

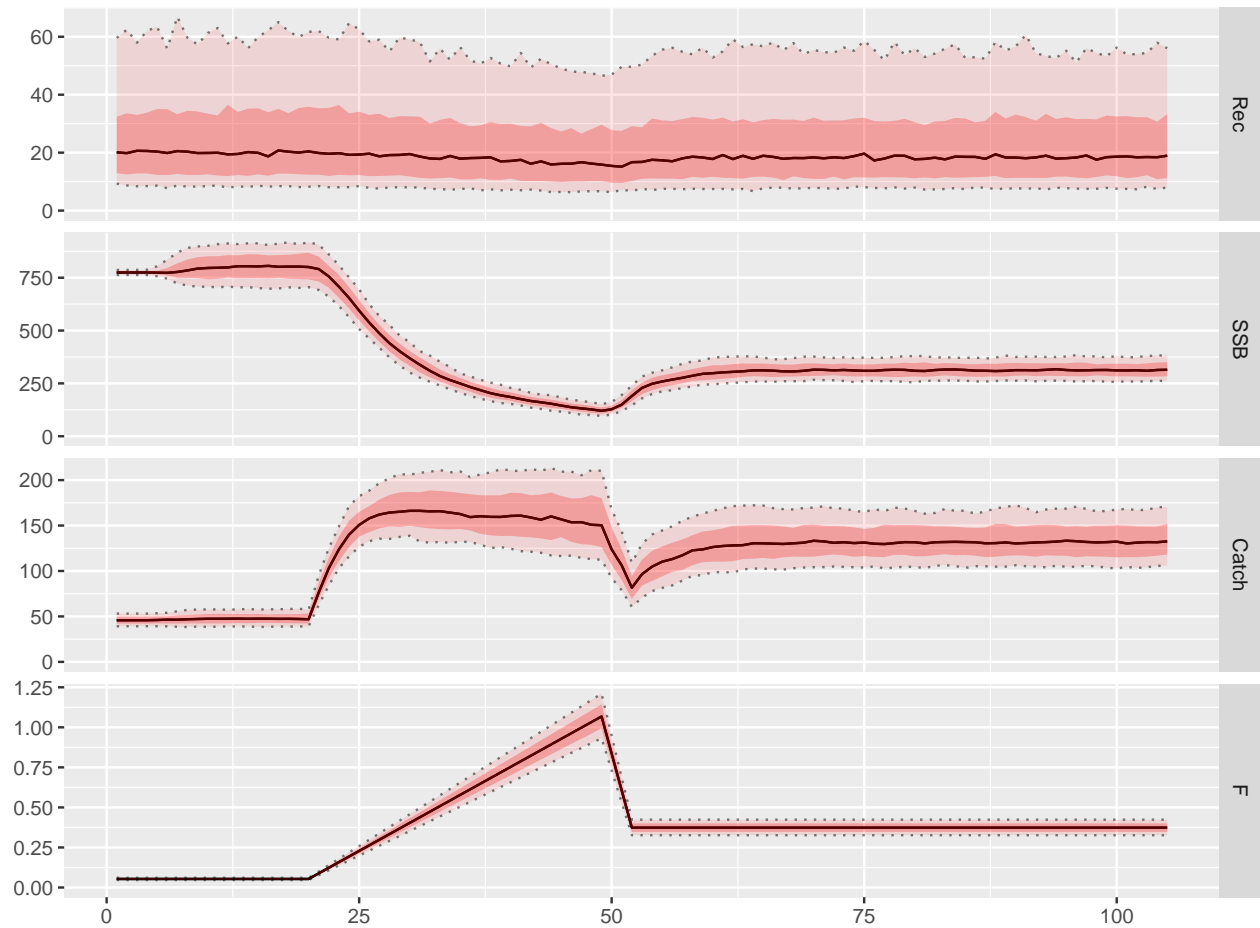
# Cross test using Operating Model based on Life History

LBSPR, length based assessment

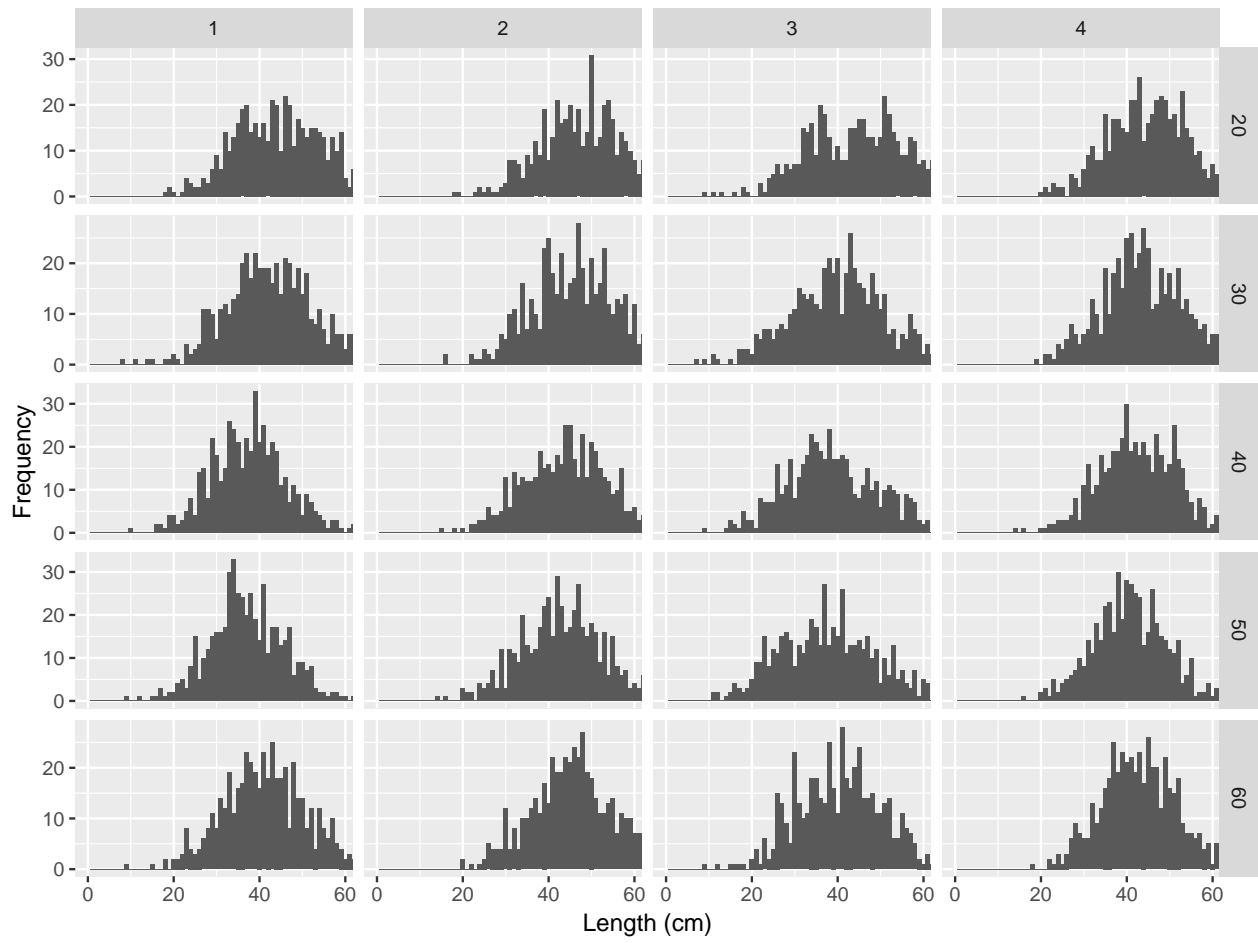
*L Kell*

*13 August, 2018*

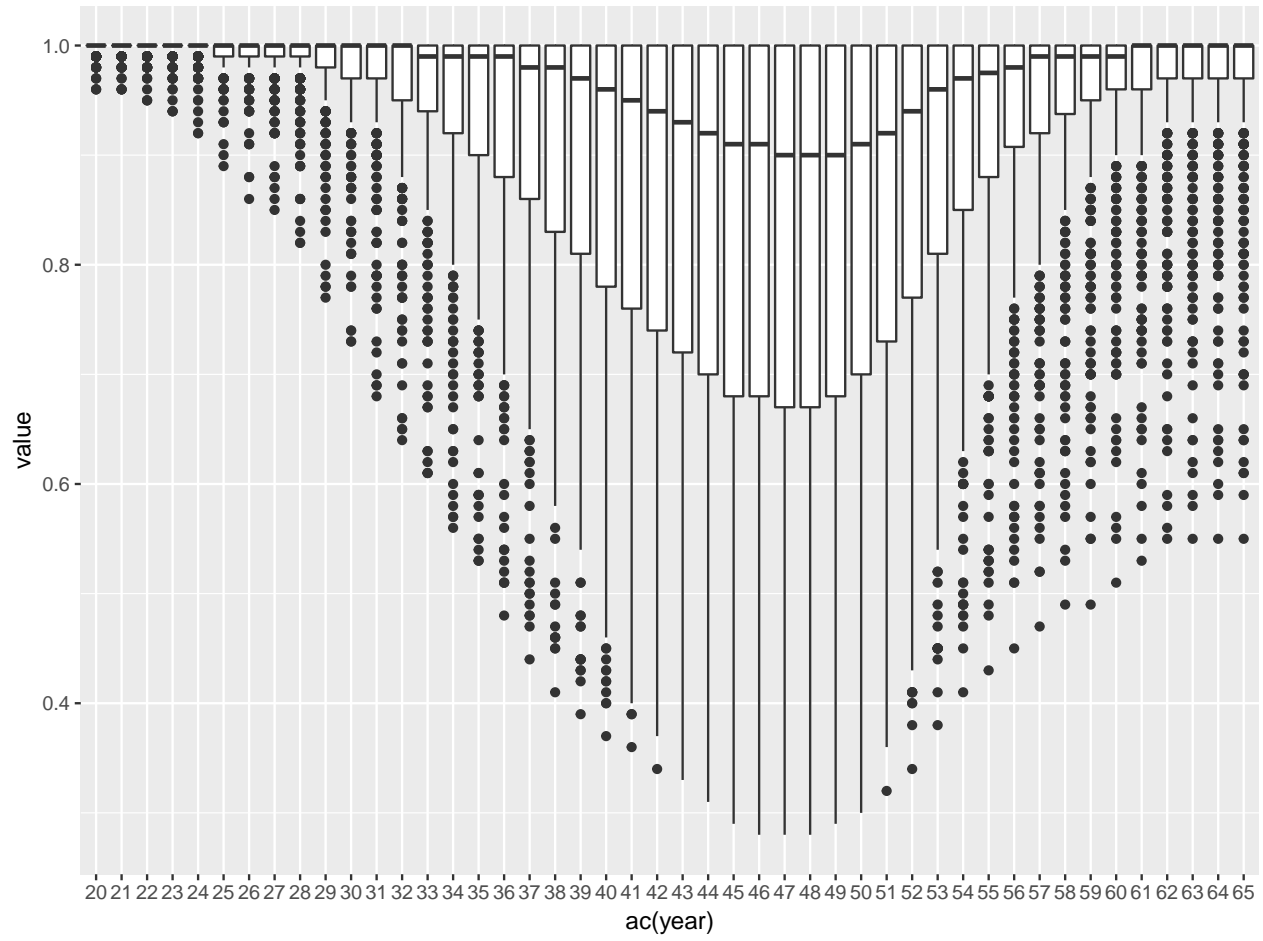
## Turbot



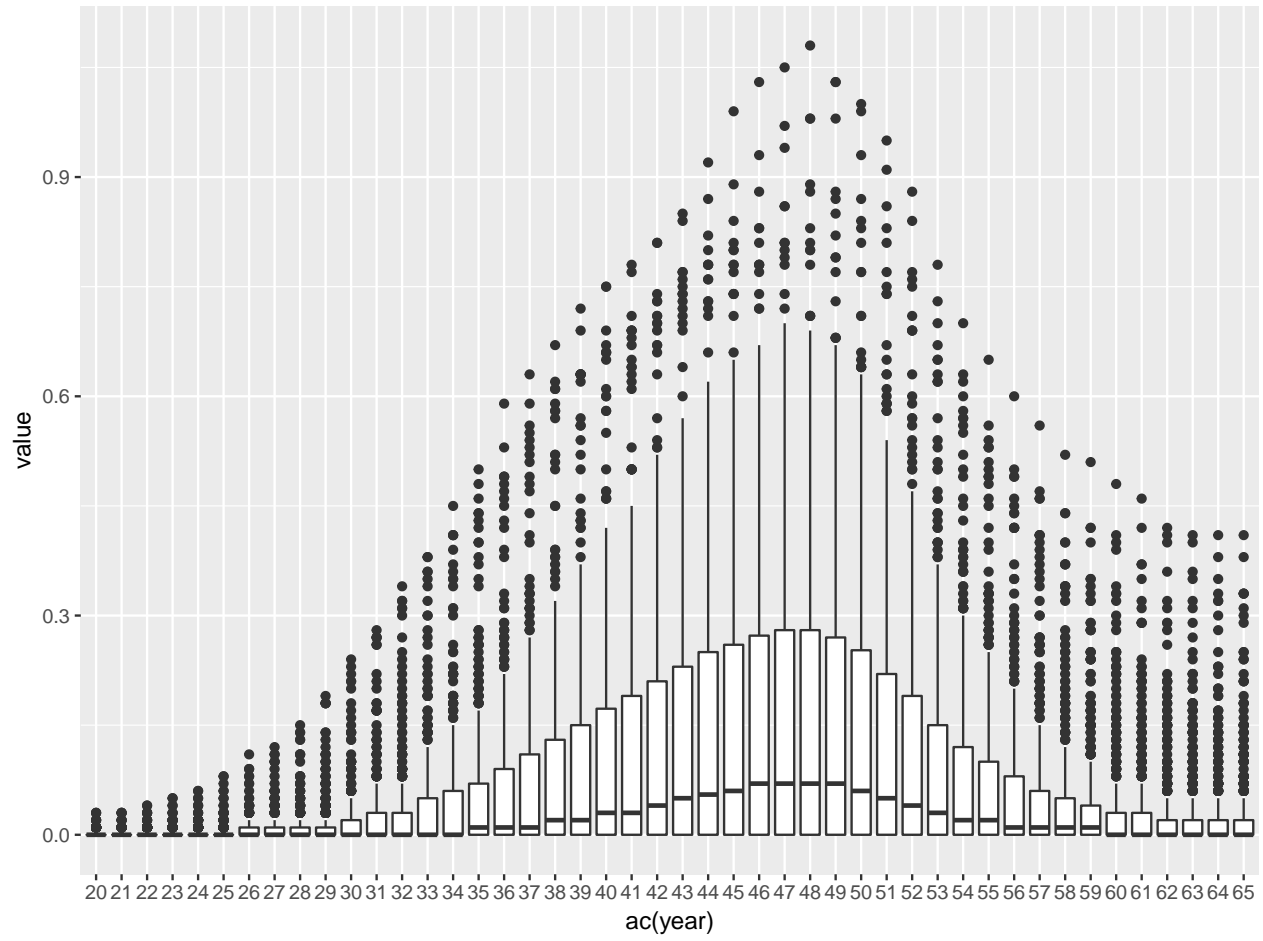
**Figure 1** Operating model for turbot.



