MEMORANDUM

ESTIMATED TIME
8 HOURS
(for all D-1 items)

TO: Council, SSC and AP Members

FROM: Chris Oliver
Executive Director

DATE: November 27, 2006

SUBJECT: Final GOA Groundfish Specifications for 2007 and 2008

ACTION REQUIRED

Review GOA SAFE report (including Ecosystem and Economic SAFEs) and adopt final GOA Harvest Specifications for 2007-2008 including:

1. Acceptable Biological Catch (ABC) and annual Total Allowable Catch (TAC)
2. TAC considerations for the State Pacific cod fishery
3. Prohibited species catch limits and discard mortality rates

BACKGROUND

At this meeting, the Council is scheduled to make final recommendations on groundfish and bycatch specifications (as listed above) to manage the 2007 and 2008 Gulf of Alaska (GOA) groundfish fisheries.

GOA SAFE Document

The groundfish Plan Teams met in Seattle November 13-17 to prepare the final SAFE reports and review the status of groundfish stocks. The GOA SAFE report forms the basis for the recommended GOA groundfish specifications for the 2007 and 2008 fishing years. Note that there are three volumes to the SAFE report: a stock assessment volume, a fishery evaluation volume ("economic SAFE"), and an ecosystem considerations volume. These three volumes were mailed to you November 22nd. The Joint Plan Team and GOA Plan Team minutes are attached as Items D-1(b)(1) and D-1(b)(2), respectively. An overview of the GOA SAFE report and ecosystem considerations volume will be provided at this meeting.

Two Year OFL and ABC Determinations

Amendment 48 to the GOA groundfish FMP made two significant changes with respect to the stock assessment process. First, since new data are limited during years when no groundfish surveys are conducted, annual assessments are no longer required for long-lived GOA species. These species include the rockfishes, flatfishes, and Atka mackerel. No GOA trawl survey was conducted in 2006, therefore, this year represents an off-year for these assessments and executive summaries are presented in lieu of full assessments. The second significant change is that the proposed and final specifications can be specified for a period of up to two years. This requires providing ABC and OFL levels for 2007 and 2008.

In September of this year, preliminary projections of ABC and OFL levels for 2007 and 2008 were made on the basis of last year's stock assessments. In this SAFE report, the Plan Team has revised most of those projections. Such revisions are typically due to the development of new models; collection of new catch, survey, age composition, or size composition data; or use of new methodology for recommending ABC.

ABCs, TACs, and Apportionments

At this meeting, the Council will establish final catch specifications for the 2007 and 2008 fisheries. The SSC and AP recommendations will be provided to the Council during the meeting. Item D-1(b)(3) lists the 2006 specifications and catch (through November 4, 2006) and GOA Plan Team recommendations for OFLs and

ABCs for 2007 and 2008. The sum of the GOA Plan Team's recommended ABCs for 2007 is 490,327 mt. The sum of the ABCs decreased 2% compared with last year. The ABC levels increased in flathead sole (3%), arrowtooth flounder (3%), Pacific ocean perch (3%) and pelagic shelf rockfish (2%). The species with ABCs that declined relative to 2006 are pollock (-21%), sablefish (-4%), rex sole (-1%), and northern rockfish (-3%). The ABC for the remaining sepcies did not change from 2006 to 2007.
The abundances of Pacific cod, Dover sole, flathead sole, arrowtooth flounder, Pacific ocean perch, rougheye rockfish, northern rockfish, and dusky rockfish are above target stock size. The abundances of pollock and sablefish are below target stock size. The relative abundances of other deep-water flatfish, shallow-water flatfish, rex sole, shortraker rockfish, demersal shelf rockfish, other pelagic shelf rockfish, other slope rockfish, thornyhead rockfish, Atka mackerel, and skates are unknown. None of the groundfish stocks are overfished nor are they approaching an overfished condition.

In June 2005, the Council took final action to implement a calculation change to the other species complex in the GOA under Amendment 69 to the GOA FMP. The 5% TAC calculation was modified such that the Council may recommend a TAC at or below 5% of the sum of the target species TACs during the annual specifications process. The Council's intent was to establish a TAC level for the other species complex which would meet incidental catch needs in other directed fisheries, with the potential to establish this TAC at a higher level which could allow for directed fishing on the complex but be low enough to prevent excessive harvest of a single targeted species or on the complex as a whole. This interim measure is intended to provide additional flexibility in responding to potential conservation concerns as they arise, until more comprehensive management changes can be made to the other species complex (i.e., analysis of individual species level assessments).

During this specifications process, the Council may recommend an other species TAC level at or below 5% of the sum of the target groundfish TACs. In order to provide the Council information to establish a TAC for the other species complex, the Plan Team discussed the incidental catch needs for directed fisheries. Information regarding incidental catch needs is contained in the summary section of the introduction to the GOA SAFE Report. Additional information on other species is provided in the preliminary other species assessments which are included as appendices to the GOA SAFE report. These assessments were presented to the Plan Team in anticipation of a forthcoming amendment analysis to evaluate establishing separate harvest specifications (individually or by complex) for these species.

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 Pacific cod TAC for the state water fisheries. The relative percentage in the Central GOA was increased by the Board of Fisheries in March 2005 from 24.25% to 25%. Using the area apportionments of the 2007 and 2008 Pacific cod ABC recommended by the Plan Team, the Federal TAC for Pacific cod would be adjusted as listed below.

Proposed 2007 Gulf of Alaska Pacific cod ABCs, TACs and state Guideline Harvest Levels (GHLs) (mt).

Specifications	Western	Central	Eastern	Total
ABC	26,855	37,873	4,131	68,859
State GHL	6,714	9,468	413	16,595
(%)	25	25	10	24.1
Federal TAC	20,141	28,405	3,718	52,264

Proposed 2008 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	6,962	9,818	428	17,207
(%)	25	25	10	24.1
Federal TAC	20,885	29,453	3,856	54,193

Prohibited Species Catch Limits

In the GOA, prohibited species catch (PSC) limits are established for halibut. Since 1995, total halibut PSC limits for all fisheries and gear types have totaled 2,300 mt. This cap was reduced from 2,750 mt after the sablefish IFQ fishery was exempted from the halibut PSC requirements in 1995. The recommended halibut PSC apportionments, based upon the 2006 apportionments for the Gulf of Alaska groundfish fisheries, are shown below.

GOA Pacific halibut PSC Limits

2007 Trawl			**2007 Hook and Line**		
Jan 20 - Apr 1	550 mt		1st trimester	Jan 1 - Jun 10	250 mt
Apr 1 - Jul 1	400 mt		2nd trimester	Jun 10 - Sep 1	5 mt
Jul 1 - Sep 1	600 mt		3rd trimester	Sept 1 - Dec 31	35 mt
Sept 1 - Oct 1	150 mt				
Oct 1 - Dec 31	300 mt		DSR	Jan 1 - Dec 31	10 mt
TOTAL	2,000 mt				300 mt

Trawl fishery categories

Season	**Shallow Water**	**Deep Water**	**Total**
Jan 1 - Apr 1	450 mt	100 mt	550 mt
Apr 1 - Jul 1	100 mt	300 mt	400 mt
Jul 1 - Sep 1	200 mt	400 mt	600 mt
Sep 1 - Oct 1	150 mt	any rollover	150 mt
Oct 1 - Dec 31	no apportionment		300 mt
TOTAL	900 mt	800 mt	2,000 mt

Halibut discard mortality rates

Halibut discard mortality rates (DMRs) are set by the Council on a 3-year cycle for non-CDQ fisheries based on an average of the past 10 years. Halibut discard mortality rates for 2005 were presented in conjunction with recommended rates for use in 2007-2009 as Appendix A to the GOA SAFE report. International Pacific Halibut Commission staff recommendations for DMRs for the GOA non-CDQ fisheries for 2007-2009 are listed below:

Gear/Target	Recommendation for 2007-2009
Trawl	
Atka mackerel	60
Bottom pollock	59
Pacific cod	63
Deep water flatfish	53
Shallow water flatfish	71
Rockfish	67
Flathead sole	61
Pelagic pollock	76
Sablefish	65
Arrowtooth flounder	69
Rex sole	63
Pot	
Pacific cod	16
Hook-and-line	
Pacific cod	14
Rockfish	10

Joint BSAI/GOA Plan Team Minutes

The meeting of the Bering Sea and Aleutian Islands and Gulf of Alaska Groundfish Plan Teams convened on November 13th at 1pm at the Alaska Fishery Science Center, Seattle, WA.

Members of the Plan Teams in attendance included:

Loh-Lee Low	AFSC REFM(BSAI chair)	Jim Ianelli	AFSC REFM (GOA co-chair)
Mike Sigler	AFSC (BSAI vice chair)	Diana Stram	NPFMC (GOA co-chair)
Kerim Aydin	AFSC REFM	Sandra Lowe	AFSC REFM
David Carlile	ADF&G	Jeff Fujioka	AFSC ABL
Bill Clark	IPHC	Jon Heifetz	AFSC ABL
Jane DiCosimo	NPFMC	Robert Foy	UAF
Theresa Tsou	WDFW	Nick Sagalkin	ADF&G
Brenda Norcross	UAF	Tory O'Connell	ADF&G
Andy Smoker	NMFSAKRO	Tom Pearson	NMFS AKRO
Grant Thompson	AFSC REFM	Sarah Gaichas	AFSC REFM
Ivan Vining	ADF&G	Bill Clark	IPHC
Dan Lew	AFSC	Theresa Tsou	WDFW
Kathy Kuletz	USFWS	Kathy Kuletz	USFWS
Lowell Fritz	NMML		

Ken Goldman (ADF&G, member of the GOA Team) was unable to attend but participated by telephone. Ward Testa was absent.

Members of the public and state and agency staff present included: Tom Wilderbuer (AFSC), Chris Rooper (AFSC), Jennifer Boldt (AFSC), Chris Lunsford (AFSC), Kalei Shotwell (AFSC), Dana Hanselman (AFSC) Phil Rigby (AFSC), Paul Spencer (AFSC), Pat Livingston (AFSC), Anne Hollowed (AFSC), Doug Demaster (AFSC), Mike Guttormsen (AFSC), Chris Wilson (AFSC), Mark Wilkins (AFSC), Beth Stewart (AEB), Mary Furuness (NMFS-AKR), Buck Stockhausen (AFSC) Jennifer Ferdinand (AFSC), Lisa Butzner (NPLA), Dave Benson, Liz Conners (AFSC),Todd Tenbrink (AFSC), Theresa A'mar, Gary Stauffer, Julie Bonney (AGDB), Ben Muse (NMFS-AKR), John Gauvin, Dave Fraser, Cleo Brylinkski (ADF&G), Ed Richardson (ASPA), Farron Wallace (WDFW), Jackie King, Martin Dorn (AFSC), Jack Tagart (Tagart Consulting), Tom Casey and Mike Symanzski.

Introductions

Changes were made to the agenda as attached.

Council update, pending actions, BSAI/GOA dark rockfish amendment

Jane DiCosimo and Diana Stram updated the teams on recent Council actions. Some items of interest for the teams for the February 2007 Council meeting include: a combined BSAI/GOA dark rockfish amendment and two SSC special topic (TBD) workshops to review the CIE review of rockfish management and the AFSC response and Pacific cod genetics for February. Team members requested additional information on the process for preparing the fishery ecosystem plan (FEP) for AI and how the existing plan teams will fit into the review process of for the FEP. David Witherell updated the teams on the how the FEP will fit under the existing framework for the current fishery management plans and act as a policy/ecosystem guiding document to evaluate broader scale interactions both ecologically and among different political entities in the AI FEP area.

The Teams discussed the adequacy of the current review process for assessment documentation. As they have noted previously, the plan team review process remains the same but documentation increases. Team members commented that having only one week to critically review up to 20 documents prior to meetings is insufficient, but also recognize that the timing is necessarily short to maximize the time available for development of the assessments once the trawl survey data are available. There appears limited ability to change this. The CIE seems to be filling a role for critical review of assessments. The Teams acknowledged that it would be useful to get some SSC and Council feedback on how to improve the review process for documents. Should the Teams adopt an SSC-like process whereby a Team member focuses on one assessment per year? Team members commented that the focus on individual species at September Joint Team meetings was useful, although this does not replace the November review. Biennial cycles for some assessments has served to lighten the review burden in those years. Theresa Tsou suggested that specific panels review full assessments with the Plan Team review focused on updated assessments. Team members noted that there used to be a similar system with the North Pacific stocks where one assessment was reviewed on an annual basis in more detail. Grant Thompson noted that the CIE is no longer filling this role specifically for assessments due to the necessity of CIE review of other non-assessment issues recently (EFH, Crab overfishing). Loh-Lee Low questioned what role should the plan team play in the Council process in general, and should this role be broadened? Team members reiterated concerns from last year that the review process of assessments by plan team is not as adequate as it ought to be and could be improved. Ivan Vining suggested that if some documents could be made available earlier (i.e., as they are completed), that this would ease the burden of needing to read all assessment in the week prior to the meeting. Sarah Gaichas suggested rotating through assessments by plan team members so that the focus for each has been critically reviewed by at least one member who will have questions, comments etc. and rotate responsibilities annually.

