

# North Pacific Fishery Management Council

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Date: 1/26/01

## MINUTES Scientific Statistical Committee December 4-7, 2000

The Scientific Statistical Committee met December 4-7, 2000 at the Hilton Hotel in Anchorage, Alaska. All members were present except Seth Macinko:

Richard Marasco, Chair  
Keith Criddle  
Jeff Hartman  
Doug Larson

Jack Tagart, Vice Chair  
Doug Eggers  
Sue Hills  
Terry Quinn

Steve Berkeley  
Steve Hare  
Dan Kimura  
Al Tyler

### C-4 HALIBUT CHARTER IFQ PROGRAM

Jane DiCosimo and Chuck Hamel introduced the issues under this agenda item. The SSC then received staff presentations on ADF&G sport fishing data collection procedures from Allen Bingham and Scott Meyer, and on the proposed community set-aside program from Nicole Kimball and Maria Tsu. There was no public testimony.

#### *ADF&G Sport Fishing Data Collection Procedures*

Council Staff member Jane DiCosimo provided an overview of the procedure for updating the halibut charter GHL based upon a new estimate of Statewide Harvest Survey (SWHS) catch, harvest, and effort. ADF&G Sportfish Division Chief Biometrician, Allen Bingham detailed the revisions and corrections made to initial SWHS estimates that were used in the Halibut Charter GHL EA/RIR. The presentation described (1) the approach taken to correct errors in the non-response bias correction algorithm, (2) changes in the data and corrections in coding errors, and (3) revisions of criteria for rejecting catch outliers.

The SSC concluded that the revisions, methods and corrections represent a reasonable approach for improving the SWHS estimates. Although errors exist in the 1993 to 1997, estimates it was not possible to apply the revisions to the 1993 through 1995 data because the original datasets for expanding the samples from these years can no longer be reproduced. The SSC suggests that some additional effort be made to develop appropriate revisions for the 1998 data because these observations were included in the determination of sport-commercial splits for the halibut charter GHL analysis.

Four Sportfish Division publications on sport halibut fishery statistics and current operational plans for creel census data collection in areas 2C and 3A, were presented to the SSC for review. Though it was not possible to conduct an in-depth review of these programs, the methodologies used appear sound and well-implemented.

### *Community Set-Aside Program*

Much of the SSC discussion was about the intent of this program, and its likely prospects for success. *It is critical that a clear problem statement be adopted to help guide the staff analysis of this issue.* In addition, to the extent that particulars of the program (such as what percentage should be set aside, where it comes from, and qualification criteria for individuals, firms or other entities that would use the community IFQs) can be specified, it will be easier to evaluate its likely effects.

Charter fisheries have not developed in some Alaskan communities to date, apparently because of barriers relating to raising capital, obtaining boats and equipment, and securing clients. It is not clear why the granting of IFQ shares, alone, will help this occur. Since these other barriers to development will continue to exist after the community set asides are in place, they could well continue to prevent the desired charter fishery development.

Some other key features of the program that need further resolution are: mechanisms to ensure allocations are fully utilized (through rollbacks, leasing, or phase-ins); and whether ownership or just use rights are granted. These, in particular, will influence the magnitude and distribution of benefits from the program. One possibility that may preserve the Council's flexibility for design of a community set-aside while proceeding with the charter IFQ program is to reserve an initial allocation for communities that can be distributed at a later time.

It is also unclear what role is played by communities *per se* in the proposal. If allocations of IFQ were made to individuals in the communities, and those individuals were able to develop charter businesses, would this also satisfy the objectives of the Council? The SSC was unable to resolve this issue. But if so, it may suggest other ways to achieve the Council's goals than by allocations to communities.

In developing rationales for the program, it is essential to keep in mind that development of new charter businesses in the subject communities have not been precluded by current regulations. Thus, for example, increasing the geographic diversity of the charter experience is not a strong rationale for the community set-aside program because there is nothing preventing charter owners today from increasing that diversity if market conditions warrant. The fact that this may not have yet occurred suggests that forcing it to occur will come at some cost.

### **C-5 STELLER SEA LION BIOP**

The SSC received a staff presentation on the Biological Opinion released last Friday from Sue Salveson, Doug DeMaster, and Mike Payne. Public testimony was provided by John Gauvin, Chris Blackburn, Donna Parker, Ed Richardson, Fred Christianson, Charles Bares, Dave Fraser, Thorne Smith, Jay Stinson, John Burns, Vidar Weststad, Bob Storrs, Bob Ness, and Steve Hughes.

This BiOp finds that the NPFMC groundfish fisheries for pollock, cod, and Atka mackerel jeopardize the recovery of Steller sea lions by adversely modifying their habitat. It appears that NMFS will implement the RPAs to commence the groundfish fisheries for the year 2001. The Council will then be asked to amend its FMPs in a process that is expected to result in final action by June 2001.

The SSC could not provide a scientific review of the 600 page document in the available time. It appears that at least some concerns expressed by the SSC in the past have been addressed in this Biological Opinion. The SSC is willing to provide a thorough review by the February 2001 meeting, should the Council so desire.

