MEMORANDUM

TO: Council, AP and SSC Members

FROM: Clarence G. Pautzke
Executive Director

DATE: September 19, 1991

SUBJECT: Bering Sea/Aleutian Islands Groundfish Specifications for 1992

ACTION REQUIRED

c. Approve for public review the draft preliminary Stock Assessment and Fishery Evaluation (SAFE) report.

d. Adopt for public review proposed specifications for the following:

1. Annual Total Allowable Catch (TAC), initial TAC (ITAC), and domestic annual processing (DAP);

2. Division of the pollock ITAC into the January 1-April 15 and June 1-December 31 allowances;

3. Amount of the pollock TAC that may be taken with bottom trawls; and

4. Bycatch allowances and seasonal apportionments of red king crab, Tanner crab, Pacific halibut, and herring to target fishery categories.

e. Review potential effects of the 1991 Bycatch Amendment on apportionment of PSCs.

BACKGROUND

At this meeting, the Council begins the annual groundfish cycle in which it adopts for public review proposed specifications of groundfish amounts and bycatch allowances as listed above. The preliminary SAFE Report, proposed groundfish specifications and the proposed bycatch allowances need to be adopted and made available for public review and comment. On the basis of comments and new information, the Council will adopt final recommendations for the 1992 fishing year at its December 1991 meeting.

SAFE Document

The Bering Sea/Aleutian Islands Groundfish Plan Team met in Seattle on September 3-6 to prepare the draft preliminary 1992 Stock Assessment and Fishery Evaluation (SAFE) which was sent to you on September 13, 1991. Attached as item D-1(d)(1) is the executive summary of the SAFE document. The sum of recommended ABCs for 1992 is 2.8 million mt (2.9 million mt was recommended for 1991). The largest changes in ABC are decreases of 255,000 mt and 25,560 mt for pollock in the eastern Bering Sea and Aleutians, creation of a 138,000 mt ABC for pollock in the Bogoslof district, and an increase of 26,400 mt in the yellowfin sole ABC. Overall, the status of the stocks continues to appear relatively favorable. Information from this summer's trawl survey is not available to provide new biomass estimates. It will be analyzed this fall and incorporated into the final 1992 SAFE document in November. An environmental assessment also is being prepared.

Adopt proposed initial ABCs, TACs and Apportionments thereof for 1992

Attached as item D-1(d)(2) is a table indicating 1990 and 1991 ABCs, TACs, and apportionments, by species. Item D-1(d)(3) is a worksheet on which initial 1992 specifications can be filled in. It includes the Plan Team's 1992 ABCs. This worksheet will be updated with recommendations of the SSC and AP during the Council meeting. Twenty-five percent of the initial specifications will go forward as interim specifications for management of the 1992 groundfish fisheries until superseded by publication of the Council's final specifications.

Adopt proposed seasonal allowances for the pollock seasons

Pollock in the BSAI must be apportioned between the roe (January 1 - April 15) and non-roe (June 1 - December 31) seasons, as indicated in the worksheet, Item D-1(d)(3).

In recommending seasonal allowances of the BSAI pollock TAC, the Council will wish to consider the following factors:

1. Estimated monthly pollock catch and effort in prior years;

2. Expected changes in harvesting and processing capacity and associated pollock catch;

3. Current estimates of and expected changes in pollock biomass and stock conditions, conditions of marine mammal stocks, and biomass and stock conditions of species taken as bycatch in directed pollock fisheries;

4. Potential impacts of expected seasonal fishing for pollock on pollock stocks, marine mammal stocks, and stocks of species taken as bycatch in directed pollock fisheries;

5. The need to obtain fishery-related data during all or part of the year;

6. Effects on operating costs and gross revenues;

7. The need to spread fishing effort over the year, minimize gear conflicts, and allow participation by various elements of the groundfish fleet and other fisheries;

8. Potential allocative effects among users and indirect effects on coastal communities; and,

9. Other biological and socioeconomic information that affects the consistency of seasonal pollock harvests with the goals and objectives of the FMP.

Adopt amounts of pollock that could be taken with bottom trawls

Amendment 16a provided for the apportionment of pollock to pelagic trawl gear (i.e., state a minimum amount of the resource which must be taken with pelagic trawl gear). In approving this amendment for Secretarial Review, the Council adopted the 88%-12% split (midwater-bottom trawl) recommended by the Region. The actual percentages from the 1990 fishery were 89%-11%. Last April the Council noted that additional pollock harvests with non-pelagic trawl gear likely would be constrained by halibut bycatch, and did not recommend a specific apportionment between pelagic and non pelagic gear. The actual percentages for 1991 turned out to be 95%-5% (midwater-bottom trawl).

Regulations require that pollock allocations to non pelagic trawls be based on the following types of information:

1. Bycatch allowances of PSC species;

2. Projected bycatches of prohibited species that might occur with and without constraining amounts of pollock taken with non pelagic trawls; and

3. Costs of a limit in terms of amounts of pollock TAC that may be taken with bottom trawls on the non pelagic trawl fisheries.

Adopt proposed bycatch allowances of red king crab, Tanner crab, Pacific halibut, and herring, and seasonal allowances thereof

The Council needs to propose for public review bycatch allowances to the following DAP target fishery categories: midwater pollock, Greenland turbot (includes arrowtooth flounder), rock sole, flatfish (includes yellowfin sole and "other flatfish"), and "Other fishery" (includes P. cod, bottom trawl pollock, Atka mackerel, sablefish and other). Item D-1(d)(4) is a table indicating 1991 PSC apportionments. Item D-1(d)(5) is a worksheet on which initial 1992 PSC apportionments can be filled in as the meeting proceeds.

The Council may also propose seasonal apportionments of the bycatch allowances. In 1991, the Council chose to seasonally apportion only the Pacific halibut bycatch allowance to the DAP "other" fishery category. Regulations require that seasonal apportionments of bycatch allowances be based on the following types of information:

1. Seasonal distribution of prohibited species;

2 Seasonal distribution of target groundfish species relative to prohibited species distribution;

3. Expected prohibited species bycatch needs on a seasonal basis relevant to change in prohibited species biomass and expected catches of target groundfish species;

4. Expected variations in bycatch rates throughout the fishing year;

5. Expected changes in directed groundfish fishing seasons;

6. Expected start of fishing efforts; and

7. Economic effects of establishing seasonal prohibited species apportionments on segments of the target groundfish industry.

Review potential effects of the 1991 Bycatch Amendment to apportionment of PSCs

The Council initiated a bycatch amendment at its July 3, 1991 teleconference. The amendment is scheduled for initial review at this meeting (see agenda item D-2(a)). It has two major components that will affect the Council's apportionment of PSCs in the groundfish fisheries.

The first provision would, if adopted, change the fisheries among which the PSCs will be apportioned. Currently four DAP trawl fisheries receive crab and halibut PSC limit allowances: 1) Greenland turbot (includes arrowtooth flounder), 2) rock sole, 3) flatfish (includes yellowfin sole/other flatfish), and 4) "Other fishery" (includes P. cod, bottom trawl pollock, m-w pollock, rockfish, Atka mackerel, sablefish and other). The following table indicates the differences between the current and proposed 1991 bycatch amendment programs.

Current Fisheries	Proposed fisheries
1. Greenland Turbot/arrowtooth flounder	1. Greenland Turbot/arrowtooth flounder
2. Rock sole	2. Rock sole and yellowfin sole/other flatfish
3. Flatfish (yellowfin sole/other flatfish)	3. Pacific cod
4. Other fishery	4. Other fishery

A second proposed change would be a halibut PSC mortality limit for the fixed gear fisheries in the BSAI. Analysis of both of these proposals is included in the 1991 bycatch amendment. A final decision on the proposed amendment is scheduled for December at which time the Council will need to set revised PSC allowances if the amendment is approved.

