## SECRETARIAL REVIEW DRAFT

### Regulatory Impact Review/
### Initial Regulatory Flexibility Analysis

# Revised Steller Sea Lion Protection Measures

## May 2014

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Abstract: This Regulatory Impact Review (RIR) provides a cost benefit analysis of proposals to modify regulations providing protections to Steller sea lions that permit groundfish fisheries to take place in the Aleutian Islands without jeopardizing the sea lion populations or adversely modifying their critical habitat, as jeopardy and adverse modification are understood in the Endangered Species Act. This RIR complies with the provisions of Presidential Executive Order 12866, as modified by subsequent executive orders. This Initial Regulatory Flexibility Analysis (IRFA) describes the small entity implications of this action and addresses the requirements of the Regulatory Flexibility Act of 1980, as subsequently amended.

# List of Acronyms and Abbreviations

*[REVISE ACCORDINGLY based on what is actually used in document]*

| | |
|---|---|
| ‘ | feet |
| AAC | Alaska Administrative Code |
| ABC | acceptable biological catch |
| ADF&G | Alaska Department of Fish and Game |
| AEQ | adult equivalent |
| AFA | American Fisheries Act |
| AFSC | Alaska Fisheries Science Center |
| AGDB | Alaska Groundfish Data Bank |
| AKFIN | Alaska Fisheries Information Network |
| ANILCA | Alaska National Interest Lands Conservation Act |
| BASIS | Bering Sea-Aleutian Salmon International Survey |
| BEG | biological escapement goal |
| BOF | Board of Fish |
| BSAI | Bering Sea and Aleutian Islands |
| CAS | Catch Accounting System |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| COAR | Commercial Operators Annual Report |
| Council | North Pacific Fishery Management Council |
| CP | catcher/processor |
| CV | catcher vessel |
| CWT | coded-wire tag |
| DPS | distinct population segment |
| E | East |
| E.O. | Executive Order |
| EA | Environmental Assessment |
| EEZ | Exclusive Economic Zone |
| EFH | essential fish habitat |
| EIS | Environmental Impact Statement |
| ESA | Endangered Species Act |
| ESU | endangered species unit |
| FMA | Fisheries Monitoring and Analysis |
| FMP | fishery management plan |
| FONSI | Finding of No Significant Impact |
| FR | *Federal Register* |
| FRFA | Final Regulatory Flexibility Analysis |
| ft | foot or feet |
| GHL | guideline harvest level |
| GOA | Gulf of Alaska |
| ID | Identification |
| IRFA | Initial Regulatory Flexibility Analysis |
| IPA | Incentive Plan Agreement |
| IQF | individually quick frozen |
| JAM | jeopardy or adverse modification |
| lb(s) | pound(s) |
| LEI | long-term effect index |
| LLP | license limitation program |
| LOA | length overall |
| m | meter or meters |

| | |
|---|---|
| Magnuson-Stevens Act | Magnuson-Stevens Fishery Conservation and Management Act |
| MMPA | Marine Mammal Protection Act |
| MSST | minimum stock size threshold |
| mt | metric ton |
| NAO | NOAA Administrative Order |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fishery Service |
| NOAA | National Oceanographic and Atmospheric Administration |
| NPAFC | North Pacific Anadromous Fish Commission |
| NPFMC | North Pacific Fishery Management Council |
| NPPSD | North Pacific Pelagic Seabird Database |
| Observer Program | North Pacific Groundfish Observer Program |
| OEG | optimal escapement goal |
| OMB | Office of Management and Budget |
| PBR | potential biological removal |
| PSC | prohibited species catch |
| PPA | Preliminary preferred alternative |
| PRA | Paperwork Reduction Act |
| PSEIS | Programmatic Supplemental Environmental Impact Statement |
| PWS | Prince William Sound |
| RFA | Regulatory Flexibility Act |
| RFFA | reasonably foreseeable future action |
| RIR | Regulatory Impact Review |
| RPA | reasonable and prudent alternative |
| RSW | refrigerated seawater |
| SAFE | Stock Assessment and Fishery Evaluation |
| SAR | stock assessment report |
| SBA | Small Business Act |
| Secretary | Secretary of Commerce |
| SEG | sustainable escapement goal |
| SET | sustainable escapement threshold |
| SNP | single nucleotide polymorphism |
| SPLASH | Structure of Populations, Levels of Abundance, and Status of Humpbacks |
| SRKW | Southern Resident killer whales |
| SSFP | Sustainable Salmon Fisheries Policy |
| SW | southwest |
| TAC | total allowable catch |
| U.S. | United States |
| USCG | United States Coast Guard |
| USFWS | United States Fish and Wildlife Service |
| VMS | vessel monitoring system |
| W | West |

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# Executive Summary

This Regulatory Impact Review (RIR) and Initial Regulatory Flexibility Analysis (IRFA) examine proposed changes to groundfish management required to insure that groundfish fisheries in the Bering Sea and Aleutian Islands Management Area (BSAI) are not likely to jeopardize the continued existence of Steller sea lions, or to adversely modify or destroy their critical habitat. This RIR was prepared to meet the requirements of Presidential Executive Order (EO) 12866.[1] The IRFA addresses the requirements of the Regulatory Flexibility Act, as amended.

Steller sea lions may be inadvertently taken in fishing gear, may be disturbed by fishing activities, and may compete with groundfish fisheries for important prey species. Atka mackerel, Pacific cod, and pollock are important Steller sea lion prey species that also are harvested in the groundfish fisheries. The North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) have taken measures that temporally and spatially disperse Atka mackerel, Pacific cod, and pollock harvests to reduce potential impacts from the groundfish fisheries on Steller sea lions and on their designated critical habitat. Spatial protection measures include closures of areas to groundfish fishing near Steller sea lion haulouts and rookeries, and in foraging areas, to reduce potential interactions with Steller sea lions and fishing vessels and to reduce potential impacts on prey resources in locations important to Steller sea lions. Temporal dispersion of pollock, Pacific cod, and Atka mackerel harvests is accomplished through seasonal apportionments of the annual total allowable catch (TAC) for these species.[2]

In 2010, NMFS completed an Endangered Species Act (ESA) section 7 consultation on the effects of the Alaska groundfish fisheries on ESA-listed species, including the western distinct population segment (WDPS) of Steller sea lions, and on designated critical habitat. Based on the best available commercial and scientific information, the consultation resulted in a biological opinion (FMP biop) that found that the Steller sea lion protection measures implemented in the BSAI since 2003 could not insure that the groundfish fisheries were not likely to jeopardize the continued existence of the Steller sea lion or to adversely modify designated critical habitat for the WDPS of Steller sea lions. A reasonable and prudent alternative (RPA) to the protection measures was included in the FMP biop to insure the groundfish fisheries were not likely to result in jeopardy or adverse modification of critical habitat. This RPA was implemented by an interim final rule as the 2011 Steller sea lion protection measures (75 FR 77535, December 13, 2010, corrected 75 FR 81921, December 29, 2010).

On March 5, 2012, NMFS was ordered by the U.S. District Court of Alaska to prepare an EIS on the Steller sea lion protection measures implemented in January 2011.[3] The Court ordered NMFS to prepare an EIS for the Steller sea lion protection measures because NMFS had failed to provide sufficient environmental information for informed public comment to the agency decision-making when it prepared the environmental assessment for this action in 2010, and failed to provide for adequate public participation. In addition, the Court determined that NMFS's conclusions about the effects of the action were highly controversial and uncertain. The Court identified examples of scientific controversy for this action such as the use of single species, rather than multi-species models for groundfish fisheries stock assessments, and the effects of the groundfish fisheries on the availability of Steller sea lion prey resources. The Court ordered the completion of the final EIS by March 2, 2014. This schedule was

[1] National Marine Fisheries Service (2007) provides current NMFS guidance for preparation of an economic analysis consisted with Executive Order 12866; Queirolo (2013) provides a more accessible overview.

[2] The details of the current Steller sea lion protection measures for the Alaska groundfish fisheries are available on the NMFS Alaska Region website at http://www.alaskafisheries.noaa.gov/sustainablefisheries/sslpm/.

[3] The Court's decision and order for this action are available on the NMFS Alaska Region website at http://alaskafisheries.noaa.gov/sustainablefisheries/sslpm/eis/.

intended to provide for increased participation by the North Pacific Fishery Management Council, and for public review and comment. The Court subsequently extended the deadline for the final EIS to August 15, 2014. The Court also ordered that any subsequent rulemaking for the BSAI groundfish fisheries as a result of the EIS must be completed by January 1, 2015.

The EIS examined six alternatives, developed based on input from the North Pacific Fishery Management Council and its Steller Sea Lion Mitigation Committee, and from public comment. These are the alternatives evaluated in this RIR:

- Alternative 1: Status Quo (no action).
- Alternative 2: Modified 2011 Steller Sea Lion Protection Measures
- Alternative 3: Further modified 2011 Steller Sea Lion Protection Measures
- Alternative 4: Modified 2010 Steller Sea Lion Protection Measures
- Alternative 5: Recommended by the Council at its October 2013 meeting
- Alternative 6: No Retention of Atka Mackerel, Pacific Cod, and Pollock in the Aleutian Islands Reporting Areas

Alternative 5 is the preferred alternative. Detailed descriptions of the alternatives may be found in Chapter 2 of the EIS. The elements of Alternatives 1 and four are summarized in Section 1 of this RIR. The elements of all alternatives are summarized in the following tables in this RIR: pollock in Table 64, Atka mackerel in Table 71, Pacific cod trawlers in Table 94, and Pacific cod non-trawl vessels in Table 114.

The comparison of the impacts of the alternatives on the directly regulated fleet sectors (trawl catcher/processors, non-trawl catcher/processors, trawl catcher vessels, and non-trawl catcher vessels) are based in part on estimates of the potential impact of the alternatives on fleet sectors during the baseline years 2004 through 2010. This set of baseline years covers a period of time during which fishing activity could be observed in the absence of the area or seasonal constraints associated with the alternatives. The revenues associated with fishing activity in the areas that were closed by regulations are described as the "revenues-at-risk" associated with the alternative, while the revenues associated with fishing activity in the areas that were not closed by the alternative are referred to as "residual revenues." These revenue estimates do not provide a cost-benefit ranking of the alternatives. As discussed in Section 1.2.14 on the "revenue-at-risk" methodology, these are not projections of revenues in future years under the alternatives. They are estimates of revenues that were associated with areas that would have been left open for fishing in the baseline years, if the alternatives had been effective in those years. They are provided as an index of relative impacts.

*Trawl catcher/processor sector*

The analysis of the trawl catcher/processor sector may be found in the following sections and sub-sections:

- 1.2.1 Trawl catcher/processor background
- 1.3 Trawl catcher/processors, Alternatives 1 and 4
- 1.7 Pollock, Alternatives 1, 2, 3, and 4
- 1.8 Atka mackerel, Alternatives 2 and 3
- 1.9 Trawl catcher/processors, Pacific cod Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

The impacts of the alternatives on Atka mackerel production were evaluated in Sections 1.3, 1.8, and 1.13. Table 154 summarizes the estimates of wholesale gross revenues from Atka mackerel fishing from areas remaining open under each alternative ("residual" revenues). Since this sector includes trawl catcher vessels delivering Atka mackerel to catcher/processors acting as motherships, these wholesale estimates include the value of these deliveries. Table 154 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues for each alternative-option combination, estimated both with and without considering the impact of the area limits imposed in Area 543 under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual revenues for Alternative 1 were $27.4 million, while the average annual revenues for Alternative 4, which approximate those actually earned during the baseline years, were $56 million. These two alternatives provide bookends for the other alternatives. The revenue estimates for most of the other alternatives were reasonably close together, ranging from $39 million to $44.7 million. Only Alternative 6, with virtually no revenues, stands apart. Given the uncertainty associated with these point estimates, it may not be possible to discriminate among Alternatives 2, 3, 4, and 5.

Alternative 1 and an option to Alternative 3 provide the same Atka mackerel season dates as the fishery had in 2011 and 2012. By allowing for summer fishing, these season dates will likely result in similar fishing behavior and allow vessels to more efficiently harvest their allocations of groundfish in the BSAI than under the baseline. There may be some benefits to ports that support these fisheries, such as Adak and Dutch Harbor, as these vessels are operating in the Aleutian Islands for longer periods of time than they did prior to 2011. Alternatives 2 through 5 seek to relax the B-season end date of November 1 to December 31 for all vessels. Extending the B-season to December 31 may provide the fleet with even more flexibility to temporally spread Atka mackerel fishing and operate more efficiently. Seasonal regulations are not applicable to Alternative 6.

Alternatives 2 through 5 include measures to relax the maximum retainable allowance (MRA) requirements for fishing Atka mackerel in the eastern Bering Sea (the eastern Bering Sea and management Area 541 share a single TAC). A shift from instantaneous calculation to calculation at the end of each offload should make it easier to retain Atka mackerel taken as incidental catches in other targets in the eastern Bering Sea.

The impacts of the alternatives on trawl catcher/processors targeting Pacific cod were discussed in Sections 1.3, 1.9, and 1.13. Table 155 summarizes the wholesale gross revenues accruing to the trawl catcher/processors from their harvests of Pacific cod in the Aleutian Islands. These vessels would also earn wholesale revenues from selling the Pacific cod delivered to them for processing by catcher vessels; however, those revenues are summarized with the catcher vessel shoreside deliveries, and are not included in these totals for confidentiality reasons. Table 155 shows the value of estimated production from areas remaining open under each alternative (called residual production), and shows those estimates modified by potential constraints associated with the area-sector limits included in the alternatives. When area-sector limits actually exceed historical harvests from the open areas, it is possible that operations could shift from the closed areas to the open areas and increase their harvests from those open areas. Estimates of revenues from this source are speculative and have not been included here.

Focusing on the results for the closure and area limits, taken together, the average annual revenues for Alternative 1 were $8 million, while the average annual revenues for Alternatives 4 and 5 were $13.3 million. Revenues for Alternative 3 come third at $7.4 million, followed by Alternative 2 at $6.9 million the protective option for Alternative 2 at $5.0 million, and Alternative 6 with no revenues. The revenues for Alternatives 1 and 3 are similar (and similar to those for Alternative 2 in the absence of the area-sector

limits). As discussed in the text, this reflects an element in Alternatives 2 and 3 that closes critical habitat to fishing east of 174° W longitude. This closes an important Pacific cod fishing ground to the east of Atka North Cape.

Alternative 2 prohibits directed fishing for Pacific cod using trawl gear after April 30 in Area 543. This should not affect directed trawl Pacific cod fishing; during the baseline years all trawl Pacific cod harvests in the area took place prior to April 30. However, this may affect retention of Pacific cod after April 30 as vessels will be required to discard Pacific cod in excess of the 20 percent MRAs.

Alternatives 2, 3, 4, and 5 extend the C-season end date for Amendment 80 trawl vessels and those fishing Pacific cod CDQ, from November 1 to December 31. This has been proposed to address potential regulatory discards after November 1; however, regulatory discards have been small during this period. This change in closing dates under Alternative 4 may affect reallocation of Pacific cod later in the year if a trawl catcher/processor fishery becomes viable at that time. This extension is not applicable to Alternative 6.

Alternatives 2, 3, 4, and 5 relax the C-season end date from November 1 to December 31 in Areas 541 and 542 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. Alternatives 2, 4, and 5 relax the C-season end date from November 1 to December 31 in Area 543 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. This relaxation of the season date would not apply to other vessels or the Bering Sea subarea. Limiting this to Amendment 80 and trawl vessels fishing for CDQ Pacific cod has been proposed to address potential regulatory discards of Pacific cod after November 1, however, regulatory discards have been relatively small in this period. If this season extension does lead to the start of a directed Pacific cod fishery in November and December, it may affect annual Pacific cod reallocations among gear groups. Seasonal modifications are not applicable to Alternative 6.

Table 156 combines the information on trawl catcher/processor revenues associated with areas remaining open for both Atka mackerel and Pacific cod. Taken together, the results suggest that the trawl catcher/processors would benefit the most from Alternative 4 and the least from Alternative 6. The ranking of benefits from the other alternatives, from most attractive to the sector to least attractive, is Alternative 5, Alternative 3, Alternative 2, and Alternative 2 with the protective option, and Alternative 1. The margin for error in these estimates is large, however.

Alternatives that reduce fishing opportunities for trawl catcher/processors in the Aleutian Islands will prompt redeployment of the vessels, as they try to offset the adverse impacts of the alternatives on their profits. Trawl catcher/processors could shift into rock sole and yellowfin sole fisheries, Bering Sea Pacific ocean perch, and arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, or other flatfish. Amendment 80 vessels could obtain some species for processing by acting as motherships for trawl vessels. Amendment 80 trawl catcher/processors may fish their Pacific cod allocations in the Bering Sea, as well as the Aleutian Islands, although the advent of a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these opportunities. Industry sources indicate, however, that Bering Sea Pacific cod tend to be smaller and bring a lower price, than Aleutian Islands Pacific cod. AFA trawl catcher/processors and vessels fishing CDQ Pacific cod quota, likewise fish against a BSAI-wide allocation, and could shift their operations. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience.

The analysis of the pollock measures in all the alternatives may be found in Section 1.7, and in Section 1.13. Alternatives 2 through 5 include measures to open up areas of critical habitat in the Aleutian Islands to fishing for pollock. This may provide more fishing opportunities for CDQ groups. In

addition, the directed fishing allocation in the Aleutian Islands is allocated to the Aleut Corporation, which must assign half of its allocation to AFA vessels. These new opportunities may, therefore, benefit trawl catcher/processors fishing for CDQ groups or for the Aleut Corporation. It is not possible to estimate the additional volumes of fish or revenues that may be generated, given the limited fishing that has taken place in the critical habitat that may be opened. The benefits to trawl catcher/processors will also depend on policy decisions to be made by the CDQ groups and the Aleut Corporation, about how their allocations should be fished (the Aleut Corporation, for example, could assign its pollock allocation to AFA catcher vessels for delivery to the port at Adak). Alternative 6 prohibits the retention of pollock, reducing fishing opportunities below those available under the status quo (Alternative 1). However, pollock fishing activity has been extremely limited in the baseline years, and in the years since the interim final rule was adopted.

*Non-trawl catcher/processors*

The analysis of the non-trawl catcher/processor sector may be found in the following sections and sub-sections:

- 1.2.2 Non-trawl catcher/processor background
- 1.4 Non-trawl catcher/processors, Alternatives 1 and 4
- 1.10 Non-trawl catcher/processors, Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

Table 157 summarizes the estimates of wholesale gross revenues from Pacific cod fishing from areas remaining open under each alternative ("residual" revenues). Table 157 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues to the sector for each alternative-option combination, estimated both with and without considering the impact of the area-sector limits imposed in Area 543 and in Areas 541-542 (jointly) under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual revenues for Alternative 1 were $3.3 million. The average revenues for the remaining alternatives and options, however, were very similar, ranging from $8.4 million to $8.8 million. These differences in average revenues are not enough to make it possible to discriminate between these alternatives with respect to their impact on this sector.

This fleet is prohibited from directed fishing for Pacific cod in the Aleutian Islands after November 1under Alternative 1 (the status quo) and Alternative 2. Alternatives 3, 4, and 5 relax this November 1 season end date and allow directed fishing until the end of the year. The freezer-longline portion of this sector operates under a voluntary cooperative and directed fishing for Pacific cod in the BSAI lasts all year. The relaxation of this season end date would allow some of this fishing to occur after November 1 in the Aleutian Islands. This is unlikely to be of advantage to the pot portion of this sector, as these vessels typically close directed fishing prior to November 1. Seasonal regulations are not applicable to Alternative 6.

This sector has limited opportunity to redeploy into other Pacific cod fisheries in the Aleutian Islands or in the Gulf of Alaska, but has relatively good opportunities to redeploy into Pacific cod fisheries in the Bering Sea, although the advent to a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Industry sources indicate that Pacific cod are larger, and that prices are better in the Aleutian Islands than in the Bering Sea, so a shift to the Bering Sea may

have adverse revenue impacts, even if the overall harvest remains the same. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience. The action may lead the freezer-longline component of this fleet to target increasing amounts of Greenland turbot in the BSAI.

*Trawl catcher vessels*

The analysis of the trawl catcher vessel sector may be found in the following sections and sub-sections:

- 1.2.3 Trawl catcher vessel background
- 1.5 Trawl catcher vessels, Alternatives 1 and 4
- 1.11 Trawl catcher vessels Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

Table 158 summarizes the estimates of processor wholesale gross revenues from Pacific cod fishing by trawl catcher vessels in areas remaining open under each alternative ("residual" revenues). Table 158 includes processor wholesale gross revenues associated with trawl catcher vessel deliveries to catcher/processors acting as motherships, as well as gross revenues associated with trawl catcher vessel deliveries to shore-based processors and shoreside floating processors. Table 158 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues to the sector for each alternative-option combination, estimated both with and without considering the impact of the area-sector limits imposed in Area 543 and in Areas 541-542 (jointly) under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual revenues for the protective option of Alternative 2, the least attractive option for the sector aside from Alternative 6, under which there are no revenues, were $10.4 million, while the average annual revenues for Alternatives 4 and 5, the most attractive, were $16.7 million. Alternatives 1, 2, and 3 had very similar gross revenue estimates ($12.0 million, $12.2 million, and $12.6 million) and it is difficult to discriminate among them on the basis of the wholesale gross revenue criterion.

Alternative 2 prohibits directed fishing using trawl gear after April 30 in Area 543. Alternatives 2, 3, 4, and 5 extend the C-season end date for Amendment 80 trawl vessels and those fishing Pacific cod CDQ, from November 1 to December 31. These changes were discussed earlier for trawl catcher/processors; that discussion is applicable to trawl catcher vessels and is not repeated here.

This sector has limited opportunity to redeploy into other Pacific cod trawl fisheries in the Aleutian Islands or in the Gulf of Alaska, but has had relatively good opportunities to redeploy into Pacific cod fisheries in the Bering Sea, although the advent of a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Here again, industry sources indicate that Pacific cod are larger, and that prices are better in the Aleutian Islands than in the Bering Sea, so a shift to the Bering Sea may have adverse revenue impacts, even if the overall harvest remains the same. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience.

*Non-trawl catcher vessels*

The analysis of the non-trawl catcher vessel sector may be found in the following sections and sub-sections:

- 1.2.4 Non-trawl catcher vessel background
- 1.6 Non-trawl catcher vessels, Alternatives 1 and 4
- 1.12 Non-trawl catcher vessels Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

While there are not enough observations to report harvest and gross revenue information, even across all management areas in a given year (primarily because of the small numbers of processors), there are enough to report summary information for the whole period 2004 through 2010. During that time a total of 26 vessels and 4 separate processors operated in this sector (NMFS AKR In-season management staff). Over the seven years, these vessels retained almost 1,000 metric tons of Pacific cod, for a mean weight of about 150 metric tons a year. (AKR report, February 7, 2013)

Estimated average aggregate annual processor wholesale gross revenues from non-trawl catcher vessels in open areas would have been about $120,000 under Alternative 1, and about $290,000 under Alternative 4. For each of the other alternatives, in almost all years, 100 percent, or almost 100 percent of the baseline catch came from within areas that would have remained open under the alternative, and thus, using the approach discussed here, estimated residual harvests under these alternatives would all have been generally equal to baseline harvests.

The extension of the fishing season until the end of the year would have little impact on this sector, which typically does not operate in the Aleutian Islands in the late fall.

This fleet has opportunities to fish in the State GHL fishery and in the Bering Sea, although the advent to a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Opportunities in the Gulf of Alaska are limited.

*Incidental catches*

The preceding discussion addresses Atka mackerel, Pacific cod, and pollock taken in target fisheries. The discussion of trawl catcher/processors also includes these species taken incidentally in fisheries targeting other species. Fishing operations in the other gear groups, targeting other species, also take Atka mackerel, Pacific cod, and pollock as incidental catches. Two of the alternatives may affect these incidental catches. These are Alternative 1, which prohibits the retention of Atka mackerel and Pacific cod in Area 543, and Alternative 6 which prohibits retention of these species in all three management areas. Alternative 1 may have reduced incidental catch revenues during the baseline years by about $33,000 a year, while Alternative 6 may have reduced incidental catch revenues by about a sum in excess of $51,000 a year.

*Benefits of protecting Steller sea lions*

The analysis of the impacts on the benefits of protecting Steller sea lions may be found in the following sections and sub-sections:

- 1.2.10 Background

- 1.15 Benefits from Steller sea lion stock health

While there is evidence that people place a positive value on improvements in Steller sea lion population health, uncertainty about the reemergence of sea lion hunting in response to a population recovery, and limitations in available research, make it impossible to determine whether sea lion populations will improve, and consequently, whether there would be a positive net impact on subsistence households or on households receiving passive-use benefits.

*Impacts on other ecosystem resources*

The actions under consideration may affect ecosystem resources such as fish stocks, seabirds, marine mammals other than Steller sea lions, habitat, and ecosystem function. The analysis of the impacts on other ecosystem resources may be found in the relevant resource chapters of the EIS, and in Section 1.16 of this RIR. The impacts of the alternatives on these resources are expected to be small, and to have limited, if any, economic impacts.

*Community economic impacts*

The analysis focused on the following important communities or classes of communities: (1) Adak, (2) Atka, (3) Unalaska, (4) Other Alaskan communities, (5) Puget Sound communities, (6) CDQ communities, and (7) Aleut Corporation shareholders.[4] Community economic impacts are distributional impacts. They are not parts of an overall cost-benefit analysis from a national accounting stance. Changes that may benefit any of the groups defined here may hurt other groups. The analysis of the impacts on the action on communities may be found in the following sections and sub-sections:

- 1.2.7 CDQ groups background
- 1.2.8 Aleut Corporation background
- 1.2.9 Subsistence background
- 1.2.11 Public finance background
- 1.2.12 Community economic impact background
- 1.7 to 1.12 Fleet specific sections include community impact discussions
- 1.17 Community economic impact analysis

Adak is the community likely to be most impacted by the alternatives. Adak's fishing economy is large relative to the community size, and the alternatives can have relatively large impacts on production from nearby fishery resources. The alternatives may affect purchases of goods and services during port visits, may affect economic impacts associated with the delivery of, and local processing of, Pacific cod and pollock, may affect local tax revenues or shared state fishery taxes, and may affect pollock-derived financial resources available to the Aleut Corporation and designated by law for the development of Adak.

Alternative 1 ranks lowest with respect to benefits for Adak, except for Alternative 6, and, possibly, for those of the protective option for Alternative 2. Alternative 1 ranks lower than 2, 3, 4, and 5, with respect to potential Adak port visits by Atka mackerel trawl catcher/processors. The impacts of Alternative 1 on deliveries of Pacific cod to Adak for processing are likely to be similar to those for Alternatives 2 and 3, but worse than those of Alternative 4. Alternative 1 has no pollock fishing benefits for Adak, as it continues the baseline management regime.

[4] In Chapter 10, the Aleut Corporation shareholders are described as a "community of interest" rather than a "place-based community."

Alternative 2 is likely to be associated with more port visits to Adak, and associated sales of goods and services, than Alternative 1, but less than the baseline. These would be particularly likely among Amendment 80 trawlers fishing for Atka mackerel, non-trawl vessels fishing for Pacific cod, and AFA or other vessels fishing for pollock. Although Alternative 2 trawl catcher vessel gross revenues are similar to those from Alternative 1 (these are used as a proxy for deliveries of product to Adak for processing), its relative impact on Adak is unclear for two reasons. Area 541 revenues are restricted by the closure of critical habitat to the east of Atka North Cape, and relatively open in the western area of Area 541 nearer to Adak. Second, Alternative 2 includes options allowing and prohibiting catcher vessels from delivering to motherships in Area 543. This may either encourage catcher vessels there to deliver to Adak, or, by increasing costs for catcher vessels in Area 543, discourage catcher vessels from operating there. Alternative 2 relaxes restrictions on pollock fishing in critical habitat near Adak, and may provide for more pollock deliveries than Alternative 1. Options in Alternative 2 that may limit fishing in Kanaga Sound may offset part of this impact.

Alternative 3 may be associated with more port visits to Adak than Alternatives 1 and 2, but fewer than Alternative 4, or the baseline years. Deliveries of Pacific cod to Adak under this alternative may be similar to those under Alternatives 1 and 2; the prospect for pollock deliveries is greater than under Alternatives 1 and 2.

Alternative 4, which returns most management regulations to those prevailing in 2010, and opens critical habitat to pollock fishing, will produce the most benefits for Adak, from port visits, Pacific cod and pollock deliveries, tax revenues, and Aleut Corporation support for Adak development.

Alternative 5, the Council's preferred alternative, is likely to provide benefits comparable to, or more than, Alternative 3, but less than Alternative 4.

Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock, ranks lowest with respect to benefits for Adak.

Atka was not involved with the Atka mackerel, Pacific cod, or pollock fisheries in the baseline years. However, the Atka Pride plant (owned by a partnership of the Atka Fisherman's Association and APICDA) began processing Pacific cod in 2012. APICDA has invested in a new dock to provide deep water vessel access, and is planning an investment in the plant and in worker housing to permit an increase in Pacific cod processing. To the extent that the measures under consideration limit catcher vessel production of Pacific cod, this action may interfere with community and APICDA efforts to diversify the village economy through increased Pacific cod processing. In this regard, although Alternatives 1, 2, and 3 have broadly similar impacts on gross revenues at the regional level, Alternatives 2 and 3 close Area 541 critical habitat to the east of Atka, and may limit its ability to exploit the popular fishing grounds just to its east (the grounds east of Atka North Cape). Atka may also be affected by changes in shared state fishery taxes. Alternatives 4 and 5 will probably create the most benefits for Atka; benefits from the two alternatives may be comparable. Alternative 6 will prohibit retention of Pacific cod in waters near Atka, and would eliminate the supply of Aleutian Islands Pacific cod for processing at Adak.

Unalaska may be impacted by changes in port visits by vessels targeting Atka mackerel, Pacific cod, or pollock, either before or after the visit. The port visits would be associated with purchases of goods and services by visiting vessels. Unalaska may also be impacted by changes in shared state fisheries taxes, or by changes in deliveries of Pacific cod or pollock for processing by vessels active in the Aleutian Islands that are associated with the alternatives. The net effect on Unalaska is unclear, because it may depend directly on overall output from Aleutian Islands fisheries; but it may also be affected by redeployment of

vessels displaced from Aleutian Islands fisheries into Bering Sea fisheries closer to Unalaska. These impacts could offset each other, and their relative sizes cannot be determined in advance.

In general, other Alaskan communities have relatively little involvement in the Aleutian Island Atka mackerel and Pacific cod fisheries, and will likely experience relatively small effects from the alternatives. The Aleut Corporation is required by law to allocate half of its directed fishery allocation of pollock to catcher vessels under 60 feet LOA. Many of the vessels that may be affected by this requirement have homeports in Sand Point and King Cove. Thus, these ports may be impacted by Alternatives 2, 3, 4, and 5. Alternative 6 would prevent retention of pollock from the Aleutian Islands management areas; this has not been an active fishery in recent years, thus, the adverse impacts may be small.

Puget Sound provides bases for a disproportionate number of the trawl catcher/processors, non-trawl catcher/processors, and trawl catcher vessels that may be impacted by the alternatives. Impacts in the region will be large compared to those in the much smaller Alaskan communities, but will be relatively small, given the large size of the regional economy.

Residents of CDQ communities may be affected by changes in the royalties received by their CDQ groups for the lease of their Atka mackerel, Pacific cod, or pollock quota, or by profits from its direct use. They may also be affected by changes in community development initiatives associated with CDQ group revenue changes caused by the action. Persons living at Atka may be particularly affected by increased job opportunities and income associated with increased deliveries of Pacific cod.

The impacts on both the Puget Sound region and on the residents of the CDQ communities have been proxied by the estimates of the relative gross revenues to the different sectors associated with the alternatives. Alternative 4 provides the largest Atka mackerel benefits to the region, while Alternative 6 imposes the greatest costs. It is difficult, on the basis of differences in residual revenues during the baseline years, to discriminate among the other alternatives. Trawl catcher/processors and trawl catcher vessels have the largest Pacific cod gross revenues under Alternatives 4 and 5, and the least under Alternative 6, and the protective option to Alternative 2. Relative gross revenues under Alternatives 1, 2, and 3 are similar. Non-trawl catcher vessel gross revenues are lowest under Alternative 6, and similar to the baseline under the remaining alternatives. The lack of activity in the pollock fishery in recent years precluded estimates of pollock gross revenues for the alternatives. However, these are likely to be greatest for the alternatives that lift the most restrictions. Thus, these are ranked: Alternatives 3 and 4 (most benefits), then Alternative 5, Alternative 2, Alternative 1, and Alternative 6.

Aleut Corporation shareholders will benefit from increased dividends or increased corporate charitable donations to shareholders, and are presumed to benefit from the development of an Aleut community at Adak. The potential of the alternatives to contribute to the development of Adak were discussed earlier in this section. This discussion is relevant here as the impact of the alternatives on Adak provides a reasonable proxy for the potential impact on Aleut Corporation revenues from businesses based in Adak, and for the psychological benefit its shareholders may receive from community development at Adak.

*Impacts on consumers*

Impacts on consumers are discussed in Sub-section 1.2.13 (on product markets) and in Section 1.18 (impacts on consumers). Most Atka mackerel products are exported, so alternatives affecting Atka mackerel production should have little impact on U.S. consumers. Since Pacific cod products are consumed in the United States, as well as exported, the alternatives may have some consumer surplus impacts. However, the alternatives may not affect overall BSAI production of Pacific cod. They may, however, affect the size composition of Pacific cod production, possibly reducing the flow of larger, more

highly valued Pacific cod to one market segment, while reducing the flow of smaller, and lower valued Pacific cod to others. A more detailed discussion is not possible. Changes in Aleutian Islands pollock production will likely have a relatively small impact on United States consumers. The volumes are small in comparison with overall BSAI pollock production, and much of the Aleutian Islands pollock allocation is currently rolled over to the Bering Sea fisheries.

*Safety*

The impacts of the alternatives on the safety of fishing operations are discussed in Section 1.19.1. The analysis of safety reached no conclusions about the relative net impact on safety of the alternatives and options. The models that would project how sectors would respond to the alternatives and how these might be related to safety outcomes were not available. Moreover, alternatives may have some elements that increase safety, while other elements decrease it. The analysis was carried out with respect to the following factors that may affect safety (these are not listed in any order that implies a ranking of the magnitude of either the probability of a vessel casualty or the consequences of a vessel casualty.

- Increasing distance westward increases risk to fishing operations. This is due to greater distance to U.S. Coast Guard search and rescue (SAR) resources.
- Increased risk is related to reduced proximity to other fishing vessels that could act as "Good Samaritans" until the arrival of U.S. Coast Guard SAR resources.
- Increasing the number of fishing vessels less than 60-foot length overall increases risk.
- A "race to fish" or other increase in fishing pressure increases risk. In this discussion, fishing pressure is considered in temporal terms.
- Increasing the amount of fishing in "winter" increases risk.

Alternatives 2 through 5 relax fishing restrictions in Area 543 and/or Area 542, thus, increasing fishing activity in the far west, and increasing fishing activity in areas where other fishing vessels may not be close by. However, increased numbers of vessels operating in these areas may conversely increase the likelihood of Good Samaritan assistance. Since regulations require that the Aleut Corporation allocate half of its pollock allocation to catcher vessels under 60 feet LOA, the alternatives which increase opportunities for fishing pollock may increase the number of small vessels active in the region. The Aleutian Islands-Bering Sea Pacific cod split, in combination with area-sector limits imposed on Pacific cod fishing under some alternatives, may contribute to a race for fish among fleet sectors. Alternatives 2 through 5 extend the Atka mackerel season from November 1 to December 31, and may contribute to increased fishing activity in the winter months. Alternatives 2 through 5 may have a similar effect for non-trawl Pacific cod fishing. Finally, the development of an A-season pollock roe fishery in the Aleutians could further contribute to winter fishing in the region. Alternative 6 prohibits retention of Atka mackerel, Pacific cod, and pollock in the three Aleutian Islands management areas, and would be expected to have impacts opposite to those described above for Alternatives 2 through 5.

*Enforcement*

Enforcement issues are discussed in Section 1.19.2. Alternative 1, the status quo, effectively precludes directed fisheries for Atka mackerel, Pacific cod, and pollock, in Area 543. Thus, the status quo has decreased enforcement input needs, decreased costs, presented a more straightforward closure regime, and present fewer enforcement difficulties compared to the measures that existed prior to implementation of the 2010 interim final rule. Alternatives 2 through 5, and their protective options, would provide additional access to Atka mackerel and Pacific cod fishing as well as new opportunities for pollock fishing in the Aleutian Islands sub-area. Enforcement of protection measures is most cost-effective if an area is completely closed or completely open. Establishing the complex series of open and closed areas

associated with Alternatives 2 through 5 would create additional enforcement responsibilities. Alternative 6 prohibits retention of Atka mackerel, Pacific cod, and pollock throughout the Aleutian Islands management areas and would thus reduce enforcement burdens.

Under Alternatives 2 through 5, NMFS will propose an amendment to the BSAI FMP requiring an increase in VMS polling rates from two per hour to 10 per hour for all trawl vessels holding a Federal Fishing Permit and fishing with trawl gear for groundfish that is deducted or required to be deducted from a Federal groundfish TAC, in the Aleutian Islands subarea. The owner of the trawl vessel must ensure NMFS receives the transmission from the VMS unit at least 10 times per hour. This proposal is discussed starting at page 315. Increasing polling rates will provide NOAA OLE and the Coast Guard with the additional information needed to monitor potential accidental or intentional trawl vessel incursions into the often small, and irregularly shaped Steller sea lion critical habitat areas. This is estimated to cost an additional $400 a year for catcher vessels and catcher/processors, other than those fishing for Atka mackerel, and an additional $1,200 a year for catcher/processors targeting Atka mackerel. From 2004 through 2010, from 11 to 16 trawl catcher/processors a year (of which from 8 to 12 targeted Atka mackerel), and from 16 to 38 trawl catcher vessels a year, that were fishing for groundfish in the Aleutian Islands, would have been subject to the requirement for increased polling rates. In some cases, vessels may have to replace VMS units in order to ensure NMFS receives transmissions. NMFS is unable to estimate the number of vessels for which this may be necessary, but the estimated cost per vessel is about $3,500. Increased polling rates would not be necessary under Alternative 6.

*In-season management*

In-season management is discussed in Sub-section 1.19.3. The Alternatives 2, 3, and 5 generally involve standard NMFS management measures, and generally do not impose new requirements on the Alaska Regional Office of NMFS. Elements of the alternatives will increase management work load as the number of TAC limits to manage are increased under Alternatives 2 and 3. Also the TAC limits are further divided into smaller amounts. When compared to potential fishing effort, some of the projected TAC limits may be too small to permit a directed fishery. This may result in more closures, as NMFS management will not be able to mitigate the risk of exceeding the TAC limit. The potential increase in pollock directed fishing as a result of relaxed closures in Alternatives 2, 3, and 5 may result in increased monitoring of the Aleutian Islands pollock TAC. The alternatives will likely require no change in staffing requirements, though increased workload from these alternatives may mean delays in other tasks. Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock in the three Aleutian Islands management areas, would reduce in-season management responsibilities.

*Science*

The impacts on the value of scientific information are discussed in Sub-section 1.19.4. Groundfish stock assessments rely on fisheries independent data from biennial trawl surveys, and other sources, but they also rely on fishery dependent data, such as catch size and composition, and the results of biological sampling. Alternatives which reduce fishing activity in the Aleutian Islands tend to reduce opportunities to collect fisheries dependent data, while activities that increase fishing activity tend to increase these opportunities. Since research to facilitate fishing activity derives its value from the value of the fishing output, circumstances that require reduced fishing activity and fishery production, may tend to reduce the value of the associated research, while circumstances that permit increased fishing activity and production may tend to increase it. The cost of a loss of fishery dependent scientific information would be (a) the reduction in net benefits associated with potentially more conservative ABC and TAC determinations, and smaller harvests, and (b) a reduction in the amount of information on interactions between fisheries and Steller sea lions, and other ecosystem resources.

Alternative 6 has the greatest adverse impact on the collection of fishery dependent scientific information, and Alternative 1 has the next greatest. In general, the protective option, and Alternatives 2 through 5, increase fishing activity for Atka mackerel and Pacific cod compared to Alternative 1. The relative increases follow the order in which the options and alternatives have just been listed, with Alternative 4 representing a return to the approximate regulatory conditions prevailing in 2010, before the interim final rule was implemented.

*Net benefits*

The sum of consumer and producer surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Atka mackerel, Pacific cod, and pollock products, and consumers' surpluses accruing to persons who value Steller sea lion population health. Producers' surpluses are likely to increase, compared to the status quo, under Alternatives 2, 3, 4, and 5, as restrictions on fishing are relaxed, but by amounts that cannot be measured. Conversely, they will decrease under Alternative 6, as retention of the three species is prohibited in the three Aleutian Island management areas. Surpluses accruing to U.S. consumers are unlikely to change much, since the Atka mackerel market is an export market and overall BSAI pollock and Pacific cod production are unlikely to change much. Limited information on the impact of the actions on Steller sea lion populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine at present. Thus, the net efficiency benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked using this criterion.

*Initial Regulatory Flexibility Analysis*

An Initial Regulatory Flexibility Analysis (IRFA) was prepared for this action, as required by section 603 of the Regulatory Flexibility Act (RFA). The IRFA describes the economic impact this proposed rule, if adopted, would have on small entities.

The entities directly regulated by this action include (1) business firms operating trawl catcher/processors and catcher vessels, and non-trawl catcher/processors and catcher vessels, fishing for Atka mackerel and Pacific cod, in the three Aleutian Island management areas (Areas 541, 542, and 543); (2) Community Development Quota (CDQ) groups that receive allocations of Atka mackerel, Pacific cod, and pollock in these three Aleutian Island management areas; (3) the Aleut Corporation, which receives an allocation of pollock in the Aleutian Islands; and (4) vessels taking Atka mackerel or Pacific cod as incidental catches in Area 543.

Of the 51 vessels identified as having been active in directed Atka mackerel or Pacific cod fisheries in 2010, 12 were believed to constitute small entities. One of these vessels was a pot catcher/processor, and the remaining operations were trawl catcher vessels. The estimated average gross revenue for these firms, in 2012, was about $1.4 million. Note that firm revenues may have been larger, if these firms had revenues from sources other than the identified vessels.

Through the CDQ program, NMFS allocates a portion of the BSAI groundfish TACs, and apportions prohibited species catch (PSC) limits for Pacific halibut, Pacific salmon, and several crab species, to 65 eligible Western Alaska communities. These communities work through six non-profit CDQ groups, and are required to use the net proceeds from the CDQ allocations to start or support activities that will result in ongoing, regionally based, commercial fishery or related businesses. The CDQ groups receive allocations through the specifications process, and are directly regulated by this action, but the 65 communities are not directly regulated. Because they are explicitly defined as small nonprofit entities within the RFA, the CDQ groups are small entities for purposes of this analysis.

As previously noted, the Aleut Corporation receives all of the pollock directed fishing allocation in Areas 541, 542, and 543. The Aleut Corporation is an Alaska Native Corporation, and is a holding company evaluated according to the Small Business Administration criteria at 13 CFR 121.201, using a $7 million gross annual receipts threshold for "Offices of Other Holding Companies" (NAICS code 551112). Aleut Corporation revenues exceed this threshold (gross revenues were about $159 million in 2010), and the Aleut Corporation is considered to be a large entity for purposes of this analysis (Table 39).

Some vessels with incidental catches of Atka mackerel and Pacific cod may also be directly regulated by this action in Area 543. Alternative 1, the status quo alternative, prohibits retention of Atka mackerel or Pacific cod in Aleutian Islands management area 543. This comprehensive prohibition on retention is relaxed under the preferred alternative. This prohibition directly regulates vessels which would otherwise have retained these species in this management area. Six separate fixed gear catcher/processors or trawl catcher vessels were identified with incidental catches of Atka mackerel and/or Pacific cod during this period. None of these is believed to be a small entity based on knowledge of vessel affiliations. Fourteen fixed gear catcher vessels had incidental catches during the period. All of these are considered to be small entities based on a review of gross revenues from all sources, and vessel affiliations.

An IRFA requires a description of any significant alternatives to the proposed action(s) that accomplish the stated objectives, are consistent with applicable statutes, and that would minimize any significant economic impact of the proposed rule on small entities. At its October 2013 meeting, the Council adopted a preferred alternative, Alternative 5. Alternative 5 is discussed in more detail in Chapter 2 of the EIS and in this RIR. Section 1.13.1 of this RIR provides an analysis of Alternative 5. Alternative 5 is compared to the other alternatives for each of the key species in the following paragraphs.

For pollock, the protection measures under Alternative 5 are similar to those under Alternatives 3 and 4, which are identical, and which are less restrictive than other alternatives (Section 1.7). Alternative 5 only differs from Alternatives 3 and 4 in that it includes management area specific A-season harvest limits, and increases critical habitat closures in Area 542. The A-season harvest limits are 5 percent of the ABC in Area 543, 15 percent of the ABC in Area 542, and 30 percent of the ABC in Area 543.

As discussed in Section 7 of this RIR, NMFS is unable to estimate the potential production, or the location of production, under the different alternatives, and so is unable to determine whether or not the area constraints for pollock fishing would be binding. However, these area constraints are not present in Alternatives 3 and 4. Thus, those alternatives may be somewhat less burdensome for small entities that Alternative 5. Management area limits were introduced to provide control over potential harvests in a new pollock fishery of unknown potential and, thus, to provide more protection for Steller sea lions; the restrictions are more stringent in the western areas, where Steller sea lion abundance is declining (thus, they follow the FMP Biop performance standards. The extension of the 542 closure areas for Steller sea lion sites located west of 178º W longitude to 20 nm (Table 2-22 in EIS) under Alternative 5, may also contribute to making this alternative more restrictive than Alternatives 3 and 4. The extension also was included in Alternative 5 to provide more protection to the Steller sea lion rookeries and haul-outs that have experienced relatively greater declines in Steller sea lion abundance compared to sites located further east.

For Atka mackerel, Alternative 5 is most comparable to Alternative 3 and the effects on small entities in the limited access trawl fishery, and CDQ groups receiving Atka mackerel allocations may be similar to those under Alternative 3. Alternatives 3 and 5 are the same in Areas 541 and 542. They differ in Area 543 in that Alternative 3 closes additional waters around Buldir Island compared to Alternative 5. However, Alternative 5 sets a TAC limit in Area 543 equal to 65 percent of ABC that is not included in Alternative 3. On balance, from information during the baseline years, Alternative 5 may be somewhat

more restrictive in Area 543 than Alternative 3. However, the Alternative 5 TAC limit is included to prevent excessive harvest of Atka mackerel and potential impacts on Steller sea lion prey resources.

As discussed in this RIR, Alternative 4 (which incorporates most of the elements of the management regime in place during the baseline years) is a less restrictive alternative to small entities participating in Aleutian Islands Atka mackerel fisheries than Alternative 5. However, the Steller Sea Lion Mitigation Committee and the Council did not recommend Alternative 4 as its preferred alternative. Alternative 4 is nearly identical to the proposed action that was found to result in jeopardy or adverse modification of critical habitat for the WDPS of Steller sea lion in the FMP Biop. Alternative 5 may provide somewhat more protection for Steller sea lions in Area 543, where population declines have been larger than elsewhere.

For Pacific cod, Alternative 5 is most closely comparable with Alternative 4. However, Alternative 4 may be less restrictive to small entities because Alternative 5 adds a harvest limit for Pacific cod in Area 543 in proportion to the annual stock assessment. The Steller Sea Lion Mitigation Committee and Council did not recommend Alternative 4 as the preferred alternative because it may provide less Steller sea lion protection than Alternative 5, increasing the possibility of adverse effects on Steller sea lion prey resources in this management area.

An IRFA should include "a description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record..."

NMFS proposes a regulatory amendment requiring an increase in VMS polling rates. Polling rates would be increased from two per hour to ten per hour for all trawl vessels holding a Federal Fisheries Permit and fishing for groundfish that is deducted or required to be deducted from a Federal groundfish TAC, in the Aleutian Islands. The owner of the trawl vessel must ensure NMFS receives the transmission from the VMS unit at least ten times per hour.

A detailed discussion of the need for this increased VMS requirement, and its implications, is included in Section 1.19.2 of this RIR. NMFS estimates that this new requirement will increase VMS costs by about $400 per year for trawl catcher vessels and catcher/processors operating in the Aleutian Islands, except for trawl catcher/processors targeting Atka mackerel. These vessels are expected to incur costs of about $1,200/year (these are all large entities, however). Some of these vessels may have to replace existing VMS units to meet the transmission reliability requirement. NMFS is unable to estimate the number of vessels for which this may be necessary, but the estimated cost per vessel is about $3,500.

Amendment 80 vessels have 100 percent observer coverage. Those observer data are linked to VMS data, and catch is assigned to critical habitat if, at any time during a trawl, a VMS point appears inside critical habitat. This allows the critical habitat harvest limits to be managed. It will likely be difficult to monitor and enforce Atka mackerel critical habitat harvest limits for BSAI trawl limited access catcher vessels. Catcher vessels that may fish the BSAI trawl limited access Atka mackerel quota do not have 100 percent observer coverage, so linking VMS data to fishing activity is not possible at this time. Alaska Department of Fish and Game statistical areas reported on eLandings are not specific to critical habitat areas, so they cannot be used to identify potential critical habitat catch. An electronic logbook would provide the information necessary to link VMS data to fishing activity by these vessels; however, there is no current regulation to require electronic logbooks on trawl catcher vessels. Managing these critical habitat harvest limits on that sector will be difficult, and a solution to this problem will require changes in the catch accounting system and recordkeeping and reporting requirements. Such changes are, however, not part of the proposed action, and so impose no attributable impacts.

No duplication, overlap, or conflict between this proposed action and existing Federal rules has been identified.

# 1 Regulatory Impact Review

## 1.1 Introduction

This Regulatory Impact Review (RIR) examines proposed changes to groundfish management required to insure that groundfish fisheries in the Bering Sea and Aleutian Islands Management Area (BSAI) are not likely to jeopardize the continued existence of Steller sea lions, or to adversely modify or destroy their critical habitat. This RIR was prepared to meet the requirements of Presidential Executive Order (EO) 12866.[5]

Steller sea lions may be inadvertently taken in fishing gear, may be disturbed by fishing activities, and may compete with groundfish fisheries for important prey species. Atka mackerel, Pacific cod, and pollock are important Steller sea lion prey species that also are harvested in the groundfish fisheries. The North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) have taken measures that temporally and spatially disperse Atka mackerel, Pacific cod, and pollock harvests to reduce potential impacts from the groundfish fisheries on Steller sea lions and on their designated critical habitat. Spatial protection measures include closures of areas to groundfish fishing near Steller sea lion haulouts and rookeries, and in foraging areas, to reduce potential interactions with Steller sea lions and fishing vessels and to reduce potential impacts on prey resources in locations important to Steller sea lions. Temporal dispersion of pollock, Pacific cod, and Atka mackerel harvests is accomplished through seasonal apportionments of the annual total allowable catch (TAC) for these species.[6]

In 2010, NMFS completed an Endangered Species Act (ESA) section 7 consultation on the effects of the Alaska groundfish fisheries on ESA-listed species, including the western distinct population segment (WDPS) of Steller sea lions, and on designated critical habitat. Based on the best available commercial and scientific information, the consultation resulted in a biological opinion (FMP biop) that found that the Steller sea lion protection measures implemented in the BSAI since 2003 could not insure that the groundfish fisheries were not likely to jeopardize the continued existence of the Steller sea lion or to adversely modify designated critical habitat for the WDPS of Steller sea lions. A reasonable and prudent alternative (RPA) to the protection measures was included in the FMP biop to insure the groundfish fisheries were not likely to result in jeopardy or adverse modification of critical habitat. This RPA was implemented by an interim final rule as the 2011 Steller sea lion protection measures (75 FR 77535, December 13, 2010, corrected 75 FR 81921, December 29, 2010).

The 2011 Steller sea lion protection measures primarily affected the Pacific cod and Atka mackerel fisheries in the Aleutian Islands subarea. The FMP biop determined that the weight of evidence indicated that fisheries for Steller sea lion prey might be appreciably reducing the reproduction, and thus, numbers, of Steller sea lions, and adversely modifying the conservation value of their critical habitat in Statistical Areas 543, 542, and 541, by removing large quantities of prey species important to the basic nutrition and reproductive capacity of Steller sea lions. Competition for prey with fisheries is likely one component of an intricate suite of natural and anthropogenic factors affecting Steller sea lion numbers and reproduction. While natural factors may be contributing, NMFS must insure that actions authorized by NMFS are not likely to jeopardize the continued existence of the WDPS of Steller sea lions, nor adversely modify designated critical habitat.

[5] National Marine Fisheries Service (2007) provides current NMFS guidance for preparation of an economic analysis consisted with Executive Order 12866; Queirolo (2013) provides a more accessible overview.

[6] The details of the current Steller sea lion protection measures for the Alaska groundfish fisheries are available on the NMFS Alaska Region website at http://www.alaskafisheries.noaa.gov/sustainablefisheries/sslpm/.

The RPA was developed based on performance standards that addressed the effects of the groundfish fisheries on the population status and foraging behavior of Steller sea lions in the Aleutian Islands subarea. The details of these standards are described in the FMP biop. The RPA was structured to mitigate effects of the fishery in locations where Steller sea lion abundance continues to be of concern (Statistical Areas 543, 542, and 541).

One of the performance standards required that the protection measures be commensurate with the rate of Steller sea lion population decline, with more stringent measures in those locations with greater population declines. The RPA met this standard by applying more fisheries restrictions in Area 543 where Steller sea lions had the highest population decline and applying fewer fisheries restrictions in Areas 542 and 541, where Steller sea lion population decline was less than in Area 543.

Implementation of the RPA was expected to reduce potential competition between Steller sea lions and the Atka mackerel and Pacific cod fisheries in Area 543. This was intended to improve foraging success and prey availability for juvenile and adult Steller sea lions. The RPA also reduced the potential competitive overlap between Steller sea lions and fisheries for Atka mackerel and Pacific cod in Areas 542 and 541. This was intended to improve foraging success and prey availability for Steller sea lions, particularly adult females with dependent young, in winter.

On March 5, 2012, NMFS was ordered by the U.S. District Court of Alaska to prepare an EIS on the Steller sea lion protection measures implemented in January 2011.[7] The Court ordered NMFS to prepare an EIS for the Steller sea lion protection measures because NMFS had failed to provide sufficient environmental information for informed public comment to the agency decision-making when it prepared the environmental assessment for this action in 2010, and failed to provide for adequate public participation. In addition, the Court determined that NMFS's conclusions about the effects of the action were highly controversial and uncertain. The Court identified examples of scientific controversy for this action such as the use of single species rather than multi-species models for groundfish fisheries stock assessments and the effects of the groundfish fisheries on the availability of Steller sea lion prey resources.

The Court ordered the completion of the final EIS by March 2, 2014. The Court also ordered that any subsequent rulemaking for the BSAI groundfish fisheries as a result of the EIS must be completed by January 1, 2015.

At its April 2012 meeting, the Council chose to reconvene its Steller Sea Lion Mitigation Committee (SSLMC). (NPFMC 2012a) This committee met repeatedly during the spring, summer, and fall of 2012, and proposed two new alternatives to the Council at its December 2012 meeting. At this meeting, the Council adopted a statement of purpose and need, and recommended a suite of four alternatives for evaluation in the EIS. Following the Council's meeting, NMFS reviewed the alternatives in light of the statement of purpose and need, and the requirements of the ESA and National Environmental Policy Act, and adopted a set of five alternatives and a protective option for analysis in the EIS. These alternatives are described in detail in Chapter 2 of the EIS.

On March 21 and 22, 2013, the Council's SSLMC reviewed a preliminary draft of the EIS, and received a draft erratum addressing errors NMFS had identified since it had distributed the preliminary draft. The SSLMC recommended a preliminary preferred alternative (PPA). The Council's Advisory Panel (AP) endorsed the SSLMC's PPA at the April 2013 Council meeting, with minor clarifications of the text. The

[7] The Court's decision and order for this action are available on the NMFS Alaska Region website at http://alaskafisheries.noaa.gov/sustainablefisheries/sslpm/eis/.

Council recommended the AP's PPA for analysis, as a part of its broader motion on the preliminary draft EIS. The Council's recommended PPA has been incorporated into this analysis as Alternative 5.

In May 2013, NMFS issued the draft EIS, starting a 60-day public comment period that ended on July 16, 2013. NMFS received 13 submissions of comment from which NMFS staff identified 227 specific, substantive comments. NMFS staff prepared a draft comment analysis report, and briefed the Council on it at the Council's October 2013 meeting. At that meeting, the Council passed a motion adopting Alternative 5, its PPA, as its recommended preferred alternative.

In consideration of public comments, NMFS introduced an additional alternative that was more protective than the status quo. This new Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock in Areas 541, 542, and 543.

This RIR has been based on Chapter 8 (Economic Analysis) of the EIS.

### 1.1.1 What is a Regulatory Impact Review?

An RIR is required for rulemaking under EO 12866 (58 FR 51735, September 30, 1993). The requirements for all regulatory actions specified in EO 12866 are summarized in the following statement from the order:

> *In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.*

EO 12866 further requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." A significant regulatory action is one that is likely to –

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

### 1.1.2 Statutory Authority

NMFS manages the U.S. groundfish fisheries of the BSAI in the exclusive economic zone off Alaska under the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI groundfish FMP) (NPFMC, 2012b). The Council prepared, and the Secretary of Commerce

approved, this FMP under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, et seq.).

The Endangered Species Act of 1972 (ESA) provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. NOAA's National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and anadromous species. NMFS has jurisdiction over 87 listed species, including the Steller sea lion.[8]

Federal agencies are directed, under section 7(a)(1) of the ESA, to use their authority to carry out programs for the conservation of threatened and endangered species. Federal agencies must also consult with NMFS, under section 7(a)(2) of the ESA, on activities that may affect a species for which NMFS has responsibility. These interagency consultations, or "Section 7" consultations, are designed to assist Federal agencies in fulfilling their duty to insure Federal actions do not jeopardize the continued existence of a species or destroy or adversely modify critical habitat. Should NMFS determine that it cannot insure that its action is not likely to jeopardize or adversely modify, NMFS will suggest Reasonable and Prudent Alternatives (RPAs) that would not violate section 7(a)(2).[9] In the current instance, the agency taking the action is the Sustainable Fisheries Division of NMFS Alaska Region, and the "consulting" agency is the Protected Resources Division of NMFS Alaska Region. A history of recent, relevant consultations and actions leading up to this action is presented in the 2010 FMP biop (NMFS, 2010a).

### 1.1.3 Purpose and Need

This action is needed to comply with the ESA requirement that a Federal agency insure that the agency's actions are not likely to jeopardize the continued existence of endangered species or to adversely modify or destroy critical habitat. In this case, NMFS's action is the management of the Alaska groundfish fisheries (including the authorization of research necessary to support such management) and the endangered species is the WDPS of Steller sea lions. In the FMP biop, NMFS determined that it could not insure that the Alaska groundfish fisheries were not likely to jeopardize the continued existence of the WDPS of Steller sea lions and not adversely modify their designated critical habitat. In response to this determination, NMFS recommended an RPA to mitigate the fishery impacts that had been identified as having the potential to cause jeopardy. The RPA restricted the Aleutian Islands Atka mackerel and Pacific cod fisheries, to provide additional protection to the WDPS of Steller sea lions and their critical habitat. The RPA and other existing fishery management measures designed to protect Steller sea lions in the Aleutian Islands are known, collectively, as the Steller sea lion protection measures. The Steller sea lion protection measures restrict the Atka mackerel, Pacific cod, and pollock fisheries in a manner that causes economic impacts.

The purpose of this action is to implement Steller sea lion protection measures for the Aleutian Islands groundfish fisheries, and their supporting research, in a manner that mitigates the Aleutian Islands groundfish fisheries potential impacts on Steller sea lions and minimizes, to the extent practicable, economic impacts to the groundfish fisheries. New information is available to evaluate and potentially revise the Steller sea lion protection measures to reduce the economic impacts, to the extent practicable, on the fisheries while still providing necessary protection to Steller sea lions.

[8] See the NOAA Fisheries Service web page http://www.nmfs.noaa.gov/pr/laws/esa/.
[9] See the NOAA Fisheries Service web page http://www.nmfs.noaa.gov/pr/consultation/.

### 1.1.4 Alternatives

Chapter 2 of the EIS provides a detailed description of, and rationale for, the alternatives under consideration in this action. There are six alternatives:

- Alternative 1: Status Quo (no action).
- Alternative 2: Modified 2011 Steller Sea Lion Protection Measures
- Alternative 3: Further modified 2011 Steller Sea Lion Protection Measures
- Alternative 4: Modified 2010 Steller Sea Lion Protection Measures
- Alternative 5: Recommended by the Council at its October 2013 meeting
- Alternative 6: No Retention of Atka Mackerel, Pacific Cod, and Pollock in the Aleutian Islands Reporting Areas

This analysis in this RIR is organized as follows. Alternatives 1 and 4 are to some extent mirror images of each other, given the 2004 through 2010 baseline used for analysis of the Atka mackerel and Pacific cod fisheries. Alternative 1 is a deviation from conditions in the years 2004 through 2010 (reflecting the provisions of the interim final rule which is the current status quo), while Alternative 4 is, to some extent, a return to it. Thus, these alternatives are evaluated together with respect to the fleets immediately impacted. This is done in four sections, each discussing the impacts on a different sector (Sections 1.3, 1.4, 1.5 and 1.6).

The SSLMC recommended alternatives dealing with pollock, and formulated its other proposed alternatives (2 and 3) on a species-by-species basis. For Pacific cod, it further developed separate alternatives for trawl and non-trawl gears. These alternatives are evaluated in a series of six sections organized by species, and, for Pacific cod, by trawl and non-trawl and catcher/processor and catcher vessel, status. Thus, the first section, dealing with pollock, compares the pollock elements of Alternatives 2 and 3 (Section 1.7). Similar sections deal with Atka mackerel (Section 1.8), and trawl catcher/processor fishing for Pacific cod (Section 1.9), non-trawl catcher/processor fishing for Pacific cod (1.10), trawl catcher vessel fishing for Pacific cod (1.11), and non-trawl catcher vessel fishing for Pacific cod (1.12). This approach was chosen for these alternatives because it reflects the thought process used by the SSLMC in designing the alternatives. For two species, Atka mackerel and pollock, much of the impact falls on a single sector. The Pacific cod alternatives and analysis are more complex.

Alternative 5, which the Council adopted as its preferred alternative in October 2013, is evaluated in Section 1.13.1, and Alternative 6 is evaluated in Section 1.13.2.

Following the fleet oriented discussion in Sections 1.3 to 1.13, additional sections look at potential non-consumptive benefits from protecting Steller sea lions, community economic impacts, and other issues.

The elements of Alternatives 2, 3, 5, and 6 are summarized at the start of the relevant species-specific sections for those alternatives. The remainder of this sub-section describes the elements of Alternatives 1 and 4. All of the alternatives and options are described in greater detail in Chapter 2 of the EIS.

*Alternative 1: the Status Quo*

Under Alternative 1, no changes would be made to current groundfish fisheries management in the Aleutian Islands. The Status Quo Alternative is the RPA in the final FMP biop. The features of the Status Quo Alternative are—

In Area 543:

- Prohibit retention of Atka mackerel and Pacific cod by all federally permitted vessels.
- Establish a TAC for Atka mackerel sufficient to support the incidental discarded catch that may occur in other target groundfish fisheries (e.g., Pacific ocean perch).
- Eliminate the Atka mackerel platoon management system in the HLA.

In Area 542:

Groundfish

- Close waters from 0–3 nm around Kanaga Island/Ship Rock to directed fishing for groundfish by federally permitted vessels.

Pacific cod

- Close 0–6 nm zone of critical habitat year round to directed fishing for Pacific cod by federally permitted vessels using non-trawl gear. For vessels 60 ft or greater, close critical habitat from 6 nm–20 nm January 1 to March 1, to directed fishing for Pacific cod using non-trawl gear by federally permitted vessels.
- Between 177° E to 178° W long., close critical habitat from 0–20 nm year round to directed fishing for Pacific cod by federally permitted vessels using trawl gear.
- Between 178° W to 177° W long., close critical habitat from 0–10 nm year round to directed fishing by federally permitted vessels using trawl gear. Between 178° W to 177° W long., close critical habitat 10 nm–20 nm June 10 to November 1, to directed fishing for Pacific cod using trawl gear by federally permitted vessels.
- Prohibit directed fishing for Pacific cod by all federally permitted vessels from November 1 to January 1. (This extends the trawl gear restriction to non-trawl gear.)
- Reinitiate ESA consultation if the non-trawl harvest of Pacific cod exceeds 1.5 percent of the BSAI Pacific cod acceptable biological catch (ABC) (equivalent to the Area 542 maximum annual harvest amount from 2007 through 2009). Similarly, reinitiate ESA consultation if the trawl harvest of Pacific cod exceeds 2 percent of the BSAI Pacific cod ABC (equivalent to the Area 542 maximum annual harvest amount from 2007 through 2009).

Atka mackerel

- Set TAC for Area 542 to no more than 47 percent of the ABC amount apportioned to Area 542 by the Council's Scientific and Statistical Committee (SSC).
- Between 177° E to 179° W long. and 178° W to 177° W long., close critical habitat from 0–20 nm year round to directed fishing for Atka mackerel by federally permitted vessels.
- Between 179° W to 178° W long., close critical habitat from 0-10 nm year round to directed fishing for Atka mackerel by federally permitted vessels. Between 179° W and 178° W long., close critical habitat from 10 nm–20 nm to directed fishing for Atka mackerel by federally permitted vessels not participating in a harvest cooperative or fishing a Community Development Quota (CDQ) allocation.
- Add a 50:50 seasonal apportionment to the CDQ Atka mackerel allocation to mirror seasonal apportionments for Atka mackerel harvest cooperatives.
- Limit the amount of Atka mackerel harvest allowed inside critical habitat to no more than 10 percent of the annual allocation for each harvest cooperative or CDQ group. Evenly divide the annual critical habitat harvest limit between the A- and B-seasons.

- Change the Atka mackerel seasons to January 20 to June 10, for the A-season and June 10, to November 1, for the B-season.
- Eliminate the Atka mackerel platoon management system in the HLA.

In Area 541:

Pacific cod

- Close 0–10 nm of critical habitat year round to directed fishing for Pacific cod by all federally permitted vessels.
- Limit the amount of catch that can be taken in the 10 nm–20 nm area of critical habitat based on gear type used:
  - Close critical habitat 10 nm–20 nm January 1 to March 1 to directed fishing for Pacific cod using non-trawl gear by federally permitted vessels.
  - Close critical habitat 10 nm–20 nm June 10 to November 1, to directed fishing by for Pacific cod using trawl gear by federally permitted vessels.
- Prohibit directed fishing for Pacific cod by federally permitted vessels November 1, to January 1. (This extends this trawl gear restriction to non-trawl gear.)
- Reinitiate ESA consultation if the non-trawl harvest of Pacific cod exceeds 1.5 percent of the BSAI Pacific cod ABC (equivalent to the Area 541 maximum annual harvest amount from 2007 through 2009). Similarly, reinitiate ESA consultation if the trawl harvest of Pacific cod exceeds 11.5 percent of the BSAI Pacific cod ABC (equivalent to the Area 541 maximum annual harvest amount from 2007 through 2009).

Atka mackerel

- Change the Bering Sea/Area 541 Atka mackerel seasons to January 20 to June 10, for the A-season and June 10 to November 1, for the B-season.
- Close the Bering Sea subarea year round to directed fishing for Atka mackerel.

Federally permitted vessels participating in the State-managed guideline harvest level (GHL) fishery (5 AAC 28.647) would be exempt from the Atka mackerel and Pacific cod closures under this alternative. NMFS has published a final rule providing that the owner of a pot or hook-and-line catcher/processor vessel who surrenders a Federal fisheries permit (FFP) will not be reissued a new FFP for that vessel within the 3-year term of the permit (76 FR 73513, November 29, 2011). This may have reduced opportunities to participate in the State-managed GHL fishery without complying with all Federal fisheries management measures. The State applies the 2003 Steller sea lion protection measures to this fishery. This would provide for continued harvest in this fishery, as analyzed in the cumulative effects of the FMP biop.

*Alternative 4: Return to modified 2010 measures*

Alternative 4 reinstates the measures that were in place in 2010, with certain exceptions:

- The HLA program, which was eliminated in 2010 by the interim final rule, is not reinstated;
- Critical habitat open to fishing by Amendment 80 vessels under the HLA program is open all year long;
- The fishing season for Amendment 80 vessels and for vessels fishing CDQ is extended from November 1 to December 31;
- Bering Sea subarea closed to directed fishing; revise Amendment 80 and CDQ MRA calculation for Atka mackerel as an incidental species.

In addition, Alternative 4 includes an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their vessel monitoring system (VMS) is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions.

## 1.2 Background

Section 1.2 provides background on topics necessary to understand the analysis of the six alternatives. Background material has been segregated here to allow the analytical sections to focus on the impacts associated with the changes caused by the alternatives. In addition to allowing a tighter focus in the analytical sections, this segregation of background material from the analysis may reduce confusion if some readers would otherwise mistake some background material as being directly applicable to the incremental analysis required for alternatives. Readers familiar with the fisheries, fishery management, and fishing communities involved in the Aleutian Islands, may choose to pass over this section and start with the analysis beginning in Section 1.3.

The vessels harvesting Atka mackerel and Pacific cod in the Federal and State parallel fisheries in the Aleutian Islands have been grouped into four sectors for analysis: (1) trawl catcher/processors; (2) non-trawl (hook-and-line and pot) catcher/processors; (3) trawl catcher vessels; and (4) non-trawl (hook-and-line, pot, and jig) catcher vessels.

These four sectors have been defined so as to balance several considerations: (1) to group vessels with similar functions (e.g., vessels that simply catch fish, as opposed to vessels that both catch and process); (2) to group vessels with similar gear types; (3) to group vessels in categories that reflect vessel categories adopted for regulation in the interim final rule; and (4) to group vessels so as to minimize the need to protect the confidentiality of some types of information.[10]

This background section discusses each of these groups, as well as other topics. The table of contents lists the topics.

### 1.2.1 Trawl catcher/processors

This sector includes:

- trawl catcher/processor vessels targeting, or taking incidental catches of, Atka mackerel and/or Pacific cod in the Aleutian Islands,
- trawl catcher/processors acting as motherships to trawl catcher vessels making deliveries of Atka mackerel, and
- catcher vessels delivering Atka mackerel to catcher/processors acting as motherships.

The North Pacific Fishery Management Council's (Council's) report, "Fishing Fleet Profiles" provides descriptions of the trawl catcher/processors and trawl catcher vessels participating in the Bering Sea and Aleutian Islands fisheries (NPFMC, 2012c).

[10] Numbers of vessels are not confidential, while volumes and value of catch are. Data is confidential if there are fewer than three observations. When confidential data has been suppressed, a "C" is substituted for the data. Sometimes it is necessary to suppress data that is not itself confidential in order to protect confidential data from back calculation. When this is done, an "S" for "suppressed" is substituted for the data point.

*Numbers of vessels*

Table 1 provides estimates of the numbers of trawl catcher/processors with retained targeted or incidental catches of Atka mackerel or Pacific cod from the fisheries in the Aleutian Islands. Many of the vessels in this fleet are fishing under the catch share system created by Amendment 80, and under these rules (at least for the six species for which shares were created) the distinction between a target and an incidental catch becomes blurred, since both are counted against a vessel operator's quota share holdings. Because of this, this fleet has been defined in this analysis as the set of trawl catcher/processors retaining targeted and incidental catches of Atka mackerel and Pacific cod. The other fleets defined here, including the non-trawl catcher/processors, trawl catcher vessels, and non-trawl catcher vessels, have been defined more narrowly as the vessels with retained targeted catches of Pacific cod (although, for these vessels, subsequent tables report their incidental catches).[11]

As shown in Table 1, the number of unique vessels in this sector before the interim final rule ranged between 11 in 2008, and 16 in 2007; the median fleet size was 13 vessels. Fleet size appears to have decreased somewhat in the three years just prior to the introduction of the interim final rule; this took place following the introduction of the Amendment 80 and Amendment 85 rules in 2008, and may have been associated with fleet rationalization and changes in sector allocations. Fleet size does not appear to have decreased at the same time as the introduction of the interim final rule in 2011; both the Atka mackerel and Pacific cod vessel subsets increased in 2011. However, the vessel count did drop in 2012. The numbers of vessels participating tended to be larger in Area 541 and to get smaller moving towards more westerly management areas.

Some trawl catcher/processors act as motherships, and accept deliveries of Atka mackerel and Pacific cod from trawl catcher vessels operating in the Aleutian Islands. Table 2 reports the numbers of catcher vessels making deliveries of Atka mackerel to catcher/processors, and of the numbers of catcher/processors accepting these deliveries. Table 3 provides similar information for vessels catching and accepting deliveries of Pacific cod.

Catcher vessels began delivering Atka mackerel to catcher/processors in 2007. The number rose gradually from one in 2007 to three in 2011. During this period, deliveries were never received by more than one catcher/processor in a year. Catcher vessels delivered Pacific cod to catcher/processors throughout the period. The numbers actually reached their highest levels (11 to 12 vessels) in 2011 and 2012. From one to three catcher/processors accepted deliveries of Pacific cod during this period. The small numbers of catcher/processors acting as motherships and receiving Atka mackerel and Pacific cod from trawl catcher vessels generally precludes reporting information on this activity separately.

Eighteen Amendment 80 trawl catcher/processors had endorsements to fish in the Aleutian Islands. All of them had endorsements allowing them to trawl in the Bering Sea, while three of them also had endorsements permitting the use of non-trawl gear in the Aleutians and Bering Sea. Among the seven Amendment 80 trawl catcher/processors that specialized in Atka mackerel in the Aleutian Islands, all had endorsements to use trawl gear in the Bering Sea and the Western Gulf, and four had endorsements to trawl in the Central Gulf.

[11] For clarity, these latter fleet sectors do not include vessels that do not target Pacific cod, but which do retain it incidentally to their harvests of other target species.

**Table 1 Numbers of trawl catcher/processors with retained Atka mackerel and Pacific cod from retained targeted or incidental catches in the Federal or State of Alaska parallel fisheries[12] in the Aleutian Islands, 2004–2012[13]**

| Year | Retained from Atka mackerel targets | | | | Retained from Pacific cod targets | | | | Unique Vessels |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique vessels) | |
| 2004 | 10 | 10 | 9 | 11 | 14 | 12 | 9 | 15 | 15 |
| 2005 | 11 | 10 | 10 | 11 | 12 | 11 | 11 | 13 | 13 |
| 2006 | 12 | 11 | 9 | 12 | 15 | 13 | 10 | 15 | 15 |
| 2007 | 11 | 11 | 9 | 12 | 16 | 14 | 9 | 16 | 16 |
| 2008 | 8 | 7 | 7 | 8 | 11 | 8 | 8 | 11 | 11 |
| 2009 | 10 | 9 | 7 | 11 | 11 | 9 | 8 | 11 | 12 |
| 2010 | 9 | 7 | 7 | 9 | 11 | 7 | 7 | 11 | 12 |
| 2011 | 11 | 7 | 0 | 11 | 13 | 7 | 1 | 13 | 13 |
| 2012* | 10 | 8 | 0 | 10 | 11 | 8 | 3 | 11 | 9 |

Notes: Federally licensed trawl catcher/processor vessels with retained catches of targeted non-CDQ and CDQ Atka mackerel and/or Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543. *The 2012 vessel counts are estimated as of December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

**Table 2 Numbers of trawl catcher/processors receiving Atka mackerel deliveries from catcher vessels, and the numbers of catcher vessels delivering Atka mackerel to catcher/processors, 2004–2012**

| Year | Counts of trawl catcher vessels making deliveries | | | | Counts of catcher/processors receiving deliveries | | | |
|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique vessels) |
| 2004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 2008 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2009 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2010 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 |
| 2011 | 3 | 2 | 0 | 3 | 1 | 1 | 0 | 1 |
| 2012* | 2 | 1 | 0 | 2 | NA | NA | NA | NA |

Notes: Federally licensed trawl catcher vessels with retained catches of targeted no-CDQ and CDQ Atka mackerel, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the entities to which they delivered. *The 2012 vessel counts are estimated as of December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Sources: AKFIN, December 18, 2012.

[12] A State parallel fishery is a fishery that occurs in State waters, is open at the same time as Federal groundfish fisheries in Federal waters, and whose groundfish catch is deducted from the Federal TAC.

[13] Background information is provided for the period from 2004 through early December 2012. The year 2004 was chosen as the starting point, because it is the first year that complete data are available systematically from the AKRO Catch Accounting System (CAS). While complete data could be provided for 2003, this would involve greater analytical resources as CDQ data has not been integrated into the CAS for that year. CAS data are not available prior to 2003. The usefulness of data from earlier years is also limited since there have been important changes in the fisheries operating in the Aleutian Islands Atka mackerel and Pacific cod fisheries, including the introduction of the Amendment 80 cooperatives in 2008, the Pacific cod sector allocation in Amendment 85, and the cooperative established among freezer longline operations that became fully operational in August 2010. Thus, data from earlier years would not be as relevant to the analysis of these alternatives as the more recent data used here. Data for 2012 were incomplete at the time these tables were compiled. There is an important fundamental discontinuity between data from 2004 through 2010, before the interim final rule went into effect, and data from 2011 through 2012, while the rule was in effect. The years 2004 through 2010 are generally used as the baseline years in the analysis.

**Table 3 Numbers of trawl catcher/processors receiving Pacific cod deliveries from catcher vessels, and the numbers of catcher vessels delivering Pacific cod to catcher/processors, 2004–2012**

| Year | Counts of trawl catcher vessels making deliveries | | | | Counts of catcher/processors receiving deliveries | | | |
|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique vessels) |
| 2004 | 2 | 3 | 0 | 3 | 1 | 2 | 0 | 2 |
| 2005 | 2 | 2 | 0 | 2 | 1 | 1 | 0 | 1 |
| 2006 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| 2007 | 3 | 2 | 3 | 4 | 2 | 1 | 2 | 2 |
| 2008 | 8 | 4 | 4 | 8 | 3 | 2 | 2 | 3 |
| 2009 | 4 | 4 | 3 | 5 | 1 | 2 | 2 | 2 |
| 2010 | 5 | 5 | 5 | 5 | 2 | 2 | 2 | 2 |
| 2011 | 11 | 6 | 0 | 11 | 3 | 2 | 0 | 3 |
| 2012* | 12 | 4 | 0 | 12 | NA | NA | NA | NA |

Notes: Federally licensed trawl catcher vessels with retained catches of targeted no-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the entities to which they delivered. *The 2012 vessel counts are estimated as of December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Sources: AKFIN, December 18, 2012.

*Amendment 80 trawl catcher/processors targeting Atka mackerel*

Amendment 80 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI groundfish FMP) identified groundfish trawl catcher/processors that were not covered by the American Fisheries Act (AFA) (i.e., the head-and-gut fleet or Amendment 80 vessels) and established a framework for future fishing by this fleet. The framework provided for an allocation of the TACs of six groundfish species among trawl fishery sectors, created Amendment 80 quota share (QS) for these vessels, facilitated the development of cooperative arrangements among the vessels, provided for a competitive fishery among Amendment 80 vessels not entering a cooperative, and created an economic data reporting (EDR) program to collect data about the fleet. The fleet currently includes 23 vessels. Seven of these vessels currently consistently target Atka mackerel in the Aleutian Islands, and it is these seven vessels that are included in this category of trawl catcher/processors.

Amendment 80 established criteria for harvesters in the Amendment 80 sector to apply for and receive QS, and for NMFS to initially allocate and transfer QS. Amendment 80 assigned QS based on the historical proportional levels of participation by Amendment 80 vessels. Amendment 80 vessels may choose to operate in a cooperative or in an open access fishery. Vessels in a cooperative may pool their quota share and fish in a rationalized fishery; vessels choosing to operate in an open access fishery contribute their quota share and associated harvest rights to the common fishery for competitive fishing.

Table 4 shows the share of Amendment 80 quota held by the different Amendment 80 firms in 2012. Firms are defined as the corporations recorded in Federal records as holders of Amendment 80 quota share. This level of reporting misses ownership affiliations between many of the corporations, and the actual concentration of the Atka mackerel quota share holdings, in particular, are greater than the table indicates. As shown in Table 4, seven firms hold more than 5 percent of the Atka mackerel QS. Among these firms, the lowest holding is 8 percent, and the largest is 25 percent. The top four firms hold about 67 percent of the Atka mackerel QS.

**Table 4 Share of Amendment 80 quota share, by firm, 2012**

| Firm | Atka Mackerel | Flathead Sole | Pacific Cod | Pacific ocean Perch | Rock Sole | Yellowfin Sole |
|---|---|---|---|---|---|---|
| ALASKA ALLIANCE, LLC | 0% | 1% | 2% | 0% | 1% | 0% |
| ALASKA JURIS, INC. | 13% | 2% | 3% | 16% | 5% | 8% |
| ALASKA LEGACY, LLC | 1% | 3% | 4% | 0% | 5% | 3% |
| ALASKA SPIRIT, INC. | 8% | 2% | 3% | 2% | 7% | 8% |
| ALASKA VAERDAL, LLC | 1% | 1% | 4% | 0% | 3% | 2% |
| ALASKA VICTORY, INC. | 11% | 1% | 3% | 7% | 3% | 7% |
| ARCTIC SOLE SEAFOODS, INC. | 0% | 1% | 0% | 0% | 1% | 0% |
| ARICA VESSEL LLC | 0% | 7% | 6% | 0% | 5% | 5% |
| CAPE HORN VESSEL, LLC | 0% | 9% | 5% | 0% | 4% | 3% |
| FCA HOLDING INC | 1% | 0% | 1% | 2% | 1% | 1% |
| M/V SAVAGE, INC. | 18% | 1% | 5% | 18% | 2% | 5% |
| NORTH PACIFIC FISHING, INC. | 1% | 2% | 6% | 0% | 7% | 4% |
| OCEAN ALASKA, LLC. | 0% | 2% | 1% | 0% | 1% | 1% |
| OCEAN PEACE, INC. | 9% | 5% | 5% | 13% | 4% | 4% |
| O'HARA CORPORATION | 1% | 33% | 19% | 0% | 18% | 14% |
| REBECCA IRENE VESSEL LLC | 0% | 7% | 5% | 0% | 4% | 4% |
| SEAFREEZE ALASKA LLC | 8% | 3% | 6% | 14% | 3% | 4% |
| THE FISHING COMPANY OF ALASKA, INC. | 25% | 3% | 6% | 27% | 8% | 16% |
| TREMONT VESSEL, LLC | 0% | 9% | 3% | 0% | 4% | 3% |
| U.S. FISHING, L.L.C. | 1% | 3% | 9% | 0% | 7% | 4% |
| UNIMAK VESSEL, LLC | 0% | 3% | 5% | 0% | 7% | 5% |
| Grand Total | 100% | 100% | 100% | 100% | 100% | 100% |

Note: Rounding errors prevent precise calculation of summary statistics from reported percentages. While some firms actually have no holdings of some species QS, in other instances firms appear to have zero QS holdings due to rounding.
Source: AKR RAM website, 2010 QS holdings. Retrieved on June 10, 2012, from http://alaskafisheries.noaa.gov/sustainablefisheries/amds/80/default.htm ("A-80 Quota Share Holders").

Table 5 shows the allocations of Atka mackerel among Amendment 80 cooperatives in the years since Amendment 80 went into effect. One cooperative was formed immediately, and has functioned each year since 2008; from 2008 through 2010, several firms operated in an open access fishery, but a second cooperative was formed in 2011, and there have been no open access allocations since that year.

**Table 5 Annual allocations of Atka mackerel (measured in metric tons) among Amendment 80 Cooperatives and the open access fishery, 2008–2013**

| Year | Alaska Seafood Cooperative (formerly Best Use Cooperative) (metric tons) | Alaska Groundfish Cooperative (metric tons) | Open Access (metric tons) |
|---|---|---|---|
| 2008 | 22,914 | No co-op | 30,339 |
| 2009 | 27,356 | No co-op | 38,398 |
| 2010 | 26,181 | No co-op | 36,749 |
| 2011 | 18,048 | 25,325 | 0 |
| 2012 | 16,542 | 23,211 | 0 |

Notes: Amendment 80 took effect in 2008. Shaded years are years during which the interim final rule was in effect.
Source: Various annual specifications for the BSAI, as published in the *Federal Register*.

Cooperative participants could consolidate fishing operations on a specific Amendment 80 vessel or subset of Amendment 80 vessels, thereby reducing monitoring, enforcement, and other operational costs,

and permitting more efficient harvest. The opportunity to trade harvest privileges among cooperatives encourages efficient harvesting, and discourages waste.

Each Amendment 80 cooperative receives an exclusive allowance of crab and halibut prohibited species catch (PSC), which the cooperative may use while harvesting in the BSAI. This halibut and crab PSC cooperative quota (CQ) is assigned to a cooperative in an amount proportionate to the amounts of Amendment 80 QS held by its members, and is not based on the amount of crab or halibut PSC historically removed by the cooperative members.

A cooperative structure may allow Amendment 80 vessel operators to better manage PSC rates than do operators who must race to harvest fish as quickly as possible before PSC causes a fishery closure. By reducing PSC through more efficient cooperative operations (such as through gear modifications or "hot spot" avoidance) Amendment 80 vessel operators may also increase the harvest of valuable targeted groundfish species and improve revenues that would otherwise be forgone.

Amendment 80 cooperatives may receive a reallocation of an additional amount of CQ, if a portion of the Amendment 80 species, or of crab or halibut PSC allotted to the BSAI trawl limited access sector, is projected to go unharvested. This reallocation to the Amendment 80 cooperatives is at the discretion of NMFS, based on projected harvest rates in the BSAI trawl limited access sector and other criteria. Each Amendment 80 cooperative would receive an additional amount of CQ based on the proportion of the Amendment 80 QS held by that Amendment 80 cooperative, as compared with all other Amendment 80 cooperatives.

The Amendment 80 program established groundfish and halibut PSC sideboards to limit the ability of Amendment 80 firms to expand their harvest efforts in the Gulf of Alaska (GOA) (75 FR 11749, March 12, 2010). Groundfish harvesting sideboard limits were established for all Amendment 80 vessels, other than the F/V *Golden Fleece.* Sideboard limits in the GOA cover pollock in the Western and Central Regulatory Areas and in the West Yakutat district, Pacific cod GOA-wide, Pacific ocean perch, and pelagic shelf rockfish in the Western Regulatory Area and West Yakutat district, and northern rockfish in the Western Regulatory Area. (75 FR 11749, March 12, 2010) The harvest of Pacific ocean perch, pelagic shelf rockfish, and northern rockfish in the Central Regulatory Area of the GOA are subject to regulation under the Central GOA Rockfish Program. Amendment 80 vessels not qualified under the Rockfish Program are excluded from directed fishing for these rockfish species in the Central GOA. The F/V *Golden Fleece* is prohibited from directed fishing for pollock, Pacific cod, Pacific ocean perch, pelagic shelf rockfish, and northern rockfish in the GOA. (75 FR 11749, March 12, 2010) All targeted or incidental catch of sideboard species made by Amendment 80 vessels will be deducted from the sideboard limits. (75 FR 11749, March 12, 2010) A minimum groundfish retention standard (GRS) applied to all Amendment 80 vessels and Amendment 80 cooperatives fishing in the BSAI. The GRS went into effect in 2008. The percentage of catch that must be retained was 65 percent in 2008, increasing to 75 percent in 2009, 80 percent in 2010, and 85 percent in 2011 and all future years.

In a June 2010 report to the Council, NMFS identified two issues with the GRS Program. First, the regulatory methodology adopted for implementation of the GRS differed from that used in the analysis of the GRS at the time of final action, and required groundfish retention beyond levels intended by the Council. Thus, the current GRS calculation schedule could have imposed economic hardships to the Amendment 80 fleet beyond those considered in the analysis. Second, NMFS enforcement had concerns with the cost of enforcing a GRS violation, and this may have hindered its ability to enforce the current GRS Program.

In 2010, the Council approved an emergency action to temporarily suspend the GRS regulations. NMFS published the emergency rule in December 2010, and subsequently published an extension through

December 17, 2011, in June 2011 (75 FR 78172; 76 FR 31881), which had the effect of suspending the GRS for 2010 and 2011. NMFS lacked the authority to extend the emergency rule beyond 2011, thus, the GRS was reinstated in January 2012. On February 25, 2013, NMFS published a final rule repealing the GRS with an effective date on March 27, 2013 (78 FR 12627).

*Trawl catcher/processors targeting Pacific cod*

The trawl catcher/processors targeting Pacific cod include Amendment 80 vessels, both the seven that are important in the Atka mackerel fishery, and others. Prior to the effective date of the interim final rule in 2011, and for a while after, this fleet segment also included the AFA trawl catcher/processor, the F/V *Katie Ann*. As a catcher/processor, the F/V *Katie Ann* harvested a portion of the AFA's Pacific cod sideboard, and as a mothership, she accepted deliveries from three catcher vessels fishing in the Federal/parallel Pacific cod fishery, and then in the State GHL Pacific cod fishery. (Jacobs, personal communication, 2010).[14] In the period prior to the interim final rule, she had a market for large Area 543 Pacific cod with Ivar's Restaurant Company, a chain of 60 seafood restaurants in the Pacific Northwest (Table 6 does suggest that Pacific cod tend to be larger in the Aleutian Islands). In 2010, representatives of Ivar's indicated that they valued the large Pacific cod from the *Katie Ann,* because they made it possible to prepare a high quality product. (Donegan 2010; Jacobs, 2010; Jacobs, personal communication, 2010).

The interim final rule prohibited retention of Pacific cod from Area 543 from 2011 on. While the *Katie Ann* continued to try and meet Ivar's needs with Area 541 and 542 Pacific cod, it was eventually unsuccessful, and the American Seafood Company and Ivar's ended their supply agreement. In addition, the *Katie Ann* was also affected by changing patterns in the AFA pollock fishery. Under Amendment 85, the AFA catcher/processors were allocated 2.3 percent of the pollock TAC. The *Katie Ann* was the AFA vessel that used this allocation for targeted fishing. However, incidental AFA catches of Pacific cod in the pollock fishery were also to be deducted from this allocation. Increasing incidental catches of Pacific cod in the directed pollock fishery in recent years have reduced the share of this 2.3 percent allocation available for the *Katie Ann's* own directed fishing. (Jacobs, personal communication, April 3, 2013).

In response to these pressures, the American Seafood Company withdrew the *Katie Ann* from the Pacific cod fishery. The processing plant in the vessel was reconstructed, and the vessel's Alaska groundfish fishery focus is now yellowfin sole. Of the three catcher vessels that had been delivering to the *Katie Ann*, one, the F/V *Forum Star*, was tied up in 2013. (Jacobs, personal communication, April 3, 2013).

[14] Jacobs, Jan. Director of Government Affairs, American Seafood Company.

**Table 6 Average weights of retained Pacific cod in the BSAI, by year and management area and by gear type, measured in kilograms**

| Hook-and-line gear | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| BSAI mgt area | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| 509 | 3.09 | 3.41 | 3.94 | 3.80 | 2.77 | 2.08 | 2.39 | 2.51 | 2.78 |
| 512 | 2.90 | 3.05 | | | 2.86 | 2.36 | 2.55 | 2.38 | |
| 513 | 3.07 | 3.53 | 3.94 | 3.70 | 3.45 | 3.10 | 2.41 | 2.43 | 2.25 |
| 514 | 2.78 | 3.31 | 2.57 | | 2.96 | | 2.49 | 2.78 | |
| 516 | 3.64 | 3.46 | 3.45 | 4.37 | 2.97 | 2.21 | 2.62 | 1.98 | 2.64 |
| 517 | 3.61 | 3.84 | 4.14 | 3.95 | 3.35 | 2.54 | 2.59 | 2.63 | 2.63 |
| 518 | 2.86 | 2.75 | 4.86 | 3.09 | 2.83 | | 3.45 | | |
| 519 | 3.55 | 3.25 | 3.42 | 3.29 | 2.44 | 2.44 | 2.99 | 2.82 | 3.02 |
| 521 | 3.37 | 3.99 | 3.99 | 4.41 | 4.09 | 3.89 | 3.51 | 3.34 | 2.91 |
| 523 | 3.83 | 4.77 | 4.35 | 3.81 | 3.57 | 3.15 | 3.29 | 2.97 | 2.75 |
| 541 | 5.12 | 5.53 | 5.30 | 5.34 | 4.86 | 4.58 | 4.97 | 3.84 | 4.58 |
| 542 | 5.69 | 5.09 | 5.35 | 5.67 | 7.10 | 5.72 | 6.00 | 4.51 | 3.62 |
| 543 | 3.37 | 2.59 | 5.36 | 5.69 | 7.63 | 6.17 | 5.87 | | 5.69 |
| **Pot gear** | | | | | | | | | |
| BSAI mgt area | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| 509 | 3.43 | 3.54 | 3.77 | 4.81 | 4.27 | 5.07 | 3.63 | 3.85 | 3.57 |
| 512 | | | | | | | | 3.20 | |
| 513 | 3.72 | 4.00 | 4.08 | 4.25 | 4.96 | 4.66 | 5.22 | 4.06 | |
| 516 | | 3.20 | | | 3.40 | | | | |
| 517 | 3.76 | 4.45 | 5.11 | 5.01 | 4.45 | 4.18 | 3.40 | 3.38 | 3.81 |
| 518 | 3.55 | 4.51 | 4.39 | | 3.02 | 2.57 | | 3.38 | 2.98 |
| 519 | 4.31 | 4.59 | 4.38 | 4.30 | 3.58 | 3.51 | 3.28 | 2.97 | 2.69 |
| 521 | 3.93 | 3.50 | 4.34 | 6.10 | 6.18 | 4.90 | 5.56 | 2.85 | |
| 523 | | | | | | | | 3.07 | |
| 524 | 3.15 | 3.58 | 3.29 | 3.28 | | 5.33 | 3.75 | | |
| 541 | 2.43 | 2.35 | 4.45 | 3.45 | 4.27 | | 5.00 | 2.66 | |
| 542 | | | 5.07 | | | | 9.47 | 3.23 | |
| **Trawl gear** | | | | | | | | | |
| BSAI mgt area | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| 509 | 2.72 | 3.12 | 3.89 | 3.01 | 1.55 | 1.57 | 1.71 | 1.98 | 1.55 |
| 512 | 2.27 | 1.79 | 2.37 | 1.36 | 1.16 | 1.03 | 1.15 | 1.77 | 1.48 |
| 513 | 2.13 | 1.76 | 1.42 | 0.95 | 0.85 | 0.73 | 1.60 | 1.83 | 1.86 |
| 514 | 2.12 | 2.52 | 3.21 | 2.95 | 2.55 | 1.88 | 1.72 | 1.82 | 1.67 |
| 516 | 4.39 | 4.68 | 4.67 | 3.86 | 0.97 | 1.90 | 2.12 | 3.00 | 3.20 |
| 517 | | | | | 2.90 | 3.26 | 3.34 | 3.35 | 4.20 |
| 518 | 4.18 | 3.61 | 3.02 | 2.31 | 3.11 | 2.04 | 2.26 | 2.93 | 3.49 |
| 519 | 2.70 | 3.46 | 3.00 | 2.46 | 2.88 | 1.80 | 2.28 | 1.59 | 2.08 |
| 521 | | 2.90 | 5.16 | 2.65 | | | 9.35 | 3.22 | 8.54 |
| 523 | 1.52 | 2.09 | 2.51 | 2.22 | 2.77 | 3.37 | 2.03 | 4.30 | 2.80 |
| 541 | 7.53 | 7.61 | 8.44 | 9.49 | 9.19 | 8.66 | 8.04 | 6.56 | 6.44 |
| 542 | 7.80 | 8.89 | 7.20 | 9.20 | 6.69 | 7.53 | 6.73 | 6.47 | 6.70 |
| 543 | 7.77 | 8.26 | 9.37 | 9.26 | 10.56 | 10.36 | 10.14 | 3.41 | |

Notes: Shaded rows identify areas in the Aleutian Islands.
Source: Observer Program.

*Retained catches and processed deliveries*

Table 7 shows the targeted and incidental catches of Atka mackerel by trawl catcher/processors in the three Aleutian Islands management areas (this excludes small amounts of retained catch from the eastern Bering Sea). Overall, the aggregate catches of Atka mackerel rose from about 46,000 metric tons round weight in 2004, to 65,000 to 70,000 metric tons in 2009 and 2010, just before the introduction of the interim final rule. Catches fell in the first year of the interim final rule (2011) to about 49,000 metric tons. The composition of retained Atka mackerel catches changed somewhat at the time of the introduction of Amendment 80 rules in 2008; incidental catches increased relative to targeted catches. Rockfish targets were the largest source of Atka mackerel incidental catch.

**Table 7 Trawl catcher/processor retained Atka mackerel catch in the Aleutian Islands (Areas 541, 542, and 543)**

| Metric tons (round weight) | | | | | | | | | Aggregate Atka mackerel in the AI |
|---|---|---|---|---|---|---|---|---|---|
| | Retained catch in Atka mackerel target | | | | Atka mackerel incidental catch | | | | |
| Year | 541 | 542 | 543 | Aggregate | Pcod Tgt | Rockfish Tgt | Other | Aggregate | |
| 2004 | 2,900 | 26,427 | 16,514 | 45,841 | 235 | 172 | 0 | 407 | 46,248 |
| 2005 | 3,094 | 33,472 | 18,793 | 55,359 | 291 | 157 | 0 | 448 | 55,806 |
| 2006 | 3,833 | 38,410 | 14,361 | 56,603 | S | 52 | C | 232 | 56,835 |
| 2007 | 19,503 | 25,389 | 8,680 | 53,573 | S | 156 | C | 501 | 54,074 |
| 2008 | 17,406 | 21,788 | 14,563 | 53,757 | S | 2,202 | C | 2,774 | 56,531 |
| 2009 | 25,406 | 27,843 | 13,866 | 67,116 | 354 | 2,191 | 1 | 2,546 | 69,661 |
| 2010 | 22,678 | 23,677 | 16,836 | 63,191 | 181 | 1,071 | 126 | 1,378 | 64,568 |
| 2011 | 38,594 | 8,751 | 0 | 47,345 | 97 | 1,491 | 109 | 1,697 | 49,042 |
| 2012* | 34,629 | 9,019 | 0 | 43,648 | 393 | 1,047 | 546 | 1,986 | 45,634 |

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. Production from Bering Sea subarea not included. *The 2012 data reflect production through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN. December 20, 2012.

Table 8 shows the targeted and incidental catches of Pacific cod by trawl catcher/processors in the three Aleutian Islands management areas. Retained catches were highest (from about 10,000 to about 12,000 metric tons round weight) in the earliest years, from 2004 through 2007. Retained catches dropped in 2008, at the time the Amendment 80 rules came into effect, and were between about 4,000 metric tons and about 5,300 metric tons from 2008 through 2010. With the introduction of the interim final rule in 2011, retained catches fell further to about 1,600 metric tons in 2011; catches grew somewhat in 2012.

**Table 8 Trawl catcher/processor retained Pacific cod catch in the Aleutian Islands (Areas 541, 542, and 543)**

| Metric tons (round weight) | | | | | | | | | Aggregate Pacific cod in the AI |
|---|---|---|---|---|---|---|---|---|---|
| | Retained catch in Pacific cod target | | | | Pacific cod incidental catch | | | | |
| Year | 541 | 542 | 543 | Aggregate | Amack Tgt | Rockfish Tgt | Other | Aggregate | |
| 2004 | 5,469 | 1,515 | 2,923 | 9,906 | 2,069 | 129 | 0 | 2,199 | 12,105 |
| 2005 | 5,018 | 1,150 | 3,135 | 9,303 | 2,018 | 83 | 0 | 2,101 | 11,404 |
| 2006 | 4,877 | 877 | 2,662 | 8,417 | 1,431 | 67 | 0 | 1,498 | 9,915 |
| 2007 | 7,307 | 1,207 | 1,875 | 10,389 | 1,640 | S | C | 1,708 | 12,098 |
| 2008 | 2,653 | S | C | 4,107 | 978 | S | C | 1,164 | 5,271 |
| 2009 | S | C | C | 3,259 | 1,835 | 47 | 0 | 1,882 | 5,141 |
| 2010 | S | C | C | 2,390 | 1,479 | 70 | 17 | 1,566 | 3,956 |
| 2011 | C | C | C | C | 1,246 | 93 | 91 | 1,431 | 1,560 |
| 2012* | C | C | C | C | 1,043 | 66 | 21 | 1,129 | 2,225 |

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data reflect production through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN. December 20, 2012.

Table 9 summarizes trawl catcher/processor incidental catch of groundfish species other than Atka mackerel and Pacific cod (which were summarized in Table 7 and Table 8). Incidental catch is larger in the Atka mackerel target fishery, consisting of flatfish, pollock, rockfish, and other species; rockfish incidental catch is clearly the greatest in each year. Rockfish incidental catch increased in 2008, the same year the Amendment 80 rules were introduced. Rockfish incidental catch dropped from 2010 levels in 2011, when the interim final rule was introduced, but remained at Amendment 80 levels from earlier years. Incidental catch in the Pacific cod target fishery tends to be comparable to or less than incidental catch in the Atka mackerel targets, and, in contrast to rockfish incidental catch in the Atka mackerel target, decreases with the advent of the Amendment 80 rules.

**Table 9 Incidental catch of other groundfish species in the trawl catcher/processor Atka mackerel and Pacific target fisheries in the Aleutian Islands**

| Metric tons (round weight) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Atka mackerel target | | | | Pacific cod target | | | |
| Year | Flatfish | Pollock | Rockfish | Other bycatch | Flatfish | Pollock | Rockfish | Other bycatch |
| 2004 | 133 | 265 | 1,766 | 16 | 170 | 397 | 78 | 5 |
| 2005 | 294 | 250 | 2,249 | 48 | 250 | 368 | 119 | 1 |
| 2006 | 227 | 194 | 2,306 | 36 | 247 | 36 | 137 | 20 |
| 2007 | 237 | 95 | 2,600 | 26 | 288 | 142 | 43 | 13 |
| 2008 | 417 | 124 | 5,254 | 90 | 46 | 1 | 9 | 1 |
| 2009 | 316 | 343 | 5,790 | 80 | 147 | 21 | 46 | C |
| 2010 | 449 | 325 | 8,264 | 125 | 156 | 7 | 4 | C |
| 2011 | 488 | 243 | 5,224 | 94 | C | C | C | C |
| 2012* | 1,628 | 337 | 5,310 | 252 | C | C | C | C |

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" Indicates confidential data. Bycatch of Atka mackerel and Pacific cod is summarized in Table 7 and Table 8.
Source: AKFIN, December 20, 2012.

Table 10 summarizes trawl catcher/processor PSC from 2004 through early 2012. Since 2007, the Atka mackerel target fisheries have tended to take more of all three prohibited species categories, but especially of crab, than the Pacific cod target fisheries.

**Table 10 PSC in the trawl catcher/processor Atka mackerel and Pacific target fisheries in the Aleutian Islands**

| | Atka mackerel | | | Pacific cod | | |
|---|---|---|---|---|---|---|
| Year | Crab | Halibut | Salmon | Crab | Halibut | Salmon |
| 2004 | C | 32 | C | 13,339 | 24 | 617 |
| 2005 | C | 37 | 2,425 | 2,408 | 44 | 405 |
| 2006 | C | 54 | 587 | 2,396 | 37 | 545 |
| 2007 | 1,828 | 90 | 895 | 1,207 | 47 | 919 |
| 2008 | 23,011 | 56 | 650 | 399 | 3 | 429 |
| 2009 | 4,816 | 67 | 422 | 947 | 14 | 288 |
| 2010 | 3,994 | 55 | 1,026 | 607 | 3 | 156 |
| 2011 | 35,214 | 111 | 410 | C | C | C |
| 2012* | 8,150 | 144 | 651 | C | C | C |

Notes: PSC, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are partial year estimates. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data.
Source: AKFIN, December 20, 2012.

*Gross revenues*

Table 11 through Table 15 summarize estimates of gross first wholesale revenues from trawl catcher/processor Atka mackerel and Pacific cod fishing in the Aleutian Islands. Tables are included for revenues from retained targeted and incidental catches of Atka mackerel and Pacific cod, and for the revenues from catches of other species taken incidentally to the target fisheries for Atka mackerel and Pacific cod. Finally, Table 15, based on the preceding tables, summarizes all trawl catcher/processor gross revenues. In Table 11 through Table 15, revenues are shown in nominal dollars (that is in the dollars earned in the year of fishing) and in "real" dollars, which have been adjusted to factor out the estimated influence of inflation. These real dollar estimates have been adjusted to 2012 dollars.[15]

[15] Gross revenue estimates are reported in nominal (the actual dollar values they took in a given year) and in real (adjusted to make annual comparisons more meaningful by taking out the effect of inflation) forms. In this case, the real values were estimated by converting to "2012" dollars using the Personal Consumption Expenditures (PCE) implicit price deflator for June of each year. This effectively increased the values from earlier years in comparison to the most recent 2011 values. The PCE implicit price deflator was chosen because it captures changes in prices of goods and services purchased by households and non-profits serving households, and this allows an intuitively meaningful welfare comparison by the reader, and this is best accomplished with a broad index of prices reflecting the goods that individuals might actually consume. While other consumer price indices might have been used, the PCE price deflator has been the Federal Reserve Board's preferred index of inflation since 2000 ("Personal consumption expenditures price index," 2012). Any conversions to "real" dollars will be imprecise, and alternative indices would have produced somewhat different results.

**Table 11 Trawl catcher/processor Atka mackerel first wholesale gross revenues, 2004–2011 (millions of dollars)**

| | Nominal gross revenues | | | | Inflation Adjustment factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | | 541 | 542 | 543 | Total |
| 2004 | 2.5 | 15.8 | 9.0 | 27.3 | 1.19 | 3.0 | 18.8 | 10.7 | 32.5 |
| 2005 | 2.4 | 20.7 | 12.3 | 35.5 | 1.16 | 2.8 | 24.1 | 14.3 | 41.2 |
| 2006 | 3.0 | 21.6 | 7.9 | 32.5 | 1.12 | 3.4 | 24.3 | 8.8 | 36.6 |
| 2007 | 14.7 | 17.9 | 5.4 | 38.0 | 1.10 | 16.1 | 19.7 | 5.9 | 41.6 |
| 2008 | 13.5 | 13.4 | 10.1 | 36.9 | 1.05 | 14.2 | 14.1 | 10.7 | 38.9 |
| 2009 | 26.4 | 25.9 | 13.7 | 65.9 | 1.06 | 27.9 | 27.4 | 14.5 | 69.8 |
| 2010 | 28.2 | 25.8 | 18.9 | 72.9 | 1.04 | 29.4 | 26.9 | 19.7 | 76.0 |
| 2011 | 61.4 | 11.3 | 0.0 | 72.7 | 1.01 | 62.3 | 11.5 | 0.0 | 73.8 |

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

**Table 12 Trawl catcher/processor Pacific cod first wholesale gross revenues, 2004–2011 (millions of dollars)**

| | Nominal gross revenues | | | | Inflation Adjustment factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | | 541 | 542 | 543 | Total |
| 2004 | 6.7 | 3.3 | 3.1 | 13.1 | 1.19 | 7.9 | 3.9 | 3.7 | 15.6 |
| 2005 | 6.4 | 2.4 | 4.6 | 13.5 | 1.16 | 7.4 | 2.8 | 5.4 | 15.6 |
| 2006 | 8.3 | 2.7 | 4.3 | 15.3 | 1.12 | 9.4 | 3.0 | 4.8 | 17.2 |
| 2007 | 15.1 | 4.4 | 4.8 | 24.3 | 1.10 | 16.6 | 4.8 | 5.3 | 26.6 |
| 2008 | 5.9 | 1.1 | 3.8 | 10.8 | 1.05 | 6.2 | 1.2 | 4.0 | 11.4 |
| 2009 | 1.8 | 1.4 | 2.5 | 5.7 | 1.06 | 1.9 | 1.5 | 2.7 | 6.0 |
| 2010 | 2.8 | 2.1 | 0.9 | 5.7 | 1.04 | 2.9 | 2.2 | 0.9 | 6.0 |
| 2011 | 1.8 | S | C | 2.5 | 1.01 | 1.9 | S | C | 2.5 |

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

**Table 13 Trawl catcher/processor first wholesale gross revenues from incidental catches other than Atka mackerel or Pacific cod, 2004–2011 (millions of dollars)**

| | Nominal gross revenues | | | | Inflation Adjustment factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | | 541 | 542 | 543 | Total |
| 2004 | 0.4 | 0.8 | 0.5 | 1.7 | 1.19 | 0.5 | 0.9 | 0.6 | 2.0 |
| 2005 | 0.6 | 1.1 | 2.1 | 3.8 | 1.16 | 0.7 | 1.3 | 2.4 | 4.4 |
| 2006 | 0.7 | 1.8 | 1.0 | 3.4 | 1.12 | 0.7 | 2.0 | 1.1 | 3.8 |
| 2007 | 1.3 | 1.3 | 0.9 | 3.4 | 1.10 | 1.4 | 1.4 | 0.9 | 3.7 |
| 2008 | 0.8 | 1.7 | 1.7 | 4.2 | 1.05 | 0.8 | 1.8 | 1.8 | 4.4 |
| 2009 | 1.5 | 2.4 | 2.5 | 6.4 | 1.06 | 1.6 | 2.6 | 2.6 | 6.8 |
| 2010 | 3.0 | 3.3 | 3.5 | 9.7 | 1.04 | 3.1 | 3.4 | 3.6 | 10.2 |
| 2011 | 8.2 | 3.0 | 0.0 | 11.3 | 1.01 | 8.4 | 3.1 | 0.0 | 11.4 |

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

**Table 14 Aggregate trawl catcher/processor first wholesale gross revenues, 2004–2011 (millions of dollars)**

| | Nominal gross revenues | | | | Inflation Adjustment factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | | 541 | 542 | 543 | Total |
| 2004 | 9.6 | 19.9 | 12.6 | 42.1 | 1.19 | 11.4 | 23.7 | 14.9 | 50.0 |
| 2005 | 9.4 | 24.3 | 19.0 | 52.7 | 1.16 | 10.9 | 28.2 | 22.1 | 61.2 |
| 2006 | 12.0 | 26.1 | 13.2 | 51.3 | 1.12 | 13.5 | 29.3 | 14.8 | 57.7 |
| 2007 | 31.0 | 23.6 | 11.1 | 65.7 | 1.10 | 34.0 | 25.9 | 12.1 | 72.0 |
| 2008 | 20.1 | 16.2 | 15.7 | 51.9 | 1.05 | 21.2 | 17.0 | 16.5 | 54.7 |
| 2009 | 29.6 | 29.7 | 18.7 | 78.0 | 1.06 | 31.4 | 31.4 | 19.8 | 82.6 |
| 2010 | 33.9 | 31.2 | 23.3 | 88.4 | 1.04 | 35.4 | 32.5 | 24.3 | 92.1 |
| 2011 | 71.4 | S | C | 86.5 | 1.01 | 72.5 | S | C | 87.8 |

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

**Table 15 Summary of aggregate trawl catcher/processor first wholesale gross revenues by source, 2004–2011 (millions of dollars)**

| | Nominal gross revenues | | | | Inflation Adjustment factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Atka mackerel | Pacific cod | Other incidental catches | Total | | Atka mackerel | Pacific cod | Other incidental catches | Total |
| 2004 | 27.3 | 13.1 | 1.7 | 42.1 | 1.19 | 32.5 | 15.6 | 2.0 | 50.0 |
| 2005 | 35.5 | 13.5 | 3.8 | 52.7 | 1.16 | 41.2 | 15.6 | 4.4 | 61.2 |
| 2006 | 32.5 | 15.3 | 3.4 | 51.3 | 1.12 | 36.6 | 17.2 | 3.8 | 57.7 |
| 2007 | 38.0 | 24.3 | 3.4 | 65.7 | 1.10 | 41.6 | 26.6 | 3.7 | 72.0 |
| 2008 | 36.9 | 10.8 | 4.2 | 51.9 | 1.05 | 38.9 | 11.4 | 4.4 | 54.7 |
| 2009 | 65.9 | 5.7 | 6.4 | 78.0 | 1.06 | 69.8 | 6.0 | 6.8 | 82.6 |
| 2010 | 72.9 | 5.7 | 9.7 | 88.4 | 1.04 | 76.0 | 6.0 | 10.2 | 92.1 |
| 2011 | 72.7 | S | C | 86.5 | 1.01 | 73.8 | S | C | 87.8 |

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

As shown in Table 2 and Table 3, some catcher/processors act as motherships, receiving deliveries of Atka mackerel and of Pacific cod from trawl catcher vessels. The tables show that small numbers of both catcher vessels and catcher/processors are involved. These small numbers make it impossible to report detailed information on these product flows.

In this analysis, Atka mackerel mothership deliveries are treated as catcher/processor production and included in the reports of catcher/processor retained catch and in catcher/processor first wholesale gross revenues. As shown in Table 2, no more than one trawl catcher/processor received deliveries of Atka mackerel in any year. There were no deliveries before 2007; since then, the number of catcher vessels making deliveries gradually grew, from 1 in 2007 to 3 in 2011. As noted above, the gross ex-vessel revenues associated with these deliveries cannot be reported; however, they did grow, along with the number of catcher vessels making deliveries, over this period (Fey, personal communication, July 13, 2012).[16]

[16] Fey, Michael. Data manager, Alaska Fisheries Information Network, Anchorage, Alaska.

In this analysis, Pacific cod mothership deliveries are combined with shoreside deliveries for reporting purposes. This is again done to preserve the confidentiality of the data. As shown in Table 3, from one to three catcher/processors received Pacific cod deliveries in every year. Deliveries to three catcher/processors were only made in one year, 2008, and these amounted to about $8.2 million in that year. In general, trawl catcher/processor revenues from this source were higher in the second half of the period than in the first. During the years 2004 through 2011, average first wholesale gross revenues were $6.7 million, and median revenues were $7.1 million. (Fey, personal communication, July 13, 2012)

*Aleutian Islands revenues as a proportion of revenues from all sources*

Table 16 summarizes gross earnings information for the trawl catcher/processor sector, and reports Atka mackerel and Pacific cod gross earnings as a proportion of the sector's gross earnings from all other fishing activities in Alaska, and on the Pacific coast. Revenues from Atka mackerel range between about 16 percent and about 40 percent of the sector's earnings from all sources, while revenues from Pacific cod range between about 1 percent and about 10 percent of the sector's earnings from all sources. Overall sector percentages may obscure heavier dependence by some vessels (as well as lesser dependence by others). To the extent that these vessels have non-fishing revenues, or revenues from activities other than operating as a mothership for other groundfish fishing vessels, these percentages may overstate the importance of Aleutian Islands Atka mackerel and Pacific cod fisheries to the revenue pictures of these vessels, for example, if a vessel is used to tender salmon at some time in the year (as, for example, the F/V *Katie Ann* was in earlier years) (NMFS 2010b; page 10-16). These latter revenue sources are generally believed to be small.

**Table 16 Proportion of trawl catcher/processor gross revenues earned from fishing for Atka mackerel and Pacific cod in the Aleutian Islands, 2004–2011 (revenues reported in millions of dollars)**

| | Atka mackerel | | Pacific cod | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Targeted and incidental Atka mackerel in AI | Incidental catch of other groundfish in the Atka mackerel Target in AI (excluding Pacific cod) | Targeted and incidental Pacific cod in AI | Incidental catch of other groundfish in the Pacific cod Target in AI (excluding Atka mackerel | Total groundfish fishing gross revenue | Other Alaska fishing gross revenues | Other West Coast gross revenues | Percent of gross revenues from AI Atka mackerel | Percent of gross revenues from AI Pacific cod |
| 2004 | 27.3 | 1.3 | 13.1 | 0.4 | 150.4 | 12.6 | 0.0 | 17.5% | 8.3% |
| 2005 | 35.5 | 3.1 | 13.5 | 0.6 | 184.7 | 24.4 | 0.0 | 18.5% | 6.7% |
| 2006 | 32.5 | 2.9 | 15.3 | 0.5 | 206.7 | 19.4 | 0.0 | 15.5% | 7.0% |
| 2007 | 38 | 2.9 | 24.3 | 0.5 | 234.5 | 7.7 | 0.0 | 16.9% | 10.2% |
| 2008 | 36.9 | 4.1 | 10.8 | 0 | 205.2 | 0.5 | 0.0 | 19.9% | 5.3% |
| 2009 | 65.9 | 6.3 | 5.7 | 0.1 | 185.5 | 0.3 | 0.0 | 38.9% | 3.1% |
| 2010 | 72.9 | 9.6 | 5.7 | 0.1 | 207.5 | 0.3 | 0.0 | 39.7% | 2.8% |
| 2011 | 72.7 | 11.3 | 2.5 | 0 | 205.8 | 1.8 | 0.0 | 40.5% | 1.2% |

Notes: Gross revenues from retained harvests of commercially caught species, valued at first wholesale value (unless the vessel operated as a catcher vessel in a specific fishery). Aleutian Islands gross revenues from Federal fisheries and from State of Alaska parallel fisheries.
Shaded year is that during which the interim final rule was in effect.
Source: AKFIN January 7, 2013. AKR calculations.

*Crew*

Table 17 shows estimates of the crew sizes, based on Weekly Processor Report (WPR) and Alaska fish ticket records, for vessels in the four different sectors defined for analysis in this action. The average of

the mean annual crew sizes on a trawl catcher/processor, over the years 2004 to 2012, was about 52 persons.[17]

Four years of EDR data (2008 through 2011) are now available for the Amendment 80 fleet. (Haynie, personal communication, July 10, 2012).[18] The seven Amendment 80 trawlers that form the core of the Atka mackerel fishery, and which also target Pacific cod, had average crew sizes that varied across the years from a low of 47.6 positions in 2009, to a high of 53.3 positions in 2008; the average for the four years was 49.8 positions. This includes an average of 8 deck crew, 33 processing crew, and 8.8 others, including officers, engineers, and cooks. The median number of employees that worked on a vessel during a year was 158.8.[19] The number of employees exceeds the number of positions, because of turnover and crew rotations during the year. On the basis of this, the seven Amendment 80 catcher/processors are estimated to use a total 349 crew positions during the Atka mackerel and Pacific cod fisheries.

**Table 17 Estimated crew sizes for trawl and non-trawl catcher/processors and catcher vessels operating in the Aleutian Islands Atka mackerel and Pacific cod fisheries**

| | Average crew size estimated from weekly observations | | Average crew size estimated over landings | |
|---|---|---|---|---|
| Year | Trawl C/P | Non-trawl C/P | Trawl CV | Non-trawl CV |
| 2004 | 47.73 | 20.77 | NA | NA |
| 2005 | 49.68 | 22.07 | NA | NA |
| 2006 | 50.71 | 17.74 | NA | NA |
| 2007 | 50.61 | 19.61 | 4.62 | 3.69 |
| 2008 | 54.16 | 20.42 | 4.65 | 4.55 |
| 2009 | 55.59 | 19.29 | 4.37 | 3.44 |
| 2010 | 53.82 | 19.25 | 4.54 | 4.14 |
| 2011 | 51.75 | 19.87 | 4.38 | 3.65 |
| 2012 | 53.83 | 18.87 | NA | NA |

Notes: Catcher/processor crew sizes are averages of crew from WPR records for weeks in which catcher/processors retained Atka mackerel or Pacific cod in the Aleutian Islands with the indicated gear type. Catcher vessel crew sizes are averages associated with landings of Pacific cod reported on Alaska fish ticket records. Years during which the interim final rule was in effect have been shaded. *The 2012 data are incomplete. Source: AKFIN, June 25, 2012.

The EDR data provides information on crew compensation, as well as on the numbers of crew members, for the period 2008 to 2011. The average annual aggregate deck crew compensation on an Amendment 80 vessel targeting Atka mackerel and Pacific cod in the Aleutian Islands was about $1.1 million during these years, the average processing crew compensation was about $2.4 million, and the average for other employees was about $1.4 million. This compensation is annual payments by the vessel's owners, and covers payments for activity in fisheries other than the Atka mackerel and Pacific cod fisheries. These average labor expenses came to a total of about $4.9 million.[20] In addition to these expenses, identified as labor expenses on the survey, the crew would have received some portion of a $700,000 category described as "Employee," which includes recruitment, travel, and benefits. Focusing only on the expenses identified as labor, the information about the number of employees and compensation implies

[17] The crew size information in this table is used in later sections on other fleet sectors.

[18] Alan Haynie. Economist. National Marine Fisheries Service, Alaska Fisheries Science Center. Supplied data.

[19] Median was used for number of employees to offset potential undue influence of an outlying data point which is currently being verified.