The SSC remains concerned with the lack of scientific evidence to provide a clear link between the groundfish fisheries and the Steller sea lion population. Scientists are trained to first consider the probability of Type I error: incorrectly concluding an effect exists when in fact it does not. In the Steller sea lion (SSL) situation, a Type I error would occur if one concluded that fisheries affect SSL's when in fact they do not. In contrast, typical applications of the Endangered Species Act focus more on the probability of Type II error: concluding that no effect exists when in fact there really is one. In the Steller sea lion (SSL) situation, a Type II error would occur if one concluded that fisheries did not affect SSL's when in fact they really do.

Consideration of Type II error shifts the burden of proof so that an effect is not ruled out unless available scientific information refutes that the effect is present. This can be problematic, both scientifically and operationally, because the range of possible effects is practically infinite. In the Steller sea lion situation, focus on Type I error would lead toward a finding of no jeopardy and no need for RPA's because scientific information supporting a fisheries impact is not very strong. Whereas, focus on Type II error encourages a jeopardy finding because there are many ways that fisheries could affect SSL's and we cannot at this time prove that fisheries do not constrain Steller sea lion recovery. The current Biological Opinion appears to rely on a Type II error rationale, in which the focus is on potential interactions rather than proven interactions.

In general, the SSC notes that the federally managed commercial fishery may overlap with Steller sea lions but the extent of any competitive interaction is unresolved. Because the existence and strength of the interaction is unresolved, the effect of the proposed RPAs is also unknown. Limitations on fisheries may increase local short-term availability of prey for Steller sea lions but may not result in recovery of the Steller sea lion population. As the SSC has said many times in the past "There is no guarantee that implementation of the RPAs will result in recovery of the Steller sea lion population because we do not know the cause of the decline or what presently prevents recovery." The RPAs address changes in the fisheries, not because fisheries have been shown certainly to be the culprit, but because this Section 7 consultation is about fisheries. Thus, the SSC continues to call for analyses of the relative importance of commercial fisheries among all the factors that may be contributing to the lack of recovery.

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

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

The SSC strongly believes that NMFS should not alter the definition of ABCs contained in the FMPs, as it has proposed in its modified control rule. The Council ABCs are based on solid scientific information and theory and provide a scientifically defensible and credible baseline from which alternative strategies can be evaluated. Rather, the NMFS adjustment should be viewed as a TAC adjustment to account for uncertainty about Steller

sea lions and social concerns about the ecosystem. If and when a solid scientific basis can be found for adjusting catch levels to provide ecosystem protections, then the adjustment can be made at the ABC level. We will comment more on the proposed control rule after we have a chance to review the BiOp. Additional SSC concerns of the effect of the RPAs on the fish stock assessments can be found in the SSC's SAFE comments.

Given the level of scrutiny that this document is likely to encounter, the authors should make every effort to carefully document data sources, simulations, and statistical tests used as a basis for the findings and conclusions. The specific test statistics should be reported along with information on the number of observations, degrees of freedom, and confidence bounds associated with these tests.

The BiOp includes very little information about potential losses to fishers or fishery dependent communities. While such analyses may not be required in the BiOp, they are required for RIR/IRFA analyses that must be prepared to support emergency actions and plan amendments. The development of these cost/impact estimates should be undertaken as soon as possible and can be expected to necessitate a substantial investment of staff time and associated resources.

#### **D-1 GENERAL SAFE CONCERNS**

1. The unprecedented demands on the analysts related to SEIS and SSL issues resulted in less time and attention being devoted to stock assessments this year. It is ironic that with the increased scrutiny of the Council's management of groundfish, that one of the main responsibilities of the Council, the TAC-setting process, is being compromised to some extent. It is imperative that analysts serving the Council process be allowed to devote sufficient time and energy to produce quality stock assessments.
2. Similarly, the consideration of new ABC and OFL definitions has been put on hold pending the freeing up of analysts' time. The SSC hopes that this issue can proceed in the year 2001 to assure that the Council's TAC-setting is based on solid conservation standards.
3. The issue of adjusting ABC based on uncertainties in data and information came up this year in the BSAI Atka mackerel assessment. While the SSC did not approve of the approach used, the SSC encourages further exploration of this issue. As the methodology evolves to constructing ADMB age-structured assessment models for most assessments, it is possible that formal definitions of risk to the population and to the fishery can be developed that conceivably would lead to greater downward adjustments when uncertainty is higher.
4. The SSC heard that the 2001 survey in the Gulf of Alaska may only be a partial survey excluding the eastern Gulf. For some stock assessments, this could create major problems in using the survey information in the assessment, because of incomplete sampling of the population. The SSC hopes that a complete survey can be conducted.

#### **D-1(a) BSAI GROUND FISH SPECIFICATION**

##### **POLLOCK**

##### *Bering Sea*

The new stock assessment shows a more optimistic state of the population than last year. Due to increases in this year's trawl and hydroacoustic surveys, results from the state-of-the art assessment model provide an estimate of total age 3+ abundance of 10.06 million mt in 2001, up from 7.70 million mt last year. This is due

to the increased presence of the strong 1996 year-class, as well as increases in the revised estimates of abundance of prior year-classes from the new information. The strength of the 1996 year-class is evidenced in the EIT surveys, the bottom trawl surveys, the fishery, and the stock assessment models. Consequently, the age structure of the population no longer appears dominated by a single year-class, total biomass is close to the largest observed since 1978, and spawning biomass is well above the  $B_{msy}$  level.

