

**SECRETARIAL 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.**

July 10, 2014

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Abstract: This Regulatory Impact Review/Initial Regulatory Flexibility Analysis (RIR/IRFA) evaluates a suite of spatial closure alternatives, affecting groundfish fisheries, around the Pribilof Islands in the Bering Sea. These alternatives are being proposed to reduce prohibited species catch (PSC) of Pribilof Island Blue King Crab, (PBKC) which is presently in an overfished status, 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 and Prohibited Species Catch (PSC) 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

Pursuant to the Magnuson-Stevens Act section 304(e)(4)(A) and the National Standard Guidelines, the purpose of this proposed action is to develop an amended rebuilding plan to reduce the risk of overfishing and to rebuild the PIBKC stock in as short as possible with the understanding that the biology of this stock and environmental conditions will likely dictate that the time needed to rebuild will exceed 10 years.

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. Action to limit bycatch in groundfish fisheries may also be necessary. 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.

1.2 Description of the Fishery¹

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 Pribilof Islands blue king crab fishery was closed beginning with the 1988/89 season, and remained closed through the 1994 season.

The 1993 National Marine Fisheries Service (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

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

3.4 million pounds. However, 2.6 million pounds was taken in 1993 and 1.0 million pounds of the 1994 GHL of 2.0 million pounds was taken in that year by 104 participating vessels.

In 1995, an increase in blue king crab abundance and a continued harvestable surplus of red king crabs resulted in a combined red and blue king crab GHL of 2.5 million pounds. Subsequent declines in red and blue king crab abundance over the next three years resulted in a combined GHL for 1998 of 1.3 million pounds. 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 PSC of PIBKC 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 PSC 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, gross revenue, and market disposition can be found in the 2010 Groundfish Economic SAFE (Hiatt et al. 2011), which is incorporated here by reference. The analysis uses specific data from the 2010 Economic SAFE to estimate potential gross 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 2010 Groundfish Economic SAFE (Hiatt et al. 2011 table 35, page 70) indicates that the Bering Sea pollock processors, which include American Fisheries Act (AFA) shoreside processors operating in King Cove, Akutan, Sand Point, Dutch Harbor, and two floating processors earned approximately 80 percent of their gross revenue from groundfish processing in 2010 (all species combined). In these communities groundfish processing provides the majority of first wholesale processor gross revenue and changes in BSAI groundfish harvests and deliveries to these communities would have impacts 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 million and \$2 million worth of halibut landings from Area 4C and 4D IFQ (Sholtz et.al, 2007). Actual halibut landings totals 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 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

This section replicates the description of the Alternatives contained in Chapter 2 of the accompanying Environmental Assessment (EA). Graphical representations of the alternatives can be found in the EA and are identified as such in this description.

1.3.1 Alternative 1: Status Quo

Alternative 1 retains the current protections for PIBKC stock. Pribilof Islands blue king crab is currently managed under the rebuilding plan that was implemented in 2004 (69 FR 17651, April 5, 2004). The rebuilding plan closes the directed fishery until the stock is completely rebuilt. Since 1999, ADF&G has closed the Pribilof Islands red king crab fishery to minimize PSC of blue king crab. ADF&G also closes an area to the snow crab fishery to minimize blue king crab bycatch. As a result, the bycatch of blue king crab in the crab fisheries is minimal.

Two management measures in the BSAI groundfish FMP minimize blue king crab PSC. First, blue king crab is a prohibited species and must be avoided, to the extent practicable, while fishing for groundfish, and must be returned to the sea with a minimum of injury (NPFMC 2010). Second, the Pribilof Islands Habitat Conservation Zone (PIHCZ) is closed to all trawl gear as show as shown in Figure 2-1 of the accompanying Environmental Assessment (EA).

1.3.2 Alternative 2: Expand the current Pribilof Islands Habitat Conservation Zone to apply to select groundfish fisheries and only Pacific cod pot fishing. (Preferred Alternative (PA))

Under Alternative 2, the existing PIHCZ, as described in Alternative 1 (EA Figure 2-1), 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 and 2b). Option 2c provides for additional observer coverage in the Pacific cod pot fishery with a closure based on reaching a PSC limit.

Option 2a: In addition to the trawl fisheries, closure in the PIHCZ would apply to all groundfish fisheries which have contributed greater than a designated threshold to PSC of PIBKC. The PIHCZ closure would apply to a fishery based upon whether PIBKC PSC in that fishery, from 2003 to 2010, met either a threshold of greater than 5 percent of ABC or greater than 10 percent of ABC. The non-trawl Bering Sea groundfish fisheries that exceed the 5 percent threshold are pot and hook-and-line Pacific cod fisheries. No fisheries currently have PSC greater than 10 percent of ABC². These fisheries and the threshold criteria are described in more detail in EA section 4.2 and in EA Table 2-1.

Option 2b (Preferred Alternative): In addition to the existing trawl closure in the PIHCZ, all Pacific cod pot fishing would be prohibited in this zone year-round. Option 2b applies only to the Pacific cod pot fishery, as this fishery has the highest annual contribution to PIBKC PSC in most years, as shown in EA Table 2-2. In June 2012, the Council designated Option 2b as the preferred alternative because the Pacific cod pot fishery comprises the highest amounts of PSC of PIBKC over the timeframe examined (2003-2010) despite the limitations in the observer coverage of this fishery. The PIHCZ has been identified as an important habitat for and area of concentration of blue king crab, and with the implementation of Amendment 21a to the BSAI groundfish FMP, has been closed to trawl gear. Thus, closure to additional gear types in the PIHCZ is consistent with the approach taken under Amendment 21a.

Option 2c: In addition to the existing trawl closure in the PIHCZ, vessels fishing for Pacific cod with pot gear in the PIHCZ must carry 100% observer coverage. Pacific cod pot fishing in the PIHCZ will be closed for the year if total PIBKC PSC across all fisheries in all areas reaches:

- i) 20%
- ii) 30%
- iii) 50%

of the overall trigger closure cap (75% ABC)

Under option 2c, additional measures are placed on the Pacific cod fishery as this fishery has the highest annual contribution to PIBKC PSC in most years. Under this option, Pacific cod pot vessels must carry 100% observer coverage in order to be authorized to fish within the PIHCZ. Furthermore, if overall PIBKC PSC in all fisheries exceeds any of the three threshold suboptions (i-iii), fishing for Pacific cod with pot gear within the PIHCZ would then be prohibited for the remainder of the year.

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° W and 170° W longitude, and between 57° N and 58° N latitude would be closed to additional fishing effort, in addition to the groundfish trawl closure as under status quo, as described in the options below. The existing closure configuration is indicated in EA Figure 2-2. There are two closure options under Alternative 3:

Option 3a: Closure applies to all groundfish fisheries which have contributed greater than a designated threshold to PSC of PIBKC since 2003. The closure to a fishery would be based on PSC of PIBKC in that fishery between 2003 and 2010, meeting either a threshold of greater than 5 percent of ABC or greater than 10 percent of ABC. Under the five percent criteria threshold the closure would apply to the following fisheries: yellowfin sole trawl, other flatfish trawl, Pacific cod pot, and Pacific cod hook-

² Previously rock sole trawl was included in the fisheries that met the 10% threshold, however it was later removed from consideration due to all observed catch occurring outside of the defined Pribilof District. See Section **Error! Reference source not found.** for additional information.

and-line fisheries. None of the fisheries met the 10% threshold³. The fisheries and the threshold criteria are described in more detail in section 3.2 and EA Table 2-1.

Option 3b: Under this option, no Federal Pacific cod fishing with pot gear would be allowed within the confines of the closures shown in EA Figure 2-2. Option 3b applies only to the Pacific cod pot fishery, as this fishery has the highest annual contribution to PIBKC PSC in most years as shown in EA Table 2-2.

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 EA Figure 2-3 (a and b), which covers the entire distribution of the PIBKC stock. The distribution of the entire PIBKC stock is defined in two ways, depending upon the data used to establish the entire distribution of the stock. Under the first option (Option 1), the closure area consists of the full distribution of the Pribilof Islands stock aggregated from 1975 to 2009, based on the NMFS EBS bottom trawl survey (EA Figure 2-3a). 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 (EA Figure 2-3b). 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 year-round closure options that can be applied to both closure areas (1975 to 2009 distribution and 1984 to 2009 distribution) under Alternative 4:

Option 4a: Closure applies to all groundfish fisheries which have contributed greater than a designated threshold to PSC of PIBKC since 2003. The closure to a fishery would be based on PSC of PIBKC in that fishery between 2003 and 2010, meeting either a threshold of greater than 5 percent of ABC or greater than 10 percent of ABC. Under the five percent criteria threshold the closure would apply to the following fisheries: yellowfin sole trawl, other flatfish trawl, Pacific cod pot, and Pacific cod hook-and-line fisheries. No fisheries met the 10% threshold⁴. The fisheries and the threshold criteria are described in more detail in EA section 3.2 and EA Table 2-1.

Option 4b: Closure area applied only to pot fishing for Pacific cod. Under this option, no federal Pacific cod fishing with pot gear would be allowed within the confines of the closure shown in EA Figure 2-3 (a or b).

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

Under Alternative 5, a PSC limit would be established equal to the OFL, the ABC, or a proportion of the ABC for the crab stock. All PSC of PIBKC in all groundfish fisheries would accrue towards this PSC limit and those groundfish fisheries which are not exempted would be subject to the closure if the limit were reached. Closure applies to all groundfish fisheries which have contributed greater than a

³ Previously rock sole trawl was included in the fisheries that met the 10% threshold, however it was later removed from consideration due to all observed catch occurring outside of the defined Pribilof District. See EA Section 2.9 for additional information.

⁴ Previously rock sole trawl was included in the fisheries that met the 10% threshold, however it was later removed from consideration due to all observed catch occurring outside of the defined Pribilof District. See EA Section 2.9 for additional information.

designated threshold to PSC of PIBKC since 2003. The closure to a fishery would be based on PSC of PIBKC in that fishery between 2003 and 2010, meeting either a threshold of greater than 5 percent of ABC or greater than 10 percent of ABC. Under the 5 percent criteria threshold the closure would apply to the following fisheries: yellowfin sole trawl, other flatfish trawl, Pacific cod pot, and Pacific cod hook-and-line fisheries. The fisheries and the threshold criteria are described in more detail in EA section 3.2 and EA Table 2-1.

Four options are considered for the PSC limits (labeled under each closure option as sub-option 1 through 4 considered for each closure).

Sub-option 1: PSC Limit = OFL

The PSC limit would be set equal to the annual PIBKC OFL based on the most recent stock assessment. The OFL for 2011/12 is 2,557 lbs. (1.16 t), which corresponds to the five year average of PSC in groundfish fisheries and bycatch in crab fisheries from 1999/2000 through 2005/2006 in NMFS Reporting Area 513. While the PIBKC stock is in Tier 4 of the Tier system, it is at stock status 'c' therefore the OFL calculation employs a Tier 5 methodology of average catch in crab and groundfish fisheries to determine a bycatch/PSC only OFL. Since the implementation of a total catch OFL in 2008, bycatch in crab and PSC in groundfish fisheries have been the only catch that has accrued towards the OFL. A complete discussion of the PIBKC OFL is provided in EA section 5.1.2.

Due to issues of stock boundary differentiation between the St. Matthew blue king crab stock and the Pribilof blue king crab stocks, as an interim measure, the NMFS Reporting Area 513 has been used for purposes of calculating the PIBKC OFL and estimating the removals that accrue towards the OFL. This notably excludes NMFS Reporting Areas 524 and 521 that are near the Pribilof Islands and a portion of which should be included in the appropriate stock boundary for PIBKC. Blue king crab bycatch/PSC in Areas 521 and 524 accumulates towards the St. Matthew blue king crab OFL, given that the majority of that stock is contained within those areas. A complete discussion of the PIBKC stock boundary issue is provided in EA section 5.2.

For purposes of this sub-option, the PSC limit is considered to be the OFL. Currently the entire OFL is the bycatch/PSC component, due to the low stock status. Should the biomass of the stock increase above MSST, the OFL would be determined using the Tier 4 control rule. The stock assessment will include information on the proportion of the total catch OFL anticipated to come from bycatch/PSC. This would constitute the non-target OFL for purposes of determining the annual PSC limit. The current rebuilding plan includes a provision that the directed fishery is closed until the stock is rebuilt (second consecutive year above B_{MSY}). Once the stock is rebuilt, the directed fishery could be re-opened. The PSC limit would continue to be estimated annually as the non-target 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 specify the PSC limit as a component of the total OFL level.

Sub-option 2: PSC Limit = ABC

The PSC limit would be set equal to the ABC recommended annually by the SSC to the Council. Under Amendment 38 to the BSAI Crab FMP, an ABC control rule is employed annually to determine the maximum permissible ABC, understanding that the SSC may recommend a lower value on an annual basis. Currently, given that the OFL for this stock is assessed using Tier 5, the SSC has recommended that the ABC be calculated using the Tier 5 formula of $ABC = 90\%$ of OFL. This results in a 2011/12 $ABC = 2,301$ lbs. (or 256 lbs. below the OFL). Once the OFL is set using Tier 4, the ABC control rule would be established using a P^* approach with the recommended P^* value = 0.49.

Sub-option 3: PSC Limit = 90% of ABC

This sub-option sets the PSC limit equivalent to 90% of the ABC. Given the ABC as specified under sub-option 2, this equates to a PSC limit of 2,071 lbs.

Sub-option 4: PSC Limit = 75% of ABC

This sub-option sets the limit equivalent to 75% of the ABC. Given the ABC as specified under sub-option 2, this equates to a PSC limit of 1,726 lbs.

The following table compares the different PSC limit sub-options in weight (lb.), as well as in numbers of crab (EA Table 2-3). Here the conversion from pounds to numbers of crab uses the mean observed weight (lb.) for crabs from 7/1/09 through 6/30/10. This is consistent with annual calculations of bycatch/PSC by weight against the OFL by the NMFS RO.

There are 4 closure options under Alternative 5:

Option 5a: The existing PIHCZ, as described in Alternative 1 (EA Figure 2-1), 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 would be Pacific cod pot, and Pacific cod hook-and-line. The non-exempt trawl fisheries are already closed from this area year-round. The closure would be triggered by attainment of a fishery-wide PSC limit, set at the options below. PSC limit options are the following:

Sub-option 1:	PSC limit = OFL
Sub-option 2:	PSC limit = ABC
Sub-option 3:	PSC limit = 90% ABC
Sub-option 4:	PSC limit = 75% ABC

Option 5b: The existing ADF&G crab closure areas between 168° W and 170° W longitude, and between 57° N and 58° N latitude would be closed to additional fishing effort as indicated in EA Figure 2-2. The fisheries to which this closure would apply are Pacific cod pot, Pacific cod hook-and-line, yellowfin sole trawl, and other flatfish trawl (see EA Table 2-1). The closure would be triggered by attainment of a fishery-wide PSC limit set at the options below. PSC limit options are the following:

Sub-option 1:	PSC limit = OFL
Sub-option 2:	PSC limit = ABC
Sub-option 3:	PSC limit = 90% ABC
Sub-option 4:	PSC limit = 75% 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 2-3A). The fisheries to which this closure would apply are Pacific cod pot, and Pacific cod hook-and-line, yellowfin sole trawl, and other flatfish trawl (see EA Table 2-1). The closure would be triggered by attainment of a fishery-wide PSC limit set at the options below. PSC limit options are the following:

Sub-option 1:	PSC limit = OFL
Sub-option 2:	PSC limit = ABC
Sub-option 3:	PSC limit = 90% ABC
Sub-option 4:	PSC limit = 75% ABC

Option 5d: The closure area (Option 2) consisting of the full distribution of the Pribilof Islands stock aggregated from 1984 to 2009 without the portion which extends east of the 168° W Pribilof District boundary (EA Figure 2-4). The fisheries to which this closure would apply are Pacific cod pot, Pacific cod hook-and-line, yellowfin sole trawl, and other flatfish trawl (see EA Table 2-1). The closure would be triggered by attainment of a fishery-wide PSC limit. PSC limit options are the following:

Sub-option 1:	PSC limit = OFL
Sub-option 2:	PSC limit = ABC
Sub-option 3:	PSC limit = 90% ABC
Sub-option 4:	PSC limit = 75% ABC

Under Option 5d, suboptions 3 and 4, there is an additional option for apportionment of the PSC limit by gear types, as follows:

Trawl gear:	40%
Pot gear:	40%
Hook-and-line gear:	20%

1.3.6 Alternative 6: PIHCZ closure to Pacific cod pot fishery and triggered area closure to qualified fisheries.

Prior to the selection of Alternative 2b as the Preferred Alternative (PA), the Council had selected as a Preliminary Preferred Alternative (PPA), the following combination of a year-round area closure of the PIHCZ (EA Figure 2-1) to Pacific cod pot fishing with a triggered closure of area 5d (EA Figure 2-4) to qualified fisheries as a preliminary preferred alternative. This alternative is no longer designated as a PPA, due to issues noted by the Council on management concerns, data limitations, and the appropriate boundary for the stock at this time. In deference to the current issues with respect to the appropriate stock boundary for the PIBKC stock, and the impact modifying the stock boundary would have upon the qualified fisheries, the Council modified their PPA to reflect only the pot cod closure under Alternative 2b as a move to constrain known sources of PSC mortality, while continuing to move forward to address issues of additional PSC and stock boundaries. The Council further noted that it may consider additional measures to minimize PIBKC bycatch/PSC should the stock boundary be resolved in this assessment cycle.

This alternative combines elements of Alternative 2, option 2B with Alternative 5, suboption 4, option 5d. The fisheries to which the triggered closure would apply are the following: Pacific cod pot, Pacific cod hook-and-line, yellowfin sole trawl, and other flatfish trawl.

Component 1: The first component of this alternative is a year-round closure of the PIHCZ to fishing for Pacific cod with pot gear. This closure would be in addition to the existing closure to all trawl gear of the PIHCZ. Thus, only fishing with hook-and-line gear would be allowable inside the PIHCZ.

Component 2: The second component of this alternative is a triggered closure of the area representing the distribution of the PIBKC stock between 1984 and 2009 (see EA Figure 2-3). The PSC limit associated with this closure is established as a fishery-wide level at 75% of the ABC

Option a: Set PSC cap in numbers of crab based on the average weight in the previous season.

Option b: Set PSC cap in numbers of crab based on a rolling five year average weight.

Option 1: This PSC limit is then further apportioned to sectors by gear type as follows:

Trawl Gear – 45% of trigger cap

Pot Gear – 45% of trigger cap

H&L Gear – 30% of trigger cap

This distribution notably over-apportions the cap, which is specifically intended to allow for greater fishing flexibility by gear type. Nevertheless, when the overall aggregate cap is reached the closure would be triggered regardless if some gear types have not yet reached their individual sector allowance. Furthermore, as with alternative 5, PSC accrual is by all fisheries in the PI District and not restricted to those fisheries that are not exempted from the closures themselves.

Option 2: The trigger cap is seasonally apportioned to all fisheries in aggregate. Any unused PSC will roll to the following season.

- a) 25% to first quarter, 25% to second quarter, 50% to last half of year
- b) 50% to first half of year, 50% to last half of year
- c) 75% to first half of year, 25% to second half of year

Option for Increased Observer Coverage

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

Option1: Apply increased observer coverage to fisheries that contributed to PIBKC PSC above threshold criteria 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 that contributed to PIBKC PSC above a threshold criteria since 2003 (as listed in EA Table 2-1) or to only specific fisheries⁵. 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 (PA) as it relates to this are the ability to annually modify coverage in fleets based on fishery management monitoring needs as well as Council and NMFS priorities. The new program is anticipated to be implemented in 2013.

1.3.7 Comparison of Alternatives.

Alternatives 1 through 6 all address different closure configurations applied to either the trawl-only fisheries (Alternative 1) or to include Pacific cod pot, Pacific cod hook-and-line, or yellowfin sole fisheries. A comparison of the relative extent of the closures across these alternatives is shown in **Figure 1**. Table 1-1 shows a comparison of the different features of all 6 alternatives.

⁵ Additional specificity would be required as to which specific fisheries this increased observer coverage would apply.

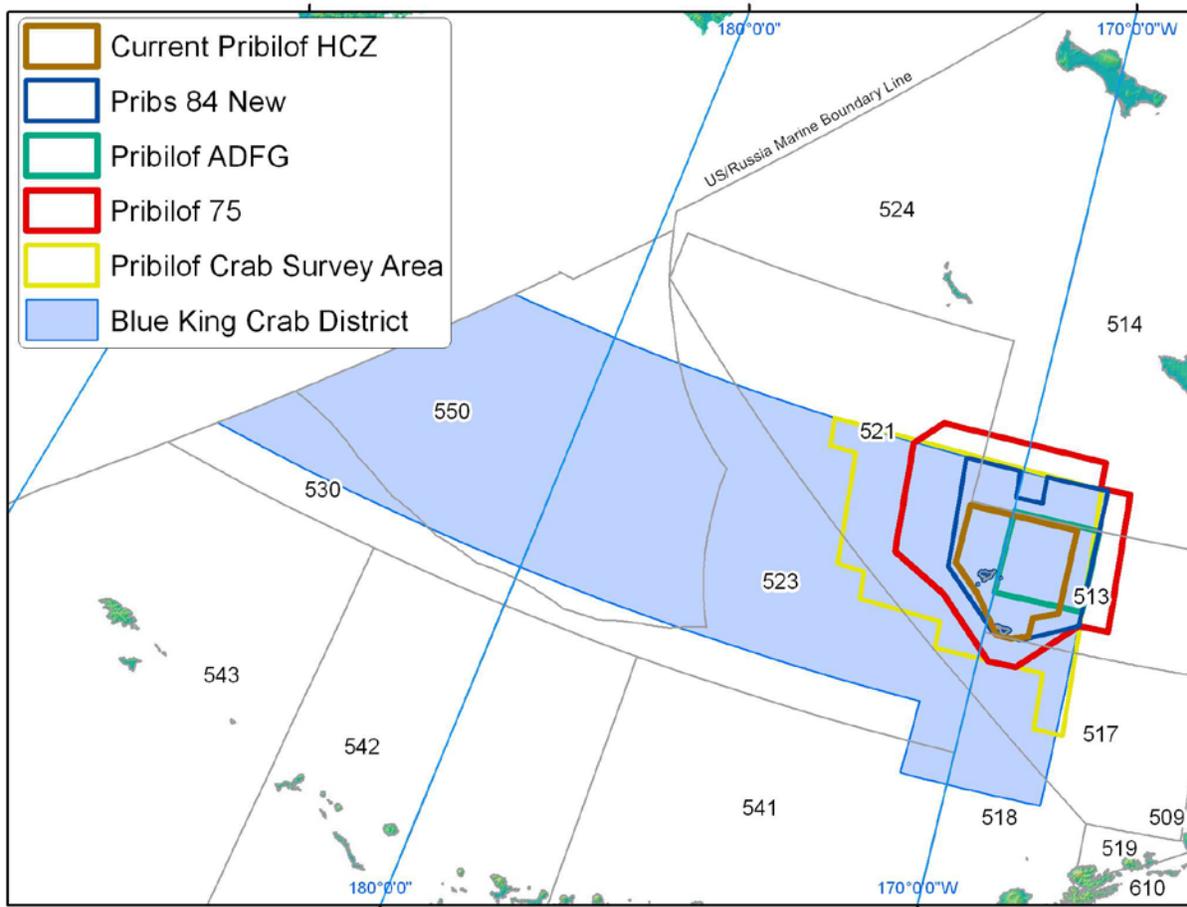


Figure 1: Comparison of alternative closure configurations under alternatives 1-6 with NMFS reporting areas (numbered) and the PI District (shaded area). **Note that Alternative 6 is the area labeled “Pribilof 84 New”.**

Table 1-1 Comparison of major features of Alternatives 1-6

Alternative	Area Closure	Fisheries	Timing and Triggers
1 Status Quo	PIHCZ	All groundfish trawl	Year-round
2 Year round closure (PA)	PIHCZ	(a) Pacific cod pot, hook-and-line Pacific cod (b) Pacific cod pot (PA)	Year-round
2 Area closure triggered by a portion of the 75% of ABC PSC limit		(c) Pacific cod pot ⁶	When bycatch by all fisheries (i) > 20% of PSC limit (ii) > 30% of PSC limit (iii) > 50% PSC limit
3 Year round closure	ADF&G	(a) Yellowfin sole, Pacific cod pot, hook-and-line Pacific cod (b) Pacific cod pot	Year-round
4 Year round closure	(a) 1975-2009 distribution	(1) Yellowfin sole, Pacific cod pot, hook-and-line Pacific cod (2) Pacific cod pot	Year-round
	(b) 1984-2009 distribution		
5 Area closure triggered by PSC limit	(a) PIHCZ	(1) Pacific cod pot, hook-and-line Pacific cod ¹ (2) Yellowfin sole, Pacific cod pot, hook-and-line Pacific cod	(i) PSC limit = OFL (ii) PSC limit = ABC (iii) PSC limit = 90% ABC (iv) PSC limit = 75 % ABC Suboption: Allocate PSC limit: 40% Trawl 40% Pot 20% Hook-and-line
	(b) ADF&G		
	(c) 1975-2009 distribution		
	(d) Revised 1984-2009 distribution		
6 (1) Year-round closure to Pacific cod pot fishing <i>and</i>	PIHCZ	Pacific cod pot	Year-round
(2) PSC limit that triggers a larger area closure to additional fisheries; PSC limit allocated by gear type	Revised 1984-2009 distribution	Yellowfin sole, Pacific cod pot, hook-and-line Pacific cod	PSC limit = 75% ABC (1) allocated: 45% Trawl 45% Pot 30% Hook-and-line (2) seasonally allocated by quarter aggregate fisheries (a) 25%, 25%, 50% (b) 50%, 50% (c) 75% , 25%

⁶ One-hundred percent observer requirement to fish inside PIHCZ. Under the option for increased observer coverage, this provision could be added to other alternatives as well but as yet the Council has not specified any increased outside of Alternative 2c for Pacific cod pot fishing.