SUMMARY

by
The Plan Team for the Groundfish Fisheries
of the Bering Sea and Aleutian Islands

INTRODUCTION

The Guidelines for Fishery Management Plans published by the National Marine Fisheries Service (NMFS) require that a stock assessment and fishery evaluation (SAFE) report be prepared and reviewed annually for each fishery management plan (FMP). The SAFE reports are intended to summarize the best available scientific information concerning the past, present, and possible future condition of the stocks and fisheries under federal management.

The SAFE reports for the groundfish fisheries managed by the North Pacific Fishery Management Council (Council) are compiled by the respective Plan Teams from chapters contributed by scientists at NMFS' Alaska Fisheries Science Center (AFSC) and the Alaska Department of Fish and Game. These SAFE reports include separate stock assessment and fishery evaluation sections. The stock assessment section includes recommended acceptable biological catch (ABC) levels for each stock and stock complex managed under the FMP. The ABC recommendations, together with social and economic factors, are considered by the Council in determining total allowable catches (TACs) and other management strategies for the fisheries.

The FMPs for the groundfish fisheries managed by the Council require that drafts of the SAFE reports be produced each year in time for the September and December meetings of the Council. Unfortunately, critical stock assessment data often do not become available until after the September draft has been completed. Such was the case this year, when results of the 1991 AFSC trawl surveys in the eastern Bering Sea (EBS) and Aleutian Islands remained unavailable at the time the present SAFE report was being compiled. Thus, most chapters of this report are largely unchanged from last year's final SAFE report. To aid the reader, each chapter of this report has been prefaced by a brief description of any substantive changes that have been made to that chapter relative to last year's final report. The reader should also be aware that many results, including 1992 ABC recommendations, could change significantly in the final draft of this year's SAFE report.

Members of the Plan Team who compiled this SAFE report were Loh-Lee Low (chairman), Brent Paine (team coordinator), Rebecca Baldwin, Jeremy Collie, Jay Ginter, Richard Merrick, Phil Rigby, Grant Thompson, Gregg Williams, and Sam Wright.

BACKGROUND INFORMATION

Management Areas and Species

The Bering Sea/Aleutian Islands (BS/AI) management area lies within the 200-mile U.S. Exclusive Economic Zone (EEZ) of the United States (Figure 1). International North Pacific Fisheries Commission (INPFC) statistical areas 1 and 2 make up the EBS. The Aleutian region is INPFC area 5.

Four categories of finfishes and invertebrates have been designated for management purposes (Table 1). They are (a) prohibited species, (b) target species, (c) other species, and (d) non-specified species. This SAFE report describes the status of the stocks in categories (b) and (c) only.

Historical Catch Statistics

Catch statistics since 1954 are shown for the EBS subarea in Table 2. The initial target species was yellowfin sole. During the early period of these fisheries, total catches of groundfish reached a peak of 674,000 metric tons (t) in 1961. Following a decline in abundance of yellowfin sole, other species were targeted upon, principally pollock, and total catches rose to 2.2 million t in 1972. Catches have since varied from 1.2 to 1.9 million t as catch restrictions and other management measures were placed on the fishery.

Catches in the Aleutian region have always been much smaller than those in the EBS. Target species have also been different (Table 3): In the Aleutians, Pacific ocean perch (POP) was the initial target species. During the early years of exploitation, overall catches of Aleutian groundfish reached a peak of 112,000 t in 1965. As POP abundance declined, the fishery diversified to other species. Total catches from the Aleutians in recent years have been about 100,000 t annually.

Recent Total Allowable Catches

Amendment 1 to the BS/AI Groundfish FMP provides the framework to manage the groundfish resources as a complex. Maximum sustainable yield (MSY) for this complex was originally estimated at 1.8 to 2.4 million t. The optimum yield (OY) range was set at 85% of the MSY range, or 1.4 to 2.0 million t.

Total allowable catches established by the Council since implementation of extended jurisdiction under the Magnuson Fishery Conservation and Management Act in 1977 are given in Table 4. The sum of the TACs equals OY for the groundfish complex, which is currently constrained by the 2.0 million t cap. Optimum yield for all species combined increased steadily from 1.4 million t in 1977 to 2.0 million t in 1984-91.

Plan Team Policy on Acceptable Biological Catch

The Plan Team continues to use the following policy regarding ABC, which was initially adopted at a meeting of the Plan Team and its Gulf of Alaska counterpart in September, 1990:

1) The Teams endorse the definition of ABC contained in the 602 Guidelines, which states, "ABC is a preliminary description of the acceptable harvest (or range of harvests) for a given stock or stock complex. Its derivation focuses on the status and dynamics of the stock, environmental conditions, other ecological factors, and prevailing technological characteristics of the fishery."

2) ABC values are chosen after consulting with individual scientists responsible for conducting assessments on the various stocks. The Teams would like to make clear that these

guidelines are in no way intended to constrain the assessment scientists in their efforts to apply new and innovative techniques; rather, the Teams encourage creativity in stock assessment research. In particular, the Teams would like to encourage assessment scientists to explore new methods of incorporating uncertainty, recruitment variability, and multispecies considerations into their assessments.

3) The ABC values recommended by the Plan Teams must not exceed the catch levels obtained by applying the overfishing definition selected by the Council in Amendment 21/16. Whether or not ABC is set at the limit of overfishing or at some lower value will depend on factors such as recruitment trends, multispecies interactions, and the degree of uncertainty in data or parameter estimates. The overfishing definition adopted by the Council defines a maximum fishing mortality rate that declines at low stock sizes. Because data availability varies between stocks, the definition contains some flexibility, as shown below:

a) Data available: stock-recruitment, fecundity, maturity, growth, and mortality parameters. The maximum allowable fishing mortality rate will be set at F_{MSY} for all biomass levels in excess of B_{MSY}. For lower biomass levels, the maximum allowable fishing mortality rate will vary linearly with biomass, starting from a value of zero at the origin and increasing to a value of F_{MSY} at B_{MSY}.

b) Data available: fecundity, maturity, growth, and mortality parameters. The maximum allowable fishing mortality rate will be set at the value that results in the biomass-per-recruit ratio (measured in terms of spawning biomass) falling to 30% of its pristine level.

c) Data available: growth and mortality parameters. The maximum fishing mortality rate will be set at the value that results in the biomass-per-recruit ratio (measured in terms of exploitable biomass) falling to 30% of its pristine level.

d) Data available: natural mortality rate. The maximum allowable fishing mortality rate will be set equal to the natural mortality rate.

In cases where a biomass estimate is unavailable, overfishing is defined as exceeding the average catch since implementation of the MFCMA.

OVERVIEW OF "STOCK ASSESSMENT" SECTION

Plan Team recommendations for 1992 ABCs are summarized in Tables 6-8. The sum of recommended ABCs for 1992 is 2.8 million t, about the same as the 2.9 million t total recommended for 1991 and slightly below the current complex-wide MSY estimate of 2.9 million t. In absolute terms, the largest changes in ABC are decreases of 255,000 t and 25,560 t for pollock in the EBS and Aleutians, creation of a 138,000 t ABC for pollock in the Bogoslof district, and an increase of 26,400 t in the yellowfin sole ABC.

Overall, the status of the stocks continues to appear relatively favorable. Stock status is summarized on a species-by-species basis below.

Walleye Pollock

EBS	1991 ABC = 1,676,000 t	1992 ABC = 1,421,000 t
Aleutians	1991 ABC = 101,460 t	1992 ABC = 75,900 t

EBS	Projected 1992 exploitable biomass = 6,060,000 t
Aleutians	Projected 1992 exploitable biomass = 330,200 t

Pollock abundance in the EBS was estimated with two age-structured methods, cohort analysis and CAGEAN, using data up to and including the 1989 catches at age and the 1988 combined hydroacoustic and bottom trawl survey. Cohort analysis indicates a minor decrease in abundance while the CAGEAN results indicate a sharp drop in biomass since the peak value in 1985. The confidence interval around the 1989 CAGEAN estimate overlaps the cohort analysis and trawl survey biomass estimates. The cohort analysis biomass estimates were chosen over CAGEAN because the cohort analysis uses more age-specific information from the surveys than does CAGEAN.

