

**FINAL 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.**

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**Abstract:** This 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<sup>1</sup>**

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 was 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 September 1993 with a Guideline Harvest Level (GHL) of 3.4 million pounds. However, 2.6 million

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<sup>1</sup> 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.

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.

### **BSAI Groundfish Fisheries:**

The alternatives analyzed herein have the potential to affect several of the groundfish fisheries of the BSAI. These include target fisheries for Pacific cod and the various flatfishes; however, the Council has specifically exempted any fisheries that do not meet PIBKC bycatch thresholds, including the Pollock fishery (see the discussion of the exemption in the description of the alternatives presented below). A detailed description of the potentially affected fisheries, including participation, landings, revenue, and market disposition can be found in the the 2009 Groundfish Economic SAFE (Hiatt et al. 2009), which is incorporated here by reference. The analysis uses specific data from the 2009 Economic SAFE to estimate potential revenue impacts and to compare such potential impacts with total values earned within target/gear combinations as detailed in the analysis of the alternatives sections presented below.

### **Fisheries Dependent Communities**

The 2009 Groundfish Economic SAFE (Hiatt et al. 2009 table 35, page 70) indicates that the Bering 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° and 170° 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 (labeled 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<sup>2</sup>. While the PIBKC stock is in Tier 4 of the Crab OFL Tier system, it is at stock status 'c' therefore the directed fishery  $F_{\text{directed}} = 0$  as  $B/B_{\text{MSY}_{\text{prox}}} < \beta$  and  $F_{\text{OFL}} < F_{\text{MSY}}$  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- $F_{\text{OFL}}$ . 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 coming 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  $B_{\text{MSY}}$ ). 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 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.

<sup>2</sup> 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.

**Sub-Option 3: PSC Cap = 90% of ABC**

This sub-option set the cap equivalent to the 90% of ABC. Given the ABC as specified under sub-option 2 this equates to a cap of 3,240 lbs.

**Sub-Option 4: PSC Cap = 75% of ABC**

This sub-option set the cap equivalent to 75% of the ABC. Given the ABC as specified under sub-option 2 this equates to a cap of 2,700 lbs.

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 11-1 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
- Sub-Option 3: Cap = 90% of ABC
- Sub-Option 4: Cap = 75% of ABC

Option 5b: The existing ADF&G crab closure areas between 168° and 170° West longitude, and between 57° and 58° North latitude would be closed to additional fishing effort as indicated in Figure 2 of the accompanying EA. The fisheries to which this closure would apply are listed in Table 11-1 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
- Sub-Option 3: Cap = 90% of ABC
- Sub-Option 4: Cap = 75% of 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
- Sub-Option 3: Cap = 90% of ABC
- Sub-Option 4: Cap = 75% of 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
- Sub-Option 3: Cap = 90% of ABC

Sub-Option 4: Cap = 75% of ABC

### 1.3.6 Options 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.

- Option 1: 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<sup>3</sup>. 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](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](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.

### 1.3.1 Exempted Groundfish Fisheries

In December of 2010, the Council directed the analysts to exempt from the proposed action any target fishery which had PIBKC bycatch, during any of the years 2003-2010, of either less than 5 percent of the PIBKC ABC (Option a) or less than 10 percent of the PIBKC AB (Option b). Analysis of bycatch by target fishery is presented in Section 3.2 of the accompanying EA, and a list of fisheries that would still be affected by the proposed alternative actions is included in EA Table 11-1. The result of the analysis indicate that the available do not identify and difference between the two options and the fisheries that would be exempted would be the pollock trawl fishery, the Pacific cod trawl fishery, and the Greenland turbot non-pelagic trawl fisheries. Thus, the impacts of the alternatives would accrue to non-trawl Pacific cod fisheries, and the various flatfish fisheries.

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<sup>3</sup> Additional specificity would be required as to which specific fisheries this increased observer coverage would apply.

## **1.4 Analysis of the Alternatives**

This analysis addresses the potential impacts, in terms of potentially forgone revenue, 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 introduction to the analysis discusses the analytical approach. The subsequent sections present the analysis of potential impacts of each alternative.

### **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, 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 2003 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.

### **1.4.1 Economic Benefits of Pribilof Islands Blue King Crab Rebuilding.**

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 to allow any capture fisheries.

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)<sup>4</sup>. 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 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

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<sup>4</sup> "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.

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. 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 follow.

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

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
Flatfish	Hook & Line	5	5	5	5	4	4	5
Flatfish	Trawl	154	170	175	184	213	266	222
<b>Total</b>		<b>291</b>	<b>303</b>	<b>310</b>	<b>307</b>	<b>316</b>	<b>383</b>	<b>343</b>
<b>Total All Species and Gear</b>		<b>1,974</b>	<b>1,979</b>	<b>1,978</b>	<b>1,977</b>	<b>1,857</b>	<b>1,541</b>	<b>1,335</b>
<b>Percent of Total</b>		14.74%	15.31%	15.67%	15.53%	17.02%	24.85%	25.69%

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
Flatfish	Hook & Line	\$4	\$6	\$7	\$9	\$8	\$8	\$6
Flatfish	Trawl	\$108	\$143	\$173	\$181	\$191	\$210	\$154
<b>Total</b>		<b>\$221</b>	<b>\$299</b>	<b>\$360</b>	<b>\$396</b>	<b>\$402</b>	<b>\$451</b>	<b>\$306</b>

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. 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 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**

The 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 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 in order to capture 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 PIHCZ 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 catch in this area was 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 0.9 percent would have been put at risk in 2009. In all remaining years, total impacts would have been between 1.7 percent and about 4.4 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.

