American Samoa Model Checks

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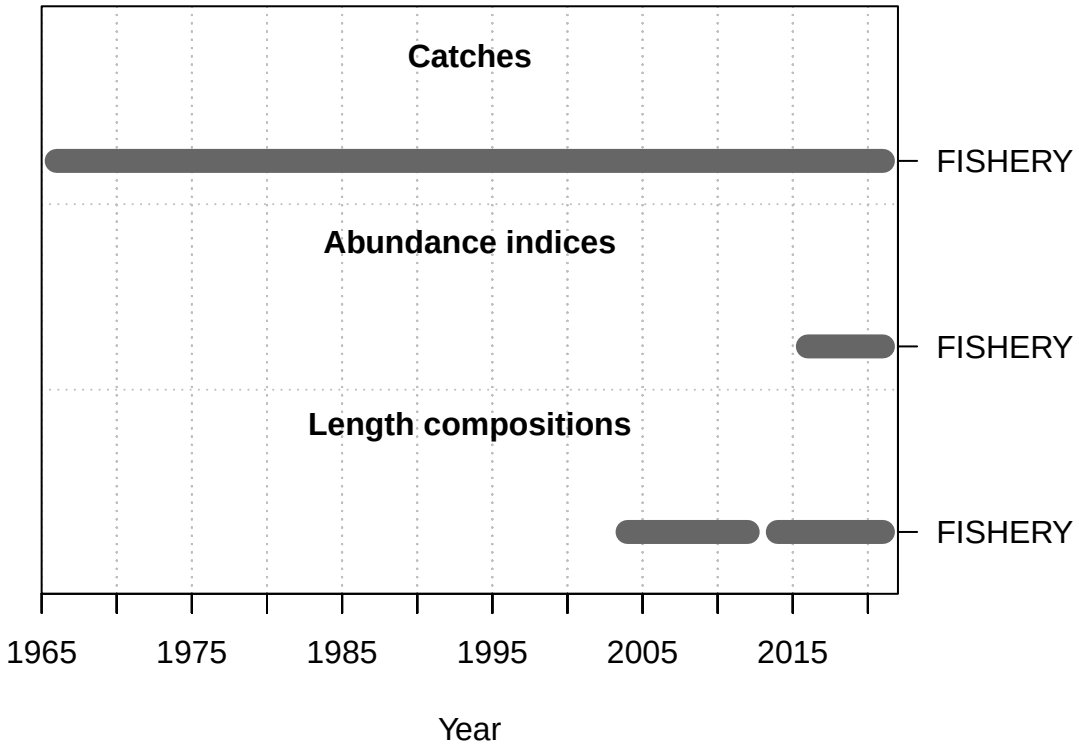
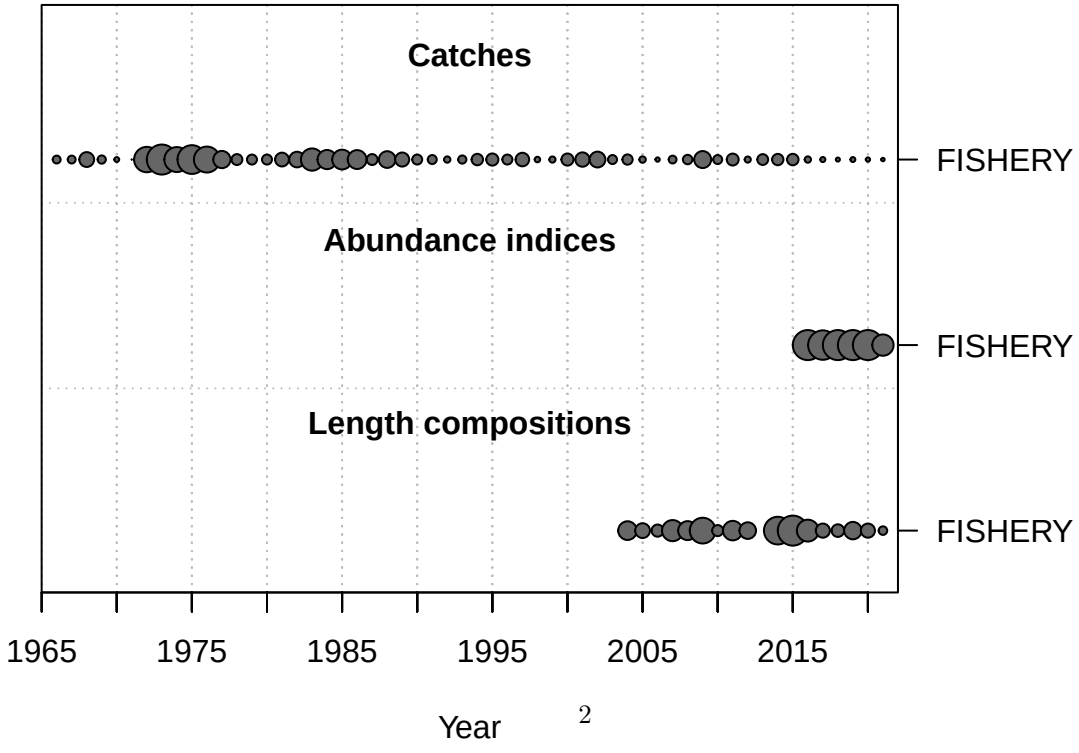
2022-08-10

This is a summary report for the LUKA base model run.

Model Output

Input Data





Convergence Check

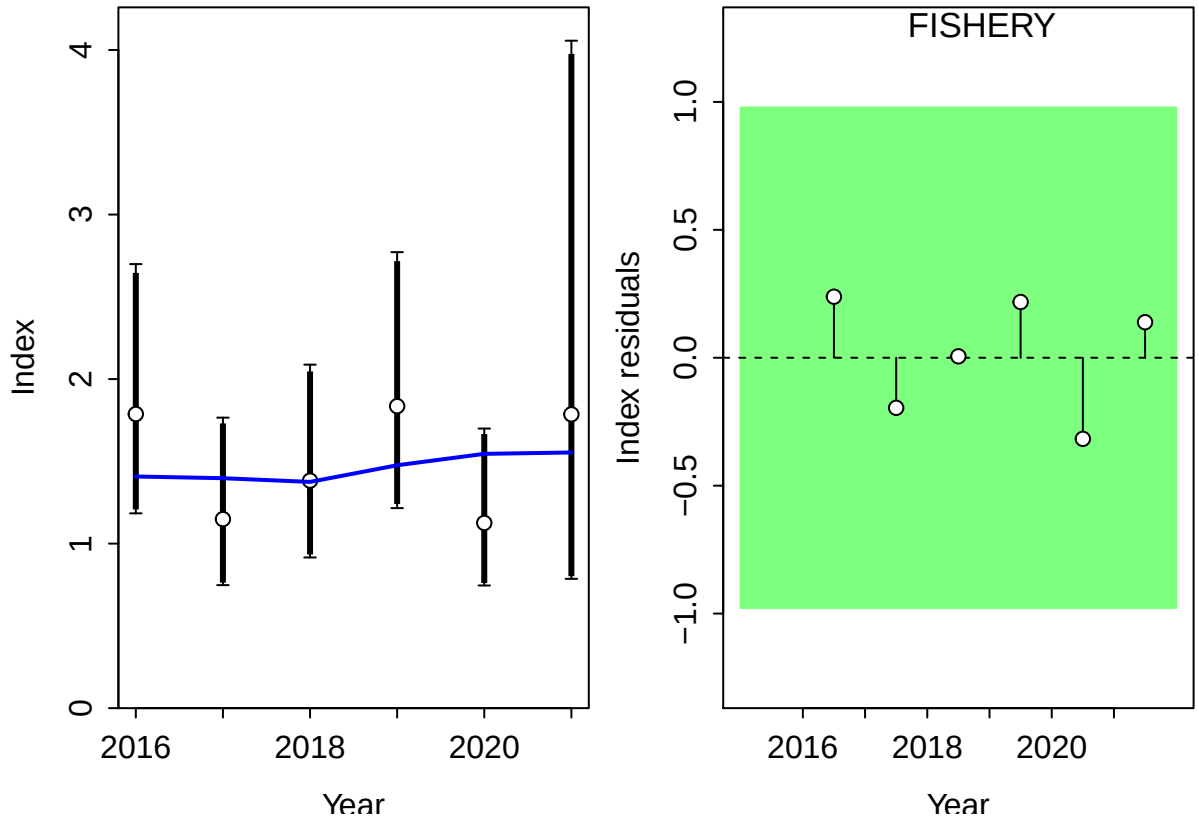
```
##   Converged   MaxGrad
## 1      TRUE 7.772e-05
```

```
## [1] "1 NOTE:  Max data length bin: 28  < max pop len bins: 31; so will accumulate larger pop len bins
## [2] "2  Main recdev biasadj is >2 times ratio of rmse to sigmaR"
## [3] "3 warning: poor convergence in Fspr search 0.4 0.435675"
## [4] "4 warning: Fmult = 40 cannot get high enough to achieve low SPR target: 0.4; SPR achieved is: 0
## [5] "5 warning: poor convergence in Fmsy, final dy/dy2= -0.0501476"
## [6] "6 Forecast F capped by max possible F from control file: 2.9"
## [7] "7 Forecast F capped by max possible F from control file: 2.9"
## [8] " N parameters are on or within 1% of min-max bound: 1; check results, variance may be suspect"
## [9] "N warnings: 7"
```

