Update on Status of Pollock Resources in the eastern Bering Sea,

Aleutian Islands, and the Bogoslof Island Regions through 2009

The standard time period for updating the status of Pollock resources for meeting the schedule of the North Pacific Fishery Management Council is in November of each year when the Groundfish Plan Teams of the Council meet. The last update was conducted in November 2009.

The full assessments of pollock stocks in the 3 management areas of the Bering Sea are located in the following web-links:

Eastern Bering Sea -- http://www.afsc.noaa.gov/REFM/docs/2009/EBSpollock.pdf

Aleutians Islands Area -- http://www.afsc.noaa.gov/REFM/docs/2009/AIpollock.pdf

Bogoslof Island Area -- http://www.afsc.noaa.gov/REFM/docs/2009/BOGpollock.pdf

The assessment for the Gulf of Alaska is located at:

http://www.afsc.noaa.gov/REFM/docs/2009/GOApollock.pdf

The summary of recent assessments that apply to the management of the 2007-2010 fisheries are as follows:

Status and catch specifications of walleye Pollock in recent years. Biomass for each year corresponds to the projection given in the SAFE (Stock Assessment and Fishery Evaluation) reports in the preceding year. * Catch for 2010 is through 22 May 2010.

Area	Year	Age 3+ Biomass (t)	OFL (overfishing level, t)	ABC (Acceptable Biological Catch, t)	TAC (Total Allowable Catch, t)	Catch
Eastern	2007	6,360,000	1,640,000	1,394,000	1,394,000	1,354,091
Bering	2008	4,712,000	1,440,000	1,000,000	1,000,000	990,314
Sea	2009	4,616,000	977,000	815,000	815,000	810,821
	2010	6,223,000	918,000	813,000	813,000	324,647*
Aleutian	2007	250,000	54,500	44,500	19,000	2,488
Islands	2008	268,000	34,000	29,400	19,000	1,277
	2009	292,000	32,600	26,900	19,000	1,729
	2010	307,000	40,000	33,100	19,000	553*
Bogoslof	2007	291,580**	48,000	5,220	50	0
** Survey	2008	No survey	58,400	7,970	50	9
	2009	110,191**	58,400	7,970	50	46
	2010	No survey	22,000	156	50	0*

A. EBS walleye pollock

Dr. Jim Inaelli was the main author for the assessment. He presented his assessment before the Plan Team for the Bering Sea-Aleutians Groundfish Fhsery Management Plan in November 2009. The following is an extract of the ssessment model, estimates and variances of year class strengths (particularly the 2006 year class), tier designation, and ABC recommendations.

The new data included in the 2009 assessment indicated that:

1) The 2009 bottom trawl survey biomass estimate was down 25% from last year, but slightly above expectations based on the 2008 assessment (see Figure 1 of survey stations).
2) The 2009 EIT survey biomass estimate was about the same as in 2008, but below expectations based on last year's assessment.
3) The relative abundance of three-year-olds in the 2009 EIT (2006 year class) was lower than expected from the 2008 assessment.
4) 2009 was the fourth consecutive year of cold temperatures in the bottom trawl survey (see Figure 2).

Assessment model The assessment model was unchanged from 2008. The summary of the assessment is shown in Figure 3.

Year class strengths The following were points raised about year class strengths, both in general and with respect to the 2006 year class:

1) The 2008 year class was estimated to be above average, but, because this estimate is based only on the 2009 survey, the confidence interval was extremely large.
2) In last year's (2008) assessment, every year class from 2001-2005 was estimated to be below average, but in this year's (2009) assessment, the 2001 year class was estimated to be almost exactly equal to the average.
3) The average of the negative recruitment deviations from 2002-2005 were much bigger than the average of the positive deviations from 2006 and 2008, which may indicate that the stock-recruitment relationship was less certain than before.
4) Because the 2006 year class was still only 3 years old, no information on possible cohort-specific maturity of this year class was available.
5) Figure 1.6 in the assessment indicates that the fishery operated in a manner that increased the selectivity of ages 3 and 4, which was not typical.

Tier designation The Plan Team discussed whether EBS pollock should be managed under Tier 1 or Tier 3 and questioned whether the stock-recruitment relationship was as reliably estimated as previously believed. Following discussion, the Team agreed that this stock continued to qualify for management under Tier 1 (Tier 1b, specifically).

ABC recommendation The Team reviewed last year's (2008) minutes regarding ABC for this stock. The Team discussion on a recommended ABC focused on two alternatives: the maximum permissible value based on the assumption that the strengths of all year classes through 2008 were equal to the estimates from the present assessment (giving a 2010 ABC of 813,000 t), and the maximum permissible value based on the assumption that the strength of the 2006 year class was equal to the long-term average (giving a 2010 ABC of 738,000 t).