#### **1.4.2.2 Revenue at Risk under Alternative 3**

Under this alternative existing ADF&G crab closure areas, between 168 and 170 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.

Table 1-7 and Table 1-8 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 3,857 tons, in 2003, to a high of 7,967 tons in 2008. In 2009; however, tonnage recorded in this area was at a period low of 343 tons. These tonnages represent between \$2.8 million (2003) and a high of \$8.2 (2005) million in total first wholesale value, while the 2009 revenue from catch within this area was approximately \$.4 million.

Table 1-9 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 .233 percent of total revenue would have been put at risk in 2005, and a period low of .14 percent would have been put at risk in 2009. 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 impacts of about 11.2 percent in 2005; however, in all other years the impact estimate is confidential. The flatfish trawl fisheries would have had smaller impacts with percentages of total fishery revenue put at risk of between .01 percent and 2.8 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.

Table 1-10 and Table 1-11 provide the tabulations of tonnage and revenue placed “at risk” by the Option 1 of alternative 4. Due to the relatively large size of this proposed closure area, many more vessels have recorded catch in the 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 Table 1-10, considerable tonnages of several target species have been reported in the proposed closure area under this alternative and option. Most notably affected are the flatfish non-pelagic

trawl fishery and the Pacific cod hook and line fishery. In all, more than 111,000 metric tons of catch occurred in this area in 2005, while the 2009 retained catches was recorded at a period low of just under 37,000 metric tons. These tonnages at risk represent annual totals that peaked in 2005, at \$111.1 million, but have been considerably lower in recent years as exemplified by the period low of \$31.7 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 30.86 percent of total revenue would have been put at risk in 2005, and a period low of 10.38 percent would have been put at risk in 2009. In all remaining years, total impacts would have been between 12.73 percent and 21.65 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, would have 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.

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 flatfish trawl, and Pacific cod hook and line. The total tonnage occurring in this area has ranged from a high of 65,455 tons to lower levels of around 31,000 tons annually from 2006 through 2008. In 2009, the tonnage recorded in this area fell to a period low of 11,714.

Table 1-14 shows that these tonnages represent between \$27 million (2003) and \$71.7 million (2005) with 2009, the period low year, generating about \$10.3 million in revenue at risk. The greatest impacts would have occurred in the flatfish fisheries with \$46.9 million of revenue at risk in 2005 followed by Pacific cod hook and line fisheries that would have had about \$20.5 million in revenue at risk in the high year of 2005. Of note; however, is that those values fall considerably in more recent years and the 2009 values would have been \$5.5 million and \$4 million for the flatfish and Pacific cod hook and line fisheries, respectively. The Pacific cod pot fishery would have had a range of between \$4.3 million (2005) and \$0.6 million (2003) in revenue at risk during the 2003-2009 timeframe with the 2009 value at \$0.9 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 19.93 percent of total revenue would have been put at risk in 2005, and a period low of 3.36 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.

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)

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
<b>Total All Non-Confidential Catch</b>				<b>3,796.78</b>	<b>6,459.74</b>	<b>8,807.33</b>	<b>5,189.45</b>	<b>4,408.23</b>	<b>2,822.63</b>	<b>1,548.42</b>

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, 2003-2009. 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	\$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
<b>Total</b>				<b>\$3.1</b>	<b>\$7.6</b>	<b>\$12.2</b>	<b>\$9.1</b>	<b>\$9.0</b>	<b>\$5.8</b>	<b>\$1.9</b>

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%
<b>Percent Revenue of Affected Fisheries</b>				<b>1.80%</b>	<b>3.05%</b>	<b>4.36%</b>	<b>2.76%</b>	<b>2.59%</b>	<b>1.70%</b>	<b>0.90%</b>

Table1-7: Hypothetical Aggregate “Tonnage At Risk” based on retained tons of groundfish caught in the Alternative 3 (ADF&G) closure area, 2003-2009. 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
<b>Total All Non-Confidential Catch</b>				<b>3,856.81</b>	<b>916.45</b>	<b>6,260.94</b>	<b>2,083.26</b>	6,488.39	<b>7,967.29</b>	343.21

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, 2003-2009. 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
<b>Total</b>				<b>\$2.8</b>	<b>\$1.0</b>	<b>\$8.2</b>	<b>\$3.6</b>	<b>\$7.9</b>	<b>\$6.9</b>	<b>\$0.4</b>

Table1-9: Revenue, as a percent of target and total revenue, put “At Risk” in the Alternative 3 (ADF&G) closure area, 2003-2009. 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%
<b>Percent Revenue of Affected Fisheries</b>				<b>1.31%</b>	<b>0.35%</b>	<b>2.33%</b>	<b>0.94%</b>	<b>2.01%</b>	<b>1.57%</b>	<b>0.14%</b>

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, 2003-2009. ("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
<b>Total All Non-Confidential Catch</b>				<b>60,281</b>	<b>66,316</b>	<b>101,749</b>	<b>68,385</b>	<b>75,453</b>	<b>48,588</b>	<b>36,923</b>

