

## GROUND FISH MANAGEMENT TEAM REPORT ON PACIFIC WHITING MANAGEMENT

At its February meeting, the GMT reviewed results of the 2005 STAR panel for Pacific whiting. As with the 2004 and prior assessments, the value of the coefficient for acoustic survey catchability ( $q$ ) remains the major source of uncertainty in determining the status of and appropriate harvest levels for this stock. The STAR panel identified a range of values for  $q$  of 0.6 to 1.0, and was unable to reach consensus that any portion of this range had a higher likelihood of including the true value. Model runs with  $q$  set at 0.8 were developed by the STAT team following the STAR panel meeting. Although the results of these runs were not included in the assessment or the STAR panel report, the GMT has included the 2005 whiting yields from these runs as additional points of comparison in its ranging of estimated bycatch impacts in the whiting fishery. Additionally, the STAT team included model projections based on an F45% harvest rate, as well as F40%, which is harvest rate specified in the U.S.-Canada whiting treaty. The GMT is not promoting use of F45%, but we have also included the 2005 whiting yields from these runs in examining potential bycatch implications of alternative whiting OYs because they have been presented previously.

### Range of ABCs and OYs

The assessment reports that current spawning biomass ranges from 38.3% of the unfished level if  $q=1.0$  to 41.4% if  $q=0.6$ . A matrix of OYs associated with three  $q$  assumptions and two harvest rates is provided in Table 2. Coastwide yields are shown on the left side of the table, with the corresponding U.S. shares on the right side. Table 2 also includes ABC values for F40% for the three values of  $q$ . The U.S. share of the ABC ranges from 269,545 mt, with  $q=1.0$ , to 441,525 mt, with  $q=0.6$ . Using an F40% harvest rate, the U.S. yields range from 269,069 mt, with  $q=1.0$ , to 441,525 mt, with  $q=0.6$ . Using an F45% harvest rate, the U.S. yields range from 223,343 mt, with  $q=1.0$ , to 356,766 mt, with  $q=0.6$ . The F 40% OYs for  $q$  values of 1.0 and 0.8 are slightly lower than the corresponding ABCs, because current spawning biomasses in these scenarios are somewhat less than the target biomass.

### Whiting Stock Trajectories and Risk Assessment

Two Decision Tables are presented in Table 1 (Table 14 in the assessment): one for F40% and one for F45%. The upper left and lower right panels in each table reflect use of a harvest policy that is consistent with the true value of  $q$ . Results for a state of nature where  $q=1.0$  are shown on the left, and those for  $q=0.6$  are shown on the right. The short-term biomass projections in these tables are influenced heavily by the below-average amount of whiting observed in the NMFS SW Center (Santa Cruz) juvenile survey in 2003. This survey is used to determine whiting recruitment during the first two years of projections, producing a projected 2005 age-2 recruitment level that is well below average. As a result, spawning biomass is currently projected to dip below 30% of the unfished level by 2006 if the correct  $q$  is assumed, regardless of which harvest rate is selected. Furthermore, if 2005 harvest is set using a  $q$  of 0.6 and  $q$  is really equal to 1.0, spawning biomass is projected to fall below the overfished threshold by 2006.

The STAR panel was presented with an alternative view of the strength of the 2005 recruitment from findings of the northern juvenile survey, which was initiated more recently through a joint effort by the NMFS NW Center and the Pacific Whiting Conservation Cooperative. However, this index could not be included in the modeling, since the current assessment was viewed as an update of the 2004 assessment. The upcoming 2005 NMFS acoustic survey will afford the first comprehensive look at the strength of this year-class.

### Sector Allocations and Estimated Bycatch Impacts

For each of the six U.S. OYs presented in Table 2, Table 3 reports the sector allocations of whiting, as well as estimated amounts of bycatch. Bycatch estimates for the 2005 whiting season were developed using the approach adopted for 2004, but with updated data from the 2004 fishery. A weighted average of incidental catch ratios (calculated as a ratio of species X to whiting) from years 2001 – 2004 was used, based on the following formula:  $[\.4*2004 \text{ ratio}] + [\.3*2003 \text{ ratio}] + [\.2*2002 \text{ ratio}] + [\.1*2001 \text{ ratio}]$ . For two species—canary and darkblotched—the non-tribal catch ratio during 2004 was the highest value observed during this four-year period. Graphs of bycatch ratios for these two species from 1998 to 2004 are provided in Figures 1 and 2.

