American Samoa Model Checks

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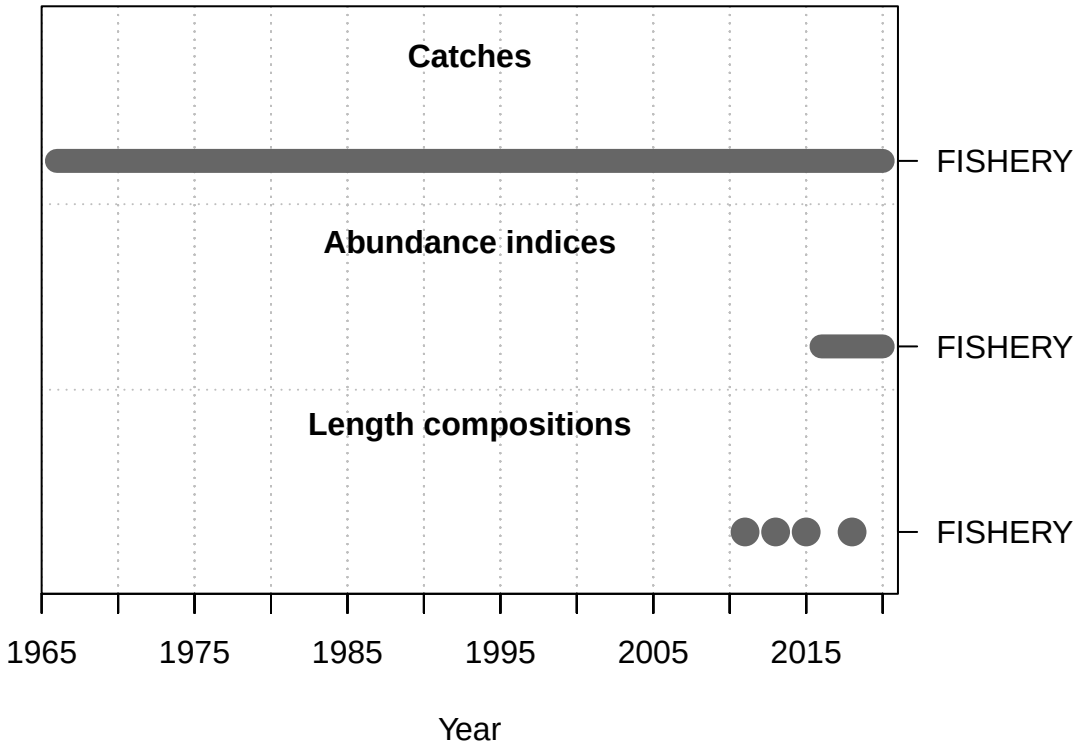
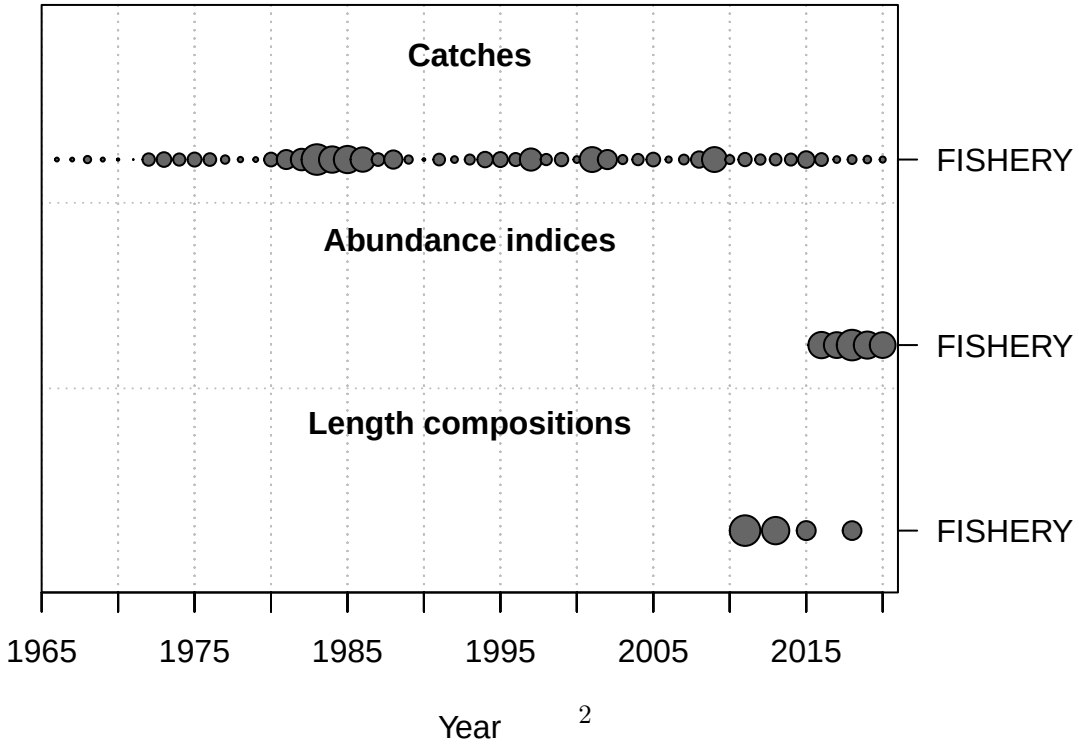
2022-08-11

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

Model Output

Input Data





Convergence Check

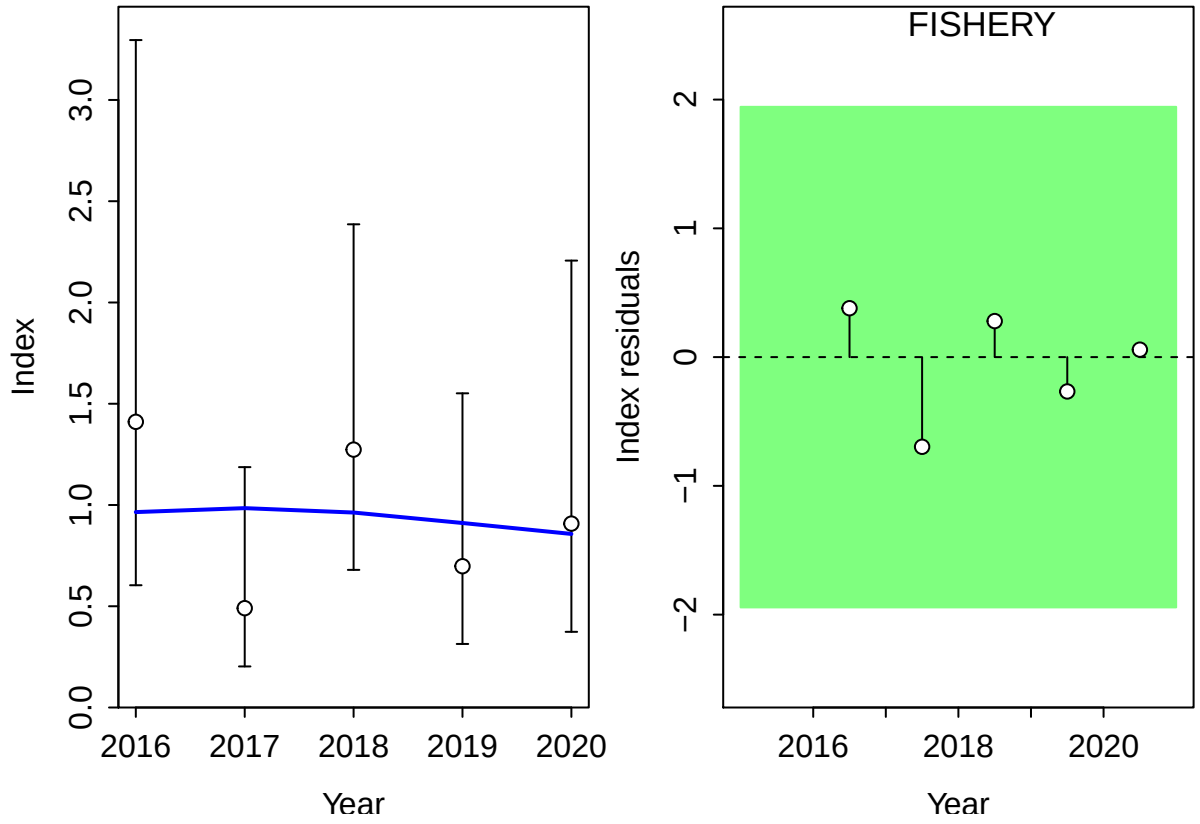
```
##   Converged     MaxGrad
## 1      TRUE 8.92014e-05
```

```
## [1] "1 catch is 0.0 in endyr; this can cause problem in the benchmark and forecast calculations"
## [2] "2 NOTE:  Max data length bin: 48  < max pop len bins: 53; so will accumulate larger pop len bins
## [3] "3 parameter init value is less than parameter min 1 < 5 for parm: 2 ; search for <now check> in
## [4] "4 warning: poor convergence in Fmsy, final dy/dy2= -0.00440774"
## [5] " N parameters are on or within 1% of min-max bound: 2; check results, variance may be suspect"
## [6] "N warnings: 4"
```