The SSC agrees with the Plan Team that Model 1 is the best model of the 9 presented, because it is similar to the one accepted last year, fits the data well, and has reasonable population productivity parameters. Consequently, the SSC believes the EBS pollock stock belongs in Tier 1a of the information tiers (in which a probability density function for MSY is available). The long-term MSY from this model is 1,839,000 mt, which occurs at an equilibrium female spawning biomass of 1,779,000 mt. Estimates of female spawning biomass are 3,197,000 mt in year 2000 and 2,761,000 mt in year 2001, which are 80% and 55% higher than the MSY spawning biomass level, respectively. The maximum permissible ABC using the 2001 yield from the harmonic mean  $F_{msy}$  value is 2,125,000 mt. **Given the excellent status of the population and the credible stock assessment, the SSC accepts the Model 1 harvest levels: ABC 1,842,000 mt (from the  $F_{40\%}$  strategy) and OFL 3,536,000 mt (from the 2001  $F_{msy}$  yield).** [The analyst and Plan Team incorrectly used  $F_{35\%}$  for OFL, rather than the prescribed  $F_{msy}$ ]. Uncertainty associated with the spawner-recruit relationship was the reason for using  $F_{40}$  in developing the SSC's ABC recommendation.

While the status of the EBS population appears to be excellent, the following information may be useful to the AP and Council in determining the appropriate TAC.

1. The estimated biomass of the population has uncertainty, as shown in Figure 1.26.
2. The three most recent recruitment estimates (year-classes 1997 to 1999) appear to be lower than average (Figure 1.28), although few observations of these year-classes have been made.
3. Estimates of productivity parameters such as MSY vary greatly depending on the model used and the length of the recruitment series (Table 1.13). The assessment from Model 1 is based on estimates from 1978 on, whereas the entire series starts at 1963. Model 5 uses the longer series but results in productivity estimates that are not credible. Our minutes from December 1999 describe this problem in detail.
4. The estimated selectivity/availability curve shown in Figure 1.19 is quite steep, peaking and flattening at age 7 and above. Under the recommended ABC, the exploitation fraction at these ages is approximately 0.45, a fairly high fraction of the population. This level of exploitation is sustainable, as shown in the projection under Scenario 1 in Table 1.17, because the exploitation on younger ages is so much lower (0 to 0.30). Consequently, the overall exploitation fraction is only 18% and the spawning exploitation fraction is 22%. Nevertheless, these fractions are higher than those in previous years (see Figure 1.27, for example).
5. The projection of the population under Scenario 1 suggests that the population will drop below  $B_{35\%}$  and then increase to  $B_{40\%}$ . Lower yields would result in population levels above  $B_{35\%}$  or  $B_{40\%}$  (Scenarios 3 and 4, for example).
6. Steller sea lion RPA measures may alter selectivity and harvesting patterns in unexpected ways. The assessment cannot account for these effects, until after they have been experienced.
7. The second half of the decade of the 1990's has shown clear oceanographic change in the Bering Sea, including strong cooling of the water mass at depth following one of the most intense El Nino's on record, a shift in primary production with coccolithophores instead of the more usual diatoms,

increased seabird mortality, reduction of year-class strength in several targeted groundfish species, and the development of heavy sea ice conditions. If these events persist in a regime shift toward a cooler period, there could be changes in pollock recruitment. Projections in the stock assessment document based on average recruitment during the warm period would then be inaccurate.

8. The largest yield taken over the period 1976 to 2000 was 1,455,000 mt in 1990 (Table 1.1); yields of the order of 1,800,000 mt occurred only twice in the history of harvesting pollock (in 1972 and 1973, see Table 1 in the Plan Team section).

For next year, the SSC requests that the analysts further explore the estimation of selectivity to determine if the high exploitation fraction at older ages is believable. These analyses could consist of an analysis with pooled ages and/or different blocking of selectivity years, alternative functional forms for the selectivity relationship, estimation of specification of higher natural mortality at older ages, and/or seasonal stratification of the harvest data (A season, B/C season).

### Bogoslof

The SSC agrees with the Plan Team that Bogoslof more appropriately belongs in Tier 5, and agrees that maximum possible ABC under Tier 5 is 45,200 mt (biomass of 301,000 mt  $\times$   $M$ ).

The SSC has a long history of recommending lower ABC based on consideration of the entire Aleutian Basin stock. While the names of the reference points have changed over time, the SSC has been remarkably consistent in reducing fishing mortality based on the ratio of the current biomass to a target biomass of about 2 million mt.

The SSC recommends that the same procedure be used to reduce ABC this year. This results in an ABC of 8,470 mt, based on an  $F$  of 0.0282, a corresponding exploitation rate of 0.021, and a current biomass of 301,000 mt.

### Aleutian Islands

The SSC concurs with the Plan Team recommendation for ABC = 23,800 mt based on Tier 5 harvest rate. OFL is 31,700 mt. This ABC is based on an estimated bottom trawl survey biomass of 106,000 mt, and a natural mortality rate  $M = 0.3$ . The recommended ABC is equal to the value used in 2000, but exceeds the recent catch for this year. In 1999 and 2000 pollock was regulated as bycatch only in the Aleutian Islands area. Historically, catch has been as great as 156,000 mt and for 20 years prior to 1999 averaged 48,354 mt.

