

**Preliminary Socioeconomic Analyses for the 2023-2024 Harvest Specifications
and Management Measures.**

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1. Socioeconomic Environment

Previous EISs, EAs, decision documents, section 3.2 in the 2015 EIS for the biennial harvest specifications and management measures, and the [Groundfish SAFE](#) (PFMC 2022) present detailed characterizations of the Pacific coast groundfish fishery. That information is incorporated by reference and updated here.

1.1 Groundfish Fishery Sectors

The commercial groundfish fishery comprises the following fishery sectors:

- **Pacific whiting trawl** is composed of at-sea and shoreside fisheries (the latter of which is a segment of the IFQ fishery, described below). The at-sea sector is subdivided between mothership processing vessels accepting fish from catcher boats, and catcher-processor vessels. The shoreside fishery delivers to processing plants on land; with Westport, Washington; and Astoria and Newport, Oregon being the principal ports receiving shoreside whiting landings.
- **Non-whiting trawl/shorebased IFQ** catches a variety of other species, although sablefish and some rockfish and flatfish are the main revenue earners. Beginning in 2011 this fishery has been managed under an IFQ program. This fishery is now usually referred to as “shorebased IFQ,” because an important feature of this management program is a relaxation on allowed gear types used by these permitted vessels. As a result, landings of sablefish by gear types other than trawl have emerged as an important part of the revenue earned by permitted vessels in this sector. In addition, a midwater trawl that targets non-whiting species, such as widow and yellowtail rockfish has redeveloped.
- **Fixed gear (longline and pot) fisheries** are divided **into** limited entry (LE) and open access (OA) portions from a regulatory standpoint. The fixed gear fisheries are also split into a “non-nearshore” sector—primarily targeting sablefish—and a “nearshore” sector targeting various nearshore groundfish species.
- **Incidental OA fisheries** include a number of non-groundfish fisheries that take groundfish incidentally and have been characterized as groundfish incidental OA for the purpose of management and data presentation. In aggregate they account for a very small proportion of groundfish landings and revenue.

1.2 Revenue Trends for Commercially Important Groundfish

Although the PCGFMP includes many species, relatively few account for most of the revenue. For the period covered by Table 1-1, 2003-2021, the top three species groups ranked by revenue [sablefish, Pacific whiting (hake), and Dover sole] accounted for 71 percent of total inflation adjusted groundfish ex-vessel revenue. Adding in the next two most important species groups, Rockfish not elsewhere identified (NEI) and petrale sole, accounts for another 16 percent of total inflation adjusted groundfish ex-vessel revenue during the 2003-2021 period. Data during the 2011-2012 biennial period show the highest average annual inflation-adjusted landings revenue

over the period shown. Revenues from Pacific whiting and Rockfish NEI have been particularly strong in the more recent years shown.

Table 1-1. Average annual inflation adjusted ex-vessel revenue, \$1,000s by groundfish species. (Source: Groundfish SAFE Table 2 and PacFIN comprehensive ft 01/18/2022).

	2003-2010		2011-2012		2013-2014	
	Revenue	Percent	Revenue	Percent	Revenue	Percent
Sablefish	\$39,232	41%	\$49,726	44%	\$27,608	29%
P. Whiting	\$17,337	18%	\$29,962	26%	\$32,545	34%
Dover Sole	\$10,904	11%	\$9,324	8%	\$8,931	9%
Rockfish NEI*	\$6,403	7%	\$7,414	7%	\$7,226	8%
Petrale Sole	\$7,372	8%	\$4,401	4%	\$7,670	8%
Thornyheads	\$6,145	6%	\$5,293	5%	\$5,064	5%
Roundfish NEI*	\$3,260	3%	\$3,495	3%	\$3,110	3%
Flatfish NEI*	\$3,485	4%	\$2,003	2%	\$1,810	2%
Other	\$1,243	1%	\$1,513	1%	\$1,439	2%
Total	\$95,380	100%	\$113,130	100%	\$95,404	100%
	2015-2016		2017-2018		2019	
	Revenue	Percent	Revenue	Percent	Revenue	Percent
Sablefish	\$36,233	42%	\$33,139	33%	\$21,785	25%
P. Whiting	\$13,815	16%	\$25,982	26%	\$31,199	36%
Dover Sole	\$7,936	9%	\$7,641	8%	\$5,658	6%
Rockfish NEI*	\$7,612	9%	\$12,731	13%	\$14,405	16%
Petrale Sole	\$8,495	10%	\$8,546	9%	\$7,249	8%
Thornyheads	\$4,583	5%	\$5,439	5%	\$3,065	3%
Roundfish NEI*	\$3,833	4%	\$3,602	4%	\$3,158	4%
Flatfish NEI*	\$1,546	2%	\$1,152	1%	\$634	1%
Other	\$1,587	2%	\$929	1%	\$622	1%
Total	\$85,642	100%	\$99,161	100%	\$87,775	100%

*NEI indicates species not elsewhere identified.

1.3 Landings and Revenue by Commercial Fishery Sector

1.3.1 Non-whiting Fishery Sectors

Table 1-2 reports ex-vessel revenue for the main non-whiting fishery sectors. In aggregate, during 2013-2019 the IFQ fishery (trawl and non-trawl) accounted for 52 percent of non-whiting ex-vessel revenue, followed by the non-nearshore fixed gear fishery (LE and OA, targeting mostly sablefish) which accounted for 31 percent.

Table 1-2. Non-whiting groundfish ex-vessel revenue in inflation-adjusted \$1,000s, by non-whiting commercial fishery sectors, 2013-2019. (Source: SAFE Table 12b).

Year	Shoreside IFQ Trawl (Non-whiting)	Shoreside IFQ Non-trawl	Non-Nearshore Fixed Gear	Nearshore Fixed Gear	Grand Total	Pct. of Annual Average
2013	\$29,099	\$3,193	\$14,035	\$4,200	\$50,527	88%
2014	\$28,036	\$5,133	\$15,429	\$4,130	\$52,728	92%
2015	\$30,055	\$5,925	\$18,378	\$4,936	\$59,294	103%
2016	\$29,829	\$7,213	\$20,215	\$3,994	\$61,251	107%
2017	\$34,581	\$6,894	\$23,333	\$4,475	\$69,284	121%
2018	\$28,983	\$4,525	\$18,983	\$4,430	\$56,922	99%
2019	\$27,609	\$4,320	\$15,826	\$4,482	\$52,237	91%
Grand Total	\$208,193	\$37,204	\$126,199	\$30,646	\$402,242	
Pct. of Total	52%	9%	31%	8%	100%	

1.3.2 Whiting Fishery Sectors

Table 1-3 reports Pacific whiting catch for non-tribal whiting sectors during 2013 to 2021. Although varying year to year, total catch since 2016 has been above the 7-year annual average in four of five years. Total non-Tribal whiting catch was lowest during the period in 2015.

Table 1-3. Pacific whiting catch, mt, by whiting commercial fishery sectors, 2013-2021. (Source: Groundfish SAFE Table 14a and GMT).

Year	Catcher-Processor Total	Mothership Total	Shoreside Whiting Trawl Total	Grand Total	Percent of Annual Average
2013	78,041	52,522	97,634	228,198	84%
2014	103,266	62,038	98,717	264,021	98%
2015	68,484	27,664	58,357	154,505	57%
2016	108,804	65,018	86,176	259,997	96%
2017	137,130	66,257	146,568	349,954	129%
2018	116,050	67,163	130,052	313,265	116%
2019	116,379	52,417	144,083	312,879	116%
2020	111,014	38,110	138,598	287,722	106%
2021 ^{a/}	103,971	35,209	126,558	265,739	98%
Grand Total	943,139	466,398	1,026,742	2,436,279	
Pct. of Total	39%	19%	42%	100%	

a/ 2021 data is considered preliminary.

1.3.3 Midwater Trawl Fishery for Rockfish

The rebuilding of canary and widow rockfish has stimulated the reemergence of a fishery using midwater gear to target pelagic rockfish, principally widow and yellowtail rockfish. Widow rockfish was declared overfished in 2001 and declared rebuilt in 2011. Canary was declared overfished in 2000 and declared rebuilt in 2015. While canary was not a target, its frequency as bycatch presented a potential constraint on the midwater fishery. Figure 1-1 shows revenue from

landings of widow, yellowtail, and chilipepper rockfish since 1981. From 1994 onward only landings from the non-whiting portion of the midwater trawl fishery are included; data prior to that year may include some whiting trips, however during that time the domestic shorebased whiting fishery was somewhat smaller than it is currently and non-whiting species landings tend to be very low. Therefore, the figure adequately represents the trend for midwater rockfish trawl fishery ex-vessel revenue. The figure shows landings steadily declined beginning the late 1980s, with the exception of 2000 and 2001. The non-whiting midwater trawl fishery essentially ceased while widow rockfish was rebuilding between 2001 and 2011, but has shown notable growth since.

