# American Samoa Model Checks

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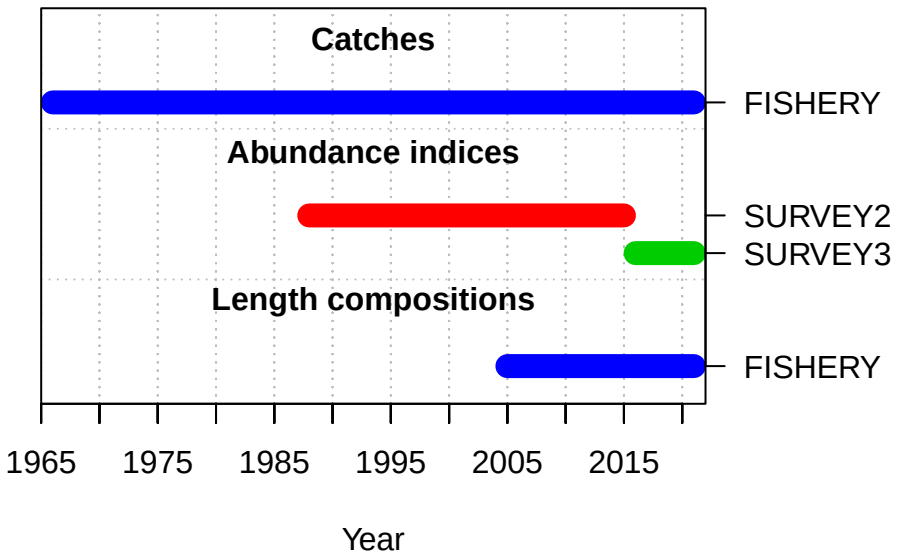
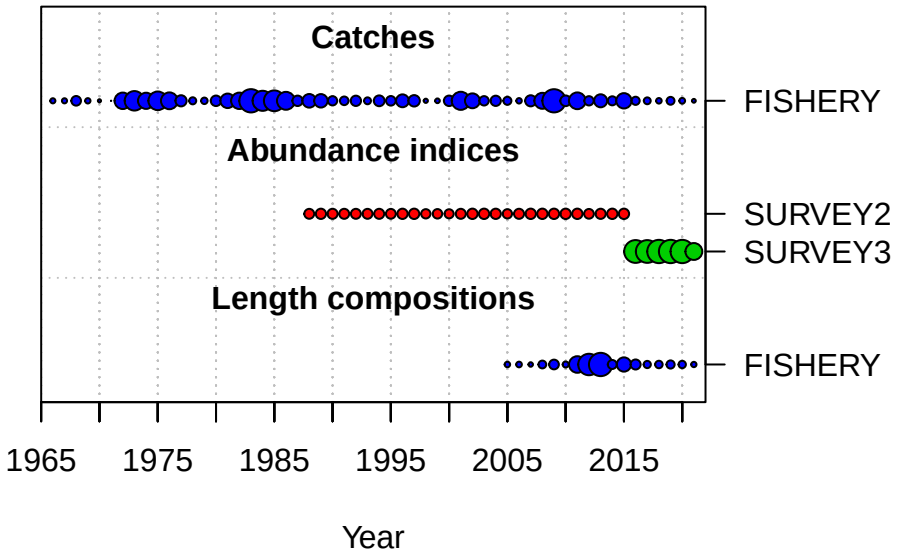
**This is a summary report for the LERU base model run.**

## Model Output

### Input Data






### Convergence Check

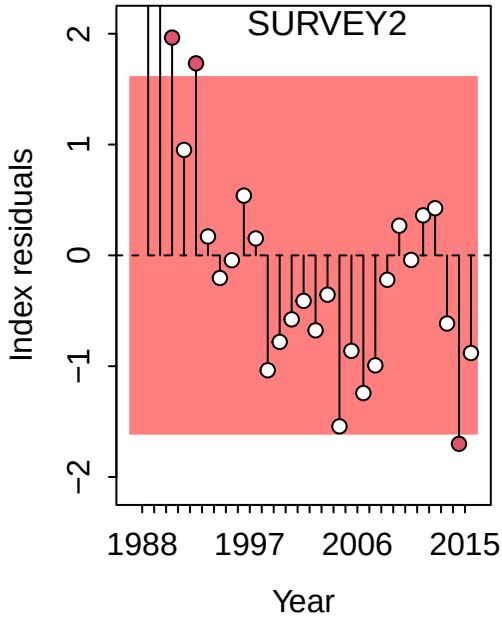
```
  Converged     MaxGrad
1      TRUE 4.37367e-06
```

