American Samoa Model Checks

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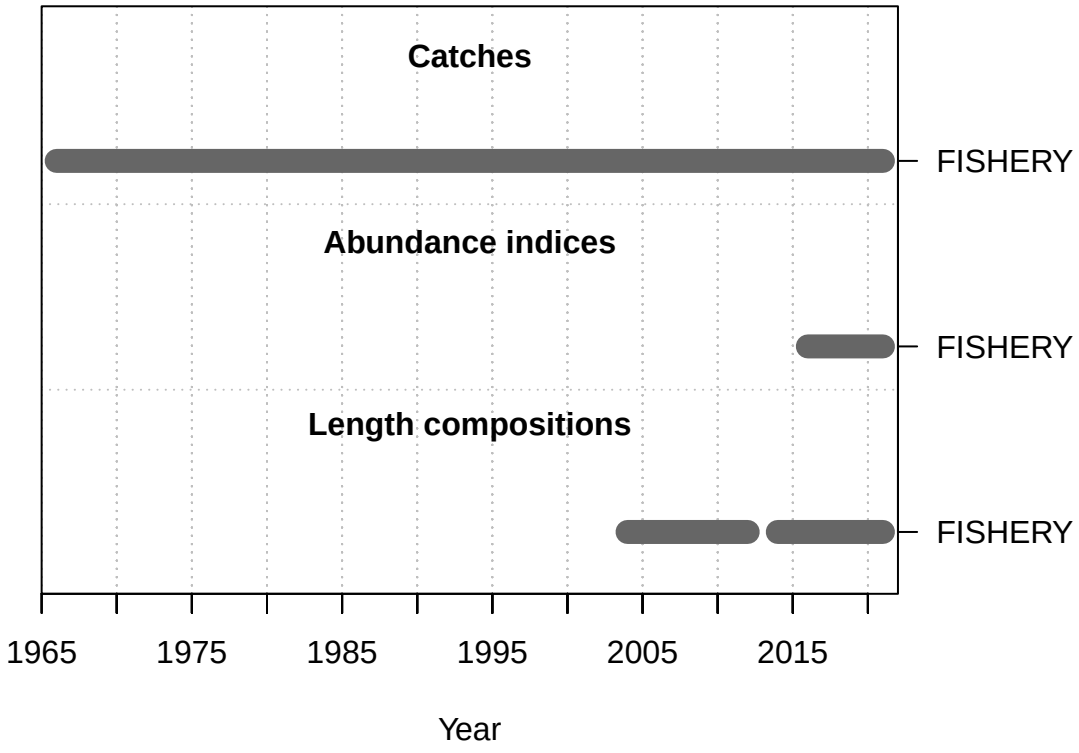
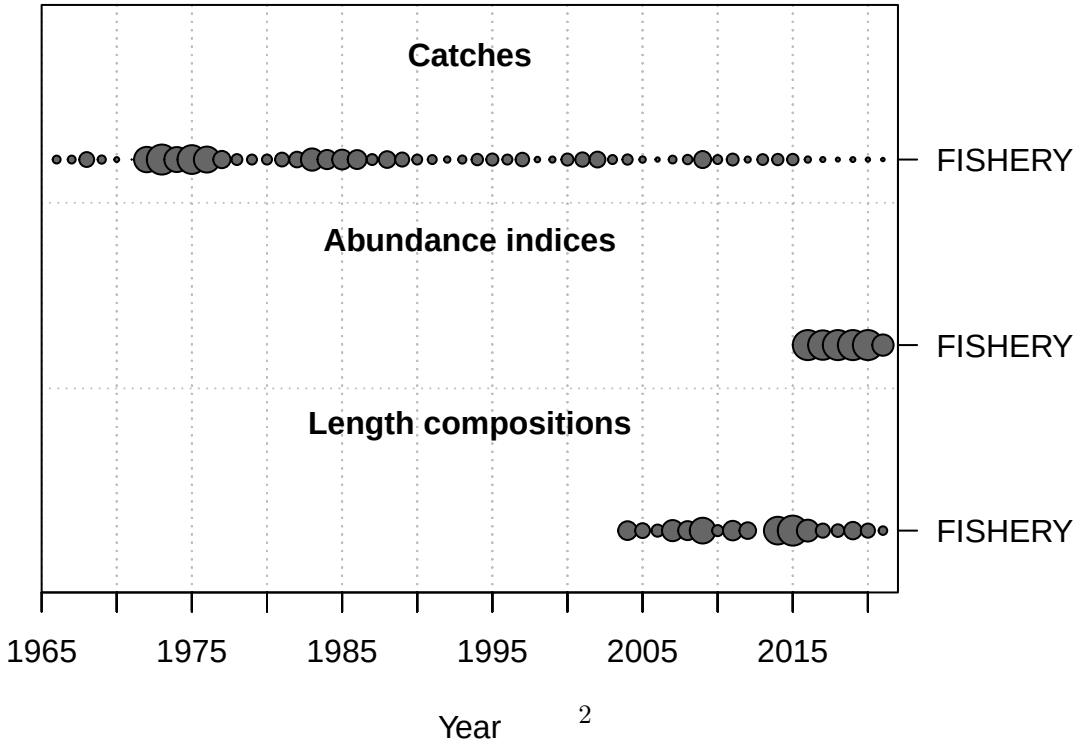
This is a summary report for the LUKA base model run.

Model Output

Input Data





Convergence Check

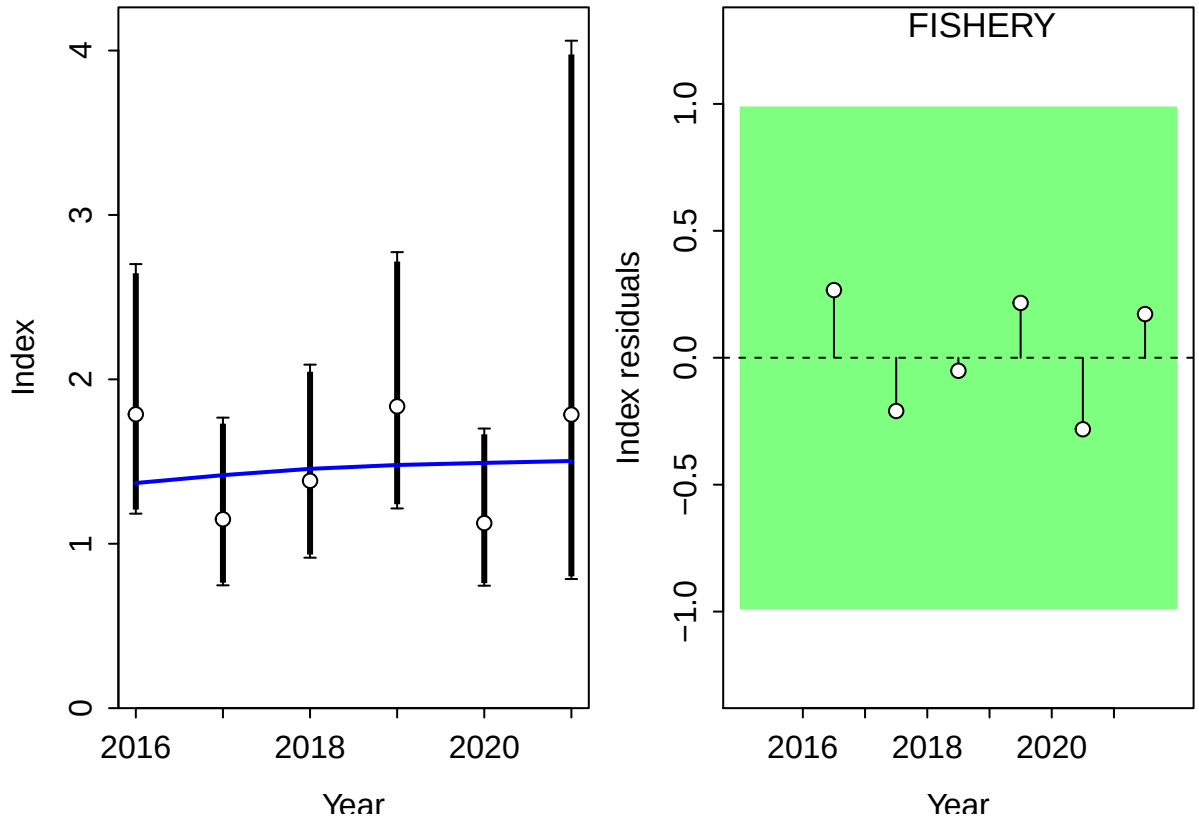
```
##   Converged     MaxGrad
## 1      TRUE 2.81808e-05
```

```
## [1] "1 NOTE:  Max data length bin: 28  < max pop len bins: 31; so will accumulate larger pop len bins
## [2] "2 parameter init value is greater than parameter max 11.2 > 10 for parm: 2 ; search for <now ch
## [3] "3 warning: poor convergence in Fspr search 0.4 0.437274"
## [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= -0.0269432"
## [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: 2; check results, variance may be suspect"
## [9] "N warnings: 7"
```

