Public Testimony Sign-Up Sheet

Agenda Item D1(c)(d) AM 80/85 Groundfish Specs

	NAME (PLEASE PRINT)	AFFILIATION
~~1~~	PAUL McG, Brent Paine, Lori Swanson	Industry
~~2~~	Julie Penny	AFDB
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NOTE to persons providing oral or written testimony to the Council: Section 307(1)(I) of the Magnuson-Stevens Fishery Conservation and Management Act prohibits any person " to knowingly and willfully submit to a Council, the Secretary, or the Governor of a State false information (including, but not limited to, false information regarding the capacity and extent to which a United State fish processor, on an annual basis, will process a portion of the optimum yield of a fishery that will be harvested by fishing vessels of the United States) regarding any matter that the Council, Secretary, or Governor is considering in the course of carrying out this Act.

AGENDA D-1(c,d)
OCTOBER 2007

MEMORANDUM

TO: Council, SSC, and AP Members

FROM: Chris Oliver
Executive Director

ESTIMATED TIME
4 HOURS
(all D-1 items)

DATE: September 26, 2007

SUBJECT: 2008-2009 BSAI and GOA Groundfish Specifications

ACTION REQUIRED

(c) Report from NMFS on specifications per Amendments 80 and 85.
(d) Recommend proposed groundfish specifications for 2008/2009.

BACKGROUND

Starting in 2005, the Council implemented a new policy of adopting proposed BSAI and GOA groundfish specifications for a two-year period each October with final specifications set each December. Further, the Council adopted a biennial cycle for some GOA and AI groundfish stocks, timed for when trawl surveys provide new data. Therefore, 2008 specifications that were adopted in December 2006 have been published in the *Federal Register* and will start the fishery on January 1, 2008. The proposed specifications for review at this meeting will be published in the proposed rule. Final specifications scheduled for review in December 2007 will replace those that started the 2008 fisheries, after they are published in the final rule in late February/early March 2008.

During their respective meetings on September 20, 2007 the BSAI and GOA Groundfish Plan Teams recommended proposed groundfish specifications for 2008 and 2009 for publication in the proposed rule (Item D-1(d)(1)). The recommendations are based on rollovers of the established 2008 final specifications rather than projections for Tier 1 to 3 stocks that have been made previously. The teams felt the rollover approach was preferable to the projection model because the former is based upon stock assessments that used the best information available at the time. The reports from the GOA plan team meeting and BSAI plan team meeting are attached as Item D-1(d)(2). The joint plan team report will be provided at the meeting.

Bering Sea/Aleutian Islands. Prohibited Species Catch (PSC) limits are established for halibut, red king crab, Tanner crab, opilio crab, and herring. These PSC limits are further allocated among gear types and apportioned by target fisheries. The 2008 PSC limits and apportionments, as implemented in regulation, are attached as Item D-1(d)(3).

The BSAI Plan Team adopted the IPHC staff recommendations for 2008 halibut discard mortality rates (DMRs) for the community development quota fisheries (CDQ), which were based on mean DMRs calculated from 1998-2006 data (at right). The rates for the

CDQ Fisheries	
Gear/Target	Recommended DMR
Trawl	
Atka mackerel	85
Bottom pollock	86
Rockfish	82
Flathead sole	87
Pelagic pollock	90
Rock sole	86
Yellowfin sole	86
Pot	
Sablefish	14
Longline	
Pacific cod	10
Turbot	4

non-CDQ fisheries have been set in regulations through 2009. Rates for non-CDQ fisheries have already been published in regulation for 2007-2009 (Item D-1(d)(4)).

The BSAI and GOA teams endorsed an interagency staff recommendation that the Council may wish to consider revising requirements in regulations for escape panels on all pots that catch sablefish in the BSAI (pots are not allowed in the GOA). The proposal is to have a rectangular panel of the same dimensions as the currently required slash panel (18 inches in length). This recommendation came as a result of a December 2005 Council request for information regarding a number of management issues related to sablefish (see appendix to the joint team minutes). However, ADF&G staff has noted that 1) Canadian studies that support this recommendation used conical traps and not rectangular traps and 2) crab pots are also required to have escape rings. Additional staff work should occur before a regulatory amendment is initiated.

Gulf of Alaska. Prohibited Species Catch (PSC) limits are established for halibut. Total halibut PSC limits for all fisheries and gear types total 2,300 mt. The halibut PSC apportionments recommended based upon the 2007 apportionments are attached as Item D-1(d)(5).

GOA TAC Considerations for State Pacific Cod Fishery: Since 1997, the Council has reduced the GOA Pacific cod TAC to account for removals of not more than 25% of the Federal P. cod TAC from the state parallel fisheries. Using the area apportionments of the 2008 P. cod proposed ABC recommended by the Plan Team (for the proposed rule), the federal TAC for P. cod would be adjusted as listed below.

Proposed 2008 and 2009 Gulf of Alaska Pacific cod ABCs, TACs and state Guideline Harvest Levels (GHLs) (mt).

Specifications	Western	Central	Eastern	Total
ABC	27,846	39,270	4,284	71,400
State GHL	6,961	9,817	428	17,206
(%)	25	25	10	24.1
Federal TAC	20,885	29,453	3,856	54,194

September BSAI Plan Team OFL and ABC Recommendations for 2008-'09

		2007				2008			2009		
Species	Area	OFL	ABC	TAC	Catch	OFL	ABC	TAC	OFL	ABC	TAC
Pollock	EBS	1,640,000	1,394,000	1,394,000	1,168,092	1,431,000	1,318,000		1,431,000	1,318,000	
	AI	54,500	44,500	19,000	2,394	50,300	41,000		50,300	41,000	
	Bogoslof	48,000	5,220	10	0	48,000	5,220		48,000	5,220	
Pacific cod	BSAI	207,000	176,000	170,720	148,349	154,000	131,000		154,000	131,000	
Sablefish	BS	3,520	2,980	2,980	793	3,290	2,970		3,290	2,970	
	AI	3,320	2,810	2,810	915	3,100	2,800		3,100	2,800	
Yellowfin sole	BSAI	240,000	225,000	136,000	116,103	261,000	245,000		261,000	245,000	
Greenland turbot	Total	15,600	2,440	2,440	1,716	16,000	2,490		16,000	2,490	
	BS		1,680	1,680	1,307		1,720			1,720	
	AI		760	760	409		770			770	
Arrowtooth flounder	BSAI	193,000	158,000	20,000	9,441	208,000	171,000		208,000	171,000	
Northern rock sole	BSAI	200,000	198,000	55,000	36,648	271,000	268,000		271,000	268,000	
Flathead sole	BSAI	95,300	79,200	30,000	17,685	92,800	77,200		92,800	77,200	
Alaska plaice	BSAI	241,000	190,000	25,000	19,176	252,000	199,000		252,000	199,000	
Other flatfish	BSAI	28,500	21,400	10,000	5,470	28,500	21,400		28,500	21,400	
Pacific Ocean perch	BSAI	26,100	21,900	19,900	16,166	25,600	21,600		25,600	21,600	
	BS		4,160	2,160	596		4,080			4,080	
	AI total		17,740	17,740	15,570		17,520			17,520	
	WAI		7,720	7,720	7,063		7,620			7,620	
	CAI		5,050	5,050	3,640		5,000			5,000	
	EAI		4,970	4,970	4,867		4,900			4,900	
Northern rockfish	BSAI	9,750	8,190	8,190	1,335	9,700	8,150		9,700	8,150	
Shortraker	BSAI	564	424	424	324	564	424		564	424	
Rougheye	BSAI	269	202	202	151	269	202		269	202	
Other rockfish	BSAI	1,330	999	999	480	1,330	999		1,330	999	
	BS		414	414	157		414			414	
	AI		585	585	323		585			585	
Atka mackerel	Total	86,900	74,000	63,000	27,904	64,200	54,900		64,200	54,900	
	WAI		20,600	9,600	484		15,300			15,300	
	CAI		29,600	29,600	8,030		22,000			22,000	
	EAI/BS		23,800	23,800	19,390		17,600			17,600	
Squid	BSAI	2,620	1,970	1,970	921	2,620	1,970		2,620	1,970	
Other species	BSAI	91,700	68,800	37,355	22,582	91,700	68,800		91,700	68,800	
Total	BSAI	3,188,973	2,676,035	2,000,000	1,596,645	3,014,973	2,642,125		3,014,973	2,642,125	

Sources: 2007 and 2008 OFLs, ABCs, and TACs from the specifications adopted by the Council in 12-07; 2009 OFLs and ABCs equal to 2008; 2007 catches through 9-8-07 from AKR Catch Accounting .

September GOA Plan Team OFL and ABC Recommendations for 2008-'09 (Page 1)

		2007				2008			2009		
Species	Area	OFL	ABC	TAC	Catch	OFL	ABC	TAC	OFL	ABC	TAC
Pollock	W(61)		25,012	25,012	9,750		30,308			30,308	
	C(62)		20,890	20,890	17,813		25,313			25,313	
	C(63)		14,850	14,850	6,525		17,995			17,995	
	WYAK		1,398	1,398	86		1,694			1,694	
	Subtotal	87,220	62,150	62,150	34,174	105,490	75,310		105,490	75,310	
	EYAK/SEO	8,209	6,157	6,157	0	8,209	6,157		8,209	6,157	
	Total	95,429	68,307	68,307	34,174	113,699	81,467		113,699	81,467	
Pacific cod	W		26,855	20,141	13,365		27,846			27,846	
	C		37,873	28,405	17,849		39,270			39,270	
	EYAK/SEO		4,131	3,718	55		4,284			4,284	
	Total	97,600	68,859	52,264	31,269	86,000	71,400		86,000	71,400	
Sablefish	W		2,470	2,470	1,864		2,458			2,458	
	C		6,190	6,190	4,688		6,159			6,159	
	WYAK		2,280	2,280	1,511		2,269			2,269	
	SEO		3,370	3,370	2,657		3,353			3,353	
	Total	16,906	14,310	14,310	10,720	15,803	14,239		15,803	14,239	
Deep water flatfish	W		420	420	8		430			430	
	C		4,163	4,163	208		4,296			4,296	
	WYAK		2,677	2,677	2		2,763			2,763	
	EYAK/SEO		1,447	1,447	8		1,494			1,494	
	Total	10,431	8,707	8,707	226	11,412	8,983		11,412	8,983	
Rex sole	W		1,147	1,147	409		1,122			1,122	
	C		5,446	5,446	2,021		5,327			5,327	
	WYAK		1,037	1,037	1		1,014			1,014	
	EYAK/SEO		1,470	1,470	0		1,437			1,437	
	Total	11,900	9,100	9,100	2,431	11,600	8,900		11,600	8,900	
Shallow water flatfish	W		24,720	4,500	274		24,720			24,720	
	C		24,258	13,000	5,570		24,258			24,258	
	WYAK		628	628	0		628			628	
	EYAK/SEO		1,844	1,844	0		1,844			1,844	
	Total	62,418	51,450	19,972	5,844	62,418	51,450		62,418	51,450	
Flathead sole	W		10,908	2,000	674		11,464			11,464	
	C		26,054	5,000	2,053		27,382			27,382	
	WYAK		2,091	2,091	2		2,198			2,198	
	EYAK/SEO		57	57	0		60			60	
	Total	48,658	39,110	9,148	2,729	51,146	41,104		51,146	41,104	
Arrowtooth flounder	W		20,852	8,000	3,007		21,164			21,164	
	C		139,582	30,000	16,860		141,673			141,673	
	WYAK		16,507	2,500	58		16,754			16,754	
	EYAK/SEO		7,067	2,500	60		7,172			7,172	
	Total	214,828	184,008	43,000	19,985	218,020	186,763		218,020	186,763	

Sources: 2007 and 2008 OFLs, ABCs, and TACs from the specifications adopted by the Council in 12-07; 2009 OFLs and ABCs equal to 2008; 2007 catches through 9-8-07 from AKR Catch Accounting .

September GOA Plan Team OFL and ABC Recommendations for 2008-'09 (Page 2)

		2007				2008			2009		
Species	Area	OFL	ABC	TAC	Catch	OFL	ABC	TAC	OFL	ABC	TAC
Other slope rockfish	W		577	577	246		577			577	
	C		386	386	307		386			386	
	WYAK		319	319	46		319			319	
	EYAK/SEO		2,872	200	42		2,872			2,872	
	Total	5,394	4,154	1,482	641	5,394	4,154		5,394	4,154	
Northern rockfish	W		1,439	1,439	1,098		1,383			1,383	
	C		3,499	3,499	60		3,365			3,365	
	E		0	0	0		0			0	
	Total	5,890	4,938	4,938	1,158	5,660	4,748		5,660	4,748	
Pacific ocean perch	W	4,976	4,244	4,244	4,371	5,030	4,291		5,030	4,291	
	C	8,922	7,612	7,612	133	9,019	7,694		9,019	7,694	
	WYAK		1,140	1,140	1,242		1,153			1,153	
	EYAK/SEO	3,260	1,640	1,640	0	3,296	1,659		3,296	1,659	
	E (subtotal)	3,260	2,780	2,780	1,242	3,296	2,812		3,296	2,812	
	Total	17,158	14,636	14,636	5,746	17,345	14,797		17,345	14,797	
Shortraker	W		153	153	188		153			153	
	C		353	353	141		353			353	
	E		337	337	224		337			337	
	Total	1,124	843	843	553	1,124	843		1,124	843	
Rougheye	W		136	136	69		137			137	
	C		611	611	166		614			614	
	E		241	241	141		242			242	
	Total	1,148	988	988	376	1,197	993		1,197	993	
Pelagic shelf rockfish	W		1,466	1,466	590		1,752			1,752	
	C		3,325	3,325	74		3,973			3,973	
	WYAK		307	307	293		366			366	
	EYAK/SEO		444	444	1		531			531	
	Total	6,458	5,542	5,542	958	8,186	6,622		8,186	6,622	
Demersal shelf rockfish	SEO	650	410	410	153	650	410		650	410	
Thornyhead rockfish	W		513	513	330		513			513	
	C		989	989	174		989			989	
	E		707	707	156		707			707	
	Total	2,945	2,209	2,209	660	2,945	2,209		2,945	2,209	
Atka mackerel	Total	6,200	4,700	1,500	1,216	6,200	4,700		6,200	4,700	
Big skate	W		695	695	67		695			695	
	C		2,250	2,250	763		2,250			2,250	
	E		599	599	7		599			599	
	Total	4,726	3,544	3,544	837	4,726	3,544		4,726	3,544	
Longnose skate	W		65	65	36		65			65	
	C		1,969	1,969	500		1,969			1,969	
	E		861	861	219		861			861	
	Total	3,860	2,895	2,895	755	3,860	2,895		3,860	2,895	
Other skates	Total	2,156	1,617	1,617	846	2,156	1,617		2,156	1,617	
Other species	Total	NA	NA	4,500	2,008	NA	NA		NA	NA	
Total	GOA	615,879	490,327	269,912	123,285	629,541	511,838		629,541	511,838	

Sources: 2007 and 2008 OFLs, ABCs, and TACs from the specifications adopted by the Council in 12-07; 2009 OFLs and ABCs equal to 2008; 2007 catches through 9-8-07 from AKR Catch Accounting .

Gulf of Alaska Plan Team Minutes

The meeting of the Gulf of Alaska groundfish Plan Team convened on September 20th, 2007 at 9am at the Alaska Fishery Science Center, Seattle, WA.
Members of the GOA plan Team in attendance included:

Jim Ianelli	NOAA/AFSC REFM (GOA co-chair)
Diana Stram	NPFMC (GOA co-chair)
Sandra Lowe	NOAA AFSC REFM
Jeff Fujioka	NOAA AFSC ABL
Jon Heifetz	NOAA AFSC ABL
Robert Foy	NOAA
Nick Sagalkin	ADF&G
Cleo Brylinsky	ADF&G
Tom Pearson	NOAA AKRO
Ken Goldman	ADF&G
Sarah Gaichas	NOAA AFSC REFM
Steve Hare	IPHC

Team member Ward Testa (NMML) was absent. Joint Team members Kathy Kuletz and Theresa Tsou attended the concurrent BSAI meeting. Approximately 10 state and agency staff and members of the public also attended. Names of attendees are included in the Joint Plan Team minutes.

The revised agenda for the meeting is included in the Joint Plan Team minutes.

Echo Integration Trawl (EIT) Survey

Mike Guttormsen provided the team with an overview of the winter EIT surveys in the Gulf of Alaska. Pollock biomass in Sanak Trough was consistent with estimates from previous years, with the exception of last year where an abnormally high amount of pollock were found north of Sanak Island. Biomass results from the Shumagins, Shelikof Strait, and Chirikof surveys were lower than expected. Results from the Morzhovoi Bay section were also low. This is the 2nd year returning to this region primarily for exploratory purposes. Plans for the 2008 Shelikof/Chirikof survey include expanded coverage along the shelf break south of Kodiak Island. Future survey effort is also planned for the shelf break south of the Shumagins as well as in Pavlof Bay.

For the Shelikof Strait region, the biomass estimate was 100k t lower than from 2006 while this year the biomass found around the Shumagins was 20k t lower. Sum of total biomass from all areas from was about 500k t in 2006 whereas this year the value was close to 300k t. The Team discussed the effect of survey timing on abundance and distribution of pollock. Mike noted that it might be better to arrive at Sanak area earlier in the year based on biological samples from that region. Patterns of fish found in Marmot Bay appear to be mainly immature/young fish despite efforts to look for adults suggesting that fish may be moving through that area.

Julie Bonney (Kodiak) noted that the commercial CPUE was high during this year's winter fishery. The transect spacing (7 miles) allowed the survey to proceed without interacting with the fishery.

This year the MACE group continued to do calibrations designed to compare the RV Miller Freeman with RV Oscar Dyson. This work will be critical to link future surveys using the new vessel.

A variety of research topics related to acoustic sampling for pollock was discussed. In particular, developments on correcting the potential biases with smaller fish were presented. Currently, the target strength-length relationship is to be the same. New methods indicate that it could be separated for different portions of the populations. For example, spawning pollock may be able to be integrated separately from juveniles.

Regarding plans, an extended shelf break survey to the east of Chirikof was announced while Marmot Bay area will be dropped next year due to timing. The Chiniak gully sampling will also be discontinued.

Martin Dorn noted that next week he will be working with Aleutians East Borough on a cooperative research project. This project will operate from a commercial boat based in Sand Point equipped with an echo sounder to evaluate the applicability for using this on this vessel for survey work. Biomass estimated will be attempted as a feasibility study.

Prince William Sound (PWS) component of GOA pollock assessment:

Martin Dorn provided an overview of the treatment of the PWS component of the annual pollock assessment and the rationale behind the current methodology for its inclusion. The survey does not include PWS thus any contribution to the overall GOA pollock from this region are not assessed by the bottom trawl survey. The methodology for inclusion of PWS in the assessment provides a compromise for how to incorporate dated ADF&G survey data in the assessment. The only survey data that has been made available to the assessment author thus far is from 1999. An expansion factor of 1% is applied to all the NMFS surveys to account for this biomass contribution from PWS. For management purposes, the resulting ABC for central and western GOA is then reduced by the guideline harvest level for PWS. Previous attempts to account for this biomass have been somewhat ad hoc and there has been only limited additional effort by ADF&G to survey this area. Comparisons of ADF&G and NMFS survey gear have indicated that the NMFS net is more effective on similar bottom areas. Thus it is likely that the ADF&G estimate of biomass is biased low. Other considerations are that the PWS fishery has historically been a spawning fishery at the entrance to PWS and it is not clear if the fish being caught are coming from PWS or from other areas of the gulf. Some genetic work has been done exploring the extent to which the spawning populations are distinct between the two regions. Results indicate some evidence of stock structure, but overall results are inconclusive.

The Team discussed the adoption of the expansion measure and noted inconsistency in the adoption of this measure with previous SSC recommendations.

Ken Goldman reviewed current efforts by the State and their plans to better assess pollock in the future. He reviewed the current biennially scheduled bottom trawl survey in the region, noting that it is focused upon estimation of Tanner crab populations and does an admittedly poor job of assessing pollock. The pollock estimate for this year in particular is very poor (the focus was on sampling in fjords given the stated objective for Tanner crab estimation). A pollock GHL is provided every 2 years. The Tanner crab survey has expanded historical stations which may provide better estimates of pollock in the future. He indicated a plan to roll over the current GHL in the short term while the State works to address longer term issues with assessing pollock in PWS. One proposed methodology would be to evaluate the relative percentage of the GHL to the ABC and take the highest percentage that has been taken as a constant ratio to be applied annual

to set the GHL. Julie Bonney questioned why the highest would be selected and not the average. She also requested additional clarification on the necessity of rolling over the GHL rather than immediately moving to a floating method. Ken indicating that timing between now and GHL-setting might preclude the ability to develop a floating method in a suitable time period.

The last survey completed by the State was in 2005 and was utilized to determine the GHL at that time. Martin noted that he was unaware that pollock biomass estimates from additional years were available. Ken will arrange to have biomass estimates and size composition data from 2001, 2003 and 2005 provided to NMFS. Nick also noted that State data from Kodiak regions will be provided for assessment purposes as well.

GOA summer bottom trawl survey update

Mark Wilkins provided the Team with an overview of results from the 2007 summer GOA bottom trawl survey. The survey began May 25 in Dutch Harbor with fishing operations starting around the end of May through to August 4th. Three vessels each ran for 70 days over four legs. There were 820 stations (compared to 825 planned) which is an increase in the number of stations that were allocated for the 2005 survey. The methodology follows 5x5 km grid squares to 1,000m depths with some delineated as untrawlable areas from previous surveys. A discussion of methodology ensued dealing with stations allocations among strata. Stations are randomly selected from available (trawlable) grids within a stratum. As part of the response to the 2006 rockfish CIE review, methods to delineate untrawlable areas using acoustics are underway.

As in past years, arrowtooth flounder was the most abundant species encountered. High total catch percentages of pacific ocean perch, pollock, halibut, flatfish and Pacific cod were also encountered. More pacific hake was found than was anticipated in this survey. Final survey biomass estimates by species are not yet available.

Mark reviewed at the median date of the survey over the past years as a measure of change in the schedule and possible impact on the survey results. He noted that there is difficulty in contracting vessels as the survey competes with their participation in the commercial fishery. Between 1993 and 1996, the survey scheduling was adjusted in order to allow for fishing of pollock in the B season, leading to approximately a one month shift in the median survey date from these years on. In recent years the trend in median date is beginning to move later as vessels are more willing to be flexible about pollock allocations.

Mark indicated that survey results by species including biomass estimate and size composition will be available to stock assessment authors by the end of next week. Chris Lunsford noted that it is becoming progressively more difficult to adhere to assessment deadlines without sufficient time to conduct analyses once survey data are available, and requested if preliminary data could be made available to facilitate the stock assessment and review process. Even an indication of preliminary results or preview of trend could assist in meeting the short stock assessment timing. Mark noted that this might be possible in the future but there is always the risk that preliminary data might need to be revised later in order to address potential problems found in final editing.

