

**Elements of the Reasonable and Prudent Alternative (RPA)  
Contained in the November 2000 Biological Opinion  
A Summary of Measures, Impacts, and Concerns**

**Background**

The NMFS Hypothesis: "At present, the leading hypothesis to explain the *continued* decline of the western population of Steller sea lions is primarily the nutritional stress of juveniles and to a lesser extent adult females (Merrick et al. 1987, Pitcher et al. 1998, Rosen et al. 2000a, Alaska Sea Grant 1993). Such nutritional stress indicates decreased foraging success, potentially as a consequence of environmentally-driven changes in prey availability, but also as a consequence of competition with the BSAI and GOA commercial groundfish fisheries. As described earlier in this chapter, the groundfish fisheries reduce prey availability on several scales, resulting in range-wide, regional, and local depletion of prey. Fishing activity may also preclude some sea lions from certain important foraging areas simply by disturbance, or the presence of fishing vessels, gear, and activity. Since sea lions and the fisheries may well target the same aggregations of prey, such interference may reduce foraging success even in when local prey are relatively abundant." p. 251.

Endangered Species Act Requirements: "Section 7(a)(2) of the ESA requires that each Federal agency shall insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species." The term "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species". The term "destruction or adverse modification" means "a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical". p. 13.

Biological Opinion Conclusion: "After analyzing the cumulative, direct and indirect effects of the Alaska groundfish fisheries on listed species, NMFS concludes that the fisheries do not jeopardize any listed species other than Steller sea lions. The biological opinion concludes that the fisheries do jeopardize Steller sea lions and adversely modify their critical habitat due to competition for prey and modification of their prey field. The three main species with which Steller sea lions compete for prey are pollock, Pacific cod, and Atka mackerel. The biological opinion provides an reasonable and prudent alternative to modify the fisheries in a way that avoids jeopardy and adverse modification." p. 12.

Approach of the RPA: "As noted earlier, the approach recommended in this Biological Opinion is reasonably designed to avoid jeopardy and adverse modification of critical habitat. The overall approach of the RPA involves the following strategy: (1) protect a substantial number of the rookeries and haulouts used by Steller sea lions and the marine environment immediately offshore of these areas from disturbance associated with commercial fishing for the three primary prey species (i.e., pollock, Atka mackerel, and Pacific cod), (2) protect a substantial portion of critical habitat from the effects of commercial fishing on the three primary prey species, (3) ensure that adequate forage resources are available to support a sustained population of Steller sea lions in excess of 34,600 animals, and (4) in areas where fishing is allowed, ensure that fishing does not create areas where Steller sea lions are not able to successfully forage." p. 293.

## Table of Contents

---

Global Control Rule .....	1
Closure Areas .....	2
Spatial Distribution .....	3
Temporal Distribution .....	4
Monitoring Program .....	6

---

### Acronyms and Definitions

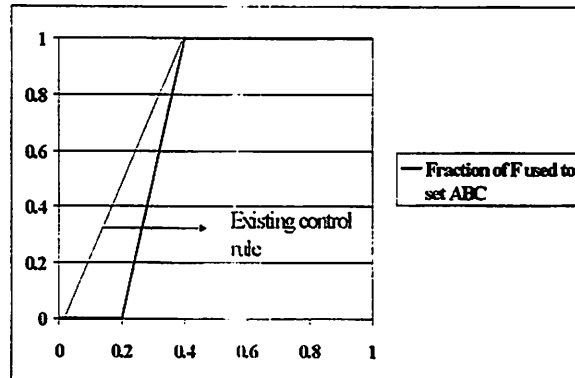
ABC	= acceptable biological catch
AI	= Aleutian Islands
BiOp	= Biological Opinion
BSAI	= Bering Sea and Aleutian Islands
BS	= Bering Sea
CH	= critical habitat
EBS	= Eastern Bering Sea
EEZ	= exclusive economic zone
ESA	= Endangered Species Act
F	= instantaneous fishing mortality rate
FMP	= fishery management plan
GOA	= Gulf of Alaska
MSY	= maximum sustainable yield
mt	= metric tons
NMFS	= National Marine Fisheries Service
RFRPA	= Revised Final RPAs (10/15/99)
RPA	= Reasonable and Prudent Alternative
SCAA	= Sea Lion Conservation Area
SSC	= Scientific and Statistical Committee
TAC	= total allowable catch

