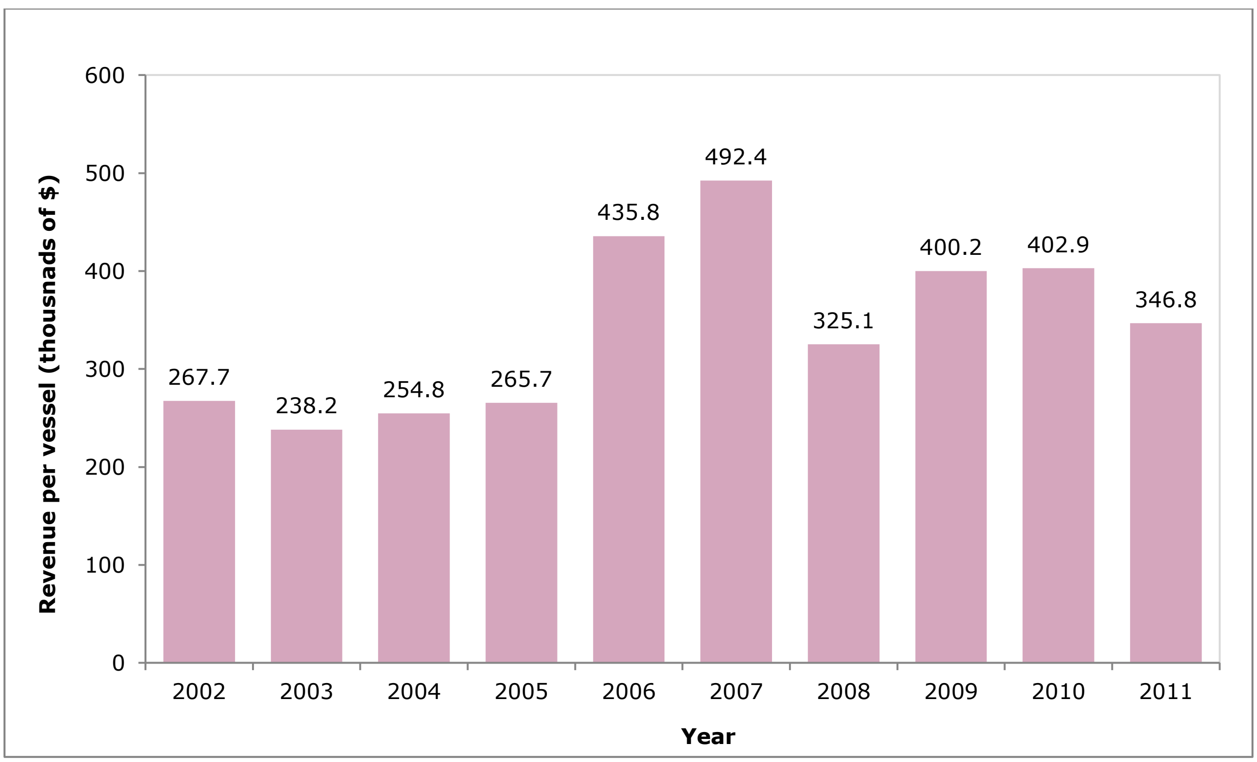

Figure 100. Revenue (inflation-adjusted 2010 dollars) per vessel in the American Samoa Longline Fishery.

Revenue per trip was about $10,000 in 2002 and reached a high of $49,000 in 2009. In 2011, revenue per trip was $28,000 (Figure 101). From 2002 to 2011, revenue per day at sea averaged $1,600 (Figure 102). Revenue per day at sea was the greatest ($1,800) in 2006, but decreased by 20% to $1,400 in 2011, relative to the period from 2007 – 2011.

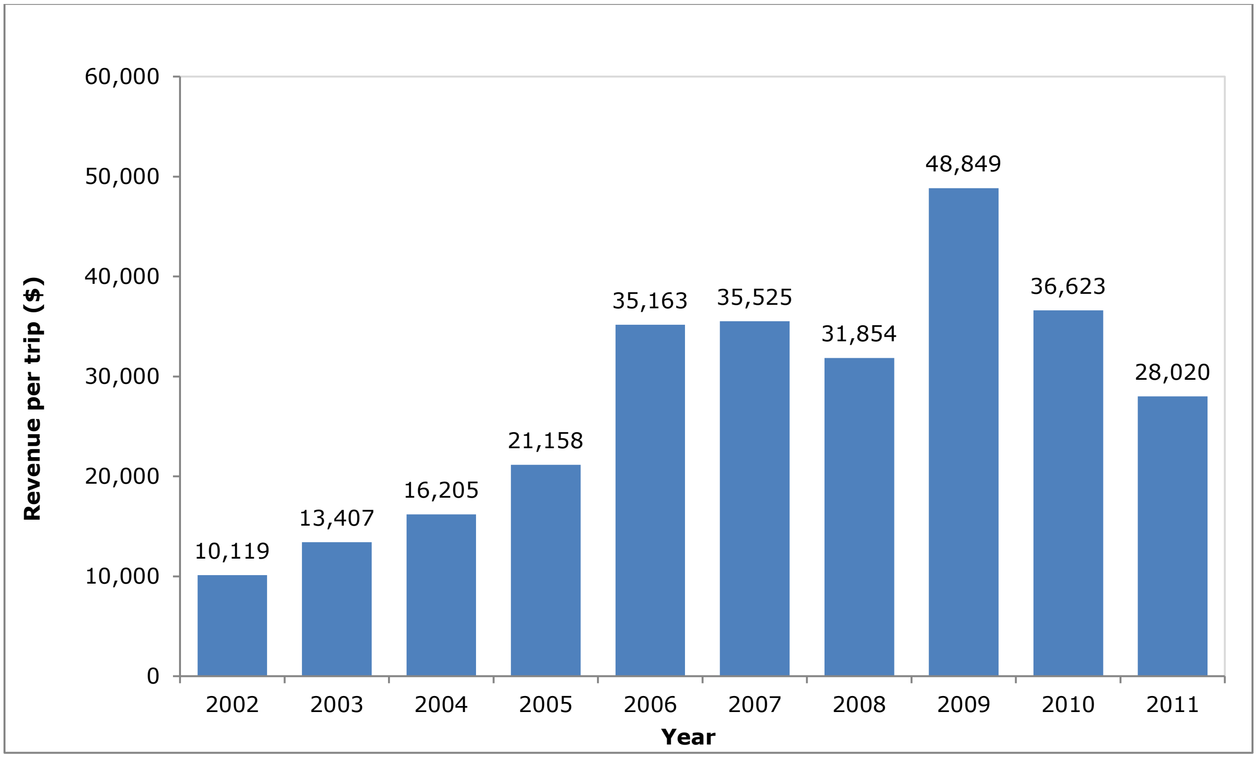

Figure 101. Revenue (inflation-adjusted 2010 dollars) per trip in the American Samoa Longline Fishery.

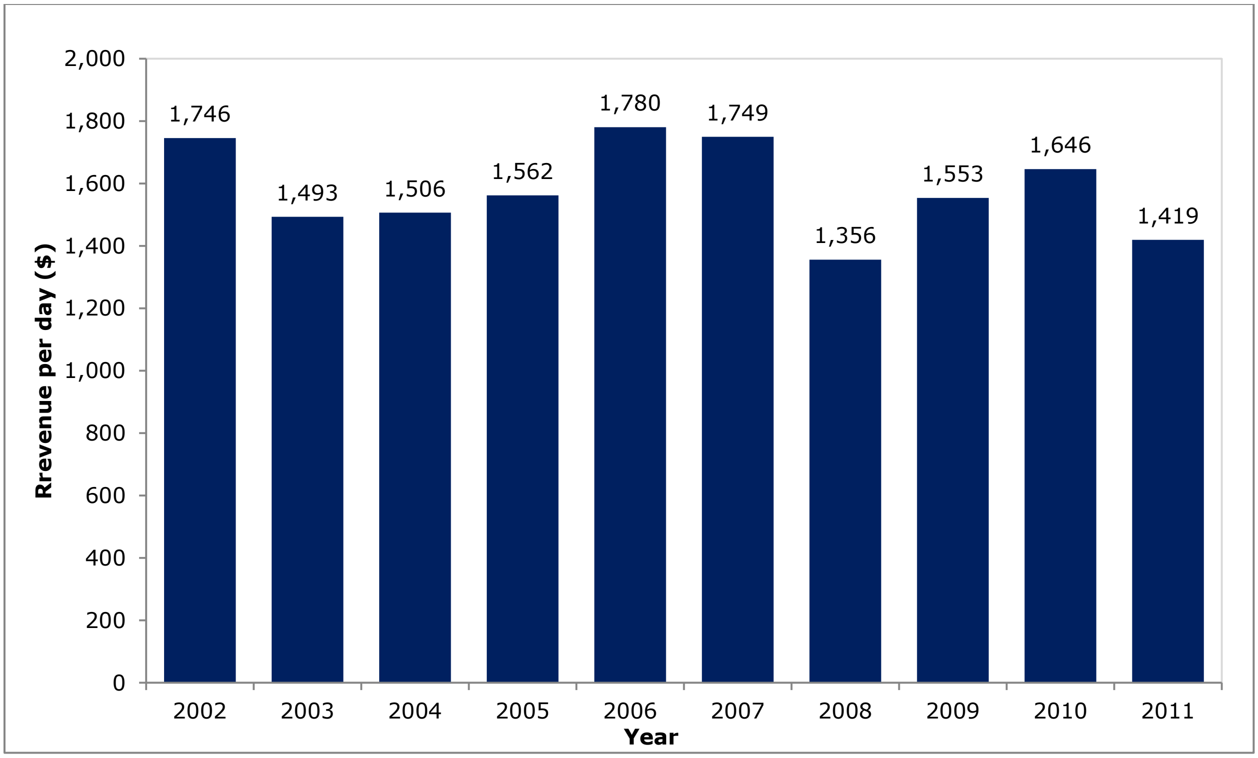

Figure 102. Revenue (inflation-adjusted 2010 dollars) per day at sea fishing in the American Samoa Longline Fishery.

The Gini coefficient was calculated to estimate the equality of the distribution of revenue among active vessels in the American Samoa Longline Fishery (Figure 103). In 2002, the Gini coefficient was 0.58 and decreased to 0.23 in 2007. The decreasing Gini coefficient during this time period was due to the decline in the number of small vessels (vessels 50 feet or shorter in legnth): these vessels accounted for the lowest revenues. Since then, the number of small vessels has been decreasing and the remaining vessels are mostly large (longer than 70 feet) and account for the majority of the revenues. This has contributed to a decreasing Gini coefficient (0.23–0.34 for 2007 – 2011).

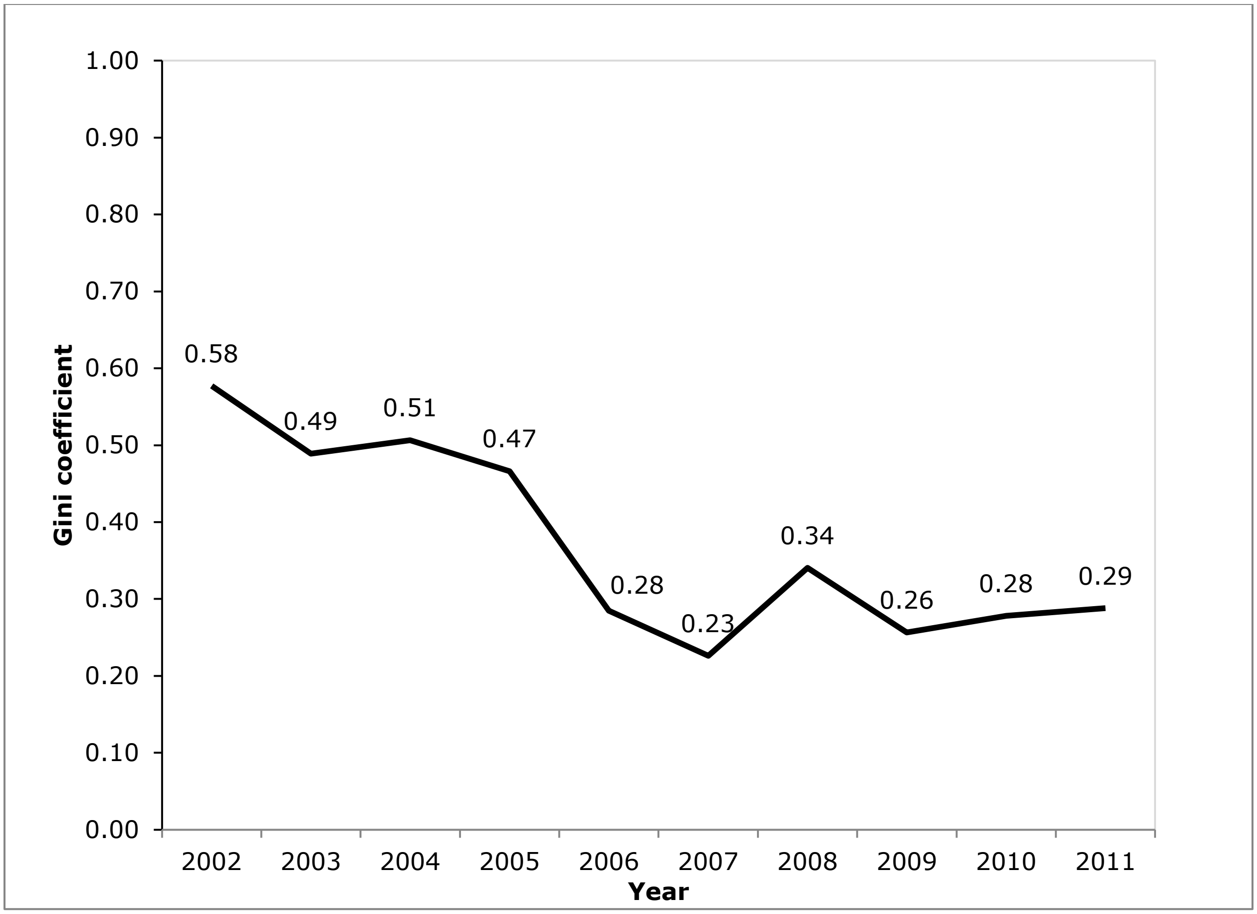

Figure 103. The Gini coefficient for active vessels in the American Samoa Longline Fishery.

d. Synopsis of recent trends

A declining albacore catch per unit effort (CPUE) in the American Samoa Longline Fishery has raised concern about the potential risk of overfishing in this fishery. Albacore CPUE was over 25 fish per 1,000 hooks in 2002, and fell to about 10 fish per 1,000 hooks in 2011. The declining CPUE has strained the fishery economically. Despite the results of a 2012 stock assessment by the Secretariat of the Pacific Community[3] that stated that overfishing of South Pacific albacore is not occurring, the use of longline gear across the South Pacific has increased the vulnerability of the stock. Longline gear tends to target older albacore despite a lower proportion of older albacore in the fishery. At the February 2013 meeting, the Science and Statistical Committee of the Western Pacific Fishery Management Council recommended that American Samoa collaborate with the Western and Central Pacific Fisheries Commission and the South Pacific Fisheries Cooperation to improve management of this fishery.

[3] Hoyle, S., J. Hampton and N. Davies. 29 July 2012. Stock assessment of albacore tuna in the south Pacific Ocean Rev 1. Western and Central Pacific Fisheries Commission, Scientific Committee Eigth Regular Session. WCPFC-SC8-2012/SA-WP-04-REV1, available online at http://www.wcpfc.int/node/3233

Greater Atlantic Region

The northern Atlantic coast of the Northeast United States, from Maine to North Carolina, comprises a variety of ecosystems and has historically been one of the most productive marine environments worldwide. Groundfish and invertebrates comprise a large portion of the commercial harvest. In addition, the region falls along important migration routes for many highly migratory species such as the northern right whale, tunas, sea turtles, and numerous seabirds. Commercial fisheries in this region are managed by the New England and Mid-Atlantic Fishery Management Councils. These Councils are responsible for a total of 11 fishery management plans covering 37 species; five plans are managed by the New England Fishery Management Council (25 species), four are managed by the Mid-Atlantic Fishery Management Council (10 species), and two (monkfish and spiny dogfish) are jointly managed. The New England Fishery Management Council has lead authority for monkfish while the Mid-Atlantic Fishery Management Council has lead authority for spiny dogfish.

Of the 11 Fishery Management Plans (FMPs) managed by either the New England or Mid-Atlantic Councils, 3 are currently managed using catch shares (Surfclam/Ocean Quahog, Mid-Atlantic Tilefish, and Northeast Multispecies), and a component of the Atlantic Sea Scallop FMP is managed as a catch share program (General Category Individual Fishing Quota, or IFQ). The limited access portion of the scallop fishery and the remaining seven FMPs are not managed under catch shares. In this report, performance indicators are reported for two non-catch share fisheries: Limited Access Days at Sea Atlantic Sea Scallop and Monkfish.

Performance indicators are reported here for each of these fisheries for the 2012 fishing year (Table 7). Detailed trend data for these fisheries are reported following a synopsis of each fishery including gears used, target and component species, products sold, current management approach, and key changes affecting the fishery. Trends for monkfish are reported for the years 2002–2012. Trends for the limited access scallop fishery are reported from 2007 to 2012, due to changes in the monitoring requirements needed to clearly delineate the limited access scallop fishery from the General Category Scallop Individual Fishery Quota fishery. All price and revenue data have been adjusted for inflation to 2010-equivalent dollars using the Gross Domestic Product price deflator. Quota and landings are reported for monkfish in live-weight–equivalent pounds and for scallop in pounds of meat.

Table 7. Greater Atlantic Region Fishery Performance Measures by Fishery for 2012.

Catch and Landings	Monkfish	Limited Access Atlantic Sea Scallops
Quota allocated to fishery[a]	32,582,118	58,503,960
Aggregate landings[a]	20,015,217	49,875,593
Utilization	61.4%	85.3%
Quota exceeded	N	N
Effort		
Number of permits (number)	685	356
Active Vessels (number)	489	351
Trips (number)	9,730	2,868
Days at sea (days)	18,520	21,971
Season length (days)	365	365
Revenue ($)[b]		
Fishery species revenue	$19,476,681	$463,695,633
Other species revenue	$197,806,095	$1,647,536
Total Revenue	$217,282,776	$465,343,169
Average fishery species price (per pound)	$0.97	$9.33
Fishery species revenue per vessel	$39,830	$1,321,070
Other species revenue per vessel	$404,511	$4,964
Total revenue per vessel	$444,341	$1,325,764
Fishery species revenue per trip	$2,002	$161,679
Other species revenue per trip	$20,330	$574
Total revenue per trip	$22,331	$162,254
Fishery species revenue per day at sea	$1,502	$21,105
Other species revenue per day at sea	$10,681	$75
Total revenue per day at sea	$11,732	$21,180
Other		
Limited entry	Y	Y
Gini coefficient	0.61	0.19

[a]Quota and landings are reported for monkfish in live weight pounds and in pounds of meat for scallops.
[b]All revenue data have been adjusted by the GDP deflator indexed for 2010.

A. Monkfish

Monkfish (also referred to as "goosefish" or "anglerfish") are broadly distributed on the Northeast U.S. continental shelf in both inshore waters and deep-water canyons. Prior to the 1990's, monkfish were considered a "trash fish" because there was no market. Depletion of monkfish stocks in European waters, the Mediterranean, and the Pacific created an international market for monkfish leading to rapid expansion of the fishery during the 1990's in the Northeast Region from Maine to Virginia and stretching southward to include North Carolina. This expansion led to the development of the first fishery management plan implemented in 1999[4].

1. Fishery synopsis

   a. Gear used

In the early 1990's, approximately 40% of total monkfish landings were from scallop dredge gear. With the recovery of the scallop resource, relatively little monkfish are now landed using scallop gear. As of 2014, the majority of landings come from vessels using trawl or gillnet gear, although the relative mix of landings by gears differs between vessels operating in the Gulf of Maine and the northern part of Georges Bank, known as the Northern Management Area (NMA), and vessels operating in the Southern Management Area (SMA), which extends from the southern flank of Georges Bank through the Mid-Atlantic Bight. In the NMA, most monkfish are landed using trawl gear as part of the groundfish trawl fishery; whereas in the SMA, the majority of monkfish are landed using gillnet gear on trips that are targeting monkfish.

   b. Target/component species

Monkfish may be targeted or may be a component species in a mixed-species fishery depending on area fished and gear. Monkfish are typically targeted using larger mesh (10 to 12-inch mesh) gillnets in the SMA. On trips using trawl gear, monkfish is a component of a mixed-species trip that may include groundfish, dogfish, skates, and some lobster. Trips taken in the Gulf of Maine may include monkfish, groundfish, and lobster whereas trips taken on Georges Bank are more likely to also include dogfish and skates.

   c. Market channels

Monkfish are mostly mouth with an edible tail and liver. Monkfish are sold as tails-only, livers-only, or whole fish. Limited on-board processing occurs by removing the tails and livers. Livers undergo further on-shore processing. Whole fish are eviscerated with the liver left intact in the body cavity of the fish. While some monkfish are sold in U.S. domestic markets, the majority are exported to markets in Europe and Asia.

[4] For more information on monkfish management and SAFE reports http://www.nefmc.org/monk/index.html or general information about monkfish see http://www.fishwatch.gov/seafood_profiles/species/monkfish/species_pages/monkfish.htm

2. Management Program

a. Current management controls

Monkfish are jointly managed by the New England and the Mid-Atlantic Fishery Management Councils, with lead authority delegated to the New England Fishery Management Council. The fishery is primarily managed by a combination of days-at-sea (DAS) and landing limits[5]. These controls vary depending on management area (SMA or NMA) and type of permit. Permit categories A and B are issued to vessels that have neither a scallop limited access nor a groundfish limited access permit; permit categories C and D are issued to vessels that have either a scallop or groundfish limited access permit; permit category E is an open access incidental catch permit. Current DAS allocations are 45.2 DAS, of which no more than 32 DAS may be used in the SMA. In the NMA, monkfish landing limits for permit categories A and C are 3,638 pounds whole weight per DAS used, while landing limits for permit categories B and D are 1,746 pounds whole weight per DAS fished. In the SMA, permit categories A and C are subject to a 1,776 pounds whole weight landing limit per monkfish DAS used, while permit categories B and D are limited to 1,455 pounds whole weight per monkfish DAS used. The incidental landing limit in the NMA is 25% of total weight of fish on board not to exceed 873 pounds whole weight for permit categories E, but 1,746 and 1,455 pounds whole weight for permit Categories C and D, respectively when fishing on a Northeast multispecies (groundfish) DAS. In the SMA, the incidental landing limit is 146 pounds whole weight in the SMA for non-trawl caught monkfish and 873 pounds whole weight for monkfish caught by trawl gear when fishing on a groundfish DAS. Other monkfish incidental landing limits apply to vessels not fishing under any DAS controls, based on the gear used and where fishing is occurring.

b. Key changes from past management controls

The monkfish management plan includes a number of provisions that have been added since the Fishery Management Plan was first implemented. These provisions include an additional permit category for a special offshore permit (Category F) to reflect historic fishing operations in the SMA and area closures to protect deep sea corals. The offshore permit program is voluntary and offers a higher trip limit to vessels electing to participate in the program in exchange for a lower DAS allocation. Participating vessels must fish for monkfish exclusively in the designated offshore area. Permit category G was developed to accommodate vessels that had been fishing for monkfish south of 38^{o} 240' N latitude that had been excluded from the original Fishery Management Plan. Recently, the New England Fishery Management Council modified the area restriction for Category H permits, and now allows such vessels to fish throughout the SMA. Through that same action (Framework Adjustment 8), the Councils allowed monkfish-only DAS (allocated monkfish DAS in excess of a Category C or D permit's allocation of groundfish Category A DAS) to be used at any time during the fishing year. The New England Fishery Management Council is currently developing a Fishery Management Plan amendment (Amendment 6) that would include an alternative to adopt a catch share program for the monkfish fishery, but also includes other provisions modifying existing effort controls.

[5] Detailed information on current regulations can be found at http://www.nero.noaa.gov/regs/infodocs/monkfish_fishery_info-final.pdf

3. Management Objectives

In addition to the National Standards established under the Magnuson-Stevens Act, the objectives of the Monkfish Fishery Management Plan were intended to ensure adequate spawning and the highest fishery yields without significantly altering the fisheries for other species or causing extensive regulatory discards. The specific objectives of the Fishery Management Plan include the following:

1) To end and prevent overfishing; to rebuild and maintain a healthy spawning stock.
2) To optimize yield and maximize economic benefits to the various fishing sectors.
3) To prevent fishing on immature fish.
4) To allow the traditional incidental catch of monkfish to occur.

4. Recent Trends

a. Quota and landings

Although a Total Allowable Catch (TAC) was set for monkfish during the years 2002-2010, these were target TACs (TTAC) that did not trigger in-season closures, but were used to make adjustments to the Fishery Management Plan for subsequent fishing years. These catch targets were subdivided into TTACs for both the NMA and the SMA. In compliance with the 2006 Magnuson-Stevens Act re-authorization, an Annual Catch Target (ACT) and accountability measures were implemented for the 2011 fishing year. For purposes of discussion, the term *quota* is used herein to refer to both TTACs and ACT. Since TTACs and ACT apply to the entire fishery, reported landings include those in state waters from federally-permitted vessels including both open access and limited access permit holders. All other performance indicators (effort and revenue) are reported only for the limited access fishery.

Both quota and landings were substantially higher in 2002-2005 as compared to 2006 to 2012 (Figure 104). From 2002 to 2005, landings averaged 47.4 million pounds and aggregate quotas were set at an average of 51.9 million pounds. During these years, the aggregate TTAC was exceeded in only 2002 although TTAC for the SMA was not exceeded. In 2003, the TTAC was exceeded in the SMA, but the combined TTAC was not exceeded. The TTAC was not exceeded in either management area during 2004 or 2005.

Due to a determination that the monkfish rebuilding targets would not be met by 2009, the combined TTAC for the NMA and SMA was lowered to 25.1 million pounds in 2006 and was set at 22.2 million pounds from 2007 to 2010. To meet these conservation requirements, DAS allocations and trip limits were adjusted, resulting in reductions in landings from 28.8 million pounds to 16.3 million pounds, an average annual decline of 13%. During these years, the SMA TTAC was exceeded in both 2006 and 2008, and in 2007 the TTAC was exceeded in both the SMA and the NMA. The TTAC was not exceeded in either area in 2009 or 2010.

The 2011 and 2012, the quota (ACT) was increased to 32.6 million pounds based on stock assessment information in 2010 indicating that the NMA and SMA were rebuilt. Landings in 2011 were 21.1 million pounds and 20 million pounds in 2012. The 2011 and 2012 ACT were not exceeded in either the NMA or SMA.

As noted above, quotas were exceeded in either the NMA, SMA or both on five occasions. However, the combined quota was exceeded on four occasions as the quota utilization exceeded 100% in 2002, 2006, 2007, and 2008 (Figure 105). Over the most recent four years (2009-2012), quotas have not been exceeded, but quota utilization has declined from 83% in 2009 to 61% in 2012.

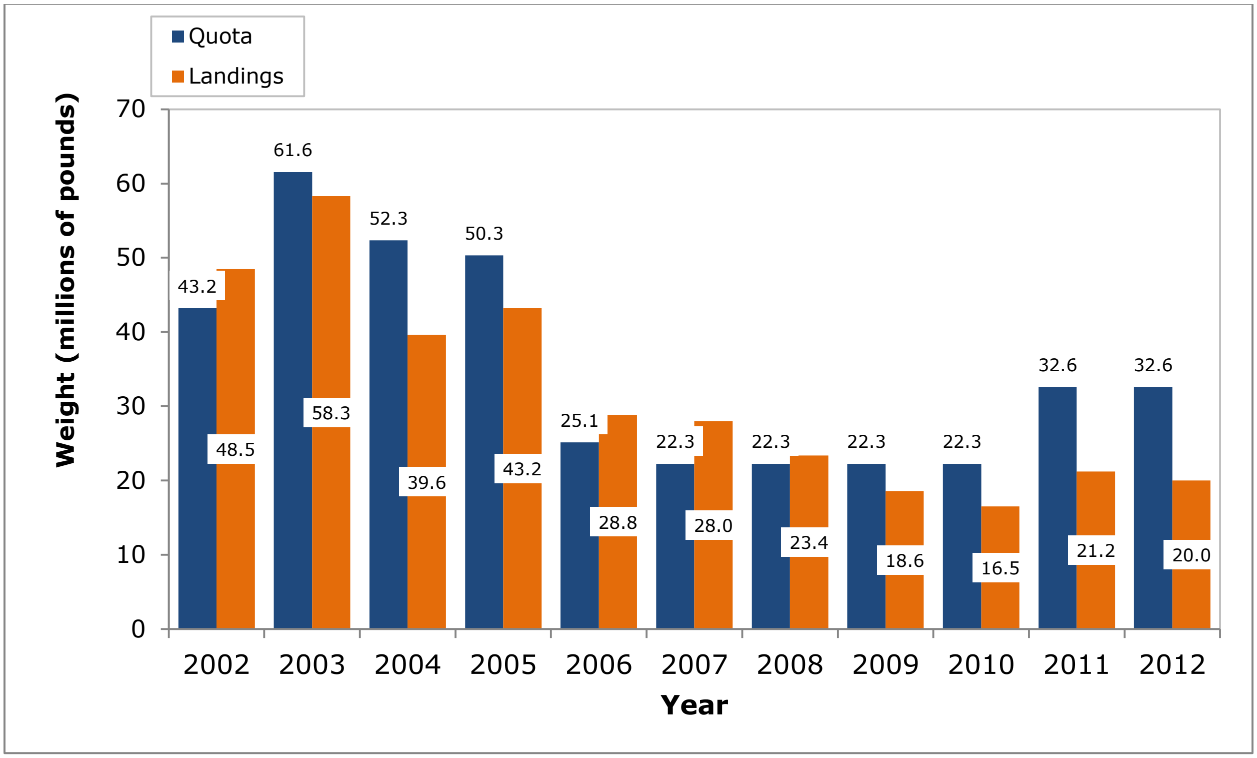

Figure 104. Quota and landings in the Monkfish Fishery.

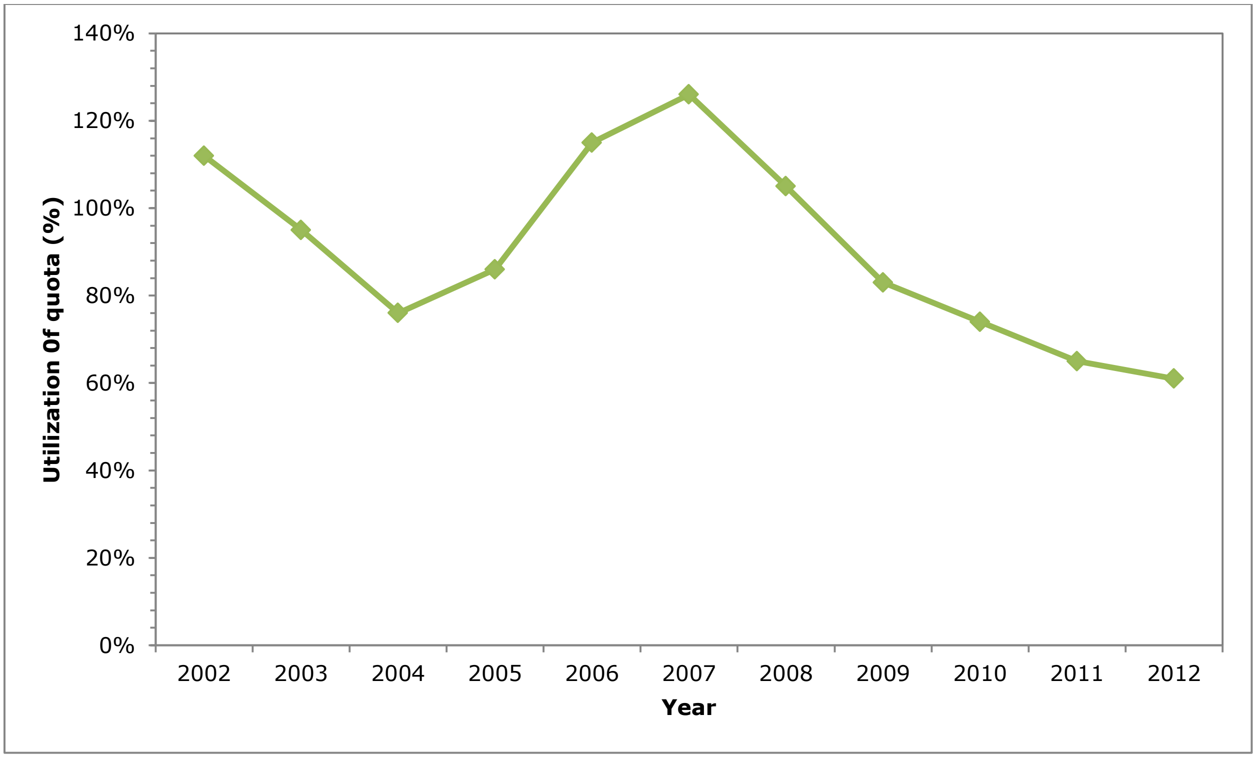

Figure 105. Utilization of the available Monkfish quota.

b. Effort

Although there are a finite number of permits that qualified for the monkfish limited access program, the number of valid permits that may be issued in any given year can vary depending on a permit's status. Permits that may be subject to sanction due to an enforcement action are not counted, nor are permits that are placed in the Conformation of Permit History (CPH) program. Permits are placed in the CPH program if there is no physical vessel associated with the permit; if the vessel has been sunk, is under repair, has been sold, or if the owner has an illness. As long as a permit remains in the CPH program, it is not available for use in the monkfish fishery so it is not counted as a valid permit. For this report, the number of valid permits is reported as of the start of the fishing year. Since the number of valid permits may change throughout the fishing year as permits may be placed in CPH, transferred, or cancelled, the number of permits reported here may differ somewhat from those reported elsewhere.

There were 726 limited access monkfish permits issued in 2002 (Figure 106). The number of limited access permits issued increased year by year, reaching 781 and 782 permits in 2006 and 2007, respectively. The increase in 2006 was due to the addition of a new limited access permit. Changes in prior years have been due to permit sanctions or changes to CPH program status. Since 2007, the number of valid permits declined year by year to 685 permits in 2012.