In 2004, the estimated bycatch of widow rockfish was most constraining, relative to amounts of each overfished species that had previously been included in the bycatch scorecard for the whiting fishery. In this year's analysis, estimated widow bycatch under the highest whiting OY in Table 2 (230 mt) is less than the whiting fishery limit (231.8 mt) on bycatch (landings + discard mortality) published in federal regulations. Due to the high bycatch ratio in the 2004 fishery, canary is now the most constraining species. Even for the lowest whiting OY in Table 3 (223,000 mt), the estimated canary bycatch (7.7 mt) exceeds the whiting fishery bycatch limit (7.3 mt) in federal regulations. If the whiting OY were set using F40% and  $q=1.0$  (269,000 mt), the estimated canary impact would be 9.22 mt. For informational purposes, the GMT has also included, at the bottom of Table 2, a panel showing the Whiting OY, and sector allocations, that produces an estimated 7.3 mt of canary bycatch. The higher bycatch rate for darkblotched during the 2004 fishery also produces higher amounts of estimated 2005 bycatch than the 9.5 mt included in the current scorecard. The highest whiting OY is estimated to produce 26 mt of darkblotched bycatch, which would be an increase of 16.5 mt. However, roughly 190 mt of darkblotched remain unassigned to any fishery in the current scorecard. Therefore, this magnitude of increase can be easily accommodated given expectations for darkblotched catch in other fisheries.

### Sector Bycatch Limits

In March 2004, the GMT recommended, and the Council approved, the inclusion of bycatch limits as management tools to be considered in 2005 and 2006. Each sector of the whiting fishery is subject to unique catch monitoring protocols, which imply a range of monitoring capabilities for catches that would count against a bycatch limit. Currently, the at-sea sector is the only sector with a catch tracking system in place that can provide estimated catch totals in a near real-time manner. The GMT explored the legality and feasibility of having bycatch limits for the at-sea sector, while allowing that sector to access their full allocation of the U.S. whiting OY (as opposed to only allowing the at-sea sector to access a portion of their whiting allocation based on assumed bycatch rates). After discussions with NOAA General Counsel, it is the

GMT's understanding that setting sector specific bycatch limits in the whiting fishery would require a formal allocation, which involves a two meeting process and full rulemaking (proposed and final), as specified in the Groundfish FMP. This would effectively rule out sector specific bycatch limits for 2005. However, the GMT understands that this may be available for 2006 and beyond if the process for establishing sector specific bycatch limits and an analysis of the necessary monitoring and tracking of catch (in all sectors of the whiting fishery) is started this year.

The GMT also discussed the possibility of setting a whiting harvest guideline below the OY, and releasing additional whiting later in the year if bycatch was low enough to warrant such a release. However, it is the GMT's understanding that NMFS does not have a mechanism in 2005 for implementing such a process, but that this could also be an option for 2006 and beyond if the two meeting, full rulemaking process was followed.

### Management Considerations for the 2005 Whiting Fishery

The GMT would like to draw the Council's attention to two options for setting the 2005 U.S. OY for Pacific Whiting.

- Option 1: Set a U.S. whiting OY of 208,306 mt, which is expected to result in a canary bycatch of 7.3 mt.
- Option 2: Set a U.S. whiting OY that is higher than 208,306 and close the whiting fishery when the OY is reached or when a whiting fishery bycatch limit is attained – whichever comes first. If current bycatch limits remain in place, the fishery would close when total catch of canary reaches 7.3, or when the total catch of widow reaches 231.8, or when the OY of Whiting is attained – whichever comes first.

