FINAL REPORT

PACIFIC COAST GROUNDFISH LIMITED ENTRY FIXED GEAR SABLEFISH PERMIT STACKING (CATCH SHARES) PROGRAM REVIEW

PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 101
PORTLAND, OR 97220
503-820-2280
WWW.PCOUNCIL.ORG

AND

NATIONAL MARINE FISHERIES SERVICE
7600 SAND POINT WAY NE, BIN C15700
SEATTLE, WA 98115-0070
206-526-6150

AUGUST 2014

DOCUMENT PREPARATION AND ACKNOWLEDGEMENTS

Preparation of this review of the limited entry fixed gear (LEFG) sablefish permit stacking program was performed by a work group composed of the following members:

Mr. Jim Seger and Dr. John Coon.....Pacific Fishery Management Council
Dr. Edward Waters.....Economics Consultant
Ms. Ariel Jacobs, Dr. Steve Freese,
and Mr. Kevin Ford.....National Marine Fisheries Service, West Coast Region

Additional assistance and consultation was provided by personnel of the National Marine Fisheries Service, Northwest Fisheries Science Center, especially Mr. John Bishop, Dr. Carl Lian, Ms. Alia Al-Humaidhi, and Ms. Lisa Pfeiffer.

REVIEW PROCESS

The Council formally approved initiation of this review at a September 2013 Council meeting in Boise, Idaho and followed through with a scoping session on November 3, 2013 at a Council meeting in Costa Mesa, California. A preliminary draft and outline of the report, developed by the sablefish work group, was presented at the April 2014 Council meeting and was followed by a second pre-briefing book draft for public review released via the Council website on May 13, 2014. The Council held its final consideration and approved the review, as contained in the June briefing book draft document, on June 24, 2014 in Garden Grove, California. The final Council recommendations are contained in Section 6.0 of this review document.

A report of the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number FNA10NMF4410014. This document may be cited as: Pacific Fishery Management Council. 2014. *Pacific Coast Groundfish Limited Entry Fixed Gear Sablefish Permit Stacking (Catch Shares) Program Review*. Pacific Fishery Management Council, 7700 NE Ambassador Place, Suite 101, Portland, Oregon 97220-1384.

TABLE OF CONTENTS

LIST OF TABLES iii

LIST OF FIGURES iii

LIST OF ACRONYMS AND ABBREVIATIONS vi

1.0 INTRODUCTION 1
- 1.1 Purpose and Need for a Program Review 1
- 1.2 Concurrent Considerations of the Sablefish Program 2

2.0 BACKGROUND 2
- 2.1 Pre-Permit Stacking Management History 2
- 2.2 Permit Stacking Program Goals and Objectives 6
- 2.3 Description of the Current Permit Stacking Program 6
- 2.4 Relevant Groundfish Policy and Regulatory Changes since Program Implementation 9

3.0 PROGRAM PERFORMANCE AND REVIEW 10
- 3.1 Rationalize the Fleet and Promote Efficiency 11
  - 3.1.1 Background 11
  - 3.1.2 Assessment 12
- 3.2 Maintain or Direct Benefits toward Fishing Communities 27
  - 3.2.1 Background 27
  - 3.2.2 Assessment 28
- 3.3 Prevent Excessive Concentration of Harvest Privileges 36
  - 3.3.1 Background 36
  - 3.3.2 Assessment 36
- 3.4 Mitigate the Reallocational Effects of Policies just prior to this Program (e.g., the Three Tier System and Equal Limits) 37
  - 3.4.1 Background 37
  - 3.4.2 Assessment 37
- 3.5 Promote Equity 38
  - 3.5.1 Background 38
  - 3.5.2 Assessment 38
- 3.6 Resolve or Prevent New Allocation Issues from Arising 38
  - 3.6.1 Background 38
  - 3.6.1 Assessment 40
- 3.7 Promote Safety 40
  - 3.7.1 Background 40
  - 3.7.2 Assessment 41
- 3.8 Improve Product Quality and Value 43

3.8.1 Background 43
3.8.2 Assessment 43
3.9 Avoid Creating Substantial New Disruptive Effects 45
3.9.1 Background 45
3.9.2 Assessment 45
3.10 Create a Program that Will Readily Transition to a Multi-month IQ Program 46
3.10.1 Background 46
3.10.2 Assessment 46
3.11 Management Costs and Cost Recovery 46
4.0 RESEARCH NEEDS 47
5.0 CONCLUSIONS 47
6.0 COUNCIL RECOMMENDATIONS 49
7.0 REFERENCES 49

LIST OF TABLES

Table 2-1. Implementation of Amendment 14. 7
Table 2-2. Key objectives of the permit stacking program and consistency with management objectives. 8
Table 3-1. Season length and management summary for the primary LEFG sablefish season north of 36° N. latitude, 1992 through the present. 13
Table 3-2. Comparison of the number of vessels and allocations for various combinations of stacked permits in 2002, 2004, 2008, and 2012. (Note that this snapshot in time may not capture changes in permit combinations during the season.) 19
Table 3-3. Comparison of sablefish landings by vessels under various allocations and combinations of stacked permits in 2002, 2004, 2008, and 2012, and share of sablefish trawl IFQ landed by these vessels in 2011-2013. 20
Table 3-4. Number of other permits with which a permit is stacked, by tier (includes post-July 1st registrations).[a/] 21
Table 3-5. Distribution of permit length endorsements for LEFG sablefish permits in 2012. 24
Table 3-6. Comparison of vessel and permit counts by size category. 26
Table 3-7. Recent listings of West Coast longline sablefish-endorsed permits offered for sale on Dock Street Brokers (info@dockstreetbrokers.com). 27
Table 3-8. Summary of landings in selected years by vessels participating in the primary sablefish fishery and operating under permits that were exempt from the owner-on-board requirements. 33
Table 3-9. Comparison of tier quotas to landings in the LEFG primary sablefish fishery, 2008-2013. 39
Table 5-1. Preliminary conclusions of the work group on the success of the Council's LEFG sablefish permit stacking program. 48

LIST OF FIGURES

Figure 3-1. Average duration in days from first to last day of landings for vessels participating in the primary sablefish fishery (1998-2013). 14
Figure 3-2. Number of vessels participating in the LEFG primary sablefish fishery from 1998 to 2013. Vessel counts for years prior to 1998 are estimated based on vessels in the LE fishery that landed at least 1 mt of sablefish north of Santa Barbara County within the appropriate season periods. 15
Figure 3-3. LEFG Sablefish fishery allocations by total, primary, and DTL fisheries, 1996-2013. Prior to 2002 there were no explicit allocations to the primary and DTL fisheries. 15
Figure 3-4. LEFG sablefish allocations and landings, 1996 through 2013. Years prior to 2002 include the mop-up and DTL fisheries, while years from 2002 to 2013 are for the primary season only. 16

Figure 3-5. Pre- and post-program LEFG sablefish allocations and landings as a percent of the allocations, 1996 through 2013. 16
Figure 3-6. Cumulative share of landings by the number of vessels participating in the LEFG primary sablefish fishery during selected years from 1996-2012. 22
Figure 3-7. Concentration of landings by the cumulative share of vessels participating in the LEFG primary sablefish fishery for selected years from 1996-2012. 23
Figure 3-8. Gini coefficients for the concentration of landings by vessels in the LEFG primary sablefish fishery for years before and after full implementation of the permit stacking program in 2002. 24
Figure 3-9. Number of LEFG sablefish vessels in 2012 with unstacked and stacked permits by vessel length class. 25
Figure 3-10. Number of LEFG sablefish permits in 2012 by permit length endorsement class and status (unstacked, stacked base, and stacked-non-base). See Note for Figure 3-9. 25
Figure 3-11. Involvement (percent of West Coast ex-vessel revenue) in the LEFG sablefish fishery by port group (data for even years 1996-2012). 29
Figure 3-12. Involvement (percent of West Coast ex-vessel revenue) in the LEFG sablefish fishery by port group in terms of three-year averages for periods before and after implementation of the tier program (data for even years 1996-2012). 30
Figure 3-13. Dependence (percent of port total ex-vessel revenue) on LEFG sablefish landings for port groups from Brookings, Oregon to Morro Bay, California (data for even years 1996-2012). 31
Figure 3-14. Dependence (percent or port total ex-vessel revenue) on LEFG sablefish landings for port groups from the North Washington Coast to Coos Bay, Oregon (data for even years 1996-2012). 32
Figure 3-15. West Coast port dependence on the LEFG sablefish fishery in terms of employment (estimated number of jobs using 2014 data) in comparison to employment by the total non-tribal groundfish fishery (2014 data) and the total port-area labor force (2012 data). 34
Figure 3-16. West Coast port dependence on the LEFG sablefish fishery in terms of income (estimated wages and salaries for 2014) in comparison to income for the total non-tribal groundfish fishery (2014) and the total port area income from all sources (2012 data) 35
Figure 3-17. Gini coefficients for the concentration of landings in the LEFG primary sablefish fishery by permit and vessel owning entities for selected years before and after implementation of the permit stacking program in 2002. 36
Figure 3-18. Total overage for all vessels with overages as a percent of pounds allocated by tier limit category for 2008-2013. Data for 2013 is incomplete. 40
Figure 3-19. Number of USCG-reported incidents in the LEFG primary sablefish fishery (from Pfeiffer and Gratz, 2014). 42
Figure 3-20. Proportion of trip starts on high wind days and fair weather days (from Pfeiffer and Gratz, 2014) 42

Figure 3-21. Average annual ex-vessel sablefish prices by gear type in inflation-adjusted 2013 dollars per pound (1994-2012)..... 44
Figure 3-22. Average annual ex-vessel prices received for sablefish caught by longline and pot gear expressed as a percent of prices received for trawl-caught sablefish: 1994-2012 (inflation-adjusted 2013 dollars per pound)..... 44

LIST OF ACRONYMS AND ABBREVIATIONS

ACL	Annual catch limit
AKFIN	Alaska Fisheries Information Network. Provides commercial fishery data for Alaska fisheries.
Council	Pacific Fishery Management Council
DTL	Daily trip limit
FMP	Fishery management plan
IFQ	Individual fishing quota
IQ	Individual quota
LAPP	Limited access privilege program
LE	Limited entry
LEFG	Limited entry fixed gear
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS	National Standard
OOB	Owner-on-board
PacFIN	Pacific Coast Fisheries Information Network. Provides commercial fishery data for Washington, Oregon, and California (maintained by the Pacific States Marine Fisheries Commission)
RCA	Rockfish Conservation Area
SSC	Scientific and Statistical Committee
USCG	United States Coast Guard
VMS	Vessel monitoring system

1.0 INTRODUCTION

This review document concerns implementation of Amendment 14 to the Pacific Coast Groundfish Fishery Management Plan (FMP). Amendment 14 (PFMC, 2001) was approved by the Pacific Fishery Management Council (Council) at its November 2000 meeting and partially implemented by National Marine Fisheries Service (NMFS) on August 2, 2001(Federal Register, 2001), in time to provide for a limited entry fixed gear (LEFG) sablefish season (longline and pot gear) from August 15 through October 31, 2001. The amendment, which covers the LEFG sablefish fishery north of 36° N. latitude, was fully implemented for the 2002 fishery. This amendment created a permit stacking program for permits with sablefish endorsements (i.e., the sablefish permit stacking program or simply the sablefish program). The program was expected to lengthen the duration of the LEFG primary sablefish fishery, increase safety and flexibility for fishery participants, and reduce capacity in the LEFG fleet.

1.1 Purpose and Need for a Program Review

The purpose of this document is to provide an overall review of the sablefish program to determine how well it has met the Council's stated objectives, and to help identify any potential modifications or improvements to the program which would then be considered through the Council's standard notice and review process. The goals and objectives of the program are based on, and are consistent with, the goals and objectives of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), which is the ultimate authority for regional council fishery management.

While the sablefish program seems to have been generally successful at achieving its main objectives, a few limited requests for program modifications have emerged in the more than 12 years that have elapsed since its implementation (see Section 1.2). During that time there have been several changes in the fishery and groundfish management. In consideration of the changes and time elapsed, the Council and NMFS have agreed upon the need to review the program with a more in-depth look to determine how well it has met its original objectives and how well it continues to serve Pacific Coast groundfish management and its stakeholders. In addition, the sablefish permit stacking program is of a type of fishery management program that was categorized in the 2006 reauthorization of the MSA as a limited access privilege program (LAPP). After 2006, any programs initiated as LAPPs had to meet certain requirements listed in Section 303A(c) of the MSA, including the need to be reviewed on a periodic basis. While it was initiated as a LAPP prior to the MSA requirements for new LAPPs, a periodic review of any program to determine how well it is working and achieving its original objectives is a prudent management process and is consistent with the requirements in §303A of the MSA.

1.2 Concurrent Considerations of the Sablefish Program

Concurrent with his review, the Council has been considering two potential modifications to the regulations implementing the sablefish program: 1) liberalizing the own-and-hold threshold to address limitations encountered by vessel owners who fish their vessels in both the West Coast and Alaska sablefish fisheries, and 2) requiring the use of electronic reporting (electronic fish tickets) to aid in the tracking of landings. At its June 2014 meeting, the Council adopted final recommendations on these issues. The Council recommended NMFS liberalize the own-and-hold restriction by providing for a limited exemption, initially only to eligible vessel owners who fish their vessels in both the West Coast sablefish permit stacking program and the Alaska sablefish IFQ program, but with the possibility for expansion at a later date. The Council also adopted a recommendation for requiring electronic fish tickets for all limited entry and open access landings that include sablefish. The limited entry permit numbers must be included on the electronic fish tickets. Details of the Council's consideration and recommendations can be found on the Council website in the briefing book archives under Agenda Item F.6 of the June meeting.

Additionally, in trailing actions for the trawl individual fishing quotas (IFQ) program (trawl rationalization), the Council previously approved a regulatory change to allow fixed gear and trawl permits to be jointly registered to the same vessel at the same time. NMFS is in the process of considering the Council's recommendation on joint registration and may incorporate that proposed action into the same regulatory package with the own-and-hold threshold and electronic reporting issues.

2.0 BACKGROUND

2.1 Pre-Permit Stacking Management History

Sablefish (*Anoplopoma fimbria*), also known as "black cod," is one of the most valuable species in the groundfish fishery off Washington, Oregon, and California. Because of its high ex-vessel value per pound, sablefish is a desirable target species for many West Coast fisheries and gear groups. Management of sablefish was, and continues to be, divided at 36° N. latitude (approximately 20 miles south of Point Sur, California) with separate annual catch limits (ACLs) for the northern and southern fisheries divided by this line. The ACLs in the north are substantially higher than those in the south (the northern ACL was three times that set for the southern area). The Council made several sablefish allocation decisions over the 15 years prior to implementation of Amendment 14 in an attempt to divide this desirable resource among different sectors of the fishery in an equitable and beneficial way.

Intersector Allocation and Seasonal Management. In 1987, an allocation of northern area sablefish was established that provided 52 percent to the trawl fishery and 48 percent to the non-trawl gear groups. This allocation was later adjusted to 58 percent and 42 percent for trawl and

non-trawl, respectively. Industry representatives for participants in the non-trawl sablefish fisheries expressed their desire that the fishery be managed on a seasonal basis (as opposed to the year-round policy the Council pursued for most sectors of the groundfish fishery). The pursuit of seasonal management for the non-trawl segment of the sablefish fishery was a key decision that, when combined with a decline in sablefish abundance and increasing effort, ultimately impacted safety, efficiency, and allocation issues that the permit stacking program was meant to address.

License Limitation. The vast majority of the trawl and non-trawl sablefish harvest (as well as that of other groundfish species) was placed under a license limitation program through Amendment 6 to the groundfish FMP, recommended by the Council in 1991 (PFMC, 1992) and implemented in 1994. Of the non-tribal commercial optimum yield of sablefish, 90.6 percent was allocated to the limited entry (LE) fishery and 9.4 percent was allocated to the open access fishery. The LE sablefish allocation was then allocated 58 percent to the LE trawl sector and 42 percent to the LE non-trawl (fixed gear) sector. The license limitation system provided the underlying structure for the LEFG sablefish catch share program that was finally implemented in 2001 under Amendment 14. Under Amendment 6, the owners of vessels which met a July 11, 1984 through August 1, 1988 (qualifying period) minimum landing requirement were given LE permits endorsed for the gear that was used to meet the requirement and endorsed for the size of the vessel. Permits were provided for trawl, longline, and fishpot vessels which were allowed to qualify for more than one gear endorsement (but only one permit was issued for each vessel). Minimum landing requirements were set with the intent of establishing LE fleets that were the size of the active fleet in 1987. The requirement for a longline permit was 6 days of landings over 500 pounds or 37.5 metric tons of total landings in the qualifying period. The requirement for a fishpot permit was 5 days of landings over 500 pounds or 150 mt of total landings in the qualifying period. The 1987 "active fleet" objective was met for the longline and fishpot vessels. Vessels using all gear types other than trawl, longline, and fishpot were left in the open access groundfish fishery, and a small open access opportunity was also provided for fishpot and longline vessels that did not qualify for permits. The opportunity for use of longline and fishpot gear in the open access fishery was provided because landings less than 500 pounds were not counted toward the landing requirement.[1]

Deliberations on a Fixed Gear Sablefish IFQ Program. After the Council finished its 1991 deliberation on Amendment 6, recognizing that a license limitation program would only slow the growth in capacity, the Council moved immediately to consideration of an IFQ program for the fixed gear sablefish fishery. Work on this program continued from 1991 through 1994. In the fall of 1994, the Council set its deliberations aside in response to a request from the West Coast

[1] A similar opportunity was not provided for trawl vessels because the 500 pound minimum had no effect on the number of vessels qualifying.

Congressional delegation to defer action until the MSA reauthorization was completed. In its 1996 re-authorization of the MSA, Congress included a moratorium on implementing new, individual quota (IQ) programs through October 1, 2000, bringing deliberations on a sablefish IFQ Program to a complete halt.

Subdivision and Management of the Fixed Gear Allocation and Derby Management. Until implementation of IFQs as part of the trawl rationalization program in 2011, the coastwide trawl fishery took sablefish as part of its year-round cumulative trip limit fisheries. During this same time, the northern area fixed gear fleet landed 85 percent of its allocation in a directed sablefish season, and 15 percent of its allocation in daily trip limit (DTL) sablefish fisheries. In the north, DTL regulations were in place before and after the directed sablefish season. The southern fixed gear fleet landed all of its allowed harvest in a DTL fishery. The directed season north of 36º N. latitude had become increasingly tense over the years as vessel capacity and competition for landings increased and amounts of fish available for harvest decreased. Through 1996, the directed (or "primary") season was managed as an open competition derby in which vessels raced with each other to catch fish before the quota was gone and the fishery closed. Derby duration shortened each year, until the fishery was just five days long in 1996.

The Sablefish Endorsement and Equal Cumulative Limits. Concern for the safety of participants in the sablefish derby led the Council to develop Amendment 9 to the FMP (PFMC, 1996). NMFS implemented Amendment 9, the sablefish endorsement program, in 1997. Under this program, the LE permit holders were eligible for sablefish endorsements based on their permit history. A fixed gear sablefish endorsement was added to permits that had a history of landing more than 16,000 pounds of sablefish in any one year from 1984 to 1994. Permits without sufficient sablefish landings history were not endorsed for future participation in the primary season, but could still be used in the DTL fisheries. When this endorsement was adopted, it was recognized that it was only the first in a series of stop gap measures to control increasing capacity and deteriorating seasons in the fishery.

Even with the sablefish endorsement to prevent LE vessels from shifting into the sablefish fishery, the fishing season was expected to remain short. In order to lengthen the season, equal limits on the harvest of all qualified participants (sablefish endorsement holders) were imposed in 1997. However, the season still had to be limited to keep the fishery from being classified as an IQ program, prohibited under the MSA moratorium on such programs. A fishery with a limited class of participants, each with an amount of fish they are allowed to harvest, is an IQ. The moratorium was interpreted to cover any program that would allow a vessel ample time and opportunity to catch a limit allocated specifically to that vessel. The moratorium forced the Council to manage the primary season for a short duration that prevented many participants from fully taking their vessel-specific limits (a "modified derby"). To further assure that the cumulative limits would not be categorized as an IQ program, regulations were established to set a maximum season length of 10 days. After the modified derby, any of the primary fishery allocation remaining was taken in a two-week mop-up fishery in which each vessel had the same

cumulative limit. Equal cumulative limits for the primary fishery were viewed by the Council as being extraordinarily reallocative in nature, but for 1997, equal limits were the only option available to lengthen the season and to begin to address safety issues.

Three Tiers of Cumulative Limits. The inequitable allocation system created by the equal cumulative limits was partially resolved with a "three-tier" system, which was established by regulatory amendment for 1998 and beyond. Under this "three-tier" system, the primary fishery continued to be managed by providing each vessel with a single cumulative limit; however, sablefish endorsement holders were ranked into three different tiers based on their permit histories, with the lowest tier (Tier 3) having the lowest qualification requirements and receiving the lowest cumulative limits. This system is described in greater detail in Section 2.3. Annual management of the three-tier cumulative limit system required that the allocation for this fishery be divided such that there were three different cumulative limits for the different tiers. While somewhat more equitable than the cumulative limit program, the three-tier system still required some fishermen to make large cutbacks in their harvest levels while allowing others to expand. The system provided little flexibility to operators to determine the manner in which their sablefish catch was harvested or to scale their harvest upward to match their pre-existing levels of capital investment. This lack of flexibility undoubtedly reduced efficiency, resulting in a lower net value for harvest.