Fit to Model

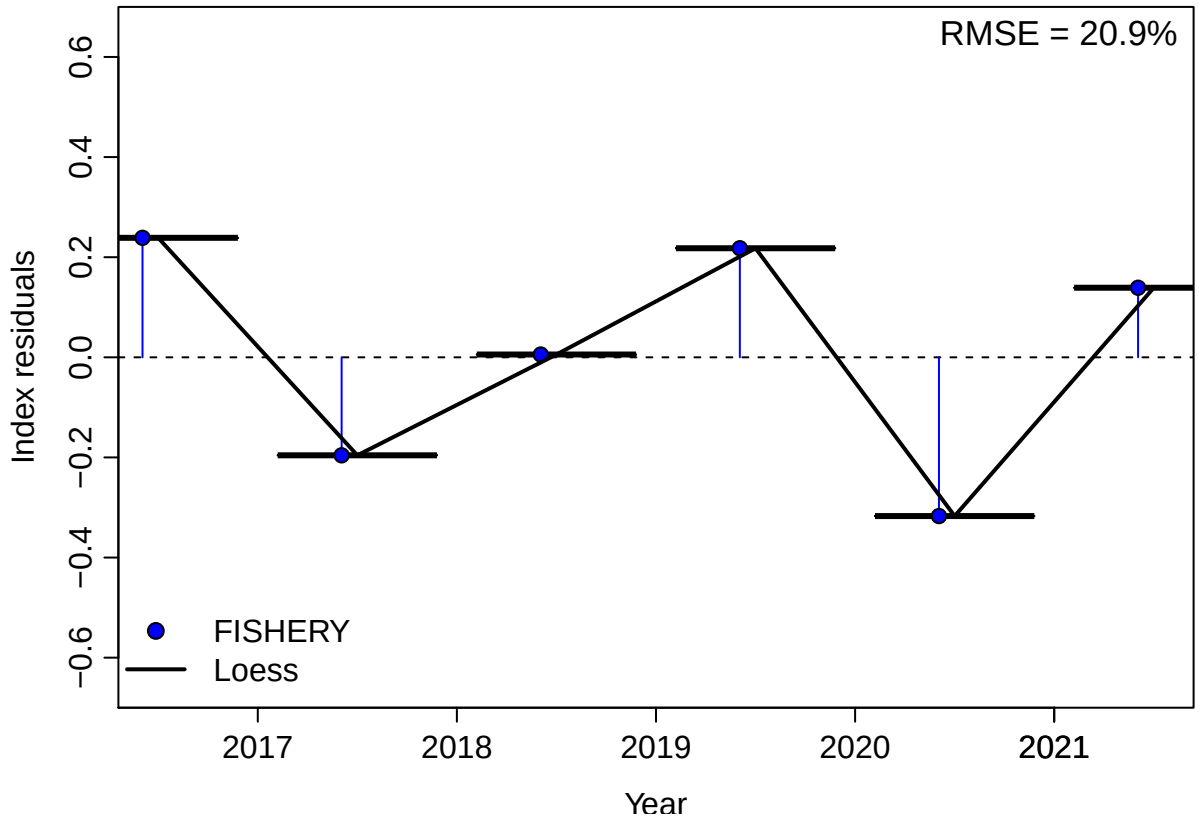
CPUE

```
##
##  Running Runs Test Diagnosics for Index
## Plotting Residual Runs Tests
```




```
##
```

```
## Runs Test stats by Index:
## Plotting JABBA residual plot

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : Chernobyl! trL>n 6

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : Chernobyl! trL>n 6

## Warning in sqrt(sum.squares/one.delta): NaNs produced
```



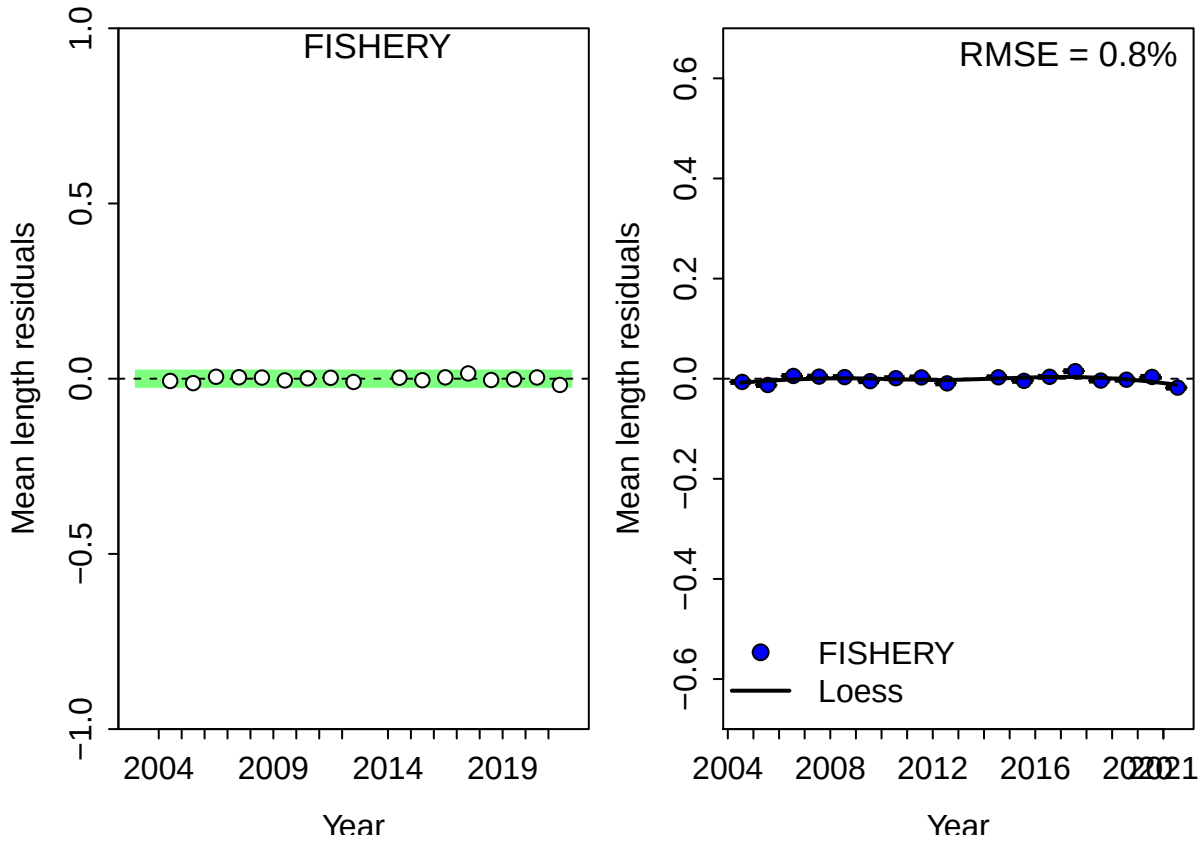

```
##
## RMSE stats by Index:
```

Length Comp

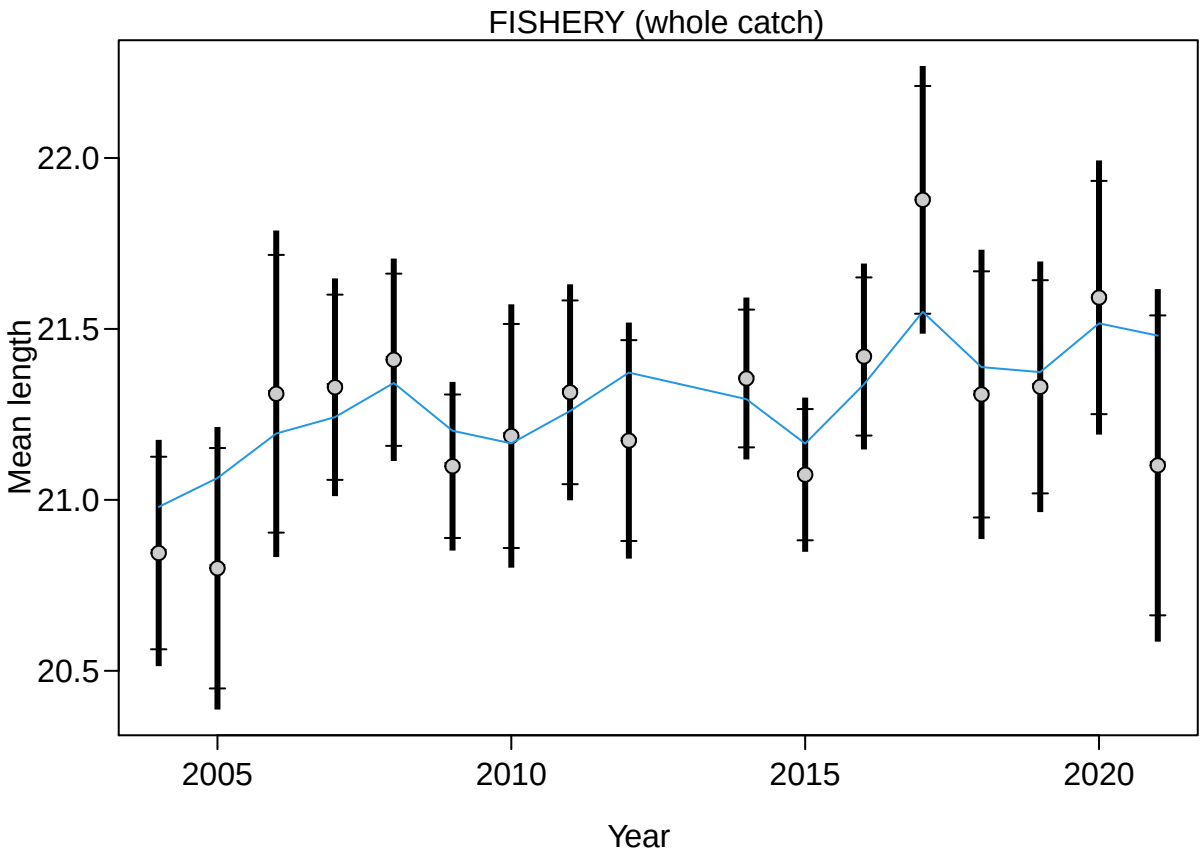
#Factor	Fleet	New_Var_adj	Type	Name
4	1	0.690855	len	FISHERY