Fit to Model

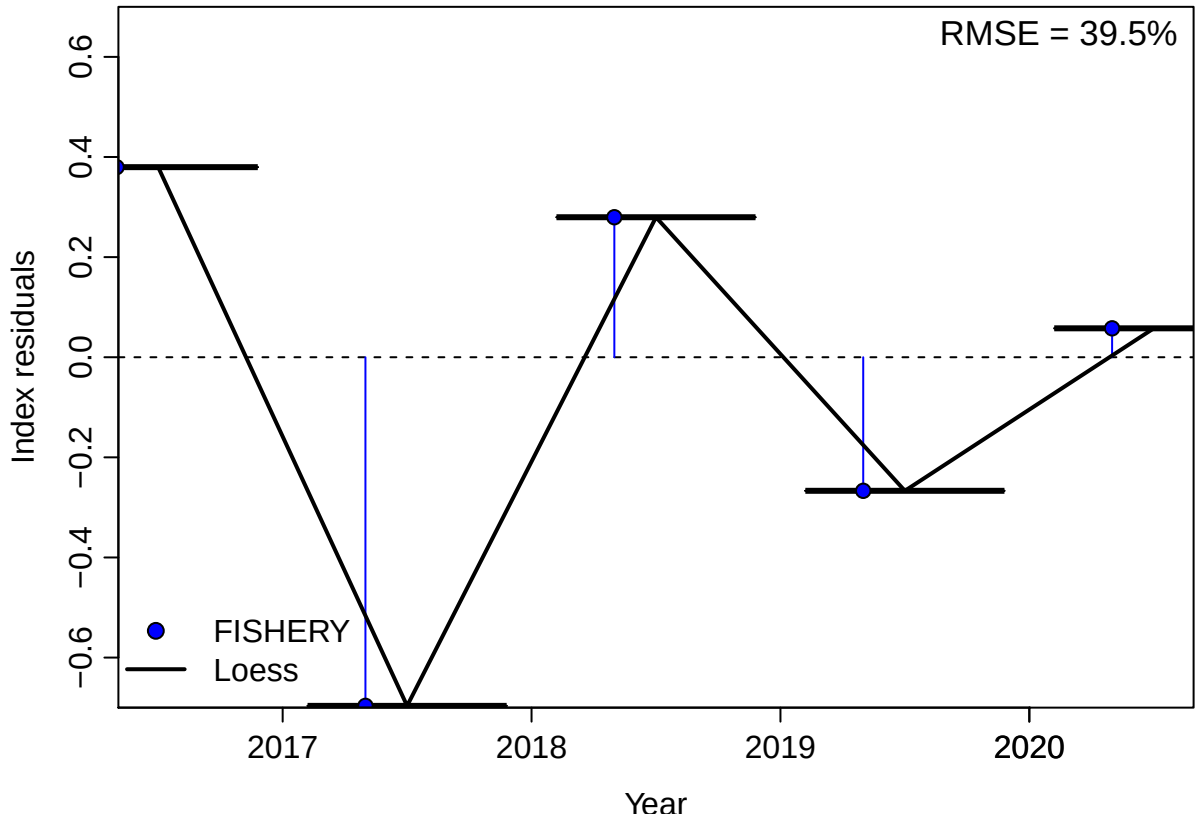
CPUE

```
##
##  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, : span too small. fe
## of freedom.

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : pseudoinverse used

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : neighborhood radiu

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : reciprocal conditi

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : There are other ne
## 4.0804
```