Team members approved of this approach, but noted potential problems with different levels of expertise by members. This could be alleviated however by assigning several people to each assessment. This was noted to be similar to the SSC's breakout of responsibilities and leaders. It was also clarified that there is an additional in-house review. Team members suggested that there be one extensive plan team review per year of a single assessment, or perhaps a group of assessments (e.g., rockfish, in general). Timing of this is a problem as the review of a single assessment, e.g. pollock, could take up an entire September meeting. Phil Rigby noted that the in-house review process includes assessment authors and tends to be during the same crunch time for writing assessments. Comprehensive reviews could occur if they was scheduled outside of the normal of the plan team schedule, such as in January as an additional scheduled meeting.

Mark Wilkins, RACE, updated the teams on the workgroup meeting held to discuss the review of untrawlable grounds and some ideas to expand the working group to include representatives from other agencies and other centers. The group's focus is on the necessity of delineating untrawlable grounds, estimating fish density within these grounds, and taking these estimates and integrating them in a rationale way with the density estimates from trawlable grounds into the assessments.

Martin Dorn noted that there will be a workshop held in mid-December on alternative ways of approaching reference points. The teams were also apprised of the annual Inter-agency Crab Research meeting in December.

Response to SSC requests (e.g., Off-year assessment issues)

The Plan Teams reviewed the criteria established at the September meeting. The SSC approved this criteria but also noted that some consideration should be given to stocks approaching an overfished condition. The Teams recommend that if stocks are approaching an overfished

condition then an additional criteria be added to recommend a full assessment. The revised criteria for off-year assessments is the following:

1) Authors **must** do a full assessment in "off" years if the Plan Team or SSC requests them to.
2) Authors **may** do a full assessment in "off" years if they choose to.
3) Anytime the assessment model is re-run and presented in the SAFE Report, a full assessment document **must** be produced.
4) The single-species projection model **must** be re-run and the results reported in a one-page SAFE Report summary if current-year catch differs by more than 10% from the expected value.
5) The single-species projection model **may** be re-run using new catch data without re-running the assessment model.
6) One-page SAFE Report summaries **do not** count as assessment "updates" for the purpose of the Species Information System.
7) Authors **must** do a full assessment in "off " years if the stock is approaching an overfished condition.

PSEIS implementation

Diana Stram provided an overview of the current groundfish management objectives in the BSAI and GOA FMPs as they relate to the Council's workplan. The management objectives were incorporated into the FMP's following the comprehensive PSEIS. This workplan is updated and reviewed by the Council at each meeting to evaluate progress towards meeting each of these objectives and how specific Council actions (current and forthcoming) relate to these goals.

Harvest specifications process

Ben Muse updated the teams on the status of the EIS for the harvest specifications. An issue which was problematic regarding this in October was the projection of EBS Pollock using a tier 3 approach rather than a tier 1 approach as suggested by the SSC. The SSC made EIS-suggestions to modify the document as well as changes to the seabird section and noted that it is likely the SSC would utilize a tier 1 approach for EBS Pollock and notification should be given to the public accordingly. Ben summarized actions by the Council with regards to preliminary specifications and the proposed rule process. The agency is currently in the process of summarizing comments received on the draft EIS and responding to the comments in the draft

Ecosystem Assessment

Kerim Aydin reviewed the Ecosystem Assessment (first section of the Ecosystem Considerations report) changes since the September plan team review.

Decreasing production trends were noted, specifically with larger older fish in the Bering Sea leading to less surplus production. Arrowtooth flounder predation in the Bering Sea appears to be increasing. Team members questioned the size classes in the prey. Kerim noted that the size of arrowtooth as well as their prey (pollock) appear larger. Direct diet data indicate that total consumption of pollock seems to have decreased. There was a sharp drop in cannibalism on age-1 pollock. Age -0 pollock information from the BASIS program indicates cannibalism of age-0s on age-0s. Forage fish biomass estimates from BASIS program indicate a possible bottom up control on production. Estimates of forage biomass were made by assumed biomass consumption methods given that trawl survey estimates of forage fish biomass are notably poor. The purpose of this being to estimate forage fish biomass necessary to support the level of production.

Lower biomass of forage fish has been observed in recent years. It is unclear what this indicates, possibly a regime shift or some other control mechanism. Salmon diets appear to be shifting to age-0 pollock.

Bob Foy questioned whether all species exhibit similar trends as forage fish. Kerim discussed a general peak in production of forage fish in the early 1990s that was similar for all species, and appeared to follow through in pollock. This may indicate some sort of prey-release mechanism.

Kerim provided an overview of the GOA food web and modeling efforts which are underway to examine this. Reconstruction analyses of production trends indicate a decline in forage fish currently as compared to historical levels. The observed increase in predators is primarily attributed to arrowtooth flounder. This raised questions, such as: are enough forage fish being left in the ecosystem for predators or are there management issues (juvenile pollock removals, forage fish removals) that are affecting this?

The discussion reviewed trends in pollock as well as major predators on pollock. Current analyses are evaluating indicators such as predation and fishing mortality to evaluate which is more dominant. This has implications for single species management as it indicates that we should be examining management actions in a broader multi-species context. Team members question to what extent this could be useful for a diagnostic for management system? Kerim noted that this type of analysis is useful in terms of highlighting relative risk and then evaluating the appropriate management measures that could be taken. Many of the concerns that are highlighted by this type of analysis are being discussed in the single species management context already, but if not, this could call attention to species which warrant additional discussion.

Kerim noted that there are issues left to be resolved in order to apply this to a management context, specifically in fitting confidence limits to results, as well as the necessity of a review process and peer-review body to evaluate and discuss to what extent this would be useful.

Ecosystem Considerations

Jennifer Boldt presented an overview of the Ecosystem Indices and Ecosystem management indices and information (second and third sections of the Ecosystem Considerations report) with particular focus upon areas that have been updated since the presentation to the plan teams in September. Ice Cover data was updated for the winter of 2006. Biological indices were updated. AI HAPC biota indices updated. Prince William Sound herring biomass remains low (no fishery), while Southeast herring is variable by region. Overall salmon catch in Alaska was updated and shows generally high catch by species in 2005 relative to the long-term means; however this varies spatially. The large mesh survey results were updated and indicate higher catches of Tanner crab and arrowtooth flounder. A question from the public requested clarification on why the GHL then decreased for Tanner crab. Nick Sagalkin explained that the abundance was noted to be primarily juvenile crabs. Pribilof Islands Northern fur seal pup production counts for 2006 were updated; St. Paul and show a continual linear decline.

Team members questioned why whale data was not updated. Jennifer indicated that there was no new data available at present from which to update this section. Jackie King noted that from the Canadian perspective, a general overview of trends shows a preliminary drop in sablefish CPUE, mixed signals in fish stocks, some southerly species moving northward, changes in zooplankton composition but a mixed bag of climate indices. Gary Stauffer noted that southeast pink salmon runs were a failure in 2006, but Kodiak had the highest pink salmon runs on record. Southeast feeding conditions for salmon species are currently poor but on the western side of the Pacific, Russian pink salmon biomass is increasing. Loh noted that 2005 was the second highest catches of salmon species overall. Team members questioned Canadian Pacific cod status. Jackie noted

that the Hackett Strait Pacific cod population declined. This is a low quota fishery which is limited to bycatch only sufficient to maintain other groundfish trawl fisheries.

Economic SAFE report

Ron Felthoven provided an overview of the Economic SAFE report. He noted that the tables had not been updated since his last presentation at the September meeting. Therefore, he requested feedback on how much and when the Economic SAFE report is utilized in order to improve upon the economic SAFE and to gear it more towards the information needs of the users of the report. Ron stated that additional descriptive information on individual fisheries, by species, will be included in the future. Sarah Gaichas requested that, if possible, it would be useful to separate the BS and the AI for other species and for rockfish. Ron noted that things will be broken out to the extent possible, and that plans had been made to further delineate the current "other species" category to break out species for which new stock assessments will be conducted. Since no more questions or comments were posed, Ron asked that any requests or comments that the team thought of be sent to to Terry Hiatt.

Jim Ianelli posed a question about how or if economic impacts should be treated in plan team discussions when making stock assessments. The teams decided that plan team discussions could include TAC and economic considerations, and potentially list them without making recommendations on specific numbers. Ron commented that the importance of providing advice regarding economic impact is when incentives are such that the industry may act in such a way that is logical at the individual level, but bad for the overall industry (e.g., highgrading). In such situations, economists may be able to suggest management measures that could mitigate negative repercussions on the value or efficiency of the fishery.

Ed Richardson suggested that one piece of information that would be useful is to develop and report upon a standardized measure of fishing effort. Ron noted that they are evaluating measurements of fishing capacity and refining metrics that could be used to measure potential fishing effort and how much is applied each year.

Sablefish

Dana Hanselman presented an overview of the Sablefish assessment. He summarized major changes to the model this year which included: making it completely sex-specific, using females only for spawning biomass, and using sex-specific maturity and weight at age data. The authors also responded to a Council request for additional information on pot fishery data in the BSAI. So far, the pot fishery data is too limited to include as a relative abundance index and cannot be presented due to confidentiality reasons but research on pot gear catch rates continues. The authors also responded to Council requests to evaluate particular questions about pot gear and related management concerns (e.g., escapement panels). The assessment authors continue to evaluate impacts of whale depredation on fishery and surveys.

The new (2005) longline survey age data indicate that the 2000 year class appears to be larger than estimated in previous years. Preliminary estimates of the 2001 year class in the Bering Sea indicate that this may become an above-average year class.

The team discussed the use of the GOA trawl survey data. The author clarified that the trawl survey data in the GOA were isolated for depths <500m. The model predictions of GOA trawl survey biomass estimates were quite good.

New data indicate that growth and maturity at age may have changed. The author recommended that further investigations are needed before the model uses the new growth information. The teams questioned if growth variability could be due to spatial differences in catch over time.

The author responded that they need more time to investigate this, and that it is likely to be more than a simple spatial shift since the apparent change also coincides with a change in sample design for age collections.

The teams discussed the new model configuration. The authors investigated multiple model configurations and recommended model 3 since it fits the data better than model 1 and provides a more realistic depiction of the stock. The fits are similar to model 2 but model 3 uses the bottom-trawl survey estimates. Bill Clark questioned the extent that model 2 is improved by including the trawl survey data. The author noted that the fits to the existing data components are similar in model 3 and model 2, but the precision of recruitment estimates is improved. The Plan Teams and the SSC had requested that trawl survey data be included. The new model configuration provides better information on incoming year classes since the trawl survey tends to cover the younger portion of the population that is not well sampled by the longline survey.

The teams compared models 1 and 3 noting that there have been concerns regarding the fit to the data in the 1990s under model 1, with these problems likely related to growth and selectivity issues. The same assumptions on selectivity are also used in model 3. In some model runs, selectivity was allowed to be dome-shaped. The question was raised whether the selectivity patterns in the longline survey appear to be biologically unrealistic since male selectivity tended toward dome- shapedness while female selectivity was asymptotic. Bill Clark commented that a similar pattern is observed in the tag-recapture data for halibut, but not in the survey data and suggested that this could be related to higher natural mortality. The author concurred that there remains work to be done to understand these selectivity patterns. Team members questioned the degree to which population movement (i.e., younger fish in the BS and older fish in the western AI and in Southeast) would affect fishery selectivity patterns. Team members further questioned the growth data and to what extent there are indications of older smaller fish. Dana noted that fish of the same age tend to be smaller at deeper depths, so a depth shift of the population could affect growth.

The team noted that the precision in estimates of recruitment increases for the split-sex model and with the inclusion of the trawl survey data. However there does seem to be a change in the estimates of the early recruitment pattern.

The author noted several issues to be evaluated in the future including growth and maturity, pot fishery issues, migration modeling and the related impact on apportionment, as well as further recruitment studies. BASIS information in 2002-4 indicated small young-of-year sablefish in surface sampling along the Bering Sea shelf. The extent these juvenile sablefish contribute to the population is unknown. The author intends to pursue this line of investigation, particularly since the pre-recruit survey (conducted in conjunction with the longline survey) has been abandoned. The pre-recruit survey (based on gillnet sets at night) were conducted over a ten year period (ending in 2004) but were found to be highly variable and difficult to include in assessments.

The teams commended the author on the careful development of the model and the clear explanations of model differences. These are considered improvements over past assessment models.

The spatial aspects of the assessment were discussed and it was posed if a split assessment could be done by population proportions between the BSAI and GOA with separate selectivities? The author noted that it would be difficult given the limited data (especially age specific data). The resolution of results in the GOA may be feasible but would be more difficult for the BSAI. Estimates of the relative movement of the population between regions would be required.

The teams discussed growth data and whether growth has changed or if there has been a methodological change in aging techniques which might account for the observed differences.

The teams noted that this needs to be understood. There has not been an obvious shift in growth so this has complicated the ability to interpret changes.