**Figure 2** Observation error model for turbot.

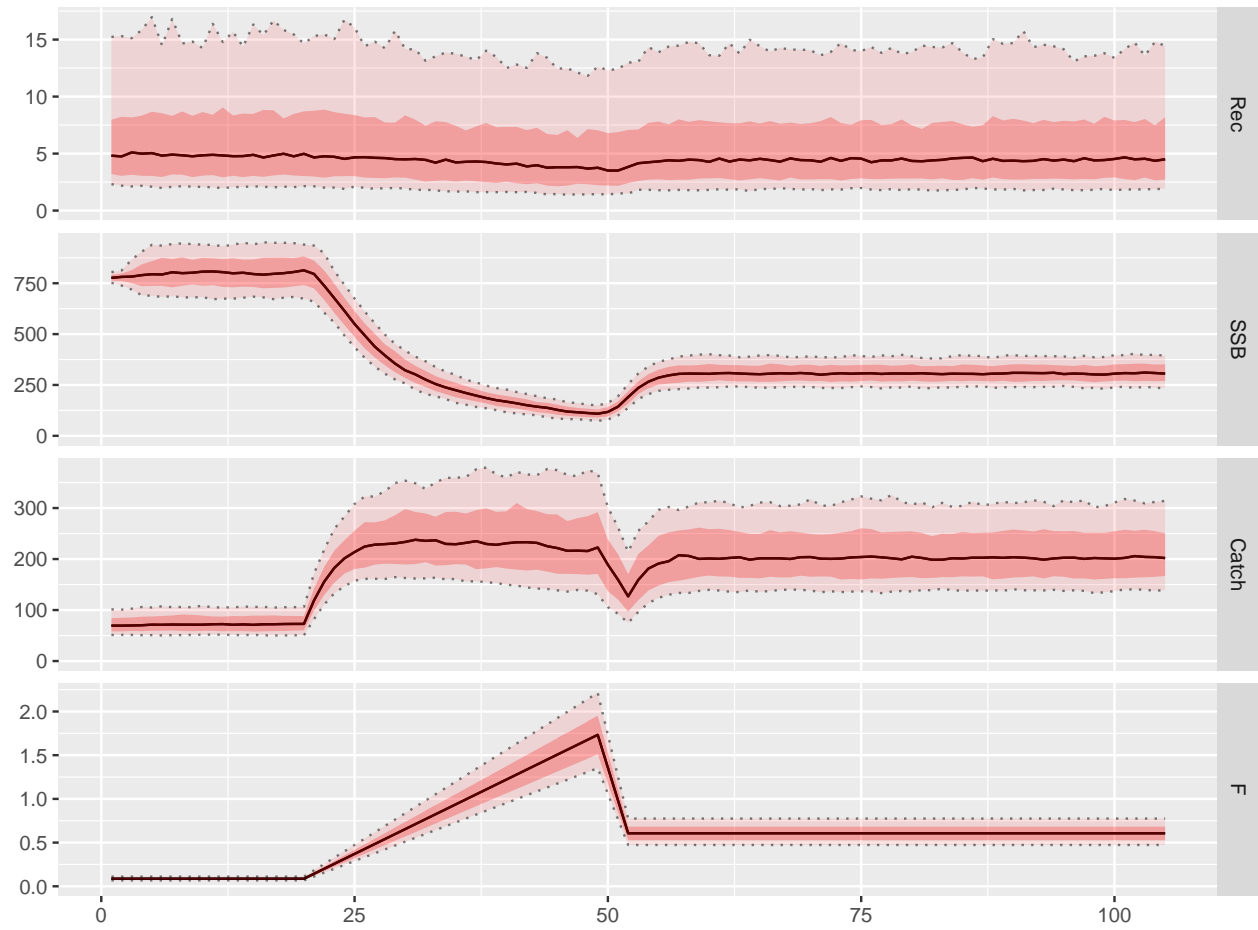


**Figure 3** Estimates of SPR for turbot.

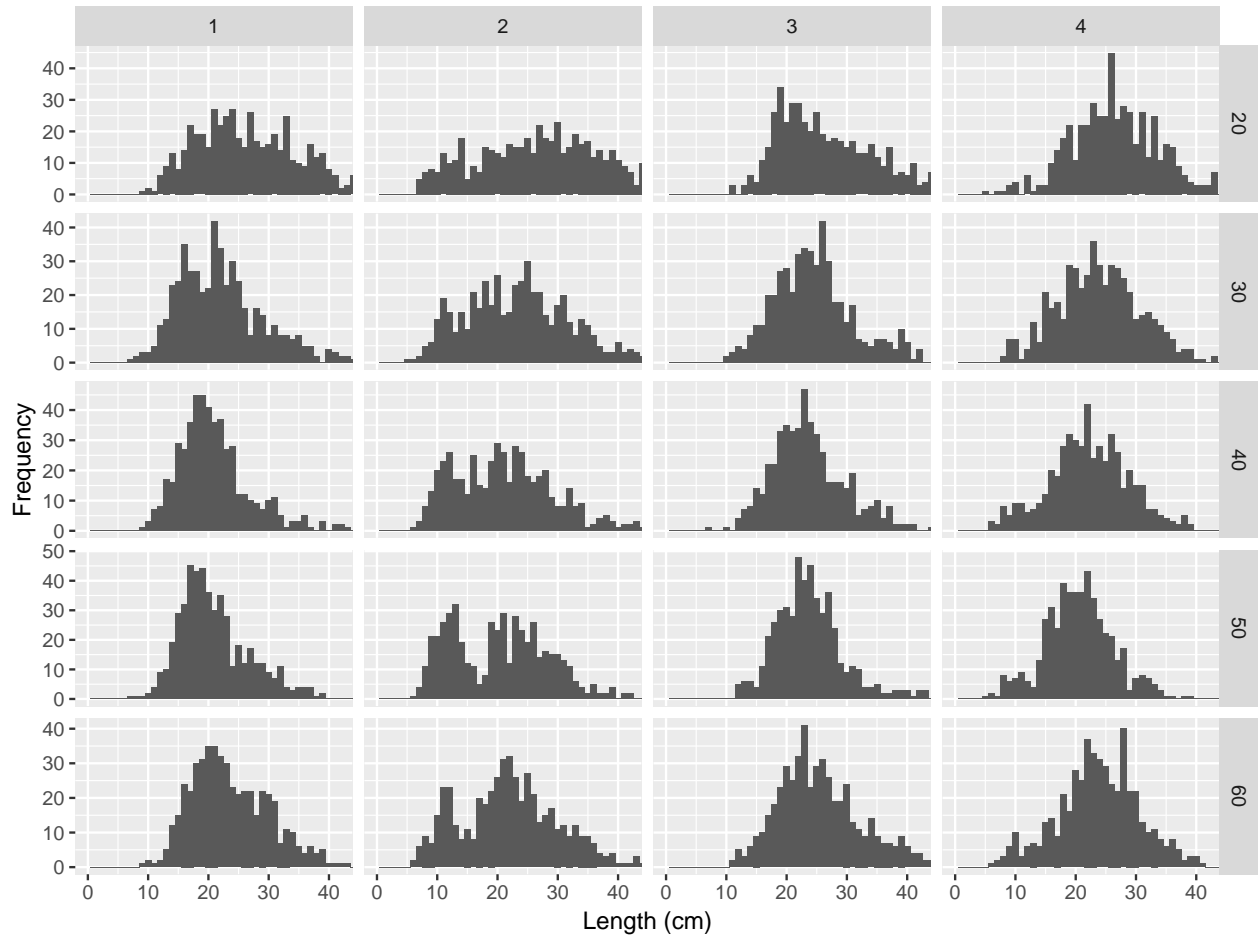


**Figure 4** Estimates of  $F/M$  for turbot.

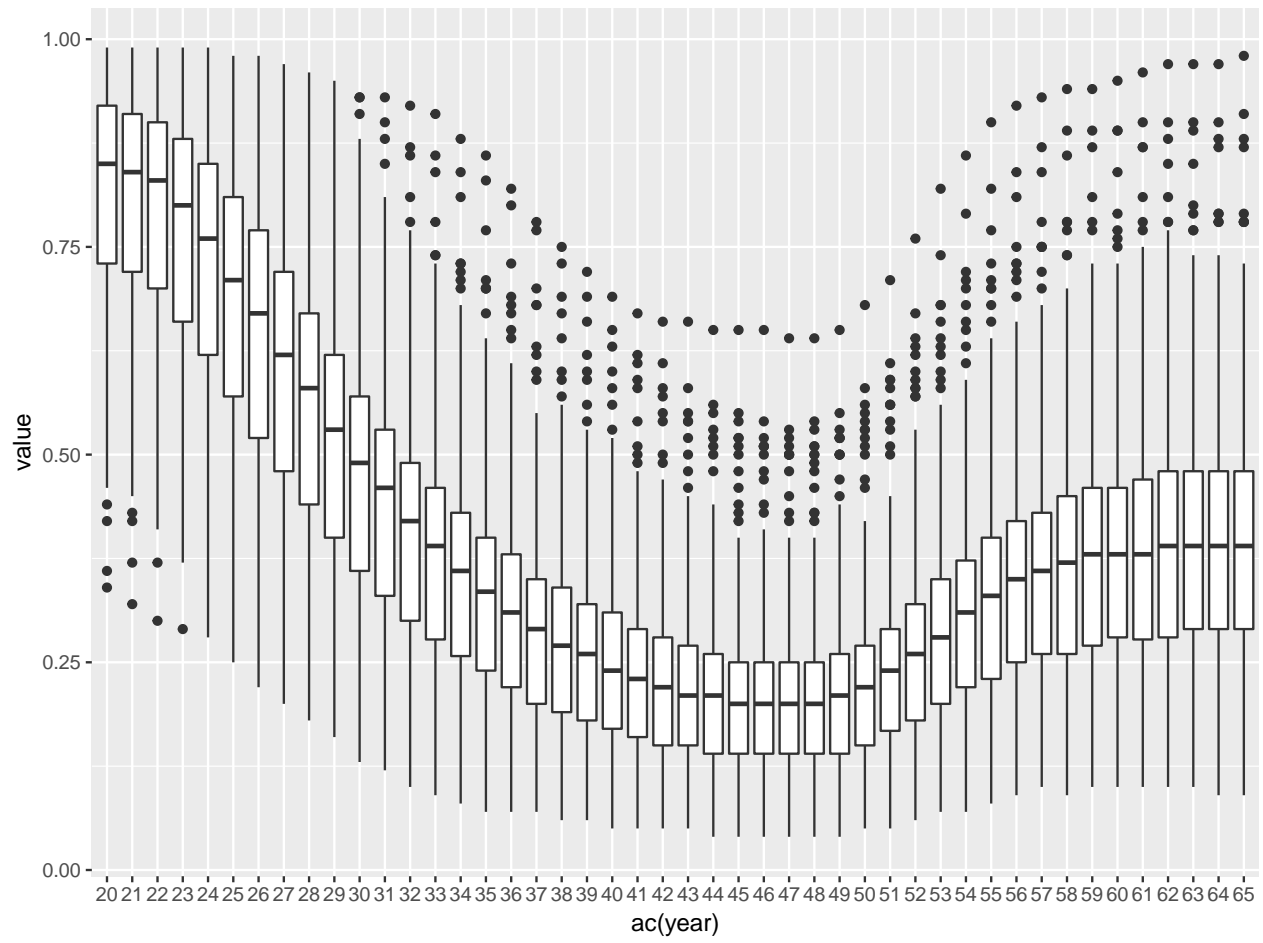
## Brill



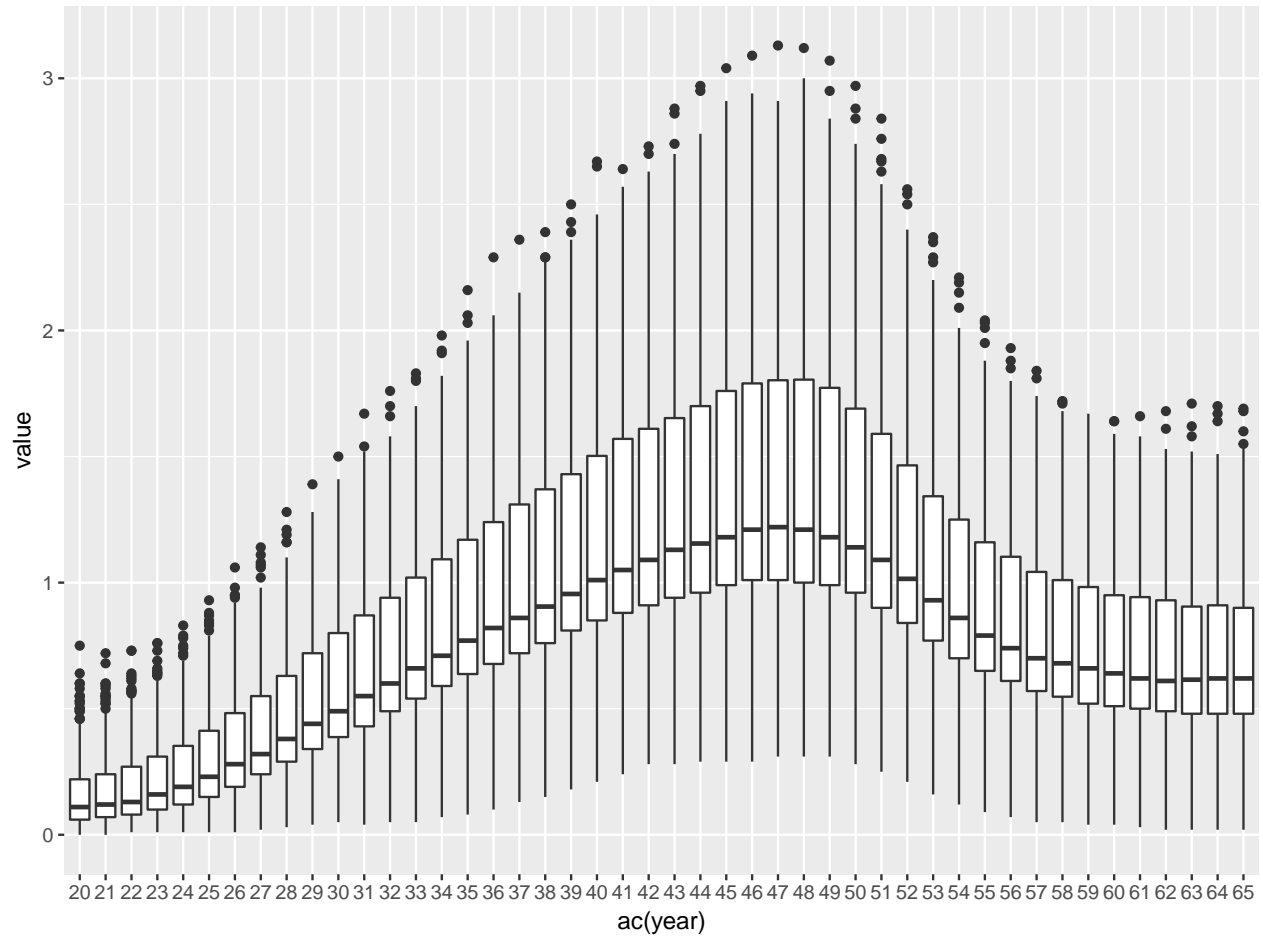