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, 2003-2009. ("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
<b>Total</b>				<b>\$44.8</b>	<b>\$64.3</b>	<b>\$111.1</b>	<b>\$85.8</b>	<b>\$85.3</b>	<b>\$57.4</b>	<b>\$31.7</b>

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, 2003-2009. ("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%
<b>Percent Revenue of Affected Fisheries</b>				<b>20.23%</b>	<b>21.47%</b>	<b>30.86%</b>	<b>21.65%</b>	<b>21.24%</b>	<b>12.73%</b>	<b>10.38%</b>

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, 2003-2009. ("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
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
<b>Total All Non-Confidential Catch</b>				<b>36,700</b>	<b>33,509</b>	<b>65,455</b>	<b>31,441</b>	<b>31,061</b>	<b>33,304</b>	<b>11,714</b>

Table 1-14: Hypothetical aggregate “Revenue 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, 2003-2009. ("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
Flatfish	CDQ + OA	CP + CV	NP Trawl	\$18.8	\$17.7	\$46.9	\$18.0	\$19.5	\$20.8	\$5.5
<b>Total</b>				<b>\$27.0</b>	<b>\$32.4</b>	<b>\$71.7</b>	<b>\$41.0</b>	<b>\$38.6</b>	<b>\$35.1</b>	<b>\$10.3</b>

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%
Flatfish	CDQ + OA	CP + CV	NP Trawl	17.46%	12.33%	27.19%	9.97%	10.20%	9.92%	3.54%
<b>Percent Revenue of Affected Fisheries</b>				<b>12.18%</b>	<b>10.82%</b>	<b>19.93%</b>	<b>10.34%</b>	<b>9.60%</b>	<b>7.78%</b>	<b>3.36%</b>

### 1.4.2.1 Revenue at Risk under Alternatives 5

Four cap levels are considered under this alternative. As detailed in section 2.5 and table 2.1 of the accompanying EA Alternative 5 PSC caps, under the four options, would be set at either the OFL (currently 4,000 lbs) or the ABC (estimated at 3,600 lbs) as well as caps set at 90 percent of ABC (3,240 lbs), and 75% of ABC (2,700 lbs.). In analyzing the impacts of closing groundfish fisheries, consideration was given to when the cap itself is reached thereby triggering area closures as defined in Alternative 5. The only year that the cap was reached, historically, was 2007. In 2007 the OFL would have been exceeded the week of September 22<sup>nd</sup>. Likewise the ABC level, 90% of the ABC, and 75% of the ABC would all have been exceeded in the same week, specifically on week ending date of September 22<sup>nd</sup>. Thus, it is not possible to differentiate between the Alternative 5 cap level options in this impact analysis as they were all historically exceeded within the same week and only in 2007. Thus for analytical purposes the cap options of Alternative 5 are considered to be equivalent<sup>5</sup>.

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 under 15 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.

Table 1-17 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 2.2 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.

Table 1-18 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 2.414 tons of harvest, and about \$3 million in revenues, at risk. These impacts would have occurred in the open access Pacific cod pot and hook and line fisheries, and in the CDQ Pacific cod hook and line fishery; however, some confidential data cannot be reported in the CDQ and open access flatfish fisheries. In percentage terms, the tonnage and revenue totals represent 3.2 percent of the total catch taken from the area in 2007, and about 3.5 percent of the revenue from that area. In comparison to the total BSAI

<sup>5</sup> 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 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. The total revenue at risk would have been approximately .75 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 1,182 tons of harvest, and about \$2.4 million in revenues, at risk. These impacts would have occurred in the open access Pacific cod pot and hook and line fisheries, and in the CDQ Pacific cod hook and line fishery; however, some confidential data cannot be reported in the CDQ and open access flatfish fisheries. In percentage terms, the tonnage and revenue totals represent 3.8 percent of the total catch taken from the area in 2007, and 6.26 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, .26 of a percent of the value of the CDQ Pacific cod hook and line fishery, and .81 percent of the value of the Pacific cod open access hook and line fishery. The total revenue at risk would have been approximately .6 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	
<b>Total</b>				<b>657.93</b>	<b>\$1.34</b>	0.06%
<b>Percent of PIBKC Area Total</b>				<b>14.93%</b>	<b>14.93%</b>	

\* 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	
<b>Total</b>				<b>142.88</b>	<b>\$0.29</b>	0.07%
<b>Percent of ADF&amp;G Area Total</b>				<b>2.20%</b>	<b>3.69%</b>	

\* 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	
<b>Total</b>				<b>2,414.26</b>	<b>\$3.02</b>	0.75%
<b>Percent of PIBKC75 Area Total</b>				<b>3.20%</b>	<b>3.54%</b>	

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	\$0.64	1.74%
Pacific Cod	CDQ	CP	Hook & Line	212.53	\$0.43	0.26%
Pacific Cod	OA	CP + CV	Hook & Line	656.37	\$1.34	0.81%
Pacific Cod	OA	CP + CV	Jig	0.00		
Flatfish	CDQ + OA	CP + CV	NP Trawl	"c"		
<b>Total</b>				<b>1,181.67</b>	<b>\$2.42</b>	0.6%
<b>Percent of PIBKC84 Area Total</b>				<b>3.80%</b>	<b>6.26%</b>	

### 1.4.3 Comparison of Impacts by Alternative

Table 1-20 through Table 1-22 provide a comparison of the potential impacts, in terms of tons and revenue at risk, of each of the Proposed closure areas (Alt. 2, 3, and 4) on the Pacific Cod pot gear fishery. As one would expect, the tons at risk increase with the size of the closure area and that finding is consistent across all years. Non-confidential tonnage put at risk ranges from 306 metric tons (Alt. 2, 2009) to as much as 4,212 metric tons (Alt. 4-1, 2008). Revenue effects range from near zero to \$9 million and the range of impacts in terms of percent of total revenue earned in the BSAI Pacific Cod pot fishery is from 1.77 percent to more than 22 percent (Alt. 4-1, 2008) of total fishery revenue. These values are also depicted graphically in Figure 1.

