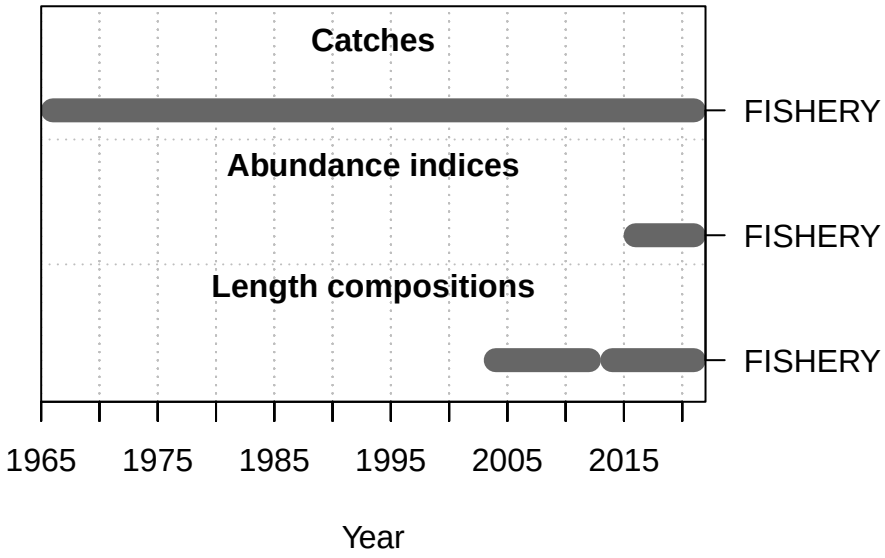
# American Samoa Model Checks

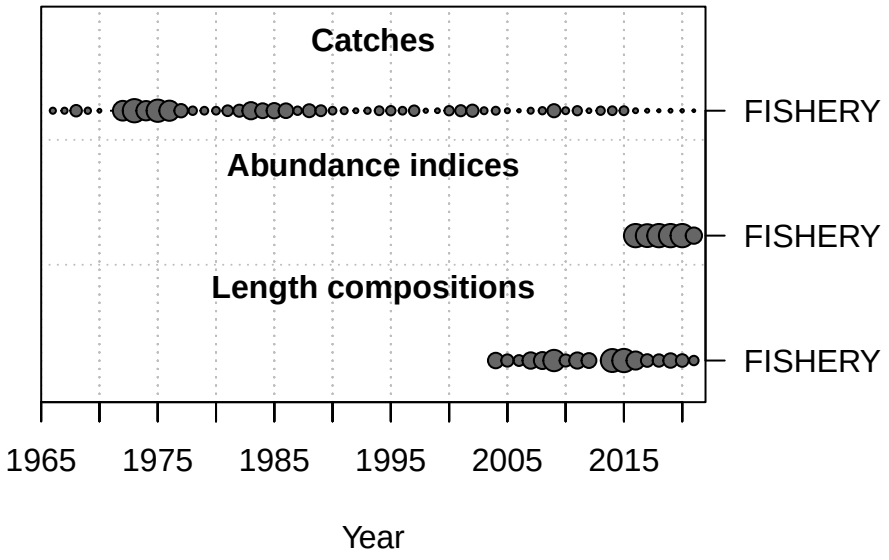
2022-09-21

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

## Model Output

### Input Data






### Convergence Check

```
  Converged     MaxGrad
1      TRUE 7.23374e-05
```

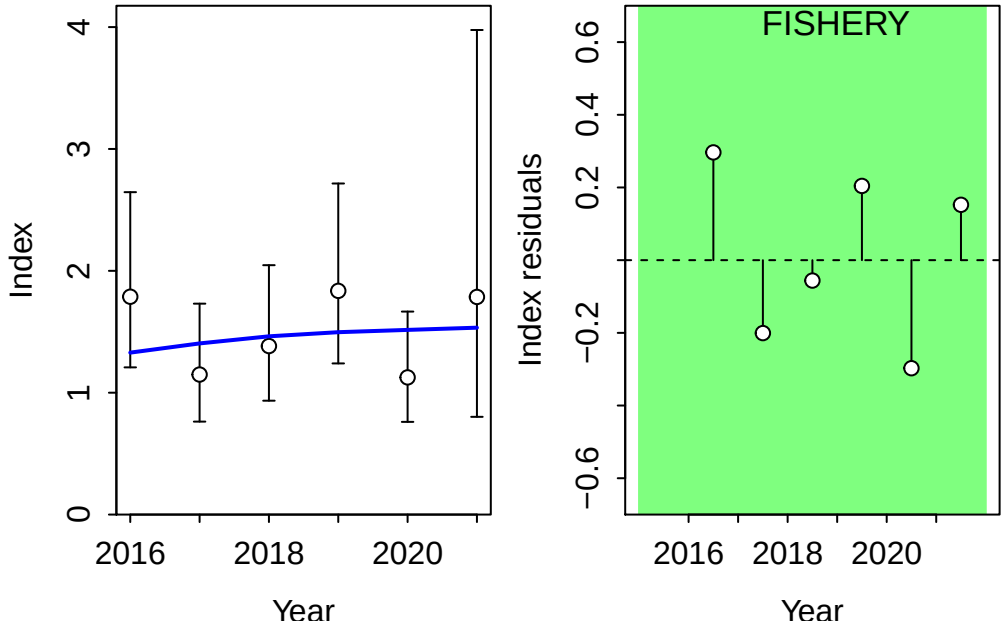
```
[1] "1 NOTE:  Max data length bin: 28  < max pop len bins: 31; so will accumulate larger pop
[2] "2 Forecast F capped by max possible F from control file: 2.9"
[3] "3 Forecast F capped by max possible F from control file: 2.9"
[4] " N parameters are on or within 1% of min-max bound: 1; check results, variance may be su
[5] "N warnings: 3"
```

