Initial Review Draft

ENVIRONMENTAL ASSESSMENT

for proposed amendment to the

FISHERY MANAGEMENT PLAN FOR THE BERING SEA AND ALEUTIAN ISLANDS KING AND TANNER CRABS

and the

FISHERY MANAGEMENT PLAN FOR THE GROUNDFISH OF THE BERING SEA AND ALEUTIAN ISLANDS

to revise the rebuilding plan for Pribilof Islands blue king crab.

Abstract

This initial draft environmental assessment evaluates five proposed alternative rebuilding measures for the Pribilof Islands blue king crab (*Paralithodes platypus*) stock. The Pribilof Islands blue king crab stock remains overfished and the current rebuilding plan has not achieved adequate progress towards rebuilding the stock by 2014. This revised rebuilding plan considers five alternatives. Four of the alternatives are different closure configurations to restrict groundfish fisheries in the areas of the stock distribution. The fifth alternative considers trigger caps and associated area closures in all groundfish fisheries. The impacts of these alternatives on rebuilding the Pribilof Island blue king crab stock as well as the environmental and social/economic impacts of these measures are considered in this analysis.

For further information contact:

Diana Stram
North Pacific Fishery Management Council
605 West 4th Ave, Anchorage, AK 99501
(907) 271-2809

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Executive Summary

The king and Tanner crab fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 miles offshore) of the Bering Sea and Aleutian Islands (BSAI) off Alaska are managed under the Fishery Management Plan for Bering Sea and Aleutian Islands King and Tanner Crabs (FMP). The FMP establishes a State/Federal cooperative management regime that defers crab fisheries management to the State of Alaska (State) with Federal oversight. State regulations are subject to the provisions of the FMP including its goals and objectives, the Magnuson-Stevens Act, and other applicable Federal laws.

This proposed action is a revised rebuilding plan for the Pribilof Islands blue king crab (PIBKC) stock. The PIBKC stock remains overfished. The purpose of this proposed action is to reduce the risk of overfishing the PIBKC stock by developing an amended rebuilding plan for this stock in compliance with the Magnuson-Stevens Act and the national standard guidelines.

Five alternatives are considered in this analysis. Four of the alternatives consider time and area closures to better protect the PIBKC stock. The fifth alternative considers trigger caps and associated time and area closures in groundfish fisheries which have contributed historically to bycatch of this stock. Alternatives 2-5 retain all of the current protection measures in place for the PIBKC stock and apply additional measures as described in the specific alternatives and options.

Alternative 1 retains the current Pribilof Islands Habitat Conservation Zone (PIHCZ) trawl closure around the Pribilof Islands. Alternative 2 applies the PIHCZ closure additionally to those groundfish fisheries contributing to PIBKC bycatch (Option 2a) or to fishing for Pacific cod (*Gadus macrocephalus*) with pot gear (Option 2b). Alternative 3 proposes to apply the existing State of Alaska (State) crab closure areas to those groundfish fisheries contributing to PIBKC bycatch (Option 3a) or to fishing for Pacific cod with pot gear (Option 3b). Alternative 4 proposes two closure configurations to cover the distribution of the PIBKC stock. These closures are then proposed to apply to either those groundfish fisheries contributing to PIBKC bycatch (Option 4a) or to fishing for Pacific cod with pot gear (Option 4b). Alternative 5 proposes a trigger cap on those groundfish fisheries contributing to PIBKC bycatch that, if reached, would close that area to fishing (Options 5a-5d). For each of Alternatives 2-5, there is the option of increasing observer coverage, either to all fisheries to which a cap or closure applies (Option 1), or to specific fisheries (Option 2).

Analysis of the impacts of these closure configurations on the rebuilding potential for the PIBKC stock shows limited effect on rebuilding between the ranges of alternative closures. Initial review is scheduled for December 2010.

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1 Introduction

The king and Tanner crab fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 miles offshore) of the Bering Sea and Aleutian Islands (BSAI) off Alaska are managed under the Fishery Management Plan for Bering Sea and Aleutian Islands King and Tanner Crabs (FMP). The groundfish fisheries of the Bering Sea and Aleutian Islands are managed under the Fishery Management Plan for groundfish fisheries of the Bering Sea and Aleutian Islands region. These FMP was developed by the North Pacific Fishery Management Council (NPFMC, or Council) under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The Crab FMP establishes a State/Federal cooperative management regime that defers crab fisheries management to the State of Alaska (State) with Federal oversight. State regulations are subject to the provisions of the FMP, including its goals and objectives, the Magnuson-Stevens Act, and other applicable Federal laws. The FMP defers much of the management of the BSAI crab fisheries to the State using the following three categories of management measures:

1. Those that are fixed in the FMP and require a FMP amendment to change;
2. Those that are framework-type measures the State can change following criteria set out in the FMP; and
3. Those measures that are neither rigidly specified nor frameworked in the FMP and are at the discretion of the State.

This proposed action is a revised rebuilding plan for the Pribilof Islands blue king crab *Paralithodes platypus* (PIBKC) stock. Management actions proposed under this analysis would amend both the BSAI Crab and the BSAI groundfish FMPs. Management actions for the BSAI groundfish and BSAI crab fisheries must comply with applicable Federal laws and regulations. Although several laws and regulations guide this action, the principal laws and regulations that govern this action are the Magnuson-Stevens Act and the National Environmental Policy Act (NEPA). These alternatives require implementing regulations and, therefore, the Regulatory Flexibility Act applies and review under Executive Order 12866 is required. A RIR/IRFA is included in this analysis.

1.1 Purpose and Need

The PIBKC stock remains overfished. On September 23, 2002, the Secretary of Commerce notified the Council that the PIBKC stock biomass was below the MSST and was overfished. A rebuilding plan was implemented in 2003 including provisions prohibiting directed fishing until the stock was rebuilt. The PIBKC fishery has been closed since 1999 and bycatch in 2009/10 was below the overfishing level. The current rebuilding plan has not achieved adequate progress to rebuild the stock by 2014. A revised rebuilding plan must be developed for the PIBKC stock and implemented within two years of notification (here, September 23, 2002). This plan must be implemented prior to the start of the 2011/12 crab fishing year. To comply with section 304(e)(7) of the Magnuson-Stevens Act, the Council is preparing an amended PIBKC rebuilding plan. The primary rebuilding alternatives address bycatch in groundfish fisheries. Annual Catch Limit (ACL) provisions for the PIBKC stock are considered in a separate analysis.

The purpose of this proposed action is to reduce the risk of overfishing and to rebuild the PIBKC stock by developing an amended rebuilding plan for this stock in compliance with the Magnuson-Stevens Act and the National Standard Guidelines.

The Council's problem statement for this analysis is the following:

The Pribilof Islands blue king crab stock remains overfished and the current rebuilding plan has not achieved adequate progress to rebuild the stock by 2014. In order *to comply with provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) an amended rebuilding plan must be implemented prior to the start of the 2011/2012 fishing season.*

The directed blue king crab fishery has been closed since 1999 and action has been taken to limit bycatch mortality in other crab fisheries occurring near the Pribilof Islands; however no similar action has been taken for groundfish fisheries. Recent trends in crab bycatch suggest that groundfish fisheries occurring near the Pribilof Islands have the potential to exceed the annual overfishing level and acceptable biological catch for this stock.

This action is necessary to facilitate compliance with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks and achieve optimum yield.

In crafting this problem statement the Council further noted that this problem statement reflects not only the Council's obligation under MSA to rebuild this stock, but also the Council's desire to prevent overfishing on an annual basis and ensure that all fisheries contributing to PIBKC bycatch mortality share in the rebuilding effort.

1.2 Magnuson-Stevens Act and National Standard guidelines

The Magnuson-Stevens Act sets forth ten national standards for fishery conservation and management. National Standard 1 states, "Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield (OY) from each fishery for the U.S. fishing industry." The specification of OY and the conservation and management measures to achieve it must prevent overfishing. The National Marine Fisheries Service (NMFS) published National Standard Guidelines (50 CFR sections 600.310-600.355) to provide comprehensive guidance for the development of FMPs and FMP amendments that comply with the Magnuson-Stevens Act National Standards. The Guidelines provide guidance for status determination criteria and rebuilding overfished stocks, including specifying the time period for rebuilding.

The Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 (MSRA, Public Law 109-479) includes provisions intended to prevent overfishing by requiring that FMPs establish a mechanism for specifying ACLs in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability. ACLs and accountability measures (AMs) are required by fishing year 2010 if overfishing is occurring in a fishery, and they are required for all other fisheries by fishing year 2011. Since overfishing is not occurring for any crab stock, all crab fisheries must have ACL and AM mechanisms by the 2011/2012 crab fishing year. The MSRA includes a requirement for the SSC to recommend Annual Biological Catch (ABC) levels to the Council, and provides that ACLs may not exceed the fishing levels recommended by the SSC. These actions are being considered under a separate analysis (see NPFMC 2010 Amendment 38 EA). The MSRA also amended section 304(e)(3) of the Magnuson-Stevens Act, which now requires the Council and Secretary to develop and implement a rebuilding plan within two years of receiving notification from the Secretary that a stock is overfished, approaching an overfished condition, or has not made adequate progress towards rebuilding.

1.3 Scope of Analysis

This Environmental Assessment (EA) relies heavily on the information and analysis contained in the Bering Sea Aleutian Islands Crab Fisheries Final Environmental Impact Statement/Regulatory Impact Review/Initial Regulatory Flexibility Analysis/Social Impact Assessment (NMFS 2004a), which is available on the NMFS Alaska Region web site at:
http://www.fakr.noaa.gov/sustainablefisheries/crab/eis/default.htm.

Throughout this analysis, that document is referred to as the Crab Environmental Impact Statement, or "Crab EIS." Additional information concerning the crab fisheries and management under the Crab Rationalization Program (Program), and impacts of these on the human environment are contained in that document.

The Crab EIS provides the status of the environment and analyzes the impacts of the crab fisheries on the human environment. This EA tiers off of the Crab EIS to focus the analysis on the issues ripe for decision and eliminate repetitive discussions. The proposed action would establish ACLs for the crab stocks under the FMP and rebuilding plans for the Eastern Bering Sea (EBS) snow crab and Tanner crab stocks. This EA details the specific impacts of the proposed action.

Chapter 3 of the Crab EIS contains a complete description of the human environment, including the physical environment, habitat, crab life history, marine mammals, seabirds, crab fisheries, a management history, the harvesting sector, the processing sector, and community and social conditions. These descriptions are incorporated by reference.

In addition to the factors discussed in the Crab EIS, this action specifically concerns the annual establishment of ACLs using the Tier system based status determination criteria for the crab stocks under the FMP. Relevant and recent information on each crab stock is contained in the chapter for that species.

The Council on Environmental Quality (CEQ) regulations encourage agencies preparing NEPA documents to, "tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review." Specifically, 40 CFR 1502.20 states the following:

> Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action. (40 CFR 1502.20)

This EA also relies heavily on the information and analysis contained in the Council's annual BSAI Crab Stock Assessment and Fishery Evaluation (SAFE) Reports, available from the Council web site at:
http://www.fakr.noaa.gov/npfmc/SAFE/SAFE.htm, or
http://fakr.noaa.gov/npfmc/membership/plan_teams/CPT/CRABSAFE2010_910.pdf

The SAFE Reports contain the status of the crab stocks and the annual stocks assessments for all ten crab stocks.

2 Description of Alternatives

There are five alternatives considered in this analysis. All of the alternatives consider time and area closures to better protect the PIBKC stock, either through year-round closures or trigger caps applied to these closures, while other alternatives consider a prohibited species cap on bycatch in groundfish fisheries. Alternatives 2-5 retain all of the current protection measures in place for the PIBKC stock and apply additional measures as described in the specific alternatives and options. Section 2.5 contains a comparison of the different alternatives. Section 2.5 includes a description of alternatives considered but not carried forward for analysis.

2.1 Alternative 1: Status Quo

Alternative 1 retains the current protections for PIBKC stock. These include a directed fishery closure until the stock is completely rebuilt, and the closure to all trawl gear of the Pribilof Islands Habitat Conservation Zone (PIHCZ) as shown in Figure 1.

Amendment 21a to the BSAI groundfish FMP established the PIHCZ, effective January 20, 1995. This closure prohibits the use of trawl gear in a specified area around the Pribilof Islands year-round (Figure 1). The intent of this closure was to protect the unique habitat and ecosystem surrounding the Pribilof Islands so the Islands could contribute long term benefits to the fisheries surrounding the waters of the Pribilof Islands area (NPFMC, 1994). The Pribilof Islands area provides habitat for commercially important groundfish species, blue king crab, red king crab (*Paralithodes camtschaticus*), Tanner crab (*Chionoecetes bairdi*), snow crab (*Chionoecetes opilio*), juvenile groundfish, Korean hair crab (*Erimacrus isenbeckii*), marine mammals, seabirds, and their prey species.

This area was established based upon the distribution and habitat of the blue king crab in the NMFS annual trawl surveys and on observer data. Blue king crabs do not exist uniformly across the Bering Sea and are instead found in isolated populations. The Pribilof Islands Habitat Conservation Area was intended to protect a majority of the crab habitat in the Pribilof Islands area (NPFMC, 1994). The closure was implemented in January 1995.

2.2 Alternative 2: Modify the current Pribilof Islands Habitat Conservation Zone to apply to select groundfish fisheries and only Pacific cod pot cod fishing.

Under Alternative 2, the existing PIHCZ, as described in Alternative 1 (Figure 1), would be modified to apply to additional fisheries (i.e., rather than just to the trawl fisheries as under the status quo).

There are two options under Alternative 2, for year-round closures:

Option 2a: Closure applies to all groundfish fisheries which have contributed to bycatch of PIBKC since 2003. These fisheries are the following (see Table 1 for additional information on catch by fishery since 2003). In addition to the existing trawl closure, all fixed gear fishing would also be prohibited in this zone year-round.

Option 2b: Closure applies to all fishing for Pacific cod with pot gear. In addition to the existing trawl closure, all Pacific cod pot fishing would also be prohibited in this zone year-round.

2.3 Alternative 3: ADF&G crab closure areas applied select groundfish fishing and just Pacific cod pot fishery.

Under Alternative 3, the existing ADF&G crab closure areas between 168° and170° West longitude, and between 57° and 58° North latitude would be closed to additional fishing effort as described in the options below. The existing closure configuration is indicated in Figure 2.

These closures would be enacted year-round for the fisheries listed below.

There are two closure options under Alternative 3:

Option 3a: Closure area applied to all groundfish fisheries which have contributed to bycatch of PIBKC since 2003. These fisheries include the Pacific cod fishery, combined flatfish trawl fisheries, pollock trawl fishery and Greenland turbot fishery (see Table 1 for additional information on catch by gear and fishery since 2003).

Option 3b: Closure area applied only to pot fishing for Pacific cod. Under this option no federal Pacific cod fishing with pot gear would be allowed within the confines of the closures shown in Figure 2.

2.4 Alternative 4: Closure that covers the entire distribution of the Pribilof Islands blue king crab stock.

This alternative proposes a new closure configuration as shown in Figure 3 (a and b), which covers the entire distribution of the PIBKC stock. The distribution of the entire PIBKC stock is defined in two ways depending upon the data used to establish the entire distribution of the stock. Under the first option (Option 1), the closure area consists of the full distribution of the Pribilof Islands stock aggregated from 1975 to 2009 based on the NMFS EBS bottom trawl survey (Figure 3a). The smaller closure area (Option 2) consists of the full distribution of the Pribilof Islands stock aggregated from 1984 to 2009. In 1984, there was a constriction of the PIBKC distribution towards the Pribilof Islands that has persisted until 2009 (Figure 3b). It is unknown if this constriction is due to declining population abundances, fishery activities, oceanography, or shifts in production. It is plausible, however, that a rebounding PIBKC stock may only be able to inhabit the smaller area.

There are two closure options under Alternative 4:

Option 4a: Closure area applied to all groundfish fisheries which have contributed to bycatch of PIBKC since 2003. These fisheries include the Pacific cod fishery, combined flatfish trawl fisheries, pollock trawl fishery and Greenland turbot fishery (see Table 1 for additional information on catch by gear and fishery since 2003). Under this option no federal groundfish fishing for those fisheries would be allowed within the confines of the closure shown in Figure 3 (a or b).

Option 4b: Closure area applied only to pot fishing for Pacific cod. Under this option no federal Pacific cod fishing with pot gear would be allowed within the confines of the closure shown in Figure 3 (a or b).

Under either option the closure would apply year-round.

2.5 Alternative 5: Trigger closures with cap levels established for PIBKC in all groundfish fisheries.

Under Alternative 5, a trigger cap would be established for all groundfish fisheries, equal to either the OFL or the ABC for the crab stock. All bycatch of PIBKC in all groundfish fisheries would accrue towards this trigger cap and those groundfish fisheries which have contributed to bycatch of PIBKC since 2003 would close when the trigger is reached. These fisheries include the Pacific cod fishery, combined flatfish trawl fisheries, pollock trawl fishery and Greenland turbot fishery (see Table 1for additional information on catch by gear and fishery since 2003). There is currently no feedback between catch of PIBKC accrual towards the OFL under the BSAI Crab FMP and any catch restrictions in the groundfish fisheries. This alternative would provide explicit feedback by closing groundfish fisheries when the PSC cap for PIBKC is reached.

Two options are considered for the cap levels (labelled under each closure option as sub-option 1 and 2 considered for each closure.

Sub-option 1: PSC Cap = OFL

Here the aggregate PSC cap would be established at the level of the annual OFL for the PIBKC stock based on the most recent stock assessment. The OFL for PIBKC stock is 0.004 million pounds in the 2010/11 fishing year. The OFL is a total-catch OFL and is computed as the sum of catches by three different sources of removals: (1) the retained legal males in directed (pot) fishery for PIBKC; (2) discards of males and females in the directed fishery;, and (3) bycatch in the groundfish pot and trawl fisheries. The directed fishery for PIBKC has been closed since 1998. Since the implementation of a total catch OFL in 2008, bycatch in crab and groundfish fisheries have been the only catch that has accrued towards the OFL. The OFL was not reached in the 2009/10 fishing year.

Currently the OFL for 2010/11 is established at 0.004 million lbs (0.0018 kt) corresponding to the five year average of bycatch in groundfish and crab fisheries from 1999/2000-2005/2006[1]. While the PIBKC stock is in Tier 4 of the Crab OFL Tier system, it is at stock status 'c' therefore the directed fishery $F_{directed}$ = 0 as $B/B_{MSYprox}$ is < beta and $F_{OFL}<F_{MSY}$ is determined by the PIBKC rebuilding plan. The OFL calculation employs a 'Tier 5" methodology of average catch in crab and groundfish fisheries to determine a bycatch-F_{OFL}. For purposes of this sub-option the cap is considered to be the bycatch component of the OFL. Currently the entire OFL is the bycatch component due to the low stock status in relation to the sloping control rule. Should the biomass of the stock increase above the beta threshold, the OFL would be determined using the true Tier 4 control rule. The stock assessment will include information on the proportion of the total catch OFL anticipated to come from bycatch. This would constitute the bycatch-OFL cap for purposes of determining the annual PSC cap. The current rebuilding plan includes a provision that the directed fishery is closed until the stock is rebuilt (second consecutive year above B_{MSY}). Once the stock is rebuilt the directed fishery could be re-opened. The PSC cap would continue to be annually estimated as the bycatch-component of the OFL. Should the crab fisheries begin to contribute to the bycatch of the stock, an estimate of the groundfish-only component of the OFL would need to be made to appropriately specific the cap level.

Sub-option 2: PSC Cap = ABC

Here the PSC cap would be established at the level of the ABC to be recommended annually by the SSC to the Council. The Council took final action on an ACL analysis (Amendment 38 to the Crab FMP) in October 2010. The Council's preferred alternative establishes an ABC control rule to be employed

[1] This 4,000 lb OFL was based upon data available in 2008. Since that time the data have been revised slightly and would result in a lower OFL if averaged over the same time period. The OFL has remained at the 4,000 lb level in order to allow for estimated incidental catch needs in groundfish fisheries.

annually to determine the maximum permissible ABC, understanding that the SSC may recommend a lower value on an annual basis. The Council's ABC control rule would be established using a P* approach with the recommended P* value = 0.49. Currently for PIBKC as a Tier 4 stock, using P* = 0.49 and employing only model-based (sigma-w) uncertainty this results in an ABC = 99.32% of OFL. This would result in an ABC = 3,973 lbs, or 27 lbs lower than the OFL. Given that the OFL for this stock is not truly assessed using a Tier 4 formula based upon stock status, it seems reasonable to establish an ABC using the Tier 5 ABC formula in the Council's preferred alternative which is that ABC = 90% of OFL. This results in an ABC = 3,600 lbs (or 400 lbs less than the OFL). For analytical purposes this is the cap considered under these alternatives.

There are 4 closure options under Alternative 5:

Option 5a: The existing PIHCZ, as described in Alternative 1 (Figure 1), would be modified to apply to additional fisheries (i.e., rather than just to the trawl fisheries as under the status quo). The fisheries to which this closure would apply are listed in Table 1. The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:

Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

Option 5b: The existing ADF&G crab closure areas between 168° and170° West longitude, and between 57° and 58° North latitude would be closed to additional fishing effort as indicated in Figure 2. The fisheries to which this closure would apply are listed in Table 1. The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:

Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

Option 5c: The closure area consists of the full distribution of the Pribilof Islands stock aggregated from 1975 to 2009 based on the NMFS EBS bottom trawl survey Figure 3A). The fisheries to which this closure would apply are listed in Table 1. The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:

Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

Option 5d: The smaller closure area (Option 2) consists of the full distribution of the Pribilof Islands stock aggregated from 1984 to 2009. In 1984, there was a constriction of the PIBKC distribution towards the Pribilof Islands that has persisted until 2009 (Figure 3B). The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:

Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

2.6 Option for Increased Observer Coverage

For each of the Alternatives, and the sub-option of each Alternative that is ultimately selected, apply an option to increase observer coverage requirements. This increase could be applied to all fisheries (Option 1, below) or for a specific fishery (Option 2, below) depending upon the selection of the individual application of an alternative under Alternatives 2-6.

Option1: Apply increased observer coverage to fisheries which contributed to PIBKC bycatch since 2003 for which a cap (PSC or trigger) or closure applies;
Option 2: Apply increased observer coverage to specific fisheries.

Sub-option (applies to both options 1 and 2): This would sunset under implementation of the restructured observer program.

Under these options, increased observer coverage would be added to fisheries which contributed to PIBKC bycatch since 2003 (as listed in Table 1) or to only specific fisheries[2]. Selection of the sub-option would indicate that any mandatory increased observer coverage on a fishery would sunset upon implementation of the observer restructuring program. The Council took final action on this analysis in October 2010. The main elements of the Council's preferred alternative as it relates to this are the ability to annually modify coverage in fleets based on fishery management monitoring needs and Council and NMFS priorities. The new program is anticipated to be implemented in 2013. The Council's motion is available at: http://fakr.noaa.gov/npfmc/current_issues/observer/ObserverMotion1010.pdf. Additional information is available in the public review draft of the analysis for this action: http://fakr.noaa.gov/npfmc/current_issues/observer/Observer_restructuring910.pdf

2.7 Comparison of Alternatives

Alternatives 1-5 all address different closure configurations applied to either the trawl-only fisheries (Alternative 1) or to include additional fisheries such as all groundfish fishing or additionally fishing for Pacific cod with pot gear. A comparison of the relative extent of the closures across these alternatives is shown in Figure 5.

2.8 Alternatives considered but not carried forward for analysis.

One alternative that was considered for this analysis but not carried forward for analysis included a gear modification for a slick ramp modification for pot gear to deter blue king crab. Development of this type of modification to pot gear is being researched and may be effective in the future for decreasing mortality of blue king crab when directly fishing Pacific cod. This gear, however, will not be available or field tested for inclusion in this analysis as a viable alternative for consideration within the time frame that a new rebuilding plan must be implemented.

Another alternative considered but not carried forward at this time is to establish a PSC cap for the PIBKC stock and to divide this cap by individual groundfish fisheries. Given the lack of sufficient observer coverage in the Pacific cod pot fishery near the Pribilof Islands and other fisheries in this region, the ability to close individual fisheries upon reaching a fishery-specific catch level is problematic.

Two additional alternatives were considered in the preliminary review draft and removed from the analysis at that time. The first was a PSC cap to which bycatch of PIBKC within the 513 reporting area would apply and upon attainment of which all groundfish fishing would cease. This alternative was considered to be unnecessary with the addition of the closure alternatives under Alternative 5 in this analysis as well as ill-conceived in that areas outside of the range of PIBKC stock would close to fishing once the cap was reached. Alternative 5 closures are better representative of the areas under consideration for PIBKC bycatch. Finally, under alternatives 2-5 one of the options would have applied these closures to all groundfish fisheries in the Bering Sea regardless of whether those fisheries have contributed to

[2] Additional specificity would be required as to which specific fisheries this increased observer coverage would apply.

PIBKC bycatch. Therefore in October 2010, the Council moved to remove from consideration for closures any fisheries which have not contributed to PIBKC bycatch since 2003.

3 Methodology for Impact Analysis

3.1 Projection Methodology for Pribilof Islands blue king crab stock rebuilding

A four-stage catch-survey assessment (CSA) model was used to estimate size specific PIBKC abundance (Zheng and Kruse 2000, Vining and Zheng 2008). The CSA model uses multiple years of trawl survey and harvest data to estimate abundance in four classes of male crabs: pre-recruit two (105-119 mm CL); pre-recruit one (120-134 mm CL); recruit (new-shell, 135-148 mm CL); and, post-recruit (>148 mm CL and old-shell, 135-148 mm CL). For each stage of crab, the molting portions of crab "grow" into different stages based on a growth matrix, and the non-molting portions of crab remain in the same stage or become post-recruits. The model links the crab abundances in four stages in year t+1 to the abundances and catch in the previous year through natural mortality, molting probability, and the growth matrix:

$$
\begin{aligned}
P2_t^b &= (P2_t e^{-0.5M} - hc2_t e^{-(0.5-y_t)M_t})\, e^{-0.5M_t - st_2 Ft_t - sf_2 Ff_t}(1 - sp_2 Ho_t h),\\
P1_t^b &= (P1_t e^{-0.5M_t} - hc1_t e^{-(0.5-y_t)M_t})\, e^{-0.5M_t - st_1 Ft_t - sf_1 Ff_t}(1 - sp_1 Ho_t h),\\
P2_{t+1} &= P2_t^b[(1 - m2_t) + m2_t\ G_{P2,P2}] + N_{t+1},\\
P1_{t+1} &= P1_t^b[(1 - m1_t) + m1_t\ G_{P1,P1}] + P2_t^b\ m2_t\ G_{P2,P1},\\
R_{t+1} &= P2_t^b\ m2_t\ G_{P2,R} + P1_t^b\ m1_t\ G_{P1,R},\\
P_{t+1} &= [(P_t + R_t)e^{-0.5M_t} - rc_t e^{-(0.5-y_t)M_t}]e^{-0.5M_t - Ft_t - Ff_t}(1 - Ho_t h),
\end{aligned}
\tag{1}
$$

Where $P2_t^b$ and $P1_t^b$ are prerecruit-2 and prerecruit-1 abundances after handling mortality in year t, $hc2_t$ and $hc1_t$ are pot bycatch for prerecruit-2s and pre-recruit 1s, st_2, st_1, sf_2, sf_1, sp_2, and $sp1$ are selectivities for pre-recruit 2s and pre-cruit 1s bycatch from groundfish trawling, groundfish fixed gear, and directed pot fisheries, Ho_t is the bycatch mortality rate from other crab fisheries, h is handling mortality rate, $H2^q$ and $H1^q$ are fishery selectivities for pre-recruit 2s and pre-recruit 1s, N_t is new crab entering the model in year t, $m2_t$ and $m1_t$ are molting probabilities for pre-recruit 2s and pre-recruit 1s in year t, $G_{i,j}$ is a growth matrix containing the proportions of molting crab growing from stage i to stage j, M_t is natural mortality in year t, rc_t is estimated commercial catch in year t, and y_t is the time lag from the survey to the mid-point of the fishery in year t. By definition, all recruits become post-recruits in the following year.

The retained catch is estimated to be:

$$rc_t = (P_t + R_t)hr, \tag{2}$$

Where hr is legal harvest rate at the survey time. The pot bycatch from the directed fishery are:

$$
\begin{aligned}
hc2_t &= sp_2\, hr\, P2_t h,\\
hc1_t &= sp_1\, hr\, P1_t h.
\end{aligned}
\tag{3}
$$

The bycatch from the groundfish fisheries are computed as:

$$
\begin{aligned}
tc2_t &= P2_t^b(1-e^{-st_2 Ft_t}),\\
tc1_t &= P1_t^b(1-e^{-st_1 Ft_t}),\\
tc_t &= (P_t+R_t)e^{-0.5M_t} - rc_t e^{-(0.5-y_t)M_t},\\
fc2_t &= P2_t^b(1-e^{-sf_2 Ff_2}),\\
fc1_t &= P1_t^b(1-e^{-sf_1 Ff_1}),\\
fc_t &= (P_t+R_t)e^{-0.5M_t} - rc_t e^{-(0.5-y_t)M_t},
\end{aligned}
\qquad (4)
$$

Where $tc2_t$, $tc1_t$, tc_t, $fc2_t$, $fc1_t$ and fc_t are crab bycatch of pre-recruit 2s, pre-recruit 1s, and legals from the trawl and fixed gear fisheries.

The pre-recruit 1, recruit, and post-recruit size classes were combined to provide an estimate of abundance of mature males; the recruit and post-recruit classes were combined to provide an estimate of legal males (Table 2). Survey measurement errors were assumed to be log-normally distributed, and a nonlinear least-squares approach that minimizes the measurement errors was used to estimate model parameters. The following model parameters were estimated for male crabs: male mature biomass (MMB, Figure 6), recruits to the model each year (Figure 7), total abundance in the first year, natural mortality, trawl survey catchabilities for pre-rercuits one and two, and molting probabilities for pre-recruits one and two. The CSA model used here was updated to include data for 1975-2008. Fits to observed survey biomass data track well with the overall trend in biomass including a steep decline in the late 1970s, a short rebound in the 1990s and a slow decline to current biomass levels (Figure 8). Large inter- annual fluctuations in observed survey biomass are not well fit by the model, however, coefficients of variation of survey MMB for the most recent year is 71.3% and has ranged between 16.8 and 79.9% in since the 1980 peak in biomass.

Rebuilding scenarios were started in 2009 and were projected for 50 years where a buffer of 1.0 was applied, each scenario had 1,000 replicates, and it was assumed that no directed fishing would take place. The probability of being overfished was defined as the proportion of replicates where the MMB was below MSST. The probability of being rebuilt was defined as the proportion of replicates where MMB is equal to or above B_{MSY} for two years in a row. Table 1 lists summaries of the posterior distributions for the key parameters which determine the productivity of the population for the Beverton-holt and Ricker stock-recruitment relationships. The distributions for F_{MSY} and B_{MSY} are the same for the two stock-recruitment relationships which is expected given the way the values for R_0 and steepness are set. The implications of the alternatives were analysed based on projections from a model based Tier 4 control rule.

The rebuilding projections were for multiple recruitment scenarios:

1. Random recruitment selected from recruitments estimated between 1984 and 2009, inclusive;
2. The Beverton-Holt stock-recruitment relationship was applied; and
3. The Ricker stock-recruitment relationship was applied.

3.2 Evaluation of applicable fisheries for cap

In June 2010 at preliminary review, the Council moved to 'remove from consideration for closures any fisheries which have not contributed to PIBKC bycatch since 2003." (Council motion June 2010). In order to evaluate which fisheries have contributed to the bycatch of PIBKC since 2003, three databases

were queried: the NMFS Catch Accounting System (CAS) for prohibited species catch (PSC) estimates of PIBKC (area 513 only), the observer program database (OBS) for actual observed (only) bycatch of PIBKC, and fishtickets (FT) for documented recordings of PIBKC bycatch. The PSC records are only listed to the Federal reporting area scale thus only area 513 was included to avoid overlap with St. Matthew BKC bycatch in area 521. The OBS and FT records include more refined areas based upon State statistical areas defined as representing the Pribilof area. These three databases were then summarized for all incidences of PIBKC bycatch from 2003-2010. Table 1 summarizes the results indicating based upon all three databases which fisheries would be included as having had documented bycatch of PIBKC since 2003. Figures showing the overlap of the proposed closures and the Federal and State stat areas encompassed by those regions are shown in Figure 6 and Figure 7. For comparison against the allocation area defined in regulation see Figure 8.