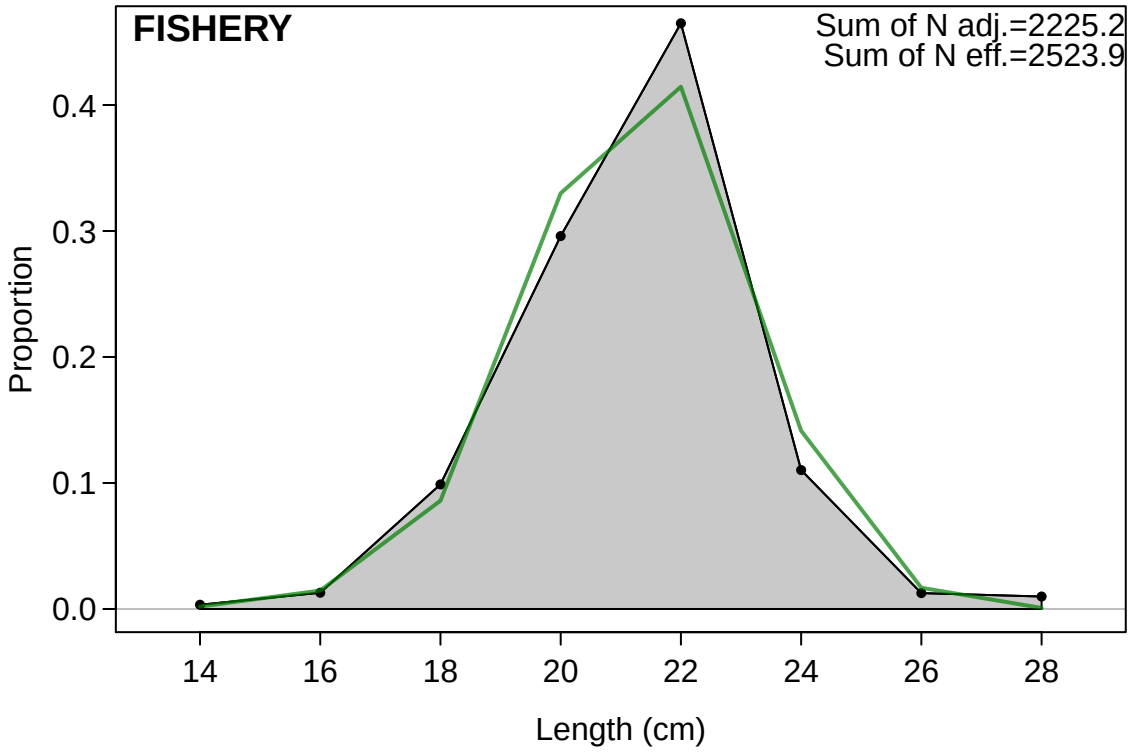
```
##
##  Running Runs Test Diagnosics for Mean length
## Plotting Residual Runs Tests

##
## Runs Test stats by Mean length:
```

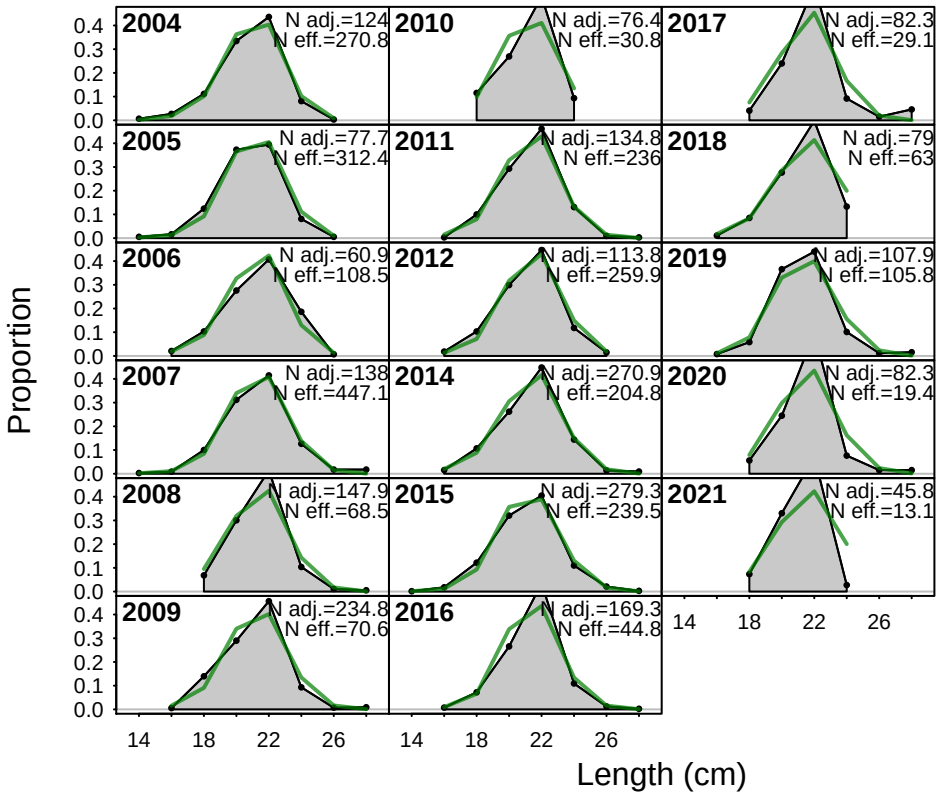
```
##     Index runs.p   test  sigma3.lo sigma3.hi type
## 1 FISHERY  0.779 Passed -0.0232903 0.0232903  len

## Plotting JABBA residual plot
```




```
##
## RMSE stats by Index:

##    indices RMSE.perc nobs
## 1  FISHERY       0.8   17
## 2 Combined       0.8   17
```


FISHERY (whole catch)
Mean length
22.0
21.5
21.0
20.5
2005
2010
2015
2020
Year


FISHERY
Sum of N adj.=2225.2
Sum of N eff.=2523.9
Proportion
0.0
0.1
0.2
0.3
0.4
14
16
18
20
22
24
26
28
Length (cm)