## Global Control Rule

**Objective:** The objective is to reduce exploitation rates when prey (pollock, cod, mackerel) is in low abundance.

**RPA Description:** The current control rule used to determine the allowable biological catch (ABC) for pollock, Pacific cod, and Atka mackerel in the BSAI and GOA will be revised to take into account the prey requirements of Steller sea lions. This will result in a more conservative catch amount (i.e., reduced fishing mortality rate) when the spawning biomass is estimated to be less than 40% of the projected unfished biomass. There would be no directed fishing for a species when the spawning biomass is estimated to be less than 20% of the projected unfished biomass. This measure changes current practice by adjusting the  $F_{40\%}$  and  $F_{OFL}$  rates if the spawning biomass ( $B$ ) is projected to be below 40% of the unfished biomass ( $B_{40\%}$ ) in the following year. It would apply to stocks in this range in Tier 3b. Currently, adjustments to  $F_{40\%}$  and  $F_{OFL}$  rates for stocks in Tier 3b are made using the following equations, where  $\alpha=0.05$ :  $F_{OFL} = F_{30\%} \times (B/B_{40\%} - \alpha)/(1-\alpha)$ ;  $F_{40\%} \text{ (adjusted)} = F_{40\%} \times (B/B_{40\%} - \alpha)/(1-\alpha)$ .

Under this current control rule, the reduction in  $F$  below  $F_{40\%}$  is linear depending on how far the stock is below  $B_{40\%}$ . Using an  $\alpha=0.05$  means that fishing mortality rates are 0, i.e., no fishing, when the stock reaches 5% of  $B_{40\%}$ , or 2% of its equilibrium unfished level. Under the control rule contained in the RPA,  $\alpha$  will be increased from 0.05 to 0.5 for the pollock, Atka mackerel, and Pacific cod fisheries in the EBS, GOA, and AI. When the spawning biomass falls below 40% of the unfished biomass ( $B < B_{40\%}$ ) for any of these stocks,  $F$  will decline faster under this control rule than under the existing management regime to buffer the effects of natural variability in stock abundance. Furthermore, directed fishing for pollock, Pacific cod and Atka mackerel would cease if their spawning biomass fell to 20% or below of equilibrium unfished levels, or 50% of  $B_{40\%}$ .



**RPA Impacts:** The effect of using the global control rule is increased likelihood that the stock is maintained at or above the target stock size by reducing the exploitation rate at low stock sizes thereby insuring a more stable source of available prey for Steller sea lions. In 2001, three stocks are projected to be below  $B_{40\%}$  in 2001: GOA pollock, BSAI Pacific cod, and AI Atka mackerel. The GOA pollock ABC using the current tier 3B adjustment would have been 105,810 mt, but using the global control rule reduces the maximum ABC by almost 19,000 mt to 86,922 mt. Similarly, the maximum BSAI Pacific cod ABC using the current tier 3B adjustment would have been 213,800 mt but using the global control rule reduces the maximum ABC by about 9,200 mt. The BSAI Plan Team, however, recommended a further reduction to 188,000 mt to account for uncertainty. The BSAI Atka mackerel maximum ABC would have been 99,165 mt, but the global control rule reduces the maximum ABC to 97,250 mt. The BSAI Plan Team further reduced this amount to 59,000 mt to account for uncertainty. The remaining stocks (EBS pollock, AI pollock and GOA Pacific cod) are all projected to be above  $B_{40\%}$  in 2001 and would thus require no  $F$  adjustment under the global control rule. Consequently, using the global control rule will, on average, maintain larger populations of pollock, Atka mackerel, and Pacific cod in the ecosystem as Steller sea lion prey.