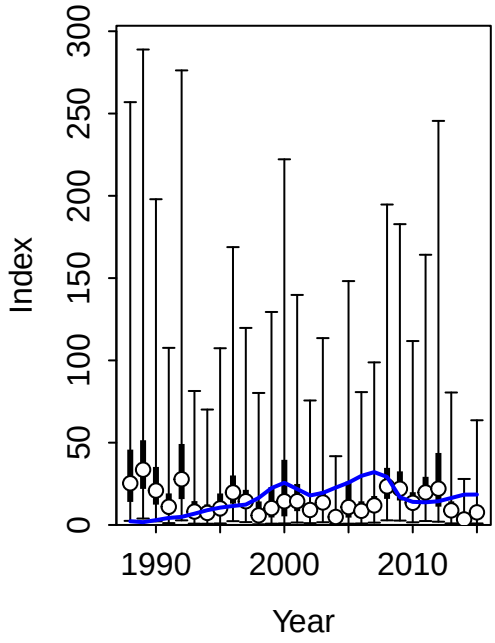
```
[1] "1 NOTE:  Max data length bin: 38.5  < max pop len bins: 43; so will accumulate larger p
[2] " N parameters are on or within 1% of min-max bound: 1; check results, variance may be s
[3] "N warnings: 1"
```

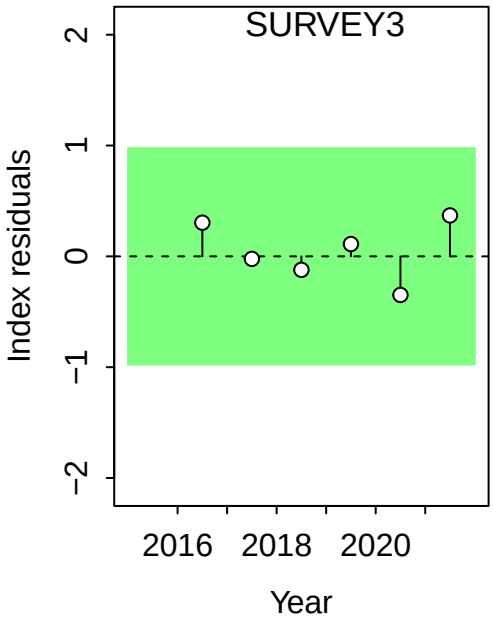
### Fit to Model

### CPUE

| Fleet | RMSE.perc | Nobs |
|---|---|---|
| SURVEY2 | 113.1 | 28 |
| SURVEY3 | 25.1 | 6 |
| Combined | 103.2 | 34 |


