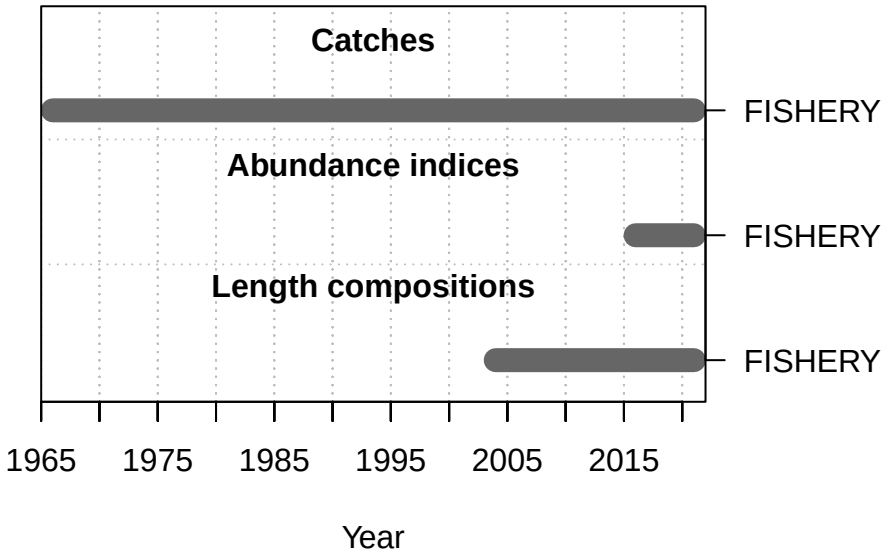
American Samoa Model Checks

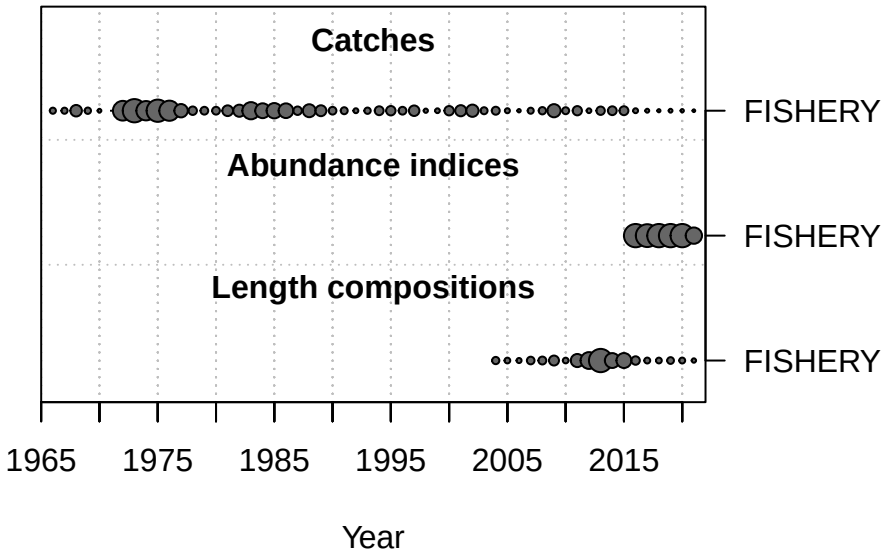
2022-09-22

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

Model Output

Input Data





Convergence Check

```
  Converged     MaxGrad
1      TRUE 4.42361e-06
```

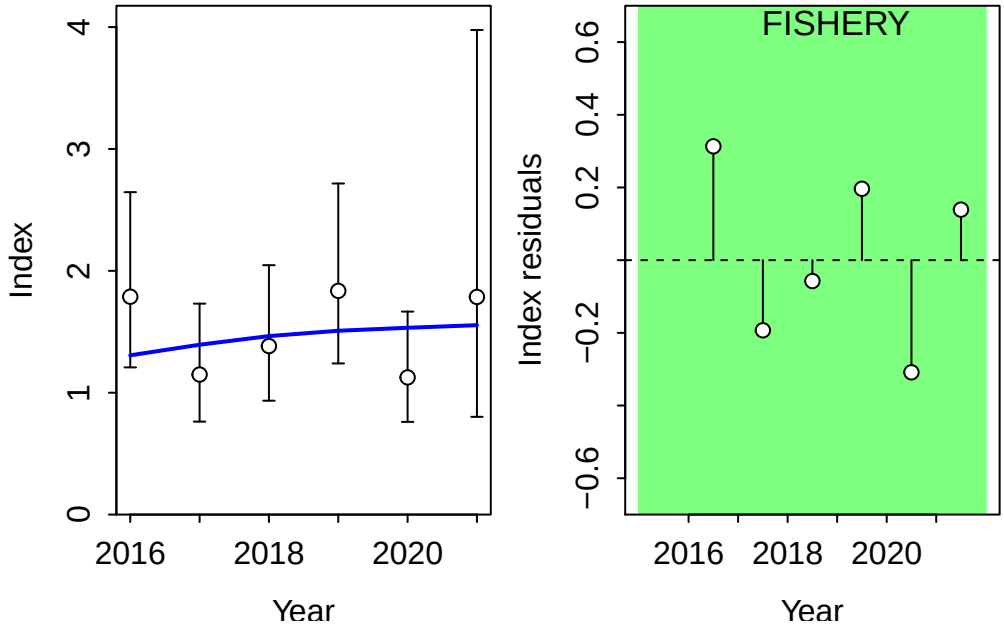
```
[1] "1 NOTE:  Max data length bin: 28  < max pop len bins: 31; so will accumulate larger pop
[2] "2 warning: poor convergence in Fspr search 0.4 0.452066"
[3] "3 warning: Fmult = 40 cannot get high enough to achieve low SPR target: 0.4; SPR achieve
[4] "4 warning: poor convergence in Btarget search 5.61753 7.17708"
[5] "5 warning: poor convergence in Fmsy, final dy/dy2= -0.0152624"
[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 warnings: 7"
```

