Operating model results for Inaccessible islands using an age-structured production model approach.

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Two alternate RC models have been selected. For both, the most recent value of the fishing proportion F_{2009} is set equal to 0.3. As this is a somewhat arbitrary selection, two sensitivity models are reported for alternate values of F_{2009} of 0.2 (SEN1) and 0.4 (SEN2). Lower values of F_{2009} produced poor fit to due (evident in the much higher negative log likelihood value), and higher values of F_{2009} produced unrealistically high values of fishing proportion in earlier years.

- **RC1**: The relative weights of GLMM-standardised longline CPUE and CAL data in the –lnL function are **1.0** and 0.1 respectively.
- **RC2**: The relative weights of GLMM-standardised longline CPUE and CAL data in the –lnL function are **5.0** and 0.1 respectively, i.e. the CPUE data are up-weighted compared to RC1.

RC2 is included to provide a scenario that reflects a recent decline in CPUE more closely.

Figure 1a-c report model fits for RC1 and its two associated sensitivity analyses, and Figures 2a-c report model fits for RC2 and its two associate sensitivity analyses.

Figures 3a and b show the estimated exploitable biomass trends from each of the two RC models compared to the standardised longline CPUE trend (to which the models are fitted) as well as to nominal powerboat CPUE trend which is shown for comparative purposes only. The powerboat CPUE data are not included in the likelihood for the model fit as they pertain to only a small part of the areal distribution of the resource, though it is of interest that they do not show as steep an earlier increase or a recent decline as the longline CPUE, and appear more consistent with RC1.

Table 1: RC1 and RC2 model results with the associated sensitivity model results. (Shaded blocks show fixed model parameters.)

	RC1 (CPUE*1.0)			RC2 (CPUE*5.0)		
	RC1	**SEN1**	**SEN2**	**RC2**	**SEN1**	**SEN2**
	F_{2009}=0.3	**F_{2009}=0.2**	**F_{2009}=0.4**	**F_{2009}=0.3**	**F_{2009}=0.2**	**F_{2009}=0.4**
K	1141	1493	976	1170	1603	955
h	1.00	1.00	1.00	1.00	1.00	0.999
M	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
σ_{length}	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
F_{2009} fixed at	**0.3**	**0.2**	**0.4**	**0.3**	**0.2**	**0.4**
Male selectivity μ	0.027	0.03	0.022	0.043	0.049	0.037
Female selectivity μ	0.174	0.17	0.175	0.179	0.179	0.180
θ	0.31	0.28	0.339	0.31	0.26	0.358
L_∞^m	125	125	125	125	125	125
L_∞^f	90	90	90	90	90	90
-lnL CPUE	-11.07	-10.11	-12.08	-16.13	-15.37	-16.49
-lnL CAL	-61.97	-62.66	-61.01	-29.60	-25.60	-40.47
-lnL total	-16.8	-16.08	-17.58	-72.30	-67.73	-76.31
SR1	1.12	0.963	1.26	11.64	12.34	10.81
Bsp(1990)/Ksp	0.28	0.25	0.30	0.28	0.24	0.32
Bsp(2009)/Ksp	0.83	0.85	0.82	0.88	0.89	0.88
Bsp(2009)/Bsp(1990)	2.97	3.42	2.72	3.23	3.78	2.75
Bexp(2009)/Bexp(1990)	1.98	2.83	1.35	2.62	3.66	1.73
Program (ifitall.tpl)	Pip1.rep	Pip1b.rep	Pip1c.rep	Pip7.rep	Pipb.rep	Pip21.rep

Figure 1a: RC1 (F_{2009}=0.3). Note that CPUE here and in Figure 2 refers to the longline CPUE.