Continuation of Short Seasons. Even under the three-tier system, the fishery still had to be managed as a modified derby, and the seasons were still too short (between 6-9 days) to allow fishermen to operate with care and safety. Short derby seasons are believed to result in accidents due to fatigue and financial pressure to fish and transit under unsafe conditions.

Fixed Gear Sablefish Catch Shares. The MSA moratorium on new IQ programs expired on October 1, 2000. On December 21, 2000, Public Law 106-553, an appropriations bill for the National Oceanic and Atmospheric Administration (NOAA), contained a continuation of the IQ moratorium through October 1, 2002 and an exception to that moratorium for the West Coast fixed gear sablefish fishery. On August 2, 2001, Amendment 14 implemented a permit stacking program, in which up to three sablefish-endorsed permits could be registered for use with a single vessel and that vessel could then have access to the primary season sablefish cumulative limits associated with each of those permits. Most importantly, the exception to the IQ moratorium for the fixed gear sablefish fishery allowed longer seasons (April through October, as implemented through Amendment 14) so that each vessel could fish against its limits at its own speed.

Phased Implementation of Catch Shares. Portions of Amendment 14 were implemented for the 2001 primary sablefish season. The extended sablefish season (April 1 through October 31) was fully implemented in 2002. In 2006, NMFS implemented additional regulations for Amendment 14. In the future, NMFS will consider implementing a permit stacking program fee

system as required by the MSA (see Section 3.11). Table 2-1 recounts the implementation history.

2.2 Permit Stacking Program Goals and Objectives

The legal basis for Amendment 14 is the Groundfish FMP approved by the Secretary of Commerce under the authority provided by the MSA.

Permit stacking and its accompanying regulatory provisions were expected to help the Council address objectives related to National Standards 4 (fair and equitable allocation), 5 (consider efficiency), 6 (take into account variations and contingencies), 8 (take communities into account), 9 (minimize bycatch and bycatch mortality), and 10 (promote safety). Specifically, it was expected to affect achievement of Groundfish FMP Goals 2 (maximize the value of the resource as a whole) and 3 (achieve maximum biological yield) through impacts related to Objectives 6 (achieve greatest net benefit), 9 (reduce wastage), 11 (minimize bycatch), 12 (equitable sharing of the conservation burden), 13 (minimize gear conflicts), and 14 (accomplish changes with minimum disruption).

Key objectives of Amendment 14 and the permit stacking program were further defined as provided in Table 2-2.

The stacking program was intended to modify the economic and social impacts of the fishery management system in order to attain a more favorable result with respect to the entire suite of standards, goals, and objectives for management of the groundfish fishery.

2.3 Description of the Current Permit Stacking Program

The sablefish fishery primary season managed under the permit stacking program occurs north of 36º N. latitude. Vessels in this fishery registered to at least one LE permit with a gear endorsement for either longline or trap (or pot) gear and an endorsement for sablefish, fish a specified tier limit. Such vessels are eligible to fish in the DTL fishery before the primary season (i.e., January through March) and after their aggregate tier limit on the vessels have been harvested, or the season has ended, whichever comes first. This transition between fisheries often occurs during the sablefish primary season. Under the permit stacking program, each fixed gear sablefish endorsed LE permit is assigned to one of three tiers. The permit's tier level determines the poundage of sablefish which can be landed by that permit each season while participating in the primary sablefish fishery. Sablefish endorsements and their tiers may not be transferred separately from the LE permits. For sablefish endorsed, LE permits, the Regional Administrator biennially or annually announces the size of the cumulative trip limit for each of the three tiers associated with the sablefish endorsement such that the ratio of limits between the tiers is approximately 1:1.75:3.85 for Tier 3, Tier 2, and Tier 1, respectively. Up to three permits can be stacked onto a single vessel, allowing that vessel to land up to the sum of the three tier limits in aggregate.

Table 2-1. Implementation of Amendment 14.

Date	Action	Reference
08/02/2001	NMFS final rule implementing initial permit stacking provisions as follows: 1) up to 3 sablefish-endorsed permits per vessel; 2) limited entry, primary sablefish season of August 15 - October 31; 3) a vessel may fish for sablefish in the primary season with any of the gears specified on at least one of the limited entry sablefish-endorsed permits registered for use with that vessel; 4) no person may own or hold more than 3 sablefish-endorsed limited entry permits unless that person owned more than 3 permits as of November 1, 2000; 5) no partnership or corporation may own a sablefish-endorsed limited entry permit unless that partnership or corporation owned a permit as of November 1, 2000; 6) cumulative limits for species other than sablefish and for the sablefish daily trip limit (DTL) fishery remain per vessel limits and are not affected by permit stacking; and 7) the limited entry DTL fishery for sablefish is open during the primary season for vessels not participating in the primary season.	66 FR 41152, August 7, 2001
03/01/2002	As part of the final rule implementing the 2002 groundfish regulations, the primary limited entry sablefish season was extended to April 1 – October 31.	67 FR 10490, March 7, 2002
04/03/2006	Final rule including additional permit stacking regulations as follows: 1) permit owners and permit holders required to document their permit ownership interests to ensure that no person holds or has ownership interest in more than 3 permits; 2) owner-on-board requirement for permit owners who did not own sablefish-endorsed permits as of November 1, 2000; 3) an opportunity for permit owners to add a spouse as co-owner; 4) vessels not meeting minimum frozen sablefish historic landing requirements are not allowed to process sablefish at sea; 5) permit transferors required to certify sablefish landings during mid-season transfers; and 6) a definition of the term “base permit.”	71 FR 10614, March 2, 2006

Table 2-2. Key objectives of the permit stacking program and consistency with management objectives.

Key Objective	Consistency with Management Objectives of the FMP and MSA
1. Rationalize the fleet and promote efficiency	Capacity reduction is one of the key elements of the Council's strategic plan. The strategic plan generally approaches capacity reduction by reducing the number of fishing vessels. This reduction does not of itself imply the rationalization of the fleet or increased efficiency. It is possible that the most efficient fixed gear sablefish harvest could involve a greater number of vessels taking sablefish as bycatch in other fisheries. However, given the high degree of overcapitalization in the fishery, it is believed that a reduction in capacity will generally move the fishery toward greater efficiency, addressing National Standard (NS) 5 and FMP Objective 6 on net national benefits.
2. Maintain or direct benefits toward fishing communities	This objective relates to NS 8 on fishing communities and FMP Objective 16 on fishing communities.
3. Prevent excessive concentration of harvest privileges	This objective relates to NS 4 on allocation, NS 8 on fishing communities, and FMP Objective 15 on avoiding adverse impacts to small entities.
4. Mitigate the reallocational effects of recent policies (3-tier system and equal limits)	This objective relates to NS 4 on allocation and FMP Objectives 12 on equitable allocation and 14 on minimizing disruption.
5. Promote equity	This objective relates to NS 4 on allocation and FMP Objective 12 on equitable sharing.
6. Resolve or prevent new allocation issues from arising	This objective relates to NS 4 on allocation and FMP Objectives 12 on equitable sharing and 14 on minimizing disruption.
7. Promote safety	This objective relates to NS 10 and FMP Objective 17 on safety.
8. Improve product quality and value	This objective relates to NS 5 on efficiency and FMP Objective 6 on net national benefits.
9. Take action without creating substantial new disruptive effects.	This objective relates to FMP Objective 14 on minimizing disruption.
10. Create a program that will readily transition to a multi-month IQ program.	This objective relates to capacity reduction recommendations in the strategic plan. Where individual quotas are transferable and divisible, they address NS 6 by providing the fleet with substantial flexibility to respond to changing conditions in the fishery and NS 5 by taking efficiency into account. FMP Objective 6 is also addressed.

The program also includes other provisions, including a prohibition on the ownership of permits by corporations or other business entities, a permit owner-on-board requirement, a limit on the number of permits any individual or entity (individually and collectively) can own or hold, and a

prohibition on at-sea processing. A grandfather clause was provided for each of these provisions, allowing the continuation of situations in place prior to Council action. For non-grandfathered permits, the owner of the permit must be on-board the vessel during the primary season when that permit's tier amount is being fished. If landings from a trip will be attributed to multiple permits, then the owners of those permits being fished must be onboard during fishing operations. However, there are medical and death exemptions from this requirement.

Currently there are 164 sablefish endorsed permits of which 131 are endorsed for longline only; 27 are fishpot endorsed only, and six have two gear endorsements (i.e., four are endorsed for both longline and fishpot gear, one is endorsed for both fishpot and trawl gear, and one is endorsed for both longline and trawl gear). The number of permits by tier level is as follows: Tier 1 – 28 permits; Tier 2 – 42 permits, and Tier 3 – 94 permits. As of August 2013, approximately 40 vessels have stacked permits.

2.4 Relevant Groundfish Policy and Regulatory Changes since Program Implementation

Since the implementation of the fixed gear sablefish permit stacking program, numerous regulatory changes have taken place within the Pacific Coast groundfish fishery. Chief among these changes was implementation of groundfish conservation areas (i.e., ecologically important habitat closed areas and rockfish conservation areas) and the rationalization of the trawl fishery. Vessel movement between the LEFG sablefish fishery and the rationalized trawl fishery make the development of the rationalized trawl fishery especially important in reviewing the sablefish program.

Fishery Disaster and Rockfish Conservation Areas. Just as the Council policies for the LEFG catch share program were being finalized in 2000, a number of stocks were being identified as overfished, primarily rockfishes, and severe harvest reductions were imposed on the groundfish fishery. The first stock assessments identifying the overfished status of some rockfish species were published in 1999. In 2000, the West Coast groundfish fishery was declared a disaster and new management measures were sought to reduce impacts. In the fall of 2002, vast swaths of the continental shelf were closed in order to reduce bycatch of overfished darkblotched rockfish. In 2003, Rockfish Conservation Area (RCA) closures were imposed for both fixed gear and trawl vessels to protect a number of overfished rockfish species.

Vessel Monitoring System. The need to enforce the RCAs led to a requirement that, starting in 2003, all LE vessels carry equipment and subscribe to services to allow satellite tracking of vessels, a vessel monitoring system (VMS).

Trawl Rationalization. Deliberations over rationalization of the trawl fishery began in 2003 and the program was implemented for the 2011 fishery. Trawl rationalization involved two closely related and interlinked decisions. The first was the specification of the management

system used to rationalize the trawl fishery—Amendment 20 to the groundfish FMP (PFMC and NMFS, 2010). Amendment 20 involved the consideration of harvest control tools such as IFQs and harvester co-ops. The second decision involved determining the proportion of the available catch that would be allocated to the trawl versus the non-trawl fishery. This decision was addressed as Amendment 21 to the Groundfish FMP (PFMC, 2010).

The trawl rationalization program allows gear switching (the use of nontrawl gear to catch fish under the trawl IFQ program). Gear switching not only allows trawl vessels to use fixed gear to catch sablefish, it also allows fixed gear vessels to acquire a trawl permit and trawl IFQ to increase their harvest of sablefish while using fixed gear. Whether by trawl or fixed gear vessels, the result has been an increase in the harvest of sablefish with fixed gear, increasing competition and potential conflict on the fixed gear sablefish fishing grounds.

3.0 PROGRAM PERFORMANCE AND REVIEW

This review of the LEFG sablefish LAPP will concentrate on assessing achievement of the 10 key objectives of the sablefish program (Sections 3.1 through 3.10) as provided in Groundfish Amendment 14 and summarized in Table 2-2 of this document. These objectives are all socio-economic objectives. While the biological impacts of the sablefish permit stacking program have not been quantified, they are believed to be insignificant. The impacts, if any, would result from a potential increase in unreported discards of smaller sablefish and changes in retention of other groundfish species. An increase in discard of small-sized sablefish (high-grading) might be expected because the permit tier limits are landing limits rather than catch limits, which would limit both catch and discards. The degree of high-grading will be a function of the price differential between large and small fish, catch composition by size class, and fishing costs. The degree of high-grading cannot be assessed based on fish tickets as there is no reliable data on size composition of landings because different buyers use different size categories. The ending of the derby fishery constraint may have allowed vessels to increase their retention of other groundfish or may have had no effect. Under current management, the conservation of sablefish and other groundfish is protected by ACLs which are independent of the permit stacking program.

This is the first official review of the impacts and outcome of this program by the Council. In 2013, NOAA published a technical memorandum on the performance of U.S. catch share programs (Brinson, Ayeisha A. and Thunberg, Eric A., 2013) which included a review of the Pacific Coast sablefish fishery. The authors of that report found evidence for capacity reduction in the fishery as well as better achievement of the catch quota. Total revenue (adjusted for inflation) also increased, however, they were not able to determine what part of the change might be due to the program versus other market forces.

This review will utilize primarily available Pacific Fishery Information Network (PacFIN) landings data, Alaska Fishery Information Network (AKFIN) vessel participation indicators ("yes/no" flags), and U.S. Coast Guard records on safety incidents to look at how the program has met its objectives.

The assessment of each objective of the program, as identified above, follows in sections 3.1 through 3.10 below.

3.1 Rationalize the Fleet and Promote Efficiency

3.1.1 Background

Rationalizing the fleet and promoting efficiency, primarily through reducing the number of participating vessels (capacity reduction) and lengthening the season, was a key objective of Amendment 14. In considering how to reduce the fleet, the Council also had to balance that reduction with its other objective of preventing excessive concentration of harvest privileges (see also Section 3.3). At the time Amendment 14 was adopted, the Council had just completed the Groundfish Strategic Plan (PFMC, 2000) for which capacity reduction is one of the goals. In support of the Council's Strategic Plan development process, the Scientific and Statistical Committee (SSC) assessed the capital utilization rates in year 2000 groundfish fisheries. The SSC characterized the capital utilization rate for a fishery as "the percentage of boats in the [year 2000] fleet needed to harvest the groundfish available in 2000." For the LEFG sablefish fishery, the SSC calculated that just 9 percent of the vessels in that fleet in 2000 were capable of harvesting that fleet's sablefish allocation for that year. While the Council was not interested in reducing the number of vessels participating in the LEFG sablefish fleet to 9 percent of the year 2000 levels, capacity reduction was a significant objective for Amendment 14 and the permit stacking program.

Amendment 14 was designed to allow the fleet to achieve some balance between too little and too much capacity reduction, without specific criteria for what constituted "too little" or "too much." Too little capacity reduction could mean that commercial fishermen intending to make a career of fishing would have to rely on sablefish landings providing a smaller proportion of their incomes and require more reliance on other fisheries. Too much capacity reduction could mean that the fleet could be reduced and concentrated to such a small number of vessels that harvest benefits from the fishery would be channeled to relatively few individuals, coastal communities, and processors.

Amendment 14 was explicitly *not* designed to reduce the fleet numbers to as few vessels as possible. The Council's judgment on whether the fleet's capacity has been reduced by too much or by too little, and whether excessive concentration of harvest privileges has occurred, will be necessarily qualitative, since the Council did not set an explicit capacity reduction goal with Amendment 14.

Information and data for considering whether the fleet has been rationalized and made more efficient include assessing the following changes:

- season length and average fishing days by year;
- number of participating vessels, attainment of allocations, and the concentration of harvest, including combinations of stacked permits, landings, and revenue by vessels in the fishery, both before and after program implementation;
- vessel capacities; and
- permit prices for available years.

While we do not have an assessment of pre-program net revenues per vessel to compare with similar post-program data, there is information available on the LEFG sablefish fishery for 2010 which has been compiled by Dr. Carl Lian of the Northwest Fisheries Science Center. Dr. Lian's paper, which is attached at the end of our review, provides estimates of total cost net revenue earned by commercial catcher vessels in the West Coast LEFG groundfish fishery, West Coast LEFG sablefish fishery, and the West Coast LEFG primary sablefish fishery. These estimates have been developed based on cost information collected through the NMFS periodic voluntary economic data collection program. An explanation of the estimates and how they were derived is provided in the attached document.[2] Based on the most recent year of data available (2010), estimated average per vessel total cost net revenue estimates were as follows:

- All LEFG vessels: $14,530
- Only those LE vessels participating in the fixed gear sablefish fishery: $13,042
- Only those LE vessels participating in the fixed gear sablefish primary fishery: $18,159

Total cost net revenue estimates for the fleet as a whole in 2010 were as follows:

- All 142 LEFG vessels: $2,063,260
- The 139 LE vessels participating in the fixed gear sablefish fishery: $1,812,838
- The 90 LE vessels participating in the fixed gear sablefish primary fishery: $1,634,310

Additional breakdowns of these estimates are provided in the attached document.

3.1.2 Assessment

Season Length and Average Fishing Days per Year. The sablefish program provided an immediate and significant lengthening of the primary sablefish fishery and average duration of the time over which a vessel might fish. Table 3-1 provides a succinct display of the season

[2] The explanation in Dr. Lian's paper includes the caution that net revenue is an upwardly biased indicator of profitability since the cost-earnings surveys used do not capture 100 percent of the costs associated with operating a commercial fishing vessel.

length and management history, including the mop-up fishery. In 1996, the primary fishery lasted only 5 days (noon to noon, September 1-6) in the derby mode. Beginning with 2002, the annual primary sablefish season was increased to 7 months in length (April 1 through October 31), giving fishermen and processors far more flexibility in how and when they fished and made landings. It also eliminated the need for a mop-up fishery.

Table 3-1. Season length and management summary for the primary LEFG sablefish season north of 36° N. latitude, 1992 through the present.

Year	Primary Season Length	Management
1992-1994	2 to 3 weeks	Derby
1995	7 days	Derby with Mop-up Fishery (Mop-up Season Sep. 1-30; Cumulative Trip Limit 5,500 lb per Vessel)
1996	5 days	Derby with Mop-up Fishery (Mop-up Season Oct. 1-15; Cumulative Trip Limit 3,400 lb per Vessel)
1997	9 days	Equal Limits/Modified Derby with Mop-up Fishery (Mop-up Season Oct. 1-22; Cumulative Trip Limt 8,500 lb per Vessel)
1998	6 days	Tiered Limits/Modified Derby with Mop-up Fishery (Mop-up Season Aug. 28-Sep. 12; Cumulative Trip Limit 3,200 lb per Vessel)
1999	9 days	Tiered Limits/Modified Derby with Mop-up Fishery (Mop-up Season Sep. 20-25; Cumulative Trip Limit 1,100 lb per Vessel)
2000	9 days	Tiered Limits/Modified Derby with Mop-up Fishery (Mop-up Season Sep. 5-19; Cumulative Trip Limit 3,000 lb per Vessel)
2001	Aug. 15 - Oct. 31	Aug. 2 implementation of Permit Stacking
2002-present	Apr. 1 - Oct. 31	Permit Stacking

Figure 3-1 displays the average duration in days over which a vessel was fished per year in the primary sablefish fishery (calendar days from a vessel's first landing until its last landing made as part of the primary sablefish fishery). Looked upon in that way, within the 7 months of fishing opportunity each year from 2002 to 2013, individual vessels tailored seasons for themselves that ranged on average from 51 to 75 days. If the duration is weighted by the landings per vessel[3], the average duration ranged from 52 to 81 days.

Number of Vessels, Attainment of Allocations, and Concentration of Harvest. With regard to reducing the capacity of the fishery, Figure 3-2 displays the number of vessels participating in the sablefish fishery prior to and following implementation of the sablefish tier program. Primary season participation from 1996 through 2000 (prior to the program) averaged 146

[3] Weighting each vessel's season duration by its total primary sablefish landings adjusts for vessels that may have had relatively low total landings or that may have fished only sporadically during the season.

vessels compared to an average of 90 vessels after program implementation (2002 through 2013), a 38 percent decrease. The number of vessels and landings in the primary season fishery prior to 1998 were not recorded separately from the total fishery, and are estimates based on counts of vessels in the LE fishery that landed at least 1 mt of sablefish north of Santa Barbara County within the appropriate season periods.

Figure 3-3 displays the historical sablefish fishery allocations from 1996 through 2013 by total, primary, and DTL fisheries. Note that the allocations reported for years prior to 2002 in this and the following two figures include the total LEFG sablefish fishery, as there were no explicit allocations to primary and nonprimary fisheries. Figure 3-4 displays the LEFG sablefish fishery allocation and landings from 1996 through 2013. Note that from 1998 through 2001 the reported landings include the DTL and mop-up fisheries. Figure 3-5 displays the percentage of the annual LEFG sablefish allocation that was landed each year of the period 1996 through 2013. Comparing pre-program (1996 through 2001) and post-implementation (2002 through 2013) periods, it can be seen that since implementation of the program the percentage landed appears within a more consistent range and has not exceeded the allocation. This appearance may be a factor of the short timeframe over which the pre-program landings are graphed, but seems more likely the result of the longer, less derby-like fisheries which are more efficiently prosecuted and managed to meet individual (permit tiers) and aggregate (sector allocation) targets.