### PACIFIC COD

$B_{40\%} = 389,00$  mt (projected)  
 $B_{\text{SPAWNING}} = 369,000$  mt (projected)  
 $B_{35\%} = 340,000$  mt (projected)

The SSC agrees with the Plan Team on its ABC estimate of 188,000 mt, down 5,000 mt from last year. The Pacific cod has been stable over the last years, with differences in stock estimates at the 'statistical noise' levels. Because the current stock size is estimated to be below  $B_{40\%}$  and because there has been a long-term decline in the population (since 1988), the SSC agrees with the 12% reduction added to the usual  $F_{40\%}$  catch level by the Plan Team as a pre-cautionary measure. The decline is due to a series of lower than average year-classes. The SSC recommends that a stock recruitment relationship be included in the next assessment and that the age composition of the adult spawning stock be assessed relative to recruitment levels, because other cod

stocks (in the Atlantic) have shown that the occurrence of strong year classes is dependent on the presence of a broad age distribution in the spawning stock.

### YELLOWFIN SOLE

The SSC supports the Plan Team's recommendation for ABC (176,000 mt;  $F_{40\%} = 0.11$ , Tier 3a) and OFL (209,000 mt,  $F_{35\%} = 0.13$ ). The present assessment is a straightforward update of last years assessment. The spawning biomass (742,000 mt) is above  $B_{40\%}$  (502,000 mt). The biomass of this stock is declining despite low exploitation rates, due to low recruitment in the last decade.

### GREENLAND TURBOT

The SSC supports the Plan Team's recommendation for ABC (8,4000 mt;  $F_{ABC} = 0.065$ , 25% of  $F_{40\%}$ , Tier 3, and OFL (31,000 mt,  $F_{35\%} = .32$ ). No new assessment was conducted for this stock. The specifications were based on projections of spawning biomass for 2001 from the stock assessment model from last year's assessment incorporating new catch and survey information. The projected spawning biomass (136,000 mt) is above  $B_{40\%}$  (81,200 mt). The biomass of this stock continues at a low level.

### ARROWTOOTH FLOUNDER

The SSC supports the Plan Team's recommendation for ABC (117,000 mt;  $F_{40\%} = 0.23$ , Tier 3a and OFL (141,500 mt,  $F_{35\%} = 0.28$ ). The present assessment is a straightforward update of last years assessment. The spawning biomass (458,000 mt) is above  $B_{40\%}$  (183,000 mt). The biomass of this stock is declining despite low exploitation rates, due to low recruitment in the last decade.

### ROCK SOLE

The SSC supports the Plan Team's recommendation for ABC (228,000 mt;  $F_{40\%} = 0.16$ , Tier 3a and OFL (271,000 mt,  $F_{35\%} = 0.19$ ). The present assessment is a straightforward update of last years assessment. The spawning biomass (676,000 mt) is above  $B_{40\%}$  (285,000 mt). The biomass of this stock is declining despite low exploitation rates, due to low recruitment in the last decade.

The SSC noted that biomass projection under  $F_{\max ABC}$  scenario fell below  $B_{35\%}$  which suggests a computational error. Public testimony by John Gauvin (Groundfish Forum) noted unusual abundance of juvenile rock sole in the winter yellowfin sole fishery.

### FLATHEAD SOLE

The SSC supports the Plan Team's recommendation for ABC (84,000 mt;  $F_{40\%} = 0.30$ , Tier 3a and OFL (102,000 mt,  $F_{35\%} = 0.38$ ). The present assessment is significant change from last years assessment, including use of AD Model Builder as a modeling platform that incorporated a simpler selectivity function. The projected spawning biomass (268,000 mt) is above  $B_{40\%}$  (134,000 mt).

The SSC notes that the new model is length based with the assumption that length at age is constant over time. This species is known to show variable length at age. The SSC agrees with the Team's recommendation that age data be collected every three years to validate the constant length at age assumption.

Public testimony by John Gauvin (Groundfish Forum) noted decreasing size of fish in the July fishery for this species.

OTHER FLATFISH COMPLEX

The SSC supports the Plan Team’s recommendation for ABC (122,000 mt;  $F_{40\%} = 0.29$ , Tier 3a and OFL (147,000 mt,  $F_{35\%} = 0.36$ ). Alaska plaice is the principal species in the complex, and the present assessment is a straightforward update of last years assessment. The projected spawning biomass (217,000 mt) is above  $B_{40\%}$  (122,000 mt). The biomass of this stock is slowly declining despite low exploitation rates, and there has been no apparent strong recruitment recently.

General Comments – Bering Sea Flatfish. The SSC notes that it provided a number of comments relative to the Bering Sea flatfish assessment in the minutes of the December, 1999 SSC meeting.

ROCKFISH GENERAL COMMENTS

The SSC thanks the section authors for creating chapters for true Pacific ocean perch (*Sebastes alutus*) and Other Red rockfish (i.e., northern/sharpchin, and rougheye/shortraker). This has resulted in a document that is much easier to read.

Pacific Ocean Perch

Again, the SSC notes a lack of adequate survey data for the POP stock assessment in the EBS. The SSC asks again, that assessment authors consider the merit of combining the EBS and AI areas into a single stock assessment model until adequate survey data becomes available for the EBS portion of the stock.

