

GROUND FISH MANAGEMENT TEAM REPORT ON
2009 PACIFIC WHITING HARVEST SPECIFICATIONS AND MANAGEMENT
MEASURES

The Groundfish Management Team (GMT) reviewed the Pacific Whiting (hake) stock assessment and Stock Assessment Review (STAR) Panel report (Agenda Items G.1.a Attachments 1 and 2). The GMT analyses focus on the base case model as approved by the STAR Panel and Scientific and Statistical Committee (SSC).

Estimates of spawning stock biomass from the current assessment are considerably lower than the estimates from the previous assessment (Agenda Item G.1.a Attachment 1, Table b). New data include historical lengths from California, and 2008 catch, length, and age data from the U.S. and Canadian fisheries. Major changes to model structure include revisions to the descriptions of ageing imprecision and increased flexibility in historical fishery selectivity. Changes in the perception of stock status continue to be reflected in uncertainty regarding catchability (q) of the acoustic survey.

Whiting Stock Depletion and Risk Assessment

The GMT's analysis focuses on the SSC-preferred model for the 2009 whiting assessment (Hamel and Stewart, 2009). The base model suggests the stock is at 32% of unfished biomass in 2009 (Agenda Item G.1.a Attachment 1, Table b), with a reported range of 15% to 49%.¹ This range spans both the overfished and target biomass reference points, reflecting the considerable uncertainty in current stock status.

The current assessment describes catches in 2008 as being dominated by the strong 1999 year-class with evidence of an emergent 2005 year class. Fishing mortality rates have increased since 2003 but constraints associated with bycatch of overfished species have resulted in landings below the OY in recent years. Spawning stock biomass has been in decline since 2003, with estimated levels approaching all time lows. In addition, as described in more detail below, there appears to be a risk of exceeding the overfished threshold in the next few years.

Changes related to ageing imprecision resulted in lower estimates of recruitment and increased recruitment variability. This results in lower estimates of spawning stock biomass and increased uncertainty in projections. Although the current estimate of relative depletion is consistent with the previous assessment, the reduction in spawning stock biomass results in lower harvestable biomass.

¹ The stock assessment uses two statistical techniques to estimate depletion levels. The 32% estimate is a maximum likelihood estimate (MLE). The second method estimates current and future depletion levels in the decision tables based on the median posterior probability distribution obtained from Markov Chain Monte Carlo (MCMC) simulations. This method estimates current stock depletion to be 29%.

Management Considerations

Setting the 2009 Coastwide Whiting OY

The Pacific whiting decision table is composed of three states of nature estimates that describe 1) state of female spawning biomass, 2) the state of depletion, and 3) the relative state of overfishing (relative spawning potential ratio (SPR)). These states of nature are related to the population through projected catches (TABLE 1).

Table 1. Extended decision table with three year projections of posterior distributions for Pacific hake female spawning biomass, depletion and relative spawning potential ratio ($1-SPR/1-SPR_{Target=0.4}$; values greater than 1.0 denote overfishing).