Current abundance is above B_{MSY}(6 million t). The strong 1982 and 1984 year-classes now contribute substantially to the fishery. Recruitment of age-three pollock in 1990-1992 is projected to be slightly below the median of the past decade. The ABC for this stock was computed with an exploitation rate corresponding to $F_{0.1}$=0.31 which is close to the F_{MSY}estimate of 0.335 obtained by Quinn and Collie (1990). Application of this fishing mortality rate gives a 1992 EBS ABC of 1,421,000 t. The ABC is less than in 1991 because the 1992 projected biomass is lower than the value projected for 1991 in last year's assessment. Exploitation at the $F_{0.1}$ rate when abundance is greater than B_{MSY}does not violate the Council's overfishing definition.

The Aleutian Islands pollock stock has not been surveyed since 1986, when the total biomass was estimated to be 527,000 t (Wespestad and Traynor 1990). The Plan Team projected 1992 Aleutian exploitable biomass as follows: 1) Assuming that the ratio of exploitable biomass to total biomass in the 1986 Aleutian survey was the same as in the 1985 EBS survey (8.4 million t divided by 9.4 million t, Wespestad and Traynor 1990), the 1986 exploitable biomass in the Aleutians would have been 470,900 t. 2) Assuming that the 1986-1992 time trend of exploitable biomass in the Aleutians parallels the corresponding trend in the EBS as indicated by cohort analysis (8.7 million t in 1986 compared to 6.1 million t in 1992, Tables 1.1 and 1.6), the 1992 exploitable biomass in the Aleutians should be 330,200 t. Application of a catch-to-biomass ratio of 0.23 (Table 1.6) yields a 1992 ABC of 75,900 t for the Aleutian stock.

Pollock taken near Bogoslof Island have a consistently different age composition and slower growth rates than pollock taken from the EBS. A hydroacoustic survey in the winter of 1991 estimated the abundance of Bogoslof pollock to be 0.6 million t (preliminary; see Appendix C). Applying a catch-to-biomass ratio of 0.23 (Table 1.6) results in a 1992 ABC of 138,000 t for the Bogoslof fishery. In setting a Bogoslof ABC, the Plan Team is recognizing the

distinctness of the Bogoslof pollock. However, it is likely that these pollock are also caught outside the U.S. EEZ and that the entire Bogoslof ABC may be caught in international waters, in which case the Bogoslof TAC should be zero. Therefore, the Plan Team does not recommend that the Bogoslof ABC be added to the EBS ABC for the purpose of determining the EBS TAC. The Plan Team also recognizes that progeny of pollock spawning in the Bogoslof area may contribute to the EBS stock.

Large catches continue to be removed from the international zone of the Aleutian Basin (donut hole). The 1988 catch of 1.5 million t exceeded the catch from the U.S. EEZ. Data collected to date suggest that donut-hole pollock are connected through spawning and recruitment processes to pollock on the surrounding continental shelves. It is conceivable that future pollock ABCs in the U.S. EEZ may need to be adjusted for catches taken elsewhere.

Pacific Cod

EBS and
Aleutians 1991 ABC = 229,000 t 1992 ABC = 225,000 t

EBS and
Aleutians Projected 1992 exploitable biomass = 941,000 t

Pacific cod in the EBS and Aleutian Islands are managed are a unit, although nearly all of the assessment research focuses on the EBS portion of the stock. Annual trawl surveys indicate that the biomass of Pacific cod in the EBS remained high and stable throughout the 1980s. However, the 1990 survey showed a 26% drop in biomass relative to 1989. The chapter author expresses concern over this decline and the poor recruitment observed during the past two years, noting that the stock's dynamics may be entering a new phase defined by different environmental conditions or ecological relationships.

The stock assessment model used to calculate ABC for Pacific cod was retuned for last year's assessment, incorporating survey and catch data from 1988, 1989, and 1990, as well as a greatly expanded supply of age data. This resulted in new estimates for all parameters in the model (except natural mortality), and led to a reduction in F_{MSY} from 0.182 to 0.156. Because it is tuned in part to the survey results, the model showed a decline in biomass between 1989 and 1990. However, the decline indicated by the model was smaller than that indicated by the survey (14% vs. 26%, respectively).

The EBS cod model calculates ABC by applying the target exploitation rate (in this case the F_{MSY} rate) to projected biomass through a complex schedule of age- and time-dependent fishing mortality rates. This procedure produces a 1992 ABC of 200,000 t for the EBS portion of the stock, which can be scaled upward by a factor of 1.124 to give a 1992 ABC of 225,000 t for the EBS and Aleutian Islands combined.

Because model projections indicate that the EBS portion of the stock will be above B_{MSY} at the start of 1992 [B_{1992} = 837,000 t vs. B_{MSY} = 824,000 t], exploiting the stock at the F_{MSY} rate does not violate the Council's overfishing definition.

Yellowfin Sole

1991 ABC = 250,600 t 1992 ABC = 277,000 t
Projected 1992 exploitable biomass = 2,660,000 t

Exploitable biomass, as calculated from both cohort analysis and stock synthesis (Methot 1990), is high and stable. Biomass is also estimated from research surveys, but has been variable since 1982 because of changes in trawl gear and net calibration. The yield per recruit corresponding to the $F_{0.1}$ value of 0.14 (estimated from the Beverton-Holt model) was multiplied by the average recruitment estimated from stock synthesis to obtain the recommended ABC of 277,000 t. The results from stock synthesis were preferred over those from cohort analysis because stock synthesis makes better use of the available data, facilitates sensitivity testing, and allows selectivity to vary with age. The Plan Team believes that current estimates of B_{MSY} are too preliminary to use in a prescriptive fashion. Given this and the fact that the $F_{0.1}$ value is less than the fishing mortality rate that would reduce the biomass-per-recruit ratio to 30% of its pristine level (F=0.17), the recommended ABC is consistent with the Council's overfishing definition.

Greenland Turbot

1991 ABC = 7,000 t 1992 ABC = 7,000 t
Projected 1992 exploitable biomass = 307,000 t

Continuous poor recruitment has been observed throughout the 1980s, indicating that biomass of the adult population is likely to decline well into the 1990s. Forecasts for a number of conservative fishing strategies, including no fishing, all show projected declines in biomass through at least 1996. Although no threshold level has been determined for this species, the Plan Team sees no justification for a major directed fishery on Greenland turbot at this time.

The recommended ABC for 1992 is 7,000 t, which is close to the low catch levels observed for turbot in recent years. This ABC should allow legitimate incidental catches to be retained (thus preventing wastage), while precluding development of any new effort directed at this resource in its currently depressed state. An ABC estimated from the $F_{0.1}$ harvest strategy (17,200 t) was considered and rejected because of concern over continued recruitment failure. Projected exploitable biomass for 1992 (307,000 t) is less than B_{MSY} (407,000 t). Consequently, an upper limit on ABC is imposed by the Council's overfishing definition at $F = [(307,000/407,000) \times F_{MSY}] = 0.75 \times 0.07 = 0.05$. The fishing mortality rate corresponding to the recommended 1992 ABC (approximately 0.02) is substantially lower than this limit.