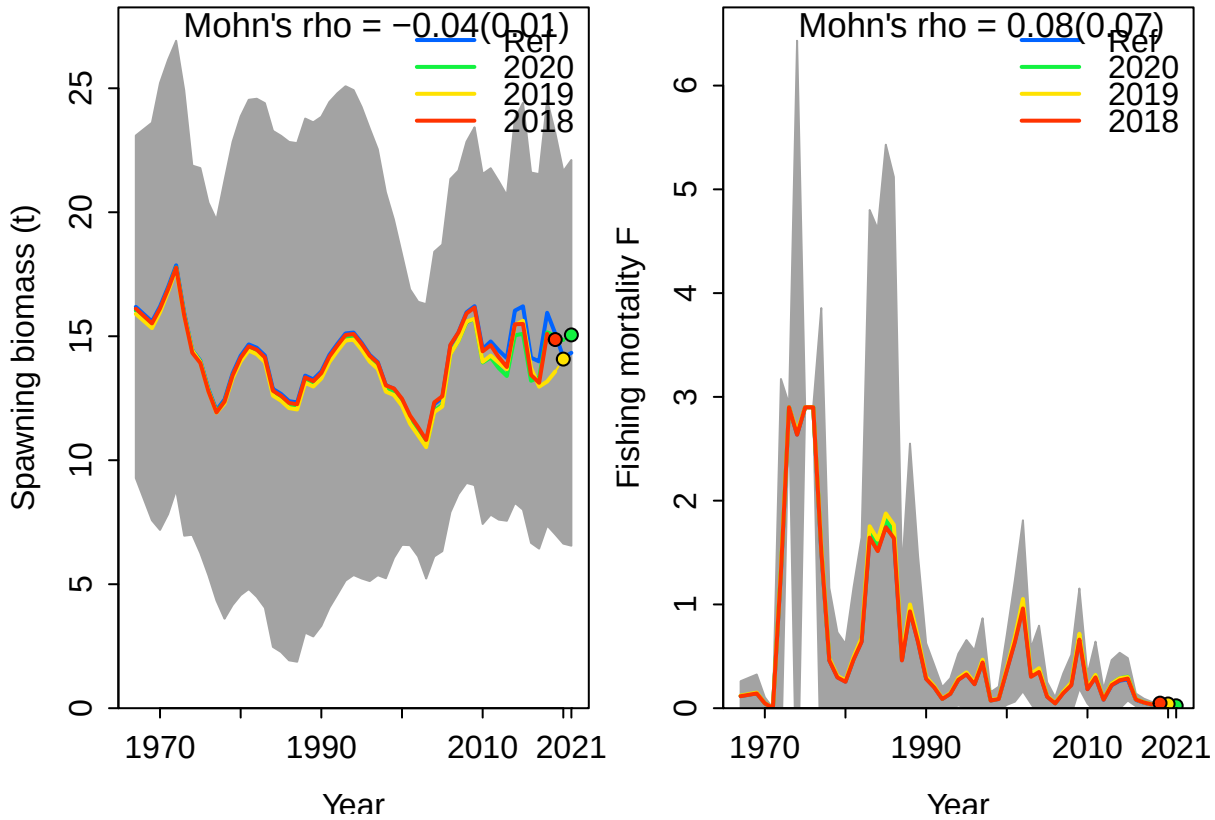


Retrospective and Hindcasting

Retrospective

```
## Plotting Retrospective pattern
```

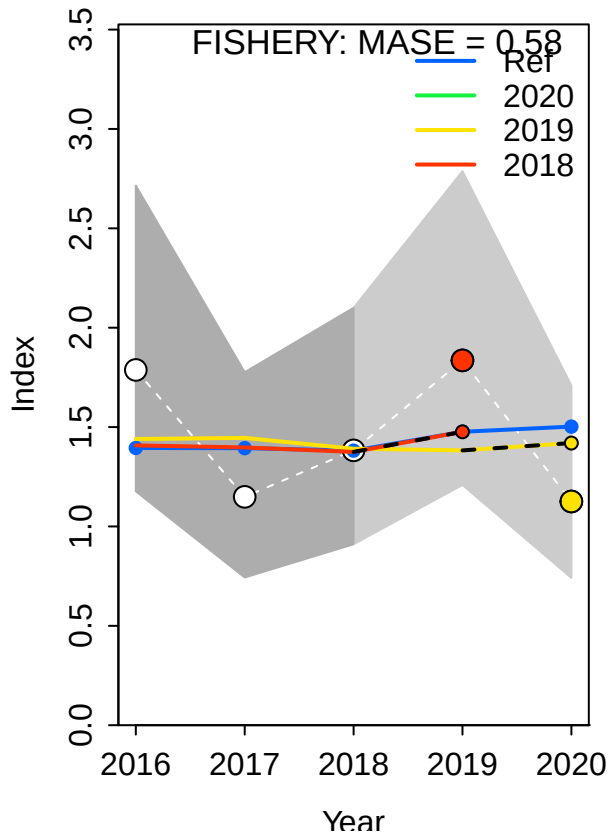
```
##
## Mohn's Rho stats, including one step ahead forecasts:
## Plotting Retrospective pattern
```



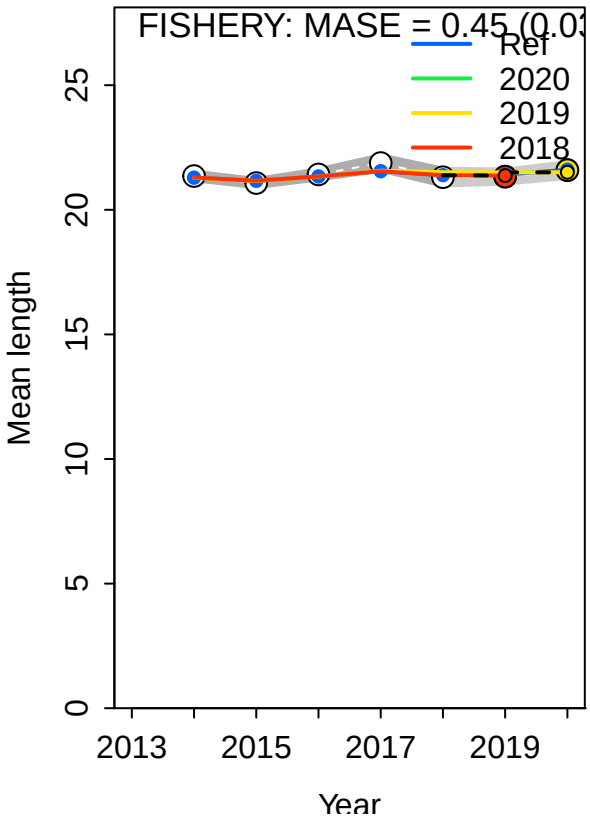

```
##
## Mohn's Rho stats, including one step ahead forecasts:

##   type     peel        Rho ForecastRho
## 1    F     2020 0.02816508 -0.01522215
## 2    F     2019 0.17301489  0.16746948
## 3    F     2018 0.05119731  0.04906931
## 4    F Combined 0.08412576  0.06710555
```

Hindcasting

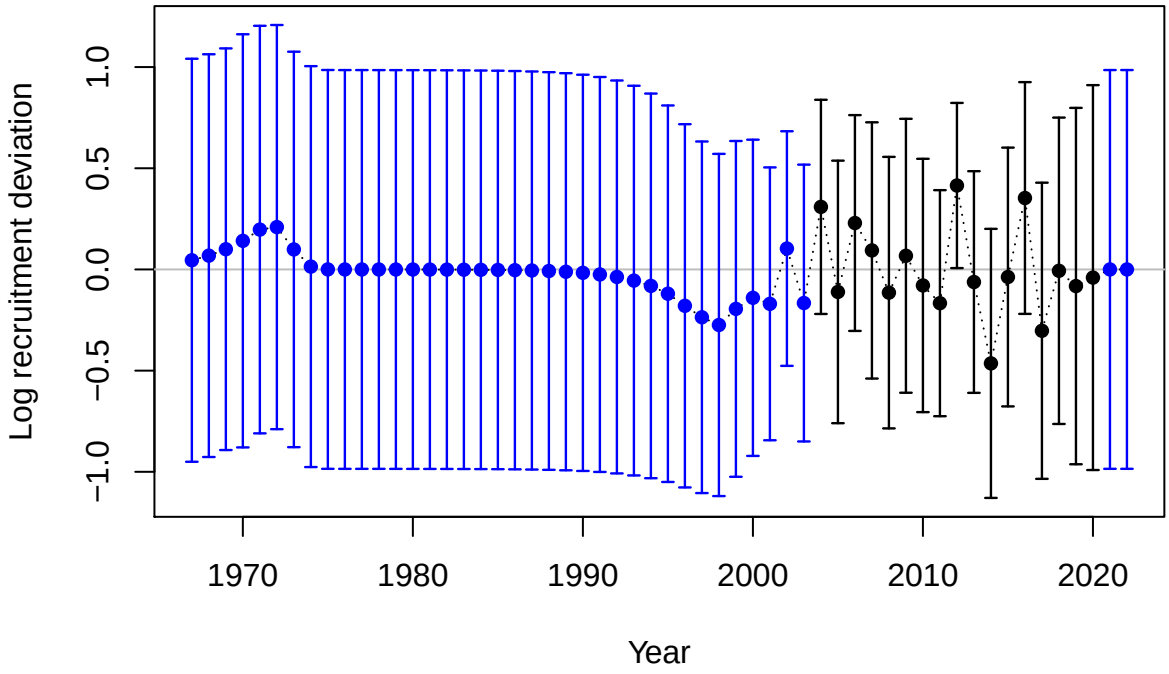
```
## Plotting Hindcast Cross-Validation (one-step-ahead)
##
##  Computing MASE with only 2 of 3  prediction residuals for Index FISHERY
##
##  Warning:  Unequal spacing of naive predictions residuals may influence the interpretation of MASE
```

