# American Samoa Model Checks

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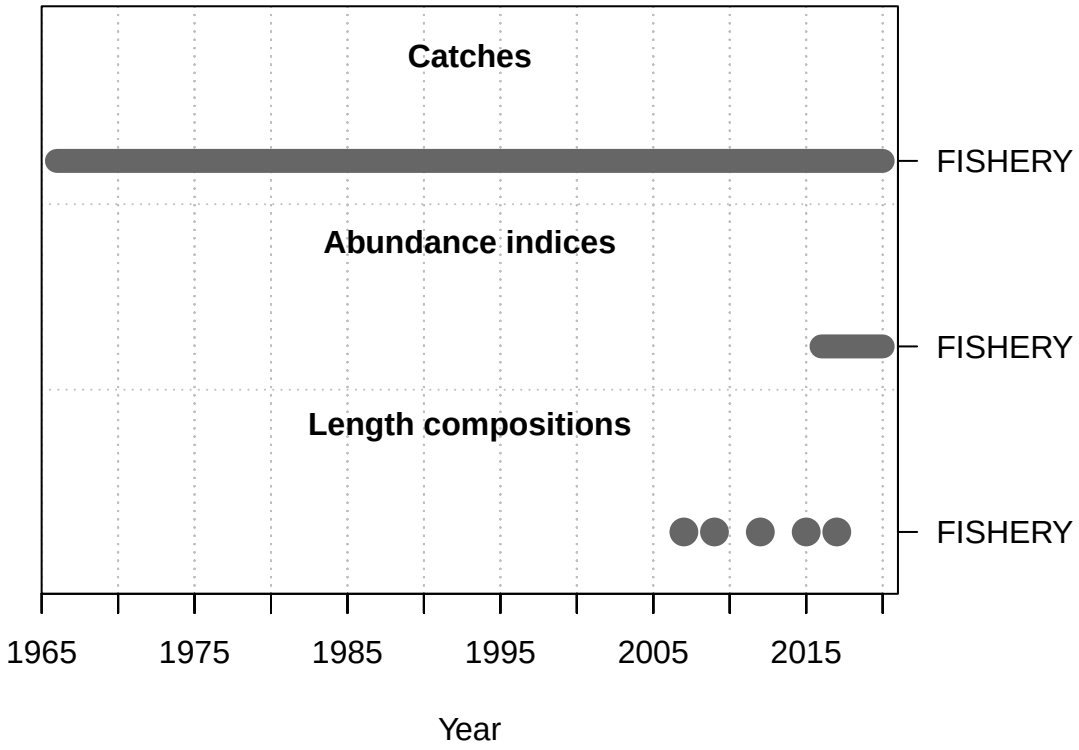
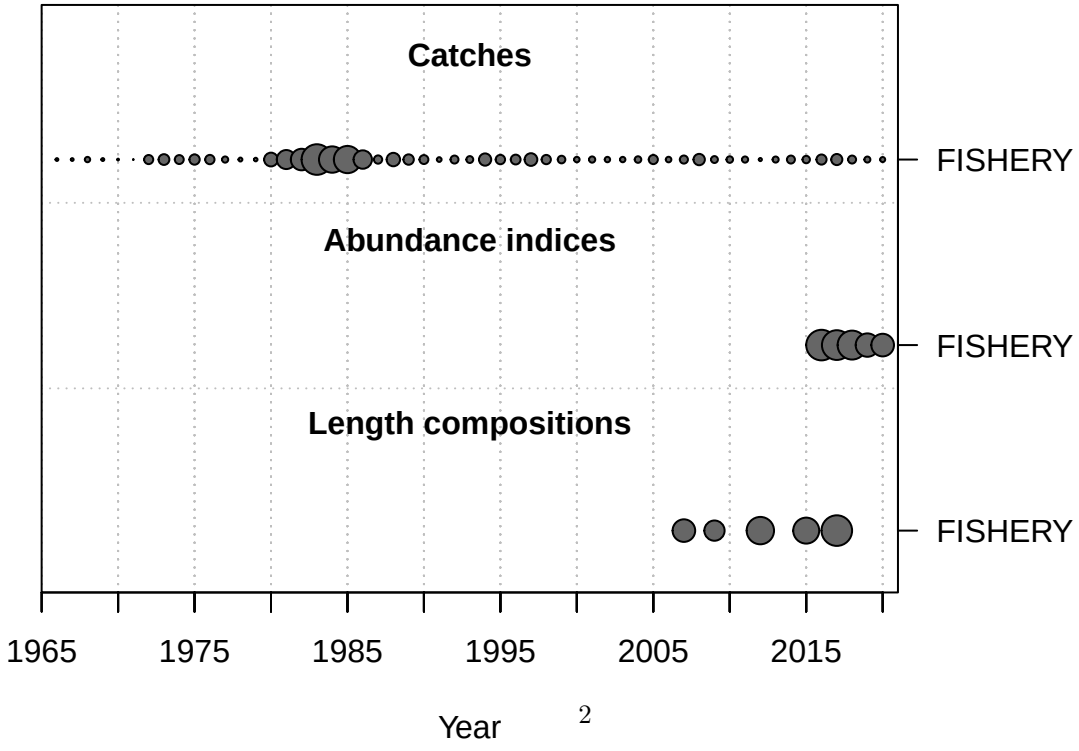
**This is a summary report for the PRZO base model run.**

# Model Output

## Input Data



## Convergence Check

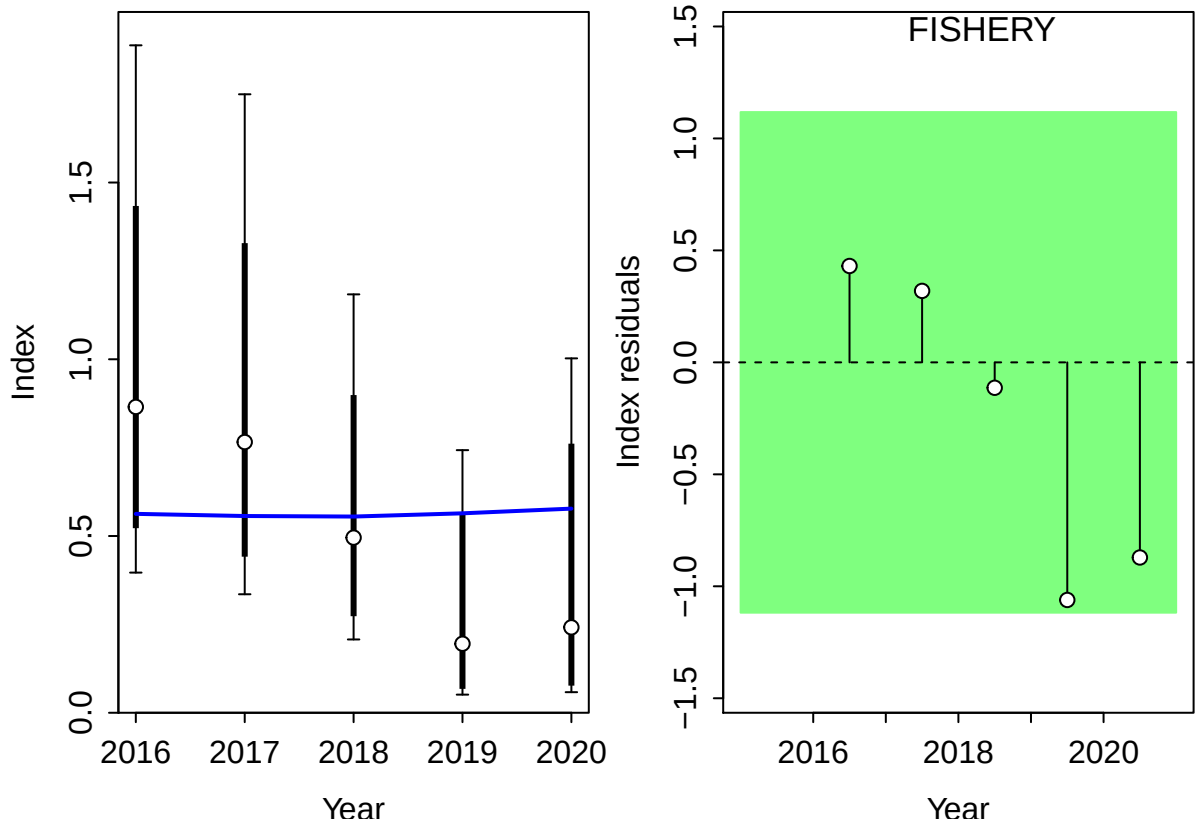
```
##   Converged     MaxGrad
## 1      TRUE 2.59573e-05
```

```
## [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: 40  < max pop len bins: 44; so will accumulate larger pop len bins
## [3] "3 warning: poor convergence in Fmsy, final dy/dy2= -0.0167901"
## [4] " N parameters are on or within 1% of min-max bound: 1; check results, variance may be suspect"
## [5] "N warnings: 3"
```