While Table 1 indicates those fisheries with recorded catch of PIBKC from 2003-2010 in the overall allocation area, when compared against those fisheries with recorded bycatch in the Stat areas defined by Figure 6 results were nearly identical with two exceptions (as noted in Table 1).

3.3 Impact Analysis for other marine resources

To assess the effects of the proposed alternatives on groundfish stocks data from observers and data on vessel movements acquired by satellite through the Vessel Monitoring System (VMS) were integrated by NMFS/Alaska Region. This VMS-Observer Enabled Catch-In-Areas (VOE-CIA) database was used to assess the spatial resolution of the observed and unobserved groundfish fisheries in each of the alternative coverages. The VOE-CIA database integrates catch data from the Catch Accounting System (which has the spatial resolution of a NMFS Reporting Area) into a database that resolves the GIS data into polygons with areas of approximately seven kilometers. In an unrestricted area, sixty four grid IDs fit inside one state statistical area.

The VOE-CIA database uses an iterative, ordered process to match VMS records, Observer collected data and VMS/Catch Accounting System indicators to a fishing vessel. This gives analysts the capability to analyze unobserved vessels that may have been transparent when only using earlier analytical tools such as observer data. It should be noted that VOE-CIA data only go back as far as 2003. This is due to the unavailability of reliable VMS data and a vessel linked catch accounting system before 2003.

Data from 2003 to 2009 for each of the proposed closed areas including the target species, management program, harvest sector, gear type, and species were assessed to quantify the potential impacts of the alternatives on groundfish fisheries (see also Economic Effects and the draft RIR/IRFA for this analysis). Table 4 through Table 7 show the metric tons of groundfish species caught in each proposed closure areas between 2003 and 2009. Appendix 1 shows similar data broken down by target species and gear type (Table A2 through Table A9).

4 Pribilof Islands blue king crab

Blue king crab, *Paralithodes platypus*, are found off Hokkaido in Japan, with disjunct populations occurring in the Sea of Okhotsk and along the Siberian coast to the Bering Straits. In North America, they are known from the Diomede Islands, Point Hope, outer Kotzebue Sound, King Islands, and the outer parts of Norton Sound. In the remainder of the Bering Sea, they are found in the waters off St. Matthew Island and the Pribilof Islands. In more southerly areas as far as southeastern Alaska in the Gulf of Alaska, blue king crabs are found in widely-separated populations that are frequently associated with fjord-like bays. The State divides the Aleutian Islands and eastern Bering Sea blue king crab into the Pribilof Islands and St. Matthew management registration areas (Alaska Department of Fish and Game (ADF&G) 2006). The PIBKC are managed under the Bering Sea king crab Registration Area Q Pribilof

District, which has as its southern boundary a line from 54° 36' N lat., 168° W long., to 54° 36' N lat., 171° W long., to 55° 30' N lat., 171° W. long., to 55° 30' N lat., 173° 30' E long., as its northern boundary the latitude of Cape Newenham (58° 39' N lat.), as its eastern boundary a line from 54° 36' N lat., 168° W long., to 58° 39' N lat., 168° W long., to Cape Newenham (58° 39' N lat.), and as its western boundary the United States-Russia Maritime Boundary Line of 1991 (ADF&G 2008).

4.1 Assessment Overview

The PIBKC stock biomass is below its estimated B_{MSY} (9.28 million lbs of mature male biomass, at the time of mating) with survey estimated mature male biomass at mating having increased from 0.25 million lbs in 2008 to 1.13 million lbs in 2009 (Foy and Rugolo 2009; Figure 9). Model estimated mature male biomass increased from 1.22 million lbs in 2008 to 1.38 million lbs in 2009 (Figure 6). The 2010 survey estimated mature male biomass in the most recent assessment, however, decreased to 0.63 million pounds (Foy 2010). Survey estimates of total biomass were highest at the beginning of the time series with a peak of 176.5 million lbs in 1980, dropped dramatically to 3.3 million lbs, increased again to 29.5 million lbs in 1995 and then steadily decreased to a low of 0.5 million lbs in 2004. Pre-recruit biomass has followed similar patterns as total biomass with no indication of above average recruitment in the past three years although small male and female recruits have been noted.

The 2009 assessment of PIBKC (Foy and Rugolo 2009) is based on survey estimates using area swept methods[3]. Survey abundance in specified length bins is summed across strata defined by single or multiple tows. Weight and maturity schedules are applied to these abundances and summed to calculate biomass.

In 2009, PIBKC were observed in 6 of the 41 stations in the Pribilof District, all of which were in the high-density sampling area (Chilton et al. 2009, Figure 10). Legal-sized males were caught at three stations east of St. Paul Island, with a density ranging from 73 to 131 crab/nmi^2. The 2009 abundance estimate of legal-sized males was 0.07 ± 0.08 million crab, representing 15% of the total male abundance and below the average of 0.56 million crab for the previous 20 years (Figure 11). Only 4 legal-sized male PIBKC were captured on the survey: one in molting or softshell condition and one in new hardshell condition, while two were in very oldshell condition. Large female PIBKC were caught at three stations in the Pribilof District with an abundance estimate of 0.6 ± 0.9 million crab representing 95% of the total female abundance. Fourteen of the 29 large female PIBKC sampled during the survey were brooding uneyed or eyed embryos. Among sampled mature females, 24% were new hardshell crab all with newly extruded embryos while 76% were oldshell females of which 24% were brooding eyed embryos and 52% had empty egg cases.

The OFL for PIBKC is currently based on the Tier 4 control rule, i.e. the proxy for F_{MSY} is taken to be the product of natural mortality (M) and a scalar, γ (NPFMC, 2008; Figure 12). The proxy for B_{MSY} is taken to be the average biomass over a specified time period (currently 1980-1984 and 1990-1997). In the absence of data on an unfished stock, this time period was chosen to represent the potential population biomass that this stock could achieve to support maximum sustainable yield assuming that production during the entire time period was constant. It is noted that data are not currently available on the likely variability in production of this stock nor on the factors that influence crab production in this region. In the current OFL setting process assessment authors have the opportunity to revisit the years used to establish B_{MSY} as new data become available. The OFL is a total-catch OFL and is computed as the sum of catches by three different sources of removals: (a) the retained legal males in directed (pot) fishery for PIBKC, (b)

[3] The analyses of this chapter are based on a new assessment model. The results are therefore not identical to those in Foy and Rugolo (2009).

discards of males and females in the directed fishery, and (c) bycatch in the groundfish pot and trawl fisheries.

The harvest strategy has incorporated protection measures for PIBKC due to its overfished status so Total Allowable Catch (TAC) has been zero in recent years. Under the current rebuilding plan (implemented as Amendment 17 to the BSAI Crab FMP), there can be no directed harvest of PIBKC until the stock is rebuilt.

4.1.1 Blue king crab spatial relationship between Pribilof Islands and St. Matthew

To assess the potential relationship between blue king crab in the Pribilof Islands and St. Matthew, the analysts consulted report entitled "Guidelines for determination of spatial management units for exploited populations in Alaskan groundfish fishery management plans" by Spencer et al. (In Prep). Per this document, aspects of blue king crab harvest and abundance trends, phenotypic characteristics, behavior, movement, and genetics will be considered. Also, over 200 samples have been collected to support a genetic study on blue king crab population structure by a graduate student at the University of Alaska. Data from this genetics study will not be available in time for this rebuilding plan but will be incorporated into the stock assessment and considered during the rebuilding period.

Following the methods of Spencer et al. (In preparation), aspects of PIBKC stocks that might lead to a conclusion about the spatial relationship with the St. Matthew stock were discussed (Table 15). The items labelled TBD still require analysis (Table 15). The data that is available suggests that the environments around the Pribilof Islands and St. Matthew Island are different and likely lead to variable crab production in the two regions. Recent publications looking at snow crab larval advection suggest that the may be physical mechanisms to entrain crab larvae from the south to the north. It is unknown, however, the magnitude (if any) that blue king crab larval drift from the Pribilof Islands may contribute to the total larval production supporting the St. Matthew stock. Further analyses will be considered to compare phenotypic characteristics based on survey data collection.

4.1.2 Spatial relationship between Pribilof Islands blue king crab and red king crab stocks

To address the potential for species interactions between blue king crab and red king crab as a potential reason for PIBKC shifts in abundance and distribution, we compared the spatial extent of both speices in the Pribilof Islands from 1975 to 2009 (Figure 13). In the early 1980s when red king crab first became abundant, blue king crab males and females dominated the 1 to 7 stations where the species co-occurred in the Pribilof Islands District (Figure 13A). Spatially, the stations with co-occurance were all dominated by blue king crab and broadly distributed around the Pribilof Islands (Figure 14A). In the 1990's the red king crab population biomass increased substantially as the blue king crab population biomass decreased. During this time period, the number of stations with co-occurance remained around a max of 8 but they were equally dominated by both blue king crab ands red king crab sugggesting a direct overlap in distribution at the scale of a survey station (Figure 13A). Spatially during this time period, the red king crab dominated stations were dispersed around the Pribilof Islands (Figure 14B). Between 2001 and 2009 the blue king crab population has decreased dramatically while the red king crab have fluctuated (Figure 13B). Interstingly, the number of stations dominated by blue king crab is similar to those dominated by red king crab for both males and females suggesting continued competition for similar habitat (Figure 13A). Spatially the only stations dominated by blue king crab exist to the north and east of St. Paul Island (Figure 14C). It is noted that although the blue king crab protection measures also afford protection for the red king crab in this region, the red king crab stocks continue to fluctuate even considering the uncertainty in the survey.

4.1.3 Pribilof Island red king crab stock status

Red king crab stocks in the Bering Sea and Aleutian Islands are managed by the State through the federal Fishery Management Plan (FMP) for Bering Sea/Aleutian Islands King and Tanner Crabs (NPFMC 1998). The Alaska Department of Fish and Game (ADF&G) has not published harvest regulations for the Pribilof district red king crab fishery. The king crab fishery in the Pribilof District began in 1973 with blue king crabs being targeted (Figure 3). A red king crab fishery in the Pribilof District opened for the first time in September 1993. Beginning in 1995, combined red and blue king crab Guideline Harvest Levels (GHL) were established. Declines in red and blue king crab abundance from 1996 through 1998 resulted in poor fishery performance during those seasons with annual harvests below the fishery GHL. The NPFMC established the Bering Sea Community Development Quota (CDQ) for Bering Sea fisheries including the Pribilof Islands red and blue king crab fisheries which was implemented in 1998. From 1999 to 2008/2009 the Pribilof Islands fishery was not open due to low blue king crab abundance, uncertainty with estimated red king crab abundance, and concerns for blue king crab bycatch associated with a directed red king crab fishery.

Pribilof Islands red king crabs occur as bycatch in the eastern Bering Sea snow crab, eastern Bering Sea Tanner crab, Bering Sea hair crab, and PIBKC fisheries. Many of these fisheries have been closed or recently re-opened so the opportunity to catch Pribilof Islands red king crab is limited. Limited non-directed catch exists in crab fisheries and groundfish pot and hook and line fisheries.

From 1980-2010, the Pribilof Islands red king crab stock exhibited widely varying mature male and female abundances. The estimate of MMB from the 2010 survey was 5.44 million pounds (Figure 15). Recruitment is not well understood for Pribilof red king crab. Pre-recruitment indices have remained relatively consistent in the past 10 years, although pre-recruits may not be well assessed with the survey. The point estimates of stock biomass from the survey in recent years has decreased since the 2007 survey with a substantial decrease in all size classes in 2009, but the stock increased in 2010 relative to 2009. The 2010 size frequency for males shows a decrease in the number of old shell and very old shell legal sized males in comparison to 2008 shell conditions, but an increase when compared to 2009. Red king crab were caught at 13 of the 41 stations in the Pribilof District high-density sampling area in 2010 (Chilton et al. in press, Figure 16). Red king crabs have been historically harvested with blue king crabs and are currently the dominant of the two species in this area.

4.2 Bycatch of Pribilof Islands blue king crab by fishery

Between the 2003/04 and 2009/10 crab fishing seasons between 300 lbs (136 kg) and 4,600 lbs (2087 kg) of PIBKC were caught incidentally during crab and groundfish fisheries. Annually, yellowfin sole comprised between 3 and 77%, Pacific cod between 20 and 100%, flathead sole between 1 and 31% of the bycatch, and rocksole 26% of the bycatch in the 2006/07 crab fishing season (Table 4). Hook-and-line fisheries accounted for between 1 and 99%, non-pelagic trawls between 1 and 79%, and pot gear between 18 and 95% of the total bycatch (Table 5).

Pribilof Islands blue king crab bycatch mortality by gear type and target species are absolute values based on the AKRO catch database as of August 2009 (Table 8 and Table 9). The total columns are based on a revised database that accounts for a previous discrepancy in how unmeasured crab were apportioned. Unfortunately due to the complexity of this issue, only total values of crab mortality are available in those years. To apportion bycatch mortality to target species and gear type, the relative proportion of bycatch based on the pre-August 2009 database was applied to the total. It is noted that this method assumes that the unmeasured crab errors were equally distributed across gear type and target species. (Mortality rates assume 50% mortality in fixed gear and 80% mortality in trawl gear).

In April 2010, the SSC commented that the rebuilding plan analysis should *"consider likely crab PSC in the halibut fishery. This review should be brought into the analysis to consider the efficacy of the alternatives to achieve stock rebuilding"* (SSC minutes April 2010). This was in response to the indications that fixed gear (specifically long line fisheries) have accounted for a significant proportion of total bycatch of PIBKC in some years (Table 5) thus the potential exists for bycatch in the halibut longline fishery operating in the area as well. To assess the potential bycatch of PIBKC in the halibut fishery, data from 2004-2009 halibut fisheries and halibut surveys were provided by the International Pacific Halibut Commission (IPHC). Within the largest proposed area closure (PIBKC75), the IPHC survey occupies approximately 32 stations (Figure 20) within 26 IPHC statistical units (Figure 21) distributed mostly in and around the Pribilof Islands. From 2004 to 2009 no blue king crab were caught during this survey based on an assessment of the first 20 hooks of each skate in a set. Between 2004 and 2009 a range of 96 to 308 total effective skates were sampled during the survey. An effective skate is an 1800' skate with 100 hooks with hook spacing greater than 4 feet. For comparison to the IPHC survey, logbook data shows that between 5,800 and 7,400 effective skates were fished and caught halibut per year between 2004 and 2008 catching between 486,000 and 966,000 lbs of halibut per year in the area of the largest proposed closure (Table 6).

At this time, specific bycatch data on PIBKC (from commercial logbooks) are not available due to confidentiality issues with reporting the data. However, it is noted that that the bycatch encounter rates in the IPHC survey are generally not representative of the commercial fleet. The survey fishes on a standardized spatial layout (10nm x 10nm grid) whereas the commercial fishery is targeting halibut.

In evaluating the data necessary to characterize the applicable fisheries for the alternative closures in this analysis (see section 3.2), there were fishticket records from 2007 indicating bycatch of PIBKC in the directed halibut longline fishery[4].

4.3 Impacts of Alternatives on rebuilding the stock

As described in Chapter 2, there are five alternatives under consideration for rebuilding the PIBKC stock. The impacts of these alternatives are considered by sensitivity analysis for impacts on PIBKC. As noted below however, rebuilding simulations indicate that none of the alternatives rebuild the PIBKC stock in less than 50 years**.**

Distributions of observed PIBKC bycatch by gear type are shown in each of the proposed closure areas for three periods (Figure 22 through Figure 24Figure 24): 2003-2007 to correspond to available data on groundfish fishery impacts, 1995-2007 to correspond to the adoption of Amendment 17 and the creation of the PIHCZ, and 1987-1994 corresponding to pre-PIHCZ. Total observed bycatch ranged from 21 to 57 crabs per year, were mostly females, and included crab with average lengths between 125.5 and 182.1 mm CL (Table 10). In 2008/2009, 0.001 million lbs of male and female PIBKC were caught in groundfish fisheries according to the AKRO Catch Accounting System analysis. The catch was mostly in non-pelagic trawls (77%) and longline (23%) fisheries. The targeted species in these fisheries were yellowfin sole (77%), and Pacific cod (23%).

For the purposes of this draft of the PIBKC rebuilding plan, the three recruitment scenarios were compared for status quo groundfish bycatch. The highest observed bycatch was used as a starting point for estimating the impact of levels of bycatch reduction on rebuilding the PIBKC stock. Estimated MMB was similar with the Ricker and Beverton-Holt stock recruit models increasing from 1.5 million lbs to 9.4 and 9.9 million lbs, respectively, over the 50 year projection (Figure 16). The MMB using the random recruitment model had lower error in the projected time series but was substantially lower than the other

[4] Note that the 'target' as listed on these records was other species taken with longline gear.

models ranging from 1.5 to 3.3 million lbs. Only the results of the projections using the Ricker stock-recruit relationship were presented for the remaining results.

To assess the impacts of alternatives on rebuilding the PIBKC stock four scenarios were considered where groundfish bycatch was reduced by a specified amount that brackest the reduction in bycatch corresponding to the closure configurations in the analysis:

1. No reduction of PIBKC bycatch in the groundfish fisheries (Alternative 1);

2. 50% reduction in all PIBKC bycatch in the groundfish fisheries;

3. 80% reduction in all PIBKC bycatch in the groundfish fisheries; and

4. 100% reduction in all PIBKC bycatch in the groundfish fisheries (Alternative 4).

The probability of overfishing similarly decreased from 1 to 0.08, 0.07, 0.07, and 0.06 for the status quo, 80% reduction, 50% reduction, and 0% reduction alternatives, respectively (Figure 17). A similar decrease was observed for the pot cod only bycatch reduction (option b under each Alternative) (Figure 18). For both the options of all groundfish and pot cod only closures, the MMB relative to B_{MSY} increased similarly for each scenario from 0.07 to 0.44 over the 50 year projection (Figure 19 and Figure 20). For option a (application of closures to all groundfish fisheries), the retained catch increased from 0 to 0.86, 0.87, 0.87, and 0.87 for the status quo, 80% reduction, 50% reduction, and 0% reduction alternatives, respectively (Figure 21). The estimated recruitment under option a also increased between 0.1 and 1 million crabs over the projected time series (Figure 22).

Alternative 5 would limit the total catch of PIBKC in the groundfish fisheries to the annually specified OFL or ACL for PIBKC. Total removals by year from 1991-2009 for both directed crab fisheries as well as groundfish fisheries (by aggregate gear type) are shown in Table 14. Currently as described in Chapter 2, there is no feedback between bycatch in the groundfish fisheries of PIBKC and management measures under the BSAI Crab FMP. Thus, if the OFL for PIBKC were exceeded due to bycatch in the BSAI groundfish fisheries, no in-season management measure would be taken to further restrict bycatch of PIBKC. An 'overfishing' determination would be made the following year in the process of annual status determination for BSAI crab stocks. Absent measures to explicitly establish in-season management measures in the groundfish fisheries to implement a fishery closure should the OFL or ACL for PIBKC be reached, no additional restrictions would be taken to limit bycatch in the groundfish fisheries. Currently crab bycatch in groundfish fisheries is tabulated after the season is over and in time for consideration in the subsequent assessment in accounting for total removals. In order to have a PSC cap towards which catch could accrue from groundfish fisheries in-season, additional catch accounting considerations may be necessary. Considerations include observer coverage in this area, the extent of the PIBKC stock for purposes of bycatch accounting from Federal areas[5], and the management measures that would be enacted to implement a fishery closure should such a limit be reached.

Currently bycatch within Federal Reporting area 513 is counted as bycatch of PIBKC stock. Until a more defined area is specified for bycatch accrual, this is the area that is used to define the spatial extent of this stock. This will be modified in the stock assessment in the future as a more spatially-explicit area can be defined to refine bycatch estimates for accruing towards the OFL (note that Area 513 does not cover the

[5] The current system for catch accounting of crab bycatch by stock from Federal reporting areas is being modified to employ smaller statistical areas to better delineate stock-specific boundaries as a result of implementation of total catch OFLs under amendment 24 to the BSAI Crab FMP.

entire distribution of this stock). Not all groundfish fisheries however contribute towards any bycatch of PIBKC. Table 14 shows the relative catch by fishery of PIBKC since 2003.

Alternative 5 would trigger a range of area closures when the specified PSC limit of PIBKC in the groundfish fisheries is reached. Bycatch from all fisheries within the PIBKC stock distribution would accrue towards this limit but when reached a specified area (as listed under options a-d) would close to all groundfish fishing. The impacts of closing these areas and the relative extent of groundfish catch in the regions over time are analysed in the RIR.

Two cap levels are considered under this alternative, a PSC limit set at either the OFL (currently 4,000 lbs) or the ACL (estimated at 3,600 lbs). In analysing the impacts of closing groundfish fisheries, consideration was given to when the cap itself is reached, triggering area closures as defined in Alternative 5. The only year that the cap was reached historically was in 2007. At that time, the OFL would have been exceeded the week of September 22nd. Likewise the ABC (or ACL) level was also exceeded in the same week-ending date. It is not possible to differentiate between the ACL and OFL cap levels in this impact analysis as both were exceeded historically within the same week thus for analytical purposes these two caps are considered to be equivalent[6]. Nevertheless, while the potential impacts differ on groundfish fisheries across alternative management measures depending upon the time frame for reaching the cap and the impacts (closure of various fisheries from the specified areas) when a cap is reached, none of the alternative management measures themselves differ in their ability to rebuild the stock over the time frame of the simulation.

4.4 Impacts of Option for increased observer coverage

The options and sub-option contained under section 2.6 relate to increasing observer coverage on select fisheries. Presumably this option would focus upon fisheries with less than 100% observer coverage as candidates for increased observer coverage under this option. All affected fisheries for this action are listed in Table 1. Of these fisheries only non-pollock (*Theragra chalcogramma*) catcher vessels (CVs) are in the partially covered category with less than 100% coverage. Note that while currently many pollock CVs are at less than 100% coverage as a result of requirements of Amendment 91, all pollock CVs will have increased observer coverage (100%) beginning with implementation of the Chinook Bycatch reduction program in 2011. Thus for purposes of identifying candidate fisheries for increased observer coverage under this analysis, pollock CVs are considered adequately covered.

If the Council were to identify fisheries for which increased coverage in these areas was a priority for this analysis, similar cost-benefits assumptions could be made consistent with the analysis and impact analysis presented in the public review draft for the observer restructuring program[7].

Increased observer coverage would increase the amount of bycatch data for pot and longline fisheries refining our understanding of spatial and temporal removals of PIBKC.

The Council took action in October on the Observer restructuring, which is anticipated to be implemented in 2013. If the Council took final action on the PIBKC rebuilding Plan in early 2011 it is not anticipated that any cap or closure system under a revised rebuilding plan would be in place prior to 2012. Thus if the sub-option were selected any new increased observer program would only be in place for one year prior to sunsetting with the new Observer restructuring program. If the sub-option were not selected, then the

[6] The OFL here is 4,000lbs while under the Tier 5 assumption the ACL is considered to be 3,600lbs, a difference of only 400 lbs. This difference would be even smaller under a 'true' Tier 4 ACL determination using the P* approach of 0.49 established under the Council's preferred alternative.

[7] http://fakr.noaa.gov/npfmc/current_issues/observer/Observer_restructuring910.pdf

impact of this action would be to mandate a certain level of coverage in these partially covered fisheries which is inconsistent with the objective of flexibility in a restructured program to change coverage annually based on management needs. One of the primary purposes of the action to implement observer program restructuring per the Council motion was to allow NMFS and the council flexibility to shift coverage amongst fisheries when determined necessary. In conjunction with this program structure however, the Council could prioritize increased coverage for the applicable fisheries and gear types in the closure area, understanding that it would then place less coverage elsewhere. The initial year of deployment anticipated a performance standard of 30% coverage rate.

5 Other Marine Resources

This section considers other marine resources in the Pribilof Islands region and the potential impact on these resources categories of the Alternatives under consideration.

5.1 Groundfish Resources

5.1.1 Overview of groundfish resources

Groundfish fisheries that occur in the same species general distribution as the PIBKC fishery include: Pacific cod, pollock, Arrowtooth flounder (*Atheresthes stomias*), Atka mackerel (*Pleurogrammus monopterygius*), yellowfin sole (*Limanda aspera*), rock sole (*Lepidopsetta bilineata*), flathead sole (*Hippoglossoides elassodon*), skates, and sculpins (NPFMC 1999). Bycatch of blue king crab in these fisheries is low. Since the implementation of the Pribilof Islands Habitat Conservation area, the overlap between the flatfish trawl fisheries and the PIBKC fishery has declined. Very little is known about the trophic interactions of blue king crab, however similar trophic interactions are presumed as for red king crab. A number of fish species are known to feed on larval red king crab, including pollock, Pacific herring (*Clupea pallasii*), sockeye salmon (*Oncorhynchus nerka*), and yellowfin sole. Once the crabs settle on the sea floor, they are prey to a number of commercial and non-commercial fish species, such as most flatfish species, halibut, sablefish (*Anoplopoma fimbria*), skates, sculpins, and other benthic invertebrates, such as sea stars. A high rate of cannibalism by juvenile red king crab on younger crab also exists. Studies have documented that Pacific cod consume soft-shelled female adult red king crab. A discussion of the specific trophic interactions between blue king crab and groundfish and other species is contained in the annual SAFE report chapter for the PIBKC stock (see Foy and Rugolo 2009).

5.1.2 Impacts of Alternatives on groundfish resources

Table 4 through Table 7 show the total groundfish catches by species and year from 2003 – 2009 from each of the Alternative closure configurations considered in this analysis. Pacific cod and pollock represent the highest removals by weight by year in the PIHCZ, Alternative 1 and 2 (Table 4). Pacific cod and yellowfin sole represent the highest removals by weight by year in the ADF&G closures under Alternative 3 (Table 5). For Alternative 4, option 1 (distribution based upon 1975-1984 distribution area) and option 2 (distribution based on the 1984-2008 area), the highest removals by weight by year are pollock, Pacific cod and yellowfin sole (Table 6, Table 7). Further examination of these catches in relation to the biomass of these species and the impact of these removals by stock will be discussed further in the initial review draft.

5.2 Incidental catch species, marine mammals, and seabirds

Under all proposed alternatives for rebuilding the PIBKC stock, harvest levels in the directed crab fisheries would remain the same (the directed fishery is closed). Further, no changes to the distribution of

crab fisheries are anticipated under the proposed Actions. To the extent that crab fishing effort is reduced, and consequently adverse interactions with incidental catch species though bycatch or disturbance are also reduced, there could be some benefit to these species. Any effects on incidental catch species, however, should not be significant under any of the proposed alternatives for the crab fisheries. Changes in effort under Alternatives 2-6 for the groundfish fisheries however may occur and could impact incidental catch. Further analysis of this will be included in the public review draft.

5.3 Habitat and ecosystem considerations

The marine waters and benthic substrates in the BSAI management area comprise the habitat of all marine species. Additionally the adjacent marine waters outside the EEZ, adjacent State waters inside the EEZ, shoreline, freshwater inflows, and atmosphere above the waters, constitutes habitat for prey species, other life stages, and species that move in and out of, or interact with, the fisheries' target species, marine mammals, seabirds, and the ESA listed species. A detailed discussion of the effects of crab fisheries on essential fish habitat (EFH) is included in the Final EIS for EFH identification and consideration in Alaska (NMFS 2005). That analysis concluded that the impacts of the crab pot fishery on habitat features in the Bering Sea and Aleutian Islands are negligible.

Ecosystem characteristics of the BSAI management areas have been described annually since 1995 in the "Ecosystem Considerations" section of the annual SAFE reports. Given that an overall increase in fishing activity is not expected under the two proposed Actions, the potential effects of the Actions on an ecosystem-wide scale are very limited. As a result, no significant adverse impacts on ecosystem relations are anticipated.

Additional analysis on the potential for changes in effort outside of the proposed closure areas as a result of the alternatives on groundfish fisheries will be included in the initial review draft.

6 Economic Effects

Please refer to Section 1.4 of the RIR.

7 Cumulative Impacts

Analysis of the potential cumulative effects of a proposed Federal action and its alternatives is a requirement of the National Environmental Policy Act (NEPA). Cumulative effects are those combined effects on the quality of the human environment that result from the incremental impact of the proposed actions when added to other past, present, and reasonably foreseeable future actions, regardless of what Federal or non-Federal agency or person undertakes such other actions (40 CFR 1508.7, 1508.25(a), and 1508.25(c)). Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The concept behind the cumulative effects analysis is to capture the total effects of many actions over time that would be missed if evaluating each action individually. Concurrently, the CEQ guidelines recognize that it is most practical to focus a cumulative effects analysis on only those effects that are truly meaningful.

The Crab Rationalization Environmental Impact Statement (NMFS 2004) and Amendment 24 to the Crab FMP (NPFMC 2008) incorporated into this analysis by reference assess the potential direct and indirect effects of crab fishery harvest levels in combination with other factors that affect physical and biological resource components of the BSAI environment.

The Council took final action on an analysis of implementing Annual Catch Limits (ACLs) for all BSAI crab stocks including the PIBKC stock as well as a revised rebuilding plan for the EBS snow crab stock. No further constraint on crab fisheries are anticipated as a result of those actions[8]. A Tanner crab rebuilding plan is likely to be developed by the Council and NMFS following stock status determination that this stock is below its MSST and a rebuilding plan will be necessary. This rebuilding plan will likely also include alternatives that could further constrain the allowable catch in that crab fisheries. The final analyses for the rebuilding plans will follow the Council's adoption of a preferred alternative on ACLs and so will take into account any reductions in harvest levels attributable to the implementation of ACLs in the discussion of impacts. The Council may also suggest revisions to the Crab Rationalization Program after the Council's five year review concludes in December 2010, which could affect the percentage of the harvest pool distributed as crew shares and could change the distribution and amount of crab landings subject to IPQ and regional landing requirements.

The Council is also considering a discussion paper evaluating crab bycatch in the groundfish fisheries. Currently, there are no hard quotas to cap crab bycatch in the groundfish fisheries, although area closures with associated catch limits are utilized to reduce bycatch. Accountability Measures (AMs) are a required provision of the MSRA in conjunction with provisions for ACL requirements. The intent of AMs are to further protect a crab stock from overfishing by providing for a transparent response mechanism in the event that the established ACLs are exceeded. Without further Council action, crab bycatch in the groundfish fisheries will be accounted for by reducing harvest in the directed crab fisheries. However, the Council did initiate an amendment analysis to consider alternative management measures for bycatch in the groundfish fisheries.

Beyond the cumulative impacts discussed above and documented in the referenced analyses, no additional past, present, or reasonably foreseeable cumulative negative impacts on the biological and physical environment (including fish stocks, essential fish habitat, ESA-listed species, marine mammals, seabirds, or marine ecosystems), fishing safety, or consumers have been identified that would accrue from the proposed actions. None of the Actions and Alternatives change the general manner, timing, or location in which the crab fisheries operate.

8 References

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Foy, R.J. and L. Rugolo. 2009. 2009 Stock Assessment and Fishery Evaluation Report for the Pribilof Islands Blue King Crab Fisheries of the Bering Sea and Aleutian Islands Regions. North Pacific Fishery Management Council. 605 W. 4th Avenue, Suite 306, Anchorage, AK 99501-2252. 139pp.

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[8] The Council did not revise the existing rebuilding plan for snow crab at final action. The Council's action thus continues the existing rebuilding plan modified only by changing the definition of 'rebuilt' to be equivalent to a single year of biomass above B_{MSY} as opposed to two consecutive years under the existing plan. No additional changes were recommended in the Council's action from October.