Fit to Model

CPUE

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



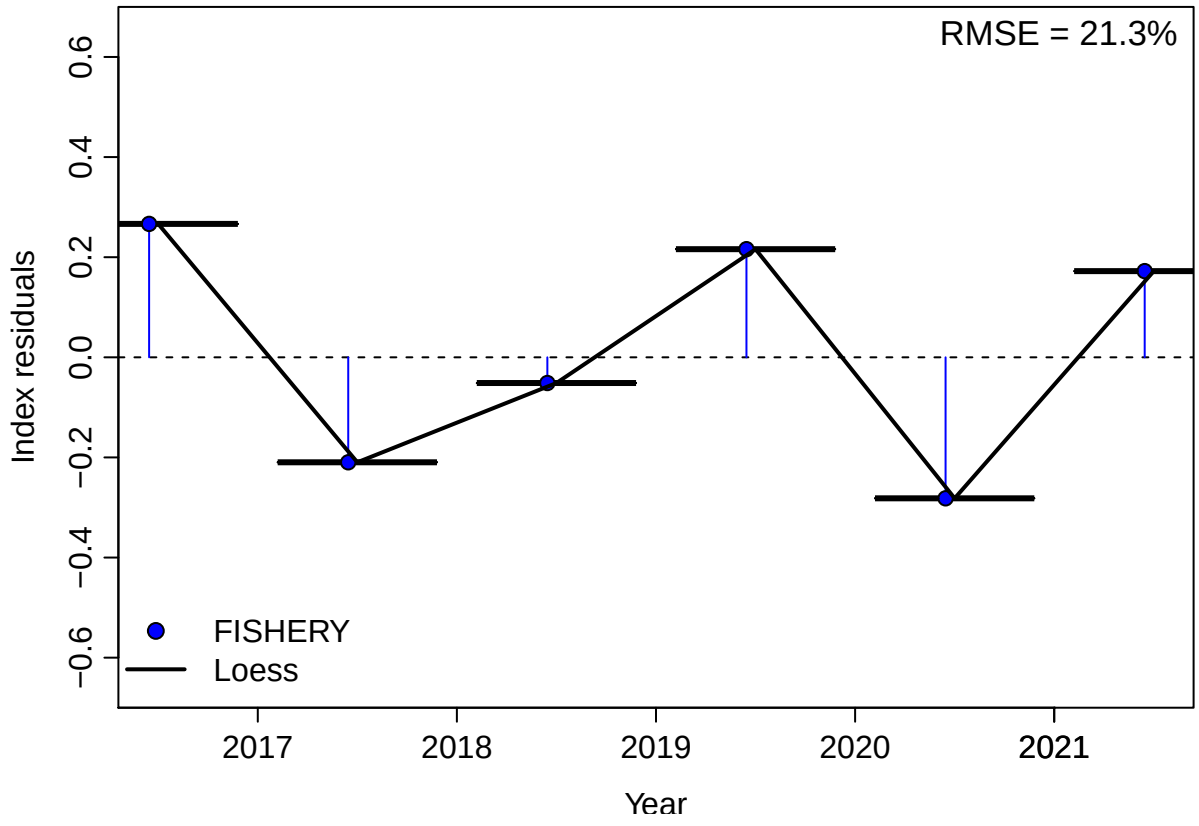

```
##
```

```
## 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

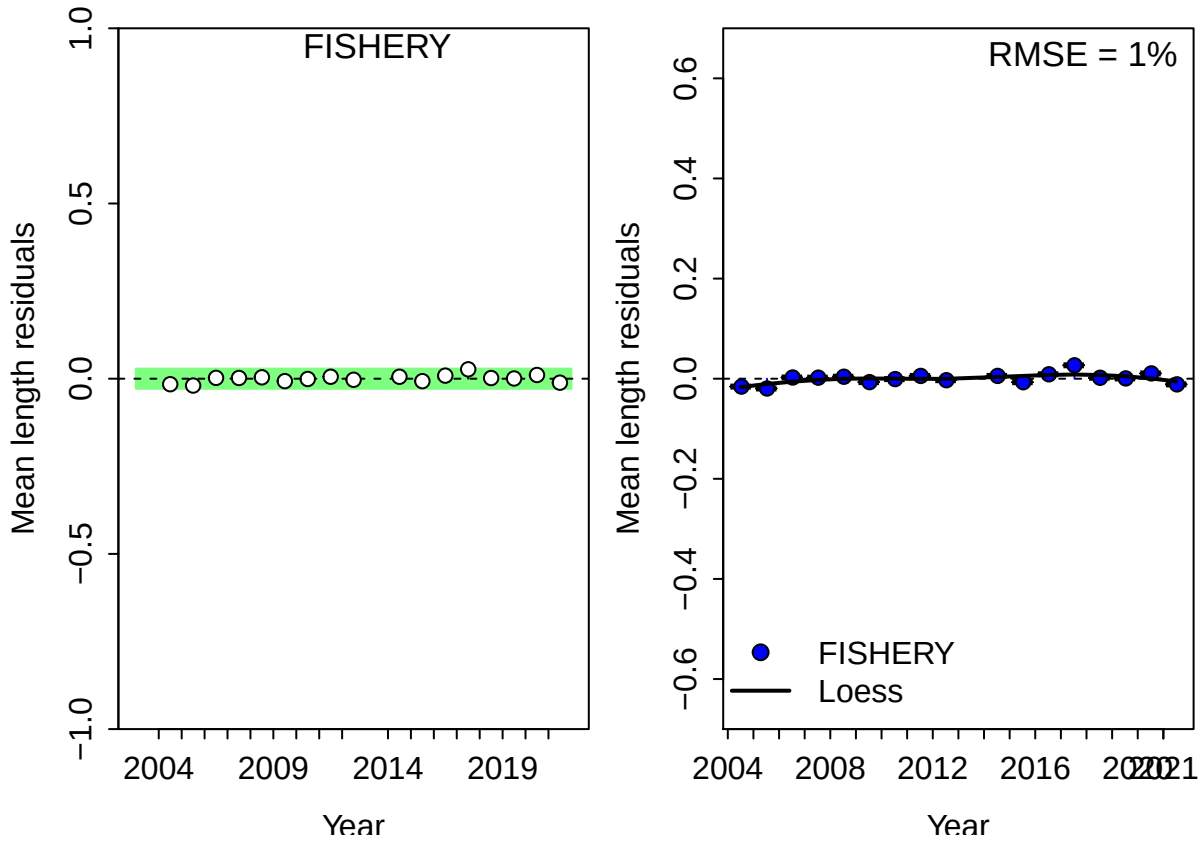
#Factor	Fleet	New_Var_adj	Type	Name
4	1	0.304826	len	FISHERY

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