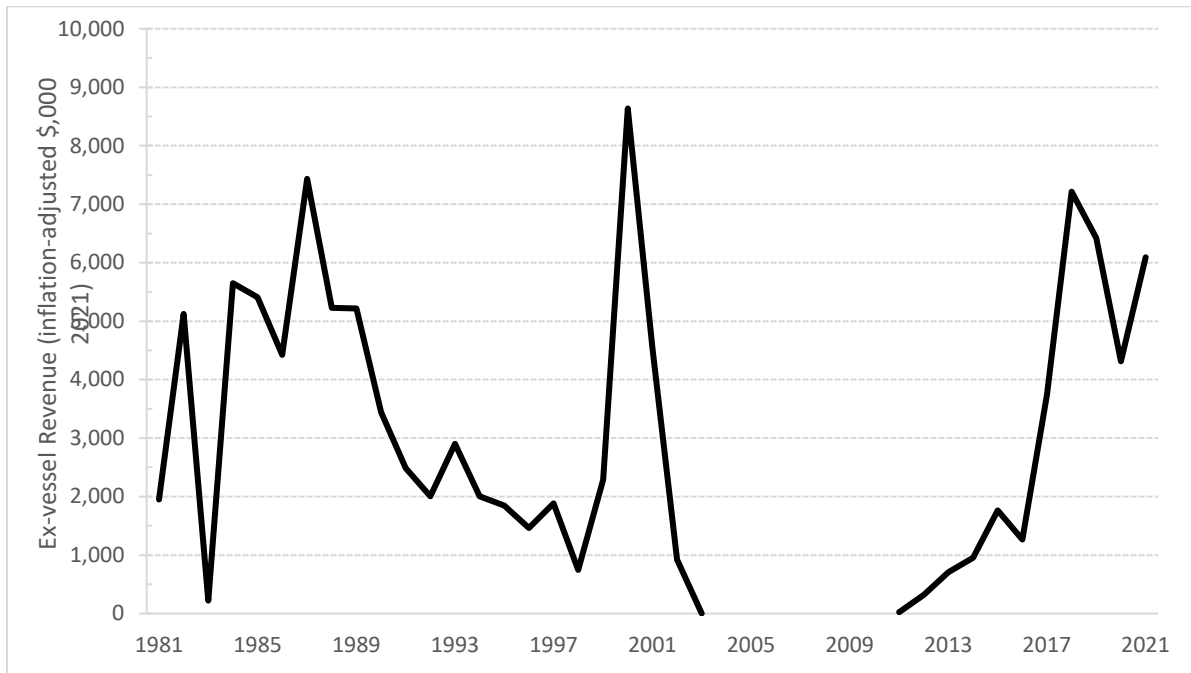


Figure 1-1. Inflation adjusted ex-vessel revenue (\$1,000s) from landings of pelagic rockfish (widow, yellowtail, chilipepper), by midwater trawl gear in the non-whiting groundfish trawl sector, 1981-2021. Landings from 2004 to 2009 excluded due to data confidentiality requirements. Landings from 1994-2021 are from the non-whiting trawl sector and EFPs. Data for 2021 should be considered preliminary. (Source: PacFIN Comprehensive_FT, 1/11/2018 and 1/18/2022).

Table 1-4 provides a snapshot of the pelagic rockfish fishery over the past 10 years (2021 data should be considered preliminary). The data include landings made under EFPs which prior to 2017 would have been for purposes other than targeting pelagic rockfish. The fishery has ramped up substantially in recent years. Since 2012, participation (number of vessels) increased by more than 50 percent and landings revenue by nearly twenty-fold. Ex-vessel revenue in 2018, 2019 and preliminary ex-vessel revenue in 2021 exceeded \$6 million.

Table 1-4. Landings (mt), inflation adjusted ex-vessel revenue, and number of vessels making landings of pelagic rockfish (chilipepper, widow, and yellowtail rockfish) with midwater trawl gear, 2012-2021. (Source: PacFIN Comprehensive_FT, 1/11/2018 and 1/18/2022).

Values	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021^{a/}
Metric tons	249	606	836	1674	1,138	5,257	11,291	9,732	8,989	11,481
\$,000	\$321	\$705	\$956	\$1,762	\$1,263	\$3,745	\$7,214	\$6,423	\$4,314	\$6,094
Number of vessels	17	12	24	37	10	16	24	25	29	27

a/ 2021 data is considered preliminary.

1.3.4 Tribal Fishery

Several Pacific Northwest Indian tribes have treaty rights to fish for groundfish in their usual and accustomed fishing grounds. The Federal government has accommodated these fisheries through a regulatory process described at 50 CFR 660.50. Tribal fishery management is coordinated through the Council process so catches can be accounted for when developing management measures. West Coast treaty tribes in Washington State have formal allocations for sablefish and Pacific whiting. For other species without formal allocations, the tribes propose set-asides which the Council tries to accommodate while ensuring that catch limits are not exceeded. Whether or not they are formally allocated, tribal catches are accounted for through set-asides, which are deducted from the ACLs along with certain other sources of catch to determine the commercial fishery HG. Washington tribes participate in whiting fisheries with both a mothership and shorebased component. Landings and revenue from this fishery cannot be reported due to data confidentiality restrictions.

The tribal non-whiting sector is defined by groundfish landings other than whiting and, thus includes a variety of gear types. While all four coastal tribes have longline fleets, only the Makah Tribe currently has a trawl fleet. Table 2-5 shows ex-vessel revenue in tribal fisheries using hook-and-line and trawl gear. Landings from net and pot gear are not reported due to data confidentiality restrictions. Landings from shrimp trawl are not reported because this fishery does not target groundfish although it does land some incidentally-caught groundfish. Revenue from groundfish landings in the tribal net, pot and shrimp fisheries averaged less than \$70,000 annually during 2013-2018. Hook-and-line gear accounted for 64 percent of revenue reported in the table. Excluding 2020, when the fishery was disrupted due to covid-19, and 2021, for which data is incomplete, revenue from tribal groundfish hook-and-line and trawl landings has generally exceeded \$4 million, reaching nearly \$6 million in 2016 and 2017.

Table 1-5. Treaty non-whiting groundfish ex-vessel revenue for hook-and-line and trawl gear (from groundfish only) 2013-2021, in inflation-adjusted \$1,000s. (Source: Groundfish SAFE Table 13b and PacFIN comprehensive ft, 1/18/2022).

Year	Hook-and-Line	Trawl	Total	Pct. of Annual Average
2013	\$2,408	\$1,981	\$4,389	106%
2014	\$3,692	\$1,232	\$4,924	119%
2015	\$3,689	\$2,001	\$5,690	137%
2016	\$3,997	\$1,866	\$5,863	142%
2017	\$3,966	\$2,025	\$5,992	145%
2018	\$2,667	\$1,770	\$4,437	107%
2019	\$1,594	\$1,687	\$3,281	79%
2020	\$667	\$130	\$796	19%
2021 ^{a/}	\$1,300	\$619	\$1,918	46%
Grand Total	\$23,981	\$13,309	\$37,290	
Pct. of total	64%	36%	100%	

a/ 2021 data is considered preliminary.

1.3.5 Recreational Groundfish Fishery

Recreational fisheries are an important part of fishery-related economic activity. However, it is more difficult to impute the economic value of these fisheries because recreational catch is not sold. Past Groundfish Harvest Specifications documents have characterized recreational fisheries in terms of fishing effort (angler trips) to quantify spatio-temporal differences in West Coast recreational fisheries. Income and employment impacts derived from IOPAC impact coefficients applied to GMT estimates of effort under the draft 2023-2024 groundfish management measures (F.4, Attachment 1, April 2022) Management Measures are reported in section 2.1.1.

Recreational groundfish fisheries are broadly subdivided between private anglers and those fishing from commercial passenger fishing vessels, commonly referred to as charter vessels. Private anglers fish from shore or from pleasure boats, while charter vessels take paying passengers.

Table 1-6 shows annual average numbers of bottomfish/halibut angler trips by mode compared to trips targeting other species. Private and charter trips targeting bottomfish/halibut comprised 27 percent of all trips and modes during the 2012-2020 period.

Table 1-7 shows the annual average counts of bottomfish/halibut and other trip type marine angler trips by state and reporting area. California accounted for 82 percent of bottomfish/halibut angler trips, with the southern California region accounting for 47 percent of coastwide trips due to its large coastal population and potential year-round fishery. Figure 1-2 shows bottomfish/halibut trips by state and year. The number of coastwide bottomfish/halibut marine angler trips peaked in 2014 at more than 1 million trips. The 914,000 trips taken in 2019 exceeded the 14-year 2007-2020 average of 817,800 trips by 12 percent. The 645,000 trips taken in 2020 was the lowest during the period, although this is at least partly the result of closures of some facilities and businesses and an undercount of anglers due to the absence of port samplers during several months of 2020 due to covid-19 restrictions.

Table 1-6. Total coastwide recreational angler trips by type and mode, annual averages during 2012-2020. (Source: GMT state reps, RecFIN).

Type:	Bottomfish+Halibut		Other Trip Types ^{a/}		Total	
Mode	Annual Average	Percent of Total Trips	Annual Average	Percent of Total Trips	Annual Average	Percent of Total Trips
Beach/Bank	0	0%	859,009	24%	859,009	24%
Man-made	88,223	2%	1,104,431	31%	1,192,654	34%
Charter	560,783	16%	137,323	4%	698,016	20%
Private	308,798	9%	501,471	14%	810,269	23%
Total	957,804	27%	2,602,144	73%	3,559,948	100%

a/ Other trip types include Salmon, HMS, combo, and other

Table 1-7. 2012–2020 average annual bottomfish plus Pacific halibut marine angler boat trips (private and charter) by reporting area. (Source: GMT state reps, RecFIN).

