FLife: Operating Model Conditioning

Turbot

L Kell & A Tidd

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Life history parameters

Life history parameters from Fish Base for the Von Bertalanffy growth model were L_∞ (58.7), k (0.286), and t_0 (-0.416), for the length/weight relationship $W = aL^b$ were a (0.0204) and b (2.93), and age at maturity (a_{50}) was (4.41).

The values for the empirical Gislason natural mortality relationship m_1 and m_2 were (174.5) and (-1.61) respectively.

The fishery was assumed to only catch mature fish and so selection pattern is modelled by a double normal equivalent to the maturity ogive, parameters were a_1, s_l and s_r were (5.41, 1, 5000) respectively.

The stock recruitment relationship is assummed to be of a Beverton and Holt functional form with a steepness and virgin biomass of 0.8 and 1000 units respectively.

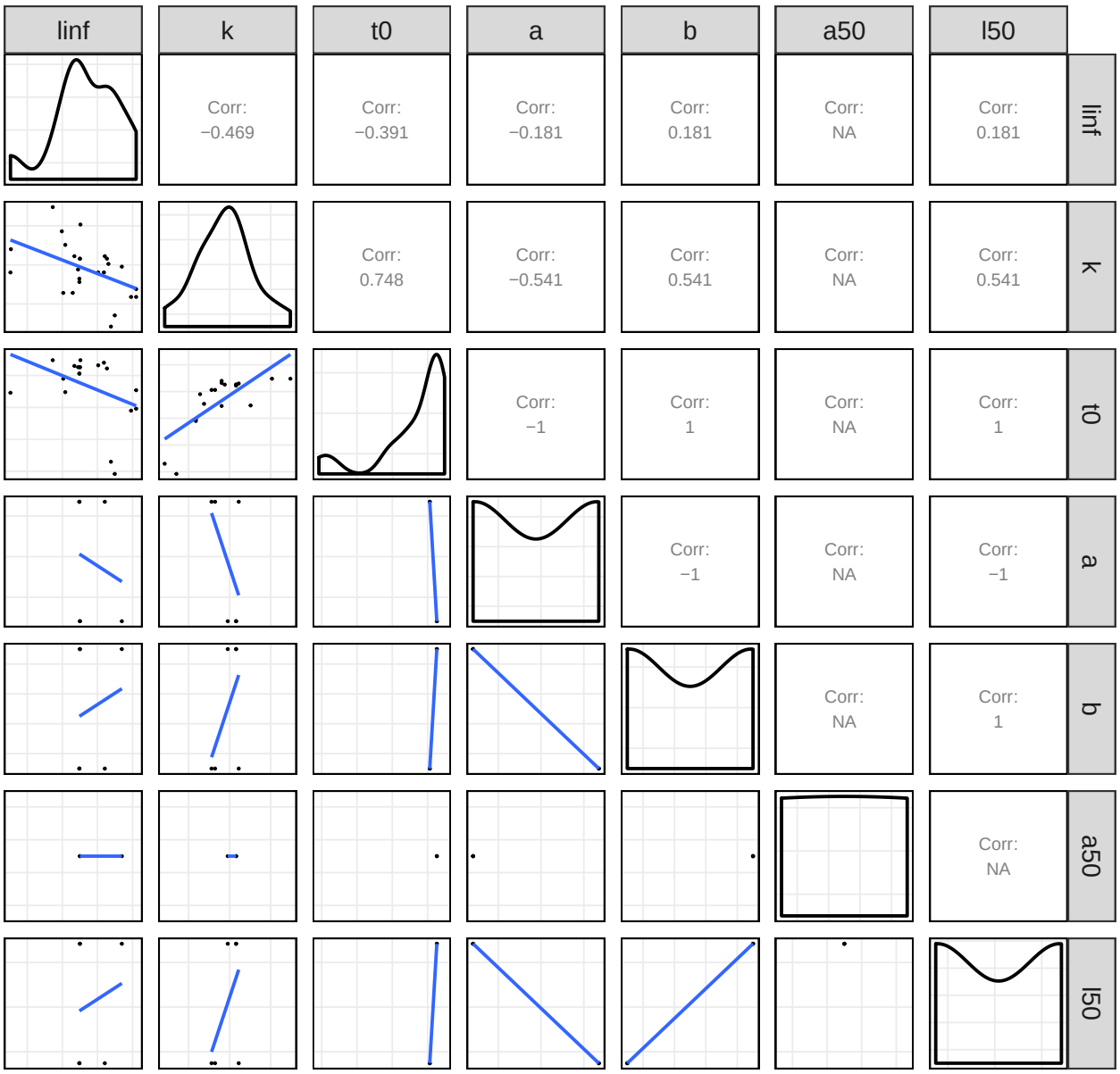

Figure 1 Pairwise scatter plots of life history parameters.