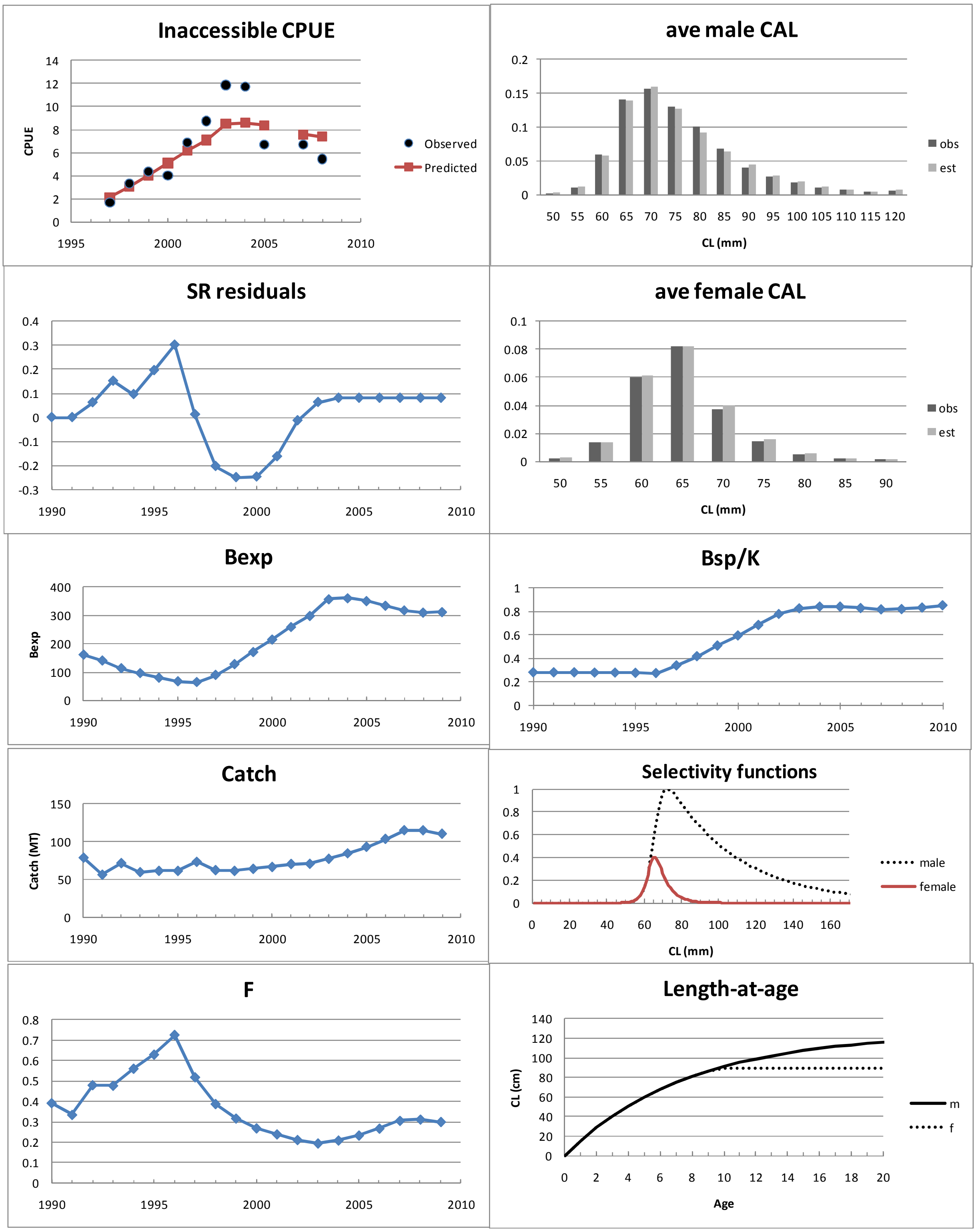

Figure 1b: RC1 SEN1 (F_{2009}=0.2)

