

West Coast Rock Lobster OMP 2015: Some initial results

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A full description of the OMP simulation framework and the underlying OMP is described in FISHERIES/2015/MAY/SWG_WCRL/13. We report here on some initial OMP variants for consideration as possible new OMP-2015 choices to be used for recommending catch limits at the sector and super-area level for the west coast rock lobster fishery.

Following an earlier SWG meeting, it is assumed that 4% of both the IR and nearshore total quota will be allowed to be taken in A7 (shifted from A8) from 2016 onwards.

Note that the OMP variants reported here include a rule that transfers 20% of offshore quota from A8+ into A34 and A56 (50:50 split) from 2015¹ onwards. A further rule to transfer 10% of the remaining A8+ offshore quota (after the above rule has been applied) from A8+ to A7 is also incorporated. These rules are very similar to those incorporated in the previous OMP, and are used in order to produce a more even split of resource recovery over the super-areas.

Four OMP variants are reported here.

VAR1: The maximum inter-annual Global (and commercial offshore) TAC increase is **10%** (this is what is currently assumed in OMP-2011 re-tuned).

VAR2: The maximum inter-annual Global (and commercial offshore) TAC increase is increased to **15%** if required.

VAR3: The maximum inter-annual Global (and commercial offshore) TAC increase is increased to **20%** if required.

VAR4: VAR1, but the R_2004 parameter is removed from the geometric mean and as the R_high option for A7 and A8+.

VAR2 and VAR3 are considered to allow possible greater increases in TAC by lessening the overshoot of the median 35% 2021 recovery target. VAR4 is included to indicate the influence of the high (but imprecisely estimated) recent recruitment estimates on results.

¹ The split season 2015/16 is referred to by the first year 2015

Results

Table 1 reports the simulation results of VAR1 – VAR4. The OMP 2011 simulation results are also included for comparison. Medians and 5th and 95th percentiles are reported. Table 2 compares the Global inter-annual TAC changes for each season. Figures 3 and 4 plot the Global TACs and B75m(y/06) trajectories.

In order to help understand why the OMP simulations in 2015 are more optimistic than those for OMP 2011, Table 3 and Figures 1 and 2 report results from the recent 2015 updated assessments (which underly the 2015 OMP simulation results). It is clear that the most recently updated assessments of the resource are more optimistic than previous assessments. In particular, note that most of the recruitment R_2004 parameter estimates are much higher for the 2015 assessments than for the previous assessments. These parameters, whilst estimated with poor precision, do play a very substantial role when projecting the populations forward into the future. There is about a nine year lag between “recruitment” and the time these young lobsters grow sufficiently large enough to enter into the legal sized portion of the population. Thus very good recruitment in 2004 is only just beginning to impact the B75m portion of the resource in 2013 (the most recent season for which data are available). The full impact of R_2004 will become evident only in the following (2014+ years).

Enforcing a maximum 10% inter-annual TAC constraint precludes a median biomass recovery target of 35% (one gets 57% instead!). Note that there are only six years of applying the OMP formula before the target year of 2021. Increasing the maximum TAC increase constraint to 15% results in a median B75m(21/06)=1.46, and to 20% results in a median B75m(21/06) value of 1.39.

Note also that the lower 5th percentile B75m(21/06) are in all cases larger (>0.90) than the previous OMP 2011 had predicted (0.72).

Further work will seek refinements to increase the lower 5th percentiles for the 2021 biomass in A12 and A34, which are both below 60% of their estimated 2006 values.

Table 1: VAR1-VAR4 OMP 2015 simulation results compared with those for OMP 2011 re-tuned. Medians with 5th and 95th percentile values shown in parentheses. (Results for 1000 simulations for OMP 2011 and 100 for OMP 2015 are reported.)