The assessment authors have employed the maturity schedules from POP in the GOA, which appear to be more realistic than those previously used from the literature. The new values compare better with a recent maturity at length samples, fit the models better, and resulted in lower ABC recommendations for 2001. A new 2000 survey biomass estimates was only available for the AI. Both stocks appear slightly below their  $B_{40\%}$  values which recommends Tier 3b with  $F_{ABC} = 0.040$  ( $F_{OFL} = 0.048$ ) in the EBS and  $F_{ABC} = 0.059$  ( $F_{OFL} = 0.069$ ) for the AI. The SSC concurs with the resulting ABC = 1,727 mt in the EBS, and ABC = 10,213 mt in the AI. Corresponding OFL = 2,043 mt and 11,842 mt in the EBS and AI, respectively.

Other Red Rockfish

The SSC supports the Plan Team’s recommendation to aggregate by species across areas rather than by areas across species. However, if subsequent stock structure research indicates that the stocks in the Eastern Bering Sea and Aleutian Islands are genetically distinct, the SSC would recommend stock specific ABC’s and OFL’s levels be applied.

The SSC concurs with Plan Team recommendations based on Tier 5,  $F_{ABC} = 0.75M$  and  $F_{OFL} = M$ :

2001 ABC’s:

Northern Rockfish (BSAI)	6,760 mt
Rougheye Rockfish (BSAI)	262 mt
Shortraker Rockfish (BSAI)	766 mt

2001 OFL’s:

Northern Rockfish (BSAI)	9,020 mt
Rougheye Rockfish (BSAI)	349 mt
Shortraker Rockfish (BSAI)	1,020 mt



### Other Rockfish Complex

Mostly, other rockfish are made up of shortspine thornyheads. Adjustments in biomass estimates have resulted in minor changes to ABC and OFL. Under Tier 5, assuming  $M = 0.07$ ,  $F_{ABC} = 0.053$  and  $F_{OFL} = 0.07$ . The SSC concurs with the Plan Team's recommended ABC of 361 mt and OFL of 482 mt for the EBS, and ABC = 676 mt and OFL = 901 mt for the AI.

The SSC also shares the Plan Team's concern that some species in the Other Rockfish Complex may be locally overfished (e.g. dusky rockfish in the AI), and supports efforts to monitor this problem.

### SABLEFISH

The BSAI components of the sablefish population is assessed jointly with the Gulf of Alaska components. See the GOA sablefish section for our discussion of the assessment and our overall recommendations. For BSAI, our specific recommendations follow the Team: ABC 1,560 mt (EBS), 2,500 mt (AI); OFL 1,910 mt (EBS), 3,070 mt (AI). The ABC is based on an adjusted  $F_{40\%}$  strategy and the OFL is based on an adjusted  $F_{35\%}$  strategy, with apportionments based on the combination of survey and fishery information.

### ATKA MACKEREL

The SSC received a report on the Plan Team's discussions concerning Atka mackerel. Public comment was also provided by John Gauvin of Groundfish Forum and Ken Stump of American Ocean Campaigns/Green Peace.

As in the past several years, a Stock Synthesis model was used for the Atka mackerel assessment. At the December 1999 Council meeting, the SSC was informed of the intention to move the assessment to an AD Model Builder framework. Unfortunately, BiOp and SEIS demands on the lead analysts' time delayed this transition for at least one more year.

The projected spawning biomass for 2001, 159,400 mt, is slightly above the estimated  $B_{40\%}$  of 154,000 mt. Biomass estimates for Atka mackerel, both that estimated by the assessment model and that observed by the triennial survey, indicate a steady downward trajectory since 1991. Under a Tier 3a designation, max  $F_{ABC}$  ( $=F_{40\%}$ ) would yield a 2001 catch of 128,000 mt. Both the assessment authors and the Plan Team felt this catch level was clearly too high and sought a method to establish a lower ABC.

The prime source of discomfort in the Atka mackerel assessment is the large variance associated with the triennial biomass estimates. Confidence bounds on the estimates for some years range from zero to double the mean estimate. Under the rationale that the assessment does not reflect the level of variability in the data, an ad hoc procedure was developed to lower  $F_{ABC}$ . The procedure uses the average coefficient of variation (CV) of the last five surveys (36.4%) as the CV for a lognormal distribution with a median of unity. The 90% lower confidence bound of this distribution is 0.56 and this is the fraction to which max  $F_{ABC}$  was reduced, resulting in a recommended 2001  $F_{ABC}$  of  $F_{0.19}$  ( $=F_{56\%}$ ). The 2001 ABC at this fishing mortality rate would be 58,700 mt. Following a split vote, the Plan Team agreed with the assessment authors' adjustment of the  $F_{ABC}$  rate.

The SSC agrees that the assessment does not convey the level of uncertainty in the estimated biomass, and that in such situations a more conservative harvest rate should be selected. Over the past year, the SSC has been working with NMFS scientists to develop more comprehensive definitions of overfishing that incorporate estimates of uncertainty. These efforts have also been delayed due to SEIS and BiOp commitments.

While the SSC recognizes the  $F_{40\%}$  value to be clearly too high, we do not accept the ad hoc procedure used to produce the lower  $F_{ABC}$ . There has not been any systematic study of the performance of this method. There are questions as to the validity of using the average CV of the survey biomass estimates when the assessment uses several data sources that contribute uncertainty to the model biomass estimates. Instead of the average of the Cvs, the CV of the average biomass estimates could as easily be selected, similarly the 75% or 95% lower CI could as easily be chosen. Ideally, uncertainty in the biomass estimates would be conveyed by the assessment. One of the motivations for moving to AD Model Builder is that confidence intervals around the biomass estimate can be computed.

