Appendix C7: Results for Model 6
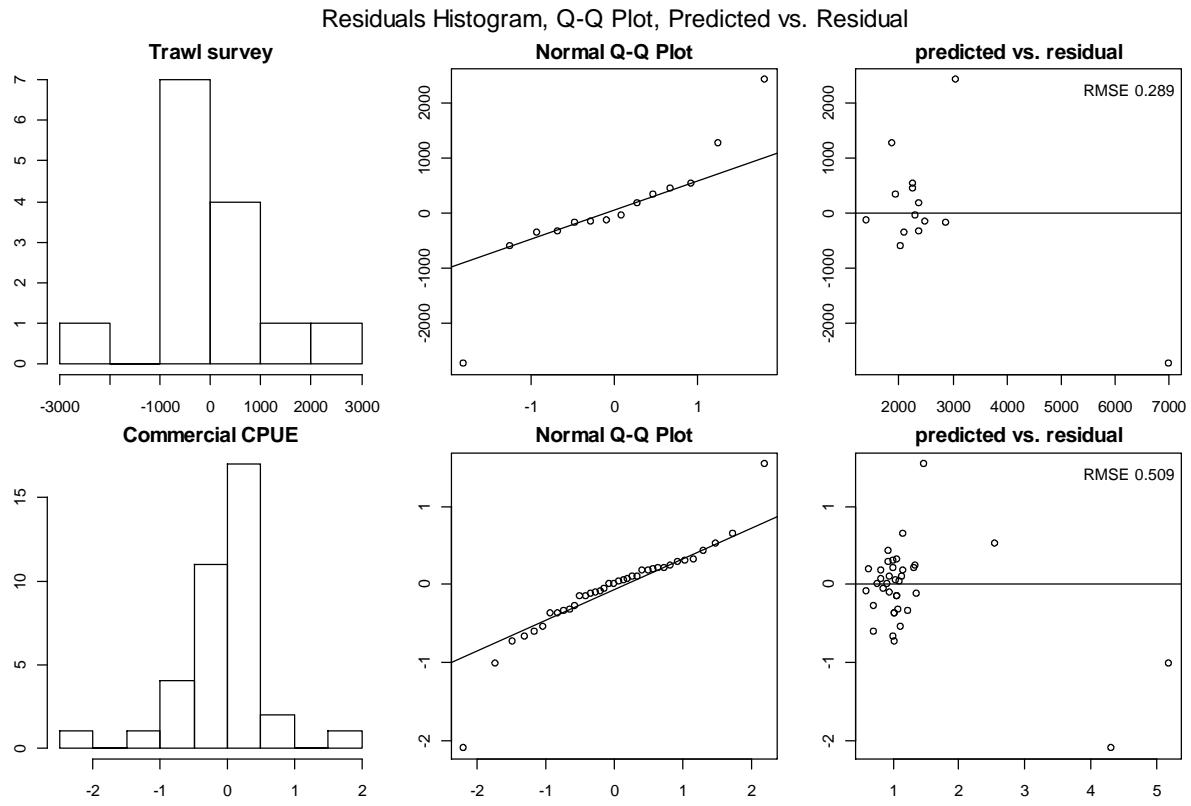
Figure C7-1. QQ plots of trawl survey abundance and commercial CPUE residuals.
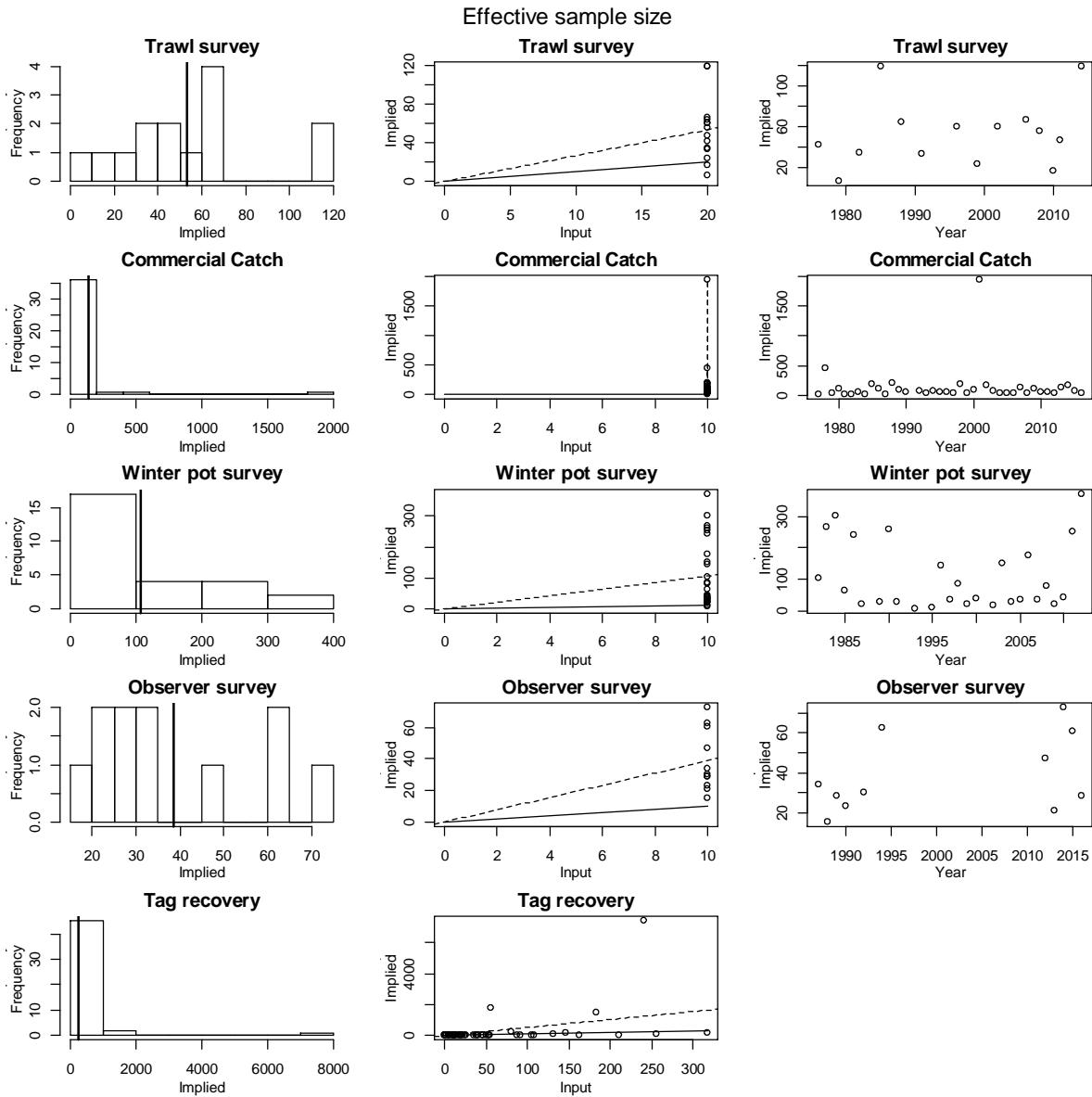
Figure C7-2: Implied effective sample sizes. Figures in the first column show implied effective sample size (x-axis) vs. frequency (y-axis). Vertical solid line is the mean implied effective sample size. The second column shows input sample sizes (x-axis) vs. implied effective sample sizes (y-axis). Dashed line indicates the linear