## Fit to Model

### CPUE

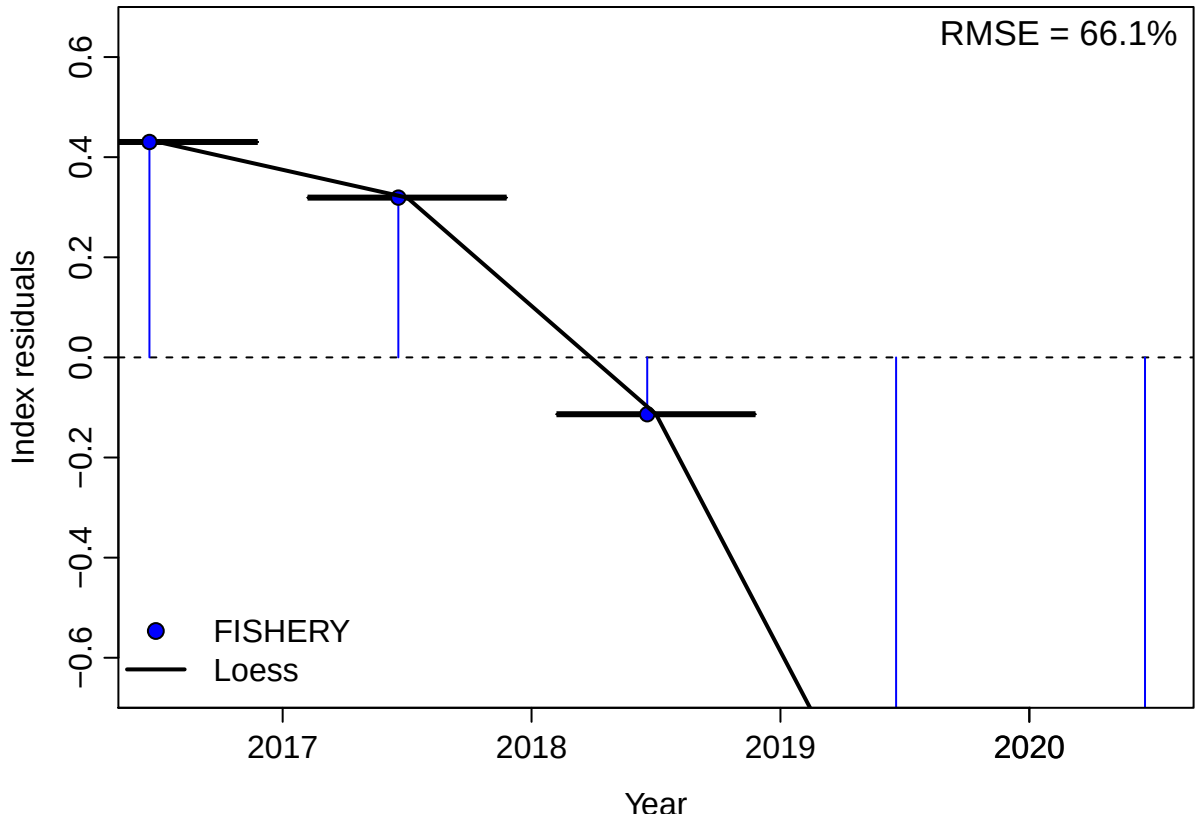
```
##
##  Running Runs Test Diagnosics for Index
## Plotting Residual Runs Tests
```




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

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : span too small.
## fewer data values than degrees of freedom.
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : pseudoinverse used
## at 2016.5

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : neighborhood radius
## 2.02

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : reciprocal
## condition number 0

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : There are other
## near singularities as well. 4.0804
```



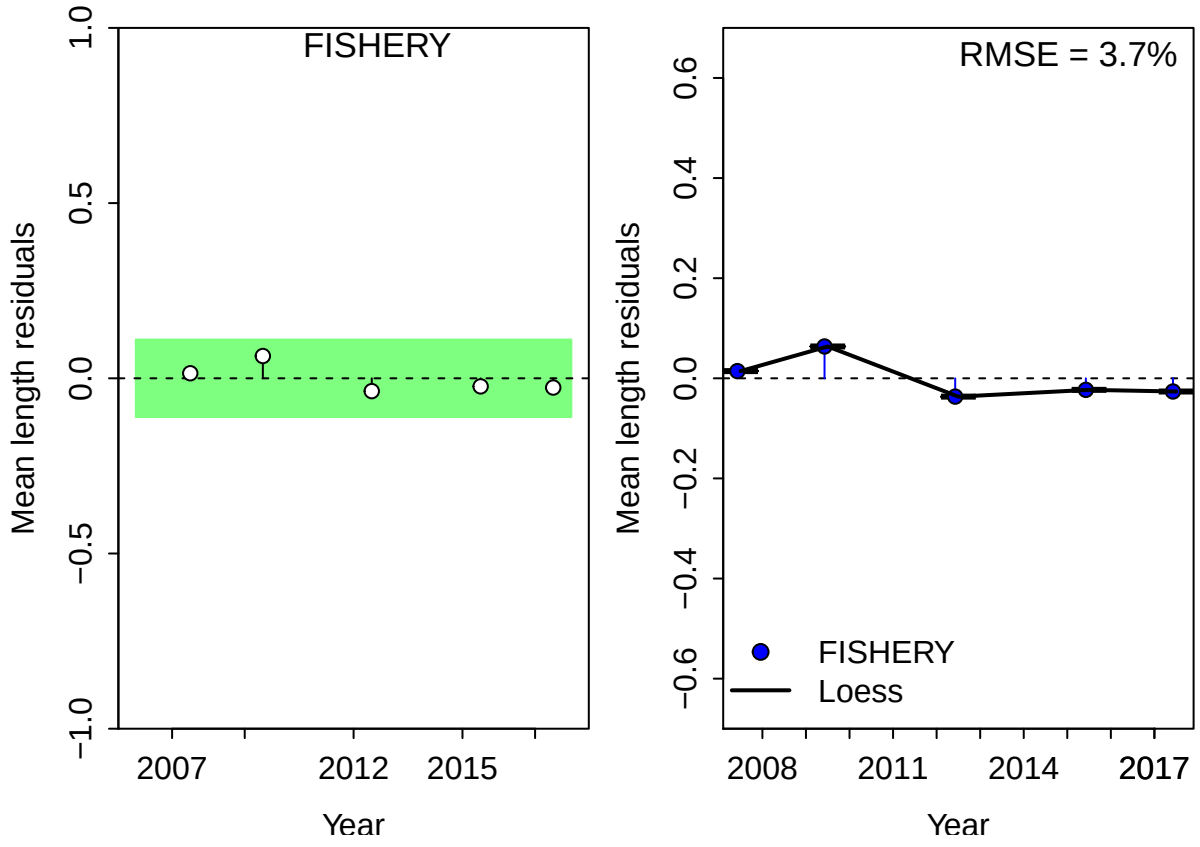