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

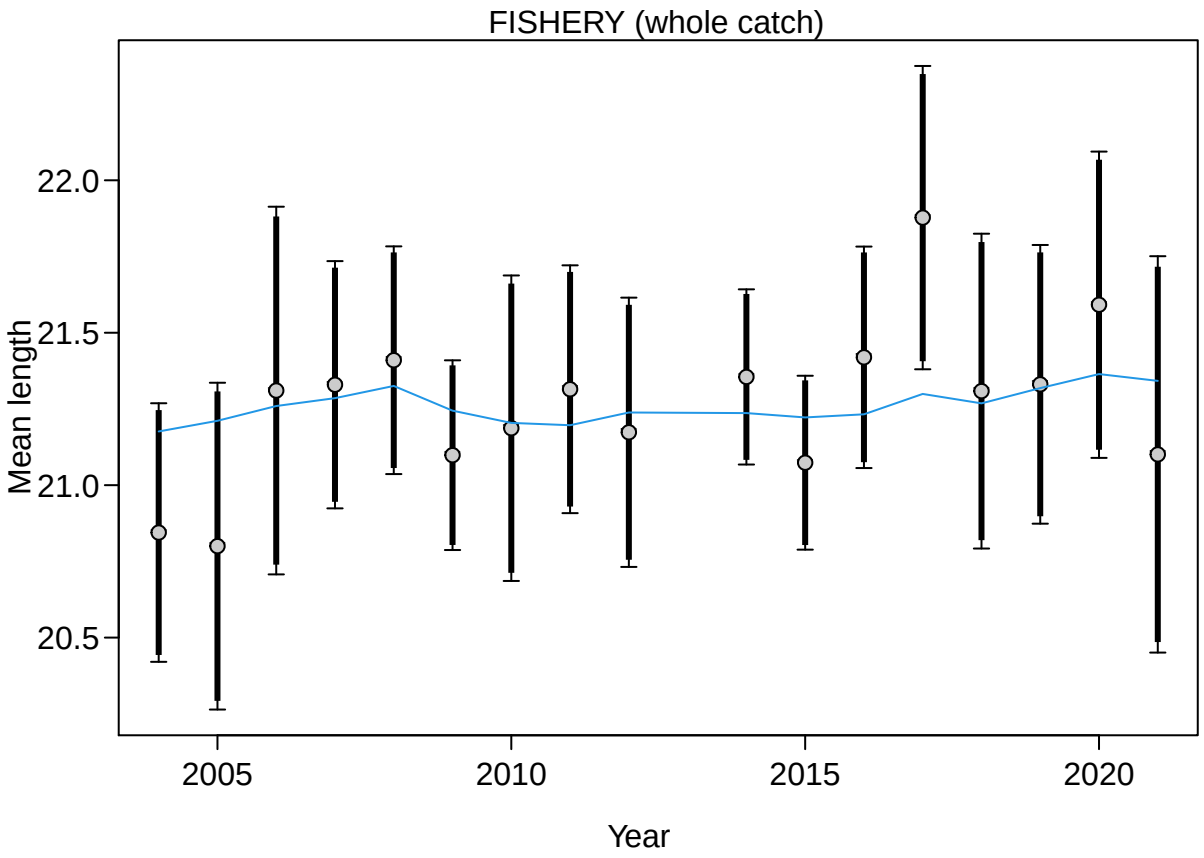
```
##     Index runs.p   test   sigma3.lo  sigma3.hi type
## 1 FISHERY  0.451 Passed -0.02876646 0.02876646  len
```

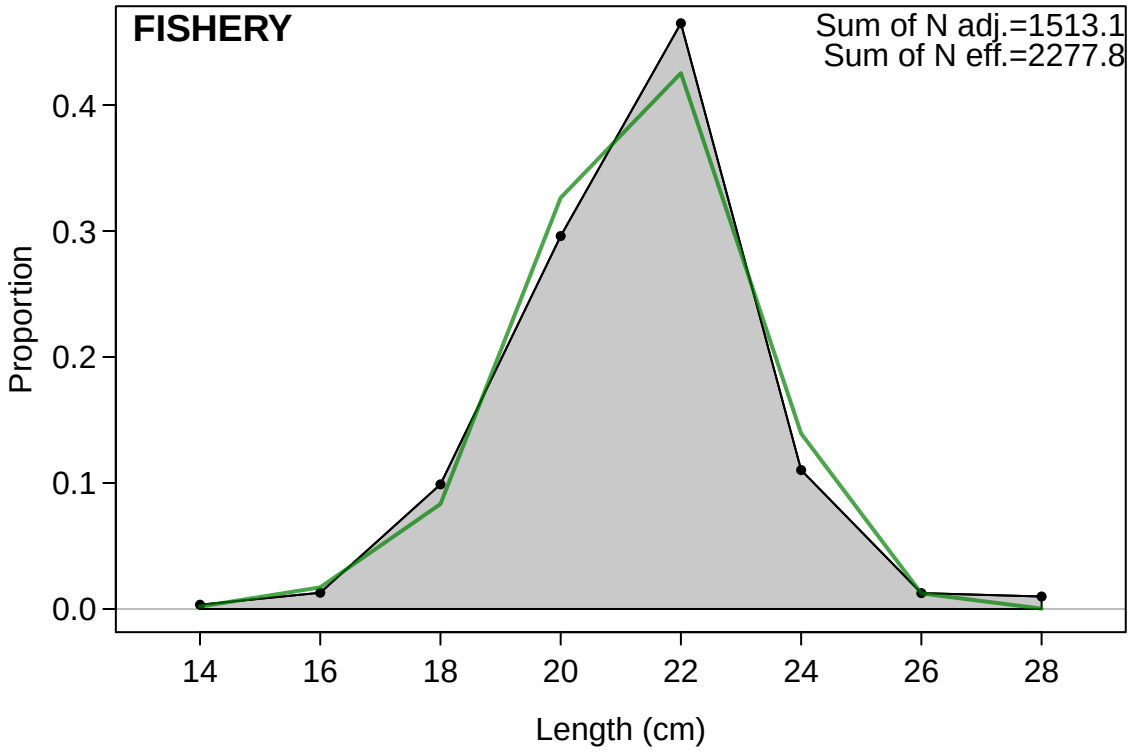
```
## Plotting JABBA residual plot
```

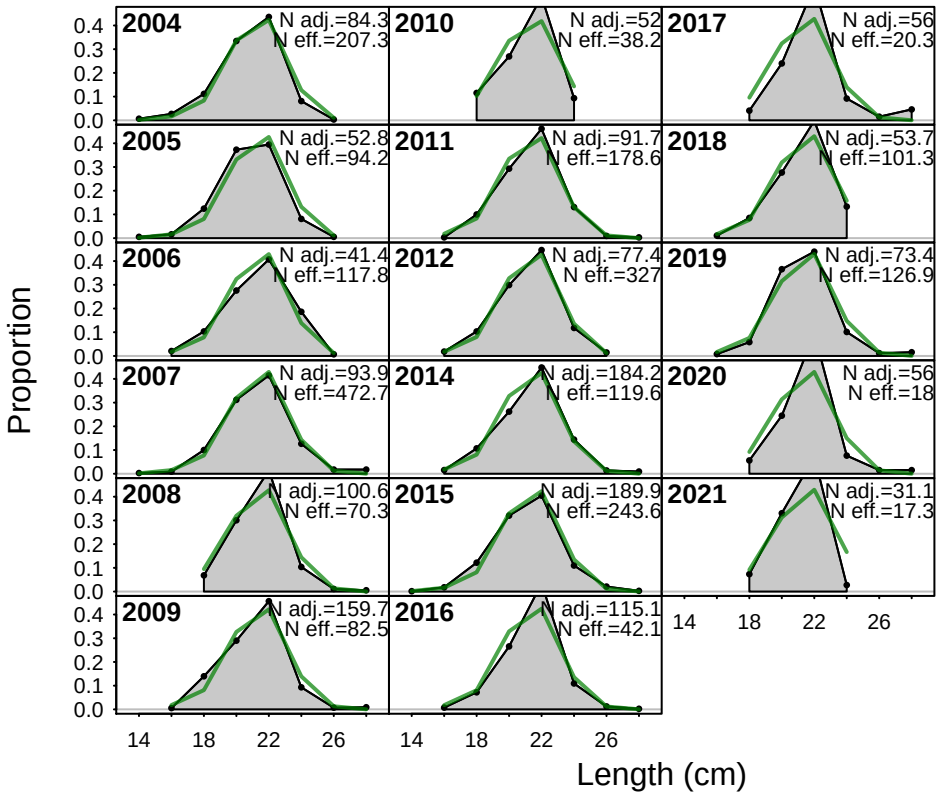