State/Region	Bottomfish + Halibut		Other Trip Types ^{a/}		Total	
	Annual Average	Percent of Bottomfish + Halibut Trips	Annual Average	Percent of Other Trips	Annual Average	Percent of All Trips
Washington Subtotal	39,605	5%	101,449	16%	141,054	9%
La Push-Neah Bay	14,990	2%	9,604	2%	24,593	2%
Westport	20,792	2%	37,641	6%	58,433	4%
Ilwaco-Chinook	3,823	0%	54,204	8%	58,027	4%
Oregon Subtotal	114,895	13%	92,379	14%	207,273	14%
Astoria	725	0%	8,154	1%	8,879	1%
Tillamook	18,031	2%	18,690	3%	36,720	2%
Newport	55,124	6%	28,469	4%	83,593	6%
Coos Bay	17,996	2%	24,356	4%	42,351	3%
Brookings	23,019	3%	12,711	2%	35,731	2%
California Subtotal	715,081	82%	444,876	70%	1,159,957	77%
North Coast: Humboldt and Del Norte	28,799	3%	21,903	3%	50,702	3%
Wine District: Mendocino	16,371	2%	11,321	2%	27,692	2%
SF District: San Mateo through Sonoma	69,466	8%	82,984	13%	152,450	10%
Central Coast: San Luis Obispo through Santa Cruz	104,393	12%	35,466	6%	139,860	9%
Channel: Ventura and Santa Barbara	87,640	10%	23,737	4%	111,377	7%
South Coast: San Diego, Orange, and Los Angeles	408,413	47%	269,464	42%	677,878	45%
Grand Total	869,581	100%	638,704	100%	1,508,285	100%

a/ Other trip types include Salmon, HMS, combo, and other.

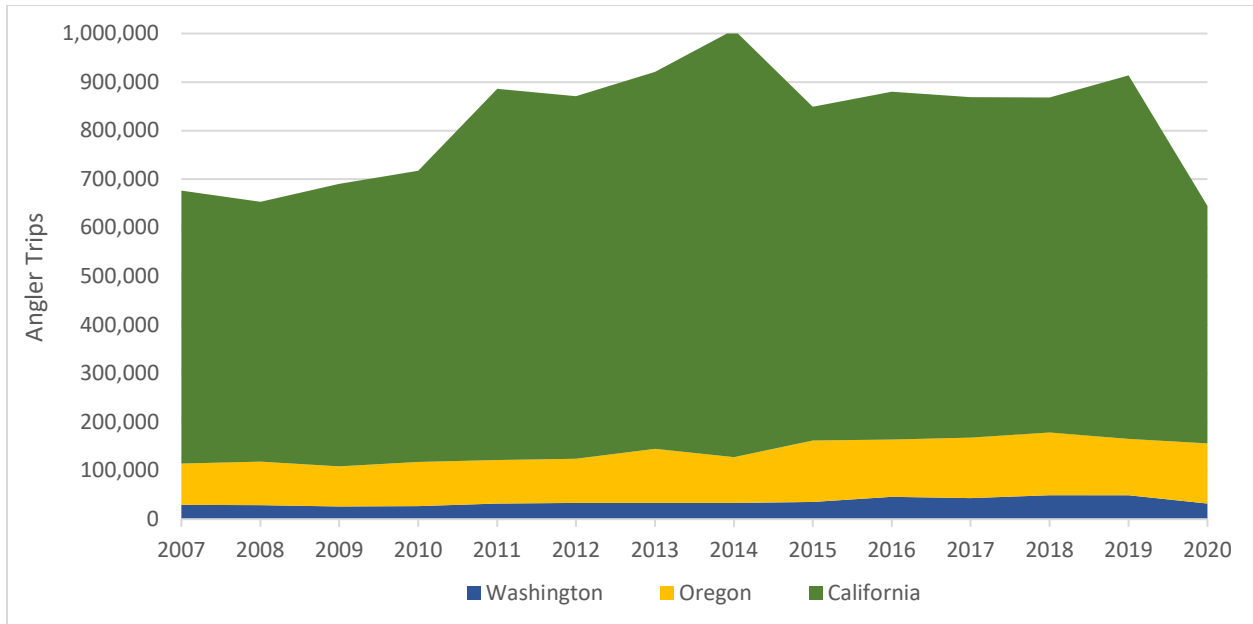


Figure 1-2. Total bottomfish plus Pacific halibut marine angler boat trips (private and charter) by state, 2007 to 2020. (Source: GMT state reps, RecFIN).

1.4 Fishing Communities

As in other recent decision documents, involvement by fishing communities in commercial groundfish fisheries is described below in terms of landings and ex-vessel revenue by West Coast Fisheries (IOPAC) port group.¹ IOPAC is also used to evaluate personal income and employment impacts of proposed management measures.

Table 1-8 shows inflation-adjusted ex-vessel revenue from non-tribal groundfish landings in aggregate over 2013-2021 by port group and groundfish fishery sector. Note that in some cases adjacent port groups were aggregated to avoid disclosure of confidential data. Landings and revenue tend to be concentrated in relatively few ports. The four top-ranked port areas of the 11 shown accounted for approximately 77 percent of coastwide revenue during the period. All four are north of the Oregon/California border. Astoria-Tillamook is the top-ranked port overall, accounting for 28 percent of coastwide groundfish revenue shown. Newport ranks second at 22 percent of coastwide revenue, and the combined Washington port groups come third at 17 percent. Whiting landings occur in only three of the port areas shown, which are also the top three ranked groundfish ports overall (Astoria-Tillamook, Newport, and Washington). Astoria-Tillamook and Newport also rank first and second, respectively, for revenue from the non-whiting IFQ sector (combining trawl IFQ and non-trawl IFQ landings), while Coos Bay-Brookings ranks third by this measure. The combined Washington ports rank first for revenues from the non-nearshore (sablefish) fixed gear sector, followed by Newport, Morro Bay-Santa Barbara, and Coos Bay-Brookings, respectively. Morro Bay-Santa Barbara is the top port area for the nearshore fixed gear sector followed by Coos Bay-Brookings, Crescent City-Eureka, Monterey, and Fort Bragg.

¹ See Table 9 in the NOAA Technical Memorandum NMFS-Northwest Fisheries Science Center (Leonard and Watson (2011)) for ports included in these port groups.

Focusing on the shoreside non-whiting IFQ sector, Table 1-9 shows revenues from fixed gear landings (often referred to as gear-switching) increasing from approximately 10 percent of the sector total in 2013 to 30 percent in 2017. The fixed-gear share of IFQ landings since declined to approximately 28 percent of the IFQ non-whiting sector total in 2018, 13 percent in 2019, and less than 10 percent in 2020 and 2021. For data confidentiality reasons, revenue from the IFQ fixed gear sector cannot be reported for many individual ports. The dominant port areas for IFQ fixed gear landings by revenue include Newport, Astoria-Tillamook, Morro Bay-Santa Barbara, and the Washington ports. Coastwide IFQ non-whiting sector fixed gear landings totaled approximately \$58 million ex-vessel revenue in inflation-adjusted terms during 2013-2021. Combined ports in the state of Oregon recorded approximately 69 percent of this revenue, and Washington ports approximately 19 percent, with the California ports accounting for the remainder (12 percent) led by Morro Bay-Santa Barbara.

Table 1-8. Total ex-vessel revenue (inflation-adjusted \$1,000s) from groundfish landings, 2013-2021, by IOPAC port group and fishery sector. (Port groups have been aggregated to avoid disclosing confidential data, 2021 data is preliminary).

Port Group	Shoreside Non-whiting IFQ ^a	Shoreside Trawl Whiting IFQ	Non-Nearshore Fixed Gear	Nearshore Fixed Gear	Other Directed and Incidental Groundfish	Grand Total	Annual Average
Washington	24,666	55,119	45,565	0	632	125,982	13,998
Astoria-Tillamook	109,151	86,499	9,732	1,542	3,659	210,583	23,398
Newport	59,514	72,455	36,770	768	1,989	171,497	19,055
Coos Bay-Brookings	39,128	-	26,603	10,928	943	77,602	8,622
Crescent City-	37,283	-	8,522	3,260	128	49,193	5,466
Fort Bragg	18,322	-	12,764	2,283	258	33,627	3,736
San Francisco (incl. Bodega Bay)	5,149	-	9,775	1,552	519	16,995	1,888
Monterey	2,319	-	8,319	2,924	173	13,736	1,526
Morro Bay-Santa Barbara	7,722	-	29,721	13,486	1,330	52,258	5,806
Los Angeles	-	-	4,414	519	206	5,139	571
San Diego	-	-	5,603	186	136	5,926	658

a/ Includes non-trawl IFQ.

Table 1-9. Annual ex-vessel revenue (inflation-adjusted \$1,000s) from non-whiting IFQ groundfish landings by gear type (trawl and fixed gear), 2013-2021.

Year	Shoreside Non-whiting Trawl	Shoreside Non-whiting Fixed Gear
2013	29,001	3,164
2014	27,928	4,612
2015	26,544	5,395
2016	29,829	9,765
2017	34,624	15,187
2018	28,976	11,439
2019	27,613	4,257
2020	18,824	1,985
2021^{a/}	22,037	2,074

a/ 2021 data is preliminary.

2. Direct and Indirect Effects

2.1 Socioeconomic Environment

2.1.1 Estimated Commercial Ex-Vessel Revenue and Recreational Effort Impacts of the Alternatives

This section evaluates the effects of the alternatives on fishery participants and fishing communities. As described in Draft Management Measure Analytical Document (F.4, Attachment 2, April 2022), the Baseline scenario characterizes catch, ex-vessel revenue, and recreational fishing effort in 2021 using the same GMT catch projection methods that were applied under the alternatives. (Section 1.1.1 supplements this characterization for the commercial fishery sectors with historical landings and ex-vessel revenue amounts recorded in the PacFIN database.)