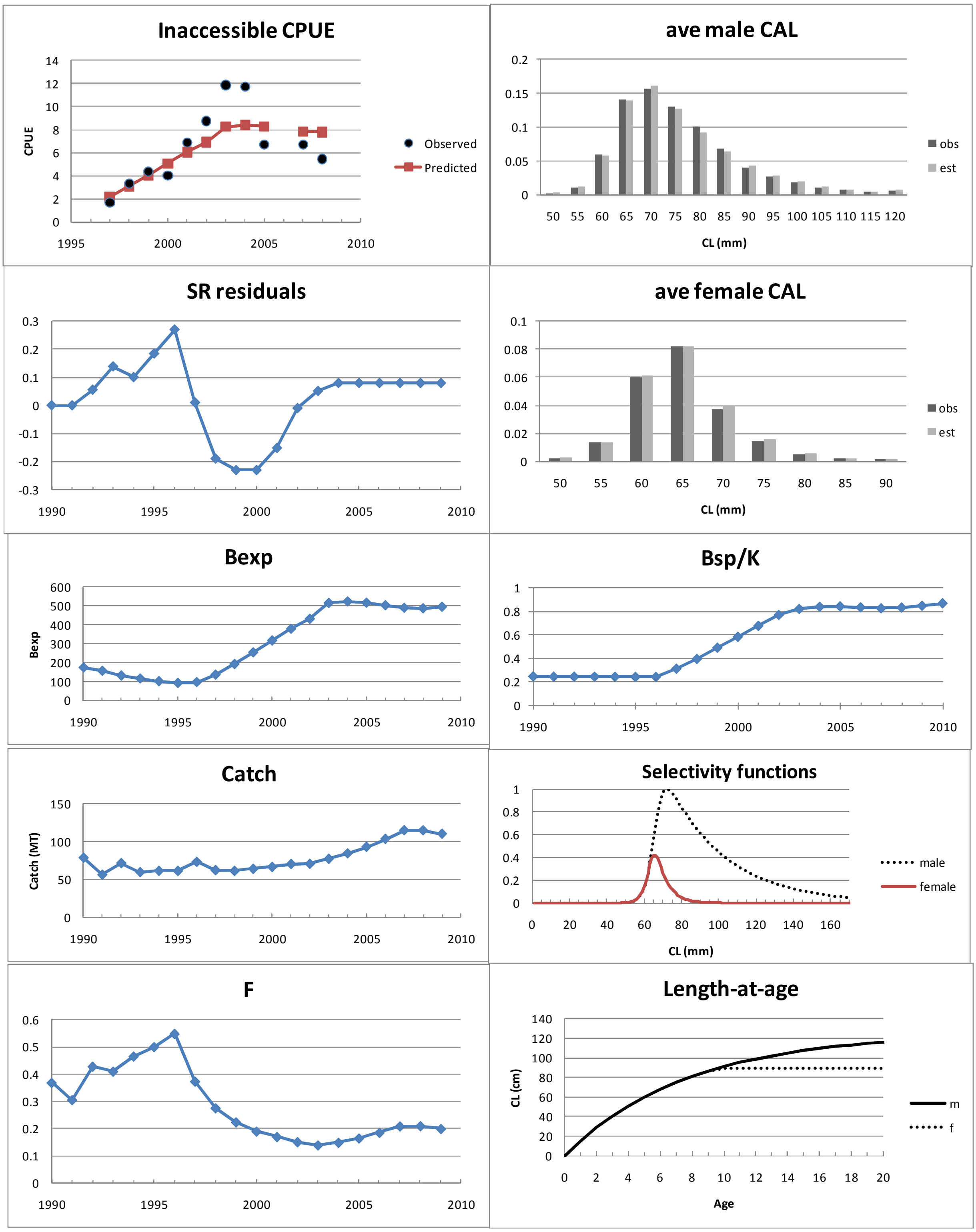

Figure 1c: RC1 SEN2 (F_{2009}=0.4)