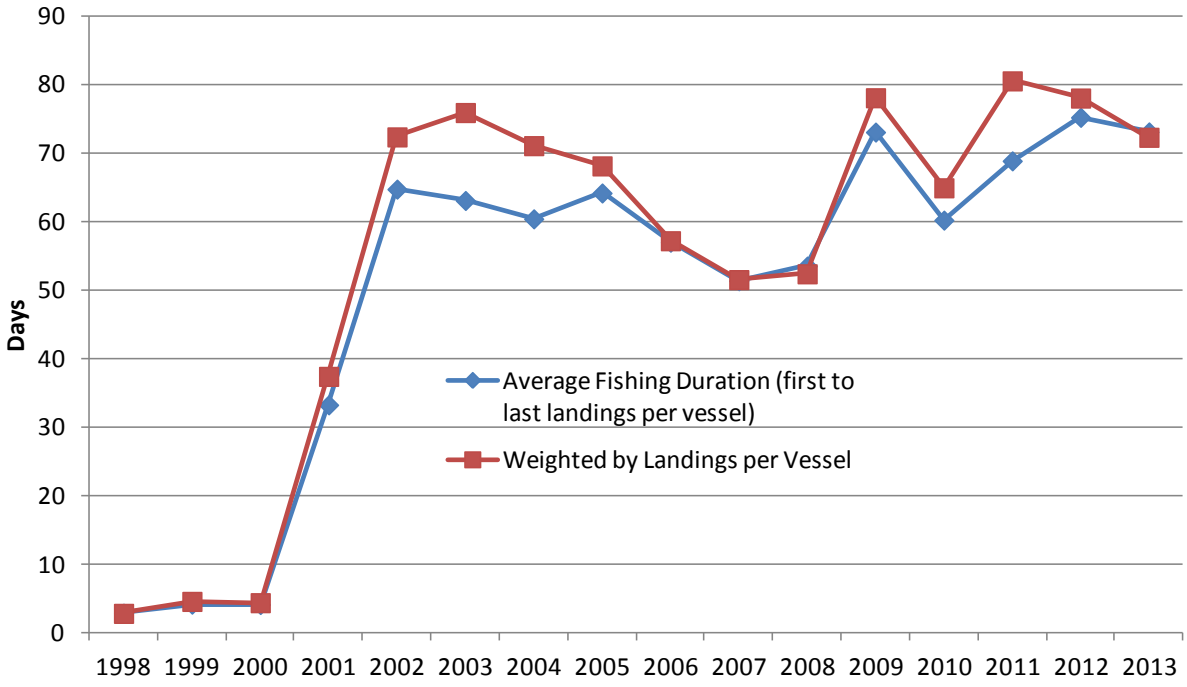

Figure 3-1. Average duration in days from first to last day of landings for vessels participating in the primary sablefish fishery (1998-2013).

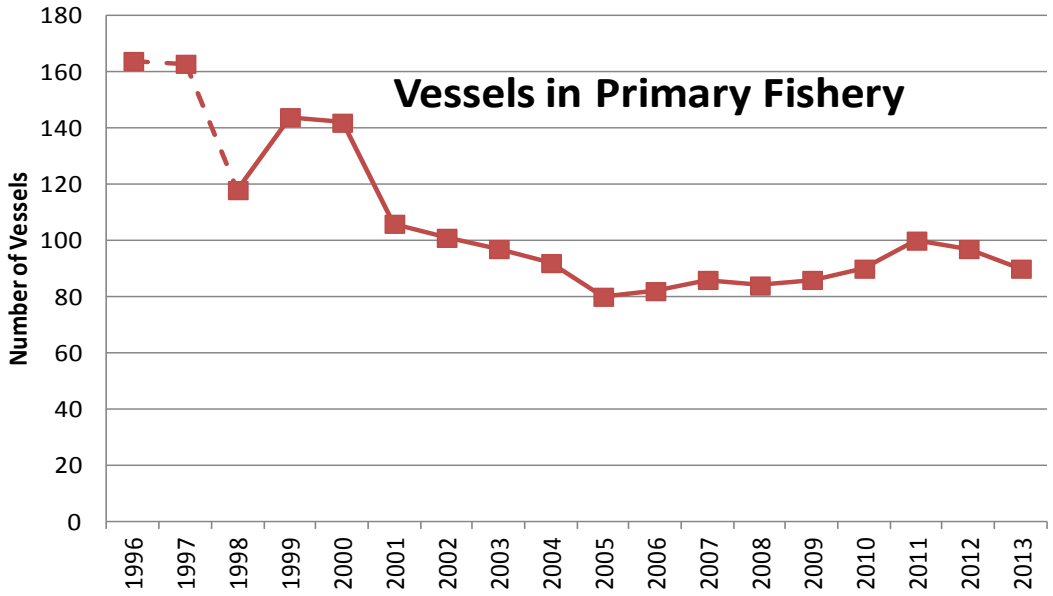

Figure 3-2. Number of vessels participating in the LEFG primary sablefish fishery from 1998 to 2013. Vessel counts for years prior to 1998 are estimated based on vessels in the LE fishery that landed at least 1 mt of sablefish north of Santa Barbara County within the appropriate season periods.

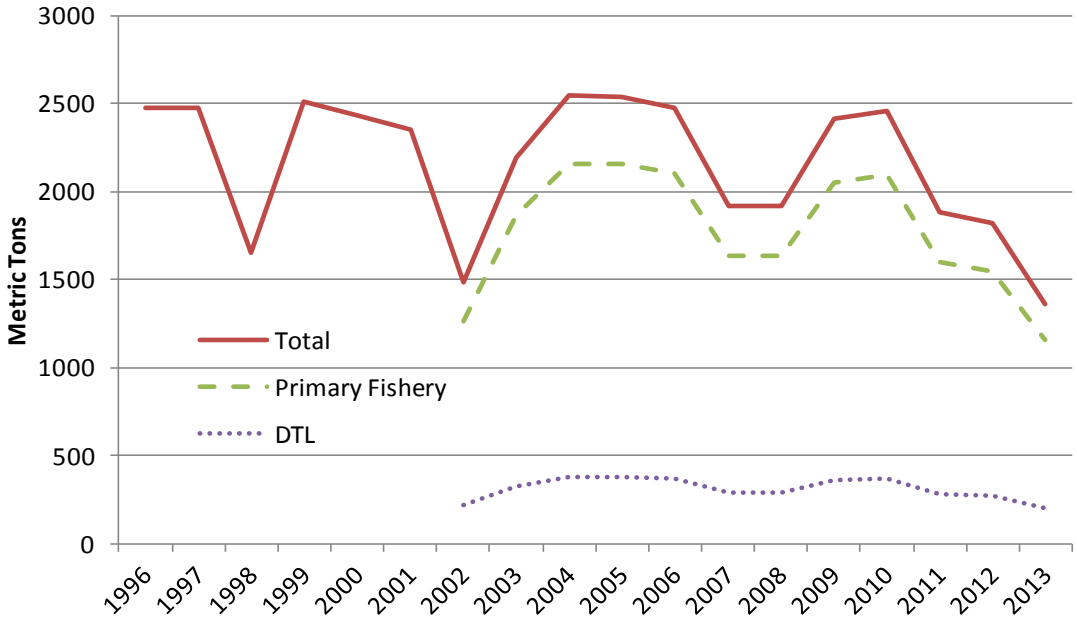

Figure 3-3. LEFG Sablefish fishery allocations by total, primary, and DTL fisheries, 1996-2013. Prior to 2002 there were no explicit allocations to the primary and DTL fisheries.

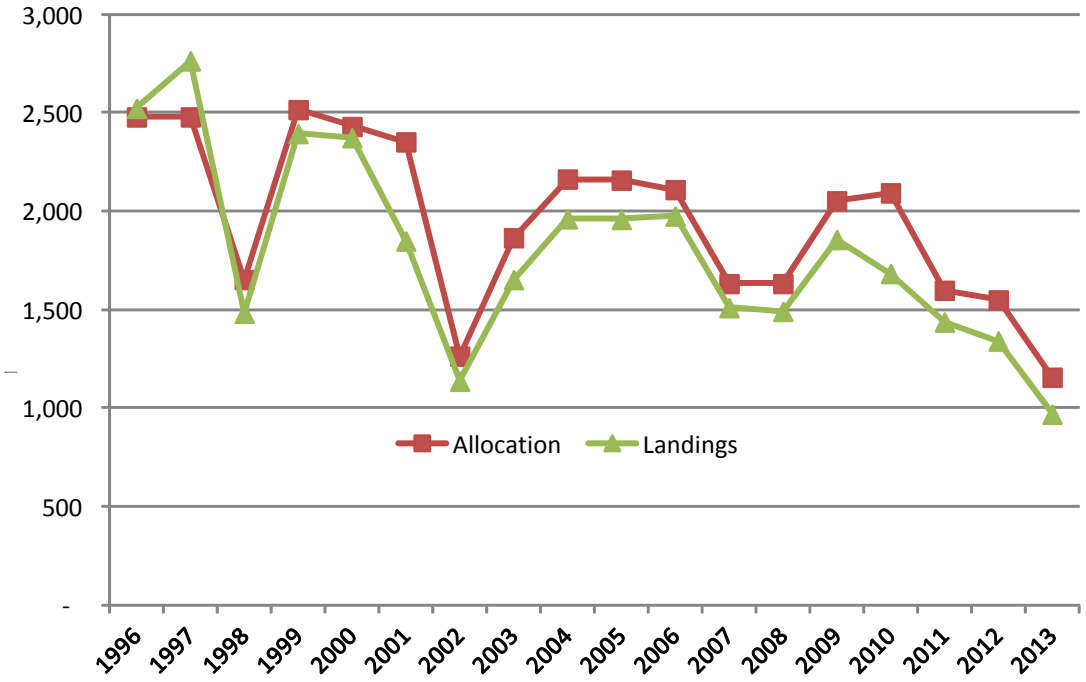

Figure 3-4. LEFG sablefish allocations and landings, 1996 through 2013. Years prior to 2002 include the mop-up and DTL fisheries, while years from 2002 to 2013 are for the primary season only.

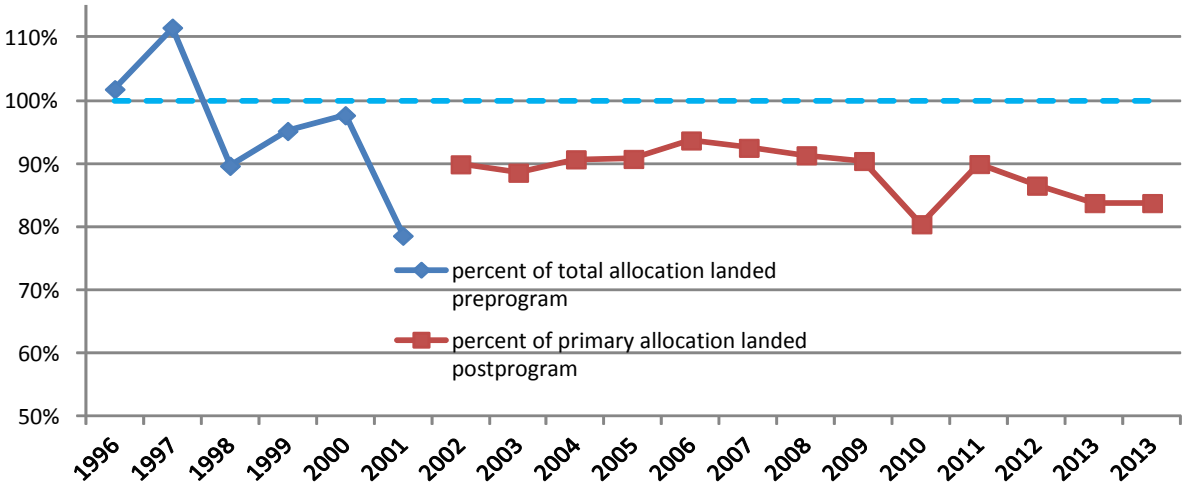

Figure 3-5. Pre- and post-program LEFG sablefish allocations and landings as a percent of the allocations, 1996 through 2013.

Over the period of program implementation, Tables 3-2 and 3-3 compare the number of vessels, their relative allocations, and landings by the various possible permit and permit stacking combinations for the years 2002, 2004, 2008, and 2012. Table 3-3 also displays the percent of the sablefish trawl IFQ harvested by vessels with tier permits during the years 2011 through 2013 (17.2 percent).

From the snapshots within the first 12 years of the program provided by Tables 3-2 and 3-3, it is hard to pick out any consistent direction of change that would indicate significant consolidation or disaggregation of permits and landings at the fleet level or on a per-vessel basis. The number of vessels with combinations other than a single Tier 3 permit varied only slightly between 58 and 61 vessels. The main differences between years are due to the varying number of vessels with only a single Tier 3 permit (last row before the total in Table 3-2).

Table 3-4 is somewhat more informative as to how the different permit tiers have or have not been stacked. The higher tier permits (Tier 1 and Tier 2) appear more likely to be stacked (consolidated) up to the maximum of three. The stacking of three Tier 1 or three Tier 2 permits on a single vessel showed a fairly consistent increase (consolidation) from 2002 to 2012, increasing by over 46 percent in each case. At the same time, as would be expected, the frequency of vessels with only one or two permits declined. For all tiers, permits that are not triple-stacked are fairly evenly split between being double-stacked and unstacked. For Tier 3 permits there is an interesting anomaly for which the drafting team and Council advisory bodies could find no relevant explanation. There appears to have been a consistent increase in the number of Tier 3 permits stacked until a change occurred between 2008 and 2012, during which the occurrence of triple-stacked permits dropped from 43 down to 22, almost as low as in the first full year of the program.

Figure 3-6 displays how the participating vessels and concentration of landings in the LEFG primary sablefish fishery changed during selected years between 1996 and 2012. The number of participating vessels decreased fairly consistently from a high of 164 in 1996 to a low of 82 in 2006. After 2006, the number of vessels participating in the primary fishery increased to 84 in 2008, 90 in 2010, and 97 in 2012. The number of vessels participating in 2012 was the highest since 92 participated in 2004. The concentration of landings among vessels generally increased over this period as well, which is more apparent in Figure 3-7 which normalizes the curves by comparing share of harvest to percent of fleet rather than to the number of vessels (Figure 3-6).

In Figure 3-7, an equal distribution line has been added which indicates the shape of the curve in the event that each vessel had landed exactly the same amount in a given year. Greater deviations from the equal distribution line indicate relatively greater concentration of landings among fewer vessels. The graph shows the distribution changing over the years since program implementation. The dark line for 1996 shows the distribution during the final year of the derby fishery. The 1997 line shows the degree to which management under equal cumulative limits equalized the distribution of harvest among vessels. The lines for 1998 and 2000 show

movement toward the 1996 distribution. For the years after the permit stacking provisions went into effect in 2001 the lines move even closer to the 1996 line. The similarity of the curves for the earliest year, 1996, to the most recent year, 2012, is striking (see Section 3.4 for additional discussion of this graph). Although many fewer vessels participated in the fishery in 2012 than in 1996, vessels delivered a similar cumulative distribution of landings in both years.

The similarity in the concentration of primary sablefish landings for 2012 and 1996 is reinforced by comparing the Gini coefficient values for concentration of landings by vessels in those years shown in Figure 3-8 (derived from the data displayed in Figure 3-7). Gini coefficients are an indicator of the deviation from the equal distribution line shown in Figure 3-7. A Gini coefficient of zero indicates an equal distribution of landings, while a value of 1 indicates that a single vessel made all the landings (i.e., the most concentrated distribution). Gini coefficient values greater than zero and less than one indicate increasingly concentrated landings distributions. The figure shows that since the imposition of the equal cumulative limits fishery in 1997, the distribution of landings has generally trended toward re-creating the concentration exhibited by the 1996 fishery. The 2013 Gini coefficient value of 0.47 is about 7 percent higher than the value for the fishery of 0.44 in 1996.

Vessel Capacity. Table 3-5 and Figures 3-9 and 3-10 display information about the distribution of vessel lengths and permit length endorsements in the LEFG sablefish fishery in 2012. Table 3-5 shows the distribution of length endorsements for sablefish permits by tier and also by gear endorsement. The table shows the average length endorsement for Tier 1 permits (66.6 feet) is longer than the average for both Tier 2 permits (53.1 feet) and Tier 3 permits (47 feet). The minimum length endorsements follow the same pattern, with the minimum Tier 1 permit length endorsement (40 feet) exceeding those for both Tier 2 (32 feet) and Tier 3 permits (18 feet). However the same is not true for the maximum length endorsements. While the longest Tier 3 permit (97.3 feet) is shorter than the longest Tier 1 permit (138 feet), it is longer than the longest Tier 2 permit (88 feet). From Table 3-5 it is difficult to discern any meaningful patterns regarding permit length and gear endorsements.

Figure 3-9 shows the number of vessels carrying stacked (two or three) and unstacked (one) permits by vessel length class on July 1, 2012. Vessel length classes were constructed so that an approximately equal number of vessels fell into each class. From the figure it is evident that permit stacking is more prevalent on longer vessels than on shorter ones. Seventy-five percent of the 20 vessels involved in the fishery that are at least 60 feet in length carried stacked permits, while only 50 percent of the 18 vessels between 50 and 60 feet in length and the 22 vessels between 43 and 50 feet in length carried stacked permits. Only one of the 17 vessels less than 35 feet in length carried stacked permits.

Table 3-2. Comparison of the number of vessels and allocations for various combinations of stacked permits in 2002, 2004, 2008, and 2012. (Note that this snapshot in time may not capture changes in permit combinations during the season.)

Possible Combinations of Stacked Permits by Tier				Relative Total Allocation for the Permit Combination	Number of Vessels															
					Total by Permit Combination				Stacking Only Longline Permits				Stacking Only Pot Permits				Stacking Both Longline and Pot Permits			
Tier 1 (3.85)	Tier 2 (1.75)	Tier 3 (1.0)	Total Number		2002	2004	2008	2012	2002	2004	2008	2012	2002	2004	2008	2012	2002	2004	2008	2012
3			3	11.55	1	1	1	2	0	0	0	0	1	1	1	2	0	0	0	0
2	1		3	9.45	1	1	2	3	0	0	1	1	0	0	0	0	1	1	1	2
2		1	3	8.7	2	1	1	1	0	1	1	1	1	0	0	0	1	0	0	0
1	2		3	7.35	-	1	1	3	-	1	1	1	-	0	0	0	-	0	0	2
1	1	1	3	6.6	4	7	5	2	1	1	1	0	0	0	0	0	3	6	4	2
1		2	3	5.85	-	2	-	-	-	1	-	-	-	0	-	-	-	1	-	-
	3		3	5.25	1	1	-	-	1	1	-	-	0	0	-	-	0	0	-	-
	2	1	3	4.5	2	2	4	3	2	2	2	2	0	0	0	0	0	0	2	1
	1	2	3	3.75	3	2	3	5	2	2	3	3	0	0	0	0	1	0	0	2
		3	3	3	2	6	9	2	1	4	7	1	0	0	0	0	1	2	2	1
2			2	7.7	1	1	-	1	1	0	-	1	0	1	-	0	0	0	-	0
1	1		2	5.6	2	3	3	-	2	2	1	-	0	0	0	-	0	1	2	-
1		1	2	4.85	3	1	2	2	1	0	0	0	0	0	0	0	2	1	2	2
	2		2	3.5	1	2	1	3	0	1	1	2	0	0	0	0	1	1	0	1
	1	1	2	2.75	7	8	6	3	6	7	4	2	0	0	0	0	1	1	2	1
		2	2	2	7	9	10	13	6	7	8	12	0	1	1	0	1	1	1	1
1			1	3.85	7	4	4	3	4	2	3	2	3	2	1	1	0	0	0	0
	1		1	1.75	17	9	10	12	14	6	9	11	3	3	1	1	0	0	0	0
		1	1	1	49	29	22	39	43	26	20	35	5	2	1	3	1[a/]	1	1	1
				TOTAL	**110**	**90**	**84**	**97**	**84**	**64**	**62**	**74**	**13**	**10**	**5**	**7**	**13**	**16**	**17**	**16**

a/ This permit is endorsed for both longline and pot gear and, therefore, is recorded in the last four columns of the table.

Table 3-3. Comparison of sablefish landings by vessels under various allocations and combinations of stacked permits in 2002, 2004, 2008, and 2012, and share of sablefish trawl IFQ landed by these vessels in 2011-2013.