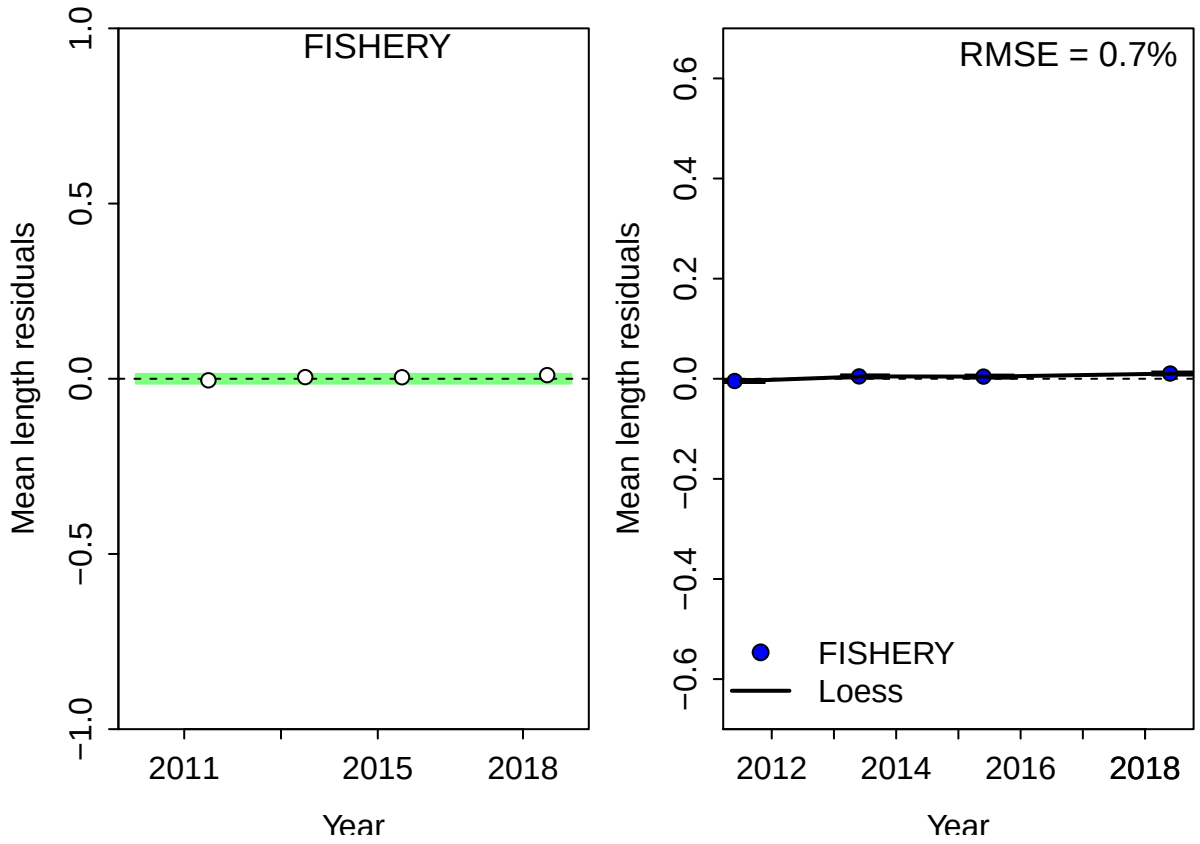

```
##
## RMSE stats by Index:
```

Length Comp

#Factor	Fleet	New_Var_adj	Type	Name
4	1	10.1523	len	FISHERY

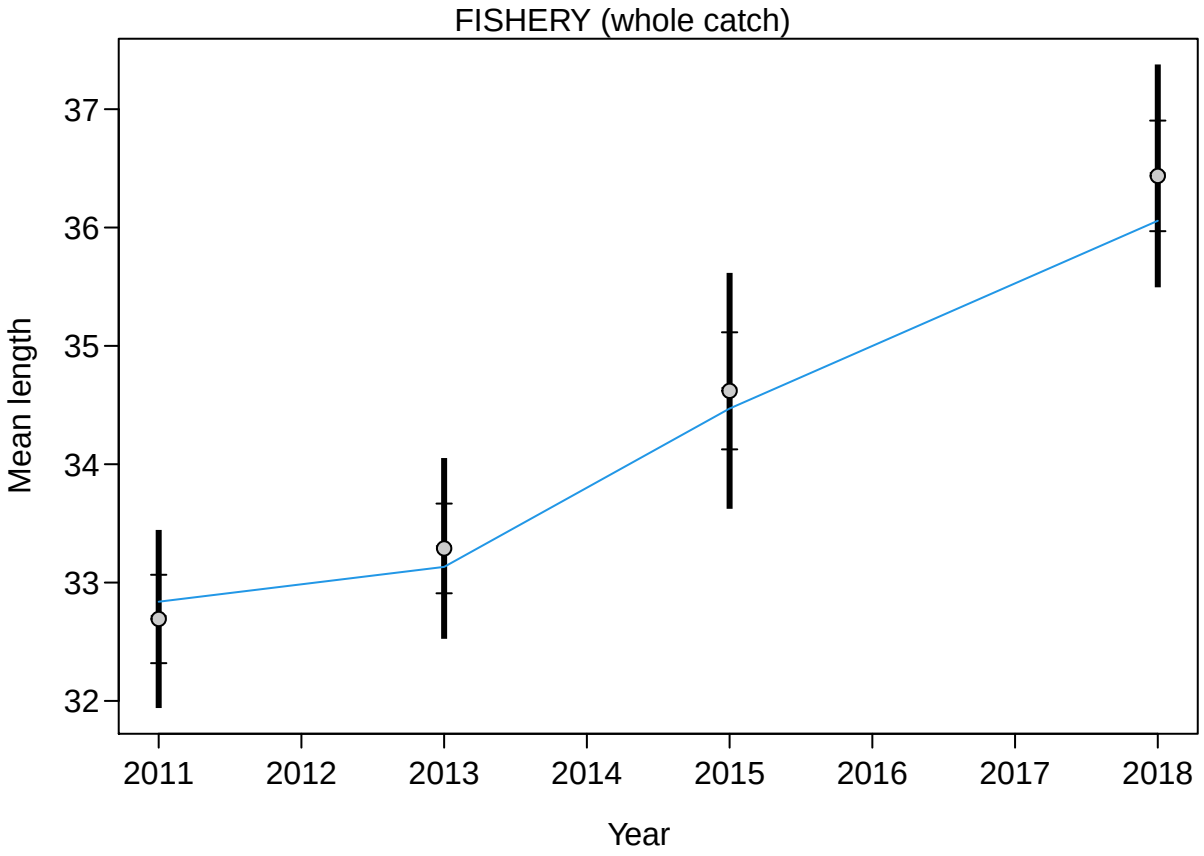
```
##
##  Running Runs Test Diagnosics for Mean length
## Plotting Residual Runs Tests
```

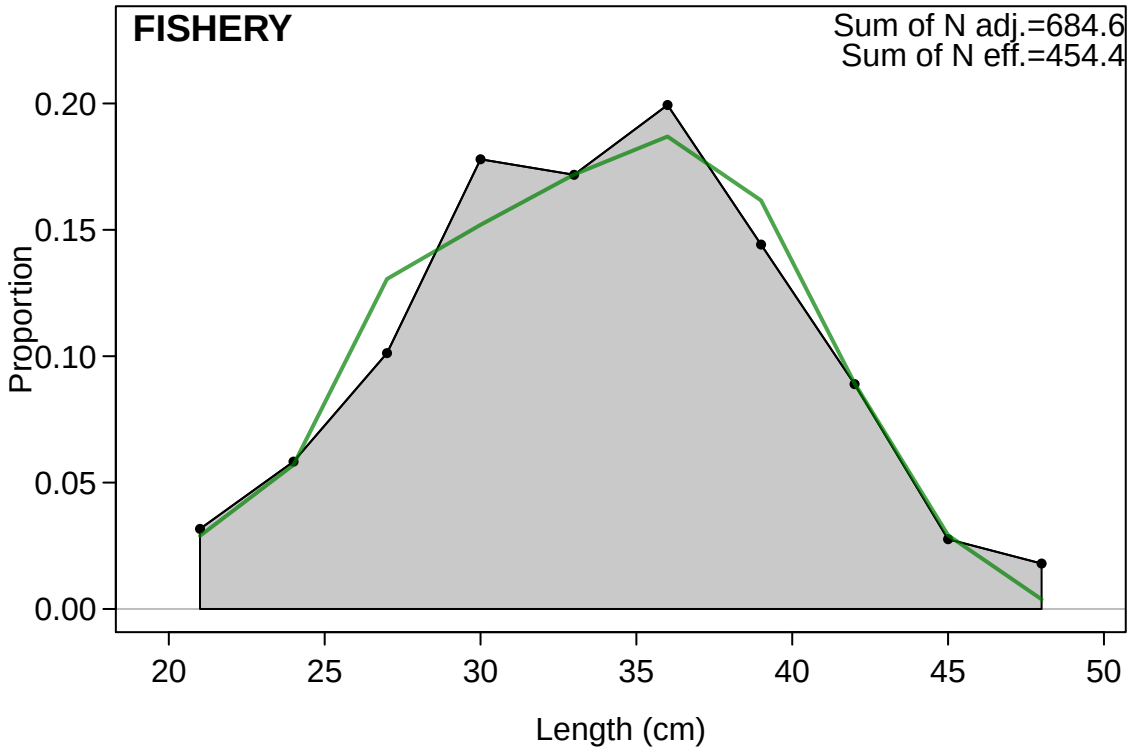
```
##
## Runs Test stats by Mean length:

##     Index runs.p   test   sigma3.lo  sigma3.hi type
## 1 FISHERY  0.159 Passed -0.01387502 0.01387502  len

## Plotting JABBA residual plot

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : span too small. fe
## of freedom.

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : pseudoinverse used

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : neighborhood radiu

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : reciprocal conditi

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : There are other ne
## 25.351
```

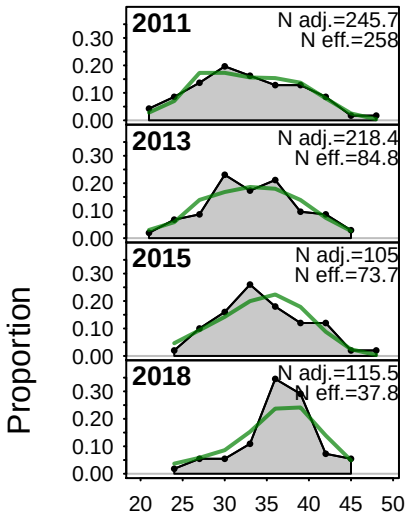



```
##
## RMSE stats by Index:
```

```
##    indices RMSE.perc nobs
## 1  FISHERY       0.7    4
## 2 Combined       0.7    4
```




FISHERY
Sum of N adj.=684.6
Sum of N eff.=454.4
Proportion
0.00
0.05
0.10
0.15
0.20
20
25
30
35
40
45
50
Length (cm)