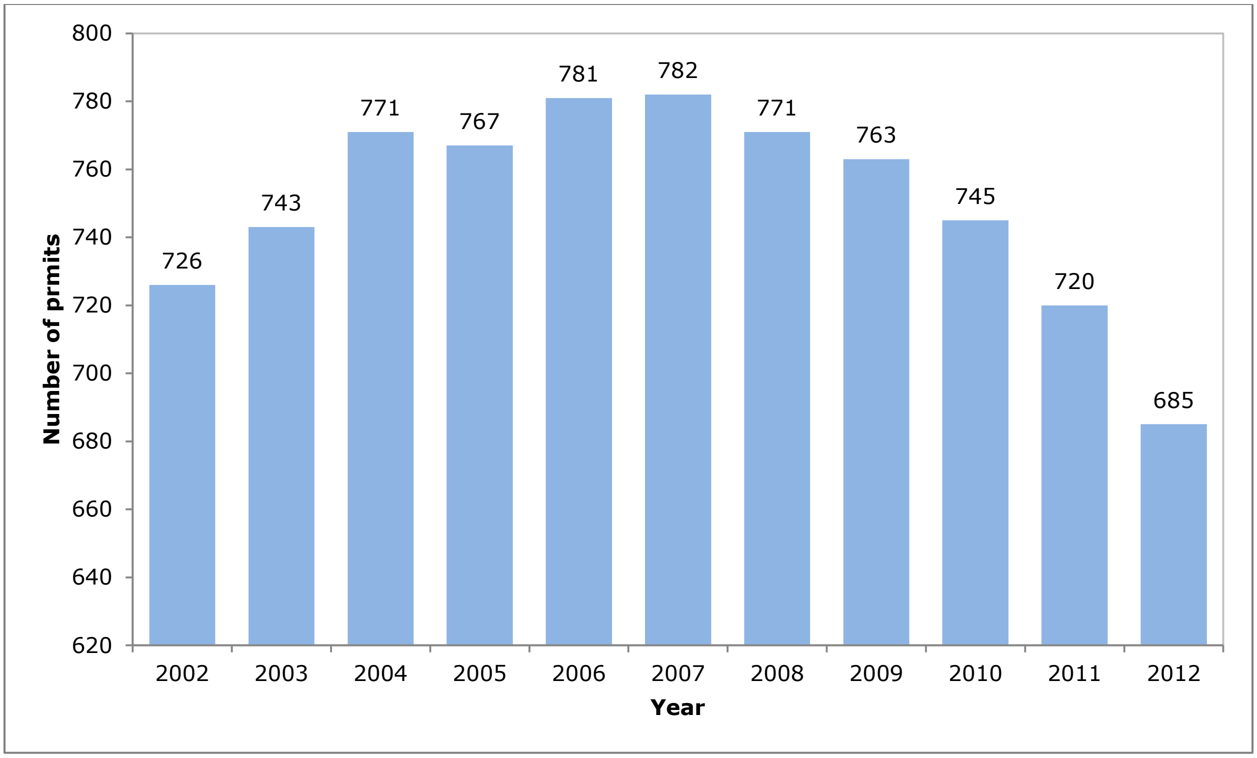

Figure 106. Number of limited access permits in the Monkfish Fishery.

Limited access vessels participating in the monkfish fishery were defined as vessels with a limited access permit that landed monkfish on at least one trip during the year. This definition includes monkfish vessels that used monkfish DAS to harvest monkfish as well as limited access vessels that landed incidental amounts of monkfish while engaged in other fisheries. The number of active limited access vessels in the monkfish fishery was highest in 2003, but has been on a declining trend ever since (Figure 107). Overall, the number of active vessels declined from 2003 to 2011 at an average annual rate of 4.2%, but the rate of change was substantially greater from 2009-2011 (-6.4% per year) compared to 2003-2008 (-3.4%). This more recent decline in active vessels participating in the monkfish fishery is likely related to the decline in numbers of active groundfish vessels, since the two fisheries overlap. In 2012, vessel numbers increased slightly to 489.

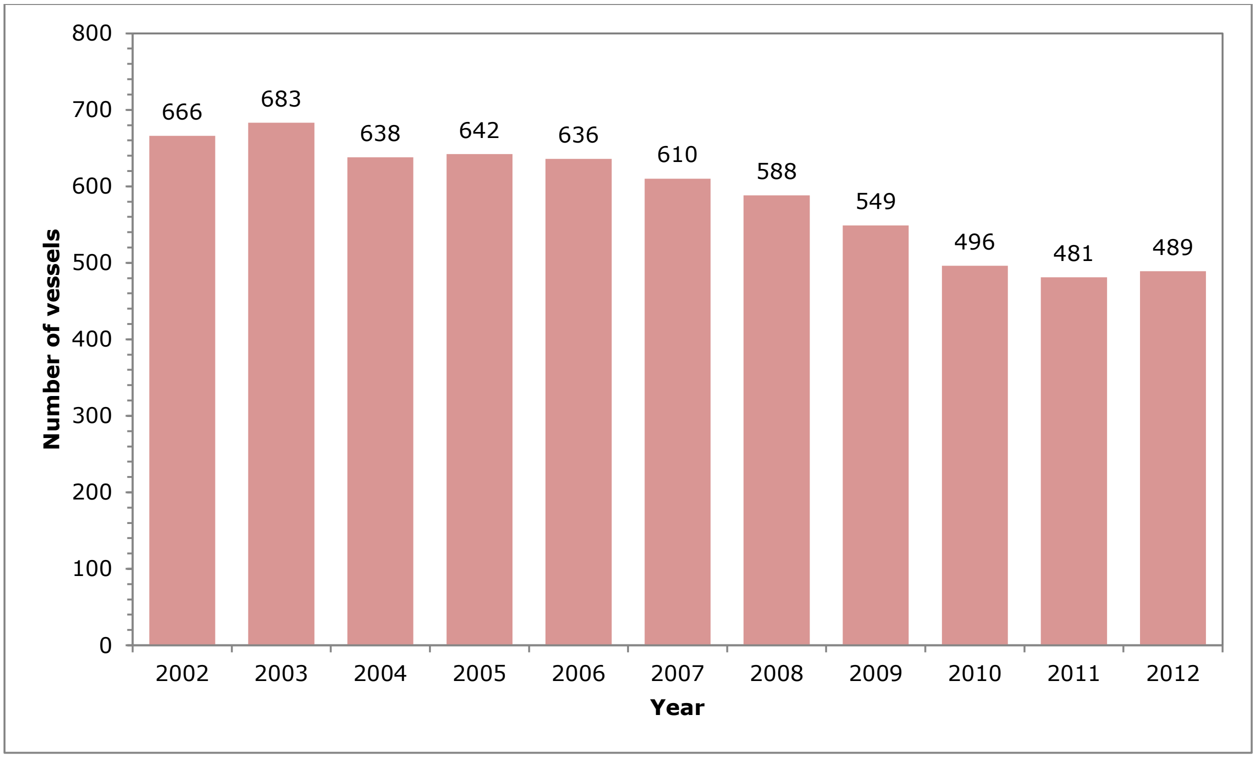

Figure 107. Number of active vessels participating in the Monkfish Fishery.

The number of trips taken by limited access permit holders on which monkfish were landed during the period 2002-2007 ranged from a low of 16,641 (2004) to a high of 19,204 (2005; Figure 108). With the exception of 2011, the number of trips where monkfish were landed has declined steadily since 2007 reaching a time-series low of 9,730 trips in 2012. The decline in trips, particularly from 2009 to 2012, is consistent with the downward trend in number of active vessels.

Days absent on trips taken by active vessels on which monkfish were landed were estimated using data from vessel trip reports. This differs from DAS as they are counted against allocated monkfish DAS, and includes the accumulated days absent on trips where only incidental amounts of monkfish were landed as well as trips taken on a monkfish DAS where monkfish were the primary target. As was the case for active vessels, the number of days absent on trips where monkfish were landed peaked in 2003 at 44,170 days (Figure 109) and the number of days absent has been on a general declining trend ever since. Although days absent fluctuated up and down from 2004 to 2007, days absent declined in consecutive years going from 35,096 days in 2007 to 26,896 days in 2010. The number of days absent increased 7.1% in 2011 to 28,808 days, but fell to a low of 18,520 days in 2012. Throughout 2002 to 2012, the season length remained constant at a full calendar year as there were no in-season closures of the Monkfish Fishery in either the SMA or NMA.

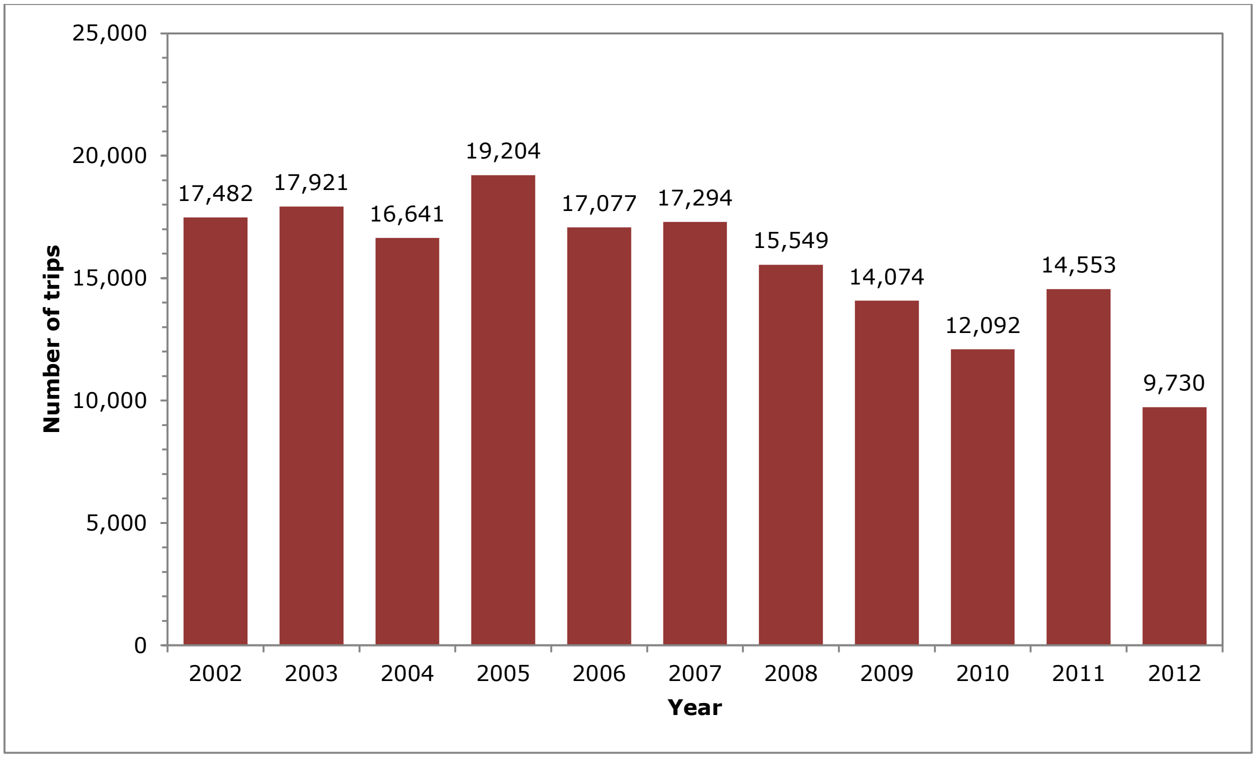

Figure 108. Number of trips taken to fish for Monkfish.

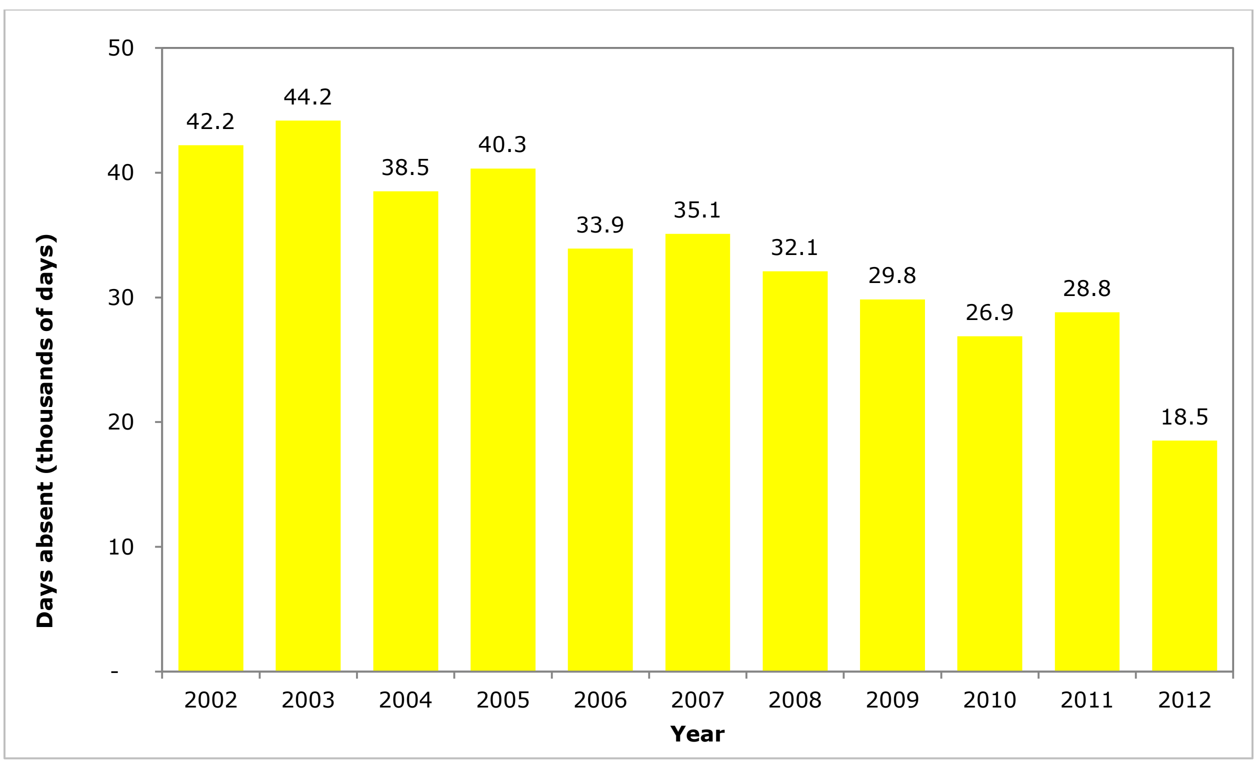

Figure 109. Number of days absent spent fishing on trips that landed Monkfish.

c. Revenue

Revenue from monkfish (adjusted for inflation using the GDP deflator indexed for 2010) ranged from a high of $44.4 million in 2005 to a low of $17.5 million in 2009 (Figure 110). However, the majority of monkfish are landed as part of a mixed species fishery where revenues from species other than monkfish averaged over 80% of the total value of all species harvested on trips that land monkfish. This means that the aggregate value of all species landed on monkfish trips ranged between $201 and $268 million from 2002 to 2012. On average, average annual values of both monkfish ($39.5 million) and total revenue ($250.5 million) were higher in 2002-2005 than in 2006-2012, when monkfish revenue averaged $23.0 million and total revenue from all species averaged $213.7 million.

Monkfish are sold as tails, livers, and whole fish, each of which fetches a different price per pound of landed product, with monkfish livers fetching the highest price. Since all landed weights are reported in live weight, aggregate revenues divided by landings yields prices for live weight price, not landed weight, which would be considerably higher as the landed weight to live weight conversion is 3.32.

The average live weight price for monkfish was $0.82 per pound in 2002 (Figure 111). Average live weight price increased steadily to $1.02 per pound in 2005 before gradually declining to $0.94-0.95 in 2008 and 2009, respectively. The average live weight monkfish price increased to highs of $1.17 per pound in 2010 and $1.28 per pound in 2011, but declined to $0.97 per pound in 2012.

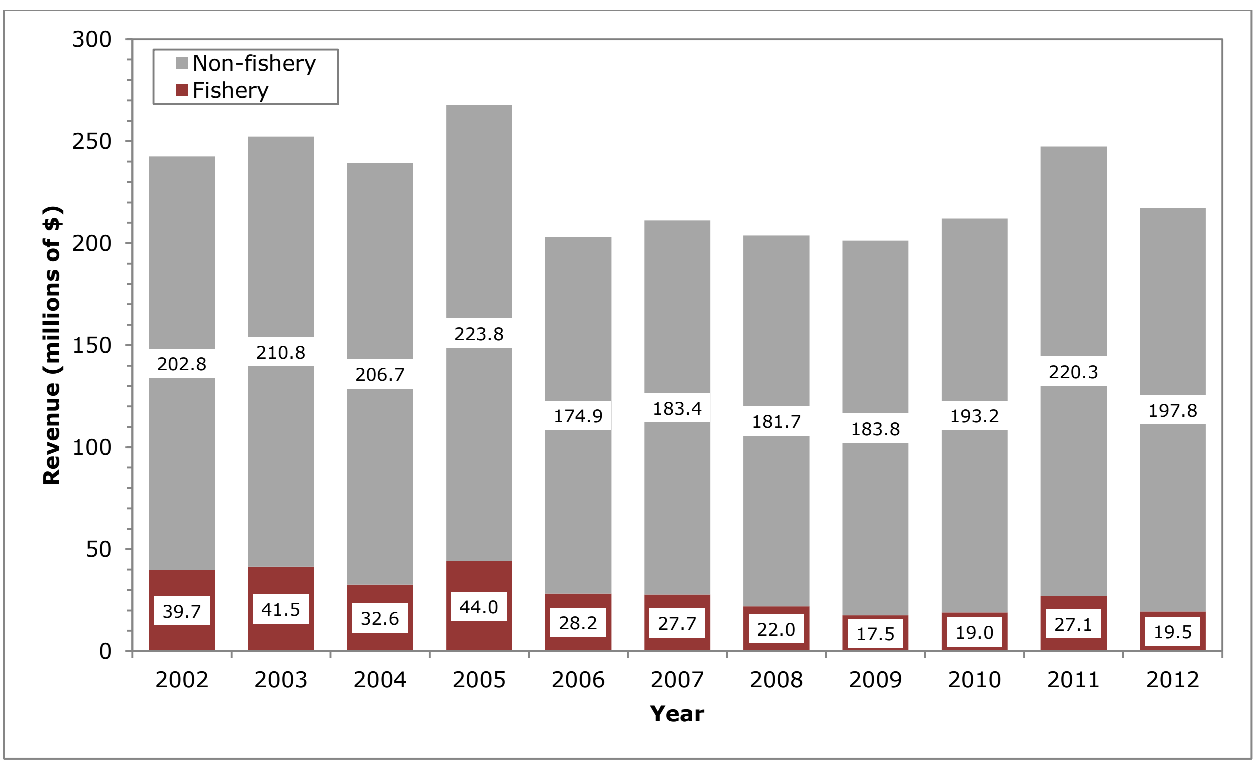

Figure 110. Revenue (inflation-adjusted 2010 dollars) from monkfish and non-monkfish landings.

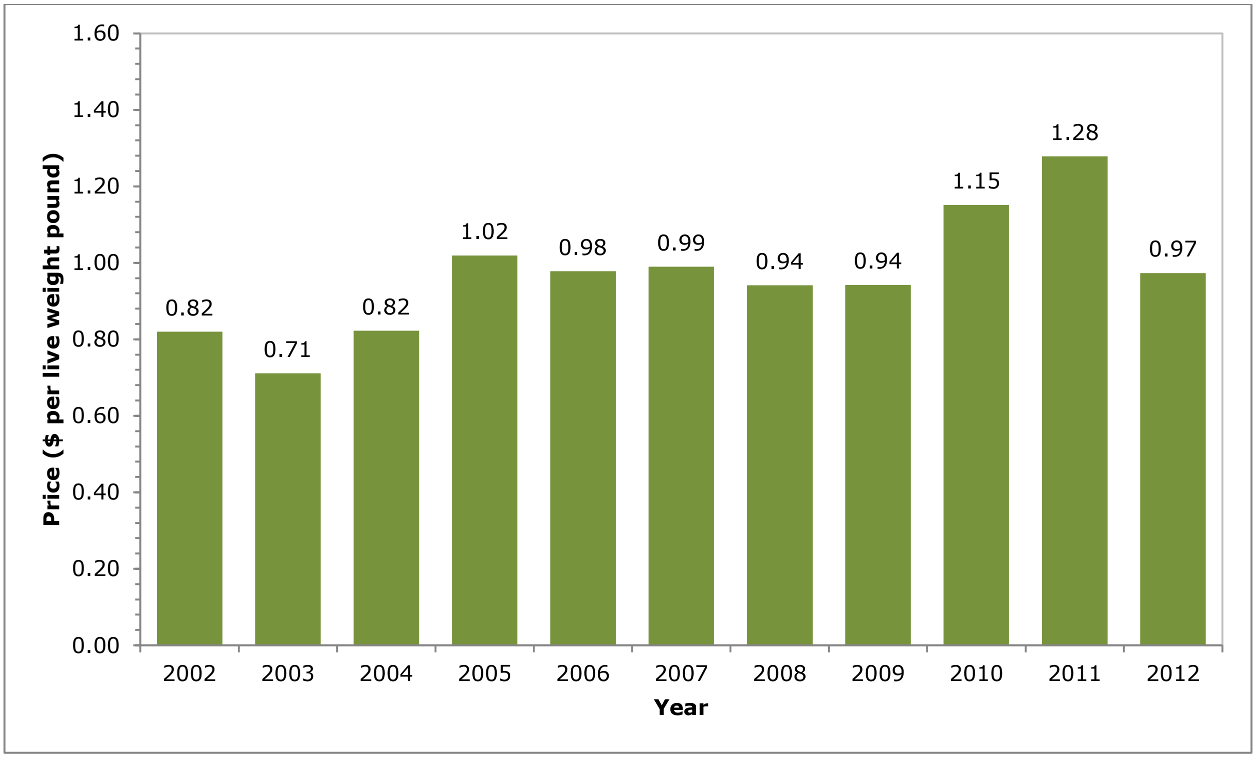

Figure 111. Average live weight prices (inflation-adjusted 2010 dollars) for monkfish.

Total revenue per vessel participating in the Monkfish Fishery averaged $363,353 annually from 2002 to 2004, of which $50,945 was from monkfish (Figure 112). In 2005, monkfish revenue per vessel peaked at $57,416 and total revenue from all species summed to $406,037. Aggregate revenue per vessel declined to $311,181 in 2006, then increased steadily through 2011, when it reached a time-series high of $495,767 (of which monkfish accounted for $37,679). In 2012, both monkfish and total revenue went down to $28,433 and $432,944, respectively. Given that aggregate revenues from all species in the fishery were relatively stable from 2006 to 2011, the improvement in revenue per vessel was due mostly to declines in the number of active vessels (Figure 107). During 2012, total revenue per vessel declined partly due to an increase (2%) in the number of active vessels (Figure 107), and partly due to a reduction in both monkfish and non-monkfish revenue (Figure 110). However, the decline in monkfish revenue was proportionally larger, and due to a decline in average live-weight monkfish price from $1.28 per lb in 2011 to $0.97 per lb in 2012 (Figure 111), even though total monkfish landings in 2011 and 2012 were nearly identical (Figure 104).

A general decline in other measures of effort, including number of trips and days at sea on trips when monkfish were landed, is coincident with the reduction in number of active vessels. Declines in these measures of effort, coupled with relatively stable aggregate revenues from 2006 to 2012, produced an upward trend in both revenue per trip (Figure 113) and revenue per day at sea (Figure 114), although the trend is more modest for the latter.

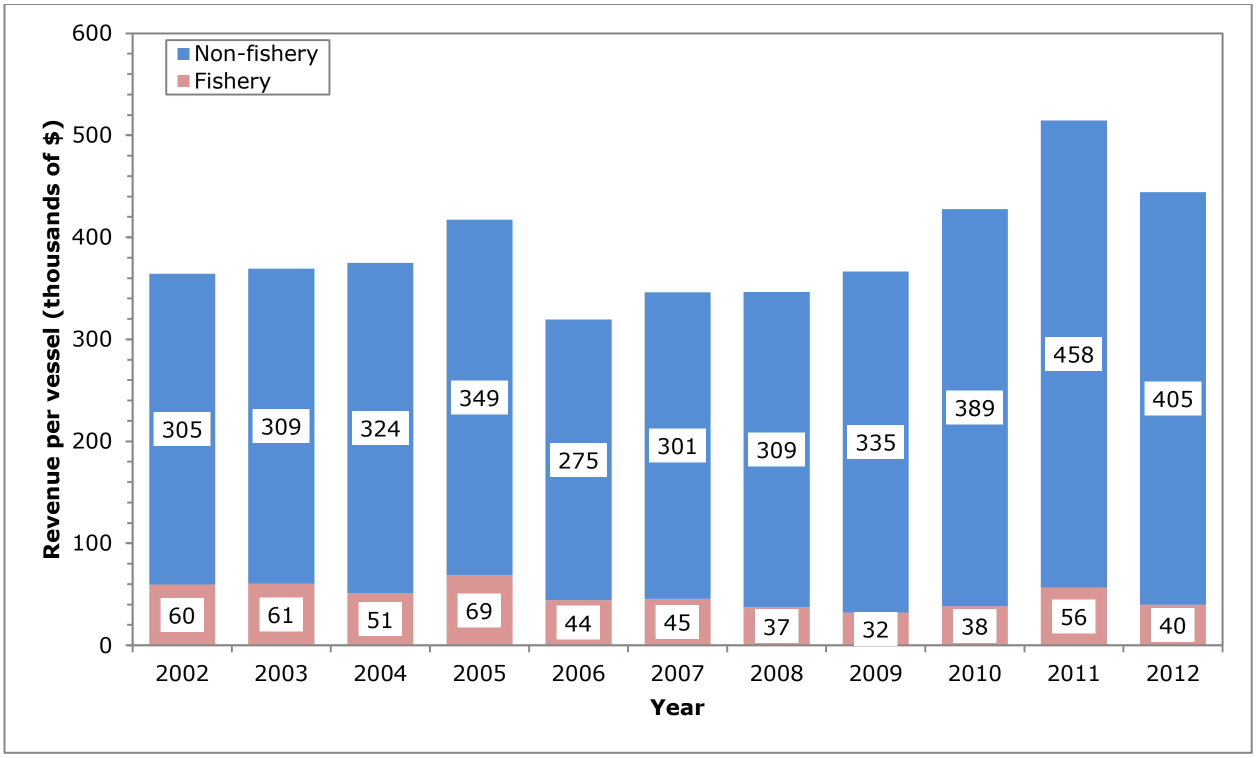

Figure 112. Revenue (inflation-adjusted 2010 dollars) per active vessel participating in the Monkfish Fishery.

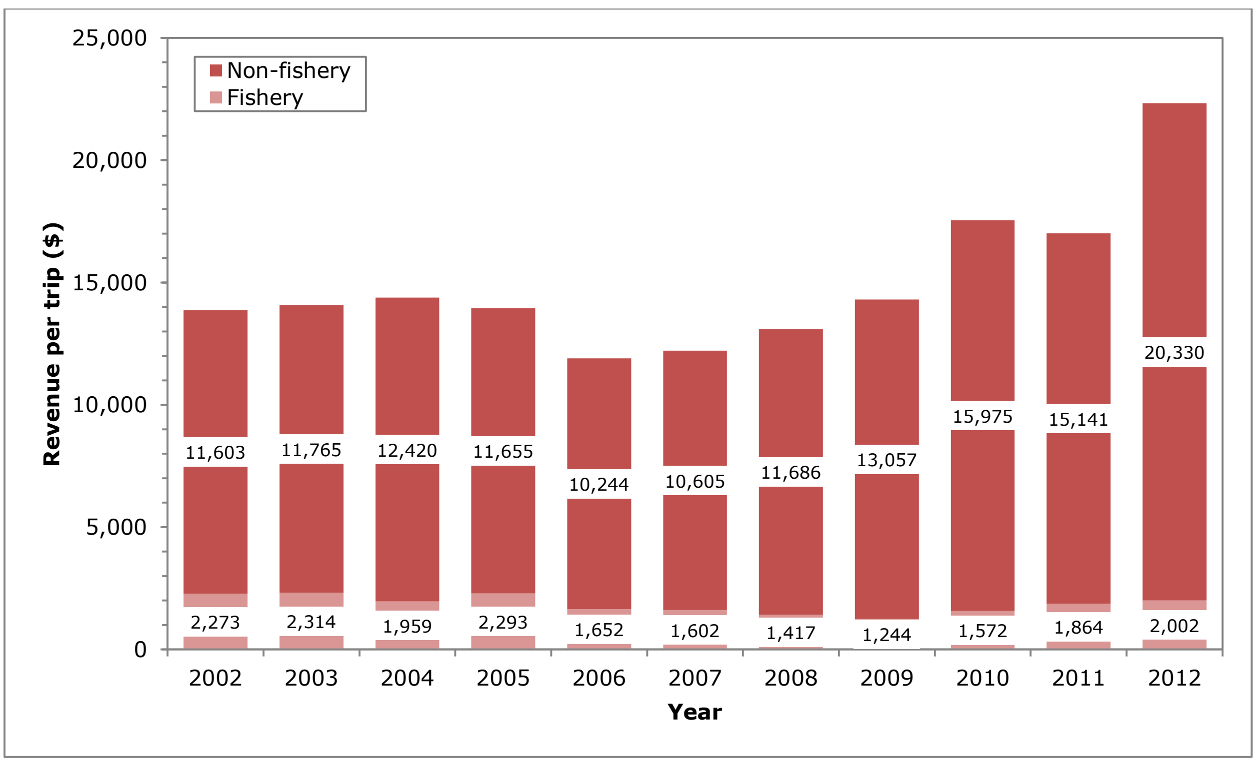

Figure 113. Revenue (inflation-adjusted 2010 dollars) per trip in the Monkfish Fishery.

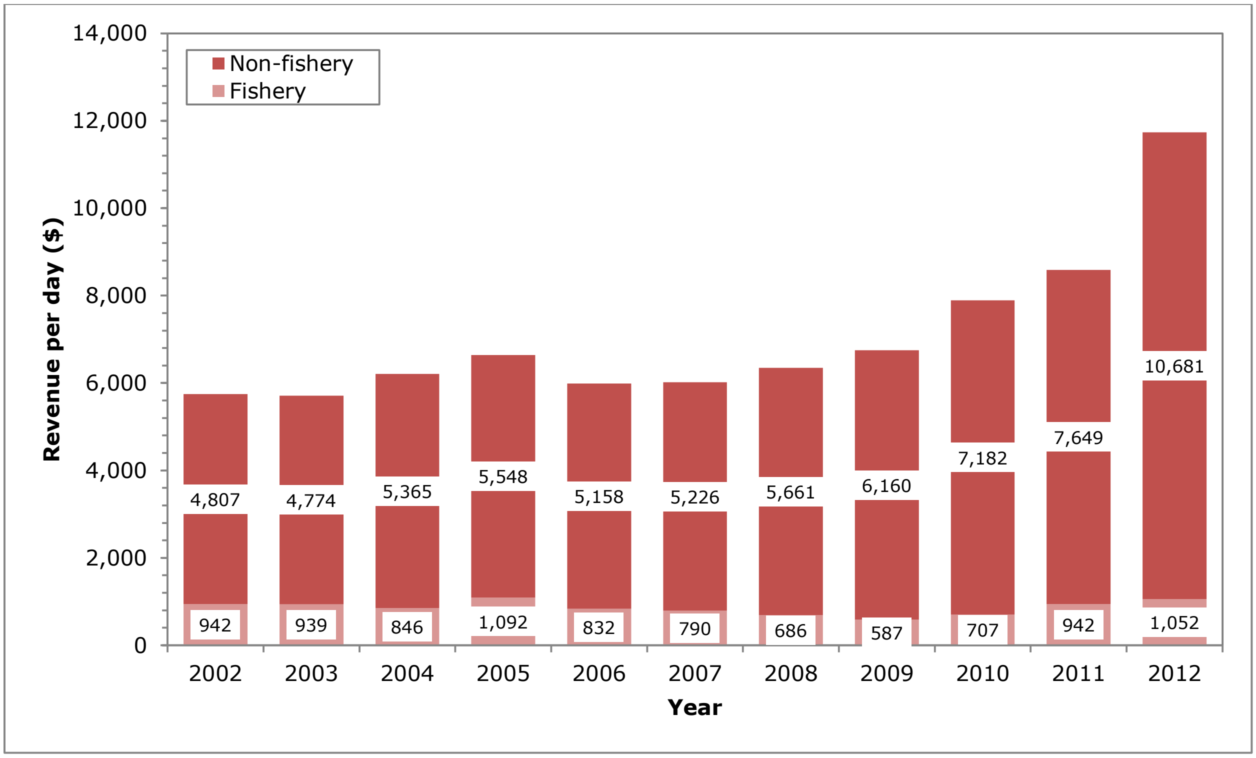

Figure 114. Revenue (inflation-adjusted 2010 dollars) per day at sea fishing for monkfish.

The Gini coefficient calculated for vessels earning revenue in the Monkfish Fishery was nearly constant from 2002 to 2006 averaging 0.61 (Figure 115). The coefficient was below 0.60 in 2007-2011, except for 2010 when it was 0.63, then decreased to 0.61 in 2012. Overall, the Gini coefficient has remained relatively constant indicating that there has been no appreciable change in the distribution of monkfish revenues among limited access vessels participating in the monkfish fishery.