The Team wished to commend Mark and all of the survey staff for pulling together a successful survey under extremely limited timing for planning and implementation. The Team understands that Mark and his staff were under the constant threat of budget constraints limiting or eliminating the GOA survey and that upon approval they were able to quickly design, implement and staff the survey under very limited timing. The Team again emphasizes previous comments regarding the absolute necessity of the continuation of this survey in order to acquire the information integral to assessing and managing fish stocks in the GOA.

Proposed specifications:

The Team discussed the proposed specifications for 2008-2009 that are used to establish the proposed rule. This year the Team is recommending a rollover of the actual specification set for 2008 for both 2008 and 2009 for the proposed rule. They noted that the added work of staff timing takes away from critical assessment work. The Team concurred that at this time of year, staff are better off focusing on assessments rather than projections that will be updated in a few months time.

The Team felt that this was an improvement over previous years given that A) the 2008 specifications were based upon stock assessments using the best information at that time combined with B) the necessity of allowing additional staff time to work upon the assessments upon which the actual final rule for specifications will be made.

The Team adopted the rollover 2008/09 ABCs and OFLS for the proposed specifications as listed in the table with the 1mt change noted by Tom Pearson under the total sablefish ABC.

Timing and Considerations for November Plan Team meeting

She commented that the plan for updating this assessment is to incorporate the new survey information for central region (CSEO) which was surveyed this year. Two areas could have been surveyed this year, EYKT or CSEO. CSEO was selected of the two possible regions due to the fact that while both are impacted by the halibut longline fishery, CSEO has additional pressure from the sportcharter fleet. Roughly 60 transects were conducted in this region and she will incorporate the updated biomass estimates for this area into the stock assessment.

The Team discussed the need to ensure authors follow the SAFE guidelines and requested that the organization of the flatfish chapter be changed to match the current management structure. Also, all Team members were urged to work on summaries prior to the next meeting to make efficient use of time during the week.

The team discussed the compressed time schedule for the November meeting due to the federal holiday which has compressed the timing down to 4 days. The Team notes that given that it is a year in which full assessments are being provided in the GOA, that timing will be very constrained. Information will be provided to Team members as soon as possible regarding summary assignments, a template for each summary and a draft agenda for the meeting in order to alleviate some of the workload during the week for compiling summaries of assessments. The Team notes that the meeting will run through the end of the day on Friday November 16th and all Team members should plan their travel accordingly.

The meeting adjourned at 12pm.

BSAI Groundfish Plan Team Report
AFSC- Seattle, WA
September 20, 2007

Loh-Lee Loh (AFSC), Chair
Grant Thompson (AFSC), Special Envoy to the SSC
Jane DiCosimo (NPFMC), Coordinator
Dave Carlile (ADF&G)
Andy Smoker (AKRO)
Dan Lew (AFSC)
Brenda Norcross (UAF)
Ivan Vining (ADF&G)
Kerim Aydin (AFSC)
Brenda Norcross (IPHC)
Lowell Fritz (NMML)
Kathy Kuletz (USFWS)

The BSAI Groundfish Plan Team convened on Thursday, September 20, 2006, at 9:00 am. Mike Sigler was absent due to a concurrently scheduled meeting. Fourteen members of the public and ten agency staff attended parts of the meeting.

Bogoslof Survey Neal Williamson summarized the 2007 Bogoslof EIT pollock survey from the *RV Miller Freeman*. The main distribution of young pollock has been near Umnak and Samalga Pass since 2000. The survey results are quite similar to last year's. One mode of young pollock occurred at 47 cm in Samalga Pass, with another mode at 62 cm in Umnak. The majority of fish were found between 400-500 m depth. The gonadosomatic index was the same in the two areas and the same as last year, about 18 percent. A slight increase in biomass was estimated, from 240,000 t to 290,000 t. The most recent dominant year class appears to be from the year 2000 cohort. Recruitment to this region generally occurs as pollock reach age 6 or 7 years old. He noted that no survey is planned for 2008 and that future Bogoslof surveys will be done every other year. The next survey will be conducted from the *RV Oscar Dyson* in 2009.

Loh-lee Low reported that the Donut Hole conference concluded that the ban on fishing in the international zone should continue. A Korean trial fishery was unable to locate fishable quantities of pollock. However this occurred in summer when fish are generally absent.

Echo-integration survey Neal Williamson also reported on the 2007 EBS EIT survey of midwater walleye pollock. Preliminary results indicated low abundance east of the Pribilof Islands. The survey extended into the Russian zone (for the fourth time since 1979). The Russian zone typically contributes a small percent of total biomass estimates from this survey (15% in 1994, 2% in 2002, 9% in 2004, and 5% in 2007). As is typical, juveniles were less abundant in the survey area east of 170°. Overall, about 12% of the biomass was found in that area. The biomass estimate west of 170° to the convention line represented about 83% of the total whereas 5% were found in the Russian zone. Biomass was estimated at 1.5 M t in 2006 and preliminary estimates from 2007 indicate about 2 M t in 2007.

The Team asked if a retrospective analysis could document how the distribution of pollock has changed over time, possibly showing a steady shift towards more northerly distributions. This is something that can be extracted from previous reports and is worth examining for the SAFE report.

A question was posed about variability between the two vessels regarding survey design and results. MACE staff reported that to date, the differences between the two vessels were small, with no significant differences in backscatter in study conducted during the acoustic survey in the Eastern Bering Sea in 2006 (presently in review).

Aleutian Islands Acoustic Survey Steve Barbeaux reported on the 2007 AI cooperative acoustic survey study on the *FV Muir Milach*. Fish surveyed in Onaga and Tanaga passes were in pre-spawning condition. They found low pollock biomass in the study area, with the locations surveyed consistent with

2002 survey. Only 1,300 mt of the 3,000 mt allowance was harvested during the 2007 experimental fishery. They are planning a similar, but expanded, study in 2008. The fishery will not occur under an experimental fishing permit in 2008. Instead, NPRB will fund the study. He reported on complementary studies on the *RV Oscar Dyson* between 173° and 178°) and aerial pinniped surveys. Steve reported that the 2000 year class is dominant in the survey area.

Eastern Bering Sea Bottom Trawl Survey Bob Lauth presented the BT survey results during the joint team meeting. The 2007 survey results for pollock is up from last year, but the estimate is 87% of long term bottom-trawl survey mean (1982-2007). See the joint team minutes for a summary.

Pollock modeling Jim Ianelli presented research activities related to pollock assessment modeling. This included developments on methods for estimating catch at age and associated sampling errors. He also summarized EBS pollock as a case study that he was invited to present to an ICES working group. The ICES working group was tasked with examining cases where environmental information directly impact TACs. For the case of pollock, since Tier 1 ABC estimates decline as uncertainty in estimating F_{msy} increases, it was clarified that this adjustment is partially environmentally driven. For example, one source of uncertainty in estimating the PDF of F_{msy} is the inter-annual variability in mean weight at age. Next year's realized pollock mean-weight at age is unknown and a mean value is used as a proxy. However, data clearly show that there is inter-annual variability and Ianelli proposed that this should be included in consideration of estimating the PDF of F_{msy} (a Tier 1 requirement). The Plan Team concurred.

The Team discussed issues related to mean weights-at-age used for projections and the estimates of F_{msy} uncertainty. It was noted that there could be cohort effects that impact these, as well as issues related to "edge-effects" (otolith increment ring-formation) in the aging process. Some patterns in the time series of mean weights at age seem to suggest the need for closer examination.

The Team recommends that the author continue to pursue methods (such as the bootstrapping approach) to obtaining sample-sizes for the fishery and survey age composition data. The Team also encouraged the authors to continue to pursue means to obtain up-to-date Russian data and evaluate them relative to the US assessment.

BSAI Pacific cod model Grant Thompson provided an update of a revised Pacific code model during the joint team meeting. See the joint team minutes for a summary.

EBS skate model Olav Ormseth and Beth Matta presented a revised assessment of the BSAI Alaska skate. The 2006 BSAI skate assessment applied tier 5 criteria and suggested modeling Alaska skates separately from other skates. This year, the authors applied tier 3 criteria to a Stock Synthesis 2 model for Alaska skates. The authors considered (1) a base model starting in 1992 that used EBS shelf survey biomass and a level of equilibrium catch equal to the 1992 catch and (2) an alternative model starting in 1958 that included EBS shelf survey data from 1982 and the full available record of historical skate catch. The EBS shelf survey has accurately identified skate species composition since 1999. The 1999-2006 composition was used to reconstruct skate biomass and catch estimates for years prior to 1999, when species identification was less reliable.

The authors reported that Alaska skate embryos deposited in eggcases on the seafloor have a 3+ year development period, so the biological data was adjusted by 3 years to include this embryonic stage in the model. The model estimates separate growth for ages 0-2 (the embryonic period), with fishery and survey selectivity equal to 0 for age 0-2 Alaska skates. Natural mortality was fixed at 0.13 for all ages, including the embryonic stage. Good data for estimating embryo mortality are lacking. The team discussed whether the assumption that M = 0.13 was appropriate. The team noted that while trawl disturbance of egg cases is

likely not a common event, it could have an impact when it occurs. The team suggested running several alternative models with different levels of historical catch. The team also discussed whether the apparent rise in skate biomass on the EBS shelf in the 1980s was the result of large recruitment events or invasion of skates from nursery areas along the shelf break.

An industry representative raised a question about the model's use of catch data from the yellowfin sole trawl fishery. Concerns about the validity of data from the yellowfin sole fishery stem from changes over time in the gear used to catch yellowfin. The fleet is increasingly changing its gear preference from larger to smaller nets and increasing the proportion of sweep (combination rope) in place of the larger nets used in the past. The sweeps are typically made of 2 ½" fabric over the cable. This has proven effective for herding flatfish, but may change the degree to which skates are herded by the trawl sweeps. This gear modification could affect the area swept for skates, making it essentially smaller over time. The move to large sweeps in place of large nets is driven by high fuel costs and quality requirements for target sole species. The old style nets create more drag and hence use more fuel. Two or three boats a year are converting to the new style of flatfish trawl with large sweeps and smaller nets. Some of the flatfish boats also use an 8-inch grate as a halibut excluder. Big skates may be excluded along with halibut, but small skates likely go through the grate along with the target fish. He offered to work with the authors to help them take a critical look at the data used to determine trawl fishery catch and selectivity.

The team recommended that the authors move to a tier 3a model for Alaska skates and keep the other skates at tier 5 in a combined assessment. The team noted that tier 3 is more conservative for Alaska skates and provides additional rationale for enhanced data collection by observers. The team noted that recent catches are very close to the tier 3 ABC estimate and could require in-season closures. The team recommended that the 2007 skate SAFE include both tier 3a and tier 5 estimates of Alaska skate ABC, and that both tier estimates be based on an M of 0.13.

Halibut discard mortality rates The BSAI Team adopted the halibut DMRS for the CDQ fisheries as recommended by the IPHC staff. The team noted that it was likely that the CDQ fisheries would enter the next 3-year cycle for adopting for the non-CDQ fisheries in 2009 for the period 2010-2012 because 10 years of data would be available to set a 3-year rate for the CDQ fisheries.

Groundfish Specifications The team adopted the OFL and ABC proposed specifications for 2008 and 2009 as attached. The recommendations are based on rollovers of the established 2008 final specifications rather than projections for Tier 1 to 3 stocks that have previously been made. The teams felt these numbers were based upon stock assessments using the best information available at that time and that additional staff work on developing the projections was better spent in preparing the assessments and other analyses.

Adjourn The team adjourned at approximately 1:30 pm.

TABLE 7.—2007 AND 2008 PROHIBITED SPECIES BYCATCH ALLOWANCES FOR THE BSAI TRAWL AND NON-TRAWL FISHERIES

Trawl Fisheries	Prohibited species and zone					
	Halibut mortality (mt) BSAI	Herring (mt) BSAI	Red King Crab (animals) Zone 1[1]	*C. opilio* (animals) COBLZ[1]	*C. bairdi* (animals)	
					Zone 1[1]	Zone 2[1]
Yellowfin sole	936	153	33,843	3,098,288	340,844	1,788,459
January 20–April 1	312	n/a	n/a	n/a	n/a	n/a
April 1–May 21	195	n/a	n/a	n/a	n/a	n/a
May 21–July 1	49	n/a	n/a	n/a	n/a	n/a
July 1–December 31	380	n/a	n/a	n/a	n/a	n/a
Rock sole/other flat/flathead sole[2]	829	27	121,413	643,800	365,320	596,154
January 20–April 1	498	n/a	n/a	n/a	n/a	n/a
April 1–July 1	164	n/a	n/a	n/a	n/a	n/a
July 1–December 31	167	n/a	n/a	n/a	n/a	n/a
Turbot/arrowtooth/sablefish[3]	n/a	12	n/a	40,238	n/a	n/a
Rockfish	n/a	n/a	n/a	n/a	n/a	n/a
July 1–December 31	69	10	n/a	40,237	n/a	10,988
Pacific cod	1,334	27	26,563	120,712	183,112	324,176
Midwater trawl pollock	n/a	1,364	n/a	n/a	n/a	n/a
Pollock/Atka mackerel/other[4]	232	194	406	80,475	17,224	27,473
Red King Crab Savings Subarea[5]	n/a	n/a	n/a	n/a	n/a	n/a
(non-pelagic trawl)	n/a	n/a	42,495	n/a	n/a	n/a
Total trawl PSC	3,400	1,787	182,225	4,023,750	906,500	2,747,250
Non-trawl Fisheries						
Pacific cod—Total	775					
January 1–June 10	320					
June 10–August 15	0					
August 15–December 31	455					
Other non-trawl—Total	58					
May 1–December 31	58					
Groundfish pot and jig	exempt					
Sablefish hook-and-line	exempt					
Total non-trawl PSC	833					
PSQ reserve[6]	342	n/a	14,775	326,250	73,500	222,750
PSC grand total	4,575	1,787	197,000	4,350,000	980,000	2,970,000

[1] Refer to §679.2 for definitions of areas.
[2] "Other flatfish" for PSC monitoring includes all flatfish species, except for halibut (a prohibited species), Greenland turbot, rock sole, yellowfin sole and arrowtooth flounder.
[3] Greenland turbot, arrowtooth flounder, and sablefish fishery category.
[4] Pollock other than pelagic trawl pollock, Atka mackerel, and "other species" fishery category.
[5] In December 2006, the Council recommended that red king crab bycatch for trawl fisheries within the RKCSS be limited to 35 percent of the total allocation to the rock sole/flathead sole/"other flatfish" fishery category (see §679.21(e)(3)(ii)(B)).
[6] With the exception of herring, 7.5 percent of each PSC limit is allocated to the CDQ program as PSQ reserve. The PSQ reserve is not allocated by fishery, gear or season.

TABLE 8.—2007 AND 2008 ASSUMED PACIFIC HALIBUT DISCARD MORTALITY RATES FOR THE BSAI

Gear	Fishery	Halibut mortality (percent)
Hook-and-line	Greenland turbot	13
	Other species	11
	Pacific cod	11
	Rockfish	17
Trawl	Arrowtooth flounder	75
	Atka mackerel	76
	Flathead sole	70
	Greenland turbot	70
	Non-pelagic pollock	74
	Pelagic pollock	88
	Other flatfish	74
	Other species	70
	Pacific cod	70
	Rockfish	76
	Rock sole	80
	Sablefish	75
	Yellowfin sole	80
Pot	Other species	7
	Pacific cod	7
CDQ trawl	Atka mackerel	86
	Flathead sole	70
	Non-pelagic pollock	85
	Pelagic pollock	90
	Rockfish	76
	Yellowfin sole	86
CDQ hook-and-line	Greenland turbot	13
	Pacific cod	10
CDQ pot	Pacific cod	7
	Sablefish	34

TABLE 9 - FINAL 2007 AND 2008 PACIFIC HALIBUT PSC LIMITS, ALLOWANCES, AND APPORTIONMENTS

(values are in metric tons)

Trawl gear		Hook-and-line gear[1]			
		Other than DSR		DSR	
Dates	Amount	Dates	Amount	Dates	Amount
January 20–April 1	550 (27.5%)	January 1–June 10	250 (86%)	January 1–December 31	10 (100%)
April 1–July 1	400 (20%)	June 10–September 1	5 (2%)		
July 1–September 1	600 (30%)	September 1–December 31	35 (12%)		
September 1–October 1	150 (7.5%)	n/a	n/a		
October 1–December 31	300 (15%)	n/a	n/a		
Total	2,000 (100%)	n/a	290 (100%)		10 (100%)

[1] The Pacific halibut PSC limit for hook-and-line gear is allocated to the demersal shelf rockfish (DSR) fishery andfisheries other than DSR. The hook-and-line sablefish fishery is exempt from halibut PSC limits.

AGENDA D-1(c,d)
Supplemental
OCTOBER 2007

Dan Falvey
123 Anna Dr
Sitka, AK 99835

September 20, 2007

N.P.F.M.C.

Dear Council and SSC Members,

I am writing to request that the Sablefish apportionment formula be updated to reflect the improved data from the observer and logbook program. **(Agenda item D-1)**

In 2000, the Council approved a formula to apportion the sablefish ABC between areas based on a weighted average between the survey data and the logbook/observer data. The 2007 SAFE describes this formula as ... *"the fishery and survey data were combined by computing a weighted average of the survey and fishery estimates, with the weight inversely proportional to the variability of each data source."* This combined data is then used to apportion the overall ABC into TAC's for the individual management areas.

The decision to include fishery data in the apportionment formula was made in an effort to balance the "snap-shot" the survey vessels experiences with fishery data collected over the 9 month fishing season. The Sablefish longline survey vessel is in an area for only 1 -2 weeks/year. If the fish are off the bite, the weather is bad, the whales are hungry, or any of a number of factors effect fishing in that area, then the TAC for that area could suffer because the survey "snap-shot" did not accurately reflect distribution. The logbooks and observer data, in contrast, are collected over the 9 month season and are an excellent supplement to the survey data. The industry has strongly supported the inclusion of fishery data and as the 2007 SAFE notes *"logbook participation by vessels under 60 feet has increased greatly in recent years. In 2005, vessels under 60 feet accounted for 66% of all logbooks submitted."*

The 2007 SAFE also noted that *"the variance for the fishery data is about twice that for the survey data, so the survey data was weighted twice as much as the fishery data."* This 2X weighting of the survey data was calculated in 2002. Table 3.5 of the 2007 SAFE (attached) shows that the CV of the fishery data has improved greatly since then. The data quality from the logbooks is now on a par with the observer data and the survey data. However, the weighting algorithm has not been updated to reflect this improved data quality.

This issue was raised at the December 2006 Plan team meeting. The minutes from that meeting state that *"The teams discussed the apportionment scheme and the extent improved fishery data should be used (currently it is down-weighted compared to the survey data). Members of the public have commented that the precision of these data has improved and should be used more fully. The industry noted that they would like to see more attention to this as they are concerned about potential over-harvesting in some areas, which could lead to a biological issue. The author noted that logbook data has improved, but that the apportionment scheme is a Council decision."*

I am writing to request that the SSC and Council recommend the allocation formula be updated to reflect the improved quality of the fishery data. In 2000, the decision was to incorporate fishery data and to weight it "inversely proportional to the variability of each data source." The intent in 2000 was that this formula would continually be updated as the logbook program improved. The 2X weighting was not set in stone. If the formula is not updated as data improves, then there is little incentive for the industry to support the log book program beyond the bare minimum needed to maintain the 2X weighting. If there are limits on the use of fishery data for the apportionment that the SSC and Plan Team believes are appropriate, then these should be stated up-front and the apportionment policy revised to reflect them.

Thank you for your consideration

Dan Falvey, F/V Myriad

Table 3.5.--Average catch rate (pounds/hook) for fishery data by year and region. SE = standard
CV = coefficient of variation. The standard error is not available when vessel sample size equal

Aleutian Islands-Observer

Year	CPUE	SE	CV	Sets	Vessels
1990	0.53	0.05	0.10	193	9
1991	0.50	0.03	0.07	248	8
1992	0.40	0.06	0.15	131	8
1993	0.25	0.04	0.14	306	12
1994	0.29	0.05	0.18	138	13
1995	0.30	0.04	0.14	208	14
1996	0.23	0.03	0.12	204	17
1997	0.35	0.07	0.20	117	9
1998	0.29	0.05	0.17	75	12
1999	0.35	0.07	0.17	305	14
2000	0.29	0.03	0.11	313	15
2001	0.26	0.04	0.15	162	9
2002	0.32	0.03	0.11	245	19
2003	0.26	0.04	0.17	170	19
2004	0.21	0.04	0.21	138	7
2005	0.15	0.05	0.34	29	6

Bering Sea-Observer

Year	CPUE	SE	CV	Sets	Vessels
1990	0.72	0.22	0.15	42	8
1991	0.28	0.11	0.20	30	7
1992	0.25	0.21	0.43	7	4
1993	0.09	0.07	0.36	4	3
1994	0.35	0.31	0.45	2	2
1995	0.41	0.14	0.17	38	10
1996	0.63	0.38	0.30	36	15
1997					0
1998	0.17	0.06	0.16	28	9
1999	0.29	0.18	0.32	27	10
2000	0.28	0.18	0.31	21	10
2001	0.31	0.05	0.07	16	10
2002	0.10	0.05	0.22	8	4
2003	0.18	0.00	0.29	6	2
2004	0.17	0.11	0.31	9	4
2005	0.23	0.07	0.16	9	6

Western Gulf-Observer

Year	CPUE	SE	CV	Sets	Vessels
1990	0.64	0.28	0.22	178	7
1991	0.44	0.11	0.13	193	16
1992	0.38	0.10	0.14	280	12
1993	0.25	0.09	0.09	106	12
1994	0.32	0.07	0.10	52	5
1995	0.51	0.09	0.09	432	22
1996	0.57	0.11	0.10	269	20
1997	0.50	0.10	0.10	349	20
1998	0.50	0.07	0.07	361	18
1999	0.53	0.13	0.12	244	14
2000	0.49	0.13	0.13	185	12
2001	0.50	0.10	0.10	273	16
2002	0.51	0.10	0.09	349	15
2003	0.48	0.09	0.10	387	16
2004	0.47	0.16	0.17	162	10
2005	0.58	0.07	0.13	447	13

Central Gulf-Observer

Year	CPUE	SE	CV	Sets	Vessels
1990	0.54	0.08	0.07	663	32
1991	0.62	0.11	0.09	303	24
1992	0.59	0.11	0.09	335	19
1993	0.60	0.08	0.07	647	32
1994	0.66	0.12	0.09	238	15
1995	0.90	0.14	0.08	457	41
1996	1.04	0.14	0.07	441	45
1997	1.07	0.17	0.08	377	41
1998	0.90	0.11	0.06	345	32
1999	0.87	0.17	0.10	269	28
2000	0.93	0.10	0.06	319	30
2001	0.70	0.06	0.06	347	31
2002	0.84	0.13	0.08	374	29
2003	0.90	0.14	0.07	363	34
2004	1.09	0.19	0.09	327	29
2005	0.89	0.06	0.07	518	32

West Yakutat-Observer

Year	CPUE	SE	CV	Sets	Vessels
1990	0.95	0.47	0.25	75	9
1991	0.85	0.14	0.10	164	12
1992	0.84	0.35	0.27	66	6
1993	0.71	0.16	0.10	241	12
1994	0.68	0.30	0.27	81	8
1995	1.02	0.20	0.10	169	21
1996	0.97	0.15	0.07	223	28
1997	1.16	0.22	0.09	128	20
1998	1.21	0.20	0.08	145	23
1999	1.20	0.21	0.13	110	19
2000	1.26	0.20	0.08	199	32
2001	1.03	0.14	0.07	184	28
2002	1.32	0.28	0.10	155	23
2003	1.36	0.26	0.07	218	27
2004	1.23	0.19	0.08	210	24
2005	1.32	0.09	0.07	352	24

East Yakutat/SE-Observer

Year	CPUE	SE	CV	Sets	Vessels
1990					0
1991	0.52	0.37	0.71	17	2
1992	0.87			20	1
1993	1.02	0.19	0.19	28	2
1994	0.38			5	1
1995	1.45	0.20	0.14	101	19
1996	1.20	0.11	0.09	137	24
1997	1.10	0.14	0.13	84	17
1998	1.27	0.12	0.10	140	25
1999	0.94	0.12	0.13	85	11
2000	0.94	0.13	0.16	81	14
2001	0.84	0.09	0.09	110	14
2002	1.20	0.23	0.19	121	14
2003	1.29	0.13	0.10	113	19
2004	1.08	0.10	0.09	135	17
2005	1.18	0.13	0.11	181	18

Table 3.5 cont.