**Industry and Scientific Concerns:** The existing control rule is already conservative in that it provides for reduced exploitation rates at low stock sizes. Applying an ad hoc adjustment to three species is inconsistent with current overfishing definitions. "The SSC strongly believes that NMFS should not alter the definition of ABCs contained in the FMPs, as it has proposed in its modified control rule. The Councils ABCs are based on solid scientific information and theory and provide a scientifically defensible and credible baseline from which alternative strategies can be evaluated. Rather, the NMFS adjustment should be viewed as a TAC adjustment to account for uncertainty about Steller sea lions and social concerns about the ecosystem. If and when a solid scientific basis can be found for adjusting catch levels to provide ecosystem protections, then the adjustment can be made at the ABC level." (SSC minutes 12/00)

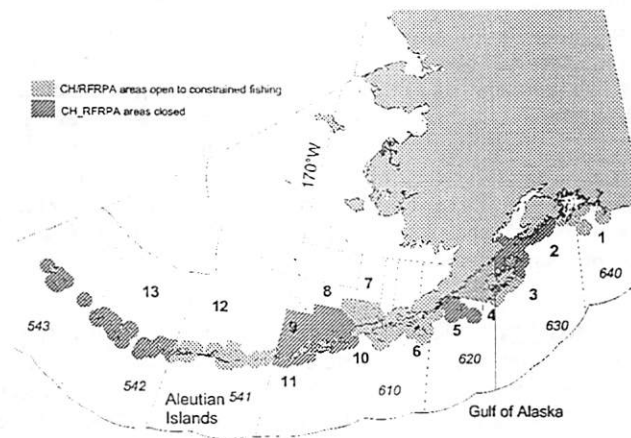
**Effects of Senator Stevens rider:** The global control rule, as discussed in the RPA, was to take effect immediately in the fisheries (subsection (c)(5)). However, paragraph 5 modifies the global control rule during 2001 to limit any reduction to not more than ten percent of the TAC of any fisheries. Based on this, the GOA pollock TAC will be 95,319 mt.

## Closure Areas

**Objective:** The objective of closure areas is to eliminate the possibility for competition within these areas.

**RPA Description:** Closed areas can be divided into three types. The first form of closure areas will be a continuation of the current 3 nm no-entry zones around rookeries specified as critical habitat in 50 CFR part 223. The second form of closures will be comprised of 3 nm no fishing zones around major haulouts identified as critical habitat in 50 CFR part 226 or identified as important to the foraging needs of Steller sea lions in the 1998 Biological Opinion for the BSAI and GOA and in the RFRPAs for the pollock fishery (closures applicable to all federally permitted groundfish fishery vessels). The areas identified as important to the foraging needs of Steller Sea lions were determined from information gathered during surveys since 1979 and included the following criteria: (1) summer haulouts with more than 200 sea lions in a summer survey, and less than 75 sea lions in winter surveys (Summer haulouts); (2) winter haulouts with less than 200 sea lions in summer surveys, and greater than 75 sea lions in a winter survey (Winter haulouts); and (3) year-round haulouts with more than 200 sea lions in a summer survey, and 75 sea lions in a winter survey. These two forms of closure areas are provided with the greatest protection, consistent with the hierarchy of protection established in this, as well as previous, biological opinions, and the importance of areas around rookeries and haulouts to the foraging needs of Steller sea lions.

The third form of closure is a system of closed CH-RFRPA zones which eliminates the possibility for competition between pollock, Pacific cod, and Atka mackerel fisheries and Steller sea lions within those areas. These include : 1) Areas around all rookeries and haulouts sites out to 20 nm that are listed in 50 CFR part 226 as critical habitat, 2) Areas around haulout sites out to 20 nm, as identified in the 1998 Biological Opinion for the BSAI and GOA pollock fishery, and 3) Critical habitat pelagic foraging areas of the Shelikof Strait in the GOA, Seguam Pass in the AI, and the Sea Lion Conservation Area (SCA). The SCA is located in the EBS and is an expansion of the Bogoslof Foraging Area to include specified areas outside of critical habitat specified at 50 CFR part 226. The inclusion of areas outside of designated critical habitat prevents the potential for edge-effect depletions caused by concentrated fishing in small open areas bounded by critical habitat.