Arrowtooth Flounder

1991 ABC = 116,400 t 1992 ABC = 116,400 t
Projected 1992 exploitable biomass = 646,600 t

The resource is in excellent condition, as the already-high biomass continues to increase. The increasing biomass trend was confirmed most recently by the 1990 trawl survey. Lacking a stock-

recruitment relationship for this species, an $F_{0.1}$ harvest strategy ($F_{0.1}$ = 0.18) was used to recommend a 1992 ABC of 116,400 t. Since B_{MSY} and F_{MSY} estimates are unavailable for this stock, an upper limit on ABC is imposed by the fishing mortality rate that would reduce the biomass-per-recruit ratio to 30% of its pristine value. The $F_{0.1}$ value used to compute ABC is well below this rate (F=0.25).

Historically, catches of Kamchatka flounder (Atheresthes evermanni) have been lumped with arrowtooth catches in the landings statistics, since the two species are difficult to distinguish in the field. For consistency, the same convention has been adopted here in the reporting of trawl survey biomass estimates. The practical effect of this convention is negligible, however, since Kamchatka flounder represents only a minor component of the combined species' biomass.

Rock Sole

1991 ABC = 246,500 t 1992 ABC = 246,500 t
Projected 1992 exploitable biomass = 1,400,600 t

Rock sole was separated from "other flatfish" in 1987 for management purposes. Trawl survey results indicate that the biomass of rock sole is high and stable. Because of uncertainties in annual point estimates, the estimated exploitable biomass is the mean of the 1989 and 1990 survey estimates. The MSY exploitation rate (F_{MSY}=0.176) is used to calculate ABC. Because the 1992 projected exploitable biomass is well in excess of B_{MSY} (904,000 t), the F_{MSY} fishing exploitation strategy is consistent with the Council's overfishing definition.

Other Flatfish Complex

1991 ABC = 219,700 t 1992 ABC = 219,700 t
Projected 1992 exploitable biomass = 1,248,300 t

Exploitable biomass is high and stable. Fishing mortality rates at F_{MSY} have not been calculated for other flatfish, so the rock sole rate (0.176) is used. To smooth out the variability in survey biomass estimates, the mean of the 1989 and 1990 values is used to estimate 1992 exploitable biomass in the EBS. This figure is then adjusted upward on the basis of the 1983 and 1986 EBS and Aleutian surveys to project the 1992 biomass for the entire BS/AI region.

The Team believes that a good estimate of B_{MSY} does not exist for this complex. The maximum fishing mortality rate allowable under the Council's overfishing definition is 0.23 (based on parameters given for male Alaska plaice), which reduces the biomass-per-recruit ratio to 30% of its pristine value. The fishing mortality rate recommended for this complex (0.176) is below this limit.

Sablefish

EBS	1991 = 3,100 t	1992 ABC = 3,100 t
Aleutians	1991 = 3,200 t	1992 ABC = 3,200 t

EBS Projected 1992 exploitable biomass = 26,400 t
Aleutians Projected 1992 exploitable biomass = 27,700 t

Catches in 1990 were 2,329 t in the EBS and 1,545 t in the Aleutians, well below the average 11,700 t harvested from the EBS alone in the 1960s. The 1990 longline survey indicated substantial decreases in relative abundance in both the EBS and Aleutians. These decreases are not entirely attributed to mortality; migration may also affect relative abundance indices. The likelihood of such migration resulted in a decision to combine the assessments for the Gulf of Alaska, Aleutians, and EBS stocks. Absolute biomass was calculated by calibrating the relative abundance trends to trawl survey biomass estimates. A single calibration factor was adopted for the EBS, Aleutians, and Gulf of Alaska.

Because the stock-recruitment relationship is poorly defined for sablefish, the Plan Team believes that F_{MSY} and B_{MSY} are inestimable with the current model. Therefore, ABC was calculated by applying the $F_{0.1}$ fishing mortality rate to the 1992 projected biomass for each area. This rate (F=0.13) is consistent with the Council's overfishing definition, which, in the absence of a reliable B_{MSY} estimate, constrains ABC by the fishing mortality rate that would reduce the biomass-per-recruit ratio to 30% of its pristine value (F=0.18).

Pacific Ocean Perch Complex

EBS

True POP	1991 ABC =	4,570 t	1992 ABC =	6,400 t
Others	1991 ABC =	1,670 t		
SC and NO			1992 ABC =	1,400 t
SR and RE			1992 ABC =	400 t

True POP	Projected 1992 exploitable biomass =	90,900 t
SC and NO	Projected 1992 exploitable biomass =	23,100 t
SR and RE	Projected 1992 exploitable biomass =	13,900 t

Aleutian Islands

True POP	1991 ABC =	10,775 t	1992 ABC =	16,900 t
SC and NO	1991 ABC =	3,440 t	1992 ABC =	4,000 t
SR and RE	1991 ABC =	1,245 t	1992 ABC =	1,400 t

True POP	Projected 1992 exploitable biomass =	211,200 t
SC and NO	Projected 1992 exploitable biomass =	67,100 t
SR and RE	Projected 1992 exploitable biomass =	51,500 t

The POP complex consists of true POP (Sebastes alutus) and four other red Sebastes species (northern rockfish [NO], rougheye rockfish [RE], sharpchin rockfish [SC], and shortraker rockfish [SR]). Prior to 1991, the complex was managed as a unit in each of the two management areas. In 1991, however, the Council began managing S. alutus separately from the other species in both areas, and also split out shortraker and rougheye in the Aleutians. This was done to avoid excessive catches of the less abundant members of the complex, particularly shortraker and rougheye. For 1992, the Plan Team has adopted the Council's 1991 management scheme, except that the Plan Team recommends splitting out a shortraker/rougheye subcomplex in the EBS as well as in the Aleutians.

The stock assessment for this complex is based mainly on S. alutus, which has the most data and is the most abundant species in the complex. Model results indicate that the S. alutus stocks in both areas underwent sharp declines in abundance due to intensive fishing in the 1960s, and remained low in abundance through the early 1980s. For several years, the Council set TAC well below (normally at 50% of) ABC to promote rebuilding of the stocks. Through a combination of these management actions and improved recruitment, the stocks have been recovering slowly.

After the POP chapter contained in this SAFE report was completed, the Plan Team received several pieces of updated information, including new estimates of S. alutus growth parameters and new results from stock reduction analysis. These results include F_{MSY} estimates of 0.07 in the EBS and 0.08 in the Aleutians, B_{MSY} estimates of 75,200 t in the EBS and 161,000 t in the Aleutians, and current biomass estimates of 90,900 t in the EBS and 211,200 t in the Aleutians. The new F_{MSY} and biomass estimates were used to compute ABC for S. alutus in the two management areas. Since current biomass is above B_{MSY}, harvesting at the F_{MSY} rate does not violate the Council's overfishing definition.

For the other two subcomplexes (sharpchin/northern and shortraker/rougheye), ABC was calculated as the product of the natural mortality rate (0.06 for sharpchin and northern, 0.025 for rougheye, and 0.03 for shortraker) and exploitable biomass. Exploitable biomass estimates, computed as the average of all previous trawl survey biomass estimates, were as follows: sharpchin/northern (EBS)--23,100 t; rougheye (EBS)--3,500 t; shortraker (EBS)--10,400 t; sharpchin/northern (Aleutians)--67,100 t; rougheye (Aleutians)--30,400 t; and shortraker (Aleutians)--21,100 t. Since estimates of other biological parameters are unavailable, harvesting at the F=M harvest strategy does not violate the Council's overfishing definition.

Other Rockfish Complex

EBS	1991 ABC = 400 t	1992 ABC = 400 t
Aleutians	1991 ABC = 925 t	1992 ABC = 900 t

EBS	Projected 1992 exploitable biomass = 8,000 t
Aleutians	Projected 1992 exploitable biomass = 18,500 t

The "other rockfish" complex includes both of the thornyhead (Sebastolobus) species and all Sebastes species not included in the Pacific ocean perch complex. U.S. observers have identified 15 confirmed species within this complex, and another 14 species have been tentatively identified. The complex is managed as two separate stocks, one in the EBS and one in the Aleutian Islands.