1.4 Analysis of the Alternatives

This analysis addresses the potential impacts, in terms of gross revenue at risk, 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 impacts 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 2010 fisheries are reexamined, in succession, as if each of the proposed PIBCK stock rebuilding plan alternatives had been in place in that year. By using this technique, the analysis can be performed using official, empirically observed and recorded catch and value data sets. The 2003 through 2010 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.

This “revenue at risk” methodology simply identifies the amount of catch, and its economic value, that occurred within the time and area in question. It does not identify the estimate as a “cost,” but rather as a potentially forgone gross revenue estimate if industry were unable to relocate effort and recover these amounts of harvest and value. This analysis assumes that industry will relocate effort to adjacent open areas and recover potentially forgone catch albeit at potentially increased costs of harvesting. While the analysts are unable to evaluate changes in costs associated with relocation of effort the analysis has qualified potential impacts by providing estimates of potential impacts as a percent of fleet sector total annual gross revenue so that one may gauge the severity of potential impacts in terms of the proportion of annual total sector gross revenue again assuming no mitigation of revenue put at risk. However, as has been stated, this analysis does indeed assume that effort will be relocated in order to attempt to mitigate potential impacts. To gain a better understanding of what effort relocation may look like this analysis has also developed a catch reprojection algorithm as described below. The graphical output of the catch reprojections will also be discussed in the analysis of the alternatives.

Catch Reprojection Analysis

This section documents the methodology that was used to reproject catch from within proposed closure areas, under the various alternatives and their options, to areas that would remain open either annually or following a trigger closure at some point in the year. This reprojection of catch is a retrospective analysis that is intended to be exemplary of where catch might have occurred had the closure been in place. This analysis utilized observed data as compiled in the VMS Enabled NOAA Fisheries Alaska Region Catch-

In-Areas Database as developed by Steve Lewis of the Alaska Region Analytical Team. The Catch- In-Areas database was given favorable reviews by the Council's Scientific and Statistical Committee in February of 2009. This analysis utilized an algorithmic approach to reproject catch using the data, and assignment of that data to a spatial grid, contained within the Catch- In-Areas Database. The reprojection is based on historical catch grouped by vessel, harvest sector, gear, and target. This representation is not intended to be interpreted as a predictive model of where fleets will redeploy when faced with a closure but rather is a reprojection of historical catch to locations where fishing occurred.

Catch reprojection was done within the Catch- In-Areas database by following a step-wise procedure of matching with proportional assignment to a fine spatial grid with aggregation to a coarse grid for display purposes. The procedures used are as follows:

Step 1: Vessel Based Match:

In the first step of the catch reprojection operation the catch of each vessel that operated in the area proposed for closure (the alternative areas) in each week of the season (using week ending date) is reprojected into grid cells (7km x 7km) occurring within 50 nautical miles of the closure boundary in the area outside of the closure area (the open area)⁷. This assignment is proportional to the actual observed catch by that same vessel and within the same target fishery and gear type in each of the 7km square grids cells the vessel actually fished in the same week of the season. In this way catch is matched first at the observed vessel level and based on that vessel's own proportion of weekly catch within a grid square. If a vessel fished in only one grid square outside the closure in a particular week when the closure would have been in place (either an annual or triggered closure) then all of the reprojected catch is assigned to that single grid square. If that vessel fished in two cells, with a 60/40 percent split, then 60 percent and 40 percent of the reprojected catch is assigned to the cells respective of the proportion observed in each cell. In many cases this match re-projects most of the catch that could potentially be forgone; however, there are instances when a specific vessel fished within a closure area, but not outside of it in a particular week. In such cases, a second matching step is applied to attempt to reproject vessel level unmatched catch to the open area.

Step 2: Vessel Type/Target/Gear Based Match

In the second step, a vessel's catch that occurred inside the closure area in a week when that vessel was not observed fishing within 50km outside of the closure boundary is reprojected proportional to the catch of vessels in its sector of the fleet that had recorded catch outside of the closure area using the same gear type, in the same species target fishery, and with the same vessel type (Catcher Processor (CP) or Catcher Vessels (CV)). In this way, catch is reprojected based on recorded catch in grid cells in the open area where the same vessel type, operating in the same target fishery, and with the same gear type, had recorded catch. This second step serves to reproject catch that could not be reprojected at the individual vessel and week level proportional to catch of similar vessels. However, there are some instances, particularly with the limited number of CVs potentially affected by some alternatives, when a relaxation of the vessel type is necessary to match catch to grid cells outside of a closure area, and that relaxation of the vessel type match is undertaken in the next step.

Step 3: All Vessels/Target/Gear Match

In this third matching step, the vessel type matching constraint is relaxed and the match is made proportional to all vessels, CPs and CVs combined, in a target fishery with the same gear type. This third step gathers all remaining catch and re-projects it, where possible, to grid cells proportional to the catch of all vessels within target fishery, gear type, and week of the season recorded in those grid cells. However,

⁷ Please note that this data is aggregated to 20km grids for reprojection in the maps due largely to the extreme quantities of data, (in excess of 3 terabytes per process) processing time generated for each map, and also because the vertical catch bars overlap each other excessively in the smaller grid display.

there are instances when no effort occurs outside of the proposed closure area by any vessel type within target, gear type, and in the specific week in question. In such cases, a final step is used, which relaxes the week of the season constraint.

Step 4: All Vessels/Target/Gear/Month Match

The final step in the reprojection algorithm relaxes the constraint of trying to match catch within the same week of the season. In this step, remaining unmatched catch is reprojected proportional to catch by any vessel type, within same target, same gear type, and within the same month of the catch that occurred within the closure area. While this last step broadens the match criteria significantly, there are nonetheless some cases where a match still cannot be made. In a couple of particular cases, to be discussed below, even this step does not provide a match. The interpretation of this finding is that the closure area was essentially the only area that had recorded catch within the target and gear combination in question and serves to highlight the importance of that area to the potentially affected fleet.

Limitations of the Reprojection Analysis:

This reprojection is entirely based on recorded historical catch within and outside the closure areas in question. Reprojection of catch in this way makes the inherent assumption that this reprojection would occur with no impact on vessels that fished within the area to which catch is reprojected to occur, with no impact on localized availability of fish stocks, and with the same catch rates (metric tons/week in proportionality method) as observed in the areas reprojection is made. In some cases these assumptions may all be true; however, in others these assumptions are likely to fail, especially in cases when the reprojection into a cell is a relatively large proportion of the catch that is being reprojected and/or is larger quantity than originally caught within the cell to which reprojection occurs. Thus, this analysis is exemplary of where catch might be taken in the instance of a closure; however, the analysis is inherently static in that it does not account for the impact that such reprojection of effort, and catch, might have on fishing conditions within grid cells to which reprojection is estimated to potentially occur in this retrospective analysis.

Data from 2003 to 2009 for each of the proposed closed areas including the target species, management program, harvest sector, gear type, and species were assessed to quantify the potential impacts of the alternatives on effort relocation. Those effects will be discussed herein with most maps of effort relocation appearing in an appendix largely due to their data intensity (i.e. file size).

1.4.1 Economic Benefits of Pribilof Islands Blue King Crab Rebuilding.

The alternatives discussed in this analysis address concerns that ongoing bycatch and PSC 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/PSC 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 such 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 mortality in other crab fisheries occurring near the Pribilof Islands; however, no similar action has been taken for PSC in groundfish fisheries. Recent trends in blue king crab bycatch, observed in other crab fisheries, suggest that groundfish fisheries occurring near the Pribilof Islands have the potential to exceed, through PSC removals, 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 stem from the fact 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 rebuilding 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.

The analysis, below, provides comparative impacts of the alternatives in terms of “Revenue at Risk,” as well as estimates of mitigation of these impacts via effort redistribution. Using this information, along with the knowledge that the alternatives do not differ with respect to stock effects, one can compare and contrast alternative impacts to determine their effect on net national benefits. Socioeconomic impacts of this action (Alternative 2b, Preferred Alternative) are limited to the year-round closure of the PIHCZ to pot fishing for Pacific cod. This analysis suggests that it is likely that some or all of the catch from the closure can be made up outside of the PIHCZ of Alternative 2b. This analysis has shown that redeployment of effort to recover small amounts of catch, while potentially increasing operating cost, won’t have appreciable impacts on landings, fishing communities, markets, or consumers. No significant adverse social or economic impacts were identified for the alternatives for impacts interrelated with natural or physical environmental effects.

1.4.2 Groundfish Fishery Gross 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 (gross revenue at risk)⁸. 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 2010?” 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 and PSC quantities, and spatial and temporal distribution of effort. 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 2010 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. American Fisheries Act (AFA), Open Access

⁸ “Gross 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.

(OA), Community Development Quota program (CDQ), Catcher Processor (CP), Catcher Vessel (CV)), based upon historical catch patterns in 2003 through 2010; (3) estimated product mix and first wholesale product values for groundfish products by sector, species group, and year from 2003 through 2010. The years 2003 through 2010 were chosen as the base years for the analysis because they represent a consistent data series given that new catch accounting began in 2003.

Harvest tonnages were valued using annual round weight equivalent first wholesale values derived from the catch accounting system (Hiatt 2008, 2009, 2010, 2011, Fissel 2012). The first wholesale prices were estimated by dividing the total wholesale value of all groundfish products by estimated retained metric tons of groundfish, to yield a round weight equivalent first wholesale value per metric ton of catch. First wholesale prices are the prices received by the first level of inshore processors, by catcher-processors, and by motherships. They reflect the value added by the initial processor of the raw catch. They are not, therefore, equivalent to ex-vessel prices; however, they allow direct comparison of impacts on all sectors inclusive of value added processing impacts. In contrast, use of an ex-vessel value would not include value added processing impacts for either the at-sea or shoreside processing sectors.

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 1-2 Round weight Equivalent First Wholesale value of Retained Groundfish by Species Group and Sector, 2003-2010 (\$/mt)

Target Species	Processor Type	Year							
		2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	CP	\$828	\$1,172	\$1,388	\$1,786	\$2,034	\$2,044	\$1,250	\$1,498
Flatfish	CP	\$701	\$844	\$986	\$988	\$886	\$788	\$692	\$743

Source: 2008, 2009, and 2010 Economic SAFE report, Table 27.

Table 1-3 BASI total tonnages by target and gear (Source: Table 2 of Econ SAFE) (1000s of metric tons)

Target Species	Gear Type	Year							
		2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	Pot	22	17	14	19	18	19	14	20
Pacific Cod	Hook-and-line	110	111	116	100	81	95	102	90
Flatfish	Hook-and-line	5	5	5	5	4	4	5	5
Flatfish	Trawl	154	170	175	184	212	266	222	249
Total		291	303	310	308	315	384	343	364
Total All Species and Gear		1,974	1,979	1,978	1,978	1,856	1,542	1,336	1,351
Percent of Total		14.74%	15.31%	15.67%	15.57%	16.97%	24.90%	25.67%	26.94%

Table 1-4 BSAI total value by target and gear (\$ Millions)

Target Species	Gear Type	Year							
		2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	Pot	\$18	\$20	\$19	\$34	\$37	\$39	\$18	\$30
Pacific Cod	Hook-and-line	\$91	\$130	\$161	\$179	\$165	\$194	\$128	\$135
Flatfish	Hook-and-line	\$4	\$4	\$5	\$5	\$4	\$3	\$3	\$4
Flatfish	Trawl	\$108	\$143	\$173	\$182	\$188	\$210	\$154	\$185
Total		\$221	\$298	\$358	\$399	\$393	\$446	\$302	\$354

The analysis of gross 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 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. However, is it possible to estimate catch that occurred outside of a closure area and use those catch records to proportionally assign catch put at risk by a closure to the area outside the closure area. This “reprojection” of catch based on recorded catch outside of the closure area is a proportionality based estimate of where catch could occur but is not a stochastic or behavioral modeling of location choice, does not have the ability to consider productivity changes, and does not account for crowding effects and gear conflicts. Still, this method does shed light on the intensity and spatial dispersion of harvests within and outside of closed areas and has been used to inform this analysis. Appendix A contains a full methodology as well as a series of annual map reprojections of catch by alternative. Reprojections are discussed within the impact analysis by alternative and some maps, primarily for triggered closures and the PPA, are included herein with the remainder contained in Appendix A.

Format of Impacts Tables

The tabulations presented 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 2010. Thus, these tonnages represent actual recorded catch within the proposed closure area during the analytical timeframe.

The information presented in these tables is hypothetical, because, as previously discussed, this analysis relies on a retrospective scenario of what would have occurred in the proposed closure area had the closure been in effect in the years 2003 through 2010.

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 gross 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, CPs and CVs have often had to be combined primarily because CV data are 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 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, which is equivalent to the total product value, inclusive of all payments to labor, capital, and raw material inputs, of a round ton of groundfish harvest. This price effectively captures all value added processing conducted by CPs, as well as that conducted by shoreside processors.

1.4.2.1 Gross Revenue at Risk Under Alternatives 2a, 2b (PREFERRED ALTERNATIVE) and 6-1.

Under Alternative 2 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 A would apply the PIHCZ closure to Pacific cod pot, and Pacific cod hook-and-line fisheries, while Option B would apply the PIHCZ closure to targeting Pacific cod, but with pot gear only. Option 2b is equivalent to Alternative 6, Option 1, thus, all impacts described here for Alternative 2b also apply under Alternative 6, Option 1.

Table 1-6, below, provides a tabulation of the hypothetical aggregate tonnage of groundfish catch that would be put “at risk” by extending the PIHCZ closure to the Pacific cod pot and hook-and-line fisheries. These tabulations show that the effect of Option B (Pacific cod pot only) would have ranged from 125 metric tons (2010) of Pacific cod catch put at risk, to as much as 2,769 metric tons (2005). Option A (Pacific cod pot and hook-and-line) adds from zero (2003) to 1,111 metric tons (2005) of Pacific cod catch put at risk from the CDQ portion of the fishery, and additionally from 892 metric tons (2009) to 4,927 metric tons (2005) from the open access portion of the Pacific cod hook-and-line fishery. In total, the catch put at risk under Option A would have ranged from 1,548 metric tons (2009) to 8,807 metric tons (2005).

Table 1-7 provides the dollar value, in round weight equivalent first wholesale value, of this catch. Option B (Pacific cod pot only) revenue at risk would have ranged from approximately \$200,000 (2010) to \$4.4 million (2007). Option A (Pacific cod pot and hook-and-line) adds from zero (2003) to \$1.6 million (2005) of revenue put at risk from the CDQ portion of the fishery, and additionally from \$1.1 million (2009) to \$6.8 million (2005) from the open access portion of the Pacific cod hook-and-line fishery. In total, the revenue put at risk under Option A would have ranged from \$1.9 million (2009) to \$12.2 million (2005).

Table 1-8 provides impact estimates in terms of percentages of target and total gross revenue put “at risk” in the Alternative 2 (PIHCZ) closure area. Combining the gross revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total gross revenue earned in those

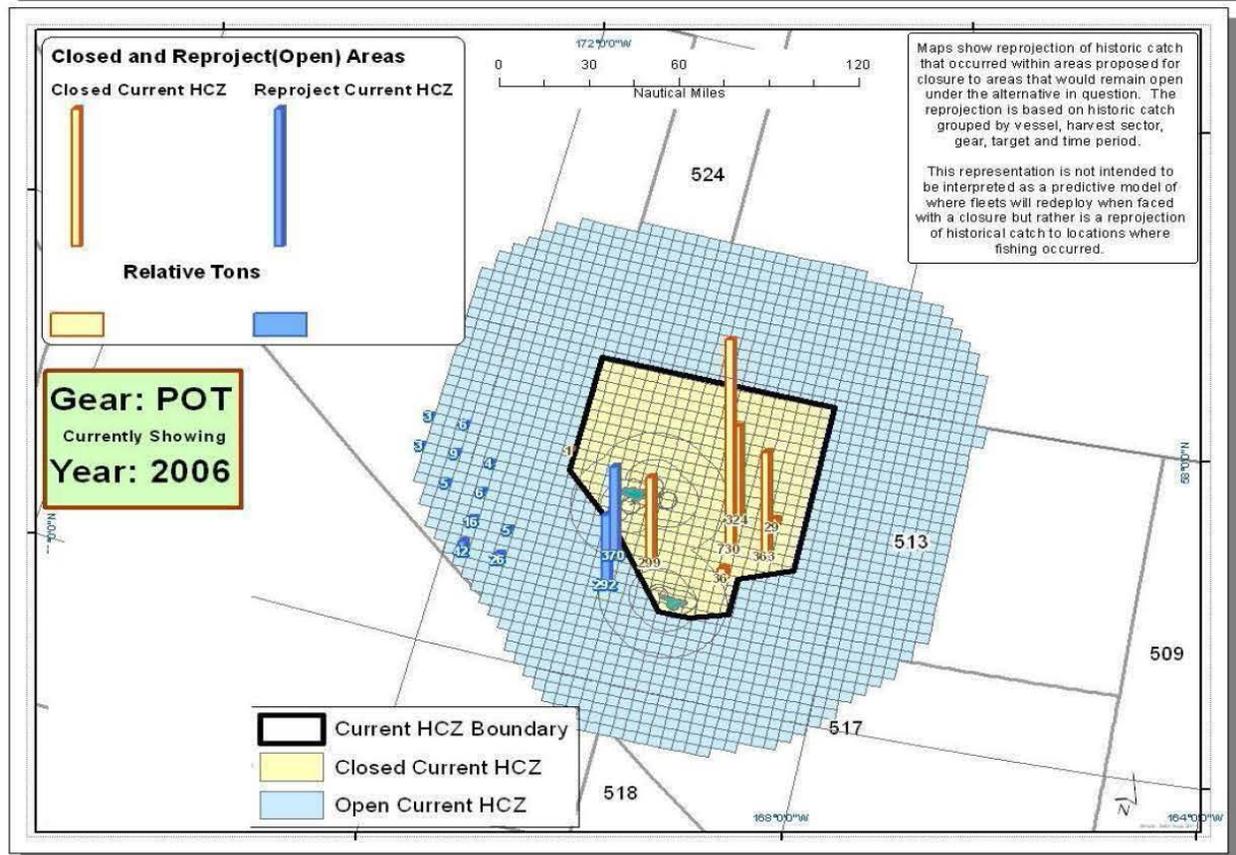
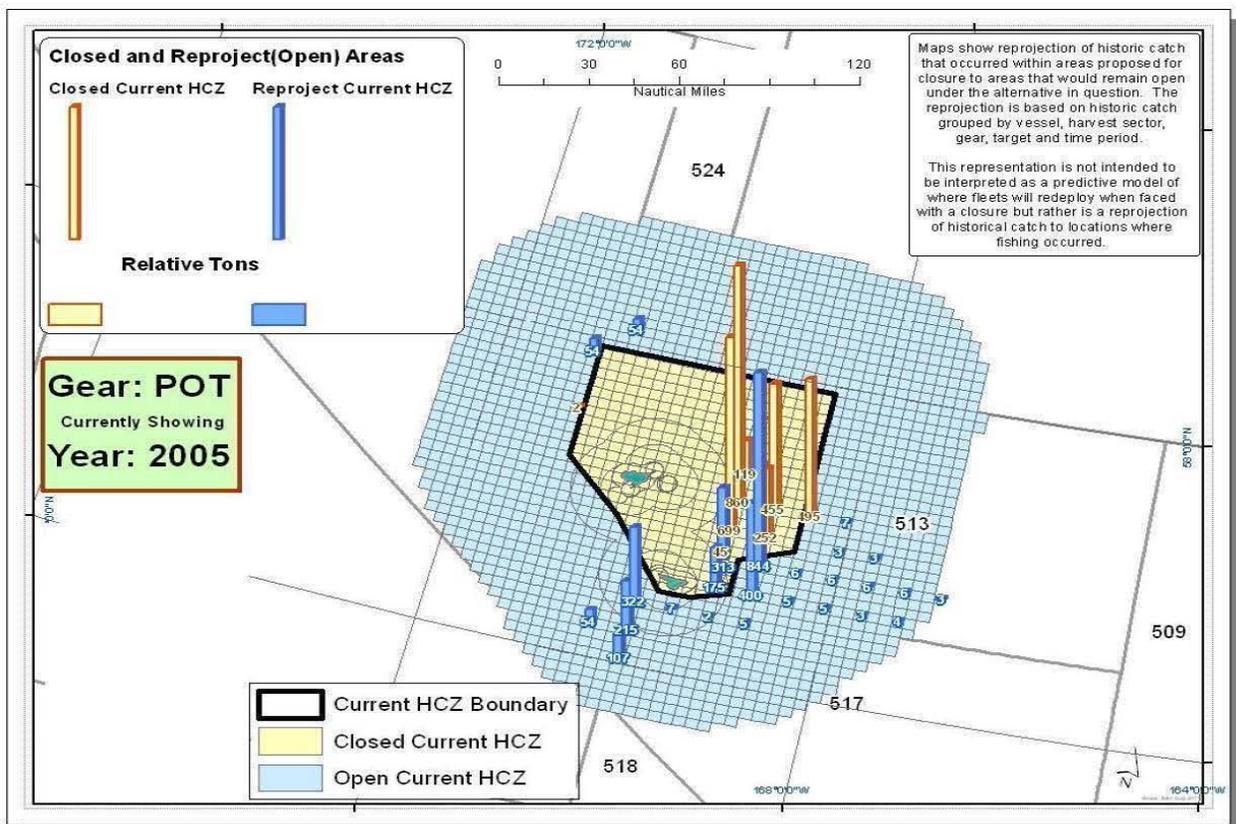
potentially affected fisheries (from table 3 above) reveals that a period high of 6.77 percent of total gross revenue would have been put at risk in 2005, and a period low of 1.17 percent would have been put at risk in 2009. In all remaining years, total impacts would have been between 1.5 percent and about 5 percent. The Pacific cod pot fishery would have had impacts ranging from as high as 19.78 percent in 2005 to a low of 0.63 percent in 2010. The Pacific cod hook-and-line fishery would have had impacts ranging from as high as 5.21 percent in 2005 to a low of 1.15 percent in 2009.