The teams made additional suggestions for the next assessment:

- Evaluate the CVs assumed for survey and fishery abundance indices
- Devise an approach that evaluates the impact of different data components affect results
- Examine growth issues, examine residuals for consistency

Kerim Aydin noted that the sablefish assessment could benefit from additional ecosystem considerations. Time could be devoted next year to expanding upon this section of the assessment in coordination with the REEM.

A member of the public also requested that additional life history and habitat information be more explicitly included in the future.

The teams commented on the ability to track similar year classes in the eastern GOA. The authors noted that sometimes these year classes do not track in EGOA and there could be some environmental mechanisms controlling this. Team members questioned to what extent the model could be over-predicting RPWs. The teams suggested that the author evaluate growth data from matching periods. However, more data is available from recent time periods than from earlier time periods.

The teams endorse the use of model 3 given the authors presentation. The teams considered additional modifications premature. The teams noted that other models tended to indicate lower stock biomass levels, but additional investigation is necessary. Growth data, if substantially changed, should be discussed further at the September 2007 plan team meeting. The teams expressed concern regarding the GOA trawl survey potentially dropping deeper stations in the future since trawl survey data is now being included. The author noted that without the deeper stations the trawl data would cease to be useful in this assessment. It was noted that changing survey protocol should account for the species that would be impacted. Budget cuts affecting surveys that limit deeper depth strata impact some assessments more than others. The teams noted that if budget and survey protocol decisions need to be made, reducing the number of stations within areas should be considered.

The plan teams approved of the 2007-2008 authors recommended ABCs and OFLs noting that apportionments also need to be annually calculated.

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. The apportionment scheme can be investigated in different ways, and should be done so if there is a potential biological concern. The teams discussed the basis for the current allocation and noted that it is based on the relative variability in abundance observations. Jeff Fujioka noted that it is inappropriate to compare survey and fishery CVs absolutely because the fishery data is coming from best depth strata and then expanded to entire area. Chris Lunsford noted that fishery data have been examined seasonally and resulted in no apparent trends. Trends in Bering Sea would be more difficult to detect due to the sparser and more variable data. In general, the quality of the data is improving in the GOA but still remains relatively poor in Bering Sea. It was noted that

cooperative research funding is currently being used to collect fishery logbook data. The current funding situation (e.g. budgetary cuts) may also impact this cooperative research project. If this information becomes more important, the quality and availability of the data should be ensured.

Jane DiCosimo briefed the teams that the Council is examining potential changes to pot storage and that this information is included in the assessment at the Council's request. The stock assessment author noted that information included in assessment responds to the Council requests but that the regulatory issues currently have limited application for the stock assessment process. In a letter to Dr. Doug DeMaster dated December 28, 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. The requested research 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. In a separate action, the Council initiated an analysis for an amendment to the BSAI Groundfish FMP. This amendment would allow the Council flexibility in setting the sablefish fixed gear/trawl allocations in the Bering Sea and Aleutian Islands management areas to allow for maximizing catch in the IFQ and CDQ fixed gear sectors, without leaving fish unharvested.

The authors responded to some of these requests in the sablefish assessment, and deferred the remaining research and management requests to those with specific expertise related to those broader issues. Earl Krygier encouraged further response to requests regarding pot gear regulatory issues. The Teams agreed but felt that this was something better dealt with at the Council rather than the Plan Team level. BSAI Plan Coordinator Jane DiCosimo offered to coordinate any further response.

Pacific cod

Dr. Grant Thompson preceded a summary of the BSAI Pacific cod assessment, with additional discussion of survey catchability in response to public comments at the October 2006 Council meeting. This review is summarized as follows.

Catchability Is there a difference between catchability and selectivity? Does estimation of one affect estimation of the other? Selectivity addresses the ratio of the survey abundance at age and the true abundance at age, conditional on the convention that the age where that ratio is maximized is defined as selectivity equal to 1.0. The product of catchability and selectivity at age determines what is observed in the survey. In practice, we know survey numbers at age, then we estimate catchability and selectivity at age to infer true abundance at age. What if we set catchability at the wrong value? Suppose we set $q = 1.0$ when, in fact, $q = 0.5$? Then, the model tries to estimate selectivity at age so that the estimated product of catchability and selectivity at age is close to the true product "on average" (across ages). The values for numbers at age are then incorrectly estimated, with estimated numbers at some ages perhaps being too high and estimated numbers at other ages perhaps being too low. After applying the weights at age to compute biomass, the estimated total biomass may be lower than, equal to, or higher than the true total biomass. Therefore, cutting catchability in half will not necessarily lead to a doubling of estimated biomass. Catchability and selectivity are different quantities, but their estimates are interdependent. Changing an assumed value of Q by some proportion may not result in the same proportional change in estimated biomass.

Why is Q (shelf bottom trawl survey) such an issue for cod? For the last 20 years, trawl survey Q has been fixed at 1.0 in the assessment model. Trawl survey biologists have concluded that this

number is reasonable based on their studies. Unfortunately, this has resulted in a trawl survey selectivity at age schedule with a pronounced "kink." As a result, the abundances of smaller and larger sizes (to the left and right of the "kink") appear to be underestimated by the survey. This means that model biomasses have usually been much higher than survey biomasses. If the model is wrong, ABCs have been too high. If the model is right, this does not mean that we can then double ABC. That is, changing an assumed value of catchability (Q) by some proportion does not necessarily result in the same proportional change in estimated biomass, unless estimated selectivity under both values of Q is close to 1.0 for a broad range of ages.

So why not just estimate Q? This was tried often during the late 1990s under stock synthesis (SS1), but was not successful (tried to estimate M too).The resulting estimates of Q were very high and the resulting estimates of M were very low. Last year, the author tried again to estimate Q by applying a revised model (SS2 - ADMB version), but it was not successful either at estimating Q or M. The only way to get both Q and M to converge was to place very narrow priors on both Q and M (cv = 0.05). In reviewing last year's assessment, the Plan Teams and SSC recommended that the author try again, but for Q only (with and without use of a prior distribution). The author assumed the same prior used in earlier attempts to estimate Q: Mean of 1, cv of 30%. The author also spent considerable time investigating the possibility that archival tags might provide sufficient information to calculate an "empirical" prior. However, a number of issues arose during this investigation. One of the key difficulties is that the tags record only the depth of the fish, not the location of the fish, meaning that bottom depth must be inferred somehow. To date, two methods for inferring bottom depth have been explored. The first is to examine only those fish retrieved in a flat area, where bottom depth was reasonable to estimate. If we look only at tags from a flat bottom area, then perhaps we can interpret up-and-down movement of the tag as vertical movement of the fish and not change in bottom depth. Unfortunately, only 11 tags meet the necessary criterion (retrieved from an area of homogeneous bottom depth). Dan Nichol is continuing to work on this approach, including possible influence of tides. The second approach is more computationally intensive, involving a hierarchical Bayesian approach based on a Kalman filter model of changes in bottom depth and fish depth. More time is necessary to perform all the data processing required for the second approach. Even if either of these two approaches proves successful in estimating the vertical distribution of fish relative to the bottom, a number of other issues remain: 1) The resulting estimates may not be an accurate description of vertical distribution when fish are encountered by an approaching vessel or net, 2) the hypothesis that fish may be able to out-swim the survey trawl also requires further investigation, and 3) it will still be necessary to disentangle the roles of catchability and selectivity before the resulting estimates can be used in the stock assessment model.

New data for 2006: The 2006 EBS shelf survey biomass was 519,000 t, down 14% from 2005. The 2006 AI survey biomass was 93,000 t, down 19% from 2004. In converting outputs from the EBS-only stock assessment model to BSAI equivalents for harvest specification purposes, estimates of biomass for the EBS have been inflated to account for the AI using the ratio 84:16, similar to the value previously used of 85:15. Historic fishery and survey length frequencies were recomputed and were found to not have changed much from the previous estimates. Three new years of survey age compositions for the years of 1994, 2004, and 2005 were added, so that a complete time series is available for 1994-2005, except for 1995. Longline survey data were provided by Chris Lunsford and Cara Rodgveller, and were incorporated into several of the alternative models, but not all. Potential problems with the longline survey data include: 1) few stations (some dropped due to killer whale depredation; only 32 EBS stations were successfully sampled each year by the Japanese survey, and only 11 by the U.S. survey), 2) most cod were caught in shallow strata where area expansion coefficients do not yet exist, and 3) the average catch per station from the Japanese longline survey showed extreme year-to-year variability. Japanese longline surveys, designed to assess sablefish, ran annually from 1982-1994. Japanese

surveys also had P. cod stations, so Mike Sigler suggested that these stations might be used in the model as a third longline survey index. However, the level of variability in fitting Japanese summer longline survey may be better for sablefish than for cod (the latter being much more variable). US surveys (EBS) occurred biennially from 1997-2005.

This year's models: The authors reviewed the assessment to answer the questions: 1) What model should be used? 2) What OFL and ABC should be adopted? and 3) should ecosystem considerations adjust the ABC?

Model 0 is last year's preferred model (Q = 1.0). Eight alternative models are also analyzed. In common are: 1) estimated trawl survey catchability (prior mean = 1.0, CV = 0.3); 2) other priors are the same as used last year; 3) the EBS shelf trawl survey catchability was estimated separately for the years 1979-1981 and 1982-2006; and 4) almost all selectivity parameters were estimated. One exception is the set of priors for the locations of the peaks for selectivity, which, because they are based on the average of the length composition peaks for the respective fishery or survey component, were re-estimated this year to take advantage of new data. Differences between models are: 1) inclusion of longline surveys; 2) functional form of the selectivity curve; and 3) priors given full (1.0) or partial (0.5) weight. Model enumeration forms a factorial design. A concern that selectivity may be overparameterized continues.

All models converged successfully, but models with down-weighted priors had to be started from the converged parameters from "full prior" runs. Model fits were similar regardless of the model configuration. For length data, fits were really good (comparing input (sample) and output (effective) sample sizes) for commercial fisheries, adequate for post-1981 shelf trawl survey, adequate for Japan longline survey, and really good for the US longline survey. Fits for age data were nearly identical across models, but not great for any model. Fits to shelf survey abundance were good, except that no model matches the huge 1994 increase and Model 0 has a consistent bias for pre-1982 years (does not separate time series of trawl survey data). Fits to the longline survey abundance index were poor, probably because the value fluctuates greatly.

Major assessment results are presented in Tables 16 and 17. Post-1981 trawl survey Q ranged from 0.55-0.70, except Model 0, in which Q was fixed at 1.0. Spawning biomass in 2007 is at 33-44% of the unfished value. All models except one find the stock to be in Tier 3b. The abundance trend is downward for all models, so that spawning biomass for 2008 ranges from 30-34% of the unfished value. The 2006:2007 ABC decrease ranges from 0-33%, depending on the model. The 2007:2008 ABC decrease ranges from 17-30%. Qualitatively, all models show similar trends for recruitment and spawning biomass. In all models, the 2000-2004 year classes are below average. The shapes of all of the female spawning biomass trends are similar, although the scale is different. Model A2 has the highest value, B1, B2, and A1 are together in a second, middle group, and the remaining models are in a third, lowest group, which includes Model 0. The difference between the A and B models are that the latter have a lower number of selectivity parameters. Version 1 and 2 differ by weight on priors (1.0 vs. 0.5, respectively). The last group of models includes the longline survey data and provides a similar picture to the last half of the time series for last year's model (Model 0).

In previous assessments, shelf trawl survey selectivity has been sharply kinked and lower for older ages. The same result holds this year for Model 0. In contrast, selectivity is only mildly dome-shaped for Models A1 and A2 and asymptotic and very similar for Models B1 to D2. Model projections indicate that female spawning biomass will decline because the 2000-2004 year classes all are below average.

Sarah Gaichas and Kerim Aydin contributed results from ecosystem models to the Pacific cod assessment. Sarah briefly summarized the model results, which are included as an attachment to the Pacific cod SAFE report chapter. The point of the attachment was to provide ecosystem

information as the Plan Team considers separate BS and AI specifications. Patterns of lower productivity and low recruitment are consistent with ecosystem analyses for other species.

From an ecosystem viewpoint, the authors concluded that the AI and EBS are distinct. Information from the early 1990s was used for modeling (because of a lack of updated AI data). Cod density in the AI is higher than the EBS and both are markedly higher than the GOA. Cod consumes both pelagic and benthic energy. Pollock is dominant in the Bering Sea, whereas the relative importance of cod is greater in the AI. Cod are connected to a lot of other species in both ecosystems. About ¼ of cod diet is pollock in the EBS. Other important prey are shrimp, epifauna, opilio, offal and infauna. In the AI, important prey include shrimp, small demersal species, Atka mackerel, squid, offal, and infauna. Mortality sources for cod in the EBS include "unaccounted" (i.e., fish which die before being eaten by a predator or harvested in the fishery, which accounts for about half of Pacific cod mortality), longline, trawl, then pollock, cod, and halibut. In the AI, "unaccounted" contributes half the mortality, followed by longline, trawl, Steller sea lions, and toothed whales.

