

## **Evaluating the Performance of Amendment 21 Allocations Since Implementation of the Trawl Catch Share Program**

Pacific Coast Groundfish Fishery Management Plan (FMP) Amendment 21 (Am 21) established long-term, formal allocations<sup>1</sup> to trawl and non-trawl sectors of the groundfish fishery. Sector allocations, designed to support the trawl catch share program, were implemented in 2011. The Pacific Management Council (Council) scheduled a five-year review of the performance of the trawl catch share program, including the Am 21 sector allocations, when developing the program. This paper evaluates the performance of Am 21 allocations by considering annual catches by sector relative to their allocations of the available harvest of FMP stocks managed with formal allocations. The analysis and discussions of allocation issues provided in this document are meant to support the five-year review of formal allocations that was called for in Am 21, in conjunction with the five-year review of the trawl catch share program. The issues raised in this document are not inclusive; other issues associated with formal allocations may arise in the scoping process.

### **Considerations for Evaluating the Performance of Intersector Allocations**

In considering the way forward on the review of intersector allocations, it is useful to review the practices and factors to be considered in that process, as recommended in the relevant National Marine Fisheries Service (NMFS) policy directive: 01-119-02, <http://www.nmfs.noaa.gov/op/pds/documents/01/119/01-119-02.pdf>. The following are the relevant topics covered in that directive.

#### ***Recommended Practices When Reviewing and Making Allocation Decisions***

- a. Evaluate and Update Council and Fishery Management Plan (FMP) Objectives.
- b. Identify User Needs.
- c. Minimize Speculative Behavior.
- d. Plan for Future Conditions.

#### ***Factors to Consider When Reviewing and Making Allocation Decisions***

“ . . . The list of factors is not all-inclusive, as there may be other appropriate factors to consider. . . .”

##### **1. Ecological Factors**

- a. What are expected ecological impacts on target species?
- b. What are the expected ecological impacts on other fisheries? What is the status of non-target species? What are the expected impacts on bycatch and bycatch mortality of both non-target species and protected species?

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<sup>1</sup> Formal allocations are specified in the FMP and can only be changed with an FMP amendment.

- c. What are the impacts on the marine ecosystem? What are the impacts on habitat? What are the impacts on the ecological community (e.g., relevant predator, prey, or competitive dynamics)?

## 2. Economic Factors

- a. Can economic efficiency be improved?
- b. What are the economic impacts of potential changes in allocation?

## 3. Social Factors

- a. Is an allocation fair and equitable?
- b. Are there disproportionate adverse effects on low income and/or minority groups?
- c. What is the importance of fishery resources to fishing communities?
  - i. What is the individual, local, and regional dependence and engagement in each sector?
  - ii. What is the community's vulnerability and adaptive capacity?
  - iii. Are there other social impacts?

## 4. Indicators of Performance and Change

- a. What are the trends in catch/landings?
- b. What is the status of fishery resources?
- c. Has the distribution of the species changed?
- d. What is the quality of information available for each sector or group?

Many of the factors listed for consideration have or are being addressed in recent Council-related projects. For ecological factors, a number of the portions of Item 1 related to ecological impacts have been covered by the analytical results from the Atlantis model generated for Amendment 24. That analysis indicated that removals of groundfish species other than Pacific whiting across a wide range of removals analyzed did not result in any significant ecological impacts to the California Current ecosystem (Council and NMFS 2015). Portions related to habitat may be covered in the current essential fish habitat review process.

The issues and considerations provided in this document address many of the economic and social factors relevant to an evaluation of existing allocations. Those that have not been explicitly addressed, such as disproportionate effects on low income and/or minority groups, were addressed in the [original analysis of Amendment 21 allocations](#) and remain unchanged. Other economic and social factors, such as the vulnerability and adaptive capacity of fishing communities are incorporated by reference from the analyses used to inform biennial management decisions (e.g., the [analyses informing 2017-2018 groundfish specifications and management measures](#)). Information on vulnerability and adaptability of fishing communities in which the trawl fishery is active will be augmented by the project team working on the Trawl Catch Share Program Five-Year Review.

Many of the indicators of Performance and Change are addressed to some degree in this document. Catches by sector, provided below, cover trends in catch and landings. Information on the status of the fishery resource and the distribution of the stocks can be found in the [2016 Groundfish Stock](#)

[Assessment and Fishery Evaluation \(SAFE\)](#) document. Information on the quality of information available for each sector or group might need to be compiled from the Northwest Fishery Science Center and the [Pacific Fisheries Information Network \(PacFIN\)](#) and [Recreational Fisheries Information Network \(RecFIN\)](#) data systems.

## **Stocks Considered in This Evaluation**

Stocks with formal sector allocations include arrowtooth flounder, chilipepper rockfish south of 40° 10' N. lat., darkblotched rockfish, Dover sole, English sole, lingcod, longspine thornyhead north of 34° 27' N. lat., stocks in the Other Flatfish complex, Pacific cod, Pacific ocean perch (POP) north of 40° 10' N. lat., Pacific whiting, petrale sole, sablefish north of 36° N. lat., sablefish south of 36° N. lat., shortspine thornyhead north of 34° 27' N. lat., shortspine thornyhead south of 34° 27' N. lat., stocks in the Slope Rockfish complex north of 40° 10' N. lat., stocks in the Slope Rockfish complex south of 40° 10' N. lat., splitnose rockfish south of 40° 10' N. lat., starry flounder, widow rockfish, and yellowtail rockfish north of 40° 10' N. lat.

Catches by sector of these species (other than Pacific whiting) from 2011-2015 are provided in Table 1. Pacific whiting allocations only affect the trawl sectors (non-trawl set-asides are specified) and a discussion of impacts associated with within-trawl allocations is provided below. Sector catches for the species listed in Table 1 are provided in NMFS West Coast Groundfish Observer Program (WCGOP) groundfish total mortality reports available at [https://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_products/data\\_library.cfm#groundfish](https://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/data_library.cfm#groundfish). Sector allocations of sablefish north of 36° N lat. were decided prior to development of Am 21, but are included in this evaluation since Am 21 called for a review of all formal allocations included in the FMP. This allocation is discussed in more detail below.

The evaluation of these sector allocations explores the potential of stranded (i.e., unused) yield, identifies potential choke species that impede access to target species' allocations, and addresses some issues that should be considered in evaluating performance of these formal allocations.

## **Trawl/Non-Trawl Allocations**

The formal allocations of FMP stocks to non-tribal trawl and non-trawl sectors, as well as the annual allocations, impacts, and percent attainment of allocations by these sectors in aggregate during 2011-2015 are provided in Table 1. The average, minimum, and maximum allocations, catches, and attainment rates for trawl and non-trawl sectors during 2011-2015 are provided in Table 2.

