

Appendix C1: Results for Model 0

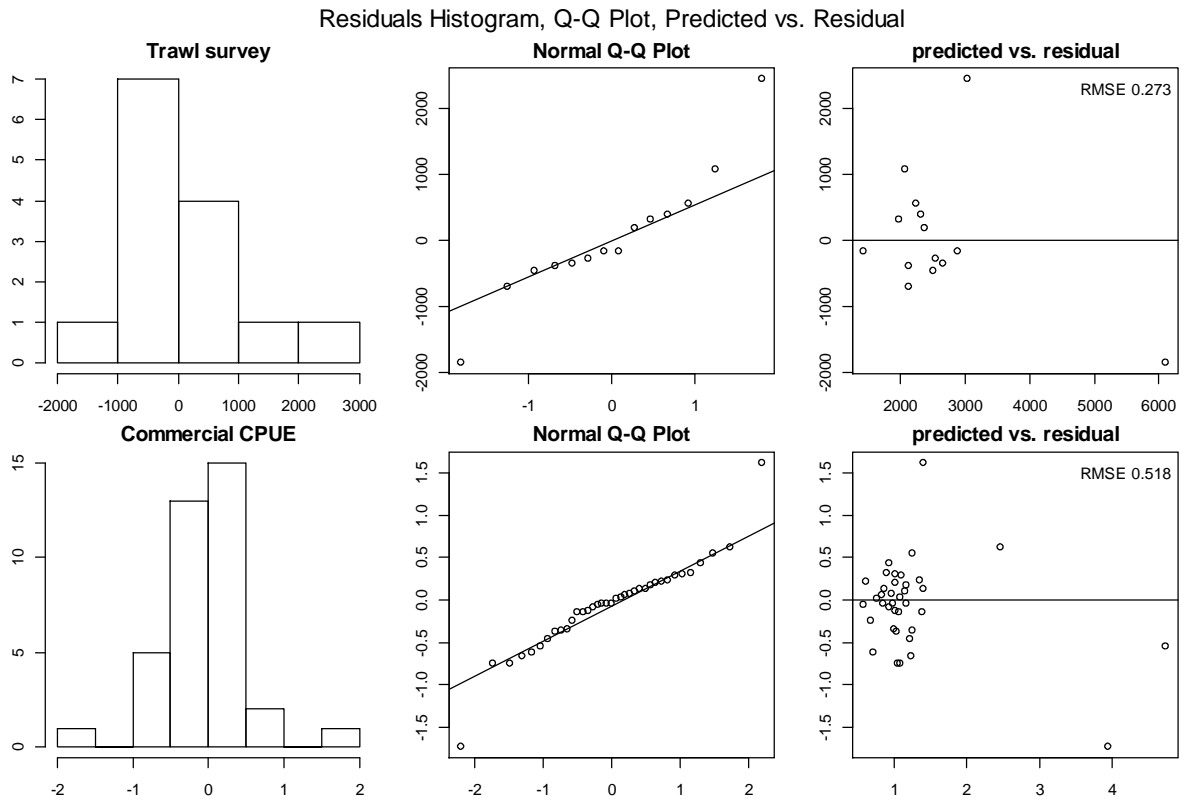


Figure C1-1. QQ plots of trawl survey abundance and commercial CPUE residuals.

