# American Samoa Model Checks

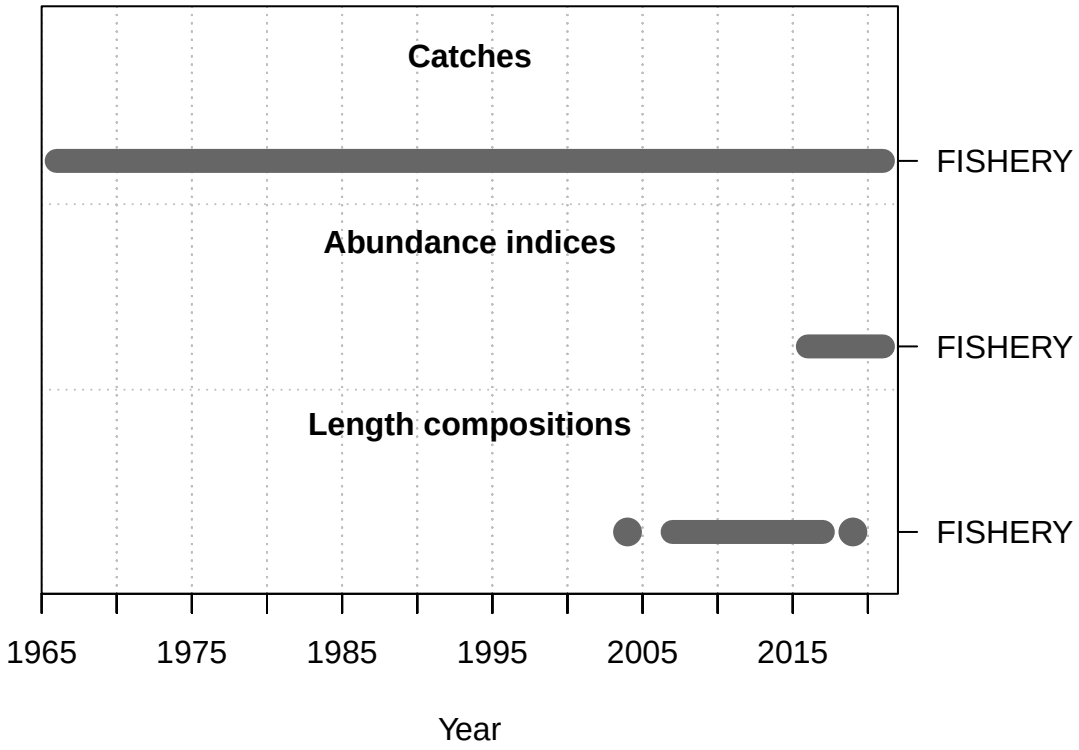
Meg Oshima

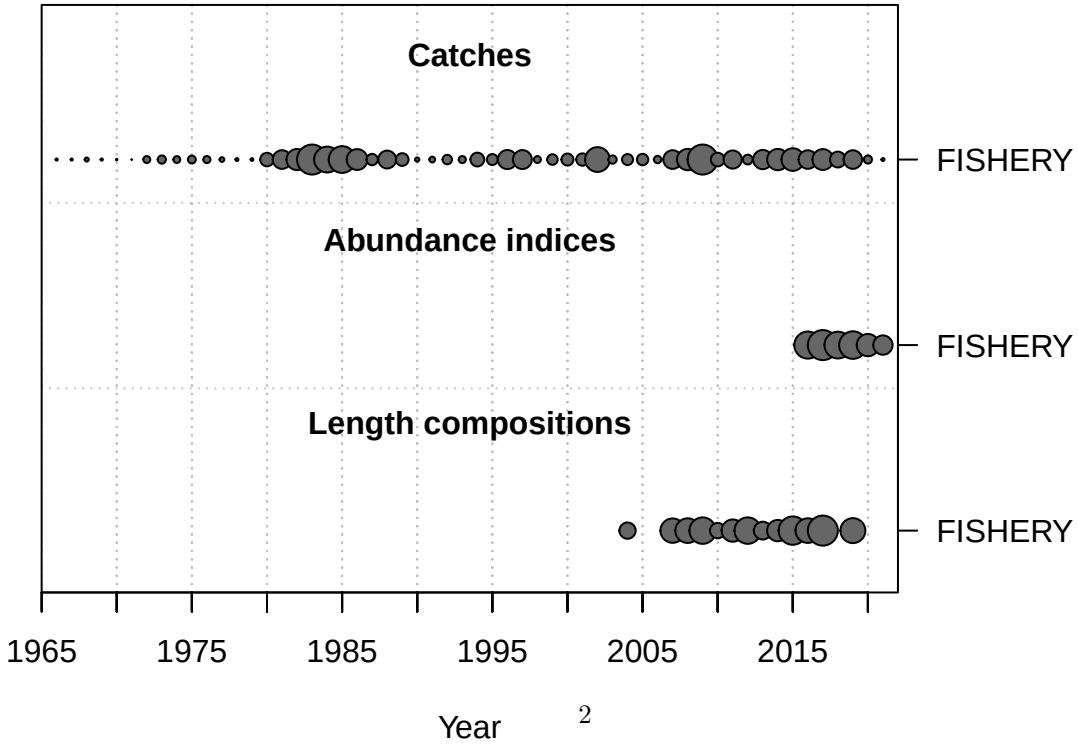
2022-08-11

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

# Model Output

## Input Data



## Convergence Check

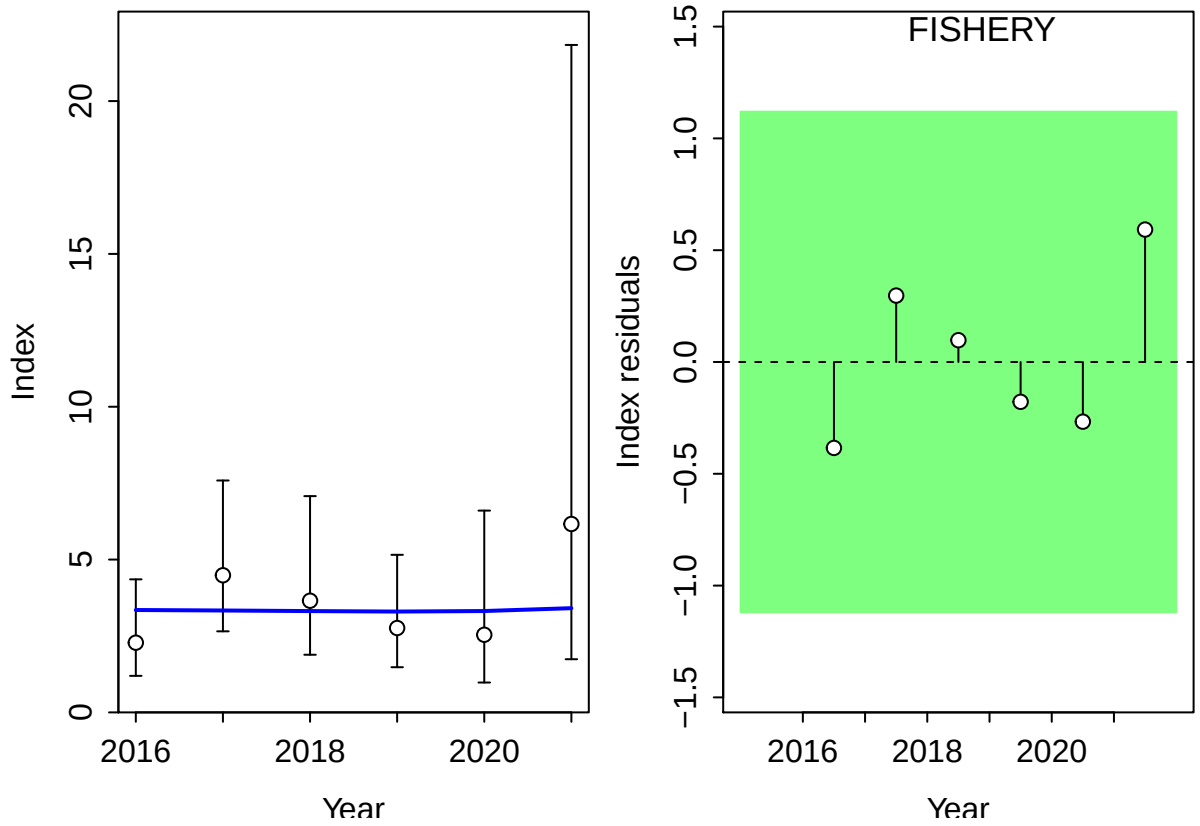
```
##   Converged     MaxGrad
## 1      TRUE 7.94649e-05
```

```
## [1] "1 NOTE:  Max data length bin: 90  < max pop len bins: 100; so will accumulate larger pop len bi
## [2] "2  Main recdev biasadj is >2 times ratio of rmse to sigmaR"
## [3] "3  Early recdev biasadj is >2 times ratio of rmse to sigmaR"
## [4] " N parameters are on or within 1% of min-max bound: 2; check results, variance may be suspect"
## [5] "N warnings: 3"
```