Table 1-20: Pacific Cod Pot Fishery Impacts by Alternative: Tons at Risk.

Alternative Area	Year						
	2003	2004	2005	2006	2007	2008	2009
A2 PIHCZ	390	2,415	2,769	1,644	2,156	1,389	306
A3 ADF&G	"c"	"c"	1,578	"c"	"c"	"c"	"c"
A4-2 PIBK84	735	2,508	3,081	2,132	2,622	2,105	681
A4-1 PIBK75	1,153	2,566	3,089	2,784	3,156	4,212	1,639

Table 1-21: Pacific Cod Pot Fishery Impacts by Alternative: Revenue at Risk.

Alternative Area	Year						
	2003	2004	2005	2006	2007	2008	2009
A2 PIHCZ	\$0	\$3	\$4	\$3	\$4	\$3	\$0
A3 ADF&G	"c"	"c"	\$2	"c"	"c"	"c"	"c"
A4-2 PIBK84	\$1	\$3	\$4	\$4	\$5	\$4	\$1
A4-1 PIBK75	\$1	\$3	\$4	\$5	\$6	\$9	\$2

Table 1-22: Pacific Cod Pot Fishery Impacts by Alternative: Revenue at Risk as percent of Target Fishery Total Revenue.

Alternative Area	Year						
	2003	2004	2005	2006	2007	2008	2009
A2 PIHCZ	1.77%	14.20%	19.78%	8.65%	11.98%	7.31%	2.19%
A3 ADF&G	"c"	"c"	11.27%	"c"	"c"	"c"	"c"
A4-2 PIBK84	3.34%	14.75%	22.01%	11.22%	14.57%	11.08%	4.86%
A4-1 PIBK75	5.24%	15.10%	22.06%	14.65%	17.54%	22.17%	11.71%