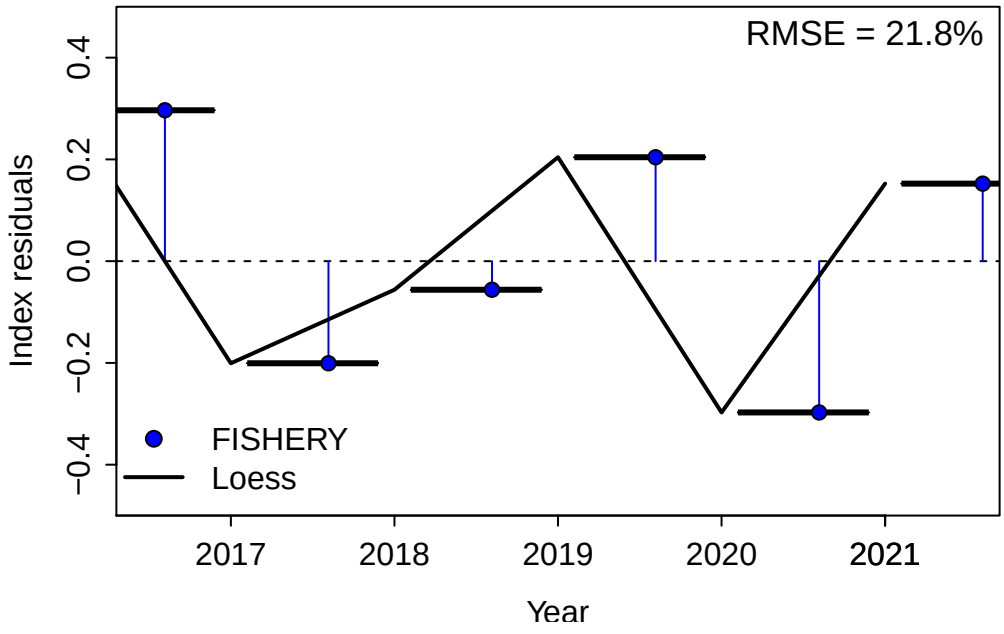
### Fit to Model

## CPUE

```
Residual Runs Test (/w plot) stats by Index:
```

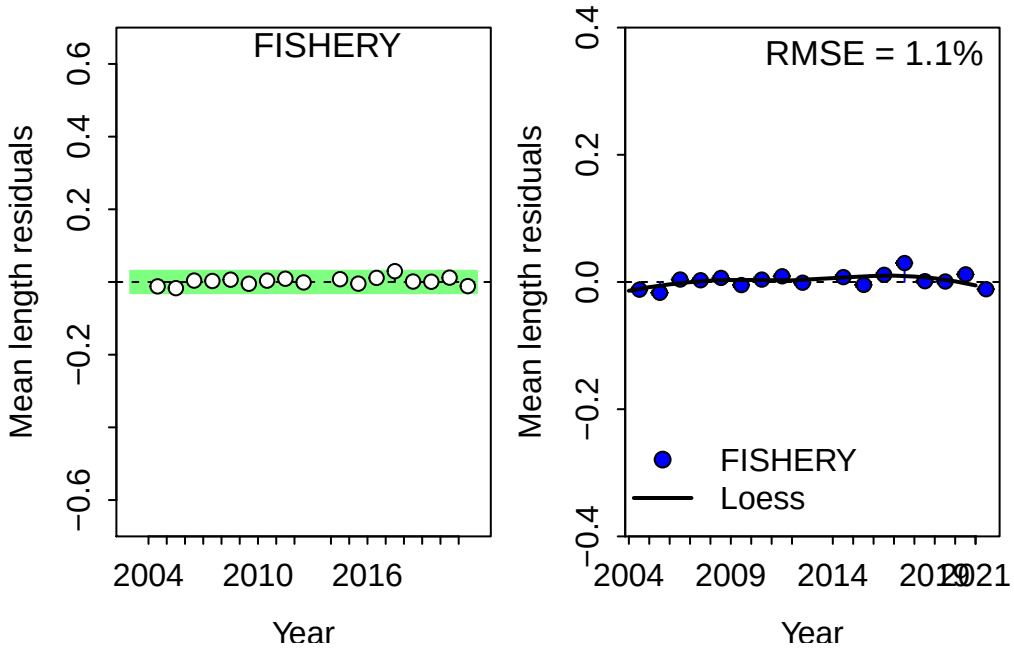
```
RMSE stats by Index:
```


Index
0
1
2
3
4
2016
2018
2020
Year
Index residuals
−0.6
−0.2
0.2
0.4
0.6
FISHERY
2016
2018
2020
Year