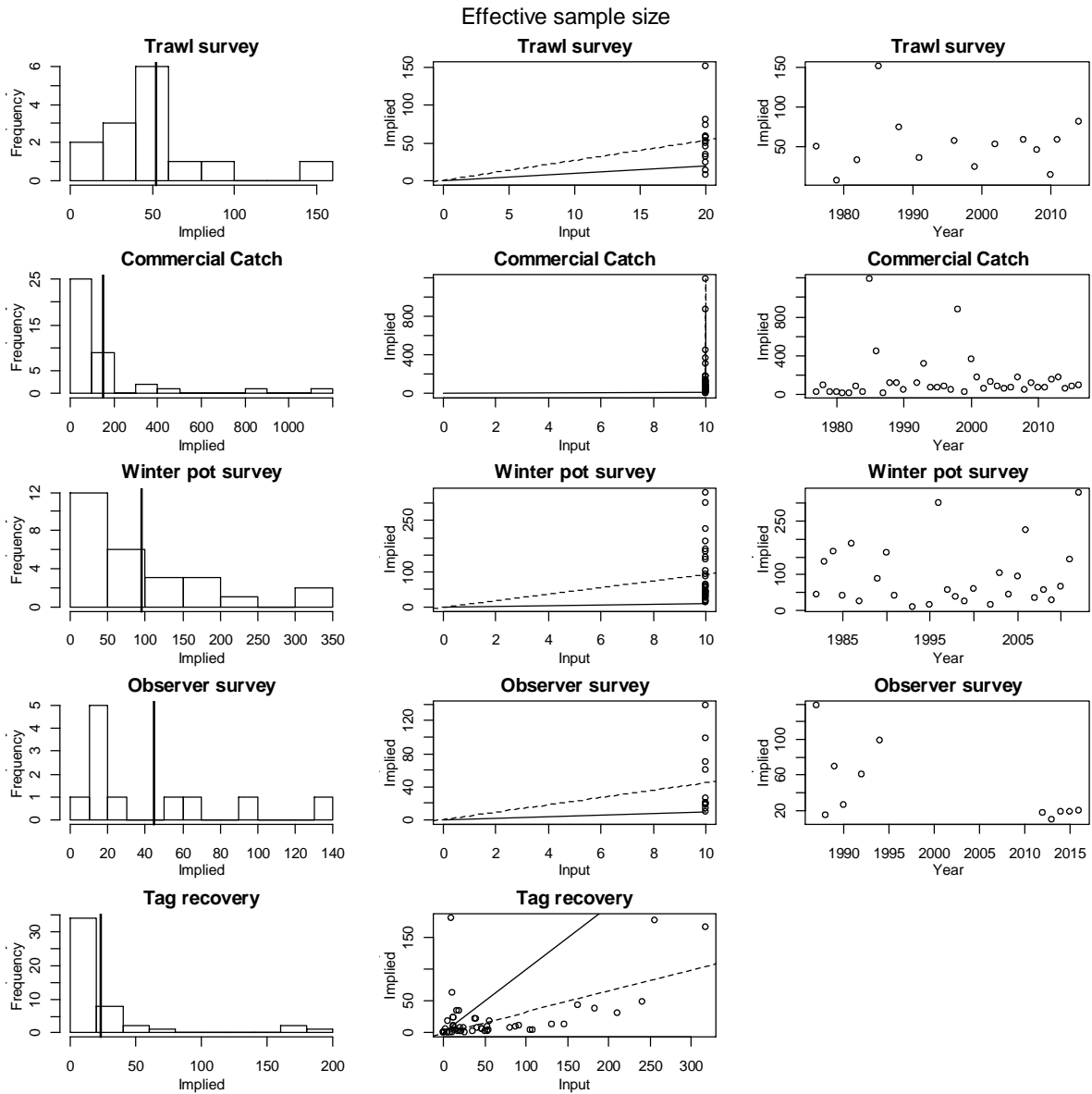


Figure C1-2: Implied effective sample sizes. Figures in the first column show implied effective sample size (x-axis) vs. frequency (y-axis). Vertical solid line is the mean implied effective sample size. The second column shows input sample sizes (x-axis) vs. implied effective sample sizes (y-axis). 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).

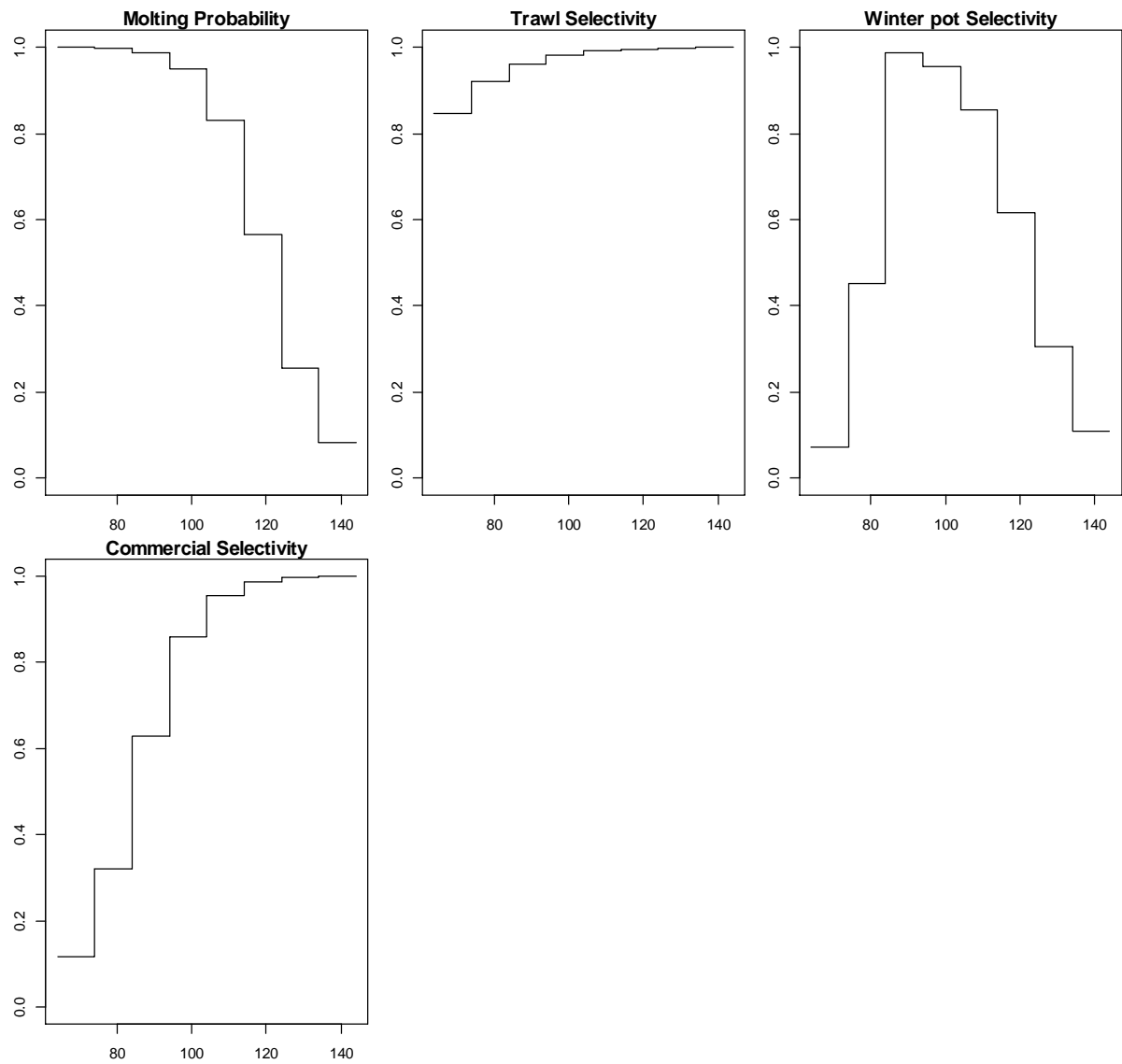


Figure C1-3. Model estimated annual molting probability, trawl survey selectivity, winter pot survey selectivity, and summer commercial fishery selectivity. X-axis is carapace length (mm).