Combinations of Stacked Permits by Tier				Relative Total Allocation for the Permit Combination	Total Vessels with this Combination of Sablefish Permits				Sablefish Landings (1,000's of Pounds) within a Combination of Tiers														Share of Sablefish IFQ landed 2011-2013
									Total				Average per Vessel				Average Percent of Total Fleet Landings per Vessel				Percent of Total Fleet Represented by all Vessels with this Combination				
Tier 1 (3.85)	Tier 2 (1.75)	Tier 3 (1.0)	Total Number of Permits		2002	2004	2008	2012	2002	2004	2008	2012	2002	2004	2008	2012	2002	2004	2008	2012	2002	2004	2008	2012	
3			3	11.55	1	1	1	2																
2	1		3	9.45	1	1	2	3																
2		1	3	8.7	2	1	1	1																
				Subtotal	4	3	4	6	363	543	520	653	91	181	130	109	3.6%	4.2%	4.0%	3.7%	15%	13%	16%	22%	5.7%
1	2		3	7.35	-	1	1	3																
1	1	1	3	6.6	4	7	5	2																
				Subtotal	4	8	6	5	245	894	489	418	61	112	82	84	2.4%	2.6%	2.5%	2.8%	10%	21%	15%	14%	1.8%
1		2	3	5.85	-	2	-	-																
	3		3	5.25	1	1	-	-																
	2	1	3	4.5	2	2	4	3																
				Subtotal	3	5	4	3	132	396	206	117	44	79	52	39	1.8%	1.8%	1.6%	1.3%	5%	9%	6%	4%	-
	1	2	3	3.75	3	2	3	5																
		3	3	3	2	6	9	2																
				Subtotal	5	8	12	7	156	407	477	252	31	51	40	36	1.2%	1.2%	1.2%	1.2%	6%	9%	15%	9%	-
2			2	7.7	1	1	-	1																
1	1		2	5.6	2	3	3	-																
1		1	2	4.85	3	1	2	2																
				Subtotal	6	5	5	3	323	574	351	209	54	115	70	70	2.2%	2.7%	2.1%	2.4%	13%	13%	11%	7%	1.3%
	2		2	3.5	1	2	1	3																
	1	1	2	2.75	7	8	6	3																
				Subtotal	8	10	7	6	212	449	242	223	26	45	35	37	0.6%	1.0%	1.1%	1.3%	8%	10%	7%	8%	1.4%
		2	2	2	7	9	10	13	130	208	178	238	19	23	18	18	0.4%	0.5%	0.5%	0.6%	5%	5%	5%	8%	-
1			1	3.85	7	4	4	3	267	186	335	152	38	46	84	51	0.9%	1.1%	2.5%	1.7%	10%	4%	10%	5%	5.9%
	1		1	1.75	17	9	10	12	261	240	229	236	15	27	23	20	0.4%	0.6%	0.7%	0.7%	11%	6%	7%	8%	1.0%
		1	1	1	49	29	22	39	414	428	258	457	8	15	12	12	0.2%	0.3%	0.4%	0.4%	18%	10%	8%	15%	-
				TOTAL	**110**	**90**	**84**	**97**	**2,503**	**4,323**	**3,285**	**2,955**	**23**	**48**	**39**	**30**					**100%**	**100%**	**100%**	**100%**	**17.2%**

Table 3-4. Number of other permits with which a permit is stacked, by tier (includes post-July 1st registrations).[a/]

Permit Combinations	2002		2004		2008		2012
Tier 1 Permit Stacked with:			**Number of Tier 1 Permits**				
Two Other Permits	13	↗	17	↗	18	↗	19
One Other Permit	7	↘	6	↘	5	↘	4
No Other Permits	7	↘	4	→	4	→	4
Total Permits for the Tier	27		27		27		27
Tier 2 Permit Stacked with:			**Number of Tier 2 Permits**				
Two Other Permits	15	↗	19	↗	23	↘	22
One Other Permit	11	↗	15	↘	10	↘	9
No Other Permits	17	↘	9	↗	10	↗	12
Total Permits for the Tier	43		43		43		43
Tier 3 Permit Stacked with:			**Number of Tier 3 Permits**				
Two Other Permits	20	↑	36	↗	43	↓	22
One Other Permit	24	↗	29	→	29	↗	33
No Other Permits	50	↓	29	↘	22	↑	39
Total Permits for the Tier	94		94		94		94
Total Permits	164	→	164	→	164	→	164
Total Vessels	110	↓	90	↘	84	↑	97

a/ Analysis based on registrations as of July 1 each year plus post-July 1 registrations for permits not registered on July 1st.

Figure 3-10 shows the distribution of stacked and unstacked permits by permit length endorsement class. The permit length endorsement categories were chosen to mirror the vessel length classes in Figure 3-9. In Figure 3-10, stacked permits are further bifurcated into base and non-base categories (for administrative purposes, NMFS normally designates one of the permits in a stack as the "base permit"—and the vessel length must be of a size authorized by that permit's length endorsement[4]). The figure shows that among permit length endorsement categories, the greatest number of stacked base permits is in the greater-than-or-equal-to 60 feet category, while the greatest number of stacked, non-base permits is in the 35-to-43 feet category (as is the greatest number of unstacked permits).

[4] "A limited entry permit may be registered for use with a vessel up to 5 ft (1.52 m) longer than, the same length as, or any length shorter than, the size endorsed on the existing permit" (§660.25(b)(3)(iii), subpart C).

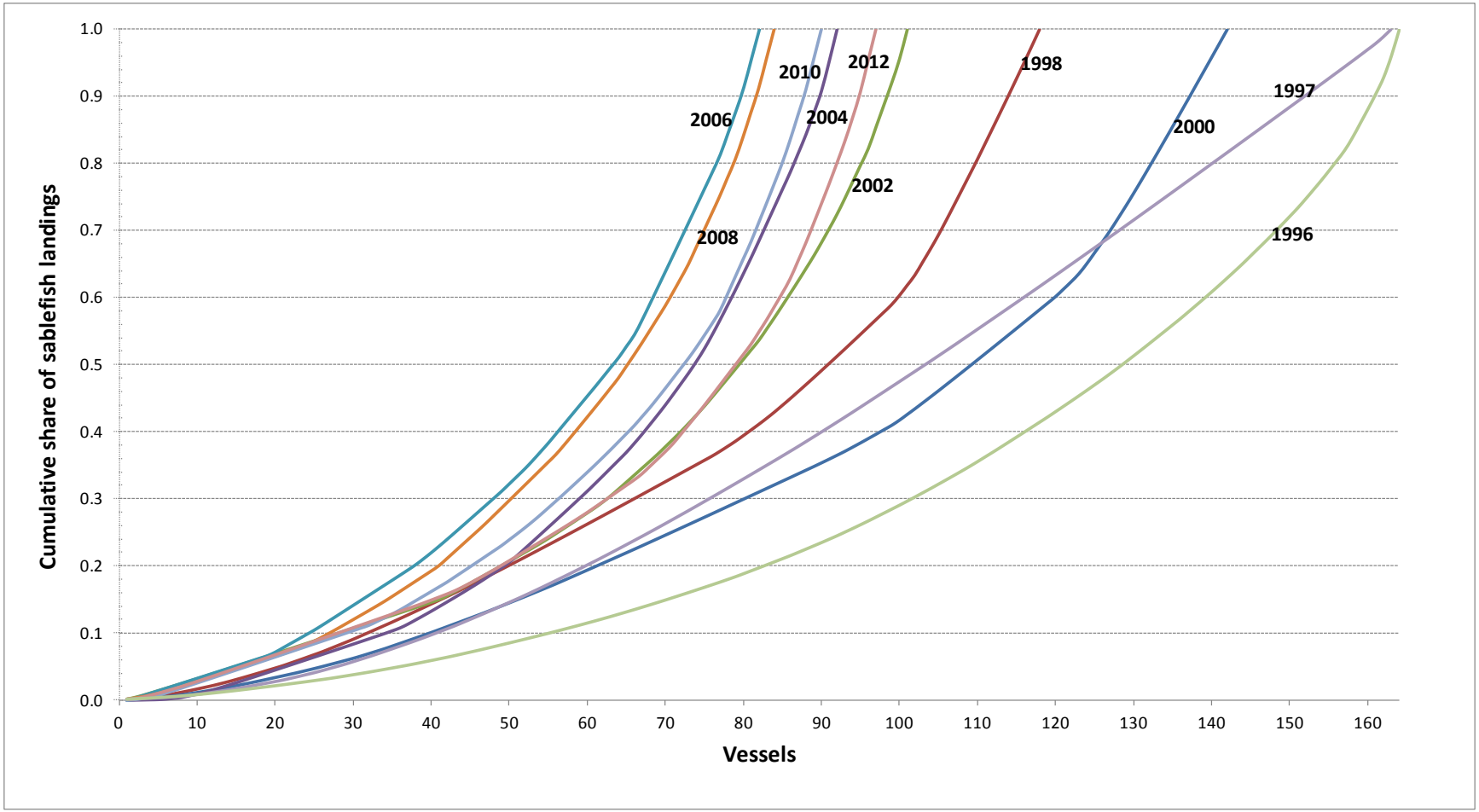

Figure 3-6. Cumulative share of landings by the number of vessels participating in the LEFG primary sablefish fishery during selected years from 1996-2012.

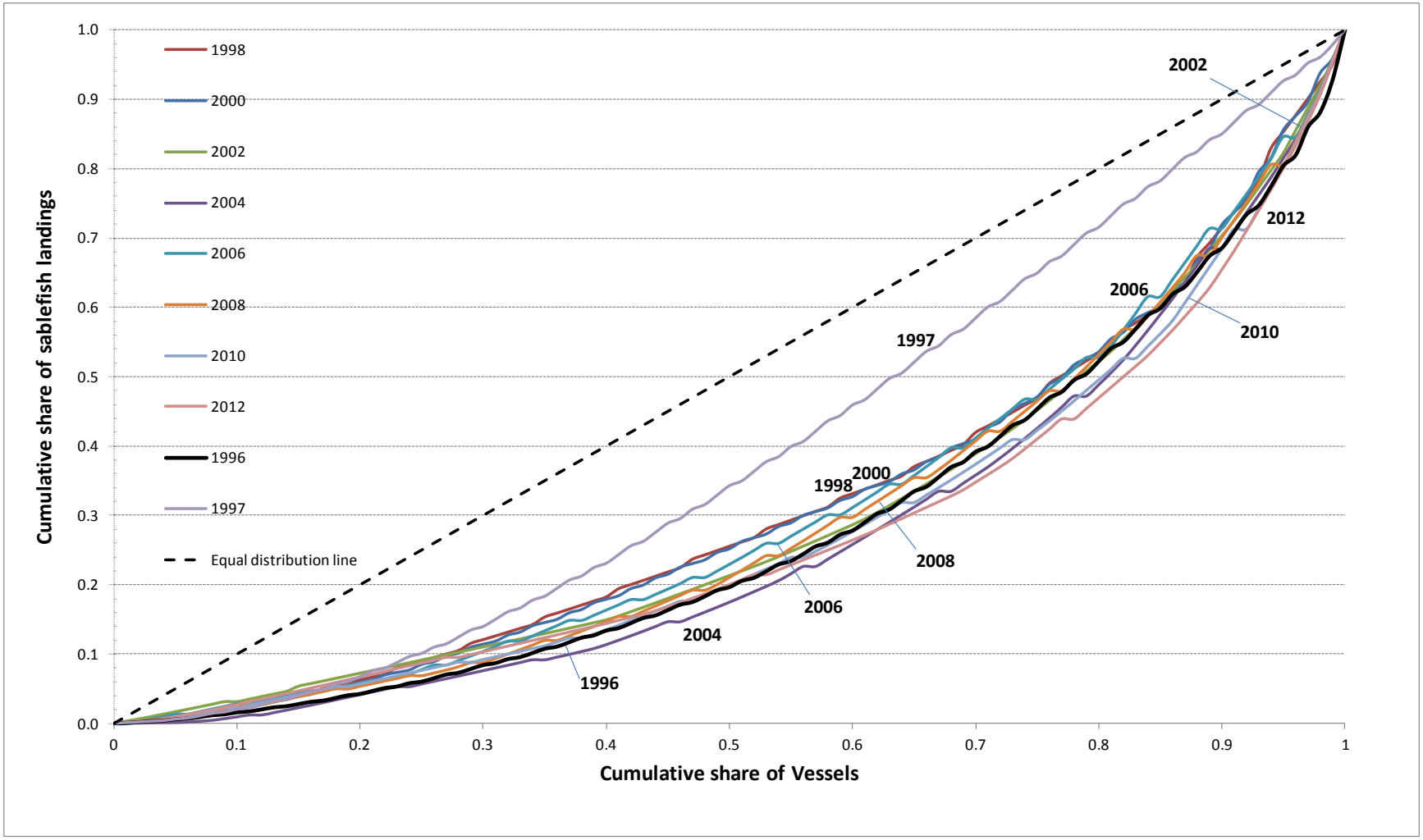

Figure 3-7. Concentration of landings by the cumulative share of vessels participating in the LEFG primary sablefish fishery for selected years from 1996-2012.

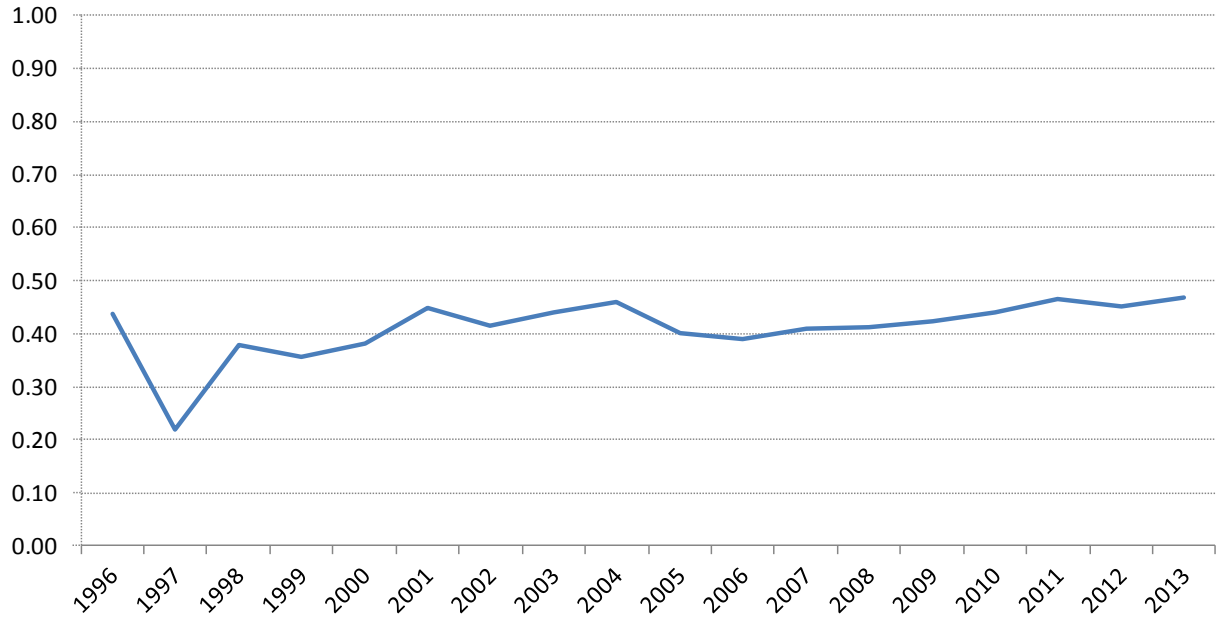

Figure 3-8. Gini coefficients for the concentration of landings by vessels in the LEFG primary sablefish fishery for years before and after full implementation of the permit stacking program in 2002.

[Note: A Gini coefficient of 0 implies a perfectly even distribution among all participants, while a coefficient of 1 indicates one vessel landed all of the fish.]

Table 3-5. Distribution of permit length endorsements for LEFG sablefish permits in 2012.

Permit Category	Number of Permits	Permit Length Endorsements in Feet			Permits Within One Standard Deviation	
		Average	Range of			
			Minimum to Maximum	One Standard Deviation	Number	Percent
Tier 1	28	66.6	40 to 138	44.4 to 88.9	20	71.4%
Tier 2	42	53.1	32 to 88	39.8 to 66.3	28	66.7%
Tier 3	94	47.0	18 to 97.3	35.1 to 59.0	67	71.3%
Longline	132	50.2	18 to 97.3	36.9 to 63.5	90	68.2%
Pot	28	60.4	32 to 138	35.6 to 85.3	19	67.9%
Both Longline and Pot	4	49.2	40 to 55.3	43.5 to 54.9	2	50.0%

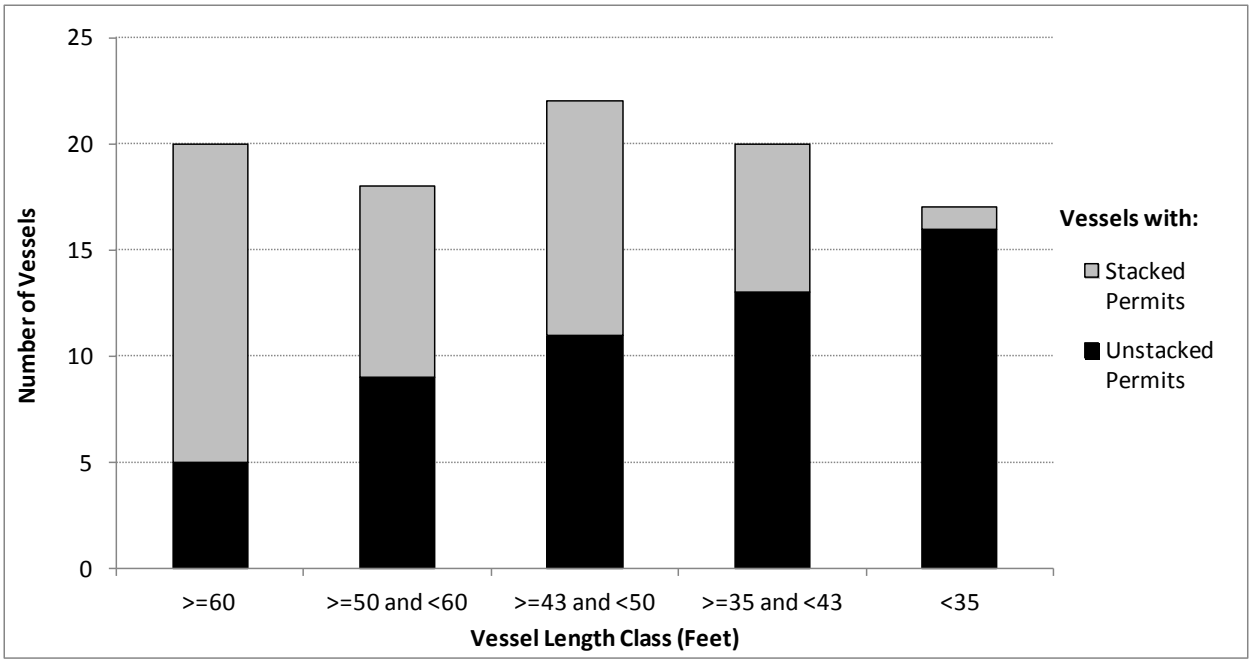

Figure 3-9. Number of LEFG sablefish vessels in 2012 with unstacked and stacked permits by vessel length class.

[Note: There were three permits with length endorsements of 64.1, 45.0 and 34.2 that were not associated with vessels on the reference date, 07-01-2012.]

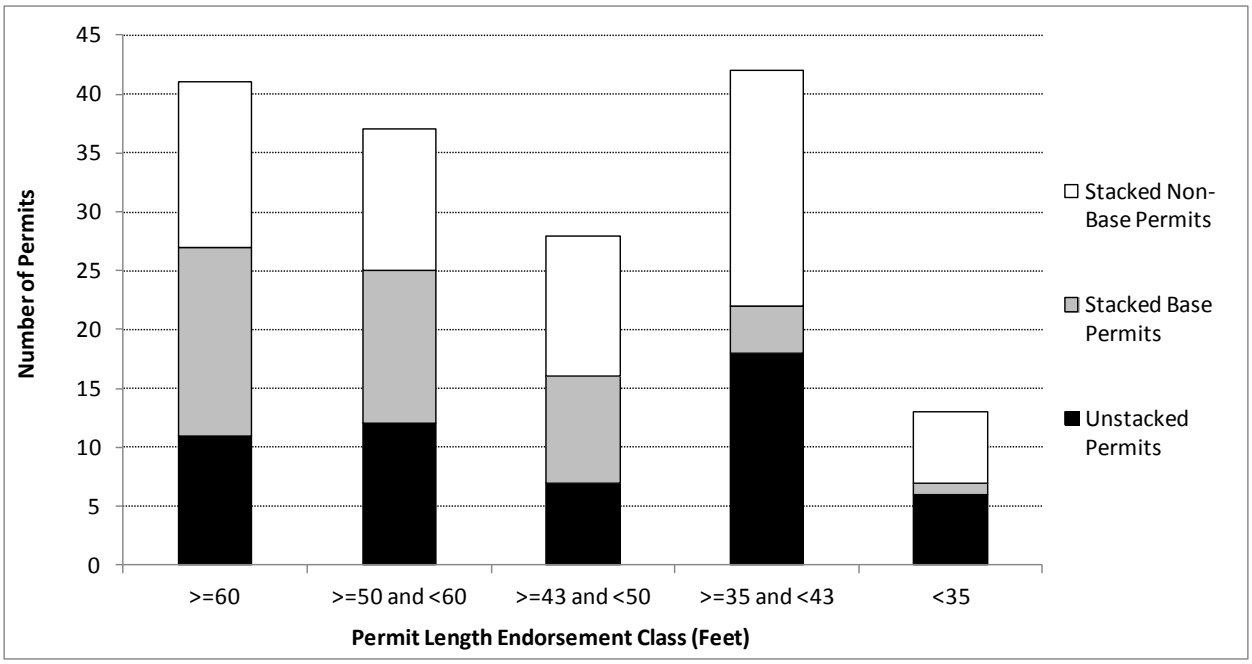

Figure 3-10. Number of LEFG sablefish permits in 2012 by permit length endorsement class and status (unstacked, stacked base, and stacked-non-base). See Note for Figure 3-9.

[Note: See note for Table 3-9.]

In general, vessels appear to be downsizing under the tier program, a possible source of increased efficiency. This is evidenced by the fact that permits are being used on vessels smaller than what is authorized by the length endorsements of the permits. Table 3-6 shows, by length category, the number of vessels and the number of permits used to authorize a vessel's participation in the fishery (primary permits). The number of primary permits is the sum of unstacked permits (i.e., single permits used on vessels that do not stack additional permits) and stacked base permits (i.e., the main permit in a two or three permit stack) in Figure 3-10. The number of vessels is taken from the total vessel counts in Figure 3-9.