Equilibrium dynamics

The parameters are then used by `lhEql` to simulate the equilibrium dynamics by combining the spawner/yield per recruit relationships with a stock recruiment relationship.

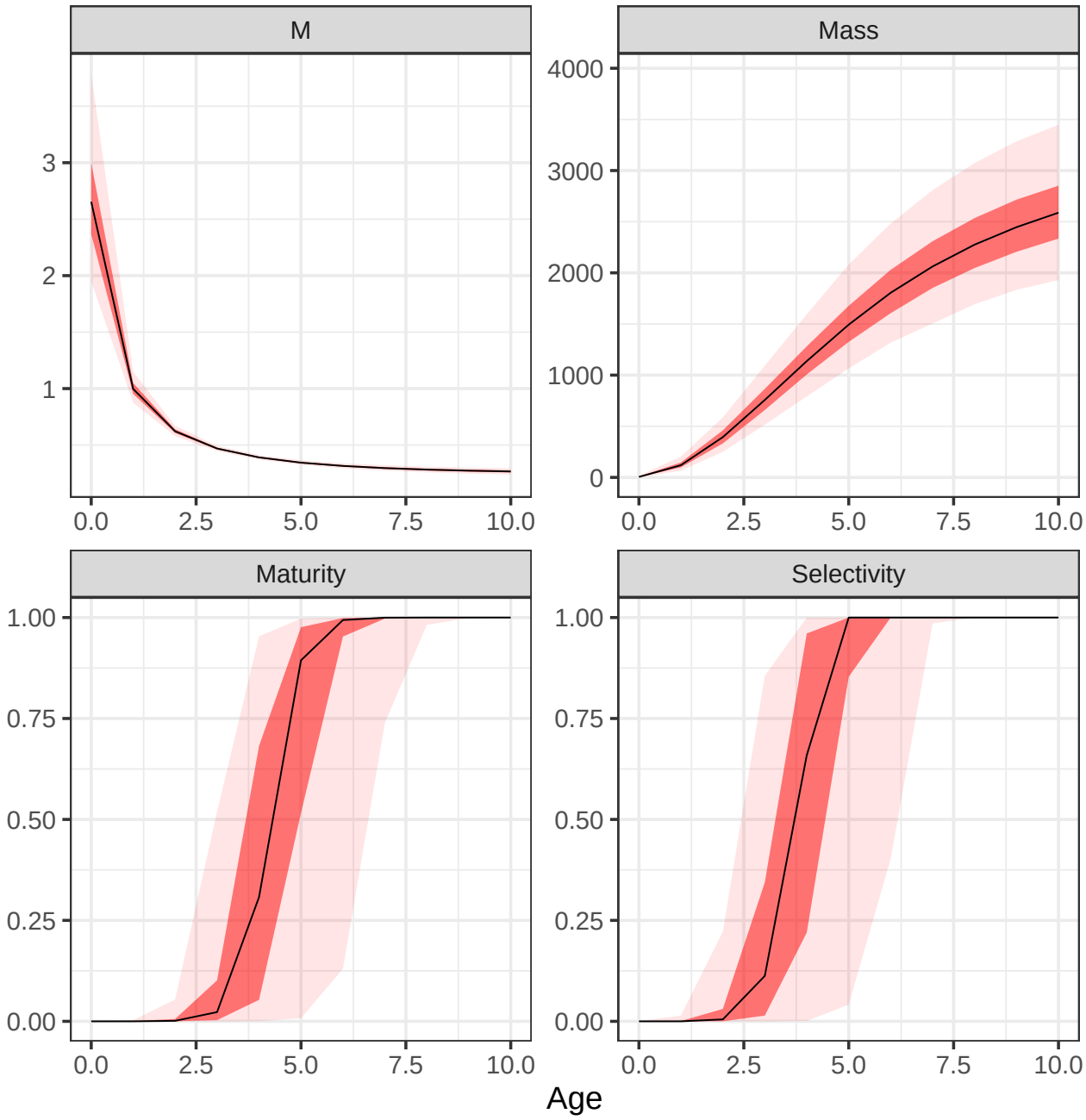

Figure 2 Vectors.