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Parada, C., D.A. Armstrong, B. Ernst, J.M. Orensanz. 2010. Spatial dynamics of snow crab (*Chionoecetes opilio*) in the eastern Bering Sea – putting together the pieces of the puzzle. Bulletin of Marine Science. 86(2):413-437.

Spencer, P., M. Canino, J. DiCosimo, M. Dorn, A.J. Gharrett, D. Hanselman, K. Palof, M. Sigler. In prep. Guidelines for determination of spatial management units for exploited populations in Alaskan groundfish fishery management plans.

9 List of preparers and persons consulted

Preparers:

Bob Foy
Scott Miller
Diana Stram
Michael Fey

Consulted:

Clayton Jernigan
Maura Sullivan
Crab Plan Team

10 Figures

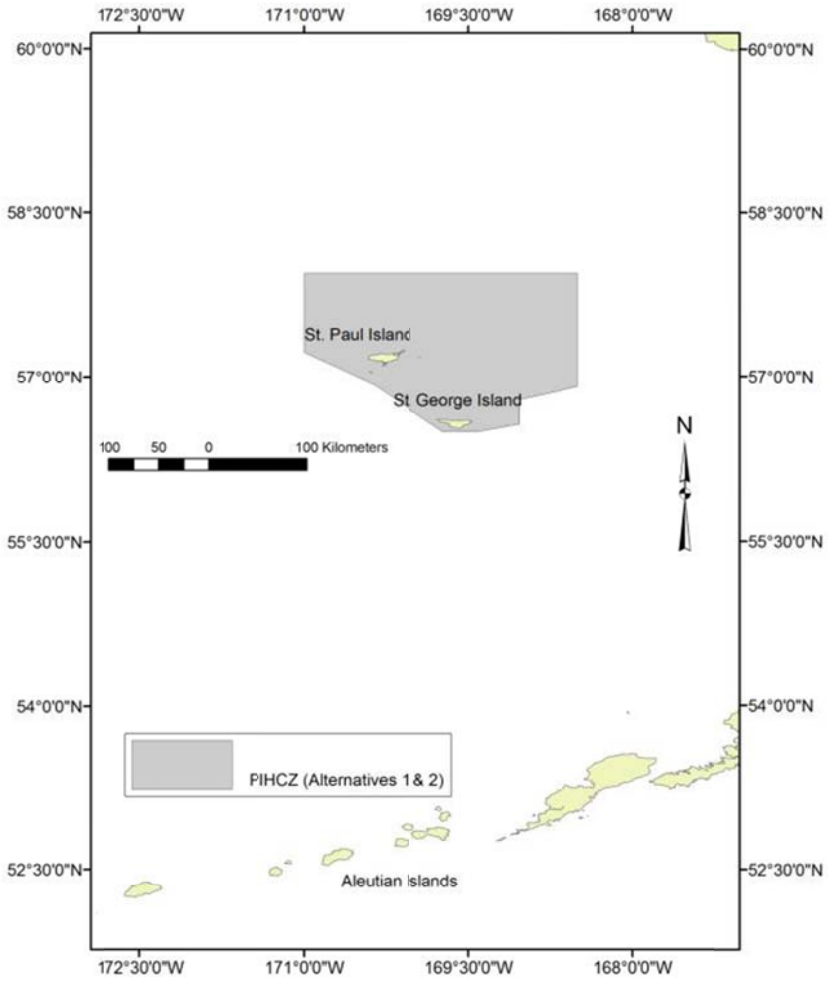

Figure 1 Pribilof Islands Habitat Conservation Zone (PIHCZ): Alternatives 1 and 2.

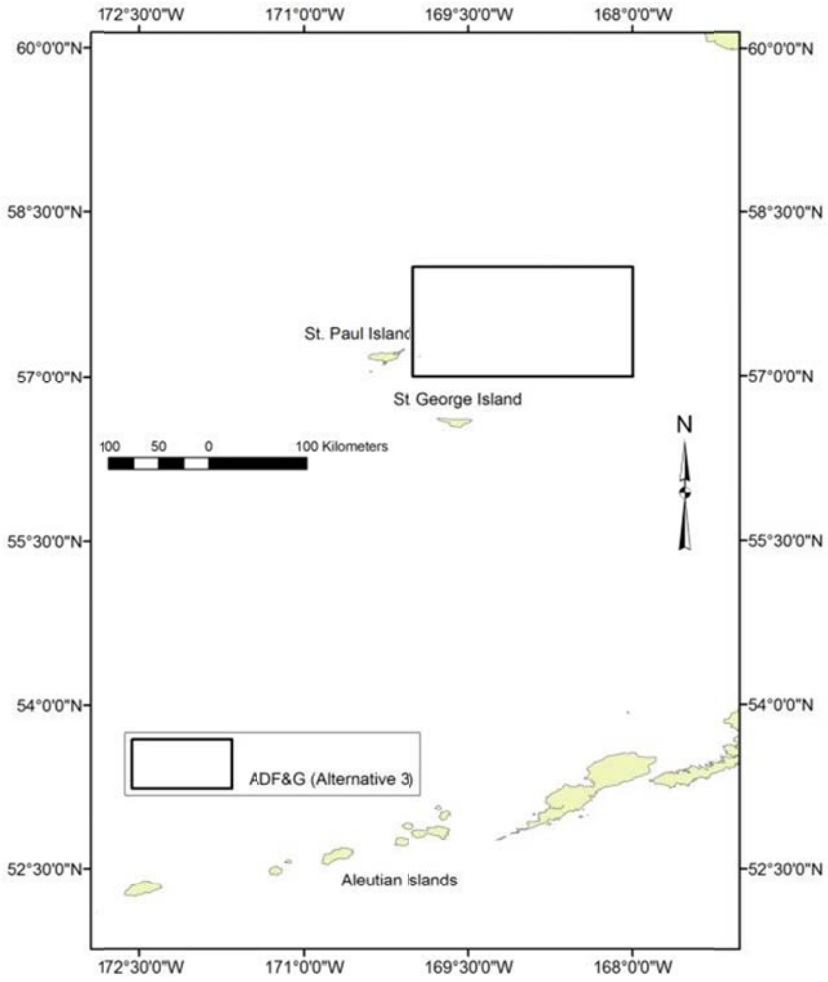

Figure 2 Alaska Department of Fish and Game (ADF&G) closure area (Alternative 3).

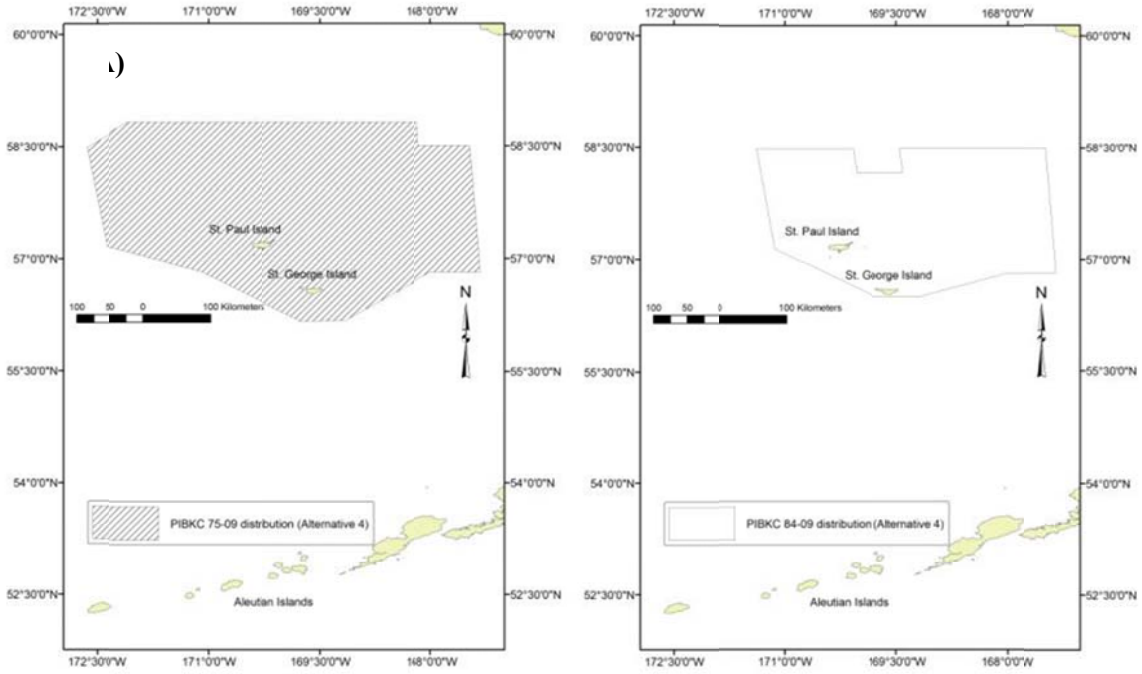

Figure 3 Pribilof Islands blue king crab distribution closure area (Alternative 4): A) 1975 to 1983 distribution; B) 1984 to 2009 distribution.

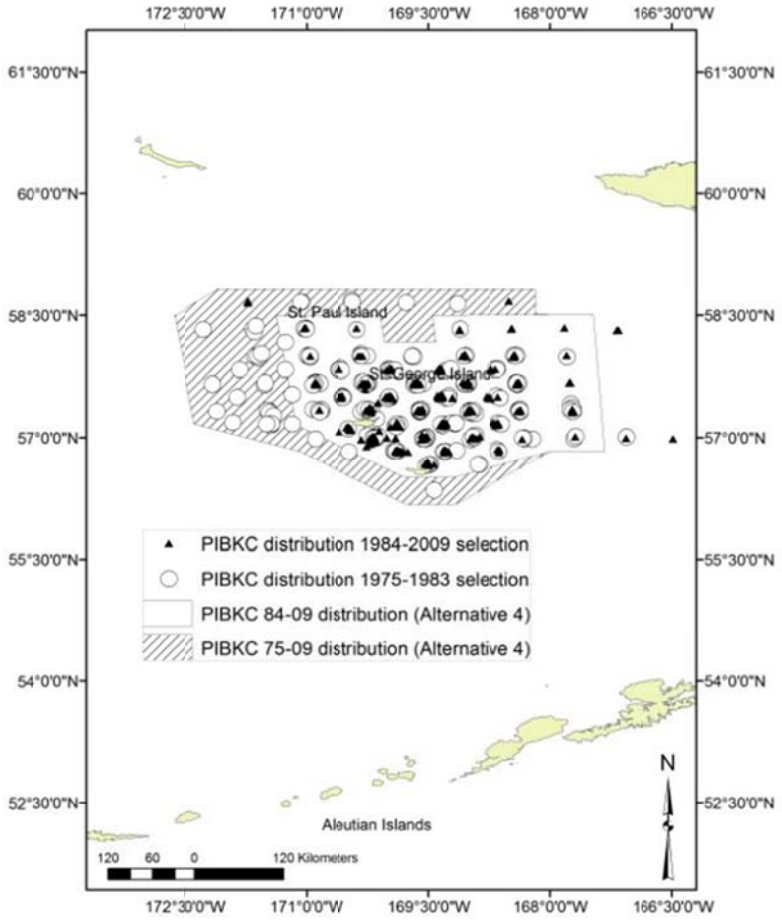

Figure 4 Distribution of Pribilof Islands blue king crab (PIBKC) showing the change in relative distribution to the east in 1984.

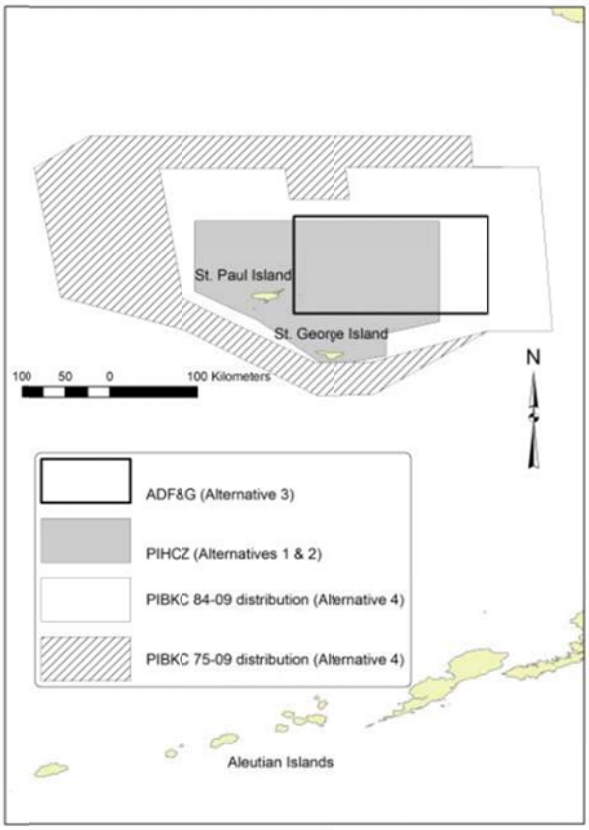

Figure 5 A comparison of relative extent of closures under Alternatives 1-4.

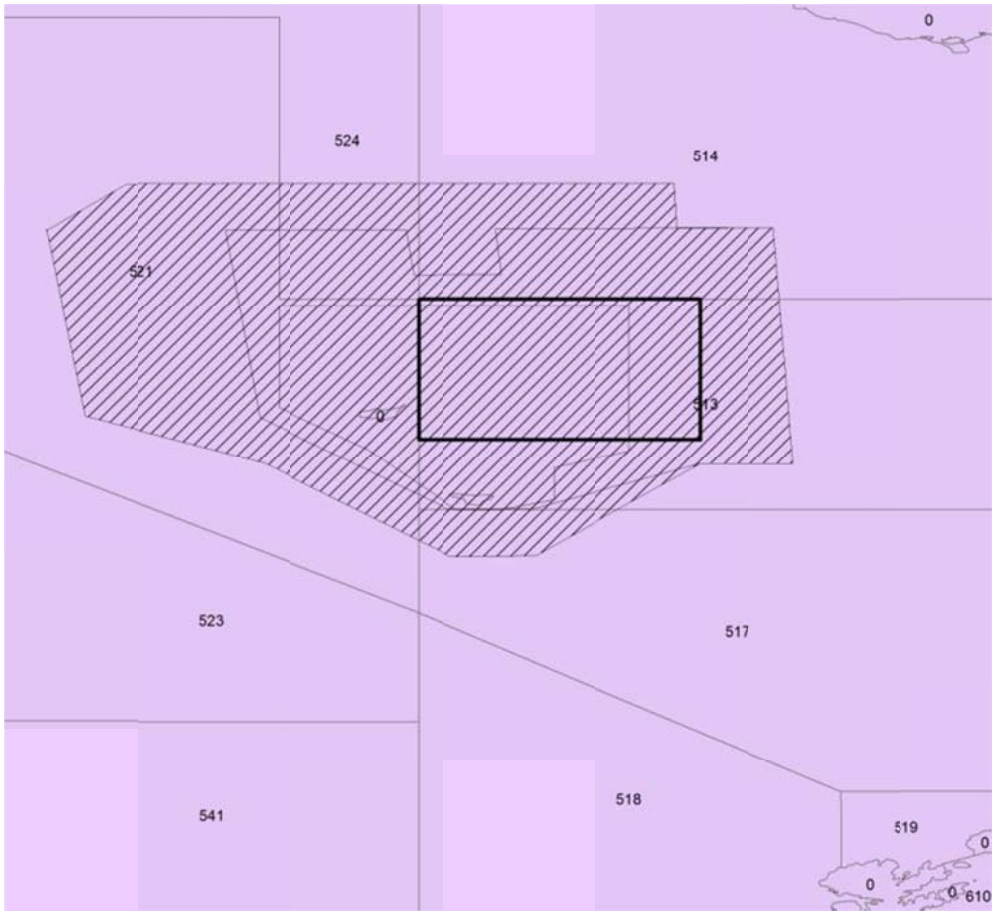

Figure 6 **Proposed closures overlaid on National Marine Fisheries Service federal reporting areas. Note as an interim measure for the assessment determination of overfishing annually for bycatch accrual currently only Area 513 is counted.**

Figure 7 Proposed closures overlaid on Alaska Department of Fish and Game Stat areas.

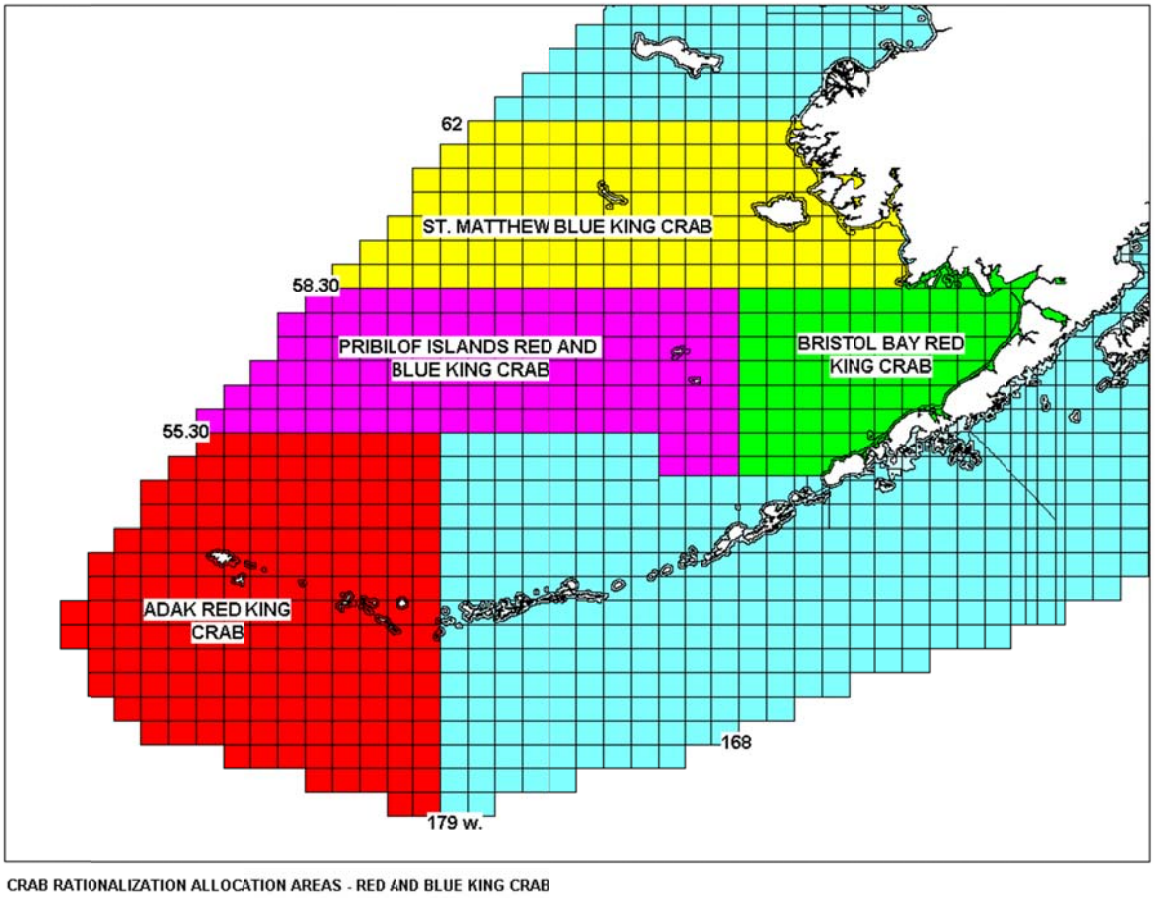

Figure 8 Crab Rationalization Allocation areas showing geographic extent of Pribilof Islands stocks in regulation.

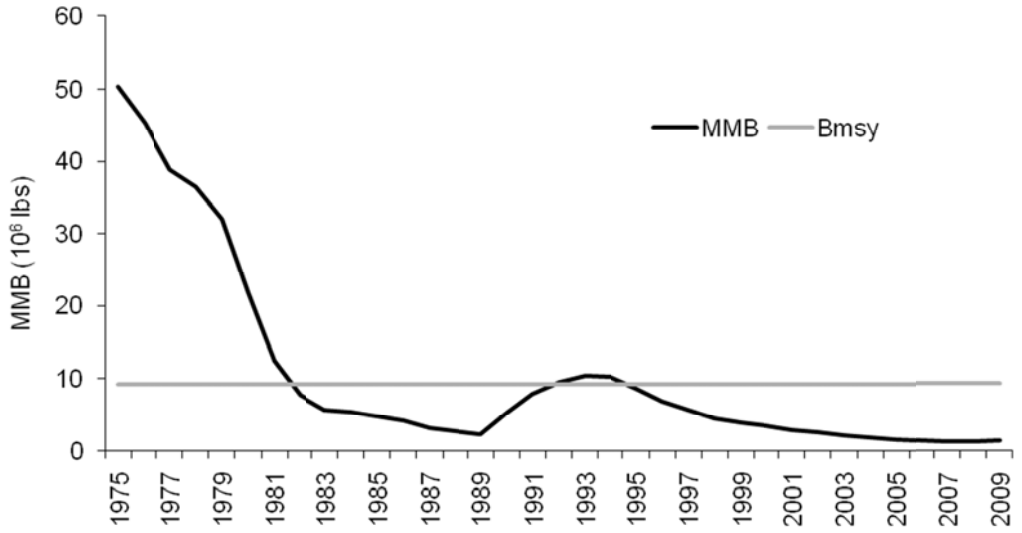

Figure 9 Estimated mature male biomass (MMB) time series relative to the current B_{MSY} based on mean mature male biomass from 1980-1984 and 1990-1997.

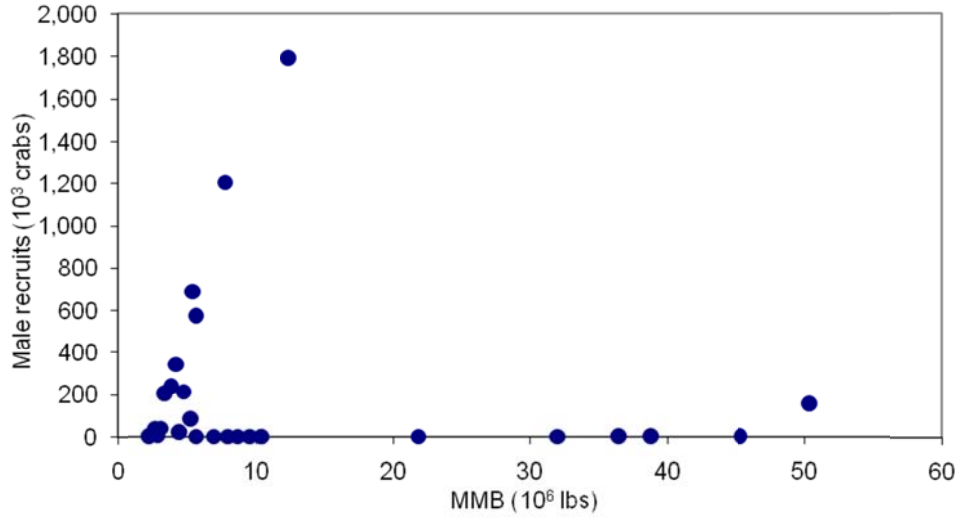

Figure 10 Model estimated male recruits relative to mature male biomass (MMB) from 1975 to 2009.

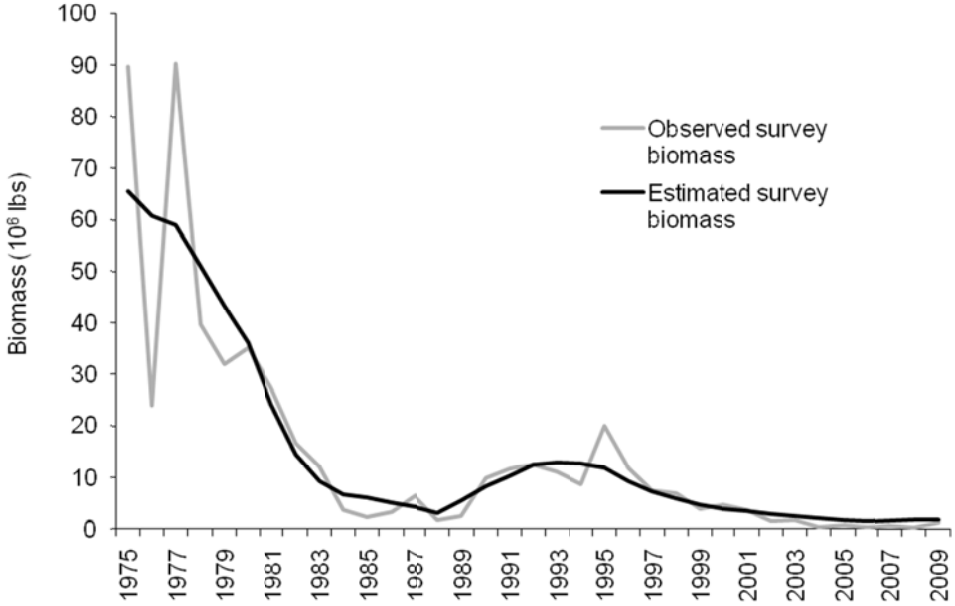

Figure 11 Time series comparison of estimated survey biomass from the Catch Survey Assessment model and observed survey biomass based on area swept estimate.

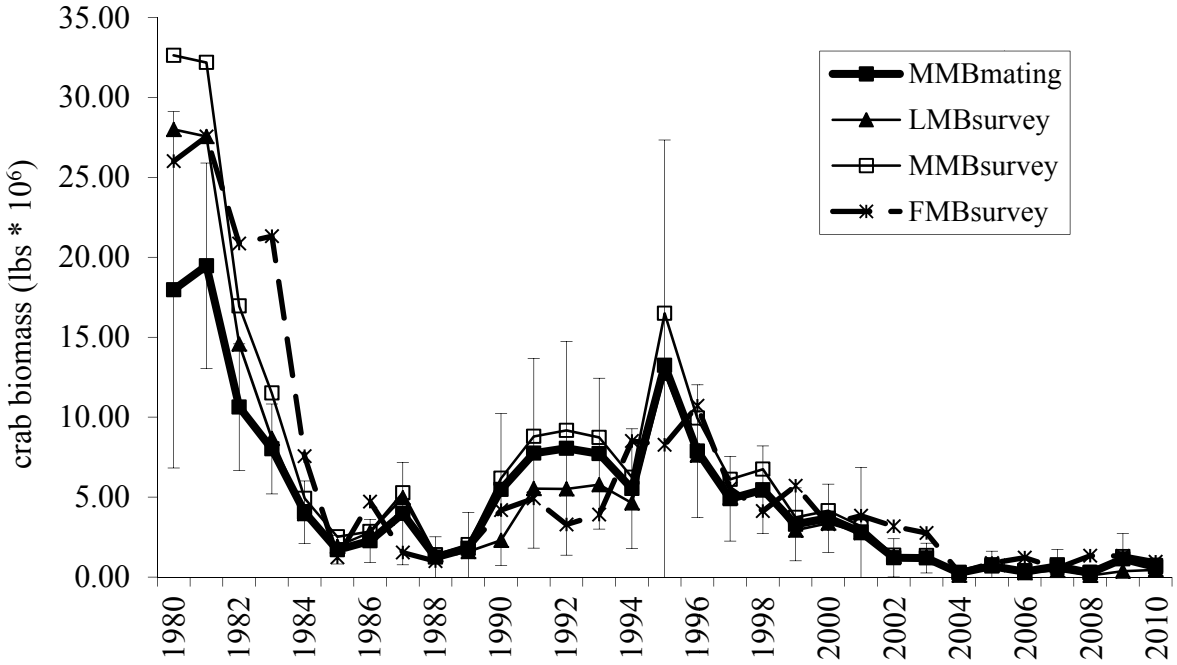

Figure 12 Historical trends of Pribilof Islands blue king crab mature male biomass (MMB, 95% CI), mature female biomass (FMB), and legal male biomass (LMB) estimated from the NMFS annual EBS bottom trawl survey.

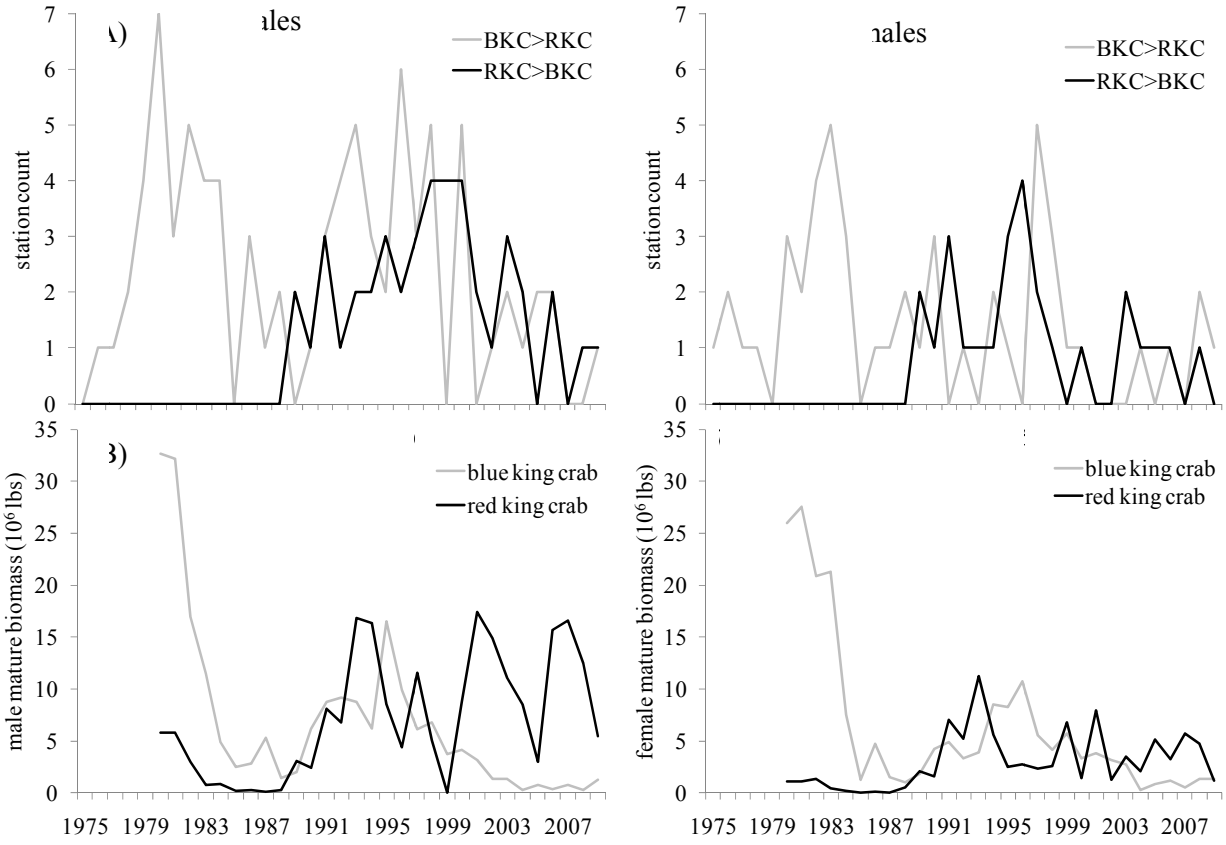

Figure 13 Time series of overlap between blue king crab and red king crab for males and females in the eastern Bering Sea showing A) the number of stations with blue king crab (BKC) or red king crab (RKC) as the dominant species and B) the mature biomass of both species.