The entire area included within the CH-RFRPA zone will then be subdivided into 13 management zones. Some of these zones will be closed to all fishing for pollock, Pacific cod, and Atka mackerel, while other areas will be open for fishing provided that additional temporal measures are implemented to minimize competition with Steller sea lions. In all, approximately 66% of the total area will be closed year-round to directed fishing for pollock, Pacific cod, and Atka mackerel. The closure areas encompass the locations where 74% of the pups and 56% of the non-pups are found.

**Industry and Scientific Concerns:** Industry has expressed two main concerns. First is that small vessels will need to travel further from shore to catch fish, thereby taking more risks in bad weather. The Coast Guard also raised these safety concerns. The second main concern is that the TACs will not be taken. The Atka mackerel catch will be reduced to only about 10% of its historic level due to the closure of the central and western AI. Pacific cod, being schooled up in the winter prior to spawning, cannot be caught economically during other times of the year. The pollock quotas in the GOA may go relatively unharvested, because fishermen were unable to find fish outside of CH during some seasons. As a consequence, fishermen and fishing communities will suffer. There has also been concern expressed about how the haulout areas were designated, in that in any survey since 1979, if a site met the criteria only once, it was designated.

**Effects of Senator Stevens budget rider:** This element may be implemented in 2002, and the Council (and NMFS) may consider implementing all or part of this element for 2001 fisheries.

---

## Spatial Distribution

**Objective:** The objective is to disperse catch over a wider area so as to avoid localized depletion in critical habitat areas.

**RPA Description:** Seasonal harvest limits for pollock, Atka mackerel, and Pacific cod will be established for those areas of critical habitat open for fishing, based on the projected biomass in that geographic area by season. Any TAC amount available inside critical habitat can be taken outside of critical habitat during the concurrent season outside.

The annual TACs will be apportioned to NMFS management areas according to the status-quo method based on estimates of the seasonal distribution of biomass. Additionally, a harvest limit would be imposed on fishing in the combined CH-RFRPA area based on the proportion of biomass estimated to be in critical habitat open to fishing to the total biomass in the overall management area (NMFS 2000). This methodology ensures that the harvest rate in critical habitat will not be greater than the global rate as determined by the global control rule.

The determination of the fraction of biomass inside critical habitat should be based on the best available information for the distribution of pollock, Pacific cod, and Atka mackerel. The proportion of TAC to assign to the open portions of critical habitat was determined by using average (1998-99) catch in open areas as a percentage of all the combined zones (1-13) by species, season and management area (NMFS 2000). The catch distribution in 1998-99 was assumed to best reflect the biomass distribution. This method would be best replaced by a comprehensive survey program that performed surveys and estimated biomass in the winter as well as summer for all 3 species.

Further, a portion of the AI will be opened to pollock fishing that was previously closed under earlier biological opinions and the Pacific cod TAC will be split from a combined BSAI TAC to separate TACs for the EBS and the AI based on the distribution of the stock.

**Industry and Scientific Concerns:** The fleet will be forced to fish outside of critical habitat. This will cause added operating expenses, reduced safety, and possibly reduced catches if fish cannot be located in open areas. The industry has also expressed concerns that the RPA will result in higher bycatch, gear conflicts, and the undoing of many years of careful, scientifically based fishery management measures.

**Effects of Senator Stevens budget rider:** This element may be implemented in 2002, and the Council (and NMFS) may consider implementing all or part of this element for 2001 fisheries.

## Temporal Distribution

**Objective:** The objective is to spread out harvest over time to prevent localized depletion of prey, particularly during the winter period.

**RPA Description:** Fishing for pollock, Pacific cod and Atka mackerel inside critical habitat will be prohibited from November 1 through January 20. Additionally, the current trawl closure from November 1 through January 20 will be continued for all areas. Outside of critical habitat, NMFS will establish 2 evenly spaced seasons for all 3 fisheries in the EBS, GOA, and AI. An amount of the annual TAC would be apportioned to each season based on the approach used in the 1998 Biological Opinion so that 40% of the annual TAC is available in the winter season (A/B seasons) and 60% would be available in the fall season (C/D seasons). Inside critical habitat, four seasons will be established for the open CH-RFRPA zones to ensure against high removal rates and possible localized depletions of prey in the most important area for Steller sea lions. This measure will evenly subdivide the combined winter allocation of 40% to the A and B seasons (20% each to the A and B season inside CH), and the combined fall allocation of 60% to the C and D seasons (30% each to the C and D season inside CH). This inside critical habitat percentage (critical habitat was used as a proxy for the entire CH-RFRPA area) would then be multiplied by the ratio of biomass inside to biomass outside of the critical habitat area to derive the seasonal apportionment.