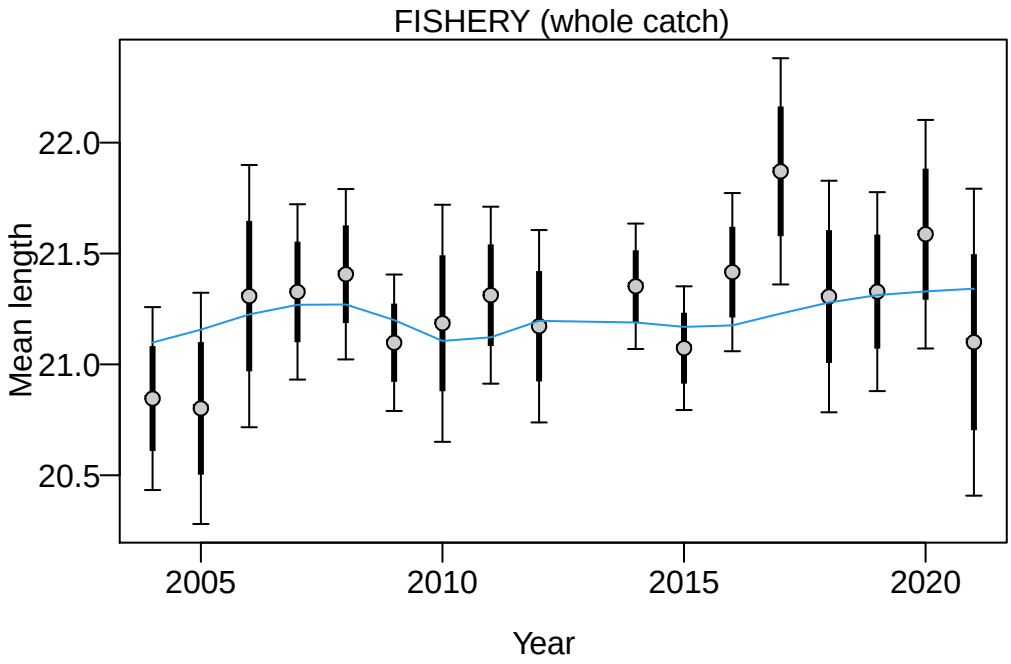

Index residuals
−0.4
−0.2
0.0
0.2
0.4
RMSE = 21.8%
FISHERY
Loess
2017
2018
2019
2020
2021
Year

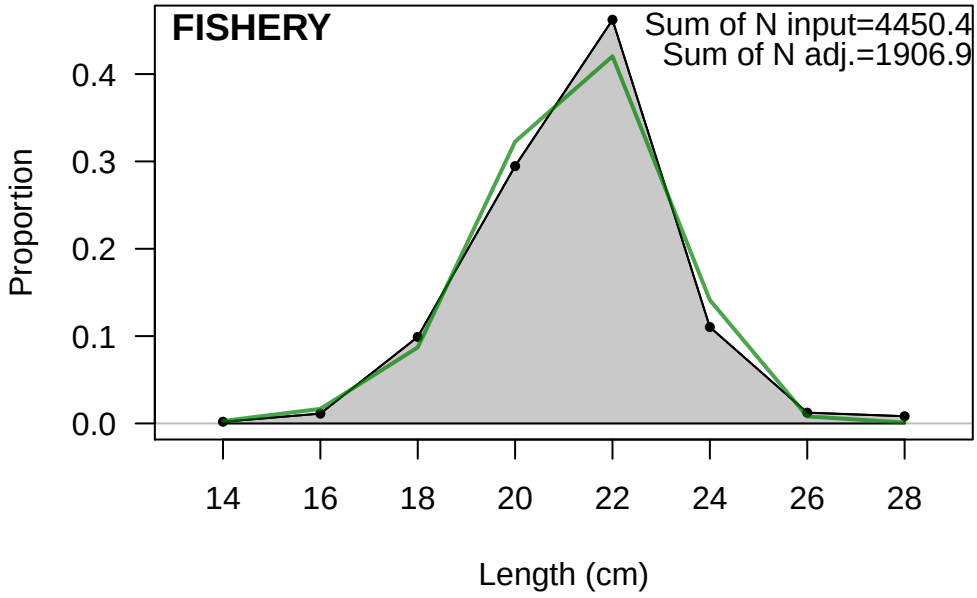
### Length Comp

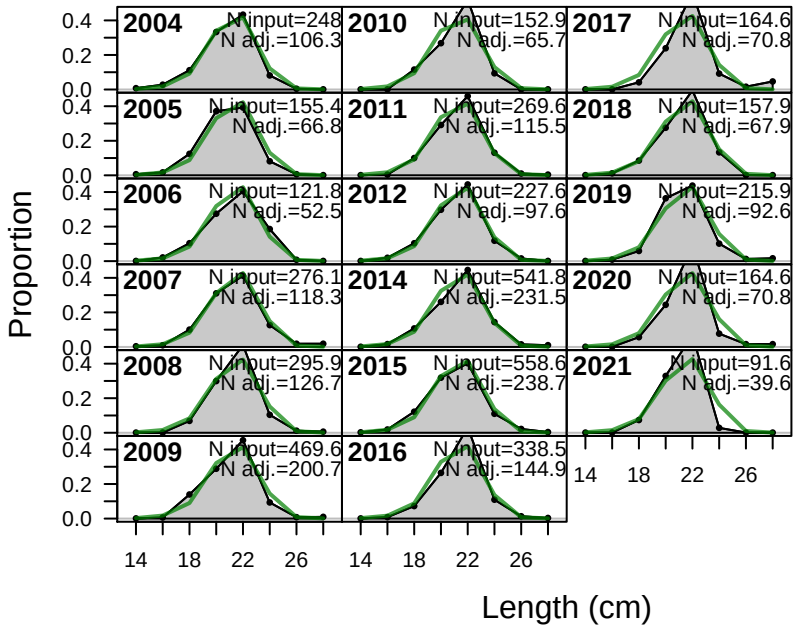
```
Residual Runs Test (/w plot) stats by Mean length:

    Index runs.p   test   sigma3.lo  sigma3.hi type
1 FISHERY  0.552 Passed -0.03070437 0.03070437  len

RMSE stats by Index:

# A tibble: 2 x 3
  Fleet    RMSE.perc  Nobs
  <chr>        <dbl> <int>
1 FISHERY        1.1    17
2 Combined       1.1    17
```