Who matters to adult cod in the AI? Juvenile cod, adult cod, small phytoplankton, benthic detritus, large phytoplankton, benthic microbes, shrimp, amphipods, cod longline, polychaetes, etc. In the BS, similar factors are ranked high.

Who do adult cod matter to in the AI? Adult cod, sablefish, cod pots, cod longline, cod trawl, rex sole, arrowtooth flounder, greenlings, sleeper shark, sablefish longline, etc. In the Bering Sea, adult cod, cod pots, cod longline, cod trawl, greenlings, bairdi crab, cod juvenile, king crab, etc.

The BSAI Team reviewed criteria for choosing a model:

1. Reasonable selectivity for a trawl survey (is there a pronounced "kink"?).
2. Data are validated and ready for use (specifically, are we ready to use the longline survey data?).
3. Model converges well (and not dependent strongly on initial values).
4. Model should not depend too strongly on prior distributions (If it does, make sure we agree on priors?).

The Team's evaluation of the models concludes:

1. Model 0 has a pronounced selectivity kink
2. Models using longline survey data (C1-D2) need further investigation (area-expansion factors, small sample sizes for abundance indices, big year-to-year fluctuations in Japan survey index).
3. Models with down-weighted priors (A2, B2, C2, D2) typically had a hard time converging (especially A2), as did models using longline survey (C1, D1, C2, D2). Models using double logistic selectivity (like A1) in the past have tended to converge on unreasonable values with free M and Q.
4. Model A2 is the most sensitive to the prior (going from A1) (16% change in 2006 biomass; versus -3%, 3%, and -2% for B1, C1, D1).
5. The above consideration results in Model B1 as the preferred model
    a. Models A1, B1, and B2 give similar results.
    b. Indicates that reduction in parameters between A1 and B1 may not be missing key factors.

Model results for B1:

1. 2000-2004 year classes are below average and 2005 year class is nearly average (though based on only one year of trawl survey data).
2. Estimated spawning biomass has been similar from 1993 to 2006, though it has been decreasing since about 2004.

3. 2007 ratio is 38% (Tier 3b); 2008 ratio is 33% (Tier 3b)
4. Maximum permissible 2007 ABC under Tier 3b is 176,000 t (down 9% from 2006) and 131,000 t for 2008 (26% down from 2007)

Can we detect a weak cohort? Some public comments have identified model estimates of weak 1985-1987 and 1993-1994 cohorts as proof of the model's inability to estimate year class strength. The stated rationale was that catches were higher in 1990-1992 than 1985-1987 (but ABCs were lower) and that catches and ABCs in 1998-1999 were both slightly higher than in 1993-1994. However, many factors go into setting ABC, not just the relative strengths of 5-7 year-olds, including harvest policy, model structure, parameter estimates, and absolute strengths of all age groups. Likewise many factors affect catch, not just the relative strengths of 5-7 year olds. Same as above, plus other management measures, profitability, and fishing effort. In both SS1 and SS2, the model is constrained to match the catch history exactly, so current cohort strength estimates must be consistent with past catch history.

What about past estimates? The author suggested that a valid test would be to compare earlier model estimates of year class strength (specifically, in the respective SAFE reports when the year classes in question first reached age 3) against recent model estimates. The rankings of three of the five cohorts (1985, 1986, and 1994) were exactly the same in the 2005 assessment (using the model chosen by the Plan Team and SSC) as when they were initially characterized. The rankings of the other two cohorts (1987 and 1993) changed slightly, but went from weak to weaker in both cases.

What about fishery CPUE? The author computed fishery catch rates by gear type (pot, longline, and trawl). Longline CPUE went up a lot in 2006; pot CPUE has increased steadily since 1999; and trawl CPUE decreased slightly this year. For these data, the sample sizes are large and standard errors are small. The longline CPUE showed a 57% increase this year. Is a 57% 1-year biomass increase possible? For the fishery CPUE data, how do you weight the gear types, especially while trawl went down 2% and longline went up 57%. Problems have sometimes arisen elsewhere when fishery CPUE is used as an index of abundance; fishermen are good at finding fish even when populations are declining. These questions and issues do not rule out the possible use of fishery CPUE in future assessments, but they will need to be addressed before such data can be used with confidence

Team recommendations to the author for new modeling efforts:

- The author and others have been concerned that selectivity may be over-parameterized. Previously, a double logistic function with 8 parameters was used. This year, the author proposed using a "double normal" function with 4 parameters instead. The double normal selectivity schedule is based on 2 normal curves (location and scale parameters), whose peaks are connected by a flat line. In contrast, the double logistic function triples the number of shape parameters. Other selectivity curves provided in SS2 besides the double logistic and double normal could also be explored. If available as options in SS2, it may be useful to consider using second-difference penalized line segments or an exponential-logistic selectivity curve.
- Last year, age-at-maturity data were updated. The AFSC has embarked on a 3-year effort to improve maturity data by expanding spatial coverage of samples (e.g. expand outside of "Cod alley" in the Bering Sea).
- The Plan Team requests that the Japanese longline survey data be examined further, as acknowledged by the author. In addition, the Plan Team requests that the shallower cod station and deeper sablefish stations be analyzed separately to create two independent indices. It would be interesting to see differences between the cod (18) and sablefish (14) stations. Bill Clark doubted that the longline survey would ever be useful, as the IPHC rejected that approach for halibut

Team comments:

- The Team concurs with the author's recommendation of Model B1. This year's changes in model structure have resulted in a more successful assessment. We finally have a decent time series of age data (about 10 years) and the model follows the convention of estimating q, with fixed M, and has a simplified selectivity function. The Plan Team recommends testing other simpler functions.
- The Plan Team notes that the 2007 ABC is greater than the 2008 OFL, which is an indicator that the stock abundance is declining.
- The difference in the ecosystem role of cod between the Aleutians and the Bering Sea indicates potential differentiation between cod assessment and management. Predation on cod is fairly low, which implies that single-species considerations are sufficient for determining ABC. Fishing is the most important source of mortality (besides unallocated mortality). The Team drew no conclusion on the advisability of setting subarea specifications based on ecosystem information. The Team noted that the SSC will review genetic information on cod at its February 2007 meeting to further advise the Council on this issue.
- Natural mortality of cod is low in the ecosystem model, but the assessment model says it is high. There may be big sources of juvenile cod mortality.
- Models tend to get more complex over time, making it difficult to communicate results to the public.
- The model previously suffered from lack of age data; inclusion of such data now allows better estimates of recruitment, and potentially natural mortality in the future.
- The Team noted that the author did not provide a retrospective analysis this year, but did in previous years. The results track best when the model does not change.
- The Plan Team agreed to carry its recommendations to authors forward each year, until authors respond to those recommendations. November minutes will collate all team recommendations.
- An external review of the BSAI Pacific cod model was sponsored by an industry group simultaneously with the development of this year's assessment. Timely completion of the BSAI and GOA Pacific assessments was compromised due to the timing of the external review. The Plan Team supports the concept of scientific reviews, both internal and external, and notes that the Pacific cod assessments have been reviewed externally on several previous occasions. The Team recommends that the Council consider adopting a policy whereby external reviews would not be conducted during the time dedicated to preparation of stock assessments (September-December). AFSC scientists are willing to participate in external reviews outside of that time period, but these should be scheduled in coordination with AFSC leadership so as not to conflict with other assignments.
- The Team noted that changing from annual surveys of the EBS shelf to biennial surveys would compromise management and assessment of Pacific cod and other species.

Public comment

Joint Team Chairs Jim Ianelli and Loh-lee Low requested that the BSAI Pacific cod stock assessment and ecosystem model presentations by the authors be allowed to proceed uninterrupted, except for questions of clarification by Plan team members. At the conclusion of the presentation, Plan team members would ask the author questions. At the conclusion of Plan Team questions, the public was invited to pose questions to the author and/or Teams. At the conclusion of public comment, the BSAI Plan Team would deliberate and develop its recommendations on OFL and ABC, and any other comments to the author on requests for next year. A separate review of the GOA Pacific cod assessment would occur later in the week.

Thorn Smith noted that last year's ABC projection for 2007 was 148,000 t, whereas this year's model projects it at 176,000t. Why the difference? The author responded that it was due to all the model differences described above.

Tom Casey noted that the authors' presentations and subsequent Plan Team questioning consumed over 3 hours before the public was allowed to speak. He quoted National Standard 1 from the MSFCMA. Loh-lee Low noted that no one was limiting anyone's opportunity to comment; the only restrictions pertained to when those comments could be offered.

Ed Richardson asked if the reason for the difference between A2 and B1 is simply that A2 does not converge very well and wondered how much risk would be posed if ABC were to be set slightly above the maximum permissible level suggested by Model B1. The author replied that the main arguments against Model A2 were two-fold: First, because Model A2 converged successfully only when it was seeded with the final parameter estimates from Model A1, it may have converged on a local minimum; and second, because Model A2 uses the double-logistic form of the selectivity function, which has been difficult to estimate in the past. To the second question, he replied that the management system is not set up that way – we pick a model and follow the constraints therein. If the Plan Team feels that Model A2 is the best model, that is one thing; but it would be a significant deviation from past policy if the Plan Team were to endorse Model B1 and then recommend an ABC from another model that exceeds the maximum permissible ABC from Model B1.

Dave Fraser asked if the assessment could include a table or figure of estimated numbers at age so that readers can track age classes as they move through the population and fishery? Grant indicated that this could be included in future assessments.

NPFMC GROUNDFISH PLAN TEAMS

AGENDA *11/13/06 DRAFT* **November 13th-17th, 2006**

A. Joint Groundfish Plan Team Meetings

Room 2076 (Traynor Room)

Monday November 13th		
	1:00 pm	Introductions, scheduling, adoption of agenda, September meeting report, outlook and issues for 2007 meetings
	1:15 pm	Council update, pending actions, BSAI/GOA dark rockfish amendment
	1:30 pm	Response to SSC requests (e.g., Off-year assessment issues), PSEIS Implementation Specifications process
	2:45 pm	Break
	3:00 pm	Ecosystem Chapter/Ecosystem Assessment
	4:00 pm	Economic SAFE report
Tuesday November 14th		
	9:00 am	**Sablefish**
	12:00 pm	*Lunch*
	1:00 pm	**Pacific cod** assessment (update on archival tag work too; till 3 pm)

B. Bering Sea/Aleutian Islands Groundfish Plan Team

Room 1055 (Observer Room)

Tuesday November 14th		
	3:00 pm	Pacific cod (continue from Joint Team meetings)
Wednesday November 15th		
	9:00 am	Yellowfin sole, Rock sole, Flathead sole, Alaska Plaice, Arrowtooth flounder, Other flatfish
	12:00 pm	*Lunch*
	1:00 pm	**EBS Pollock**, AI Pollock, Bogoslof Pollock
Thursday November 16th		
	9:00 am	POP, Northern rockfish, Red rockfish, Other rockfish
	11:00 am	Greenland turbot
	12:00 pm	*Lunch*
	1:00 pm	**Atka mackerel**
	3:00 pm	Other species, research reports
Friday November 17th		
	9:00 am	Table preparation, Report writing/finalizing, other business
	3:00 pm	Adjourn

C. Gulf of Alaska Groundfish Plan Team

Room 2076 (Traynor Room)

Tuesday November 14th		
	3:00 pm	Optional participation in BSAI Pacific cod discussions
Wednesday November 15th		
	9:00 am	**GOA pollock**
	12:00 pm	*Lunch*
	1:00 pm	Arrowtooth flounder, Flathead sole, other flatfish (Dover sole, rex sole),
	3:00 pm	Pacific ocean perch, SR/RE and other slope rockfish, Northern rockfish, Pelagic shelf rockfish, demersal shelf rockfish
	4:00 pm	Thornyheads, Atka mackerel
Thursday November 16th		
	9:00 am	Skates, other species, Alternatives to Tier 6 approach
	12:00 pm	*Lunch*
	1:00 pm	Sharks
	3:00 pm	**Pacific cod**
Friday November 17th		
	9:00 am	Table preparation, Report writing/finalizing, other business
	3:00 pm	Adjourn

Gulf of Alaska Plan Team Minutes

The meeting of the Gulf of Alaska groundfish Plan Team convened on November 15th at 9am at the Alaska Fishery Science Center, Seattle, WA.

Members of the GOA plan team in attendance included:

Jim Ianelli	AFSC REFM (GOA co-chair)
Diana Stram	NPFMC (GOA co-chair)
Sandra Lowe	AFSC REFM
Jeff Fujioka	AFSC ABL
Jon Heifetz	AFSC ABL
Robert Foy	UAF
Nick Sagalkin	ADF&G
Tory O'Connell	ADF&G
Tom Pearson	NMFS AKRO
Ken Goldman(by phone)	ADF&G
Sarah Gaichas	AFSC REFM
Bill Clark	IPHC
Theresa Tsou	WDFW

Ward Testa (NMML) was unable to attend. Approximately 15 state and agency staff and members of the public also attended. Names of attendees are included in the Joint Plan Team minutes.

The team approved the agenda with changes as noted during the Joint Plan team meeting. The agenda is attached to the Joint Plan Team meeting report.