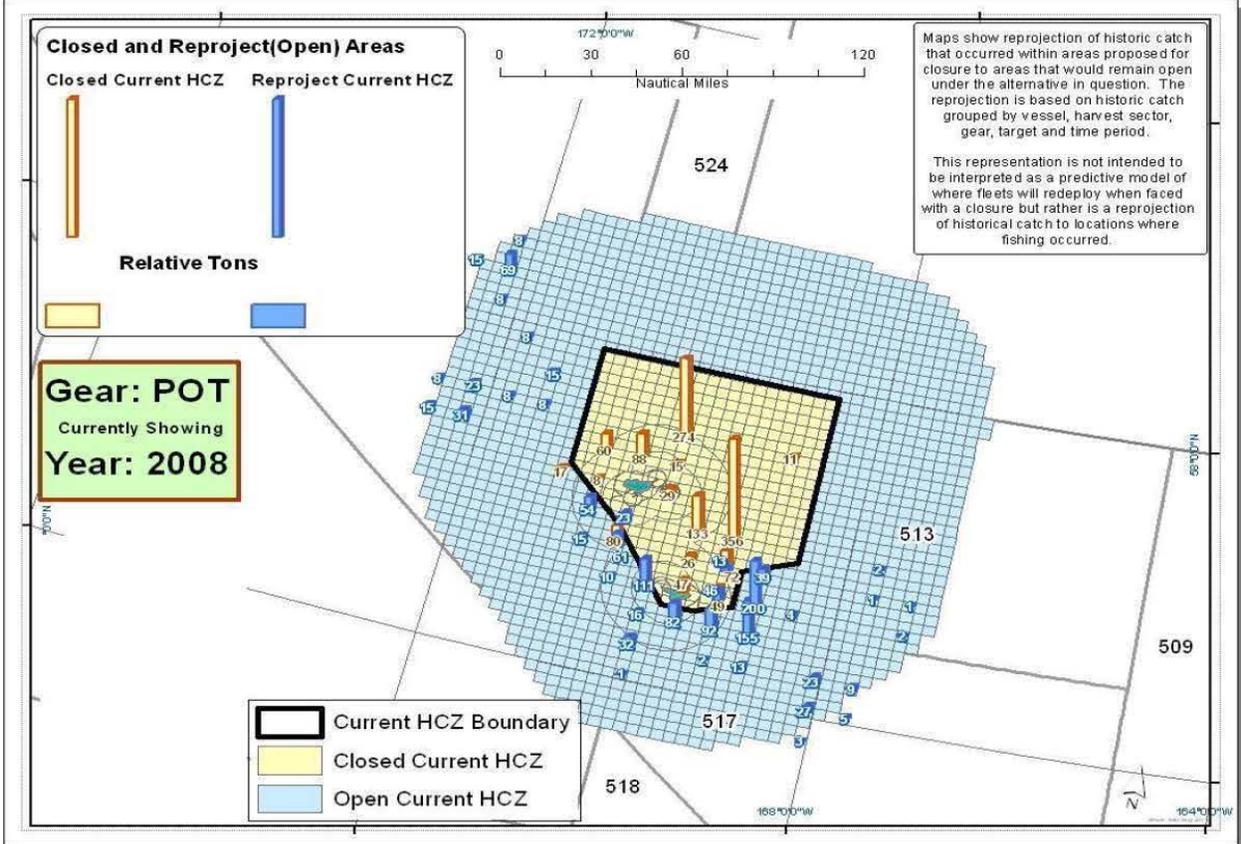
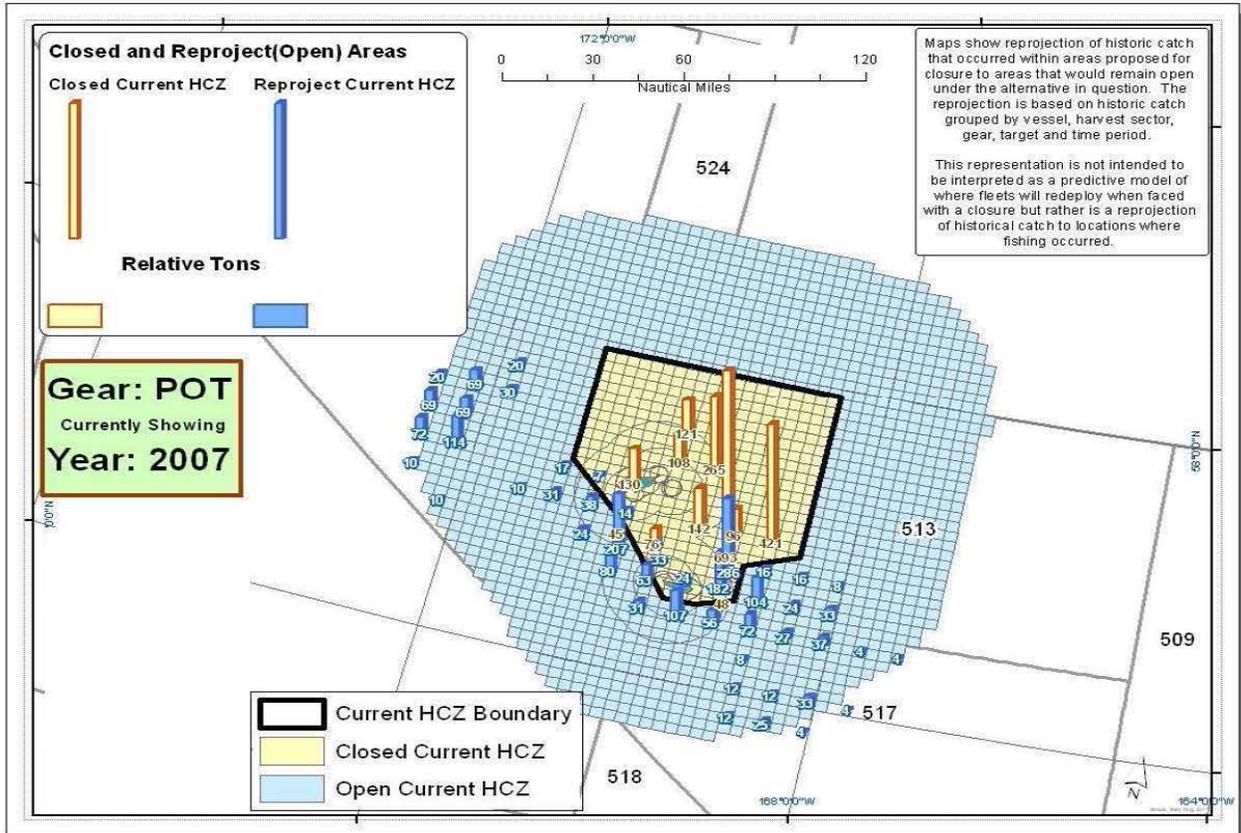
1.4.2.2 Reprojection of Catch Under Alternative 2

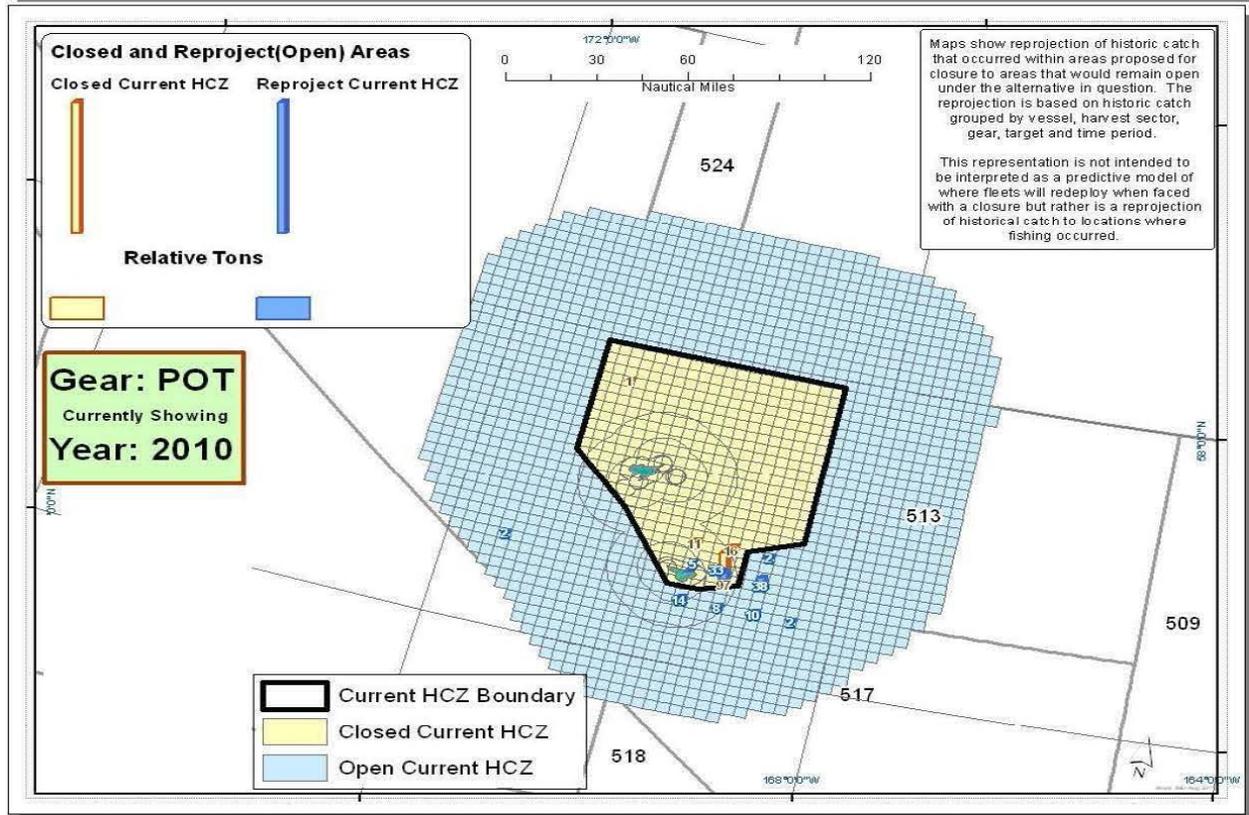
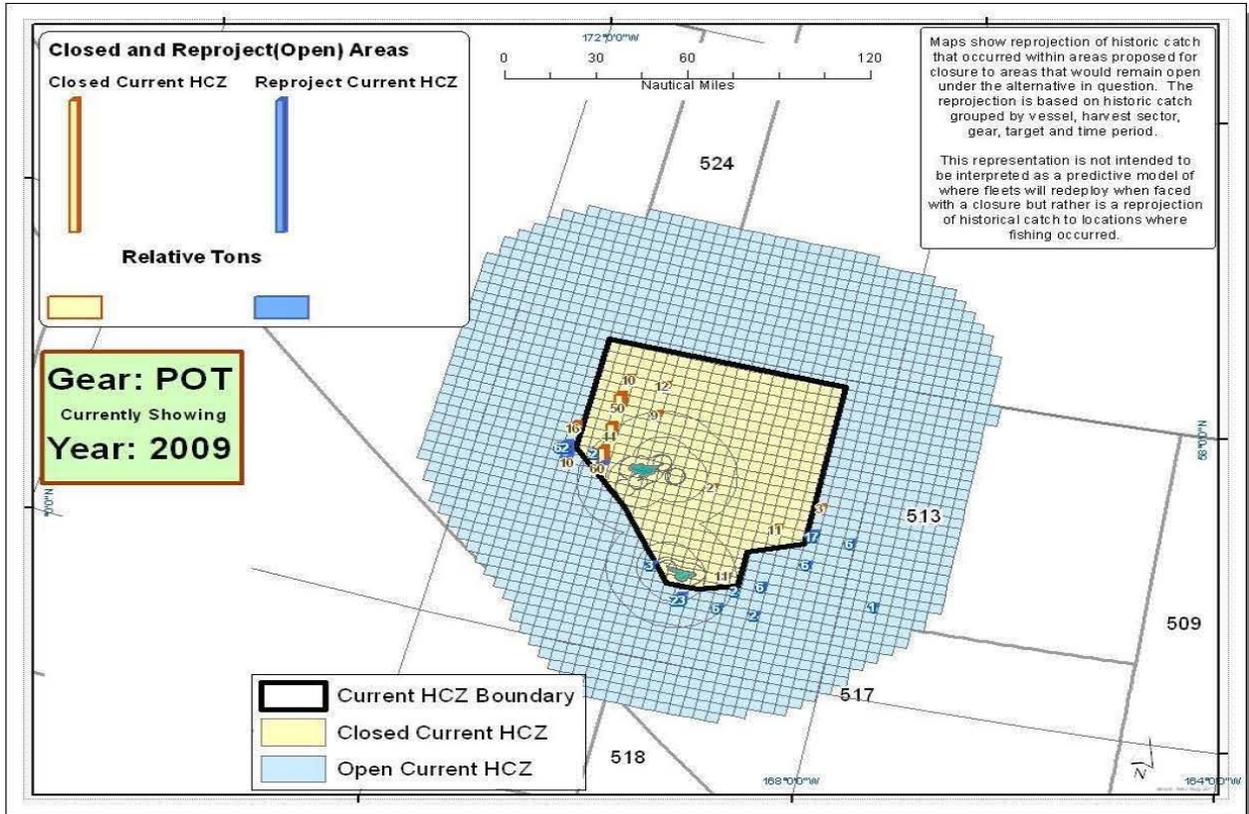
Figures A10 and A11 in the accompanying Appendix A provide spatial/temporal reprojection, to remaining open areas, of catch that occurred within the Alternative 2 (PIHCZ) annual closure areas by year from 2003 through 2010. Since Alternative 2b has been identified as the PA, maps of Alternative 2b rejections are also shown here in Figure 2. As discussed in section 1.4 above, this reprojection utilizes a stepwise matching algorithm to reproject catch to open areas where catch was observed to have occurred in the same week, and/or month, and within the same target fishery, gear type, and, to the extent possible, to the same vessel type.

Figure 2 shows the annual reprojection of catch in the Pacific cod pot fishery from 2003 through 2010 under Alternative 2. This reprojection shows considerable inter-annual variability in both the locations and the relative intensity of fishing effort that occurred within the closure area. In general, years with a few locations accounting for a majority of the catch within the closure area also reproject to a similar number of locations with similar effort intensity. In instances where catch within the closure area is more dispersed, the reprojection outside the closure area is similarly more dispersed. Thus, it is difficult to discern a consistent pattern that would suggest operational impacts due to reprojection of catch via effort relocation.

Figure A11 shows the annual reprojection of catch in the Pacific cod hook-and-line fishery from 2003 through 2010 under Alternative 2. This shows a consistent pattern of reprojection to immediately adjacent areas with high intensity of effort; however, there is also a considerable reprojection of relatively small amounts of effort in a widely dispersed pattern in all years. This suggests that fairly high catches occurring in discrete locations within the closure area will be made up, to some extent, by similarly large catches near the boundary of the closure, but that remaining catch will have to be made up in multiple areas with a history of smaller catches in a widely dispersed pattern. This could mean additional sets, greater searching behavior, and generally increased costs to harvest the catch put at risk by the closure.







1.4.2.3 Gross Revenue at Risk Under Alternative 2c.

Table 1-5 tabulates the tonnage and gross revenue effects of threshold based triggered closure of the PIBKC area under Alternative 2c in the weeks following triggering of the closure in affected fisheries. Under the 20 percent of PSC limit threshold, fishery closures would have been triggered in 2005 and 2007 on February 5th and May 12th, respectively. These triggered closures would have put 2,161 metric tons, and 677 metric tons at risk, with associated gross revenue at risk of \$3 million, and \$1.38 million, which would have represented 15.44 percent, and 3.76 percent of annual gross revenue in 2005 and 2007, respectively. The impacts would have accrued to both the open access and CDQ Pacific cod hook-and-line fisheries and upon both CVs and CPs. The 2007 closure potential effects also apply to the 30 percent threshold trigger even though the triggering date occurs two weeks later, while the 50 percent threshold would have triggered a closure following September 8th of 2007. The potential effects of the 50 percent threshold triggered closure are 538 metric tons of catch at risk or just over \$1 million in gross revenue at risk, which represents approximately 3 percent of total annual target fishery gross revenue.

Table 1-5: Hypothetical aggregate Pacific cod pot fishery catch and gross revenue (\$ millions) “At Risk” based on retained metric tons of groundfish caught in the Alternative 2c threshold triggered closures of the PIHCZ area.

Year	20% Trigger Date	30% Trigger Date	50% Trigger Date	Catch At Risk			Gross Revenue at Risk (\$millions)		Percent of Annual Target Fishery Gross Revenue	
				20% Trigger	30% Trigger	50% trigger	20%; 20% and 30% in 2007	50%	20%; and 30% in 2007	50%
2003	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
2004	May 8th	June 19th	nt	c	c	nt	c	nt	c	nt
2005	Feb. 5th	Feb. 12th	nt	2,161	c	nt	\$3.00	nt	15.44%	nt
2006	Aug. 12th	Aug. 19th	nt	c	c	nt	c	nt	c	nt
2007	May 12th	June 30th	Sept. 8th	677	677	538	\$1.38	\$1.09	3.76%	2.99%
2008	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
2009	Aug. 22nd	Sept. 5th	Sept. 26th	c	c	c	c	c	c	c
2010	Oct. 16th	Oct. 10th	nt	c	c	nt	c	c	c	c

NOTES: nt=no trigger event. c= confidential data.

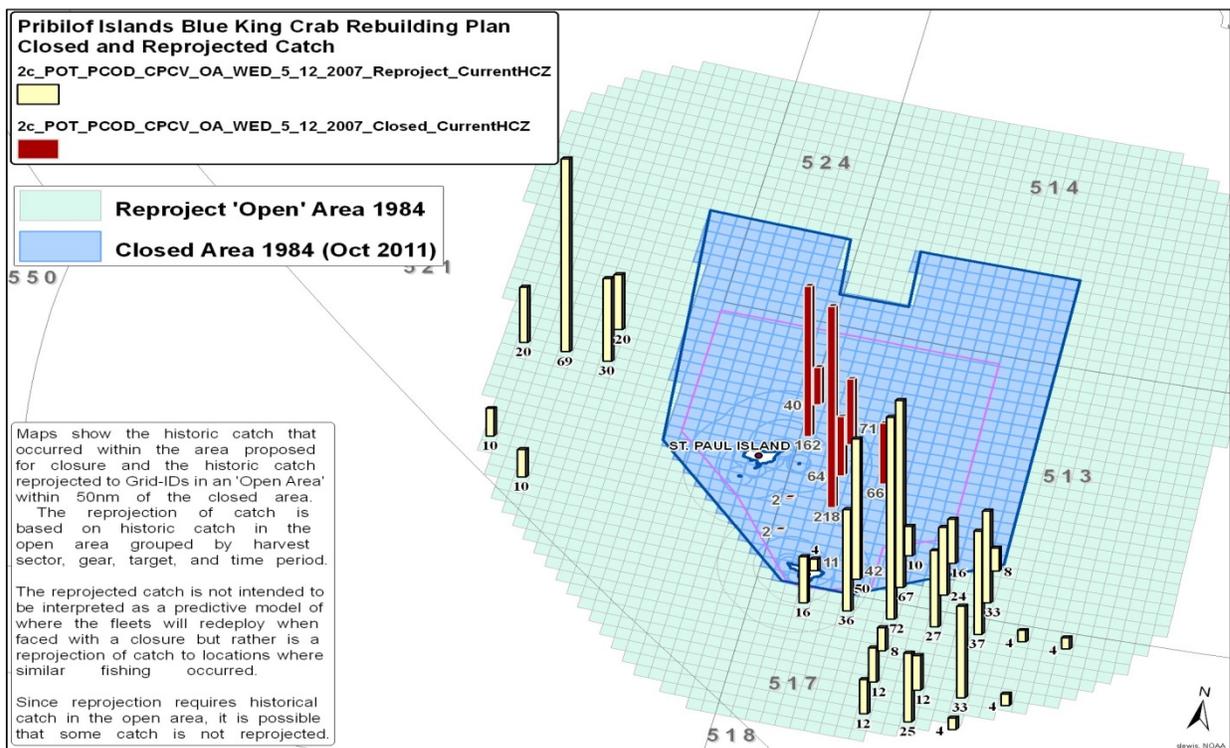
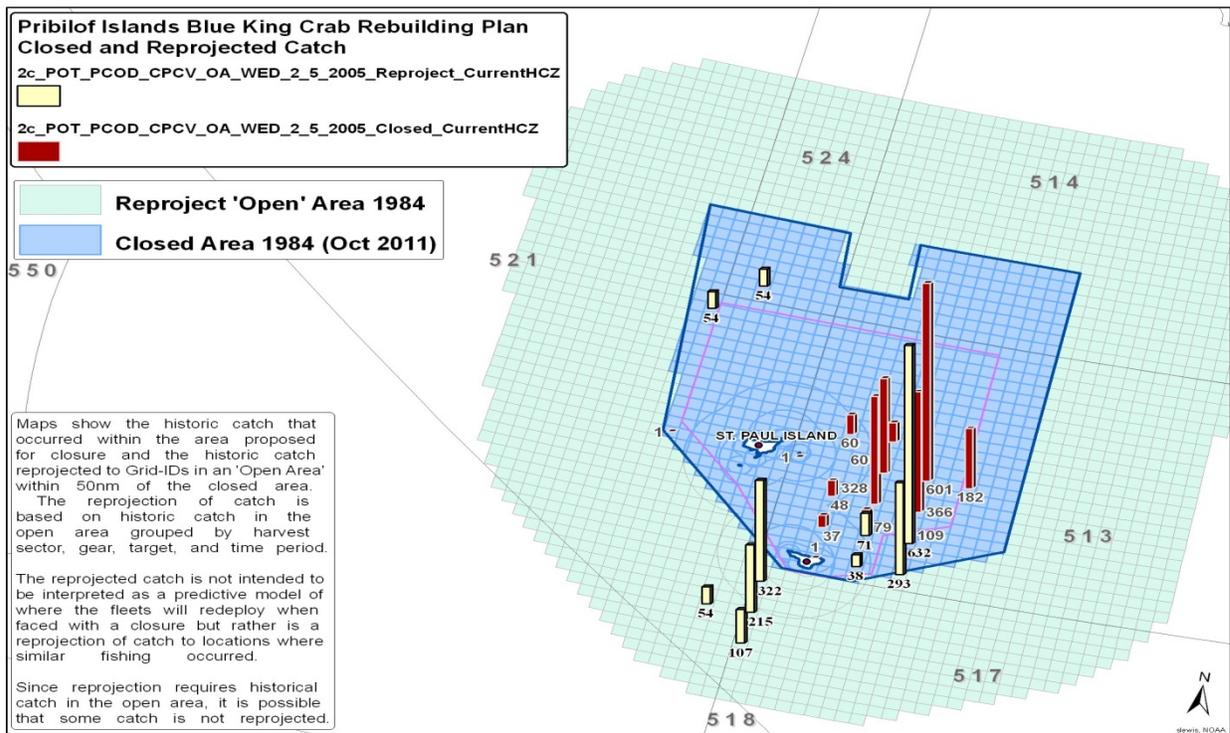
1.4.2.4 Reprojection of Catch Under Alternative 2c.