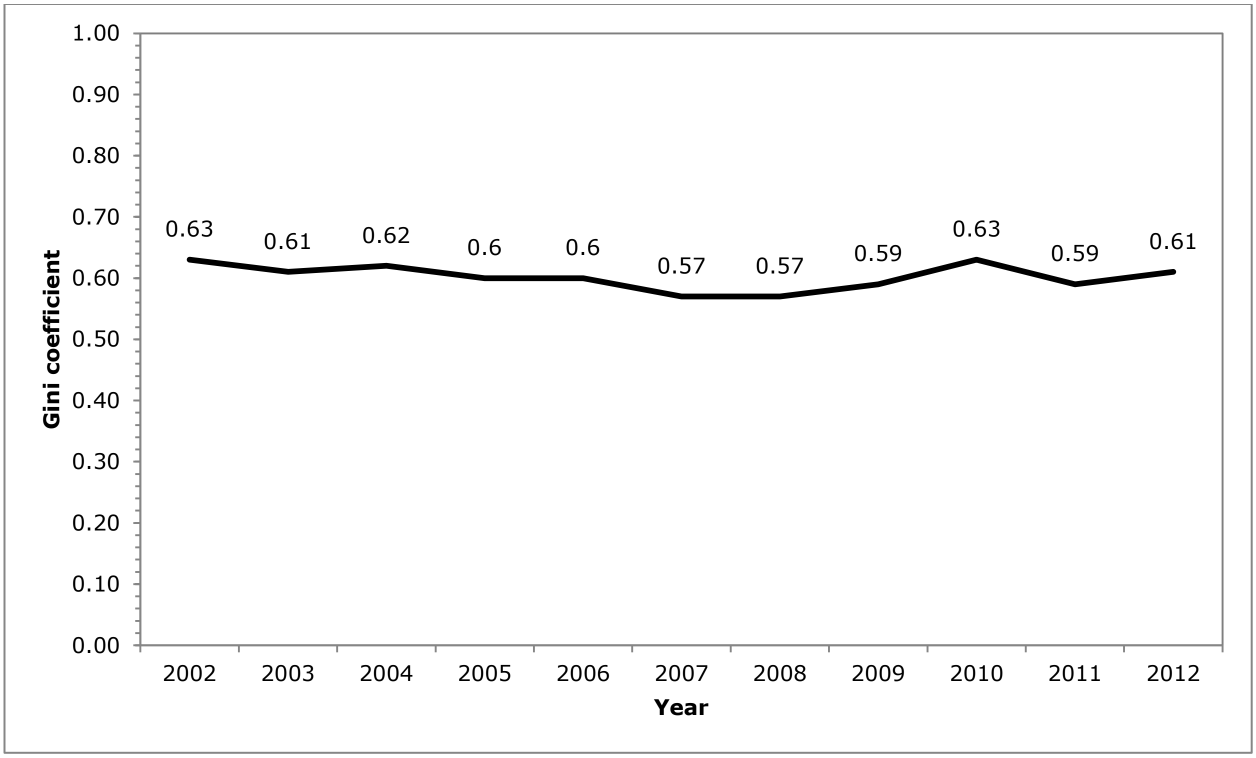

Figure 115. The Gini coefficient for active vessels participating in the Monkfish Fishery.

d. Synopsis of recent trends

The monkfish fishery has been relatively stable in recent years in terms of landings and DAS usage. Recent efforts have focused on increasing the proportion of the ACTs harvested in each area due to continued under-harvest of available ACTs. Since incidental landings while targeting groundfish are the predominant source of monkfish catch in the NMA, such limits have been increased as the primary means of increasing monkfish landings, while in the SMA, landing limits when fishing on a monkfish DAS limit have been increased as a means to increase monkfish landings. In addition, the Councils have attempted to increase the efficiency of vessel operations by eliminating measures that unnecessarily restrict vessel operations such as limitations on when monkfish-only DAS can be used or where Category H permitted vessels can fish. Available monkfish quota provides an additional revenue source for vessels subject to quota reductions in other fisheries during recent years, especially the groundfish fishery. However, there is a concern that effort shifts from other fisheries may adversely affect the sustainability of monkfish stocks and hence the economic viability of the monkfish fishery, particularly in light of existing latent effort within the monkfish fishery itself, and continued patterns in retrospective monkfish stock assessments, which overestimate biomass and underestimate fishing mortality.

B. Limited Access Atlantic Sea Scallops

The majority of the Atlantic sea scallop fishery is prosecuted in Mid-Atlantic Coastal waters from Virginia to New York and on Georges Bank and surrounding areas including the Great South Channel and Nantucket Shoals[6]. The original Fishery Management Plan for Atlantic sea scallops was developed by the New England Fishery Management Council and implemented in 1994 creating a management program with separate provisions for limited access and open access vessels. Limited access vessels were managed under Days at Sea (DAS) controls, whereas open access vessels which were referred to as General Category (GC) vessels were primarily regulated through trip limits. At the time the Fishery Management Plan was implemented, the scallop resource was depleted and fishing effort was not sustainable. The resource has since rebounded to sustainable levels at near record high population sizes after a series of management actions to reduce DAS, close areas, limit crew size, and implement gear modifications. As of 2014, the sea scallop fishery is the highest valued fishery in the Northeast region and is the most valuable wild scallop fishery in the world. In 2010, the General Category fishery was converted to a catch share fishery and was allocated 5% of the entire scallop catch limit. Performance measures for the General Category Individual Fishing Quota fishery are included in a National report on the economic performance of U.S. catch share programs (Brinson and Thunberg, 2013). The following is based only on the limited access fishery.

1. Fishery synopsis

    a. Gear used

Sea scallops are predominately harvested using dredge gear, although a small number of vessels harvest scallops using otter trawls. The scallop dredge consists of a towing bar, a metal frame, and a mesh bag made from linked metal rings. On the top of the dredge, there is a space between the frame and the bag known as the "twine top". The placement and the mesh size of twine top allow small scallops to escape as well as allowing escapement of small finfish. Larger scallops are retained in the bag. Vessels may tow more than one dredge at a time although only one dredge may be permitted under certain circumstances. Each scallop dredge may not exceed a specified maximum size and both ring size and mesh size of the twine top are subject to minimum size specifications.

    b. Target/component species

The Fishery Management Plan does not regulate any species other than Atlantic sea scallops. Scallop gear is a specialized gear and under current population sizes, high scallop prices, and regulations in other fisheries, very few species other than scallops are retained on scallop trips. However, in the 1990's when the scallop resource was at lower abundance, monkfish as well as flatfish such as yellowtail flounder were an important component catch on scallop trips.

[6] This section draws from FishWatch at the following URL. The URL provides general information about Atlantic sea scallops as well as other species
http://www.fishwatch.gov/seafood_profiles/species/scallop/species_pages/atlantic_sea_scallop.htm

c. Market channels

The majority of Atlantic sea scallops are sold as shucked meats in which the abductor muscle is cut from the shell and retained. Most scallops are shucked by crew at sea, although there is a market for roe-on scallops.

2. Management Program

a. Current management controls

Atlantic sea scallops are managed by a combination of DAS controls and a rotational area program. The DAS controls, as well as limits on crew size and gear, were implemented concurrent with the original Fishery Management Plan. Unlike groundfish that included an individual DAS category, the scallop Fishery Management Plan provides for uniform DAS allocations depending on permit category. Full-time permits are allocated more DAS than part-time, and part-time permits are allocated more DAS than occasional permits. Qualification criteria were developed for each permit category and vessels were assigned a permit category based on the qualification criteria. A rotational area program was introduced in 2004 with Amendment 10 to improve the economic yield from the fishery by reducing growth overfishing. The rotational area program is based on annual surveys to identify high concentrations of juvenile scallops. These areas are temporarily closed to scallop fishing to take advantage of high growth rates and increased prices received for larger scallops. Reopening a closed area is done under controlled circumstances by allocating a limited number of trips to each permit holder so as to avoid a "gold rush" that would occur if access to the area were not controlled.

b. Key changes from past management controls

In addition to the Atlantic sea scallop rotational area program, the Fishery Management Plan includes provisions for access to some areas that were closed to all gears as part of the groundfish plan. These areas include closed Area 1, closed Area 2, and the Nantucket Lightship area. Access to these areas is allocated in a manner similar to that of the rotational area program but the areas have had seasonal closures at various times when bycatch of yellowtail flounder is expected to be highest. Currently, only Closed Area 2 has a seasonal closure. Note that the requirement for Annual Catch Limits and Accountability Measures meant that the New England Fishery Management Council has had to develop bycatch Annual Catch Limits and Accountability Measures for yellowtail flounder in the scallop fishery as a whole. To increase the likelihood that the yellowtail quota will not be exceeded, industry, in conjunction with the University of Massachusetts Dartmouth School and Marine Sciences and Technology, has developed a yellowtail avoidance program by reporting areas with high encounter rates with yellowtail flounder. In 2013 an Annual Catch Limit and Accountability Measures for windowpane flounder were added to the scallop FMP. Additionally, the scallop fishery has been subject to the requirement to use a turtle excluder device in times and areas where interactions with turtles are likely.

3. Management Objectives

In addition to the National Standards established under the Magnuson-Stevens Act, the objectives of the Atlantic sea scallop Fishery Management Plan have evolved over time in response to the specific management problems as they have changed over time. The original Fishery Management Plan objectives dealt almost exclusively with biological concerns intended to restore the adults' stock abundance and enhance yield per recruit from the stock. In doing so, however, the overarching management objective was "to maximize the joint social and economic benefits from harvesting and use of the sea scallop resource." The most recent Fishery Management Plan amendment (Amendment 15) was developed to bring the Fishery Management Plan into compliance with the re-authorized Magnuson-Stevens Act, address excess capacity in the limited access fishery, and consider measures to improve the effectiveness of the overall management programs. Specific Amendment 15 objectives were to:

1) Identify and implement appropriate Annual Catch Limits and Accountability Measures for various components of the scallop fishery.
2) Consider addressing capacity in the limited access scallop fishery and improve overall economic performance while considering impacts on various fisheries and fishing communities.
3) Consider adjusting the current overfishing definition to be more compatible with area rotation.
4) Consider adjustments to the limited access general category management program.
5) Consider addressing the essential fish habitat closed areas under the Scallop Fishery Management Plan.
6) Consider adjustments to the current research set-aside program.
7) Consider adjusting the scallop fishing year.

4. Recent Trends

a. Quota and landings

Target total allowable catch (TTAC) were set in the Limited Access Atlantic Sea Scallop Fishery from 2007 to 2010. These TTACs were set based on resource conditions and were used to set days at sea limits that were expected to meet the TTACs for that fishing year. Exceeding a TTAC did not result in any in-season closures, but may have resulted in adjustments to allocated days at sea in the following year. In 2011, an Annual Catch Limit (ACL) was set with accountability measures in compliance with the reauthorized Magnuson-Stevens Act.

The limited access scallop TTACs were set at about 40 million pounds in both 2007 and 2008 with modest increases to 41.3 and 43.3 million pounds in 2009 and 2010, respectively; whereas, the 2011 ACL was set at 55.0 million pounds and was increased to 58.5 million pounds in 2012 (Figure 116). Landings of scallops exceeded the TTACs in each year from 2007 to 2010 by as much as 29% in 2007, but neither the 2011 nor the 2012 ACLs were exceeded (Figure 117). Landings were lowest in 2008 at 44.6 million pounds, but were right around 50 million pounds in all other years including 2012 when landings were 49.9 million pounds.

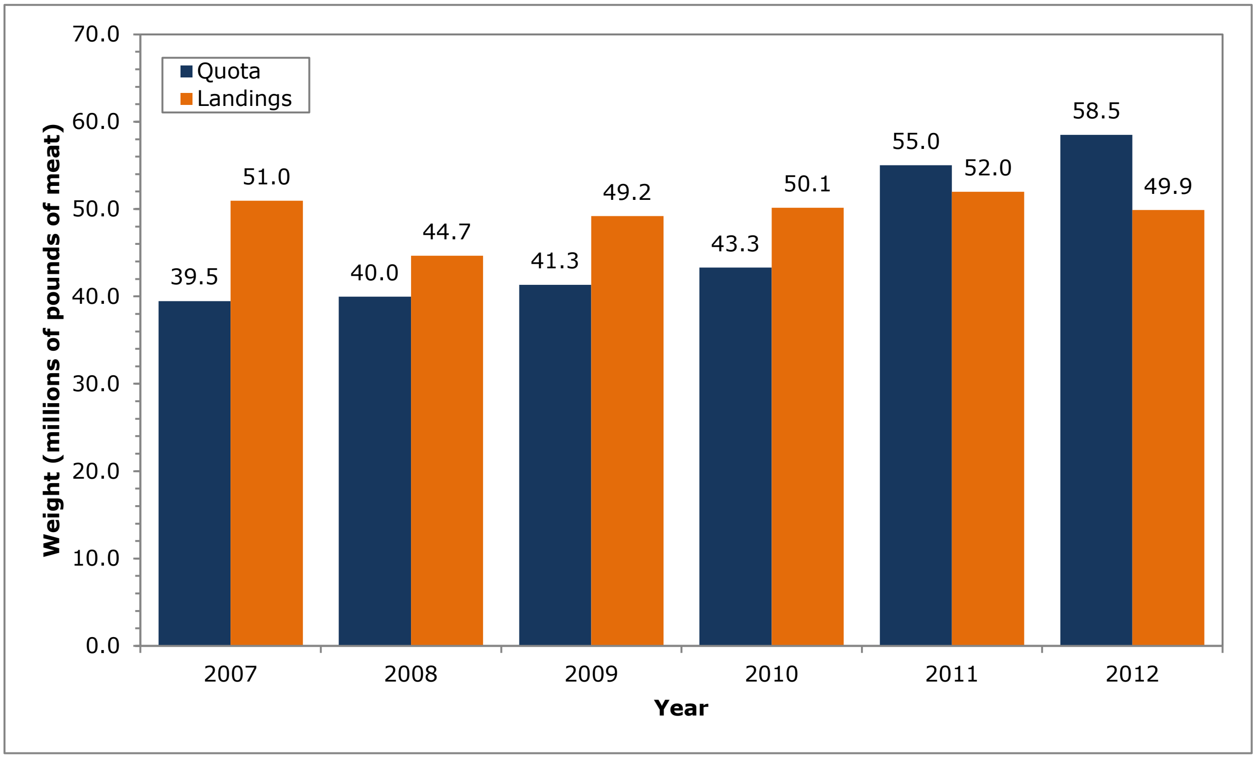

Figure 116. Quota and landings in the Limited Access Atlantic Sea Scallop Fishery.

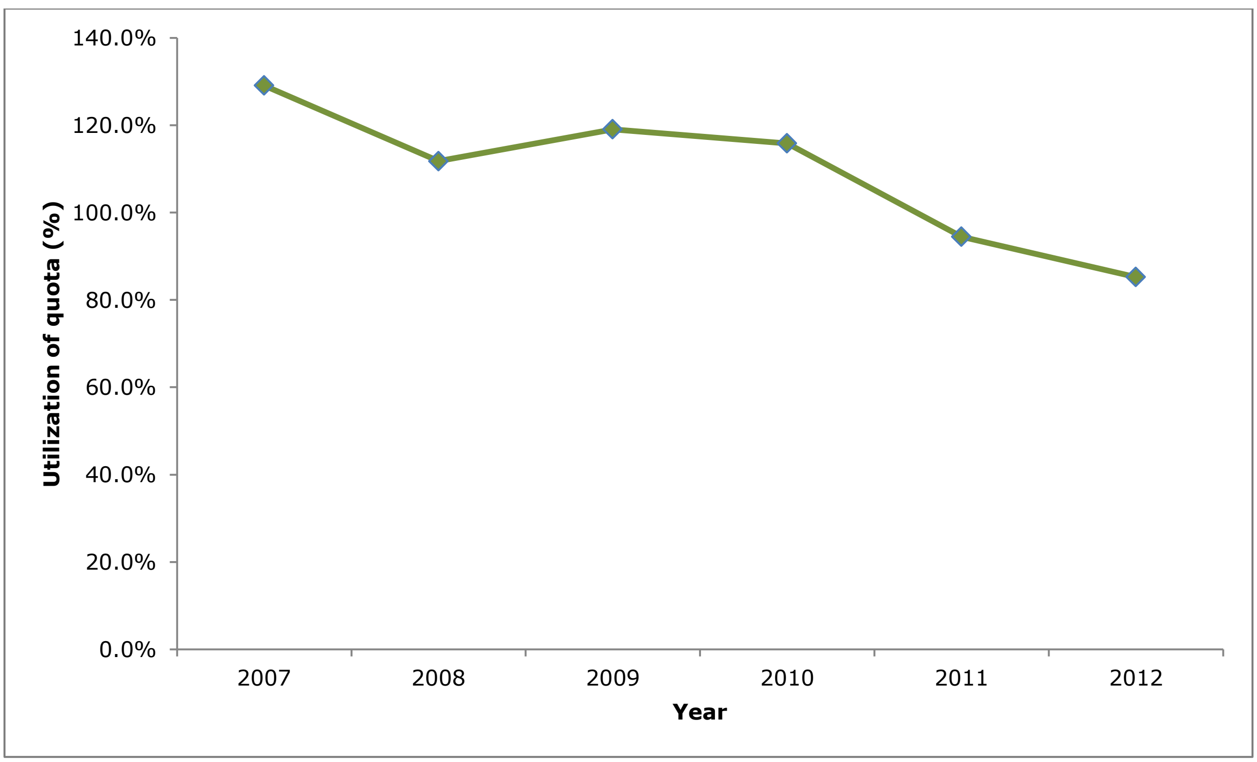

Figure 117. Utilization of the available Limited Access Atlantic Sea Scallop quota.

b. Effort

Although there are a finite number of limited access permits that may be issued in any given year, the number of valid permits during the year may vary; where a valid permit is defined as being a permit that is assigned to a vessel that may fish at any time during the fishing year. Vessel permits that may be subject to a sanction or are placed in the Conformation of Permit History (CPH) program are not valid permits, because they are not immediately available to be fished.

There were 369 valid limited access scallop permits issued in 2007 (Figure 118). The number of valid permits declined to 356 in 2008, but has remained stable at between 350 and 356 from 2009 to 2012. The number of scallop limited access vessels that actually participated in the fishery varied little, ranging from 348 vessels in 2009 to 353 vessels in 2011 (Figure 119). In all years, at least 95% of vessels with valid limited access scallop permits participated in the fishery. Note that the number of active vessels in 2010 (351) was higher than the number of limited access permits (350) reported above. As previously noted the number of valid limited access scallop permits may vary throughout the year which means that the number of permits reported in Figure 118 depends on when the permit data were queried whereas, active vessels is based on the total number of vessels that participated in the Limited Access Atlantic Sea Scallop Fishery at any time during the year. In this manner, it is possible for the number of active vessels to exceed the number of limited access permits at a point in time, especially in fisheries like the limited access scallop fishery where the number of inactive permits is very low.

The number of limited access scallop trips was highest in 2007 at 3,772 trips, but was relatively stable in all other years averaging 3,035 trips plus or minus no more than 135 trips (Figure 120). Similarly, the number of days at sea on limited access scallop trips was highest in 2007 (28,250), but hovered around 23,000 days at sea plus or minus 1,800 days at sea (Figure 121).

Since the limited access fishery was managed with TTACs and the 2011 Annual Catch Limits was not exceeded, the fishery was not subject to any in-season closures resulting in a year-round fishing season of 365/366 days.

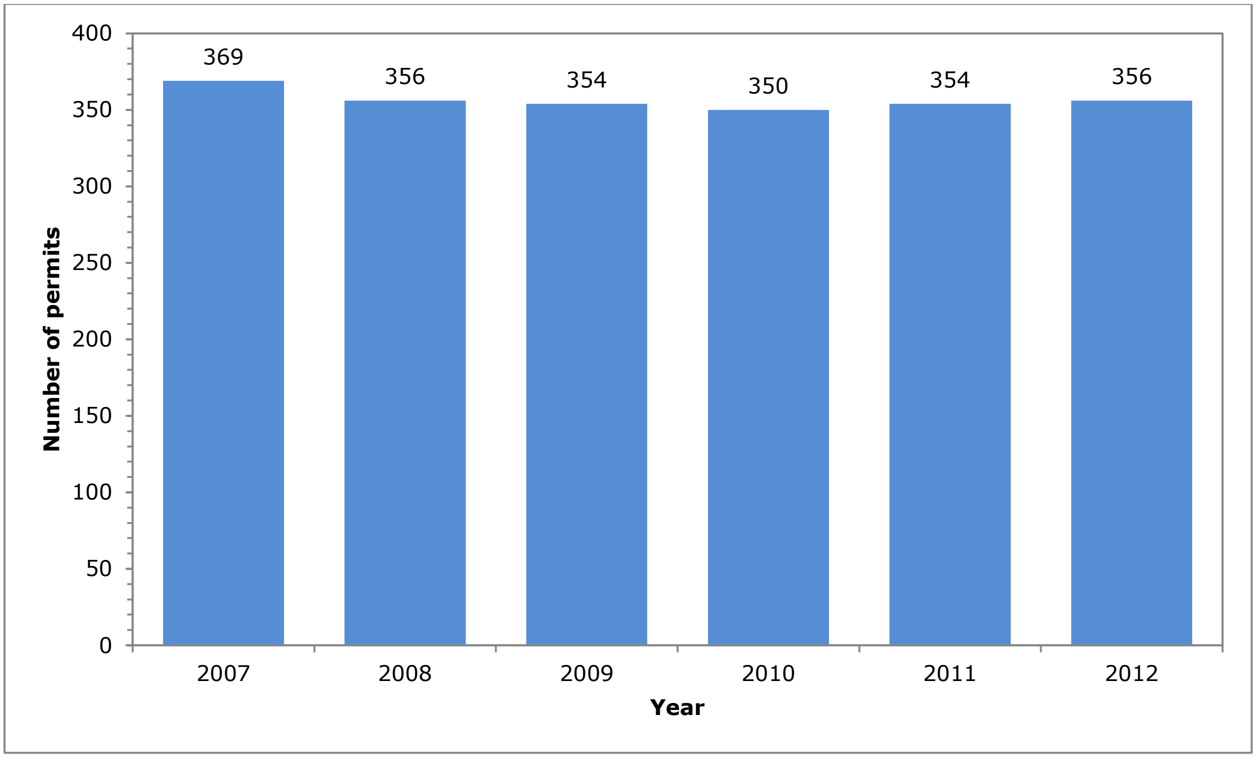

Figure 118. Number of permits issued in the Limited Access Atlantic Sea Scallop Fishery.

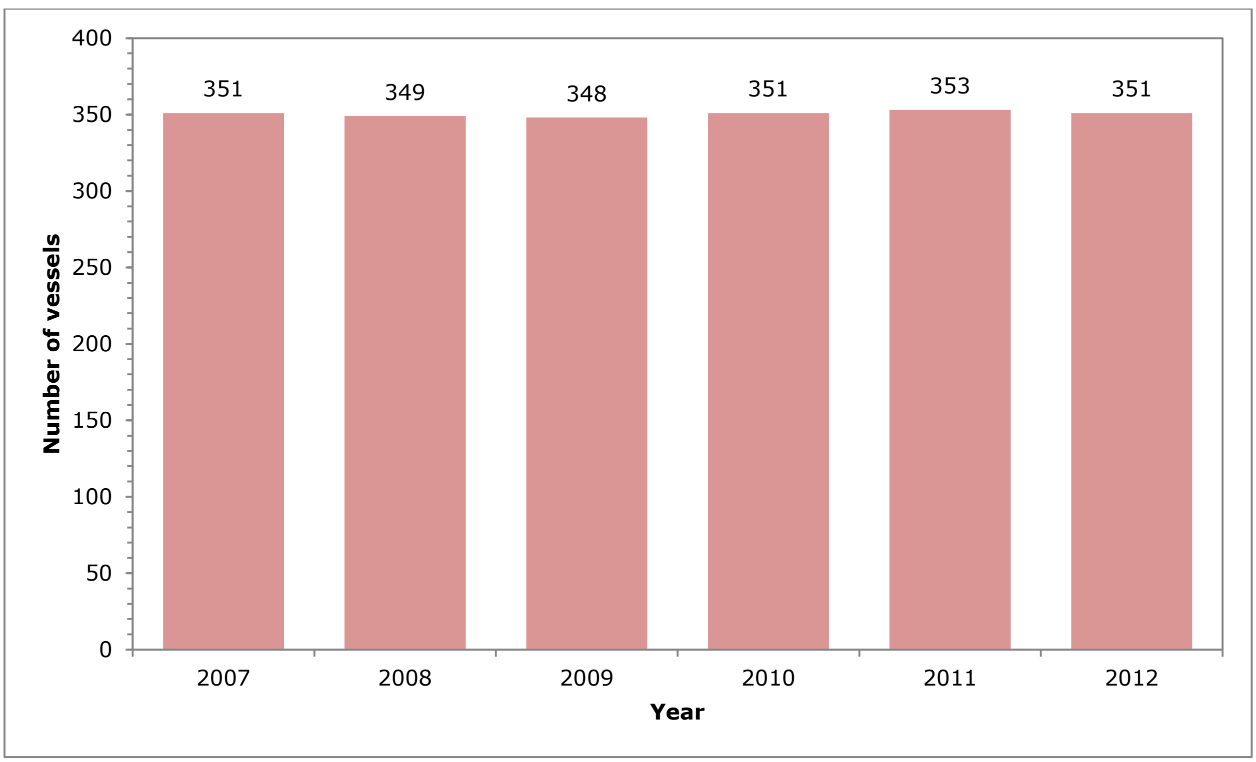

Figure 119. Number of active vessels participating in the Limited Access Atlantic Sea Scallop Fishery.

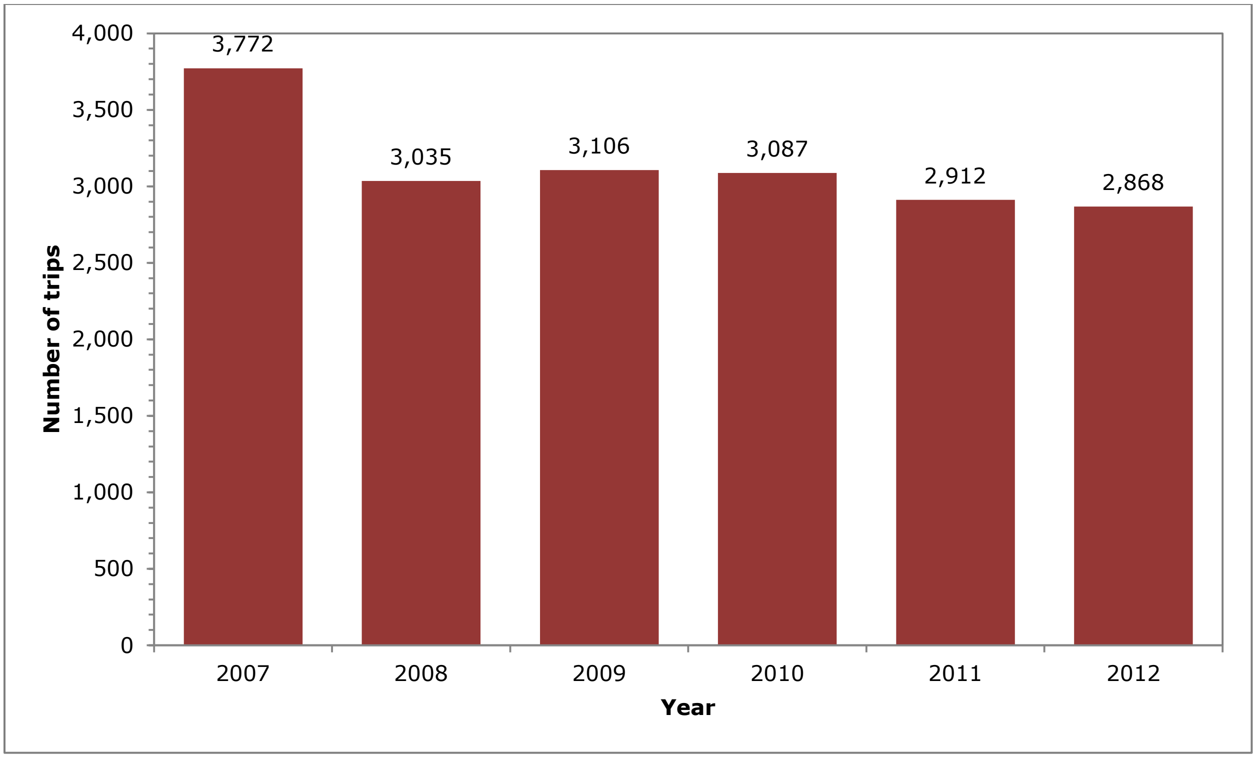

Figure 120. Number of trips taken in the Limited Access Atlantic Sea Scallop Fishery.

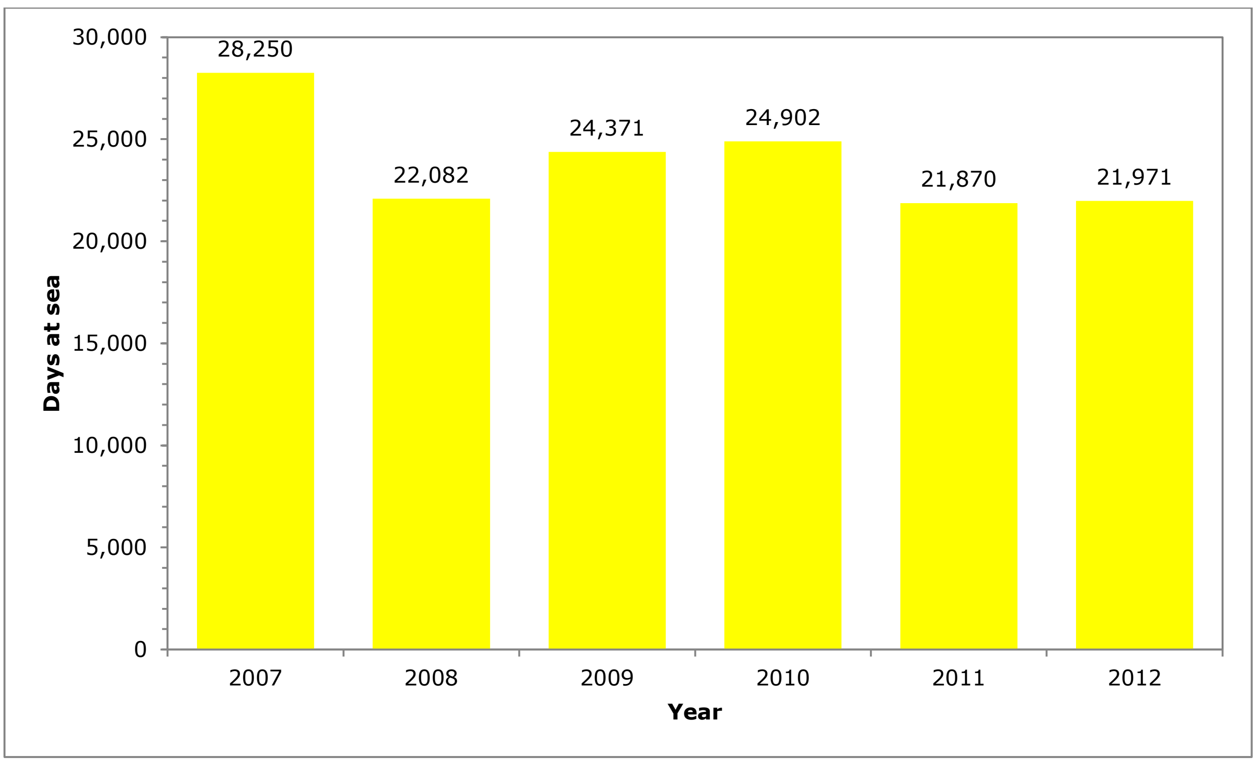

Figure 121. Number of days at sea fishing in the Limited Access Atlantic Sea Scallop Fishery.

c. Revenue

All revenue data have been adjusted by the GDP deflator indexed for 2010. During the 1990's, at a time when the scallop resource was depleted, income from monkfish was an important source of fishing revenue. More recently, reliance on revenue from other species has greatly diminished and was, at most, 1% of aggregate fishing revenue on limited access scallop trips. For this reason, the discussion herein will focus only on revenues received from scallops.

Inflation-adjusted limited access fishery scallop revenue was $349.9 million in 2007 (Figure 122). Scallop revenue declined to $316.5 million in 2008, but has been on an increasing trend in consecutive years from $320.5 million in 2009 to $499.9 million in 2011. Sea scallop revenue dipped to $463.7 million in 2012, which was still second highest in the time period.

The average price per pound of scallop meat was $6.94 in 2007 (Figure 123). Scallop prices increased to an average of $7.13 per pound in 2008 then dipped to $6.55 per pound in 2009. Since 2009, average prices increased to over $9 per pound in both 2011 ($9.64) and 2012 ($9.33).

Scallop revenue per participating limited access scallop vessel was at least $900,000 in every year from 2007 to 2009 and exceeded $1 million per vessel in every year thereafter (Figure 124). After falling by about $100,000 from 2007 to 2008, scallop revenue per vessel increased every year from 2008 to 2011 from $906,900 to $1.4 million per vessel in 2011. Scallop revenue per vessels was $1.3 million in 2012. This general trend was also evident for scallop revenue per trip and for scallop revenue per day at sea. Scallop revenue per trip was $93,210 in 2007, increased to just over $100,000 in both 2008 and 2009 before increasing steadily to $171,377 in 2011, followed by a decline of about $10,000 per trip to $161,679 in 2012 (Figure 125). Similarly, scallop revenue per day was $12,466 in 2007, was between $14,000 and $15,000 per day from 2008 to 2010 before increasing to a time-series high of $22,819 in 2011 (Figure 126). Compared to 2011, scallop revenue per day declined by $1,753 to $21,180.

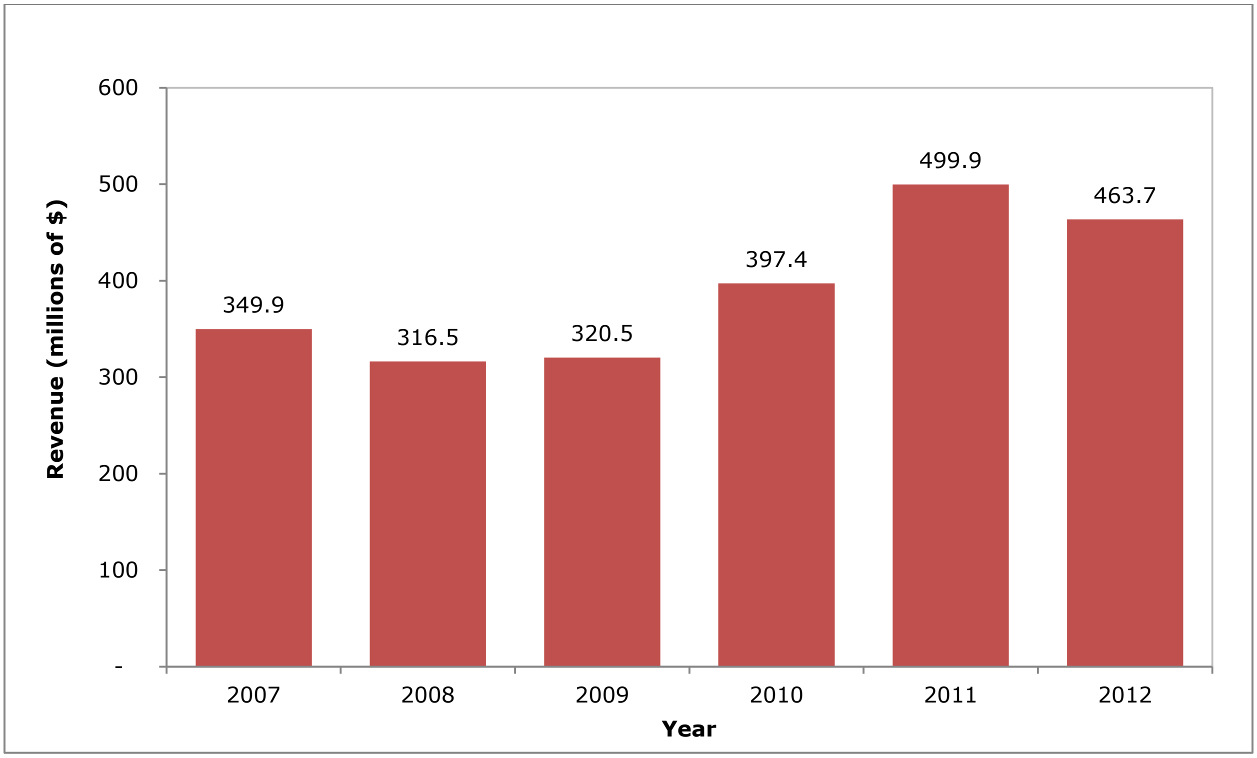

Figure 122. Revenue (inflation-adjusted 2010 dollars) in the Limited Access Atlantic Sea Scallop Fishery.

