Appendix 8 : Sensitivities on the Assessment of the Namibian Horse Mackerel Resource

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The assessment of the Namibian horse mackerel resource presented in a working paper (with catch-at-age but catch-at-length information) is updated with a CV on the recruitment residuals (σ_R) of 0.4 instead of 0.25 (Reference Case). Three sensitivities on this assessment are also presented: i) with the survey bias correction factor q estimated rather than fixed to 2, ii) omitting the GLM-standardised CPUE series for the midwater trawl fishery and iii) with M=0.4 and h=0.75.

20-year projections have been carried out assuming a constant catch of 320 and 41 thousand tons for the midwater and pelagic fleets respectively (i.e. as in 2004).

Table 1: Estimates of management quantities for a) the Reference Case assessment of the Namibian horse mackerel resource and b)-d) three sensitivities on this assessment. Values fixed on input are shown in bold.

	a) Reference Case (σ_R=0.4)			b) q survey estimated			c) excl. midwater GLM CPUE series			d) with h=0.75 and M=0.4		
'-lnL:overall	-19.2			-19.6			-8.0			-7.1		
'-lnL:CPUE	-23.8			-24.9			-8.2			-8.2		
'-lnL:Survey	-3.2			-3.1			-3.7			-3.7		
'-lnL:CAA	-6.5			-6.1			-14.9			-13.9		
'-lnL:CAAsurv	1.7			1.7			1.3			1.5		
'-lnL:LAA	-			-			-			0.0		
'-lnL:LAAsurv	-			-			-			0.0		
Recruitment_Pen	12.6			12.8			17.5			17.3		
		Midwater	Pelagic		Midwater	Pelagic		Midwater	Pelagic		Midwater	Pelagic
K^{sp}	5036			5554			5339			3786		
K^{ex}	2050	1902	1776	2230	2066	1739	2005	1866	1437	1737	1622	1581
B^{sp}_{2004}	1347			2020			1455			1331		
B^{ex}_{2004}	753	685	760	1086	990	965	751	678	693	770	695	924
h	**0.600**			**0.600**			**0.600**			**0.750**		
M	**0.300**			**0.300**			**0.300**			**0.400**		
$MSYL^{sp}$	1608	1583	1726	1767	1739	1888	1682	1655	1794	1002	982	1051
$MSYL^{ex}$	812	743	754	895	818	747	817	751	625	565	498	624
MSY	369	392	247	399	426	260	378	404	236	491	523	320
B^{sp}_{2004}/K^{sp}	0.268			0.364			0.273			0.352		
B^{ex}_{2004}/K^{ex}	0.367	0.360	0.428	0.487	0.479	0.555	0.375	0.364	0.482	0.443	0.429	0.585
$B^{sp}_{2004}/MSYL^{sp}$	0.838	0.851	0.781	1.144	1.162	1.070	0.865	0.879	0.811	1.329	1.356	1.267
$B^{ex}_{2004}/MSYL^{ex}$	0.927	0.922	1.009	1.213	1.210	1.292	0.920	0.903	1.109	1.363	1.397	1.482
$MSYL^{sp}/K^{sp}$	0.319	0.314	0.343	0.318	0.313	0.340	0.315	0.310	0.336	0.265	0.259	0.278
$MSYL^{ex}/K^{ex}$	0.396	0.391	0.424	0.401	0.396	0.429	0.407	0.402	0.435	0.325	0.307	0.395
Age	Survey1	Midwater	Pelagic	Survey1	Midwater	Pelagic	Survey1	Midwater	Pelagic	Survey1	Midwater	Pelagic
S(0)	0.31	0.00	0.14	0.31	0.00	0.14	0.30	0.00	0.14	0.26	0.00	0.12
S(1)	1.00	0.04	1.00	1.00	0.04	1.00	1.00	0.04	1.00	0.95	0.03	1.00
S(2)	0.93	0.28	0.43	0.93	0.30	0.42	0.96	0.30	0.41	1.00	0.25	0.45
S(3)	0.43	0.63	0.35	0.41	0.67	0.32	0.43	0.69	0.29	0.49	0.63	0.35
S(4)	0.20	1.00	0.29	0.18	1.00	0.25	0.20	1.00	0.21	0.24	1.00	0.28
S(5)	0.09	0.14	0.23	0.08	0.12	0.19	0.09	0.08	0.15	0.12	0.13	0.22
S(6)	0.04	0.14	0.19	0.04	0.12	0.15	0.04	0.08	0.10	0.06	0.13	0.17
S(7)	0.02	0.14	0.16	0.02	0.12	0.12	0.02	0.08	0.07	0.03	0.13	0.13
	Midwater	Bulgaria	Poland	Midwater	Bulgaria	Poland	Midwater	Bulgaria	Poland	Midwater	Bulgaria	Poland
Commercial_q's	0.008	0.003	0.002	0.006	0.003	0.002	0.007	0.003	0.002	0.007	0.003	0.002
Commercial_sigma's	0.202	0.423	0.795	0.200	0.405	0.793	0.600	0.394	0.791	0.600	0.396	0.809
Survey_q's	**2.000**			1.399			**2.000**			**2.000**		