**Figure 5** Operating model for Brill.



**Figure 6** Observation error model for Brill.



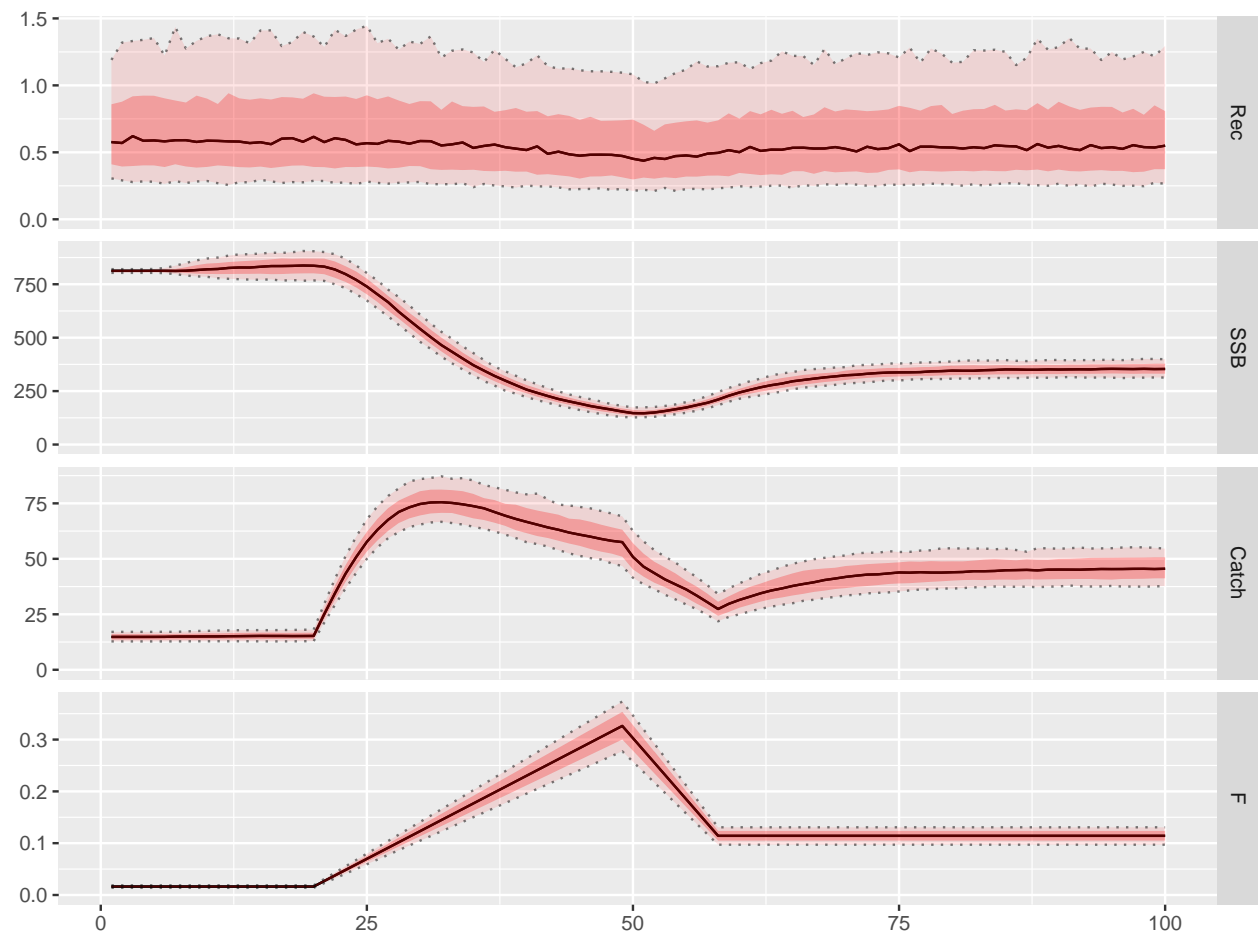
**Figure 7** Estimates of SPR for brill.



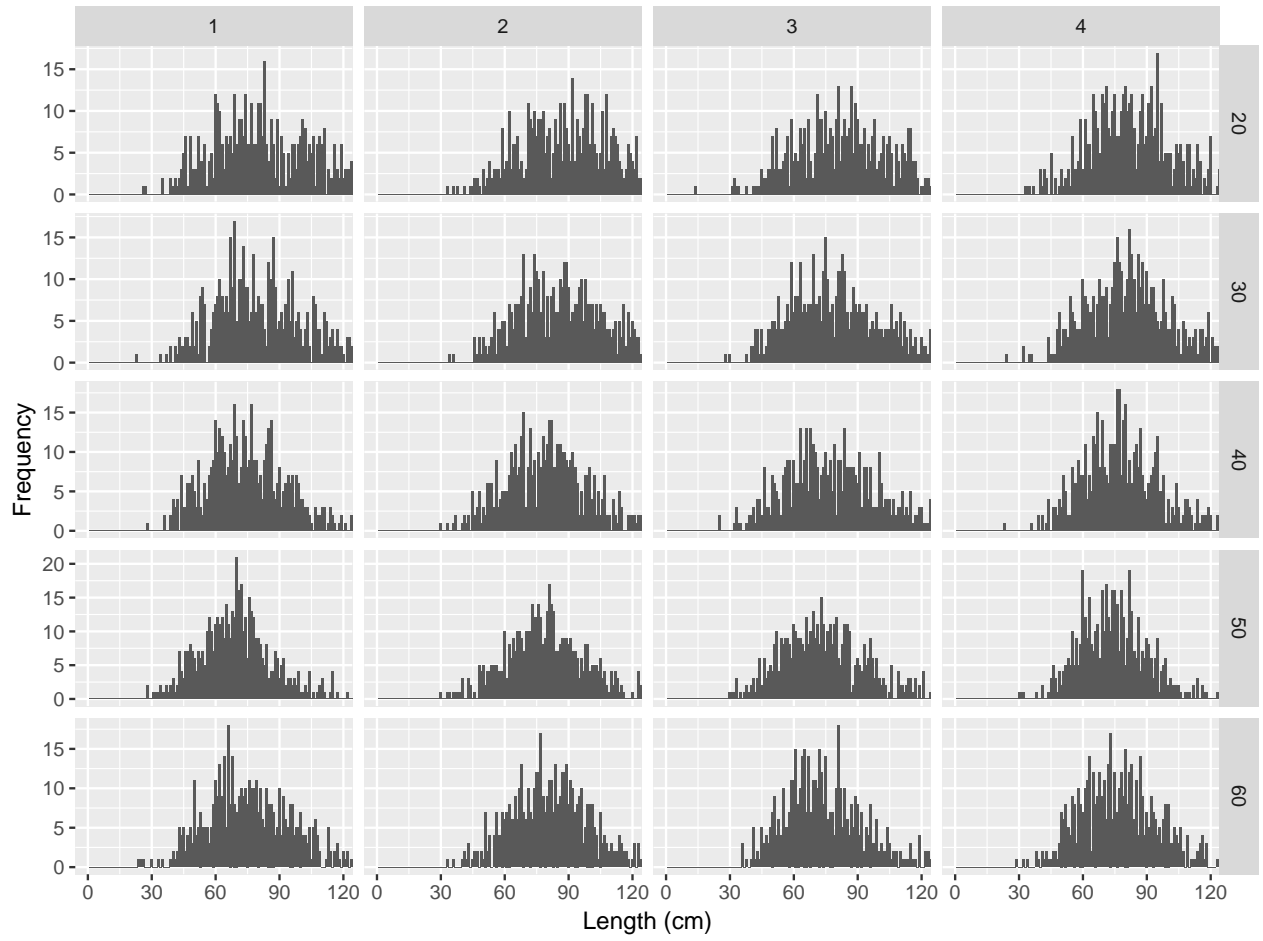
**Figure 8** Estimates of  $F/M$  for brill.