regression slope, and solid line is 1:1 line. The third column shows years (x-axis) vs. implied effective sample sizes (y-axis).
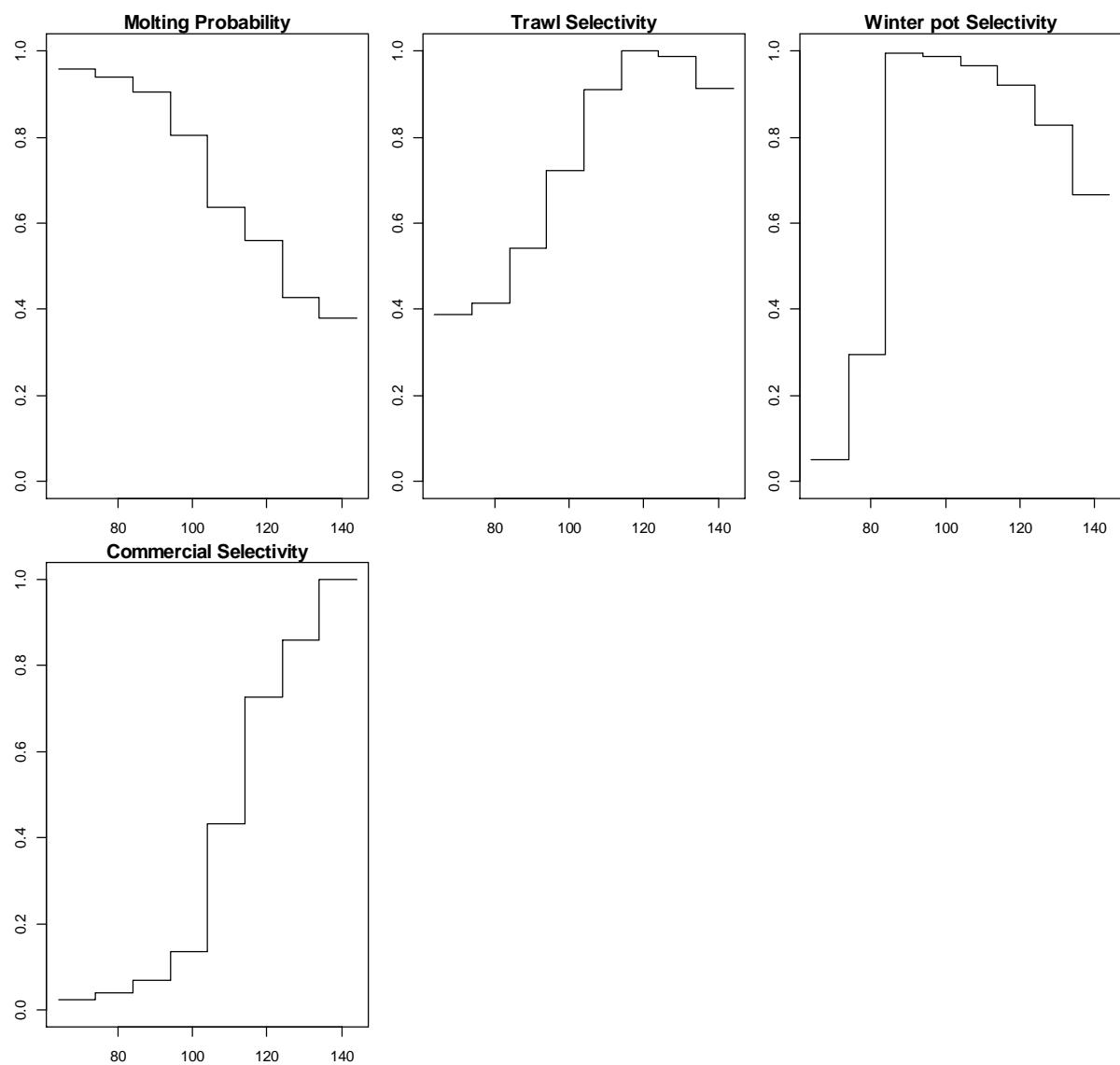
Figure C7-3. Model estimated annual molting probability, trawl survey selectivity, winter pot survey selectivity, and summer commercial fishery selectivity. X-axis is carapace length (mm).
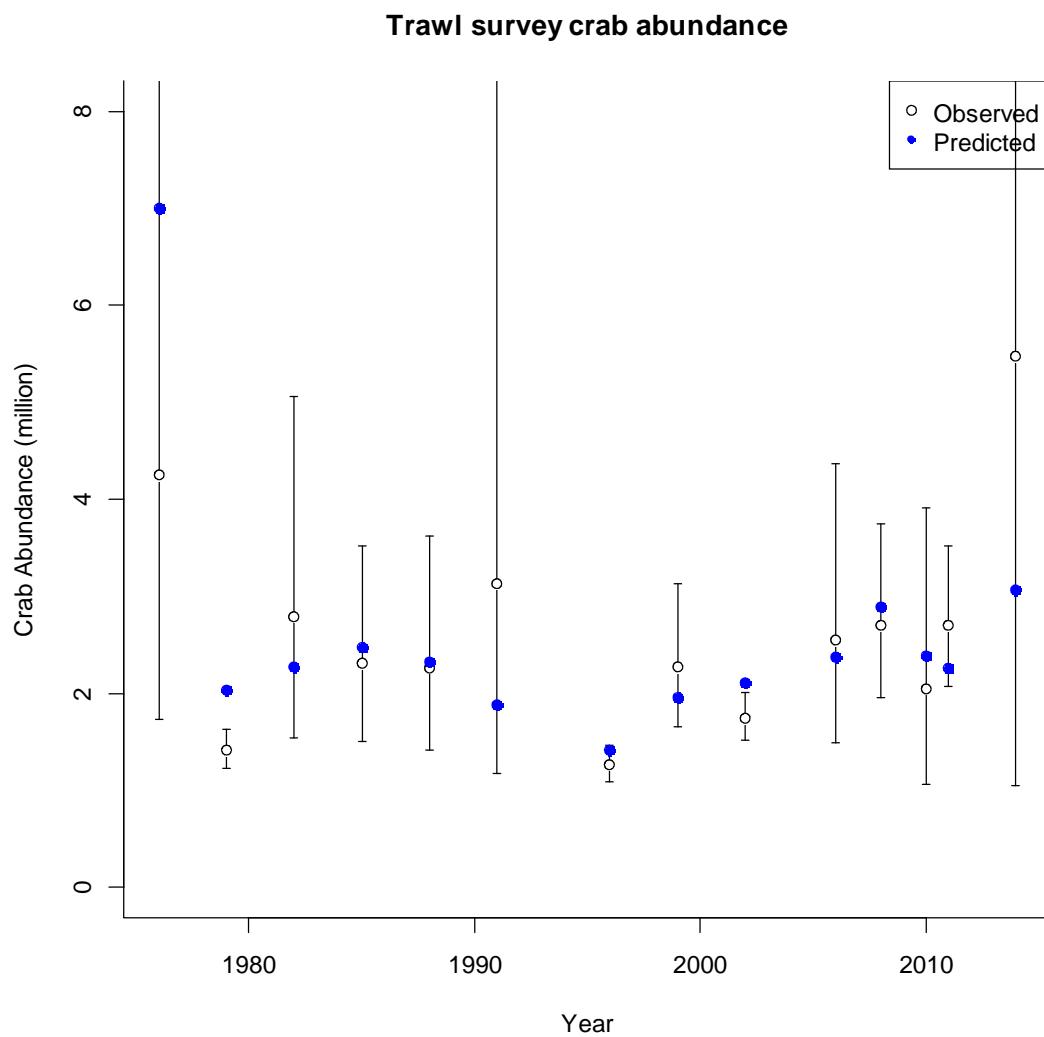
Figure C7-4. Observed and model estimated trawl survey male abundances over time with 95% confidence intervals (crab ≥ 74 mm CL).