Little is known about the species in this complex. Commercial catch and effort data are of little use in examining abundance trends for these species since most of the catch is probably incidental. Because biomass estimates are derived from the cooperative shelf/slope trawl surveys in the EBS (the last of which was conducted in 1988) and trawl surveys in the Aleutian Islands (the last of which was conducted in 1986), no new biomass estimates are available for the present assessment.

The natural mortality rate for species in this complex has been estimated at 0.05, which was used as the target fishing mortality rate in calculating ABC. Lacking estimates of other biological parameters, the resulting ABC values correspond to the limit specified by the Council's overfishing definition.

Atka Mackerel

1991 ABC = 24,000 t 1992 ABC = 24,400 t
Projected 1992 exploitable biomass is unavailable

The status of Atka mackerel is difficult to assess for three reasons: 1) the stock tends to occur in localized concentrations, making survey estimates highly uncertain; 2) results from the 1991 Aleutians trawl survey are not yet available, and the next most recent survey results are now five years old; and 3) the two Aleutian surveys preceding the 1986 survey were unable to sample shallow waters successfully. Trends in abundance cannot be inferred from survey and catch data. Since the status of this stock cannot be assessed, there is no current information on which to recommend an ABC. In cases when a biomass estimate is unavailable, overfishing is defined as exceeding the average catch since implementation of the MFCMA. The average catch of Atka mackerel for the years 1978-1990 is 24,400 t. The Plan Team believes that catches up to this level are probably sustainable.

Squid and Other Species Complex

Squid	1991 ABC = 3,800 t	1992 ABC = 3,600 t
	Projected 1992 exploitable biomass is unavailable	
Other Species	1991 ABC = 28,700 t	1992 ABC = 27,100 t
	Projected 1992 exploitable biomass = 889,400 t	

In recent years, catches of squid and "other species" have represented 1% or less of the total catch of all groundfish. Biomass estimates for "other species" were derived from demersal trawl surveys. The survey data suggest that sculpins and skates constitute most of the "other species" biomass but it is recognized that the abundance of pelagic species such as smelts and sharks may be substantially underestimated by demersal trawls. Recent increases in the exploitable biomass of this category is largely attributable to the substantially increased biomass of skates. Projected biomass for 1992 was computed by adding the biomass estimates from the 1990 EBS survey and the 1986 Aleutians survey. Survey abundance estimates for squid are unavailable because squid are mainly pelagic over deep water.

Because of the scarcity of data regarding these species, the Council's overfishing definition caps the ABC at the average catch levels since 1977, which are 3,600 t for squid and 27,100 t for "other species." The decreases in recommended ABCs from 1991 to 1992 are due to the addition of another year of catch data.

OVERVIEW OF "FISHERY EVALUATION" SECTION

Landings data presented in the fishery evaluation (economic) section were extracted from PacFIN on August 23, 1991. These data may differ from catch data presented elsewhere in the SAFE report

due to lags in processing fishtickets and the presence of discards. Caution should be used in judging reductions in harvest during 1991 because of the incomplete data. Total domestic landings of groundfish in the BS/AI region increased in both 1989 and 1990. Domestic landings of pollock showed the largest increase in tonnage, rising by 470,000 t in 1989 and by another 340,000 t in 1990. The 1990 domestic BS/AI landings of Pacific cod, Atka mackerel, and rockfish increased over the 1988 totals by 75,700 t, 20,300 t, and 22,600 t, respectively. Already, the 1991 Atka Mackerel fishery has eclipsed the 1990 harvest by 800 t. However, the greatest increase seen thus far is in the flatfish fishery, where the annual domestic landings of roughly 40,000 t observed between 1988 and 1990 has already risen to more than 90,000 t this year.

Area-wide increases in landings were observed in trawl and longline gear groups. Longline landings were up from 8,700 t in 1988 to nearly 54,000 t in 1990, largely due to increased Pacific cod landings. Trawl operations increased their landings from 651,000 in 1988 to 1,535,000 t in 1990. Although the majority of this increase was derived from pollock, most species other than sablefish also exhibited higher domestic landings. Shoreside and at-sea processors also benefitted from increased domestic landings. The volume of fish processed shoreside increased from 170,000 t (round weight) in 1988 to 285,000 t in 1990. During the same period, at-sea processing rose from 490,000 t to 1,303,000 t.

These increases in domestic landings were obtained through substantial reductions in the joint-venture (JV) harvest of several species. From a high of over 1,300,000 t in 1987, JV harvest in the BS/AI region dropped to less than 135,000 t in 1990, with no JV catch having yet occurred during 1991. Pollock has undergone the largest drop since 1988, when more than 1,000,000 t was taken by joint ventures. JV catch of Pacific cod fell from a high of 110,000 t in 1988 to 8,100 t in 1990. Annual JV harvest of flatfish and Pacific cod had reached all-time highs of 230,000 t and 110,000 respectively during 1988. Atka mackerel also fell by 20,000 over this period.

The ex-vessel value of domestic landings (excluding the value added by at-sea processing) increased by over $100 million dollars in 1989, and by another $110 million in 1990, producing total revenue of $353 million. Over this 2-year period, the value of longline landings increased by $23 million, including a $26 million increase from Pacific cod, while trawl revenue increased by $188 million. Most of the trawl fishery gains occurred in the pollock fishery, which increased in value from $88 million in 1988 to $255 million in 1990. In 1991, trawl revenue from the rapidly expanding flatfish fishery ($33 million) has already surpassed the sum of the earnings from the preceding three years of flatfish landings. Roughly 90% of the increase in ex-vessel revenue between 1988 and 1990 was realized by vessels participating in the at-sea processing sector.

Year-to-date BS/AI trawl prices for rockfish, flatfish, sablefish, and Pacific cod are 54%, 42%, 35%, and 33% higher, respectively, than the average prices in 1990. The year-to-date longline price for sablefish is $1.06/lb, which is 47% higher than the 1990 price. The massive shift of pollock harvest from JV to domestic landings in recent years has contributed substantially to an increase in the

value of Alaskan and Northwest exports of groundfish from $358 million in 1988 to $796 million in 1990. During this period, the percentage of total fisheries exports, by value, accounted for by groundfish products rose from 21% to 39%.

OVERVIEW OF APPENDICES

Marine Mammal Considerations

Three marine mammal species are of particular concern in the EBS and Aleutian Islands - northern sea lion (Eumetopias jubatus), northern fur seals (Callorhinus ursinus), and harbor seal (Phoca vitulina). The intensity of declines in northern sea lion numbers as determined from surveys conducted through 1990 were sufficient to lead to a final listing on 26 November 1990 of the species as threatened throughout its range under the Endangered Species Act (ESA). Northern fur seals have also declined in abundance in the last 20 years, and as a result were listed as depleted under the Marine Mammal Protection Act (MMPA) in 1988. Harbor seals, although not listed under either the ESA or MMPA, have also undergone considerable numerical declines in most of Alaska. Marine mammal considerations are detailed in Appendix A.

Pacific Halibut SAFE Report

A separate SAFE report on the Pacific halibut (Hippoglossus stenolepis) stock and fishery has been prepared by the staff of the International Pacific Halibut Commission, and is included with the present SAFE report as Appendix B. Catches of halibut by the 1990 directed fishery totalled 56.4 million pounds in the northeast Pacific Ocean and 5.4 million pounds in the BS/AI region. Exploitable biomass was estimated at 234.7 million pounds in 1990, representing a decline of 8% percent from the 1989 biomass estimate. Although 1990 was the fifth year in which biomass was observed to decline, such a pattern is consistent with the long-term cycles typical of the halibut resource. Constant exploitation yield for the directed setline fishery was estimated to be 82.15 million pounds net weight. This figure was based on an overall exploitation rate of 35%, and was adjusted to allow for other removals. Incidental mortality increased in 1990, reaching 18 million pounds. Over half of the incidental mortality occurred in the EBS.