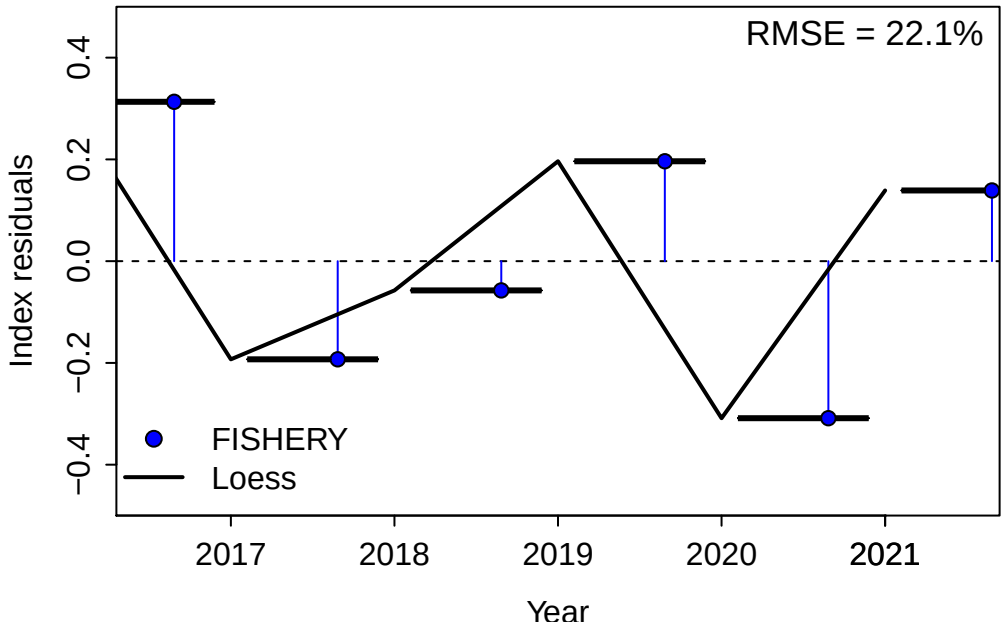
Fit to Model

CPUE

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

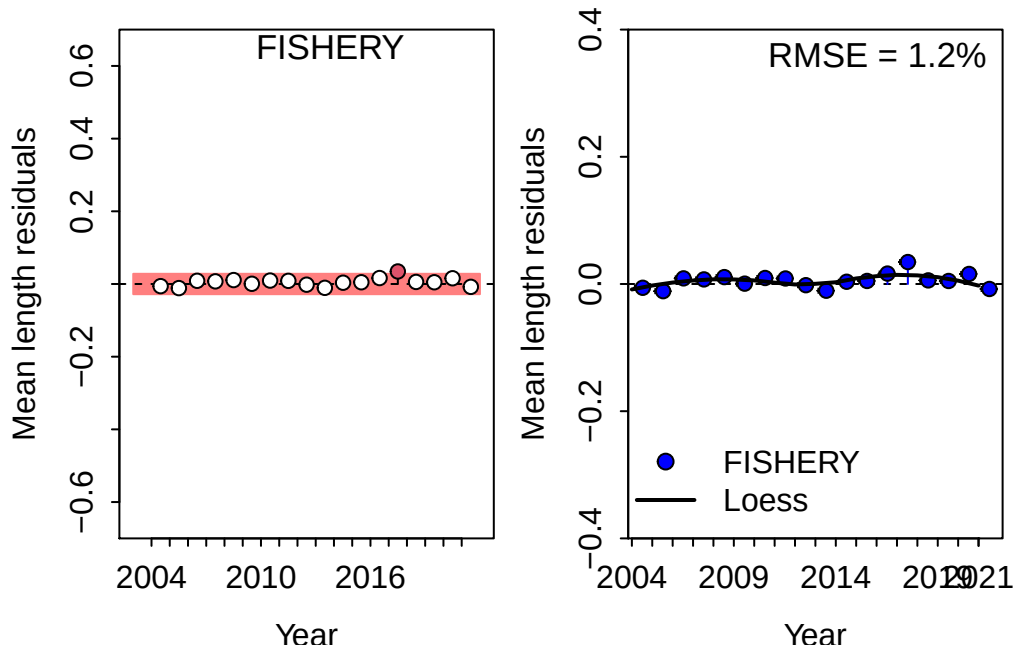
```
RMSE stats by Index:
```


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

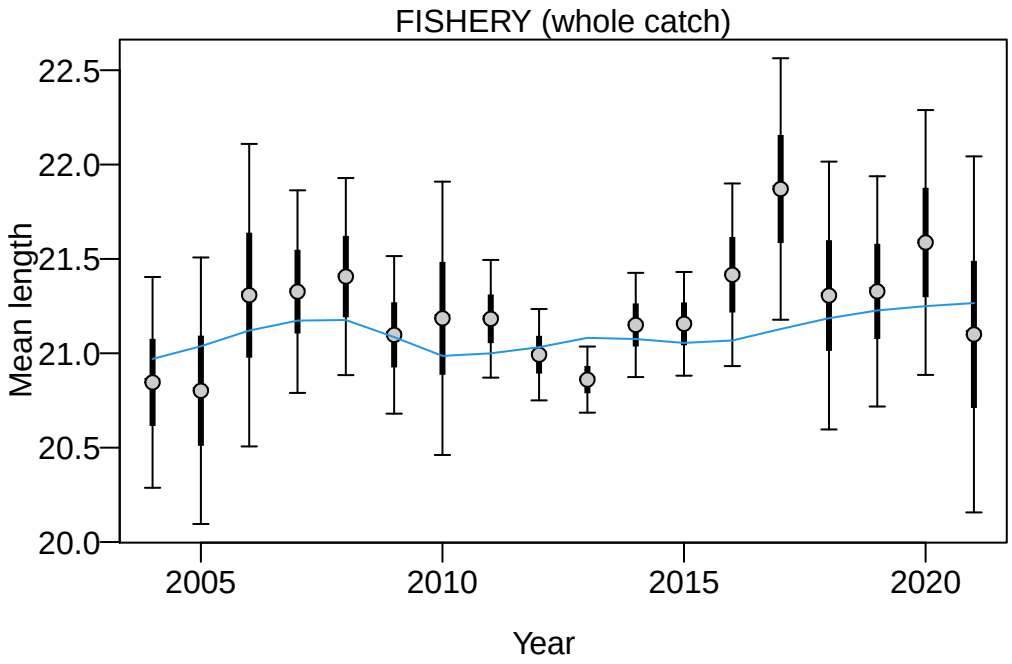

Index residuals
−0.4
−0.2
0.0
0.2
0.4
RMSE = 22.1%
FISHERY
Loess
2017
2018
2019
2020
2021
Year