[20] Medians used to offset potential undue influence of an outlying data point which is currently being verified.

that the average person would have earned about $30,900, while the average position would have received about $98,400, in 2008.[21]

In 2010, a representative of American Seafood Co. estimated that the F/V *Katie Ann* carried a crew of about 100 persons, and that there were no crew rotations during the winter-spring Pacific cod season (Jacobs, personal communication, August 24, 2010).[22] An examination of daily processor reports for the spring-winter season of 2010 shows the reported crew sizes ranging between 94 and 96 (NMFS AKR estimate). For the purposes of this discussion, the crew size is estimated to be 96 persons.

*Costs and net returns*

Table 18 summarizes data on total gross revenues from all fisheries (from reported Commercial Operator's Annual Report [COAR] values) and reported operating costs for different cost categories in all fisheries (from the EDR) for Amendment 80 trawl catcher/processors processing Atka mackerel in the Aleutian Islands. Some of these revenues come from harvesting and processing Pacific cod in the Aleutian Islands.

**Table 18 Estimated aggregate revenues and costs for the seven Amendment 80 trawl catcher/processors targeting Atka mackerel consistently in recent years (millions of dollars)**

| | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|
| Gross revenues | 137.6 | 128.4 | 152.2 | 195.9 |
| Administration | 9.8 | 8.4 | 6.1 | 19.9 |
| Co-op | 0.2 | 0.2 | 0.3 | 0.4 |
| Employee | 4.5 | 4.1 | 4.3 | 6.8 |
| Fish gear | 3.3 | 4.4 | 4.1 | 5.0 |
| Fish tax | 1.2 | 1.1 | 0.5 | 0.7 |
| Food | 2.9 | 2.8 | 2.6 | 3.0 |
| Freight gear | 0.4 | 0.6 | 0.8 | 0.8 |
| Freight sales | 2.2 | 6.6 | 7.5 | 7.4 |
| Fuel | 18.0 | 14.0 | 15.8 | 21.1 |
| Insurance | 4.9 | 6.1 | 5.5 | 8.8 |
| Labor crew | 6.0 | 14.2 | 5.2 | 5.8 |
| Labor other | 7.7 | 7.6 | 10.7 | 11.9 |
| Labor proc | 17.9 | 10.4 | 18.3 | 20.2 |
| Lube | 1.3 | 0.8 | 3.3 | 6.4 |
| Observer | 1.4 | 1.3 | 1.3 | 1.3 |
| Packaging | 1.9 | 1.2 | 1.6 | 2.2 |
| Raw fish | 3.3 | 0.0 | 0.0 | 1.6 |
| Repairs and maintenance | 12.0 | 14.8 | 22.2 | 13.7 |
| Vessel lease | 0.0 | 0.0 | 0.0 | 0.0 |

Source: AFSC, July and August 2012. Revenue estimates from AKFIN COAR data, cost estimates are from EDR supplied by AFSC.

[21] Average per person equals labor expenses divided by median number of employees during a year (158.8); average per position equals labor expenses divided by average number of positions (49.8).

[22] Jan Jacobs. Director of Government Affairs, American Seafoods Company. Seattle, Washington.

### 1.2.2 Non-trawl catcher/processors

This sector includes non-trawl (hook-and-line and pot gears) catcher/processors targeting Pacific cod in the Aleutian Islands. Hook-and-line and pot gears have been grouped for analysis because the interim final rule groups non-trawl gears for regulatory purposes, and because the small numbers of pot vessels would create confidentiality issues if these were treated as a separate sector. The Council's recent report "Fishing Fleet Profiles" provides descriptions of the non-trawl catcher/processors participating in the Bering Sea and Aleutian Islands fisheries (NPFMC, 2012c).

*Numbers of vessels*

Non-trawl catcher/processors target Pacific cod in the Aleutian Islands. Table 19 summarizes estimates of the numbers of hook-and-line and pot catcher/processors with retained targeted Pacific cod from the three Aleutian Islands management areas. Unlike the tables with trawl catcher/processor counts, this table only counts vessels targeting Pacific cod and does not include non-trawl catcher/processors merely retaining incidental catches of Pacific cod. Table 19 shows that the number of hook-and-line vessels operating in the Aleutian Islands management areas ranged from four to 11 between 2004 and 2011 (2012 data are incomplete); the number of pot vessels ranged from none to four. Aleutian Islands Pacific cod activity, by vessels using each gear type, declined in 2011 and 2012.

**Table 19 Numbers of non-trawl catcher/processor vessels with retained Pacific cod catches in the Aleutian Islands, 2004–2012**

| | Hook-and-line gear | | | | Pot gear | | | | Unique vessels |
|---|---|---|---|---|---|---|---|---|---|
| Year | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique vessels) | |
| 2004 | 6 | 2 | 3 | 6 | 0 | 0 | 0 | 0 | 6 |
| 2005 | 4 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 4 |
| 2006 | 10 | 1 | 1 | 11 | 1 | 0 | 0 | 1 | 12 |
| 2007 | 5 | 3 | 3 | 7 | 0 | 1 | 0 | 1 | 8 |
| 2008 | 7 | 7 | 3 | 9 | 2 | 4 | 1 | 4 | 13 |
| 2009 | 6 | 5 | 2 | 6 | 2 | 3 | 1 | 3 | 9 |
| 2010 | 10 | 7 | 4 | 10 | 2 | 2 | 1 | 3 | 13 |
| 2011 | 6 | 2 | 0 | 6 | 1 | 1 | 0 | 1 | 7 |
| 2012* | 4 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 4 |

Notes: Federally licensed non-trawl catcher/processor vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543. Shaded years are those during which the interim final rule was in effect.
*2012 is a partial year; data shown is through December 8, 2012.
Source: AKFIN, December 18, 2012.

*Hook-and-line (Freezer longline) vessels*

The primary target species in the freezer longline fisheries are Pacific cod, sablefish (black cod), and Greenland turbot. In addition, longline vessels also have incidental harvests of species such as skates, rockfish, arrowtooth flounder, and pollock. Retention of non-target species depends on fishing regulations, such as increased retention/increased utilization, and maximum retainable amounts (MRA), as well as market price and the pace of fishing. (NMFS, 2012: 15)

At the end of 2011, 35 licenses carried Aleutian Islands catcher/processor hook-and-line Pacific cod endorsements. There were 31 licensed vessels (three vessels carried two license limitation program

[LLP] licenses, and one LLP was not attached to a vessel). All of these licenses carried similar endorsements for the Bering Sea. Sixteen carried similar endorsements for the Western Gulf of Alaska, and 21 carried similar endorsements for the Central Gulf. Three of these licenses carried Aleutian Islands and Bering Sea pot catcher/processor endorsements and one carried a Western Gulf pot catcher/processor endorsement. (AKR RAM 2011 LLP file).[23]

Since 2006, most of the persons holding LLPs endorsed for freezer longline catcher/processors in the BSAI have been members of the Freezer Longliner Conservation Cooperative (FLCC). In June 2010, the remaining LLP holders joined the cooperative, so that with the start of the 2010 B-season on August 15, all holders of LLPs authorizing the use of these vessels were members of the cooperative.

Each year, an allocation is made to the freezer longline catcher/processor sector through the annual harvest specifications process. Cooperative members each receive a share of the quota for harvest; shares are issued in proportion to historical fishing activity with the LLP. Cooperative members are free to exchange their quota shares among themselves, and to stack shares on individual vessels. Compliance with the agreement is monitored by SeaState, Inc., and the contract signed by the members imposes heavy financial penalties for non-compliance. In the past, even without 100 percent membership, the cooperative has been able to organize GOA harvests, so as to make reliable commitments that members would reach halibut PSC avoidance goals. NMFS has relied on these commitments to open fisheries that would not otherwise have been opened. Cooperative efforts have led to the withdrawal of vessels from the fishery. (NMFS 2010b: 10-23)

A harvest cooperative running an individual quota program, such as the FLCC, creates the conditions for reorganization of fishing activity. Individual operations now have effectively guaranteed harvest quotas each year, and have the opportunity to fish these in the way that they find most profitable. While it is difficult to project exactly how the fishery will evolve, given the technology used in the freezer longline Pacific cod sector, reductions in the number of active vessels, reductions in the speed of harvest, improvements in product quality, or a lengthening of the fishing season are all possible. Harvest rates declined, the season lengthened, and fewer vessels were actively participating, when the 2011 A-season is compared to the 2010 A-season. Sector profits are likely to increase and the fleet may be able to redeploy some fishing effort from the rationalized Pacific cod fishery into other targets, such as sablefish and Greenland turbot, all else equal. The vessels and techniques that were best adapted for a competitive fishery may not be the vessels best adapted for a rationalized fishery, which may lead to a replacement of segments of the fleet. (NMFS, 2012: 30)

Before 2011, the vessels in this sector generally began fishing for Pacific cod on January 1 and continued until the initial seasonal allocation was fully harvested in February, March, or April. They subsequently returned to fishing Pacific cod from August 15, when the next halibut PSC allowance became available, through November or December. In 2011, the A-season remained open until June 10, possibly because the introduction of the voluntary cooperative slowed the harvest rate and spread out effort. Also in 2011, the harvest specifications for halibut PSC in this fleet were modified, to release the halibut PSC limit on June 10, as well as August 15. In 2011 and 2012, the fleet operated during more of the year than in the past. (AKR In-season managers, personal communication, April 18, 2013)

In 2010, Congress passed and the President signed the "Longline Catcher Processor Subsector Single Fishery Cooperative Act." This legislation requires the Secretary of Commerce to approve a single fishery cooperative for the longline catcher/processor subsector in the BSAI no more than two years after the receipt of a request from 80 percent of the licenses issued for that subsector. The legislation authorizes the cooperative to harvest an allocation made to it, provide for a subsector "non-cooperative

[23] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 31, 2012.

limited access fishery," provides for an allocation between cooperative and non-cooperative fisheries, and authorizes measures to control a shift by the rationalized fleet into GOA fisheries. The private cooperative currently in place was not set up under the auspices of this act. (NMFS, 2012: 33)

In October 2012, the Council took final action on an amendment to change the maximum length overall (MLOA) on LLP licenses with Pacific cod hook-and-line catcher/processor endorsements for the Bering Sea or Aleutian Islands. The MLOA on all LLP licenses would be increased to 220 feet. The Council also affirmed that the large vessel capacity restrictions of the AFA would no longer apply to freezer-longliners, given the conservation and management measures in place in the BSAI Pacific cod fishery, including the direct sector allocation and limited numbers of fishery participants. An option was included to allow qualifying LLP license holders with pot cod endorsements to choose either to (a) receive the larger MLOA and give up their pot cod endorsements, or (b) retain the original MLOA and keep the pot cod endorsement. Vessel owners have 36 months to make this one time decision. (NPFMC, 2012f)

New investments are being made in the hook-and-line catcher/processor fleet (Stewart, 2013). The Petersburg-based Alaska Longline Company is replacing two of its existing five hook-and-line catcher/processors with a new 136-foot freezer longliner constructed by the Ketchikan-based Alaska Ship & Drydock company (Bowlen, 2012). Alaska Leader Fisheries has contracted with J.M. Martinac Shipbuilding of Tacoma, to build the new 184-foot F/V *Northern Leader*, for delivery in 2013, as well (Singleton & Delaney, 2012). Blue North Fisheries has signed a contract with Dakota Creek Industries to construct a new freezer longliner, as well. (Stewart, 2013)

*Pot catcher/processor vessels*

The Council's recent report, "Fishing Fleet Profiles" provides descriptions of the pot catcher/processor fleet participating in the Bering Sea and Aleutian Islands fisheries (NPFMC, 2012c). Pot catcher/processor vessels target Pacific cod with pots usually set on single lines. Pot catcher/processors are allocated 1.5 percent of the BSAI Pacific cod TAC. As with other fleets, the pot catcher/processor Pacific cod allocation is a BSAI-wide allocation and may be caught in the Bering Sea and/or in the Aleutian Islands. To fish for Pacific cod with pot gear in the Aleutian Islands, a vessel must have an Aleutian Islands sub-area endorsement on its LLP, as well as a non-trawl endorsement, and a Pacific cod pot gear endorsement if the vessel is 60 feet or greater, length overall. Vessels active in the fishery may also fish for halibut and sablefish, crab, or target Pacific cod for use as crab bait.

In 2011, five distinct vessels carried five distinct licenses to fish for Pacific cod in the Aleutian Islands as catcher/processors with pot gear. These licenses also carried five endorsements to fish as catcher/processors with pot gear in the Bering Sea, four endorsements to fish with hook-and-line gear in the Aleutian Islands (three as catcher/processors and one as a catcher vessel), four endorsements to fish with hook-and-line gear in the Bering Sea (three as catcher/processors and one as a catcher vessel), three endorsements to fish with hook-and-line gear in the central and/or western Gulf of Alaska, and one to fish with pot gear in the western Gulf (all as catcher/processors). (AKR RAM 2011 LLP file).[24]

*Retained catches and processed deliveries*

Table 20 provides estimates of the catcher/processor non-trawl retained catches of Aleutian Islands Pacific cod from 2004 through 2012 (including targeted Pacific cod, and incidental catch of Pacific cod in other targets). Aggregate retained catches (targeted and incidental), shown in Table 20, generally rose from 2004 through 2005 levels through 2010, and then declined in 2011, at the start of the effective

[24] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 31, 2012.

period of the interim final rule. Catches rose somewhat in 2012 from 2011 levels, but did not return to the levels observed in the years just prior to the interim final rule.

**Table 20 Estimated non-trawl catcher/processor retained catches of Aleutian Islands Pacific cod, 2004–2012**

| | Retained catch in AI Pacific cod targets | | | | Aggregate Pacific cod in the AI |
|---|---|---|---|---|---|
| Year | 541 | 542 | 543 | Aggregate | |
| 2004 | 1,557 | C | S | 2,923 | 2,937 |
| 2005 | S | C | C | 2,780 | 2,794 |
| 2006 | S | C | C | 2,986 | 3,056 |
| 2007 | 1,760 | 706 | 1,660 | 4,125 | 4,160 |
| 2008 | 1,897 | 2,510 | 2,308 | 6,715 | 6,723 |
| 2009 | 1,401 | 1,923 | 2,741 | 6,066 | 6,090 |
| 2010 | 2,659 | 2,407 | 3,163 | 8,228 | 8,231 |
| 2011 | S | C | 0 | 1,150 | 1,161 |
| 2012* | S | C | 0 | 3,137 | 3,140 |

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are partial year production. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data. Source: AKFIN, December 20, 2012.

Table 21 summarizes information about the incidental catch of other groundfish species and PSC in the non-trawl Aleutian Islands Pacific cod fishery. Incidental species were a diverse group; PSC was predominately crab and halibut.

**Table 21 Incidental catch of other groundfish species and PSC in the non-trawl catcher/processor Pacific target fisheries in the Aleutian Islands (metric tons)**

| | Incidental catch | | | | PSC | | |
|---|---|---|---|---|---|---|---|
| Year | Flatfish | Rockfish | Sablefish | Other bycatch | Crab | Halibut | Salmon |
| 2004 | 1 | 1 | C | 161 | 8,002 | 31 | 0 |
| 2005 | 6 | C | C | 51 | 339 | 22 | C |
| 2006 | 23 | 8 | 31 | 89 | 2,682 | 25 | 0 |
| 2007 | 53 | 39 | C | 310 | 17,156 | 78 | 0 |
| 2008 | 12 | 36 | 19 | 211 | 247,478 | 68 | C |
| 2009 | C | 41 | C | 258 | 167,236 | 70 | 0 |
| 2010 | 22 | 124 | 28 | 222 | 62,591 | 64 | 0 |
| 2011 | 4 | 6 | 6 | 54 | 3,191 | 19 | C |
| 2012* | 17 | 36 | 10 | 88 | 156 | 18 | 0 |

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data.
Source: AKFIN, December 20, 2012.

*Gross revenues*

Table 22 summarizes the fleet's first wholesale gross revenues from the Aleutian Islands Pacific cod fishery, including the value of the Pacific cod, and of the incidental groundfish catch in that fishery. Estimates are provided in both nominal dollars, and in real, inflation adjusted, 2012, dollars. During the baseline years, and focusing on the real dollar values, first wholesale gross revenues are estimated to have

ranged between about $4.6 million (in 2011) and about $19.2 million (in 2010). Revenues had been generally rising since 2004, reaching a maximum in 2010, and then dropping to their lowest levels in the following year, the first during which the interim final rule was in effect.

**Table 22 Estimated non-trawl catcher/processor first wholesale gross revenues from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011 (millions of dollars)**

| | Nominal gross revenues | | | | Inflation Adjustment factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | | 541 | 542 | 543 | Total |
| 2004 | 1.7 | C | S | 3.8 | 1.19 | 2.0 | C | S | 4.6 |
| 2005 | S | C | C | 4.3 | 1.16 | S | C | S | 5.0 |
| 2006 | S | C | C | 7.3 | 1.12 | S | C | C | 8.2 |
| 2007 | 4.4 | 1.8 | 3.6 | 9.8 | 1.10 | 4.9 | 1.9 | 3.9 | 10.7 |
| 2008 | 4.5 | 6.3 | 4.7 | 15.5 | 1.05 | 4.7 | 6.7 | 5.0 | 16.3 |
| 2009 | 1.9 | 3.5 | 5.6 | 11.0 | 1.06 | 2.0 | 3.7 | 6.0 | 11.7 |
| 2010 | 5.3 | 5.4 | 7.8 | 18.5 | 1.04 | 5.5 | 5.6 | 8.1 | 19.2 |
| 2011 | S | C | 0.0 | 2.4 | 1.01 | S | C | 0.0 | 2.4 |

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for May each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

*Aleutian Islands revenues as a proportion of all revenues*

Table 23 shows estimates of the annual percentage of their revenues that the non-trawl catcher/processors operating in the Aleutian Islands Pacific cod fisheries have earned from their harvests in that fishery for the years 2004 through 2011. These percentages range from about 6 percent to about 39 percent. The percentages tended to rise from about 2006, and reached their highest level in 2010. During 2011, the first during which the interim final rule was in effect, they fell to their lowest level during the period.

**Table 23 Proportion of fixed-gear catcher/processor revenues earned from fishing for Pacific cod in the Aleutian Islands, 2004–2011 (gross revenues in millions of dollars)**

| Year | Targeted Pacific cod in AI | Total Groundfish revenues | Other Alaska revenues | Other West Coast revenues | Percent of revenues from AI Pacific cod |
|---|---|---|---|---|---|
| 2004 | 3.8 | 31.0 | 1.4 | 0.0 | 11.7% |
| 2005 | 4.3 | 23.4 | 2.3 | 0.0 | 16.7% |
| 2006 | 7.3 | 68.0 | 3.6 | 0.0 | 10.2% |
| 2007 | 9.8 | 50.1 | 0.0 | 0.0 | 19.6% |
| 2008 | 15.5 | 58.8 | 6.4 | 0.0 | 23.8% |
| 2009 | 11.0 | 34.2 | 5.3 | 0.0 | 27.8% |
| 2010 | 18.5 | 43.0 | 4.9 | 0.0 | 38.6% |
| 2011 | 2.4 | 31.1 | 7.0 | 0.0 | 6.3% |

Notes: Gross revenues from retained harvests of commercially caught species, valued at first wholesale value (unless the vessel operated as a catcher vessel in a specific fishery). Non-trawl includes hook-and-line and pot. Only includes vessels targeting Pacific cod in the three Aleutian Islands management areas in the year shown. Aleutian Islands revenues from Federal fisheries and from State of Alaska parallel fisheries. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, December 20, 2012.

As discussed on page 143, freezer-longliner representatives indicate that they receive a higher price for the head-and-gut product produced in the Aleutian Islands. While NMFS was unable to find strong statistical evidence for an Aleutian Islands price premium, the statistical test was weak, and this analysis assumes that this regional price variation exists, although NMFS is unable to determine its size. This implies that the sector's Aleutian Islands gross revenues, and changes in those gross revenues, are underestimated to an unknown extent, in absolute terms, and relative to revenues from outside the Aleutian Islands.

*Crew sizes*

Table 17 shows estimates of the crew sizes, based on WPR and Alaska fish ticket records, for vessels in the four different fleet categories defined for analysis in this action. The average estimated crew size on a non-trawl catcher/processor, over the years 2004 to 2012, was 19.8 persons.

### 1.2.3 Trawl catcher vessels

This sector includes trawl catcher vessels targeting Pacific cod in the Aleutian Islands, whether they deliver the retained Pacific cod to shoreside plants, shoreside floating processors, or to catcher/processors operating in the Aleutian Islands acting as motherships. The Council's recent report "Fishing Fleet Profiles" provides descriptions of the trawl catcher vessels participating in the Bering Sea and Aleutian Islands fisheries (NPFMC, 2012c).

*Numbers of vessels*

Table 24 provides estimates of the numbers of trawl catcher vessels retaining targeted Pacific cod in the three Aleutian Islands management areas and making deliveries to shoreside plants. Table 3 reports the numbers of trawl catcher vessels making deliveries to catcher/processors acting as motherships.

**Table 24 Numbers of trawl catcher vessels targeting Pacific cod and making shoreside deliveries**

| | Counts of trawl catcher vessels making deliveries | | | | Counts of shoreside plants receiving deliveries | | | |
|---|---|---|---|---|---|---|---|---|
| Year | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique vessels) |
| 2004 | 18 | 14 | 0 | 18 | 4 | 2 | 0 | 4 |
| 2005 | 14 | 5 | 0 | 14 | 4 | 2 | 0 | 4 |
| 2006 | 12 | 10 | 0 | 16 | 4 | 2 | 0 | 4 |
| 2007 | 23 | 20 | 0 | 31 | 7 | 3 | 0 | 7 |
| 2008 | 24 | 6 | 0 | 26 | 7 | 2 | 0 | 7 |
| 2009 | 19 | 11 | 0 | 22 | 4 | 1 | 0 | 4 |
| 2010 | 22 | 5 | 0 | 22 | 4 | 2 | 0 | 4 |
| 2011 | 6 | 0 | 0 | 6 | 1 | 0 | 0 | 1 |
| 2012* | 10 | 0 | 0 | 10 | NA | NA | NA | NA |

Notes: Federally licensed trawl catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the entities to which they delivered. The 2012 data are partial year data, through December 8, 2012. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

*Description of this sector*

Trawl catcher vessels active in the Aleutian Islands fish against the BSAI trawl catcher vessel allocation of Pacific cod. This allocation is 22.1 percent of the total BSAI Pacific cod TAC. Many of the vessels that participate in the directed fishery are AFA trawl catcher vessels. These vessels have a sideboard limit of 86.09 percent of the seasonal allocations of trawl catcher vessel Pacific cod. Between 2004 and 2011, the AFA trawl catcher vessels harvested an average of 65 percent of the total BSAI trawl catcher vessel Pacific cod harvest. However, AFA trawl catcher vessels harvested an average of 85 percent of the total amount of Pacific cod caught by trawl catcher vessels in the Aleutian Islands. The remaining amount of Pacific cod was harvested by unaffiliated trawl catcher vessels.

Catcher vessels deliver their products to several outlets. These include catcher/processors acting as motherships (such as the F/V *Katie Ann)*, shoreside processors, or floating processors. Within Area 541, Adak and Atka have shoreside processing plants. Atka Pride Seafoods in Atka has not processed Pacific cod in the past. The plant at Adak was very active processing Pacific cod, but the firm operating this plant filed for bankruptcy in late 2009; processing activity was renewed in 2011 and 2012 when Icicle Seafoods leased the processing plant. Relatively small amounts of catcher vessel product have been delivered to several other ports.

Floating processors are vessels that anchor within State waters and accept deliveries. For example, at times Trident's vessel, the M/V *Independence* (353 feet long, with a crew of about 235 when processing Pacific cod) has processed Pacific cod in the winter-spring season. The M/V *Independence* could buy from as many as 20 catcher vessels, independents as well as Trident boats. These were primarily trawlers, but there were some non-trawl vessels as well. Aside from providing a market for catcher vessels, the M/V *Independence* interacted with local communities through its need for logistical support and through State of Alaska fish taxes (Soper, McManus, Scheibert, personal communication).[25]

Catcher vessels fish in federally managed fisheries under the authority of licenses issued under a license limitation program. Vessel licenses carry endorsements, authorizing fishing in different areas with trawl and non-trawl gears. Forty-three catcher vessels have LLP endorsements to trawl in the Aleutian Islands; 12 of these also have endorsements allowing them to use non-trawl (hook-and-line or pot) gear in the Aleutian Islands. Many of these vessels have endorsements allowing them to fish in other management areas as well. Forty-two have endorsements to trawl in the Bering Sea; 11 have endorsements to fish with non-trawl gear in the Bering Sea. Five have endorsements to trawl in the Western Gulf, while 10 have endorsements to use non-trawl gear in the Western Gulf. Four have endorsements to use trawl gear in the Central Gulf, while seven have endorsements to use non-trawl gear in the Central Gulf. Only one has an endorsement to fish in the Southeastern Gulf. Only one of these vessels had an endorsement to fish for Pacific cod; this vessel's endorsements allowed it to fish for Pacific cod in the Aleutian Islands and Central Gulf with hook-and-line gear. (AKR RAM 2011 LLP file)

*Retained catches*

Table 25 summarizes the volumes of retained Pacific cod harvested by trawl catcher vessels in the Aleutian Islands from 2004 through 2012. The table shows the volumes taken in Pacific cod target fisheries, and the volumes taken as incidental catch in other target fisheries.

[25] Paul Soper, Vic Scheibert, and Jim McManus, officials of the Trident Company. Seattle, WA. Personal communication, September 27, 2010.

**Table 25 Trawl catcher vessel Pacific cod production in the Aleutian Islands**

| Metric tons (round weight) | | | | | | | | | Aggregate Pacific cod in the AI |
|---|---|---|---|---|---|---|---|---|---|
| | Retained catch in Pacific cod target | | | | Retained Pacific cod by-catch | | | | |
| Year | 541 | 542 | 543 | Aggregate | Amack Tgt | Rockfish Tgt | Other | Aggregate | |
| 2004 | 10,989 | 2,454 | 0 | 13,443 | 0 | 0 | 0 | 0 | 13,443 |
| 2005 | 6,693 | 1,280 | 0 | 7,973 | 0 | 0 | 0 | 0 | 7,973 |
| 2006 | 5,085 | S | C | 6,907 | 0 | 0 | C | C | 6,907 |
| 2007 | 11,016 | S | C | 13,130 | C | C | C | C | 13,234 |
| 2008 | 10,280 | S | C | 13,933 | C | C | C | C | 13,993 |
| 2009 | 9,695 | S | C | 14,880 | C | C | C | 165 | 15,044 |
| 2010 | 8,280 | S | C | 12,611 | C | C | C | 143 | 12,754 |
| 2011 | 6,759 | C | S | 7,493 | C | C | C | C | 7,749 |
| 2012* | S | C | 0 | 7,278 | C | C | C | C | 7,525 |

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN. December 20, 2012.

Table 26 shows the estimated incidental catch and PSC in the trawl catcher vessel Pacific cod target fishery in the Aleutian Islands, from 2004 through 2012.

**Table 26 Incidental catch of other groundfish species and PSC in the trawl catcher vessel Pacific target fisheries in the Aleutian Islands**

| | Incidental catch (mt) | | | | PSC (number crab and salmon; mt halibut) | | |
|---|---|---|---|---|---|---|---|
| Year | Flatfish | Pollock | Rockfish | Other incidental catch | Crab | Halibut | Salmon |
| 2004 | 7 | C | 6 | C | 567 | 5 | 169 |
| 2005 | C | 37 | 0 | C | 3,416 | 13 | 558 |
| 2006 | C | 3 | 0 | 0 | 1,664 | 20 | 416 |
| 2007 | 6 | 22 | C | 1 | 1,468 | 19 | 1,363 |
| 2008 | 7 | 15 | 77 | 1 | 792 | 15 | 1,113 |
| 2009 | 18 | 4 | 12 | 1 | 1,244 | 16 | 785 |
| 2010 | 30 | 7 | 2 | C | 874 | 12 | 646 |
| 2011 | 130 | 49 | 18 | 3 | 256 | 15 | 475 |
| 2012* | 55 | 13 | 26 | C | 586 | 32 | 228 |

Notes: Retained catches, including non-CDQ and CDQ, in the Federal and State parallel fisheries in the Aleutian Islands. *The 2012 data are through December 8, 2012. Shaded years are those during which the interim final rule was in effect. "C" indicates confidential data.
Source: AKFIN, December 20, 2012.

*Gross revenues*

Table 27 provides estimates of historical gross ex-vessel revenues accruing to the trawl catcher vessel fleet in the Aleutian Islands Pacific cod fisheries, from 2004 through 2011. Estimates are shown in nominal and in real, inflation-adjusted, 2012 dollars. In real terms, aggregate fleet ex-vessel gross revenues grew from the $4.9 million to $7.6 million level in the years 2004 through 2006, to the $13.8 to $18.2 million level in 2007 and 2008. They declined considerably in 2009 and 2010, and declined further at the time of the introduction of the interim final rule in 2011.

**Table 27 Estimated trawl catcher vessel ex-vessel gross revenues from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011**

| | Nominal gross revenues | | | | Inflation Adjustment factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | | 541 | 542 | 543 | Total |
| 2004 | 5.4 | 1.0 | 0.0 | 6.4 | 1.19 | 6.4 | 1.1 | 0.0 | 7.6 |
| 2005 | 3.6 | 0.7 | 0.0 | 4.2 | 1.16 | 4.1 | 0.8 | 0.0 | 4.9 |
| 2006 | 3.9 | S | C | 5.4 | 1.12 | 4.4 | S | C | 6.1 |
| 2007 | 10.7 | S | C | 12.6 | 1.10 | 11.7 | S | C | 13.8 |
| 2008 | 12.8 | S | C | 17.2 | 1.05 | 13.5 | S | C | 18.2 |
| 2009 | 5.2 | S | C | 7.6 | 1.06 | 5.5 | S | C | 8.0 |
| 2010 | 4.2 | S | C | 6.4 | 1.04 | 4.4 | S | C | 6.7 |
| 2011 | 4.2 | C | S | 4.6 | 1.01 | 4.2 | C | S | 4.7 |

Notes: Estimated ex-vessel value to catcher vessels with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKFIN, January 8, 2013; PCE implicit price deflator for June each year from St. Louis FRB FRED; inflation adjustment calculated by AKR.

Table 28 provides corresponding estimates of the processor first wholesale value to processors of the trawl catcher vessel retained catch. Note that it is incorrect to sum ex-vessel and wholesale revenues for the same product at different levels in the product chain, ex-vessel revenues to the fisherman are a cost to the processor. Revenue estimates for the different levels are provided here to provide distributional information.

Real wholesale revenues to processors in Table 28 follow the pattern shown in Table 27, since the volumes of retained catch used to produce each are the same. The wholesale revenues include revenues earned by catcher/processors acting as motherships and accepting deliveries from trawl catcher vessels, as well as revenues earned by shoreside, and shoreside floating, processors. Thus, these revenues should not be interpreted as shoreside revenues alone.

**Table 28 Estimated wholesale gross revenues to processors and catcher/processors acting as motherships from trawl catcher vessel retained catches from Aleutian Islands Pacific cod targets and associated incidental harvests, 2004–2011 (millions of dollars)**

| | Nominal gross revenues | | | | Inflation Adjustment Factor | Real gross revenues (2012 dollars) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | | 541 | 542 | 543 | Total |
| 2004 | 12.4 | 2.9 | 0.0 | 15.3 | 1.19 | 14.8 | 3.4 | 0.0 | 18.2 |
| 2005 | 9.2 | 1.7 | 0.0 | 10.9 | 1.16 | 10.7 | 2.0 | 0.0 | 12.7 |
| 2006 | 8.3 | S | C | 11.0 | 1.12 | 9.3 | S | C | 12.4 |
| 2007 | 23.2 | S | C | 28.3 | 1.10 | 25.5 | S | C | 31.0 |
| 2008 | 20.8 | S | C | 28.6 | 1.05 | 21.9 | S | C | 30.1 |
| 2009 | 10.8 | S | C | 16.8 | 1.06 | 11.5 | S | C | 17.8 |
| 2010 | 12.0 | S | C | 18.4 | 1.04 | 12.5 | S | C | 19.2 |
| 2011 | 11.6 | C | S | 13.0 | 1.02 | 11.8 | C | S | 13.2 |

Notes: First wholesale gross revenues from target species and incidental catches for trawl catcher/processors with retained target catches in the designated year. Nominal prices converted to real 2012 prices using an adjustment factor based on the implicit GDP price deflator. Revenues from harvest in Federal fishery and in State of Alaska parallel fishery. Shaded year is that during which the interim final rule was in effect. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: AKR, February 6, 2013, August 17, 2012; PCE implicit price deflator for June each year from St. Louis FRB FRED.

*Aleutian Islands Pacific cod revenues as a proportion of all revenues*

Table 29 compares estimates of ex-vessel gross revenues from fishing Pacific cod in the Aleutian Islands, to revenues from other fishing sources on the West Coast and in Alaska, for the vessels in this sector. This is the one sector with meaningful fishing activity in West Coast fisheries outside of Alaska. The percentage of revenues from Aleutian Islands Pacific cod compared to revenues from all sources, may be found in the rightmost column of the table. This ranges from 10 percent in 2006 to 23 percent in 2008.

**Table 29 Proportion of trawl catcher vessel ex-vessel gross revenues earned from fishing for Pacific cod in the Aleutian Islands, 2004–2011 (gross revenue estimates in millions of dollars)**

| Year | Targeted Pacific cod in AI | Total groundfish revenues | Other Alaska revenues | Other West Coast revenues | Percent of revenues from AI Pacific cod |
|---|---|---|---|---|---|
| 2004 | 6.4 | 27.2 | 3.5 | 0.6 | 20% |
| 2005 | 4.2 | 23.8 | 1.2 | 0.5 | 17% |
| 2006 | 5.4 | 48.6 | 1.3 | 2.5 | 10% |
| 2007 | 12.6 | 62.4 | 2.7 | 1.8 | 19% |
| 2008 | 17.2 | 65.7 | 3.3 | 5.6 | 23% |
| 2009 | 7.6 | 30.8 | 3.9 | 1.3 | 21% |
| 2010 | 6.4 | 29.1 | 3.1 | 1.9 | 19% |
| 2011 | 4.6 | 25.3 | 0.0 | 2.3 | 17% |

Notes: Gross revenues from retained harvests of commercially caught species, valued at ex-vessel value (unless the vessel operated as a catcher/processor in a specific fishery). Only includes vessels targeting Pacific cod in the three Aleutian Islands management areas in the year shown. Aleutian Islands revenues from Federal fisheries and from State of Alaska parallel fisheries. Shaded year is that during which the interim final rule was in effect.
Source: AKFIN, January 7, 2013

*Crew sizes*

Table 17 shows estimates of the crew sizes, based on Weekly Processor Reports and Alaska fish ticket records, for vessels in the four different fleet categories defined for analysis in this action. As shown in the table, the estimated average crew size on trawl catcher vessels, over the years 2007 to 2011, was about 4.5 persons.

### 1.2.4 Non-trawl catcher vessels

This sector includes catcher vessels targeting Pacific cod with jig, hook-and-line, and pot gear in the Aleutian Islands. Atka mackerel and pollock are not targeted with these gear types. These vessels deliver their products to shoreside processors. The Council's recent report "Fishing Fleet Profiles" provides descriptions of the non-trawl catcher vessels participating in the Bering Sea and Aleutian Islands fisheries (NPFMC, 2012c).

*Numbers of vessels*

Table 30, Table 31, and Table 32 summarize information about the numbers of catcher vessels using each of these non-trawl types, and the number of shoreside plants receiving deliveries from them. For each gear type, vessel participation was greatest in Area 541, less in Area 542, and absent in Area 543. The tables also show that in many years and areas the number of these vessels using a gear type and the number of processors to which they deliver are too few to provide summary catch or revenue information

without releasing confidential information. Thus, these gear types have been grouped together for this analysis.

**Table 30 Numbers of jig catcher vessels targeting Aleutian Islands Pacific cod**

| | Counts of jig catcher vessels making deliveries | | | | Counts of shoreside plants receiving deliveries | | | |
|---|---|---|---|---|---|---|---|---|
| Year | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique plants) |
| 2004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 2006 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 2007 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 1 |
| 2008 | 8 | 6 | 0 | 9 | 1 | 1 | 0 | 1 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2012 | 0 | 1 | 0 | 1 | NA | NA | NA | NA |

Notes: Federally licensed jig catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI Areas 541, 542, and 543, and the firms to which they delivered. These 2012 data are incomplete; only activity through December 8, 2012 is included. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

**Table 31 Numbers of longline catcher vessels targeting Aleutian Islands Pacific cod**

| | Counts of longline catcher vessels making deliveries | | | | Counts of shoreside plants receiving deliveries | | | |
|---|---|---|---|---|---|---|---|---|
| Year | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique plants) |
| 2004 | 2 | 2 | 0 | 2 | 2 | 2 | 0 | 2 |
| 2005 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 2006 | 3 | 0 | 0 | 3 | 1 | 0 | 0 | 1 |
| 2007 | 6 | 2 | 0 | 6 | 1 | 1 | 0 | 1 |
| 2008 | 6 | 2 | 0 | 6 | 1 | 1 | 0 | 1 |
| 2009 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 2010 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 2011 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 2012 | 0 | 0 | 0 | 0 | NA | NA | NA | NA |

Notes: Federally licensed longline catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the firms to which they delivered. These 2012 data are incomplete; only activity through December 8, 2012 is included. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

**Table 32 Numbers of pot catcher vessels targeting Aleutian Islands Pacific cod**

| | Counts of pot catcher vessels making deliveries | | | | Counts of shoreside plants receiving deliveries | | | |
|---|---|---|---|---|---|---|---|---|
| Year | 541 | 542 | 543 | AI (unique vessels) | 541 | 542 | 543 | AI (unique plants) |
| 2004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 2 | 2 | 0 | 2 | 1 | 1 | 0 | 1 |
| 2007 | 2 | 1 | 0 | 3 | 1 | 1 | 0 | 1 |
| 2008 | 2 | 0 | 0 | 2 | 2 | 0 | 0 | 2 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 2012 | 1 | 0 | 0 | 1 | NA | NA | NA | |

Notes: Federally licensed pot catcher vessels with retained catches of targeted non-CDQ and CDQ Pacific cod, from the Federal fishery and/or the State parallel fishery in BSAI areas 541, 542, and 543, and the firms to which they delivered. These 2012 data are incomplete; only activity through December 8, 2012 is included. Shaded years are those during which the interim final rule was in effect.
Source: AKFIN, December 18, 2012.

*Description of this sector*

Pot catcher vessels target Pacific cod with square or conical pots, usually set on single lines. Pot catcher vessels less than 60 feet length overall share 2 percent of the BSAI TAC with hook-and-line vessels in that size class, while pot catcher vessels 60 feet or over are allocated 8.4 percent of the TAC. As with other fleets, the pot catcher vessel Pacific cod allocations are BSAI-wide and may be caught in the Bering Sea and/or in the Aleutian Islands. Vessels active in the fishery may also fish for halibut, sablefish, and crab, if licensed to do so, or target Pacific cod for use as crab bait. (NPFMC, 2012c)

To fish for Pacific cod with pot gear in the Aleutian Islands, a vessel must have an Aleutian Islands sub-area endorsement on its LLP, as well as a non-trawl endorsement, and a Pacific cod pot gear endorsement, if the vessel is 60 feet length overall or greater. Three LLP licenses have this combination of endorsements. Two of these licenses carry endorsements allowing them to fish for Pacific cod with pots in the Bering Sea, and one has an endorsement allowing it to fish for Pacific cod with pots in the Western Gulf of Alaska. These licenses have no other Pacific cod endorsements. (AKR RAM LLP license list for 2011)[26]

Jig vessels target Pacific cod using fishing lines with baited hooks, dropped vertically from the vessel. The action of the lines is controlled by machines that move the jigs up and down a modest amount to induce the fish to bite. Machines are adjusted to haul back when the tension on the line indicates a target weight of fish has been hooked. Jig vessels are less than 60 feet length overall, and no LLP is required for catcher vessels in this length class using jig gear. In the BSAI, the jig sector is allocated 1.4 percent of the Pacific cod TAC. As with other Pacific cod allocations, this may be fished in the Aleutian Islands and/or in the Bering Sea. (NPFMC, 2012c)

Longliners deploy ground lines, anchored at each end, along the sea bottom. Shorter lines with baited hooks diverge from the longline at intervals. Catcher vessels might deploy 12,300 fathom lengths of longline at a time (73,800 feet or nearly 14 miles), for soak times lasting from two to 24 hours. Longliners under 60 feet length overall share 2 percent of the Pacific cod TAC with pot vessels of the same length. Longline catcher vessels 60 feet or greater receive an allocation of 0.2 percent of the TAC.

[26] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 30, 2012.

As with other Pacific cod allocations, this may be fished in the Aleutian Islands and/or in the Bering Sea. (NPFMC, 2012c)

To fish for Pacific cod with longline gear in the Aleutian Islands, a vessel must have an Aleutian Islands sub-area endorsement on its LLP, as well as a non-trawl endorsement, and a Pacific cod longline gear endorsement if the vessel is 60 feet in length overall, or greater. Seven LLP licenses carry the hook-and-line catcher vessel endorsement allowing them to fish in the Aleutian Islands. Four of these licenses also carry endorsements to fish for Pacific cod with catcher vessels in the eastern Bering Sea. Licenses also carry a selection of other Pacific cod endorsements (1 for Bering Sea catcher/processor pot gear, 1 for Aleutian Islands catcher/processor pot gear, 1 for western Gulf of Alaska catcher/processor pot gear, 1 for western Gulf catcher vessel pot gear, and 1 for Central Gulf catcher vessel hook-and-line gear). (AKR RAM LLP license list for 2011)[27]

While there are not enough observations to report harvest and gross revenue information, even across all management areas in a given year (primarily because of the small numbers of processors), there are enough to report summary information for the whole period 2004 to 2010. During that time, a total of 26 vessels and 4 separate processors operated in this sector (NMFS AKR In-season management staff). Over the seven years, these vessels retained almost 1,000 metric tons of Pacific cod, for a mean weight of about 150 metric tons a year. Retained catches ranged up to about 400 metric tons a year. (AKR report, February 7, 2013)

The fishing vessels in the sector had estimated aggregate ex-vessel gross revenues of about $1.2 million (2012 inflation adjusted dollars) for the seven baseline years 2004 through 2010, for a mean value of about $170,000 a year. Wholesale revenues totaled about $2.1 million, or an average of about $290,000 a year. (AKR report, February 7, 2013)

Table 17 shows estimates of the crew sizes, based on Weekly Processor Reports and Alaska fish ticket records, for vessels in the four different fleet categories defined for analysis in this action. As shown in the table, the estimated average crew size on a non-trawl catcher vessel, over the years 2007 to 2011, was about 3.9 persons.

### 1.2.5 State of Alaska Aleutian Islands Pacific cod GHL fishery[28]

Before 2006, the BSAI Pacific cod fishery in State-waters was managed as a parallel fishery to the Federal fishery; the Federal government managed all harvests (inside or outside State waters) against the Federal BSAI Pacific cod TAC and allocations, opened and closed seasons, and established gear restrictions. (NPFMC, 2011a: 9)

In February 2006, the Alaska Board of Fisheries created a new regulation establishing a State waters Pacific cod fishery in the Aleutian Islands. Since 2006, the plan has been modified in almost every year (Hartill, 2011: 2). The following description of the 2012 fishery management plan has been excerpted from Hartill (2011):

> The 2012 State-waters Pacific cod season is managed using a guideline harvest level (GHL) based on three percent of the Federal BSAI Pacific cod TAC. The State-waters Pacific cod GHL is split between an A and B-season, where the A-season is allocated 70 percent of the GHL and

[27] Retrieved from http://www.alaskafisheries.noaa.gov/ram/llp.htm on December 30, 2012.

[28] In this analysis, the State managed fishery in State waters that takes place while the Federal fishery is open is called the "parallel fishery," while the State managed fishery in State waters that takes place when the Federal fishery is closed (the fishery discussed in this section), is called the "GHL fishery."

the B-season 30 percent. Unharvested A-season GHL may be rolled over to the B-season; however, the total GHL available during the B-season may not exceed 70 percent of the entire State-waters GHL. The State-waters season is closed when the GHL has been reached.

The State-waters A-season opens January 1 from 175° W long to 178° W long to vessels 60 feet OAL [overall length] or less using trawl, pot, and jig gear, and vessels 58 feet or less OAL using longline gear. Harvest occurring between 175° W long to 178° W long will accrue toward the GHL, while harvest occurring in State waters outside of 175° W long to 178° W long will be managed under parallel rules and accrue toward the Federal TAC. State waters outside of 175° W long to 178° W long will open for the State-waters A-season four days after the Federal catcher-vessel trawl fishery closes. If the Federal catcher-vessel trawl fishery has not closed by noon March 14, and State-waters A-season GHL remains, the parallel season outside of 175° W long to 178° W long will close and a State-waters season will open at noon on March 15. Beginning March 15 in State waters inside and outside of 175° W long to 178° W long, vessels using trawl gear may not be greater than 100 feet OAL, pot vessels may not be greater than 125 feet OAL, and mechanical jig vessels and longline vessels may not be greater than 58 feet OAL.

If the State-waters A-season GHL has not been taken by April 1st, when the Federal catcher-vessel trawl B-season opens, the State-waters A-season in the waters outside of 175° W long to 178° W long will close and a parallel fishery will immediately open. Within State waters from 175° W long to 178° W long the State-waters A-season will remain open to vessels 60 feet OAL or less using trawl, pot, and jig gear, and vessels 58 feet or less OAL using longline gear. If State-waters A-season GHL remains when the Federal catcher-vessel trawl B-season closes, the State-waters A-season will reopen and remain open until the State-waters A-season GHL is reached, or through June 9. If the State-waters A-season reopens, in State waters outside and within 175° W long to 178° W long, vessels using trawl gear may not be greater than 100 feet OAL, pot vessels 125 feet OAL, mechanical jig vessels and longline vessels 58 feet OAL.

The State-waters B-season opens June 10. From June 10 through July 31 a vessel participating in the State-waters B-season may be not greater than 60 feet OAL. Beginning August 1, pot vessels may not be more than 125 feet OAL; however, vessel length limits for all other gear types may not be greater than 60 feet OAL. If the State-waters B-season GHL has not been taken by September 1, the State-waters B-season will close and a parallel season will immediately open concurrent with the Federal catcher-vessel pot fishery B-season for vessels over 60 feet in length. If State-waters B-season GHL remains when the Federal catcher-vessel pot fishery B-season for vessels over 60 feet in length closes, the State-waters B-season will re-open. Vessel length restrictions from 175° W long to 178° W long during the State-waters A-season do not apply to the State-waters B-season.

Registration for the Aleutian Islands District State-waters Pacific cod season is non-exclusive. Vessels registered for the Aleutian Islands District State-waters Pacific cod season may also register for any other non-exclusive or one other exclusive State-waters Pacific cod season. Processors and tenders for Pacific cod are required to register for the State-waters season prior to beginning operations….

During a State-waters season, a vessel may harvest up to 150,000 pounds of Pacific cod per day and may not have more than 150,000 pounds of unprocessed Pacific cod on board the vessel at any time. All Pacific cod caught must be retained, and any overage must be immediately reported to the Department, with proceeds from the overage forfeited to the State. Enforcement action against vessel operators who incur overages of the daily or trip limit will be pursued….

> Steller sea lion protection measures in State waters depend on whether a State-waters or parallel season is open….
>
> During the 2012 Aleutian Islands District State-waters Pacific cod season, Steller sea lion closures in place prior to 2011 will be in effect (5 AAC 28.647(g)(1) and (2)). Descriptions of closures in effect during a State-waters season and their coordinates are found in Table 5 to 50 CFR Part 679 (69 FR 75865, December 20, 2004), posted on the NMFS website[29] and Table 12 to 50 CFR Part 679 (73 FR 76136, December 15, 2008), also posted on the NMFS website.[30]

Table 33 shows catch of Aleutian Islands Pacific cod from 2006 through June 2012. The guideline harvest level for this fishery has ranged from about 11.5 million pounds to about 20.8 million pounds since the inception of the fishery, with the majority of the harvest taken in the A-season (70 percent is allocated prior to June 10).

Table 34 describes the fishing seasons from 2006 through 2012, and provides estimates of the fishery value. Much of the value information is confidential, but the estimates show A-season values that gradually increase from 2006, peaking in 2008, and then falling in 2009 and 2010. B-season data are only reported for 2007 and 2008. All the value data for 2011 and 2012 are confidential.

Table 35 shows estimates of harvest by gear type and season in the GHL fishery, from 2006 through June 2012. Much of this information is confidential; however, the data indicate that trawl and pot gear dominate the aggregate harvests. The trawl fishery takes place entirely in the A-season, while the pot harvest is divided between the two seasons.

While trawl, longline, pot, and jig gear are allowed at various times during the GHL fishery, overall, as shown in Table 35, the majority of the GHL fishery has been harvested by vessels using trawl and pot gear. Since the fishery was initiated, Pacific cod harvested in the fishery has been delivered to shorebased plants, floating processors, and catcher/processors. While the majority of the processing data are confidential due to a low number of processors, a few general trends can be discussed.

Since 2006, approximately 80 percent of the harvest has been delivered to shorebased and floating processors (each receiving roughly 40 percent). The remaining 20 percent has been harvested by catcher/processors. The proportion of harvest and deliveries each processor type receives varies each year. Variability is primarily a function of vessel participation and season timing. From 2009 through 2011, operation of the shorebased processor in Adak was intermittent, resulting in fewer shorebased deliveries and therefore a greater proportion of floating processor deliveries. In addition, proportionally higher floating processor deliveries typically correspond with years when the fishery opened March 15 or prior. This was evidenced in 2006, 2008, and 2010; in each of those years floating processors accounted for over half of the harvest.

Catcher/processor participation was highest in 2009 and 2010. In both years, the fishery remained open until June 9 and June 4, respectively. In 2006, the fishery closed March 24, however, catcher/processors accounted for approximately 21 percent of the harvest. This proportion is a direct result of the catcher/processors operating trawl gear. Since 2007, catcher/processor activity has been by pot vessels. In 2007, trawl vessel size was limited to 100 feet overall length or less. This restriction prohibited the larger trawl catcher/processors from participating.

[29] http://www.alaskafisheries.noaa.gov/cm/rules/?Year=2004&rule_type=3
[30] http://www.alaskafisheries.noaa.gov/cm/rules/?Year=2008&rule_type=3

**Table 33 Aleutian Islands State-waters Pacific cod fishery guideline harvest level and harvest apportionment (2006–2012)**

| Year | Season | Initial GHL[a] | Harvest[a] | Number of | |
|---|---|---|---|---|---|
| | | | | Vessels | Deliveries |
| 2006 | A season | 8,981,540 | 8,502,781 | 26 | 68 |
| | B season | 3,849,232 [b] | CF | 5 | CF |
| | TOTAL | 12,830,772 | CF | 30 [c] | CF |
| 2007 | A season | 8,148,202 | 8,229,931 | 27 | 97 |
| | B season | 3,492,086 [d] | 3,409,070 | 15 | 106 |
| | TOTAL | 11,640,288 | 11,639,001 | 41 [c] | 203 |
| 2008 | A season | 8,148,202 | 7,477,507 | 30 | 116 |
| | B season | 3,492,086 [e] | 4,241,692 | 18 | 77 |
| | TOTAL | 11,640,288 | 11,719,199 | 45 [c] | 193 |
| 2009 | A season | 8,425,981 | 5,537,886 | 22 | 50 |
| | B season | 3,611,135 [e] | CF | 5 | CF |
| | TOTAL | 12,037,116 | CF | 27 | CF |
| 2010 | A season | 8,055,608 | 7,959,514 | 16 | 84 |
| | B season | 3,452,404 [e] | CF | 3 | CF |
| | TOTAL | 11,508,012 | CF | 16 [c] | CF |
| 2011 | A season | 10,879,701 | CF | 3 | CF |
| | B season | 4,662,729 [e] | CF | 4 | CF |
| | TOTAL | 15,542,430 | 595,289 | 6 [c] | 19 |
| 2012 | A season | 14,537,132 | 11,462,339 | 20 | 201 |
| | B season | 6,230,200 [e] | CF | 3 | CF |
| | TOTAL | 20,767,332 | CF | 22 [c] | CF |

Note: CF = Confidential data.

[a] In whole pounds.

[b] Alaska Department of Fish and Game made available 3.5 million pounds of the GHL to the Federal fishery (NMFS) going into effect on September 1.

[c] Some vessels participated in both seasons.

[d] Overage from the A-season was deducted from the B-season GHL. Initial GHL shown.

[e] A-season GHL was not fully harvested, and the remaining A-season GHL rolled over into B-season GHL. Initial GHL shown.

**Table 34 Aleutian Islands State-waters Pacific cod fishery economic performance, season length and dates (2006–2012)**

| Year | Season | Season Dates | | Season Length[a] | Fishery Value[b] | Average Price per Pound [c] |
|---|---|---|---|---|---|---|
| | | Opened | Closed | | | |
| 2006 | A season | 15-Mar | 24-Mar | 9 | $1.3 | $0.23 |
| | B season | 10-Jun | 1-Sep | 84 | CF | CF |
| 2007 | A season | 16-Mar | 23-Mar | 7 | $3.6 | $0.45 |
| | B season | 10-Jun | 1-Sep | 83 | $0.9 | $0.52 |
| | B season | 1-Oct | 3-Dec | 63 | $0.4 | $0.52 |
| 2008 | A season | 10-Mar | 18-Mar | 8 | $4.5 | $0.63 |
| | B season | 10-Jun | 9-Jul | 29 | $1.8 | $0.57 |
| 2009 | A season | 25-Mar | 1-Apr | 7 | $0.4 | $0.25 |
| | A season | 7-Apr | 9-Jun | 63 | $0.6 | $0.22 |
| | B season | 10-Jun | 1-Sep | 83 | CF | CF |
| 2010 | A season | 16-Mar | 4-Jun | 81 | $1.6 | $0.25 |
| | B season | 10-Jun | 1-Sep | 83 | CF | CF |
| | B season | 15-Nov | 31-Dec | 46 | CF | CF |
| 2011 | A season | 30-Mar | 1-Apr | 2 | CF | CF |
| | A season | 5-Apr | 9-Jun | 65 | CF | CF |
| | B season | 10-Jun | 1-Sep | 83 | CF | CF |
| | B season | 25-Oct | 31-Dec | 67 | CF | CF |
| 2012 | A season | 1-Jan | 9-Jun | 8 | NA | NA |
| | B season | 10-Jun | Current | NA | NA | NA |

[a] In days.

[b] In millions of dollars.

[c] Per pound dressed weight.

**Table 35 Summary information on harvests by gear type in the Pacific cod GHL fishery in the Aleutian Islands (millions of whole pounds)**

| Year | Season | Longline | Trawl | Pot | Jig | Total |
|---|---|---|---|---|---|---|
| 2006 | A season | CF | 7,053,035 | CF | 0 | 8,502,781 |
| | B season | CF | 0 | CF | 0 | CF |
| 2007 | A season | 0 | 6,998,224 | 1,231,707 | 0 | 8,229,931 |
| | B season | CF | 0 | 2,383,163 | CF | 3,409,070 |
| 2008 | A season | CF | 6,130,304 | CF | 0 | 7,477,507 |
| | B season | 362,410 | 0 | 3,786,710 | 92,572 | 4,241,692 |
| 2009 | A season | CF | 1,295,595 | 3,879,737 | CF | 5,537,886 |
| | B season | CF | 0 | 0 | CF | CF |
| 2010 | A season | 0 | 4,899,783 | 3,059,731 | 0 | 7,959,514 |
| | B season | CF | 0 | CF | 0 | 826,171 |
| 2011 | A season | 0 | CF | CF | 0 | CF |
| | B season | CF | 0 | CF | 0 | CF |
| 2012 | A season | CF | 5,983,213 | CF | 0 | 11,462,339 |
| | B season | CF | 0 | CF | CF | CF |

Note: CF = Confidential data.

### 1.2.6 Atka mackerel fishing in the Bering Sea

Prior to 1993, the Bering Sea subarea catch of Atka mackerel was counted against the BSAI Atka mackerel TAC. With the division of the Atka mackerel ABC and TAC into three separate ABCs and TACs in mid-1993, the eastern Bering Sea catch was counted against a combined "Eastern Aleutian Islands (Area 541) and eastern Bering Sea" ABC and TAC. (Lowe et al., 2011: 1084-1086)

Prior to 2011, directed fishing for Atka mackerel in the Bering Sea subarea was open outside critical habitat, but closed inside critical habitat. In the Bering Sea, however, Atka mackerel is found primarily inside Steller sea lion critical habitat. Although critical habitat was closed to directed fishing for Atka mackerel, vessels could retain Atka mackerel caught inside critical habitat in amounts of up to 20 percent of other groundfish catch (the maximum retainable amount or MRA).[31] The "other groundfish catch" is referred to as the "basis species."

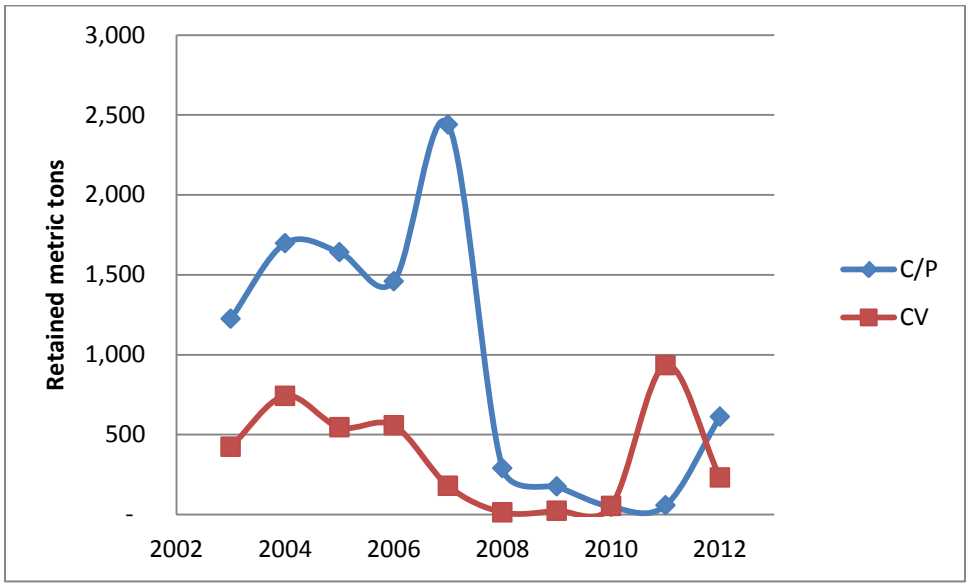
However, the other groundfish species used as basis species for retaining Atka mackerel occur primarily outside critical habitat. Moreover, the Atka mackerel MRA was fishing trip specific, and new fishing trips were triggered by crossing the boundary between open and closed fishing areas (see the definition of fishing trip at § 679.2, particularly the condition that a fishing trip terminates when "the vessel enters or leaves an area where a different directed fishing prohibition applies"). Thus, an operation that fished a species such as yellowfin sole in the Bering Sea subarea, outside of critical habitat, could not use that retained yellowfin sole as a basis species for retaining Atka mackerel inside critical habitat, which is where the Atka mackerel was available. Once the vessel entered critical habitat, a new fishing trip was

[31] This MRA is measured "instantaneously", rather than at the time the groundfish are delivered (50 CFR 679.20(e)(3)(ii)). This means that at all times during the trip, the vessel must carry enough basis species to allow for the volume of Atka mackerel on board. This may require the vessel to discard Atka mackerel if it inadvertently takes a large amount of it early in the trip.

triggered, and the yellowfin sole it had caught and retained outside critical habitat could not be used as a basis species.

The interim final rule closed the Bering Sea subarea year round to directed fishing for Atka mackerel, thus eliminating the different fishing prohibitions inside and outside critical habitat. Since regulations no longer triggered a new "trip" when a vessel crossed the critical habitat boundary, vessel operators could use groundfish harvested outside of critical habitat as basis species for calculation of the Atka mackerel MRA within critical habitat.

Figure 1 summarizes Bering Sea subarea Atka mackerel retained catches for trawl catcher/processors and trawl catcher vessels (catches by other vessel classes were very small), from 2003 through 2012.[32] Catcher/processor retained catches ranged between about 1,200 and about 2,500 metric tons between 2003 and 2007, then fell to about 50 to about 300 metric tons in later years (possibly due to changes in fishing practices with the advent of Amendment 80 in 2008). Catches rose to higher levels in 2012. Almost all of the remaining retained catch in this region was taken by trawl catcher vessels.

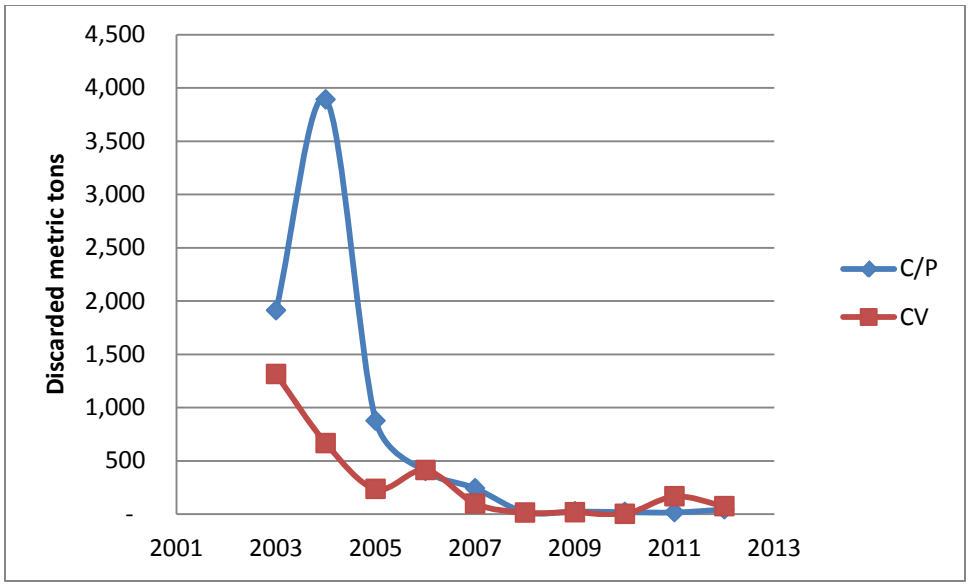



Source: AKRO CAS. December 5, 2012.

**Figure 1 Retained trawl Atka mackerel catches in the Bering Sea subarea, 2003–2012**

Estimates of Atka mackerel discards by these fleet sectors in the Bering Sea subarea from 2003 through 2012 are shown in Figure 2. Discards were quite high relative to retained Atka mackerel in the early years, but fell off considerably thereafter. The majority of the discards in the early years occurred in the trawl catcher/processor sector and in cod targets. Both discard levels and retained catches may have been affected by Amendment 85, the cod sector allocation, and by Amendment 80, which implemented the rights-based management program covering Atka mackerel and other key species, in the non-AFA catcher/processor fleet.

[32] 2012 data includes landings through December 2, 2012.




Source: AKRO CAS. December 5, 2012

**Figure 2 Discarded trawl Atka mackerel catches in the Bering Sea subarea, 2003–2012**

### 1.2.7 CDQ groups

The large scale commercial groundfish and crab fisheries of the BSAI originally developed without much participation from rural western Alaska communities. Communities in the region are small, remote, and often have few development opportunities. The Community Development Quota (CDQ) Program was created to improve conditions in coastal western Alaska communities by making it possible for them to participate in the BSAI fisheries. The program does this by allocating a portion of commercially important BSAI species fishing limits, including halibut, crab, pollock, and various other groundfish, to such communities.

The CDQ Program was implemented by the Council and NMFS in 1992 with allocations of 7.5 percent of the BSAI pollock TAC. Allocations of halibut and sablefish were added to the program in 1995. Authorization for the CDQ Program was added to the Magnuson-Stevens Fishery Conservation and Management Act by the U.S. Congress in 1996. In 1998, the Council expanded the CDQ Program by adding allocations of additional groundfish species, prohibited species, and crab.

In 2013, the CDQ Program was allocated 10.7 percent of the Amendment 80 species (Atka mackerel, Pacific cod, flathead sole, rock sole, yellowfin sole, and Aleutian Islands Pacific ocean perch), 20 percent of the sablefish TAC allocated to hook-and-line or pot gear, 7.5 percent of the sablefish TAC allocated to trawl gear, 10.7 percent of the TACs for Bering Sea Greenland turbot and arrowtooth flounder, and 10 percent of the TAC for pollock. (78 FR 13815; March 1, 2013)

Sixty-five communities participate in the program through six CDQ groups.[33] CDQ groups are non-profit corporations that manage and administer the CDQ allocations, economic development projects, and

[33] The CDQ entities include the Aleutian Pribilof Island Community Development Association (APICDA), the Bristol Bay Economic Development Corporation (BBEDC), the Central Bering Sea Fishermen's Association (CBSFA), the Coastal Villages Region Fund (CVRF), the Norton Sound Economic Development Corporation (NSEDC), and the Yukon Delta Fisheries Development Association (YDFDA).

investments, including ownership interests in the at-sea processing sector and catcher vessels. Annual CDQ allocations provide a revenue stream for CDQ entities through various channels, including the direct catch and sale of some species, leasing quota to various harvesting partners, and income from investments.

Geographically dispersed, the member communities extend westward to Atka, on the Aleutian Islands chain, and northward along the Bering Sea coast to the village of Wales, near the Arctic Circle. The overall population of these communities is about 28,600 persons. Large proportions of the persons in the CDQ communities are Alaska Natives. CDQ communities are remote, isolated settlements with few commercially valuable natural assets with which to develop and sustain a viable, diversified economic base. As a result, economic opportunities are few and unemployment rates tend to be high.

The only CDQ community within Areas 541, 542, and 543 is Atka, a member of the Aleutian Pribilof Islands Community Development Association (APICDA). APICDA is an equal partner with the Atka Fishermen's Association in the Atka Pride Seafoods Plant, and owns the Nazan Bay Inn in Atka. The Atka Pride plant has processed halibut and sablefish in the past, but in 2012 began developing Pacific cod processing. In 2013 and 2014 the plant operators plan to substantially expend Pacific cod and crab production. APICDA has invested in Atka infrastructure, or assisted the community in obtaining infrastructure finding. (Aleutian Pribilof Islands Community Development Association, 2012: 9)

The Atka mackerel CDQ allocation is divided among the three Aleutian Islands management areas in proportion to the allocation of TAC across those three areas. In the 7-year period prior to the interim final rule (from 2004 through 2010), CDQ groups were able to use their Atka mackerel allotments effectively: over 90 percent was fished in almost all year-area combinations. Only in Area 541 in 2005, was a smaller percentage (85 percent) harvested. Otherwise, in each area, from 2007 to 2010, over 90 percent was harvested in each year, and usually over 95 percent. These high levels of CDQ harvest persisted in Areas 541 and 542 in 2011 and 2012, under the interim final rule. Use of CDQ from Area 543, however, declined to about 3 percent, as a consequence of the prohibition on retained catch in that area (Table 36).

**Table 36 Percentages of CDQ Aleutian Islands Atka mackerel allocations harvested by year**

| Year | Area 541 | Area 542 | Area 543 |
|---|---|---|---|
| 2004 | 91 | 96 | 95 |
| 2005 | 85 | 95 | 96 |
| 2006 | 93 | 94 | 94 |
| 2007 | 99 | 99 | 96 |
| 2008 | 97 | 98 | 96 |
| 2009 | 98 | 99 | 98 |
| 2010 | 98 | 98 | 100 |
| 2011 | 98 | 91 | 3 |

Note: Shaded year is that during which the interim final rule was in effect.
Source: NMFS AKR: 2004–2007 from NMFS AKR MS CDQ/PSQ Catch to Date; 2008–2012 from Bering Sea Aleutian Islands Catch Report (CDQ Only). Downloaded on May 15, 2012, and January 2, 2012, from http://www.alaskafisheries.noaa.gov/sustainablefisheries/catchstats.htm.

Atka mackerel CDQ allocations are not distributed equally among the six CDQ groups. Table 37 shows the distribution of the Amendment 80 species among the CDQ groups in 2012. These have not changed since 2004. Three groups, APICDA, BBEDC, and YDFDA, have relatively large allotments of Amendment 80 species. APICDA, especially, gets a relatively large share of the Atka mackerel allotment

(30 percent). Pacific cod is divided relatively evenly among five of the groups, for these the allocations range between 15 percent and 21 percent. One CDQ group, CBSFA, has relatively small allotments of Amendment 80 species (8 percent to 9 percent of each).

**Table 37 Proportional allotments of Amendment 80 species CDQ allocations among CDQ Groups**

| | APICDA | BBEDC | CBSFA | CVRF | NSEDC | YDFDA |
|---|---|---|---|---|---|---|
| Pacific cod | 15 | 21 | 9 | 18 | 18 | 19 |
| Atka mackerel | 30 | 15 | 8 | 15 | 14 | 18 |
| Yellowfin sole | 28 | 24 | 8 | 6 | 7 | 27 |
| Rock sole | 24 | 23 | 8 | 11 | 11 | 23 |
| Flathead sole | 20 | 21 | 9 | 15 | 15 | 20 |
| Pacific ocean perch in the AI | 30 | 15 | 8 | 15 | 14 | 18 |
| Note: Distributions are reported by management area for Atka mackerel and Pacific ocean perch, but the percentages are the same across areas. Source: NMFS AKR worksheet retrieved on June 12, 2012, from http://alaskafisheries.noaa.gov/cdq/current_historical.htm. | | | | | | |

Most Pacific cod CDQ is harvested in the Bering Sea, rather than in the Aleutian Islands. Table 38 shows harvests of Pacific cod CDQ in each of the three Aleutian Islands management areas, and in the BSAI as a whole. From 2004 through 2012,[34] from 2 percent to 18 percent of the harvest of the annual CDQ Pacific cod allocation was harvested in the Aleutian Islands fisheries.

**Table 38 CDQ Pacific cod harvests in the Aleutian Islands (metric tons)**

| Year | 541 | 542 | 543 | Total | BSAI | AI % of BSAI |
|---|---|---|---|---|---|---|
| 2004 | S | 246 | C | 273 | 16,030 | 2% |
| 2005 | 690 | S | C | 1,002 | 14,689 | 7% |
| 2006 | 756 | S | C | 1,101 | 14,255 | 8% |
| 2007 | 1,684 | 158 | 226 | 2,068 | 12,773 | 16% |
| 2008 | 1,435 | 186 | 109 | 1,730 | 18,183 | 10% |
| 2009 | 628 | C | S | 887 | 18,538 | 5% |
| 2010 | 1,596 | 1,185 | 433 | 3,214 | 18,029 | 18% |
| 2011 | C | C | C | C | 22,847 | S |
| 2012 | 1,294 | S | C | 1,370 | 20,199 | 7% |
| Source: AKR CAS. "C" indicates confidential. "S" indicates data suppressed to protect data in a confidential cell. | | | | | | |

In 2011, the six CDQ groups earned nearly $311.5 million in revenue and had operating expenses of about $248.8 million; net assets increased in 2011 by nearly $63 million. About 25 percent of revenues came from CDQ royalties. Direct income exceeded royalty income for the first time in 2004. That pattern has continued since that time with direct income ranging from 55 percent to 83 percent annually. (Blandford, personal communication)[35]

In 2011, the CDQ groups made over $151 million in fisheries-related investments and paid over $45.5 million in payroll to about 2,400 persons. CDQ processors, fish-buying stations, and other fisheries businesses made ex-vessel payments of over $32.2 million to more than 1,360 permit holders. The Western Alaska Community Development Association estimates that there were an additional 2,000 crew positions associated with those permits. The CDQ groups contributed almost $7.3 million to community infrastructure and over $17.7 million in other community benefit projects. The groups granted over 725 scholarships and additional training opportunities for 865 eligible residents. (Blandford, personal communication)

[34] Except for 2011, for which the data are confidential.

[35] Aggie M. Blandford, Executive Director, Western Alaska Community Development Association. Email on January 3, 2013.

### 1.2.8 Aleut Corporation

The Aleut Corporation is a regional Native Corporation formed under the Alaska Native Claims Settlement Act (ANCSA) of 1971. When it was established, the Aleut Corporation's 3,249 voting stockholders received a cash settlement of $19.5 million, 70,789 acres of surface land, and 1.572 million subsurface acres. (Aleut Corporation, 2010: 9) ANCSA stock was initially issued to persons who were at least one-fourth Alaska Native. While a complex set of rules governs how shares can be distributed and inherited, it is assumed that the vast majority of Aleut Corporation shareholders continue to identify as Alaska Native.

Aleut Corporation shareholders are widely distributed. Currently there are 3,523 voting shareholders, 2,097 of whom live in Alaska, and 1,426 of whom live outside the state (almost entirely within the United States). Shareholders in other states are widely distributed: 65 percent live in the three West Coast states with the remainder distributed among 44 states and Canadian provinces. Of those in Alaska, 430 live within the boundaries of the Aleutians West Census Area, which include the civilian communities of Adak, Atka, Nikolski, Unalaska, St. George, and St. Paul. (Bourdukofsky, personal communication)[36]

Corporate income comes from several sources, including Federal government operating and maintenance contracting, fuel sales and storage, rental properties and gravel sales, industrial products and services, and other income and investments. Fuel sales and storage income comes from a wholly owned subsidiary of the Aleut Corporation, Aleut Enterprise, LLC. Real estate sales and rental income come from a second wholly owned subsidiary, Aleut Real Estate, LLC. Aleut Real Estate has residential and commercial properties located on Adak. (Aleut Corporation, 2012: 7-9)

As discussed in detail in Chapter 3 of the EIS, when the directed pollock fishery reopened in 2005, the directed fishing allowance was allocated to the Aleut Corporation[37], pursuant to the requirements of The Consolidated Appropriations Act of 2004 (Public Law 108–199). Through this allocation, the act sought to promote the economic development of Adak, Alaska. The law required the Aleut Corporation to select participants in the Aleutian Islands directed pollock fishery and limited participation to American Fisheries Act (AFA) qualified entities and vessels 60 feet (18.3 m) or less length overall (LOA). The law restricted the annual harvest of pollock in the Aleutian Islands directed pollock fishery by vessels 60 feet (18.3 m) LOA or less to less than 25 percent of the annual allocation until 2009, and to less than 50 percent of the annual allocation prior to 2013. These vessels were to receive 50 percent of the annual directed pollock fishery allocation in 2013 and in later years. (70 FR 9856, March 1, 2005). The Council incorporated this legal requirement into its management regime when it adopted Amendment 82 to the BSAI groundfish FMP in June 2004, revising the FMP to establish the management framework for the Aleutian Islands directed pollock fishery. The Aleut Corporation has not been able to take large amounts of pollock since 2005, however, alternatives under consideration in this analysis may open new areas for this fishery, and create a revenue stream for the corporation. Chapter 3 of the EIS includes more details on Aleutian Islands pollock management.

The Aleut Enterprise Corporation was created in 1997 to help privatize the U.S. Navy base at Adak and since then has evolved into a fuel services company providing bulk fuel supplies to its own customers and fuel storage for third parties, from facilities at Adak and Cold Bay. Corporate headquarters are in Anchorage. At Adak, Aleut Enterprise provides a range of fuel products to many types of customers, including commercial fishing vessels, marine cargo vessels, commercial aviation customers, government agencies, scientific researchers, private tourists, other industries that may operate regionally, and

[36] Angela Bourdukofsky, Shareholder Relations Manager, Aleut Corporation. Spreadsheet of voting shareholder residences supplied December 6, 2012.

[37] The term "Aleut Corporation" means the Aleut Corporation or its authorized agent(s) for purposes of describing activities required for managing the Aleutian Islands directed pollock fishery.

residential customers in Adak. With respect to fishing vessels, Aleut Enterprise advertises that its facility in Adak can reduce run time to Dutch Harbor by four days, maximizing fishing time, minimizing fuel costs, and increasing fishing profits. (Aleut Enterprise LLC (Adak web site); Aleut Enterprise LLC (Corporate web site)

The alternatives under consideration in this analysis may affect the demand for fuel purchases at Adak from the Aleut Enterprise Corporation, particularly fuel purchases by catcher/processors operating in the western Aleutian Islands. The president of the Aleut Enterprise Corporation has indicated that fuel sales were hurt by the interim final rule (Tsukada, 2010). The Aleut Enterprise Corporation is also the lessor of a fish processing plant at Adak. (Aleut Corporation, 2012: 27)

Table 39 summarizes several measures of Aleut Corporation and Aleut Enterprise Corporation revenues for the years 2008 through 2012. The 2011 annual report of the Aleut Corporation reported that a drop in FY 2011 gross revenues (which included the first three months of the current action, from January 2011 to March 2011) reflected lower revenues from fuel sales. The report elaborated that the decline in net revenues was due to the Steller sea lion restrictions, the tsunami in Sendai, Japan, the loss of equipment and inventory due a fire in Adak, and accrued expenses for projected costs related to clean-up of miscellaneous environmental matters. (Aleut Corporation, 2011: 10-11).

**Table 39 Aleut Corporation and Aleut Enterprise LLC income flows, 2008–2012.**

| | Aleut Corporation | | | Aleut Enterprise LLC | | |
|---|---|---|---|---|---|---|
| Year | Gross revenues (million $) | Before tax net revenue (million $) | After tax net revenue (million $) | Revenues (million $) | Expenses (million $) | Net (million $) |
| 2008 | 116.1 | 13.3 | 36.6 | 15.2 | 13.3 | 1.8 |
| 2009 | 146.1 | 17.9 | 43.5 | 25.9 | 24.8 | 1.1 |
| 2010 | 159.4 | 11.8 | 26.7 | 15.3 | 14.9 | 0.4 |
| 2011 | 148.4 | 8.4 | 8.4 | 13.1 | 13.2 | -0.1 |
| 2012 | 98.1 | -10.8 | -8.5 | 15.3 | 13.6 | 1.7 |

Notes: Years are fiscal years, beginning on April 1 of the prior year, and ending March 31 of the year shown. Numbers may not add up due to rounding to the nearest hundred thousand dollars.
Source: (Aleut Corporation 2009; Aleut Corporation 2010; Aleut Corporation 2011; Aleut Corporation 2012)

The Aleut Corporation profits may be affected by actions affecting the restrictions on fishing in the Aleutian Islands in several ways. Actions may affect the volume of fuel sales by the Aleut Enterprise Corporation, they may affect the Aleut Enterprise Corporation lease payments from the rental of the processing plant at Adak, they may affect the value of the Aleut Real Estate corporation real estate holdings on the island and its rental income from island properties, and they may make it possible for the Aleut Corporation to obtain royalty income from its rights to the directed fishery allowance of pollock in the Aleutian Islands.

In turn, Aleut Corporation profits may impact the Aleut community in several ways. Aleut shareholders receive dividends on their stock holdings. In the 2011 fiscal year, the company paid about $7.7 million in dividends and elder benefits. In February the company declared dividends of $21 per share. In addition, the company pays an elder benefit to shareholders 60 years old or older at the end of the fiscal year. In the 2011 fiscal year, 847 elders received an elder benefit of $1,000. (Aleut Corporation, 2011: 13) In the 2012 fiscal year, the dividend and elder payments were much lower. In FY 2012, the company declared dividends of $5.00 per share, declared elder benefits of $500 per elder, and aggregate dividend and elder benefits were about $2.1 million. (Aleut Corporation, 2012: 11)

In addition the company makes donations to support the Aleut Foundation. In its 2011 fiscal year, the company made $790,000 in contributions to charitable and non-profit organizations, of which $600,000 went to the Aleut Foundation. In 2012, total charitable donations were about $1.1 million, of which $1.0 million were made to the Aleut Foundation. The Aleut Foundation is a non-profit, formed to "support the economic and social needs of the Aleut people with scholarships for postsecondary education, career development, and burial assistance for shareholders of The Aleut Corporation." In the 2012 fiscal year, the Aleut Foundation provided 247 student scholarships, community development programs in Sand Point and Saint Paul, job placement training, internship funding, and funding for high school students to attend a leadership summit. (Aleut Corporation, 2011: 13, 2012: 11)

### 1.2.9 Subsistence[38]

*Steller sea lions*

Alaska Natives hunt Steller sea lions for subsistence.[39] They have done so for at least 6,000 years, as indicated by remains found at prehistoric archeological sites (Turek, Pedersen, Ratner, & See, 2008: 14). Harvest data collected intermittently between 1981 and 1991, from 25 communities on the lower Alaska Peninsula, lower Cook Inlet, Prince William Sound, and Kodiak Island, indicate an annual harvest of between 300 and 400 animals in those areas (Turek et al., 2008: 34). Systematic harvest estimates are available from 1992 through 2008; the point estimates of total takes (harvested animals and animals struck and lost) range from 146 animals in 2008 to 549 animals in 1992. The 95 percent confidence interval around the 2008 point estimate was 106 to 224 animals. The harvest declined from 1992 to 1996, and then leveled off at a lower level through 2008 (Wolfe, Fall, & Riedel, 2009: 25-26).

Relatively small numbers of subsistence users harvest Steller sea lions. In 2008, an estimated 57 Alaska Native households reported hunting Steller sea lions, and an estimated 50 households reported harvesting sea lions. These participation levels had dropped considerably since 1992, when 135 households reported hunting sea lions, and 91 reported harvesting sea lions. In 2008, 96.8 percent of the households surveyed did not hunt Steller sea lions (Wolfe et al., 2009: 35, 38).

Persons from both Atka and Adak are Steller sea lion subsistence hunters. Atkans are relatively active in Steller sea lion harvests, compared to residents of other Alaska subsistence communities. The 2008 Atka take of 35 sea lions by 10 households was a large percentage of the statewide 2008 take of 146 sea lions. Residents of Adak households are estimated to have taken four sea lions in 2008 (Wolfe et al., 2009: 86, C-87).[40]

Steller sea lion products are distributed through subsistence trade and sharing networks (Wolfe et al., 2009: 38), thus, the number of households potentially impacted by Steller sea lion subsistence harvests is larger than the number actually engaged in hunting. For example, in Atka in 2008 there were 25 Alaska Native households and an estimated Alaska Native population of 84 persons. Atka residents harvested an estimated 35 sea lions in 2008. An estimated 40 percent of the households harvested sea lions, 70 percent received sea lion products, and 60 percent gave away sea lion products (Wolfe et al., 2009: C-91). The reported survey information does not distinguish between sea lion products entering and leaving the community. The percentages suggest that people receiving sea lion products will also give them away, and that households harvesting sea lions may still receive sea lion products through exchange networks.

[38] Section 10.4.5.1 of Chapter 10 of the EIS includes a discussion of Steller sea lion subsistence hunting.

[39] As discussed at greater length in Section 10.4.5.1, subsistence harvest of marine mammals, including Steller sea lions, is limited to Alaska Natives, under the Marine Mammal Protection Act of 1972.

[40] Section 10.4.5.1 of Chapter 10 provides more details about Adak and Atka harvests.

Turek et al., (2008), citing Haynes & Mishler (1991: 14), describe the traditional subsistence uses for sea lions:

> Traditionally, Steller sea lions were taken for food, clothing, and for materials for skin boats. Sea lion blubber and meat, including the livers and hearts, was dried, baked, boiled, or eaten raw. Boots soles were made from the skin of the flippers and boot uppers from the skin of the throats. The stomach was used as a water-tight container, and the bladder was made into a fishing float. Sea lion whiskers decorated wooden hunting hats and cleaned tobacco pipes.

As noted, harvests of sea lions declined in the early 1990s and then leveled off for the remainder of the period. Subsistence harvests of sea lions have not been regulated or controlled by the State or Federal government; therefore, this is not the reason for the decline in subsistence hunting. The size of the sea lion population may affect harvests in three ways. [41]

First, a smaller population may lead to lower harvest per unit of effort. Even if effort stayed at historical levels, harvests could drop. Steller sea lions aggregate reasonably persistently at known haulout and rookery locations year after year. Declining populations would still do so, except if a haulout or rookery population crossed a threshold leading to abandonment of a site. Under these circumstances catch per unit of effort could remain relatively high as population declined.

Second, effort may not stay at historical levels. If catch per unit of effort gets smaller, time required to find and harvest each sea lion increases, and the opportunity costs of harvesting sea lions, as opposed to pursuing other subsistence activities, or using time for other purposes, becomes larger. A day spent hunting sea lions could have a higher cost in terms of forgone harvests of other fish and game species. Some subsistence hunters would spend less time hunting sea lions, and others would stop hunting altogether.

Third, reductions in numbers of observed animals, or publicity about declining stocks and the listing of the animals, may cause subsistence hunters to stop or limit hunting because of a conservation motive, or because of confusion about hunting regulations. Haynes & Mishler, (1991: 33) observed "a widespread misapprehension among Native hunters that it is illegal for them to take sea lions for subsistence because of their widely publicized listing as a threatened species. All over the State Native hunters are increasingly afraid of being prosecuted if they do take sea lions…. This misunderstanding in itself will almost certainly lead to a reduced overall harvest in coming years."

Successful efforts to improve the Steller sea lion population health, and a possible associated change in listing from endangered to threatened, or a possible delisting, could lead to increased harvest per unit of effort, reduced opportunity costs of harvesting, or to a reduction in conservation or regulatory concerns about hunting, and a greater willingness to hunt sea lions. If sea lion hunting or butchering skills have been lost, or cultural interest in harvesting sea lions has declined, due to relatively low participation in hunts in recent years, hunting might not return to historical levels, or may only do so with a delay.

An increase in the catch per unit of effort for hunting sea lions could improve welfare if households are able to consume more sea lions and/or to spend more time on collection and preparation of other subsistence resources, while maintaining existing sea lion harvests. An increased variety of species for hunting may allow subsistence hunters and communities to diversify their "portfolios" of resources, and reduce income risks associated with changes in the availability of individual resources.

[41] It is possible that increasing productivity in other subsistence activities, or increasing wage income opportunities, may increase the opportunity costs of hunting sea lions. Desire to harvest Steller sea lions may also change as village culture evolves.

This result could strengthen subsistence based communities. Individual hunting households could be better off, as could individual households receiving sea lion products through exchange or as a gift. Native community cultures originated in subsistence communities and continue to depend on subsistence production (even if most communities are now subsistence-market hybrids). Improved subsistence hunting opportunities could strengthen Alaska Native communities.

Improved stocks in the western Aleutian Islands might have little impact on harvest per unit of effort for most subsistence hunters, since there are no local subsistence communities within Areas 542 and 543. This may also be the case if harvest per unit of effort remained high while populations were low as depleted populations remained concentrated in a few locations. There might be some benefits to small communities, particularly to Atka, where subsistence harvests remain high and might be directly influenced by improvements in local populations. Benefits might be greater if subsistence hunters elsewhere in the BSAI or GOA regions are refraining from targeting sea lions to some extent from a precautionary motive, and if improvement in stocks leads to a change in listing status for the western distinct population segment, as a whole. If this is the mechanism by which the action benefits subsistence activities, the impact may be delayed for some years, until listings are modified.

The relationship between Steller sea lion population size and subsistence hunting activity is not well defined. As noted in Chapter 10 of the EIS, "…while there is clearly some relationship between the Steller sea lion population level and subsistence harvest from that population, the strength of that relationship cannot be determined given other factors in play." The difficulties are connected with limited knowledge "both in terms of precise measurement as well as in terms of causal linkages…" (Chapter 10 of the EIS)

*Groundfish*

While there is relatively little information on current subsistence fishing for Atka mackerel, Pacific cod, or pollock in the Aleutian Islands, there is some evidence that residents of Atka have subsistence fished for Pacific cod in the past. There have been subsistence harvests of Atka mackerel elsewhere. It is possible that actions that resulted in localized depletion associated with commercial fishing could have some impact on subsistence fishing; however, there is no evidence that commercial fishing for these species has had adverse impacts on subsistence fisheries. (Chapter 10 of the EIS)

*Indirect impacts on other subsistence harvests*

Participation in other subsistence activities may be affected by this action if it affects the income available to subsistence households for pursuing subsistence activities, or if it affects the availability of vessels and gear used jointly in commercial and subsistence activities. Income impacts could extend beyond the local area through impacts on CDQ revenue streams. For a number of reasons, the potential incidence of these indirect impacts is very difficult to predict (Chapter 10 of the EIS). Given the limited local participation in the directly regulated fisheries, the impacts to existing local households may be small.

### 1.2.10 Benefits from Steller sea lion stock health

People value the health of the Steller sea lion population for a variety of reasons. As discussed in Section 1.2.9, subsistence hunters may value the health of the stock. Others may value stock health, if it allows them to view Steller sea lions, or if it draws eco-tourism clients. Some, who do not use the stock in these ways, may still place a value on knowing that the stock is healthy. They may value the existence or characteristics of the stock, or value the option of one day hunting or viewing the animals. On the other hand, it is also possible that some people would incur net costs if stock health improves: Steller sea lions

compete with humans for prey species and can be a nuisance for fishing operations when they interact with fishing gear.

Ideally, the economic value people place on a good or service could be inferred from their behavior. For an environmental good, like the health of the Steller sea lion population, however, this is often difficult. In these instances, there may be no information in markets for the good or service, or in related markets, from which to infer a value. Under these circumstances, analysts often use survey research to attempt to estimate the appropriate value.

Willingness to accept (WTA) compensation for a reduction in Steller sea lion health below some ideal level may be appropriate in a context in which individuals may be said to have a property right in the health of the resource, which may be the case in this instance. WTA is the minimum compensation that would have to be paid to people to make them indifferent to the difference between the actual and desired level of population health. However, there are problems with the use of survey methods to gather the information needed to estimate WTA measures. Under these circumstances, it is common practice to estimate a related measure, willingness to pay (WTP). WTP is an estimate of the maximum amount individuals would be willing to pay for something, rather than go without it. In general, estimated WTA tends to be higher than estimated WTP. (Goldar & Misra, 2001: 150)

A recent study, prepared at the NMFS Alaska Fisheries Science Center, provides some information on WTP for improvements in the Steller sea lion population trajectory (Lew, Layton, & Rowe, 2010).[42] The study was based on survey research conducted in 2007. Survey respondents were presented with a set of scenarios and asked to rank them according to their preferences. Each scenario included information about the state of the eastern and western populations in 60 years, and a cost to the respondent that would be incurred in equal increments over a 20-year period. A copy of one of the questions is shown in Figure 3.[43]

[42] An earlier study of WTP for Steller sea lions (Giraud, Turcin, Loomis, & Cooper, 2002), based on survey research conducted in 2000, has not been used in the present EIS. The survey results are seven years older than Lew et al. (2010), and the analysis was less focused on specific growth rate and listing outcomes.

[43] Each survey contained three separate versions of this question and three separate versions of the survey were used.

**Q10** **Which of the following three alternatives do you most prefer, and which you least prefer? Please indicate your responses below the table.**

| | Results in 60 years for each alternative | | |
|---|---|---|---|
| | **Alternative A Current program** | **Alternative B** | **Alternative C** |
| **Western Stock** Population status…… (Endangered now) | Endangered | Threatened | Endangered |
| Population size…… (45,000 now) | 45,000 | 75,000 | 45,000 |
| **Eastern Stock** Population status…… (Threatened now) | Recovered | Recovered | Recovered |
| Population size…… (45,000 now) | 60,000 | 80,000 | 80,000 |
| **Added cost to your household** each year for 20 years…… | $0 | $40 | $10 |
| | **Alternative A** | **Alternative B** | **Alternative C** |
| **Which alternative do you prefer the most?** *Check one box------>* | ☐ | ☐ | ☐ |
| **Which alternative do you prefer the least?** *Check one box------>* | ☐ | ☐ | ☐ |

**Figure 3 Typical information in the choice question in the AFSC Steller sea lion 2007 valuation survey**

The questions posed in the survey framed the scenarios in terms of outcomes known with certainty. Value estimates based on these will overstate, by an unknown margin, the willingness to pay for results that are uncertain.[44]

The 2010 environmental assessment (EA) evaluating the interim final rule included an appendix using the results from Lew et al. (2010) to infer the values households place on changes that are expected to lead to a -2 percent, +1 percent, and +2 percent change in the annual rate of western Steller sea lion population growth. The -2 percent decline was associated with an endangered population in 60 years, the +1 percent with a relisting to "threatened" status, and the +2 percent with a delisting to "recovered" status. Assuming that the baseline was a stable stock,[45] the mean WTP estimates for respondents were $0 per responding household for the -2 percent growth change, about $100 (with a 95 percent confidence interval of $72 to $128) per responding household for 1 percent growth, and about $116 (with a 95 percent confidence interval of $77 to $157) per responding household for 2 percent growth. (NMFS, 2010b: 10-86)

There are about 116.7 million households in the United States according to the 2010 Census. Arguably, a portion of these households should be excluded from the households assumed to have average WTP when aggregate WTP is calculated. These include households that would correspond to survey non-respondents, individuals who did not have confidence in their own responses, who did not provide responses to the choice question, or who clearly lacked an understanding of how to answer this type of question. To be conservative, these respondents, assumed to be in similar proportions to the general population, will be assumed to have a zero WTP when calculating aggregate WTP. Thus, the positive

[44] Assuming people are risk-neutral or risk averse (and not risk loving).

[45] In the analysis, "stable stock" means that the Steller sea lion population will remain listed as endangered and maintain its current population size in 60 years. The analysis used the stable stock assumption on the basis of the most recent stock assessment available at the time it was completed (Allen & Angliss, 2010: 3). This is discussed in the text following Table 10-53. The biological opinion states that the western distinct population segment has been increasing at a rate of about 1.4 percent, however, it notes that the estimate is not statistically significant. (NMFS 2010a: 374)

average household values would only be applied to 51.84 percent of the households (NMFS, 2010b: 10-103). Following this procedure leaves 60.5 million households. The aggregate annual WTP from 1 percent growth would thus range between $4.4 billion and $7.7 billion over 20 years. The aggregate annual WTP for a 2 percent growth increment would range between $4.7 billion and $9.5 billion.

A more recent study based on Lew et al. (2010) (Sanchirico, Lew, Haynie, Kling, & Layton, 2012) assumed an increasing stock in the absence of action, and provided estimated WTP for a change in the population of the western distinct population segment from 60,000 animals to 70,000 animals over a 60-year period. The size of this change is assumed to be known with certainty. In this scenario, the listing status of the Steller sea lion was assumed to remain "endangered" at the end of the period, so there was no change in listing status. The mean annual household WTP in this case was $34.94, with a 95 percent confidence interval ranging from $29.03 to $41.16.[46] (Sanchirico et al., 2012: 525) With the 60.5 million households used in the 2010 appendix, the annual WTP would range from $1.8 billion to $2.5 billion. The estimated WTP for this scenario is smaller than for the scenarios evaluated in 2010 because of the more optimistic outlook for stock growth in the absence of action, a much smaller growth rate for the Steller sea lion stock if action is taken (less than 0.03 percent, as opposed to 1 percent or 2 percent), and because of the lack of a change in ESA listing status.

The WTP estimates based on Lew et al. (2010) are estimates of the value placed on changes in the growth rate of the western distinct population segment of the Steller sea lions. This population segment ranges from the area of Prince William Sound in the east, to the western Aleutian Islands in the west. The action under consideration in this analysis may affect the members of this population segment in the Central and Western Aleutian Islands. The applicability of the estimates from this model will depend on (a) whether the impact of the action on the populations of Steller sea lions in the Central and Western Aleutian Islands can be estimated; (b) the impact such a local population change can be said to have on the rate of change in the overall population segment; and (3) the potential for the action to contribute to a change in the listing status for this population segment. In the 2010 analysis, NMFS was unable to make these connections, or use the model to make WTP estimates for the action alternatives.[47]

The stated preference methods used here continue to be debated within the economics profession. A reviewer of the analysis presented in detail in the 2010 EA explained that, while the "methodology used by Lew et al. (2010) to estimate willingness-to-pay with household surveys is widely used by economists, and the analysis was reported in a peer-reviewed article" there is nevertheless "controversy associated with the reliability of this methodology to estimate non-market environmental benefits that are difficult to describe and of which most people have little direct understanding. There is also controversy associated with the potential biases of surveys in which respondents are asked about their willingness to pay without actually being required to pay, as well as other potential biases associated with all types of survey research" [48] (Bernard, Jeffries, Knapp, & Trites, 2011: 72).

Subsistence users almost certainly did not fall in the sample of the U.S. population surveyed in the WTP analysis discussed above. Thus, the WTP estimates do not include WTP for subsistence. Subsistence values, if they could be had, would be additive with those WTP estimates. While individual subsistence

[46] Again, as in the analysis in the technical appendix to Section 10.4 of the RIR for the 2010 RPAs, this is an annual payment over 20 years.

[47] Bernard et al. discuss this issue (Bernard et al., 2011: 72)

[48] For surveys of the issues see (Carson, Flores, & Meade, 2001). NMFS guidelines encourage use of these techniques where appropriate, "Whenever practicable, non-market values should be monetized (e.g., consumers' WTP) using appropriate valuation techniques, such as travel cost, stated preference (including contingent valuation), or hedonic methods (NMFS, 2007). Three papers in a recent symposium in the Journal of Economic Perspectives provide a relatively accessible summary of the arguments for and against the use of contingent valuation methods (Carson, 2012; Hausman, 2012; Kling, Phaneuf, & Zhao, 2012)

households and subsistence community members may value an improvement in sea lion populations much more than members of the average U.S. household, the number of U.S. households is so much larger (approximately 116.7 million U.S. households) that a quantitative estimate of the value of subsistence consumptive-use would be much smaller than a national valuation of non-consumptive benefits by non-subsistence households.

### 1.2.11 Public Finance

Three levels of government—Federal, state, and local—impose taxes and fees on the fishing operations in the Aleutian Islands, and spend public money to support those fisheries. Important state tax flows, connected to the fisheries, are shared with local communities in the Aleutian Islands region.

The key Federal taxes are those imposed on personal income and corporate profits earned by fishing in the Aleutian Islands. Federal expenditures include those incurred by the North Pacific Fishery Management Council for Aleutian Islands related management, by the NMFS Alaska Regional Office for fisheries management, by the Alaska Fisheries Science Center for the research and monitoring efforts supporting fisheries management, by the NOAA Office of Law Enforcement and NOAA Office of General Counsel, and by the United States Coast Guard, for law enforcement and emergency response efforts supporting the fisheries. The information on taxable incomes and profits, and on relevant tax rates, that would make it possible to estimate Federal tax revenues is not available. While Federal expenses for the BSAI fisheries in general are discussed in Section 6.2.1 of the BSAI groundfish FMP ("Expected costs of groundfish management"), information on the share of these attributable to the Aleutian Islands, and on how these might change with the management actions, is not provided there.

The State of Alaska taxes fish processed outside of and first landed in Alaska, fish processed in Alaska, and raw fish exported from Alaska, and shares a portion of these revenues with qualified boroughs and/or municipalities in Alaska. The amount of money distributed depends on the taxes collected during the program base year as defined in Alaska statute and on other factors. These other factors include the organization of each borough in which processing or landings occur and number of incorporated cities in each borough. The three cities highlighted in this section, Unalaska, Adak, and Atka all lie within the Aleutian West Census Area, and are not in an organized borough. The State of Alaska also retains portions of the revenues raised from these taxes for its own use.

Both Fisheries Business Taxes and Fisheries Resource Landing taxes are generally levied against fishery resources processed, landed, or exported in the preceding calendar year. For example, fiscal year 2011 payments or shared fishery tax revenues were generally derived from taxes collected in calendar year 2010. In the following tables the reported taxes for 2012 generally reflect fishing and/or processing activity for the 2011 calendar year, and were the first reported fisheries business taxes to fully reflect fishing activity under the interim final rule.

*The Alaska Fisheries Business and Resource Landings Taxes*

The Fisheries Business Tax is generally paid by the first processor of processed fish, or the exporter of unprocessed fish, on raw fish landed in the State of Alaska, and is based on the ex-vessel price of unprocessed fish. The tax rates vary from 1 percent to 5 percent, depending on whether the fishery resource is considered "established" or "developing," and whether it was processed by a shore-based or floating processor. Currently, the tax rates for established fisheries are 3 percent for fishery resources processed at shorebased plants and 5 percent for those processed at floating processors (AS 43.75.015).

The State retains half of the Fisheries Business Tax and returns the balance to communities and organized boroughs where, or near where, fish were landed and processed. Revenues for fish landed within a municipality's boundaries are shared with communities by the Alaska Department of Revenue (DOR). Revenues for fish landed outside of municipal boundaries are shared with communities by the Division of Community and Regional Affairs (DCRA) of the Alaska Department of Commerce. The DCRA first allocates the revenues raised statewide in proportion to share of statewide pounds of fish and shellfish processed in 19 different Fishery Management Areas (FMA), and then within FMAs by formulas that may vary by FMA. The Aleutian Islands communities most directly affected by this action, Adak, Atka, and Unalaska, fall in an FMA that distributes 60 percent of these latter revenues equally among four affected communities (in addition to the three mentioned, Akutan is included) and the Aleutians East Borough, and 40 percent in proportion to the populations of the four communities. The shared revenues for Adak, Atka, and Unalaska are summarized in Table 40, Table 41, and Table 42. [49]

The Alaska Fishery Resource Landings Tax is levied on fishery resources processed outside the three-mile limit and first landed in Alaska, or on fish processed subject to section 210(f) of the American Fisheries Act[50]. The tax is collected from floating processors and catcher/processors that process fish outside the State's 3-mile limit and bring products into Alaska for transshipment, or any processed fishery resource subject to section 210(f) of the AFA. The tax is levied each calendar year by multiplying the average annual price (an ex-vessel price) for each landed groundfish species by the amount of unprocessed groundfish. The tax rate applied to this estimate of gross revenue for unprocessed groundfish is 3 percent.[51] Fish products would not be subject to both the Fisheries Business Tax and the Fishery Resource Landing Tax.

The State retains half of the Resource Landings Tax and, as with the Fishery Business Tax, returns the balance to communities and organized boroughs where, or near where, fish were landed and processed. Revenues for fish landed within a municipality's boundaries are shared with communities by the DOR. Revenues for fish landed outside of municipal boundaries are shared with communities by the DCRA. The DCRA allocates the revenues raised statewide in proportion to share of the unprocessed value of taxed statewide fish and shellfish processed in the FMAs, and then within FMAs by formulas that may vary by FMA. The Aleutian Islands communities divide these revenues in the same way they divide those from the Fishery Business Tax. The shared Resource Landings Tax revenues for Adak, Atka, and Unalaska are summarized in Table 40, Table 41, and Table 42.

[49] Reported tax revenues in these tables are total tax revenues from all relevant fishery sources, and include revenues from species other than Aleutian Islands Atka mackerel, Pacific cod, and pollock. These estimates are provided because they provide insight into the importance of these revenues to the local communities; however, they do not themselves provide insight into the changes in these revenue streams that would follow from the different alternatives.

[50] This paragraph requires that parties to a contract implementing an AFA cooperative agree among themselves to pay the State of Alaska, for pollock landed outside of Alaska, revenues in lieu of, and equivalent to, the taxes the state would have charged had the pollock been landed in Alaska.

[51] The rate is 1 percent for a developing commercial fish species.

**Table 40 Adak, State fisheries business tax revenues**

| Adak | | | | | |
|---|---|---|---|---|---|
| DOR FY reporting year | CY of fishing activity | DOR Fishery business tax-shared | DOR Landing Tax-shared | DCED Fishery business tax shared[1] | DCED Landing Tax-shared[1] |
| 2008 | 2007 | $254,359 | $128,199 | $124,918 | $131,352 |
| 2009 | 2008 | $311,439 | $97,736 | $107,123 | $201,055 |
| 2010 | 2009 | $13,567 | $54,949 | $98,973 | $92,919 |
| 2011 | 2010 | $143,848 | $40,219 | $122,742 | $165,964 |
| 2012 | 2011 | $75,469 | $61,035 | $145,816 | $115, 360 |

Provided by DCED, DCRA –January 6, 2013. Lawrence Blood[52]

**Table 41 Atka, State fisheries business tax revenues**

| Atka | | | | | |
|---|---|---|---|---|---|
| DOR FY reporting year | CY of fishing activity | DOR Fishery business tax-shared | DOR Landing Tax-shared | DCED Fishery business tax shared | DCED Landing Tax-shared |
| 2008 | 2007 | $18,349 | $16,413 | $119,953 | $126,132 |
| 2009 | 2008 | $80,923 | $14,134 | $99,901 | $187,500 |
| 2010 | 2009 | $0 | $9,682 | $93,115 | $87,420 |
| 2011 | 2010 | $57,861 | $10,377 | $106,976 | $144,645 |
| 2012 | 2011 | $51,168 | $18,946 | $126,575 | $100,138 |

Provided by DCED, DCRA –January 6, 2013. Lawrence Blood

**Table 42 Unalaska, State fisheries business tax revenues**

| Unalaska | | | | | |
|---|---|---|---|---|---|
| DOR FY reporting year | CY of fishing activity | DOR Fishery business tax-shared | DOR Landing Tax-shared | DCED Fishery business tax shared | DCED Landing Tax-shared |
| 2008 | 2007 | $3,469,175 | $4,771,328 | $408,526 | $429,570 |
| 2009 | 2008 | $4,207,955 | $4,040,106 | $339,130 | $636,497 |
| 2010 | 2009 | $2,882,391 | $3,234,224 | $316,899 | $297,515 |
| 2011 | 2010 | $3,780,072 | $2,977,485 | $363,706 | $491,778 |
| 2012 | 2011 | $3,968,378 | $4,558,307 | $430,062 | $340,236 |

Provided by DCED, DCRA –January 6, 2013. Lawrence Blood

*Shared revenues from taxes on Atka mackerel and Pacific cod*

The Alaska Department of Revenue has reviewed confidential tax records, and has estimated combined Fisheries Business Tax and Resource Landing Tax Revenues from Atka mackerel and Pacific cod fishing activity in the communities of Adak, Atka, and Unalaska for the fiscal years 2008 through 2012. Revenues represent production from other management areas, including the Eastern Bering Sea, as well

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as the Aleutian Islands. These estimates are summarized in Table 43. These estimates have been highly aggregated by the Department of Revenue to protect tax data confidentiality.

The table is most informative with respect to revenues from Atka mackerel, almost all of which is sourced from within the Aleutian Islands. Moreover, the small catches from the Bering Sea area may also be affected by some of the alternatives.

**Table 43 Combined Fisheries Business Tax and Resource Landing Tax Revenue (in dollars)**

| Calendar year | Fiscal year | Adak | Atka | Unalaska | Total |
|---|---|---|---|---|---|
| 2007 | 2008 | $13,344 | $6,870 | $7,032 | $27,245 |
| 2008 | 2009 | *** | *** | *** | $15,360 |
| 2009 | 2010 | $18,688 | 7,729 | $10,572 | $36,989 |
| 2010 | 2011 | 14,291 | 8,339 | $7,218 | $29,848 |
| 2011 | 2012 | 32,282 | $40,383 | $37,073 | $109,738 |
| Calendar year | Fiscal year | Adak | Atka | Unalaska | Total |
| 2007 | 2008 | $517,341 | $19,681 | $3,239,559 | $3,776,582 |
| 2008 | 2009 | $604,918 | $151,548 | $3,988,509 | $4,744,976 |
| 2009 | 2010 | $215,887 | $13,856 | $2,031,430 | $2,261,174 |
| 2010 | 2011 | *** | *** | *** | $2,270,734 |
| 2011 | 2012 | *** | *** | *** | $3,449,512 |

Source: Alaska Department of Revenue.

*** indicates confidential data

Notes: This report assumes that tax returns reflect the fiscal year in which they were submitted. Actual tax payments may differ from the data in this report.

*Municipal Taxes and Revenues*

In addition to the shared Fishery Business tax, and the shared Fisheries Resource Landing tax, described above, municipalities may collect their own raw fish taxes on landings. Municipal raw fish taxes vary by community, and, where they exist, range from approximately 1 percent to 3 percent of the unprocessed value of the fishery resources. Municipalities may impose other taxes that may be affected by fishing activity, including sales taxes, bed taxes, and fuel transfer taxes. Table 44, Table 45, and Table 46, summarize tax revenue reports provided by Adak, Atka, and Unalaska to the State Department of Revenue for recent years or for projected years, based on the most recent tax and revenue reports available from the DCRA web site.[53]

In 2008, Adak levied a 3 percent sales tax and a $0.02/gallon fuel transfer tax. The sales tax increased to 4 percent in 2011 and is reported in FY 2013 as the major component of the local taxes (Table 44). Of $1.64 million in FY 2013 estimated taxes, 30.9 percent are from Fisheries Business and Resource

[53] As before, reported tax revenues in these tables are total tax revenues from all relevant fishery sources, and include revenues from species other than Aleutian Islands Atka mackerel, Pacific cod, and pollock. These estimates are provided because they provide insight into the importance of these revenues to the local communities, however, they do not themselves provide quantitative insight into the changes in these revenue streams that would follow from the different alternatives.

Landing taxes. Through 2012, Adak did not levy a dedicated local raw fish tax, although a portion of its sales tax was derived from fish sales. The amount of the sales tax attributed to fish sales is not reported in the DCED data, but approximately 1/3 of the tax base for Adak originated from activities associated with the fishing industry. In December 2012, Adak voted to adopt a 2 percent raw fish tax, and to modify its sales tax so that it no longer applied to raw fish sales by fishermen. The raw fish tax was implemented in January 2013. This was done to set Adak's fish tax rate at a level comparable to other Aleutian Islands and Bristol Bay communities (Layton Lockett, City Manager, City of Adak, personal communication, February 11, 2013).

Atka levies a 2 percent raw fish tax, and a 10 percent bed tax; these taxes rates have been in place for several years, and were not revised for 2013. In 2012, of approximately $921,734 in total municipal revenues in Atka, approximately $250,000 came from the local raw fish tax, the shared Fisheries Business Tax, and the shared Resource Landing Tax. Aggregate fisheries taxes represent approximately 27 percent of the fiscal year 2012 revenues for the municipality.

Of the three municipalities highlighted in this section, Unalaska has the largest tax and fee base. The historical budget for Unalaska from 2008 through 2010 is available on the DCRA website and is used here as the best available date for comparison purposes. Unalaska levies a 2 percent sales tax, a 2 percent raw fish tax, and a 5 percent bed tax. These taxes continue to apply in FY 2013. In 2010 total revenues for the municipality were reported to be $30.9 million. The fisheries revenues from local and shared sources for 2010 represented approximately 41 percent of the total annual revenues for this municipality.

**Table 44 Adak revenue and tax sources and annual expenditures projected for fiscal year 2013**

| Source of Local and Shared Taxes and Revenue (projected) | U.S. dollars |
|---|---|
| Local Taxes | 758,250 |
| Leases | 116,399 |
| License and Use Fees | 16,400 |
| Shared Fishery Business Tax | 295,000 |
| Shared Fisheries Landing Tax | 210,000 |
| State Aid to local govt. | 161,500 |
| Contract Services and Federal Aid | 78,001 |
| **Total Revenues** | 1,635,753 |
| | |
| **Expenditures (projected)** | |
| Administration/Finance | 314,049 |
| Clerk | 58,549 |
| Council | 6,550 |
| Public Safety | 102,502 |
| Public Works | 234,650 |
| Public Facilities | 332,658 |
| Awards and Grants | 12,500 |
| Misc. contribution funds | 574,215 |
| **Total Operating Expenditures** | 1,635,673 |

DCRA web site: Community Data **http://www.commerce.state.ak.us/dcra/commfin/Adak/AdakFY13Budget.pdf**

**Table 45 Atka revenue and tax sources and annual expenditures for fiscal year 2012**

| Source of Local and Shared Taxes and Revenue (projected) | U.S. dollars FY 2012 |
|---|---|
| Raw Seafood Tax | 30,000 |
| AK Fisheries Business | 210,000 |
| AK Fisheries Resource Landing | 10,000 |
| Transportation & Utility | 338,150 |
| Rental Lease | 60,584 |
| Investment Earnings | 111,500 |
| Other Revenues | 161,500 |
| **Total Revenues** | 921,734 |
| | |
| **Expenditures** | |
| City Salaries and Wages | 296,082 |
| Taxes and Benefits | 58,128 |
| Contract | 41,950 |
| Supplies | 18,350 |
| Communications | 13,220 |
| Travel | 19,000 |
| Other Expenses | 310,380 |
| **Total Operating Expenditures** | 757,110 |

DCRA web site: Community Data http://www.commerce.state.ak.us/dcra/commfin/Atka/AtkaFY12Budget.pdf

**Table 46 Unalaska revenue and tax sources and annual expenditures for fiscal year 2008 to 2010**

| Source of Local and Shared Taxes and Revenue (projected) | Tax or Revenue in U.S. dollars | | |
|---|---|---|---|
| | 2008 | 2009 | 2010 |
| Raw Seafood Tax | 4,689,810 | 4,619,222 | 3,594,173 |
| AK Fisheries Business | 3,909,016 | 3,877,701 | 4,547,084 |
| AK Fisheries Resource Landing | 4,362,451 | 5,200,897 | 4,676,603 |
| Property Taxes | 4,279,653 | 4,259,949 | 4,249,337 |
| Sales Tax | 7,348,387 | 6,913,131 | 5,808,605 |
| Investment Earnings | 5,266,548 | 5,614,363 | 2,648,105 |
| Other Revenues | 3,044,811 | 8,397,406 | 5,390,510 |
| **Total Revenues** | 32,900,676 | 38,882,670 | 30,914,418 |

| Expenditures | U.S. dollars | | |
|---|---|---|---|
| Mayor & Council | 421,496 | 587,206 | 751,213 |
| City Administration | 1,334,777 | 1,377,698 | 1,460,407 |
| City Clerk | 458,038 | 451,241 | 335,594 |
| Finance | 1,130,793 | 1,293,558 | 1,242,720 |
| Planning | 203,536 | 126,891 | 223,185 |
| Public Safety | 3,806,767 | 4,227,891 | 4,307,627 |
| Public Works | 4,743,217 | 5,015,862 | 5,202,844 |
| Parks, Culture & Recreation | 2,052,736 | 2,101,374 | 2,138,623 |
| Other Expenses | 4,731,258 | 5,054,832 | 5,525,888 |
| **Total Operating Expenditures** | 18,882,619 | 20,236,553 | 21,188,100 |

DCRA web site: Community Data http://www.commerce.state.ak.us/dcra/commfin/Unalaska/UnalaskaFY12Budget.pdf

### 1.2.12 Community economic impacts

*How fisheries may impact communities*

Communities in Alaska and the Pacific Northwest will be impacted by the alternatives for management of Atka mackerel, Pacific cod, and pollock fishing in the Aleutian Islands. These impacts will take several forms: (1) incomes of fishing operation stakeholders (including crew, specialized crew, vessel owners, fishing rights holders) will change, and these changes will affect personal incomes in communities directly, and indirectly through changes in local spending by the fishery stakeholders; (2) vessel home ports may see changes in fishing vessel expenditures; (3) communities in which unprocessed Pacific cod is delivered will see changes in processing activity; (4) communities (other than home ports) providing logistical support for the fleet (including providing fuel and supplies, storage, offloading support, and air ports for crew rotation) will see changes; (5) communities participating in the CDQ program may see changes; and (6) communities may be affected by changes in collections of fish taxes and by the sharing of fish taxes by the State of Alaska. This analysis also treats impacts of this action on Aleut Corporation shareholders as a community impact. These shareholders may be affected by changes in Aleut Corporation revenues (see the more detailed discussion in Sub-section 1.2.8).

For analytical purposes, it is convenient to divide the employment and impact effects associated with fishery policy changes into direct, indirect, and induced effects.[54] The direct effects are those reflected in

[54] As explained in Section 10.6, the analysis in this section is not a cost-benefit analysis, and is not provided as an input into a cost-benefit analysis.

changes in jobs and income directly attributable to participation in the fisheries. In this instance, these are changes in the direct employment of the crew of the fishing vessels and of workers in processing plants, and direct income to various participants in the fishing and processing firms: wages, salaries, or shares for crew, profits for vessel owners, or lease or royalty payments to quota share holders or to holders of CDQ fishing privileges, acquired and used by a participating fishing firm.

The indirect effects are those reflected in changes generated in other businesses, by the changes in purchases of the fishing firms. In this instance, indirect effects would accrue to businesses supplying fuel and supplies, fishing gear and fishing gear repairs, ship construction and repairs, insurance, banking, legal, and accounting services, and lobbying and consulting. In the discussion that follows, activity in a fishing firm's corporate office (overall management and strategic direction, marketing, accounting, human resources, and legal services)[55] will be treated as an indirect employment impact. There is no bright line between the production of many of these services by the fishing firm itself, and their purchase in the market place. The goods and services above are "backward" linkages. Jobs and income may also be associated with "forward" linkages, in firms providing subsequent reprocessing, warehousing, cold storage, brokering, and distribution services.

Alaska's fisheries taxes, the receipts of which are shared with the communities in which fish are landed, are another source of indirect fishery impacts. Changes in "fish" tax receipts may lead to reductions (increases) in community sales tax or property tax assessments, to additional (reduced) municipal expenditures on goods and services within the community, purchases of goods and services outside the community, or some combination of these. Employment and community member income impacts would differ, depending on which of these ways, or which combination of these ways, the tax revenues influenced spending patterns. More information about shared fisheries taxes may be found in Sub-section 1.2.11.

Induced effects are those generated in an economy when people receiving income from fisheries—through shares or wages, profits, or royalties—spend their money on things like groceries, gas, cars, car repairs, rent, home repairs, home construction, insurance. As the preceding descriptions suggest, these effects can be either positive (increases in direct, indirect, and induced economic activity in the economy of interest) or negative (loss of economic activity in the subject economic unit, e.g., village, community, region).

It is customary to think of these impacts in terms of *multipliers* showing the total employment and income impacts of changes in direct sector jobs, or of direct sector income, as the direct income circulates. Multiplier estimates for Alaskan local economies are typically lower than those for other regions of the nation, because they import a large proportion of the goods and services that are used there, and a large part of the fishing labor force in the Aleutian Islands is seasonal, transient, and from outside Alaska.[56] In general, the smaller the region or community economy examined, the smaller the multiplier, since more goods and services would be purchased from sources outside of the subject economy.

The use of a simple income and employment multiplier analysis assumes that prices and productivity in a community remain unchanged by changes in the size of the community and the scale of production. However, community growth may make it possible for firms to obtain inputs at lower prices, or may

[55] For example, the F/T *Ocean Peace* employs 7 to 9 persons in its home office (Gleason, 2010). These, and the office employees of other fishing firms, will be treated as indirect employment in this discussion.

[56] This is, by-in-large, based upon anecdotal information, because good statistics for crew place-of-residence are not available.

contribute to an increase in the productivity with which inputs may be used.[57] Lower input prices, or greater productive efficiency, could then themselves contribute to additional community growth.

For example, a larger community may be able to afford a larger fixed investment in power infrastructure, possibly allowing it to provide power at lower incremental costs, or increasing the reliability and the productivity of the power supply. In a larger community, individuals may have more opportunities for child care, and be less liable to miss work due to sick children. This could increase worker productivity. Increased income, and increased transient and permanent populations, may also create increased demand for and ability to support amenity infrastructure (such as swimming pools or playgrounds). These may also reduce the cost to local firms of attracting employees. A larger market may provide economies of scale, and increased competition, possibly leading to lower prices. Increased economic activity at Adak associated with more port visits by vessels fishing Atka mackerel, Pacific cod, and pollock, or larger deliveries of Pacific cod and pollock for processing, could contribute to lower costs of production, or higher productivity in the production of other species, or allow economies of scale with respect to non-fishing activity, such as airport passenger and air freight services.

However, none of this is certain, this is a complex issue, and we have little information about how these considerations may affect development in communities such as those under consideration here. It is not clear how important these types of growth enhancing factors may be in affected communities as a result of the alternatives under consideration. For example, while increased deliveries of Pacific cod to Adak in the spring may be associated with reduced annual average costs of air passenger service to Adak, or of processing fish at the processing plant, and may reduce average costs within the A-season, they may not have effects that carry over from one season to another within a year. Air service that may be viable in March during the Pacific cod trawl fishery, may or may not be viable in August. Similarly, fish processing may be economically viable in March but not August. In 2013, the fish processing plant operated by Icicle Seafoods in Adak was scheduled to close for the summer "due to the high operating costs during the slower summer months" (NPFMC 2013a: 19).[58]

Background information on the relevant communities defined for this analysis (Adak, Atka, Unalaska, Other Alaskan Communities, Pacific Northwest, CDQ communities, and Aleut Corporation shareholders) may be found in Sub-sections 1.2.7 (CDQ), 1.2.8 (Aleut Corporation shareholders), and 1.2.9 (Subsistence).

*A note on employment impacts*

A preliminary review of data on weeks with landings for vessels that operated in 2010 in the fisheries that were regulated by the interim final rule does not preclude the possibility that the interim final rule led to large employment declines, but does not support the hypothesis either.