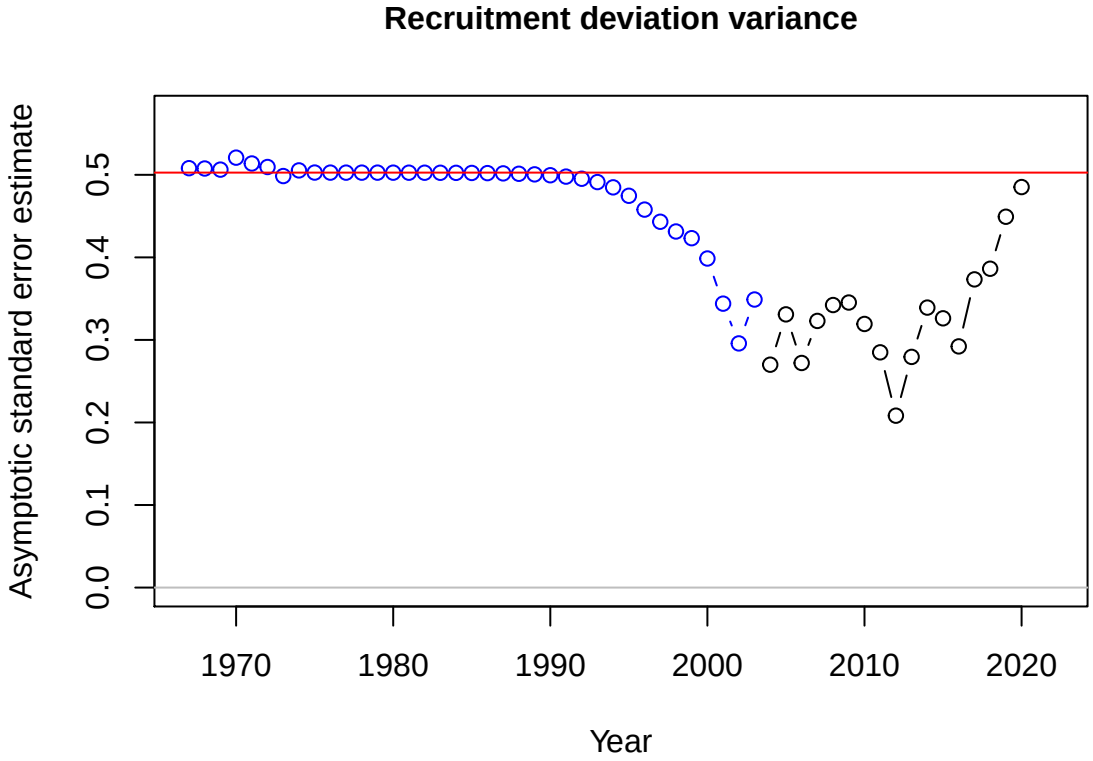



```
##
## MASE stats by Index:
## Plotting Hindcast Cross-Validation (one-step-ahead)
##
##  Computing MASE with only 2 of 3  prediction residuals for Index FISHERY
##
##  Warning:  Unequal spacing of naive predictions residuals may influence the interpretation of MASE

##
## MASE stats by Index:
```


FISHERY: MASE = 0.45 (0.0
Ref
2020
2019
2018
Mean length
0
5
10
15
20
25
2013
2015
2017
2019
Year

Recruitment Deviations





Likelihood Profile

```
## [1] "SR_LN"
```

```
## Parameter matching profile.string=SR_LN: SR_LN(R0)
```

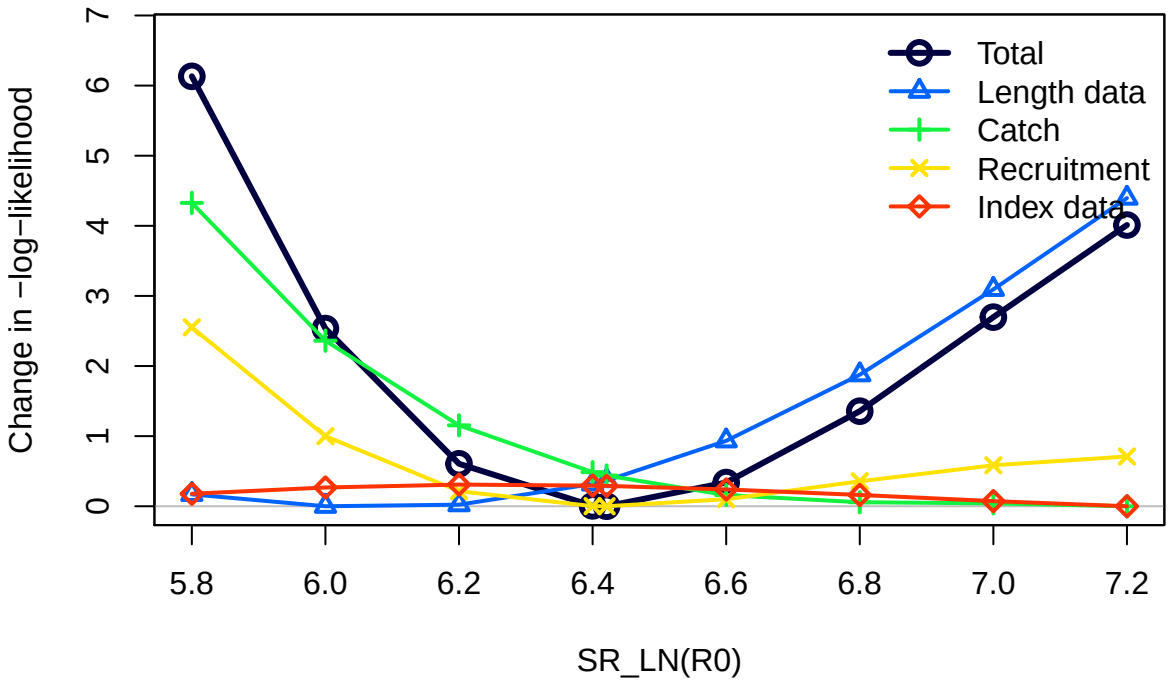
```
## Parameter values (after subsetting based on input 'models'): 5.8, 6, 6.2, 6.4, 6.6, 6.8, 7, 7.2, 6.4
```

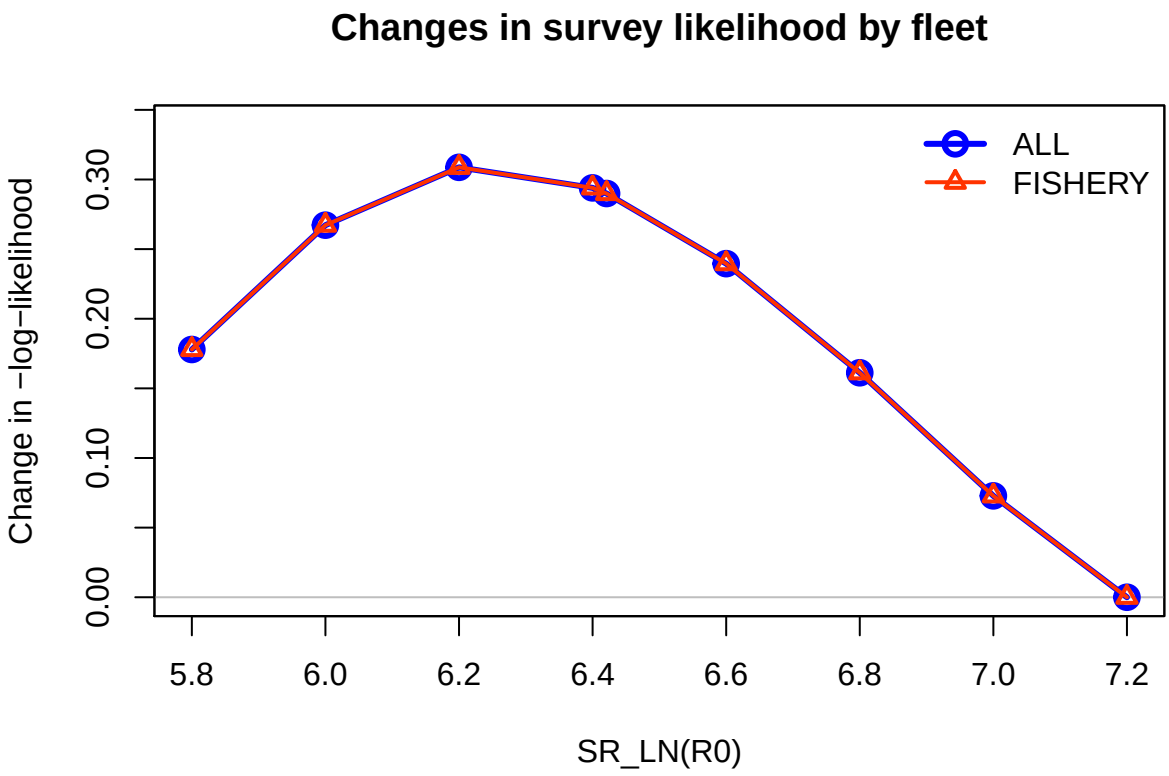
```
##
## Likelihood components showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
```

```
##                       frac_change include                            label
## TOTAL                      1.0000    TRUE                            Total
## Catch                      0.7057    TRUE                            Catch
## Equil_catch                0.0000   FALSE                Equilibrium catch
## Survey                     0.0503    TRUE                       Index data
## Length_comp                0.7168    TRUE                      Length data
## Recruitment                0.4162    TRUE                      Recruitment
## InitEQ_Regime              0.0000   FALSE Initital equilibrium recruitment
## Forecast_Recruitment       0.0000   FALSE             Forecast recruitment
## Parm_priors                0.0000   FALSE                           Priors
## Parm_softbounds            0.0000   FALSE                      Soft bounds
## Parm_devs                  0.0000   FALSE             Parameter deviations
## Crash_Pen                  0.0000   FALSE                    Crash penalty
```

```
## Parameter matching profile.string = 'SR_LN': 'SR_LN(R0)
## Parameter values (after subsetting based on input 'models'): 5.8, 6, 6.2, 6.4, 6.6, 6.8, 7, 7.2, 6.4
```