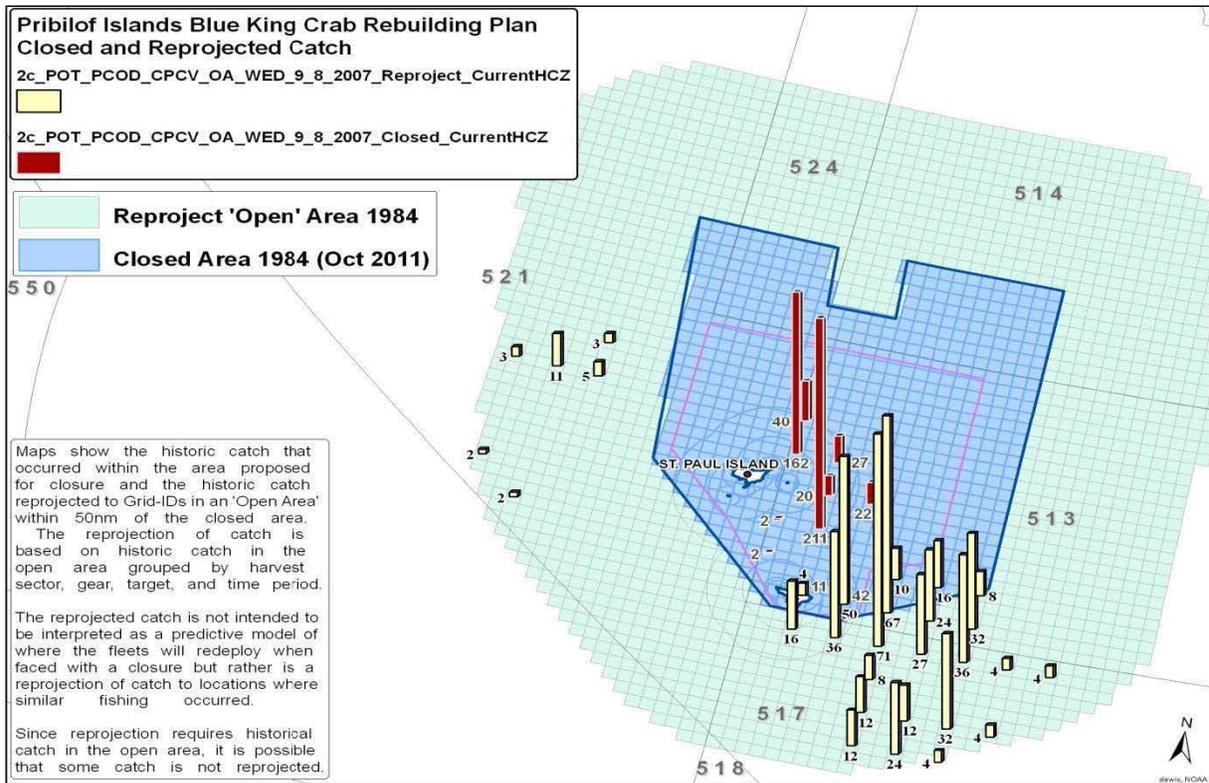
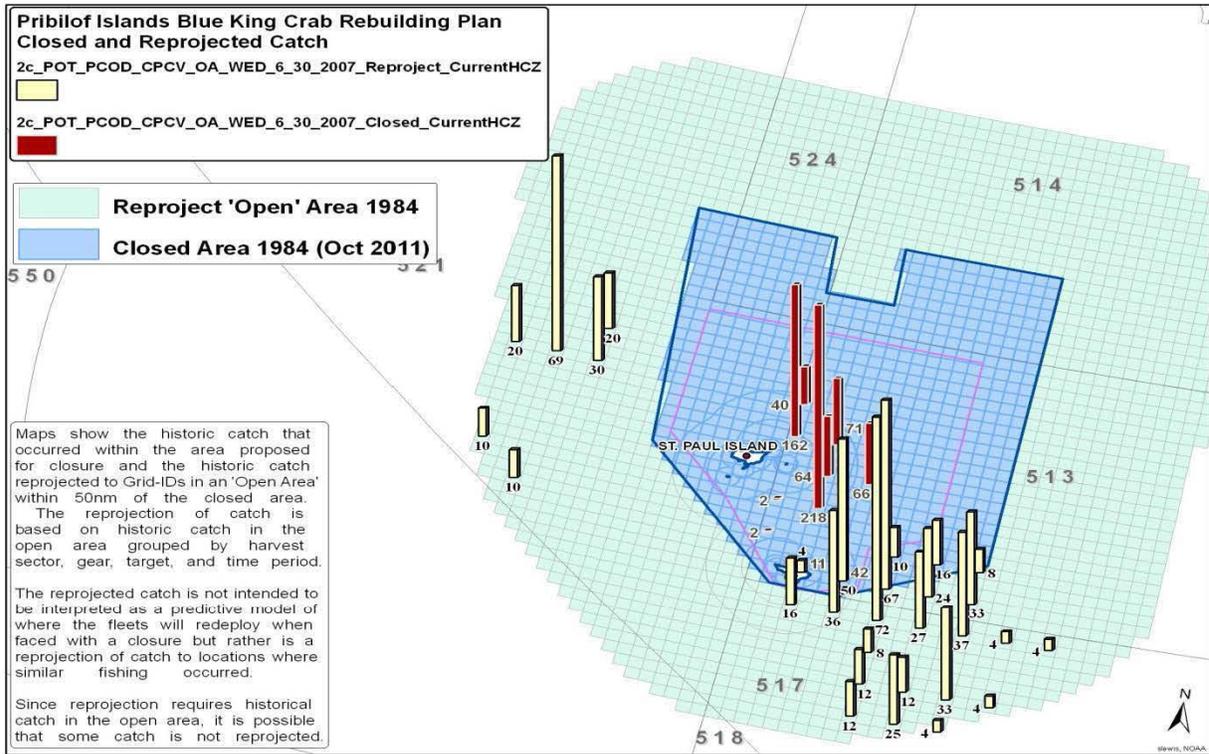
Figure 3, below, provides spatial/temporal reprojection to remaining open areas of catch that occurred within the Alternative 2c PIHCZ closure area. As discussed in section 1.4 above, this reprojection utilizes a stepwise matching algorithm to reproject catch to open areas where catch was observed to have occurred in the same week, and/or month, and within the same target fishery, gear type, and, to the extent possible, to the same vessel type.

The reprojection of catch due to the 2005 20 percent threshold trigger closure is shown first in Figure 3. In this case, catch is highly concentrated within the closure area to the east of the Pribilof Islands and is associated with bathymetric features. The catch reprojection is also fairly concentrated in areas to the south and southeast of the Pribilof Islands.

The 2007 closures are shown in the second and third panel and show strikingly different patterns of reprojection further to the southwest, but also to the west-northwest of the Pribilof Islands. These rejections show that catch within the area that would be closed is highly concentrated in just a few grid squares (analyzed at 7x7km, shown at 20x20km due to confidentiality); however, the rejections are spread among many more grid squares. This suggests that the catch within the closure area occurred at a higher intensity than when reprojected to the open area. As a result, it is likely that such closures would tend to increase the time needed for vessels to harvest the TAC available to them. This would tend to increase operating costs, although to what extent is unknown. It also appears that there is considerable opportunity for the fleet to make up catch, and gross revenue, put at risk because Pacific Cod catch is broadly distributed throughout the remaining open area. This suggests less likelihood for gear conflicts and/or localized intra-season depletion.

Figure 3: Alternative 2c: Reprojection Of Catch Due To Closure Of The PIHCZ Area In The Pacific Cod Open Pot Fishery 2003-2010 In 4 panels Below.





1.4.2.5 Gross revenue at Risk under Alternative 3

Under this alternative, existing ADF&G crab closure areas, between 168 W and 170 W long., and between 57 N and 58 N lat., would be closed to additional fishing effort as defined in EA Figure 10. These closures would apply year-round. There are two closure options under this alternative: Option A could apply the closure to Pacific Cod and flatfish (excluding flathead sole, and Greenland turbot) fishing, while Option B would apply to Pacific cod pot fishing only.

Table 1-9 and Table 1-10 provide the tabulations of tonnage and gross 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 metric 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 gross 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, and the non-pelagic trawl fishery for flatfish (excluding flathead sole, and Greenland Turbot). The impacts shown vary by year and gear type; however, overall combined impacts range from 337 metric tons, in 2009, to a high of 7,963 metric tons in 2008. Potential gross revenue at risk ranges from between \$400,000 (2009), and a high of \$8.2 million (2005) in total first wholesale value.

Table 1-11 provides estimates of gross revenue, as a percent of target and total gross revenue, put “at risk” in the Alternative 3 (ADF&G) closure area. Combining the gross revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total gross revenue earned in those same fisheries (from table 3 above) reveals that a period high of 2.33 percent of total gross revenue would have been put at risk in 2005, and a period low of 0.12 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 0.3 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 gross revenue put at risk of between 0.01 percent and 2.8 percent.

1.4.2.6 Reprojection of Catch under Alternative 3

Figure A-12 through A-14, in the accompanying Appendix A, provide spatial/temporal reprojected to remaining open areas of catch that occurred within the Alternative 3 annual closure areas from 2003 through 2010. As discussed in section 1.4, above, this reprojected utilizes a stepwise matching algorithm to reproject catch to open areas where catch was observed to have occurred in the same week, and/or month, and within the same target fishery, gear type, and, to the extent possible, to the same vessel type.

Figure A-12 shows the annual reprojected of catch in the Pacific Cod Pot fishery under the Alternative 3 (ADF&G) area. This is shown only for 2005 due to confidentiality of the catch data in all other years. This reprojected shows a small number of catch locations with high intensity would reproject to a similar number of locations with similar catch intensity immediately outside the boundary of the closure area and very close to the original catch locations. Ignoring the potential for crowding and/or gear conflicts, it does not appear that this closure would have resulted in substantial increases on operating costs in the single year that can be displayed. Effort reprojected in years that are confidential cannot be displayed; however, it does not appear that the patterns differ between confidential years and the non-confidential year.

Figure A-13 shows the annual reprojected catch in the Pacific cod hook-and-line fishery under the Alternative 3 (ADF&G) area from 2003 through 2010. This reprojected catch shows that a small number of catch locations, with high catch intensity, would reproject in a widely dispersed pattern across the south and west portions of the reprojected area. This pattern is consistent across all years and suggests that the closure would cause relocation of effort in a dispersed way leading to more sets, greater search time, and generally higher operating costs.

Figure A-24 shows the annual reprojected catch in the flatfish non-pelagic trawl fishery under the Alternative 3 (ADF&G) area from 2003 through 2010. This reprojected catch shows that when there are high intensity catch locations inside the closure area there are also fairly high intensity catch locations immediately outside of the closure area; however, catch is not fully made up in those immediately adjacent areas and the additional catch reprojects in a fairly widely dispersed pattern likely leading to more tows, greater search time, and generally higher operating costs.

1.4.2.7 Gross 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 from 1984 through 2009.

Table 1-12 and Table 1-13 provide the tabulations of tonnage and gross 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; however, it did necessitate combining CVs with CPs due to the small number of CVs observed in the area.

As can be seen in Table 1-12, 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, 96,299 metric tons of catch occurred in this area in 2005, while the 2009 retained catches recorded at a period low of 31,738 metric tons. These tonnages represent annual gross revenue at risk totals that peaked in 2005, at \$105.7 million, but have been considerably lower in recent years, as exemplified by the period low of \$28.1 million occurring in 2009.

Table 1-14 provides estimates of gross revenue, as a percent of target and total gross revenue, put “at risk” in the Alternative 4 Option 1 (1975-2009 PIBKC distribution) closure area. Combining the gross revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total gross revenue earned in those potentially affected fisheries (from Table 3 above) reveals that a period high of 29.53 percent of total gross revenue would have been put at risk in 2005, and a period low of 7.9 percent would have been put at risk in 2009. In all remaining years, total impacts would have been between 11.36 percent and 19.55 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 39.74 percent in 2005, to a low of 7.8 percent in 2009, with impacts near or exceeding 15 percent in all but two of the remaining years in the analysis. Similarly, the Pacific cod pot fishery would have had just over 22 percent of its gross revenue at risk in 2005 and 2007. The Pacific cod hook-and-line fishery would have had more than 20 percent of its gross revenue put at risk in 2004, 2005, 2006 and 2010.

Table 1-15 and Table 1-16 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 through 2009. As would be expected, this smaller area has 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 62,078 metric tons (2005) to the 2010 period low of 9,762 metric tons.

Table 1-16 shows that revenue at risk, under this alternative, would have ranged between \$9 million (2009) and \$68.4 million (2005). The greatest impacts would have occurred in the flatfish fisheries with \$43.6 million of gross revenue at risk in 2005, followed by Pacific cod hook-and-line fisheries that would have had about \$20.5 million in gross revenue at risk in the high year of 2005. Of note; however, is that those values fall considerably in more recent years and the 2010 values would have been \$4.7 million and \$4.3 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 \$600,000 (2003) in gross revenue at risk during the 2003 through 2009 timeframe with the 2010 value at \$700,000.

Table 1-17 provides estimates of gross revenue, as a percent of target and total gross revenue, put “at risk” in the Alternative 4 Option 2(1984 through 2009 PIBKC distribution) closure area. Combining the gross revenue at risk estimates for all potentially affected fisheries and comparing those impacts with the total gross revenue earned in those potentially affected fisheries (from Table 3 above) reveals that a period high of 19.38 percent of total gross revenue would have been put at risk in 2005, and a period low of 2.57 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 25.26 percent in 2005, to as low as 2.25 percent in 2009. Similarly, the Pacific cod pot fishery would have had just over 22 percent of its gross revenue at risk in 2005, and between 11percent and 14.75 percent at risk in each of the years 2004, 2006, 2007, and 2008. The Pacific cod hook-and-line fishery would have had 12.75 percent of its gross revenue put at risk in 2005, and between 5 percent and 11 percent put at risk in each of the years of 2004, 2006, 2007, and 2008.

1.4.2.8 Reprojection of Catch Under Alternative 4

Figures A-15 through A-20, in the accompanying Appendix A, provide spatial/temporal reprojection to remaining open areas of catch that occurred within the alternative annual closure areas by year, from 2003 through 2010. As discussed in Section 1.4, above, this reprojection utilizes a stepwise matching algorithm to reproject catch to open areas where catch was observed to have occurred in the same week, and/or month, and within the same target fishery, gear type, and, to the extent possible, to the same vessel type.

Figure A-15 shows the reprojection of catch that would have been closed out of the PIBKC 1975 through 2009 (Alt. 4, Option 1) distribution area in the Pacific cod pot fishery, annually, from 2003 through 2010. This reprojection shows that catch tended to occur in several distinct locations within the closure area; however, reprojection of that catch occurs in a much more dispersed pattern that varies as to its direction from the closure boundary in various years. While the pattern is not consistent from year to year it does appear that the greater dispersion of the catch outside the closure area can be expected to increase operating costs via additional pot lifts, greater searching behavior, possibly increased running time.

Figure A-16 shows the reprojection of catch that would have been closed out of the PIBKC 1975 through 2009 (Alt. 4, Option 1) distribution area in the Pacific cod hook-and-line fishery, annually, from 2003 through 2010. This reprojection shows that catch was highly concentrated along the southern boundary of the closure area and reprojection of that catch was highly dispersed around the outside of the closure area. Thus, it appears that the greater dispersion of the catch outside the closure area can be expected to

increase operating costs via additional pot lifts, greater searching behavior, and possibly increased running time.

Figure A-17 shows the reprojection of catch that would have been closed out of the PIBKC 1975 through 2009 (Alt. 4, Option 1) area in the flatfish non-pelagic trawl fishery, annually, from 2003 through 2010. This reprojection shows that catch was concentrated along the edge of the PIHCZ, with the greatest concentrations to the northwest corner of the area. Catch rejections, while showing some high intensity locations near the north boundary of the closure areas are generally reprojected in a widely dispersed pattern around the edge of the closure area with much of the reprojection appearing to the east. Thus, it appears that the greater dispersion of the catch outside the closure area can be expected to increase operating costs via additional tows, greater searching behavior, and possibly increased running time.

Figure A-18 shows the reprojection of catch that would have been closed out of the PIBKC 1984 through 2009 (Alt. 4 Option 2) area in the Pacific cod pot fishery from 2003 through 2010. This reprojection shows that catch tends to occur in a small number of locations within the closure area and when reprojected a majority of the catch would occur in a similarly few discrete areas at the south edge of the closure area and fairly close to many of the catch locations within the closure. Also shown; however, are relatively small amounts of catch being reprojected in a widely dispersed pattern further to the southeast as well as to the distant western edge of the closure area. Thus, while it appears that the majority of catch put at risk by the closure could be made up nearby with little impact to operating costs, some additional pot lifts, greater searching behavior, possibly increased running time could increase costs.

Figure A-19 shows the reprojection of catch that would have been closed out of the PIBKC 1984 through 09 (Alt. 4 Option 2) area in the Pacific cod hook-and-line fishery from 2003 through 2010. This reprojection shows that catch tends to occur with high intensity along the southern edge of the closure areas and would be reprojected in a widely dispersed pattern further to the south and west extending out the edge of the 50nm reprojection area. Thus, it is likely that this degree of catch dispersion will result in additional operating costs, via more sets, greater searching behavior, and possibly increased running time.

Figure A-20 shows the reprojection of catch that would have been closed out of the PIBKC 1984 through 2009 (Alt. 4, Option 2) area in the flatfish non-pelagic trawl fishery annually from 2003 through 2010. This reprojection shows that catch was concentrated along the edge of the PIHCZ with the greatest concentrations to either the northwest corner of the area or near the east boundary depending on the year. Catch rejections, while showing some high intensity locations near the north boundary of the closure areas are generally reprojected in a widely dispersed pattern around the edge of the closure area with much of the reprojection appearing to the west and the east. Thus, it appears that the greater dispersion of the catch outside the closure area can be expected to increase operating costs via additional tows, greater searching behavior, and possibly increased running time.

Table 1-6: Hypothetical aggregate tonnage “At Risk” based on retained metric tons of groundfish caught in the Alternative 2 (PIHCZ) closure area, 2003-2010. Option A is all groundfish catch in the PIHCZ area and Option B is Pot Pacific Cod only (black highlighted line, which is also Option 1 of Alternative 6)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
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	125.23
Pacific Cod	CDQ	CP	Hook-and-line	0.00	50.04	1,110.83	192.91	196.95	129.31	349.92	223.21
Pacific Cod	OA	CP + CV	Hook-and-line	3,406.46	3,994.91	4,927.49	3,352.41	2,055.74	1,304.80	892.20	1,314.79
Total All Non-Confidential Catch				3,796.79	6,459.60	8,807.33	5,189.46	4,408.22	2,822.64	1,548.43	1,663.23

Table 1-7: Hypothetical Aggregate “Gross revenue At Risk” in round weight equivalent first wholesale value (\$ millions) based on retained metric tons of groundfish caught in the Alternative 2 (PIHCZ) closure area, 2003-2010. Option A is all groundfish catch in the PIHCZ area and Option B is Pot Pacific Cod only (black highlighted line, which is also Option 1 of Alternative 6)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	\$0.3	\$2.8	\$3.8	\$2.9	\$4.4	\$2.8	\$0.4	\$0.2
Pacific Cod	CDQ	CP	Hook-and-line	\$0.0	\$0.1	\$1.5	\$0.3	\$0.4	\$0.3	\$0.4	\$0.3
Pacific Cod	OA	CP + CV	Hook-and-line	\$2.8	\$4.7	\$6.8	\$6.0	\$4.2	\$2.7	\$1.1	\$2.0
Total				\$3.1	\$7.6	\$12.1	\$9.2	\$9.0	\$5.8	\$1.9	\$2.5

Table 1-8: Gross revenue, as a percent of target and total gross revenue, put “At Risk” in the Alternative 2 (PIHCZ) closure area, 2003-2010. Option A is all groundfish catch in the PIHCZ area and Option B is Pot Pacific Cod only (black highlighted line, which is also Option 1 of Alternative 6)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	1.77%	14.20%	19.78%	8.65%	11.98%	7.31%	1.28%	0.63%
Pacific Cod	All	CP + CV	Hook-and-line	3.10%	3.64%	5.21%	3.55%	2.78%	1.51%	1.15%	1.71%
Percent Gross Revenue of Affected Fisheries				2.88%	5.05%	6.77%	4.36%	4.45%	2.48%	1.17%	1.51%

Table1-9: Hypothetical Aggregate “Tonnage At Risk” based on retained metric tons of groundfish caught in the Alternative 3 (ADF&G) closure area, 2003-2010. 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 are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	1,578.30	"c"	"c"	"c"	"c"	"c"
Pacific Cod	CDQ + OA	CP + CV	Hook-and-line	1,134.59	786.33	3,558.27	2,053.12	1,832.77	522.64	321.70	348.00
Flatfish	CDQ + OA	CP + CV	NP Trawl	2,722.22	47.77	1,119.79	30.15	4,580.60	7,441.31	15.37	33.00
Total All Non-Confidential Catch				3,856.81	834.10	6,256.36	2,083.27	6,413.37	7,963.95	337.07	381.00

Table1-10: Hypothetical aggregate “Gross revenue At Risk” (\$ millions) in round weight equivalent first wholesale value based on retained metric tons of groundfish caught in the Alternative 3 (ADF&G) closure area, 2003-2010. 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 are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	\$2.2	"c"	"c"	"c"	"c"	"c"
Pacific Cod	CDQ + OA	CP + CV	Hook-and-line	\$0.9	\$1.0	\$4.9	\$3.7	\$3.7	\$1.0	\$0.4	\$0.5
Flatfish	CDQ + OA	CP + CV	NP Trawl	\$1.9	\$0.0	\$1.1	\$0.0	\$4.1	\$5.9	\$0.0	\$0.0
Total				\$2.8	\$1.0	\$8.2	\$3.7	\$7.8	\$6.9	\$0.4	\$0.5

Table1-11: Gross revenue, as a percent of target and total gross revenue, put “At Risk” in the Alternative 3 (ADF&G) closure area, 2003-2010. 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 are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	11.27%	"c"	"c"	"c"	"c"	"c"
Pacific Cod	CDQ + OA	CP + CV	Hook-and-line	1.03%	0.71%	3.07%	2.05%	2.26%	0.55%	0.30%	0.39%
Flatfish	CDQ + OA	CP + CV	NP Trawl	1.77%	0.03%	0.64%	0.02%	2.16%	2.80%	0.01%	0.01%
Percent Gross Revenue of Affected Fisheries				1.31%	0.33%	2.33%	0.94%	2.00%	1.57%	0.12%	0.16%

Table1-12: Hypothetical aggregate “Tonnage At Risk” based on retained metric tons of groundfish caught in the Alternative 4 Option 1(1975-2009 PIBKC distribution) closure area, 2003-2010. ("c" Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	1,153	2,566	3,089	2,784	3,156	4,212	1,639	979
Pacific Cod	CDQ	CP	Hook-and-line	0	1,134	2,085	906	849	495	1,182	901
Pacific Cod	OA	CP + CV	Hook-and-line	18,793	21,601	21,573	20,509	11,353	10,281	8,071	17,117
Flatfish	OA	CP + CV	Hook-and-line	6	"c"	0	0	4	0	0	0
Flatfish	CDQ + OA	CP	NP Trawl	29,115	26,281	69,552	35,253	48,455	25,381	20,846	31,579
Total All Non-Confidential Catch				49,067	51,582	96,299	59,452	63,817	40,369	31,738	50,576

Table 1-13: Hypothetical aggregate “Gross revenue At Risk” (\$ millions) in round weight equivalent first wholesale value based on retained metric tons of groundfish caught in the Alternative 4 Option 1(1975-2009 PIBKC distribution) closure area, 2003-2010. ("c" Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	\$1.0	\$3.0	\$4.3	\$5.0	\$6.4	\$8.6	\$2.0	\$1.5
Pacific Cod	CDQ	CP	Hook-and-line	\$0.0	\$1.3	\$2.9	\$1.6	\$1.7	\$1.0	\$1.5	\$1.3
Pacific Cod	OA	CP + CV	Hook-and-line	\$15.6	\$25.3	\$29.9	\$36.6	\$23.1	\$21.0	\$10.1	\$25.6
Flatfish	OA	CP + CV	Hook-and-line	\$0.0	"c"	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Flatfish	CDQ + OA	CP	NP Trawl	\$20.4	\$22.2	\$68.6	\$34.8	\$42.9	\$20.0	\$14.4	\$23.5
Total				\$36.9	\$51.8	\$105.7	\$78.0	\$74.2	\$50.6	\$28.0	\$51.9

Table 1-14: Gross revenue, as a percent of target and total gross revenue, put “At Risk” in the Alternative 4 Option 1(1975-2009 PIBKC distribution) closure area, 2003-2010. ("c" Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	5.24%	15.10%	22.06%	14.65%	17.54%	22.17%	6.84%	4.90%
Pacific Cod	CDQ + OA	CP + CV	Hook-and-line	17.08%	20.48%	20.40%	21.41%	15.06%	11.34%	8.58%	20.02%
Flatfish	OA	CP + CV	Hook-and-line	0.12%	"c"	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%
Flatfish	CDQ + OA	CP	NP Trawl	18.91%	15.46%	39.74%	19.16%	22.86%	9.54%	7.80%	12.68%
Percent Gross Revenue of Affected Fisheries				16.73%	17.41%	29.53%	19.55%	18.89%	11.36%	7.93%	16.05%

Table 1-15: Hypothetical aggregate “Tonnage At Risk” based on retained metric tons of groundfish caught in the Alternative 4 Option 2 (1984-2009 PIBKC distribution) closure area, 2003-2010. ("c" Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	735	2,508	3,081	2,132	2,622	2,105	681	454
Pacific Cod	CDQ	CP	Hook-and-line	0	243	1,500	556	380	297	655	382
Pacific Cod	OA	CP + CV	Hook-and-line	9,081	9,797	13,291	10,408	6,328	4,518	2,520	2,610
Flatfish	CDQ + OA	CP + CV	NP Trawl	22,135	14,497	44,206	15,020	14,975	22,391	6,006	6,316
Total All Non-Confidential Catch				31,951	27,046	62,078	28,116	24,306	29,311	9,862	9,762

Table 1-16: Hypothetical aggregate “Gross revenue At Risk” (dollars) in round weight equivalent first wholesale value based on retained metric tons of groundfish caught in the Alternative 4 Option 2 (1984-2009 PIBKC distribution) closure area, 2003-2010. ("c" Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	\$0.6	\$2.9	\$4.3	\$3.8	\$5.3	\$4.3	\$0.9	\$0.7
Pacific Cod	CDQ	CP	Hook-and-line	\$0.0	\$0.3	\$2.1	\$1.0	\$0.8	\$0.6	\$0.8	\$0.6
Pacific Cod	OA	CP + CV	Hook-and-line	\$7.5	\$11.5	\$18.4	\$18.6	\$12.9	\$9.2	\$3.2	\$3.9
Flatfish	CDQ + OA	CP + CV	NP Trawl	\$15.5	\$12.2	\$43.6	\$14.8	\$13.3	\$17.6	\$4.2	\$4.7
Total				\$23.6	\$26.9	\$68.4	\$38.2	\$32.3	\$31.7	\$9.1	\$9.9

Table 1-17: Gross revenue, as a percent of target and total gross revenue, put “At Risk” in the Alternative 4 Option 2 (1984-2009 PIBKC distribution) closure area, 2003-2010.