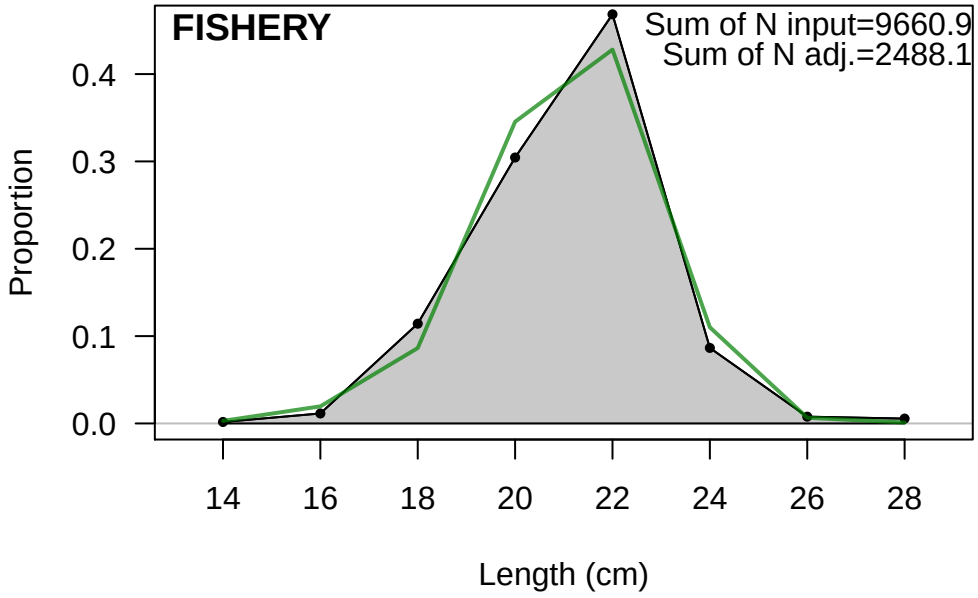
Length Comp

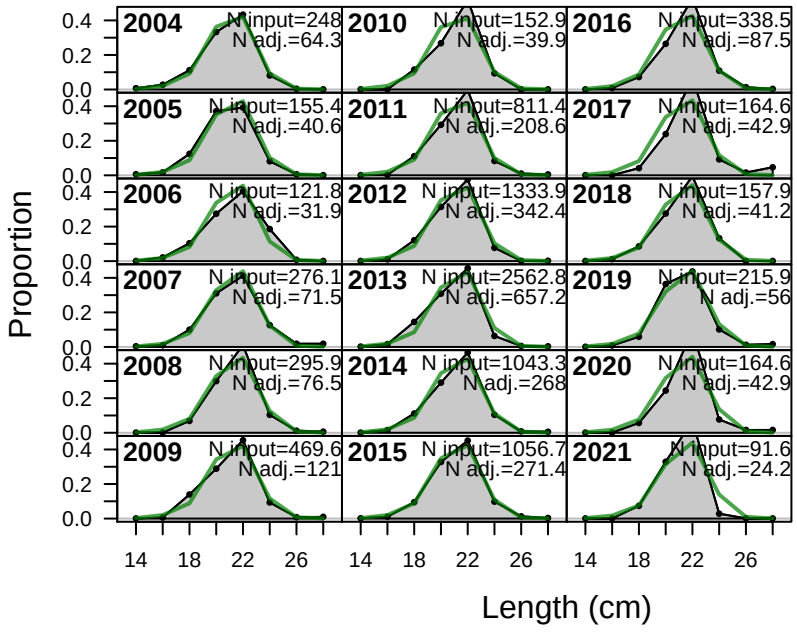
```
Residual Runs Test (/w plot) stats by Mean length:

    Index runs.p   test   sigma3.lo  sigma3.hi type
1 FISHERY  0.024 Failed -0.02803011 0.02803011  len

RMSE stats by Index:

# A tibble: 2 x 3
  Fleet    RMSE.perc  Nobs
  <chr>        <dbl> <int>
1 FISHERY        1.2    18
2 Combined       1.2    18
```