Both income and employment are important dimensions of impacts on individual persons. This discussion about employment does not have implications with respect to the changes in income for the persons employed, and in fact these may not move tightly together. For example, a fishing firm facing reduced revenues may continue to employ the same numbers of people, but they may each receive smaller crew shares.

[57] The literature on urban and spatial economics refers to these as "agglomeration economies." Agglomeration economies may be "pecuniary" when an increase in community size reduces the costs of inputs, or 'technical" when an increase in community size increases input productivity.

[58] This is mentioned for illustrative purposes. Later in Spring 2013, Icicle Seafoods decided to cease operations at Adak completely. At the end of 2013 the firm Adak Cod Cooperative LLC planned to operate at Adak. (Shedlock, 2013).

Table 47 provides information on weeks of fishing activity for four groups of vessels. The groupings used reflect the sectors used elsewhere in this analysis, but also differ from them somewhat. Trawl catcher/processors are examined in two groups: the seven Amendment 80 catcher/processors that dominate the Atka mackerel fishery, and the other vessels (Amendment 80 and others) that target Pacific cod. Additionally, both trawl and non-trawl catcher vessels have been grouped together.

The table summarizes information for the vessels in each sector that were fishing in 2010, the year before the interim final rule went into effect. It shows the total weeks fishing all groundfish off of Alaska by these vessels in 2009, 2010, 2011, and 2012. The weeks fishing have been multiplied by average crew sizes from Table 17 to provide estimates of the number of person-weeks of fishing employment in each year. Finally, to enhance the meaningfulness of the numbers, and comparability, the fishing employment has been reframed as annual-equivalent jobs (AEJs), by assuming an annual job is 48 working weeks.

These are very rough estimates of vessel activity over the course of the year. They do not include activity as tenders, or fishing in non-groundfish fisheries; they do not include transit time, or time in port. A week is included whether the vessel was fishing one day or seven days. Many factors other than the interim final rule could have affected weeks spent fishing (examples include, but are not limited to changes in TACs, prices, PSC levels, or other structural changes in the fisheries, such as the development of the freezer-longline fishing cooperative). The estimates are offered as a preliminary index of activity by these vessels, pending further research.

The results do not indicate reduced levels of activity by the sectors. The number of Atka mackerel annual-equivalent jobs declines somewhat in 2011 from 293 to 276, but then increases above the 2010 levels to 295 in 2012. Similarly, the number of Pacific cod trawl catcher/processor annual jobs drops somewhat in 2011, before rising above the 2010 level in 2012. The non-trawl catcher/processor annual jobs rose considerably in 2011 and 2012. This may be due to rationalization following the formation of a cooperative among the freezer-longliners in the second half of 2010, a provision in the interim final rule that altered fishing seasons so as to allow the freezer-longliners to fish a greater part of the year, or an increase in BSAI Pacific cod TACs in 2012. Finally, catcher vessel groundfish annual jobs also increased slightly in 2011 and 2012.

These results do not preclude a reduction in weeks fishing in the Aleutian Islands, but they strongly suggest that vessels active in 2010 responded, at least in part, to the interim final rule by redeploying and fishing more weeks in other groundfish fisheries.[59] These results do not preclude adverse employment impacts from the interim final rule; they are simple approximations of employment, only look at one component of firm employment, do not look at non-groundfish fishing functions, do not look at indirect or induced employment, and do not compare employment to an explicit counter-factual in which the interim final rule had not gone into effect. As noted above, they do not address changes in income for the persons employed. The only implication is a limited one: they do not appear to provide evidence for the hypothesis that the interim final rule led to large reductions in direct employment in the sectors directly regulated by the action. In 2011, employment dropped by 6 percent and 4 percent in two sectors, but rose in two others; in the second year, employment rose to levels exceeding 2010 levels in three of the sectors (although dropping below 2010 levels in the fourth sector after having risen above 2010 in 2011).

[59] The 2010 EA accompanying the interim final rule included estimates of the employment impacts of this action based on the use of an impact model developed at the Alaska Fisheries Science Center. (NMFS 2010b, Section 10.7.2) This model estimated employment impacts by extrapolating from changes in gross revenues. This analysis has not been updated for the EIS and the RIR, however, because this preliminary analysis of annual equivalent job impacts raises questions about the application of the model in this instance.

**Table 47 Estimated annual-equivalent years of groundfish fishing on vessels active in 2010 in fisheries regulated by the interim final rule during the following year**

| Year | Weeks | Average crew | Total weeks | AEJs | Weeks | Ave crew | Total weeks | AEJs |
|---|---|---|---|---|---|---|---|---|
| | Atka mackerel trawl C/Ps | | | | Pacific cod trawl C/Ps | | | |
| 2009 | 248 | 56 | 13,786 | 287 | 170 | 56 | 9,450 | 197 |
| 2010 | 261 | 54 | 14,047 | 293 | 178 | 54 | 9,580 | 200 |
| 2011 | 256 | 52 | 13,248 | 276 | 179 | 52 | 9,263 | 193 |
| 2012 | 263 | 54 | 14,157 | 295 | 194 | 54 | 10,443 | 218 |
| | Non-trawl C/Ps | | | | Catcher vessels | | | |
| 2009 | 325 | 19 | 6,269 | 131 | 335 | 4 | 1,464 | 30 |
| 2010 | 317 | 19 | 6,102 | 127 | 339 | 5 | 1,539 | 32 |
| 2011 | 344 | 20 | 6,835 | 142 | 362 | 4 | 1,586 | 33 |
| 2012 | 313 | 19 | 5,906 | 123 | 418 | 4 | 1,831 | 38 |

Notes: Vessel weeks are weeks of groundfish fishing in the designated year for vessels active in the Aleutian Islands fisheries in 2010 (the year before the interim final rule went into effect). These estimates do not include weeks spent in non-fishing activity (transit, tied-up), in non-groundfish fishing, and, for catcher/processors, weeks spent operating as a mothership, but not fishing. Annual equivalent jobs are estimated assuming a 48-week work year. Sectors defined somewhat differently than in remainder of this analysis: trawl and non-trawl catcher vessel sectors group; trawl catcher/processors broken out into seven key Atka mackerel vessels, and other catcher/processors.
Source: Vessel weeks AKR CAS. February 20, 2013. Average crew from Table 17.

An alternative approach, using EDR data available from the Amendment 80 vessels targeting Atka mackerel in the Aleutian Islands, provides some confirmation for this last conclusion that this general approach does not provide evidence for a large amount of job loss, and hints at some of the complexities missing from the analysis.

The EDR reporting provides information on the number of days a year a reporting vessel was inactive, and the average crew size of the vessel during the year. Assuming that active days are equal to 365 minus the number of inactive days, that each seven days constitutes a week of activity, and that there are 48 weeks of activity per vessel a year, it is possible to compile an AEJ index for these vessels. This alternative approach to estimating AEJs is based on different data and a different methodology. This methodology (starting from a number of days and dividing by 7 to determine a count of weeks) may have shortcomings of its own. Given the differences in the approaches, the estimated AEJs do not appear to be very different. The results are summarized in Table 48.

The results for this fleet sector, the seven trawl catcher/processors targeting Atka mackerel, are similar. These data do not suggest a large decline in direct employment in this sector. This data set does make it possible to compare the results for the Atka mackerel vessels with other vessels in the Amendment 80 fleet. AEJs in both fleets rose from 2010 to 2011, but the percentage increase for the other Amendment 80 vessels was higher than that for the Atka mackerel vessels. This raises the question of whether or not employment in the Atka mackerel fleet might have grown at a similar rate in the absence of this action. This is not a question that can be answered without additional research.

**Table 48 Estimated annual-equivalent years of activity by Amendment 80 vessels from 2008 through 2011**

| Year | Average reported Inactive days | Estimated average active days | Average reported crew sizes | Number reporting vessels | Estimated person-weeks fishing | Estimated AEJs |
|---|---|---|---|---|---|---|
| Amendment 80 Atka mackerel vessels | | | | | | |
| 2008 | 101 | 264 | 53.29 | 7 | 14,045 | 293 |
| 2009 | 126 | 239 | 47.57 | 7 | 11,356 | 237 |
| 2010 | 114 | 251 | 49.29 | 7 | 12,364 | 258 |
| 2011 | 108 | 257 | 49.00 | 7 | 12,593 | 262 |
| Other Amendment 80 vessels | | | | | | |
| 2008 | 85 | 280 | 29.70 | 15 | 17,841 | 372 |
| 2009 | 98 | 267 | 31.40 | 15 | 17,961 | 374 |
| 2010 | 100 | 265 | 24.40 | 15 | 13,877 | 289 |
| 2011 | 79 | 286 | 26.10 | 14 | 14,948 | 311 |
| Notes: based on EDR data supplied by the AFSC; AKR estimates. | | | | | | |

### 1.2.13 Product markets

Almost all the supply of Atka mackerel in the United States originates in the Aleutian Islands. Industry sources indicate that larger Atka mackerel bring higher prices than smaller Atka mackerel, and that the size of Atka mackerel in harvests tends to increase as fishing moves from west to east along the Aleutians. Thus, Atka mackerel from Area 541 are likely to bring higher wholesale prices than Atka mackerel from Area 543.

Since most Atka mackerel is believed to be exported to consumer markets in East Asia, and relatively little is said to be consumed in the United States, the reductions in the harvest of this species projected in this analysis would have little impact on U.S. consumers' surplus. Since a Regulatory Impact Review cost-benefit analysis is required to focus on impacts experienced by U.S. domestic consumers, the relevant consumers' surplus impact of the reduction in Atka mackerel supplies is probably close to zero.

Most domestically-produced Pacific cod fillets are destined for the domestic market for use in the foodservice industry. However, Pacific cod harvested in Alaska groundfish fisheries and processed as headed-and-gutted is ultimately exported. While a change in consumers' surplus in foreign markets does not enter into the cost-benefit calculations in an economic analysis from a national accounting perspective, the change in U.S. markets does. (Fissel et al., 2012)[60]

Industry sources note that the size distribution of Pacific cod in the Aleutian Islands is skewed towards larger fish than are available in the Bering Sea. The F/V *Katie Ann*, which has targeted Pacific cod in the Aleutian Islands on her own behalf, and which has accepted deliveries from catcher vessels targeting Pacific cod, has served a U.S. market of restaurants serving fish and chips. In 2010, representatives of the F/V *Katie Ann*, and of Ivar's, a chain of 60 restaurants in the Pacific Northwest, indicated that Ivar's used Pacific cod from the F/V *Katie Ann* for most of its fish and chips product, citing the large size of the fish, and the resulting quality of the product. The large size of Pacific cod from the Aleutian Islands may limit its substitutability with other products (Donegan 2010; Jacobs 2010; Jacobs, personal communication,

[60] Specifically see the section titled "Alaska Groundfish Market Profiles 2008." By Northern Economics Inc., updated by Terry Hiatt and Ben Fissel, November 2012.

August 24, 2010[61]). If access to this source of Pacific cod was limited by an alternative under consideration in this action, firms selling products whose quality depends on the size of the fish would be likely to substitute alternative and less desirable sources of whitefish, leading to a possible loss in domestic consumers' surplus; conversely, if a change in regulations increased the availability of larger, higher quality, fish, consumers' surplus might be increased.

Markets for BSAI pollock fillets and surimi exist in the United States. Aleutian Islands pollock are believed to have relatively large egg sacs. The market for this roe is in Japan and Korea and not to any great extent in the United States (Fissel et al., 2012)

Fisheries off Alaska appear to account for most or all of the world production of rock sole and yellowfin sole. The rock sole fishery has been, predominately, a roe fishery. In the past, most male rock sole were discarded because of their low value, but this is changing in response to the development of markets for male rock sole, and to changing management measures. In the past, most rock sole was exported to Japan, but Japanese imports have declined since 2004, possibly due to preference changes associated with generational change. Exports to China/Hong Kong, where the sole is filleted and re-exported to the United States, have risen considerably since 2004. (Fissel et al., 2012)

Whole round yellowfin sole is sold to South Korea for consumption there. Headed and gutted yellowfin sole are sold to re-processors in China and processed into individual skinless boneless fillets. Most of these are then re-exported to the United States and Canada to the food service market. Apparently increasing amounts of fillets are being exported to Europe or consumed in China itself. China evidently has an advantage in the relatively labor intensive process of filleting the relatively small fillets of the yellowfin. (Fissel et al., 2012)

While Asian markets are important for both rock sole and yellowfin sole, supplies also appear to find their way to the U.S. market. Thus, impacts on these fisheries may affect U.S. consumers' surplus.

### 1.2.14 "Revenue-at-risk" methodology

Key measures in the alternatives open or close Steller sea lion critical habitat in the Aleutian Islands to directed fishing for Atka mackerel, Pacific cod, and pollock. Fishing operations of different types are expected to respond to these changes in different ways, as they seek to minimize the costs of the altered regulatory constraints. For any given alternative, the actual fishing responses would vary from year to year, as circumstances change.

It would be desirable to have programming or simulation models, which would make it possible to project how these operations would respond, and how net measures of their returns would be affected, as this happened. While research on the spatial dimensions of vessel fishing activity, including in the North Pacific fisheries, is very active right now, it has not advanced to the point where it can be adapted to this analysis. Moreover, any such analysis would face difficult problems projecting the appropriate future environmental, technological, market, and regulatory conditions under which vessel responses should be assumed to take place.

Notwithstanding these considerable data limitations and model constraints, the analysts are required to use the "best available scientific data and commercial information" to evaluate the likely operational,

[61] Jacobs, Jan. Director of Government Affairs, American Seafood Company.

economic, and social impacts attributable to each action alternative, relative to the baseline "No Action" alternative. Executive Order 12866 (Clinton, 1993) expressly mandates that:

> "In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches agencies should select those approaches that maximize net benefits **(including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity)**, unless a statute requires another regulatory approach." [Emphasis added]

Further guidance on preparation of regulatory impact analyses is found in the President's Office of Management and Budget Circular A-4 (Office of Management and Budget, 2003). There, the analyst is advised that:

> "You need to measure the benefits and costs of a rule against a baseline. This baseline should be **the best assessment of the way the world would look absent the proposed action… It may be reasonable to forecast that the world absent the regulation will resemble the present.** If this is the case, however, your baseline should reflect the future effect of current government programs and policies." [Emphasis added]
>
> "In unusual cases where no quantified information on benefits, costs, and effectiveness can be produced, the regulatory analysis should present a qualitative discussion of the issues and evidence."
>
> "Your analysis should also present information on the streams of benefits and costs over time in order to provide a basis for assessing intertemporal distributional consequences, particularly where intergenerational effects are concerned."
>
> "If fundamental scientific disagreement or lack of knowledge prevents construction of a scientifically defensible probability distribution, **you should describe benefits or costs under plausible scenarios and characterize the evidence and assumptions underlying each alternative scenario.**" [Emphasis added]

Consistent with the foregoing regulatory mandates, and in the absence of more sophisticated tools, we provide as background information estimates of the volumes of historical harvest, and the corresponding gross revenues, associated with areas variously under consideration for openings and closures under the different alternatives. These estimates of the historical volumes of fish and of the associated fishing gross revenues that came from those waters under consideration for closure are referred to as harvest, or gross revenues, "at-risk." Historical volumes of fish or associated fishing gross revenues that came from waters that would remain open to fishing under an alternative are referred to as "residual" harvest or revenue.

This calculation of volumes of fish that came from within the closed areas is based on estimates made using the Alaska Region's Catch in Area (CIA) Database. This, in turn is based on the Alaska Region's Catch Accounting System data, modified by algorithms developed to allocate catch to areas with a fine spatial scale. The Council's SSC has reviewed the methods underlying the CIA. Catches from closed areas were monetized using annual species price information derived from the Alaska Fisheries Information Network and converted into real, inflation-adjusted dollars.

These descriptions of historical catch and associated gross revenues are not statistical estimates of the impacts that would necessarily occur under each alternative. They are, however, representations of "plausible scenarios," based upon the best available data and information, as "characterized (by) the evidence and assumptions underlying each alternative scenario," described throughout this economic analysis. If these alternatives had been in place during the baseline years, actual residual harvests and revenues would likely have been substantially different than the harvest or revenues from the areas that would have remained open, as in reality fishing operations would redirect efforts to optimize economic returns under the new circumstances; decreasing, at least to some (unknown) degree, the potential loss of harvests and revenues that would have otherwise been associated with the areas closed, had the alternative been in place. Nevertheless, this empirically based information, if appropriately employed and sufficiently qualified, may be useful in defining "plausible scenarios" that allow discussion of the possible relative impacts across different fishery sectors, were these alternatives to be put in place in future years.

The specific baseline years chosen were selected based on a balance of considerations: (1) did NMFS have data for the year with a sufficiently fine spatial resolution that it was possible to estimate the species production that came from the, frequently complex, areas defined for protection; (2) was there production from within the critical habitat that would be closed by the alternatives; (3) did the years occur before the introduction of the interim final rule; (4) did the years capture important elements of the current regulatory structure; (5) was there a reasonable consistency of management structure during the years considered. Not all of these conditions could be met perfectly for any set of years, and the baseline years chosen represented a balancing of these considerations. The baseline years for Atka mackerel and Pacific cod alternatives are 2004 through 2010. The baseline years for pollock alternatives are 2005 through 2012 (although lack of fishing within critical habitat, and a consequent inability to make estimates of pollock production inside of critical habitat during these years, reduces the utility of the pollock baseline).

While the baseline is relevant for describing the changes in activity, revenues, and costs that plausibly may have been associated with the alternatives (with the limitations noted above), other information from non-baseline years has been used in the analysis where appropriate. For example, ABCs from 1991 through 2014 are used to create estimates of the potential range of Aleut Corporation pollock allocations under the alternatives, and observed harvests from 1991 through 1998 are used to estimate the potential for pollock production in critical habitat.

The selected baseline years do have several drawbacks. One is the inevitably limited range of environmental variability that can be observed over a 7-year period. A corollary of this is the relatively limited range of Council species specifications (ABCs and TACs) that can be included. Secondly, there were important regulatory changes, even during this 7-year period, so that the years do not provide a consistent regulatory background. Important regulatory changes during this period include Amendment 80, which restructured the important non-AFA groundfish fishery (and affected Atka mackerel and Pacific cod), and Amendment 85, which allocated BSAI Pacific cod among user groups. A third drawback is that the institutional framework for the baseline years will only imperfectly represent the future regulatory structure. For example, the freezer longline sector's cooperative became fully inclusive in August 2010, at the end of the baseline period. Thus, while the baseline years would not be affected by this measure, future non-trawl catcher/processor fishing will be. As another example, the Council has recommended separate Aleutian Island and Bering Sea Pacific cod ABCs in 2014 and 2015. This did not affect the baseline years, but may affect impacts of the alternatives in future years.

Given these considerations, it is clear that estimates of residual revenues and at-risk revenues contained in this analysis are not, and cannot be, projections of these values in the future if one or another of the alternatives were adopted. Even if these could be forecasted with pinpoint accuracy, the at-risk and residual estimates do not provide a complete picture of the catch and gross revenue impacts on the several

fishing fleets active in this area. They do not capture price changes that may be associated with, and offset some of the revenue impact of, changes in harvest.

In addition, they do not capture behavioral changes by vessel operators. Operators will respond to the fishing area restrictions by redeploying their vessels, in an effort to offset the burden of the action, and minimize the costs of any new restrictions. It may be possible for them to redeploy from closed areas to open areas in the Aleutians, increasing harvest in those open areas to offset lost harvest in the closed areas. If so, the at-risk and residual harvest and gross revenue will be poor guides to the actual impacts in the Aleutians themselves, and actual harvests will be higher than the reported residual harvests. More broadly, fishing operations may redeploy to new fisheries in new areas of the Bering Sea, Gulf of Alaska, or the Pacific Northwest. This possibility is not captured in the residual revenue methodology. NMFS has supplemented the revenue-at-risk analysis with additional information and analysis, particularly with respect to the potential redeployment of fishing fleets as they seek to offset adverse impacts of the proposed alternatives by becoming more active in other fisheries.

These measures also have important limitations as measures of the welfare impacts of the alternatives. They are gross measures and do not take account of changes in variable costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues, minus the change in variable costs associated with the action (Just, Hueth, and Schmitz 2004). However, data with which to estimate these welfare measures are not available because necessary industry cost information is not available. Because the measures presented in this analysis assume no reaction by the regulated entities to minimize the costs to them of the action they represent, in a sense, a 'worst case' scenario.

Given these known limitations and potential short comings, the at-risk and residual catches and revenues from areas that would have been closed or open under a given alternative, had that alternative been in place during the baseline years, will be interpreted as a first approximation of the relative impact of the action on the directly regulated fleets during the baseline years. They have been supplemented by qualitative discussions of the redeployment alternatives available to the directly regulated fleets, and other factors which may cause the gross revenue measures to deviate from more appropriate welfare measures.

During the baseline years, vessels chose to fish in certain spatial patterns. Operators that fished inside open critical habitat, or outside of critical habitat, did so presumably because they believed this behavior would maximize profits, *ceteris paribus*. Alternatives that leave open areas with relatively larger amounts of harvest during the baseline years, leave open areas that were relatively more attractive to fishermen during that time. Alternatives that would close areas that represented substantial proportions of total harvests and revenues for the baseline years are assumed, all things being equal, to result a lesser relative (but quantitatively unknown) ability of the fleet to fully offset the potential loss of whatever revenues would be otherwise associated with those same areas today.

To some extent, these fisheries may lend themselves to this approach more than some others, (abstracting from the ability of these fleets to redeploy outside the Aleutian Islands) because of the localized nature of the fisheries in time and/or space. Atka mackerel are habitat specific and aggregate in certain locations; non-trawl fisheries for Pacific cod are spread through the Aleutian Islands, but take place from three to ten miles from shore because of the depth strata they exploit; trawl fisheries for Pacific cod primarily take place over about 10 weeks in the late winter and early spring in specific locations; a new pollock fishery will be an A-season roe fishery, and the available observer data from the 1990s suggest that it was relatively concentrated at a few locations; protection of habitat areas of particular concern also limit potential redeployment of vessels using non-pelagic trawl gear to target Atka mackerel and Pacific cod within the Aleutian Islands. More details, including maps showing the locations of historical catches, can be found in Chapter 3 of the EIS.

Given these concerns, estimates of residual revenues under each alternative have been used as a rough index of the relative operational and gross economic burden each alternative would have placed on fleet sectors during the baseline years and, by implication, a "plausible scenario" of the relative burden that may accrue, if a particular alternative is adopted under this proposed action. It is worthy of note that, because there are so many factors that enter into an estimate of impacts under such uncertain circumstances, the resulting ordinal ranking of alternatives could possibly change, were that missing information available. That is, it's not necessarily true that the ranking of alternatives on the basis of gross revenue at risk corresponds to the "true" impact on industry or on net benefits. Furthermore, even if one agrees that the ordinal rankings are correct, an ordinal index does not provide insight into the relative scale of attributable impacts, That is, an ordinal ranking says nothing more than, for example, Alternative A appears to be preferred to (i.e., "better" than) Alternative B on the basis of the criteria selected. It tells one ***nothing*** about "how much better" Alternative A is than Alternative B (e.g., Alternative A has X percent fewer adverse economic impacts than Alternative B). This is an important caveat.

Notwithstanding this acknowledged shortcoming, NMFS and the Council have used "revenue-at-risk" analysis to evaluate proposals for spatial closures. This approach, or very similar approaches, have been used in the Alaska Region, including in the Supplemental Steller Sea Lion EIS in 2001 (Appendix C) (NMFS, 2001), the Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska of 2005 (Appendix C) (NMFS, 2005a), and the 2010 Steller sea lion protection measures EA (Chapter 10) (NMFS, 2010b). The Council's SSC endorsed the proposed methodological approach to this RIR, including the use of revenue-at-risk analysis in October 2012, subject to the qualifications that have been discussed in this section (Section 1.20).

A difference-in-differences analysis was considered as an alternative to the revenue at risk analysis. A difference-in-differences analysis exploits natural experiments with two similarly situated groups, a control and a treatment group, where the treatment group was subjected to some external impact that was not felt by the control group. The treatment and control groups are then compared with respect to how outcomes of interest changed for each. The "differences" are the changes in the outcome of interest for each group, and the "difference" is the difference between these changes. Under the right circumstances both groups are subject to the same set of "background" conditions, and the difference in their differences may be interpreted as a result of the impact. In the Aleutian Islands, for example, if half of the hook-and-line catcher/processors had been subjected to the closures and half had not, one might compare average gross revenues for the two groups in the year before and the year after the effective date of the interim final rule to look for the impact of the rule. A simpler analysis, proposed in public comments on the chapter in the draft of the EIS that is the basis for this RIR, that simply looked at the changes from the period before the interim final rule, and the period after, a "before-after" methodology, lacked the control group element present in the difference-in-differences approach.

However, NMFS determined that this approach, and by implication the before and after methodology, did not lend itself to analysis of the interim final rule for several reasons: (a) the analysis addressed five alternatives, not simply the interim final rule and a return to 2010 (essentially Alternative 4); (b) control groups were not available: all Aleutian Island vessels of a certain class were subject to the same impact and vessels fishing outside of the Aleutians were not considered a suitable control group due to the possibility of selection bias (that is, there were reasons some vessels were active in the Aleutian Islands and some were not); and (c) a comparison of events in two years would focus on too few years of experience. Although the analysis was primarily based on the revenues-at-risk approach, supplemented with a qualitative analysis of redeployment, "before and after" analyses were occasionally used to supplement the revenue at risk analysis.

### 1.2.15 Gross revenue estimates

Gross revenue estimation methods differed between the background tables of Section 1.2, and the analytical tables included in Sections 1.3 through 1.12. The tables were prepared by different agencies, using somewhat different methodologies. The different methodologies reflected different purposes; the analytical tables had to be constructed to allow them to be manipulated to prepare different revenue estimates for the different levels of production associated with the different alternatives, the tables in Section 1.2 did not have to serve this function. The following paragraphs discuss the ways revenues were estimated for (a) catcher/processors, (b) catcher vessels at the ex-vessel level, and (c) processor first wholesale value of catcher vessel production.

Catcher/processor wholesale values. Wholesale catcher/processor gross revenue estimates in the Section 1.2 background tables are based on BSAI-wide prices derived from Commercial Operator's Annual Report (COAR) data, and on Aleutian Island product volumes derived from Weekly Processor Report (WPR)[62] data. Catcher/processor wholesale prices for different processor-species-product combinations are estimated as the COAR-based Product Price Index (PPI).[63] The COAR-based PPIs are matched to the WPR volumes using an algorithm that first attempts to match processors, species, and products, then progressively moves through coarser aggregations until all products in the WPR have an assigned price. Catcher/processor gross revenues, equal to the sum of the products of all matched prices and volumes, are estimated separately for catcher/processors using trawl gear, and catcher/processors using non-trawl gear. (Fey, personal communication, April 15, 2013) [64].

A different procedure was used to calculate wholesale catcher/processor gross revenues in Sections 1.3 to 1.12, where the value of production in the baseline years from open and closed fishing areas was also estimated for multiple alternatives. The prices, in these later sections, were at-sea round prices calculated from estimates of the COAR-WPR-based wholesale gross revenue estimates for different species and gear types, and inferences from WPR product data and product recovery rates, on the round weight of total purchases of those species by vessels of the appropriate gear type. Thus, gross revenues for a particular species, as calculated above, would be summed across all catcher/processors and product types, and divided by the round weight of purchases of that species (also from the WPR). While the word "price" is used here for these "values per metric ton round weight," they do not represent specific prices paid for a product at the wholesale level, but are a wholesale value applied to round weight to reproduce an estimated wholesale gross revenue for all products produced by that round weight (Fey, personal communication, April 15, 2013). Total gross revenues in Sections 1.3 to 1.12 were then estimated as the sum of the products of these prices and of volumes of production from inside and outside Aleutian Islands closed critical habitat derived from the NMFS Alaska Region's Catch in Area (CIA)[65] database (Lewis, personal communication, April 15, 2013)[66].

While the background tables in Section 1.2 and the analytical tables in Sections 1.3 to 1.12 were based on the same estimates of wholesale prices, they are based on somewhat different measures of fishery production. Section 1.2 wholesale revenues apply the prices to production derived from WPR reports, while Sections 1.3 to 1.12 apply the prices to production derived from the CAS. WPR estimates of production can diverge from CAS estimates, thereby generating somewhat different estimates of total

[62] The WPR data is now submitted daily.

[63] The PPI was developed by the Gross Earnings Workgroup, a collaboration between the Alaska Fisheries Science Center (AFSC) and the Alaska Fisheries Information Network (AKFIN). The PPI was originally created by AFSC for use in the Economic Stock Assessment and Fishery Evaluation Report (SAFE) and had been used for many years. In 2011, the process was vetted by the workgroup and replicated by AKFIN with minor changes.

[64] Fey, Michael. Data manager, Alaska Fisheries Information Network, Anchorage, Alaska.

[65] The CIA data is a subset of NMFS Catch in Area data set, but one providing a finer spatial breakout of the data.

[66] Lewis, Steve. Geographical Information Systems Coordinator, Alaska Regional Office, NMFS.

wholesale revenues. Several data inputs are used to generate the CAS estimates, including WPR information, observer information, and eLandings information. The CAS system estimates are NMFS's official record of catch.

To better understand the differences, NMFS examined differences between Aleutian Island total wholesale gross revenue estimates from the two sources, creating an index equal to the average of the absolute difference in gross revenues between the estimates, divided by each of the two estimates. Out of 21 observations on catcher/processors (seven baseline years, and three sectors – trawl Atka mackerel, trawl Pacific cod, and non-trawl Pacific cod), this index reached 10 percent three times, and reached 18 percent one time – for non-trawl catcher/processors in 2006. As noted above, however, the difference is due to production, not price estimates, and the analytical sections from 1.3 to 1.12 are based on the NMFS official record of catch.

Ex-vessel values. Ex-vessel gross revenue estimates in Section 1.2 are based on price data prepared by the Alaska Commercial Fisheries Entry Commission (CFEC) and on harvest data from the CAS. The CFEC prices are based on a mix of information on prices from the COAR, and from State of Alaska fish tickets. For this project, these are averaged at the species, target fishery, and Aleutian Islands or Bering Sea levels. Volumes of production of a species in a target fishery are aggregated across vessels and then priced using the most appropriate average prices. Gross revenues are aggregated across gear types to report revenues by trawl and non-trawl gears (Fey, personal communication, April 15, 2013).

Ex-vessel gross revenues in Sections 1.3 to 1.12 are estimated in a similar way. Prices are calculated for trawl and non-trawl vessel classes by dividing total gross revenues for trawl and non-trawl gear, by the total volume harvested by each sector (from the CAS). (Fey, personal communication, April 15, 2013) Gross revenue estimates are then made by summing the products of these prices (in dollars per metric ton round weight) and relevant estimates of metric tons round weight associated with open and closed critical habitat under different alternatives (Lewis, personal communication, April 15, 2013).

Because background summary tables in Section 1.2, and analytical tables in Sections 1.3 to 1.12 were calculated using the same CFEC prices, and the same catch information from the CAS, these tables show minor differences.

Wholesale value to processors of catcher vessel deliveries. A somewhat different approach was used to prepare estimates of the wholesale gross revenues received by processors for fish delivered by trawl and non-trawl catcher vessels.[67] For these deliveries, both the background tables in Section 1.2, and the analytical tables in Sections 1.3 to 1.12, were calculated in the same way.

The wholesale prices received by processors for these deliveries are based on values per metric ton round weight used by the Alaska Fisheries Science Center to prepare Table 27 in the Center's annual groundfish economic SAFE report. These are BSAI-wide prices, and are not differentiated by gear type. These prices have a long history of use in the Alaska Region. Total wholesale gross revenues were estimated by matching[68] these BSAI species or species-group specific prices with estimates of the metric tonnages in

[67] This applies to catcher vessels making deliveries of Pacific cod shoreside and to motherships. Catcher vessel deliveries of Atka mackerel to motherships are treated as discussed in the section on catcher/processor wholesale values.

[68] The "matching" work behind Sections 1.3 through 1.12 was not trivial. Here is a more detailed discussion of the procedure. For the analysis in Sections 1.2 through 1.12, prices were prepared at the ex-vessel level, and at the first wholesale level (separately for at-sea processors and for shoreside processors). Prices were obtained from AKFIN or the AFSC and were uploaded into the system by agency species code, subregion, and gear type. All retained groundfish species were covered in the price update process. After the first set of updates, fields with missing price\ton values were updated only by species group code, subregion, and gear type. A final iteration updated any missing price\ton values based on species group code and gear type only. Only ex-vessel and at-sea wholesale prices were categorized by gear type; gear breakouts were not available for shoreside wholesale prices. Ex-vessel prices were Aleutian Islands prices for trawl and fixed gear, reflecting the fact that most of the

the Aleutian Islands subarea, multiplying prices and quantities, and summing across species. Prices are weighted averages of the processor wholesale prices for mothership and shoreside deliveries; the weights are the proportions of the species being delivered to each category of processor.

NMFS considered using an approach to estimating processor wholesale values for shoreside deliveries that paralleled that used for estimating catcher/processor wholesale values. In this instance, COAR prices and eLandings Production Report (ELPR) volumes would have been used to estimate total wholesale gross revenues. The ELPR product data, and product recovery rates, would then have been combined to estimate the associated round weight of production. Dividing the total gross revenues, by the total round weight of production, would have generated the processor first wholesale values per metric ton round weight. However, value estimates generated by this process differed considerably from other prices used in the analysis. Because of increased consistency among price series, because the AFSC prices have a long history of use in the groundfish economic SAFE document, and following expert advice from AKFIN, the current procedure was used. (Fey, Lewis, NMFS In-season management, personal communication, 2013)

Because of the approaches used here, there are no differences between baseline wholesale revenue estimates in the trawl catcher vessel background tables in Section 1.2, and trawl catcher vessel estimates in Sections 1.3 to 1.12.

*Regional price variation*

Industry sources report that there is regional price variation in Atka mackerel and Pacific cod prices. For example, there is a tendency to find larger and more valuable Atka mackerel in Area 541, with average size and value decreasing with a movement west through Areas 542 and 543. There can be other, more localized, price variations; for example, within Area 542 fish are said to be smaller and to bring a lower price on the Petrel Bank, outside critical habitat, than inside critical habitat (Gauvin, Swanson, Kercheval, personal communications).[69] Fishing industry sources in the trawl and in the non-trawl sectors also report that Aleutian Islands Pacific cod tend to be larger than the Pacific cod taken in the Bering Sea, and that they bring higher prices for this reason.[70] (Jacobs, Hosmer, Magnuson, personal communications, August and September 2010).[71]

catcher vessel retained catches were made by trawl catcher vessels. At-sea wholesale prices were Aleutian Islands prices for trawl and fixed gears.

[69] John Gauvin, Gauvin and Associates, Burien, Washington. Lori Swanson, Groundfish Forum, Seattle, Washington. Personal communications, August 9, 2010. Nancy Kercheval, President, Cascade Fishing, Inc. Personal communication, October 8, 2010.

[70] The value difference per pound round weight is reportedly created by a higher price for the products from the larger fish, and from improved product recovery from the larger fish. This can be illustrated with the following example, reported to be representative of prices in mid-September 2010. These fish are sold "headed and gutted" (H&G). Larger fish lend themselves to an H&G cut called "collar bone on" (CBO). Smaller cod are given a cut called a J-cut. CBO cut fish produce a 57 percent recovery rate, while a J-cut produces a 47 percent recovery rate. At the time the example was reported, the price FOB Unalaska for CBO cut Pacific cod was $1.80 per pound. Converting this into dollars/pound round weight ($1.80*.57) gives a price of $1.03. At that time, J-cut was selling for $1.50 headed and gutted. Converting this into dollars/pound round weight ($1.50*.47) gives a price of $0.70. The price differences reflect the different markets into which the Pacific cod of different sizes are directed. The larger fish is more likely to be shipped to Portugal and Norway for salting and then exported to Brazil to be rehydrated for use in a popular local salted fish dish called Bacalhau. Smaller J-cut fish are more likely to be sent for a different type of processing in Denmark, France, and Portugal, and then make their way to markets in Spain, Italy, and France. (Magnuson).

[71] Jan Jacobs, Director of Government Affairs, American Seafood Company, Seattle, Washington, personal communication, August 24, 2010, April 3, 2013; Chuck Hosmer, General Manager, M/V *Baranof* and M/V *Courageous*, personal communication, August 2010; Lance Magnuson, Blue North Fisheries, personal communication, September 16, 2010.

Observer data on Atka mackerel weights confirm that fish in easterly catches tend to be larger than fish in westerly catches. The mean of the average weights from the years 2004 through 2012 in Area 543 is 0.52 kg; the average drops somewhat in Area 542 to 0.47 kg; however, the average weight then begins to increase, rising to 0.75 kg in Area 541, and to 1.14 kg in the Bering Sea subarea. (Observer data supplied by NMFS AKR In-season management staff).

Observer data also suggest that Aleutian Islands Pacific cod are larger than Bering Sea cod. Table 6 shows the average sizes of Pacific cod caught in the BSAI, as measured by observers, from 2004 through 2012, by management area and by gear type, and appears to show evidence of the size difference that industry sources indicate is associated with a price differential for hook-and-line and trawl gear. Size differences for pot gear are not as clearly defined. The size differential appears to be greater for trawl gear than for hook-and-line gear. The median average weight in a Bering Sea management area for hook-and-line caught Pacific cod was 3.27 kilograms, while the median size in the Aleutian Islands for this gear was 5.35 kg. The median average for pot gear in the Bering Sea was 3.79 kg., while the median in the Aleutian Islands was 4.03 kg. The median average for trawl gear in the Bering Sea was 2.37 kg., while the median in the Aleutian Islands was 7.92 kg.

Data on wholesale Pacific cod prices are only kept by NMFS at the FMP and at the annual-level. However, different vessels fish different amounts of their activity in different areas. For example, one vessel might fish 50 percent of its effort in the Aleutian Islands, another might fish only 10 percent in the Aleutian Islands, while another might only fish in the Bering Sea. Using variation in area-specific catch among these vessels, it is possible to econometrically test whether there is a price premium evident for vessels, based on how much they fish in the Aleutian Islands. However, an econometric analysis was unable to identify such a premium, for either the Amendment 80 or hook-and-line fisheries. In 2010, representatives of the trawl catcher/processor (and mothership) F/V *Katie Ann* indicated that she received a higher average price for her product in the Aleutian Islands than she would receive for Bering Sea Pacific cod (Jacobs, 2010). The F/V *Katie Ann* was not included in the statistical analysis. Many different functional forms (e.g., with different starting years, with vessel and annual fixed effects) were evaluated. However, it should be noted that many factors that affect variation among vessels, and it is possible there is a premium for some vessels in some instances. The full regression results are confidential, because they are vessel-specific. (Dr. Alan Haynie, Economist, National Marine Fisheries Service, Alaska Fisheries Science Center, personal communication, October 15, 2010)

This RIR accepts, for the purposes of analysis, that the regional price variation, identified by industry sources, exists for Pacific cod and Atka mackerel. Industry sources tell a consistent story, with corroborating detail, and observer information about fish sizes appears to be broadly consistent with it. The statistical tests carried out in the case of Amendment 80 and hook-and-line Pacific cod did not confirm the existence of these variations, but these were not powerful tests. Regional variation in Atka mackerel and Pacific cod prices can have implications for the revenues associated with alternative actions to close different management areas, since the price of fish caught in different places may vary. Nevertheless, the existence, size, and variability of regional price differences for Atka mackerel and Pacific cod are not well understood and require further scientific investigation.

### 1.2.16 Aleutian Islands/Bering Sea Pacific cod split

In the three years before the effective date of the interim final rule (2008 through 2010) fishing firms harvested Pacific cod within limits set by BSAI sector allocations (for example, an allocation to the hook-

and-line catcher/processor sector) that could be fished in either the Aleutian Islands or the Bering Sea.[72] A single set of Pacific cod harvest specifications (comprising an OFL, ABC, and TAC) applied to the Aleutian Islands and the Bering Sea jointly during these years. The sector allocations were percentage shares of the BSAI TAC, after modifications to account for CDQ allocations. Any part of a sector's Aleutian Islands Pacific cod harvest that might be precluded by SSL protection measures could be legally taken in the Bering Sea. This continued to be the case during the first three years the interim final rule was in effect (2011 through 2013).

A division of the BSAI Pacific cod harvest specifications into separate Bering Sea subarea and Aleutian Islands subarea harvest specifications had been under consideration for several years, when in December 2012, the Council's SSC announced that it would recommend separate harvest specifications starting with the 2014 fishing year (NPFMC SSC 2012, page 7). The SSC followed through in December 2013 and the Council adopted separate harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species.

While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Because sector allocations (except CDQ allocations) continue to be defined BSAI-wide, sectors remain free to redeploy from the Aleutian Islands to the Bering Sea to try and offset Aleutian Island production losses. However, not all sectors can do so fully if the Bering Sea TAC is fully utilized.[73] If the Bering Sea TAC would otherwise be fully harvested, a sector could harvest its entire BSAI Pacific cod allocation in the Bering Sea, only so long as it completed its harvest before other sectors harvested their entire BSAI Pacific cod allocation in the Bering Sea; if it did so, it would reduce the Bering Sea harvest available for other sectors. If the non-CDQ portion of the TAC in either sub-area is reached NMFS will close directed fishing for Pacific cod in that subarea. CDQ allocations are not transferable between the sub-areas.

Thus, vessels unable to harvest Pacific cod in the Aleutian Islands may not be able to offset Pacific cod harvest reductions with increased harvests in the Bering Sea, unless, through more intense competition, they are able to harvest Pacific cod that another vessel would have harvested. Rights-based management rules should provide opportunities to control intra-sectoral competition by Amendment 80, AFA, and freezer longline vessels. However, sector allocations may not control inter-sectoral competition.

Pacific cod trawl fisheries tend to take place in the winter and spring of the year (February to April are the key months), while fixed gear fishing is spread throughout the year. In general, trawl gear is unable to harvest its full allocation, leading to reallocations of unharvested Pacific cod allocations from trawl gear sectors to fixed gear sectors later in the year. If these patterns were to continue, trawl redeployment into the Bering Sea may reduce the size of reallocations to fixed gear.

Larger TACs in the Aleutian Islands, with larger potential foregone catches due to SSL protection measures, increase the possibility that one or both sectors would be unable to fully make up foregone Aleutian Islands harvest in the Bering Sea.

[72] Amendment 85, which established this system of sector allocations, went into effect in 2008 (72 FR 50788; September 4, 2007).

[73] It is possible that the Bering Sea TAC may not be fully harvested in a year. The BSAI TAC was not fully harvested in 2011, 2012, or 2013, years in which the BSAI TAC was large compared to TACs in other recent years. (Thompson 2013, page 272)

The Aleutian Islands and Bering Sea Pacific cod split may also reduce the impact of the SSL protection measures on Aleutian Islands Pacific cod production. The State of Alaska has authorized a GHL fishery for Pacific cod in the Aleutian Islands equal to 3 percent of the combined BSAI ABC. Prior to the split, this GHL was deducted from the entire BSAI ABC before sector allocations were calculated. Following the split, the entire GHL is now deducted from the Aleutian Islands ABC reducing the TAC of Pacific cod available for harvest in the Aleutians Islands.[74]

It is even possible that in some years an Aleutian Island-specific Pacific cod TAC, in combination with a deduction from the ABC for a GHL fishery, and a deduction for an ICA, may leave the Aleutian Islands TAC too small to permit a directed fishery. If an Aleutian Islands Pacific cod fishery were to be precluded by a combination of the Bering Sea-Aleutian Islands split, and the GHL and ICA, which are measures unconnected with the Steller sea lion action, the actual cost of the Steller sea lion measures in terms of foregone Pacific cod would be reduced.

In the short term, lost production may be limited by the low level of Aleutian Islands harvest specifications for 2014 and 2015. ABCs, set pursuant to a Tier 5 approach (75 percent of expected natural mortality) are 15,100 mt in each year. This ABC level is significantly smaller than the typical aggregate Federal plus state catch in any of the baseline years (2004 through 2010). The Aleutian Islands TACs in 2014 and 2015 (between about 6,500 mt and about 7,000 mt) are significantly less than Federal harvests during the years the interim final rule has been in effect (2011 through 2013). Trawl survey information suggests that Aleutian Islands Pacific cod stocks have been smaller recently than in prior years (Thompson and Palsson 2013: Table 2A.6). It is not unreasonable to expect a reversion to the mean in the size of this stock. Moreover, as understanding of the stock improves, it is possible that the SSC will recommend ABCs based on a higher Tier, potentially producing less conservative ABC recommendations. In 2013, the analyst evaluated Tier 3 models, but these were not used for harvest specifications purposes. These factors may tend to increase the impact of the SSL protection measures on Aleutian Islands production.

The ultimate impact of the Pacific cod split will depend on policy decisions made by the Council and the Secretary. In the 10 years between the first year of the baseline period for this analysis (2004) and the last year prior to the Aleutian Islands-Bering Sea TAC split (2013), the BSAI Pacific cod TAC was only set equal to the ABC in two years (Thompson 2013, page 272). There may be scope for the Council to offset anticipated Aleutian Island production limits by setting the Aleutian Islands TAC less than the ABC, and the Bering Sea TAC equal to the ABC. The 2 million metric ton groundfish optimum yield is the sum of the BSAI TACs, so a decrease in the Aleutian Islands TAC, coupled with an equal increase in the Bering Sea TAC, would leave the aggregate BSAI Pacific cod TAC unchanged, and would not require reductions in TACs for other species so as to comply with the optimum yield requirement.

Currently, there are no provisions for the reallocation of Aleutian Islands Pacific cod TAC that would otherwise be unfished into the Bering Sea by in-season managers. Council and Secretarial action could create a framework in which such reallocations could occur in years in which the Bering Sea ABC was greater than the Bering Sea TAC.

[74] In 2013, the Alaska Board of Fisheries also created a new Bering Sea Pacific cod GHL fishery, setting the GHL at 3 percent of the BSAI ABC. (Dischner, 2013)

### 1.2.17 Incidental catch[75]

Alternative 1, which prohibits the retention of Atka mackerel and Pacific cod in management area 543, regulates incidental catches as well as directed fisheries for those species in that area. Alternative 6, which prohibits retention of Atka mackerel, Pacific cod, and pollock in management areas 541, 542, and 543, similarly regulates incidental catches. It is thus necessary to provide some description of incidental harvest of these three species during the baseline years. The other alternatives do not regulate incidental catches.

Incidental catches of Atka mackerel and Pacific cod in the trawl catcher/processor directed fisheries for those two species are included in the volumes of fish reported in Section 1.2.1, and this topic is not discussed here. This subsection focuses on non-trawl catcher/processors and catcher vessels, trawl catcher vessels, and trawl catcher/processors in directed fisheries for species other than Atka mackerel and Pacific cod.

Because Alternative 1 prohibits retention of Atka mackerel and Pacific cod only, while Alternative 6 prohibits retention of these species and pollock, the discussion is divided into three parts: (1) Atka mackerel and Pacific cod in Areas 541 and 542 together; (2) the same species in Area 543; (3) pollock in all three areas together.

In Areas 541 and 542, treated together, non-trawl catcher/processors and catcher vessels, and trawl catcher vessels targeting species other than Atka mackerel all took incidental catches (i.e., retained catches) of either Atka mackerel and Pacific cod during the baseline years (2004 through 2010), and have continued to do so under the status quo.

- During the baseline years 17 separate fixed gear catcher/processors took incidental catches of either Atka mackerel or Pacific cod during 39 separate vessel-years of fishing activity. The vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest during the baseline years was about $19,000, about $3,000 per year, or about $500 per vessel-year of fishing.
- During these years, 62 separate fixed gear catcher vessels took incidental catches of these species during 169 separate vessel-years of fishing activity. These vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest was about $335,045, about $48,000 per year, and about $2,000 per vessel-year.
- During these years five separate trawl catcher vessels, owned by two separate companies, took incidental catches of these species during 17 separate vessel-years of activity. Because these vessels were operated by only two separate firms, data on fishing activity and revenues is confidential.

In Area 543, incidental catch activity was relatively limited. During the baseline years, one trawl catcher vessel, 14 non-trawl catcher vessels, and five non-trawl catcher/processors reported incidental catches of Atka mackerel and Pacific cod. Little can be reported about the single trawl catcher vessel because of confidentiality restrictions. The non-trawl catcher vessels made incidental catches in a total of 36 separate vessel-years, while the non-trawl catcher/processors made incidental catches in a total of nine separate vessel-years. Over all sectors and baseline years, incidental catches of these species totaled 154 metric tons, and had an estimated value of about $224,000, or about $32,900 per year, or $5,000 per vessel-year.

[75] Under the MSA, incidental catch is defined as the unintended harvest and *retention* of a species that is not the target species. Under the BSAI and GOA Groundfish FMPs, bycatch is defined as the unintended harvest of groundfish species that are *discarded.*

Pollock is taken as incidental catch by trawlers in the rockfish, and arrowtooth, and Kamchatka flounder fisheries. Most of this, (94 percent) was taken by catcher/processors and very little was taken by other sectors. Incidental pollock harvests in all sectors averaged 644 metric tons a year from all three management areas from 2004-2013.

## 1.3 Trawl catcher/processors

This section evaluates Alternatives 1 and 4 with respect to the trawl catcher/processor sector. Alternatives 2 and 3, and their options, are evaluated in Section 1.8, which deals with Atka mackerel, and in Section 1.9, which deals with trawl catcher/processor Pacific cod harvests. Alternatives 5 and 6 are examined in Section 1.13.

### 1.3.1 Catches

Table 49 summarizes the historical volumes of retained Atka mackerel catches by trawl catcher/processors and of deliveries of Atka mackerel by catcher vessels to catcher/processors acting as motherships. The volumes are summarized by Aleutian Islands management area, and for all three management areas together, for the years 2004 through 2010. These are the baseline years for the analysis. In addition, the table provides estimates of the volume of retained catch taken from areas closed under Alternative 1, and from areas remaining open under Alternative 1. Finally, the table shows the estimated percentage of the total catch taken from areas remaining open.

Table 49 is based on the Alaska Regional Office's Catch-in-Area (CIA) database, which is, itself, an adaptation of the Alaska Regional Office's Catch Accounting System (CAS) database. The CIA database uses information from vessel monitoring system reports, and other sources, to allocate catches at smaller spatial scales than the CAS.

Table 49 summarizes baseline trawl catcher/processor and catcher vessel Atka mackerel retained catches. Catcher/processor retained catches and catcher vessel retained catches delivered to catcher/processors acting as motherships, have been aggregated for this analysis to protect the confidentiality of data on catcher vessel deliveries to motherships. Almost all of the information on this issue is confidential because of the small numbers of catcher vessels that harvest Atka mackerel, and the small number of catcher/processors that serve as motherships and accept the catcher vessel deliveries.

The catches at risk in Area 541 during the baseline years (2004 through 2010) are small, consistent with the minimal Atka mackerel regulatory changes made by the status quo in that area. Table 7 shows that actual harvests from Area 541 increase substantially during 2011 and 2012, while the interim final rule was in effect. This reflects the shift in the center of gravity of the biomass towards the east, as estimated from recent trawl surveys, which led to an increase in the proportion of the harvest taken from Area 541 (78 FR 13813, March 1, 2013).

Alternative 1 produces relatively large reductions in retained Atka mackerel catches in Area 542 and in Area 543 (where retention of Atka mackerel catches is prohibited). The aggregate Aleutian Islands catches at risk are large; the residual harvest percentages in the column on the far right of Table 49 indicate that the catch coming from open areas under this alternative would have ranged from 39 percent of retained catches of Atka mackerel in 2004 and 2005, to 67 percent in 2007.

Much of the difference between years is connected to the distribution of retained catches among the three areas. When the share of retained catches from Area 541 is relatively small (as in 2004 and 2005) the reduction in harvests is large, and the percent of the baseline estimated to have been retained is small. When the share of retained catches in Area 541 is relatively large (as in 2007, when, the retained catch in Area 543 was quite small), the residual catch as a percentage of the baseline is larger.

**Table 49 Location of estimated aggregate trawl catcher/processor Atka mackerel harvest in the Aleutian Islands under Alternative 1, from 2004 through 2010**

| | Total catch (mt) | | | | Catch from areas closed (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Open area catch as % of total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 3,161 | 26,561 | 16,527 | 46,248 | 174 | 11,728 | 16,527 | 28,428 | 2,987 | 14,832 | 0 | 17,820 | 39% |
| 2005 | 3,356 | 33,720 | 18,730 | 55,806 | 257 | 15,047 | 18,730 | 34,034 | 3,099 | 18,673 | 0 | 21,772 | 39% |
| 2006 | 4,013 | 38,447 | 14,374 | 56,835 | 186 | 17,835 | 14,374 | 32,396 | 3,827 | 20,612 | 0 | 24,439 | 43% |
| 2007 | 19,752 | 25,475 | 8,846 | 54,074 | 119 | 9,056 | 8,846 | 18,022 | 19,633 | 16,419 | 0 | 36,052 | 67% |
| 2008 | 18,701 | 22,175 | 15,654 | 56,531 | 96 | 8,913 | 15,654 | 24,663 | 18,605 | 13,263 | 0 | 31,868 | 56% |
| 2009 | 25,734 | 28,461 | 15,466 | 69,661 | 38 | 16,410 | 15,466 | 31,914 | 25,696 | 12,051 | 0 | 37,748 | 54% |
| 2010 | 23,074 | 24,033 | 17,462 | 64,568 | 107 | 14,204 | 17,462 | 31,773 | 22,967 | 9,829 | 0 | 32,796 | 51% |

Notes: Metric tons round weight retained Atka mackerel from targeted and incidental fishing (includes CDQ), and from deliveries of Atka mackerel by trawl catcher vessels to trawl catcher/processors acting as motherships.
Source: NMFS AKR estimates using CIA data. January 22, 2013.

Table 50 summarizes historical volumes of retained Pacific cod harvests by trawl catcher/processors, by management area, and for the three management areas in total, for the years 2004 through 2010.[76] In addition, the table provides estimates of the retained harvest coming from areas closed by Alternative 1 (catches at risk), and from areas left open by the alternative. Finally, the table shows the estimated percentage of the total harvest coming from areas left open by the alternative (residual catches).

The aggregate Aleutian Islands catches at risk are large; as shown in the column on the far right of the table, it is estimated that the catch coming from open areas under this alternative would have been from 35 percent of retained catches of Pacific cod in 2005, to 64 percent in 2007. The greatest reductions generally come from Area 543, where retained catches of Pacific cod are prohibited. Reductions are also relatively large in Area 542. In Area 541, where the interim final rule is less restrictive, the estimated reductions in retained catch are least. Reductions in retained catches from Area 542 drop during this period, and are at their lowest (less than 1,000 metric tons) from 2008 to 2010. Reductions in Area 541 retained catches are highest in 2004 and 2005, years with large baseline retained catches in this area.

[76] As the fleets have been defined for this analysis, the wholesale value of the Pacific cod production associated with catcher vessels delivering to motherships has been grouped with that of catcher vessels delivering shoreside to create a trawl catcher vessel sector covering both types of catcher vessel activity.

**Table 50 Location of estimated aggregate trawl catcher/processor Pacific cod harvests in the Aleutian Islands under Alternative 1, from 2004 through 2010**

| | Total catch (mt) | | | | Catch from areas closed (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Open area catch as % of total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 5,597 | 3,269 | 3,239 | 12,105 | 739 | 2,334 | 3,239 | 6,313 | 4,857 | 935 | 0 | 5,792 | 48% |
| 2005 | 5,117 | 2,187 | 4,099 | 11,403 | 1,410 | 1,934 | 4,099 | 7,443 | 3,706 | 254 | 0 | 3,960 | 35% |
| 2006 | 5,045 | 1,854 | 3,016 | 9,915 | 336 | 1,462 | 3,016 | 4,814 | 4,709 | 391 | 0 | 5,101 | 51% |
| 2007 | 7,724 | 2,145 | 2,228 | 12,098 | 725 | 1,413 | 2,228 | 4,366 | 6,999 | 732 | 0 | 7,731 | 64% |
| 2008 | 2,834 | 785 | 1,652 | 5,271 | 259 | 523 | 1,652 | 2,434 | 2,574 | 262 | 0 | 2,837 | 54% |
| 2009 | 1,966 | 1,518 | 1,657 | 5,141 | 43 | 748 | 1,657 | 2,448 | 1,923 | 770 | 0 | 2,693 | 52% |
| 2010 | 2,123 | 1,284 | 549 | 3,956 | 87 | 815 | 549 | 1,450 | 2,036 | 469 | 0 | 2,506 | 63% |

Notes: Metric tons round weight retained Pacific cod from targeted and incidental fishing (includes CDQ) by trawl catcher/processors.
Source: NMFS AKR estimates using CIA data. Status quo data prepared January 25, 2013.

### 1.3.2 Gross revenues

Table 51 provides estimates of gross revenues from Atka mackerel, Table 52 provides estimates of gross revenues from Pacific cod, and Table 53 provides estimates of gross revenues for both species together. Each table has two parts, one reporting estimates of gross revenue in nominal dollars, and one reporting the gross revenue estimates in dollars adjusted for inflation, so that they are expressed in real, 2012 dollars.

Each table follows the organization of the preceding volume tables: a first block of columns shows estimated total gross revenue for the year, in the absence of the action; a second block shows the estimated gross revenues from harvests within critical habitat closed by the alternative; and the third block shows estimated gross revenues from within areas left open by the alternative. A final column shows the relationship between gross revenues from open areas and gross revenues in the absence of the action, expressed as a percentage. Gross revenues from areas closed by the alternative are described as gross revenues at risk, while gross revenues from areas left open, are described as residual revenues.

Table 53 summarizes the results of this gross revenue analysis. Residual gross revenues range from 37 percent of total gross revenues, in 2005, to 65 percent of total gross revenues in 2007. The estimated gross revenues at risk range from about $27 million in 2007, up to about $48 million in 2010 (in 2012 dollars). The mean value was about $35 million.

**Table 51 Estimated aggregate trawl catcher/processor Atka mackerel first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010**

| Nominal (millions of dollars) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 2.1 | 17.2 | 10.9 | 30.1 | 0.1 | 7.5 | 10.9 | 18.5 | 1.9 | 9.7 | 0.0 | 11.6 | 39% |
| 2005 | 2.5 | 23.4 | 14.5 | 40.4 | 0.3 | 10.3 | 14.5 | 25.1 | 2.2 | 13.1 | 0.0 | 15.3 | 38% |
| 2006 | 2.8 | 24.9 | 9.7 | 37.4 | 0.1 | 11.4 | 9.7 | 21.2 | 2.7 | 13.5 | 0.0 | 16.2 | 43% |
| 2007 | 16.0 | 20.4 | 7.4 | 43.8 | 0.4 | 7.2 | 7.4 | 15.0 | 15.7 | 13.1 | 0.0 | 28.8 | 66% |
| 2008 | 14.5 | 17.8 | 13.0 | 45.3 | 0.4 | 6.9 | 13.0 | 20.2 | 14.2 | 10.9 | 0.0 | 25.0 | 55% |
| 2009 | 28.3 | 32.0 | 17.9 | 78.1 | 0.7 | 18.4 | 17.9 | 36.9 | 27.6 | 13.6 | 0.0 | 41.1 | 53% |
| 2010 | 29.8 | 31.2 | 24.5 | 85.5 | 0.9 | 18.2 | 24.5 | 43.6 | 28.9 | 13.0 | 0.0 | 41.9 | 49% |
| Real (millions of "2102" dollars) | | | | | | | | | | | | | |
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 2.4 | 20.4 | 12.9 | 35.8 | 0.1 | 8.9 | 12.9 | 22.0 | 2.3 | 11.5 | 0.0 | 13.8 | 39% |
| 2005 | 3.0 | 27.2 | 16.8 | 47.0 | 0.4 | 12.0 | 16.8 | 29.2 | 2.6 | 15.2 | 0.0 | 17.8 | 38% |
| 2006 | 3.2 | 28.0 | 10.9 | 42.1 | 0.1 | 12.8 | 10.9 | 23.8 | 3.1 | 15.2 | 0.0 | 18.2 | 43% |
| 2007 | 17.6 | 22.3 | 8.1 | 48.0 | 0.4 | 7.9 | 8.1 | 16.4 | 17.2 | 14.4 | 0.0 | 31.5 | 66% |
| 2008 | 15.3 | 18.7 | 13.7 | 47.7 | 0.4 | 7.3 | 13.7 | 21.3 | 14.9 | 11.5 | 0.0 | 26.4 | 55% |
| 2009 | 29.9 | 33.9 | 18.9 | 82.7 | 0.7 | 19.5 | 18.9 | 39.1 | 29.2 | 14.4 | 0.0 | 43.6 | 53% |
| 2010 | 31.1 | 32.5 | 25.5 | 89.1 | 0.9 | 19.0 | 25.5 | 45.4 | 30.1 | 13.5 | 0.0 | 43.6 | 49% |

Notes: Includes retained catches of Atka mackerel from all sources in the Aleutian Islands. Virtually all of this catch is taken by trawl catcher/processors and by trawl catcher vessels delivering to catcher/processors acting as motherships. Values include the values of retained targeted and incidental catches of Atka mackerel, and of retained incidental catches of groundfish (other than Pacific cod) taken in Atka mackerel targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June of each year.

Source: NMFS AKR estimates using CIA database. January 22, 2013.

**Table 52 Estimated aggregate changes in trawl catcher/processor Pacific cod first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010**

| Nominal (millions of dollars) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 6.7 | 3.9 | 3.8 | 14.4 | 0.9 | 2.8 | 3.8 | 7.5 | 5.9 | 1.1 | 0.0 | 6.9 | 48% |
| 2005 | 6.3 | 2.7 | 5.1 | 14.1 | 1.8 | 2.4 | 5.1 | 9.3 | 4.5 | 0.3 | 0.0 | 4.8 | 34% |
| 2006 | 8.6 | 3.2 | 5.2 | 17.0 | 0.6 | 2.5 | 5.2 | 8.2 | 8.1 | 0.7 | 0.0 | 8.7 | 52% |
| 2007 | 16.5 | 4.6 | 4.7 | 25.8 | 1.5 | 3.0 | 4.7 | 9.3 | 15.0 | 1.6 | 0.0 | 16.6 | 64% |
| 2008 | 6.4 | 1.8 | 3.7 | 11.9 | 0.6 | 1.2 | 3.7 | 5.5 | 5.8 | 0.6 | 0.0 | 6.4 | 54% |
| 2009 | 2.5 | 1.8 | 2.1 | 6.3 | 0.1 | 0.9 | 2.1 | 3.0 | 2.4 | 0.9 | 0.0 | 3.3 | 53% |
| 2010 | 3.4 | 2.0 | 0.8 | 6.2 | 0.1 | 1.3 | 0.8 | 2.2 | 3.2 | 0.7 | 0.0 | 4.0 | 64% |
| Real (millions of "2102" dollars) | | | | | | | | | | | | | |
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 8.0 | 4.6 | 4.5 | 17.1 | 1.0 | 3.3 | 4.5 | 8.9 | 7.0 | 1.3 | 0.0 | 8.2 | 48% |
| 2005 | 7.3 | 3.1 | 5.9 | 16.3 | 2.1 | 2.8 | 5.9 | 10.8 | 5.2 | 0.3 | 0.0 | 5.6 | 34% |
| 2006 | 9.7 | 3.6 | 5.8 | 19.1 | 0.6 | 2.8 | 5.8 | 9.2 | 9.1 | 0.7 | 0.0 | 9.8 | 52% |
| 2007 | 18.1 | 5.0 | 5.2 | 28.3 | 1.7 | 3.3 | 5.2 | 10.2 | 16.4 | 1.7 | 0.0 | 18.2 | 64% |
| 2008 | 6.7 | 1.9 | 3.9 | 12.5 | 0.6 | 1.2 | 3.9 | 5.8 | 6.1 | 0.6 | 0.0 | 6.7 | 54% |
| 2009 | 2.6 | 1.9 | 2.2 | 6.7 | 0.1 | 1.0 | 2.2 | 3.2 | 2.5 | 1.0 | 0.0 | 3.5 | 53% |
| 2010 | 3.5 | 2.1 | 0.9 | 6.5 | 0.1 | 1.3 | 0.9 | 2.3 | 3.4 | 0.8 | 0.0 | 4.1 | 64% |

Notes: Includes retained catches by trawl catcher/processors. Values include the values of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish (other than Atka mackerel) take in Atka mackerel targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June of each year.

Source: NMFS AKR estimates using CIA database. January 25, 2013.

**Table 53 Estimated aggregate Atka mackerel and Pacific cod trawl catcher/processor first wholesale gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010**

| Nominal (millions of dollars) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 8.8 | 21.1 | 14.7 | 44.5 | 1 | 10.3 | 14.7 | 26 | 7.8 | 10.8 | 0 | 18.5 | 42% |
| 2005 | 8.8 | 26.1 | 19.6 | 54.5 | 2.1 | 12.7 | 19.6 | 34.4 | 6.7 | 13.4 | 0 | 20.1 | 37% |
| 2006 | 11.4 | 28.1 | 14.9 | 54.4 | 0.7 | 13.9 | 14.9 | 29.4 | 10.8 | 14.2 | 0 | 24.9 | 46% |
| 2007 | 32.5 | 25 | 12.1 | 69.6 | 1.9 | 10.2 | 12.1 | 24.3 | 30.7 | 14.7 | 0 | 45.4 | 65% |
| 2008 | 20.9 | 19.6 | 16.7 | 57.2 | 1 | 8.1 | 16.7 | 25.7 | 20 | 11.5 | 0 | 31.4 | 55% |
| 2009 | 30.8 | 33.8 | 20 | 84.4 | 0.8 | 19.3 | 20 | 39.9 | 30 | 14.5 | 0 | 44.4 | 53% |
| 2010 | 33.2 | 33.2 | 25.3 | 91.7 | 1 | 19.5 | 25.3 | 45.8 | 32.1 | 13.7 | 0 | 45.9 | 50% |
| Real (millions of "2102" dollars) | | | | | | | | | | | | | |
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 10.4 | 25 | 17.4 | 52.9 | 1.1 | 12.2 | 17.4 | 30.9 | 9.3 | 12.8 | 0 | 22 | 42% |
| 2005 | 10.3 | 30.3 | 22.7 | 63.3 | 2.5 | 14.8 | 22.7 | 40 | 7.8 | 15.5 | 0 | 23.4 | 37% |
| 2006 | 12.9 | 31.6 | 16.7 | 61.2 | 0.7 | 15.6 | 16.7 | 33 | 12.2 | 15.9 | 0 | 28 | 46% |
| 2007 | 35.7 | 27.3 | 13.3 | 76.3 | 2.1 | 11.2 | 13.3 | 26.6 | 33.6 | 16.1 | 0 | 49.7 | 65% |
| 2008 | 22 | 20.6 | 17.6 | 60.2 | 1 | 8.5 | 17.6 | 27.1 | 21 | 12.1 | 0 | 33.1 | 55% |
| 2009 | 32.5 | 35.8 | 21.1 | 89.4 | 0.8 | 20.5 | 21.1 | 42.3 | 31.7 | 15.4 | 0 | 47.1 | 53% |
| 2010 | 34.6 | 34.6 | 26.4 | 95.6 | 1 | 20.3 | 26.4 | 47.7 | 33.5 | 14.3 | 0 | 47.7 | 50% |

Notes: Includes retained catches of Pacific cod by trawl catcher/processors, and deliveries of Atka mackerel to trawl catcher/processors acting as motherships by trawl catcher vessels. Values include the values of retained targeted and incidental catches of Atka mackerel and Pacific cod, and of retained incidental catches of groundfish take in these targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June of each year.

Source: Table 51 and Table 52

In addition to limits on catch in critical habitat, Alternative 1 also includes an overall limit on Area 542 TAC equal to 47 percent of the ABC. This was set to prevent fishing operations from increasing catch outside Area 542 critical habitat, once catches inside critical habitat were limited. This constraint would have limited Area 542 harvests in some years during the baseline period. Harvest would have been constrained by 215 metric tons in 2004, 2,507 metric tons in 2007, and 1,842 metric tons in 2008. In the remaining years, estimated residual harvests would have been smaller than the 47 percent limit, so the limit would not have been binding. The estimated revenue limits introduced by the constraint would have been $200,000 in 2004, $2 million in 2007, and $1.4 million in 2008 (all in real 2012 dollars). The average reduction over the seven baseline years would have been $500,000. These revenue reductions are in addition to those described in Table 53.

### 1.3.3 Fleet redeployment and impacts on other fisheries

Fishing vessels in the North Pacific typically participate in several fisheries each year.[77] The fisheries may change from year to year as relative costs, or relative product values, change. The status quo alternative restricts vessel access to preferred fishing grounds, changing the relative costs and productivity of different fishing areas. Vessel operators will respond by changing their fishing patterns as they seek to

[77] Multiple fisheries are defined as fisheries targeting different species, or the same species in different places or in different seasons or with a different gear-type.

maximize their profits under the new constraints. The actual changes may vary from year to year, as circumstances change.

Formal programming or simulation models allowing NMFS to project vessel redeployment for different alternatives, under different environmental and economic conditions, are not available. NMFS has approached this issue qualitatively, by reviewing and explaining the options open to the fishing fleets. Where possible, the likelihood of redeployment is evaluated, given the qualitative nature of the discussion. NMFS is unable to estimate the extent to which redeployment may offset losses due to the measures in the Aleutian Island.

Trawl catcher/processors may shift their target species to compensate for restrictions on Aleutian Islands Atka mackerel and Pacific cod fishing. Potential alternative targets include (1) Bering Sea and Gulf of Alaska Atka mackerel and Pacific cod; (2) other Amendment 80 species; (3) targeted fishing for open access species; (4) mothership activity on behalf of trawl catcher vessels targeting open access species.

*Amendment 80 species*

Amendment 80 vessels whose Atka mackerel and Pacific cod fishing is restricted in the Aleutian Islands may try to increase harvests of Atka mackerel and Pacific cod elsewhere, or increase harvests of the four other Amendment 80 species. These additional species include Pacific ocean perch in the Aleutian Islands, rock sole, yellowfin sole, and flathead sole.

These species are all managed under Amendment 80 catch share quotas, and a vessel operator that wants to increase harvests of the other Amendment 80 species must either have unused quota for that species, or must be willing to lease quota, or acquire a vessel with those quota rights. Vessels may also access rights to fish these species by leasing CDQ quota.[78] Leasing or purchase of rights obviously involves costs to the firm acquiring the rights. Increased demand for certain types of quota by vessels redeploying out of the Aleutian Islands fisheries could tend to increase quota values.

The interim final rule eliminated the Harvest Limit Area (HLA) regulations under which the fleet fishing Atka mackerel had operated for several years. The HLA set season dates in which Amendment 80 vessels with Atka mackerel allocations in the Central (Area 542) and Western (Area 543) Aleutian Islands would be able to harvest Atka mackerel inside critical habitat. As a result, most vessels with Atka mackerel allocations participated in the fishery at this time. HLA regulations also restricted vessels' abilities to pursue other target fisheries. The HLA and the A-season dates of January 20 to April 15 were restrictive to the Amendment 80 fleet.

Elimination of the HLA regulations, along with a change in the ending date for the A-season from April 15 to June 10, provided the Amendment 80 fleet more flexibility to pursue Atka mackerel and other target species. While the HLA fishery for Atka mackerel was open, the directed fishing for Pacific cod was closed in the Aleutian Islands. In 2011 and 2012, the Amendment 80 fleet combined multiple targets in the Aleutian Islands; in particular, Pacific ocean perch and arrowtooth/Kamchatka flounder fishing were combined with Atka mackerel fishing.

[78] In addition to themselves acquiring rights to harvest, catcher/processors may act as motherships to access the BSAI trawl limited access sector's Atka mackerel, Pacific ocean perch, and trawl catcher vessel Pacific cod allocations. This possibility is discussed later in this section.

*Atka mackerel in the Aleutian Islands*

The estimates of the impacts of the action on Atka mackerel retained catches, described in Table 49, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to fishing under the interim final rule, and assuming that this Atka mackerel could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled, "Open area catch as % of total," show the share of harvest coming out of areas that would remain open under the action. As shown in this table, depending on the year, from 39 percent to 67 percent of the volume of Atka mackerel retained by this sector in the Aleutian Islands came from areas that remained open under the status quo.

Each Aleutian Islands statistical area has its own TAC, and this limits the extent to which vessels fishing Atka mackerel can offset Atka mackerel harvest reductions in one area with increases in another. Under the status quo, trawl catcher/processors may no longer retain Atka mackerel in the Western Aleutian Islands (Area 543), and may collectively no longer retain more than 47 percent of the Central Aleutian Islands (Area 542) TAC. They cannot increase their overall harvests by shifting into Eastern Aleutian Islands/Bering Sea (Area 541/BS), unless the overall distribution of the TACs among the three areas has also changed.

As noted in Section 1.2, the distribution of TACs among the three areas did change in 2011, in such a way that the proportion of the TAC for Area 541/BS did increase. This new distribution reflected changes in the distribution of the biomass observed in biennial trawl surveys. If other surveys show the biomass shifting west, towards Areas 542 and 543, the distribution of TACs can change so as to reduce fishing opportunities in Area 541/BS. Prices are reported to be typically higher for Area 541/BS Atka mackerel than for Atka mackerel further west. To the extent this is the case, shifts of Atka mackerel harvests to the east would tend to increase the average price received per metric ton, independently of any overall price changes induced by changes in harvest.

*Atka mackerel in the Bering Sea and Gulf of Alaska*

Opportunities to increase Atka mackerel harvests outside of the Aleutian Islands are very limited. The Bering Sea harvest is counted against the Area 541/Bering Sea TAC for Amendment 80 and CDQ vessels. The rule may affect the location of some harvest, but is likely to have little impact on its overall level.

Trawl limited access vessels may have an incentive for a top-off fishery counted against the Bering Sea incidental catch allowance. Incidental catches of Atka mackerel taken in the Bering Sea may be retained up to the MRA, but this amount is counted against the Area 541\BS ICA. This fleet has not harvested much Atka mackerel from the Bering Sea in the past. It is possible that if Aleutian Islands harvest restrictions increase Atka mackerel prices, there will be increased incentives for topping-off behavior by these vessels.

Opportunities are also limited in the GOA. Atka mackerel occurs in the GOA, but the fishery is not currently open for directed fishing. There has been interest from the industry in opening this fishery, however, the stock assessment authors and plan team have not recommended that this fishery be opened to directed fishing (Lowe et al., 2011). Catch of Atka mackerel in the GOA has been limited to incidental catch.

Some active topping-off fishing for Atka mackerel in the GOA does occur, and incidental catches of Atka mackerel in the GOA have been increasing for several years. It is possible that incidental catch could increase more as vessels affected by more restrictive regulation in the Aleutian Islands try to mitigate those effects. However, this topping-off behavior is limited by the availability of basis species. The basis

species used for this topping-off behavior is Western GOA rockfish, which tends to be open for only short periods of time in July, and flatfish species, which are limited by Amendment 80 sideboards of both the target species and halibut prohibited species catch (PSC) limits. Should a topping off fishery for Atka mackerel exceed the Atka mackerel TAC in the GOA, the Regional Administrator would prohibit retention of Atka mackerel in the GOA per regulations in 50 CFR 679.20. This action would eliminate any financial incentive to harvest Atka mackerel in the GOA, and would stop potential "top-off" fishing. This action would only limit retention of Atka mackerel and is unlikely to impact directed fisheries in the GOA.

*Pacific cod in the Aleutian Islands*

The estimates of the impacts of the status quo on Pacific cod retained catches, described in Table 50, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to directed fishing under the interim final rule, and assuming that this Pacific cod could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled, "Open area catch as % of total," show the share of harvest coming out of areas that would remain open under the action. That table shows that, depending on the year, from 35 percent to 64 percent of the volume of Pacific cod retained by this sector in the Aleutian Islands came from areas that were to remain open under the status quo.

Pacific cod harvests within the Aleutian Islands were not constrained by management area TACs during the baseline years, or under Alternatives 1 and 4. Vessels could thus, theoretically, make up lost harvest in one Aleutian Islands management area by shifting to another. However, under Alternative 1, other Pacific cod trawling opportunities in the Aleutian Islands are limited. The interim final rule prohibits the retention of Pacific cod in Area 543, and restricts the fishing areas considerably in Area 542. Greater opportunities remain in Area 541, but even these may be limited compared to the baseline period. Most trawlable depths for Pacific cod are close to shore and within the 20 nm critical habitat designations. As shown in Table 8, the sector's retained Pacific cod, which had been decreasing since 2007, continued to decline in 2011, and remained lower in 2012 than in 2010.[79]

*Pacific cod in the Bering Sea*

Both Amendment 80 and AFA trawl catcher/processors receive sectoral allocations of Pacific cod that they may fish in either the Aleutian Islands or the Bering Sea. Therefore, if these fleets are unable to harvest as much Pacific cod from the Aleutian Islands as they have in the past, they may be able to make up part, or all, of the loss in the Bering Sea.

However, as explained in Section 1.2.16, whereas in earlier years there was a single Pacific cod TAC for the entire BSAI, from 2014 forward there will be separate Pacific cod TACs for the Aleutian Islands and for the Bering Sea. Because of this, if the Bering Sea TAC would otherwise have been fully harvested, a sectoral shift from the Aleutian Islands to the Bering Sea can only take place at the expense of another sector's ability to harvest Pacific cod in the Bering Sea.[80] Trawl catcher/processors may have an advantage with respect to this since their seasonal allocations of Pacific cod are received by June 10 and they receive nothing in the second half of the year (other than possible seasonal rollovers), while the trawl

[79] The reader is reminded that, by definition, this sector includes trawl catcher/processor harvests of Pacific cod, but does not include the processing of Pacific cod delivered to catcher/processors acting as motherships. The number of motherships involved is very small, and to protect the confidentiality of the participants, this production has been included with catcher vessel deliveries to shoreside processors.

[80] Section 1.2.16 provides a more detailed discussion of the Aleutian Islands/Bering Sea split in the BSAI Pacific cod specifications.

catcher vessel sector and the fixed gear sectors do not receive large proportions of their annual allocations until the summer and/or the fall.

From 2008 through 2010, trawl catcher/processors took between 15 percent and 25 percent of their retained Pacific cod catches from the Aleutian Islands. This declined each year, starting in 2008. The declines prior to 2011 occurred at the time of the introduction of Amendment 80 and Amendment 85 in 2008. In 2011, the share of Pacific cod taken in the Aleutian Islands declined to 5 percent, from 13 percent in 2010. Reductions in targeted harvest of Pacific cod in the Aleutian Islands after the introduction of Amendment 80, may be due to Amendment 80 vessels reserving Pacific cod quota to support their incidental catch of Pacific cod in flatfish fisheries. Also, Amendment 85 constrained the ability of American Fisheries Act trawl catcher/processors to directed fish for Pacific cod. (NMFS AKRO In-season management staff.)

Factors other than the Bering Sea and Aleutian Islands TAC split may prevent trawl catcher/processors from fully offsetting lost Aleutian Islands Pacific cod revenues in the Bering Sea. First, industry sources indicate that Pacific cod in the Bering Sea tend to be smaller than in the Aleutian Islands and, because smaller fish bring a lower price, they are a less attractive target, all else equal. Table 6 shows the average weights of trawl-caught Pacific cod, by management area, in the Bering Sea and the Aleutian Islands. A comparison of the average weights tends to confirm that trawl-caught Pacific cod are larger in the Aleutian Islands.

Second, the halibut PSC rate in the Bering Sea Pacific cod trawl fishery is high, compared to halibut PSC in the Aleutian Islands, as shown in Table 54. The estimated average halibut PSC rate in the Aleutian Islands Pacific cod fishery for 2008 through 2011 is 0.002 metric tons of halibut mortality per metric ton of groundfish (NMFS Catch Accounting System); however, it is 0.013 metric tons of halibut mortality per metric ton of groundfish in the Bering Sea.

**Table 54 Estimated prohibited species catch rates per ton of trawl catcher/processor groundfish harvest in the Bering Sea Pacific cod, rock sole, and yellowfin sole fisheries (averages for 2008–2011)**

| | Pacific cod BS | Pacific Cod AI | Rock Sole | Yellowfin Sole | Units |
|---|---|---|---|---|---|
| *C. bairdi* | 1.428 | 0.010 | 1.211 | 2.393 | Crab/mt |
| *C. opilio* | 1.300 | 0.001 | .264 | 4.344 | Crab/mt |
| Red king crab | 0.135 | 0.024 | .519 | .005 | Crab/mt |
| Halibut | 0.013 | 0.002 | 0.008 | 0.005 | mt mortality/mt |
| Chinook salmon | 0.005 | .060 | .002 | .001 | Salmon/mt |
| Other salmon | 0.019 | .004 | .003 | .001 | Salmon/mt |

Note: As discussed in the text, Amendment 80 changed the prosecution of non-pollock trawl catcher/processor fisheries in the BSAI. Therefore, the rates are limited to 2008 to 2011. Ratios and percentages were calculated to show the metric tonnage of the incidental or PSC species per metric ton of retained and discarded target species. PSC species subject to limits are included.
Source: NMFS AKR Catch Accounting System.

A shift by Aleutian Islands trawl catcher/processors into the Bering Sea Pacific cod fishery may increase congestion in some areas of the Bering Sea, and may interfere with the activities of other fishing operations already there. Most of the vessels affected by increased regulations in the Aleutian Islands also fish in the Bering Sea.

The vessels that targeted Pacific cod in the Aleutian Islands in 2010 managed to maintain their 2010 levels of Pacific cod harvests in 2011, by increasing Pacific cod production in the Bering Sea, despite declining Aleutian Islands production. Aggregate Aleutian Islands Pacific cod production for these

vessels was 4,005 metric tons in 2010, and 1,549 metric tons in 2011.[81] Aggregate BSAI Pacific cod production for these vessels in 2010 was 11,692 metric tons, while aggregate BSAI production in 2011 was 11,973 metric tons.[82] These vessels, even in 2010, processed more Pacific cod caught outside of the Aleutian Islands area than within it, and, in aggregate, were able to compensate for the reduced Aleutian Islands production in 2011, by increasing production in the Bering Sea.

However, the performance of these vessels, in 2011, fell short of the performance of trawl catcher/processors that were active in the BSAI in 2010, but which had not fished in the Aleutian Islands that year. These vessels saw their Pacific cod harvests rise from 16,925 metric tons in 2010, to 21,328 metric tons in 2011, an increase of 26 percent compared to a 2 percent increase for the vessels that had fished in the Aleutian Islands in 2010.[83] This performance comparison does not take into account mothership activity by either group of catcher/processors.

While Amendment 80 vessels are no longer subject to the GRS rule, they are still required to report on their retention levels to the Council. Retention rates are relatively high in the Aleutian Islands Atka mackerel and Pacific cod fisheries, and industry sources have expressed concern that reductions in the level of fishing activity in these fisheries would make it more difficult for the industry to keep retention levels high. If the GRS were still in effect, the current required retention rate would have been 85 percent. In 2011, with the increased restrictions in the Aleutian Islands, the Amendment 80 fleet had an 86.6 percent retention rate overall, while in 2012 it had an 86.3 percent rate overall.[84]

*Rock sole and yellowfin sole*

Amendment 80 vessels could increase fishing effort for rock sole or yellowfin sole in the Bering Sea. Recent TACs have not been fully harvested, leaving room for additional expansion in production. As with any other Amendment 80 species, the opportunities to increase production are limited by the vessel or firm's unfished Amendment 80 quota share holdings, its ability to lease quota share from other Amendment 80 firms, to lease CDQ from Community Development Groups, or to acquire vessels with Amendment 80 quota attached. Other limiting factors are the availability of other allocated species that may be caught incidentally and the viability of a market for these species.

While halibut PSC is a concern, other allocated groundfish species have proven to be more limiting in recent years. From 2009 to the present, Pacific cod has been a limiting species in expanding production of rock sole and yellowfin sole. Rock sole has also become a limiting species for yellowfin sole.[85] In 2012, high incidental catch rates of rock sole for vessels targeting yellowfin sole prevented expansion in yellowfin sole catch later in the year. Amendment 80 vessels have the ability to control how much fish they allocate to incidental catch, with the consequence that a species may become limiting to their fishing operation should they not allocate sufficient amounts. Amendment 80 participants are still learning how to manage their fisheries. As this program matures, it is possible Pacific cod and rock sole may not be as limiting as they currently are.

Amendment 80 participants have been hesitant to lease quota to other members of their cooperative in the past. Because incidental catch rates of Amendment 80 species can be so variable from year to year,

[81] These estimates were prepared by NMFS AKR In-season management branch staff, and differ slightly from the estimates in Table 10, prepared by AKFIN.

[82] Estimates prepared by NMFS AKR In-season management branch staff, September 4, 2012.

[83] Estimates prepared by NMFS AKR In-season management branch staff, September 4, 2012.

[84] Estimates prepared by NMFS AKR In-season management branch staff, December 2012.

[85] The Council may take action to allow flexibility in flatfish use of TACs for yellowfin, rock sole, and flathead sole. If adopted, quota for any one of these species will be permitted to be traded for an equal amount of quota of any of the other of these species, up to the excess-ABC amount.

leasing quota early in the year may limit an operation later in the year. If leasing was to occur, it would likely be later in the year and may be outside the operational times of the vessels requesting a lease. It is also possible that Amendment 80 firms would deny their cooperative members flatfish quota in order to seize a competitive advantage. If leases do take place, a large part of the net revenues from such deals would accrue to firms providing the quota, and this could reduce the actual revenue offset to injured firms, all else equal.

Prior to 2008, CDQ yellowfin sole and rock sole were heavily used. From 2005 through 2006, between 89 percent and 99 percent of the CDQ for these species was harvested each year. These percentages decreased considerably to 32 percent in 2008 and 8 percent in 2009, and increased slightly to 13 percent in 2010. (NMFS AKR catch reports) This may have been connected with the introduction of Amendment 80. Prior to Amendment 80, vessels in the head-and-gut fleet were engaged in a race for fish as they sought to harvest available allocations of yellowfin sole and rock sole. CDQ fish provided a mechanism for extending the season. Amendment 80 mitigated the race for fish, and may have reduced the demand for access to the CDQ allocations by Amendment 80 operators.

Thus, it is possible that vessels impacted by increased restrictions in the Aleutian Islands could expand into CDQ flatfish. As mentioned above for non-CDQ species, prohibited species limits are a potential constraining factor, along with competition for access to CDQ fish. In 2011, CDQ catch of rock sole and yellowfin sole increased to 36 percent and 78 percent, respectively, and in 2012 they were 66 percent and 65 percent. (NMFS AKR catch reports).[86]

Increased demand for certain types of CDQ by vessels redeploying out of the Aleutian Islands fisheries could tend to increase quota values.

Crab PSC limits have been identified as a constraint to expanding fishing activity into yellowfin sole and rock sole fisheries. In most years, these PSC limits are well above actual catch. However, crab PSC is variable from year to year, and has been constraining in the past in some areas. The red king crab savings subarea and Zone 2 Bairdi have been a concern in recent years.

Multiple concerns were identified by the Amendment 80 fleet in 2010. The primary concern was that an increase in effort in the yellowfin sole and rock sole fishing by vessels impacted by increased Steller sea lion restrictions might impact other vessels that relied on those flatfish fisheries. Vessels impacted by the increased Steller sea lion restrictions might have participated in those fisheries at different times of the year than they had in the past, resulting in higher PSC. However, with Amendment 80, the fleet has the tools to respond to high PSC rates of crab and, in prior years, has shown the ability to adapt to high PSC rates to prevent a closure. Concerns were expressed, in 2010, that some of the vessels that might expand into this fishery might lack the skill to adapt as the non-Aleutian Islands vessels had. The Amendment 80 cooperatives provide a mechanism for dealing with this.

Amendment 80 vessels specializing in Atka mackerel in the Aleutian Islands received large amounts of Amendment 80 Atka mackerel quota, because of their fishing history. Amendment 80 PSC limits were also distributed within the fleet on the basis of fishing history. Thus, vessels that fished relatively more in the Aleutian Islands, where PSC rates were relatively low, received PSC limits that were relatively low, compared to those vessels that fished more in the Bering Sea. Though PSC rates in recent years have not been a huge concern, years with high PSC may leave these vessels at a disadvantage in pursuing fisheries in the Bering Sea, where PSC rates are relatively higher. These firms may be able to lease PSC limits

[86] Catch reports are available at the NMFS AKR website: http://alaskafisheries.noaa.gov/sustainablefisheries/catchstats.htm .

from other firms, but this is likely to be costly, if it is possible, as, especially in the case of halibut, PSC may be in short supply.

Recent increases in incidental catch of rock sole by the directed pollock fishery have led to larger incidental catch allowances (ICA) being set in the harvest specifications. There are concerns that additional effort by non-Amendment 80 vessels impacted by restrictions in the Aleutian Islands in the BSAI trawl limited access yellowfin sole fishery may impact Amendment 80 vessels. The incidental catch rate of rock sole in the BSAI trawl limited access yellowfin sole fishery can be relatively high (25 percent to 35 percent). For non-Amendment 80 trawl vessels, this rock sole is funded by the ICA. This may cause an increase in the ICA to accommodate the extra rock sole harvest. Any increase to the ICA may decrease the amount available for the Amendment 80 directed fishery allocation of rock sole (Park 2010).

By statute, the sum of the BSAI TACs cannot exceed 2.0 million metric tons per year, and historically, the pollock TAC has been given a high priority. With increasing pollock TACs, it is possible that flatfish TACs could be set lower to accommodate the additional pollock. If this occurred, lower TACs could constrain movement into yellowfin sole and rock sole fisheries. This is an allocation decision that the Council chooses to make each year.

The F/V *Katie Ann* is an AFA, rather than an Amendment 80 trawl catcher/processor, but she has also redeployed, after reconfiguring her processing plant, into the BSAI yellowfin sole fishery. As noted earlier, this move was motivated in part by the loss of the Area 543 fishing grounds, and in part by increasing incidental catches of Pacific cod by other AFA vessels, which reduced the share of AFA Amendment 85 Pacific cod available for targeting by the *Katie Ann*. As an AFA catcher/processor, the Katie Ann is fishing against the trawl limited access sector yellowfin allocation and competing with other AFA catcher/processors and catcher vessels, non-AFA catcher vessels, and Amendment 80 catcher/processors accepting deliveries as motherships. Because there are no individual allocations of either yellowfin sole or halibut PSC, it can be shut down at any time due to high halibut PSC rates, or the race for fish. A source from American Seafood Company, the firm that owns the *Katie Ann*, indicates that because of this, this fishery, on which the *Katie Ann* is currently dependent in Alaska, is unpredictable and hard to plan for. (Jacobs, personal communication, April 6, 2013)

Should effort increase in yellowfin sole and rock sole fisheries there may be a reduction in prices that might adversely affect operations already in these fisheries.

Yellowfin sole and rock sole are not targeted in the Bristol Bay area. Most of Bristol Bay has been closed to flatfish trawling since 1997, by the Nearshore Bristol Bay Trawl Closure Area. The only exception is a relatively small area (the Nearshore Bristol Bay Trawl Area) that remains open to trawling from April 1 to June 15. This opening provides flatfish trawling opportunities in an area with high flatfish catch per unit of effort, and relatively low PSC. The timing was meant to close trawling activity in the area when halibut begin to move near shore in mid-June (Wilson and Evans 2009: 8). Local representatives remain concerned about halibut PSC, and about potential gear conflicts. In 2009 and 2010, most of the Amendment 80 fleet had a voluntary agreement with local fishermen in the Bristol Bay region to limit the location and time the trawl fleet fishes in this area more than regulation would have permitted. Local representatives have been concerned that, with pressure to offset revenue at risk in the Aleutian Islands, the voluntary agreement could be abandoned, leaving local, small-scale fishermen vulnerable to gear conflict and preemptive harvest of halibut taken by trawl vessels as their PSC limits (Samuelsen, 2010).

*Pacific Ocean Perch*

As shown in Table 4, vessels and firms with larger amounts of Amendment 80 Atka mackerel quota also tend to have larger amounts of Amendment 80 Aleutian Islands Pacific ocean perch quota. Pacific ocean perch is allocated to the Amendment 80 program in the Aleutian Islands, but not in the Bering Sea. Aleutian Islands Pacific ocean perch is fully allocated and harvest rates have been relatively high under Amendment 80. Thus, Aleutian Islands Pacific ocean perch is not likely to provide increased opportunities for redeployment.

Bering Sea Pacific ocean perch is not an Amendment 80 species. However, in recent years agreements among Amendment 80 operations have made it possible for in-season managers to provide for directed Bering Sea Pacific ocean perch fishing later in the year. Since the advent of Amendment 80, the Bering Sea TAC (including CDQ) has varied between about 3,200 metric tons and about 8,100 metric tons. The percent of the Bering Sea TAC caught was in the teens in 2008 and 2009, but was between 98 percent and 100 percent from 2010 through 2012. The 2013 quota was relatively high, but the catch was only 62 percent of the quota, because of management measures to limit incidental harvests of shortraker rockfish. (NMFS AKR In-season managers; Alaska Region Catch and Production Reports, various issues). The quotas and catches in this fishery have been somewhat higher since 2010 than in the years just prior, but it is not clear that these would have gone unharvested in the absence of the interim final rule or that they have provided a significant opportunity for redeployment by the Amendment 80 sector.

*Flathead sole*

Flathead sole has not been targeted by Amendment 80 Atka mackerel vessels in the past. As shown in Table 4, vessels or firms with relatively large Atka mackerel holdings tend to have relatively small (1 percent to 3 percent) shares of the Amendment 80 flathead sole quota. The flathead sole taken by these vessels was usually taken as incidental catch in yellowfin sole and rock sole target fisheries. If halibut PSC is low enough, compared to the available PSC limits, and species such as Pacific cod are not limiting, it may be possible for these vessels to increase their flathead sole catch; however, history suggests that it is more likely they would reserve their available halibut PSC and Pacific cod for use in the rock sole, yellowfin sole, and arrowtooth flounder fisheries.

*Non-Amendment 80 species*

Trawl catcher/processors may turn to fisheries that are not in a catch share program in the BSAI and GOA. These include fisheries in the BSAI for arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, and other flatfish, and fisheries in the GOA for arrowtooth flounder, rockfish, and rex sole.

Arrowtooth flounder and Kamchatka flounder are relatively new target fisheries, and some Amendment 80 Atka mackerel vessels have been targeting these species since the Amendment 80 program began in 2008. To some extent, increased activity in these fisheries has been a result of the Amendment 80 program. Before Amendment 80, halibut PSC allowances were provided separately for individual species or groups of species. The PSC allowance for the species group including turbot, Kamchatka flounder, and arrowtooth flounder was set equal to zero. This precluded directed fishing for these species by trawl vessels. Amendment 80 converted the individual species PSC limits to global cooperative limits that can be allocated by the cooperative among different target species as it chooses. This made it possible to target turbot, Kamchatka flounder, and arrowtooth flounder, and trawl harvests of these species began in 2008. The season opening date for both fisheries is May 1, thus, while arrowtooth flounder and Kamchatka flounder production may increase through time, this production may not be related to the closure of Atka mackerel fishing in Areas 542 and 543 during the first part of the year.

In recent years, trawl catcher/processor vessels have been increasing harvests of Greenland turbot. As described in the discussion of arrowtooth and Kamchatka flounders, this originated as a result of the Amendment 80 program. The interim final rule may intensify interest in this option. Competition for Greenland turbot between the freezer longline sector and the trawl catcher/processor sector has increased in some recent years and is discussed in more detail in the freezer longline section of this chapter. Greenland turbot fishing opportunities will depend on stock strength. Pursuant to an intersectoral agreement, Amendment 80 trawl catcher/processors were restricted to incidental catches of Greenland turbot in 2013 and 2014. (NMFS AKR in-season managers)

Alaska plaice was generally lightly harvested through 2010, but harvests have increased from 2011 to 2013. During the first years of the Amendment 80 program, the quota was 42,500 metric tons, and 33 percent to 41 percent of it was caught. From 2011 through 2013, the quota was reduced to 16,000 to about 22,000 metric tons. However, catches were higher during this later period; the average catch from 2008 to 2010 was about 16,000 metric tons, while the average catch from 2011 through 2013 was about 21,000 metric tons. The reduced quotas were exceeded in 2011 and 2013. Previously, Alaska plaice were primarily incidental catch in yellowfin sole fisheries, while more recently they have been the subject of directed fishing (Bering Sea Aleutian Islands Catch Report [includes CDQ] various issues).

The miscellaneous category of the "other flatfish" species group are generally not pursued as fishery targets, but are incidental catch in other fisheries. During the first years of the Amendment 80 program, quotas were about 14,700 metric tons to about 18,400 metric tons, and 15 percent to 20 percent of the quotas were caught. From 2011 to 2013 the quotas ranged from about 3,000 to 3,200 metric tons (Bering Sea Aleutian Islands Catch Report [ includes CDQ] various issues).

Amendment 80 catcher/processors also could target the trawl allocation of sablefish, but there are high halibut PSC rates in this fishery. It has also been indicated by Amendment 80 catcher/processors that they cannot find sablefish in trawlable densities to support targeting (NMFS, 2010b).

Under the Amendment 80 program, only 11 of the Amendment 80 vessels are authorized to fish for flatfish in the GOA (the vessels are listed in Table 39 of 50 CFR 679). Amendment 80 GOA flatfish participation is also limited by Amendment 80 halibut PSC sideboard limits, and a joint PSC limit the Amendment 80 vessels share with the catcher vessel trawl fleet. If the halibut PSC limit is reached, it could become difficult for the trawl catcher vessels to target deep-water and shallow-water flatfish. Increased participation in these fisheries, as a result of Steller sea lion measures in the Aleutian Islands, may, thus, impact trawl catcher vessels fishing for flatfish in the GOA.

Amendment 80 vessels also participate in Western GOA rockfish fisheries. This fishery starts on July 1 and most vessels impacted by increased restrictions in the Aleutian Islands participate in this fishery. Expansion by other Amendment 80 vessels in recent years will likely prevent any additional expansion in this fishery by vessels impacted by increased restrictions in the Aleutian Islands. The Pacific ocean perch TAC has been exceeded in recent years, and, in 2012, a 24-hour fishery caused the OFL to be exceeded. A combination of decreased rockfish TACs and management concerns may impact access to this fishery in the future.

*Catcher/processors acting as motherships*

Amendment 80 catcher/processors may obtain some species for processing by acting as motherships for trawl catcher vessels in the BSAI trawl limited access sector.

With the advent of the Amendment 80 program, Amendment 80 trawl catcher/processor harvests were limited by their quota share. One way for these vessels to increase production was for the trawl

catcher/processors to act as motherships for trawl catcher vessels with access to allocations of these species. Table 2 and Table 3 show the number of catcher vessels delivering to motherships and the number of catcher/processors acting as motherships. In both cases, mothership activity preceded Amendment 80. Amendment 80 went into effect at the same time there were increases in both Atka mackerel mothership activity and Pacific cod mothership activity.[87]

The number of catcher vessels delivering Pacific cod to motherships more than doubled between 2010 and 2011 (5 vessels in 2010, 11 in 2011, and 12 in 2012). A relationship between trawl catcher vessels delivering Atka mackerel and the interim final rule is harder to identify. If this increase is a response to the interim final rule, it may create competition with other potential buyers of Pacific cod, possibly including shoreside processors, such as Adak, and AFA trawl catcher/processors. Trawl catcher vessels will be affected positively or negatively, depending on their ability to contract with the Amendment 80 sector.

Catcher/processors acting as motherships affected by increased regulations could seek to increase deliveries of BSAI trawl limited access yellowfin sole. This could create conflicts with AFA catcher/processors, also seeking to access BSAI trawl limited access yellowfin allocations.

*Other activities*

Opportunities for these vessels to fish outside waters in or adjacent to Alaska are probably limited. Large catcher/processors are unusual in most U.S. fisheries, although trawl catcher/processors are used in the fishery for Pacific whiting, under the management jurisdiction of the Pacific Fishery Management Council. While some catcher/processors in the pollock fishery participate in the Pacific whiting fishery, the Pacific whiting fishery is now under limited entry. Catcher/processors displaced from the Aleutian Islands could only enter the Pacific whiting fishery, either as a catcher/processor or mothership, by buying a limited entry permit. In general, this does not appear to be a source of offsetting revenues for the firms potentially adversely impacted by this alternative, nor does it appear to be a source of offsetting aggregate production for U.S. fisheries (J. Seger, personal communication).[88]

Vessels may remain in port during the period they would otherwise have been harvesting Atka mackerel and Pacific cod in the Aleutian Islands. If the vessels displaced from the Aleutian Islands remained in their home ports during the period when they had formerly been fishing, there would be no offsetting fish catches, although they would avoid most, if not all, variable costs associated with fishing. Vessels may remain in port only part of this period, fishing off Alaska for the remainder. For example, it is possible that vessels may remain in port for a week or so longer than they otherwise would have, before traveling to fishing grounds off Alaska. Each of these alternative strategies could reduce variable operating costs, to some degree.

*Indirectly impacted sectors*

Redeployment by trawl catcher/processors into the Bering Sea may affect fishing sectors not otherwise directly regulated by this action. The potential for adverse impacts on other Amendment 80 vessels appears limited by the operation of the Amendment 80 quota program and by the operation of the Amendment 80 cooperatives. Increases in harvests of some species, however, such as yellowfin sole or rock sole, may lead to lower prices for those species, and reduce revenues to vessels already fishing for these species. A shift into the Bering Seas Pacific cod fishing may increase competition with non-

[87] Given the small numbers of catcher vessels and motherships, most volume and value data on this topic is confidential.

[88] James Seger, Economist, Pacific Fisheries Management Council, personal communication, June 25, 2010.

Amendment 80 vessels already fishing for those species. If trawl catcher/processors redeploy into the turbot fishery there could be increased resource competition with freezer longliners.

### 1.3.4 Alternative 1 summary

As the trawl catcher/processors redeploy to minimize the impact of the restrictions imposed by the interim final rule, their costs, as well as their revenues, will change. Revenue reductions associated with reduced fishing for Atka mackerel and Pacific cod in the Aleutian Islands will be accompanied by reductions in the variable costs (e.g., crew, vessel, skipper, and other revenue shares, fuel, food expenses) of fishing in the Aleutian Islands. Shifts to other fisheries, and new revenue streams from those fisheries, will be accompanied by increases in variable costs in those fisheries.

If vessels or gear must be reconfigured, there may be fixed costs with shifting between fisheries. To the extent that skippers and crew must become familiar with operations in new areas or for new species, or to the extent that vessels were better adapted to the old fisheries than the new ones, the operations will incur costs associated with learning to operate in the new fisheries. These may take the shape of lower catch per unit of effort in the new fisheries, and, thus, higher variable costs for any given volume of catch. NMFS does not have data that would allow it to estimate the size of these possible costs.

There may also be price impacts associated with the change. Large potential reductions in Atka mackerel harvests may be associated with offsetting changes in the prices received. Since industry can influence the TAC setting process in the Council, it is likely that it has exercised its influence to prevent production reaching levels that would actually reduce revenues. Thus, the industry may be operating on the elastic portion of its demand curve, where volume decreases are associated with revenue decreases (that is, the price increase is not large enough to fully offset the volume reduction's impact on gross revenues). Industry indicates that larger Atka mackerel, which become more common with a move from Areas 543 and 542 to Area 541 and the Bering Sea, bring higher prices. If this is the case, an adverse revenue impact would be obscured by an increase in the proportion of higher priced Atka mackerel TAC taken in Area 541, which occurred at the time the interim final rule went into effect. A shift in the biomass, and the proportion of the TAC, coming from Areas 542 and 543 may occur in the future.

Vessels shifting their Pacific cod harvests from the Aleutian Islands into the Bering Sea may receive a lower price for Pacific cod in the Bering Sea than they had been receiving in the Aleutian Islands, given the reported differences in fish size and price between the two areas. Reductions in the supply of Aleutian Islands Pacific cod may increase the price received for that supply segment, while increased supplies of smaller cod may lead to reduced prices in that market segment. To the extent that vessels must operate in new fisheries with new markets, firms may face a marketing learning curve as they develop new marketing channels. NMFS does not have data that would allow it to estimate the size of these possible costs.

Table 53 provides estimates of revenue at risk for Alternative 1. The mean value wholesale gross revenues at risk in the Aleutian Islands would have been about $35 million per year during the baseline years (2004 through 2010). The annual wholesale gross revenue at risk ranged from about $27 million, to about $48 million per year. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Adjust revenues for reduction in variable operating costs associated with reduced fishing in the Aleutian Islands;
- Adjust revenues to reflect possible increases in wholesale prices as Atka mackerel production drops;

- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Adjust revenues to reflect possible change in average annual Atka mackerel prices as the center of gravity of fishing is shifted to the east (all other things equal), and to reflect a possible decrease in Pacific cod prices as production shifts from the Aleutian Islands to the Bering Sea;
- Add costs that may be imposed on other fleets as trawl catcher/processors redeploy into their fisheries.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated.

### 1.3.5 Alternative 4

Alternative 4 partially recreates the regulations faced by the trawl catcher/processors in 2010, the year ***before*** the interim final rule went into effect. The principal difference between Alternative 4 and the Steller sea lion protection rules in place during the baseline period is the season extension, and the elimination of the Harvest Limitation Area (HLA). Because of the methodology in use, this does not affect the estimates of gross revenues, although it would affect fishing costs.

Under Alternative 1, an average of about $35 million a year, during the baseline years, came from critical habitat closed under the alternative. Under Alternative 4, these areas would not be closed. Because of the elimination of the HLA rule, which allows the vessels in the sector more flexibility with respect to the harvest of Atka mackerel, this alternative probably reduces costs below those during the baseline years.

This revenue-at-risk comparison focuses on wholesale gross revenues from areas that would be closed under the two alternatives. As discussed above, this does not take account of associated changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

## 1.4 Non-trawl catcher/processors (Alternatives 1 and 4)

This section evaluates Alternatives 1 and 4 with respect to the non-trawl catcher/processor sector. Alternatives 2 and 3, and their options, are evaluated in Section 1.10. Alternatives 5 and 6 are examined in Section 1.13. The non-trawl catcher/processor sector includes both hook-and-line and pot catcher/processors, as described in Section 1.2.2.

### 1.4.1 Catches

Table 55 summarizes historical volumes of retained Pacific cod catches by non-trawl catcher/processors, by management area, and in total, for the years 2004 through 2010 (the baseline). In addition, the table provides estimates of the retained catch associated with areas that are closed by, or that remain open under, Alternative 1, had that alternative been in effect in the years shown. The final column shows the estimated percentage of the baseline catch that came from areas left open under the alternative.

As shown in the left-hand block of the table, baseline retained catches of Pacific cod by this fleet had increased in all but two years during the time period examined. Retained catches in the last two years were each more than twice the retained catches in the first two years. While retained catches were

greatest in Area 541 in 2004, by 2008 retained catches in Area 542 and 543 tended to be similar to, or greater than, retained catches in Area 541.

The volumes of the fleet's retained baseline year catches that came from areas closed under Alternative 1 ranged between about 1,800 metric tons (in 2006) and about 6,200 metric tons (in 2010). The impact of Alternative 1 was relatively large; the catch coming from areas remaining open, as a percentage of the baseline retained catch, ranges from 25 percent (in 2010), to 41 percent (in 2006).

**Table 55 Location of estimated aggregate non-trawl catcher/processor Pacific cod harvests in the Aleutian Islands, Alternative 1, from 2004 through 2010.**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Open area catch as % of total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 1,568 | C | S | 2,937 | 961 | C | S | 1,885 | 607 | C | S | 1,052 | 36% |
| 2005 | S | C | C | 2,794 | S | C | C | 1,856 | S | C | C | 938 | 34% |
| 2006 | S | C | C | 3,054 | S | C | C | 1,799 | S | C | C | 1,256 | 41% |
| 2007 | 1,770 | 751 | 1,639 | 4,160 | 958 | 288 | 1,639 | 2,885 | 812 | 463 | 0 | 1,275 | 31% |
| 2008 | 1,898 | 2,495 | 2,330 | 6,723 | 1,334 | 841 | 2,330 | 4,505 | 565 | 1,654 | 0 | 2,219 | 33% |
| 2009 | 1,226 | 1,997 | 2,866 | 6,090 | 618 | 824 | 2,866 | 4,309 | 608 | 1,173 | 0 | 1,780 | 29% |
| 2010 | 2,659 | 2,426 | 3,146 | 8,231 | 1,710 | 1,324 | 3,146 | 6,180 | 949 | 1,102 | 0 | 2,051 | 25% |

Notes: Metric tons round weight retained Pacific cod from targeted and incidental fishing (includes CDQ). "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, February 5, 2013.

### 1.4.2 Gross revenues

Table 56 summarizes estimates of the total gross revenues associated with the sector during the baseline years. In addition, it provides estimates of the gross revenues associated with areas that would be closed under Alternative 1, and estimates of the gross revenues associated with areas that would remain open under the alternative. Revenues include revenues from retained targeted Pacific cod, revenues from incidental catches of Pacific cod in non-Pacific cod target fisheries, and revenues from incidental catches of other groundfish species in Pacific cod target fisheries. The table is divided into two parts; the upper part provides estimates of actual gross revenues in the year earned, while the lower part translates these into "real" 2012 dollars, to eliminate the effect of inflation. This inflation adjustment has the effect of increasing the size of all earlier year revenues relative to later year revenues. The revenues for 2004 are increased about 19 percent (reflecting the influence of inflation in the general economy), and the revenues from later years increase by smaller percentages. The 2010 revenues are little changed**.**

Under this status quo alternative, 25 percent to 42 percent of baseline gross revenues, depending on the year, came from areas that would have remained open under the alternative, if it had been in effect during the years 2004 through 2010. In real terms, from $3.2 million to $13.6 million of the sector's revenues would have come from areas closed by the alternative, while this fleet would have earned from $1.7 million in 2005, up to $5.2 million in 2008, from areas remaining open, also in real terms.

**Table 56 Estimated aggregate non-trawl catcher/processor Pacific cod first wholesale gross revenues in the Aleutian Islands, Alternative 1, from 2004 through 2010**

| Nominal (millions of dollars) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 2.2 | C | S | 4.2 | 1.4 | C | S | 2.7 | 0.9 | C | S | 1.5 | 36% |
| 2005 | S | C | C | 4.4 | S | C | C | 2.9 | S | C | C | 1.5 | 34% |
| 2006 | S | C | C | 6.1 | S | C | C | 3.6 | S | C | C | 2.5 | 42% |
| 2007 | 4.4 | 1.9 | 4.0 | 10.2 | 2.3 | 0.7 | 4.0 | 7.0 | 2.0 | 1.2 | 0.0 | 3.2 | 31% |
| 2008 | 4.3 | 5.5 | 5.2 | 15.0 | 3.0 | 1.9 | 5.2 | 10.1 | 1.2 | 3.7 | 0.0 | 4.9 | 33% |
| 2009 | 2.1 | 3.4 | 5.0 | 10.5 | 1.1 | 1.4 | 5.0 | 7.5 | 1.0 | 2.0 | 0.0 | 3.1 | 29% |
| 2010 | 5.7 | 5.1 | 6.7 | 17.5 | 3.6 | 2.7 | 6.7 | 13.1 | 2.1 | 2.3 | 0.0 | 4.4 | 25% |
| Real (millions of "2102" dollars) | | | | | | | | | | | | | |
| | Baseline gross revenue | | | | Gross revenue in closed area (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 2.7 | C | S | 5.0 | 1.6 | C | S | 3.2 | 1.0 | C | S | 1.8 | 36% |
| 2005 | S | C | C | 5.1 | S | C | C | 3.4 | S | C | C | 1.7 | 34% |
| 2006 | S | C | C | 6.8 | S | C | C | 4.0 | S | C | C | 2.8 | 42% |
| 2007 | 4.8 | 2.1 | 4.4 | 11.2 | 2.5 | 0.8 | 4.4 | 7.7 | 2.2 | 1.3 | 0.0 | 3.5 | 31% |
| 2008 | 4.5 | 5.8 | 5.5 | 15.8 | 3.2 | 2.0 | 5.5 | 10.6 | 1.3 | 3.9 | 0.0 | 5.2 | 33% |
| 2009 | 2.2 | 3.6 | 5.3 | 11.1 | 1.1 | 1.5 | 5.3 | 7.9 | 1.1 | 2.1 | 0.0 | 3.2 | 29% |
| 2010 | 5.9 | 5.3 | 7.0 | 18.2 | 3.8 | 2.9 | 7.0 | 13.6 | 2.1 | 2.4 | 0.0 | 4.6 | 25% |

Notes: Includes retained catches by non-trawl (hook-and-line and pot) catcher/processors. Values include the values of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish taken in Pacific cod targets. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June each year. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.

Source: NMFS AKR estimates using CIA database. February 5, 2013.

### 1.4.3 Fleet Redeployment and Impacts on Other Fisheries

Non-trawl catcher/processors may adapt to more restrictive regulations in the Aleutian Islands by shifting their Pacific cod fishing to (1) the remaining unrestricted waters in the Aleutian Islands, (2) the Bering Sea, (3) the Gulf of Alaska, or (4) by shifting their targets to other Bering Sea or Gulf of Alaska groundfish fisheries.

As shown in Table 23, the vessels in this category that are active in the Aleutian Islands in any year also do other things. In 2010, the last year before the interim final rule came into effect, these vessels earned about 39 percent of their revenues from Pacific cod in the Aleutian Islands.

*Pacific cod in the Aleutian Islands*

The estimates of the impacts of the action on Pacific cod retained catches, described in Table 55, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to fishing under the interim final rule, and by assuming that this Pacific cod could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled "Open area catch as % of total," show the share of harvest coming out of areas that would remain open under the action. As shown in that table, depending on the year, from 25 percent to 41 percent of the volume of Pacific cod retained by this sector in the Aleutian Islands came from areas that were to remain open under the status quo.

Non-trawl catcher/processors that formerly fished for Pacific cod in areas that have become restricted could conceivably shift their fishing effort into Aleutian Islands areas that remain open. Operations formerly active in Area 543 might shift their fishing into Areas 542 and 541, and operations that were active in parts of Areas 542 and 541 that are now closed might shift their operations to zones in those areas that remain open. However, in practice, opportunities for this are limited by the relatively large footprint that non-trawl catcher/processors require to effectively fish an area, in combination with the limited amount of Pacific cod habitat available in the Aleutian Islands.

The footprint is the area needed for gear deployment for effective fishing. For example, a longline can be several miles long and draw fish within a half a mile of each side of the gear. Placing two longlines immediately adjacent to each other is inefficient. Also the gear must be left in the water (soak time) from 6 hours to over 24 hours. Therefore, most freezer longliners will set multiple longlines to efficiently maximize catch. Multiple longlines are set and spaced over a mile apart making the footprint a block of several miles by several miles.

The prime Pacific cod fishing locations in the Aleutian Islands are found in depths less than 300 meters. Most of those locations fall within critical habitat and access has been heavily restricted.[89]

Table 20 summarizing non-trawl catcher/processor Pacific cod retained catches in the Aleutian Islands, shows a drop of about 86 percent in the retained catch in 2011, the year the interim final rule went into effect. Retained catches were higher in 2012, but still much lower than they were in 2010. Retained catches were prohibited in Area 543, but they also dropped by large proportions in Area 542 and Area 541. The overall decline of 86 percent in 2011 exceeded the declines projected in Table 55 for the baseline years 2004 through 2010. Residual catch estimates for those years did not decline below 25 percent.

Figure 3-15 and Figure 3-16 in Chapter 3 of the EIS are charts showing the locations of Pacific cod harvests by non-trawl vessels from 2004 through 2010, and in 2011 and 2012. A comparison of the charts shows how the location of non-trawl Pacific trawl harvests changed following the implementation of the interim final rule. The charts show the elimination of retained harvests in Area 543, and the substantial reduction in Area 542. The charts also show the continuing importance of harvests in Area 541, including in an area outside of critical habitat, just south of Atka Island.

As explained above, Table 20 shows a large harvest decline in 2011, larger than would have been predicted by an examination of the impacts of the action in the baseline years 2004 through 2010, suggesting that other factors may have been operative in 2011, to cause shifts in the location of the fleet's Pacific cod harvest. The harvest rebounded somewhat in 2012, although not to the mean or median levels observed in the baseline years 2004 through 2010.

The Pacific cod restrictions may have implications for vessels fishing for other species in the Aleutian Islands. One operator has indicated that his fishing strategy in the Aleutian Islands depends on the availability of both Pacific cod and sablefish fishing opportunities. This operator finds that killer whale and sperm whale predation on his gear becomes a problem when he is targeting sablefish or Greenland turbot in the Aleutian Islands. When this becomes a problem, he stops fishing deep-water gear and shifts to targeting Pacific cod, until the whales disperse. He indicates that it is not uncommon for whales to follow his boat for a week or more, until they become discouraged (Lone, 2010).

[89] The relationship between the location of prime Pacific cod habitat and the location of critical Steller sea lion habitat is discussed at greater length in Chapter 5.

*Pacific cod in the Bering Sea*

Both freezer longline and pot catcher/processor sectors receive sectoral allocations of Pacific cod that they may fish in either the Aleutian Islands or the Bering Sea. Therefore, if these fleets are unable to harvest as much Pacific cod from the Aleutian Islands as they have in the past, they may be able to make up part, or all, of the loss in the Bering Sea.

However, as explained in Section 1.2.16, whereas in earlier years there was a single Pacific cod TAC for the entire BSAI, from 2014 forward there will be separate Pacific cod TACs for the Aleutian Islands and for the Bering Sea. Because of this, if the Bering Sea TAC would otherwise have been fully harvested, a sectoral shift from the Aleutian Islands to the Bering Sea can only take place at the expense of another sector's ability to harvest Pacific cod in the Bering Sea.[90] Freezer longline and pot catcher/processors may be at a disadvantage with respect to this, since a large proportion of their seasonal allocations of Pacific cod are received in the summer or fall, while the complete trawl catcher/processor seasonal allocations, and over four-fifths of the trawl catcher vessel allocation, are received by June 10. In a normal year, trawlers are unable to fully harvest their allocations, and some of the trawl gear allocations are reallocated to non-trawl sectors. If trawlers tended to harvest a larger proportion of their BSAI allocations in the Bering Sea because of restrictions in the Aleutian Islands, reallocations to non-trawl sectors may be reduced.

Non-trawl catcher/processors active in the Aleutian Islands also have a history of activity in the Bering Sea. Comparisons of vessels that fish in the Aleutian Islands indicate there are relatively small differences in weekly catch rates in the Aleutian Islands versus the Bering Sea by those same vessels and at those same time periods. Table 57 shows annual weekly average harvest in the Bering Sea, expressed as a percentage of annual weekly average harvest in the Aleutian Islands, for the vessels that were active in the Aleutian Islands B-season in each year. In the Aleutian Islands, most non-trawl catcher/processor effort occurs in the B-season and is spread out along the entire Aleutian chain.

**Table 57 Comparison of average Pacific cod B-season weekly harvest rates in the Bering Sea and the Aleutian Islands for vessels active in the Aleutian Islands**

| Year | Number of vessels | Average Weekly Aleutian Islands Catch | Average Weekly Bering Sea Catch | Ratio of Bering Sea average weekly catch to that of Aleutian Islands |
|---|---|---|---|---|
| 2004 | *3* | 39.66 | 54.80 | 1.38 |
| 2005 | *2* | C | C | C |
| 2006 | *4* | 42.31 | 65.80 | 1.56 |
| 2007 | *5* | 78.14 | 55.63 | 0.71 |
| 2008 | *10* | 52.28 | 66.62 | 1.27 |
| 2009 | *8* | 48.72 | 48.82 | 1.00 |
| 2010 | *7* | 40.21 | 55.33 | 1.38 |
| 2011 | *4* | 35.40 | 60.72 | 1.72 |
| 2012* | *2* | C | C | C |

Notes: number of vessels is the number targeting Pacific cod in the Aleutian Islands in the year shown. "C" indicates confidential information. *Partial year
Source: NMFS AKR calculation from CAS, September 5, 2012.

As discussed in Section 1.3, in some years the trawl sectors may be unable to effectively harvest additional Pacific cod in the Bering Sea to make up for the loss of Pacific cod fishing opportunities in the Aleutian Islands. If that is the case, the unused trawl allocation may be reallocated to other fleets, and may find its way to the non-trawl catcher/processor fleet, towards the end of the year. The hook-and-line

[90] Section 1.2.16 provides a more detailed discussion of the Aleutian Islands/Bering Sea split in the BSAI Pacific cod specifications.

catcher/processor sector normally receives reallocations of BSAI Pacific cod TAC from other fishing sectors that are likely to be unable to take their full allocations. Between 2004 and 2009, these reallocations ranged between about 1,100 metric tons and about 22,200 metric tons. The fleet has shown the ability to harvest these reallocations in the Bering Sea. The annual Aleutian Islands harvest during this period, between about 2,600 metric tons and about 6,400 metric tons, is near the lower end of this range of reallocations. This suggests that the fleet will have the capacity to harvest the fish forgone in the Aleutian Islands, by shifting effort to the Bering Sea, if Bering Sea TAC levels made this possible.[91]

A shift in the location of Pacific cod harvests by this sector would be associated with changes in the incidental catch of other groundfish species, and of PSC species; however, changes in PSC amounts appear unlikely to constrain Bering Sea production by this fleet. The relevant incidental catch and PSC rates for the Aleutian Islands and the Bering Sea are summarized in Table 58.