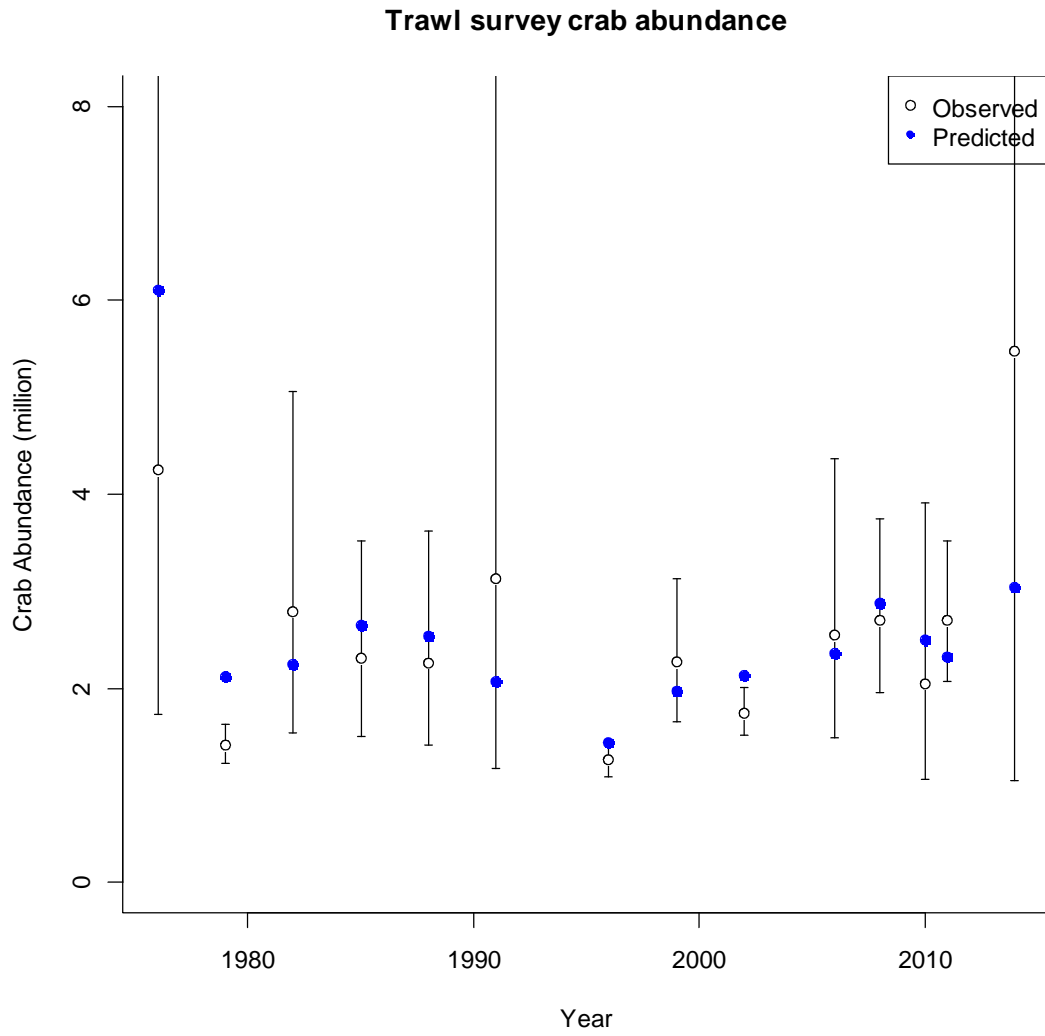


Figure C1-4. Observed and model estimated trawl survey male abundances over time with 95% confidence intervals (crab \geq 74 mm CL).

Modeled crab abundance Feb 01

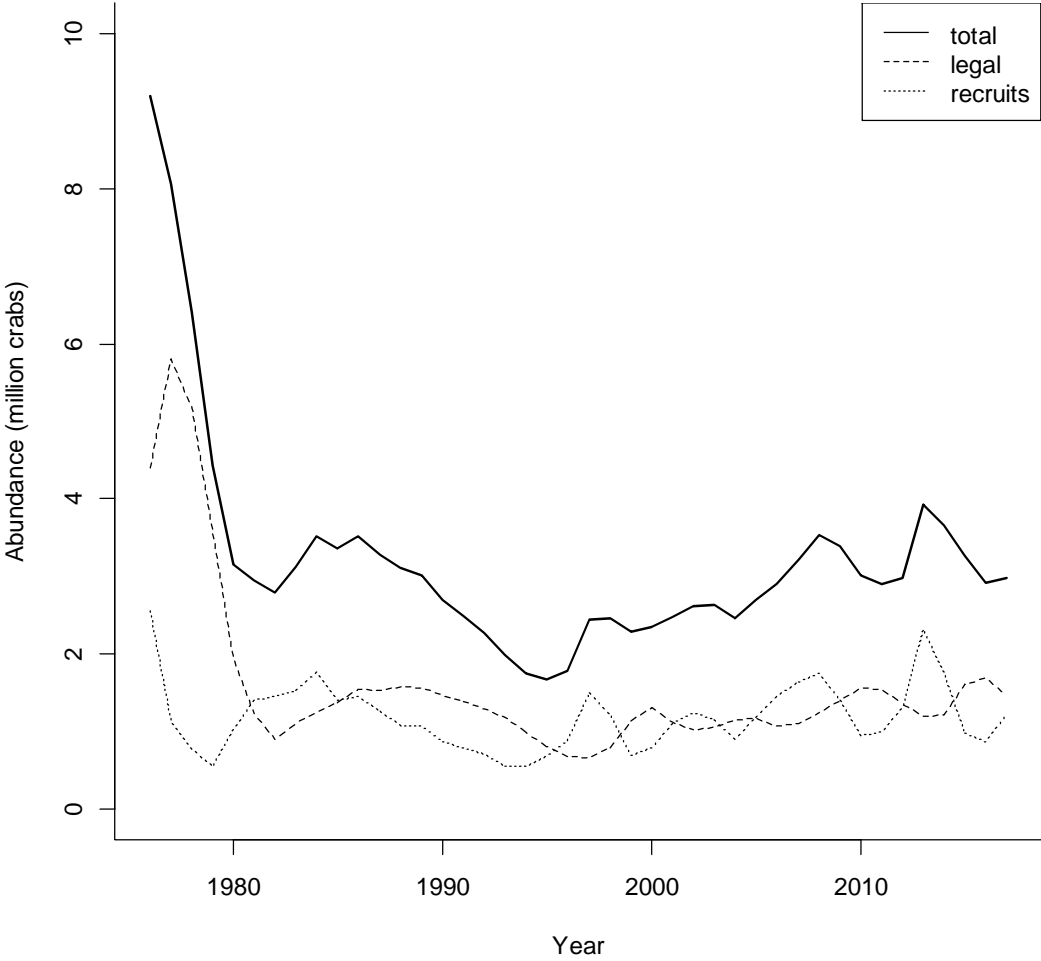


Figure C1-5. Estimated abundance of total, legal, and recruit males during 1976-2016.