## Fit to Model

### CPUE

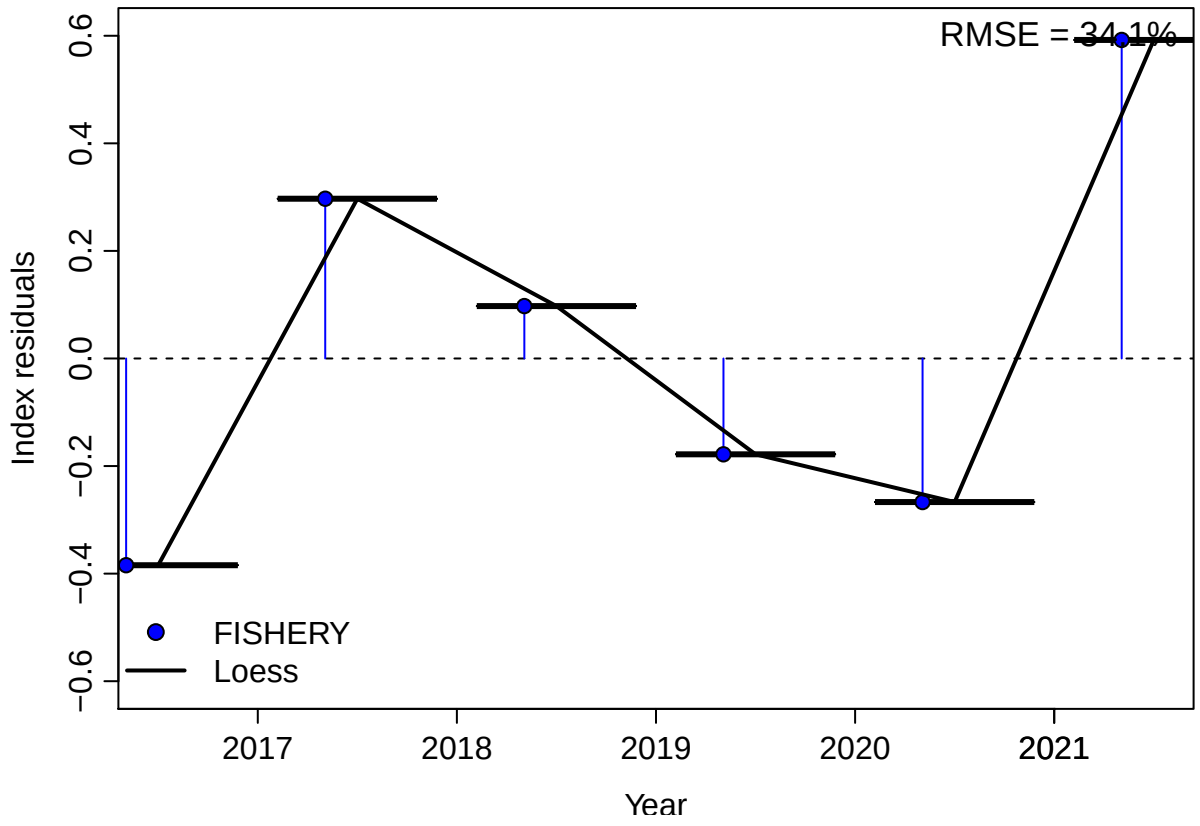
```
##
##  Running Runs Test Diagnosics for Index
## Plotting Residual Runs Tests
```