SURVEY2
Index residuals
2
1
0
−1
−2
1988
1997
2006
2015
Year

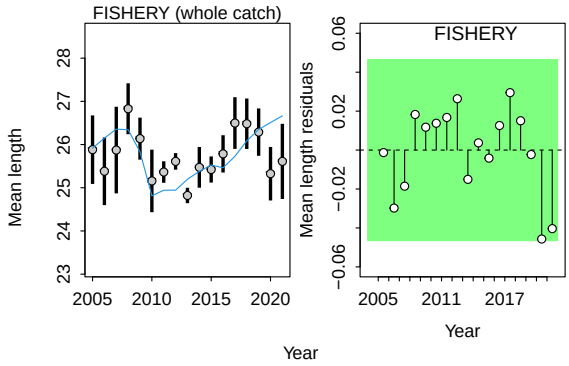

Index
300
250
200
150
100
50
0
1990
2000
2010
Year

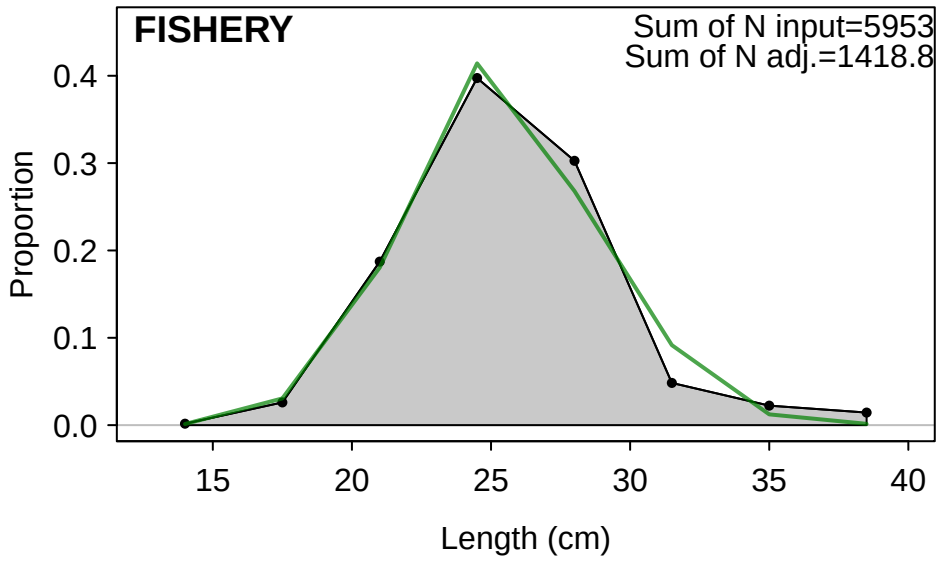

SURVEY3
Index residuals
2
1
0
−1
−2
2016
2018
2020
Year

### Length Comp

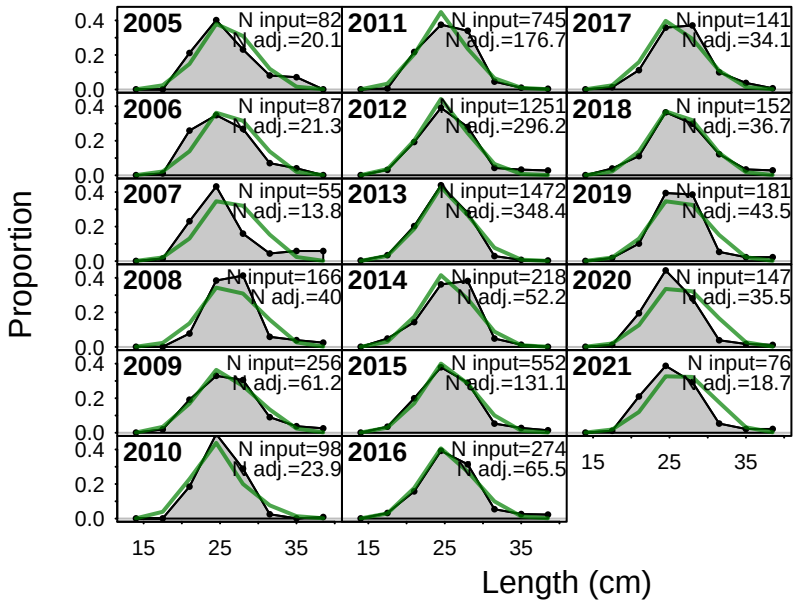
| Fleet | RMSE.perc | Nobs |
|---|---|---|
| FISHERY | 2.2 | 17 |
| Combined | 2.2 | 17 |