| Management Action | | States of nature | | | | | | | | | | | | | | |
|-------------------|-----------------------|--|------|------|------------------|------|--|------|------|------|------|--|------|------|------|------|
| | | Female spawning biomass (millions mt) posterior interval | | | | | Estimated depletion posterior interval | | | | | Relative spawning potential ratio posterior interval | | | | |
| Year | Coast-wide catch (mt) | 5th | 25th | 50th | 75 th | 95th | 5th | 25th | 50th | 75th | 95th | 5th | 25th | 50th | 75th | 95th |
| 2009 | 50,000 | 0.25 | 0.33 | 0.40 | 0.48 | 0.64 | 18% | 24% | 29% | 34% | 46% | 0.24 | 0.31 | 0.36 | 0.42 | 0.52 |
| 2010 | 50,000 | 0.23 | 0.33 | 0.41 | 0.50 | 0.69 | 17% | 24% | 29% | 36% | 49% | 0.22 | 0.29 | 0.34 | 0.41 | 0.52 |
| 2011 | 50,000 | 0.24 | 0.33 | 0.43 | 0.56 | 0.90 | 17% | 24% | 31% | 40% | 64% | 0.19 | 0.27 | 0.33 | 0.40 | 0.51 |
| 2009 | 100,000 | 0.25 | 0.33 | 0.40 | 0.48 | 0.64 | 18% | 24% | 29% | 34% | 46% | 0.43 | 0.52 | 0.60 | 0.68 | 0.81 |
| 2010 | 100,000 | 0.21 | 0.31 | 0.38 | 0.48 | 0.66 | 15% | 22% | 28% | 34% | 47% | 0.40 | 0.52 | 0.60 | 0.70 | 0.86 |
| 2011 | 100,000 | 0.20 | 0.29 | 0.39 | 0.52 | 0.86 | 14% | 21% | 28% | 37% | 61% | 0.37 | 0.50 | 0.60 | 0.72 | 0.89 |
| 2009 | 137,526 | 0.25 | 0.33 | 0.40 | 0.48 | 0.64 | 18% | 24% | 29% | 34% | 46% | 0.54 | 0.65 | 0.73 | 0.82 | 0.96 |
| 2010 | 131,109 | 0.19 | 0.29 | 0.37 | 0.46 | 0.65 | 14% | 21% | 26% | 33% | 46% | 0.51 | 0.64 | 0.74 | 0.84 | 1.02 |
| 2011 | 156,111 | 0.17 | 0.26 | 0.36 | 0.49 | 0.83 | 12% | 19% | 26% | 35% | 59% | 0.53 | 0.70 | 0.82 | 0.96 | 1.14 |
| 2009 | 184,000 | 0.25 | 0.33 | 0.40 | 0.48 | 0.64 | 18% | 24% | 29% | 34% | 46% | 0.65 | 0.77 | 0.86 | 0.95 | 1.08 |
| 2010 | 184,000 | 0.17 | 0.27 | 0.35 | 0.44 | 0.63 | 13% | 19% | 25% | 31% | 45% | 0.65 | 0.80 | 0.91 | 1.02 | 1.20 |
| 2011 | 184,000 | 0.13 | 0.22 | 0.32 | 0.45 | 0.79 | 9% | 16% | 23% | 32% | 56% | 0.62 | 0.81 | 0.95 | 1.10 | 1.31 |
| 2009 | 215,000 | 0.25 | 0.33 | 0.40 | 0.48 | 0.64 | 18% | 24% | 29% | 34% | 46% | 0.72 | 0.84 | 0.93 | 1.02 | 1.15 |
| 2010 | 215,000 | 0.16 | 0.25 | 0.33 | 0.42 | 0.61 | 12% | 18% | 24% | 30% | 44% | 0.73 | 0.89 | 1.00 | 1.11 | 1.29 |
| 2011 | 215,000 | 0.11 | 0.19 | 0.29 | 0.42 | 0.77 | 7% | 14% | 21% | 30% | 55% | 0.70 | 0.91 | 1.05 | 1.22 | 1.43 |
| 2009 | 253,582 | 0.25 | 0.33 | 0.40 | 0.48 | 0.64 | 18% | 24% | 29% | 34% | 46% | 0.79 | 0.91 | 1.00 | 1.09 | 1.22 |
| 2010 | 193,109 | 0.14 | 0.24 | 0.32 | 0.41 | 0.60 | 10% | 17% | 23% | 29% | 43% | 0.69 | 0.86 | 0.98 | 1.10 | 1.29 |
| 2011 | 189,054 | 0.10 | 0.19 | 0.28 | 0.42 | 0.76 | 7% | 14% | 21% | 30% | 54% | 0.65 | 0.86 | 1.01 | 1.18 | 1.40 |
| 2009 | 365,784 | 0.25 | 0.33 | 0.40 | 0.48 | 0.64 | 18% | 24% | 29% | 34% | 46% | 0.95 | 1.07 | 1.15 | 1.23 | 1.35 |
| 2010 | 256,993 | 0.09 | 0.18 | 0.27 | 0.36 | 0.55 | 7% | 14% | 19% | 25% | 39% | 0.85 | 1.04 | 1.17 | 1.30 | 1.45 |
| 2011 | 222,901 | 0.04 | 0.12 | 0.21 | 0.34 | 0.69 | 3% | 9% | 15% | 25% | 50% | 0.77 | 1.02 | 1.20 | 1.38 | 1.46 |

100,000 mt option

The current assessment suggests that this constant catch scenario results in a 1% decline in relative stock depletion in 2010. Female spawning biomass is projected to increase slightly between 2010 and 2011. All higher catch levels presented in Table 1 result in a consistent decline in female spawning biomass over the 2009-2011 period.

137,526 mt option

This option uses the 40-10 rule and $F_{40\%}$ harvest rate to set catch assuming the 'pessimistic model' wherein catchability (q) equals 1.31. This results in projected depletion rates 1% above the limit reference point/overfished level of $SB_{25\%}$. The probability of overfishing the resources in 2010 is unlikely based on the $SPR_{40\%}$ proxy out to the 95th percentile.