**Table 58 Estimated PSC catch rates per metric ton of non-trawl catcher/processor groundfish harvest, and rates of prohibited species catch (averages for 2004 through 2011)**

| | PSC AI | PSC BS | Units |
|---|---|---|---|
| *C. bairdi* | 2.688 | .600 | Crab/mt groundfish |
| *C. opilio* | 3.234 | 1.321 | Crab/mt groundfish |
| Red king crab | .011 | .076 | Crab/mt groundfish |
| Halibut | 7.862 | 3.923 | kg mortality/mt groundfish |
| Chinook salmon | 0 | 0 | Salmon/mt groundfish |
| Other salmon | .001 | .002 | Salmon/mt groundfish |

Note: Ratios and percentages were calculated to show the metric tonnage of the incidental or PSC species per metric ton of retained and discarded target species.
Source: NMFS AKR Catch Accounting System, September 5, 2012.

A comparison of the average BSAI-wide Pacific cod retained catches in 2010 and 2011 for the vessels active in the Aleutian Islands with the vessels that only fished in the Bering Sea suggests that the vessels fishing in the Aleutian Islands in 2010 gained ground in terms of the volume of Pacific cod harvested, relative to the vessels that only fished in the Bering Sea. Vessels fishing in the Aleutian Islands in 2010 averaged 2,060 metric tons BSAI-wide, of which a large proportion, 829 metric tons, came from fishing in the Aleutian Islands. These vessels retained 2,706 metric tons from the BSAI in 2011, of which only 112 metric tons came from the Aleutian Islands. Thus, for these vessels, the large drop in Aleutian Islands harvests was offset by an increase in Bering Sea harvests.[92] (NMFS AKR In-season management data summary, August 30, 2012)

In volume terms, these vessels appear to have gained ground slightly in 2011, compared to vessels that only fished in the Bering Sea in 2010. Vessels that only fished in the Bering Sea averaged 2,509 metric tons in 2010, and averaged 3,203 metric tons in 2011. These vessels had a 28 percent increase in their average harvests in 2011, but the vessels that fished in both the Aleutian Islands and Bering Sea in 2010 had a 31 percent increase. (NMFS AKR In-season management data summary, August 30, 2012)

Conceivably, a shift of vessels out of the Aleutian Islands could create congestion on the fishing grounds and reduce harvest rates for vessels already operating in the Bering Sea. The potential for this may be

[91] In 2011, the freezer longline fleet left about 2 percent of the available TAC in the water (1,975 mt). This was largely due to slower than expected summer harvest rates and the fleet not fishing as soon as they could. Some vessels expected harvest rates similar to those in earlier years, since the cooperative eliminated much of the competition for harvest shares, decided to stand down from fishing during part of the summer. However, with the slower rates that were actually experienced, they did not have enough time to fully harvest their quotas. (NMFS AKR In-season management staff)

[92] But only in volume, not necessarily in value, terms. This comparison focuses only on the volumes of fish, and does not take account of the potential differences in the value of fish caught in the Aleutian Islands and the Bering Sea.

limited by the large area in the Bering Sea within which non-trawl catcher/processors can fish productively. The extensive sea ice in the Bering Sea in 2012 provided a natural experiment on the extent to which sector production may be constrained by spatial limits. In 2012, the ice edge covered much of the area exploited by non-trawl catcher/processors in 2011. This compressed all fleets, including freezer longliners, into a much smaller area from January through March. Even with this, catch rates remained well above average and the entire A-season allocation of all gear groups was achieved. It is possible that ongoing license buyback and cooperative-driven fleet consolidation in the hook-and-line catcher/processor fleet may also mitigate potential congestion.

While the non-trawl catcher/processor vessels may be able to offset the volume loss of Pacific cod by redeploying into the Bering Sea, the shift will nevertheless have adverse implications for the fishing operations. These vessels had originally gone to the Aleutian Islands because they expected—given vessel configuration, captain's skills, and marketing networks—that the Aleutian Islands would be the most profitable destination. Restrictions that force redeployment to other fishing grounds, move the vessels towards what are likely to be less profitable fisheries.

Industry sources indicate that fishery conditions are different in the Aleutian Islands and the Bering Sea. For example, they indicate that the size distribution of fish in catches tends to be skewed toward larger fish in the Aleutian Islands, and that the larger fish have a distinct market niche that receives a higher price. Thus, a shift towards the smaller fish found in the Bering Sea may constrain the industry's ability to service certain markets, and reduce the overall value of the harvest to the industry. See Table 6 on the average size of Pacific cod.

Other information indicates that fishing operations are different in the Bering Sea. The Bering Sea fishery tends to be a higher volume fishery, depending on fishing more gear and fishing it more intensively. This may affect operations on the cost side. For example, the Bering Sea fishery may be more bait intensive (Hosmer, personal communication).[93] In addition to increasing this element of fishing costs, this may also affect demand for, and the price of, bait.

Incidental catch of skate and shark species is higher in the Bering Sea than the Aleutian Islands. It is possible that vessels displaced by increased regulation in the Aleutian Islands could increase incidental catch of sharks and skates. Some skate species have value to freezer longliners. Increasing incidental catch of skates by displaced vessels could cause the TAC to be reached in less time than normal which would trigger a prohibition on further retention for those skates they catch incidentally. Sharks are primarily discarded and there is not a management concern under the current management of sharks. However, sharks are managed as a group of species. If the shark group was ever broken out, and sharks began to be managed as individual species, increased shark catch could be a constraining factor for the freezer longline sector.

*Pacific cod in the Gulf of Alaska*

While, as described in Section 1.2.2, many freezer longliner licenses carry endorsements to fish in the western and central GOA, freezer longline harvests in the GOA are constrained by sector allocation limits. In December 2009, the Council adopted Amendment 83, which superseded the inshore/offshore processing allocation of Central and Western GOA Pacific cod. In its place, Pacific cod TACs were allocated among a number of gear sectors, including freezer longliners. Freezer longliners were given an allowance of about 5.1 percent of the Pacific cod TAC, net of a jig harvest allocation, in the Central Gulf and 19.8 percent of the TAC, net of a jig harvest allocation, in the Western Gulf. Allocations reflected historical harvest patterns and went into effect on January 1, 2012 (76 FR 74670, 74688; December 1,

[93] Chuck Hosmer, General Manager M/V *Baranof* and M/V *Courageous*. Personal communication, August 2010.

2011). Freezer longlines shifting to the GOA from the BSAI would be members of the fishing cooperative, and this is likely to take steps to control intra-cooperative competition in the GOA.

Pot catcher/processors received joint western and central GOA allocations with pot catcher vessels under Amendment 83. However, several factors will limit the ability of pot catcher/processors to redeploy into the GOA. Of the five pot catcher/processors licensed to fish for Pacific cod in the Aleutian Islands, only one was endorsed to fish with pot gear in the western GOA (see Section 1.2.2). Pot catcher/processors will be further limited in fishing for Pacific cod in the GOA by crab sideboard limits, and by the fact that BSAI and GOA pot fishing seasons take place at the same time, so that a vessel fishing less in the Aleutian Islands would forego fishing in the Bering Sea if it shifted to the GOA.

*Other groundfish species*

Non-trawl vessels can fish for halibut and sablefish, but these are individual fishing quota (IFQ) species, and would create few issues as vessels shifting into these species will have to fish their own individual fishing quota.

Conceivably, the action may lead freezer longliners to increase fishing effort for Greenland turbot in the BSAI. This could increase conflicts with Amendment 80 trawl catcher/processors, which might similarly seek to increase Greenland turbot effort as a substitute for lost Atka mackerel and Pacific cod fishing opportunities. There has been some concern about conflicts between these gear groups over this resource in recent years. At its June 2012 meeting, the Council adopted a draft purpose and need statement, and advance alternative regulatory actions for analysis. In 2013 and 2014, in the face of relatively low Greenland turbot stocks, the Freezer Longline Coalition and the Amendment 80 cooperatives reached a non-regulatory agreement to manage Greenland turbot catch which preserved the opportunity for a Bering Sea fixed gear directed fishery in the fall. (In-season management, personal communication, January 13, 2014).

However, the increased interest in Greenland turbot by the Amendment 80 trawlers and freezer longliners may be a consequence of rationalization in the two fisheries as well as of efforts to find substitute species. Amendment 80 removed the allocation of halibut PSC limits to specific target species groups and instead gave the Amendment 80 cooperatives one halibut PSC limit that they could use for any target species. In 2008, with the advent of Amendment 80, and of specification of halibut PSC limit changes that opened Greenland turbot to directed fishing by Amendment 80 vessels in a cooperative, the trawl catcher/processor in the Amendment 80 cooperative fleet began increasing its participation in the Greenland turbot fishery. The freezer longline fleet has recently adopted a fishing cooperative that allocates quota shares and is leading to increased rationalization of that fishery. One apparent consequence is a change in freezer longline participation in the Pacific cod fishery over the course of the year. Pacific cod fishing is now spread more evenly over the whole year. Freezer longliners used to fish for Greenland turbot in summer, between early and late Pacific cod fishing. With Pacific cod fishing taking place all year, they also have more time for Greenland turbot at different seasons, however, Greenland turbot opens for directed fishing on May 1 each year.

Freezer-longline participation is prohibited in the Pacific Northwest sablefish fishery, so Pacific cod longline catcher/processors could not be used there (J. Seger, personal communication, 2010).

*Indirectly impacted sectors*

Non-trawl catcher/processors redeploying from the Aleutian Islands focus on Pacific cod. Impacts of redeployment into the Aleutian Islands and Bering Sea are likely to be mitigated by BSAI Pacific cod sector allocations, the large fishing areas available in the Bering Sea, and the existence of a fisheries

cooperative allocating BSAI catches among freezer longliners. That said, if the Bering Sea Pacific cod quotas would otherwise have been fully harvested, new activity by freezer longliners in the Bering Sea would come at the expense of operations already there. Moreover, reallocations of Pacific cod from trawl operations to freezer longliners may be reduced.

### 1.4.4 Alternative 1 Summary

As the non-trawl catcher/processors redeploy to minimize the impact of the restrictions imposed by the interim final rule, their costs, as well as their revenues, will also change. Any revenue reductions associated with reduced fishing for Pacific cod in the Aleutian Islands may be accompanied by reductions in the variable costs (e.g., crew, vessel, skipper, and other revenue shares, fuel, food expenses) of fishing in the Aleutian Islands. Shifts to other fisheries, and new revenue streams from those fisheries, will be accompanied by changes in variable costs from fishing in those areas. To the extent that skippers and crew must become familiar with fishing in new areas or for new species or that vessels were better adapted to the old fisheries than the new ones, the operations will incur costs associated with learning, or with reconfiguring vessels, to operate in the new fisheries. These may take the shape of lower catch per unit of effort in the new fisheries, and, thus, higher variable costs for any given volume of catch. NMFS does not have data that would allow it to estimate the size of these possible costs.

Vessels may receive a lower price for Pacific cod in the Bering Sea than they had been receiving in the Aleutian Islands, given the reported differences in fish size and price between the two areas. Reductions in the supply of Aleutian Islands Pacific cod may increase the prices received for that supply segment, while increased supplies of smaller cod may lead to reduced prices in that market segment. To the extent that vessels must operate in new fisheries with new markets, firms may face a marketing learning curve as they develop new marketing channels. As before, NMFS does not have data that would allow it to estimate the size of these possible costs.

The mean annual value of wholesale gross revenues at risk in the Aleutian Islands from Alternative 1 (Table 56) would have been about $7 million during the baseline years (2004 through 2010). The annual wholesale gross revenue at risk in this period ranged from about $3 million up to about $14 million. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Deduct costs to cover the reduction in variable operating costs associated with reduced fishing for Pacific cod in the Aleutian Islands;
- There may be an impact on prices, since this action may lead to higher prices (all other things equal) for larger sizes of Pacific cod, given the reduction in the production of reportedly larger sizes of Pacific cod typical of the Aleutian Islands fishery;
- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Adjust revenues if vessels receive lower prices from smaller Pacific cod in the Bering Sea;
- Fleet redeployment may lead to reduced Pacific cod availability for vessels already there if the quota would otherwise have been taken. This is more likely to affect non-trawl vessels already in the Bering Sea since trawlers tend target Pacific cod earlier in the year.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated.

The foregoing discussion addresses directed fisheries. As explained in Section 1.2.17, five non-trawl catcher/processors took incidental catches of either Atka mackerel or Pacific cod in Area 543 during the baseline years. The average annual value of these incidental harvests by all sectors during these years was about $39,000 a year. A share of these harvests would be foregone by the non-trawl catcher/processor sector because of the prohibition on retention in Area 543 under this alternative.

### 1.4.5 Alternative 4

Alternative 4 recreates the regulatory environment faced by the non-trawl catcher/processors in 2010, the year before the interim final rule took effect. Thus, the analysis of the impact of Alternative 4 on Pacific cod harvests, and on gross revenues from these sources, can be carried out with information in the analysis of Alternative 1. Compared to the baseline, this alternative has no adverse impacts on gross revenues. Compared to Alternative 1, Alternative 4 would have avoided placing an average of about $7 million in wholesale gross revenues per year at risk during the baseline years.

These are not net outcomes, since as explained above they do not take account of changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

## 1.5 Trawl catcher vessels (Alternatives 1 and 4)

### 1.5.1 Catches

Table 59 summarizes the volumes of Pacific cod delivered to shoreside processors, and to catcher/processors acting as motherships, by trawl catcher vessels, from 2004 through 2010 (the baseline catch). The table provides estimates of the volumes of retained catch coming from critical habitat areas that are closed under Alternative 1 (catch at risk), as well as volumes coming from areas that remain open under the alternative (residual catch). Finally, the table shows the estimated percentage of the baseline catch that came from areas remaining open under the alternative.

Sector production data for Area 543 are confidential, in years when production took place, because of the small numbers of vessels and processors involved. For the Aleutian Islands, production is relatively consistent, in the range of about 12,700 metric tons to about 15,000 metric tons, except for the two years 2005 and 2006, when it was in the range of about 6,900 metric tons to about 8,000 metric tons. A comparison of counts of catcher vessels delivering shoreside, in Table 24, and of trawl catcher vessels delivering to motherships, in Table 3, indicates that the sector in Area 543 delivers to catcher/processors acting as motherships.

The estimates in the table indicate that the interim final rule would have closed areas from which relatively large amounts of baseline production were obtained, leaving a residual retained catch of 52 percent to 65 percent of the baseline, depending on the year.

**Table 59 Location of estimated aggregate trawl catcher vessel Pacific cod harvests in the Aleutian Islands, Alternative 1, from 2004 through 2010**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 10,916 | 2,533 | 0 | 13,449 | 4,040 | 1,566 | 0 | 5,606 | 6,875 | 967 | 0 | 7,843 | 58% |
| 2005 | 6,731 | 1,239 | 0 | 7,969 | 2,899 | 690 | 0 | 3,589 | 3,831 | 549 | 0 | 4,380 | 55% |
| 2006 | 5,185 | S | C | 6,907 | 786 | S | C | 2,411 | 4,399 | S | C | 4,496 | 65% |
| 2007 | 10,847 | S | C | 13,228 | 3,484 | S | C | 5,214 | 7,363 | S | C | 8,015 | 61% |
| 2008 | 10,183 | S | C | 13,994 | 1,764 | S | C | 5,473 | 8,419 | S | C | 8,521 | 61% |
| 2009 | 9,676 | S | C | 15,025 | 1,943 | S | C | 5,895 | 7,733 | S | C | 9,131 | 61% |
| 2010 | 8,325 | S | C | 12,746 | 1,742 | S | C | 6,056 | 6,583 | S | C | 6,690 | 52% |

Notes: Metric tons round weight retained Pacific cod from targeted and incidental fishing (includes CDQ) delivered shoreside and to catcher/processors acting as motherships. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data. Status quo data from January 25, 2013.

### 1.5.2 Gross revenues

Table 60 and Table 61 summarize estimates of the sector gross revenues during the baseline years, if the interim final rule had been in effect during those years. Estimates are provided at the ex-vessel level, and for the first wholesale value, received by processors, of fish purchased from the sector. As with other sectors, these estimates are obtained by identifying fleet retained catches from areas and times in which fishing would have been prevented by the interim final rule in a given year. The volume estimates were converted to dollar terms using estimates of prices prevailing in the year. These revenue estimates overstate the total likely change in operation gross revenues in the years shown, because operations would have redeployed in an effort to minimize adverse impacts. Possible redeployment options are discussed in the following section. All revenue changes have been estimated in real "2012" dollars, and it is those estimates that are discussed here.

It can be determined from Table 60, the sector's estimated real ex-vessel gross revenues placed at risk averaged about $4 million a year during the baseline years, with annual changes ranging from about $2 million to about $7 million, depending on the year. It can also be determined from Table 61, the first wholesale gross revenues associated with the sector (accruing to shoreside processors and to catcher/processors acting as motherships) placed at risk by the action averaged about $8 million a year in the baseline years, and ranged between about $4 million and about $12 million, depending on the year. As shown in Table 61, the residual real wholesale gross revenues ranged from a low of 52 percent of baseline gross revenues, to a high of 65 percent of baseline gross revenues.

**Table 60 Estimated aggregate total Pacific cod trawl catcher vessel fishery ex-vessel gross revenues in the Aleutian Islands, for Alternative 1, from 2004 through 2010**

| Nominal (millions of dollars) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue from areas remaining open (residual revenues) | | | | Open area revenue as % of baseline |
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 5.2 | 1.2 | 0.0 | 6.4 | 1.9 | 0.7 | 0.0 | 2.7 | 3.3 | 0.5 | 0.0 | 3.7 | 58% |
| 2005 | 3.6 | 0.7 | 0.0 | 4.2 | 1.5 | 0.4 | 0.0 | 1.9 | 2.0 | 0.3 | 0.0 | 2.3 | 55% |
| 2006 | 4.1 | S | C | 5.4 | 0.6 | S | C | 1.9 | 3.4 | S | C | 3.5 | 65% |
| 2007 | 10.4 | S | C | 12.7 | 3.3 | S | C | 5.0 | 7.1 | S | C | 7.7 | 61% |
| 2008 | 12.6 | S | C | 17.3 | 2.2 | S | C | 6.8 | 10.4 | S | C | 10.5 | 61% |
| 2009 | 4.9 | S | C | 7.7 | 1.0 | S | C | 3.0 | 4.0 | S | C | 4.7 | 61% |
| 2010 | 4.2 | S | C | 6.5 | 0.9 | S | C | 3.1 | 3.3 | S | C | 3.4 | 52% |
| Real (millions of "2102" dollars) | | | | | | | | | | | | | |
| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue from areas remaining open (residual revenues) | | | | Open area revenue as % of baseline |
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 6.1 | 1.4 | 0.0 | 7.6 | 2.3 | 0.9 | 0.0 | 3.2 | 3.9 | 0.5 | 0.0 | 4.4 | 58% |
| 2005 | 4.2 | 0.8 | 0.0 | 4.9 | 1.8 | 0.4 | 0.0 | 2.2 | 2.4 | 0.3 | 0.0 | 2.7 | 55% |
| 2006 | 4.6 | S | C | 6.1 | 0.7 | S | C | 2.1 | 3.9 | S | C | 4.0 | 65% |
| 2007 | 11.4 | S | C | 13.9 | 3.6 | S | C | 5.5 | 7.8 | S | C | 8.5 | 61% |
| 2008 | 13.3 | S | C | 18.2 | 2.3 | S | C | 7.1 | 11.0 | S | C | 11.1 | 61% |
| 2009 | 5.2 | S | C | 8.1 | 1.1 | S | C | 3.2 | 4.2 | S | C | 4.9 | 61% |
| 2010 | 4.4 | S | C | 6.8 | 0.9 | S | C | 3.2 | 3.5 | S | C | 3.5 | 52% |

Notes: Includes retained catches by trawl catcher vessels, whether delivered shoreside or to catcher/processors acting as motherships. Values include the value of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish taken in Pacific cod target fisheries. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June each year. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.

Source: NMFS AKR estimates using CIA database. February 3, 2013.

**Table 61 Estimated aggregate total wholesale gross revenues to processors of harvests by trawl catcher vessels in the Aleutian Islands, for Alternative 1, from 2004 through 2010**

| Nominal (millions of dollars) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue from areas remaining open (residual revenues) | | | | Open area revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 12.4 | 2.9 | 0.0 | 15.3 | 4.6 | 1.8 | 0.0 | 6.4 | 7.8 | 1.1 | 0.0 | 8.9 | 12.4 |
| 2005 | 9.2 | 1.7 | 0.0 | 10.9 | 4.0 | 0.9 | 0.0 | 4.9 | 5.3 | 0.8 | 0.0 | 6.0 | 9.2 |
| 2006 | 8.3 | S | C | 11.0 | 1.3 | S | C | 3.8 | 7.0 | S | C | 7.2 | 8.3 |
| 2007 | 23.2 | S | C | 28.3 | 7.4 | S | C | 11.1 | 15.8 | S | C | 17.2 | 23.2 |
| 2008 | 20.8 | S | C | 28.6 | 3.6 | S | C | 11.2 | 17.2 | S | C | 17.4 | 20.8 |
| 2009 | 10.8 | S | C | 16.8 | 2.2 | S | C | 6.6 | 8.7 | S | C | 10.2 | 10.8 |
| 2010 | 12.0 | S | C | 18.4 | 2.5 | S | C | 8.8 | 9.5 | S | C | 9.7 | 12.0 |
| Real (millions of "2102" dollars) | | | | | | | | | | | | | |
| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue from areas remaining open (residual revenues) | | | | Open area revenue as % of baseline |
| | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | 541 | 542 | 543 | Tot | |
| 2004 | 14.8 | 3.4 | 0.0 | 18.2 | 5.5 | 2.1 | 0.0 | 7.6 | 9.3 | 1.3 | 0.0 | 10.6 | 58% |
| 2005 | 10.7 | 2.0 | 0.0 | 12.7 | 4.6 | 1.1 | 0.0 | 5.7 | 6.1 | 0.9 | 0.0 | 7.0 | 55% |
| 2006 | 9.3 | S | C | 12.4 | 1.4 | S | C | 4.3 | 7.9 | S | C | 8.1 | 65% |
| 2007 | 25.5 | S | C | 31.0 | 8.1 | S | C | 12.2 | 17.3 | S | C | 18.9 | 61% |
| 2008 | 21.9 | S | C | 30.1 | 3.8 | S | C | 11.8 | 18.1 | S | C | 18.3 | 61% |
| 2009 | 11.5 | S | C | 17.8 | 2.3 | S | C | 7.0 | 9.2 | S | C | 10.8 | 61% |
| 2010 | 12.5 | S | C | 19.2 | 2.6 | S | C | 9.1 | 9.9 | S | C | 10.1 | 52% |

Notes: Includes retained catches by trawl gear catcher vessels, whether delivered shoreside or to catcher/processors acting as motherships. Values include the value of retained targeted and incidental catches of Pacific cod, and of retained incidental catches of groundfish taken in Pacific cod target fisheries. Values are unweighted averages of the at-sea wholesale value of trawl catcher vessel retained catches, and the shoreside wholesale value of trawl catcher vessel retained catches. Adjustments for inflation calculated using the monthly seasonally adjusted Personal Consumption Expenditures: Chain-type Price Index (PCEPI) for June each year. "C" indicates confidential data; "S" indicates data suppressed to protect confidential data.

Source: NMFS AKR estimates using CIA database. March 30, 2013.

### 1.5.3 Fleet redeployment and impacts on other fisheries

As shown in Table 29, the vessels in this category that are active in the Aleutian Islands in any year, also participate in other fisheries. In 2010, the last year before the interim final rule came into effect, these vessels[94] earned about 16 percent of their revenues from Pacific cod in the Aleutian Islands. Other groundfish revenues in the Aleutian Islands, or elsewhere in the Bering Sea and Aleutian Islands (BSAI) or Gulf of Alaska (GOA), accounted for about 72 percent of the revenues, other Alaska revenues accounted for about 8 percent, and fishing in other West Coast fisheries accounted for about 5 percent. Trawl vessels operating on the West Coast may be involved in Pacific whiting, flatfish, or anchovy fisheries (Fraser, personal communication, September 5, 2012)[95].

[94] It is worth noting that these vessels are the fleet of trawl catcher vessels that actually fish in the Aleutian Islands in any one year. Not all the trawl catcher vessels authorized to fish in the BSAI fish in the Aleutian Islands in any year, and there is some turnover from year to year in the vessels that do so.

[95] Fraser, Dave. Adak Community Development Corporation.

Trawl catcher vessels may adjust to more restrictive regulations in the Aleutian Islands by shifting their Pacific cod fishing to trawling (1) the remaining unrestricted waters in the Aleutian Islands, (2) for Bering Sea Pacific cod, (3) for GOA Pacific cod, or (4) in other Bering Sea or GOA groundfish fisheries.

*Aleutian Islands Pacific cod trawl fishing*

The estimates of the impacts of the action on Pacific cod retained catches, described in Table 59, were prepared by examining the volumes of retained catch coming from areas and times that would be closed to fishing under the interim final rule, and assuming that this Pacific cod could no longer be taken in the Aleutian Islands. Thus, the percentages in the far-right column, labeled, "Residual catch as % of historical," show the volumes coming out of areas of the Aleutian Islands that would remain open under the action. As shown in that table, depending on the year, from 52 percent, to 65 percent of the volume of Pacific cod retained by this sector in the Aleutian Islands came from areas that were to remain open under the status quo.

Alternative Pacific cod trawling opportunities in the Aleutian Islands are limited. The interim final rule prohibits the retention of Pacific cod in Area 543, and restricts the fishing areas considerably in Area 542. Opportunities remain in Area 541, but even these have been limited, compared to the baseline period. Most trawlable depths for Pacific cod are close to shore and within the 20 nm critical habitat designations.

Figure 3-11 and Figure 3-12 in Chapter 3 of the EIS, show the locations of harvest in 2004 through 2010 and 2011 and 2012 for trawl catcher vessels delivering to shoreside plants; Figure 3-13 and Figure 3-14 show the locations of harvest in these years for trawl catcher vessels delivering to motherships.

The figures with harvests by trawl catcher vessels making shoreside deliveries show the 2004 through 2010 concentration of harvest by these vessels in Area 541, in the area around Adak and to the east of Atka North Cape. The figures also show large reductions in harvests in both areas in 2011 and 2012. This may reflect the introduction of the interim final rule in 2011;, however, it may also reflect the difficulties faced by the processing plant at Adak, which went bankrupt in 2009. The reopening of the plant in 2011 took place after the important March-April period for the trawl catcher vessel fishery.

The figures with the harvests by trawl catcher vessels delivering to catcher/processors acting as motherships show concentrations of harvest by these vessels in Area 541 just east of Atka North Cape, in Area 542 at the Petrel Banks, and in Area 543 in the Area of Shemya Island. A comparison of the figures shows the elimination of the Area 543 harvest in 2011 and 2012, a residual Area 542 harvest at the base of Petrel Banks, and an increased harvest to the east of Atka North Cape.

If numbers of trawl catcher vessels continued to operate in the Aleutian Islands, there could be increased congestion in the remaining fishing areas. As shown in Table 24, the number of trawl catcher vessels delivering to shore based plants dropped from 22 in 2009 and 2010, to six in 2011, then increased to 10 by mid-summer 2012. On the other hand, as shown in Table 3, the number of trawl catcher vessels delivering to catcher/processors operating as motherships increased from five in 2010, to 11 in 2011, and 12 in 2012. It is not clear how decreases in vessel activity on the scale implied by summing both classes of catcher vessels would affect grounds congestion.

*Bering Sea Pacific cod trawl fishing*

The trawl catcher vessel sector receives a sectoral allocation of Pacific cod that may be fished in either the Aleutian Islands or the Bering Sea. Therefore, if trawl catcher vessels are unable to harvest as much Pacific cod from the Aleutian Islands as they have in the past, they may be able to make up part, or all, of the loss in the Bering Sea.

However, as explained in Section 1.2.16, whereas in earlier years there was a single Pacific cod TAC for the entire BSAI, from 2014 forward there will be separate Pacific cod TACs for the Aleutian Islands and for the Bering Sea. Because of this, if the Bering Sea TAC would otherwise have been fully harvested, a sectoral shift from the Aleutian Islands to the Bering Sea can only take place at the expense of another sector's ability to harvest Pacific cod in the Bering Sea.[96] Trawl catcher vessels may be at a relative advantage to fixed gear sectors with respect to this, since a large proportion of their seasonal allocations of Pacific cod are received in the winter and spring, while large proportions of fixed gear allocations are received in the summer and fall. Many trawlers are also AFA vessels, operating under a quota system that extends to Pacific cod, and this should provide a framework for structuring intra-sectoral harvesting and controlling competition.

From 2004 through 2010, the BSAI trawl catcher vessels fishing for Pacific cod took between 21 percent and 51 percent of their Pacific cod harvests from the Aleutian Islands, and this percentage increased each year between 2006 through 2009. The percentage decreased to about 45 percent in 2010, perhaps reflecting difficulties in processing at Adak that year. In 2011, when the interim final rule went into effect, the percentage decreased to 19 percent (NMFS AKR In-season management staff).

Despite the reduction in retained catch coming from the Aleutian Islands in 2011, the first year in which the interim final rule was in effect, the BSAI trawl catcher vessel fleet took over 99 percent of its A- and B-season BSAI Pacific cod allocations. This was slightly greater than the 96 percent of its A- and B-season allocations it took in 2010, the year before the interim final rule went into effective.[97] (Bering Sea Aleutian Islands Catch Report [includes CDQ])

Trawl halibut PSC rates are higher in the Bering Sea than in the Aleutian Islands. Table 62 summarizes PSC rates for this fishery. Halibut PSC limits could potentially prevent trawl catcher vessels that historically participated in the Aleutian Islands from catching as much Pacific cod in the Bering Sea. Halibut PSC was relatively low in 2011, when only 240 metric tons were taken out of the 453 metric ton PSC limit. The halibut PSC was higher in 2012, 430 metric tons out of 453 metric tons, but it was not, ultimately, necessary to close the fishery (NMFS AKR in-season managers).

**Table 62 Estimated prohibited species catch rates per ton of catcher vessel groundfish harvest (averages for 2004 through 2012)**

| | PSC rate AI | PSC rate BS | Units |
|---|---|---|---|
| *C. bairdi* | .042 | 1.182 | Crab/mt groundfish |
| *C. opilio* | .025 | .398 | Crab/mt groundfish |
| Red King crab | .092 | .026 | Crab/mt groundfish |
| Halibut | .0013 | .014 | mt mortality/mt groundfish |
| Chinook salmon | .041 | .049 | Salmon/mt groundfish |
| Other salmon | .014 | .017 | Salmon/mt groundfish |

Note: Rates were calculated to show the metric tonnage of the PSC species per metric ton of retained and discarded groundfish species.
Source: NMFS AKR Catch Accounting System.

If an increase in halibut PSC, caused by a shift in Pacific cod production from the low PSC Aleutian Islands to the higher PSC Bering Sea, were to cause sector Pacific cod harvests to decline, unused amounts of B-season trawl catcher vessel Pacific cod allocation would be rolled into the trawl catcher vessel C-season. Since the C-season allocation is rarely fully used by the trawl catcher vessel fleet, a

[96] Section 1.2.16 provides a more detailed discussion of the Aleutian Islands/Bering Sea split in the BSAI Pacific cod specifications.

[97] The sector also has a C-season during the second half of the year, but the fleet does not normally target Pacific cod at this time of year, and much of its sectoral allocation is reallocated to another sector. Thus, quota and harvest are not compared for this season.

large amount of this may be reallocated to other sectors. Based on 2011 and 2012, it appears highly unlikely that there would be unused amounts of Pacific cod in the A- and B-season. In those years, the fleet, even with a limited operation in the Aleutian Islands in 2011 (because of the lack of a shore based processor at Adak during the key fishing season) and with extremely high Pacific cod TACs (see Table 3-5, Chapter 3 of the EIS) was still able to harvest almost its entire A- and B-season allocations. Trawl catcher vessels in the Pacific cod fishery take relatively little crab or salmon PSC.

Representatives of the trawl and non-trawl catcher/processor fleets have indicated that they tend to receive higher prices per pound for Pacific cod taken in the Aleutian Islands, since these fish tend to be larger than those found in the Bering Sea. If this is also the case for this fleet as well, a shift to the Bering Sea may be associated with a reduction in revenues, even if overall retained catch levels are maintained.

Pacific cod fishing by trawl catcher vessels in the Bering Sea during the A- and B-seasons primarily occurs in an area known as the "Slime Banks." This area, north of Unimak Island, supports most Bering Sea fishing fleets during that period. This is due to a combination of productive fishing for multiple species and an area that remains ice free from January through April. Additional congestion by vessels that are displaced by more restrictive regulations in the Aleutian Islands is possible. However, the likely impacts appear to be minimal. In 2012, the Bering Sea ice edge extended further than normal during the A- and B-season. The "Slime Banks" remained one of the only ice free areas of the Bering Sea. More vessels were fishing in this area than normal, yet the fleets were still able to harvest their allocations of Pacific cod in less time than normal. This suggests that additional congestion on the "Slime Banks" by displaced vessels may not have much impact.

Vessels fishing Pacific cod in the Aleutian Islands in 2010 averaged 596 metric tons of Pacific cod BSAI-wide, of which most, 484 metric tons, came from fishing in the Aleutian Islands. These vessels retained 589 metric tons from the BSAI in 2011, of which 235 metric tons came from the Aleutian Islands. Thus, while Aleutian Islands retained catches dropped by about half in 2011, overall BSAI retained catches for these vessels remained about the same, suggesting they made up most of their Pacific cod retained catches by increased activity in the Bering Sea (NMFS AKR In-season management data summary).

However, these vessels appear to have lost ground in 2011, relative to vessels that only fished in the Bering Sea. Vessels that only fished in the Bering Sea in 2010, averaged 464 metric tons that year. In 2011, they averaged 703 metric tons. This could be due to slower A-season pollock fishing in 2011. Many Aleutian Islands Pacific cod vessels also target Bering Sea pollock. These vessels typically join the Pacific cod fishery when they are finished with their AFA pollock. At this time, late March/early April, Pacific cod aggregations in the Aleutian Islands are starting to show up. In 2011, with slower fishing and relatively low Chinook salmon PSC, these vessels joined the Pacific cod fishery later than normal. This gave more opportunity to the Bering Sea Pacific cod only vessels to harvest more Pacific cod before NMFS closed the fishery. Thus, these vessels saw a substantial increase in their average harvests in 2011, which was not shared by the vessels that had been active in the Aleutian Islands in 2010. (NMFS AKR In-season management data summary)

*GOA Pacific cod trawl fishing*

There have been suggestions that trawl catcher vessels fishing for Pacific cod in the Aleutian Islands may shift their operations into GOA Pacific cod fisheries as a result of this action. It has been hypothesized that additional competition for Pacific cod could lead to shorter seasons, reduced revenues for vessels already active in those fisheries, and adverse economic impacts on GOA communities (Park, 2010).

While a shift to the GOA cannot be ruled out, there are several factors that will constrain it: (1) limitations imposed by the combinations of endorsements on LLP licenses, (2) the timing of Pacific cod fishing in

the two areas, and (3) the restrictions placed on trawl catcher vessel fishing in the GOA by the new sector allocations. NMFS did not observe catcher vessels moving from the Bering Sea to the GOA as a result of the interim final rule in 2011 or 2012. The BSAI trawl catcher vessel A- and B-season allocations were almost fully harvested in 2011 and 2012. (NMFS AKR In-season management staff)

Shifts in trawling activity will be constrained by differences in timing between fisheries in the two areas. The GOA Pacific cod fishery is largely complete before the Aleutian Islands fishery gets underway. Thus, the fleet participating in the Aleutian Islands Pacific cod fisheries has limited opportunities to shift to GOA Pacific cod during the period when Aleutian Islands fishing might be limited by regulation. This remains the case, even with the Pacific cod sector splits. This should limit the extent to which vessels shift between the fisheries (assuming these vessels are fully subscribed during the entire fishing year). As shown in Table 63, Western and Central GOA Pacific cod fisheries are open from late January until late February or early March, and, normally, the Aleutian Islands Pacific cod trawl catcher vessel fishery does not begin until mid- to late-February. Aleutian Islands Pacific cod are only aggregated enough to be efficiently fished with trawl gear between late February and April. As shown in Figure 4, most harvests of Pacific cod in the Aleutian Islands take place after the GOA fisheries close. Vessels that fish in the Aleutian Islands Pacific cod fishery are normally active in other fisheries prior to March, some of these vessels are in the GOA.

**Table 63 Closure dates for the GOA Trawl Pacific cod A-season fishery compared to Aleutian Islands fishing periods**

| Year | Western Gulf | Central Gulf | Week ending date for first week contributing 10% or more to cumulative AI harvest |
|---|---|---|---|
| 2004 | February 24 | January 31 | February 28 |
| 2005 | February 24 | January 26 | February 26 |
| 2006 | February 23 | February 23 | February 18 |
| 2007 | March 8 | February 27 | February 24 |
| 2008 | February 29 | February 20 | February 16 |
| 2009 | February 25 | January 27 | February 28 |
| 2010 | February 19 | January 31 | February 27 |
| 2011 | February 16 | January 29 | February 26 |
| 2012 | February 22 | March 26 | February 18 |
| 2013 | February 14 | March 23 | February 23 |

Notes: Pacific cod A-season inshore closures. The late closure in the Central Gulf in 2012 is due to the fleet response to the Pacific cod sector split and poor trawl catch rates in the Central GOA.
Source: AKR web site; NMFS AKR in-season management calculations.

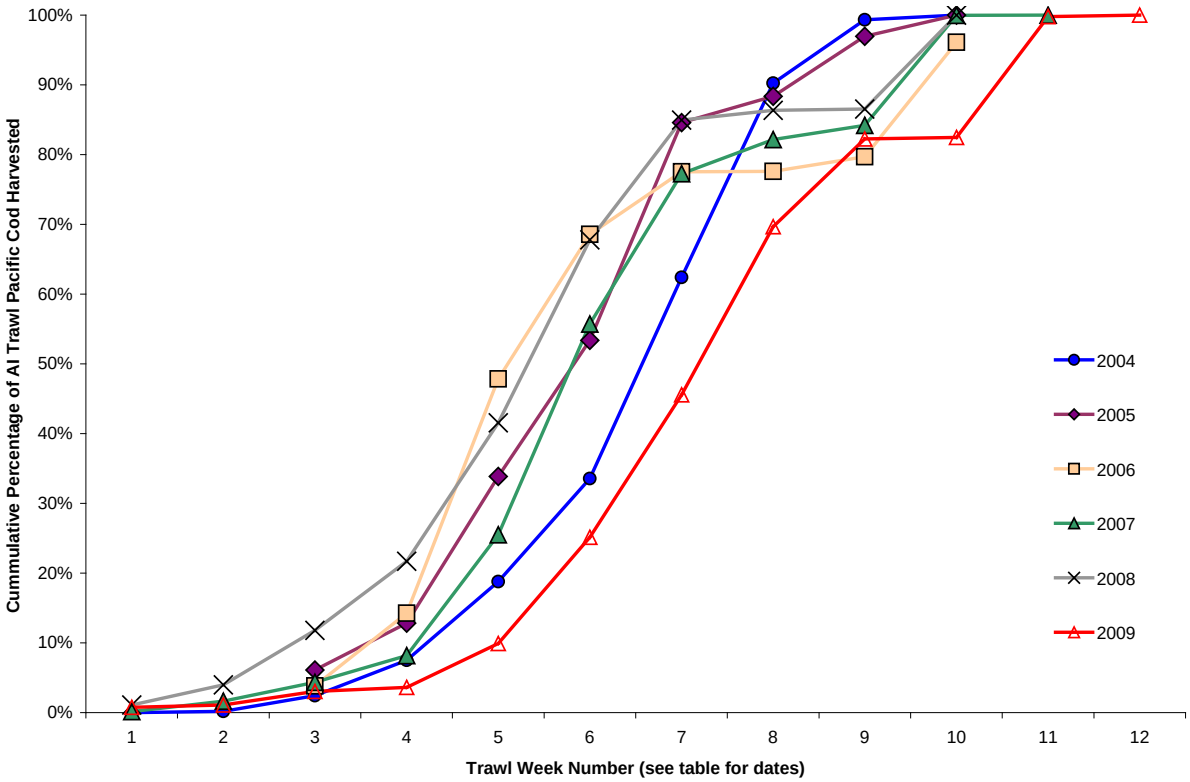



**Figure 4** **Cumulative percentage trawl catcher vessel Pacific cod harvests in the Aleutian Islands, prior to June 10 (by statistical week)**

Starting in 2012, trawl catcher vessels have been subject to the provisions of Amendment 83 to the Fishery Management Plan for Groundfish of the Gulf of Alaska, which allocated Pacific cod total allowable catch in the Western and Central GOA areas among various gear and operational sectors. Trawl catcher vessels receive 38.4 percent of the TAC in the Western GOA, and about 41.6 percent in the Central GOA. These allocations were divided between the A- and B-seasons, with 60 percent for the A-season, and 40 percent for the B-season. (76 FR 74670, 74688; December 1, 2011) This will limit the scope for competition between trawl catcher vessels shifting to the GOA and catcher/processors using trawl gear; however, it does not eliminate the potential for competition with other catcher vessels that may be targeting GOA Pacific cod.

*Other BSAI or GOA groundfish fisheries*

These vessels have limited opportunities for redeployment into other BSAI or GOA groundfish fisheries. Access to most BSAI flatfish species is precluded as a result of Amendment 80 allocations, and pollock is fully allocated under the provisions of the AFA. Access to species such as arrowtooth, rex sole, and Kamchatka flounder are precluded, because there is no halibut PSC allowance for those fisheries. Only a few vessels rely solely on Pacific cod in the Bering Sea. While there are some flatfish allocations available for BSAI trawl limited access vessels in the Bering Sea, the fishery is small because of limited local markets (NMFS AKR in-season management). Although the data are confidential, there has been some activity by catcher vessels delivering yellowfin sole, Pacific ocean perch, and Atka mackerel to

motherships and catcher/processors acting as motherships; this process began with the introduction of Amendment 80 in 2008, and it is not clear it is related to the interim final rule.

The State of Alaska manages Guideline Harvest Level (GHL) fisheries for Pacific cod in the Prince William Sound, Cook Inlet, Kodiak, Chignik, and South Peninsula areas. These occur at times when the Federal/parallel fisheries in adjacent waters are closed. Legal gear-types include pot, jig, and (in the Prince William Sound area) longline. Thus, unless the Board of Fisheries takes action to allow the use of trawl gear, these GHL fisheries are not available to Aleutian Islands trawlers. (NPFMC, 2011b)

*Indirectly impacted sectors*

There do not appear to be many fisheries that may be indirectly impacted by shifts in the fishing activity of the trawl catcher vessels operating in the Aleutian Islands. The sector fishes against a BSAI-wide Pacific cod allocation and vessels may shift into the Bering Sea. The principally affected fleet there is likely to be other trawl catcher vessels, which may be affected by increased competition for Pacific cod, and, possibly, crowding. The potential for this fleet to fish for Pacific cod in the GOA is limited. The potential to fish for other Federal groundfish is also limited.

### 1.5.4 Alternative 1 summary

As the trawl catcher vessels redeploy to minimize the impact of the restrictions imposed by the interim final rule, their costs, as well as their revenues, will change. Revenue reductions associated with reduced fishing for Pacific cod in the Aleutian Islands will be accompanied by reductions in the variable costs (e.g., crew, vessel, skipper, and other revenue shares, fuel, food expenses) of fishing in the Aleutian Islands. Shifts to other fisheries, and new revenue streams from those fisheries, will be accompanied by changes in variable costs from fishing in those areas.

To the extent that skippers and crew must become familiar with fishing in new areas or for new species or that vessels were better adapted to the old fisheries than the new ones, the operations will incur costs associated with learning to operate in the new fisheries. These may take the shape of lower catch per unit of effort in the new fisheries and, thus, higher variable costs for any given volume of catch. NMFS does not have data that would allow it to estimate the size of these possible costs. As previously discussed, changes in the size of cod and market niches could impact prices, even if total landings are unchanged.

The mean annual value of processor wholesale gross revenues from trawl catcher vessels at risk in the Aleutian Islands from Alternative 1 (Table 61) would have been about $8 million during the baseline years (2004 through 2010). The annual wholesale gross revenue at risk in this period ranged from about $4 million to about $12 million. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Deduct costs to cover the reduction in variable operating costs associated with reduced fishing in the Aleutian Islands;
- There may be an impact on prices, since this action may lead to higher prices (all other things equal) for larger sizes of Pacific cod, given the reduction in the production of reportedly larger sizes of Pacific cod typical of the Aleutian Islands fishery;
- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Adjust revenues if vessels receive lower prices from smaller Pacific cod in the Bering Sea;

- Fleet redeployment may lead to reduced Pacific cod availability for vessels already there if the quota would otherwise have been taken.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated.

The foregoing discussion addresses directed fisheries. As explained in Section 1.2.17, one trawl catcher vessel took incidental catches of either Atka mackerel or Pacific cod in Area 543 during the baseline years. The average annual value of these incidental harvests by all sectors during these years was about $39,000 a year. A share of these harvests would be foregone by the trawl catcher vessel sector because of the prohibition on retention in Area 543 under this alternative.

### 1.5.5 Alternative 4

Alternative 4 recreates the regulatory environment faced by the trawl catcher vessels in 2010, the year before the interim final rule took effect. Thus, the analysis of the impact of Alternative 4 on Pacific cod harvests, and on gross revenues from these sources, can be carried out with the information in the discussion of Alternative 1. Compared to the baseline, this alternative has no adverse impacts on gross revenues. Compared to Alternative 1, Alternative 4 would have avoided placing an average of about $8 million in wholesale gross revenues per year at risk during the baseline years. As explained above, these are not net outcomes, since they do not take account of changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

## 1.6 Non-trawl catcher vessels (Alternatives 1 and 4)

Non-trawl catcher vessels fish with jig, pot, or hook-and-line gear and deliver to a processor (in a small number of cases, to a catcher/processor). These vessels participate primarily in Pacific cod fisheries and the individual fishing quota (IFQ) fisheries for sablefish and halibut. The Alternative 1 measures applicable to non-trawl catcher vessels were described in Section 1.1 of this chapter. This section describes the impact of the Alternative 1 and 4 measures in relation to the baseline for this fleet (2004 through 2010).

This is a small fleet, and much of the information about it is confidential. As defined, this fleet does not include non-trawl vessels that only fish in the State of Alaska's GHL fishery for Pacific cod, and it does not include vessels that make incidental harvests of Pacific cod or Atka mackerel while fishing halibut and sablefish quota shares in Federal waters around the Aleutian Islands. These incidental catches are not regulated by this action.

The Alternative 4 measures for this sector simply return the regulations to the way they were in 2010, the end of the baseline period. Thus, the impact of Alternative 4 is the reverse of the Alternative 1 impact. For this reason, these alternatives are discussed together here. The impacts of Alternatives 2 and 3, and their options, on this sector are discussed in Section 1.12 of this chapter.

### 1.6.1 Alternative 1

During the seven years from 2004 through 2010, twenty-six unique vessels made deliveries where the catch was predominantly Pacific cod (i.e., Pacific cod target). Of those vessels, ten used only hook-and

line gear, seven used only jig gear, and six used only pot gear. Three other vessels used multiple gear types, all using jig and either hook-and-line or pot gear. Over this seven year period vessels made landings at four unique processors. Most vessels were less than 60 feet in length overall.

The small numbers of non-trawl catcher vessels retaining targeted Pacific cod, and the even smaller numbers of processors taking deliveries of Pacific cod from them, make it impossible to report the annual volumes and annual values of production from this sector, or estimates of the catch and revenues coming from critical habitat closed by the alternatives, even at the Aleutian Islands-wide area level. To address this confidentiality issue, Aleutian Islands production and value for the three management areas are reported in aggregate for the seven years 2004 through 2010.

These data suggest that about 554 metric tons of harvest came from areas that would have been in closed critical habitat over that period; this was about 56 percent of the baseline retained catch. Ex-vessel revenues associated with fish from closed areas are estimated to have been about $690,000 in aggregate (in real "2012" dollars), or about $99,000/year. Wholesale revenues received by processors associated with fish from closed areas are estimated to have been about $1.2 million, or about $171,000 a year. Residual ex-vessel revenues under Alternative 1 are estimated to be $490,000, or $70,000 a year, while residual wholesale revenues under Alternative 1 are estimated to be $850,000, or $121,000 a year.

Non-trawl catcher vessels affected by increased restrictions in the Aleutian Islands also participate in other fisheries. Of the 26 unique vessels from 2004 through 2010, 17 participated in other Federal or parallel GOA fisheries during those years. Most of those vessels participated in other Pacific cod fisheries in both the Bering Sea and the GOA between 2004 through 2010. This suggests that the majority of vessels that participated in the non-trawl catcher vessel Pacific cod fisheries in the Aleutian Islands are mobile and diversified. On average, Aleutian Islands directed Pacific cod catch represents less than 12 percent of total retained groundfish catch harvested by these vessels between 2004 and 2010.

The six vessels that show no other Federal groundfish activity range from 32 feet to 38 feet length overall. All of those vessels only participated in the Aleutian Islands Pacific cod fishery in one year, between 2004 and 2010.

Only five of the 26 vessels that participated in the Aleutian Islands non-trawl Pacific cod fishery participated in more than one year. This may mean that the majority of vessels that participated in this fishery participated in a way that was exploratory in nature, and that they did not rely on the fishery. The vessels with more than one year's participation may be impacted to a greater extent by more restrictive regulations in the Aleutian Islands.

Most vessels impacted by more restrictive regulations in the Aleutian Islands are likely to continue to participate in other Pacific cod fisheries, and in the GOA and Aleutian Island State GHL fisheries. They may continue to participate in the BSAI, less than 60-foot hook-and-line and pot fishery and the BSAI jig fishery, but by fishing in the Bering Sea rather than the Aleutian Islands. Some of these vessels have historical participation in the Bering Sea fisheries.

As discussed in Section 1.2.16, the Council has created separate Aleutian Islands and Bering Sea OFLs, ABCs, and TACs for Pacific cod. This split of the BSAI Pacific cod specifications into two separate specifications may mean that vessels shifting from the Aleutian Islands to the Bering Sea can only increase their Bering Sea production at the expense of vessels already active in the Bering Sea. Consult Section 1.2.16 for more details.

There could be movement of these vessels into GOA Pacific cod fisheries, if they have the proper license limitation program endorsements to participate. Some of these vessels already participate in those fisheries, and thus impacts on these fisheries may be small.

IFQ sablefish and halibut are available if the vessel operators wish to purchase or lease IFQ quota shares. However, that option is likely to be expensive for the vessels impacted. Opportunities, other than those listed, appear limited for the vessels in this sector.

The estimated mean annual value of ex-vessel gross revenues at risk in the Aleutian Islands from Alternative 1 would have been on the order of about $99,000 during the baseline period (2004 through 2010), while the estimated mean annual wholesale revenues at risk would have been about $171,000 a year. The estimates of the gross revenues at risk in the Aleutian Islands must be modified by the following factors, to determine the net economic impact of the action:

- Deduct costs to cover the reduction in variable operating costs associated with reduced fishing in the Aleutian Islands;
- The small amounts of Pacific cod involved, and the likelihood that the fleet would make it up in other areas, suggest that this would have negligible price impacts;
- Vessels would have earned additional revenues and incurred additional variable costs from any increased production in the Bering Sea;
- Vessels shifting from cod fishing in the Aleutian Islands to cod fishing in the Bering Sea may receive lower prices after making the shift;
- The small size of this fleet, as well as the size of vessels that comprise this fleet, and its apparent involvement in fisheries outside of the Aleutian Islands, suggest that a shift to other fisheries would have a negligible impact on participants in those fisheries.

The fleet is expected to incur net costs from this action as it is forced to redeploy in ways it finds suboptimal. The size of these costs cannot be estimated, except that they appear to be relatively small in an absolute sense.

The foregoing discussion addresses directed fisheries. As explained in Section 1.2.17, 14 non-trawl catcher vessels took incidental catches of either Atka mackerel or Pacific cod in Area 543 during the baseline years. The average annual value of these incidental harvests by all sectors during these years was about $39,000 a year. A share of these harvests would be foregone by the non-trawl catcher/processor sector because of the prohibition on retention in Area 543 under this alternative.

### 1.6.2 Alternative 4

Alternative 4 partially recreates the regulatory environment faced by the non-trawl catcher vessels in 2010, the year before the interim final rule took effect. Thus, compared to the baseline, this alternative has no adverse impacts on gross revenues. Compared to Alternative 1, Alternative 4 avoids placing about $99,000 in annual ex-vessel gross revenues at risk each year during the baseline period. If this is evaluated at the processor first wholesale level, Alternative 4 avoids placing about $171,000 at risk each year during the baseline period. The ex-vessel and wholesale measures are alternative measures of impact, but they cannot be added together. To do so would double count the ex-vessel component, which is included in the wholesale measure (since the processors pay it to the catcher vessels out of their wholesale revenues). These are not net costs, since (as discussed above) they do not take account of changes in variable costs, impacts of production changes on price, net earnings from shifting vessels to their next best alternative, and possible adverse impacts on other fleets.

## 1.7 Pollock (Alternatives 1 through 4 and their options)

### 1.7.1 Introduction

Table 64, based on Table 2-22 in Chapter 2 of the EIS, summarizes and contrasts the main elements of the pollock alternatives. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

In addition to the measures described in Table 64, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in Section 1.19.2.

The pollock alternatives originated during the 2012 meetings of the North Pacific Fishery Management Council's (Council's) Steller Sea Lion Mitigation Committee (SSLMC), and were modified by the Council at its December 2012 meeting. The Council's recommendations were reviewed by NMFS and altered where necessary to add precision, or address regulatory or management issues. In some instances measures may have been considered, but not further analyzed. Section 2.3 of Chapter 2 discusses these.

Chapter 3 of the EIS describes the specification of the annual Aleutian Islands pollock fishery. In this fishery, the TAC, setting aside allocations for CDQ and an incidental catch allowance (ICA), is allocated to the Aleut Corporation as a directed fishing allocation (DFA).

Under Alternative 1, the status quo, there is limited directed pollock fishing in the Aleutian Islands. Directed fishing for pollock is prohibited in Steller sea lion critical habitat in the Aleutian Islands and pollock are found primarily in critical habitat. (Chapter 2 of the EIS) If the Bering Sea TAC is less than the ABC, the Aleutian Islands CDQ and DFA are normally reallocated to eastern Bering Sea fisheries early in the year.[98] Alternative 2 provides for pollock fishing opportunities in parts of Areas 541 and 542, and Alternatives 3 and 4 provide for more pollock fishing opportunities, and extend these into Area 543.

For Atka mackerel and Pacific cod, Alternative 4 is largely a return to the fishery as it was in 2010, before the interim final rule. However, there were limited pollock fishing opportunities in 2010, or at any time during the baseline years 2004 through 2010. For pollock, the Alternative 4 measures are the same as those for Alternative 3. Alternatives 2, 3, and 4 each have protective options (these are the same for each alternative). Alternatives 5 and 6 are described and evaluated in Section 1.13.

Figures in Chapter 2 of the EIS show the pollock open areas proposed under Alternatives 2, 3, and 4, and their options. The figures for Alternatives 2, 3, and 4 have insets detailing open areas proposed for Amukta Pass, Atka North Cape, Kanaga Sound, the Rat Islands, and Shemya Island. Figure 3-18 in Chapter 3 of the EIS shows the locations of pollock fishing in the 1990s (for reasons discussed later in this section, there has been no pollock fishing inside critical habitat in more recent years).

The appropriate baseline for this analysis is the years 2005 through 2012.[99] During these years, the CDQ groups and the Aleut Corporation were regulated by a consistent set of Steller sea lion protection measures and Aleut Corporation allocation rules. The baseline is relevant for describing the changes in activity, revenues, and costs caused by the alternatives. While the baseline is useful for measuring the

[98] If the Bering Sea TAC is equal to the ABC, it is not possible to reallocate the Aleutian Islands CDQ and DFA.

[99] In this, pollock differs from Atka mackerel and Pacific cod. For these species, as described earlier, the baseline years in this analysis are 2004 through 2010.

changes caused by the alternatives, other information from non-baseline years is used in the analysis when appropriate. For example, ABCs from 1991 through 2012 are used below in Table 65 to create estimates of the possible range of Aleut Corporation pollock allocations under the alternatives. However, these allocations are compared to the baseline experience to determine whether the change in Aleut Corporation allocations under an alternative is large or small.

**Table 64 Comparison of pollock elements of the alternatives**

| Alternative | Seasons | Area-wide Catch and Participation limits | Area 543 | Area 542 | | Area 541 |
|---|---|---|---|---|---|---|
| | | | Closures and catch limit | Closures and catch limit | Additional participation limits | Closures and catch limit |
| 1 | A season: 1/20–6/10. | Only CDQ and vessels registered with the Aleut Corporation in directed fishery. | Critical habitat closed to directed fishing. | Critical habitat closed to directed fishing. | None | Critical habitat closed to directed fishing. |
| | | 50% of Aleut Corp. directed fishery allocation to vessels ≤ 60 ft. | | | | |
| | B season: 6/10–11/1. | When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ ABC. | | | | |
| | | Total A season apportionment no more than 40% of ABC. | | | | |
| 2 | A season: 1/20–6/10. | Same as Alternative 1 | No directed fishing in the area. | Critical habitat closed to directed fishing except for:<br>- Rat Islands Area outside of 3 nm from Tanadak, Segula, and Krysi Point and 10 nm from Little Sitkin and Ayugudak, and<br>-an area outside of 3 nm from Kanaga and Bobrof Island.<br>Option: Kanaga area outside 10 nm closure at Kanaga/Ship rock.<br>Option: Kanaga area outside 6 nm closure at Kanaga/Ship rock. | Option: prohibit directed fishing for pollock in Kanaga area by vessels ≥ 60 ft. | Critical habitat closed to directed fishing, except<br>-an area at Atka North Cape outside of 3 nm from haulouts<br>-an area at Amukta Pass outside of 3 nm from haulouts. |
| | B season: 6/10–11/1. | | | Protective Option:<br>A season: close 0–10 nm from rookeries, close 0–20 nm from haulouts.<br>B season: close 0–10 nm from rookeries and haulouts. | | Protective Option:<br>A season: close 0–10 nm from rookeries, close 0–20 nm from haulouts<br>B season: close 0–10 nm from haulouts, close 0–20 nm from rookeries. |
| 3 and 4 | A season: 1/20–6/10. | Same as Alternative 1 | Critical habitat closed except an area outside of 0–3 nm from Shemya, Alaid, and Chirikof haulouts. | Critical habitat closed 0–10 nm from rookeries and haulouts west of 178° W long., except open critical habitat in Rat Islands as under Alternative 2 | None | Critical habitat closed to directed fishing 0–3 nm from haulouts and 0–10 nm from rookeries |
| | | | | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries east of 178° W long.,<br>except open critical habitat in Kanaga area as under Alternative 2. | | Seguam Foraging Area closed to directed fishing. |
| | B season: 6/10–11/1. | | | Protective Option:<br>Same as Alternative 2. | | Protective Option:<br>Same as Alternative 2. |
| 5 | Same as Alternatives 1, 2, 3, and 4 | Same as Alternatives 1, 2, 3, and 4 | Critical habitat closed except an area outside of 0–3 nm from Shemya, Alaid, and Chirikof haulouts and outside 20 nm of rookeries. | Critical habitat closed 0–20 nm from at rookeries and haulouts west of 178°W long. except open a portion of critical habitat at Rat Islands Area outside 3 nm from Tanadak, Segula, and Krysi Point, and 10 nm from Little Sitkin and Ayugudak | Same as Alternatives 1, 3, and 4 | Critical habitat closed to directed fishing 0–3 nm from haulouts and 0–10 nm from rookeries |
| | | | | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries east of 178° W long.,<br>except open portions of critical habitat<br>outside 3 nm from Kanaga and Bobrof Island. | | Seguam Foraging Area closed to directed fishing. |
| | | | A season catch limit 5% of ABC. | A season catch limit 15% of ABC. | | A season catch limit 30% of ABC. |
| 6 | Not applicable. | Not applicable. | No retention | No retention | Not applicable. | No retention |

TAC=total allowable catch, ABC=acceptable biological catch, AI=Aleutian Islands

### 1.7.2 TAC based analysis

Table 65 provides estimates of the CDQ and Aleut Corporation allocations had the current allocation rules been in effect in the years from 1991 through 2014. As explained in Chapter 3 of the EIS, the Aleut Corporation and CDQ allocations have actually been in effect since 2005. This table goes back to 1991, however, to take advantage of the wider range of Aleutian Islands ABCs provided by this history, and to explain how these might affect CDQ and Aleut Corporation allocations. This table is driven by fluctuations in the ABC during this time; the incidental catch allowance (ICA) is assumed to be set at 1,600 mt, its level in 2013 and 2014. The table assumes the Aleut Corporation will seek to maximize the share of its allocation harvested during the relatively more lucrative A-season, and will not have A-season surplus to roll over to the B-season. Columns on the right hand-side show the amounts available to the American Fisheries Act (AFA), and dedicated small catcher vessel, sectors if (a) there is a 50/50 split as called for in regulations and all of the allocation is harvested, and (b) there is the same 50/50 split, but only the A-season harvest takes place, and the AFA sector harvests most of that.

Table 65 projects results for a range of ABCs from 23,800 mt to 101,460 mt. Higher ABCs would have no impact on the analysis, since the TAC would not change, and the Aleut Corporation A-season harvest would already be constrained to 40 percent of the TAC, minus the CDQ and ICA-seasonal allocations in any year. It is possible that ABCs could drop below 19,000 mt, in which case the TAC and Aleut Corporation allocations would also drop below the levels shown here. At ABCs below 19,000 mt, the Council could set a TAC below the ABC. While ABCs at these low levels cannot be ruled out, they have not been observed during this period. Over the period covered, the ABCs were large enough to allow a 19,000 metric ton TAC in every year. The Aleut Corporation would have been able to harvest from 7,960 mt to 15,500 mt (of its 15,500 mt annual DFA) in the A-season. This is important because, "Due to the low value of pollock carcasses ($0.09 per pound) and high value of roe ($1.10 per pound) and relatively low densities of pollock in other months, the fishery is thought to be only economically viable during March and April, shortly before spawning." (S. J. Barbeaux & Fraser, 2009: 1)[100]

The available information on pollock harvests within critical habitat make it impossible to estimate the volumes of catch that might have come from open and closed critical habitat if the alternatives had been in place during the baseline years. Likewise, it is not possible to project the revenues that would have been associated with those catches. The following revenue estimates are not predictions, but are meant to illustrate the potential magnitude of revenue flows.

Between 2007 and 2011, wholesale pollock prices received by catcher/processors in the Bering Sea and Aleutian Islands (BSAI) ranged between about $1,000 and $1,500 per mt round weight,[101] or between about $1,100 and $1,500 per mt round weight in inflation-adjusted 2012 dollars. During the same period, wholesale prices for shoreside processed pollock ranged from about $900 to about $1,300 per mt round weight, or between about $1,000 and $1,400 per mt in real 2012 dollars. Using this range of real prices, the gross revenues from the Aleut Corporation's allocation (assuming only the A-season was harvested, and that the catcher/processor fleet received its allocation with the balance allocated to the small vessel fleet)[102] would have ranged between about $9 million and about $23 million.[103]

[100] Barbeaux and Fraser cite a personal communication from Dave Fraser, Manager of Adak Fisheries, LLC.

[101] Prices as reported in Table 27 of the 2012 Groundfish Economic SAFE (Fissel et al., 2012).

[102] Since the catcher/processor wholesale price is higher, this tends to provide an upper limit on revenues. The Aleut Corporation may choose instead to prioritize access by the small vessel fleet. That is a policy decision it may have to make if both fleets can operate successfully in the region.

[103] The high prices have been used with the high volumes, on the assumption that the comparatively small share of BSAI pollock production coming from an Aleutian Islands fishery would have relatively small impacts on prices.

**Table 65 Estimated Aleut Corporation directed fishing allowances, seasonal allocations, and sector splits, based on 1991 through 2014 ABCs (metric tons)**

| Year | ABC | TAC | CDQ | ICA | Aleut Corp | CDQ+ICA+DFA | | DFA | | 50/50 split | | A-season constraint | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A-season | B-season | A-season | B-season | AFA | CV≤60 | AFA | CV≤60 |
| 1991 | 101,460 | 19,000 | 1,900 | 1,600 | 15,500 | 19,000 | 0 | 15,500 | 0 | 7,750 | 7,750 | 7,750 | 7,750 |
| 1992 | 51,600 | 19,000 | 1,900 | 1,600 | 15,500 | 19,000 | 0 | 15,500 | 0 | 7,750 | 7,750 | 7,750 | 7,750 |
| 1993 | 58,700 | 19,000 | 1,900 | 1,600 | 15,500 | 19,000 | 0 | 15,500 | 0 | 7,750 | 7,750 | 7,750 | 7,750 |
| 1994 | 56,600 | 19,000 | 1,900 | 1,600 | 15,500 | 19,000 | 0 | 15,500 | 0 | 7,750 | 7,750 | 7,750 | 7,750 |
| 1995 | 56,600 | 19,000 | 1,900 | 1,600 | 15,500 | 19,000 | 0 | 15,500 | 0 | 7,750 | 7,750 | 7,750 | 7,750 |
| 1996 | 35,600 | 19,000 | 1,900 | 1,600 | 15,500 | 14,240 | 4,760 | 12,680 | 2,820 | 7,750 | 7,750 | 7,750 | 4,930 |
| 1997 | 28,000 | 19,000 | 1,900 | 1,600 | 15,500 | 11,200 | 7,800 | 9,640 | 5,860 | 7,750 | 7,750 | 7,750 | 1,890 |
| 1998 | 23,800 | 19,000 | 1,900 | 1,600 | 15,500 | 9,520 | 9,480 | 7,960 | 7,540 | 7,750 | 7,750 | 7,750 | 210 |
| 1999 | 23,800 | 19,000 | 1,900 | 1,600 | 15,500 | 9,520 | 9,480 | 7,960 | 7,540 | 7,750 | 7,750 | 7,750 | 210 |
| 2000 | 23,800 | 19,000 | 1,900 | 1,600 | 15,500 | 9,520 | 9,480 | 7,960 | 7,540 | 7,750 | 7,750 | 7,750 | 210 |
| 2001 | 23,800 | 19,000 | 1,900 | 1,600 | 15,500 | 9,520 | 9,480 | 7,960 | 7,540 | 7,750 | 7,750 | 7,750 | 210 |
| 2002 | 23,800 | 19,000 | 1,900 | 1,600 | 15,500 | 9,520 | 9,480 | 7,960 | 7,540 | 7,750 | 7,750 | 7,750 | 210 |
| 2003 | 39,400 | 19,000 | 1,900 | 1,600 | 15,500 | 15,760 | 3,240 | 14,200 | 1,300 | 7,750 | 7,750 | 7,750 | 6,450 |
| 2004 | 39,400 | 19,000 | 1,900 | 1,600 | 15,500 | 15,760 | 3,240 | 14,200 | 1,300 | 7,750 | 7,750 | 7,750 | 6,450 |
| 2005 | 29,400 | 19,000 | 1,900 | 1,600 | 15,500 | 11,760 | 7,240 | 10,200 | 5,300 | 7,750 | 7,750 | 7,750 | 2,450 |
| 2006 | 29,400 | 19,000 | 1,900 | 1,600 | 15,500 | 11,760 | 7,240 | 10,200 | 5,300 | 7,750 | 7,750 | 7,750 | 2,450 |
| 2007 | 44,500 | 19,000 | 1,900 | 1,600 | 15,500 | 17,800 | 1,200 | 15,500 | 0 | 7,750 | 7,750 | 7,750 | 7,750 |
| 2008 | 28,160 | 19,000 | 1,900 | 1,600 | 15,500 | 11,264 | 7,736 | 9,704 | 5,796 | 7,750 | 7,750 | 7,750 | 1,954 |
| 2009 | 26,873 | 19,000 | 1,900 | 1,600 | 15,500 | 10,749 | 8,251 | 9,189 | 6,311 | 7,750 | 7,750 | 7,750 | 1,439 |
| 2010 | 33,100 | 19,000 | 1,900 | 1,600 | 15,500 | 13,240 | 5,760 | 11,680 | 3,820 | 7,750 | 7,750 | 7,750 | 3,930 |
| 2011 | 36,700 | 19,000 | 1,900 | 1,600 | 15,500 | 14,680 | 4,320 | 13,120 | 2,380 | 7,750 | 7,750 | 7,750 | 5,370 |
| 2012 | 35,200 | 19,000 | 1,900 | 1,600 | 15,500 | 14,080 | 4,920 | 12,520 | 2,980 | 7,750 | 7,750 | 7,750 | 4,770 |
| 2013 | 37,300 | 19,000 | 1,900 | 1,600 | 15,500 | 14,920 | 4,080 | 13,360 | 2,140 | 7,750 | 7,750 | 7,750 | 5,610 |
| 2014 | 39,800 | 19,000 | 1,900 | 1,600 | 15,500 | 15,920 | 3,080 | 14,360 | 1,140 | 7,750 | 7,750 | 7,750 | 6,610 |

Source: ABCs are from the 2012 AI pollock SAFE chapter (S. Barbeaux, Ianelli, & Palsson, 2012) with modifications for 2012–2014 from annual specifications; the ICA is assumed to be 1,600 metric tons based on the 2013–2014 specifications. However, this can vary and has been smaller in the past. Changes in the ICA would modify calculations somewhat, as illustrated in Table 65 above. Seasonal sector splits assume the 2013–2014 A/B splits of 40%/60% for CDQ and 50%/50% for ICA. Seasonal sector splits between small CVs and other trawlers assume that the Aleut Corporation would allocate as much A-season allocation to the catcher/processors and large trawl catcher vessels as possible.

These ranges are based on the high and low prices from the time period, and these extreme prices may be less common than a more central measure of price. The median catcher/processor wholesale value in 2012 dollars was about $1,389 per metric ton round weight, and the median shoreside wholesale value was about $1,276. Assuming a median A-season DFA of about 12,600 mt, divided between the two sectors with A-season harvest priority given to harvesting by AFA, revenues would be about $17 million.

This gross revenue is greater than the income that would be received by the Aleut Corporation, which would have received royalties from catcher/processors and catcher vessels bidding for the right to earn these gross revenues. The revenues will be smaller if the authorized Aleut Corporation fishing operations are not able to fully harvest the DFA or the Aleut Corporation forgoes revenues in exchange for commitments by vessel operators to visit and do business in Adak.

As an A-season fishery, the fishery will be targeting roe bearing pollock. This suggests another way to estimate revenues. Assuming, as above, a median A-season DFA of 12,600 mt, that only A-season pollock is harvested, that the catcher/processors harvest their full share and the residual is left for the catcher vessels, using information on median prices and available DFA, and assuming there will be a 10 percent roe content, the value for at-sea processed BSAI pollock roe might be (7,750 metric tons)*(0.1)*($11,133/metric ton) = $8.6 million, while the value of the shoreside processed pollock roe might be (4,850 metric tons)*(0.1)*($7,363/metric ton) = $3.6 million, for a total of $12.2 million.[104] This does not include potential revenues from producing pollock fillets for market. Again, the actual revenues received by the Aleut Corporation would be smaller, because its income would be in the form of royalties paid by fishing operations for the right to harvest its pollock allocation.

However, the most meaningful way to estimate the potential value of the pollock DFA to the Aleut Corporation is to estimate the value of the potential royalties it might receive if it leased out the allocation. Industry sources indicate that, in early 2013, reasonable royalty payments for pollock allocation might range from $400 to $600 a metric ton. The upper end of the range reflects a subjective appraisal of the potential value of Aleutian Islands pollock fishing rights given the higher roe content that many anticipate for the region. (Fraser, Cotter, personal communication, March 22, 2013)[105] The potential royalty payments are estimated here assuming that only the A-season pollock will be harvested, and that it will be economically viable to harvest the entire A-season DFA. It is not clear at this time that the full DFA would be harvested under the measures under consideration here. From Table 65, the median estimated A-season DFA for the Aleut Corporation would have been 12,600 metric tons over the period 1991through 2014 (the period used since these years provide a range of historical TACs and a sense of the potential range in DFAs). At $400/mt, the average royalties would have been about $5.0 million, and at $600/mt the average gross royalties would have been $7.6 million.

Given the limited pollock fishing that has taken place in the Aleutian Islands since the DFA was allocated to the Aleut Corporation, NMFS cannot predict the volume of production that will be associated with opening the different areas identified in the four alternatives and the protective options discussed in this section. Assuming that this is primarily an A-season fishery, the Aleut Corporation might enter into contracts resulting in harvest of an amount from 7,960 mt to 13,940 mt (depending on the ABC in a year).

[104] This estimate is lower than the total revenue estimate made earlier using the annual BSAI-wide pollock wholesale prices. All estimates are based on pollock roe prices from Table 26 of the 2012 Groundfish Economic SAFE report (Fissel et al., 2012). The median prices for the years 2007 through 2011 was converted to 2012 dollars, and converted from dollars per pound to dollars per metric ton. The lower roe-based price was unexpected, and points to the rough approximations behind all these estimates. It is not possible to do more than point to a plausible "ballpark" for future revenues given all the uncertainties in the available information.

[105] Dave Fraser (Adak Community Development Corporation) and Larry Cotter (Chief Executive Officer of the Aleutian Pribilof Islands Community Development Corporation). Estimates were provided during a meeting of the Council's Steller Sea Lion Mitigation Committee (SSLMC).

Development of B-season fisheries could increase annual harvests from 1,560 mt to 7,540 mt, depending on the year. Lower ABCs tend to push more of the TAC to the B-season, as the A-season total harvest cannot be more than 40 percent of the ABC. It is not possible to determine quantitatively how harvests would change as more areas are opened for pollock fishing, except to speculate that the possibility of larger harvests increases as more areas become available for fishing.

Table 65 shows that the CDQ allocation would have been 1,900 metric tons, under each of the ABCs from 1991 through 2014. The CDQ allocation would drop below 1,900 mt, if the ABC fell below 19,000 mt, but would not rise above it. The CDQ portion is further subdivided among the six CDQ groups, each of which holds a share of the Aleutian Islands CDQ[106]:

- APICDA (14 percent of the TAC), 266 metric tons
- BBEDC (21 percent), 399 metric tons
- CBSFA (5 percent), 95 metric tons
- CVRF (24 percent), 456 metric tons
- NSEDC (22 percent), 418 metric tons
- YDFDA (14 percent), 266 metric tons

Finally, the CDQ would be divided between A- and B-season allocations.

No Aleutian Island management area CDQ allocation has been fished in recent years. When the BSAI TAC has been far enough below the ABC, the CDQ allocation has been reallocated to the CDQ groups for fishing in the Bering Sea. CDQ groups may be reluctant to send a vessel to the Aleutian Islands to fish the relatively small allocations available there. However, this will also depend on the quality of roe that may be harvested, if relaxation of the restrictions makes it possible to harvest pollock in the area. CDQ groups may also form joint ventures with each other, or with the Aleut Corporation, to allow a single vessel to harvest CDQ pollock from multiple groups. (AKR in-season managers)

### 1.7.3 Spatial/temporal analysis

Critical habitat in the Aleutian Islands was closed to pollock directed fishing before the Aleut Corporation received and began trying to fish its allocations in 2005. Thus, there is little recent experience with pollock fishing in this region in the areas proposed to be opened under Alternatives 2 through 4. However, fishing did take place in this area from 1991 through 1998, and NMFS has examined observer data from this period to determine if fishing took place in areas that might be opened by this action. Summary information from these years may be found in Table 66.

Observer data collected for this fishery during the years 1991 to 1998 provides an incomplete picture of the location of harvests and a weak basis for projecting the volumes of harvest coming from the areas that may be opened: (1) The data are dated; pollock populations and distribution may have changed a great deal since that time; (2) Some of the data may have come from vessels with 30 percent observer coverage, and observer sampling on these vessels was not statistically random; (3) Observers provided information on the location of the starting point and ending point of an observed tow, but the tow itself may not have been a straight line, making it difficult to infer the exact location of catch.

[106] From the Annual Quota Allocation Matrix for 2012, retrieved on January 13, 2013, from the http://www.alaskafisheries.noaa.gov/cdq/allocations/annualmatrix2012.pdf.

Moreover, information from the 1990s was collected before many measures were adopted that would affect fishing activity in the region, including the AFA, the allocation of the Aleutian Islands directed fishing allowance to the Aleut Corporation, and measures to restrict trawling to protect fisheries habitat.

Dynamic changes in pollock stocks in the region are described in Chapter 3 of the EIS. "The most recent surveys show that the Aleutian Islands pollock population is predominantly concentrated in the eastern portion of the Aleutian Islands chain, closer to the Eastern Bering Sea shelf. Surveys from the 1980s and 1990s estimated higher proportions of pollock biomass in the central and western Aleutian Islands. This recent spatial imbalance in population abundance may reflect a spatial contraction of the stock in the Eastern Bering Sea after the collapse of the Central Bering Sea population in the early 1990s, low Aleutian Islands pollock recruitments since the mid-1980s, documented high exploitation rate of the Aleutian Islands pollock in the mid to late 1990s, and possibly a high undocumented exploitation rate in the late 1980s, by foreign fish[ing operations]." The changing pattern of harvest through time indicates that the location of pollock stocks is not stable.

A key element in Alternatives 2, 3, and 4 is the opening of four to five carefully defined zones within critical habitat.[107] Table 66 shows the number of vessels, volume of pollock, and number of calendar years with activity, for observed activity in the Aleutian Islands in total, within each of these five zones, and in areas outside of these five zones. The column labeled "0–3 nm" is labeled "n.a." for each zone, since none of the proposals open critical habitat within three miles of shore. The column labeled "Outside CH" is also labeled "n.a." for each zone, since some zones include areas outside of critical habitat that are currently open to fishing. The totals at the bottom of each column include information from within the different zones, as well as from areas outside the five pollock zones. The only critical habitat not included from 0 to 20 nautical miles, lies in the Sequam Pass area; therefore, a column for Sequam Pass is included, but is not relevant to consideration of the five zones themselves.

The information for the zones as presented in the alternatives can be read from the final "Row total" column. This sums the information for each zone described in the alternatives for the areas falling in critical habitat within 3 nautical miles to 20 nautical miles, and within 10 nautical miles to 20 nautical miles. The row labeled "Areas not proposed for opening" shows the numbers of vessels, volumes of pollock, or years of activity, in that range that fall outside the five pollock zones. Amukta Pass and Atka are in Area 541, Kanaga and Hawadax Islands are in Area 542, and Shemya is in Area 543. The lower right hand cell shows the totals across Areas 541 to 543, both inside and outside the zones defined in the alternatives.

The table shows that fishing operations from 1991 through 1998 harvested pollock in each of the five zones. In the Kanaga Sound and Hawadax Island zones the catches appear to have come from the parts of the zones from 3 nautical miles to 10 nautical miles, but not from the parts of the zones from 10 nautical miles to 20 nautical miles. In the three other areas, there was production in both the 3-nautical-mile to 10-nautical-mile and 10-nautical-mile to 20-nautical-mile parts of the zones. To the extent that the volumes of pollock from each area provide a weak signal for the potential productivity of each area, Kanaga Sound stands out, with more observed production than from any of the other four areas.

The 1991 through 1998 observer data do not provide information about the sizes of the vessels used in the fishery. However, two of the open zones under consideration in this analysis, the Kanaga Sound and Atka North Cape zones, may be relatively more attractive to small trawlers (60 feet and under) than other areas, due to their proximity to ports at Adak and Atka, and to the relatively protected waters within Kanaga Sound.

[107] Tables in Chapter 2 show these areas: Amukta Pass, Kanaga Sound, Atka North Cape, the Rat Islands, and Shemya.

**Table 66 Fishing activity in areas proposed for opening under Alternatives 2 through 4, from observer data collected from 1991 to 1998**

| Number of vessels | | | | | | |
|---|---|---|---|---|---|---|
| | Inside Critical Habitat (CH) | | | | Outside CH | Row total |
| Zones | 0–3 nm | 3–10 nm | 10–20nm | Sequam | | |
| Amukta Pass | n.a. | 11 | 31 | 0 | n.a. | 42 |
| Atka | n.a. | 31 | 37 | 0 | n.a. | 68 |
| Kanaga | n.a. | 36 | 0 | 0 | n.a. | 36 |
| Rat Islands | n.a. | 5 | 0 | 0 | n.a. | 5 |
| Shemya | n.a. | 6 | 3 | 0 | n.a. | 59 |
| Areas not proposed for opening | 31 | 54 | 57 | 12 | 59 | 213 |
| Total vessels-years | 31 | 143 | 128 | 0 | 59 | 373 |
| **Volume of pollock (metric tons)** | | | | | | |
| | Inside Critical Habitat (CH) | | | | Outside CH | Row total |
| Zones | 0–3 nm | 3–10 nm | 10–20nm | Sequam | | |
| Amukta Pass | n.a. | 8,149 | 17,807 | 0 | n.a. | 25,957 |
| Atka | n.a. | 17,063 | 13,323 | 0 | n.a. | 30,386 |
| Kanaga | n.a. | 59,808 | 0 | 0 | n.a. | 59,808 |
| Rat Islands | n.a. | 2,449 | 0 | 0 | n.a. | 2,449 |
| Shemya | n.a. | 9,005 | 2,593 | 0 | n.a. | 11,598 |
| Areas not proposed for opening | 8,887 | 8,910 | 63,122 | 4,521 | 94,853 | 180,294 |
| Total tonnage | 8,887 | 105,385 | 96,845 | 4,521 | 94,853 | 310,492 |
| **Number of separate calendar years with production** | | | | | | |
| | Inside Critical Habitat (CH) | | | | Outside CH | Row total |
| Zones | 0–3 nm | 3–10 nm | 10–20nm | Sequam | | |
| Amukta Pass | n.a. | 3 | 5 | 0 | n.a. | 8 |
| Atka | n.a. | 7 | 8 | 0 | n.a. | 15 |
| Kanaga | n.a. | 5 | 0 | 0 | n.a. | 5 |
| Rat Islands | n.a. | 4 | 0 | 0 | n.a. | 4 |
| Shemya | n.a. | 2 | 1 | 0 | n.a. | 3 |
| Areas not proposed for opening | 9 | 23 | 18 | 3 | 14 | 67 |

Notes: Listed zones only include critical habitat inside described bounds. Areas marked "n.a." are not covered by the proposed action, either because they are in critical habitat, but not opened (0–3 nm), or because they fall inside the dimensions of the area defined by the alternative, but are outside critical habitat and, so, already open to fishing.
Source: AKR analysis of observer data, January 4, 2012.

*Alternative 2*

Alternative 2 opens the pollock fishing zones in critical habitat at Amukta Pass, Atka North Cape, Kanaga Sound, and the Rat Islands. These areas are shown in Figure 2-12 in Chapter 2 of the EIS. Amukta Pass and Atka North Cape are in Area 541, while Kanaga Sound and the Hawadax Islands zones are in Area 542. No areas in Area 543 are opened under this alternative. As shown in Table 66 above, these areas account for most of the observed harvest in the five zones from 1991 to 1998. While the potential pollock production from these zones is uncertain, it is possible that the Aleut Corporation and CDQ groups could harvest their entire allocations from these four zones and in these two management areas, with the implications for revenues discussed earlier.

Alternative 2 includes three options that may be applied to the Kanaga Sound zone. One option prohibits directed fishing for pollock in the Kanaga Sound zone by vessels greater than or equal to 60 feet length overall (LOA). The other two options exclude the areas within (a) 10 nautical miles and (b) 6 nautical miles of the Ship Rock rookery in Kanaga Sound from the area within the open zone.

Prohibiting vessels over 60 feet LOA from the Kanaga area would prevent AFA catcher vessels and catcher/processors from fishing in the area. It would not prevent small vessels from delivering to AFA catcher/processors or to fish plants in Adak, so long as these were authorized to process fish from this area by the Aleut Corporation. The estimates of observed catch in Table 66 suggest that in the period 1991 to 1998, more observed production of pollock came from Kanaga Sound than from any of the other four zones proposed for opening under Alternatives 2 and 3. This option could restrict the ability of the AFA component of the fleet to harvest its 50 percent share of the Aleut Corporation allocation. Conversely, it would have the effect of reserving the Kanaga Sound pollock for the smaller vessels.

While this would presumably reduce the value of the action for the AFA fleet, and increase it for potential participants in the small vessel fleet, it could also adversely impact the Aleut Corporation stockholders, and the town of Adak. If reserving this area for vessels under 60 feet were advantageous to the Aleut Corporation and Adak, Aleut Corporate managers would be able to reserve the Kanaga Sound pollock for small vessels, through the conditions imposed when it authorizes vessels to fish. It may be, for example, that the Aleut Corporation thinks that Adak would be best served if the Kanaga Sound pollock were harvested by larger AFA trawlers for some years. This option, if it were adopted, would prevent that economic and operational flexibility.

Figure 2-12 in Chapter 2 of the EIS shows the spatial impact of excluding the area within 10 nautical miles of Ship Rock from the Kanaga Sound open zone. Much of the area within the Kanaga Sound to the south of Bobrof Island would no longer be open. A review of observer data from 1991 through 1998 indicates that this would remove the area where most of the zone's pollock harvests occurred. As shown in Table 66 above, from 1991 through 1998 there were about 59,800 mt of observed pollock harvest in the whole Kanaga Sound zone. A review of the observer records indicates that only about 12,500 mt were taken in the truncated zone. This tonnage was taken by 27 vessels in four separate years. (AKR review of observer data, January 8, 2013) Moreover, much of the area remaining in the zone is to the north of Kanaga and Bobrof Islands, outside of the more protected waters of the Kanaga Sound. Smaller vessels may have a more difficult time operating in these more exposed waters than they would in the Kanaga Sound. (Fraser, personal communication, January 7, 2013)

Figure 2-12 in Chapter 2 of the EIS shows the impact of excluding the area within 6 nautical miles of Ship Rock from the Kanaga Sound open zone. This has less impact on the area and on the volume of observed harvest than the 10-nautical-mile option. Observer records indicate that about 34,637 mt of observed harvest came from the remaining open area in the Kanaga Sound zone from 1991 through 1998.

These were taken by 33 unique vessels, in 5 different years. Thus, the "Kanaga 6" option appears to be less restrictive than the "Kanaga 10" option.

This option is, thus, likely to have an adverse impact on potential harvests from Kanaga Sound, and because of the Kanaga Sound's proximity to the port of Adak, may have a proportionately greater impact on vessels less than 60 feet LOA, than on the AFA fleet. Since Kanaga Sound is relatively close to Adak, the restriction on harvest from this area, and the more exposed waters remaining open to small vessels, may adversely affect possible pollock processing at Adak, or the market for support and logistical services at Adak.

*Alternatives 3 and 4*

Alternatives 3 and 4 open the Shemya zone in Area 543 to pollock fishing (see Figure 2-20 in Chapter 2 of the EIS). Observed harvests from this area were about 11,600 mt, from 1991 to 1998 (Table 66). The four zones open in Areas 541 and 542 under Alternative 2 are also open under Alternatives 3 and 4.

In addition, Alternatives 3 and 4 open large additional swaths of critical habitat in Areas 541 and 542. In Area 542 west of 178° W longitude (west of Tanaga Island on the west side of Kanaga Sound), critical habitat is open for fishing outside of 10 nautical miles of rookeries and haulouts. In Area 542 to the east of that line, critical habitat is open for pollock fishing in waters that are both (a) outside 3 nautical miles of haulouts, and (b) outside 10 nautical miles of rookeries. In Area 541, critical habitat is open to pollock fishing in waters that are outside both (a) three nautical miles of haulouts and (b) 10 nautical miles of rookeries.

The opening of these areas would provide the Aleut Corporation with access to additional locations for harvesting its Aleutian Islands allocation. While the Aleut Corporation may be able to harvest its allocations under Alternative 2, this additional area may increase the probability it will do so. The additional area may make it easier to accommodate more authorized fishing vessels, and, if pollock spawning aggregation locations are variable from year to year, it opens more of those locations to potential fishing effort.

*Protective options for Alternatives 2, 3, and 4*

The areas opened to fishing under the protective options for each alternative are the same, and are shown in Figures 2-13 and 2-14 (for Alternative 2), and in Figures 2-21 and 2-22 (for Alternatives 3 and 4) in Chapter 2 of the EIS. Table 66 summarizes the information on fishing activity collected from observers from 1991 through 1998.

This information can be used carefully, to provide a rough index of the impacts of the protective options. A review of the table shows that under the basic elements of Alternative 2, the areas where 69 percent of the observed harvest was taken would be open to fishing,[108] while under the Alternative 2 protective option, about 61 percent would be open.[109] This is an overestimate of the volume of fish that may be taken under the protective option, because available data do not currently differentiate between haulouts and rookeries on a seasonal basis. It is not possible to estimate the size of this overestimate. Closing the

[108] This is the percentage of the total tonnage outside critical habitat and the row totals for Amutka Pass, Atka, Kanaga, Rat Islands, and Shemya, divided by the total tonnage row total (all numbers from Table 66).

[109] For the purposes of making these rough estimates, it is assumed that the production described in Table 66 came in the A-season. The 69 percent figure is the sum of the volume of production outside critical habitat and the production from 3nm to 20 nm in the Amukta, Atka, Kanaga, and Rat Island zones, divided by total production. The 61 percent estimate is equal to the sum of the volume of production outside critical habitat, the production from 10 nm to 20 nm in the Amukta and Atka zones, and the production from 10 nm to 20 nm from area not proposed for opening under the alternative, divided by total production.

waters from 0 to 20 nautical miles around haulouts in the A-season, when the majority of the pollock fishery is likely to take place, will be more restrictive. The amount cannot be quantified with available information.

Under Alternatives 3 and 4, 72 percent of the observed volume would be in open areas; under the Alternative 3 and 4 protective options, this volume would be about about 62 percent, or about the same as under the Alternative 2 protective option.[110] As noted earlier, these are overestimates of the volume and it is not possible to know the size of the overestimate.

Thus, the observer data from 1991 to 1998, summarized in Table 66, suggest that the protective options will likely be more restrictive to the fishery than the alternatives without the option. Protective options under Alternatives 3 and 4 have similar impacts to the protective option in Alternative 2. (The only substantive change is that Area 543 fishing is allowed in Alternatives 3 and 4, without restrictions in critical habitat, except 0 to 3 nm.) Therefore, the protective options in each alternative should be viewed as being less restrictive than Alternative 1, but more restrictive than Alternative 2.

### 1.7.4 Incidental catch of Groundfish and PSC

*Incidental catch of groundfish*

Despite the constraints on the Aleutian Islands directed pollock fishery from 2005 through 2010, some targeted pollock fishing occurred. This fishery, outside critical habitat, provided some data on the incidental catch rates of other groundfish species and on prohibited species catch (PSC). The majority of this fishing activity occurred in Area 541. Therefore, there is little information on differences in incidental catch and PSC rates between management areas, or inside/outside of critical habitat within an area.

As seen in Table 67, from 2005 through 2010, about 88 percent of the groundfish catch in trips targeting pollock with pelagic trawl gear (directed pollock fishery) in the Aleutian Islands was pollock. Since the corresponding figure in the Bering Sea directed pollock fishery is about 98 percent, incidental catches are higher in the Aleutian Islands pollock fishery than in the Bering Sea pollock fishery.

In the Aleutian Islands the groundfish species assemblage that makes up the incidental catch is predominately Pacific ocean perch (POP). This information is consistent with the Aleutian Islands Cooperative Acoustic Survey studies in 2006 and 2007 (S. J. Barbeaux & Fraser, 2009). POP accounted for about 96 percent of the incidental catch of groundfish in the pollock directed fishery in the Aleutian Islands. Other incidental catch species include sculpins and miscellaneous flatfish species.

**Table 67 Average catch of groundfish species in the pollock directed fishery in the BSAI from 2005-2010**

| | Pollock | Pacific ocean perch | Other species |
|---|---|---|---|
| Aleutian Islands Average 2005–2010 | 88.32% | 11.47% | 0.20% |
| Average 2005–2010, minus high and low years | 93.45% | 6.45% | 0.10% |
| Bering Sea Average 2005–2010 | 98.16% | 0.04% | 1.80% |
| Source: AKR analysis of CAS, January 4, 2013. | | | |

[110] The 96 percent estimate is created by adding the production from the Shemya, and areas not proposed for opening, zones to the numerator in the Alternative 2 calculation.

As discussed in Chapter 3 of the EIS, POP are pelagic. Fishermen have indicated that POP mix with pollock at certain depths and are sometimes hard to distinguish from pollock on sonar. It is expected that an Aleutian Islands pollock fishery will encounter POP. Based on data on pollock directed fishing in the Aleutian Islands from 2005 through 2010, the average rate of POP incidental catch is 11.47 percent. A trimmed mean, created by dropping the highest and lowest incidental catch rates, is 6.45 percent. This incidental catch rate varies by year and area. As the pollock fishery in the Aleutian Islands develops, and participants develop experience at avoiding POP, this incidental catch rate may decrease.

There are separate POP ABCs and TACs in Areas 541, 542, and 543. POP TACs are usually set equal to ABCs, and the TACs are fully allocated to the CDQ, incidental catch allowance, Amendment 80, and BSAI trawl limited access sectors. The incidental catch of POP accrues to an incidental catch allowance (ICA) in each area. The ICA is published in the harvest specifications. In 2013, the ICAs were set at 200 mt in Area 541, 75 mt in Area 542, and 10 mt in Area 543.

Because POP TACs are normally set equal to ABCs, the ICAs must be set conservatively to ensure that the ABCs are not exceeded. Also, because it is not clear in which management area the pollock fishery may occur (it could occur entirely in one area), the ICA must be set high in each area. Due to the limitations of recent data, the POP ICA will likely be set conservatively in each area for the first few years. The ICAs may be set as high as 12 percent of the Aleutian Islands pollock TAC in each area. However, as more information on the incidental catch rate of POP is collected, the rate will be adjusted to reflect the most current data. Table 68 shows the potential ICA and the potential impact to the Amendment 80 and BSAI trawl limited access sectors if the entire pollock allocations are expected to be harvested. Because the CDQ allocation is deducted from the TAC prior to the ICA deduction under § 679.20, there is no impact to CDQ allocations as a result of an increased POP ICA.

**Table 68 Potential Incidental Catch Allowance, Amendment 80, and BSAI trawl limited access allocations of Pacific ocean perch if the entire Aleutian Islands pollock allocation is harvested (metric tons)**

| | 2013 Allocation | POP Rate | POP Rate |
|---|---|---|---|
| | | 11.47% | 6.45% |
| **Incidental Catch Allowance** | | | |
| 541 | 200 | 2,035 | 1,232 |
| 542 | 75 | 1,910 | 1,107 |
| 543 | 10 | 1,845 | 1,042 |
| **Amendment 80** | | | |
| 541 | 7,688 | 6,037 | 6,759 |
| 542 | 5,542 | 3,891 | 4,614 |
| 543 | 8,917 | 7,118 | 7,905 |
| **BSAI Trawl Limited Access** | | | |
| 541 | 854 | 671 | 751 |
| 542 | 616 | 432 | 513 |
| 543 | 182 | 145 | 161 |

According to § 679.20(a)(10)(iii)(B), if, during a fishing year, the Regional Administrator determines that a portion of the incidental catch allowance for each Amendment 80 species, other than Pacific cod, is unlikely to be harvested, the Regional Administrator may issue inseason notification in the *Federal Register* that reallocates that remaining amount to Amendment 80 cooperatives. Because it is likely that

the pollock directed fishery in the Aleutian Islands would occur primarily in the A-season, and because Amendment 80 POP are usually harvested after the A-season pollock directed fishery, unused amounts of the POP ICA could be reallocated to the Amendment 80 sector before it actively participates in the POP directed fishery. This would be more difficult if a B-season pollock directed fishery were to emerge.

*Incidental catch of Prohibited Species*

Table 69 summarizes information on potential PSC rates in the Aleutian Islands pollock directed fishery from the 2005 Environmental Assessment for Amendment 82 (NMFS, 2005b). The table also summarizes more recent information on PSC rates in the Aleutian Islands and Bering Sea pollock fisheries, from 2005 through 2010.

**Table 69 Average Aleutian Islands pollock directed fishery PSC rates from 1993 through 1998 and Aleutian Islands (AI) and Bering Sea (BS) pollock directed fishery PSC rates 2005 through 2010**

| | 1993–1998 AI Average | 2005–2010 AI Average | 2005–2010 BS Average |
|---|---|---|---|
| Halibut (kg/mt of pollock) | .02 | .80 | .23 |
| Chinook Salmon (# of animals/mt) | .03 | .14 | .04 |
| Other Salmon (# of animals/mt) | .03 | .013 | .17 |
| Bairdi (# of animals/mt) | < .01 | .01 | < .01 |

Notes: The fishery in the Aleutian Islands is limited, and the Aleutian Island rates are based on small samples.
Source: 1993–1998 from 2005 EA on Amendment 82 (NMFS, 2005b); 2005–2010 from AKR analysis of CAS, January 4, 2013

The 1993 through 1998 averages indicate that PSC rates in the Aleutian Islands are less than the Bering Sea PSC rates from recent years (although the fishery occurred at a different time, and under different regulations, than pollock directed fisheries currently operate). More recent data, from 2005 through 2010, indicate that the PSC rates in pollock directed fishing in the Aleutian Islands are higher than in the Bering Sea. However, these data are limited and the PSC rates may not represent what would occur, in a fully developed Aleutian Islands directed pollock fishery. These data provide a range.

There is a seasonal component to PSC rates, particularly for salmon. It is known that higher Chinook salmon PSC rates occur in the A-season and higher non-Chinook salmon PSC rates in the B-season. A pollock directed fishery in the Aleutian Islands is expected to largely take place in the A-season, implying that Chinook PSC rates may be higher than shown in Table 69, while non-Chinook rates may be lower.. Origin of these salmon is unknown at this time, so the effect on particular in-river salmon runs cannot be quantified. If salmon were encountered in the Aleutian Islands pollock directed fishery, observers would collect genetic samples that may make it possible to determine origin in the future.

As currently managed, the Aleutian Islands pollock directed fishery is not subject to PSC limits that would close that entire fishery. Amendment 91 did not address Chinook salmon PSC in the Aleutian Islands; therefore, Chinook salmon PSC is not counted against any hard cap. However, § 679.21(e)(1)(viii) specifies 700 Chinook salmon as the PSC limit for the Aleutian Islands pollock directed fishery. NMFS, by notification in the *Federal Register*, will close the Aleutian Islands Chinook Salmon Savings Area, as defined in Figure 8 part 679, to directed fishing for pollock with trawl gear on the following dates: "from the effective date of the closure until April 15, and from September 1 through December 31, if the Regional Administrator determines that the annual limit of Aleutian Islands Chinook salmon will be attained before April 15" (§ 679.21(e)(7)(viii)(A)). NMFS allots 7.5 percent of the PSC limit, or 53 Chinook salmon, to the CDQ program, and the remaining 647 Chinook salmon PSC limit to

the non-CDQ pollock directed fishery. Though there are halibut PSC limits for pollock, Atka mackerel, and other target species, in pollock targets, only directed fishing for pollock with non-pelagic gear closes when a halibut limit is reached. However, non-pelagic trawl gear is prohibited when directed fishing for pollock in the Aleutian Islands, so this closure would not affect the Aleutian Islands pollock directed fishery. Neither the *C. bairdi* crab closure areas nor the chum salmon savings area include the Aleutian Islands, so even if PSC limits were reached, these closures would not affect the Aleutian Islands pollock directed fishery. Overall, even with higher pollock catch, the total PSC in the Aleutian Islands pollock directed fishery is expected to be low.

### 1.7.5 Rollover implications

If areas opened to pollock directed fishing under these alternatives and options turn out to be productive, some or all of the Aleut Corporation DFA and the CDQ may be taken. However, these areas may not be productive, in which case DFA and CDQ would normally be rolled over to the Bering Sea fisheries. This can occur in years in which the Council sets the Bering Sea pollock TAC below the ABC. No reallocation is possible when Bering Sea ABC is set equal to TAC. The Aleut Corporation does not benefit from pollock rolled over in this way.

To the extent that the Aleut Corporation is able to harvest a large proportion of its allocation in a year, reallocations from the Aleut Corporation to the directed pollock fisheries in the eastern Bering Sea would be reduced. This reduction in reallocations would affect the AFA fisheries in years in which the Bering Sea pollock TAC has been set below the Bering Sea pollock ABC (if they are equal, reallocations are not possible).[111] Reallocations may be smaller, and take place later in the year, than they otherwise would have. While the amounts involved will be small in proportion to typical AFA allocations in the eastern Bering Sea, considering the values estimated earlier in this section, they could still amount to millions of dollars.

### 1.7.6 Fleet and community impacts

*Impact on the Aleut Corporation and its shareholders*

If an action alternative is adopted, the impact on the Aleut Corporation will depend on policy decisions the Aleut Corporation makes with respect to organizing the fishery, and the success of its fishermen in harvesting pollock under new management measures.

The key policy decision concerns the objectives the Aleut Corporation chooses to pursue with its allocation. The legislation passed by Congress states that the allocation to the Aleut Corporation is for the purpose of development in Adak.[112] The Aleut Corporation could (a) seek to maximize its revenues from its pollock allocation and invest these in Adak; (b) seek to maximize the direct impacts of new pollock fishing on Adak, by requiring firms leasing its allocations to interact with the port at Adak in some way (perhaps requiring deliveries of pollock or other fish products in Adak, purchases of fuel or other goods or services in Adak, or local hire); or (c) some mixture of these objectives. A second key policy decision follows from the collection of revenues for development of Adak: the Aleut Corporation must decide how to use the revenues. The revenues might be spent on fisheries related infrastructure, for other fisheries related purposes, or for purposes unrelated to fisheries. It is also possible that the Aleut

[111] The net effect would depend on the extent to which AFA operations would have cooperated with the Aleut Corporation in harvesting its Aleutian Islands pollock.

[112] Public Law 108-199, Section 803(d).

Corporation would substitute the pollock royalties for monies from other sources currently being invested in Adak, using those monies for other purposes. In this event, the impact on Adak of this management action could be small.

In a typical corporation, and in the absence of corporate governance problems preventing stockholders from exercising complete control over the corporation's executives, an unexpected increase in the value of corporate assets would be reflected in an increase in share prices. To the extent that corporate governance problems allow corporate executives to secure a share of the increased value for themselves, the increase would not be fully reflected in the share prices. Conversely, an unexpected decrease in asset values would have the opposite effect on stock prices and executive compensation. In these cases, an increase in the value of corporate assets would benefit current stockholders and executives, and provide relatively less benefit to those in the future. Future shareholders would have to pay more for shares; future executives may invest in "rent seeking" behavior to access a share of rents enjoyed by managers, thereby reducing the value of those rents.

However, the Aleut Corporation, and Alaska Native Claims Settlement Act (ANCSA) regional corporations more generally, are atypical in this regard. The structure of ANCSA and the bylaws of the Aleut Corporation suppress the market in corporate stock. Shares are not supposed to be bought and sold, and there are important restrictions on who may receive corporate stock. Moreover, the shares are focal points of ethnic identify and pride, which may contribute to a bequest motive for transfers. The requirement that transfers be uncompensated, and consequently governed by bequest motives, may mean that benefits from the increase in corporate asset values will flow to future shareholders, as well as to current shareholders.
However, this transfer to future shareholders could be offset somewhat, to the extent that prohibitions on compensated transfers are evaded, either legally (through non-market transfers and compensation) or illegally, through side payments, perhaps hidden in apparently unrelated transfers.

*Impact on AFA trawlers*

Fifty percent of the Aleut Corporation's allocation is set aside for AFA trawl catcher/processors and AFA catcher vessels (§ 679.7(l)(1)(iii) and § 679.20(a)(5)(iii)). To the extent that the Aleut Corporation is seeking to maximize its profits from its allocation, in order to use the funds for the development of Adak, AFA vessel owners will have to bid for, or compensate the Aleut Corporation for the use of the Aleut Corporation's allocation. If the Aleut Corporation tries to balance profit maximization with direct Adak development activity, AFA vessel owners may have to incorporate port visits and port-related activity into regional activity. Contracts made with the Aleut Corporation incorporating port requirements likely also would involve smaller royalty payments than otherwise, depending upon the relative negotiating success of the parties.

*Impact on trawlers less than or equal to 60 feet LOA*

Fifty percent of the Aleut Corporation allocation must be fished by vessels less than or equal to 60 feet LOA. No LLPs are required by trawl vessels directed fishing for pollock in the Aleutian Islands (§ 679.2, definition of License limitation groundfish). The increased access to pollock grounds in the Aleutian Islands may provide a new fishing opportunity for owners and operators of small trawlers.

An examination of all vessels in this size class using trawl gear off Alaska from 2005 through 2012 identified as many as 38 unique vessels (this may be an overestimate if vessels were renamed, or obtained new Federal fishery permits). There was an average of about 26 vessels involved in each year. These vessels fished for pollock in the Gulf of Alaska, predominately (92 percent) in Area 610, but also in Areas

620 and 630. These vessels did not fish pollock in the Bering Sea. The potential volumes of pollock available to these vessels in the Aleutian Islands (up to 7,750 metric tons a year) could be meaningful in comparison with the harvests of pollock in the Gulf from 2005 through 2012 (which averaged 17,300 metric tons a year).

Vessels with home ports in the Western and Central Gulf of Alaska were an especially important part of this fleet. There was an average of ten vessels a year from Sand Point, four vessels a year from King Cove, and two vessels a year from Kodiak. The remaining vessels reported Girdwood, Juneau, Petersburg, and Seattle home ports. There are questions about the reliability of home port information on vessel license files; however, as a rough index, this points to the importance of Western and Central Gulf ports for this fleet. Almost all of the vessels involved were 58 feet LOA, pointing to the importance of the 58-foot salmon limit seiner class of vessels in this fleet.

The Aleut Corporation only authorized participation in their Aleutian Islands fishery by as many as seven catcher vessels (under 60 feet LOA) in the 2007 fishery. Although vessels were authorized, no landings were reported by this fleet segment. Of the seven vessels in 2007, six appear on the 2007 list of small vessels operating trawl gear. Only one of these reported a Western and Central Gulf homeport (Sand Point); five of them reported homeports at Girdwood, Juneau, or Seattle.

From 2005 through 2012, nine vessels less than 60 feet LOA trawled in the Aleutian Islands. These vessels were in the Aleutian Islands a total of 36 separate vessel-years during this eight year period. Only three of these vessels fished six years or more. These vessels primarily participated in the Aleutian Islands trawl Pacific cod fishery and the Aleutian Islands State-water GHL Pacific cod fishery. Activity in these fisheries was largely restricted to the period from late February to the first week of April. There appears to be some correlation between the vessels' activity in the Aleutian Islands and the closure of the Western GOA fisheries, suggesting that these vessels participate in Western GOA fisheries before leaving the Western GOA to join the Aleutian Islands Pacific cod fishery.

Depending on Aleut Corporation policies with respect to Adak development, fishing operations may pay royalties for the use of the Aleut Corporation allocation, may make commitments to deliver or buy supplies at the Port of Adak, or some combination of these. Since no vessel operator would voluntarily make these payments, unless it expected to enjoy a net benefit, the alternatives under consideration in this analysis should benefit operators of small trawlers.

*Impact on Adak, or other communities*

Increases in Aleut Corporation pollock harvests in the Aleutian Islands could benefit people who live in Adak in three ways: (1) revenues from the program could be used for investment in Adak infrastructure; (2) contracts with fishermen could require Adak deliveries, Adak port visits, or purchases (perhaps of fuel) at Adak; (3) tax revenues from fisheries or sales taxes. These alternatives could provide benefits to people in Adak if they created new business opportunities and jobs. Jobs filled by persons from outside of Adak would not benefit Adak residents to the same extent as jobs they fill themselves, but may do so indirectly.

The other region with the potential for systematic and positive impacts from the development of a small vessel pollock fishery in the Aleutian Islands is the Western and Central Gulf of Alaska, including Sand Point, King Cove, and Kodiak. Pollock deliveries from the Aleutian Islands appear unlikely, but the increased access to pollock grounds may provide a new opportunity for these fishermen. However, there are large uncertainties associated with this. These vessels have not been entering the Bering Sea to fish for pollock, and this area does not appear to have been the primary source of authorized small trawlers in 2007. The Aleutian Islands are remote and operations are costly, the fishery would conflict with other

seasonal fisheries for the Gulf trawlers, and the firms may have to bid for shares of the Aleut Corporation's directed fishing allocation (either paying for the allocation with a share of the revenues, or making concessions involving activity at Adak). To some extent, the attractiveness of an Aleutian Islands pollock directed fishery to these operations would depend on policy decisions made by the Aleut Corporation.

While the alternatives would tend to benefit people who live in Adak or other communities, the size and nature of the benefit cannot be predicted, because of (a) the uncertainty about future pollock harvests under the relaxed Steller sea lion restrictions, (b) the uncertainty about how the policy decisions the Aleut Corporation would make with respect to its use of the allocation, and (c) uncertainty about the regional economic impact pathways associated with increased fishing activity.

*Impact on CDQ groups*

As noted, CDQ groups have been receiving 1,900 metric tons of Aleutian Islands pollock CDQ each year; this is divided unequally among the CDQ groups in amounts ranging from 95 mt to 456 mt. If opening new areas to pollock directed fishing in the Aleutian Islands made it possible for the CDQ groups to harvest their allocations, less of the CDQ pollock might be reallocated to the eastern Bering Sea each year. If CDQ groups chose to fish pollock in the Aleutian Islands to maximize their incomes from pollock (especially if they take advantage of larger pollock and higher roe content reputed to be in the Aleutian Islands), they would only do so because it was more profitable for them. Thus, the actions under consideration may have some potential to benefit CDQ groups.

*Impact on pollock consumers*

This action is unlikely to have large impacts on U.S. pollock consumers. This is likely to be a roe fishery and the primary markets for pollock roe are outside of the United States. Moreover, the volumes of pollock under consideration are small, and, in some years, increased production from the Aleutian Islands may be offset by reductions in pollock reallocations to the Bering Sea. Thus, U.S. consumers are unlikely to see any change in the volume of pollock available, or in its price, as a result of this action.

*Impact on persons valuing Steller sea lion population health*

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this RIR analysis.

### 1.7.7 Summary

Table 70 summarizes the preceding discussion, organizing the impacts so as to highlight a comparison of the alternatives.

**Table 70 Comparison of pollock alternatives**

| | Alternative 1: | Alternative 2: | | | Alternatives 3 and 4 | Protective Option |
|---|---|---|---|---|---|---|
| **Description** | **Status quo** | **SSLMC some additional fishing** | **Kanaga closure Options (6 miles and 10 miles around Ship Rock** | **Kanaga vessel size option** | **SSLMC more additional fishing** | **Option to Alternatives 2, 3, and 4** |
| Aleut Corporation stockholders | No change from baseline (in which pollock fishing is prohibited in critical habitat) so no impacts on these sectors. | Potential additional revenues for the corporation. Benefit to corporation and stockholders will depend on policy decisions made to exploit the revenues. While fishery production may have a gross value exceeding $10 million under reasonable assumptions, income to Corporation will be royalties for right to fish, which will be less by an unknown amount. | Reduces the potential for income compared to Alternative 2 without these options. The reduction in the potential for income is greater for the 10-mile alternative than for the 6-mile alternative. | No impact because the Corporation can already control fishing behavior. | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 1, but less than those under Alternative 2. | In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 1, but less than those under Alternative 2. |
| American Fisheries Act trawlers | | Some operations may benefit from access to Aleutian Islands; others may face small reductions in pollock rollovers from the Aleutian Islands. | This would close waters in the southern portion of the proposed open zone and to that extent, limit waters available for fishing and potential harvests. Given the proximity of this area to Adak, this may have a greater effect on smaller vessels. | Lose the opportunity to fish Kanaga Sound | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. | In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. |
| Trawlers under 60 feet LOA | | Some operations may benefit from access to Aleutian Islands. | | Face reduced competition for pollock in Kanaga Sound | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. | In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. |
| Other fishing sectors | | Increased pollock fishing and associated Pacific ocean perch incidental catch may adversely affect Amendment 80 vessels. | | | The impact of increased Pacific ocean perch incidental catch may be greater than under Alternative 2. | The impact of increased Pacific ocean perch may be less than under Alternative 2. |
| Adak | | Adak may benefit from port visits by catcher/processors, processing deliveries for catcher vessels. Adak may also benefit from pollock-related development expenditures by Aleut Corporation; this benefit will depend on policy decision to be made by the Corporation. Adak could benefit from additional tax revenues. | This would tend to reduce the benefits to Adak compared to those for Alternative 2 without these options. | Potential for increased deliveries to Adak for processing. | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. |

| | Alternative 1: | Alternative 2: | | | Alternatives 3 and 4 | Protective Option |
|---|---|---|---|---|---|---|
| **Description** | **Status quo** | **SSLMC some additional fishing** | **Kanaga closure Options (6 miles and 10 miles around Ship Rock** | **Kanaga vessel size option** | **SSLMC more additional fishing** | **Option to Alternatives 2, 3, and 4** |
| Other communities | | Fishing operations in the western and central Gulf of Alaska may have new fishing opportunities in the Aleutian Islands. | These options would make the important Kanaga Sound zone less attractive to small fishing operations, and this would reduce the potential value of these options to these communities. | If small vessels do face reduced competition in Kanaga Sound, this option may benefit western and central Gulf communities. | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. |
| CDQ | | CDQ groups may benefit if they are able to harvest pollock more profitably in the Aleutian Islands than in the Bering Sea. | This would tend to reduce the potential benefits of Alternative 2 to CDQ groups. | Unless CDQ operations chose to fish the Aleutian Islands with small boats, they would be adversely impacted by this measure. | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. | In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. |
| PSC | | This could increase PSC in comparison with Alternative 1, but overall, total PSC in an Aleutian Islands pollock fishery is expected to be low. | If these options reduce fishing opportunities and pollock volumes they may reduce the possibility of PSC. However total PSC in an Aleutian Islands pollock fishery is expected to be low. | NMFS does not have information on the relative PSC of large and small trawling vessels. The net impact of this option is unclear. | In general, these alternatives could generate PSC somewhat greater than Alternative 2. However, total PSC in the Aleutian Islands pollock fishery is expected to be low. | In general, this option could generate PSC somewhat greater than Alternative 1, but less than Alternative 2. However, total PSC in the Aleutian Islands pollock fishery is expected to be low. |
| Incidental catch | | Incidental catches of Pacific ocean perch may adversely affect fishing opportunities for Amendment 80 and BSAI trawl limited access vessels targeting that species. | If these options reduce fishing opportunities and pollock volumes, they may reduce the possibility of costs for Amendment 80 vessels. | NMFS does not have information on the relative incidental catches of large and small trawling vessels. The net impact of this option is unclear. | In general, these alternatives could create costs for Amendment 80 vessels that are somewhat greater than those under Alternative 2. | In general, this option could create costs for Amendment 80 vessels that are greater than Alternative 1, but less than those under Alternative 2. |
| Steller sea lion stock | | This may be less attractive for the Steller sea lion stock, and for people who value the health of the stock than Alternative 1. However, there are considerable uncertainties associated with this conclusion. | Both of these options close fishing areas near the Ship Rock rookery and, thus, both of these should benefit the Steller sea lion stock. There are considerable uncertainties about the size of the impact. | This option primarily affects the fishermen that may access Kanaga Sound, and may not affect the Steller sea lion population. | In general, these alternatives could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. | In general, this option could create benefits similar in type to, but greater in magnitude than, those under Alternative 2. |
| Sum of producers and consumers surpluses | | The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of pollock products, and consumers' surpluses accruing to persons who value SSL population health. Producers' surpluses increase by an undetermined amount, and surpluses accruing to pollock U.S. consumers may not change much given the importance of export markets to the roe fishery and the relatively small amounts of pollock involved. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts, makes this source of surplus impossible to determine for this action. Thus, the net efficiency benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion. | | | | |

## 1.8 Atka mackerel analysis (Alternatives 2 and 3)

### 1.8.1 Introduction

Of the six alternatives, Alternatives 1 and 4 are to some extent mirror images of each other, and were discussed in Section 1.3. Alternative 5, which was adopted as the preferred alternative by the Council in October 2013, and Alternative 6 are discussed in Section 1.13. This section discusses Alternatives 2 and 3, introduced by the Council in December 2012.

These alternatives originated during the 2012 meetings of the Steller Sea Lion Mitigation Committee. The recommended alternatives were reviewed by NMFS and altered where necessary to add precision, or address regulatory or management issues.

Alternatives 2 and 3 include a variety of measures, including TAC limits, limits on catches in critical habitat, actual closures of critical habitat, changes in maximum retainable amounts, seasons, and rules governing rollovers. Table 71, based on Table 2-19 in Chapter 2 of the EIS, summarizes and contrasts the Atka mackerel alternatives. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

The analysis in this section is organized so that actual critical habitat closure areas are discussed first, TAC and critical habitat catch limits are discussed second, and the range of other measures such as season and rollover changes are discussed third. TAC and critical habitat limits may interact with critical habitat closures, and these interactions are discussed when the TAC and critical habitat limits are introduced. Other sections discuss the implications for redeployment, incidental catches, PSC, and fleet and community impacts. An appendix with tables summarizing data on the harvest and revenue implications of critical habitat closures closes out the section.

Table 71 describes the elements of the alternatives as they apply to Atka mackerel. In addition to the measures described in Table 71, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in Section 1.19.2.

**Table 71 Comparison of Alternatives for Atka mackerel**

| Alternative | Seasons | Area 543 | | Area 542 | | Area 541/Bering Sea | |
|---|---|---|---|---|---|---|---|
| | | closures | Catch and participation limits | closures | Catch and participation limits | closures | Catch and participation limits |
| 1 | Trawl:<br>A season: 1/20–6/10<br>B season: 6/10–11/1.<br>50:50 seasonal apportionment including CDQ.<br>Rollover from A to B season. | No retention. | Not applicable. | Critical habitat closed except between 178°W and 179° W long., critical habitat closed 0–10 nm | Must be in a cooperative or CDQ fishing to fish inside critical habitat.<br>No more than 10% of the group's allocation harvested from critical habitat, distribute evenly between seasons.<br>TAC ≤ 47% of ABC. | Critical habitat closed to directed fishing.<br>BS subarea closed to directed fishing. | TAC for combined Area 541/BS subarea. |
| 2 | Trawl:<br>A season: 1/20–6/10<br>B season: 6/10–12/31.<br>50:50 seasonal apportionment including CDQ.<br>Rollover from A to B season fished outside of critical habitat. | Critical habitat closed.<br>W of 174.5 E long. closed. | TAC set 65% of ABC.<br>Option 1: TAC 50% of ABC.<br>Option 2: TAC 40 % of ABC. | Critical habitat closed between 178°E long. to 180° and between 178°W to 177°W. long.<br>Option: prohibit BS trawl limited access vessels inside critical habitat.<br>In remaining critical habitat, close 0–3 nm from haulouts and 0–10 nm from rookeries. | TAC 65% of ABC.<br>Critical habitat harvest limit 50% of TAC, distribute evenly between seasons. | Critical habitat closed except 12–20 nm portion southeast of Seguam Island.<br>BS subarea closed to directed fishing. | Prohibit BS trawl limited access inside critical habitat.<br>Critical habitat catch limit 50% of TAC, distribute evenly between seasons.<br>TAC specified for combined Area 541 and BS.<br>Amend. 80 co-op and CDQ in BS: Revise MRA calculation for Atka mackerel as an incidental species. |
| 3 | Trawl:<br>A season: 1/20–6/10<br>B season: 6/10–12/31<br>Option: B season June 10–Nov. 1.<br>50:50 seasonal apportionment including CDQ.<br>Rollover from A to B season, fished outside critical habitat. | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.<br>Option: Close all critical habitat.<br>Close Buldir Island 0–15 nm except portions in 10–15 nm zone.<br>Option: Close west of 174.5° E long. | Critical habitat harvest limit 60% of TAC, distribute evenly between seasons. | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries except close critical habitat between 178°E long. to 180° and east of 178°W long. | Critical habitat harvest limit 60% of TAC west of 178° W long, distribute evenly between seasons. | Same as Alternative 2 | Amend. 80 co-op and CDQ in BS: Revise MRA calculation for Atka mackerel as an incidental species. |
| 4 | Trawl:<br>A season: 1/20–6/10<br>B season: 6/10–12/31.<br>50:50 seasonal apportionment including CDQ.<br>Rollover from A to B season. | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.<br>Close Buldir Island 0–15 nm. | Same as Alternative 3 | West of 178°W, critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.<br>Critical habitat closed east of 178°W. long. | Same as Alternative 3 | Same as Alternative 1 | Same as Alternative 3 |
| 5 | Same as Alternative 2 and 3 without the option | Critical habitat closed 0–3 from haulouts and 0–10 from rookeries. | Critical habitat harvest limit 60% of TAC, distribute evenly between seasons.<br>TAC ≤ 65% ABC. | Same as Alternative 3 | Same as Alternatives 3 and 4 | Same as Alternatives 2 and 3 | Same as Alternatives 3 and 4 |
| 6 | Not applicable. | No retention | Not applicable. | No retention | Not applicable. | No retention<br>BS subarea closed to directed fishing. | TAC for combined Area 541/BS subarea. |

CDQ=Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, MRA=maximum retainable amount, BS=Bering Sea

### 1.8.2 Critical habitat area closures

*Impacts of closed area restrictions*

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing. These have been evaluated using the revenue-at-risk and residual revenue analysis described in Section 1.2.14, and used to evaluate Alternatives 1 and 4 in earlier sections.