### Retrospective and Hindcasting

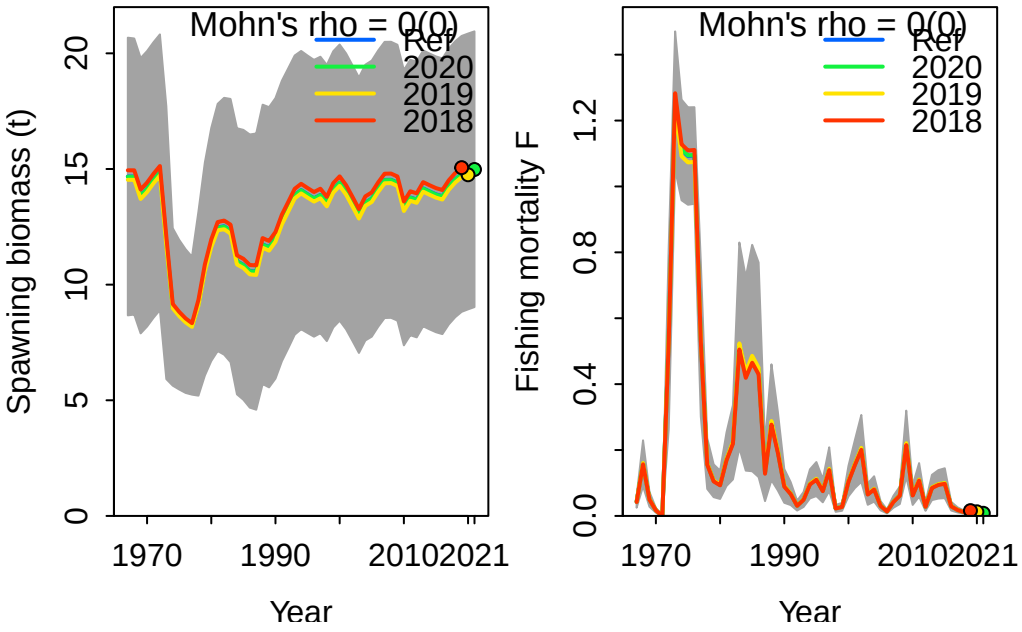

FISHERY (whole catch)
Mean length
22.0
21.5
21.0
20.5
2005
2010
2015
2020
Year


FISHERY
Sum of N input=4450.4
Sum of N adj.=1906.9
Proportion
0.4
0.3
0.2
0.1
0.0
14
16
18
20
22
24
26
28
Length (cm)




**Retrospective**

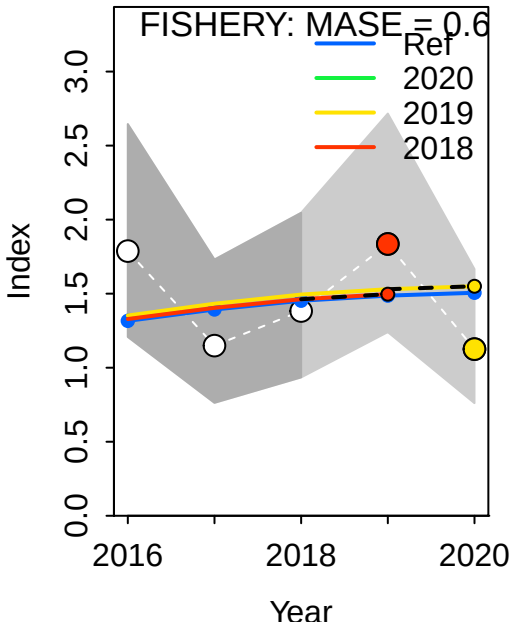
`Mohn's Rho stats, including one step ahead forecasts:`



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

  type     peel          Rho   ForecastRho
1    F     2020  0.000498176  0.0004884789
2    F     2019  0.006978065  0.0067896572
3    F     2018 -0.016916183 -0.0165080373
4    F Combined -0.003146648 -0.0030766337
```

### Hindcasting

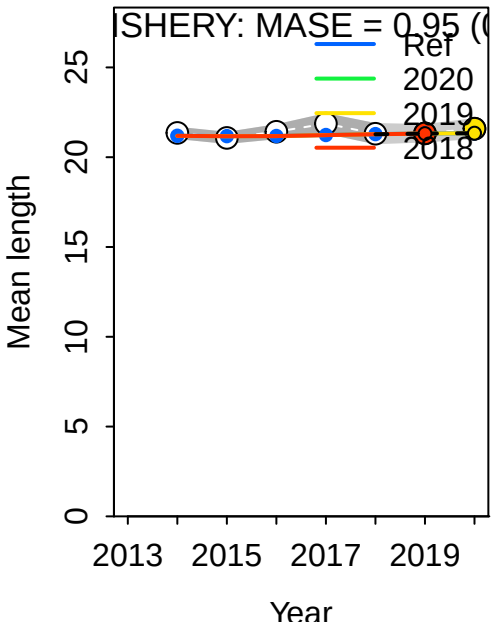
```
Plotting Hindcast Cross-Validation (one-step-ahead)