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

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



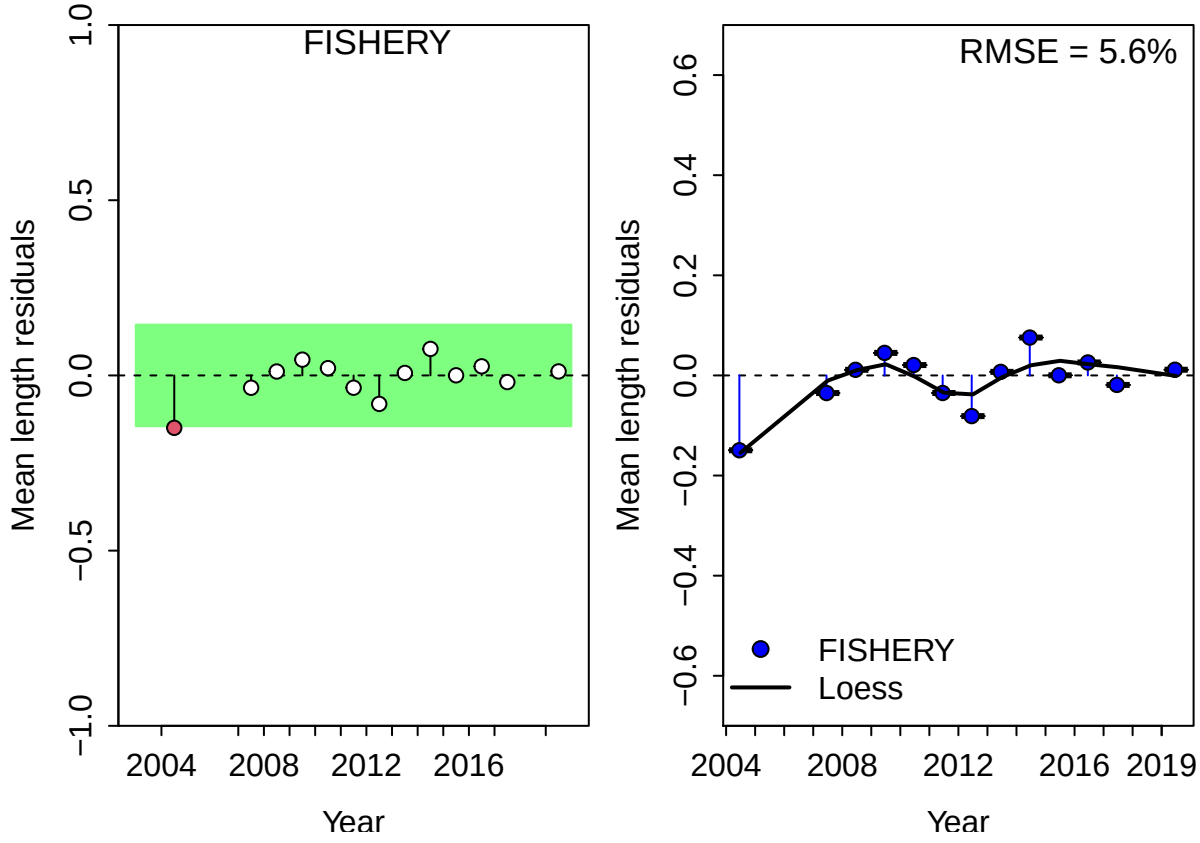

```
##
## RMSE stats by Index:
```

**Length Comp**

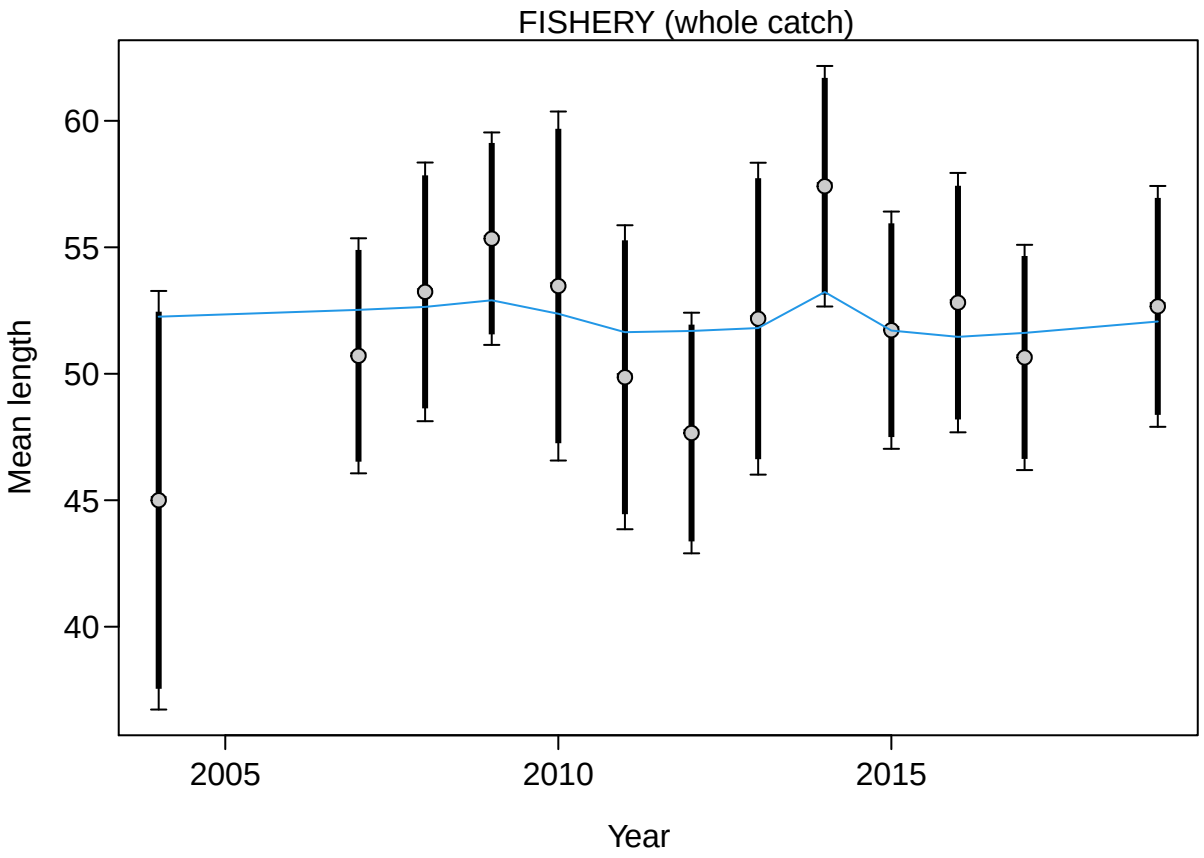
| #Factor | Fleet | New_Var_adj | Type | Name |
|---|---|---|---|---|
| 4 | 1 | 0.332749 | len | FISHERY |

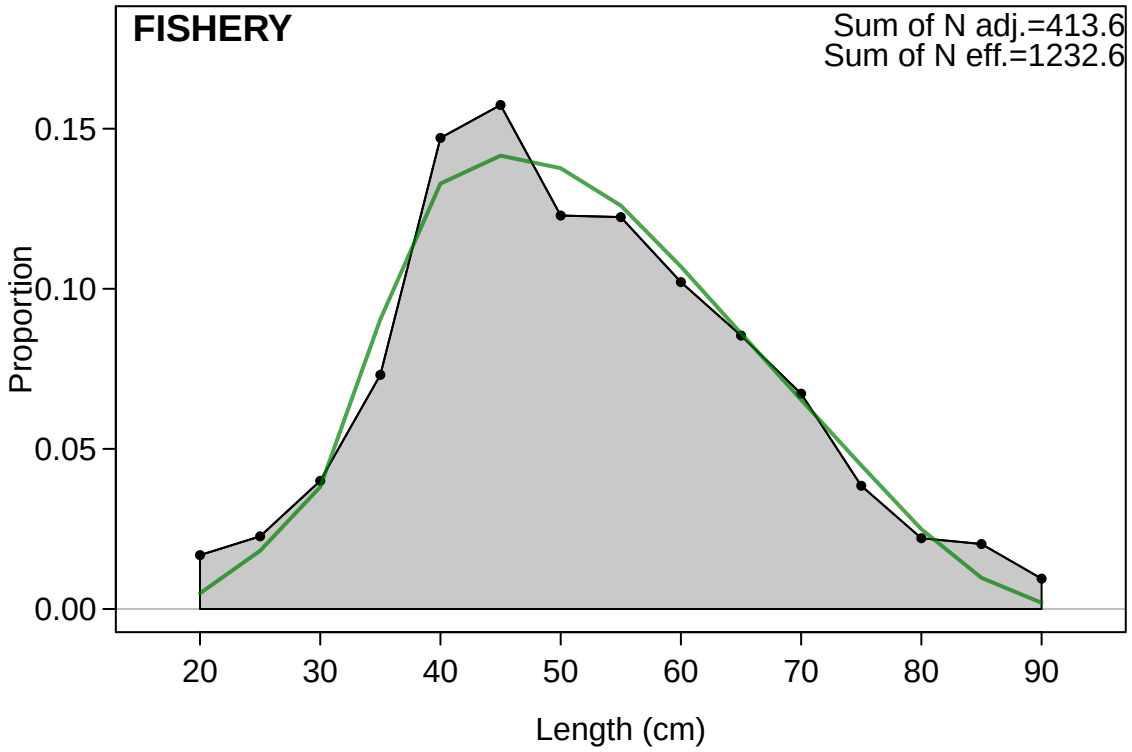
```
##
##  Running Runs Test Diagnosics for Mean length
## Plotting Residual Runs Tests

##
## Runs Test stats by Mean length:

##     Index runs.p   test  sigma3.lo sigma3.hi type
## 1 FISHERY  0.239 Passed -0.1449617 0.1449617  len
```