Arguments in favor of a 2010 ABC of 738,000 t (2006 year class = average) included the following:

1) The estimated strength of the 2006 year class has dropped considerably from the 2008 assessment, and may drop again.
2) Last year's (2008) assessment projected that the stock would recover to B_{MSY} by 2010, but this year's (2009) assessment indicated that this will not occur until 2012.
3) Recent survey biomass estimates have been low and the model projects that next year's (2010) bottom trawl survey biomass estimate will be the lowest in the time series.
4) The estimate of the 2006 year class was still fairly uncertain.
5) Even if the 2006 year class is above average, all of the other year classes currently in the fishery since the 2001 year class have all been below average (the 2008 year class has not yet recruited to the fishery).
6) There have been relatively few previous instances in which this stock has been so dependent on one year class. In other years when the stock was extremely dependent on a single year class, the dominant year class was an extremely strong one, whereas in the present case, the dominant year class is much closer to average in strength.
7) The stock-recruitment relationship is uncertain.

Arguments in favor of a 2010 ABC of 813,000 t (2006 year class = model estimate) included the following:

1) The Team agreed that the model was appropriate for making harvest specifications, and there was no reason to believe that the model's estimate of the 2006 year class was biased.
2) Reducing the ABC from 813,000 t to 738,000 t will have no discernible effect on the time the stock will take to recover to B_{MSY}.
3) The 2008 year class appeared to be above average (in last year's minutes, the Team indicated that this year's recommendation for the 2010 ABC would be based in part on evidence of an additional strong year class).
4) Setting the 2006 year class equal to the long-term average value lacked statistical justification; a similar assumption could be applied to weak year classes as well.
5) While the stock is highly dependent on the 2006 year class, the extent of this dependence was not unprecedented.
6) A 2010 catch of 813,000 t would maintain the spawning exploitation rate below 20%, which has been used as a reference point in past Team recommendations.

Following discussion, the Plan Team recommended (by a one-vote margin) a 2010 ABC of 813,000 t.

Plan Team Recommendations for Future Assessments

As a general recommendation (i.e., not specific to the EBS pollock assessment), the Plan Team recommends that a workshop be held, or a working group be formed, to develop guidance regarding how to decide when a stock qualifies for management under Tier 1. In so doing, the Plan Team recognized that the SSC has final responsibility for making tier determinations.

The Plan Team noted that a CIE (Center of Independent Experts) review is scheduled for summer 2010.

B. Bogoslof Pollock (Figure 4). Jim Ianelli reported that the standard assessment approach was applied again for the 2009 assessment. A biennial cycle of the survey by the R/V *Oscar Dyson* was completed in March 2009. The report of this survey can be found at the following web-link:

http://www.afsc.noaa.gov/REFM//CBS/Docs/14th%20Annual%20Conference/Appendix%203B-USBogoslog09.pdf

This survey resulted in the lowest estimate of biomass recorded since 1988. The next survey is scheduled for 2011. The decreased biomass estimate results in a recommendation for a decreased ABC. The Team accepted the author's recommendation for OFL and ABC under Tier 5 and noted that the ABC value follows the SSC's approach, which is less than the maximum permissible.

The history of surveys conducted by the Alaska Fisheries Science Center (NOAA Fisheries) in the Central Bering Sea Specific Area of the Convention is shown in the table below:

Year	Biomass Estimated (million t)
1988	2.396
1989	2.126
1990	No Survey
1991	1.283
1992	0.888
1993	0.631
1994	0.490
1995	1.020
1996	0.582
1997	0.342
1998	0.432
1999	0.393 Conducted by Japan Fisheries Agency
2000	0.270
2001	0.208
2002	0.226
2003	0.198
2004	No survey
2005	0.253
2006	0.240
2007	0.292
2008	No survey
2009	0.110

C. Aleutian Islands Pollock (Figure 5). Steve Barbeaux presented the updated assessment to the Plan Team. He presented two model configurations which differ only in that model 1 excludes catches east of 174 west longitude (which may be part of the eastern Bering Sea stock). Model 2, which includes all catches for the Aleutian Islands, was adopted by the team to recommend ABC and OFL values. The model estimated that there was less than 1% chance that the population would be below $B_{20\%}$ of unfished spawning biomass.

The Plan Team recommended that an Aleutian Islands survey be conducted in 2010. The survey normally is conducted every other year. However no survey was conducted in 2008 due to lack of funds. The last survey was completed in 2006.

Directed catch has mostly been taken from small areas located outside Steller sea lion critical habitat. SSL critical habitat in the Aleutian Islands was closed to pollock fishing. Very little targeting of pollock in the AI occurred in the past decade, with targeted catch in 2009 of less than 600 t. Current catches were mostly bycatch in target fisheries for other species. Pollock catches were low and typically mixed with Pacific ocean perch.