The results of the revenues-at-risk analyses for Alternatives 2 and 3, and their principal options, have been summarized in a set of tables in an appendix to this section (Sub-section 1.8.9). For each alternative or option, these tables summarize (1) the harvest or associated gross revenues in the baseline years 2004 through 2010; (2) the harvest or associated gross revenues coming from the areas that are closed to fishing under the alternative or option, described as the harvest or revenue placed at risk by the action; (3) the harvest or associated gross revenues coming from the areas that remain open under the alternative, described as the residual harvest or gross revenue associated with the action; and (4) the residual harvest expressed as a percentage of the baseline harvest.

Figure 5 and Figure 6 summarize the results in these tables. Figure 5 shows the wholesale gross revenues from areas remaining open under the alternative after closing critical habitat in each alternative, and Figure 6 shows these wholesale gross revenues as a percentage of the actual historical gross revenues during the baseline years. As explained in the discussion of methodology, in Section 1.2.14, these are not predictions of future revenues or of the revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

In addition to Alternatives 1, 2, 3, and 4, the figures summarize revenue impacts for two options to Alternative 3. One option (referred to as "3a" in this section) would close all critical habitat except the 10 nm to15 nm portion at Buldir Island, providing a protective option that allows for more fishing area than Alternative 2, while protecting nearly all critical habitat in Area 543 (see Figure 2-16 in Chapter 2 of the EIS). The second option (referred to as "3b" in this section) would allow an area at Buldir to be open outside of 10 nm, as with other rookeries in Area 543, but close all of Area 543 west of 174.5° E longitude to directed fishing for Atka mackerel. This would allow fishing in a location that does not appear to be used much by Steller sea lions, based on survey data, while protecting the far western portion of Area 543 where some Steller sea lions still occur in larger numbers.

Treating the estimates of the baseline revenues as a rough index of the relative restrictiveness of the different alternatives, Alternative 4 approximates the revenues associated with the baseline period 2004 through 2010, while Alternative 1, the interim final rule, has the greatest adverse impact on gross revenues. Alternatives 2 and 3a have very similar impacts on revenues, as do Alternatives 3 and 3b. In 2004, Alternative 2, and the three variants of Alternative 3, had very similar impacts; however, these gradually diverged through time. In most years, Alternatives 2 and 3a have greater adverse impacts than Alternatives 3 and 3b. Note that these considerations only take account of the impact of area closures on revenues. The TAC and critical habitat analyses in Sub-section 1.8.3 of this section show that, for Alternative 2 in Areas 543 and 542, and Alternative 3 in Area 543, the TACs may restrict catch below the levels associated with the area closures in some years, while in other years they may allow fishermen, if they can redeploy successfully, to increase their revenues above the levels shown in these figures.

Industry sources indicate that fishing took place near Buldir Island in Area 543, prior to the baseline years, and industry believes recent survey information indicates the presence of Atka mackerel stocks there. However, the data from the baseline years do not show much fish harvest near Buldir. If these industry perceptions are correct, the gross revenues analysis based on fish harvest during the baseline

years could be understating the potential gross revenues associated with opening the area around Buldir. (Gauvin, personal communication, April 13, 2013; Loomis, personal communication, April 12, 2013).[113]

While residual revenue estimates may be useful indices of relative impacts, they are not, as just noted, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare measures of the actions. They are gross measures and do not take account of changes in variable costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues, minus the change in variable costs associated with the action (Just, Hueth, & Schmitz, 2004). Data to estimate the effects of the alternatives with this welfare measure, however, are not available, because the cost information needed is not available. In addition, the wholesale gross revenues measure focuses attention on the remaining revenues from Atka mackerel fishing, and does not take account of the ability of fishing operations to take actions in response to the alternatives that would minimize the impact of the alternatives on their profits, most importantly in this instance, their ability to substitute into other fisheries.

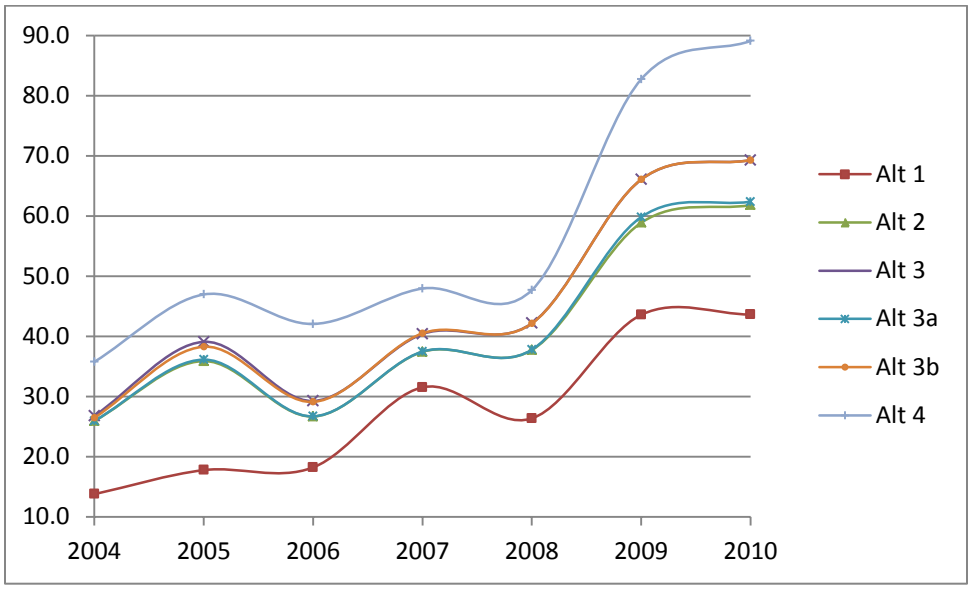



**Figure 5 Residual Atka Mackerel Wholesale Gross Revenues, by Alternative, Baseline Years 2004 through 2010 (millions of 2012 dollars)**

[113] Gauvin, John. Gauvin and Associates, LLC, Burien Washington; Loomis, Todd. Government Affairs, Ocean Peace, Inc.

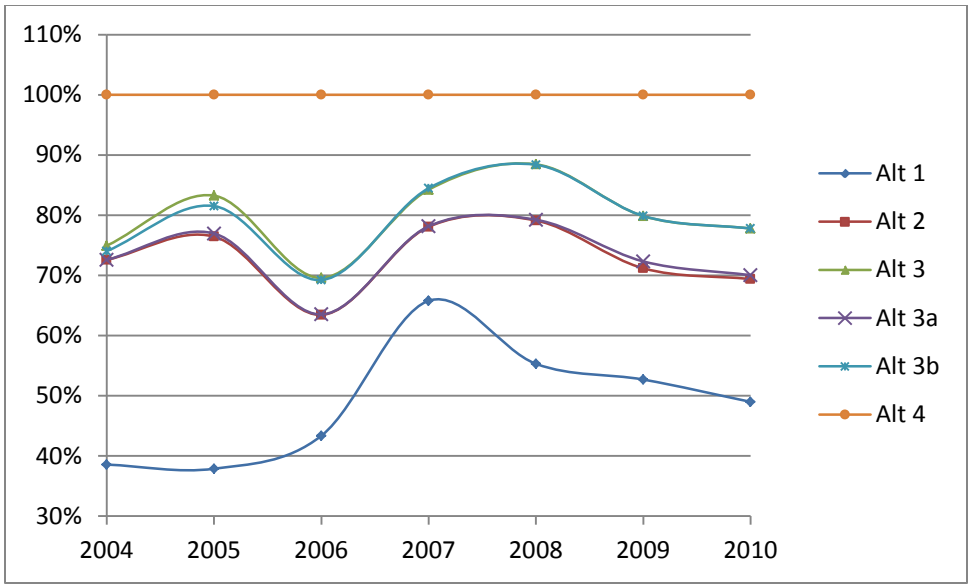



**Figure 6 Residual Atka Mackerel Wholesale Gross Revenues as a Percentage of Baseline Revenues, by Alternative, Baseline Years 2004 through 2010**

These estimated gross revenue changes do not take account of the TAC and critical habitat limits that are also part of these alternatives. These limits are an additional constraint on vessel activity. In some of the baseline years and management areas, these additional constraints were not binding, but in other years they were. These constraints, and their interaction with the critical habitat area closures, are discussed in the following sub-section.

### 1.8.3 TAC and critical habitat limits

Elements of these alternatives and options define area TACs as percentages of area ABCs, and limit harvests from open critical habitat to percentages of TACs.[114] As shown in Table 71 these elements include:

1. A provision in Alternative 1 setting the Area 542 TAC no greater than 47 percent of the ABC and limiting a cooperative or CDQ group from harvesting more than 10 percent of its allocation in critical habitat;
2. A provision in Alternative 2 setting the Area 543 TAC equal to 65 percent of the ABC, with additional options to set it equal to 50 percent of the ABC and 40 percent of the ABC;
3. A provision in Alternative 2 setting the Area 542 TAC equal to 65 percent of the ABC, and setting a critical habitat limit equal to 50 percent of the ABC;
4. A provision in Alternative 2 setting an Area 541 critical habitat limit equal to 50 percent of the TAC;
5. A provision in Alternative 3 setting an Area 543 critical habitat limit equal to 60 percent of the TAC;

[114] The alternatives and options also affect Atka mackerel production by opening or closing critical habitat to directed fishing. These alternatives and options are dealt with later in the analysis, but they may interact with the TAC and critical habitat limits.

6. A provision in Alternative 3 setting a critical habitat limit (west of 178° W longitude) equal to 60 percent of the TAC.

The first of these measures, the Alternative 1 limit in Area 542, was discussed at the end of Section 1.3.2. The remainder of this section discusses each of the other measures in turn, for each of the management areas. Thus, the next sub-section examines the operation of the Alternative 2 measures in Area 543.

*Alternative 2, Area 543 TAC determination*

Alternative 2 sets the Area 543 TAC equal to 65 percent of the ABC (with options to set the TAC equal to 50 percent or to 40 percent of the ABC).[115] This is meant to protect Steller sea lions in this sensitive region, by limiting the potential harvest associated with renewed fishing activity. Table 72 shows the actual Area 543 ABCs, TACs, and catches from 1994 through 2014, and compares these to the TACs that would be associated with each of the ABC percentages discussed above.

The TAC determination options under consideration in Alternatives 2 and 3 remove the Council's policy discretion to set TACs in Area 543 (and in Areas 542 and 541.)[116] Once the ABC for Area 543 was determined, the TACs for Area 543 would be set by the percentage limit chosen. This eliminates the Council's ability to set TACs at other levels in response to socio-economic criteria, or to use Aleutian Islands Atka mackerel as a tool to keep the sum of all BSAI TACs within the 2 million mt BSAI optimum yield limit.

The ABC-percentage based TACs may be compared with (a) historical TACs, (b) historical catches, and (c) historical catches from areas remaining open under the different alternatives. Each of these comparisons is carried out in the next few paragraphs. The most important is the comparison of the ABC percentage-based TACs with catch from areas remaining open (c), since this may affect the conclusions of a purely open-and-closed-area-based analysis. Figure 7, Figure 8, and Figure 9 show these relationships for each of the TAC options for the baseline years, from 2004 through 2010, and add information from Table 72 on the residual harvest from Area 543, given the critical habitat closures in this area (this is equivalent to the harvest from outside closed critical habitat during those years).[117]

The alternative and its options require that TAC be set equal to a percentage of ABC, but as Table 72 shows, in some years the Council made policy decisions to set TACs below the levels implied by some of the percentages. TACs were below the percentages in 2011 to 2014, because of the interim final rule, rather than Council policy, but the Council did choose to set TACs below all of the three percentage thresholds in 1994 and 1995, and, perhaps more relevant given changes in the fisheries since then, it set TACs below the 50 percent and 65 percent thresholds in 2005, 2006, and 2007, and below the 40 percent threshold in 2006.

As discussed in Chapter 3 of the EIS, the Council has set TAC in this fishery below the ABC, and was more likely to do so for higher ABCs. This may be associated with efforts by the Council to keep the sum of all groundfish TACs below the BSAI 2 million mt optimum yield limit, because of industry concerns about price effects at high TACs or for other reasons.

[115] By comparison, Alternative 1, the status quo, prohibits retention of Atka mackerel in Area 543. TACs of 1,500 mt have been set in harvest specifications to take account of Atka mackerel taken as bycatch and discarded.

[116] This is not the case with the Area 542 47 percent limit in Alternative 1, which requires the TAC be set at a level "no more than" 47 percent of the ABC.

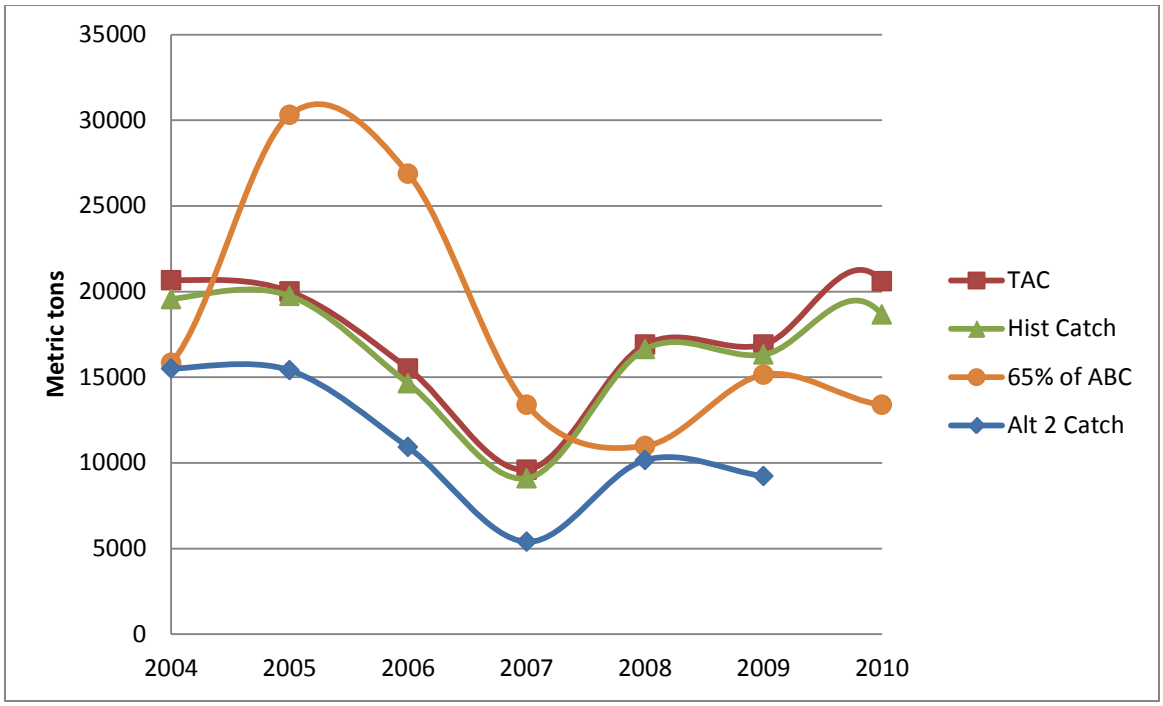
[117] There are three classes of areas under consideration here: (1) non-critical habitat, (2) closed critical habitat, and (3) open critical habitat. Fishing can take place in non-critical habitat and open critical habitat. Volumes of fish and revenues lost under the different alternatives and options are based on estimates of the volumes of fish and revenues from closed critical habitat under that alternative or option.

**Table 72 Area 543 Atka mackerel ABCs, TACs, catches, and TACs under options to Alternative 2 (1994 through 2014)**

| Year | 543 ABC | 543 TAC | 543 catch | TAC = 40% of ABC | TAC = 50% of ABC | TAC = 65% of ABC |
|---|---|---|---|---|---|---|
| 1994 | 53,900 | 10,000 | 8,923 | 21,560 | 26,950 | 35,035 |
| 1995 | 55,600 | 16,500 | 16,967 | 22,240 | 27,800 | 36,140 |
| 1996 | 55,700 | 45,857 | 42,246 | 22,280 | 27,850 | 36,205 |
| 1997 | 32,200 | 32,200 | 29,537 | 12,880 | 16,100 | 20,930 |
| 1998 | 27,000 | 27,000 | 24,617 | 10,800 | 13,500 | 17,550 |
| 1999 | 30,700 | 27,000 | 16,366 | 12,280 | 15,350 | 19,955 |
| 2000 | 29,700 | 29,700 | 10,503 | 11,880 | 14,850 | 19,305 |
| 2001 | 27,900 | 27,900 | 20,309 | 11,160 | 13,950 | 18,135 |
| 2002 | 19,700 | 19,700 | 18,077 | 7,880 | 9,850 | 12,805 |
| 2003 | 22,990 | 19,990 | 17,885 | 9,196 | 11,495 | 14,944 |
| 2004 | 24,360 | 20,660 | 19,554 | 9,744 | 12,180 | 15,834 |
| 2005 | 46,620 | 20,000 | 19,743 | 18,648 | 23,310 | 30,303 |
| 2006 | 41,360 | 15,500 | 14,637 | 16,544 | 20,680 | 26,884 |
| 2007 | 20,600 | 9,600 | 9,097 | 8,240 | 10,300 | 13,390 |
| 2008 | 16,900 | 16,900 | 16,643 | 6,760 | 8,450 | 10,985 |
| 2009 | 23,300 | 16,900 | 16,319 | 9,320 | 11,650 | 15,145 |
| 2010 | 20,600 | 20,600 | 18,650 | 8,240 | 10,300 | 13,390 |
| 2011 | 21,000 | 1,500 | 205 | 8,400 | 10,500 | 13,650 |
| 2012 | 20,000 | 1,500 | 227 | 8,000 | 10,000 | 13,000 |
| 2013 | 17,100 | 1,500 | | 6,840 | 8,550 | 11,115 |
| 2014 | 16,700 | 1,500 | | 6,680 | 8,350 | 10,855 |

Notes: The baseline years have been shaded.
Source: ABCs, TACs, and historical catches from 2012 Atka mackerel SAFE chapter (Table 17.2) (Lowe, Ianelli, & Palsson, 2012a) and Council 2013–2014 harvest specifications retrieved on January 15, 2013, from the Council web site.

As shown in Table 72 and in Figure 7, Figure 8, and Figure 9, during the baseline years (2004 through 2010), a TAC set equal to 65 percent of the ABC would have exceeded the historical TAC levels authorized by the Council in three years, and would have been less than the Council's authorized TACs in four years. A TAC set at 50 percent of ABC would have exceeded the Council's TACs in three years and fallen below in four years, and a TAC set at 40 percent would have exceeded the Council's authorized TAC in one year and fallen below in six years.

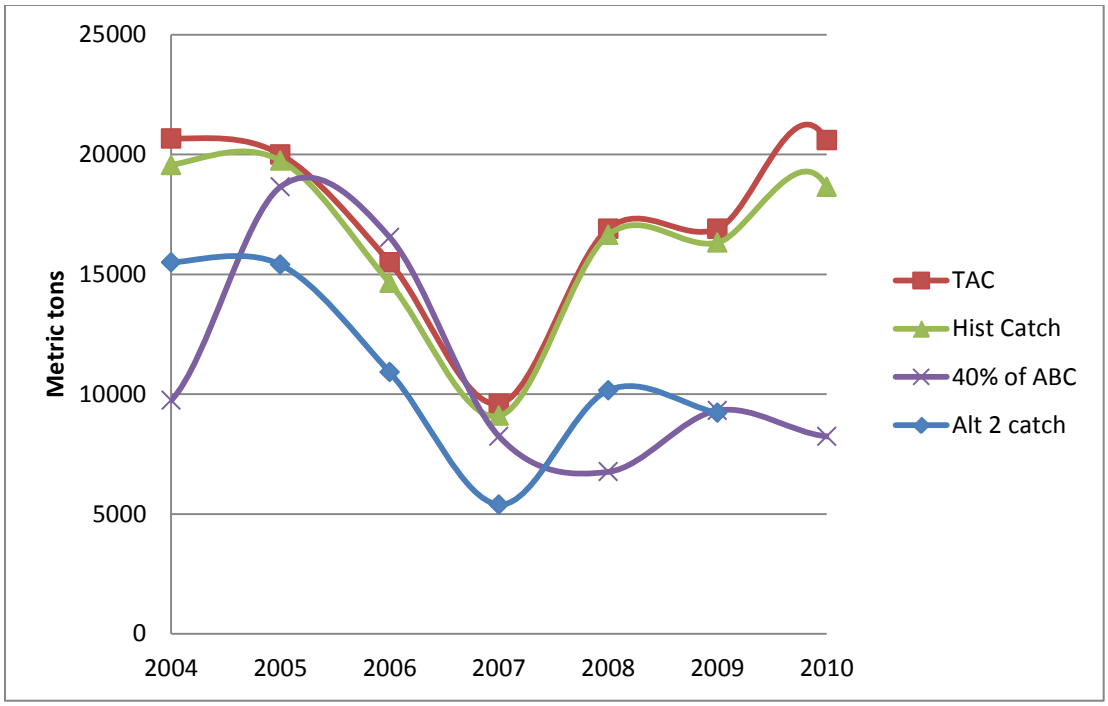



Source: Table 72

**Figure 7** **Area 543 actual TACs, TACs at a hypothetical TAC equal to 65 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 (metric tons)**


Source: Table 72

**Figure 8** **Area 543 actual TACs, TACs at a hypothetical TAC equal to 50 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 (metric tons)**




Source: Table 72

**Figure 9 Area 543 actual TACs, TACs at a hypothetical TAC equal to 40 percent of ABC, historical catch, and estimated residual catch given Alternative 2 critical habitat closures, 2004 through 2010 (metric tons)**

Figure 7, Figure 8, and Figure 9 also show that in some years, ABC-percentage based TAC options would have restricted harvests by the Amendment 80 fleet more than would be expected by considering the Alternative 2 critical habitat closures alone.

Table 73 makes this clearer, by comparing the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) with the TACs associated with the ABC-percentage based TAC options under Alternative 2. The table shows the additional catch restrictions, over and above those associated with the critical habitat closure that might be imposed by the ABC-based TAC limits.[118] The 65 percent ABC based TAC does not restrict harvests, but the 50 percent and 40 percent ABC based TACs do restrict harvests in three of the seven years.

[118] Residual catch includes only retained catch. However, in the analysis in this section the proposed limits apply to retained and discarded catch. Atka mackerel discards averaged about 4 percent per year from 2008 to 2010. These are the years in which the Amendment 80 rules were in force. The rate averaged about 5 percent per year over the full 2004 through 2010 baseline period, and was unusually high (13 percent) in 2004. However, discard behavior under the Amendment 80 rules is believed to be more relevant for this analysis. Thus, while use of retained catch may cause the analysis to understate the extent to which the constraints bind, the amount of understatement is relatively small.

**Table 73 Harvest limits in addition to Area 543 critical habitat closure limits associated with the ABC-percentage based TAC options (metric tons)**

| Year | Alternative 2 residual harvest | TACs by ABC-percentage options | | | Additional catch constraint associated with TAC by ABC-percentage options | | |
|---|---|---|---|---|---|---|---|
| | | 40% | 50% | 65% | 40% | 50% | 65% |
| 2004 | 15,501 | 9,744 | 12,180 | 15,834 | 5,757 | 3,321 | 0 |
| 2005 | 15,403 | 18,648 | 23,310 | 30,303 | 0 | 0 | 0 |
| 2006 | 10,914 | 16,544 | 20,680 | 26,884 | 0 | 0 | 0 |
| 2007 | 5,397 | 8,240 | 10,300 | 13,390 | 0 | 0 | 0 |
| 2008 | 10,162 | 6,760 | 8,450 | 10,985 | 3,402 | 1,712 | 0 |
| 2009 | 9,221 | 9,320 | 11,650 | 15,145 | 0 | 0 | 0 |
| 2010 | 12,117 | 8,240 | 10,300 | 13,390 | 3,877 | 1,817 | 0 |

Table 74 provides estimates of the revenues associated with these production shortfalls (using real 2012 dollar estimates).[119] In most years, the limits would not impose costs. The 65 percent ABC based TAC never imposes costs. In three years, the 50 percent ABC based TAC imposes costs of $1.3 million to $2.4 million in forgone gross revenues, and in three years the 40 percent ABC TAC imposes costs of $2.6 million to $4.7 million in forgone gross revenues. Potential gross revenue decreases would be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

**Table 74 Estimates of revenues associated with production shortfalls in Area 543 associated with ABC-percentage based TACs**

| Year | Real price per ton (2012 $/metric ton round weight) | 40% of ABC (millions of 2012 $) | 50% of ABC (millions of 2012 $) | 65% of ABC (millions of 2012 $) |
|---|---|---|---|---|
| 2004 | 733 | 4.2 | 2.4 | 0.0 |
| 2005 | 772 | 0.0 | 0.0 | 0.0 |
| 2006 | 675 | 0.0 | 0.0 | 0.0 |
| 2007 | 815 | 0.0 | 0.0 | 0.0 |
| 2008 | 759 | 2.6 | 1.3 | 0.0 |
| 2009 | 1,094 | 0.0 | 0.0 | 0.0 |
| 2010 | 1,202 | 4.7 | 2.2 | 0.0 |

In some baseline years, ABC-percentage based TACs exceeded the harvests coming from areas outside of critical habitat. If the Amendment 80 fleet is successfully able to redeploy from fishing in closed critical habitat to areas that remain open, these TAC increases could make possible increased fishing production. Table 75 compares the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) with the TACs associated with the ABC-percentage based TAC options under Alternative 2, and calculates the additional catch that might be possible if the fleet

[119] This is an approximation of the revenue shortfall, based solely on a consideration of the forgone Atka mackerel revenues, but not considering the potential for revenue impacts of lost incidental catches.

could successfully redeploy into Atka mackerel within Area 543 (in a sense, this table is the "inverse" of Table 74).

**Table 75 Potential additional production in Area 543 if the Amendment 80 fleet can redeploy into open areas from closed areas (metric tons)**

| Year | Alternative 2 residual harvest | TACs by ABC-percentage options | | | Additional catch constraint associated with TAC ABC-percentage option | | |
|---|---|---|---|---|---|---|---|
| | | 40% | 50% | 65% | 40% | 50% | 65% |
| 2004 | 15,501 | 9,744 | 12,180 | 15,834 | 0 | 0 | 333 |
| 2005 | 15,403 | 18,648 | 23,310 | 30,303 | 3,245 | 7,907 | 14,900 |
| 2006 | 10,914 | 16,544 | 20,680 | 26,884 | 5,630 | 9,766 | 15,970 |
| 2007 | 5,397 | 8,240 | 10,300 | 13,390 | 2,843 | 4,903 | 7,993 |
| 2008 | 10,162 | 6,760 | 8,450 | 10,985 | 0 | 0 | 823 |
| 2009 | 9,221 | 9,320 | 11,650 | 15,145 | 99 | 2,429 | 5,924 |
| 2010 | 12,117 | 8,240 | 10,300 | 13,390 | 0 | 0 | 1,273 |

Table 76 provides estimates of the value of this potential production increase (using real 2012 dollar estimates). [120] Potential gross revenues associated with the 65 percent ABC based TAC range from $200,000 to $11.5 million, potential gross revenues associated with the 50 percent ABC based TAC range from zero to $6.6 million, and potential gross revenues associated with the 40 percent ABC based TAC range from zero to $3.8 million. Potential gross revenue increases could be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these revenue estimates. In particular, they depend on the Amendment 80 fleet's ability to redeploy from closed critical habitat and to fish for Atka mackerel successfully in parts of Area 543 that remain open.

**Table 76 Estimates of potential revenue increases (over estimates based solely on critical habitat closures) of in Area 543 associated with ABC-percentage based TACs**

| Year | Real price per ton (2012 $/metric ton round weight) | 40% of ABC (Millions of 2012 $) | 50% of ABC (Millions of 2012 $) | 65% of ABC Millions of 2012 $) |
|---|---|---|---|---|
| 2004 | 733 | 0.0 | 0.0 | 0.2 |
| 2005 | 772 | 2.5 | 6.1 | 11.5 |
| 2006 | 675 | 3.8 | 6.6 | 10.8 |
| 2007 | 815 | 2.3 | 4.0 | 6.5 |
| 2008 | 759 | 0.0 | 0.0 | 0.6 |
| 2009 | 1,094 | 0.1 | 2.7 | 6.5 |
| 2010 | 1,202 | 0.0 | 0.0 | 1.5 |

[120] This is an approximation of the revenue increase, based solely on a consideration of the forgone Atka mackerel revenues, but not considering the potential for lost incidental catches.

*Alternative 2, Area 542 TAC determination and critical habitat limits*

Alternative 2 sets the Area 542 TAC equal to 65 percent of the ABC, and limits harvest within critical habitat to 50 percent of the Area 542 TAC. By comparison, Alternative 1, the status quo, imposes a TAC no greater than 47 percent of the ABC, and a critical habitat limit equal to 10 percent of the TAC. These limits are meant to protect Steller sea lions in this sensitive region, by limiting the potential harvest associated with permissible fishing activity.

The overall TAC under Alternative 1 limits fishing outside of critical habitat to the levels observed prior to the interim final rule. This prevents fishing operations from offsetting the limits in critical habitat, by increasing overall production in the remaining open areas of Area 542. Table 77 shows the actual Area 542 ABCs, TACs, and catches from 1994 through 2014, and compares these to the TACs that would be associated with 47 percent and 65 percent ABC based TACs discussed above.

As noted earlier, the Alternative 2 and Alternative 3 ABC-percentage based TAC options remove the Council's policy discretion to set alternative TACs in Area 542. Once the Area 542 ABC was determined, the TAC for Area 542 would be set by the percentage limit. This eliminates the Council's ability to set TACs at other levels in response to socio-economic criteria, or to use Aleutian Islands Atka mackerel as a tool to keep the sum of all BSAI TACs within the 2 million mt BSAI optimum yield limit.

While actual TACs that would be chosen by the Council in the absence of this rule could be below the levels implied by the 65 percent ABC based TAC rule, this did not happen from 1994 through 2010. It did happen in 2011 to 2014, while the interim final rule was in effect, since the interim final rule set the TAC no greater than 47 percent of the ABC, while Alternative 2 sets TAC equal to 65 percent of the ABC.

**Table 77 Area 542 Atka mackerel TACs under options to Alternative 2 (metric tons)**

| Year | 542 ABC | 542 TAC | 542 Catch | Alt 1: 47% | Alt 2: 65% |
|---|---|---|---|---|---|
| 1994 | 55,125 | 44,525 | 28,871 | 25,909 | 35,831 |
| 1995 | 55,900 | 50,000 | 50,386 | 26,273 | 36,335 |
| 1996 | 33,600 | 33,600 | 33,523 | 15,792 | 21,840 |
| 1997 | 19,500 | 19,500 | 19,990 | 9,165 | 12,675 |
| 1998 | 22,400 | 22,400 | 20,209 | 10,528 | 14,560 |
| 1999 | 25,600 | 22,400 | 22,419 | 12,032 | 16,640 |
| 2000 | 24,700 | 24,700 | 22,383 | 11,609 | 16,055 |
| 2001 | 33,600 | 33,600 | 32,829 | 15,792 | 21,840 |
| 2002 | 23,800 | 23,800 | 22,291 | 11,186 | 15,470 |
| 2003 | 29,360 | 29,360 | 25,435 | 13,799 | 19,084 |
| 2004 | 31,100 | 31,100 | 30,169 | 14,617 | 20,215 |
| 2005 | 52,830 | 35,500 | 35,069 | 24,830 | 34,340 |
| 2006 | 46,860 | 40,000 | 39,836 | 22,024 | 30,459 |
| 2007 | 29,600 | 29,600 | 26,723 | 13,912 | 19,240 |
| 2008 | 24,300 | 24,300 | 22,329 | 11,421 | 15,795 |
| 2009 | 33,500 | 32,500 | 30,070 | 15,745 | 21,775 |
| 2010 | 29,600 | 29,600 | 26,389 | 13,912 | 19,240 |
| 2011 | 24,000 | 11,280 | 10,713 | 11,280 | 15,600 |
| 2012 | 22,900 | 10,763 | 12,002 | 10,763 | 14,885 |
| 2013 | 16,000 | 7,520 | | 7,520 | 10,400 |
| 2014 | 15,700 | 7,379 | | 7,379 | 10,205 |

Notes: Baseline years are shaded. Note that TACs may be set no greater than 47% under Alternative 1, while they are set equal to 65% under Alternative 2.
Sources: 2012 Atka mackerel SAFE chapter (Lowe et al., 2012a) and AKR calculations.

Figure 10 shows the relationships between historical TAC, historical catch, residual catch in Area 542 under the Alternative 2 critical habitat closures, and the 47 percent or 65 percent ABC- percentage based TACs. A TAC equal to 65 percent of the ABC would have been less than the historical TAC in each of the baseline years. It would have been close to the Area 542 TAC in 2005, but not in other years. Clearly, the 47 percent TAC limit would be even further from the Council's TACs than the 65 percent limit. During the baseline years, historical catches were close to the historical TAC in all years. Both the 47 percent TAC limit and the 65 percent TAC limit would have kept actual harvests below historical levels in the baseline years.

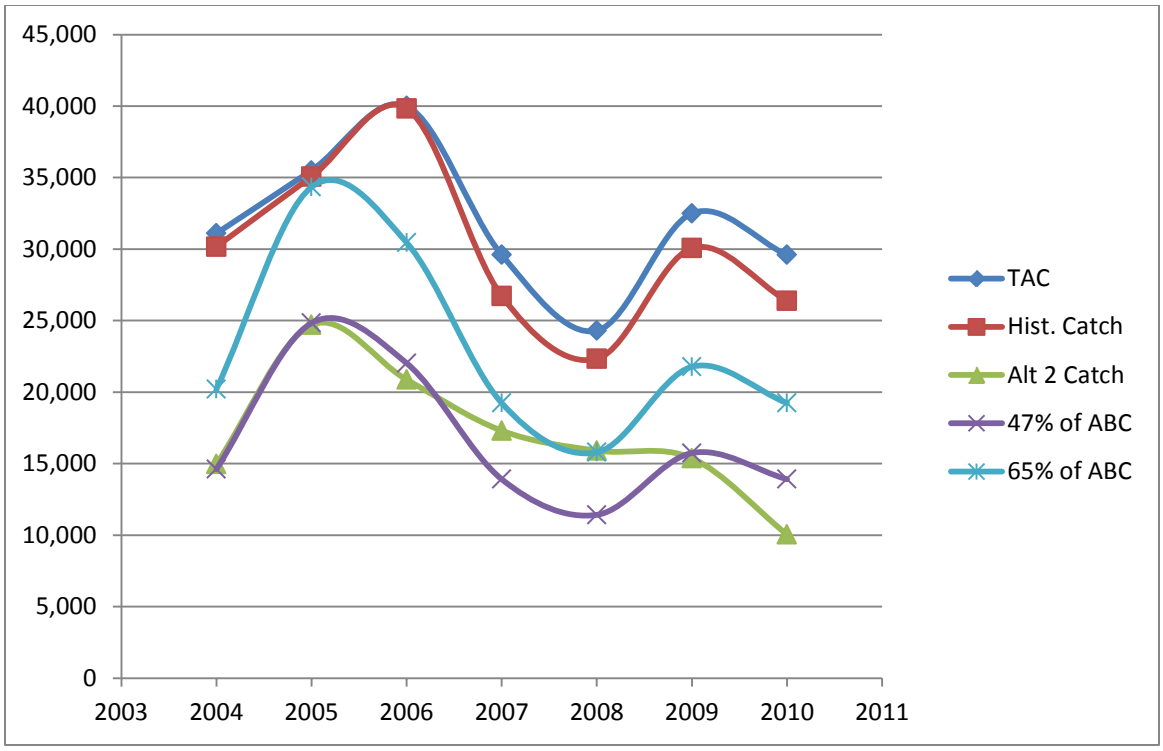



**Figure 10 Alternative 2 Area 542 TAC analysis (metric tons)**

In general, the 65 percent ABC based TAC would not have constrained harvests below the levels associated with critical habitat closures alone. The line in Figure 10 labeled, "Alt 2 Catch" is the estimated catch in the baseline years from areas that would have remained open to fishing under Alternative 2. Except in 2008, these are smaller than the catches allowed under the 65 percent ABC based TAC (even in 2008 the two values are only 114 metric tons apart). Thus, the 65 percent limit does not appear to add an important constraint on the harvest during the baseline years (beyond that created by the area closures).

If the Amendment 80 fleet is successfully able to redeploy from fishing in closed critical habitat, to areas that remain open, TACs that exceed historical harvests from open areas could make increased catches possible. Table 78 compares the open area catch estimates in Area 542 under Alternative 2 (from the analysis of critical habitat closures) with the TACs associated with the ABC-percentage based TAC options under Alternative 2, and calculates the additional catch that might be possible if the fleet could successfully redeploy to catch more Atka mackerel within Area 542.

**Table 78 Potential additional production in area 542 if the Amendment 80 fleet can redeploy into open areas from closed areas**

| Year | Alternative 2 residual harvest | TACs by ABC-percentage options | | Additional catch constraint associated with TAC by ABC-percentage option | |
|---|---|---|---|---|---|
| | | 47% | 65% | 47% | 65% |
| 2004 | 14,974 | 14,617 | 20,215 | 0 | 5,241 |
| 2005 | 24,698 | 24,830 | 34,340 | 132 | 9,642 |
| 2006 | 20,876 | 22,024 | 30,459 | 1,148 | 9,583 |
| 2007 | 17,306 | 13,912 | 19,240 | 0 | 1,934 |
| 2008 | 15,909 | 11,421 | 15,795 | 0 | 0 |
| 2009 | 15,380 | 15,745 | 21,775 | 365 | 6,395 |
| 2010 | 10,043 | 13,912 | 19,240 | 3,869 | 9,197 |

Table 79 provides estimates of the potential gross revenues that could have accrued to the fleet if it had been able to successfully redeploy under these ABC-percentage based TAC during the baseline years.[121] The gross revenues associated with the 65 percent ABC based TAC ranged from about zero in 2008, up to about $11.1 million in 2010.[122] Potential gross revenue increases could be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these revenue estimates. In particular, they depend on the Amendment 80 fleet's ability to redeploy from closed critical habitat and to fish successfully in areas in 542 that remain open.

**Table 79 Estimates of potential revenue increases (over estimates based solely on critical habitat closures) of in Area 542 associated with ABC-percentage based TACs**

| Year | Real price per ton (2012 $/metric ton round weight) | 47% of ABC (millions of 2012 $) | 65% of ABC (millions of 2012 $) |
|---|---|---|---|
| 2004 | 733 | 0.0 | 3.8 |
| 2005 | 772 | 0.1 | 7.4 |
| 2006 | 675 | 0.8 | 6.5 |
| 2007 | 815 | 0.0 | 1.6 |
| 2008 | 759 | 0.0 | 0.0 |
| 2009 | 1,094 | 0.4 | 7.0 |
| 2010 | 1,202 | 4.7 | 11.1 |

Alternative 2 also contains a provision allowing catches of up to 50 percent of the TAC to be taken from open critical habitat. This contrasts with a provision under Alternative 1, allowing up to 10 percent of the TAC to be taken from open critical habitat. These catch limits apply to incidental, as well as targeted catches of Atka mackerel, and to the discarded, as well as the retained portions of the catch.

[121] As in the Area 543 discussion, this is an approximation of the revenue increase, based solely on a consideration of the forgone Atka mackerel revenues, but not considering the potential revenue deficit for lost incidental catches.

[122] If the 114 metric tons by which the 65 percent TAC fell below harvests from open areas in 2008 were priced using the 2008 price in Table 79, the value would be about $87,000 in 2008. This has been rounded to zero in the text.

Table 80 provides estimates of the impact of this provision. The leftmost column provides estimates of the volume of Atka mackerel taken from within critical habitat during the baseline years 2004 through 2010. This estimate includes total catch, including catch in Atka mackerel targets and other targets, and retained and discarded. The next two columns provide estimates of the TACs under Alternatives 1 and 2, given the ABCs in the baseline years. The next two columns show the limits on catch from within critical habitat implied by the TACs and by the Alternatives 1 and 2 critical habitat harvest limits of 10 percent and 50 percent, respectively. The final columns show the impact of the restrictions under Alternatives 1 and 2, and the impact of relaxing the Alternative 1 restriction and adopting the Alternative 2 restriction.

Alternative 1 restricts critical habitat catch from about 11,900 mt to about 18,400 mt, depending on the year. Alternative 2 restricts critical habitat catch from about 2,700 mt to about 8,100 mt, depending on the year.

The shift from the Alternative 1 to the Alternative 2 critical habitat limits relaxes the constraint. As noted in the background section, industry sources have indicated that in Area 542, the larger, more valuable fish were found inside critical habitat, and less valuable fish were found outside of critical habitat. Thus, this measure may positively affect revenues, compared to Alternative 1, if fishing operations are able to take relatively more of their fish inside critical habitat. However, information on the price differential between the areas is not good enough to permit a revenue estimate.

**Table 80 Impact of Alternatives 1 and 2 critical habitat harvest limits in Area 542 (metric tons)**

| Year | 542 Critical habitat | 542 TACs | | 542 Critical habitat limits | | Estimated reduction in catch within critical habitat | | |
|---|---|---|---|---|---|---|---|---|
| | | Alt 1 (47%) | Alt 2 (65%) | Alt 1 (10%) | Alt 2 (50%) | Alt 1 (10% of 47%) | Alt 2 (50% of 65%) | Difference between Alt 1 and Alt 2 |
| 2004 | 15,261 | 14,617 | 20,215 | 1,462 | 10,108 | 13,799 | 5,154 | 8,646 |
| 2005 | 19,883 | 24,830 | 34,340 | 2,483 | 17,170 | 17,400 | 2,713 | 14,687 |
| 2006 | 20,615 | 22,024 | 30,459 | 2,202 | 15,230 | 18,412 | 5,385 | 13,027 |
| 2007 | 13,303 | 13,912 | 19,240 | 1,391 | 9,620 | 11,912 | 3,683 | 8,229 |
| 2008 | 13,536 | 11,421 | 15,795 | 1,142 | 7,898 | 12,394 | 5,638 | 6,755 |
| 2009 | 18,972 | 15,745 | 21,775 | 1,575 | 10,888 | 17,398 | 8,085 | 9,313 |
| 2010 | 16,775 | 13,912 | 19,240 | 1,391 | 9,620 | 15,384 | 7,155 | 8,229 |
| Source: AKR CIA, January 2013; TACs from ; calculations based on alternatives | | | | | | | | |

*Alternative 2, Area 541 limits*

Under Alternative 1 (the status quo) critical habitat in Area 541 is closed to directed fishing for Atka mackerel. Critical habitat remains closed under Alternative 2, except for an area 12 nm to 20 nm southeast of Seguam Island (shown in Figure 2-9 in Chapter 2 of the EIS).

No directed fishing for Atka mackerel took place within this area of critical habitat during the baseline years, so the only estimates of Atka mackerel production from this area are for incidental catches of Atka mackerel in other target groundfish fisheries. As discussed in detail in Chapter 5 of the EIS, there is some evidence that the Atka mackerel present within the area proposed for opening are part of a stock that is currently fished in waters outside critical habitat, and which straddles the 20 nm critical habitat boundary

in this area. There is also some evidence that this stock is separated to some extent from nearby stocks within critical habitat. The rationale for this provision is to reduce fishing costs, allowing operations to pursue stocks they are already fishing outside critical habitat, potentially without affecting stocks predominately within critical habitat. Further information, and an analysis of the potential for this action to affect Steller sea lion prey, may be found in Section 5.2.2.3.1.

To prevent excessive harvests from within critical habitat, a provision in Alternative 2 sets an Area 541 critical habitat limit equal to 50 percent of the TAC. Table 81 summarizes historical and current TACs in Area 541 from 1994 through 2014, shows the volumes taken from within critical habitat during the 2004 to 2010 baseline years (incidental harvests, as explained above), and shows the increased volume that might be taken from within critical habitat if the measure is adopted.

This does not necessarily represent an increase in actual production in Area 541. Area 541 retained catches have typically been close to the TACs. If this measure did lead to increased harvests, these would be small, as the fleet edges somewhat closer to the TAC each year. Thus, there would be little revenue impact associated with this increased fishing. This measure could, however, lead to a change in harvest location and reduce fishing operation costs.

**Table 81 Potential for increased production from within Area 541 critical habitat if 50 percent of the Area 541 TAC may be taken within critical habitat (metric tons)**

| Year | Area 541 TAC | Potential critical habitat harvest if limit is 50% of the TAC | Actual catch from within critical habitat during the baseline years | Possible increase in production if the 50% limit is adopted |
|---|---|---|---|---|
| 1994 | 13,475 | 6,738 | | |
| 1995 | 13,500 | 6,750 | | |
| 1996 | 26,700 | 13,350 | | |
| 1997 | 15,000 | 7,500 | | |
| 1998 | 14,900 | 7,450 | | |
| 1999 | 17,000 | 8,500 | | |
| 2000 | 16,400 | 8,200 | | |
| 2001 | 7,800 | 3,900 | | |
| 2002 | 5,500 | 2,750 | | |
| 2003 | 10,650 | 5,325 | | |
| 2004 | 11,240 | 5,620 | 433 | 5,187 |
| 2005 | 7,500 | 3,750 | 502 | 3,248 |
| 2006 | 7,500 | 3,750 | 406 | 3,344 |
| 2007 | 23,800 | 11,900 | 199 | 11,701 |
| 2008 | 19,500 | 9,750 | 104 | 9,646 |
| 2009 | 27,000 | 13,500 | 52 | 13,448 |
| 2010 | 23,800 | 11,900 | 171 | 11,729 |
| 2011 | 40,300 | 20,150 | | |
| 2012 | 38,500 | 19,250 | | |
| 2013 | 16,900 | 8,450 | | |
| 2014 | 16,500 | 8,250 | | |

Notes: Baseline years have been shaded. Note that the baseline catch and possible increase in catch include discarded and retained catches and exceeds retained catch.
Source:Lowe, Ianelli, and Palsson 2012b; AKR CIA dataset; AKR calculations.

*Alternative 3, Area 543 critical habitat limits*

Under Alternative 1, the status quo, retention of Atka mackerel is prohibited in Area 543. Some critical habitat is opened under Alternative 3 (shown in Figure 2-15 in Chapter 2 of the EIS). The impacts of these openings on the potential volume of Atka mackerel production are discussed later in this section. A provision in Alternative 3 sets an Area 543 critical habitat limit equal to 60 percent of the TAC.

Table 82 summarizes historical and current TACs in Area 543 from 1994 through 2014, shows the volumes taken from within critical habitat during the 2004 through 2010 baseline years, and shows the increased volume that might be taken from within critical habitat if the measure is adopted.

This action increases potential production from critical habitat considerably. However, during the baseline years, fishing operations had the opportunity to fish Area 543 Atka mackerel inside the critical habitat, and chose not to harvest more than the amount shown in the table, preferring to fish in open areas outside of critical habitat. While the sector may choose to increase fishing effort within critical habitat, it

seems more likely that it would focus any additional effort in the areas where its production has been greatest in the past.

**Table 82 Potential for increased production of Atka mackerel from within Area 543 critical habitat if 60 percent of the Area 543 TAC may be taken within critical habitat (metric tons)**

| Year | Area 543 TAC | Potential critical habitat harvest if limit is 60% of the TAC | Actual catch from within critical habitat during the baseline years | Potential harvest minus actual harvest during baseline years |
|---|---|---|---|---|
| 1994 | 10,000 | 6,000 | | |
| 1995 | 16,500 | 9,900 | | |
| 1996 | 45,857 | 27,514 | | |
| 1997 | 32,200 | 19,320 | | |
| 1998 | 27,000 | 16,200 | | |
| 1999 | 27,000 | 16,200 | | |
| 2000 | 29,700 | 17,820 | | |
| 2001 | 27,900 | 16,740 | | |
| 2002 | 19,700 | 11,820 | | |
| 2003 | 19,990 | 11,994 | | |
| 2004 | 20,660 | 12,396 | 1,260 | 11,136 |
| 2005 | 20,000 | 12,000 | 3,431 | 8,569 |
| 2006 | 15,500 | 9,300 | 3,502 | 5,798 |
| 2007 | 9,600 | 5,760 | 3,528 | 2,232 |
| 2008 | 16,900 | 10,140 | 5,516 | 4,624 |
| 2009 | 16,900 | 10,140 | 6,427 | 3,713 |
| 2010 | 20,600 | 12,360 | 5,524 | 6,836 |
| 2011 | 1,500 | 900 | | |
| 2012 | 1,500 | 900 | | |
| 2013 | 1,500 | 900 | | |
| 2014 | 1,500 | 900 | | |

Notes: Baseline years have been shaded. Note that the baseline catch and possible increase in catch include discarded and retained catches and exceeds retained catch.
Source:Lowe, Ianelli, and Palsson 2012b; AKR CIA dataset; AKR calculations.

*Alternative 3, Area 542 critical habitat limits*

A provision in Alternative 3 sets an Area 542 critical habitat limit equal to 60 percent of the TAC west of 178° W longitude. This limit is evenly distributed between the A- and B-seasons.

Table 83 summarizes historical and current TACs in Area 542 from 1994 through 2014, shows the catches taken from within critical habitat during the 2004 to 2010 baseline years, and shows the increased catches that might be taken from within critical habitat, if this measure is adopted. This action increases potential production from critical habitat. However, during the baseline years, fishing operations had the opportunity to fish Area 542 Atka mackerel inside the critical habitat, and chose not to harvest more than

the amount shown in the table. While the sector may choose to increase fishing effort within Area 542 critical habitat, the most productive areas of critical habitat in the past remain closed under the alternative.

**Table 83 Potential for increased Atka mackerel production from within Area 542 critical habitat if 60 percent of the Area 542 TAC may be taken within critical habitat (metric tons)**

| Year | Area 542 TAC | Potential critical habitat harvest if limit is 60% of the TAC | Actual catch from within critical habitat during the baseline years | Potential harvest minus actual harvest during baseline years |
|---|---|---|---|---|
| 1994 | 44,525 | 26,715 | | |
| 1995 | 50,000 | 30,000 | | |
| 1996 | 33,600 | 20,160 | | |
| 1997 | 19,500 | 11,700 | | |
| 1998 | 22,400 | 13,440 | | |
| 1999 | 22,400 | 13,440 | | |
| 2000 | 24,700 | 14,820 | | |
| 2001 | 33,600 | 20,160 | | |
| 2002 | 23,800 | 14,280 | | |
| 2003 | 29,360 | 17,616 | | |
| 2004 | 31,100 | 18,660 | 15,261 | 3,399 |
| 2005 | 35,500 | 21,300 | 19,883 | 1,417 |
| 2006 | 40,000 | 24,000 | 20,615 | 3,385 |
| 2007 | 29,600 | 17,760 | 13,303 | 4,457 |
| 2008 | 24,300 | 14,580 | 13,536 | 1,044 |
| 2009 | 32,500 | 19,500 | 18,972 | 528 |
| 2010 | 29,600 | 17,760 | 16,775 | 985 |
| 2011 | 11,280 | 6,768 | | |
| 2012 | 10,763 | 6,458 | | |
| 2013 | 7,520 | 4,512 | | |
| 2014 | 7,379 | 4,427 | | |

Notes: Baseline years have been shaded. Note that the baseline catch and possible increase in catch include discarded and retained catches and exceeds retained catch.
Source: Lowe, Ianelli, and Palsson 2012b; AKR CIA dataset; AKR calculations.

*BSAI trawl limited access critical habitat fishing*

Alternative 1, the status quo, and an option to Alternative 2 include provisions prohibiting BSAI trawl limited access vessels from fishing within critical habitat in Area 542. A similar provision of Alternative 2 (not an option) prohibits BSAI trawl limited access sector fishing inside Area 541 critical habitat.

While this fleet has been able to harvest its Area 542 and Area 541 quotas under the interim final rule, this rule is restrictive for this fleet, and presumably increases its costs.

The purpose of the interim final rule is to facilitate Atka mackerel management. Amendment 80 vessels have 100 percent observer coverage, the observer data are linked to VMS data, and catch is assigned to

critical habitat if, at any time during a trawl, a VMS point appears inside critical habitat. This allows the critical habitat limits to be managed. Catcher vessels that may fish the BSAI trawl limited access Atka mackerel quota do not have 100 percent observer coverage, so linking VMS data to fishing activity is not possible at this time. Alaska Department of Fish and Game statistical areas reported on eLandings are not specific to critical habitat areas, so they do not identify potential critical habitat catch. An electronic logbook would provide the information necessary to link VMS data to fishing activity by these vessels; however, there is no current regulation to require electronic logbooks on trawl catcher vessels. Managing these critical habitat limits on that sector will be difficult and a solution to this problem will require changes in the catch accounting system and recordkeeping and reporting requirements.

Alternatives 3, 4, and 5 do not include the proposed prohibition on BSAI trawl limited access fishing within critical habitat. In the absence of this limit, and of an electronic logbook requirement, NMFS in-season managers would seek an agreement among the small number of participants to limit fishing, or would assume all harvest by this sector came from within critical habitat. NMFS in-season managers will close fishing within critical habitat to keep catch within an area and sector's critical habitat limit.

*Revenues from potential redeployment within areas*

As discussed in this section, ABC-percentage based TAC determination rules can restrict TACs below levels of harvest estimated for Alternative 2. In these instances, revenues may be lower than they would be based solely on a consideration of historical harvests from open and closed critical habitat. Similar effects were not identified with the critical habitat limits of either Alternatives 2 or 3.

Figure 11 is a variant of Figure 5, modified to remove gross revenue estimates for Alternatives 1 and 4,[123]and to create three Alternative 2 gross revenue estimates that take account of the reduced revenues associated with the 40 percent and 50 percent ABC based TACs in Area 543. Note while reading this figure, that the results for Alternative 3, and for Alternative 3b are very similar, as they are in Figure 5, while the results for Alternative 2 (in its various variants) and Alternative 3a, also tend to be similar, as they also are in Figure 5.

As discussed in Sub-section 1.8.2, the ABC-percentage based TACs can sometimes be larger than the estimated catch from the area, based on the assumption that Atka mackerel formerly caught in areas of critical habitat that have been closed, will be lost, and not made up by fishing activity in areas remaining open.

However, if the Amendment 80 sector is able to redeploy its fleet into the remaining open areas, it may make up some or all of the difference between the historical revenues from open areas, and the TAC. It was to avoid such an offsetting shift of production into open areas, that the interim final rule included a provision setting the Area 542 Atka mackerel TAC no greater than 47 percent of the ABC; this was the proportion of ABC observed catch coming from the areas that were to remain open in past years.

[123] Alternatives 1 and 4 were removed to make it easier to read the figure. Alternative 1 gross revenues were below revenue estimates from all other alternatives in each year, and Alternative 4 gross revenues were higher than revenue estimates from all other alternatives in each year.

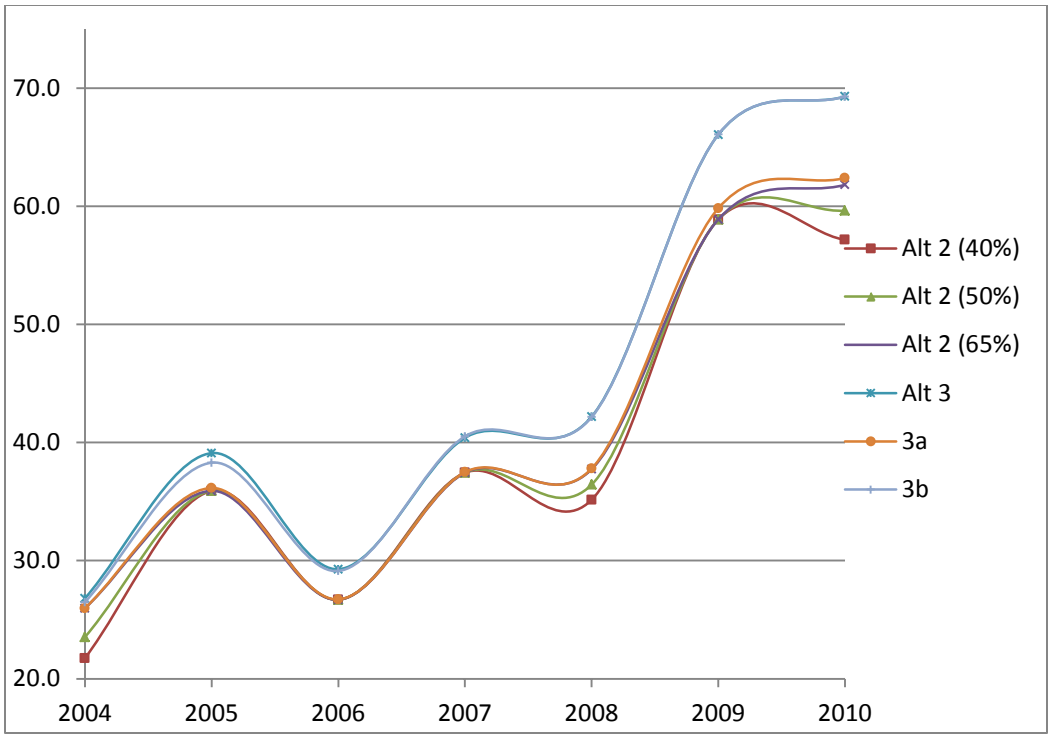



**Figure 11 Atka mackerel Revenue streams modified to reflect Area 543 ABC-percentage based TACs under Alternative 2 (millions of dollars)**

Earlier in this section it was pointed out that an increase in this proportion of the ABC to 65 percent might lead to increased production and increased revenues from Area 542. Figure 12 is based on Figure 11, adjusting the former figure to include potential additional revenues if the industry was able to harvest at the 65 percent level under Alternative 2. Since this figure is based on Figure 11, it also takes account of those years in which revenue streams might have fallen short, because of TAC constraints.

Consideration of potential harvest shifting out of closed critical habitat into remaining open areas has the potential to change the relative ranking of the alternatives. Alternatives 3, 3a, and 3b are unchanged in this figure. Alternatives 3 and 3b still have almost the same impacts. However, Alternative 2, which used to have an impact similar to that of Alternative 3a, now has a smaller adverse impact, with residual revenue flows that are often larger than those under Alternative 3a. This analysis is speculative, since it depends on the fleet's ability to harvest the available TAC, even if this means harvesting more from remaining open areas than it has in the past.

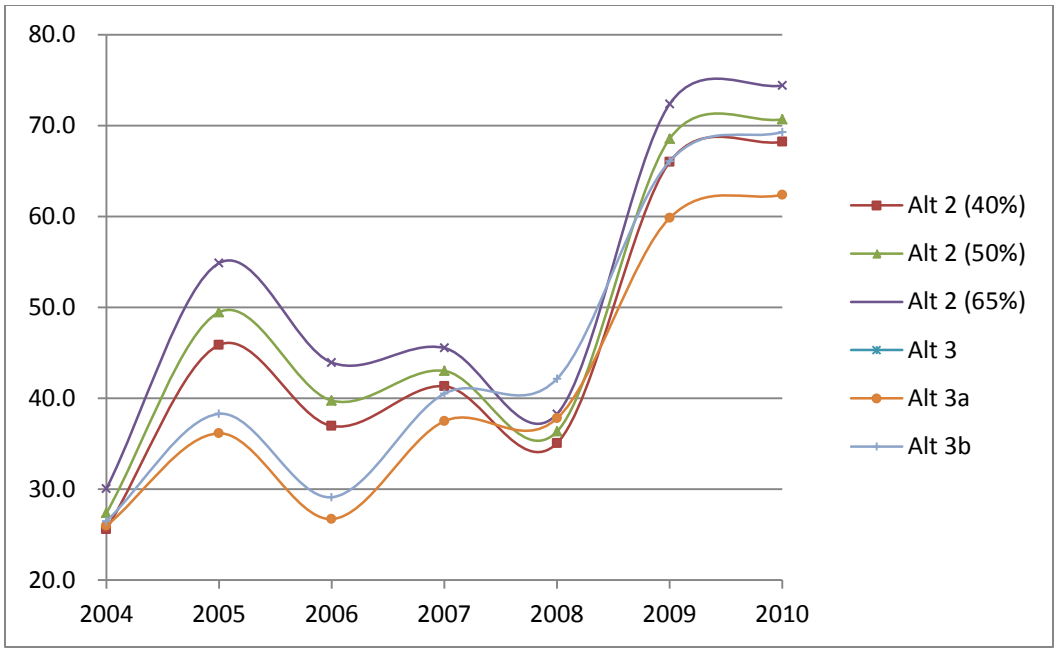



**Figure 12 Revenue streams modified to reflect ABC-percentage based TACs and potential revenue increases under Alternative 2 (millions of dollars)**

### 1.8.4 Maximum retainable amount changes, seasons, and rollovers

*Maximum retainable amounts changes*

Maximum retainable amount (MRA) is the amount of a groundfish species that is closed to directed fishing that a vessel may nonetheless retain. MRAs are calculated as a proportion of the retained amount of groundfish that is open for directed fishing; where the retained groundfish open to directed fishing are known as "basis" species. For Atka mackerel, the MRA is 20 percent of all basis species (Table 11 to Part 679). If Bering Sea Atka mackerel directed fishing is closed, vessels targeting groundfish species open to harvesting can only retain Atka mackerel up to 20 percent of their basis species.

Under Alternative 1, the status quo, the MRA must be met at any time during a fishing trip (§ 679.20(e)(3)(ii)). When Atka mackerel is closed to directed fishing, a vessel can only retain Atka mackerel up to 20 percent of the amount of the basis species actually on board. In the past, this regulation has required vessels to discard Atka mackerel in the Bering Sea.

Alternatives 2 through 4 include measures to revise the calculation of the MRA for Atka mackerel for vessels fishing for Amendment 80 and CDQ species in the Bering Sea. The Bering Sea would be closed to directed fishing for Atka mackerel, and instead of instantaneous calculation, the MRA would be calculated at the end of each offload, with respect to the basis species retained since the previous offload.

Therefore, if a vessel caught Atka mackerel, that vessel could retain all amounts of Atka mackerel if it was expected that it would subsequently harvest sufficient basis species to comply with the 20 percent MRA standard at offload. This is a relaxation of the MRA calculation and is meant to decrease regulatory discards, and to potentially facilitate Bering Sea, rather than Aleutian Islands Area 541, Atka mackerel harvests (Area 541 and the Bering Sea are subject to the same TAC).

This MRA calculation method will only apply to Amendment 80 vessels and vessels participating in CDQ fishing. Therefore, there will be little increase in the total amount of Atka mackerel harvested, because for these vessels Atka mackerel is managed under a hard cap. It is possible that there will be a shift in fishing activity from Area 541 of the Aleutian Islands to the Bering Sea, if vessels in the Bering Sea actively target Atka mackerel up to the MRA.

Incidental catch of other groundfish species and prohibited species may change; however, based on historical incidental catch rates in hauls that are primarily Atka mackerel in the Bering Sea, the change is likely to be minimal. It is not possible to quantify the change in incidental catch and PSC, because it is not possible to predict how much effort will shift in response to this management measure.

Industry sources indicate that Atka mackerel prices generally increase from west to east, as the Atka mackerel tend to increase in size. For this reason, a shift of production from Area 541 to the Bering Sea may be associated with somewhat greater revenues from the harvest of the EBS/541 TAC.

*Seasons and rollovers*

In 1999, the Atka mackerel fishery was temporally dispersed with the creation of two seasonal allowances. The A-season started on January 20 and ended on April 15. The B-season started on September 1 and ended on November 1. From 1999 to 2008, these seasons were enforced and TACs were reached prior to the season end dates.

In 2008, Amendment 80 was implemented. For many operations, this eliminated the race for fish, and introduced cooperative management. This cooperative management allowed the Amendment 80 participants to temporally spread out the catch of Atka mackerel to meet business needs. However, harvest limit area (HLA) regulations continued to temporally compress the Atka mackerel fishery.

In 2011, the interim final rule (75 FR 77535, December 13, 2010) removed the HLA regulations, changed the end date of the A-season from April 15 to June 10, and changed the B-season start date from September 1 to June 10. This resulted in the Alternative 1 (status quo) A-season starting on January 20 and ending on June 10, and the B-season starting on June 10 and ending on November 1. The effective result was a single season.

With the removal of the HLA regulations and the extension of the A- and B-seasons, the fishery in 2011 and 2012 was less concentrated in time than in previous years. When before, the majority of Atka mackerel fishing occurred only in January and February, in 2011 and 2012 fishing activity took place in most weeks from January 20 all the way to May. It also shifted the majority of the A-season Atka mackerel fishery to March and April. This has allowed some vessels to participate in the rock sole fishery in the BSAI, when roe value is optimal. It may have also reduced halibut prohibited species catch in the rock sole fishery, as halibut PSC rates are typically lower in January and February than in later months.

In 2011 and 2012, the B-season fishery saw benefits from the season extension. It allowed Amendment 80 vessels to remain in the Bering Sea yellowfin sole fishery longer, before moving to the Aleutian Islands to harvest Atka mackerel. This reduced the incidental catch of Pacific cod in yellowfin sole fisheries, which can be a limiting species to Amendment 80 vessels. However, because of the November 1 season end date, the Atka mackerel fishery production has concentrated somewhat at the end of October, as Amendment 80 vessels ensure that their allocation of Atka mackerel is harvested before the end of the B-season.

Alternative 1 and an option to Alternative 3 provide the same season dates as the fishery had in 2011 and 2012. By allowing for summer fishing, these season dates will likely result in similar fishing behavior

and allow vessels to more efficiently harvest their allocations of groundfish in the BSAI than under the baseline. There may be some benefits to ports that support these fisheries, such as Adak and Dutch Harbor, as these vessels are operating in the Aleutian Islands for longer periods of time than they did prior to 2011. Alternatives 2 through 5 seek to relax the B-season end date of November 1 to December 31 for all vessels. Extending the B-season to December 31 may provide the fleet with even more flexibility to temporally spread Atka mackerel fishing and operate more efficiently.

Alternative 2 contains measures prohibiting the rollover of seasonal allocations in critical habitat.

### 1.8.5 Redeployment

Section 1.3, evaluating Alternatives 1 and 4, included a detailed, but qualitative, discussion of the impacts of this action on the trawl catcher/processor fleet in the Aleutian Islands. Alternatives 1 and 4 represent the two extremes of restrictions on the trawl catcher/processor fleet. The restrictions under Alternative 1 (the interim final rule, which is the status quo for this analysis) are greater than those under other alternatives, and the restrictions under Alternative 4 (a return to the regulations as they were in 2010, with modest changes) are the least restrictive. The results for these two alternatives, therefore, can be thought of as bookends for the impacts of Alternatives 2 and 3 and their options.

This is true for redeployment, as well as for other impacts. In general, the conclusions with respect to redeployment under Alternative 1 hold (see Section 1.3.3), except that the fleet is not likely to redeploy to the same extent, since its fishing in Aleutian Islands Atka mackerel and Pacific cod fisheries will not have been restricted to the same extent. It is not possible to provide quantitative estimates of the differences between the alternatives.

Section 1.3.3 discussed redeployment under four headings: (1) other Amendment 80 species, (2) non-Amendment 80 species, (3) mothership operations, and (4) other activities. Amendment 80 species are allocated among participating firms as quota. A firm hoping to redeploy into another Amendment 80 species as a target must hold or acquire the quota to do it. It if does not hold the quota, much of its profit from redeployment is likely to be transferred to the entity from which it acquires the quota.

The fleet would have limited opportunities to fish for Atka mackerel elsewhere in the Aleutian Islands or in the Gulf of Alaska because of TACs. The ABC-percentage based TACs used in Alternative 2 may provide some additional opportunities for fishing in Aleutian Islands areas that remain open. There may be some increased activity in the Bering Sea, if the rules governing the MRAs are changed. Pacific cod fishing opportunities in the Aleutian Islands are limited, but Amendment 80 vessels may be able to fish their Pacific cod quota in the Bering Sea. Their ability to fully offset their Aleutian Islands Pacific cod losses in the Bering Sea could be limited, however, by the split between the Aleutian Islands and Bering Sea Pacific cod specifications, by higher halibut PSC rates in the Bering Sea, and possibly by lower prices for smaller Bering Sea Pacific cod. Amendment 80 vessels could shift into increased rock sole and yellowfin sole, although halibut PSC and incidental catches of other Amendment 80 species, such as Pacific cod may be limiting. Aleutian Islands Pacific ocean perch is fully allocated and harvested by the sectors that have allocations. Bering Sea Pacific ocean perch is not an Amendment 80 allocated species, and may offer some opportunities for these vessels. The Amendment 80 flathead sole quota has not been fully harvested in the past. The vessels are more likely to reserve their halibut PSC and Pacific cod for use in the rock sole, yellowfin sole, and arrowtooth flounder fisheries.

Trawl catcher/processors may turn to fisheries that are not limited by Amendment 80 quotas, including BSAI fisheries for arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, and other flatfish, and GOA fisheries for arrowtooth flounder, rockfish, and rex sole. The BSAI fisheries may

provide attractive opportunities, although other flatfish is generally used as incidental catch in other fisheries, rather than as a target fishery. The GOA fisheries are constrained by Amendment 80 sideboards for pollock, Pacific cod, Pacific ocean perch, northern rockfish, dusky rockfish, and halibut PSC. The Amendment 80 vessels could target the BSAI trawl allocation of sablefish, but there are high halibut PSC rates in this fishery.

Amendment 80 trawl catcher/processors could obtain some species for processing by acting as motherships for trawl catcher vessels in the BSAI trawl limited access sector. This has been a source of Atka mackerel for some trawl catcher/processors. These vessels could also seek to increase access to BSAI trawl limited access yellowfin sole; however, this could create conflicts with AFA catcher/processors also seeking access to BSAI trawl limited access yellowfin sole. Opportunities for Amendment 80 vessels outside of Alaska appear to be limited.

### 1.8.6 Incidental catch and PSC

When compared to the baseline years of 2004 to 2010, there would be a reduction in targeted Atka mackerel fishing in the Aleutian Islands for Alternative 1, Alternative 2, and Alternative 3. This will reduce incidental catches of other groundfish, and slightly reduce PSC. Table 84 summarizes the average rates of incidental catch and PSC in Atka mackerel targets in the Aleutian Islands from 2004 through 2012.

As seen in Table 84 the species with the highest incidental catch rate in Atka mackerel targets is Pacific ocean perch. A reduction in Atka mackerel targeted fishing in the Aleutian Islands may result in a smaller catch of Pacific ocean perch in Atka mackerel targeted fishing. However, Pacific ocean perch is an Amendment 80 species, so total harvest of Pacific ocean perch is unlikely to decrease. Pacific ocean perch not caught while targeting Atka mackerel will likely be harvested in the directed fishery for Pacific ocean perch.

The species with the second highest incidental catch rate is northern rockfish. Incidental catch of northern rockfish is higher in Areas 542 and 543. It is likely that a reduction of Atka mackerel harvest in those areas would result in a reduction in incidental catches of northern rockfish. In recent years, northern rockfish TACs have been increasing in the BSAI. Contingent on agreements by the Amendment 80 fleet that they will not target northern rockfish, the Regional Administrator has opened directed fishing for northern rockfish. This allows the Amendment 80 fleet to avoid regulatory discards of northern rockfish, caused by the MRA when northern rockfish is closed for directed fishing. When compared to the baseline years, a decrease in incidental catch of northern rockfish will allow this management to continue.

**Table 84 Average rate of incidental catch and PSC in Atka mackerel targets between 2004 and 2012**

| | 541 | 542 | 543 | All Areas |
|---|---|---|---|---|
| **Groundfish (percentage of total groundfish catch in Atka mackerel targets)** | | | | |
| Atka Mackerel | 86.32% | 84.74% | 80.90% | 84.39% |
| Northern Rockfish | 2.31% | 4.99% | 6.73% | 4.51% |
| Pacific Ocean Perch | 5.98% | 4.37% | 8.44% | 5.82% |
| Other Rockfish | 0.79% | 0.17% | 0.12% | 0.36% |
| Pacific Cod | 1.98% | 3.10% | 2.00% | 2.49% |
| All Other Species | 2.62% | 2.63% | 1.80% | 2.44% |
| **Prohibited species catch (numbers of animals per mt of groundfish)** | | | | |
| Golden King Crab | 0.197 | 0.115 | 0.035 | 0.124 |
| Red King Crab | 0.003 | 0.025 | 0.007 | 0.013 |
| Bairdi Tanner Crab | 0.003 | 0.000 | 0.000 | 0.001 |
| Chinook Salmon | 0.002 | 0.004 | 0.001 | 0.003 |
| Non Chinook Salmon | 0.008 | 0.005 | 0.025 | 0.011 |
| **Prohibited species catch (percentage of total groundfish)** | | | | |
| Halibut mortality | 0.28% | 0.07% | 0.08% | 0.14% |

Pacific cod has the third highest incidental catch rate and, like Pacific ocean perch, is also an Amendment 80 species. A reduction in Atka mackerel harvest is unlikely to be the cause of a change the total BSAI Pacific cod harvest. Catch limits in the Pacific cod sections of the alternatives may create incentive to decrease Pacific cod incidental catch in Atka mackerel targets to provide for more flexibility in the Pacific cod directed fishery.

*Prohibited Species Catch*

Prohibited species catch in Atka mackerel target fisheries during the baseline years was low compared to other fisheries. A reduction in Atka mackerel harvest under the alternatives would likely result in a small decrease in PSC. A reduction in PSC, in particular halibut, may make halibut PSC allowance amounts available for other target fisheries that have higher halibut PSC rates. PSC rates of crab and salmon species in the Atka mackerel target are relatively low and are not currently a management concern.

### 1.8.7 Fleet and community impacts

*Amendment 80 trawl catcher/processors*

Atka mackerel is targeted by the Amendment 80 trawl catcher/processor fleet. The reduction in Atka mackerel fishing opportunities in the Aleutian Islands adversely affects this fleet, and the vessels in this fleet will redeploy into other fishing activities as they seek to minimize the adverse impacts of the action. It is likely that the impact of the interim final rule was lessened to some extent in 2011 and 2012 by relatively high TACs and a relatively high allocation of the ABC and TACs in Area 541. Area 541 had fewer restrictions from the interim final rule than Areas 542 and 543. The higher TACs and Area 541 apportionments are not available in 2013, and possibly 2014, as ABCs have decreased, and ABC area apportionments have shifted, relatively, away from Area 541. These are temporary fluctuations, and the longer term ABC and apportionments are unclear.

Alternatives 2 through 4 are expected to have smaller impacts on this fleet than Alternative 1. The relative impacts of the alternatives on this fleet may be identified in Figure 5, which uses estimated impacts on gross revenues as an index of the impact. Alternative 1 has the greatest adverse impact on this fleet, followed by Alternative 2 and Alternative 3b (with the option closing critical habitat in Area 543 west of 174.5° E longitude), and then by Alternatives 3 and 3a. Alternative 4 has the least adverse impact.

*Adak/Seattle-Tacoma*

Atka mackerel are processed at sea and, thus, processing in Adak would not be affected by this action. However, vessels fishing Atka mackerel in the Aleutian Islands visit the port of Adak to purchase goods and services. These include fuel and use of the Adak airport for crew rotation. At the time the interim final rule went into effect, the number of visits to Adak by trawl catcher/processors fishing for Atka mackerel declined. The number of visits, which averaged about 44 a year from 2004 to 2010, decreased to 28 in 2011. (See Chapter 10 of the EIS for more details). In addition, as discussed in Section 1.2.11 of this RIR, Adak receives a share of revenues from the fisheries business tax, collected by the State of Alaska, from vessels processing catch and delivering it to shore. A decline in Atka mackerel production may reduce revenues from this source (although the decline in production may be offset in part by an increase in the Atka mackerel price, moderating the decline in tax collections).

It does not appear that Amendment 80 trawl catcher/processors left the fishery. Purchases of goods and services in the Puget Sound base areas of this fleet may have declined, but if they did, and that is not known, there is no information on the size of the decline. If incomes received by participants in the fishery declined (profits to the fishing companies and wages, salaries, and shares for persons working for the companies) expenditures by these persons may have declined as well. This could have reduced spending in the Puget Sound region. However, any change in fishing company purchases, or in spending out of personal income by fishing vessel employees or owners, is small in comparison to the Puget Sound economy.

*CDQ*

The alternatives reduce CDQ group allocations of Atka mackerel, and, thus, adversely affect the CDQ groups and the communities that they benefit. The comparison of alternatives follows the discussion above, for the Amendment 80 sector.

*Benefits of protecting Steller sea lions*

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA analysis.

### 1.8.8 Summary

Table 85 summarizes key results from this analysis for all Atka mackerel alternatives and options (including Alternative 1 and 4 results from Section 1.3). The inclusion of Alternative 1 and 4 results provides overall context for the Alternative 2 and 3 results.

**Table 85 Comparison of Atka mackerel alternatives**

| | Alternative 1: | Alternative 2: | Alternative 3 | | | Alternative 4 |
|---|---|---|---|---|---|---|
| **Description** | **Status quo** | **SSLMC some additional fishing** | **SSLMC more additional fishing** | **3(a) Close all CH and Buldir Island 0–15 nm, except portions in 10–15 nm zone** | **3(b) Close Area 543 west of 174.5° E longitude** | **Return to most 2010 measures (not including the HLA)** |
| Amendment 80 trawl catcher/processors and trawl catcher vessels delivering to vessels acting as motherships; CDQ; trawl limited access allocation | Residual gross revenues are 38% to 66% of baseline revenues. | Residual gross revenues are 63% to 79% of baseline revenues. | Residual gross revenues are 70% to 88% of baseline revenues. | Residual gross revenues are 64% to 79% of baseline revenues. | Residual gross revenues are 69% to 88% of baseline revenues. | Residual gross revenues are 100% of baseline gross revenues. |
| Other fishing sectors | MRA relaxation may lead to more topping off in Bering Sea by trawl vessels | MRA relaxation may lead to more topping off in Bering Sea by trawl vessels | MRA relaxation may lead to more topping off in Bering Sea by trawl vessels | MRA relaxation may lead to more topping off in Bering Sea by trawl vessels | MRA relaxation may lead to more topping off in Bering Sea by trawl vessels | MRA relaxation may lead to more topping off in Bering Sea by trawl vessels |
| Adak | Fewer port visits by Amendment 80 vessels generate less local income. Visits dropped from 44 a year in 2004–2010 to 28 in 2011. | Port visits lower than baseline years, but not as low as under Alternative 1. | More port visits than under Alternative 2. | Similar to Alternative 2. | More port visits than under Alternative 2. | Back to baseline levels of visits (i. e., approx. 44 per year). |
| Other communities | This may have adverse impacts on ports in the Pacific Northwest supplying logistic services to Amendment 80 vessels, and to places where persons earning incomes in these fleets spend their incomes. Impacts are small compared to overall economies. | Adverse impacts smaller than under Alternative 1. | Adverse impacts smaller than under Alternatives 1 and 2. | Similar to Alternative 2. | Similar to Alternative 2. | Back to baseline levels. |
| CDQ | The distribution of impacts to CDQ groups and associated communities is similar to that for the Amendment 80 fleet. | | | | | |
| Incidental catch and PSC | None of the alternatives appear to create serious issues for incidental catch or PSC. | | | | | |

| | Alternative 1: | Alternative 2: | Alternative 3 | | | Alternative 4 |
|---|---|---|---|---|---|---|
| **Description** | **Status quo** | **SSLMC some additional fishing** | **SSLMC more additional fishing** | **3(a) Close all CH and Buldir Island 0–15 nm, except portions in 10–15 nm zone** | **3(b) Close Area 543 west of 174.5° E longitude** | **Return to most 2010 measures (not including the HLA)** |
| Steller sea lion stock | This is the most attractive alternative for the Steller sea lion stock since it has the greatest potential impact on prey competition, disturbance, and takes. However, it is not possible to quantify the impact on the population. | This is less attractive for the Steller sea lion stock, and for people who value the health of the stock than Alternative 1. | This option is likely to be less attractive for the Steller sea lion stock than Alternative 2. | This option may be comparable to Alternative 2 with respect to the health of the Steller sea lion stock. | This option may be comparable to Alternative 3 without any options, with respect to the health of the Steller sea lion stock. | This alternative, which returns to baseline levels of Atka mackerel removal, may be the least attractive with respect to the health of the Steller sea lion stock. |
| Sum of producers and consumers surpluses | The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Atka mackerel products, and consumers' surpluses accruing to persons who value SSL population health. Producers' surpluses increase by an undetermined amount, surpluses accruing to U.S. consumers are unlikely to change much, since the Atka mackerel market is an export market. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus, the net efficiency benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion. | | | | | |

### 1.8.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Atka mackerel by trawl catcher/processors. This analysis of these measures is summarized in the catch and revenue impact tables in this appendix. The appendix includes a catch table, and a wholesale gross revenue table, for each of the principal alternative-option combinations.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the catch taken from areas remaining open as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars, respectively. Each alternative and option combination is summarized in one catch and one revenue table.

**Table 86 Location of estimated Atka mackerel harvests with respect to Alternative 2 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 2 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 3,161 | 26,561 | 16,527 | 46,248 | 174 | 11,586 | 1,025 | 12,785 | 2,987 | 14,974 | 15,501 | 33,463 | 72% |
| 2005 | 3,356 | 33,720 | 18,730 | 55,806 | 257 | 9,021 | 3,327 | 12,605 | 3,099 | 24,698 | 15,403 | 43,201 | 77% |
| 2006 | 4,013 | 38,447 | 14,374 | 56,835 | 164 | 17,571 | 3,460 | 21,196 | 3,849 | 20,876 | 10,914 | 35,639 | 63% |
| 2007 | 19,752 | 25,475 | 8,846 | 54,074 | 92 | 8,169 | 3,449 | 11,710 | 19,660 | 17,306 | 5,397 | 42,364 | 78% |
| 2008 | 18,701 | 22,175 | 15,654 | 56,531 | 48 | 6,266 | 5,492 | 11,806 | 18,653 | 15,909 | 10,162 | 44,724 | 79% |
| 2009 | 25,734 | 28,461 | 15,466 | 69,661 | 19 | 13,081 | 6,245 | 19,345 | 25,715 | 15,380 | 9,221 | 50,316 | 72% |
| 2010 | 23,074 | 24,033 | 17,462 | 64,568 | 72 | 13,990 | 5,345 | 19,407 | 23,001 | 10,043 | 12,117 | 45,162 | 70% |
| Notes: Volumes refer to retained, targeted Atka mackerel from CDQ and non-CDQ catches.<br>Source: NMFS AKR estimates using CIA data, January 22, 2013. | | | | | | | | | | | | | |

**Table 87 Estimated Alternative 2 Atka mackerel wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.1 | 17.2 | 10.9 | 30.1 | 0.1 | 7.4 | 0.7 | 8.3 | 1.9 | 9.8 | 10.1 | 21.8 | 73% |
| 2005 | 2.5 | 23.4 | 14.5 | 40.4 | 0.3 | 6.3 | 2.9 | 9.5 | 2.2 | 17.1 | 11.6 | 30.9 | 76% |
| 2006 | 2.8 | 24.9 | 9.7 | 37.4 | 0.1 | 11.2 | 2.4 | 13.7 | 2.7 | 13.7 | 7.3 | 23.8 | 63% |
| 2007 | 16.0 | 20.4 | 7.4 | 43.8 | 0.3 | 6.4 | 2.8 | 9.6 | 15.7 | 13.9 | 4.5 | 34.2 | 78% |
| 2008 | 14.5 | 17.8 | 13.0 | 45.3 | 0.3 | 4.9 | 4.2 | 9.5 | 14.2 | 12.9 | 8.7 | 35.8 | 79% |
| 2009 | 28.3 | 32.0 | 17.9 | 78.1 | 0.6 | 14.9 | 7.0 | 22.5 | 27.7 | 17.1 | 10.9 | 55.6 | 71% |
| 2010 | 29.8 | 31.2 | 24.5 | 85.5 | 0.8 | 17.9 | 7.4 | 26.2 | 29.0 | 13.2 | 17.1 | 59.3 | 69% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.4 | 20.4 | 12.9 | 35.8 | 0.1 | 8.8 | 0.9 | 9.8 | 2.3 | 11.6 | 12.1 | 26.0 | 73% |
| 2005 | 3.0 | 27.2 | 16.8 | 47.0 | 0.4 | 7.3 | 3.4 | 11.1 | 2.6 | 19.9 | 13.4 | 35.9 | 76% |
| 2006 | 3.2 | 28.0 | 10.9 | 42.1 | 0.1 | 12.6 | 2.6 | 15.4 | 3.1 | 15.4 | 8.2 | 26.7 | 63% |
| 2007 | 17.6 | 22.3 | 8.1 | 48.0 | 0.4 | 7.0 | 3.1 | 10.5 | 17.2 | 15.3 | 5.0 | 37.4 | 78% |
| 2008 | 15.3 | 18.7 | 13.7 | 47.7 | 0.3 | 5.2 | 4.5 | 10.0 | 15.0 | 13.6 | 9.2 | 37.7 | 79% |
| 2009 | 29.9 | 33.9 | 18.9 | 82.7 | 0.6 | 15.8 | 7.4 | 23.8 | 29.3 | 18.1 | 11.5 | 58.9 | 71% |
| 2010 | 31.1 | 32.5 | 25.5 | 89.1 | 0.9 | 18.7 | 7.7 | 27.3 | 30.2 | 13.8 | 17.8 | 61.8 | 69% |
| Source: NMFS AKR estimates using CIA data, January 22, 2013. | | | | | | | | | | | | | |

**Table 88 Location of estimated Atka mackerel harvests with respect to Alternative 3 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 3 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 3,161 | 26,561 | 16,527 | 46,248 | 174 | 11,586 | 15 | 11,775 | 2,987 | 14,974 | 16,511 | 34,473 | 75% |
| 2005 | 3,356 | 33,720 | 18,730 | 55,806 | 257 | 9,021 | 1 | 9,279 | 3,099 | 24,698 | 18,729 | 46,527 | 83% |
| 2006 | 4,013 | 38,447 | 14,374 | 56,835 | 164 | 17,571 | 4 | 17,740 | 3,849 | 20,876 | 14,370 | 39,095 | 69% |
| 2007 | 19,752 | 25,475 | 8,846 | 54,074 | 92 | 8,169 | 0 | 8,261 | 19,660 | 17,306 | 8,846 | 45,813 | 85% |
| 2008 | 18,701 | 22,175 | 15,654 | 56,531 | 48 | 6,266 | 1 | 6,316 | 18,653 | 15,909 | 15,653 | 50,215 | 89% |
| 2009 | 25,734 | 28,461 | 15,466 | 69,661 | 19 | 13,081 | 60 | 13,161 | 25,715 | 15,380 | 15,406 | 56,500 | 81% |
| 2010 | 23,074 | 24,033 | 17,462 | 64,568 | 72 | 13,990 | 44 | 14,106 | 23,001 | 10,043 | 17,418 | 50,462 | 78% |

Notes: Volumes refer retained, targeted Atka mackerel from CDQ and non-CDQ catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 89 Estimated Alternative 3 Atka mackerel wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.1 | 17.2 | 10.9 | 30.1 | 0.1 | 7.4 | 0.0 | 7.5 | 1.9 | 9.8 | 10.8 | 22.6 | 75% |
| 2005 | 2.5 | 23.4 | 14.5 | 40.4 | 0.3 | 6.3 | 0.2 | 6.8 | 2.2 | 17.1 | 14.3 | 33.7 | 83% |
| 2006 | 2.8 | 24.9 | 9.7 | 37.4 | 0.1 | 11.2 | 0.1 | 11.4 | 2.7 | 13.7 | 9.6 | 26.0 | 70% |
| 2007 | 16.0 | 20.4 | 7.4 | 43.8 | 0.3 | 6.4 | 0.1 | 6.9 | 15.7 | 13.9 | 7.2 | 36.9 | 84% |
| 2008 | 14.5 | 17.8 | 13.0 | 45.3 | 0.3 | 4.9 | 0.0 | 5.2 | 14.2 | 12.9 | 13.0 | 40.1 | 88% |
| 2009 | 28.3 | 32.0 | 17.9 | 78.1 | 0.6 | 14.9 | 0.2 | 15.7 | 27.7 | 17.1 | 17.6 | 62.4 | 80% |
| 2010 | 29.8 | 31.2 | 24.5 | 85.5 | 0.8 | 17.9 | 0.2 | 19.0 | 29.0 | 13.2 | 24.3 | 66.5 | 78% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.4 | 20.4 | 12.9 | 35.8 | 0.1 | 8.8 | 0.0 | 9.0 | 2.3 | 11.6 | 12.9 | 26.8 | 75% |
| 2005 | 3.0 | 27.2 | 16.8 | 47.0 | 0.4 | 7.3 | 0.2 | 7.9 | 2.6 | 19.9 | 16.6 | 39.1 | 83% |
| 2006 | 3.2 | 28.0 | 10.9 | 42.1 | 0.1 | 12.6 | 0.1 | 12.8 | 3.1 | 15.4 | 10.8 | 29.3 | 70% |
| 2007 | 17.6 | 22.3 | 8.1 | 48.0 | 0.4 | 7.0 | 0.2 | 7.6 | 17.2 | 15.3 | 7.9 | 40.4 | 84% |
| 2008 | 15.3 | 18.7 | 13.7 | 47.7 | 0.3 | 5.2 | 0.0 | 5.5 | 15.0 | 13.6 | 13.7 | 42.2 | 88% |
| 2009 | 29.9 | 33.9 | 18.9 | 82.7 | 0.6 | 15.8 | 0.2 | 16.7 | 29.3 | 18.1 | 18.7 | 66.1 | 80% |
| 2010 | 31.1 | 32.5 | 25.5 | 89.1 | 0.9 | 18.7 | 0.2 | 19.8 | 30.2 | 13.8 | 25.3 | 69.3 | 78% |

Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 90 Location of estimated Atka mackerel harvests with respect to Alternative 3, Option to close Area 543 critical habitat and portions of Buldir**

| | Total catch (mt) | | | | Catch from areas closed by Alt 2 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 3,161 | 26,561 | 16,527 | 46,248 | 174 | 11,586 | 1,024 | 12,784 | 2,987 | 14,974 | 15,503 | 33,464 | 72% |
| 2005 | 3,356 | 33,720 | 18,730 | 55,806 | 257 | 9,021 | 3,322 | 12,600 | 3,099 | 24,698 | 15,408 | 43,206 | 77% |
| 2006 | 4,013 | 38,447 | 14,374 | 56,835 | 164 | 17,571 | 3,448 | 21,184 | 3,849 | 20,876 | 10,926 | 35,651 | 63% |
| 2007 | 19,752 | 25,475 | 8,846 | 54,074 | 92 | 8,169 | 3,393 | 11,654 | 19,660 | 17,306 | 5,453 | 42,420 | 78% |
| 2008 | 18,701 | 22,175 | 15,654 | 56,531 | 48 | 6,266 | 5,484 | 11,798 | 18,653 | 15,909 | 10,170 | 44,733 | 79% |
| 2009 | 25,734 | 28,461 | 15,466 | 69,661 | 19 | 13,081 | 5,503 | 18,604 | 25,715 | 15,380 | 9,963 | 51,058 | 73% |
| 2010 | 23,074 | 24,033 | 17,462 | 64,568 | 72 | 13,990 | 4,982 | 19,044 | 23,001 | 10,043 | 12,480 | 45,524 | 71% |

Notes: Volumes refer retained, targeted Atka mackerel from CDQ and non-CDQ catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 91 Estimated Alternative 3, Option to close Area 543 critical habitat and portions of Buldir, Atka mackerel wholesale gross revenues for open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.1 | 17.2 | 10.9 | 30.1 | 0.1 | 7.4 | 0.7 | 8.2 | 1.9 | 9.8 | 10.1 | 21.8 | 73% |
| 2005 | 2.5 | 23.4 | 14.5 | 40.4 | 0.3 | 6.3 | 2.7 | 9.3 | 2.2 | 17.1 | 11.8 | 31.1 | 77% |
| 2006 | 2.8 | 24.9 | 9.7 | 37.4 | 0.1 | 11.2 | 2.3 | 13.7 | 2.7 | 13.7 | 7.3 | 23.8 | 64% |
| 2007 | 16.0 | 20.4 | 7.4 | 43.8 | 0.3 | 6.4 | 2.8 | 9.6 | 15.7 | 13.9 | 4.6 | 34.2 | 78% |
| 2008 | 14.5 | 17.8 | 13.0 | 45.3 | 0.3 | 4.9 | 4.2 | 9.4 | 14.2 | 12.9 | 8.8 | 35.9 | 79% |
| 2009 | 28.3 | 32.0 | 17.9 | 78.1 | 0.6 | 14.9 | 6.1 | 21.6 | 27.7 | 17.1 | 11.8 | 56.5 | 72% |
| 2010 | 29.8 | 31.2 | 24.5 | 85.5 | 0.8 | 17.9 | 6.8 | 25.6 | 29.0 | 13.2 | 17.7 | 59.9 | 70% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.4 | 20.4 | 12.9 | 35.8 | 0.1 | 8.8 | 0.9 | 9.8 | 2.3 | 11.6 | 12.1 | 26.0 | 73% |
| 2005 | 3.0 | 27.2 | 16.8 | 47.0 | 0.4 | 7.3 | 3.1 | 10.8 | 2.6 | 19.9 | 13.7 | 36.1 | 77% |
| 2006 | 3.2 | 28.0 | 10.9 | 42.1 | 0.1 | 12.6 | 2.6 | 15.3 | 3.1 | 15.4 | 8.2 | 26.7 | 64% |
| 2007 | 17.6 | 22.3 | 8.1 | 48.0 | 0.4 | 7.0 | 3.1 | 10.5 | 17.2 | 15.3 | 5.0 | 37.5 | 78% |
| 2008 | 15.3 | 18.7 | 13.7 | 47.7 | 0.3 | 5.2 | 4.4 | 9.9 | 15.0 | 13.6 | 9.3 | 37.8 | 79% |
| 2009 | 29.9 | 33.9 | 18.9 | 82.7 | 0.6 | 15.8 | 6.5 | 22.9 | 29.3 | 18.1 | 12.5 | 59.8 | 72% |
| 2010 | 31.1 | 32.5 | 25.5 | 89.1 | 0.9 | 18.7 | 7.1 | 26.7 | 30.2 | 13.8 | 18.4 | 62.4 | 70% |
| Source: NMFS AKR estimates using CIA data, January 22, 2013. | | | | | | | | | | | | | |

**Table 92 Location of estimated Atka mackerel harvests with respect to Alternative 3, Option to close Area 543 west of 174.5° E Long**

| | Total catch (mt) | | | | Catch from areas closed by Alt 2 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 3,161 | 26,561 | 16,527 | 46,248 | 174 | 11,586 | 459 | 12,219 | 2,987 | 14,974 | 16,068 | 34,029 | 74% |
| 2005 | 3,356 | 33,720 | 18,730 | 55,806 | 257 | 9,021 | 596 | 9,874 | 3,099 | 24,698 | 18,135 | 45,933 | 82% |
| 2006 | 4,013 | 38,447 | 14,374 | 56,835 | 164 | 17,571 | 81 | 17,817 | 3,849 | 20,876 | 14,293 | 39,018 | 69% |
| 2007 | 19,752 | 25,475 | 8,846 | 54,074 | 92 | 8,169 | 1 | 8,262 | 19,660 | 17,306 | 8,846 | 45,812 | 85% |
| 2008 | 18,701 | 22,175 | 15,654 | 56,531 | 48 | 6,266 | 5 | 6,320 | 18,653 | 15,909 | 15,649 | 50,211 | 89% |
| 2009 | 25,734 | 28,461 | 15,466 | 69,661 | 19 | 13,081 | 65 | 13,165 | 25,715 | 15,380 | 15,401 | 56,496 | 81% |
| 2010 | 23,074 | 24,033 | 17,462 | 64,568 | 72 | 13,990 | 53 | 14,115 | 23,001 | 10,043 | 17,409 | 50,454 | 78% |
| Notes: Volumes refer retained, targeted Atka mackerel from CDQ and non-CDQ catches.<br>Source: NMFS AKR estimates using CIA data, January 22, 2013. | | | | | | | | | | | | | |

**Table 93 Estimated Alternative 3, Option to close Area 543 west of 174.5° E Long, Atka mackerel wholesale gross revenues for open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenue in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.1 | 17.2 | 10.9 | 30.1 | 0.1 | 7.4 | 0.3 | 7.8 | 1.9 | 9.8 | 10.6 | 22.3 | 74% |
| 2005 | 2.5 | 23.4 | 14.5 | 40.4 | 0.3 | 6.3 | 0.9 | 7.5 | 2.2 | 17.1 | 13.6 | 33.0 | 82% |
| 2006 | 2.8 | 24.9 | 9.7 | 37.4 | 0.1 | 11.2 | 0.2 | 11.5 | 2.7 | 13.7 | 9.5 | 25.9 | 69% |
| 2007 | 16.0 | 20.4 | 7.4 | 43.8 | 0.3 | 6.4 | 0.0 | 6.8 | 15.7 | 13.9 | 7.3 | 37.0 | 84% |
| 2008 | 14.5 | 17.8 | 13.0 | 45.3 | 0.3 | 4.9 | 0.0 | 5.3 | 14.2 | 12.9 | 12.9 | 40.0 | 88% |
| 2009 | 28.3 | 32.0 | 17.9 | 78.1 | 0.6 | 14.9 | 0.2 | 15.7 | 27.7 | 17.1 | 17.6 | 62.4 | 80% |
| 2010 | 29.8 | 31.2 | 24.5 | 85.5 | 0.8 | 17.9 | 0.2 | 19.0 | 29.0 | 13.2 | 24.3 | 66.5 | 78% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.4 | 20.4 | 12.9 | 35.8 | 0.1 | 8.8 | 0.4 | 9.3 | 2.3 | 11.6 | 12.6 | 26.5 | 74% |
| 2005 | 3.0 | 27.2 | 16.8 | 47.0 | 0.4 | 7.3 | 1.0 | 8.7 | 2.6 | 19.9 | 15.8 | 38.3 | 82% |
| 2006 | 3.2 | 28.0 | 10.9 | 42.1 | 0.1 | 12.6 | 0.2 | 12.9 | 3.1 | 15.4 | 10.6 | 29.1 | 69% |
| 2007 | 17.6 | 22.3 | 8.1 | 48.0 | 0.4 | 7.0 | 0.0 | 7.4 | 17.2 | 15.3 | 8.0 | 40.5 | 84% |
| 2008 | 15.3 | 18.7 | 13.7 | 47.7 | 0.3 | 5.2 | 0.0 | 5.5 | 15.0 | 13.6 | 13.6 | 42.2 | 88% |
| 2009 | 29.9 | 33.9 | 18.9 | 82.7 | 0.6 | 15.8 | 0.2 | 16.7 | 29.3 | 18.1 | 18.7 | 66.1 | 80% |
| 2010 | 31.1 | 32.5 | 25.5 | 89.1 | 0.9 | 18.7 | 0.2 | 19.8 | 30.2 | 13.8 | 25.3 | 69.3 | 78% |
| Source: NMFS AKR estimates using CIA data, January 22, 2013. | | | | | | | | | | | | | |

## 1.9 Pacific cod trawl catcher/processor analysis (Alternatives 2, 3, and their options)

### 1.9.1 Introduction

Of the six alternatives, Alternatives 1 (status quo) and 4 (return to most of the measures in place before the interim final rule went into effect in 2011) were analyzed in Section 1.3, and Alternative 5 (adopted by the Council as its preliminary preferred alternative in April 2013) and Alternative 6 are analyzed in Section 1.13. This section deals with Alternatives 2 and 3 and their options.

Table 94, based on Table 2-21 in Chapter 2 of the EIS, summarizes and contrasts the Pacific cod alternatives as they apply to trawl gear. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts showing the different areas listed in the table.

In addition to the measures described in Table 94, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in 1.19.2.

For the purpose of this analysis, the trawl catcher/processor sector includes:

- trawl catcher/processor vessels targeting, or taking incidental catches of, Atka mackerel and/or Pacific cod in the Aleutian Islands,
- trawl catcher/processors acting as motherships to trawl catcher vessels making deliveries of Atka mackerel, and
- catcher vessels delivering Atka mackerel to catcher/processors acting as motherships.

Production and revenues by trawl catcher vessels delivering Pacific cod to catcher/processors acting as motherships have been included in the trawl catcher/vessel sector and not in this one. Production in that

sector reflects both shoreside and mothership deliveries of trawl catcher vessel caught Pacific cod. This division of the sectors protects the confidentiality of Pacific cod deliveries to motherships. This fleet definition must be kept in mind while reading this section, since Alternative 2 includes options that both permit and prohibit trawl catcher vessel deliveries of Area 543 Pacific cod to motherships.

**Table 94 Comparison of alternatives for Pacific cod trawl gear.**

| Alternative | Seasons | Area 543 | | Area 542 | | Area 541 | |
|---|---|---|---|---|---|---|---|
| | | closures | Catch and participation limits | closures | Catch and participation limits | Closures | Catch and participation limits |
| 1 | A season: 1/20–4/1<br>B season: 4/1–6/10<br>C season: 6/10–11/1<br>Seasonal apportionment based on BSAI wide TAC level under Amend 85. | No retention | Not applicable | Critical habitat closed except between 178°W and 177° W long.<br>Critical habitat closed 0–10 nm year round and 0–20 nm June 10–Nov. 1. | ESA reinitiation trigger with harvest more than 2% of BSAI Pacific cod ABC. | Critical habitat closed 0–10 nm year round and 0–20 nm June 10–Nov. 1.<br>Seguam Foraging Area closed. | ESA reinitiation trigger with harvest more than 11.5% of BSAI Pacific cod ABC. |
| 2 | A season: 1/20–4/1<br>B season: 4/1–6/10<br>C season:<br>CVs and AFA CPs: 6/10–11/1.<br>CDQ and Amend. 80 coop: 6/10–12/31.<br>Seasonal apportionment based on BSAI wide TAC level under Amend 85. | Critical habitat closed except close 0–10 nm from rookeries and haulouts between 174.5° E long. and 173° E long.<br>Protective option:<br>A and B season: Close 0–10 nm from rookeries, close 0–20 nm from haulouts between 173° E long. and 174.5° E long. | Catch limit based on annual stock assessment.<br>Vessels limited to CPs and CVs.<br>Option 1: Prohibit motherships.<br>Option 2: Allow motherships.<br>Set catch limit for CP or CP/mothership sector based on average annual catch 2006–2010.<br>Prohibit directed fishing after April 30<br>Shoreside CVs limited to overall area catch limit. | Critical habitat closed except east of 178°W and west of 174°W long., critical habitat closed 0–3 from haulouts and 0–10 from rookeries | Catch limit in proportion to Area 542/541 abundance based on annual stock assessment.<br>Set CP/mothership catch limit based on average annual catch 2006–2010.<br>Shoreside CVs limited to overall area catch limit. | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries.<br>Critical habitat closed east of 174°W long.<br>Seguam Foraging Area closed. | Combined with Area 542. |
| 3 | Area 543:<br>A season: 1/20–4/1<br>B season: 4/1–6/10<br>C season: 6/10–11/1<br>Areas 542/541:<br>A season: 1/20–4/1<br>B season: 4/1–6/10<br>C season:<br>CVs and AFA CPs: 6/10–11/1.<br>CDQ and Amend. 80 coop: 6/10–12/31.<br>Seasonal apportionment based on BSAI wide TAC level under Amend 85. | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries. | Catch limit in proportion to Area 543 abundance based on annual stock assessment.<br>Set catch limit for CP/mothership sector based on average annual catch 2006–2010.<br>Shoreside CVs limited to overall area catch limit. | Same as Alternative 2 | Same as Alternative 2 | Same as Alternative 2 | Same as Alternative 2 |
| 4 | A season: 1/20–4/1<br>B season: 4/1–6/10<br>CVs and AFA CPs:<br>C season: 6/10–11/1.<br>Amend. 80 and CDQ:<br>C season: 6/10–12/31<br>Seasonal apportionment based on BSAI wide TAC level under Amend 85. | Same as Alternative 3 | None | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries. | None | Critical habitat closed 0–3 nm from haulouts and 0–10 nm from rookeries, except a 20 nm closure from Agligadak.<br>Seguam Foraging Area closed. | None |
| 5 | Same as Alternative 4 | Same as Alternatives 3 and 4 | Catch limit in proportion to Area 543 abundance based on annual stock assessment. | Same as Alternative 4 | Same as Alternative 4 | Same as Alternative 4 | Same as Alternative 4 |
| 6 | Not applicable. | No retention | Not applicable. | No retention | Not applicable. | No retention | Not applicable. |

CDQ= Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, ESA=Endangered Species Act, CP= catcher/processor. CV=catcher vessel, CP=catcher/processor

### 1.9.2 Pacific cod harvest limits

Alternatives 2 and 3 include provisions for the allocation of Aleutian Islands Pacific cod among Areas 541, 542, and 543, and for sector limits on trawl and non-trawl catcher/processor catches in these areas. These measures treat Area 543 independently and group Areas 541 and 542 together. This section looks at the area allocation measures first, and then at the sector limits. A subsequent section (Section 1.9.3) examines the interaction of area and sector limits with the constraints on harvests imposed by the critical habitat closure rules in the alternatives.

*Area allocations*

During the baseline years, Pacific cod was managed as one stock in the BSAI. The ITAC was divided among nine separate sector allocations, in addition to the CDQ allocation. As explained in Section 1.2.16, in December 2013 the Council adopted separate Pacific cod harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species. While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Alternatives 2 and 3 require the definition of area catch limits for Area 543 and for Areas 541-542 (considered jointly). The measures call for setting catch limits in proportion to the Area 543 and Area 541-542 biomasses, estimated during the annual stock assessment process.

NMFS has approached this in the following steps:

- The proportion of the annual BSAI biomass estimated to be in the Aleutian Islands from the annual Pacific cod Stock Assessment and Fishery Evaluation Report (SAFE) chapter is used to determine the overall Aleutian Islands harvest limit as a percent of the BSAI ABC. This ranged from 16 percent to 7 percent over the period 2004 through 2014, which includes the baseline years (2004 through 2010), and the years under the interim final rule (2011 through 2014).
- The product of this biomass proportion, and the BSAI Pacific cod ABC in a year is treated, for this analysis, as an Aleutian Islands ABC.[124]
- The State of Alaska's Pacific cod guideline harvest level (GHL) fishery is assumed to take 3 percent of the Aleutian Islands ABC.
- The Area 543, and Area 541-542, area limits are determined from this Aleutian Islands ABC minus the GHL. These limits are based on a moving average of the relative biomass sizes in these two areas as determined from the most recent four summer trawl surveys. The volumes in Area 543 range between 24.5 percent and 26.4 percent of the whole; the volumes in Area 541-542 consequently range between 73.6 percent and 74.6 percent.
- The balances in each region will cover the CDQ directed fishing allocation (DFA), incidental catch allowances (ICAs) and the Aleut Corporation DFA. ICAs have not been separately identified here, since these will be determined by NMFS during the fishing year.

[124] This assumption was made for analytical purposes and provides a practical method for estimating the Aleutian Islands Pacific cod TACs and sector allocations for the different fleets as an illustrative approach for the purpose of this analysis. As noted above, the Council has now split the Aleutian Islands and Bering Sea for Pacific cod specifications. The methods used by the Council may change through time if changing biological understanding leads to changes in the tier status of Aleutian Islands Pacific cod. The results from any given method will change through time as information about the Aleutian Islands stock status changes.

In Table 95, these rules have been applied to data from 2004 through 2014[125] to estimate the amount of an Aleutian Islands "ABC" in each year and to estimate how that ABC net of the GHL would have been allocated to CDQ, ICA, and DFA in Area 543, and in Areas 541-542 (jointly). These are hypothetical estimates, made for these years, assuming the rules under consideration here had been in place during those years.

For comparative purposes, the effective 2014 proportion of the annual BSAI biomass estimated to be in the Aleutian Islands is 5.6 percent (as opposed to 7.0 percent in Table 95). The 2014 Aleutian Islands ABC was 15,100 metric tons, the GHL was 8,103 metric tons, and the Aleutian Islands ABC net of the GHL was 6,997 metric tons. (NMFS AKR In-season management, personal communication, January 17, 2014). Given the management area percentages used in Table 95 for 2014, this would have meant an Area 543 limit of 1,847 metric tons, and an Area 541-542 limit of 5,150 metric tons.

[125] Catch, TAC, and ABC data from earlier years are included in Table 95 to provide context for the information from 2004 to 2014. Data for 2013 and 2014 are based on the 2013/2014 harvest specifications published March 1, 2013 (78 FR 13813).

**Table 95 Area allocation of Pacific cod limits under Alternatives 2 and 3 (metric tons and percentages)**

| | BSAI Historical | | | Percent | | | Aleutian Islands wide | | | Area Limits | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Catch | TAC | ABC | AI | Area 543 | Areas 541-542 | AI ABC | GHL | ABC net of GHL | 543 | 541-542 |
| 1992 | 207,278 | 182,000 | 182,000 | | | | | | | | |
| 1993 | 167,391 | 164,500 | 164,500 | | | | | | | | |
| 1994 | 193,802 | 191,000 | 191,000 | | | | | | | | |
| 1995 | 245,033 | 250,000 | 328,000 | | | | | | | | |
| 1996 | 240,676 | 270,000 | 305,000 | | | | | | | | |
| 1997 | 257,765 | 270,000 | 306,000 | | | | | | | | |
| 1998 | 193,256 | 210,000 | 210,000 | | | | | | | | |
| 1999 | 173,998 | 177,000 | 177,000 | | | | | | | | |
| 2000 | 191,060 | 193,000 | 193,000 | | | | | | | | |
| 2001 | 176,749 | 188,000 | 188,000 | | | | | | | | |
| 2002 | 197,356 | 200,000 | 223,000 | | | | | | | | |
| 2003 | 210,969 | 207,500 | 223,000 | | | | | | | | |
| 2004 | 212,161 | 215,500 | 223,000 | 15.0% | 24.5% | 75.5% | 33,450 | 6,690 | 26,760 | 6,543 | 20,217 |
| 2005 | 205,635 | 206,000 | 206,000 | 15.0% | 24.5% | 75.5% | 30,900 | 6,180 | 24,720 | 6,045 | 18,675 |
| 2006 | 193,017 | 189,786 | 194,000 | 16.0% | 25.4% | 74.6% | 31,040 | 5,820 | 25,220 | 6,398 | 18,822 |
| 2007 | 174,124 | 170,720 | 176,000 | 16.0% | 25.4% | 74.6% | 28,160 | 5,280 | 22,880 | 5,805 | 17,075 |
| 2008 | 170,853 | 170,720 | 176,000 | 16.0% | 25.4% | 74.6% | 28,160 | 5,280 | 22,880 | 5,805 | 17,075 |
| 2009 | 175,732 | 176,540 | 182,000 | 16.0% | 25.4% | 74.6% | 29,120 | 5,460 | 23,660 | 6,002 | 17,658 |
| 2010 | 171,851 | 168,780 | 174,000 | 16.0% | 26.4% | 73.6% | 27,840 | 5,220 | 22,620 | 5,974 | 16,646 |
| 2011 | 220,134 | 227,950 | 235,000 | 9.0% | 26.4% | 73.6% | 21,150 | 7,050 | 14,100 | 3,724 | 10,376 |
| 2012 | 212,170 | 261,000 | 314,000 | 9.0% | 26.4% | 73.6% | 28,260 | 9,420 | 18,840 | 4,975 | 13,865 |
| 2013 | n.a. | 260,000 | 307,000 | 7.0% | 26.4% | 73.6% | 21,490 | 9,210 | 12,280 | 3,243 | 9,037 |
| 2014 | n.a. | 260,880 | 323,000 | 7.0% | 26.4% | 73.6% | 22,610 | 9,690 | 12,920 | 3,412 | 9,508 |

Notes: Shaded years are years during which the interim final rule was in effect. The projected 2013 and 2014 limits are based on the biomass distribution from the 2012 Pacific Cod SAFE, and the ABCs from the 2013-2014 specifications adopted by the Council. The 2006 TAC was originally 194,000 mt, but was reduced mid-season to adjust for the State of Alaska GHL fishery introduced that year. While area percentages are reported rounded to a single decimal digit, the area limit estimates are based on area percentages to five decimal digits.
Sources: Thompson and Lauth 2012; AKR CAS; AKR calculations.

*Sector limits*

Within the two area allocations created by Alternatives 2 and 3 (for Area 543 and joint Areas 541-542) the alternatives include provisions that place limits on trawl and non-trawl catcher/processor sector catches. These sector limits are not allocations, but limits on the amounts that may be caught by the sectors to which they are assigned. Catcher vessels, not subject to these limits, could conceivably fully harvest the available Pacific cod, leaving nothing for the sectors that do have limits. However, the opposite could not happen; a sector with its own limit could not catch more of the area allocation than its sector limit permits. The sector limits are based on historical average catches from 2006 through 2010. While catcher vessels are not subject to sector limits in these areas, they are subject to the overall area limits.

Alternative 2 has an option *prohibiting* catcher vessel deliveries to motherships in Area 543, and an option *allowing* catcher vessel deliveries to motherships in Area 543. The mothership limit in Area 543 does not prohibit a catcher vessel from fishing in Area 543, so long as the catch is not delivered to a mothership. Thus, a catcher vessel could deliver fish caught in Area 543 to a shoreside plant, perhaps at Adak, or to a shoreside floating processor. Similarly, the delivery of fish caught in Area 542 to a mothership in Area 543 is not prohibited.

These two options have different implications for sector allocations in Area 543 since, when motherships are included, the trawl sector allocation is determined by the proportion of area catch taken by trawl catcher/processors and motherships, while when motherships are prohibited, the allocation is determined by the proportion of area catch taken by catcher/processors only. In the first case, the sector allocation is 67.7 percent, while in the second it is 28.02 percent.

Table 96 builds on the area allocation estimates summarized in Table 95 and incorporates the sector limits discussed above. Under Alternative 2, Option 1, which excludes motherships from Area 543, the trawl catcher/processor sector would receive 28.02 percent of the 2006 to 2010 average catch; under Alternative 2, Option 2, which includes motherships, the sector would receive 67.7 percent of the average catch. Under Alternative 3, which does not have an option prohibiting catcher vessel deliveries to motherships, the sector receives 67.7 percent in Area 543. Under both alternatives, the sector receives 47.01 percent in Areas 541 and 542.

As shown in Table 96, area-sector limits can be quite small in some years (for example, 909 metric tons to 1,394 metric tons from 2010 to 2014 under Alternative 2, Option 1, in Area 543). Once catch has been set aside for incidental catch of Pacific cod in other groundfish fisheries, low area-sector limits may preclude directed fishing for Pacific cod by this sector, in some areas, during some years.

**Table 96 Estimated trawl catcher/processor sector limits under Alternatives 2 and 3, 2004 through 2014 (metric tons)**

| | Area Limits | | Area 543 sector allocations | | | Areas 541-542 sector allocations | |
|---|---|---|---|---|---|---|---|
| Year | 543 | 541-542 | Alt 2 O1 | Alt 2 O2 | Alt 3 | Alt 2 | Alt 3 |
| 2004 | 6,543 | 20,217 | 1,833 | 4,430 | 4,430 | 9,504 | 9,504 |
| 2005 | 6,045 | 18,675 | 1,694 | 4,092 | 4,092 | 8,779 | 8,779 |
| 2006 | 6,398 | 18,822 | 1,793 | 4,332 | 4,332 | 8,848 | 8,848 |
| 2007 | 5,805 | 17,075 | 1,626 | 3,930 | 3,930 | 8,027 | 8,027 |
| 2008 | 5,805 | 17,075 | 1,626 | 3,930 | 3,930 | 8,027 | 8,027 |
| 2009 | 6,002 | 17,658 | 1,682 | 4,064 | 4,064 | 8,301 | 8,301 |
| 2010 | 5,974 | 16,646 | 1,674 | 4,044 | 4,044 | 7,825 | 7,825 |
| 2011 | 3,724 | 10,376 | 1,043 | 2,521 | 2,521 | 4,878 | 4,878 |
| 2012 | 4,975 | 13,865 | 1,394 | 3,368 | 3,368 | 6,518 | 6,518 |
| 2013 | 3,243 | 9,037 | 909 | 2,196 | 2,196 | 4,248 | 4,248 |
| 2014 | 3,412 | 9,508 | 956 | 2,310 | 2,310 | 4,470 | 4,470 |

Notes: Shaded years are years during which the interim final rule was in effect. As explained in the text, Alt2 Opt1 assumes motherships are prohibited, while Alt2 Opt2 does not.
Source: Table 95, AKR calculations.

Pacific cod Alternatives 2 and 3 incorporate separate limits on catch for trawl and non-trawl catcher/processors in Area 543, and in Areas 541-542. These are limits on sector harvests in each area or area combination, but not sector allocations. Because they are not allocations, they do not guarantee a sector a share of the area harvest. The catcher vessel sectors in Area 543 and in Area 541-542 are not subject to similar sector limits, and could, potentially, harvest both area limits completely themselves.

Targeted catcher/processor and catcher vessel trawl fishing for Pacific cod in the Federal and parallel fisheries in the Aleutian Islands takes place primarily from mid-February through April. The catcher/processors also make incidental catches of Pacific cod in the fall. Non-trawl vessels, primarily catcher/processors, target Pacific cod early in the year during the same period as the trawlers, but also have an important targeted Pacific cod fishery again in the fall. (Figure 3-8 in Chapter 3 of the EIS; NMFS AKR In-season managers) Thus, the catcher/processors have been fishing simultaneously with, or after, the catcher vessels.

Since the catcher vessels could conceivably complete the harvest of all the area allocations of Pacific cod before the catcher/processor sectors could take their sector limits, Alternatives 2 and 3 could create a race for the Pacific cod, as catcher/processors harvest Pacific cod earlier in the year than they otherwise would. The potential for such a race, and its costs, depends on the relative attractiveness of Aleutian Islands Pacific cod vis-à-vis Bering Sea Pacific cod. The catcher/processors are fishing against a BSAI-wide allocation (not a limit). If they fail to catch part of it in the Aleutian Islands, it is still reserved for them in the Bering Sea.

### 1.9.3 Critical habitat closures

In addition to the catch and participation limits discussed in Sub-section 1.9.2, the alternatives include measures that close different areas of critical habitat to directed fishing for Pacific cod. This section

examines the differences in revenues associated with the areas remaining open to directed fishing under the different alternatives. This is done first without considering the possible additional effect of the trawl catcher/processor limits discussed in the preceding sub-section. However, the impacts of critical habitat closures cannot be treated in isolation from the proposed sector limits. The second part of this section discusses this interaction.

The discussions in this section pertain to the sector as defined for the purposes of this analysis: that is, trawl catcher/processors processing Pacific cod that they harvest themselves. The catch and revenue at risk, and residual catch and revenue estimates discussed in this section do not include catch by catcher vessels delivering to catcher/processors acting as motherships. This affects the analysis of the mothership restrictions under consideration.

*Critical habitat closures treated in isolation*

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing activity. The impacts of these alternatives have been evaluated by identifying the volumes of Pacific cod retained from inside and from outside of the closed critical habitat areas by trawl catcher/processors[126] in the baseline years 2004 through 2010, assuming that the volumes from inside the closed areas would no longer be harvested, and that this loss in Pacific cod production would not be made up by increased fishing in the areas outside of the closed critical habitat. These volumes, and associated revenues, are commonly referred to in similar analyses as production or revenues "at risk."