MMB Feb 01

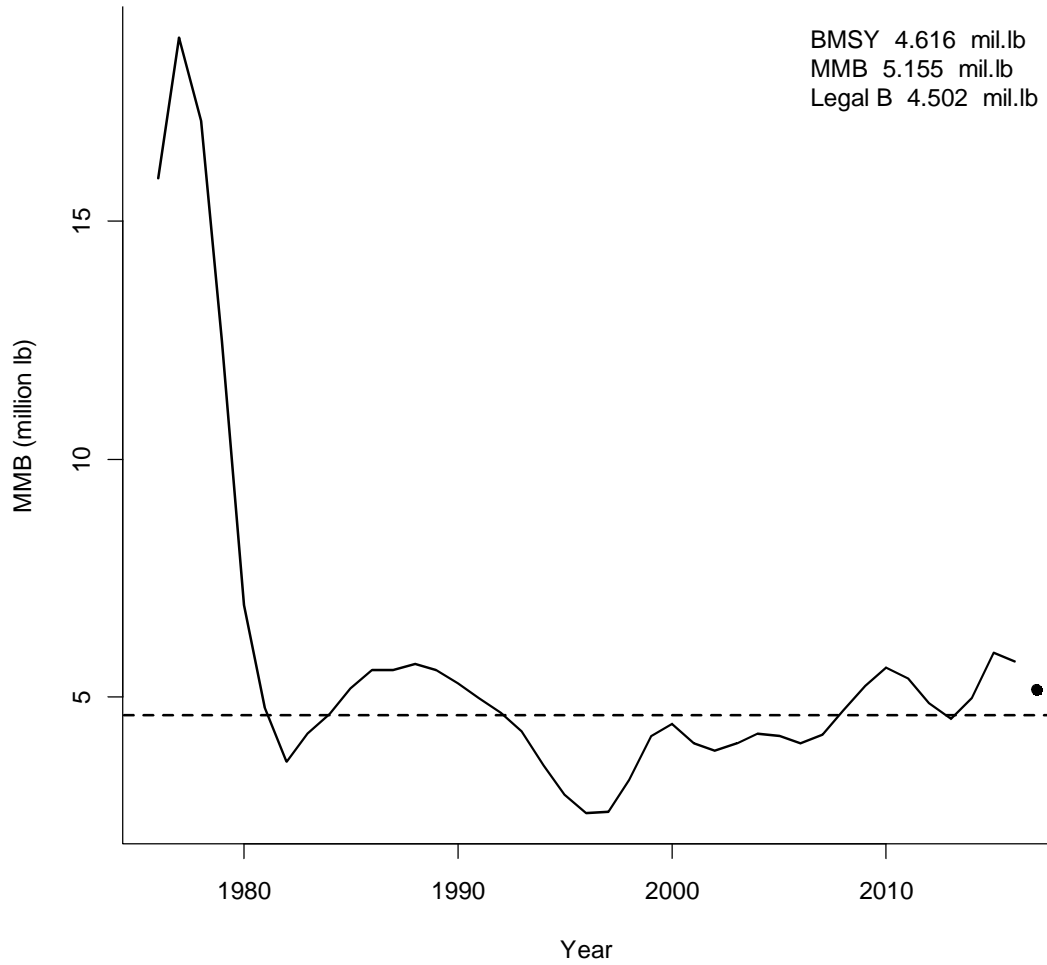


Figure C1-6. Estimated mature male biomass from 1976-2016. The dashed line shows B_{msy} (Average MMB of 1980-2016).