184,000 mt option

This option, requested by the GMT, determines the maximum catch level at which the depletion rate matches the overfished level (25%) in year 2010 at a 50% probability. Through 2011 there is less than a 50% chance of overfishing. However, this catch level will exceed the overfished limit in 2011. Caution is necessary when targeting the limit reference point given the large uncertainty in the assessment and, thus, the current state of the population.

215,000 mt option

A constant coastwide catch of 215,000 mt is the OY associated with the posterior median estimate of stock depletion (29%) (Agenda item G.1.a, Attachment 1, Table f). This amount of catch does not exceed the target harvest rate in 2009. However, there is a greater than 50% probability that spawning biomass will drop below the overfished threshold in 2010.

253,582 mt option

A coastwide catch of 253,582 mt is the 40-10 adjusted OY based on the SSC's preferred estimate of stock depletion (32%) (Agenda item G.1.a, Attachment 1, Table f). Under this constant harvest rate option, the probability of overfishing in 2009 is approximately 50% for this harvest level based on the current assessment. However, the probability of being below the 25% biomass threshold (overfished status) in 2010 is greater than 50% for this management action (Agenda item G.1.a, Attachment 1, Table g(2)).

365,784 mt option

This constant harvest rate option is closest to the 2008 coastwide OY (364,842 mt). Under this option, the probabilities of overfishing in 2009 and being overfished at the start of 2010 both exceed 50%.

Set Asides

Prior to calculating the whiting sector allocations, tribal set-asides and whiting removals in other fisheries must be accounted. The Final Rule (74 FR 9874) published on March 6, 2009 specifies a 50,000 mt tribal set aside. Information presented in the report on *Estimated Discard and Total Catch of Selected Groundfish Species in the 2007 U.S. West*

Coast Fisheries (NWFSC, December 31, 2008) indicate that 2,808 mt of whiting were caught in the shrimp trawl fishery and 1,155 mt in the limited entry non-whiting trawl fishery (Table 17, page 59). The Northwest Region anticipates approximately 50 mt will be needed for research in 2009. In total, 4,000 mt will be deducted from the US OY prior to determining the non-tribal sector allocations.

Once the set asides have been removed from the US OY, 42% of the whiting OY is available for the shoreside, 34% for the catcher-processor, and 24% for the mothership sectors. Table 2 outlines forward catch projections (based on the posterior median of depletion), the resulting allocations by sector after set asides, and projected 2010 depletion levels based on the median of the posterior distribution of the MCMC.

Table 2. Potential 2009 Pacific Whiting Specifications (mt).

| Coastwide OY | U.S. OY | Set-asides | | Non-treaty whiting allocations | | | | Projected 2010 Depletion (% of B0) |
|--------------|---------|-----------------------------|--------|--------------------------------|--------|--------|--------|------------------------------------|
| | | Non-whiting fishery bycatch | Tribal | Total | MS | CP | SSW | |
| 215,000 | 158,842 | 4,000 | 50,000 | 104,842 | 25,162 | 35,646 | 44,034 | 24% |
| 184,000 | 135,939 | | | 81,939 | 19,665 | 27,859 | 34,414 | 25% |
| 150,000 | 110,820 | | | 56,820 | 13,637 | 19,319 | 23,864 | 26% |
| 100,000 | 73,880 | | | 19,880 | 4,771 | 6,759 | 8,350 | 28% |

Management Measures

The management measures for the 2009-10 limited entry whiting trawl management include sector-specific bycatch limits for the non-tribal sectors. Bycatch limits for canary, darkblotched, and widow rockfish have been apportioned according to the pro-rata distribution of the whiting allocation with 34 percent of the available yields of these species' bycatch limits allocated to the catcher-processor sector, 24 percent to the mothership sector, and 42 percent to the shoreside sector. This pro-rata distribution is specified in regulation. NMFS also has the ability to institute depth restrictions, on a sector-specific basis, in order to reduce overfished species impacts. Further, NMFS will automatically close the non-tribal whiting fishery upon projection of attainment of a bycatch limit rather than waiting until the limit is attained.

The Council also established a rollover provision for unused bycatch limit yields, such that when a whiting sector is closed by attaining its whiting allocation or if it is closed by projected attainment of a sector-specific bycatch limit, any remaining yield of the bycatch limit is distributed to the other non-tribal whiting sectors using the same pro-rata apportionment used to allocate whiting quota and sector-specific bycatch limits.