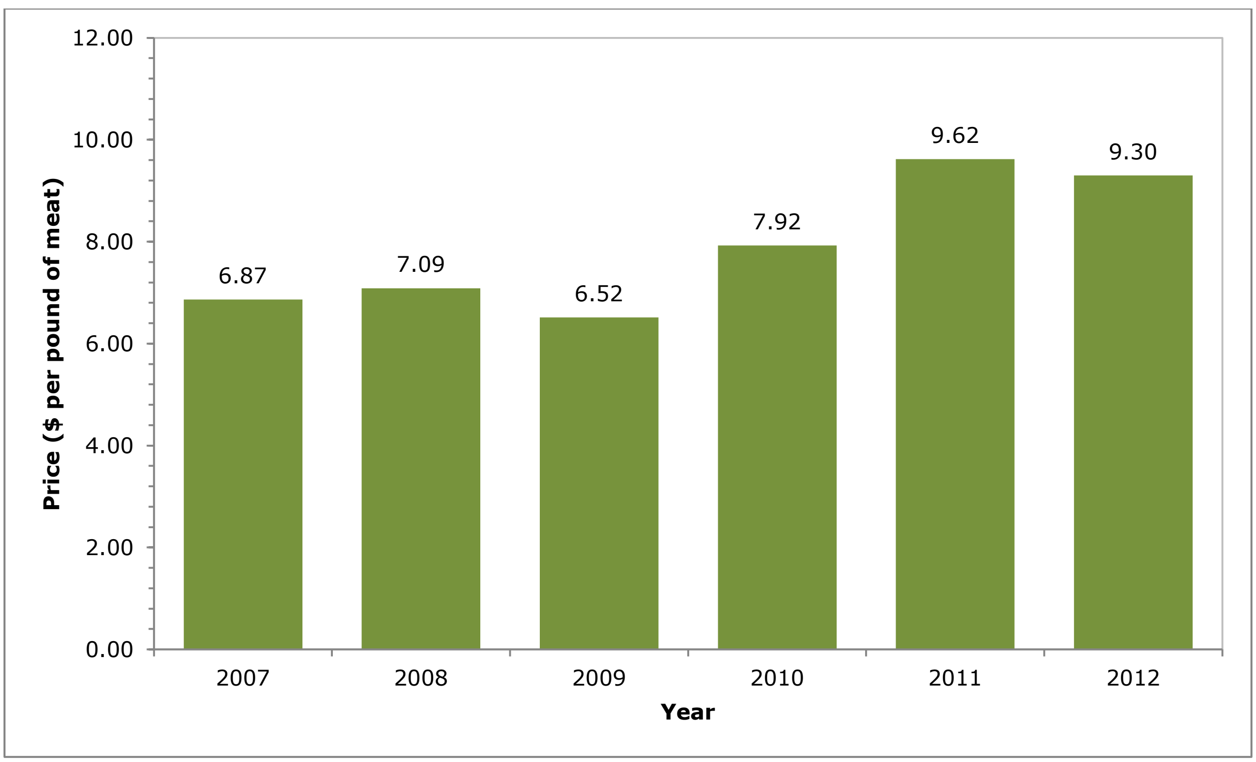

Figure 123. Average prices (inflation-adjusted 2010 dollars) for Limited Access Atlantic Sea Scallops.

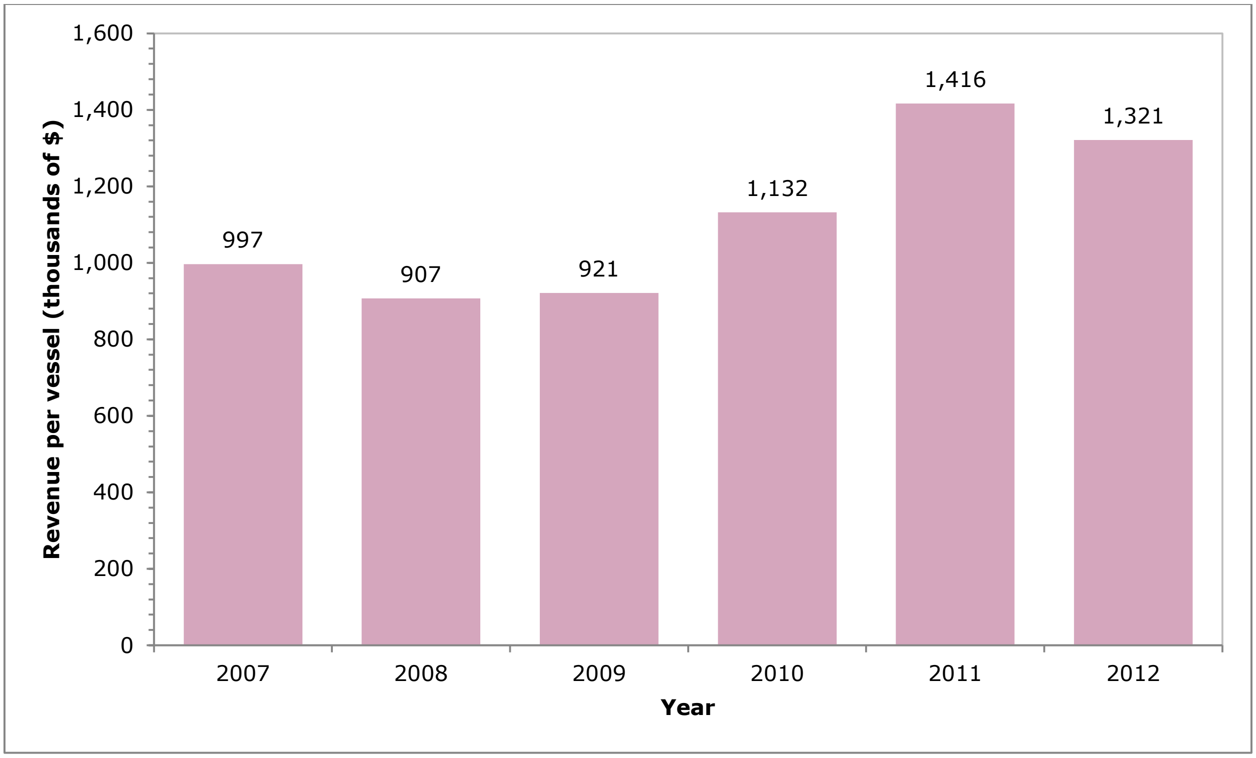

Figure 124. Revenue (inflation-adjusted 2010 dollars) per vessel in the Limited Access Atlantic Sea Scallop Fishery.

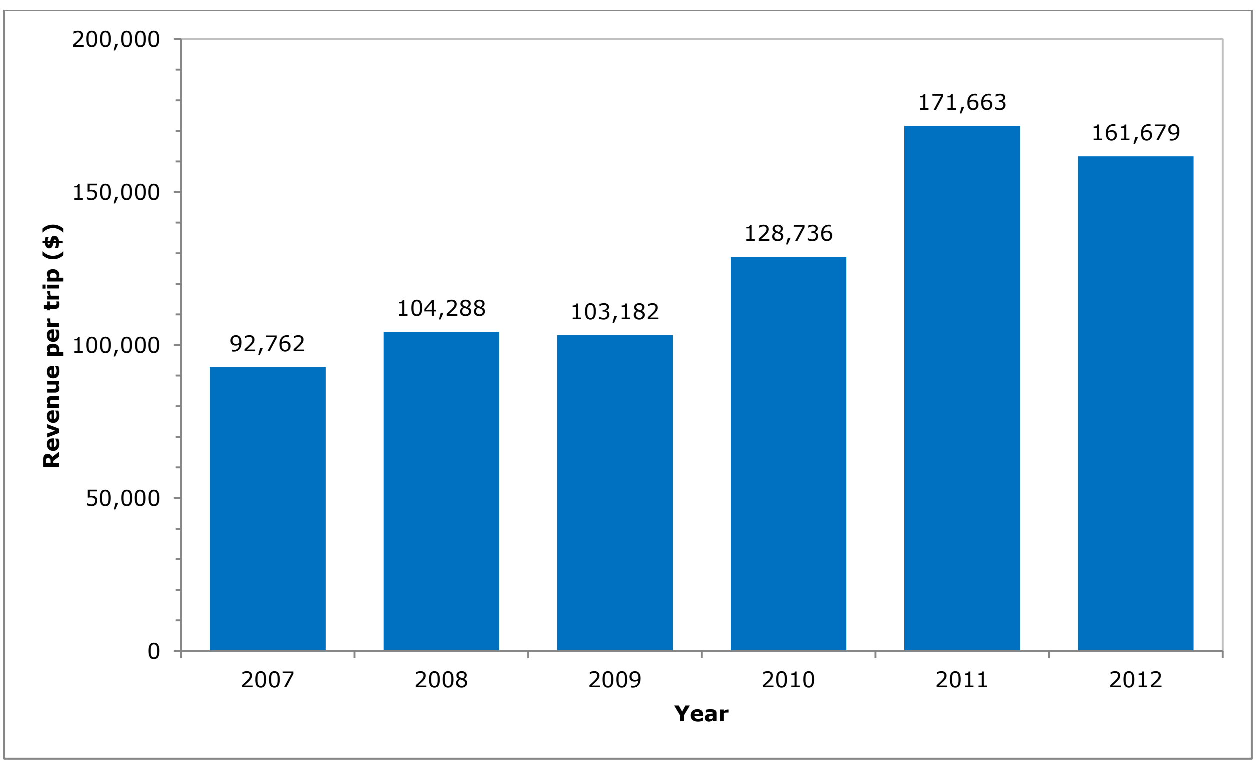

Figure 125. Revenue (inflation-adjusted 2010 dollars) per trip in the Limited Access Atlantic Sea Scallop Fishery.

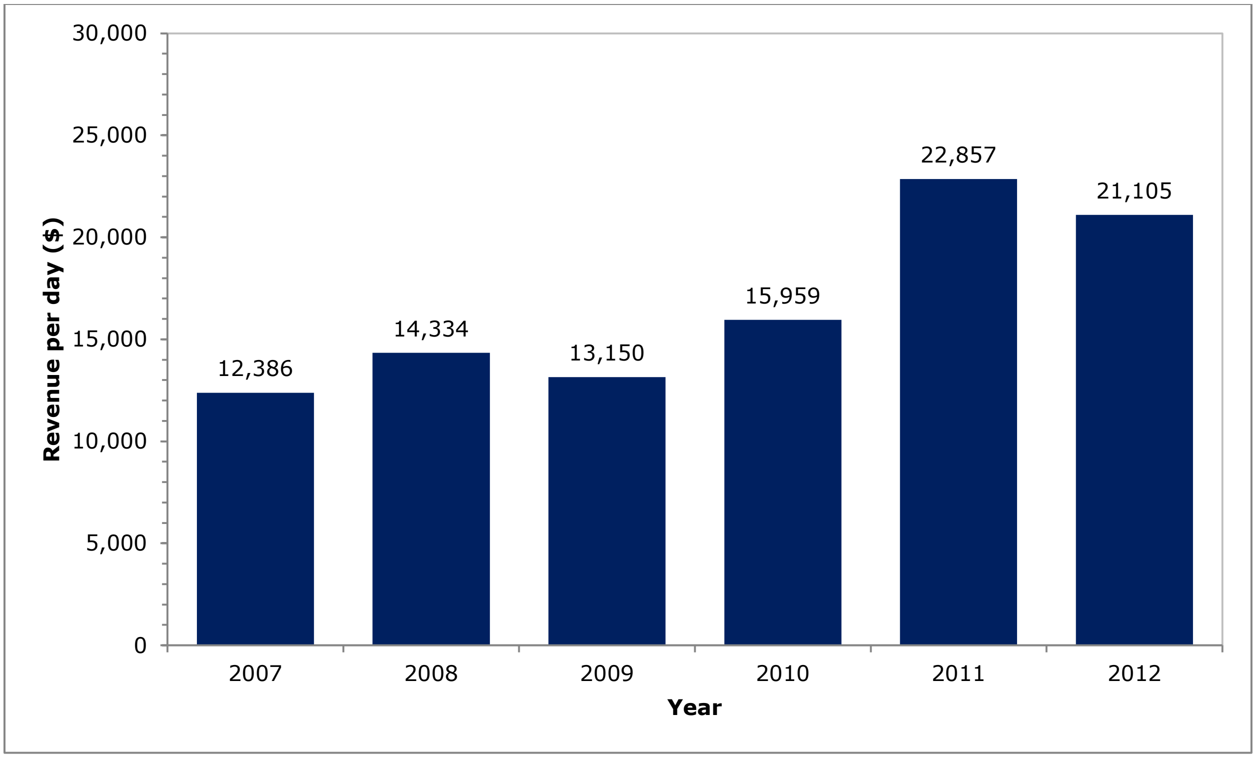

Figure 126. Revenue (inflation-adjusted 2010 dollars) per day at sea in the Limited Access Atlantic Sea Scallop Fishery.

The Gini coefficient was 0.22 in 2007 and was virtually unchanged from 2008 to 2012 at 0.19 (Figure 127). This trend means that the relative distribution of scallop revenues among participating limited access scallop vessels has remained stable over time. The Gini coefficient ranges from 0 to 1 where a fishery in which fishing revenues for every vessel was the same would have a Gini coefficient of zero. The low value of the Gini coefficient for the Limited Access Atlantic Sea Scallop Fishery indicates that scallop revenues among active vessels are relatively evenly distributed.

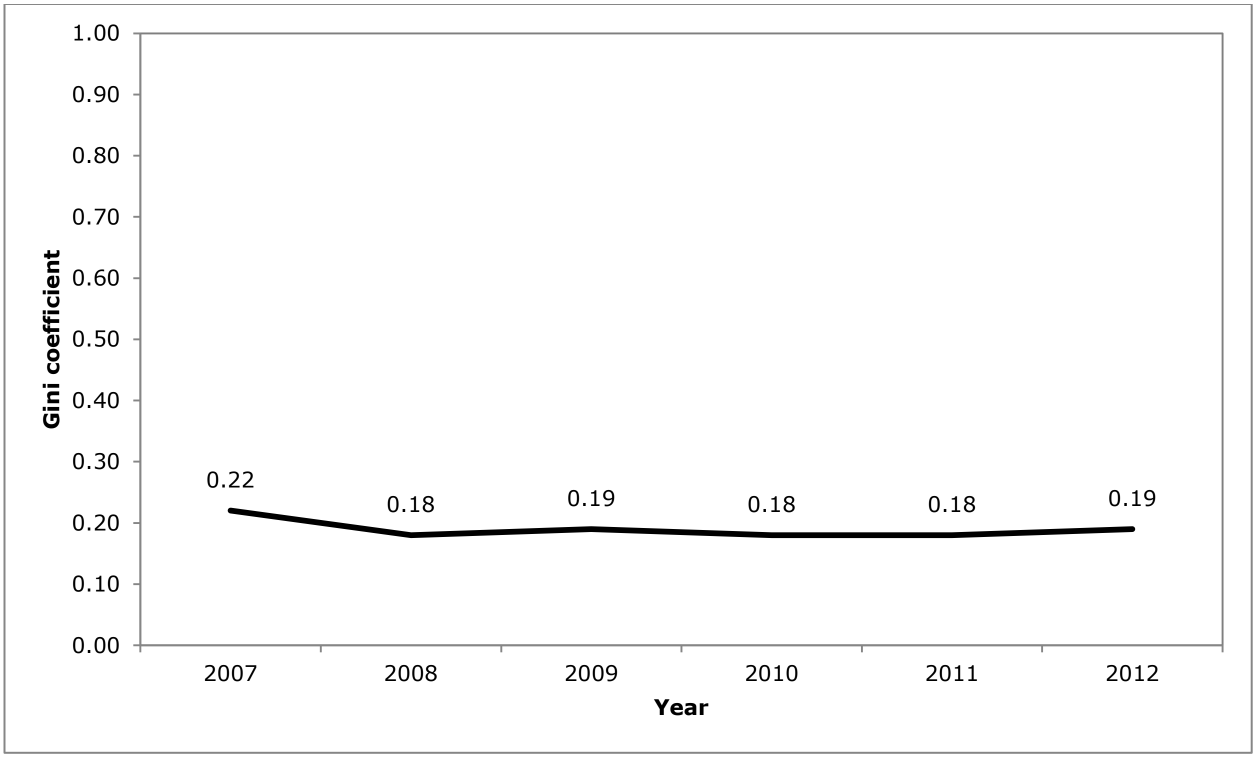

Figure 127. The Gini coefficient for active vessels in the Limited Access Atlantic Sea Scallop Fishery.

d. Synopsis of recent trends

Although the scallop fishery's allocations have slightly declined since 2012 (*i.e.*, allocations were about 30% higher in 2012 compared to 2013 and 2014), the Mid-Atlantic access areas (Delmarva and Elephant Trunk access areas, in particular) currently contain high numbers of small scallops. During 2013 and 2014, management has been focused on protecting these areas to allow these scallops to grow to marketable size and as a result, much of the fishing pressure has been in open areas (*i.e.*, outside of the rotational access area program). Assuming that the annual resource surveys indicate that these small scallops are surviving and growing, we anticipate that beginning in 2015, the fishery will focus pressure again on access areas in the Mid-Atlantic for the next few years and quotas will be slightly higher as a result. Finally, the U.S. Atlantic sea scallop fishery was certified in December of 2013 as sustainable by the Marine Stewardship Council, joining only a handful of fisheries on the eastern seaboard that have been certified by the MSC.

Southeast Region

The Gulf of Mexico is a semi-enclosed coastal sea with a vast array of topography and moderately high productivity that supports biological diversity and high biomass of fish, sea birds, and marine mammals. Along with supporting a large recreational and commercial fishing industry, the Gulf of Mexico also provides vital services such as oil and gas production, tourism, habitat for endangered species, and support for many Gulf State economies. The jurisdiction of the Gulf of Mexico Fishery Management Plans includes all waters of the Gulf of Mexico between three and 200 nautical miles from the coasts of Alabama, Mississippi, and Louisiana, and between three leagues (about nine nautical miles) and 200 nautical miles from the coasts of Florida and Texas. In total, the area spans more than 270,000 square miles. Fisheries located in the Gulf of Mexico are managed by NOAA Fisheries and the Gulf of Mexico Fishery Management Council through the implementation of seven Fishery Management Plans, two of which are jointly managed with the South Atlantic Fishery Management Council. Targeted species include brown, white, and pink shrimp, Gulf of Mexico menhaden, king and Spanish mackerel, groupers, snappers, jacks and tunas.

A synopsis of the performance measures for vermillion snapper is listed below (Table 8). These performance measures only capture the activity of the commercial fleet that operates in federal waters, which in 2012 accounted for 93% of the Gulf-wide vermilion snapper commercial landings. More detailed trend data for the vermilion snapper commercial segment of the reef fish fishery is reported in the sections to follow. In addition to trend data, a synopsis is provided including gears used, target and component species, products sold, current management approach, and key changes affecting the fishery. Trends are reported for the most recent 11 years beginning with 2002 and ending in 2012. All price and revenue data have been adjusted for inflation to 2010 equivalent dollars using the Gross Domestic Product price deflator. All quantities for quotas and landings are reported in gutted weight pounds

Table 8. Southeast Region Fishery Performance Measures for 2012.

Catch and Landings	**Vermilion Snapper**
Quota allocated to fishery[a]	3,081,081[b]
Aggregate landings	2,028,784[c]
Utilization	88%[d]
Quota exceeded	N
Effort	
Number of permits (number)	917
Active Vessels (number)	342
Trips (number)	2,813
Days at sea (days)	14,742
Season length (days)	366
Revenue ($)[e]	
Fishery species revenue	$5,856,234
Other species revenue	$18,196,175
Total Revenue	$24,052,410
Average fishery species price ($/pound)	$2.89
Fishery species revenue per vessel	$17,123
Other species revenue per vessel	$53,205
Total revenue per vessel	$70,329
Fishery species revenue per trip	$2,082
Other species revenue per trip	$6,469
Total revenue per trip	$8,550
Fishery species revenue per day at sea	$397
Other species revenue per day at sea	$1,234
Total revenue per day at sea	$1,632
Other	
Limited entry	Y
Gini coefficient	0.77

[a] Quota and landings are reported in gutted weight pounds.

[b] The vermilion snapper Annual Catch Limit is set for the commercial and recreational sectors combined. In other words, there is no share of the ACL exclusively assigned to the commercial sector.

[c] This value only applies to commercial landings that took place in federal waters. If state landings were included, then the aggregate commercial landings would equal 2,865,171 gutted pounds. Data are only for the commercial sector, but the quota is for the commercial and recreational sectors combined.

[d] This metric includes recreational landings (681,128 gutted pounds) and commercial landings that took place in federal waters only (2,028,784 gutted pounds). If state and federal commercial and recreational landings were used, then percent utilization would be about 93%.

[e] All revenue data have been adjusted by the GDP deflator indexed for 2010.

A. Vermilion snapper

Gulf of Mexico vermilion snapper is managed under the Reef Fish Fishery Management Plan. Vermilion snapper is one of 11 snapper species and 31 reef fish species in the management unit. Other species included in the Fishery Management Plan are groupers, jacks, one triggerfish species, and one wrasse species. Following quota reductions as part of the red snapper rebuilding plan in 2007, as well as the implementation of Catch Share Programs for red snapper and grouper-tilefish in 2007 and 2010, respectively, vermilion snapper has become a more heavily targeted species in recent years. In addition to being an important commercial fishery, vermilion snapper is a popular recreational fishery in the Gulf of Mexico.

1. Fishery synopsis

    a. Gear used

Most vermilion snapper are harvested using vertical hook-and-line gear (handline and bandit gear). The use of trawl gear, fish traps, entanglement nets, and bottom longlines (in certain areas) are prohibited in the Gulf of Mexico.

    b. Target/component species

Vermilion snapper is most common over inshore live-bottom habitats, shelf-edge, rocky-rubble and rocky outcrop habitats. In the Gulf of Mexico, vermilion snapper are usually found near hard bottom areas in the northern Gulf of Mexico, the Florida Middle Grounds, and the Flower Garden Banks National Marine Sanctuary. Vermilion snapper feed on fish, shrimp, crabs, polychaetes, and other bottom-dwelling invertebrates, as well as cephalopods and plankton found high in the water column. Vermilion snapper can reach lengths of up to 24 inches and have been found to live to at least 15 years.

    c. Market channels

Market demand for vermilion snapper is lower than the market demand for red snapper due to the common perception that red snapper has superior flavor and versatility in cooking. Due to this difference in demand, red snapper yield a substantially higher price than vermilion snapper. About two-thirds of the vermilion snapper harvest is sold in the retail market (for home preparation) and the remaining third is sold in the wholesale market (for restaurant preparation). Significant competition in the U.S. vermilion snapper market comes from snapper imports from Mexico, Panama, and Venezuela.

2. Management Program

    a. Current management controls

In 1984, the Reef Fish Fishery Management Plan was originally designed to rebuild declining reef fish stocks, and initial regulations included certain gear restrictions, minimum size limits, and data reporting requirements. Regulation of vermilion snapper harvest continues through the implementation of gear restrictions, total length limits, and limited access through commercial permit requirements. While no new permits are currently being issued, permits are transferable.

The vermilion snapper component of the reef fish fishery is managed with a stock Annual Catch Limit. The commercial and recreational sectors have separate allocations. Instead, when the combined recreational and commercial harvests reach or are projected to reach the stock Annual Catch Limit, the vermilion snapper fishing season is closed for both the commercial and recreational fishing sectors for the remainder of the year. In addition, several areas are closed to fishing for reef fish, including vermilion snapper, in order to protect sensitive fish populations and habitats.

b. Key changes from past management controls

The Reef Fish Fishery Management Plan was established in 1984 and has been amended nearly 40 times in the years since. Vermilion snapper was included in the 33 species complex that comprised the original Fishery Management Plan Unit. In 1989, Amendment 1 set a minimum size limit of 8 inches for vermilion snapper. In 1995, Amendment 12 created an aggregate bag limit of 20 reef fish for all reef fish species, including vermilion snapper. In response to a 1996 stock assessment that indicated that vermilion snapper were showing signs of overfishing, Amendment 15 increased the minimum size limit for vermilion snapper from 8 inches to 10 inches. Despite this measure, a 2001 stock assessment indicated that vermilion snapper were overfished and overfishing was occurring. In response to this, Amendment 23 created a 10-year rebuilding plan for vermilion snapper, increasing the minimum size limit to 11 inches, setting a recreational bag limit of 10 vermilion snapper, and closing the fishing season from April 22 through May 31. The 2006 stock assessment later concluded that the stock was not overfished nor experiencing overfishing. A 2007 regulatory amendment then revised management measures for vermilion snapper to those prior to implementation of Reef Fish Amendment 23. In 2008, Amendment 27 addressed methods to reduce discard mortality by the commercial and recreational sectors of the reef fish fishery with a requirement for the use of non-stainless steel circle hooks when using natural baits, as well as requirements for the possession and use of venting tools and dehooking devices.

An updated stock assessment conducted in 2011 found that the vermilion snapper stock continues to be neither overfished or undergoing overfishing. An Annual Catch Limit, Annual Catch Target, and a season closure accountability measure were instituted during the same year. The most recent Framework Action for the Reef Fish Fishery Management Plan adjusted the Annual Catch Limit for vermilion snapper to be consistent with Acceptable Biological Catch recommendations of the Council's Scientific and Statistical Committee; set the vermilion snapper bag limit at 10 fish within the 20-fish reef fish aggregate bag limit; and removed regulations requiring possession and use of venting tools by participants to minimize bycatch and bycatch mortality. Vermilion snapper are frequently caught by vessels participating in the Red Snapper and Grouper-Tilefish Individual Fishing Quota Programs.

3. Management Objectives

The original Reef Fish Fishery Management Plan identified a basic objective to manage fish stocks in order to harvest optimum yield for domestic use. Amendment 3 to the Plan revised the primary objective as stabilizing long-term population levels of all reef fish species by establishing a certain survival rate of biomass into the stock of spawning age to achieve at least a 20 percent spawning potential ratio. In addition to the National Standards established under the Magnuson-Stevens Act, four more specific objectives were also identified in the original Fishery

Management Plan. Since the original Fishery Management Plan, multiple Amendments have been passed to establish Annual Catch Limits, recreational fishing limits, time and area closures for the reef fish species. Original objectives for the Plan include the following:

1) Rebuild declining reef fish stocks wherever they occur within the fishery.
2) Establish a fishery reporting system for monitoring the reef fish fishery.
3) Conserve and increase habitat for reef fish to increase reef fish populations and provide protection for juveniles.
4) Minimize conflicts between user groups of the resource and conflicts for space.

4. Recent Trends

a. Quota and landings

This and subsequent sections discuss performance metrics for the commercial fleet that operates in federal waters. In 2012, the commercial fleet that operated in federal waters took about 93% of the Gulf-wide vermilion snapper commercial landings. There was no Annual Catch Limit, Total Allowable Catch, or quota for vermilion snapper specified until 2012. In 2012, the Council approved a combined Annual Catch Limit for commercial and recreational vermilion snapper. Landings of vermilion snapper have ranged from 1.6 million pounds to 3.4 million pounds for 2002–2012 (Figure 128). Beginning in 2004, landings of vermilion snapper decreased relative to the previous year for the following three years by a rate of 13%, 16% and 4%, respectively. Landings increased in 2007, 2008 and 2009 relative to the previous year by 33%, 15% and 32%, respectively. In 2010, vermilion snapper landings decreased by 46% to 1.7 million pounds. In 2010, the Deepwater Horizon oil spill resulted in large closure areas, significantly reducing landings for many Gulf fisheries. Large parts of the Gulf of Mexico, including state and federal waters, were closed to fishing during May through November 2010. In 2011, landings rebounded to 2.6 million pounds, a 49% increase over the previous year. Landings in 2012 were down 22% relative to 2011.

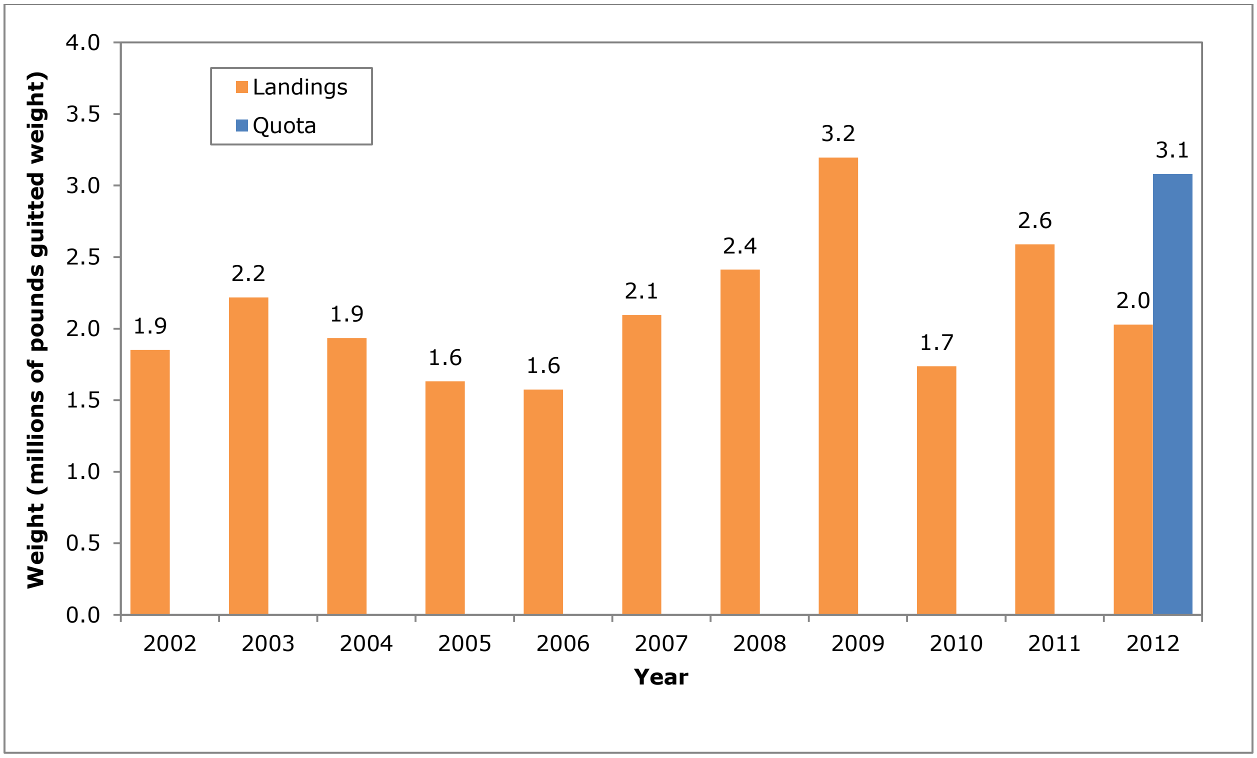

Figure 128. Landings and quota of vermilion snapper in the Gulf of Mexico Reef Fish Fishery. Prior to 2012, there was no specific quota for the commercial sector, the ACL was set for the commercial and recreational sectors combined.

b. Effort

There were 1,285 Gulf of Mexico reef fish permits issued in 2002 (Figure 129). The number of permits has decreased at an average annual rate of 3%. In 2012, there were 917 permits renewed in the reef fish fishery. There were 441 active vessels fishing for vermilion snapper in 2002 (Figure 130). Active vessels decreased by 4% in 2003, when compared to 2002. The number of active vessels increased for the following two years, reaching the maximum number of active vessels (469) in 2005. The largest annual decreases in the number of active vessels fishing for vermilion snapper occurred in 2007 (-21%) and 2010 (-13%). These decreases coincided with the implementation of the Red Snapper and Grouper-Tilefish Individual Fishing Quota Programs in 2007 and 2010, respectively. Vermilion snapper are often caught while fishermen are using their IFQ quota to target red snapper or groupers and tilefish. Since 2007, the number of active vessels has remained stable.