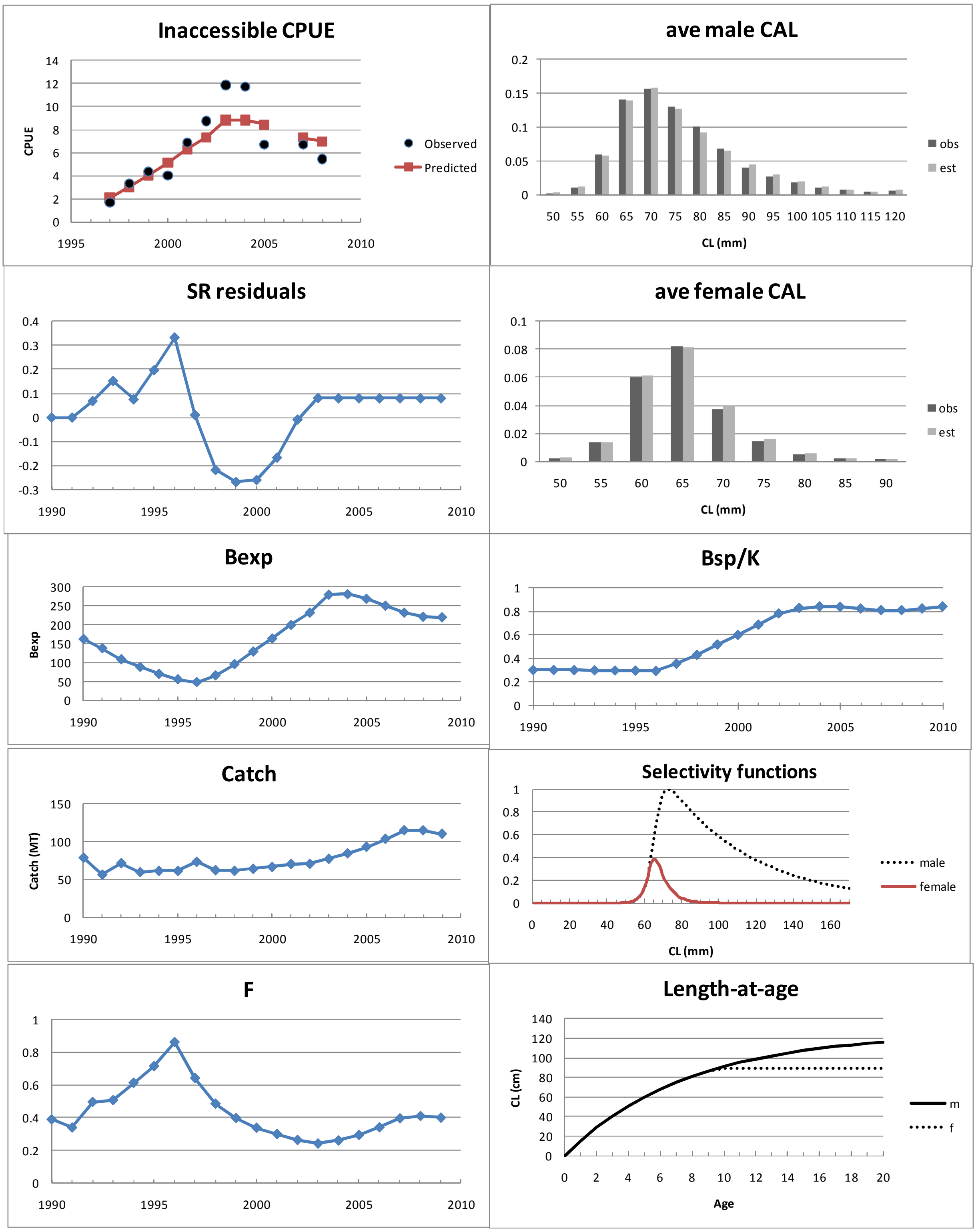

Figure 2a: RC2 (F_{2009}=0.3)