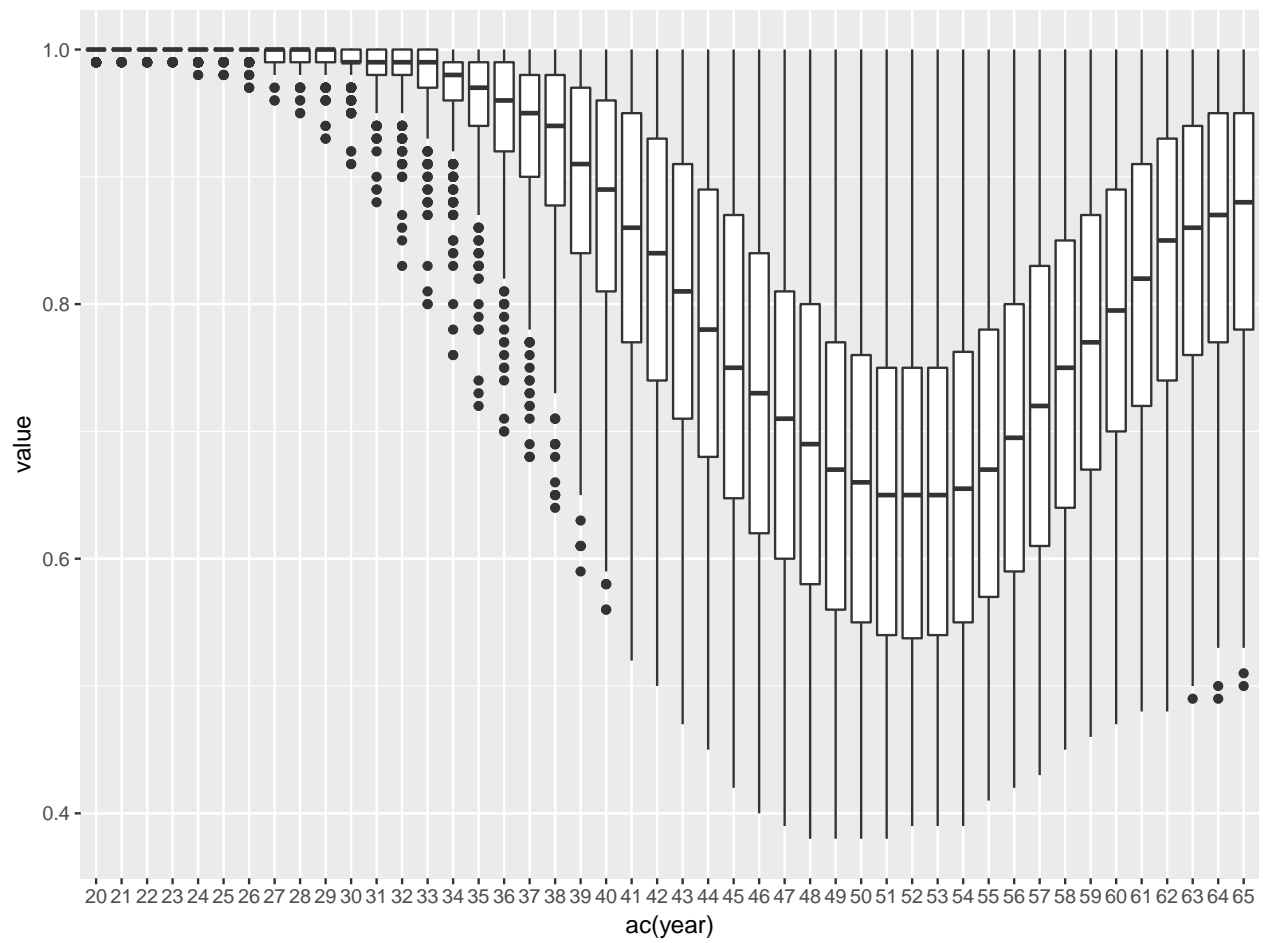
## Ray



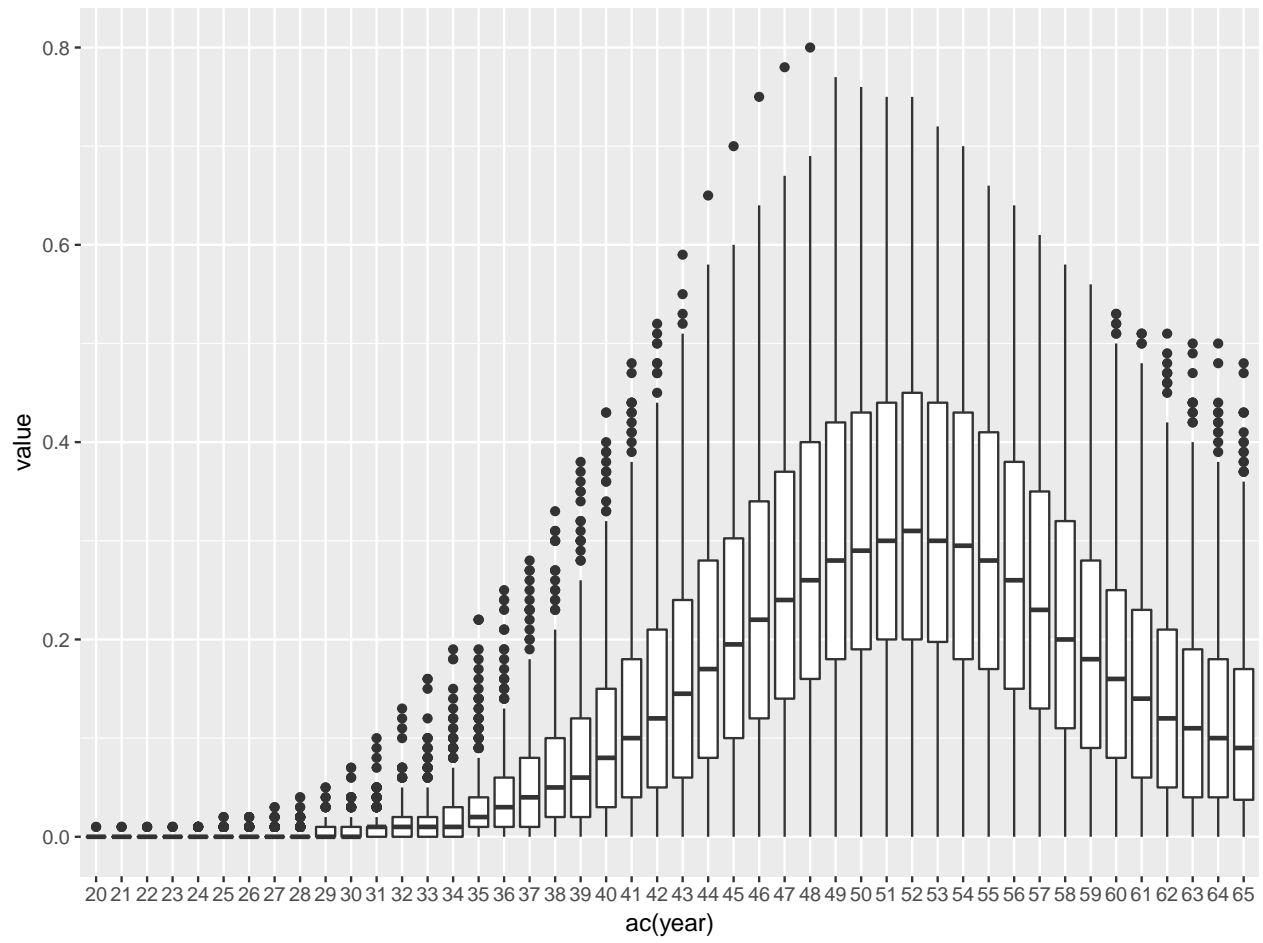
**Figure 9** Operating model for ray.