Summer commercial standardized cpue

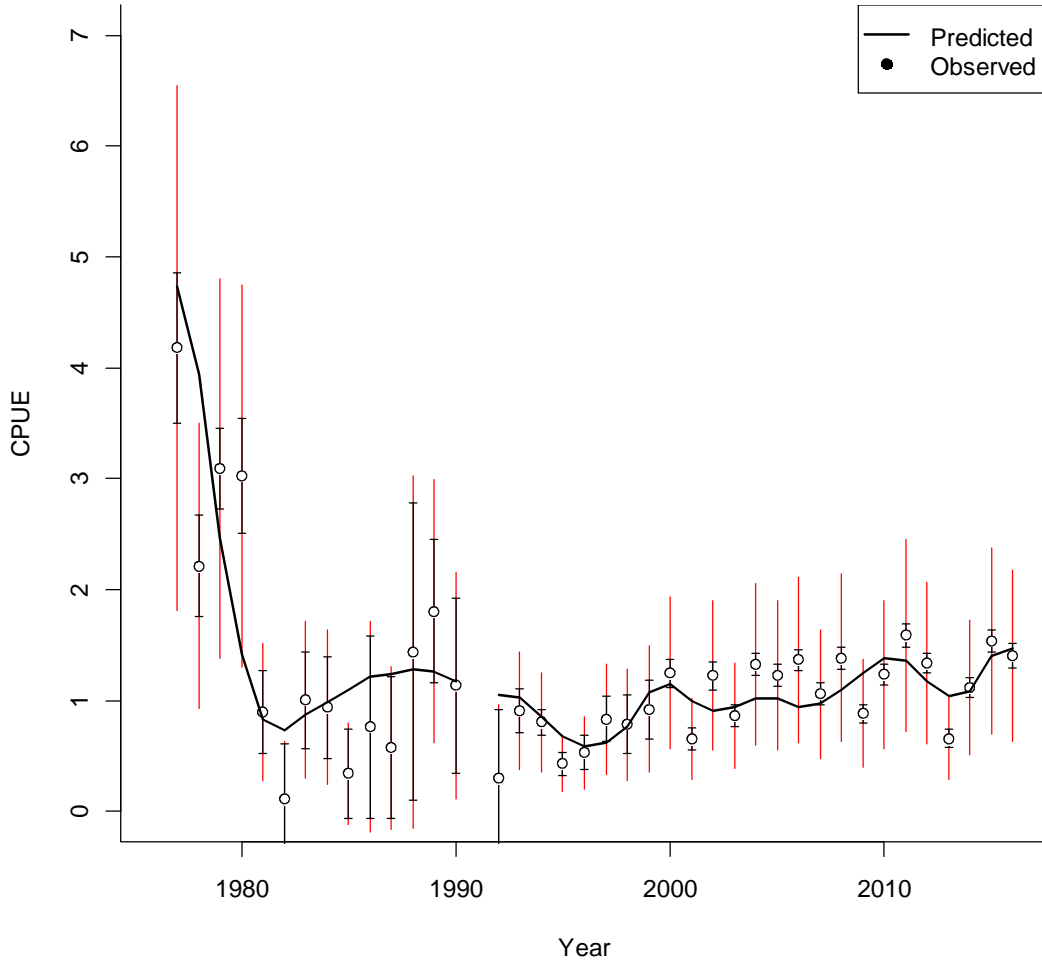


Figure C1-7. Summer commercial fishery standardized cpue during 1977-2016.

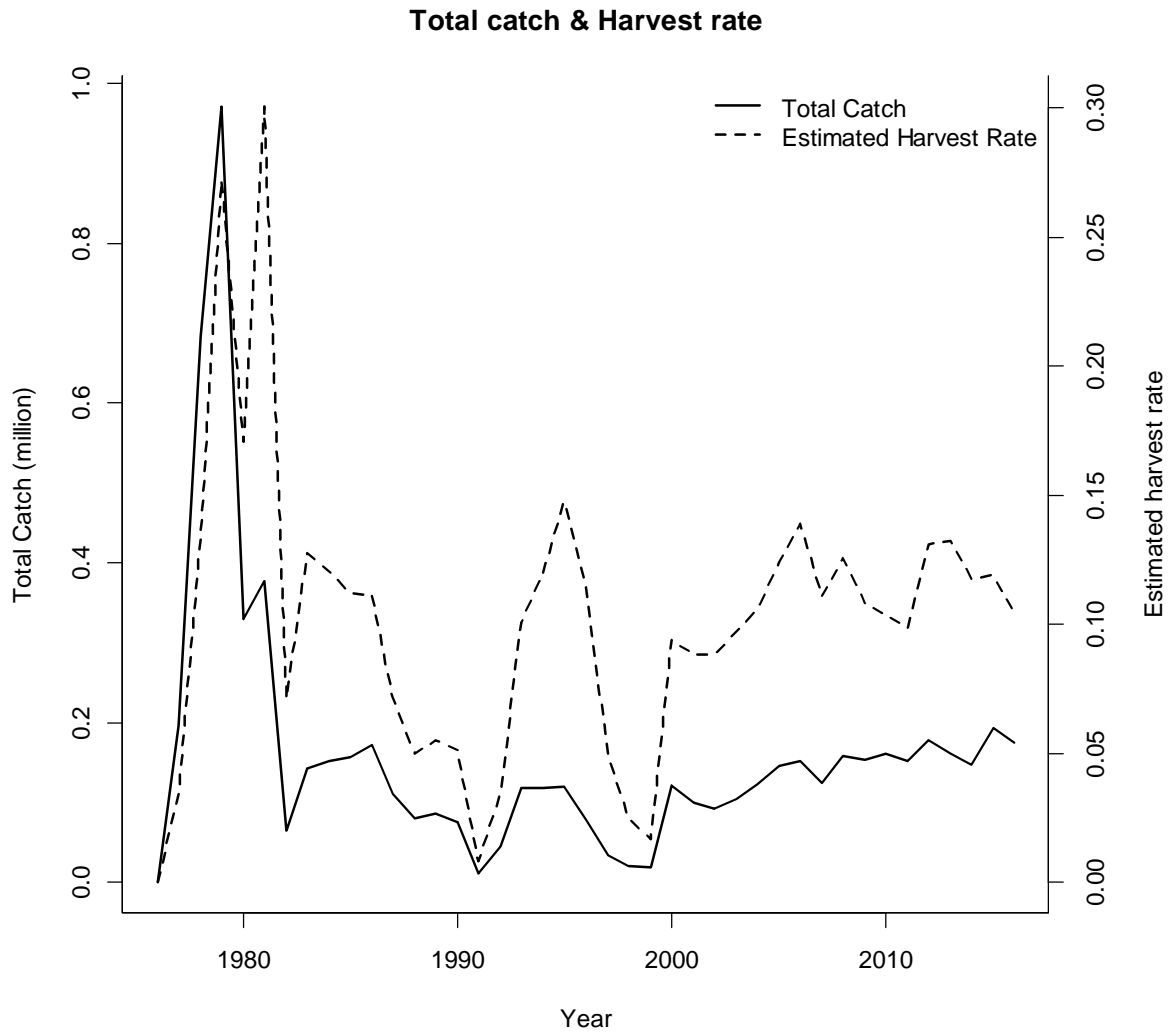


Figure C1-8. Total catch and estimated harvest rates during 1976-2016.