### ***Evidence of Stranded Yield***

Primary target stocks, such as petrale sole in the trawl fishery and sablefish in both trawl and non-trawl fisheries, have had high attainment rates since the trawl catch share program was implemented (Table 1 and Table 2). Shortspine thornyhead north of 34° 27' N. lat. have also experienced relatively high attainment rates. Of the formally allocated overfished stocks, darkblotched and POP have had relatively high attainment rates indicating the potential for these stocks to be choke species that can inhibit access to target stocks. Both of these stocks are known to constrain some trawl fishing activities.

Many of these stocks can and do constrain trawl fishing activities regardless of the sectors' attainment rates. For example, arrowtooth flounder, with an average trawl sector attainment of 33 percent during 2011-2015 (Table 2), has constrained individuals in the trawl fishery due to low quotas at the permit level. The constraining nature of arrowtooth to the fishery was in part due to annual catch limits (ACL) that were biased low due to overly conservative removal assumptions<sup>2</sup> when projecting allowable harvests in the 2007 assessment (Kaplan and Helser 2008). The Council partially mitigated this bias by requesting a catch-only update of the 2007 arrowtooth assessment with actual catches assumed removed from the population since then (see [Agenda Item I.4, Attachment 3, November 2015](#)). Other considerations for reducing unnecessary fishery constraints (arrowtooth is a healthy and abundant stock) include a change in the allocation framework to reduce the amount of stranded yield in the non-trawl allocation.

Many of the stocks formally allocated under Am 21 are trawl-dominant (defined as  $\geq 90$  percent of the average available historical harvest to non-tribal groundfish fisheries was caught by limited entry trawl sectors). The trawl-dominant stocks include arrowtooth flounder, darkblotched rockfish, Dover sole, English sole, longspine thornyhead north of  $34^{\circ} 27'$  N. lat., Pacific cod, POP north of  $40^{\circ} 10'$  N. lat., petrale sole, shortspine thornyhead north of  $34^{\circ} 27'$  N. lat., and splitnose rockfish south of  $40^{\circ} 10'$  N. lat.. A minimum allocation of 5 percent of the fishery harvest guideline (fishery HG) of the trawl-dominant species was allocated to non-trawl sectors under Am 21 (Table 1) creating the potential for stranded yield in non-trawl fisheries based on this allocation scheme.

One consideration would be to manage the non-trawl impacts of trawl-dominant stocks using set-asides. The fishery HG would then be allocated to trawl sectors decreasing the potential of stranding yield that could be utilized in the trawl fishery. These stocks are not targeted in non-trawl fisheries and the management system could be structured such that incidental catch in non-trawl gears would not constrain their activities (i.e., set-aside management). Managing stock impacts with sector allocations implies limits to their take and a management response to maintain sector impacts within allocations. When there is a low level of truly incidental bycatch of such stocks, it might make sense to specify set-asides, which can be changed every two years in the specifications process. This adaptive management strategy may be preferable to hard allocations.

Non-trawl set-asides could also be considered for arrowtooth flounder, darkblotched rockfish, Dover sole, English sole, longspine thornyhead north of  $34^{\circ} 27'$  N. lat., petrale sole, POP north of  $40^{\circ} 10'$  N. lat., and splitnose rockfish south of  $40^{\circ} 10'$  N. lat. since these stocks are caught incidentally and not targeted by non-trawl gears. The amount of yield set-aside to accommodate bycatch in non-trawl fisheries can be specified every two years to react to fishery observations and to consider the relative risk of overfishing any of these stocks. Shortspine thornyhead north of  $34^{\circ} 27'$  N. lat. might also be considered for set-aside management in non-trawl fisheries. However, there is a successful target fishery for shortspine thornyhead south of  $34^{\circ} 27'$  N. lat. using non-trawl gears. If this becomes more of a non-trawl target stock in the north, then set-aside management may not be appropriate.

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<sup>2</sup> Assessments in 2007 assumed ABC removals (now denoted OFLs) when projecting future biomass instead of the current assumption of ACL removals.

### *Amendment 6 Considerations*

FMP Amendment 6 (Am 6), which established the commercial non-treaty limited entry system, also established allocation procedures for any species to be newly allocated between commercial open access (including directed and incidental open access) and limited entry based on catch history for the license limitation allocation period (July 11, 1984 through August 1, 1988). The species that were affected by Am 6 are lingcod, chilipepper rockfish, yellowtail rockfish, the species in the rockfish complexes, and shortspine thornyhead north of the Conception area. Am 21 superseded any Am 6 allocations for affected species (i.e., lingcod, the species in the Slope Rockfish complexes north and south, and shortspine thornyhead north). The FMP also suspends such allocations for overfished species. In current practice, the Am 6 limited entry and open access allocations are rarely met, due to constraints imposed by management measures designed to rebuild overfished species.

As part of the five-year review, the question of whether the Am 6 allocations of species in the Nearshore and Shelf Rockfish complexes (the remaining stocks affected by Am 6) should continue. Nearshore rockfish allocations are managed by state policies and nearshore FMPs in California and Oregon. Access to shelf rockfish is severely affected by species' rebuilding plans, and Am 6 allocations of shelf rockfish are unlikely to be an issue for the foreseeable future.

Table 1. West coast groundfish sector allocations and catches (in mt) since implementation of Amendment 21, 2011-2015 (highlighted cells indicate attainment rates  $\geq 90\%$ ).