Logbook Fishery Data

Aleutian Islands-Logbook

Year	CPUE	SE	CV	Sets	Vessels
1999	0.28	0.09	0.15	187	15
2000	0.24	0.10	0.21	265	18
2001	0.38	0.32	0.41	36	5
2002	0.48	0.37	0.39	33	5
2003	0.36	0.22	0.30	139	10
2004	0.45	0.11	0.25	102	7
2005	0.46	0.15	0.33	109	8

Bering Sea-Logbook

Year	CPUE	SE	CV	Sets	Vessels
1999	0.56	0.16	0.14	291	43
2000	0.21	0.09	0.22	169	23
2001	0.35	0.29	0.33	61	8
2002	0.24	0.30	0.63	5	2
2003	0.24	0.26	0.53	25	6
2004	0.38	0.09	0.24	202	8
2005	0.36	0.07	0.19	86	10

Western Gulf-Logbook

Year	CPUE	SE	CV	Sets	Vessels
1999	0.94	0.12	0.09	245	27
2000	0.80	0.10	0.09	301	32
2001	0.47	0.09	0.10	109	24
2002	0.80	0.16	0.13	78	14
2003	0.39	0.08	0.11	202	24
2004	0.65	0.09	0.09	768	26
2005	0.78	0.08	0.11	571	33

Central Gulf-Logbook

Year	CPUE	SE	CV	Sets	Vessels
1999	0.80	0.09	0.06	817	60
2000	0.79	0.08	0.05	746	64
2001	0.74	0.12	0.08	395	52
2002	0.83	0.12	0.07	276	41
2003	0.67	0.14	0.08	399	45
2004	1.08	0.05	0.05	1676	80
2005	0.98	0.07	0.07	1154	63

West Yakutat-Logbook

Year	CPUE	SE	CV	Sets	Vessels
1999	1.08	0.16	0.08	233	36
2000	1.04	0.12	0.06	270	42
2001	0.89	0.19	0.11	203	29
2002	0.99	0.14	0.07	148	28
2003	1.26	0.20	0.08	104	23
2004	1.27	0.06	0.05	527	54
2005	1.13	0.05	0.04	1158	70

East Yakutat/SE-Logbook

Year	CPUE	SE	CV	Sets	Vessels
1999	0.91	0.15	0.08	183	22
2000	0.98	0.15	0.08	190	26
2001	0.98	0.17	0.09	109	21
2002	0.83	0.12	0.07	108	22
2003	1.13	0.19	0.09	117	22
2004	1.19	0.05	0.04	427	55
2005	1.15	0.05	0.05	446	77

TABLE 1– 2008 OVERFISHING LEVEL (OFL), ACCEPTABLE BIOLOGICAL CATCH (ABC), TOTAL ALLOWABLE CATCH (TAC), INITIAL TAC (ITAC), AND CDQ RESERVE ALLOCATION OF GROUNDFISH IN THE BSAI[1]

[Amounts are in metric tons]

Species	Area	2008				
		OFL	ABC	TAC	ITAC[2]	CDQ[3]
Pollock[4]	BS	1,431,000	1,318,000	1,318,000	1,186,200	131,800
	AI	50,300	41,000	19,000	17,100	1,900
	Bogoslof	48,000	5,220	10	10	0
Pacific cod[5]	BSAI	154,000	131,000	127,070	113,474	13,596
Sablefish[3]	BS	3,290	2,970	2,970	1,263	111
	AI	3,100	2,800	2,800	596	52
Atka mackerel	BSAI	64,200	54,900	54,900	49,026	5,874
	EAI/BS	n/a	17,600	17,600	15,717	1,883
	CAI	n/a	22,000	22,000	19,646	2,354
	WAI	n/a	15,300	15,300	13,663	1,637
Yellowfin sole	BSAI	261,000	245,000	150,000	133,950	16,050
Rock sole	BSAI	271,000	268,000	75,000	66,975	8,025
Greenland turbot	BSAI	16,000	2,490	2,490	2,117	n/a
	BS	n/a	1,720	1,720	1,462	184
	AI	n/a	770	770	655	0
Arrowtooth flounder	BSAI	208,000	171,000	30,000	25,500	3,210
Flathead sole	BSAI	92,800	77,200	45,000	40,185	4,815
Other flatfish[6]	BSAI	28,500	21,400	21,400	18,190	0
Alaska plaice	BSAI	252,000	199,000	60,000	51,000	0
Pacific ocean perch	BSAI	25,600	21,600	21,600	19,114	n/a
	BS	n/a	4,080	4,080	3,468	0
	EAI	n/a	4,900	4,900	4,376	524
	CAI	n/a	5,000	5,000	4,465	535
	WAI	n/a	7,620	7,620	6,805	815
Northern rockfish	BSAI	9,700	8,150	8,150	6,928	0
Shortraker rockfish	BSAI	564	424	424	360	0
Rougheye rockfish	BSAI	269	202	202	172	0
Other rockfish[7]	BSAI	1,330	999	999	849	0
	BS	n/a	414	414	352	0
	AI	n/a	585	585	497	0
Squid	BSAI	2,620	1,970	1,970	1,675	0
Other species[8]	BSAI	91,700	68,800	58,015	49,313	0
TOTAL		3,014,973	2,642,125	2,000,000	1,763,808	187,491

[1] These amounts apply to the entire BSAI management area unless otherwise specified. With the exception of pollock, and for the purpose of these harvest specifications, the Bering Sea (BS) subarea includes the Bogoslof District.

[2] Except for pollock, the portion of the sablefish TAC allocated to hook-and-line and pot gear, and Amendment 80 species 15 percent of each TAC is put into a reserve. The ITAC for each species is the remainder of the TAC after the subtraction of these reserves.

[3] For the Amendment 80 species (Atka mackerel, Aleutian Islands Pacific ocean perch, yellowfin sole, rock sole, flathead sole, and Pacific cod) 10.7 percent of the TAC is reserved for use by CDQ participants (see §§ 679.20(b)(1)(ii)(C) and 679.31). Twenty percent of the sablefish TAC allocated to hook-and-line gear or pot gear and 7.5 percent of the sablefish TAC allocated to trawl gear, Bering Sea Greenland turbot, and arrowtooth flounder is reserved for use by CDQ participants (see § 679.20(b)(1)(iii)(B) and (D)). Aleutian Islands Greenland turbot, "other flatfish," Alaska plaice, Bering Sea Pacific ocean perch, northern rockfish, shortraker rockfish, rougheye rockfish, "other rockfish," squid, and "other species" are not allocated to the CDQ program.

[4] Under § 679.20(a)(5)(i)(A)(1), the annual Bering Sea subarea pollock TAC after subtraction for the CDQ directed fishing allowance (10 percent) and the incidental catch allowance (2.8 percent), is further allocated by sector for a directed pollock fishery as follows: inshore - 50 percent; catcher/processor - 40 percent; and motherships -

10 percent. Under § 679.20(a)(5)(iii)(B)(2)(i) and (ii), the annual Aleutian Islands subarea pollock TAC, after subtracting first for the CDQ directed fishing allowance (10 percent) and second for the incidental catch allowance (1,600 mt), is allocated to the Aleut Corporation for a directed pollock fishery.

[5] The Pacific cod TAC is reduced by 3 percent from the ABC to account for the State of Alaska's (State) guideline harvest level in State waters of the Aleutian Islands subarea.

[6] "Other flatfish" includes all flatfish species, except for halibut (a prohibited species), flathead sole, Greenland turbot, rock sole, yellowfin sole, arrowtooth flounder and Alaska plaice.

[7] "Other rockfish" includes all Sebastes and Sebastolobus species except for Pacific ocean perch, northern, shortraker, and rougheye rockfish.

[8] "Other species" includes sculpins, sharks, skates, and octopus. Forage fish, as defined at § 679.2, are not included in the "other species" category.

TABLE 2–2008 APPORTIONMENT OF RESERVES TO ITAC CATEGORIES

[Amounts are in metric tons]

Species--area or subarea	2008 ITAC	2008 reserve amount	2008 final ITAC
Shortraker rockfish–BSAI	360	31	391
Rougheye rockfish–BSAI	172	15	187
Northern rockfish-BSAI	6,928	611	7,539
Other rockfish--Bering Sea subarea	352	31	383
Total	7,812	688	8,500

TABLE 4–2008 SEASONAL AND SPATIAL ALLOWANCES, GEAR SHARES, CDQ RESERVE, AND AMENDMENT 80 ALLOCATIONS OF THE BSAI ATKA MACKEREL TAC
[Amounts are in metric tons]

Sector	Season	Allocation by management area		
		Eastern Aleutian district/Bering Sea	Central Aleutian district	Western Aleutian district
TAC	n/a	17,600	22,000	15,300
CDQ reserve	Total	1,883	2,354	1,637
	HLA	n/a	1,412	982
ICA	Total	1,400	10	10
Jig	Total	143	0	0
BSAI trawl limited access	Total	283	393	0
	A	142	196	0
	HLA	n/a	118	0
	B	142	196	0
	HLA	n/a	118	0
Amendment 80 limited access	Total	6,945	9,622	6,826
	A	3,473	4,811	3,413
	HLA	n/a	2,886	2,048
	B	3,473	4,811	3,413
	HLA	n/a	2,886	2,048
Amendment 80 cooperatives	Total	6,945	9,622	6,826
	A	3,812	4,811	3,413
	HLA	n/a	2,886	2,048
	B	3,473	4,811	3,413
	HLA	n/a	2,886	2,048

[1] Regulations at §§ 679.20(a)(8)(ii)(A) and 679.22(a) establish temporal and spatial limitations for the Atka mackerel fishery.

[2] Section 679.20(a)(8)(ii) allocates the Atka mackerel TACs, after subtraction of the CDQ reserves, jig gear allocation, and ICAs, to the Amendment 80 and BSAI trawl limited access sectors. The allocation of the ITAC for Atka mackerel to the Amendment 80 and BSAI trawl limited access sectors is established in Table 33 to Part 679 and § 679.91. The CDQ reserve is 10.7 percent of the TAC for use by CDQ participants (see §§ 679.20(b)(1)(ii)(C) and 679.31).

[3] The seasonal allowances of Atka mackerel are 50 percent in the A season and 50 percent in the B season.

[4] The A season is January 1 (January 20 for trawl gear) to April 15 and the B season is September 1 to November 1.

[5] Harvest Limit Area (HLA) limit refers to the amount of each seasonal allowance that is available for fishing inside the HLA (see § 679.2). In 2008, 60 percent of each seasonal allowance is available for fishing inside the HLA in the Western and Central Aleutian Districts.

[6] Eastern Aleutian District and the Bering Sea subarea.

[7] Regulations at § 679.20 (a)(8)(i) require that up to 2 percent of the Eastern Aleutian District and the Bering Sea subarea TAC be allocated to jig gear after subtraction of the CDQ reserve and ICA. The amount of this allocation is 1 percent. The jig gear allocation is not apportioned by season.

TABLE 5–2008 GEAR SHARES AND SEASONAL ALLOWANCES OF THE BSAI PACIFIC COD TAC
[Amounts are in metric tons]

Gear sector	Percent	2008 share of gear sector total	2008 share of sector total	2008 seasonal apportionment[2,3]	
				Date	Amount
Total TAC	100	127,070	n/a	n/a	n/a
CDQ	10.7	13,596	n/a	see §679.20(a)(7)(i)(B)	n/a
Total hook-and-line/pot gear	60.8	68,992	n/a	n/a	n/a
Hook-and-line/pot ICA[1]	n/a	n/a	500	n/a	n/a
Hook-and-line/pot sub-total	n/a	68,492	n/a	n/a	n/a
Hook-and-line C/P	48.7	n/a	54,861	Jan 1-Jun 10	27,979
				Jun 10-Dec 31	26,882
Hook-and-line CV	0.2	n/a	225	Jan 1-Jun 10	115
				Jun 10-Dec 31	110
Pot C/P	1.5	n/a	1,690	Jan 1-Jun 10	862
				Sept 1-Dec 31	828
Pot CV	8.4	n/a	9,463	Jan 1-Jun 10	4,826
				Sept 1-Dec 31	4,637
CV < 60 ft LOA using Hook-and-line or pot gear	2.0	2,253	2,253	n/a	n/a
Trawl CV	22.1	25,078	n/a	Jan 20-Apr 1	18,557
			n/a	Apr 1-Jun 10	2,759
			n/a	Jun 10-Nov 1	3,762
AFA trawl CP	2.3	2,610	n/a	Jan 20-Apr 1	1,957
			n/a	Apr 1- Jun 10	652
			n/a	Jun 10-Nov 1	0
Amendment 80 limited access	n/a	7,603	n/a	Jan 20-Apr 1	5,702
				Apr 1- Jun 10	1,901
				Jun 10-Nov 1	0
Amendment 80 cooperative	n/a	7,603	n/a	Jan 20-Apr 1	5,702
				Apr 1- Jun 10	1,901
				Jun 10-Nov 1	0
Jig	1.4	1,589	n/a	Jan 1-Apr 30	953
			n/a	Apr 30-Aug 31	318
			n/a	Aug 31-Dec 31	318

[1] The ICA for the hook-and-line and pot sectors will be deducted from the aggregate portion of Pacific cod TAC allocated to the hook-and-line and pot sectors. The Regional Administrator proposes an ICA of 500 mt for 2008 based on anticipated incidental catch in these fisheries.

The Pacific cod ITAC is apportioned into seasonal allowances to disperse the Pacific cod fisheries over the fishing year (see §§ 679.20(a)(7)(iv)(A) and 679.23(e)(5)). Pursuant to §§ 679.20(a)(7)(i)(B) and 679.23(e)(5) the CDQ season allowances by gear are as follows. For most hook-and-line catcher/processors and hook-and-line catcher vessels greater than or equal to 60 ft LOA, the first seasonal allowance of 60 percent of the ITAC is made available for directed fishing from January 1 to June 10, and the second seasonal allowance of 40 percent of the ITAC is made available from June 10 (September 1 for pot gear) to December 31. No seasonal harvest constraints are imposed on the Pacific cod fishery for pot gear or catcher vessels less than 60 feet (18.3 m) LOA using hook-and-line gear. For trawl gear, the first season is January 20 to April 1 and is allocated 60 percent of the ITAC. The second season, April 1 to June 10, and the third season, June 10 to November 1, are each allocated 20 percent of the ITAC. The trawl catcher vessel allocation is further allocated as 70 percent in the first season, 10 percent in the second season, and 20 percent in the third season. The trawl catcher/processor allocation is allocated 50 percent in the first season, 30 percent in the second season, and 20 percent in the third season. For jig gear, the first and third

seasonal allowances are each allocated 40 percent of the ITAC and the second seasonal allowance is allocated 20 percent of the ITAC. Table 5 lists the 2008 allocations and seasonal apportionments of the Pacific cod ITAC. In accordance with § 679.20(a)(7)(iv)(B) and (C), any unused portion of a seasonal Pacific cod allowance will become available at the beginning of the next seasonal allowance.

Pursuant to § 679.20(a)(7)(iv)(A) the non-CDQ season allowances by gear are as follows. For hook-and-line and pot catcher/processors and hook-and-line and pot vessels greater than or equal to 60 ft LOA, the first seasonal allowance of 51 percent of the ITAC is made available for directed fishing from January 1 to June 10, and the second seasonal allowance of 49 percent of the ITAC is made available from June 10 (September 1 for pot gear) to December 31. No seasonal harvest constraints are imposed on the Pacific cod fishery for catcher vessels less than 60 feet (18.3 m) LOA using hook-and-line or pot gear. For trawl gear, the first season is January 20 to April 1, the second season is April 1 to June 10, and the third season is June 10 to November 1. The trawl catcher vessel allocation is further allocated as 74 percent in the first season, 11 percent in the second season, and 15 percent in the third season. The trawl catcher/processor allocation is allocated 75 percent in the first season, 25 percent in the second season, and 0 percent in the third season. For jig gear, the first seasonal allowance is allocated 60 percent of the ITAC and the second and third seasonal allowances are each allocated 20 percent of the ITAC.

TABLE 16–2008 CDQ RESERVES, INCIDENTAL CATCH AMOUNTS, AND AMENDMENT 80 ALLOCATIONS OF THE ALEUTIAN ISLANDS PACIFIC OCEAN PERCH, FLATHEAD SOLE, ROCK SOLE, AND YELLOWFIN SOLE TACS
[Amounts are in metric tons]

Species	Pacific ocean perch			Flathead sole	Rock sole	Yellowfin sole
Area	Eastern Aleutian district	Central Aleutian district	Western Aleutian district	BSAI	BSAI	BSAI
TAC	4,900	5,000	7,620	45,000	75,000	150,000
CDQ	524	535	815	4,815	8,025	16,050
ICA	100	10	10	2,000	2,000	2,000
BSAI trawl limited access	214	223	136	0	0	18,522
Amendment 80 limited access	2,031	2,116	3,329	19,093	32,488	56,714
Amendment 80 cooperatives	2,031	2,116	3,329	19,093	32,488	56,714

TABLE 7a–2008 APPORTIONMENT OF PROHIBITED SPECIES CATCH ALLOWANCES TO NON-TRAWL GEAR, THE CDQ PROGRAM, AMENDMENT 80, AND THE BSAI TRAWL LIMITED ACCESS SECTORS

PSC species	Total non-trawl PSC	Non-trawl PSC remaining after CDQ PSQ	Total trawl PSC	CDQ PSQ reserve	Trawl PSC remaining after CDQ PSQ	Amendment 80 sector	BSAI trawl limited access fishery
Halibut mortality	900	832	3,675	343	3,400	2,525	875
Herring	n/a	n/a	1,787	n/a	n/a	n/a	n/a
Red king crab	n/a	n/a	197,000	21,079	175,921	109,915	53,797
C. opilio (COBLZ) PSC limit	n/a	n/a	4,350,000	465,450	3,884,550	2,386,668	1,248,494
Zone 1 C. bairdi crab PSC limit	n/a	n/a	980,000	104,860	875,140	460,674	411,228
Zone 2 C. bairdi crab PSC limit	n/a	n/a	2,970,000	317,790	2,652,210	784,789	1,241,500

TABLE 7b–2008 HERRING AND RED KING CRAB SAVINGS SUBAREA PROHIBITED SPECIES CATCH ALLOWANCES FOR ALL TRAWL SECTORS

Trawl gear	Herring	Red king crab (animals) Zone 1
Yellowfin sole	153	n/a
Rock sole/other flat/flathead sole[2]	27	n/a
Turbot/arrowtooth/sablefish[3]	12	n/a
Rockfish	n/a	n/a
July 1 - December 31	10	n/a
Pacific cod	27	n/a
Midwater trawl pollock	1,364	n/a
Pollock/Atka mackerel/other[4]	194	n/a
Red king crab savings subarea	n/a	n/a
Non-pelagic trawl gear	n/a	49,250
Total trawl PSC	1,787	197,000

[1] The red king crab bycatch for trawl fisheries within the RKCSS is limited to 25 percent of the red king crab PSC allowance (see § 679.21(e)(3)(ii)(B)(2)).

TABLE 7c–2008 PROHIBITED SPECIES BYCATCH ALLOWANCES FOR THE BSAI TRAWL LIMITED ACCESS

BSAI trawl limited access fisheries	Prohibited species and zone				
	Halibut mortality (mt) BSAI	Red king crab (animals) Zone 1[1]	C. opilio (animals) COBLZ[1]	C. bairdi (animals) Zone 1[1]	C. bairdi (animals) Zone 2[1]
Yellowfin sole	241	9,991	961,341	154,622	808,216
January 20 - April 1	80	n/a	n/a	n/a	n/a
April 1 - May 21	50	n/a	n/a	n/a	n/a
May 21 - July 1	13	n/a	n/a	n/a	n/a
July 1 - December 31	98	n/a	n/a	n/a	n/a
Rock sole/other flat/flathead sole[2]	213	35,844	199,759	165,725	269,406
January 20 - April 1	128	n/a	n/a	n/a	n/a
April 1 - July 1	42	n/a	n/a	n/a	n/a
July 1 - December 31	43	n/a	n/a	n/a	n/a
Turbot/arrowtooth/sablefish[3]	0	n/a	12,485	n/a	n/a
Rockfish	n/a	n/a	n/a	n/a	n/a
July 1 - December 31	18	n/a	12,485	n/a	4,966
Pacific cod	343	7,842	37,455	83,068	146,497
Pollock/Atka mackerel/other[4]	60	120	24,970	7814	12,415
Total BSAI trawl limited access PSC	875	53,797	1,248,494	411,228	1,241,500
Amount of PSC to BSAI trawl limited access	875	30.58%	32.14%	46.99%	46.81%
Non-trawl fisheries					
Pacific cod-Total	775				
January 1-June 10	320				
June 10-August 15	0				
August 15-December 31	455				
Other non-trawl-Total	58				
May 1-December 31	58				
Groundfish pot and jig	exempt				
Sablefish hook-and-line	exempt				
Total non-trawl PSC	833				
PSQ reserve	342	21,079	465,450	104,860	317,790
PSC grand total	4,575	197,000	4,350,000	980,000	2,970,000

[1] Refer to § 679.2 for definitions of areas.