Baseline represents the environmental baseline using actual totals and projections based on regulations in place towards the end of 2021. To help illustrate a range of possible socioeconomic effects an assumption about the sector distribution of at-sea whiting catch is used that may differ from that used in F.4, Attachment 2, April 2022. That analysis assumes the reapportionment of unused tribal fishery quota to the non-tribal commercial fishery under all alternatives. When reapportionment has occurred, as it did in 2021, whiting quota and potential catch were shifted from the tribal sector to the non-tribal sector. Since such shifts generally have occurred late in the year, catch in the shorebased IFQ sector has been only slightly affected. In this analysis the shift in whiting quota is assumed to affect potential catch and revenue in the at-sea tribal sector and the non-tribal at-sea mothership and catcher-processor sectors. Since impacts to the tribal and at-sea whiting sectors are not traced through to shorebased communities, any projected effects of whiting quota reapportionment on the at-sea tribal and non-tribal commercial sectors under the alternatives do not extend to estimated community income or employment impacts.

The Baseline, No Action and Action alternative scenarios all assume post-reapportionment 2021 whiting allocations and catch levels. Again, effects of the reapportionment do not affect the distribution of estimated community income and employment impacts described below.

The alternatives were constructed to illustrate how conditions may change both by applying harvest specifications based on default HCRs and compliant management measures (i.e., the No Action Alternative), and varying ACLs and management measures for certain stocks [e.g., black rockfish (Oregon), vermilion rockfish, etc.] under the action alternatives. The ACLs for all remaining stocks are consistent across all alternatives. Under each alternative, including No Action, there are multiple options available corresponding to alternative assumptions about regulation of the nearshore commercial fishery and California recreational fishery.

For simplicity, fishery and community economic impacts in the following sections are displayed for 2023, the first year of the two-year management cycle, only. Although the totals may be somewhat different in some cases during the second year of the management cycle in 2024, the relative distribution of economic effects and inferences regarding rankings of the alternatives would look very similar. Also, for simplicity, the range of scenarios modeled was encapsulated in a set of alternatives containing the alternatives for the IFQ and non-nearshore fixed gear sectors as

well as the range of options for the nearshore commercial fishery and California recreational fishery as follows:

Table 2-1. Range of options modeled for the non-nearshore, nearshore, and recreational fisheries

Modeled Alternative	Shoreside IFQ Sector Alternative	Non-nearshore Fixed gear Sector Alternative ^{a/}	Nearshore Fixed gear Sector Option ^{b/}	California Recreational Option ^{c/}	Washington and Oregon Recreational Sectors ^{d/}
No Action	No Action	No Action	No Action Option 1	Option 1	No Action
Alternative 1	Alternative 1	Alternative 1	Alternative 1 Option 1	Option 1	No Action
Alternative 2	Alternative 2	Alternative 2	Alternative 1 Option 2	Option 2	No Action
Alternative 3	Alternative 3	Alternative 2	Alternative 1 Option 3	Option 4	No Action

a/ There are only two action alternatives for the Non-nearshore fixed gear sector (Alternative 1 and Alternative 2).

b/ There are three options for the Nearshore fixed gear sector under No Action and also three options under the action alternative (Alternative 1).

c/ There are four California Recreational sector options any of which could be selected under any alternative (including No Action). The effects of Option 3 cannot currently be quantified so it has been omitted from the analysis of quantitative impacts under the alternatives.

d/ There is only a single option under consideration for Washington and Oregon recreational fisheries under all alternatives.

The 2015 EIS included detailed descriptions of the models and data used to project socioeconomic impacts. Updated documentation of the models may be found in Appendix A: Model Documentation (available June 2022). The projection models include:

- GMT catch projection models for different sectors of the commercial groundfish fishery,
- GMT fishing effort (angler trips) projections for the recreational groundfish fishery,
- The landings distribution model (LDM), which is used to assign where commercial landings are likely to occur and the resulting port-level ex-vessel revenues,
- The IOPAC economic impact model used to evaluate the effects of the alternatives on coastal communities (ports where commercial groundfish landings and recreational groundfish effort occur) in terms of personal income generated (“income impacts”) and associated employment,
- Net revenue in commercial fishery operations based on projected landings and vessel cost earnings surveys.

The following sections assess socioeconomic impacts in terms of:

- Changes in commercial ex-vessel revenue by fishery sector,
- Change in recreational angler trips by community,
- Change in net revenue by fishery,
- Change in income and employment impacts by community resulting from changes in commercial landings revenue and recreational effort.

2.1.2 Commercial Fisheries

Revenue estimates are based on projected landings estimates from the GMT models referenced above. Table 2-2, Table 2-3, and Table 2-4 compare ex-vessel revenue estimates under the alternatives to the Baseline. All projections assume average ex-vessel prices observed in 2021. Effects are presented by groundfish fishery “sectors,” which are described in Section 1.1.

A number of caveats apply to modeling commercial fishery impacts. First, effort displaced by management measures is assumed not to switch readily into other fishery sectors or geographic region. Second, landings projection models and economic impact models like IOPAC are calibrated to represent a “snapshot” of the economy at a particular point in time. Consequently, these models are best able to address impacts of scenarios that are not too far removed from what has occurred in the recent past. Third, catch projections in the IFQ fishery may not reflect the leveraging effect of increases in ACLs for certain “choke” species (those with low ACLs/allocations). A higher or lower allocation of a particularly constraining species may generate more or less actual revenue than is forecast using the current catch projection models. At the same time, market limitations may constrain the extent to which commercial fisheries are able to take advantage of increased allocations. Finally, stock recruitment variability and catch monitoring uncertainty will contribute to the divergence between actual catches and the projections. Although actual ACL attainment may differ from projections, inseason management measures are routinely applied to prevent ACLs from being exceeded.

As noted above, the Pacific whiting TAC is determined annually, consistent with the Agreement with Canada on Pacific Hake/Whiting where 73.88 percent of the TAC is allocated to U.S. fisheries, of which 17.5 percent is allocated to the Tribal sector. Since the TAC and resulting allocation is not determined during the harvest specifications process, a historical TAC (2021) is used to estimate socioeconomic impacts. The actual TACs for 2023 and 2024 could be higher or lower than the assumed value.

Under the No Action and action alternatives, annual average coastwide ex-vessel revenue, including the at-sea sectors, is projected to exceed the Baseline by from \$6.2 million to \$9.3 million. The relatively small difference (\$3.1 million) in projected overall ex-vessel revenue between the alternatives is likely to be within the margin of error for these estimates. Most of the differences between the commercial fishery alternatives are due to projected effects in the Non-whiting IFQ and Non-nearshore limited entry fixed gear sectors.

Key points regarding estimated ex-vessel revenue impacts by fishery sector are as follows:

- The TAC for Pacific whiting is set annually outside of this harvest specifications process. In this analysis the 2023-2024 TAC and allocations are assumed to be the same as 2021: the Baseline, No Action and Action alternative scenarios all assume post-reapportionment 2021 whiting allocations and catch levels.
 - Projections for the shorebased non-tribal whiting fishery do not vary under the No Action and Action Alternatives. Ex-vessel revenue from shoreside non-tribal whiting landings is estimated to be \$23.8 million under the baseline and all alternatives.

- In the non-tribal and Tribal at-sea fisheries, ex-vessel revenue equivalents are projected to be \$37.2 million and \$3.1 million, respectively, under the Baseline and all alternatives.
- Estimated ex-vessel revenue in the shoreside IFQ non-whiting fishery under the alternatives ranges from a decrease from the Baseline of \$1.2 million under No Action to a decrease of \$2.6 million under Alternative 3. *
- The limited entry fixed gear and non-nearshore open access sectors target sablefish, with sablefish landings accounting for approximately 87 percent of sector ex-vessel revenue (see Groundfish SAFE Table 8b). Compared with Baseline both sectors show increased ex-vessel revenue under the No Action and the action alternatives. Estimated increases in the limited entry fixed gear sector range from \$3.5 million under Alternatives 2 and 3 to \$4.8 million under No Action. Revenues in the non-nearshore open access sector are projected to be \$1.3 million greater than Baseline under No Action and the action alternatives.*
- The nearshore open access sector primarily targets rockfish, cabezon, and lingcod with black rockfish accounting for the largest share of any single species (see Groundfish SAFE Table 9b). Annual ex-vessel revenues relative to the Baseline are estimated to increase by from \$1.3 million under Alternative 3 (Option 3) to \$1.5 million under No Action (Option 1). While the nearshore sector contributes a relatively small portion of coastwide shoreside revenue, it is especially important in Southern Oregon, Northern California, and Central California fishing communities.
- Shoreside Tribal sector revenues (including whiting) are projected to increase relative to the Baseline by from \$2.7 million under Alternatives 2 and 3 to \$3.0 million under No Action. The differences are due to variation in the assumed allocation of sablefish among the alternatives.*

Table 2-2. Estimated ex-vessel revenues by groundfish harvest sector under the Alternatives (\$million).

	Baseline	No Action	Alternative 1	Alternative 2	Alternative 3
Shoreside Sectors:					
Whiting	23.8	23.8	23.8	23.8	23.8
Non-whiting Trawl+Non-trawl IFQ	24.8	23.6	23.2	22.9	22.2
Limited Entry Fixed Gear	9.7	14.5	13.9	13.3	13.3
Nearshore Open Access	3.7	5.2	5.1	5.1	5.0
Non-nearshore Open Access	2.5	3.8	3.8	3.8	3.8
Incidental Open Access	0.1	0.1	0.1	0.1	0.1
Tribal (incl. whiting)	3.2	6.2	6.0	5.9	5.9
Shoreside sectors' Totals	67.9	77.2	75.9	74.8	74.1
At-sea Sectors:					
Non-Tribal Whiting	37.2	37.2	37.2	37.2	37.2
Tribal Whiting	3.1	3.1	3.1	3.1	3.1
At-sea sectors' Totals	40.3	40.3	40.3	40.3	40.3
TOTAL Groundfish Revenue	108.2	117.5	116.2	115.1	114.4

Table 2-3. Change in groundfish ex-vessel revenues from Baseline by groundfish harvest sector under the Alternatives (\$million).