commercial harvest length: observed vs predicted

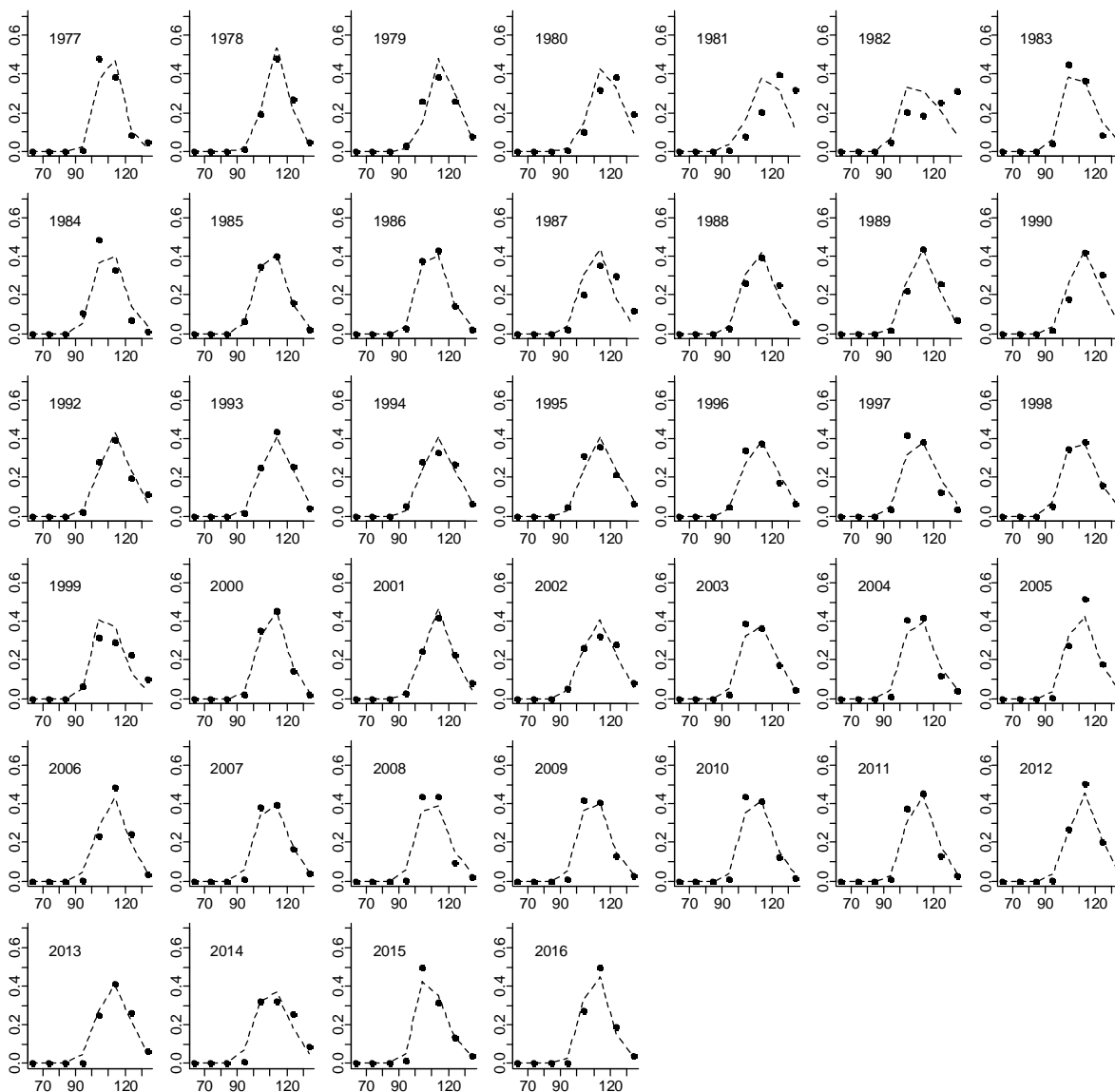


Figure C1-9. Predicted (dashed line) vs. observed (black dots) length class proportions for the summer commercial catch.

Winter pot length: observed vs predicted

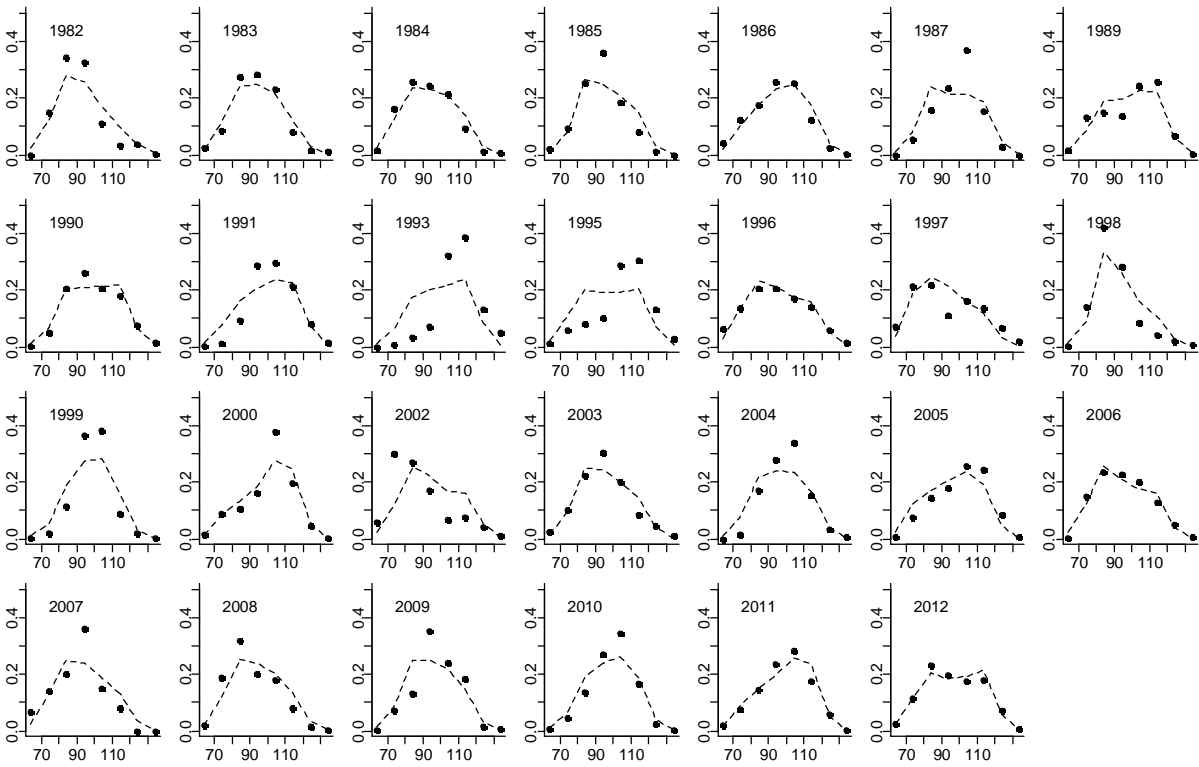


Figure C1-10. Predicted (dashed line) vs. observed (black dots) length class proportions for the winter pot survey.