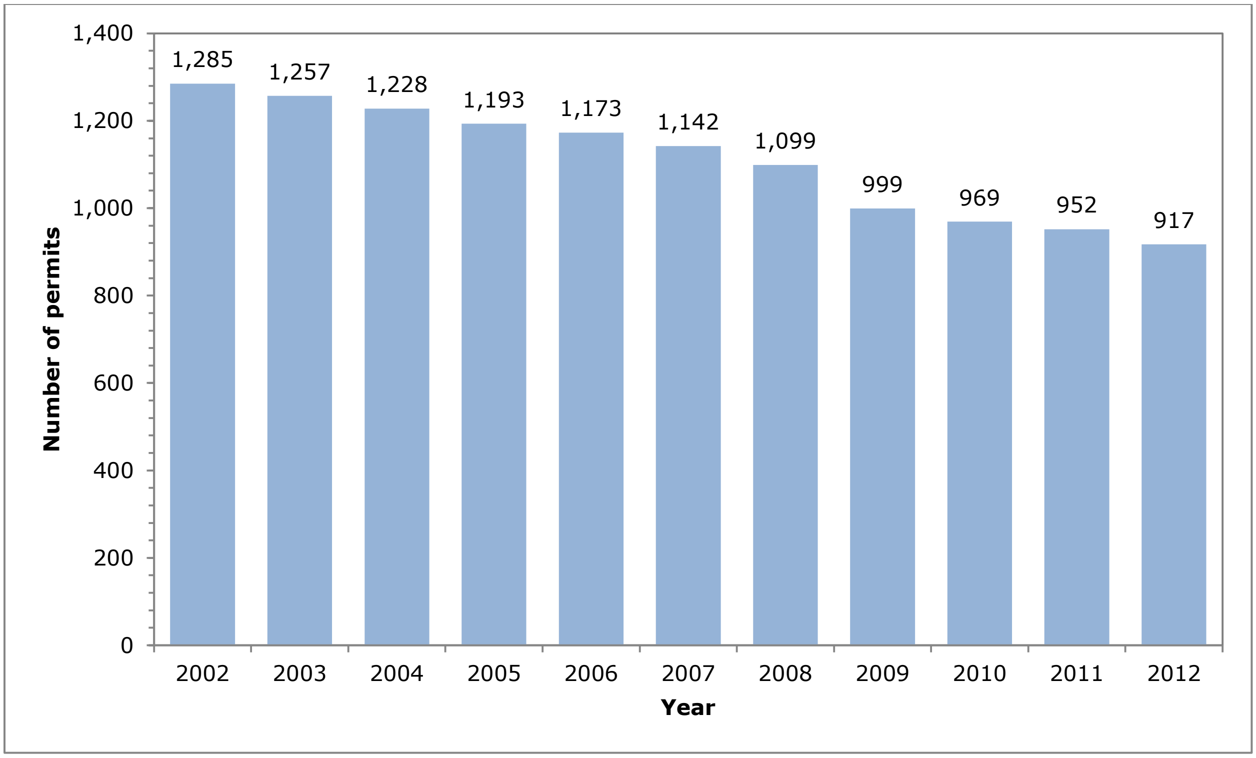

Figure 129. Count of Federal Gulf of Mexico Reef Fish permits, 2002-2011.

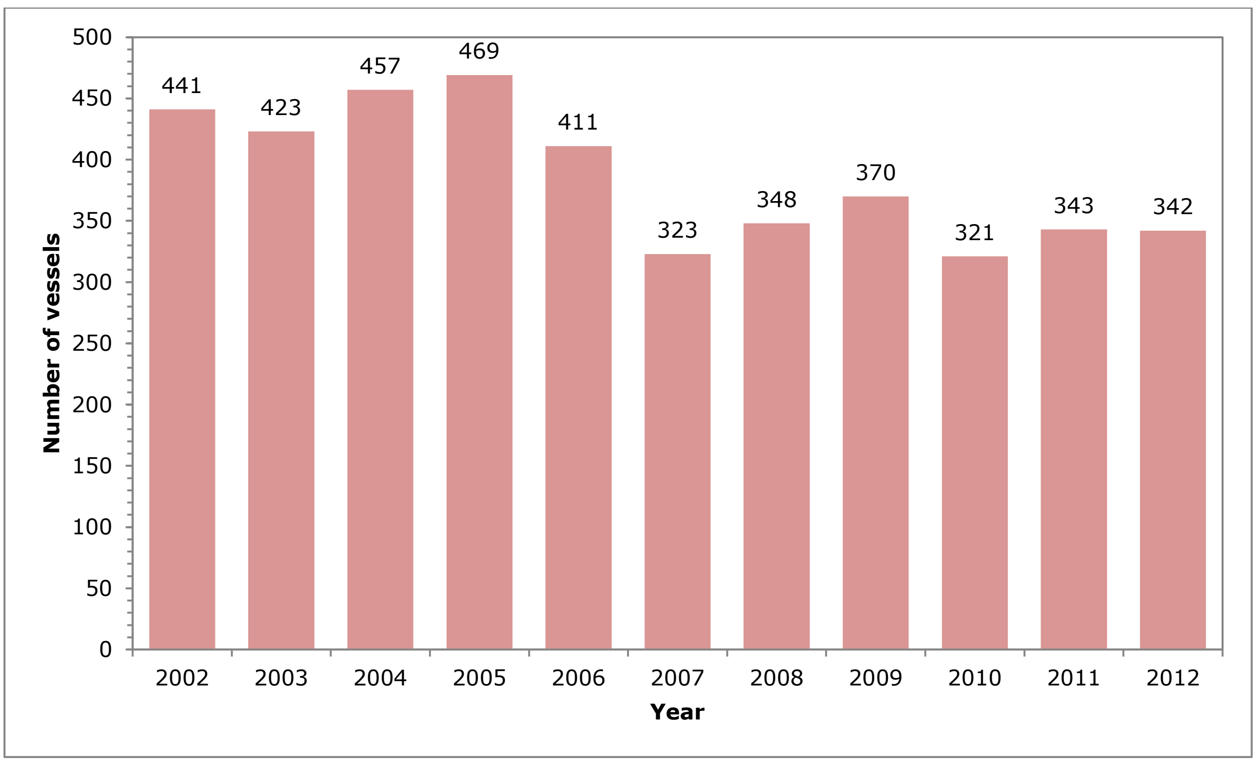

Figure 130. Number of active vessels landing vermilion snapper in the Gulf of Mexico Reef Fish Fishery.

On average, fishermen took 3,100 trips where vermilion snapper were caught between 2002 and 2012 (Figure 131). Trips landing vermilion snapper peaked (4,300) in 2003 and were the lowest (2,100) in 2010. In 2012, there were 2,800 trips taken where vermilion snapper were landed, a 31% decline from 2002 trips. Similar to the trips, the number of days at sea fishing for vermilion snapper began to decline in 2004, but returned to an upward trend in 2008 (Figure 131). The number of days at sea continued to increase through 2012, except for in 2010. In 2010, the number of days at sea decreased by 25% when compared to the previous year. Fishing for vermilion snapper has been allowed year-round, except for 2006 and 2007 when the commercial sector was open for 325 days due to the implementation of a 40-day seasonal closure (Figure 133).

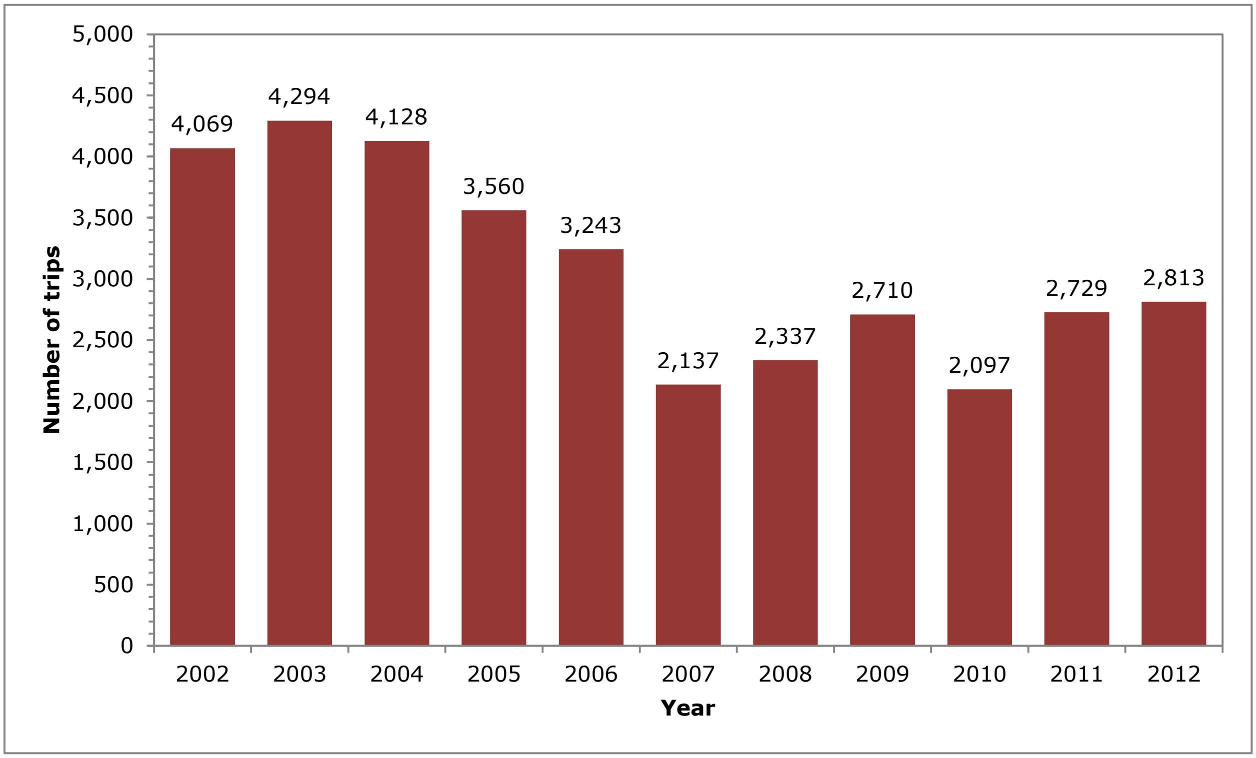

Figure 131. Number of trips taken where vermilion snapper were landed in the Gulf of Mexico Reef Fish Fishery.

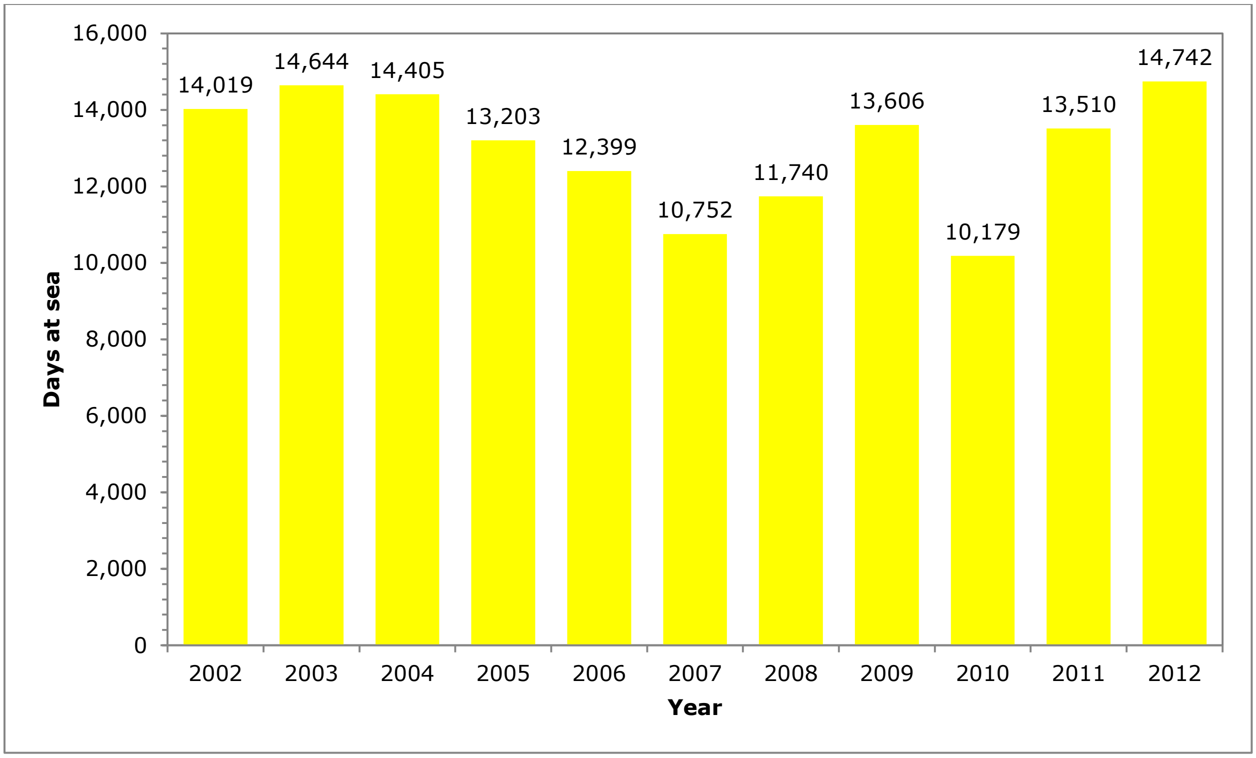

Figure 132. Number of days at sea where vermilion snapper were landed in the Gulf of Mexico Reef Fish Fishery.

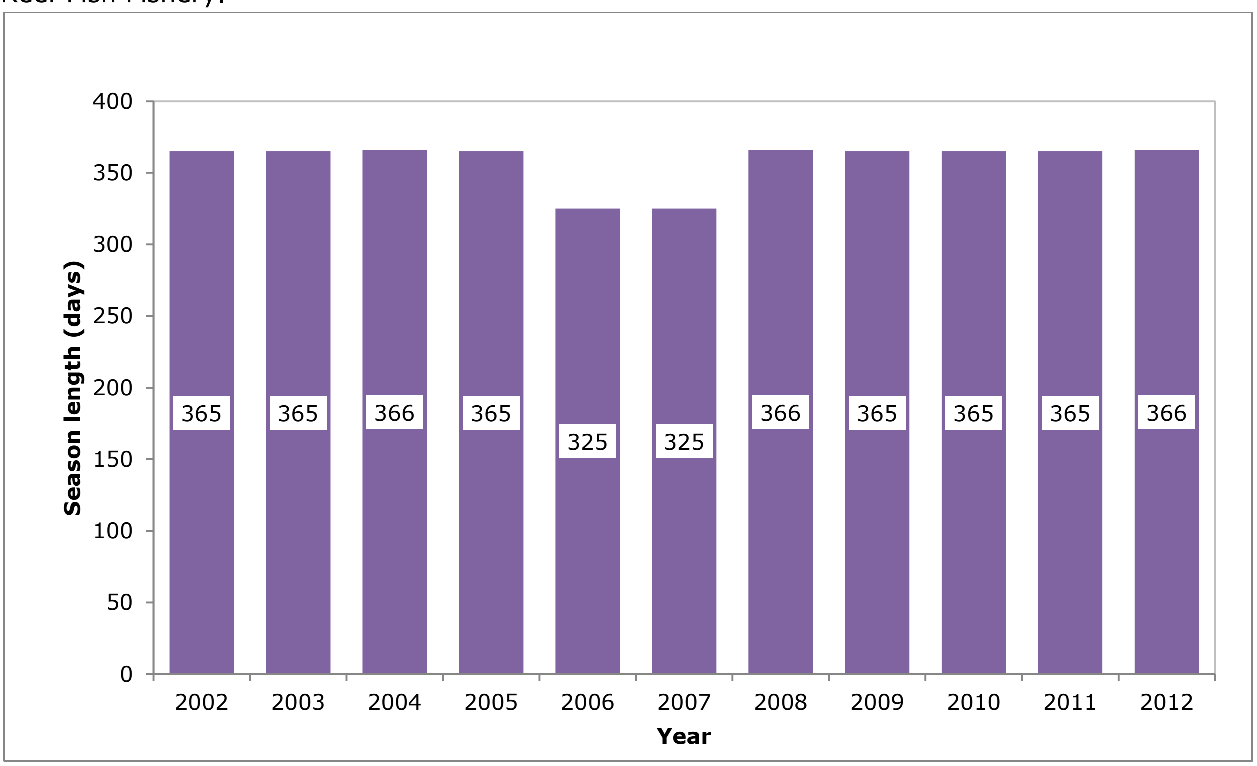

Figure 133. Commercial season length for vermilion snapper, 2002 – 2012.

c. Revenue

Total revenue (inflation adjusted with the the GDP deflator, indexed for 2010) from commercial vessels harvesting vermilion snapper peaked in 2012 at $24 million and was the lowest in 2010 ($16 million), but has averaged $19 million for the 2002 – 2012 time period (Figure 134). On average, revenue from vermilion snapper comprised one-third of total revenue. In 2007, vermilion snapper dockside revenue began to comprise a larger component of total revenue and in 2009 revenue from the vermilion snapper component of the reef fish fishery comprised the largest proportion (42%) of total revenue. Average dockside prices for vermilion snapper have averaged $2.57 over the past 11 years, but have steadily risen from $2.45 to $2.89 per pound since 2009 (Figure 135).

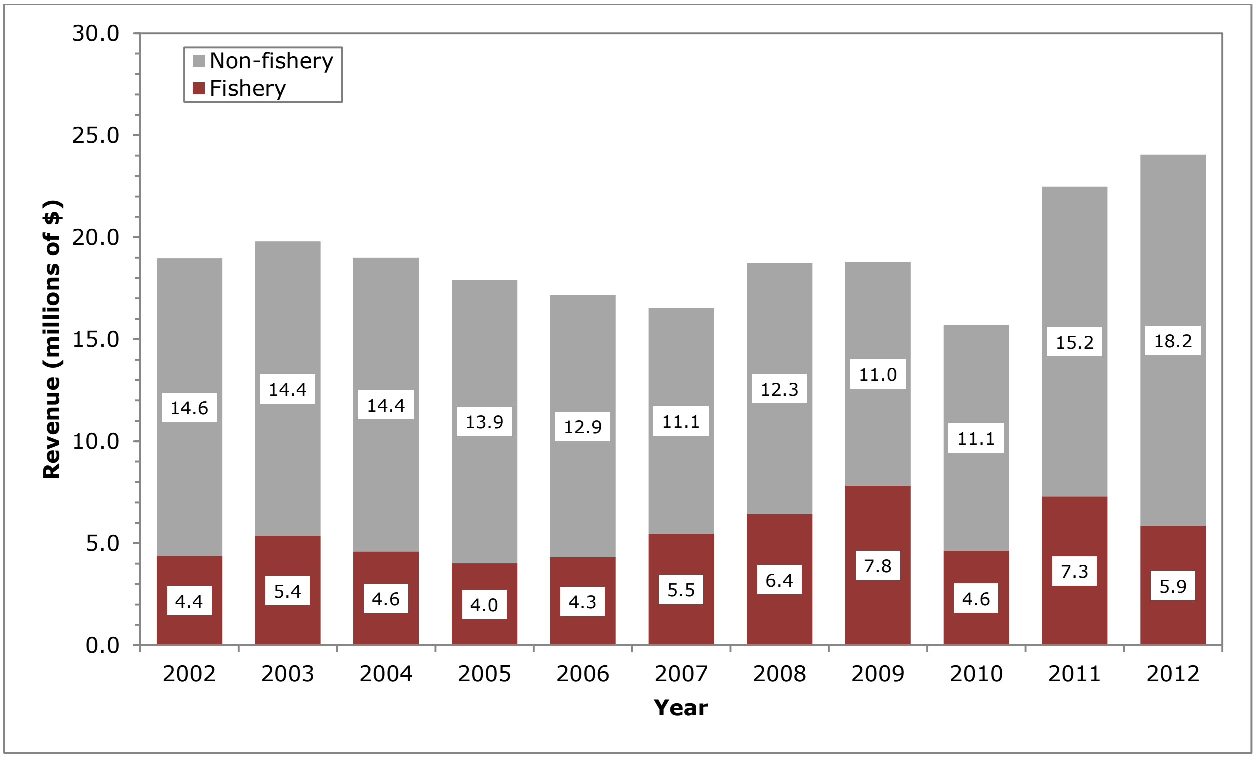

Figure 134. Revenue (inflation-adjusted 2010 dollars) earned from vermilion snapper (Fishery Revenue) and other species (Non Fishery Revenue).

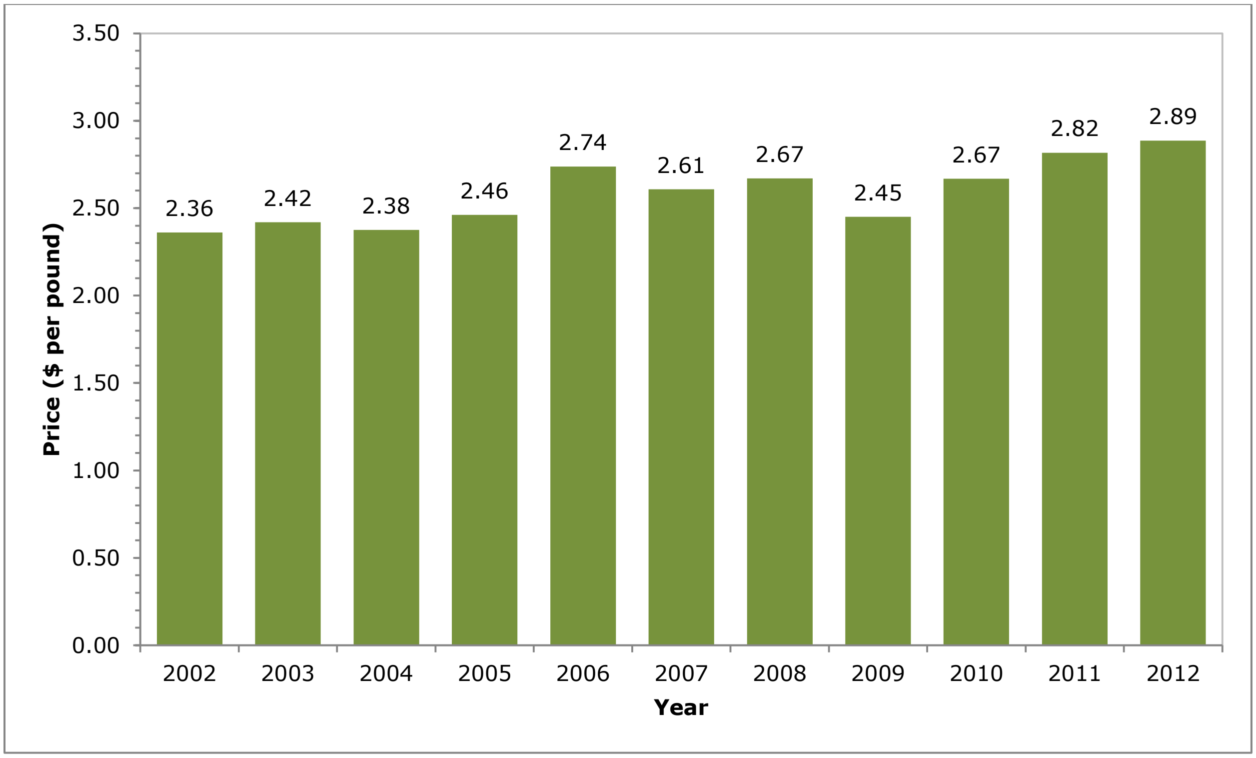

Figure 135. Average price per pound (inflation-adjusted 2010 dollars) for vermilion snapper.

As total revenue has increased and the number of active vessels has declined in the vermilion snapper component of the reef fish fishery, revenue per active vessel has generally increased. Total revenue per vessel was $70,000 in 2012, a 64% increase over total revenue per vessel in 2002 (Figure 136). As the number of trips has declined, total revenue per trip has also generally increased: total revenue per trip in 2012 was $8,550, a 83% increase over the 2002 amount (Figure 137). Total revenue per trip only decreased in 2003 (by 1%), 2004 (by 0.2%) and 2009 (by 14%), relative to the previous years. In 2003 and 2011, the number of trips increased when compared to the previous year. In 2004, both total revenue and the number of trips declined (by 4%) relative to the previous year. Revenue per day at sea has followed similar trends. Fishery revenue per day at sea peaked in 2009 at $576, while non-fishery revenue per day at sea peaked in 2012 at $1,234 (Figure 138). Total revenue per day at sea peaked in 2011 ($1,664).

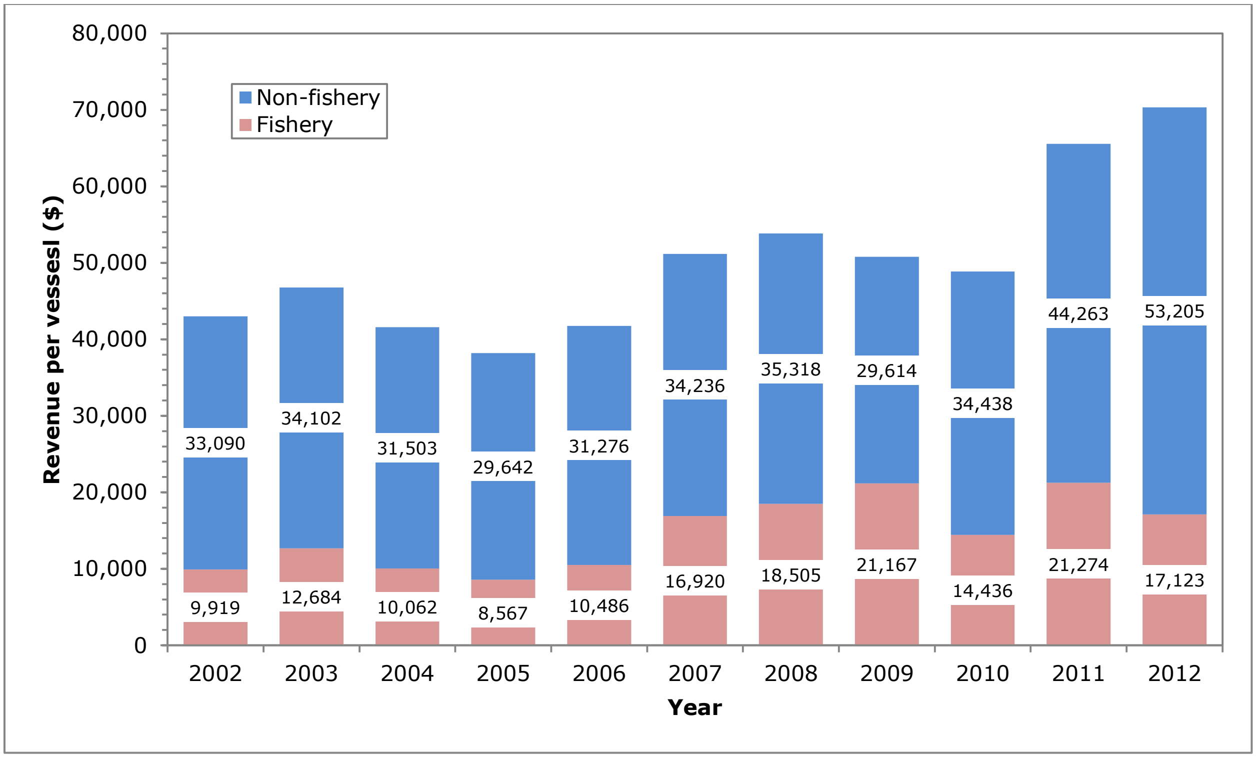

Figure 136. Revenue (inflation-adjusted 2010 dollars) per vessel fishing for vermilion snapper.

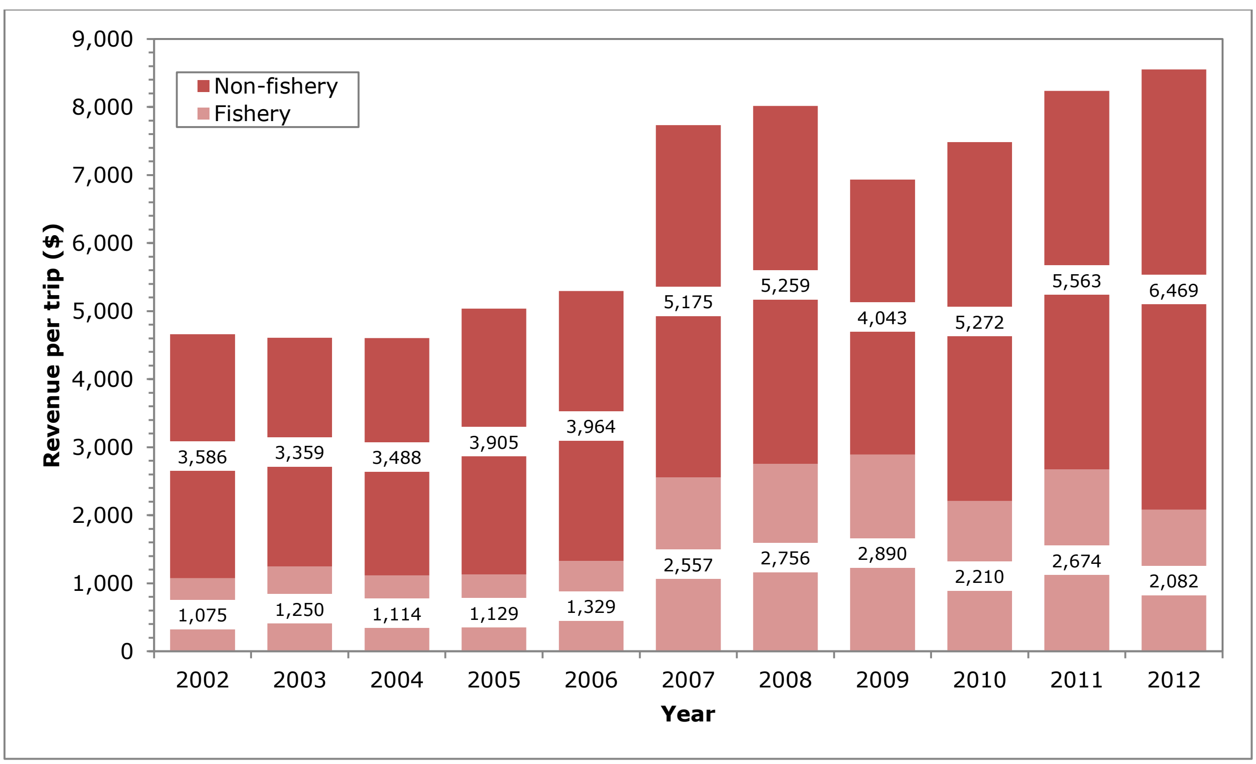

Figure 137. Revenue (inflation-adjusted 2010 dollars) per trip fishing for vermilion snapper.

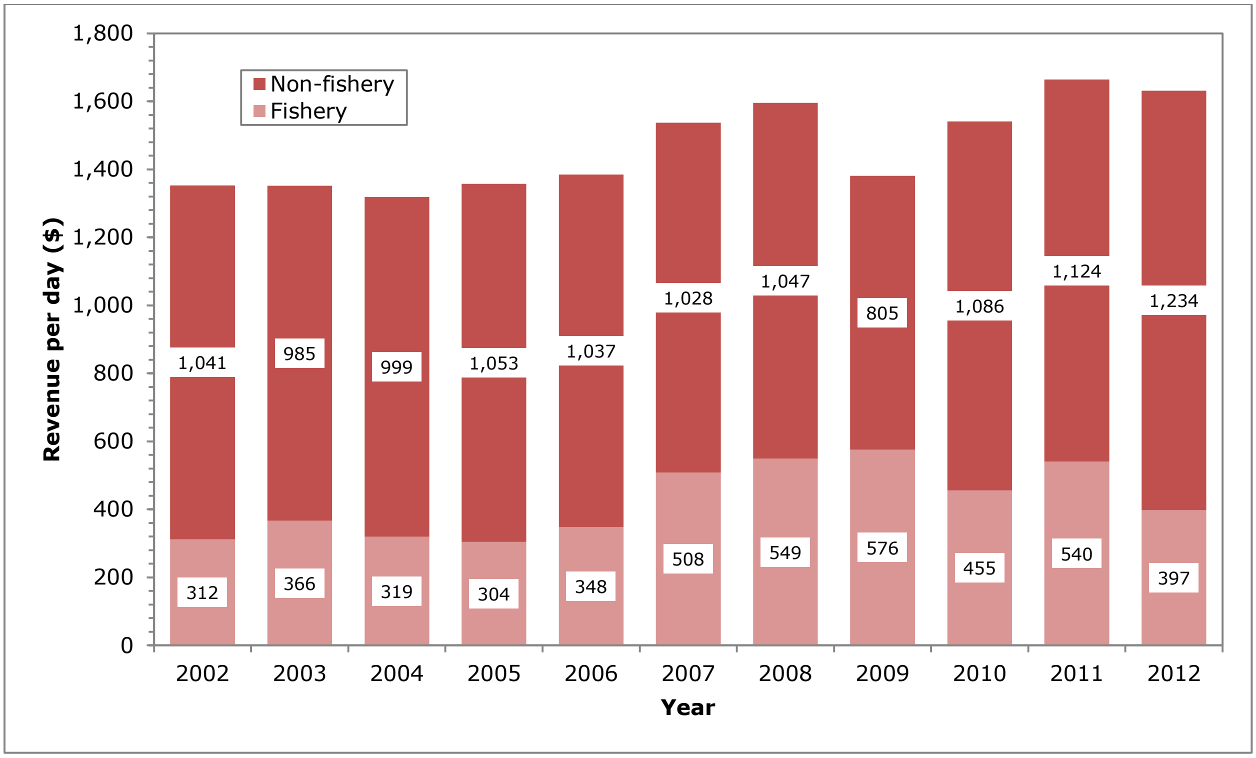

Figure 138. Revenue (inflation-adjusted 2010 dollars) per day at sea fishing for vermilion snapper.

The Gini coefficient measures the equality of a distribution. The Gini coefficient is used to measure the distribution of revenue among active vessels fishing for vermilion snapper in the Gulf of Mexico Reef Fish Fishery. A value of zero represents a perfectly equal distribution of revenue amongst the vessels, whereas, a value of one represents a perfectly unequal distribution. The Gini coefficient for the vermilion snapper fishery was nearly constant from 2002 to 2006 ranging from 0.84 to 0.86 (Figure 139). This means that the relative distribution of vermilion snapper revenues among vessels was largely unchanged over these years. Since 2007, the Gini coefficient has been decreasing and was 0.8 in 2012. This change indicates that the share of vermilion snapper revenues among participating vermilion snapper vessels has become slightly more equally distributed in recent years as compared to the distribution of revenue during 2002 to 2006.