Stocks	Intersector Allocations		2011							2012						
	Trawl Sectors	Non-Trawl Sectors	Fishery HG	Trawl Sectors			Non-Trawl Sectors			Fishery HG	Trawl Sectors			Non-Trawl Sectors		
				Alloc	Catch	% Attain	Alloc	Catch	% Attain		Alloc	Catch	% Attain	Alloc	Catch	% Attain
Arrowtooth Flounder	95.0%	5.0%	13,096	12,441	2,532	20.3%	655	60	9.2%	9,971	9,472	2,394	25.3%	499	43	8.5%
Chilipepper S. of 40°10'	75.0%	25.0%	1,966	1,475	317	21.5%	492	6	1.2%	1,774	1,331	288	21.7%	444	9	2.0%
Darkblotched	95.0%	5.0%	279	265	103	38.8%	14	16	113.3%	277	263	88	33.6%	14	9	65.9%
Dover Sole	95.0%	5.0%	23,410	22,240	7,796	35.1%	1,171	7	0.6%	23,410	22,240	7,024	31.6%	1,171	10	0.8%
English Sole	95.0%	5.0%	19,661	18,678	138	0.7%	983	1	0.2%	10,050	9,548	147	1.5%	503	1	0.3%
Lingcod	45.0%	55.0%	4,154	1,869	270	14.4%	2,285	523	22.9%	4,037	1,817	358	19.7%	2,220	645	29.1%
Longspine N. of 34°27'	95.0%	5.0%	2,075	1,971	944	47.9%	104	6	6.3%	2,020	1,919	892	46.5%	101	6	5.9%
Other Flatfish	90.0%	10.0%	4,686	4,217	710	16.8%	469	101	21.5%	4,686	4,217	690	16.4%	469	96	20.6%
Pacific Cod	95.0%	5.0%	1,200	1,140	258	22.6%	60	4	6.6%	1,200	1,140	396	34.7%	60	3	4.5%
POP N. of 40°10'	95.0%	5.0%	144	137	54	39.3%	7	1	9.3%	144	137	53	38.8%	7	0	5.7%
Petrale Sole	95.0%	5.0%	911	865	810	93.7%	46	1	3.1%	1,095	1,040	1,033	99.3%	55	2	3.8%
Sablefish N. of 36° a/	52.5%	47.5%	4,941	2,597	2,399	92.4%	2,345	2,391	102.0%	4,790	2,517	2,187	86.9%	2,273	1,899	83.6%
Sablefish S. of 36°	42.0%	58.0%	1,264	531	453	85.3%	733	764	104.3%	1,224	514	223	43.3%	710	481	67.7%
Shortspine N. of 34°27'	95.0%	5.0%	1,528	1,452	730	50.3%	76	73	95.5%	1,511	1,435	711	49.5%	76	63	83.6%
Shortspine S. of 34°27'	50 mt	NA	363	50	6	12.2%	313	177	56.5%	359	50	1	1.9%	309	127	41.0%
Slope RF N. of 40°10'	81.0%	19.0%	1,092	885	235	26.6%	207	66	31.7%	1,092	885	293	33.1%	207	129	62.2%
Slope RF S. of 40°10'	63.0%	37.0%	599	377	52	13.8%	222	138	62.4%	599	377	124	32.9%	222	131	59.1%
Splitnose S. of 40°10'	95.0%	5.0%	1,454	1,381	40	2.9%	73	0	0.2%	1,531	1,454	60	4.1%	77	0	0.4%
Starry Flounder	50.0%	50.0%	1,345	673	12	1.7%	673	13	1.9%	1,353	677	8	1.2%	677	9	1.3%
Widow	91.0%	9.0%	539	491	174	35.6%	49	2	4.1%	539	491	232	47.3%	49	6	13.3%
Yellowtail N. of 40°10'	88.0%	12.0%	3,857	3,394	820	24.2%	463	54	11.7%	3,872	3,407	1,066	31.3%	465	38	8.3%

Stocks	Fishery HG	2013						2014						
		Trawl Sectors			Non-Trawl Sectors			Trawl Sectors			Non-Trawl Sectors			
		Alloc	Catch	% Attain	Alloc	Catch	% Attain	Alloc	Catch	% Attain	Alloc	Catch	% Attain	
Arrowtooth Flounder	4,070	3,867	2,449	63.3%	204	28	13.7%	3,671	3,487	1,749	50.2%	184	28	15.5%
Chilipepper S. of 40°10'	1,466	1,100	393	35.7%	367	8	2.2%	1,423	1,067	312	29.2%	356	12	3.2%
Darkblotched	296	281	122	43.5%	15	4	27.0%	309	294	108	36.9%	15	5	32.9%
Dover Sole	23,410	22,240	7,956	35.8%	1,171	6	0.5%	23,410	22,240	6,455	29.0%	1,171	5	0.5%
English Sole	6,712	6,376	220	3.5%	336	1	0.2%	5,543	5,266	237	4.5%	277	0	0.1%
Lingcod	3,860	1,737	346	19.9%	2,123	878	41.4%	3,654	1,644	248	15.1%	2,010	985	49.0%
Longspine N. of 34°27'	1,963	1,865	1,056	56.6%	98	9	8.9%	1,912	1,816	884	48.7%	96	7	7.0%
Other Flatfish	4,682	4,214	810	19.2%	468	162	34.6%	4,682	4,214	841	20.0%	468	147	31.5%
Pacific Cod	1,191	1,131	154	13.6%	60	2	4.1%	1,191	1,131	166	14.7%	60	2	3.3%
POP N. of 40°10'	134	127	55	43.7%	7	0	3.9%	137	130	45	34.6%	7	0	3.6%
Petrale Sole	2,358	2,240	2,118	94.6%	118	4	3.0%	2,418	2,297	2,316	100.8%	121	2	1.4%
Sablefish N. of 36° a/	3,575	1,878	1,835	97.7%	1,696	1,354	79.8%	3,878	2,038	1,876	92.1%	1,840	1,487	80.8%
Sablefish S. of 36°	1,434	602	87	14.4%	832	525	63.1%	1,555	653	198	30.4%	902	484	53.6%
Shortspine N. of 34°27'	1,481	1,407	871	61.9%	74	59	79.5%	1,466	1,393	718	51.5%	73	53	71.7%
Shortspine S. of 34°27'	355	50	4	7.4%	305	109	35.8%	351	50	3	5.3%	301	97	32.4%
Slope RF N. of 40°10'	1,098	889	240	27.0%	209	80	38.2%	1,098	889	209	23.4%	209	50	24.0%
Slope RF S. of 40°10'	597	376	117	31.2%	221	22	10.0%	601	379	99	26.3%	222	38	17.1%
Splitnose S. of 40°10'	1,598	1,518	46	3.0%	80	0	0.1%	1,658	1,575	65	4.1%	83	0	0.5%
Starry Flounder	1,513	757	3	0.5%	757	5	0.6%	1,521	761	15	1.9%	761	11	1.4%
Widow	1,411	1,284	443	34.5%	127	20	15.6%	1,411	1,284	710	55.3%	127	20	15.7%
Yellowtail N. of 40°10'	3,677	3,236	989	30.6%	441	38	8.6%	3,681	3,239	1,205	37.2%	442	49	11.0%