GOA Pollock

Martin Dorn presented an overview of the pollock assessment. The assessment is an update of last year's assessment with no model configuration changes. New data included in the assessment are 2005 catch and age data from the fishery, the 2006 Shelikof EIT survey biomass and age composition estimates, and 2006 ADFG trawl survey biomass and length composition estimates. An overview of catch and incidental catch (excluding prohibited species (PSC) information was presented).

The team discussed issues surrounding PSC reporting and how they may best be included in assessments. Authors noted that PSC values are stored in a different database from standard catch statistics. The team noted that it would be useful to have catch information for targets, non-targets and prohibited species catch in a commonly accessible form for assessment authors to summarize. Jim Ianelli noted that there is a national initiative to evaluate statistical estimates of bycatch species. While the North Pacific groundfish fisheries are widely held as having a model observer program and method of fisheries management, the fact that the current catch-accounting system lacks statistical formalism results in a low "score" relative to other areas of the country. Initial reports from this project note that a "one-size fits all" approach may be inappropriate. However, it is clear that development of statistical approaches for the catch-accounting system is required.

Results from the GOA pollock model indicate that the 2004 year class appears to be above average. It was noted that the age 0s observed in 2005 that did not appear as age 1s in the 2006 Shelikof Strait EIT survey. The age 1s however were prevalent in the Shumagin area survey in 2006. Martin questioned to what extent mapping of age 0s could be done by year. Chris Wilson noted that only two years of data are available thus far. The summer EIT surveys provide additional distributional patterns that were not available in previous years. Summer bottom trawl estimates of age 1 fish do not seem to correlate as well

with recruitment as the EIT survey does. The team discussed the example of the 1995 year class which had not shown up in the EIT survey but eventually recruited to the trawl survey in later years. To what extent this could be representative of aging error is unknown but seems to be a consistent pattern unlikely to be solely attributed to aging error.

A strong 2005 year class was observed in the Shumagin area EIT survey in 2006. Because the Shumagin survey time series is short, this is not attributed as a strong year class at the population level at this point. Martin discussed the broadscale patterns of inter-annual variability in age composition by area. Some modeling work is proposed (IBM) which may help to explain these dynamics. Martin noted that the predictive capacity is somewhat limited to the early life history stages for pollock. Spawning appears to be occurring in areas outside of Shelikof Strait and the transport characteristics of these sites are being examined to help explain the structural mechanisms of these sub-populations.

All survey indices show a consistent relative decline (Shelikof EIT, ADFG, and NMFS bottom trawl). The teams discussed the relative progression of year classes and fishery catch characteristics. The potential unfished state of year class diversity was discussed. The utility of exploring the indices of population status (e.g., the Shannon-Weiner index applied to age classes) would be more useful if there were metrics to compare with (e.g., from an unfished population and/or a population fished at the target harvest rate).

The team discussed the estimates of natural mortality and the degree to which they reflect current predation levels. The author chose to use a lower estimate of natural mortality to be precautionary. The team discussed the management strategy evaluations that are underway and suggested that they include alternative control rules, e.g., to preserve age structure, and include alternative natural mortality estimates. The team was encouraged by the progress being made on the MSE and in particular, the move to include multi-species interactions. They look forward to providing feedback on this work.

The team discussed the proportion of total spawning population indexed by 2003-2006 winter EIT surveys. Martin noted that in recent years the model overpredicts the survey estimates. Julie Bonney questioned to what extent this is due to predicting just the Shelikof region, and if the fraction in Shelikof is not constant over time then it would account for the lack of fit. However if all areas surveyed are included the total biomass estimate it is very close to the aggregate amount. Martin noted that the aggregate biomass is compared in the assessment, however the overall aggregate index is not included in model fitting. Limitations to using this aggregate index include the short time period and region covered.

The fact that there is consistency between the overall assessment results and the aggregate values provides additional justification for the ABCs as recommended. The team encouraged continued research into the distribution of spawning pollock outside of the Shelikof region with the hope that someday it may be explicitly included.

The team discussed the catchability coefficient in the model. The model estimate of Q has consistently predicted 0.8 but the Q utilized in the model remains at 1. The results would be notably less conservative if a lower Q value were incorporated. The team discussed the fishery and survey selectivity estimates. The team discussed the change in fishery age composition data indicating some aberrant years where a high proportion of 9 yr olds are caught with no ten year olds and what the implications are regarding the selectivity values used. The results from the MSE work might aid in resolving this. Martin also indicated that extending data out to 15 year-olds might provide additional information. It was suggested that it might be useful to explore combining ages 9 and 10 and examining the potential interaction with the selectivity and catchability estimates, particularly as relates to the standard likelihood profile that is done for survey catchability. The bottom-trawl survey selectivity in the EBS pollock assessment peaks around the same age-range but then drops off slightly and is constant for ages 11-15. Martin indicated that the selectivity pattern when the results were extended out to age 15 was strongly dome shaped. The older fish tend to be more nearshore and thus less available to the NMFS survey. The selectivity used for reference point analysis is an average from 1992 onwards. The team noted that MSE should be used to

explore alternatives, perhaps by evaluating different ABC formulations from a different range of selectivity curves or from specific years (e.g., the most precautionary). It would also be useful to examine how much selectivity change is driven by year classes, and to examine how selectivity differs depending upon the age-structure of the population. This was considered important to include in the operational model of the MSE.

Members of the public questioned whether the temporal shift due to SSL protection measures impacted selectivity given that some of these time periods were previously unfished. They believe that they are currently fishing different segments of the population. Martin noted that spatial and temporal management has occurred since the 90s with pre and post spawning fishing seasons. He indicated that he has considered splitting fishery selectivity by pre and post spawning fishery.

The currently estimated decline in spawning biomass is projected to be short-lived. The potential for future recruitment is cautiously optimistic but concerns remain regarding the precision of these estimates and external processes affecting static assumptions (e.g., high predation rates versus assumed constant natural mortality). The estimated 2006 age composition is similar to that projected for 2006 in the 2005 assessment for all but the 2 year olds. A major change however is that the estimate of age 2 recruitment is now based on survey data (previous "estimates" were based on average levels).

Projections for spawning biomass improve once the contribution from the 2004 year class is included in the next several years. 2007 shows a substantial (>20%) drop in ABC and is consistent with previous year's predictions. Team members questioned how much of the subsequent increase in 2008 and beyond is due to observed year class strength or use of average year class strength. It was noted that the projected increase is also due to average recruitment assumption. The recent (2004) year class was included in the projections.

The team discussed the SSL measures control rule and the author's recommended control rule. Preliminary MSE results indicate that harvest control rule is effective at maintaining appropriate stock size and that the assessment model is adequate for evaluating the population trends when true stock dynamics are similar to those assumed by the assessment model. Additional analyses will focus upon the impact of other factors such as climate forcing.

Sarah Gaichas reviewed Figure 9 and figure 7 from the ecosystem SAFE and Figure 7 in ecosystem SAFE and provided the team an overview of recent work estimating the relative impact of fishing mortality and predation mortality compared with stock production. Preliminary ecosystem modeling results indicate that while fishing mortality on GOA pollock has been generally low, fishing mortality plus predation are exceeding the annual production of the population. This suggests that leaving conservatism built into the assessment (e.g., with Q=1) would be wise for the near-term until additional information is available to suggest otherwise.

Team members requested additional information regarding whether size-specific predation is included. Sarah noted that currently they are modeling the adult biomass only thus would not be able to ascertain specifics of consumption by age. The results show aggregated production over the whole time series as well as production estimates over a single year. The team noted that the combined mortality over time further justifies the relative conservatism necessary in the fishing mortality rates for GOA Pollock. The team discussed the stock assessment characteristic of F rates scaling in conjunction with the M used in the assessment, given that this is a measure of production. The ecosystem analysis provides an alternative measure of natural mortality due to predation, but simply inserting this much higher natural mortality estimate into the pollock stock assessment is not recommended as it would suggest a less conservative F rate within the single species assessment. Ecosystem model results are consistent with a declining stock. Questions were posed regarding total production in the GOA. It was noted that it is difficult to use this modeling approach to address lower trophic level impacts. Suggestions from the team included adding error bars to the analysis as well as extending the time series. Team members questioned how arrowtooth biomass matches with this trend. Arrowtooth account for a lot of juvenile mortality and when combined

with halibut and cod account for the majority of adult mortality. Suggestions were made to annotate results to show how mortality changes by year.

The SEO Pollock biomass assessment shows consistently different results than for the rest of the GOA in that older fish are largely absent from the survey age composition data. This population is not fished.

The team discussed the new apportionment scheme presented in the assessment (as an appendix). The 4 urvey was utilized for a winter apportionment table by area using a 4 survey average. This new scheme focuses more on more recent data rather than the entire time series. The 1990 Karp survey still contributes to the present apportionment scheme. The apportionment scheme is a part of the SSL protection measures. Ken Stump noted that temporal and spatial management of the fishery was for stock protection purposes and not solely for SSL measures. The Authors and Team agreed that uncertainty in stock structure was played a role in apportioning pollock ABCs.

Julie Bonney commented that there is no survey in 630 on the east side of Kodiak and expressed concern if funding is lost and surveys are cut back. How is consistency to be maintained in methodology of apportionment? Martin noted that the acoustics group may survey these sites but the budget outlook is uncertain. Mike Guttormsen agreed and noted the intent to survey them in the future. Martin noted that he would like the apportionment to be dynamic and maintain the ability to modify it annually based upon improved survey estimates. There is the need to build some survey record for a new site prior to inclusion in the apportionment scheme.

The apportionment scheme for this year changes the winter apportionment and reflects an increase in area 610. The increase in 610 comes primarily from 620. Martin considered that this is more reflective of the current biomass distribution. The team discussed the difficulty in establishing these apportionments to reflect the recent information, noting that ideals for management purposes are not always reflected in the available information. Concerns that budget impacts might be even more apparent on survey effort in the GOA would exacerbate the situation.

ABC recommendations

The team approved the author's recommended ABCs, OFLs and apportionments are presented in the assessment for 2007 and 2008. The team feels that reflecting the most recent information in the apportionment is important.

Arrowtooth flounder

Sarah Gaichas provided an overview of arrowtooth flounder food habits investigations that have been on-going. Diets of arrowtooth in the Bering Sea appear more dependent on pollock than arrowtooth in the GOA. Bob Foy discussed indications from recent studies of their switching mechanism between dependence on capelin and pollock in diets. Food habits data are from the late 90s however indications are that this is likely similar to data in recent years. The team noted that more recent information for food habits data would be useful to compare with the late 90s information in order to better investigate to what extent arrowtooth food habits are constant over time. Team members questioned the trend in cannibalism by species given the large population increase for arrowtooth. Sarah noted that additional information is planned for incorporation in the arrowtooth assessment next year.

Buck Stockhausen presented an overview of the executive summary of the GOA arrowtooth flounder assessment. Catch information for arrowtooth since 2004 were shown. The projection model was run with updated catch information. The ABC was very similar to the previously projected ABC for 2007. Nick Sagalkin comment as to why the arrowtooth ABC in 2006 decreased despite the increase in biomass. This was noted to be due to model configuration issues. The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Plan team discussed the issue of the apparent discrepancies between the end date of catch used in the projection versus the summary of catch used in the intro sections. The team noted that the catch summaries in the intro will use a different date than the catch information utilized in the projections but the summary sections will note this difference.

Arrowtooth MRA proposed amendment:

Diana Stram provided an overview of a proposed regulatory amendment to modify the MRAs for arrowtooth flounder. Arrowtooth is the only fishery with MRAs set to 0, which was originally established with the intent to protect against the use of the species as a ballast for retaining other species. The modification of the MRAs would make arrowtooth MRAs consistent with those of other fisheries and allow for retaining bycatch of those species in a developing arrowtooth-specific fishery. The team noted that skate catch in the arrowtooth fishery is not very high, unless the fishery suddenly begins to retain more. The TAC for arrowtooth in 2007 will likely increase to meet demand. This results in slightly higher catch in the Central GOA but still remains constrained by halibut PSC limits. Julie Bonney noted that the trade-off in targeting arrowtooth would be in less rex sole and flathead sole given that halibut PSC is apportioned by complex. She noted that the fleet did more pelagic fishing with the rockfish pilot project on line thus more deepwater flats were available. The appropriate amount for the aggregated rockfish MRA is still being evaluated. Team members commented that it would be useful to examine what the average rockfish catch would be, and that 2% might represent a more intrinsic rate. The team is in favor of increased targeting arrowtooth flounder and felt that the MRA adjustment amendment is appropriate in so far as it decreases the necessity of regulatory discards.