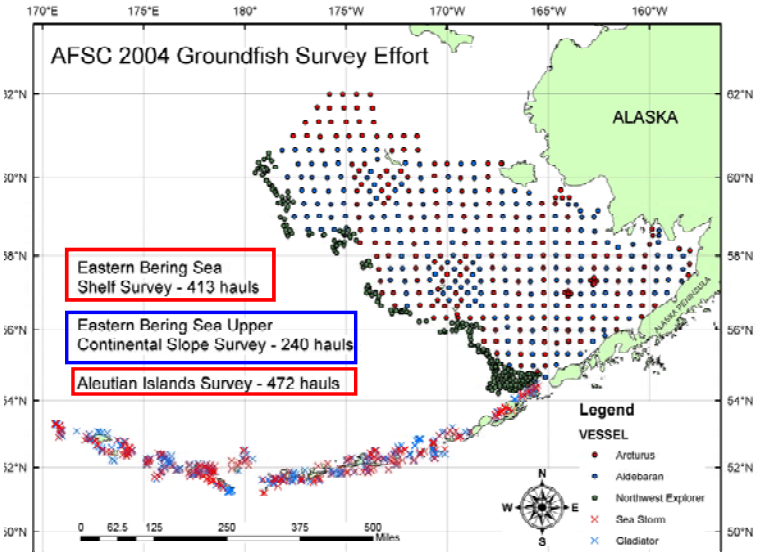

Figure 1: Typical surveys on groundfish conducted by the Alaska Fisheries Science Center in the Bering Sea.

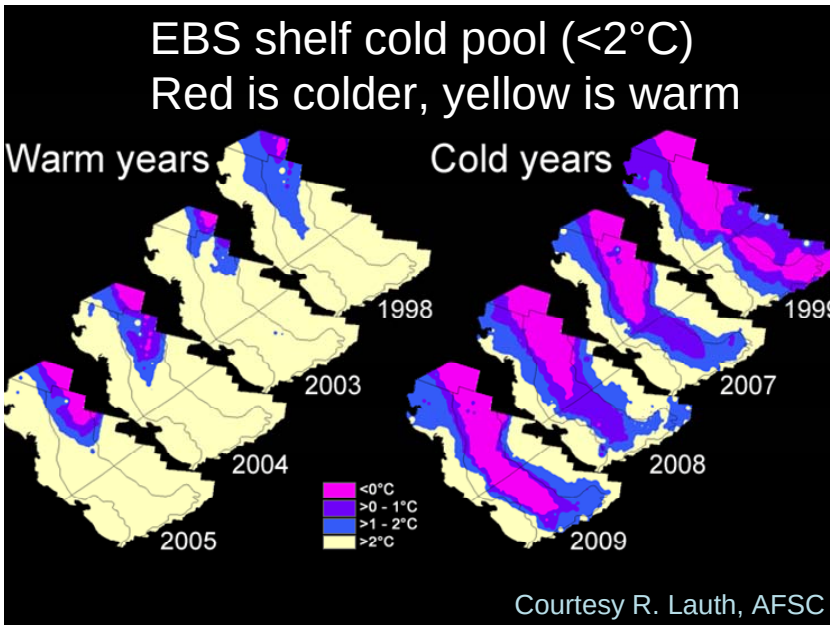

Figure 2: Recent surface temperature in the Bering Sea as measured during trawl surveys by the Alaska Fisheries Science Center.