```
##
## RMSE stats by Index:
```

**Length Comp**

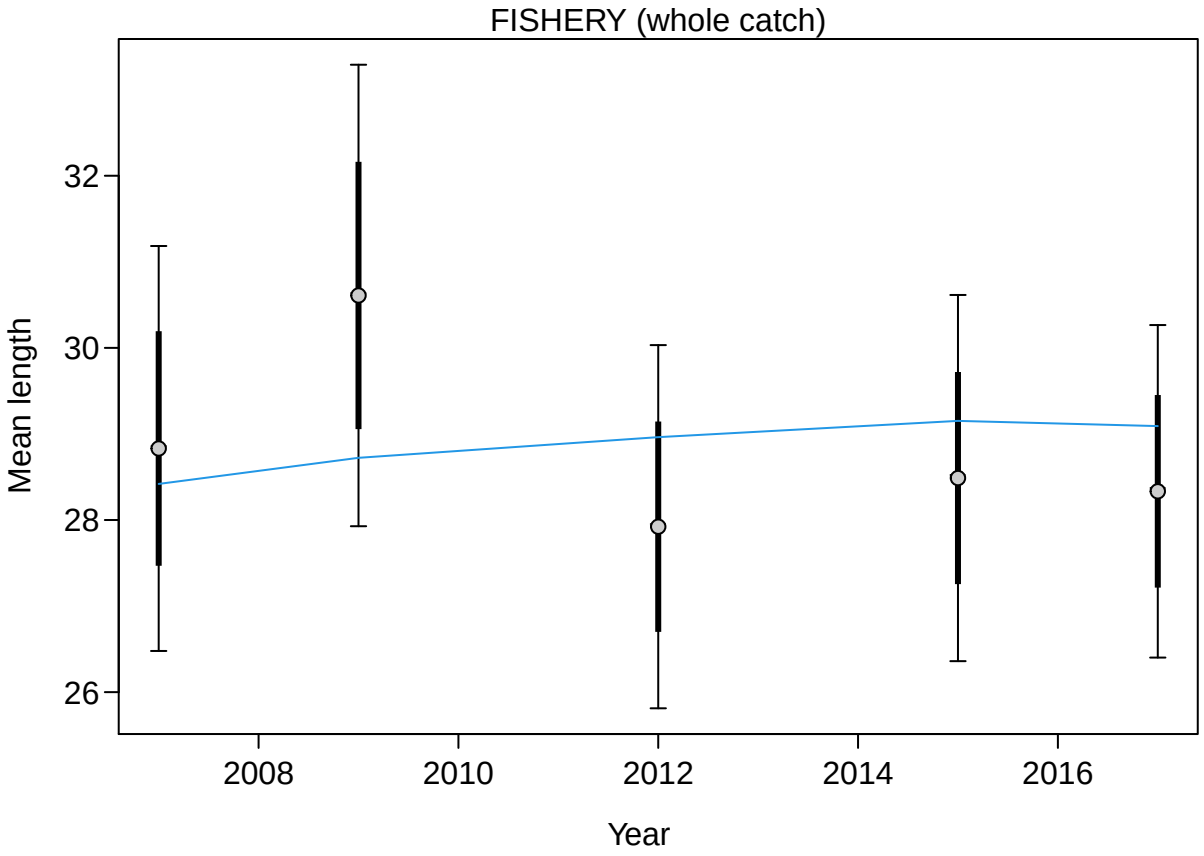
| #Factor | Fleet | New_Var_adj | Type | Name |
|---|---|---|---|---|
| 4 | 1 | 0.335462 | len | FISHERY |

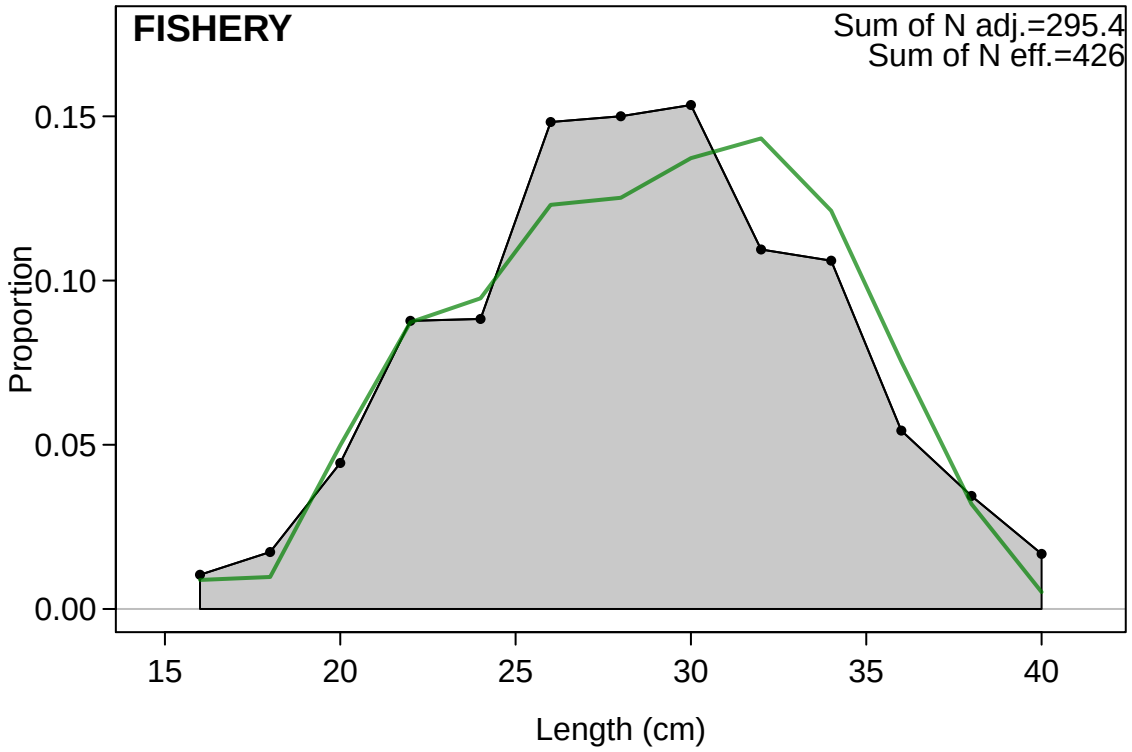
```
##
##  Running Runs Test Diagnosics for Mean length
## Plotting Residual Runs Tests
```

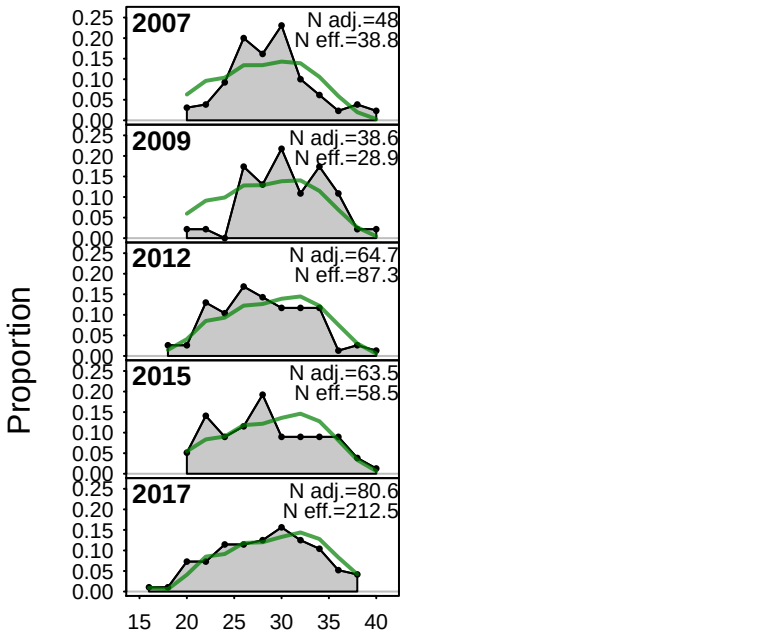
```
##
## Runs Test stats by Mean length:

##     Index runs.p   test  sigma3.lo sigma3.hi type
## 1 FISHERY  0.063 Passed -0.1105795 0.1105795  len

## Plotting JABBA residual plot

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : span too small.
## fewer data values than degrees of freedom.