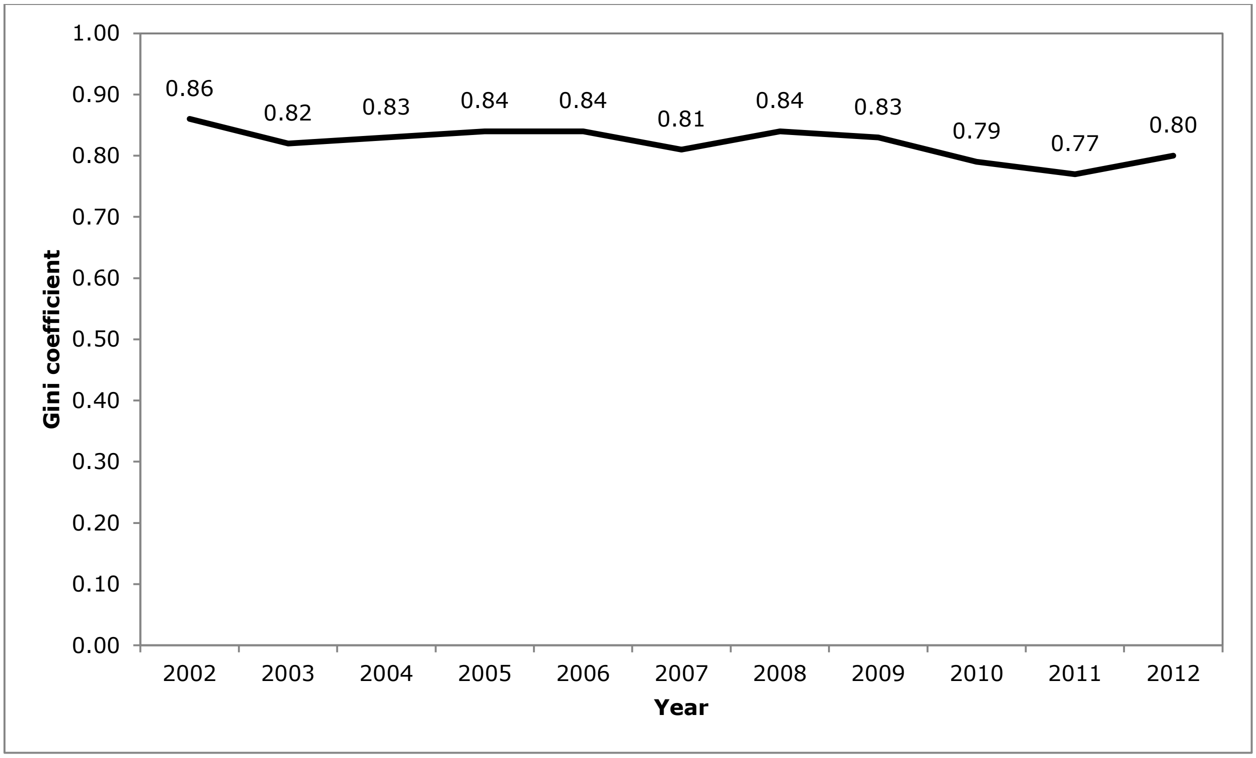

Figure 139. The Gini coefficient for active vessels fishing for vermilion snapper.

d. Synopsis of recent trends

Most changes in trends for the vermilion snapper component of the reef fish fishery begin around 2007, the year that the Red Snapper IFQ Program began; this may indicate that the changes in trends are not related to a direct impact from specific management measures for vermilion snapper. This is not unexpected, as vermilion and red snapper are frequently caught together and are part of the overall Gulf of Mexico reef fish fishery, and managed under the same limited access Gulf reef fish permit. Vermilion snapper landings and days per trip increased in 2007. Prior to the Red Snapper IFQ, fishermen harvesting red snapper (whether targeting them or not) were limited to either 200 pounds or 2,000 pounds per trip (Class I or II red snapper licenses); furthermore, harvesting could only occur in the first 10-15 days of each month, resulting in shorter trips. This would have an indirect effect on all other species that are commonly caught with red snapper, including vermilion snapper, and thereby reduce the overall days per trip. Similarly, red snapper commercial fishermen would often target vermilion snapper when red snapper was closed each month. In the last five years, vermilion snapper also contributed more to the overall revenue for vessels harvesting vermilion snapper than in the previous years. This too may be partly influenced by the creation of the Red Snapper and Grouper-Tilefish IFQ Programs that allow year-round fishing. The switch to year-round fishing may change the behavior of fishermen who harvest vermilion snapper, as they are no longer switching target species based on defined seasons for red snapper and/or grouper-tilefish. The reader should interpret data from 2010 with caution due to the Deepwater Horizon oil spill that resulted in large closure areas, significantly reducing landings for many Gulf fisheries. Large parts of the Gulf of Mexico, including state and federal waters, were closed to fishing during May through November 2010. Therefore, 2010 values should be considered anomalous fishing years and differences in those years would not signify changes for the fishery.

Time Trends in Non-Catch Share Fisheries

This report includes indicators of performance for 13 U.S. fisheries managed using a variety of controls exclusive of catch shares. Two fisheries (Atlantic Scallops and Monkfish) are managed by the New England Fishery Management Council; one (Vermillion Snapper) is managed by the Gulf of Mexico Fishery Management Council; five (Albacore, Swordfish, Sardines, Squid, and Pacific Salmon are managed by the Pacific Fishery Management Council; three (American Samoa Longline, Hawaiʻi Longline, and Hawaiʻi Bottomfish) are managed by the Pacific Islands Fishery Management Council; and two (Weathervane Scallops and Gulf of Alaska Other Rockfish) are managed by the North Pacific Fishery Management Council. All but three of the 13 fisheries are limited entry fisheries. Only the Pacific Coast Albacore, Pacific Coast Sardine, and the Hawaiʻi Bottomfish fisheries were open-access as of calendar year 2012.

Each fishery described in this report has different management objectives, different regulatory frameworks, and markedly different operational characteristics. Furthermore, there are substantial differences in fishery size (landings, revenues, numbers of vessels, etc.) across regions and fisheries. While constructing statistical models to explain trends in any particular fishery would be a worthwhile endeavor, the interest here is in detecting whether there are any positive or negative trends in performance indicators that are common to multiple fisheries, and making inferences about such shared trends. Given the differences among fisheries, making any direct comparison of performance trends across fisheries is complicated, except in terms of direction of change.

For this purpose, we calculated Spearman rank-order correlation coefficients between values of performance indicators and time. The Spearman correlation coefficient is calculated by rank ordering pairs of variables. The resulting correlation coefficient is less sensitive to outliers because it is based on rank order rather than magnitude. Unlike the Pearson correlation coefficient which detects linear relationships, the Spearman rank-order correlation coefficient detects any monotonic relationship between two variables. Last, the Spearman rank-order correlation is non-parametric and does not require any assumptions about underlying distributions. A Spearman correlation coefficient greater than or equal to 0.5 is associated with an upward trend through time, whereas a correlation coefficient less than or equal to –0.5 is indicative of a downward time trend. A significance level of 0.10 was selected to determine whether or not a time trend was statistically significant.

It is important to keep in mind that correlation coefficients may not detect cyclical or shorter-term trends. That is, correlations with time will be statistically significant only if the association with time is consistently up or down. This does not necessarily mean that year-to-year changes are always up or down, only that annual changes fluctuate around a distinct trend. Simple correlation coefficients also do not indicate the presence or absence of causal relationships such as any underlying structural reasons for change, nor do they reveal more complex relationships that may exist among performance indicators.

As noted in prior sections of this report, data were not available for all indicators for all fisheries. In several cases, effort data such as the number of trips or days at sea were not available while in others, revenues from other species were either not available or not reported because they were so low. With the exception of trends in quota, the discussion to follow first summarizes trends for fishery indicators that are available for all fisheries (landings, fishery species revenue, average price, active vessels, fishery revenue per vessel, and the Gini coefficient), followed by trends in indicators for fisheries for which trip and/or days at sea data were available. Trends in indicators for fisheries where data on revenue from other species were available are summarized last. For purposes of reporting, correlation coefficients that are not statistically significant at the 10% level of significance are denoted by white bars in all figures while statistically significant assocaiations are denoted in blue. As was the case throughout this report, time trends for prices and revenues were estimated for inflation-adjusted 2010 dollars.

1. Trends in Aggregate Quotas

Where required, Annual Catch Limits (ACLs) consistent with the 2006 reauthorization of the Magnuson-Stevens Act were not formally specified in any of the 13 fisheries covered in this report until 2010 or 2011. However, prior to the 2006 reauthorization, several of the 13 fisheries covered in this report were managed with some form of catch limit either in the form of a quota, harvest guideline, or target total allowable catch (TTAC). Specifically, prior to 2010, six of the 13 fisheries were quota-managed through a specified quota or guideline harvest level while two others were managed by catch targets that did not necessarily result in any in-season closures. Of these eight fisheries, three exhibited an increasing trend (a statistically significant correlation coefficient of 0.5 or greater; blue bars in Figure 140). These fisheries included Limited Access Atlantic Sea Scallops, Hawai'i Bottomfish, and Hawai'i Longline. Five fisheries exhibited a decreasing trend (a statistically significant correlation coefficient less than or equal to -0.5). These fisheries included Gulf of Alaska Other Rockfish, Monkfish, West Coast Salmon Troll, West Coast Sardines, and Weathervane scallops).

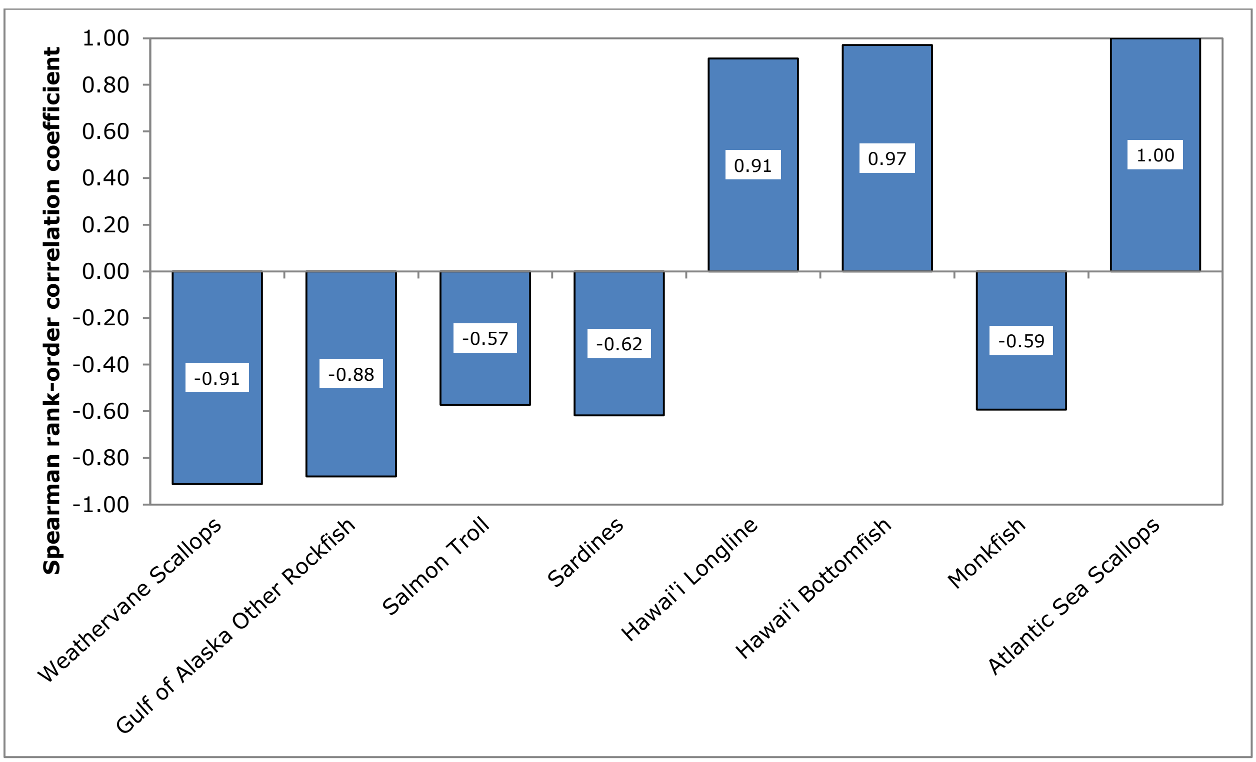

Figure 140. Correlation Coefficients between aggregate fishery species quota and time.

Evaluation of whether quotas, specified as a target, harvest guideline, or ACLs, have been exceeded is complicated by the fact that implementation of these management instruments across fisheries have changed over time. Furthermore, in several fisheries including Gulf of Alaska Other Rockfish, Hawaiʻi Longline, West Coast Salmon Troll, Monkfish, and Weathervane Scallops separate limits on catch apply to multiple management units in the fishery. This means that a catch limit or quota on one species or sub-component of a fishery may be exceeded while the aggregate quota has not.

In 2003, five fisheries were managed with some form of catch limit (Figure 141). Of these, there were two (West Coast Sardines and West Coast Salmon Troll) where quotas were not exceeded and three in which at least one catch limit was exceeded. These included overages in one or more subcomponents of the Monkfish, Gulf of Alaska Other Rockfish, and the Weathervane Scallop fisheries (however, the aggregate combined quotas for all stocks in each of these fisheries were not exceeded). From 2003 to 2008, the number of occasions where quotas for at least one stock was exceeded was at least equal to the number of fisheries with no overages. In 2009, overages occurred in three of eight fisheries subject to some form of catch limit. Fisheries with overages included Limited Access Atlantic Sea Scallops, Gulf of Alaska Other Rockfish, and Weathervane Scallops. By 2012, quotas or ACLs had been implemented in nine of the thirteen fisheries included in this report. Of these nine fisheries, overages occurred in only the one or more subcomponents of the Gulf of Alaska Other Rockfish and of the Weathervane Scallop fisheries. In neither case were the aggregate quotas for all stocks exceeded.

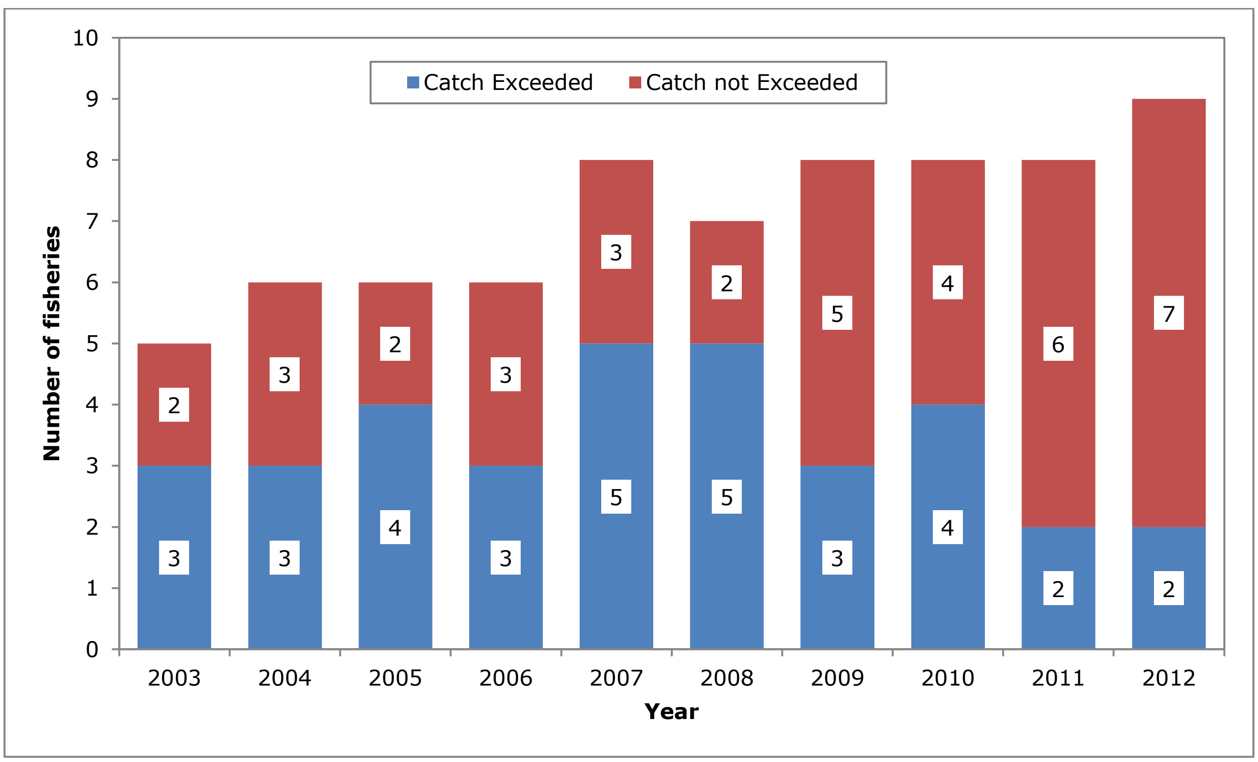

Figure 141. Annual number of fisheries managed with a catch limit, number of fisheries in which one or more catch limits was exceeded, and number of fisheries in which no catch limit was exceeded.

2. *Indicator Trends (All Fisheries)*

Spearman rank correlation coefficients between aggregate landings of fishery species and time were not statistically significant in seven of the 13 fisheries included in this report (Figure 142; blue bars denote statistically significant, white bars denote not statistically significance). This does not necessarily mean that landings in these fisheries were relatively stable or did not exhibit any meaningful short term trends, only that they did not exhibit a consistent increasing or decreasing trend. Of the six fisheries that did exhibit a statistically significant trend, landings were declining in four fisheries and increasing in two. Of those fisheries with a downward trend in landings, in the Gulf of Alaska Other Rockfish, Monkfish, West Coast Swordfish and Pacific Coast Salmon Troll Fisheries also displayed deceasing trends in catch limits. The upward trend in Hawai'i Longline Fishery landings is similarly consistent with that fishery's upward trend in aggregate quota. Although the statistical test for time trends in landings in the Atlantic Sea Scallop, Hawai'i Bottomfish, and Weathervane Scallop Fisheries failed to produce significant results, we note that the signs of the coefficients were consistent with the direction of change in quota over time in these fisheries.

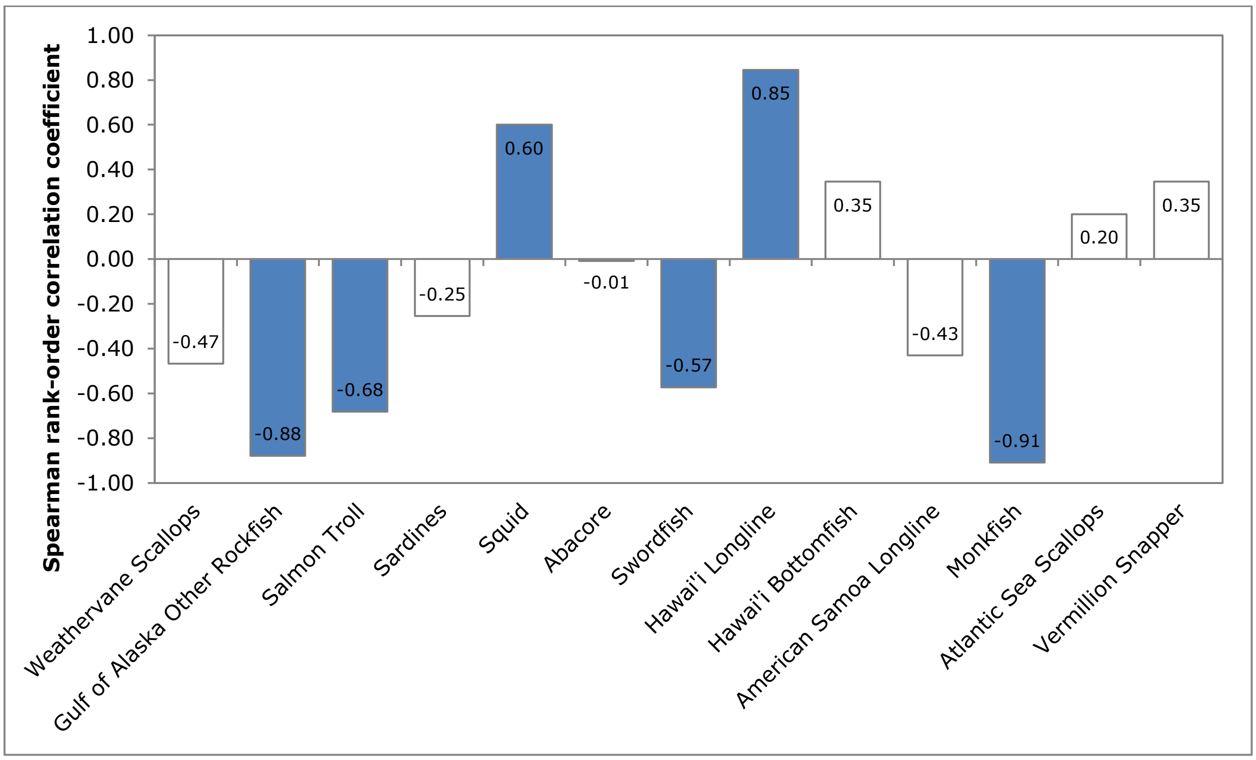

Figure 142. Correlation coefficients between aggregate fishery species landing and time.

Revenue from fishery species exhibited a statistically significant correlation with time in nine of the 13 fisheries included in this report (Figure 143; blue bars denote statistically significant, white bars denote not statistically significancant). Of these nine, the majority (5) exhibited an increasing trend, while four (American Samoa Longline, Monkfish, West Coast Salmon Troll, and West Coast Swordfish) show downward trends.

A statistically significant positive correlation between average price and time was evident for nine fisheries and was positive in all cases (Figure 144; blue bars denote statistically significant, white bars denote not statistically significant). The correlation between average price and time was found to be positive but not statistically significant in the West Coast Squid fishery while the correlation between price and time was negative in the American Samoa Longline, Gulf of Mexico Vermillion Snapper, and the West Coast Swordfish fishery. In general, a statistically significant time trend does not necessarily mean that prices are strictly increasing or decreasing as the correlation coefficient for landings and average price was negative for all but two fisheries, indicating a mostly inverse relationship between prices and landings: prices increase when landings decline and vice versa (Figure 145; blue bars denote statistically significant, white bars denote not statistically significant).

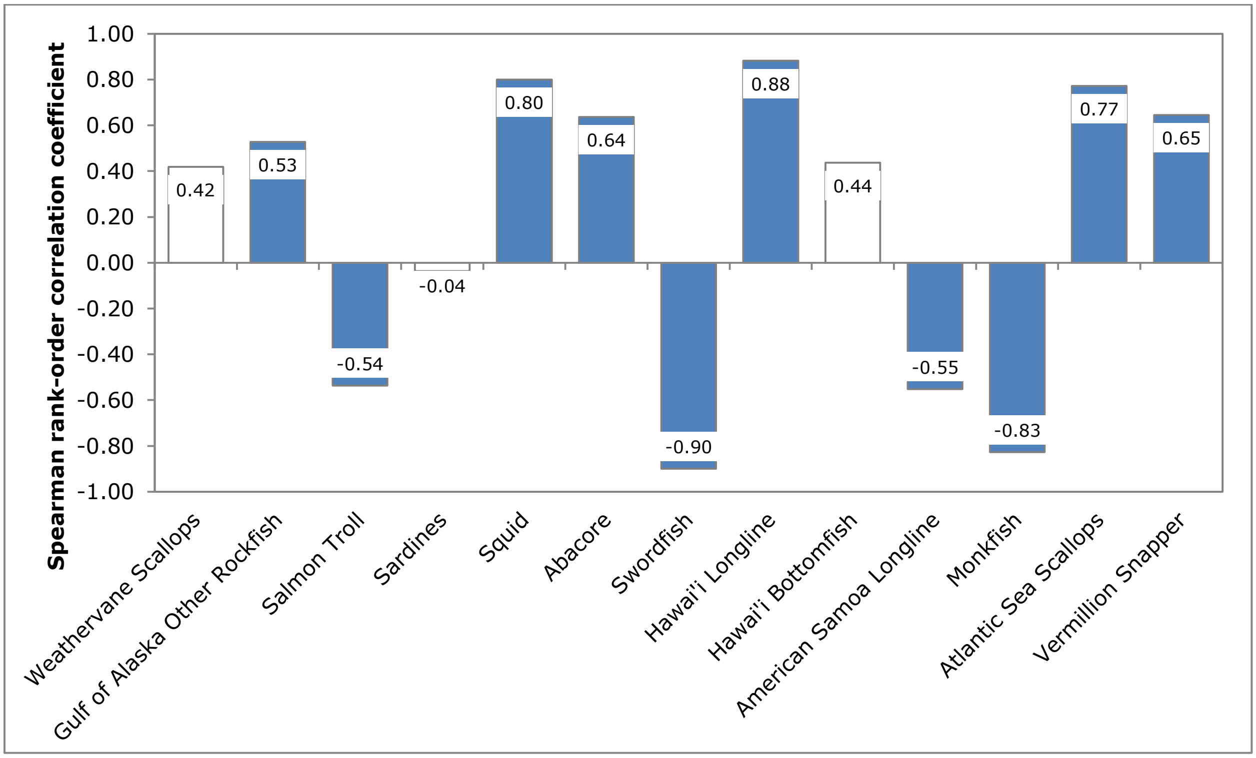

Figure 143. Correlation coefficients between fishery species revenue and time.

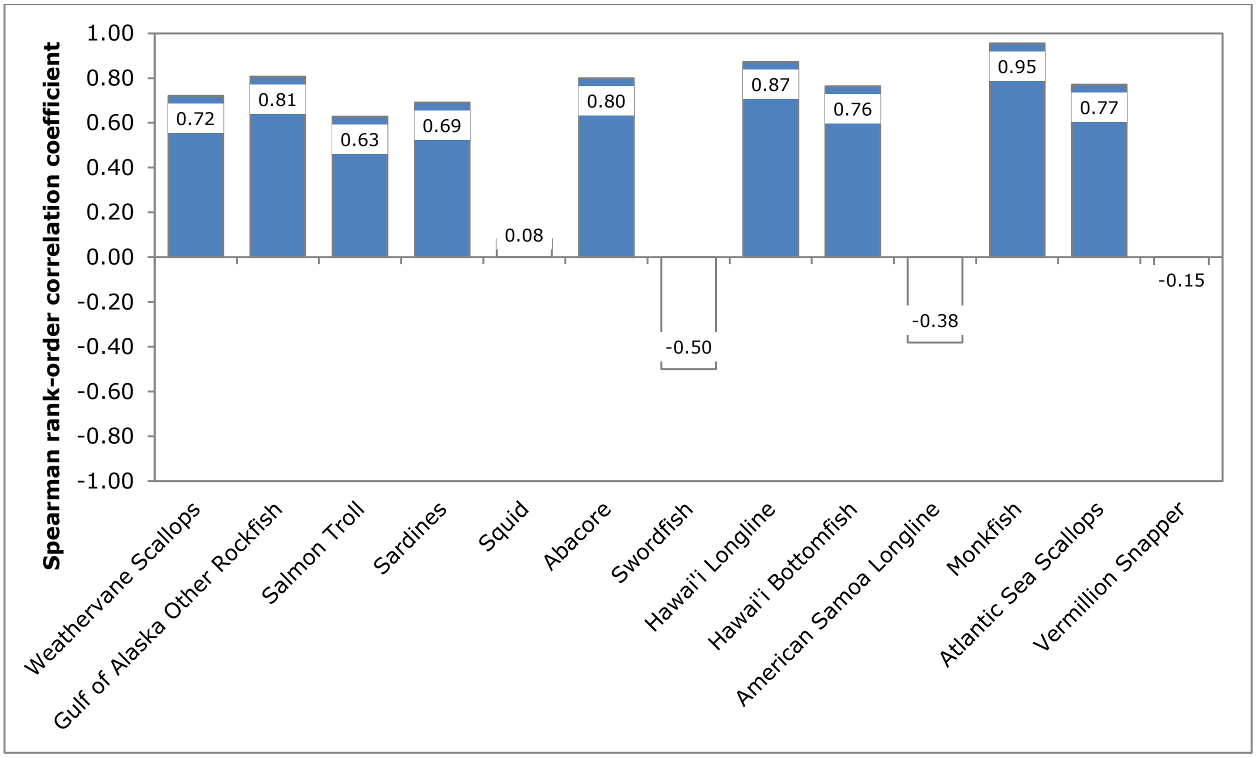

Figure 144. Correlation coefficients between average fishery species price and time.

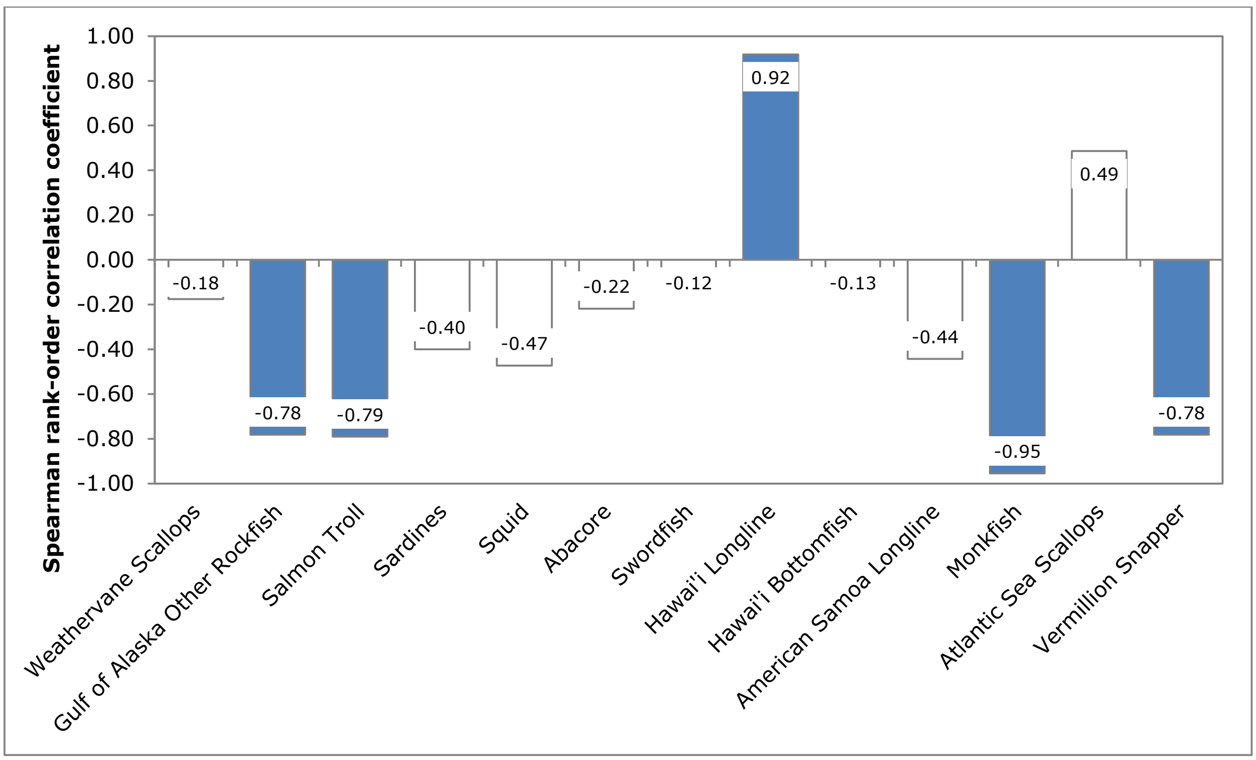

Figure 145. Correlation coefficients between aggregate fishery species landings and average price.

The correlation coefficient between the number of active vessels and time was negative in nine of 13 fisheries of which the negative correlation coefficient was statistically significant in seven fisheries (Figure 146; blue bars denote statistically significant, white bars denote not statistically significant). Of the fourisheries exhibiting positive correlations, only the correlation coefficient in the Hawai'i Longline fishery was statistically significant.

Correlation coefficients for revenue per vessel with time were positive for eight fisheries, of which, all but one were statistically significant (Figure 147; blue bars denote statistically significant, white bars denote not statistically significant). Of the five fisheries with a negative correlation between fishery revenue per vessel and time, the correlation coefficient was statistically significant in the fisheries for Monkfish, West Coast Salmon Troll, and West Coast Swordfish. Among active vessels the relative distribution of fishery species revenue as measured by the Gini coefficient tended to become more even as estimated correlation coefficients were negative in nine of the 13 fisheries (Figure 148; blue bars denote statistically significant, white bars denote not statistically significant). This relationship was statistically significant in five fisheries. The correlation coefficient was positive in four fisheries, but was statistically significant in only two.

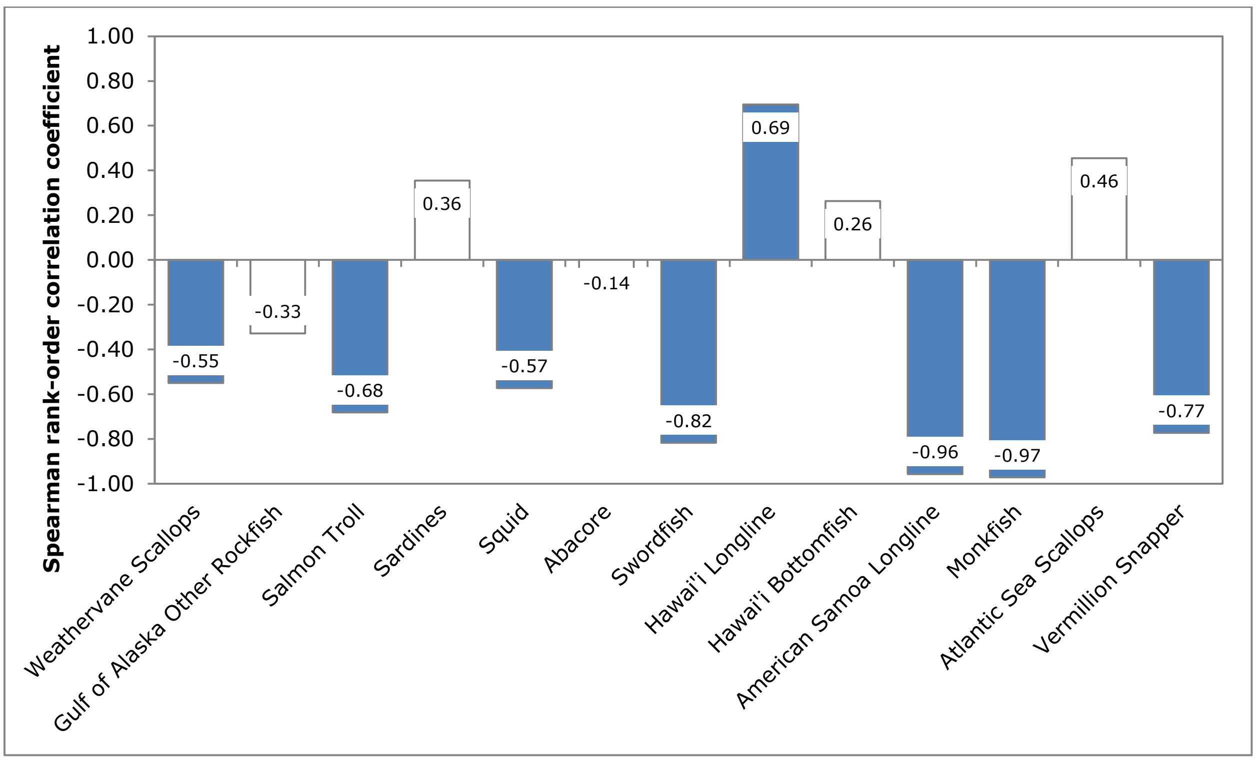

Figure 146. Correlation coefficients between active vessels and time.