**Figure 10** Observation error model for ray.

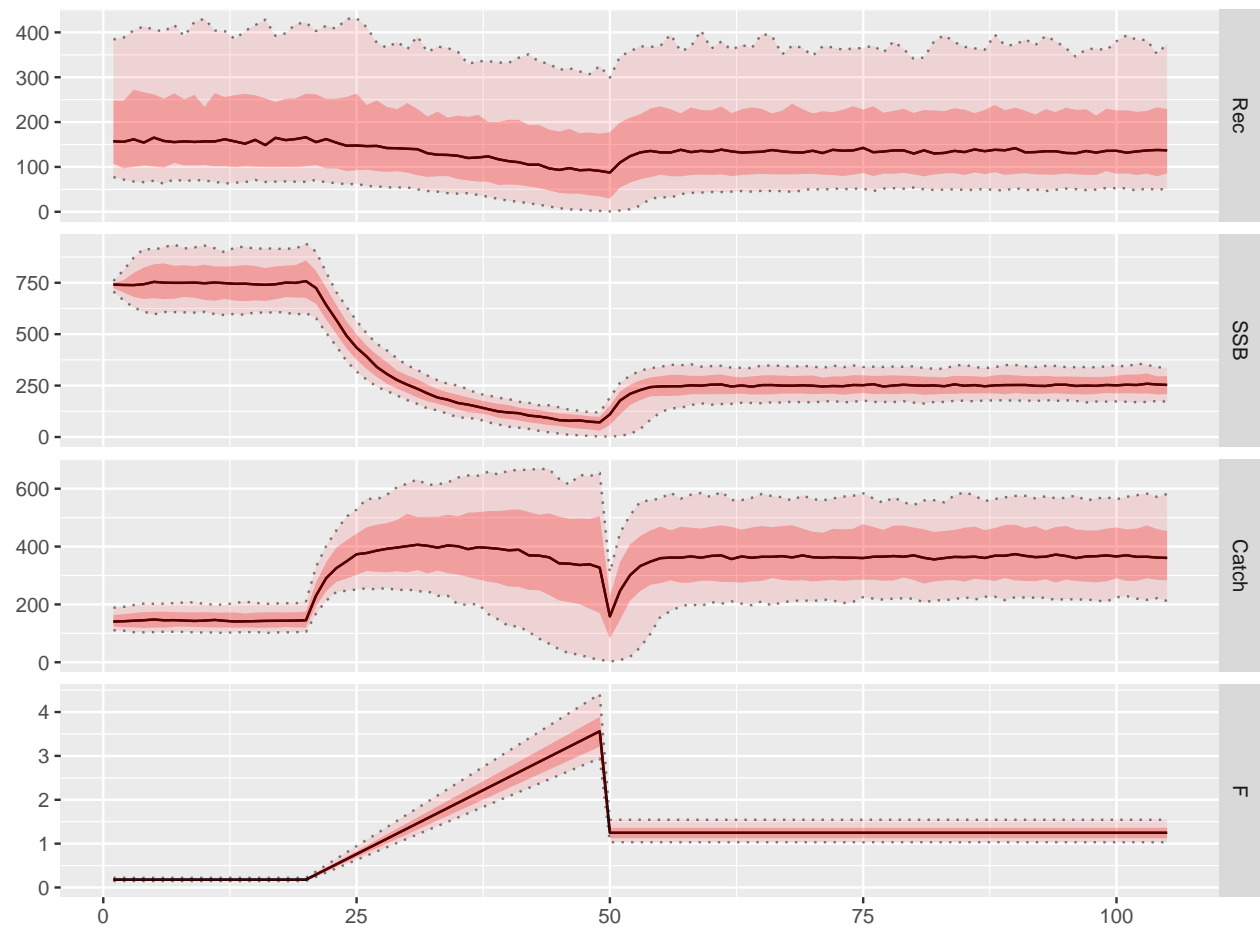


**Figure 11** Estimates of SPR for ray.

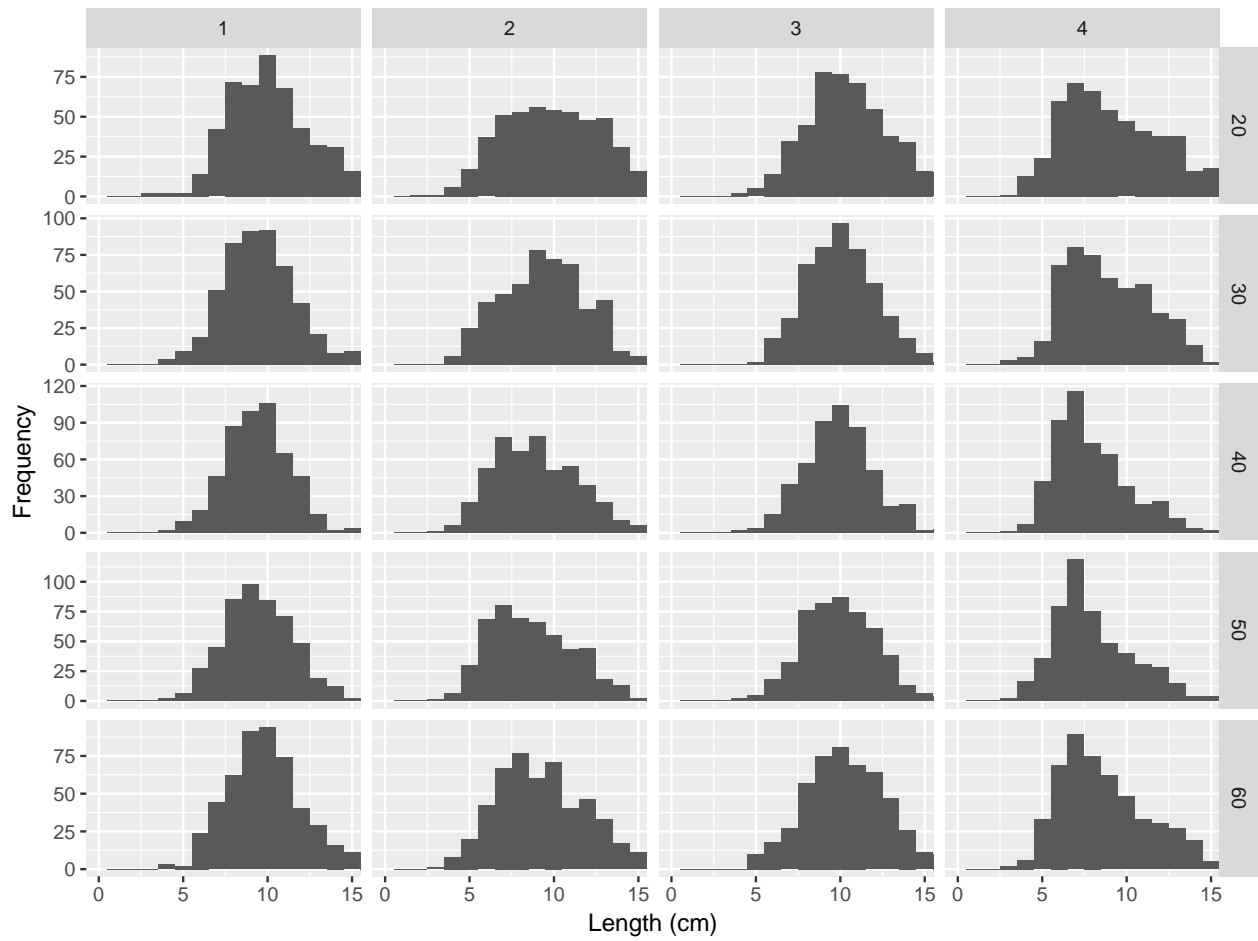


**Figure 12** Estimates of  $F/M$  for ray.

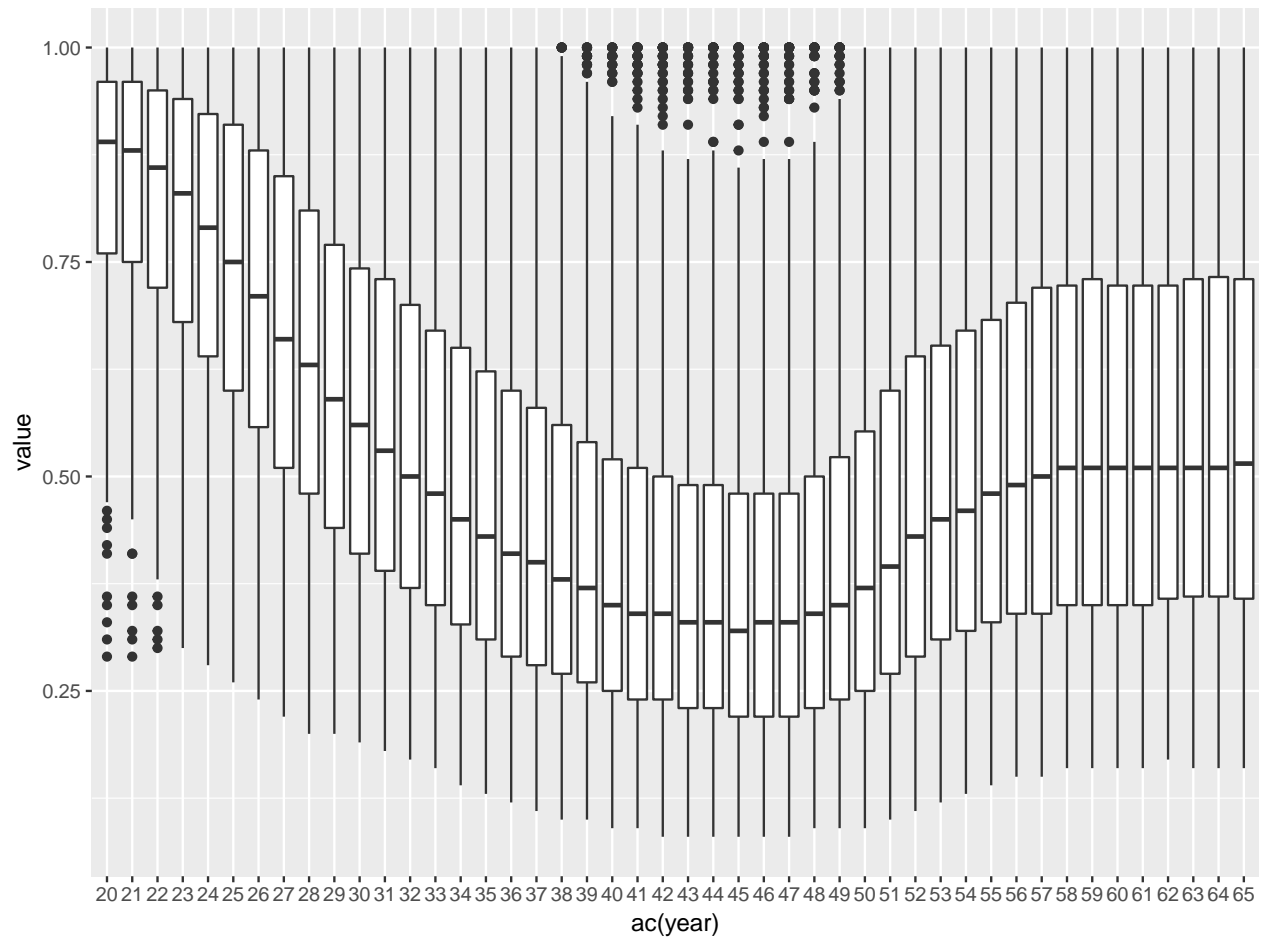
## sprat



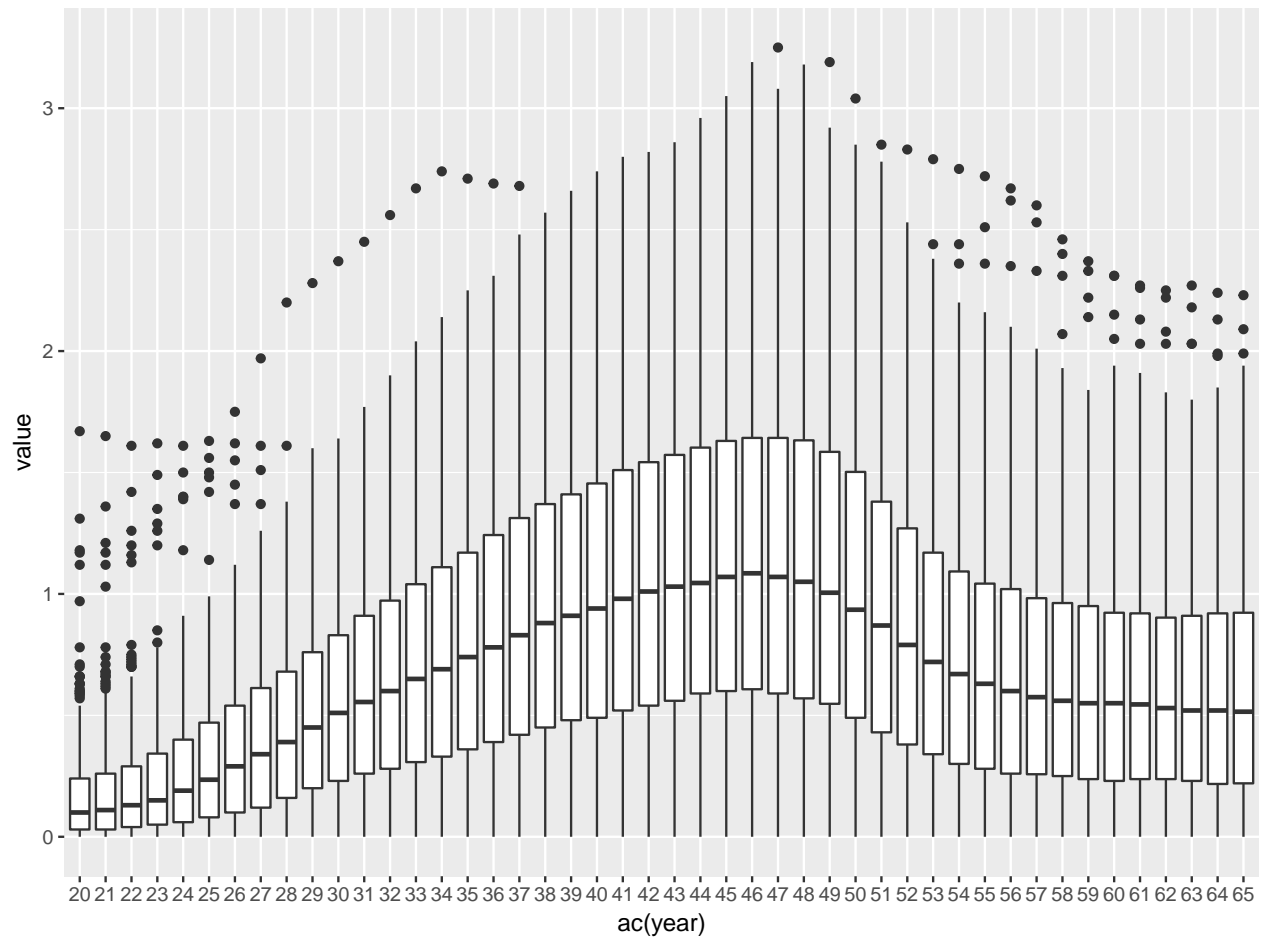
**Figure 13** Operating model for sprat.



**Figure 14** Observation error model for sprat.



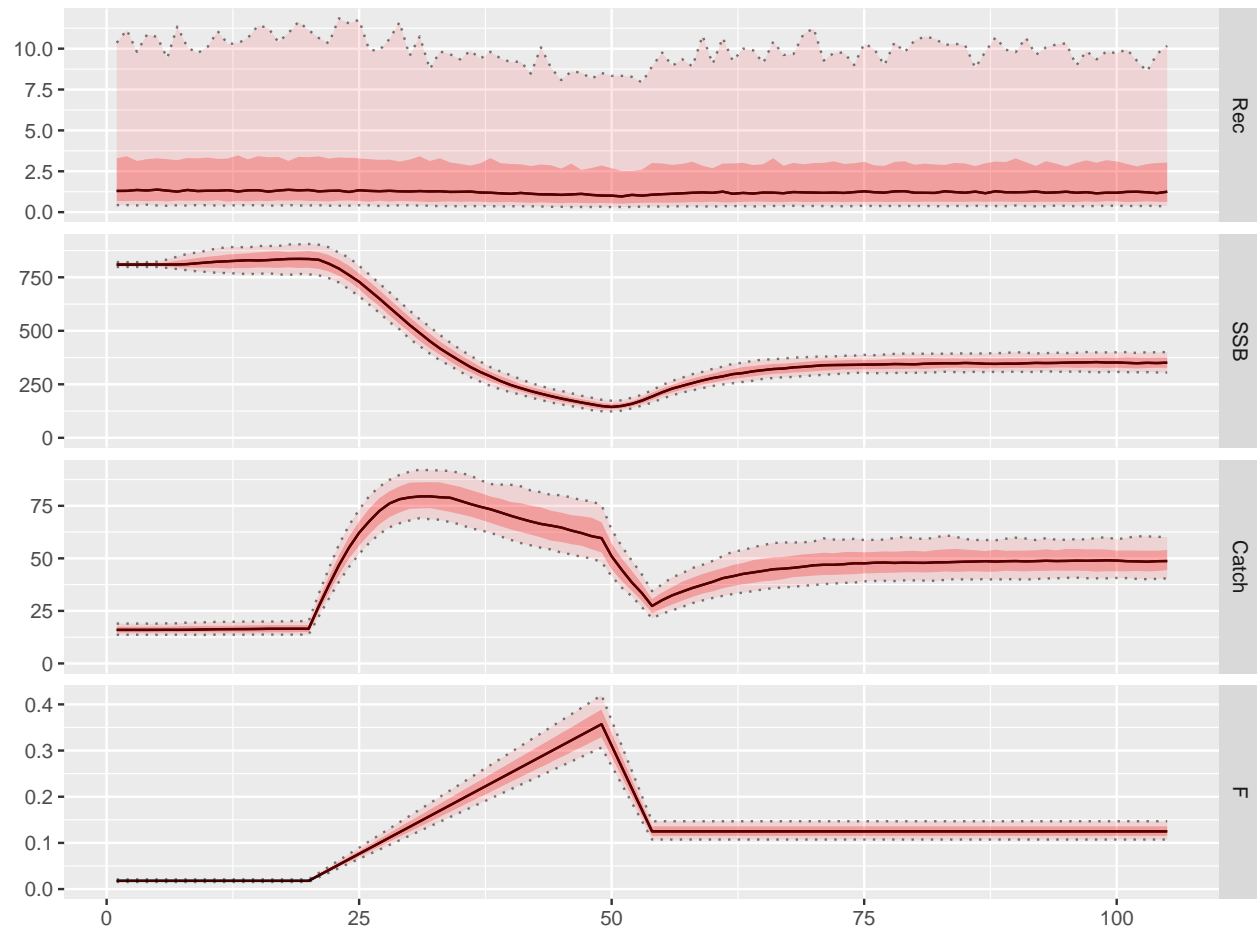
**Figure 15** Estimates of SPR for pollack.



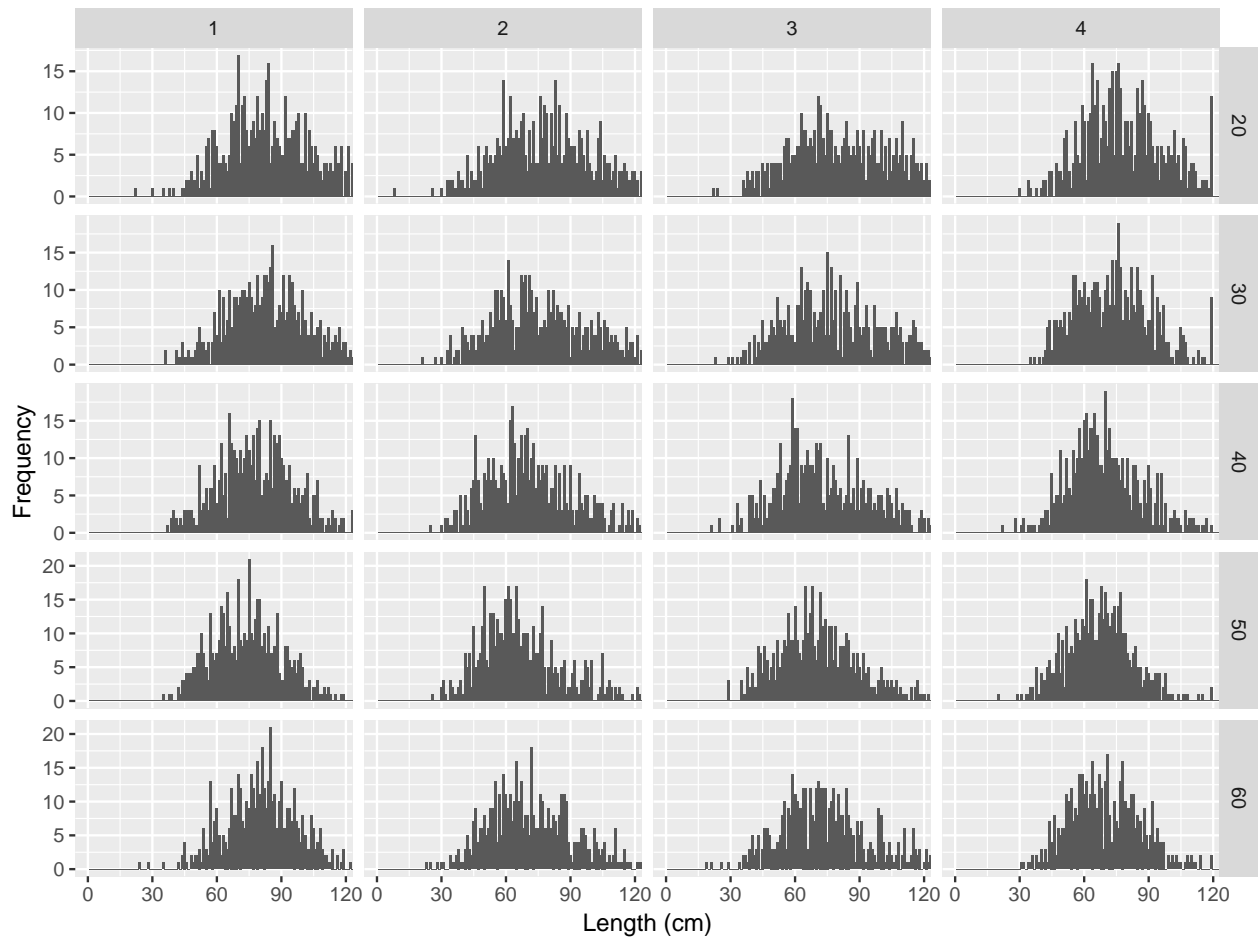
**Figure 16** Estimates of  $F/M$  for pollack.