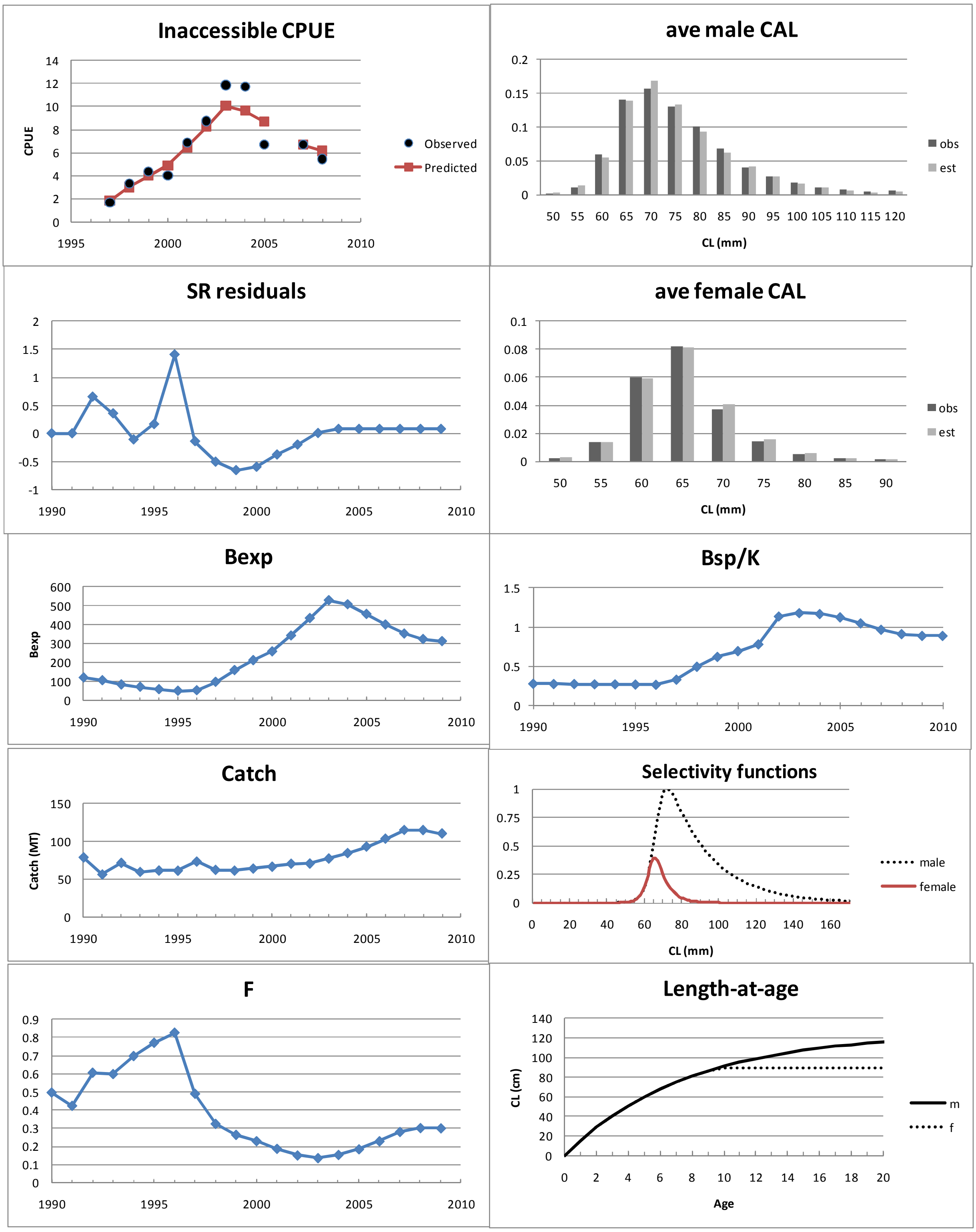

Figure 2b: RC2 SEN1 (F_{2009}=0.2).