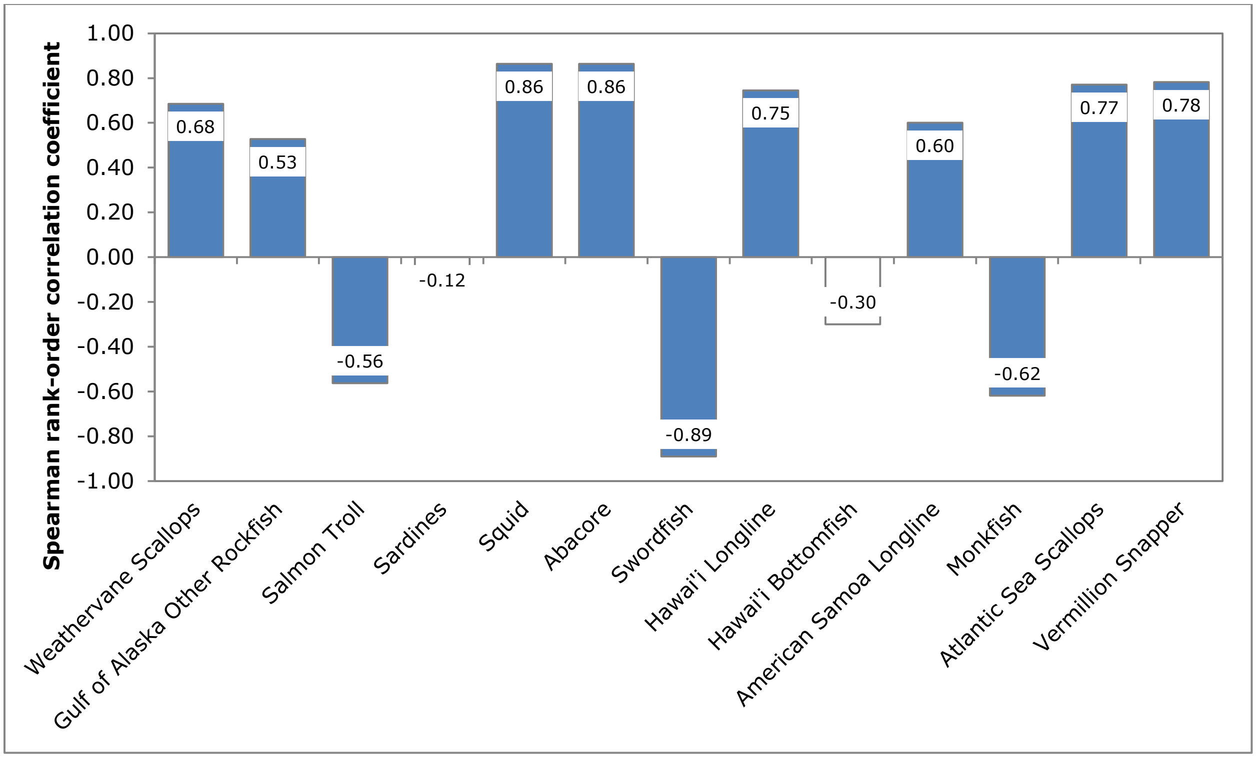

Figure 147. Correlation coefficients between fishery species revenue per vessel and time.

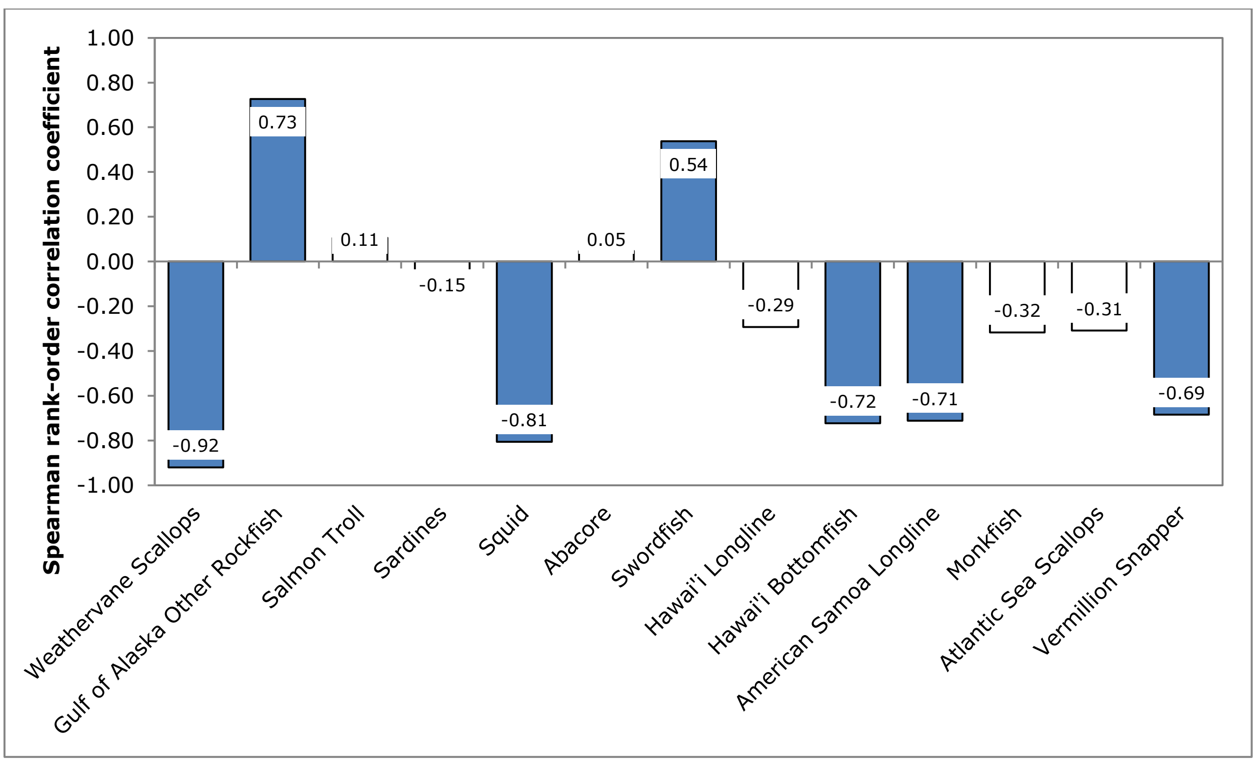

Figure 148. Correlation coefficients between for the Gini coefficient and time.

3. Indicator Trends (Fisheries with Trip and Days at Sea Data)

Data on the number of trips taken were available for 11 of the 13 fisheries included in this report. Of these, the correlation between the annual number of trips and time was not significant in four fisheries (West Coast Squid, West Coast Albacore, Hawai'i Longline, and Hawai'i Bottomfish; Figure 149; blue bars denote statistically significant, white bars denote not statistically significant). For all of the remaining seven isheries, the numbers of trips exhibited a statistically significant negative correlation coefficient. This finding is consistent with the general decline in the number of active vessels (Figure 146) as most cross-correlation coefficients between active vessels and trips were positive and statistically significant (Figure 150; blue bars denote statistically significant, white bars denote not statistically significant).

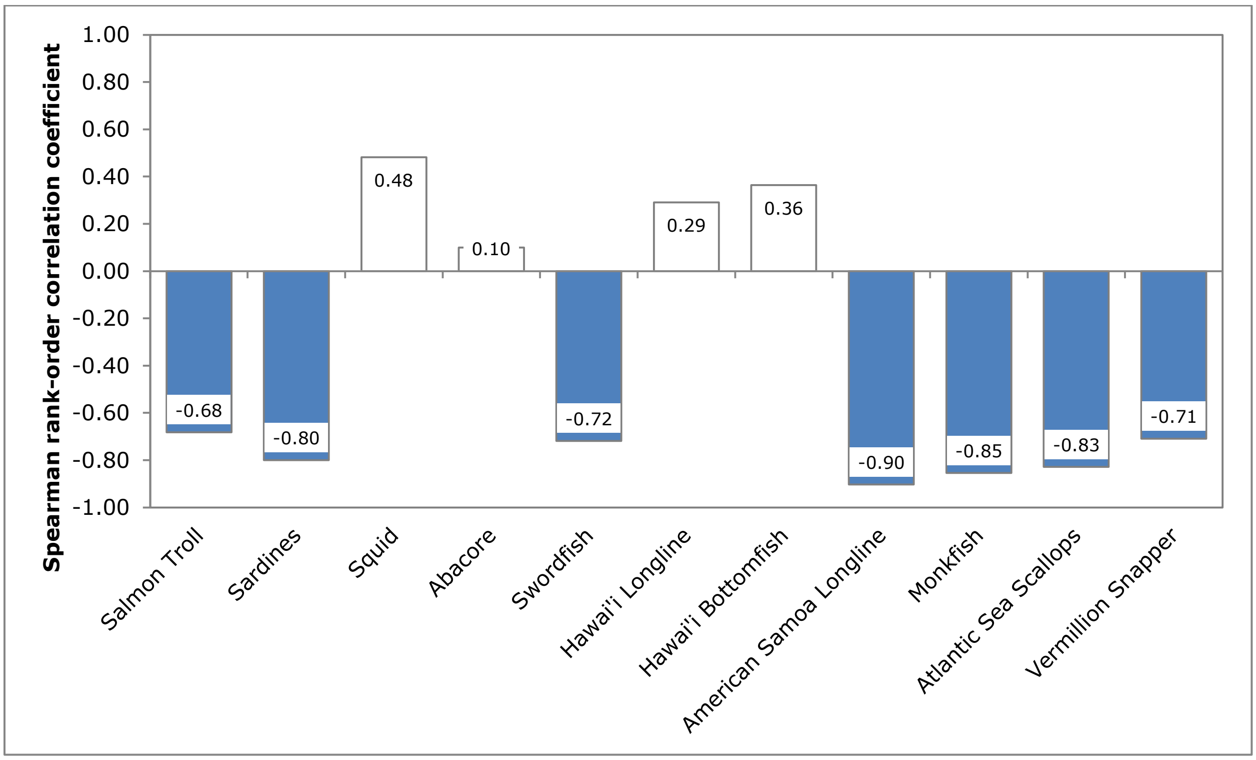

Figure 149. Correlation coefficients between number of trips in the fishery and time.

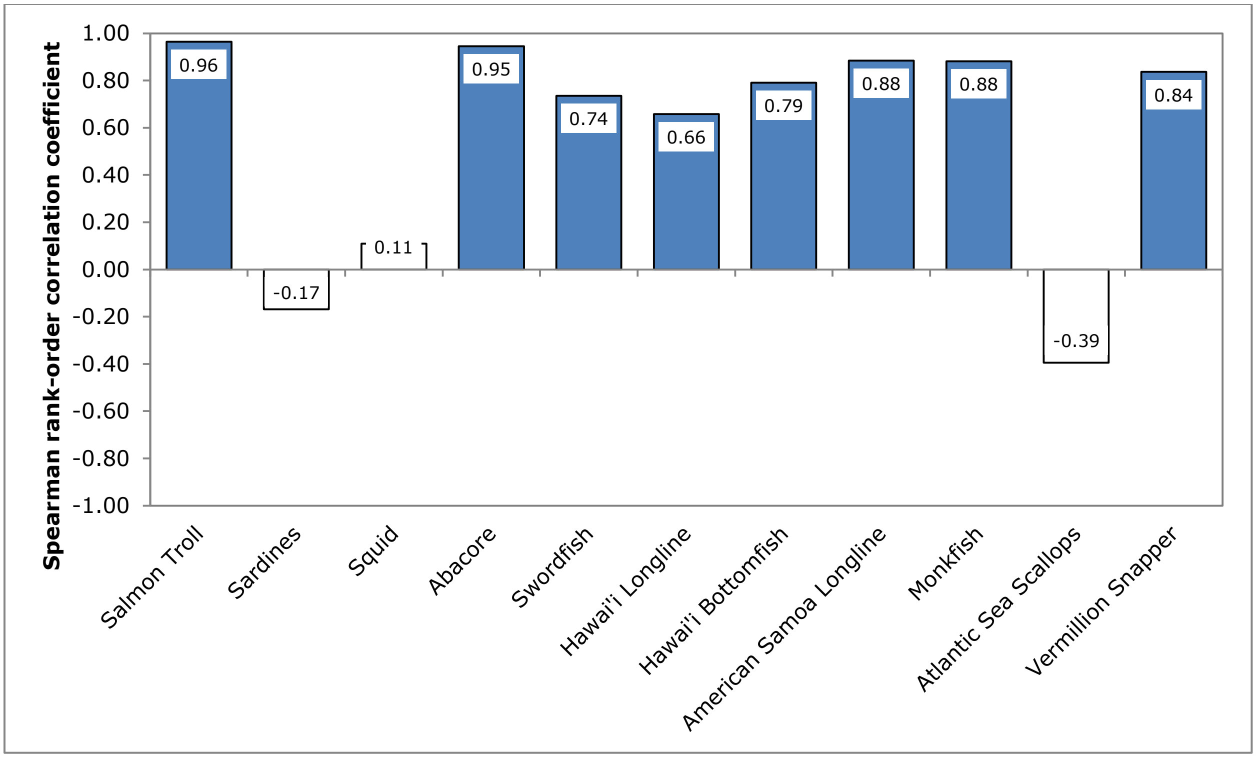

Figure 150. Cross-correlation coefficients between active vessels and trips.

Both the West Coast Salmon Troll and West Coast Sardine fisheries operate as day fisheries but data were not available to estimate the number of days absent on fishing trips. The West Coast Squid fishery is also primarily a day fishery, but data were available to estimate total fishing time. Data on trip duration were not available for the West Coast Swordfish fishery. This leaves eight fisheries for which days absent data were available. For these fisheries, the correlation between total days absent in the fishery and time was positive and statistically significant in two fisheries (West Coast Albacore, and Hawai'i Longline) and was negative and statistically significant in three fisheries (American Samoa Longline, Limited Access Atlantic Sea Scallops, and Monkfish; Figure 151; blue bars denote statistically significant, white bars denote not statistically significant). On average, the duration of each fishing trip has been trending upward as correlation coefficients for five of the six fisheries with a statistically significant time trend were positive (Figure 152; blue bars denote statistically significant, white bars denote not statistically significant). Only the correlation coefficient for the Monkfish Fishery exhibited a statistically significant negative correlation coefficient between average trip duration and time.

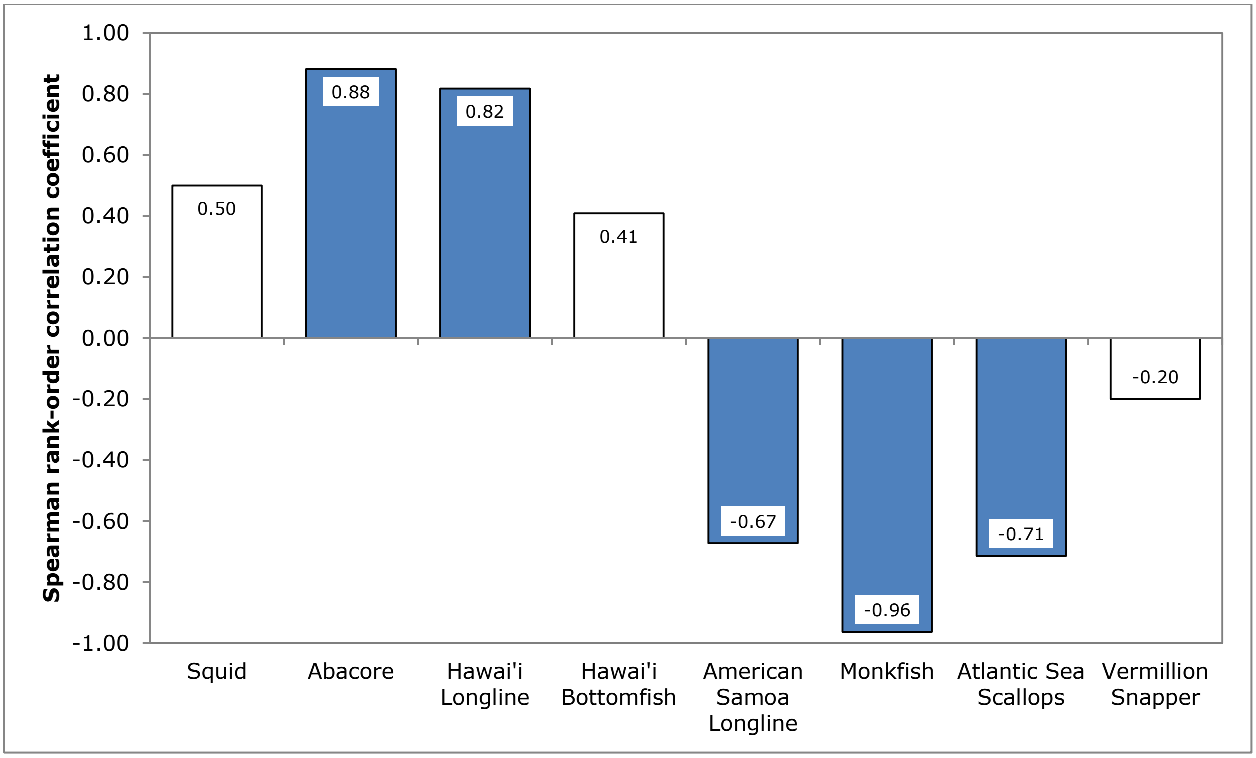

Figure 151. Correlation coefficients between for number of days at sea in the fishery and time.

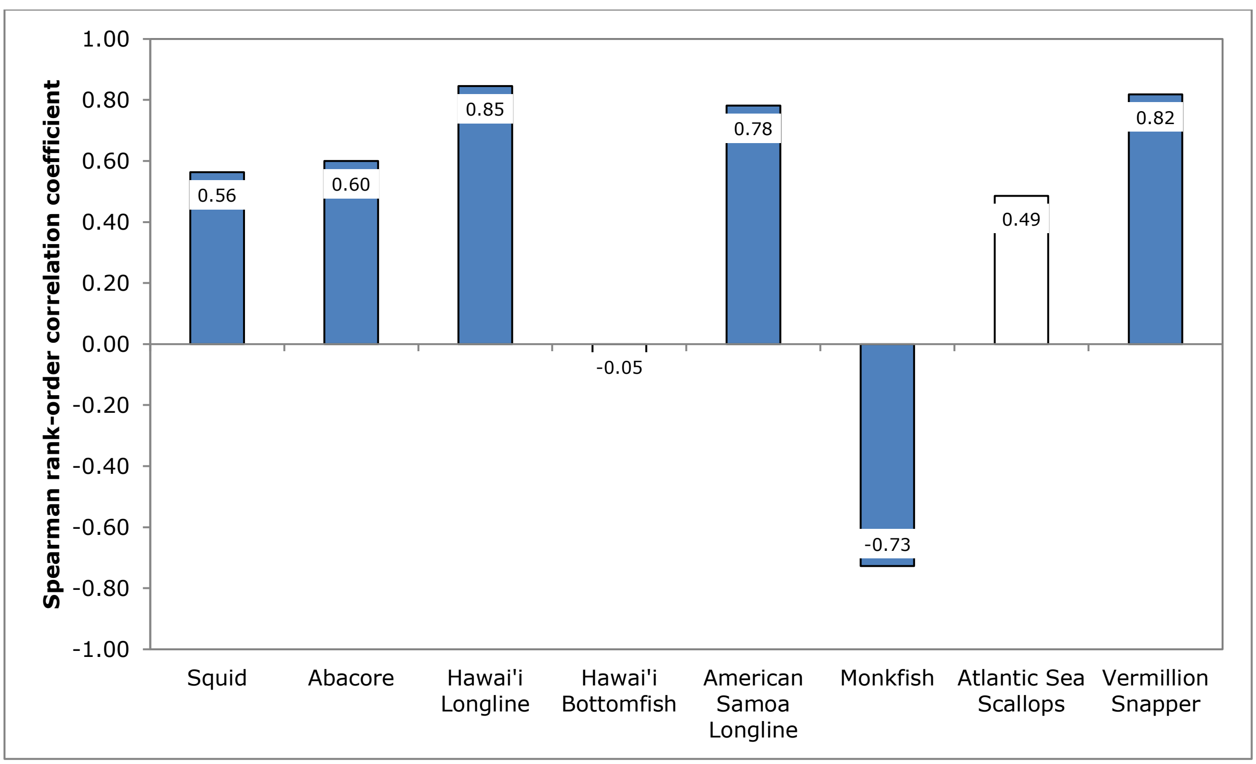

Figure 152. Correlation coefficients for average trip duration and time.

The correlation between time and both fishery species revenue per trip (Figure 153; blue bars denote statistically significant, white bars denote not statistically significant) and fishery revenue per day at sea (Figure 154; blue bars denote statistically significant, white bars denote not statistically significant) was positive for most fisheries with a statistically significant correlation coefficient. The positive correlation with time is consistent with the general decline in number of trips coupled with a general increase in fishery revenue resulting in higher per trip revenue.

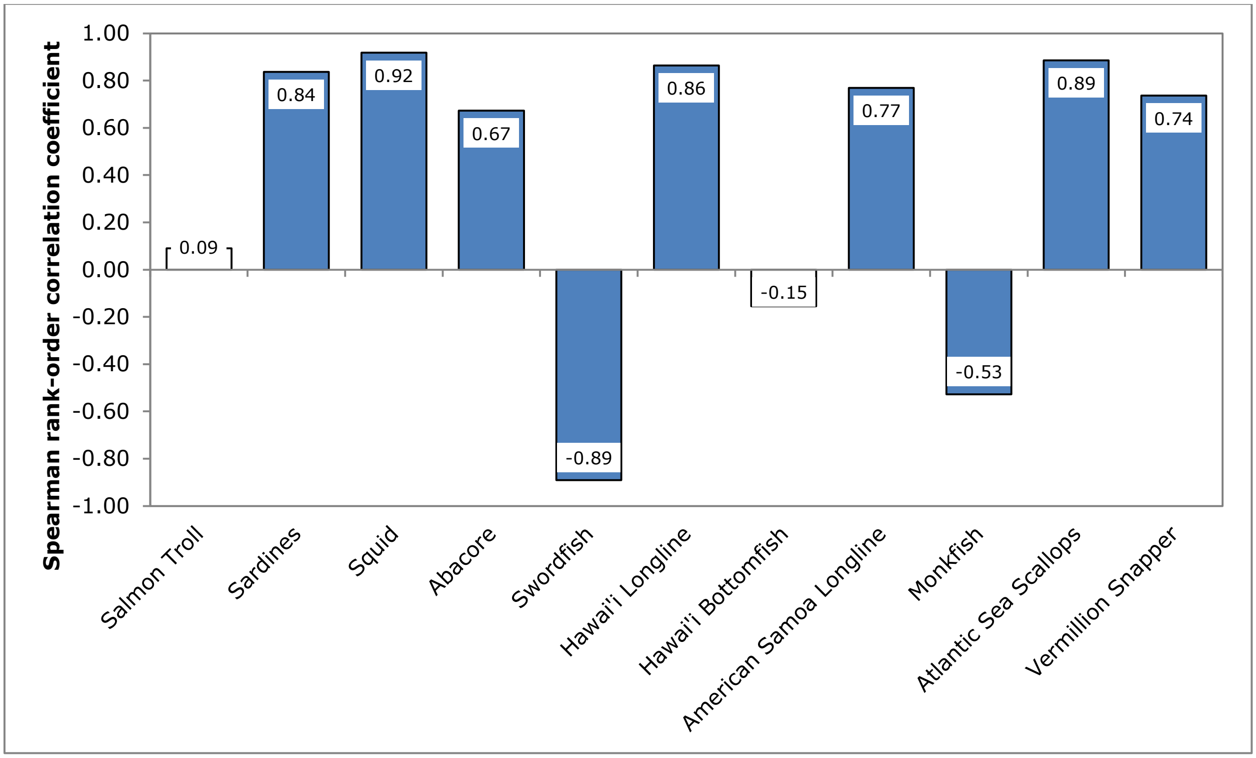

Figure 153. Correlation coefficients between fishery revenue per trip and time.

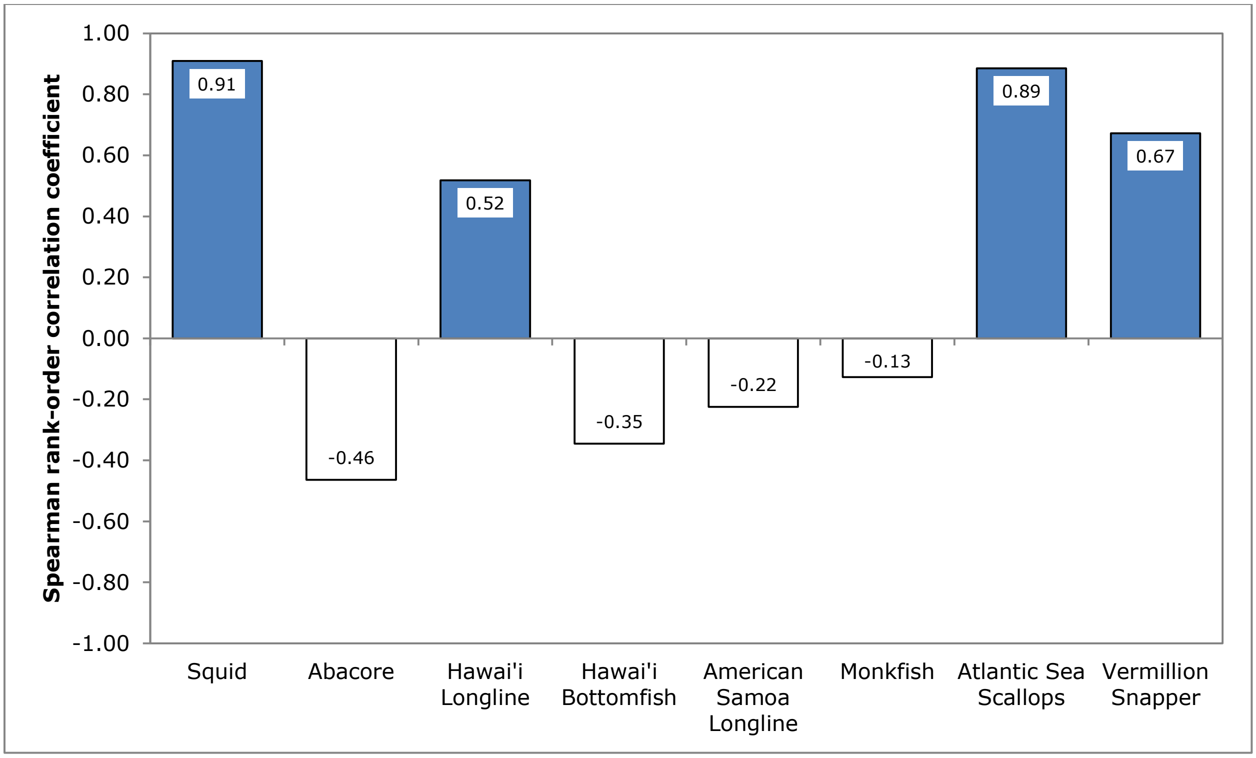

Figure 154. Correlation coefficients between fishery species revenue per day at sea and time.

4. Trends in Revenue Indicators for Fisheries with Non-Fishery Species Revenue

Each of the 13 fisheries included in this report were defined according to a set of species considered to be part of the fishery. In most of these fisheries, at least some revenue may be earned from other species on trips in the fishery. However, in cases where trip-level data were not available (Gulf of Alaska Other Rockfish and Weathervane Scallop), revenues from other species could not be estimated, whereas in others, non-fishery revenues were so low that they were not reported (West Coast Squid, Hawai‘i Longline, and American Samoa Longline). Even for fisheries where revenue from other species was reported, the levels were so low that trends in total revenue are indistinguishable from trends in fishery species revenue. This was the case for both West Coast Albacore and Limited Access Atlantic Sea Scallop, where revenues from incidentally harvested species were less than 1% of total revenue earned. Thus, trends in revenue are here examined for only five fisheries with non-fishery species revenue: Gulf of Mexico Vermilion Snapper, Hawai‘i Bottomfish, Monkfish, West Coast Salmon Troll, and West Coast Swordfish.

Total revenue exhibited no statistically significant correlation with time in either the Monkfish or the Gulf of Mexico Vermillion Snapper fishery (Figure 155; blue bars denote statistically significant, white bars denote not statistically significant). A statistically significant negative correlation with time was evident in both the West Coast Salmon Troll and West Coast Swordfish fisheries, whereas a positive correlation with time was evident in the Hawai‘i Bottomfish fishery. The relative importance of non-fishery revenue in total earnings has been trending upward as the correlation between time and fishery species revenue share in total revenue exhibits a statistically significant negative trend for all but Gulf of Mexico Vermillion Snapper (Figure 156; blue bars denote statistically significant, white bars denote not statistically significant). This tendency may be due to increased targeting of other species in the fishery due to management changes or to higher prices received for non-fishery species. In the case of the West Coast Swordfish Fishery, bycatch provisions for protected species have led to increased reliance on other species.

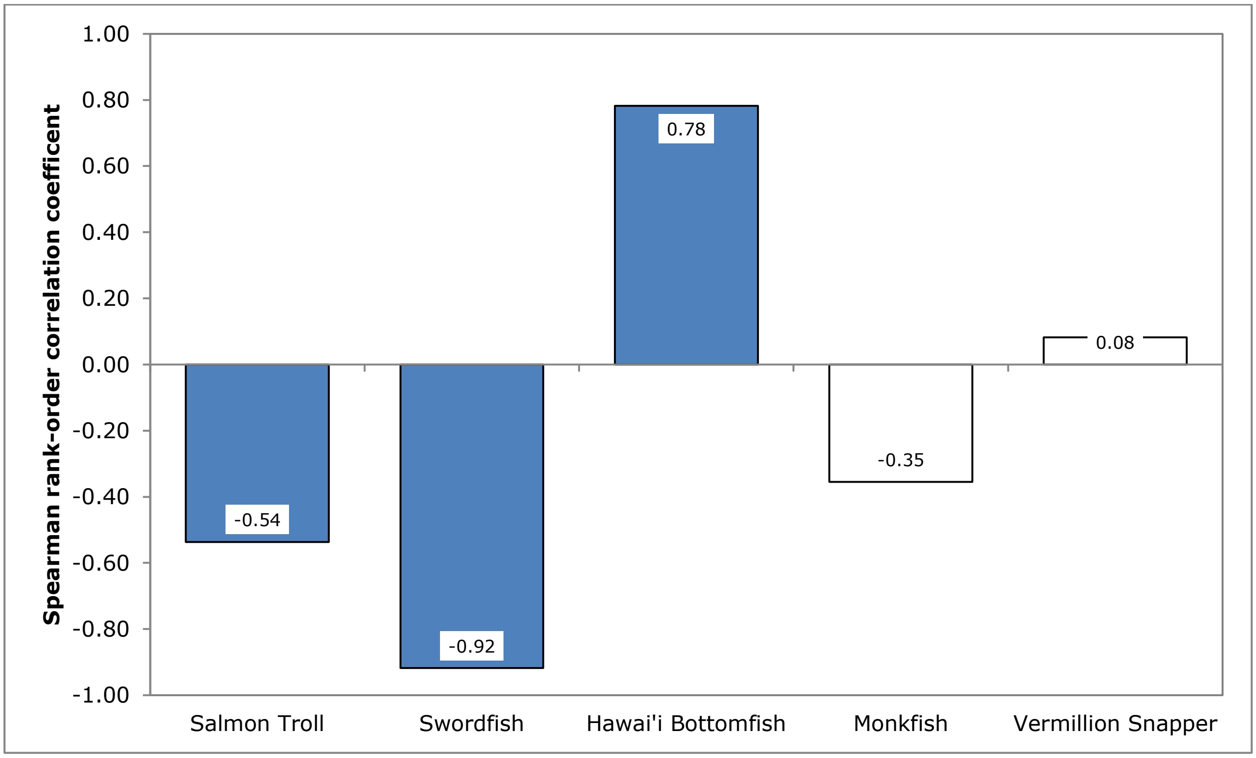

Figure 155. Correlation coefficients between total revenue and time.

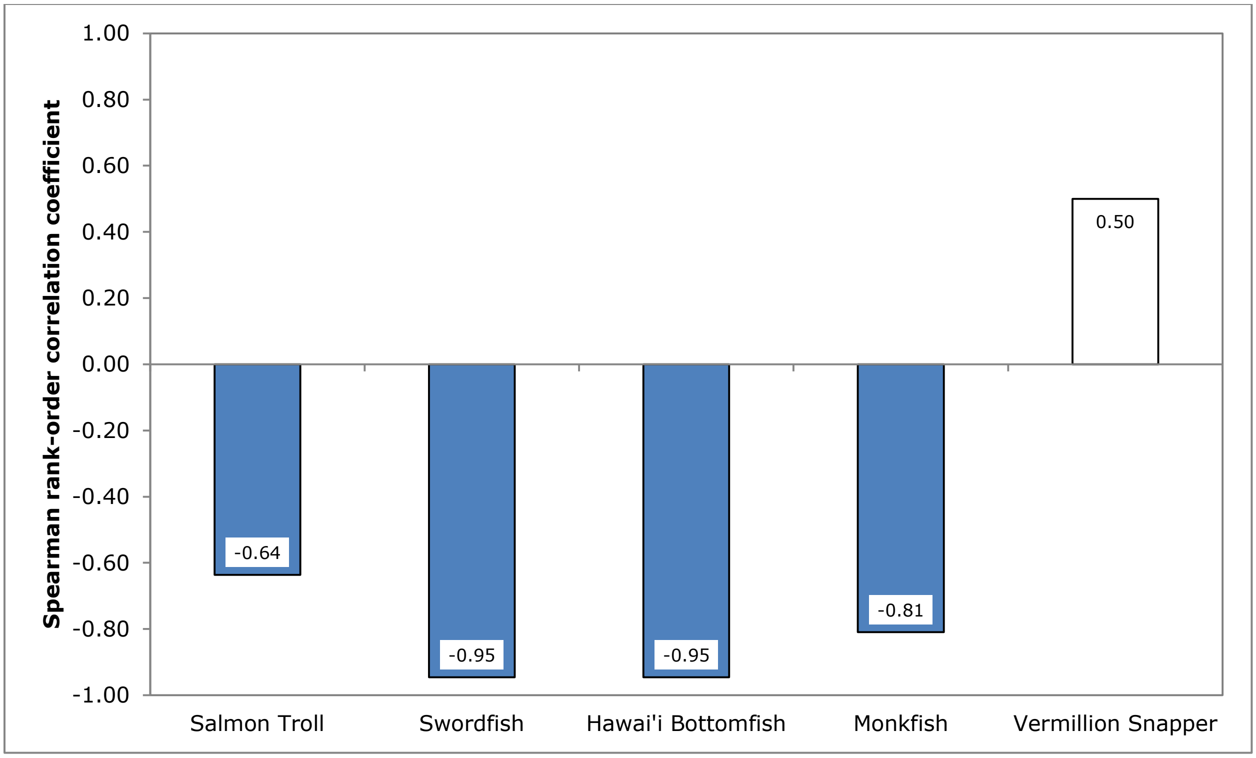

Figure 156. Correlation coefficients between fishery species revenue share and time.