		OMP 2011 retuned (Max TAC incr. constraint 10%)	OMP 2015 VAR1 Max TAC incr. constraint 10%	OMP 2015 VAR2 Max TAC incr. constraint 15%	OMP 2015 VAR3 Max TAC incr. constraint 20%	OMP 2015 VAR4 Max TAC increase constraint 10% + remove R_04 par from geometric mean etc.
Tuning parameter	α	2300	5000	5000	5000	5000
10-yr (2011-2020) Ave Global TAC	A1-2	37 [25; 44]	45 [38; 45]	53 [42; 54]	56 [45; 58]	45 [38; 45]
	A3-4	364 [202; 532]	452 [227; 488]	521 [245; 580]	561 [253; 628]	452 [226; 488]
	A5-6	165 [141; 182]	384 [356; 423]	449 [347; 500]	485 [370; 543]	384 [357; 422]
	A7	459 [62; 745]	211 [194; 222]	237 [201; 252]	247 [203; 267]	212 [195; 224]
	A8	1151 [995; 1379]	1166 [1100; 1184]	1291 [1142; 1317]	1343 [1177; 1385]	1166 [1102; 1184]
	T	2156 [1641; 2747]	2235 [1980; 2239]	2520 [2100; 2528]	2640 [2211; 2687]	2235 [1981; 2239]
10-yr (2011-2020) Ave offshore TAC	A1-2	0 [0; 0]	0 [0; 0]	0 [0; 0]	0 [0; 0]	0 [0; 0]
	A3-4	224 [101; 379]	312 [138; 347]	356 [148; 412]	384 [152; 449]	312 [138; 347]
	A5-6	60 [60; 60]	282 [254; 321]	329 [249; 381]	356 [260; 410]	281 [253; 319]
	A7	452 [60; 737]	193 [177; 204]	215 [183; 231]	223 [185; 243]	195 [178; 206]
	A8	602 [518; 754]	649 [628; 671]	684 [630; 710]	704 [634; 733]	648 [628; 670]
	T	1312 [992; 1757]	1463 [1295; 1466]	1633 [1344; 1638]	1720 [1410; 1737]	1462 [1296; 1466]
10-yr (2011-2020) Ave near shore TAC	A1-2	23 [15; 28]	27 [23; 27]	33 [26; 33]	34 [27; 35]	27 [23; 27]
	A3-4	68 [45; 84]	78 [48; 78]	93 [54; 93]	95 [55; 98]	78 [48; 78]
	A5-6	30 [24; 37]	34 [29; 34]	41 [33; 41]	42 [35; 43]	34 [29; 34]
	A7	0 [0; 0]	9 [8; 9]	12 [9; 12]	13 [10; 13]	9 [8; 9]
	A8	301 [234; 372]	308 [269; 308]	363 [301; 364]	372 [317; 381]	308 [269; 308]
	T	422 [323; 520]	432 [387; 432]	503 [420; 504]	513 [440; 526]	432 [387; 432]
10-yr (2011-2020) Ave subsistence TAC	A1-2	11 [7; 13]	15 [13; 15]	18 [14; 18]	19 [15; 20]	15 [13; 15]
	A3-4	51 [31; 58]	49 [31; 50]	58 [34; 59]	62 [36; 65]	50 [31; 51]
	A5-6	53 [41; 61]	56 [49; 57]	66 [53; 66]	71 [55; 73]	56 [49; 57]
	A7	0 [0; 0]	5 [5; 5]	7 [5; 7]	8 [6; 8]	5 [4; 5]
	A8	130 [97; 149]	144 [124; 145]	171 [140; 172]	187 [151; 192]	144 [124; 145]
	T	244 [180; 278]	262 [226; 262]	296 [242; 297]	314 [261; 228]	262 [226; 262]
10 yr (2011-2020) Ave Total Recreational Take	T	173 [124; 210]	99 [92; 99]	111 [93; 111]	116 [96; 118]	99 [92; 99]
<i>B75_m</i> (21/06)	A1-2	1.26 [0.66; 3.05]	0.77 [0.41; 2.02]	0.72 [0.38; 1.97]	0.69 [0.36; 1.92]	0.77 [0.41; 2.02]
	A3-4	1.28 [0.50; 3.77]	1.29 [0.59; 2.41]	1.16 [0.51; 2.16]	1.02 [0.46; 2.07]	1.26 [0.59; 2.40]
	A5-6	1.62 [1.14; 3.30]	1.93 [0.82; 4.35]	1.58 [0.62; 3.86]	1.36 [0.43; 3.62]	1.85 [0.80; 4.26]
	A7	1.93 [0.48; 8.63]	1.90 [1.24; 2.89]	1.83 [1.20; 2.82]	1.82 [1.20; 2.78]	2.00 [1.54; 2.89]
	A8	0.98 [0.44; 2.41]	1.39 [0.82; 2.70]	1.29 [0.78; 2.59]	1.24 [0.74; 2.53]	1.32 [0.81; 2.48]
	T	1.35 [0.72; 3.11]	1.57 [0.99; 2.55]	1.46 [0.94; 2.39]	1.39 [0.90; 2.31]	1.53 [1.02; 2.39]