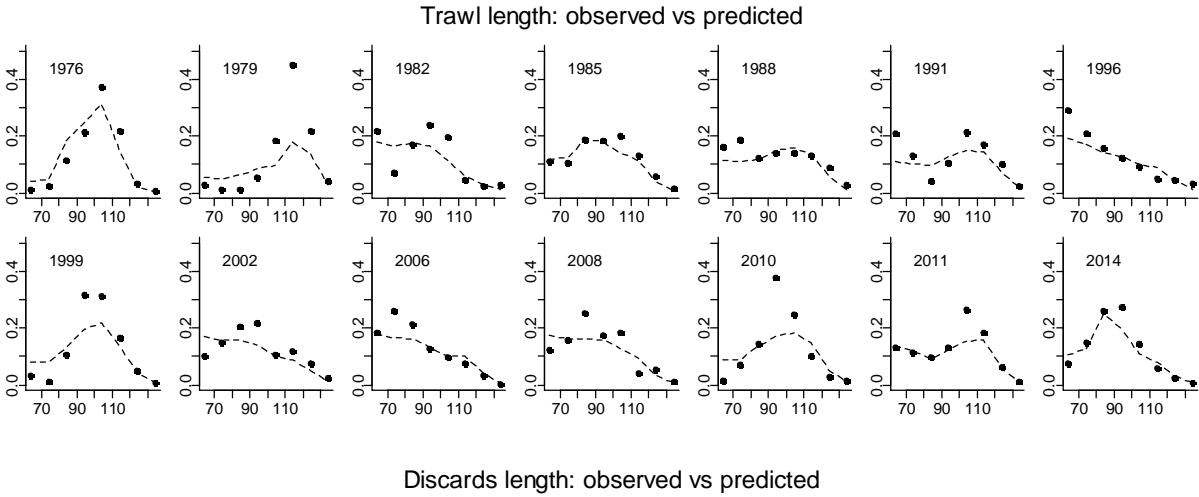


Figure C1-11. Predicted (dashed line) vs. observed (black dots) length class proportions for the trawl survey and observer survey.

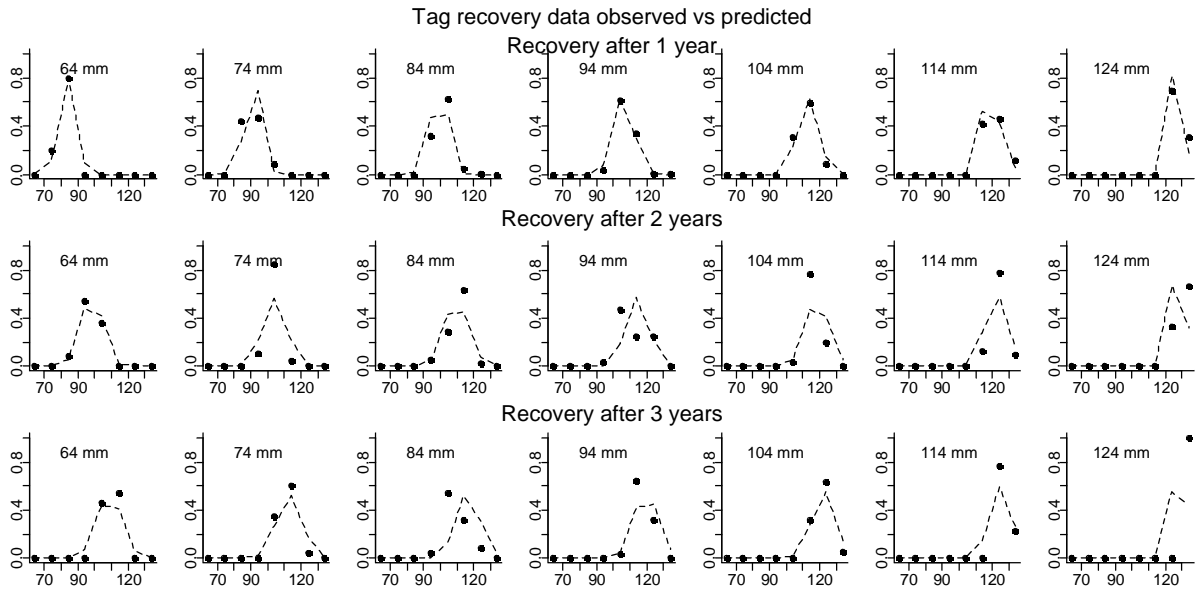


Figure C1-12. Predicted (dashed line) vs. observed (black dots) length class proportions for tag recovery data.