 Computing MASE with only 2 of 3  prediction residuals for Index FISHERY

 Warning:  Unequal spacing of naive predictions residuals may influence the interpretation o
```




```
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 o
```

```
MASE stats by Index:
```



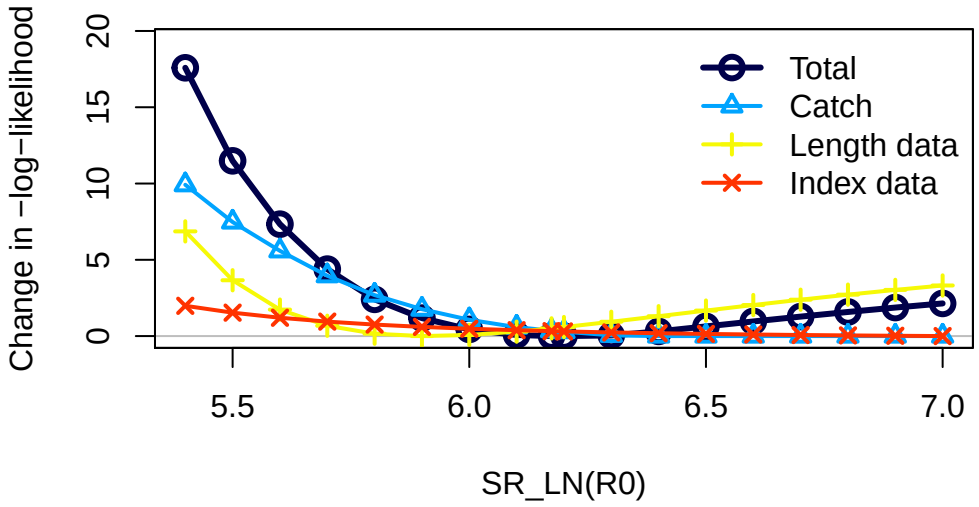

**Recruitment Deviations**

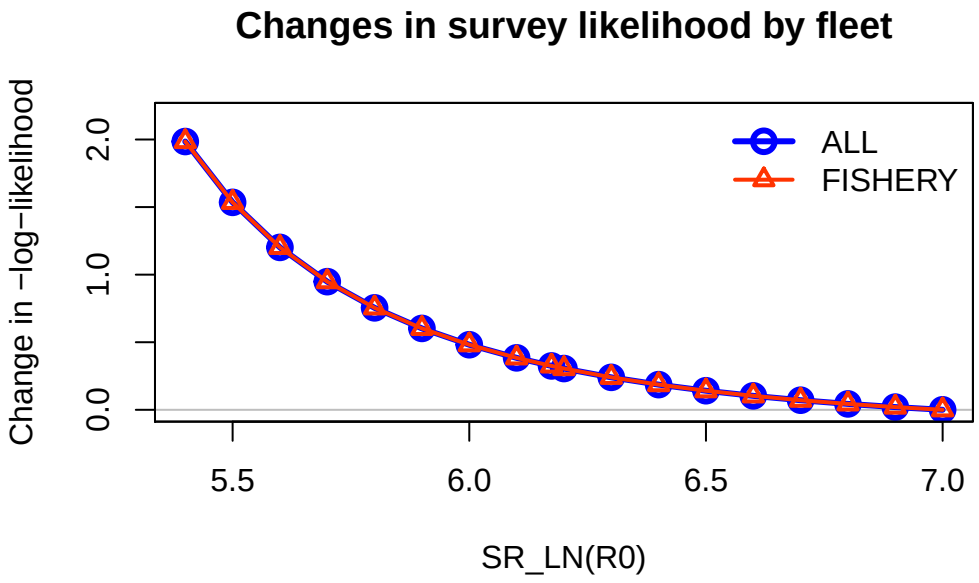
**Likelihood Profile**

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

| | frac_change | include | label |
