

GROUND FISH ADVISORY SUBPANEL REPORT ON PACIFIC WHITING MANAGEMENT FOR 2007

The Groundfish Advisory Subpanel (GAP) received a presentation from whiting Stock Assessment Review (STAR) Panel chair Dr. Ray Conser.

2007 Assessment

The GAP accepts that the STAR Panel and Scientific and Statistical Committee (SSC) concluded that the current assessment is suitable for management. Notably, they consider that there are two equally plausible models – Model 1 using a $q = 1.0$ and Model 2 using a prior-based q .

The GAP notes the striking similarity of the 2007 assessment to the 2006 assessment. That is, the 2007 assessment estimates current SSB to range between 1.15 to 1.65 million mt (Agenda Item E.3.a., Supplemental Revised Attachment 1, table h) and current depletion to range between 32.1% (Model 1) and 39.8% (Model 2) of unfished SSB (Agenda Item E.3.a., Supplemental Revised Attachment 1, table h). These values are very similar to estimates in the 2006 assessment (see Attachment 1 to this report, a comparison of 2006 Table g and 2007 Table g). The bottom line is that we are starting 2007 at pretty much the same place we were at the start of 2006, including projected depletion estimates for the next several years.

As seen in 2007 Table g, the current assessment estimates an optimum yield (OY) for 2007 ranging from 575,090 mt (Model 1) to 878,670 mt (Model 2). (Agenda Item E.3.a., Supplemental Revised Attachment 1) As the GAP noted last year, these model estimated OYs seem unreasonably high, especially in contrast to the model's estimated depletion trend.

To address this uncertainty in 2006, the Pacific Fishery Management Council (PFMC) derived the 2006 Coastwide OY by focusing on the estimated depletion trajectory; notably which level of 2006 OY would prevent the whiting stock from crossing the 25% overfished threshold in the next two years. This action was a prudent balance of stock dynamics and needs of the fishing community; that is, the PFMC adopted the model derived ABC, but reduced the OY to a reasonable amount that met the needs of the fishing community and prevented reaching the overfished state within two years.

As in 2006, the GAP recognizes that there remains a great deal of uncertainty in the current model, for example, the virgin biomass (B_0) estimate seems unrealistically high, harvest level projections also seem unrealistically high, and recent recruitment, e.g. 2003 and 2004 year classes, do not appear to be fully accounted for in the model.

Specific to uncertainty of the model's estimate of B_0 , the STAR Panel states:

- The simplified model runs [that is, Stock Assessment, Appendix 2]... suggested large uncertainty in the estimate of B_0 , and that B_0 may be smaller than that estimated by SS2 Model 1 and Model 2 runs (Agenda Item E.3.a, Attachment 3, p. 6); and
- SS2 hake modelling... may be causing lack of fit to the acoustic survey and an upward bias in the Model 1 and Model 2 estimates of SSB_0 as well as concomitant effects in depletion estimates. These results are consistent with dozens of runs made using the simplified [Stock Assessment, Appendix 2] model that tended to estimate smaller SSB_0 than the Model 1 and 2 SS2 estimates (Agenda Item E.3.a, Attachment 3, p. 11).

Younger fish started to appear in the 2005 fishery and occurred more frequently in the 2006 fishery. The STAR Panel notes “[b]ased on the 2005 acoustic survey length composition data a moderately strong 2003 year-class was moving into the fishery, whereas the fishery data are consistent with a moderately strong 2004 year-class.” (Agenda Item E.3.a, Attachment 3, p. 4) While their likely contribution to the stock is undetermined, the GAP believes that this recent recruitment will provide for a stable fishery. At the same time the GAP recognizes that if this recruitment is not as strong as expected, reductions in future years may be necessary.

Acoustic survey catchability (“q”) continues to be a major source of uncertainty in the whiting assessment. This is the principal reason two models are put forward. For management considerations, however, the Stock Assessment states, “The acoustic survey catchability coefficient (q) has been, and continues to be, one of the major sources of uncertainty in the model. Due to the lengthened acoustic survey biomass trends the assessment model was able to freely estimate the acoustic survey q. These estimates were substantially below the assumed value of $q = 1.0$ from earlier assessments (Agenda Item E.3.a, Supplemental Revised Attachment 1, p. 3).