Modeled crab abundance Feb 01
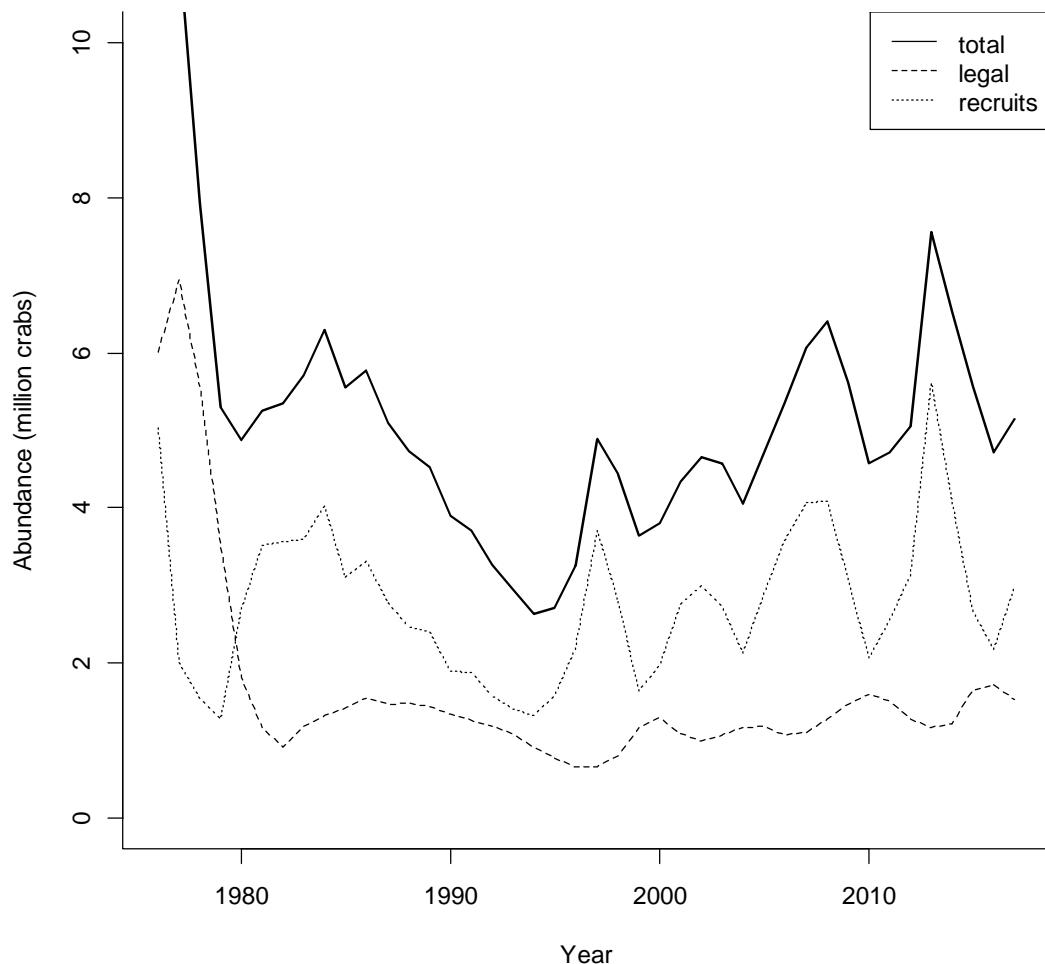
Figure C7-5. Estimated abundance of total, legal, and recruit males during 1976-2016.