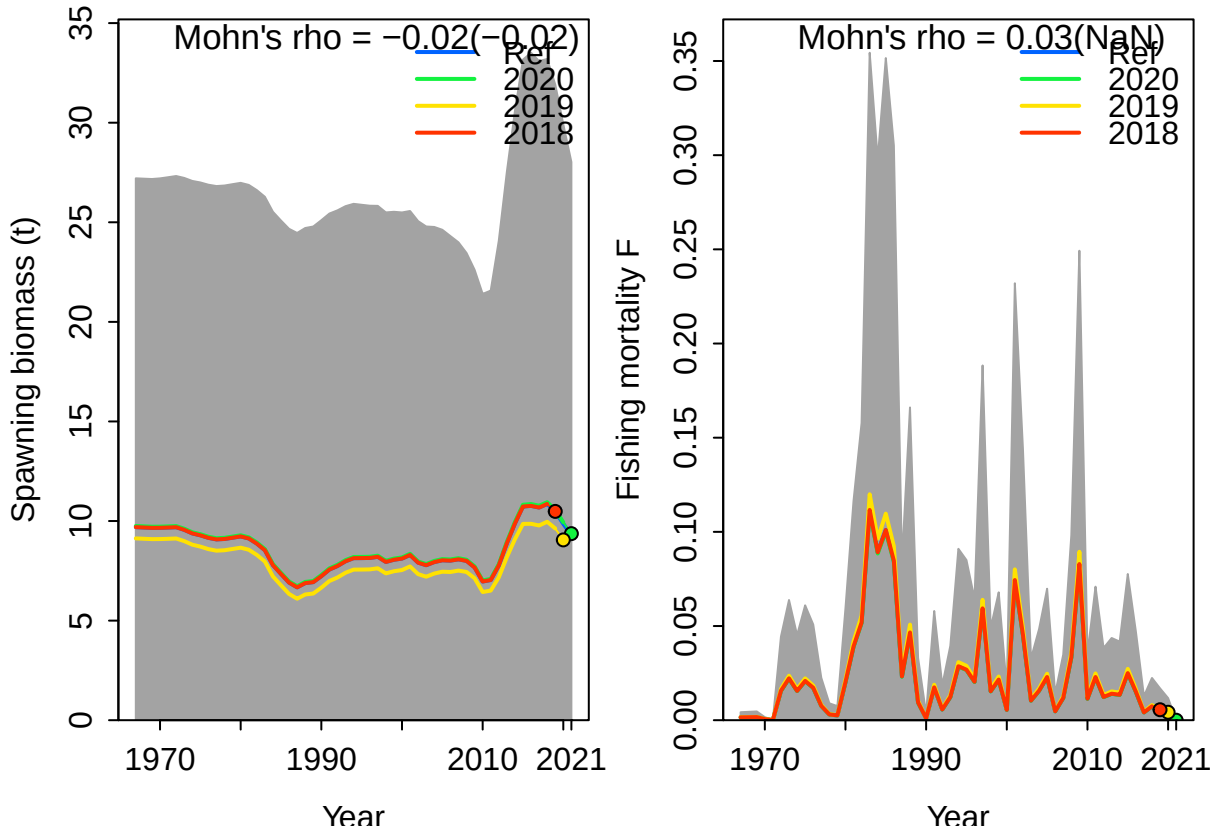


Retrospective and Hindcasting

Retrospective

```
## Plotting Retrospective pattern
```

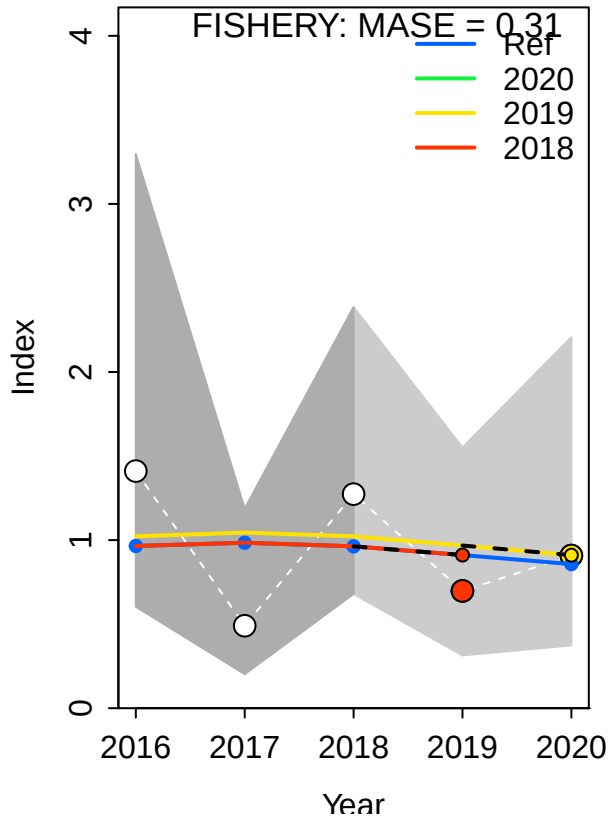
```
##
## Mohn's Rho stats, including one step ahead forecasts:
## Plotting Retrospective pattern
```




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

##   type     peel          Rho ForecastRho
## 1    F     2020 -0.007670568         NaN
## 2    F     2019  0.088984256  0.08916648
## 3    F     2018  0.000000000  0.00000000
## 4    F Combined  0.027104563         NaN
```

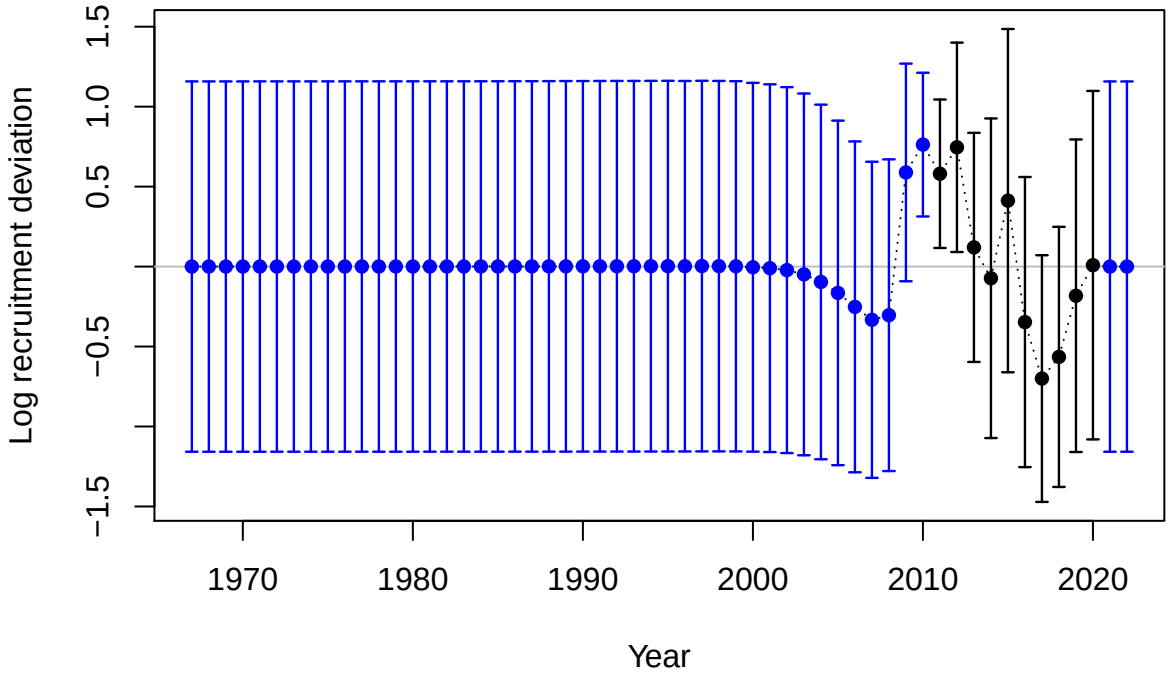
Hindcasting

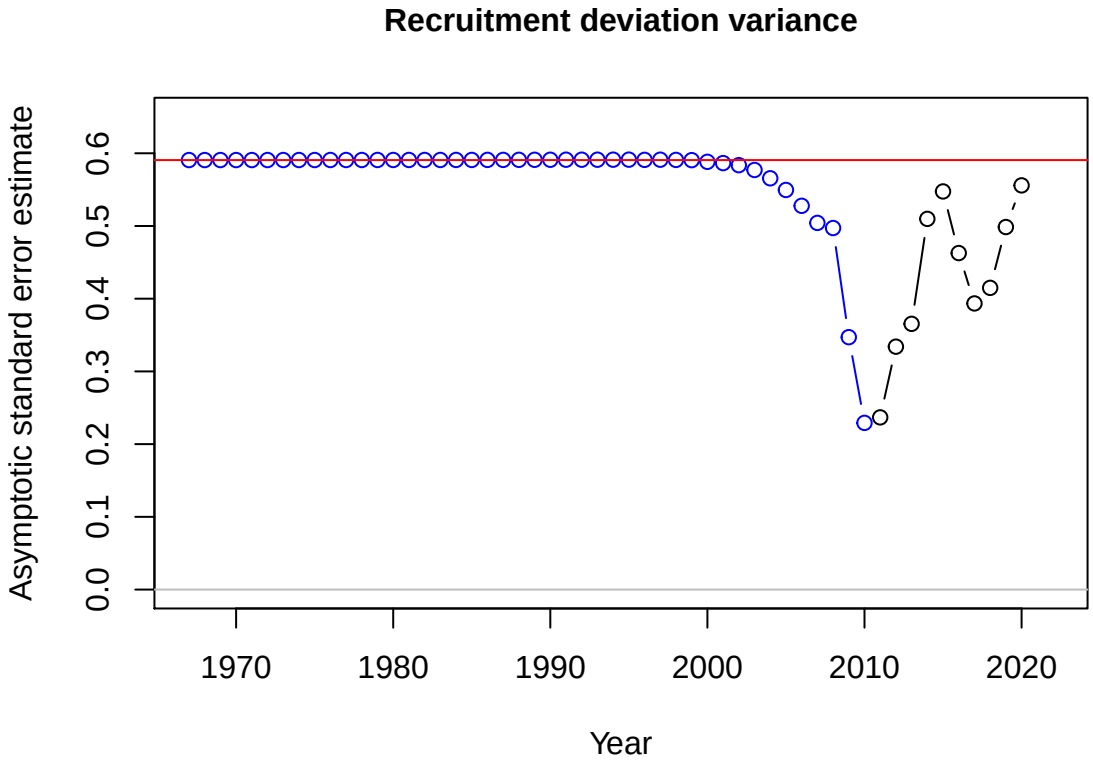
```
## Plotting Hindcast Cross-Validation (one-step-ahead)
##
##  Computing MASE with only 2 of 3  prediction residuals for Index FISHERY
##
##  Warning:  Unequal spacing of naive predictions residuals may influence the interpretation of MASE
```