These two options reflect differing levels of risk, with regard to bycatch and fishery revenue. The GMT feels that the risk of exceeding bycatch limits in the whiting fishery is less with Option 1. Under Option 2, delays in processing catch data from the shorebased and tribal sectors could lead to the fishery exceeding bycatch limits before managers have the opportunity to close the fishery. Additionally, the whiting sectors may have an increased incentive to achieve attainment of their whiting allocation before a bycatch limit is reached. If this results in an incentive to race for fish, participants may focus more on whiting catch than on bycatch reduction, potentially leading to an earlier closure than if a lower whiting OY was specified. Due to the differential season timing among sub-sectors, and the fact that sub-sector bycatch caps cannot be specified in 2005, higher OYs pose an increased risk to the shorebased fleet that an overall bycatch limit will be reached before their whiting allocation has been achieved.

In addition to concerns involved with option 2, other questions identified by the GMT for consideration are the following:

- Could the tribal whiting fishery be closed if the whiting fishery attains the sector bycatch limit?
- Is it possible for shorebased processors to feed near real-time landings data to NMFS so that NMFS can better monitor the shorebased whiting sector?

- Is verification of catch in the shorebased and mothership sectors of the whiting fishery adequate to monitor and close the fishery in a timely manner? And if not, can it be made so for the 2005 fishery?