	<i>Baseline</i>	No Action	Alternative 1	Alternative 2	Alternative 3
Shoreside Sectors:					
Whiting	23.8	+0.0	+0.0	+0.0	+0.0
Non-whiting Trawl+Non-trawl IFQ	24.8	-1.2	-1.7	-1.9	-2.6
Limited Entry Fixed Gear	9.7	+4.8	+4.2	+3.5	+3.5
Nearshore Open Access	3.7	+1.5	+1.4	+1.4	+1.3
Non-nearshore Open Access	2.5	+1.3	+1.3	+1.3	+1.3
Incidental Open Access	0.1	+0.0	+0.0	+0.0	+0.0
Tribal (incl. whiting)	3.2	+3.0	+2.8	+2.7	+2.7
Shoreside sectors' Totals	67.9	+9.3	+8.0	+6.9	+6.2
At-sea Sectors:					
Non-Tribal Whiting	37.2	+0.0	+0.0	+0.0	+0.0
Tribal Whiting	3.1	+0.0	+0.0	+0.0	+0.0
At-sea sectors' Totals	40.3	+0.0	+0.0	+0.0	+0.0
TOTAL Groundfish Revenue	108.2	+9.3	+8.0	+6.9	+6.2

Table 2-4. Change in groundfish ex-vessel revenues from Baseline by groundfish harvest sector under the Alternatives (percent).

	<i>Baseline</i>	No Action	Alternative 1	Alternative 2	Alternative 3
Shoreside Sectors:					
Whiting	23.8	+0.0%	+0.0%	+0.0%	+0.0%
Non-whiting Trawl+Non-trawl IFQ	24.8	-5.0%	-6.7%	-7.8%	-10.5%
Limited Entry Fixed Gear	9.7	+49.4%	+42.7%	+36.2%	+36.2%
Nearshore Open Access	3.7	+39.5%	+37.9%	+37.3%	+36.3%
Non-nearshore Open Access	2.5	+51.3%	+51.3%	+51.3%	+51.3%
Incidental Open Access	0.1	+0.0%	+0.0%	+0.0%	+0.0%
Tribal (incl. whiting)	3.2	+94.3%	+89.1%	+84.1%	+84.1%
Shoreside sectors' Totals	67.9	+13.7%	+11.8%	+10.2%	+9.1%
At-sea Sectors:					
Non-Tribal Whiting	37.2	+0.0%	+0.0%	+0.0%	+0.0%
Tribal Whiting	3.1	+0.0%	+0.0%	+0.0%	+0.0%
At-sea sectors' Totals	40.3	+0.0%	+0.0%	+0.0%	+0.0%
TOTAL Groundfish Revenue	108.2	+8.6%	+7.4%	+6.4%	+5.7%

2.2 Recreational Fisheries

For recreational fisheries, projected marine area angler boat trips taken in groundfish plus Pacific halibut recreational fisheries are compared to Baseline fishing effort under the proposed management alternatives. Table 2-5,

Table 2-6, and Table 2-7 compare projected recreational angler trips under the No Action and Action alternatives to Baseline average annual angler effort. Results are shown by coastal regions that are aggregated from statistical reporting regions²

To produce a tractable number of economic impact projections that cover the range of possible outcomes, in addition to No Action, three action alternatives (Alternatives 1-3) were constructed from the range of management alternatives and/or options proposed by each state. Proposed management regimes for Washington's and Oregon's recreational fisheries do not vary under Baseline, No Action, and the action alternatives. There are four management options (Options 1-4) for the California recreational fishery. Any of the four options can be selected under any of the alternatives, including No Action. Since the effects of California Option 3 cannot currently be quantified it has been omitted from the following analysis of quantitative impacts under the alternatives.³

For purposes of comparing the range of alternative management options under consideration, No Action and Alternative 1 are associated with California Option 1 (Baseline management), Alternative 2 is associated with California Option 2 (closure of the boat-based fishery), and Alternative 3 is associated with California Option 4 (year-round all depth fishing). These associations are maintained in this and subsequent sections of the economic analysis. For more information about the proposed recreational management options see F.4, Attachment 2, April 2022 for descriptions of the California recreational Options.

Key points regarding estimated recreational effort impacts by coastal region are as follows:

- Coastwide recreational effort is projected to be the same as Baseline under No Action and Alternative 1 (California Option 1). Under Alternative 2 (California Option 2) coastwide recreational fishing effort is projected to decrease from Baseline by 679,300 trips (81.1 percent) due to closure of the recreational fishery in California. Under Alternative 3 (California Option 4) coastwide recreational fishing effort is projected to increase from Baseline by 209,100 trips (24.9 percent) due to relaxation of depth management measures in California.
- Recreational fishing effort for the Washington Coast is projected to be the same as Baseline under all alternatives. The harvest control rules under consideration for 2023 and 2024 include sub-bag limits for species such as vermilion, quillback and copper rockfishes,

² The Puget Sound region is not shown in these tables because Council managed recreational fisheries do not occur in this region.

³ While it is expected that decreases in groundfish effort would occur in all management areas under Option 3 (offshore fishery) relative to Baseline/No Action, the amount cannot be quantified as estimates of angler trips cannot be parsed into depth bins. Additionally, dependent upon which RCA line is chosen under Option 3, effort levels could be closer to Baseline or closer to complete fishery closure.

which are not expected to affect effort. Washington Coast ports accounted for 6.5 percent of coastwide Baseline fishing effort.

- Recreational fishing effort in Oregon is projected to be the same as Baseline under all alternatives. The management options under consideration for 2023 and 2024 are not expected to affect effort. The combined three coastal regions of Oregon account for 12.4 percent of coastwide Baseline fishing effort.
- California recreational fishing effort is projected not to change from Baseline under No Action and Alternative 1 (California recreational Option 1), but is projected to be zero in all regions under Alternative 2 (California recreational Option 2), and to increase from Baseline under Alternative 3 (California recreational Option 4) in all California regions by at least 19.4 percent. Note that under Alternative 2 (California recreational Option 2) no fishing would be allowed, while under Alternative 3 (California recreational Option 4) fishing would be allowed at all depths throughout the year. The Santa Barbara to San Diego region accounts for more than half (55.7 percent) of coastwide Baseline recreational angler effort, and this region also shows the largest change in effort under Alternative 3 (California recreational Option 4), an increase of 162,300 trips (34.8 percent). Increases projected for the other California regions under Alternative 3 (California recreational Option 4) are: Crescent City-Eureka 19.4 percent, Fort Bragg-Bodega Bay 19.4 percent, San Francisco area 22.7 percent, and Santa Cruz to Morro Bay 22.7 percent. The combined five California regions shown account for 81.1 percent of coastwide Baseline fishing effort.

Table 2-5. Estimated Recreational Effort (halibut+bottomfish) under Baseline and the Alternatives (thousands of angler trips).

Community Groups	Baseline	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)	Alternative 3 (California Option 4)
Washington Coast	54.8	54.8	54.8	54.8	54.8
Astoria-Tillamook	18.5	18.5	18.5	18.5	18.5
Newport	44.0	44.0	44.0	44.0	44.0
Coos Bay-Brookings	41.4	41.4	41.4	41.4	41.4
Crescent City-Eureka	25.0	25.0	25.0	0.0	29.8
Fort Bragg - Bodega Bay	18.6	18.6	18.6	0.0	22.2
San Francisco Area	74.2	74.2	74.2	0.0	91.0
SC – Mo – MB*	94.6	94.6	94.6	0.0	116.1
SB – LA – SD*	466.9	466.9	466.9	0.0	629.2
Coastwide Total	838.1	838.1	838.1	158.8	1,047.2

*SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 2-6. Estimated change from Baseline Recreational Effort (halibut+bottomfish) under the Alternatives (thousands of angler trips).

Community Groups	Baseline	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)	Alternative 3 (California Option 4)
Washington Coast	54.8	-	-	-	-
Astoria-Tillamook	18.5	-	-	-	-
Newport	44.0	-	-	-	-
Coos Bay-Brookings	41.4	-	-	-	-
Crescent City-Eureka	25.0	-	-	-25.0	+4.8
Fort Bragg - Bodega Bay	18.6	-	-	-18.6	+3.6
San Francisco Area	74.2	-	-	-74.2	+16.8
SC – Mo – MB*	94.6	-	-	-94.6	+21.5
SB – LA – SD*	466.9	-	-	-466.9	+162.3
Coastwide Total	838.1	-	-	-679.3	+209.1

*SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 2-7. Estimated change from Baseline Recreational Effort (halibut+bottomfish) under the Alternatives (percent).