Concerns over uncertainty in the biomass estimate and the confirmed downward trajectory last year led the Plan Team and SSC to depart from the  $F_{40\%}$  fishing rate and adopt the previous year's conservative rate of  $F_{52\%}$ . The SSC recommends that this rate be adopted again this year. This rate is slightly higher than the  $F_{ABC}$  of  $F_{56\%}$ , and results in an ABC of 69,300 mt. The OFL, 138,000 mt, was determined by applying  $B_{35\%} = 0.42$ .

A second item of contention for Atka mackerel concerns the apportionment of the TAC among areas 541, 542, and 543. The procedure developed in previous years is to use a weighted average of the past 4 surveys. In 2000, the fraction of the biomass found in the eastern most regime, Area 541, was extremely low this year, amounting to only 0.2 % of the total. In previous surveys, the amount in Area 541 has ranged from 10% to 5% of the total. Survey biologists examined several possible explanations for this discrepancy, principally involving survey operations, but found no operational differences. The SSC believes the time weighting scheme properly accounts for measurement error and recommends using this scheme. Based on an ABC of 69,300 mt the area split is as follows:

Area 543 - 27,900 mt

Area 542 - 33,600 mt

Area 541 - 7,800 mt

### SQUID AND OTHER SPECIES

Squid and other species includes a group of otherwise unrelated species receiving little directed fishing effort in the BSAI regions of this time. The SSC concurs with Plan Team recommendations for squid ABC. ABC follows a Tier 6 strategy in which OFL (2,620 mt) is equal to mean catch from 1975-1995, ABC is set at 75% of OFL or 1,970 mt, and is unchanged from the 2000 level.

The SSC disagrees with the Plan Team recommendation for other species. As we did in 2000 the SSC recommends stepping up to an ABC based on Tier 5 specifications process, where maximum ABC is computed from the product of species specific natural mortality rates, individual species estimated biomass and a discount factor (0.75). The SSC step process is based on a 10 year stair step, begun in 1999. We are in the 3rd year of the step process. ABC is equal to 1999 ABC plus 3/10 time the difference between Max ABC<sub>2001</sub> [51,800 mt] and ABC<sub>99</sub> [25,800 mt].

Total other species biomass was reported as 547,000 mt (p26, BSAI SAFE). Biomass for a subset of species (sculpins, skates, sharks, and octopus), was reported on Table 4.0, p542 of BSAI SAFE. Natural mortality rates were set at 0.15 for sculpins; 0.10 for skates, 0.09 for sharks, 0.30 for octopus, and 0.20 for remaining species. Remaining species biomass was the difference between total reported biomass (547,000 mt) and the sum of species specific biomass for the combined EBS and AI (535,550 mt).

OFL is set as the sum of  $M \times \text{Biomass}$  for all species, or 69,000 mt. Maximum permissible ABC is 51,800 mt. The SSC recommended other species ABC for 2001 is 33,600 mt ( [51,800 - 25,800 mt] \* .3 + 25,800).

## D-1(b) GOA GROUND FISH SPECIFICATIONS

### POLLOCK

The GOA stock assessment is a straightforward update of last year's approach. The stock assessment continues to show a declining trend in the W/C/WYK population, and this year, it is estimated to be at an all-time low. On the other hand, estimated biomass in 2001 is 699,000 mt, compared with 588,000 mt estimated last year due to some changes in weight at age data and some minor changes in the assessment procedure (see page 49 of the stock assessment document). **The authors and Plan Team recommend an ABC based on an adjusted  $F_{40\%}$  rate of 0.28 from Tier 3b and average recruitment, resulting in a 2001 ABC of 100,770 mt, the maximum permissible value. The Tier 3b OFL is 117,750 mt. The SSC accepts the Plan Team recommendations. Last year, the SSC used a  $F_{45\%}$  harvest rule that had the same rate of 0.28. In the interests of maintaining continuity in the recommended harvest rate, the SSC agrees with the change to  $F_{40\%}$ . The SSC also accepts the apportionments of ABC by area and the ABC for EYK/SEO. The SSC notes that an alternate method of projecting recruitment using an inverse variance weighting scheme is being investigated and is interested in seeing more about this next year.**

### PACIFIC COD

$B_{40\%} = 89,600$  mt (projected)  
 $B_{\text{SPAWNING}} = 93,800$  mt (projected from adjusted  $F_{\text{ABC}}$ )  
 $B_{35\%} = 78,400$  mt

The spawning biomass of GOA Pacific cod has continued to decline since 1987. The estimates decline over the last year is 15%. Because of this continued decline the SSC agrees with the precautionary, Bayesian reduction applied to  $F_{40\%}$  to arrive at a reduced  $F_{\text{ABC}}$ . **This puts the ABC at 67,800 mt, down by 11% of last year's level.**

Pacific cod is of special concern for precautionary measures in the setting of the ABC. That is not only because of the declining spawning biomass, but also because of the possibility of unknown fishery sampling inadequacy. Sampling is being reviewed currently by the Observer Program. The SSC expressed its concern more completely in last year's minutes, especially from the October 1999 meeting. Sampling the Pacific fishery is difficult because of the complexity of its various fishing sectors.

