NOAA FISHERIES

SEDAR 57
Spiny Lobster

Review Workshop
Presentation 5
STX BASE MODEL

July 9-11, 2019

STX Base Model

- Structure
- Model Fit
- Diagnostics
- Derived Quantities

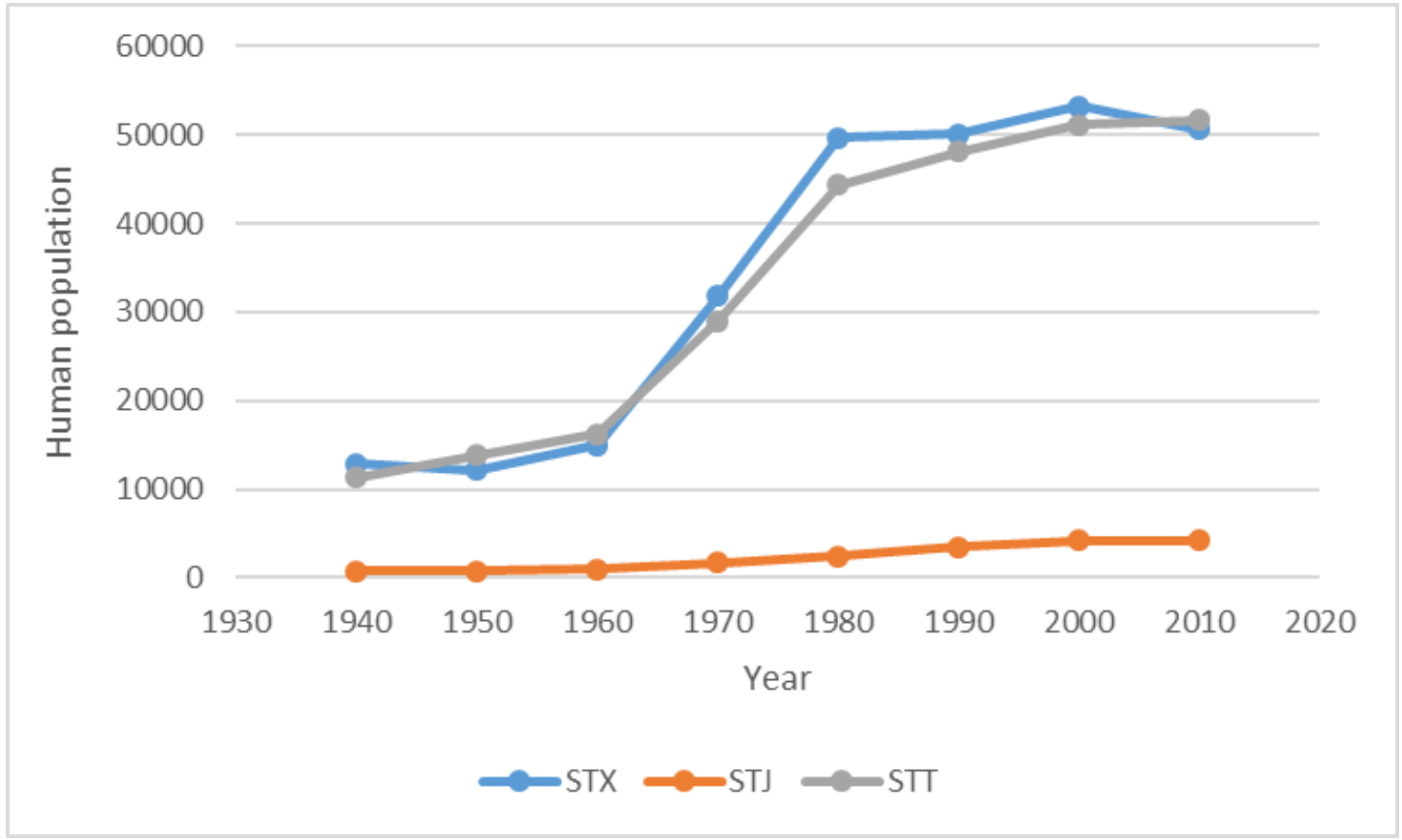
Base Model Structure

Fisheries

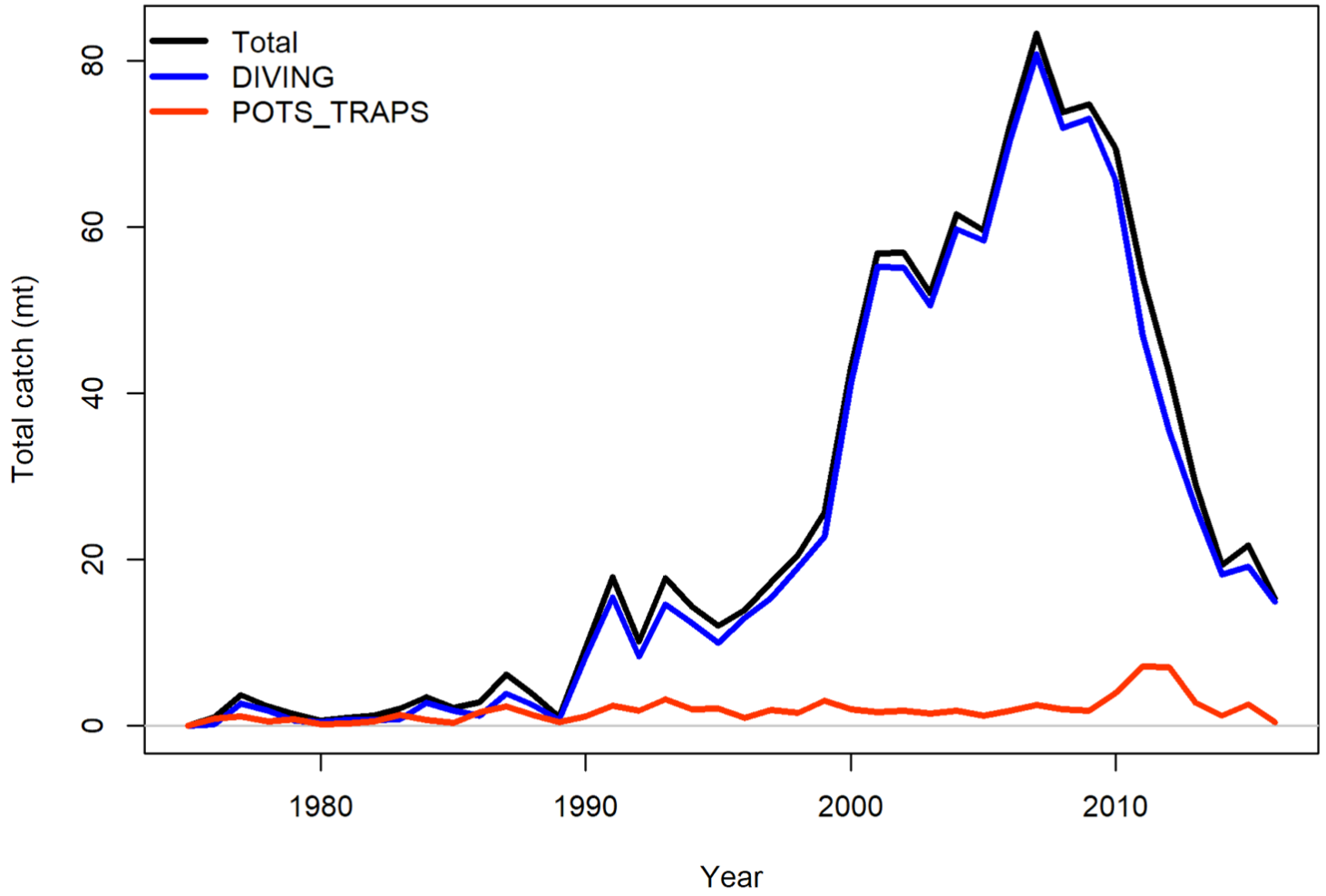
- Two fisheries:
  - Diving, Pots and Traps
  - Selectivity at length: informative prior from STT, mirrored for trap fishery
  - F initial = 0

- Retention blocks:
  - Minimum size limit 89 mm (3.5”) introduced in 1985
  - Time block for retention estimated over years: 1985-2016

Human population growth USVI. Obtained from United States Census Bureau.