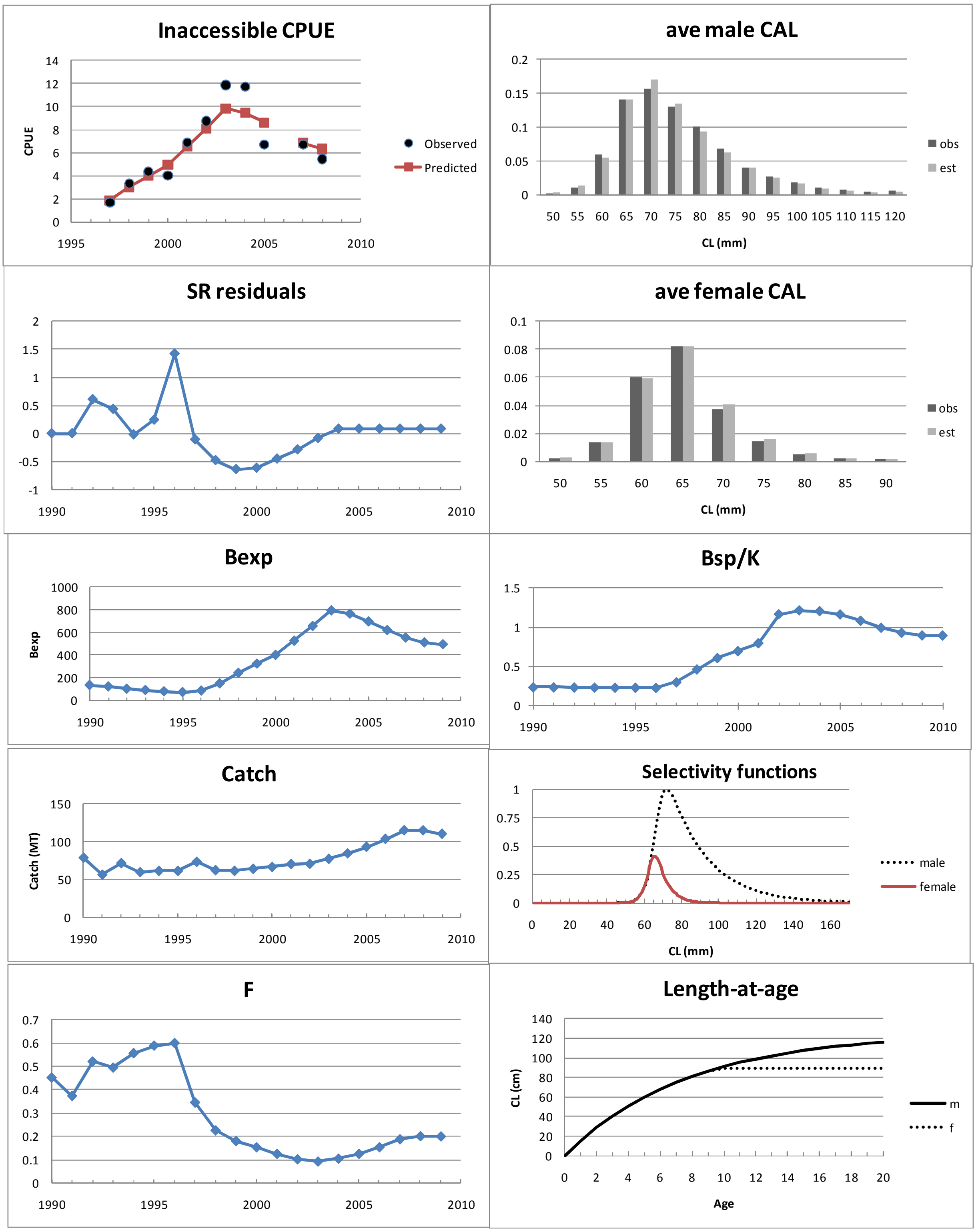

Figure 2c: RC2 SEN2 (F_{2009}=0.4).