Stocks	2015						
	Fishery HG	Trawl Sectors			Non-Trawl Sectors		
		Alloc	Catch	% Attain	Alloc	Catch	% Attain
Arrowtooth Flounder	3,410	3,240	1,727	53.3%	171	38	22.3%
Chilipepper S. of 40°10'	1,604	1,203	192	16.0%	401	7	1.8%
Darkblotched	317	301	103	34.1%	16	4	23.2%
Dover Sole	48,406	45,986	6,227	13.5%	2,420	10	0.4%
English Sole	9,640	9,158	325	3.6%	482	4	0.8%
Lingcod	3,547	1,596	203	12.7%	1,951	1,244	63.7%
Longspine N. of 34°27'	3,124	2,968	756	25.5%	156	7	4.3%
Other Flatfish	8,545	7,691	832	10.8%	855	162	18.9%
Pacific Cod	1,091	1,036	377	36.4%	55	6	11.5%
POP N. of 40°10'	143	136	40	29.4%	7	1	7.1%
Petrale Sole	2,579	2,450	2,498	101.9%	129	9	7.1%
Sablefish N. of 36° a/	4,281	2,250	2,177	96.8%	2,031	1,997	98.3%
Sablefish S. of 36°	1,714	720	161	22.4%	994	444	44.7%
Shortspine N. of 34°27'	1,686	1,602	717	44.7%	84	48	56.7%
Shortspine S. of 34°27'	881	50	1	1.3%	831	78	9.4%
Slope RF N. of 40°10'	1,629	1,319	143	10.8%	310	60	19.4%
Slope RF S. of 40°10'	673	424	69	16.3%	249	36	14.3%
Splitnose S. of 40°10'	1,705	1,620	29	1.8%	85	0	0.3%
Starry Flounder	1,524	762	6	0.8%	762	23	3.0%
Widow	1,880	1,711	338	19.8%	169	7	4.2%
Yellowtail N. of 40°10'	5,560	4,893	993	20.3%	667	44	6.6%

a/ The Fishery HG for sablefish north of 36° N lat. is the commercial fishery HG (recreational impacts are managed as set-asides). Therefore, only commercial allocations and catches are depicted for non-trawl sectors. The allocation percentages are revised from those specified in the FMP to break down the formal allocations for trawl vs. commercial non-trawl sectors.



**Table 2. Average, minimum, and maximum sector allocations, catches, and attainment rates of formally allocated groundfish stocks during 2011-2015 (based on the data provided in Table 1). (Minimum and maximum catches and attainment rates do not necessarily occur in the same year).**

Stocks	Average Catches and Attainment Rates By Sector, 2011-2015						Minimum Catches and Attainment Rates By Sector, 2011-2015				Maximum Catches and Attainment Rates By Sector, 2011-2015			
	Trawl Sectors			Non-Trawl Sectors			Trawl Sectors		Non-Trawl Sectors		Trawl Sectors		Non-Trawl Sectors	
	Alloc	Catch	% Attain	Alloc	Catch	% Attain	Catch	% Attain	Catch	% Attain	Catch	% Attain	Catch	% Attain
Arrowtooth Flounder	6,501	2,170	33.4%	342	39	11.5%	1,727	20.3%	28	8.5%	2,532	63.3%	60	22.3%
Chilipepper S.	1,235	300	24.3%	412	8	2.0%	192	16.0%	6	1.2%	393	35.7%	12	3.2%
Darkblotched	281	105	37.4%	15	8	51.0%	88	33.6%	4	23.2%	122	43.5%	16	113.3%
Dover Sole	26,989	7,092	26.3%	1,420	8	0.6%	6,227	13.5%	5	0.4%	7,956	35.8%	10	0.8%
English Sole	9,805	213	2.2%	516	2	0.3%	138	0.7%	0	0.1%	325	4.5%	4	0.8%
Lingcod	1,733	285	16.4%	2,118	855	40.4%	203	12.7%	523	22.9%	358	19.9%	1,244	63.7%
Longspine N.'	2,108	907	43.0%	111	7	6.2%	756	25.5%	6	4.3%	1,056	56.6%	9	8.9%
Other Flatfish	4,911	777	15.8%	546	134	24.5%	690	10.8%	96	18.9%	841	20.0%	162	34.6%
Pacific Cod	1,116	270	24.2%	59	3	5.9%	154	13.6%	2	3.3%	396	36.4%	6	11.5%
POP N.	133	49	37.1%	7	0	6.0%	40	29.4%	0	3.6%	55	43.7%	1	9.3%
Petrale Sole	1,778	1,755	98.7%	94	4	3.8%	810	93.7%	1	1.4%	2,498	101.9%	9	7.1%
Sablefish N.	2,256	2,095	92.9%	2,037	1,826	89.6%	1,835	86.9%	1,354	79.8%	2,399	97.7%	2,391	102.0%
Sablefish S.	604	224	37.2%	834	540	64.7%	87	14.4%	444	44.7%	453	85.3%	764	104.3%
Shortspine N.	1,458	749	51.4%	77	59	77.0%	711	44.7%	48	56.7%	871	61.9%	73	95.5%
Shortspine S.	50	3	5.6%	412	118	28.6%	1	1.3%	78	9.4%	6	12.2%	177	56.5%
Slope RF N.	973	224	23.0%	228	77	33.7%	143	10.8%	50	19.4%	293	33.1%	129	62.2%
Slope RF S.	387	92	23.9%	227	73	32.2%	52	13.8%	22	10.0%	124	32.9%	138	62.4%
Splitnose S.	1,510	48	3.2%	79	0	0.3%	29	1.8%	0	0.1%	65	4.1%	0	0.5%
Starry Flounder	726	9	1.2%	726	12	1.6%	3	0.5%	5	0.6%	15	1.9%	23	3.0%
Widow	1,052	380	36.1%	104	11	10.6%	174	19.8%	2	4.1%	710	55.3%	20	15.7%
Yellowtail N.	3,634	1,015	27.9%	496	45	9.0%	820	20.3%	38	6.6%	1,205	37.2%	54	11.7%

### *Allocation of Sablefish North of 36° N lat.*

Sablefish north of 36° N. lat. were formally allocated many years before Am 21 was implemented. However, as with all formal intersector allocations, the Council intended a full review at this juncture. The allocations, estimated mortality, and percent of the annual allocation attained of sablefish north of 36° N. lat. by the non-tribal commercial sectors of the groundfish fishery during 2011-2015 are provided in Table 3.

One issue with the sablefish north allocation is the management line at 36° N. lat. The allocation was decided in an era when the sablefish assessment only assessed the portion of the stock north of 36° N. lat. since the surveys then only extended that far south. However, as is made clear in the last full sablefish assessment (Stewart, *et al.* 2011), the 36° N lat. line “does not likely correspond to any meaningful biological boundary” and Pt. Conception at 34° 27' N. lat. is a more reasonable biogeographic break for west coast sablefish. For many years, there has been a post-stratification of the assessed biomass using trawl survey data to apportion stock biomass north and south of 36° N. lat. to determine the current allocations.