Flathead Sole

Buck Stockhausen presented an overview of the executive summary of the flathead sole assessment. Catch distribution for the last 3 years were presented. Catch was noted to be much less than TAC. Area apportionment percentages presented were consistent with 2006. The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Rex sole

Buck Stockhausen presented an overview of the executive summary of the rex sole assessment. Catch history and catch distribution were presented. Team members questioned to what extent the distribution of catch is a function of effort or an indication of a true distributional change. Julie Bonney noted that shallow flats tend to be more shoreside thus catches are closer to shore, but catch of rex sole would be tend to indicate more of the true abundance rather than a reflection of effort. There was a higher catch for rex sole this year than in previous years, concentrated primarily around Kodiak. Area apportionments were based on the 2005 survey biomass. The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Dover sole

Buck Stockhausen presented an overview of the executive summary of the Dover sole assessment. Catch history and distribution information were presented. He noted the decreasing catch in recent years. There was a slight increase but limited change in ABCs for 2007 and 2008. The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Other flatfish

Buck Stockhausen presented an overview of the executive summary of the other flatfish assessments. Catch history and distribution information were presented. The other flatfish summary includes deepwater and shallow water complex summaries. Deepwater flatfish includes Dover sole as well as deep sea sole

and Greenland turbot. Thus, OFLs and ABCs for deep water flats include the contribution from deep sea sole and turbot (Tier 6 species) combined with Dover sole. The shallow water complex includes species in both Tiers 4 and 5.

The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Pacific Ocean Perch

Kalei Shotwell presented an overview of the executive summary of the Pacific ocean perch assessment. Model projections were updated with new catch for the age-structured assessment. There was a 21% increase in catch in 2006. The ABC increased slightly for 2007 and 2008. Julie Bonney noted that the CPUE for POP was extremely high this year. It was a 5 day season, with abnormally high CPUE for both POP and PSR. Phil Rigby questioned to what extent there would be a market for a higher ABC for POP. Julie Bonney noted that the pilot program for rockfish begins in May of 2007.

The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Rougheye Rockfish

Kalei Shotwell presented an overview of the executive summary of the rougheye rockfish assessment. Model projections were updated with new catch for the age-structured assessment. There was a 9% increase in catch from 2005 to 2006. OFLs and ABCs reflect a small change from the previous year in the model projection. Two appendices are included in the report this year. Appendix A evaluated a sensitivity analysis in the trawl and longline abundance indices. An expanded analysis of this will be included for next year's assessment.

Appendix B provides a literature review of rougheye rockfish species. A second species of rougheye rockfish has been genetically identified and the proposed name is the blackspotted rockfish. There is substantial overlap in the distribution between the two species with rougheye rockfish extending farther south along the Pacific Rim and blackspotted rockfish extending into the western Aleutian Islands. A difference in depth distribution may exist. Preliminary discussions with researchers from field experiments suggest that rapid and accurate identification of each species was difficult. Studies should be developed to assess whether the two species have significantly different life history characteristics to determine the feasibility of distinct population assessments. Methods need to be developed and tested to enable field identification so that catch accounting can occur.

The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Shortraker and other slope

Kalei Shotwell presented an overview of the executive summary of the shortraker and other slope rockfish assessment. There was a marked increase in catch of shortraker from 2005 to 2006 and a smaller increase in other slope rockfish catch over the same time period.

The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Northern rockfish

An overview of the assessment was provided by Kalei Shotwell. A full presentation of the assessment was provided by the lead assessment author in September. Nine model configurations were examined. The team agreed with the assessment author's recommendation of the model 1 configuration for maximum permissible ABC recommendations. There was a decrease in overall biomass due to model changes as noted in September. The team again recommends that the study on maturity at age which has been completed but not yet published be made available to assessment authors for use in the assessment.

The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Pelagic Shelf Rockfish

Kalei Shotwell presented an overview of the executive summary of the pelagic shelf rockfish assessment. Updated projections for dusky led to a minimal increase in the 2007 estimate for ABC but a large increase in 2008. A section was added to the executive summary regarding the progress for proceeding with removing dark rockfish from the complex (and FMP) via a plan amendment. Julie Bonney questioned why the PSR fishery was re-opened in fall. Tom Pearson noted that it was to accommodate fixed-gear fishery for targeting of PSR, primarily the jig fishery for duskies and dark rockfish. Julie noted that the re-opening for PSR resulted in theTACs for POP and northern rockfish being exceeded and caused higher discards of northerns and POP by trawl gear.

The team approved of the OFLs, ABCs and apportionments as presented for 2007 and 2008.

Demersal Shelf Rockfish

Tory O'Connell reviewed the executive summary for DSR. Sections were added on full retention in response to SSC comments as well as an overview of how halibut fishery bycatch is now estimated and on recreational catch of DSR. Tory reviewed the dichotomy between state and federal rules on full retention, noting that current treatment of overages has changed.

For estimation of DSR bycatch in the commercial halibut fishery the 2005 halibut survey and fishery logbook data were stratified by depth. The old method of using only an area estimate of bycatch compared with new means of depth/area estimates led to a lower estimate of DSR bycatch. This estimate of mortality likely better captures the true mortality. Last year concerns were raised that we were possibly exceeding the OFLs with sport and recreational fisheries hence an expanded analysis of these fisheries contributions to catch was reqeusted. There was a notable allocation by the BOF in 2006 between user groups with 84% of the TAC allocated to commercial fisheries and 16% allocated to recreational fisheries. More restrictive sport regulations have been enacted but discard mortality remains an issue of concern. Estimates of sportfishery harvests were provided by the Sport Fish Division, with the caveat that problems persist in this estimation given that creel and logbook data do not match. The team noted that there were no data tables or error statistics provided for these estimates. Catches have decreased from last year however.

No biomass survey is planned for next year due to lack of funding and the ability to update the assessment next year is dependant upon this additional information. Tory reviewed the availability of age data and the potential for creation of an age-structured model. An age-structured model has been proposed and might be appropriate but there remains a staffing issue for taking on the assessment as well as some issues related to age data for this species. If the current approach to estimating total mortality is more accurate (given the noted need to look more at variance in sportfish data), then landing estimates could potentially allow for a small directed fishery for DSR. However, the team expressed reluctance to open a fishery with no biomass estimate. The survey funding is notably limited for assessing the species and it appears unlikely that additional information will be available for next year's assessment. . It was noted that charter halibut catch in area 2C was exceeded by 47% but DSR catch decreased. It appears likely that release mortality of sport caught DSR is under reported.

The team noted some issues for consideration by the SSC. What should be done with assessments such as DSR where no additional information is available? The team stressed the importance of the continuation of the survey for this species as the primary information used to assess this species comes from the surveys. In EYAK, the most recent survey was in 2003 and this is the most likely area for a directed fishery to concentrate. In other regions, the most recent surveys were 2005 in SSEO, 2003 in CSEO and 2001 for NSEO. Without the continuation of surveys for this species, the best available data to manage this species becomes more and more dated.

The team approved rolling over OFLs and ABCs for 2007 and 2008.

Thornyheads

Sandra Lowe presented an overview of the executive summary of the assessment. No new information other than catch information is available. This is a Tier 5 species. Area apportionments are based on the 2005 surveys. The team approved rolling over OFLs and ABCs for 2007 and 2008. Information was included in the research priorities to highlight the importance of the deep water survey strata to the adequate assessment of this species. The team suggested that similar language be added to all deep water species.

The team expressed extreme concern with the potential impact of survey cuts and noted that there is a risk of several assessments being dropped to Tier 6 levels in the absence of reliable biomass estimates. This information should be added to all assessments where this possibility exists to drop to Tier 6.

Atka mackerel

Sandra Lowe presented an overview of the executive summary of the assessment. Catch information was updated. Otolith information was evaluated and highlighted the presence of the 1999 year class. Biomass still remains to be primarily due to the influence of the single strong year class. The team in 2005 recommended a higher ABC with a strong lower TAC recommendation in case an EFP could be implemented for collection of additional data. The interest in an EFP waned in conjunction with the potential for a consultation on the SSL measures. Increased catch numbers might be indicative of purely incidental catch levels and not a result of deliberate topping off. Regulations prohibit directed fishing but there does not appear to be a biological concern if catch continues to increase to meet TAC levels. The team felt that 1500 tons was adequate to meet incidental catch needs in this fishery.

Skates

Sandra Lowe provided an overview of the executive summary for skates. There remains a difference of opinion between the assessment author's recommendation of area-specific OFLs and the plan team recommendation of gulfwide OFLs for big and longnose skates. Julie Bonney commented that POP is the only GOA species with area-specific OFLs. Tom Pearson noted that localized depletion issues for POP were raised prior to the stock being declared overfished. Rationale was provided in the POP rebuilding plan for area-specific OFL management. Sarah Gaichas noted that area-specific OFL recommendations for skates were included due to concerns of localized depletion for these species

Beth Matta provided an overview of the observer program special projects regarding skates. In the GOA length frequency data are requested for all skate species in Pacific cod hook and line fishery catch. This fishery represents approximately 80% of the bycatch of skates. Age composition data are requested for the three main skate species from the observer program for all boats in the GOA. These are special projects as a request for the observer program. Lengths will be taken even if skates are not predominant in the catch. The sampling level requested is 20 skates per set per week. Special project means that it is for one year only and is not comprehensively followed by all observers (and thus some spotty coverage). Data from this special project will be available for incorporation into the assessment for next year.

Todd Tenbrink provided an overview of the table of life history characteristics for big skates and longnose skates included in the executive summary. The previous assessment assumed an average maximum age of 40 years and an M of ~0.1. The data presented in the executive summary would probably lead to an M of ~0.2. Big skate estimates are still highly variable thus the impact on mortality estimates for the following assessment is as yet unknown. These data were not available for the previous assessment and will be incorporated into the following assessment next year. It is unclear at this point

who will be doing the next assessment for skates. Catch in 2006 increased for big skates and other skates from the 2005 catch estimates.

The plan team recommends rolling over the previous ABCs and OFLs using the same area methodology as previous years given limited information in the off-year of the assessment to suggest otherwise.

Other species

Jennifer Ferdinand provided the team an overview of an NPRB proposal to provide additional catch estimation of bycatch in the halibut fleet. Estimating bycatch in the halibut fleet has been an ongoing issue for estimating the incidental catch of many species (DSR, skates, etc). Each vessel will carry two observers and a video monitoring system for comparison on adequacy of results. The project will begin in the summer of 2007 and will likely be focused in southeast. The work in 2008 is dependant upon funding from NPRB. The team felt that this issue is of extreme importance and has been noted in numerous years and numerous assessments. The team decided to draft a letter of support to NPRB for funding and focus on research of this nature in order to improve estimates of bycatch in this fishery (attached). Julie Bonney commented that video monitoring will be pursued in the rockfish pilot project using one coop at the start of the pilot project in May. There are numerous practical and regulatory issues left to be resolved before this can be implemented.

The team reviewed draft assessments of other species which are to be included as appendices to the GOA SAFE report. The team had reviewed previous drafts of these assessments in September but did not carry through their review to include OFL and ABC considerations at that time. The team did deliberate on ABCs and OFLs for these species during this meeting in order to provide discussion and preliminary recommendations for the record for the forthcoming amendment analysis to break other species out in the GOA. While no specifications will be set for any of these species prior to the implementation of a plan amendment, ABCs and OFLs were recommended in order to evaluate the potential impacts of species-level specifications in the amendment analysis. This analysis is intended for initial review by the Council in 2007.

Alternatives to Tier 6 Approach:

Per SSC request in October, the team discussed alternative Tier 6 approaches for other species. Liz Conners presented an overview of possible approaches using octopus as a candidate species. The criteria for application of a modified approach are that 1-data for tier 5 or above are not available; 2- there is no recent history of commercial fishery; 3- no evidence of current problems (e.g., neutral or increasing tends in biomass index or CPUE); and 4- not listed as threatened or endangered. Thus the general premise for application of a modified approach is an assumption that the current fishing pattern is not a problem but a desire exists to prevent a new fishery without constraining existing fisheries. Management goals include the following: 1-allow continued incidental catch at current/recent levels; 2-do not unduly restrict fisheries; 3-prevent rapid increases in catch and 4-allow research/experimental fisheries for additional data collection.

Management techniques include monitoring catch including retention, keeping the non-target group on bycatch only status until sufficient data has been collected, to keep time series of biomass index if feasible, and to set ABC/OFL based on the best estimate of incidental catch.

Two options were presented for establishing OFLs and ABCs using incidental catch as an index. Under option 1, the maximum of incidental catch rate is established as the OFL, with ABC=75%OFL. Under option 2, the ABC is established as the maximum incidental catch with OFL=133%ABC. The two option provide a range of conservative (option 1) and less conservative (option 2) means of establishing ABCs and OFLs for Tier 6 consideration.

The team agreed on the importance of using an appropriate time frame for estimating incidental catch levels. The years for which data establish incidental catch levels should not be representative of a time

period where targeting of the species occurred, or from a time period representative of a change in industry pattern which would also substantially change the incidental catch. It is further recommended that TAC be set below ABC to limit retention and allow for an experimental fishery in order to collect additional data. Additional discussion by the team of the modified Tier 6 approach is contained in the species-specific discussions below.