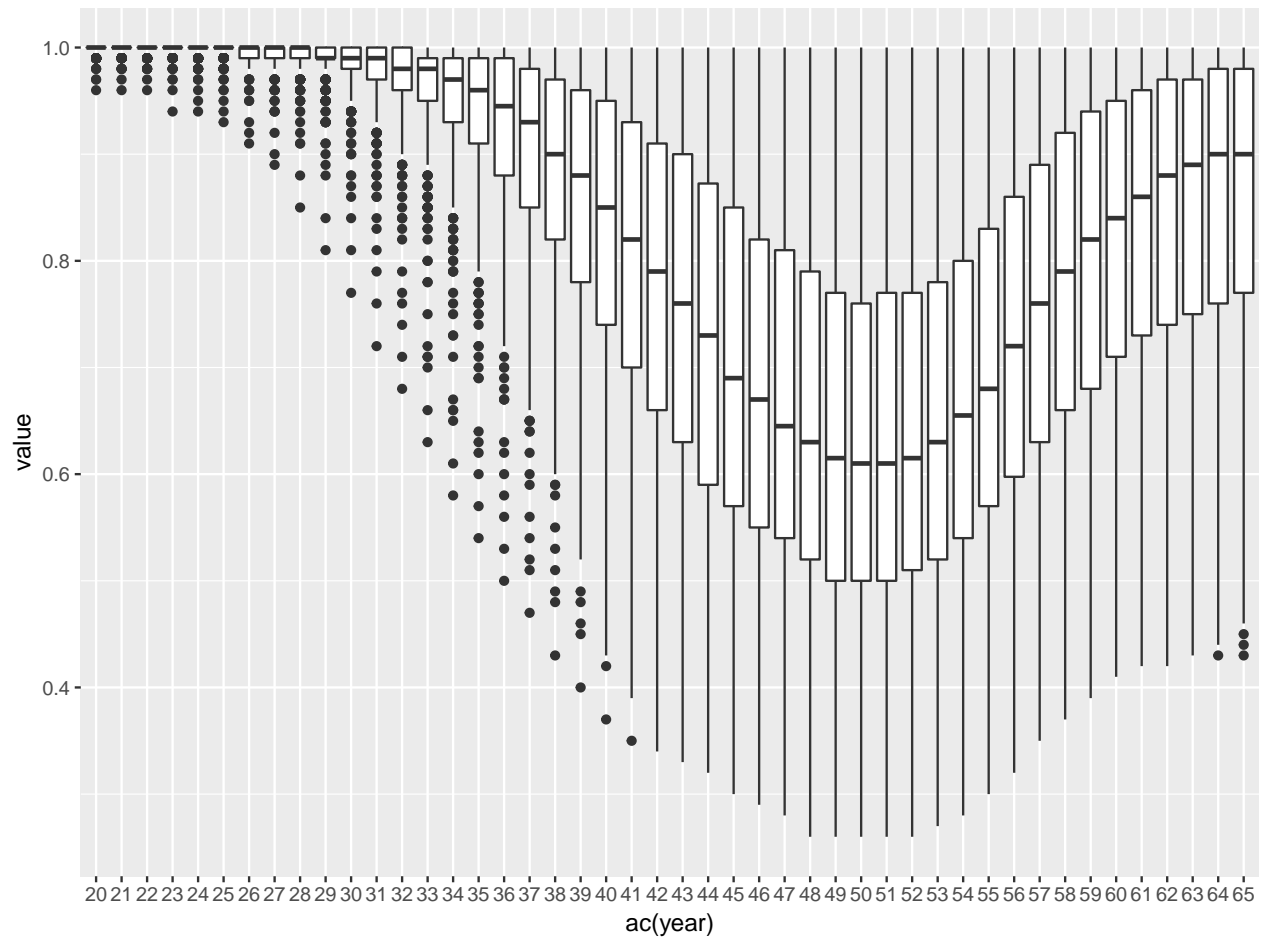
## pollack



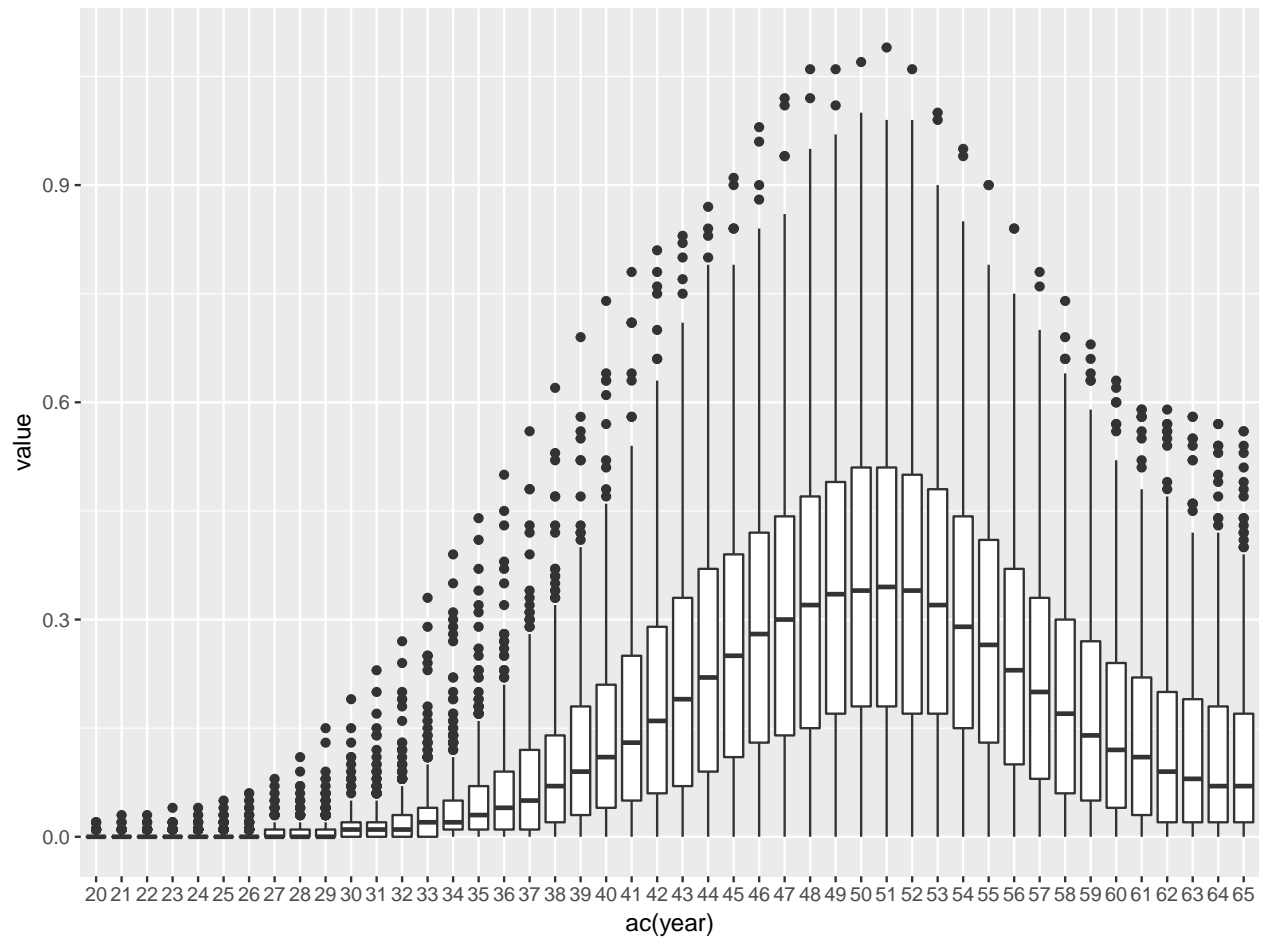
**Figure 17** Operating model for pollack.