The results for each of the alternatives, and the principal options within each alternative, have been summarized in a set of tables in an appendix to this section. Figure 13 and Figure 14 summarize this analysis (adding, for comparison, results for Alternatives 1 and 4). Figure 13 shows the residual gross revenues for each alternative, and Figure 14 shows these residual gross revenues as a percentage of estimated actual gross revenues in the baseline years.[127] The figures summarize the more detailed analysis in the tables of the appendix to this section.[128] As explained in the discussion of methodology, in Section 1.2.14, these are not projections of future revenues or of the revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

The high revenue year (2007) saw high real prices and high production; while prices remained high in 2008, production of Pacific cod in the Aleutian Islands by trawl catcher/processors decreased.[129] This may reflect changes in the way the Amendment 80 segment of the fleet used Pacific cod after the introduction of Amendment 80 quotas in 2008. Amendment 80 vessel operators now were faced with new types of tradeoffs between targeting Pacific cod in the Aleutian Islands and Bering Sea, and husbanding it to cover their incidental catches of Pacific cod in other groundfish fisheries in those subareas.

Alternative 4 clearly imposes the smallest burden on trawl catcher/processors harvesting Pacific cod; this is because the alternative reverts to the regulations in place before the interim final rule (Alternative 1, the status quo) went into effect in 2011. However, Alternatives 2 and 3 are very similar to the interim final

[126] Because this sector has been defined to exclude mothership Pacific cod production, this only includes Pacific cod taken by the catcher/processors themselves.

[127] These figures summarize the gross revenues from areas remaining open under the alternatives (the residual gross revenues). These figures are not adjusted to take account of the possible gross revenue impacts of TAC percentage determination rules, or of critical habitat limits.

[128] Both figures have been simplified by identifying gross revenues under Alternative 4 with gross revenues under the baseline, thereby obviating the need for separate baseline and Alternative 4 revenue lines.

[129] The value per metric ton round weight from the Groundfish Economic SAFE provides an index of relative prices. This took a value for BSAI catcher/processor Pacific cod of $2,035 in 2007, $2,027 in 2008, and $1,247 in 2009. (Fissel et al., 2012, Table 27)

rule in their impacts on the sector. Alternative 3 is generally somewhat more attractive than Alternative 2, but each of these can be better for the fleet than Alternative 1, or worse, depending on the baseline period year. Each of the lines in Figure 13 is a crude estimate of revenues under the proposed alternative, with a confidence interval whose width is unknown, but which is believed to be wide. This uncertainty about the true position of each of these lines contributes to the difficulty of ranking Alternatives 1, 2, and 3 with respect to Pacific cod for this fleet. The Alternative 2 protective option has the greatest adverse impact on revenues from fishing in closed areas.

While residual revenue estimates may be useful indices of relative impacts, they are not, as just noted, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare measures of the actions. They are gross measures and do not take account of changes in costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues minus the change in variable costs associated with the action (Just et al., 2004). This welfare measure, however, is not available. In addition, this measure focuses attention on the remaining revenues in the Pacific cod fishery, and does not take account of the ability of fishing operations to take actions in response to the alternatives that would minimize the impact of the alternatives on their revenues, most importantly in this instance, their ability to substitute into other fisheries.

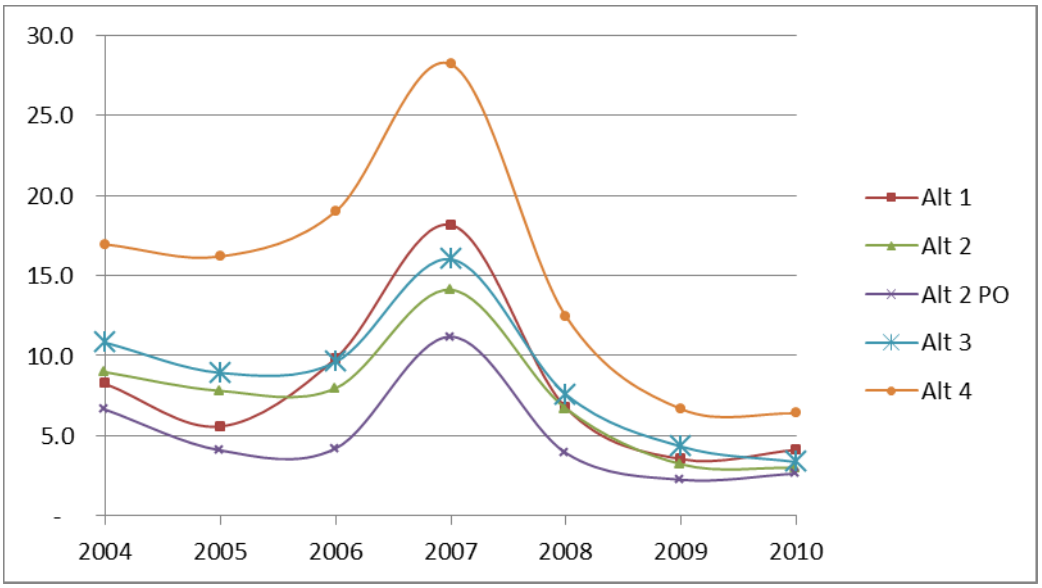



**Figure 13 Hypothetical trawl catcher/processor residual revenues from 2004 through 2010 for each of the Pacific cod alternatives (millions of 2012 dollars)**

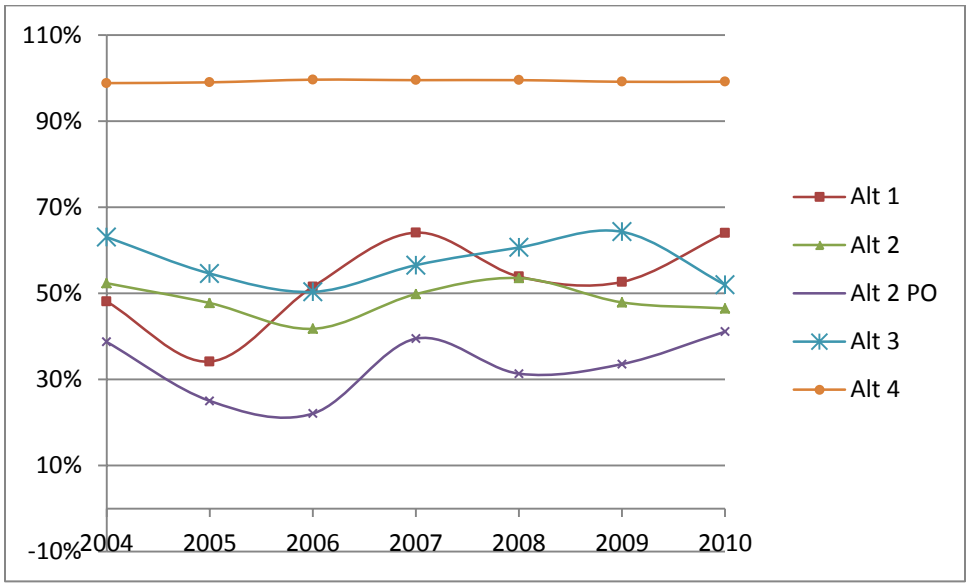



**Figure 14 Hypothetical trawl catcher/processor residual revenues from 2004 through 2010 for each of the Pacific cod alternatives, expressed as a percentage of baseline revenues**

*Interaction of critical habitat limits and area-sector limits*

In some years, some of the area-sector limits would have restricted Pacific cod harvests by trawl catcher/processors more than would be expected by simply closing critical habitat to fishing activity. Table 97 compares the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) with the area-sector limit restrictions in the alternatives and

options, and shows how much the area-sector limits restrict harvest beyond the levels associated with the critical habitat closures. Where there is no limit, the value has been set to zero. Similar information is not provided for Areas 541-542, since the area-sector limits proposed in those areas did not constrain harvests.

A comparison of the residual harvests associated with area closures and area-sector limits has only been prepared for the no-mothership option.[130] For the purposes of protecting the confidentiality of catcher vessels delivering to catcher/processors acting as motherships, and of catcher/processors acting as motherships, the trawl catcher/processor sector has been defined to include only Pacific cod that has been both caught and processed by catcher/processors. The Pacific cod caught by catcher vessels and delivered to catcher/processors acting as motherships has been grouped with the Pacific cod caught by catcher vessels and delivered to shoreside processors or shoreside floating processors. Thus the residual volumes of Pacific cod harvest for this sector only include the volumes the catcher/processors caught themselves.

A comparison of these volumes with an area-sector limit that included mothership processing would not be informative. The area-sector limit would not bind the residual catch. The comparison has been carried out for the area-sector limit defined only for catcher/processors processing their own catch.

Table 97 shows that the area-sector limits bind most often under Alternative 2 in the early years of the baseline period. Table 98 provides estimates of the revenues associated with these production shortfalls (using real 2012 dollar estimates).[131] Potential gross revenue decreases could be reduced to some extent by offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

[130] Residual catch includes only retained catch. However, in the analysis in this section, the proposed limits apply to retained and discarded catch. Discarding of Pacific cod is prohibited by increased retention/increased utilization regulations, with minor exceptions (e.g., damages or tainted fish; regulatory discards). Trawl catcher/processor Pacific cod discards averaged about a half percent per year from 2008 to 2010. These are the years in which the Amendment 80 rules were in force. Average annual discard rates were higher in the earlier baseline years, but the overall 2004 through 2010 average was only about 1 percent. Discard behavior under the Amendment 80 rules is believed to be more relevant for this analysis. Thus, while use of retained catch may cause the analysis to understate the extent to which the constraints bind, the amount of understatement is believed to be relatively small.

[131] This is an approximation of the revenue shortfall, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost incidental catches. Prices are BSAI-wide and may not capture the potentially higher value of larger Aleutian Islands Pacific cod. The impact of these changes in volume on price are unclear, since this is a small part of overall BSAI production. Any effect would take the form of a mitigation of revenue declines as volume reductions are offset by price rises.

**Table 97 Constraints imposed on potential Area 543 trawl catcher/processor residual catches by area-sector limits (metric tons)**

| Alternative 2 | | | |
|---|---|---|---|
| **Year** | **Open Critical Habitat Residual harvest** | **Catcher/processor only area-sector limit** | **Residual harvest minus area-sector limit** |
| 2004 | 1,939 | 1,833 | 105 |
| 2005 | 3,393 | 1,694 | 1,699 |
| 2006 | 2,154 | 1,793 | 362 |
| 2007 | 1,408 | 1,626 | 0 |
| 2008 | 1,274 | 1,626 | 0 |
| 2009 | 772 | 1,682 | 0 |
| 2010 | 327 | 1,674 | 0 |
| **Alternative 2, protective option** | | | |
| **Year** | **Open Critical Habitat Residual harvest** | **Catcher/processor only area-sector limit** | **Residual harvest minus area-sector limit** |
| 2004 | 255 | 1,833 | 0 |
| 2005 | 720 | 1,694 | 0 |
| 2006 | 179 | 1,793 | 0 |
| 2007 | 156 | 1,626 | 0 |
| 2008 | 104 | 1,626 | 0 |
| 2009 | 33 | 1,682 | 0 |
| 2010 | 108 | 1,674 | 0 |
| **Alternative 3** | | | |
| **Year** | **Open Critical Habitat Residual harvest** | **Catcher/processor only area-sector limit** | **Residual harvest minus area-sector limit** |
| 2004 | 3,239 | 1,833 | 1,406 |
| 2005 | 4,099 | 1,694 | 2,405 |
| 2006 | 3,016 | 1,793 | 1,223 |
| 2007 | 2,227 | 1,626 | 601 |
| 2008 | 1,649 | 1,626 | 22 |
| 2009 | 1,631 | 1,682 | 0 |
| 2010 | 548 | 1,674 | 0 |

Notes: Where the area-sector limit is greater than the open critical habitat catch estimate, the area-sector limit would not bind, and the cell has been set equal to zero.
Sources: Open critical habitat residual harvest estimates from this section's appendix tables; area-sector limits from Table 96

**Table 98 Estimates of revenues associated with production shortfalls in Area 543 associated with trawl catcher/processor area-sector limits (millions of real 2012 dollars)**

| Year | Real price per ton ($/metric ton round weight) | Alt 2 | Alt 2 – P.O. | Alt 3 |
|---|---|---|---|---|
| 2004 | 1,364 | 0.1 | - | 1.9 |
| 2005 | 1,368 | 2.3 | - | 3.3 |
| 2006 | 1,868 | 0.7 | - | 2.3 |
| 2007 | 2,286 | - | - | 1.4 |
| 2008 | 2,358 | - | - | 0.1 |
| 2009 | 1,271 | - | - | - |
| 2010 | 1,594 | - | - | - |
| Source: Table 97, AKFIN price estimates, AKR calculations. | | | | |

Figure 15 shows the relationships between the alternatives, and the Alternative 2 protective option given the constraints placed on revenues when the area-sector limits are less than residual catch from the open areas in the baseline years. The estimates in the preceding tables have been supplemented with gross revenues for Alternatives 1 and 4, calculated "as if" area-sector limits were applied to these alternatives. Although these alternatives do not explicitly include area-sector limits, under an Aleutian Islands/Bering Sea Pacific cod split measures similar to those included in Alternatives 2 and 3 may be implemented under Alternatives 1 and 4. Treating all the alternatives this way, in this figure, enhances comparability of the revenue flows.

Alternative 4 has the largest revenue flows, while the protective option to Alternative 2 has the lowest. Alternatives 1, 2, and 3 have very similar revenues. Alternative 2 may have revenues somewhat lower than the other two alternatives. Too much weight should not be placed on small revenue differences, given the uncertainties inherent in this analysis. The Alternative 2 limits are the catcher/processor only limits. This figure does not allow a comparison of the limits when catcher vessels are allowed to make deliveries to motherships.

The similarity of the results of Alternatives 1, 2, and 3 with respect to residual gross revenues may seem counter-intuitive. Alternative 1, the status quo, reflects the adverse impacts on fishery production and revenues caused by the interim final rule. Alternatives 2 and 3 were designed to mitigate the adverse impact of Alternative 1. However, in aggregate, it is not clear that they provide large benefits to trawl catcher/processors. An examination of production data suggests that Alternative 1 performs worse than Alternatives 2 and 3 for trawlers in Area 543, and in Area 542, but that it performs better in Area 541, and that the differences offset each other to some extent. The key is the recognition that in Areas 541-542 (considered jointly), Alternatives 2 and 3 prohibit trawling in critical habitat east of 174 degrees west. An examination of the location of trawl Pacific cod production in Figure 19 shows that this line lies just to the east of Atka, and that a very large amount of the Area 541 Pacific cod production has taken place just to the east of this line.

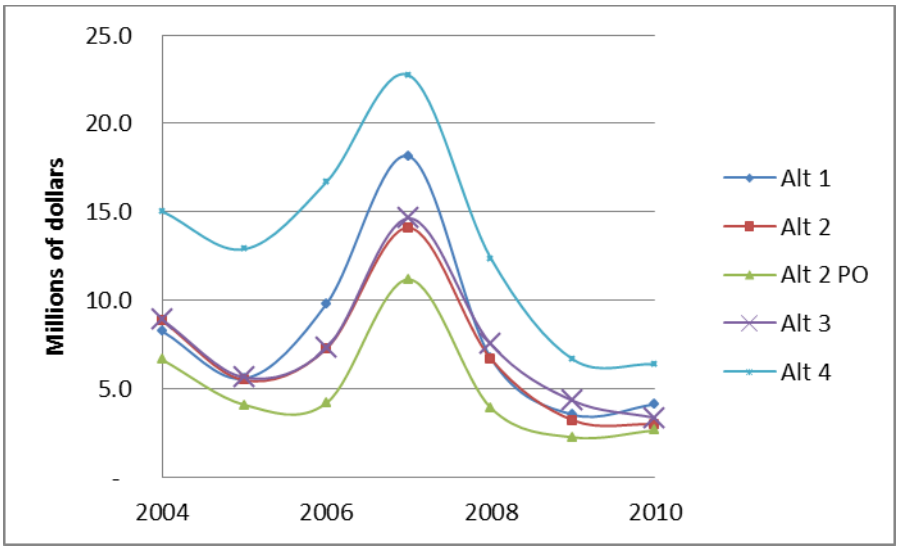



**Figure 15 Hypothetical trawl catcher/processor gross revenues, by alternative, taking account of the catcher/processor only area-sector limits (millions of 2012 dollars)**

In other years, some of the area-sector limits would have exceeded the harvests coming from areas outside of closed critical habitat in the baseline years. If trawl catcher/processors successfully redeploy from fishing in closed critical habitat to areas that remain open, these limits may allow increased production. Table 99 compares the residual harvest in Area 543 (from the analysis of critical habitat closures summarized in the appendix to this section) and in Areas 542-543 with the TACs associated with the percentage TAC options under Alternatives 2 and 3, and calculates the additional Pacific cod catch that might be possible, if the fleet could successfully redeploy into Pacific cod within Area 543. For the reasons discussed earlier in this sub-section, this analysis is only carried out for the Alternative 2 option that does not allow catcher vessels to deliver their Area 541 catches to catcher/processors acting as motherships.

**Table 99 Potential expansion of open area fishing within the limits imposed on open area catches (residual catches) by area-sector limits (metric tons)**

| Area 543 - Alternative 2 | | | |
|---|---|---|---|
| **Year** | **Open Critical Habitat Residual harvest** | **Catcher/processor only area-sector limit** | **Area-sector limit minus residual harvest** |
| 2004 | 1,939 | 1,833 | 0 |
| 2005 | 3,393 | 1,694 | 0 |
| 2006 | 2,154 | 1,793 | 0 |
| 2007 | 1,408 | 1,626 | 218 |
| 2008 | 1,274 | 1,626 | 352 |
| 2009 | 772 | 1,682 | 910 |
| 2010 | 327 | 1,674 | 1,347 |
| **Area 543 - Alternative 2, protective option** | | | |
| **Year** | **Open Critical Habitat Residual harvest** | **Catcher/processor only area-sector limit** | **Area-sector limit minus residual harvest** |
| 2004 | 255 | 1,833 | 1,579 |
| 2005 | 720 | 1,694 | 974 |
| 2006 | 179 | 1,793 | 1,614 |
| 2007 | 156 | 1,626 | 1,471 |
| 2008 | 104 | 1,626 | 1,523 |
| 2009 | 33 | 1,682 | 1,649 |
| 2010 | 108 | 1,674 | 1,566 |
| **Area 543 - Alternative 3** | | | |
| **Year** | **Open Critical Habitat Residual harvest** | **Catcher/processor only area-sector limit** | **Area-sector limit minus residual harvest** |
| 2004 | 3,239 | 1,833 | 0 |
| 2005 | 4,099 | 1,694 | 0 |
| 2006 | 3,016 | 1,793 | 0 |
| 2007 | 2,227 | 1,626 | 0 |
| 2008 | 1,649 | 1,626 | 0 |
| 2009 | 1,631 | 1,682 | 51 |
| 2010 | 548 | 1,674 | 1,126 |
| **Area 541-542 – Alternatives 2, 2 with protective option, and 3 (these have same residual harvest)** | | | |
| **Year** | **Open Critical Habitat Residual harvest** | **Joint catcher processor - mothership area-sector limit** | **Area-sector limit minus residual harvest** |
| 2004 | 4,433 | 9,504 | 5,071 |
| 2005 | 2,184 | 8,779 | 6,595 |
| 2006 | 1,984 | 8,848 | 6,864 |
| 2007 | 4,621 | 8,027 | 3,407 |
| 2008 | 1,549 | 8,027 | 6,478 |
| 2009 | 1,667 | 8,301 | 6,634 |
| 2010 | 1,520 | 7,825 | 6,306 |

Notes: Where the area-sector limit is greater than the open critical habitat catch estimate, the area-sector limit would not bind, and the cell has been set equal to zero.
Sources: Open critical habitat residual harvest estimates from this section's appendix tables; harvests under options from Table 96

Table 100 provides estimates of the possible monetary value of this potential production increase (using real 2012 dollar estimates).[132] There is a large, but unknown, degree of uncertainty associated with these revenue estimates. These are not predictions of revenue increases; the estimates are speculative and assume that the fleets are able to shift effort from closed to open areas under each alternative, within the area-sector limits.

**Table 100 Estimates of potential trawl catcher/processor wholesale gross revenue increases (over estimates based solely on critical habitat closures and net of possible area-year shortfalls) associated with area-sector limits (millions of dollars)**

| Year | Real price per ton ($/metric ton round weight) | Alt 2 Option 1 | Alt 2 – P.O. Option 1 | Alt 3 |
|---|---|---|---|---|
| 2004 | 1,364 | 6.8 | 9.1 | 5.0 |
| 2005 | 1,368 | 6.7 | 10.4 | 5.7 |
| 2006 | 1,868 | 12.1 | 15.8 | 10.5 |
| 2007 | 2,286 | 8.3 | 11.2 | 6.4 |
| 2008 | 2,358 | 16.1 | 18.6 | 15.2 |
| 2009 | 1,271 | 9.6 | 10.5 | 8.5 |
| 2010 | 1,594 | 12.2 | 12.5 | 11.9 |
| Source: Estimates calculated as the product of the values shown and the relevant volumes from Table 99, minus the appropriate revenue estimates from Table 96. | | | | |

The preceding discussion focuses on the interaction residual revenues and the area-sector limits, assuming the "no mothership" option was chosen in Area 543 under Alternative 2. The no-mothership area-sector limits have been compared to the area closure residual revenues for the trawl catcher/processor sector to determine in what years the area-sector limits would restrict harvests below the area closure restrictions, and in what years they might allow a redeployment of harvesting activity into areas remaining open for fishing.

However, trawl catcher/processors active in Area 543 are physically capable of operating as motherships for trawl catcher vessels. The "no mothership" option prohibits them from doing so. Table 101 provides estimates of the potential "revenues at risk" for the trawl catcher/processor fleet if they are prohibited from operating as motherships. In this table, the estimated area-sector limits, if motherships are prohibited, are subtracted from those if motherships were allowed. The difference provides a measure of the restriction in the volumes of Pacific cod caught in Area 543 (forgone by catcher vessels and not processed by catcher/processors) and processed by catcher/processors. The final column provides wholesale revenue estimates for these volumes of Pacific cod. These estimates range from $1.7 million up to $5.4 million during the baseline years.

These revenues at risk are not necessarily revenues that would have been generated by mothership activity if it were allowed. The Alternative 2 option that allows motherships does not prohibit the trawl catcher/processors from catching the entire area-sector limit themselves (similarly, it does not prohibit the entire limit from being harvested by trawl catcher vessels and being delivered to catcher/processors for processing).

[132] This is an approximation of the revenue increase, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost incidental catch revenues.

**Table 101 Potential wholesale gross revenue loss to trawl catcher/processor sector of inability to act as motherships in Area 543 under Alternative 2, Option 1**

| Year | Area-sector limit permitting motherships | Area-sector limit if motherships are prohibited | Difference between the two area-sector limits | Value in 2012 $/mt | Value of difference in million $ |
|---|---|---|---|---|---|
| 2004 | 4,430 | 1,833 | 2,597 | 1,364 | 3.5 |
| 2005 | 4,092 | 1,694 | 2,398 | 1,368 | 3.3 |
| 2006 | 4,331 | 1,793 | 2,538 | 1,868 | 4.7 |
| 2007 | 3,930 | 1,626 | 2,304 | 2,286 | 5.3 |
| 2008 | 3,930 | 1,626 | 2,304 | 2,358 | 5.4 |
| 2009 | 4,064 | 1,682 | 2,382 | 1,271 | 3.0 |
| 2010 | 4,044 | 1,674 | 2,370 | 1,594 | 3.8 |

Note: Motherships would have acquired the Pacific cod from catcher vessels. They would have had to pay the catcher vessels for the fish.
Source: Limits summarized from Table 96.

Because the sector limits are defined with respect to the share of harvests from 2006 to 2010, a period when vessel counts suggest mothership activity was greater than in 2004-2005 (see Table 3), the area-sector limit for motherships may not be very restrictive.

### 1.9.4 Seasons and other measures

The trawl Pacific cod fisheries in the Bering Sea and Aleutian Islands are temporally dispersed into three seasons—an A-season from January 20 to April 1, a B-season from April 1 to June 10, and a C-season from June 10 to November 1. Unused amounts in A-season rollover to the subsequent season. Alternative 1 keeps these seasons in place for all sectors.

*Alt 2 prohibition on directed fishing after April 30 in Area 543*

Alternative 2 prohibits directed fishing using trawl gear for Pacific cod after April 30 in Area 543. This proposed directed fishing end date would not impact the Pacific cod fishery, all else equal. From 2004 through 2010, all targeted Pacific cod catch by trawl vessels in Area 543 was harvested before April 30.

However, this proposed directed fishing closure date may affect retention of Pacific cod after April 30. A prohibition on directed fishing means that vessels harvesting more than the 20 percent MRA after April 30 are required to discard some Pacific cod. From 2004 through 2010, approximately 4 percent of total Pacific cod catch harvested after April 30 in Area 543 was discarded. Since Pacific cod is required to be retained if the Pacific cod fishery is open, the amounts of discards likely occurred when the fishery was closed due to halibut PSC limit management. After the implementation of Amendment 80 in 2008 through 2010, less than 1 percent was discarded.

*Alt 2, 3, and 4 C-season end date extension in Areas 541 and 542*

Alternatives 2, 3, and 4 relax the C-season end date from November 1 to December 31 in Areas 541 and 542 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. Alternatives 2 and 4 relax the C-season end date from November 1 to December 31 in Area 543 for

Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. This relaxation of the season date would not apply to other vessels or the Bering Sea subarea. Limiting this to Amendment 80 and trawl vessels fishing for CDQ Pacific cod has been proposed to address potential regulatory discards of Pacific cod after November 1.

From 2004 through 2010, approximately 0.3 percent of total Pacific cod harvest by trawl catcher/processors and motherships in the Aleutian Islands was harvested after November 1. Catch after November 1 was rarely discarded. The information is confidential; however, less than 0.01 percent was discarded from 2004 through 2010. This indicates that regulatory discards are not a concern, all else equal.

This relaxation of the C-season end date may impact the reallocation of Pacific cod later in the year. Catch limits per area in Alternatives 2 and 3 would limit any additional catch and likely prevent any impact on reallocation of Pacific cod. However, there could be an impact for Alternative 4, if the total TAC of Aleutian Islands Pacific cod, expected to be implemented in the 2014 harvest specifications, is not fully harvested.

In most years, the C-season apportionment of the BSAI trawl catcher vessel allocation is not fully harvested. This allows NMFS to reallocate Pacific cod in the BSAI from the BSAI trawl catcher vessel sector, and any other sectors not expected to fully harvest their allocation, to the sectors that can harvest it. This reallocation is usually done late in the year, from mid-October to early December, when NMFS Inseason management staff can determine that the trawl catcher vessel sector is not able to harvest their allocation.

The regulations at 50 CFR 679.20(a)(7)(iii)(A) determine the sectors that get preference during this reallocation. These regulations state that the less than 60-foot hook-and-line and pot sector gets first preference of available Pacific cod, second is trawl gear reallocations to other trawl gear sectors, and third is Pacific cod reallocations to the other non-trawl sectors including the hook-and-line catcher/processors.

In a typical year, a small amount of Pacific cod is reallocated to the less than 60-foot hook-and-line and pot sector. The Amendment 80 sector gets a portion of the reallocated Pacific cod to support incidental catch, but due to C-season end date of November 1, this amount is typically limited. All remaining amounts get reallocated to the hook-and-line catcher/processor sector.

With the change of the November 1 season date to December 31, a directed fishery for Pacific cod could develop in the Aleutian Islands after November 1. This concern is limited because this change only applies to the Aleutian Islands and the Pacific cod TAC is expected to be split from the Bering Sea TAC in 2014. However, in years when the Aleutian Islands Pacific cod TAC is high, and if the sector allocations are still managed BSAI wide, this scenario could occur under Alternative 4 and a directed fishery for Pacific cod could develop in the Aleutian Islands after November 1.

Under Amendment 80, trawl catcher/processors may use their Pacific cod allocation for directed fishing or for incidental harvests of Pacific cod. The Amendment 80 fleet cannot know for sure what its incidental Pacific cod needs will be at the start of the year, although these will become clearer as the year progresses. Once these needs are more clearly defined, the fleet will learn the full scope of its potential directed Pacific cod harvests. If a directed fishery becomes possible later in the year, the Amendment 80 sector may request all remaining amounts of trawl catcher vessel Pacific cod to support this directed fishery. Since this relaxation of the season end date proposed in the alternatives only applies to Amendment 80 vessels, they would be the only sector to benefit from a late directed fishery for Pacific cod. This could result in smaller reallocations to the hook-and-line catcher/processor sector.

*ESA re-initiation triggers.*

Under Alternative 1, ESA consultation is to be reinitiated if area-sector Pacific cod harvests exceed certain trigger levels. These are: (a) 11.5 percent of the BSAI Pacific cod ABC for trawl gear, and 1.5 percent for non-trawl gear, in Area 541, and (b) 2 percent of BSAI Pacific cod ABC for trawl gear, and 1.5 percent for non-trawl gear in Area 542. These limits are meant to constrain production from these areas to levels observed from 2007 through 2009. (Chapter 2 of the EIS)

These trigger levels were not reached in the years 2011 through 2013. They were put in place to prevent an increase of harvest in the Aleutian Islands. This is not a limit that is managed inseason or subject to closures. Therefore, this trigger could be reached. However, it is possible that an area-sector trigger may be exceeded, for example if Pacific cod harvests were concentrated only one area of the Aleutian Islands.

Alternatives 2 and 3 remove this trigger in lieu of sector and area allocations to prevent additional catch. Since under these alternatives these limits are established, the trigger is not necessary. Alternative 4 has no limits or triggers and could result in more catch in an area or by a sector than has occurred historically.

### 1.9.5 Redeployment

Section 1.3, evaluating Alternatives 1 and 4, included a detailed, qualitative discussion of the impacts of this action on the trawl catcher/processor sector in the Aleutian Islands. Alternatives 1 and 4 represent the two extremes of restrictions on the trawl catcher/processor sector. The restrictions under Alternative 1 (the interim final rule, which is the status quo for this analysis) are greater than those under other alternatives, and the restrictions under Alternative 4 (a return to the regulations as they were in 2010, with modest changes) are the least restrictive. The results for these two alternatives, therefore, can be thought of as bookends for the impacts of Alternatives 2 and 3, and their options.

This is true for redeployment, as well as for other impacts. In general, the conclusions with respect to redeployment under Alternative 1 hold (see Section 1.3.3), except that the fleet is not likely to redeploy to the same extent, since its fishing in Aleutian Islands Atka mackerel and Pacific cod fisheries will not have been restricted to the same extent. It is not possible to provide quantitative estimates of the differences between the alternatives, since the analysis has necessarily been qualitative.

Section 1.3 discussed redeployment under four headings: (1) other Amendment 80 species; (2) non-Amendment 80 species; (3) mothership operations; and (4) other activities. Amendment 80 species are allocated among participating firms in cooperatives as quota share. A firm hoping to redeploy into another Amendment 80 species as a target must hold or acquire the quota share. If it does not hold the quota share, much of its profit from redeployment is likely to be transferred to the firm from which it acquires the quota.

The fleet would have limited opportunities to fish for Atka mackerel elsewhere in the Aleutian Islands or in the Gulf of Alaska because of TAC limits. There may be some increased activity in the Bering Sea, if the rules governing the MRA are changed.

Pacific cod fishing opportunities in the Aleutian Islands are limited, but vessels may be able to fish their Pacific cod quota in the Bering Sea. Given the Aleutian Islands and Bering Sea Pacific cod specifications split, the ability to shift to the Bering Sea may be constrained by the directed fishing allowance for the Bering Sea area. Their ability to fully offset their Aleutian Islands Atka mackerel losses here, however, could be limited by higher halibut PSC rates, and possibly lower prices for smaller Bering Sea Pacific cod. Vessels could shift into increased rock sole and yellowfin sole, although halibut PSC and incidental

catches of other Amendment 80 species, such as Pacific cod, may be limiting. Aleutian Islands Pacific ocean perch is fully allocated and harvested and, therefore, is not available for redeployment. Bering Sea Pacific ocean perch is not an Amendment 80 allocated species, and may offer some opportunities for these vessels. Flathead sole has not been targeted by these vessels in the past; however, the vessels are more likely to reserve their halibut PSC and Pacific cod quota for use as incidental catch in the rock sole, yellowfin sole, and arrowtooth flounder fisheries.

Trawl catcher/processors may turn to fisheries that are not limited by Amendment 80 quotas, including BSAI fisheries for arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, and "other flatfish," and Gulf of Alaska fisheries for arrowtooth flounder, rockfish, and rex sole. The BSAI fisheries may provide attractive opportunities, although "other flatfish" is generally used as incidental catch in other fisheries, rather than as a target. The GOA fisheries are constrained by Amendment 80 sideboards. The vessels could target the trawl allocation of sablefish, but there are high halibut prohibited species catch rates in this fishery.

Amendment 80 trawl catcher/processors could obtain some species for processing by acting as motherships for trawl catcher vessels. This has been a source of Atka mackerel and Pacific cod for some trawl catcher/processors. These vessels could also seek to increase access to BSAI trawl catcher vessel yellowfin sole; however, this could create conflicts with American Fisheries Act catcher/processors also seeking access to these yellowfin sole. Opportunities for these vessels outside of Alaska appear to be limited.

### 1.9.6 Incidental catch and PSC

When compared to the baseline data of 2004 to 2010, there would be a reduction in targeted Pacific cod fishing in the Aleutian Islands under Alternatives 1, 2, and 3. The Aleutian Islands Pacific cod TAC split will reduce this catch even more. The end result may be a reduction of groundfish caught incidental to Pacific cod. It may also result in a slight reduction of prohibited species catch (PSC). Table 102 provides the average rate of incidental catch and PSC in Pacific cod targets in the Aleutian Islands from 2004 through 2012.

**Table 102 Aleutian Islands average rate of incidental catch and PSC in Pacific cod targets by trawl gear from 2004 through 2012**

| | 541 | 542 | 543 | All areas |
|---|---|---|---|---|
| **Groundfish (percentage of total groundfish catch in Pacific cod targets)** | | | | |
| Pacific cod | 92.75% | 88.26% | 92.86% | 92.22% |
| Atka mackerel | 1.67% | 3.07% | 1.85% | 1.87% |
| Pollock | 1.00% | 2.95% | 1.10% | 1.26% |
| Rock sole | 2.34% | 1.92% | 1.31% | 2.12% |
| All other species | 2.24% | 3.80% | 2.88% | 2.53% |
| **Prohibited Species catch (#s of animals per metric tons of groundfish)** | | | | |
| C. opilio king crab | 0.013 | 0.017 | 0.000 | 0.012 |
| Red king crab | 0.004 | 0.219 | 0.002 | 0.030 |
| C. bairdi tanner crab | 0.113 | 0.085 | 0.100 | 0.107 |
| Chinook salmon | 0.053 | 0.031 | 0.003 | 0.042 |
| Non-Chinook salmon | 0.007 | 0.042 | 0.001 | 0.010 |
| **Prohibited species catch (percentage of total groundfish)** | | | | |
| Halibut | 0.30% | 0.29% | 0.14% | 0.27% |

As seen in Table 102 the species with the highest incidental rate in Pacific cod targets by trawl gear is rock sole. A reduction in Pacific cod targeted fishing by trawl gears in the Aleutian Islands may result in less incidental catch of rock sole. Rock sole is an Amendment 80 species and an ICA is set for all other vessels. The overall reduction in rock sole is likely not enough to affect the amount used to set the ICA and total harvest of rock sole by Amendment 80 and CDQ vessels is unlikely to decrease. Rock sole that is not caught incidentally by Amendment 80 and CDQ vessels is likely to be harvested in the directed fishery in the Bering Sea.

The next highest incidental catch rate is Atka mackerel. Similar to rock sole, a reduction in incidental catch rates is unlikely to change overall harvest or amounts set aside for the ICA. The incidental catch rates for pollock may be reduced; however, this is unlikely to change the amount set for the ICA. All other species caught incidentally in Pacific cod targets by trawl gear currently are not a management concern.

PSC in Pacific cod targets by trawl gear during the baseline years is very low. A reductions in Pacific cod catch by trawl gear under the alternatives would likely result in a small decrease in PSC. A reduction in PSC, in particular halibut, may provide halibut PSC limits available for other target fisheries that have higher halibut PSC rates. However, because the halibut PSC rate in the Aleutian Islands is (relatively) so low, that change is likely to be small. PSC rates of crab and salmon species are low and currently are not a substantial management concern.

### 1.9.7 Fleet and community impacts

*Trawl catcher/processors*

The reduction in Pacific cod fishing opportunities in the Aleutian Islands adversely affects the trawl catcher/processor fleet, and the vessels in it seek to redeploy into other fishing activities to minimize the adverse impacts of the action on their profitability. The owners of scarce resources used in this fishery

(limited fishing rights, exceptional fishing skills) will experience a loss of the returns accruing to those resources. As shown in Figure 13, considering only the area closures, the protective option of Alternative 2 has the greatest adverse impact on fishing revenues, while Alternative 4, has minimal or trivial impacts. Alternatives 1, 2 (without the protective option), and 3 have intermediate impacts. The relative impacts of these alternatives on fishing operations will depend on year-specific circumstances.

*Adak/Seattle-Tacoma*

Trawl catcher/processors process Pacific cod at sea and, thus, potential processing at Adak would not be affected by this action. However, vessels fishing Pacific cod in the Aleutian Islands visit the port of Adak, and purchase goods and services there. These include fuel, and use of the airport at Adak for crew rotation. At the time the interim final rule went into effect, the number of visits to Adak by trawl catcher/processors fishing for Pacific cod, either before or after the visit, declined. The number of visits, which averaged about 29 a year from 2004 to 2010, decreased to 13 in 2011 **(**see Table 10-13 of the EIS for more details). In addition, as discussed in Section 1.2.11 of this RIR, Adak receives a share of revenues from the fisheries business tax collected by the State of Alaska from vessels processing catch and delivering it to shore. A decline in Pacific cod production may reduce revenues from this source.

The impact of the measure in Alternative 2 that would prohibit the use of catcher/processors as motherships for Pacific cod caught in Area 543 may cause catcher vessels to deliver Pacific cod to Adak as an alternative, assuming that option is available. However, by increasing catcher vessel operating costs in Area 543, it may also reduce overall catcher vessel fishing activity in that area.

It does not appear that Amendment 80 trawl catcher/processors left the BSAI fisheries following the effective date of the interim final rule. Purchases of goods and services in the Puget Sound base areas of this fleet may have declined, but if they did, and that is not known, there is no information on the size of the decline. If incomes received by participants in the fishery declined (profits to the fishing companies and wages, salaries, and shares for persons working for the companies) expenditures by these persons probably declined as well. This could have reduced spending in the Puget Sound region. However, any change in fishing company purchases, or in spending out of personal income by employees or owners, is small in comparison to the Puget Sound economy.

*CDQ communities and Aleut Corporation stockholders*

The alternatives under consideration here reduce CDQ group allocations of Pacific cod and, thus, adversely affect the CDQ groups, and the communities that they benefit. The comparison of alternatives follows the discussion above, for the trawl catcher/processor sector.

The alternatives under consideration here may affect the revenues of the Aleut Corporation subsidiary, the Aleut Enterprise Corporation, by reducing fuel sales, and purchases of other goods and services, at Adak. Changes in activity at Adak can affect Aleut Corporation objectives of contributing to the development of Adak.

*Benefits of protecting Steller sea lions*

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, and of destruction or adverse modification to Steller sea lion critical habitat, represents a legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA and Regulatory Impact Review analysis.

### 1.9.8 Summary

Table 103 summarizes key results from this analysis for all Pacific cod alternatives and options (including Alternative 1 and 4 results from Section 1.3). The inclusion of Alternative 1 and 4 results provides context for the Alternative 2 and 3 results.

**Table 103 Comparison of Pacific cod trawl catcher/processor alternatives**

| Description | Alternative 1 | Alternative 2 | | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| | | Basic | With Protective Option | | |
| Amendment 80 trawl catcher/processors | Residual gross revenues are 34% to 64% of baseline revenues | Residual gross revenues are 42% to 54% of baseline revenues. | Residual gross revenues are 22% to 41% of baseline revenues. | Residual gross revenues are 50% to 64% of baseline revenues. | Residual gross revenues are 99% to 100% of baseline revenues. |
| Adak | Fewer port visits by trawl catcher/processors generate less local income. Visits dropped from 29 a year in 2004–2010 to 13 in 2011. Reduced revenues, lower income from State shared fishery taxes. | Comparable to Alternative 1 | Fewer port visits than under Alternatives 1, 2, and 3. | Comparable to Alternative 1 | More port visits than under all other alternatives. |
| Other communities | This may have adverse impacts on ports in the Pacific Northwest supplying logistical services to trawl catcher/processors, and to places where persons earning incomes in these fleets spend their incomes. Impacts are small compared to overall economies. | Adverse impacts smaller than those under Alternative 1. | Adverse impacts smaller than under Alternatives 1 and 2. | Similar to Alternative 2. | Similar to Alternative 3. |
| CDQ communities and the Aleut Corporation | The relative distribution of impacts to CDQ communities and Aleut Corporation stockholders is similar to that for the trawl catcher/processor fleet. | | | | |
| Incidental catch and PSC | None of the alternatives appear to create serious issues for incidental catch or PSC. | | | | |
| Steller sea lion stock | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | This alternative appears to remove the least prey from the prey field and, thus, may have a smaller impact on Steller sea lions than the other alternatives. | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | This alternative removes the most prey from the prey field, and, thus, may have the greatest adverse impact on Steller sea lions. |
| Sum of producers and consumers surpluses | The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Pacific cod products, and consumers' surpluses accruing to persons who value SSL population health. Producers' surplus changes cannot be estimated, surpluses accruing to U.S. consumers are unlikely to change much since overall BSAI Pacific cod production is unlikely to change much. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus, the net benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion. | | | | |

### 1.9.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Pacific cod by trawl catcher/processors. This analysis of these measures is summarized in the catch and revenue tables in this appendix. The appendix includes a catch table, and a revenue table, for each of the principal alternative-option combinations.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the residual catch as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars. Each alternative and option combination is summarized in one catch and one revenue table.

**Table 104 Location of catcher/processor Pacific cod harvests with respect to Alternative 1 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open by (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 5,597 | 3,269 | 3,239 | 12,105 | 739 | 2,334 | 3,239 | 6,313 | 4,857 | 935 | 0 | 5,792 | 48% |
| 2005 | 5,117 | 2,187 | 4,099 | 11,403 | 1,410 | 1,934 | 4,099 | 7,443 | 3,706 | 254 | 0 | 3,960 | 35% |
| 2006 | 5,045 | 1,854 | 3,016 | 9,915 | 336 | 1,462 | 3,016 | 4,814 | 4,709 | 391 | 0 | 5,101 | 51% |
| 2007 | 7,724 | 2,145 | 2,228 | 12,098 | 725 | 1,413 | 2,228 | 4,366 | 6,999 | 732 | 0 | 7,731 | 64% |
| 2008 | 2,834 | 785 | 1,652 | 5,271 | 259 | 523 | 1,652 | 2,434 | 2,574 | 262 | 0 | 2,837 | 54% |
| 2009 | 1,966 | 1,518 | 1,657 | 5,141 | 43 | 748 | 1,657 | 2,448 | 1,923 | 770 | 0 | 2,693 | 52% |
| 2010 | 2,123 | 1,284 | 549 | 3,956 | 87 | 815 | 549 | 1,450 | 2,036 | 469 | 0 | 2,506 | 63% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 105 Estimated Alternative 1 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 6.7 | 3.9 | 3.8 | 14.4 | 0.9 | 2.8 | 3.8 | 7.5 | 5.9 | 1.1 | 0.0 | 6.9 | 48% |
| 2005 | 6.3 | 2.7 | 5.1 | 14.1 | 1.8 | 2.4 | 5.1 | 9.3 | 4.5 | 0.3 | 0.0 | 4.8 | 34% |
| 2006 | 8.6 | 3.2 | 5.2 | 17.0 | 0.6 | 2.5 | 5.2 | 8.2 | 8.1 | 0.7 | 0.0 | 8.7 | 52% |
| 2007 | 16.5 | 4.6 | 4.7 | 25.8 | 1.5 | 3.0 | 4.7 | 9.3 | 15.0 | 1.6 | 0.0 | 16.6 | 64% |
| 2008 | 6.4 | 1.8 | 3.7 | 11.9 | 0.6 | 1.2 | 3.7 | 5.5 | 5.8 | 0.6 | 0.0 | 6.4 | 54% |
| 2009 | 2.5 | 1.8 | 2.1 | 6.3 | 0.1 | 0.9 | 2.1 | 3.0 | 2.4 | 0.9 | 0.0 | 3.3 | 53% |
| 2010 | 3.4 | 2.0 | 0.8 | 6.2 | 0.1 | 1.3 | 0.8 | 2.2 | 3.2 | 0.7 | 0.0 | 4.0 | 64% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 8.0 | 4.6 | 4.5 | 17.1 | 1.0 | 3.3 | 4.5 | 8.9 | 7.0 | 1.3 | 0.0 | 8.2 | 48% |
| 2005 | 7.3 | 3.1 | 5.9 | 16.3 | 2.1 | 2.8 | 5.9 | 10.8 | 5.2 | 0.3 | 0.0 | 5.6 | 34% |
| 2006 | 9.7 | 3.6 | 5.8 | 19.1 | 0.6 | 2.8 | 5.8 | 9.2 | 9.1 | 0.7 | 0.0 | 9.8 | 52% |
| 2007 | 18.1 | 5.0 | 5.2 | 28.3 | 1.7 | 3.3 | 5.2 | 10.2 | 16.4 | 1.7 | 0.0 | 18.2 | 64% |
| 2008 | 6.7 | 1.9 | 3.9 | 12.5 | 0.6 | 1.2 | 3.9 | 5.8 | 6.1 | 0.6 | 0.0 | 6.7 | 54% |
| 2009 | 2.6 | 1.9 | 2.2 | 6.7 | 0.1 | 1.0 | 2.2 | 3.2 | 2.5 | 1.0 | 0.0 | 3.5 | 53% |
| 2010 | 3.5 | 2.1 | 0.9 | 6.5 | 0.1 | 1.3 | 0.9 | 2.3 | 3.4 | 0.8 | 0.0 | 4.1 | 64% |

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 106 Location of catcher/processor Pacific cod harvests with respect to Alternative 2 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open by (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 5,597 | 3,269 | 3,239 | 12,105 | 2,098 | 2,334 | 1,301 | 5,733 | 3,499 | 935 | 1,939 | 6,372 | 53% |
| 2005 | 5,117 | 2,187 | 4,099 | 11,403 | 3,187 | 1,934 | 706 | 5,827 | 1,930 | 254 | 3,393 | 5,577 | 49% |
| 2006 | 5,045 | 1,854 | 3,016 | 9,915 | 3,452 | 1,462 | 862 | 5,776 | 1,593 | 391 | 2,154 | 4,139 | 42% |
| 2007 | 7,724 | 2,145 | 2,228 | 12,098 | 3,836 | 1,413 | 820 | 6,069 | 3,888 | 733 | 1,408 | 6,029 | 50% |
| 2008 | 2,834 | 785 | 1,652 | 5,271 | 1,553 | 516 | 378 | 2,447 | 1,281 | 268 | 1,274 | 2,824 | 54% |
| 2009 | 1,966 | 1,518 | 1,657 | 5,141 | 1,069 | 748 | 885 | 2,702 | 897 | 770 | 772 | 2,439 | 47% |
| 2010 | 2,123 | 1,284 | 549 | 3,956 | 1,073 | 815 | 222 | 2,110 | 1,050 | 470 | 327 | 1,846 | 47% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 107 Estimated Alternative 2 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 6.7 | 3.9 | 3.8 | 14.4 | 2.5 | 2.8 | 1.5 | 6.9 | 4.2 | 1.1 | 2.3 | 7.6 | 52% |
| 2005 | 6.3 | 2.7 | 5.1 | 14.1 | 4.0 | 2.4 | 1.0 | 7.4 | 2.3 | 0.3 | 4.1 | 6.7 | 48% |
| 2006 | 8.6 | 3.2 | 5.2 | 17.0 | 5.9 | 2.5 | 1.5 | 9.9 | 2.7 | 0.7 | 3.7 | 7.1 | 42% |
| 2007 | 16.5 | 4.6 | 4.7 | 25.8 | 8.2 | 3.0 | 1.7 | 13.0 | 8.3 | 1.6 | 3.0 | 12.9 | 50% |
| 2008 | 6.4 | 1.8 | 3.7 | 11.9 | 3.5 | 1.2 | 0.8 | 5.5 | 2.9 | 0.6 | 2.9 | 6.3 | 54% |
| 2009 | 2.5 | 1.8 | 2.1 | 6.3 | 1.3 | 0.9 | 1.1 | 3.3 | 1.1 | 0.9 | 1.0 | 3.0 | 48% |
| 2010 | 3.4 | 2.0 | 0.8 | 6.2 | 1.7 | 1.3 | 0.3 | 3.3 | 1.7 | 0.7 | 0.5 | 2.9 | 47% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 8.0 | 4.6 | 4.5 | 17.1 | 3.0 | 3.3 | 1.8 | 8.2 | 5.0 | 1.3 | 2.7 | 9.0 | 52% |
| 2005 | 7.3 | 3.1 | 5.9 | 16.3 | 4.7 | 2.8 | 1.1 | 8.5 | 2.7 | 0.3 | 4.8 | 7.8 | 48% |
| 2006 | 9.7 | 3.6 | 5.8 | 19.1 | 6.7 | 2.8 | 1.6 | 11.1 | 3.0 | 0.7 | 4.2 | 8.0 | 42% |
| 2007 | 18.1 | 5.0 | 5.2 | 28.3 | 9.0 | 3.3 | 1.9 | 14.2 | 9.1 | 1.7 | 3.3 | 14.1 | 50% |
| 2008 | 6.7 | 1.9 | 3.9 | 12.5 | 3.7 | 1.2 | 0.9 | 5.8 | 3.0 | 0.6 | 3.0 | 6.7 | 54% |
| 2009 | 2.6 | 1.9 | 2.2 | 6.7 | 1.4 | 1.0 | 1.1 | 3.5 | 1.2 | 1.0 | 1.0 | 3.2 | 48% |
| 2010 | 3.5 | 2.1 | 0.9 | 6.5 | 1.8 | 1.3 | 0.4 | 3.5 | 1.7 | 0.8 | 0.5 | 3.0 | 47% |

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 108 Location of catcher/processor Pacific cod harvests with respect to Alternative 2 protective option area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open by (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 5,597 | 3,269 | 3,239 | 12,105 | 2,098 | 2,334 | 2,985 | 7,417 | 3,499 | 935 | 255 | 4,688 | 39% |
| 2005 | 5,117 | 2,187 | 4,099 | 11,403 | 3,187 | 1,934 | 3,380 | 8,500 | 1,930 | 254 | 720 | 2,903 | 25% |
| 2006 | 5,045 | 1,854 | 3,016 | 9,915 | 3,452 | 1,462 | 2,837 | 7,751 | 1,593 | 391 | 179 | 2,163 | 22% |
| 2007 | 7,724 | 2,145 | 2,228 | 12,098 | 3,836 | 1,413 | 2,073 | 7,322 | 3,888 | 733 | 156 | 4,776 | 39% |
| 2008 | 2,834 | 785 | 1,652 | 5,271 | 1,553 | 516 | 1,548 | 3,618 | 1,281 | 268 | 104 | 1,653 | 31% |
| 2009 | 1,966 | 1,518 | 1,657 | 5,141 | 1,069 | 748 | 1,624 | 3,441 | 897 | 770 | 33 | 1,700 | 33% |
| 2010 | 2,123 | 1,284 | 549 | 3,956 | 1,073 | 815 | 441 | 2,329 | 1,050 | 470 | 108 | 1,627 | 41% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 109 Estimated Alternative 2 protective option trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 6.7 | 3.9 | 3.8 | 14.4 | 2.5 | 2.8 | 3.5 | 8.8 | 4.2 | 1.1 | 0.3 | 5.6 | 39% |
| 2005 | 6.3 | 2.7 | 5.1 | 14.1 | 4.0 | 2.4 | 4.2 | 10.6 | 2.3 | 0.3 | 0.9 | 3.5 | 25% |
| 2006 | 8.6 | 3.2 | 5.2 | 17.0 | 5.9 | 2.5 | 4.8 | 13.2 | 2.7 | 0.7 | 0.4 | 3.7 | 22% |
| 2007 | 16.5 | 4.6 | 4.7 | 25.8 | 8.2 | 3.0 | 4.4 | 15.6 | 8.3 | 1.6 | 0.3 | 10.2 | 39% |
| 2008 | 6.4 | 1.8 | 3.7 | 11.9 | 3.5 | 1.2 | 3.5 | 8.1 | 2.9 | 0.6 | 0.2 | 3.7 | 31% |
| 2009 | 2.5 | 1.8 | 2.1 | 6.3 | 1.3 | 0.9 | 2.0 | 4.2 | 1.1 | 0.9 | 0.1 | 2.1 | 34% |
| 2010 | 3.4 | 2.0 | 0.8 | 6.2 | 1.7 | 1.3 | 0.7 | 3.6 | 1.7 | 0.7 | 0.2 | 2.5 | 41% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 8.0 | 4.6 | 4.5 | 17.1 | 3.0 | 3.3 | 4.2 | 10.5 | 5.0 | 1.3 | 0.4 | 6.6 | 39% |
| 2005 | 7.3 | 3.1 | 5.9 | 16.3 | 4.7 | 2.8 | 4.8 | 12.3 | 2.7 | 0.3 | 1.1 | 4.1 | 25% |
| 2006 | 9.7 | 3.6 | 5.8 | 19.1 | 6.7 | 2.8 | 5.4 | 14.9 | 3.0 | 0.7 | 0.4 | 4.2 | 22% |
| 2007 | 18.1 | 5.0 | 5.2 | 28.3 | 9.0 | 3.3 | 4.8 | 17.1 | 9.1 | 1.7 | 0.4 | 11.2 | 39% |
| 2008 | 6.7 | 1.9 | 3.9 | 12.5 | 3.7 | 1.2 | 3.7 | 8.6 | 3.0 | 0.6 | 0.2 | 3.9 | 31% |
| 2009 | 2.6 | 1.9 | 2.2 | 6.7 | 1.4 | 1.0 | 2.1 | 4.5 | 1.2 | 1.0 | 0.1 | 2.3 | 34% |
| 2010 | 3.5 | 2.1 | 0.9 | 6.5 | 1.8 | 1.3 | 0.7 | 3.8 | 1.7 | 0.8 | 0.2 | 2.7 | 41% |

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 110 Location of catcher/processor Pacific cod harvests with respect to Alternative 3 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open by (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 5,597 | 3,269 | 3,239 | 12,105 | 2,099 | 2,334 | 0 | 4,433 | 3,498 | 935 | 3,239 | 7,672 | 63% |
| 2005 | 5,117 | 2,187 | 4,099 | 11,403 | 3,187 | 1,934 | 0 | 5,120 | 1,930 | 254 | 4,099 | 6,283 | 55% |
| 2006 | 5,045 | 1,854 | 3,016 | 9,915 | 3,452 | 1,462 | 0 | 4,914 | 1,593 | 391 | 3,016 | 5,000 | 50% |
| 2007 | 7,724 | 2,145 | 2,228 | 12,098 | 3,836 | 1,413 | 1 | 5,250 | 3,888 | 733 | 2,227 | 6,848 | 57% |
| 2008 | 2,834 | 785 | 1,652 | 5,271 | 1,553 | 516 | 3 | 2,073 | 1,281 | 268 | 1,649 | 3,198 | 61% |
| 2009 | 1,966 | 1,518 | 1,657 | 5,141 | 1,069 | 748 | 26 | 1,843 | 897 | 770 | 1,631 | 3,298 | 64% |
| 2010 | 2,123 | 1,284 | 549 | 3,956 | 1,073 | 815 | 1 | 1,889 | 1,050 | 470 | 548 | 2,067 | 52% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 111 Estimated Alternative 3 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 6.7 | 3.9 | 3.8 | 14.4 | 2.5 | 2.8 | 0.0 | 5.3 | 4.2 | 1.1 | 3.8 | 9.1 | 63% |
| 2005 | 6.3 | 2.7 | 5.1 | 14.1 | 4.0 | 2.4 | 0.0 | 6.4 | 2.3 | 0.3 | 5.1 | 7.7 | 55% |
| 2006 | 8.6 | 3.2 | 5.2 | 17.0 | 5.9 | 2.5 | 0.0 | 8.4 | 2.7 | 0.7 | 5.2 | 8.5 | 50% |
| 2007 | 16.5 | 4.6 | 4.7 | 25.8 | 8.2 | 3.0 | 0.0 | 11.2 | 8.3 | 1.6 | 4.7 | 14.6 | 57% |
| 2008 | 6.4 | 1.8 | 3.7 | 11.9 | 3.5 | 1.2 | 0.0 | 4.7 | 2.9 | 0.6 | 3.7 | 7.2 | 61% |
| 2009 | 2.5 | 1.8 | 2.1 | 6.3 | 1.3 | 0.9 | 0.0 | 2.3 | 1.1 | 0.9 | 2.0 | 4.1 | 64% |
| 2010 | 3.4 | 2.0 | 0.8 | 6.2 | 1.7 | 1.3 | 0.0 | 3.0 | 1.7 | 0.7 | 0.8 | 3.2 | 52% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 8.0 | 4.6 | 4.5 | 17.1 | 3.0 | 3.3 | 0.0 | 6.3 | 5.0 | 1.3 | 4.5 | 10.8 | 63% |
| 2005 | 7.3 | 3.1 | 5.9 | 16.3 | 4.7 | 2.8 | 0.0 | 7.4 | 2.7 | 0.3 | 5.9 | 8.9 | 55% |
| 2006 | 9.7 | 3.6 | 5.8 | 19.1 | 6.7 | 2.8 | 0.0 | 9.5 | 3.0 | 0.7 | 5.8 | 9.6 | 50% |
| 2007 | 18.1 | 5.0 | 5.2 | 28.3 | 9.0 | 3.3 | 0.0 | 12.3 | 9.1 | 1.7 | 5.2 | 16.0 | 57% |
| 2008 | 6.7 | 1.9 | 3.9 | 12.5 | 3.7 | 1.2 | 0.0 | 4.9 | 3.0 | 0.6 | 3.9 | 7.6 | 61% |
| 2009 | 2.6 | 1.9 | 2.2 | 6.7 | 1.4 | 1.0 | 0.0 | 2.4 | 1.2 | 1.0 | 2.1 | 4.3 | 64% |
| 2010 | 3.5 | 2.1 | 0.9 | 6.5 | 1.8 | 1.3 | 0.0 | 3.1 | 1.7 | 0.8 | 0.9 | 3.4 | 52% |

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 112 Location of catcher/processor Pacific cod harvests with respect to Alternative 4 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open by (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 5,597 | 3,269 | 3,239 | 12,105 | 100 | 49 | 0 | 149 | 5,497 | 3,220 | 3,239 | 11,956 | 99% |
| 2005 | 5,117 | 2,187 | 4,099 | 11,403 | 38 | 83 | 0 | 120 | 5,079 | 2,105 | 4,099 | 11,283 | 99% |
| 2006 | 5,045 | 1,854 | 3,016 | 9,915 | 19 | 19 | 0 | 39 | 5,025 | 1,834 | 3,016 | 9,875 | 100% |
| 2007 | 7,724 | 2,145 | 2,228 | 12,098 | 13 | 48 | 1 | 62 | 7,711 | 2,097 | 2,227 | 12,036 | 99% |
| 2008 | 2,834 | 785 | 1,652 | 5,271 | 13 | 10 | 3 | 26 | 2,821 | 775 | 1,649 | 5,245 | 100% |
| 2009 | 1,966 | 1,518 | 1,657 | 5,141 | 16 | 4 | 26 | 45 | 1,950 | 1,514 | 1,631 | 5,095 | 99% |
| 2010 | 2,123 | 1,284 | 549 | 3,956 | 28 | 6 | 1 | 34 | 2,095 | 1,279 | 548 | 3,922 | 99% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 113 Estimated Alternative 4 trawl catcher/processor Pacific cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 6.7 | 3.9 | 3.8 | 14.4 | 0.1 | 0.1 | 0.0 | 0.2 | 6.6 | 3.8 | 3.8 | 14.3 | 99% |
| 2005 | 6.3 | 2.7 | 5.1 | 14.1 | 0.0 | 0.1 | 0.0 | 0.1 | 6.3 | 2.6 | 5.1 | 13.9 | 99% |
| 2006 | 8.6 | 3.2 | 5.2 | 17.0 | 0.0 | 0.0 | 0.0 | 0.1 | 8.6 | 3.1 | 5.2 | 16.9 | 100% |
| 2007 | 16.5 | 4.6 | 4.7 | 25.8 | 0.0 | 0.1 | 0.0 | 0.1 | 16.5 | 4.5 | 4.7 | 25.7 | 99% |
| 2008 | 6.4 | 1.8 | 3.7 | 11.9 | 0.0 | 0.0 | 0.0 | 0.1 | 6.4 | 1.7 | 3.7 | 11.8 | 100% |
| 2009 | 2.5 | 1.8 | 2.1 | 6.3 | 0.0 | 0.0 | 0.0 | 0.1 | 2.4 | 1.8 | 2.0 | 6.3 | 99% |
| 2010 | 3.4 | 2.0 | 0.8 | 6.2 | 0.0 | 0.0 | 0.0 | 0.1 | 3.3 | 2.0 | 0.8 | 6.1 | 99% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 8.0 | 4.6 | 4.5 | 17.1 | 0.1 | 0.1 | 0.0 | 0.2 | 7.9 | 4.6 | 4.5 | 16.9 | 99% |
| 2005 | 7.3 | 3.1 | 5.9 | 16.3 | 0.1 | 0.1 | 0.0 | 0.2 | 7.3 | 3.0 | 5.9 | 16.2 | 99% |
| 2006 | 9.7 | 3.6 | 5.8 | 19.1 | 0.0 | 0.0 | 0.0 | 0.1 | 9.7 | 3.5 | 5.8 | 19.0 | 100% |
| 2007 | 18.1 | 5.0 | 5.2 | 28.3 | 0.0 | 0.1 | 0.0 | 0.1 | 18.1 | 4.9 | 5.2 | 28.2 | 99% |
| 2008 | 6.7 | 1.9 | 3.9 | 12.5 | 0.0 | 0.0 | 0.0 | 0.1 | 6.7 | 1.8 | 3.9 | 12.4 | 100% |
| 2009 | 2.6 | 1.9 | 2.2 | 6.7 | 0.0 | 0.0 | 0.0 | 0.1 | 2.6 | 1.9 | 2.1 | 6.7 | 99% |
| 2010 | 3.5 | 2.1 | 0.9 | 6.5 | 0.0 | 0.0 | 0.0 | 0.1 | 3.5 | 2.1 | 0.9 | 6.4 | 99% |

Notes: 2012 revenues estimated using the 2011 prices, since 2012 prices are not yet available.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

## 1.10 Pacific Cod Non-trawl Catcher/Processors (Alternatives 2, 3, and their options)

### 1.10.1 Introduction

The non-trawl gear (hook-and-line, pot, and jig) catcher/processor sector includes vessels fishing and processing Pacific cod in the Aleutian Islands. Mothership activity by these vessels has been minimal.

Alternatives 1 (status quo) and 4 (return to most of the measures in place before the interim final rule went into effect in 2011) were analyzed in Section 1.4, and Alternative 5 (the preliminary preferred alternative adopted by the Council in April 2013) and Alternative 6 are analyzed in Section 1.13. This section deals with Alternatives 2 and 3 and their options.

Table 114, based on Table 2-20 in Chapter 2 of the EIS, summarizes and contrasts the Pacific cod alternatives as they apply to non-trawl gear. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

**Table 114 Comparison of alternatives for Pacific cod non-trawl gear.**

| Alternative | Seasons | Area 543 | | Area 542 | | Area 541 | |
|---|---|---|---|---|---|---|---|
| | | closures | Catch and participation limits | closures | Catch and participation limits | closures | Catch and participation limits |
| 1 | Hook-and-Line:<br>A season: 1/1–6/10<br>B season: 6/10–12/31 | No retention | Not applicable | Critical habitat closed 0–6 nm year round. | ESA reinitiation trigger with harvest more than 1.5% of BSAI Pacific cod ABC. | Critical habitat closed 0–10 nm year round and 0–20 nm Jan 1–March 1. | ESA reinitiation trigger with harvest more than 1.5% of BSAI Pacific cod ABC. |
| | Pot:<br>A season: 1/1–6/10<br>B season: 9/1–12/31 | | | For vessels ≥60 ft, close critical habitat 0–20 nm Jan 1–March 1 | | | |
| | Jig:<br>A season: 1/1–4/30<br>B season: 4/30–8/31<br>C season: 8/31–12/31 | | | | | Seguam Foraging Area closed. | |
| | Seasonal apportionments based on BSAI-wide TACs under Amend 85. | | | Prohibit directed fishing after Nov. 1. | | Prohibit directed fishing after Nov. 1. | |
| 2 | Hook-and-Line:<br>A season: 1/1–6/10<br>B season: 6/10–11/1 | Critical habitat closed 0–6 nm from rookeries and haulouts. | Catch limit in proportion to Area 543 abundance based on annual stock assessment. | Critical habitat closed 0–3 nm from rookeries. | Catch limit in proportion to Area 542/541 abundance based on annual stock assessment. | Critical habitat closed 0–3 nm from rookeries. | Catch limit in proportion to Area 542/541 abundance based on annual stock assessment. |
| | Pot:<br>A season: 1/1–6/10<br>B season: 9/1–11/1 | | Option 1: Only CPs and shoreside CVs. Prohibit motherships.<br>Option 2: Only CPs, CVs, and motherships with associated CVs. | | | | |
| | Jig:<br>A season: 1/1–4/30<br>B season: 4/30–8/31<br>C season: 8/31–11/1 | <u>Protective option</u>:<br>A season: Close 0–10 nm from rookeries and haulouts.<br>B and C seasons: Close 0–6 nm from rookeries and haulouts. | Set catch limit for CP or CP/mothership sector in proportion to average annual catch 2006–2010. | | Set 542/541 catch limit for CP/mothership sector based on portion of average annual catch 2006–2010. | Seguam Foraging Area closed. | Set 542/541 catch limit for CP/mothership sector based on portion of average annual catch 2006–2010. |
| | Seasonal apportionments based on BSAI-wide TACs under Amend 85. | | Shoreside CVs limited to overall Area 543 catch limit. | | Shoreside CVs limited to overall 542/541 area catch limit. | | Shoreside CVs limited to overall 542/541 area catch limit. |
| 3 | Same As Alternative 1 | Critical habitat closed 0–3 nm from rookeries and 0–10 nm from Buldir Island. | Catch limit in proportion to Area 543 abundance based on annual stock assessment. | Same as Alternative 2 | Same as Alternative 2 | Same as Alternative 2 | Same as Alternative 2 |
| | | | Set catch limit for CP/mothership sector in proportion to average annual catch 2006–2010. | | | | |
| 4 | Same as Alternatives 1 and 3 | Hook-and-line and pot: Critical habitat closed 0–3 nm from rookeries and 0–10 from Buldir Island. | None | Hook-and-line and pot: Critical habitat closed 0–3 nm from rookeries. | None | Hook-and-line and pot: Critical habitat closed 0–3 nm from rookeries W of 172.59° W long., | None |
| | | | | | | Hook-and-line and pot:: Critical habitat closed east of 172.59° W long. | |
| | | | | | | Hook-and-line, pot and jig: Seguam Foraging Area closed. | |
| 5 | Same as Alternatives 1, 3, and 4 | Same as Alternative 4 | Catch limit in proportion to Area 543 abundance based on annual stock assessment. | Same as Alternative 4 | Same as Alternative 4 | Same as Alternative 4 | Same as Alternative 4 |
| 6 | Not applicable. | No retention | Not applicable. | No retention | Not applicable. | No retention | Not applicable. |

ESA=Endangered Species Act, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, GHL=guideline harvest level, CV=catcher vessel, CP=catcher/processor

### 1.10.2 Pacific cod harvest limits

Alternatives 2 and 3 include provisions for the allocation of Aleutian Islands Pacific cod among Areas 541, 542, and 543, and for the creation of limits on trawl and non-trawl gear catcher/processor harvest in these areas. These measures treat Area 543 independently, and group Areas 541 and 542 together.

This section looks at the area allocation measures first, and then the sector limits. A subsequent section (Section 1.10.3) examines the interaction of area and sector limits with the constraints on harvests imposed by the critical habitat closure rules in the alternatives.

*Area allocations*

During the baseline years, Pacific cod was managed as one stock in the BSAI. The ITAC was divided among nine separate sector allocations, in addition to the CDQ allocation. As explained in Section 1.2.16, in December 2013 the Council adopted separate Pacific cod harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species. While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Alternatives 2 and 3 require the definition of area catch limits for Area 543 and for Areas 541-542 (considered jointly). The measures call for setting catch limits in proportion to the Area 543 and Area 541-542 biomasses, estimated during the annual stock assessment process.

NMFS has approached this in the following steps:

- The proportion of the annual BSAI biomass estimated to be in the Aleutian Islands from the annual Pacific cod Stock Assessment and Fishery Evaluation Report (SAFE) chapter is used to determine the overall Aleutian Islands harvest limit as a percent of the BSAI ABC. This ranged from 16 percent to 7 percent in the baseline years (2004 through 2010), and in the years under the interim final rule (2011 through 2014).[133]
- The product of this biomass proportion and the BSAI Pacific cod ABC in a year is treated, for this analysis, as an Aleutian Islands ABC.
- Because the State of Alaska's Pacific cod Guideline Harvest Level (GHL) fishery takes place almost entirely within Areas 541, 542, and 543, the entire GHL of 3 percent of the BSAI ABC is deducted from this new estimated Aleutian Islands ABC.
- The Area 543 and Area 541-542 area limits are determined from this Aleutian Islands ABC minus the GHL. These limits are based on a moving average of the relative biomass sizes in these two areas as determined from the most recent four summer trawl surveys. The volumes in Area 543 range between 24.5 percent and 26.4 percent of the whole; the volumes in Area 541-542 consequently range between 73.6 percent and 74.6 percent.
- The balances in each region will cover Community Development Quota (CDQ) harvests, incidental catch allowances (ICAs) and directed fishing allowances (DFAs). ICAs have not been separately identified here, since these will be determined by NMFS during the fishing year.

[133] This assumption was made for analytical purposes and provides a practical method for estimating the Aleutian Islands Pacific cod TACs and sector allocations for the different fleets as an illustrative approach for the purpose of this analysis. As noted above, the Council has now split the Aleutian Islands and Bering Sea for Pacific cod specifications. The methods used by the Council may change through time if changing biological understanding leads to changes in the tier status of Aleutian Islands Pacific cod. The results from any given method will change through time as information about the Aleutian Islands stock status changes.

These rules have been applied to data from 2004 through 2014 to estimate the size of an Aleutian Islands "ABC" in each year, and to estimate how that ABC, net of the GHL, would have been allocated to CDQ, ICA, and DFA in Area 543, and in Areas 541-542 (jointly). Data for 2013 and 2014 are based on the 2012/2013 harvest specifications assuming catch is equal to TAC. These are hypothetical estimates, made for these years, assuming the rules under consideration had been in place during those years. The estimates were summarized in Section 1.9.2, in Table 95, and are not reproduced here.

*Sector limits*

Alternatives 2 and 3 include provisions dividing the available Pacific cod among areas, and then creating harvest limits for certain vessel sectors within these areas. These sector limits are not allocations, but limits on the amounts that may be harvested by the vessel sectors to which they are assigned. Other vessel sectors, not facing their own limits, could conceivably fully harvest the resource, leaving nothing for the vessel sectors that do face limits. However, the opposite could not happen; a sector with its own limit could not harvest more of the area allocation than its limit permits. This is a common characteristic of this action with respect to those gear/modes with sector limits.

The alternatives include separate rules for Areas 543 and 541-542. Non-trawl catcher/processor limits are based on the sector share of historical average catches from 2006 through 2010. Table 115 builds on the area allocation estimates summarized in Table 95, and incorporates the non-trawl catcher/processor sector limits. Under Alternatives 2 and 3 in Area 543, the non-trawl gear catcher/processor sector would have a catch limit equal to 32.21 percent of the TAC; under Alternatives 2 and 3 in Areas 541-542, the sector would have a catch limit equal to 19.23 percent of the TAC.

Although Alternative 2 includes options prohibiting the use of non-trawl catcher/processors as motherships for catcher vessels in Area 543, and allowing them to do so in that area, the measures would have had no practical effect during the baseline years. Mothership activity did not take place here. Thus, fixed gear operations would have received the same share of the TAC (32.21 percent) under either option.

As shown in Table 115, area-sector limits can be quite small in some years (for example, between about 1,000 and about 1,200 metric tons in Area 543 in 2011, 2013, and 2014). Once accommodation is made for incidental catch allowances, low area-sector allocations may preclude directed fishing for Pacific cod by this sector in some areas for some years.

**Table 115 Estimated non-trawl catcher/processor sector allocations under Alternatives 2 and 3, 2004 through 2014 (metric tons)**

| | Area Limits | | Area 543 sector allocations | | | Areas 541-542 sector allocations | |
|---|---|---|---|---|---|---|---|
| Year | 543 | 541-542 | Alt 2 Opt1 | Alt 2 Opt2 | Alt 3 | Alt 2 | Alt 3 |
| 2004 | 6,543 | 20,217 | 2,108 | 2,108 | 2,108 | 3,888 | 3,888 |
| 2005 | 6,045 | 18,675 | 1,947 | 1,947 | 1,947 | 3,591 | 3,591 |
| 2006 | 6,398 | 18,822 | 2,061 | 2,061 | 2,061 | 3,619 | 3,619 |
| 2007 | 5,805 | 17,075 | 1,870 | 1,870 | 1,870 | 3,284 | 3,284 |
| 2008 | 5,805 | 17,075 | 1,870 | 1,870 | 1,870 | 3,284 | 3,284 |
| 2009 | 6,002 | 17,658 | 1,933 | 1,933 | 1,933 | 3,396 | 3,396 |
| 2010 | 5,974 | 16,646 | 1,924 | 1,924 | 1,924 | 3,201 | 3,201 |
| 2011 | 3,724 | 10,376 | 1,199 | 1,199 | 1,199 | 1,995 | 1,995 |
| 2012 | 4,975 | 13,865 | 1,603 | 1,603 | 1,603 | 2,666 | 2,666 |
| 2013 | 3,243 | 9,037 | 1,045 | 1,045 | 1,045 | 1,738 | 1,738 |
| 2014 | 3,412 | 9,508 | 1,099 | 1,099 | 1,099 | 1,828 | 1,828 |

Notes: The interim final rule was in effect during the shaded years.
Source: Table 95. AKR calculations.

An Aleutian Islands and Bering Sea split of the current BSAI Pacific cod ABC and TAC will also affect Alternatives 1 and 4. However, these alternatives do not include measures to allocate any resulting Aleutian Islands ABC or TAC among the three regulatory areas, nor among sectors.

Under Alternatives 1 and 4, and an Aleutian Islands split, and in the absence of other area-sector limits, fishing by vessels from different sectors would continue in the Aleutian Islands, until the directed fishing allowances for the year were taken. Then the directed fisheries in the Aleutian Islands would be closed, leaving enough incidental catch allowance to meet fishery incidental catch needs for the remainder of the year. BSAI Pacific cod is allocated among sectors, and these sectors could continue fishing for their sector BSAI allocations in the Bering Sea, should the Aleutian Islands close to directed fishing for Pacific cod, since the sectoral allocations may be fished in either the Aleutian Islands or Bering Sea, so long as area TACs are unharvested.

Pacific cod Alternatives 2 and 3 incorporate separate limits on catch for trawl and non-trawl catcher/processors in Area 543, and in Areas 541-542. These limits are sector limits, but not sector allocations. As such, they do not guarantee a sector a share of the area harvest. The catcher vessel sectors in Area 543 and in Area 541-542 are not subject to similar sector limits, and could, potentially, harvest both area limits completely.

Targeted catcher/processor and catcher vessel trawl fishing for Pacific cod in the Federal and parallel fisheries in the Aleutian Islands takes place primarily from mid-February through April. Catcher/processors also take incidental catches of Pacific cod in the fall. Non-trawl vessels, primarily catcher/processors, target Pacific cod early in the year during the same period as the trawlers, but also have an important targeted Pacific cod fishery again in the fall. (Figure 3-8 in Chapter 3 of the EIS; NMFS AKR In-season managers) Thus, the catcher/processors have been fishing simultaneously with, or after, the catcher vessels.

Since the catcher vessels could conceivably complete the harvest of all the area allocations of Pacific cod before the catcher/processor sectors could take their sector limits, Alternatives 2 and 3 could create a race for the Pacific cod, as catcher/processors harvest Pacific cod earlier in the year than they otherwise would have done so. The potential for such a race, and its costs, depends on the relative attractiveness of Aleutian Islands Pacific cod vis-à-vis Bering Sea Pacific cod. The catcher/processors are fishing against a BSAI-wide allocation (not a limit). If they fail to catch part of it in the Aleutian Islands, it is still reserved for them in the Bering Sea as long as the Bering Sea directed fishing allowance is not fully harvested or PSC limits trigger closure.

### 1.10.3 Critical habitat closures

In addition to the catch and participation limits discussed in Sub-section 1.10.2, the alternatives include measures that close different areas of critical habitat to directed fishing for Pacific cod with non-trawl gear. This section examines the revenues associated with the areas remaining open to directed fishing under the different alternatives. This is done first without considering the possible additional effect of the non-trawl catcher/processor limits discussed in the preceding sub-section. However, the impacts of critical habitat closures cannot be treated in isolation from the proposed sector limits. The second part of this sub-section discusses this interaction.

*Critical habitat closures*

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing. The impacts of these alternatives have been evaluated by identifying the volumes of Pacific cod retained from inside and from outside of the closed critical habitat areas by fishing vessels in the baseline years 2004 through 2010, assuming that the volumes from inside the closed areas would no longer be harvested, and that this loss of Pacific cod production would not be made up by increased fishing in the areas outside of the critical habitat.

The results for each of the alternatives, and the principal options within each alternative, have been summarized in a set of tables provided as an appendix to this section. For each alternative or option, these tables summarize (1) the harvest or associated gross revenues in the baseline years 2004 through 2010; (2) the volume of harvest or associated gross revenues from the areas that are closed to fishing under the alternative or option, described as the harvest or revenue placed at risk by the action; (3) the volume of harvest or associated gross revenues from the areas that remain open under the alternative, described as the residual harvest or gross revenue associated with the action; and (4) the residual harvest expressed as a percentage of the baseline harvest. As explained in the discussion of methodology, in Section 1.2.14, these are not projections of future revenues or of the revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

Figure 16 and Figure 17 summarize the more detailed analysis in the appendix to this section.[134] Figure 16 shows the residual gross revenues after closing critical habitat in each alternative, and Figure 17 shows these residual gross revenues as a percentage of the baseline gross revenues.[135]

Alternative 1 would have had a large adverse impact on sector gross revenues from the Aleutian Islands Pacific cod fishery in the baseline years 2004 through 2010. Depending on the year, revenues generated

[134] Both figures have been simplified by identifying gross revenues under Alternative 4, with gross revenues under the baseline, thereby obviating the need for separate baseline and Alternative 4 revenue lines.

[135] These figures summarize the residual gross revenues resulting from the analysis of the volumes of Pacific cod from closed critical habitat, under each alternative. These figures are not adjusted to take account of the possible gross revenue impacts of TAC percentage determination rules, or of critical habitat limits.

from areas left open ranged from 25 percent to 41 percent of baseline levels. Median annual revenues from areas left open under Alternative 1 are 33 percent of their baseline levels.

Relatively little gross revenues came from closed areas in the baseline years under Alternatives 2 (including the protective option), 3, or 4. Alternatives 3 and 4 have no adverse impact. Under Alternative 2 the median annual gross revenues from open areas are equal to 97 percent of their baseline levels, while under the protective option to Alternative 2 they are equal to 92 percent.

Industry sources have indicated that the larger Pacific cod harvested in the Aleutian Islands bring a higher price. NMFS was unable to confirm this. Because of this, the revenue estimates in the figures (and the appendix tables) may understate revenues and adverse revenue impacts. If the sector is able to offset these Aleutian Islands production reductions by redeploying to the Bering Sea, then it is still possible it could receive a lower price for its Pacific cod in the Bering Sea.

While residual revenue estimates may be useful indices of relative impacts, they are not, as noted earlier, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare measures of the actions. They are gross measures and do not take account of changes in costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues minus the change in variable costs associated with the action (Just, Hueth, and Schmitz 2004). This welfare measure, however, is not available. In addition, this measure focuses attention on the remaining revenues in the Pacific cod fishery, and does not take account of the ability of fishing operations to take actions in response to the alternatives that could minimize the impact of the alternatives on their profits, most importantly in this instance, their ability to substitute into other fisheries.

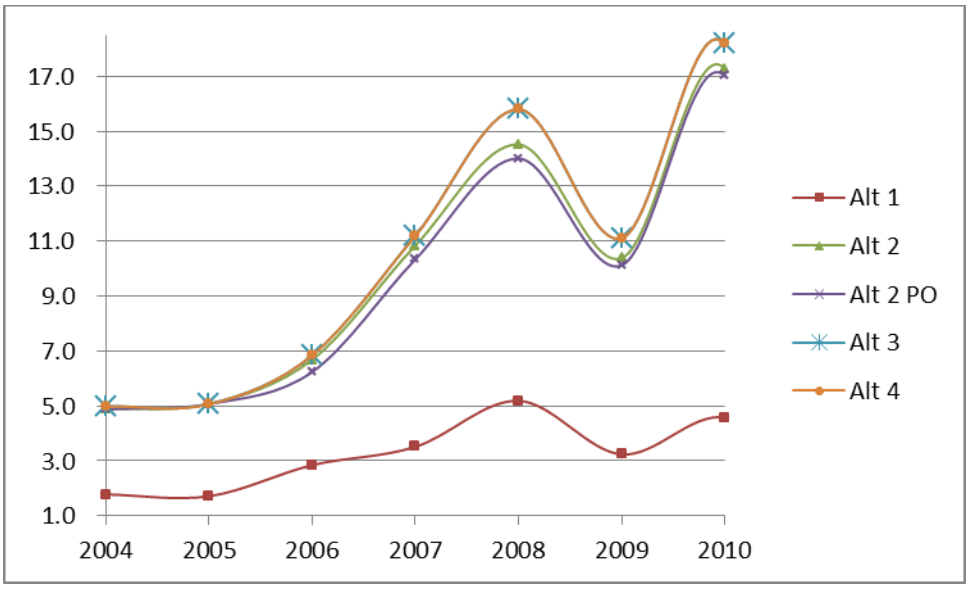



**Figure 16 Hypothetical non-trawl gear catcher/processor residual revenues in the Baseline Years for each of the Pacific cod alternatives (millions of 2012 dollars)**

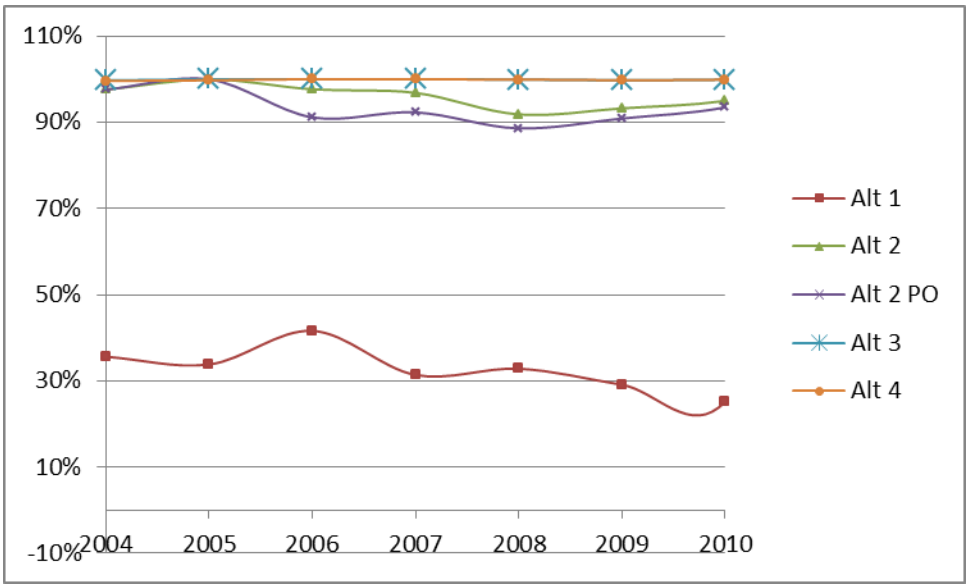



**Figure 17 Hypothetic non-trawl gear catcher/processor residual revenues in the baseline years for each of the Pacific cod alternatives. Expressed as a percentage of baseline revenues**

*Interaction of critical habitat closures and area-sector limits*

In some years, some of the area-sector limits would have restricted Pacific cod harvests by non-trawl catcher/processors more than would be expected by simply closing critical habitat to fishing activity. Table 116 compares the residual harvest in Area 543 and Areas 541-542 (from the analysis of critical habitat closures summarized in the appendix to this section) with the area-sector limit restrictions in the alternatives and options, and calculates how much the area-sector limits restrict harvest beyond the levels associated with the critical habitat closures.[136] Table 116 shows that the area-sector constraints bind more often in the later years of the baseline period, when the proportion of the biomass in the Aleutian Islands subarea decreased from the levels of former years.

In other baseline years, area-sector limits exceeded the harvests from areas outside of closed critical habitat. If the non-trawl gear catcher/processor sector is successful in redeploying from fishing in closed critical habitat to areas that remain open, these limits may make possible increased fishing. Table 116 identifies these situations as well.

[136] Residual catch includes only retained catch. However, in the analysis in this section, the proposed limits apply to retained and discarded catch. Non-trawl catcher/processor Pacific cod discards averaged about 2 percent per year from 2008 to 2010. This was approximately the same average over the entire baseline period (about 2 percent). Thus, while use of retained catch may cause the analysis to understate the extent to which the constraints bind, the amount of understatement is relatively small.

**Table 116 Impact of area limits on potential non-trawl catcher/processor Pacific cod harvests during the baseline years 2004 through 2010, showing years in which those harvests would have been limited, and years in which there would have been potential for increased harvests. (metric tons)**

| | Residual catch | | Area limits | | Area 543 comparisons | | Areas 541-542 comparisons | |
|---|---|---|---|---|---|---|---|---|
| Year | 543 | 541-542 | 543 | 541-542 | Shortfall | Overage | Shortfall | Overage |
| Alternative 2 | | | | | | | | |
| 2004 | C | C | 2,108 | 3,888 | C | C | C | C |
| 2005 | C | C | 1,947 | 3,591 | C | C | C | C |
| 2006 | C | C | 2,061 | 3,619 | C | C | C | C |
| 2007 | 1,504 | 2,521 | 1,870 | 3,284 | 0 | 366 | 0 | 763 |
| 2008 | 1,785 | 4,388 | 1,870 | 3,284 | 0 | 85 | -1,104 | 0 |
| 2009 | 2,468 | 3,214 | 1,933 | 3,396 | -535 | 0 | 0 | 182 |
| 2010 | 2,744 | 5,085 | 1,924 | 3,201 | -820 | 0 | -1,884 | 0 |
| Alternative 2 (protective option) | | | | | | | | |
| 2004 | C | C | 2,108 | 3,888 | C | C | C | C |
| 2005 | C | C | 1,947 | 3,591 | C | C | C | C |
| 2006 | C | C | 2,061 | 3,619 | C | C | C | C |
| 2007 | 1,307 | 2,521 | 1,870 | 3,284 | 0 | 563 | 0 | 763 |
| 2008 | 1,562 | 4,388 | 1,870 | 3,284 | 0 | 308 | -1,104 | 0 |
| 2009 | 2,321 | 3,214 | 1,933 | 3,396 | -388 | 0 | 0 | 182 |
| 2010 | 2,619 | 5,085 | 1,924 | 3,201 | -695 | 0 | -1,884 | 0 |
| Alternative 3 | | | | | | | | |
| 2004 | C | C | 2,108 | 3,888 | C | C | C | C |
| 2005 | C | C | 1,947 | 3,591 | C | C | C | C |
| 2006 | C | C | 2,061 | 3,619 | C | C | C | C |
| 2007 | 1,639 | 2,520 | 1,870 | 3,284 | 0 | 231 | 0 | 764 |
| 2008 | 2,330 | 4,387 | 1,870 | 3,284 | -460 | 0 | -1,103 | 0 |
| 2009 | 2,861 | 3,214 | 1,933 | 3,396 | -928 | 0 | 0 | 182 |
| 2010 | 3,146 | 5,085 | 1,924 | 3,201 | -1,222 | 0 | -1,884 | 0 |

Note: Negative results in the comparisons mean that the area limit falls short of the residual catch; positive results mean that the area limit exceeds the residual catch. Zeros in cells mean there is no shortfall, or overage, depending on the column in which they appear.
Sources: Residual catches are from appropriate tables in the appendix to this section; area limits are from Table 115.

Table 117 provides estimates of the revenues associated with these production shortfalls (using real 2012 dollar estimates).[137] In most area-year combinations, the limits would not impose costs. In the three years in which each alternative-option combination creates costs (2008 through 2010) these costs for all three options are similar. Potential gross revenue decreases would be reduced to some extent by

[137] This is an approximation of the gross revenue shortfall, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost incidental catch revenues. Prices are BSAI-wide and may not capture the potentially higher value of larger Aleutian Islands Pacific cod (if they exist). The impact of these changes in volume on price is unclear, since this is a small part of overall BSAI production. Any effect would take the form of a mitigation of gross revenue declines as volume reductions are offset by price rises.

offsetting changes in prices. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

**Table 117 Shortfalls in open area gross revenues, or potential to exceed those gross revenues, associated with area-sector limits (Millions of 2012 $)**

| Year | Value | Alt 2 | | | Alt 2, Protective option | | | Alt 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Short | Over | Balance | Short | Over | Balance | Short | Over | Balance |
| 2004 | 1,617 | C | C | 5.2 | C | C | 5.2 | C | C | 5.1 |
| 2005 | 1,801 | C | C | 4.9 | C | C | 4.9 | C | C | 4.9 |
| 2006 | 2,128 | C | C | 5.7 | C | C | 6.2 | C | C | 5.6 |
| 2007 | 2,560 | 0.0 | 2.9 | 2.9 | 0.0 | 3.4 | 3.4 | 0.0 | 2.5 | 2.5 |
| 2008 | 2,290 | 2.5 | 0.2 | (2.3) | 2.5 | 0.7 | (1.8) | 3.6 | 0.0 | (3.6) |
| 2009 | 1,785 | 1.0 | 0.3 | (0.6) | 0.7 | 0.3 | (0.4) | 1.7 | 0.3 | (1.3) |
| 2010 | 2,121 | 5.7 | 0.0 | (5.7) | 5.5 | 0.0 | (5.5) | 6.6 | 0.0 | (6.6) |

Notes: "C" identified confidential data.
Source: Volumes from Table 116; values per metric ton as shown.

Figure 18 shows the relationships between Alternatives 1 through 4, given the limits placed on gross revenues when the area-sector limits are less than residual catch from the open areas in the baseline years. To enhance comparability, the gross revenue estimates for Alternatives 1 and 4 have been "normalized" to reflect the area-sector allocations of Alternatives 2 and 3, even though area-sector splits are not part of these alternatives. A comparison with Figure 16 shows little change for Alternative 1, but a large downward shift in the levels of residual gross revenues for Alternatives 2, 3, and 4. Alternatives 1 and 4 do not include area and sector limits, such as those in in Alternatives 2 and 3. However, to the extent that the area-sector allocations are a response to the Aleutian Islands and Bering Sea Pacific cod split, the area-sector limits may one day be relevant to those alternatives. Thus, they have been included in this figure to enhance the comparability of the full set of alternatives.

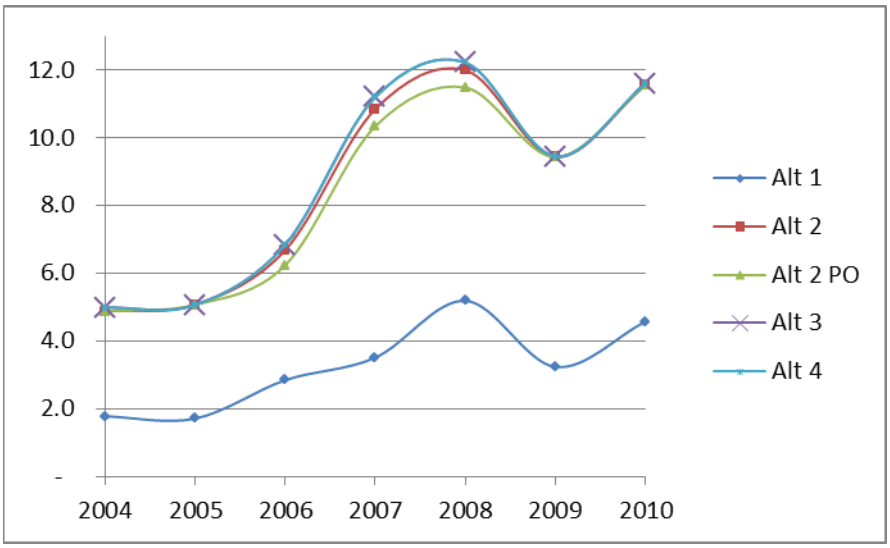



**Figure 18 Gross revenues for Alternatives 2 and 3, taking account of the area-sector limits (millions of 2012 dollars)**

### 1.10.4 Seasons and other measures

*Seasons and rollovers*

Most hook-and-line and pot gear Pacific cod fisheries in the BSAI are temporally dispersed into two seasons. The A-season is from January 1 to June 10 and the B-season from June 10 to December 31. The exception is the allocation to vessels less than 60 feet LOA, which is not temporally dispersed into seasons. In addition to these seasons, directed fishing for Pacific cod is prohibited after November 1 in the Aleutian Islands subarea of the BSAI. This was imposed as a Steller sea lion protection measure in the interim final rule in 2011. As with the trawl gear sectors, a sector's unused amounts of Pacific cod in the "A" season roll over to the subsequent season. Alternatives 1 and 2 retain these seasons for all sectors.

Alternative 3, 4, and 5 would relax the November 1 season end date in the Aleutian Islands. This would allow directed fishing for Pacific cod to continue until the end of the year. This would be the same season end date used during the baseline years, from 2004 through 2010. In general, the hook-and-line catcher/processor sector would benefit from this relaxation of the season end date more than other sectors. Seasonal changes aren't applicable under Alternative 6.

During five of the seven baseline years, from 2004 through 2010, hook-and-line catcher/processors fished for Pacific cod in the Aleutian Islands after November 1. On average 5 percent of the total Pacific cod harvested in the BSAI after November 1 occurred in the Aleutian Islands. When compared to the Pacific cod harvest for the whole year by hook-and-line catcher/processors, less than 1 percent was harvested in the Aleutian Islands after November 1. Hook-and-line catcher/processors currently operate under a voluntary cooperative. The mitigation of the race for fish for this sector may have contributed to directed fishing for Pacific cod the entire year.

Vessels greater than 60 feet LOA using pot gear typically do not fish in the Aleutian Islands; therefore, the November 1 season end in the Aleutian Islands may not affect them. While some pot catcher/processors have participated in the Aleutian Islands, this fishery typically closes prior to

November 1. Vessels less than 60 feet LOA using hook-and-line, pot, or jig gear typically do not operate in the Aleutian Islands in the late fall months. The vessels using these gears typically deliver to processors in Dutch Harbor or Akutan after November 1. It is possible that if the fishery is still open, then vessels could fish in the Aleutian Islands after November 1. However, this did not occur during the baseline years.

*ESA re-initiation triggers*

Under Alternative 1, there are ESA re-initiation triggers for the non-trawl gear Pacific cod sector. These triggers would result in ESA consultation if more than 1.5 percent of the BSAI Pacific cod ABC is harvested in Area 542, or more than 1.5 percent of the BSAI Pacific cod ABC is harvested in Area 541. Combined with the 13.5 percent trigger from the trawl gear sectors, the total trigger is 16.5 percent of the BSAI ABC. With the Bering Sea-Aleutian Islands Pacific cod specification split, the Aleutian Islands Pacific cod TAC may be reached prior to a trigger. However, it is still possible that sector and area triggers could be exceeded if one sector fishes more or concentrates activity in only one area.

These triggers were developed to prevent an increase of Pacific cod harvest in the Aleutian Islands. The triggers are not a limit that is managed inseason or subject to closures. Therefore, a trigger could be reached and directed fishing for Pacific cod may continue. In 2011 and 2012, the increase in the BSAI ABC ensured that these triggers were not reached.

Alternatives 2 and 3 remove this trigger in lieu of sector and area allocations to prevent increased catch. With the sector allocations, these triggers may not be necessary. Alternative 4 has no limits or triggers, and could result in more catch in an area or by a sector than has occurred historically.

### 1.10.5 Redeployment

Potential redeployment opportunities for non-trawl gear catcher/processors were discussed in Section 1.4.3. The discussion is summarized here. There is limited scope for redeployment for Pacific cod in the Aleutian Islands, because of the combination of a relatively large fishing footprint for hook-and-line vessels, and because of the limited amount of Pacific cod habitat outside of Steller sea lion critical habitat.

Conversely, the sector currently has opportunities to offset lost fishing opportunities in the Aleutian Islands with increased Pacific cod fishing in the Bering Sea. The vessels active in the Aleutian Islands also have a history of fishing for Pacific cod in the Bering Sea. However, prices in the Bering Sea may be lower than those in the Aleutian Islands.

The Council has created separate TACs for the Aleutian Islands and the Bering Sea management areas. Sector allocations, including those for the freezer longliners and pot vessels, overlap the Aleutian Islands and Bering Sea. Thus, vessels that are not fully able to harvest their allocation in the Aleutian Islands will be able to redeploy into the Bering Sea and harvest the remainder of their allocation in the Bering Sea, all else equal. However, the split may limit these opportunities, since they are only available so long as the Bering Sea DFA has not been taken by other sectors.

Freezer longliner and pot vessels will have limited opportunities to fish for additional Pacific cod in the Gulf of Alaska. Some freezer longliners are limited by Pacific cod sideboards in the Gulf of Alaska.

This action could lead to increased interest in Greenland turbot in the Bering Sea. There have been concerns about conflicts with trawl catcher/processors also interested in Greenland turbot. Both sectors have more opportunities to fish Greenland turbot, since they formed cooperatives. These alternatives may

exacerbate these conflicts. Few other groundfish species are good alternatives for the non-trawl catcher/processor sector.

### 1.10.6 Incidental catch and PSC

Alternatives that reduce Pacific cod catch should tend to reduce groundfish incidental catch and PSC in the Aleutian Islands. When compared to the baseline data from 2004 through 2010, these critical habitat and area closures result in a possible reduction of targeted fishing for Pacific cod in the Aleutian Islands in Alternative 1 and a slight reduction in Alternative 2. Alternatives 3 and 4 do not significantly reduce Pacific cod catches from critical habitat and area closures. Table 118 provides the average rate of incidental catch and PSC in Pacific cod targets in the Aleutian Islands from 2004 through 2012.

**Table 118 Average rate of incidental catch and PSC in Pacific cod targets by non-trawl gear between 2004 and 2013**

| Species | 541 | 542 | 543 | All AI | BS |
|---|---|---|---|---|---|
| Groundfish species (proportions per each metric ton of groundfish retained) | | | | | |
| Pacific cod | 83% | 84% | 83% | 83% | 82% |
| Pollock | 0% | 0% | 0% | 0% | 4% |
| Skates | 8% | 6% | 9% | 8% | 11% |
| Sculpins | 6% | 5% | 3% | 5% | 1% |
| Rockfish | 1% | 3% | 2% | 2% | 0% |
| Flatfish | 1% | 0% | 1% | 1% | 2% |
| Other | 1% | 1% | 1% | 1% | 0% |
| PSC species (number of animals per metric ton of groundfish) | | | | | |
| Opilio Tanner crab | 1.075 | 9.765 | 3.907 | 4.711 | 1.160 |
| Bairdi Tanner crab | 1.653 | 8.483 | 1.184 | 3.836 | 0.521 |
| Red King Crab | 0.056 | 0.215 | 0.028 | 0.102 | 0.115 |
| Golden King Crab | 0.045 | 0.014 | 0.112 | 0.051 | 0.002 |
| Chinook salmon | 0.000 | 0.000 | - | 0.000 | 0.000 |
| Non-chinook salmon | 0.000 | 0.000 | - | 0.000 | 0.001 |
| Halibut (mt of halibut per mt of groundfish) | | | | | |
| Halibut mortality | 0.01 | 0.00 | 0.01 | 0.01 | 0.00 |
| Total halibut | 0.06 | 0.04 | 0.10 | 0.06 | 0.03 |
| Source: NMFS AKR SF In-season management, March 6, 2014. | | | | | |

Chapter 4 of the EIS provides more details on incidental catch in the Aleutian Islands. A reduction in targeted fishing for Pacific cod by these vessels in the Aleutian Islands may result in smaller Aleutian Islands incidental catches of these species. These species are typically not targeted, and most are closed to directed fishing. Any Pacific cod catch reduction in the Aleutian Islands will likely not affect the management of these species. All other groundfish species harvested incidentally in Pacific cod target

fisheries are encountered at very low rates. These reductions would be offset to some extent if vessels shift their operations to the Bering Sea.

PSC in non-trawl Pacific cod target fisheries by catcher/processors in the Aleutian Islands during the baseline years was dominated by Tanner crab. Any reduction in Pacific cod catch by these vessels under the alternatives would likely result in a small decrease in PSC of these species. For non-trawl gear vessels, there are currently no PSC limits for crab species and any reduction or increase in this PSC does not currently affect this fishery.

Halibut incidental catch mortality rates in the Aleutian Islands are higher than in the Bering Sea. As shown in Table 118, the average rate of mortality in metric tons, per metric ton of groundfish caught was about 1/100$^{th}$ of a metric ton in the Aleutian Islands, but rounded to zero in the Bering Sea. The expected reduction in PSC in the Aleutian Islands, in particular halibut, may make more of the halibut PSC limit available in the Bering Sea. However, halibut PSC has not been a concern for non-trawl gear vessels in recent years.

### 1.10.7 Sector and community impacts

*Non-trawl gear catcher/processors*

Alternative 1 imposes the largest reductions in output associated with these alternatives. It reduces gross revenues from $3.2 million to $13.6 million or from 25 percent to 42 percent of baseline levels, depending on the year. If area-sector allocations and their interaction with area closures are taken into consideration, the remaining alternatives appear to have very similar impacts. If the area-sector limits do not bind, Alternatives 3 and 4 have no adverse impacts, and Alternative 2, with and without its protective option, has only small impacts on harvests. If the area-sector limits do bind, however, Alternatives 2, 3, and 4 can have larger impacts on the sector. The vessels in this sector have reasonably good opportunities for redeploying into other areas of the Bering Sea to attempt to offset Aleutian Islands production losses, so long as Bering Sea DFA is available, although lower prices for Bering Sea Pacific cod may reduce the gross revenues associated with any given level of harvest. The owners of scarce resources used in this fishery (limited fishing rights, exceptional fishing skills) will experience a loss of the returns accruing to those resources.

*Adak/Seattle-Tacoma Metropolitan Statistical Area*

This sector processes Pacific cod at sea, and, thus, Adak processing would not be affected by this action. However, non-trawl gear catcher/processors fishing Pacific cod in the Aleutian Islands visit the port of Adak, and purchase goods and services there. These include fuel, and use of the airport at Adak for crew rotation. At the time the interim final rule went into effect, the number of visits to Adak by non-trawl gear catcher/processors fishing for Pacific cod declined. The number of visits, which averaged about 29 a year from 2004 through 2010, decreased to 13 in 2011 (see Chapter 10 of the EIS for more details). In addition, as discussed in Sub-section 1.2.12 of this RIR, Adak receives a share of revenues from the fisheries business tax collected by the State of Alaska from vessels processing catch and delivering it to shore. A decline in Pacific cod production may reduce revenues from this source.

The freezer longliner participants of this sector formed a voluntary cooperative in late 2010, and have been rationalizing the harvest. Purchases of goods and services in the Puget Sound area by this fleet may have declined, but if they did, and that is not known, there is no information on the size of the decline. If incomes received by participants in the fishery declined (profits to the fishing companies and wages, salaries, and shares for persons working for the companies) expenditures by these persons probably

declined as well. This could have reduced spending in the Puget Sound area. However, any change in fishing company purchases, or in spending out of personal income by employees or owners of fishing operations active in these fisheries, is small in comparison to the Puget Sound economy.

*CDQ communities and Aleut Corporation stockholders*

The alternatives under consideration here reduce CDQ group allocations of Pacific cod, and, thus, may adversely affect the CDQ groups, and the communities that they benefit. The comparison of alternatives follows the discussion above, for the Amendment 80 sector.

The alternatives under consideration here may affect the revenues of the Aleut Corporation subsidiary, the Aleut Enterprise Corporation, by reducing marine fuel sales, sales of other goods and services, and tax receipts, at Adak. Changes in activity at Adak can affect Aleut Corporation objectives of contributing to the development of Adak.

*Benefits of protecting Steller sea lions*

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA analysis.

### 1.10.8 Summary

Table 119 summarizes key results from this analysis for all Pacific cod alternatives and options (including Alternative 1 and 4 results from Section 1.3). The inclusion of Alternative 1 and 4 results provides overall context for the Alternative 2 and 3 results.

**Table 119 Comparison of Pacific cod non-trawl catcher/processor alternatives**

| Description | Alternative 1 | Alternative 2 | | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| | | Basic | With Protective Option | | |
| Non-trawl catcher/processors | Non-trawl catcher/processor gross revenues decrease of 25% to 42% (depending on the year) of their baseline levels. Revenue reductions range between $3.2 million and $13.6 million, depending on the year. | Non-trawl catcher/processor gross revenues decrease modestly under the alternative. Revenues remain at 92% to 100% of their baseline levels for Alternative 2, and 89% to 100% for Alternative 2 with the protective option. Revenues decline by up to $1.3 million, depending on the year under Alternative 2, and by up to $1.8 million under Alternative 2 with the protective option. While consideration of area-sector limits appear to reduce the revenues under this alternative, these reductions are due to factors essentially unrelated to the Steller sea lion protection measures. | | Non-trawl catcher/processor gross revenues are unaffected by these alternatives. While consideration of area-sector limits appear to reduce the revenues under these alternatives, these reductions are due to factors essentially unrelated to the Steller sea lion protection measures. | |
| Adak | Adversely affected, to an unknown extent, by a loss of sales of goods and services to non-trawl catcher/processors visiting the port, and decline in tax revenues. | Minor adverse impacts, of unknown size, as sector reduces purchases of goods and services at Adak, and minor decline in tax revenues. | | Adak would not be affected by these alternatives. | |
| Other communities | May reduce some sales of goods and services to non-trawl fleet in western Washington. May reduce induced effects there, if industry participants spend less of their income. Impacts small in relation to the region. | Adverse impacts would be minor. Any impacts likely to be felt in western Washington. | | Other communities would not be affected by these alternatives. | |
| CDQ communities and the (non-CDQ) Aleut Corporation | Loss of CDQ income. Aleut Corporation loses income from fuel sales at Adak; Aleut Corporation Adak development objectives adversely affected. | Adverse impacts would be minor. | | CDQ communities and the Aleut Corporation would not be affected by these alternatives. | |

| Description | Alternative 1 | Alternative 2 | | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| | | Basic | With Protective Option | | |
| Incidental catch and PSC | Reduced targeting of Pacific cod may reduce incidental catches of other species and PSC; PSC allowances may be freed for use in the Bering Sea. Changes in Aleutian Islands will not be likely to affect management of other groundfish. Reduced halibut PSC use in the Aleutian Islands and shift of non-trawl catcher/processors to the Bering Sea are likely to have little impact on halibut PSC management for non-trawl vessels. | Only minor affects to incidental catch and PSC | | Incidental catch and PSC would not be affected by these alternatives. | |
| Steller sea lion stock | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | This option appears to remove the least prey from the prey field, and thus may less impact on Steller sea lions than the other alternatives. | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | This alternative removes the most prey from the prey field, and, thus, may have the greatest adverse impact on Steller sea lions. |
| Sum of producers and consumers surpluses | The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Pacific cod products, and consumers' surpluses accruing to persons who value SSL population health. Alternatives that relax restrictions on fishing operations may increase producers' surpluses relative to the status quo; surpluses accruing to U.S. consumers may not change much, since the overall BSAI level of production of Pacific cod may not change. However, there may be consumer surplus effects associated with action-induced changes in the size composition of BSAI Pacific cod production. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus, the net benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranking on this criterion. | | | | |

## 1.10.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Pacific cod by non-trawl catcher/processors. This analysis of these measures is summarized in the catch and revenue tables in this appendix. The appendix includes a catch table, and a revenue table, for each of the principal alternative-option combinations.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the residual catch as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars, respectively. Each alternative and option combination is summarized in one catch and one revenue table.

**Table 120 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 1 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 1,568 | C | S | 2,937 | 961 | C | S | 1,885 | 607 | C | S | 1,052 | 36% |
| 2005 | S | C | C | 2,794 | S | C | C | 1,856 | S | C | C | 938 | 34% |
| 2006 | S | C | C | 3,054 | S | C | C | 1,799 | S | C | C | 1,256 | 41% |
| 2007 | 1,770 | 751 | 1,639 | 4,160 | 958 | 288 | 1,639 | 2,885 | 812 | 463 | 0 | 1,275 | 31% |
| 2008 | 1,898 | 2,495 | 2,330 | 6,723 | 1,334 | 841 | 2,330 | 4,505 | 565 | 1,654 | 0 | 2,219 | 33% |
| 2009 | 1,226 | 1,997 | 2,866 | 6,090 | 618 | 824 | 2,866 | 4,309 | 608 | 1,173 | 0 | 1,780 | 29% |
| 2010 | 2,659 | 2,426 | 3,146 | 8,231 | 1,710 | 1,324 | 3,146 | 6,180 | 949 | 1,102 | 0 | 2,051 | 25% |

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches of Pacific cod. "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 121 Estimated Alternative 1 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.2 | C | S | 4.2 | 1.4 | C | S | 2.7 | 0.9 | C | S | 1.5 | 36% |
| 2005 | S | C | C | 4.4 | S | C | C | 2.9 | S | C | C | 1.5 | 34% |
| 2006 | S | C | C | 6.1 | S | C | C | 3.6 | S | C | C | 2.5 | 42% |
| 2007 | 4.4 | 1.9 | 4.0 | 10.2 | 2.3 | 0.7 | 4.0 | 7.0 | 2.0 | 1.2 | 0.0 | 3.2 | 31% |
| 2008 | 4.3 | 5.5 | 5.2 | 15.0 | 3.0 | 1.9 | 5.2 | 10.1 | 1.2 | 3.7 | 0.0 | 4.9 | 33% |
| 2009 | 2.1 | 3.4 | 5.0 | 10.5 | 1.1 | 1.4 | 5.0 | 7.5 | 1.0 | 2.0 | 0.0 | 3.1 | 29% |
| 2010 | 5.7 | 5.1 | 6.7 | 17.5 | 3.6 | 2.7 | 6.7 | 13.1 | 2.1 | 2.3 | 0.0 | 4.4 | 25% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.7 | C | S | 5.0 | 1.6 | C | S | 3.2 | 1.0 | C | S | 1.8 | 36% |
| 2005 | S | C | C | 5.1 | S | C | C | 3.4 | S | C | C | 1.7 | 34% |
| 2006 | S | C | C | 6.8 | S | C | C | 4.0 | S | C | C | 2.8 | 42% |
| 2007 | 4.8 | 2.1 | 4.4 | 11.2 | 2.5 | 0.8 | 4.4 | 7.7 | 2.2 | 1.3 | 0.0 | 3.5 | 31% |
| 2008 | 4.5 | 5.8 | 5.5 | 15.8 | 3.2 | 2.0 | 5.5 | 10.6 | 1.3 | 3.9 | 0.0 | 5.2 | 33% |
| 2009 | 2.2 | 3.6 | 5.3 | 11.1 | 1.1 | 1.5 | 5.3 | 7.9 | 1.1 | 2.1 | 0.0 | 3.2 | 29% |
| 2010 | 5.9 | 5.3 | 7.0 | 18.2 | 3.8 | 2.9 | 7.0 | 13.6 | 2.1 | 2.4 | 0.0 | 4.6 | 25% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 122 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 2 area closures**

| | Total catch (mt) | | | | Catch from areas closed by Alt 1 (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 1,568 | C | S | 2,937 | 5 | C | S | 70 | 1,563 | C | S | 2,866 | 98% |
| 2005 | S | C | C | 2,794 | S | C | C | 1 | S | C | C | 2,792 | 100% |
| 2006 | S | C | C | 3,054 | S | C | C | 75 | S | C | C | 2,979 | 98% |
| 2007 | 1,770 | 751 | 1,639 | 4,160 | 0 | 0 | 135 | 135 | 1,770 | 751 | 1,504 | 4,025 | 97% |
| 2008 | 1,898 | 2,495 | 2,330 | 6,723 | 0 | 6 | 545 | 551 | 1,898 | 2,489 | 1,785 | 6,172 | 92% |
| 2009 | 1,226 | 1,997 | 2,866 | 6,090 | 0 | 9 | 399 | 408 | 1,226 | 1,988 | 2,468 | 5,682 | 93% |
| 2010 | 2,659 | 2,426 | 3,146 | 8,231 | 0 | 0 | 402 | 402 | 2,659 | 2,426 | 2,744 | 7,829 | 95% |

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches of Pacific cod. "C" indicates confidential data. "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 123 Estimated Alternative 2 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.2 | C | S | 4.2 | 0.0 | C | S | 0.1 | 2.2 | C | S | 4.1 | 98% |
| 2005 | S | C | C | 4.4 | S | C | C | 0.0 | S | C | C | 4.4 | 100% |
| 2006 | S | C | C | 6.1 | S | C | C | 0.1 | S | C | C | 5.9 | 98% |
| 2007 | 4.4 | 1.9 | 4.0 | 10.2 | 0.0 | 0.0 | 0.3 | 0.3 | 4.4 | 1.9 | 3.6 | 9.9 | 97% |
| 2008 | 4.3 | 5.5 | 5.2 | 15.0 | 0.0 | 0.0 | 1.2 | 1.2 | 4.3 | 5.5 | 4.0 | 13.8 | 92% |
| 2009 | 2.1 | 3.4 | 5.0 | 10.5 | 0.0 | 0.0 | 0.7 | 0.7 | 2.1 | 3.4 | 4.3 | 9.8 | 93% |
| 2010 | 5.7 | 5.1 | 6.7 | 17.5 | 0.0 | 0.0 | 0.9 | 0.9 | 5.7 | 5.1 | 5.8 | 16.6 | 95% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.7 | C | S | 5.0 | 0.0 | C | S | 0.1 | 2.6 | C | S | 4.9 | 98% |
| 2005 | S | C | C | 5.1 | S | C | C | 0.0 | S | C | C | 5.1 | 100% |
| 2006 | S | C | C | 6.8 | S | C | C | 0.2 | S | C | C | 6.7 | 98% |
| 2007 | 4.8 | 2.1 | 4.4 | 11.2 | 0.0 | 0.0 | 0.4 | 0.4 | 4.8 | 2.1 | 4.0 | 10.8 | 97% |
| 2008 | 4.5 | 5.8 | 5.5 | 15.8 | 0.0 | 0.0 | 1.3 | 1.3 | 4.5 | 5.8 | 4.2 | 14.5 | 92% |
| 2009 | 2.2 | 3.6 | 5.3 | 11.1 | 0.0 | 0.0 | 0.7 | 0.8 | 2.2 | 3.6 | 4.6 | 10.4 | 93% |
| 2010 | 5.9 | 5.3 | 7.0 | 18.2 | 0.0 | 0.0 | 0.9 | 0.9 | 5.9 | 5.3 | 6.1 | 17.3 | 95% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 124 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 2 protective option area closures**

| | Total catch (mt) | | | | Catch from areas closed (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 1,568 | C | S | 2,937 | 5 | C | S | 70 | 1,563 | C | S | 2,866 | 98% |
| 2005 | S | C | C | 2,794 | S | C | C | 1 | S | C | C | 2,792 | 100% |
| 2006 | S | C | C | 3,054 | S | C | C | 284 | S | C | C | 2,770 | 91% |
| 2007 | 1,770 | 751 | 1,639 | 4,160 | 0 | 0 | 332 | 332 | 1,770 | 751 | 1,307 | 3,828 | 92% |
| 2008 | 1,898 | 2,495 | 2,330 | 6,723 | 0 | 6 | 768 | 774 | 1,898 | 2,489 | 1,562 | 5,949 | 88% |
| 2009 | 1,226 | 1,997 | 2,866 | 6,090 | 0 | 9 | 546 | 555 | 1,226 | 1,988 | 2,321 | 5,535 | 91% |
| 2010 | 2,659 | 2,426 | 3,146 | 8,231 | 0 | 0 | 527 | 527 | 2,659 | 2,426 | 2,619 | 7,704 | 94% |

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches and to incidental catches of Pacific cod. "C" indicates confidential data. "S" indicates data suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 125 Estimated Alternative 2 protective option non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.2 | C | S | 4.2 | 0.0 | C | S | 0.1 | 2.2 | C | S | 4.1 | 98% |
| 2005 | S | C | C | 4.4 | S | C | C | 0.0 | S | C | C | 4.4 | 100% |
| 2006 | S | C | C | 6.1 | S | C | C | 0.5 | S | C | C | 5.6 | 91% |
| 2007 | 4.4 | 1.9 | 4.0 | 10.2 | 0.0 | 0.0 | 0.8 | 0.8 | 4.4 | 1.9 | 3.2 | 9.4 | 92% |
| 2008 | 4.3 | 5.5 | 5.2 | 15.0 | 0.0 | 0.0 | 1.7 | 1.7 | 4.3 | 5.5 | 3.5 | 13.3 | 89% |
| 2009 | 2.1 | 3.4 | 5.0 | 10.5 | 0.0 | 0.0 | 0.9 | 1.0 | 2.1 | 3.4 | 4.1 | 9.6 | 91% |
| 2010 | 5.7 | 5.1 | 6.7 | 17.5 | 0.0 | 0.0 | 1.1 | 1.1 | 5.7 | 5.1 | 5.6 | 16.3 | 93% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.7 | C | S | 5.0 | 0.0 | C | S | 0.1 | 2.6 | C | S | 4.9 | 98% |
| 2005 | S | C | C | 5.1 | S | C | C | 0.0 | S | C | C | 5.1 | 100% |
| 2006 | S | C | C | 6.8 | S | C | C | 0.6 | S | C | C | 6.2 | 91% |
| 2007 | 4.8 | 2.1 | 4.4 | 11.2 | 0.0 | 0.0 | 0.9 | 0.9 | 4.8 | 2.1 | 3.5 | 10.3 | 92% |
| 2008 | 4.5 | 5.8 | 5.5 | 15.8 | 0.0 | 0.0 | 1.8 | 1.8 | 4.5 | 5.8 | 3.7 | 14.0 | 89% |
| 2009 | 2.2 | 3.6 | 5.3 | 11.1 | 0.0 | 0.0 | 1.0 | 1.0 | 2.2 | 3.6 | 4.3 | 10.1 | 91% |
| 2010 | 5.9 | 5.3 | 7.0 | 18.2 | 0.0 | 0.0 | 1.2 | 1.2 | 5.9 | 5.3 | 5.8 | 17.0 | 93% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 126 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 3 area closures**

| | Total catch (mt) | | | | Catch from areas closed (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 1,568 | C | S | 2,937 | 5 | C | S | 8 | 1,563 | C | S | 2,929 | 100% |
| 2005 | S | C | C | 2,794 | S | C | C | 1 | S | C | C | 2,793 | 100% |
| 2006 | S | C | C | 3,054 | S | C | C | 0 | S | C | C | 3,054 | 100% |
| 2007 | 1,770 | 751 | 1,639 | 4,160 | 0 | 1 | 0 | 1 | 1,770 | 750 | 1,639 | 4,160 | 100% |
| 2008 | 1,898 | 2,495 | 2,330 | 6,723 | 0 | 6 | 0 | 6 | 1,898 | 2,489 | 2,330 | 6,718 | 100% |
| 2009 | 1,226 | 1,997 | 2,866 | 6,090 | 0 | 9 | 6 | 15 | 1,226 | 1,988 | 2,861 | 6,075 | 100% |
| 2010 | 2,659 | 2,426 | 3,146 | 8,231 | 0 | 0 | 0 | 0 | 2,659 | 2,426 | 3,146 | 8,231 | 100% |

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches of Pacific cod. "C" means the data is confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 127 Estimated Alternative 3 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.2 | C | S | 4.2 | 0.0 | C | S | 0.0 | 2.2 | C | S | 4.2 | 100% |
| 2005 | S | C | C | 4.4 | S | C | C | 0.0 | S | C | C | 4.4 | 100% |
| 2006 | S | C | C | 6.1 | S | C | C | 0.0 | S | C | C | 6.1 | 100% |
| 2007 | 4.4 | 1.9 | 4.0 | 10.2 | 0.0 | 0.0 | 0.0 | 0.0 | 4.4 | 1.9 | 4.0 | 10.2 | 100% |
| 2008 | 4.3 | 5.5 | 5.2 | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 5.5 | 5.2 | 15.0 | 100% |
| 2009 | 2.1 | 3.4 | 5.0 | 10.5 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 3.4 | 5.0 | 10.5 | 100% |
| 2010 | 5.7 | 5.1 | 6.7 | 17.5 | 0.0 | 0.0 | 0.0 | 0.0 | 5.7 | 5.1 | 6.7 | 17.4 | 100% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.7 | C | S | 5.0 | 0.0 | C | S | 0.0 | 2.6 | C | S | 5.0 | 100% |
| 2005 | S | C | C | 5.1 | S | C | C | 0.0 | S | C | C | 5.1 | 100% |
| 2006 | S | C | C | 6.8 | S | C | C | 0.0 | S | C | C | 6.8 | 100% |
| 2007 | 4.8 | 2.1 | 4.4 | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 4.8 | 2.1 | 4.4 | 11.2 | 100% |
| 2008 | 4.5 | 5.8 | 5.5 | 15.8 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 5.8 | 5.5 | 15.8 | 100% |
| 2009 | 2.2 | 3.6 | 5.3 | 11.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 3.6 | 5.3 | 11.1 | 100% |
| 2010 | 5.9 | 5.3 | 7.0 | 18.2 | 0.0 | 0.0 | 0.0 | 0.0 | 5.9 | 5.3 | 7.0 | 18.2 | 100% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 128 Location of estimated non-trawl catcher/processor Pacific cod harvests with respect to Alternative 4 area closures**

| | Total catch (mt) | | | | Catch from areas closed (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 1,568 | C | S | 2,937 | 9.059 | C | S | 12 | 1,559 | C | S | 2,925 | 100% |
| 2005 | S | C | C | 2,794 | S | C | C | 7 | S | C | C | 2,786 | 100% |
| 2006 | S | C | C | 3,054 | S | C | C | 0 | S | C | C | 3,054 | 100% |
| 2007 | 1,770 | 751 | 1,639 | 4,160 | 1 | 1 | 0 | 2 | 1,769 | 750 | 1,639 | 4,159 | 100% |
| 2008 | 1,898 | 2,495 | 2,330 | 6,723 | 0 | 6 | 0 | 6 | 1,898 | 2,489 | 2,330 | 6,718 | 100% |
| 2009 | 1,226 | 1,997 | 2,866 | 6,090 | 0 | 9 | 6 | 15 | 1,226 | 1,988 | 2,861 | 6,075 | 100% |
| 2010 | 2,659 | 2,426 | 3,146 | 8,231 | 0 | 0 | 0 | 0 | 2,659 | 2,426 | 3,146 | 8,231 | 100% |

Notes: Volumes refer to retained, targeted Pacific cod from CDQ and non-CDQ catches of Pacific cod. "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 129 Estimated Alternative 4 non-trawl catcher/processor Pacific Cod wholesale gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenue in areas remaining open (residual revenue) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 2.2 | C | S | 4.2 | 0.0 | C | S | 0.0 | 2.2 | C | S | 4.2 | 100% |
| 2005 | S | C | C | 4.4 | S | C | C | 0.0 | S | C | C | 4.4 | 100% |
| 2006 | S | C | C | 6.1 | S | C | C | 0.0 | S | C | C | 6.1 | 100% |
| 2007 | 4.4 | 1.9 | 4.0 | 10.2 | 0.0 | 0.0 | 0.0 | 0.0 | 4.4 | 1.9 | 4.0 | 10.2 | 100% |
| 2008 | 4.3 | 5.5 | 5.2 | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 5.5 | 5.2 | 15.0 | 100% |
| 2009 | 2.1 | 3.4 | 5.0 | 10.5 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 3.4 | 5.0 | 10.5 | 100% |
| 2010 | 5.7 | 5.1 | 6.7 | 17.5 | 0.0 | 0.0 | 0.0 | 0.0 | 5.7 | 5.1 | 6.7 | 17.4 | 100% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 2.7 | C | S | 5.0 | 0.0 | C | S | 0.0 | 2.6 | C | S | 5.0 | 100% |
| 2005 | S | C | C | 5.1 | S | C | C | 0.0 | S | C | C | 5.1 | 100% |
| 2006 | S | C | C | 6.8 | S | C | C | 0.0 | S | C | C | 6.8 | 100% |
| 2007 | 4.8 | 2.1 | 4.4 | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 4.8 | 2.1 | 4.4 | 11.2 | 100% |
| 2008 | 4.5 | 5.8 | 5.5 | 15.8 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 5.8 | 5.5 | 15.8 | 100% |
| 2009 | 2.2 | 3.6 | 5.3 | 11.1 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 3.6 | 5.3 | 11.1 | 100% |
| 2010 | 5.9 | 5.3 | 7.0 | 18.2 | 0.0 | 0.0 | 0.0 | 0.0 | 5.9 | 5.3 | 7.0 | 18.2 | 100% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

## 1.11 Pacific Cod Trawl Catcher Vessels (Alternatives 2, 3, and their options)

### 1.11.1 Introduction

Table 94, based on Table 2-21 in Chapter 2 of the EIS, summarizes and contrasts the alternatives as they apply to vessels fishing for Pacific cod with trawl gear. Note also, as described earlier, Alternatives 2 through 5 include an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in 1.19.2. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

Alternative 1 (the status quo) and Alternative 4 (adopting a modified version of the rules in place in 2010) were discussed in detail in Section 1.5 of this RIR, as they relate to trawl catcher vessels targeting Pacific cod with trawls. This section focuses on the impacts of Alternatives 2 and 3, and their options

These alternatives originated during 2012 meetings of the Council's Steller Sea Lion Mitigation Committee (SSLMC), and were modified by the Council at its December 2012 meeting. The Council's recommendations were reviewed by NMFS and altered where necessary to add precision, or to address regulatory or management issues. In some instances measures were considered but not further analyzed. Section 2.3 of Chapter 2 of the EIS discusses these.