Table 2: Global TAC % inter-annual changes (median, 5th and 95th percentiles).

season	% Global TAC change		
	VARX 10% maximum inter-annual TAC increase constraint	VARY 15% maximum inter-annual TAC increase constraint	VARZ 20% maximum inter-annual TAC increase constraint
2011	6.10	6.10	6.10
2012	0.00	0.00	0.00
2013	-11.08	-11.08	-11.08
2014	-16.50	-16.50	-16.50
2015	6.23 [6.23; 6.23]	9.34 [-6.21; 9.34]	12.45 [-6.21; 12.45]
2016	4.89 [4.79; 4.97]	13.06 [7.18; 13.14]	18.36 [9.99; 18.44]
2017	5.44 [5.05; 5.53]	13.80 [3.66; 13.99]	11.14 [-3.04; 11.26]
2018	9.14 [-3.72; 9.25]	14.06 [-7.15; 14.19]	19.09 [-7.17; 19.20]
2019	9.37 [-17.73 [#] ; 9.49]	9.91 [-17.60 [#] ; 10.11]	11.67 [-16.31; 19.20]
2020	5.92 [-20 [#] ; 89; 6.08]	14.42 [-15.82 [#] ; 14.62]	17.45 [-19.66; 19.59]

[#] These values are low due to "RULE 1" of the OMP being implemented in cases of extremely poor resource performance.

Table 3: B75m(2014/06) estimates from the updated 2015 assessments.

	B75m(14/06)	
	2014 ass	2015 ass
A12	0.77	0.71
A34	1.20	1.50
A56	1.46	2.01
A7	0.24	0.82
A8	0.92	0.88
T	0.98	1.07

Figure 1: The recruitment parameter estimates for 2004 (R_2004) for the updated 2015 assessments, compared with those of the previous 2014 estimates.