Community Groups	Baseline	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)	Alternative 3 (California Option 4)
Washington Coast	54.8	-	-	-	-
Astoria-Tillamook	18.5	-	-	-	-
Newport	44.0	-	-	-	-
Coos Bay-Brookings	41.4	-	-	-	-
Crescent City-Eureka	25.0	-	-	-100%	+19.4%
Fort Bragg - Bodega Bay	18.6	-	-	-100%	+19.4%
San Francisco Area	74.2	-	-	-100%	+22.7%
SC – Mo – MB*	94.6	-	-	-100%	+22.7%
SB – LA – SD*	466.9	-	-	-100%	+34.8%
Coastwide Total	838.1	-	-	-81.1%	+24.9%

*SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

2.2.1 Estimated Commercial Vessel Net Revenue Impacts of the Alternatives

To be completed by the June 2022 Pacific Marine Fishery Council meeting's advanced briefing book

2.3 Estimated Change in Income and Employment Impacts by Community

Socioeconomic impacts to fishing communities engaged in groundfish fisheries are evaluated based on the changes in personal income (dollar income impacts) and employment (number of jobs) under the alternatives. These effects are functions of the projected changes in commercial landings and recreational effort described above. Comparisons are presented with respect to the Baseline under No Action (California Option 1), Alternative 1 (California Option 1), Alternative 2 (California Option 2) and Alternative 3 (California Option 4). For simplification and ease of comparing impacts from commercial and recreational fishing activities, commercial fisheries port groups are aggregated regionally so as to be consistent with the recreational reporting regions. For a description of the counties included in these regions see page 378 in the 2015 EIS.

Projected changes in commercial ex-vessel revenues and recreational angler trips were converted into income and employment effects using results from the NWFSC IOPAC input-output model. Impacts include combined direct, indirect, and induced economic effects resulting from projected changes in recreational angling, commercial fishing, fish processing, and related input supply and industry support activities.

Community impacts from commercial and recreational fishing are displayed separately. Impacts are calculated by applying income and employment multipliers generated using IOPAC regional impact models to the projected levels of local expenditures by commercial harvesters, seafood processors, and recreational anglers under Baseline and the alternatives.

Income and employment impacts from Tribal fisheries and also from at-sea Pacific whiting catcher-processor and mothership sectors are not included in the community impact totals for the following reasons:

1. Tribal groundfish harvesting and processing are not included in any of the cost-revenue data collected by NWFSC.
2. While overall estimators of income and employment impacts derived from the at-sea whiting fishery (tribal and non-tribal CPs and motherships) have been developed, the detail required to attribute these impacts to particular port groups has not.

That being said, presumably most of the income and employment impacts associated with at-sea whiting fisheries would likely accrue in the Seattle region; while corresponding impacts of shorebased tribal groundfish fisheries most likely accrue in Washington Coast communities.

Economic impact models like IOPAC are calibrated to represent a “snapshot” of the economy at a particular point in time. Consequently, these models are best able to address impacts of scenarios that are within the range of what may have occurred over the recent past. Analysis of scenarios that represent particularly large departures from the Baseline may, therefore, result in biased impact estimates.

2.3.1 Commercial Fishery Community Income Impacts

Table 2-8 presents estimates of community personal income impacts by region due to projected commercial groundfish fishing activity under the range of Alternatives. Table 2-9 and Table 2-10 compare commercial groundfish fishery impact estimates under the alternatives against the Baseline. Table 2-11 presents estimated income impacts resulting from recreational groundfish fisheries, with Table 2-12 and Table 2-13 comparing the recreational estimates relative to the Baseline.

Key points regarding estimated income impacts from commercial groundfish fisheries by coastal region are as follows:

- Coastwide estimated personal income impacts from commercial groundfish fishing are estimated to be \$158.3 million under the Baseline and are projected to increase to between \$162.6 million and \$167.6 million under the range of alternatives. The highest coastwide total and the highest level of income impacts for each community occur under No Action and the lowest occur under Alternative 3.
- Puget Sound ports show increases ranging from \$1.6 million (Alternative 3) to \$2.2 million (No Action) over baseline, or 48.6 percent to 67.3 percent, respectively. Puget Sound ports account for 2.0 percent of estimated coastwide Baseline personal income impacts from commercial fishing.
- Oregon and Washington Coast port areas show personal income changes ranging from a decrease of \$2.7 million (Astoria-Tillamook under Alternative 3) to an increase of \$1.7 million (Coos Bay-Brookings under No Action). Those two port areas also show the largest percentage changes in income impacts among Oregon and Washington Coast ports under the alternatives: -3.9 percent for Astoria-Tillamook under Alternative 3 and +23.7 percent in Coos Bay-Brookings under No Action. Astoria-Tillamook is the only port area showing decreases from Baseline in projected income impacts under all alternatives. Combined Oregon and Washington Coast ports account for 84.7 percent of estimated coastwide Baseline personal income impacts from commercial fishing.
- All California port groups are projected to see increases from Baseline under all alternatives, ranging from \$0.3 million (San Francisco under Alternative 3) to \$1.4 million (Santa Barbara-San Diego under all alternatives). The largest relative increases in personal income impacts compared to Baseline are projected for the Santa Cruz to Morro Bay region, ranging from 34.8 percent under Alternative 3 to 41.4 percent under No Action. Projected landings by fixed gear fisheries in those ports account for much of the increased income impacts. California ports account for 13.3 percent of coastwide Baseline income impacts from commercial fishing.

Table 2-8. Commercial fishery income impacts under Baseline and the Alternatives by community group (\$million).

	Baseline	No Action	Alternative 1	Alternative 2	Alternative 3
Puget Sound	3.2	5.4	5.1	4.8	4.8
Washington Coast	32.1	32.4	32.3	32.2	32.1
Astoria-Tillamook	68.4	67.2	66.8	66.6	65.7
Newport	26.1	27.4	27.0	26.7	26.4
Coos Bay-Brookings	7.3	9.0	8.6	8.4	8.3
Crescent City-Eureka	5.7	6.6	6.4	6.3	6.2
Fort Bragg – Bodega Bay	3.7	4.8	4.7	4.6	4.6
San Francisco Area	3.0	3.5	3.5	3.4	3.4
SC – Mo – MB*	3.1	4.4	4.3	4.2	4.2
SB – LA – SD*	5.5	6.9	6.9	6.9	6.9
Coastwide Total	158.3	167.6	165.6	164.0	162.6

* SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 2-9. Change in commercial fishery income impacts (from Baseline) under the Alternatives by community group (\$million).

	Baseline	No Action	Alternative 1	Alternative 2	Alternative 3
Puget Sound	3.2	+2.2	+1.9	+1.6	+1.6
Washington Coast	32.1	+0.2	+0.1	+0.1	-0.1
Astoria-Tillamook	68.4	-1.2	-1.6	-1.8	-2.7
Newport	26.1	+1.3	+0.9	+0.5	+0.2
Coos Bay-Brookings	7.3	+1.7	+1.3	+1.1	+1.1
Crescent City-Eureka	5.7	+0.9	+0.7	+0.6	+0.5
Fort Bragg – Bodega Bay	3.7	+1.1	+1.0	+0.9	+0.9
San Francisco Area	3.0	+0.5	+0.4	+0.4	+0.3
SC – Mo – MB*	3.1	+1.3	+1.2	+1.1	+1.1
SB – LA – SD*	5.5	+1.4	+1.4	+1.4	+1.4
Coastwide Total	158.3	+9.3	+7.4	+5.8	+4.3

* SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

Table 2-10. Change in commercial fishery income impacts (from Baseline) under the Alternatives by community group (percent).

	Baseline	No Action	Alternative 1	Alternative 2	Alternative 3
Puget Sound	3.2	+67.3%	+57.6%	+48.3%	+48.6%
Washington Coast	32.1	+0.6%	+0.4%	+0.2%	-0.2%
Astoria-Tillamook	68.4	-1.8%	-2.3%	-2.6%	-3.9%
Newport	26.1	+4.9%	+3.3%	+1.9%	+0.8%
Coos Bay-Brookings	7.3	+23.7%	+18.5%	+14.7%	+14.6%
Crescent City-Eureka	5.7	+16.2%	+13.2%	+11.4%	+9.7%
Fort Bragg – Bodega Bay	3.7	+29.8%	+27.0%	+24.7%	+23.8%
San Francisco Area	3.0	+15.2%	+13.6%	+12.1%	+11.1%
SC – Mo – MB*	3.1	+41.4%	+38.3%	+34.9%	+34.8%
SB – LA – SD*	5.5	+24.7%	+24.7%	+24.6%	+24.5%
Coastwide Total	158.3	+5.9%	+4.6%	+3.7%	+2.7%

* SC – Mo – MB = Santa Cruz, Monterey, and Morro Bay; SB – LA – SD = Santa Barbara, Los Angeles, and San Diego.

2.3.2 Recreational Fishery Community Income Impacts

Recreational income impacts are derived from changes in recreational fishing effort (angler trips) and associated expenditures. See Recreational Fisheries section, above, for discussion regarding change in projected fishing effort due to management changes. Table 2-11 shows estimated recreational income impacts under Baseline and the alternatives; Table 2-12 shows the incremental change with respect to the Baseline; Table 2-13 shows the percentage change.