MMB Feb 01

BMSY 4.982 mil.lb
MMB 5.642 mil.lb
Legal B 2.925 mil.lb
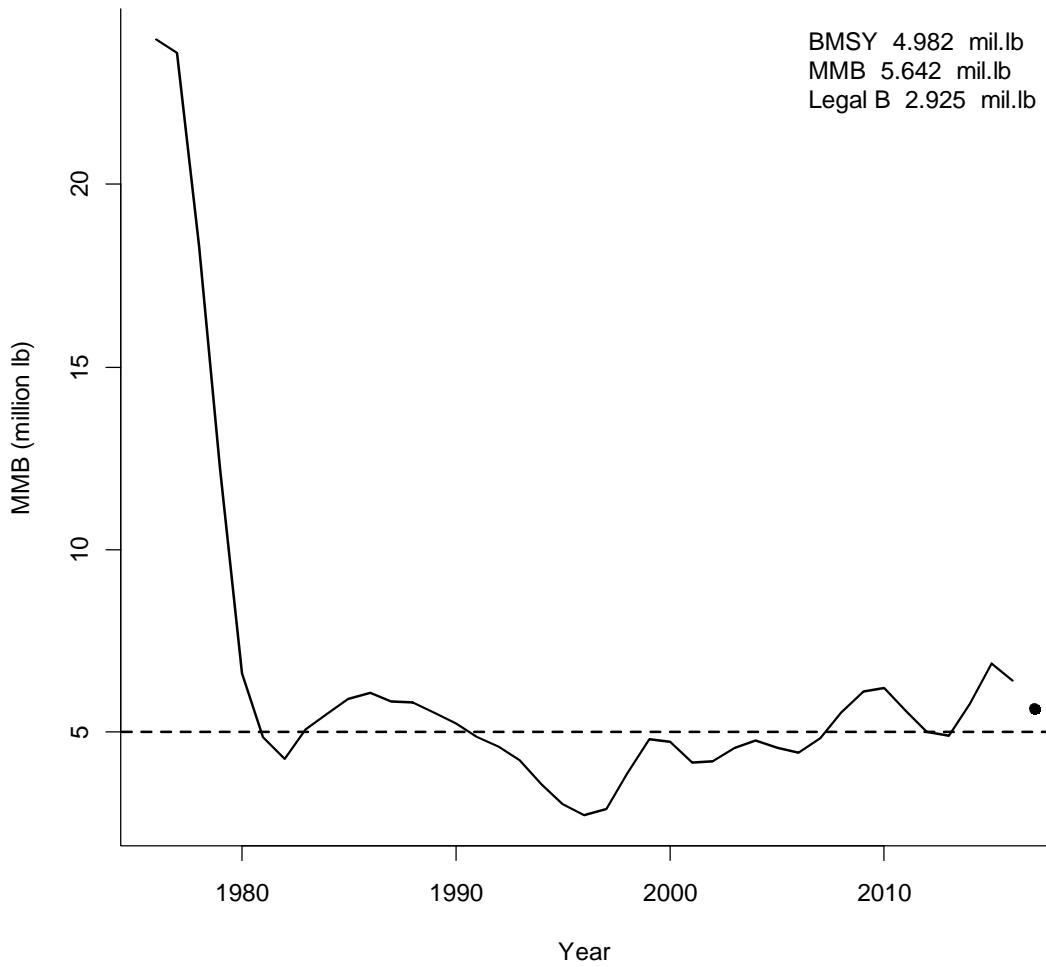
Figure C7-6. Estimated mature male biomass from 1976-2016. The dashed line shows B_{msy} (Average MMB of 1980-2016).
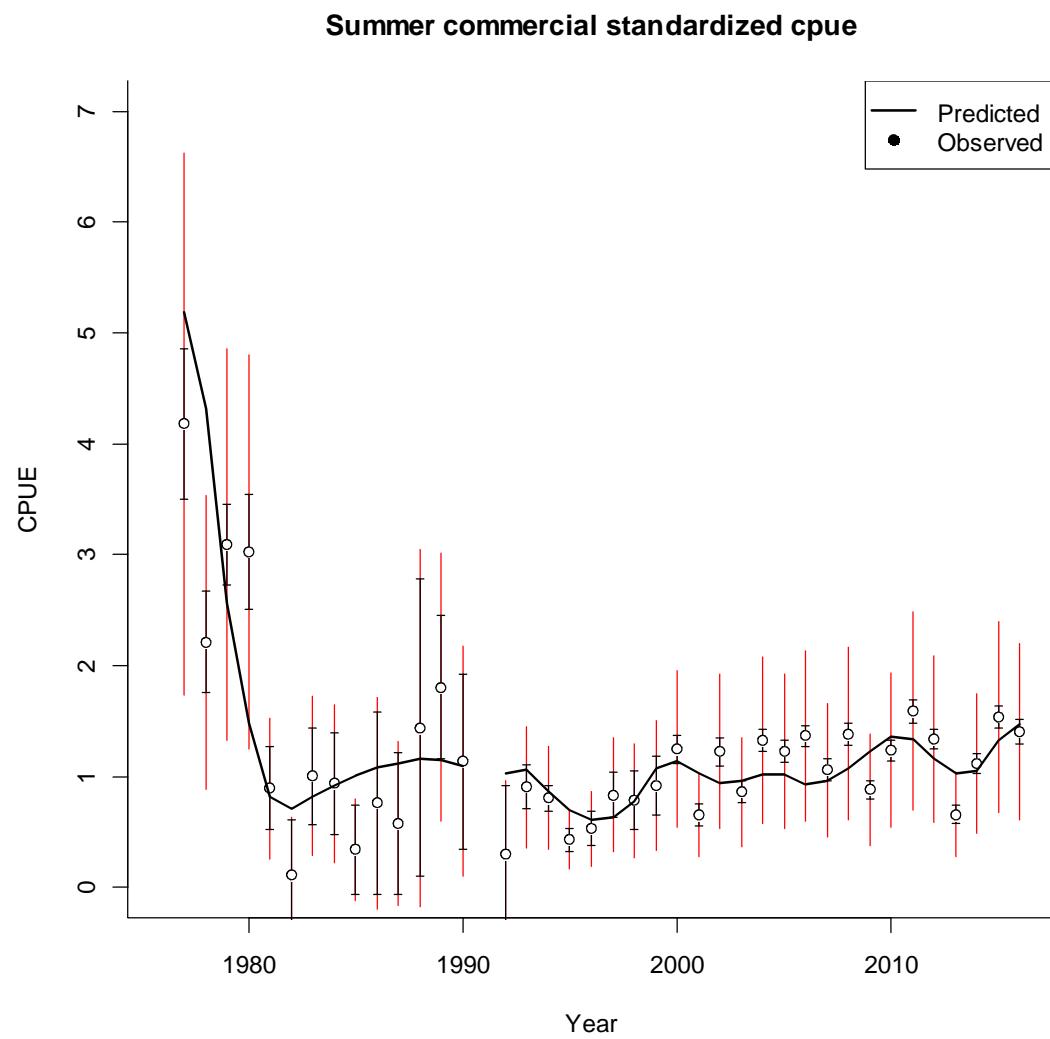
Figure C7-7. Su Summer commercial fishery standardized cpue during 1977-2016.