**RPA Impacts:** The following table is a brief overview of the temporal fishing pattern required by the RPA. Season dates and percentage of the annual TAC apportioned to each season are fixed. However the catch limit in critical habitat will be a frameworked RPA so that the appropriate limits can be set based on the most recent survey biomass estimates.

Area	Seasons			
	A	B	C	D
EBS, AI, or GOA	Combined A/B season January 20 - June 10 40% of annual TAC		Combined C/D season June 11 - October 31 60% of annual TAC	
CH-RFRPA	A season Jan. 20 - Mar. 31 catch limit*	B season Apr. 1 - Jun. 10 catch limit*	C season Jun. 11 - Aug. 21 catch limit*	D season Aug. 22 - Oct. 31 catch limit*

The table on the next page lists the catch limits for each species based on Council's recommended 2001 specifications.

**Industry and Scientific Concerns:** Industry has expressed concern that Pacific cod, being schooled up in the winter prior to spawning, cannot be caught economically during other times of the year. There are also concerns about allocative issues, as well as causing the cost of the harvest to increase operationally while causing a high likelihood of decreasing its value.

**Effects of Senator Stevens budget rider:** This element may be implemented in 2002, and the Council (and NMFS) may consider implementing all or part of this element for 2001 fisheries.

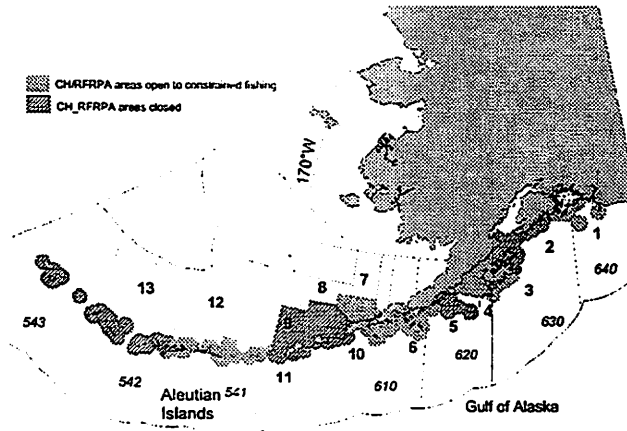
Table. Seasonal and area catch limit allocations (mt) for pollock, cod, and mackerel under the RPA, split among the combined A+B seasons and C+D seasons, and the amounts of that catch of which would be allowed within critical Steller sea lion habitat within each season, based on contingent TAC recommendations from the Council 12/00.

<u>Area</u>	<u>Species</u>	<u>Season dates</u>	<u>A</u> <u>Jan 20-Mar 31</u>	<u>B</u> <u>Apr 1-Jun 10</u>	<u>C</u> <u>Jun 11-Aug 21</u>	<u>D</u> <u>Aug 22-Oct 31</u>
<b><u>Bering Sea</u></b>						
EBS	Pollock	TAC split inside Area 7	102,200	560,000 64,400	12,600	840,000 19,600
EBS	Pacific cod	TAC split inside Area 7	11,415	66,176 2,151	4,136	99,264 9,926
<b><u>Gulf of Alaska</u></b>						
610	Pollock	TAC split inside CH-RFRPA	3,863	9,122 3,863	1,711	19,808 1,711
620	Pollock	TAC split inside CH-RFRPA	8,591	19,628 8,591	3,665	11,766 3,665
630	Pollock	TAC split inside CH-RFRPA	86	2,640 86	1,800	15,512 1,800
640	Pollock	TAC split inside CH-RFRPA	58	794 158	237	1,192 237
610	Pacific cod	TAC split inside CH-RFRPA	1,153	9,600 68	68	14,400 68
620/30	Pacific cod	TAC split inside CH-RFRPA	5,424	15,460 1,492	2,508	23,190 2,576
640	Pacific cod	TAC split inside CH-RFRPA	271	1,900 135	135	2,850 203
<b><u>Aleutian Islands</u></b>						
AI	Pollock	TAC split inside CH-RFRPA	108	4,800 120	216	7,200 204
AI	Pacific cod	TAC split inside CH-RFRPA	3,090	9,024 1,669	993	13,536 2,188
541/BS	Mackerel	TAC split inside CH-RFRPA	1,178	3,120 1,178	1,733	4,680 1,733
542	Mackerel	TAC split inside CH-RFRPA	0	13,440 0	0	20,160 0
543	Mackerel	TAC split inside CH-RFRPA	0	11,160 0	0	16,740 0