**Figure 18** Observation error model for pollack.

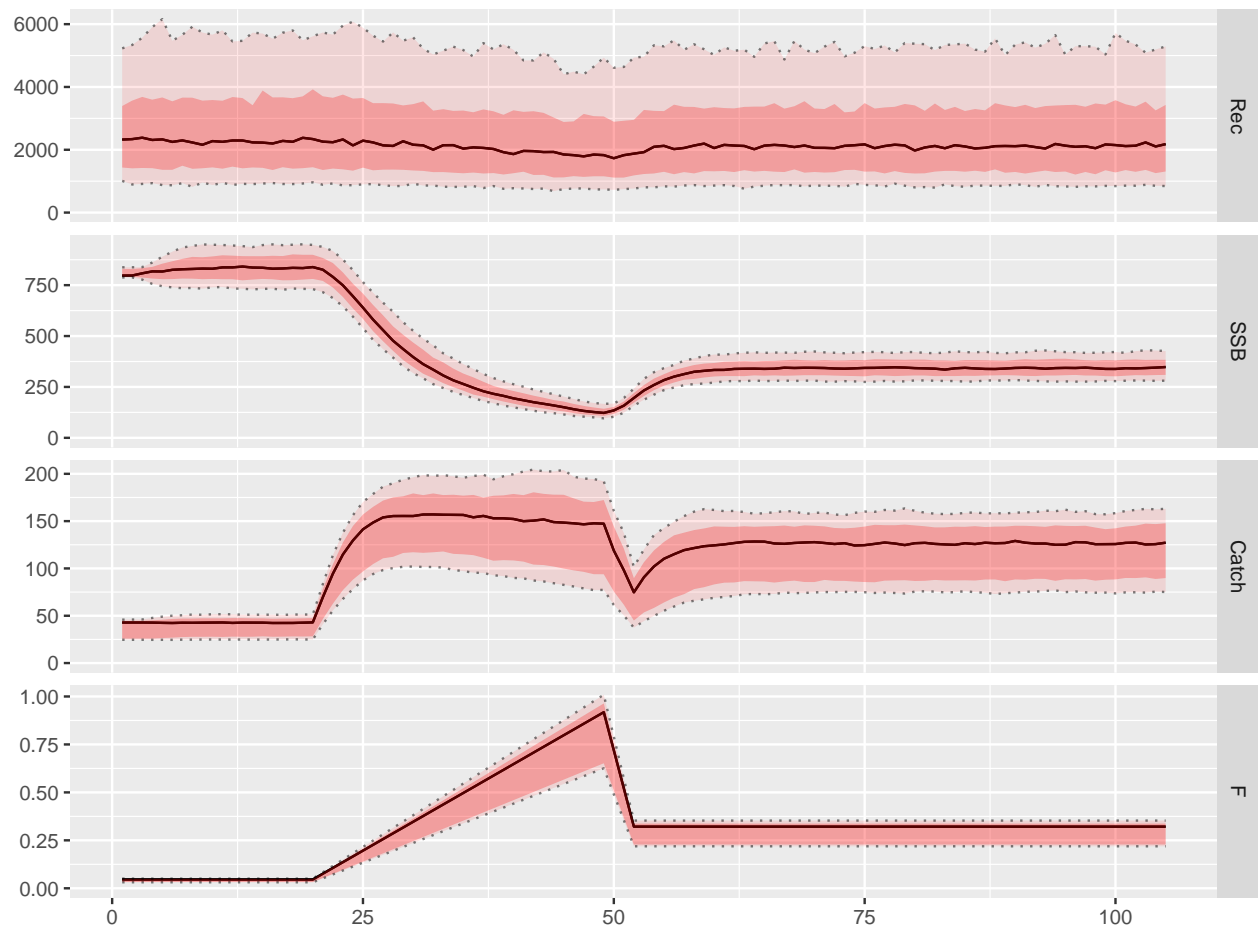


**Figure 19** Estimates of SPR for pollack.

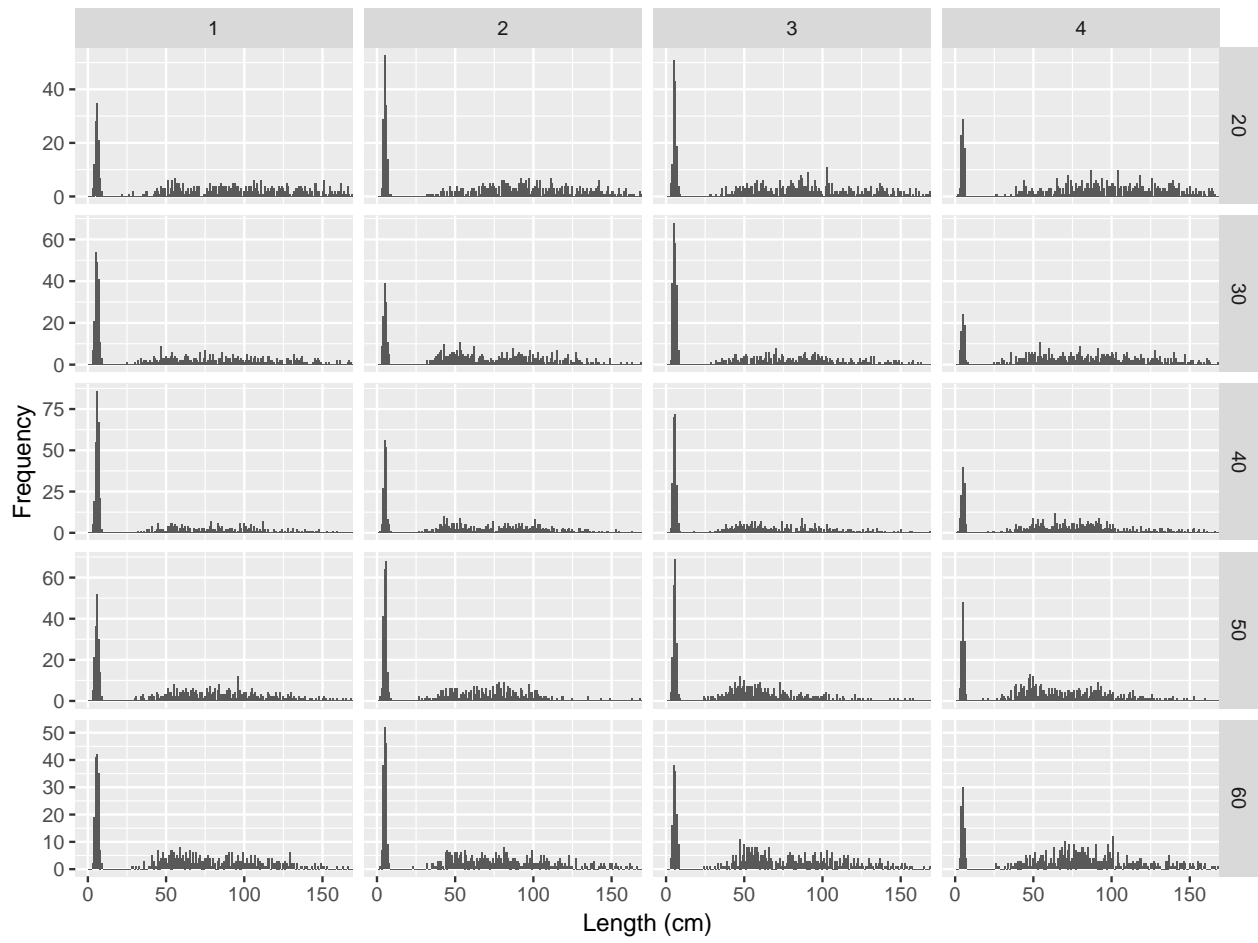


**Figure 20** Estimates of  $F/M$  for pollack.

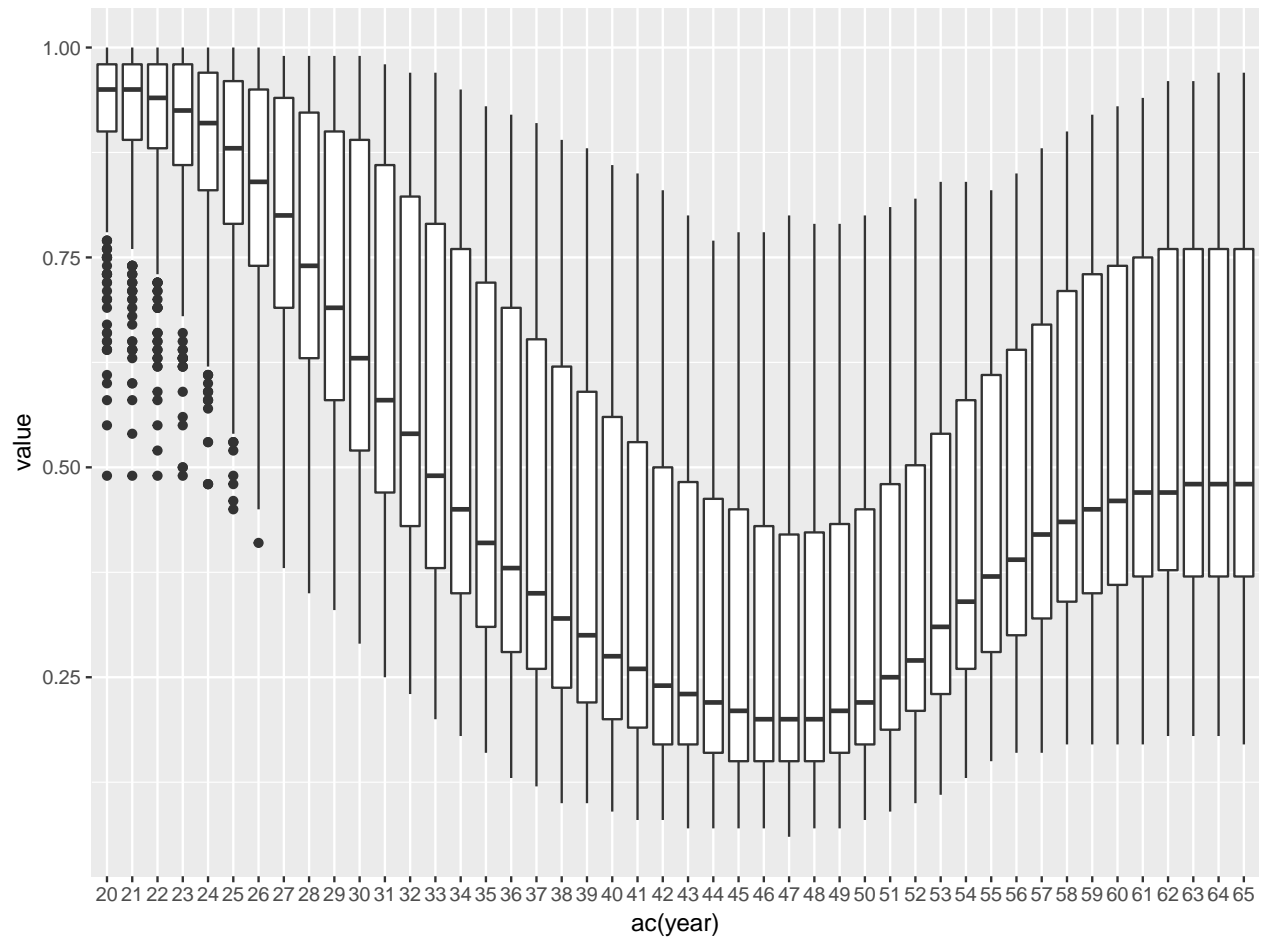
## razor



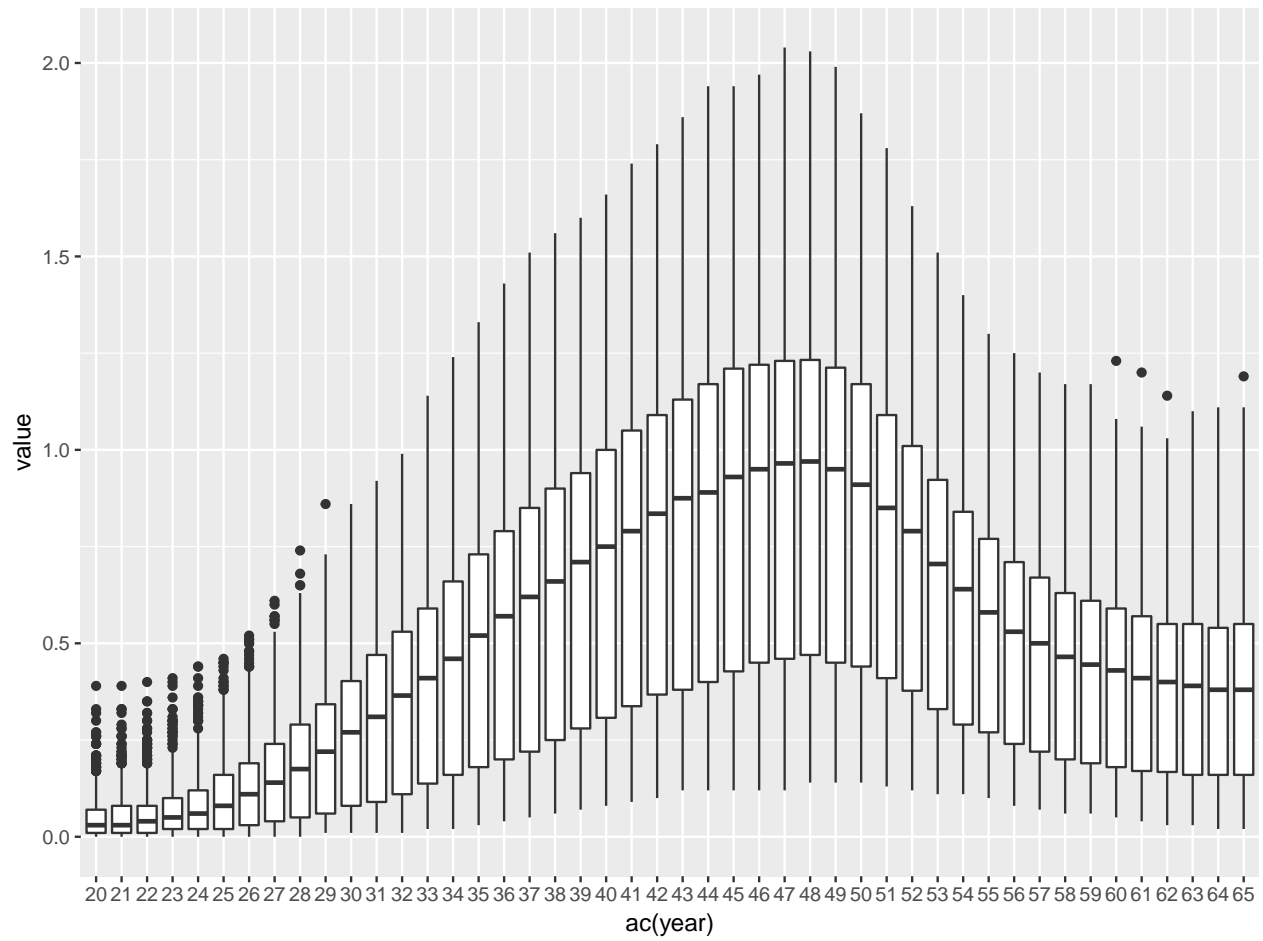
**Figure 21** Operating model for razor.



**Figure 22** Observation error model for razor.



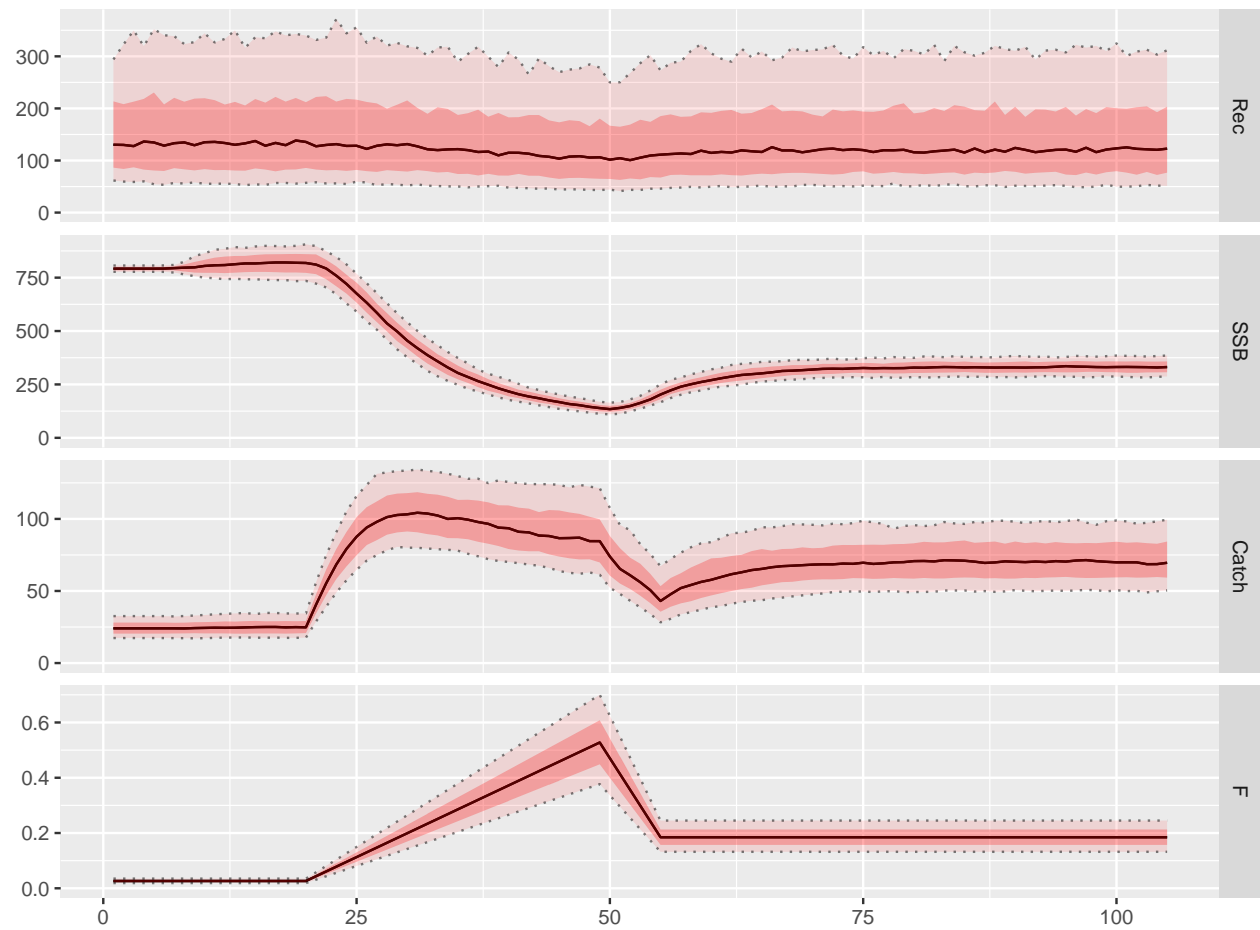
**Figure 23** Estimates of SPR for razors.