[2] "Other flatfish" for PSC monitoring includes all flatfish species, except for halibut (a prohibited species), Greenland turbot, rock sole, yellowfin sole and arrowtooth flounder.

[3] Greenland turbot, arrowtooth flounder, and sablefish fishery category.

[4] Pollock other than pelagic trawl pollock, Atka mackerel, and "other species" fishery category.

[5] Section 679.21(e)(1)(v) allocates 276 mt of the trawl halibut mortality and § 679.21(e)(2)(ii) allocates 7.5 percent, of the non-trawl halibut mortality limit and as the PSQ reserve for use by the groundfish CDQ program. The PSQ reserve for crab species is 10.7 percent of each crab PSC limit. The PSQ reserve is not allocated by fishery, gear or season.

TABLE 7d–2008 PROHIBITED SPECIES BYCATCH ALLOWANCES FOR THE BSAI AMENDMENT 80 COOPERATIVES

Trawl Fisheries	Prohibited species and zone				
	Halibut mortality (mt) BSAI	Red King Crab (animals) Zone 1[1]	C. opilio (animals) COBLZ[1]	C. bairdi (animals) Zone 1[1]	C. bairdi (animals) Zone 2[1]
Fifty percent of Amendment 80 PSC	1,263	54,958	1,193,334	230,337	39,238
Total Amendment 80 trawl PSC	2,525	109,915	2,386,668	460,674	78,476

TABLE 7e–2008 PROHIBITED SPECIES BYCATCH ALLOWANCES FOR THE BSAI AMENDMENT 80 LIMITED ACCESS

Trawl Amendment 80 limited access fisheries	Prohibited species and zone				
	Halibut mortality (mt) BSAI	Red King Crab (animals) Zone 1[1]	C. opilio (animals) COBLZ[1]	C. bairdi (animals) Zone 1[1]	C. bairdi (animals) Zone 2[1]
Yellowfin sole	348	10,207	918,867	86,607	255,449
January 20 - April 1	116	n/a	n/a	n/a	n/a
April 1 - May 21	72	n/a	n/a	n/a	n/a
May 21 - July 1	18	n/a	n/a	n/a	n/a
July 1 - December 31	141	n/a	n/a	n/a	n/a
Rock sole/other flat/flathead sole[2]	308	36,617	190,933	92,826	85,150
January 20 - April 1	185	n/a	n/a	n/a	n/a
April 1 - July 1	61	n/a	n/a	n/a	n/a
July 1 - December 31	62	n/a	n/a	n/a	n/a
Turbot/arrowtooth/sablefish[3]	n/a	n/a	11,933	n/a	n/a
Rockfish	n/a	n/a	n/a	n/a	n/a
July 1 - December 31	26	n/a	11,933	n/a	1,569
Pacific cod	496	8,011	35,800	46,528	46,303
Pollock/Atka mackerel/other[4]	86	122	23,867	4,377	3,924
Fifty percent of Amendment 80 trawl PSC	1,263	54,958	1,193,334	230,337	392,394
Total Amendment 80 trawl PSC	2,525	109,915	2,386,668	460,674	784,789

[1] Refer to § 679.2 for definitions of areas.

[2] "Other flatfish" for PSC monitoring includes all flatfish species, except for halibut (a prohibited species), Greenland turbot, rock sole, yellowfin sole and arrowtooth flounder.

[3] Greenland turbot, arrowtooth flounder, and sablefish fishery category.

[4] Pollock other than pelagic trawl pollock, Atka mackerel, and "other species" fishery category.

[5] The red king crab bycatch for trawl fisheries within the RKCSS is limited to 25 percent of the red king crab PSC allowance (see § 679.21(e)(3)(ii)(B)(2)).

[6] The PSQ reserve for halibut is 7.5 percent. The PSQ reserve for crab species is 10.7 percent of each crab PSC limit. The PSQ reserve is not allocated by fishery, gear or season.

TABLE 9 - 2008 DIRECTED FISHING CLOSURES[1] [Amounts are in metric tons]

Area	Sector	Species	2008 Incidental catch allowance
Bogoslof District	All	ICA Pollock	10
Aleutian Islands subarea	All	ICA Pollock	1,600
	All	"Other rockfish"	497
Eastern Aleutian district/Bering Sea	Non amendment 80 and BSAI trawl limited access	ICA Atka mackerel	1,400
Central Aleutian district	Non amendment 80 and BSAI trawl limited access	ICA Atka mackerel	10
Western Aleutian district	Non amendment 80 and BSAI trawl limited access	ICA Atka mackerel	10
Eastern Aleutian district	Non amendment 80 and BSAI trawl limited access	ICA Pacific ocean perch	100
Central Aleutian district	Non amendment 80 and BSAI trawl limited access	ICA Pacific ocean perch	10
Western Aleutian district	Non amendment 80 and BSAI trawl limited access	ICA Pacific ocean perch	10
Bering Sea subarea	All	Pacific ocean perch	3,468
	All	"Other rockfish"	383
	All	ICA Pollock	33,214
Bering Sea and Aleutian Islands	All	Northern rockfish	7,539
	All	Shortraker rockfish	392
	All	Rougheye rockfish	187
	All	"Other species"	49,313
	Hook-and-line and pot gear	ICA Pacific cod	500
	Non amendment 80	ICA flathead sole	2,000
	Non amendment 80	ICA rock sole	2,000
	Non trawl gear	ICA yellowfin sole	2,000

[1]Maximum retainable amounts may be found in Table 11 to 50 CFR part 679.

TABLE 10–2008 LISTED BSAI AMERICAN FISHERIES ACT CATCHER/PROCESSOR GROUNDFISH SIDEBOARD LIMITS

[Amounts are in metric tons]

Target species	Area	1995 - 1997			2008 ITAC available to trawl C/Ps[3]	2008 C/P side-board limit
		Retained catch	Total catch	Ratio of retained catch to total catch		
Sablefish trawl	BS	8	497	0.016	1,263	20
	AI	0	145	0.000	596	0
Atka mackerel	Central AI	n/a	n/a	n/a	n/a	n/a
	A season[1]	n/a	n/a	0.115	9,823	1,130
	HLA limit[2]	n/a	n/a	n/a	5,894	678
	B season[1]	n/a	n/a	0.115	9,823	1,130
	HLA limit[2]	n/a	n/a	n/a	5,894	678
	Western AI	n/a	n/a	n/a	n/a	n/a
	A season[1]	n/a	n/a	0.200	6,831	1,366
	HLA limit[2]	n/a	n/a	n/a	4,099	820
	B season[1]	n/a	n/a	0.200	6,831	1,366
	HLA limit[2]	n/a	n/a	n/a	4,099	820
Yellowfin sole[5]	BSAI	100,192	435,788	0.230	133,950	n/a
Rock sole	BSAI	6,317	169,362	0.037	66,975	2,478
Greenland turbot	BS	121	17,305	0.007	1,462	10
	AI	23	4,987	0.005	655	3
Arrowtooth flounder	BSAI	76	33,987	0.002	25,500	51
Flathead sole	BSAI	1,925	52,755	0.036	40,185	1,447
Alaska plaice	BSAI	14	9,438	0.001	51,000	51
Other flatfish	BSAI	3,058	52,298	0.058	18,190	1,055
Pacific ocean perch	BS	12	4,879	0.002	3,468	7
	Eastern AI	125	6,179	0.020	4,376	88
	Central AI	3	5,698	0.001	4,465	4
	Western AI	54	13,598	0.004	6,805	27
Northern rockfish	BSAI	91	13,040	0.007	7,539	53
Shortraker rockfish	BSAI	50	2,811	0.018	392	7
Rougheye rockfish	BSAI	50	2,811	0.018	187	3
Other rockfish	BS	18	621	0.029	383	11
	AI	22	806	0.027	497	13
Squid	BSAI	73	3,328	0.022	1,675	37
Other species	BSAI	553	68,672	0.008	49,313	395

[1] The seasonal apportionment of Atka mackerel in the open access fishery is 50 percent in the A season and 50 percent in the B season. Listed AFA catcher/processors are limited to harvesting no more than zero in the Eastern Aleutian District and Bering Sea subarea, 20 percent of the annual ITAC specified for the Western Aleutian District, and 11.5 percent of the annual ITAC specified for the Central Aleutian District.

[2] Harvest Limit Area (HLA) limit refers to the amount of each seasonal allowance that is available for fishing inside the HLA (see § 679.2). In 2008, 60 percent of each seasonal allowance is available for fishing inside the HLA in the Western and Central Aleutian Districts.

[3]Aleutians Islands Pacific ocean perch, Atka mackerel, flathead sole, rock sole and yellowfin are multiplied by the remainder Pacific ocean perch TAC after the subtraction of the CDQ reserve under § 679.20(b)(1)(ii)(C).

[4] Section 679.64(a)(1) exempts Aleutian Islands pollock and BSAI Pacific cod from AFA catcher/processor sideboard limits.

[5] Section 679.64(a)(1)(v) exempts AFA catcher/processors from a yellowfin sole sideboard limit because the 2008 aggregate ITAC of yellowfin sole assigned to the Amendment 80 sector and BSAI trawl limited access sector (133,950 mt) is greater than 125,000 mt.

TABLE 11–2008 BSAI AMERICAN FISHERIES ACT LISTED CATCHER/PROCESSOR PROHIBITED SPECIES SIDEBOARD LIMITS [1]

PSC species	Ratio of PSC catch to total PSC	2008 PSC available to trawl vessels after subtraction of PSQ	2008 C/P sideboard limit
Halibut mortality	n/a	n/a	286
Red king crab	0.007	175,921	1,231
C. opilio[2]	0.153	3,884,550	594,336
C. bairdi	n/a	n/a	n/a
Zone 1[2]	0.140	875,140	122,520
Zone 2[2]	0.050	2,652,210	132,611

[1] Halibut amounts are in metric tons of halibut mortality. Crab amounts are in numbers of animals.

[2] Refer to § 679.2 for definitions of areas.

TABLE 12–2008 BSAI AMERICAN FISHERIES ACT CATCHER VESSEL SIDEBOARD LIMITS

[Amounts are in metric tons]

Species	Fishery by area/season/ processor/gear	Ratio of 1995-1997 AFA CV catch to 1995-1997 TAC	2008 initial TAC	2008 Catcher vessel sideboard limits
Pacific cod	BSAI	n/a	n/a	n/a
	Jig gear	0.0000	1,589	0
	Hook-and-line CV	n/a	n/a	n/a
	Jan 1 - Jun 10	0.0006	115	0
	Jun 10 - Dec 31	0.0006	110	0
	Pot gear CV	n/a	n/a	n/a
	Jan 1 - Jun 10	0.0006	4,826	3
	Sept 1 - Dec 31	0.0006	4,637	3
	CV < 60 feet LOA using hook-and-line or pot gear	0.0006	2,253	1
	Trawl gear CV	n/a	n/a	n/a
	Jan 20 - Apr 1	0.8609	18,557	15,976
	Apr 1 - Jun 10	0.8609	2,759	2,375
	Jun 10 - Nov 1	0.8609	3,762	3,239
Sablefish	BS trawl gear	0.0906	1,263	114
	AI trawl gear	0.0645	596	38
Atka mackerel	Eastern AI/BS	n/a	n/a	n/a
	Jig gear	0.0031	142	0
	Other gear	n/a	n/a	n/a
	Jan 1 - Apr 15	0.0032	7,787	25
	Sept 1 - Nov 1	0.0032	7,787	25
	Central AI	n/a	n/a	n/a
	Jan - Apr 15	0.0001	9,823	1
	HLA limit	0.0001	5,894	1
	Sept 1 - Nov 1	0.0001	9,823	1
	HLA limit	0.0001	5,894	1
	Western AI	n/a	n/a	n/a
	Jan - Apr 15	0.0000	6,831	0
	HLA limit	n/a	4,099	0
	Sept 1 - Nov 1	0.0000	6,831	0
	HLA limit	n/a	4,099	0
Yellowfin sole[2]	BSAI	0.0647	133,950	n/a
Rock sole	BSAI	0.0341	66,975	2,284
Greenland turbot	BS	0.0645	1,462	94
	AI	0.0205	655	13
Arrowtooth flounder	BSAI	0.0690	25,500	1,760
Alaska plaice	BSAI	0.0441	51,000	2,249
Other flatfish	BSAI	0.0441	18,190	802

Species	Fishery by area/season/ processor/gear	Ratio of 1995-1997 AFA CV catch to 1995-1997 TAC	2008 initial TAC	2008 Catcher vessel sideboard limits
Pacific ocean perch	BS	0.1000	3,468	347
	Eastern AI	0.0077	4,376	34
	Central AI	0.0025	4,465	11
	Western AI	0.0000	6,805	0
Northern rockfish	BSAI	0.0084	7,539	63
Shortraker rockfish	BSAI	0.0037	392	1
Rougheye rockfish	BSAI	0.0037	187	1
Other rockfish	BS	0.0048	383	2
	AI	0.0095	497	5
Squid	BSAI	0.3827	1,675	641
Other species	BSAI	0.0541	49,313	2,668
Flathead sole	BS trawl gear	0.0505	40,185	2,029

[1] Aleutians Islands Pacific ocean perch, Atka mackerel, flathead sole, rock sole and yellowfin are multiplied by the remainder Pacific ocean perch TAC after the subtraction of the CDQ reserve under § 679.20(b)(1)(ii)(C).

[2] Section 679.64(a)(1)(v) AFA catcher/processors will not be subject to a yellowfin sole harvest limit because the 20008 aggregate ITAC of yellowfin sole assigned to the Amendment 80 sector and BSAI trawl limited access sector (133,950 mt) is greater than 125,000 mt.

TABLE 13–2008 AMERICAN FISHERIES ACT CATCHER VESSEL PROHIBITED SPECIES CATCH SIDEBOARD LIMITS FOR THE BSAI[1]

[Amounts are in metric tons]

PSC species	Target fishery category[2]	AFA catcher vessel crab PSC sideboard limit ratio	2008 PSC limit after subtraction of PSQ reserves	2008 AFA catcher vessel PSC sideboard limit
Halibut	Pacific cod trawl	n/a	n/a	887
	Pacific cod hook-and-line or pot	n/a	n/a	2
	Yellowfin sole total	n/a	n/a	101
	January 20-April 1	n/a	n/a	34
	April 1-May 21	n/a	n/a	21
	May 21-July 1	n/a	n/a	5
	July 1-December 31	n/a	n/a	41
	Rock sole/flathead sole/other flatfish total[5]	n/a	n/a	228
	January 20-April 1	n/a	n/a	137
	April 1-July 1	n/a	n/a	45
	July 1-December 31	n/a	n/a	46
	Turbot/Arrowtooth/Sablefish	n/a	n/a	0
	Rockfish (July 1 - December 31)	n/a	n/a	2
	Pollock/Atka mackerel/other species	n/a	n/a	5
Red King Crab Zone 1[3,4]	Pacific cod	0.299	25,644	7,668
	Yellowfin sole	0.299	32,672	9,769
	Rock sole/flathead sole/other flatfish[5]	0.299	117,213	35,047
	Pollock/Atka mackerel/other species	0.299	392	117
C. opilio COBLZ[3]	Pacific cod	0.168	120,712	20,280
	Yellowfin sole	0.168	2,991,104	502,505
	Rock sole/flathead sole/other flatfish[5]	0.168	621,528	104,417
	Pollock/Atka mackerel/other species	0.168	77,691	13,052
	Rockfish	0.168	38,845	6,526
	Turbot/Arrowtooth/Sablefish	0.168	40,238	6,760
C. bairdi Zone 1[3]	Pacific cod	0.33	176,777	58,336
	Yellowfin sole	0.33	329,052	108,587
	Rock sole/flathead sole/other flatfish[5]	0.33	352,682	116,385
	Pollock/Atka mackerel/other species	0.33	16,628	5,487
C. bairdi Zone 2[3]	Pacific cod	0.186	312,961	58,211
	Yellowfin sole	0.186	1,726,588	321,145
	Rock sole/flathead sole/other flatfish[5]	0.186	575,530	107,049
	Pollock/Atka mackerel/other species	0.186	26,523	4,933
	Rockfish	0.186	10,608	1,973

[1] Halibut amounts are in metric tons of halibut mortality. Crab amounts are in numbers of animals.

[2] Target fishery categories are defined in regulation at § 679.21(e)(3)(iv).

[3] Refer to § 679.2 for definitions of areas.

[4] In December 2006, the Council recommended that red king crab bycatch for trawl fisheries within the RKCSS be limited to 25 percent of the red king crab PSC allowance (see § 679.21(e)(3)(ii)(B)(2)).

[5] "Other flatfish" for PSC monitoring includes all flatfish species, except for halibut (a prohibited species), Greenland turbot, rock sole, yellowfin sole, arrowtooth flounder.

TABLE 14–2008 AMERICAN FISHERIES ACT LISTED CATCHER/PROCESSOR SIDEBOARD DIRECTED FISHING CLOSURES[1] [Amounts are in metric tons]

Species	Area	Gear types	2008 Sideboard limit
Sablefish trawl	BS	Trawl	20
	AI	Trawl	0
Rock sole	BSAI	all	2,478
Greenland turbot	BS	all	10
	AI	all	3
Arrowtooth flounder	BSAI	all	51
Flathead sole	BSAI	all	1,447
Pacific ocean perch	BS	all	7
	Eastern AI	all	88
	Central AI	all	4
	Western AI	all	27
Northern rockfish	BSAI	all	53
Shortraker rockfish	BSAI	all	7
Rougheye rockfish	BSAI	all	3
Other rockfish	BS	all	11
	AI	all	13
Squid	BSAI	all	37
"Other species"	BSAI	all	395

[1]Maximum retainable amounts may be found in Table 11 to 50 CFR part 679.

TABLE 15–2008 AMERICAN FISHERIES ACT CATCHER VESSEL SIDEBOARD DIRECTED FISHING CLOSURES[1] [Amounts are in metric tons]

Species	Area	Gear types	2008 Sideboard limit
Pacific cod	BSAI	hook-and-line	0
	BSAI	pot	6
	BSAI	jig	0
Sablefish	BS	trawl	114
	AI	trawl	38
Atka mackerel	Eastern AI/BS	jig	0
	Eastern AI/BS	other	50
	Central AI	all	2
	Western AI	all	0
Rock sole	BSAI	all	2,284
Greenland Turbot	BS	all	94
	AI	all	13
Arrowtooth flounder	BSAI	all	1,760
Flathead sole	BSAI	all	2,029
Pacific ocean perch	BS	all	347
	Eastern AI	all	34
	Central AI	all	11
	Western AI	all	0
Northern rockfish	BSAI	all	63
Shortraker rockfish	BSAI	all	1
Rougheye rockfish	BSAI	all	1
Other rockfish	BS	all	2
	AI	all	5
Squid	BSAI	all	641
"Other species"	BSAI	all	2,668

[1]Maximum retainable amounts may be found in Table 11 to 50 CFR part 679.

Table 17 - 2008 Amendment 80 Gulf of Alaska Sideboard Limits for Groundfish for the Amendment 80 Vessels
(values are in metric tons)

Species	Apportionments and allocations by area/season/processor/gear	Ratio of 1998-2004 amendment 80 sector vessels catch to TAC	2008 TAC	2008 amendment 80 vessel sideboard limts
Pollock	A Season (W/C areas only) January 20 - February 25			
	Shumagin (610)	0.003	5,466	16
	Chirikof (620)	0.002	8,915	18
	Kodiak (630)	0.002	4,023	8
	B Season (W/C areas only) March 10 - May 31			
	Shumagin (610)	0.003	5,466	16
	Chirikof (620)	0.002	10,814	22
	Kodiak (630)	0.002	2,124	4
	C Season (W/C areas only) August 25 - September 15			
	Shumagin (610)	0.003	9,688	29
	Chirikof (620)	0.002	2,792	6
	Kodiak (630)	0.002	5,924	12
	D Season (W/C areas only) October 1 - November 1			
	Shumagin (610)	0.003	9,688	29
	Chirikof (620)	0.002	2,792	6
	Kodiak (630)	0.002	5,924	12
	Annual			
	WYK (640)	0.002	1,694	3
Pacific cod	A Season[1] January 1 - June 10			
	W	0.020	12,531	251
	C	0.044	17,672	778
	B Season[2] September 1 - December 31			
	W	0.020	8,354	167
	C	0.044	11,781	518
	Annual			
	WYK	0.034	3,856	131
Pacific ocean perch	W	0.994	4,291	4,265
	WYK	0.961	1,153	1,108
Northern rockfish	W	1.000	1,383	1,383
Pelagic shelf rockfish	W	0.764	1,752	1,339
	WYK	0.896	366	328

[1] The Pacific cod A season for trawl gear does not open until January 20.
[2] The Pacific cod B season for trawl gear closes November 1.

Table 18 - 2008 Amendment 80 Vessel Prohibited Species Catch (PSC) Limits for the GOA

PSC species	Season	Target fishery	Historic amendment 80 use of the annual halibut PSC limit catch	2008 annual PSC limit (mt)	2008 amendment 80 vessel PSC limit (mt)
Halibut	Trawl 1st seasonal allowance January 20 - April 1	shallow-water	0.0048	2,000	10
		deep-water	0.0115	2,000	23
	Trawl 2nd seasonal allowance April 1- July 1	shallow-water	0.0189	2,000	38
		deep-water	0.1072	2,000	214
	Trawl 3rd seasonal allowance July 1 - September 1	shallow-water	0.0146	2,000	29
		deep-water	0.0521	2,000	104
	Trawl 4th seasonal allowance September 1 - October 1	shallow-water	0.0074	2,000	15
		deep-water	0.0014	2,000	3
	Trawl 5th seasonal allowance October 1 - December 31	shallow-water	0.0227	2,000	45
		deep-water	0.0371	2,000	74

Joint Groundfish Plan Team minutes

September 18-19, 2007
Alaska Fisheries Science Center
Seattle, WA

The Joint meeting of the BSAI and GOA groundfish Plan Teams convened Tuesday, September 18th at 9:00 am at the Alaska Fisheries Science Center in Seattle, Washington.