Northwest Region staff indicated that monitoring for the catcher vessels delivering to motherships, part of the Council's preferred alternative for whiting, was not able to be accommodated for the 2009 season. Additionally, it is unclear whether non-EFP vessels who are fishing in the RCA with mid-water gear during the primary season will carry observers (paid for by the vessel owner). If observers are not onboard the vessel, the GMT will continue to estimate bycatch impacts of this operation, based on best available data.

Amendments 10 and 15

Amendment 10, the maximized retention and monitoring program for the shoreside whiting fishery will not be implemented in time for the 2009 fishery. As in years past, the shoreside fishery will continue to be monitored under an EFP. Information from the Northwest Region indicates that Amendment 15, the whiting limited entry program should be published this week.

GMT Recommendations

- 1) The Council should select coastwide and U.S. OYs that reflect their best estimate of the current status of the stock and future biomass projections (Table 1) while taking into account the management measures needed to prosecute the fishery.
- 2) Prior to calculating the sector specific whiting allocations, the Council should consider a 4,000 mt set aside for catch/mortality in non-tribal non-whiting fisheries.

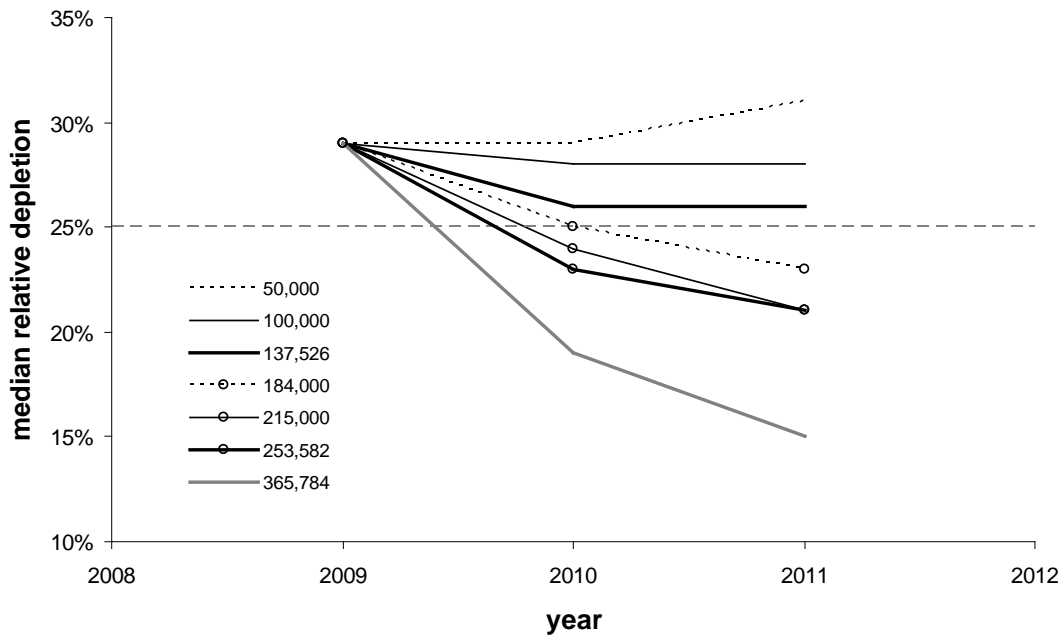


Figure 1. Median relative depletion (current biomass / unfished equilibrium biomass) projections based on posterior distributions from the base model. Catch options correspond to the proposed 2009 coastwide catches listed in Table 1. The overfished threshold (25% of unfished biomass) is shown for reference.