```
          w          lo          hi           Index runs.p   test   sigma3.lo  sigma3.hi type
0.13604605 0.07437904 0.37339620       1 FISHERY  0.107 Passed -0.04651642 0.04651642  len
```



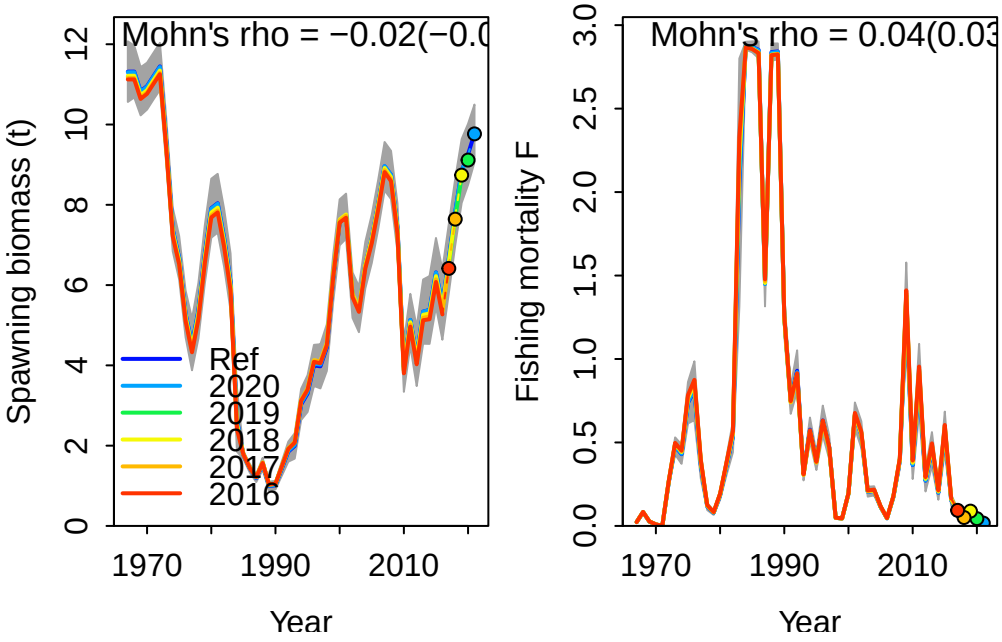




### Retrospective and Hindcasting




**Retrospective**

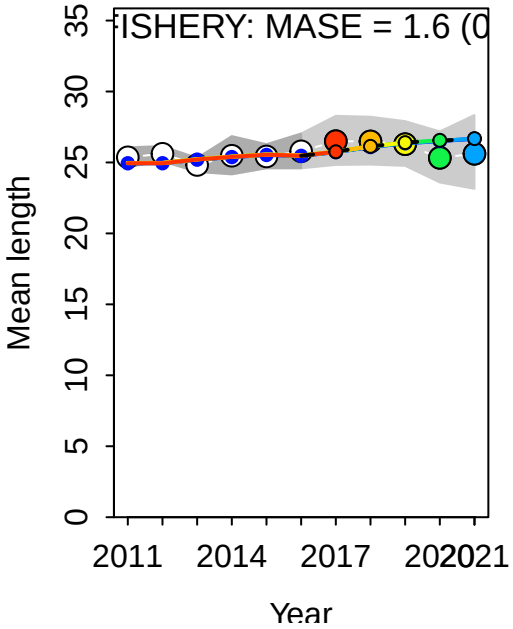
`Mohn's Rho stats, including one step ahead forecasts:`