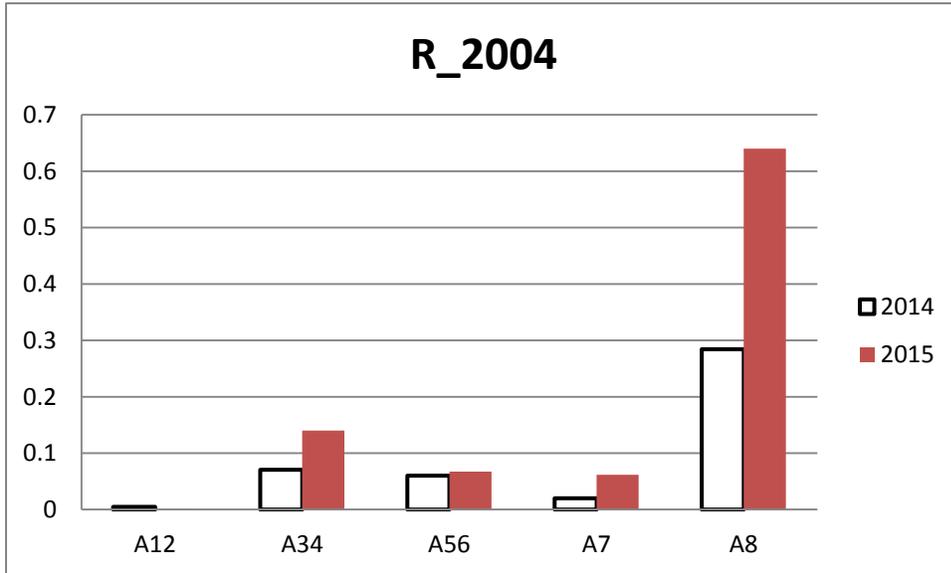


Figure 2: The total B75m biomass estimated by the updated 2015 assessment (solid black line) compared with the two previous assessments. (The vertical line indicates 2006, with the circle indicating a 35% increase from the 2006 value).

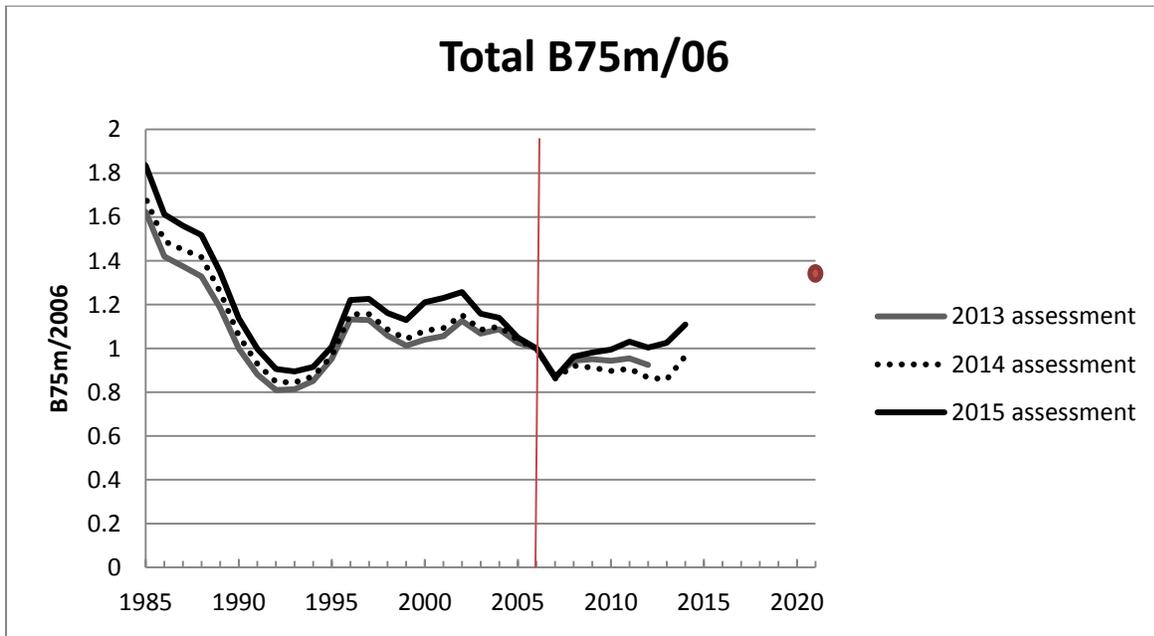


Figure 3: Global TAC (MT) and B75m(y/06) trajectories for VAR1-VAR4. Median, 5th and 95th percentiles are plotted.