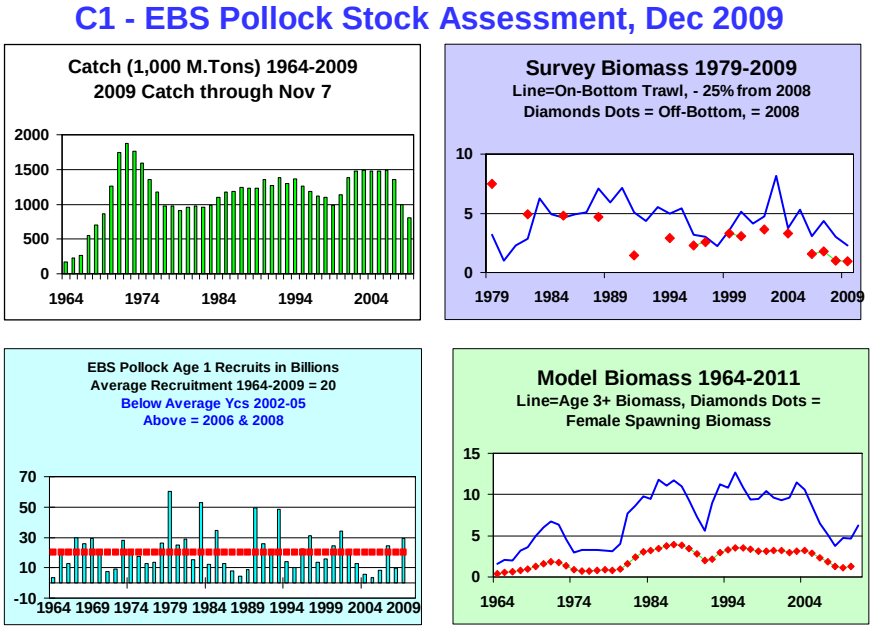

Figure 3: Summary of pollock stock assessment in the eastern Bering Sea, 2009.

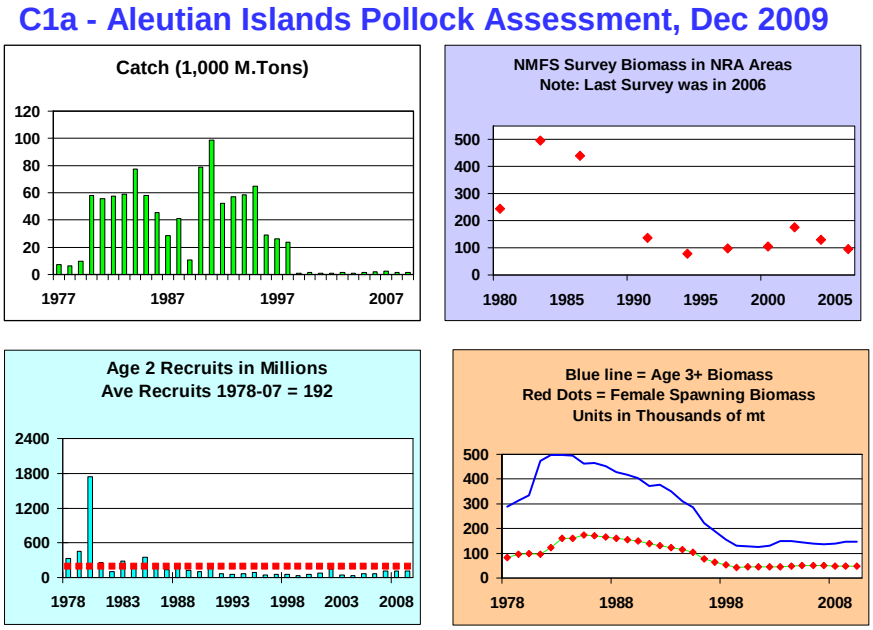

Figure 4: Summary of pollock stock assessment in the Bogoslof Island Area, 2009.

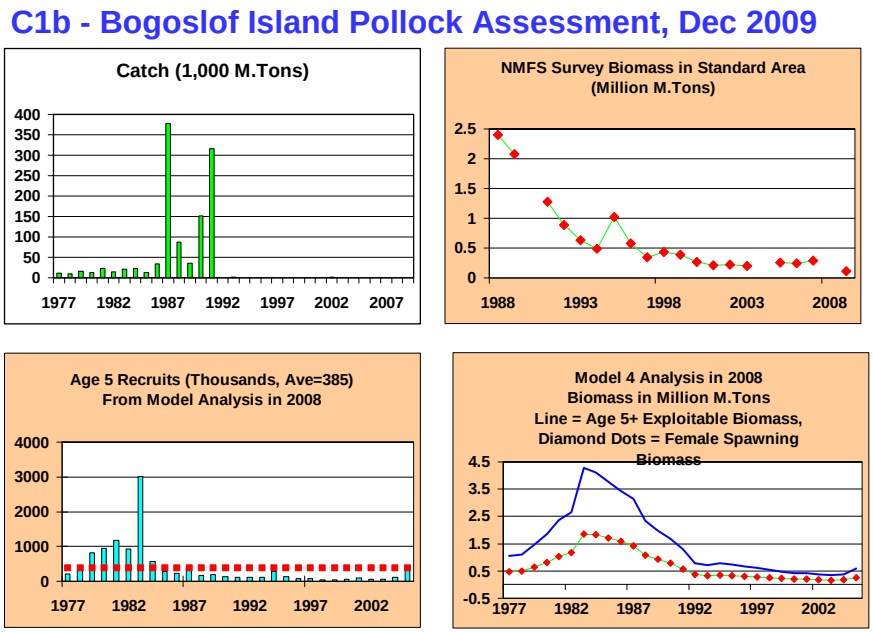

Figure 5: Summary of pollock stock assessment in the Aleutian Islands region, 2009.