Retrospective and Hindcasting

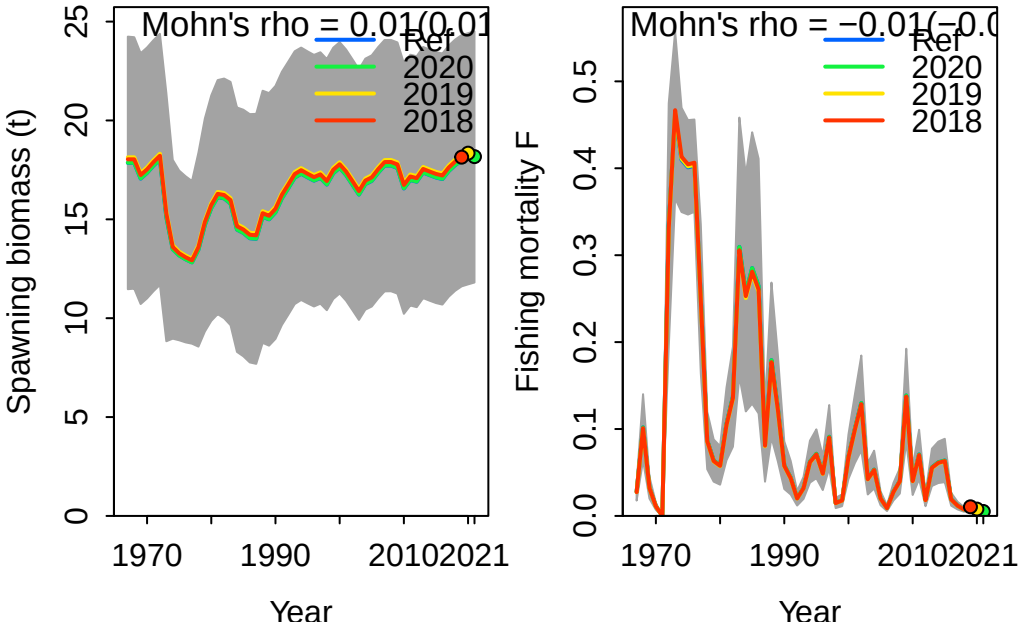

FISHERY (whole catch)
Mean length
22.5
22.0
21.5
21.0
20.5
20.0
2005
2010
2015
2020
Year


FISHERY
Sum of N input=9660.9
Sum of N adj.=2488.1
Proportion
0.4
0.3
0.2
0.1
0.0
14
16
18
20
22
24
26
28
Length (cm)



Retrospective

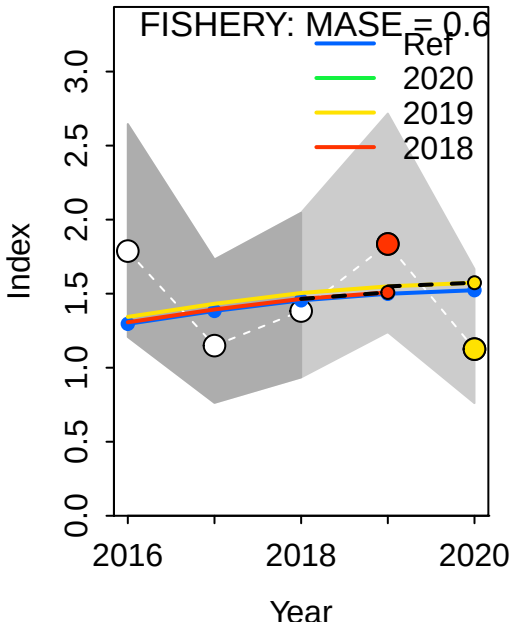
`Mohn's Rho stats, including one step ahead forecasts:`



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

  type     peel           Rho   ForecastRho
1    F     2020 -0.0002433336 -0.0002272745
2    F     2019 -0.0154574401 -0.0151827685
3    F     2018 -0.0090489327 -0.0087113446
4    F Combined -0.0082499021 -0.0080404625
```

Hindcasting

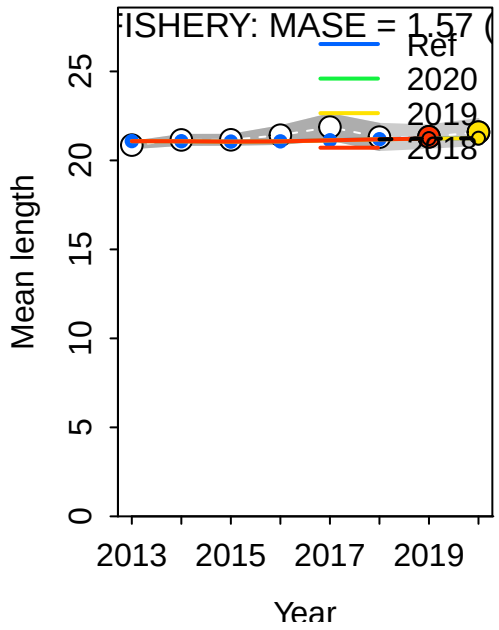
```
Plotting Hindcast Cross-Validation (one-step-ahead)