Figure 1: Pacific Cod Pot Fishery Effects

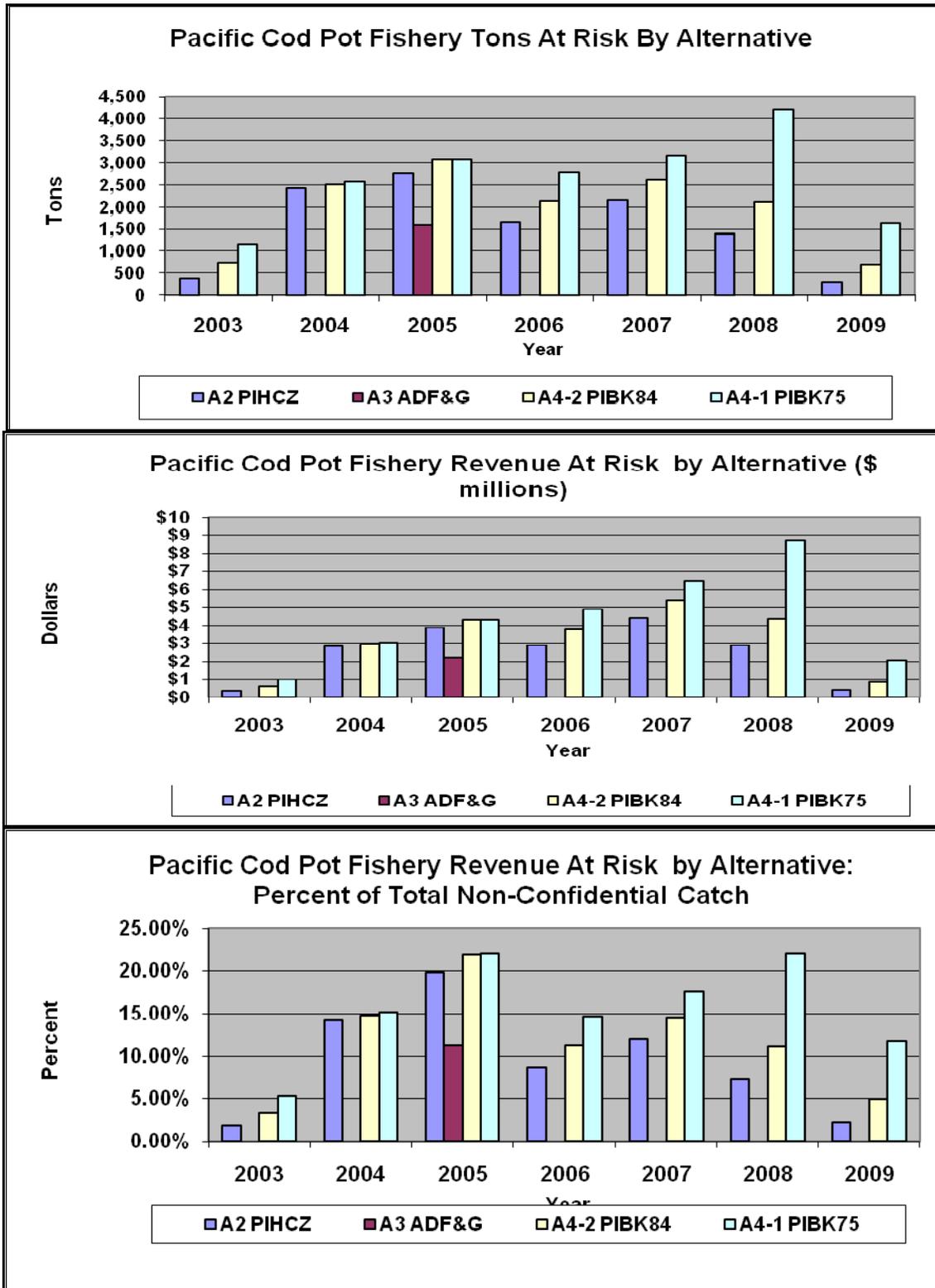


Table 1-23 through Table 1-25 provide a comparison of the potential impacts, in terms of tons and revenue at risk, of each of the Proposed closure areas on the all groundfish fisheries combined. In contrast to the Pacific cod pot fishery, the distribution of groundfish effort in the flatfish fisheries within the ADF&G area results in larger tons at risk tabulations in the Alternative 3 ADF&G areas than occurs in the Alternative 1 PIHCZ area in several, but not all, years. Though there are a few exceptions, tons at risk tend to increase with the size of the closure area and that finding is consistent across all years. Non-confidential tonnage put at risk ranges from 343 metric tons (Alt. 3, 2009) to more than 101,000 metric tons (Alt. 4-1, 2005). Revenue effects range from near zero to \$111 million and the range of impacts in terms of percent of total revenue earned in the BSAI Pacific Cod pot fishery is from .14 percent to approximately 30.9 percent (Alt. 4-1, 2005) of total fishery revenue. These values are also depicted graphically in Figure 2

Table 1-23: All Fishery Impacts by Alternative: Tons at Risk

Alternative Area	Year						
	2003	2004	2005	2006	2007	2008	2009
A2 PIHCZ	3,797	6,460	8,807	5,189	4,408	2,823	1,548
A3 ADF&G	3,857	916	6,261	2,083	6,488	7,967	343
A4-2 PIBK84	36,700	33,509	65,455	31,441	31,061	33,304	11,714
A4-1 PIBK75	60,281	66,316	101,749	68,385	75,453	48,588	36,923

Table 1-24: All Fishery Impacts by Alternative: Revenue at Risk

Alternative Area	Year						
	2003	2004	2005	2006	2007	2008	2009
A2 PIHCZ	\$3	\$8	\$12	\$9	\$9	\$6	\$2
A3 ADF&G	\$3	\$1	\$8	\$4	\$8	\$7	\$0
A4-2 PIBK84	\$27	\$32	\$72	\$41	\$39	\$35	\$10
A4-1 PIBK75	\$45	\$64	\$111	\$86	\$85	\$57	\$32

Table 1-25: All Fishery Impacts by Alternative: Revenue at Risk as percent of Target Fishery Total Revenue.

Alternative Area	Year						
	2003	2004	2005	2006	2007	2008	2009
A2 PIHCZ	2.76%	4.88%	6.61%	4.28%	4.32%	2.43%	0.90%
A3 ADF&G	1.31%	0.35%	2.33%	0.94%	2.01%	1.57%	0.14%
A4-2 PIBK84	12.18%	10.82%	19.93%	10.34%	9.60%	7.78%	3.36%
A4-1 PIBK75	20.23%	21.47%	30.86%	21.65%	21.24%	12.73%	10.38%