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

  type     peel         Rho ForecastRho
1    F     2020 0.003982974 0.003846881
2    F     2019 0.032531283 0.030323897
3    F     2018 0.028109703 0.025815685
4    F     2017 0.050133390 0.043097124
5    F     2016 0.073611580 0.062353447
6    F Combined 0.037673786 0.033087407
```

### Hindcasting

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

No observations in evaluation years to compute prediction residuals for Index SURVEY2

MASE stats by Index:
Plotting Hindcast Cross-Validation (one-step-ahead)

 Computing MASE with all 5 of 5  prediction residuals for Index FISHERY


MASE stats by Index:

    Index Season     MASE     MAE.PR   MAE.base  MASE.adj n.eval
1 FISHERY      1 1.604008 0.02686844 0.01675081 0.2686844      5
```

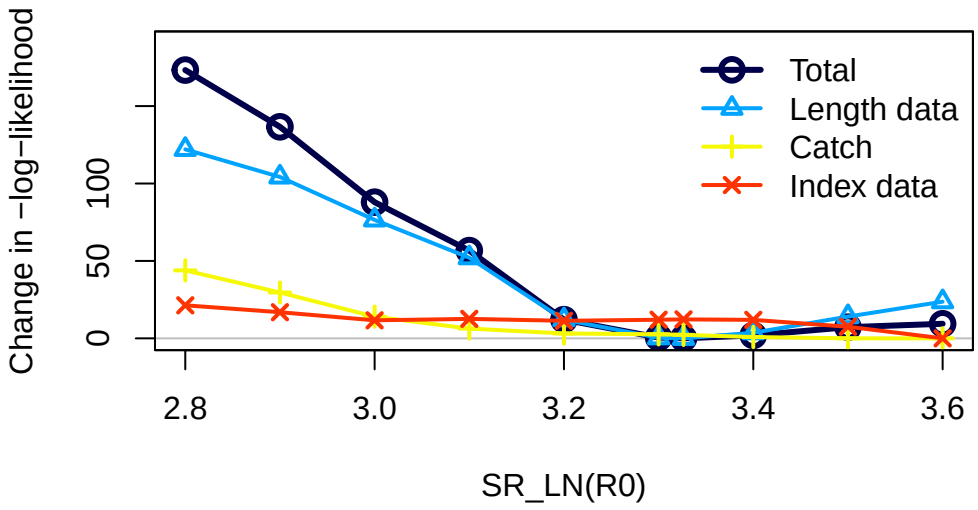


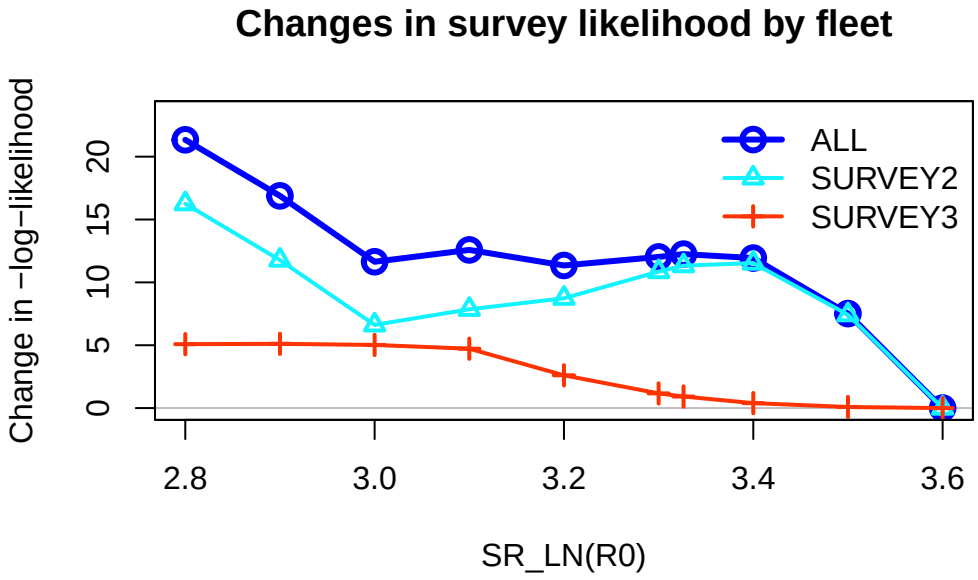

**Recruitment Deviations**

**Likelihood Profile**

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

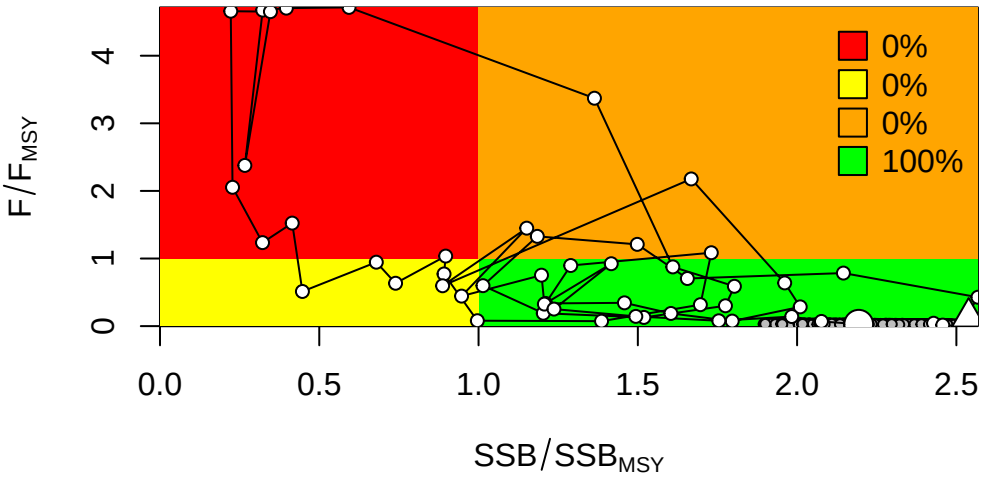
| | frac_change | include | label |
|---|---|---|---|
| TOTAL | 1.0000 | TRUE | Total |
| Catch | 0.2533 | TRUE | Catch |
| Equil_catch | 0.0000 | FALSE | Equilibrium catch |
| Survey | 0.1232 | TRUE | Index data |
| Length_comp | 0.7045 | TRUE | Length data |
| Recruitment | 0.0000 | FALSE | Recruitment |
| InitEQ_Regime | 0.0000 | FALSE | Initital equilibrium recruitment |
| Forecast_Recruitment | 0.0000 | FALSE | Forecast recruitment |
| Parm_priors | 0.0027 | FALSE | Priors |
| Parm_softbounds | 0.0001 | FALSE | Soft bounds |
| Parm_devs | 0.0000 | FALSE | Parameter deviations |
| Crash_Pen | 0.0000 | FALSE | Crash penalty |