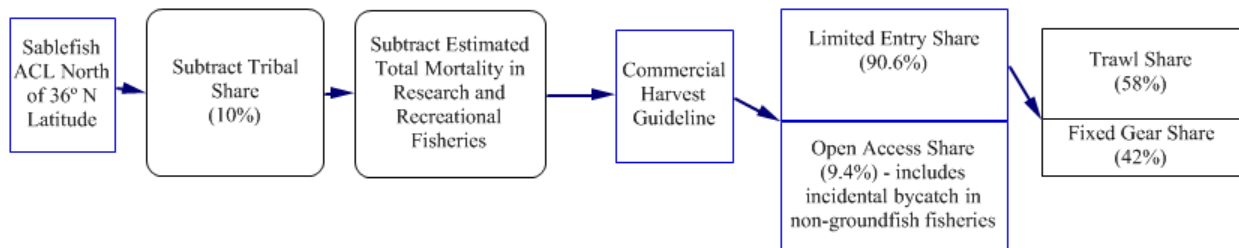
Changing the management boundary from 36° N. lat. to 34° 27' N. lat. could be done without going through a reallocation process. For example, the current allocation scheme (Figure 1) could be recalculated for the portion of the stock north of 34° 27' N. lat. by adding the average proportion of the trawl survey biomass between 34° 27' N. lat. and 36° N. lat. and recalculating the sector allocation percentages north and south. There is an automatic way to recalculate quota shares for individual fishing quota (IFQ) fishermen with a shift in the management line. The Council and NMFS could also reconsider all the formal sablefish sector allocations with a line shift. However, reconsidering sablefish north allocations was explicitly rejected in the Am 21 process, given the contentious nature of that allocation.

There could be issues for the participants in the limited entry fixed gear (LEFG) sector without sablefish-endorsed permits who fish during the primary sablefish season south of 36° N. lat. and north of 34° 27' N. lat. if a management line shift is considered. Those LEFG participants who currently fish in that area for sablefish who did not qualify for a sablefish endorsement in the north would likely be subject to more conservative trip limits than status quo if there was a change in the management boundary. To explore this concern more fully, landings by sablefish vessels operating between 34° 27' N. lat. and 36° N. lat. during 2011-2016 were analyzed. Vessels were categorized by the "principal port" where a plurality of their landings revenue in the fishery occurred (e.g., a vessel in the LEFG fishery that landed, in aggregate during 2011-2016, \$1000 in Moss landing, \$1000 in Monterey, and \$1001 in Morro Bay would be assigned to Principal Port = Morro Bay). Approximately 70 vessels made a total of \$19.6 million in LEFG landings in ports between 34° 27' N. lat. and 36° N. lat. during 2011-2016 (Table 4). 46 of those vessels had Morro Bay or Santa Barbara (i.e., south of 36° N. lat.) as their principle port for LEFG fishery activities in the region. The 52 of those 70 (74 percent) vessels fishing without sablefish endorsements accounted for approximately 72 percent of LEFG landings revenue in the region.

During 2011-2016 approximately 30 vessels made fixed gear landings using limited entry trawl permits ("gear switching") in ports located between 34° 27' N. lat. and 36° N. lat. (Table 5). Of those, 8 vessels also made landings in the region using LEFG permits, of which 5 fished without sablefish endorsements.

**Table 3. Annual allocations and catches of sablefish north of 36° N. lat. for non-tribal commercial sectors, 2011-2015 (highlighted cells indicate attainment rates ≥ 90%).**

Year	Comm. HG	LE Trawl			LEFG			OA		
		Alloc.	Catch	% Attain.	Alloc.	Catch	% Attain.	Alloc.	Catch	% Attain.
2011	4,941	2,597	2,399	92.4%	1,880	1,954	103.9%	464	437	94.0%
2012	4,790	2,517	2,187	86.9%	1,823	1,625	89.1%	450	273	60.6%
2013	3,575	1,878	1,835	97.7%	1,360	1,199	88.1%	336	155	46.0%
2014	3,878	2,038	1,876	92.1%	1,476	1,221	82.7%	365	265	72.7%
2015	4,281	2,250	2,177	96.8%	1,629	1,469	90.2%	402	450	111.9%



**Figure 1. Fixed intersector allocations of sablefish north of 36° N. latitude.**

**Table 4. Landings revenue and counts for vessels fishing with LE Fixed Gear permits making landings between Santa Cruz and Oxnard-Ventura by principal port during 2011-2016.**

Principal Port Area (PPA) <sup>a/</sup>	No. of Vessels	Total Revenue 2011-2016 (\$,000)	Vessels Fishing without SAB Endorsement		Vessels Fishing with SAB Endorsement	
			No. of Vessels	Landings Revenue 2011-2016 (\$,000)	No. of Vessels	Landings Revenue 2011-2016 (\$,000)
Santa Cruz	3	13	b/	b/	b/	b/
Moss Landing	14	2,345	7	559	8	1,733
Monterey	b/	b/	b/	b/	-	-
Morro Bay	27	8,240	20	5,783	10	3,839
Santa Barbara	19	7,452	18	6,137	b/	b/
Oxnard	7	1,524	7	1,524	-	-
Ventura	b/	b/	b/	b/	-	-
	<b>70</b>	<b>19,575</b>	<b>52</b>	<b>14,004</b>	<b>18</b>	<b>5,572</b>

a/ For vessel landings in Monterey, Morro Bay and/or Santa Barbara Port Areas.

b/ Denotes values withheld and combined with totals in adjacent cells due to possible data confidentiality concerns.

**Table 5. Landings revenue and counts for vessels fishing with fixed gears and limited entry trawl permits (i.e., "gear switching") making landings between Santa Cruz and Oxnard-Ventura by principal port during 2011-2016.**

Principal Port Area (PPA) <sup>a/</sup>	No. of Vessels	Total Revenue 2011-2016 (\$,000)	Vessel Also Fishing with LEFG			
			No. of Vessels	LEFG Landings Revenue (\$,000)	No. Fishing LEFG without Sablefish Endorsement	No. Fishing LEFG with Sablefish Endorsement
Moss Landing	5	202	b/	b/	b/	-
Monterey	3	65	-	-	-	-
Morro Bay	22	6,786	8	2,263	5	3
Avila	b/	b/	-	-	-	-
Santa Barbara	b/	b/	-	-	-	-
	<b>30</b>	<b>7,052</b>	<b>8</b>	<b>2,263</b>	<b>5</b>	<b>3</b>

a/ For vessel landings in Monterey, Morro Bay and/or Santa Barbara Port Areas.

b/ Denotes values withheld and combined with totals in adjacent cells due to possible data confidentiality concerns.