The correlation between total revenue per vessel and time was statistically significant in only the West Coast Swordfish and Gulf of Mexico Vermilion Snapper Fisheries (Figure 157; blue bars denote statistically significant, white bars denote not statistically significant). The Swordfish Fishery showed a decreasing trend in total revenue per vessel, while the trend in the Vermilion Snapper Fishery was upward.

Statistically significant correlations were found between time and total revenue per trip in four fisheries; they were positive in the Gulf of Mexico Vermillion Snapper, Hawai‘i Bottomfish, and Monkfish Fisheries, and negative in the West Coast Swordfish Fishery (Figure 158; blue bars denote statistically significant, white bars denote not statistically significant). The correlation with time of estimated total revenue per day was statistically significant and positive for all three fisheries (Gulf of Mexico Vermillion Snapper, Hawai‘i Bottomfish, and Monkfish) for which both total revenue and days absent data were available (Figure 159; blue bars denote statistically significant, white bars denote not statistically significant).

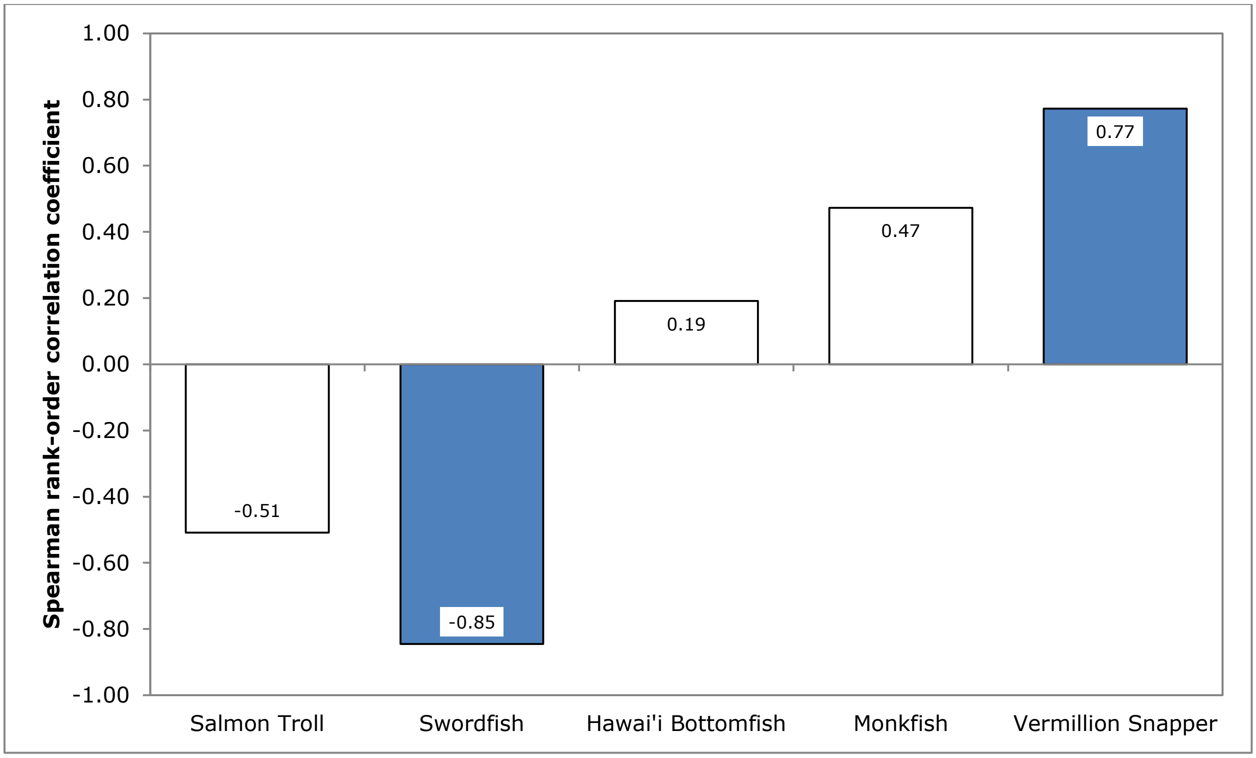

Figure 157. Correlation coefficients between total revenue per vessel and time.

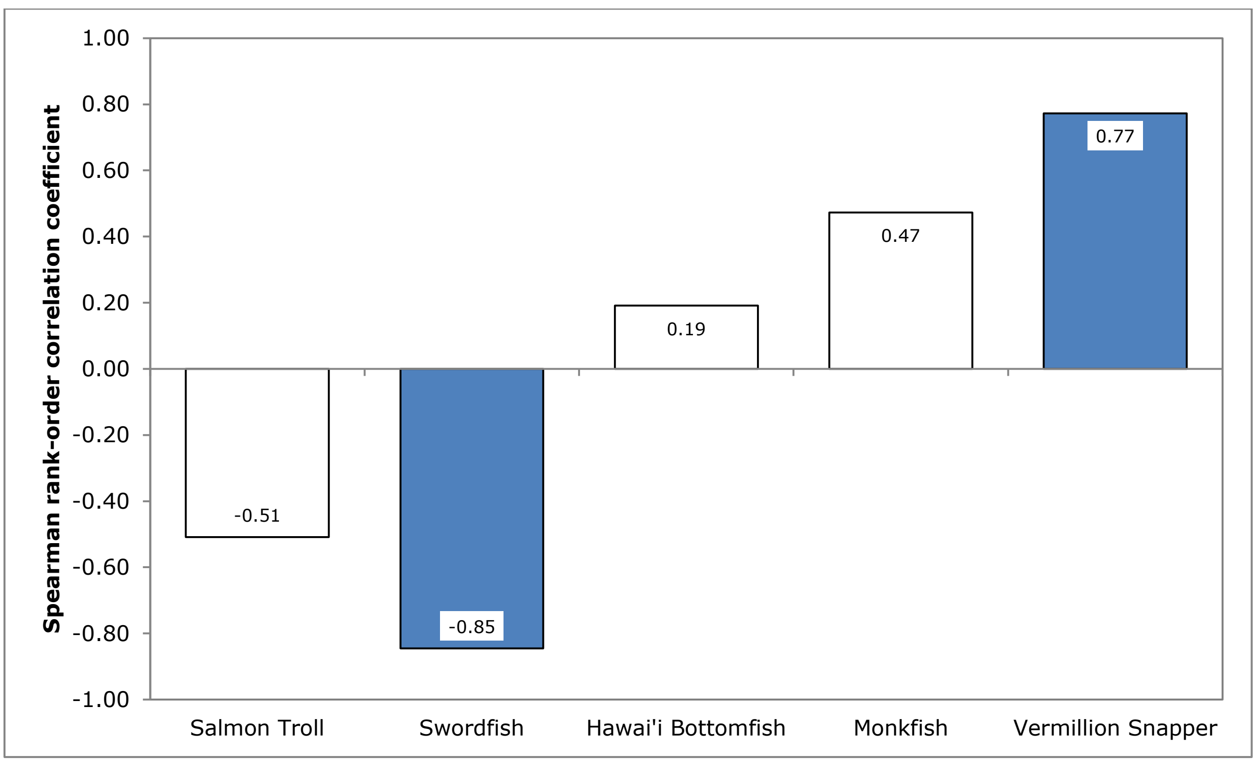

Figure 158. Correlation coefficients between total revenue per trip and time.

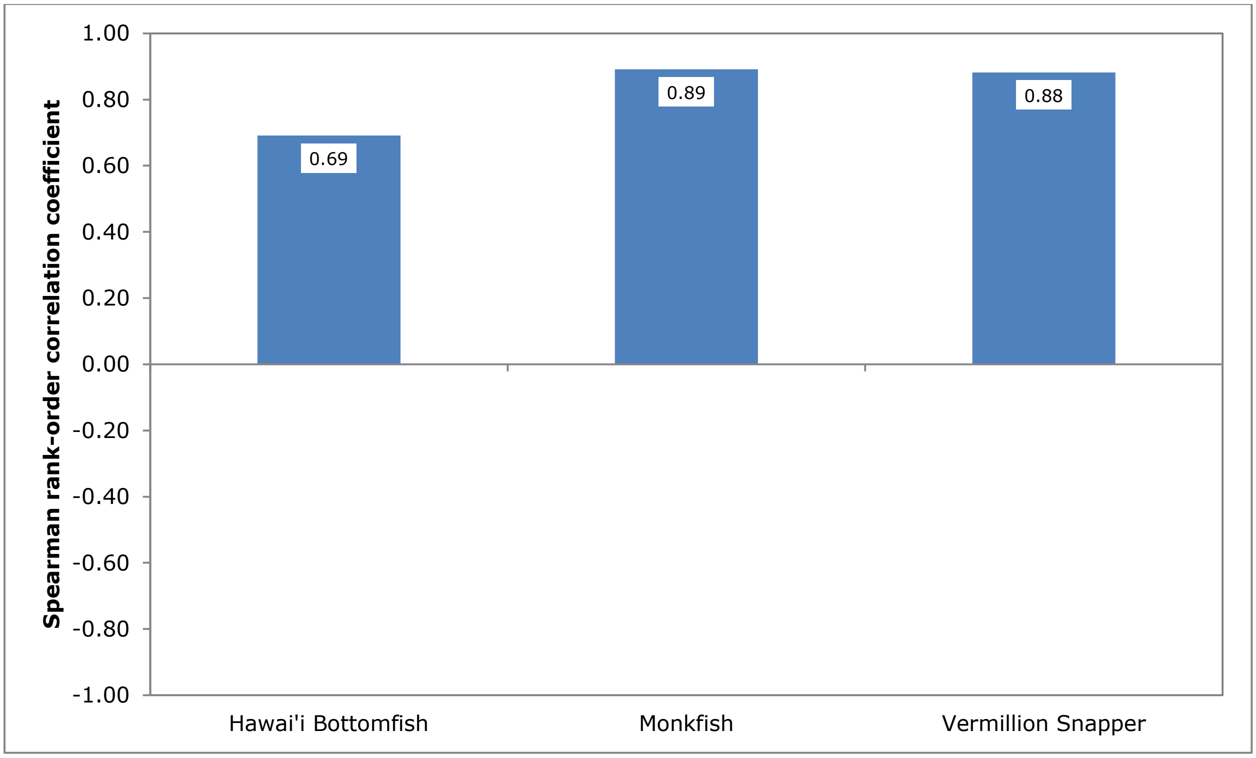

Figure 159. Correlation coefficients between total revenue per day and time.

Conclusions

Comparisons of the general direction of change as measured by correlations with time and statistical significance of these correlations in performance indicators reveals several shared trends across fisheries. The correlation with time in average price was statistically significant in 69% of all fisheries and was positive in nine instances (Table 9). The correlation with time in active vessels was significant in 62% of fisheries and was negative in seven of the eight fisheries with a statistically significant correlation coefficient. The correlation coefficient with time and fishery revenue per vessel was significant in 77% of fisheries and was positive for seven of the nine fisheries with significant correlation coefficients with time. A negative correlation with time in the number of trips was evident in all fisheries with statistically significant correlation coefficients, whereas correlation with time in fishery revenue per trip was positive seven of the nine fisheries with statistically significant correlation coefficients.

Evidence of shared correlations with time for both relative distribution of fishery revenue shares as measured by the Gini coefficient and aggregate fishery landings were less definitive. The correlation with time for the Gini coefficient was statistically significant for 54% of all fisheries and exhibited a negative correlation in five fisheries, whereas the Gini coefficient was positively correlated with time in two fisheries. Overall, there appears to be a general trend toward less difference among vessels in terms of how fishery revenues are distributed. The correlation with time in aggregate fishery landings was statistically significant in less than half (46%) of the fisheries included in this report. Of the fisheries with statistically significant correlation coefficients, fourexhibited downward (negative correlations) trends and two exhibited an upward (positive correlation coefficient) trend. Considering correlations between time and landings, the number of fisheries where correlations were not statistically significant was about evenly split between fisheries with positive correlations (3) and fisheries with negative correlations (4).

Table 9. Summary of Direction of Change and Statistical Significance by Performance Indicator.

	Direction of Change in Time Trend and Statistical Significance				
Indicator[1]	Not Significant Negative	Not Significant Positive	Percent Significant[2]	Significant Negative	Significant Positive
Fishery Landings (Figure 142)	4	3	46%	4	2
Fishery Revenue (Figure 143)	1	3	69%	4	5
Price (Figure 144)	3	1	69%	0	9
Active Vessels (Figure 146)	2	3	62%	7	1
Revenue per Vessel (Figure 147)	2	1	77%	3	7
Gini Coefficient (Figure 148)	4	2	54%	5	2
Trips (Figure 149)	0	4	64%	7	0
Revenue per Trip (Figure 153)	1	1	82%	2	7

[1] Parentheses denote figure number.
[2] Center column respresents the % of all 13 fisheries with statistically significant correlation using 0.10 level of significance.

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Brinson, A.A. and E.M. Thunberg. 2013. The Economic Performance of U.S. Catch Share Programs. U.S. Department of Commerce, NOAA Technical Memorandom NMFS-F/SPO-133a, 159 p. Available at: https://www.st.nmfs.noaa.gov/economics/fisheries/commercial/catch-share-program/index

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Appendix A: Spearman Rank-Order Correlation Coefficients and Significance

Spearman rank-order correlation coefficients were calculated using the CORR procedure in SAS Version 9 with the Spearman option. The resulting correlation coefficients and their level of significance are reported in Table A 1. With two exceptions, all reported correlation coefficients are for the correlation between the performance indicator in each column heading in Table A 1 and time. The two exceptions are; the cross correlation between average price and landed quantities and the cross correlation between and number of active vessels and trips.

Table A 1. Spearman Rank-Order Correlation Coefficients for Non-Catch Share Performance Indicators

Fishery	Quota	Fishery Species Landings	Fishery Species Revenue	Average Price	Landings* Price	Active Vessels	Fishery Species Revenue per Vessels	Gini Coefficient
Weathervane Scallops	-0.91	-0.47	0.42	0.72	-0.18	-0.55	0.68	-0.92
	(0.0002)[a]	(0.1739)	(0.2291)	(0.0186)	(0.6272)	(0.0992)	(0.0289)	(0.0004)
GOA Other Rockfish	-0.88	-0.88	0.53	0.81	-0.78	-0.33	0.53	0.73
	(0.0008)	(0.0008)	(0.1173)	(0.0049)	(0.0075)	(0.3544)	(0.1173)	(0.0174)
West Coast Swordfish	NA[b]	-0.57	-0.90	-0.50	-0.12	-0.82	-0.89	0.54
		(0.0655)	(0.0002)	(0.1173)	(0.7293)	(0.0021)	(0.0002)	(0.0878)
West Coast Squid	NA	0.60	0.80	0.08	-0.47	-0.57	0.86	-0.81
		(0.0510)	(0.0031)	(0.8110)	(0.1420)	(0.0655)	(0.0006)	(0.0028)
West Coast Sardines	-0.62	-0.25	-0.04	0.69	-0.40	0.36	-0.12	-0.15
	(0.0426)	(0.4500)	(0.9155)	(0.0186)	(0.2229)	(0.2835)	(0.7293)	(0.6561)
West Coast Albacore	NA	-0.01	0.64	0.80	-0.22	-0.14	0.86	0.05
		(0.9788)	(0.0353)	(0.0031)	(0.5192)	(0.6893)	(0.0006)	(0.8904)
West Coast Salmon Troll	-0.57	-0.68	-0.54	0.63	-0.79	-0.68	-0.56	0.11
	(0.0655)	(0.0208)	(0.0890)	(0.0388)	(0.0037)	(0.0208)	(0.0710)	(0.7564)
Monkfish	-0.59	-0.91	-0.83	0.95	-0.95	-0.97	-0.62	-0.32
	(0.0549)	(0.0001)	(0.0017)	(<.0001)	(<.0001)	(<.0001)	(0.0426)	(0.3418)
Limited Access Atlantic Sea Scallops	1.00	0.20	0.77	0.77	0.49	0.46	0.77	-0.31
	(<.0001)	(0.7040)	(0.0724)	(0.0724)	(0.3287)	(0.3641)	(0.0724)	(0.5518)
HI Longline	0.91	0.85	0.88	0.87	0.92	0.69	0.75	-0.29
	(0.0015)	(0.0010)	(0.0003)	(0.0005)	(<.0001)	(0.0176)	(0.0085)	(0.3829)
AMSAM Longline	NA	-0.43	-0.55	-0.38	-0.44	-0.96	0.60	-0.71
		(0.2145)	(0.0984)	(0.2763)	(0.2004)	(<.0001)	(0.0667)	(0.0211)
HI Bottomfish	0.97	0.35	0.44	0.76	-0.13	0.26	-0.30	-0.72
	(0.0012)	(0.2981)	(0.1797)	(0.0062)	(0.7092)	(0.4334)	(0.3701)	(0.0119)
Gulf of Mexico Vermillion Snapper	NA	0.35	0.65	-0.15	-0.78	-0.77	0.78	-0.69
		(0.2981)	(0.0320)	(0.6500)	(0.0045)	(0.0053)	(0.0045)	(0.0200)

[a] Numbers in parentheses denotes level of statistical significance

[b] NA denotes not applicable

Table A 1 (Continued). Spearman Rank-Order Correlation Coefficients for Non-Catch Share Performance Indicators

Fishery	Trips in the Fishery	Active Vessels*Trips	Days Absent in the Fishery	Average Trip Length	Fishery Species Revenue per Trip	Fishery Species Revenue per Day	Total Revenue in the Fishery	Fishery Species Revenue Share	Total Revenue per Vessel	Total Revenue per Trip	Total Revenue per Day
West Coast Swordfish	-0.72	0.74	NA[b]	NA	-0.89	NA	-0.92	-0.95	-0.85	-0.88	NA
	(0.0128)[a]	(0.0099)			(0.0002)		(<.0001)	(<.0001)	(0.0010)	(0.0003)	
West Coast Squid	0.48	0.11	0.50	0.56	0.92	0.91	NA	NA	NA	NA	NA
	(0.0031)	(0.7495)	(0.1173)	(0.0710)	(<.0001)	(0.0001)					
West Coast Sardines	-0.80	-0.17	NA	NA	0.84	NA	NA	NA	NA	NA	NA
	(0.0031)	(0.6203)			(0.0013)						
West Coast Albacore	0.10	0.95	0.88	0.60	0.67	-0.46	NA	NA	NA	NA	NA
	(0.7699)	(<.0001)	(0.0003)	(0.0510)	(0.0233)	(0.1509)					
West Coast Salmon Troll	-0.68	0.96	NA	NA	0.09	NA	-0.54	-0.64	-0.51	0.12	NA
	(0.0208)	(<.0001)			(0.7904)		(0.0890)	(0.0353)	(0.1097)	(0.7293)	
Monkfish	-0.85	0.88	-0.96	-0.73	-0.53	-0.13	-0.35	-0.81	0.47	0.54	0.89
	(0.0008)	(0.0003)	(<.0001)	(0.0112)	(0.0956)	(0.7092)	(0.2847)	(0.0026)	(0.1420)	(0.0890)	(0.0002)
Limited Access Atlantic Sea Scallops	-0.83	-0.39	-0.71	0.49	0.89	0.89	NA	NA	NA	NA	NA
	(0.0416)	(0.4387)	(0.1108)	(0.3287)	(0.0188)	(0.0188)					
HI Longline	0.29	0.66	0.82	0.85	0.86	0.52	NA	NA	NA	NA	NA
	(0.3855)	(0.0279)	(0.0021)	(0.0010)	(0.0006)	(0.1025)					
AMSAM Longline	-0.90	0.88	-0.67	0.78	0.77	-0.22	NA	NA	NA	NA	NA
	(0.0003)	(0.0007)	(0.0330)	(0.0075)	(0.0075)	(0.5334)					
HI Bottomfish	0.36	0.79	0.41	-0.05	-0.15	-0.35	0.78	-0.95	0.19	0.61	0.69
	(0.2716)	(0.0037)	(0.2115)	(0.8734)	(0.6500)	(0.2981)	(0.0045)	(<.0001)	(0.5739)	(0.0467)	(0.0186)
Gulf of Mexico Vermillion Snapper	-0.71	0.84	-0.20	0.82	0.74	0.67	0.08	0.50	0.77	0.89	0.88
	(0.0146)	(0.0013)	(0.5554)	(0.0021)	(0.0098)	(0.0233)	(0.8110)	(0.1173)	(0.0053)	(0.0002)	(0.0003)

[a] Numbers in parentheses denotes level of statistical significance

[b] NA denotes not applicable

Appendix B: Fishery Performance Indicator Data

Data for the performance indicators used in this report are reported in this Appendix. The tables include base data for each indicator. All revenue data are reported in constant 2010 dollars using the GDP implicit price deflator. The derived values for performance indicators are not included in the appendix since they may be readily replicated from the base data. The following provides general notes about the data as well as notes about specific tables and their use. In all tables missing cells mean that indicator data were not available for that program/year.

Reporting Years

- Data for Weathervane scallops and Gulf of Alaska Other Rockfish programs are reported for 2003-2012; 2002 data were not available.
- Data for the American Samoa Longline are reported for 2002-2011; 2012 data were not available.
- Data for the Limited Access DAS Atlantic Sea Scallop Fishery are reported for 2007-2012 due to a change in data collection system implemented to enable monitoring of the General Category Scallop IFQ program.

Pacific Coast Salmon

- Pacific coast salmon landings are reported in both numbers of fish and in total gutted weight (see columns 8 and 9, respectively in Table B 2). The former can be used in conjunction with reported numbers of fish in the quota table (see column 8 of Table B 1) to compute the derived indicator for quota utilization. The latter can be used in conjunction with the total species revenue table (see column 8 of Table B 8) to compute the derived indicator for average price.

Derived Indicators

- Average price can be calculated by dividing the data reported in Table B 8 by data reported in Table B 2.
- Fishery species revenue per vessel can be calculated by dividing the data reported in Table B 8 by data reported in Table B 4.
- Fishery species revenue per trip can be calculated by dividing the data reported in Table B 8 by data reported in Table B 5.
- Fishery species revenue per day absent can be calculated by dividing the data reported in Table B 8 by the data reported in Table B 6.
- Total revenue from fishery species and non-fishery species can be calculated as the sum of the data reported in Table B 8 and the data reported in Table B 9.
- Total revenue per vessel can be calculated as the sum of the data reported in Table B 8 and Table B 9 divided by the data reported in Table B 4.
- Total Revenue per trip can be calculated as the sum of the data reported in Table B 8 and Table B 9 divided by the data reported in Table B 5.
- Total revenue per day absent can be calculated as the sum of the data reported in Table B 8 and Table B 9 divided by the data reported in Table B 6.

Table B 1. Indicator Data for Quota

Year	Weathervane Scallops (lbs Meat Weight)	GOA Other Rockfish (MT)	West Coast Swordfish	West Coast Squid	West Coast Sardines (MT)	West Coast Albacore	West Coast Salmon Troll (Numbers)	Monkfish (lbs Whole Weight)	Limited Access Atlantic Sea Scallops (lbs Meat Weight)	HI Longline (lbs Whole Weight)	AMSAM Longline	HI Bottomfish (lbs Whole Weight)	Gulf of Mexico Vermillion Snapper (lbs Gutted Weight)
2002					118442		121000	43200000					
2003	640000	29680			110908		163600	61550000					
2004	670000	27058			122747		87374	52337704		330693			
2005	602000	27999			136179		75450	50338148		330693			
2006	540000	30713			118937		64800	25141516		330693			
2007	540000	17162			152564		62650	22266688	39472500	1102311		178000	
2008	533000	16669			89093		23500	22266688	39960990			241000	
2009	549000	16392			66932		75340	22266688	41310219	9398306		254050	
2010	527400	16820			72039		93825	22266688	43292174	9398306		254050	
2011	495900	16368			50526		49680	32582118	55014180	9398306		325000	
2012	417500	14628			109409		70603	32582118	58503960	9398306		325000	3081081

Table B 2. Indicator Data for Fishery Species Landings

Year	Weathervane Scallops (lbs Meat Weight)	GOA Other Rockfish (MT)	West Coast Swordfish	West Coast Squid	West Coast Sardines (MT)	West Coast Albacore	West Coast Salmon Troll (Numbers)	Monkfish (lbs Whole Weight)	Limited Access Atlantic Sea Scallops (lbs Meat Weight)	HI Longline (lbs Whole Weight)	AMSAM Longline	HI Bottomfish (lbs Whole Weight)	Gulf of Mexico Vermillion Snapper (lbs Gutted Weight)	Weathervane Scallops (lbs Meat Weight)
2002			1725	72880	96897	9999	120849	774,207	48467538		17248170	15644755	224996	1852365
2003	492000	19840	2135	45068	71923	16611	91500	902,069	58300922		17636817	11539319	231628	2217581
2004	425477	19723	1186	40116	89339	14524	83665	821,298	39629386		18352337	8985597	228263	1935273
2005	525357	19011	297	55755	86464	9028	58640	631,283	43217498		21257592	8770633	207975	1632589
2006	487473	21246	542	49186	86608	12773	52362	124,141	28846232		19961898	11947233	187017	1573884
2007	458313	9685	550	49475	127789	11500	51996	186,877	28000189	50954197	22683355	14155518	193183	2095405
2008	342434	9102	531	38101	87190	11134	16108	16,731	23394931	44663924	23872956	9547692	255929	2412045
2009	488059	9173	409	93107	67084	12270	55034	55,488	18582171	49187096	19829940	10597180	204753	3195418
2010	459759	9172	370	130864	66892	11824	70234	102,762	16506098	50147118	21692223	10769027	265070	1736741
2011	456058	7580	619	121557	46746	10935	36262	132,528	21223612	51974341	24212431	7417818	231421	2589908
2012	417551	7999	403	97644	100407	13873	59699	328,593	20015217	49875593	23915012		240044	2028784

Table B 3. Indicator Data for Number of Permits

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002			169	144	98	736	2926	726		164		384	1285
2003	9	1718	174	150	91	888	2862	743		164		348	1257
2004	9	1702	164	143	89	780	2852	771		164		358	1228
2005	9	1689	115	127	94	599	2803	767		164	60	373	1193
2006	9	1686	112	142	83	635	2693	781		164	60	332	1173
2007	9	1680	114	109	95	679	2557	782	369	164	60	351	1142
2008	9	1676	116	105	98	523	2556	771	356	164	60	476	1099
2009	9	1669	111	107	110	680	2501	763	354	164	60	459	999
2010	9	1617	104	120	103	651	2418	745	350	164	60	471	969
2011	9	1622	99	130	86	687	2343	720	354	164	60	479	952
2012	9	1640	87	136	99	854	2310	685	356	164		458	917

Table B 4. Indicator Data for Number of Active Vessels

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002			155	144	98	736	1251	666		102	60	551	441
2003	4	785	149	150	91	888	1160	683		110	52	360	423
2004	5	731	127	143	89	780	1422	638		126	40	392	457
2005	5	711	73	127	94	599	1336	642		125	36	401	469
2006	4	736	78	142	83	635	918	636		127	28	376	411
2007	4	735	87	109	95	679	1116	610	351	129	29	359	323
2008	4	735	92	105	98	523	224	588	349	129	28	490	348
2009	3	741	87	107	110	680	322	549	348	127	26	479	370
2010	3	734	73	120	103	651	701	496	351	124	26	489	321
2011	4	728	60	130	86	687	880	481	353	129	24	491	343
2012	4	729	41	136	99	854	1093	489	351	129		465	342

Table B 5. Indicator Data for Number of Trips on Which Fishery Species Were Landed

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002			858	3242	3849	2627	31007	17482		1169	1587	2995	4069
2003			821	3199	2793	3249	30355	17921		1227	924	2880	4294
2004			758	2661	3315	2967	36539	16641		1351	629	2755	4128
2005			694	2973	2882	1932	30079	19204		1552	452	2588	3560
2006			902	2225	2580	2336	14225	17077		1445	347	2387	3243
2007			814	2403	3603	2602	17178	17294	3772	1515	402	2345	2137
2008			775	2101	2605	1973	2032	15549	3035	1474	296	3273	2337
2009			765	4157	2052	2774	3210	14074	3106	1365	213	2798	2710
2010			601	4324	2109	2523	8702	12092	3087	1321	286	3434	2097
2011			445	4725	1235	2697	12785	14553	2912	1390	297	3107	2729
2012			370	4293	2236	3383	22727	9730	2868	1443		2988	2813

Table B 6. Indicator Data for Number of Days Absent on Trips on Which Fishery Species Were Landed

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002				3077	3553	4638		42201		22648	9199	3092	14019
2003				3001	2620	4281		44170		23082	8299	3048	14644
2004				2556	3043	6155		38520		25772	6768	2930	14405
2005				2815	2732	9823		40338		28929	6123	2705	13203
2006				2165	2487	9972		33917		28466	6853	2489	12399
2007				2282	3411	8948		35096	28250	32187	8164	2394	10752
2008				2045	2471	8817		32095	22082	32225	6952	3332	11740
2009				3965	1836	11736		29831	24371	31675	6699	2846	13606
2010				4146	1975	10767		26896	24902	31540	6364	3482	10179
2011				4555	1174	10907		28808	21870	31425	5865	3298	13510
2012				4176	2129	34242		18520	21971	32772		3189	14742

Table B 7. Indicator Data for Season Length in Calendar Days

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002			276	365	365	365	300	365		365	365	365	365
2003	206	109	276	365	365	365	300	365		365	365	365	365
2004	201	23	276	365	365	365	300	365		366	366	366	366
2005	219	28	276	365	365	365	300	365		365	365	365	365
2006	170	100	276	365	365	365	240	365		365	365	365	325
2007	204	169	276	365	365	365	270	365	366	365	365	198	325
2008	105	184	276	365	365	365	210	365	365	366	366	233	366
2009	173	184	276	365	365	365	180	365	365	365	365	231	365
2010	133	184	276	365	365	365	180	365	365	365	365	192	365
2011	176	184	276	365	365	365	240	365	366	365	365	366	365
2012		32	276	365	365	365	240	365	365	366		365	366

Table B 8. Indicator Data for Fishery Species Revenue in 2010 Dollars Using the GDP Implicit Price Deflator

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002			7619838	21728698	16525220	16931183	16569728	39740254		46274072	16059152	1377804	4374233
2003	3013560	2677999	9160490	29623096	10808462	28464382	23793918	41470557		47284887	12388200	1423741	5365444
2004	2657418	2885665	5491400	22485803	14139328	31091718	32930724	32597811		50470042	10192983	1455033	4598282
2005	4381600	2718434	2484135	34626860	13497713	22846692	24982750	44037876		61107358	9563551	1407181	4017988
2006	4090123	4153151	3215596	28783630	11619713	25334864	9709516	28205514		56892923	12201451	1241031	4309887
2007	2830812	4854815	3653756	30255276	14964318	22351657	12142600	27708684	349897443	64267106	14280923	1229095	5465242
2008	2214952	4828747	2517316	26992275	15803294	29483428	1227175	22026515	316514528	70832512	9428803	1475582	6439714
2009	3201048	3221208	1790291	57564582	13327375	27876259	1531903	17513544	320481982	54948376	10404894	1259501	7831730
2010	3838988	3547192	919500	71160383	12788620	29497572	7151722	19004298	397409508	66727433	10474317	1566279	4633867
2011	4647166	3474250	1213564	65285150	9717114	42187096	9043934	27129126	499883339	76063448	8322083	1435716	7296864
2012	4181649	4593651	1008988	61654806	20617583	43957024	18939409	19476681	463695633	86223888		1580814	5856234

Table B 9. Indicator Data for Non-Fishery Species Revenue Reported in 2010 dollars Using the GDP Implicit Price Deflator

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002			285607			37760	1022175	202845468				114620	14592523
2003			208342			26885	1558812	210848870				207691	14425101
2004			203745			33100	2598061	206675342				256744	14396656
2005			271639			189621	1425061	223814525				275109	13901966
2006			352009			5957	774048	174942255				271084	12854577
2007			466262			7698	675611	183396348	3485065			225978	11058080
2008			435875			16550	156724	181699430	2159199			374591	12290646
2009			310266			6145	159427	183759197	1584256			567559	10957102
2010			317276			35267	905360	193164918	1107272			486609	11054615
2011			221121			10706	823393	220340396	1262242			584797	15182227
2012			188920			60435	1620488	197806095	1647536			841225	18196175

Table B 10. Indicator Data for the Gini Coefficient

Year	Weathervane Scallops	GOA Other Rockfish	West Coast Swordfish	West Coast Squid	West Coast Sardines	West Coast Albacore	West Coast Salmon Troll	Monkfish	Limited Access Atlantic Sea Scallops	HI Longline	AMSAM Longline	HI Bottomfish	Gulf of Mexico Vermillion Snapper
2002			0.63	0.67	0.58	0.73	0.56	0.63		0.22	0.58	0.78	0.86
2003	0.50	0.80	0.64	0.67	0.63	0.71	0.60	0.61		0.27	0.50	0.79	0.82
2004	0.66	0.81	0.64	0.72	0.61	0.72	0.57	0.62		0.26	0.53	0.77	0.83
2005	0.56	0.82	0.62	0.66	0.65	0.73	0.54	0.60		0.21	0.47	0.77	0.84
2006	0.35	0.86	0.61	0.69	0.63	0.71	0.54	0.60		0.24	0.30	0.78	0.84
2007	0.33	0.88	0.61	0.66	0.63	0.74	0.56	0.57	0.22	0.22	0.22	0.69	0.81
2008	0.30	0.88	0.61	0.64	0.49	0.72	0.55	0.57	0.18	0.22	0.29	0.73	0.84
2009	0.33	0.83	0.66	0.55	0.58	0.71	0.64	0.59	0.19	0.23	0.27	0.72	0.83
2010	0.27	0.86	0.68	0.55	0.59	0.71	0.63	0.63	0.18	0.23	0.28	0.71	0.79
2011	0.21	0.86	0.73	0.58	0.54	0.72	0.60	0.59	0.18	0.23	0.29	0.76	0.77
2012		0.90	0.72	0.63	0.64	0.74	0.54	0.61	0.19	0.21		0.72	0.80