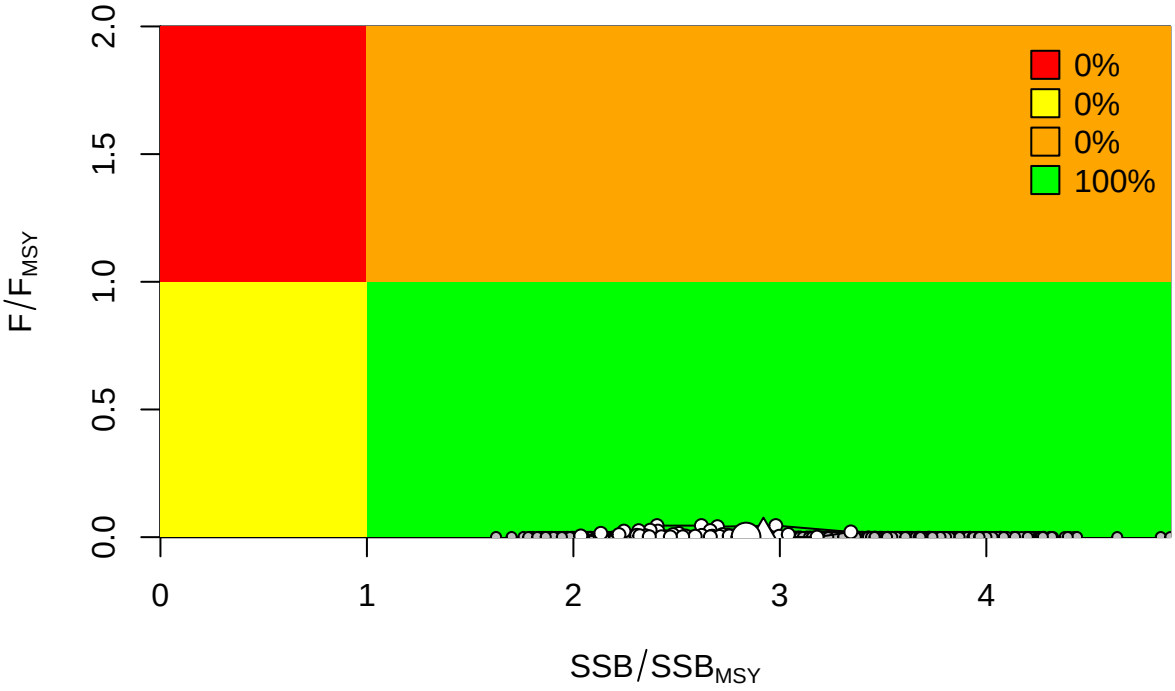
```
## Fleet-specific likelihoods showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
##                        frac_change include
## prof.table....c.1.3..            1    TRUE
```


Change in −log−likelihood
0
1
2
3
4
5
6
7
5.8
6.0
6.2
6.4
6.6
6.8
7.0
7.2
SR_LN(R0)
Total
Length data
Catch
Recruitment
Index data

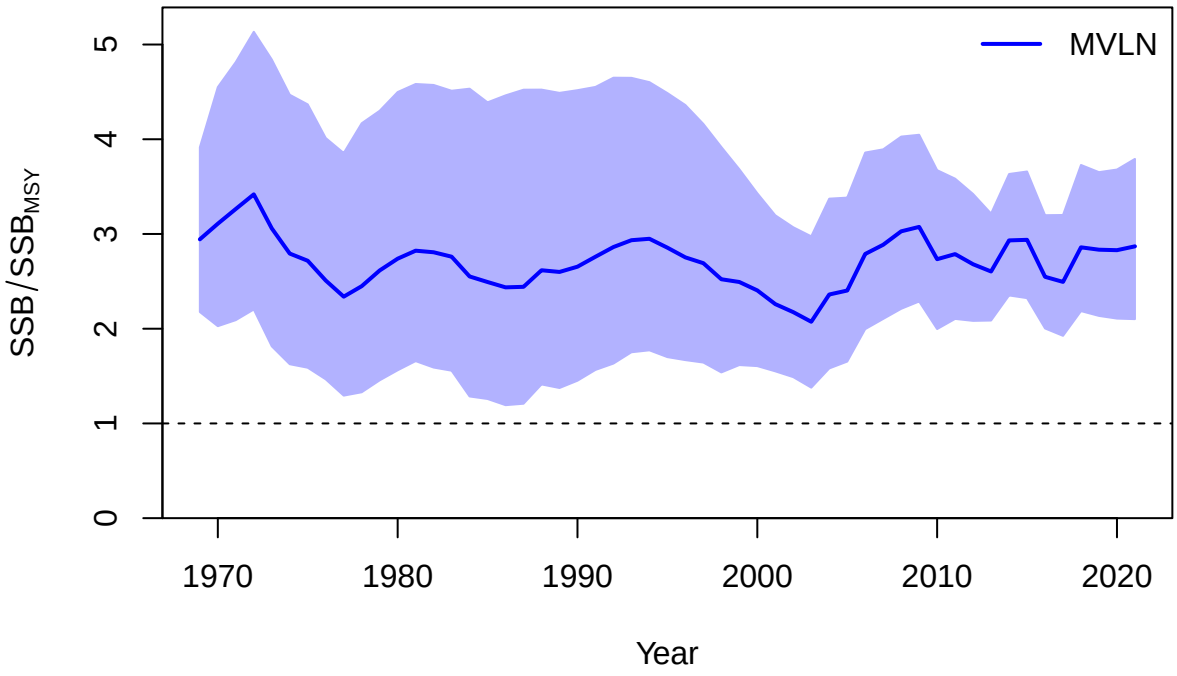


Management Quantities

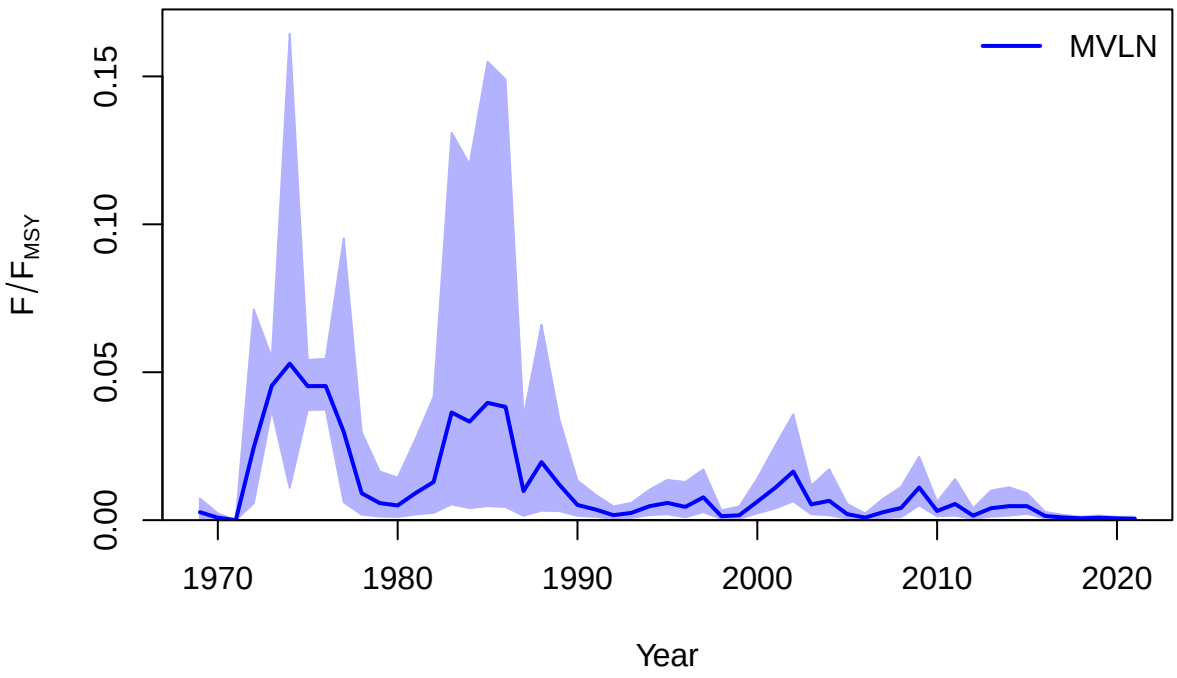
```
##
##  starter.sso with Bratio: SSB/SSBMSY and F: _abs_F
##
```