Total catch & Harvest rate
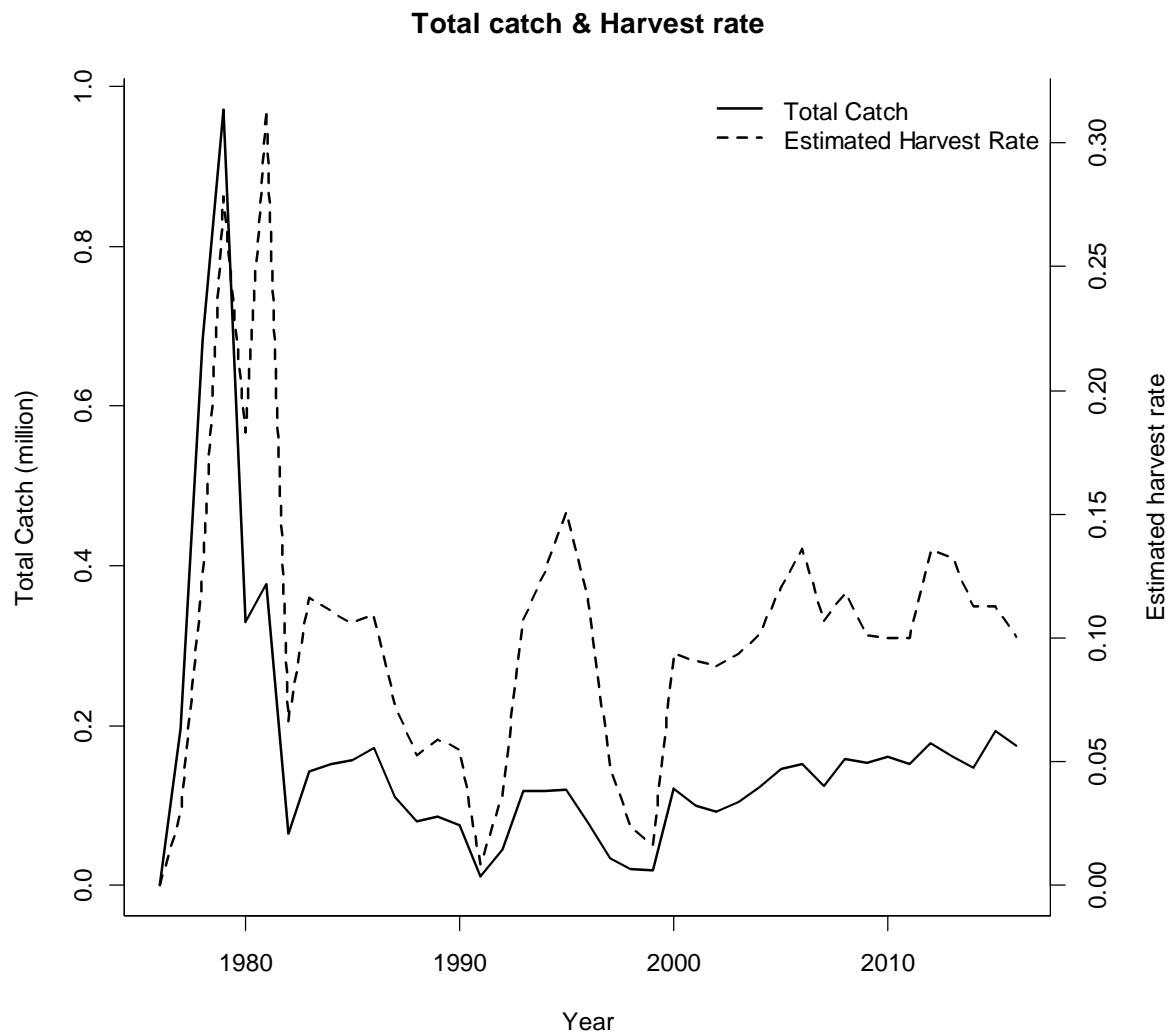
Figure C7-8. Total catch and estimated harvest rates during 1976-2016.