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	3.34%	14.75%	22.01%	11.22%	14.57%	11.08%	2.84%	2.27%
Pacific Cod	All	CP + CV	Hook-and-line	8.26%	9.05%	12.75%	10.96%	8.28%	5.07%	2.94%	3.32%
Flatfish	CDQ + OA	CP + CV	NP Trawl	14.37%	8.53%	25.26%	8.16%	7.06%	8.42%	2.25%	2.54%
Percent Gross Revenue of Affected Fisheries				10.88%	9.18%	19.38%	9.69%	8.29%	7.18%	2.57%	2.82%

1.4.2.9 Gross 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); the ABC (estimated at 3,600 lbs); at 90 percent of ABC (3,240 lbs); or 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 22nd. Likewise the ABC level options, 90% of the ABC and 75% of the ABC, would each have been exceeded in the same week, specifically on week ending date of September 22nd. 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 functionally equivalent⁹ with respect to the effects of PSC driven closures.

Table 1-18 tabulates the tonnage and gross 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 metric tons of harvest, and about \$1.34 million in gross 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 gross revenue totals represent just under 15 percent of the total catch taken from the PIHCZ area in 2007, and about 15 percent of the gross revenue from that area. In comparison to the total BSAI gross 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 gross revenue at risk would have been approximately 0.34 percent of the estimated total gross revenue of these fisheries BSAI wide.

Table 1-18: Hypothetical aggregate catch and gross revenue (\$ millions) “At Risk” based on retained metric tons of groundfish caught in the Alternative 5 triggered closure of the PIHCZ area after 9/22/2007. ("c" Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Gross revenue at Risk	Gross Revenue as percent of Annual Total*
Pacific Cod	OA	CP + CV	Pot	272.38	\$0.56	1.51%
Pacific Cod	CDQ	CP	Hook-and-line	"c"	\$0.00	
Pacific Cod	OA	CP + CV	Hook-and-line	385.55	\$0.78	0.48%
Total				657.93	\$1.34	0.34%
Percent of PIBKC Area Total				14.93%	14.93%	

* Gross 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

⁹ 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.

Table1-19 tabulates the tonnage and gross 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 metric tons of harvest, and about \$300,000 in gross 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 gross 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 gross revenue from that area. In comparison to the total BSAI gross 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 gross revenue at risk would have been approximately .07 percent of the estimated total gross revenue of these fisheries BSAI wide.

Table1-19: Hypothetical aggregate catch and gross revenue (\$ millions) “At Risk” based on retained metric tons of groundfish caught in the Alternative 5 triggered closure of the ADF&G area after 9/22/2007. (“c” Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Gross revenue at Risk	Gross revenue as percent of Annual Total*
Pacific Cod	OA	CP + CV	Pot	"c"	"c"	0.18%
Pacific Cod	CDQ + OA	CP + CV	Hook-and-line	142.88	\$0.29	
Flatfish	CDQ + OA	CP + CV	NP Trawl	"c"	"c"	
Total				142.88	\$0.29	0.07%
Percent of ADF&G Area Total				2.23%	3.73%	

* Gross 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

Table1-20 tabulates the tonnage and gross 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 metric tons of harvest, and about \$3 million in gross revenues, at risk.

Table1-20: Hypothetical aggregate catch and gross revenue (\$ millions) “At Risk” based on retention of groundfish caught in the Alternative 5 triggered closure of the Option 1(1975-2009 PIBKC distribution) area after 9/22/2007.(“c” Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Gross revenue at Risk	Gross revenue as percent of Annual Total*
Pacific Cod	OA	CP + CV	Pot	495.20	\$0.62	1.69%
Pacific Cod	CDQ	CP	Hook-and-line	607.27	\$0.76	0.46%
Pacific Cod	OA	CP + CV	Hook-and-line	1,311.79	\$1.64	0.99%
Flatfish	OA	CP + CV	Hook-and-line	"c"	"c"	
Flatfish	CDQ + OA	CP	NP Trawl	"c"	"c"	
Total				2,414.26	\$3.02	0.77%
Percent of PIBKC75 Area Total				3.78%	4.04%	

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 gross revenue totals represent 3.8 percent of the total catch taken from the area in 2007, and about 4 percent of the gross revenue from that area. In comparison to the total BSAI gross 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 gross revenue at risk would have been approximately 0.75 percent of the estimated total gross revenue of these fisheries BSAI wide.

Table 1-21 tabulates the tonnage and gross revenue effects of triggered closure of an 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 metric tons of harvest, and about \$2.4 million in gross revenues, at risk. These impacts would have occurred in the open access Pacific cod pot, Pacific cod hook-and-line, and CDQ Pacific cod hook-and-line fisheries. Confidential data cannot be reported in the CDQ and open access flatfish fisheries. In percentage terms, the tonnage and gross revenue totals represent 4.8 percent of the total catch taken from the area in 2007, and 7.45 percent of the gross revenue from that area. In comparison to the total BSAI gross 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, 0.26 percent of the value of the CDQ Pacific cod hook-and-line fishery, and 0.81 percent of the value of the Pacific cod open access hook-and-line fishery. The total gross revenue at risk would have been approximately 0.6 percent of the estimated total gross revenue of these fisheries BSAI wide.

Table 1-21: Hypothetical aggregate catch and gross revenue “At Risk” based on retained metric tons of groundfish caught in the Alternative 5 triggered closure of the Option 2 (1984-2009 PIBKC distribution) area after 9/22/2007("c" Indicates that data are confidential)

Target Species	Mgmt.	Vessel Type	Gear Type	2007 Post 9/22 Catch	Gross Revenue at Risk	Gross revenue as percent of Annual Total
Pacific Cod	OA	CP + CV	Pot	312.77	\$0.64	1.74%
Pacific Cod	CDQ	CP	Hook-and-line	212.53	\$0.43	0.26%
Pacific Cod	OA	CP + CV	Hook-and-line	656.37	\$1.34	0.81%
Flatfish	CDQ + OA	CP + CV	NP Trawl	"c"	"c"	
Total				1,181.67	\$2.41	0.61%
Percent of PIBKC84 Area Total				4.86%	7.45%	

1.4.2.10 Reprojection of Catch Under Alternative 5

Figure A-1 through A-9, in the accompanying Appendix A provide spatial/temporal reprojected to remaining open areas of catch that occurred within the Alternative 5a,b,c, and d triggered closure areas after the closure was triggered post September 22nd of 2007. As discussed in section 1.4 above, this reprojected utilizes a stepwise matching algorithm to reproject catch to open areas where catch was

observed to have occurred in the same week, and/or month, and within the same target fishery, gear type, and, to the extent possible, to the same vessel.

Figure A-1 shows the reprojection of catch that would have been closed out of the PIHCZ area (Alt. 5a) in the Pacific cod pot fishery in 2007. This reprojection shows that catch occurred in two distinct locations within the PIHCZ area; however, catch is reprojected, based on observed catch outside the closure area, in a highly dispersed pattern. This suggests that fairly high catches occurring in discrete locations within the closure area will have to be made up in multiple areas with history of smaller catches. This could mean additional pot lifts, greater searching behavior, and generally increased costs to harvest the catch put at risk by the closure.

Figure A-2 shows the reprojection of catch that would have been closed out of the PIHCZ area (Alt. 5a) in the Pacific cod hook-and-line fishery in 2007. This reprojection shows that catch occurred in several fairly distinct locations within the PIHCZ area; however, catch is reprojected, based on observed catch outside the closure area, with a somewhat more dispersed pattern. This suggests that fairly high catches occurring in discrete locations within the closure area will have to be made up in multiple areas with histories of smaller catches. Similar to the result for the Pacific cod pot fishery, this could mean additional sets, greater searching behavior, and generally increased costs to harvest the catch put at risk by the closure.

Figure A-3 shows the reprojection of catch that would have been closed out of the ADF&G area (Alt. 5b) in the Pacific cod hook & line fishery in 2007. This reprojection shows that nearly all catch occurred in a single distinct location within the ADF&G area; however, catch is reprojected, based on observed catch outside the closure area, with a considerably more dispersed pattern and at the far edge of the 50nm reprojection limit. This suggests that very high catches occurring in a single discrete location within the closure area will have to be made up in multiple areas with histories of smaller catches and at a considerable distance from the closure area. The greater dispersion of the reprojected catch, relative to catch within the closure area, and the considerable distance away from the closure area to which catch is reprojected suggests the need for additional sets, greater searching behavior, longer running time to the reprojection area, and generally increased costs to harvest the catch put at risk by the closure.

Figure A-4 shows the reprojection of catch that would have been closed out of the PIBKC 1975 through 2009 (Alt. 5c) area in the Pacific cod pot fishery, beginning on September 22nd in 2007. This reprojection shows that catch occurred in several distinct locations within the closure area and when reprojected a majority of the catch would occur in a similarly few discrete areas at the Southeast edge of the closure area and very close to many of the catch locations within the closure. Also shown; however, are relatively small amounts of catch being reprojected in a widely dispersed pattern, further to the southeast, as well as to the distant western edge of the closure area. Thus, while it appears that the majority of catch put at risk by the closure could be made up nearby with little impact to operating costs, some additional pot lifts, greater searching behavior, possibly increased running time could increase costs.

Figure A-5 shows the reprojection of catch that would have been closed out of the PIBKC 1975 through 2009 (Alt. 5c) area in the Pacific cod hook-and-line CDQ fishery, beginning on September 22nd in 2007. This reprojection shows that catch within the closure was concentrated in multiple grid cells along the Southwest edge of the closure area. Reprojection of this catch occurs to a large extent immediately adjacent to the catch within the closure area; however, there are rejections of substantial proportions of the overall catch at the edge of the 50nm reprojection zone to the southeast, as well as dispersed rejections of small amounts of catch elsewhere. This suggests that much of the catch could be made up in the area immediately adjacent to the closure boundary; however, some may also have to be made up in more distant locations, resulting in the potential for increased operating costs. Figure A-6 provides the similar reprojection for the open access portion of this fishery with similar patterns.

Figure A-7 shows the reprojection of catch that would have been closed out of the PIBKC 1984 through 2009 (Alt. 5d) area in the Pacific cod pot fishery, beginning on September 22nd in 2007. This reprojection shows that catch occurred in two distinct locations within the closure area and, when reprojected, a majority of the catch would occur in a similarly few discrete areas at the south edge of the closure area and fairly close to many of the catch locations within the closure. Also shown; however, are relatively small amounts of catch being reprojected in a widely dispersed pattern, further to the southeast, as well as to the distant western edge of the closure area. Thus, while it appears that the majority of catch put at risk by the closure could be made up nearby with little impact to operating costs, some additional pot lifts, greater searching behavior, possibly increased running time could increase costs.

Figure A-8 shows the reprojection of catch that would have been closed out of the PIBKC 1984 through 2009 (Alt. 5d) area in the Pacific cod CDQ hook-and-line fishery, beginning on September 22nd in 2007. This reprojection shows that catch occurred in several locations within the closure area and, when reprojected, a majority of the catch would occur in a similar number of areas at the southwest edge of the closure area and fairly close to many of the catch locations within the closure. Also shown, however, are relatively small amounts of catch being reprojected in a widely dispersed pattern, further to the southeast. Thus, while it appears that the majority of catch put at risk by the closure could be made up nearby with little impact to operating costs, some additional sets, greater searching behavior, and possibly increased running time could increase costs. Figure A-9 provides a similar result for the open access portion of this fishery.

1.4.2.11 Gross revenue At Risk Under Alternative 5d and Alternative 6-2 Allocated Threshold Based Trigger Closures

It is important to note that Alternative 6, Component 1, is identical to Alternative 2b, and has been discussed previously. What is discussed here are potential effects of Alternative 5d and Alternative 6, Component 2. These are presented in this section together, because the potential effects are very similar.

Component 2 of Alternative 6 also has two options for the method used to determine when triggering of the closure area occurs. The first, option a, is based on the average weight of PIBKC taken in the previous season. The second, option b, is based on a rolling 5 year average weight. For this analysis, trigger caps were calculated for both options; however, the use of option b did not change any of the trigger week ending dates and, thus, what is presented here represents the potential effects under both options.

Component 2 of Alternative 6 also contains two options for apportioning the PSC limit based threshold caps. Option 1 applies an allowance method of 45 percent of the PSC limit to each of the trawl and pot gear sectors, with 30 percent of the limit established as the allowed threshold cap in the hook-and-line sector. Option 2 applies one of three seasonal apportionments to all fisheries in the aggregate with any unused PSC rolling over into the following season.

Table 1-22 tabulates the tonnage and gross revenue effects of threshold based triggered closure of the area associated with the revised PIBKC stock distribution from 1984 through 2009 (as defined in Alternative 5d option 4) in the weeks following triggering of the closure in affected fisheries. Under the 20 percent allocation threshold in the Pacific cod hook-and-line fishery closures would have been triggered in 2004, 2006, and 2009 on September 4th, 2nd, and 26th, respectively. These triggered closures would have, respectively, put 3,001, 1,301, and 482 metric tons at risk, with associated gross revenue at risk of \$3.5 million, \$2.3 million, and \$600,000; representing 2.7 percent, 1.3 percent, and 0.47 percent of annual gross revenue in each of those years. The impacts would have accrued to both the open access and CDQ Pacific cod hook-and-line fisheries and upon both CVs and CPs.

Table 1-22: Alternative 5d Threshold Analysis Fishery Impacts: Potentially Foregone Catch, Gross Revenue, and Percent of Total Target Fishery Gross Revenue

Threshold	Year Threshold Exceeded	Post Week Ending Date	Target Fishery	Mgmt. and Vessel Type	Catch at Risk	Gross Revenue at Risk (\$millions)	Percent of Annual Target Fishery Revenue
40% Trawl	2004	Aug. 7th	Y. SOLE	OA CP	c	c	c
	2006	Aug. 19th	Y. SOLE	OA CP	c	c	c
40% Pot	2005	Feb. 12th	P. COD	OA CP+CV	1464	\$2.032	10.46%
	2007	Sept. 22nd	P. COD	OA CP+CV	331	\$0.673	1.84%
20 % H&L	2004	Sept. 4th	P. COD	CDQ+OA CP+CV	3,001	\$3.517	2.70%
	2006	Sept. 2nd	P. COD	OA+CDQ CP	1,301	\$2.324	1.30%
	2009	Sept. 26th	P. COD	OA+CDQ CP	482	\$0.603	0.47%

Under the 40 percent apportionment threshold in the Pacific cod pot fishery, closures would have been triggered in 2005 and 2007 in the week ending February 12th and September 22nd, respectively. These triggered closures would have, respectively, put 1,464 metric tons and 331 metric tons at risk, with associated gross revenue at risk of \$2 million and \$700,000, which would have represented 10.46 percent and 1.84 percent of annual gross fleet revenue. The impacts would have accrued in the open access Pacific cod pot fishery and upon both CVs and CPs.

Under the 40 percent trawl apportionment threshold in the yellowfin sole fishery, closures would have been triggered in 2004 and 2006 in the week ending August 7th and August 19th, respectively. However, the potential effects of these triggered closures in terms of catch amounts, and gross revenue at risk, cannot be divulged due to confidentiality restrictions (fewer than 3 vessels)

Table 1-23 tabulates the tonnage and gross revenue effects of threshold based triggered closure of the area associated with the revised PIBKC stock distribution from 1984 through 2009 (as defined in Alternative 6, option 2) in the weeks following triggering of the closure in affected fisheries. Under the 30 percent allocation threshold in the Pacific cod hook-and-line fishery closure would have been triggered on September 26th of 2009. This triggered closure would have put 482 metric tons at risk, with associated gross revenue at risk of \$600,000, which would have represented 0.47 percent of annual gross fleet revenue. The impacts would have accrued to the CDQ Pacific Cod hook-and-line fisheries and CPs.

Under the 45 percent allocation threshold in the Pacific cod pot fishery closures would have been triggered in 2005 and 2007 in the week ending February 12th and September 22nd, respectively. These triggered closures would have, respectively, put 1,464 metric tons and 331 metric tons at risk, with associated gross revenue at risk of \$2 million and \$673,000, which would have represented 10.46 percent and 1.84 percent of annual gross fleet revenue. The impacts would have accrued in the open access Pacific cod pot fishery and to both CVs and CPs.

Under the 45 percent trawl allocation threshold in the yellowfin sole fishery, closures would have been triggered in 2004 in the week ending June 19th. However, the potential effects of this triggered closure in terms of catch and revenue at risk cannot be divulged due to confidentiality restrictions (fewer than 3 vessels).

Table 1-23: Alternative 6-2 Threshold Analysis Fishery Impacts: Potentially Foregone Catch, Gross Revenue at Risk, and Percent of Total Target Fishery Gross Revenue

Threshold	Year Threshold Exceeded	Post Week Ending Date	Target Fishery	Mgmt. and Vessel Type	Catch at Risk	Gross Revenue at Risk (\$millions)	Percent of Annual Target Fishery Revenue
45% Trawl	2004	June 19th	Y.Sole	CDQ CP	c	c	c
45% Pot	2005	Feb. 12th	P. COD	OA CP+CV	1,464	\$2.032	10.46%
	2007	Sept. 22nd	P. COD	OA CP+CV	331	\$0.673	1.84%
30 % H&L	2009	Oct. 17th	P. COD	CDQ CP	482	\$0.603	0.47%

Under Component 2 of Alternative 6 there is an option to seasonally apportion trigger caps and to allow a rollover of remaining PSC not used in the specified season. This approach allows for a fishery-level (combined all sectors, as well as CDQ and non-CDQ) seasonal allowance that would provide for maximizing fishing opportunities under the existing cap options in the analysis. The Alternative 6 PSC limit (75% of the ABC) only is examined here, as this option is contained only under this alternative. Quartiles of the PSC limit are compared with PSC in each year.

Three options are proposed for consideration: seasonal apportionment of 25% of the PSC in the first quarter of the year, option 1) 25% in the second quarter and 50% for the remainder of the year, option 2) 50% of the PSC (for all gear types combined) beginning January 1 through June 10, with 50% remaining June 11 through December 31; and option 3) 75% January 1 through June 10, with 25% remaining June 11 through December 31. These cap allowances, by year, are shown in EA Table 5-13. The inherent assumption is that the PSC that accrues towards this cap apportionment is for all fisheries combined. When the cap itself is reached, however, only the fisheries which are subject to this action (yellowfin sole, Pacific cod pot, and Pacific cod hook-and-line fisheries) would be subject to whichever closure constraint is proposed by the Council.

An examination of all groundfish fisheries PSC under these two seasonal allocation schemes was conducted using the CIA DB to estimate total PSC of PIBKC by all gear types in the Pribilof District. PSC was tabulated in the PI District, by year, and compared against the proportion of the cap estimated in each year. Data were compiled for consideration with and without a rollover of unused PSC from the first apportionment (January 1 through June 10) to the second (June 11 through December 31). These date ranges are meant to bracket the full range of applicable seasons for all gear types, understanding that not all gear types are able to fish under the full seasonal allocation time frame.

The week-ending dates that an estimated constraint would be reached by seasonal allocation are shown in EA Tables 5-14 through 6-16 and are not repeated here. However, Table 1-24, below provides the Catch and associated revenue put at risk, as well as the percent of total annual revenue that is put at risk under post triggering of the closure.

For both the 25/25/50 and 50/50 seasonal allowances, the only year the cap would have been estimated to have been reached in the first and second seasons would have been in 2005. The resulting impact is potentially quite large, with nearly 22 percent, 8 percent, and 16 percent of total annual revenue put at risk in the flatfish trawl, Pacific cod hook-and-line, and Pacific cod pot fisheries, respectively. For the second season however, without a rollover the cap would have been reached in 2006, 2007, and 2009. With the seasonal apportionment the cap would have been reached later in 2006, but the same weekend date in

2007. In 2007, the cap levels for all caps under consideration were reached in the week of September 22nd. Under the rollover for this option, the cap would not have been reached in 2009.

For the 75/25 apportionment, the cap is not reached in any year in the first seasonal allowance. In the second season, absent a rollover the smaller proportion of the cap is reached in multiple years (2004, 2006, 2007, 2009, and 2010). However, with the rollover, the cap is only reached in 2006 on September 2nd and in 2007 on September 22nd (when all cap levels are reached due to PSC in that period as noted previously). Overall, the effect of the seasonal apportionment scenario, versus the sector allowance method of option 1, is to increase the years in which closures would apply to all three fisheries, with the greatest potential impacts concentrated in the 2005 year across all three fisheries.

Table 1-24: Alternative 6-2 Seasonal Apportionment Analysis of Fishery Impacts: Potentially Foregone Catch, Gross Revenue at Risk, and Percent of Total Target Fishery Gross Revenue

Trigger Date	Catch At Risk			Revenue at Risk (\$ millions)			Percent of Total Annual Revenue		
	Trawl Flatfish	PCOD H&L	PCOD POT	Trawl Flatfish	PCOD H&L	PCOD POT	Trawl Flatfish	PCOD H&L	PCOD POT
2004 7 Aug.	c	3,588	c	c	\$4.2	c	c	3.2%	c
2005 12-Feb	41,350	8,872	2,238	\$40.8	\$12.3	\$3.1	21.71%	7.6%	16.0%
2006 19 Aug.	c	2,676	c	c	\$4.8	c	c	2.7%	c
2006 2-Sept.	c	1,860	c	c	\$3.3	c	c	1.9%	c
2007 8 Sept.	0	1,309	704	0	\$2.7	\$1.4	0	1.6%	7.4%
2007 22 Sept.	0	1,133	464	0	\$2.3	\$0.9	0	1.4%	4.9%
2009 19 Sept.	0	891	c	0	\$1.1	c	0	0.9%	c
2009 26 Sept.	0	891	c	0	\$1.1	c	0	0.9%	c
2010 25 Sept.	c	1,933	c	c	\$2.9	c	c	2.1%	c

1.4.2.12 Reprojection of Catch Under Alternative 5 and Alternative 6-2 Apportioned Threshold Based Triggered Closures

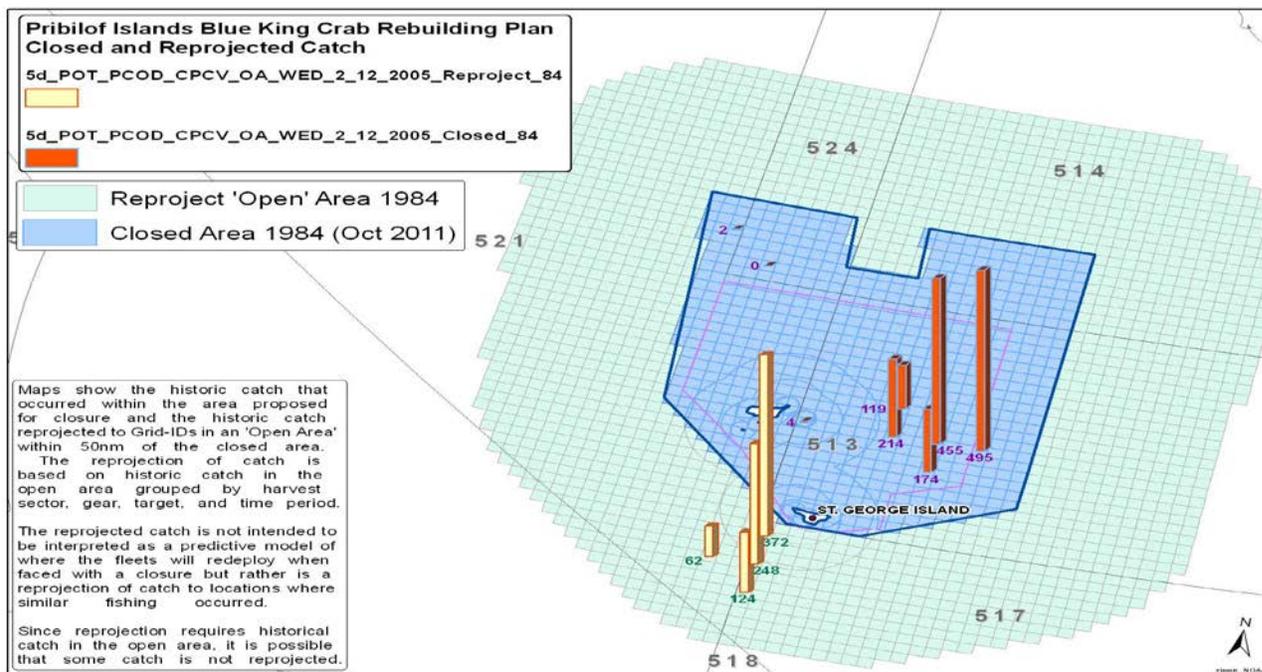
Figure 4, below, provides spatial/temporal reprojction to remaining open areas of catch that occurred within the Alternative 5d closure area (Revised PIBKC 1984 through 2009 Area) after the closure was triggered. As discussed in section 1.4, above, this reprojction utilizes a stepwise matching algorithm to reprojct catch to open areas where catch was observed to have occurred in the same week, and/or month, and within the same target fishery, gear type, and, to the extent possible, to the same vessel type.