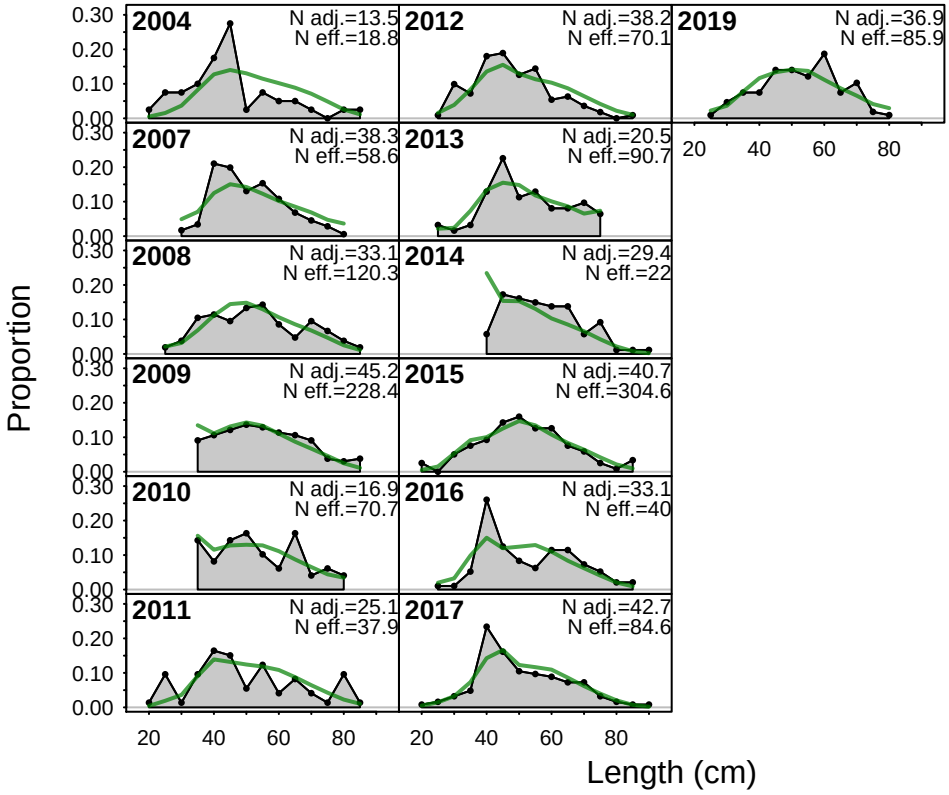
```
## Plotting JABBA residual plot
```




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

##    indices RMSE.perc nobs
## 1  FISHERY       5.6   13
## 2 Combined       5.6   13
```


FISHERY (whole catch)
Mean length
60
55
50
45
40
2005
2010
2015
Year


FISHERY
Sum of N adj.=413.6
Sum of N eff.=1232.6
Proportion
0.15
0.10
0.05
0.00
20
30
40
50
60
70
80
90
Length (cm)

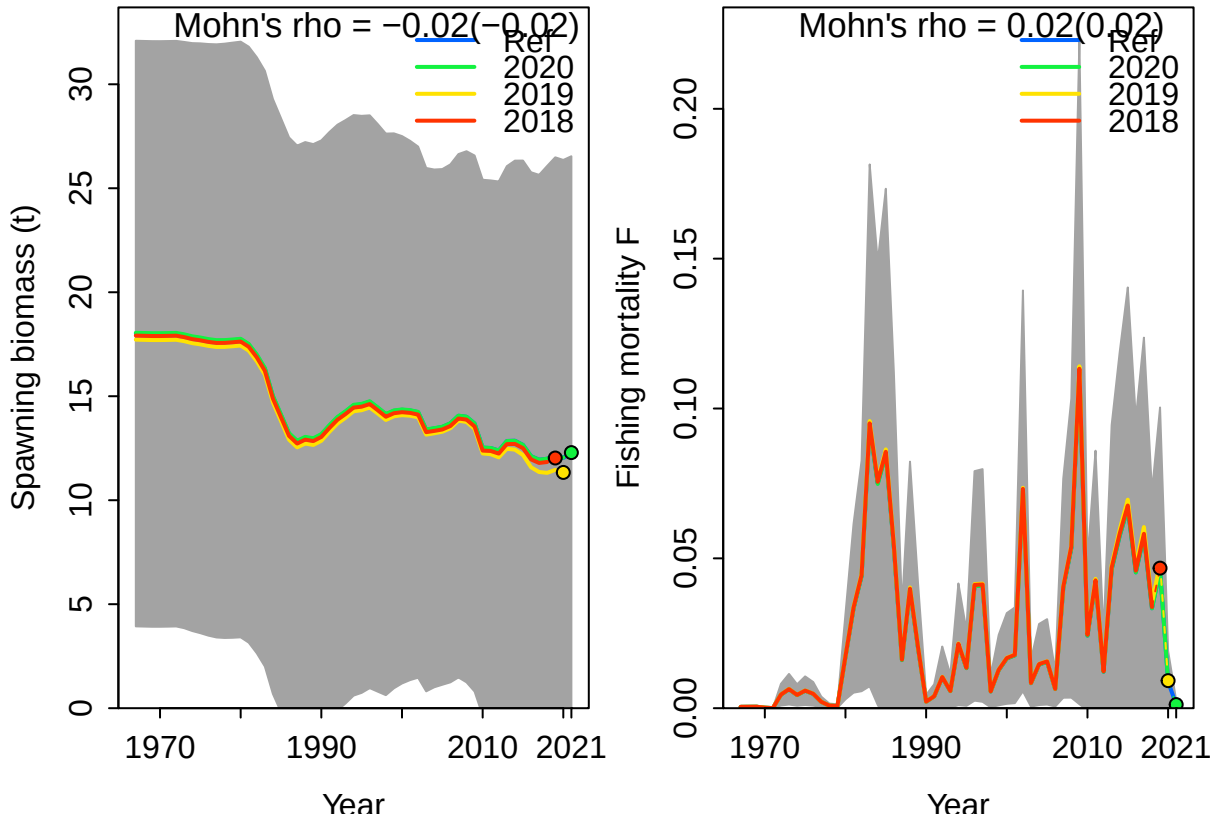



## Retrospective and Hindcasting

### Retrospective

```
## Plotting Retrospective pattern
```

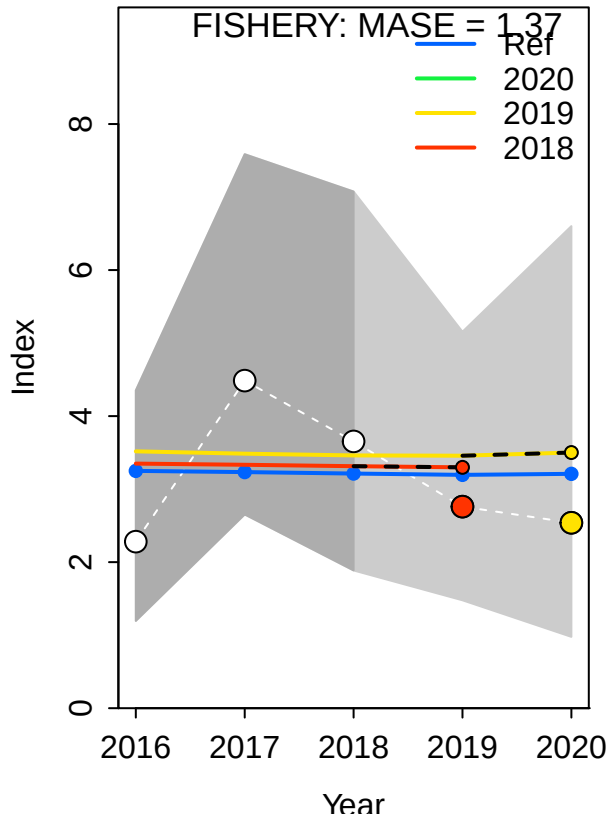
```
##
## Mohn's Rho stats, including one step ahead forecasts:
## Plotting Retrospective pattern
```




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

##   type     peel          Rho  ForecastRho
## 1    F     2020 -0.001382029 -0.001662091
## 2    F     2019  0.048248652  0.039779147
## 3    F     2018  0.012340382  0.011522712
## 4    F Combined  0.019735668  0.016546589
```