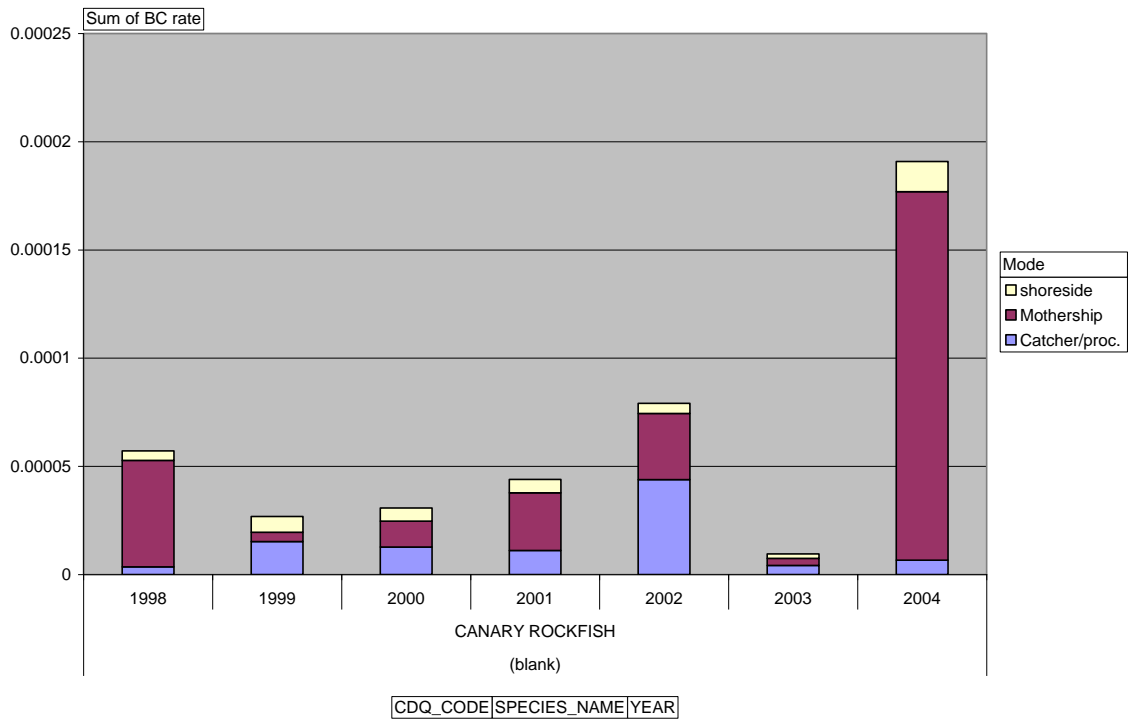


Figure 1. Non-Tribal Incidental Catch Rate of Canary in Hake Fisheries

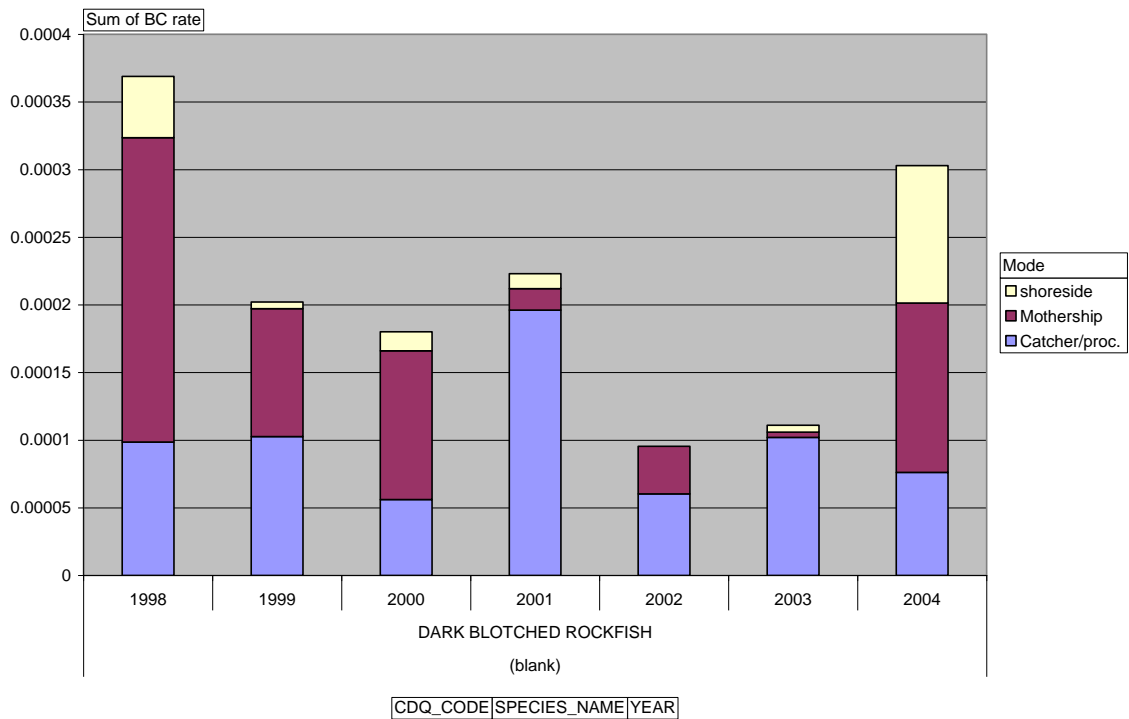


Figure 2. Non-Tribal Incidental Catch Rate of Darkblotched in Hake Fisheries

Table 1 (Assessment Table14). Decision Table evaluating the consequences of setting OY based on a correct or incorrect assumption regarding acoustic survey catchability ( $q$ ). Results in the upper left and lower right panels reflect harvests that are correctly specified using the true value of  $q$ . Projected spawning biomass (millions mt), depletion level (% unfished biomass), and exploitation rates in 2005-2014 are given.

Assumed State of Nature			True State of Nature					
			$q = 1.0$			$q = 0.6$		
Year	OY Assumed	Spawning Biomass	Percent Unfished	Exploitation Rate	Spawning Biomass	Percent Unfished	Exploitation Rate	
$q = 1.0$								
	2005	364,197	0.997	0.383	0.185	1.673	0.414	0.113
	2006	258,507	0.696	0.268	0.198	1.268	0.314	0.113
	2007	248,323	0.707	0.272	0.164	1.382	0.343	0.092
	2008	278,576	0.779	0.300	0.166	1.557	0.386	0.087
<b>F40% (40-10)</b>	2009	321,665	0.838	0.322	0.173	1.621	0.402	0.096
	2010	353,427	0.921	0.354	0.177	1.824	0.452	0.096
	2011	371,392	0.936	0.360	0.179	1.833	0.454	0.099
	2012	369,845	0.934	0.359	0.183	1.800	0.446	0.101
	2013	363,418	0.909	0.350	0.185	1.824	0.452	0.099
	2014	365,660	0.919	0.353	0.182	1.862	0.461	0.097
$q = 0.6$								
	2005	597,625	0.997	0.383	0.306	1.673	0.414	0.113
	2006	422,115	0.578	0.222	0.413	1.185	0.298	0.195
	2007	382,138	0.521	0.200	0.361	1.140	0.286	0.159
	2008	408,865	0.550	0.212	0.350	1.192	0.300	0.163
<b>F40% (40-10)</b>	2009	450,905	0.594	0.229	0.350	1.225	0.308	0.171
	2010	489,969	0.641	0.246	0.367	1.330	0.334	0.172
	2011	515,007	0.639	0.246	0.364	1.334	0.335	0.174
	2012	530,105	0.623	0.240	0.385	1.370	0.344	0.179
	2013	540,436	0.577	0.222	0.433	1.377	0.346	0.184
	2014	564,831	0.562	0.216	0.445	1.430	0.359	0.179