commercial harvest length: observed vs predicted
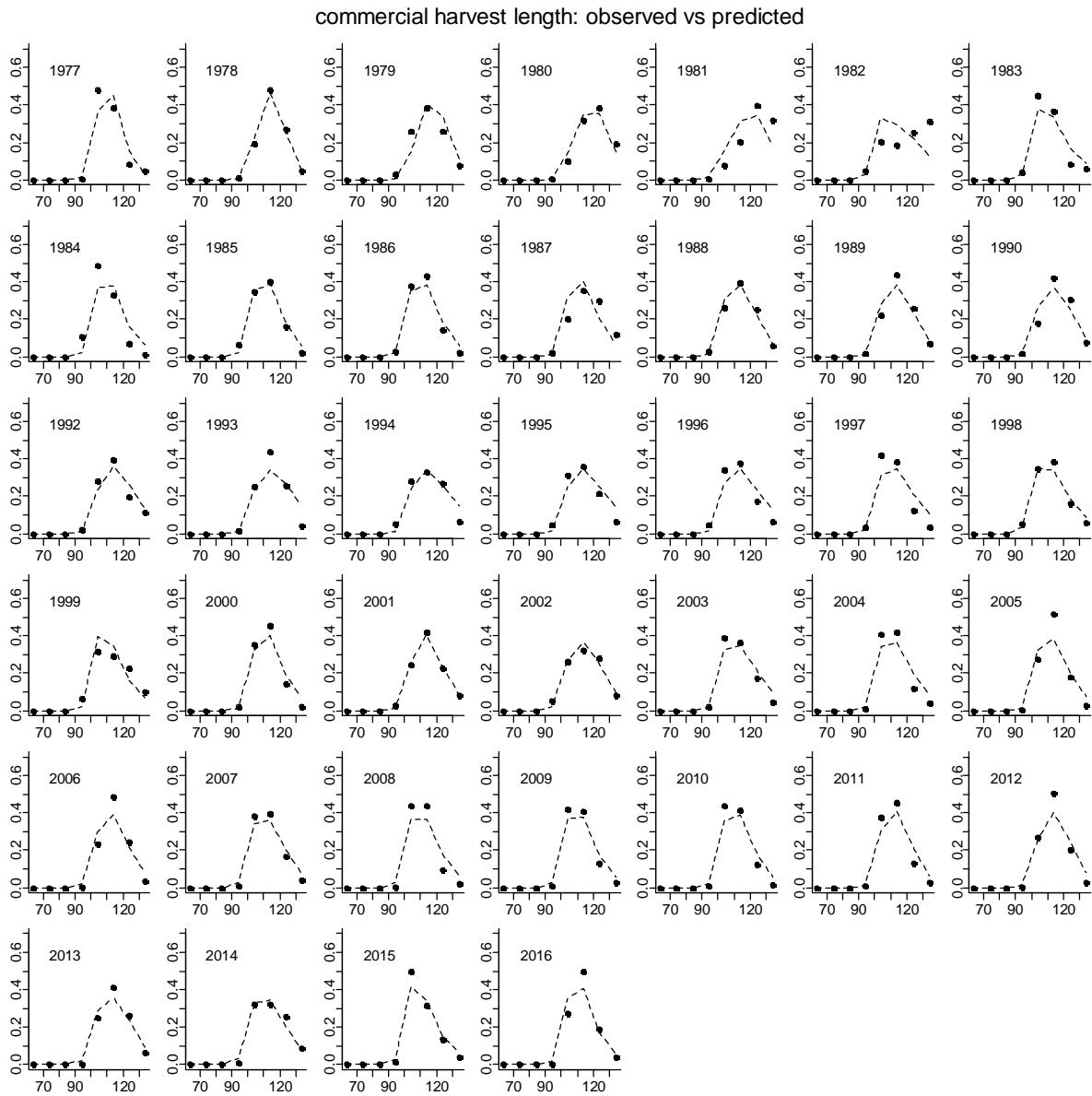
Figure C7-9. Predicted (dashed line) vs. observed (black dots) length class proportions for commercial catch.

Winter pot length: observed vs predicted
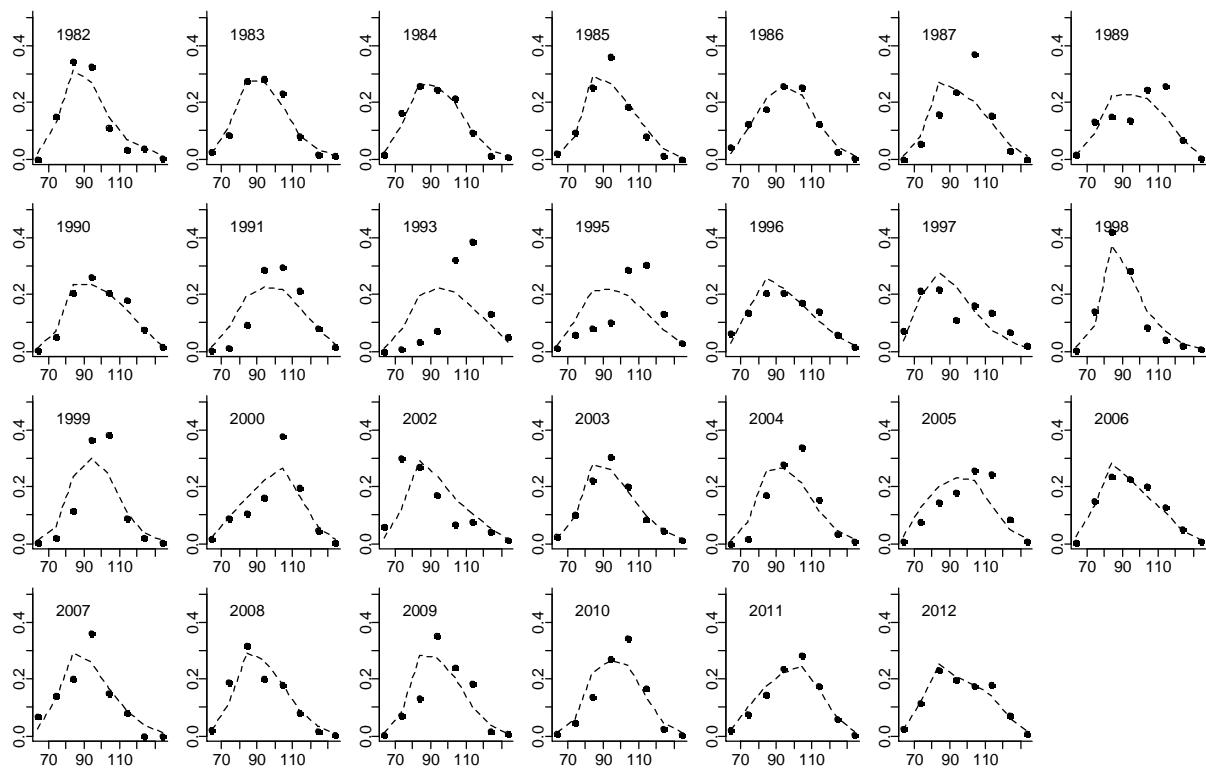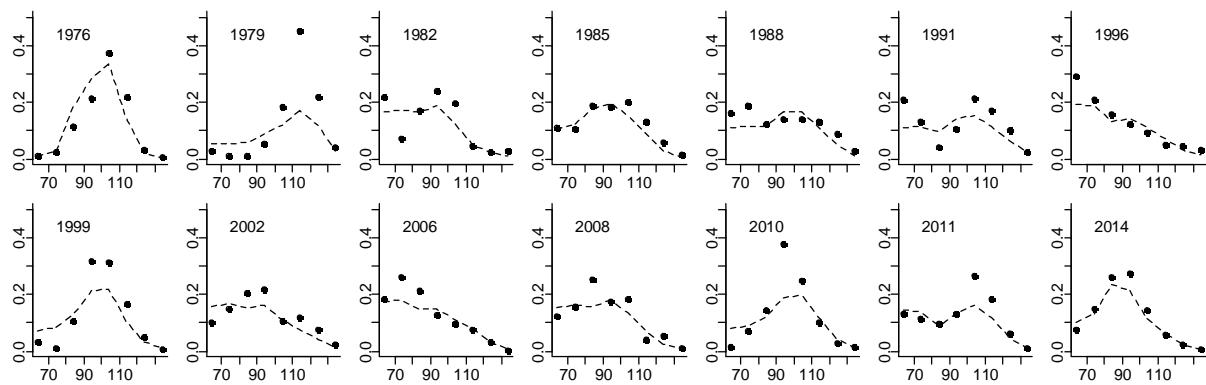
Figure C7-10. Predicted (dashed line) vs. observed (black dots) length class proportions for the winter pot survey.