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : pseudoinverse used
## at 2007.5

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : neighborhood radius
## 5.05

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : reciprocal
## condition number 0

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric = parametric, : There are other
## near singularities as well. 25.502
```



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

##    indices RMSE.perc nobs
## 1  FISHERY       3.7    5
## 2 Combined       3.7    5
```




FISHERY
Sum of N adj.=295.4
Sum of N eff.=426
Proportion
0.15
0.10
0.05
0.00
15
20
25
30
35
40
Length (cm)

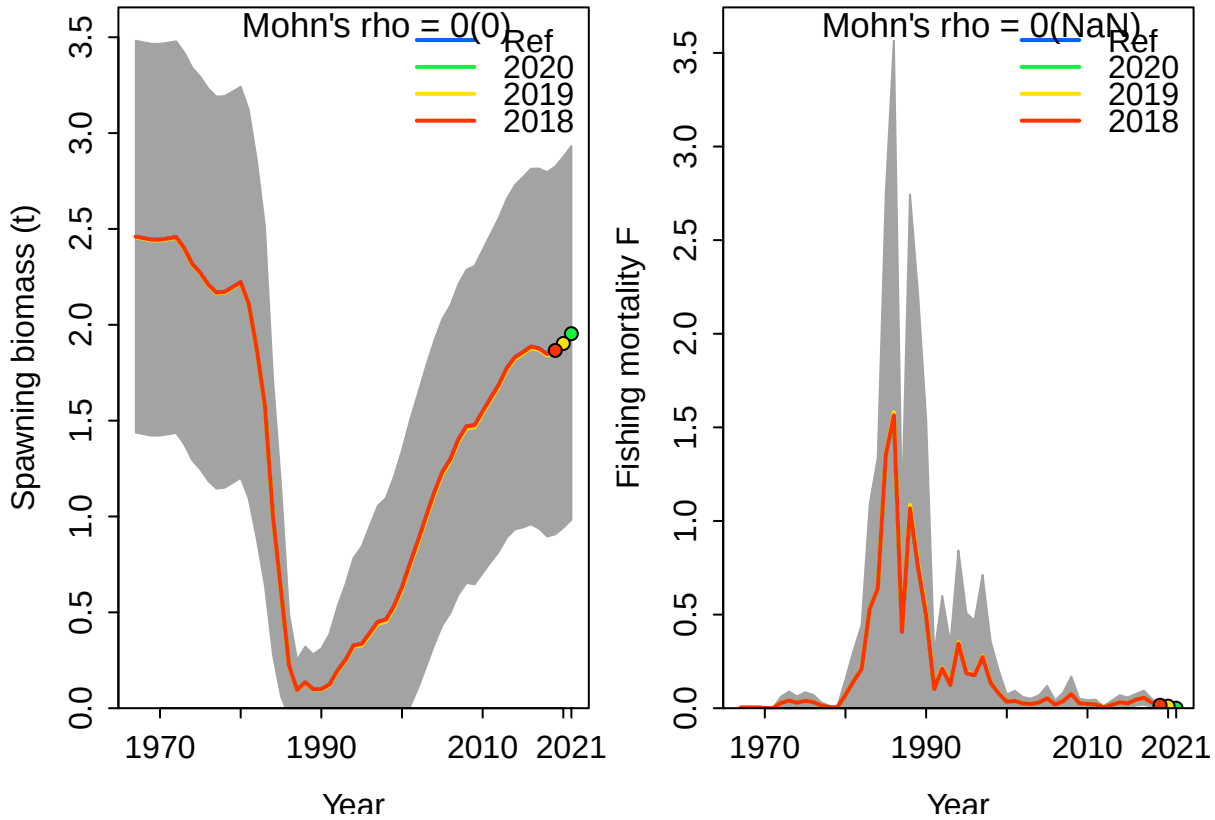



## Retrospective and Hindcasting

### Retrospective

```
## Plotting Retrospective pattern
```

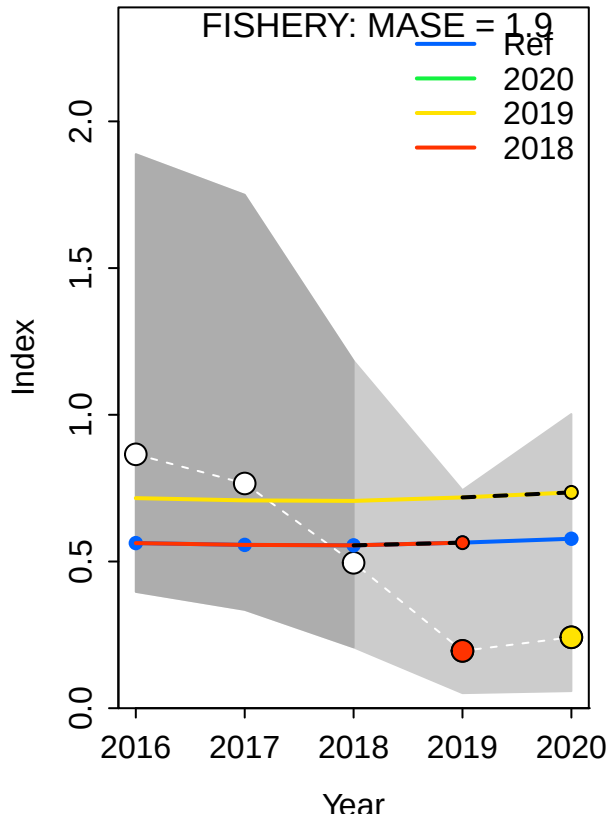
```
##
## Mohn's Rho stats, including one step ahead forecasts:
## Plotting Retrospective pattern
```




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

##   type     peel           Rho ForecastRho
## 1    F     2020  3.487454e-04         NaN
## 2    F     2019 -1.823120e-04 0.001505112
## 3    F     2018  0.000000e+00 0.000000000
## 4    F Combined  5.547782e-05         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

```
## Skipped SSplotrecdevs - no rec devs estimated
```