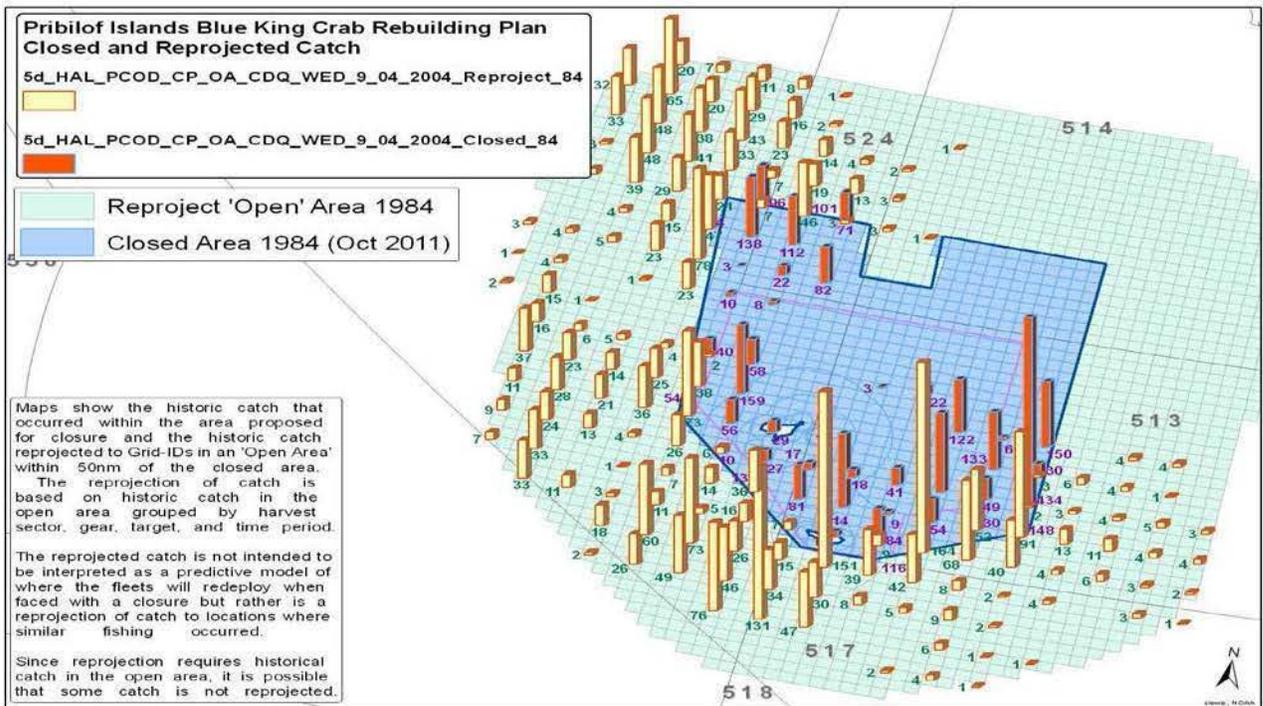
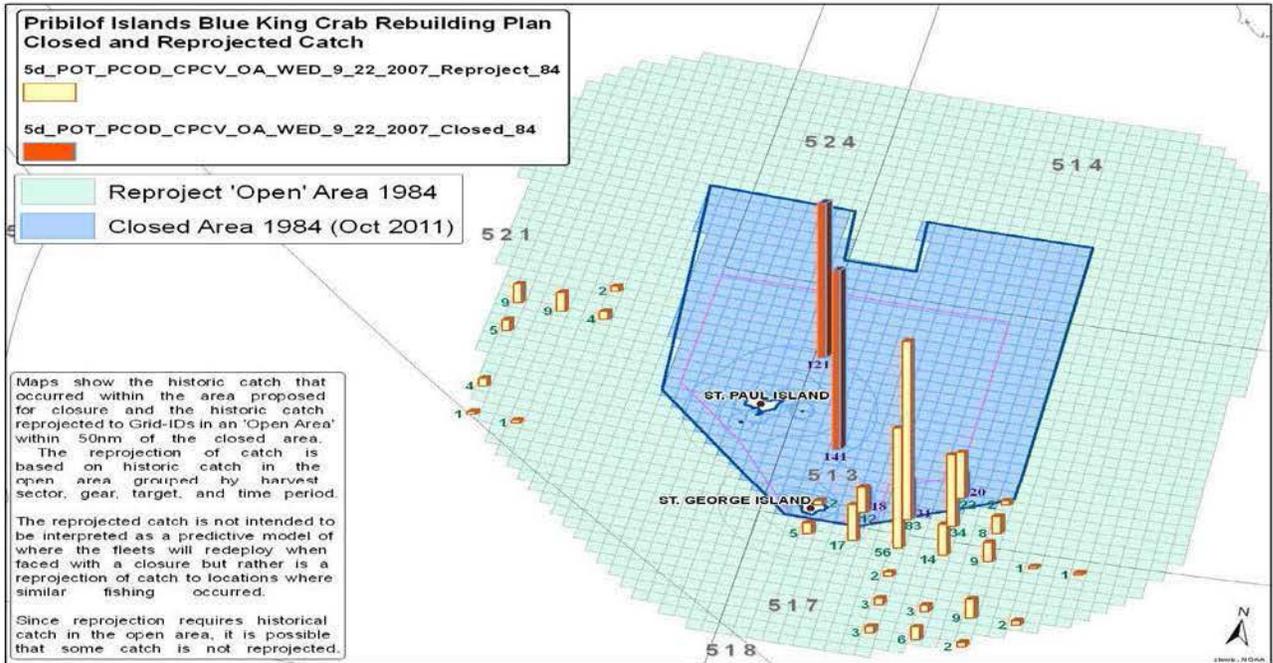
The reprojction of catch due to a 2005 40 percent threshold trigger closure, and the Alternative 6 45 percent threshold trigger closure, in the Pacific cod pot fishery is shown first in Figure 4. In this case, catch is highly concentrated, within the closure area, to the east of the Pribilof Islands and is associated with bathymetric features. Also important to note is that unlike any of the other threshold based triggered closures, which all had 100 percent matching of catch within the closed area to the open area within target, gear, and vessel type, this particular closure scenario resulted in only 36 percent catch matching. This means that even with the final matching step of relaxing the week ending date constraint and allowing any match within the month, 74 percent of the catch that occurred within the closed area could

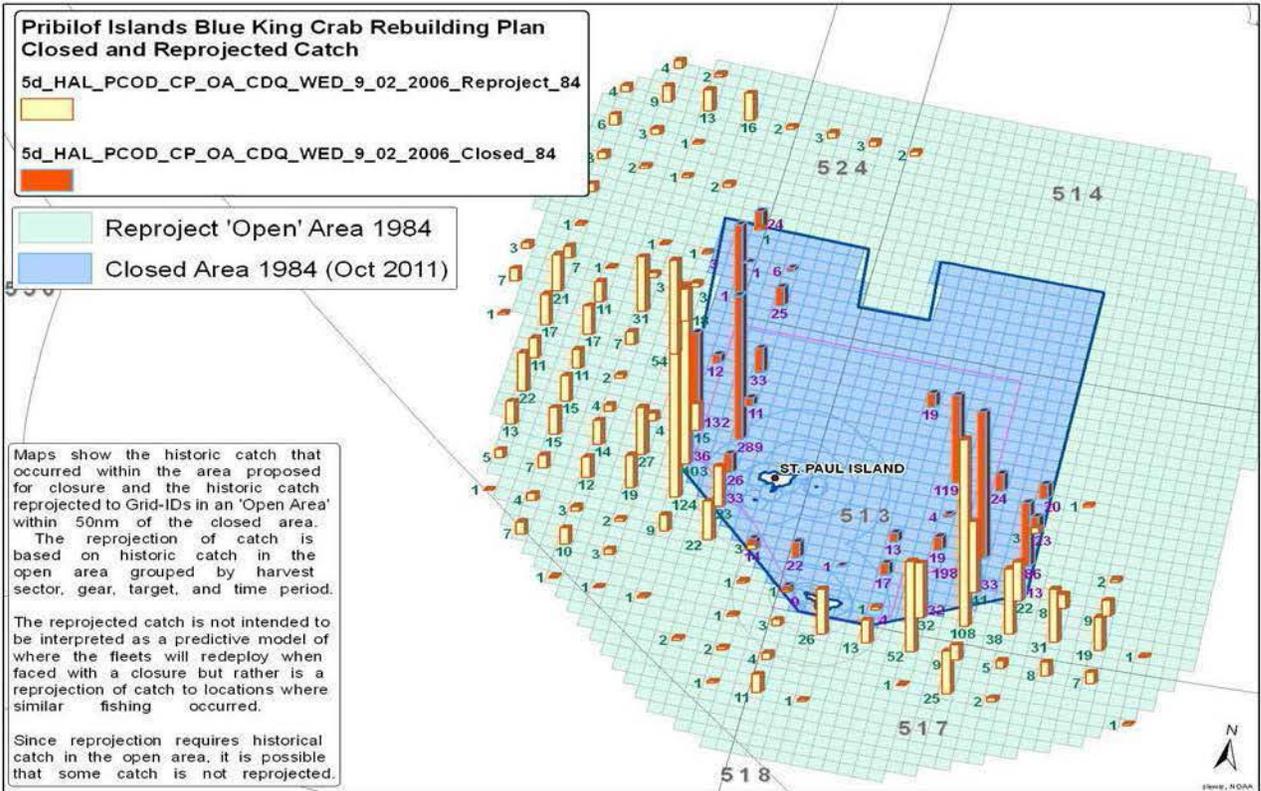
not be match to harvest activity outside of the closed area. This is simply because there was very little catch recorded outside the closure area by Pacific cod pot vessels from February 12th through the end of the year. This fact suggests that the closure area was highly important to the Pacific cod pot fishery, at least in 2005. In contrast, reprojected catch in the second year of a closure under this threshold (2007) did match at 100 percent and shows much more dispersed effort outside the closure area in that year. Thus, it is apparent that there is considerable inter-annual variability in effort and catch location within this fishery. Note also that the 2007 catch reprojected map represents the 45 percent threshold trigger closure under Alternative 6-2 in that year.

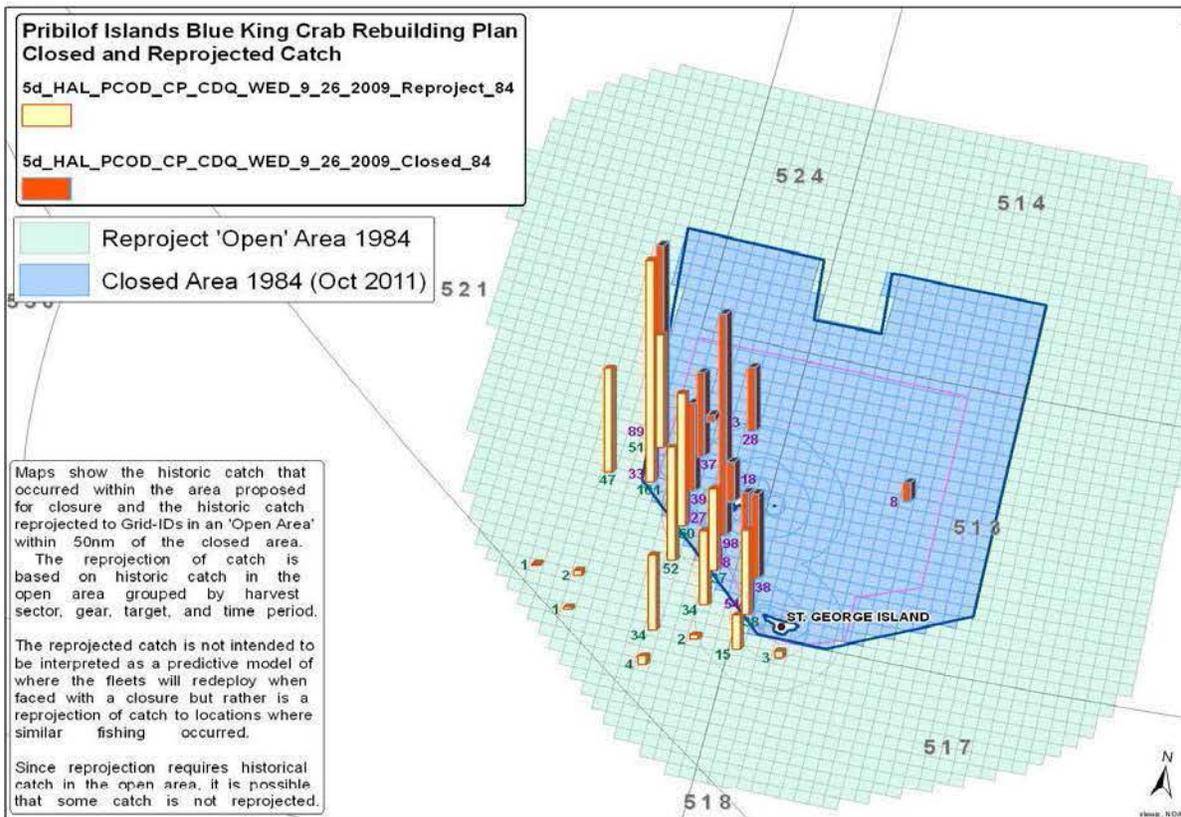
In the 2004 closure of the Pacific cod hook-and-line fishery based on the 20 percent threshold trigger, catch reprojected is widely dispersed around the south and west boundaries of the closure area, which suggests that the catch within the closure area occurred at a higher intensity than when reprojected to the open area. As a result, it is likely that such a closure would tend to increase the time needed for vessels to harvest the TAC available to them. This would tend to increase operating costs, although to what extent is unknown. It also appears that there is considerable opportunity for the fleet to make up catch, and gross revenue, put at risk because Pacific cod catch is broadly distributed throughout the remaining open area as opposed to in only a few discrete locations. This suggests less likelihood for gear conflicts and/or localized intra-season depletion. Figure 4 presents a similar reprojected picture for the 2006 closure within this fishery; however, the 2009 closure reprojected, which also applies to Alternative 6-2 shows a much more concentrated level of effort reprojected just outside the boundary southwest of the Pribilof Islands.

Figure 4: Alternative 5d and 6, Option 2: Reprojection Of Catch Due To Closure Of The Revised 1984-2009 PIBKC Stock Distribution Area In The Pacific Cod Pot and Hook-and-line Fisheries 2003-2010 In 5 panels Below.









1.4.3 Comparison of Impacts by Alternative

Table 1-25 through Table 1-27 provide a comparison of the potential impacts, in terms of metric tons and gross revenue at risk, of each of the proposed annual closure areas (Alt. 2, 3, and 4) on the Pacific cod pot gear fishery. As one would expect, the metric 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 125 metric tons (Alt. 2, 2010) to as much as 4,212 metric tons (Alt. 4-1, 2008). Gross revenue effects range from near zero to \$9 million, and the range of impacts in terms of percent of total gross revenue earned in the BSAI Pacific cod pot fishery is from 0.89 percent to more than 22 percent (Alt. 4-1, 2008) of total fishery gross revenue. These values are also depicted graphically in Figure 5.

Table 1-25: Pacific Cod Pot Fishery Impacts by Alternative: Metric tons at Risk.

Alternative Area	Year							
	2003	2004	2005	2006	2007	2008	2009	2010
A2 PIHCZ	390	2,415	2,769	1,644	2,156	1,389	306	125
A3 ADF&G	"c"	"c"	1,578	"c"	"c"	"c"	"c"	"c"
A4-2 PIBK84	735	2,508	3,081	2,132	2,622	2,105	681	454
A4-1 PIBK75	1,153	2,566	3,089	2,784	3,156	4,212	1,639	979

Table 1-26: Pacific Cod Pot Fishery Impacts by Alternative: Gross Revenue at Risk 9 (\$ millions).

Alternative Area	Year							
	2003	2004	2005	2006	2007	2008	2009	2010
A2 PIHCZ	\$0	\$3	\$4	\$3	\$4	\$3	\$0	\$0
A3 ADF&G	"c"	"c"	\$2	"c"	"c"	"c"	"c"	"c"
A4-2 PIBK84	\$1	\$3	\$4	\$4	\$5	\$4	\$1	\$1
A4-1 PIBK75	\$1	\$3	\$4	\$5	\$6	\$9	\$2	\$1

Table 1-27: Pacific Cod Pot Fishery Impacts by Alternative: Gross Revenue at Risk as Percent of Target Fishery Total Gross Revenue.

Alternative Area	Year							
	2003	2004	2005	2006	2007	2008	2009	2010
A2 PIHCZ	1.77%	14.20%	19.78%	8.65%	11.98%	7.31%	1.28%	0.63%
A3 ADF&G	"c"	"c"	11.27%	"c"	"c"	"c"	"c"	"c"
A4-2 PIBK84	3.34%	14.75%	22.01%	11.22%	14.57%	11.08%	2.84%	2.27%
A4-1 PIBK75	5.24%	15.10%	22.06%	14.65%	17.54%	22.17%	6.84%	4.90%

Figure 5: Pacific Cod Pot Fishery Effects

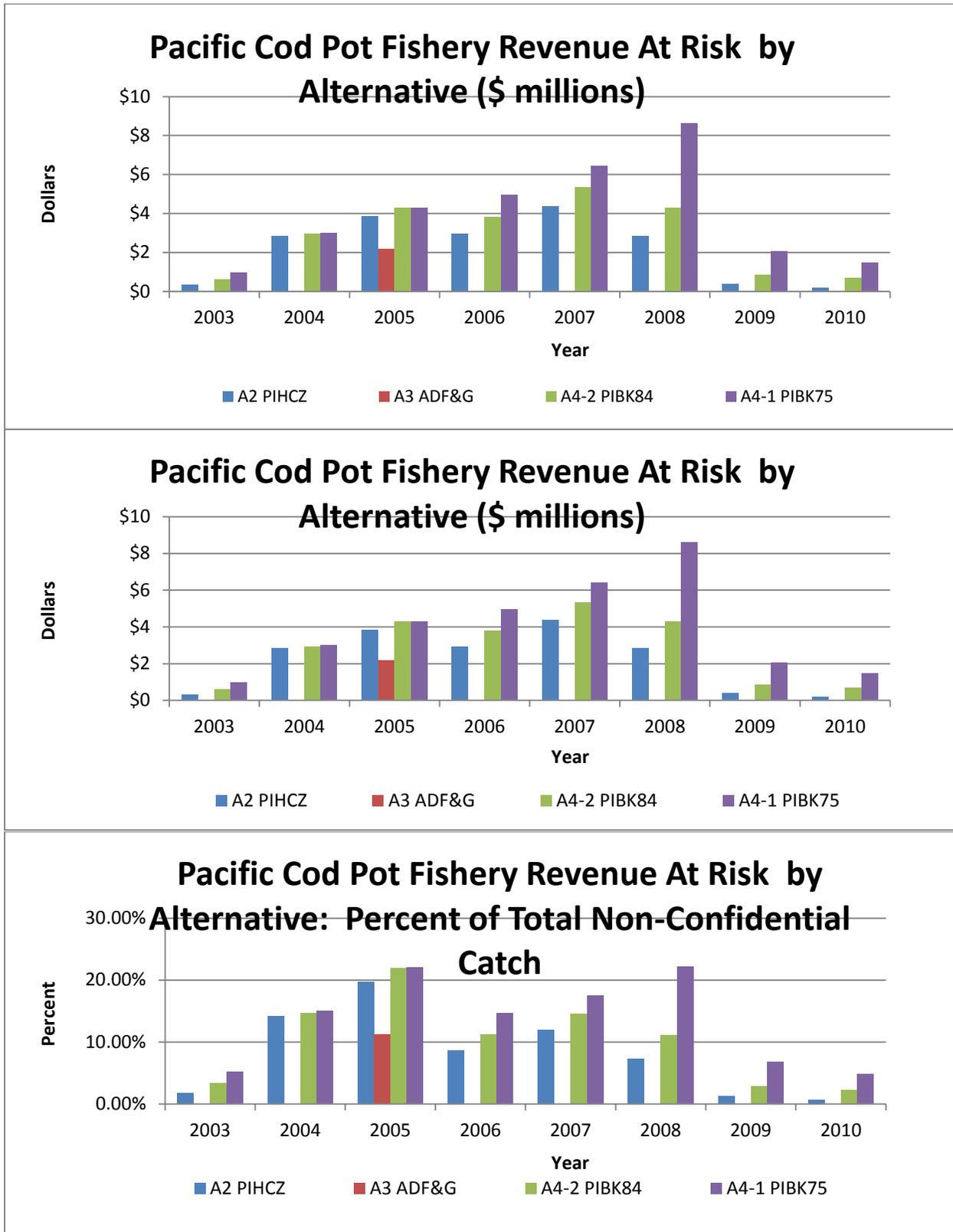


Table 1-28 through Table 1-30 provide a comparison of the potential impacts, in terms of metric tons and gross revenue at risk, of each of the proposed closure areas on all groundfish fisheries combined. In contrast to the Pacific cod pot fishery, the distribution of groundfish effort in the flatfish fisheries within the ADF&G area results in larger metric 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, metric 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 337 metric tons (Alt. 3, 2009) to more than 96,000 metric tons (Alt. 4-1, 2005). Gross revenue effects range from near zero to \$106 million, and the range of impacts in terms of percent of total gross revenue earned in the BSAI Pacific cod and flatfish fisheries is from 0.14 percent to approximately 29.5 percent (Alt. 4-1, 2005) of total fishery gross revenue. These values are also depicted graphically in Figure 6.

Table 1-28: All Fishery Impacts by Alternative: Metric tons at Risk

Alternative Area	Year							
	2003	2004	2005	2006	2007	2008	2009	2010
A2 PIHCZ	3,797	6,460	8,807	5,189	4,408	2,823	1,548	1,663
A3 ADF&G	3,857	834	6,256	2,083	6,413	7,964	337	381
A4-2 PIBK84	31,951	27,046	62,078	28,116	24,306	29,311	9,862	9,762
A4-1 PIBK75	49,067	51,582	96,299	59,452	63,817	40,369	31,738	50,576

Table 1-29: All Fishery Impacts by Alternative: Gross Revenue at Risk (\$ millions)

Alternative Area	Year							
	2003	2004	2005	2006	2007	2008	2009	2010
A2 PIHCZ	\$3	\$8	\$12	\$9	\$9	\$6	\$2	\$2
A3 ADF&G	\$3	\$1	\$8	\$4	\$8	\$7	\$0	\$1
A4-2 PIBK84	\$24	\$27	\$68	\$38	\$32	\$32	\$9	\$10
A4-1 PIBK75	\$37	\$52	\$106	\$78	\$74	\$51	\$28	\$52

Table 1-30: All Fishery Impacts by Alternative: Gross revenue at Risk as percent of Target Fishery Total Gross revenue.