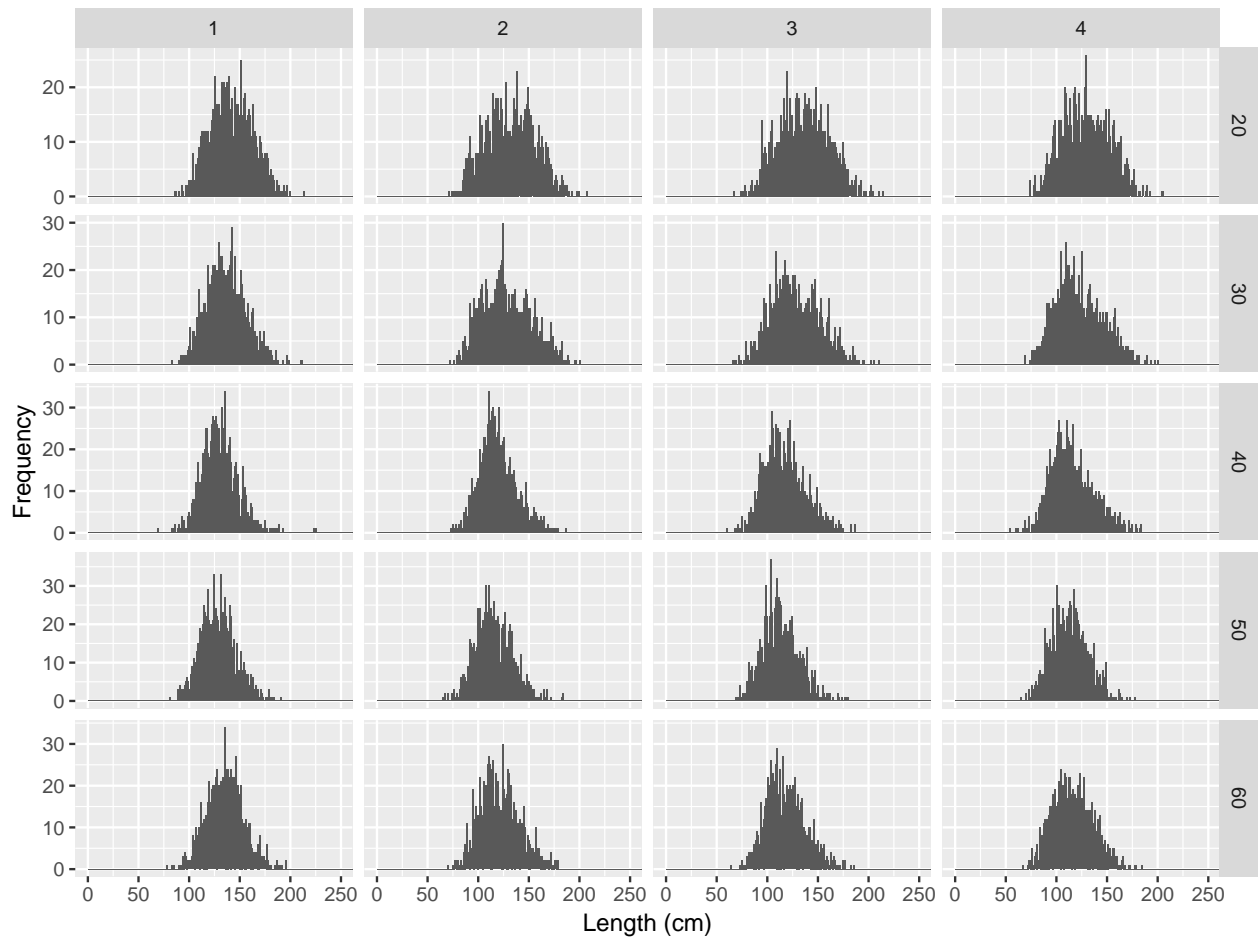
**Figure 24** Estimates of  $F/M$  for razors.



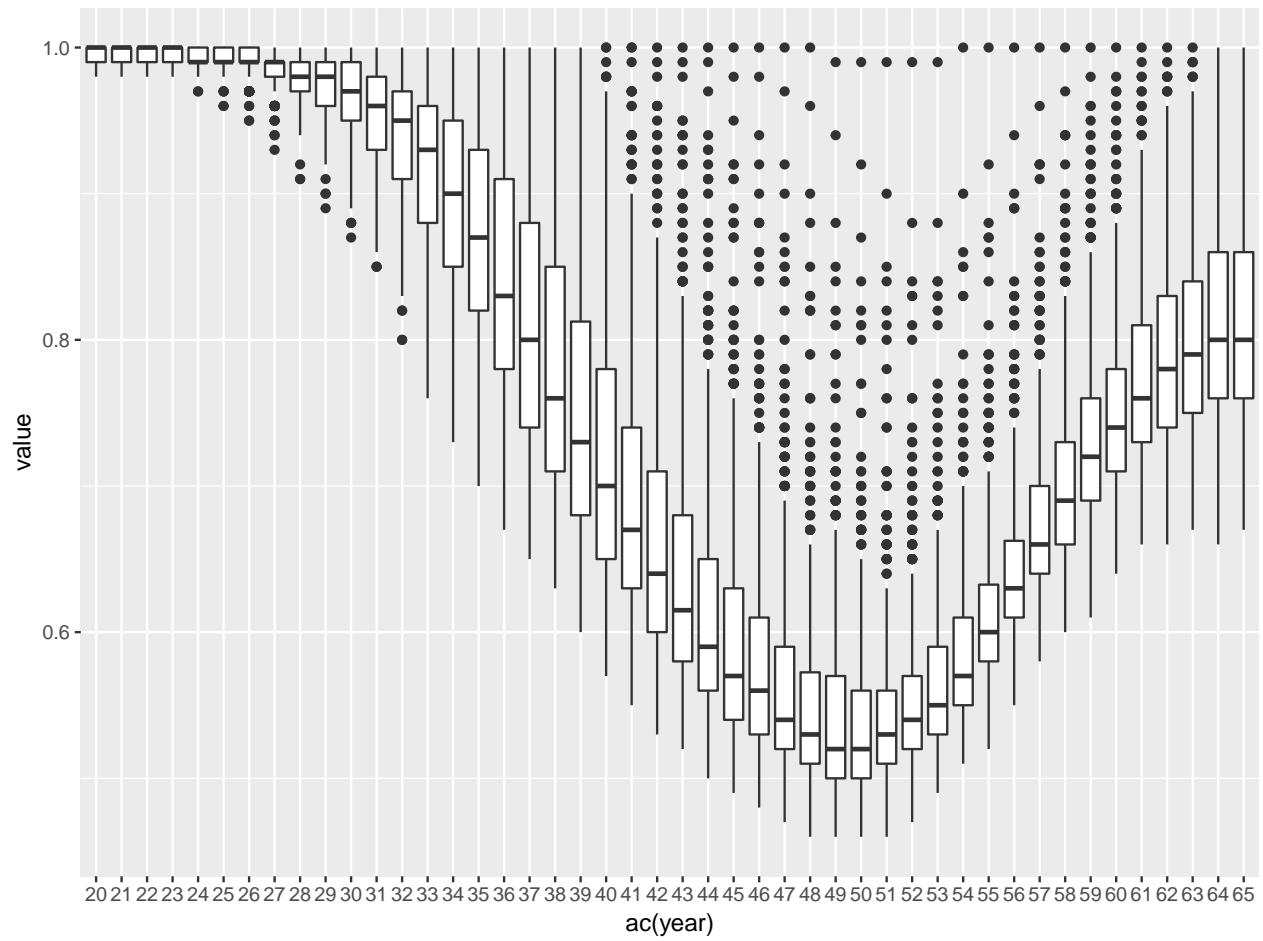
## lobster



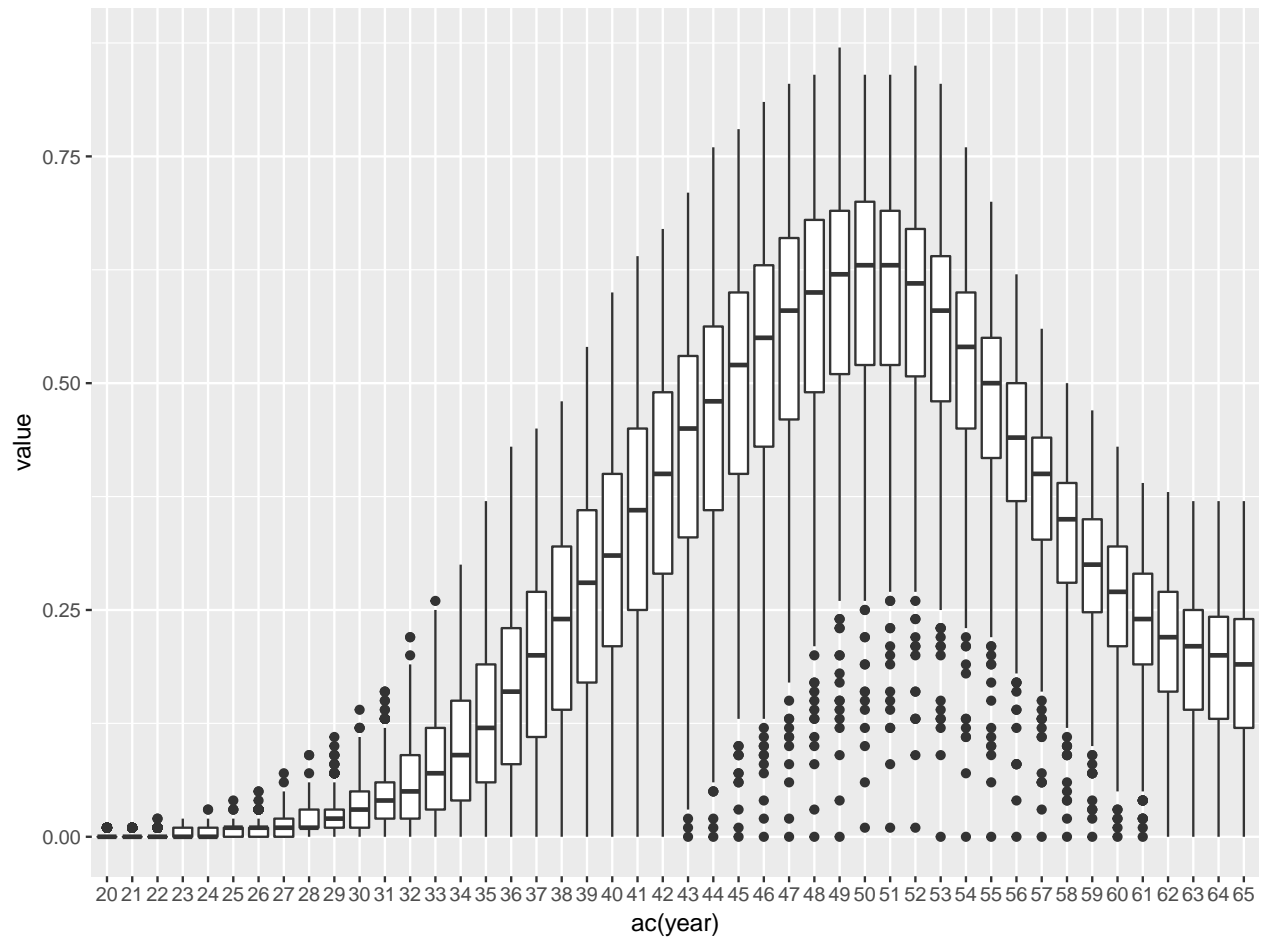
**Figure 25** Operating model for lobster.



**Figure 26** Observation error model for lobster.



**Figure 27** Estimates of SPR for lobster.



**Figure 28** Estimates of  $F/M$  for lobster.

## Session Info

R version 3.4.1 (2017-06-30)  
Platform: x86\_64-pc-linux-gnu (64-bit)  
Running under: Ubuntu 16.04.2 LTS

Matrix products: default  
BLAS: /usr/lib/libblas/libblas.so.3.6.0  
LAPACK: /usr/lib/lapack/liblapack.so.3.6.0

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[3] LC\_TIME=en\_GB.UTF-8 LC\_COLLATE=en\_US.UTF-8  
[5] LC\_MONETARY=en\_GB.UTF-8 LC\_MESSAGES=en\_US.UTF-8  
[7] LC\_PAPER=en\_GB.UTF-8 LC\_NAME=C  
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attached base packages:  
[1] stats graphics grDevices utils datasets methods base

other attached packages:  
[1] LBSPP\_0.1.2 FLlife\_3.2.1.9001 FLBRP\_2.5.3 ggplotFL\_2.6.4  
[5] FLCore\_2.6.9 lattice\_0.20-35 dplyr\_0.7.6 ggplot2\_3.0.0  
[9] reshape\_0.8.7 plyr\_1.8.4 knitr\_1.20

loaded via a namespace (and not attached):  
[1] Rcpp\_0.12.18 RColorBrewer\_1.1-2 pillar\_1.1.0  
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[7] digest\_0.6.15 evaluate\_0.10.1 tibble\_1.4.2  
[10] gtable\_0.2.0 pkgconfig\_2.0.1 rlang\_0.2.1  
[13] Matrix\_1.2-10 yaml\_2.1.18 bindrcpp\_0.2.2  
[16] gridExtra\_2.3 withr\_2.1.2 stringr\_1.3.1  
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[22] tidyselect\_0.2.4 glue\_1.2.0 R6\_2.2.2  
[25] plotrix\_3.7 rmarkdown\_1.9 FLRP\_1.0.1.9002  
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## Software Versions

- R version 3.4.1 (2017-06-30)
- FLCore: 2.6.9
- FLlife: 3.2.1.9001
- FLBRP: 2.5.3
- **Compiled:** Tue Aug 14 12:07:56 2018

## **Author information**

**Laurence Kell.** laurie@seaplusplus.es

## **Acknowledgements**

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## **References**