Assumed State of Nature			True State of Nature					
			$q = 1.0$			$q = 0.6$		
Year	OY Assumed	Spawning Biomass	Percent Unfished	Exploitation Rate	Spawning Biomass	Percent Unfished	Exploitation Rate	
$q = 1.0$								
	2005	302,305	0.997	0.383	0.154	1.673	0.414	0.094
	2006	230,359	0.729	0.280	0.168	1.300	0.322	0.098
	2007	225,028	0.753	0.289	0.141	1.428	0.354	0.081
	2008	251,998	0.831	0.319	0.141	1.609	0.399	0.077
<b>F45% (40-10)</b>	2009	290,260	0.896	0.345	0.146	1.675	0.415	0.084
	2010	318,141	0.997	0.383	0.149	1.896	0.470	0.084
	2011	336,497	1.020	0.392	0.152	1.909	0.473	0.086
	2012	338,863	1.022	0.393	0.154	1.881	0.466	0.089
	2013	336,312	1.008	0.388	0.156	1.910	0.473	0.088
	2014	338,300	1.018	0.391	0.155	1.955	0.485	0.086
$q = 0.6$								
	2005	482,899	0.997	0.383	0.247	1.673	0.414	0.149
	2006	370,917	0.637	0.245	0.327	1.207	0.299	0.167
	2007	366,140	0.601	0.231	0.301	1.245	0.309	0.139
	2008	410,192	0.625	0.240	0.312	1.365	0.338	0.138
<b>F45% (40-10)</b>	2009	453,579	0.655	0.252	0.322	1.409	0.349	0.148
	2010	479,357	0.697	0.268	0.334	1.523	0.377	0.149
	2011	488,955	0.689	0.265	0.324	1.519	0.376	0.151
	2012	479,261	0.677	0.260	0.326	1.461	0.362	0.154
	2013	472,026	0.648	0.249	0.340	1.440	0.357	0.154
	2014	474,799	0.656	0.252	0.342	1.463	0.363	0.152

Table 2.--Alternative 2005 ABCs and OYs for whiting, for ranges of acoustic survey catchability (q) values and harvest rates.

Model q assumption	Coastwide			U.S. Share (73.88%)		
	F40%		F45%	F40%		F45%
	ABC	OY	OY	ABC	OY	OY
0.6	597,625	597,625	482,899	441,525	441,525	356,766
0.8	432,100	428,944	357,737	319,235	316,904	264,296
1.0	364,842	364,197	302,305	269,545	269,069	223,343

*- Ralph's proposal*  
*- Phi's proposal*

Table 3.-- Whiting sector allocations and estimated bycatch of selected groundfish species for the U.S. OY alternatives presented in Table 1.