```
##
## MASE stats by Index:
## Plotting Hindcast Cross-Validation (one-step-ahead)
##
## No observations in evaluation years to compute prediction residuals for Index FISHERY
##
## MASE stats by Index:
```

Recruitment Deviations





Likelihood Profile

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

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

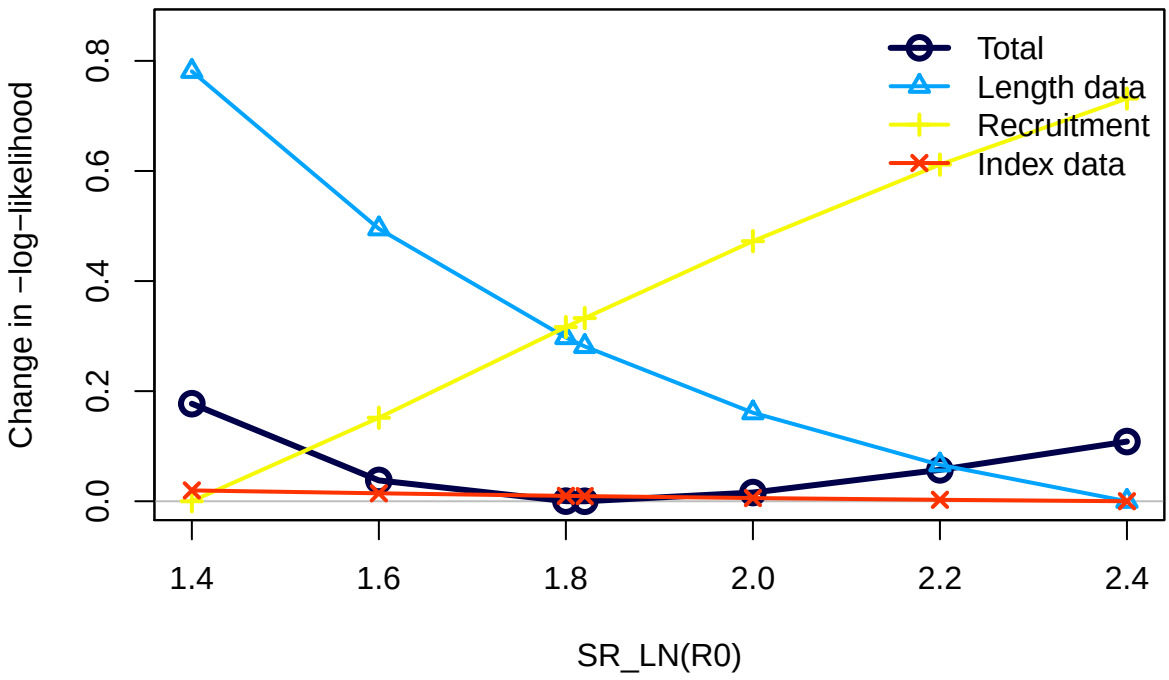
```
## Parameter values (after subsetting based on input 'models'): 1.4, 1.6, 1.8, 2, 2.2, 2.4, 1.82015
```

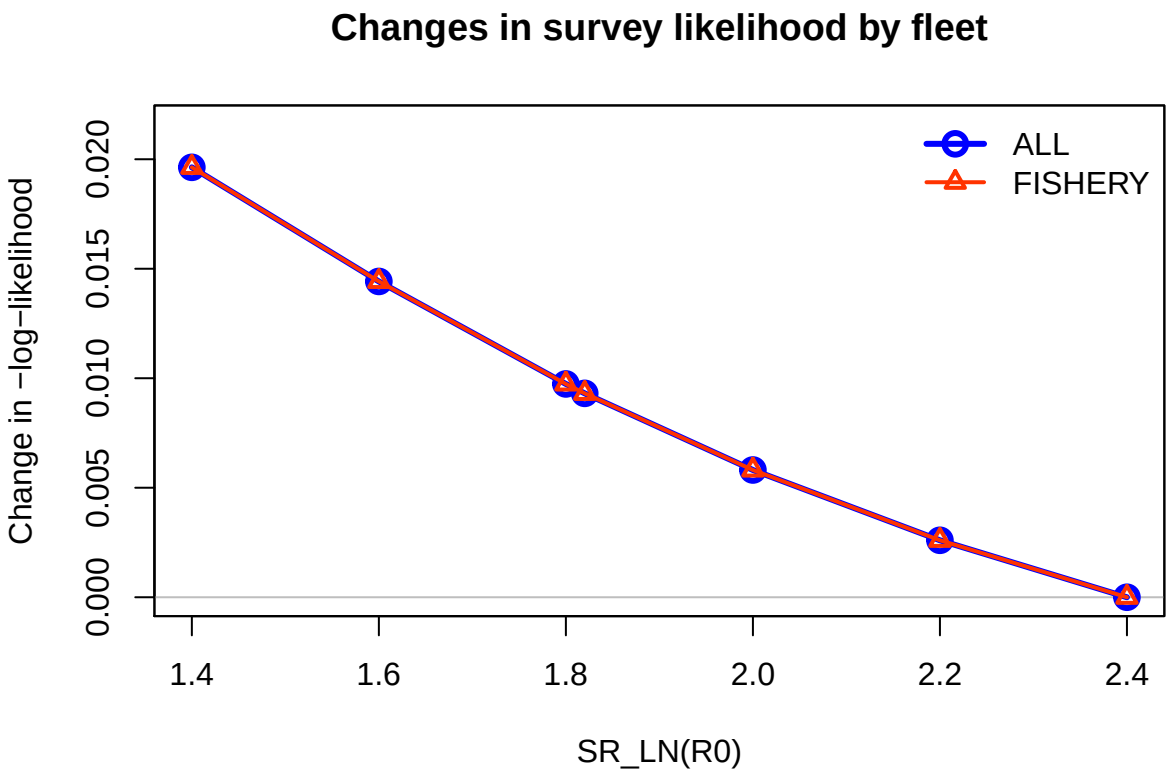
```
##
## Likelihood components showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
```