|---|---|---|---|
| TOTAL | 1.0000 | TRUE | Total |
| Catch | 0.5640 | TRUE | Catch |
| Equil_catch | 0.0000 | FALSE | Equilibrium catch |
| Survey | 0.1129 | TRUE | Index data |
| Length_comp | 0.3903 | 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 | 0.0007 | FALSE | Priors |

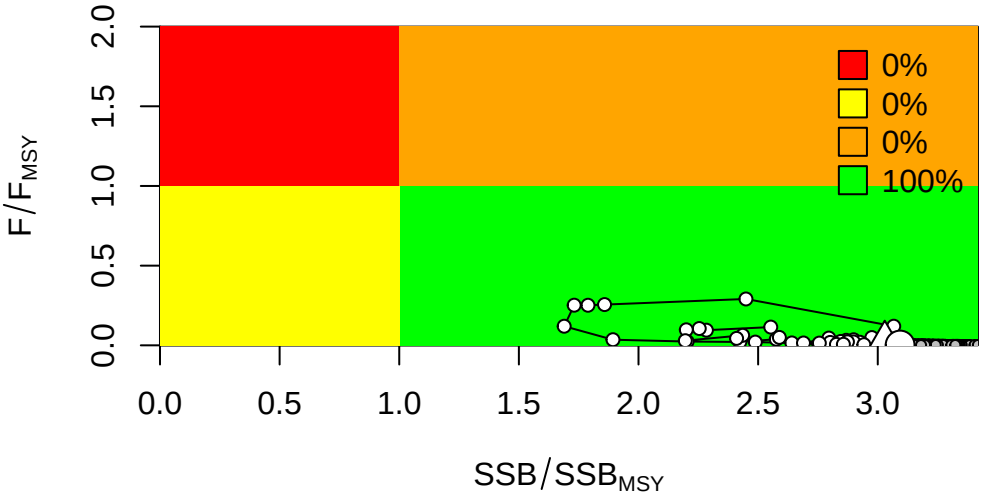
```
Parm_softbounds          0.0000   FALSE                    Soft bounds
Parm_devs                0.0000   FALSE          Parameter deviations