## Monitoring Program

**Objective:** The goal of the monitoring project is to ascertain the extent to which the implemented conservation measures promote the recovery of sea lions (i.e. remove jeopardy and adverse modification).

**RPA Description:** The region was divided into three primary blocks, referred to as blocks I, II, and III. Each of these blocks was further subdivided into 13 areas of the expanded critical habitat areas referred to as the CH-RFRPA. The following objectives were used in defining the 13 areas: (1) at least 50% of critical habitat should be closed to fishing, (2) the area closed to fishing should protect approximately 50% of the non-pup population and 75% of the areas where pups are born, (3) the underlying trend in open and closed areas in each of the three blocks should be statistically equivalent to allow for independent evaluation of the efficacy of the RPA in the three blocks, and (4) after a period no-longer than six years of monitoring, there should be an acceptable likelihood of successfully detecting an improvement in the status of Steller sea lions in each of the three blocks. The following areas define each block: Block I (areas 1-6), Block II (areas 7-11), Block III (areas 12-13).



The RPA is designed to close adequate portions of critical habitat to commercial fishing for the three primary prey species of groundfish, while imposing restrictions on fishing operations in areas open to fishing to avoid local depletion of prey resources for Steller sea lions. This approach of creating areas open and closed to fishing operations forms the basis for the monitoring program designed to assess the efficacy of the RPA and any associated conservation measures.

**RPA Impacts:** To ascertain whether or not the RPA promoted the recovery of sea lions, the population trend of sea lions after implementation of the conservation measures will be compared to the population trend before implementation, both in closed and open areas. This information, in combination with other studies, will allow an investigation regarding whether the conservation measures are effective. The monitoring program is scheduled to last six years.

**Industry and Scientific Concerns:** Industry has expressed concerns that the monitoring program was ill-conceived, unnecessarily costly to the fishing industry, and from a practical standpoint would not provide reliable results. Essentially, industry believes that the areas opened or closed must be comparable, and the open areas must be subject to fishing at normal commercial levels in order to detect any possible effects.

"The SSC has commented strongly in the past on the need for a monitoring program (Experimental Design, Adaptive Management) to assess the efficacy of management actions taken regarding Steller sea lions. We are pleased that the BiOp contains such a monitoring program as an integral part of the RPAs and view it as a welcome starting place. Given that this program has had only limited peer review and no Council involvement, the SSC suggests that this program be thoroughly reviewed and possibly modified by the Council family and other review bodies (e.g., National Academy of Sciences, the new Steller Sea Lion Recovery Team, ADF&G) before it is put in place. An open process with thorough review and consideration of alternative designs will give this monitoring program a better chance for success.

Because of the lags inherent in the dynamics of slow growing species such as sea lions, it may take a long treatment period to detect differences among treatments. In addition, because there are numerous environmental or ecological factors that likely influence foraging success, fecundity, morbidity, and mortality, it may be difficult to differentiate between changes induced by the treatments, and those that result from changes in uncontrolled factors. This is particularly true because the mechanisms and dynamic timing of these effects are largely unknown or unobservable. Thus the choice of covariates to be monitored is critical. Because the monitoring program should be fairly long term (six years or more), it is particularly important to be sure the best possible design is used to ensure acceptance of the results by affected parties." (SSC minutes 12/00)

**Effects of Senator Stevens budget rider:** This element may be implemented in 2002, and the Council (and NMFS) may consider implementing all or part of this element for 2001 fisheries.