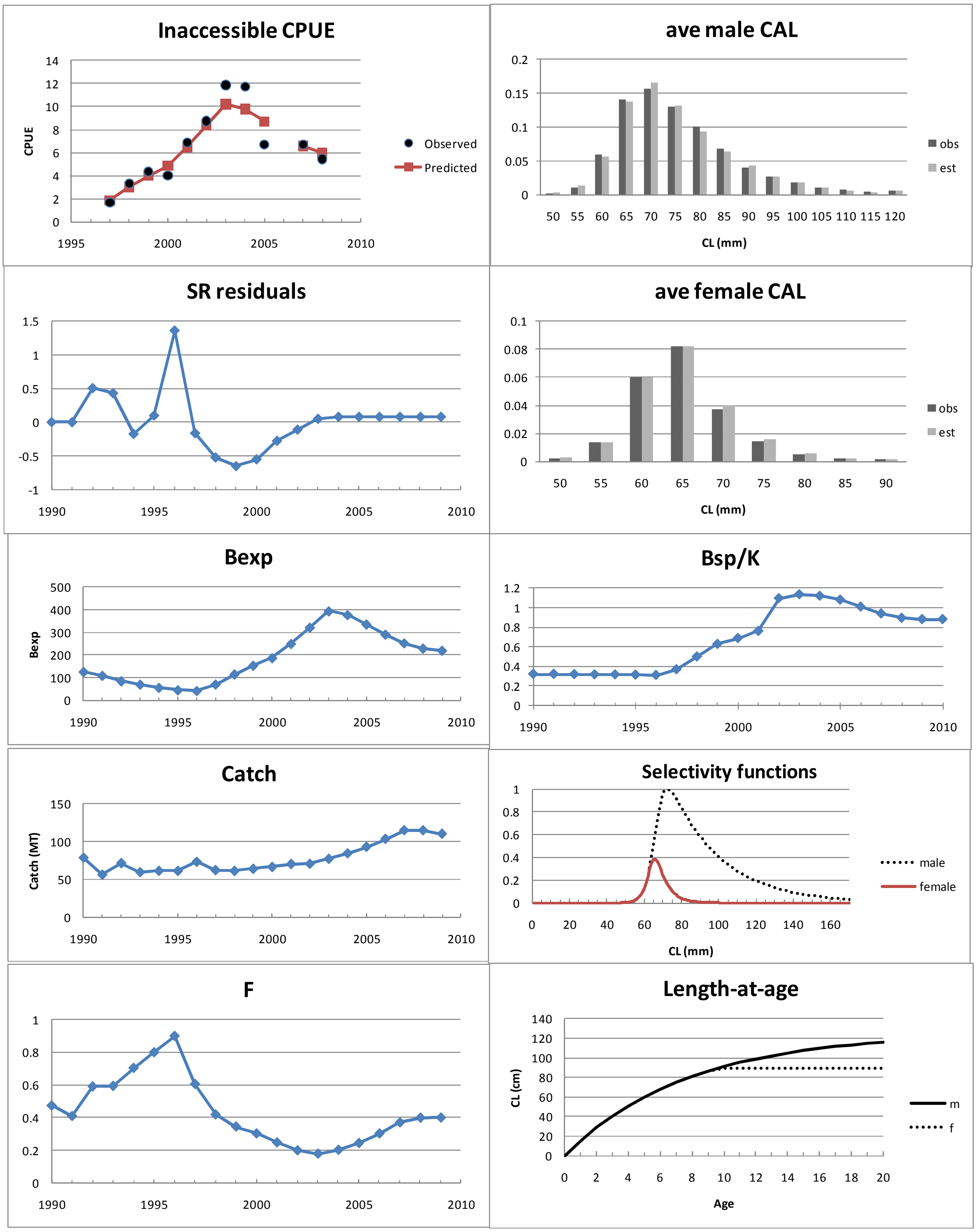

Figure 3a: Model RC1 estimated B_{exp} trend compared with both the GLMM-standardized longline CPUE trend (to which the model is fitted in minimizing the –lnL) and the nominal powerboat CPUE trend.

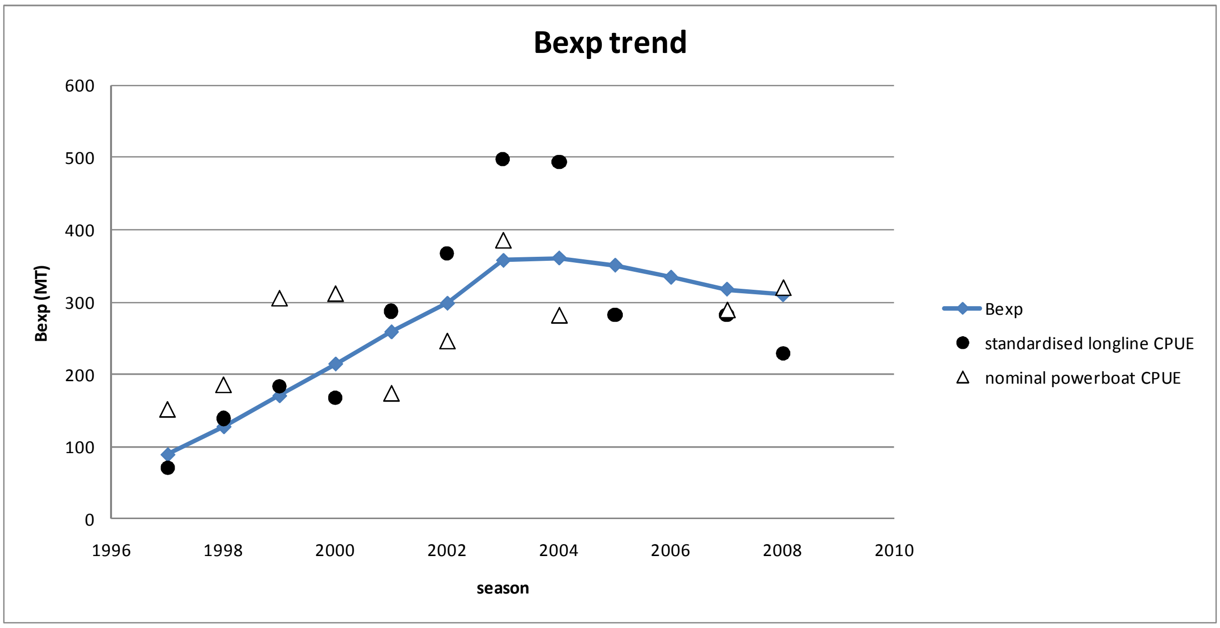

Figure 3b: Model RC2 estimated B_{exp} trend compared with both the GLMM-standardized longline CPUE trend (to which the model is fitted in minimizing the –lnL) and the nominal powerboat CPUE trend.