Figure 2 All Fisheries Combined, Effects of Alternatives

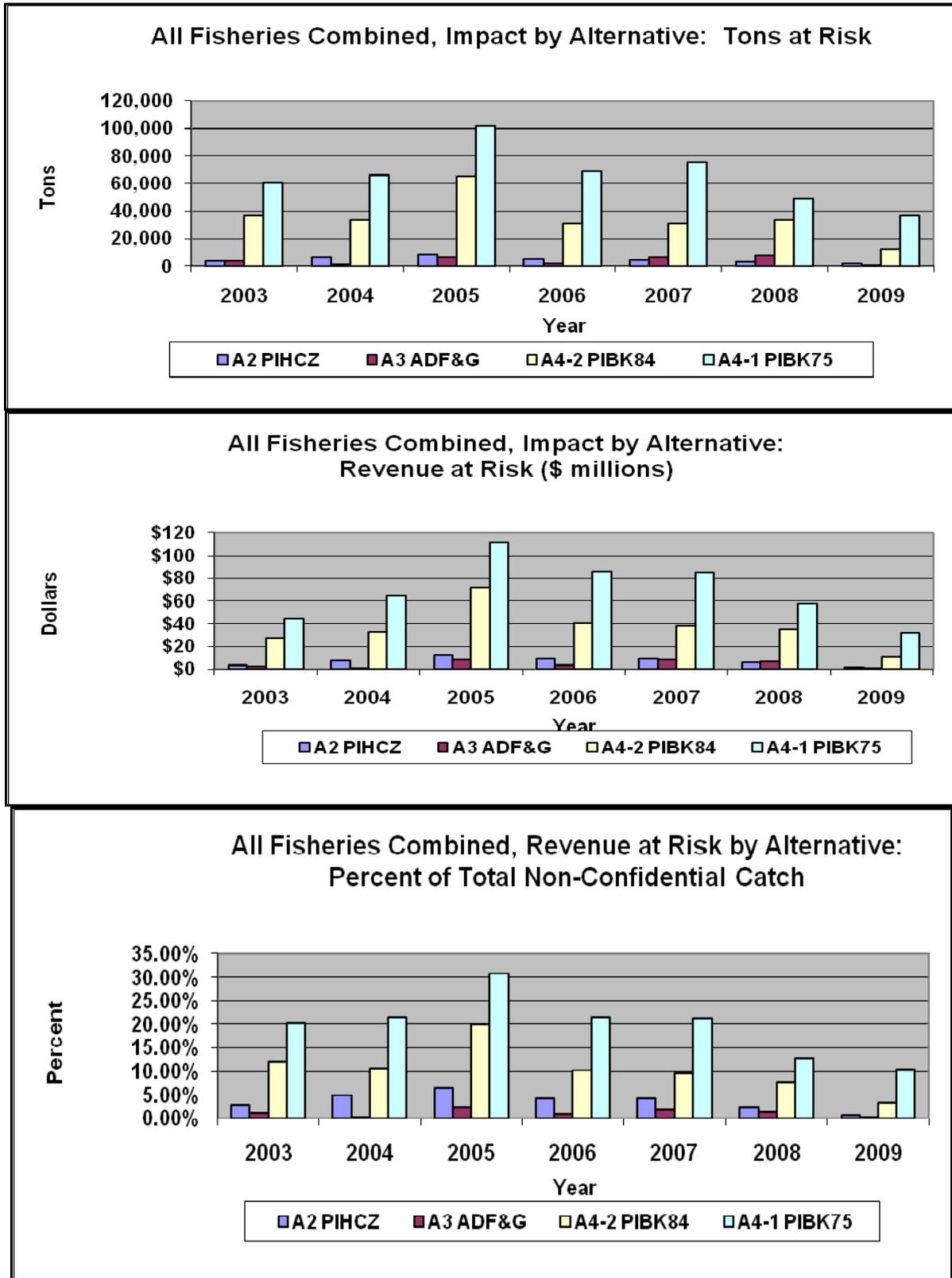


Table 1-26 through Table 1-28, and Figure 3 through Figure 5 provide comparisons of the effect of the various options of Alternative 5 (triggered area closures) on potentially affected fisheries. Unfortunately, all impacts associated with the flatfish fisheries are confidential and cannot be divulged. In the Pacific cod fishery, the greatest impacts of the triggered closure would have occurred in the hook and line combined CP+CV grouping where 1,312 tons are put at risk were a closure in the largest stock distribution area (A5c) and this option would also result in the largest total impacts of 2,414 metric tons across all of the Pacific cod fisheries potentially affected. The Alternative 5d option, which is the second largest triggered closure area under consideration, would have had the second highest total impact of 1,182 tons, most of which comes from the hook and line CP+CV grouping. Due to confidentiality, only a combined Pacific cod hook and line group could be reported, with 143 metric tons put at risk. Extending the existing trawl closure in the PIHCZ to all groundfish fisheries, as a triggered closure, would have put 271 and 386 tons (658 total) at risk in the Pacific cod pot CP+CV group and the Pacific cod hook and line CP+CV group, respectively. These tonnages, when converted to revenue at risk, result in total potential impacts ranging from \$0.292 million (ADF&G area) up to just over \$3 million (PIBKC75 area). Most of the potential impact estimates, in specific gear and target fisheries, approach or exceed a half a million dollars, while the largest potential revenue at risk impacts exceed \$1.6 million in the Pacific cod hook and line CP+CV grouping.

In percentage terms, these potential impacts are, with the exception of the Pacific cod pot fishery, all less than one percent of the overall target fishery level and the Pacific cod pot fishery impacts are less than two percent of target fishery revenue in all areas. However, it is important to recognize that while these values are small, in percentage of overall target fishery revenue and aggregate total revenue, the potential impacts may be concentrated in a small number of operators.

Table 1-26: Alternative 5 Fishery Impacts: Tons at Risk

Alternative Area	Pacific Cod			Flatfish		Total
	Pot CP+CV	H&L CDQ CP	H&L CP+CV	H&L CP+CV	NP Trawl	
A5a PIHCZ	272	"c"	386			658
A5b ADF&G	"c"		143		"c"	143
A5c PIBK75	495	607	1,312	"c"	"c"	2,414
A5d PIBK84	313	213	656		"c"	1,182