Landings STX



Fixed and estimated quantities

Estimated quantities:

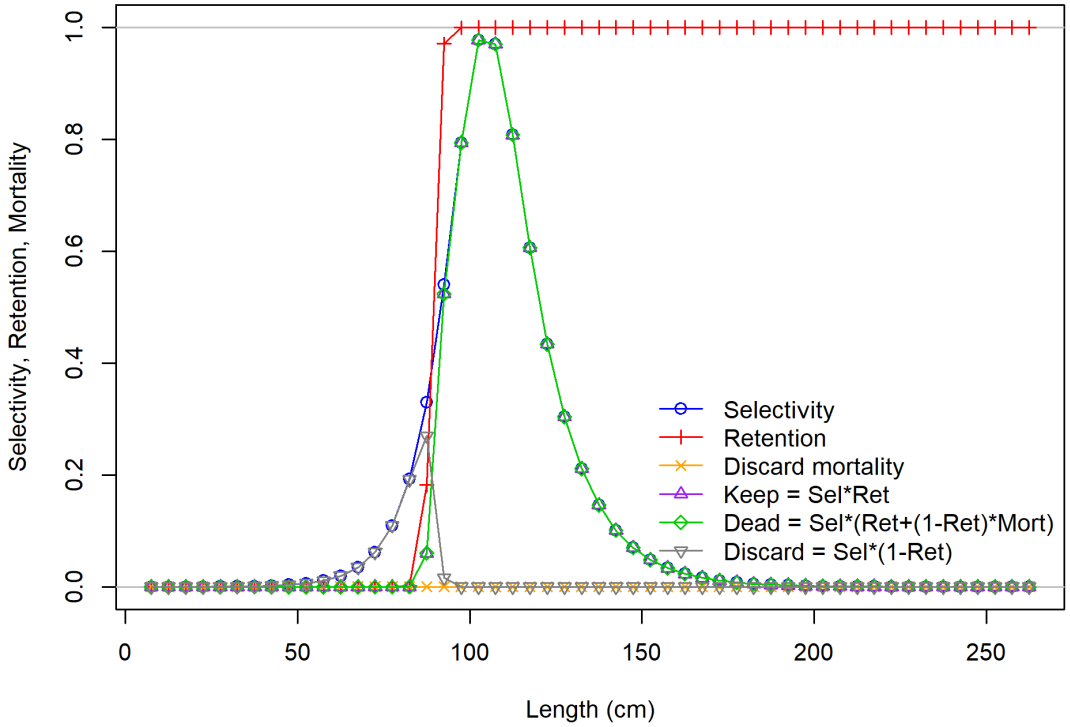
- Unfished recruitment (R0)
- Selectivity – 3 parameters with informed priors

Fixed quantities:

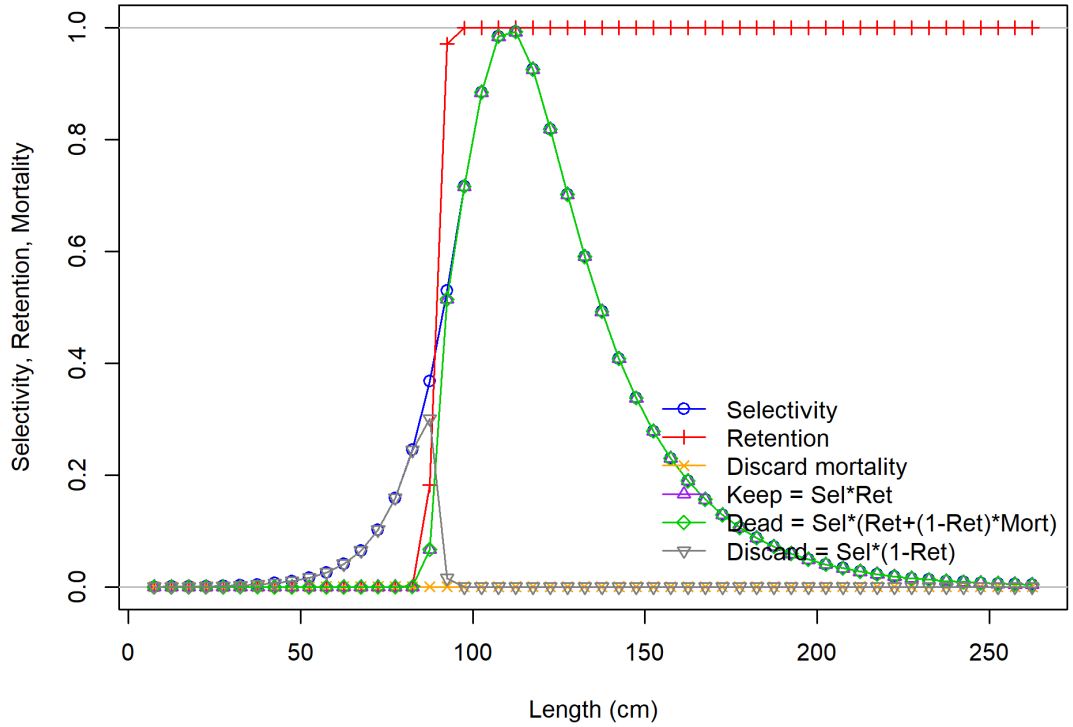
- LVB Female: Linf=191 mm, K=0.25 /year
- LVB Male: Linf=195, K=0.24 /year
- M=0.34 /year
- Maturity function, L50=92 mm; L-W relationship
- Steepness, h=0.95