Trawl length: observed vs predicted

Discards length: observed vs predicted
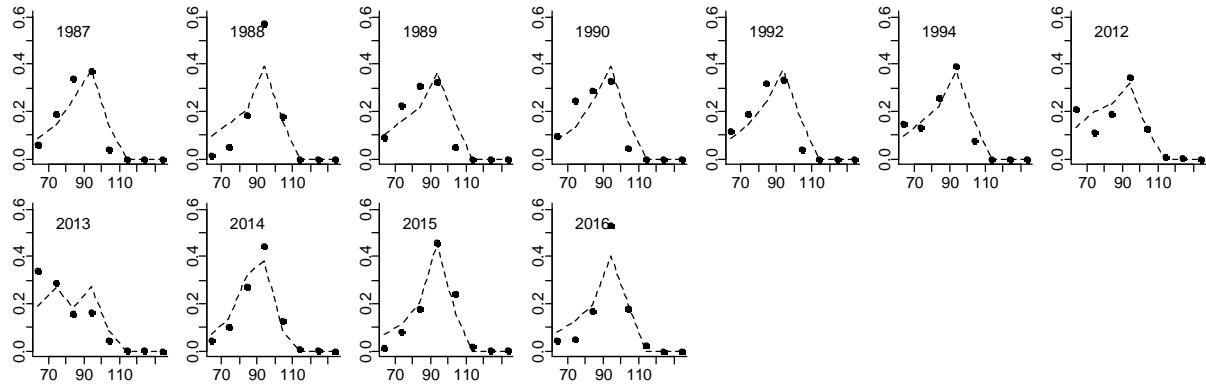
Figure C7-11. Predicted (dashed line) vs. observed (black dots) length class proportions for the trawl survey and observer survey.

Tag recovery data observed vs predicted

Recovery after 1 year

Recovery after 2 years

Recovery after 3 years
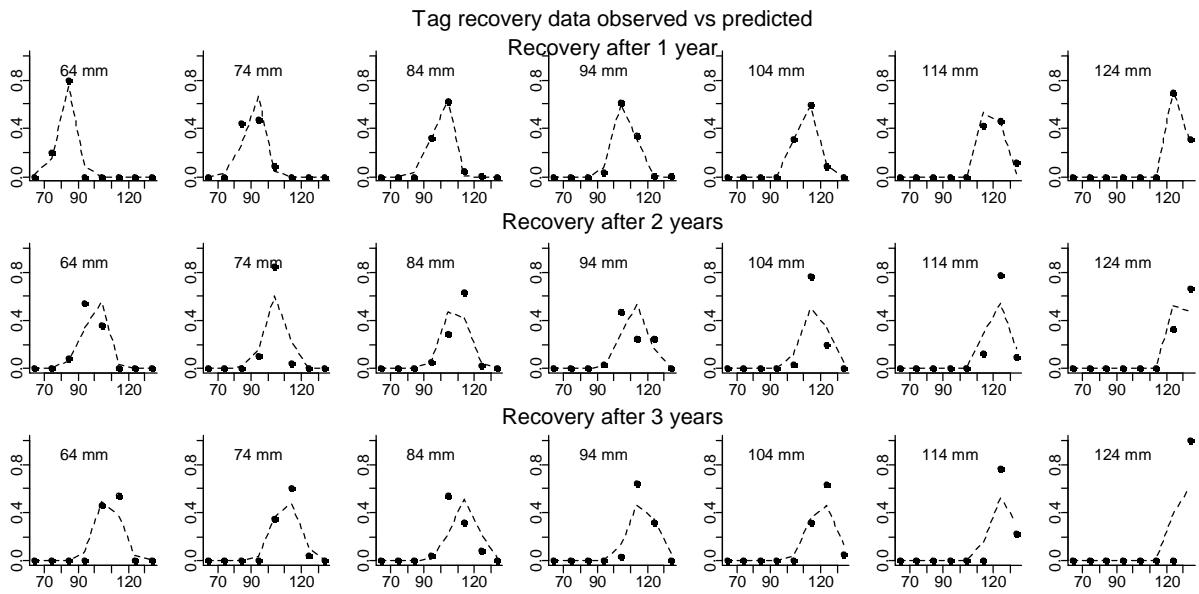
Figure C7-12. Predicted (dashed line) vs. observed (black dots) length class proportions for tag recovery data.