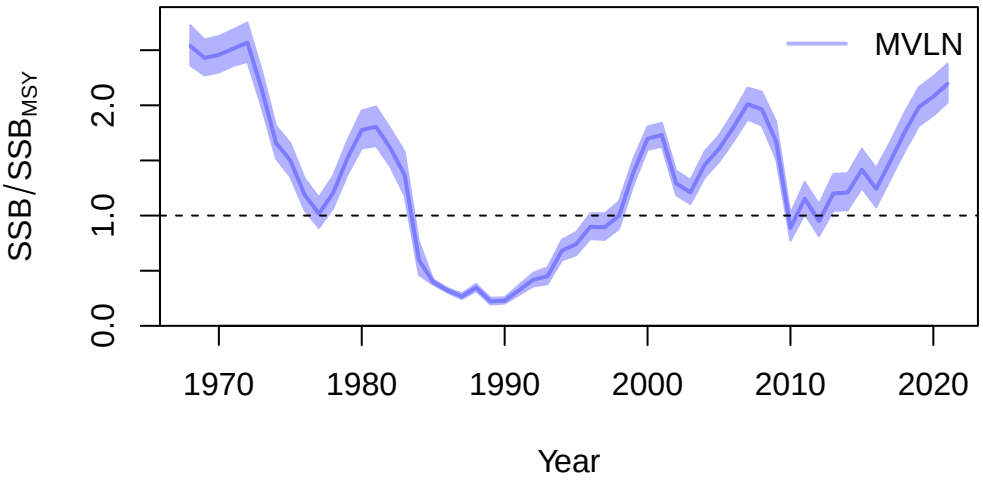


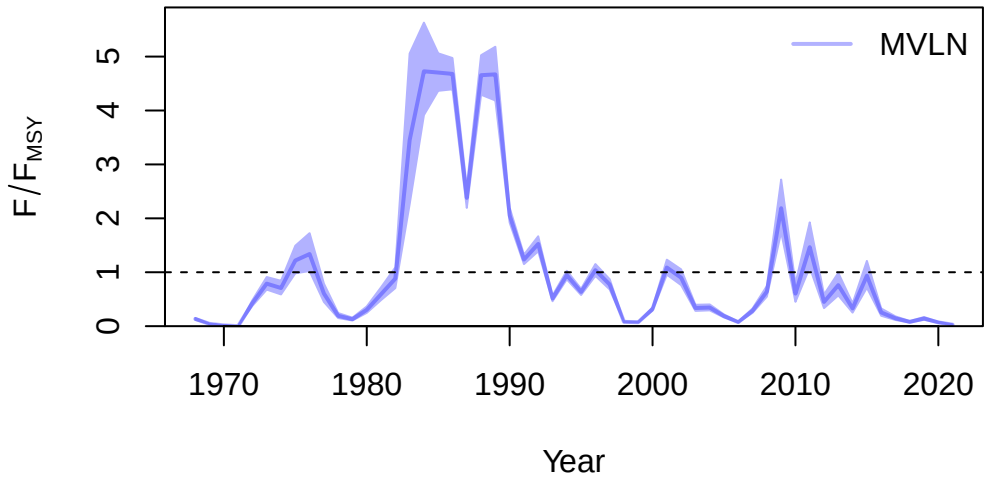



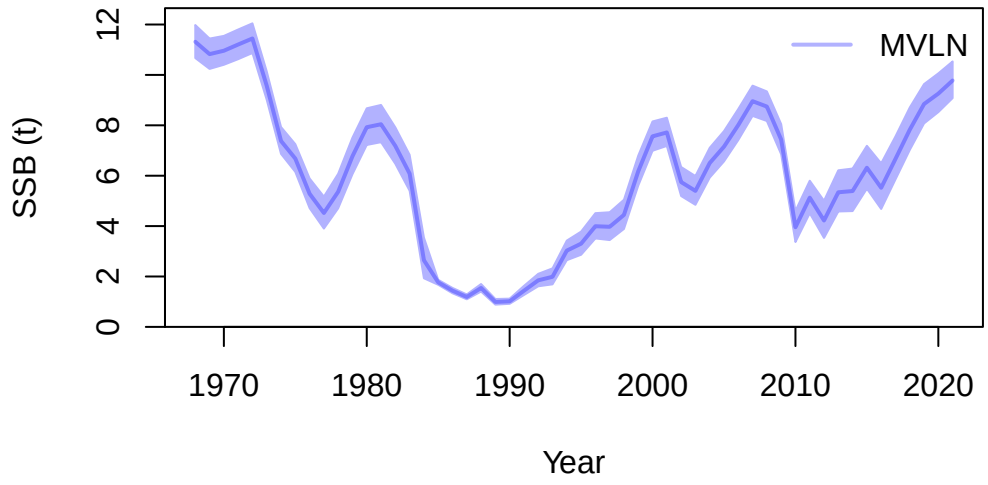

**Management Quantities**

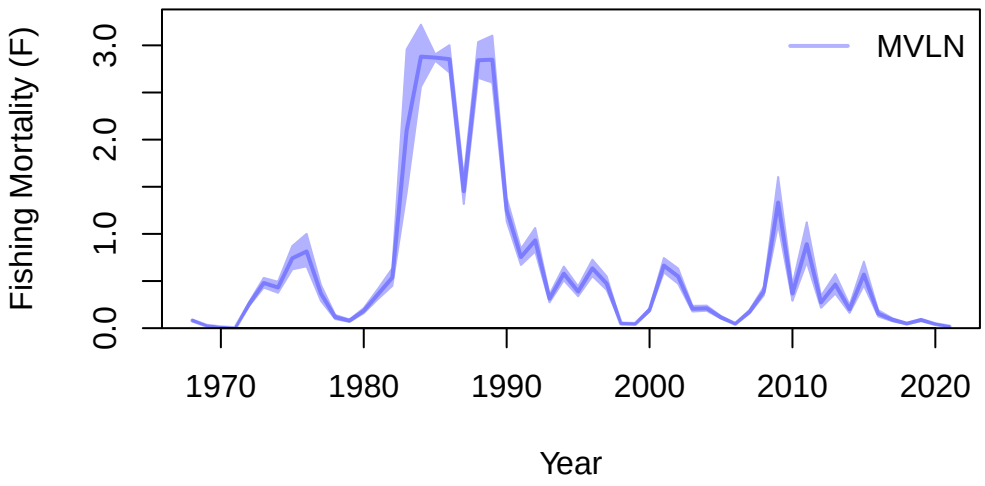
starter.sso with Bratio: SSB/SSBMSY and F: _abs_F