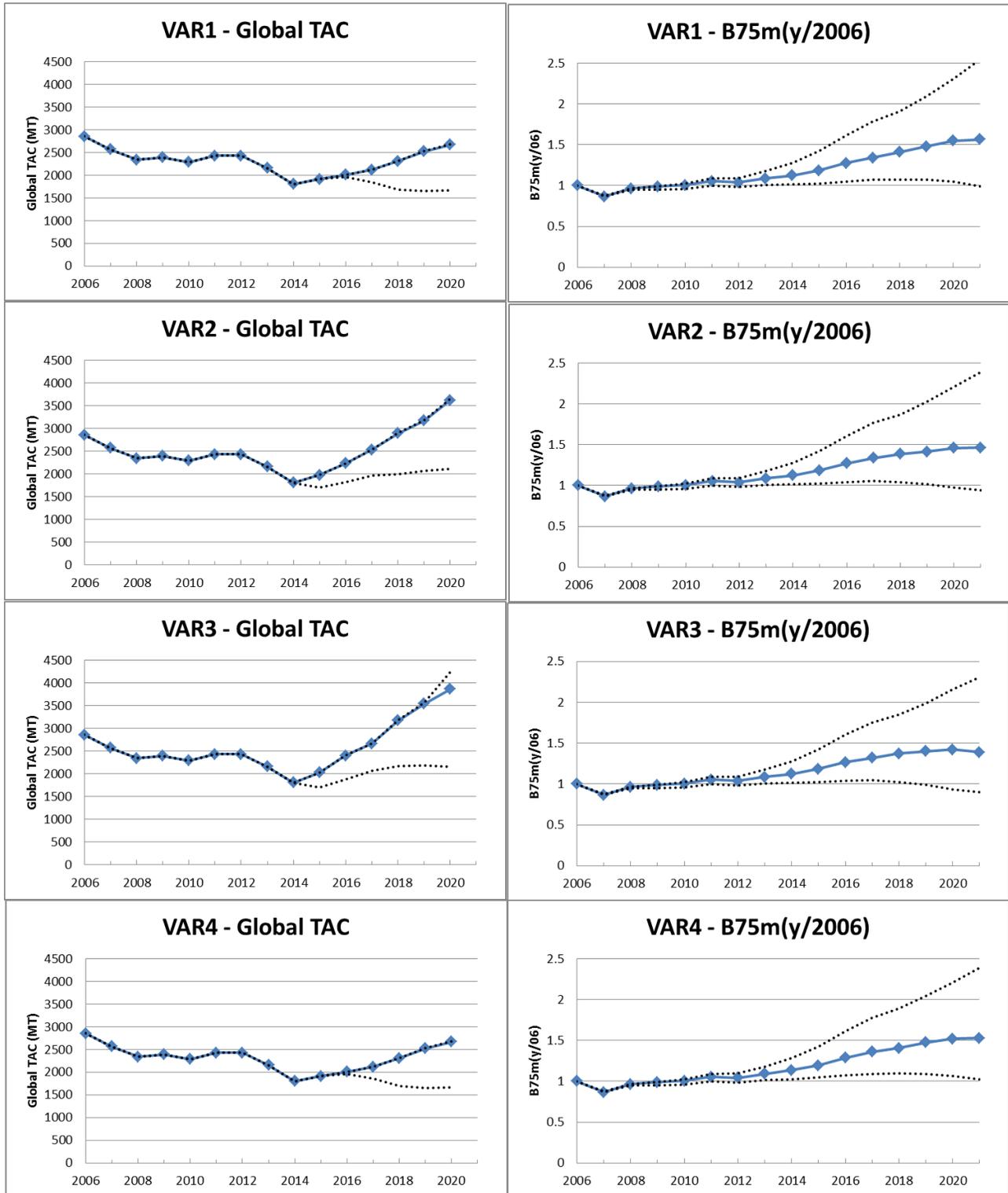


Figure 4: Comparisons of median Global TACs and B75m(y/06) trajectories between VAR1-VAR4.