With respect to the degree of apparent downsizing, Table 3-6 shows there are 20 vessels in the fishery greater than 60 feet in length, whereas permits with length endorsements greater than 60 feet are being used as the "primary" permit (i.e., either an unstacked permit or stacked base permit) on 27 vessels, indicating that seven permits endorsed for more than 60 feet are being used on less than 60 foot vessels. There is a similar pattern for the 50–to-60 foot and 35-to-43 foot categories, indicating that small vessels are using permits that would allow larger vessels into the fishery. These trends indicate that smaller vessels are being used than would be allowable by the length endorsements of the associated permits authorizing those vessels' participation (i.e., the length endorsements of the primary permits).

Vessels in the 43-to-50 foot category and the less-than-35-foot category are apparently absorbing the permits with longer length endorsements. There are 22 vessels in the 43-to-50 foot size category, but only 16 such permits used as primary permits. Similarly, there are 17 vessels in the less-than-35 foot size category, but only 7 such permits used as primary permits. These trends indicate there are vessels in these two size categories using permits that would authorize larger vessels.

Table 3-6. Comparison of vessel and permit counts by size category.

Size Category	Vessels in the Fleet [a/]	Primary Permits Used by the Fleet [b/]
>60'	20	27
50'-60'	18	25
43'-50'	22	16
35'-43'	20	22
<35'	17	7

a/ The number of vessels by size category is from Table 3-9.

b/ The number of primary permits by length endorsement category is from Table 3-10 and is the sum of unstacked permits (permits used on vessels that hold only one permit) and stacked base permits (the main permit in a stack). Stacked non-base permits are excluded from these counts.

Permit Prices. Information on sablefish permit prices proved to be too limited for use in determining any trends in the permit values over time. Table 3-7 shows recent offerings of tier

permit prices from Dock Street Brokers website. This snapshot appears to show a preponderance of trading for Tier 3 permits (the lowest quota share level).

Table 3-7. Recent listings of West Coast longline sablefish-endorsed permits offered for sale on Dock Street Brokers (info@dockstreetbrokers.com).

Type of Permit	Asking Price	Updated	Notes
Tier 1	$825,000	11/26/2012	- pot endorsed
Tier 2		05/17/2013	- Call for Pricing
Tier 2		03/05/2014	- Will trade for northern sablefish trawl quota
Tier 3	$165,000	08/23/2013	- make offer
Tier 3	$197,000	10/15/2013	- Good to ~70' LOA
Tier 3	$155,000	03/10/2014	- SOLD
Tier 3	$140,000	02/21/2014	- Price Reduced** good to 51 feet
Tier 3	$208,000	01/25/2013	
Tier 3	$145,000	02/25/2014	- SOLD 3/10/2014
Tier 3	$170,000	04/02/2013	
Tier 3		05/17/2013	- Pot Endorsed Call for pricing
Tier 3	$13,000	04/14/2014	- Lease available for 2014 season

3.2 Maintain or Direct Benefits toward Fishing Communities

3.2.1 Background

This objective relates most directly to National Standard (NS) 8 and FMP Objective 16 (take socio-economic needs of fishing communities into account) [5]. Did the program provide for the sustained participation of fishing communities and, to the extent practicable, minimize adverse economic impacts on such communities?

To consider how well the sablefish program maintained or directed benefits toward fishing communities requires data on changes in the sablefish landings by West Coast port over the life of the program. Additionally, an owner-on-board requirement, intended, in part, to direct benefits toward local fishing communities, can be assessed by evaluating changes in the number of entities subject to the provision. The following information was considered or analyzed for this objective:

- Identification of the primary ports where sablefish landings (both primary season landings and landings made in the DTL fishery) are occurring;
- Calculation of port involvement and dependence ratios; and
- Percent of landings by owner on board versus non-owner on board vessels.

[5] Objective 17 at the time Amendment 14 was adopted.

3.2.2 Assessment

Port Involvement. Figure 3-11 displays the involvement of individual port groups in the LEFG sablefish fishery for even years from 1996 through 2012. Involvement is measured as the ex-vessel value of fixed gear sablefish landings in a port as a share of the total ex-vessel value of the entire West Coast fixed gear sablefish fishery. Figure 3-12 removes some of the complexity in viewing the pre- and post-program changes by using three-year averages to display the same data. The most significant shifts in involvement appear to be at the northern and southern extremities of the region, with Puget Sound becoming less involved in the fishery in more recent years (in terms of landings to the area) and Morro Bay having increasing involvement. The Brookings area also appears to show a trend toward increased involvement since implementation of the program in 2002. Port Orford is part of the Brookings area and has an active non-profit organization (Port Orford Ocean Resources Team) which seeks to enhance the small fixed gear fishery operating out of that port. The existence of the permit stacking program may have enhanced the ability of the community to influence the development of the fishery in the port and the community's economic future. However, for most ports, no consistent trend is obvious from these figures, and it is not possible to separate the effects of the program from the many other causes of variation in involvement by the port groups.

Port Dependence. Figures 3-13 and 3-14 display the dependence of port groups on revenue from the LEFG sablefish fishery measured as a percent of each port's total landings revenue from all non-tribal fisheries. The pattern for most ports shows annual variation within a range that might be expected given changes in species availability, weather, market forces, and varying allocations. However, a huge spike in revenue dependence for Morro Bay in 2010 (Figure 3-13) may reflect the beginning of The Nature Conservancy exempted fishing permit program under which vessels with trawl permits were authorized to use fixed gear. Trawl landings in Morro Bay dropped to zero in that year, but reappeared in 2011 and 2012.

Another apparent deviation involves ports in Puget Sound which exhibited a significant drop in fixed gear sablefish landings and dependence since 2008 (Figure 3-14). Council member and public testimony at the June Council meeting indicated that this was likely the result of reductions in the area's fisheries outside of the sablefish program and the subsequent loss of two fish buyers. More specifically, there was a loss of trawl vessels to the buy-back program (five out of seven vessels), a reduction in the spiny dogfish fishery, and a closure of rockfish fisheries in Puget Sound due to Endangered Species Act requirements.

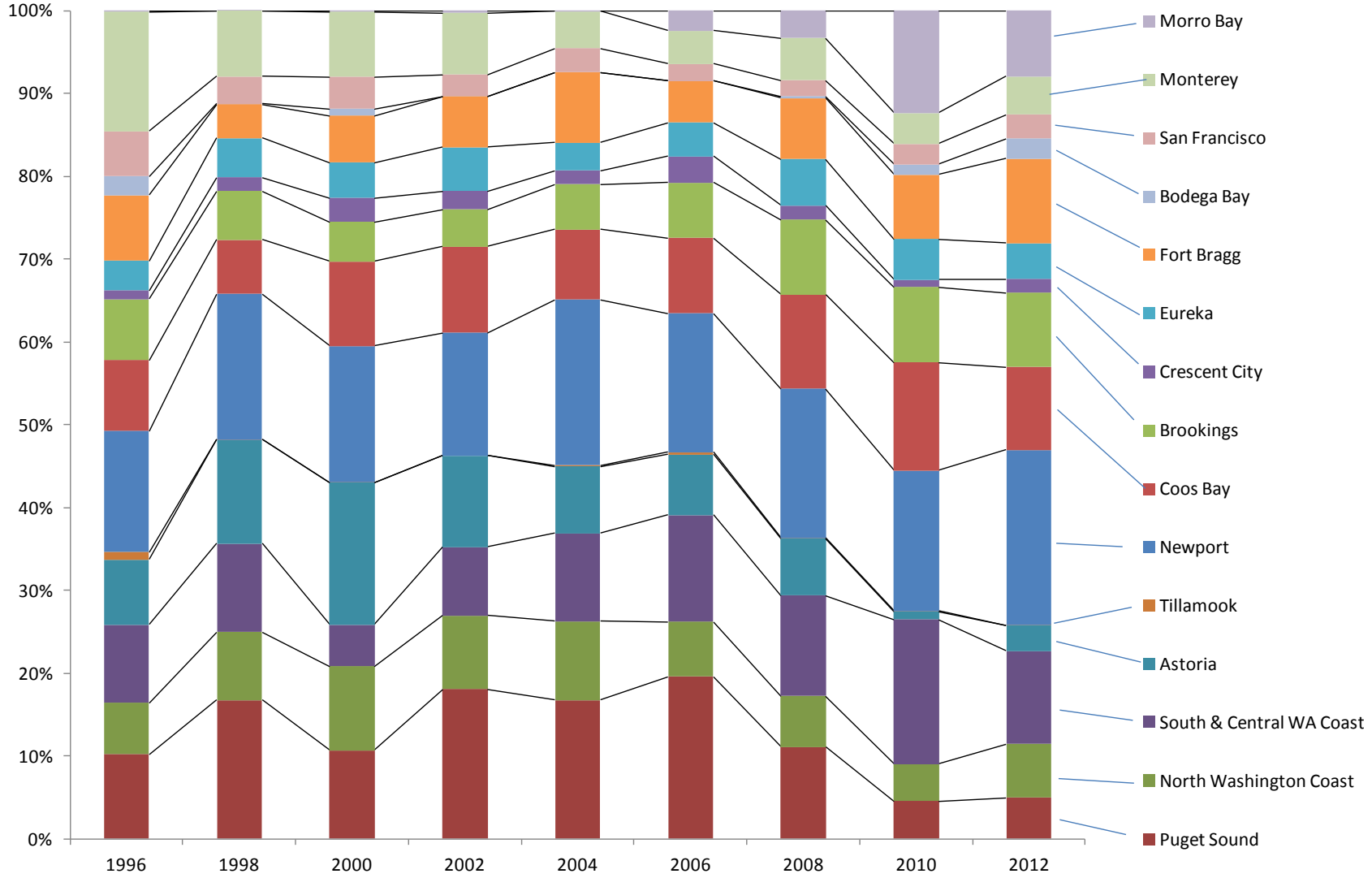

Figure 3-11. Involvement (percent of West Coast ex-vessel revenue) in the LEFG sablefish fishery by port group (data for even years 1996-2012).

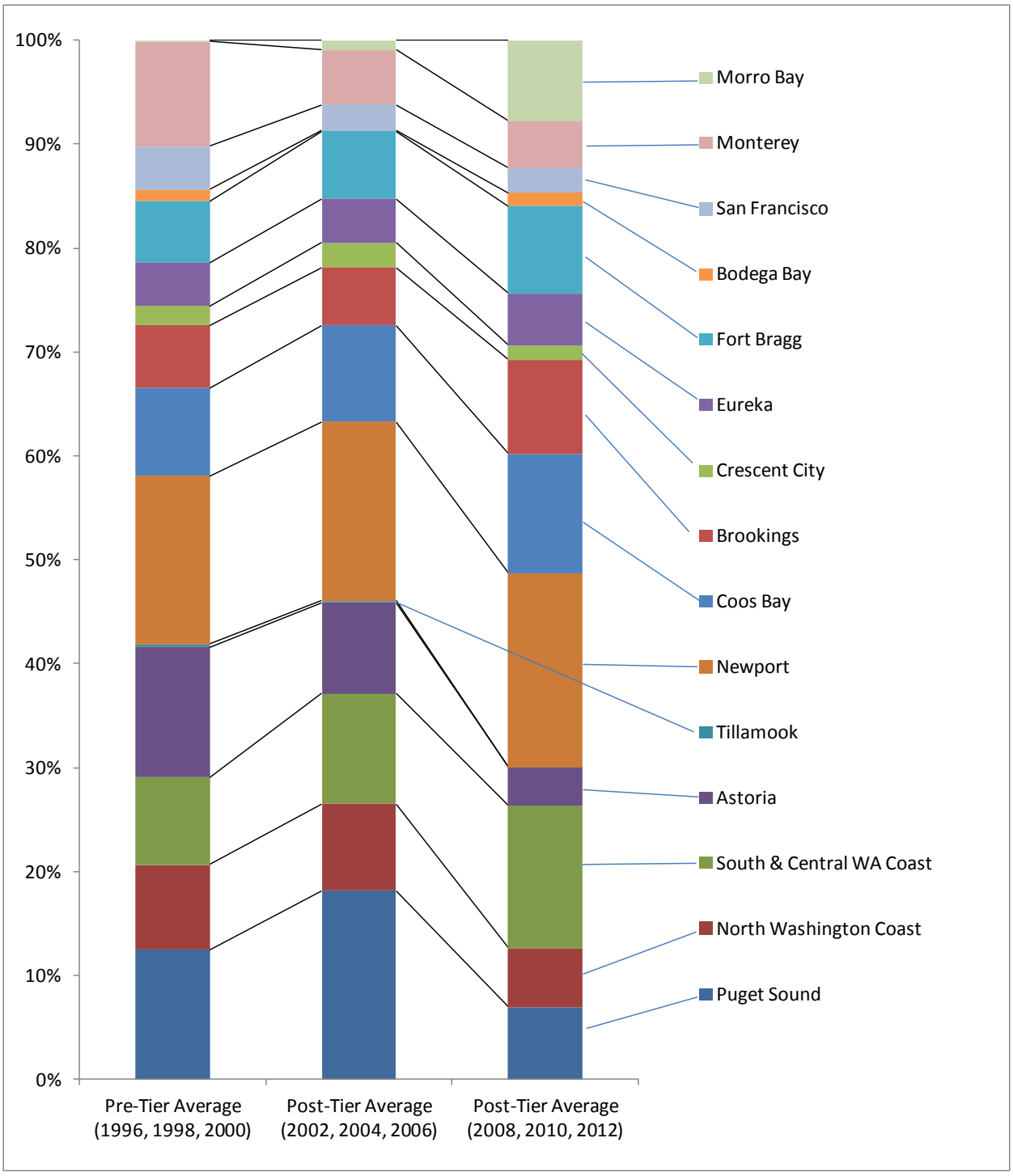

Figure 3-12. Involvement (percent of West Coast ex-vessel revenue) in the LEFG sablefish fishery by port group in terms of three-year averages for periods before and after implementation of the tier program (data for even years 1996-2012).

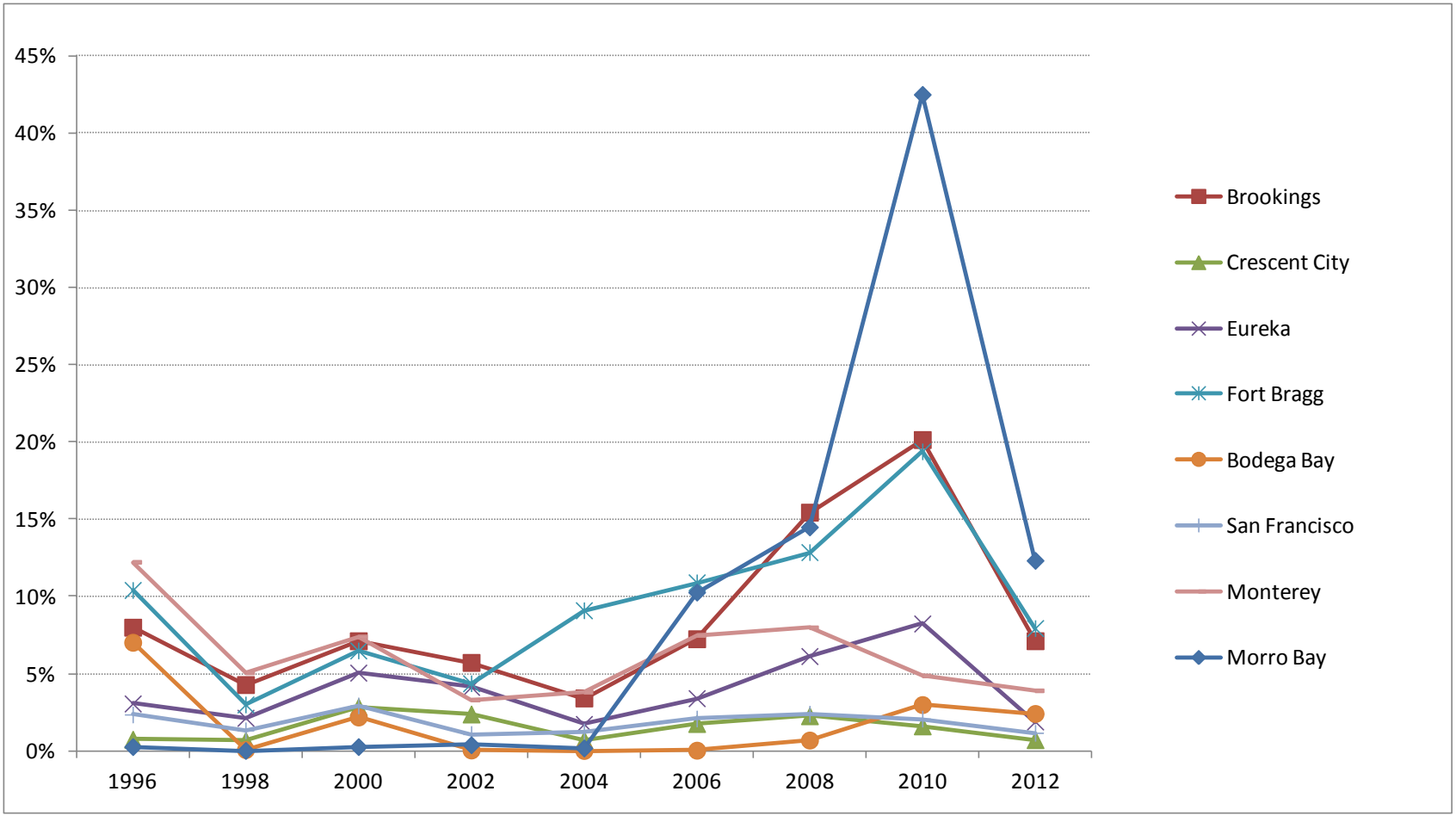

Figure 3-13. Dependence (percent of port total ex-vessel revenue) on LEFG sablefish landings for port groups from Brookings, Oregon to Morro Bay, California (data for even years 1996-2012).

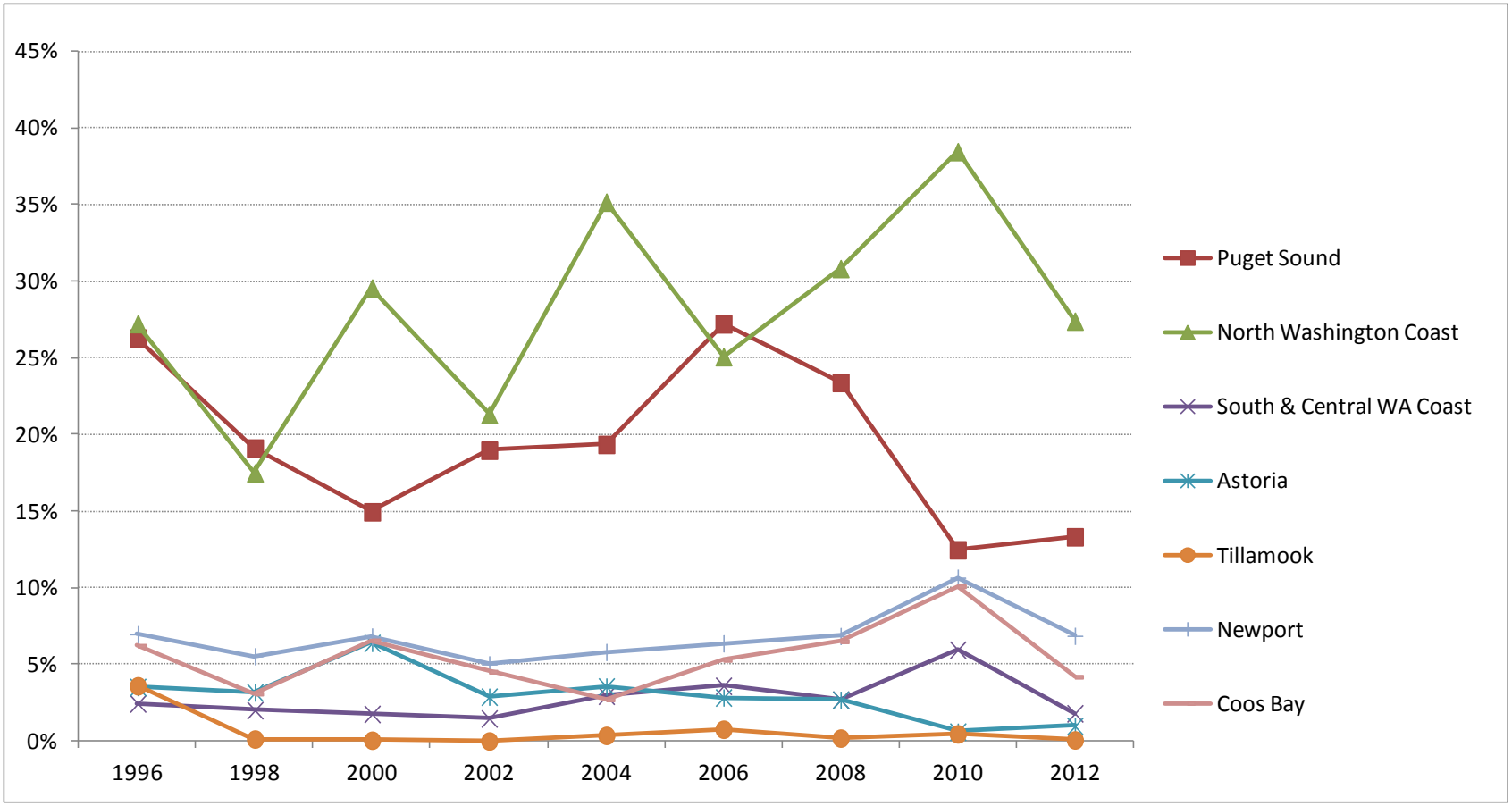

Figure 3-14. Dependence (percent or port total ex-vessel revenue) on LEFG sablefish landings for port groups from the North Washington Coast to Coos Bay, Oregon (data for even years 1996-2012).