Alternative Area	Year							
	2003	2004	2005	2006	2007	2008	2009	2010
A2 PIHCZ	2.88%	5.05%	6.77%	4.36%	4.45%	2.48%	1.17%	1.51%
A3 ADF&G	1.31%	0.33%	2.33%	0.94%	2.00%	1.57%	0.12%	0.16%
A4-2 PIBK84	10.88%	9.18%	19.38%	9.69%	8.29%	7.18%	2.57%	2.82%
A4-1 PIBK75	16.73%	17.41%	29.53%	19.55%	18.89%	11.36%	7.93%	16.05%

Figure 6 All Fisheries Combined, Effects of Alternatives

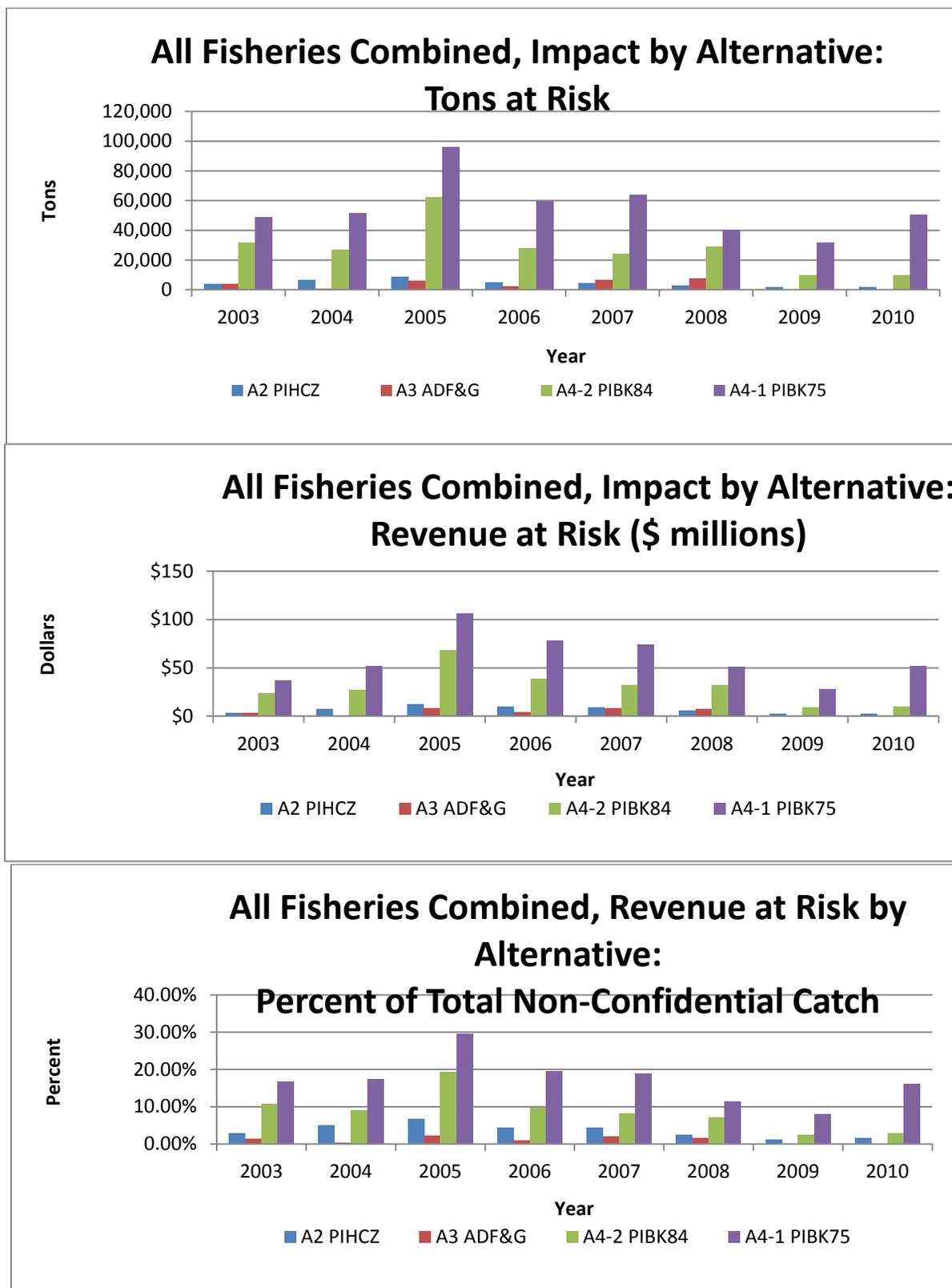


Table 1-31 through Table 1-33 and Figure 7 through Figure 9 provide comparisons of the effect of the various options of Alternative 5 triggered area closures on potentially affected fisheries. Unfortunately, all impacts associated with the flatfish fisheries are confidential and cannot be divulged. In 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 metric tons are put at risk, were a closure triggered in the largest stock distribution area (Alt. 5c). 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 metric 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 272 metric tons and 386 metric tons (658 metric tons in 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 gross revenue at risk, result in total potential impacts ranging from \$292,000 (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 gross 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 gross revenue in all areas. However, it is important to recognize that while these values are small, in percentage of overall target fishery gross revenue and aggregate total gross revenue, the potential impacts may be concentrated in a small number of operators.

Table 1-31: Alternative 5 Triggered Closure Fishery Impacts: Metric 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 7: Effects of Alternative 5 Triggered Closure Options; Metric tons at Risk

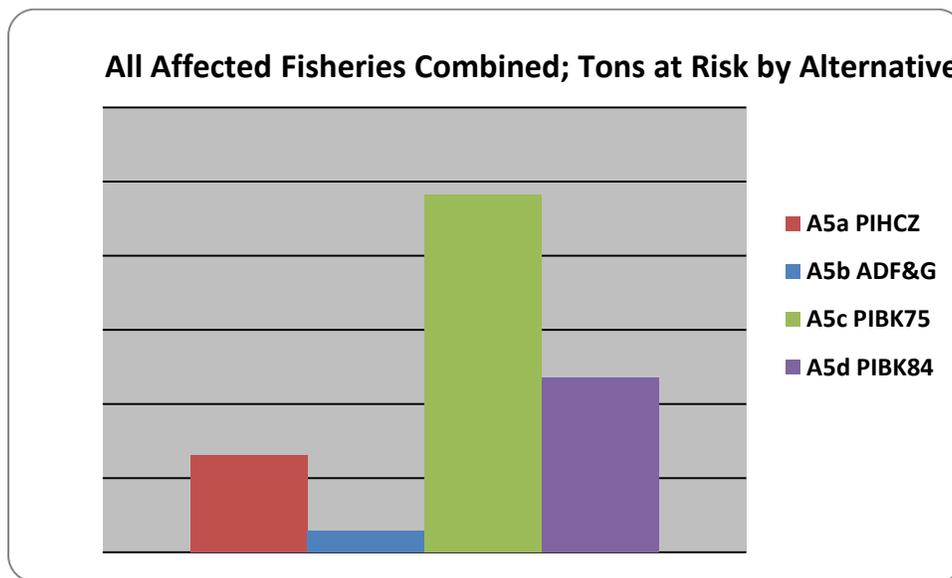


Table 1-32: Alternative 5 Triggered Closure Fishery Impacts: Gross Revenue at Risk (\$ millions)

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 8: Effects of Alternative 5 Triggered Closure Options; Gross Revenue at Risk

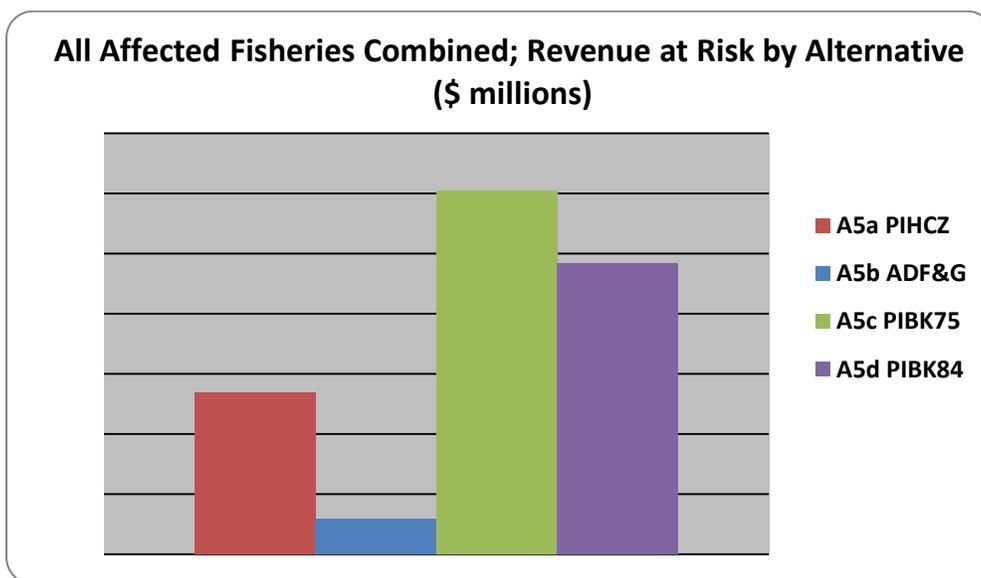


Table 1-33: Alternative 5 Triggered Closure Fishery Impacts: Gross Revenue at Risk as a Percent of Total Target Fishery Gross Revenue

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

Figure 9: Effects of Alternative 5 Triggered Closures; Percent of Total Target Fishery Gross Revenue

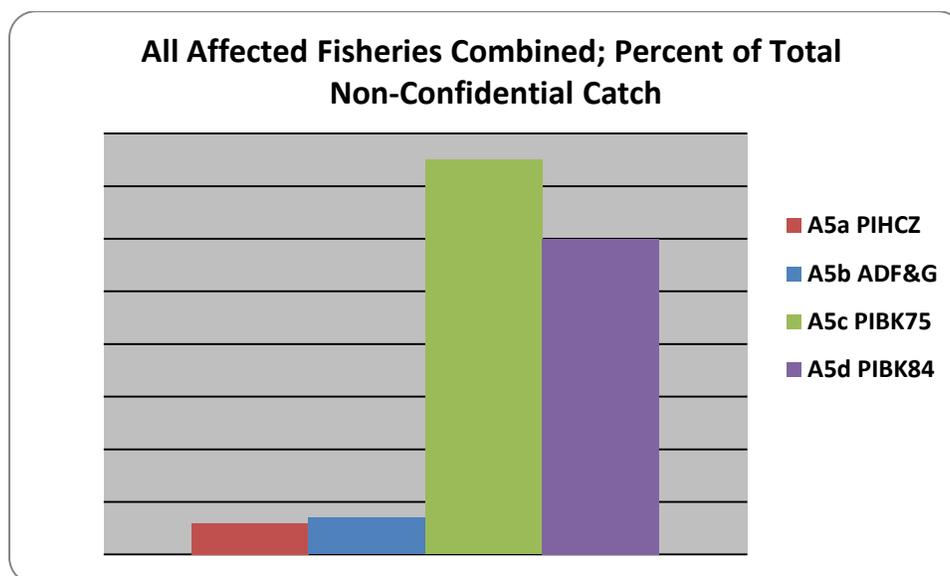


Figure 10, below, provides a graphical representation of the tonnage and gross revenue effects of threshold based triggered closure of the area associated with the revised PIBKC stock distribution from 1984 through 2009 (as defined in Alternative 5d option 4, and Alternative 6) in the weeks following triggering of the closure in affected fisheries. This information was previously discussed and is shown in Table 1-22 and Table 1-23.

Under the 20 percent apportionment threshold in the Pacific cod hook-and-line fishery closures would have been triggered in 2004, 2006, and 2009 on September 4th, 2nd, and 26th, respectively, with the 2009 triggered closure also applying to Alternative 6, option 2. These triggered closures would have, respectively, put 3,001 metric tons, 1,301 metric tons, and 482 metric tons at risk, with associated gross revenue at risk of \$3.5 million, \$2.3 million, and \$600,000, representing 2.7 percent, 1.3 percent, and 0.47 percent of annual gross revenue in each of those years. The impacts would have accrued to both the open access and CDQ Pacific Cod hook-and-line fisheries and to both CVs and CPs.

Under the 40 percent allocation threshold in the Pacific cod pot fishery, closures would have been triggered in 2005 and 2007 in the week ending February 12th and September 22nd, respectively, with both closures also applying under Alternative 6, option 2. These triggered closures would have, respectively, put 1,464 metric tons and 331 metric tons at risk, with associated gross revenue at risk of \$2 million and \$700,000, representing 10.46 percent and 1.84 percent of annual gross revenue. The impacts would have accrued in the open access Pacific cod pot fishery and to both CVs and CPs.

Under the 40 percent trawl allocation threshold in the yellowfin sole fishery, closures would have been triggered in 2004 and 2006 in the week ending August 7th and August 19th, respectively, and on June 19th under Alternative 6, option 2. However, the potential effects of these triggered closures in terms of catch and revenue at risk cannot be divulged due to confidentiality restrictions (fewer than 3 vessels).

Figure 10: Effects of Alternative 5d and 6: Triggered Closures

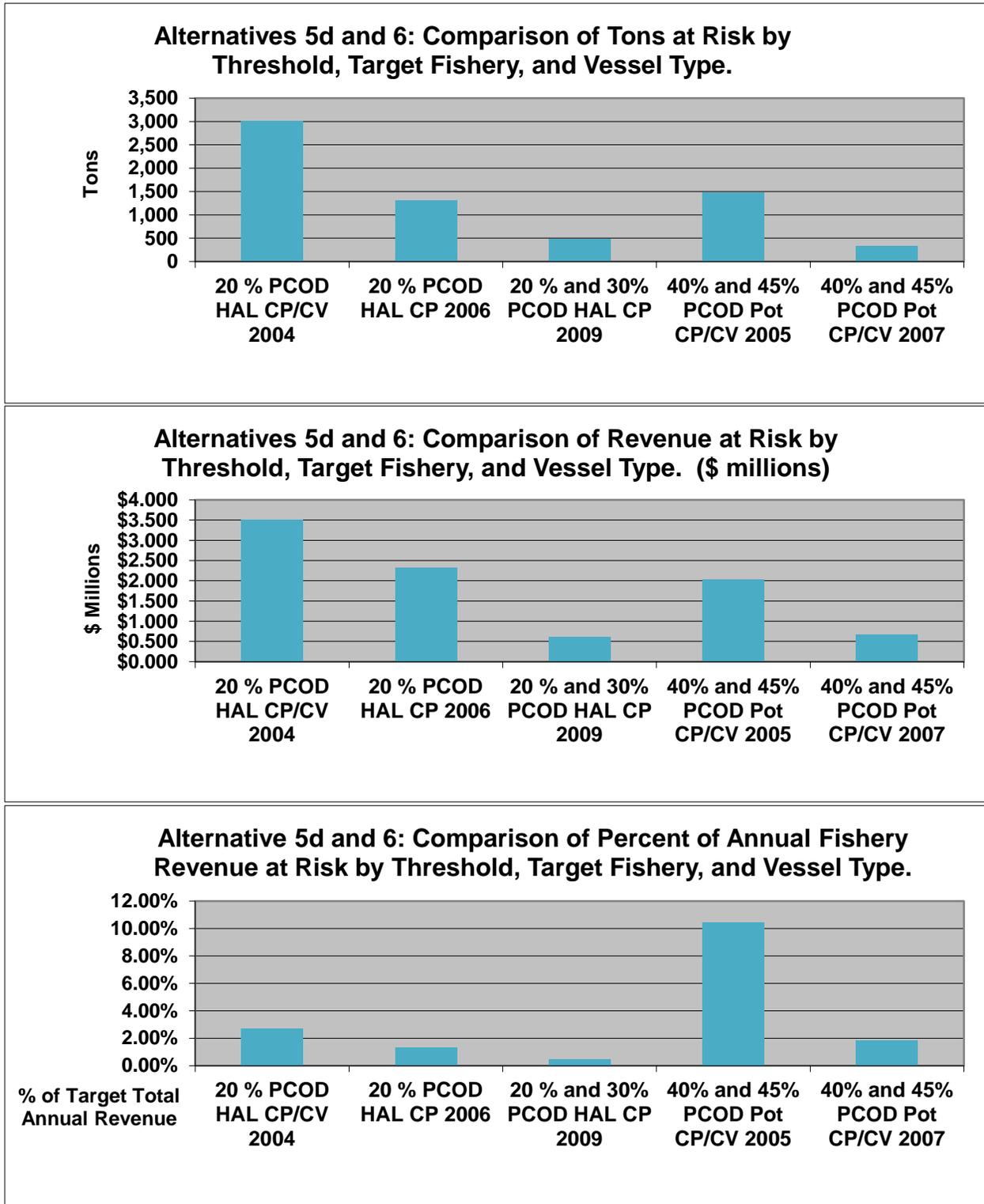
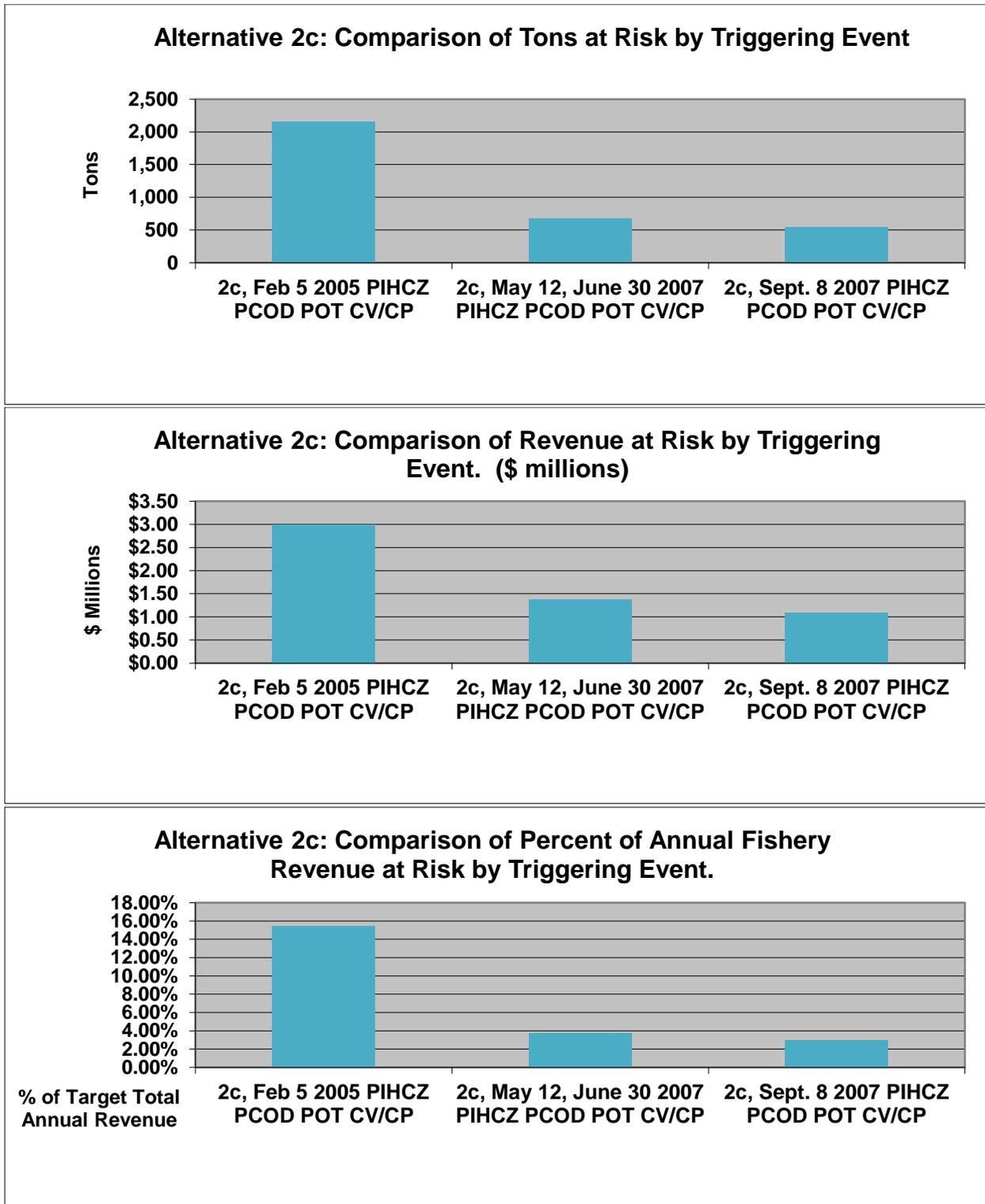


Figure 11, below, provides a graphical representation of the tonnage and gross revenue effects of threshold based triggered closure of the area associated with the PIHCZ under the PSC limit thresholds of Alternative 2c. This information was previously discussed and is shown in Table 1-5.

Under the 20 percent of PSC limit threshold, fishery closures would have been triggered in 2005 and 2007 on February 5th and May 12th, respectively. These triggered closures would have put 2,161 metric tons, and 677 metric tons at risk, with associated gross revenue at risk of \$3 million, and \$1.38 million, representing 15.44 percent, and 3.76 percent of annual gross revenue in 2005 and 2007, respectively. The impacts would have accrued to both the open access and CDQ Pacific Cod hook-and-line fisheries and to both CVs and CPs. The 2007 closure potential effects also apply to the 30 percent threshold trigger even though the triggering date occurs two weeks later, while the 50 percent threshold would have triggered a closure following September 8th of 2007. The potential effects of the 50 percent threshold triggered closure are 538 metric tons of catch at risk or just over \$1 million in gross revenue at risk, which represents approximately 3 percent of total annual target fishery gross revenue.

Figure 11: Effects of Alternative 2c: Triggered Closures



1.4.4 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 gross revenue, put at risk by the closure. The catch reprojection analysis attempts to identify where catch may be made up, at what comparative level of intensity, at what dispersion pattern relative to catch within the closure area. That analysis, as discussed above for each alternative has found that there are cases where wide dispersal of the catch reprojection may lead to increased operating costs due to the need to make additional sets, lifts, or tows, as well as increased searching behavior and running time. That analysis has not, however, found a case where it is clear that catch may actually be forgone, resulting in reduced landings at ports and reduced fish products available to markets and consumers. What is more likely is that operational cost increases, especially for food, bait, gear, and fuel, will result in increased vessel expenditures within fishing communities, thereby generating additional tax revenues.

This analysis suggests that 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) and under the triggered closures and/or threshold based triggered closures. The larger closure areas, based on historical stock distribution and catch reprojection analysis contained herein, would create potential impacts on catch and gross revenue of more than ten percent of total fishery gross revenue in several years, and nearly 30 percent in the worst case under examination here. Redeployment to recover small amounts of catch, while potentially increasing operating cost 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 gross 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 gross revenue at risk as the best available proxy. Nonetheless, the potential effects of each alternative on secondary operation will scale with the potential effects, in percent of gross revenue terms, on those fishing entities directly affected by the proposed action as analyzed herein.

1.4.5 Comport of the Preferred Alternative with the Problem Statement.

The Council chose Alternative 2b (closure of the Pribilof Islands Habitat Conservation Zone (PIHCZ) to Pot fishing for Pacific cod) as its preferred Alternative. As discussed in the accompanying Environmental Assessment (EA), the Pacific cod pot and hook and line sectors have historically had among the highest PIBKC Prohibited Species Catch (PSC) of all fleet components considered in this analysis.

Historically, catch of Pacific Cod with pot gear within the PIHCZ has been considerable. However, in more recent years Pacific cod pot sector harvests within the PIHCZ have declined considerably to about 125 tons with a value of about \$200,000, which represents less than one percent of Pacific cod pot fleet total revenue in 2010. The Pacific cod hook and line fleet has had similar harvest trends as the pot fleet. However, the hook and line fleet continues to annually harvest more than 1,500 tons with a value of \$2 million, or about 1.7 percent of fleet total revenue, from within the PIHCZ. Thus, impacts of the retrospective "revenue at risk" analysis, contained herein, appear to be minimal in more recent times for the pot sector as opposed to the hook and line sector.