### Likelihood Profile

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

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

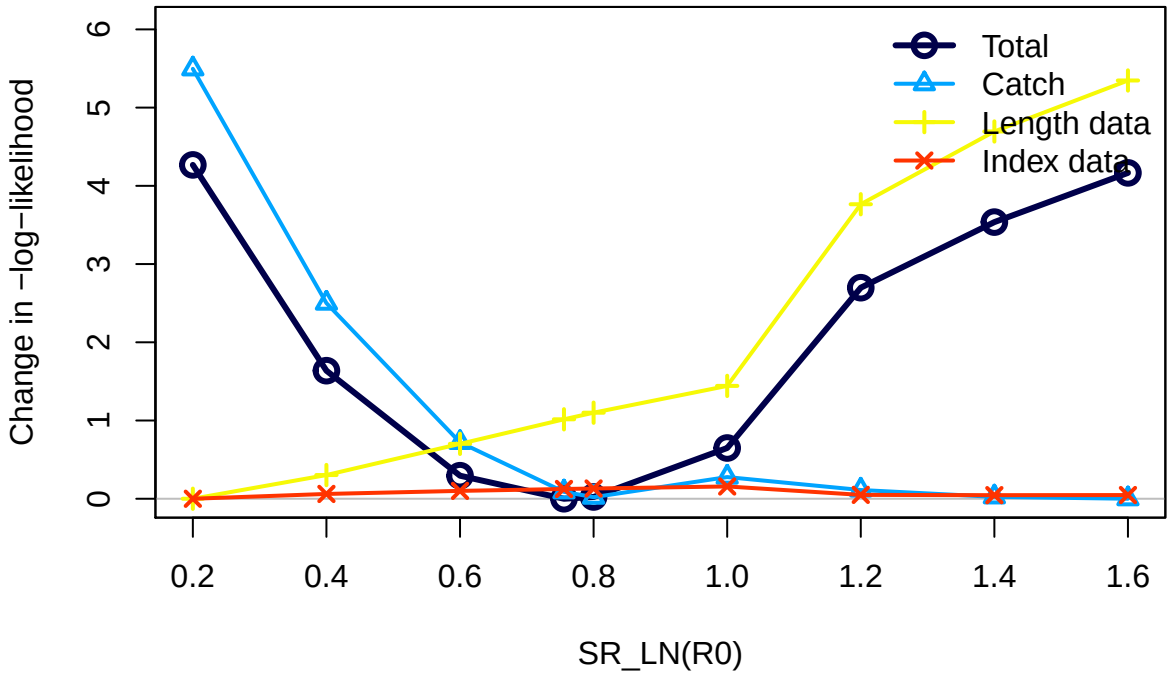
```
## Parameter values (after subsetting based on input 'models'): 0.2, 0.4, 0.6, 0.8, 1, 1.2, 1.4, 1.6, 0
```

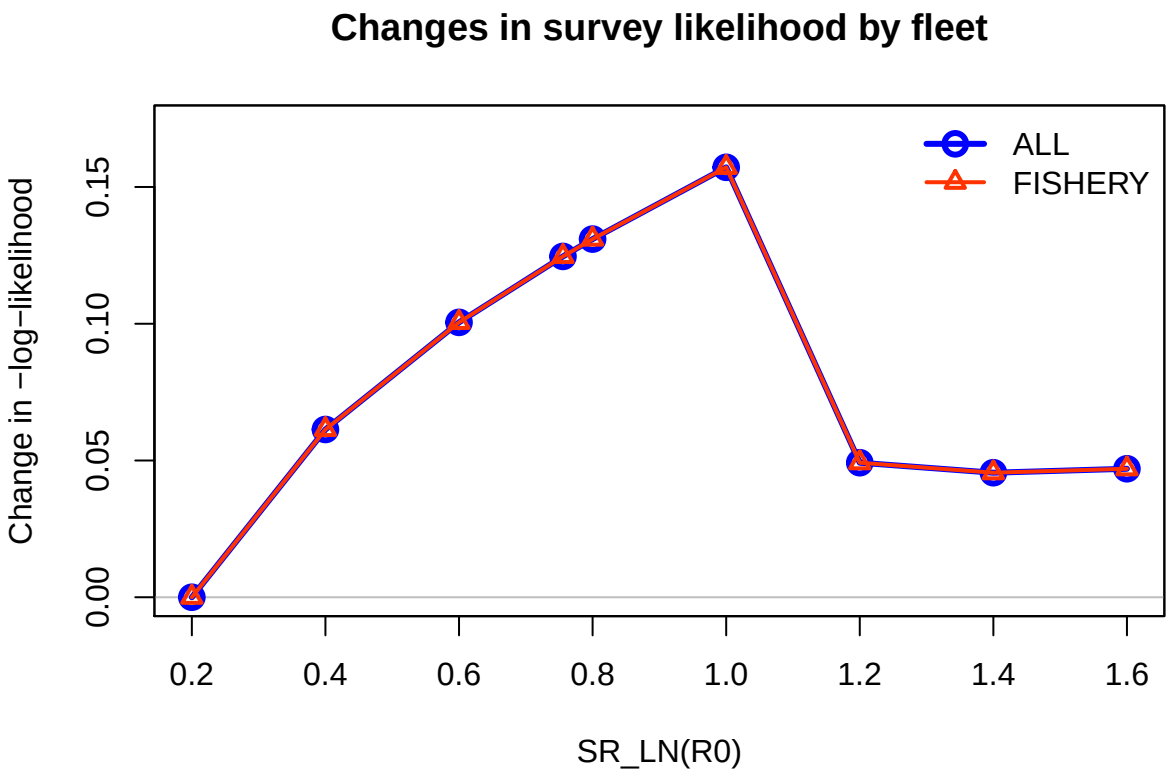
```
##
## Likelihood components showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
```

```
##                       frac_change include                           label
## TOTAL                      1.0000    TRUE                           Total
## Catch                      1.2877    TRUE                           Catch
## Equil_catch                0.0001   FALSE                 Equilibrium catch
## Survey                     0.0368    TRUE                        Index data
## Length_comp                1.2529    TRUE                       Length data
## Recruitment                0.0000   FALSE                       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'): 0.2, 0.4, 0.6, 0.8, 1, 1.2, 1.4, 1.6, 0
```

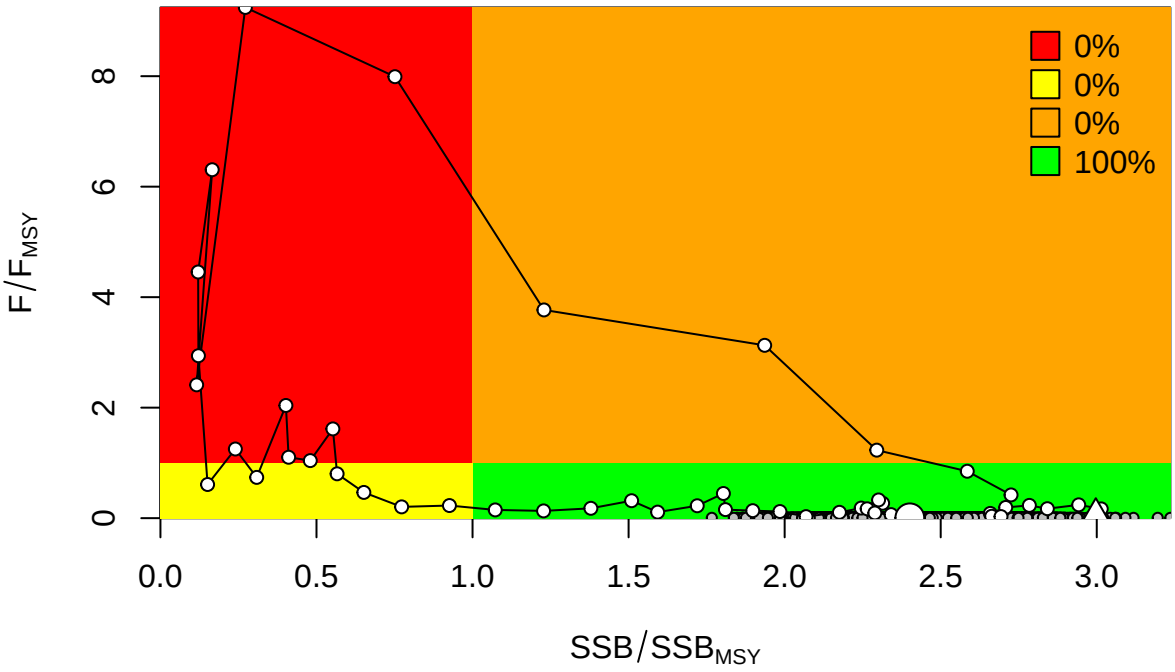
```
## Fleet-specific likelihoods showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
##                        frac_change include
## prof.table....c.1.3..            1    TRUE
```