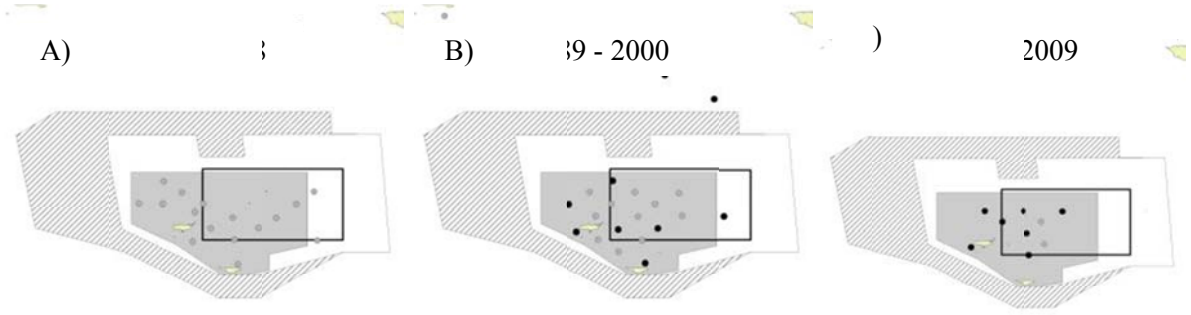

Figure 14 Spatial distribution of stations where there is overlap between blue king crab and red king crab males showing the dominant species (blue king crab=gray circles; red king crab=black circles) corresponding to time periods of major changes in biomass of both species.

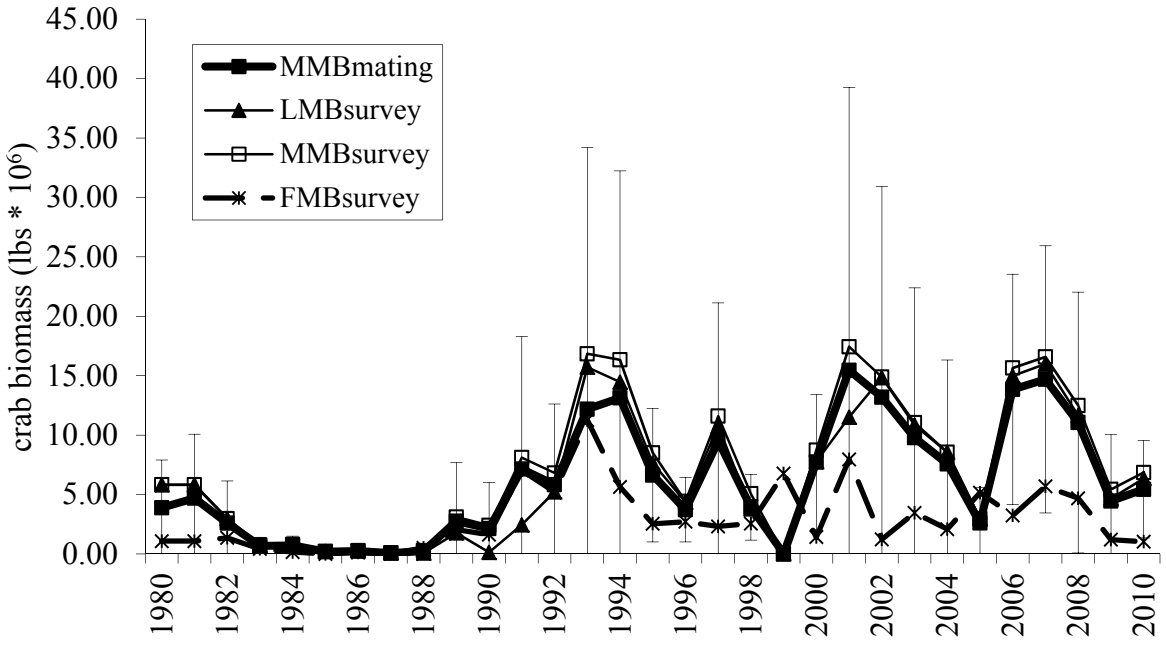

Figure 15 Historical trends of Pribilof Island red king crab mature male biomass (MMB, 95% C.I.), mature female biomass (FMB), and legal male biomass (LMB) estimated from the National Marine Fisheries Service annual eastern Bering Sea bottom trawl survey.

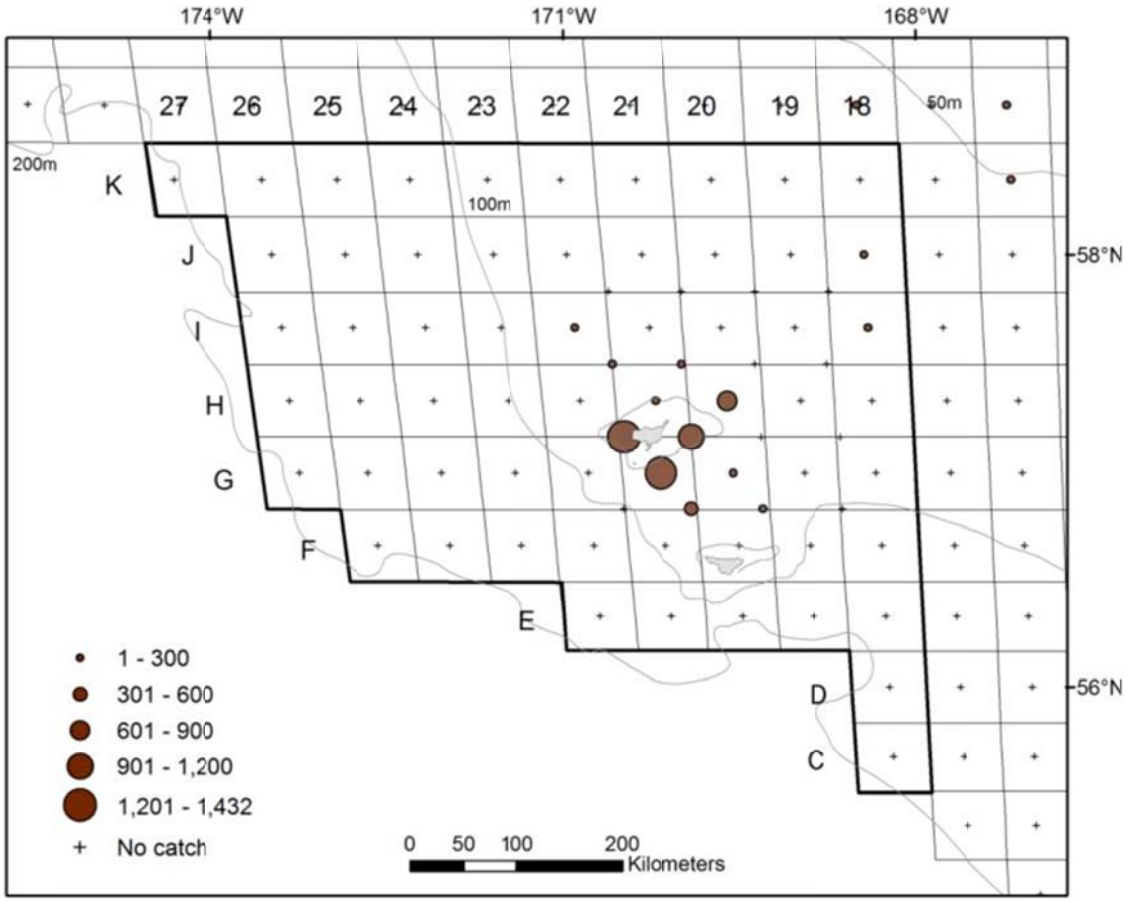

Figure 16 Total density (number/nm^2) of red king crab in the Pribilof District in the 2010 eastern Bering Sea bottom trawl survey.

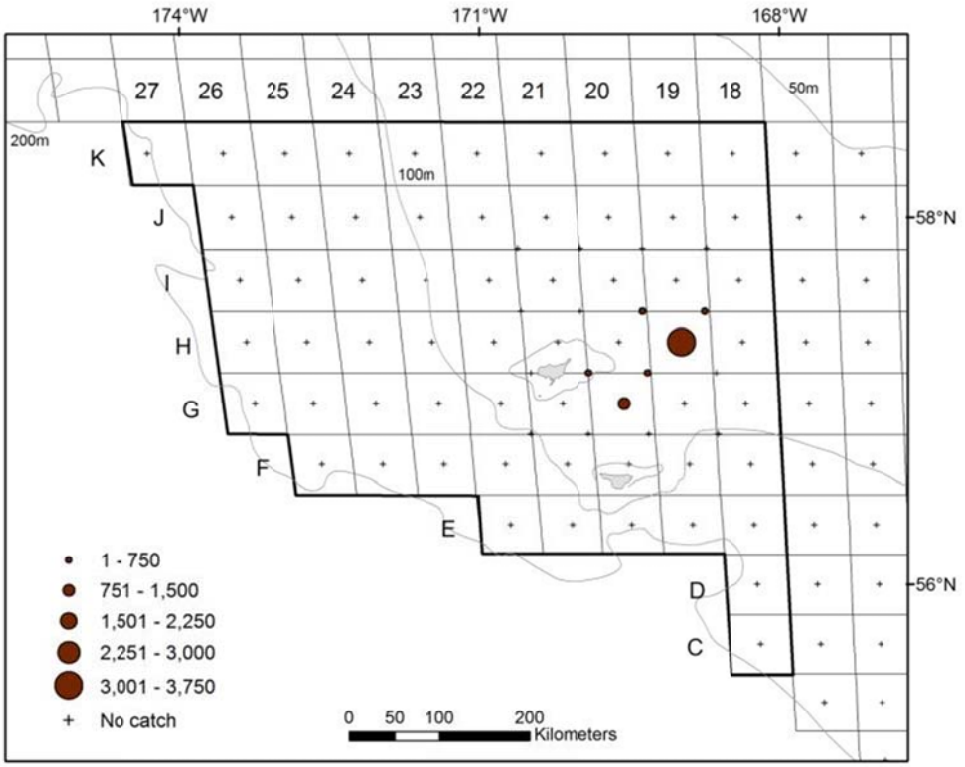

Figure 17 Total density (number/nm^2) of Pribilof Islands blue king crab in the 2009 eastern Bering Sea bottom trawl survey.

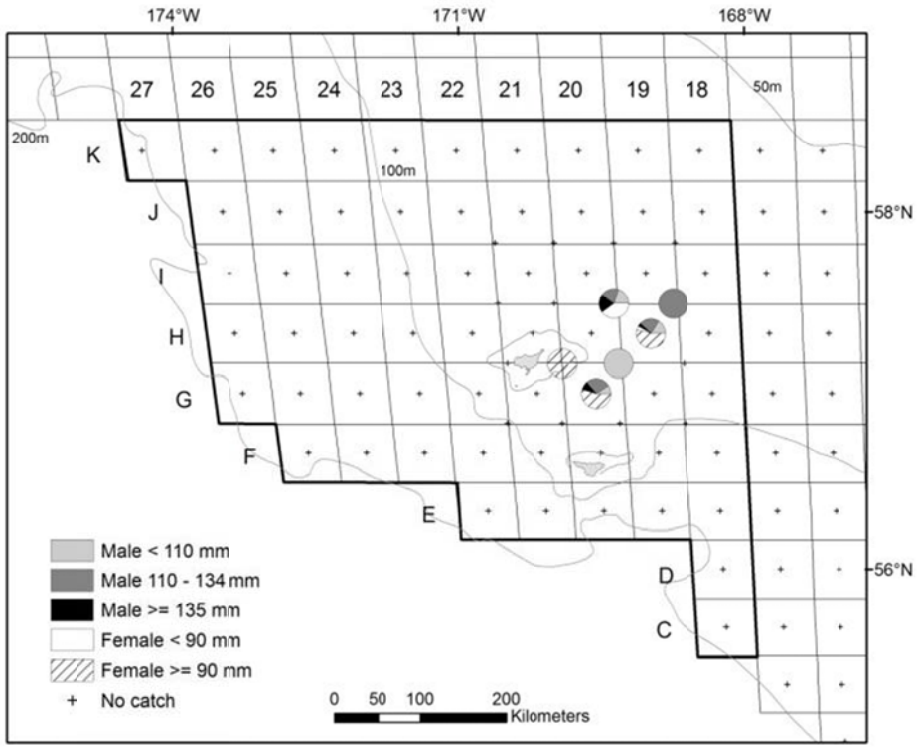

Figure 18 2009 eastern Bering Sea bottom trawl survey size class distribution of Pribilof Islands blue king crab.

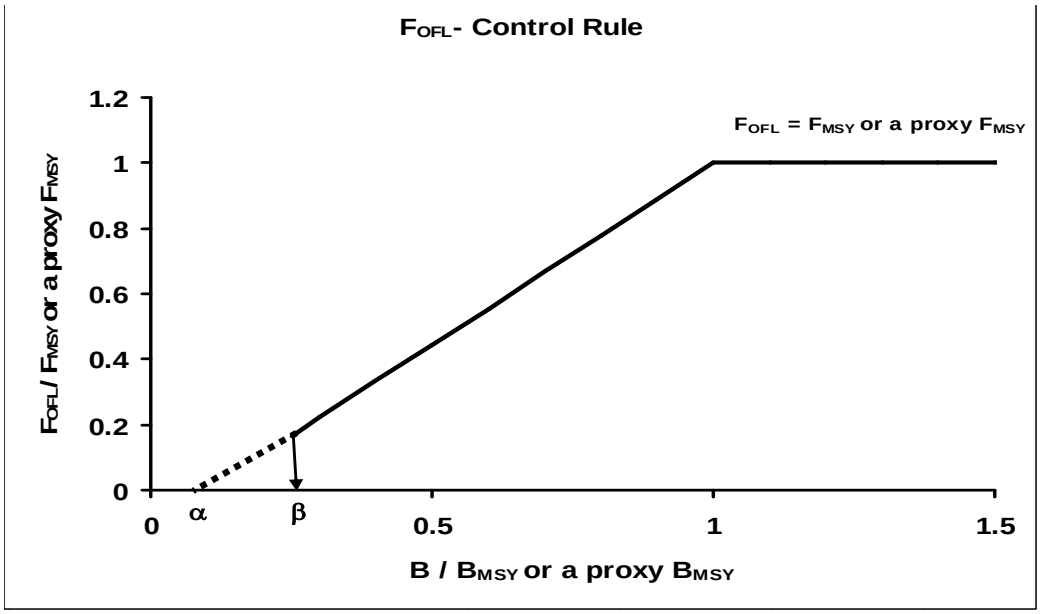

Figure 19 F_{OFL} Control Rule for Tier 4 stocks under Amendment 24 to the Bering Sea Aleutian Islands King and Tanner Crabs fishery management plan. Directed fishing mortality is set to 0 below β.

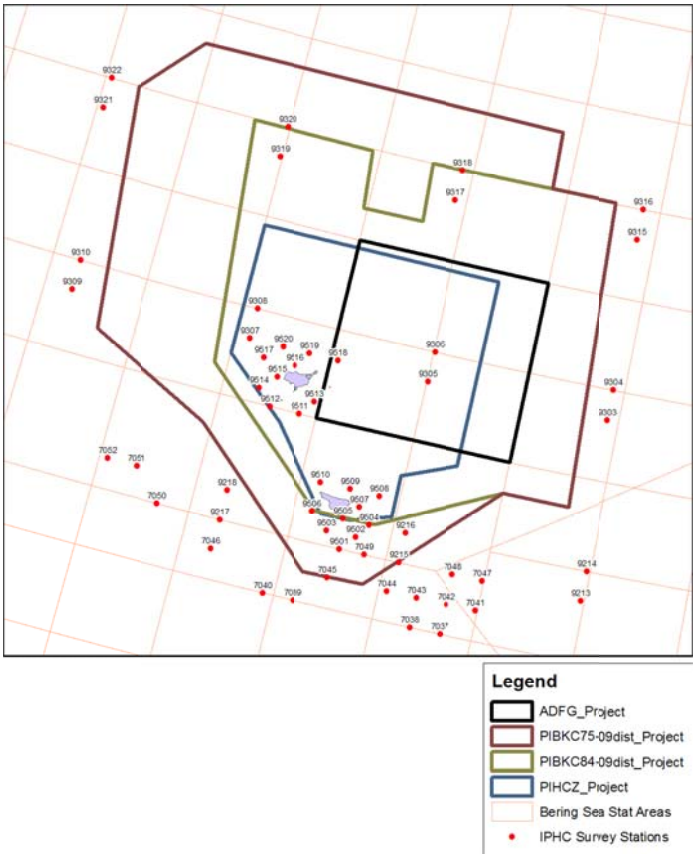

Figure 20 International Pacific Halibut Commission survey stations located within the proposed closure areas around the Pribilof Islands.

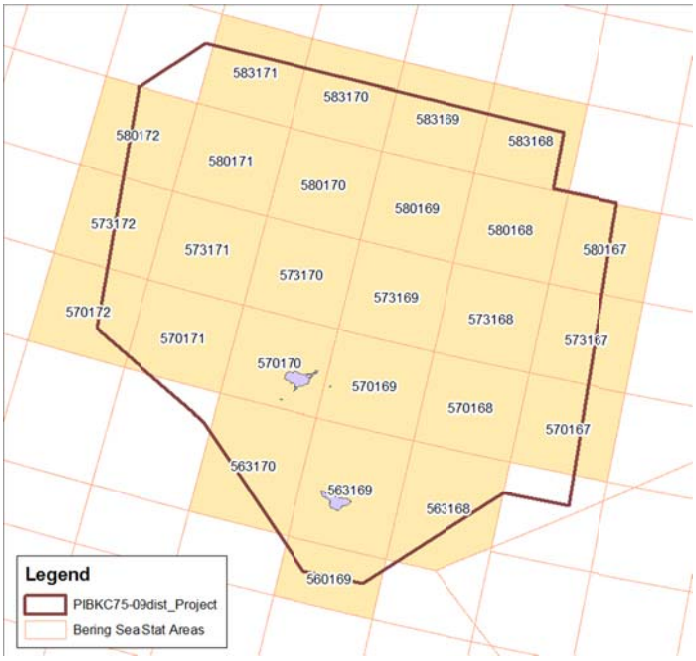

Figure 21 International Pacific Halibut Commission statistical areas located within the proposed closure areas around the Pribilof Islands.

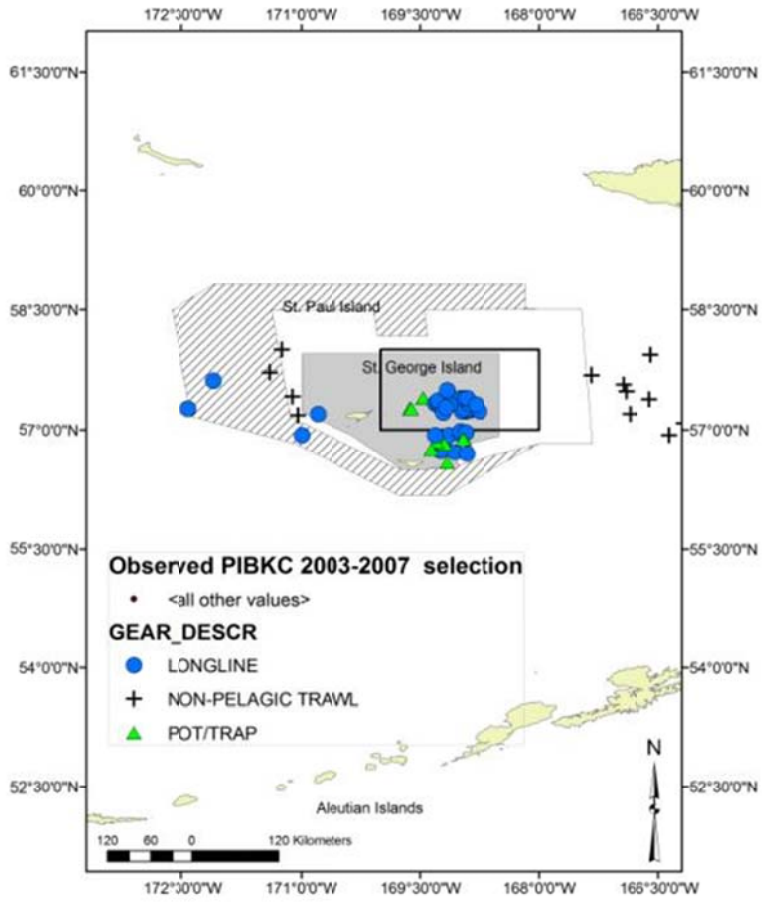

Figure 22 Distribution of 2003-2007 Pribilof Islands blue king crab (PIBKC) catches in groundfish fisheries relative to the four proposed closure areas based on alternatives.

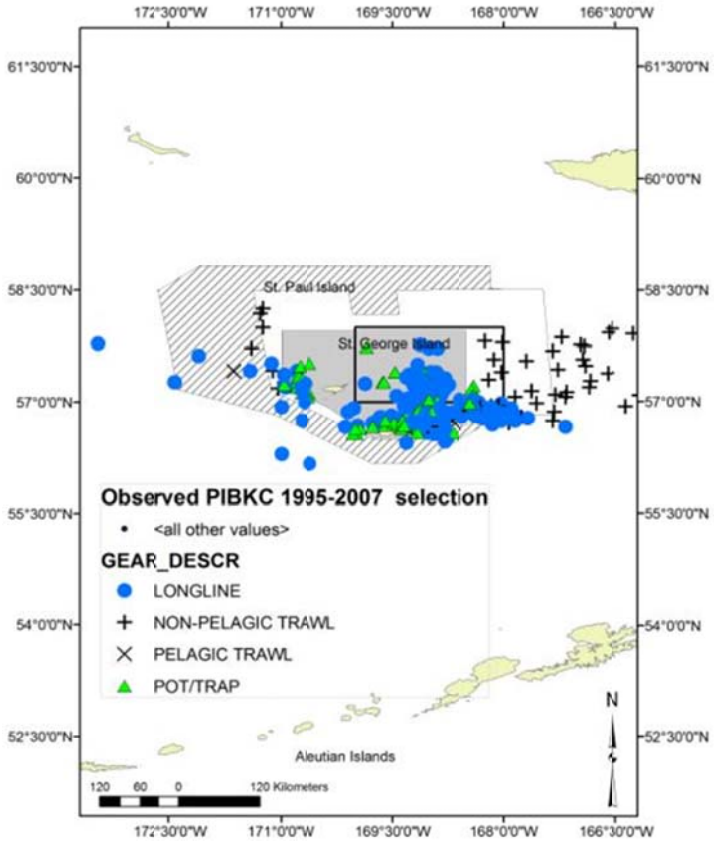

Figure 23 Distribution of 1995-2007 Pribilof Islands blue king crab (PIBKC) catches in groundfish fisheries relative to the four proposed closure areas based on alternatives.

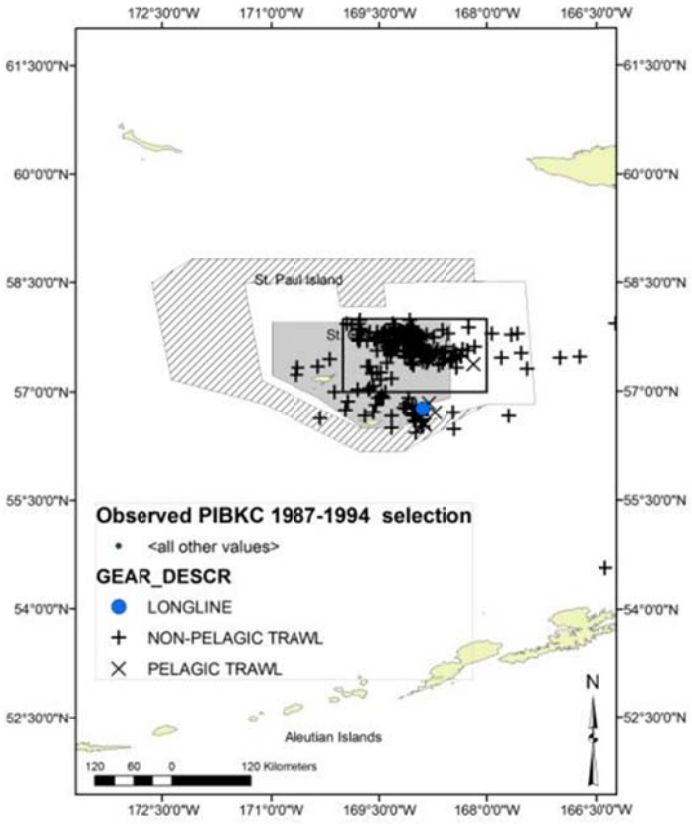

Figure 24 Distribution of 1987-1994 Pribilof Islands blue king crab (PIBKC) catches in groundfish fisheries relative to the four proposed closure areas based on alternatives.

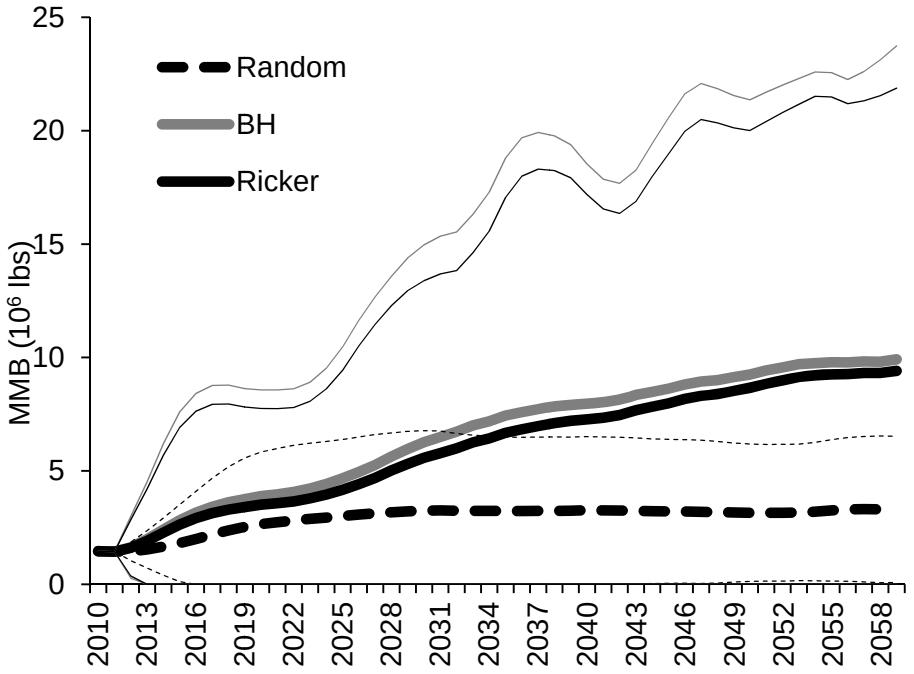

Figure 25 Projection estimates (± CI) of mature male biomass (MMB) based on random, Ricker, and Beverton-Holt (BH) recruitment models for the status quo reduction in groundfish bycatch of Pribilof Islands blue king crab.

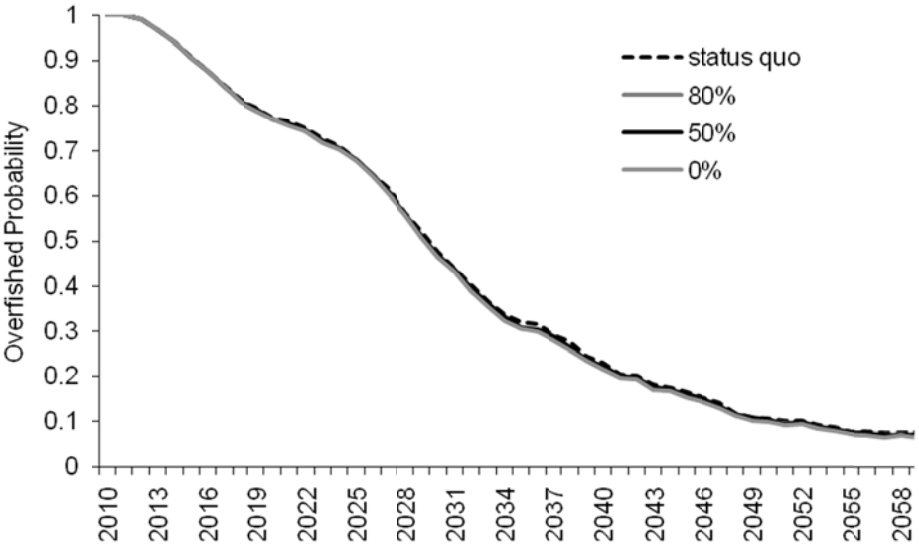

Figure 26 Projection estimates of the probability of overfishing based on a Ricker recruitment function for each groundfish reduction of Pribilof Islands blue king crab bycatch scenario under option a for all groundfish fisheries.

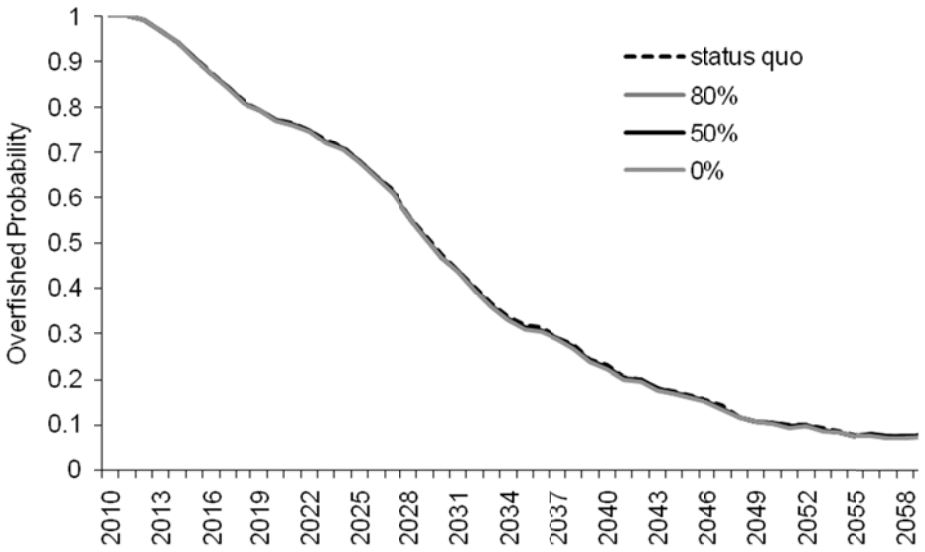

Figure 27 Projection estimates of the probability of overfishing based on a Ricker recruitment function for each groundfish reduction of Pribilof Islands blue king crab bycatch scenario under option b for Pacific cod pot fisheries.

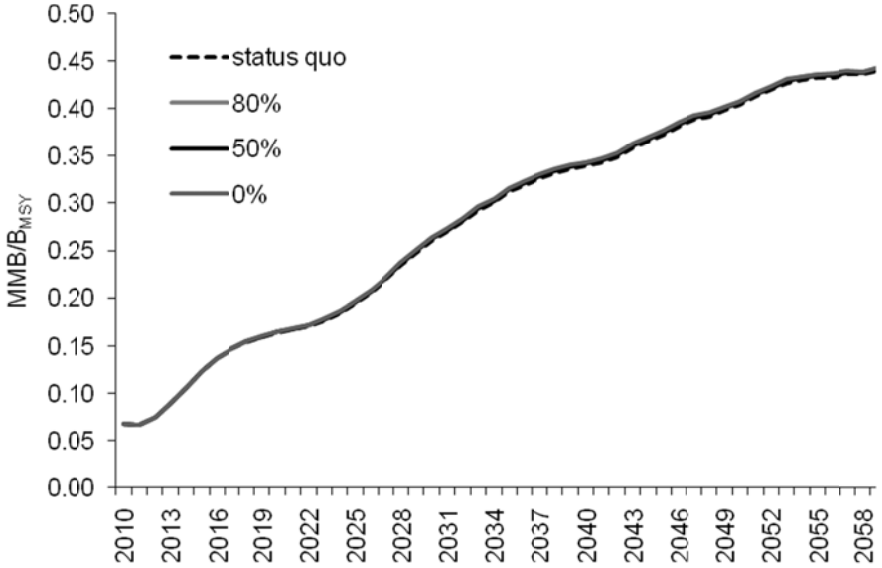

Figure 28 Projection estimates of MMB relative to B_{MSY} based on a Ricker recruitment function for each groundfish reduction of Pribilof Islands blue king crab bycatch scenario under option a for all groundfish fisheries.