This sector includes trawl catcher vessels targeting Pacific cod in the Aleutian Islands, and making deliveries to shoreside processors, floating processors, or to motherships. Volumes of Pacific cod delivered to catcher/processors acting as motherships, and the ex-vessel and wholesale values of this Pacific cod, are included in the totals reported in this section, and not in the totals reported for the trawl catcher/processor sector. This avoids the potential for double-counting if volumes or values are

aggregated across sectors and preserves the confidentiality of the small numbers of catcher vessels delivering to catcher/processors acting as motherships, and the small numbers of motherships. Ex-vessel and wholesale gross revenues are not additive; the two levels of revenue have been estimated to provide some distributive information. Wholesale gross revenues are the revenues received by the processors who buy the fish from the catcher vessels; catcher vessels do not participate in this wholesale market for processed fish.

### 1.11.2 Pacific cod harvest limits

Alternatives 2 and 3 include provisions for the allocation of Aleutian Islands Pacific cod among Areas 541, 542, and 543, and for the creation of limits on trawl and non-trawl catcher/processor harvest in these areas. These measures treat Area 543 independently, and group Areas 541 and 542 together.

This section looks at the area allocation measures first, and then the sector limits. Although the sector limits do not apply to trawl catcher vessels, if the trawl and non-trawl catcher/processors fully harvested their area-sector limits, the trawl catcher vessel catch would also be constrained.

*Area allocations*

During the baseline years, Pacific cod was managed as one stock in the BSAI. The ITAC was divided among nine separate sector allocations, in addition to the CDQ allocation. As explained in Section 1.2.16, in December 2013 the Council adopted separate Pacific cod harvest specifications for the Aleutian Islands and the Bering Sea in the 2014 and 2015 fishing years. The intent is that this will be a permanent split in the harvest specifications for this species. While separate OFLs, ABCs, and TACs, have been created for the Aleutian Islands and for the Bering Sea, the actual sector allocations (except CDQ allocations) remain BSAI-wide allocations. Sector allocations are calculated as a percent of the summed Aleutian Island and Bering Sea TACs, after adjustments are made to account for CDQ allocations.

Alternatives 2 and 3 require the definition of area catch limits for Area 543 and for Areas 541-542 (considered jointly). The measures call for setting catch limits in proportion to the Area 543 and Area 541-542 biomasses, estimated during the annual stock assessment process.

NMFS has approached this in the following steps:

- The proportion of the annual BSAI biomass estimated to be in the Aleutian Islands from the annual Pacific cod Stock Assessment and Fishery Evaluation Report (SAFE) chapter is used to determine the overall Aleutian Islands harvest limit as a percent of the BSAI ABC. This ranged from 16 percent to 7 percent in the baseline years (2004 through 2010), and in the years under the interim final rule (2011 through 2014). [138]
- The product of this biomass proportion, and the BSAI Pacific cod ABC in a year is treated, for this analysis, as an Aleutian Islands ABC.
- The State of Alaska has an Aleutian Islands Pacific cod GHL equal to 3 percent of the combined Bering Sea and Aleutian Islands ABCs. This is deducted from this new estimated Aleutian Islands ABC.

[138] This assumption was made for analytical purposes and provides a practical method for estimating the Aleutian Islands Pacific cod TACs and sector allocations for the different fleets as an illustrative approach for the purpose of this analysis. As noted above, the Council has now split the Aleutian Islands and Bering Sea for Pacific cod specifications. The methods used by the Council may change through time if changing biological understanding leads to changes in the tier status of Aleutian Islands Pacific cod. The results from any given method will change through time as information about the Aleutian Islands stock status changes.

- The Area 543 and Area 541-542 limits are based on this Aleutian Islands ABC, minus the GHL. These limits are based on a moving average of the relative biomass sizes in these two areas as determined from the most recent four summer trawl surveys. The volumes in Area 543 range between 24.5 percent and 26.4 percent of the whole; the volumes in Area 541-542 consequently range between 73.6 percent and 74.6 percent.
- The balances in each region will cover CDQ harvests, incidental catch allowances (ICAs) and directed fishing allowances (DFAs). ICAs have not been separately identified here, since these will be determined by NMFS during the fishing year.

These rules have been applied to data from 2004 through 2014 to estimate the size of an Aleutian Islands "ABC" in each year, and to estimate how that ABC, minus the GHL, would have been allocated to CDQ, ICA, and DFA in Area 543, and in Areas 541-542 (jointly). These are hypothetical estimates, made for these years assuming the rules under consideration had been in place during those years. The estimates were summarized in Section 1.9.2, in Table 95, and are not reproduced here.

*Sector limits*

Alternatives 2 and 3 also include provisions dividing the available Pacific cod in each management area between limits for trawl and non-trawl catcher/processor sectors. These sector limits are not allocations, but restrictions on the amounts that may be harvested by the vessel classes to which they are assigned. Catcher vessels (both fixed and trawl gears), do not have similar limits, and could conceivably fully harvest the entire area allocations, leaving nothing for the sectors that do face limits. However, the opposite could not happen; a sector with its own limit could not harvest more of the area allocation than its limit permits.

However, if the catcher/processor sectors are each able to fully harvest their limits, an implicit constraint will be placed on the harvests by the two catcher vessel sectors. Since non-trawl catcher vessel harvests have been relatively small in past years, the greatest restriction on catcher vessel harvest would be placed on trawl catcher vessels. This sub-section provides estimates of the potential constraint placed on catcher vessel harvests. The approach is to subtract the catcher/processor harvest limit estimates from the area allocations in Area 543 and in Area 541-542. The remainder is the amount available to catcher vessels if the catcher/processor sectors fully harvest their limits.

The non-trawl catcher/processor limits restrict these non-trawl vessels to 32.21 percent of the area allocation in Area 543 and to 19.23 percent of the area allocation in Areas 541-542 (jointly).

The consideration of the trawl catcher/processor sector limits is more complex because the vessels in this sector can harvest and process as catcher/processors, but may also process fish as motherships, that are actually harvested by catcher vessels. However, the fleet definitions used in this analysis to group production information treat catcher vessels delivering to shoreside processors, and catcher vessels delivering to motherships, as the same sector, and group production accordingly. Therefore, in this analysis, the trawl catcher/processor limit used to calculate the remainder available for catcher vessels, is a limit that excludes deliveries to motherships. With this in mind, the trawl catcher/processor sector limits are 28.02 percent in Area 543, and 28.6 percent in Areas 541-542. While the Area 543 percent corresponds to the limit for the alternative that prohibits catcher vessels from delivering Area 543 Pacific cod to motherships, there is no similar prohibition in Areas 541-542.

Having defined the trawl catcher/processor limit as just described, the combined catcher/processor limits in Area 543 are 60.23 percent, while the combined catcher/processor limits in Areas 541-542 are 47.83 percent. Table 130 summarizes the estimates of potential catcher vessel harvest under Alternatives 2 and 3. As explained above, these are amounts available to catcher vessels, including both trawl and non-trawl

catcher vessels. However, non-trawl catcher vessel catches have been small compared to trawl catcher vessel catches.

These catcher vessel estimates are speculative. A key assumption is that, in the absence of the mothership prohibition, the trawl catcher/processor sector would continue to process the fish it harvested, and continue to buy the fish for processing from catcher vessels, in the same percentages that it has in the past. However, the alternatives do not require this. The sector allocation is to trawl catcher/processors and applies to the round weight of the Pacific cod used for processing. In future, all of this fish could be obtained by the catcher/processors themselves, with none purchased from catcher vessels, or all of it could be obtained from catcher vessels and none of it harvested by the catcher/processors operating in mothership mode themselves, or it could be obtained by catcher/processor or catcher vessel fishing in any combination. In the first case, the table below will overstate the harvest available to catcher vessels, and in the second case, it will understate the harvest available to catcher vessels. In the third category of cases, it is not possible to say whether or not the table is an over- or under-estimate.

**Table 130 Estimates of Constraints on Catcher Vessels if Catcher/Processors Harvest the Full Amounts Available to Them Under their Area-Sector Limits (metric tons)**

| | Area limits | | Fixed and Trawl C/P limits | | | | | Implied catcher vessel constraint | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Area 543 | | | Areas 541-542 | | Area 543 | | | Areas 541-542 | |
| Year | 543 | 541-542 | A2 Opt1 | A2 Opt2 | A3 | A2 | A3 | A2 Opt1 | A2 Opt2 | A3 | A2 | A3 |
| 2004 | 6,543 | 20,217 | 3,941 | 3,941 | 3,941 | 9,670 | 9,670 | 2,602 | 2,602 | 2,602 | 10,547 | 10,547 |
| 2005 | 6,045 | 18,675 | 3,641 | 3,641 | 3,641 | 8,932 | 8,932 | 2,404 | 2,404 | 2,404 | 9,743 | 9,743 |
| 2006 | 6,398 | 18,822 | 3,854 | 3,854 | 3,854 | 9,002 | 9,002 | 2,545 | 2,545 | 2,545 | 9,819 | 9,819 |
| 2007 | 5,805 | 17,075 | 3,496 | 3,496 | 3,496 | 8,167 | 8,167 | 2,308 | 2,308 | 2,308 | 8,908 | 8,908 |
| 2008 | 5,805 | 17,075 | 3,496 | 3,496 | 3,496 | 8,167 | 8,167 | 2,308 | 2,308 | 2,308 | 8,908 | 8,908 |
| 2009 | 6,002 | 17,658 | 3,615 | 3,615 | 3,615 | 8,446 | 8,446 | 2,387 | 2,387 | 2,387 | 9,212 | 9,212 |
| 2010 | 5,974 | 16,646 | 3,598 | 3,598 | 3,598 | 7,962 | 7,962 | 2,376 | 2,376 | 2,376 | 8,684 | 8,684 |
| 2011 | 3,724 | 10,376 | 2,243 | 2,243 | 2,243 | 4,963 | 4,963 | 1,481 | 1,481 | 1,481 | 5,413 | 5,413 |
| 2012 | 4,975 | 13,865 | 2,997 | 2,997 | 2,997 | 6,631 | 6,631 | 1,979 | 1,979 | 1,979 | 7,233 | 7,233 |
| 2013 | 3,243 | 9,037 | 1,953 | 1,953 | 1,953 | 4,322 | 4,322 | 1,290 | 1,290 | 1,290 | 4,715 | 4,715 |
| 2014 | 3,412 | 9,508 | 2,055 | 2,055 | 2,055 | 4,548 | 4,548 | 1,357 | 1,357 | 1,357 | 4,960 | 4,960 |

Notes: Trawl C/P limits are calculated only for vessels acting as C/Ps. If a vessel acts as a mothership, catcher vessel activity is automatically implied.
Sources: Calculations based on information in Table 95 and on the fixed and trawl catcher/processor limits described in the text.

As explained, Alternative 2 includes two options with respect to the use of motherships in Area 543. One option allows catcher vessels to deliver Area 543 Pacific cod to catcher/processors operating as motherships. This reflects the practice during the baseline years. The second alternative prohibits catcher vessels from delivering Pacific cod caught in Area 543 to catcher/processors operating as motherships. Under this option, catcher vessels would have to deliver Pacific cod to a shoreside processing plant (the nearest is in Adak), or to a shoreside floating processor.

The option that prohibits catcher vessels from delivering Pacific cod caught in Area 543 to catcher/processors acting as motherships would close an important market for this Pacific cod. The annual information on catcher vessel activity in Area 543 has not been reported in order to protect

confidential data; however, the 2006 to 2010 trawl catcher/processor allocations associated with the two options provide a rough measure of the importance of this activity in the later baseline years. If deliveries to catcher/processors acting as motherships are included, the trawl catcher/processor sector receives 67.7 percent of the Area 543 TAC, if these deliveries are not included, the sector only receives 28.02 percent. Thus, catcher vessels delivering to catcher/processors acting as motherships account for about 39.68 percent of the Area 543 production from 2006 to 2010. The wholesale value of this production under Alternative 2 was approximated in Table 101, and was between $3.0 million and $5.4 million a year.[139]

It may not be possible for this sector to make up the lost volume and value of Pacific cod. It is not clear that the vessels participating in this fishery during the baseline years would be able to economically substitute the processor at Adak for deliveries to trawl catcher/processors. Since the trawl and non-trawl catcher/processor sector harvest would be constrained by their sector limits, this raises the possibility that, given an Aleutian Islands-Bering Sea Pacific cod split leading to an Area 543 Pacific cod TAC, some Area 543 Pacific cod TAC could remain unharvested, if motherships are prohibited.[140]

Pacific cod Alternatives 2 and 3 incorporate separate limits on catch for trawl and non-trawl catcher/processors in Area 543, and in Areas 541-542. These limits are sector limits, but not sector allocations. As such, they do not guarantee a sector a share of the area harvest. The catcher vessel sectors in Area 543 and in Area 541-542 are not subject to similar sector limits, and could, potentially, harvest both area limits completely themselves.

Targeted catcher/processor and catcher vessel trawl fishing for Pacific cod in the Federal and parallel fisheries in the Aleutian Islands takes place primarily from mid-February through April. Catcher/processors also make incidental catches of Pacific cod in the fall. Non-trawl vessels, primarily catcher/processors, target Pacific cod early in the year during the same period as the trawlers, but also have an important targeted Pacific cod fishery again in the fall. (Figure 3-8 in Chapter 3 of the EIS; NMFS AKR In-season managers) Thus, the catcher/processors have been fishing simultaneously with, or after, the catcher vessels.

Since the catcher vessels could conceivably complete the harvest of all the area allocations of Pacific cod before the catcher/processor sectors could take their sector limits, Alternatives 2 and 3 could create a race for the Pacific cod, as catcher/processors harvest Pacific cod earlier in the year than they otherwise would have done so. The potential for such a race, and its costs, depends on the relative attractiveness of Aleutian Islands Pacific cod vis-à-vis Bering Sea Pacific cod. The catcher/processors are fishing against a BSAI-wide allocation (not a limit). If they fail to catch part of it in the Aleutian Islands, it is still reserved for them in the Bering Sea.

### 1.11.3 Critical habitat closures

In addition to the catch and participation limits discussed in Sub-section 1.11.2, the alternatives include measures that close different areas of critical habitat to directed fishing for Pacific cod with non-trawl gear. This section examines the revenues associated with the areas remaining open to directed fishing under the different alternatives. This is done first without considering the possible additional effect of the trawl catcher vessel limits discussed in the preceding sub-section. However, the impacts of critical

[139] These are not estimates of actual annual values, but approximations based on the language of Alternative 2, and the trawl catcher/processor shares between 2006 and 2010.

[140] The mothership option does not guarantee that trawl catcher vessels would continue to deliver the same amounts to the catcher/processors. Under the option there is no requirement that the catcher/processors acquire Pacific cod from catcher vessels. They could harvest and process the entire amount themselves. However, as a practical matter they could have done this in the baseline years, but evidently found it more cost effective to act as motherships.

habitat closures cannot be treated in isolation from the proposed sector limits. The second part of this sub-section discusses this interaction.

*Critical habitat closures*

Alternatives 2 and 3 include provisions that close designated areas within critical habitat to directed fishing activity. The impacts of these alternatives have been evaluated by identifying the volumes of Pacific cod retained from inside and from outside the closed critical habitat areas by trawl catcher vessels in the baseline period 2004 through 2010, assuming that the volumes from inside the closed areas would no longer be harvested, and that this loss in Pacific cod production would not be made up by increased fishing in the areas outside of the closed critical habitat. As a reminder, the harvest from inside the closed areas is described as "harvest at risk," while the harvest from the open areas is described as "residual" harvest. As explained in the discussion of methodology, in Section 1.2.14, these are not projections of future revenues or of the expected revenue impact, but may provide a rough index to the relative restrictiveness of the different alternatives.

Figure 20 and Figure 21 summarize this analysis. Figure 20 shows the residual wholesale gross revenues to processors for fish purchased from trawl catcher vessels after closing critical habitat in each alternative, and Figure 21 shows these residual revenues as a percentage of the baseline revenues.[141] The figures summarize the more detailed analysis in the processor wholesale gross revenue tables of the appendix to this section.[142]

Alternative 4 imposes the smallest relative burden on trawl catcher vessels harvesting Pacific cod and their processors; this is because the alternative is the only one that fully reverts to the pattern of critical habitat protections in place before the interim final rule (Alternative 1, the status quo) went into effect in 2011. Alternative 4 may be considered a proxy for the baseline in this figure.

Alternatives 1, 2, and 3 appear to have very similar effects and are relatively more burdensome to the trawl catcher vessels and their processors than Alternative 4. Alternative 3 tends to produce marginally higher gross revenues than Alternative 2; the revenues from Alternative 1 are generally less than those from Alternative 3, and similar to those for Alternative 2, however it does exceed both in one year as well. Given the uncertainties inherent in this analysis, and the change in the relative impact of the three alternatives, depending on the year, it may not be possible to rank these alternatives with respect to their respective burdens on trawl catcher vessels and their processors (although Alternative 3 appears marginally less burdensome to the sector than Alternatives 1 or 2).

The similarity of the results of Alternatives 1, 2, and 3 with respect to residual gross revenues may seem counter-intuitive. Alternative 1, the status quo, reflects the adverse impacts on fishery production and revenues caused by the interim final rule. Alternatives 2 and 3 were designed to mitigate the adverse impact on the fisheries associated with Alternative 1. However, as noted, in aggregate, it is not clear that Alternatives 2 and 3 are substantially less burdensome to trawl catcher vessels than Alternative 1.

An examination of production data indicates that Alternative 1 performs worse for trawlers and processors in Area 543, and in Area 542, but that it often performs better in Area 541. The differences offset each other to some extent. The key is the recognition that in Areas 541-542 (considered jointly), Alternatives 2 and 3 prohibit trawling in critical habitat east of 174° W longitude. An examination of the

[141] These figures summarize the residual revenues resulting from the analysis of the volumes of Pacific cod from closed critical habitat under each alternative. These figures are not adjusted to take account of the possible gross revenue impacts of area-sector, or of critical habitat, limits.

[142] Both figures have been simplified by identifying gross revenues under Alternative 4 with gross revenues under the baseline, thereby obviating the need for separate baseline and Alternative 4 revenue lines.

location of trawl catcher vessel Pacific cod production in Figures 3-11 through 3-14 in Chapter 3 of the EIS, shows a large concentration of historical catcher vessel Pacific cod production in Area 541 just to the east of Atka North Cape, and just to the east of this line.

Figure 19 helps show why Alternatives 2 and 3 would have been associated with lower production in the baseline years. This figure provides a blowup of Area 541 to the east of Atka North Cape. The alternatives call for critical habitat to be closed to the east of the line drawn at 174° W longitude. The figure also includes information about the location of trawl Pacific cod harvests during the baseline years. These occur predominately to the east of this line. A comparison of this figure with Figure 2-24 in Chapter 2 of the EIS shows that much of the critical habitat shown to the east of the 174° line, including the habitat where the harvest concentration is located, was open during the baseline years.

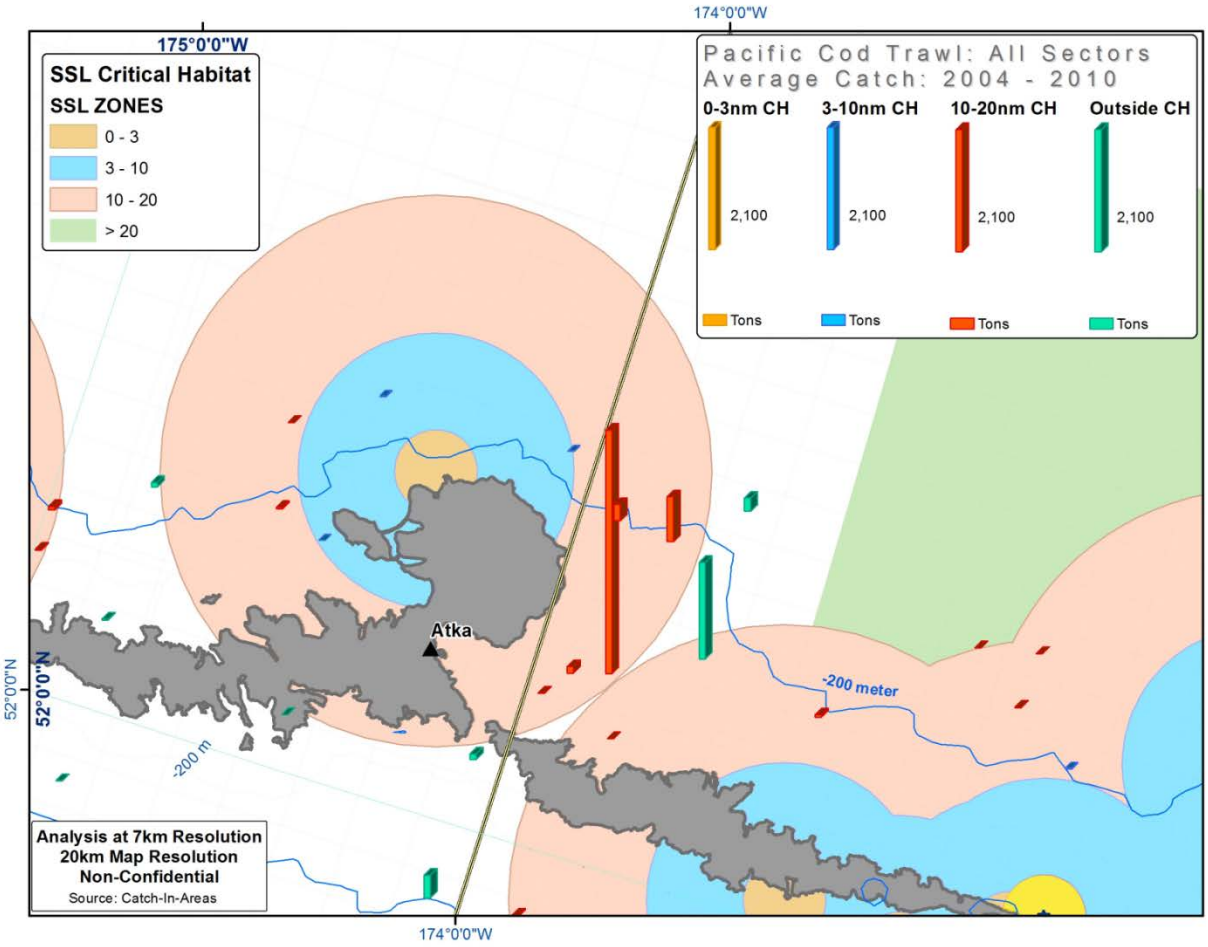



**Figure 19 Pacific cod trawl catches in the vicinity of Atka North Cape, 2004 through 2010**

Alternative 2, with the protective option, does appear to place a heavier burden on the vessels and processors in this sector in the later years of this period.

While residual revenue estimates may be useful indices of relative impacts, they are not, as just noted, projections of revenue impacts. Moreover, even if they were, they would have important limits as welfare

measures of the actions. They are gross measures and do not take account of changes in costs that may be associated with the alternatives. A more appropriate welfare measure would be quasi-rents, which may be defined as the change in revenues minus the change in variable costs associated with the action (Just et al., 2004). This welfare measure, however, is not available. In addition, this measure focuses attention on the remaining revenues in the Aleutian Islands Pacific cod fishery, and does not take account of the ability of fishing operations to take actions in response to the alternatives so as to minimize the impact of the alternatives on their profits. Most important in this instance, is their ability to substitute into other fisheries.

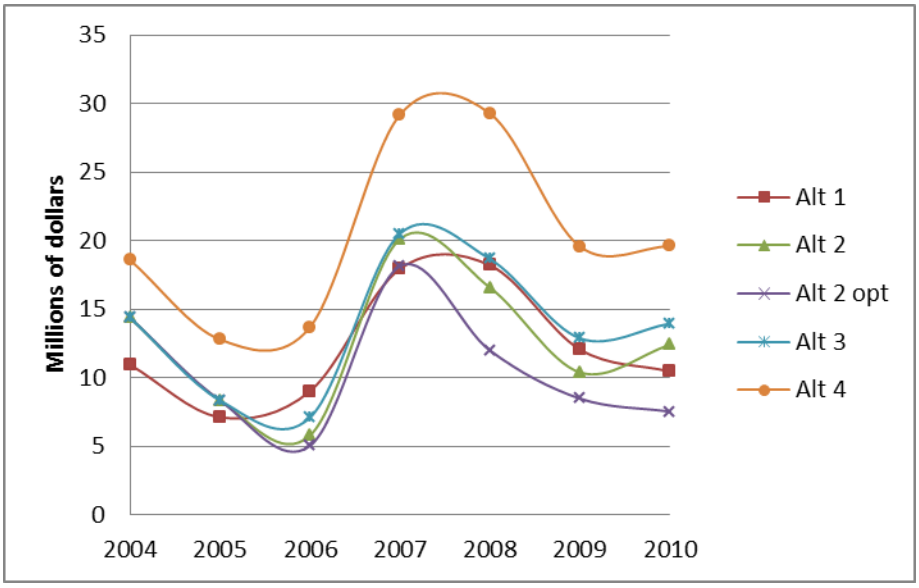



**Figure 20 Hypothetical processor wholesale gross revenues from trawl catcher vessel Pacific cod production for the baseline years for the Pacific cod alternatives (millions of real 2012 dollars)**

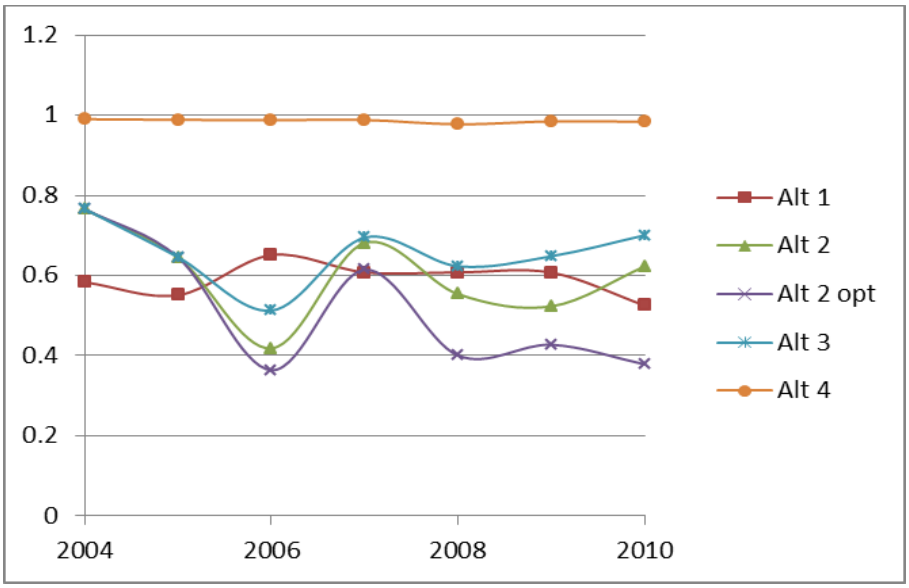



**Figure 21 Hypothetic processor wholesale gross revenues from trawl catcher vessel Pacific cod production for the baseline years for the Pacific cod alternatives, expressed as a percentage of baseline revenues**

*Interaction of critical habitat limits and area-sector limits*

In some years, some of the area-sector limits would have restricted Pacific cod harvests by trawl catcher vessels more than would be expected by simply closing critical habitat to fishing activity. Table 131 compares the residual harvest in Area 543 and Areas 541-542 (from the analysis of critical habitat closures summarized in the appendix to this section) with the area-sector limit restrictions in the alternatives and options, and calculates how much the area-sector limits restrict harvest beyond the levels associated with the critical habitat closures. Where the area-sector limits would not actually have limited harvests, the value has been set to zero.

In other years, some of the area-sector limits would have considerably exceeded the harvests from areas outside of closed critical habitat in the baseline years. If the non-trawl catcher/processor sector is successfully able to redeploy its fleet from fishing in closed critical habitat to areas that remain open, these limits may make possible increased fishing production. Table 131 compares the residual harvest in Area 543 and Areas 541-542 (from the analysis of critical habitat closures summarized in the appendix to this section) with the TACs associated with the percentage TAC options under Alternative 2, and calculates the additional catch that might be possible if the fleet could successfully redeploy into Pacific cod within Area 543.

Table 131 shows that the area-sector constraints tend to bind the most in the later years of the baseline period, when the proportion of the biomass in the Aleutian Islands was lower than the levels of former years.

**Table 131 Potential restriction, or opportunity for expansion, of open area fishing by trawl catcher vessels within the limits imposed on potential Area 543 and Areas 541-542 open area catches (residual catches) by area area-sector limits (metric tons)**

| | Area 543 | | | Areas 541 and 542 | | | Balance |
|---|---|---|---|---|---|---|---|
| | Residual catch | Area limit | Area limit minus residual catch | Residual catch | Area limit | Area limit minus residual catch | |
| Alternative 2 | | | | | | | |
| 2004 | - | 2,602 | 2,602 | 10,299 | 10,547 | 248 | 2,850 |
| 2005 | - | 2,404 | 2,404 | 5,155 | 9,743 | 4,588 | 6,992 |
| 2006 | 379 | 2,545 | 2,166 | 2,510 | 9,819 | 7,309 | 9,475 |
| 2007 | 891 | 2,308 | 1,417 | 8,133 | 8,908 | 775 | 2,192 |
| 2008 | 2,124 | 2,308 | 184 | 5,612 | 8,908 | 3,296 | 3,480 |
| 2009 | 1,459 | 2,387 | 928 | 6,401 | 9,212 | 2,811 | 3,739 |
| 2010 | 3,159 | 2,376 | (783) | 4,784 | 8,684 | 3,900 | 3,117 |
| Alternative 2, protective option | | | | | | | |
| 2004 | - | 2,602 | 2,602 | 10,299 | 10,547 | 248 | 2,850 |
| 2005 | - | 2,404 | 2,404 | 5,155 | 9,743 | 4,588 | 6,992 |
| 2006 | 2 | 2,545 | 2,543 | 2,512 | 9,819 | 7,307 | 9,850 |
| 2007 | 2 | 2,308 | 2,306 | 8,135 | 8,908 | 773 | 3,079 |
| 2008 | 2 | 2,308 | 2,306 | 5,614 | 8,908 | 3,294 | 5,600 |
| 2009 | 27 | 2,387 | 2,360 | 6,427 | 9,212 | 2,785 | 5,145 |
| 2010 | 37 | 2,376 | 2,339 | 4,821 | 8,684 | 3,863 | 6,202 |
| Alternative 3 | | | | | | | |
| 2004 | - | 2,602 | 2,602 | 10,299 | 10,547 | 248 | 2,850 |
| 2005 | - | 2,404 | 2,404 | 5,155 | 9,743 | 4,588 | 6,992 |
| 2006 | 1,031 | 2,545 | 1,514 | 2,510 | 9,819 | 7,309 | 8,823 |
| 2007 | 1,063 | 2,308 | 1,245 | 8,114 | 8,908 | 794 | 2,039 |
| 2008 | 3,099 | 2,308 | (791) | 5,612 | 8,908 | 3,296 | 2,505 |
| 2009 | 3,338 | 2,387 | (951) | 6,401 | 9,212 | 2,811 | 1,860 |
| 2010 | 4,149 | 2,376 | (1,773) | 4,784 | 8,684 | 3,900 | 2,127 |
| | | | | | | | |
| | | | | | | | |

Table 132 provides estimates of the processor wholesale gross revenues associated with these production shortfalls (using real 2012 dollar estimates).[143] In most area-year combinations the limits would not impose costs. Most of the costs are associated with Alternative 2 with its protective option. There is a large, but unknown, degree of uncertainty associated with these cost estimates.

[143] This is an approximation of the revenue shortfall, based solely on a consideration of the forgone Pacific cod revenues, but not considering the potential for lost revenues from incidental catches. Prices are BSAI-wide and may not capture the potentially higher value of larger Aleutian Islands Pacific cod. The impact of these changes in volume on price are unclear, since this is a small part of overall BSAI production. Any effect would take the form of a mitigation of revenue declines as volume reductions are offset by price rises.

**Table 132 Shortfalls in open area processor wholesale gross revenues associated with trawl catcher vessel Pacific cod production, or potential to exceed those gross revenues, associated with area-sector limits (millions of dollars)**

| | | Alt 2 | | | Alt 2, P.O. | | | Alt 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Value | Short | Over | Net | Short | Over | Net | Short | Over | Net |
| 2004 | 1,351 | 0.0 | 3.9 | 3.9 | 0.0 | 3.9 | 3.9 | 0.0 | 3.9 | 3.9 |
| 2005 | 1,591 | 0.0 | 11.1 | 11.1 | 0.0 | 11.1 | 11.1 | 0.0 | 11.1 | 11.1 |
| 2006 | 1,792 | 0.0 | 17.0 | 17.0 | 0.0 | 17.7 | 17.7 | 0.0 | 15.8 | 15.8 |
| 2007 | 2,345 | 0.0 | 5.1 | 5.1 | 0.0 | 7.2 | 7.2 | 0.0 | 4.8 | 4.8 |
| 2008 | 2,149 | 0.0 | 7.5 | 7.5 | 0.0 | 12.0 | 12.0 | (1.7) | 7.1 | 5.4 |
| 2009 | 1,187 | 0.0 | 4.4 | 4.4 | 0.0 | 6.1 | 6.1 | (1.1) | 3.3 | 2.2 |
| 2010 | 1,506 | (1.2) | 5.9 | 4.7 | 0.0 | 9.3 | 9.3 | (2.7) | 5.9 | 3.2 |
| Notes: Revenue shortfalls (reduction in revenues associated with limits) in parentheses. | | | | | | | | | | |

Figure 22 shows the relationships between Alternatives 1 through 4 given the limits placed on revenues when the area-sector limits are less than residual catch from the open areas in the baseline years. Although Alternatives 1 and 4 do not formally include any area-sector components, these area-sector limit measures are, to a considerable extent, addressing an anticipated Bering Sea and Aleutian Islands Pacific cod split. Such a split would affect Alternatives 1 and 4 as well. Thus, Figure 22 applies these measures to Alternatives 1 and 4 as well, in order to enhance the comparability of alternatives.

The relative ranking of the alternatives from this figure is similar to that in Figure 20. Alternative 4 is the best, from the point of view of the trawl catcher vessels, and Alternative 2, with its protective option is the worst. Alternatives 1, 2, and 3 appear to have generally similar impacts, although their relative rankings can change from year to year. These results all have a level of uncertainty that cannot be quantified, but that is probably large.

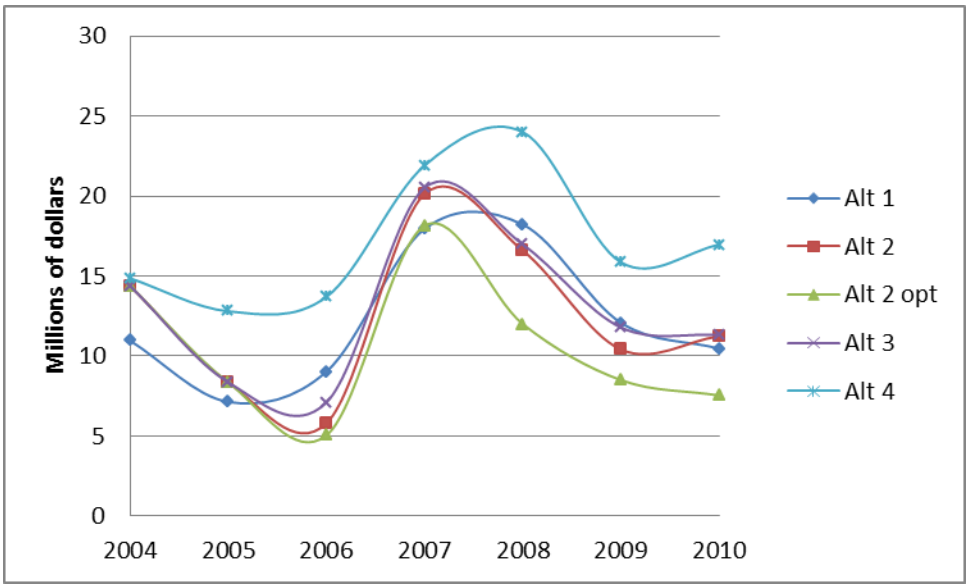



**Figure 22 Gross revenues by alternative, taking account of the area-sector limits (millions of real 2012 dollars)**

### 1.11.4 Seasons and ESA reinitiation triggers

In addition to opening or closing areas of critical habitat to fishing, and in addition to imposing area and sector limits on harvest, the alternatives under consideration in this action include measures to modify fishing seasons for trawl gear, and to impose ESA reinitiation triggers if harvest exceeds certain levels. The analysis of trawl catcher/processor impacts included a discussion of these issues in Sub-section 1.9.4. This was written to cover both the trawl catcher/processor and the trawl catcher vessel sectors. In the interests of economy, this discussion is not reproduced here, and the reader is referred to that earlier sub-section.

### 1.11.5 Redeployment

Trawl catcher vessel sector redeployment was discussed in detail with respect to Alternative 1 in Section 1.5.3 of this RIR. This section will merely summarize the comments made in more detail there.

Alternative Pacific cod trawling opportunities in the Aleutian Islands are believed to be limited. Most trawlable depths for Pacific cod exist close to shore and within the 20 nautical mile critical habitat designations. Alternatives 2, 3, and 4 lift the "no retention" requirement in Area 543, making more areas within critical habitat available.

Conversely, there are opportunities for trawl catcher vessels to redeploy and fish for Pacific cod in the Bering Sea. In the past, vessels in this fishery took important amounts of their annual Pacific cod catch in the Bering Sea. Halibut PSC rates are higher in the Bering Sea and this may be a concern and may limit the sector's ability to fully make up all lost Aleutian Islands Pacific cod in the Bering Sea. Pacific cod that this sector was unable to harvest would be rolled over to other sectors. Pacific cod in the Bering Sea may bring a lower price than those from the Aleutian Islands.

Opportunities to fish for Pacific cod in the Gulf of Alaska are likely to be limited by license limitation program endorsements, divergent timing of the Aleutian Islands and Gulf of Alaska Pacific cod fisheries, and Gulf of Alaska trawl sector allocation restrictions.

There appear to be few opportunities to expand into other groundfish species.

### 1.11.6 Incidental catch and PSC

The trawl catcher vessel fleet has small incidental catches of groundfish, and also of PSC. The analysis of trawl catcher/processor impacts included a Sub-section 1.9.6 that discussed these issues for the trawl catcher vessels, as well as the trawl catcher/processors. In the interests of economy, this discussion is not reproduced here, and the reader is referred to that earlier sub-section.

### 1.11.7 Fleet and community impacts

*Trawl catcher vessels*

Alternatives 1, 2, and 3 should have similar impacts with respect to reductions in sector gross revenues. The mean annual residual wholesale gross revenues to processors buying fish from this sector, associated with area closures, are 59 percent of baseline wholesale gross revenues under Alternative 1, 60 percent under Alternative 2, and 66 percent under Alternative 3.[144] While Alternative 3 should logically have smaller adverse impacts than Alternative 2, each of these estimates is associated with a large, but not quantifiable, confidence interval, which makes it difficult to state that there is a meaningful revenue difference between these alternatives. Average residual revenues under the protective option to Alternative 2 are 51 percent of baseline revenues; this alternative does appear to be worse for this sector than the others. Alternative 4, which basically adopts the management regulations prevailing during the baseline period, does not have a discernible impact, on this sector. Vessels in this sector are believed to have relatively good opportunities for redeployment into the Bering Sea. Pacific cod harvests there may be associated with lower prices, and higher halibut PSC, however.

*Adak/Atka/Unalaska*

Compared to the baseline, Alternatives 1, 2, and 3 involve fewer product deliveries, less processing activity, fewer tax revenues, fewer sales of ancillary goods and services, and less potential for immigration and home porting of future vessels at Adak and Atka. Alternatives 1, 2, and 3 may reduce deliveries to that town compared to the baseline period. The protective option to Alternative 2 would have a greater adverse impact, while Alternative 4 should have no discernible impact compared to the baseline. Potential impacts on Unalaska cannot be ascertained. While the overall reduction in production could reduce deliveries of Pacific cod from the Aleutians, redeployment of catcher vessels could lead to more product deliveries in Unalaska.

*Other communities*

Many of the vessels in this sector have western Washington State home ports. These alternatives may affect incomes to persons living in that region and having an ownership or employment interest in these

[144] These percentages are those associated with closing critical habitat compared to the baseline and do not reflect the impacts of area-sector limits. The area closure percentages have been used given the importance of the Aleutian Islands and Bering Sea Pacific cod split as a reason for the area-sector splits.

vessels. Similarly, firms in these areas, supplying this sector with goods and services, may also be affected. Some related impacts may flow, in a few cases, to communities in Alaska. In general, these changes will be small in proportion to the size and normal fluctuations of income and output in these communities.

*CDQ communities/ Aleut Corporation stockholders*

The alternatives under consideration here do not affect BSAI CDQ group allocations of Pacific cod, although they impose limits on CDQ group ability to harvest their Pacific cod where and when they choose. Thus, the alternatives have an unknown adverse impact on the CDQ groups, and the communities that they benefit.

The alternatives under consideration here may affect the revenues of the Aleut Corporation subsidiaries, the Aleut Enterprise LLP, and the Aleut Real Estate LLP, by reducing fuel sales, and sales of other goods and services, at Adak. Changes in activity at Adak can also affect Aleut Corporation objectives of contributing to the development of Adak.

*Benefits of protecting Steller sea lions*

Available models are unable to predict the impact of the alternatives and options on the various characteristics of the Steller sea lion populations. While more protective alternatives, such as Alternative 1, should logically help the Steller sea lion population, NMFS is unable to make specific quantitative predictions of the impact on populations. This makes it impossible to project the impact of the alternatives on the welfare of persons placing a value on population characteristics.

Avoidance of jeopardy to the population, or of adverse modification to Steller sea lion critical habitat, represents a different, legal criterion for comparing the alternatives. However, a judgment on those issues requires completion of a Biological Opinion covering these alternatives and options, and cannot be made on the basis of this NEPA analysis.

### 1.11.8 Summary

Table 133 summarizes key results from this analysis for all Pacific cod alternatives and options (including Alternative 1 and 4 results from Section 1.3). The inclusion of results for Alternative 1 and 4 provides overall context for the Alternative 2 and 3 results.

**Table 133 Comparison of Pacific Cod trawl catcher vessel alternatives**

| Impact category | Alternative 1 | Alternative 2 | | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| | | No protective option | Protective option | | |
| Trawl catcher vessels | The adverse impacts on trawl catcher vessels are similar to those under Alternatives 2 and 3. Average residual revenues are 59% of baseline revenues, ignoring area-sector impacts. | The adverse impacts on trawl catcher vessels are similar to those under Alternatives 1 and 3. Average residual revenues are 60% of baseline revenues, ignoring area-sector impacts. | The impacts of this option are similar to those of Alternatives 1, 2, and 3 in some years, but appear to be more adverse to the fleet in others. Average residual revenues are 51% of baseline revenues, ignoring area-sector impacts. | The adverse impacts on trawl catcher vessels are similar to those under Alternatives 1 and 2. Average residual revenues are 66% of baseline revenues, ignoring area-sector impacts. | This alternative does not have adverse impacts on the fleet, or on other impact categories, compared to the baseline (the baseline is the regulatory structure from 2004 through 2010; Alternative 4 adopts these regulations for this fleet). |
| Other fishing sectors | | | | | |
| Adak, Atka, and Unalaska | Compared to the baseline, at Adak and Atka, there would be fewer product deliveries, less processing activity, fewer tax revenues, fewer sales of ancillary goods and services, less potential for immigration and home porting of future vessels. The net impact on Unalaska is unclear. | Similar to Alternative 1 | Adverse impacts on Adak would be greater than those for Alternatives 1, 2, and 3. | Similar to Alternatives 1 | |
| Other communities | Impacts would be felt in the Seattle-Tacoma Region, and in some Alaskan communities. In general impacts are expected to be small in comparison with the overall economies of these communities. | | | | |
| CDQ communities and Aleut Corporation stockholders | Compared to baseline, this alternative may reduce the profitability of CDQ BSAI Pacific cod quota. Aleut Corporation revenues may be reduced because of reduced fuel sales in Adak, and because of reduced leases associated with reduced processing activity at the plant in Adak. | Similar to Alternative 1. | Adverse impacts would be greater than those for Alternatives 1, 2, and 3. | Similar to Alternative 1 | |
| Incidental catch and PSC | None of the alternatives appear to create serious issues for incidental catch or PSC. | | | | |
| Steller sea lion stock | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | This option appears to remove the least prey from the prey field, and thus may have less impact on Steller sea lions than the other alternatives. | It is difficult to distinguish between the benefits of Alternatives 1, 2 (not including the Protective Option), and 3 for Steller sea lions. | |

| Impact category | Alternative 1 | Alternative 2 | | Alternative 3 | Alternative 4 |
|---|---|---|---|---|---|
| | | No protective option | Protective option | | |
| Sum of producers' and consumers' surplus | The sum of these surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Pacific cod products, and consumers' surpluses accruing to persons who value SSL population health. Alternatives 1, 2, and 3 decrease producers' surpluses from the baseline, while Alternative 4 does not, surpluses accruing to U.S. consumers are unlikely to change much since overall BSAI Pacific cod harvests are unlikely to change. Limited information on the impact of the actions on SSL populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to determine for this action. Thus the net benefits of the alternatives are indeterminate, and the alternatives themselves cannot be ranked on this criterion. | | | | |

### 1.11.9 Appendix: Critical habitat closure tables

The four alternatives discussed in this section each take a somewhat different approach to closures of critical habitat to directed fishing for Pacific cod by trawl catcher vessels. This analysis of these measures is summarized in the catch and revenue tables in this appendix. The appendix includes a catch table, an ex-vessel gross revenue table, and a wholesale gross revenue table for each of the principal alternative-option combinations.

Wholesale revenues accrue to the processors to which catcher vessels sell their Pacific cod and incidental catches of other species; catcher vessels do not participate in the wholesale market. Revenues from the wholesale level and ex-vessel level are not additive for welfare comparison purposes. Ex-vessel gross revenues are an operating cost for the processors, selling at wholesale. The two levels of revenues have been provided because they provide the gross revenue picture from the perspectives of two separate sector participants: operators of catcher vessels and operators of processing plants.

Each catch table has four parts: (1) estimates of historical catch by area and in total (these estimates are the same in each table); (2) estimates of the volume of catch taken from within critical habitat closed to fishing under the alternative or option; (3) estimates of the catch taken from open critical habitat, or from outside critical habitat; (4) a final column expressing the residual catch as a percentage of the historical catch.

Each revenue table has a similar organization; revenue tables have upper and lower portions showing estimated revenues in nominal and in real (2012 equivalent) dollars. Each alternative and option combination is summarized in one catch and one revenue table.

**Table 134 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 1 area closures**

| | Total catch (mt) | | | | Catch from closed areas (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 10,916 | 2,533 | 0 | 13,449 | 4,040 | 1,566 | 0 | 5,606 | 6,875 | 967 | 0 | 7,843 | 58% |
| 2005 | 6,731 | 1,239 | 0 | 7,969 | 2,899 | 690 | 0 | 3,589 | 3,831 | 549 | 0 | 4,380 | 55% |
| 2006 | 5,185 | S | C | 6,907 | 786 | S | C | 2,411 | 4,399 | S | C | 4,496 | 65% |
| 2007 | 10,847 | S | C | 13,228 | 3,484 | S | C | 5,214 | 7,363 | S | C | 8,015 | 61% |
| 2008 | 10,183 | S | C | 13,994 | 1,764 | S | C | 5,473 | 8,419 | S | C | 8,521 | 61% |
| 2009 | 9,676 | S | C | 15,025 | 1,943 | S | C | 5,895 | 7,733 | S | C | 9,131 | 61% |
| 2010 | 8,325 | S | C | 12,746 | 1,742 | S | C | 6,056 | 6,583 | S | C | 6,690 | 52% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 135 Estimated Alternative 1 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 5.2 | 1.2 | 0.0 | 6.4 | 1.9 | 0.7 | 0.0 | 2.7 | 3.3 | 0.5 | 0.0 | 3.7 | 58% |
| 2005 | 3.6 | 0.7 | 0.0 | 4.2 | 1.5 | 0.4 | 0.0 | 1.9 | 2.0 | 0.3 | 0.0 | 2.3 | 55% |
| 2006 | 4.1 | S | C | 5.4 | 0.6 | S | C | 1.9 | 3.4 | S | C | 3.5 | 65% |
| 2007 | 10.4 | S | C | 12.7 | 3.3 | S | C | 5.0 | 7.1 | S | C | 7.7 | 61% |
| 2008 | 12.6 | S | C | 17.3 | 2.2 | S | C | 6.8 | 10.4 | S | C | 10.5 | 61% |
| 2009 | 4.9 | S | C | 7.7 | 1.0 | S | C | 3.0 | 4.0 | S | C | 4.7 | 61% |
| 2010 | 4.2 | S | C | 6.5 | 0.9 | S | C | 3.1 | 3.3 | S | C | 3.4 | 52% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 6.1 | 1.4 | 0.0 | 7.6 | 2.3 | 0.9 | 0.0 | 3.2 | 3.9 | 0.5 | 0.0 | 4.4 | 58% |
| 2005 | 4.2 | 0.8 | 0.0 | 4.9 | 1.8 | 0.4 | 0.0 | 2.2 | 2.4 | 0.3 | 0.0 | 2.7 | 55% |
| 2006 | 4.6 | S | C | 6.1 | 0.7 | S | C | 2.1 | 3.9 | S | C | 4.0 | 65% |
| 2007 | 11.4 | S | C | 13.9 | 3.6 | S | C | 5.5 | 7.8 | S | C | 8.5 | 61% |
| 2008 | 13.3 | S | C | 18.2 | 2.3 | S | C | 7.1 | 11.0 | S | C | 11.1 | 61% |
| 2009 | 5.2 | S | C | 8.1 | 1.1 | S | C | 3.2 | 4.2 | S | C | 4.9 | 61% |
| 2010 | 4.4 | S | C | 6.8 | 0.9 | S | C | 3.2 | 3.5 | S | C | 3.5 | 52% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 136 Estimated Alternative 1 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 12.4 | 2.9 | 0.0 | 15.3 | 4.6 | 1.8 | 0.0 | 6.4 | 7.8 | 1.1 | 0.0 | 8.9 | 58% |
| 2005 | 9.2 | 1.7 | 0.0 | 10.9 | 4.0 | 0.9 | 0.0 | 4.9 | 5.3 | 0.8 | 0.0 | 6.0 | 55% |
| 2006 | 8.3 | S | C | 11.0 | 1.3 | S | C | 3.8 | 7.0 | S | C | 7.2 | 65% |
| 2007 | 23.2 | S | C | 28.3 | 7.4 | S | C | 11.1 | 15.8 | S | C | 17.2 | 61% |
| 2008 | 20.8 | S | C | 28.6 | 3.6 | S | C | 11.2 | 17.2 | S | C | 17.4 | 61% |
| 2009 | 10.8 | S | C | 16.8 | 2.2 | S | C | 6.6 | 8.7 | S | C | 10.2 | 61% |
| 2010 | 12.0 | S | C | 18.4 | 2.5 | S | C | 8.8 | 9.5 | S | C | 9.7 | 52% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 14.8 | 3.4 | 0.0 | 18.2 | 5.5 | 2.1 | 0.0 | 7.6 | 9.3 | 1.3 | 0.0 | 10.6 | 58% |
| 2005 | 10.7 | 2.0 | 0.0 | 12.7 | 4.6 | 1.1 | 0.0 | 5.7 | 6.1 | 0.9 | 0.0 | 7.0 | 55% |
| 2006 | 9.3 | S | C | 12.4 | 1.4 | S | C | 4.3 | 7.9 | S | C | 8.1 | 65% |
| 2007 | 25.5 | S | C | 31.0 | 8.1 | S | C | 12.2 | 17.3 | S | C | 18.9 | 61% |
| 2008 | 21.9 | S | C | 30.1 | 3.8 | S | C | 11.8 | 18.1 | S | C | 18.3 | 61% |
| 2009 | 11.5 | S | C | 17.8 | 2.3 | S | C | 7.0 | 9.2 | S | C | 10.8 | 61% |
| 2010 | 12.5 | S | C | 19.2 | 2.6 | S | C | 9.1 | 9.9 | S | C | 10.1 | 52% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

**Table 137 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 2 area closures**

| | Total catch (mt) | | | | Catch from closed areas (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 10,916 | 2,533 | 0 | 13,449 | 1,854 | 1,296 | 0 | 3,150 | 9,062 | 1,237 | 0 | 10,299 | 77% |
| 2005 | 6,731 | 1,239 | 0 | 7,969 | 2,248 | 567 | 0 | 2,815 | 4,483 | 672 | 0 | 5,155 | 65% |
| 2006 | 5,185 | S | C | 6,907 | 3,065 | S | C | 4,018 | 2,120 | S | C | 2,889 | 42% |
| 2007 | 10,847 | S | C | 13,228 | 3,415 | S | C | 4,205 | 7,432 | S | C | 9,023 | 68% |
| 2008 | 10,183 | S | C | 13,994 | 4,863 | S | C | 6,258 | 5,320 | S | C | 7,736 | 55% |
| 2009 | 9,676 | S | C | 15,025 | 4,732 | S | C | 7,166 | 4,944 | S | C | 7,860 | 52% |
| 2010 | 8,325 | S | C | 12,746 | 3,648 | S | C | 4,803 | 4,677 | S | C | 7,943 | 62% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 138 Estimated Alternative 2 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 5.2 | 1.2 | 0.0 | 6.4 | 0.9 | 0.6 | 0.0 | 1.5 | 4.3 | 0.6 | 0.0 | 4.9 | 77% |
| 2005 | 3.6 | 0.7 | 0.0 | 4.2 | 1.2 | 0.3 | 0.0 | 1.5 | 2.4 | 0.4 | 0.0 | 2.7 | 65% |
| 2006 | 4.1 | S | C | 5.4 | 2.4 | S | C | 3.1 | 1.7 | S | C | 2.3 | 42% |
| 2007 | 10.4 | S | C | 12.7 | 3.3 | S | C | 4.0 | 7.1 | S | C | 8.7 | 68% |
| 2008 | 12.6 | S | C | 17.3 | 6.0 | S | C | 7.7 | 6.6 | S | C | 9.6 | 55% |
| 2009 | 4.9 | S | C | 7.7 | 2.4 | S | C | 3.7 | 2.5 | S | C | 4.0 | 52% |
| 2010 | 4.2 | S | C | 6.5 | 1.9 | S | C | 2.4 | 2.4 | S | C | 4.0 | 62% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 6.1 | 1.4 | 0.0 | 7.6 | 1.0 | 0.7 | 0.0 | 1.8 | 5.1 | 0.7 | 0.0 | 5.8 | 77% |
| 2005 | 4.2 | 0.8 | 0.0 | 4.9 | 1.4 | 0.4 | 0.0 | 1.7 | 2.8 | 0.4 | 0.0 | 3.2 | 65% |
| 2006 | 4.6 | S | C | 6.1 | 2.7 | S | C | 3.5 | 1.9 | S | C | 2.5 | 42% |
| 2007 | 11.4 | S | C | 13.9 | 3.6 | S | C | 4.4 | 7.8 | S | C | 9.5 | 68% |
| 2008 | 13.3 | S | C | 18.2 | 6.3 | S | C | 8.1 | 6.9 | S | C | 10.1 | 55% |
| 2009 | 5.2 | S | C | 8.1 | 2.6 | S | C | 3.9 | 2.7 | S | C | 4.3 | 52% |
| 2010 | 4.4 | S | C | 6.8 | 1.9 | S | C | 2.5 | 2.5 | S | C | 4.2 | 62% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 139 Estimated Alternative 2 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 12.4 | 2.9 | 0.0 | 15.3 | 2.1 | 1.5 | 0.0 | 3.6 | 10.3 | 1.4 | 0.0 | 11.7 | 77% |
| 2005 | 9.2 | 1.7 | 0.0 | 10.9 | 3.1 | 0.8 | 0.0 | 3.9 | 6.1 | 0.9 | 0.0 | 7.1 | 65% |
| 2006 | 8.3 | S | C | 11.0 | 4.9 | S | C | 6.4 | 3.4 | S | C | 4.6 | 42% |
| 2007 | 23.2 | S | C | 28.3 | 7.3 | S | C | 9.0 | 15.9 | S | C | 19.3 | 68% |
| 2008 | 20.8 | S | C | 28.6 | 9.9 | S | C | 12.8 | 10.9 | S | C | 15.8 | 55% |
| 2009 | 10.8 | S | C | 16.8 | 5.3 | S | C | 8.0 | 5.5 | S | C | 8.8 | 52% |
| 2010 | 12.0 | S | C | 18.4 | 5.3 | S | C | 6.9 | 6.8 | S | C | 11.5 | 62% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 14.8 | 3.4 | 0.0 | 18.2 | 2.5 | 1.8 | 0.0 | 4.3 | 12.3 | 1.7 | 0.0 | 13.9 | 77% |
| 2005 | 10.7 | 2.0 | 0.0 | 12.7 | 3.6 | 0.9 | 0.0 | 4.5 | 7.1 | 1.1 | 0.0 | 8.2 | 65% |
| 2006 | 9.3 | S | C | 12.4 | 5.5 | S | C | 7.2 | 3.8 | S | C | 5.2 | 42% |
| 2007 | 25.5 | S | C | 31.0 | 8.0 | S | C | 9.9 | 17.4 | S | C | 21.2 | 68% |
| 2008 | 21.9 | S | C | 30.1 | 10.5 | S | C | 13.5 | 11.4 | S | C | 16.7 | 55% |
| 2009 | 11.5 | S | C | 17.8 | 5.6 | S | C | 8.5 | 5.9 | S | C | 9.3 | 52% |
| 2010 | 12.5 | S | C | 19.2 | 5.5 | S | C | 7.2 | 7.0 | S | C | 12.0 | 62% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

**Table 140 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 2 protective option area closures**

| | Total catch (mt) | | | | Catch from closed areas (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 10,916 | 2,533 | 0 | 13,449 | 1,854 | 1,296 | 0 | 3,150 | 9,062 | 1,237 | 0 | 10,299 | 77% |
| 2005 | 6,731 | 1,239 | 0 | 7,969 | 2,248 | 567 | 0 | 2,815 | 4,483 | 672 | 0 | 5,155 | 65% |
| 2006 | 5,185 | S | C | 6,907 | 3,065 | S | C | 4,394 | 2,120 | S | C | 2,512 | 36% |
| 2007 | 10,847 | S | C | 13,228 | 3,415 | S | C | 5,094 | 7,432 | S | C | 8,135 | 61% |
| 2008 | 10,183 | S | C | 13,994 | 4,863 | S | C | 8,380 | 5,320 | S | C | 5,614 | 40% |
| 2009 | 9,676 | S | C | 15,025 | 4,732 | S | C | 8,598 | 4,944 | S | C | 6,427 | 43% |
| 2010 | 8,325 | S | C | 12,746 | 3,648 | S | C | 7,925 | 4,677 | S | C | 4,821 | 38% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 141 Estimated Alternative 2 protective option trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 5.2 | 1.2 | 0.0 | 6.4 | 0.9 | 0.6 | 0.0 | 1.5 | 4.3 | 0.6 | 0.0 | 4.9 | 77% |
| 2005 | 3.6 | 0.7 | 0.0 | 4.2 | 1.2 | 0.3 | 0.0 | 1.5 | 2.4 | 0.4 | 0.0 | 2.7 | 65% |
| 2006 | 4.1 | S | C | 5.4 | 2.4 | S | C | 3.4 | 1.7 | S | C | 2.0 | 36% |
| 2007 | 10.4 | S | C | 12.7 | 3.3 | S | C | 4.9 | 7.1 | S | C | 7.8 | 61% |
| 2008 | 12.6 | S | C | 17.3 | 6.0 | S | C | 10.4 | 6.6 | S | C | 6.9 | 40% |
| 2009 | 4.9 | S | C | 7.7 | 2.4 | S | C | 4.4 | 2.5 | S | C | 3.3 | 43% |
| 2010 | 4.2 | S | C | 6.5 | 1.9 | S | C | 4.0 | 2.4 | S | C | 2.5 | 38% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 6.1 | 1.4 | 0.0 | 7.6 | 1.0 | 0.7 | 0.0 | 1.8 | 5.1 | 0.7 | 0.0 | 5.8 | 77% |
| 2005 | 4.2 | 0.8 | 0.0 | 4.9 | 1.4 | 0.4 | 0.0 | 1.7 | 2.8 | 0.4 | 0.0 | 3.2 | 65% |
| 2006 | 4.6 | S | C | 6.1 | 2.7 | S | C | 3.9 | 1.9 | S | C | 2.2 | 36% |
| 2007 | 11.4 | S | C | 13.9 | 3.6 | S | C | 5.4 | 7.8 | S | C | 8.6 | 61% |
| 2008 | 13.3 | S | C | 18.2 | 6.3 | S | C | 10.9 | 6.9 | S | C | 7.3 | 40% |
| 2009 | 5.2 | S | C | 8.1 | 2.6 | S | C | 4.7 | 2.7 | S | C | 3.5 | 43% |
| 2010 | 4.4 | S | C | 6.8 | 1.9 | S | C | 4.2 | 2.5 | S | C | 2.6 | 38% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 25, 2013.

**Table 142 Estimated Alternative 2 protective option Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 12.4 | 2.9 | 0.0 | 15.3 | 2.1 | 1.5 | 0.0 | 3.6 | 10.3 | 1.4 | 0.0 | 11.7 | 77% |
| 2005 | 9.2 | 1.7 | 0.0 | 10.9 | 3.1 | 0.8 | 0.0 | 3.9 | 6.1 | 0.9 | 0.0 | 7.1 | 65% |
| 2006 | 8.3 | S | C | 11.0 | 4.9 | S | C | 7.0 | 3.4 | S | C | 4.0 | 36% |
| 2007 | 23.2 | S | C | 28.3 | 7.3 | S | C | 10.9 | 15.9 | S | C | 17.4 | 61% |
| 2008 | 20.8 | S | C | 28.6 | 9.9 | S | C | 17.1 | 10.9 | S | C | 11.5 | 40% |
| 2009 | 10.8 | S | C | 16.8 | 5.3 | S | C | 9.6 | 5.5 | S | C | 7.2 | 43% |
| 2010 | 12.0 | S | C | 18.4 | 5.3 | S | C | 11.5 | 6.8 | S | C | 7.0 | 38% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 14.8 | 3.4 | 0.0 | 18.2 | 2.5 | 1.8 | 0.0 | 4.3 | 12.3 | 1.7 | 0.0 | 13.9 | 77% |
| 2005 | 10.7 | 2.0 | 0.0 | 12.7 | 3.6 | 0.9 | 0.0 | 4.5 | 7.1 | 1.1 | 0.0 | 8.2 | 65% |
| 2006 | 9.3 | S | C | 12.4 | 5.5 | S | C | 7.9 | 3.8 | S | C | 4.5 | 36% |
| 2007 | 25.5 | S | C | 31.0 | 8.0 | S | C | 12.0 | 17.4 | S | C | 19.1 | 61% |
| 2008 | 21.9 | S | C | 30.1 | 10.5 | S | C | 18.0 | 11.4 | S | C | 12.1 | 40% |
| 2009 | 11.5 | S | C | 17.8 | 5.6 | S | C | 10.2 | 5.9 | S | C | 7.6 | 43% |
| 2010 | 12.5 | S | C | 19.2 | 5.5 | S | C | 11.9 | 7.0 | S | C | 7.3 | 38% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

**Table 143 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 3 area closures**

| | Total catch (mt) | | | | Catch from closed areas (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 10,916 | 2,533 | 0 | 13,449 | 1,854 | 1,296 | 0 | 3,150 | 9,062 | 1,237 | 0 | 10,299 | 77% |
| 2005 | 6,731 | 1,239 | 0 | 7,969 | 2,248 | 567 | 0 | 2,815 | 4,483 | 672 | 0 | 5,155 | 65% |
| 2006 | 5,185 | S | C | 6,907 | 3,065 | S | C | 3,366 | 2,120 | S | C | 3,541 | 51% |
| 2007 | 10,847 | S | C | 13,228 | 3,434 | S | C | 4,051 | 7,414 | S | C | 9,177 | 69% |
| 2008 | 10,183 | S | C | 13,994 | 4,863 | S | C | 5,283 | 5,320 | S | C | 8,711 | 62% |
| 2009 | 9,676 | S | C | 15,025 | 4,732 | S | C | 5,287 | 4,944 | S | C | 9,738 | 65% |
| 2010 | 8,325 | S | C | 12,746 | 3,648 | S | C | 3,814 | 4,677 | S | C | 8,933 | 70% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 144 Estimated Alternative 3 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 5.2 | 1.2 | 0.0 | 6.4 | 0.9 | 0.6 | 0.0 | 1.5 | 4.3 | 0.6 | 0.0 | 4.9 | 77% |
| 2005 | 3.6 | 0.7 | 0.0 | 4.2 | 1.2 | 0.3 | 0.0 | 1.5 | 2.4 | 0.4 | 0.0 | 2.7 | 65% |
| 2006 | 4.1 | S | C | 5.4 | 2.4 | S | C | 2.6 | 1.7 | S | C | 2.8 | 51% |
| 2007 | 10.4 | S | C | 12.7 | 3.3 | S | C | 3.9 | 7.1 | S | C | 8.8 | 69% |
| 2008 | 12.6 | S | C | 17.3 | 6.0 | S | C | 6.5 | 6.6 | S | C | 10.8 | 62% |
| 2009 | 4.9 | S | C | 7.7 | 2.4 | S | C | 2.7 | 2.5 | S | C | 5.0 | 65% |
| 2010 | 4.2 | S | C | 6.5 | 1.9 | S | C | 1.9 | 2.4 | S | C | 4.5 | 70% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 6.1 | 1.4 | 0.0 | 7.6 | 1.0 | 0.7 | 0.0 | 1.8 | 5.1 | 0.7 | 0.0 | 5.8 | 77% |
| 2005 | 4.2 | 0.8 | 0.0 | 4.9 | 1.4 | 0.3 | 0.0 | 1.7 | 2.8 | 0.4 | 0.0 | 3.2 | 65% |
| 2006 | 4.6 | S | C | 6.1 | 2.7 | S | C | 3.0 | 1.9 | S | C | 3.1 | 51% |
| 2007 | 11.4 | S | C | 13.9 | 3.6 | S | C | 4.3 | 7.8 | S | C | 9.7 | 69% |
| 2008 | 13.3 | S | C | 18.2 | 6.3 | S | C | 6.9 | 6.9 | S | C | 11.4 | 62% |
| 2009 | 5.2 | S | C | 8.1 | 2.6 | S | C | 2.9 | 2.7 | S | C | 5.3 | 65% |
| 2010 | 4.4 | S | C | 6.8 | 1.9 | S | C | 2.0 | 2.5 | S | C | 4.7 | 70% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 145 Estimated Alternative 3 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 12.4 | 2.9 | 0.0 | 15.3 | 2.1 | 1.5 | 0.0 | 3.6 | 10.3 | 1.4 | 0.0 | 11.7 | 77% |
| 2005 | 9.2 | 1.7 | 0.0 | 10.9 | 3.1 | 0.8 | 0.0 | 3.9 | 6.1 | 0.9 | 0.0 | 7.1 | 65% |
| 2006 | 8.3 | S | C | 11.0 | 4.9 | S | C | 5.4 | 3.4 | S | C | 5.6 | 51% |
| 2007 | 23.2 | S | C | 28.3 | 7.3 | S | C | 8.6 | 15.9 | S | C | 19.7 | 69% |
| 2008 | 20.8 | S | C | 28.6 | 9.9 | S | C | 10.8 | 10.9 | S | C | 17.8 | 62% |
| 2009 | 10.8 | S | C | 16.8 | 5.3 | S | C | 5.9 | 5.5 | S | C | 10.9 | 65% |
| 2010 | 12.0 | S | C | 18.4 | 5.3 | S | C | 5.5 | 6.8 | S | C | 12.9 | 70% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 14.8 | 3.4 | 0.0 | 18.2 | 2.5 | 1.8 | 0.0 | 4.3 | 12.3 | 1.7 | 0.0 | 13.9 | 77% |
| 2005 | 10.7 | 2.0 | 0.0 | 12.7 | 3.6 | 0.9 | 0.0 | 4.5 | 7.1 | 1.1 | 0.0 | 8.2 | 65% |
| 2006 | 9.3 | S | C | 12.4 | 5.5 | S | C | 6.0 | 3.8 | S | C | 6.3 | 51% |
| 2007 | 25.5 | S | C | 31.0 | 8.0 | S | C | 9.5 | 17.4 | S | C | 21.6 | 69% |
| 2008 | 21.9 | S | C | 30.1 | 10.5 | S | C | 11.4 | 11.4 | S | C | 18.7 | 62% |
| 2009 | 11.5 | S | C | 17.8 | 5.6 | S | C | 6.3 | 5.9 | S | C | 11.6 | 65% |
| 2010 | 12.5 | S | C | 19.2 | 5.5 | S | C | 5.7 | 7.0 | S | C | 13.5 | 70% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

**Table 146 Location of estimated trawl catcher vessel Pacific cod harvests with respect to Alternative 4 area closures**

| | Total catch (mt) | | | | Catch from closed areas (mt) (catch at risk) | | | | Catch from areas left open (mt) (residual catch) | | | | Residual catch as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| 2004 | 10,916 | 2,533 | 0 | 13,449 | 100 | 33 | 0 | 133 | 10,816 | 2,500 | 0 | 13,316 | 99% |
| 2005 | 6,731 | 1,239 | 0 | 7,969 | 76 | 16 | 0 | 92 | 6,655 | 1,223 | 0 | 7,878 | 99% |
| 2006 | 5,185 | S | C | 6,907 | 68 | S | C | 85 | 5,117 | S | C | 6,822 | 99% |
| 2007 | 10,847 | S | C | 13,228 | 146 | S | C | 157 | 10,701 | S | C | 13,072 | 99% |
| 2008 | 10,183 | S | C | 13,994 | 175 | S | C | 317 | 10,008 | S | C | 13,677 | 98% |
| 2009 | 9,676 | S | C | 15,025 | 90 | S | C | 224 | 9,585 | S | C | 14,801 | 99% |
| 2010 | 8,325 | S | C | 12,746 | 155 | S | C | 208 | 8,170 | S | C | 12,538 | 98% |

Notes: Volumes refer to volumes of retained, targeted Pacific cod from CDQ and non-CDQ catches and Pacific cod incidental catches. "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 147 Estimated Alternative 4 trawl catcher vessel Pacific cod ex-vessel gross revenues from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 5.2 | 1.2 | 0.0 | 6.4 | 0.0 | 0.0 | 0.0 | 0.1 | 5.1 | 1.2 | 0.0 | 6.3 | 99% |
| 2005 | 3.6 | 0.7 | 0.0 | 4.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3.5 | 0.6 | 0.0 | 4.2 | 99% |
| 2006 | 4.1 | S | C | 5.4 | 0.1 | S | C | 0.1 | 4.0 | S | C | 5.3 | 99% |
| 2007 | 10.4 | S | C | 12.7 | 0.1 | S | C | 0.2 | 10.3 | S | C | 12.6 | 99% |
| 2008 | 12.6 | S | C | 17.3 | 0.2 | S | C | 0.4 | 12.4 | S | C | 16.9 | 98% |
| 2009 | 4.9 | S | C | 7.7 | 0.0 | S | C | 0.1 | 4.9 | S | C | 7.6 | 98% |
| 2010 | 4.2 | S | C | 6.5 | 0.1 | S | C | 0.1 | 4.2 | S | C | 6.4 | 98% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 6.1 | 1.4 | 0.0 | 7.6 | 0.1 | 0.0 | 0.0 | 0.1 | 6.1 | 1.4 | 0.0 | 7.5 | 99% |
| 2005 | 4.2 | 0.8 | 0.0 | 4.9 | 0.0 | 0.0 | 0.0 | 0.1 | 4.1 | 0.8 | 0.0 | 4.9 | 99% |
| 2006 | 4.6 | S | C | 6.1 | 0.1 | S | C | 0.1 | 4.5 | S | C | 6.0 | 99% |
| 2007 | 11.4 | S | C | 13.9 | 0.2 | S | C | 0.2 | 11.3 | S | C | 13.8 | 99% |
| 2008 | 13.3 | S | C | 18.2 | 0.2 | S | C | 0.4 | 13.0 | S | C | 17.8 | 98% |
| 2009 | 5.2 | S | C | 8.1 | 0.0 | S | C | 0.1 | 5.2 | S | C | 8.0 | 98% |
| 2010 | 4.4 | S | C | 6.8 | 0.1 | S | C | 0.1 | 4.3 | S | C | 6.6 | 98% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, January 22, 2013.

**Table 148 Estimated Alternative 4 Pacific cod processor wholesale gross revenues from trawl catcher vessel production from open and closed areas (millions of dollars)**

| | Baseline gross revenues | | | | Gross revenues in closed areas (revenue at risk) | | | | Gross revenues in areas remaining open (residual revenues) | | | | Residual revenue as % of historical |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | 541 | 542 | 543 | Total | |
| Nominal revenues | | | | | | | | | | | | | |
| 2004 | 12.4 | 2.9 | 0.0 | 15.3 | 0.1 | 0.0 | 0.0 | 0.2 | 12.3 | 2.8 | 0.0 | 15.2 | 99% |
| 2005 | 9.2 | 1.7 | 0.0 | 10.9 | 0.1 | 0.0 | 0.0 | 0.1 | 9.1 | 1.7 | 0.0 | 10.8 | 99% |
| 2006 | 8.3 | S | C | 11.0 | 0.1 | S | C | 0.1 | 8.2 | S | C | 10.9 | 99% |
| 2007 | 23.2 | S | C | 28.3 | 0.3 | S | C | 0.3 | 22.9 | S | C | 28.0 | 99% |
| 2008 | 20.8 | S | C | 28.6 | 0.4 | S | C | 0.6 | 20.4 | S | C | 27.9 | 98% |
| 2009 | 10.8 | S | C | 16.8 | 0.1 | S | C | 0.3 | 10.7 | S | C | 16.6 | 98% |
| 2010 | 12.0 | S | C | 18.4 | 0.2 | S | C | 0.3 | 11.8 | S | C | 18.1 | 98% |
| Real revenues (in 2012 dollars) | | | | | | | | | | | | | |
| 2004 | 14.8 | 3.4 | 0.0 | 18.2 | 0.1 | 0.0 | 0.0 | 0.2 | 14.6 | 3.4 | 0.0 | 18.0 | 99% |
| 2005 | 10.7 | 2.0 | 0.0 | 12.7 | 0.1 | 0.0 | 0.0 | 0.1 | 10.6 | 1.9 | 0.0 | 12.6 | 99% |
| 2006 | 9.3 | S | C | 12.4 | 0.1 | S | C | 0.2 | 9.2 | S | C | 12.2 | 99% |
| 2007 | 25.5 | S | C | 31.0 | 0.3 | S | C | 0.4 | 25.1 | S | C | 30.7 | 99% |
| 2008 | 21.9 | S | C | 30.1 | 0.4 | S | C | 0.7 | 21.5 | S | C | 29.4 | 98% |
| 2009 | 11.5 | S | C | 17.8 | 0.1 | S | C | 0.3 | 11.4 | S | C | 17.6 | 98% |
| 2010 | 12.5 | S | C | 19.2 | 0.2 | S | C | 0.3 | 12.3 | S | C | 18.9 | 98% |

Notes: "C" means the data are confidential. "S" means the data was suppressed to protect confidential data.
Source: NMFS AKR estimates using CIA data, March 30, 2013.

## 1.12 Pacific Cod Non-trawl Catcher Vessels (Alternatives 2, 3, and their options)

The non-trawl catcher vessel sector includes vessels targeting Pacific cod in the Federal and state parallel fisheries in the Aleutian Islands using longline, pot, and jig gear. These vessels may have delivered

Pacific cod to shoreside processing plants, floating processors, or catcher/processors operating as motherships. The definition excludes vessels fishing in the state GHL fishery only. It also excludes vessels only taking incidental catches of Pacific cod. A number of catcher vessels fished in the sablefish and halibut quota share fisheries in the Aleutian Islands, and took incidental catches of Pacific cod.

Table 114 in Sub-section 1.10.1, based on Table 2-20 in Chapter 2 of the EIS, summarizes and contrasts the Pacific cod alternatives as they apply to non-trawl operations. In the interest of economy, this table is not reproduced here. Chapter 2 provides much more detail on the alternatives and their rationales, and includes charts describing the different areas listed in the table.

Alternative 1 (the status quo) and Alternative 4 (adopting a modified version of the rules in place in 2010) were discussed in detail in Section 1.6 of this RIR, as they relate to non-trawl catcher vessels. This section focuses on the impacts of Alternatives 2 and 3, and their options, on this sector.

This is a small sector. Tables in Sub-section 1.2.4 indicate that an average of about two jig vessels, about three longline vessels, and one pot vessel were active each year during the baseline years. The numbers of vessels fishing during the baseline period were small enough in several years, that volume or value information cannot be provided. The largest numbers of vessels participated in the middle years in the center of the baseline period. There was no activity by this sector in Area 543 in any year.

Non-trawl catcher vessels are subject to the Aleutian Islands, and Management Areas 543 and 541-542, area catch limits. They are not explicitly subject to sector catch limits. However, if the trawl and non-trawl catcher/processor sectors take their full catch limits, non-trawl catcher vessels and trawl catcher vessels will compete for the remaining harvests. Given the small baseline harvests by this sector, and the much larger role trawl and non-trawl catcher/processors and trawl catcher vessels play in catching Pacific cod in the Aleutian Islands, it is simplest, as a practical matter and to a first approximation, to view this sector as facing limits that are determined by circumstances outside of its control. In this analysis, baseline catches from open areas (the residual catch) have not been compared to area-sector limits to determine whether they would be restricted by those limits. The impact on catches is treated as a function of the availability of open fishing areas.

Under Alternative 1, about 554 metric tons of harvest came from areas that would have been in closed critical habitat over that period; this was about 56 percent of the baseline retained catch. Ex-vessel revenues associated with fish from closed areas are estimated to have been about $690,000 in aggregate (in real "2012" dollars), or about $99,000/year. Wholesale revenues received by processors associated with fish from closed areas are estimated to have been about $1.2 million, or about $171,000 a year. Residual ex-vessel revenues under Alternative 1 are estimated to be $490,000, or $70,000 a year, while residual wholesale revenues under Alternative 1 are estimated to be $850,000, or $121,000 a year.

The impacts of the other alternatives can be described quickly. For each alternative in almost every year, 100 percent, or almost 100 percent, of the baseline catch came from within areas that would have remained open under the alternative, and thus, using the approach discussed here, estimated residual revenues under these alternatives would all have been about equal to baseline residual revenues.[145]

Sub-section 1.10.4 discussed the seasonal elements of the alternatives non-trawl vessels. As noted there, the seasonal extension to the end of the year would have little impact on these vessels, which typically do not operate in the Aleutian Islands in the late fall months. These vessels typically deliver to processors in Dutch Harbor and Akutan after November 1. It is possible that if the fishery is still open, vessels could fish in the Aleutian Islands after November 1, but that effort was not seen during the baseline years. Sub-

[145] There is only one exception to this. In 2004 in Area 541 under Alternative 4, the relevant percentage is 88 percent.

section 1.10.4 also discussed ESA triggers. As noted, it is possible that these will be reached under Alternative 1. There are no ESA triggers in Alternatives 2, 3, or 4. In Alternatives 2 and 3, the area-sector limits were provided as a substitute.

Section 1.6, evaluating Alternatives 1 and 4 for non-trawl vessels, included a detailed, but qualitative, discussion of the impacts of this action on the non-trawl catcher vessel sector redeployment. Alternatives 2 and 3 would have had the same effects as Alternative 4: that is, there would have been no regulation induced redeployment. Similar comments apply to incidental catch and prohibited species catch, and sector and community impacts.

Because of the confidentiality of much of the information about this sector, the relative simplicity of the analysis, and the equivalence of Alternatives 2 and 3 with Alternative 4, a summary table similar to those used in earlier sections is not provided here. Similarly, because of the confidentiality of much of the information, an appendix with critical habitat closure tables is not provided for this section.

## 1.13 Alternatives 5 (Preferred alternative) and 6

### 1.13.1 Alternative 5 (Preferred alternative)

On March 7, 2013, NMFS sent a Preliminary Draft EIS (PDEIS) to the Council for review by the SSLMC, and by the Council, its SSC, and its Advisory Panel (AP).

The SSLMC met on March 21 and 22, was briefed on the PDEIS, and provided an erratum listing the errors that had been identified in the PDEIS at that time. On March 22, the SSLMC discussed the PDEIS and recommended a preliminary preferred alternative for consideration by the Council. This built on elements of the alternatives that had been evaluated in the PDEIS.

At the April 2013 meeting, the Council AP was briefed on the contents of the PDEIS, and provided with an updated erratum. The AP recommended that the Council adopt the alternative recommended by the SSLMC with minor textual clarifications. The Council adopted the alternative for analytical purposes, as a part of its broader motion on the Steller sea lion EIS. At its December 2013 meeting, the Council recommended Alternative 5 as its preferred alternative.

A detailed description of Alternative 5 may be found in Chapter 2 of the EIS. Table 149 provides a summary of its key elements. In general, the different elements of Alternative 5 were adapted from elements of other alternatives, which were evaluated in detail in earlier sections. Those provisions of Alternative 5 that regulate Atka mackerel fishing were based on Alternative 3; those that regulate Pacific cod were based on Alternative 4; those that regulate pollock were based on Alternatives 3 and 4, which are themselves identical). Alternative 5 includes an option to require operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, to ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions. This VMS requirement is discussed in 1.19.2.

**Table 149 Alternative 5 Summary Table (Preferred Alternative Recommended by the Council, December 2013)**

| Fishery | Seasons | Area 543 | | Area 542 | | Area 541 | |
|---|---|---|---|---|---|---|---|
| | | Closures | Catch and Participation limits | Closures | Catch and Participation limits | Closures | Catch and Participation limits |
| **Atka mackerel** | Trawl: A-season: 1/20-6/10 B-season: 6/10-12/31. | Critical habitat closed 0-3nm haulouts and 0-10 nm from rookeries. | Critical habitat harvest limit 60 % of TAC, distribute evenly between seasons. | Critical habitat closed 0-3 nm from haulouts and 0-10 nm from rookeries except, close critical habitat between 178°E long. to 180° and east of 178°W long. | Critical habitat harvest limit 60% of TAC west of 178° W long, distribute evenly between seasons. | Critical habitat closed except 12 nm -20 nm portion southeast of Seguam Island. | Amend. 80 and CDQ in BS: revise MRA calculation for Atka mackerel as an incidental species. |
| | 50:50 seasonal apportionment including CDQ. | | | | | | |
| | Rollover from A to B-season, fished outside of critical habitat. | | TAC ≤ 65% ABC. | | | BS subarea closed to directed fishing. | |
| **Pacific cod trawl** | Amend 80 and CDQ: A-season: 1/20-4/1 B-season: 4/1-6/10 C-season: 6/10-12/31. | Critical habitat closed 0-3nm haulouts and 0-10nm from rookeries. | Catch limit in proportion to Area 543 abundance based on annual stock assessment. | Critical habitat closed 0-3nm from haulouts and 0-10nm from rookeries. | None | Critical habitat closed 0-3 nm haulouts and 0-10 nm from rookeries, except a 20 nm closure at Agligadak. | None |
| | CVs and AFA CPs: A-season: 1/20-4/1 B-season: 4/1-6/10 C-season: 6/10-11/1. | | | | | | |
| | Seasonal apportionments based on BSAI wide TAC level under Amend 85. | | | | | Seguam Foraging Area closed. | |
| **Pacific cod non-trawl** | Hook-and-line: A-season: 1/1-6/10 B-season: 6/10-12/31. | Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries and 0-10 nm from Buldir Island. | Catch limit in proportion to Area 543 abundance based on annual stock assessment. | Hook-and-line and pot: Critical habitat closed 0-3 nm from rookeries. | None | Critical habitat closed 0-3 nm from rookeries west of 172.59° W long. | None |
| | Pot: A-season: 1/1-6/10 B-season: 9/1-12/31. | | | | | Critical habitat closed east of 172.59° W long. | |
| | Jig: A-season: 1/1-4/30 B-season: 4/30-8/31 C-season: 8/31-12/31. | | | | | Hook-and-line and pot: Seguam Foraging Area closed. | |
| | Seasonal apportionments based on BSAI wide TACs under Amend 85. | | | | | | |

| Fishery | Seasons | Area 543 | | Area 542 | | Area 541 | |
|---|---|---|---|---|---|---|---|
| | | **Closures** | **Catch and Participation limits** | **Closures** | **Catch and Participation limits** | **Closures** | **Catch and Participation limits** |
| **Pollock** | A-season: 1/20-6/10<br>B-season: 6/10-11/1 | Critical habitat closed, except an area outside of 0-3 nm from Shemya, Alaid, and Chirikof haulouts. | Only vessels registered with the Aleut Corporation in directed fishery. | Critical habitat closed 0-10 nm at rookeries and haulouts west of 178°W long. | Only vessels registered with the Aleut Corporation in directed fishery. | Critical habitat closed to directed fishing 0-3 nm from haulouts and 0-10 nm from rookeries. | Only vessels registered with the Aleut Corporation in directed fishery. |
| | | | 50% of AI directed fishery allocation to vessels ≤ 60 ft | | 50% of AI directed fishery allocation goes to vessels ≤ 60 ft. | | 50% of AI directed fishery allocation to vessels ≤ 60 ft. |
| | A-season apportionment no more than 40% of ABC for AI subarea. | | When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ AI ABC. | Critical habitat closed 0-3 nm haulouts and 0-10 nm from rookeries east of 178° W long., except open portions of critical habitat at: Hawadax Island Area outside of 3 nm from Tanadak, Segula, and Krysi Point and 10 nm from Little Sitkin and Ayugudak, and outside of 3 nm from Kanaga and Bobrof Island. | When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ AI ABC. | Seguam Foraging Area closed to directed fishing. | When AI ABC ≥ 19,000 mt, AI TAC = 19,000 mt. When AI ABC < 19,000 mt, AI TAC ≤ AI ABC. |
| | | | A-season catch limit 5% of ABC. | | A-season catch limit 15% of ABC. | | A-season catch limit 30% of ABC. |

CDQ= Community Development Quota, TAC=total allowable catch, ABC=acceptable biological catch, BSAI=Bering Sea and Aleutian Islands Management Area, CV=catcher vessel, CP=catcher processor, AFA=American Fisheries Act, MRA=maximum

*Pollock*

The pollock elements of Alternatives 1 through 4 are evaluated in Section 1.7. Alternative 5 is similar to Alternatives 3 and 4, which are themselves identical, except for the following modifications:

- While Alternatives 3, 4, and 5 open the same areas of critical habitat east of 178° W longitude, and in Area 543, Alternative 5 closes critical habitat from 10 nm to 20 nm from haulouts and rookeries in western Area 542, while Alternatives 3 and 4 do not.
- The addition of A-season area specific catch limits in relation to the Aleutian Island pollock ABC. This modification imposes an A-season catch limit of 5 percent of the ABC in Area 543, 15 percent of the ABC in Area 542, and 30 percent of the ABC in Area 541.

While Alternative 5 closes more critical habitat in western Area 542 than Alternatives 2 and 3, the observer data from the 1990s, summarized in Figure 3-18 in Chapter 3 of the EIS, suggests that, at that time, there was little fishing in this area. There was one pollock "hot spot" in this area in those years in the vicinity of Hawadax Island. This area is one of the "postage stamps" of critical habitat opened under Alternative 5, as it is under Alternatives 3 and 4.

Table 150 shows the catches available in each area under the 5 percent -15 percent -30 percent A-season area-limits in 2013 and 2014. The catch limits become more restrictive from east to west, consistent with the FMP biop standards to provide more protection to Steller sea lions where more decline is evident. These are catch limits, not area allocations or area-specific TACs.

**Table 150 Pollock A-season Catch Limits under Alternative 5 in mt**

| Year | ABC | Area 543 Catch Limit (5%) | Area 542 Catch Limit (15%) | Area 541 Catch Limit (30%) |
|---|---|---|---|---|
| 2013 | 37,300 | 1,865 | 5,595 | 11,190 |
| 2014 | 39,800 | 1,990 | 5,970 | 11,940 |

As noted in Section 1.7, this is expected to be an A-season fishery. Pollock fishing in the B-season is not expected to be economically viable under current conditions.

The pollock analysis did not provide estimates of harvests taken from within the critical habitat that would be opened under the different alternatives. Alternatives were ranked with respect to the area opened, with a subjective weighting by the observed volume of 1990s pollock catches, assuming that this provided a rough indicator of the accessibility of fishable pollock concentrations under the different alternatives. Thus, the while the limits may provide some additional protection for Steller sea lions, particularly in the western Aleutian Islands, they do not necessarily restrict pollock harvests or revenues.

The sum of these limits (50 percent of the ABC) exceeds the A-season harvest limit (40 percent of the ABC) and should not create a global Aleutian Islands constraint on harvest. However, as discussed earlier, the analysis does not make projections of the changes in Aleutian Islands pollock harvest associated with the different alternatives, or of the distributions of harvests among the three Aleutian Islands management areas. If it was optimal for the Aleut Corporation and its fishing vessels to catch 20 percent of the ABC in Area 542 in the A-season, or 40 percent in Area 541 in the A-season, the corporation would be constrained by these limits.

As discussed in Section 1.7.4, the primary incidental catch in the pollock fishery is likely to be Pacific ocean perch. The additional harvest control associated with the area-specific pollock catch limits in Alternative 5 may make it possible to reduce incidental catch allowances (ICAs) for Pacific ocean perch below what they would have been under other action alternatives, thus potentially reducing the impacts on Amendment 80 Pacific ocean perch fishing.

Alternative 5 is very similar to Alternatives 3 and 4 for pollock (Alternatives 3 and 4 have equivalent pollock provisions). However, it does close more critical habitat in Area 542, and it includes the 5 percent - 15 percent - 30 percent area catch limit provision that might restrict harvests from some management areas under certain conditions. Discussion of the effects of these limits on catch is speculative, given the lack of available information on recent pollock catches from within critical habitat. Ranking these alternatives by the potential value they may provide to the Aleut Corporation, and for Adak development, Alternative 5 ranks below Alternatives 3 and 4 because of the restrictions described above. However, it appears to be less restrictive than Alternative 2, since it allows some fishing in Area 543, near Shemya Island, and opens more critical habitat in the east.

*Atka mackerel*

The Atka mackerel elements of Alternative 5 are nearly identical to those of Alternative 3. Two differences between the alternatives affect Area 543:

- Under Alternative 5, the area around the rookery at Buldir Island is closed to fishing within 10 nm under Alternative 5, in comparison to the 15 nm closure (with notches in the 10 nm to 15 nm range) under Alternative 3;
- Alternative 5 includes a restriction limiting the Area 543 TAC to less than or equal to 65 percent of the ABC. The TAC limit in Alternative 5 is similar to the TAC limit in Alternative 2, which is, however, expressed as a TAC "equal to" 65 percent of the ABC, rather than "equal to or less than 65 percent."

The Atka mackerel elements of Alternatives 1 and 4 are evaluated in Section 1.3, and the elements of Alternatives 2 and 3 are evaluated in Section 1.8. The latter section also compares Alternatives 1 and 4 with Alternatives 2 and 3.

The area closure elements of Alternative 5 are almost the same as those of Alternative 3, and the analysis applicable to Alternative 3 is likewise applicable to Alternative 5. The only difference between them is the opening of increased fishing areas between 10 nm and 15 nm of Buldir Island under Alternative 5, in comparison with Alternative 3. During the baseline years, this would have had little impact on retained catch. Figure 3-5 in Chapter 3 of the EIS provides a spatial analysis of Atka mackerel fishing during the baseline years, and shows that only small amounts of harvest were taken from this area. Alternative 3 already includes two "notches" in the 10 nm to 15 nm zone, where industry expects it would be most likely to harvest Atka mackerel. Other areas opened by the alternative are unavailable to non-pelagic trawl fishermen fishing for Atka mackerel because of the presence of designated habitat of particular concern. However, the baseline analysis may not provide a complete analysis of potential harvests from this area. Industry sources indicate that fishing took place in this area prior to the baseline years, and industry believes recent survey information indicates the presence of Atka mackerel stocks here. (Gauvin, personal communication, April 13, 2013; Loomis, personal communication, April 12, 2013)[146]

[146] Gauvin, John. Gauvin and Associates, LLC, Burien Washington; Loomis, Todd. Government Affairs, Ocean Peace, Inc.

The 65 percent TAC limit included in Alternative 5 was evaluated in sub-section 1.8.2 with reference to Alternative 2. The 65 percent limit would not have restricted Atka mackerel fishing in Area 543 under Alternative 2 during the baseline years. However, as shown in Table 151 , the TAC limit was less than the Alternative 3 residual harvest in four of the seven baseline years, particularly in the later years of the baseline period.

**Table 151 Alternative 5 TAC limit compared to residual catch under Alternative 5**

| Year | Alternative 3 Residual catch (mt) | 65% TAC limit (mt) | Difference (mt) | Real price $/mt | Value of difference (millions of dollars) |
|---|---|---|---|---|---|
| 2004 | 16,511 | 15,834 | 677 | 733 | 0.5 |
| 2005 | 18,729 | 30,303 | 0 | 772 | 0 |
| 2006 | 14,370 | 26,884 | 0 | 675 | 0 |
| 2007 | 8,846 | 13,390 | 0 | 815 | 0 |
| 2008 | 15,653 | 10,985 | 4,668 | 759 | 3.5 |
| 2009 | 15,406 | 15,145 | 261 | 1,094 | 0.3 |
| 2010 | 17,418 | 13,390 | 4,028 | 1,202 | 4.8 |

Note: Difference set to zero when TAC limit would have exceeded residual catch, and limit would not have been binding. Residual catch from Table 88, 65% limit from Table 72, real price from Table 74.

Adjusting the estimated wholesale gross revenues from areas remaining open under Alternative 3 during the baseline years, which may be found in Table 89, by the gross revenue estimates in Table 151, changes the mean value of residual gross revenues from $44.7 million to $43.4 million over the baseline years.

The limit proposed for Alternative 5 differed somewhat from the limit proposed for Alternative 2, in that Alternative 2 set the limit equal to 65 percent of the ABC, while Alternative 5 sets it equal to or less than 65 percent of the ABC. The limit proposed for Alternative 5, thus, provides the Council more discretion over the choice of TAC. This could be useful to the Council if, for example, it had to reduce TACs of Pacific cod to stay within the BSAI optimum yield of 2 million metric tons. Smaller limits in the baseline years would have bound the fishery more tightly, however, those would have been policy decisions made by the Council in the specifications process.

Alternative 5 is very similar to Alternative 3 for Atka mackerel, although it does include a catch limit in Area 543 that might have restricted catch during some baseline years. Thus, depending on circumstances, it may be more restrictive than Alternative 3.

*Trawl catcher/processors and trawl catcher vessels: Pacific cod*

The trawl Pacific cod elements of Alternatives 1 and 4 are discussed in Sections 1.3 and 1.5, while the elements of Alternatives 2 and 3 are discussed in Sections 1.9 and 1.11. Alternative 5 is nearly identical to Alternative 4. The exception is the Area 543 catch limit that is to be set in proportion to the Area 543 Pacific cod abundance based on the stock assessment process. This could provide a limit on catch in the portion of the Aleutian Islands where Steller sea lions have experienced the greatest decline.

The Area 543 limit is a restriction on the total amount of Pacific cod that may be taken from Area 543. It is not a TAC. The indicated volume of Pacific cod does not need to be harvested within Area 543.

Harvests in Areas 541 and 542 are not subject to a similar limit. It could happen that the entire Aleutian Islands TAC of Pacific cod could be harvested in Areas 541 and 542, and none in Area 543. The converse is not possible. In Section 1.9, annual Area 543 area-limits that were close to 25 percent of a hypothetical Aleutian Islands Pacific cod TAC during the baseline years were used for analysis.

This Area 543 limit could potentially restrict fishing activity in Area 543, although, because of data confidentiality, these results cannot be presented. Table 152 summarizes information from earlier sections on the size of the area limit during the baseline years, on residual catches by the trawl catcher/processor and catcher vessel sectors, and on residual catches by the non-trawl catcher/processor sector. The trawl catcher vessel information is either zero in the early years, or confidential in later years. Recall however, that over the period 2006 through 2010, the trawl catcher vessels delivered to motherships and accounted for about 40 percent of the total harvest. A final column in the table provides estimates of the Area 543 catch if 40 percent of it was taken by catcher vessels delivering to motherships in the years 2007 through 2010. These hypothetical harvests suggest that the limit could have been binding in these years.

**Table 152 Potential for Alternative 5 Area 543 catch limit to constrain Area 543 catches.**

| Year | Hypothetical Area 543 limit (mt) | Alternative 4 Trawl catcher/processor retained catch (mt) | Alternative 4 Non-trawl catcher/processor retained catch (mt) | Alternative 4 Trawl catcher vessel retained catch (mt) | Hypothetical total area catch (mt) |
|---|---|---|---|---|---|
| 2004 | 6,543 | 3,239 | C | 0 | Not calculated due to confidential information |
| 2005 | 6,045 | 4,099 | C | 0 | |
| 2006 | 6,398 | 3,016 | C | C | |
| 2007 | 5,805 | 2,227 | 1,639 | C | 6,443 |
| 2008 | 5,805 | 1,649 | 2,330 | C | 6,632 |
| 2009 | 6,002 | 1,631 | 2,861 | C | 7,486 |
| 2010 | 5,974 | 548 | 3,146 | C | 6,156 |

Notes: Limits from Table 95, trawl catcher/processor catch under Alt 4 from Table 112, non-trawl catcher/processor catch from Table 128, trawl catcher vessel catch from Table 146. Hypothetical total area catch is equal to the sum of the catcher/processor catches, divided by 0.6.

Alternative 5 imposes trawl Pacific cod restrictions that are very similar to those in Alternative 4. However, the area-limit in Area 543 under Alternative 5 may restrict catches there. The fleet may be able to make up lost harvest in Areas 541 and 542, which are unconstrained. Note that, during the baseline years, Area 543 trawl catches were made by catcher/processors and catcher vessels delivering to motherships, and that very little catch by this sector was delivered to shoreside plants for processing.

*Non-trawl Pacific cod*

The non-trawl Pacific cod elements of Alternatives 1 and 4 are discussed in Sections 1.4 and 1.6, while the elements of Alternatives 2 and 3 are discussed in Sections 1.10 and 1.12. Alternative 5 is nearly identical to Alternative 4. The exception is the Area 543 catch limit in proportion to the Area 543 Pacific cod abundance based on the stock assessment process. This would provide a limit on catch in relation to the best available information on Pacific cod harvest in the portion of the Aleutian Islands where Steller

sea lions have experienced the greatest decline. The discussion of this limit in the preceding sub-section is also relevant to this fleet sector.

Alternative 5 imposes non-trawl Pacific cod restrictions very similar to those in Alternative 4. Recall, however, that there is reason to believe that the implications for the non-trawl fleet of all the alternatives, other than Alternative 1, were very similar.

### 1.13.2 Alternative 6

Alternative 6 would prohibit retention of the three principal Steller sea lion prey species harvested in the Alaska groundfish fisheries in the Aleutian Islands reporting areas (Statistical Areas 541, 542, and 543 and adjacent State of Alaska waters). Vessels would be prohibited from directed fishing for these species and prohibited from retaining any incidental catch of these species while directed fishing for other groundfish targets. Alternative 6 was added to the EIS in response to public comment on the draft EIS to have a more protective alternative than the status quo. Alternative 6 would provide the same protection for Steller sea lion prey resources as Alternative 1 in Area 543 and additional protection in Areas 542 and 541.

The retention prohibition removes any incentive to catch Atka mackerel, Pacific cod, and pollock in other targeted groundfish fisheries. While not eliminating removals of these Steller sea lion prey species by the groundfish fisheries in the Aleutian Islands, this alternative is the most protective action for Steller sea lions that can be taken without prohibiting other groundfish fisheries in the Aleutian Islands subarea. Though this alternative is potentially the most adverse economically to the Atka mackerel, Pacific cod, and pollock fisheries, some groundfish fisheries could continue to operate in the Aleutian Islands subarea (i.e., rockfish and flatfish), reducing potential economic impacts on these other groundfish fisheries compared to prohibiting all groundfish fishing.

To be consistent with the protection measures provided under the other alternatives, Alternative 6 would prohibit the Atka mackerel directed fishing in the Bering Sea subarea and prohibit directed fishing for groundfish within 3 nm of the Kanaga Island/Ship Rock rookery. Because retention is prohibited in the Aleutian Islands, seasons for the Atka mackerel, Pacific cod, and pollock fisheries in the Aleutian Islands are not applicable under Alternative 6. Pacific cod seasons specified for the Bering Sea directed fishery would remain unchanged. The monitoring and enforcement option for enhanced VMS operation as described for Alternatives 2 through 5 does not apply to Alternative 6, given the comprehensive prohibition on retention of the key species. Research as described in Chapter 11 of the EIS is also expected to be implemented under this alternative.

The following discussion distinguishes between impacts on fisheries targeting Atka mackerel, Pacific cod, and pollock, and fisheries for other targets in which these species are taken and retained (that is, fisheries in which Atka mackerel, Pacific cod, and pollock are incidental harvests).

*Directed fisheries*

Under Alternative 6, it would not be legal to retain Atka mackerel, Pacific cod, or pollock. Thus the fisheries currently targeting these species would no longer be able to do so. Retained catches of these species would have been zero during the baseline years 2004 through 2010. The impacts of this action on fisheries targeting these species have been approximated by assuming that the harvests of these species in the baseline years would not have occurred. Table 153, which is based on estimates of baseline harvests contained in earlier tables in this RIR, provides estimates of the revenues from the baseline years that would have been lost if the fisheries in those years had not occurred. The aggregate foregone revenues

exceed those of all other alternatives; mean revenues-at-risk in the baseline years were about $102 million. Residual revenues would be zero, and these are compared to residual revenues for the other alternatives for each sector in tables in Section 1.14.

**Table 153 Alternative 6 revenue losses in targeted Atka mackerel and Pacific cod fisheries in millions of 2012 dollars**

| Year | Trawl C/P Atka mackerel | Trawl C/P Pacific cod | Non-trawl C/P | Trawl CV | Non-trawl CV | Aggregate revenues foregone |
|---|---|---|---|---|---|---|
| 2004 | 35.8 | 17.1 | 5.0 | 18.2 | 0.2 | 76.3 |
| 2005 | 47.0 | 16.3 | 5.1 | 12.7 | 0.2 | 81.3 |
| 2006 | 42.1 | 19.1 | 6.8 | 12.4 | 0.2 | 80.6 |
| 2007 | 48.0 | 28.3 | 11.2 | 31.0 | 0.2 | 118.7 |
| 2008 | 47.7 | 12.5 | 15.8 | 30.1 | 0.2 | 106.3 |
| 2009 | 82.7 | 6.7 | 11.1 | 17.8 | 0.2 | 118.5 |
| 2010 | 89.1 | 6.5 | 18.2 | 19.2 | 0.2 | 133.2 |
| Mean | 56.1 | 15.2 | 10.5 | 20.2 | 0.2 | 102.1 |
| Median | 47.7 | 16.3 | 11.1 | 18.2 | 0.2 | 106.3 |

Notes: revenues in real 2012 dollars; average seven year estimate is reported for non-trawl CV to protect data confidentiality;
Sources: Table 51, Table 52, Table 56, Table 61, and Section 1.6.1.

As discussed in Section 1.7, although directed fishing for pollock has been authorized by the Aleut Corporation and its agents, and by CDQ groups, in recent years, Steller sea lion protection measures existing during the baseline years, and continued under the status quo (Alternative 1), have effectively precluded significant directed fisheries. Fishing efforts following the creation of the Aleut Enterprise allocation in 2005 led to fishing which culminated in 1,411 metric tons of directed harvest in 2007. Harvests subsequently fell off rapidly, and there have been no directed harvests in the years since 2010. Alternative 6 is, thus, likely to produce little or no adverse impact on the pollock fishery.

Earlier sections of this analysis described the potential ways in which the directly regulated fleets might alter their operations and redeploy into other fisheries so as to minimize the overall impact of this action. This alternative creates greater incentives for redeployment than other alternatives. However, the redeployment opportunities remain unchanged. Therefore, the fleets are expected to offset smaller proportions of their foregone revenues under this alternative, and to create greater impacts on other fleets.

Alternative 6 prohibits retained catches of Atka mackerel in the Area 541, but Area 541 shares a single TAC with the Bering Sea. While directed fishing for Atka mackerel is prohibited in the Bering Sea, incidental catches may be retained, and a top off fishery is possible as Atka mackerel fishing vessels redeploy and seek new fishing opportunities. Top-off fishing for Atka mackerel is also possible in the Gulf of Alaska.

Top off fishing in the Bering Sea can be limited by the Council by adjustments in the Area541/Bering Sea TAC level. As explained in Section 1.3.3, top-off fishing in the Gulf of Alaska is limited by the availability of basis species. Should top-off fishing in the Gulf exceed the TAC, the Regional Administrator would prohibit retention of Atka mackerel.

This alternative will reduce fishing mortality of Atka mackerel and Pacific cod to levels that will be lower than those in the past, and eliminates uncertainty about potential directed fishing mortality on those stocks. It is possible that in these circumstances, the Council will reduce Aleutian Islands TACs to the minimum necessary to account for incidental mortality. This would make it possible to increase other TACs in the Aleutian Islands or the Bering Sea while staying within the BSAI optimum yield limit of 2 million metric tons. Directed fishing for Atka mackerel in the Bering Sea would not be possible, but directed fishing for Pacific cod would be. It is possible that, when the Bering Sea Pacific cod ABC would otherwise have been above the Bering Sea Pacific cod TAC, the Council might offset the reduced Pacific cod TACs in the Aleutian Islands with increased TACs in the Bering Sea.

*Incidental harvests*

Under the status quo, no retention of Atka mackerel or Pacific cod is currently permitted in Area 543. Thus, Alternative 6 does not change the regulations in Area 543, and would not have any impact on fishing activity in that management area. However, Alternative 6, by extending the no retention requirement to management areas 541 and 542, would prevent fishing operations in those areas, for example operations fishing for IFQ sablefish or halibut, from retaining Atka mackerel or Pacific cod taken incidentally in those fisheries.

Alternative 6 would prevent the retention of Atka mackerel and Pacific cod taken incidentally by fishing operations in Areas 541 and 542. The impacts on trawl catcher/processors and on trawl catcher vessels delivering Atka mackerel to catcher/processors acting as motherships, have been incorporated into the analysis of trawl catcher/processor operations because both targeted and incidental catches count against Amendment 80 quotas.

Non-trawl catcher/processors and catcher vessels, and trawl catcher vessels targeting species other than Atka mackerel all take incidental catches of either Atka mackerel and Pacific cod during the baseline years (and they have continued to do so under the status quo).

- During the baseline years, 17 separate fixed gear catcher/processors took incidental catches of either Atka mackerel or Pacific cod during 39 separate vessel-years of fishing activity. The vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest during the baseline years was about $19,000, about $3,000 per year, or about $500 per vessel-year of fishing.
- During these years, 62 separate fixed gear catcher vessels took incidental catches of these species during 169 separate vessel-years of fishing activity. These vessels fished a median of two years each in these areas. The total estimated value of this incidental harvest was about $335,045, about $48,000 per year, and about $2,000 per vessel-year.
- During these years five separate trawl catcher vessels, owned by two separate companies, took incidental catches of these species during 17 separate vessel-years of activity. Because these vessels were operated by only two unique firms, data on fishing activity and revenues are confidential.

On the basis of this activity level, the estimated cost of Alternative 6 in terms of foregone incidental values of Atka mackerel and Pacific cod harvests is above $51,000 a year.

The action will also prevent the retention of pollock taken as incidental catch by trawlers in the rockfish, and Arrowtooth and Kamchatka flounder fisheries.[147] Most of this, (94 percent) was taken by catcher/processors) Incidental pollock harvests in these fisheries averaged 644 metric tons a year from 2004 through 2013. In 2012, the gross average wholesale value per metric ton of catcher/processor retained round weight of pollock was about $1,206 in the BSAI and $668 in the GOA. Given that incidental catches of pollock include relatively little pollock with valuable roe content, and that incidental catches will often be directed to lower valued markets, the lower GOA value is used to approximate the order-of-magnitude of the revenue losses associated with a loss of incidental pollock catches. Using the GOA value a rough approximation of the possible gross value of this production would be about $400,000.

## 1.14 Summary of impacts on directly regulated fleets

*Trawl catcher/processor sector*

The analysis of the trawl catcher/processor sector may be found in the following sections and sub-sections:

- 1.2.1 Trawl catcher/processor background
- 1.3 Trawl catcher/processors, Alternatives 1 and 4
- 1.7 Pollock, Alternatives 1, 2, 3, and 4
- 1.8 Atka mackerel, Alternatives 2 and 3
- 1.9 Trawl catcher/processors, Pacific cod Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

The impacts of the alternatives on Atka mackerel production were evaluated in Sections 1.3, 1.8, and 1.13. Table 154 summarizes the estimates of wholesale gross revenues from Atka mackerel fishing from areas remaining open under each alternative ("residual" revenues). Since this sector includes trawl catcher vessels delivering Atka mackerel to catcher/processors acting as motherships, these wholesale estimates include the value of these deliveries. Table 154 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues for each alternative-option combination, estimated both with and without considering the impact of the area limits imposed in Area 543 under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual gross revenues for Alternative 1 were $27.4 million, while the average annual gross revenues for Alternative 4, which approximate those actually earned during the baseline years, were $56 million. These two alternatives provide bookends for the other alternatives. The gross revenue estimates for most of the other alternatives were reasonably close together, ranging from $39 million to $44.7 million. Only Alternative 6, with virtually no revenues, stands apart. Given the uncertainty associated with these point estimates, it may not be possible to discriminate among Alternatives 2, 3, 4, and 5.

[147] Pollock is also taken as incidental catch in the Atka mackerel and Pacific cod trawl fisheries, but has been accounted for with other incidental catches in the analyses of these fisheries. Some pollock is taken incidentally in other fisheries, but the volume is very small. These volumes are, however, included in the totals cited in this paragraph.

**Table 154 Estimated residual trawl catcher/processor Atka mackerel wholesale gross revenues by alternative and option, with and without closure limits, during the baseline years (millions of real 2012 dollars)**

| | Closure only | | | Closure and area limits | | |
|---|---|---|---|---|---|---|
| | **Minimum** | **Average** | **Maximum** | **Minimum** | **Average** | **Maximum** |
| 1 | 13.8 | 27.9 | 43.6 | 13.8 | 27.4 | 43.6 |
| 2 (40%) | 26.0 | 40.6 | 61.8 | 21.7 | 39.0 | 58.9 |
| 2 (50%) | 26.0 | 40.6 | 61.8 | 23.5 | 39.8 | 59.6 |
| 2 (65%) | 26.0 | 40.6 | 61.8 | 26.0 | 40.6 | 61.8 |
| 3 | 26.8 | 44.7 | 69.3 | 26.8 | 44.7 | 69.3 |
| 3a | 26.0 | 40.9 | 62.4 | 26.0 | 40.9 | 62.4 |
| 3b | 26.5 | 44.6 | 69.3 | 26.5 | 44.6 | 69.3 |
| 4 | 35.8 | 56.0 | 89.1 | 35.8 | 56.0 | 89.1 |
| 5 | 26.8 | 44.7 | 69.3 | 26.3 | 43.4 | 65.8 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Revenues include estimates of incidental catches (other than Pacific cod). Alternative 5 revenues are assumed equal to Alternative 3 revenues, except for Alternative 5-specific adjustment in Area 543. These adjustments are based on those in Table 152. Alternative 6 revenues would likely have been approximately zero; some small revenues might have been produced by topping-off in a Bering Sea MRA fishery.

Alternative 1 and an option to Alternative 3 provide the same Atka mackerel season dates as the fishery had in 2011 and 2012. By allowing for summer fishing, these season dates will likely result in similar fishing behavior and allow vessels to more efficiently harvest their allocations of groundfish in the BSAI than under the baseline. There may be some benefits to ports that support these fisheries, such as Adak and Dutch Harbor, as these vessels are operating in the Aleutian Islands for longer periods of time than they did prior to 2011. Alternatives 2 through 5 seek to relax the B-season end date of November 1 to December 31 for all vessels. Extending the B-season to December 31 may provide the fleet with even more flexibility to temporally spread Atka mackerel fishing and operate more efficiently. Seasonal regulations are not applicable to Alternative 6.

Alternatives 2 through 5 include measures to relax the MRA requirements for fishing Atka mackerel in the eastern Bering Sea (the eastern Bering Sea and management Area 541 share a single TAC). A shift from instantaneous calculation to calculation at the end of each offload should make it easier to retain Atka mackerel taken as incidental catches in other targets in the eastern Bering Sea.

The impacts of the alternatives on trawl catcher/processors targeting Pacific cod were discussed in Sections 1.3, 1.9, and 1.13. Table 155 summarizes the wholesale gross revenues accruing to the trawl catcher/processors from their harvests of Pacific cod in the Aleutian Islands. These vessels would also earn wholesale revenues from selling the Pacific cod delivered to them for processing by catcher vessels; however, those revenues are summarized with the catcher vessel shoreside deliveries, and are not included in these totals for confidentiality reasons. Table 155 shows the gross value of estimated production from areas remaining open under each alternative (called residual production), and shows

those estimates modified by potential constraints associated with the area-sector limits included in the alternatives. When area-sector limits actually exceed historical harvests from the open areas, it is possible that operations could shift from the closed areas to the open areas and increase their harvests from those open areas. Estimates of revenues from this source are speculative and have not been included here.

Focusing on the results for the closure and area limits, taken together, the average annual gross revenues for Alternative 1 were $8 million, while the average annual gross revenues for Alternatives 4 and 5 were $13.3 million. Gross revenues for Alternative 3 come third at $7.4 million, followed by Alternative 2 at $6.9 million the protective option for Alternative 2 at $5.0 million, and Alternative 6 with no revenues. The revenues for Alternatives 1 and 3 are similar (and similar to those for Alternative 2 in the absence of the area-sector limits). As discussed in the text, this reflects an element in both Alternatives 2 and 3 that closes critical habitat to fishing east of 174° W longitude. This closes an important Pacific cod fishing ground to the east of Atka North Cape.