```
##
## RMSE stats by Index:
```

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


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


FISHERY
Sum of N adj.=1513.1
Sum of N eff.=2277.8
Proportion
0.0
0.1
0.2
0.3
0.4
14
16
18
20
22
24
26
28
Length (cm)

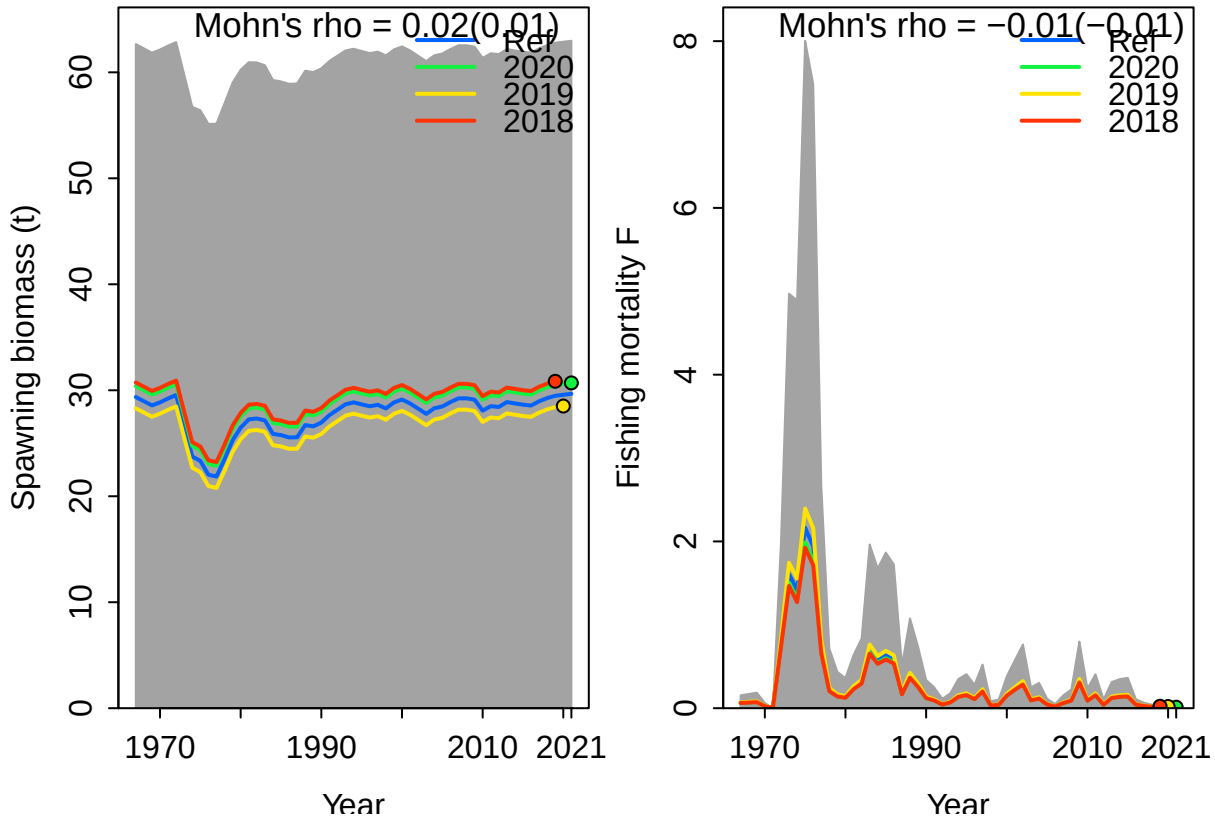


Retrospective and Hindcasting

Retrospective

```
## Plotting Retrospective pattern
```

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

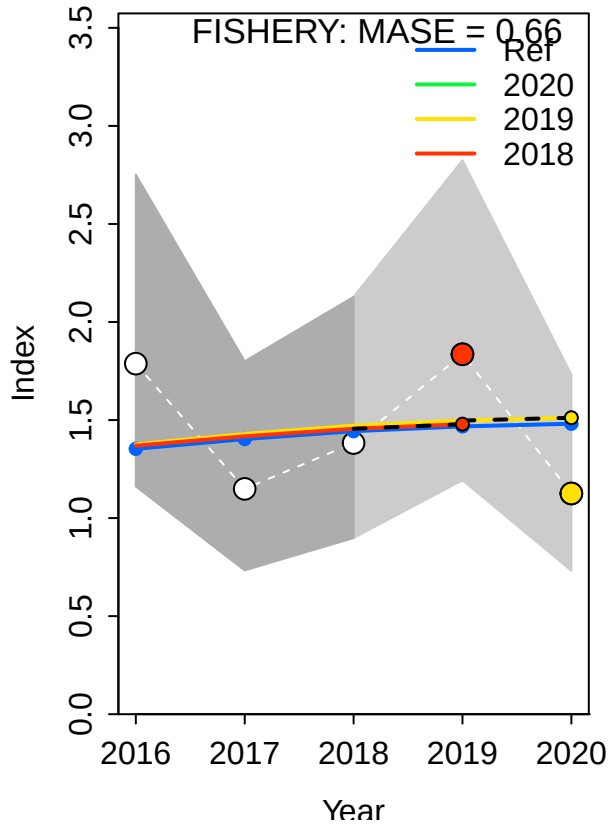



```
##
## Mohn's Rho stats, including one step ahead forecasts:

##   type     peel         Rho ForecastRho
## 1    F     2020 -0.03887658 -0.03858774
## 2    F     2019  0.05776112  0.05731310
## 3    F     2018 -0.05996356 -0.05914647
## 4    F Combined -0.01369301 -0.01347370
```

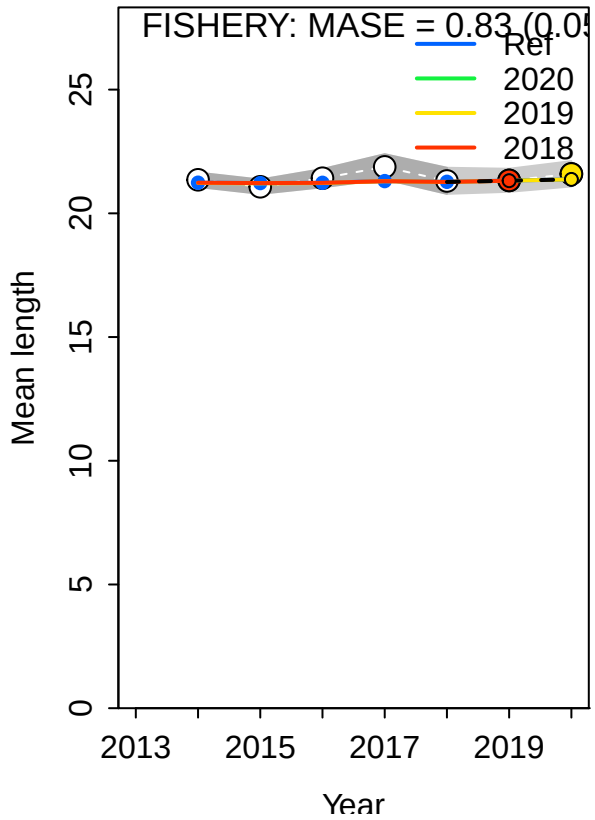
Hindcasting

```
## 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:
```



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'): 6.4, 6.6, 6.8, 7, 7.2, 7.4, 7.6, 7.0884
```