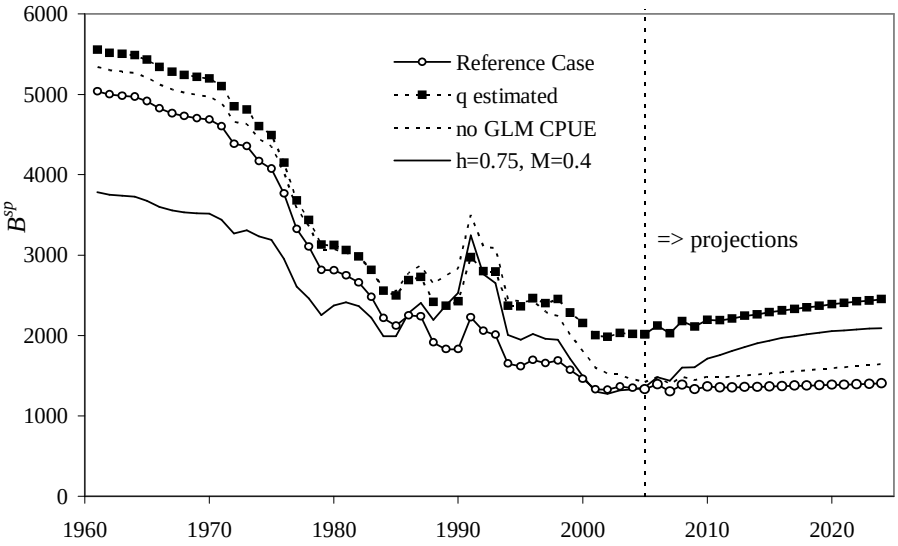

Fig. 1a: Time-series of estimated spawning biomass for the Reference Case and three sensitivities for the Namibian horse mackerel resource. Projected spawning biomass under a constant catch strategy is also shown.