For purposes of comparing recreational impacts, No Action and Alternative 1 are associated with California Option 1 (Baseline management), Alternative 2 is associated with California Option 2 (closure of the boat-based fishery), and Alternative 3 is associated with California Option 4 (year-round all depth fishing).⁴ Key points regarding estimated income impacts from recreational groundfish fisheries by coastal region are as follows:

- Coastwide recreational fishing income impacts are projected not to change from Baseline under No Action and Alternative 1 (California Option 1), to decrease by 89.3 percent (\$143.4 million) under Alternative 2 (California Option 2), and to increase by 28.5 percent (\$45.7 million) under Alternative 3 (California Option 4).
- The Washington Coast shows no change relative to the Baseline in estimated recreational fishing income impacts under the alternatives. Washington Coast ports account for 4.5 percent of Baseline recreational fishing income impacts.
- Recreational fishing income impacts are projected to be the same as Baseline in all regions in Oregon across all alternatives. Combined Oregon Coast ports account for 6.1 percent of Baseline recreational fishing income impacts.
- California recreational fishing income impacts are projected not to change from Baseline under No Action and Alternative 1 (California recreational Option 1). Under Alternative 2 (California recreational Option 2) no fishing would be allowed, while under Alternative 3 (California recreational Option 4) fishing would be allowed at all depths throughout the year. Income impacts are projected to be zero in all regions under Alternative 2 (California recreational Option 2) (i.e., -100 percent), and to increase from Baseline under Alternative 3 (California recreational Option 4) in all California regions by at least 19.4 percent. The Santa Barbara to San Diego region shows the largest change in income impacts under Alternative 3 (California recreational Option 4), an increase of \$38.5 million (34.8 percent). Increases in recreational fishing impacts projected for the other California regions under Alternative 3 (California recreational Option 4) include: Crescent City-Eureka \$0.4 million (19.4 percent), Fort Bragg-Bodega Bay \$0.5 million (19.4 percent), San Francisco area \$3.1 million (22.7 percent), and Santa Cruz to Morro Bay \$3.1 million (22.7 percent). Combined California Coast ports account for 89.3 percent of Baseline recreational fishing income impacts.

⁴ Any of the four California Recreational sector options could be selected under any alternative including No Action. Effects of Option 3 cannot currently be quantified so it has been omitted from this analysis.

Table 2-11. Recreational fishery income impacts under Baseline and the Alternatives by community group (\$million).

Community Groups	Baseline	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)	Alternative 3 (California Option 4)
Washington Coast	7.3	7.3	7.3	7.3	7.3
Astoria-Tillamook	1.4	1.4	1.4	1.4	1.4
Newport	5.8	5.8	5.8	5.8	5.8
Coos Bay-Brookings	2.7	2.7	2.7	2.7	2.7
Crescent City-Eureka	2.3	2.3	2.3	0.0	2.7
Fort Bragg - Bodega Bay	2.8	2.8	2.8	0.0	3.4
San Francisco Area	13.5	13.5	13.5	0.0	16.5
SC – Mo – MB*	13.9	13.9	13.9	0.0	17.0
SB – LA – SD*	110.9	110.9	110.9	0.0	149.4
Coastwide Total	160.5	160.5	160.5	17.2	206.3

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 2-12. Change in recreational fishery income impacts from Baseline under the Alternatives by community group (\$million)

Community Groups	Baseline	No Action (California Option 1)	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)
Washington Coast	7.3	-	-	-	-
Astoria-Tillamook	1.4	-	-	-	-
Newport	5.8	-	-	-	-
Coos Bay-Brookings	2.7	-	-	-	-
Crescent City-Eureka	2.3	-	-	-2.3	+0.4
Fort Bragg - Bodega Bay	2.8	-	-	-2.8	+0.5
San Francisco Area	13.5	-	-	-13.5	+3.1
SC – Mo – MB*	13.9	-	-	-13.9	+3.1
SB – LA – SD*	110.9	-	-	-110.9	+38.5
Coastwide Total	160.5	-	-	-143.4	+45.7

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

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Table 2-13. Change in recreational fishery income impacts from Baseline under the Alternatives by community group (percent).

Community Groups	<i>Baseline</i>	No Action (California Option 1)	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)
Washington Coast	7.3	-	-	-	-
Astoria-Tillamook	1.4	-	-	-	-
Newport	5.8	-	-	-	-
Coos Bay-Brookings	2.7	-	-	-	-
Crescent City-Eureka	2.3	-	-	-100%	+19.4%
Fort Bragg - Bodega Bay	2.8	-	-	-100%	+19.4%
San Francisco Area	13.5	-	-	-100%	+22.7%
SC – Mo – MB*	13.9	-	-	-100%	+22.7%
SB – LA – SD*	110.9	-	-	-100%	+34.8%
Coastwide Total	<i>160.5</i>	-	-	-89.3%	+28.5%

* SC – Mo – MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

2.3.3 Commercial Fishery Community Employment Impacts

Coastwide estimated employment impacts from commercial groundfish fishing are estimated to be 2,302 jobs under the Baseline and are projected to increase to between 2,496 and 2,576 jobs under the range of alternatives. The highest coastwide total and the highest level of employment impacts for each community among the alternatives occur under No Action, and the lowest occur under Alternative 3.

- Puget Sound ports show increases in employment over Baseline ranging from 20 jobs (Alternative 3) to 28 jobs (No Action), or increases of 48.7 percent and 67.4 percent, respectively. Puget Sound ports account for 1.8 percent of estimated coastwide employment impacts from commercial fishing.
- Oregon and Washington Coast port areas show employment impact changes ranging from a decrease of 24 jobs (Astoria-Tillamook under Alternative 3) to an increase of 35 jobs (Coos Bay-Brookings under No Action). Those two port areas also show the largest percentage changes in income impacts among Oregon and Washington Coast ports under the alternatives: -3.1 percent for Astoria-Tillamook under Alternative 3, and +18.4 percent in Coos Bay-Brookings under No Action. Astoria-Tillamook is the only port area showing decreases from Baseline in projected employment impacts under all alternatives. Combined Oregon and Washington Coast ports account for 74.1 percent of estimated coastwide Baseline employment impacts from commercial fishing.
- All California port groups are projected to see increases from Baseline under all alternatives, ranging from 8 jobs (San Francisco under Alternative 3) to 61 jobs (Santa Cruz to Morro Bay under No Action). The largest relative increases in employment impacts compared to Baseline are projected for the Fort Bragg-Bodega Bay region, ranging from 43 percent under Alternative 3 to 48.6 percent under No Action. Projected landings by fixed gear fisheries in those ports account for much of the increased employment impacts. Combined California ports account for 24.1 percent of coastwide Baseline employment impacts from commercial fishing. Coastwide estimated employment impacts

from commercial groundfish fishing are estimated to be 2,302 jobs under the Baseline and are projected to increase to between 2,496 and 2,576 jobs under the range of alternatives. The highest coastwide total and the highest level of employment impacts for each community among the alternatives occur under No Action, and the lowest occur under Alternative 3.

Puget Sound ports show increases in employment over Baseline ranging from 20 jobs (Alternative 3) to 28 jobs (No Action), or increases of 48.7 percent and 67.4 percent, respectively. Puget Sound ports account for 1.8 percent of estimated coastwide employment impacts from commercial fishing.

- Oregon and Washington Coast port areas show employment impact changes ranging from a decrease of 24 jobs (Astoria-Tillamook under Alternative 3) to an increase of 35 jobs (Coos Bay-Brookings under No Action). Those two port areas also show the largest percentage changes in income impacts among Oregon and Washington Coast ports under the alternatives: -3.1 percent for Astoria-Tillamook under Alternative 3, and +18.4 percent in Coos Bay-Brookings under No Action. Astoria-Tillamook is the only port area showing decreases from Baseline in projected employment impacts under all alternatives. Combined Oregon and Washington Coast ports account for 74.1 percent of estimated coastwide Baseline employment impacts from commercial fishing.
- All California port groups are projected to see increases from Baseline under all alternatives, ranging from 8 jobs (San Francisco under Alternative 3) to 61 jobs (Santa Cruz to Morro Bay under No Action). The largest relative increases in employment impacts compared to Baseline are projected for the Fort Bragg-Bodega Bay region, ranging from 43 percent under Alternative 3 to 48.6 percent under No Action. Projected landings by fixed gear fisheries in those ports account for much of the increased employment impacts. Combined California ports account for 24.1 percent of coastwide Baseline employment impacts from commercial fishing.

Table 2-14 shows projected employment impacts due to the commercial groundfish fishery under Baseline and the alternatives; Table 2-15 and Table 2-16 show the change in commercial fishery impacts relative to Baseline in terms of dollars and percentage, respectively. Key points regarding estimated employment impacts from commercial groundfish fisheries by coastal region are as follows:

- Coastwide estimated employment impacts from commercial groundfish fishing are estimated to be 2,302 jobs under the Baseline and are projected to increase to between 2,496 and 2,576 jobs under the range of alternatives. The highest coastwide total and the highest level of employment impacts for each community among the alternatives occur under No Action, and the lowest occur under Alternative 3.
- Puget Sound ports show increases in employment over Baseline ranging from 20 jobs (Alternative 3) to 28 jobs (No Action), or increases of 48.7 percent and 67.4 percent, respectively. Puget Sound ports account for 1.8 percent of estimated coastwide employment impacts from commercial fishing.
- Oregon and Washington Coast port areas show employment impact changes ranging from a decrease of 24 jobs (Astoria-Tillamook under Alternative 3) to an increase of 35 jobs

(Coos Bay-Brookings under No Action). Those two port areas also show the largest percentage changes in income impacts among Oregon and Washington Coast ports under the alternatives: -3.1 percent for Astoria-Tillamook under Alternative 3, and +18.4 percent in Coos Bay-Brookings under No Action. Astoria-Tillamook is the only port area showing decreases from Baseline in projected employment impacts under all alternatives. Combined Oregon and Washington Coast ports account for 74.1 percent of estimated coastwide Baseline employment impacts from commercial fishing.