Moreover, relative to the value for survey q (i.e., 1.0 vs. freely estimated) – In response to a STAR Panel request, the STAT reported that “including the early survey data resulted in the model estimating a q of 0.062 (1977-1989) and 0.069 (1992-2005)... The precision of the selectivity estimates were not available, but the different patterns in 1977-1989 and 1992-2005 seem to provide a more realistic picture to the STAR panel, at least consistent with what is known about the survey history.” (Agenda Item E.3.a, Attachment 3, p. 7)

In addition, in their review of discrepancies in the whiting assessment, the STAR Panel states: “The estimated selectivity functions for the Canadian fishery, the U.S. fishery, and the acoustic survey are all strongly dome-shaped. While plausible mechanisms were postulated for some degree of domeness, **the Panel did not find the unusually small selectivities for older fish (say age 12+) to be entirely credible.** Such model structure has management implications in that the cryptic biomass can represent a significant proportion of standing stock of SSB in some years. Since by definition the cryptic biomass can never be sampled or measured directly by either fishery or by the acoustic survey, **it is difficult to gauge the reliability of the SSB and other biomass estimates.**” (Agenda Item E.3.a, Attachment 3, p.12; emphasis added)

The whiting stock will again be assessed in 2008. The 2008 assessment will include 2007 fishery data, information from the pre-recruit index, and additionally (unlike the current assessment) the hydro-acoustic survey. These data sources should confirm the strength of recent year classes.

Proposed Optimum Yield

A majority of the GAP (14 in favor, 1 opposed, 1 abstention) recommends status quo management for the 2007 whiting fishery, which results in a 364,197 mt coastwide optimum yield (OY) and a 269,069 mt harvest guideline for the U.S.

Justification for status quo can be seen in Attachment 2. The projection for hitting the 25% depletion threshold by 2009 using a blend of Model 1 and Model 2 is a coastwide OY of 368,187 mt. Status quo – 364,197 mt – is below that projection and should provide an extra buffer to prevent reaching the overfished state by 2009. Attachment 2 also provides information on reductions in available harvest and projected revenue loss for OY values below status quo. A coastwide OY 350,000 mt would result in depletion of approximately 25.4% by 2009, but would result in a loss of \$1.3 million in ex-vessel revenue, which would have downstream impacts on processors and coastal communities. Values below 350,000 mt would result in even larger economic losses.

Management Measures

The GAP discussed rockfish bycatch limits for the non-tribal whiting fishery. In 2006, these limits were initially set at 4.7 mt for canary rockfish, 25 mt for darkblotched rockfish, and 200 mt for widow rockfish. If any of the bycatch limits are exceeded during the directed whiting fishery any or all sectors of the whiting fishery can be closed by National Marine Fisheries Service via automatic action. Since implementation of the bycatch limits, through fleetwide communication and active avoidance of rockfish, the non-tribal whiting sectors have caught the available whiting OY without exceeding the bycatch limits. For 2006, the non-tribal whiting sectors caught 2.63 mt of canary rockfish, 13.27 mt of darkblotched rockfish, and 187.95 mt of widow rockfish.

Specific recommendations about bycatch limits for the 2007 whiting fishery will be included in the GAP Report under Agenda Item E.5 (Inseason Management).

Minority View

One member of the GAP does not agree with the GAP's recommended 2007 OY. Those concerns are detailed at the end of this report.

Minority Statement 2007 Whiting OY

The following represent issues of concern with the proposed harvest limit from the GAP for whiting in 2007.