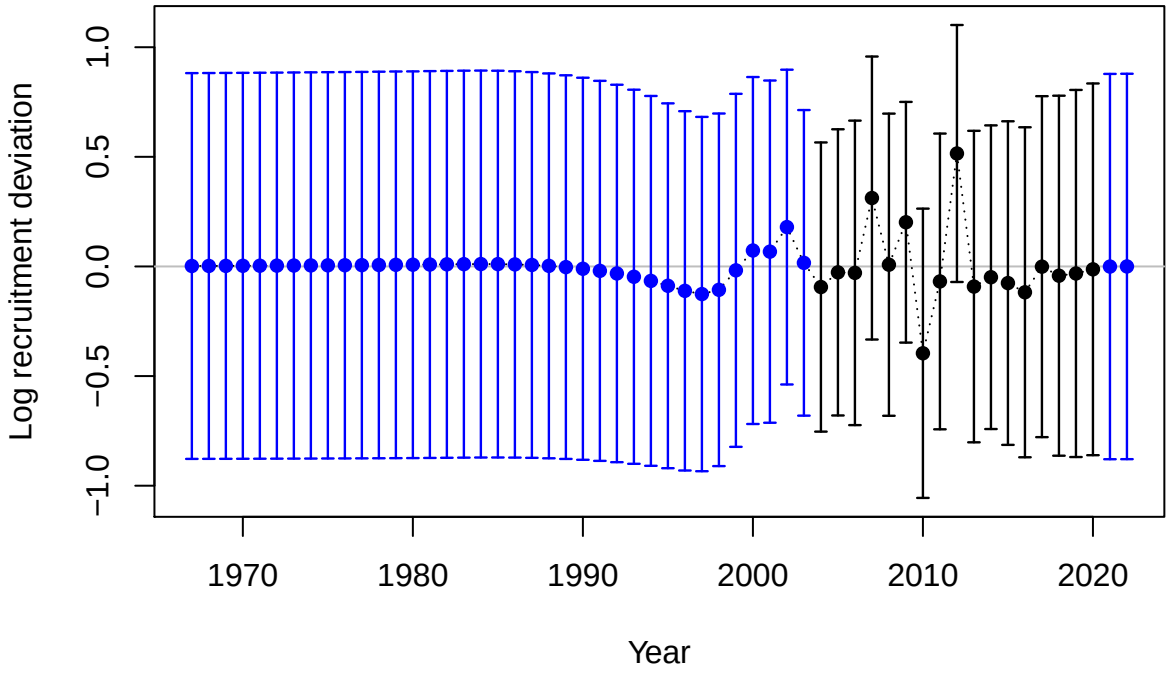
**Hindcasting**

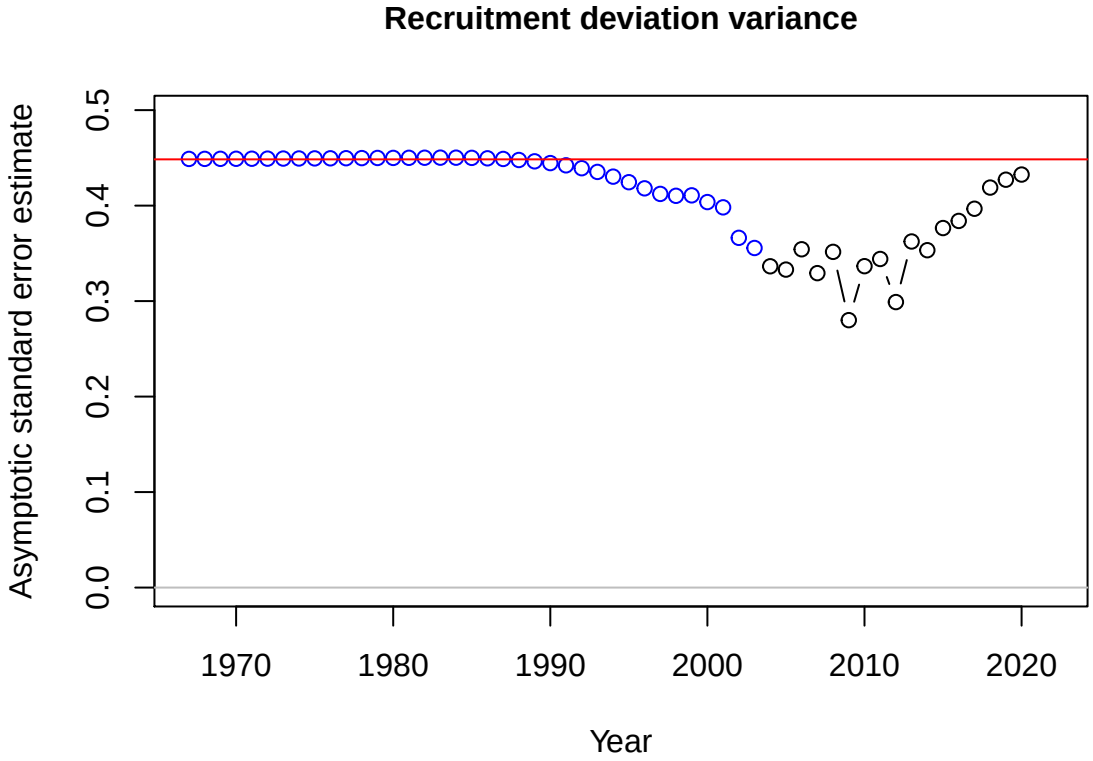
```
## Plotting Hindcast Cross-Validation (one-step-ahead)
##
##  Computing MASE with only 2 of 3  prediction residuals for Index FISHERY
##
##  Warning:  Unequal spacing of naive predictions residuals may influence the interpretation of MASE
```




```
##
## 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)
```

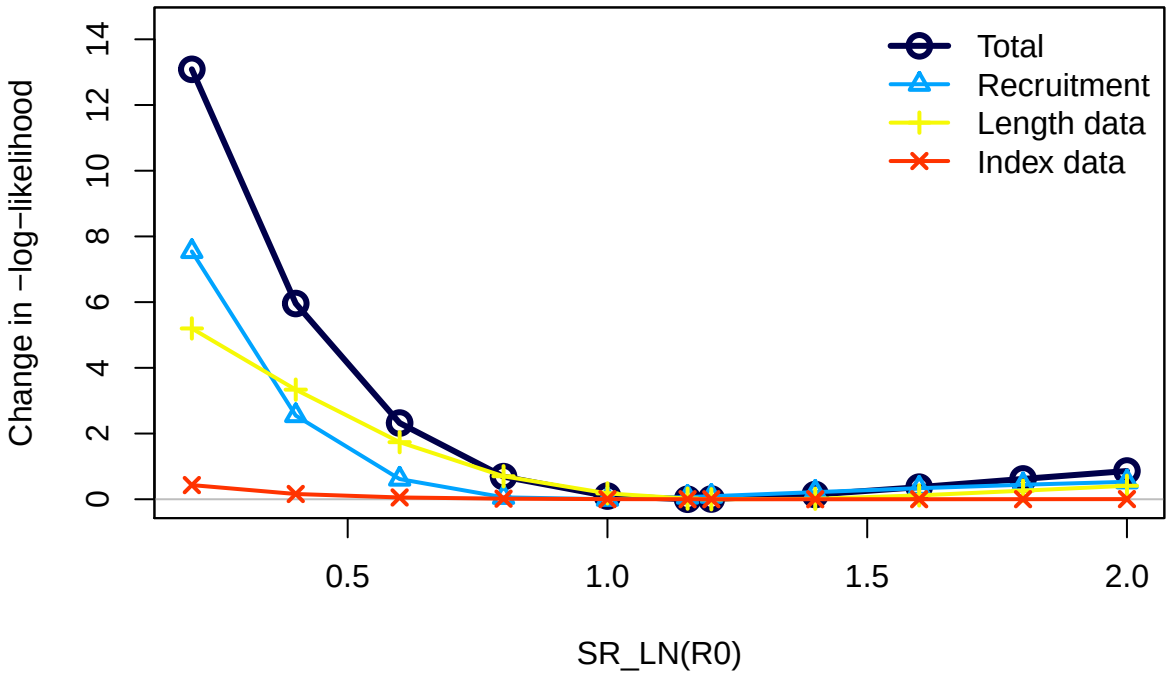
```
## Parameter values (after subsetting based on input 'models'): 0.2, 0.4, 0.6, 0.8, 1, 1.2, 1.4, 1.6, 1
```

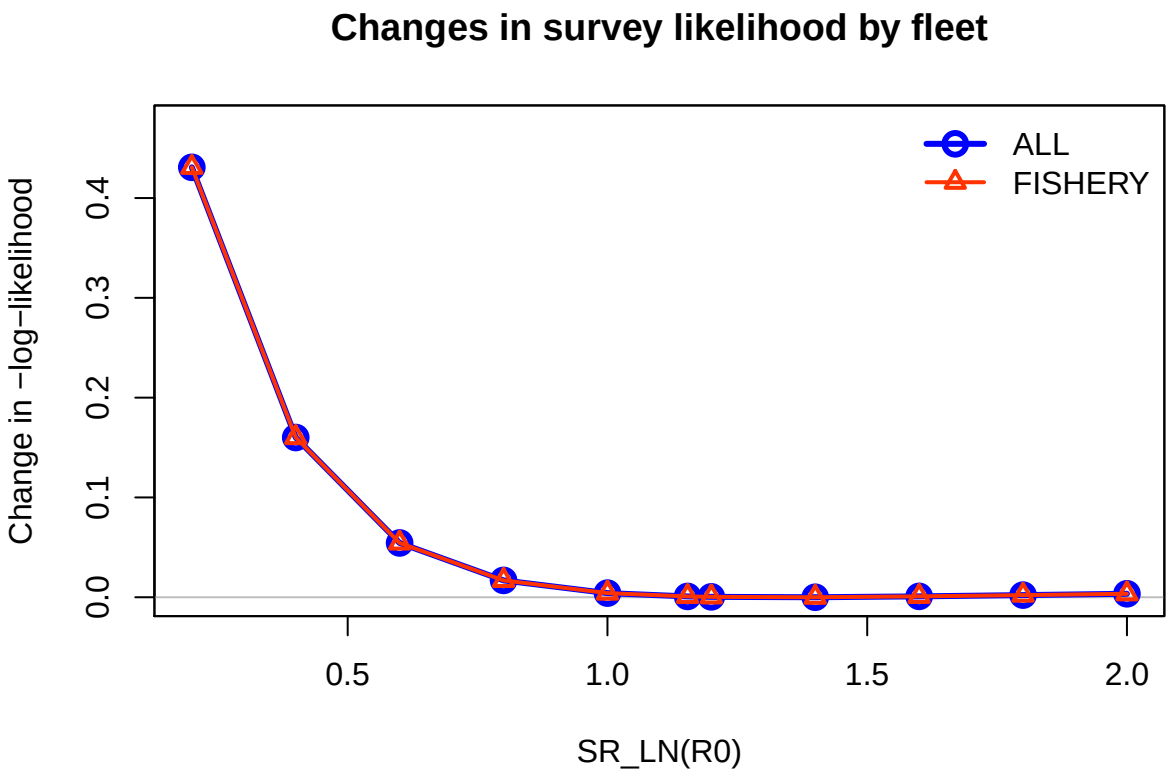
```
##
## Likelihood components showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
```

```
##                       frac_change include                            label
## TOTAL                      1.0000    TRUE                            Total
## Catch                      0.0000   FALSE                            Catch
## Equil_catch                0.0000   FALSE                Equilibrium catch
## Survey                     0.0329    TRUE                       Index data
## Length_comp                0.3973    TRUE                      Length data
## Recruitment                0.5763    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'): 0.2, 0.4, 0.6, 0.8, 1, 1.2, 1.4, 1.6, 1
```