## Within-Trawl Sector Allocations

The limited entry trawl allocation of some of the Am 21 stocks are further allocated between the three trawl sectors (Shoreside IFQ, Catcher-Processors, and Motherships). The stocks managed

with within-trawl allocations are currently canary rockfish, darkblotched rockfish, POP north of 40° 10' N. lat., widow rockfish, and Pacific whiting.<sup>3</sup> Table 6 depicts the trawl sector allocations, catches, and allocation attainment percentage by sector and year of these stocks since implementation of the trawl catch share program. Yellowtail rockfish are included in Table 6 since this stock is a major target for the Shoreside IFQ sector and can be caught in significant amounts in the at-sea whiting fishery (discussed in more detail below).

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<sup>3</sup> The specific within trawl allocations are as follows:

***Pacific Whiting:*** The nontribal commercial share of whiting is allocated to LE whiting trawl sectors as follows: 42 percent for the shoreside whiting sector, 24 percent for the at-sea mothership whiting sector, and 34 percent for the at-sea catcher-processor whiting sector.

***Canary Rockfish:*** Decided in the biennial specifications process.

***Darkblotched Rockfish:*** Allocate 9 percent or 25 mt, whichever is greater, of the total LE trawl allocation of darkblotched rockfish to the whiting fisheries (at-sea and shoreside combined). The distribution of the whiting trawl allocation of darkblotched to individual whiting sectors will be done pro rata relative to the sectors' whiting allocation.

***Pacific Ocean Perch:*** Allocate 17 percent or 30 mt, whichever is greater, of the total LE trawl allocation of Pacific ocean perch to the whiting fisheries (at-sea and shoreside combined). The distribution of the whiting trawl allocation of POP to individual whiting sectors will be done pro rata relative to the sectors' whiting allocation.

***Widow Rockfish:*** Initially allocate 52 percent of the total LE trawl allocation of widow rockfish to the whiting sectors if the stock is under rebuilding or 10 percent of the total LE trawl allocation or 500 mt of the trawl allocation to the whiting sectors, whichever is greater, if the stock is rebuilt. If the stock is overfished when the initial allocation is implemented, the latter allocation scheme automatically kicks in when it is declared rebuilt. The distribution of the whiting trawl allocation of widow to individual whiting sectors will be done pro rata relative to the sectors' whiting allocation.

**Table 6. West coast groundfish trawl sector allocations and impacts (in mt) since implementation of Amendment 21 (highlighted cells indicate attainment rates  $\geq 90\%$ ).**

Stocks	Shoreside IFQ				Catcher-Processors				Motherships			
	Initial Alloc.	Final Alloc.	Catch	% Attain.	Initial Alloc.	Final Alloc.	Catch	% Attain.	Initial Alloc.	Final Alloc.	Catch	% Attain.
2011												
Pacific Whiting	92,817.8	92,817.8	91,185.8	98.2%	75,138.0	75,138.0	71,522.4	95.2%	53,039.0	53,039.0	50,049.8	94.4%
Canary Rockfish	25.9	25.9	3.7	14.3%	4.8	8.1	0.5	5.6%	3.4	0.1	0.1	78.6%
Darkblotched Rockfish	250.8	250.8	90.9	36.2%	8.5	12.8	10.3	80.4%	6.0	1.7	1.7	100.0%
Pacific Ocean Perch	119.6	119.6	46.7	39.0%	10.2	16.7	6.5	39.0%	7.2	0.7	0.7	94.6%
Widow Rockfish	342.7	342.7	137.6	40.2%	86.7	135.0	24.1	17.8%	61.2	12.9	12.8	99.6%
Yellowtail Rockfish a/	3,094.2	3,094.2	738.6	23.9%	NA	NA	14.6	NA	NA	NA	66.7	NA
2012												
Pacific Whiting	56,902.0	68,661.9	65,661.5	95.6%	46,046.0	55,584.0	55,694.6	100.2%	32,515.0	39,235.0	38,215.5	97.4%
Canary Rockfish	25.9	25.9	7.2	27.6%	4.8	4.8	0.3	5.6%	3.4	3.4	0.2	4.4%
Darkblotched Rockfish	248.9	248.9	85.7	34.4%	8.5	8.5	1.4	16.9%	6.0	6.0	1.3	21.0%
Pacific Ocean Perch	119.5	119.5	48.6	40.7%	10.2	10.2	3.2	31.0%	7.2	7.2	1.4	19.0%
Widow Rockfish	342.7	342.7	152.6	44.5%	86.7	86.7	42.0	48.4%	61.2	61.2	37.3	61.0%
Yellowtail Rockfish a/	3,107.4	3,107.4	963.3	31.0%	NA	NA	32.0	NA	NA	NA	11.0	NA
2013												
Pacific Whiting	85,697.0	98,296.9	97,621.3	99.3%	69,373.0	79,573.0	78,041.0	98.1%	48,970.0	56,170.0	52,522.3	93.5%
Canary Rockfish	39.9	39.9	10.2	25.6%	7.4	7.4	0.2	2.4%	5.2	5.2	0.5	9.2%
Darkblotched Rockfish	266.7	266.7	116.0	43.5%	8.6	8.6	2.1	24.2%	6.1	6.1	4.2	69.6%
Pacific Ocean Perch	109.4	109.4	50.0	45.7%	10.2	10.2	4.3	41.9%	7.2	7.2	1.1	15.8%
Widow Rockfish	994.0	994.0	411.6	41.4%	170.0	170.0	15.7	9.3%	120.0	120.0	15.5	13.0%
Yellowtail Rockfish a/	2,935.8	2,935.8	719.3	24.5%	NA	NA	78.5	NA	NA	NA	190.9	NA