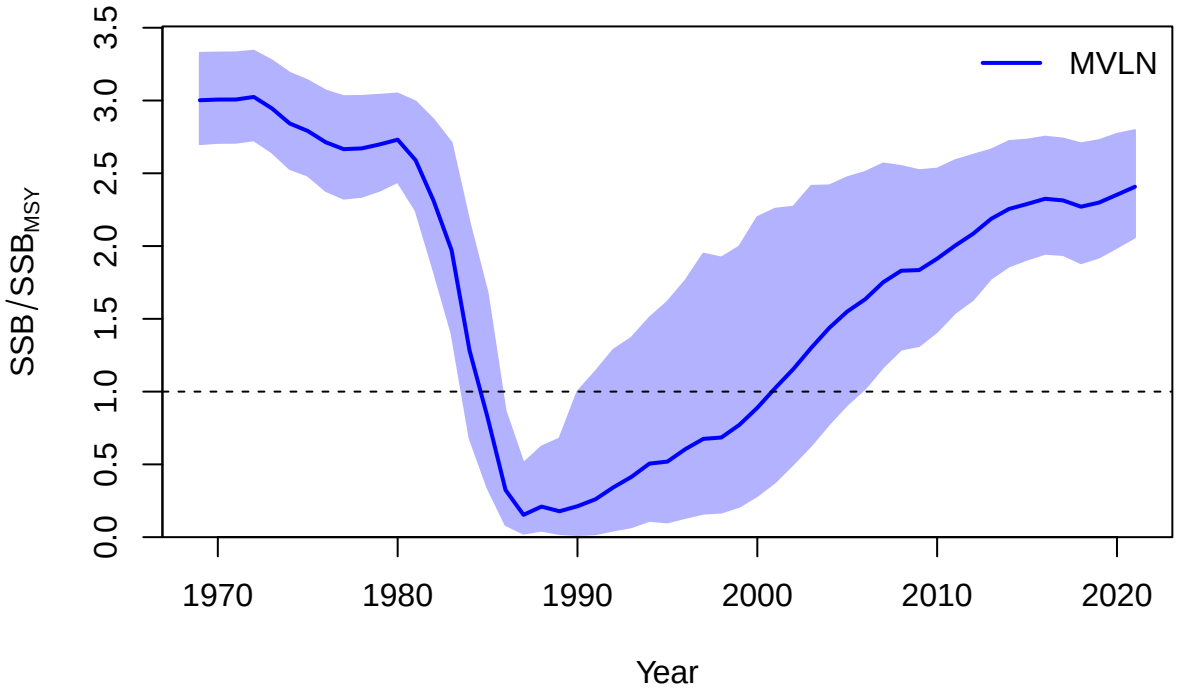



### Management Quantities

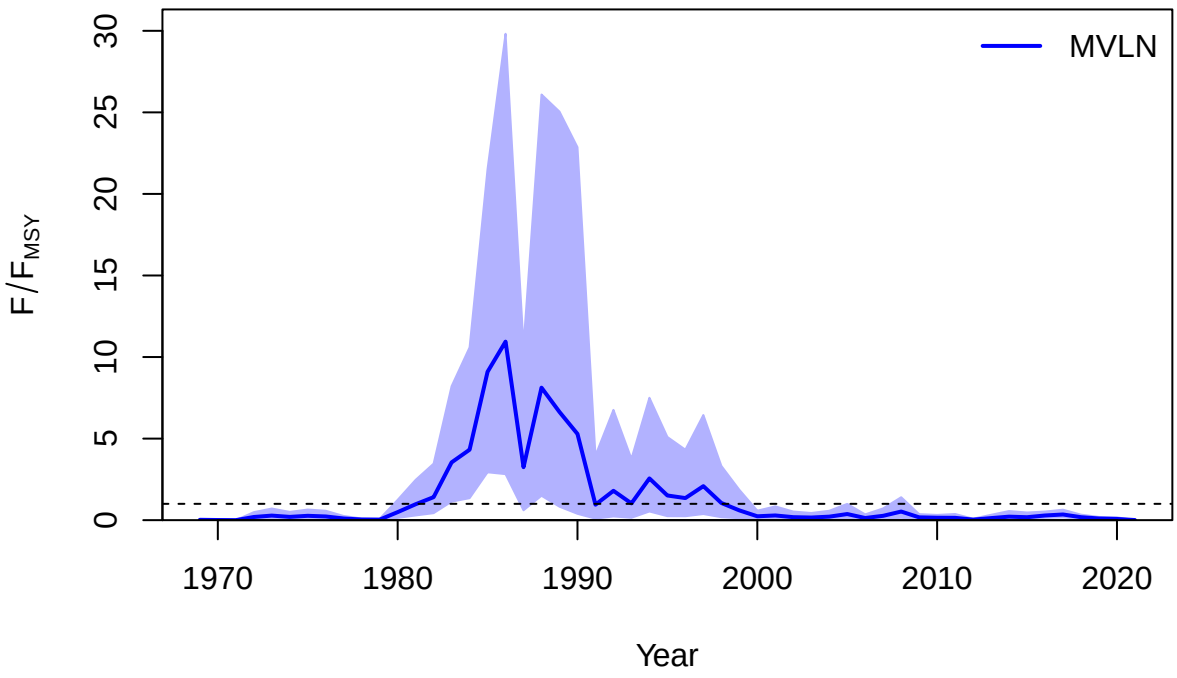
```
##
##  starter.sso with Bratio: SSB/SSBMSY and F: _abs_F
##
```