Octopus

Liz Conners presented an overview of the Octopus assessment. Biomass estimates from the trawl survey are not considered to be reliable, and there are no order-specific mortality rates. Octopus has been historically retained for bait but with a limited additional market. A small developing market started in 2004. Octopus bycatch is primarily in the Pacific cod pot fishery. Incidental catch estimates are available for the period from 1997-2006. While targeting octopus is unlikely to be occurring, it is being retained in greater quantities lately

The team discussed the recommended options for ABCs and OFLs for octopus and the implicatiuons of chosing one option over another. If octopus were managed according to average catch as an OFL (using straight Tier 6 criteria) as opposed to an OFL above the maximum catch (option 2) there is a high likelihood that octopus would not only reach PSC status quickly but that there is a potential of shutting down many other fisheries. Recent biomass trends in the GOA do not indicate current conservation concerns. Liz noted that there is an observer special project underway to obtain weights of octopus. This helps to distinguish large species of octopus from smaller species. She noted that resolving to species level of smaller species is a problem. The majority of commercial catch thus far is giant octopus. Julie Bonney suggested soliciting information for the assessment analysis from the AFDF project on a directed octopus fishery (ie funding from a grant to look at viability of directed fishery). She noted that a directed fishery is probably not an economically viable option, as vessels would need to run lots of pots and current fishing practices are not sufficient to do this. Nick Sagalkin noted that in State waters fishing is allowed by Commissioners' permit using modified pots. In the Southeast directed fishing for octopus is specifically prohibited but this is not a statewide regulation. Tom Pearson further noted that any interest in octopus fishing has been more concentrated in State waters than Federal waters.

Liz presented alternative methods for establishing ABCs and OFLs for octopus based on Tier 5 approach and three mechanisms for Tier 6 approaches. M is estimated at 53% from age at reproduction tables. Nick Sagalkin questioned the possibility of unreported harvest estimates for bait fish. Theoretically everything that is caught is reported and incidental catch estimates include both retained and discarded. There may be additional unreported catch in the halibut fleet. Tom Pearson commented that catch rates may likely be higher than reported. Sarah Gaichas commented that any fishery for octopus should be managed at a different spatial scale (e.g., possibly State waters) than most Federal fisheries. Liz noted that there is limited information regarding the biomass distribution in State and Federal waters. An experimental fishery would provide additional information for this species. Tory O'Connell noted that while there is likely a large population in State waters, they are also widely distributed at different depths. They are also sometimes caught on longline gear.

The team approved of the Tier 6 estimated approaches put forward by the assessment author. The team supports the list of criteria put forward by the assessment author. The author also requested that TAC be set below ABC for these fisheries in order to allow for an EFP to collect necessary biological information. The other assessment authors for the other species assessments approved of this approach for additional species as well e.g sharks and squid. Sculpins may not be applicable as Tier 5 might be the prescribed approach for this species given reliable biomass estimates for this species. The team recommends that the maximum incidental catch be established as the ABC with a buffer built in to establish OFL above ABC. The team notes that catch of octopus should be closely monitored for patterns in increased incidental catch and to what extent this catch is utilized. The team supports the recommendation to set TAC below ABC to allow for the collection of additional biological data. As fishing patterns change, the applicable

years for evaluating trends in incidental catch would likewise be monitored. The team discussed the appropriateness of allowing the OFL/ABC to fluctuate annually and how this may not be appropriate. Concerns were expressed regarding rapid changes in incidental catch as for squid in the GOA in 2006. Tom Pearson noted that from a management perspective there is also the option available to close areas spatially rather than closing a fishery. Spatial closures even on a smaller scale (eg Shelikof) could have massive economic impacts on the fleet in the GOA given the limited areas available for fishing. The team discussed the importance of consideration to not unnecessarily constrain fisheries. Squid biomass is notably particularly fluctuating. For octopus, similar biomass estimation problems exist whereby last year's estimate is not a good prediction of next year's catch. The teams discussed the possibility of not setting quotas and instead managing effort. The team noted that the analysis should also pursue non-quota setting options. Establishment of some form of cap however is still necessary under current management practices in order to constrain effort. The team felt that it would be constructive to explore options outside of quota-setting.

The team discussed the issues with the aggregate OFLs and ABCs and proactive management of these species under the proposed amendment. Options available under the amendment analysis include both establishing species-specific OFLS and ABCs as well as aggregate other species OFLs and ABCs similar to management in the BSAI. The team encouraged the flexible application of a new Tier 6 methodology such that it would be annually reviewed. The time period over which the Tier 6 incidental catch averages are considered should be applicable to the appropriate time period where no directed fishing was occurring. This window of time could continue into the present (for recent estimates) provided no directed fishing was occurring or could be fixed in time if recent catch begins to approach a level that is not consistent with incidental catch. Liz noted that in Canada and Japan management of octopus is solely effort based. The team recommends that considerations be given to these alternative programs to evaluate to what extent these could be applicable in the GOA to enhance a quota-only setting program for management. The team still feels that additional management measures are necessary in conjunction with the Tier 6 approach such that in instances where biomass increases abruptly from one year to the next it is possible to include this in the ABC and OFL setting. Sarah suggested that the buffer between ABC and OFL could be established in a different manner (e.g. a larger buffer) for years where biomass increases would inappropriately constrain fisheries. Some form of variance calculation should be included to account for this variability in the OFL. ABC could be established as the average or maximum incidental catch with the OFL buffer variable depending on some estimate of increased or decreased biomass variability. The ecosystem model notably provides some indication of the minimal estimate of production and consumption and might provide some additional information to suggest appropriate buffer levels.

Sculpins

Rebecca Reuter presented the overview of the GOA sculpins assessment. There are 15-20 species consistently observed in the GOA survey and likely less in the actual catch. This is likely related to abundance and catchability. The larger sculpins dominate the catch over the smaller species. Over 40 species have been identified. Limited life history information is available for GOA sculpins, with the majority of the available life history information from Russian and Japanese stocks. The data for GOA species is extremely limited, and no otoliths have been collected for any GOA species. The prioritization for research information is on the main sculpin species. Nick Sagalkin offered to coordinate with the ADF&G trawl survey to collect otoliths for sculpin species. The biomass distribution of sculpins show some hot spots in the western GOA. The survey biomass estimates do not account for the depth distribution in the GOA by survey year. No depletion concerns by individual species were detected in abundance estimates. The species composition does change by depth. Data from the Bering Sea slope survey indicates the diversity of species by depth distribution and change in species composition by depth. The catch of sculpins by year appears consistent. There was an increase in the percent contribution to the composition of the other species catch in the year following skates being removed from the other species complex. Interannual variability in the overall amount of sculpin catch is likely

due to a combination of population fluctuations and catch estimation/sampling issues. Sculpin species are not specifically patchily distributed but tend to be more widespread. Most of the bycatch of larger sculpin species occurs in the flatfish trawl and p cod pot fisheries. Smaller sculpin species are most often caught in the rockfish fisheries. Stomach analyses from GOA sculpins is notably limited.

The natural mortality estimate used is the most conservative of the known sculpin species. ABC and OFL recommendations are based on a Tier 5 approach given that biomass estimates are considered reliable for these species. A three year average biomass estimate is utilized to capture recent biomass trends. The team noted that the lack of survey in the EGOA in 2003 should be appropriately accounted for in order to accurately estimate the survey biomass for sculpins. This should be consistent with the treatment of rockfish species. This should be noted in the forthcoming analysis for breaking out these species and the appropriate biomass estimate should be recalculated accordingly. The team discussed the potential for a directed sculpin fishery. While there has been some limited interest in developing markets no specific interest has been noted. The team approved of the Tier 5 approach for sculpins.

Grenadiers

The team reviewed changes made to the grenadier assessment in conjunction with comments from the Joint teams at the September meeting. The team agreed with the authors recommendation for Tier 5 values for grenadiers using the proxy natural mortality rate of M = 0.057. The team notes that catch is much less than ABC thus the recommended ABCs and OFLs are unlikely to constrain current fisheries.

Squid

Todd Tenbrink provided an overview of the executive summary squid assessment. Trawl survey biomass estimates are likely represent an extreme underestimate of the biomass for this species. The biomass estimate is not considered reliable thus the Tier 5 approach is considered inapplicable for this species. Squid catch in 2006 increased from 626mt in 2005 to 1526 mt in 2006. This was notably due to incidental catch increase in Shelikof in the Pollock fishery. The team discussed the Tier 5 and Tier 6 approaches for this species. The option 2 method that was suggested for octopus with the maximum incidental catch as an ABC with a larger buffer for OFL would be appropriate for squid. Sarah noted the consumption-based estimate for the ecosystem model would estimate approximately 200,000 tons for squid. Under this scenario the ABC would be set as the maximum incidental catch from 2006 with an OFL established incorporating an appropriate buffer above this. The team approved of this approach for this species.

Tom Pearson commented that squid surveys only catch a small fraction of the total catch of squid. Sarah noted that suggestions have been put forward for extremely small Q values. Tory noted that studies have been completed on estimating catchability for squid. The biomass estimates included in the executive summary are the raw survey biomass estimates. The survey biomass estimates represent minimum biomass estimates. There are better means to survey squid and acoustic measures are being pursued in the Bering Sea. A directed squid fishery would provide additional information on the distribution of this species. The predictability of squid biomass is notably problematic for encouraging any type of directed fishery and it was suggested that quota-management may not be feasible.

Overall Other species catch needs:

The team discussed the need to meet incidental catch needs in all groundfish fisheries. The team recommended 4000 tons to meet incidental catch needs in all fisheries for 2006. The team noted that an additional 500mt were added by the Council in response to public testimony in order to allow for a limited directed fishery potential for sharks. Total catch for the other species complex in 2006 as of November 4, 2006 was 3,601 mt. The team notes that we are unlikely to have an in-season estimate of bycatch in the halibut fishery. An approximate buffer to account for bycatch in the halibut fishery should be added. The largest increase in catch in the GOA was squid and incidental catch of spiny dogfish. The team recommends continuing with a recommendation of 4000mt as appropriate to meet incidental catch

needs. The team feels that this is adequately responsive to unforeseen increases in incidental catch of species such as squid and dogfish as occurred in 2006.

Sharks:

Ken Goldman presented a powerpoint presentation of demographic modeling of shark species. He noted the difficult in establishing life history characteristics for shark species. This information was included as an appendix to the Shark assessment. If a fishery were to begin on salmon sharks it would be for ages 5 and up. No salmon sharks have been aged that are less then 5 years old. Results for the eastern North Pacific (defined as east of 180 i.e., GOA) suggest that no directed fishing should occur in this area. Sarah noted that given the range of natural mortality rates presented, and a Tier 5 approach, this would result in higher F rates then are suggested by the author for a sustainable population. Thus tier 5 should not be applied. Biomass estimates from the trawl survey have very high variance and may not be reliable enough for a Tier 5 approach. It was noted that studies in the Bering Sea also indicated that temperature also played an important role in sleeper shark distribution.

Dean Courtney presented an overview of the GOA Sharks assessment with alternative Tier 6 alternatives presented. Population trends for shark species appear to be stable or increasing. Catch in 2006 however would exceed the Tier 6 average catch approach. For next year the authors anticipate using a Tier 5 approach for spiny dogfish and re-evaluating the alternative Tier 6 criteria for the remainder of the complex. The alternative (option 1) Tier 6 approach would result in an ABC of 1793 with an OFL of 2390. Under traditional Tier 6 management historical catches would have been constrained. Under Tier 5 management catch would not be constrained but this method includes unreliable biomass and natural mortality estimates. The alternative Tier 6 OFL would provide a margin of error such that fisheries would not be constrained.

This alternative Tier 6 approach appears appropriate for long-lived species as opposed to the alternative (option 2) approach proposed for octopus which would allow for a larger buffer to reach OFL. The team discussed to what extent the maximum catch is an appropriate level of removal to avoid impacting the reproductive capacity of this species. The team felt that there was appropriate justification for additional conservatism in the ABC and OFL estimation based on life history characteristics for sharks.

Halibut bycatch estimates of sleeper sharks applying the survey bycatch rates to the fishery catch would indicate a bycatch of sleeper sharks which would exceed the calculated OFL. The team noted continual problems with the estimation of bycatch in the halibut fishery. Tory noted that for DSR they look at the survey bycatch and then apply it only to the distribution of the commercial fishery whereas the numbers for sharks were applied to the entire halibut fishery. These numbers do indicate that there could be substantial catches of sharks in the Pacific halibut fishery. Any potential directed fishery for sharks should be very small given the uncertainty in the potentially large amount of removals in the halibut fishery. The team noted that it is likely that mortality of dogfish incidentally-caught is likely to be extremely high.

The team debated to what extent the maximum catch is appropriate as an index. The team does not wish to codify a system where maximum catch is always appropriate as an index for OFL and ABCs for other species. There is some comfort conveyed by the fact that the alternative Tier 6 approach is substantially lower then the tier 5 approach and slightly higher than a traditional Tier 6 approach using just average catch. There are a lot of uncertainties which might lead to choosing the most conservative specification. The team discussed the necessity of choosing appropriate time periods which are not only representative of catch but also with an appropriate buffer time period such that the population effect of these removals has been demonstrated. This is particularly important for longer lived species.