Figure 3: Effects of Alternative 5 Options; Tons at Risk

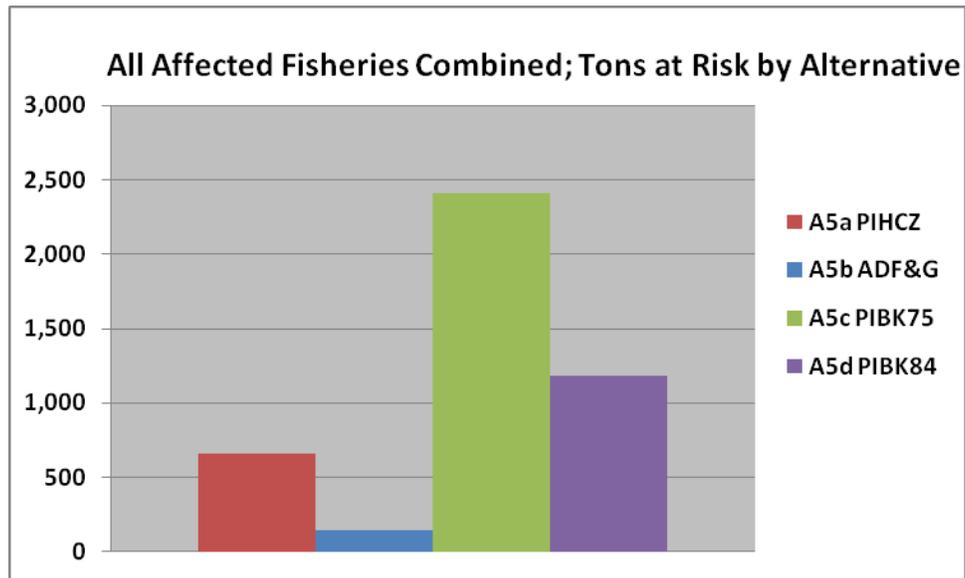


Table 1-27: Alternative 5 Fishery Impacts: Revenue at Risk

Alternative Area	Pacific Cod			Flatfish		Total
	Pot CP + CV	H&L CDQ CP	H&L CP+CV	H&L CP+CV	NP Trawl	
A5a PIHCZ	\$0.557	"c"	\$0.788			\$1.345
A5b ADF&G	"c"		\$0.292		"c"	\$0.292
A5c PIBK75	\$0.620	\$0.760	\$1.642	"c"	"c"	\$3.023
A5d PIBK84	\$0.639	\$0.434	\$1.342		"c"	\$2.415

**Figure 4: Effects of Alternative 5 Options; Revenue at Risk**

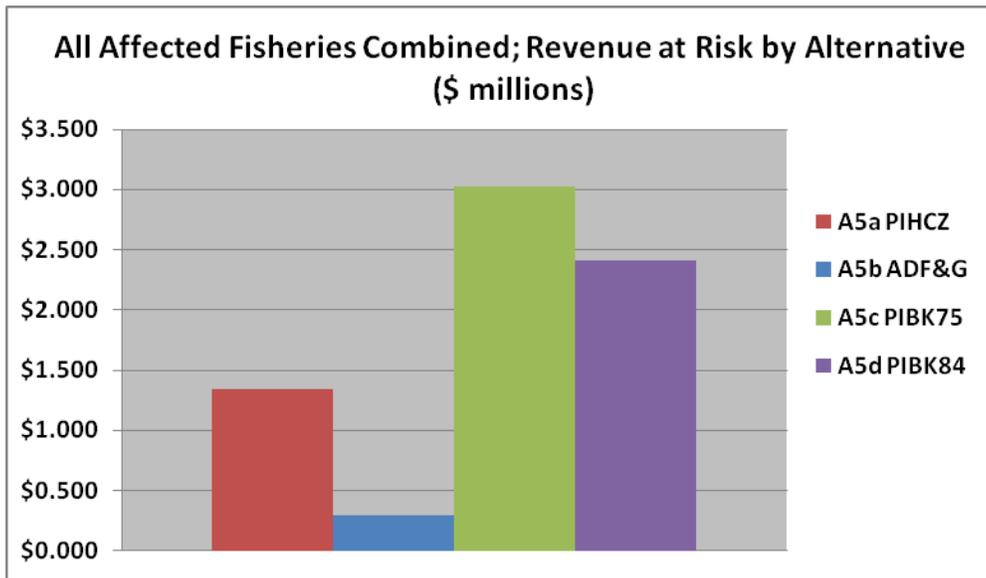
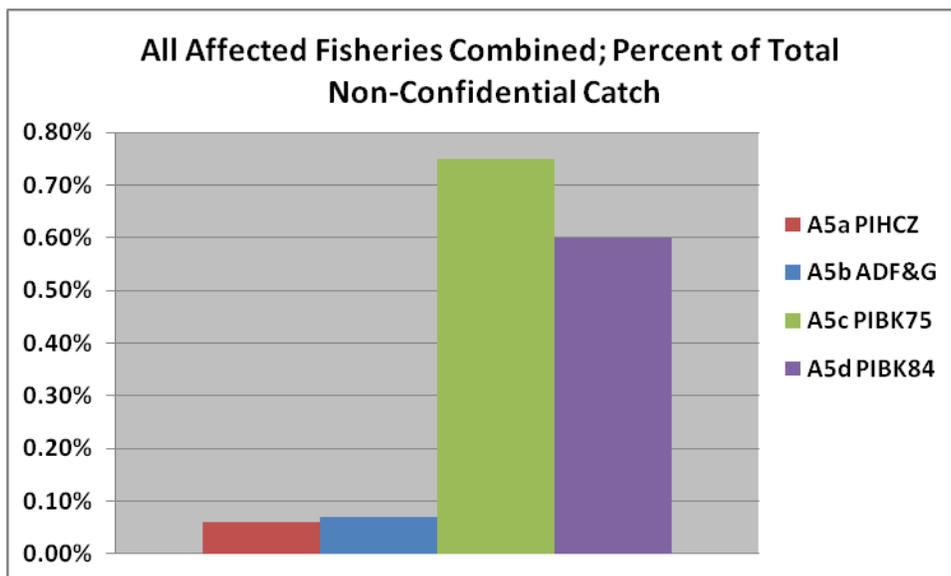