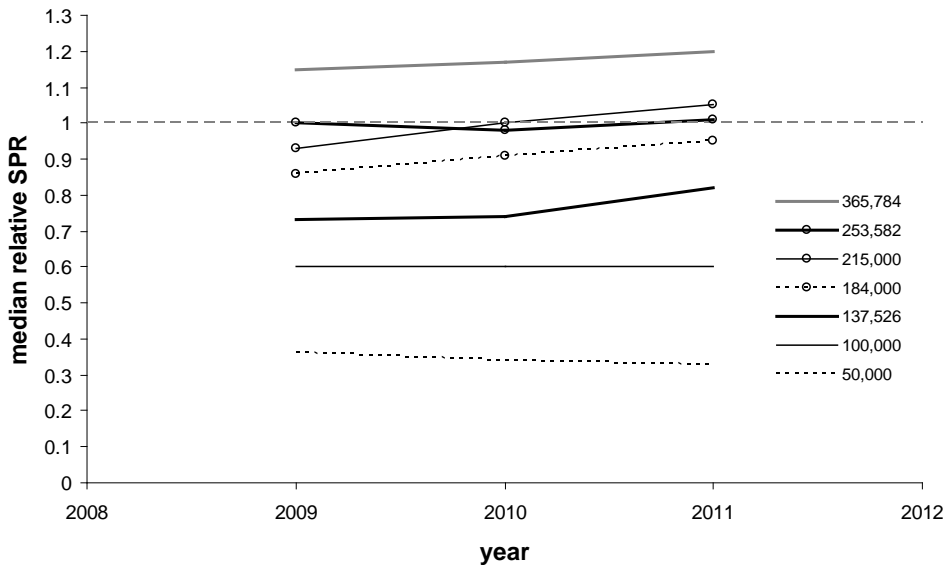


Figure 2. Median relative spawning potential ratio ($[1-SPR]/[1-SPR_{40\%}]$) projections based on posterior distributions from the base model. Catch options correspond to the proposed 2009 coastwide catches listed in Table 1. Values greater than 1 indicate overfishing.

Appendix A. Calculating the Commercial Whiting OY

The groundfish regulations specify that the deductions from the U.S. OY, in order to calculate the commercial whiting OY, are to include the tribal set-aside and potential mortality/catches in: scientific research projects and non-groundfish fisheries. The GMT discussed the best estimates available for whiting catch in the above mentioned sources, and provides the following information to inform the non-tribal set-aside for calculating the 2009 commercial whiting OY (Table A1).

Table A1. Comparison of non-tribal set-asides, used to calculate the commercial whiting OYs and the actual estimates of mortality of whiting.

| Sources of non-tribal mortality | | 2005 – Set asides ^{1/} | 2005 – Catch Est. ^{2/} | 2006 – Set-asides ^{1/} | 2006 – Catch Est. ^{2/} | 2007 – Set-asides ^{1/} | 2007 – Catch Est. ^{2/} | 2008 – Set-asides ^{1/} | 2009 – Non-tribal set-aside | |
|-------------------------------------|-------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---|---|
| Research | | 2,000 | 42 | 200 | 16 | - | 49 | 2,000 | 49 (2009 should be similar to 2007 value, due to similar surveys conducted) | |
| Bycatch in non-groundfish fisheries | Pink Shrimp | | unknown | 1,800 | unknown | 2,000 | 2,808 | | None observed | 2,808 (best estimated of mortality from non-groundfish fisheries in 2007) |
| | CA halibut | | >0.5 | | No observations | | | | | |
| Total: | | 2,000 | 42 | 2,000 | 16 | 2,000 | 2,857 | 2,000 | 2,857 | |

1/ Described in Federal regulations

2/ Described in: NWFS total mortality report for each year.

The GMT also discussed mortality of whiting in the non-whiting groundfish fishery, which occurs primarily in the non-whiting bottom trawl fishery. Previously, mortality estimates shown in Table A2 were not explicitly removed from the whiting OY, prior to setting the sector specific whiting allocations. However, the total whiting mortality from all non-whiting (including the non-whiting bottom trawl fishery) was accounted for within the 2,000 mt non-tribal set-aside described above.

Table A2: Mortality of whiting in non-whiting fisheries.

| | 2005 – Set asides ^{1/} | 2005 – mortality est. ^{2/} | 2006 – Set-asides ^{1/} | 2006 – mortality est. ^{2/} | 2007 – Set-asides ^{1/} | 2007 – mortality est. ^{2/} | 2008 – Set-asides ^{1/} | 2008 – mortality est. ^{3/} | 2009 – |
|-------------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|---|--------|
| LE bottom trawl fishery | - | 822 | - | 941 | - | 1,155 | - | Likely similar to 2007, though increasing trend | 1,155 |

1/ According to Federal regulations, set-asides of catch in commercial groundfish fisheries must be deducted from the commercial OY, and not from the U.S. OY.

2/ Described in: NWFS total mortality report for each year.

3/ Landings in PacFIN are similar to landings in 2007, so it is likely that total mortality would be similar.

Based on information presented in the 2007 total mortality report, 2,000 mt is no longer an adequate set-aside to account for all whiting mortality that is estimated to occur outside of the primary whiting season. The Council should consider establishing a non-tribal set aside based on the whiting mortality described in Table A1. The Council should consider subtracting whiting mortality from the non-whiting limited entry bottom trawl fishery from the commercial whiting OY before the sector specific whiting allocations are calculated, pending additional guidance from NMFS.