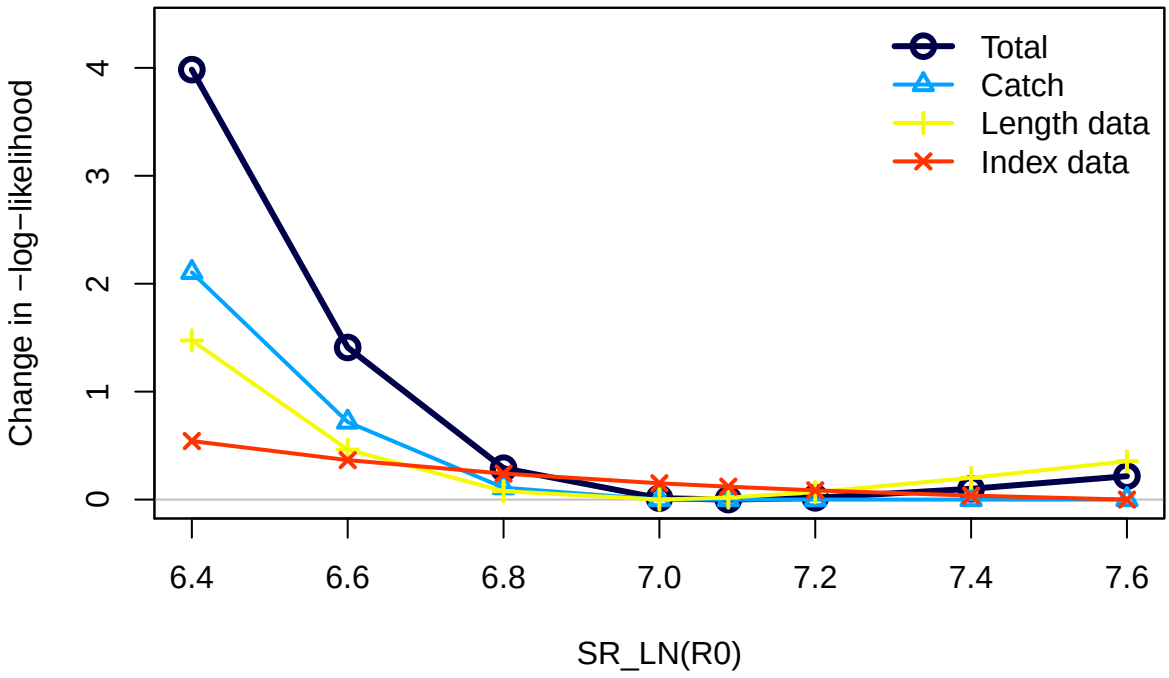
```
##
## Likelihood components showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
```

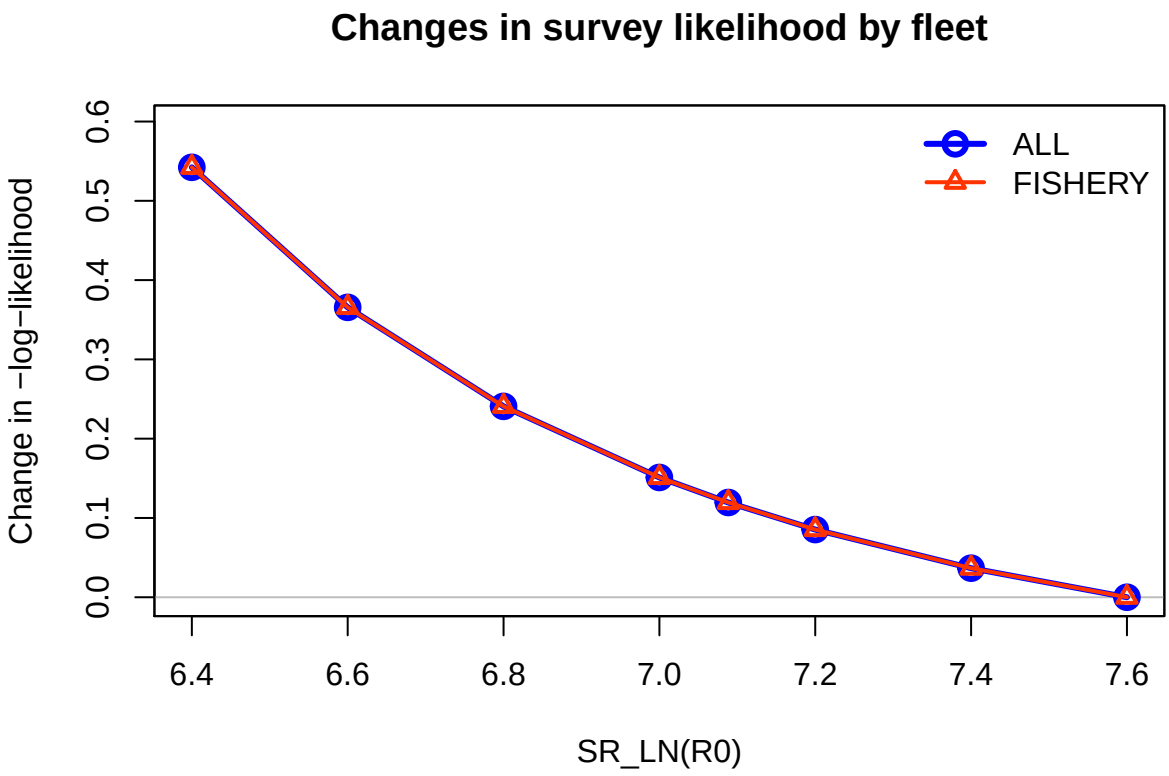
```
##                      frac_change include                          label
## TOTAL                     1.0000    TRUE                          Total
## Catch                     0.5284    TRUE                          Catch
## Equil_catch               0.0000   FALSE              Equilibrium catch
## Survey                    0.1361    TRUE                     Index data
## Length_comp               0.3702    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'): 6.4, 6.6, 6.8, 7, 7.2, 7.4, 7.6, 7.0884
```

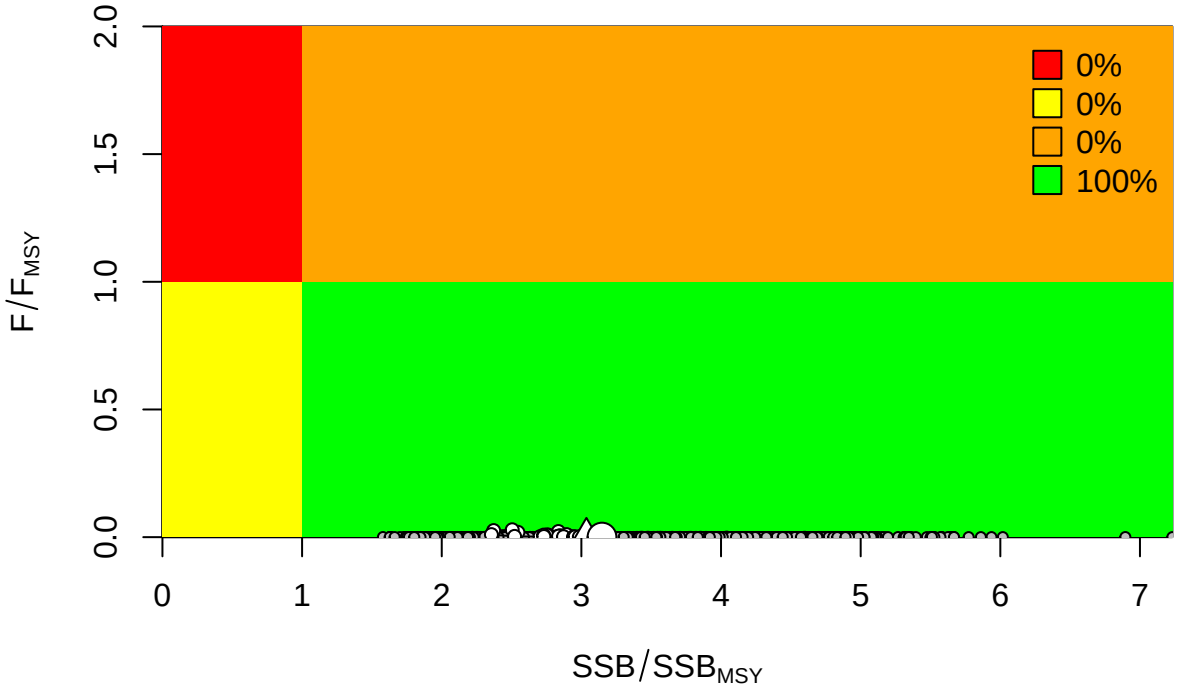
```
## Fleet-specific likelihoods showing max change as fraction of total change.
## To change which components are included, change input 'minfraction'.
##                        frac_change include
## prof.table....c.1.3..           1    TRUE
```