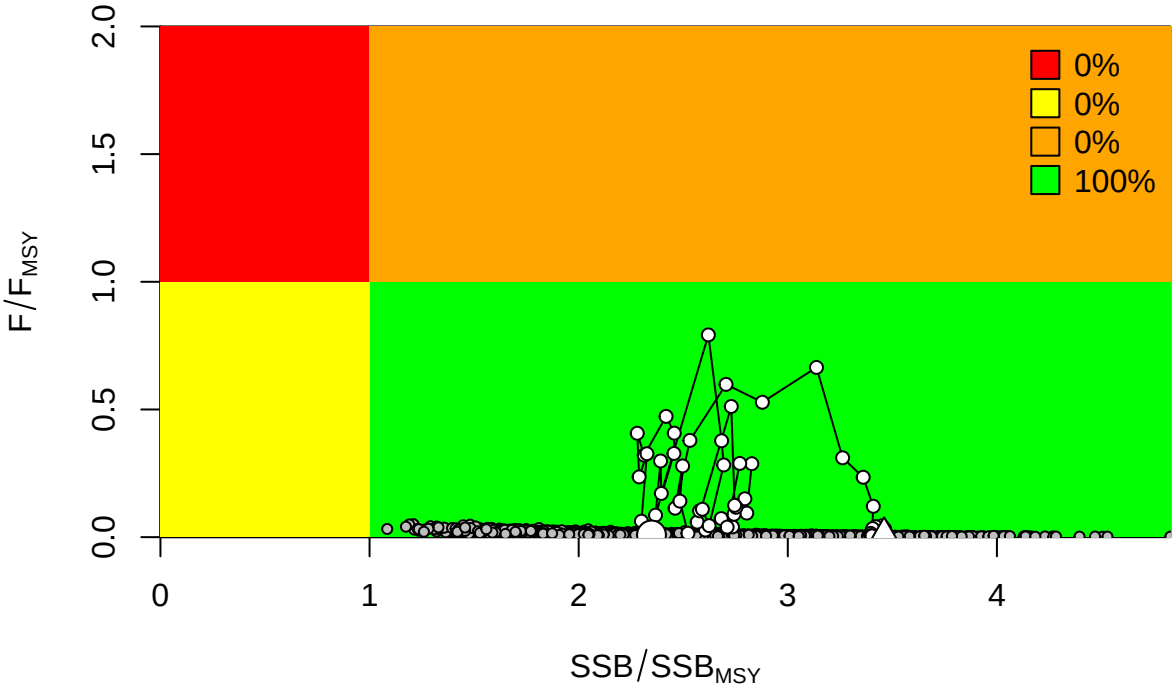
```
## Fleet-specific likelihoods showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
##                         frac_change include
## prof.table....c.1.3..           1    TRUE
```


Change in −log−likelihood
0
2
4
6
8
10
12
14
0.5
1.0
1.5
2.0
SR_LN(R0)
Total
Recruitment
Length data
Index data

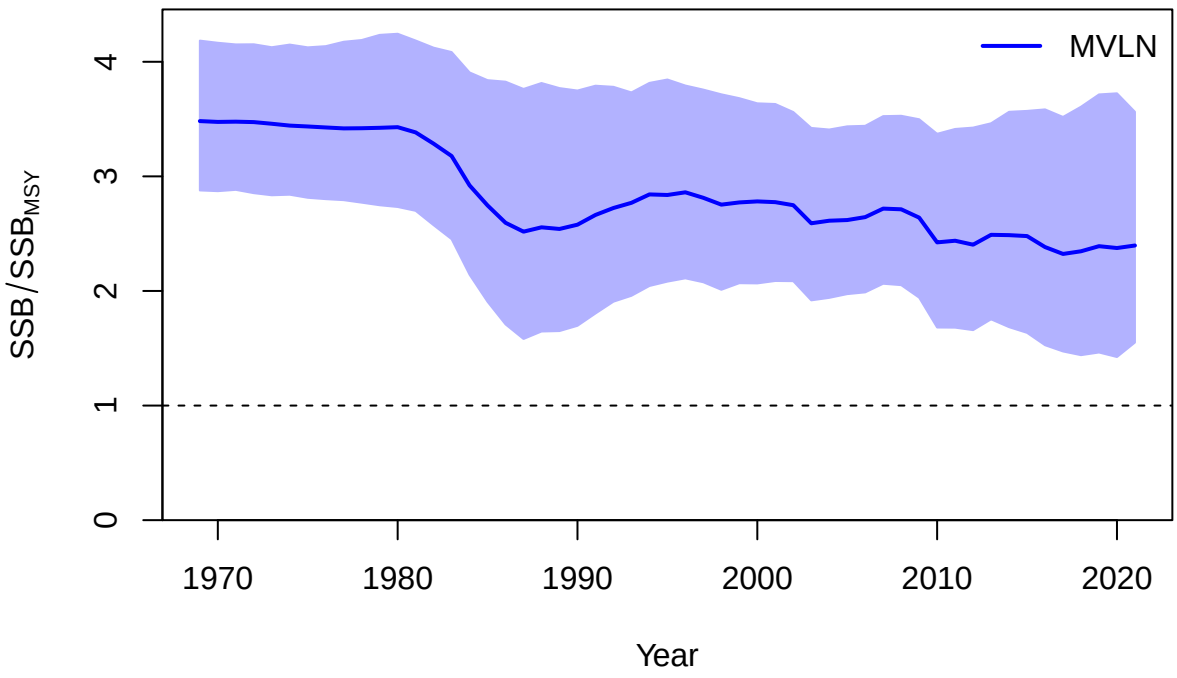



### Management Quantities

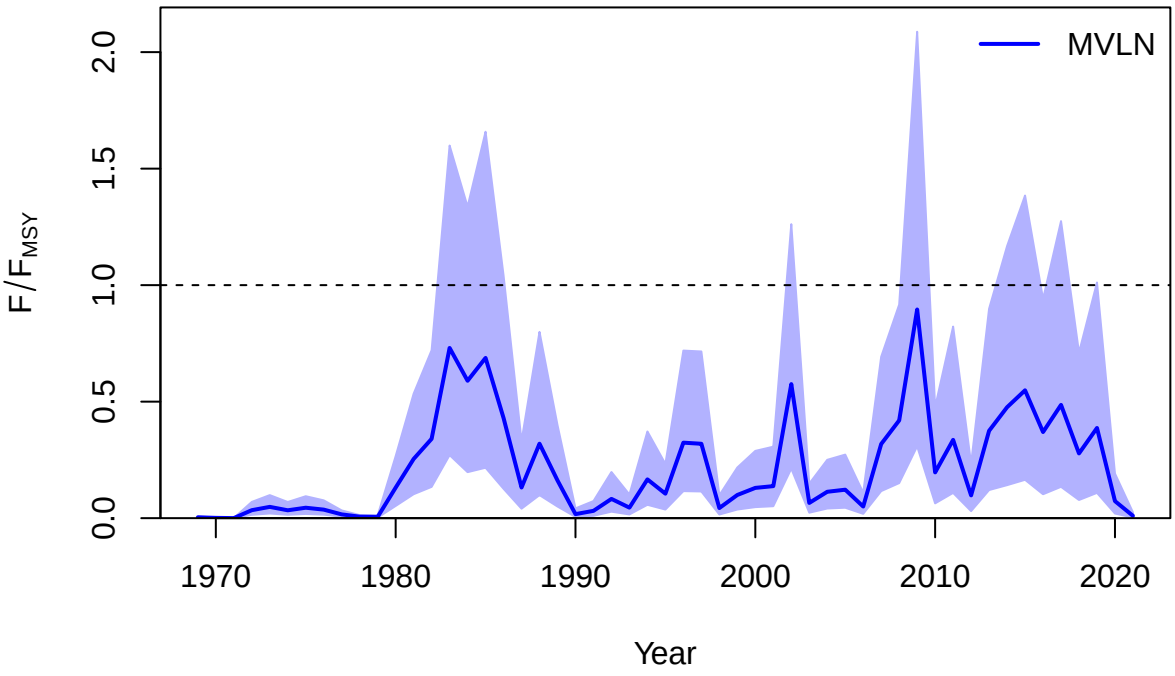
```
##
##  starter.sso with Bratio: SSB/SSBMSY and F: _abs_F
##
```