 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:
```



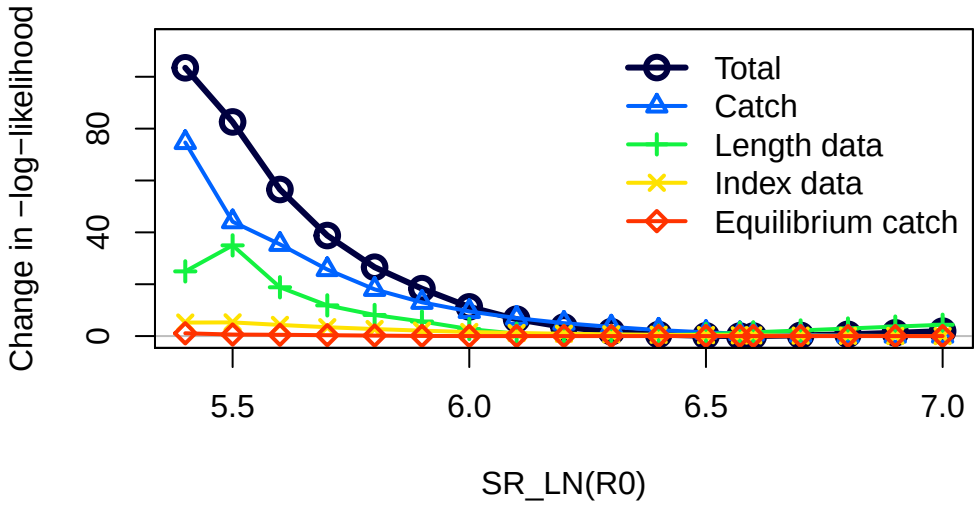
Recruitment Deviations

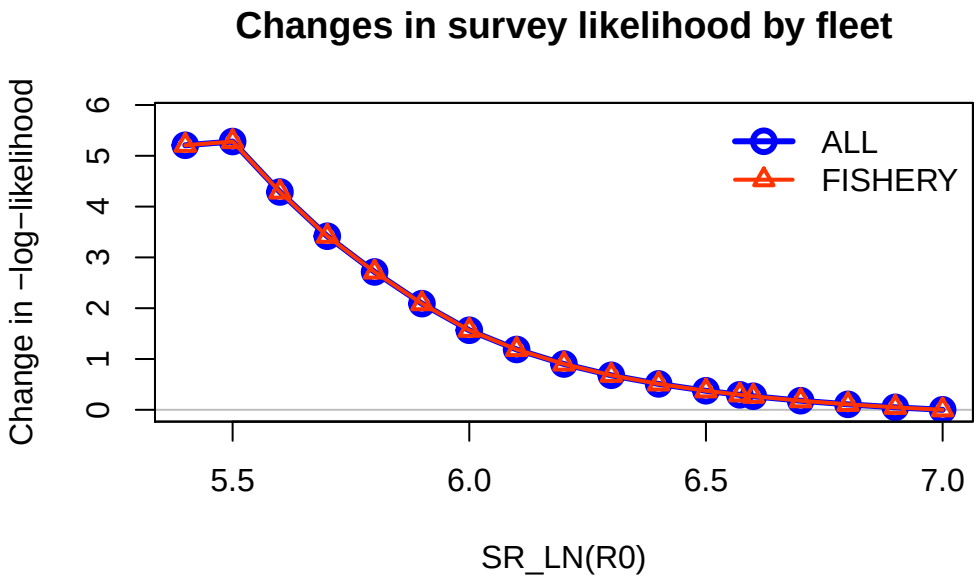
Likelihood Profile

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

	frac_change	include	label
TOTAL	1.0000	TRUE	Total
Catch	0.7217	TRUE	Catch
Equil_catch	0.0105	TRUE	Equilibrium catch
Survey	0.0510	TRUE	Index data