Effort redeployment analysis for the Pacific cod pot sector suggests that, although catch locations after redeployment vary by year, there is a pattern of similar density of catch from year to year. In years where the catch that occurred inside the PIHCZ is concentrated in a small number of 7km x 7km grid squares, the reprojection tends to be similarly concentrated into a relatively small number of grid squares outside the PIHCZ. This pattern suggests that operational costs may not differ greatly under the preferred alternatives because the density of effort will be similar and will occur mostly in areas immediately adjacent to the PIHCZ boundary. Similarly, the reprojection does not suggest impacts to the Pribilof Islands economy from pushed the fleet away from Pribilof Islands and the fleet does not deliver product to Saint Paul because there is no groundfish processing capacity there at present.

In contrast to the redeployment results for the Pacific cod pot sector, the redeployment results for the hook and line sector tends to have the opposite result: concentrated catch inside the PIHCZ tends to reproject more broadly. The dispersed reprojection pattern suggests that the hook and line fleet may experience greater operating costs brought about by fishing a broader area than they fished inside the PIHCZ.

In choosing the preferred alternative, the council chose to augment the current bottom trawl closure of the PIHCZ with a closure to fishing for Pacific cod with pots. The additional closure comports with the Council's problem statement by further limiting PSC of PIBKC in the Pacific cod groundfish fishery. With this action, the council has closed the PIHCZ to two of the three bottom contact gear types used to fish groundfish in the Bering Sea. The hook and line sector was not closed from the PIHCZ at this time as this analysis suggests potential adverse economic impacts both in terms of "revenue at risk" and potentially higher operating costs due to the need to redeploy effort in a broader pattern of fishing than presently employed. Similarly, this analysis has shown considerably greater potential economic impacts from the larger closure areas. Lastly, it is important to note that the stock rebuilding model presented in the EA cannot differentiate among the closure alternatives. Thus, while additional limits on PIBKC PSC have been deemed necessary, the best available information on the potential for the stock to rebuild under the various alternatives does not justify extending restrictions to the hook and line fleet given the greater potential for adverse economic impact with little evidence of improved stock rebuilding potential.

2.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS

2.1 The Purpose of an IRFA

The Regulatory Flexibility Act (RFA), first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a Federal regulation. Major goals of the RFA are: (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require that agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and on the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action.

On March 29, 1996, President Clinton signed the Small Business Regulatory Enforcement Fairness Act. Among other things, the new law amended the RFA to allow judicial review of an agency's compliance with the RFA. The 1996 amendments also updated the requirements for a final regulatory flexibility analysis, including a description of the steps an agency must take to minimize the significant economic impact on small entities. Finally, the 1996 amendments expanded the authority of the Chief Counsel for Advocacy of the Small Business Administration (SBA) to file *amicus* briefs in court proceedings involving an agency's violation of the RFA.

In determining the scope, or 'universe', of the entities to be considered in an IRFA, NMFS generally includes only those entities that can reasonably be expected to be directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis. NMFS interprets the intent of the RFA to address negative economic impacts, not beneficial impacts, and thus such a focus exists in analyses that are designed to address RFA compliance.

Data on cost structure, affiliation, and operational procedures and strategies in the fishing sectors subject to the proposed regulatory action are insufficient, at present, to permit preparation of a "factual basis" upon which to certify that the preferred alternative does not have the potential to result in "significant adverse impacts on a substantial number of small entities" (as those terms are defined under RFA).

Because, based on all available information, it is not possible to 'certify' this outcome, should the proposed action be adopted, a formal IRFA has been prepared and is included in this package for Secretarial review.

2.2 What is required in an IRFA?

Under 5 U.S.C., Section 603(b) of the RFA, each IRFA is required to contain:

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- A description of the reasons why action by the agency is being considered;
 - A succinct statement of the objectives of, and the legal basis for, the proposed rule;
 - A description of and, where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate);
 - A description of the projected reporting, record keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
 - An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;
 - A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the proposed action, consistent with applicable statutes, and that would minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:
 1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
 2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
 3. The use of performance rather than design standards;
 4. An exemption from coverage of the rule, or any part thereof, for such small entities.

2.3 What is a small entity?

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) small government jurisdictions.

Small business. Section 601(3) of the RFA defines a ‘small business’ as having the same meaning as ‘small business concern’, which is defined under Section 3 of the Small Business Act. ‘Small business’ or ‘small business concern’ includes any firm that is independently owned and operated and not dominant in its field of operation. The SBA has further defined a “small business concern” as one “organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor... A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the firm is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture.”

The SBA has established size criteria for all major industry sectors in the United States, including fish harvesting and fish processing businesses. A business involved in finfish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of \$21.5 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 \$21.5 million criterion for fish harvesting operations. Finally, a wholesale business servicing the fishing industry is a small business if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established “principles of affiliation” to determine whether a business concern is “independently owned and operated.” In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern’s size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when, (1) a person is an affiliate of a concern if the person owns or controls, or has the power to control 50 percent or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) if two or more persons each owns, controls or has the power to control less than 50 percent of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors, or general partners, controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint ventures if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small organizations. The RFA defines “small organizations” as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

2.4 Reason for considering the action

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

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

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

The legal basis for this action is contained in section 304(e)(7) of the Magnuson-Stevens Act. Because the Secretary determined that the current rebuilding plan has not resulted in adequate progress toward rebuilding the stock, compliance with section 304(e)(7) requires that the Council prepare and implement an amended rebuilding plan by September 24, 2011. However, the revised rebuilding plan must comply with National Standard 9 in section 301 of the Magnuson-Stevens Act. Regulations implementing the National Standard Guidelines state that any conservation and management measure that does not give priority to bycatch avoidance “must be supported by appropriate analysis.” 50 C.F.R. 600.350(d). Further, analysis of management measures “including the status quo,” should consider the impact of minimizing bycatch and bycatch mortality. 50 C.F.R. 600.350(d)(2).

Under the FMPs for BSAI and GOA groundfish fisheries, explicit provisions are made in regulation differentiating fishery removals generally regarded as ‘bycatch’ from interceptions and removals of several specifically enumerated species of particular concern that have critical economic and/or cultural value. These species include Pacific salmon, Pacific halibut, several crab species, and Pacific herring. Interception of these “Prohibited Species” is to be avoided to the extent practicable, and any Prohibited Species Catch (PSC) must be either returned to the sea with the minimum injury, held for scientific sampling in compliance with genetic data collection regulations, or, in the case of salmon PSC, entered into a National Marine Fisheries Service approved “Prohibited Species Donation Program.” In any case, Prohibited Species Catch may not be retained for sale or personal use. PSC, as defined under these two FMPs, has distinctly different legal implications from “bycatch” and are identified as such.

In addition, the rebuilding plan must comply with all ten National Standards established in in Sec. 600.350 of the Magnuson-Stevens Act. The objective of this action is to facilitate compliance with requirements of the MSA to end and prevent overfishing, rebuild overfished stocks and achieve optimum yield.

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

The proposed action(s) being considered by the Council apply, depending on alternative, to those entities that participate in the directed Pacific cod and flatfish fisheries in the Bering Sea and may accrue to gear sectors using pot, hook-and-line, or trawl gear. The entities that participate in potentially directly regulated trawl fisheries are all affiliated under the RFA via their membership in Amendment 80 cooperatives (see http://www.fakr.noaa.gov/ram/daily/A80_coop_list.pdf) and, thus, are not identified here as potentially regulated small entities. Some vessels that target Pacific cod and/or flatfish using pot and/or hook-and-line gear report less than \$19 million in annual gross revenue and are, thus, considered to be small entities for RFA purposes. However, information on ownership affiliations in BSAI crab cooperatives and the BSAI Freezer-Longliner Cooperatives has been used to adjust the numbers of potentially directly regulated small entities, and the potential impacts on such small entities, in this analysis. Additionally, the six western

Alaska Community Development Quota (CDQ) organizations, that presently receive CDQ allocations of BS groundfish, are defined as small entities for RFA purposes.

In 2010 there were a total of 114 vessels potentially directly regulated by the proposed action, 80 in the hook-and-line gear sector and 34 in the pot gear sector that caught, or caught and processed, less than \$21.5 million in gross value in Bering Sea fisheries and are, thereby, considered small entities. (Based on data from Fissel, et.al. 2012, Tables 36 and 37, page 73 and 74). Of these small entities, 41 were catcher vessels and 39 were catcher processors in the hook-and-line gear sector, while 39 were catcher vessels and 4 were catcher processors in the pot gear sector. All of these small entities are potentially directly regulated by the proposed action although only a small fraction of these vessels actually harvested Pacific cod and/or flatfish from within the closure areas defined under each alternative.

2.7 Impacts on Regulated Small Entities

Each of the action alternatives has the potential to create impacts on directly regulated small entities. The full analysis of alternatives is presented in the RIR. Presented here is analysis of the potential effects of Alternative 2, Alternative 3, and Alternative 4, on directly regulated small entities. This is a subset of the analysis presented in the RIR in Table 1-25 through Table 1-27, and utilizes a specially created data set of small entity vessel identification numbers provided by the Alaska Fish Information Network.

In some cases small entity data is confidential and cannot be reported. For example, many of the estimates of impacts under the closure thresholds contained in Alternative 2, option c, Alternative 5, and Alternative 6 are confidential, even when large and small entities are combined, and very few of the potential closure impacts can be reported. In some cases, too few vessels of one class or too few in one management program were observed within the closure area. Thus, Catcher Processor and Catcher Vessel data is often aggregated as is open access and CDQ data. In all cases, these aggregations are identified in the impact tables. A review of the threshold analyses contained in the RIR revealed that small entity impacts do make up a portion of the overall impacts for these Alternatives. However, in all instances there were too few small entities to allow reporting of small entity effects.

Alternative 1, the status quo, includes a directed Pribilof Islands blue king crab fishery closure until the stock is completely rebuilt, and the closure to all trawl gear of the Pribilof Island Habitat Conservation Zone (PIHCZ). These measures, however, have failed to rebuild the PIBKC stock sufficiently thus necessitating a new rebuilding plan, including additional PIBKC protection measures, as required under the MSA.

Table 1-1 provides a comparison of potential small entity impacts, in terms of the percentage of catch and gross revenue at risk, of each of the proposed closure areas (Alt. 2, 3, and 4). These impacts are limited to pot and hook-and-line gear types in the Pacific Cod fisheries. As discussed above, trawl gear impacts do not accrue to directly regulated small entities due to cooperative affiliations, and all hook and line flatfish vessels were found to be large entities by affiliation as well. Under the Alternatives, the proportion of small entity catch occurring within the proposed closure area ranges from zero to 100 percent depending on year, gear type, and target species. Considerable annual variability is evident, with vessels moving in and out of the area, and potential impacts accrue to different small entity vessels from year to year. Recall also that all CDQ allocated is defined as small.

Table 1-1 also identifies the potential impacts, in terms of Revenue at Risk, of the alternatives on small entities in each of the potentially affected sectors. The potential impacts on small entities of the Preferred Alternative (2b) accrue in the Pacific cod pot gear sector and range from approximately zero (2010) to nearly \$2.8 million (2004). Alternative 2, options a and b combined, impacts on small entities range from \$335,747 (2010) to \$6.9 million (2005). These potential impacts will be mitigated through effort redistribution to adjacent areas that remain open to fishing.

The Pacific cod pot sector impacts in the ADF&G area of Alternative 3 are largely confidential. Thus, total impacts, under Alternative 3, are actually from the Pacific cod hook-and-line sector in all years except 2005. These Alternative 3 small entity impacts range from \$521,304 to approximately \$6.9 million, with the larger value coming in the 2005 year when approximately \$2 million in impacts accrued in the Pacific cod pot sector. Small entity impacts, under Alternative 4, option 1, ranged from \$1.7 million (2010) to \$36 million (2006) and represent the largest potential impacts of all of the alternatives. Small entity impacts, under Alternative 4, option 2, ranged from approximately \$580,502 (2010) to \$23 million (2005).

In recent years, many of the vessels identified in this analysis as having potential small entity impacts have become members of fishing cooperatives. Increased affiliation with the BSAI Freezer-Longline Cooperative, as well as various crab cooperatives, results in many vessels now being classified as large entities due to these affiliations. This analysis has incorporated cooperative affiliation information to adjust the numbers of potentially directly regulated small entities and, thereby, the estimate of revenue at risk specific to small entities. The result is evident in the declining small entity impact estimates in 2010, where estimated impacts are near zero for many alternatives with the exception of potential CDQ impacts which are, by definition, small regardless of the fact that the vessels that harvest for CDQ organizations are themselves now large via affiliations. Thus, with increased membership in cooperatives, nearly all of the potentially directly regulated vessels are presently classified as large entities and the potential effects of the proposed action on small entities appears to be de minimis.

Table 1-1: Potential Impacts on Small Entities: Percent of Catch and Revenue at risk, in dollars, 2003-2010, for Alternatives 2, 3, and 4.

Alternative 2: PIHCZ Area											
Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	100.00%	100.00%	65.75%	27.82%	50.33%	18.53%	95.38%	0.00%
Pacific Cod	CDQ	CP	H & L	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Pacific Cod	OA	CP + CV	H & L	100.00%	99.22%	82.36%	78.68%	53.87%	47.76%	54.97%	0.07%
Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	\$323,190	\$2,829,973	\$2,527,028	\$816,917	\$2,206,642	\$525,909	\$365,193	\$0
Pacific Cod	CDQ	CP	H & L	\$0	\$58,649	\$1,541,827	\$344,528	\$400,606	\$264,308	\$437,394	\$334,369
Pacific Cod	OA	CP + CV	H & L	\$2,820,548	\$4,645,519	\$5,632,896	\$4,710,887	\$2,252,508	\$1,273,764	\$613,052	\$1,379
Total				\$3,143,737	\$7,534,141	\$9,701,751	\$5,872,332	\$4,859,755	\$2,063,981	\$1,415,638	\$335,747

Alternative 3: ADF&G Area											
Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	c"	c"	90.34%	c"	c"	c"	c"	c"
Pacific Cod	CDQ + OA	CP + CV	Hook-and-line	100.00%	100.00%	99.95%	92.07%	82.48%	100.00%	97.10%	4.01%
Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	c"	c"	\$1,979,062	c"	c"	c"	c"	c"
Pacific Cod	CDQ + OA	CP + CV	H & L	\$939,437	\$921,583	\$4,938,878	\$3,666,869	\$3,727,847	\$1,068,280	\$402,119	\$521,304
Total				\$939,437	\$921,583	\$6,917,940	\$3,666,869	\$3,727,847	\$1,068,280	\$402,119	\$521,304

Alternative 4, Option 1: 1975-2009 Distribution Area

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	100.00%	80.62%	67.07%	11.99%	46.54%	35.67%	27.16%	0.42%
Pacific Cod	CDQ	CP	H & L	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Pacific Cod	OA	CP + CV	H & L	96.44%	92.92%	87.44%	92.34%	62.67%	79.88%	86.86%	1.28%
Flatfish	OA	CP + CV	H & L	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	\$954,341	\$2,424,807	\$2,875,244	\$596,093	\$2,987,862	\$3,070,810	\$556,500	\$6,159
Pacific Cod	CDQ + OA	CP + CV	H & L	\$0	\$1,328,518	\$2,894,600	\$1,617,926	\$1,726,444	\$1,011,539	\$1,477,563	\$1,349,548
Pacific Cod	OA	CP + CV	H & L	\$15,006,969	\$23,523,964	\$26,182,648	\$33,822,688	\$14,471,970	\$16,786,975	\$8,763,068	\$328,210
Total				\$15,961,310	\$27,277,289	\$31,952,492	\$36,036,708	\$19,186,276	\$20,869,324	\$10,797,131	\$1,683,918

Alternative 4, Option 2: 1984-2009 Distribution Area

Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	100.00%	80.73%	66.82%	25.46%	46.18%	20.42%	44.60%	0.00%
Pacific Cod	CDQ	CP	H & L	100%	100%	100%	100%	100%	100%	100%	100%
Pacific Cod	OA	CP + CV	H & L	96.89%	95.99%	99.53%	95.20%	69.65%	83.50%	96.97%	0.16%
Target Species	Mgmt.	Vessel Type	Gear Type	Year							
				2003	2004	2005	2006	2007	2008	2009	2010
Pacific Cod	OA	CP + CV	Pot	\$608,674	\$2,373,246	\$2,857,775	\$969,443	\$2,463,208	\$878,585	\$379,571	\$0
Pacific Cod	CDQ	CP	H & L	\$0	\$285,313	\$2,082,373	\$992,247	\$773,845	\$607,333	\$819,075	\$572,236
Pacific Cod	OA	CP + CV	H & L	\$7,284,975	\$11,021,931	\$18,360,622	\$17,697,261	\$8,964,854	\$7,711,904	\$3,054,671	\$6,256
Total				\$7,895,651	\$13,682,494	\$23,302,775	\$19,660,958	\$12,203,914	\$9,199,829	\$4,255,325	\$580,502

2.8 Recordkeeping and reporting requirements

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

2.9 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.

2.10 Description of significant alternatives to the proposed action

The potential impacts of the alternatives on directly regulated small entities are treated in section 2.7, above. Note, however, that impacts of the threshold based triggered closures of Alternatives 2c, 5, and 6, cannot be divulged due to confidentiality restrictions. All of the alternatives considered in this analysis, including those that are confidential, have potential impacts, in terms of “Revenue at Risk,” on directly regulated small entities. Further, the development of the alternative set was focused on establishing closure areas that encompass some portion of the known stock distribution of Pribilof Islands king crab. Thus, none of the alternatives, including the preferred alternative, contain specific provisions to minimize small entity impacts. The alternatives were designed to evaluate the potential to rebuild the PIBCK stock, as required under the MSA, via minimizing PIBKC PSC in fisheries that historically have had the highest PSC amounts, regardless of whether small entities would be adversely affected.

The suite of potential actions includes six alternatives with components and options for closures in the Bering Sea to minimize the bycatch/PSC of PIBKC and reduce the risk of overfishing.

The Council’s preferred alternative, Alternative 2b, was selected as the action alternative. Alternative 2b would close year round the PIHCZ to directed fishing for Pacific cod with pot gear to reduce the risk of overfishing of PIBKC and minimize bycatch of PIBKC in groundfish fisheries. Alternative 2b would further reduce PIBKC bycatch mortality in groundfish fisheries, enhancing the likelihood of a successful rebuilding effort.

Alternative 1 is the status quo or no action alternative, which would not change the closure to all trawl gear in the PIHCZ. This alternative does not meet the goals and objectives of the action to minimize bycatch of PIBKC, and would not provide further protection to PIBKC from the potential effects of the groundfish fisheries.

Alternatives 2 through 6 would retain all of the current protection measures in place for the PIBKC stock and apply additional measures. These alternatives would establish closure areas for specific groundfish fisheries that are described in the following paragraphs for each alternative.

Alternative 2 included three specific methods for closing the PIHCZ to directed fishing for a variety of groundfish fisheries. Alternative 2a would close the PIHCZ on an annual basis to groundfish fisheries that met a threshold of PIBKC bycatch from 2003 to 2010 that is greater than 5 percent or greater than 10 percent of the ABC of PIBKC.

There were no fisheries that met the 10-percent threshold, as the rock sole fishery, which met this threshold, was removed from consideration as all observed catch occurred outside of the defined Pribilof District (see Figure 2-4 in the EA for Pribilof District boundaries). Fisheries that met the 5-percent threshold are the Pacific cod hook-and-line fishery, Pacific cod pot fishery, yellowfin sole trawl fishery, and other flatfish trawl fishery. Alternative 2b, the preferred alternative proposed to be implemented by this action, would close the PIHCZ year round to Pacific cod pot fishing. Alternative 2c would close the PIHCZ to directed fishing for Pacific cod by vessels using pot gear if the total PIBKC bycatch in all groundfish fisheries in the BSAI reached 20 percent, 30 percent, or 50 percent of the overall trigger closure cap of 75 percent of the ABC. Alternative 2c would also require vessels directed fishing for Pacific cod with pot gear in the PIHCZ to maintain 100 percent observer coverage. Alternatives 2a and 2c would have a greater impact on small entities than Alternative 2b because more vessels would be subject to potential closures in the PIHCZ. Alternative 2c would also increase the potential costs on small entities by increasing observer coverage requirements for these vessels.

Alternative 3 would close the existing ADF&G crab closure area between 168° and 170° West longitude, and between 57° and 58° North latitude to additional fishing effort, in addition to the status quo groundfish trawl closure. Under Alternative 3, Option 3a, this closure would apply to all groundfish fisheries that have contributed greater than a designated threshold to bycatch of PIBKC since 2003. The closure to a fishery would be based on bycatch of PIBKC in that fishery between 2003 and 2010 meeting either a threshold of greater than 5 percent of ABC or greater than 10 percent of ABC. Under the 5 percent criteria threshold, the closure would apply to the following fisheries: yellowfin sole trawl, other flatfish trawl, Pacific cod pot, and Pacific cod hook-and-line. None of the fisheries met the 10 percent threshold. Alternative 3b would close the area to directed fishing for Pacific cod only. Alternative 3a would have a greater impact on small entities than Alternative 3b because more vessels would be subject to potential closures in the PIHCZ. While Alternative 3b could potentially have less of an impact on small entities than the other alternatives (data is confidential for all years except 2005), the Alternative 3 closure boundaries exclude southern parts of the PIHCZ where PIBKC bycatch by Pacific cod pot fishing has occurred (see Figure 5-25 in the EA).

Alternative 4 would establish a closure throughout the range of the PIBKC based on either the distribution of the PIBKC stock aggregated from 1975 to 2009 or from 1984 to 2009. This range of data represented recent trends of the known distribution of PIBKC based on current stock survey methodologies and is greater than the area closure in the PIHCZ and the ADF&G closures defined under Alternative 3. Alternatives 4a and 4b would establish closures consistent with the same criteria established for Alternatives 2a and 2b, and 3a and 3b, respectively. Alternative 4 would have a greater impact on small entities due to the greater size of the closure.

Alternative 5 would establish a PSC limit equal to either the overfishing limit (OFL), the ABC, or a proportion of the ABC for the PIBKC stock. All bycatch of the PIBKC in all groundfish fisheries would accrue toward this PSC limit, and those

groundfish fisheries that contributed to greater than a designated threshold of PIBKC bycatch since 2003 would be closed once the fishery-wide PSC limit was reached.

Alternative 5 would have four closure area options: Options 5a, 5b, 5c, and 5d, which correspond to the closure areas defined under Alternatives 1, 3, and 4 (1975 to 2009 PIBKC stock distribution and 1984 to 2009 PIBKC stock distribution), respectively. Under each of these options, the closure would be triggered by attainment of a fishery-wide PIBKC PSC limit set at the following options: PSC limit equal to the OFL, PSC limit equal to the ABC, PSC limit equal to 90 percent of the ABC, or PSC limit equal to 75 percent of the ABC. Under Option 5d, under the PSC limit equal to 90 percent of the ABC and the PSC limit equal to 75 percent of the ABC, there would be an additional option for allocation of the PSC limit by gear type: 40 percent trawl gear, 40 percent pot gear, and 20 percent hook-and-line gear.

Alternative 6 would have two components: 1) establish a year-round closure of the PIHCZ to directed fishing for Pacific cod using pot gear, and 2) establish a triggered closure of the area representing the distribution of the PIBKC stock from 1984 to 2009. The PSC limit associated with the triggered closure would be established as a fishery-wide level at 75 percent of the ABC. The PSC limit would be set either in the numbers of crab based on the average weight in the previous season or in numbers of crab based on a rolling 5-year average weight. The PSC limit would be further allocated to sectors either by gear type or to all groundfish fisheries in the aggregate by seasons. In addition, each of the alternatives included options to increase observer coverage that could be applied to all fisheries or a specific fishery.

The Council ultimately did not consider trigger cap closures (Alternatives 2c, 5, and 6) viable alternatives due to uncertainty in appropriate definition of the stock area and the resulting current limitations in the methodology for estimating mortality of PIBKC relative to the stock distribution (see discussion in Section 5.2.2 of the EA). These alternatives would not have a measurable impact that would minimize the bycatch of PIBKC. These alternatives would not reduce the risk of overfishing consistent with the goals and objectives of this action.

None of the viable alternatives (Alternative 2a, Alternatives 3a and 3b, and Alternatives 4a and 4b), could potentially have less of an impact on fisheries than the Council's recommended alternative, 2b. Table 1-34 provides a comparison of the potential impacts on directly regulated small entities, in terms of gross revenue at risk, under each of the alternatives. Based on the best available scientific data and information, there are no alternatives to the proposed action that have the potential to accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that have the potential to minimize any significant adverse economic impact of the proposed rule on directly regulated small entities.

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