- All California port groups are projected to see increases from Baseline under all alternatives, ranging from 8 jobs (San Francisco under Alternative 3) to 61 jobs (Santa Cruz to Morro Bay under No Action). The largest relative increases in employment impacts compared to Baseline are projected for the Fort Bragg-Bodega Bay region, ranging from 43 percent under Alternative 3 to 48.6 percent under No Action. Projected landings by fixed gear fisheries in those ports account for much of the increased employment impacts. Combined California ports account for 24.1 percent of coastwide Baseline employment impacts from commercial fishing.

Table 2-14. Commercial fishery employment impacts under Baseline and the Alternatives by community group (number of jobs).

	Baseline	No Action	Alternative 1	Alternative 2	Alternative 3
Puget Sound	41	69	65	61	62
Washington Coast	382	392	390	388	387
Astoria-Tillamook	774	765	761	759	750
Newport	361	385	379	373	369
Coos Bay-Brookings	190	225	215	210	210
Crescent City-Eureka	100	129	126	124	123
Fort Bragg – Bodega Bay	119	178	175	172	171
San Francisco Area	65	75	74	73	73
SC – Mo – MB*	132	193	190	187	186
SB – LA – SD*	137	166	166	166	166
Coastwide Total	2,302	2,576	2,542	2,515	2,496

* SC – Mo – MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 2-15. Change in commercial fishery employment impacts from Baseline under the Alternatives by community group (number of jobs).

	Baseline	No Action	Alternative 1	Alternative 2	Alternative 3
Puget Sound	41	+28	+24	+20	+20
Washington Coast	382	+10	+8	+6	+5
Astoria-Tillamook	774	-9	-12	-15	-24
Newport	361	+24	+18	+12	+9
Coos Bay-Brookings	190	+35	+25	+20	+20
Crescent City-Eureka	100	+29	+26	+24	+23
Fort Bragg – Bodega Bay	119	+58	+55	+52	+51
San Francisco Area	65	+10	+9	+8	+8
SC – Mo – MB*	132	+61	+58	+55	+54
SB – LA – SD*	137	+29	+29	+29	+29
Coastwide Total	2,302	+275	+240	+213	+195

* SC – Mo – MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 2-16. Change in commercial fishery employment impacts from Baseline under the Alternatives by community group (percent).

	<i>Baseline</i>	No Action	Alternative 1	Alternative 2	Alternative 3
Puget Sound	41	+67.4%	+57.7%	+48.3%	+48.7%
Washington Coast	382	+2.6%	+2.1%	+1.6%	+1.3%
Astoria-Tillamook	774	-1.1%	-1.6%	-1.9%	-3.1%
Newport	361	+6.6%	+4.9%	+3.4%	+2.4%
Coos Bay-Brookings	190	+18.4%	+13.0%	+10.6%	+10.6%
Crescent City-Eureka	100	+28.7%	+26.3%	+24.5%	+23.2%
Fort Bragg – Bodega Bay	119	+48.6%	+46.3%	+43.9%	+43.0%
San Francisco Area	65	+15.5%	+14.2%	+13.0%	+12.1%
SC – Mo – MB*	132	+45.8%	+44.0%	+41.5%	+40.6%
SB – LA – SD*	137	+21.4%	+21.4%	+21.3%	+21.2%
Coastwide Total	2,302	+11.9%	+10.4%	+9.3%	+8.5%

* SC – Mo – MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

2.3.4 Recreational Fishery Community Employment Impacts

Table 2-17 shows projected employment impacts due to the recreational groundfish fishery under Baseline and the alternatives; Table 2-18 and Table 2-19 show the change in recreational fishery impacts relative to the Baseline in terms of dollars and percentage, respectively.

For purposes of comparing recreational impacts, No Action and Alternative 1 are associated with California Option 1 (Baseline management), Alternative 2 is associated with California Option 2 (closure of the boat-based fishery), and Alternative 3 is associated with California Option 4 (year-round all depth fishing).⁵ Key points regarding estimated employment impacts from recreational groundfish fisheries by coastal region are as follows:

- Coastwide recreational fishing employment impacts are projected not to change under No Action and Alternative 1 (California Option 1), to decrease by 81.1 percent (2,271 jobs) under Alternative 2 (California Option 2), and to increase by 25.8 percent (721 jobs) under Alternative 3 (California Option 4).
- The Washington Coast shows no change relative to the Baseline in estimated employment impacts under the alternatives. Washington Coast ports account for 7.8 percent of Baseline recreational fishing employment impacts.
- Recreational fishing employment impacts are projected to be the same as Baseline in all regions in Oregon across all alternatives. Combined Oregon Coast ports account for 11.0 percent of Baseline recreational fishing employment impacts.
- California recreational fishing employment impacts are projected not to change from Baseline under No Action and Alternative 1 (California recreational Option 1). Under Alternative 2 (California recreational Option 2) no fishing would be allowed, while under Alternative 3 (California recreational Option 4) fishing would be allowed at all depths throughout the year. Employment impacts are projected to be zero in all regions under Alternative 2 (California recreational Option 2) (i.e., -100 percent), and to increase from

⁵ Any of the four California Recreational sector options could be selected under any alternative including No Action. Effects of Option 3 cannot currently be quantified so it has been omitted from this analysis.

Baseline under Alternative 3 (California recreational Option 4) in all California regions by at least 19.4 percent. The Santa Barbara to San Diego region shows the largest change in employment under Alternative 3 (California recreational Option 4), an increase of 601 jobs (34.8 percent). Increases projected for the other California regions under Alternative 3 (California recreational Option 4) are: Crescent City-Eureka 8 jobs (19.4 percent), Fort Bragg-Bodega Bay 10 jobs (19.4 percent), San Francisco area 47 jobs (22.7 percent), and Santa Cruz to Morro Bay 56 jobs (22.7 percent). Combined California Coast ports account for 81.1 percent of Baseline recreational fishing employment impacts.

Table 2-17. Recreational fishery employment impacts under Baseline and the Alternatives by community group (number of jobs).

Community Groups	Baseline	No Action (California Option 1)	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)
Washington Coast	219	219	219	219	219
Astoria-Tillamook	53	53	53	53	53
Newport	173	173	173	173	173
Coos Bay-Brookings	82	82	82	82	82
Crescent City-Eureka	39	39	39	0	47
Fort Bragg - Bodega Bay	49	49	49	0	59
San Francisco Area	208	208	208	0	255
SC – Mo – MB*	246	246	246	0	301
SB – LA – SD*	1,729	1,729	1,729	0	2,330
Coastwide Total	2,800	2,800	2,800	528	3,521

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 2-18. Change in recreational fishery employment impacts from Baseline under the Alternatives by community group (number of jobs).

Community Groups	Baseline	No Action (California Option 1)	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)
Washington Coast	219	-	-	-	-
Astoria-Tillamook	53	-	-	-	-
Newport	173	-	-	-	-
Coos Bay-Brookings	82	-	-	-	-
Crescent City-Eureka	39	-	-	-39	+8
Fort Bragg - Bodega Bay	49	-	-	-49	+10
San Francisco Area	208	-	-	-208	+47
SC – Mo – MB*	246	-	-	-246	+56
SB – LA – SD*	1,729	-	-	-1,729	+601
Coastwide Total	2,800	-	-	-2,271	+721

* SC – Mo –MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

Table 2-19. Change in recreational fishery employment impacts from Baseline under the Alternatives by community group (percent).

Community Groups	Baseline	No Action (California Option 1)	No Action (California Option 1)	Alternative 1 (California Option 1)	Alternative 2 (California Option 2)
Washington Coast	219	-	-	-	-
Astoria-Tillamook	53	-	-	-	-
Newport	173	-	-	-	-
Coos Bay-Brookings	82	-	-	-	-
Crescent City-Eureka	39	-	-	-100%	+19.4%
Fort Bragg - Bodega Bay	49	-	-	-100%	+19.4%
San Francisco Area	208	-	-	-100%	+22.7%
SC – Mo – MB*	246	-	-	-100%	+22.7%
SB – LA – SD*	1,729	-	-	-100%	+34.8%
Coastwide Total	2,800	-	-	-81.1%	+25.8%

* SC – Mo – MB: Santa Cruz – Monterey – Morro Bay; SB – LA – SD: Santa Barbara – Los Angeles – San Diego.

2.3.5 At-sea Whiting Fishery Income and Employment Impacts

Economic impacts contributed by the at-sea whiting fishery are not assigned to coastal communities. That being said, presumably most of the income and employment impacts associated with at-sea whiting fisheries are associated with the participating vessels themselves and would likely accrue in the Seattle region. Impacts shown in Table 2-20 under the Baseline and for all alternatives assume 2021 Pacific whiting allocations after reapportionment of the unused Tribal portion to the non-Tribal whiting sectors. For that reason, there is no projected variation in estimated income or employment impacts under Baseline or the alternative scenarios.

Table 2-20. Estimated total ex-vessel revenue equivalent, income and employment impacts under baseline and the alternatives for At-sea whiting sectors: Non-Tribal (Motherships, Catcher vessels and Catcher-Processors) and Tribal (Motherships and Catcher vessels).

	Baseline	No Action	Alternative 1	Alternative 2	Alternative 3
Ex-vessel Revenue Equivalent (\$mil)					
Non-Tribal Whiting	37.2	37.2	37.2	37.2	37.2
Tribal Whiting	3.1	3.1	3.1	3.1	3.1
Income Impacts (\$mil)					
Non-Tribal Whiting	244.7	244.7	244.7	244.7	244.7
Tribal Whiting	15.0	15.0	15.0	15.0	15.0
Employment Impacts (jobs)					
Non-Tribal Whiting	3,693	3,693	3,693	3,693	3,693
Tribal Whiting	323	323	323	323	323