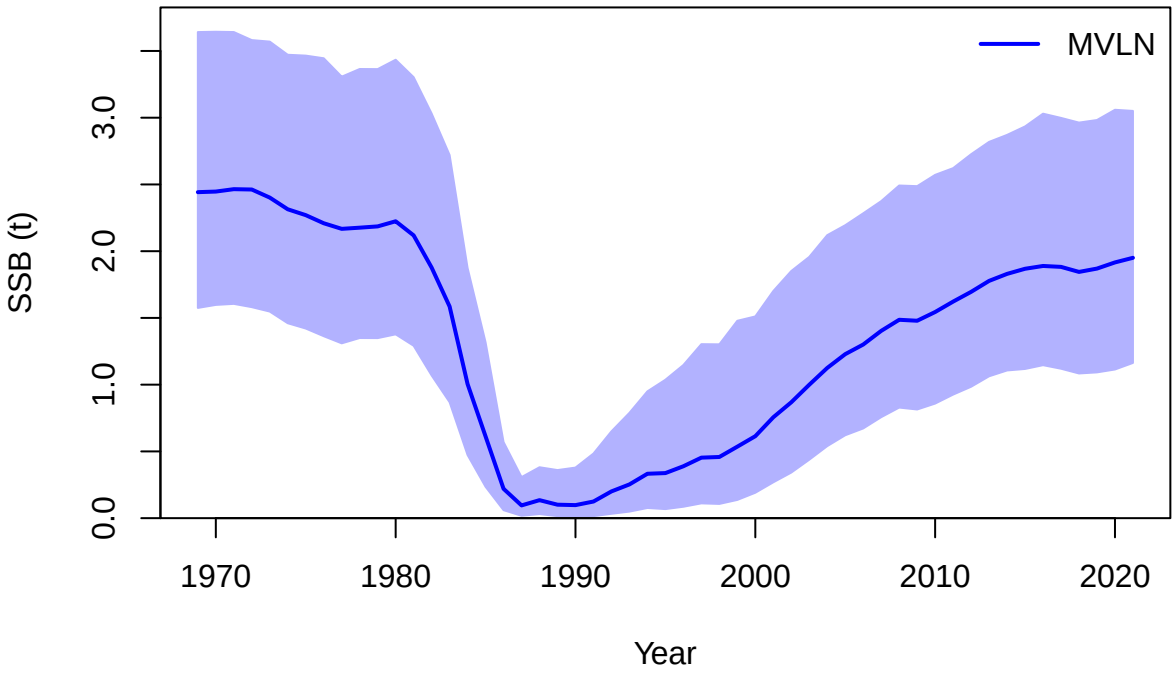

```
##
## Plot Comparison of stock
```



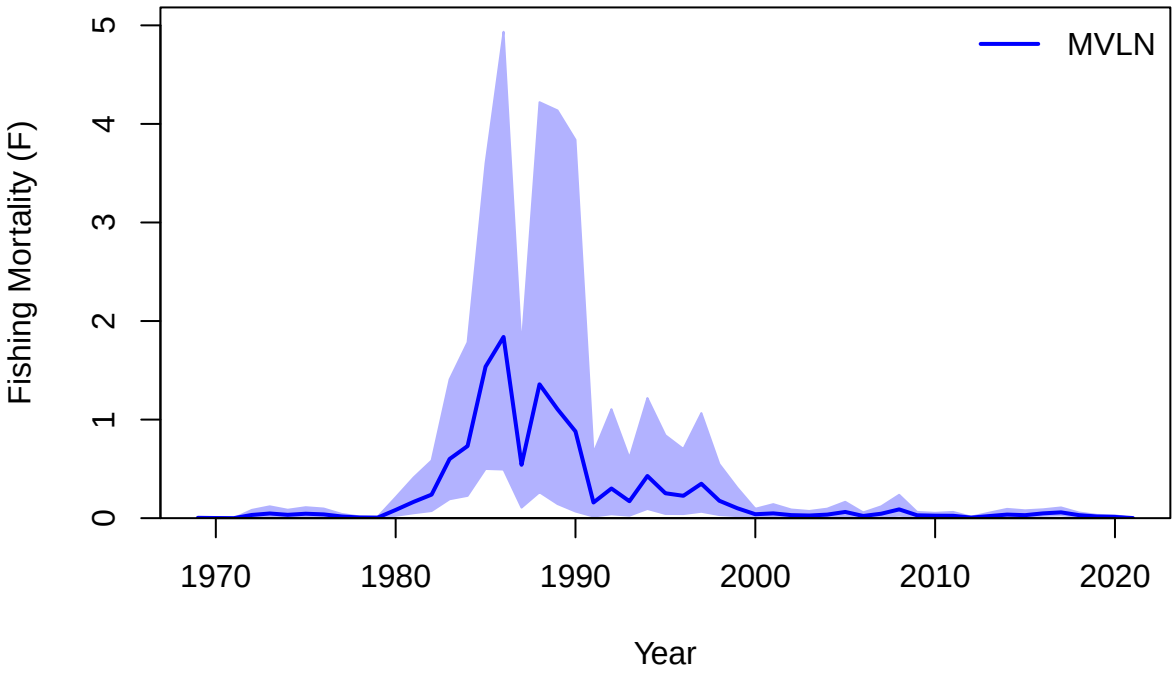

```
##
## Plot Comparison of harvest
```