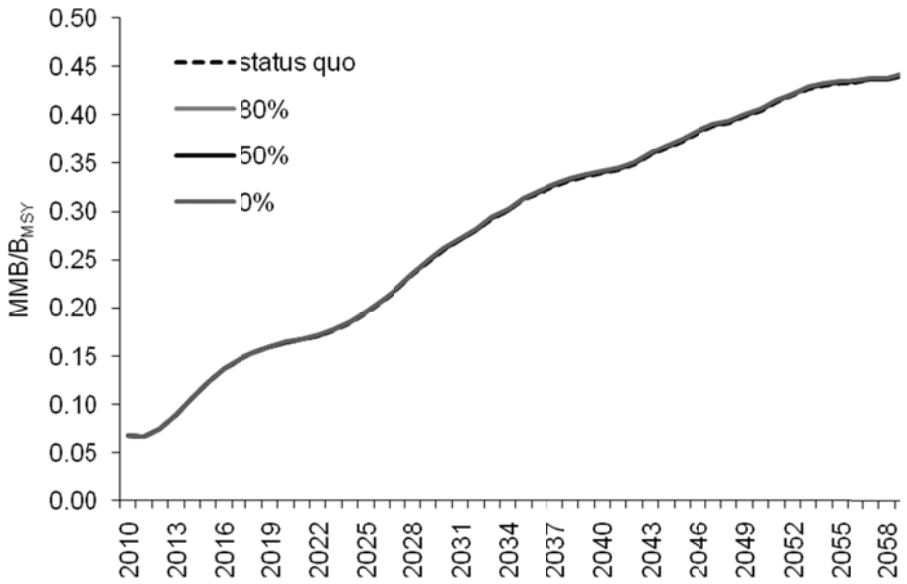

Figure 29 Projection estimates of mature male biomass (MMB) relative to B_{MSY} based on a Ricker recruitment function for each groundfish reduction of Pribilof Islands blue king crab bycatch scenario under option b for Pacific cod pot fisheries.

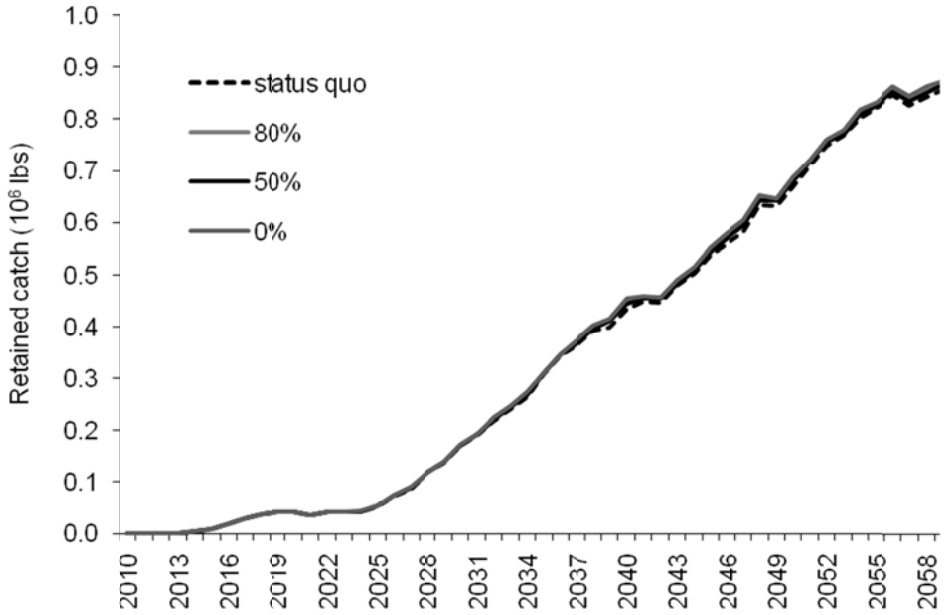

Figure 30 Projection estimates of retained catch based on a Ricker recruitment function for each groundfish reduction of Pribilof Islands blue king crab bycatch scenario under option a for all groundfish fisheries.

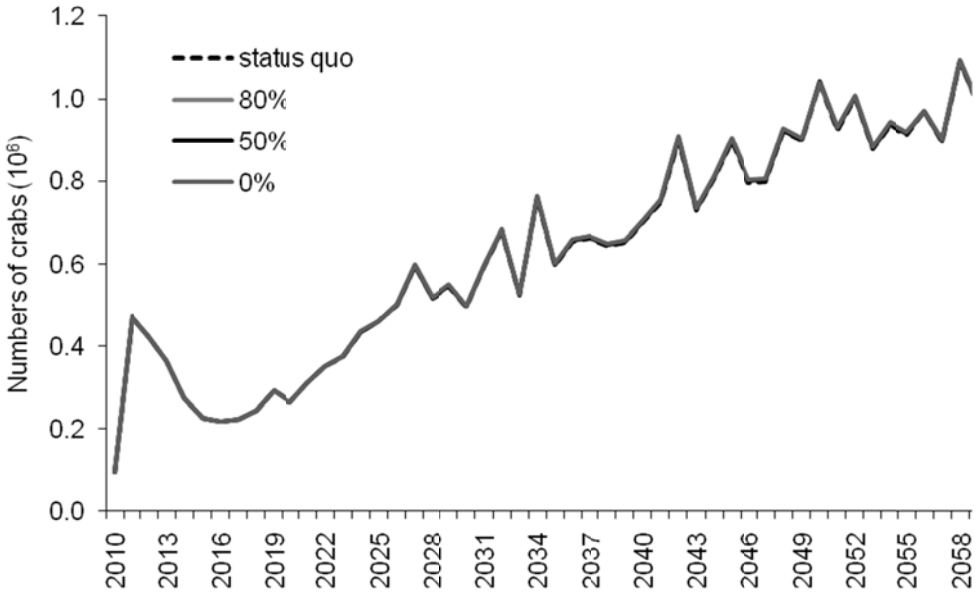

Figure 31 Projection estimates of recruitment based on a Ricker recruitment function for each groundfish reduction of Pribilof Islands blue king crab bycatch scenario under option a for all groundfish fisheries.

11 Tables

Table 1 List of fisheries and gear types with recorded bycatch of Pribilof Islands blue king crab in the area shown in Figure 8, 2003-2010 (as of 11/2/2010).

The records column indicates the datasource where a record of bycatch since 2003 was used. PSC = NMFS RO estimates (from CAS in area 513 only), OBS = Observer data and FT = Fishticket from Alaska Department of Fish and Game Stat areas used to define the Pribilof area.

Target	Gear	Records
Pacific cod	Pot	PSC, FT, OBS
	Trawl	PSC, FT,
	Hook and Line	PSC, FT, OBS
Rock Sole	Trawl	PSC
Flathead Sole	Trawl	PSC, FT, OBS[9]
Yellowfin sole	Trawl	PSC, OBS
Pollock	Trawl	FT, OBS
Other Flatfish	Trawl	OBS
Greenland Turbot	Hook and Line	OBS
Other Species	Hook and Line	FT[10]

[9] When smaller areas are included per Figure 8 the Flathead sole NPT fishery also has an observed record of PIBKC bycatch.

[10] Note when smaller areas are considered per Figure 8 these are no longer included.

Table 2 Estimated Pribilof Islands blue king crab stock abundances (millions of crab).

Year	Pre-recruit 2	Pre-recruit 1	Recruits	Post-Recruits	Legals	Matures
1975	4.54	4.40	1.91	4.54	6.45	10.85
1976	2.41	3.57	1.29	5.14	6.43	9.99
1977	5.82	2.40	1.28	4.66	5.94	8.34
1978	2.64	3.03	0.92	4.26	5.19	8.22
1979	0.96	2.19	1.32	3.68	5.00	7.20
1980	0.50	1.19	0.94	3.50	4.44	5.63
1981	0.63	0.63	0.46	2.47	2.93	3.57
1982	0.70	0.47	0.23	1.40	1.63	2.10
1983	0.47	0.43	0.16	0.84	1.00	1.42
1984	0.20	0.34	0.16	0.59	0.75	1.08
1985	0.07	0.21	0.16	0.59	0.75	0.95
1986	0.02	0.09	0.10	0.56	0.66	0.76
1987	0.01	0.04	0.05	0.52	0.57	0.60
1988	0.00	0.01	0.02	0.39	0.41	0.42
1989	1.80	0.00	0.01	0.34	0.35	0.35
1990	1.62	1.01	0.06	0.29	0.35	1.36
1991	1.06	1.10	0.55	0.32	0.86	1.97
1992	1.15	0.87	0.43	0.74	1.17	2.04
1993	0.76	0.79	0.31	0.98	1.29	2.08
1994	0.72	0.63	0.26	1.08	1.34	1.96
1995	0.45	0.53	0.16	1.12	1.28	1.82
1996	0.33	0.41	0.09	0.92	1.00	1.42
1997	0.22	0.32	0.07	0.73	0.79	1.11
1998	0.24	0.24	0.04	0.60	0.64	0.89
1999	0.16	0.20	0.03	0.47	0.50	0.70
2000	0.12	0.16	0.02	0.42	0.44	0.60
2001	0.09	0.13	0.01	0.37	0.38	0.51
2002	0.07	0.10	0.01	0.32	0.33	0.43
2003	0.05	0.08	0.01	0.27	0.28	0.37
2004	0.04	0.07	0.01	0.24	0.25	0.31
2005	0.03	0.05	0.01	0.21	0.21	0.27
2006	0.04	0.04	0.01	0.18	0.19	0.23
2007	0.27	0.03	0.01	0.16	0.16	0.20
2008	0.36	0.08	0.01	0.14	0.15	0.23
2009	0.21	0.14	0.03	0.12	0.15	0.29

Table 3 Posterior means and 90% intervals for key parameters of the Pribilof Islands blue king crab population dynamics model used for projection purposes.

Parameter	Distribution
Beverton-Holt stock-recruitment relationship	
Virgin MMB	27.0 (25.3, 28.6)
Steepness, h	0.250 (0.501, 0.538)
F_{MSY} ($F_{35\%}$)	0.18
B_{MSY} ($B_{35\%}$)	9.0 (8.5, 9.4)
σ_R	10.1 (7.7, 12.5)*
Ricker stock-recruitment relationship	
Virgin MMB	21.2 (20.1, 22.4)
Steepness, h	0.543 (0.519, 0.564)
F_{MSY} ($F_{35\%}$)	0.18
B_{MSY} ($B_{35\%}$)	9.0 (8.5, 9.4)
σ_R	10.1 (7.6, 12.5)*

* σ_R was set to 1.5 for the projections

Table 4 Proportion of the Pribilof Islands blue king crab bycatch among target species between 2003/04 and 2009/10 crab fishing seasons. Total mortality is the total bycatch multiplied by the handling mortality (50% fixed gear, 80% trawl gear).

Crab fishing season	Yellowfin sole %	Pacific cod %	Flathead sole %	Rocksole %	Total Mortality million lbs
2003/04	47	22	31		0.0008
2004/05		100			0.0009
2005/06		97	3		0.0028
2006/07	54	20		26	0.0003
2007/08	3	96	1		0.0046
2008/09	77	23			0.0010
2009/10	51	39	10		0.0013

Table 5 Proportion of the Pribilof Islands blue king crab bycatch among gear types between 2003/04 and 2009/10 crab fishing seasons. Total mortality is the total bycatch multiplied by the handling mortality (50% fixed gear, 80% trawl gear).

Crab fishing season	hook and line %	non-pelagic trawl %	pot %	TOTAL million lbs
2003/04	21	79		0.0008
2004/05	99	1		0.0009
2005/06	18	3	79	0.0028
2006/07	20	20		0.0003
2007/08	1	3	95	0.0046
2008/09	23	77		0.0010
2009/10	21	61	18	0.0013

Table 6 Pacific halibut catch from 2004 to 2008 in International Pacific Halibut Commission areas that overlap with Pribilof Islands blue king crab 1975-1984 distribution area.

	Log Data			Ticket Data	
Year	Net wt (lbs)	Effective skates hauled	Distinct # of vessels	Net wt (lbs)	Distinct # of vessels
2004	602,063	6,867	25	965,598	40
2005	473,426	6,180	21	534,876	23
2006	401,420	5,785	17	486,359	20
2007	439,683	7,071	15	546,842	21
2008	597,274	7,448	25	791,283	32

Table 7 Groundfish catches (t) in the Pribilof Islands Habitat Conservation Zone between 2003 and 2009. C represents a confidential value. Species code names found in Appendix Table A1.

Species	2003	2004	2005	2006	2007	2008	2009
AKPL	49.15	2.12	2.8	27.22	46.42	16.35	2.71
AMCK	0.01	7.65	0.11	0.01	0.06	0.15	0.04
ARTH	92.3	67.78	26.74	46.07	192.3	27.17	33.38
DEM1	3.53						
DFL4	0.27						
FLO5	3.48	16.08	4.35	2.25	8.43	0.92	0.37
FSOL	313.46	153.58	55	102.19	293.59	173.25	139.15
GTRB	0.75	0.16	0.15	0.79	0.18	0.04	0.30
NORK	0.13	0.28	0.2	0.08	0.03	0.07	0.10
OTHR	429.03	580.7	818.82	503.51	519.74	278.65	233.74
PCOD	3392.04	5847.39	7833.58	4640.75	4083.36	2563.44	1295.97
PEL7	0.04						
PLCK	2742.45	6540.28	2554.52	1315.92	736.78	339.29	
POPA	0.22	0.02	C	0.02	1.03		0.07
REYE		0.02	C			0.01	C
ROCK	0.58	0.99	0.34	0.05	0.06	0.12	0.10
RSOL	57.52	44.12	31.23	53.55	155.21	57.94	25.61
SABL	109.24	C	0.32	C	C	0.03	C
SFL1	0.38						C
SQID	0.15	0.12	0.09	C	C	C	0.21
SRKR		0.43	C	C		0.08	
SRRE	4.78						
THDS	6.11						
USKT			C				
YSOL	144.93	19.41	37.53	97.06	270.67	54.41	26.33

Table 8 Bycatch mortality by fishery 2003/04-2009/10

Crab fishing season	yellowfin sole	pacific cod	flathead sole	rocksole	TOTAL
2003/04	0.0004	0.0002	0.0002		0.0008
2004/05		0.0009			0.0009
2005/06		0.0027	0.00008		0.0028
2006/07	0.0002	0.0001	0.0000	0.0001	0.0003
2007/08	0.0001	0.0044	0.00005		0.0046
2008/09	0.0008	0.0002	0.0000		0.0010
2009/10	0.0007	0.0005	0.0001		0.0013

Table 9 Bycatch mortality by gear type 2003/04-2009/10

Crab fishing season	hook and line	non-pelagic trawl	pot	TOTAL
2003/04	0.0002	0.0006		0.0008
2004/05	0.0009			0.0009
2005/06	0.0005	0.0001	0.0022	0.0028
2006/07	0.0001	0.0001		0.0003
2007/08	0.00005	0.0001	0.0044	0.0046
2008/09	0.0002	0.0008		0.0010
2009/10	0.0003	0.0008	0.0002	0.0013

Table 10 Groundfish catches (t) in the ADF&G closure area between 2003 and 2009. C represents a confidential value. Species code names found in Appendix Table A1.

Species	2003	2004	2005	2006	2007	2008	2009
AKPL	46.7	2.2	81.5	8.6	457.9	437	3.27
AMCK		0	C	C			
ARTH	3.9	7.5	9.6	21.6	4.9	71	3.06
FLO5	3	2	4.1	1.7	108.1	69	0.76
FSOL	8	24.3	13.4	26.6	46.2	184.6	1.23
GTRB			C	C			
NORK		0					
OTHR	189.7	108.6	410.4	272.9	409.3	245.4	66.99
PCOD	1132.8	1757.5	4749.8	1973.9	1970.8	955	269.21
PLCK	646.7	3429.7	1041.1	2046.7	167	215.8	20.12
POPA					C		C
ROCK		C			C		C
RSOL	266.5	24.5	275.3	83.7	154.2	280.8	5.26
SABL			C				
USKT			C				
YSOL	1589	57.1	541.3	80.8	3687.8	5575.8	7.925399

Table 11 Groundfish catches (t) in the Pribilof Islands blue king crab 1975 to 1984 distribution area (Alternative 4) between 2003 and 2009. C represents a confidential value. Species code names found in Appendix Table A1.

Species	2003	2004	2005	2006	2007	2008	2009
AKPL	2811.06	2045.68	5230.71	6144.12	6648.04	3052.31	3068.79
AMCK	26.08	48.78	146.71	80.93	1.58	5.37	0.70
ARTH	2230.63	2128.19	919.34	1211.98	1736.82	814.67	518.96
BSKT					C		
DEM1	3.53						
DFL4	0.27						
FLO5	68.3	178.22	207.04	91.76	292.25	95.98	20.17
FSOL	6505.89	6639.13	3494.26	4175.13	5498.23	4659.14	2949.39
GTRB	20.3	30.95	3.52	9.13	45.31	6.16	9.36
NORK	12.67	4.91	15.34	25.59	12.94	7.84	5.18
OTHR	3943.18	4952.31	4752.88	4787.51	4508.9	2876.37	2402.20
PCOD	20441.1	25625.09	27050.89	23805.02	16817.21	16084.11	11326.55
PEL7	0.39		C				C
PLCK	156257.6	135226.8	171928.5	110899.7	114518.4	98157.62	109329.87
POPA	30.49	31.98	29.5	38.03	61.68	6.38	16.40
REXS			C				
REYE		0.45	0.1	0.11	0.01	0.16	0.42
ROCK	7.99	8.78	4.16	5.04	7.89	4.2	1.56
RSOL	3065.19	4273.2	5955.45	3587.82	3491.96	1681.15	1659.25
SABL	111.84	1.57	2.16	11.28	0.81	8.39	43.25
SFL1	0.38		C		C		C
SQID	22.76	13.19	28.41	32.11	31.39	14.14	2.25
SRKR		10.93	4.92	0.29	1.12	2.46	2.38
SRRE	8.38						
THDS	6.11						2.30
USKT			4.76		C		0.44
YSOL	18626.66	20670.73	50288.53	23257.97	34578.35	18457.86	14628.91

Table 12 Groundfish catches (t) in the Pribilof Islands blue king crab 1984 to 2008 distribution area (Alternative 4) between 2003 and 2009. C represents a confidential value. Species code names found in Appendix Table A1.

Species	2003	2004	2005	2006	2007	2008	2009
AKPL	2096.72	1021.31	4073.45	2440.17	1882.07	2585.37	930.4366
AMCK	8.18	44.59	114.46	16.67	0.12	0.45	0.14
ARTH	1045.58	1036.87	531.97	565.26	1090.16	490.76	203.50
BSKT					C		
DEM1	3.53						
DFL4	0.27						
FLO5	40.85	101.67	136.09	46.53	233.21	87.81	6.57
FSOL	2802.2	2782.98	1858.87	1499.6	2674.1	2487.75	1132.59
GTRB	10.64	6.58	1.88	2.56	1.44	1.55	1.10
NORK	0.28	0.83	12.43	0.81	0.06	0.18	0.42
OTHR	2003.05	2067.34	2867.57	1974.07	1922.39	1676.59	933.06
PCOD	10413.82	12741.2	18184.63	12493	9414.95	7341.05	3727.89
PEL7	0.39						
PLCK	38058.53	75092.87	46230.32	18850.34	21793.93	17508.1	13679.10
POPA	8.59	18.84	23.47	0.85	15.54	0.03	0.84
REXS			C				
REYE		0.05	C	C	C	0.02	0.00
ROCK	4.77	2.82	0.77	0.4	0.13	0.2	0.19
RSOL	1902.29	1811.81	4333.92	1183.77	1621.72	1011.36	702.91
SABL	110.07	0.56	1.58	C	0.09	0.04	C
SFL1	0.38				C		
SQID	0.74	1.02	0.41	0.46	0.34	0.25	0.15
SRKR		0.92	C	C	C	0.09	0.35
SRRE	4.85						
THDS	6.11						
USKT			C		C		
YSOL	14461.82	11625.25	30371.47	10753.54	10902.81	16752.7	3947.835

Table 13 The count and mean length of observed Pribilof Islands blue king crab catches by sex for each alternative proposed closure area between 2003 and 2007.

		2003		2004		2005		2006		2007	
Alternative		count	mean length	count	mean length	count	mean length	count	mean length	count	mean length
	Female	24	130.1	18	143.3	38	140.3	17	147.4	19	125.5
1 & 2	Male	7	163.7	5	167.0	17	180.7	4	153.0	5	128.0
	Total	31	139.2	23	149.0	55	155.1	21	148.5	24	126.1
	Female	0		4	124.3	38	140.3	15	146.9	19	125.5
3	Male	0		1	158.0	17	180.7	4	153.0	5	128.0
	Total	0		5	131.0	55	155.1	19	148.3	24	126.1
	Female	25	126.0	18	143.3	39	139.5	17	147.4	19	125.5
4	Male	7	163.7	6	171.3	17	180.7	5	164.0	5	128.0
(1984-2009)	Total	32	135.8	24	151.0	56	154.2	22	151.3	24	126.1
	Female	25	126.0	18	143.3	39	139.5	18	144.5	19	125.5
4	Male	7	163.7	6	171.3	18	182.1	6	163.0	5	128.0
(1975-2009)	Total	32	135.8	24	151.0	57	155.3	24	149.3	24	126.1

Table 14 Non-retained total catch mortalities from directed and non-directed fisheries for Pribilof Islands District blue king crab.

Handling mortalities (pot and hook/line= 0.5, trawl = 0.8) were applied to the catches. (Bowers et al. 2008; D. Pengilly, ADF&G; J. Mondragon, NMFS). NMFS Area 513 only.

	Crab Pot Fisheries			Groundfish Fisheries	
	Legal non-retained 10^6 lbs	Sublegal male 10^6 lbs	All Female 10^6 lbs	All Pot 10^6 lbs	All Trawl 10^6 lbs
1991	0	0	0	0.0001	0.0109
1992	0	0	0	0.0010	0.1072
1993	0	0	0	<0.0001	0.0604
1994	0	0	0	<0.0001	0.0121
1995	0	0	0	0.0001	0.0023
1996	0	0.001	0	<0.0001	0.0001
1997	0	0	0	0.0016	0.0002
1998	0.003	0.001	0.004	0.0218	0.0001
1999	0.004	0.005	0.002	0.0009	<0.0001
2000	0	0	0	0.0001	<0.0001
2001	0	0	0	0.0009	0.0001
2002	0	0	0	0.0001	0.0005
2003	0	0	0	0.0004	0.0004
2004	0	0	0	0.0009	<0.0001
2005	0	0	0.0001	0.0004	0.0024
2006	0	0	0.0001	0.0002	0.0001
2007	0	0	0.0001	0.0044	0.0002
2008	0	0	0	0.0002	0.0008

Table 15 Preliminary assessment of the potential relationship between blue king crab in the Pribilof Islands and St. Matthew. Factors and criterion were based on information contained in Spencer et al. (In Prep).

Harvest and Trends	
Factor and criterion	**Justification**
Fishing mortality (5-year average percent of F_{max})	Fishing mortality rates are low in the Pribilof Islands and although rates near St. Matthew have increased in the past two years, they are much lower than F_{max}.
Spatial concentration of fishery relative to abundance (Fishing is focused in areas << management areas)	Harvests in the St. Matthew stock are concentrated south of St. Matthew likely due to the accessibility of the stock. Since much of the stock biomass is north of St. Matthew localized depletion may be an issue.
Population trends (Different areas show different trend directions)	Population trends are very different between St. Paul and St. Matthew stocks suggesting different productivities or better recruitment conditions.

Barriers and phenotypic characters	
Generation time (e.g., >10 years)	Generation time in <10 years.
Physical limitations (Clear physical inhibitors to movement)	No apparent physical barriers to adult dispersal but larval dispersal may be affected by local oceanography (see Parada et al. 2010).
Growth differences (Significantly different LAA, WAA, or LW parameters)	Unknown although warmer temperatures in the Pribilof Islands likely lead to higher growth rates.
Age/size-structure (Significantly different size/age compositions)	TBD
Spawning time differences (Significantly different mean time of spawning)	Unknown
Maturity-at-age/length differences (Significantly different mean maturity-at-age/ length)	TBD
Morphometrics (Field identifiable characters)	Unknown
Meristics (Minimally overlapping differences in counts)	Unknown

Behavior and movement	
Spawning site fidelity (Spawning individuals occur in same location consistently)	Unknown
Mark-recapture data (Tagging data may show limited movement)	TBD
Natural tags (Acquired tags may show movement smaller than management areas)	Unknown

Genetics	
Isolation by distance (Significant regression)	No apparent isolation by distance.
Dispersal distance (<<Management areas)	Not available
Pairwise genetic differences (Significant differences between geographically distinct collections)	TBD

12 Appendix: Groundfish catch by closure area, target species and gear type 2003-2009

Table A1 Species codes in groundfish catch tables.

Species code	Common name
PCOD	Pacific Cod
ARTH	Arrowtooth Flounder
RSOL	Rock Sole
YSOL	Yellowfin Sole
GTRB	Greenland Turbot
POPA	Pacific Ocean Perch
HLBT	Halibut
PLCK	Pollock
SABL	Sablefish
SQID	BSAI Squid
RKCR	Red King Crab
BTCR	Bairdi Tanner Crab
OTCR	Opilio Tanner (Snow) Crab
HERR	Herring
STLH	Steelhead Trout
BKCR	Blue King Crab
GKCR	Golden (Brown) King Crab
CHNK	Chinook Salmon
CHUM	Chum Salmon
COHO	Coho Salmon
PINK	Pink Salmon
SOCK	Sockeye Salmon
AMCK	Atka Mackerel
NCHN	Non-Chinook Salmon
AKPL	BSAI Alaska Plaice
NORK	Northern Rockfish
GREN	Grenadier
HAKE	Pacific Hake
REYE	BSAI Rougheye Rockfish
SRKR	BSAI Shortraker Rockfish
FSOL	Flathead Sole
FLO5	BSAI Other Flatfish
PEL7	GOA Pelagic Shelf Rockfish
ROCK	Other Rockfish
NONQ	Non-Quota species
OTHR	Other Species

Table A2 Groundfish catches (t) in the Pribilof Islands Habitat Conservation Zone between 2003 and 2009. C represents a confidential value. Targets: C= Pacific cod, I=halibut, K=rockfish, S=sablefish, and W=arrowtooth flounder. CDQ=Community Development Quota, OA=Open Access, IFQ=Individual Fishing Quota. CV=catcher vessel, and CP=catcher processor.

Target	Program	Sector	Gear	2003	2004	2005	2006	2007	2008	2009
C	CDQ	CP	HAL		50.04	1110.83	192.91	196.95	129.31	349.92
C	OA	CP	HAL	3405.58	3994.91	4926.2	3352.41	2055.74	1304.8	892.20
C	OA	CP	POT	C	1881.55	C	C	1423.65	C	303.10
C	OA	CV	HAL	C		C				
C	OA	CV	JIG		0.14					C
C	OA	CV	POT	C	533.1	991.78	733.78	731.88	794.98	C
I	CDQ	CV	HAL				C	C		
I	IFQ	CV	HAL	4	0.48	C			1.61	
I	OA	CV	HAL		C	C				
K	IFQ	CV	HAL	0.37						
K	OA	CP	HAL	C						
K	OA	CV	HAL	1.38						
K	OA	CV	JIG	C						
NULL	OA	CP	POT		C				C	
O	OA	CP	HAL				C			
O	OA	CV	HAL	C	C					
S	IFQ	CV	HAL	32.18				C		
S	OA	CP	HAL	18.42						
S	OA	CV	HAL	74.7						
T	OA	CP	HAL	1.65						
W	OA	CP	HAL					C		

Table A3 Groundfish catches (t) in the Pribilof Islands Habitat Conservation Zone between 2003 and 2009. C represents a confidential value. Species code names found in Appendix 1, Table A1.

Gear	Species	2003	2004	2005	2006	2007	2008	2009
HAL	AKPL	C		0.03	C	C		C
HAL	AMCK		0.03	C		C		0.04
HAL	ARTH	14.74	12.28	16.1	14.01	6.59	8.73	8.96
HAL	DEM1	3.52						
HAL	DFL4	0.27						
HAL	FLO5	3.15	2.38	3.94	2.03	7.76	0.79	0.09
HAL	FSOL	5.56	13.27	14.69	19.33	10.16	11.9	7.10
HAL	GTRB	0.74	0.14	0.15	0.06	C	0.03	0.25
HAL	NORK	0.1	0.08	0.14	0.08	0.03	C	0.06
HAL	OTHR	360.64	516.47	789.24	434.47	395.11	215.06	218.95
HAL	PCOD	2913.59	3381.84	5072.66	2990.94	1763.68	1172.93	980.21
HAL	PEL7	0.03						
HAL	PLCK	105.64	104.22	96.35	47.62	51.39	20.45	20.73
HAL	POPA			C	C			C
HAL	REYE		0.02	C			0.01	C
HAL	ROCK	0.58	0.99	0.34	0.05	0.04	0.08	0.10
HAL	RSOL	1.21	1.46	19.96	2.46	0.43	0.29	0.50
HAL	SABL	109.24	C	0.32	C	C	0.03	C
HAL	SFL1	0.38						
HAL	SQID						C	
HAL	SRKR		0.19	C	C		0.08	0.21
HAL	SRRE	4.78						
HAL	THDS	6.11						
HAL	USKT			C				
HAL	YSOL	10.91	12.05	23	35.15	19.72	5.35	6.84
JIG	DEM1	C						
JIG	PCOD		0.14					
JIG	PEL7	C						
JIG	ARTH							C
JIG	FSOL							C
JIG	OTHR							C
JIG	PCOD							C
JIG	PLCK							C
POT	AKPL	C						
POT	AMCK		C		C	0.04	C	
POT	ARTH		C		C		C	C
POT	FLO5		C		C		C	
POT	FSOL	C	C	0.03	C	C	0.01	
POT	GTRB				C		C	C
POT	NORK		C			C	0.07	C
POT	OTHR	8.76	17.18	14.1	36.81	45.6	22.69	3.45
POT	PCOD	378.61	2392.89	2742.12	1600.95	2096.1	1363.52	291.10
POT	PLCK	2.43	1.97	1.73	1.84	0.51	0.16	C
POT	ROCK		C			C	0.04	C
POT	RSOL	C	0.03	0.07	C	C	0.01	
POT	YSOL	C	2.52	10.97	4.06	11.55	1.84	C

Table A4 Groundfish catches (t) in the Alaska Department of Fish and Game closure area between 2003 and 2009.

C represents a confidential value. Targets: C= Pacific cod, I=halibut, K=rockfish, S=sablefish, and W=arrowtooth flounder. CDQ=Community Development Quota, OA=Open Access, IFQ=Individual Fishing Quota. CV=catcher vessel, and CP=catcher processor.

Target	Program	Sector	Gear	2003	2004	2005	2006	2007	2008	2009
B	CDQ	CP	PTR			C				
B	OA	CP	NPT				C			
B	OA	CP	PTR			C				
C	CDQ	CP	HAL		C	C	C	C	C	C
C	OA	CP	HAL	1134.6	785	3182.2	1983.4	1828.8	515.2	313.22
C	OA	CP	NPT	C	C		C			
C	OA	CP	POT		C	C	C	C	C	C
C	OA	CV	HAL			C				
C	OA	CV	POT	C		123.1				
I	CDQ	CV	HAL					C		
L	OA	CP	NPT		82.4	C		C	C	C
P	AFA	CV	PTR		C			C		
P	CDQ	CP	PTR		278.9		C			
P	CDQ	CV	PTR		C	C				
P	OA	CP	PTR	C	3054.7	468.6	1501.9			C
P	OA	CV	PTR	C		C				
R	CDQ	CP	NPT		C			C		
R	CDQ	CV	NPT					C		
R	OA	CP	NPT	C	C	507.4	C			C
W	OA	CP	HAL					C		
Y	CDQ	CP	NPT					C	C	
Y	CDQ	CV	NPT					C		
Y	OA	CP	NPT	2388.6	40.1	612.4	20.5	3226.4	7072.2	C
Y	OA	CV	NPT				C		C	

Table A5 Groundfish catches (t) in the Alaska Department of Fish and Game closure area between 2003 and 2009.

C represents a confidential value. Species code names found in Appendix 1, Table A1.