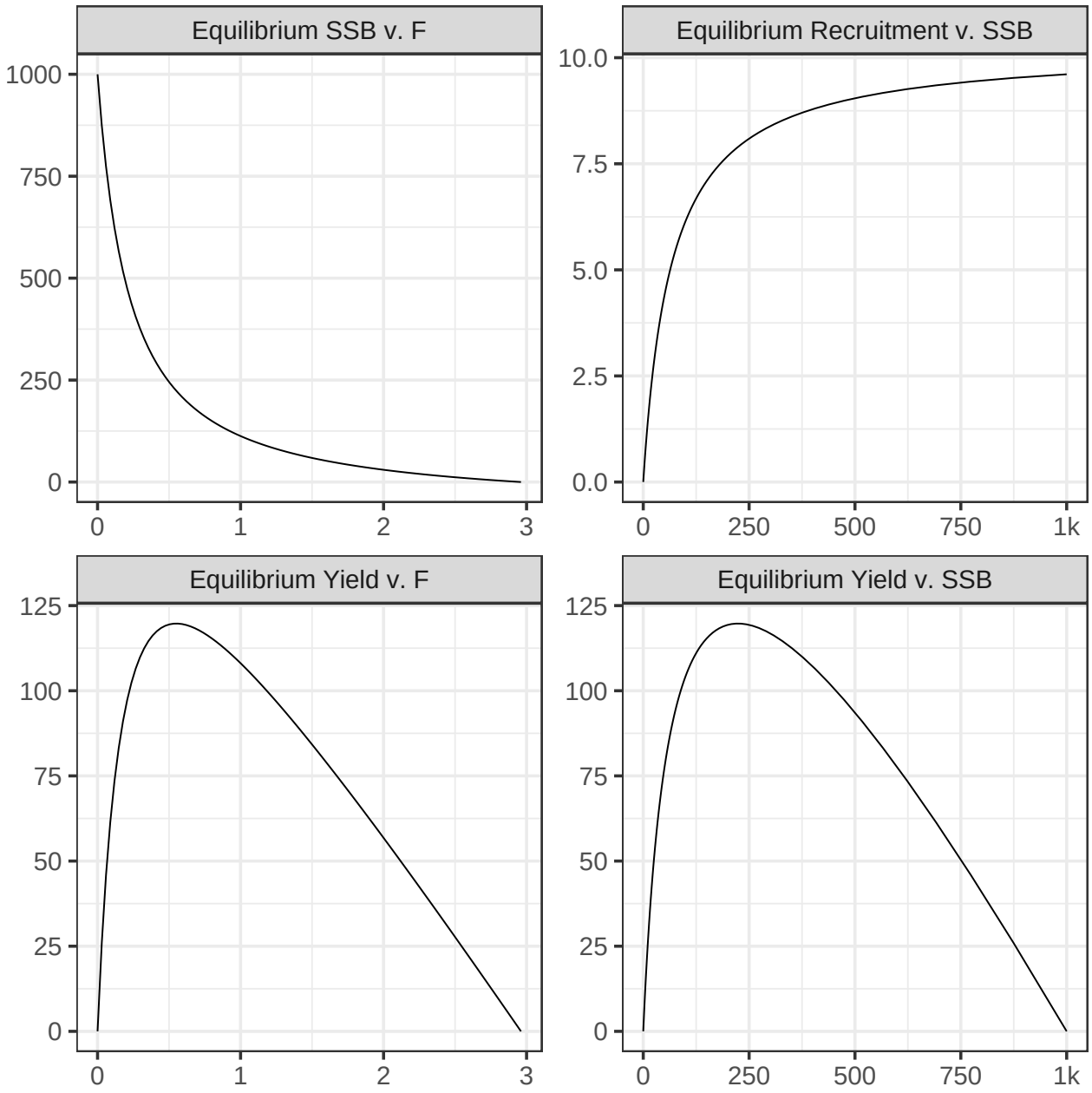

Figure 3 Example equilibrum Curve.