173
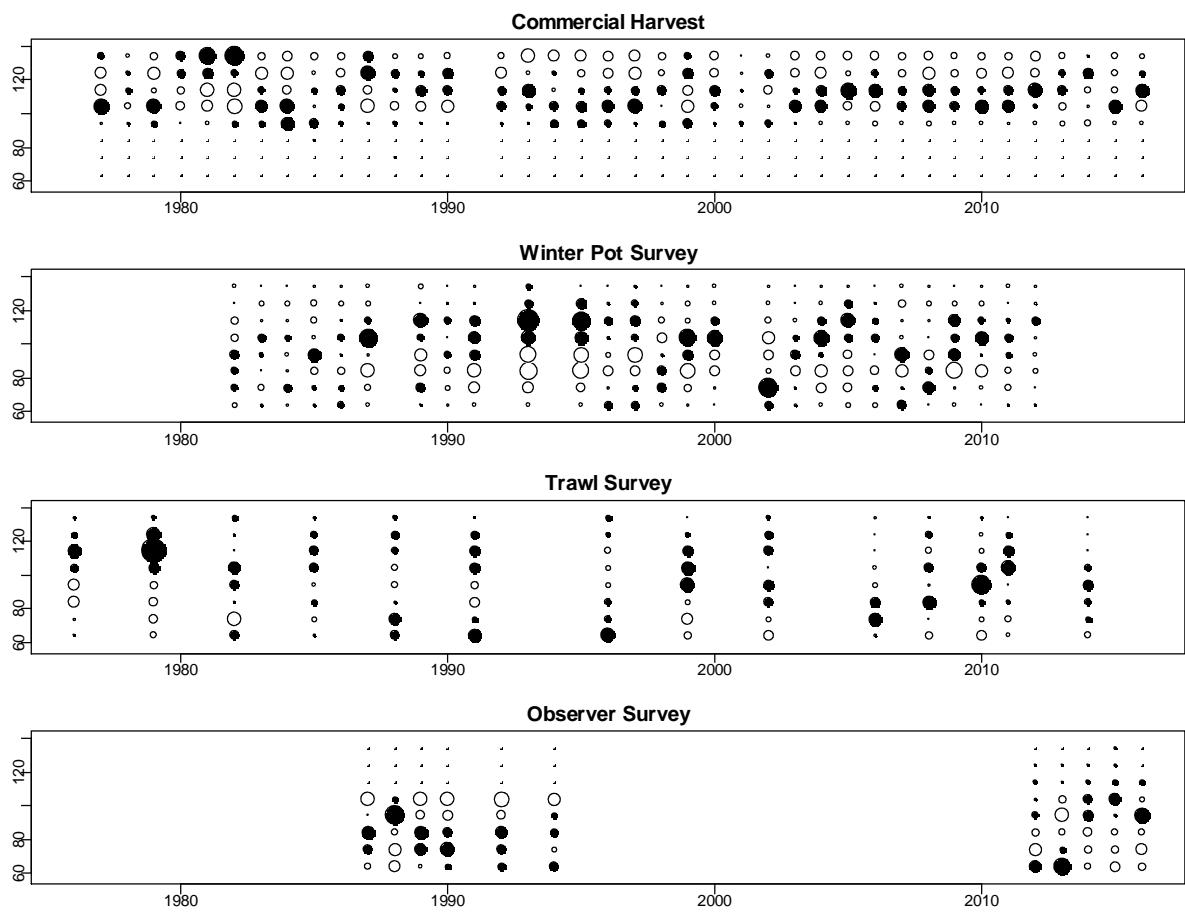
Figure C7-13. Bubble plots of predicted and observed length proportions. Black circle indicates model estimates lower than observed, white circle indicates model estimates higher than observed. Size of circle indicates degree of deviance (larger circle = larger deviance).

174

Table C7-1 . Summary of parameter estimates for a length-based stock synthesis population model of Norton Sound red king crab.

name	Estimate	std.dev	name	Estimate	std.dev	name	Estimate	std.dev
$\log\_q_1$	-6.407	0.453	$\log\_R_{07}$	0.476	0.259	Sw1	0.053	0.026
$\log\_q_2$	-6.223	0.500	$\log\_R_{08}$	0.011	0.319	Sw2	0.296	0.075
$\log\_N_{76}$	9.650	0.255	$\log\_R_{09}$	-0.384	0.313	sc.sel1	0.025	0.017
R_0	7.395	0.302	$\log\_R_{10}$	0.161	0.250	sc.sel2	0.040	0.025
$\log\_R_{76}$	-0.228	0.413	$\log\_R_{11}$	0.279	0.297	sc.sel3	0.071	0.042
$\log\_R_{77}$	-0.628	0.367	$\log\_R_{12}$	1.010	0.241	sc.sel4	0.136	0.074
$\log\_R_{78}$	-0.740	0.360	$\log\_R_{13}$	0.120	0.345	sc.sel5	0.433	0.211
$\log\_R_{79}$	0.331	0.332	$\log\_R_{14}$	-0.076	0.416	sc.sel6	0.726	0.306
$\log\_R_{80}$	0.386	0.314	$\log\_R_{15}$	-0.212	0.434	sc.sel7	0.860	0.265
$\log\_R_{81}$	0.344	0.285	a_1	2.050	4.300	sc.sel8	1.000	0.001
$\log\_R_{82}$	0.366	0.336	a_2	3.037	3.956	$w^2{}_t$	0.075	0.023
$\log\_R_{83}$	0.525	0.293	a_3	4.568	3.704	q	0.806	0.143
$\log\_R_{84}$	0.010	0.313	a_4	4.713	3.678	ms		
$\log\_R_{85}$	0.364	0.286	a_5	4.647	3.664	σ	0.444	0.052
$\log\_R_{86}$	-0.051	0.305	a_6	3.646	3.688	β_1	4.147	0.238
$\log\_R_{87}$	-0.041	0.259	a_7	1.695	4.020	β_2	9.758	0.987
$\log\_R_{88}$	-0.049	0.270	r1	10.000	0.669			
$\log\_R_{89}$	-0.429	0.297	r2	9.797	0.733			
$\log\_R_{90}$	-0.245	0.260	mol.1	0.957	0.038			
$\log\_R_{91}$	-0.591	0.300	mol.2	0.939	0.030			
$\log\_R_{92}$	-0.601	0.306	mol.3	0.906	0.027			
$\log\_R_{93}$	-0.671	0.307	mol.4	0.804	0.033			
$\log\_R_{94}$	-0.365	0.280	mol.5	0.638	0.036			
$\log\_R_{95}$	-0.017	0.246	mol.6	0.561	0.044			
$\log\_R_{96}$	0.570	0.227	mol.7	0.428	0.068			
$\log\_R_{97}$	-0.211	0.332	mol.8	0.381	0.159			
$\log\_R_{98}$	-0.674	0.326	st.sel1	0.389	0.135			
$\log\_R_{99}$	-0.100	0.320	st.sel2	0.414	0.121			
$\log\_R_{00}$	0.205	0.285	st.sel3	0.542	0.142			
$\log\_R_{01}$	0.182	0.267	st.sel4	0.723	0.164			
$\log\_R_{02}$	0.029	0.324	st.sel5	0.911	0.158			
$\log\_R_{03}$	-0.301	0.350	st.sel6	1.000	0.001			
$\log\_R_{04}$	0.304	0.263	st.sel7	0.987	0.255			
$\log\_R_{05}$	0.411	0.244	st.sel8	0.913	0.550			
$\log\_R_{06}$	0.529	0.264	$\log\_\phi_w$	-2.421	0.357			