Status of the Pollock Resource in the Aleutian Basin

The status of the pollock resource in the Aleutian Basin is discussed in Appendix C. Some studies have suggested that the resource is declining or being fished at excessive rates. These findings have been corroborated by declining catches and catch rates in the Basin and declining biomass estimates in the Bogoslof area. However, the size of the overall Basin stock remains in dispute, with estimates ranging from 5 million to 20 million t.

The Basin fishery has apparently been supported by the large 1978 year class and above-average year classes spawned in 1977, 1979, and 1980. Except for the 1982 and 1984 year classes, no strong year classes have been spawned since 1980. The absence of strong recruitment in recent years, coupled with the gradual attrition of the 1977-1980 year classes, would explain the observed decline in

catch rates. Since the present Basin pollock biomass is comprised primarily of fish from weaker year classes (1983 and 1985-88), no improvement in stock condition is anticipated in the near future. The decline will be reversed only when strong year classes are produced or management actions are taken to reduce harvest rates.

The decline of the Basin stock has a fairly clear potential to undermine the U.S. pollock roe fishery in the Bogoslof area, since pollock in this area are predominantly of Basin origin during the roe season. However, since the direction and significance of migration patterns between the Basin and EBS shelf are less well-defined, the Basin fishery's impact on the EBS shelf stock is less clear. One possibility is that Basin fish spawn primarily in the Bogoslof area, with the eggs and larvae drifting onto the shelf to reside as juveniles and young adults, then finally returning to the Basin at ages five and older. If adult fish from the EBS shelf do indeed migrate into the Basin (where they are currently subjected to high exploitation rates), potential for an adverse impact exists. However, the magnitude of any such impact cannot yet be estimated. The Basin fishery also has the potential to impact the northern sea lion population, designated as threatened under the ESA. Since sea lions eat pollock, there is concern that reduced pollock abundance, particularly near rookeries along the Aleutian chain, could cause further harm.

Bycatch of Fully U.S.-Utilized Groundfish Species

Amendment 12 to the BS/AI Groundfish FMP authorizes the Council to establish allowable levels of incidental catch of groundfish species that are fully utilized by domestic fishermen. Previous regulations required joint venture operations to discard such species, but without any limit to the amount of discard.

In 1990, joint venture fisheries targeted only on yellowfin sole and "other flatfish." Bycatch allowances of pollock, Pacific cod, arrowtooth flounder, and rock sole were made by the Council. There were no joint venture fisheries in 1991. If the Council wishes to allow joint venture fisheries in 1992, data useful for calculating potential bycatch allowances are presented in Appendix D.

Seasonal Allocation of the Pollock TAC

Amendment 14 to the BS/AI Groundfish FMP provides for the allocation of the pollock TAC between a roe season (Jan. 1 - April 15) and a non-roe season (June 1 - Dec. 31). The Plan Team's report on this topic is attached as Appendix E.

Seasonal Allocation of Crab and Halibut PSC Apportionments

Amendment 16 to the BS/AI Groundfish FMP provides for the allocation of crab and halibut bycatch apportionments on a seasonal basis. The Plan Team's report on this topic is attached as Appendix F.

Stock Synthesis Modeling of Pacific Ocean Perch

Current and previous assessments of POP have relied on stock reduction analysis. However, stock synthesis provides the potential for a more complete assessment of this species. Currently, AFSC scientists are developing a new analysis for POP

using the stock synthesis approach. The Plan Team anticipates that the results of this analysis will be available in time for the final edition of the SAFE report. A summary of the method and preliminary results is contained in Appendix G.

Definitions of Common Acronyms

Although a conscientious attempt has been made to see that each acronym used in this SAFE report is defined at the point of its first occurrence, a collection of such definitions has also been included as Appendix H.

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Wespestad, V. G., and J. J. Traynor. 1990. Walleye pollock. In L. L. Low and R. E. Narita (editors), Condition of groundfish resources in the Bering Sea-Aleutian Islands region as assessed in 1988, p. 19-43. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-178.

Table 6-- Summary of stock abundance and exploitation strategies for the eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof district (518) in 1992. Biomass figures are in metric tons.

Species	Area	Exploitable Biomass	B_{MSY}	F_{OF}[a]	Harvest Strategy
Pollock	EBS	6,060,000	6,000,000	0.38	$F_{0.1}$=0.31
	AI	330,200	289,000	0.38	$F_{0.1}$=0.31
	518	600,000		0.38	$F_{0.1}$=0.31
Pacific cod		941,000	926,000	0.16	F_{MSY}=0.16
Yellowfin sole		2,660,000		0.17	$F_{0.1}$=0.14
Greenland turbot		307,000	407,000	0.05	F =0.02[b]
Arrowtooth flounder		646,600		0.25	$F_{0.1}$=0.18
Rock sole		1,400,600	904,000[c]	0.18	F_{MSY}=0.18
Other flatfishes		1,248,300		0.23	F =0.18[d]
Sablefish	EBS	26,400		0.18	$F_{0.1}$=0.13
	AI	27,700		0.18	$F_{0.1}$=0.13
POP complex					
True POP	EBS	90,900	75,200	0.07	F_{MSY}=0.07
Sharp/Northern[e]	EBS	23,100		0.06	M =0.06
Short/Rougheye[f]	EBS	13,900		0.03	M =0.03
True POP	AI	211,200	161,000	0.08	F_{MSY}=0.08
Sharp/Northern[e]	AI	67,100		0.06	M =0.06
Short/Rougheye[f]	AI	51,500		0.03	M =0.03
Other rockfish	EBS	8,000		0.05	M =0.05
	AI	18,500[h]		0.05	M =0.05
Atka mackerel		n/a[h]		F_{his}[g]	F_{his}[g]
Squid		n/a[h]		F_{his}[g]	F_{his}[g]
Other species		827,400[c]		F_{his}[g]	F_{his}[g]

a. Fishing mortality rate corresponding to overfishing.
b. Harvest strategy for Greenland turbot is ad hoc.
c. Eastern Bering Sea only.
d. Rock sole harvest rate was used as a proxy for this complex.
e. Sharpchin rockfish and northern rockfish.
f. Shortraker rockfish and rougheye rockfish.
g. Fishing mortality rate corresponding to the historic average catch.
h. Not available.

Table 7-- Estimates of maximum sustainable yield (MSY) and acceptable biological catch (ABC) for 1991 and 1992 for groundfish in the eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof district (518). Where current MSY estimates encompass a range of values, the midpoint has been listed. Figures are in metric tons.