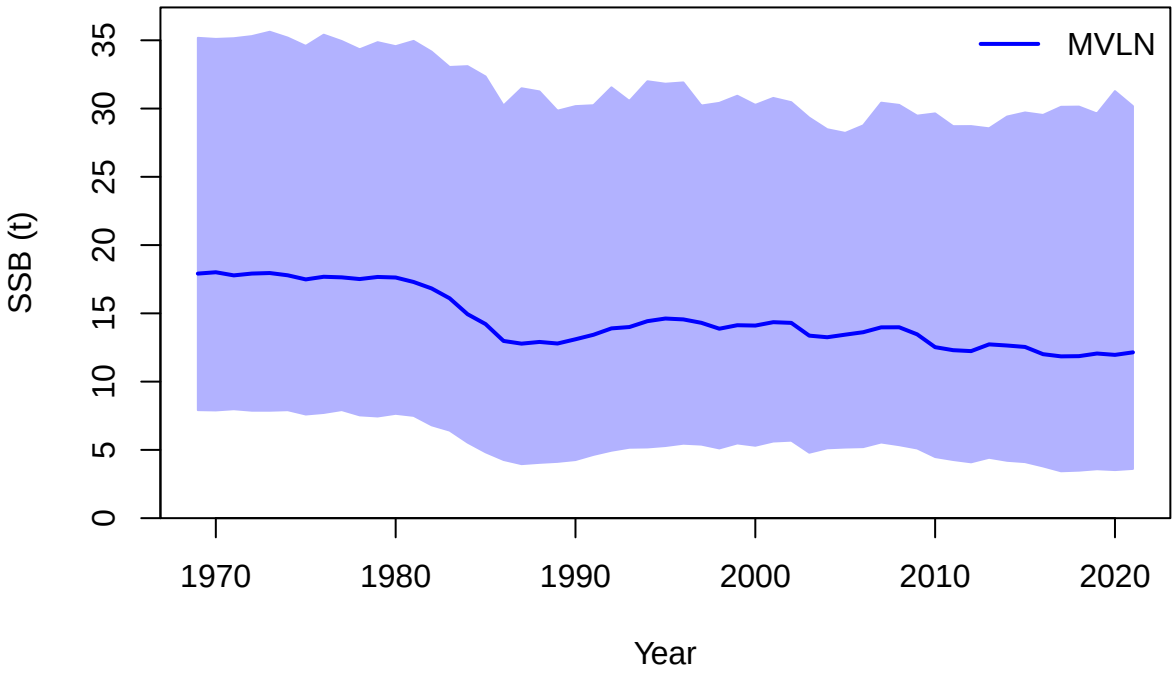

```
##
## Plot Comparison of stock
```



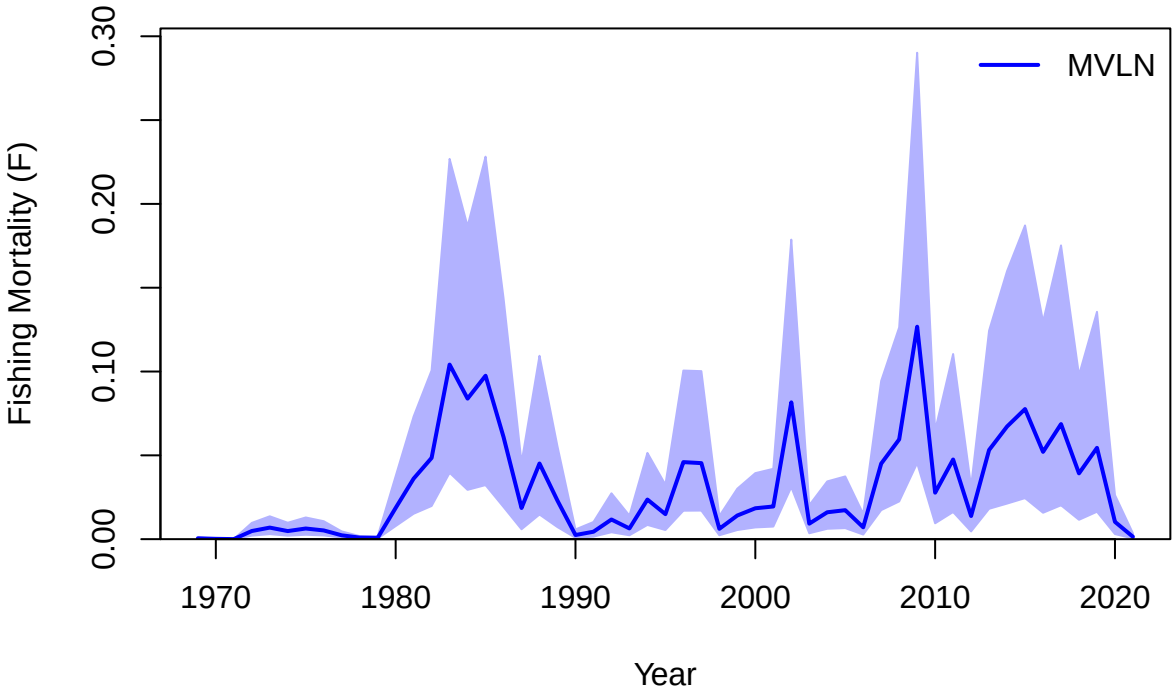

```
##
## Plot Comparison of harvest
```