1. This fishery has been historically dependent on uniquely large year classes to sustain commercial operations. There has only been one such successful year class in the last 20 years which was the 1999 yr. class. It would appear that spawning success was better prior to 1985 with multiple large spawning occurring within a 10 yr. period.
2. Under all harvest options presented by the scientists all future depletion levels of the resource decline.
3. The more optimistic model, where Q is .7 drops the resource level below .40 while the Q is 1 model drops to .32. This represents the 4th consecutive drop in depletion levels under either model.
4. We have 4 consecutive years of decreasing spawning mass.
5. Dr. Ray Conser suggested that with an OY of zero the depletion levels could still drop, which suggests that we have very poor aggregate year class strengths from 2003 and 2004. Nevertheless industry believes they have seen a larger 2003 yr. class in their catches. This is a critical discrepancy with the survey and what industry may be seeing.
6. It is difficult to believe that the ABC level can be 500,000 to 800,000 metric tons on a spawning biomass of 1.146 M mt with the continued decline in depletion levels. Even the Plan team and STAR committee comment on this.
7. The range of harvest levels from 100,000 mt to 800,000 mt is not useful in order to give the Council a reasonable opinion. Considering whiting has the most science to support Council actions, this type of OY range is not helpful. It suggests with all the science a large amount of uncertainty and therefore reason to be more cautious.
8. We should wait for the NMFS survey in 2007 to verify larger year classes before we harvest in excess of 200,000 mt. A 200,000 mt harvest would buy one more year under the Q is 1 model before the resource goes below .25.
9. Harvest in the range of 350,000 mt is the highest allowed for this fishery. This does not seem reasonable given all the declining graphics for spawning biomass and depletion levels.

PFMC
03/07/07

2006 Stock Assessment

Table g. Decision table for two states of nature (base and alternative models) and four different harvest strategies given the state of nature.

Relative probability Model	State of Nature			
	0.50 h = 0.75, q = 1.0		0.50 h = 0.75, q prior	
Management action	Total coast-wide Catch (mt)	Year	Relative depletion (2.5%-97.5% interval)	
OY Model h=0.75, q=1.0	593,746	2006	0.308 (0.247-0.369)	0.380 (0.304-0.457)
	358,416	2007	0.227 (0.181-0.272)	0.310 (0.219-0.401)
	213,223	2008	0.178 (0.135-0.221)	0.263 (0.164-0.363)
	183,620	2009	0.172 (0.092-0.253)	0.254 (0.127-0.380)
OY Model h=0.75, q prior	883,490	2006	0.308 (0.247-0.369)	0.380 (0.304-0.457)
	522,511	2007	0.202 (0.125-0.279)	0.268 (0.215-0.322)
	302,298	2008	0.144 (0.056-0.232)	0.202 (0.155-0.249)
	240,702	2009	0.136 (0.020-0.252)	0.188 (0.104-0.273)
Total coast-wide catch = 200,000 mt	200,000	2006	0.308 (0.247-0.369)	0.380 (0.304-0.457)
	200,000	2007	0.282 (0.209-0.354)	0.351 (0.264-0.438)
	200,000	2008	0.250 (0.167-0.333)	0.315 (0.219-0.411)
	200,000	2009	0.239 (0.125-0.352)	0.299 (0.175-0.423)
Total coast-wide catch = 400,000 mt	400,000	2006	0.308 (0.247-0.369)	0.380 (0.304-0.457)
	400,000	2007	0.258 (0.184-0.332)	0.330 (0.241-0.419)
	400,000	2008	0.207 (0.122-0.292)	0.276 (0.177-0.375)
	400,000	2009	0.178 (0.063-0.294)	0.245 (0.118-0.372)

2007 Stock Assessment

Table g. Decision table for two states of nature (base and alternative models) and four different harvest strategies given the state of nature.