Population dynamics

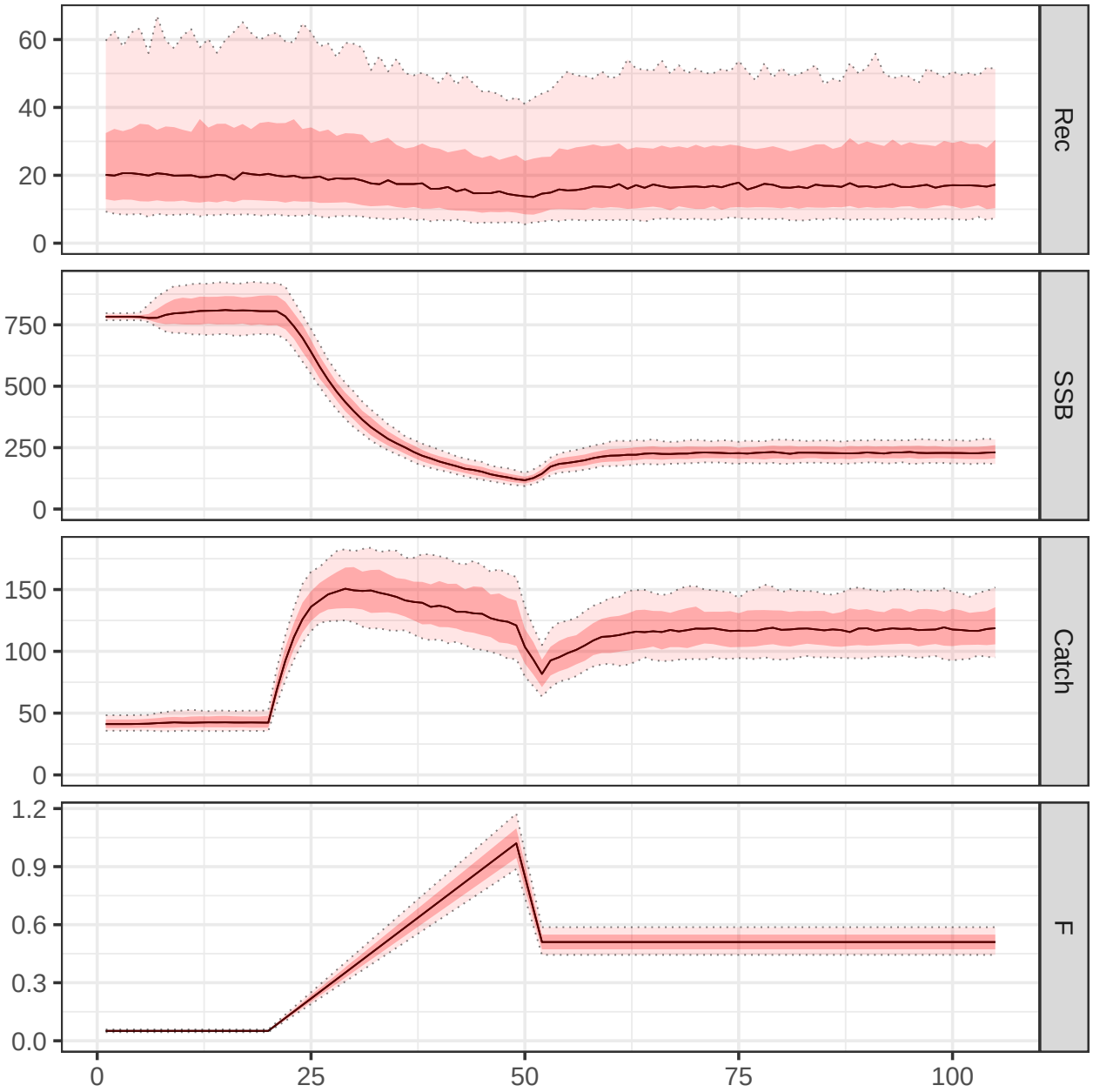

Figure 4 Time series.