Crash_Pen                0.0000   FALSE                  Crash penalty
```

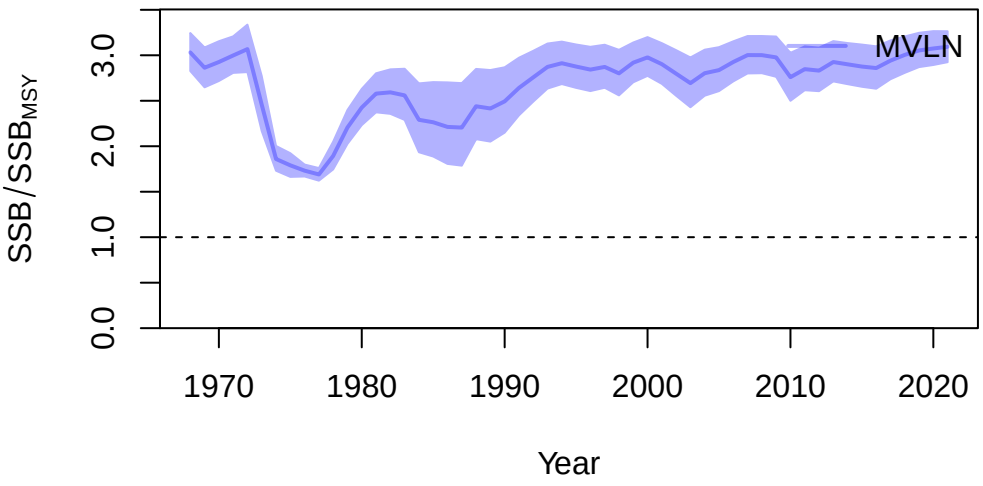


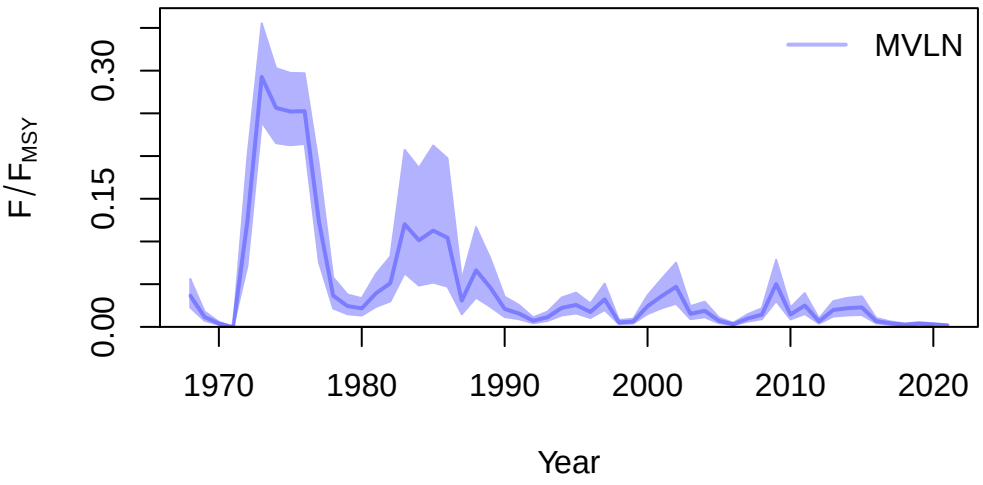



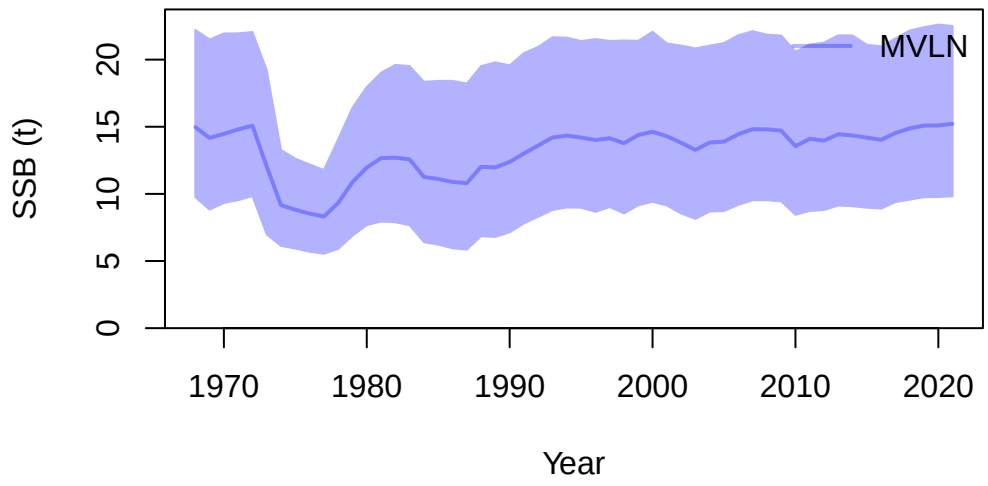
**Management Quantities**

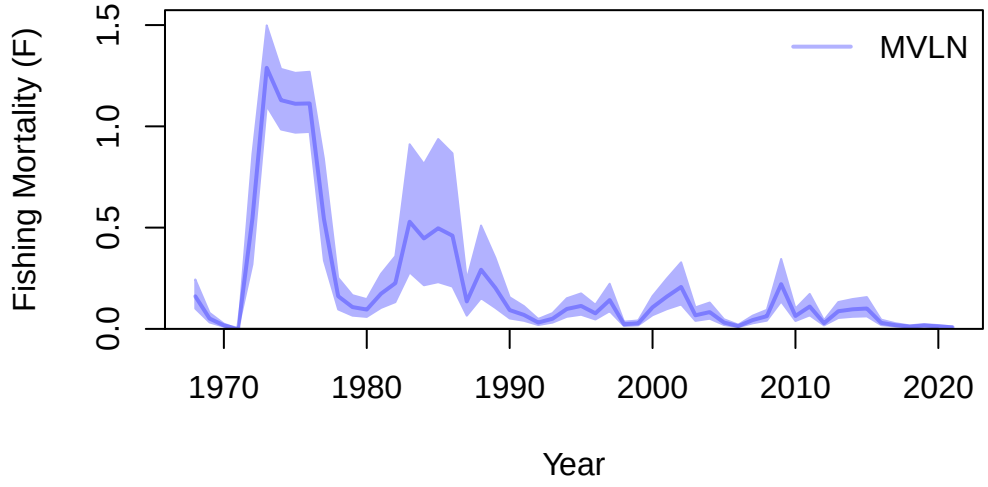
`starter.sso with Bratio: SSB/SSBMSY and F: _abs_F`




SSB/SSB$_{MSY}$
0.0
1.0
2.0
3.0
MVLN
1970
1980
1990
2000
2010
2020
Year

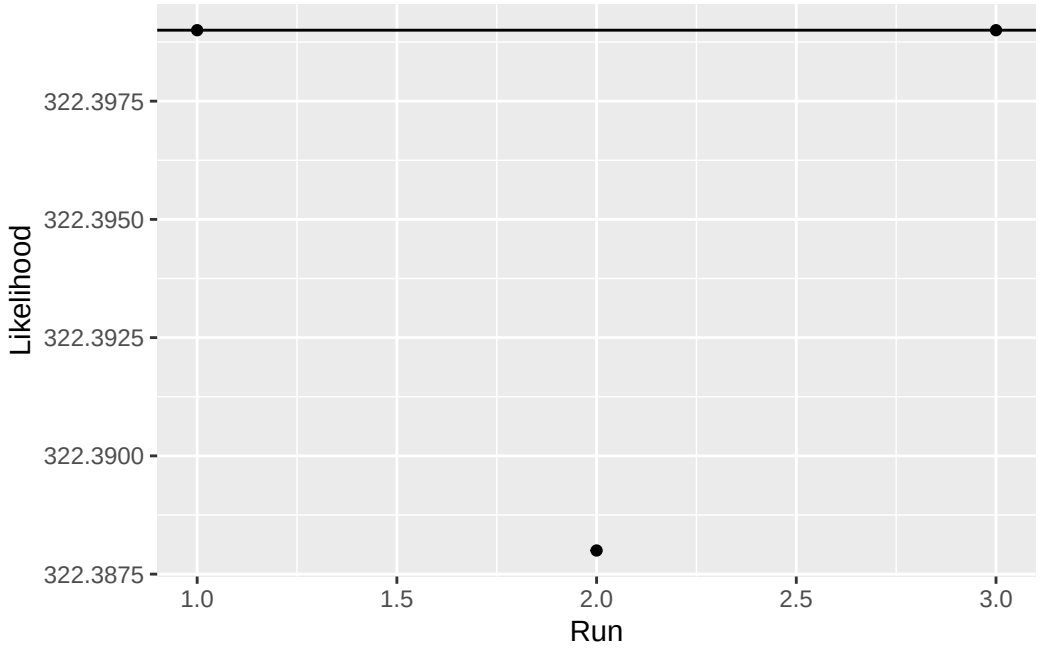

F/F$_{MSY}$
0.00
0.15
0.30
MVLN
1970
1980
1990
2000
2010
2020
Year