Length_comp	0.3381	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	0.0011	FALSE	Priors

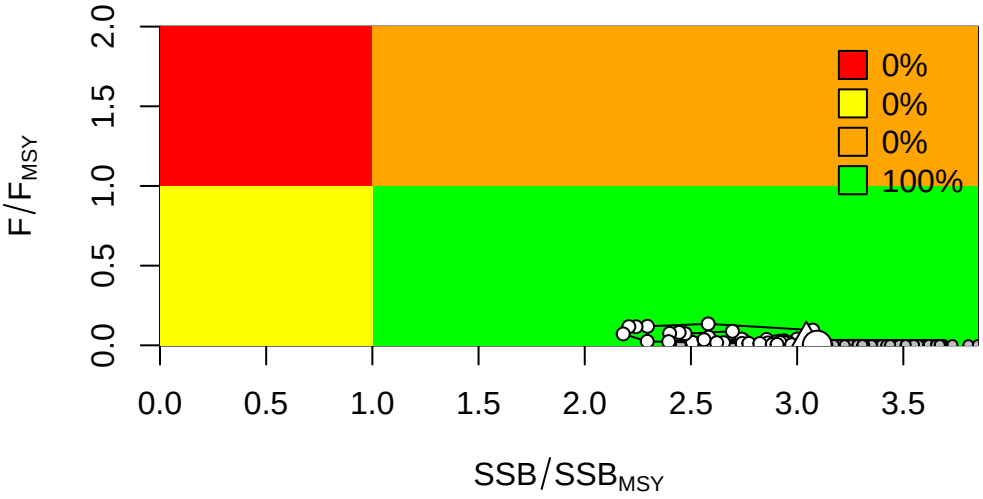
```
Parm_softbounds          0.0000   FALSE                  Soft bounds
Parm_devs                0.0000   FALSE        Parameter deviations
Crash_Pen                0.0000   FALSE                Crash penalty
```

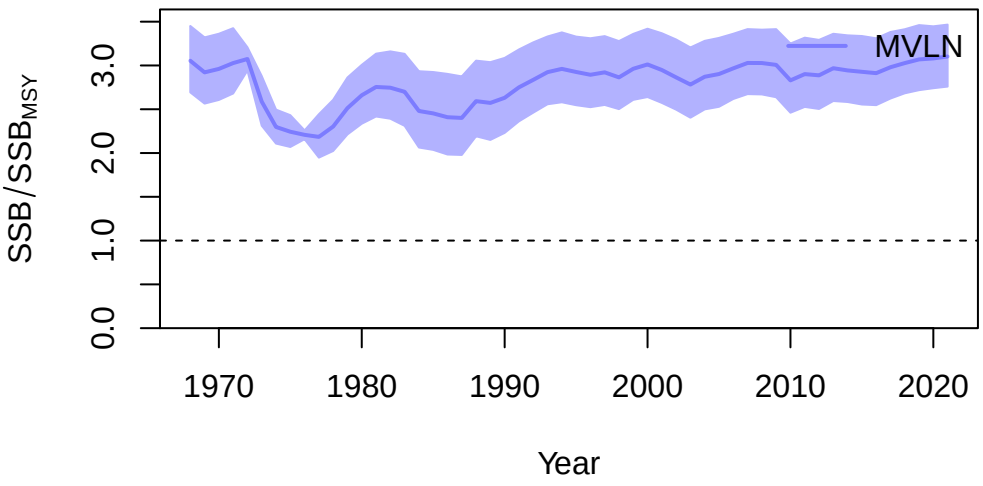


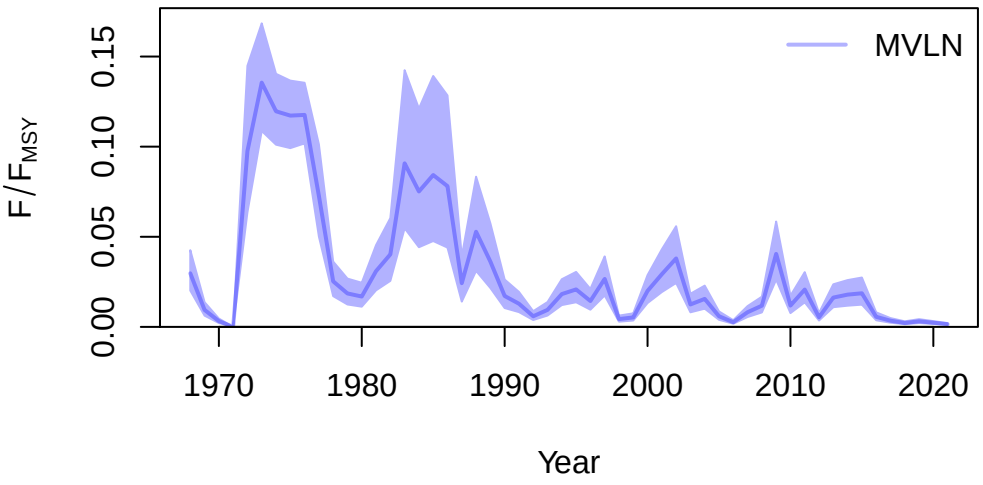