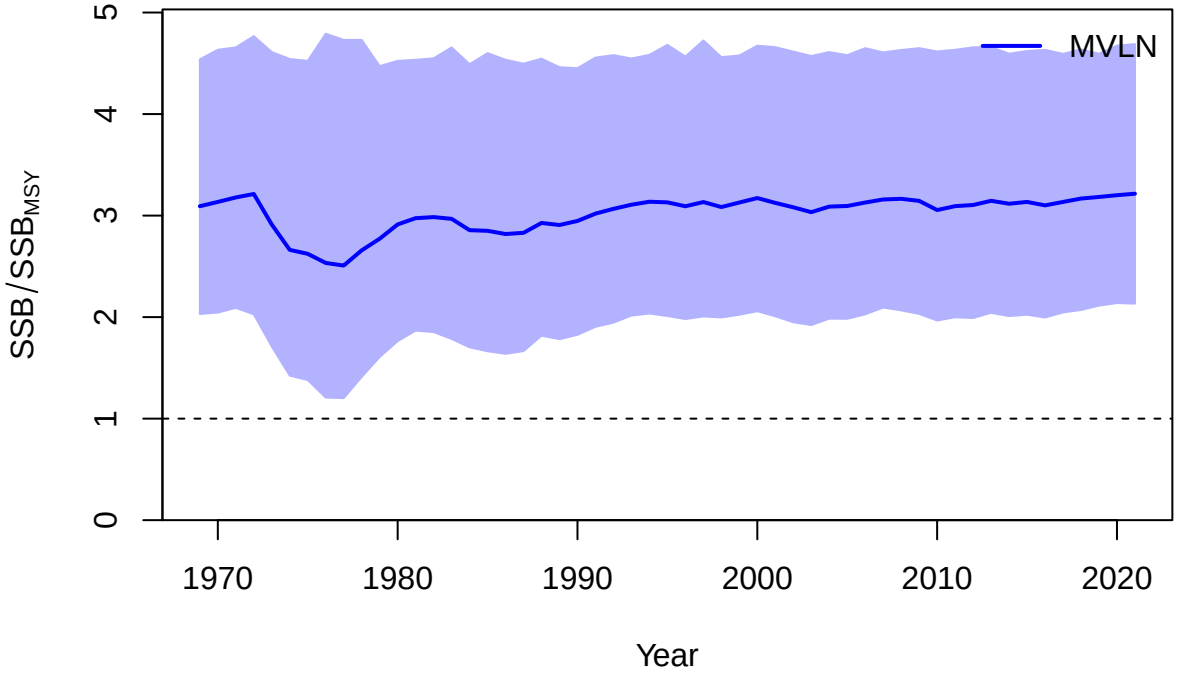


Management Quantities

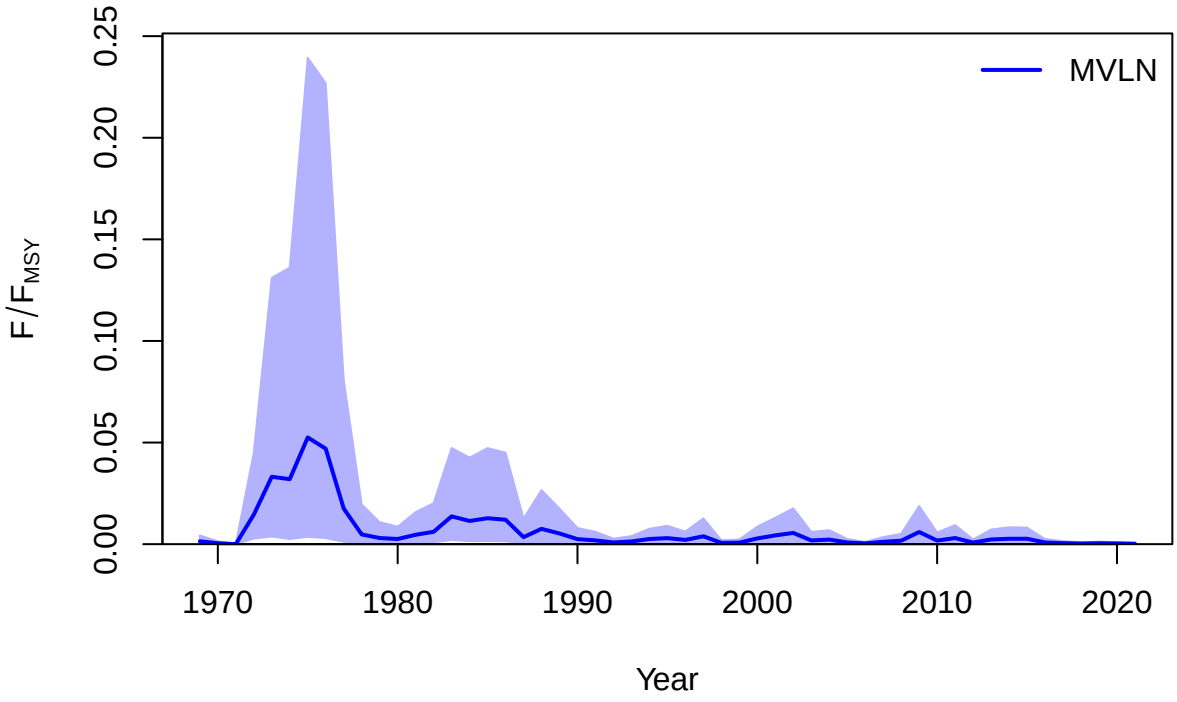
```
##
##  starter.sso with Bratio: SSB/SSBMSY and F: _abs_F
##
```