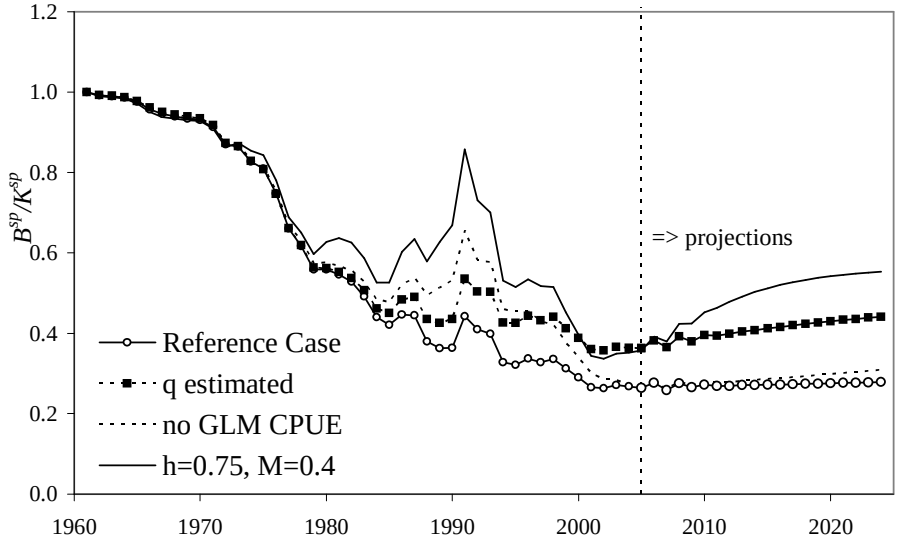

Fig. 1b: Time-series of estimated depletion for the Reference Case and three sensitivities for the Namibian horse mackerel resource. Projected spawning biomass under a constant catch strategy is also shown.

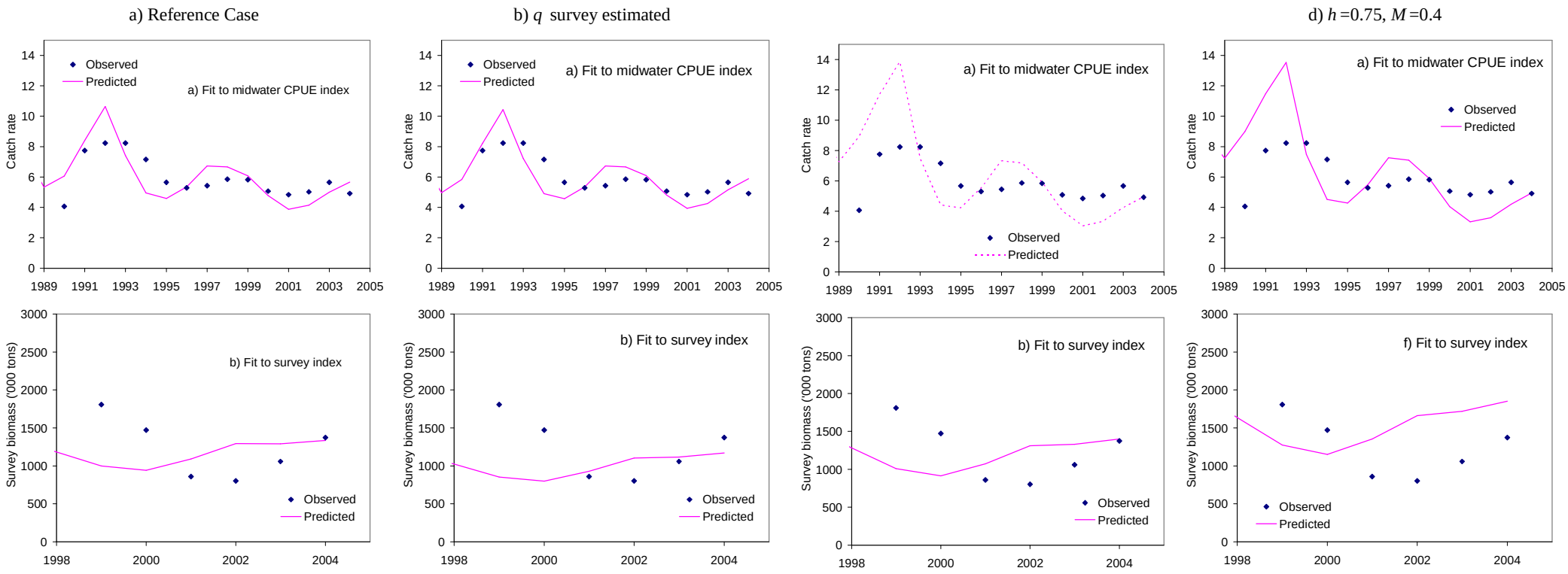

Fig. 2: Model fits of the Reference Case and three sensitivities to the midwater GLM CPUE and survey abundance indices for the Namibian horse mackerel resource.