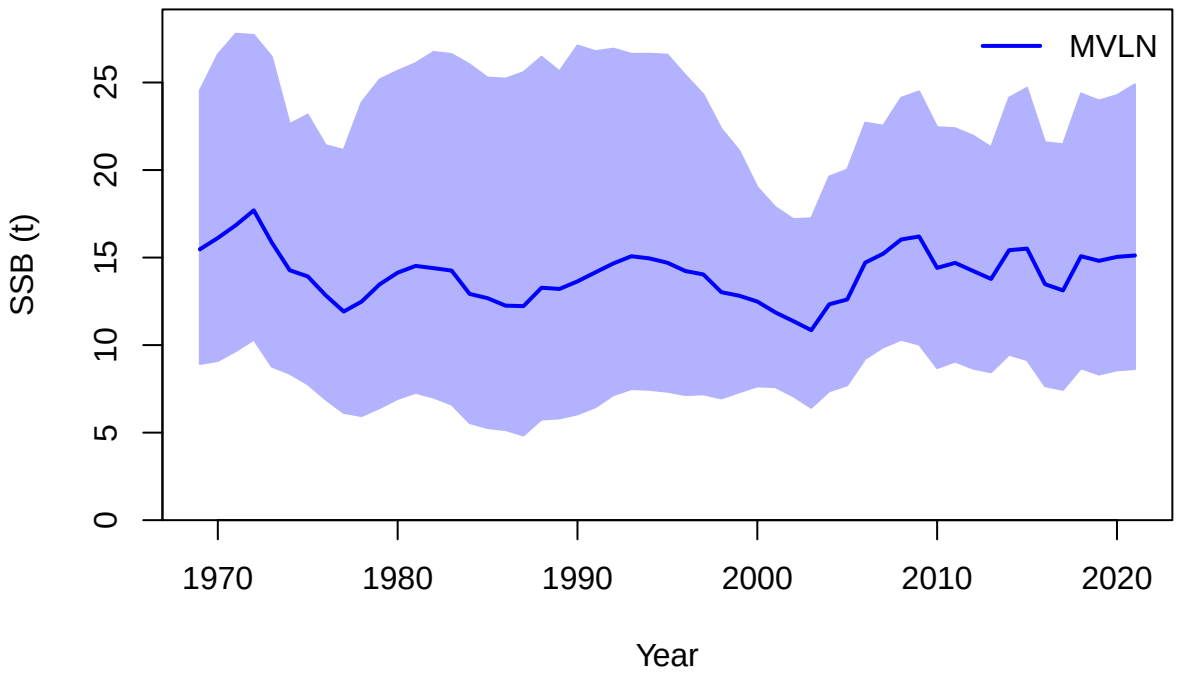

```
##
## Plot Comparison of stock
```



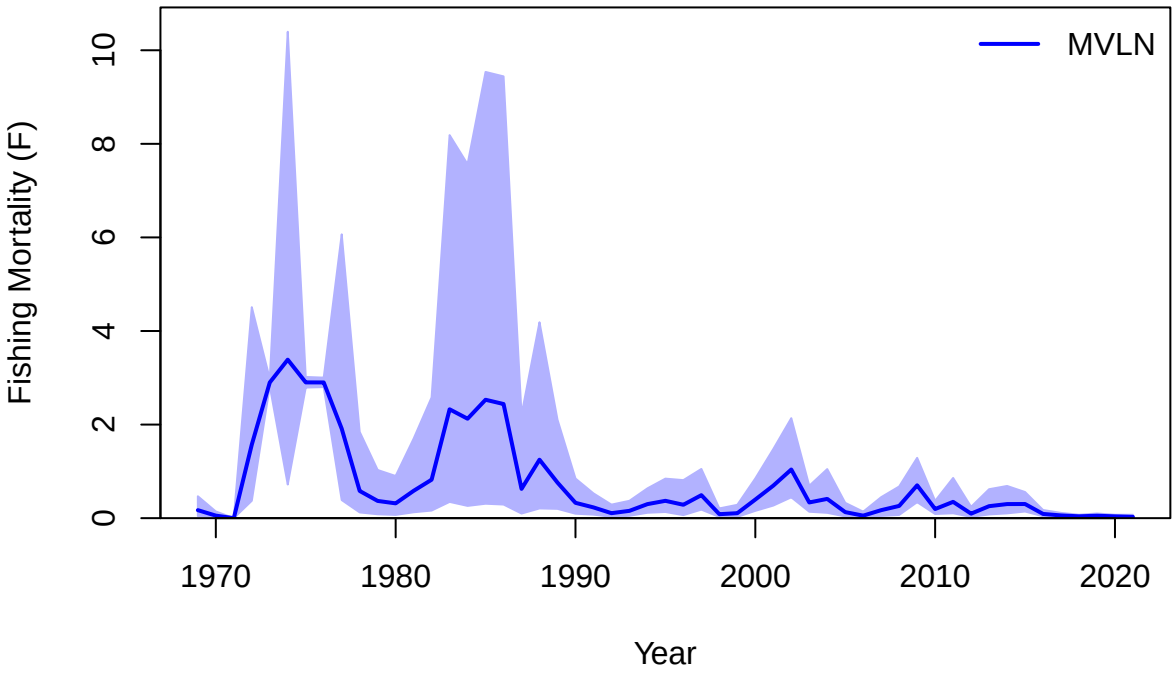

```
##
## Plot Comparison of harvest
```




```
##
## Plot Comparison of SSB
```