Members of the Plan Teams present for all or part of the meeting included:

Loh-Lee Low	AFSC REFM(BSAI chair)	Jim Ianelli	AFSC REFM (GOA co-chair)
Lowell Fritz	AFSC MML	Diana Stram	NPFMC (GOA co-chair)
David Carlile	ADF&G	Sandra Lowe	AFSC REFM
Steven Hare	IPHC	Jeff Fujioka	AFSC ABL
Jane DiCosimo	NPFMC (Coordinator)	Jon Heifetz	AFSC ABL
Theresa Tsou	WDFW	Robert Foy	NMFS
Brenda Norcross	UAF	Nick Sagalkin	ADF&G
Andy Smoker	NMFS AKRO	Cleo Brylinsky	ADF&G
Grant Thompson	AFSC REFM (Rapporteur)	Tom Pearson	NMFS AKRO
Ivan Vining	ADF&G	Ken Goldman	ADF&G
Dan Lew	AFSC	Sarah Gaichas	AFSC REFM
		Steven Hare	IPHC
		Theresa Tsou	WDFW

Plan Team members who were unable to attend include Mike Sigler (BSAI Vice-chair), Kerim Aydin, and Kathy Kuletz because they were attending a concurrently scheduled meeting. Ward Testa (GOA Team) was also absent. About 40 members of the public and AFSC attended parts of the meeting.

The teams welcomed new members Steven Hare and Cleo Brylinsky and noted that Bob Foy moved from UAF to NMFS and a university seat could be filled with a new member, at the Council's discretion. The teams reviewed changes to the draft agenda.

Research Priorities

The Teams noted that its opportunity for suggesting revisions to the research priorities is at its joint team September meeting, while the SSC/Council cycle for annually revising research priorities is April. The teams reviewed the Council's current research priorities and designated subgroups to suggest revisions for SSC and Council consideration when those bodies next consider revisions. The joint team suggestions for revisions to the research priorities are attached to the minutes.

Stock Assessments: Loh-lee Loh, Jim Ianelli, and Sandra Lowe
Fishery Performance and Monitoring: Tom Pearson, Andy Smoker, Nick Sagalkin
Fishery Interactions: Steven Hare, Ivan Vining, Cleo Brylinsky
Ecosystem: Sarah Gaichas, Bob Foy, Teresa Tsou
Protected Species Interactions: Lowell Fritz, Jeff Fuijioka, Dave Carlile
Habitat: Jon Heifetz, Ken Goldman, Brenda Norcross
Other research: Dan Lew, Diana Stram, Jane DiCosimo

ABC/TAC Specifications Process

For the December 2007 Council meeting, the NMFS AKRO staff will prepare a Supplemental Information Report to the 2006 EIS using the information generated in the November 2007 SAFE report. The SAFE report will be the latest scientific information to determine whether (1) substantial changes to

the proposed action have occurred or (2) new information or circumstances exist relevant to environmental concerns and bearing on the proposed action or its impacts. It is expected that no substantial changes in the action (harvest strategies) and no new information or circumstances that would lead us to modify the conclusions about the impacts of the action will be found. The teams will convene separately to recommend OFLs and ABCs for the proposed rule for the 2008/2009 fisheries. These will not be used to open the 2008 fishery but to fulfill Administrative Procedures Act for the final rule. The final specifications recommended by the Council in December 2006 will start the 2008 fisheries.

Council activities Jane DiCosimo distributed a summary sheet of Council activities. The Secretary is reviewing a recommendation to remove dark rockfish from the GOA and BSAI groundfish FMPs, following a GOA Plan Team recommendation. The FMP amendment is expected to be implemented for the 2009 fisheries. The Council will consider a staff recommendation to separate two other species actions into two analyses on separate timelines. The first action would amend the GOA FMP to authorize and OFL and ABC for the other species assemblage. Final action could occur by June 2008 and be implemented for the next specification cycle in 2009/2010; in that event, chapters for GOA sharks, squids, sculpins, octopuses, and possibly grenadier would be needed by November 2008 to set group specifications. For the second analysis, Scott Miller has prepared a discussion paper with a preliminary analysis of which fisheries may be directly affected by group level specifications and a plan for preparing the economic analysis. This analysis is planned for review in Spring 2008, but is not likely to be implemented by 2009.

Olav Ormseth gave a short presentation his efforts regarding the removal of non-target species from the specification process. These ideas build on the work of many others over the last decade and have yet to be enlarged into a formal proposal for Council action. Managing non-targets outside of the MSY-based framework is sensible because we are not managing these species for yield. Using a different management approach also provides the opportunity to use management tools that are more appropriate for data-limited species. He suggested that removal of non-targets from specification be a formal process, based on a quantitative analysis of the level of fishing mortality relative to natural mortality. Species that are subject to relatively low levels of fishing impact would be candidates for removal. Criteria based on the life history and ecology of species or species groups would be used to develop alternative management approaches. For example, a minimum catch allowance may be appropriate for fast-growing, short-lived animals such as squid. AFSC scientists have concerns that removal from specification may reduce the level of interest in and protection of non-target species. For sensitive species, such as sharks, a catch limit may still be necessary to provide a minimum level of protection. These limits could be based on non-MSY criteria similar to those used to manage threatened or endangered species, and might result in maintaining some non-target species at levels below B_{MSY}. Ormseth also proposed that the status of non-target species that are not adequately sampled in AFSC surveys could be monitored through periodic special projects. For example, a pelagic survey for sharks could be conducted every five years to monitor abundance. Changes in age structure or age at maturity may also serve as symptoms of population declines. An additional advantage of the proposed management changes would be that we could formalize the development of new fisheries on non-target species.

Tier 6 approaches Liz Conners noted that for octopus catch data reflects incidental catch history and not commercial catch history. There is no evidence of negative impacts to the octopus stocks from the current management approach, therefore we can consider continuing incidental catch levels to continue at what it has been and can take the maximum Incidental Catch Allowance, rather than the average. The GOA Team adopted this approach in 2006, but the BSAI Team adopted Tier 5.

B_0 Martin Dorn briefly summarized the Pacific Council process for biennial stock assessment with the off year used to hold science workshops on selected topics. In December 2006, the Pacific Council's SSC held a workshop to address the following three issues: (1) evaluate the performance of the Pacific Council's 40-10 harvest policy for stocks with different life history and stock-recruit patterns, (2) evaluate alternative methods to estimate B_0 and B_{MSY} proxies and provide recommendations on their use, and (3)

provide recommendations on the use of priors for key assessment parameters in stock assessment models. Parameters for which priors could potentially be useful include natural mortality, stock-recruit steepness, survey catchability, and recruitment variability. Melissa Haltuch (NWFSC) gave her AFS presentation on estimators of fishery management reference points to the teams. AFSC assessments use the second half of the data set because of regime shift and different parts of stock recruitment curve compared with Haltuch's use of the entire timeline for stable stocks. The question for the teams is whether to: (1) continue with our false estimate of B0, (2) embrace the real B0, or (3) look at other approaches. The teams noted if stock recruitment can be estimated in the model. There's a pretty high standard to go from tier 3 to tier 1, which may be more restrictive than necessary. The teams noted that authors could estimate an intrinsic stock recruitment relationship in the assessments more regularly.

Annual Catch Limits and Accountability Measures are a new requirement of the 2006 Magnuson-Stevens Reauthorization Act. They must be implemented in fishing year 2010 for fisheries determined by the Secretary to be subject to overfishing and 2011 for those that are not. Preliminary guidance suggests that for each managed stock an OFL should be established and an ACL must be established. An ACL would be an annual numerical target catch level and set below the OFL to ensure that overfishing does not occur. An AM is a management measure established with ACLs to end and prevent overfishing. NMFS will develop guidelines by year end. Jane DiCosimo reported that it may be possible for the Council to restart its analysis to separate groundfish into target and non-target categories and move some non-target species out from the specification process.

MSE for GOA pollock fishery Teresa A'mar (UW) presented her findings from the Management Strategy Evaluation (MSE) work applied to GOA pollock. This study is part of the larger initiative at the AFSC to evaluate current harvest policies and provide tools for developing alternatives. The latest developments include methods to link environmental ecosystem forcing as part of (or impacting) the operating model from which simulations are conducted (and subsequently evaluated with current single-species assessment models). The Teams were encouraged by her progress and from results presented, it appeared that no immediate concerns were raised about the current assessment/ABC setting system.

Bering Sea Integrated Ecosystem Research Plan Mike Sigler briefed the teams on ongoing projects under the BSIERP. The plan will form the basis of a trophic level examination of focal species in the field and linked through models. There are seasonal components to the studies being conducted in spring, summer, and fall. The plan will address both broad and finer scale issues, including (1) specific trophic interactions, (2) affects on people and communities through collection of local traditional knowledge; (3) affects on fishermen (economics). New surveys will be built on existing research initiatives (FOCI, BASIS), and new cruises will commence through BEST (Bering Ecosystem Study) which is funded by the National Science Foundation.

Economic SAFE report Ron Felthoven summarized the 2007 Economic SAFE report. The current draft This report contains detailed information about economic aspects of the fishery, including figures and tables, reports on the various fleets operating within the fishery, market analyses for the most commercially valuable species, and a summary of the relevant research being undertaken by the Economic and Social Sciences Research Program at the AFSC. The final draft of this document will include three sets of additional information: (1) a fleet profile of the vessels targeting pollock; (2) a set of market analyses for pollock, Pacific cod, sablefish and flatfish; and (3) project descriptions and updates for ongoing research activities of the Economics and Social Sciences Research Program (ESSRP) at the AFSC. Felthoven previewed 26 projects undertaken by his staff.

Flatfish CIE review Tom Wilderbuer summarized the reviewer's comments from the flatfish CIE review that were released a week ago. The review covered the assessments of arrowtooth flounder and rex sole in the Gulf of Alaska and flathead sole, Greenland turbot, northern rock sole, and yellowfin sole in the BSAI and GOA. There was consensus that the modeling for BSAI and GOA flatfish assessments and harvest recommendations were appropriate given the available data and provided the best scientific advice. The

reviewers provided 32 specific recommendations for the three terms of reference which encompassed the review. There has not been sufficient time for the AFSC to respond to the reviews. Plans were already underway to develop a split sex model for BSAI yellowfin sole in 2008, include more uncertainty in the projections (for many assessments), and multi-species modeling.

Wilderbuer asked if the teams had recommendations to prioritize the CIE recommendations for changes to the models. The teams felt that they did not have sufficient time to review the CIE recommendations so as to prioritize the recommendations, however, the teams did address some of the CIE recommendations. The teams discussed whether the lack of trawl survey coverage and the corresponding expansion of the trawlable area to the untrawlable area came up during the CIE review as it was an issue in the rockfish CIE reviews that is generic to other groundfish stocks. Wilderbuer responded that it did not come up. In response to a CIE recommendation, the team member discussed that there was no directed fishery on rex sole, so a fishery selectivity estimate could not be determined. One would not want to set TAC on a selectivity based on bycatch harvests. And while it is important to get correct age data, this is not key to the rex sole assessment. The team wondered if the CIE reviewers noted something specific to flatfishes in the recommendation for multi-species modeling for flatfish. Wilderbuer could not report on any specific CIE discussion on this issue. An industry representative questioned a recommendation that suggested using the fishery CPUE as an index of abundance in the face of potential survey budget reductions. He asked how one could tease out market effects on annual harvests. The teams concurred with Wilderbuer's response that he would not want to use CPUE to estimate abundance.

Some of the recommendations are equally applicable to all groundfish assessments, but without a AFSC response to guide the team members no specific recommendations were made. The teams will keep them in mind during reviews of flatfish assessments in November 2007. The teams recommended that the Council request that the AFSC provide a written response to the CIE reviews and report to the Council at a future SSC meeting (possibly February 2008 in Seattle).

Pacific halibut review Bill Clark summarized the CIE review, which followed a 2003 Marine Stewardship Council review and a 2004 review by Paul Spencer and others. He reported that the coastwide assessment was controversial. It involved assessing the abundance of the halibut stock as a single coastwide unit, rather than independently estimating the biomass of each regulatory area (closed-area assessments), as had been done over the previous two decades. The coastwide approach was taken primarily in response to new information from tagging programs, which showed greater levels of movement by adult fish than previously believed, but also was intended to resolve some disparities among independent estimates of stock biomass distribution. This methodology for partitioning the coastwide biomass estimate was not endorsed by the Commission in January 2007, in part because the Commission wanted to have a more thorough and broader review of any new methodologies. In May 2007 the IPHC staff held a combination public workshop and CIE review over 1 ½ days, followed by private discussions between the staff and CIE reviewers. Background documents were posted online prior to the workshop. All staff presentations were posted online, along with public workshop summary, and CIE reviews. Steven Hare summarized the IPHC harvest policy and CIE recommendations. The CIE review has not been made public to allow the Commissioners and scientific advisors to review the recommendations.

Pacific cod Grant Thompson reported on (1) the Pacific cod technical workshop held in April at the request of the SSC and (2) the preliminary assessment of the Bering Sea stock. The workshop included reports on both background research and assessment research pertaining to Pacific cod. Results from a large number of models were presented in detail: 23 models of the Bering Sea stock and 17 models of the Gulf of Alaska stock were developed prior to the workshop, and 8 models were developed during the workshop itself. The workshop was open to the public and 44 people participated. Pat Livingston served as chair and Liz Conners served as rapporteur. The workshop concluded with a session in which all of the participants were invited to make suggestions for this year's assessments. Forty suggestions were received.

For this year's preliminary assessment, the suggestions from the workshop were considered by the assessment authors, who then settled on four models to present. The four models deal with the Bering Sea stock only. The data used in these models were basically similar to the data used in last year's assessment, except that trawl and longline fishery CPUE data were included and age data were treated as age-at-length compositions rather than traditional age compositions. The models had several features in common, including: A) selectivity for the January-May trawl fishery was constrained to be monotone increasing; B) length at age 1, recruitment, and the ascending limbs of all selectivity schedules were allowed to vary annually; C) all parameters were estimated internally; and D) uniform priors were used exclusively. Other features of the four models were as follow: Model 1 started in 1976, attempted to estimate the effect of a 1976 regime shift on median recruitment, and did not attempt to fit the fishery CPUE data; Model 2 was the same as Model 1 except that it allowed the natural mortality rate to increase linearly with age after age 8; Model 3 was the same as Model 1 except that it attempted to fit the longline fishery CPUE data; and Model 4 started in 1982, did not attempt to estimate a regime shift effect on median recruitment, attempted to fit the longline fishery CPUE data, did not attempt to fit the initial (equilibrium) catch, did not attempt to fit the age data, and iteratively re-weighted input variance parameters for all abundance and size composition data.

Estimates of some key parameters were as follow: All four models estimated the natural mortality rate at values (0.43-0.68 for ages 0-8) higher than the traditional value of 0.37. Models 1-3 gave estimates of mean length at age 1 (11.7-11.8 cm) very similar to the value used in last year's assessment (11.3 cm), while Model 4 gave a lower estimate (7.1 cm). Models 1-3 gave estimates of the Brody growth coefficient (0.07-0.08) that were lower than the value used in last year's assessment (0.11), while Model 4 gave a higher estimate (0.20). Model 4 gave a higher estimate of the variability of length at old ages than the other three models (a different relationship was used in last year's assessment). The four model estimates of catchability for the post-1981 shelf bottom trawl survey (0.45-0.69) bracketed the value of 0.57 estimated in last year's assessment.

In terms of goodness of fit, Model 3 gave the best fits to the survey biomass and longline fishery CPUE data but tended to fit the size composition data worse than the other models. Model 4 gave the best fits to the size composition data but the worst fits to the survey biomass and longline CPUE data (even though Model 4 attempted to fit the longline CPUE data, the iterative re-weighting used in Model 4 resulted in these data being largely de-emphasized). The fits provided by Models 1 and 2 tended to be intermediate between Models 3 and 4. The log likelihood obtained by Model 2 was over 20 points better than that obtained by Model 1, with the greatest difference being in the fits to the survey size composition data.

In terms of results, all four models agreed that the 2001-2004 year classes were likely below average, and all but Model 4 agreed that the 2000 year class was also likely below average. These results are similar to the results obtained in last year's assessment. Model 1's estimated time series of female spawning biomass was almost identical to that obtained in last year's assessment, with Model 2's estimated time series tending to be slightly lower, Model 3's estimated time series tending to be much higher, and Model 4's estimated time series weaving back and forth between the others. For total biomass (both sexes and all ages combined), the results roughly paralleled those for spawning biomass, except here Model 2 rather than Model 1 gave results most similar (almost identical) to those from last year's assessment.

Most of the Plan Team discussion centered on the reliability of the age data. It was noted that the mean lengths at ages 1-4 from the age data sometimes do not line up well with the first few modes from the survey length composition data; more specifically, the mean lengths at ages 2 and 3 or 3 and 4 sometimes appear to straddle a single mode in the length composition data. It was noted that the AFSC ageing lab has devoted considerable effort to making sure the age data are accurate and that the method has been validated in a peer-reviewed article based on tagging data and the relationship between fish age and otolith size. Dan Kimura and Delsa Anderl from the ageing lab offered the following possible explanations for discrepancies between estimated mean lengths and survey length modes: A) the models are fitting the annual distribution of ages within individual length bins, meaning that sample sizes are very

small; B) beyond about 30 cm, the survey length compositions are undoubtedly mixtures of age-specific length compositions, meaning that the modes in the survey length compositions could be misleading indicators of the locations of the underlying age-specific modes; C) the models may not be capturing the full range of interannual variability in the length-at-age relationship; and D) otoliths collected during the summer are more difficult to age due to potential ambiguity of edge types. Other participants in the discussion noted that that the survey takes place over a period of several weeks during which substantial growth of young fish could be occurring, that an ageing error of plus/minus 1 year can be significant if the error occurs at young ages, and that an alternative explanation for the discrepancy is "de-recruitment" of age 2 or 3 fish from the survey by movement upward in the water column or out of the survey area. *The Plan Team agreed to include a recommendation for a "known age" tagging study of Pacific cod, similar to the study recently conducted for sablefish, in its list of research priorities.*

An industry consultant suggested several features to include in the final assessment. These included: A) ignore the age data, B) use survey numbers rather than survey biomass as an index of abundance, and C) increase the standard errors of the survey abundance indices to a "more appropriate" level (one that would account for process errors that are missing from the overall model in addition to measurement error from the survey itself).

There was also some discussion regarding estimation of annual deviations for growth and selectivity parameters. It was noted that the amount of variability estimated for the fixed gear fisheries, in particular, was very small and may not be worth the additional parameters needed. A suggestion was also made to the effect that the way interannual growth variability is modeled within SS2 could be problematic because the parameters define the length-at-age relationship for a particular year rather than a particular cohort. It was also suggested that the choice of upper reference age for the relationship describing variability in length at age be examined.

For the final assessment, the authors reported that they will attempt to include bycatch data from the IPHC longline survey as an index of relative abundance. Pacific cod size composition data were collected from this year's IPHC survey but were not available in time to include in the preliminary assessment. The team commended Thompson for its efforts on the workshop and revisions to the BS model, and had no specific recommendations pertaining to the Pacific cod assessment.

Public participation Loh-lee Low raised the issue of public participation in stock assessment reviews in the context of periodic public work shops of selected AFSC stock assessments that were recently held by the AFSC for Pacific cod in April 2007 and of Pacific halibut by the IPHC in conjunction with a CIE review in June 2007. Low acknowledged that the AFSC cannot undertake public workshops during the Plan Team process, in accordance with the Council's policy on external review guidelines for groundfish. Strong public interest was expressed by a number of industry representatives to attend the full CIE reviews. The Pacific Council's Stock Assessment Review (STAR) Panel and the CIE reviews for those stock assessments include full participation by the public.

The teams stressed that at least three processes were being intermingled in this discussion: (1) the Plan Team reviews of stock assessments, (2) CIE reviews of particular stock assessments on a separate timeline from the Plan Team process, and (3) moderated public education workshops. The Plan Team process includes three components: (i) staff presentations, (ii) technical review, and (iii) public participation (but not education). The CIE reviews have two components: (i) staff presentations and (ii) technical interaction between the CIE reviewers and stock assessment authors. The AFSC has conducted both of those privately for their reviews, while the IPHC included the public in the presentation portion of the meeting, but held the technical interaction between the reviewers and stock assessment authors private. Both agencies held the CIE review technical discussion private; there has been some misunderstanding by the public on this point, as some have expressed the opinion that the IPHC process was more open than that of the AFSC. The difference between the two events was public attendance at the staff presentation provided to the CIE reviewers. Public workshops have been held by both agencies.

These were well attended by both scientists and industry, and addressed a different goal than the technical reviews.

The teams concurred that the AFSC could increase communication with the public through workshops, but did not reach agreement on a recommendation to include the public during the staff presentations to the CIE panel. Some team members agreed that the technical interactions between the reviewers and staff benefited from their focused one-on-one interaction and should not be opened to the public. Sandra Lowe reported that a proposal for a CIE review of Atka mackerel for 2008 has been submitted. The proposed format includes an open public presentation portion and a private technical review.

Sablefish Dana Hanselman provided the teams an overview of the joint sablefish assessment. He previewed two approaches that will be incorporated into the sablefish assessment. He reported on an updated growth analysis for Alaska sablefish. ABL staff and Katy Howard, a UAF graduate student, updated and corrected for bias in the older length-stratified data (1981-1993), analyzed newer randomly collected samples (1996-2004), and estimated new length-at-age and weight-at-age parameters. The analyses showed that both male and female sablefish growth has changed modestly, but significantly. Recently, sablefish are growing to a larger maximum size. They then applied the updated growth data to the current stock assessment model through new age-length transition matrices. The model using the new growth data provided a superior fit to survey and fishery data, while abundance and recruitment trends remained similar. He recommended using the two growth periods divided into the two time periods (1981-1993 and 1996-2004). The teams concurred with this approach.

Hanselman summarized additional modeling revisions. Prior distributions for survey and fishery catchability were computed using NMFS trawl survey biomass estimates which provide more informative distributions than previously used. New prior distributions for catchability appear to be reasonable values, and are within the range of previous values used in the sablefish stock assessment. The most important assumption in this analysis that may be violated is that the trawl survey catchability is equal to 1. It is more likely that the true catchability of the trawl survey is less than, rather than more than 1, because (1) sablefish are capable of evading the net and (2) the trawl survey has limited coverage of the full depth distribution of sablefish. If this is true, then assuming a trawl catchability of 1 is a precautionary assumption. However, there is enough uncertainty in the derived prior distributions for the data to provide substantial influence on the final estimate, yet there is enough precision to guide the model on how each catchability value is related between indices.

Applying these distributions to the model should result in greater model stability, and more precise estimates of biomass. The effect on harvest recommendations will likely be small, but directionality is not obvious due to interaction between the catchabilities and other parameters such as selectivity. The plan team encouraged showing a model run using these catchability priors in November.

Hanselman also summarized a interagency workshop on sablefish that was held in Seattle on February 21 – 23, 2007. The purpose of the workshop was to bring together sablefish assessment scientists from the United States and Canada to exchange information, describe ongoing work, identify new avenues for research, and investigate cooperative research opportunities. A workshop summary was prepared and is found at: (ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/SablefishWorkshopSummaryFinal.pdf).