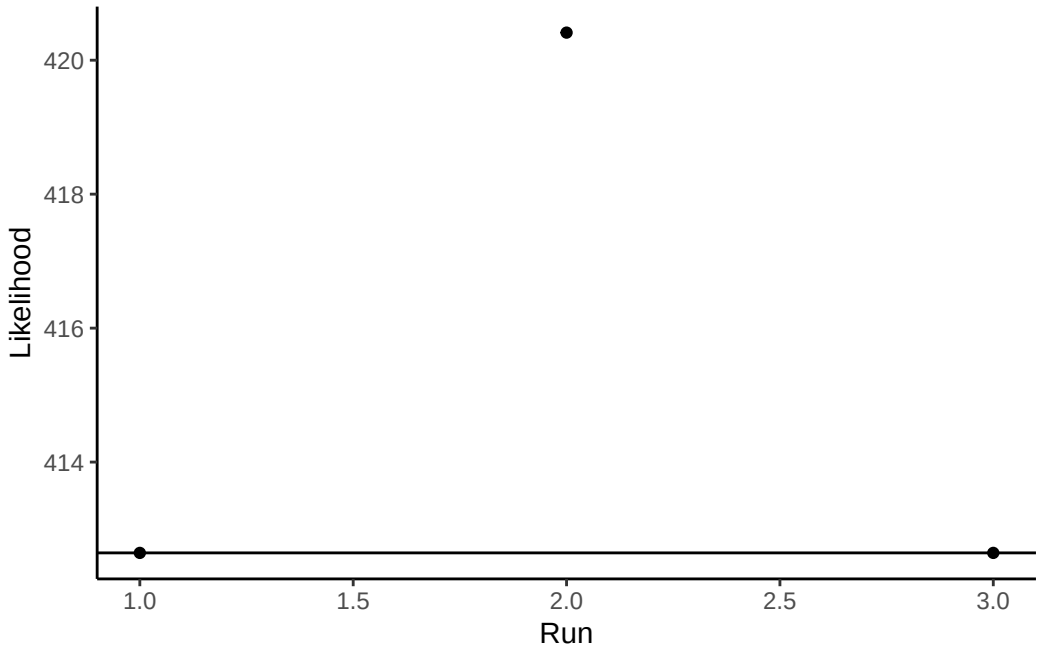

MVLN
F/F_MSY
0
1
2
3
4
5
1970
1980
1990
2000
2010
2020
Year

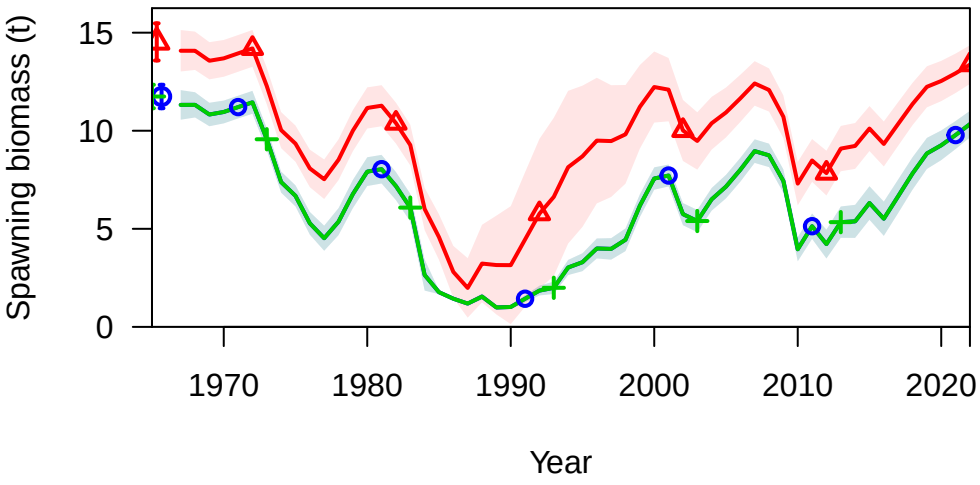

MVLN
SSB (t)
0
2
4
6
8
12
1970
1980
1990
2000
2010
2020
Year

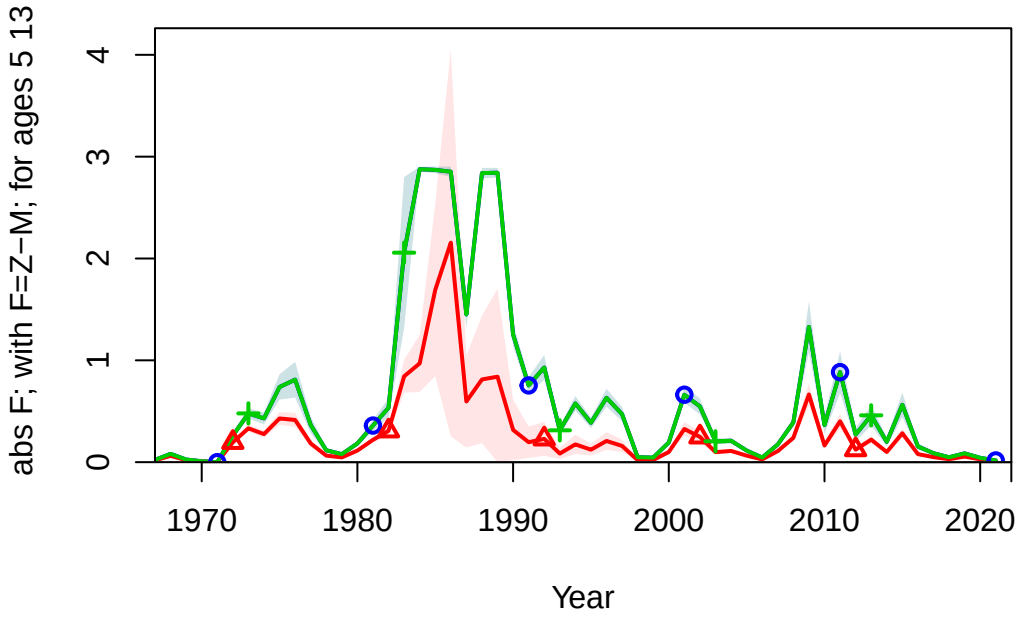


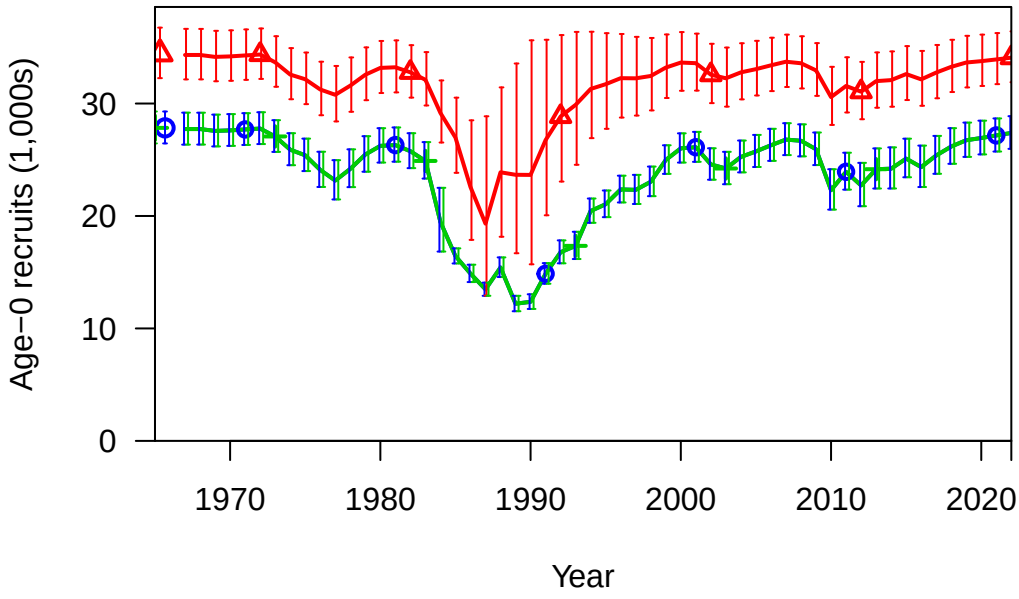

```
null device
          1
```

**Jitter**

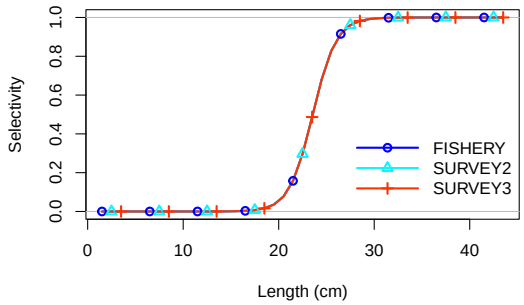

Likelihood
420
418
416
414
1.0
1.5
2.0
2.5
3.0
Run

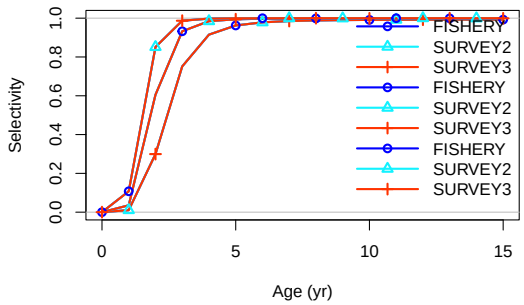

Spawning biomass (t)
15
10
5
0
1970
1980