Relative probability Model	State of Nature			
	0.5 h = 0.75, q = 1.0		0.5 h = 0.75, q prior	
Management action	Total coast-wide Catch (mt)	Year	Relative depletion (2.5%-97.5% interval)	
OY Model h=0.75, q=1.0	575,090	2007	0.321 (0.243-0.397)	0.398 (0.308-0.488)
	377,360	2008	0.245 (0.195-0.295)	0.326 (0.236-0.417)
	232,040	2009	0.193 (0.150-0.236)	0.271 (0.180-0.363)
	191,600	2010	0.184 (0.102-0.266)	0.257 (0.138-0.376)
OY Model h=0.75, q prior	878,670	2007	0.321 (0.243-0.397)	0.398 (0.308-0.488)
	560,070	2008	0.208 (0.126-0.290)	0.293 (0.236-0.350)
	334,990	2009	0.139 (0.052-0.226)	0.222 (0.176-0.268)
	258,650	2010	0.124 (0.008-0.240)	0.203 (0.117-0.289)
Total coast-wide catch = 100,000 mt	100,000	2007	0.321 (0.243-0.397)	0.398 (0.308-0.488)
	100,000	2008	0.305 (0.230-0.379)	0.377 (0.290-0.463)
	100,000	2009	0.279 (0.204-0.354)	0.344 (0.259-0.428)
	100,000	2010	0.274 (0.167-0.381)	0.333 (0.218-0.447)
Total coast-wide catch = 200,000 mt	200,000	2007	0.321 (0.243-0.397)	0.398 (0.308-0.488)
	200,000	2008	0.291 (0.216-0.367)	0.365 (0.277-0.452)
	200,000	2009	0.254 (0.177-0.332)	0.323 (0.233-0.409)
	200,000	2010	0.239 (0.131-0.348)	0.303 (0.186-0.419)
Total coast-wide catch = 300,000 mt	300,000	2007	0.321 (0.243-0.397)	0.398 (0.308-0.488)
	300,000	2008	0.278 (0.201-0.355)	0.354 (0.266-0.442)
	300,000	2009	0.230 (0.150-0.309)	0.302 (0.213-0.389)
	300,000	2010	0.205 (0.094-0.316)	0.273 (0.155-0.392)
Total coast-wide catch = 400,000 mt	400,000	2007	0.321 (0.243-0.397)	0.398 (0.308-0.488)
	400,000	2008	0.265 (0.187-0.342)	0.343 (0.253-0.432)
	400,000	2009	0.205 (0.124-0.286)	0.280 (0.190-0.371)
	400,000	2010	0.170 (0.057-0.283)	0.244 (0.123-0.364)

GAP Report E.3.b, Attachment 2, March 2007

Coastwide OY (mt)	Year	depletion			Status quo		Alternative 2007 OYs		Difference from	
		q=1.0	q prior	average	Coastwide	US OY (mt)	coastwide	US OY (mt)	Status quo (mt)	Revenue loss
200,000	2007	0.321	0.398	0.360	364,197	269,069	350,000	258,580	10,489.00	
200,000	2008	0.291	0.365	0.328		35,000 tribal		35,000 tribal	0.00	
200,000	2009	0.254	0.323	0.289		2,000 misc		2,000 misc	0.00	
200,000	2010	0.239	0.303	0.271		97,469 SS		93,064 SS	4,405.40	
					2007 US	55,696 MS		53,179 MS	2,516.80	
265,528	2010			0.250	196,172	78,903 CP		75,337 CP	3,565.80	
						232,068 non-tribal		221,580 non-tribal	10,488.00	\$1,251,832.31
										non-tribal
300,000	2007	0.321	0.398	0.360			300,000	221,640	47,429.00	
300,000	2008	0.278	0.354	0.316				30,000 tribal	5,000.00	
300,000	2009	0.230	0.302	0.266				2,000 misc	0.00	
300,000	2010	0.205	0.273	0.239				79,649 SS	17,820.20	
350,000	2007	0.321	0.398	0.360				45,514 MS	10,182.40	
350,000	2008	0.272	0.349	0.310				64,478 CP	14,425.40	
350,000	2009	0.218	0.291	0.254				189,640 non-tribal	42,428.00	\$5,064,114.06
350,000	2010	0.188	0.259	0.223						non-tribal
					2007 US		200,000	147,760	121,309.00	
368,187	2009			0.250	272,017			25,000 tribal	10,000.00	
								2,000 misc	0.00	
400,000	2007	0.321	0.398	0.360				50,719 SS	46,749.80	
400,000	2008	0.265	0.343	0.304				28,982 MS	26,713.60	
400,000	2009	0.205	0.280	0.243				41,058 CP	37,844.60	
400,000	2010	0.170	0.244	0.207				120,760 non-tribal	111,308.00	\$13,285,465.54
										non-tribal
Coastwide OY (mt)					2007 US					
based on 40-10		q=1.0	q prior	average						
575,090	2009	0.193	0.271	0.232	424,876					
878,670	2009	0.139	0.222	0.181	649,161					

Note the 350,000 mt depletion estimates are averages of the 300K and 400K depletion estimates.

The SSC notes that the results from both models could be combined to form the basis for management advice giving each model equal weight. (SSC March 2006)