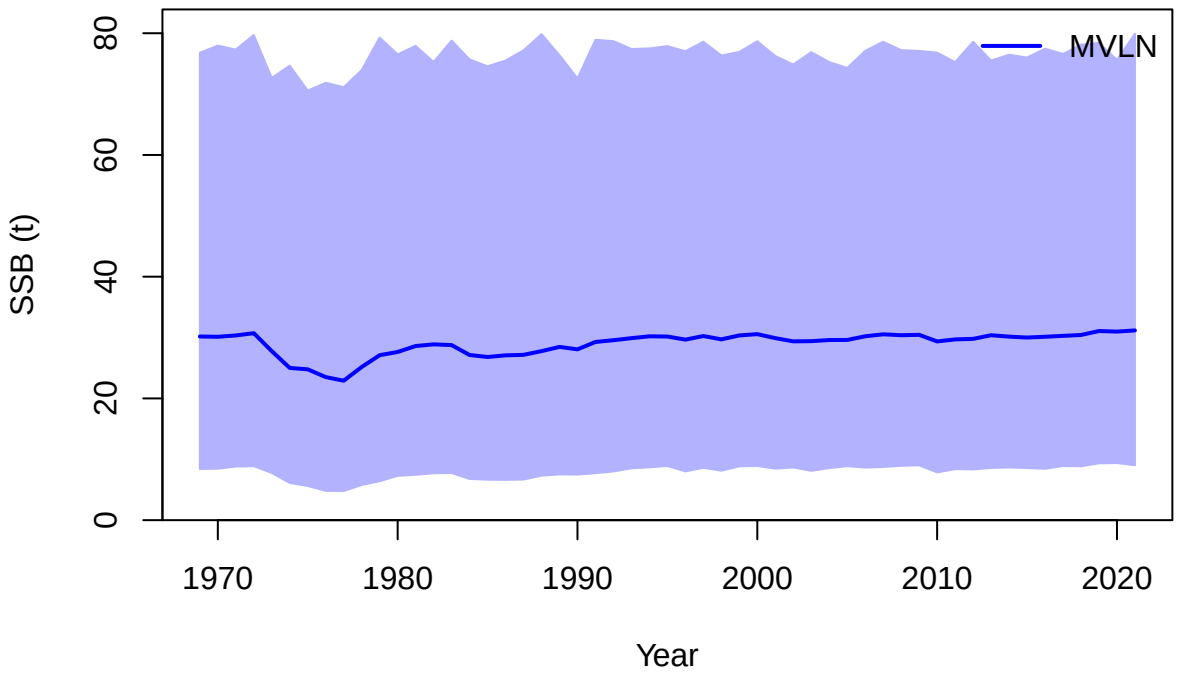

```
##
## Plot Comparison of stock
```



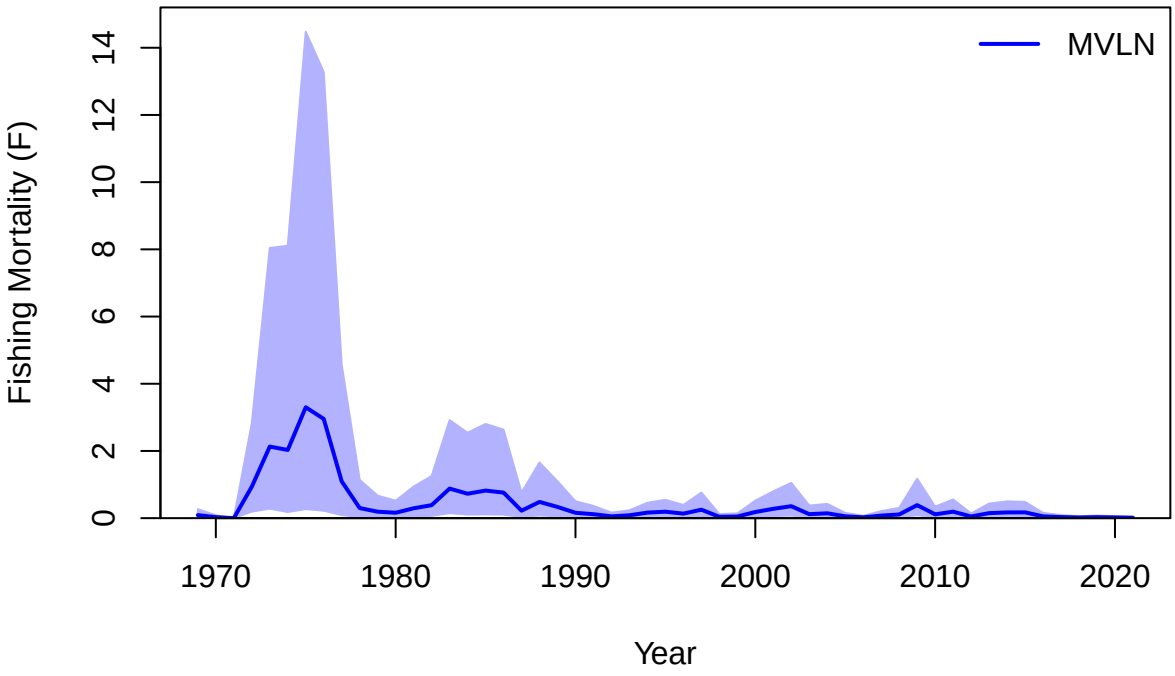

```
##
## Plot Comparison of harvest
```