Gear	Species	2003	2004	2005	2006	2007	2008	2009
HAL	AKPL	C		C	0	C		
HAL	AMCK		C					
HAL	ARTH	2.7	1.3	3	2.9	1.2	1.3	2.33
HAL	FLO5	2.7	1.8	0.2	0.6	1.5		0.02
HAL	FSOL	2.4	2.4	2.1	1.8	0.6	0.5	0.62
HAL	GTRB			C	C			
HAL	NORK		C					
HAL	OTHR	131.5	91.2	370.1	218.5	321.7	67.4	65.18
HAL	PCOD	950.9	664.1	3067.3	1737.3	1381.1	426	245.14
HAL	PLCK	37.6	18.5	85.9	59.2	94	20.7	6.46
HAL	ROCK		C					0.02
HAL	RSOL	0.1	0.1	0.9	0.1	0.2	0	C
HAL	SABL			C				
HAL	USKT			C				
HAL	YSOL	6.7	6.9	25.5	32.6	34.2	6.7	1.90
NPT	AKPL	46.7	2.2	81.4	8.6	457.9	437	3.27
NPT	ARTH	1.2	6.2	6.6	C	3.7	69.7	C
NPT	FLO5	C	C	3.9	1.1	106.7	69	C
NPT	FSOL	5.6	21.4	11.2	23.4	44.3	184.1	0.56
NPT	OTHR	58.1	10.5	32.8	47.8	86.7	178	1.06
NPT	PCOD	180.6	17.1	97.6	80.9	82	461.8	1.39
NPT	PLCK	590.2	15.1	111.8	223.7	66.9	195.1	4.16
NPT	POPA					C		C
NPT	RSOL	266.4	15.8	270.9	83.3	154	280.8	5.17
NPT	YSOL	1582.3	48.7	508.1	47.7	3653.5	5569.1	4.44
POT	FLO5		C					
POT	FSOL			0		C		
POT	OTHR	C	C	5.4	C	C	C	C
POT	PCOD	C	C	1563.7	C	C	C	C
POT	PLCK	C	C	1.5	C	C		C
POT	ROCK					C		
POT	RSOL		C	0	C	C		
POT	YSOL	C	C	7.7	C	C	C	C
PTR	AKPL		0		0			C
PTR	AMCK		0	C	C			
PTR	ARTH	C	0	C	0.2	C		C
PTR	FLO5		0		C	C		C
PTR	FSOL	C	0.6	0.1	1.3	C		C
PTR	OTHR	C	2.4	2.1	0.8	C		C
PTR	PCOD	C	11.8	21.3	14.9	C		C
PTR	PLCK	C	3395.2	842	1763.5	C		C
PTR	RSOL	C	8.5	3.5	0.2	C		C
PTR	YSOL	C	0.3		0.3			

Table A6 Groundfish catches (t) in the Pribilof Islands blue king crab 1975 to 1983 distribution area (Alternative 4) between 2003 and 2009.

C represents a confidential value. Targets: C= Pacific cod, I=halibut, K=rockfish, S=sablefish, W=arrowtooth flounder, P=pollock (midwater), Y=yellowfin sole, B=Pollock (bottom), E=Alaska plaice, F=other flatfish, L=flathead sole, O=other, R=rock sole, T=Greenland turbot.

Target	Program	Sector	Gear	2003	2004	2005	2006	2007	2008	2009
A	OA	CP	NPT	C	93.95	254.01	C			
B	AFA	CV	PTR	215.12	C	C	C	938.47	1175.29	3260.21
B	CDQ	CP	PTR		C	C			C	717.34
B	CDQ	CV	PTR						38.56	C
B	OA	CP	NPT	C			54.47			
B	OA	CP	PTR	C	C	C	1878.35	2076.02	4192.13	5231.55
B	OA	CV	PTR	C					C	C
C	CDQ	CP	HAL		1133.55	2085.45	905.89	848.79	494.88	1182.05
C	OA	CP	HAL	18787.57	21600.46	21571.45	20492.55	11350.53	10280.79	8069.22
C	OA	CP	NPT	1490.2	3364.94	1030.32	2712.02	1419.34	270.37	190.56
C	OA	CP	POT	C	1923.93	C	2043.33	2175.05	C	C
C	OA	CV	HAL	5.83	C	C	C	C	C	C
C	OA	CV	JIG	0.07	0.71	C	C	C	C	C
C	OA	CV	NPT	91.59		C	C	380.85	499.08	145.74
C	OA	CV	POT	612.57	642.36	1193.16	740.31	981.29	3084.24	C
C	SMPC	CV	JIG				C			
E	OA	CP	NPT					C	78.11	
F	OA	CP	NPT		C	C	C	31.12		
I	CDQ	CV	HAL			C	C	0.02	0.26	
I	IFQ	CV	HAL	4.11	3.27	0.32	C	0.17	3.11	2.35
I	OA	CP	HAL		C					
I	OA	CV	HAL	C	C	C			C	
I	OA	CV	JIG					C		
K	IFQ	CV	HAL	0.37						
K	OA	CP	HAL	C						
K	OA	CP	NPT	C	C		C			
K	OA	CV	HAL	1.38						
K	OA	CV	JIG	C						
L	CDQ	CP	NPT					C		C
L	OA	CP	NPT	11214.05	14733.56	5450.35	8933.11	10883.38	8218.46	5073.54
NULL	OA	CP	HAL	C			C	C		
NULL	OA	CP	NPT		C		C			
NULL	OA	CP	POT		C			C	C	
O	OA	CP	HAL				C			
O	OA	CP	NPT	C	C		C	C		
O	OA	CV	HAL	C	C					
O	OA	CV	POT		C					
P	AFA	CV	NPT							C
P	AFA	CV	PTR	52356.7	29907.04	70920.58	27943.73	40579.23	55029.57	40400.39
P	CDQ	CP	PTR	4.11	14663.86	15454.28	15491.98	15382.35	7540.1	15059.84
P	CDQ	CV	PTR	C	C	C	C	C	C	C
P	OA	CP	NPT			C				
P	OA	CP	PTR	79024.89	76781.63	66316.76	50981.59	44931.98	21427.06	32040.36
P	OA	CV	PTR	19010.35	2595.12	10193.83	7996.13	4840.29	5245.33	8835.83
R	CDQ	CP	NPT		C	C	C	C		C
R	CDQ	CV	NPT					C		
R	OA	CP	NPT	1176.47	2585.5	4897.1	2456.5	1357.38	389.7	731.49
S	CDQ	CV	POT						C	
S	IFQ	CV	HAL	32.2		C	12.5	C	C	C
S	IFQ	CV	POT	C		C	C		C	
S	OA	CP	HAL	C				C		
S	OA	CV	HAL	75.44						

Target	Program	Sector	Gear	2003	2004	2005	2006	2007	2008	2009
T	OA	CP	HAL	3.42	C					
T	OA	CP	POT		C					
W	CDQ	CP	NPT			C		C		
W	OA	CP	HAL					C		
W	OA	CP	NPT	73.91	C	21.06	51.01	C	24.69	18.23
W	OA	CP	POT		C					
Y	CDQ	CP	NPT		C			C	C	
Y	CDQ	CV	NPT					C		
Y	OA	CP	NPT	27864.8	23079.97	64580.73	32310.66	45366.73	23404.11	20034.37
Y	OA	CV	NPT		C	C	364.35		C	

Table A7 Groundfish catches (t) in the Pribilof Islands blue king crab 1975 to 1983 distribution area (Alternative 4) between 2003 and 2009.

C represents a confidential value. Species code names found in Appendix 1, Table A1.

Gear	Species	2003	2004	2005	2006	2007	2008	2009
HAL	AKPL	0.03	0.09	0.07	0.1	C	0.01	C
HAL	AMCK	0.06	0.79	0.47	C	C	C	0.05
HAL	ARTH	132.39	125.99	98.13	97.29	59.57	94	158.82
HAL	BSKT					C		
HAL	DEM1	3.52						
HAL	DFL4	0.27						
HAL	FLO5	20.36	22.57	16.26	18.55	21.98	3.18	2.28
HAL	FSOL	74.19	129.82	87.15	127.49	50.23	56.23	30.15
HAL	GTRB	3.43	3.1	0.82	0.82	0.95	0.71	4.49
HAL	NORK	1.47	2.18	2.61	1.21	0.42	0.44	1.00
HAL	OTHR	2229.13	2994.95	3007.27	2554.46	1710.22	1486.39	1202.12
HAL	PCOD	15494.49	18662.36	19938.44	18133.72	9984.07	8799.33	7584.86
HAL	PEL7	0.38		C				C
HAL	PLCK	767.95	623.62	364.62	375.42	312.3	301.51	261.70
HAL	POPA	C	0.02	C	C		C	0.03
HAL	REYE		0.44	0.08	C	C	0.13	0.41
HAL	ROCK	2.91	6.64	3.1	1.45	0.56	1.48	1.27
HAL	RSOL	3.74	10.48	22.4	7.11	1.51	1.06	1.10
HAL	SABL	110.97	0.98	0.76	10.11	0.79	2.32	42.88
HAL	SFL1	0.38		C		C		C
HAL	SQID						C	
HAL	SRKR		2.17	C	C	0.1	0.39	2.31
HAL	SRRE	6.45						
HAL	THDS	6.11						2.30
HAL	USKT			C		C		0.44
HAL	YSOL	73.2	154.04	112.3	109.93	56.06	35.16	17.64
JIG	DEM1	C						
JIG	PCOD	0.07	0.71	C	0.33	2.01	C	C
JIG	PEL7	C						
JIG	PLCK							C
NPT	AKPL	2807.32	2044.36	5228.72	6142.57	6647.65	3044.64	3064.89
NPT	AMCK	24.84	46.63	137.64	49.97	0.37	0.7	0.15
NPT	ARTH	2069.07	1988.09	803.49	1088.76	1530.78	696.45	276.78
NPT	FLO5	45.03	143.15	162.8	69.15	259.82	90.12	14.18
NPT	FSOL	6044.58	6217.67	3014.21	3852.51	5020.85	4299.22	2408.32
NPT	GTRB	15.66	27.37	2.26	7.29	43.72	3.9	4.16
NPT	NORK	C	1.39	12	8.76	0.07	0.08	C
NPT	OTHR	1527.54	1726.49	1540.7	2066.6	2602.32	1108.05	862.84
NPT	PCOD	3208.07	3698.68	3164.23	2374.52	3197.06	2345.87	1169.52
NPT	PLCK	5115.69	4363.94	6378.9	4964.34	4858.42	2950.7	3590.40
NPT	POPA	21.91	21.64	23.26	12.87	25.81	3.06	0.26
NPT	REXS			C				
NPT	REYE		C		C		C	C
NPT	ROCK	4.48	1.68	C	3.02	C	1.79	0.03
NPT	RSOL	2826.44	3888.28	5714.59	3439.74	3381.52	1470.3	1136.57
NPT	SABL	0.78	C	1.37	1.03	C		
NPT	SQID	C				C	C	C
NPT	SRKR		C		C			C
NPT	SRRE	C						
NPT	USKT			C				
NPT	YSOL	18391.28	20348.81	50163.12	22994.17	34435.5	18354.07	14515.54
POT	AKPL	C						

Gear	Species	2003	2004	2005	2006	2007	2008	2009
POT	AMCK	C	C		0.01	0.1	3.61	
POT	ARTH	C	0.08	C	0.03		1.3	C
POT	FLO5		C		C		0	C
POT	FSOL	C	C	0.03	C	C	0.2	
POT	GTRB	C	C	C	0.44		C	C
POT	NORK		C			C	0.72	C
POT	OTHR	21.33	19.49	16.81	49.36	61.95	75.12	14.54
POT	PCOD	1126.17	2541.5	3058	2724.97	3069.84	4123.26	1599.20
POT	PLCK	3.79	2.01	1.8	4.04	1.3	0.9	1.22
POT	POPA				C		0.01	C
POT	REYE		C				C	
POT	ROCK	C	0.02	C	C	C	0.43	C
POT	RSOL	C	0.04	0.08	0.01	C	0.12	C
POT	SABL	C	C	C	C		C	
POT	SRKR			C				
POT	SRRE	C						
POT	YSOL	1.27	2.94	11.86	4.78	21.41	6.77	24.03
PTR	AKPL	3.7	1.23	1.91	1.45	0.38	7.65	3.88
PTR	AMCK	1.18	1.06	8.61	30.88	1.08	0.98	0.49
PTR	ARTH	29.16	14.03	17.72	25.9	146.47	22.92	83.33
PTR	FLO5	2.9	12.46	27.98	4.05	10.45	2.69	3.71
PTR	FSOL	387.11	291.63	392.87	195.13	425.57	303.5	510.92
PTR	GTRB	1.21	0.31	0.44	0.59	0.63	1.48	0.65
PTR	NORK	6.27	1.33	0.74	15.63	12.44	6.6	4.17
PTR	OTHR	165.18	211.39	188.11	117.09	134.41	206.82	322.57
PTR	PCOD	612.31	721.83	890.22	571.49	564.23	815.65	970.85
PTR	PLCK	150107.94	129856.34	164630.23	105945.18	108331.17	94072.01	105476.34
PTR	POPA	8.56	10.32	6.23	25.12	35.87	3.3	16.02
PTR	REYE		C	0.02	C	0.01	0.01	C
PTR	ROCK	0.6	0.44	0.61	0.57	0.59	0.5	0.23
PTR	RSOL	234.99	374.41	218.39	140.95	108.82	209.67	521.57
PTR	SABL	0.06	0.01	0.01	C	0.01	C	0.37
PTR	SQID	22.44	13.19	28.41	32.11	31.29	14.12	2.21
PTR	SRKR		8.68	4.86	0.15	1.02	2.07	
PTR	SRRE	1.85						
PTR	YSOL	160.92	164.94	1.25	149.09	65.38	61.85	71.71

Table A8 Groundfish catches (t) in the Pribilof Islands blue king crab 1984 to 2008 distribution area (Alternative 4) between 2003 and 2009.

C represents a confidential value. Targets: C= Pacific cod, I=halibut, K=rockfish, S=sablefish, W=arrowtooth flounder, P=pollock (midwater), Y=yellowfin sole, B=Pollock (bottom), E=Alaska plaice, F=other flatfish, L=flathead sole, O=other, R=rock sole, T=Greenland turbot.

Target	Program	Sector	Gear	2003	2004	2005	2006	2007	2008	2009
A	OA	CP	NPT	C	C	C	C			
B	AFA	CV	PTR	192.87	C	C		788.42	247.01	303.87
B	CDQ	CP	PTR		C	C			C	
B	CDQ	CV	PTR						C	C
B	OA	CP	NPT	C			34.44			13.95
B	OA	CP	PTR		C	C	224.06	C	3152.18	2798.90
B	OA	CV	PTR	C					C	C
C	CDQ	CP	HAL		243.44	1500.27	555.57	380.45	297.13	655.26
C	IFQ	CP	HAL							C
C	OA	CP	HAL	9079.69	9797.25	13288.89	10408.49	6328.07	4518.5	2519.85
C	OA	CP	JIG							C
C	OA	CP	NPT	1168.28	1340.57	901.78	1073.94	524.82	259.24	177.42
C	OA	CP	POT	C	1888.95	C	C	1813.22	C	C
C	OA	CV	HAL	1		C				C
C	OA	CV	JIG		0.63		C			
C	OA	CV	NPT	C		C	C	C		139.85
C	OA	CV	POT	406.67	619.35	1193.16	733.78	809.17	1323.23	C
C	SMPC	CV	JIG				C			
E	OA	CP	NPT					C	77.77	
F	OA	CP	NPT		C	C	C	C		
I	CDQ	CV	HAL				C	C	0.07	
I	IFQ	CV	HAL	4	0.73	C			1.8	
I	OA	CV	HAL		C	C			C	
K	IFQ	CV	HAL	0.37						
K	OA	CP	HAL	C						
K	OA	CP	NPT	C			C			
K	OA	CV	HAL	1.38						
K	OA	CV	JIG	C						
L	CDQ	CP	NPT					C		
L	OA	CP	NPT	4749.4	6462.16	3377.2	3324.72	6035.57	3993.03	1852.00
NULL	OA	CP	HAL	C				C		
NULL	OA	CP	NPT		C		C			
NULL	OA	CP	POT		C				C	
O	OA	CP	HAL				C			
O	OA	CP	NPT	C	C		C			
O	OA	CV	HAL	C	C					
O	OA	CV	POT		C					
P	AFA	CV	NPT							C
P	AFA	CV	PTR	13564.61	19227.29	16308.59	843.23	7550.59	2307.08	5806.50
P	CDQ	CP	PTR	C	9667.97	2054.47	2674.17	2521.01	2318.83	452.91
P	CDQ	CV	PTR		C	C	C	C	C	C
P	OA	CP	NPT							C
P	OA	CP	PTR	16130.58	37963.98	15607.62	10431.98	7118.82	6563.29	2383.01
P	OA	CV	PTR	4942.15	940.58	6615.79	C	C	1443.94	1006.77
R	CDQ	CP	NPT		C	C	C	C		C

Target	Program	Sector	Gear	2003	2004	2005	2006	2007	2008	2009
R	CDQ	CV	NPT					C		
R	OA	CP	NPT	1011.65	1145.52	4526.38	1169.02	530.45	287.65	459.23
S	IFQ	CV	HAL	32.2				C		
S	OA	CP	HAL	C						
S	OA	CV	HAL	74.7						
T	OA	CP	HAL	C						
W	CDQ	CP	NPT					C		C
W	OA	CP	HAL					C		C
W	OA	CP	NPT	C	C	C	C	C	C	
Y	CDQ	CP	NPT		C			C	C	
Y	CDQ	CV	NPT					C		
Y	OA	CP	NPT	21054.68	12795.84	39631.84	13724.74	12766.67	20750.77	5475.28
Y	OA	CV	NPT		C	C	61.61		C	

Table A9 Groundfish catches (t) in the Pribilof Islands blue king crab 1975 to 1983 distribution area (Alternative 4) between 2003 and 2009.

C represents a confidential value. Species code names found in Appendix 1, Table A1.

Gear	Species	2003	2004	2005	2006	2007	2008	2009
HAL	AKPL	0.01	C	0.07	0.07	C	C	C
HAL	AMCK		0.14	0.21	C	C		0.05
HAL	ARTH	40.05	50.41	33.44	35.55	21.12	26.06	24.90
HAL	BSKT					C		
HAL	DEM1	3.52						
HAL	DFL4	0.27						
HAL	FLO5	14.49	12.02	10.22	12.16	12.34	1.37	0.12
HAL	FSOL	43.7	65.77	51.22	62.25	27.96	31.22	15.20
HAL	GTRB	1.18	0.37	0.21	0.16	0.14	0.1	0.33
HAL	NORK	0.18	0.33	0.3	0.51	0.05	C	0.11
HAL	OTHR	1050.98	1257.55	1820.42	1146.3	1029.72	793.28	543.77
HAL	PCOD	7536.01	8296.81	12523.68	9415.77	5346.48	3727.06	2509.22
HAL	PEL7	0.38						
HAL	PLCK	344.37	263.35	241.27	190.61	211.99	209.73	69.11
HAL	POPA	C	C	C	C		C	0.01
HAL	REYE		0.04	C	C		0.02	0.00
HAL	ROCK	0.6	2.35	0.54	0.3	0.05	0.1	0.14
HAL	RSOL	1.93	5.11	21.04	4.08	0.9	0.52	0.58
HAL	SABL	109.28	C	0.64	C	C	0.04	C
HAL	SFL1	0.38				C		
HAL	SQID						C	
HAL	SRKR		0.21	C	C		0.09	0.35
HAL	SRRE	4.85						
HAL	THDS	6.11						
HAL	USKT			C		C		
HAL	YSOL	57.43	86.91	84.38	99.12	52.73	27.89	13.43
JIG	ARTH							C
JIG	DEM1	C						
JIG	FSOL							C
JIG	OTHR							C
JIG	PCOD		0.63		C			C
JIG	PEL7	C						
JIG	PLCK							C
NPT	AKPL	2096.56	1021.04	4073.28	2439.95	1881.81	2585.31	930.04
NPT	AMCK	C	43.84	114.18	15.6	C	0.18	0.09
NPT	ARTH	990.07	981.61	493.06	526.07	1017.47	458.06	159.42
NPT	FLO5	25.62	83.9	121.21	34.19	220.42	85.68	6.03
NPT	FSOL	2641.87	2596.81	1713.97	1402.41	2510.38	2397.83	1047.46
NPT	GTRB	9.39	6.15	1.62	1.96	1.27	1.4	0.70
NPT	NORK	C	0.19	C	C	C	C	C
NPT	OTHR	904.29	672.26	978.51	764.28	806.21	764.36	307.85
NPT	PCOD	1954.52	1502.67	2307.49	882.25	1382.96	1215.16	343.45
NPT	PLCK	3243.37	2407.07	4400.36	1702.96	2058.52	1541.9	1022.34
NPT	POPA	7.78	18.8	C	C	15.52	C	0.16
NPT	REXS			C				
NPT	ROCK	C	C	C	C	C		0.01
NPT	RSOL	1845.44	1577.93	4215.51	1133.28	1586.49	870.84	517.57
NPT	SABL	0.78	C	0.93	C			

Gear	Species	2003	2004	2005	2006	2007	2008	2009
NPT	SQID	0.32				C		C
NPT	SRKR				C			
NPT	USKT			C				
NPT	YSOL	14384.46	11474.03	30274.19	10608.67	10775.59	16722.05	3912.18
POT	AKPL	C						
POT	AMCK	C	C		C	0.06	0.22	
POT	ARTH		0		C		0.11	C
POT	FLO5		C		C		C	
POT	FSOL	C	C	0.03	C	C	0.12	
POT	GTRB				C		C	C
POT	NORK		C			C	0.12	C
POT	OTHR	13.62	18.94	16.32	41.63	51.58	31.8	10.20
POT	PCOD	717.94	2484.21	3051.23	2082.65	2553.82	2069.47	647.96
POT	PLCK	2.69	2	1.79	3	0.93	0.4	C
POT	POPA						C	C
POT	ROCK		C			C	0.07	C
POT	RSOL	C	0.04	0.08	C	C	0.08	C
POT	YSOL	0.85	2.85	11.83	4.22	14.28	2.59	22.08
PTR	AKPL	0.16	0.25	0.1	0.15	0.24	0.04	0.39
PTR	AMCK	0.46	0.38	0.07	1.06	0.03	0.04	0.00
PTR	ARTH	15.46	4.85	5.46	3.62	51.56	6.53	19.17
PTR	FLO5	0.74	5.71	4.66	0.17	0.45	0.77	0.42
PTR	FSOL	116.62	120.4	93.65	34.94	134.17	58.57	69.93
PTR	GTRB	0.07	0.05	0.05		0.03	C	0.03
PTR	NORK	0.1	0.31	0.13	0.29	0.01	0.01	0.30
PTR	OTHR	34.17	118.58	52.32	21.85	34.88	87.15	71.23
PTR	PCOD	205.35	456.89	302.23	112.32	131.69	329.35	227.02
PTR	PLCK	34468.11	72420.45	41586.89	16953.77	19522.5	15756.07	12587.14
PTR	POPA	0.8	0.04	0.8	0.46	0.02	C	0.62
PTR	REYE		C	C		C		C
PTR	ROCK	0.04	0.03	C	0.02	0.03	0.03	0.03
PTR	RSOL	54.92	228.73	97.29	46.39	34.23	139.91	184.75
PTR	SABL	0.01				C		
PTR	SQID	0.42	1.02	0.41	0.46	0.24	0.24	0.14
PTR	SRKR		C	C		C		
PTR	YSOL	19.07	61.47	1.07	41.52	60.21	0.17	0.14

INITIAL REVIEW DRAFT
REGULATORY IMPACT REVIEW/
INITIAL REGULATORY FLEXIBILITY ANALYSIS

For Amendments to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI) and the BSAI Crab FMP to revise the Pribilof Islands Blue King Crab Rebuilding Plan.

November 2010

Lead Agency: National Marine Fisheries Service
National Oceanic and Atmospheric Administration
Alaska Region

Responsible Official: James Balsiger
Regional Administrator
National Marine Fisheries Service
Alaska Regional Office

For Further Information Contact:

Scott A. Miller
NMFS Alaska Region
709 W. 9th Street, Suite 801
P.O. Box 21668
Juneau, AK 99802-1668
907-586-7416

Diana Stram
North Pacific Fishery Management Council
605 West 4th, Suite 306
Anchorage, AK 99501-2252
(907) 271-2809

Abstract: This Initial Regulatory Impact Review/Initial Regulatory Flexibility Analysis RIR/IRFA evaluates four spatial closure alternatives, affecting groundfish fisheries, around the Pribilof Islands in the Bering Sea. These alternatives are being proposed to reduce bycatch of Pribilof Island Blue King Crab, (PBKC) which is presently in an overfished status and subject to a stock rebuilding plan, as part of a revised rebuilding plan and in order to enhance the long term sustainability of the PIBKC stock.

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1.0 REGULATORY IMPACT REVIEW

This Regulatory Impact Review (RIR) examines the costs and benefits of a proposed regulatory amendment to revise the Pribilof Islands Blue King Crab (PBIKC) stock rebuilding plan.

1.1 What is a Regulatory Impact Review?

The preparation of an RIR is required under Presidential Executive Order (E.O.) 12866 (58 *FR* 51735: October 4, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following Statement from the E.O.:

> 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.

E.O. 12866 requires that the Office of Management and Budget (OMB) 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.

1.1.1 Statutory Authority

Under the Magnuson-Stevens Act, the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ). The management of these marine resources is vested in the Secretary of Commerce and in the Regional Fishery Management Councils. The potentially affected groundfish fisheries in the Bering Sea EEZ are managed under the Bering Sea and Aleutian Island Fisheries Management Plan (BSAI FMP). In addition, the management of crab stocks has been deferred to the State of Alaska Department of Fish and Game.

Statutory authority for measures designed to reduce bycatch is specifically addressed in Sec. 600.350 of the Magnuson-Stevens Act. That section establishes the ten National Standards.

1.1.2 Purpose and Need for Action

The purpose of this proposed action is to reduce the risk of overfishing and to rebuild the PIBKC stock by developing an amended rebuilding plan for this stock in compliance with the Magnuson-Stevens Act and the National Standard Guidelines.

The Council's problem statement for this analysis is the following:

> *The Pribilof Islands blue king crab stock remains overfished and the current rebuilding plan has not achieved adequate progress to rebuild the stock by 2014.* In order *to comply with provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) an amended rebuilding plan must be implemented prior to the start of the 2011/2012 fishing season.*
>
> *The directed blue king crab fishery has been closed since 1999 and action has been taken to limit bycatch mortality in other crab fisheries occurring near the Pribilof Islands; however no similar action has been taken for groundfish fisheries. Recent trends in crab bycatch suggest that groundfish fisheries occurring near the Pribilof Islands have the potential to exceed the annual overfishing level and acceptable biological catch for this stock.*
>
> *This action is necessary to facilitate compliance with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks and achieve optimum yield.*

In crafting this problem statement the Council further noted that this problem statement reflects not only the Council's obligation under MSA to rebuild this stock, but also the Council's desire to prevent overfishing on an annual basis and ensure that all fisheries contributing to PIBKC bycatch mortality share in the rebuilding effort.

1.2 Description of the Fishery[1]

The king crab fishery in the Pribilof District began in 1973, when vessels targeted blue king crabs in the vicinity of Saint George and Saint Paul Islands. The first reported catch in this area was 1.3 million pounds taken by eight vessels between July 1973 and October 1974. By the 1980/81 season, fishing effort had increased to 110 vessels that harvested 11.0 million pounds, the largest catch on record. However, fishery catch per unit effort had dropped from 26 legal crabs per pot lift to a low of two crabs per pot by the end of the 1986/87 season when harvest as 260,000 pounds, taken by 16 vessels. Due to this six-year decline in harvest and concurrently low annual population estimates, the blue king crab fishery was closed beginning with the 1988/89 season and remained closed through the 1994 season.

The 1993 NMFS summer trawl survey of the Bering Sea indicated a marked increase in the abundance of red king crabs around the Pribilof Islands. Although no threshold abundance level for opening the fishery was established for Pribilof red king crabs, survey results indicated a harvestable surplus of legal-sized male crabs. Consequently, a red king crab fishery in the Pribilof District opened for the first time in

[1] Information on Pribilof Islands blue and red king crab fisheries is excerpted from the ADF&G Annual Management Report for the commercial and subsistence shellfish fisheries of the BSAI.

September 1993 with a Guideline Harvest Level (GHL) of 3.4 million pounds. However, 2.6 million pounds was taken in 1993 and 1.0 million pounds of the 1994 GHL of 2.0 million pounds was taken in that year by 104 participating vessels.

In 1995, an increase in blue king crab abundance and a continued harvestable surplus of red king crabs resulted in a combined red and blue king crab GHL of 2.5 million pounds. Subsequent declines in red and blue king crab abundance over the next three years resulted in a combined GHL for 1998 of 1.3 million pounds including the CDQ fishery. Poor fishery performance during those seasons resulted in annual harvests below the fishery GHL. From 1999 to 2007/08, blue king crab abundance continued to decline and the Pribilof fishery was not opened.

The economic value of the Pribilof district red king crab fishery peaked at $13.0 million in 1993 with an ex-vessel price of $4.98 per pound, the second highest price on record. The value of the Pribilof District blue king crab fishery peaked at $13.6 million in 1981/82, with an ex-vessel price of $1.50 per pound. Total value declined from $6.8 million in 1995 to $2.4 million in 1998.

At present, the Pribilof Islands blue king crab stock is under a rebuilding plan with no directed fishery allowed. In addition, the Pribilof Islands red king crab fishery has been closed since the 1999 season due to the imprecision of abundance estimates and concerns about bycatch of blue king crab.

As depicted in the associated EA, there does not appear to be potential for a directed fishery for Pribilof Islands blue king crab to occur, nor does it appear likely that the Pribilof Islands red king crab fishery will be opened in the foreseeable future. Thus, the PIBKC stock rebuilding plan will serve primarily to sustain the stock at levels sufficient to allow bycatch of PIBCK in the groundfish fisheries that occur around the Pribilof Islands. These groundfish fisheries are described in detail in the Programmatic Groundfish Supplemental Environmental Impact Statement (NMFS, 2004) and those descriptions are incorporated by reference.

Fisheries Dependent Communities

The 2009 Groundfish Economic SAFE (Hiatt et al. 2009 table 35, page 70) indicates that the Being Sea Pollock processors, which include AFA shoreside processors operating in King Cove, Akutan, Sand Point, Dutch Harbor, and two floating processors earned nearly 84% of their all species combined gross revenue from groundfish processing in 2008. In these communities groundfish processing provides the majority of first wholesale processor revenue and changes in BSAI groundfish harvests and deliveries to these communities would have indirect effects on processor earnings, crew wages, municipal finance, and community structure.

In the Pribilof Islands, where a shore plant and a floating processor receive deliveries of nearly half of the Bering Sea snow crab quota, and a small share of the Bristol Bay Red King Crab quota, diversification into groundfish processing does not exist within the community of Saint Paul. Saint Paul is heavily dependent on the Bering Sea snow crab fishery and only receives between $1 and $2 million worth of Halibut landings from area 4C and 4D halibut IFQ (Sholtz et.al, 2007). Actual halibut landings are confidential due to the existence of a single processing plant. The plant in Saint Paul does not process groundfish at present and would not be affected by changes in BSAI groundfish harvest and deliveries to shore plants.

Many fisheries dependent communities rely on fisheries taxes and/or sales taxes for a substantial portion of their annual operating budget. Thus, reductions in landings will result in reductions in such tax revenue although future increases in landings, as stock rebuild, will result in improved tax collections in

later years of the rebuilding plan. The City of Unalaska levies a 2% raw fish tax, and a 3% sales tax, the latter of which is largely derived from fisheries related services (Kelty, Frank: Personal Communication, August 24, 2010). In contrast, Akutan and Sand Point do not levy sales or fish taxes. King Cove levies a 4% sales tax and flat rate fisheries impact tax. In addition, the Aleutians East Borough levies a 2% raw fish tax. In the Pribilof Islands, Saint Paul levies 3% sales and 3% raw fish taxes, while Saint George levies neither a sales or raw fish tax. In addition, the State of Alaska levies a Fisheries Business Tax that is shared with municipalities that demonstrate fishery related impacts.