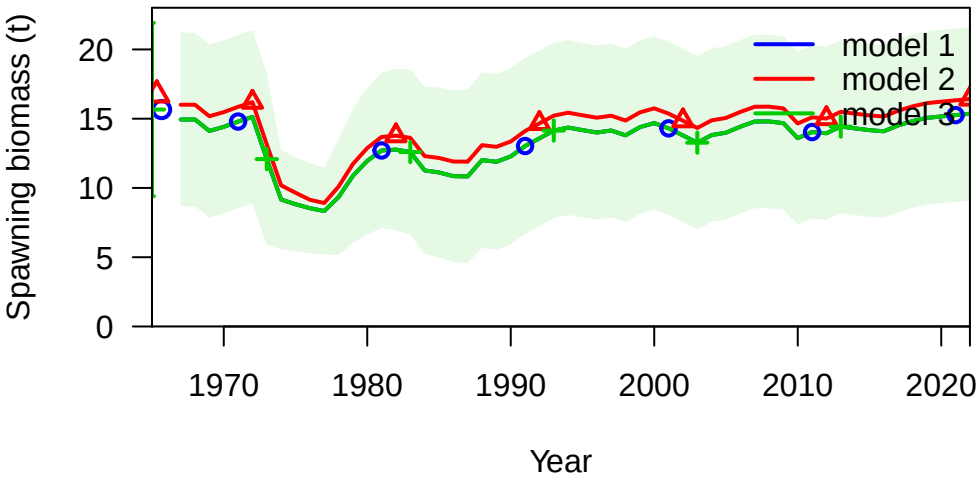


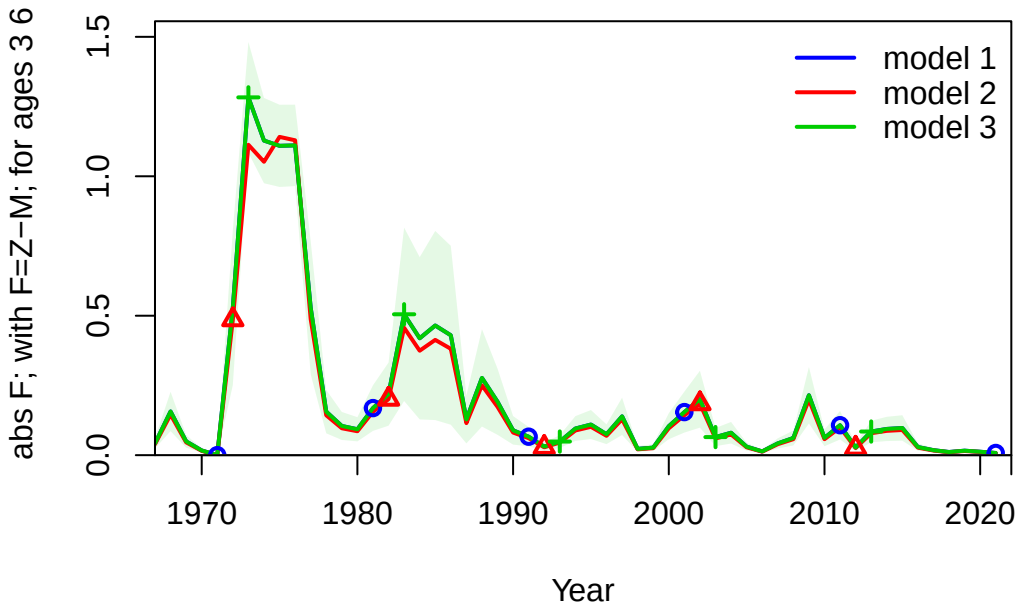



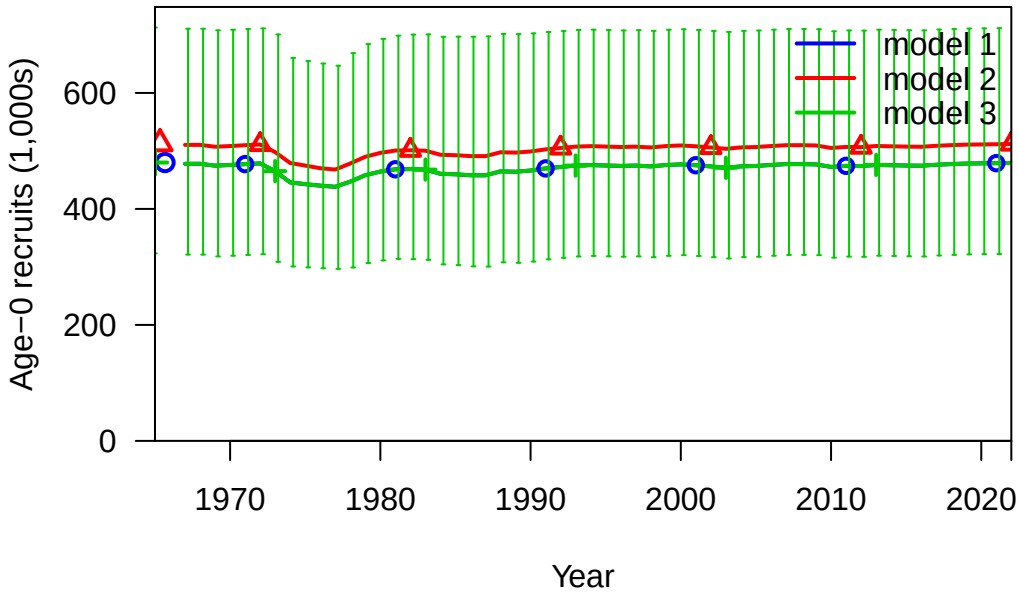

```
null device
          1
```

**Jitter**


322.3975
322.3950
322.3925
322.3900
322.3875
Likelihood
1.0
1.5
2.0
2.5
3.0
Run


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


abs F; with F=Z−M; for ages 3 6
0.0
0.5
1.0
1.5
1970
1980
1990
2000
2010
2020
Year
model 1
model 2
model 3


Age−0 recruits (1,000s)
0
200
400
600
1970
1980
1990
2000
2010
2020
Year
model 1
model 2
model 3