**Table 155 Estimated residual trawl catcher/processor Pacific cod gross revenues by alternative and option, with and without closure limits (millions of real 2012 dollars)**

| | Closure only | | | Closure and area-sector limits | | |
|---|---|---|---|---|---|---|
| | **Minimum** | **Average** | **Maximum** | **Minimum** | **Average** | **Maximum** |
| 1 | 3.5 | 8.0 | 18.2 | 3.5 | 8.0 | 18.2 |
| 2 | 3.0 | 7.4 | 14.1 | 3.0 | 6.9 | 14.1 |
| 2, P.O. | 2.3 | 5.0 | 11.2 | 2.3 | 5.0 | 11.2 |
| 3 | 3.4 | 8.7 | 16.0 | 3.4 | 7.4 | 14.6 |
| 4 | 6.4 | 15.1 | 28.2 | 6.4 | 13.3 | 22.7 |
| 5 | 6.4 | 15.1 | 28.2 | 6.4 | 13.3 | 22.7 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |

Notes: Revenues include estimates of value of incidental catches (other than Atka mackerel). Alternative 5 gross revenues have been set equal to the Alternative 4 revenues given the similarity between the measures in these alternatives. The Alternative 5 Area 543 limit does not affect revenues in a way that can be estimated here, since it is not globally binding in the Aleutians. Alternative 6 revenues have been set equal to zero.

Alternative 2 prohibits directed fishing for Pacific cod using trawl gear after April 30 in Area 543. This should not affect directed trawl Pacific cod fishing; during the baseline years all trawl Pacific cod harvests in the area took place prior to April 30. However, this may affect retention of Pacific cod after April 30 as vessels will be required to discard Pacific cod in excess of the 20 percent MRAs.

Alternatives 2, 3, 4, and 5 extend the C-season end date for Amendment 80 trawl vessels and those fishing Pacific cod CDQ, from November 1 to December 31. This has been proposed to address potential regulatory discards after November 1; however, regulatory discards have been small during this period. This change in closing dates under Alternative 4 may affect reallocation of Pacific cod later in the year, if a trawl catcher/processor fishery becomes viable at that time. This extension is not applicable to Alternative 6.

Alternatives 2, 3, 4, and 5 relax the C-season end date from November 1 to December 31 in Areas 541 and 542 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. Alternatives 2, 4, and 5 relax the C-season end date from November 1 to December 31 in Area 543 for Amendment 80 vessels and those trawl vessels fishing CDQ Pacific cod in the Aleutian Islands. This relaxation of the season date would not apply to other vessels or the Bering Sea subarea. Limiting this to Amendment 80 and trawl vessels fishing for CDQ Pacific cod has been proposed to address potential regulatory discards of Pacific cod after November 1, however, regulatory discards have been relatively small in this period. If this season extension does lead to the start of a directed Pacific cod fishery in November and December, it may affect annual Pacific cod reallocations among gear groups. Seasonal modifications are not applicable to Alternative 6.

Table 156 combines the information on trawl catcher/processor revenues associated with areas remaining open for both Atka mackerel and Pacific cod. Taken together, the results suggest that the trawl catcher/processors would benefit the most from Alternative 4 and the least from Alternative 6. The ranking of benefits from the other alternatives, from most attractive to the sector to least attractive, is Alternative 5, Alternative 3, Alternative 2, and Alternative 2 with the protective option, and Alternative 1.[148] The margin for error in these estimates is large, however.

**Table 156 Estimated residual Atka mackerel and Pacific cod gross revenues for trawl catcher/processors by alternative and option during the baseline years (millions of 2012 dollars)**

| | | Atka mackerel average revenue | Pacific cod trawl alternatives | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 2 Pro. Opt. | 3 | 4 | 5 (PPA) | 6 |
| **Pcod average revenue** | | | 8.0 | 6.9 | 5.0 | 7.4 | 13.3 | 13.3 | 0 |
| **Atka mackerel alternatives** | **1** | 27.4 | 35.4 | | | | | | |
| | **2 (40%)** | 39.0 | | 45.9 | 44.0 | | | | |
| | **2 (50%)** | 39.8 | | 46.7 | 44.8 | | | | |
| | **2 (65%)** | 40.6 | | 47.5 | 45.6 | | | | |
| | **3** | 44.7 | | | | 52.1 | | | |
| | **3a** | 40.9 | | | | 48.3 | | | |
| | **3b** | 44.6 | | | | 52.0 | | | |
| | **4** | 56.0 | | | | | 69.3 | | |
| | **5 (PPA)** | 43.4 | | | | | | 56.7 | |
| | **6** | 0 | | | | | | | 0 |
| Values are average values for closure and area sector limits together, taken from Table 154 and Table 155. | | | | | | | | | |

Alternatives that reduce fishing opportunities for trawl catcher/processors in the Aleutian Islands will prompt redeployment of the vessels, as they try to offset the adverse impacts of the alternatives on their profits. Trawl catcher/processors could shift into rock sole and yellowfin sole fisheries, Bering Sea Pacific ocean perch, and arrowtooth flounder, Kamchatka flounder, Greenland turbot, Alaska plaice, or other flatfish. Amendment 80 vessels could obtain some species for processing by acting as motherships

[148] These rankings do not constitute a cost-benefit ranking of the alternatives. As discussed in Section 1.2.14 on the "revenue-at-risk" methodology, these are not projections of revenues in future years under the alternatives. They are estimates of revenues that were associated with areas that would have been left open for fishing in the baseline years, if the alternatives had been effective in those years. They are provided as an index of relative impacts.

for trawl vessels. Amendment 80 trawl catcher/processors may fish their Pacific cod allocations in the Bering Sea, as well as the Aleutian Islands, although the advent of a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these opportunities. Industry sources indicate, however, that Bering Sea Pacific cod tend to be smaller and bring a lower price, than Aleutian Islands Pacific cod. AFA trawl catcher/processors and vessels fishing CDQ Pacific cod quota, likewise fish against a BSAI-wide allocation, and could shift their operations. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience.

The analysis of the pollock measures in all the alternatives may be found in Section 1.7, and in Section 1.13. Alternatives 2, through 5 include measures to open up areas of critical habitat in the Aleutian Islands to fishing for pollock. This may provide more fishing opportunities for CDQ groups. In addition, the directed fishing allocation in the Aleutian Islands is allocated to the Aleut Corporation, which must assign half of its allocation to AFA vessels. These new opportunities may, therefore, benefit trawl catcher/processors fishing for CDQ groups or for the Aleut Corporation. It is not possible to estimate the additional volumes of fish or revenues that may be generated, given the limited fishing that has taken place in the critical habitat that may be opened. The benefits to trawl catcher/processors will also depend on policy decisions to be made by the CDQ groups and the Aleut Corporation, about how their allocations should be fished (the Aleut Corporation, for example, could assign its pollock allocation to AFA catcher vessels for delivery to the port at Adak). Alternative 6 prohibits the retention of pollock, reducing fishing opportunities below those available under the status quo (Alternative 1). However, pollock fishing activity has been extremely limited in the baseline years, and in the years since the interim final rule was adopted.

*Non-trawl catcher/processors*

The analysis of the non-trawl catcher/processor sector may be found in the following sections and sub-sections:

- 1.2.2 Non-trawl catcher/processor background
- 1.4 Non-trawl catcher/processors, Alternatives 1 and 4
- 1.10 Non-trawl catcher/processors, Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

Table 157 summarizes the estimates of wholesale gross revenues from Pacific cod fishing from areas remaining open under each alternative ("residual" revenues). Table 157 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues to the sector for each alternative-option combination, estimated both with and without considering the impact of the area-sector limits imposed in Area 543 and in Areas 541-542 (jointly) under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual gross revenues for Alternative 1 were $3.3 million. The average gross revenues for the remaining alternatives and options, however, were very similar, ranging from $8.4 million to $8.8 million. These differences in average gross revenues are not enough to make it possible to discriminate between these alternatives with respect to their impact on this sector.

**Table 157 Estimated residual non-trawl catcher/processor wholesale gross revenues by alternative and option, with and without closure limits, during the baseline years (millions of dollars)**

| | Closure only | | | Closure and area limits | | |
|---|---|---|---|---|---|---|
| **Alternative** | **Minimum** | **Average** | **Maximum** | **Minimum** | **Average** | **Maximum** |
| 1 | 1.7 | 3.3 | 5.2 | 1.7 | 3.3 | 5.2 |
| 2 | 4.9 | 10.0 | 17.3 | 4.9 | 8.6 | 12.0 |
| 2 PO | 4.9 | 9.7 | 17.0 | 4.9 | 8.4 | 11.5 |
| 3 | 5.0 | 10.5 | 18.2 | 5.0 | 8.8 | 12.2 |
| 4 | 5.0 | 10.5 | 18.2 | 5.0 | 8.8 | 12.2 |
| 5 | 5.0 | 10.5 | 18.2 | 5.0 | 8.8 | 12.2 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Revenues include estimates of incidental catches. Alternative 5 gross revenues have been set equal to the Alternative 4 revenues given the similarity between the measures in these alternatives. The Alternative 5 Area 543 limit does not affect revenues in a way that can be estimated here, since it is not globally binding in the Aleutians.

This fleet is prohibited from directed fishing for Pacific cod in the Aleutian Islands after November 1 Alternative 1 (the status quo) and Alternative 2. Alternatives 3, 4, and 5 relax this November 1 season end date and allow directed fishing until the end of the year. The freezer-longline portion of this sector operates under a voluntary cooperative and directed fishing for Pacific cod in the BSAI lasts all year. The relaxation of this season end date would allow some of this fishing to occur after November 1 in the Aleutian Islands. This is unlikely to be of advantage to the pot portion of this sector, as these vessels typically close directed fishing prior to November 1. Seasonal regulations are not applicable to Alternative 6.

This sector has limited opportunity to redeploy into other Pacific cod fisheries in the Aleutian Islands or in the Gulf of Alaska, but has relatively good opportunities to redeploy into Pacific cod fisheries in the Bering Sea, although the advent to a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Industry sources indicate that Pacific cod are larger, and that prices are better in the Aleutian Islands than in the Bering Sea, so a shift to the Bering Sea may have adverse revenue impacts, even if the overall harvest remains the same. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience. The action may lead the freezer-longline component of this fleet to target increasing amounts of Greenland turbot in the BSAI.

*Trawl catcher vessels*

The analysis of the trawl catcher vessel sector may be found in the following sections and sub-sections:

- 1.2.3 Trawl catcher vessel background
- 1.5 Trawl catcher vessels, Alternatives 1 and 4
- 1.11 Trawl catcher vessels Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

Table 158 summarizes the estimates of processor wholesale gross revenues from Pacific cod fishing by trawl catcher vessels in areas remaining open under each alternative ("residual" revenues). Table 158 includes processor wholesale gross revenues associated with trawl catcher vessel deliveries to catcher/processors acting as motherships, as well as gross revenues associated with trawl catcher vessel deliveries to shore-based processors and shoreside floating processors. Table 158 shows summary information about annual sector wholesale gross revenues in the baseline years 2004 through 2010; the table includes estimates of minimum annual, maximum annual, and average annual wholesale gross revenues to the sector for each alternative-option combination, estimated both with and without considering the impact of the area-sector limits imposed in Area 543 and in Areas 541-542 (jointly) under Alternative 2.

Focusing on the results for the closure and area limits, taken together (the right-hand columns in the table), the average annual revenues for the protective option of Alternative 2, the least attractive option for the sector aside from Alternative 6, under which there are no revenues, were $10.4 million, while the average annual gross revenues for Alternatives 4 and 5, the most attractive, were $16.7 million. Alternatives 1, 2, and 3 had very similar gross revenue estimates ($12.0 million, $12.2 million, and $12.6 million) and it is difficult to discriminate among them on the basis of the wholesale gross revenue criterion.

**Table 158 Estimated residual wholesale gross revenues to processors from catcher vessel catches by alternative and option, with and without closure limits, during the baseline years (millions of 2012 dollars)**

| | Closure only | | | Closure and area limits | | |
|---|---|---|---|---|---|---|
| **Alternative** | **Minimum** | **Average** | **Maximum** | **Minimum** | **Average** | **Maximum** |
| 1 | 7.0 | 12.0 | 18.9 | 7.0 | 12.0 | 18.9 |
| 2 | 5.2 | 12.3 | 21.2 | 5.2 | 12.2 | 21.2 |
| 2 PO | 4.5 | 10.4 | 19.1 | 4.5 | 10.4 | 19.1 |
| 3 | 6.3 | 13.4 | 21.6 | 6.3 | 12.6 | 21.6 |
| 4 | 12.2 | 19.9 | 30.7 | 12.2 | 16.7 | 24.1 |
| 5 | 12.2 | 19.9 | 30.7 | 12.2 | 16.7 | 24.1 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |

Note: Revenues include estimates of incidental catches. Alternative 5 gross revenues have been set equal to the Alternative 4 revenues given the similarity between the measures in these alternatives. The Alternative 5 Area 543 limit does not affect revenues in a way that can be estimated here, since it is not globally binding in the Aleutians.

Alternative 2 prohibits directed fishing using trawl gear after April 30 in Area 543. Alternatives 2, 3, 4, and 5 extend the C-season end date for Amendment 80 trawl vessels and those fishing Pacific cod CDQ, from November 1 to December 31. These changes were discussed earlier for trawl catcher/processors; that discussion is applicable to trawl catcher vessels and is not repeated here.

This sector has limited opportunity to redeploy into other Pacific cod trawl fisheries in the Aleutian Islands or in the Gulf of Alaska, but has had relatively good opportunities to redeploy into Pacific cod fisheries in the Bering Sea, although the advent of a Bering Sea and Aleutian Islands split in the Pacific

cod specifications may reduce these latter opportunities. Here again, industry sources indicate that Pacific cod are larger, and that prices are better in the Aleutian Islands than in the Bering Sea, so a shift to the Bering Sea may have adverse revenue impacts, even if the overall harvest remains the same. Other costs may be associated with the shift of vessels to new fisheries and markets for which they may not have been designed and with which their crews may have little experience.

*Non-trawl catcher vessels*

The analysis of the non-trawl catcher vessel sector may be found in the following sections and sub-sections:

- 1.2.4 Non-trawl catcher vessel background
- 1.6 Non-trawl catcher vessels, Alternatives 1 and 4
- 1.12 Non-trawl catcher vessels Alternatives 2, 3, and their options
- 1.13.1 Alternative 5
- 1.13.2 Alternative 6

While there are not enough observations to report harvest and gross revenue information, even across all management areas in a given year (primarily because of the small numbers of processors), there are enough to report summary information for the whole period 2004 through 2010. During that time a total of 26 vessels and 4 separate processors operated in this sector (NMFS AKR In-season management staff). Over the seven years, these vessels retained almost 1,000 metric tons of Pacific cod, for a mean weight of about 150 metric tons a year. (AKR report, February 7, 2013)

Estimated average aggregate annual processor wholesale gross revenues from non-trawl catcher vessels in open areas would have been about $120,000 under Alternative 1, and about $290,000 under Alternative 4. For each of the other alternatives, in almost all years, 100 percent, or almost 100 percent of the baseline catch came from within areas that would have remained open under the alternative, and thus, using the approach discussed here, estimated residual harvests under these alternatives would all have been generally equal to baseline harvests.

The extension of the fishing season until the end of the year would have little impact on this sector, which typically does not operate in the Aleutian Islands in the late fall.

This fleet has opportunities to fish in the State GHL fishery and in the Bering Sea, although the advent to a Bering Sea and Aleutian Islands split in the Pacific cod specifications may reduce these latter opportunities. Opportunities in the Gulf of Alaska are limited.

## 1.15 Benefits from Steller sea lion stock health

This section analyzes the economic benefits to the public of improved protection for the western stock of Steller sea lions. As discussed in Sections 1.2.9 and 1.2.10, these may accrue to subsistence hunters taking Steller sea lions, and to members of the general public placing a value on the health of the Steller sea lion population.

While survey-based evidence suggests that an improvement in the WDPS population growth rate could have a large value, the reasonable and prudent alternative (RPA) does not predict that the action will necessarily lead to an increase in the rate of population growth of Steller sea lion populations, nor does it make probabilistic statements about the range of potential outcomes.

The FMP biological opinion states that "While effects of the RPA on the response of the Steller sea lion population cannot be projected with certainty with the available information, NMFS has determined that conserving important prey species to foraging Steller sea lions in the areas and seasons commensurate with the rate of decline observed in each fishery management area will be adequate to reduce the effects of the fisheries such that they would not be likely to suppress the survival and recovery of the species to an appreciable extent." (NMFS 2010a:374).

Uncertainty about the effect of this action on the rate of Steller sea lion population recovery make it impossible to determine whether there would be a positive net impact on subsistence households or households obtaining other types of benefits, or to estimate the size of possible benefits.[149]

## 1.16 Impacts on other ecosystem resources

The action alternatives may also impact a variety of ecosystem resources. The following resources are discussed in separate chapters in the EIS:

- Fish stocks
- Marine mammals (in addition to Steller sea lions)
- Seabirds
- Habitat; ecosystem resources

The impacts of this action on fish stocks are discussed in detail in Chapters 3 and 4 of the EIS. Alternatives 2, 3, 4, 5, and 6 will change harvests of Atka mackerel, Pacific cod, and pollock stocks in the Aleutian Islands, and possibly increase harvests from yellowfin sole, and Pacific cod stocks in the Bering Sea. Catches of some groundfish species taken as incidental catch or bycatch to these targets may change. Atka mackerel may be especially affected, since it is a localized species, and harvests under Alternatives 2, 3, 4, 5, and 6 would increase. Changes in Atka mackerel stock size in the Aleutian Islands could have implications for future ABCs, TACs, and catch rates for the remaining fishery. Prohibited species impacts would remain limited, in an absolute sense, by current PSC limits, although halibut PSC may increase, risking earlier closures of Bering Sea yellowfin sole fisheries.

These actions could affect human welfare through human interest in stock health in and of itself, through changes in the costs of harvest associated with changes in stock size, and through the role some fish species play in supporting bird and marine mammal populations that provide value. The alternatives are not expected to reduce any stock to below its minimum stock size threshold. The status of these stocks with respect to overfishing is not expected to change because the current harvest specifications process for setting TACs and managing harvests within the limits would continue. The change in the fisheries harvest is not likely to impact prey availability and habitat in a way that would affect the sustainability a stock. In general, it is likely that costs or benefits from this source will be small.

The impacts of this action on marine mammals are discussed in detail in Chapter 5 of the EIS. The economic impacts of the action on the value placed on Steller sea lion stocks are discussed in Section 1.14 of this RIR. Non-consumptive and consumptive values exist for marine mammals, including subsistence harvests of some marine mammals. The non-consumptive benefits for other marine mammals found off Alaska have not been studied to the extent that Steller sea lion non-consumptive benefits have been

[149] The survey discussed elsewhere in this section did not include Alaskans in the survey frame and did not include any questions designed to elicit information about the valuation of subsistence uses. To the extent that residents of the United States value subsistence uses and the existence of subsistence communities, the survey results may be interpreted as including this source of value.

studied (Lew, personal communication, August 1, 2010).[150] With respect to other marine mammals, the EIS found little reason to believe that any of the actions under consideration would have a substantial impact on incidental take or disturbance, or reduced prey availability, although in the Aleutian Islands, it is possible that shifting fishing away from near-shore areas may reduce potential disturbance of near shore mammals (e.g., harbor seals and northern sea otters). The actions under consideration here are unlikely to have a large impact on values associated with these resources.

The impacts of this action on seabird populations were discussed in detail in Chapter 6 of the EIS. Non-consumptive values exist for seabirds. One of them, value from bird-watching trips, could even have an economic impact within the Aleutian Islands. Seabirds are also harvested for sport and subsistence purposes. Chapter 6, however, suggests that the action alternatives may have relatively small impacts on seabird populations. Under the status quo, seabird takes, disruptions to benthic habitat, and changes in prey availability are not estimated to be at a level that would reduce survival or reproductive success, and are mitigated to some degree by current spatial restrictions in the Aleutian Islands fisheries. The analysis found that there would be an insignificant impact to seabirds from additional open fishing grounds or from shifting fleets under the action alternatives. Thus, it is likely that the action alternatives will have little impact on economic benefits from seabird populations.

In the late summer and fall of 2010, two endangered short-tailed albatross were taken with longline gear in the Bering Sea. Then another was taken in the same fishery in October of 2011. These are the first takes of this species since 1998; including these, there have been a total of nine takes since 1983. The short-tailed albatross is protected in U.S. waters by the Endangered Species Act (ESA). As a result of consultation with the U.S. Fish and Wildlife Service (USFWS) under the ESA, USFWS issued an incidental take statement of four birds during each 2-year period for the BSAI and Gulf of Alaska hook-and-line groundfish fisheries. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending reinitiation of consultation with the USFWS. NMFS may choose to reinitiate consultation if/when the level of authorized incidental take is met, but not exceeded, in order to avoid potential delays in federally authorized fishing operations. To date, the incidental take levels have not been reached during the current or any previous biological opinions.

Most of these short-tailed albatross takes were made with hook-and-line gear on the Bering Sea shelf break. While the proposed action may lead to a shift of fishing effort from the Aleutian Islands to the Bering Sea, due to the historical rarity of takes, this action is not expected to have implications for the short-tailed albatross population. NMFS would reinitiate consultation with USFWS if/when the incidental take statement is reached, before it is exceeded. That has not happened under this biological opinion, and is unlikely to happen in the foreseeable future. (Mabry, personal communication)[151]

The physical impacts of these alternatives on the ecosystem, including those on habitat, predator prey, and fishing effects interactions, are discussed in detail in Chapter 7 of the EIS. Alternative 1 (the status quo) tended to decrease fishing activity in the Aleutians, compared to the 2004 through 2010 baseline. Alternatives 2 through 6 could potentially increase from status quo the amount of bottom trawling, longlining, pot deployment, and other activities that may impact bottom habitat in the Aleutian Islands. Alternative 4 may lead to levels similar to those during the baseline years.

Habitat may provide non-consumptive benefits to persons who enjoy learning about, thinking about, and, in some cases, viewing unique subsea habitats, such as coral gardens (although trawl impacts on coral gardens are believed to have been small, considering the trawl closures currently implemented). Habitat

[150] Daniel Lew, Ph.D. Economist. NMFS Alaska Fisheries Science Center. Seattle, Washington.

[151] Kristin Mabry, National Marine Fisheries Service, Alaska Regional Office. Juneau, Alaska. Personal communication, October 20, 2010.

may also provide consumptive benefits, by contributing to the productivity of fish and shellfish stocks. Humans could benefit if healthier fish stocks contributed to the health of bird, or marine mammal populations, or of fish stocks harvested for human use.

However, as noted elsewhere in Chapter 7, the alternatives are not expected to have significant impacts on these. Increases in fish removals under Alternatives 2 through 5 could potentially increase the adverse impacts of fisheries in the Aleutian Islands and thereby reduce benefits provided by Aleutian Islands habitat, while reductions under Alternative 6 may have the reverse effect; however, there are no anticipated discernible effects on habitat attributable to adoption of Alternatives 2, 3, 4, 5, or 6. Actual physical impacts, and economic benefits and costs, are likely to be small, since much of the habitat is already protected by various measures and for the reasons discussed above.

The impact of the alternatives to the predator/prey and fishing effects interactions described in the Aleutian Islands Fishery Ecosystem Plan (NPFMC, 2007) are unknown, due to the need for additional information and research. Therefore, it is difficult to determine environmentally significant ecosystem function impacts following from the alternatives.

Due to the nature of this action, the Atka mackerel, Pacific cod, and pollock fisheries, as modified by the alternatives, are not predicted to have additional impacts on the ecosystem or change the ecological impacts described in the Aleutian Islands Fishery Ecosystem Plan. Therefore, the impacts of the alternatives on the Aleutian Islands ecosystem are insignificant. Because Chapter 7 did not find environmentally significant ecosystem function impacts following from the alternatives, associated costs and benefits, other than those discussed elsewhere in the economic analysis, are likely to be relatively small.

## 1.17 Community economic impacts

The following communities and classes of communities have been selected for detailed examination in this community economic impact analysis: Adak, Atka, Unalaska, Other Alaskan communities, Pacific Northwest communities, CDQ communities, and Aleut Corporation shareholders.

It is not possible to make explicit or detailed estimates of the employment or income impacts of these actions on communities. Our ability to evaluate the changes in vessel activity is limited, and useful models to connect these changes to specific community impacts, should it be possible to estimate the changes with reasonable accuracy, are not available.

The approach taken here has been to examine each community, identify the key fishing sectors relevant to the community, and use the rough estimates of wholesale gross revenue changes associated with the different alternative and option combinations presented in earlier sections as an index of the likely relative impact of the different alternatives. In some cases, the estimates of wholesale gross revenue impacts are not precise enough to discriminate among the alternatives, but in other cases it is possible to do so.

*Adak*

Adak is a small and remote community. The U.S. Census reported there were 326 residents in April 2010. Commercial fisheries are important here; the community's economy and its engagement with the fisheries are described in detail in Chapter 10 of the EIS. There is a fish processing plant at Adak that has processed Pacific cod in the past. The Adak Cod Cooperative LLC has made arrangements to process

cod there in the future.[152] The opening of a pollock fishery could lead to pollock processing, as well . Large amounts of Atka mackerel are unlikely to be processed at the plant.

Adak also serves as a home port for two small fixed gear vessels. The Adak profile in Chapter 10 of the EIS identified two unique vessels in the data for the period 2004 through 2011, with an annual average of 0.6 Adak resident-owned vessels per years for 2004 through 2010 in Area 541 and 0.4 in Area 542. Adak-resident owned trawl or catcher/processor vessels were not identified.

Port visits to Adak, associated with Atka mackerel, Pacific cod, and pollock fishing, by both catcher/processors and catcher vessels, may create demand for goods and services in the community. Vessel services may include support for crew rotations, fuel supplies, and emergency medical services at the local clinic. The local fuel distributor has indicated that the large volume of fuel sold to fishing vessels allows the firm to sell fuel to residential and commercial customers in Adak at lower prices than it otherwise would be able to. Actions that reduce port visits may, thus, increase living costs and the costs of doing business in the community (Tsukada, 2010).[153]

A review of catch and VMS records, summarized in Table 10-12 and Table 10-13 of Chapter 10 of the EIS shows a decline in Adak port visits by catcher/processors and catcher vessels that targeted Atka mackerel or Pacific cod immediately before or after the visit, at the time the interim final rule went into effect. The average number of visits by catcher/processors fishing for Atka mackerel in the Aleutian Islands, either before or after the visit from 2004 through 2010, was about 44, while the number of visits in 2011 was 28. The average number of visits by catcher/processors fishing Pacific cod from 2004 through 2010 was about 29, while the number in 2011 was 13.[154]

Even more striking was a decline in the numbers of catcher vessels fishing for Pacific cod in the Aleutian Islands, either before or after visiting Adak. These declined from about 118 a year from 2004 through 2010, to 11 in 2011. However, this decline in catcher vessel visits may be due in part to difficulties at the processing plant at Adak. This makes it difficult to identify the direct impact of the interim final rule. The firm operating the plant went bankrupt in late 2009, and the successor firm did not begin operations until after the important March-April Pacific cod fishery in 2011.

Implicit in parts of the following discussion is the assumption that Pacific cod processing is economically viable at Adak. However, this assumption may not hold. Processing margins at Adak may be smaller than elsewhere, given its remote location; at least one operation went bankrupt trying to operate in Adak prior to the date the interim final rule went into effect. In addition, the Aleutian Islands and Bering Sea Pacific cod split has led to initial reductions in Aleutian Islands Pacific cod harvests. Furthermore, a CDQ group has been working to establish Pacific cod processing at Atka; if this is successful, Atka could compete with Adak for Pacific cod.

Because of Adak's small size, its residents must import a large proportion of the goods they consume. Moreover, a large part of the processor work force is made up of temporary workers who come to town for the season and who leave when it is over. They spend money in the town while they are there, but a

[152] In mid-April 2013, Icicle Seafoods, which operated the processing plant at Adak in 2011 through 2013, announced that it would close its operation there. Icicle representatives reportedly cited several reasons for its decision, including (a) regulatory uncertainty, (b) concern over the Pacific cod stock in the region, and (c) high operating costs at Adak. At the end of 2013, Adak Cod Cooperative LLC planned to begin operations at Adak. (Shedlock 2013; Paulin 2013)

[153] This may be a source of agglomeration economies discussed in Section 1.2.12.

[154] These changes were large and took place at the time the interim final rule went into effect, but they may have been influenced by other factors as well. In 2010 the TAC in Area 541 was increased proportionately to the TACs in Areas 542 and 543, reflecting changes in biomass distribution identified by trawl surveys. This may increase the likelihood of catcher/processors traveling to Dutch Harbor for port calls.

large part of their income would be spent elsewhere. Other sources of personal income and induced impacts may be so limited, however, that induced impacts (sales at the local grocery store for home consumption, for example) may have importance. Adak shares in the State's fisheries business tax revenues and its fishery resource landing tax revenues may vary with the alternatives, and any reduction in landings or offload in the municipal limits, or in the unorganized borough (Aleutians West census area) are likely to impact Adak city revenues. The loss of part of these municipal revenues could reduce municipal expenditures, and be an additional source of induced effects.

Adak may be affected by the alternatives in a number of ways:

- Changes in Atka mackerel availability may lead to changes in port visits by trawl catcher/processors targeting Atka mackerel.
- Changes in Pacific cod availability may lead to similar changes in port visits by trawl and non-trawl catcher/processors, and by trawl and non-trawl catcher vessels delivering product to Adak.
- Changes in pollock availability may lead to changes in Aleut Corporation revenues to be used for Adak development, to increases in trawl catcher/processor visits to Adak, and to increases in trawl catcher vessel deliveries in Adak.
- Changes in availability of all these species may lead to changes in revenues to Adak from its raw fish tax, other taxes it imposes (for example on fuel sales), and to fisheries resource and fisheries business taxes that may be shared with it by the State of Alaska.
- Increased sales in Adak, and increases in income to its residents, may lead to growth at Adak through indirect and induced impacts.
- Adak may experience agglomeration benefits which may contribute to its growth.

These are distributional impacts. They are not parts of an overall cost-benefit analysis from a national perspective. Changes that may benefit Adak, may create offsetting costs in other places.

Investments in promoting a civilian community in Adak contribute to maintaining a port, an airfield capable of servicing large jets, and infrastructure such as warehouses, a bulk fuel tank farm, and a clinic, in a remote region of the Aleutian Islands. These may have benefits in an air, maritime, or military emergency, or with respect to long-term national security interests. For example, the 24 crew of the *Cougar Ace* were brought to Adak when that 600-foot ship rolled on her side in shipping lanes 200 miles to the south in July 2006 (Terry, 2006). Currently, a tow package has been pre-positioned at Adak, and some Department of Defense overseas flights land at Adak to refuel and secure other services (Lockett, City Manager, City of Adak, personal communication, August 15, 2013). Adak was the site of various military commands from World War II through the Cold War, but the installation closed in 1997, and reverted to private use. This suggests a limited value with respect to national security needs.

Assuming the current services provided by Adak are optimal, the benefit of maintaining the civilian community at Adak would be the difference between the current cost of providing these services, and the cost of providing them in the absence of the civilian community. This difference is not known. Federal and state governments have taken steps to promote the creation of a civilian community at Adak, including the air travel subsidies provided by the Federal Essential Air Service Program (Restino, 2012), Federal allocations of fish to support a fishing community and processing at Adak, and the State of Alaska's creation of a state-waters fishery for Pacific cod in the region. The Essential Air Service subsidy represents a cost to the nation in the form of resources no longer available for other purposes; fish allocations represent a transfer of resources from one party to another without net costs, except for any that might be generated by increased costs of transferring harvesting rights or costs of constraints imposed on resource use.

Alternative 1: Aside from Alternative 6, Alternative 1 has the greatest adverse impacts on Atka mackerel revenues (Figure 5), and on non-trawl Pacific cod catcher/processor revenues (Figure 16). The impacts of Alternative 1 on Pacific cod trawl revenues, both for catcher/processors (Figure 13) and catcher vessels (Figure 20) are adverse compared to the baseline, and comparable to those for Alternatives 2 and 3. The adverse impacts on Pacific cod trawl gross revenues are not as severe as those for the protective option of Alternative 2.

On balance, it is likely that the adverse impacts of Alternative 1 on port visits to Adak are worse than those for the other alternatives, except for those of Alternative 6, and possibly excepting those for the protective option of Alternative 2. They are worse because, despite the similarities of the Alternative 1, 2, and 3 impacts on trawl vessels, Alternative 1 has more severe impacts on trawl catcher/processor Atka mackerel revenues and non-trawl catcher/processor Pacific cod revenues. These factors would adversely affect the likelihood of port visits to Adak, and associated purchases of goods and services there, compared to the baseline, and to the other alternatives.

The adverse impact on trawl catcher vessel gross revenues would also be associated with a reduced volume of Pacific cod deliveries to the processing plant in Adak, compared to the baseline. This would adversely affect economic activity at the plant, and income streams generated for Adak residents by this activity. Such revenue streams would be associated with purchases of goods and services by the plant, the lease of the processing plant, and fisheries tax revenues paid to the city of Adak by fishermen delivering product in Adak. These impacts would be comparable to those under Alternatives 2 and 3, worse than those under Alternative 4, and not as bad as those under Alternative 6, and the protective option to Alternative 2.

As discussed in Section 1.7, this alternative does not remove restrictions on pollock fishing in critical habitat in the Aleutian Islands. Thus, this alternative has no pollock-fishing-mediated impact on Adak in comparison with the baseline years. However, Alternatives 2, 3, and 4 do lift some restrictions on pollock fishing and this could have a positive impact on Adak in comparison to the baseline[155] and to Alternative 1.

Alternative 2 is likely to be associated with more catcher/processor visits to Adak, and associated sales of goods and services, than Alternative 1, but less than the baseline. These increases are more likely to come from trawl vessels fishing for Atka mackerel and from non-trawl vessels fishing for Pacific cod, than from trawl vessels fishing for Pacific cod. For both of the first two sector-species combinations, the estimated production and revenues associated with Alternative 2 are greater than those associated with Alternative 1. The impacts associated with port visits by trawl vessels targeting Pacific cod may not be very different from those under Alternative 1. As noted in Figure 13 and in Figure 20, Pacific cod trawler gross revenue streams during the baseline period are very similar for Alternatives 1 and 2. Pollock production under this alternative may also contribute to port visits. Alternative 2 includes options to allow catcher vessels fishing for Pacific cod in Area 543 to deliver their harvest to motherships, and prohibiting these catcher vessels from delivering to motherships. A prohibition of mothership activity in Area 543 under this option could reduce port visits to Adak by catcher/processors that might have acted as motherships, and by catcher vessels that might have delivered to them.

Although Alternative 2 gross revenues are similar to those for Alternative 1, the relative impact of Alternative 2 on Pacific cod deliveries to the processing plant in Adak, in comparison to those under Alternative 1, is not clear. First, while overall gross revenues for trawl catcher vessels during the baseline

[155] Recall that the baseline years are 2005 through 2012 for pollock, and 2004 through 2010 for Atka mackerel and Pacific cod. Alternative 4 adopts most, but not all of the regulations in effect during the baseline period and so is similar to, but not exactly equivalent to, the baseline.

years are not very different from those under Alternative 1, Alternative 2 tends to produce its results by restricting fishing area in the eastern half of Area 541, while lifting restrictions to a great extent in the western half of Area 541, where Adak is located.

Second, Alternative 2 includes options to allow catcher vessels fishing for Pacific cod in Area 543 to deliver their harvest to motherships, and prohibiting these catcher vessels from delivering to motherships. The impact of these options on Adak is unclear. If catcher vessels are unable to deliver Area 543 harvest to motherships, they may have no alternative except to deliver to Adak. However, the prohibition on mothership deliveries of Pacific cod caught in Area 543 may increase the operating costs for catcher vessels in Area 543, and discourage any catcher vessel activity there. This may reduce the overall attractiveness of the region to catcher vessels and discourage the use of the port of Adak.

Since there has been so little fishing for pollock in recent years, it is difficult to project how pollock production will change with the alternatives. In general, it is assumed in this analysis that increasing the amount of open area will increase opportunities for pollock fishing, and will likely be associated with increases in harvests. Alternative 2 creates more opportunities for fishing pollock than during the baseline years, or under Alternative 1.

Alternative 2 has options that would close waters in Kanaga Sound to pollock fishing within 6 and 10 nautical miles of Ship Rock in the southern sound. Both of these options would reduce the potential benefits of the action to Adak; the 10 nautical mile closure reduces benefits to a greater extent than the 6 nautical mile closure.

Alternative 2 includes an option to prohibit directed fishing for pollock in Kanaga Sound by vessels greater than or equal to 60 feet LOA. While this measure may be intended to increase opportunities for pollock fishing by vessels likely to deliver in nearby Adak, it is not clear that this measure would benefit Adak. The Aleut Corporation can control the way the directed fishing allocation (DFA) in the Aleutians is fished, and could introduce this measure on its own if it thought that this would provide the most benefit to Adak. It would have more flexibility to modify its decision through time if the measure were not written into regulations.

Alternative 2 includes a protective option defining seasonally-changing closure areas for pollock around rookeries and haulouts in Areas 541 and 542. Since an examination of harvest data from protected areas in the 1990s suggests that somewhat more production came from the areas opened under Alternative 2 than under its protective option, the protective option is expected to reduce the benefits of the action to Adak compared to Alternative 2; however, the benefits would be greater than under Alternative 1.

Alternative 3 may be associated with more port visits to Adak than Alternatives 1 and 2, but fewer than Alternative 4, or the baseline years. As shown in Figure 5, Atka mackerel wholesale gross revenues under Alternative 3 and its option to close Area 543 west of 174.5° E longitude are somewhat higher than Alternative 2 and its options, and much higher than Alternative 1. The Alternative 3 option that closes all Area 543 critical habitat and closes the area around Buldir Island from 0 to 15 nautical miles (except for certain areas from 10 to 15 nautical miles) has estimated gross revenues that are similar to, and not worse than, those of Alternative 2 and its options. Port visits associated with Pacific cod production would be similar to those under Alternatives 1 and 2, greater than those under the protective option to Alternative 2, but less than those for Alternative 4. Pollock production under this alternative may also contribute to port visits.

Estimated catcher vessel gross revenues by alternative in the baseline years were summarized in Figure 20. As discussed above, there are not large differences in catcher vessel Pacific cod production and gross revenues between Alternatives 1, 2, and 3. If deliveries to Adak are correlated with the availability of

Pacific cod to catcher vessels, this alternative should have similar effects to Alternatives 1 and 2. Production should be smaller than during the baseline years, or than under Alternative 4. However, production may also tend to be higher than under the protective option to Alternative 2.

In general, Alternative 3 and Alternative 4, which are discussed briefly below, should increase opportunities for pollock harvests, compared to Alternative 2. However, each of these alternatives contains the same protective option that is provided for Alternative 2. If the Alternative 3 protective option were adopted, the benefits from the action would be similar to those associated with the Alternative 2 protective option.

Alternative 4 is the best alternative from the point of view of the current residents of Adak. Under this alternative, Atka mackerel and Pacific cod management return to most of the regulations in place in 2010, before the interim final rule went into effect on January 1, 2011. Port visits by catcher/processors, and deliveries by catcher vessels, should return to levels similar to baseline levels, assuming processing is available and reliable. In fact, catcher vessel deliveries may exceed baseline levels, because, while the Adak plant had financial difficulties and went bankrupt in the later baseline years, the plant began operating again in 2011.

In addition, areas of critical habitat, which were closed during the baseline years, are made available for pollock fishing. Because of this latter measure, Alternative 4 provides net benefits to Adak residents when compared to those under the baseline conditions. Alternative 4 pollock benefits are similar to those in Alternative 3 and greater than those under Alternatives 1 and 2.

Alternative 4 contains the same protective option proposed for Alternative 2; if the protective option to this alternative were adopted, the results for Adak would be similar to those that would have occurred had the Alternative 2 protective option been adopted.

Alternative 5, discussed in detail in Section 1.13.1, is the Council's preferred alternative. As discussed in Section 1.13.1, the different elements of Alternative 5 were adapted from elements of other alternatives, which were evaluated in detail in earlier sections. Those provisions of Alternative 5 that regulate Atka mackerel fishing were based on Alternative 3; those that regulate Pacific cod were based on Alternative 4; those that regulate pollock were based on Alternatives 3 and 4, which are, themselves, identical. Modifications from the underlying alternatives were made in each case. Alternative 5 impacts for Adak, better than those of Alternatives 1, 2, 3, and 6, and not as good as those of Alternative 4.

Alternative 6, which prohibits the retention of Atka mackerel, Pacific cod, and pollock has greater adverse impacts on Adak than all other alternatives.

*Atka*

Fishing vessels from Atka have primarily targeted halibut and sablefish, and not Pacific cod and Atka mackerel. Atka has not been an important logistical support base and is not impacted by transfers of product from catcher/processors to tramp steamers. There may be some impact from changes in the number of crew rotations carried out through Atka in connection with fishing operations. However, there are not currently many of these a year, and each involves small numbers of persons, interacting minimally with the community (Snigaroff, Lokanin, Wood, personal communications).[156] Atka shares in the State's fisheries business tax and fishery resource landing tax revenues, and the loss of these revenues may be an additional source of impact. Atka has a 2 percent raw fish tax, and planned increases in Pacific cod

[156] Mark Snigaroff, Atka. Personal communication, September 3, 2010. Leonty Lokanin, Mayor of Atka. Personal communication, September 24, 2010.

deliveries may create new revenues. In the past, Atka Pride Seafoods did not take deliveries of, or process, Pacific cod; however, it began to do so in the summer of 2012, and plans to expand production in the future. (Cotter, personal communication, September 10, 2012)[157]

Atka may be affected by the alternatives in a number of ways:

- Changes in Pacific cod availability may lead to increased catcher vessel deliveries to the Atka Pride plant at Atka, providing jobs and community income.
- Changes in availability of all these species may lead to changes in revenues to Atka from its raw fish tax, other taxes it imposes (for example on fuel sales), and to fisheries resource and fisheries business taxes that may be shared with it by the State of Alaska.
- Increased sales in Atka, and increases in income to its residents may lead to growth at Atka through indirect and induced impacts.

Based on the past, this action is unlikely to have much impact on Atka from changes in port visits unconnected with deliveries of Pacific cod to the Atka Pride processing plant. Changes in trawl catcher vessel revenues associated with the action may be a useful proxy for the impact of the action on Atka. This measure can be evaluated using Figure 20. Alternative 4 would be the most beneficial for residents of Atka, while Alternative 6, and the protective option of Alternative 2 would be the least beneficial. Given the uncertainties inherent in the estimates, and the similar patterns for the gross revenue estimates for Alternatives 1, 2, and 3, it is difficult to discriminate between the alternatives on this basis. Alternative 5 is very comparable to Alternative 4.

As noted in the discussion of Adak, Alternatives 2 and 3 close the critical habitat in Area 541 from the approximate position of the village of Atka to the eastern border of Area 541, leaving much of the waters to the west of this point open. This may adversely affect Atka's ability to exploit some nearby Pacific cod grounds, in comparison with Alternative 1. Figure 3-11 and Figure 3-12 show the locations of catcher vessel harvests of Pacific cod in the periods 2004 through 2010 and 2011 through 2012. Both of these figures show concentrations of harvests in critical habitat from 10 to 20 nautical miles from shore, just to the east of Atka North Cape.

*Unalaska*

Catcher vessel deliveries of Aleutian Islands Pacific cod and pollock to Unalaska have been relatively small. Moreover, Chapter 10 of the EIS points to relatively little involvement by Unalaska-owned vessels in the Aleutian Islands Atka mackerel and Pacific cod fisheries. While local resident direct income from the fisheries cannot be determined, it may be relatively limited.

However, numbers of catcher vessels and catcher/processors visit Unalaska either before or after fishing for Pacific cod in the Aleutian Islands areas. As shown in Table 10-13 in Chapter 10 of the EIS, from 2004 to 2010 an average of 32 catcher/processors visited Unalaska either before or after targeting Atka mackerel in the Aleutians, while in 2011, there were 48. From 2004 to 2010, an average of about 37 catcher/processors visited Unalaska before or after fishing for Pacific cod in the Aleutians, while in 2011, there were 15. Similarly, numbers of catcher vessels visit Unalaska before or after targeting Pacific cod in the Aleutians; from 2004 to 2010 there were an average of about 33, while in 2011 there were 17.

Vessels entering port may require a variety of logistical services. Catcher/processors may offload product to a tramp steamer in the harbor or deliver product across the dock to local cold storage. Even deliveries in the harbor will generate impacts within the community, because of a requirement to use longshore

[157] Larry Cotter, President of the Aleutians Pribilof Islands Development Association. Personal communications, 2012.

workers. Unalaska is a base for logistical support for the fishing industry in the Aleutian Islands. The range of services includes support for crew rotations, repairs, gear storage, refueling, and watering. The demand for these services could be reduced by this action, generating indirect impacts.

It has been pointed out that fisheries support businesses in Unalaska are diversified, and support operations in different fisheries. This diversification provides some income stability from year to year, as different fisheries are more or less lucrative for fishermen and as participation in them rises and falls. Within the course of a year, the different seasonality of fisheries can help stabilize demand and cash flow. Moreover, having a multi-fishery base could allow some businesses to justify a presence in Unalaska. Restrictions on fishing activity in the Aleutian Islands may reduce this diversification for shoreside firms (Benton, 2010). The potential impacts of the fishing restrictions in the Aleutian Islands may also affect other fisheries in the Bering Sea. If increased harvest of PSC by trawler catcher/processors operating in rock sole, yellowfin sole, and Pacific cod fisheries, for example, led to earlier closures of some of these fisheries, the seasonal pattern of demand, and perhaps aggregate demand, for shoreside services in Unalaska could be affected (Kelty, 2010).

Unalaska is larger than the communities to the west, and the local economy is more developed. Indirect impacts may be larger here, although as before, goods and services are probably imported from outside the community in larger proportions than they would be from a similarly sized community, say, in the Puget Sound area. Induced impacts would depend on the extent to which persons earning incomes in the fisheries live in, and would make personal purchases in, Unalaska. The extent of this is unknown, but is probably not great.

Unalaska shares in the State's fisheries business tax and fishery resource landing tax revenues, and the loss of these revenues may be an additional source of impact. While Unalaska has a 2 percent raw fish tax, little Aleutian Islands Pacific cod is delivered there, so this is not likely to create a large impact. Unalaska also has a 2 percent sales tax, a 5 percent bed tax, and a 1 percent capital tax. Reduced support activity associated with reduced fishing in the Aleutian Islands may affect this source of revenue and create additional induced effects.

Unalaska may be affected by the measures in several ways:

- Changes in Atka mackerel, Pacific cod, and pollock availability in the Aleutian Islands may have implications for catcher/processor port visits that are difficult to ascertain. Visits may drop, as they are likely to do in Adak, if availability is reduced; or they may increase, if redeployment involves vessels in fisheries closer to Unalaska's Port of Dutch Harbor.
- Increased pollock availability in the Aleutians may mean somewhat less availability in the eastern Bering Sea; the Aleut Corporation may seek to engage catcher/processors and catcher vessels that become active in the fishery with the Port of Adak. This could promote some deployment away from Dutch Harbor. Given the small amounts of pollock in the Aleutian Islands, compared to typical harvests in the Bering Sea, impacts on Unalaska are likely to be small.
- Changes in the availability of Atka mackerel, Pacific cod, and pollock, or the locations from which they are harvested, may affect revenues from Unalaska's raw fish tax, as well as the fishery resource and business taxes shared with it by the State of Alaska.
- In general, the economy of Unalaska is comparatively large with respect to the potential impacts it may face from this action.

The net effect of the alternatives on Unalaska is unclear because they may depend directly on overall fisheries output, or on shifts in fishing activity associated with redeployment. These effects do not pull in the same direction, and their relative sizes are unclear. To the extent that a reduction in fishing activity in

the central and western Aleutian Islands reduces vessel port visits in Unalaska, and associated purchases of goods and services and sales of unprocessed product, Unalaska may be hurt. However, to the extent that fishing operations redeploy into Bering Sea fisheries, and shift port visits to Unalaska from ports further west, Unalaska may be benefitted by an alternative. This analysis cannot discriminate among the impacts of the alternatives sufficiently to determine whether Unalaska will be adversely affected or not.

*Other Alaskan communities*

Other Alaskan communities, from Ketchikan to Sand Point, may have limited involvement in the Atka mackerel and Pacific cod fisheries. Home port and residence information from administrative sources may be imprecise. Communities not listed may be involved, and the reports may provide a misleading picture of the relative importance of the fisheries to the different communities.

In general, these communities receive some direct income from the earnings of crew members, vessel owners, and fishing privilege owners, and enjoy some indirect incomes from the provision of support services to the fishing operations, and induced incomes as direct and indirect income earners spend locally. However, as noted in Chapter 10 of the EIS, the involvement is limited. Anchorage is listed as a home port, but the fishery would also generate income for Anchorage, since Anchorage is a transit point for crew rotations and the shipment of supplies for operations in the Aleutian Islands and the Bering Sea. While this action could affect incomes in these communities, in most of these "other" Alaskan communities, this impact should be relatively small.

Sub-section 1.7.5 of this RIR discussed the potential impacts of providing more pollock fishing opportunities. Fifty percent of the Aleut Corporation allocation must be fished by vessels less than or equal to 60 feet LOA. No LLP licenses are required by trawl vessels directed fishing for pollock in the Aleutian Islands (50 CFR 679.2, definition of license limitation groundfish). The increased access to pollock grounds in the Aleutian Islands may provide a new fishing opportunity for owners and operators of small trawlers. An examination of vessels in this size class using trawl gear off of Alaska from 2005 through 2012 identified as many as 38 unique vessels (this may be an overestimate if vessels were renamed, or obtained new Federal Fishery Permits). There was an average of about 26 vessels involved in each year. These vessels fished for pollock in the Gulf of Alaska, predominately (92 percent) in Area 610, but also in Areas 620 and 630. These vessels did not fish pollock in the Bering Sea. Vessels with home ports in the Western and Central Gulf of Alaska were an especially important part of this fleet. There was an average of 10 vessels a year from Sand Point, four vessels a year from King Cove, and two vessels a year from Kodiak. The remaining vessels reported Girdwood, Juneau, Petersburg, and Seattle home ports.

Other Alaskan communities may be affected by these alternatives in the following ways:

- In general, impacts on communities outside of the central and western Aleutian Islands will be small. Relatively few of the vessels active in the Aleutian Islands are based in these ports; the ports provide relatively small direct support for these fisheries.
- If the pollock fisheries in the Aleutian Islands are stimulated by the alternatives, the Alaska Peninsula ports of Sand Point and King Cove may be impacted. These ports provide home ports and bases for a number of trawl vessels under 60 feet LOA that have experience in the Aleutian Islands and in fishing for pollock.

The impacts associated with changes in the Atka mackerel and Pacific cod regulations may be relatively small in Alaskan communities outside of the Aleutians, given their limited involvement in the fisheries, and the relatively small proportion of their fishing income believed to be derived from the fisheries.

Impacts of changes in pollock regulations may be more focused in King Cove and Sand Point. If so, Alternative 4 would have the greatest positive impact on residents of these communities, Alternative 1 would have no impacts relative to the baseline, and Alternatives 2 and 3 would have intermediate levels of impact. Alternative 5 may have impacts that are similar to, but possibly not quite as good as those of Alternatives 3 and 4. Alternative 6 prohibits retention of pollock, however, given the limited pollock fishing activity outside of critical habitat in recent years, this is likely to have small impacts on these communities.

*Pacific Northwest*

The Pacific Northwest, and especially the Seattle-Tacoma area, is an important locus for any employment and income impacts of this action. However, while the absolute impacts are probably relatively large here, compared to other communities such as Adak, Atka, and Unalaska, the large size of the Seattle-Tacoma area, and its diverse economy, mean that the impacts are smaller, proportionately, than in other communities.

As described in Chapter 10 of the EIS, important components of the fleets fishing for Atka mackerel and Pacific cod, especially the trawl catcher/processors, the fixed gear catcher/processors, and the trawl catcher vessels are owned by residents of the Seattle-Tacoma area. It is also likely that many of the crew members come from this region. The incomes accruing to local vessel owners and crews are a direct impact of the fishery. The incomes spent by owners and crew will generate induced effects in other businesses, as owners and crew spend their incomes on personal purchases of goods and services.

The region is an important supplier of logistical services to the fleet, including corporate headquarters support, shipyard services, other repairs and maintenance, supplies, and services support, including the provision of financial, legal, and other services, marketing, and product shipment and storage. The region has seafood reprocessing plants that receive and reprocess catcher/processor deliveries from BSAI fisheries. Many crew rotations originate in the Pacific Northwest. These expenditures would represent direct impacts of the fishery. Firms supplying the fleet will, themselves, make regional purchases, generating additional, indirect, impacts through employment and income multipliers.

The restrictions associated with the status quo, and the potential for reductions in revenues from the fishery will thus have direct, indirect, and induced impacts in the Seattle-Tacoma area.

This regional economy is a large one, and persons with direct and indirect sources of income associated with the fishery probably spend a larger proportion of it regionally than do persons in smaller Alaskan communities. In addition, persons living in Alaska and earning incomes associated with the fishery spend a relatively large proportion in the Pacific Northwest, as well, as they travel through the region, purchase goods and services produced in the region, and purchase goods and services that transit the region. Thus, this area probably receives a large proportion of the induced impacts associated with the action.

The Pacific Northwest may be affected by the alternatives in the following ways:

- A large part of the trawl and non-trawl catcher/processor and catcher vessel fleet is based on the Puget Sound area. Changes in the profitability of this fleet, associated with fluctuations in Atka mackerel and Pacific cod availability in the Aleutian Islands may affect fleet expenditures on goods and services.
- Similarly, changes in the profitability of the fleet may affect incomes accruing to vessel owners, crew members, and other fleet stakeholders.

- Expenditure and income changes will have indirect and induced effects in the region. These effects will be large in comparison to those in Alaskan communities. However, these impacts will be small in relation to the overall Puget Sound economy.

As in the preceding discussions, the relative impacts of the alternatives on sector and species wholesale-level gross revenues during the baseline years have been used as an index of the relative impacts of the alternatives on the Pacific Northwest community. Here, for convenience, the discussion is organized by the three species regulated by this action.

Atka mackerel: Atka mackerel is important to seven Amendment 80 trawl catcher/processors with Puget Sound connections. All alternatives drop the HLA requirement that was in place during the baseline years. The increased operational flexibility this provides, with reduced costs and potential revenue increases, cannot be identified using the gross revenues methodology here. All alternatives provide this benefit when compared to the baseline period.[158] The relative gross revenue impacts of the alternatives may be seen in Figure 5. Alternative 1 imposes the greatest costs on these vessels relative to the baseline years. Alternative 4, which drops the HLA requirements, but otherwise returns the sector to the management rules prevailing before the interim final rule was adopted, is actually likely to provide benefits to the vessels, in comparison to the record of the baseline years. After Alternative 4, the ranking of alternatives from the point of view of the annual gross revenues they provide the fleet during the baseline period is, 3 and 3b, 3a, 2 (65%), 2 (50%), and 2 (40%). The differences between 3a and the different variants of 2 are small. Given the uncertainties inherent in this analysis, they may not be meaningful. Alternative 5 is better for communities than Alternatives 1, 2, 3, and 6, and not as good as those of Alternative 4. Alternative 6 has the greatest adverse impacts.

Pacific cod: The impacts of the alternatives on the three key sectors targeting Pacific cod, trawl and non-trawl catcher/processors and trawl catcher vessels, are summarized in Figure 13, Figure 16, and Figure 20. The impacts on the trawl fleets are very similar: Alternatives 1, 2 (excluding its protective option), and 3, have very similar results, and it is difficult to discriminate among them. All of these alternatives reduce wholesale gross revenues compared to the baseline years. Alternative 4 returns gross revenues to baseline year levels, and, thus, promises the greatest potential benefits when compared to the status quo. The protective option to Alternative 2 reduces gross benefits below status quo levels, and, thus, would be less attractive to the Puget Sound region than the other alternative/option combinations. Alternative 5 impacts are similar to those of Alternative 4. Alternative 6 has the greatest adverse impacts.

The pattern of impacts of the alternatives on the Pacific cod non-trawl catcher/processors are different. These are summarized in Figure 16. Alternative 1, the status quo, has a large impact on sector wholesale gross revenues in all of the baseline years. The other alternatives have very similar impacts, once area-sector considerations are applied to Alternative 4 to normalize it and make it comparable to the other alternatives. In some years, there are differences among these alternatives, with Alternatives 3 and 4 producing the best (and very similar) results for the sector, while Alternative 2 ranks next, and the protective option to Alternative 2 ranking lowest. However the differences among these alternatives are small compared to the difference between them and Alternative 1, and given the uncertainties inherent in these estimates, it may not be appropriate to discriminate among them on the basis of wholesale gross revenues. Alternative 5 impacts are similar to those of Alternative 4. Alternative 6 has the greatest adverse impacts.

Pollock: Alternative 1 does not change pollock availability from baseline year levels. Thus, Alternative 1 provides no additional benefit to the AFA fleet, or to trawl catcher vessels from the Puget Sound area that

[158] Recall that none of the alternatives exactly corresponds to the baseline years of 2004 through 2010. Alternative 4 is very similar, but differs in that it adopts the repeal of the Atka mackerel HLA program in the interim final rule.

may be attracted to a pollock fishery. Alternative 2 provides some additional opportunities, while Alternatives 3 and 4, which are equivalent with respect to pollock, provide more opportunities than Alternative 2. The protective option to Alternative 2 lies between Alternatives 1 and 2. The benefits from pollock fishing will depend on policy decisions made by the Aleut Corporation or CDQ groups with respect to how the pollock should be fished. Alternative 5 effects are similar to, but possibly not quite as good, as those of Alternative s 3 and 4. Alternative 6 has the greatest adverse impacts.

*CDQ communities*

CDQ groups receive 10 percent of the pollock TAC in the Aleutian Islands, 10.7 percent of the BSAI Pacific cod, and 10.7 percent of the Atka mackerel TACs in each of the three Aleutian Islands management areas. These CDQ allocations are divided, unevenly, among the six CDQ groups. The allocations of these species among CDQ groups are summarized in Table 37.

The CDQ groups use these allocations to benefit their member communities. They may earn royalties from leasing the CDQ to other fishing companies, or they may arrange to fish it themselves. In addition to holding CDQ for species regulated by this action, the groups hold CDQ quota for other BSAI species that might provide alternative fisheries for fishing firms and vessels that find their Atka mackerel and Pacific cod fishing opportunities in the Aleutian Islands limited. The interim final rule might affect the CDQ groups in several ways.

CDQ communities may be affected by the alternatives in different ways:

- Persons living in CDQ communities may be affected by changes in the royalties received by their CDQ group from leases of Atka mackerel, Pacific cod, and pollock. Community resident impacts would be indirect, and they would depend on policy decisions by CDQ groups, translating increased changes in revenue flows into revenue, service, and investment flows in their communities.
- Persons living in the APICDA CDQ community of Atka may be particularly affected by increased job opportunities and income associated with increased deliveries of Pacific cod to the Atka Pride processing plant.

The methodology used here to rank alternatives with respect to community impacts is based on estimated changes in gross revenues attributable to sectors and species during the baseline years 2004 through 2010. The discussion of revenue flow changes to the Pacific Northwest provides a summary that appears applicable to the CDQ communities as well (at least with respect to the first bulleted point above), and is not repeated here. The impact on APICDA associated with the flow of product to its Atka Pride plant in Atka was summarized in the discussion of Atka, and, also, is not repeated here.

CDQ groups will be affected differently by the changes in species-specific revenues because they receive varying percentages of the species allocations (as noted above, these percentages are summarized in Table 37).

The residents of the APICDA CDQ group communities would be most affected by changes in Atka mackerel availability; APICDA received 30 percent of the 2012 CDEQ program quota for this species in each of the three management areas. The residents of the CBSFA communities would be least affected by changes; CBSFA holds 9 percent of the quota. The other four CDQ groups receive from 14 percent to 18 percent of the quota.

The residents of the CBSFA group communities would also be least affected by changes in Pacific cod fishing; this CDQ group holds 9 percent of the BSAI quota. The remaining CDQ quota is divided

relatively evenly among the other CDQ groups, with allocations ranging between 15 percent and 21 percent.

The residents of CSFBA group communities would also be the least affected by changes in Aleutian Islands pollock fishing. This group holds only 5 percent of the pollock CDQ quota. The residents of the CVRF and NSEDC groups could be most affected, since these groups hold 24 percent and 22 percent of the quota. APICDA and YDFDA each hold 14 percent of this pollock quota.

*Aleut Corporation stockholders*

Sub-section 1.2.8 provided background on the Aleut Corporation, and on its relationship to Adak. Aleut Corporation stockholders may be affected by the fisheries management actions through two principal ways: (1) the actions may affect the profitability and net wealth of the Aleut Corporation, and, thus, its ability to serve stockholders (who are Alaska Natives although not necessarily residents of Alaska) by providing dividend payments, and charitable donations; and (2) as an Alaska Regional Native Corporation, the Aleut Corporation serves its stockholders by its support for Aleut communities and culture; it thus has objectives that go beyond providing income to its stockholders.

The actions under consideration may affect the profitability of the Aleut Corporation by; affecting the profitability of its wholly owned subsidiaries, the Aleut Enterprise, LLC, and the Aleut Real Estate, LLC. Income from these firms may be affected by deliveries of Pacific cod and pollock for processing at the seafood processing plant at Adak. These would affect the profitability of processing at Adak, and the present value to the Aleut Enterprise Corporation the processing plant, which it owns and leases to the processing company. Income may also be affected by the potential for fuel sales to visiting catcher vessels and catcher/processors, sales and leases of real estate, lease of worker housing to the processing firm operating the plant at Adak, income from visitors to the Adak Island Inn, and potential associated growth in the community.

The Aleut Corporation shareholder interest in the economic development of Adak may also be affected by these alternatives. The ways the alternatives may affect the development of Adak were discussed earlier in the section on Adak, and will not be repeated here, except to note that alternatives that increase the availability of pollock in the Aleutian Islands should increase Aleut Corporation income, since the Aleut Corporation has the rights to all directed fishing allowances that may be created (this does not apply to CDQ fishing rights). The corporation is responsible for using these for the development of Adak, although the ways this is to be done are not specified in statute.

The Aleut Corporation is a large diversified corporation, and income from the Aleut Enterprise LLC, and Adak income from Aleut Real Estate LLC represent only a part of its income, although the amounts are non-trivial. It is not clear how the alternatives will affect these revenue flows, and how these changes would compare to normal year-to-year fluctuations in Aleut Corporation income.

Aleut Corporation stockholders may be affected by the alternatives in several ways:

- The Aleut Corporation earns revenues from sales of goods and services to fishing and processing operations at Adak, including income from fuel sales, processing plant leases, and lodging service sales. Vessels may visit Adak to deliver Pacific cod or pollock to the processing plant or for logistical support services only.
- The Aleut Corporation owns real estate at Adak, whose value may be affected by the level of economic activity at Adak.

- The Aleut Corporation stockholders may benefit in a non-pecuniary sense from the development of an Aleut community at Adak. The Corporation has been allocated the Aleutian Islands directed fishing allowance for the purpose of development at Adak. Measures that increase the availability of pollock for harvest may contribute to this development. Economic development alone, however, can only contribute indirectly to the development of an Aleut community at Adak. Immigration of ethnic Aleuts would also be necessary.

The potential of the alternatives to contribute to the economic development of Adak were discussed earlier in this section. This discussion is relevant here, with the additional note that the benefits to Aleut Corporation shareholders will be indirect, since they depend on policy decisions made by the corporation's management.

The potential of the alternatives to contribute to the Aleut Corporation's revenues are also related to the impacts of the Alternatives on the community at Adak, because Aleut Corporation subsidiaries operate businesses, including fuel sales, real estate sales, processing plant leases, and hospitality, that are dependent on the health of the economy in Adak.

## 1.18 Consumers[159]

As discussed in Section 1.8, the regulatory restrictions in Alternatives 1, 2, 3, 5, and 6 are likely to reduce Atka mackerel production compared to baseline years. The Aleutian Islands are the primary source for Atka mackerel in the United States and almost all the catch of this species is believed to be exported. The production of Pacific cod may decrease, if fishing vessels are unable to offset their loss of Aleutian Islands fishing opportunities with catches in the Bering Sea. Even if the industry is able to offset the production in aggregate volume, industry sources indicate that, because of different average sizes of the fish in the harvest, Bering Sea and Aleutian Islands Pacific cod are not perfect substitutes, have different markets, and bring different prices. If the status quo leads to changes in the size composition of Pacific cod entering market channels the different markets may be affected differently. The production of rock sole and yellowfin sole may increase, compared to what it would otherwise have been. Overall production of BSAI pollock is not likely to change much, as production in the Aleutian Islands is small compared to overall BSAI production, and may be offset to some extent by reduced production in the Bering Sea.

Changes in the quantities of these species of fish supplied to the market may affect consumer welfare. The appropriate measure of this welfare change is consumers' willingness to pay to get an outcome that they consider a benefit, or to pay to avoid an outcome that they would consider a harm. As a practical matter, in many cost and benefit analyses, consumers' surplus is used as a proxy for the theoretically correct measure (Boardman, Greenberg, Vining, & Weimer, 2011: Chapter 3). In order to calculate the change in consumers' surplus, it is necessary to have an estimate of the consumers' demand curve, usually obtained as part of a larger multi-equation econometric model. Because models of this sort are not available for these species, the analysis in this section is necessarily qualitative.

*Atka mackerel*

Since most Atka mackerel is believed to be exported to consumer markets in East Asia, and relatively little is said to be consumed in the United States, the reductions in the harvest of this species projected in this analysis would have little impact on U.S. consumers' surplus. Since a cost-benefit analysis conducted from a national accounting stance focuses on impacts experienced by U.S. domestic

[159] This section draws on background material summarized in Section 1.2.13.

consumers, the relevant consumers' surplus impact of the reduction in Atka mackerel supplies is probably close to zero.

*Pacific cod*

As discussed in Sections 1.3 to 1.6, the status quo may change aggregate Pacific cod production in the United States, as well as the size composition of output. The non-trawl catcher/processors should be able to make up a large part, or all, of the reduction by fishing more intensively in the Bering Sea. The trawl catcher vessels and catcher/processors may be hobbled to a greater extent by the lack of a history of Bering Sea activity, and by higher halibut PSC rates in the Bering Sea. However, they may be able to make up part of their Aleutian Islands harvests. It is possible that, if catcher vessels are unable to harvest their Pacific cod allocations, the cod may be reallocated to other sectors. This is not the case for catcher/processors.

Since Pacific cod products are consumed in the United States, as well as exported, U.S. consumers' surplus may be affected. While a change in consumers' surplus in foreign markets does not enter into the calculations in a cost-benefit analysis conducted from a national accounting perspective, the change in U.S. markets does. Increased product may flow to markets requiring smaller Pacific cod, while less flows to markets requiring larger Pacific cod.

*Pollock*

This action is likely to have a relatively small impact on U.S. consumers. The volumes of pollock that may become available are small in comparison with volumes currently produced in the BSAI. The potential TAC in the Aleutian Islands is 19,000 metric tons. Meanwhile, the TACs in the Eastern Bering Sea have ranged between 813,000 and 1,492,000 metric tons between 2000 and 2012; the median was 1,394,000 metric tons. Thus, maximum potential Aleutian Islands production has been just over 1 percent of the median eastern Bering Sea production. In fact, in many years, when the eastern Bering Sea TAC has been less than the ABC, the foregone Aleutian Islands production has been rolled over to the eastern Bering Sea. An important characteristic of the Aleutian Islands pollock fishery is the large roe sacs that the pollock in the region are believed to have. The market for this roe is in East Asia and not in the United States. Thus, changes in the availability of this product are expected to have small impacts on U.S. consumers' surplus.

*Other species*

Both rock sole and yellowfin sole appear to enter foreign and U.S. markets. Increases in production of these species under the status quo may lead to increases in U.S. consumers' surplus. Potential benefits are impossible to estimate.

## 1.19 Additional impacts

### 1.19.1 Safety

In general, quantitative comparisons of fishery resource management effects on vessel safety are difficult. The reasons for this are many: casualty investigations have missing or inconsistent data on fishery

management, accurate denominator data[160] are not available, and there is considerable disagreement on the magnitude and relevance of fishery management effects on accident causality. For this reason, this analysis will introduce and compare safety impacts of the six alternatives in a qualitative discussion.

The authors used five principle factors to evaluate risk to commercial fishing vessels operating in the BSAI. Note that these are generalizations, based on U.S. Coast Guard analysis across all fishery types and geographic areas. There are obviously exceptions to these assumptions: the purpose here is to examine general trends among large groups of vessels.

The following are not listed in any order that implies a ranking of the magnitude of either the probability of a vessel casualty or the consequences of a vessel casualty.

A. Increasing distance westward increases risk to fishing operations. This is due to greater distance to U.S. Coast Guard search and rescue (SAR) resources.

   The U.S. Coast Guard maintains seasonal search and rescue support facilities at Cold Bay in the late fall, and at St. Paul Island at the start of the year. Otherwise, aircraft responding to a distress call in the Western or Central Aleutian Islands would have to start from the U.S. Coast Guard base in Kodiak. Operational restrictions on the distance unescorted aircraft are allowed to fly over open water mean that planes originating from any of these locations would probably travel by way of Unalaska and Adak. Travel time from Kodiak to Kiska could be eight hours for a C130, and 12 hours for a helicopter. Thus, both alternatives would tend to shorten travel times to vessels that shift their operations to waters closer to these bases.

   The U.S. Coast Guard also endeavors to maintain a SAR cutter with embarked helicopter in the Bering Sea 365 days a year. The presence of this cutter is often dependent on exigent circumstances, such as weather, casualties, and marine incidents. The high concentration of fishing activity in the Eastern and Central Bering Sea typically dictate the cutter's presence there for both law enforcement and SAR purposes.

B. Decreasing fishing density increases risk. Fishing density may be considered from a spatial or temporal perspective. In this discussion, the density of fishing vessels is considered from a spatial perspective and the increased risk is related to reduced proximity to other fishing vessels that could act as "Good Samaritans" until the arrival of U.S. Coast Guard SAR resources. The Coast Guard estimates that in 70 percent to 80 percent of serious fishing vessel casualties in the BSAI, there is another fishing vessel on-scene prior to SAR arrival.

C. Increasing the number of fishing vessels less than 60-foot length overall increases risk. Generally, these vessels as a class lack detailed stability information, have less system redundancy, smaller and unlicensed crews, and less adherence to construction and condition standards (such as enrollment in the U.S. Coast Guard's Alternate Safety and Compliance Agreement and /or classification/loadline).

D. A "race to fish" or other increase in fishing pressure increases risk. The adverse safety impacts of the "race to fish" are well documented in other fisheries, and include fatigue and greater tolerance

[160] The National Institute for Occupational Safety and Health expresses injury and death rates in multiple ways, for example: injury/mortality per unit time by industry or per worker day or month. The denominator could also be expressed as the amount of fishing effort. These denominators are difficult to standardize for the fishing industry.

for increased risk (such as operating in poor weather) during limited fishing openings. In this discussion, fishing pressure is considered in temporal terms.

E. Increasing the amount of fishing in "winter" increases risk. This follows from the generally harsher weather patterns that predominate in the region during the months of November through March.

The following analysis will examine the six alternatives in light of these assumptions in a qualitative manner, drawing inferences about the safety impacts of each.

It is notable that an analysis of any single alternative using the assumptions stated above may result in both increases and decreases in safety. For example, an alternative may involve movement westward to areas of less fishing density, yet increase profitability and relieve fishing pressure. In addition, a precise estimate of the fleet's redeployment and adaptation to any alternative's unintended consequences is not available. It is the objective of this analysis to identify where safety risk is anticipated to increase, with the understanding that a precise measurement of the net effect may not be possible to predict.

*Increasing fishing effort in Areas 543 and 542 (Factors A and B):*

Alternative six is characterized by comprehensive prohibitions on retention of Atka mackerel, Pacific cod, and pollock in all three management areas. Alternative 1, or the status quo, is characterized by sweeping area and species closures for the most remote areas (543 and 542). The second, third, fourth, and fifth alternatives are characterized by elimination of the retention prohibition in Area 543 for Atka mackerel and Pacific cod, and an increase in access to these species in Area 542. These alternatives are also associated with relaxation of critical habitat restrictions on pollock fishing, which may lead to increased fishing for pollock in all three areas during the pollock A-season.

Should additional fishing pressure take place in Areas 542 and 543, these vessels will be further away from traditional U.S. Coast Guard search and rescue assets. Due to this distance, any prospective search and rescue response from these assets will take longer, potentially putting mariners at additional risk. If as a result of fleet redeployment to these areas vessels are operating in closer proximity to each other, safety could potentially be improved due to Good Samaritan assistance, although this could not be guaranteed. By reducing vessel activity in the western Aleutians, Good Samaritan assistance for vessels that continue to target unaffected species in the region, would be reduced.

*Fishing by small vessels (Factor C)*

The pollock allocation in the Aleutian Islands is divided between the ICA, the CDQ groups, and the Aleut Corporation. The Aleut Corporation has considerable authority to organize the pollock fishery in the region, but it is subject to certain constraints. An important regulatory constraint requires the Aleut Corporation to allocate 50 percent of its own allocation for fishing by catcher vessels under 60 feet LOA. Thus, if productive pollock grounds are in fact opened in Aleutian Islands critical habitat under Alternatives 2, 3, 4, or 5, small trawl catcher vessels may have an increased incentive to operate within the Aleutian Islands. Alternative 6 prohibits pollock retention, and could have the effect of limiting small vessel activity, but this activity has not been authorized by the Aleut Corporation in recent years, and the impact of this would be non-existent or small.

*Race for fish (Factor D)*

The Council has separated Aleutian Islands and Bering Sea Pacific cod TACs in 2014. This is expected to be a permanent change. This split has the potential to create a race for Pacific cod in the Aleutian

Islands as operations with different gears and in different processing sectors compete for the available Pacific cod. Several of the alternatives include area limits on harvest that may reduce the available supply of Pacific cod in some areas, and which may exacerbate this race for fish. Alternatives 2 and 3 include measures to limit harvests by some sectors, while leaving other sectors unlimited. These may be associated with a race for fish. Alternatives 4 and 5 do not limit any of the sectors below the area limits defined for Area 543. These alternatives may also be associated with races for fish. The Atka mackerel and pollock fisheries are not likely to be associated with a race for fish, as each of these has been rationalized (by Amendment 80 for Atka mackerel, and with the Aleut Corporation allocation for pollock).

*Winter fishing (Factor E):*

The extension of some fishing seasons beyond November 1 may increase the level of activity that will occur in winter months, while also effectively lengthening the seasons that allow for temporal dispersion of activity, thereby reducing likelihood of increased risk-taking to achieve TAC in shorter timeframes. Analysis by the criteria above indicates that an increase in fishing activity during these months could decrease safety as the likelihood of fishing during adverse weather increases, or increase safety as dispersion of fishing activity over longer periods occurs. All Atka mackerel and Pacific cod alternatives employ various options for season length and may affect fishing during November and December. The Atka mackerel season is extended from November 1 to December 31 in Alternatives 2, 3, 4, and 5; the non-trawl Pacific cod season is effectively extended in comparison to the status quo by Alternatives 3, 4, and 5.[161] While trawler seasons are extended under some alternatives, trawlers do not target Pacific cod in November and December, so an extension is unlikely to lead to increased fishing (although it may provide for an MRA and reduce regulatory discards). Alternative 6, which prohibits retention of all species, would eliminate any winter fishing.

The opening of a pollock A-season roe fishery under Alternatives 2 through 5 could increase fishing activity in the winter months during the early part of the year and may also contribute to more winter fishing in the Aleutian Islands.

### 1.19.2 Enforcement

*Introduction*

Alternatives 1 through 5, and the protective option, contain management measures that require (or would require) monitoring by the NOAA Office of Law Enforcement (NOAA OLE) and the U.S. Coast Guard for their effective enforcement. The management measures considered under the alternatives include variations in fishing seasons, critical habitat closures, and restrictions on groundfish retention. Enforcement of these measures, such as critical habitat no-fishing and directed fishing closures, is heavily reliant on use of vessel monitoring systems (VMS), information from vessel reporting/eLandings, aerial/surface patrols and at sea boarding, and audits of product offloads.

*VMS: need and limitations*

VMS is the primary enforcement tool for groundfish management in the Aleutian Islands and it is likely to become more important in the future. Use of VMS is likely to increase because the Aleutian Islands are a challenging environment to implement any other form of compliance monitoring. It is an expansive

[161] The non-trawl season extension is not based on a change in the formal season itself, but on the lifting of a prohibition on directed fishing after November 1 under these alternatives.

area, with low commercial fishing vessel densities. The management strategies for limiting catch of Steller sea lion prey species in proximity to Steller sea lion habitat, apply numerous and complex area closures. This vast management area is supported by a limited Coast Guard and NOAA OLE presence.

Enforcement resources are limited in both of the Federal enforcement agencies charged with monitoring and compliance in the fisheries of the North Pacific. NOAA OLE currently has six staff dedicated to investigative efforts for the Gulf of Alaska west of Kodiak, and the BSAI. In the North Pacific, fisheries enforcement is only one of many missions the U.S. Coast Guard is currently tasked with. The Coast Guard maintains a one-cutter presence in the BSAI for law enforcement and SAR purposes. Using this high-endurance cutter, along with occasional buoy tenders that transit the Aleutian Islands to service aids to navigation, the U.S. Coast Guard patrols the Aleutian Islands with surface assets only 4 to 8 weeks per year. The U.S. Coast Guard also maintains four fixed-wing aircraft with the range to conduct patrols of the Aleutian Islands from their home station in Kodiak. Given the operational and logistical demand for these aircraft throughout Alaska, aerial patrols of the Aleutian Islands occur only once or twice per month. The U.S. Coast Guard's myriad responsibilities, coupled with a restrained budget climate, suggest that it will be increasingly difficult to free up additional resources for Aleutian Islands enforcement for implementing any of the alternatives.

Considering the current fiscal limitations, VMS has become a critical tool for monitoring and enforcement of area closures across all of the alternatives. VMS systems are small, tamper-resistant, transmitter-GPS combinations that send regular signals identifying the vessel and its location to ground stations via overhead satellites. These signals make it possible for NOAA OLE to monitor the locations of fishing vessels. The information helps NOAA OLE identify vessels that may have fished inside closed areas, permitting the targeting of investigative resources.[162] VMS information is also used by NMFS in-season fishery managers to monitor fishing effort in a region or area, and plays an important role in determining when to close a fishery to avoid exceeding a TAC or an ABC, and when it can safely be left open or must be closed.

All federally permitted vessels fishing for groundfish in the Aleutian Islands sub-area have been required to carry a VMS since 2006 (71 FR 36694, June 28, 2006). The current practice is for vessel VMS units to report every thirty minutes, although NOAA OLE can increase this "polling" rate if a vessel appears to be operating near a no-transit or no-fishing zone. (NPFMC, 2012d).

An important consideration with respect to the enforceability of the alternatives considered in this discussion is that the reliability of VMS service in the BSAI may vary substantially from vessel to vessel or between VMS service providers. In the Aleutian Islands, approximately 30 percent of the VMS units used in the Atka mackerel and Pacific cod fisheries are not currently compliant with the rate of 2 transmissions per hour. The reliability of VMS service is defined as the proportion of the vessel transmissions actually received. Service quality is observed as a loss of a large number of vessel transmissions ("polling"), after the signal is transmitted from the vessel and not received or translated at the satellite and transmitted to the surface receiver, or by potential errors in the software used by a VMS provider. The result is that the ground station receiver may receive incomplete or intermittent information on vessel movements. Location information in transmissions that are actually received from the western Aleutian Islands is as accurate as that from transmissions originating further east.

VMS provides intermittent, rather than continuous, reports of vessel location. This can limit its usefulness for compliance purposes. For example, at times VMS can give rise to a phenomena enforcement staff refer to as "scalloping." This occurs when a trawler repeatedly crosses a critical habitat

[162] For more details, see the Council's recent (December 2012) discussion paper on the use of VMS in Alaska Fisheries (NPFMC, 2012d).

boundary immediately after a location transmission, sweeps through critical habitat, leaving it just before the time of the next transmission. Thus, scalloping occurs when a vessel, fishing along the boundary of a closure, momentarily crosses the boundary in between VMS transmissions. Periodic transmissions of location from VMS make it possible for a vessel operator to attempt to time the entry and exit to a closed area within the 30-minute window. A vessel operator may also make assumptions regarding the number of times a position is registered inside a Steller sea lion protection area boundary and the probability of a formal inquiry into the vessel's activity. Intermittent transmissions may result in a lower probability of an inquiry.

The utility of VMS for the enforcement of these measures in the Aleutian Islands could be enhanced through stricter adherence to the regulatory performance standards currently in place for VMS and the addition of geo-fencing.[163] While, geo-fencing may be investigated further in the future, one related performance standard involves increasing the rate of VMS polling. This is discussed in the following section. Increased polling rates would have deterrence effects as well as facilitating subsequent investigations. In addition, increased polling is likely to increase the annual cost to vessel owners of operating VMS.

The enforcement of the alternatives varies primarily by the complexity of the closures. Enforcement of vessel activities is necessary for tracking compliance with the opening or closing of A-season or monitoring and auditing of allowable retention of groundfish species when a species (such as Atka mackerel, Pacific cod or other groundfish) is closed to directed fishing. Therefore, this discussion will focus on the difference among the alternatives in the enforcement of the area closures.

*Increase VMS polling rate for trawl vessels: Applies to Alternatives 2 through 5*

As described in Chapter 2 of the EIS, NMFS will propose the following FMP amendment requiring an increase in VMS polling rates to the Secretary of Commerce for alternatives 2 through 5:

> Operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, must ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions.

This option consists of two independent elements: (1) increasing the frequency of VMS transmissions, and (2) clarifying the trawl vessel owner is the responsible party for resolving issues, with the provider and on the vessel, that could provide unreliable VMS transmissions. This option would improve the accuracy and precision of VMS for all the alternatives and throughout the Aleutian Islands, and is considered to be necessary and feasible under all of the alternatives.

The amendment would apply to trawl vessels only, because these vessels deploy mobile gear that may be fished at speeds of 3 to 6 knots. Typically, a trawl vessel in the BSAI traveling at 4 knots per hour , with a 2 per hour poll rate, could enter critical habitat and transit or fish for up to 2 miles into critical habitat without detection. The VMS transmission rate of 10 per hour would increase the precision for locating a vessel to less than ½ nm. Fixed gear operations such as jig, pot, and longline do not have the same capability for entry, and exit from critical habitat without detection, though some gear (such as jig gear) may move during fishing at relatively slow speeds. The amendment would not be specific to trawl vessels engaged in directed fishing. The broader application to all vessels engaged in trawling for groundfish as opposed to vessels using trawl gear in a specific directed fishery is necessary because of the difficulty for NOAA OLE or U.S. Coast Guard to determine the target fishery for a vessel.

[163] Referred to as "geo-fencing" (NPFMC, 2012d)

Under Alternatives 2 through 5, trawl vessels fishing for groundfish (including Steller sea lion prey species) must comply with extensive, complex closures in the Aleutian Islands subarea. Particularly under Alternatives 2 and 3, Steller sea lion closure areas are dominated by very small and irregularly shaped Steller sea lion critical habitat areas. The closures under all alternatives are further complicated by the overlap of the Aleutian Islands Habitat Conservation Area. Increasing the frequency of polling will provide NOAA OLE and the U.S. Coast Guard with an efficient method for tracking accidental or intentional incursions into critical habitat.

In implementing this option, NMFS would provide information to vessel owners to assist in ensuring the owner's vessel is complying with VMS regulation; they must contact NOAA OLE to request information on the frequency and consistency of transmissions received from VMS. NOAA OLE may experience more frequent contacts by vessel owners, to provide this verification in comparison with current communications regarding VMS. If NOAA OLE identifies VMS reception issues, the vessel owners will be expected to work with the VMS service providers to resolve these issues. In some cases, this would be an iterative process to inform vessel owners that they are achieving a satisfactory transmission rate. NOAA OLE would also reach out to the fleet on an ad-hoc basis to request information on intermittent VMS transmissions, but the responsibility for ensuring compliance with VMS regulations would be placed on the vessel owners.

Improvement in the detection of any vessel operatory that chose to chronically scallop into Steller sea lion protection areas, would assist in the deployment of specific U.S. Coast Guard resources to deter these practices. Under the status quo polling requirements, a vessel that is reporting multiple positions that are adjacent to a closed area, may trigger costly visual inspection by U.S. Coast Guard air observation resources. The increase in position data to 10 transmissions per hour, could inform agents that a fly-over is either warranted or not warranted.

The option to increase the polling rate would also assist with spatial analysis with the Catch in Areas (CIA) database, derived from VMS data. The CIA analysis has become essential for evaluating management actions to protect Steller sea lions. Current technology allows for haul-specific catch data to be merged with vessel location tracks to estimate groundfish catch by management area or smaller Steller Sea Lion protection areas. Increasing the polling frequency will decrease errors in these estimates.

For Alternatives 2 through 5, the incremental costs to Aleutian Island trawl vessels associated with this option to increase polling rates would be small compared with the current VMS hardware, software and programing. All vessels required to have a Federal fisheries permit (FFP), and fishing in the Aleutian Islands, are required to have and operate VMS. Thus, the alternatives do not require investment in new VMS units or software, unless it is warranted to provide the required transmission reliability. NMFS is unable to estimate the number of VMS units that may require replacement to provide the required reliability. All units installed since 2008 have been required to be "enhanced mobile transmitting units" capable of meeting the standard. However, units installed earlier may or may not be capable of meeting the standard, and other units may be faulty and unable to meet the standard. Moreover, regulatory proposals are under consideration which may change the set of acceptable units. A 2012 VMS discussion paper estimated the cost of VMS replacement (including installation) as about $3,500. (NPFMC, 2012d)

Increasing polling rates to 10 per hour from 2 per hour is likely to increase the average monthly cost of a VMS service provider agreements by approximately $200 per month. This rate of $200 per month was established in the draft EA/RIR/IRFA for Habitat Areas of Particular Concern (HAPC) for Areas of Skate Egg Concentration (NPFMC, 2013b). Table 159, provides an estimated total annual increase in cost of VMS to a trawl catcher vessel targeting any groundfish species of approximately $400. For trawl catcher/processors targeting Atka mackerel, the average cost increase per year is estimated to be

approximately $1,200 per year, and for catcher/processors targeting groundfish species other than Atka mackerel, the average cost per year is estimated to be approximately $400 (Table 159).

**Table 159 Estimated Cost to Trawl Vessels by increasing Polling rate in the Aleutian Islands based on 2010 data**

| | Estimated hours and costs in dollars: Trawl Gear by Species | | |
|---|---|---|---|
| | CV (all target species) | CP (Atka mackerel) | CP (fishing other than Atka mackerel) |
| Estimated months for projecting costs* | 2 months | 6 months | 2 months |
| Estimated cost per Month | $200 | $200 | $200 |
| Estimated total Cost per year | $400 | $1,200 | $400 |

*Based on fishing activity by relevant vessels and adjusting upwards as necessary to account for VMS billing practices.

From 2004 through 2010, from 11 to 16 trawl catcher/processors a year (of which from 8 to 12 targeted Atka mackerel), and from 16 to 38 trawl catcher vessels a year, that were fishing for groundfish in the Aleutian Islands, would have been subject to the requirement for increased polling rates. (AKRO In-season management)

*Alternative 1, the status quo*

The status quo management measures in the Aleutian Islands groundfish fisheries implemented by the interim final rule (75 FR 77535, December 13, 2010) included selected closures to directed fishing for Atka mackerel and Pacific cod. When a directed fishing closure is activated, these actions typically would reduce fishing effort in Areas 541, 542, and 543 for Atka mackerel and Pacific cod. Because status-quo closures apply to large areas, this type of closure regime has been relatively straight forward to enforce compared with more complex, multiple, geographically small or isolated closure regimes. The status quo reduced areas open to Atka mackerel and Pacific cod fishing, tended to shift vessel effort eastward from the more western regulatory areas. This has increased the likelihood of vessels fishing in closer proximity to each other, and may have increased self-policing of existing closures compared to the pre-interim final rule. Since implementation of Alternative 1 closures, NOAA OLE has observed fewer overall vessel-days in the more westward areas, possibly reducing the time spent by enforcement staff on monitoring and investigation of incidents in the area, and, thus, enforcement costs in comparison to the 2010 interim final rule. An eastward shift in fishing effort has likely resulted in reduced transit times for U.S. Coast Guard aerial and surface patrol units, and resulted in increased patrol coverage in areas to the east. In aggregate, the status quo has decreased enforcement input needs, decreased costs, presented a more straightforward closure regime, and presents fewer enforcement difficulties compared to the measures that existed prior to implementation of the 2010 interim final rule. By definition, the status quo does not include any changes to the existing management regime. Thus, this alternative does not include a VMS option.

*Alternatives 2 through 5, and their options*

Alternatives 2 through 5 and their options provide fishermen access to more areas of critical habitat. In that sense, they are less restrictive to fishermen than Alternative 1. However, in many cases, this increased access is created by defining specific areas within critical habitat that are open, while leaving

other areas closed. The increased access is achieved by increasing the complexity of the system of open and closed areas. The number of boundary lines that must be enforced may be increased. As a result of the increased complexity of the open and closed areas in Alternatives 2 through 5, there is a higher likelihood of inadvertent as well as intentional violations. Many of the open areas are wholly contained within areas that are closed to the same fishing activity. This creates a challenge for enforcement, as vessels will be constantly traveling into and through closed areas to reach imbedded open areas. VMS position reports do not indicate what the vessel is doing at the time of the report, and it becomes difficult to validate that fishing activity is not occurring within surrounding closed areas. Due to the small size of some of the open areas contained within larger closed areas, there exists a very real possibility that VMS position data of vessels legally operating within the open area will show excessive activity in the surrounding closed area. As a result there would be an increased need for enforcement to monitor and investigate positions showing a vessel within the closed areas. This would be problematic due to the lack of resources available to NOAA OLE at this time. This situation would be partially ameliorated by increasing the polling rate of VMS in these fisheries, but many of the sources of error for enforcement of Alternatives 2 and 3, and to some extent Alternatives 4 and 5, will still persist.

Many of the open areas have complex boundaries that do not follow straight latitude lines or longitudinal meridians, but rather, curved range lines from, in some cases, multiple geographic positions corresponding to designated critical habitats (see Figures 2-8 and 2-11 in Chapter 2 of the EIS). From the perspective of detection of incursions by aerial or surface patrols, incursions into closed areas with straight line and meridian boundaries are the simplest to detect and verify with onboard radars and electronic position fixing equipment. Straight boundaries minimize the uncertainty of the incurring vessels position relative to the boundary, therefore facilitating quick action by the patrolling unit to validate the illegal activity and conduct timely and proper evidence collection while the illegal activity is taking place.

Conversely, complex boundaries, or those derived from other than straight lines or meridians, can make it more difficult and time consuming for aircraft commanders and cutter commanding officers to verify that illegal activity is taking place, therefore delaying appropriate action. Such delays allow vessels engaged in illegal pursuits to alter their activity (i.e., change course, release gear, abandon catch) prior to sufficient evidence collection by the patrolling unit. It becomes much easier to detect, investigate and prosecute these position-critical cases when there are straight line boundaries or range boundaries based on a single geographical position.

The option to increase polling rates for VMS for trawl vessels fishing in the Aleutian Islands, would improve the quality of time, area and location data for enforcing these protection measures should this alternative be selected by the Secretary of Commerce.

Alternatives 2 through 5, and their options, would provide additional access to Atka mackerel and Pacific cod fishing as well as new opportunities for pollock fishing in the Aleutian Islands sub-area. While increasing transmission rates of VMS will assist with compliance under these alternatives, enforcement of protection measures is most cost-effective if an area is completely closed or completely open. Establishing the complex series of open and closed areas associated with Alternatives 2 through 5 would create additional enforcement responsibilities.

*Alternative 6*

Alternative 6 prohibits retention of Atka mackerel, Pacific cod, and pollock in Areas 541, 542, and 543. It does not require enforcement of closed areas, and does not create a requirement for enhanced VMS coverage.

### 1.19.3 In-season management

Alternatives 2, 3, 4, 5 and 6 generally involve standard NMFS management measures, and generally do not impose new requirements on the Alaska Regional Office of NMFS. Elements of the alternatives will increase management work load as the number of TAC limits to manage are increased under Alternatives 2 and 3. Also the TAC limits are further divided into smaller amounts. When compared to potential fishing effort, some of the projected TAC limits may be too small to open for directed fisheries. This may result in more closures as NMFS management will not be able to mitigate the risk of exceeding the TAC limit.[164] The potential increase in pollock directed fishing as a result of relaxed closures in Alternatives 2, 3, 4, and 5 may result in increased monitoring of the Aleutian Islands pollock TAC. The alternatives will likely require no change in staffing requirements, though increased workload from these alternatives may mean delays in other tasks (NMFS In-season management, personal communication, 2013).

### 1.19.4 Science

*Introduction*

Chapter 11 of the EIS provides a detailed description of data gathering in the Aleutian Islands to support groundfish fishery management, and to improve understanding of groundfish fishery interaction with Steller sea lions. Chapter 11 explains that, while groundfish stock assessments rely on fisheries independent data from biennial trawl surveys, and other sources, they also rely on fishery dependent data such catch size and composition, and the results of biological sampling.

Alternatives that reduce fishing activity in the Aleutian Islands tend to reduce opportunities to collect fisheries dependent data, while activities that increase fishing activity tend to increase these opportunities. Since research to facilitate fishing activity derives its value from the value of the fishing output, circumstances that require reduced fishing activity and fishery production, may tend to reduce the value of the associated research, while circumstances that permit increased fishing activity and production may tend to increase it.

*Alternative 1*

Alternative 1, the status quo, eliminated fishing for Atka mackerel and Pacific cod in Area 543, and reduced it in Areas 542 and 543. In general, this limitation of fishing reduces the availability of fishery dependent data from these fisheries compared to the baseline.[165] Alternative 1 may affect the amount and quality of information on the condition of Atka mackerel and Pacific cod stocks in the Aleutian Islands, particularly in the central and western Aleutian Islands, and it may affect availability of information on other aspects of the ecosystem. Local sources have indicated that if the action affects future Pacific cod production sufficiently at Adak, there may be adverse impacts on the availability of support services there. This may affect the cost of surveys. The loss of fishery dependent data may be offset by increased expenditures on fisheries independent data collection, and if it is not, it may be reflected in more conservative fisheries management.

The reduction in harvests would mean a reduction in the amount of observer information on Atka mackerel and Pacific cod age and length. This would make it harder to interpolate biomass estimates between survey years, and may increase the uncertainty associated with biomass estimates and short-term

[164] The interim final rule eliminated the HLA platoon registration and lottery for Atka mackerel and eliminated other tasks for the Alaska Regional Office of NMFS. None of the current alternatives include these provisions.

[165] The biennial summer trawl survey would not be interrupted by the status quo.

projections. The stock assessment would be less informed and less precise, and may lead to more conservative ABC recommendations as a result of uncertainty about stock status (Lowe, personal communication).[166]

The cost of the loss of fisheries dependent data would be the reduction in the net benefits associated with potentially more conservative ABC and TAC determinations, and smaller harvests. It is not possible to estimate this potential cost, given limited information about how the information loss would affect, for example, the tiers used for Atka mackerel and Pacific cod in the Aleutian Islands in the annual specifications process, and given the limited information on how levels of fishing activity, operating costs, and fish prices might change in response.

The action may also reduce the amount of information on interactions between the fisheries and Steller sea lions. For example, tag recovery studies of Atka mackerel and Pacific cod play an important role in studying the impact of fisheries on localized depletion of stocks and on the efficacy of trawl exclusion zones. To conduct these studies, however, fish need to be tagged and recovered both inside and outside closure areas. In the past, commercial fisheries have been a source of recovery of tagged Atka mackerel and Pacific cod. With the closure of critical habitat, tagged fish must be recovered within critical habitat by scientific tag recovery cruises. To ensure recovery of adequate numbers of tags, catches during these cruises are higher than typical for surveys such as the groundfish bottom trawl surveys. This loss of scientific information could increase future costs of Steller sea lion protection by requiring more conservative fisheries restrictions to protect sea lion prey resources than would otherwise be necessary. (Chapter 11 of the EIS)

The action may lead to loss of scientific information related to other ecosystem elements. For example, observer-collected information on stomach contents provides valuable information on the way different species feed on each other. This information is valuable for modeling energy flows through the ecosystem (Aydin, personal communication).[167] The impact of this ecosystem information loss is even harder to estimate, even in qualitative terms.

*Alternatives 2 through 5, and their options*

In general, Alternatives 2, 3, 4, and 5 and their options, increase fishing activity for Atka mackerel and Pacific cod compared to Alternative 1. The relative increases follow the order in which the options and alternatives have just been listed, with Alternative 4 representing a return to the approximate regulatory conditions prevailing in 2010 before the interim final rule was implemented.

Alternatives 2, 3, 4, and 5 also open up new areas for potential pollock fishing. These options and alternatives thus represent a liberalization of pollock fishing activity beyond that existing in the baseline period 2004 to 2010. The re-introduction of a pollock fishery in the Aleutian Islands creates opportunities for gathering new information on pollock stocks and other ecosystem resources in the region. American Fisheries Act pollock vessels carry 100 percent observer coverage. Trawl vessels less than 60 feet length overall will also carry observer coverage, albeit at lower coverage rates. Observers will collect data on pollock, other species taken as bycatch or incidentally, and on other ecosystem resources encountered, such as seabirds and marine mammals.

In 2006, the Alaska Fisheries Science Center, in combination with the Aleut Enterprise Corporation, the owners and operators of the F/V *Muir Milach*, and Adak Fisheries, LLC, tested the feasibility of using small (under 35 meters) commercial fishing vessels to conduct acoustic surveys on pollock in the central

[166] Dr. Sandra Lowe. Alaska Fisheries Science Center, Seattle, Washington. Email dated August 8, 2012.
[167] Dr. Kerim Aydin, Alaska Fisheries Science Center, Seattle, Washington. Phone call October 4, 2010.

Aleutian Islands. The study found that small commercial vessels could be used to conduct high quality acoustic surveys of pollock in this region. Alternatives that increase the number of pollock vessels visiting the Aleutian Islands, and increase the number of operators familiar with pollock fishing in this area, may reduce the cost and increase the effectiveness of this source of information about pollock stocks should it be considered for use in the future. (S. J. Barbeaux & Fraser, 2009)

Management of pollock harvests that apply the results of these acoustic surveys could provide harvest opportunities that are based on more precise estimates of available biomass in time and area. This method would improve knowledge of the pollock stocks and the likelihood that harvest levels are appropriate and sustainable.

The discussion in this section generally points out to the possibility of improving available scientific information under some alternatives, but it is not possible to know at this time how important the improvements or the economic value of the improved information would be.

*Alternative 6*

Alternative 6 will reduce fishing opportunities in all three management areas in the Aleutian Islands, and will decrease the opportunity to gather fisheries dependent stock data. The analysis of Alternative 1 will be applicable, but to a greater extent.

### 1.19.5 Federal mandates and grants

In 2007, NMFS approved and implemented a $35.7 million fishing capacity reduction loan program for the Longline Catcher/Processor Subsector, which represented the full amount authorized for that subsector. The initial program removed three fishing vessels and 12 fishing licenses and permits for a loan amount of $35 million. All longline catcher/processors harvesting non-pollock groundfish were required to pay and forward a fee to NMFS to repay the loan. The original fee assessment was $0.02 per pound caught, with payment and collection beginning on October 24, 2007, which has since been reduced to $0.0145 (77 FR 58775, September 24, 2012).

In September 2012, NMFS published a final rule to implement a second fishing capacity reduction program (also commonly known as "buyback") and an industry fee system to repay a $2.7 million loan for a single latent permit within the Longline Catcher/Processor Subsector of the Bering Sea and Aleutian Islands (BSAI) non-pollock groundfish fishery (Reduction Fishery) (77 FR 58775, September 24, 2012).

This action may affect the ability of the freezer longline catcher/processors to repay the loan, but not in a clear-cut way. Industry sources indicate that a shift of production into the Bering Sea may reduce revenues as Bering Sea fish tend to be smaller, and to bring a lower price. On the other hand, if the action makes it impossible for the trawl catcher vessel fleet to fully harvest its Pacific cod allocation because of higher halibut PSC in the Bering Sea, end of the year reallocations to Coalition members may increase.

The Federal and State governments have taken steps to support the creation of a civilian community at Adak. These steps include transportation subsidies to under the Federal Essential Air Service Program (Restino, 2012), and Federal allocations of pollock and crab to support fishing and processing at Adak, and the State of Alaska's creation of an Aleutian Islands GHL fishery for Pacific cod. This action may adversely affect Adak's economy in important ways, potentially making it harder to achieve community development objectives of the support.

### 1.19.6 U.S. balance of trade

The balance of trade in goods and services is equal to the difference between exports and imports. The factors that determine the size of the trade deficit or surplus are much broader than production in any one industry. They include all the factors that determine aggregate employment and production, decisions to divide income between consumption and savings, and similar decisions in other countries. A reduction in Atka mackerel or Pacific cod production in the United States would be one factor entering into this determination, but there would be many others, and there would not be a clear-cut, dollar-for-dollar change in the trade deficit associated with the reduction.

## 1.20 Net efficiency impacts

The sum of consumer and producer surpluses includes the producer surpluses accruing to participants in fishing operations, consumers' surplus for consumers of Atka mackerel, Pacific cod, and pollock products, and consumers' surpluses accruing to persons who value Steller sea lion population health. Producers' surpluses are likely to increase, compared to the status quo under Alternatives 2, 3, 4, and 5, as restrictions on fishing are relaxed, but by amounts that cannot be measured at present. Conversely, they will decrease under Alternative 6, as retention of the three species is prohibited in the three Aleutian Island management areas. Surpluses accruing to U.S. consumers are unlikely to change much, since the Atka mackerel market is an export market and overall BSAI pollock and Pacific cod production are unlikely to change much. Limited information on the impact of the actions on Steller sea lion populations, and on the value placed by persons on those population impacts makes this source of surplus impossible to quantify. Thus, the net efficiency benefits of the alternatives are indeterminate, and the alternatives, themselves, cannot be ranked using this criterion.

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# 2 Initial Regulatory Flexibility Analysis

## 2.1 Introduction

This Initial Regulatory Flexibility Analysis (IRFA) estimates the numbers of small entities (as defined by the Small Business Administration) directly regulated by proposed changes to groundfish management that are required to insure that the groundfish fisheries in the Bering Sea and Aleutian Islands Management Area (BSAI) are not likely to result in jeopardy of continued existence or adverse modification or destruction of the critical habitat of Steller sea lions. The specific measures under consideration would modify Federal fishery regulations for Atka mackerel, Pacific cod, and pollock in the Aleutian Island management areas 541, 542, and 543.[168]

This IRFA has been prepared following the statutory requirements of the Regulatory Flexibility Act (RFA) of 1980 [as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 (5 U.S.C. 601-612)], governing the preparation of an Initial Regulatory Flexibility Analysis (IRFA).[169]

## 2.2 The purpose of an IRFA

The RFA, first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a Federal regulation. Major goals of the RFA are (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require that agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group, distinct from other entities, and on the consideration of alternatives that may minimize the adverse impacts, while still achieving the stated objective of the action.

On March 29, 1996, President Clinton signed the SBREFA. Among other things, the new law amended the RFA to allow judicial review of an agency's compliance with the RFA. The 1996 amendments also updated the requirements for a final regulatory flexibility analysis, including a description of the steps an agency must take to minimize the significant (adverse) economic impacts on small entities. Finally, the 1996 amendments expanded the authority of the Chief Counsel for Advocacy of the Small Business Administration (SBA) to file *amicus* briefs in court proceedings involving an agency's alleged violation of the RFA.

In determining the scope or "universe" of the entities to be considered in an IRFA, NOAA's National Marine Fisheries Service (NMFS) generally includes only those entities that can reasonably be expected to be directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis. NMFS interprets the intent of the RFA to address negative economic impacts, not beneficial impacts, and, thus, such a focus exists in analyses that are designed to address RFA compliance.

[168] Some measures affect Atka mackerel in the Bering Sea, as well.

[169] National Marine Fisheries Servies (2007) provides current NMFS guidance for preparation of an IRFA; (Queirolo, 2013) provides a more accessible overview.

Data on cost structure, affiliation, and operational procedures and strategies in the fishing sectors subject to the proposed regulatory action are insufficient, at present, to permit preparation of a "factual basis" upon which to certify that the preferred alternative does not have the potential to result in "significant economic impacts on a substantial number of small entities" (as those terms are defined under RFA).

## 2.3 What is required in an IRFA?

Under 5 U.S.C., section 603(a) and (b) of the RFA, each IRFA is required to contain:

- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and the legal basis for, the proposed rule;
- A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply including a description of the adverse economic impacts of the proposed rule on directly regulated small entities;
- A description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;
- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the proposed action, consistent with applicable statutes, and that would minimize any significant adverse economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:
    1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
    2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
    3. The use of performance rather than design standards;
    4. An exemption from coverage of the rule, or any part thereof, for such small entities.

## 2.4 What is a small entity?

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) and small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a "small business" as having the same meaning as "small business concern" which is defined under section 3 of the Small Business Act. "Small business" or "small business concern" includes any firm that is independently owned and operated and not dominant in its field of operation. The SBA has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor...A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the firm is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the United States, including fish harvesting and fish processing businesses. From July 22, 2013, a business involved in *finfish* harvesting

is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual gross receipts not in excess of $19.0 million, for all its affiliated operations worldwide. A business involved in *shellfish* harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual gross receipts not in excess of $5.0 million, for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business that both harvests and processes fish (i.e., a catcher/processor) is a small business if it meets the criteria for the applicable fish harvesting operation (i.e., finfish or shellfish). A wholesale business servicing the fishing industry is a small business if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established "principles of affiliation" to determine whether a business concern is "independently owned and operated." In general, business concerns are affiliates of each other when one concern controls or has the power to control the other or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern's size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when (1) a person is an affiliate of a concern if the person owns or controls, or has the power to control 50 percent or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) if two or more persons each owns, controls or has the power to control less than 50 percent of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors, or general partners control the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor or subcontractor is treated as a participant in a joint venture if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small non-profit organizations. The RFA defines "small organizations" as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

## 2.5 Why the action is being considered

This action is needed to comply with the Endangered Species Act of 1972 (ESA) requirement that a Federal agency insure that the agency's actions are not likely to jeopardize the continued existence of endangered species or to adversely modify or destroy critical habitat. In this case, NMFS's action is the management of the Alaska groundfish fisheries (including the authorization of research necessary to support such management) and the endangered species is the western distinct population segment (WDPS) of Steller sea lions. In the biological opinion on the Alaska groundfish fisheries (NMFS, 2010a), NMFS determined that it could not insure that the Alaska groundfish fisheries were not likely to jeopardize the continued existence of the WDPS of Steller sea lions and not adversely modify their designated critical habitat. In response to this determination, NMFS recommended a reasonable and prudent alternative (RPA) to mitigate the fishery impacts that had been identified as having the potential to cause jeopardy. The RPA restricted the Aleutian Islands Atka mackerel and Pacific cod fisheries, to provide additional protection to the WDPS of Steller sea lions and their critical habitat. The RPA and other existing fishery management measures designed to protect Steller sea lions in the Aleutian Islands are known, collectively, as the Steller sea lion protection measures. The Steller sea lion protection measures restrict the Atka mackerel, Pacific cod, and pollock fisheries in a manner that may cause adverse economic impacts.

## 2.6 The objectives of, and the legal basis for, the proposed rule

*Objectives*

The objectives of this action are:

- implement Steller sea lion protection measures for the Aleutian Islands groundfish fisheries, and their supporting research, in a manner that mitigates the Aleutian Islands groundfish fisheries' potential adverse impacts on Steller sea lions;
- implement Steller sea lion protection measures for the Aleutian Islands groundfish fisheries, and their supporting research, in a manner that … minimizes, to the extent practicable, adverse economic impacts to the groundfish fisheries.

*Legal basis*

NMFS manages the U.S. groundfish fisheries of the BSAI in the exclusive economic zone off Alaska under the Fishery Management Plan (FMP) for Groundfish of the BSAI (NPFMC, 2012b). The North Pacific Fishery Management Council (Council) prepared, and the Secretary of Commerce (Secretary) approved, this FMP under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, *et seq.*).

The ESA provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. NMFS and the U.S. Fish and Wildlife Service (USFWS) share responsibility for implementing the ESA. Generally, USFWS manages land and freshwater species, while NMFS manages marine and anadromous species. NMFS has jurisdiction over 87 listed species, including the Steller sea lion.[170]

Federal agencies are directed, under section 7(a)(1) of the ESA, to use their authorities to carry out programs for the conservation and recovery of threatened and endangered species. Federal agencies must

[170] See the NMFS web page http://www.nmfs.noaa.gov/pr/laws/esa/.

also consult with NMFS, under section 7(a)(2) of the ESA, on **activities that may affect a species for which NMFS has responsibility**. These interagency consultations, also known as "Section 7" consultations, are designed to assist Federal agencies in fulfilling their duty to insure Federal actions are **not likely to jeopardize** the continued existence of a species, nor destroy or adversely modify critical habitat. Should NMFS determine that it cannot insure that the subject Federal action is not likely to jeopardize or adversely modify, NMFS will suggest RPAs that would not violate section 7(a)(2).[171] In the current instance, the agency taking the action is the Sustainable Fisheries Division of NMFS Alaska Region, and the "consulting" agency is the Protected Resources Division of NMFS Alaska Region. A history of recent, relevant consultations and actions, leading up to this action, is presented in the 2010 FMP Biological Opinion(biop) (NMFS, 2010a).

## 2.7 Number and description of small entities directly regulated by the proposed action

The entities directly regulated by this action include (1) business firms operating trawl catcher/processors and catcher vessels, and non-trawl catcher/processors and catcher vessels, fishing for Atka mackerel and Pacific cod, in the three central and western Aleutian Island management areas (Areas 541, 542, and 543); (2) Community Development Quota (CDQ) groups that receive allocations of Atka mackerel, Pacific cod, and pollock in these three Aleutian Island management areas; (3) the Aleut Corporation, which receives an allocation of pollock in the Aleutian Islands; and (4) vessels taking Atka mackerel or Pacific cod as incidental catches in Area 543.[172]

NMFS has taken account of known business or cooperative affiliations among vessels in estimating the numbers of directly regulated small business entities. However, the public sources of information on the potentially complex co- or joint-ownership or contractual relationships that may exist among multiple vessels operated by individual firms is not complete. To the extent that NMFS has failed to identify all RFA relevant relationships, the number of small entities may be overestimated, since more of the entities categorized as small might have been treated as large entities, had multiple ownership and/or affiliation structures been amenable to identification. No large entities would have been moved to the small entity category as a result of the adoption of this approach. NMFS chose 2010 as the baseline year for identifying the numbers of entities. This was the last year before the effective date of the interim final rule implementing the Steller sea lion rules that comprise the status quo (75 *FR* 77535; December 13, 2010), and, thus, would not reflect any impact that action might have had on the number of active vessels.

NMFS evaluated catcher/processor and catcher vessel business firm revenues and affiliations in the year 2012 against the SBA's size thresholds, since that year provided the most recent complete annual revenue information at the time this evaluation was prepared (December 2013). If the interim final rule reduced vessel revenues, this might be reflected in a relatively larger number of small entities in 2012 than in 2010. Three vessels, active in 2010, were not active in Alaska fisheries in 2012. Based on firm and cooperative affiliations in 2010, these vessels would have been large entities had they been active in 2012, and they were classified as large for the analysis.

Of the 51 vessels identified as having been active in 2010, 12 vessels—one catcher/processor and 11 catcher vessels—were believed to constitute small entities. One of these vessels was a pot catcher/processor, and the remaining operations were trawl catcher vessels. The estimated average gross revenue for these firms, in 2012, was about $1.4 million. Note that firm revenues may have been larger,

[171] See the NMFS web page http://www.nmfs.noaa.gov/pr/consultation/.

[172] More detailed descriptions of all of these sectors may be found in Section 1.2 of this RIR. To economize on space, these descriptions are not repeated here.

if these firms had revenues from sources other than the identified vessels. If this was the case, average gross revenues for small entities may be underestimated or the number of small entities might be overestimated, and the direction of the impact on average revenue for the remaining vessels would be unknown.

Through the CDQ program, the Council and NMFS allocate a portion of the BSAI groundfish total allowable catches (TACs), and apportion prohibited species catch (PSC) limits for Pacific halibut, Pacific salmon, and several crab species, to 65 eligible Western Alaska communities. These communities work through six non-profit CDQ groups, and are required to use the net proceeds from the CDQ allocations to start or support activities that will result in ongoing, regionally based, commercial fishery or related businesses. The CDQ groups receive allocations through the specifications process, and are directly regulated by this action, but the 65 communities are not directly regulated. Because they are explicitly defined as small nonprofit entities within the RFA, the CDQ groups are small entities for purposes of this analysis.

As previously noted, the Aleut Corporation receives all of the pollock directed fishing allocation in Areas 541, 542, and 543.[173] The Aleut Corporation is an Alaska Native Corporation, and is a holding company evaluated according to the SBA criteria at 13 CFR 121.201, using a $7 million gross annual receipts threshold for "Offices of Other Holding Companies" (NAICS code 551112). As noted, in Table 39 of this RIR, Aleut Corporation revenues exceed this threshold (gross revenues were about $159 million in 2010), and the Aleut Corporation is considered to be a large entity for purposes of this analysis. This follows the analysis in the RFA certification for BSAI FMP Amendment 82, which created the Aleut Corporation allocation in the Aleutian Islands. (NMFS, 2005: 413).

Alternative 1, the status quo alternative, prohibits retention of Atka mackerel or Pacific cod in Aleutian Islands management area 543. This comprehensive prohibition on retention, which was not implemented under this alternative in Areas 541 and 542, is relaxed under the preferred alternative. This prohibition directly regulates vessels which would otherwise have retained these species in this management area. Thus, the preferred alternative directly regulates these vessels in this area. Only small numbers of vessels took incidental catches of these species in Area 543 during the baseline years. Six separate fixed gear catcher/processors or trawl catcher vessels were identified with incidental catches of Atka mackerel and/or Pacific cod during this period. None of these is believed to be a small entity based on a knowledge of vessel affiliations. Fourteen fixed gear catcher vessels had incidental catches during the period. All of these are considered to be small entities based on a review of their gross revenues from all sources and their affiliations. The fixed gear catcher vessel revenues, for all vessels from these sources, are estimated to average about $11,300 a year in real 2012 dollars, during the baseline years (2004 through 2010). Average revenues per vessel-year from this source are estimated to be about $2,200.[174]

## 2.8 Recordkeeping and reporting requirements

An IRFA should include "a description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record..."

[173] The Aleut Corporation may contract with fishing operations to harvest the pollock DFA. Because the Aleut Corporation receives the allocation and has discretion over its disposition, the Aleut Corporation, and not the fishing operations with which it may contract, is the entity directly regulated by the pollock measures in this action.

[174] Trawl catcher/processor incidental catches were included with the directed revenue analysis for these vessels, given the difficulty of discriminating between targeted and incidental revenues for many of these vessels following the introduction of the Amendment 80 quota system.

NMFS will propose to the Secretary the following FMP amendment requiring an increase in vessel monitoring system (VMS) polling rates for all alternatives:

> Operators of federally permitted vessels in the Aleutian Islands subarea using trawl gear to directed fish for groundfish, which are deducted from the Federal TAC, must ensure their VMS is transmitting the vessel location at least 10 times per hour and that NMFS is receiving the transmissions.

A detailed discussion of the need for this FMP amendment, and its implications, is included in Section 1.19.2 ("Enforcement") of the accompanying RIR. The reader is referred there for the details. NMFS estimates that this new requirement will increase VMS costs by about $400/year for trawl catcher vessels and catcher/processors operating in the Aleutian Islands, except for trawl catcher/processors targeting Atka mackerel. These vessels are expected to incur costs of about $1,200/year (these are all large entities, however). Some of these vessels may have to replace existing VMS units to meet the transmission reliability requirement. As explained in Section 1.19.2, NMFS is unable to estimate the number of vessels for which this may be necessary, but the estimated cost per vessel is about $3,500.

Amendment 80 vessels have 100 percent observer coverage. Those observer data are linked to VMS data, and catch is assigned to critical habitat if, at any time during a trawl, a VMS point appears inside critical habitat. This allows the critical habitat limits to be managed. It will likely be difficult to monitor and enforce Atka mackerel critical habitat limits for BSAI trawl limited access catcher vessels. Catcher vessels that may fish the BSAI trawl limited access Atka mackerel quota do not have 100 percent observer coverage, so linking VMS data to fishing activity is not possible at this time. Alaska Department of Fish and Game statistical areas reported on eLandings are not specific to critical habitat areas, so they cannot be used to identify potential critical habitat catch. An electronic logbook would provide the information necessary to link VMS data to fishing activity by these vessels; however, there is no current regulation to require electronic logbooks on trawl catcher vessels. Managing these critical habitat limits on that sector will be difficult, and a solution to this problem will require changes in the catch accounting system and recordkeeping and reporting requirements. Such changes are, however, not part of the current action, so impose no attributable impacts.

## 2.9 Federal rules that may duplicate, overlap, or conflict with proposed action

An IRFA should include "An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule..."

This analysis did not reveal any Federal rules that duplicate, overlap, or conflict with the proposed action.

## 2.10 Description of significant alternatives and their effects on small entities

An IRFA should include, "A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the proposed action, consistent with applicable statutes, and that would minimize any significant adverse economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives…"

At its October 2013 meeting, the Council adopted a preferred alternative, referred to as Alternative 5. This alternative is discussed in more detail in Chapter 2 of the EIS (NMFS 2014) and in this RIR. Section 13.1 of Chapter 8 provides an analysis of Alternative 5, while Chapter 19 compares Alternative 5 to the other alternatives.

*Pollock management alternatives: minimizing impacts to small entities*

The elements of Alternative 5 that regulate the pollock fishery are similar to those in Alternatives 3 and 4, which are identical, and which are less restrictive than other alternatives (see Section 1.7 of this RIR). Alternative 5 only differs from Alternatives 3 and 4 in that it includes management area specific A-season catch limits, and increases critical habitat closures in Area 542. The A-season catch limits are 5 percent of the ABC in Area 543, 15 percent of the ABC in Area 542, and 30 percent of the ABC in Area 543.

As discussed in Section 7 of this RIR, NMFS is unable to estimate the potential production, or the location of production, under the different alternatives, and so is unable to determine whether or not the area constraints would be binding. However, these area constraints are not present in Alternatives 3 and 4. Thus, those alternatives may be somewhat less burdensome for small entities that Alternative 5. Management area limits were introduced to provide control over potential harvests in a new pollock fishery of unknown potential and, thus, to provide more protection for Steller sea lions; the restrictions are more stringent in the western areas, where Steller sea lions are not doing as well as in the east (thus, they follow the Biop performance standards). The extension of the 542 closure areas, west of 178º W longitude, to 20 nm (see Table 2-22) under Alternative 5, may also contribute to making this alternative more restrictive than Alternatives 3 and 4. The extension was also included in Alternative 5 to provide more protection to the SSL rookeries and haul-outs that have experienced relatively greater declines in local SSL populations.

*Atka mackerel management alternatives: minimizing impacts to small entities*

For Atka mackerel, Alternative 5 is most comparable to Alternative 3 and the effects on small entities in the limited access trawl fishery and CDQ groups receiving Atka mackerel allocations may be similar to those under Alternative 3. Alternatives 3 and 5 are the same in Areas 541 and 542. They differ in Area 543 in that Alternative 3 closes certain waters around Buldir Island explicitly, while Alternative 5 does not do this. However Alternative 5 sets a TAC limit equal to 65 percent of ABC that is not included in Alternative 3. On balance, from information during the baseline years, Alternative 5 may be somewhat more restrictive in Area 543 than Alternative 3. However, the Alternative 5 TAC limit is included to prevent excessive harvest of Atka mackerel and potential jeopardy for the Steller sea lion population and/or adverse modification to their critical habitat.

As discussed in Section 8 of this RIR, Alternative 4 (which incorporates most of the elements of the management regime in place during the baseline years) is a less restrictive alternative to small entities participating in AI Atka mackerel fisheries than Alternative 5. However, the SSLMC did not select Alternative 4 as its preferred alternative. Alternative 4 measures were found to result in jeopardy or adverse modification of critical habitat for the Western DPS of Steller sea lion in the 2010 Biological Opinion. Alternative 5 may provide somewhat more protection for Steller sea lions in Area 543, where population declines have been larger than elsewhere.

*Pacific cod management alternatives: minimizing impacts to small entities*

For Pacific cod, Alternative 5 is most closely comparable with Alternative 4. However, Alternative 4 may be less restrictive to small entities, since Alternative 5 (Table 2-18) adds a catch limit for Pacific cod in Area 543 that limits area catch in proportion to the annual sock assessment. The SSLMC did not select

Alternative 4 as its preferred alternative, since it may provide less Steller sea lion protection than Alternative 5, increasing the possibility of adverse modification or jeopardy in this management area.

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