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

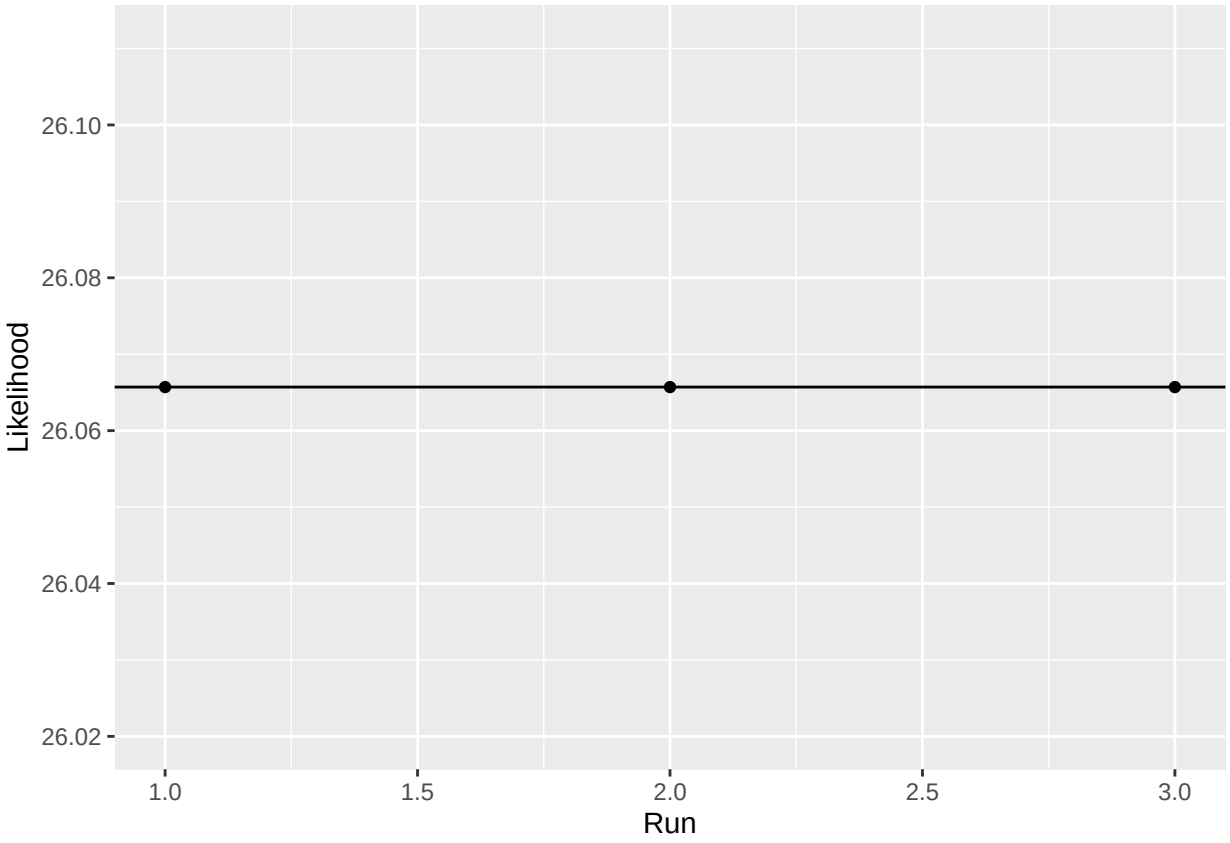


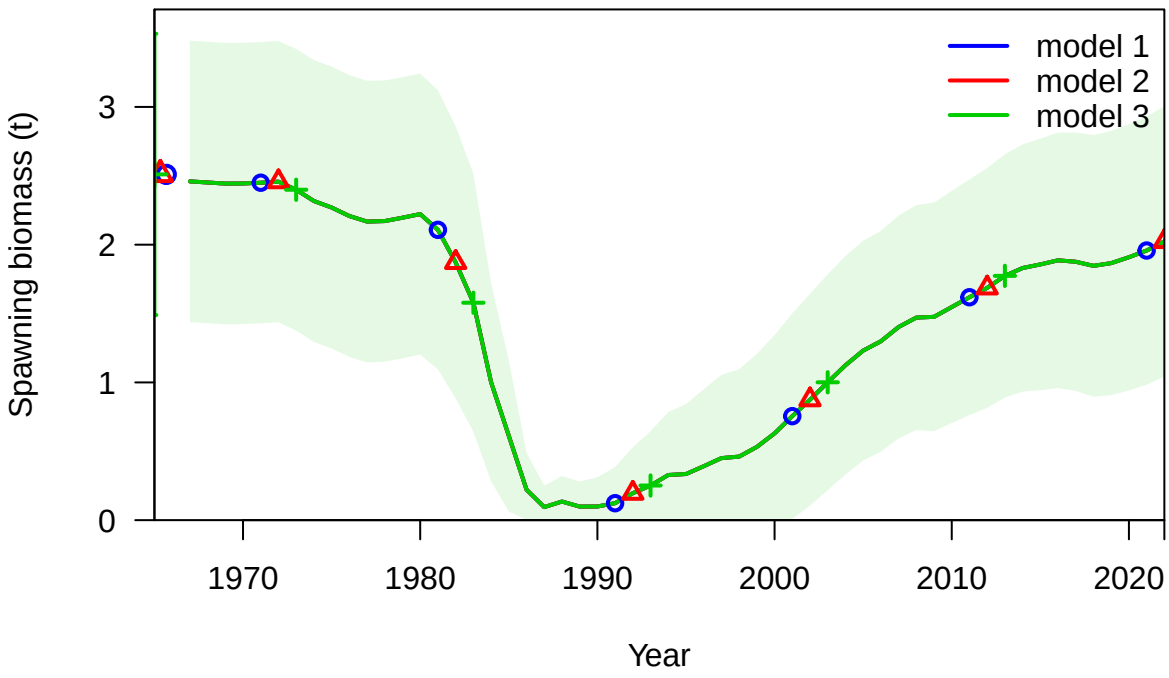

```
##
## Plot Comparison of F
```

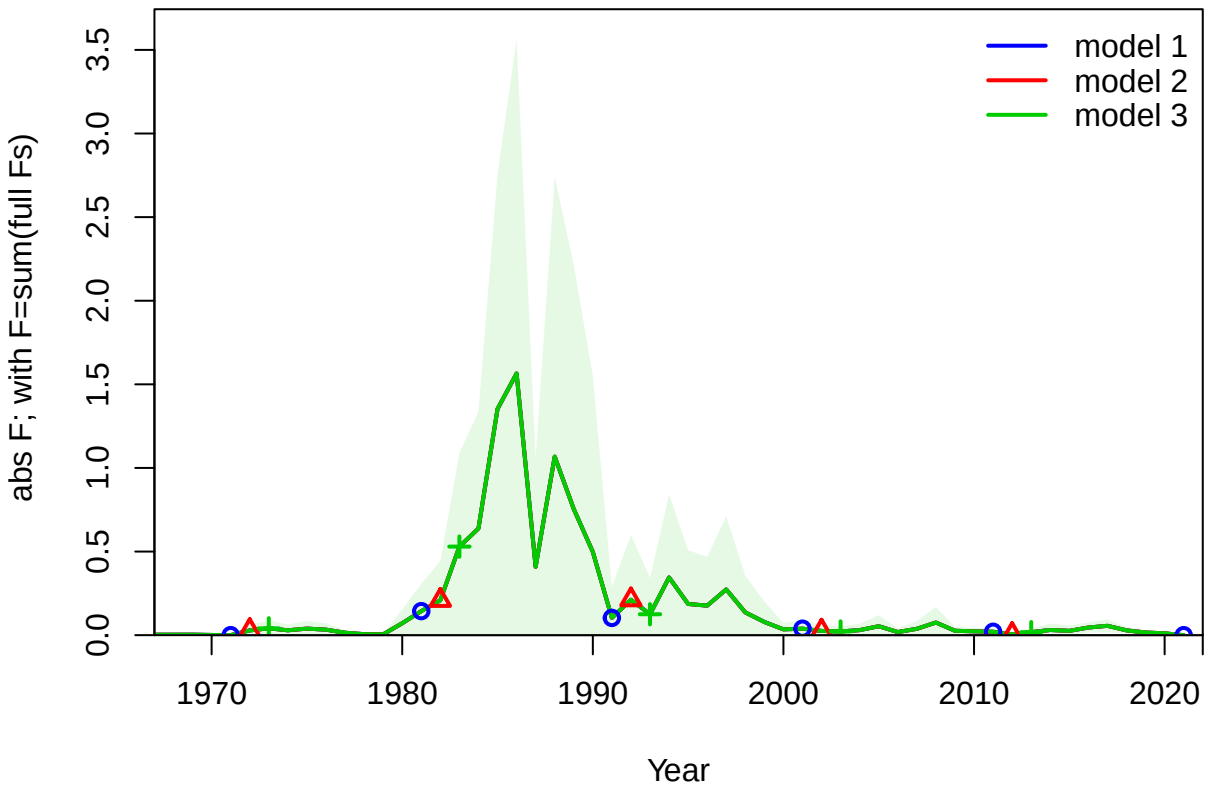

MVLN
Fishing Mortality (F)
0
1
2
3
4
5
1970
1980
1990
2000
2010
2020
Year

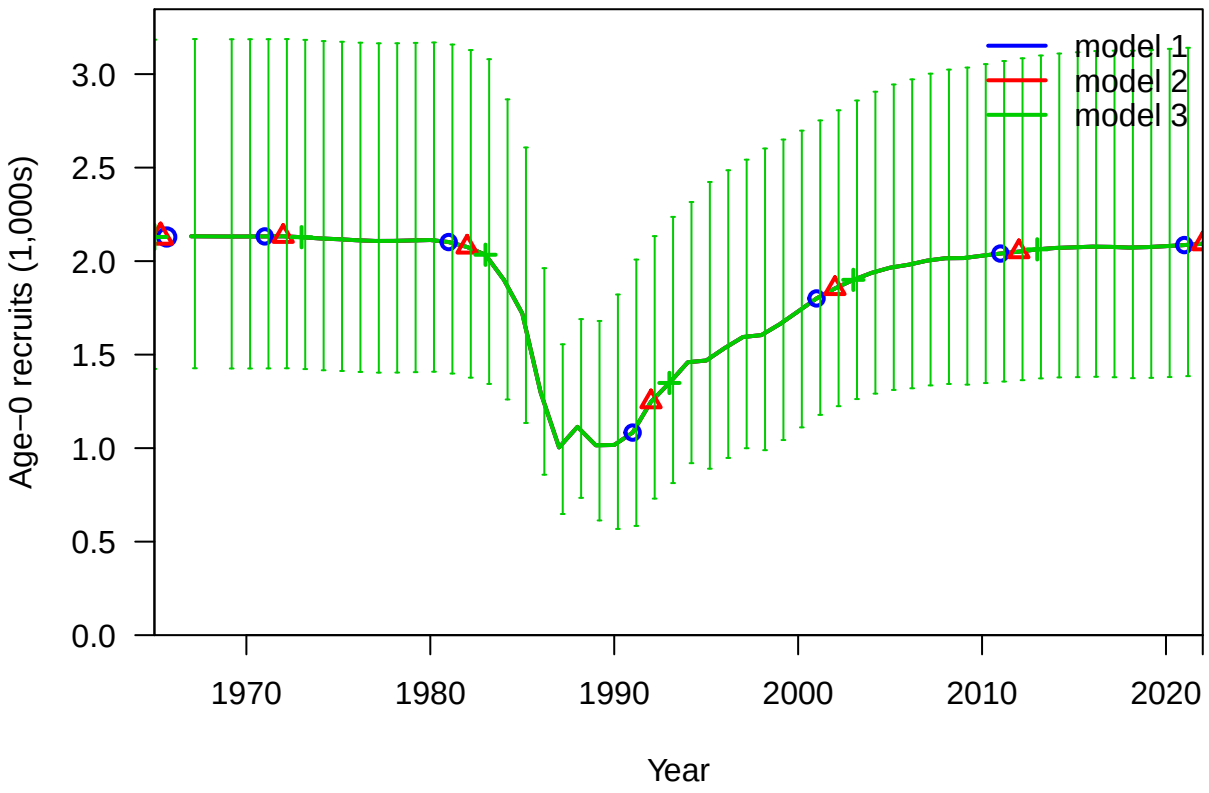
```
## RStudioGD
##         2
```

**Jitter**




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


model 1
model 2
model 3
abs F; with F=sum(full Fs)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
Age−0 recruits (1,000s)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1970
1980
1990
2000
2010
2020
Year