```
##                      frac_change include                            label
## TOTAL                     1.0000    TRUE                            Total
## Catch                     0.0000   FALSE                            Catch
## Equil_catch               0.0000   FALSE                Equilibrium catch
## Survey                    0.1108    TRUE                       Index data
## Length_comp               4.4074    TRUE                      Length data
## Recruitment               4.1284    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           0.0011   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'): 1.4, 1.6, 1.8, 2, 2.2, 2.4, 1.82015,
```

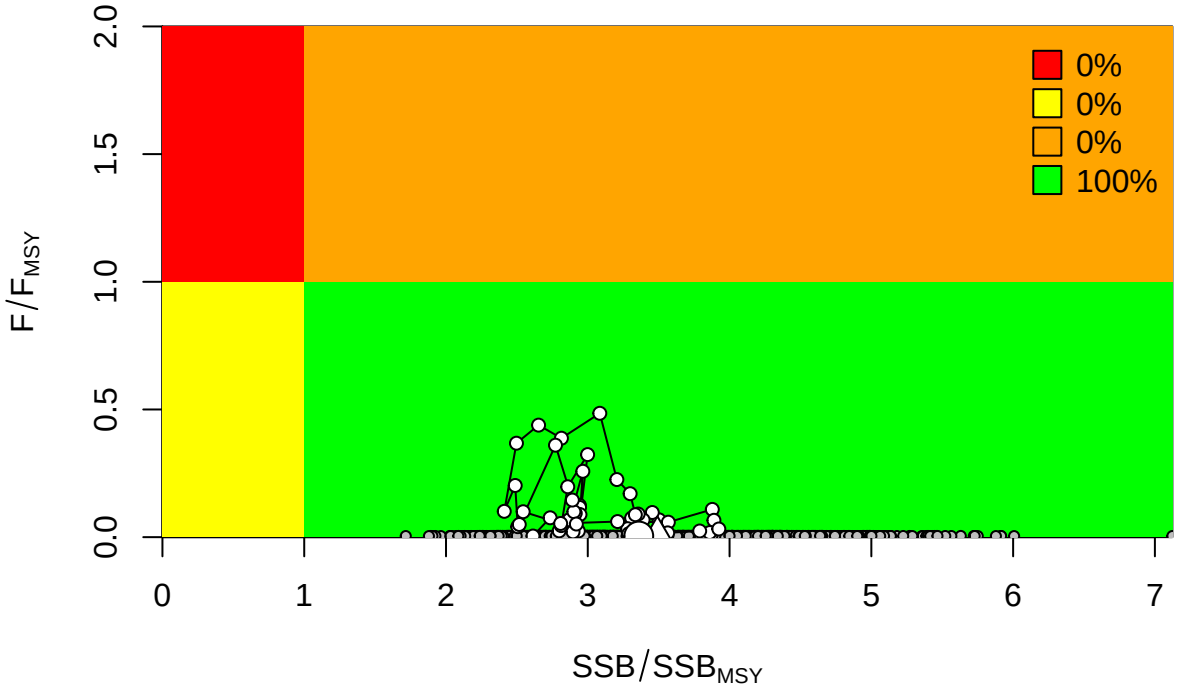
```
## Fleet-specific likelihoods showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
##                        frac_change include
## prof.table....c.1.3..           1    TRUE
```


Change in −log−likelihood
0.0
0.2
0.4
0.6
0.8
1.4
1.6
1.8
2.0
2.2
2.4
SR_LN(R0)
Total
Length data
Recruitment
Index data

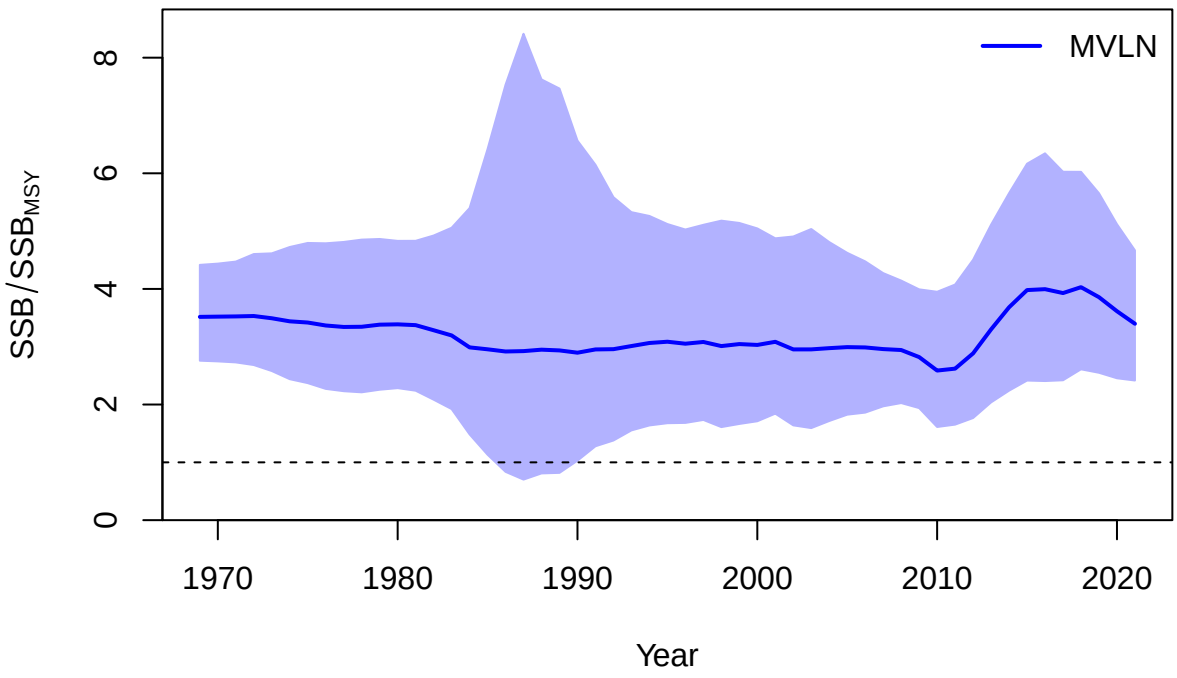


Management Quantities

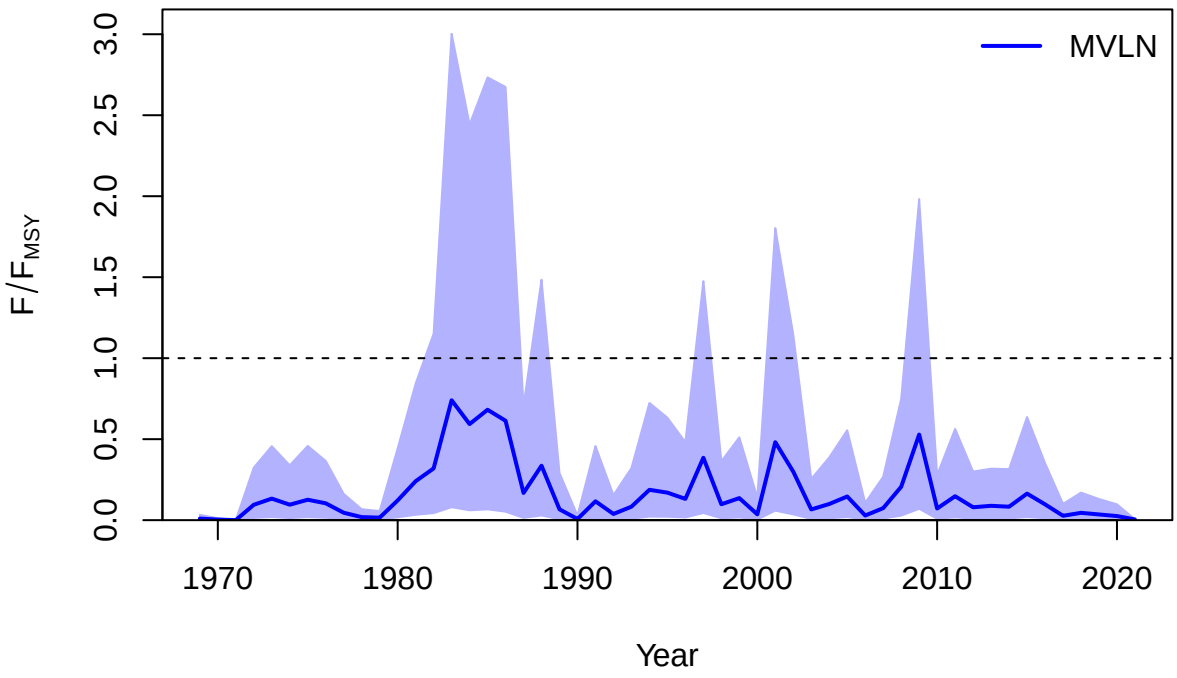
```
##
##  starter.sso with Bratio: SSB/SSBMSY and F: _abs_F
##
```



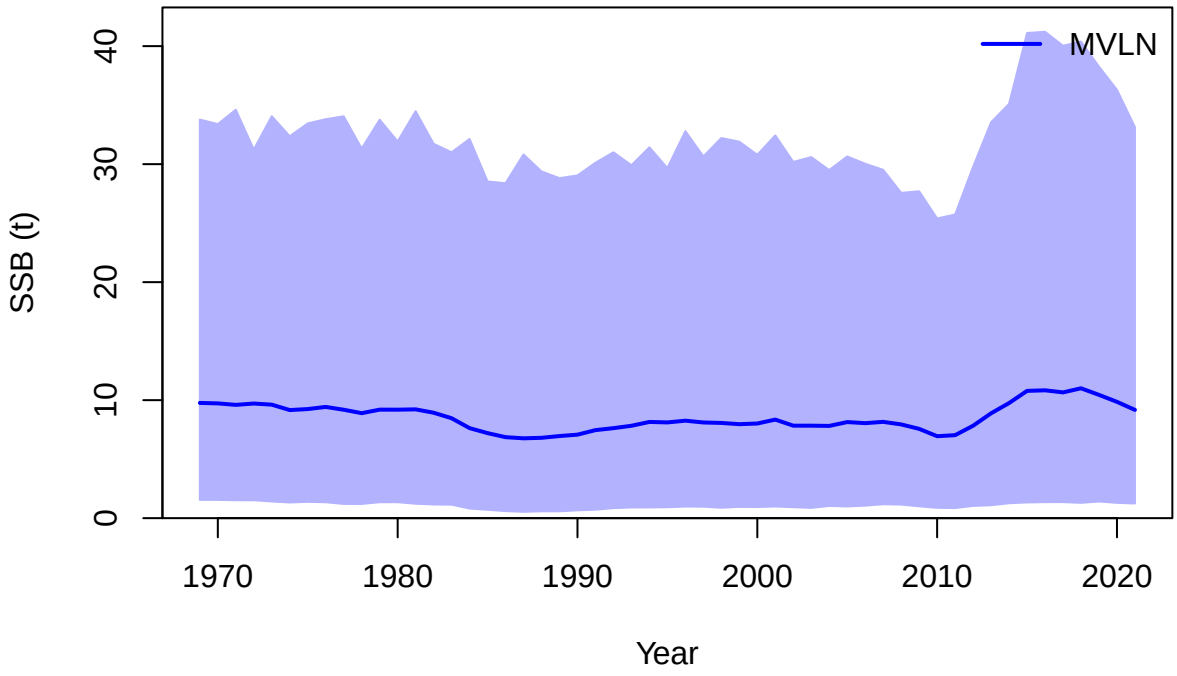