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

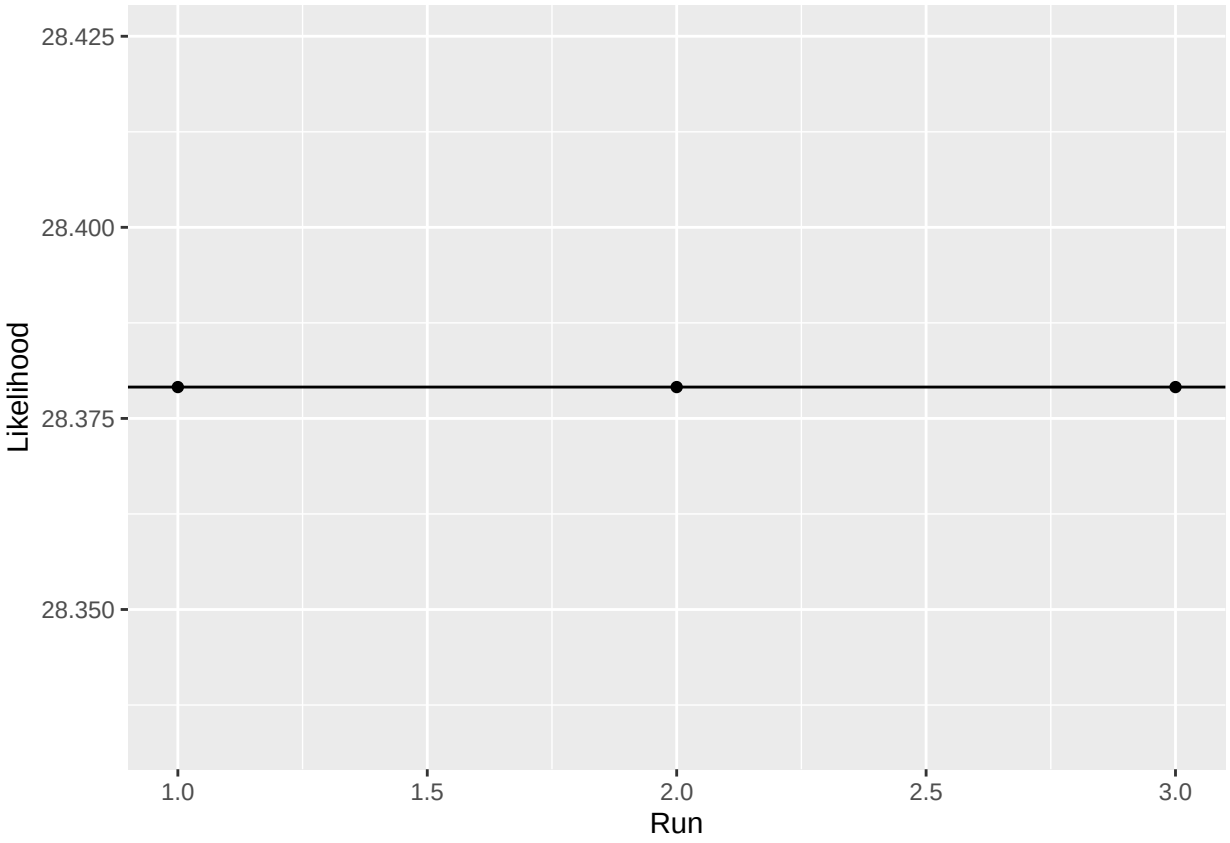


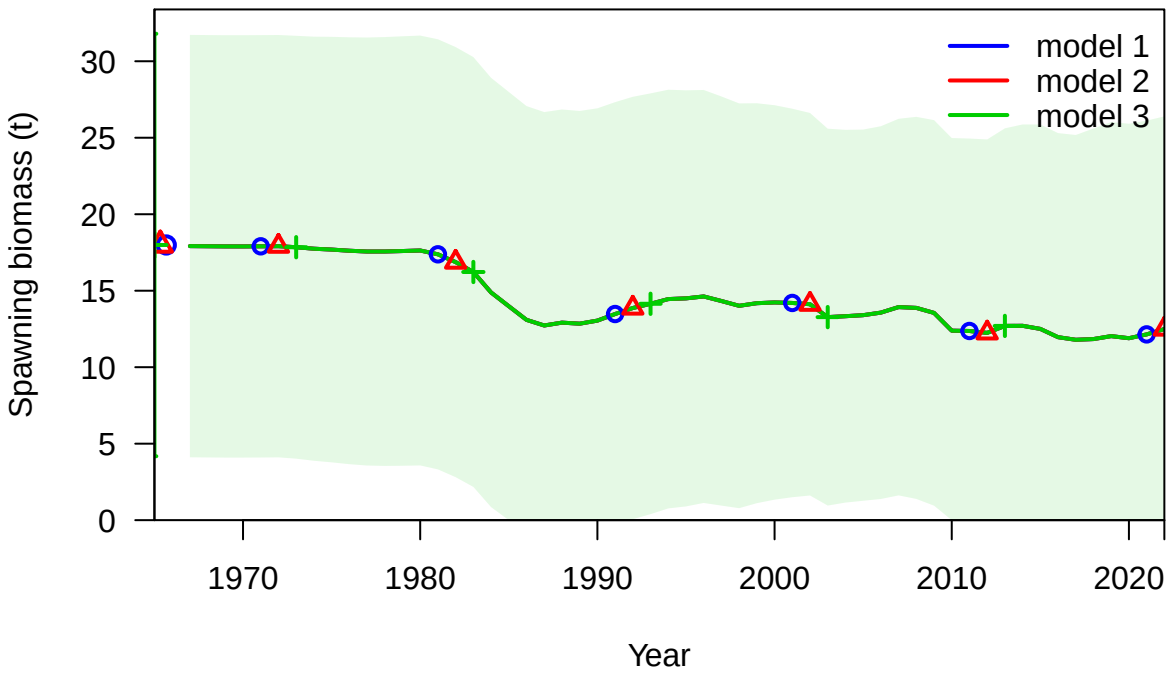

```
##
## Plot Comparison of F
```

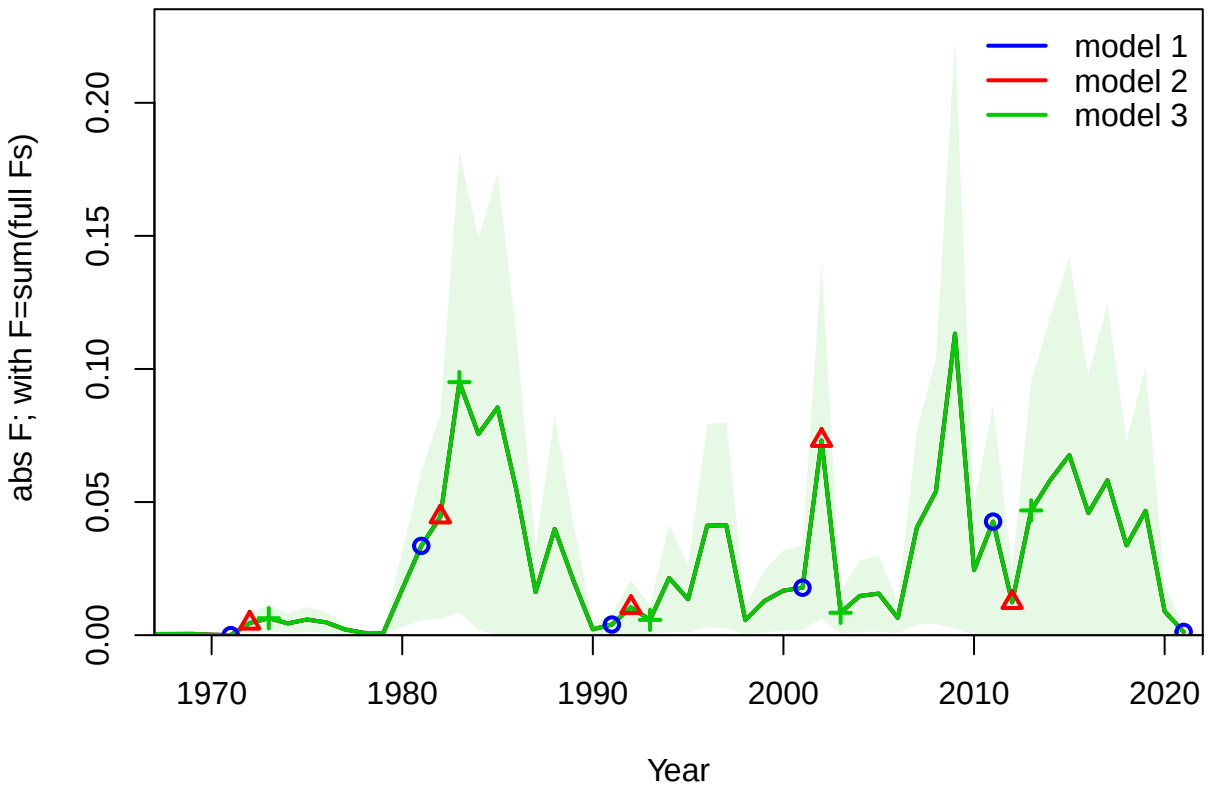

Fishing Mortality (F)
0.00
0.10
0.20
0.30
1970
1980
1990
2000
2010
2020
Year
MVLN

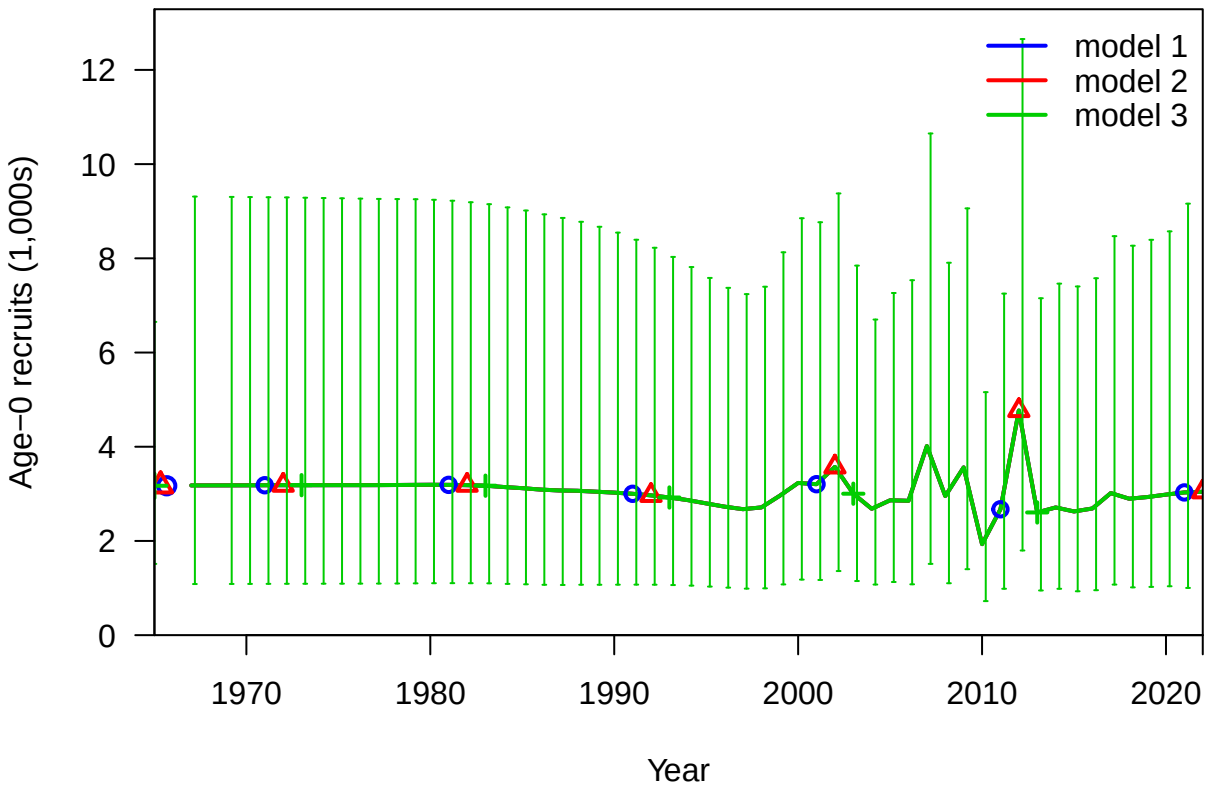
```
## RStudioGD
##         2
```

**Jitter**




model 1
model 2
model 3
Spawning biomass (t)
0
5
10
15
20
25
30
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
abs F; with F=sum(full Fs)
0.00
0.05
0.10
0.15
0.20
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
Age−0 recruits (1,000s)
0
2
4
6
8
10
12
1970
1980
1990
2000
2010
2020
Year