q	F-Rate	Sector	Whiting allocation	Estimated bycatch (mt)							
				Bocaccio	Canary	Dark-blotched	Lingcod	POP	Widow	Yellow-eye	Sablefish
0.6	F40%	Tribal	35,000	0.00	3.04	0.04	0.41	1.34	10.02	0.00	0.26
		Mothership	97,086	0.00	7.55	5.82	1.62	1.88	41.63	0.01	15.83
		CP	137,539	0.00	1.90	12.75	0.92	11.65	139.02	0.02	55.87
		Shoreside	169,901	0.00	1.32	7.35	4.09	4.17	39.38	0.01	297.97
		<b>Total</b>	<b>441,525</b>	<b>0.00</b>	<b>13.81</b>	<b>25.96</b>	<b>7.03</b>	<b>19.04</b>	<b>230.05</b>	<b>0.03</b>	<b>369.93</b>
0.6	F45%	Tribal	35,000	0.00	3.04	0.04	0.41	1.34	10.02	0.00	0.26
		Mothership	76,744	0.00	5.97	4.60	1.28	1.48	32.91	0.01	12.51
		CP	108,720	0.00	1.50	10.08	0.72	9.21	109.89	0.01	44.17
		Shoreside	134,302	0.00	1.04	5.81	3.23	3.30	31.13	0.00	235.53
		<b>Total</b>	<b>356,766</b>	<b>0.00</b>	<b>11.55</b>	<b>20.53</b>	<b>5.64</b>	<b>15.33</b>	<b>183.95</b>	<b>0.02</b>	<b>292.47</b>
0.8	F40%	Tribal	35,000	0.00	3.04	0.04	0.41	1.34	10.02	0.00	0.26
		Mothership	67,177	0.00	5.23	4.02	1.12	1.30	28.81	0.00	10.95
		CP	95,167	0.00	1.31	8.83	0.63	8.06	96.19	0.01	38.66
		Shoreside	117,560	0.00	0.91	5.09	2.83	2.89	27.25	0.00	206.17
		<b>Total</b>	<b>316,904</b>	<b>0.00</b>	<b>10.49</b>	<b>17.97</b>	<b>4.99</b>	<b>13.59</b>	<b>162.27</b>	<b>0.02</b>	<b>256.04</b>
0.8	F45%	Tribal	35,000	0.00	3.04	0.04	0.41	1.34	10.02	0.00	0.26
		Mothership	54,551	0.00	4.24	3.27	0.91	1.05	23.39	0.00	8.89
		CP	77,281	0.00	1.07	7.17	0.51	6.54	78.11	0.01	31.39
		Shoreside	95,464	0.00	0.74	4.13	2.30	2.34	22.12	0.00	167.42
		<b>Total</b>	<b>264,296</b>	<b>0.00</b>	<b>9.09</b>	<b>14.60</b>	<b>4.13</b>	<b>11.29</b>	<b>133.65</b>	<b>0.02</b>	<b>207.97</b>
1	F40%	Tribal	35,000	0.00	3.04	0.04	0.41	1.34	10.02	0.00	0.26
		Mothership	55,696	0.00	4.33	3.34	0.93	1.08	23.88	0.00	9.08
		CP	78,903	0.00	1.09	7.32	0.53	6.68	79.76	0.01	32.05
		Shoreside	97,469	0.00	0.76	4.22	2.35	2.39	22.59	0.00	170.94
		<b>Total</b>	<b>269,069</b>	<b>0.00</b>	<b>9.22</b>	<b>14.91</b>	<b>4.21</b>	<b>11.49</b>	<b>136.25</b>	<b>0.02</b>	<b>212.33</b>
1	F45%	Tribal	30,000	0.00	2.61	0.03	0.35	1.15	8.59	0.00	0.22
		Mothership	45,922	0.00	3.57	2.75	0.77	0.89	19.69	0.00	7.49
		CP	65,057	0.00	0.90	6.03	0.43	5.51	65.76	0.01	26.43
		Shoreside	80,364	0.00	0.62	3.48	1.94	1.97	18.63	0.00	140.94
		<b>Total</b>	<b>223,343</b>	<b>0.00</b>	<b>7.70</b>	<b>12.29</b>	<b>3.48</b>	<b>9.52</b>	<b>112.67</b>	<b>0.01</b>	<b>175.08</b>
Whiting OY that produces 7.3 mt of canary	Tribal	30,000	0.00	2.61	0.03	0.35	1.15	8.59	0.00	0.22	
	Mothership	42,313	0.00	3.29	2.54	0.71	0.82	18.14	0.00	6.90	
	CP	59,944	0.00	0.83	5.56	0.40	5.08	60.59	0.01	24.35	
	Shoreside	74,048	0.00	0.57	3.20	1.78	1.82	17.16	0.00	129.86	
	<b>Total</b>	<b>208,306</b>	<b>0.00</b>	<b>7.30</b>	<b>11.33</b>	<b>3.24</b>	<b>8.86</b>	<b>104.49</b>	<b>0.01</b>	<b>161.34</b>	