Jane DiCosimo summarized an interagency discussion that occurred on September 18, 2007 in response to a request by the Council to the AFSC in December 2005 on a number of BSAI sablefish management issues (see Appendix). She summarized the discussion and consensus of most of the participants. The Plan Teams endorsed the consensus for the Council to consider revising the escape panel regulations to a rectangular panel instead of the slash. This should be done in cooperation with the State of Alaska. The rationale for the change is to decrease the amount of unknown mortality of small sablefish. The teams also recommended a universal policy for accounting of State water catches (not inside waters) with the Federal TAC.

EBS Bottom Trawl Survey Bob Lauth summarized the results from the 2007 survey. In addition to routine survey duties, AFSC staff undertook 29 special projects and data collection. These included: MACE acoustic data collection, trawl gear comparison, light effects on pollock distribution, using acoustic data to reduce variance of pollock trawl catches, summer zooplankton abundance, seabird and fishery interactions, trophic interactions and feed ecology, Alaska skate age and growth, and egg case collections, octopus life history, validating Pacific cod visual maturities, sand lance taxonomy, icthyophonus in walleye pollock, reproductive biology of yellow Irish lord, improving trawl gear monitoring, prey library DNA collections, taxonomic collections for coral, decapods, and sand lance.

Lauth highlighted a few points for the teams. The cold pool (< 2°C) reached a little further south in 2007. Pollock biomass estimates increased this year to 4.16 mt, but this is only 87 percent of the long term average. Most of the pollock biomass increase was seen in the northwest portion of the EBS. There was an 18 percent decline in P. cod biomass, with a positive sign of recruitment of young-of-the-year fish. Yellowfin sole biomass was similar to 2006. Declines were seen for rock sole, flathead sole, Bering sole, Greenland turbot, arrowtooth flounder, and Kamchatka flounder. Colder bottom temperatures were probably related to the delay in the molting and spawning of female red king crab in Bristol Bay that necessitated re-sampling of 32 red king crab stations at the end of the survey; this was the fourth time during the history of the survey that re-sampling was necessary. The team noted that Jennifer Boldt's studies show that this pattern is normal and warmer years are less common historically.

Rockfish Working Group Paul Spencer provided a brief update on the status of the RWG and some specific research projects: (1) RACE is hiring a hydroacoustic technician to determine the roughness of the sea floor from split beam data in response to rockfish CIE recommendations to reevaluate the expansion of survey trawl data from trawlable areas to untrawlable areas, (2) Sandra Lowe has developed a contract for Bryan Black at Oregon State university to conduct a shortspine thornyhead aging study, (3) Auke Bay Lab scientists will assess maternal effects of rockfish in southeast Alaska, and (4) Spencer will continue his work modeling the influence of maternal effects on harvest rate reference points.

Multi-species technical workshop. Jim Ianelli reported on three multi-species statistical age-structured models that were examined in great detail at a recent workshop held at the AFSC. These models have been developed in separate labs (UW, AFSC, and UAF) for the Aleutian Islands, EBS, and GOA, respectively. Also, interested participants presented their work on similar multi-species models in Korea and from the Grand Banks off New England. The exchange of approaches was particularly useful and demonstrated the utility of the stomach content data collections. Also, since the EBS has lots of data on size at age, there may be potential to link growth data with temperatures and evaluate inter-annual variability in ration.

Aleutian Islands Fishery Ecosystem Plan Sarah Gaichas reported on the status of the AI FEP, which was adopted by the Council in June 2007. The AI FEP is broad in scope, and assembles all current information on historical, physical, biological, socioeconomic, and management relationships in the AI, including issues normally outside the scope of the Council process and fisheries management, such as military activity, shipping, and oil and gas exploration. The FEP team identified critical interactions in the AI using this background information, suggested current and potential indicators to assess the status of these critical interactions, and applied a risk assessment framework to prioritize interactions most important to the Council. A "glossy" synthesis of the AI FEP is currently in production, and will be distributed when available. The AI FEP is considered a "living document" which will be revisited by the FEP team and Council periodically to update information and re-assess potential risks to the AI ecosystem and sustainable fisheries and communities in that region. The teams briefly discussed how the FEP team may be best utilized to advice the groundfish plan teams and Council on forthcoming changes and/or early warning signs. Some ideas were discussed such as having individual assessment authors call attention to specific interactions as identified in the FEP and cross reference where additional information could be found with respect to this.

Ecosystem Considerations Sarah Gaichas summarized the updated and/or new indices in the Ecosystem Considerations report. Overall, there were 22 updated contributions and 6 new contributions. Many of the physical environmental indices in the Ecosystem Considerations report were updated. For example, the Pacific Decadal Oscillation (PDO), which is the leading mode of North Pacific sea surface temperature (SST) variability, transitioned from moderately positive in early 2006 to moderately negative in the summer/early fall of 2006 and has slowly increased to weakly positive values during the summer of 2007. When the PDO is positive, SST anomalies tend to be positive along the North American coast, extending to the south-eastern Bering Sea. The Bering Sea experienced a relatively cold winter and spring (2007). The presence of sea ice together with below normal ocean temperatures likely resulted in the first ice edge primary production bloom since 1999. Despite the presence of ice in the Bering Sea, there was a record low total area of sea ice in the Arctic in the summer of 2007. Unlike the northern Bering Sea and Arctic Ocean hot spots, the rate of warming in the southern Bering Sea is slowing down, suggesting a large natural variability component to recent extremes in addition to a background anthropogenic contribution toward warmer temperatures.

Some biological indices were also updated in this draft of the Ecosystem Considerations report. For example, demersal groundfish species in the BSAI and GOA had above-average recruitments from the mid- or late 1970s to the late 1980s, followed by below-average recruitments during most of the 1990s. There is an indication for above-average recruitment from 1994-2000 (with the exception of 1996). In the Gulf of Alaska, recruitment has been below average across stocks since 2001. Annual groundfish surplus production in the EBS and GOA decreased between 1978 and 2005. Declines in production may be a density-dependent response to observed increases in biomass and aging populations of groundfish.

The eastern Bering Sea groundfish community appears to have fewer small individuals and more large individuals through time. The community size spectrum (CSS) slope became less negative and the CSS intercept decreased from 1982-1987, primarily due to significant changes in the slopes and intercepts of non-target fish over time. This would imply that, overall (and particularly for non-target fish), the groundfish community has fewer small individuals and more large individuals through time. Factors other than fishing, such as the regime shift in 1976/77, may have had an influence on the community size spectrum.

Additional updates will be provided in the final November 2007 report.

Ecosystem Assessment Kerim Aydin reported that the ecosystem assessment section was not updated for the September 2007 draft, but may be updated for the final 2007 report. This year work on the Ecosystem Assessment is going to address three of the recommendations that came out of the PICES/NPRB workshop (Seattle, WA June 1-3, 2006): (1) publish concise, attractive executive summaries, (2) research how to synthesize data into fewer indicators, and (3) develop and utilize a formal process of evaluating and selecting indicators. Procedures for rating and vetting indices as well as blending data analysis and modeling into fewer indicators are being examined. He identified that one goal is to have a limited number of indicators that clearly and concisely communicate the status of the ecosystem, and indicate the future direction of the ecosystem. The approach taken will follow the Driver/Pressure, State, Impact, Response (DPSIR) model for turning indicators into potential action thresholds. Developing a DPSIR approach may be part of the development of an Integrated Ecosystem Assessment (IEA) for the region, although there is no current timeline for the development of IEAs for Alaska.

Marine Mammal Update Lowell Fritz provided an update on research results for Steller sea lions and northern fur seals. The adult and juvenile portion of the western stock of Steller sea lions was surveyed in June 2007 using a NOAA Twin Otter aircraft. Because of weather and logistical delays, it was not possible to do a complete survey of the range of the western stock in Alaska. Results were not available for the meeting but will be presented at the Steller Sea Lion Mitigation Committee meeting in Seattle, 16-18 October 2007. Fritz provided a summary of modeling and mark-recapture work to estimate Steller sea lion vital rates. Historical modeling analysis (Holmes et al, in press, Ecological Applications, Dec 2007)

indicated that the decline in the western population of Steller sea lions in the 1980s was primarily caused by a steep decline in juvenile survival, but was also associated with smaller declines in adult survival and natality (birth rate per female). Through the 1990s, when the western stock decline rate lessened, survivorship increased while natality continued to slip. Currently, reproductive rates are only two-thirds those of the 1970s while survival is at least as good or greater than that estimated for the 1970s. Holmes et al. concluded that factors that caused the decline, primarily 'top-down' factors affecting survival, are different from those that are affecting recovery, which are primarily 'bottom-up' factors affecting the condition and reproduction of adult females. With respect to northern fur seals, a count of adult males on the Pribilof Islands was conducted in July 2007, and data were presented for St George Island only. Pup production in 2007 was estimated on Bogoslof Island. While the results have not been finalized, preliminary analysis indicates that the population has continued to increase on Bogoslof Island and it may now produce as many pups as all of St George Island (approximately 17,000 per year). Adult females from Bogoslof Island forage almost exclusively in nearby slope and basin waters (where pollock fishing has been prohibited since 1992) and make short foraging trips of 1-2 days duration. Pribilof fur seals forage primarily in shelf waters and make longer foraging trips of 7-10 days duration. The consequences of the differences in summer female foraging strategies for pup and female condition and survival from the different rookeries is being explored.

The meeting adjourned on Wednesday, September 19, at approximately 4 pm.

Sablefish Management Discussion
September 17, 2007
Second DRAFT

Participants: Andy Smoker and Tom Pearson - NMFS AKRO
Phil Rigby, Jeff Fujioka, Dana Hanselman, Chris Lunsford - NMFS AFSC ABL
Nick Sagalkin, Cleo Brylinsky, Ivan Vining, Dave Carlile, Wayne Donaldson, Forrest Bowers, and Krista Milani - ADF&G
Demian Schane – NOAA GCAK
Jane DiCosimo – NPFMC

Background: In December 2005 the Council requested that AFSC Auke Bay Laboratory (ABL) scientists investigate a number of issues related to sablefish management in the Bering Sea and Aleutian Islands. The Council requested that ABL staff conduct experimental research in 2006 to determine the effectiveness of different size escape rings, soak times, and biodegradable panels, in conjunction with ongoing efforts to develop catch-per-unit-effort indices for sablefish pot gear. Specifically, ABL staff would address three potential changes to sablefish pot gear regulations based on research results: 1) escape rings; 2) changes to required biodegradable panels; and 3) banning at-sea storage of pots. The Council suggested that requested research be reviewed by the BSAI Plan Team at its September 2006 meeting. The 2006 sablefish stock assessment (pp 343-344) responded to several of the Council inquiries (see below).

1. A comparison of CPUE and size information from pot and longline fisheries is presented in section 3.1.2 of this document.
2. A study of the distribution of sablefish less than 40 cm has been undertaken. Results indicate that juveniles are distributed on the Gulf of Alaska shelf with varying abundance by year. On the Bering Sea shelf, while abundant at times, their presence is much more intermittent (Shotwell 2006).
3. A study of escape rings by the Canadian Department of Fisheries and Oceans (DFO) recommended that: "Escape rings are an effective means of reducing the catch of sub-legal blackcod" (Saunders and Surry 1998). Additional studies by DFO indicate similar results (appendix N in Haist et al. 2003). To attain the sample size to experimentally verify that this would occur in the Bering Sea may require inordinate amount of effort and time due to the intermittent and lower density of sablefish in this area.
4. The Observer Program has begun sampling stomachs of large sablefish taken from pot vessel trips to examine the possibility of cannibalism of small sablefish. Sufficient samples have not been attained at this time.
5. An estimate of size specific RPW's apportioned by area indices can be computed using the longline target fishery selectivity to estimate exploitable biomass to account for the difference in sizes between areas. The Bering Sea which generally has a smaller average fish size would be expected to have a smaller apportionment of exploitable biomass, than if exploitable biomass is estimated by the current depth specific RPW.
6. Information on soak times observed in the Alaska fishery is shown in section 3.1.2. Analyses or studies to determine a maximum soak time have not been initiated on the Alaska fishery. A study by Scarsbrook et al. (1988) in Canadian waters noted significant mortality when soak time extended beyond 10 days.
7. Pot catch rate data available from the Alaska fishery has been compiled (section 3.1.2). Development of pot fishery indices of abundance will be considered after any escape ring and soak time regulations have been stabilized and sufficient observer coverage and time series of data is available.
8. It appears State and Federal regulations already require an 18 inch slash secured with biodegradable twine in all pot gear. Research done in Canada testing the effectiveness of various escape mechanism in conical pots used in the sablefish fishery found that square or triangular panels were more effective than just a "slash" secured with biodegradable twine (Scarsbrook et al. 1988).

9. Banning at-sea pot storage of pots: Considerations of such regulations have industry wide implications and have implications to various fish species as well as habitat. The expertise and resources needed to evaluate this sufficiently is beyond the capacity of sablefish assessment scientists alone.

Meeting summary: On September 18, 2007 ADF&G, NMFS, and Council staff convened to advise the Council whether problems in the fishery exist related to: 1) gear requirements; 2) escape panels; 3) soak times; and 4) cannibalism of juvenile sablefish in pots. Additional issues were discussed.

Recent workshop Chris Lunsford and Dana Hanselman reviewed a summary of a February 2007 workshop with AFSC, NWFSC, and DFO sablefish scientists the issues addressed in last year's SAFE chapter. They specifically reviewed the Canadian studies on biodegradable panels and escape rings. ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/SablefishWorkshopSummaryFinal.pdf

Current regulations Tom Pearson reviewed Federal regulations. Under section 679.2 Definitions, Authorized fishing gear: pot gear describes the requirements for a biodegradable panel and maximum tunnel eye size. Regulations require that all groundfish pots (or traps) have a tunnel eye no more than 36 inches in circumference and a bio-degradable panel 18 inches long, made of untreated cotton of certain thread count sewn in. The circumference requirement was implemented to reduce the incidental catch of halibut. Section 679.24 Gear limitations describes how pot gear may be used to target sablefish. There are no Federal regulations related to pot storage or escape rings. Federal regulations do not allow the use of groundfish pots in the GOA.

Nick Sagalkin reviewed State regulations for groundfish traps. The effect of state regulations is the same as Federal regulations, but the legal requirements are different. Wayne Donaldson reported that sablefish pots used in the BSAI are smaller and rounder than pots that are used for crab and Pacific cod. The BSAI and GOA cod pot fishery uses predominantly heavier rectangular modified crab pots. Pots are allowed to be used in the State Clarence Strait sablefish fishery. 5AAC28.632 stipulates where pots may be stored when not being fished.

5 AAC 39.145. "Escape mechanism" for shellfish and bottomfish pots

Pot gear must include an "escape mechanism" in accordance with the following provisions:

(1) A sidewall, which may include the tunnel, of all shellfish and bottomfish pots must contain an opening equal to or exceeding 18 inches in length, except that in shrimp pots the opening must be a minimum of six inches in length. The opening must be laced, sewn, or secured together by a single length of untreated, 100 percent cotton twine, no larger than 30 thread. The cotton twine may be knotted at each end only. The opening must be within six inches of the bottom of the pot and must be parallel with it. The cotton twine may not be tied or looped around the web bars. Dungeness crab pots may have the pot lid tie-down straps secured to the pot at one end by a single loop of untreated, 100 percent cotton twine no larger than 60 thread, as a substitute for the above requirement; the pot lid must be secured so that, when the twine degrades, the lid will no longer be securely closed.

(2) All king crab, Tanner crab, shrimp, miscellaneous shellfish and bottomfish pots may, instead of complying with (1) of this section, satisfy the following: a sidewall, which may include the tunnel, must contain an opening at least 18 inches in length, except that shrimp pots must contain an opening at least six inches in length. The opening must be laced, sewn, or secured together by a single length of treated or untreated twine, no larger than 36 thread. A galvanic timed release (GTR) device, designed to release in no more than 30 days in salt water, must be integral to the length of twine so that, when the device releases, the twine will no longer secure or obstruct the opening of the pot. The twine may be knotted only at each end and at the attachment points on the galvanic timed release device. The opening must be within six inches of the bottom of the pot and must be parallel with it. The twine may not be tied or looped around the web bars.

Escape panels Ghostfishing can be a serious problem from lost and/or abandoned gear. Based on a recent DFO paper that noted the relative success of allowing escapement of sablefish less than the Canadian minimum size of 55 inches using a three-sided *rectangular* escape panel in allowing groundfish to escape pots (97-100%) compared to the *slash* panel (34-79%). *Therefore, the working group recommended that the Council consider requiring all pots that catch groundfish to have a rectangular panel of the same dimensions as the currently required slash panel.* This will likely affect the sablefish, Pacific cod, and crab pot fisheries.

Recognizing the potential impacts on the crab fisheries, the group recommended that the proposed change had the highest priority for directed sablefish pots and should be examined for other groundfish and crab pots, along with potential economic impacts. Crab pots are also required to have escape rings to allow undersized crab to escape. ADF&G data from the crab fisheries could identify groundfish bycatch in these fisheries. Cod pots look just like a crab pots without escape rings and mesh panel and tunnel eyes have to be reduced to keep halibut out. Tunnel eye for crab are slanted upward. Pots for sablefish are lighter: 200 lb v 700 lb pots for cod.

In the Aleutian Islands, where some crab pot gear is allowed to soak for several weeks, twine should last 30 days. The twine may break due to longer soak times. As a result of a BOF proposal from a golden crab fisherman, ADF&G is evaluating the performance of two sizes of twine. Revising regulations to allow the use of a stronger twine may be less conservative.

Escape rings No new information might be gathered from additional research beyond that currently available from Canadian studies. Canadian requirements for an escape ring of 3 ½ inches made from acrylic so as not to gill the fish resulted from an industry request and experiments. Incentives occur in the Alaska IFQ fishery for a voluntary approach: 1) price differences for larger sablefish, 2) lower market prices for substandard fish and small fish. While not legal, staff reported a common practice for IFQ fishermen to discard sablefish less than 2 lb (about 50 cm). Selective release of non-marketable sablefish is not accounted in stock assessments (the fishery is shifting harvests to larger (female) fish by increasing fish hook size). Voluntary efforts through the use of a maximum mesh size could also minimize harvest of unmarketable fish. Pot gear could achieve this by using escape rings voluntarily. Observer data indicate the sablefish pot fishery does not have a lot of groundfish bycatch. Because cod have larger heads than sablefish, escape rings on pots used in both fisheries would have different effects. *The working group was neutral in whether the Council should consider requiring all pots that catch groundfish to have escape rings.* The group felt that industry members should take the lead on escape rings. If the Council was interested in pursuing such regulations, it could use the Canadian fishery and studies as a model.

Soak times Observer data indicate that during 1999-2005, 90% of pots were soaked less than 7 days. Significant mortality did not occur until pots were soaked more than 10 days. *Staff did not think there was a problem in the fishery related to excessive soak times.*

Cannibalism of juvenile sablefish in pots is related to excessive soak times, escape rings, and escape panels. No evidence of cannibalism exists from stomach content analyses. *Staff did not think there was a problem in the fishery related to cannibalism of juvenile sablefish.*

Pot storage There are no closed seasons for the use of pots in the groundfish fisheries, as pot gear has been exempted from PSC limits. The State has identified different pot storage areas among regulatory areas and fisheries. Most groundfish pot storage areas are restricted to 25 fathoms or less, except near beginning and end of season. They are required to be without bait and with doors tied open. NOAA Enforcement Division might be expected to prefer to have clear Federal regulations for where and when pots can be stored in Federal waters (similar to those in State regulations). It is preferable to define a period when the gear is either fishing or not fishing.

Other potential management issues:

Pot prohibition in the GOA The group noted that most sablefish fishing off western Alaska is with pot gear and not longlines. California Fish and Game has noted a lot of longline gear has been lost to derelict pots and a lot of ground has been lost to fishing. Staff discussed whether the Council should consider relaxing its pot gear prohibition due to marine mammal depredation. The group reviewed the history behind the gear prohibition. Staff noted that one vessel in the GOA took over half the TAC one year, which resulted in the ban. In compensation, pots were allowed in the BS and AI. Kodiak-based crabbers that had geared up to fish pots in the GOA lost out. The gear prohibition addressed a perceived gear conflict between fixed gear industry and trawlers. Where both pots and longline gear are fished, the stronger lines used in the pot fishery could result in pot gear being pulled to the surface, while longline gear could break. There does not appear to be as great a potential for conflict due to longer fishing seasons under the IFQ fishery. At the time of the prohibition, small boats could stack a hundred pots or more. The already established longline gear felt put upon by a new sector. Staff discussed potential gear conflicts in AI between pot and trawl gear. The Atka mackerel fishery in the eastern AI (Area 541) used to be a 12-24 h derby fishery. One conflict occurred where an Atka mackerel fisherman ran over the pot gear set by a golden king crab boat. New regulations implemented under Amendment 80 could eliminate that type of conflict. Additionally, while more conflict occurred from pot gear being destroyed by trawl gear, trawlers get damaged by abandoned crab pots. The Council could consider lifting the ban if industry requested it. *Staff felt that no change was needed for biological reasons unless the biomass and/or TACs were affected by marine mammal depredation in the GOA.*

Habitat The group discussed the status of juvenile sablefish in heavily trawled areas in the EBS. The February 2007 workshop suggested that the cumulative effects of trawling in the Eastern Bering Sea could have degraded the habitat for juvenile sablefish which used to be abundant there in the late 1970s according to trawl survey results. *Council staff will follow up with ABL staff on this issue.*

Gear code Council staff has requested that a pot longline gear code be added to Federal reporting requirements and ADF&G fish tickets. The BSAI sablefish fisheries are increasingly moving to pot longline gear due to whale depredation. Managers can make some assumptions based on knowledge of fishing operations. Most BSAI sablefish harvests are from the catcher/processor sector using pot longline gear and observed. It is not, however, an ideal method to estimate gear used. Pots (single or longline) are not allowed in GOA waters. *The group felt that a pot longline gear code should be created at the earliest convenience of State and Federal fishery data managers.*

Accounting Staff noted that the Council does not have a consistent policy of deducting State groundfish catches against Federal quotas. AI sablefish fishery is assessed using the Federal stock assessment and 5% of Federal TAC is set as the State fishery GHL. State water AI sablefish catches count against IFQs, is QS are held, but remaining State water catches do not reduce the TAC. In Prince William Sound, the State GHL for pollock is deducted from the ABC for the western GOA pollock stock (W/C/WYK areas). State parallel fishery cod catches are deducted before Federal TAC is set. In the last few years, NMFS stopped deducting groundfish catches in inside waters of SEO (Area 659) from federal TACs (e.g., thornyheads in State sablefish fisheries). *The group endorsed a uniform policy of accounting for state GHL catches against Federal quotas, where separate biomasses are not assessed for Council consideration.*

North Pacific Fishery Management Council

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North Pacific Fishery Management Council

Research Priorities and Needs

The North Pacific Fishery Management Council has developed a list of research needs and priorities, in three parts. This document contains the following sections:

- Research Priorities for 2007–2008
- Research Priorities for 2007–2012
- Comprehensive Research Needs for North Pacific Fishery Management

Research Priorities for 2007–2008

I. Fisheries

A. Stock Assessments

1. Continuation of annual and biennial surveys in the GOA, AI and EBS are a critical aspect of fishery management in Alaska. It is important to prioritize these surveys in light of recent proposed federal budgets in which funding may not be sufficient to conduct these surveys. These surveys provide baseline distribution and abundance data that form the foundation for stock assessments and the development of ecosystem approaches to management. These surveys are considered the highest priority research activity contributing to assessment of Alaskan groundfish fisheries. Moreover, the expansion of routine surveys into the northern Bering Sea and baseline surveys of the Arctic Ocean will become increasingly important under ongoing warming ocean temperatures and range expansions of harvested fishery resources. ~~In particular, increase the annual survey to include the North Bering Sea Research Area (NBSRA) "wedge"[1]. The Council recognizes that funding is tight for stock assessment and surveys. If additional funds are not available, NMFS should consider a scientific research plan that provides a baseline in this relatively untrawled NBSRA as well as "cost recovery" in the "wedge".~~
2. Continuation and expansion of cooperative research efforts to supplement existing surveys to provide seasonal or species specific information for use in improved assessment and management
3. Improved stock assessment of "other species," non-target crab and non-target rockfish. Highest priority research tasks include: (1) alternative indices of abundance (and biomass) and fishing mortality are necessary for species for which standard surveys are inadequate; and (2) life history information (specifically, natural mortality, size at maturity, and other basic indicators of stock production) for "other species" and non-target crab to allow application of Tier 5 or Tier 4 assessment criteria. Little information is available especially for sculpins, skates, octopuses, squids, grenadiers and some sharks.
4. Continue research on the design and implementation of ~~In particular for rockfish, conduct~~ appropriate survey and ~~analysis~~ analyses to aid the Council in developing mechanisms to assess

[1] The "wedge" refers to the area between St Matthew and Nunivak Islands, north to 60° N. The longitudinal expanse between the two islands has been reported as the first area likely to be utilized by the flatfish trawl fleet, if the sea ice edge moves and fish stocks migrate northward.

species that are locally lumped in their distribution and are thus not adequately represented (either over or under estimated) in the annual or biannual groundfish surveys.