Stocks	Shoreside IFQ				Catcher-Processors				Motherships			
	Initial Alloc.	Final Alloc.	Catch	% Attain.	Initial Alloc.	Final Alloc.	Catch	% Attain.	Initial Alloc.	Final Alloc.	Catch	% Attain.
2014												
Pacific Whiting	108,935.0	127,835.0	98,714.0	77.2%	88,186.0	103,486.0	103,266.3	99.8%	62,249.0	73,049.0	62,038.3	84.9%
Canary Rockfish	41.1	41.1	10.5	25.5%	7.6	7.6	0.3	3.7%	5.4	5.4	0.4	6.5%
Darkblotched Rockfish b/	278.4	278.4	97.8	35.1%	9.0	6.0	3.4	56.8%	6.3	9.3	7.2	77.5%
Pacific Ocean Perch	112.3	112.3	41.0	36.5%	10.2	10.2	0.3	3.1%	7.2	7.2	3.6	50.0%
Widow Rockfish	994.0	994.0	654.3	65.8%	170.0	170.0	16.6	9.7%	120.0	120.0	39.6	33.0%
Yellowtail Rockfish a/	2,939.3	2,939.3	1,163.3	39.6%	NA	NA	0.0	NA	NA	NA	41.9	NA
2015												
Pacific Whiting	112,007.0	124,607.3	58,383.7	46.9%	90,673.0	100,873.0	68,483.9	67.9%	64,004.0	71,204.0	27,660.4	38.8%
Canary Rockfish	47.3	47.3	44.8	94.8%	8.0	8.0	0.1	0.9%	5.7	5.7	0.1	2.5%
Darkblotched Rockfish	285.5	285.5	122.4	42.9%	9.2	9.2	5.6	60.4%	6.5	6.5	2.4	36.6%
Pacific Ocean Perch	118.5	118.5	49.9	42.1%	10.2	10.2	7.0	68.2%	7.2	7.2	1.7	24.2%
Widow Rockfish	1,306.2	1,306.2	814.6	62.4%	170.0	170.0	17.4	10.3%	120.0	120.0	17.2	14.3%
Yellowtail Rockfish a/	4,592.8	4,592.8	1,449.9	31.6%	NA	NA	0.5	NA	NA	NA	86.3	NA

a/ Yellowtail rockfish is managed as a set-aside species for the at-sea whiting trawl sectors (i.e., Catcher-Processors and Motherships) with an annual set-aside amount of 300 mt for both sectors combined.

b/ The original allocation of darkblotched to the Mothership sector (6.3 mt) was increased to 9.3 mt with a transfer of yield from the Catcher-Processors sector by automatic action on October 17, 2014.

### ***Darkblotched Rockfish and Pacific Ocean Perch Set-Asides***

The Council decided to change the within-trawl allocation framework for darkblotched rockfish and POP north of 40° 10' N. lat. In September 2016, the Council decided to manage the allocated amounts of darkblotched rockfish and POP to the at-sea whiting sectors as yield set-asides rather than as total catch limits. This action mitigates increasing bycatch issues with both stocks in the at-sea whiting fleets. The management response to exceeding a hard bycatch cap is premature fishery closure. There is no management response to exceeding a set-aside unless there is a risk of exceeding an ACL. The Council also recommended giving NMFS inseason authority to automatically close the 2017 or 2018 at-sea whiting fisheries in the event the species-specific set-aside amounts plus the buffer amounts are anticipated to be exceeded.

### ***Yellowtail Rockfish Considerations***

Yellowtail rockfish are not currently subject to within-trawl allocations since it is managed as a set-aside species in the at-sea whiting fishery. Yellowtail rockfish, similar to widow rockfish and canary rockfish at times, is a pelagic species that can aggregate in large schools in the water column. They can be caught in significant amounts in whiting fisheries. They are also an important target in midwater trawl efforts in the Shoreside IFQ fishery.

Now that widow rockfish and canary rockfish are rebuilt, it is expected that there will be increased targeting of yellowtail in the Shoreside IFQ fishery with a consequent increase in the attainment rate of the sector's allocations. This trend is already evidenced in the time series of yellowtail catches by this sector since implementation of the catch share program (Figure 2).

Yellowtail impacts by the at-sea whiting sectors are managed with a 300 mt yield set-aside that is deducted from the trawl allocation of yellowtail (Shoreside IFQ is allocated the remainder). This amount of yield set-aside to accommodate yellowtail bycatch has been sufficient since the set-aside was first specified in 2011 (Table 7). However, that bycatch is highly variable with annual attainment rates of the set-aside varying between 14 percent and 90 percent during 2011-2015.

One consideration for managing yellowtail rockfish north of 40° 10' N. lat. is to allocate quota to all three trawl sectors and manage the stock as a bycatch cap species in the at-sea whiting fisheries. It may make sense to manage the aggregating midwater rockfish stocks that co-mingle with whiting (i.e., canary, widow, and yellowtail) since there can be large magnitude bycatch events of all three stocks. This does represent a cost to the at-sea sectors in that the fishery is less efficient at attaining their whiting quotas when there are more stocks that constrain access to whiting. However, when managed as a set-aside, the yield is stranded and cannot be reallocated inseason to sectors in need, such as the Shoreside IFQ sector. If this management strategy is compelling, there should also be consideration of trawl intersector trading of quota of these bycatch stocks to mitigate potential negative effects of adding another bycatch cap stock to the at-sea fisheries.



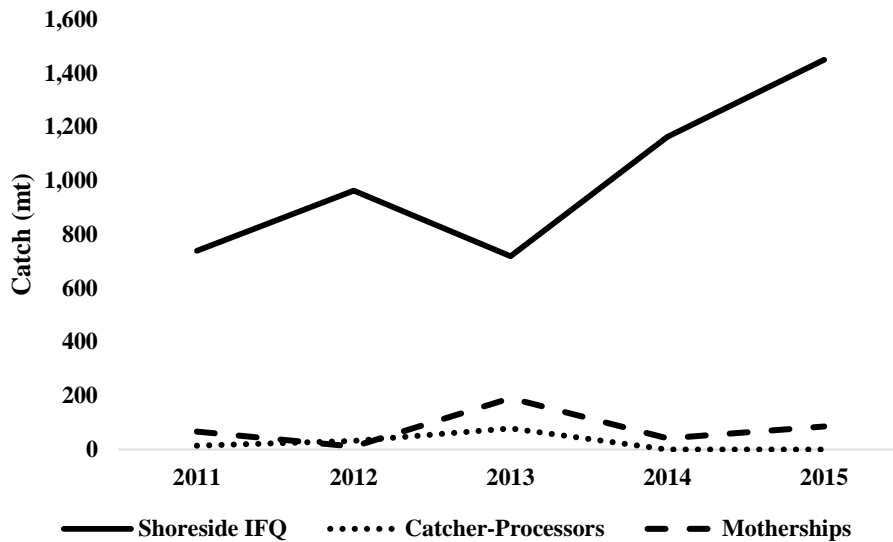


Figure 2. Time series of catch (landings + dead discards) of yellowtail rockfish north of 40° 10' N. lat. by trawl sector, 2011-2015.

Table 7. Yellowtail rockfish north of 40° 10' N. lat. catch accounting: comparing annual at-sea sector impacts to the 300 mt set-aside.