Figure 3-15 displays port dependence in terms of employment (number of jobs). For each port area the figure compares the number of jobs provided by the LEFG sablefish fishery with two other measures: employment generated by the total non-tribal groundfish fishery, and the total work force in 2012. Fisheries-generated employment estimates are taken from the IO-PAC analysis of the 2015-2016 groundfish specifications, and port area work force estimates are taken from U.S. Bureau of Labor Statistics county-level data. While the data displayed in Figure 3-15 indicate the sablefish fishery provides a relatively small number of jobs in comparison to the total non-tribal groundfish fishery and coastwide labor force, for a few ports it constitutes a significant proportion of the groundfish labor force, providing 20 percent or more of non-tribal groundfish fishery employment for the port areas of Puget Sound, North Washington Coast, Crescent City, Fort Bragg, Bodega Bay, Santa Barbara, and Los Angeles.

Figure 3-16 displays port dependence in terms of income (total wages and salaries). Again these estimates are from the IO-PAC analysis of the 2015-2016 groundfish specifications and data from the U.S. Bureau of Labor Statistics. As would be expected, these data fairly closely mirror the employment dependence results in Figure 3-15.

Landings and the Owner-on-board (OOB) Exemption. Table 3-8 shows the distribution of vessels and landings (at 4-year intervals from 2000 to 2012) for vessels controlled by entities that were exempt from the OOB permit requirement. The table shows the number of vessels that participated in the primary fishery with OOB exemptions declined from 2000 to 2008 and remained relatively unchanged from 2008 to 2012. However, the share of total vessels with owners exempt from the OOB provision declined over the entire period and in each of the years displayed. The share of total primary fishery landings accounted for by these vessels also declined during that time, although not as precipitously as the share of total vessels.

Table 3-8. Summary of landings in selected years by vessels participating in the primary sablefish fishery and operating under permits that were exempt from the owner-on-board requirements.

Year	Vessel Count	Share of Total Vessels	Landings (mt)	Share of Total Landings
2000	131	92.3%	1,160	65.7%
2004	72	78.3%	1,223	62.4%
2008	43	51.2%	687	46.1%
2012	44	45.4%	579	43.2%

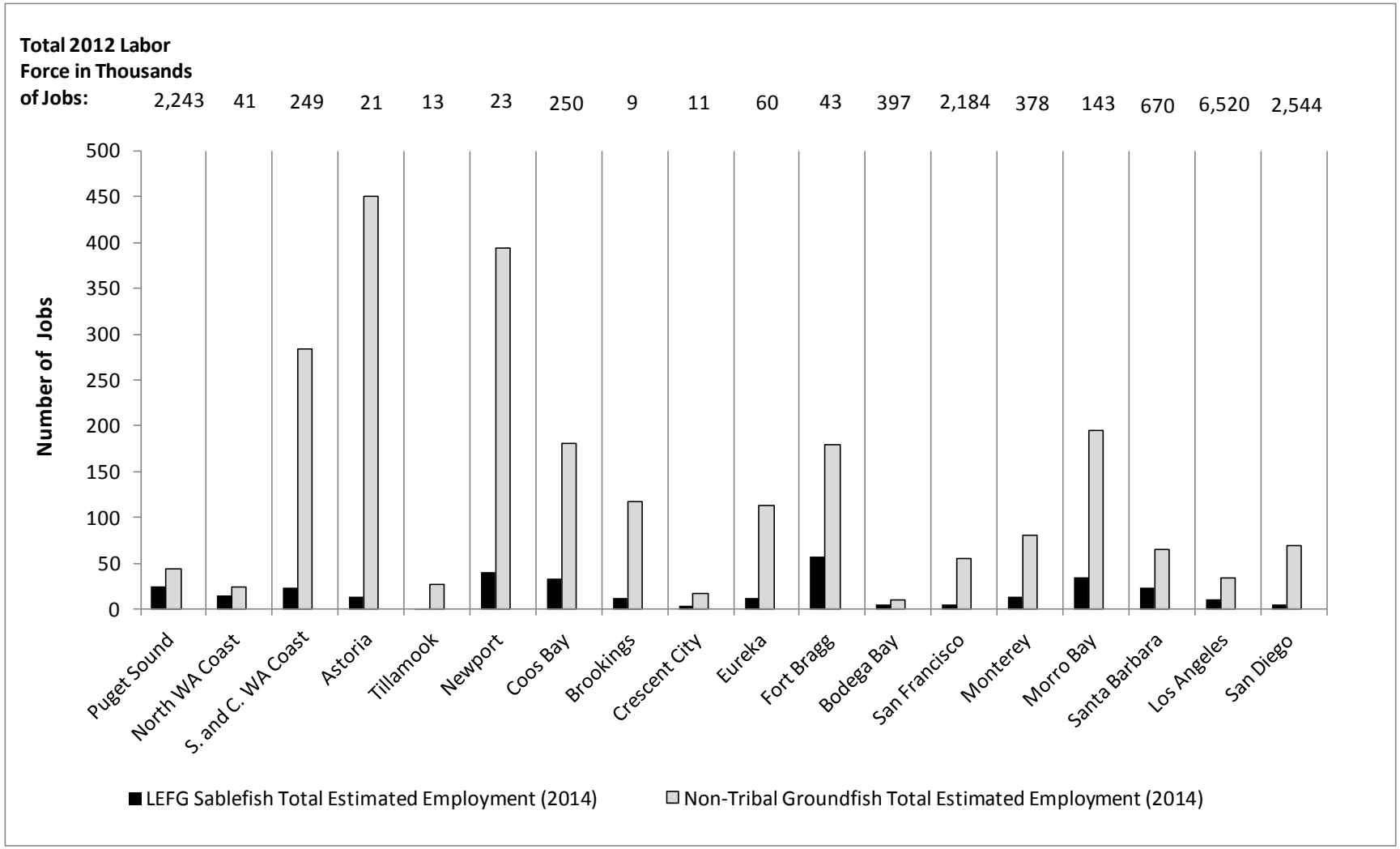

Figure 3-15. West Coast port dependence on the LEFG sablefish fishery in terms of employment (estimated number of jobs using 2014 data) in comparison to employment by the total non-tribal groundfish fishery (2014 data) and the total port-area labor force (2012 data).

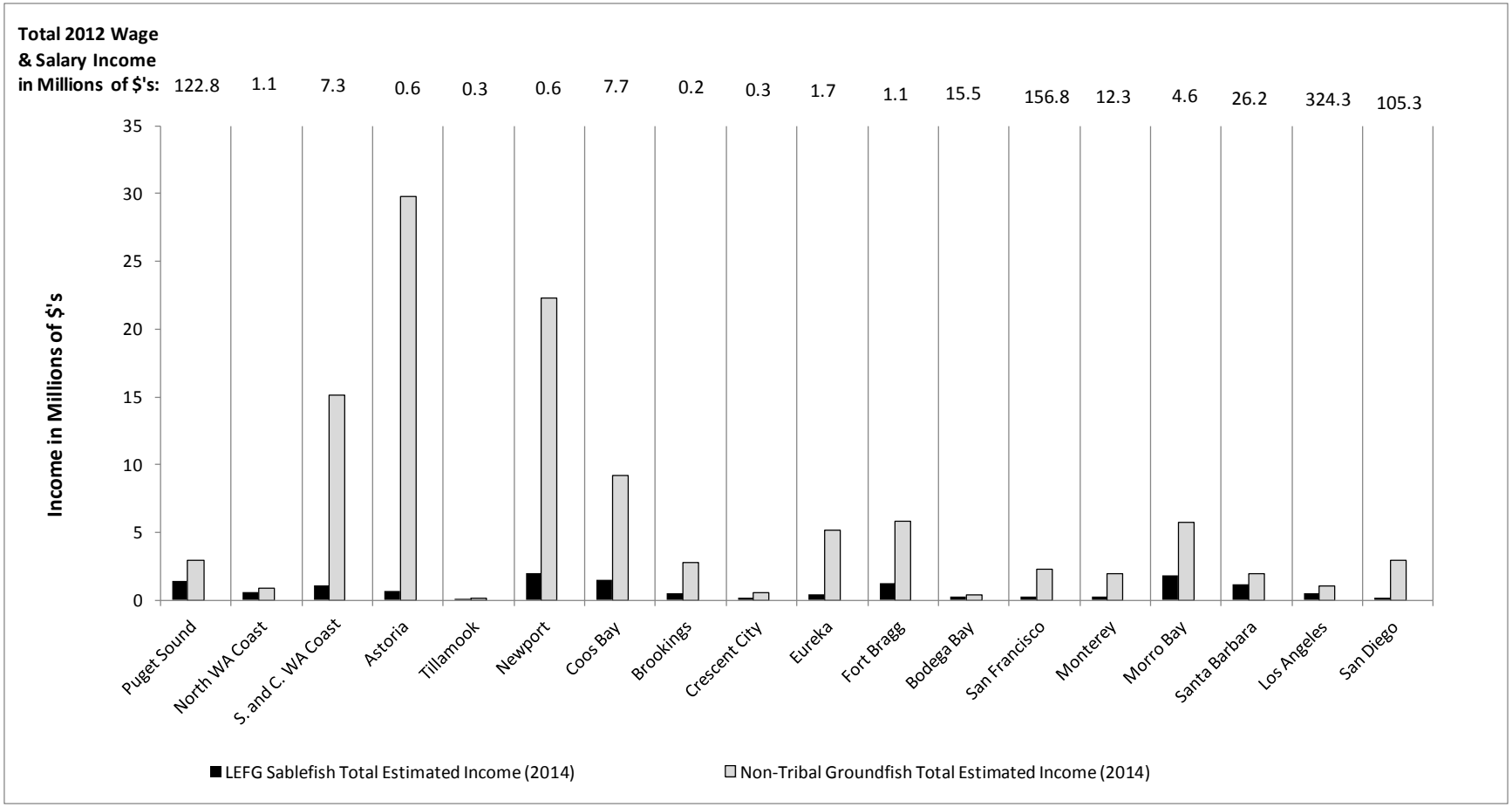

Figure 3-16. West Coast port dependence on the LEFG sablefish fishery in terms of income (estimated wages and salaries for 2014) in comparison to income for the total non-tribal groundfish fishery (2014) and the total port area income from all sources (2012 data).

3.3 Prevent Excessive Concentration of Harvest Privileges

3.3.1 Background

This objective relates to NS 4 on allocation and NS 8 and FMP Objective 16 on fishing communities. In the Council's effort to reduce capacity in the fishery, did they provide an environment for excessive concentration of the remaining harvest privileges among a few individuals or entities? Such concentration could lead to significant changes in the distribution of fishery benefits among participating communities.

3.3.2 Assessment

One source of insight into whether the sablefish program has prevented excessive concentration of harvest privileges is to examine if there is any apparent pattern to the changes in the ownership or control of permits and vessels in the fishery.

Figure 3-17 displays the Gini coefficients for permit and vessel ownership in the LEFG sablefish fishery for selected years prior to (1998 and 2000) and following (2002-2012) implementation of the permit stacking program. Gini coefficients are indicators of the deviation from an equal distribution. In this case, a Gini coefficient of zero would imply an equal distribution of the ownership of permits and vessels, while a value of 1 indicates that a single participant owns all of the permits or vessels. The range of Gini coefficient values in this case indicates very little change in the concentration of ownership and control of the LEFG sablefish vessels and permits following implementation of the permit stacking program. Comparing the averages of Gini coefficient values for the two selected years prior to the program with the averages of the four selected years post-program indicates increases of less than 5 percent and 10 percent in permit ownership and vessel ownership concentrations, respectively.

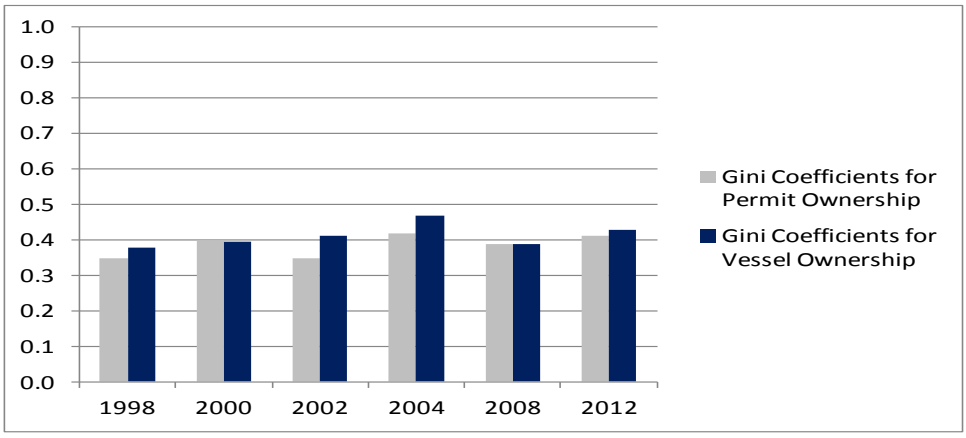

Figure 3-17. Gini coefficients for the concentration of landings in the LEFG primary sablefish fishery by permit and vessel owning entities for selected years before and after implementation of the permit stacking program in 2002.

[Note: A Gini coefficient of 0 implies a perfectly even distribution among all participants, while a coefficient of 1 indicates one owner landed all of the fish.]

3.4 Mitigate the Reallocational Effects of Policies just prior to this Program (e.g., the Three Tier System and Equal Limits)

3.4.1 Background

This very specific objective can really be categorized as a subset of the broader objective of promoting overall equity which is covered in Section 3.5. Both objectives relate to National Standard 4 on allocation, FMP Objective 12 on equitable allocation, and FMP Objective 14 on minimizing disruption.

The regulatory regime prior to Amendment 14 had included a series of partial and short-term policies and actions in an attempt to end the derby fishery during a time when new IQ programs were prohibited by Congress (Table 3-1). In 1997, the regulations substantially flattened the distribution of harvest among vessels in the fleet by giving equal cumulative limits to fishery participants who qualified for LEFG sablefish endorsements. These limits were substantially higher than the maximum landings ever made by many of the lower-level participants and substantially lower than historic landings of the high-liners. The flattening effect of the equal limits in 1997 can be seen by comparing the shapes of the annual lines in Figure 3-7.

3.4.2 Assessment

To assess how well the sablefish program mitigated the effects of the temporary policies used to modify the derby fishery requires comparing the vessel harvests prior to the 1997 equal cumulative limit management regime with harvests following full implementation of the stacking program. The first step toward restoring the prior distribution was the implementation of tiered cumulative limits in 1998. Each sablefish-endorsed permit was assigned to one of three tiers based on its landing history. Tier 1 permits received cumulative limits 3.85 times that of Tier 3 permits, and Tier 2 permits received cumulative limits 1.75 times that of Tier 3 permits. The lines for 1998 and 2000 shown in Figure 3-7 are fairly close together and illustrate some movement away from the 1997 equal cumulative limits distribution and convergence toward the harvest distributions that occurred during the 1996 derby fishery. Landings during the derby year reflect a typical distribution that occurs when all vessels are on an equal footing with respect to speed of harvest. The final step in mitigating the reallocation effects was implementation of the permit stacking program in August 2001 with its allowance for up to three tier-endorsed permits and their associated tier limits to be stacked on a single vessel. The effectiveness of this policy is illustrated in Figure 3-7 by the trend of the annual vessel harvest distribution lines for the years following program implementation to converge ever closer to the 1996 distribution. In general, under the derby system, vessels competed on the basis of how quickly and effectively they could fish. The tier system replaced speed of harvest with other economic factors in determining the competitive outcome, resulting in a somewhat similar distribution of harvest concentration.

3.5 Promote Equity

3.5.1 Background

Promoting equity is an overarching objective that includes the objective of the previous section (3.4). Both objectives relate to NS 4 on allocation, FMP Objective 12 on equitable allocation, and FMP Objective 14 on minimizing disruption. The issue of compliance (with the regulations) also bears heavily on this objective. If some fishermen are not complying with the program, they are often viewed as gaining an unfair advantage over other fishermen.

3.5.2 Assessment

Much of this objective was addressed through the re-establishment under permit stacking of the opportunity to achieve a distribution of harvest among vessels similar to the distributions prior to imposition of equal cumulative limits in 1997, and similar to what is seen in many other fisheries (Figure 3-7).

Regarding compliance with regulations, data on the number of permits that were estimated to have had sablefish landings exceeding the permit's limit from 2008 through 2013 are shown in Table 3-9. For all tiers taken together, the number of permits fished between 2008 and 2012 ranged from a high of 162 in 2011 to a low of 158 in 2012[6]. During that time, the number of permits estimated to have landings exceeding their permit limits ranged from a low of 25 in 2012 to a high of 41 in 2009; or a range of 16 percent to 25 percent of total permits in the fishery. A cursory review of data for individual permits did not indicate that it was the same permits that were consistently over (or under) their limits. Also, the amount (percentage) of the overage has generally been quite small over that range of years, as shown in Figure 3-18. These data would tend to support the conclusion that noncompliance is not a significant equity issue for the fishery, and it has also not been a significant target of industry comments to the Council. Table 3-9 also shows the percent of pounds landed short of the permit quotas (i.e., the underage) . It is noteworthy that in each year shown in the table the total underage is significantly larger than the total overage, thus resulting in consistent under-harvest of the total allowable quotas in each year of the period (Figures 3-4 and 3-5).

3.6 Resolve or Prevent New Allocation Issues from Arising

3.6.1 Background

This objective relates to NS 4 on allocation and FMP Objectives 12 on equitable sharing and 14 on minimizing disruption.

[6] Landings for year 2013 were excluded from this comparison since the fishery in that year was not complete at the time of the data query and consequently may be artificially low.

Table 3-9. Comparison of tier quotas to landings in the LEFG primary sablefish fishery, 2008-2013.

				Overage				Underage			
Tier	Number of Permits Fished	Total Tier Quota (lbs)	Tier Limits (lbs)	Percent of Pounds Landed over the Tier Quota	Number of Permits Over	Maximum Overage (lbs)	Avgerage Overage (lbs)	Percent of Pounds Landed under the Tier Quota	Number of Permits Under	Maximum Underage (lbs)	Avgerage Underage (lbs)
All Tiers											
2008	161	3,419,500	-	+0.1%	40	562	111	-4.1%	114	-11,457	-1,217
2009	161	4,335,303	-	+0.2%	41	1,847	199	-5.8%	113	-31,739	-2,232
2010	158	3,911,903	-	+0.2%	36	1,984	172	-5.3%	112	-23,313	-1,860
2011	162	3,385,864	-	+0.6%	28	3,409	671	-7.0%	124	-18,533	-1,904
2012	161	3,270,288	-	+0.4%	25	6,433	538	-10.0%	134	-28,346	-2,452
2013[a/]	131	1,997,251	-	+0.3%	19	1,701	358	-27.1%	112	-27,838	-4,839
Tier 1											
2008	28	1,358,000	48,500	+0.1%	8	194	90	-1.4%	20	-9,599	-926
2009	28	1,716,288	61,296	+0.2%	11	1,847	298	-5.3%	17	-31,739	-5,400
2010	28	1,570,268	56,081	+0.0%	10	115	53	-2.0%	16	-23,313	-1,974
2011	28	1,335,516	47,697	+0.0%	2	93	62	-3.8%	26	-11,330	-1,944
2012	28	1,294,664	46,238	+0.6%	11	6,433	652	-9.9%	17	-28,346	-7,518
2013[a/]	23	793,799	34,513	+0.1%	2	629	438	-31.2%	21	-27,838	-11,810
Tier 2											
2008	42	924,000	22,000	+0.2%	9	562	175	-4.7%	32	-8,250	-1,364
2009	42	1,170,204	27,862	+0.2%	11	872	193	-6.8%	29	-14,427	-2,744
2010	41	1,045,172	25,492	+0.1%	10	441	110	-6.7%	29	-11,234	-2,400
2011	42	910,560	21,680	+1.2%	8	3,409	1,390	-9.5%	28	-18,533	-3,090
2012	42	882,714	21,017	+0.3%	5	2,924	607	-9.0%	36	-17,449	-2,213
2013[a/]	35	549,080	15,688	+0.4%	6	1,701	410	-23.2%	29	-12,654	-4,384
Tier 3											
2008	91	1,137,500	12,500	+0.2%	23	560	94	-6.7%	62	-11,457	-1,235
2009	91	1,448,811	15,921	+0.2%	19	783	145	-5.6%	67	-11,553	-1,206
2010	89	1,296,463	14,567	+0.4%	16	1,984	285	-8.3%	67	-11,430	-1,599
2011	92	1,139,788	12,389	+0.7%	18	1,948	420	-8.7%	70	-9,975	-1,415
2012	91	1,092,910	12,010	+0.3%	9	2,416	361	-11.1%	81	-10,287	-1,495
2013[a/]	73	654,372	8,964	+0.5%	11	1,271	315	-25.5%	62	-8,256	-2,691

a/ On the query date (11/04/2013), data were 90 percent complete in PacFIN--through: August for Washington Department of Fish and Wildlife, September for Oregon Department of Fish and Wildlife, and July for California Department of Fish and Wildlife data.