The team notes that the increase in incidental catch in 2006 was predominantly spiny dogfish. This shows an indication of an interest in developing a fishery. Julie Bonney noted that anecdotally from fisherman, dogfish bycatch is widespread and there might be a distributional change in the species. Sarah

noted that if spiny dogfish were split out as a separate target species from other shark species this would result in a very small ABC and OFL for the remaining sharks in the complex using the modified tier 6 approach presented here.

The team recommends the alternative Tier 6 approach for OFL and ABCs at this time (for analytical purposes) but notes that they have reservations with codifying this system at this time given the rationale explained above. This approach might be modified in the future but the team agrees upon the approach currently for the analysis.

Given uncertainty and possible biases in halibut bycatch estimation there should be some consideration given in the assessment to the potential for a conservation concern on this species. This is true for all species with similar concerns regarding the estimation of bycatch in the directed halibut fishery.

Pacific cod

(see Joint Plan Team minutes for additional assessment discussion)

Grant Thompson presented the GOA Pacific cod assessment.

Updated information includes catch data for 2005 and 2006, new age data from the survey, new length data from the fishery. Length-at-age and weight-at-length parameters were re-estimated.

One model configuration was presented. This is the same model chosen by the plan team last year. The major change in the model from last year is that the length at age is estimated outside of the model. No additional alternative approaches were investigated this year.

Recruitment variability in the GOA is lower than in last year's assessment. The biomass decline projected from last year is still present but less severe. Projected spawning biomass is estimated to decline for the next couple years based on several years of below average recruitment.

Projected maximum permissible ABC: Last year a new maturity schedule resulted in a large increase in ABC in the midst of projected stock declines. The plan team recommended the ABC from the model last year with a strong TAC recommendation to establish TAC at a level that would stabilize catches. The SSC disagreed with the team and instead employed a stair-step procedure for the 2006 ABC. The maximum permissible ABC from the model in this assessment under Tier 3a is up 18% from the 2006 ABC but is then projected to decline in 2008.

The author presented a number of reasons for choosing to go below maximum ABC:

- maxABC would result in a large increase in ABC while spawning biomass is projected to decline. Last year the new maturity schedule led to a higher F40.
- SSC advised against a large increase last year.
- The increase would likely be short-lived (1 yr).
- 2006 fishery seems unlikely to take the current ABC.
- Alternative GOA model structures should be evaluated further as has been done for the EBS model.

The author recommended a 2007 ABC of 68,859 (equal to last year's SSC value). The maximum permissible value is 81,200 t which, if caught, would give a 2008 maximum permissible ABC of 68,300 t. If ABC is set at the maximum permissible level in 2007, the OFLs would be 97,600 and 82,300 in 2007 and 2008, respectively.

Tom Pearson noted that the 2006 fishery was constrained by the halibut caps and this kept the fleet from catching the full TAC. Julie Bonney noted that SSL measures are also factoring into the fleet's ability to maximize catch again this year.

The team noted that the maturity schedule last year exhibited a large impact on the assessment results. There were questions raised last year (see GOAPT minutes from 2005) regarding the geographic extent of

the study leading to the new maturity schedule. The AFSC has embarked on a three-year study of Pacific cod maturity. Results will be reported as soon as they become available.

The assessment author noted that the State jig component represents a fairly significant contribution to overall landings and this component might be evaluated further in the model with a separate selectivity.

The team agrees with the author's recommendation that essentially carries forward the SSC's ABC from last year. The team feels that additional analyses of model inputs and the relative impact of various new data on model results should be further evaluated as well as variations in model configurations as per the EBS model configurations and examinations this year.

The team feels strongly that the assessment author should be given appropriate and unimpeded time to devote to stock assessment between the time when new data become available (typically, early September) and the December Council meeting. To this end, the Team supports the recommendations made during the joint plan team meeting that external stock assessment reviews should occur prior to the survey-assessment cycle (e.g., between January and June). The team feels that external reviews can be beneficial but should conducted in a timely manner.

The team adjourned their meeting on Friday, November 17th at 5pm.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Alaska Fisheries Science Center
REFM Division
7600 Sand Point Way N.E.
Seattle, Washington 98115-6349

November 27, 2006

Dr. Clarence Pautzke
North Pacific Research Board
1007 W. 3rd Avenue, Suite 100
Anchorage, Alaska 99501

Dear Dr. Pautzke,

I am writing this letter in support of the proposed NPRB research project entitled "Bycatch characterization in the Pacific halibut fishery using electronic video monitoring" by Leaman, Cahalan, and Karp. The proposed research would ultimately benefit both stock assessment and ecosystem modeling efforts in the Gulf of Alaska (GOA) FMP area for the North Pacific Fishery Management Council (NPFMC). It would also lay the groundwork to address a data gap which has been identified by the NPFMC GOA Groundfish Plan Teams each year since 2003.

Estimation of incidental catch of groundfish species in the directed Pacific halibut fishery is increasingly important to stock assessments. Using information derived from IPHC longline surveys and halibut catch data, the skate and shark stock assessments for the GOA (Gaichas et al 2005 and Courtney et al 2006, available at http://www.afsc.noaa.gov/refm/docs/2005/GOAskates.pdf and ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/Nov/GOAsharks.pdf) currently estimate that bycatch of skates and sharks in the directed halibut fishery may exceed that observed in all directed groundfish fisheries combined. Similarly, the GOA demersal shelf rockfish assessment (O'Connell and Carlisle 2006, ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/Nov/GOAdsr.pdf) estimated that two thirds to half the allowable biological catch for that complex would be taken in the directed halibut fishery. There are legitimate concerns that the IPHC longline survey catch of skate, shark, and rockfish species is not representative of the halibut fishery catch of those species; these concerns can be only partially addressed by re-stratifying survey data for estimation (e.g., O'Connell and Carlisle 2006).

Because there is no direct information on the incidental catch of other species in halibut fisheries, it is also difficult to evaluate the potential effects of this fishery in the ecosystem context. Ecosystem models constructed for the GOA face the same estimation problems as the stock assessments in attempting to represent the directed halibut fishery using IPHC longline survey information. Direct observation of halibut fishery incidental catch and discard is necessary to determine the actual effects of this fishery on skates, sharks, rockfish, and the ecosystem as a whole. The proposed research is a critical first step in implementing innovative technology that might eventually supply the information required to fully assess halibut fishery interactions with nontarget species and the ecosystem.

I appreciate the continued work of NPRB in supporting important research on the fisheries and ecosystems of the North Pacific, and look forward to more improvements in the information available for assessments of groundfish and the broader ecosystem. Thank you for your consideration.

Sincerely,

Sarah Gaichas, Ph.D.
Research Fishery Biologist
NPFMC GOA Groundfish Plan Team

Table 1. Gulf of Alaska groundfish Plan Team recommended 2007 - 2008 OFLs and ABCs, and 2006 OFLs, ABCs and TACs (catch reported through November 4, 2006)

		2006				2007		2008	
Stock/Assemblage	Area	OFL	ABC	TAC	Catch	OFL	ABC	OFL	ABC
Pollock	W (61)		29,187	29,187	24,985		25,012		30,308
	C (62)		30,775	30,775	27,155		20,890		25,313
	C (63)		18,619	18,619	17,034		14,850		17,995
	WYAK		1,809	1,809	1,572		1,398		1,694
	Subtotal	110,100	80,390	80,390	72,396	87,220	62,150	105,490	75,310
	EYAK/SEO	8,209	6,157	6,157	0	8,209	6,157	8,209	6,157
	Total	118,309	86,547	86,547	72,396	95,429	68,307	113,699	81,467
Pacific Cod	W		26,855	20,141	14,247		26,855		27,846
	C		37,873	28,405	21,091		37,873		39,270
	E		4,131	3,718	21		4,131		4,284
	Total	97,600	68,859	52,264	35,359	97,600	68,859	86,000	71,400
Sablefish	W		2,670	2,670	2,074		2,470		2,458
	C		6,370	6,370	5,467		6,190		6,159
	WYAK		2,280	2,280	1,651		2,280		2,269
	SEO		3,520	3,520	3,092		3,370		3,353
	Total	17,880	14,840	14,840	12,284	16,906	14,310	15,803	14,238
Deep-water flatfish[1]	W		420	420	8		420		430
	C		4,139	4,139	364		4,163		4,296
	WYAK		2,661	2,661	12		2,677		2,763
	EYAK/SEO		1,445	1,445	10		1,447		1,494
	Total	11,008	8,665	8,665	394	10,431	8,707	11,412	8,983
Rex sole	W		1,159	1,159	352		1,147		1,122
	C		5,506	5,506	2,937		5,446		5,327
	WYAK		1,049	1,049	0		1,037		1014
	EYAK/SEO		1,486	1,486	0		1,470		1,437
	Total	12,000	9,200	9,200	3,289	11,900	9,100	11,600	8,900
Shallow-water flatfish[2]	W		24,720	4,500	237		24,720		24,720
	C		24,258	13,000	7,369		24,258		24,258
	WYAK		628	628	0		628		628
	EYAK/SEO		1,844	1,844	1		1,844		1,844
	Total	62,418	51,450	19,972	7,607	62,418	51,450	62,418	51,450
Flathead sole	W		10,548	2,000	462		10,908		11,464
	C		25,195	5,000	2,650		26,054		27,382
	WYAK		2,022	2,022	1		2,091		2,198
	EYAK/SEO		55	55	0		57		60
	Total	47,003	37,820	9,077	3,113	48,658	39,110	51,146	41,104
Arrowtooth flounder	W		20,154	8,000	2,011		20,852		21,164
	C		134,906	25,000	25,400		139,582		141,673
	WYAK		15,954	2,500	25		16,507		16,754
	EYAK/SEO		6,830	2,500	65		7,067		7,172
	Total	207,678	177,844	38,000	27,501	214,828	184,008	218,020	186,763

Table 1 continued.

Stock/Assemblage	Area	2006 OFL	2006 ABC	2006 TAC	2006 Catch	2007 OFL	2007 ABC	2008 OFL	2008 ABC
Other slope[3]	W		577	577	237		577		577
	C		386	386	509		386		386
	WYAK		317	317	96		319		319
	EYAK/SEO		2,872	200	16		2,872		2,872
	Total	5,394	4,152	1,480	858	5,394	4,154	5,394	4,154
Northern rockfish[3]	W		1,483	1,483	970		1,439		1,383
	C		3,608	3,608	4,034		3,499		3,364
	E		0	0	0		0		0
	Total	7,673	5,091	5,091	5,004	5,890	4,938	5,660	4,747
Pacific ocean perch	W	4,931	4,155	4,155	4,199	4,976	4,244	5,030	4,291
	C	8,806	7,418	7,418	8,288	8,922	7,612	9,019	7,694
	WYAK		1,101	1,101	1,258		1,140		1,153
	SEO		1,587	1,587	0	3260	1,640	3296	1,659
	E(subtotal)	3,190	2,688	2,688	1,258	3260	2,780	3296	2,812
	Total	16,927	14,261	14,261	13,745	17,158	14,636	17,345	14,797
Shortraker	W		153	153	89		153		153
	C		353	353	291		353		353
	E		337	337	248		337		337
	Total	1,124	843	843	628	1,124	843	1,124	843
Rougheye	W		136	136	57		136		137
	C		608	608	129		611		614
	E		239	239	145		241		242
	Total	1,180	983	983	331	1,148	988	1,197	993
Pelagic shelf rockfish	W		1,438	1,438	554		1,466		1,752
	C		3,262	3,262	1,770		3,325		3,973
	WYAK		301	301	173		307		366
	EYAK/SEO		435	435	1		444		531
	Total	6,662	5,436	5,436	2,498	6,458	5,542	8,186	6,622
Demersal rockfish	SEO	650	410	410	141	650	410	650	410
Thornyhead rockfish	W		513	513	195		513		513
	C		989	989	385		989		989
	E		707	707	169		707		707
	Total	2,945	2,209	2,209	749	2,945	2,209	2,945	2,209
Atka mackerel	Total	6,200	4,700	1,500	875	6,200	4,700	6,200	4,700
Big skate	W		695	695	66		695		695
	C		2,250	2,250	1,146		2,250		2,250
	E		599	599	251		599		599
	Total	4,726	3,544	3,544	1,463	4,726	3,544	4,726	3,544
Longnose skate	W		65	65	34		65		65
	C		1,969	1,969	673		1,969		1,969
	E		861	861	139		861		861
	Total	3,860	2,895	2,895	846	3,860	2,895	3,860	2,895
Other skates	Total	2,156	1,617	1,617	930	2,156	1,617	2,156	1,617
Other Species	Total	NA	NA	13,942	3,601	NA	NA	NA	NA
Total		633,393	501,366	292,776	193,612	615,879	490,327	629,541	511,836

[1] "Deep water flatfish" includes Dover sole, Greenland turbot and deepsea sole.

[2] "Shallow water flatfish" includes rock sole, yellowfin sole, butter sole, starry flounder, English sole, Alaska plaice, and sand sole.

[3] The EGOA ABC of 2 mt for northern rockfish has been included in the WYAK ABC for other slope rockfish.