1.3 Description of the Alternatives

1.3.1 Alternative 1: Status Quo

Alternative 1 retains the current protections for PIBKC stock. These include a directed fishery closure until the stock is completely rebuilt, and the closure to all trawl gear of the Pribilof Island Habitat Conservation Zone (PIHCZ) as shown in Figure 1 of the accompanying Environmental Assessment (EA).

1.3.2 Alternative 2: Modify the current Pribilof Island Habitat Conservation Zone (PIHCZ) to apply to: all groundfish fishing and only Pacific cod pot fishing

Under Alternative 2, the existing PIHCZ, as described in Alternative 1 would be modified to apply to additional fisheries (i.e., rather than just to the trawl fisheries as under the status quo).

There are two options under Alternative 2, for year-round closures:

Option 2a: Closure applies to all groundfish fisheries which have contributed to bycatch of PIBKC since 2003. In addition to the existing trawl closure, all fixed gear fishing would also be prohibited in this zone year-round.

Option 2b: Closure applies to all fishing for Pacific cod with pot gear. In addition to the existing trawl closure, all Pacific cod pot fishing would also be prohibited in this zone year-round

1.3.3 Alternative 3: ADF&G crab closure areas applied to select groundfish fishing, and just Pacific cod pot fishery.

Under Alternative 3, the existing ADF&G crab closure areas between 168° and170° West longitude, and between 57° and 58° North latitude would be closed to additional fishing effort as described in the options below. The existing closure configuration is indicated in Figure 2 of the accompanying EA. These closures would be enacted year-round for the fisheries listed below.

There are two closure options under Alternative 3:

Option 3a: Closure area applied to all groundfish fisheries which have contributed to bycatch of PIBKC since 2003. These fisheries include the Pacific cod fishery, combined flatfish trawl fisheries, pollock trawl fishery and Greenland turbot fishery.

Option 3b: Closure area applied only to pot fishing for Pacific cod. Under this option no federal Pacific cod fishing with pot gear would be allowed within the confines of the closures shown in Figure 2 of the accompanying EA.

1.3.4 Alternative 4: Closure which covers the entire distribution of the Pribilof Island blue king crab stock

This alternative proposes a new closure configuration as shown in Figure 3 (a & b) of the accompanying EA. The distribution of the entire PIBKC stock is defined in two ways depending upon the data used to establish the entire distribution of the stock. Under the first option (Option 1), the closure area consists of the full distribution of the Pribilof Islands stock aggregated from 1975 to 2009 based on the NMFS EBS bottom trawl survey (Figure 3a) The smaller closure area (Option 2) consists of the full distribution of the Pribilof Islands stock aggregated from 1984 to 2009. In 1984, there was a constriction of the PIBKC distribution towards the Pribilof Islands that has persisted until 2009 (Figure 3b). It is unknown if this constriction is due to declining population abundances, fishery activities, oceanography, or shifts in production. It is plausible, however, that a rebounding PIBKC stock may only be able to inhabit the smaller area.

There are two closure options under Alternative 4:

Option 4a: Closure area applied to all groundfish fisheries which have contributed to bycatch of PIBKC since 2003. These fisheries include the Pacific cod fishery, combined flatfish trawl fisheries, pollock trawl fishery and Greenland turbot fishery. Under this option no federal groundfish fishing for those fisheries would be allowed within the confines of the closure.

Option 4b: Closure area applied only to pot fishing for Pacific cod. Under this option no federal Pacific cod fishing with pot gear would be allowed within the confines of the closure area.

Under either option the closure would apply year-round.

1.3.5 Alternative 5: Prohibited Species Catch (PSC) level established for PIBKC in all groundfish fisheries.

Under Alternative 5, a trigger cap would be established for all groundfish fisheries, equal to either the OFL or the ABC for the crab stock. All bycatch of PIBKC in all groundfish fisheries would accrue towards this trigger cap and those groundfish fisheries which have contributed to bycatch of PIBKC since 2003 would close when the trigger is reached. These fisheries include the Pacific cod fishery, combined flatfish trawl fisheries, pollock trawl fishery and Greenland turbot fishery (see Table 12 for additional information on catch by gear and fishery since 2003). There is currently no feedback between catch of PIBKC accrual towards the OFL under the BSAI Crab FMP and any catch restrictions in the groundfish fisheries. This alternative would provide explicit feedback by closing groundfish fisheries when the PSC cap for PIBKC is reached.

Two options are considered for the cap levels (labelled under each closure option as sub-option 1 and 2 considered for each closure.

Sub-option 1: PSC Cap = OFL
Here the aggregate PSC cap would be established at the level of the annual OFL for the PIBKC stock based on the most recent stock assessment. The OFL for PIBKC stock is 0.004 million pounds in the 2010/11 fishing year. The OFL is a total-catch OFL and is computed as the sum of catches by three different sources of removals: (1) the retained legal males in directed (pot) fishery for PIBKC; (2) discards of males and females in the directed fishery;, and (3) bycatch in the groundfish pot and trawl

fisheries. The directed fishery for PIBKC has been closed since 1998. Since the implementation of a total catch OFL in 2008, bycatch in crab and groundfish fisheries have been the only catch that has accrued towards the OFL. The OFL was not reached in the 2009/10 fishing year.

Currently the OFL for 2010/11 is established at 0.004 million lbs (0.0018 kt) corresponding to the five year average of bycatch in groundfish and crab fisheries from 1999/2000-2005/2006[2]. While the PIBKC stock is in Tier 4 of the Crab OFL Tier system, it is at stock status 'c' therefore the directed fishery $F_{directed} = 0$ as $B/B_{MSYprox}$ is < beta and $F_{OFL}<F_{MSY}$ is determined by the PIBKC rebuilding plan. The OFL calculation employs a 'Tier 5" methodology of average catch in crab and groundfish fisheries to determine a bycatch-F_{OFL}. For purposes of this sub-option the cap is considered to be the bycatch component of the OFL. Currently the entire OFL is the bycatch component due to the low stock status in relation to the sloping control rule. Should the biomass of the stock increase above the beta threshold, the OFL would be determined using the true Tier 4 control rule. The stock assessment will include information on the proportion of the total catch OFL anticipated to come from bycatch. This would constitute the bycatch-OFL cap for purposes of determining the annual PSC cap. The current rebuilding plan includes a provision that the directed fishery is closed until the stock is rebuilt (second consecutive year above B_{MSY}). Once the stock is rebuilt the directed fishery could be re-opened. The PSC cap would continue to be annually estimated as the bycatch-component of the OFL. Should the crab fisheries begin to contribute to the bycatch of the stock, an estimate of the groundfish-only component of the OFL would need to be made to appropriately specific the cap level.

Sun-option 2: PSC Cap = ABC
Here the PSC cap would be established at the level of the ABC to be recommended annually by the SSC to the Council. The Council took final action on an ACL analysis (amendment 38 to the Crab FMP) in October 2010. The Council's preferred alternative establishes an ABC control rule to be employed annually to determine the maximum permissible ABC, understanding that the SSC may recommend a lower value on an annual basis. The Council's ABC control rule would be established using a P* approach with the recommended P* value = 0.49. Currently for PIBKC as a Tier 4 stock, using P* = 0.49 and employing only model-based (sigma-w) uncertainty this results in an ABC = 99.32% of OFL. This would result in an ABC = 3,973 lbs, or 27 lbs lower than the OFL. Given that the OFL for this stock is not truly assessed using a Tier 4 formula based upon stock status, it seems reasonable to establish an ABC using the Tier 5 ABC formula in the Council's preferred alternative which is that ABC = 90% of OFL. This results in an ABC = 3,600 lbs (or 400 lbs less than the OFL). For analytical purposes this is the cap considered under these alternatives.

There are 4 closure options under Alternative 5:

Option 5a: The existing PIHCZ, as described in Alternative 1, would be modified to apply to additional fisheries (i.e., rather than just to the trawl fisheries as under the status quo). The fisheries to which this closure would apply are listed in Table 1 of the accompanying EA. The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:
Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

Option 5b: The existing ADF&G crab closure areas between 168° and170° West longitude, and between 57° and 58□° North latitude would be closed to additional fishing effort as

[2] This 4,000 lb OFL was based upon data available in 2008. Since that time the data have been revised slightly and would result in a lower OFL if averaged over the same time period. The OFL has remained at the 4,000 lb level in order to allow for estimated incidental catch needs in groundfish fisheries.

indicated in Figure 2 of the accompanying EA. The fisheries to which this closure would apply are listed in Table 1 of the accompanying EA**Error! Reference source not found.**. The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:
Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

Option 5c: The closure area consists of the full distribution of the Pribilof Islands stock aggregated from 1975 to 2009 based on the NMFS EBS bottom trawl survey (EA Figure 3a) The fisheries to which this closure would apply are listed in EA Table 1. The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:
Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

Option 5d: The smaller closure area (Option 2) consists of the full distribution of the Pribilof Islands stock aggregated from 1984 to 2009. In 1984, there was a constriction of the PIBKC distribution towards the Pribilof Islands that has persisted until 2009 (EA Figure 3b). The closure would be triggered by attainment of a fishery-wise cap set at the options below. Cap options are the following:
Sub-option 1: Cap level = OFL
Sub-option 2: Cap level = ABC

1.3.6 Option for Increased Observer Coverage.

For each of the Alternatives, and the sub-option of each Alternative that is ultimately selected, apply an option to increase observer coverage requirements. This increase could be applied to all fisheries (Option 1, below) or for a specific fishery (Option 2, below) depending upon the selection of the individual application of an alternative under Alternatives 2-6.

Option1: Apply increased observer coverage to fisheries which contributed to PIBKC bycatch since 2003 for which a cap (PSC or trigger) or closure applies;
Option 2: Apply increased observer coverage to specific fisheries.

Sub-option (applies to both options 1 and 2): This would sunset under implementation of the restructured observer program.

Under these options, increased observer coverage would be added to fisheries which contributed to PIBKC bycatch since 2003) or to only specific fisheries[3]. Selection of the sub-option would indicate that any mandatory increased observer coverage on a fishery would sunset upon implementation of the observer restructuring program. The Council took final action on this analysis in October 2010. The main elements of the Council's preferred alternative as it relates to this are the ability to annually modify coverage in fleets based on fishery management monitoring needs and Council and NMFS priorities. The new program is anticipated to be implemented in 2013. The Council's motion is available at: http://fakr.noaa.gov/npfmc/current_issues/observer/ObserverMotion1010.pdf. Additional information is

[3] Additional specificity would be required as to which specific fisheries this increased observer coverage would apply.

available in the public review draft of the analysis for this action:
http://fakr.noaa.gov/npfmc/current_issues/observer/Observer_restructuring910.pdf

EA section 4.4 identifies pending issues with analysis of this option, thus, the reader is referred to that section of the EA for treatment of this topic.

1.4 Analysis of the Alternatives

This analysis will eventually address the potential costs of each of the proposed alternatives on the Bering Sea groundfish fishery, as well as potential benefits of the PIBKC rebuilding plan in terms of its effect on stock sustainability. This initial review draft analysis focuses on the potential direct effects of the alternatives on groundfish harvests based on a retrospective spatial and temporal analysis of harvests, by target species, within potentially affected areas.

An Analytical Clarification

A benefit/cost framework is the appropriate way to evaluate the relative economic and socioeconomic merits of the alternatives under consideration in this RIR. When performing a benefit/cost analysis, the principal objective is to derive informed conclusions about probable net effects of each alternative under consideration (e.g., net revenue impacts). However, in the present case, necessary empirical data (e.g., operating costs, capital investment, debt service, opportunity costs) are not available to the analysts, making a quantitative net benefit analysis impossible. Furthermore, empirical studies bearing on other important aspects of these alternative actions (e.g., subsistence-use values, domestic and international seafood demand) are also unavailable, and time and resource constraints prevent their preparation for use in this analysis.

The following regulatory impact review, and initial regulatory flexibility analysis, t use the best available information and quantitative data, combined with accepted economic theory and practice, to provide the fullest possible assessment (both quantitative and qualitative) of the potential economic benefits and presumptive costs attributable to each alternative action.

For clarity of presentation, a simple analytical convention is adopted for the gross revenue-at-risk assessment (presented below), in which the 2003 through 2009 fisheries are reexamined, in succession, as if each of the proposed PIBCK stock rebuilding plan alternatives had been in place in that year. This convention is adopted, in large part, to reduce the inherent risk of introducing parameter bias, associated with the analysts speculating on, for example, future catch distributions, species catch composition, ex-vessel and first wholesale prices, and costs, etc. By using this technique, the analysis can be performed using official, empirically observed and recorded, catch and value data sets. The 2004 through 2009 records are used because they represent the most recent complete data sets for the fisheries in question and cover the timeframe during which current management has been in place.

Approach in this Analysis

The first section of the analysis of each alternative will eventually present potential benefits attributable to, or deriving from, the alternative PIBKC rebuilding measures under consideration by NMFS and the Council. The second section of the analysis of each alternative presents the costs associated with the PIBKC rebuilding measures under consideration. These analyses are conducted from the point of view of all citizens of the United States; that is, they seek to address the question: "What is likely to be the net benefit to the Nation?"

The alternatives discussed in this analysis address concerns that ongoing bycatch of PIBKC may be adversely affecting stocks of PIBKC and the potential for subsistence, commercial, personal use, and sport fisheries that are dependent on those PIBKC stocks. In economic parlance, one might say that ongoing PIBKC bycatch is 'consuming' crab that would otherwise be expected to be utilized in capture fisheries were the stock to recover sufficiently under the rebuilding plan. This analysis presents an overall discussion of the potential range of effects on costs and benefits of the proposed PIBKC rebuilding measures.

1.4.1 Economic Benefits of Pribilof Islands Blue King Crab Rebuilding.

As noted in the Council's problem statement, the Pribilof Islands blue king crab stock remains overfished and the current rebuilding plan has not achieved adequate progress to rebuild the stock by 2014. The directed blue king crab fishery has been closed since 1999 and action has been taken to limit bycatch mortality in other crab fisheries occurring near the Pribilof Islands; however no similar action has been taken for groundfish fisheries. Recent trends in crab bycatch suggest that groundfish fisheries occurring near the Pribilof Islands have the potential to exceed the annual overfishing level and acceptable biological catch for this stock.

In order to comply with provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) an amended rebuilding plan must be implemented prior to the start of the 2011/2012 fishing season. Thus, the benefits of this action are that it will facilitate compliance with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks, and achieve optimum yield. Nevertheless, while the potential impacts differ on groundfish fisheries across alternative management measures depending upon the time frame for reaching the cap and the impacts (closure of various fisheries from the specified areas) when a cap is reached, none of the alternative management measures themselves differ in their ability to rebuild the stock over the time frame of the simulation. As a result, it is not possible to identify differences in benefits between the Alternatives being considered in this action, and it is not anticipated that any of the alternatives would result in stock rebuilding sufficient to allow a target fishery for Pribilof Islands blue king crab in the reasonably foreseeable future.

1.4.2 Groundfish Fishery Revenue Effects

This section examines the potential impacts on the groundfish industry's gross revenues attributable to potential reductions in groundfish products being delivered to market due to relocation of effort outside of a closure area (revenue at risk)[4]. To better place these impacts in a comparable empirical context, an analytical approach is adopted here, in which the question evaluated is expressed as follows: "What would the effects of these alternatives have been, had each, in turn, been in place in 2003 through 2009?" By posing the analytical question in this way, it is possible to use actual empirical information and official data records on fleet participation, catch, first wholesale prices, bycatch quantities, spatial and temporal distribution of effort, and geographical patterns of deliveries to primary processors or transshipping facilities. These estimates can provide at least a crude empirical measure of the potential economic impact of the alternatives on different fleet sectors. Moreover, if it is assumed that harvest foreclosed to a fleet sector could not have been made up elsewhere by that fleet sector, then the at-risk

[4] "Revenue at risk" should be regarded as an upper-bound estimate. That is, it represents a projection, based upon historical effort and landings data, of the gross value of the catch that would be forgone as a result of one or more provisions of the proposed action, assuming none of that displaced catch could be made up by shifting effort to another area. In many cases, this will not be the case. Therefore, the true impact on gross revenue is likely to be smaller than the estimated revenue at risk, although that is not assured.

estimate becomes an approximation of the potential maximum forgone gross revenues directly attributable to the proposed action.

To be precise, the gross revenues at risk were estimated using information about the following: (1) projected fleet segment harvests for the 2003 through 2009 fishing years assuming the provisions of each PIBKC bycatch minimization alternative had been in place in that year; (2) the actual proportions of harvest of different allocations, by different sectors (e.g. AFA, OA, CDQ, CP, CV), based upon historical catch patterns in 2003 through 2009; (3) estimated product mix and first wholesale product values for groundfish products by sector, species group, and year from 2003 through 2009. The years 2003 through 2009 were chosen as the base years for the analysis because they represent a consistent data series (new catch accounting began in 2003).

Harvest tonnages were valued using annual round weight equivalent first wholesale prices derived from the catch accounting system (Hiatt 2008, 2009). The first wholesale prices were estimated by dividing the total wholesale value of all groundfish products by estimated retained tons of groundfish, to yield a round weight per ton of catch equivalent value. First wholesale prices are the prices received by the first level of inshore processors, or by catcher-processors and motherships. They reflect the value added by the initial processor of the raw catch. They are not, therefore, equivalent to ex-vessel prices.

The first wholesale values by target species group, and processor type, used in this analysis are summarized in the table below. Public comment on the preliminary draft of this analysis indicated that use of these averages understates potential effects on pollock revenue because much of the revenue is earned during the A season when pollock prices are substantially higher than these averages due to roe content. In response, the analysis has recalculated pollock revenue impacts, for both CPs and Shoreside by applying A and B season prices to seasonal catch numbers to estimate total potential impact. Further, analysis of triggered closures under Alternative 5 uses B season pollock prices to reflect the lower value of potentially forgone Pollack catch during the impact time frame. Also provided below are tables indicating the harvest tonnages, by target and gear, as well as the resulting estimated first wholesale value. These later tables are used to calculate impact percentages in the analysis of alternatives that follows.

Table 1-1 Round weight Equivalent First Wholesale value of Retained Groundfish by Species Group and Sector, 2004-2008 ($/mt)

Target Species	Processor Type	Year						
		2003	2004	2005	2006	2007	2008	2009*
Pacific Cod	CP	$828	$1,172	$1,388	$1,755	$2,044	$2,061	$1,252
Flatfish	CP	$701	$844	$986	$981	$897	$788	$694
Pollock	CP A	$971	$1,141	$1,246	$1,170	$1,283	$1,947	$1,760
Pollock	CP B	$567	$591	$767	$748	$871	$994	$898
Pollock	Shoreside A	$797	$849	$1,018	$947	$1,023	$1,094	$946
Pollock	Shoreside B	$633	$596	$700	$700	$763	$822	$711

Source: 2008, 2009, and 2010 (draft) Economic SAFE report, Table 27, additional data from Terry Hiatt
*Preliminary

Table 1-2 BASI total tonnages by target and gear from Table 2 of Econ SAFE (1000s of metric tons)

Target Species	Gear Type	Year						
		2003	2004	2005	2006	2007	2008	2009
Pacific Cod	Pot	22	17	14	19	18	19	14
Pacific Cod	Hook & Line	110	111	116	99	81	94	102
Pacific Cod	Trawl	79	84	72	70	71	53	57
Flatfish	Hook & Line	5	5	5	5	4	4	5
Flatfish	Trawl	154	170	175	184	213	266	222
Pollock	Trawl	1,485	1,476	1,481	1,485	1,354	987	808
Total		**1,855**	**1,863**	**1,863**	**1,862**	**1,741**	**1,423**	**1,208**
Total All Species and Gear		**1,974**	**1,979**	**1,978**	**1,977**	**1,857**	**1,541**	**1,335**
Percent of Total		93.97%	94.14%	94.19%	94.18%	93.75%	92.34%	90.49%

Table 1-3 BSAI total value by target and gear ($ Millions)

Target Species	Gear Type	Year						
		2003	2004	2005	2006	2007	2008	2009
Pacific Cod	Pot	$18	$20	$19	$33	$37	$39	$18
Pacific Cod	Hook & Line	$91	$130	$161	$174	$166	$194	$128
Pacific Cod	Trawl	$65	$98	$100	$123	$145	$109	$71
Flatfish	Hook & Line	$4	$6	$7	$9	$8	$8	$6
Flatfish	Trawl	$108	$143	$173	$181	$191	$210	$154
Pollock	Trawl	$1,441	$1,685	$1,846	$1,738	$1,737	$1,922	$1,422
Total		**$1,728**	**$2,082**	**$2,306**	**$2,257**	**$2,283**	**$2,482**	**$1,799**

The analysis of revenue impacts of the alternatives on the groundfish industry was conducted in terms of gross revenues at risk under the PIBKC closure area options contained in the Alternatives. The affected fishing fleets may or may not have been able to make up the displaced catch and the gross revenues that would have been lost because of these restrictions by fishing outside of the closure area. Because some sectors may potentially have been able to recover some or all of these gross revenues, the gross income from these catches cannot, strictly speaking, be described as lost. Instead, they have been described here as "at risk."

Only if it is assumed that harvest foreclosed to a fleet sector in one area by Alternatives 2, 3, and 4 could not have been made up elsewhere by that fleet sector would at-risk gross revenues be an estimate of lost gross revenues. Accurate estimates of the abilities of fleets to make up a reduction in harvests in one area, due to closures under the Alternatives, by fishing in another area require information on the following: (1) the volume of catch (and resulting production) affected by the Alternative closure areas, (2) the extent to which each fleet sector would have redirected its operations into other fishing areas, and (3) the comparative productivity of the fleet sectors in the new areas. Currently, it is possible to quantitatively estimate only the first of these, (i.e., the volume of catch coming from areas that would no longer have been available to fishermen under each closure scenario contained within the Alternatives.

As noted above, gross revenues at risk are forgone **only** if a fishing fleet is unable to modify its operation to accommodate the imposed limits and, thus, cannot make up displaced catches elsewhere (either in

remaining open fishing areas or during alternative open fishing periods). Having estimated the maximum gross revenues that might be lost to each sector, on the assumption that the fleet is unable to make up the affected harvests, it is possible to incrementally relax this assumption and assess the effects. If one assumes that the underlying behavioral model is linear in its parameters, evaluating an alternative assumption about the total forgone catch is straightforward. For example, if one assumes that a given sector is able to make up 10% of the harvest elsewhere, the estimated at risk gross revenue impact would be multiplied by 0.90; if the assumption is that, say, 20% is made up elsewhere, the total is multiplied by a factor of 0.80, and so forth. This is done without specifying where (or when) the sector might operate, or at what cost. With total gross revenue at risk information available for each fleet segment, the reader may apply his or her own assumptions about the extent to which each fleet segment would be able to make up its catch elsewhere, thus producing his or her own estimates of the gross revenues that might be forgone.

Format of Impacts Tables

These tabulations presented in the tables below, are obtained by querying, from a spatial "Catch-in-areas" database, actual catch by gear, sector, target, management program, and species in the proposed closure area during 2003 through 2009. Thus, these tonnages represent actual recorded catch within the proposed closure area during the analytical timeframe.

The information presented in these tables is presented as hypothetical because, as previously discussed, this analysis relies on a retrospective hypothetical scenario of what would have occurred in the proposed closure area had the closure been in effect in the years 2003-2009. Also, this analysis does not, and cannot, account for mitigation of revenue at risk via relocation of fishing effort and explicitly recognized this limitation by identifying these impacts as hypothetical.

The information presented in these tables is identified as aggregate tonnage because much of the catch data, when broken down to sector and target levels, is confidential (fewer than three vessels reporting). When breaking catch down to a species level, confidentiality severely limits presentation of information. Thus, to report as much of the catch, and revenue, placed at risk as possible a manual aggregation of the summarized data has been undertaken.

In the catch aggregation, the various management regimes, such as open access (OA), the American Fisheries Act (AFA) and the Community Development Quota (CDQ) programs have had, in many cases, to be combined. Similarly, Catcher Processors (CPs) and Catcher Vessels (CVs) have often had to be combined primarily because CV data is largely confidential. The last line of the tonnage tables, below, shows the percent of total catch that the aggregated non-confidential catch represents. In other words, the percent of total catch calculation identifies the proportion of total catch that could be displayed with the aggregation of data. In most cases, more than 98 percent of the total catch is displayed via the aggregations.

The combination of vessel types has also resulted in a compromise on estimating dollar value of these catches. First, it has become necessary to use the target species as the species group for pricing purposes. This is due to extreme confidentiality problems when breaking data out to specific species levels. Second, the combination of CPs and CVs for reporting has meant that pricing of those combined tonnages has relied on round weight equivalent first wholesale value, rather than ex-vessel values for CV and first wholesale value for CPs. This application of wholesale values necessarily overestimates CV revenue because it includes processing value added. Thus, the CV catches are evaluated as if they were processed into first wholesale goods, which captures the value added processing that would occur at shoreside plants.

1.4.2.1 Revenue at Risk Under Alternative 2

Under this alternative the existing PIHCZ (status quo) would be modified to apply to additional groundfish fisheries rather than just to the trawl fisheries as under the status quo. Option 1 would apply the PICHCZ closure to all groundfish fishing and Option 2 would apply the PIHCZ closure to targeting Pacific cod with pot gear.

Table 1-4, below, provides a tabulation of the hypothetical aggregate tonnage of groundfish catch that would be put "at risk" by extending the PIHCZ closure to all groundfish fishing, represented by the total of all non-confidential groundfish catch, as well as to the Pacific cod pot fishery (black highlighted line) only. Also shown are tabulations by gear type, and target species so that one may compare effects across sectors. These tabulations show that the effect of Option 2 (Pacific cod pot only) would have ranged from slightly more than 390 tons of Pacific cod catch put at risk to as much as 2,769 tons. Table 1-5 provides the dollar value, in round weight equivalent first wholesale value, of this catch. Option 2 would have placed between $.3 million and $4.4 million of revenue "at risk" of being foregone in the Pacific cod pot fishery.

Option 1 of this alternative applies to all groundfish fisheries that occurred in the PIHCZ area. The tabulations of Table 1-4 and Table 1-5 show that there was catch primarily in the Pacific cod target fishery, hook and line gear type. Both CDQ and OA fisheries would have been affected, with the OA fishery having the greatest potential impact of between approximately 1,305 tons (2008) and 4,927 tons (2005) being placed "at risk" In revenue terms, the OA impacts would be between $2.7 million and $6.8 million, while the greatest CDQ impacts would have been approximately $1.5 million in 2005. Overall, these impacts range from a low of $3.1 million, in 2003, to a high of $12.2 million, in 2005.

Table 1-6 provides impact estimates in terms of percentages of target and total revenue put "At Risk" in the Alternative 2 (PIHCZ) closure area. Combining the revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total revenue earned in those potentially affected fisheries (from table 3 above) reveals that a period high of 4.36 percent of total revenue would have been put at risk in 2005, and a period low of 1.22 percent would have been put at risk in 2009. In all remaining years, total impacts would have been between 1.7 percent and about 3 percent. The Pacific cod pot fishery had impacts ranging from as high as 19.78 percent in 2005 to a low of 1.77 percent in 2003. The remaining Pacific cod fisheries, combined, had impacts ranging from as high as 5.21 percent in 2005 to a low of 1.22 percent in 2009.

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1.4.2.2 Revenue at Risk under Alternative 3

Under this alternative existing ADF&G crab closure areas, between 168 and170 W long., and between 57 and 58 N lat., would be closed to additional fishing effort as defined in EA Figure X. These closures would apply year-round. There are two closure options under this alternative: Option A could apply the closure to all groundfish fishing, while Option B would apply it to Pacific cod pot fishing only.

Table1-7 and Table1-8 provide the tabulations of tonnage and revenue placed "at risk" by these options. Unfortunately, the Pacific cod pot fishery in this area is prosecuted by too few vessels to allow reporting in most years. The one year when confidentiality (fewer than three vessels) was not a restriction was 2005, when 1,578 tons of catch occurred in the Pacific cod pot fishery in the ADF&G area. That translated into approximately $2.2 million in first wholesale revenue placed "at risk" under Option B in the one year for which data can be reported.

Option A would include the Pacific cod pot fishery impacts as well as impacts to the hook and line fishery for Pacific cod, the non-pelagic trawl fishery for flatfish (all species of flatfish, except halibut, combined), and in the all trawl category for pollock. The impacts shown vary by year and gear type; however, overall combined impacts range from 3,885 tons, in 2003, to a high of 7,967 tons in 2008. In 2009; however, tonnage recoreded in this area was at a period low of 343 tons. These tonnages represent between $2.9 million (2003) and a high of $9.2 (2005) million in total first wholesale value, while the 2009 revenue from catch within this area was approximately $.4 million.

Table1-9 provides estimates of revenue, as a percent of target and total revenue, put "At Risk" in the Alternative 3 (ADF&G) closure area. Combining the revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total revenue earned in those potentially affected fisheries (from table 3 above) reveals that a period high of .42 percent of total revenue would have been put at risk in 2005, and a period low of .02 percent would have been put at risk in 2009. In all remaining years, total impacts would have been between .17 and.37 percent. The Pacific cod hook and line fisheries had impacts ranging from as high as 3.07 percent in 2005 to a low of .32 percent in 2009. The Pacific cod pot fishery would have had 11.2; however, in all other years the impact estimate is confidential. The flatfish and pollock trawl fisheries would have had smaller impacts with percentages of total fishery revenue put at risk of between 0 percent and 3 percent.

1.4.2.3 Revenue at Risk under Alternative 4

Option 1 of alternative 4 proposes a closure of the range of full distribution of the PIBKC stock aggregated from 1975 to 2009 based on the NMFS EBS bottom trawl survey. Option 2 proposes a closure of the range of full distribution of the PIBKC stock aggregated 1984-2009. Note that this alternative is not specifically formulated to apply only to the Pacific cod pot fishery only versus all groundfish, at this time; however, that breakout is provided in the tables for the interested reader.

Table1-10 and Table 1-11 provide the tabulations of tonnage and revenue placed "at risk" by these options of alternative 4. Due to the relatively large size of this proposed closure area, many more vessels have recorded catch in this area. Thus confidentiality was not as great an issue, although it still prohibits revealing catch for several years in the Jig fishery. As can be seen in Table1-10, considerable tonnages of several target species have been reported in the proposed closure area under this alternative and option. Most notably affected are the pollock trawl fisheries, the flatfish non-pelagic trawl fishery and the Pacific cod hook and line fishery. In all, nearly 270,000 metric tons of catch occurred in this area in 2005, while the 2008 and 2009 catches were recorded at a period low of just over 145,000 metric tons. These tonnages at risk represent annual totals that peaked in 2005, at $284.8 million, but have been considerably lower in recent years as exemplified by the period low of $150.3 million occurring in 2009.

Table 1-12 provides estimates of revenue, as a percent of target and total revenue, put "At Risk" in the Alternative 4 Option 1(1975-2009 PIBKC distribution) closure area. Combining the revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total revenue earned in those potentially affected fisheries (from table 3 above) reveals that a period high of 12.39 percent of total revenue would have been put at risk in 2005, and a period low of 6.86 percent would have been put at risk in 2008. In all remaining years, total impacts would have been between 8.18 and 9.6 percent. These combined impacts somewhat mask much higher impacts, in percentage terms, in some of the individual target fisheries. The flatfish trawl fisheries, for example, had impacts ranging from as high as 42.86 percent in 2005 to a low of 11.73 percent in 2009 with impacts near or exceeding 25 percent in all but one of the remaining years in the analysis. Similarly, the Pacific cod pot fishery would have had just over 22 percent of its revenue at risk in 2005 and 2008, and between 11.71 and 17.54 percent at risk in

each of the years of 2004, 2006, and 2009. The Pacific cod hook and line fishery would have had more than 20 percent of its revenue put at risk in 2004, 2005, and 2006. The pollock trawl fisheries would have had smaller impacts with percentages of total fishery revenue put at risk of between 5.65 (2006) and 9.41percent (2005).