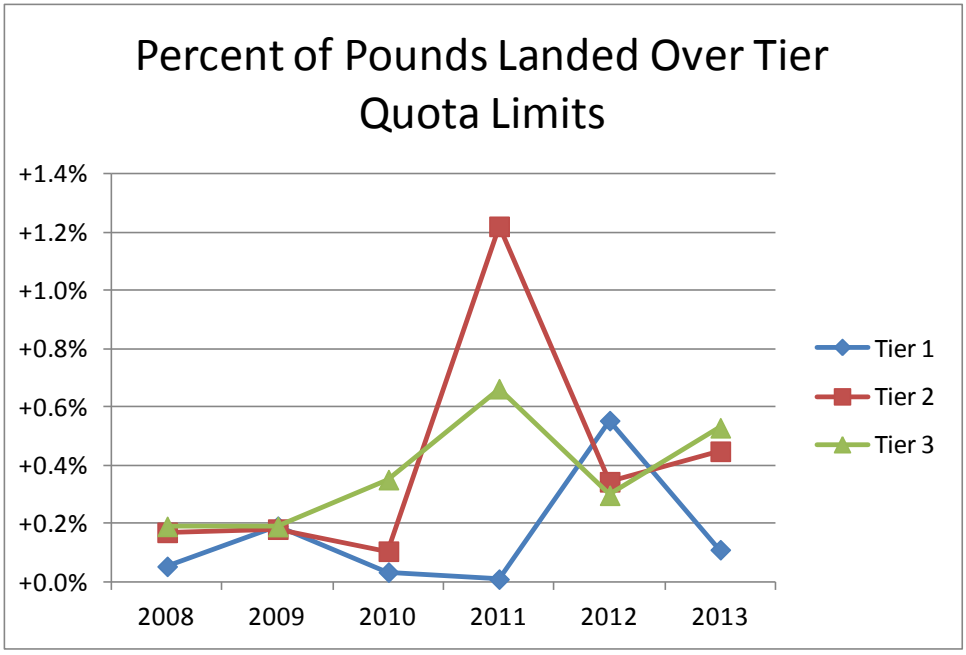

Figure 3-18. Total overage for all vessels with overages as a percent of pounds allocated by tier limit category for 2008-2013. Data for 2013 is incomplete.

3.6.1 Assessment

Since implementation of the permit stacking program in 2002, there have been few calls for any changes to the allocations within the fixed gear sector. Most discussion and concern has been with intersector allocations. However, while there was some brief discussion of the intersector sablefish allocation during the Council's formal consideration of its groundfish allocations for Amendment 21, it was decided that, relative to other workload concerns at that time, there was not a sufficient need to reconsider intersector allocations of sablefish.

Within the LEFG sector, 15 percent of the sablefish is set aside for a DTL fishery. There has been some suggestion that this allocation and its management might be revisited, but up until the time this program review was initiated, the interest in modifications has not been sufficient to bring the topic onto the Council agenda.

3.7 Promote Safety

3.7.1 Background

This objective relates to NS 10 and FMP Objective 17 on safety. Before Amendment 14 was implemented, the LEFG sablefish fishery had become a classic derby fishery, lasting only 5 days in 1996. Such classic derby fisheries are well-known for creating safety hazards. The short seasons provide a strong incentive to fish regardless of the weather in order to get an adequate share of the catch and also encourage taking risks with overloading the capacity of the vessel or

to skip important maintenance at inopportune times (National Resarch Council, Marine Board, Committee on Fishing Vessel Safety, 1991).

3.7.2 Assessment

The elimination of the derby fishery through the extension of the season to seven months could be expected to have a positive effect on reducing the pressure to fish under unsafe conditions. Support for this assumption could be inferred from the fact that following implementation of Amendment 14, there has been an absence of anecdotal reports on safety problems associated with the primary fishery, particularly in comparison to the volume of concerns expressed during the derby fisheries of the mid-1990s. However, explicit information on significant safety incidents that might be useful in evaluating the safety record of the fleet before and after implementation of the fixed gear permit stacking program is not readily available.

While the United States Coast Guard (USCG) keeps safety incident statistics, it is only possible to isolate those statistics by date, geographic area, and broad fishery categories (e.g., groundfish, salmon, etc.). Available data bases of past incidents do not provide direct information on the fishery in which a vessel involved in an incident was participating (particularly when events prevented a vessel from making a landing). However, the incident report required (of the vessel operator and any insurance company) in current Federal law (Title 46 Part 28.80) now includes information on the specific fishery, intended catch, and length of fishery opening. This may help to make more fishery-specific data available in the future.

Table A.3 in the Council's Fishery Ecosystem Initiatives Appendix to the Pacific Coast Ecosystem Fishery Plan (PFMC, 2013) uses USCG vessel incident data to display recorded vessel incidents by FMP (e.g., groundfish, salmon, etc). However, the data do not identify the specific season or fishery in which the incidents occurred. The available data primarily cover a time period after implementation of the permit stacking program.

The Northwest Fisheries Science Center is currently conducting an assessment that examines fishery and permit data, available incident report data from the USCG, and certain weather information in an attempt to provide more specific insights into the safety effects of the LEFG sablefish permit stacking program within the primary sablefish fishery. The preliminary results of the assessment have been made available as a working paper (Pfeiffer & Gratz, 2014) with the intent of issuing the final report as a NMFS technical publication. The authors used USCG incident databases filtered by location, timing, and vessel and permit information to try to isolate reported incidents which are likely to have occurred during the primary sablefish fishery from 1994 through 2012 (Figure 3-19). While the number of incidents appears to have generally declined after the permit stacking program, the number of reported incidents is small (four or fewer per year) and, as such, random events may appear significant. Figure 3-20, also from the working paper, shows that the proportion of trip starts under high wind advisories appears to have declined and remained consistently smaller than during the pre-program period.

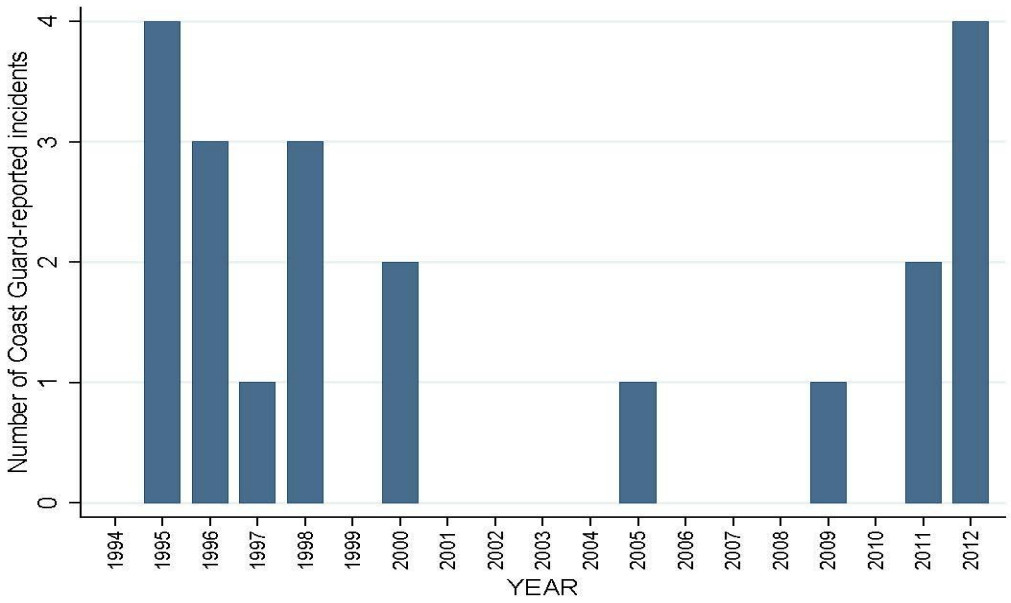

Figure 3-19. Number of USCG-reported incidents in the LEFG primary sablefish fishery (from Pfeiffer and Gratz, 2014).

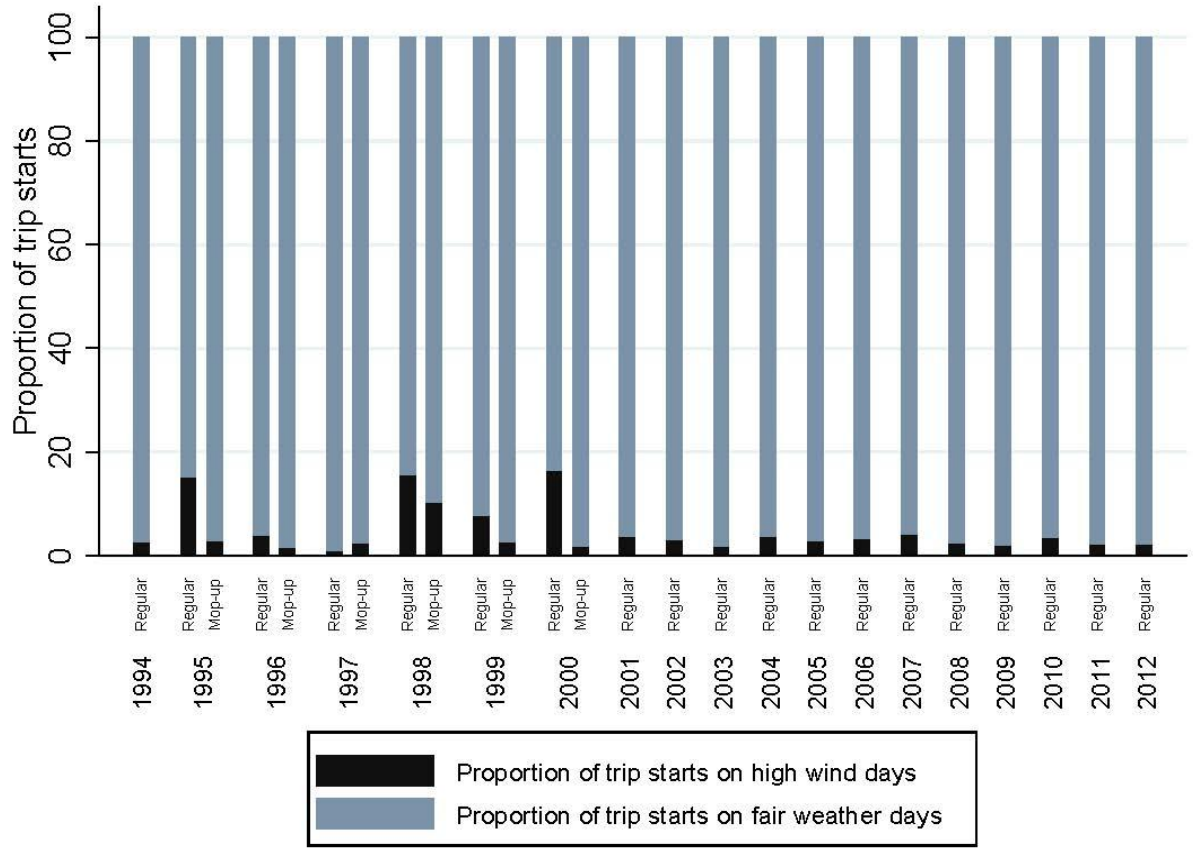

Figure 3-20. Proportion of trip starts on high wind days and fair weather days (from Pfeiffer and Gratz, 2014).

Figure 3-20 also shows that in years prior to the program the proportion of trip starts under high wind advisories in the mop-up fishery was generally lower than it was for the short regular (derby) seasons. Mop-up fisheries provided IQ to the permit holders and thus were similar to the current permit stacking program. The results of this assessment would seem to help confirm an improvement in safety following initiation of the permit stacking program. The report authors hope to continue working to discern the safety effects from various other factors that would influence these statistics, such as vessel size, expected costs and revenues, and alternative fishery opportunities.

3.8 Improve Product Quality and Value

3.8.1 Background

This objective relates to NS 5 on efficiency and FMP Objective 6 on net national benefits. Determining achievement of this objective could be reflected by changes in the sales price and volume of sablefish after implementation of Amendment 14. However, changes in ex-vessel price (the most readily-available data) are strongly driven by market conditions which might overshadow any effects resulting from a change in product quality. For example, sales volumes and prices for some species have been influenced by shifts in fuel prices, which affect transportation costs, and also by the recent worldwide recession because species like sablefish are essentially luxury goods. An analysis of the difference between ex-vessel prices for fixed-gear-caught and trawl-caught sablefish during the derby years, compared with the price differential between these gears after implementation of the permit stacking program could provide some limited insight. A widening gap might indicate an improvement in the quality of fixed gear-caught sablefish. Larger fish generally bring higher prices and might be considered higher quality. Size of fish landed may also be increased by gear selectivity or high-grading, which the longer season may facilitate. However, unfortunately, there is no consistent and reliable information from fish tickets on the size of fish landed.

3.8.2 Assessment

Figure 3-21 displays average annual ex-vessel sablefish prices (revenue per round weight pound) by gear type in inflation-adjusted 2013 dollars. The longline and pot gear prices are heavily weighted by, but not exclusive to, landings in the LEFG primary sablefish fishery. Relative to trawl landings, the size of the price differential for longline and pot gear landings does not seem to show any significant change after the permit stacking program was initiated and, as stated above, is likely to be influenced by market conditions and other factors to a greater extent than by events in the West Coast sablefish fishery.

Data displayed in Figures 3-21 and 3-22 may indicate some stabilization of the price differential between gear types during the period following implementation of the permit stacking program, but prior to the start of the trawl IFQ (2002 through 2010). This stabilization may reflect harvesters' increased ability to tailor deliveries to meet market demand and thereby garner better

prices, rather than being solely at the mercy of whatever prices prevailing market conditions happened to present during the relatively short seasons prior to 2002.

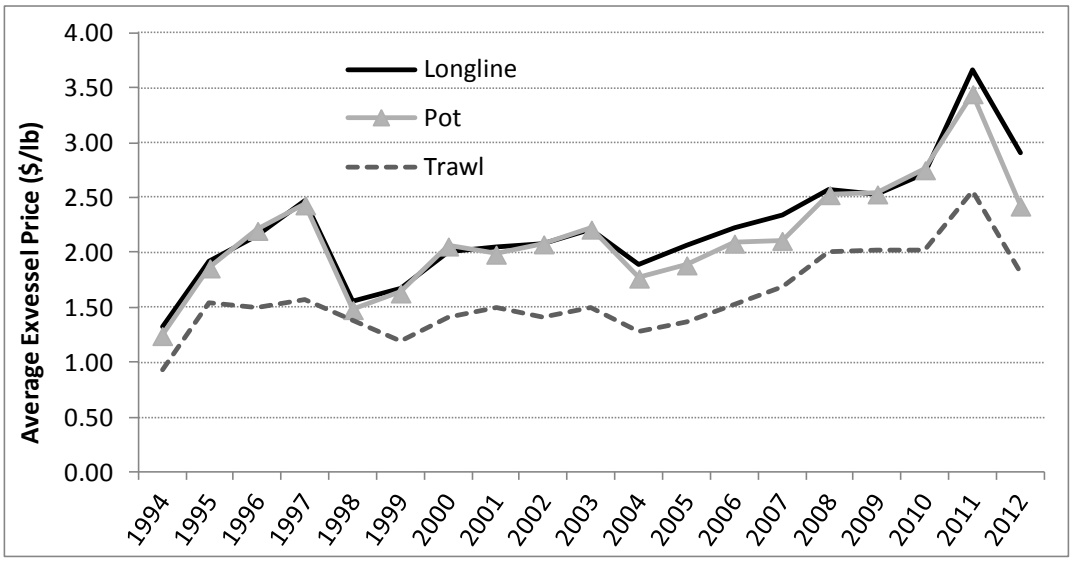

Figure 3-21. Average annual ex-vessel sablefish prices by gear type in inflation-adjusted 2013 dollars per pound (1994-2012).

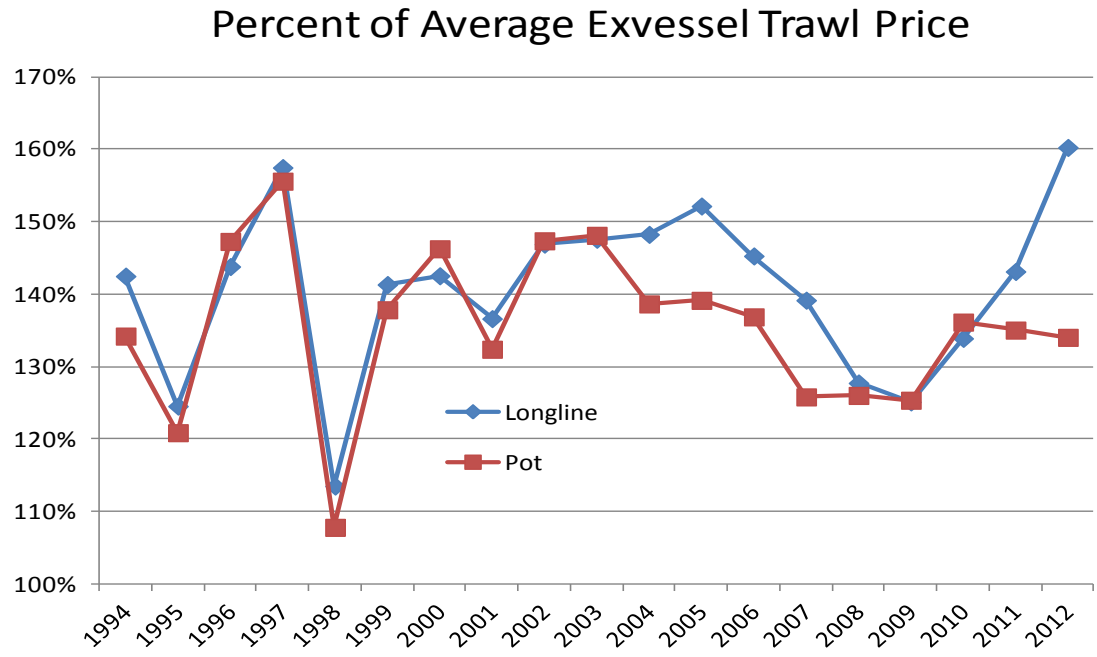

Figure 3-22. Average annual ex-vessel prices received for sablefish caught by longline and pot gear expressed as a percent of prices received for trawl-caught sablefish: 1994-2012 (inflation-adjusted 2013 dollars per pound).

From 2009 to 2011, ex-vessel prices for all three gear types showed a rapid upward trend, reaching their highest levels in inflation-adjusted terms since the beginning of the time series, before falling in 2012 (Figure 3-21). The Groundfish Advisory Subpanel testimony suggests that some of this change may be due to the directed sablefish fleet moving off of some of their shallower fishing grounds to avoid certain overfished rockfish species such as yelloweye. Figure 3-22 also shows a dramatic departure since 2010 in the price differential for longline gear-caught sablefish compared to the price differential earned for pot-gear landings.

3.9 Avoid Creating Substantial New Disruptive Effects

3.9.1 Background

This objective relates to FMP Objective 15 that directs the Council when considering alternative management measures to choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and environment. The Council moved toward the permit stacking program because the existing derby fishery and initial limited steps available to deal with it were a significant cause of disruption to the historical fishery.

3.9.2 Assessment

The derby fishery and equal cumulative limit system that the permit stacking program replaced were extremely disruptive. The Council and industry were mostly in accord with moving to the permit stacking program. When the new program was proposed for implementation, only seven entities provided formal comments on the proposed rule (two state agencies, one commercial organization, and four individuals). Public comment generally included overall positive comments about the program. Dissent generally concerned specific issues relating to a few individuals (e.g., permit allocation, ownership or control, and owner-on-board requirements). The comments were generally split between support or opposition to the owner-on-board requirement, the limit on the number of permits that could be stacked, and the restrictions on processing at sea.

Not only did the permit stacking program avoid new disruption, it replaced the ongoing disruption of the derby fishery and equal cumulative limits with a much more efficient program that was more compatible with the existing fishing industry stakeholders. The objective was achieved with program implementation that allowed for a longer, more reasonable fishing season, and by allowing fishermen to acquire and stack permits rather than directly changing the allocation among permits. Given that permit caps (tier limits) were already in place, the creation of a longer season allowed participants to have more flexibility in when they went fishing. At the same time, the allowance for tiers based on fishing history and the capability to stack permits limited disruption of former practices and provided sufficient flexibility to meet the different and changing needs among the fishermen. In the 12 years the program has operated, the Council has received little, if any, complaint about disruption caused by the program.

3.10 Create a Program that Will Readily Transition to a Multi-month IQ Program

3.10.1 Background

The type of program created for the sablefish fishery assists in attaining capacity reduction recommendations in the Groundfish Strategic Plan and responds to NS 6 (take into account variations and contingencies). Individual harvest quotas that are transferable provide the fleet with substantial flexibility to respond to changing conditions in the fishery or to changes faced by individual fishermen. The properties of transferability and divisibility also address NS 5 (efficiency) and FMP Objective 6 (achieving the best possible net economic benefit).