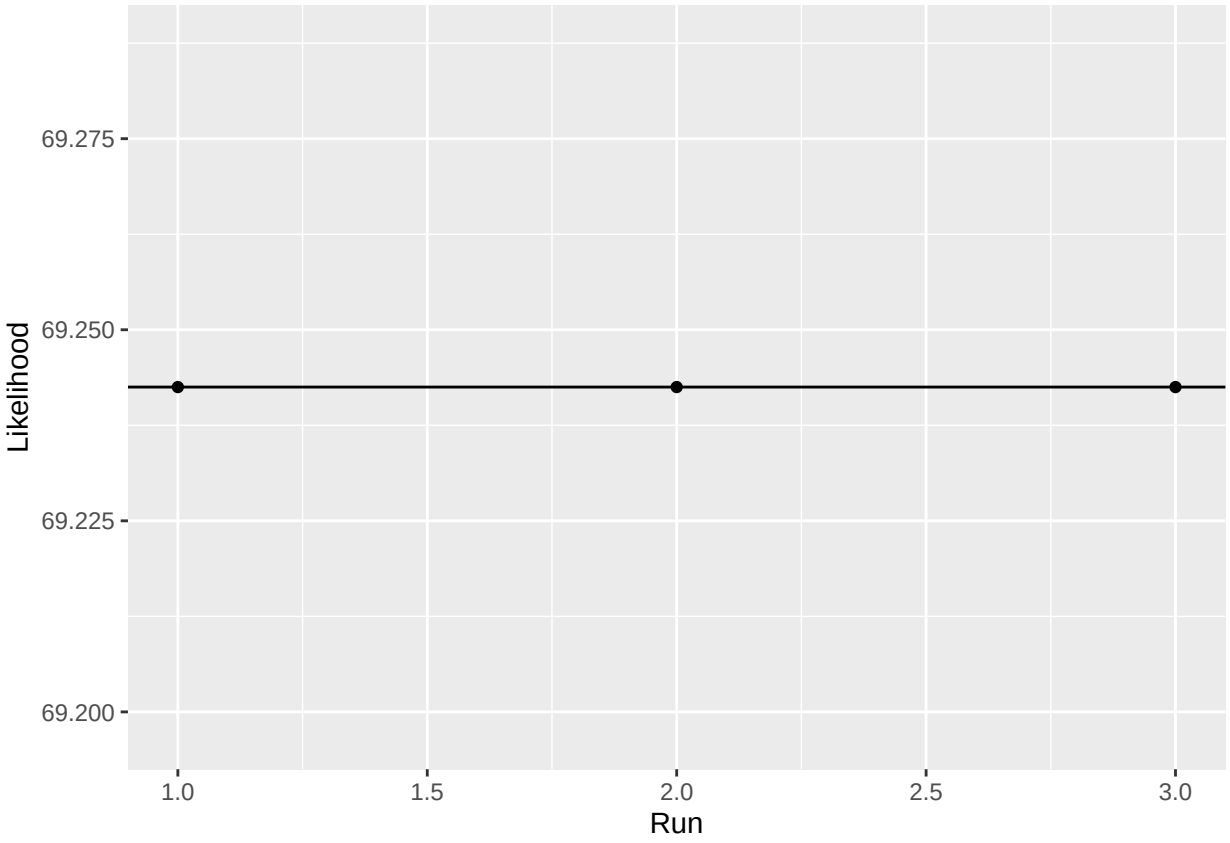


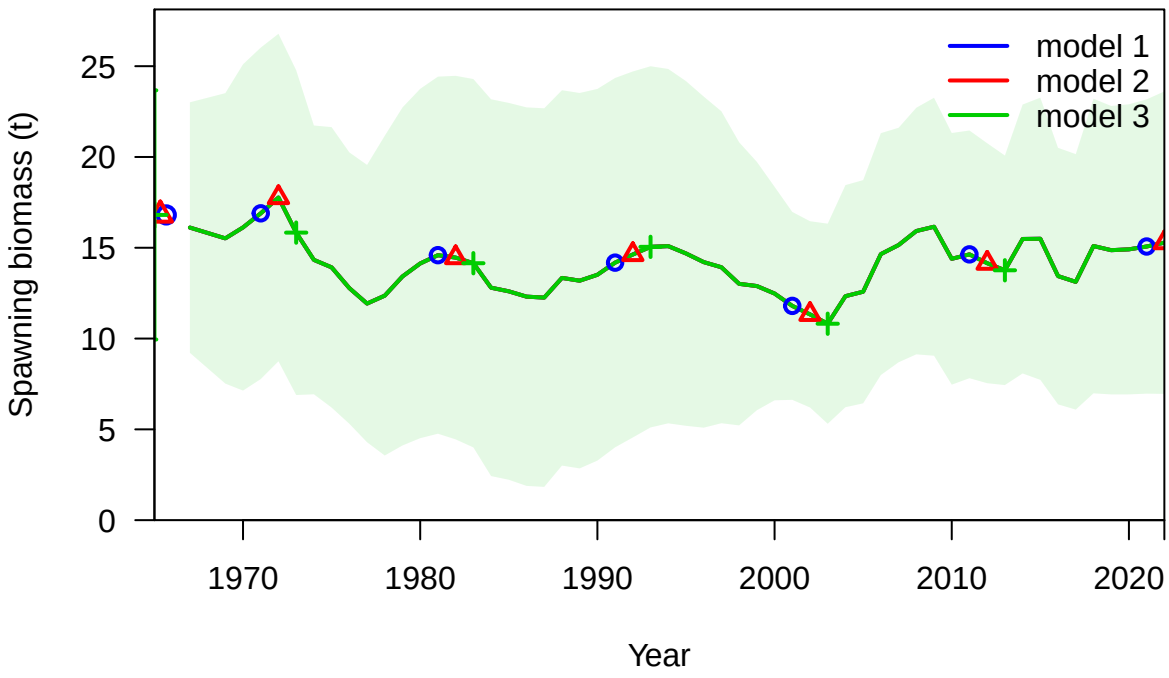

```
##
## Plot Comparison of F
```

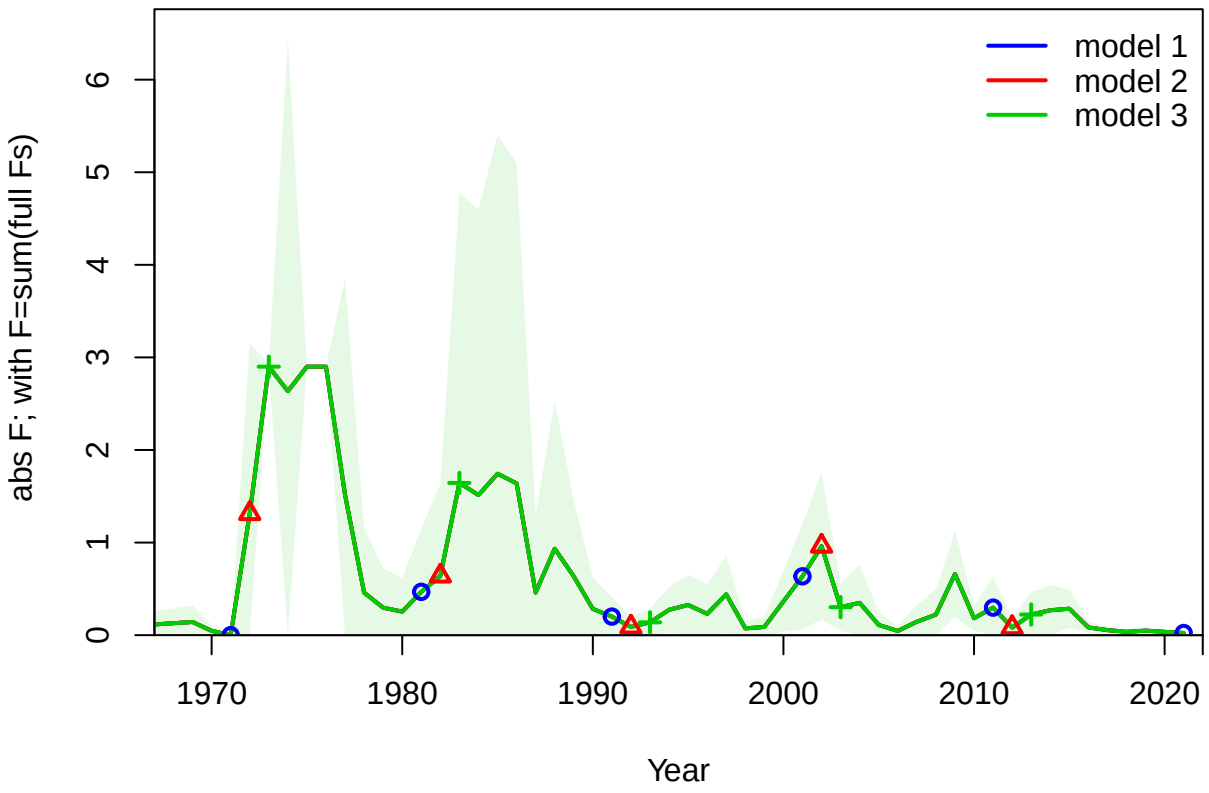

MVLN
Fishing Mortality (F)
0
2
4
6
8
10
1970
1980
1990
2000
2010
2020
Year

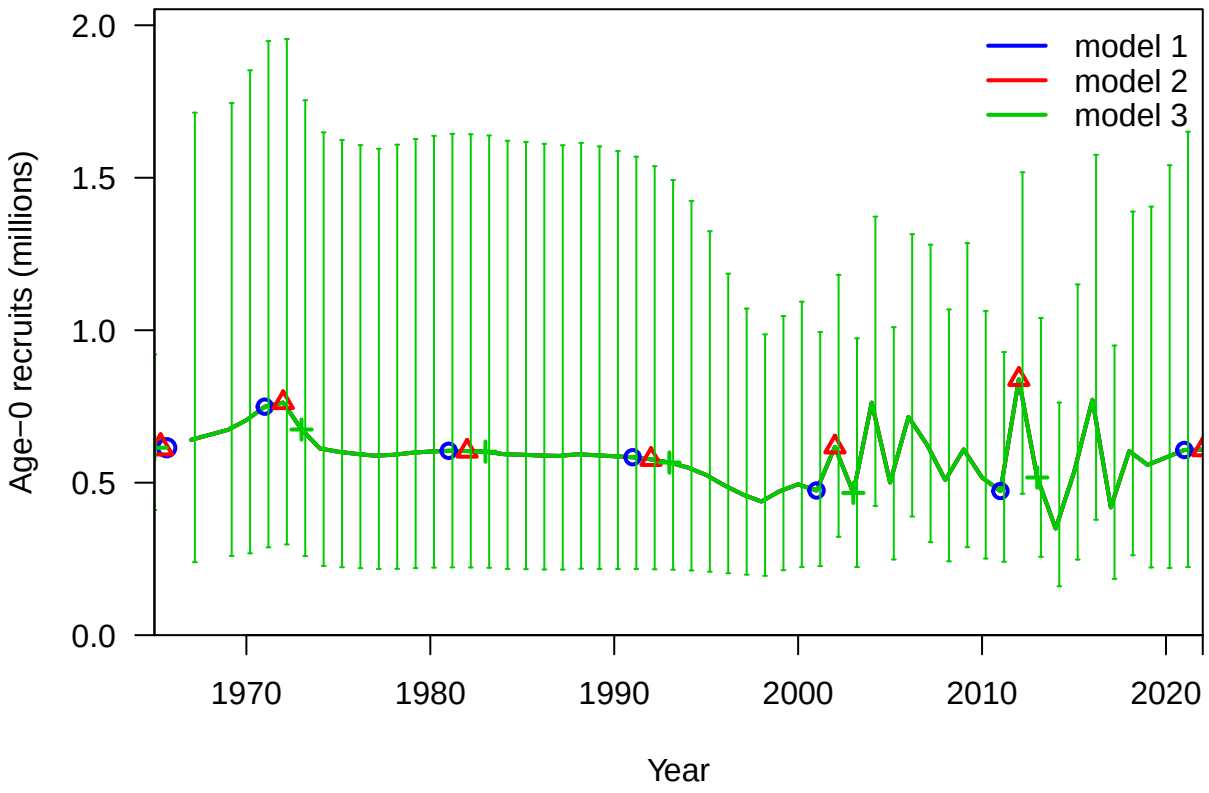
```
## RStudioGD
##         2
```

Jitter




model 1
model 2
model 3
Spawning biomass (t)
0
5
10
15
20
25
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
abs F; with F=sum(full Fs)
0
1
2
3
4
5
6
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
Age−0 recruits (millions)
2.0
1.5
1.0
0.5
0.0
1970
1980
1990
2000
2010
2020
Year