Table 1-13 and Table 1-14 provide similar treatment for Option 2 of alternative 4, which is the smaller closure area represented by the range of PIBKC stock distribution from 1984 to 2009. As would be expected, this smaller area results in smaller catch amounts occurring within the closure area. However, the most heavily impacted sectors are still pollock trawl, flatfish trawl, and Pacific cod hook and line. The total tonnage occurring in this area has ranged from a high of more than 108,000 tons to lower levels of around 50,000 tons annually from 2006 through 2008. In 2009, the tonnage recorded in this area fell to a period low of 25,263.

Table 1-14 shows that these tonnages represent between $56 million, in 2003, and $118.5 million, in 2005, with the period low year of 2009 generating about $25 million.

Table 1-15 provides estimates of revenue, as a percent of target and total revenue, put "At Risk" in the Alternative 4 Option 2(1984-2009 PIBKC distribution) closure area. Combining the revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total revenue earned in those potentially affected fisheries (from table 3 above) reveals that a period high of 5.16 percent of total revenue would have been put at risk in 2005, and a period low of 1.37 percent would have been put at risk in 2009. These combined impacts somewhat mask much higher impacts, in percentage terms, in some of the individual target fisheries. The flatfish fisheries, for example, had impacts ranging from as high as 27.19 percent in 2005 to as low as 3.54 percent in 2009 with impacts near or exceeding 10 percent in the remaining years in the analysis. Similarly, the Pacific cod pot fishery would have had just over 22 percent of its revenue at risk in 2005 and between 11 and 14.75 percent at risk in each of the years of 2004 and 2006 through 2008. The Pacific cod hook and line fishery would have had 12.75 percent of its revenue put at risk in 2005, and between 5 percent and 11 percent put at risk in each of the years of 2004 and 2006 through 2008 . The Pacific cod trawl and pollock trawl fisheries would have had smaller impacts with percentages of total fishery revenue put at risk of less than 3.6 percent in all years, and at or below 1 percent in several years

Table 1-4: Hypothetical aggregate tonnage "At Risk" based on retained tons of groundfish caught in the Alternative 2 (PIHCZ) closure area, 2003-2009. Option A is all groundfish catch in the PIHCZ area and Option B is Pot Pacific Cod only (black highlighted line) ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	390.33	2,414.65	2,769.01	1,644.14	2,155.53	1,388.53	306.31
Pacific Cod	CDQ	CP	Hook & Line	0.00	50.04	1,110.83	192.91	196.95	129.31	349.92
Pacific Cod	OA	CP + CV	Hook & Line	3,406.46	3,994.91	4,927.49	3,352.41	2,055.74	1,304.80	892.20
Pacific Cod	OA	CP + CV	Jig	0.00	0.14	0.00	0.00	0.00	0.00	0.00
Total All Non-Confidential Catch				**3,796.78**	**6,459.74**	**8,807.33**	**5,189.45**	**4,408.23**	**2,822.63**	**1,548.42**
Percent of Total Catch				**99.9%**	**99.8%**	**100.0%**	**100.0%**	**99.9%**	**99.9%**	**99.5%**

Table 1-5: Hypothetical Aggregate "Revenue At Risk" in round weight equivalent first wholesale value ($ millions) based on retained tons of groundfish caught in the Alternative 2 (PIHCZ) closure area, 2003-2008. Option A is all groundfish catch in the PIHCZ area and Option B is Pot Pacific Cod only (black highlighted line)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	$0.3	$2.8	$3.8	$2.9	$4.4	$2.9	$0.4
Pacific Cod	CDQ	CP	Hook & Line	$0.0	$0.1	$1.5	$0.3	$0.4	$0.3	$0.4
Pacific Cod	OA	CP + CV	Hook & Line	$2.8	$4.7	$6.8	$5.9	$4.2	$2.7	$1.1
Pacific Cod	OA	CP + CV	Jig	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
			Total	$3.1	$7.6	$12.2	$9.1	$9.0	$5.8	$1.9

Table 1-6: Revenue, as a percent of target and total revenue, put "At Risk" in the Alternative 2 (PIHCZ) closure area, 2003-2009. Option A is all groundfish catch in the PIHCZ area and Option B is Pot Pacific Cod only (black highlighted line)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	1.77%	14.20%	19.78%	8.65%	11.98%	7.31%	2.19%
Pacific Cod	All	CP + CV	All-non pot	3.10%	3.64%	5.21%	3.58%	2.78%	1.53%	1.22%
Percent Revenue of Affected Fisheries				1.80%	3.05%	4.36%	2.76%	2.59%	1.70%	0.90%

Table1-7: Hypothetical Aggregate "Tonnage At Risk" based on retained tons of groundfish caught in the Alternative 3 (ADF&G) closure area, 2003-2008. Option A is all groundfish catch in the ADF&G area and Option B is Pot Pacific Cod only (black highlighted line) ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	1,578.30	"c"	"c"	"c"	"c"
Pacific Cod	CDQ + OA	CP + CV	Hook & Line	1,134.59	786.33	3,558.27	2,053.12	1,832.77	522.64	321.70
Flatfish	CDQ + OA	CP + CV	NP Trawl	2,722.22	130.12	1,124.37	30.15	4,655.62	7,444.64	21.52
Pollock	All	CP + CV	All Trawl	28.17	3,425.97	868.86	2,286.15	"c"	0.00	"c"
Total All Non-Confidential Catch				**3,884.97**	**4,342.42**	**7,129.80**	**4,369.42**	**6,488.39**	**7,967.29**	**343.21**
Percent of Total Catch				**"c"**	**"c"**	**100.0%**	**"c"**	**92.6%**	**"c"**	**"c"**

Table1-8: Hypothetical aggregate "Revenue At Risk" ($ millions) in round weight equivalent first wholesale value based on retained tons of groundfish caught in the Alternative 3 (ADF&G) closure area, 2003-2008. Option A is all groundfish catch in the ADF&G area and Option B is Pot Pacific Cod only (black highlighted line) ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	$2.2	"c"	"c"	"c"	"c"
Pacific Cod	CDQ + OA	CP + CV	Hook & Line	$0.9	$0.9	$4.9	$3.6	$3.7	$1.1	$0.4
Flatfish	CDQ + OA	CP + CV	NP Trawl	$1.9	$0.1	$1.1	$0.0	$4.2	$5.9	$0.0
Pollock*	All	CP + CV	All Trawl	$0.0	$3.2	$1.0	$1.9	"c"	$0.0	"c"
			Total	**$2.9**	**$4.3**	**$9.2**	**$5.5**	**$7.9**	**$6.9**	**$0.4**

Table1-9: Revenue, as a percent of target and total revenue, put "At Risk" in the Alternative 3 (ADF&G) closure area, 2003-2008. Option A is all groundfish catch in the ADF&G area and Option B is Pot Pacific Cod only (black highlighted line) ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	11.27%	"c"	"c"	"c"	"c"
Pacific Cod	CDQ + OA	CP + CV	Hook & Line	1.03%	0.71%	3.07%	2.07%	2.26%	0.56%	0.32%
Flatfish	CDQ + OA	CP + CV	NP Trawl	1.77%	0.08%	0.64%	0.02%	2.19%	2.80%	0.01%
Pollock*	All	CP + CV	All Trawl	0.00%	0.19%	0.05%	0.11%	"c"	0.00%	"c"
Percent Revenue of Affected Fisheries				**0.17%**	**0.22%**	**0.42%**	**0.26%**	**0.37%**	**0.29%**	**0.02%**

Table1-10: Hypothetical aggregate "Tonnage At Risk" based on retained tons of groundfish caught in the Alternative 4 Option 1(1975-2009 PIBKC distribution) closure area, 2003-2008. ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	1,152.59	2,566.30	3,088.57	2,783.64	3,156.34	4,211.81	1,639.17
Pacific Cod	CDQ	CP	Hook & Line	0.00	1,133.55	2,085.45	905.89	848.79	494.88	1,182.05
Pacific Cod	OA	CP + CV	Hook & Line	18,793.40	21,600.99	21,573.17	20,508.64	11,353.17	10,281.43	8,070.98
Pacific Cod	OA	CP + CV	Jig	0.07	0.71	"c"	"c"	"c"	"c"	"c"
Flatfish	OA	CP + CV	Hook & Line	6.08	"c"	0.00	0.00	3.51	0.00	0.00
Flatfish	CDQ + OA	CP	NP Trawl	40,329.23	41,014.74	75,002.18	44,186.53	60,090.78	33,599.52	26,030.69
Pollock	CDQ	CP + CV	All Trawl	4.11	21,955.05	18,931.87	17,721.09	17,519.01	9,459.35	17,890.52
Pollock	OA	CP + CV	All Trawl	99,432.63	79,865.26	76,793.19	60,856.07	51,848.29	30,900.12	46,671.99
Pollock	AFA	CV	P. Trawl	52,571.82	30,244.16	71,261.10	28,288.92	41,517.70	56,204.86	43,660.60
Total All Non-Confidential Catch				**212,289.93**	**198,380.75**	**268,735.53**	**175,250.79**	**186,337.59**	**145,151.98**	**145,146.01**
Percent of Total Catch				"c"	"c"	"c"	**98.4%**	"c"	"c"	"c"

Table 1-11: Hypothetical aggregate "Revenue At Risk" ($ millions) in round weight equivalent first wholesale value based on retained tons of groundfish caught in the Alternative 4 Option 1(1975-2009 PIBKC distribution) closure area, 2003-2008. ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	$1.0	$3.0	$4.3	$4.9	$6.5	$8.7	$2.1
Pacific Cod	CDQ	CP	Hook & Line	$0.0	$1.3	$2.9	$1.6	$1.7	$1.0	$1.5
Pacific Cod	OA	CP + CV	Hook & Line	$15.6	$25.3	$29.9	$36.0	$23.2	$21.2	$10.1
Pacific Cod	OA	CP + CV	Jig	$0.0	$0.0	"c"	"c"	"c"	"c"	"c"
Flatfish	OA	CP + CV	Hook & Line	$0.0	"c"	$0.0	$0.0	$0.0	$0.0	$0.0
Flatfish	CDQ + OA	CP	NP Trawl	$28.3	$34.6	$74.0	$43.3	$53.9	$26.5	$18.1
Pollock	CDQ	CP + CV	All Trawl	$0.0	$20.2	$20.5	$16.6	$19.1	$12.9	$22.0
Pollock	OA	CP + CV	All Trawl	$81.0	$73.4	$83.3	$57.2	$56.6	$42.0	$57.5
Pollock	AFA	CV	P. Trawl	$39.8	$24.2	$69.9	$24.3	$40.5	$57.5	$39.1
			Total	**$165.6**	**$182.1**	**$284.8**	**$183.9**	**$201.4**	**$169.7**	**$150.3**

Table 1-12: Revenue, as a percent of target and total revenue, put "At Risk" in the Alternative 4 Option 1(1975-2009 PIBKC distribution) closure area, 2003-2008. ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	5.24%	15.10%	22.06%	14.65%	17.54%	22.17%	11.71%
Pacific Cod	CDQ + OA	CP + CV	Hook & Line	17.08%	20.48%	20.40%	21.63%	15.06%	11.46%	9.07%
Flatfish	OA	CP + CV	Hook & Line	0.10%	"c"	0.00%	0.00%	0.04%	0.00%	0.00%
Flatfish	CDQ + OA	CP	NP Trawl	26.19%	24.13%	42.86%	24.01%	28.21%	12.63%	11.73%
Pollock	All	CP + CV	All Trawl	8.38%	7.00%	9.41%	5.65%	6.69%	5.85%	8.34%
Percent Revenue of Affected Fisheries				**9.60%**	**8.77%**	**12.39%**	**8.18%**	**8.85%**	**6.86%**	**8.39%**

Table 1-13: Hypothetical aggregate "Tonnage At Risk" based on retained tons of groundfish caught in the Alternative 4 Option 2 (1984-2009 PIBKC distribution) closure area, 2003-2008. ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	735.11	2,508.30	3,081.29	2,131.98	2,622.38	2,104.98	680.84
Pacific Cod	CDQ	CP	Hook & Line	0.00	243.44	1,500.27	555.57	380.45	297.13	655.26
Pacific Cod	OA	CP + CV	Hook & Line	9,080.69	9,797.25	13,290.58	10,408.49	6,328.07	4,518.50	2,520.10
Pacific Cod	OA	CP + CV	Jig	0.00	0.63	0.00	"c"	0.00	0.00	0.00
Pacific Cod	OA	CP + CV	NP Trawl	1168.63	1340.57	932.87	1116.61	526.46	259.24	317.27
Flatfish	CDQ + OA	CP + CV	NP Trawl	26,884.61	20,959.06	47,582.76	18,344.48	21,730.33	26,383.62	7,858.17
Pollock	CDQ	CP + CV	P. Trawl	"c"	15,080.66	3,213.74	3,510.43	3,057.15	2,634.94	730.25
Pollock*	OA	CP + CV	All Trawl	21,163.80	38,945.34	22,491.37	12,897.80	8,574.14	11,189.90	6,334.63
Pollock	AFA	CV	P. Trawl	13,757.47	19,393.87	16,440.03	843.23	8,339.02	2,554.10	6,167.08
Total All Non-Confidential Catch				**72,790.31**	**108,269.12**	**108,532.90**	**49,808.59**	**51,558.00**	**49,942.39**	**25,263.60**
Percent of Total Catch				"c"	**99.9%**	**99.8%**	"c"	**100.0%**	**100.0%**	**100.0%**

Table 1-14: Hypothetical aggregate "Tonnage At Risk" (dollars) in round weight equivalent first wholesale value based on retained tons of groundfish caught in the Alternative 4 Option 2 (1984-2009 PIBKC distribution) closure area, 2003-2008. . ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2009
Pacific Cod	OA	CP + CV	Pot	$0.6	$2.9	$4.3	$3.7	$5.4	$4.3	$0.9
Pacific Cod	CDQ	CP	Hook & Line	$0.0	$0.3	$2.1	$1.0	$0.8	$0.6	$0.8
Pacific Cod	OA	CP + CV	Hook & Line	$7.5	$11.5	$18.4	$18.3	$12.9	$9.3	$3.2
Pacific Cod	OA	CP + CV	Jig	$0.0	$0.0	$0.0	"c"	$0.0	$0.0	$0.0
Pacific Cod	OA	CP + CV	NP Trawl	$1.0	$1.6	$1.3	$2.0	$1.1	$0.5	$0.4
Flatfish	CDQ + OA	CP + CV	NP Trawl	$18.8	$17.7	$46.9	$18.0	$19.5	$20.8	$5.5
Pollock	CDQ	CP + CV	P. Trawl	"c"	$14.4	$3.6	$3.2	$3.3	$3.9	$0.9
Pollock*	OA	CP + CV	All Trawl	$17.6	$37.2	$25.3	$11.7	$9.4	$16.6	$7.5
Pollock	AFA	CV	P. Trawl	$10.6	$16.0	$16.6	$0.7	$8.1	$2.8	$5.4
			Total	**$56.1**	**$101.5**	**$118.5**	**$58.5**	**$60.5**	**$58.8**	**$24.5**

Table 1-15: Revenue, as a percent of target and total revenue, put "At Risk" in the Alternative 4 Option 2 (1984-2009 PIBKC distribution) closure area, 2003-2008.

Target Species	Mgmt.	Vessel Type	Gear Type	Year						
				2003	2004	2005	2006	2007	2008	2008
Pacific Cod	OA	CP + CV	Pot	3.34%	14.75%	22.01%	11.22%	14.57%	11.08%	4.86%
Pacific Cod	All	CP + CV	Hook & Line	8.26%	9.05%	12.75%	11.07%	8.28%	5.12%	3.11%
Pacific Cod	OA	CP + CV	NP Trawl	1.48%	1.60%	1.30%	1.60%	0.74%	0.49%	0.56%
Flatfish	CDQ + OA	CP + CV	NP Trawl	17.46%	12.33%	27.19%	9.97%	10.20%	9.92%	3.54%
Pollock	All	CP + CV	All Trawl	1.96%	3.15%	2.27%	0.71%	1.01%	1.01%	0.91%
			Percent Revenue of Affected Fisheries	**3.26%**	**4.89%**	**5.16%**	**2.60%**	**2.66%**	**2.38%**	**1.37%**

1.4.2.1 Revenue at Risk under Alternatives 5

Two cap levels are considered under this alternative, a PSC limit set at either the OFL (currently 4,000 lbs) or the ACL (estimated at 3,600 lbs). In analyzing the impacts of closing groundfish fisheries, consideration was given to when the cap itself is reached, triggering area closures as defined in Alternative 5. The only year that the cap was reached historically was in 2007. At that time, the OFL would have been exceeded the week of September 22nd. Likewise the ABC (or ACL) level was also exceeded in the same week-ending date. It is not possible to differentiate between the ACL and OFL cap levels in this impact analysis as both were exceeded historically within the same week thus for analytical purposes these two caps are considered to be equivalent[5].

Table 1-16 tabulates the tonnage and revenue effects of triggered closure of the PIHCZ area (As defined in Alternative 2) in the weeks following September 22, 2007. Triggered closure of this area in 2007 would have placed about 658 tons of harvest, and about $134 million in revenues, at risk. These impacts would have occurred in the open access Pacific cod pot, and hook and line, fisheries; however, some confidential data cannot be reported in the CDQ hook and line fishery for Pacific cod. In percentage terms, the tonnage and revenue totals represent just over 10 percent of the total catch taken from the PIHCZ area in 2007, and about 15 percent of the revenue from that area. In comparison to the total BSAI revenue earned within these target fisheries, the impacts of the triggered closure of the PIHCZ, in 2007, would have represented about 1.5 percent of the value of the Pacific cod Pot fishery, less than half of a percent of the value of the BSAI Pacific cod open access hook and line fishery, and the total revenue at risk would have been approximately .06 percent of the estimated total revenue of these fisheries BSAI wide.

Table1-17 tabulates the tonnage and revenue effects of triggered closure of the ADF&G area (As defined in Alternative 3) in the weeks following September 22, 2007. Triggered closure of this area in 2007 would have placed about 143 tons of harvest, and about $.3 million in revenues, at risk. These impacts would have occurred in the Pacific cod hook and line, fisheries; however, some confidential data cannot be reported in the Pacific cod pot fishery and the flatfish trawl fishery. In percentage terms, the tonnage and revenue totals represent just over 2 percent of the total catch taken from the ADF&G area in 2007, and about 3.7 percent of the revenue from that area. In comparison to the total BSAI revenue earned within these target fisheries, the impacts of the triggered closure of the ADF&G area, in 2007, would have represented about .18 percent of the value of the Pacific cod hook and line fishery, and the total revenue at risk would have been approximately .01 percent of the estimated total revenue of these fisheries BSAI wide.

Table1-18 tabulates the tonnage and revenue effects of triggered closure of area associated with the PIBKC stock distribution from 1975 to 2009 (As defined in Alternative 4, option 1) in the weeks following September 22, 2007. Triggered closure of this area in 2007 would have placed about 14,327 tons of harvest, and about $13.3 million in revenues, at risk. These impacts would have occurred in the open access Pacific cod pot and hook and line fisheries, the CDQ Pacific cod hook and line fishery, and in the pollock trawl fisheries; however, some confidential data cannot be reported in the CDQ and open access flatfish fisheries as well as in the CDQ pollock fishery. In percentage terms, the tonnage and

[5] The OFL here is 4,000lbs while under the Tier 5 assumption the ACL is considered to be 3,600lbs, a difference of only 400 lbs. This difference would be even smaller under a 'true' Tier 4 ACL determination using the P* approach of 0.49 established under the Council's preferred alternative.

revenue totals represent 7.6 percent of the total catch taken from the area in 2007, and about 6.6 percent of the revenue from that area. In comparison to the total BSAI revenue earned within these target fisheries, the impacts of the triggered closure of the area, in 2007, would have represented about 1.7 percent of the value of the Pacific cod Pot fishery, less than half of a percent of the value of the CDQ Pacific cod hook and line fishery, about 1 percent of the value of the Pacific cod open access hook and line fishery, about .5 percent of the open access pollock trawl fishery, and .09 percent of the AFA pollock trawl fishery. The total revenue at risk would have been approximately .58 percent of the estimated total revenue of these fisheries BSAI wide.

Table 1-19 tabulates the tonnage and revenue effects of triggered closure of area associated with the PIBKC stock distribution from 1984 to 2009 (As defined in Alternative 4, option 2) in the weeks following September 22, 2007. Triggered closure of this area in 2007 would have placed about 3,269 tons of harvest, and about $4.2 million in revenues, at risk. These impacts would have occurred in the open access Pacific cod pot and hook and line fisheries, the CDQ Pacific cod hook and line fishery, and in the pollock trawl fisheries; however, some confidential data cannot be reported in the CDQ and open access flatfish fisheries. In percentage terms, the tonnage and revenue totals represent 6.34 percent of the total catch taken from the area in 2007, and 6.98 percent of the revenue from that area. In comparison to the total BSAI revenue earned within these target fisheries, the impacts of the triggered closure of the triggered closure of the area, in 2007, would have represented about 1.7 percent of the value of the Pacific cod Pot fishery, .26 of a percent of the value of the CDQ Pacific cod hook and line fishery, a.81 percent of the value of the Pacific cod open access hook and line fishery, about .1 percent of the open access pollock trawl fishery, and less than .01 percent of the AFA pollock trawl fishery. The total revenue at risk would have been approximately .18 percent of the estimated total revenue of these fisheries BSAI wide.

Table 1-16: Hypothetical aggregate tonnage and revenue ($ millions) "At Risk" based on retained tons of groundfish caught in the Alternative 5 triggered closure of the PIHCZ area, 2003-2009. Option A is all groundfish catch in the PIHCZ area and Option B is Pot Pacific Cod only (black highlighted line) ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Potentially Forgone Revenue	Revenue as percent of Annual Total*
Pacific Cod	OA	CP + CV	Pot	272.38	$0.56	1.51%
Pacific Cod	CDQ	CP	Hook & Line	"c"	$0.00	
Pacific Cod	OA	CP + CV	Hook & Line	385.55	$0.79	0.48%
Pacific Cod	OA	CP + CV	Jig	0.00	$0.00	
			Total	**657.93**	**$1.34**	0.06%
			Percent of PIBKC Area Total	**10.43%**	**14.93%**	

* Revenue as percent of annual total is expressed as percentage of the annual total for the Species/Gear group and is not broken down by management program

Table1-17: Hypothetical aggregate tonnage revenue ($ millions) "At Risk" based on retained tons of groundfish caught in the Alternative 5 triggered closure of the ADF&G area, 2003-2008. Option A is all groundfish catch in the ADF&G area and Option B is Pot Pacific Cod only (black highlighted line) ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Potentially Forgone Revenue	Revenue as percent of Annual Total*
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	
Pacific Cod	CDQ + OA	CP + CV	Hook & Line	142.88	$0.29	0.18%
Flatfish	CDQ + OA	CP + CV	NP Trawl	"c"	$0.00	
Pollock*	All	CP + CV	All Trawl	0.00	$0.00	
			Total	**142.88**	$0.29	0.01%
			Percent of ADF&G Area Total	**2.04%**	**3.69%**	

* Revenue as percent of annual total is expressed as percentage of the annual total for the Species/Gear group and is not broken down by management program

Table1-18: Hypothetical aggregate tonnage and revenue ($ millions) "At Risk" based on retained tons of groundfish caught in the Alternative 5 triggered closure of the Option 1(1975-2009 PIBKC distribution) area, 2003-2008. ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Potentially Forgone Revenue	Revenue as percent of Annual Total*
Pacific Cod	OA	CP + CV	Pot	495.20	$0.62	1.69%
Pacific Cod	CDQ	CP	Hook & Line	607.27	$0.76	0.46%
Pacific Cod	OA	CP + CV	Hook & Line	1,311.79	$1.64	0.99%
Pacific Cod	OA	CP + CV	Jig	0.00	0	
Flatfish	OA	CP + CV	Hook & Line	"c"	0	
Flatfish	CDQ + OA	CP	NP Trawl	"c"	0	
Pollock	CDQ	CP + CV	All Trawl	"c"	$0.00	
Pollock*	OA	CP + CV	All Trawl	9,784.90	$8.79	0.51%
Pollock	AFA	CV	P. Trawl	2,127.83	$1.51	0.09%
			Total	**14,327.00**	$13.33	0.58%
			Percent of PIBKC75 Area Total	**7.61%**	**6.61%**	

Table 1-19: Hypothetical aggregate tonnage and revenue "At Risk" based on retained tons of groundfish caught in the Alternative 5 triggered closure of the Option 2 (1984-2009 PIBKC distribution) area, 2003-2008. ("c" Indicates that data is confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Potentially Forgone Revenue	Revenue as percent of Annual Total
Pacific Cod	OA	CP + CV	Pot	312.77	$639,303.40	1.74%
Pacific Cod	CDQ	CP	Hook & Line	212.53	$434,401.66	0.26%
Pacific Cod	OA	CP + CV	Hook & Line	656.37	$1,341,630.22	0.81%
Pacific Cod	OA	CP + CV	Jig	0.00		
Pacific Cod	OA	CP + CV	NP Trawl	0.00		
Flatfish	CDQ + OA	CP + CV	NP Trawl	"c"		
Pollock	CDQ	CP + CV	P. Trawl	0.00		
Pollock*	OA	CP + CV	All Trawl	1977.93	$1,722,499.21	0.10%
Pollock	AFA	CV	P. Trawl	109.58	$83,627.66	0.00%
			Total	**3269.17**	$4,221,462.16	0.18%
			Percent of PIBKC84 Area Total	**6.34%**	**6.98%**	

1.4.3 Mitigation of Revenue at Risk

Under the alternatives to the status quo, fishermen would be expected to attempt to minimize losses associated with revenue placed at risk by altering their current operations. These reactions could include the following: (1) mitigating an area closure by re-deploying fishing effort, using the same fishing gear and methods, to known adjacent fishing grounds that may be equally or only somewhat less productive (similar CPUE) than the fishing grounds lost to the PIBKC bycatch minimization measure; (2) avoiding PIBKC bycatch by re-deploying fishing effort to an area of unknown productivity and operational potential, using the identical fishing gear, in an exploratory mode. Each of these strategies may have operational cost implications as well as varying degrees of mitigation of catch and revenue put at risk.

While empirical data on operating cost structure at the vessel or plant level are not available it is possible to assess the likely redistribution of effort that might occur based on historical fishing location choice. Catch rates inside the proposed closure area can then be compared with those that occur in immediately adjacent areas to provide information on the likelihood that vessel operators can catch the quantity of fish forgone within the closure area outside of that area and to identify differences in the length of time, a proxy for cost of production, it may take to make up for forgone catch.

An analysis of redistribution of effort will be conducted prior to final action. That analysis will utilize the NOAA Fisheries Alaska Region Catch-In-Areas database tool, which is presently fully committed to analysis of the pending action associated with the Steller Sea Lion Biological Opinion. That analysis will be needed to address the extent to which effort redistribution may mitigate potentially forgone catch under each of Alternatives 2, 3, and 4, as well as under the trigger closure provisions of Alternative 5. Recall that Alternative 5 has four options corresponding to each of the geographic closure areas contained in Alternatives 2, 3, and 4.

The analysis of redistribution will provide information that can be used to address effects on variable operating costs, vessel safety, and gear conflicts and will also provide information necessary to assess potential indirect impacts of the alternatives on product quality, markets, & consumers, fishery dependent communities, as well as management and enforcement costs. This analysis will be completed prior to final Council review and is not available for initial review.

2.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS

2.1 The Purpose of an IRFA

The Regulatory Flexibility Act (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 impacts while still achieving the stated objective of the action.

On March 29, 1996, President Clinton signed the Small Business Regulatory Enforcement Fairness Act. 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 economic impact 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 violation of the RFA.

In determining the scope, or 'universe', of the entities to be considered in an IRFA, 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.

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 adverse impacts on a substantial number of small entities" (as those terms are defined under RFA).
Because, based on all available information, it is not possible to 'certify' this outcome, should the proposed action be adopted, a formal IRFA has been prepared and is included in this package for Secretarial review.

2.2 What is required in an IRFA?

Under 5 U.S.C., Section 603(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 profile of the industry divided into industry segments, if appropriate);
- A description of the projected reporting, record keeping 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 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.

2.3 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) small government jurisdictions.

Small business. 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. A business involved in fish 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 receipts not in excess of $4.0 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 involved in both the harvesting and processing of seafood products is a small business if it meets the $4.0 million criterion for fish harvesting operations. Finally, 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, controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint ventures 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 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.

2.4 Reason for considering the action

The purpose of this proposed action is to reduce the risk of overfishing the Pribilof Island blue king crab stock by developing an amended rebuilding plan for this stock in compliance with the Magnuson-Stevens Act and the national standard guidelines.

2.5 Objectives of, and legal basis for, the proposed action

Under the Magnuson-Stevens Act, the United States has exclusive management authority over all living marine resources found within its EEZ. The management of marine fishery resources is vested in the Secretary of Commerce, with advice from the Regional Fishery Management Councils. The Bering Sea groundfish fishery in the EEZ off Alaska is managed under the BSAI FMP.

Statutory authority for measures designed to reduce bycatch is specifically addressed in Sec. 600.350 of the Magnuson-Stevens Act. That section establishes National Standard 9—Bycatch, which directs the Councils to minimize bycatch and to minimize mortality of bycatch when it cannot be avoided.

The dual objectives of the proposed action are to reduce PIBKC bycatch, to the extent practicable, in the BSAI groundfish fisheries in compliance with National Standard 9 of the Magnuson-Stevens Act and, further, to comply with National Standard 1 of the Magnuson-Stevens Act which requires that conservation and management measures prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

2.6 Number and description of small entities regulated by the proposed action

The proposed action(s) being considered by the Council applies to those entities that participate in the directed groundfish fishery in the Bering Sea. These entities include the American Fisheries Act (AFA) affiliated pollock fleet and the six western Alaska Community Development Quota (CDQ) organizations that presently receive CDQ allocations of BS pollock as well as some Open Access fishery participants.

The RFA requires a consideration of affiliations between entities for the purpose of assessing if an entity is small. The AFA pollock cooperatives in the BS are an important type of affiliation. Some of the entities directly affected by the proposed action are members of AFA co-ops in 2008, and therefore, are "affiliated" and are considered to be large entities for RFA purposes. The six CDQ organizations potentially directly regulated by the proposed action are considered to be small entities for RFA purposes. Depending on the Alternative and/or option chosen in this action, impacts may be felt by groundfish fishery participants using all gear types, or only pot gear for Pacific cod. Thus, the consideration of small entities potentially affected by this action must include all groundfish gear types eligible to fish in the Bering Sea. In 2009, there were a total of 209 vessels that caught, or caught and processed less than $4.0 million ex-vessel value or product value of groundfish and other species in the Bering Sea. Of these small entities, 191 were catcher vessels and 18 were catcher processors. Options within this alternative set that specifically limit impacts to Pacific Cod pot vessels would affect 51 small catcher vessels and 3 small catcher processors (Hiatt, et.al., 2010, Table 37, page 74).

2.7 Recordkeeping and reporting requirements

The action alternatives involve regulatory closure areas to groundfish fishing. These closure areas would not invoke additional recordkeeping and reporting requirements as vessels operating in the groundfish fisheries presently must maintain the same catch accounting records as would be required under the action alternatives.

2.8 Federal rules that may duplicate, overlap, or conflict with proposed action

At present, NMFS is preparing a Biological Opinion (BIOP) regarding the status of Steller Sea Lion (SSL) stocks in the BSAI. It is unclear at present whether the SSL BIOP will require additional protection measures around the Pribilof Islands. It is anticipated that the BIOP will be published prior to Council initial review of the proposed actions and, thus, it is anticipated that additional information or an duplication, overlap, or conflict between the proposed action and SSL protection measures will be available for initial review.

2.9 Description of significant alternatives to the proposed action

Chapter 2 of the associated EA describes in detail the alternative under consideration, as well as those which have been considered but eliminated. Once a preferred alternative is chosen, this section will identify and describe any significant alternatives to the proposed action that (1) meet the action objectives and (2) imposed smaller adverse economic impacts on the identified directly regulated entities.

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