3.10.2 Assessment

At the time it was implemented, the permit stacking program transitioned to a multi-month catch share program with a season that is seven months long. To date, there have been no moves to consider allowing the sablefish tiers to be separated from permits or divided into smaller units, such that the permit stacking program would resemble a more typical IFQ program. While such divisibility could be added to the program, this might diminish achievement of other standards and objectives. Net effects would have to be assessed during consideration of such a change.

While there have been no Council actions or discussions regarding a transition to a more typical IFQ program, the objective of Amendment 14 was to create a program that could readily make such a transition, not necessarily to make the transition. The existence of an already-implemented allocation among permits addresses one of the major challenges for new catch share programs (the initial allocation). On that basis, this objective might be considered to have been met.

3.11 Management Costs and Cost Recovery

The MSA requires LAPPs to develop a methodology and means to identify and assess cost of management, data collection and analysis, and enforcement programs that are directly related to and in support of the LAPP. Further, the Secretary of Commerce is authorized to establish and collect fees paid by holders of limited access privileges that will cover the costs of management, data collection and analysis, and enforcement activities; not to exceed 3 percent of the ex-vessel value of the fish harvested under the program. The LEFG sablefish program was established prior to the addition of these requirements in the MSA and, to this point, a means to identify costs or policies to establish a cost recovery program have not been developed.

Prior to the program review, incremental costs associated with this LAPP were likely minimal, although at this time no quantitative assessment of incremental costs has been done. However, certain actions being considered during this review process would implement an electronic fish ticket and modify the control rules. Also, the Council has taken action to allow trawl and LEFG-

endorsed permits to be registered to the same vessel at the same time. These actions may introduce additional incremental administrative costs. For example, implementation of modified control rules could require collection of additional information on the vessel ownership interest form (or design of a new form), as well as new database programming requirements that would take time and would require additional funding to implement. These are examples of additional incremental costs that could be tracked and partially recovered through implementation of a cost recovery program for the LAPP.

4.0 RESEARCH NEEDS

At the Council's April 2014 meeting, the SSC recommended the following future research to add further insight into the LEFG sablefish tier permit fishery.

1. Routine collection of permit sale prices to indicate the market value of the fishery.

2. Collect information about crew, captains, and owners of vessels. Information about the county of residence and participation in the fishery is necessary to understand the regional economic impacts of the fishery (for models such as IO-PAC), and to estimate the number of people who directly work in the fishery. This information will also assist in an evaluation of the community effect of the owner-on-board requirement.

5.0 CONCLUSIONS

Overall, this review supports the conclusion that the LEFG sablefish permit stacking program, adopted under Groundfish FMP Amendment 14, has been mostly successful in achieving a significant majority of the goals and objectives intended by the Council. The work group drafting this review believes that sufficient information and data are available to classify eight of the Council's ten objectives as significantly achieved. Two objectives could not be adequately assessed to sufficiently indicate a probable result. However, existing data and anecdotal information suggests that the Council's actions have been at least neutral in regard to these two objectives. Table 5-1 summarizes the work group's conclusions.

Table 5-1. Preliminary conclusions of the work group on the success of the Council's LEFG sablefish permit stacking program.

Objective	Assessment Summary and Preliminary Conclusions
1. Rationalize Fleet and Promote Efficiency (Significantly Achieved)	• Significantly lengthened seasons and ended derby fishery (Table 3-1 and Figure 3-1). • Reduced number of participating vessels (Figure 3-2) while: ◦Improving the ability of the fleet to achieve, without exceeding, the overall harvest allocation (Figures 3-4 and 3-5); ◦Allowing appropriate flexibility in how permits are stacked and fished (Tables 3-2 through 3-4); and ◦Allowing a similar concentration of landings as the original fishery (Figures 3-6, 3-7, and 3-8).
2. Maintain or Direct Benefits toward Fishing Communities (Limited Assessment; Likely Neutral Effect)	• Appears to be a possible decrease in involvement of Puget Sound in recent years and an increase in Brookings and Morro Bay. Landings data are extremely variable and program effects cannot be clearly separated from other sources of variation (Figures 3-11 through 3-14).
3. Prevent Excessive Concentration of Harvest Privileges (Significantly Achieved)	• Comparison of annual Gini coefficients indicate little change in the concentration of permit and vessel ownership after implementation of the permit stacking program. Comparing the averages of the years prior to the program with the averages of the years post-program indicates increases of less than 5 percent and 10 percent in permit and vessel ownership concentrations, respectively (Figure 3-17).
4. Mitigate the Reallocational Effects of Policies in place just prior to this Program (Significantly Achieved)	• Maintained a similar concentration of landings as the original fishery (Figures 3-7 and 3-8).
5. Promote Equity (Significantly Achieved)	•Maintained a similar concentration of landings as the original fishery (Figures 3-7 and 3-8). • Estimates of landings exceeding tier quota limits are very small and there does not appear to be a consistent pattern of offending permits over time (Figure 3-18 and Table 3-8).
6. Resolve or Prevent New Allocation Issues from Arising (Significantly Achieved)	• Few calls for any changes to the allocations within the fixed gear sector. • During formal consideration of groundfish allocations for Amendment 21, Council decided that there was not a sufficient need to examine reallocations of sablefish among sectors.
7. Promote Safety (Significantly Achieved)	• Significantly lengthened season and eliminated the derby fishery (Table 3-1 and Figure 3-1). • USCG incident data and estimates of trip starts under high wind conditions indicate generally safer vessel operations (Figures 3-19 and 3-20).
8. Improve Product Quality and Value (Limited Assessment)	• Changes in ex-vessel prices do not indicate a significant change in product value and are driven by numerous variables outside the scope of this study. However, since the inception of the program there may have been stabilization in the relative price differential between fixed gear and trawl-caught sablefish (Figures 3-21 and 3-22).

Objective	Assessment Summary and Preliminary Conclusions
9. Avoid Creating New Disruptive Effects (Significantly Achieved)	• Allowed season of reasonable length without changing allocations, by creating flexibility with permit stacking.
10. Capability to Readily Transition to a Multi-Month IQ Program (Significantly Achieved)	• Allocations are already established (a difficult first step in an IQ program) and could be transitioned to a more typical IQ program (with divisible quota freely transferable separate from the limited entry permits) if the need arises. Thus far the program is working well enough that there has been no call for such a transition.

6.0 COUNCIL RECOMMENDATIONS

At the June 2014 meeting, the Council approved the draft sablefish program review document and recommended that another review be scheduled in 7 years.

In addition, the Council made five recommendations that will be included in the omnibus workload consideration and prioritization at the September 2014 Council meeting:

1. Include tracking of permit price upon the transfer of permits in future data collection;
2. Require that all pot gear be returned to shore at the end of each fishing trip;
3. Convert daily trip limits to a tier endorsement;
4. Combine longline and pot gear limited entry gear endorsements into a single fixed gear endorsement; and
5. Move the seaward line of the Rockfish Conservation Area closer to shore for pot vessels.

At the June meeting, the Council also adopted recommendations regarding the three permit own-and-hold regulations and requirements for electronic reporting (see Section 1.2).

7.0 REFERENCES

Brinson, Ayeisha A. and Thunberg, Eric A. 2013. The Economic Performance of U.S. Catch Share Programs. *NOAA Technical Memorandum NMFS-F/SPO-133, 160 p.* U.S. Department of Commerce.

Federal Register. 2001. Fisheries off West Coast States and in the Western Pacific Coast Groundfish Fishery; Amendment 14, Final Rule. *Vol. 66, No. 45*, 41152-41159.

National Resarch Council, Marine Board, Committee on Fishing Vessel Safety. 1991. Fishing Vessel Safety: Blueprint for a National Program. National Research Council.

Pfeiffer, L., & Gratz, T. 2014. The effects of the Limited Entry Fixed Gear Sablefish Permit Stacking Program on Vessel Safety. NMFS Working Paper, April 15, 2014. Seattle, Washington.

PFMC. 1992. Amendment 6 (Limited Entry) to the Fishery Management Plan for Pacific Groundfish. January 1992. Portland, Oregon: Pacific Fishery Management Council.

PFMC. 1996. Amendment 9 to the Fishery Management Plan for Pacific Coast Groundfish (Limited Entry Fixed Gear Sablefish Endorsement). September 1996. Portland, Oregon: Pacific Fishery Management Council.

PFMC. 2010. Groundfish Fishery Management Plan 21 (Intersector Allocation). Portland, Oregon: Pacific Fishery Management Council.

PFMC. 2013. Pacific Coast Fishery Ecosystem Plan for the U.S. Portion of the California Current Large Marine Ecosystem (July 2013). Portland, Oregon: Pacific Fishery Management Council.

PFMC. 2000. Pacific Fishery Management Council Groundfish Strategic Plan "Transition to Sustainability". Portland, Oregon: Pacific Fishery Management Council.

PFMC. 2001. Permit Stacking, Season Extension, and Other Modifications to the Limited Entry Fixed Gear Sablefish Fishery (Amendment 14) (March 2001 ed.). Portland, Oregon: Pacific Fishery Management Council.

PFMC and NMFS. 2010. Rationalization of the Pacific Coast Groundfish Limited Entry Trawl Fishery. Portland, Oregon: Pacific Fishery Management Council.

ATTACHMENT

Net Revenue Earned in the West Coast Limited Entry Fixed Gear Groundfish Fishery and Primary Sablefish Fishery During 2010

Carl Lian
Economic and Social Science Research
Northwest Fisheries Science Center
Seattle, WA 98112
May 2014

I. Introduction

This paper provides estimates of total cost net revenue earned by commercial catcher vessels in the West Coast limited entry fixed gear groundfish fishery, West Coast limited entry fixed gear sablefish fishery, and the West Coast primary sablefish fishery. Estimates of total cost net revenue are based on 2010 cost earnings data collected by the Northwest Fisheries Science Center (NWFSC) in cooperation with the Pacific States Marine Fisheries Commission (PSMFC).

Since the cost earnings survey collected cost data at the vessel level and most of the vessels considered in this paper participate in multiple fisheries, producing estimates of total cost net revenue at the fishery level requires allocating joint costs to individual fisheries. This paper allocates the costs incurred by catcher vessels responding to the cost earnings survey to individual fisheries. After cost data has been allocated to individual fisheries, it is used to calculate the total cost net revenue derived from operations in individual fisheries.

II. Data Requirements and Cost Earnings Survey Data

A. Defining Revenues and Costs Directly Related to Commercial Fishing Vessel Operation

Estimating total cost net revenues earned by operating a commercial fishing vessel requires data on vessel revenues and costs. Since the same entity that owns a commercial fishing vessel may also be engaged in any number of other fishing related or non-related activities, it is important to define which revenues and costs are included in the measurement of net revenue.

The NWFSC economic data collection program focuses on collecting revenue and cost information directly related to the operation of a commercial fishing vessel. There are a variety of costs that are associated with running a catcher vessel that are not requested on the form because it is difficult to determine the share of the cost associated with the vessel. These costs include items that can be used for activities other than fishing, or are too difficult to allocate to a particular vessel in a multi-vessel company. These expenses include office space, pickup trucks, storage of equipment, professional fees, and marketing. In general, the data collection forms attempt to capture costs that are directly related to vessel maintenance and fishing operations, and not costs that are related to activities or equipment off the vessel. For these reasons, the aggregated measures of costs (variable costs, fixed costs, and total costs) underestimate the true costs of operating a business.

Since most vessels considered in this paper operate in multiple fisheries, much of the available cost data pertain to multiple fisheries. While some of the costs, such as vessel repairs and maintenance, are joint costs, other costs, such as fuel, are not necessarily joint costs but are not reported separately by fishery in the survey[7] While it is not necessary to disaggregate costs in order to analyze net revenue for all vessel operations, it is necessary in order to analyze net revenue associated with operations in the West Coast limited entry fixed gear groundfish fishery, the West Coast limited entry fixed gear sablefish fishery, and the West Coast primary sablefish fishery.

B. Data Sources

Data on ex-vessel revenue, landings, and number of active vessels in each fishery considered in this analysis was obtained from the Pacific Fisheries Information Network (PacFIN). Cost information for catcher vessels was obtained from a voluntary cost earnings survey conducted by the NWFSC in cooperation with the PSMFC. Survey responses were obtained from 67 of the 142 (47%) vessels participating in the limited entry fixed gear groundfish fishery during 2010 and 53 of the 90 vessels (59%) participating in the primary sablefish fishery during 2010. Table 1 provides a list of the cost categories collected from catcher vessels by this survey.

C. Testing and Correcting for Non-response Bias

A two sample t-test was used to determine whether the differences observed between survey respondents and non-respondents were statistically significant. The two sample t-test is based on a null hypothesis that the mean value of the variable being tested is the same for respondents and non-respondents. Variables considered when testing for non-response bias were vessel length, engine horsepower, West Coast sablefish revenue, and West Coast landings revenue from all species.

Tests for non-response bias indicated that non-response bias was statistically significant at the 91% confidence level for the limited entry fixed gear fleet. Therefore, the responses to the limited entry fixed gear survey were weighted in order to reduce non-response bias. Survey weights were based on the species that accounted for the most vessel landings and the dollar value of West Coast landings. Non-response bias for the limited entry fixed gear fleet resulted from higher response rates for vessels that participate in the primary sablefish fishery (and have a higher level of landings) than vessels that participate in other groundfish fisheries (such as the live thornyhead fishery).

---

[7] Joint costs are production costs incurred by the firm when two or more outputs are jointly produced. Joint costs can occur when the cost of an input is a fixed cost and when that input is used to produce multiple outputs either concurrently or consecutively. In the case of concurrent outputs, a variable cost can be a joint cost. Repair and maintenance costs that prepare the vessel for use in all fisheries are joint costs. If a single trawl tow harvests both sablefish and Dover sole, the fuel used to harvest the sablefish and Dover sole from the same tow is a joint cost. However, fuel costs incurred to harvest sablefish in July and crab in December would not be a joint cost even if fuel expense is reported on an annual basis.

III. Calculating Fishery Costs

This section presents the methodology used to allocate costs reported on the 2010 cost earnings survey for vessel operations to individual fisheries. Because cost data collected from the limited entry groundfish fixed gear fleet covers vessel operations in all fisheries, it is necessary to allocate reported cost data to individual fisheries for vessels participating in multiple fisheries in order to obtain cost data for individual fisheries. Allocating costs to individual groundfish fishery is necessary to calculate the total cost net revenue earned by participants in the fishery.

Terry et al. (1996) identify three properties any cost allocation method should satisfy. First, a cost allocation method should be the same for all fisheries in which a commercial fishing vessel participates. Second, the cost allocation method should be simple and easy to understand (in order to promote trust in the analysis). Third, the cost allocation method should be equitable. They recommend the use of facilities method (UFM) of cost allocation, which allocates costs to fisheries in proportion to the use of common facilities by each fishery. Three methods of implementing the UFM method of cost allocation are (i) by days at sea in each fishery, (ii) by revenue earned in each fishery, and (iii) by pounds harvested in each fishery. For information on the method used to allocate each cost category to individual fisheries, see Appendix A of Steiner, Harley, and Lee (2014).

IV. Net Revenue

Table 2 presents estimates of total revenue, total costs, and total cost net revenue derived from survey respondents participating in the limited entry fixed gear groundfish fishery, the West Coast limited entry fixed gear sablefish fishery, and the West Coast primary sablefish fishery. The 67 survey respondents participating in the West Coast limited entry fixed gear groundfish fishery earned revenue of $109,801 per vessel, incurred $95,271 in costs, and earned $14,530 in total cost net revenue. When the per vessel total cost net revenue of $14,530 for survey respondents is multiplied by the population of 142 vessels in the fishery, an estimate of $2,063,260 total cost net revenue earned in the West Coast limited entry fixed gear groundfish fishery is obtained.

The average survey respondent earned $94,380 revenue in the West Coast limited entry fixed gear sablefish fishery (which includes both the primary sablefish fishery and the daily fishery). The average vessel incurred $81,338 in costs from operations in this fishery, and earned $13,042 in total cost net revenue from these operations. When the per vessel total cost net revenue of $13,042 is multiplied by the 139 vessels participating in this fishery, an estimate of $1,812,838 is obtained for total cost net revenue earned by all fishery participants.

Among the 53 survey respondents who participated in the primary sablefish fishery, the average revenue earned in the primary sablefish fishery was $123,362. The average vessel incurred costs of $105.203 from operations in the primary sablefish fishery and earned total cost net revenue of $18,159. When the per vessel total cost net revenue of $18,159 is multiplied by the 90 vessels participating in the fishery, an estimate of $1,634,310 in total cost net revenue is obtained for the primary sablefish fishery during 2010. During 2010 the primary sablefish fishery earned 90% of the total cost net revenue earned in the limited entry

fixed gear sablefish fishery and 79% of the total cost net revenue earned in the limited entry fixed gear groundfish fishery.

V. Variations by Vessel Size and Geography

The data reported in Table 2 provides an estimate of total cost net revenue across all vessels operating in each fishery. This section examines how total cost net revenue earned by survey respondents varied by length of vessel and state in which the vessel made the most West Coast landings. This comparison is provided for the limited entry fixed gear groundfish fishery and the primary sablefish fishery.

Table 3 classifies each survey respondent as having a vessel less than 35 feet in length, 35 to 50 feet in length, or over 50 feet in length. Within the limited entry fixed gear groundfish fishery, total cost net revenue per vessel rises from $4,811 for vessels under 35 feet to $14,881 for vessels between 35 and 50 feet in length and $18,715 for vessels over 50 feet in length. For vessels under 35 feet in length, total cost net revenue is a smaller share of revenue than for vessels over 35 feet in length. Within the limited entry fixed gear groundfish fishery, survey respondents in Oregon had the highest revenue and total cost net revenue while survey respondents in California had the lowest revenue and total cost net revenue. Total cost net revenue as a share of revenue was slightly higher in Oregon than Washington, and slightly higher in Washington than California.

Within the primary sablefish fishery, results are not reported for vessels under 35 feet in length because the number of survey respondents was not sufficient to protect data confidentiality. Total cost net revenue as a percentage of revenue increases as vessel length increases --- from 14% for vessels between 35 and 50 feet in length to 16% for vessels over 50 feet in length. Vessels in Oregon and Washington earned higher total cost net revenue as a percentage of revenue (15%) than vessels in California (12%). . .

Table 1
Cost Categories Collected by Limited Entry
Fixed Gear Catcher Vessel Survey

Cost Category

Variable Cost Categories
- Bait
- Captain
- Communications
- Crew
- Fishing association dues
- Food
- Freight
- Fuel and lubrication
- Ice
- License fees
- Observers
- Offloading
- Supplies
- Travel
- Trucking

Fixed Cost Categories (Capitalized and Expensed Collected Separately)
- Fishing gear
- Processing equipment
- Vessel and on-board equipment

Other Fixed Cost Categories (Expensed)
- Insurance premium payments
- Lease of vessel
- Moorage

Data for 2010 was collected in 2010 dollars. All cost, revenue, and total cost net revenue figures reported in this document are reported in 2010 dollars.

Table 2
Total Cost Net Revenue Earned in Three Limited Entry Fixed Gear Fisheries

Fishery	Revenue Per Vessel	Total Cost Per Vessel	Total Cost Net Revenue Per Vessel	Total Cost Net Revenue Fishery
Limited Entry Fixed Gear Groundfish	$109,801	$95,271	$14,530	$2,063,260
Limited Entry Fixed Gear Sablefish	$94,380	$81,338	$13,042	$1,812,838
Primary Sablefish	$123,362	$105,203	$18,159	$1,634,310

Table 3
Variation in Total Cost Net Revenue with Vessel Length and State

Fishery	Revenue Per Vessel	Cost Per Vessel	Total Cost Net Revenue Per Vessel
Limited Entry Fixed Gear Groundfish	$109,801	$95,271	$14,530
< 35 feet	$58,212	$53,401	$4,811
35 to 50 feet	$107,627	$92,746	$14,881
➢ 50 feet	$144,229	$125,514	$18,715
California	$83,123	$73,823	$9,300
Oregon	$121,199	$103,766	$17,433
Washington	$107,168	$93,940	$13,228
Primary Sablefish	$123,362	$105,203	$18,159
< 35 feet	---	---	---
35 to 50 feet	$108,274	$93,127	$15,147
➢ 50 feet	$152,139	$128,317	$23,822
California	$81,222	$71,100	$10,122
Oregon	$150,470	$127,261	$23,209
Washington	$118,298	$100,777	$17,521

Revenue, Costs, and Total Cost Net Revenue not reported for vessels < 35 feet in the primary sablefish fishery because the number of observations was not sufficient to protect respondent confidentiality

References:

Steiner, E., A. Harley, and T. Lee. 2014. Economic Data Collection Program Cather Vessel Report 2009-11, Northwest Fisheries Science Center. Available at www.nwfsc.noaa.gov/research/divisions/fram/economic/economic_data.cfm

Terry, J. G. Silvia, D. Squires, W. Silverthorn, J. Seger, G. Munro, R. Marasco, D. Larson, J. Kirkley, L. Jacobson, S. Herrick, J. Gauvin. 1996. A. Gantan, S. Freese, and R. Baldwin, Fixed Costs and Joint Cost Allocation in the Management of Pacific Whiting - A Workshop Report, NMFS-SWFSC-234.