### FLATFISH

The SSC concurs with the Plan Team's recommendations for ABC and OFL levels for deepwater, rex sole, shallow water and flathead sole groups.

<u>Species Group</u>	<u>ABC</u>	<u><math>F_{\text{ABC}}</math></u>	<u>OFL</u>	<u><math>F_{\text{OFL}}</math></u>	<u>Tier</u>
Deep water	5,300	0.075	6,980	0.10	5,6
Rex sole	9,440	0.15	12,300	0.20	5
Shallow water	37,860	0.15-0.17	45,320	0.209-0.25	4,5
Flathead sole	<u>26,270</u>	0.15	34,210	0.20	5
TOTAL	<u>78,870</u>				

The regulatory area apportionments of ABC are based only on biomass distributions from the 1999 triennial survey, unlike most other species for which a weighted combination of the past several surveys is used. The SSC agrees with this apportionment method.

<u>Species Group</u>	<u>Western</u>	<u>Central</u>	<u>WYAK</u>	<u>EYAK/SEO</u>	<u>Total</u>
Deep water	280	2,710	1,240	1,070	5,300
Rex sole	1,230	5,660	1,540	1,010	9,440
Shallow water	19,510	16,400	790	1,160	37,860
Flathead sole	<u>8,490</u>	<u>15,720</u>	<u>1,440</u>	<u>620</u>	<u>26,270</u>
TOTAL	29,510	40,490	5,010	3,860	78,870

**ARROWTOOTH**

The SSC supports the Plan Team’s recommendation for ABC (148,500 mt,  $F_{40\%} = 0.134$ , Tier 3a) and OFL (173,550 mt,  $F_{35\%} = 0.159$ ). Exploitable biomass (1,586,530 mt) was greater than  $B_{40\%}$  (450,097 mt).

**SABLEFISH**

In addition to a presentation by the assessment author, the SSC received public testimony from Arne Fuglvog of Petersburg Vessel Owners Association.

The SSC wishes to note the conciseness and clarity of the sablefish assessment and attempts to continually refine the model.

The sablefish assessment continues to be incrementally improved each year. This year, age data from the commercial fishery were added for the first time, and otoliths collected during the Japan-US cooperative longline surveys were aged. Previously, ages from the surveys had been estimated from a length age key.

The assessment model for sablefish continues to show the population at a low but stable level. Spawning biomass is estimated to be at 34% of unfished value, thus sablefish fall under Tier 3b. An adjusted  $F_{40\%}$ , fishing mortality rate of 0.10 results in an ABC of 16,900 mt. An adjusted  $F_{35\%}$  rate of 0.12 gives an OFL of 20,700 mt. The SSC concurs with the Plan Team on both the ABC and OFL. The SSC also concurs with area apportionment of the ABC.

The GOA ABC apportionment is:

WGOA - 2,010 mt                      CGOA - 5,410 mt                      WY - 1,880 mt, and EY/SE - 3,540 mt

Two issues concerning the assessment were raised on which SSC opinion was sought.

1. Use of fishery catch rates in the assessment and areal splits of ABC. In 1999, the assessment incorporated longline fishery CPUE for the first time. Concerns were expressed over the potential biases arising from changing fishery catchability and non-random distribution of fishery effort. An analysis addressing these concerns was presented. While there are a few areas where survey and fishery CPUE trends are not in agreement, the overall results were encouraging. The SSC supports inclusion of the longline CPUE in both the assessment and area apportionments, and encourages continued investigation into inclusion of this and other potentially useful data (e.g. juvenile trawl surveys).
2. Utility and appropriateness of the decision analysis. For the second consecutive year, the assessment author presented a simple, but well-considered Bayesian decision analysis. This approach is an alternative method of establishing a safe harvest level. The analysis examines how variability in Q and M, two of the more ill-defined parameters, affect biomass trends under different levels of catch. With a goal of maintaining biomass at the same level after 5 years, the recommended ABC is 16,800 mt,

essentially the same value recommended under the adjusted  $F_{40\%}$  ABC. The SSC encourages continued development of the decision theoretic approach as an alternative means of examining optimum harvest rates.

## ROCKFISH GENERAL COMMENTS

The SSC recommends that the GOA break up the slope rockfish section into different species sections, as was done for red rockfish in the EBS/AI (i.e., POP, northern, other slope rockfish). This would be especially helpful in the GOA because both Pacific ocean perch and northern rockfish are being assessed using age-structured models. The SSC commends the stock assessment authors for bringing on the new AD model builder age-structured northern rockfish model and encourage them to pursue an age-structure model for dusky rockfish.

### Pacific Ocean Perch

A stock synthesis model with  $q$  estimated ( $q=2.99$ ) was used as last year, with updated catch data. Since the current biomass is less than  $B_{40\%}$ , the Tier 3b approach is used with  $F_{ABC} = 0.067$ , and  $F_{OFL} = 0.078$ . The SSC concurs with these results which imply  $ABC = 13,510$  mt, with  $OFL = 15,960$  mt. The SSC also concurs with the weighted survey method of apportioning ABC and OFL over the Western (9.5%), Central (71%), and Eastern (19.4%) portion of the GOA.