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

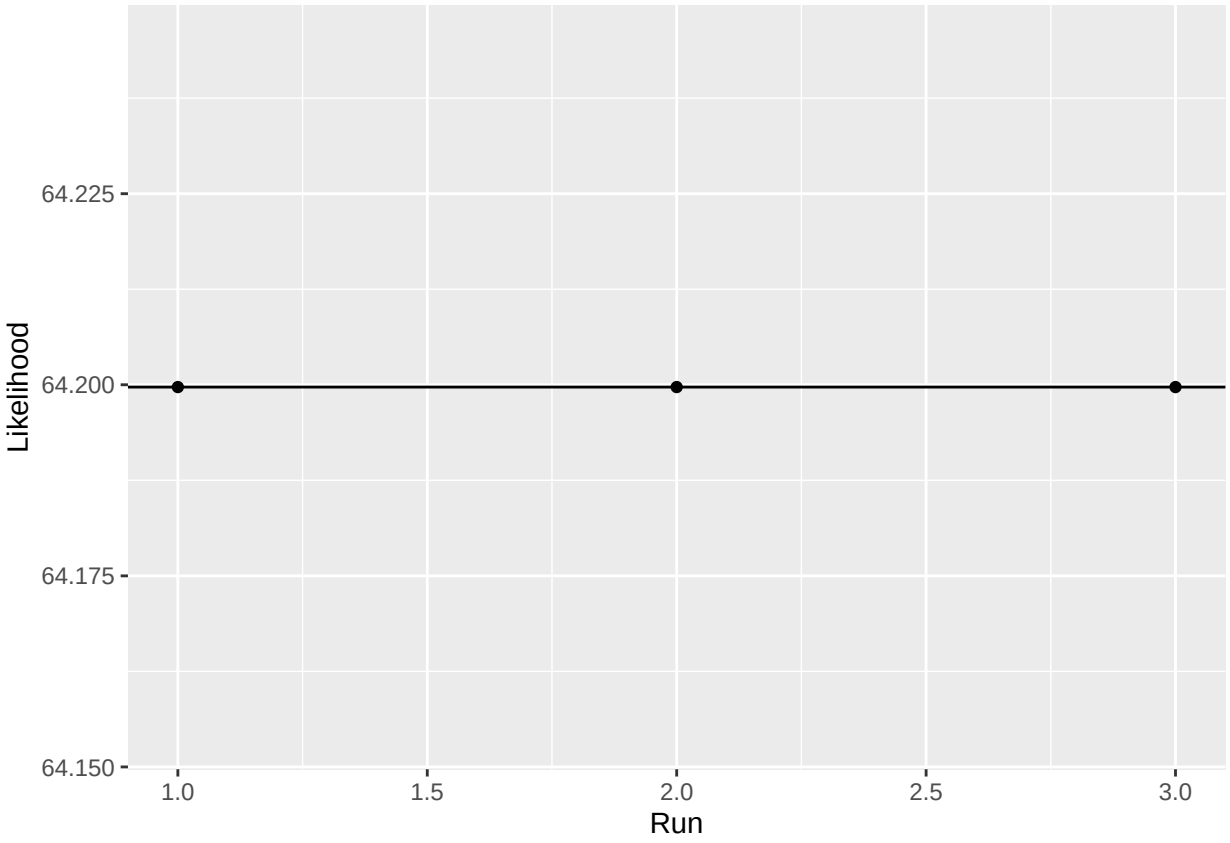


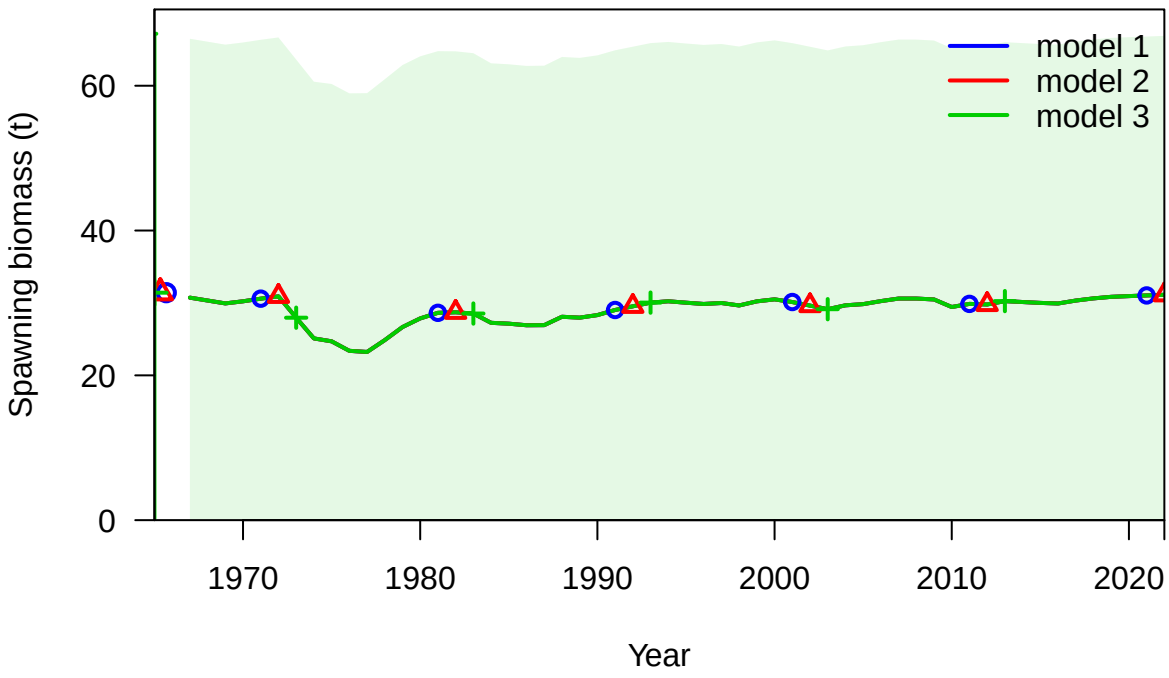

```
##
## Plot Comparison of F
```

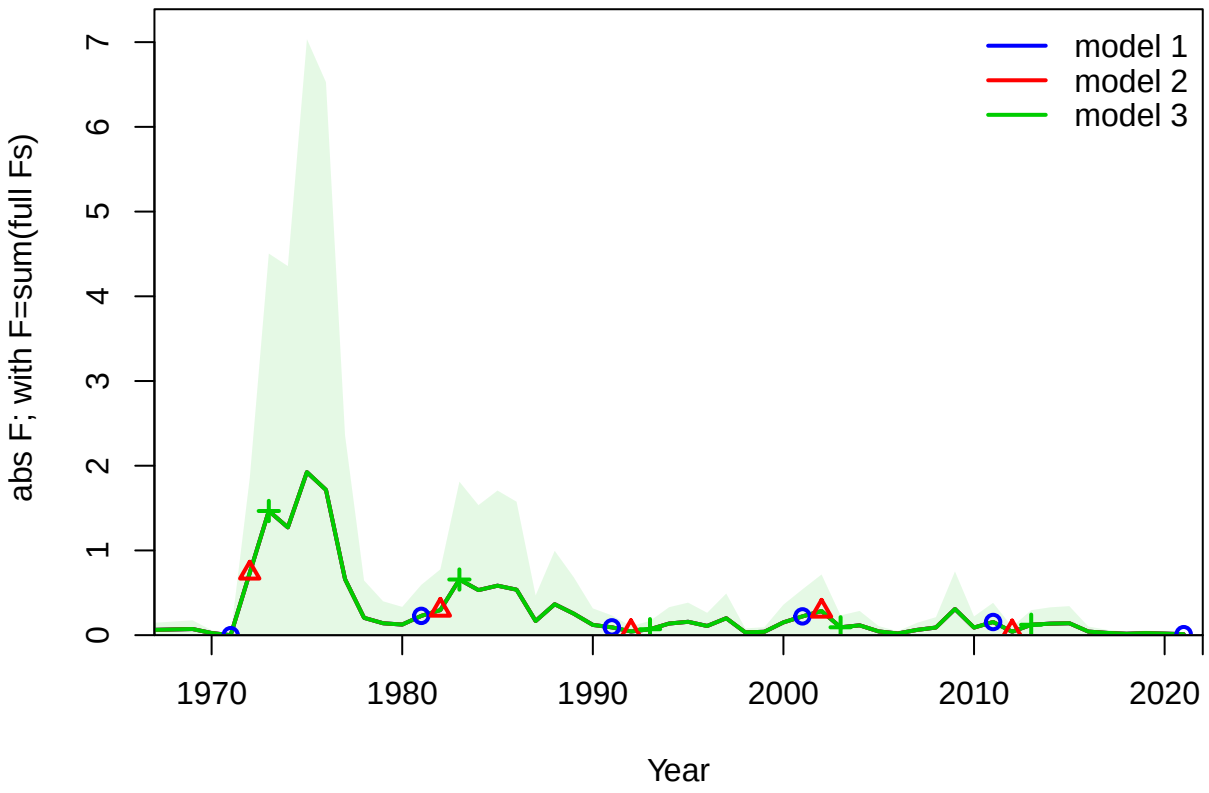

MVLN
Fishing Mortality (F)
0
2
4
6
8
10
12
14
1970
1980
1990
2000
2010
2020
Year

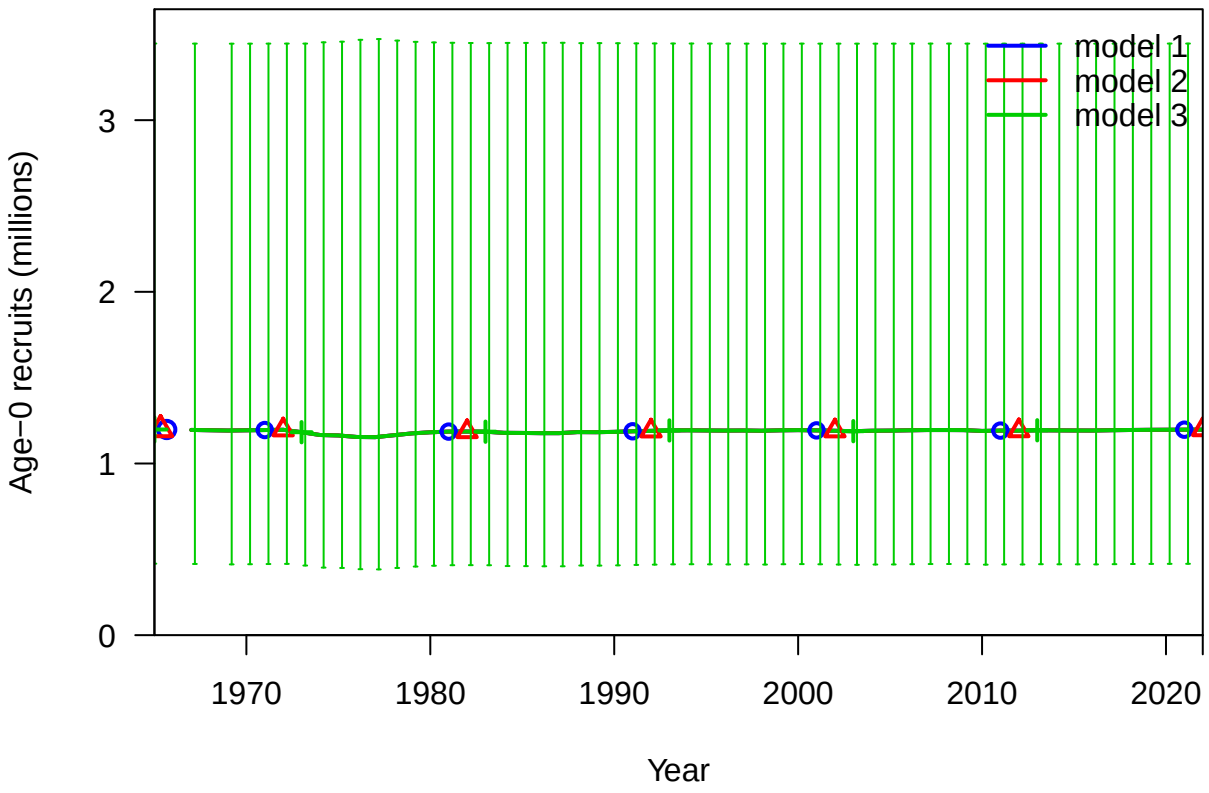
```
## RStudioGD
##         2
```

Jitter




model 1
model 2
model 3
Spawning biomass (t)
0
20
40
60
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
7
1970
1980
1990
2000
2010
2020
Year


model 1
model 2
model 3
Age−0 recruits (millions)
0
1
2
3
1970
1980
1990
2000
2010
2020
Year