Table 1-28: Alternative 5 Fishery Impacts: Revenue at Risk as a Percent of Total Target Fishery Revenue and as a Percent of Tons at Risk

Alternative Area	Pacific Cod			Flatfish		All Affected Targets	Alternative Area
	Pot CP+CV	H&L CDQ CP	H&L CP+CV	H&L CP+CV	NP Trawl		
A5a PIHCZ	1.51%	"c"	0.48%			0.06%	A5a PIHCZ
A5b ADF&G	"c"		0.18%		"c"	0.07%	A5b ADF&G
A5c PIBK75	1.69%	0.46%	0.99%	"c"	"c"	0.75%	A5c PIBK75
A5d PIBK84	1.74%	0.26%	0.81%		"c"	0.60%	A5d PIBK84

**Figure 5: Effects of Alternative 5; Percent of Total Target Fishery Revenue**



#### 1.4.4 Options for Increased Observer Coverage

The Council has not yet identified which fisheries would receive increased observer coverage. Presumably, this option would focus on fisheries with less than 100% coverage requirements as candidates for increased coverage. All affected fisheries for this action are listed in Table 11-1 of the accompanying EA. Of these fisheries, only non-pollock catcher vessels (CVs) are in the partially covered category with less than 100% coverage (generally CVs 60' – 125' and pot vessels of all sizes have 30% observer coverage requirements). Note that all Bering Sea pollock CVs have at least 100% observer coverage requirements as a result of BSAI Amendment 91, which was effective starting January 2011. Thus, for purposes of identifying candidate fisheries for increased observer coverage under this analysis, pollock CVs are considered adequately covered.

The implementation of Options 1 and 2 requires that the Council identify specific fisheries for which increased coverage in these areas is a priority under this analysis. If specific fisheries were recommended for increased coverage, similar cost-benefit assumptions could be made, consistent with the public review draft analysis for observer restructuring.<sup>6</sup> This analysis estimates that the cost of an observer day under the existing service delivery model is \$366.<sup>7</sup> Absent identification of the specific fisheries to receive increased observer coverage under the proposed options, one could multiply the number of fishing days for each sector identified for increased observer coverage by \$366/day to estimate the total observer costs by sector. The difference between this estimate and the status quo observer costs would be the net increase in observer costs due to Options 1 and 2. The benefit to increased observer coverage is not estimated quantitatively; it would increase the amount of bycatch data for pot and longline fisheries, refining NMFS's understanding of spatial and temporal removals of PIBKC.

#### 1.4.5 Potential Impacts on Fishing Operations, Fishery Dependent Communities, Markets, and Consumers.

With any spatial or temporal/spatial closure it is likely that the affected operators will redeploy their fishing effort to adjacent areas where they may expect to make up catch, and revenue, put at risk by the closure. While it is likely that some or all of the catch can be made up outside of the smallest proposed closure areas (e.g. PIHCZ and ADF&G areas) the larger closure areas, based on historic stock distribution, would create potential impacts on catch and revenue of more than ten percent of total fishery revenue in several years and more than 30 percent in the worst case under examination here. Redeployment to recover small amounts of catch, while potentially increasing operating cost due to longer running time and/or greater fishing duration, won't have appreciable impacts on landings, fishing communities, markets, or consumers. However, as impacts increase with the size of the closure area it is less likely that all catch can be made up and, thus, there may be decreased landing and revenue, decreased tax revenue and vessel expenditures in fishing communities, and potentially contraction in supply to fish markets potentially affecting consumers via increased prices. A comprehensive treatment of these potential effects would require information on vessel operating costs, spatial modeling of effort location choice, vessel port expenditure information, as well as comprehensive domestic market supply and demand models. Unfortunately, these kinds of information are not available at present and, thus, this analysis has relied on analysis of potentially forgone revenue as the best available proxy. Nonetheless, the potential effects of each alternative on secondary operation will scale with the potential effects, in percent of revenue terms, on those fishing entities directly affected by the proposed action as analyzed herein.

<sup>6</sup>[http://www.fakr.noaa.gov/npfmc/current\\_issues/observer/Observer\\_restructuring910.pdf](http://www.fakr.noaa.gov/npfmc/current_issues/observer/Observer_restructuring910.pdf)

<sup>7</sup>Refer to Appendix 6 of the observer restructuring document for the calculations and assumptions on which this estimate is based.

## INITIAL REGULATORY FLEXIBILITY ANALYSIS

### 1.5 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.

### 1.6 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.

## **1.7 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.

## **1.8 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.

## **1.9 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.

## **1.10 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).

## **1.11 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.

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

No Federal rules have been identified that duplicate, overlap, or conflict with the proposed action.

**1.13 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.

## References:

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- Hiatt, T.R. et.al. 2010. Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic Status of the Groundfish Fisheries off Alaska, 2009. Economic and Social Sciences Research Program Alaska Fisheries Science Center National Marine Fisheries Service National Oceanic and Atmospheric Administration 7600 Sand Point Way N.E. Seattle, Washington 98115-6349 October 2010.
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- Scholz, Astrid J., Kruse, S.A., Huntington, H., Petersen Lewis, R.S., Klain, S., Ahmann, J. 2007. Socioeconomics Baseline Information for the Pribilof Islands. NPRB Project 528, Ecotrust, Portland Oregon.