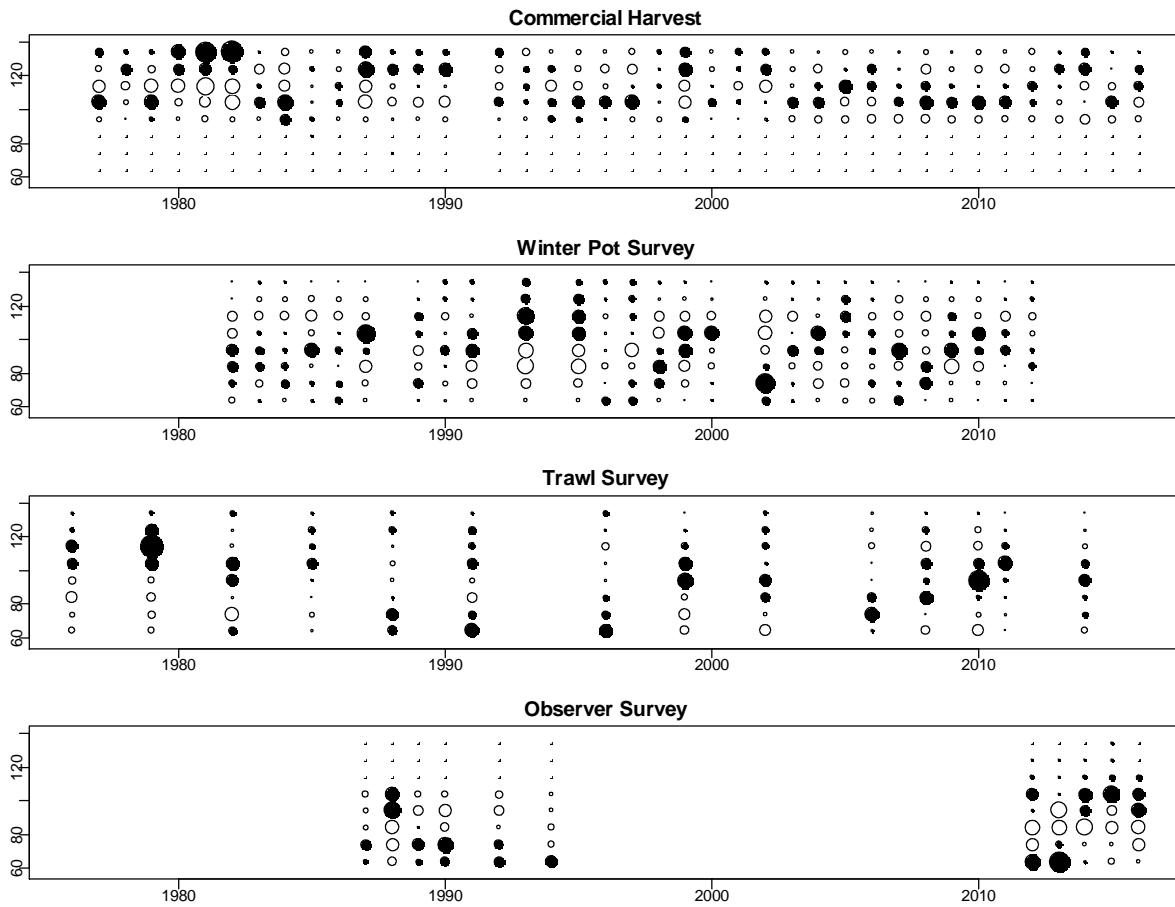


Figure C1-13. Bubble plots of predicted and observed length proportions. Black circles indicate model estimates lower than observed, white circles indicate model estimates higher than observed. Size of circle indicates degree of deviance (larger circle = larger deviance).

Table C1-1 . Summary of parameter estimates for a length-based stock synthesis population model of Norton Sound red king crab.

| name | Estimate | std.dev |
|---------|----------|---------|
| log_q1 | -6.941 | 0.187 |
| log_q2 | -6.826 | 0.109 |
| log_N76 | 9.127 | 0.148 |
| R0 | 6.491 | 0.088 |
| log_R76 | -0.002 | 0.440 |
| log_R77 | -0.600 | 0.369 |
| log_R78 | -0.730 | 0.354 |
| log_R79 | 0.237 | 0.321 |
| log_R80 | 0.333 | 0.297 |
| log_R81 | 0.308 | 0.274 |
| log_R82 | 0.389 | 0.317 |
| log_R83 | 0.574 | 0.279 |
| log_R84 | 0.059 | 0.309 |
| log_R85 | 0.427 | 0.283 |
| log_R86 | -0.009 | 0.303 |
| log_R87 | -0.005 | 0.261 |
| log_R88 | 0.027 | 0.271 |
| log_R89 | -0.381 | 0.296 |
| log_R90 | -0.275 | 0.262 |
| log_R91 | -0.505 | 0.285 |
| log_R92 | -0.759 | 0.312 |
| log_R93 | -0.585 | 0.291 |
| log_R94 | -0.369 | 0.268 |
| log_R95 | -0.070 | 0.239 |
| log_R96 | 0.537 | 0.216 |
| log_R97 | -0.203 | 0.313 |
| log_R98 | -0.658 | 0.318 |
| log_R99 | -0.154 | 0.310 |
| log_R00 | 0.146 | 0.268 |
| log_R01 | 0.185 | 0.256 |
| log_R02 | 0.020 | 0.309 |
| log_R03 | -0.299 | 0.335 |
| log_R04 | 0.293 | 0.247 |
| log_R05 | 0.339 | 0.239 |
| log_R06 | 0.487 | 0.249 |

| name | Estimate | std.dev |
|-----------------------------|----------|---------|
| log_R07 | 0.508 | 0.244 |
| log_R08 | 0.108 | 0.299 |
| log_R09 | -0.318 | 0.304 |
| log_R10 | 0.053 | 0.253 |
| log_R11 | 0.293 | 0.281 |
| log_R12 | 0.995 | 0.228 |
| log_R13 | 0.050 | 0.341 |
| log_R14 | -0.242 | 0.412 |
| log_R15 | -0.203 | 0.439 |
| a1 | 2.508 | 4.255 |
| a2 | 2.572 | 4.189 |
| a3 | 3.910 | 3.983 |
| a4 | 4.193 | 3.967 |
| a5 | 4.422 | 3.960 |
| a6 | 3.633 | 3.986 |
| a7 | 2.023 | 4.210 |
| r1 | 10.000 | 0.648 |
| r2 | 9.636 | 0.698 |
| log_a | -2.018 | 0.017 |
| log_φ _{st1} | -2.601 | 0.304 |
| log_φ _w | -2.050 | 0.050 |
| Sw7 | 0.071 | 0.034 |
| Sw8 | 0.452 | 0.108 |
| log_φ _l | -2.060 | 0.054 |
| w ² _t | 0.071 | 0.022 |
| q | 0.769 | 0.141 |
| ms | 3.482 | 0.307 |
| σ | 4.227 | 0.247 |
| β ₁ | 10.516 | 0.744 |
| β ₂ | 8.103 | 0.190 |