1990
2000
2010
2020
Year

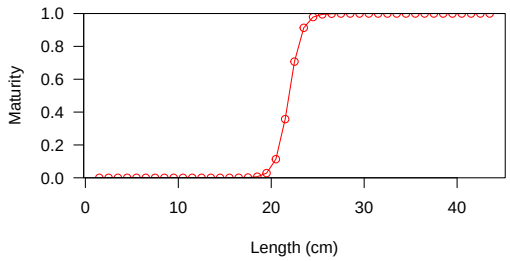


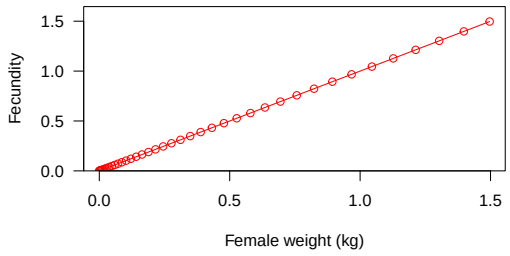




**Selectivity and Maturity**


Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
Length (cm)
FISHERY
SURVEY2
SURVEY3


Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
5
10
15
Age (yr)
FISHERY
SURVEY2
SURVEY3
FISHERY
SURVEY2
SURVEY3
FISHERY
SURVEY2
SURVEY3


Maturity
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
Length (cm)


Fecundity
0.0
0.5
1.0
1.5
0.0
0.5
1.0
1.5
Female weight (kg)