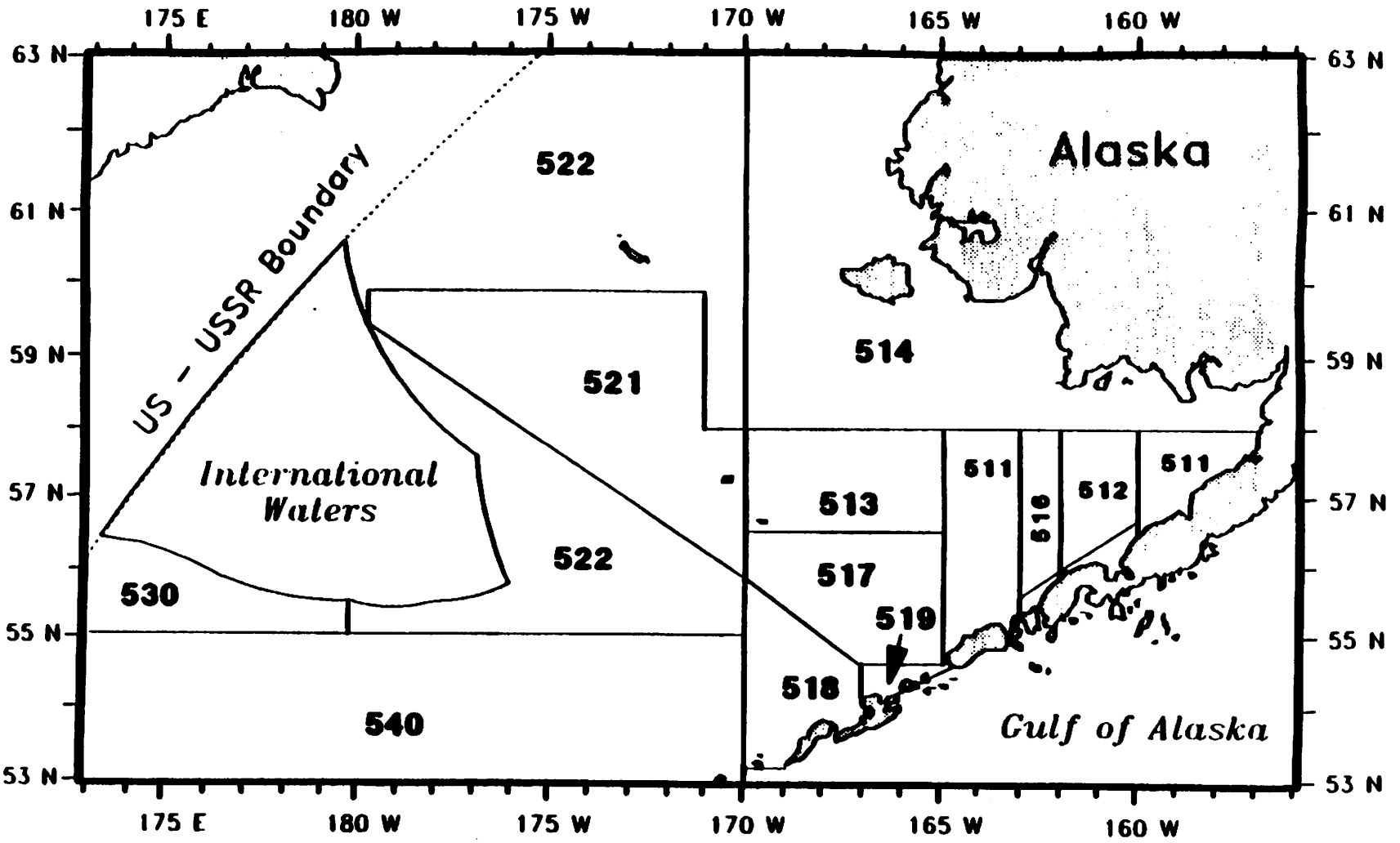
Species	Area	MSY	ABC(1991)	ABC(1992)
Pollock	EBS	1,875,000	1,676,000	1,421,000
	AI	109,800[a]	101,460	75,900
	518	n/a[a]	0	138,000
Pacific cod		192,000	229,000	225,000
Yellowfin sole		219,500	250,600	277,000
Greenland turbot		25,200	7,000	7,000
Arrowtooth flounder		59,000	116,400	116,400
Rock sole		160,200	246,500	246,500
Other flatfish		148,500	219,700	219,700
Sablefish	EBS	3,600	3,100	3,100
	AI	3,800	3,200	3,200
POP complex				
True POP	EBS	5,000[a]	4,570	6,400
Other POP complex	EBS	n/a[a]	1,670	0
Sharp/Northern[b]	EBS	n/a[a]	0	1,400
Short/Rougheye[c]	EBS	n/a[a]	0	400
True POP	AI	12,100[a]	10,775	16,900
Sharp/Northern[b]	AI	n/a[a]	1,245	4,000
Short/Rougheye[c]	AI	n/a[a]	3,440	1,400
Other rockfish	EBS	400	400	400
	AI	900[a]	925	900
Atka mackerel		n/a[a]	24,000	24,400
Squid		10,000	3,800	3,600
Other species		62,900	28,700	27,100
Groundfish complex		2,887,900	2,932,485	2,819,700

a. Not available.
b. Sharpchin rockfish and northern rockfish.
c. Shortraker rockfish and rougheye rockfish.

Table 8-- Summary of stock abundance and 1992 ABC estimates for groundfish in th eastern Bering Sea (EBS), Aleutian Islands (AI), and Bogoslof distric (518). Biomass and ABC figures are in metric tons.

Species	Area	Biomass[a]	Rate[b]	ABC	Relative abundance, trend
Pollock	EBS	6,060,000	$F_{0.1}$	1,421,000	Moderately high, declining
	AI	330,200	$F_{0.1}$	75,900	Not available
	518	600,000	$F_{0.1}$	138,000	Average (?), declining
Pacific cod		941,000	F_{MSY}	225,000	High, declining
Yellowfin sole		2,660,000	$F_{0.1}$[c]	277,000	High, stable
Greenland turbot		307,000	$F_{???}$	7,000	Low, declining
Arrowtooth flounder		646,600	$F_{0.1}$	116,400	Very high, rapid increase
Rock sole		1,400,600	F_{MSY}[d]	246,500	Very high, increasing
Other flatfish		1,248,300	F_{MSY}	219,700	Very high, stable
Sablefish	EBS	26,400	$F_{0.1}$	3,100	Average, declining
	AI	27,700	$F_{0.1}$	3,200	Average, declining
POP complex					
True POP	EBS	90,900	F_{MSY}	6,400	Average, slow increase
Sharp/Northern[e]	EBS	23,100	F=M	1,400	Not available
Short/Rougheye[f]	EBS	13,900	F=M	400	Not available
True POP	AI	211,200	F_{MSY}	16,900	Average, slow increase
Sharp/Northern[e]	AI	67,100	F=M	4,000	Not available
Short/Rougheye[f]	AI	51,500	F=M	1,400	Not available
Other rockfish	EBS	8,000	F=M	400	Average, stable
	AI	18,500	F=M	900	Average, stable
[illegible]a mackerel		n/a[g]	F_{hish}[h]	24,400	Not available
[illegible]id		n/a[g]	F_{hish}	3,600	Not available
[illegible]ner species		827,400	F_{his}	27,100	High, increasing
Groundfish complex				2,819,700	High, stable

a. Projected exploitable biomass for 1992.
b. Harvest strategy.
c. Harvest strategy for Greenland turbot is ad hoc.
d. Rock sole harvest rate was used as a proxy for this complex.
e. Sharpchin rockfish and northern rockfish.
f. Shortraker rockfish and rougheye rockfish.
g. Not available.
h. Fishing mortality rate corresponding to the historic average catch.