5. For groundfish in general, continue and expand research on trawlable and untrawlable habitat to improve resource assessment surveys
6. Identification and recovery of archived data (e.g., historical agency groundfish and shellfish surveys) should be pursued.

B. Fishery Management

1. Evaluate the effectiveness (e.g., potential for overharvest or unnecessarily limiting other fisheries) of setting ABC and OFL levels using Tier 5 and 6 approaches for rockfishes and other poorly assessed species (e.g., squid, octopus, skates, non-target crab).

II. Fisheries Interactions

A. Bycatch and Observer Issues

1. Improved estimation of total bycatch including tier 2 marine mammals and seabirds. At present, it is clear that observer coverage in some fisheries is insufficient for estimation of total bycatch. Further, observer coverage must be analyzed to compare, to the extent possible, the total catch, bycatch, and fishing behavior between observed and unobserved fishing vessels. Examples include the CV trawl fisheries, sablefish longline fishery, ~~skate fishery,~~ Pacific cod pot and longline fishery, halibut longline fishery, and sport fisheries. Improved accuracy of identifications and enumerations of bycatch species is necessary. The current program results in imprecise bycatch (mortality) estimates for species, such as skates, sharks, yelloweye rockfish, and sablefish in halibut longline fisheries and discards in sport fisheries. Improved methods ~~may~~ should include direct and alternative monitoring options (e.g., electronic logbooks, video monitoring) particularly on smaller groundfish, ~~and~~ halibut, and sport vessels.
2. Gear technology. Further research is needed on gear modifications and fishing practices for reducing bycatch, particularly for PSC species (e.g., salmon).

B. Expanded Ecosystem Studies

1. Environmental influences on ecosystem processes.

a) Ocean acidification: As atmospheric greenhouse gas emissions increase, more CO_2 is absorbed by the sea surface, thus increasing levels of carbonic acid, resulting in lower pH and the subsequent undersaturation of calcite. If trends continue, the ability of organisms, such as pteropods and crab, to form exoskeletons will be compromised. Monitoring of pH levels and additional studies on the effects of calcite undersaturation on growth and survival are necessary.

b) Climate variability: Changes in ocean temperature may affect managed species and lower trophic levels.

i) Sea ice: If recent changes in ice cover and temperatures in the Bering Sea persist, they may have profound effects on marine communities.

ii) **Zooplankton production:** Apparent declines in zooplankton wet weight over the shelf measured by the Oshoro Maru could imply the loss of critical copepod and euphausiid prey of important species, such as pollock.

iii) Fish composition: Existing data sets (bottom trawl surveys, BASIS surveys) can be used to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, and monitor changes in the distribution of individual species and assemblages. Additional monitoring may be necessary in the Aleutian Islands and other areas of the Gulf of Alaska.

iv) **Recruitment and growth:** Studies on effects of climate on recruitment and growth (GPT) could include the development of standard environmental scenarios for future

variability based on observed patterns. There is also a clear need for information that covers a wider range of seasons than presently available.

v) **Fish movement:** Studies to assess the movement of fish to understand the spatial importance of predator-prey interactions in response to environmental variability.

2. **Trophic interactions.**

a) **Temporal and spatial data collection:** Diet information from seasons in addition to summer is needed to assess seasonal changes in predator-prey interactions. The diet information should be collected on the appropriate spatial scales for key predators and prey to determine how food webs may be changing.

b) **Ecosystem structure studies:** Studies are needed on the implications on food web interactions of global warming, ocean acidification, and selective fishing. For instance, studies are needed to fully evaluate selective removal of some components of the ecosystem (e.g., Pacific cod, pollock) relative to others (e.g., arrowtooth flounder).

~~1. Climate change and fish communities. Changes in ocean temperature and acidity may affect managed species and lower trophic levels. For instance, if recent changes in ice cover and temperatures in the Bering Sea persist, they may have profound effects on marine communities. Apparent declines in zooplankton wet weight over the shelf measured by the Oshoro Maru could imply the loss of critical copepod and euphausiid prey of important species, such as pollock. Existing data sets (bottom trawl surveys, BASIS surveys) can be used to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, and monitor changes in the distribution of individual species and assemblages. Additional monitoring may be necessary in the Aleutian Islands and other areas of the Gulf of Alaska.~~

~~2. Ecosystem structure studies. Studies are needed on the implications of food web interactions and global warming, ocean acidification, and selective fishing. For instance, studies are needed to fully evaluate selective removal of some components of the ecosystem (e.g., Pacific cod, pollock)~~

C. Protected Species Interactions

1. Population dynamics, life history and assessment of protected species including Steller sea lions, northern fur seals, spectacled eider, short-tailed albatross
2. Local fishery interaction studies. Whereas global fishery control rules may generally prevent overfishing on a broad regional basis, non-random patterns of fishing may cause high rates of removals in local areas important to apex predators such as Steller sea lions and northern fur seals, spectacled eider, short-tailed albatross. More studies are needed to fully evaluate potential local effects of fishing on other components of the ecosystem (e.g., marine mammals, seabirds, and the impact on benthic habitat by bottom contact gear).

III. Habitat

A. Habitat Mapping

1. Improved habitat maps are required to identify essential fish habitat and distributions of various substrates and habitat types, including habitat-forming ~~living substrates~~biota.
2. Evaluate Bering Sea canyons and skate nursery areas. In particular, an assessment of the extent, distribution, and abundance of important skate nursery areas in support of future HAPC.
3. Begin to develop a GIS relational database for habitat in order to track changes in distribution

IV. Other Areas of Research Necessary for Management Purposes

A. Social and Economic Research

1. Evaluation of economic effects from ~~Kodiak is at the center of controversy associated with the~~ recently adopted crab rationalization program~~.~~ on Gulf Coast communities, including Kodiak. This includes understanding the economic impacts (both ~~What were the~~ direct and indirect impacts and how ~~were~~ the impacts are distributed ~~throughout the community?~~ among communities and economic sectors, conducting qualitative research to assess changes in community participation and effort in fisheries, and estimating net economic ~~How do these costs and~~ benefits ~~compare to other affected communities?~~.
2. As Kodiak is ~~also~~ likely to be at the center of controversy over the likely consequences of Gulf rationalization, ~~it would be particularly advantageous if~~ research ~~could~~ should be designed to use Kodiak in addition to~~or~~ other Gulf communities as case studies in prospective analyses of the potential effects of Gulf rationalization options~~.~~ on fishing behavior and participation and economic impacts.
3. Research to understand the economic effects of alternative halibut management measures on the charter boat recreational fishing sector including effects on participation, spatial and temporal effort allocation, and fishing communities.

Research Priorities for 2007-2012

I. Fisheries

A. Stock Assessments

1. Continuation of annual and biennial surveys in the GOA, AI and EBS are a critical aspect of fishery management in Alaska. It is important to prioritize these surveys in light of recent proposed federal budgets in which funding may not be sufficient to conduct these surveys. These surveys provide baseline distribution and abundance data that form the foundation for stock assessments and the development of ecosystem approaches to management. These surveys are considered the highest priority research activity contributing to assessment of Alaskan groundfish fisheries. Moreover, the expansion of routine surveys into the northern Bering Sea and baseline surveys of the Arctic Ocean will become increasingly important under ongoing warming ocean temperatures and range expansions of harvested fishery resources.
2. Continuation and expansion of cooperative research efforts to supplement existing surveys to provide seasonal or species specific information for use in improved assessment and management.
3. Improved stock assessment of "other species" and non-target crab. Highest priority research tasks include: (1) alternative indices of abundance (and biomass) and fishing mortality are necessary for species for which standard surveys are inadequate; and (2) life history information (specifically, natural mortality, size at maturity, and other basic indicators of stock production) for "other species" and non-target crab to allow application of Tier 5 or Tier 4 assessment criteria. Little information is available especially for sculpins, skates, octopuses, squids, grenadiers and some sharks.

B. Fishery Performance and Monitoring

1. Improvements in at-sea observations are needed in several areas: (1) species-specific identification of priority species on scientific surveys; (2) review and revision of observer deployment and coverage to adequately characterize total catch, as well as a review of sampling procedures (e.g., basket versus whole haul) employed by observers that form the basis for total catch estimation; (3) improved means of data collection especially on small vessels; ~~and~~ (4) improved biological data collection of bycatch species (e.g., octopus, squid, skates, sharks, and non-target crab); (5) estimates of groundfish catch and discards in the halibut fishery; (6) improved estimates of halibut mortality in the sablefish fishery; and (7) estimates of groundfish catch in the sport fisheries.~~,~~
2. Improved estimation methods for total catch and fishing mortality of all target and non-target species at the stock and fishery level as well as at the level needed for various management programs. This may include revised observer deployment, use of flow scales, development of electronic logbooks, integration of logbook data into stock assessments and ecosystem modeling, monitoring of LAPPs, and continued development of e-landings reporting system,~~etc~~.
3. Develop confidence intervals for NMFS catch accounting estimates of catch focusing in particular on discards at sea of groundfish, non-targets, and prohibited species.

C. Fishery Management

1. Evaluate the effectiveness (e.g., potential for overharvest or unnecessarily limiting other fisheries) of setting ABC and OFL levels using Tier 5 and 6 approaches for rockfishes and other poorly assessed species (e.g., squid, octopus, skates, non-target crab).
2. Advancing ecosystem approach to fisheries management. This includes development of suitable indicators and indicator species (including novel approaches such as using corticosterone levels in

predators as an indicator of prey availability, developing ecosystem reference points, including OY cap considerations, and improvements of current ecosystem models.

3. Development of forecasting tools that incorporate ecosystem indicators into single or multi-species stock assessments to conduct management strategy evaluations under differing assumptions regarding climate and market demands. Standardization of "future scenarios" will help to promote comparability of model outputs. Process-oriented research focused on local impacts of fishing on prey availability for top trophic level consumers will also be informative.
4. Development of spatially explicit stock assessments that allow for management to be linked appropriately to stock boundaries and habitat use.
5. Assist ADF&G in evaluating BOF groundfish proposals with respect to conservation and management concerns.

II. Fisheries Interactions

A. Bycatch and Observer issues

1. Improved estimation of total bycatch including tier 2 marine mammals and seabirds. At present, it is clear that observer coverage in some fisheries is insufficient for estimation of total bycatch. Examples include the sablefish longline fishery, ~~skate fishery,~~ Pacific cod pot and longline fishery, halibut longline fishery, and sport fisheries. Improved accuracy of identifications and enumerations of bycatch species is necessary. The current program results in imprecise bycatch (mortality) estimates for species, such as skates, sharks, yelloweye rockfish, and sablefish in halibut longline fisheries and discards in sport fisheries. Improved methods ~~may~~ should include direct and alternative monitoring options (e.g., electronic logbooks, video monitoring) particularly on smaller groundfish, ~~and~~ halibut, and sport -vessels.
2. Research on discard and handling mortality rates. Better estimates of discard mortality rates by gear and fishery is needed to estimate more accurately total bycatch mortality for all discarded species, with an emphasis on such species as crabs, skates, sharks, rays, and octopus.
3. Gear technology. Further research is needed on gear modifications and fishing practices for reducing bycatch, particularly for PSC species.

B. Expanded Ecosystem Studies

1) **Environmental influences on ecosystem processes.**

a) **Ocean acidification:** As atmospheric greenhouse gas emissions increase, more CO_2 is absorbed by the sea surface, thus increasing levels of carbonic acid, resulting in lower pH and the subsequent undersaturation of calcite. If trends continue, the ability of organisms, such as pteropods and crab, to form exoskeletons will be compromised. Monitoring of pH levels and additional studies on the effects of calcite undersaturation on growth and survival are necessary.

b) **Climate variability:** Changes in ocean temperature may affect managed species and lower trophic levels.

i) **Sea ice:** If recent changes in ice cover and temperatures in the Bering Sea persist, they may have profound effects on marine communities.

ii) **Zooplankton production:** Apparent declines in zooplankton wet weight over the shelf measured by the Oshoro Maru could imply the loss of critical copepod and euphausiid prey of important species, such as pollock.

iii) **Fish composition:** Existing data sets (bottom trawl surveys, BASIS surveys) can be used to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, and monitor changes in the distribution of individual species and assemblages. Additional monitoring may be necessary in the Aleutian Islands and other areas of the Gulf of Alaska.

iv) **Recruitment and growth:** Studies on effects of climate on recruitment and growth (GPT) could include the development of standard environmental scenarios for future variability based on observed patterns. There is also a clear need for information that covers a wider range of seasons than presently available.

v) **Fish movement:** Studies to assess the movement of fish to understand the spatial importance of predator-prey interactions in response to environmental variability.

2) **Trophic interactions.**

a) **Temporal and spatial data collection:** Diet information from seasons in addition to summer is needed to assess seasonal changes in predator-prey interactions. The diet information should be collected on the appropriate spatial scales for key predators and prey to determine how food webs may be changing.

b) Ecosystem structure studies: Studies are needed on the implications on food web interactions of global warming, ocean acidification, and selective fishing. For instance, studies are needed to fully evaluate selective removal of some components of the ecosystem (e.g., Pacific cod, pollock) relative to others (e.g., arrowtooth flounder).

3) **Forage production and fishery interactions at scales relevant to key predators.**

Understanding the dynamics of important pelagic and benthic forage species, such as capelin, herring, eulachon, myctophids, euphausiids, shrimp, squid, and juvenile pollock remains a high priority for understanding energy flow to commercially important species and to protected species, including seabirds and mammals. Whereas global fishery control rules may generally prevent overfishing on a broad regional basis, non-random patterns of fishing may cause high rates of removals in local areas important to apex predators. More studies are needed to fully evaluate potential local effects of fishing on other components of the ecosystem (e.g., marine mammals and seabirds).

~~0.Climate change and fish communities. Changes in ocean temperature and acidity may affect managed species and lower trophic levels. For instance, if recent changes in ice cover and temperatures in the Bering Sea persist, they may have profound effects on marine communities. Apparent declines in zooplankton wet weight over the shelf measured by the Oshoro Maru could imply the loss of critical copepod and euphausiid prey of important species, such as pollock. Existing data sets (bottom trawl surveys, BASIS surveys) can be used to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, and monitor changes in the distribution of individual species and assemblages. Additional monitoring may be necessary in the Aleutian Islands and other areas of the Gulf of Alaska.~~

~~0.Ecosystem structure studies. Studies are needed on the implications of food web interactions and global warming, ocean acidification, and selective fishing. For instance, studies are needed to fully evaluate selective removal of some components of the ecosystem (e.g., Pacific cod, pollock) relative to others (e.g., arrowtooth flounder).~~

C. Protected Species Interactions

~~1.~~Population dynamics, life history and assessment of protected species including Steller sea lions, northern fur seals, spectacled eider, short-tailed albatross, and

1. Steller's Eider studies should be pursued.
2. Local fishery interaction studies. Whereas global fishery control rules may generally prevent overfishing on a broad regional basis, non-random patterns of fishing may cause high rates of removals in local areas important to apex predators such as Steller sea lions and northern fur seals, spectacled eider, short-tailed albatross. More studies are needed to fully evaluate potential local effects of fishing on other components of the ecosystem (e.g., marine mammals and seabirds).

3. Economic, social, and cultural valuation research (e.g., consumptive use, passive use, non-consumptive use).

III. Habitat

A. Habitat Mapping

Improved habitat maps are required to identify essential fish habitat and distributions of various substrates and habitat types, including habitat-forming ~~living substrates~~biota.

B. Recovery rates and sensitivity of seafloor habitats.
Field and laboratory studies are needed to assess recovery rates and sensitivity to gear disturbance for habitat biota (e.g. sponges and corals). This data can be used within the framework of the existing habitat impacts model.

~~B.~~ Development of a Geographic Information System database where all information on habitat is made easily accessible. This will allow habitat data containing a spatial component to be more easily accessed by scientists and managers involved in habitat analyses.

C.

D. Evaluate the effectiveness of existing habitat closures to meet stated management objectives.

IV. Other Areas of Research Necessary for Management Purposes

A. Social and Economic Rresearch

1. Development of an ongoing database of product inventories (and trade volume and prices) for principal shellfish, groundfish, and salmon harvested by US fisheries in the North Pacific and Eastern Bering Sea. This database needs to include information about product form (e.g., canned, frozen, whole fish, fillets, value-added product, etc.), but does not need to be firm specific.
2. Analyses of current determinants of exvessel, wholesale, international, and retail demands for principal seafood products from the GOA and BSAI;

~~3.~~

3. Research to identify and characterize potential or emerging markets for seafood products from the GOA and BSAI.
4. Evaluation of economic effects from recently adopted crab rationalization program on Gulf Coast communities, including Kodiak. This includes understanding the economic impacts (both direct and indirect impacts) and how the impacts are distributed among communities and economic sectors, conducting qualitative research to assess changes in community participation and effort in fisheries, and estimating net economic benefits.
5. As Kodiak is likely to be at the center of controversy over the likely consequences of Gulf rationalization, research should be designed to use Kodiak in addition to other Gulf communities as case studies in prospective analyses of the potential effects of Gulf rationalization options on fishing behavior and participation and economic impacts.
6. Research to understand the economic effects of alternative halibut management measures on the charter boat recreational fishing sector including effects on participation, spatial and temporal effort allocation, and fishing communities
7. Develop a framework for collection of economic information on commercial, recreational, charter fishing, and fish processing to meet the requirements of this MSFCMA sections 303(a)(5, 9, 13), 303(b)(6), and 303A.

~~Kodiak is at the center of controversy associated with the recently adopted crab rationalization program. What were the direct and indirect impacts and how were the impacts distributed throughout the community? As~~

~~Kodiak is also likely to be at the center of controversy over the likely consequences of Gulf rationalization, it would be particularly advantageous if research could be designed to use Kodiak or other Gulf communities as case studies in analyses of the effects.~~

~~4.~~

Comprehensive List of Research Needs

I. Fisheries

A. Stock Assessment

The SSC notes that continuation of annual or biennial surveys in the GOA, AI and EBS are a critical aspect of natural resource management. These surveys provide baseline distribution and abundance data that form the foundation for stock assessments and the development of ecosystem approaches to management. These surveys should be considered a high priority research activity. Also the SSC notes that continued research on the life history of groundfish, crab and scallop should be considered an essential activity to improve stock assessments and management of managed resources. Critical life history research topics include: estimates of natural mortality (including temporal shifts in predation for target species), size-at-maturity or age-at-maturity (including environmental factors influencing maturity schedules), maternal effects (especially for Pacific cod and long-lived species such as rockfish), environmental impacts on growth, and environmental factors influencing reproductive success.

The following lists identify high priority research for groundfish, crab and scallops.

Groundfish

1. Rockfish – a general need for improved fishery independent estimates of abundance, catch, stock structure, and biological variables.
   a. Direct observations (e.g., submersible and dive surveys) to compare fish densities, particularly for rockfish, between trawlable and nontrawlable habitats.
   b. Improved surveys for minor rockfish species to verify range relative to standard surveys.
   c. Supplemental trawl survey biomass estimates to address patchy distribution.
   d. Age samples from the fishery, esp. POP, northern rockfish, and dusky rockfish. There is a need to increase the number of age determinations annually conducted for rockfish and to train researchers to make age determinations on species that are difficult to age.
2. Improved stock assessment of "other species." The SSC ranks items a, e, and f very high because they form the basis for a tier 5 calculation.
   a. Improved identification of priority species within each group in the fisheries by both processors and observers to avoid misidentifications, as well as categories containing large numbers of unidentified species.
   b. Species-specific identification of priority species on scientific surveys, including NMFS trawl and longline surveys, IPHC surveys, and ADF&G surveys.
   c. Increase knowledge of the acoustic sign types and target strength to length relationships to allow assessment of other targets during hydroacoustic surveys.
   d. Improved biological data collection via enhanced survey sampling, fishery port sampling and at-sea observations, including collection of lengths and age structures for priority species.
   e. Alternative indices of abundance (and biomass) and fishing mortality are necessary for species for which standard surveys are inadequate. With an increase in the number needed stock assessments, it will be critical to develop alternative estimates of abundance and/or direct estimates of fishing mortality. Two possibilities that require dedicated research for development are: (1) directly estimate fishing mortalities through large-scale tagging programs; and (2) habitat-based estimates of abundance based on local density estimates in combination with large-scale habitat maps.

f. Life history information (specifically, natural mortality, size at maturity, and other basic indicators of stock production) must be improved for many members of the others species complex to allow application of Tier 5 or Tier 4 assessment criteria. Little information is available especially for sculpins, skates, octopuses, squids, grenadiers and some sharks.

g. Improved catch histories for groups in this complex for improved stock assessment and application of Tier 6 criteria. Greater use of historical foreign observer data is needed, as part of this activity.