```
##
## Plot Comparison of stock
```



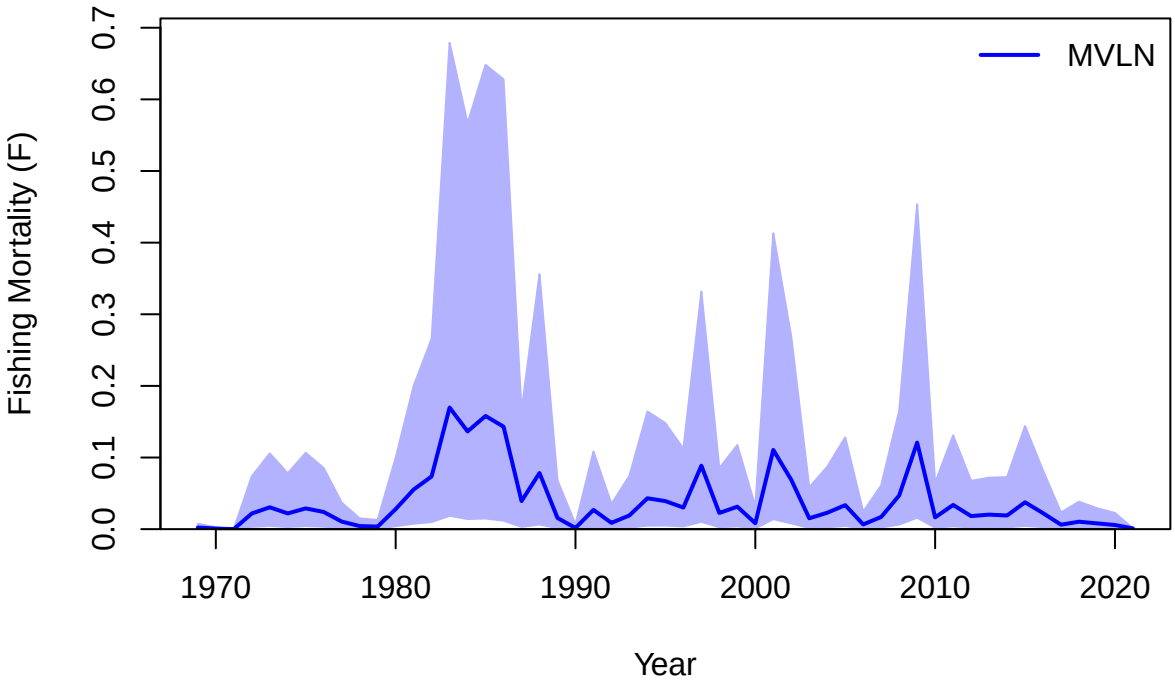

```
##
## Plot Comparison of harvest
```




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

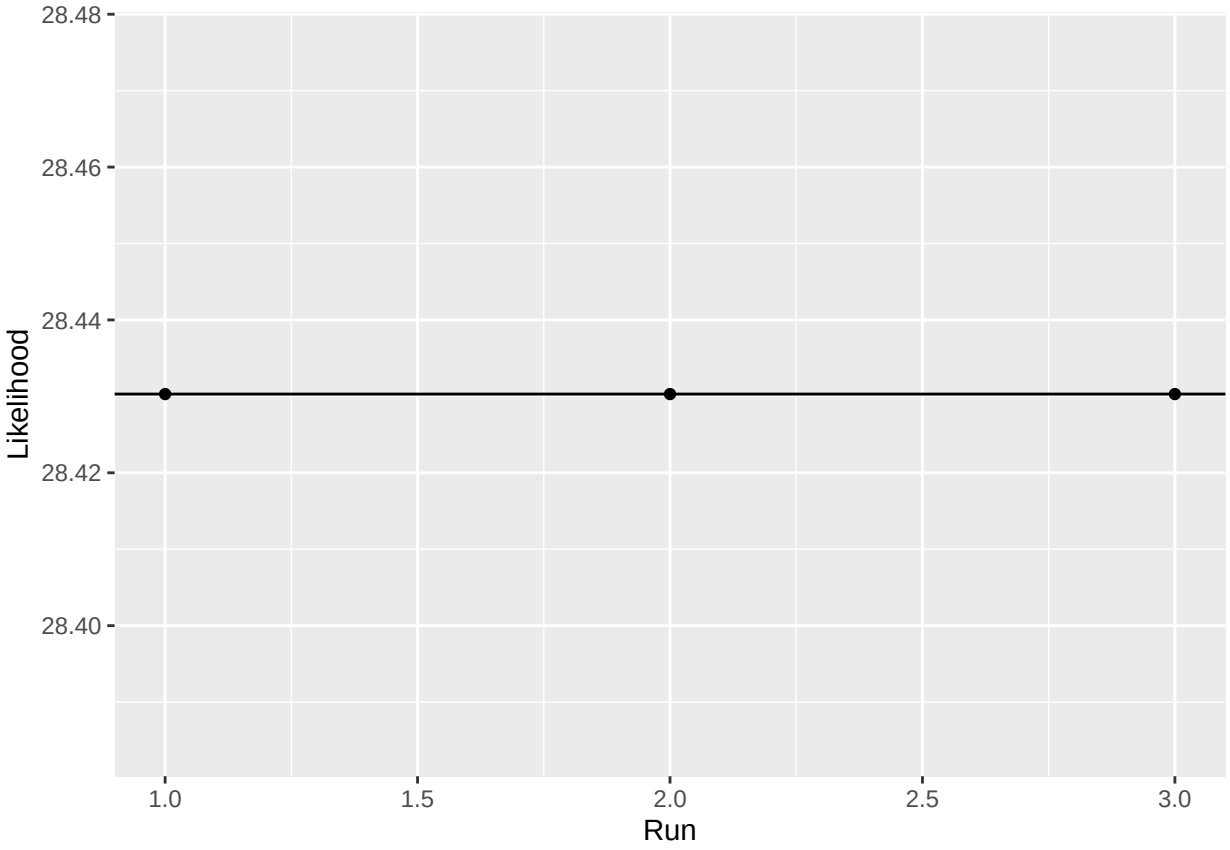


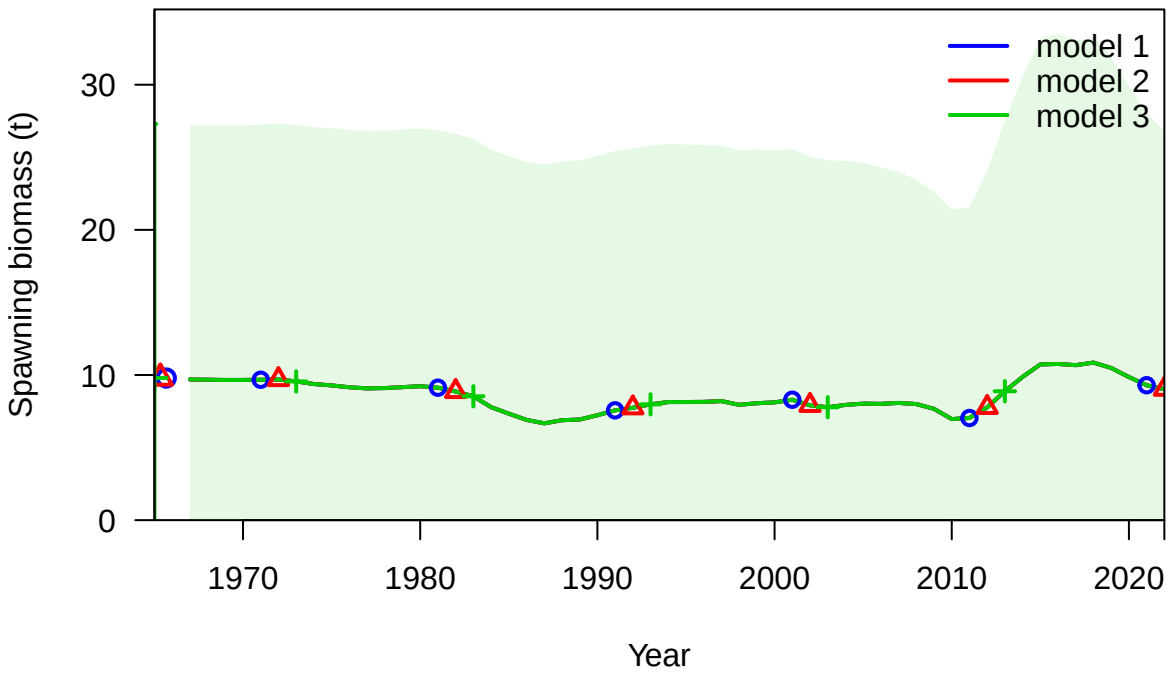