Year	At-Sea Sectors Combined		
	Set-Aside	Catch	% Attain.
2011	300	81.2	27.1%
2012	300	43.0	14.3%
2013	300	269.4	89.8%
2014	300	42.0	14.0%
2015	300	86.8	28.9%

### *Within-Trawl Intersector Quota Trading*

All of the stocks allocated among the trawl sectors are important to each sector either as a primary target stock (e.g., Pacific whiting) or because the allocated amounts can disrupt access to healthy target stocks. The only target stock for the at-sea whiting sectors is Pacific whiting; the other allocated stocks are managed with bycatch caps and can constrain access to whiting. These same stocks are either important targets for the Shoreside IFQ sector (e.g., widow rockfish) or stocks that constrain access to target opportunities (e.g., canary, darkblotched, and POP).

One consideration for mitigating the negative effects of managing the allocation of constraining or “choke” species in trawl fisheries is to allow intersector trading of trawl quota which is currently prohibited. There have been proposals to allow some intersector trading. For example, the Council considered a proposal to allow entities who have quota in both the Shoreside IFQ and Mothership sectors to allow quota trading of darkblotched and POP from their Shoreside IFQ accounts to their Mothership accounts to avert a bycatch problem. Managing at-sea sector impacts of these two stocks with set-asides was preferred over intersector trading since it was considered a more

expedient and expeditious solution. However, intersector quota trading may be more practical in the long term.

### **Pacific Halibut Individual Bycatch Quota**

The trawl catch share program was designed to minimize Pacific halibut bycatch in limited entry trawl fisheries. Pacific halibut bycatch in the IFQ fishery north of 40° 10' N. lat. is managed under a system of individual bycatch quotas (IBQ) where the dead discarded catch of Pacific halibut (Pacific halibut is a prohibited species in the trawl fishery) in the fishery is debited against the permit's IBQ. The FMP sets the trawl bycatch mortality limit at 15 percent of the Area 2A total constant exploitation yield (TCEY) for legal-size (i.e.,  $\geq 32''$ ) halibut (net weight), not to exceed 130,000 pounds (59 mt) annually for legal size halibut (net weight) for 2012 through 2014 and, beginning in 2015, not to exceed 100,000 pounds annually for legal-size halibut (net weight). Additionally, there is a set-aside of 5 mt to accommodate Pacific halibut bycatch in the IFQ fishery south of 40° 10' N. lat. and another 5 mt set-aside to accommodate bycatch in the at-sea whiting fisheries that comes off the top of the annual trawl bycatch limit.

The IBQ values in Table 8 are the quota pounds (converted to mt) of Pacific halibut IBQ (converted to round weight of legals + sublegals) issued to the IFQ fishery north of 40° 10' N. lat. (available at <https://www.webapps.nwfsc.noaa.gov/ifq/>). The total estimated mortality of Pacific halibut in trawl fisheries was obtained from annual Pacific halibut mortality reports from the NMFS WCGOP available at [https://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_products/data\\_library.cfm#pacific-halibut](https://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/data_library.cfm#pacific-halibut).

The percent attainment of Pacific halibut limits (IBQ + set-asides) in trawl fisheries has ranged from 23 percent to 34 percent during 2011-2015 (Table 8). As can be seen in Figure 3, the total mortality of Pacific halibut incidentally caught in west coast limited entry trawl fisheries has decreased dramatically since implementation of IBQ management in 2011; the 2011-2015 average trawl mortality is 15 percent of the 2002-2010 average.

**Table 8. Bycatch limits and total mortality of Pacific halibut in the limited entry trawl fishery by sector and year, 2011-2015.**

Year	Shorebased IFQ				At-Sea Whiting		Total LE Trawl		
	IBQ	Set-Aside a/	Tot. Mort.	% Attain.	Set-Aside	Tot. Mort.	IBQ+Set-Asides	Tot. Mort.	% Attain.
2011	116.8	5	33.2	27.2%	5	0.6	126.8	33.8	26.6%
2012	105.6	5	38.9	36.8%	5	0.6	115.6	39.6	34.2%
2013	107.3	5	33.0	30.7%	5	1.1	117.3	34.0	29.0%
2014	107.3	5	27.0	25.2%	5	0.4	117.3	27.4	23.3%
2015	100.0	5	35.8	35.8%	5	0.1	110.0	35.8	32.6%

a/ 5 mt of Pacific halibut is specified for the IFQ fishery south of 40° 10' N. lat.

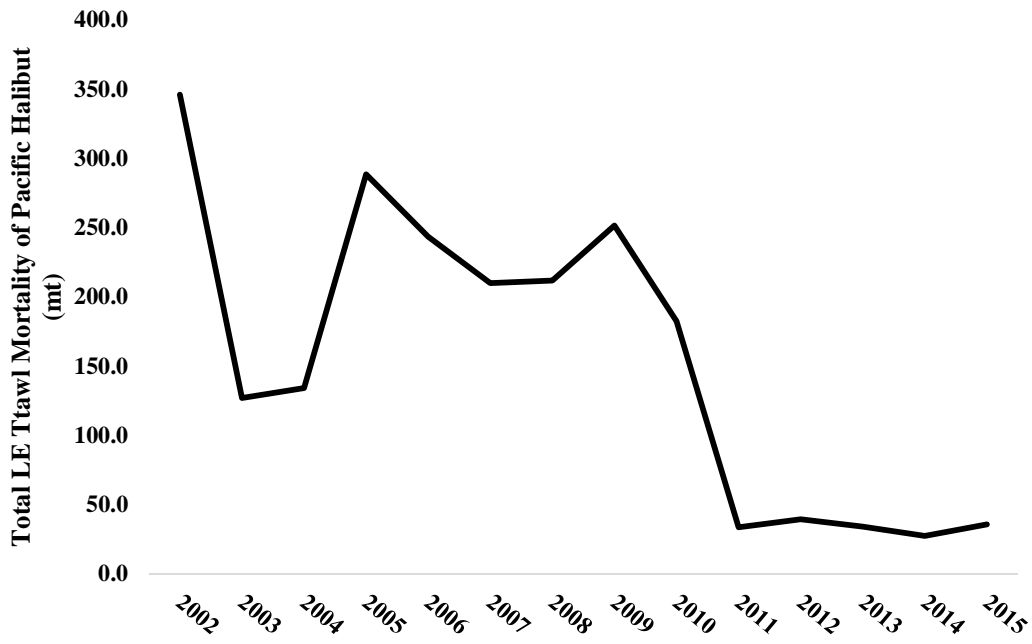


Figure 3. Total mortality of Pacific halibut in west coast limited entry groundfish trawl fisheries, 2002-2015.

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