3. Research is needed to incorporate seasonal movements, and stock boundaries of managed species into stock assessments. To identify stock boundaries, expanded studies are needed in the areas of genetics, reproductive biology, larval distribution and advection. Expanded tagging efforts are needed to support the development of spatially explicit assessments. High priority species for spatially explicit models include: walleye pollock, Pacific cod, sablefish, yellowfin sole, rock sole, Pacific Ocean perch, and Atka mackerel.
4. Incorporating uncertainty into the stock assessment advice. This requirement was proposed in the PSEIS, but progress towards amending the groundfish guidelines to address this issue has not been started. Management strategy evaluations are also encouraged because these evaluations serve as useful tools to assess the efficacy of harvest control measures under different assumptions regarding stock production.
5. Efforts to incorporate ecosystem considerations into stock assessments should be accelerated through research to improve knowledge of the functional relationship between environmental factors (e.g. physics, competition, and predation) and recruitment, growth, natural mortality and availability to surveys.
6. Expand surveys beyond typical boundaries to include the shelf break and the northern Bering Sea to evaluate the fraction of the stocks that are not assessed by the shelf survey. This will become increasingly important as species distributions shift northward as the Bering Sea continues to warm.
7. Expand the collection of underway oceanographic data and marine mammal sighting during standard assessment surveys.

Crabs

1. Natural mortality (M) estimates. Estimates of M (obtained independently from models) are needed for all stocks (except Bristol Bay red king crab), with highest priority assigned to Tanner and snow crabs.
2. Improved stock assessment of non-target crab. Highest priority research tasks include: (1) alternative indices of abundance (and biomass) and fishing mortality are necessary for species for which standard surveys are inadequate, and (2) life history information (specifically, natural mortality, size at maturity, and other basic indicators of stock production) for non-target crab to allow application of Tier 5 or Tier 6 assessment criteria.
3. Conduct field studies to improve knowledge of growth increments and molting probabilities and the relationship between shell condition and age of Bering Sea Tanner and snow crabs.
4. Improve understanding of seasonal movements, stock structure, natural mortality and harvest rates of crabs through mark recapture studies with emphasis on snow and Tanner crab stocks. In addition, improved understanding of seasonal movements of species without surveys or with a short time series of existing survey data are needed to assess the probability of incidental capture in other fisheries.
5. Improve understanding of processes influencing the fertilization rate of egg clutches, including consideration of spatial dynamics of crab reproduction and contribution to reproduction by males as a function of size, time post molt, and their distribution during stock assessment surveys and

during the fisheries. Primary emphasis is on snow and Tanner crabs, with secondary emphasis on red king crab.

6. Develop a spatial stock assessment model for eastern Bering Sea Tanner crab.
7. Conduct studies to improve crab aging using radiometric aging or lipofuscin and, for Bering Sea Tanner and snow crabs, improve knowledge of the relationship between shell condition and age.
8. Improve understanding of processes controlling recruitment dynamics for all FMP crab species. Incorporate these processes into scenarios regarding temporal trends in recruitment. Perform a management strategy evaluation using variable recruitment scenarios. This is a very broad topic encompassing the need to identify and assess biological and environmental effects on egg production, egg hatching, and larval survival, as well as mechanisms controlling the abundance of juvenile crabs from settlement to recruitment into the fishery. Factors include larval transport, predation, competition, and habitat availability. Effects of ocean acidification on crab larval growth and survival is also of interest. Primary emphasis is on stocks currently declared overfished: eastern Bering Sea Tanner crab, St. Matthew Island blue king crab, eastern Bering Sea snow crab, and Pribilof Islands blue king crab.
9. As an extension to research items 4 and 7, develop a spawning index which is demonstrably proportional to total fertilized egg production and be responsive to fishing mortality that could be used in stock-recruitment models for biological reference points determination for major red king snow, and Tanner crab stocks.
10. Examine the temporal dynamic of size at maturity for eastern Bering Sea Tanner crab and its implications on spawning biomass and fisheries management through analysis of the trawl survey data.
11. Conduct calibration studies to assess survey selectivity and catchability of snow crab, Tanner crab, and blue king crab with current trawl survey gear and new survey net.
12. Research on handling mortality rates. Better estimates of pot handling mortality rates by crab species are needed to estimate more accurately total bycatch mortality for all discarded species.
13. Describe Tanner crab habitat characteristics using side-scanning and/or multi-beam sonar to allow increased precision of survey catch rate estimates.

Scallops

1. Development of an age-structured model for assessment of abundance to be applied to each stock (e.g., Yakutat, Prince William Sound, Cook Inlet, and so forth).
2. Identify larval sources, as well as advective pathways, to evaluate the potential effects of fishing on recruitment for major beds.
3. Estimate survival rates for discarded scallops and of scallops contacted by the dredge that are not captured. [SSC modified with ADF&G Shellfish Priorities]
4. Investigate causes of high natural mortality recently observed in the Cook Inlet fishery, and scallop meat quality issues (i.e. off-color meats, 'weak meats', 'weak shell syndrome') observed in the Yakutat area.
5. Expansion of the recently developed remote video survey method for four objectives:
   a. to estimate densities and abundance of scallops in major fishing areas as well as in nearby unfished areas for monitoring environmental effects independent of fishing,
   b. to estimate catchability coefficients for commercial and research dredges,
   c. to evaluate habitat and distribution of non-scallop species that are present in scallop beds, and
   d. to conduct field studies to compare the dredge survey used in Central Region to the video sled survey.

6. Develop/standardize scallop shell aging methodology and complete aging of backlogged observer-collected scallop shells.

B. Fishery Performance and Monitoring

1. Improved onboard observations. Improvements in at-sea observations are needed in several areas:
   a. Observer deployment and coverage. There is a long-standing need to review the allocation of observers among fisheries to adequately characterize the total catch, as well as a review of sampling procedures (e.g., basket versus whole haul) employed by observers that form the basis for total catch estimation.
   b. Conduct research on mechanisms to supplement observer program information. Improved means of data collection are needed, especially on small vessels. Research is needed on utility of other data collection methods, such as at-sea video monitoring, port sampling, and other direct methods.
   c. Improved biological data collection. There are needs to improve biological data collection (e.g., age, size, sex) of some bycatch species (e.g., sharks, skates, octopus, squid, sculpins, grenadiers) to better quantify potential effects of bycatch on these stocks. Better estimates of stock of origin are needed for salmon bycatch.
2. Improved estimation methods for total catch (including bycatch) and fishing mortality of all target and non-target species. This may include revised observer deployment, use of flow scales, etc. Two levels of improvements are needed:
   a. Improved estimation at the stock and fishery level. Assessment and management depend critically on catch estimates. More rigorous statistical methods for catch estimation need to be implemented (e.g., Miller 2005). Specifically, identifying sources of variability in actual and estimated bycatch rates is needed. Approaches to integrate estimates of variance on the observed portion of the fisheries into the total catch estimates are needed.
   b. Improved detailed estimation of catch for specific management programs. Some management programs (e.g., IFQ, cooperatives, other rationalization programs) require extensive record keeping to increasingly finer degrees of resolution (e.g., vessel, subareas). Research is needed to evaluate the effectiveness of reporting systems to newly developed management groups or practices.

C. Fishery Management

1. Evaluate the effectiveness (e.g., potential for overharvest or unnecessarily limiting other fisheries) of setting ABC and OFL levels using Tier 5 and 6 approaches for rockfishes and other poorly assessed species (e.g., squid, octopus, skates, non-target crab), as appropriate.
2. Continue to develop a systematic approach to lumping and splitting that takes into account both biological and management considerations.
3. Advancing ecosystem approach to fisheries management. This includes development of suitable indicators and indicator species (including novel approaches such as using corticosterone levels in predators as an indicator of prey availability, developing ecosystem reference points, including OY cap considerations, and improvements of current ecosystem models.
4. Development of forecasting tools that incorporate ecosystem indicators into single or multi-species stock assessments to conduct management strategy evaluations under differing assumptions regarding climate and market demands. Standardization of "future scenarios" will help to promote comparability of model outputs. Process-oriented research focused on local impacts of fishing on prey availability for top trophic level consumers will also be informative.

5. Development of spatially explicit stock assessments that allow for management to be linked appropriately to stock boundaries and habitat use.

II. Fisheries Interactions

B. Bycatch and Observer issues

1. Improved estimation of total bycatch including tier 2 marine mammals and seabirds. At present, it is clear that observer coverage in some fisheries is insufficient for estimation of total bycatch. Examples include the sablefish longline fishery, Pacific cod pot and longline fishery, halibut longline fishery, and sport fisheries. Improved accuracy of identifications and enumerations of bycatch species is necessary. The current program results in imprecise bycatch (mortality) estimates for species, such as skates, sharks, yelloweye rockfish, and sablefish in halibut longline fisheries and discards in sport fisheries. Improved methods should include direct and alternative monitoring options (e.g., electronic logbooks, video monitoring) particularly on smaller groundfish, halibut, and sport vessels.

~~C. Bycatch~~

~~2. Improved estimation of total bycatch including tier 2 marine mammals and seabirds. At present, it is clear that observer coverage in some fisheries is insufficient for estimation of total bycatch. Examples include the sablefish longline fishery, skate fishery, Pacific cod pot and longline fishery, and halibut longline fishery. Improved accuracy of identifications and enumerations of bycatch species is necessary. The current program results in imprecise bycatch estimates for species, such as skates, sharks, yelloweye rockfish, and sablefish in halibut fisheries. Improved methods may include direct and alternative monitoring options (e.g., electronic logbooks, video monitoring) on smaller groundfish and halibut vessesls.~~

2. Research on discard and handling mortality rates. Better estimates of discard mortality rates by gear and fishery is needed to estimate more accurately total bycatch mortality for all discarded species, with an emphasis on such species as crabs, skates, sharks, rays, and octopus.

3. Efficacy of bycatch mitigation measures. Research is needed on the efficacy of bycatch mitigation measures (e.g., PSCs, time/area closures) and their effects on populations of the bycatch and target species, effects of changes in abundance of bycatch species on bycatch rates, and methods for assessing the economic and social costs of bycatch.

4. Gear technology. Further research is needed on gear modifications and fishing practices for reducing bycatch and ghost fishing (esp. pot fisheries), such as research that has been conducted to protect salmon, halibut, rockfish and seabirds.

B. Expanded Ecosystem Studies

1. Forage fish. Understanding the dynamics of important pelagic and benthic forage species, such as capelin, eulachon, herring, myctophids, euphausiids, shrimp, squid, and juvenile pollock remains a high priority for understanding energy flow to commercially important species and to protected species, including seabirds and mammals. Innovative approaches to assessing such stocks are needed and may include novel acoustic techniques (e.g. low-frequency sound), air-borne surveys, and indices based on the diet of predators, including seabirds or marine mammals.

2. Benthic ecology. Studies focused on the ecology and energy flow from the benthic environment are necessary to fill the gap in knowledge that currently exists. Data on the spatial and temporal distribution of benthic organisms is needed to relate to commercially important species such as flatfish and crab species.

3. Environmental influences on ecosystem processes.

i. **Ocean acidification:** As atmospheric greenhouse gas emissions increase, more CO_2 is absorbed by the sea surface, thus increasing levels of carbonic acid, resulting in lower pH and the subsequent undersaturation of calcite. If trends continue, the ability of organisms, such as pteropods and crab, to form exoskeletons will be compromised. Monitoring of pH levels and additional studies on the effects of calcite undersaturation on growth and survival are necessary.

ii. **Climate variability:** Changes in ocean temperature may affect managed species and lower trophic levels.

iii. **Sea ice:** If recent changes in ice cover and temperatures in the Bering Sea persist, they may have profound effects on marine communities.

iv. **Zooplankton production:** Apparent declines in zooplankton wet weight over the shelf measured by the Oshoro Maru could imply the loss of critical copepod and euphausiid prey of important species, such as pollock.

v. **Fish composition:** Existing data sets (bottom trawl surveys, BASIS surveys) can be used to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, and monitor changes in the distribution of individual species and assemblages. Additional monitoring may be necessary in the Aleutian Islands and other areas of the Gulf of Alaska.

4. **Recruitment and growth:** Studies on effects of climate on recruitment and growth (GPT) could include the development of standard environmental scenarios for future variability based on observed patterns. There is also a clear need for information that covers a wider range of seasons than presently available.

vi. **Fish movement:** Studies to assess the movement of fish to understand the spatial importance of predator-prey interactions in response to environmental variability.

5. Trophic interactions.

vii. **Temporal and spatial data collection:** Diet information from seasons in addition to summer is needed to assess seasonal changes in predator-prey interactions. The diet information should be collected on the appropriate spatial scales for key predators and prey to determine how food webs may be changing.

viii. **Ecosystem structure studies:** Studies are needed on the implications on food web interactions of global warming, ocean acidification, and selective fishing. For instance, studies are needed to fully evaluate selective removal of some components of the ecosystem (e.g., Pacific cod, pollock) relative to others (e.g., arrowtooth flounder).

6. Fishery interactions.

ix. **Ecological effects of bycatch and discards:** Selective removal of certain species of certain size ranges can affect the relative abundance of fish communities, perhaps with consequences on their ecological interactions. Moreover, fishery discards can favor scavenging species over others, perhaps with consequences on groups, such as seabirds and benthic communities.

x. **Local fishery interaction studies:** Whereas global fishery control rules may generally prevent overfishing on a broad regional basis, non-random patterns of fishing may cause high rates of removals in local areas important to apex predators. More studies are needed to identify the importance of scale and to fully evaluate potential local effects of fishing on other components of the ecosystem (e.g., marine mammals and seabirds).

7. Nutrients and lower trophic levels. There is limited information regarding nutrient dynamics and phytoplankton/zooplankton dynamics on the Bering Sea and Gulf of Alaska shelves and through

the Aleutian Island passes (e.g., supply of nutrients to the shelf, interannual variability and changes in nutrient supply, potential for HABs, etc.). Recent advances in technology such as towed undulating vehicles with various sensors and plankton recorders allow high-frequency sampling of both nutrients and plankton. Such sampling could support detailed process studies as well as the development of relatively low-cost monitoring programs in conjunction with existing surveys or through new surveys.

xi. Relationships between oceanographic conditions, prey, and effects on scallop population health and distribution with an emphasis on Yakutat. Sporadic poor quality of scallop meats from the Yakutat area is an issue. A broader issue is the relationship between ocean currents and scallop metapopulation structure.

~~1.Forage fish. Understanding the dynamics of important pelagic and benthic forage species, such as capelin, herring, myctophids, euphausiids, shrimp, squid, and juvenile pollock remains a high priority for understanding energy flow to commercially important species and to protected species, including seabirds and mammals. Innovative approaches to assessing such stocks are needed and may include novel acoustic techniques (e.g. low frequency sound), air borne surveys, and indices based on the diet of predators, including seabirds or marine mammals.~~

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~~3.Climate change and fish communities. Changes in ocean temperature and acidity may affect managed species and lower trophic levels. For instance, if recent changes in ice cover and temperatures in the Bering Sea persist, they may have profound effects on marine communities. Apparent declines in zooplankton wet weight over the shelf measured by the Oshoro Maru could imply the loss of critical copepod and euphausiid prey of important species, such as pollock. Existing data sets (bottom trawl surveys, BASIS surveys) can be used to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, and monitor changes in the distribution of individual species and assemblages. Additional monitoring may be necessary in the Aleutian Islands and other areas of the Gulf of Alaska.~~

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~~5.Ocean acidification and effects on marine ecosystems. As atmospheric greenhouse gas emissions increase, more CO_2 is absorbed by the sea surface, thus increasing levels of carbonic acid, resulting in lower pH. If trends continue, the ability of organisms, such as pteropods and king crab larvae, to form exoskeletons will be compromised, perhaps resulting in extirpation of these species. Monitoring of pH levels and additional studies of these effects are necessary.~~

~~6.Environmental effects on recruitment and growth. Studies on effects of climate on recruitment and growth (GPT C1) could include the development of standard environmental scenarios for future variability based on observed patterns. There is also a clear need for information that covers a wider range of seasons than presently available.~~

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A. Protected Species Interactions

1. Population dynamics, life history and assessment of protected species including Steller sea lions, northern fur seals, spectacled eider, short-tailed albatross.
2. Local fishery interaction studies. Whereas global fishery control rules may generally prevent overfishing on a broad regional basis, non-random patterns of fishing may cause high rates of removals in local areas important to apex predators such as Steller sea lions and northern fur seals, spectacled eider, short-tailed albatross. More studies are needed to fully evaluate potential local effects of fishing on other components of the ecosystem (e.g., marine mammals and seabirds).
3. Economic, social, and cultural valuation research (i.e., non-market consumptive use, passive use, non-consumptive use).

III. Habitat

A. Habitat Mapping

1. Improved habitat maps are required to identify essential fish habitat and distributions of various substrates and habitat types, including habitat-forming living substrates.
2. Improved identification and quantification of removal of species are needed in the broad "coral" category by the Fishery Observer Program.
3. Improved mapping of critical habitats are needed for listed marine mammals and seabirds, such as short-tailed albatross, spectacled eider, and Steller sea lions.

B. Habitat Models

Further development of habitat-based models of fish distribution, abundance, and sensitivities are necessary. Such models have great potential to lead to improved estimates of stock size and their spatial structure, as well as areas of sensitivity to fishing impacts.

C. Effects of Fishing on Bottom Habitats

Additional field studies are needed on the effects of fishing on seafloor habitats. Studies need to be conducted in a variety of bottom habitat types using a variety of gear types. Studies should focus on short- and long-term effects on benthic communities and bio-geological processes. Such studies are particularly needed in the northern Bering Sea.

D. Management Strategy Evaluations

Evaluate the effectiveness of existing closures to meet stated management objectives.

IV. Other Areas of Research Necessary for Management Purposes

A. Social and Economic Research

The need for the development and continued maintenance of basic social and economic information databases on the fisheries and fisheries dependent communities of GOA and BSAI is made ever more pressing as the Council continues to adopt actions that are intended to improve the long term net benefits derived from fisheries. This information is required for establishing a baseline to be used in identifying stakeholders to be included in the distribution of dedicated access privileges (e.g., harvesting quotas and processing quotas), a baseline to be used for projecting the likely consequences of alternative management measures, and as a baseline for retrospective analysis of management actions that have been taken.

Particularly pressing research needs include:

1. Development of an ongoing database of product inventories (and trade volume and prices) for principal shellfish, groundfish, and salmon harvested by US fisheries in the North Pacific and Eastern Bering Sea.
2. Analyses of current determinants of exvessel, wholesale, international, and retail demands for principal seafood products from the GOA and BSAI;
3. Pre- and post-implementation studies of the benefits and costs, and distribution of benefits and costs associated with changes in management regimes (e.g., changes in product markets, characteristics of quota share markets, changes in distribution of ownership, changes in crew compensation, as a consequence of the introduction of dedicated access privileges in the halibut/sablefish, pollock, and crab fisheries). "Benefits and costs" include both economic and social dimensions.

4. Prospective analyses of the robustness and resilience of alternative management strategies under varying environmental and ecological conditions; and,
5. Prospective and retrospective analyses of changes in the spatial and temporal distribution of fishing effort in response to management actions (e.g., time/area closures, marine reserves, bycatch restrictions, co-ops, IFQs).
6. Kodiak is at the center of controversy associated with the recently adopted crab rationalization program. What were the direct and indirect impacts and how were the impacts distributed throughout the community? As Kodiak is also likely to be at the center of controversy over the likely consequences of Gulf rationalization, it would be particularly advantageous if research could be designed to use Kodiak or other Gulf communities as case studies in analyses of the effects.
7. Develop a framework for collection of economic information on commercial, recreational, charter fishing, and fish processing to meet the requirements of this MSFCMA sections 303(a)(5, 9, 13), 303(b)(6), and 303A.

Additional important research needs include:

1. Development of longitudinal data sets of:
   a. Transaction level observations of exvessel, wholesale, and retail prices;
   b. Daily or weekly, firm-scale data on production by species and product form;
   c. Trip-scale data on variable costs (e.g., fuel, labor, supplies, etc.) for catcher vessels, catcher-processors, and sportfishing charters (this data should be matched with existing data on catch, catch composition, and production);
   d. Daily or weekly plant-scale data on variable processing costs (e.g., fuel and power, labor, supplies, packaging, etc.) for shore-based and floating processors;
   e. Annual vessel- or plant-level data on fixed costs (e.g., capital replacement, maintenance, repair, upgrades, insurance, etc.);
   f. Trip-scale information about the location and duration of fishing (e.g., VMS records, or observer information on steaming time, fishing time, etc.);
   g. Weekly or monthly data on patterns (location and magnitude) of expenditures associated with harvesting, processing, and sportfishing charters;
   h. Pay-period scale, vessel- and plant-level data on employment and income of fishery participants, especially crew and processing plant workers;
   i. Socioeconomic and demographic data for fishery dependent communities (income levels and distributions, population levels and distributions); and,
   j. Community- and regional-scale annual data on the distribution and magnitude of tax receipts and transfer payments associated with commercial and sport fishing.
2. Analyses or the development of models to evaluate:
   a. The evolution of community social and economic structure in response to alternative management actions:
      i) Baseline assessments of selected communities and industry sectors relative to social considerations identified by the Council and the Advisory Panel;
      ii) Field studies to elucidate the full array of linkages between fisheries and social and economic life in fishery dependent communities;
      iii) Regional economic models of activities and impacts associated with commercial, sport and subsistence fisheries;

iv) Prospective and retrospective studies of the social and economic impacts of alternative management actions;

v) Development of better methods for determining the social costs and benefits of management actions (e.g. through the use of non-market valuation techniques);

b. The benefits, costs, and the distribution of benefits and costs associated with consumptive and non-consumptive uses of resources supported by the North Pacific and Eastern Bering Sea ecosystems:

i) Cost functions for harvesting, processing, and sportfishing charters;

ii) Producers and consumers surpluses associated with commercial fisheries under current and alternative management regimes;

iii) The magnitude and distribution of benefits and costs associated with sport and subsistence harvests under current and alternative management regimes;

iv) Existence and option values associated with corals, seabirds, and marine mammals;

v) The value of ecosystem services;

c. Evaluation of alternative management strategies:

i) The cumulative efficiency and equity consequences of management actions that apply time/area closures;

ii) Management strategies and optimal yield for multi-use fisheries, e.g., commercial, sport, and subsistence fisheries for halibut and salmon;

iii) The relationship between sampling strategies and the confidence of bycatch estimates associated with individual and pooled bycatch quotas and the economic and social costs of bycatch;

iv) Changes in catch efficiency and operating costs associated with gear modification and avoidance behaviors intended to reduce bycatch;

d. Evolving seafood markets:

i) Mechanisms for providing and costs of traceability systems for certifying product and production process attributes of seafoods;

ii) Consumer demand for seafood ands its associated byproducts harvested from stocks that have been certified as sustainably managed.