```
##
## Plot Comparison of F
```

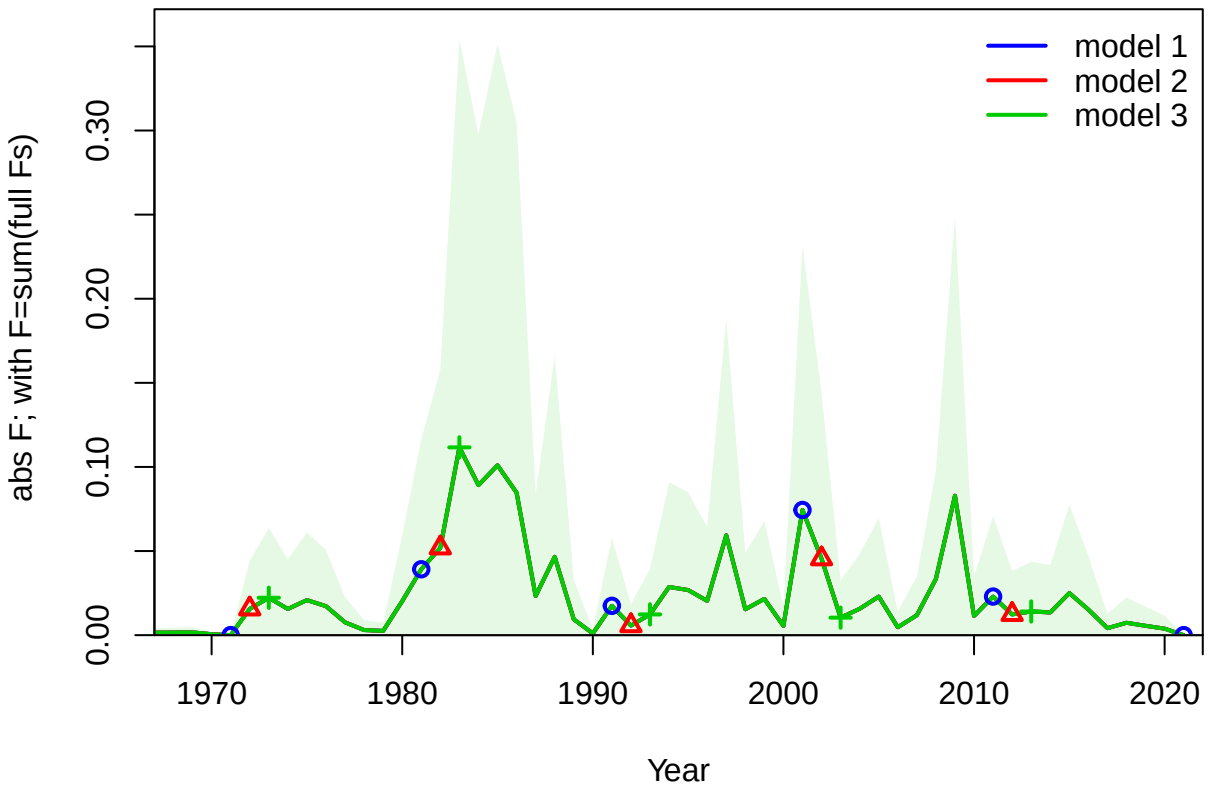

Fishing Mortality (F)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1970
1980
1990
2000
2010
2020
Year
MVLN

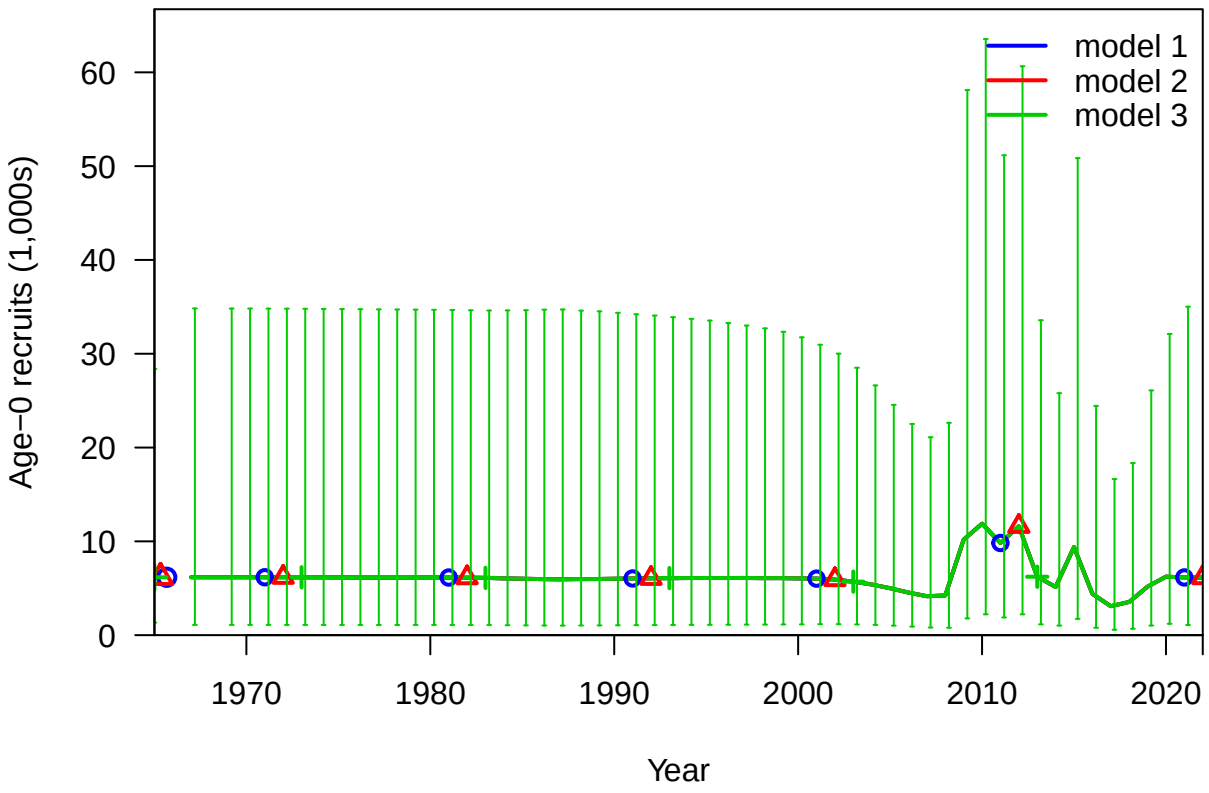
```
## RStudioGD
##         2
```

Jitter




model 1
model 2
model 3
Spawning biomass (t)
0
10
20
30
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
abs F; with F=sum(full Fs)
0.00
0.10
0.20
0.30
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
Age−0 recruits (1,000s)
0
10
20
30
40
50
60
1970
1980
1990
2000
2010
2020
Year