175 E
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US - USSR Boundary
International Waters
Alaska
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522
Gulf of Alaska

TABLE 1

BERING SEA/ALEUTIAN ISLANDS GROUNDFISH

Council Recommendations for 1990 and 1991 ABCs, TACs and apportionments (mt)

		1990		1991			
Species	Area	ABC	TAC	ABC	TAC	ITAC*	DAP
Pollock	EBS	1,450,000	1,280,000	1,676,000	1,300,000	1,105,000**	1,105,000
	AI	153,600	100,000	101,460	85,000	72,250***	72,250
Pacific cod		417,000	227,000	229,000	229,000	194,650	194,650
Yellowfin sole		278,900	207,650	250,600	135,000	114,750	114,750
Greenland turbot		7,000	7,000	7,000	7,000	5,950	5,950
Arrowtooth flounder		106,500	10,000	116,400	20,000	17,000	17,000
Rock sole		216,300	60,000	246,500	90,000	76,500	76,500
Other flatfish		188,000	60,150	219,700	64,675	54,974	54,974
Sablefish	EBS	2,700	2,700	3,100	3,100	2,635	2,635
	AI	4,500	4,500	3,200	3,200	2,720	2,720
POP complex	EBS	6,300	6,300				
True POP	EBS			4,570	4,570	3,885	3,885
Other POP complex	EBS			1,670	1,670	1,420	1,420
POP complex	AI	16,600	6,600				
True POP	AI			10,775	10,775	9,159	9,159
Sharp/Northern	AI			3,440	3,440	2,924	1,058
Short/Rougheye	AI			1,245	1,245	1,058	2,924
Other rockfish	EBS	500	500	400	400	340	340
	AI	1,100	1,100	925	925	786	786
Atka mackerel		24,000	21,000	24,000	24,000	20,400	20,400
Squid		10,000	500	3,800	1,000	850	850
Other species		55,500	5,000	28,700	15,000	12,750	12,750
BS/AI TOTAL		2,938,500	2,000,000	2,932,485	2,000,000	1,700,000	1,700,000

POP: Pacific Ocean Perch (Sebastes Alutus)

Other POP: Rougheye, Shortraker, Sharpchin and Northern rockfish

* Recommended TAC less 15%

** Roe Season (1/1-4/15): 441,500 mt
Non-Roe Season (6/1-12/31): 663,500 mt

*** The Council did not divide the AI pollock TAC into roe & non-roe seasonal allowances.

TABLE 2 BERING SEA/ALEUTIAN ISLANDS GROUNDFISH

Preliminary 1992 SSC recommended ABC, AP recommended TAC and apportionments (mt)

		1991			Plan Team	SSC		Advisory Panel	
Species	Area	ABC	TAC	Catch *	ABC	Seasons	ABC	TAC	DAP
Pollock	EBS	1,676,000	1,300,000	1,280,184	1,421,000	Roe (1/1-4/15) Non-Roe (6/1-12/31)			
	AI	101,460	85,000	78,245	75,900	Roe (1/1-4/15) Non-Roe (6/1-12/31)			
	518	0	0	0	138,000	Roe (1/1-4/15) Non-Roe (6/1-12/31)			
Pacific cod		229,000	229,000	153,695	225,000				
Yellowfin sole		250,600	135,000	74038	277,000				
Greenland turbot		7,000	7,000	6937	7,000				
Arrowtooth flounder		116,400	20,000	11986	116,400				
Rock sole		246,500	90,000	43167	246,500				
Other flatfish		219,700	64,675	25508	219,700				
Sablefish	EBS	3,100	3,100	1018	3,100				
	AI	3,200	3,200	1682	3,200				
POP complex									
True POP	EBS	4,570	4,570	4,289	6,400				
Other POP complex	EBS	1,670	1,670	492	0				
Sharp/Northern	EBS	0	0	0	1,400				
Short/Rougheye	EBS	0	0	0	400				
True POP	AI	10,775	10,775	2183	16,900				
Other POP complex	AI			349					
Sharp/Northern	AI	3,440	3,440		4,000				
Short/Rougheye	AI	1,245	1,245		1,400				
Other rockfish	EBS	400	400	364	400				
	AI	925	925	425	900				
Atka mackerel		24,000	24,000	24,816	24,400				
Squid		3,800	1,000	1,302	3,600				
Other species		28,700	15,000	14,281	27,100				
BS/AI TOTAL		2,932,485	2,000,000	1,724,961	2,819,700				

* DAP catch data through September 9, 1991.

AGENDA D-1(d)(3a)

TABLE 3

BERING SEA/ALEUTIAN ISLANDS GROUNDFISH

Preliminary 1992 Council Recommendations for ABCs, TACs and Apportionments (metric tons)

Sep-91

Species	Seasons	Area	Council Recommendations ABC	TAC	DAP
Pollock	Roe (1/1- 4/15)	EBS			
		AI			
		518			
	Non-Roe (6/1 -12/31)	EBS			
		AI			
		518			
Pacific cod					
Yellowfin sole					
Greenland turbot					
Arrowtooth flounder					
Rock sole					
Other flatfish					
Sablefish		EBS			
		AI			
POP complex					
True POP		EBS			
Sharp/Northern		EBS			
Short/Rougheye		EBS			
True POP		AI			
Sharp/Northern		AI			
Short/Rougheye		AI			
Other rockfish		EBS			
		AI			
Atka mackerel					
Squid					
Other species					
BERING SEA/ALEUTIAN ISLANDS TOTAL					

TABLE 4. 1991 PSC APPORTIONMENTS

1991 BSAI PSC Apportionments to Trawl Fisheries

Fishery	Halibut Primary (mt)	Halibut Secondary	Herring (mt)	Red King Crab (Zone 1)	C. bairdi (Zone 1)	C. bairdi (Zone 2)
DAP Flatfish	660	800	83	40,000	100,000	825,000
Rock Sole	908	1,100	0	150,000	700,000	300,000
DAP Deep	165	200	8	0	0	50,000
DAP Other	2,667	3,233	158	10,000	200,000	1,825,000
MW Pollock	n/a	n/a	584	n/a	n/a	n/a
TOTAL	**4,400**	**5,333**	**833**	**200,000**	**1,000,000**	**3,000,000**

Quarterly Allowances of Halibut PSC Apportionment to DAP "Other" Fishery

Quarter	Percent	mt
1	45	1,455
2	40	1,293
3	15	485
4		
Total		**3,233**

Table 5. 1992 BERING SEA BYCATCH WORKSHEET

HALIBUT

PRIMARY CAP: 4400 MT (ZONE 1, 2H)

1991 Apportionments	(mt)
DAP Flatfish	660
Rock Sole	908
DAP Deep	165
DAP Other	2,667

1992 Council Recommendations

	DAP Flatfish	DAP Rock sole	DAP Deep	DAP Other
Quarter 1				
Quarter 2				
Quarter 3				
Quarter 4				

HALIBUT

SECONDARY CAP: 5333 MT (BSAI-wide)

1991 Apportionments	(mt)
DAP Flatfish	800
Rock Sole	1,100
DAP Deep	200
DAP Other	3,233

1992 Council Recommendations

	DAP Flatfish	DAP Rock sole	DAP Deep	DAP Other
Quarter 1				
Quarter 2				
Quarter 3				
Quarter 4				

C. bairdi
TANNER CRAB

ZONE 1 CAP: 1,000,000 animals

1991 Apportionments	
DAP Flatfish	100,000
Rock Sole	700,000
DAP Deep	0
DAP Other	200,000

1992 Council Recommendations

	DAP Flatfish	DAP Rock sole	DAP Deep	DAP Other
Quarter 1				
Quarter 2				
Quarter 3				
Quarter 4				

C. bairdi
TANNER CRAB

ZONE 2 CAP: 3,000,000 animals

1991 Apportionments	
DAP Flatfish	825,000
Rock Sole	300,000
DAP Deep	50,000
DAP Other	1,825,000

1992 Council Recommendations

	DAP Flatfish	DAP Rock sole	DAP Deep	DAP Other
Quarter 1				
Quarter 2				
Quarter 3				
Quarter 4				

RED KING CRAB

CAP: 200,000 animals (Zone 1 only)

1991 Apportionments	
DAP Flatfish	40,000
Rock Sole	150,000
DAP Deep	0
DAP Other	10,000

1992 Council Recommendations

	DAP Flatfish	DAP Rock sole	DAP Deep	DAP Other
Quarter 1				
Quarter 2				
Quarter 3				
Quarter 4				

HERRING

CAP: 1 % OF BSAI BIOMASS

1991 Apportionments (mt)	
DAP Flatfish	83
Rock Sole	0
DAP Deep	165
DAP Other	458
MW Pollock	584

1992 Council Recommendations

	DAP Flatfish	DAP Rock sole	DAP Deep	DAP Other	MW Pollock
Quarter 1					
Quarter 2					
Quarter 3					
Quarter 4					