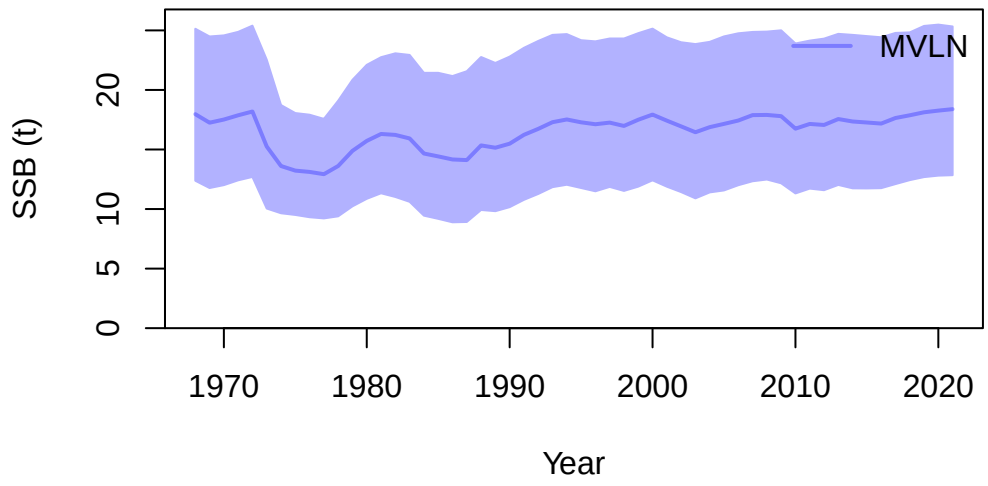
Management Quantities

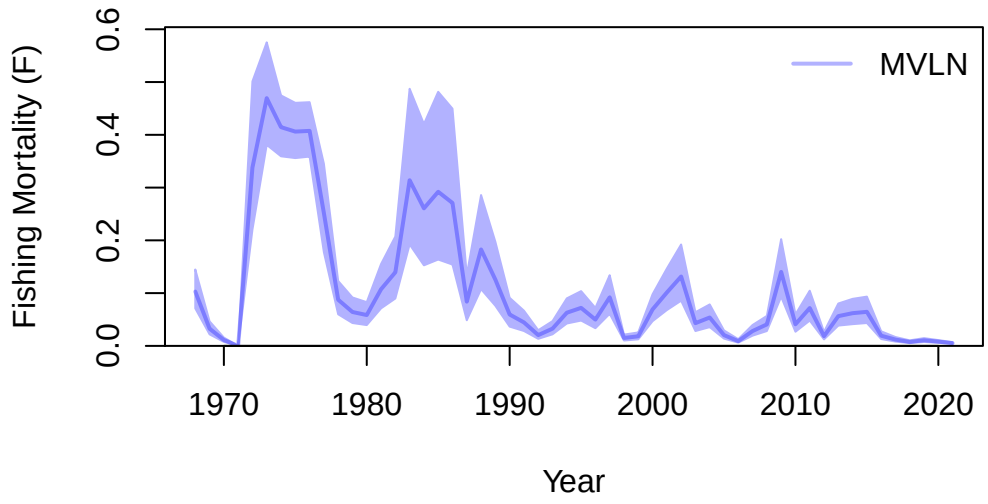
`starter.sso with Bratio: SSB/SSBMSY and F: _abs_F`




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

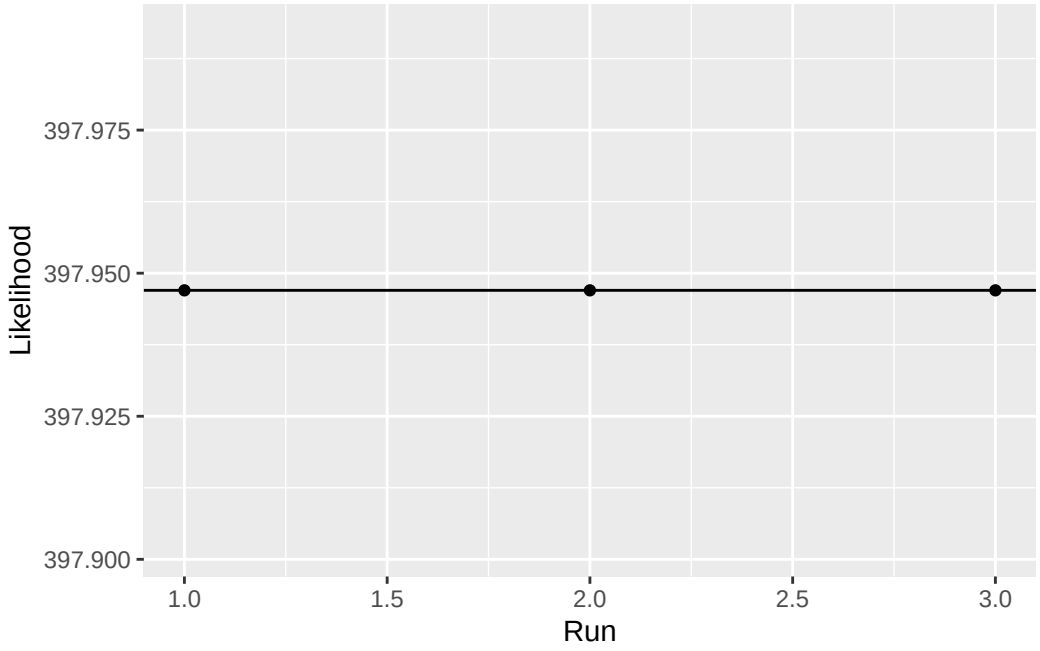

F/F$_{MSY}$
0.00
0.05
0.10
0.15
1970
1980
1990
2000
2010
2020
Year
MVLN

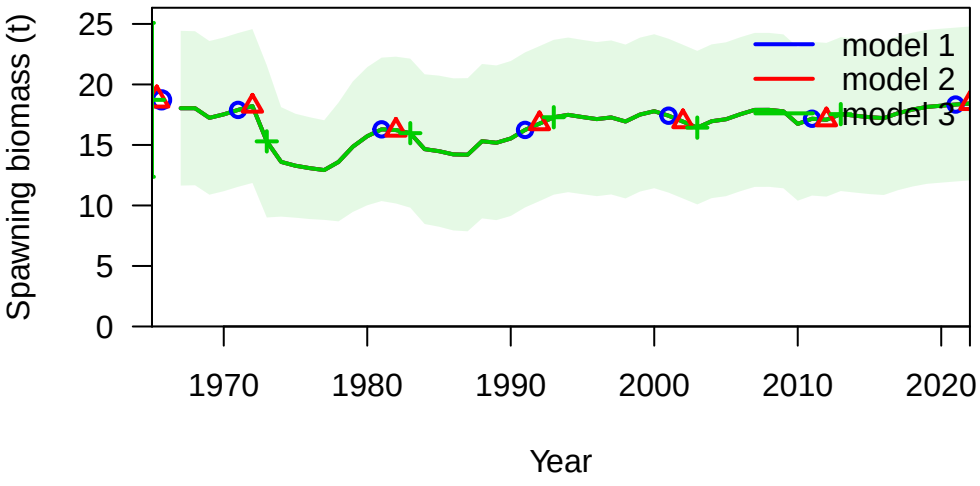


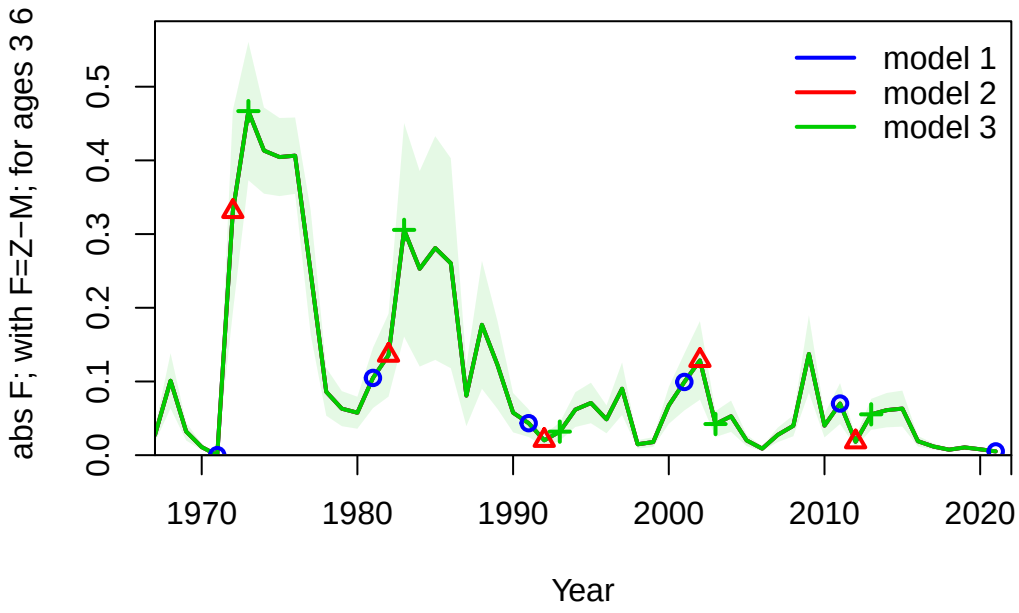