	<u>ABC</u>	<u>OFL</u>
Western	1,280 mt	1,520
Central	9,610 mt	11,350
Eastern	2,620 mt	3,090
-----WYAK (0.33)	870 mt	

### Shortraker/Rougheye

No new information is available for the stock assessment of the shortraker/rougheye species group. The SSC concurs with ABCs using Tier 4 for rougheye, Tier 5 for shortraker and the average of three previous surveys. As for the last assessment this results in shortraker(ABC) = 520 mt and rougheye(ABC) = 1,210 mt.  $OFL = 2,510$  mt for the combined group. Again, a weighted exponential approach is used to split the ABCs into a Western (210 mt), Central (930 mt), and Eastern (590 mt) apportionment.

### Northern Rockfish

The new northern rockfish assessment was challenging for the stock assessment authors due to the inconsistency between age, length and biomass data. The authors went with models that fit the age data well which is not a bad idea since northern rockfish are relatively easy to age. Interestingly  $q$  was estimated at 0.45, which is the opposite of POP where  $q$  is typically estimated to be greater than 1.0. This can be explained by noting northern inhabit rougher bottom. Female spawning biomass appears to be well above  $B_{40\%}$ , which implies a Tier 3a approach. This results in  $F_{40\%} = 0.055$  and  $F_{OFL} = 0.065$ . The SSC concurs with the resulting  $ABC = 4,880$  mt, and  $OFL=5,780$  mt. Apportionment of ABC to the Western and Central Areas occurs as with POP resulting in Western (ABC) = 600 mt, Central (ABC) = 4,280 mt. Minor amounts of northern rockfish are combined with other slope rockfish in the Eastern area for management purposes.

### Other Slope Rockfish

No new information is available for the stock assessment of the other slope rockfish species group. The SSC concurs with ABCs using Tier 4 for sharpchin, and Tier 5 for other species in this group. As for the last assessment this results in ABC=4,900t and OFL=6,390 mt. Again, a weighted exponential approach is used to split the ABCs into a Western (20 mt), Central (740 mt), and Eastern (4,140 mt) apportionment. The SSC also concurs with the recommended apportionment of Eastern ABC to WYAK (250 mt), and 3,890 mt for the rest of the Eastern area.

### Pelagic Shelf Rockfish

This complex is mostly (98-99%) light dusky rockfish. With no new information ABC is set as in the previous assessment. For this species an  $F=M$  strategy is more conservative than an  $F_{40\%}$  strategy, and this is what has been used. OFL is set using Tier 4,  $F_{35\%}$ . The SSC concurs with the resulting ABC = 5,980 mt and OFL = 9,040 mt). Area apportionment and portions for WYAK were carried out as for POP. The SSC concurs with the resulting apportionment of Western (550 mt), Central (4,080 mt), and Eastern (1,350 mt) with 580 mt of the Eastern portion allocated to WYAK.

### Demersal Shelf Rockfish

Yelloweye average weight and standard error was updated using 1999 port sampling data. Under Tier 4,  $F_{ABC}$  was set at  $F=M=0.02$ . The SSC concurs with the slightly reduced recommended ABC of 330 mt and the OFL = 410 mt.

However, the SSC remains concerned over the conservative nature of biomass estimates based on the sum of lower 90% confidence limits by area. The usual method would be to calculate the lower 90% confidence limit of the total biomass estimate and then distribute this over the different areas. The SSC would like to see the calculations performed both ways so that we can compare results.

### Thornyhead Rockfish

With little new, the projection from the 1999 assessment was used to update ABC. The stock is well above its  $B_{40\%}$  level. The SSC concurs with the Tier 3a recommended ABC = 2,310 mt and OFL = 2,770 mt. These are slightly below the values in the last assessment. The area specific apportionments are Western (420 mt), Central (970 mt), and Eastern (920 mt).

### ATKA MACKEREL

The SSC supports the Plan Team's recommendations for ABC (600 mt, bycatch only) and OFL (6,200 mt, Tier 6).

### OTHER SPECIES

ABC = 11,890 mt

Apportionments:       skates: 45%  
                              sharks: 20%  
                              sculpins: 30%  
                              octopus and squid: 5%

**The SSC supports the Plan Teams procedure for determining ABC based on Tier 5 procedures (survey biomass x 0.75 for each major taxa and summed over all taxa) and apportionment by proportionate share of ABC. The SSC encourages the development of a formal FMP that allows development of standard ABCs for the species in this group.**

## **ECOSYSTEM CONSIDERATIONS**

The SSC received a presentation on the Ecosystem chapter of the BSAI and GOA SAFE from Jim Ianelli (NMFS). The SSC is pleased to note the continuing evolution of this chapter and the utility it brings to understanding of fisheries and environmental influences on stocks. Furthermore, the SSC notes a change in expressed intent of this chapter to one of providing the Council with information about the effects of fishing from an ecosystems perspective in addition to the prior expressed intent to look at the effects of environmental change on fish stocks. The SSC believes that key tables and indices presented in the chapters should be placed on the web to provide convenient access to stock assessment and other scientists. These indices should be examined by the stock assessment scientists to determine their relevance and utility in the annual status of stocks review. We also recommend that the Plan Team evaluate and comment on the contents of this chapter and that their comments be made a routine part of the SAFE document.