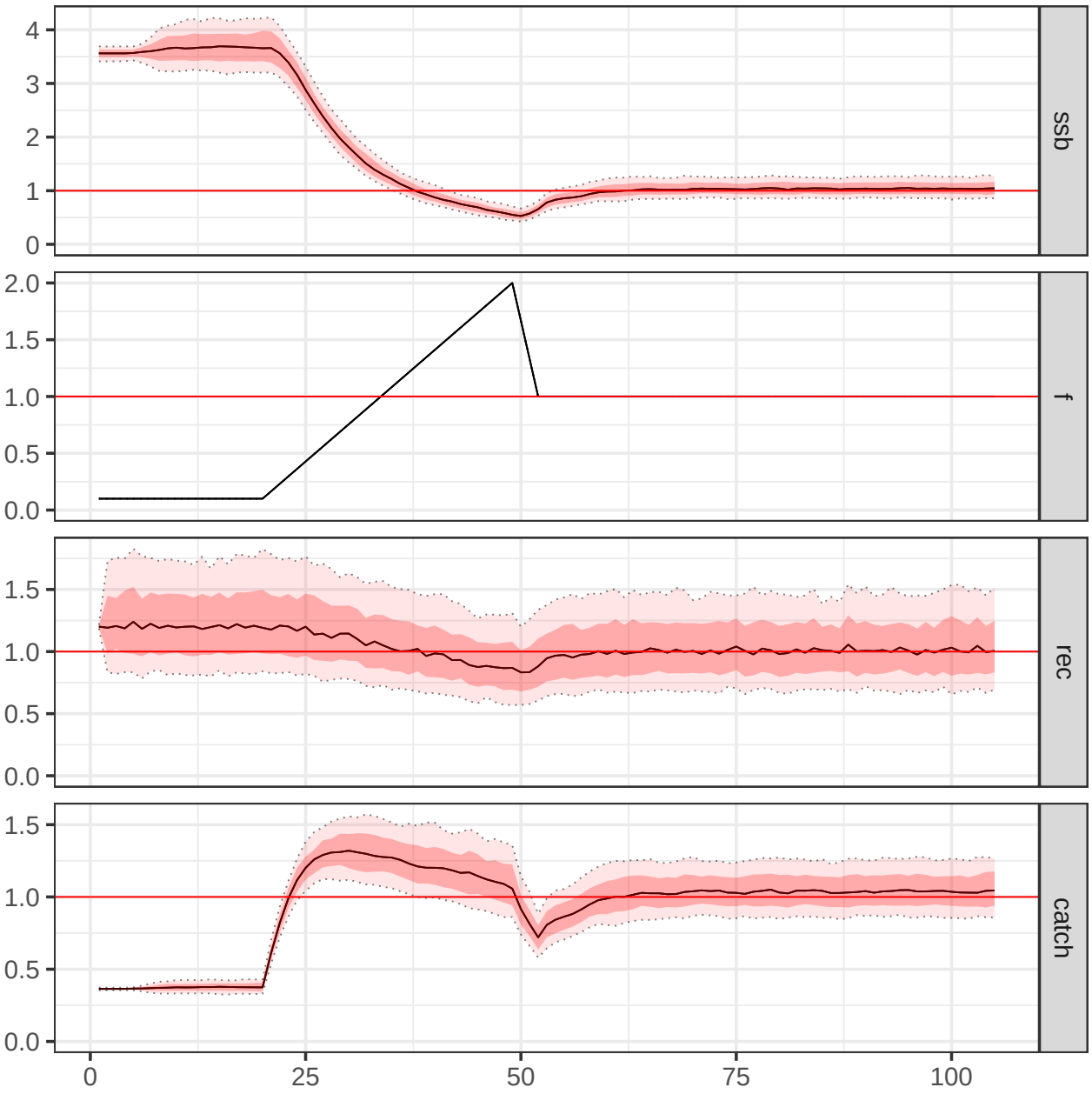

Figure 5 Time series relative to MSY benchmarks.

Software Versions

- R version 3.4.1 (2017-06-30)
- FLCore: 2.6.9
- FLBRP: 2.5.3
- FLasher: 0.5.0
- FLife: 3.2.1.9001
- ggplotFL: 2.6.4
- **Compiled**: Tue Aug 14 15:17:09 2018

Author information

Laurence Kell. laurie@seaplusplus.es

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References

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

locale:
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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
 [9] LC_ADDRESS=C               LC_TELEPHONE=C
[11] LC_MEASUREMENT=en_GB.UTF-8 LC_IDENTIFICATION=C

attached base packages:
[1] stats     graphics  grDevices utils     datasets  methods   base

other attached packages:
 [1] FLife_3.2.1.9001 ggplotFL_2.6.4   FLasher_0.5.0    FLFishery_0.1.5
 [5] FLBRP_2.5.3      FLCore_2.6.9     lattice_0.20-35  GGally_1.4.0
 [9] reshape_0.8.7    dplyr_0.7.6      plyr_1.8.4       ggplot2_3.0.0
[13] knitr_1.20

loaded via a namespace (and not attached):
 [1] Rcpp_0.12.18       RColorBrewer_1.1-2 compiler_3.4.1
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```