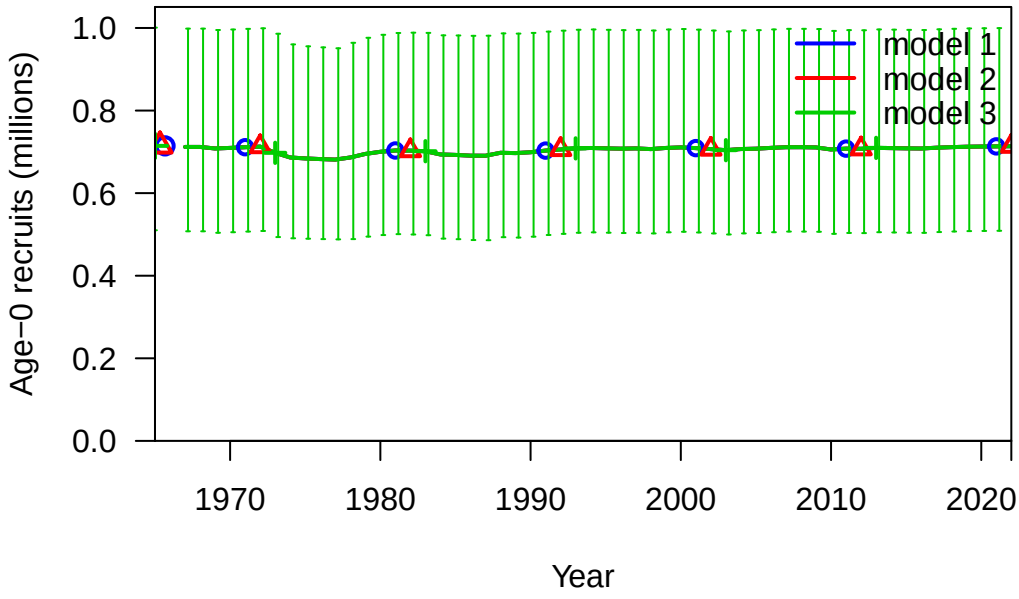

```
null device
          1
```

Jitter


Likelihood
397.975
397.950
397.925
397.900
1.0
1.5
2.0
2.5
3.0
Run


Spawning biomass (t)
25
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
0.1
0.2
0.3
0.4
0.5
1970
1980
1990
2000
2010
2020
Year
model 1
model 2
model 3


Age−0 recruits (millions)
0.0
0.2
0.4
0.6
0.8
1.0
1970
1980
1990
2000
2010
2020
Year
model 1
model 2
model 3