Model Fit

STX


Selectivity, Retention, Mortality
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
250
Length (cm)
Selectivity
Retention
Discard mortality
Keep = Sel*Ret
Dead = Sel*(Ret+(1-Ret)*Mort)
Discard = Sel*(1-Ret)

STT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0.0
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50
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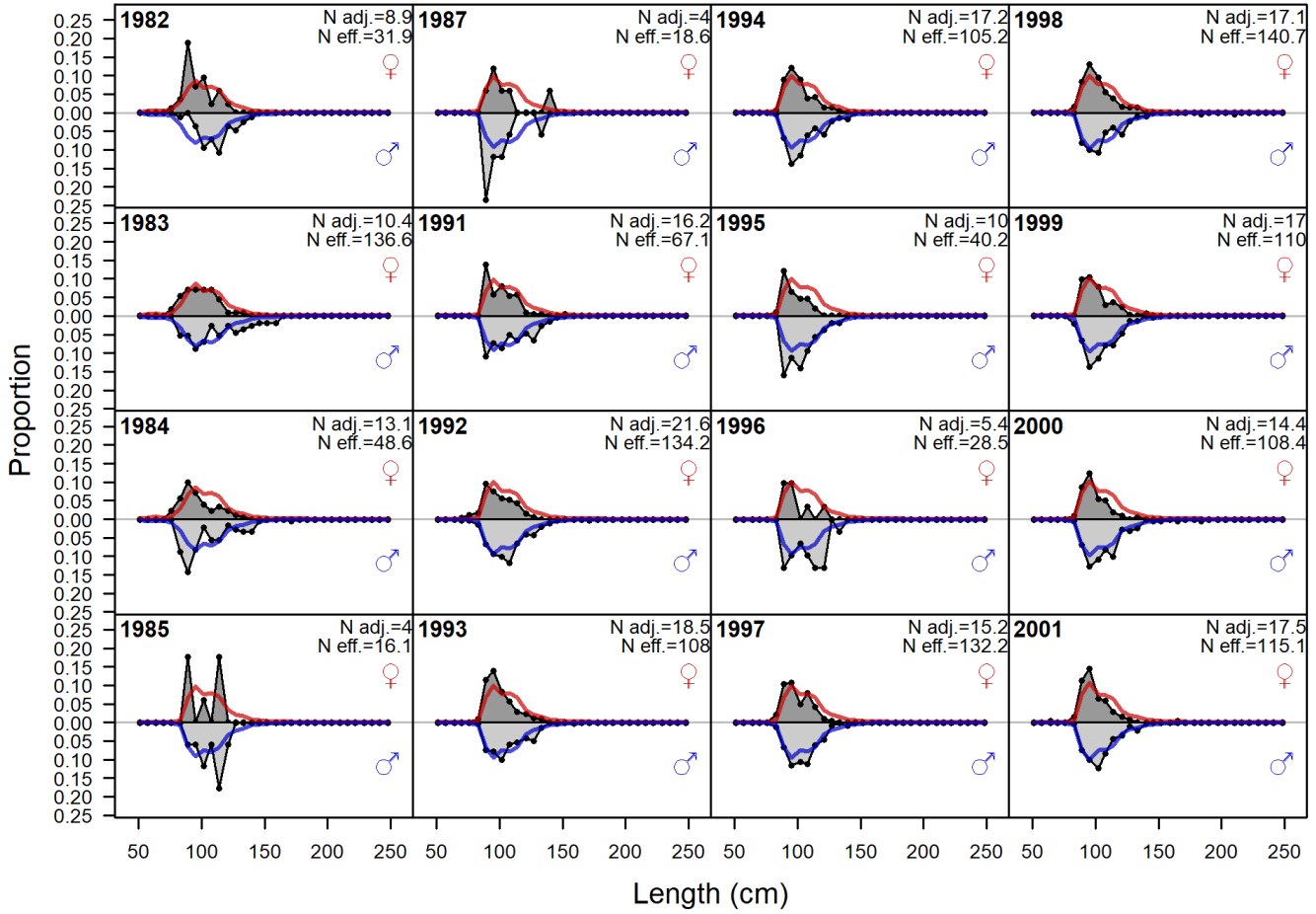
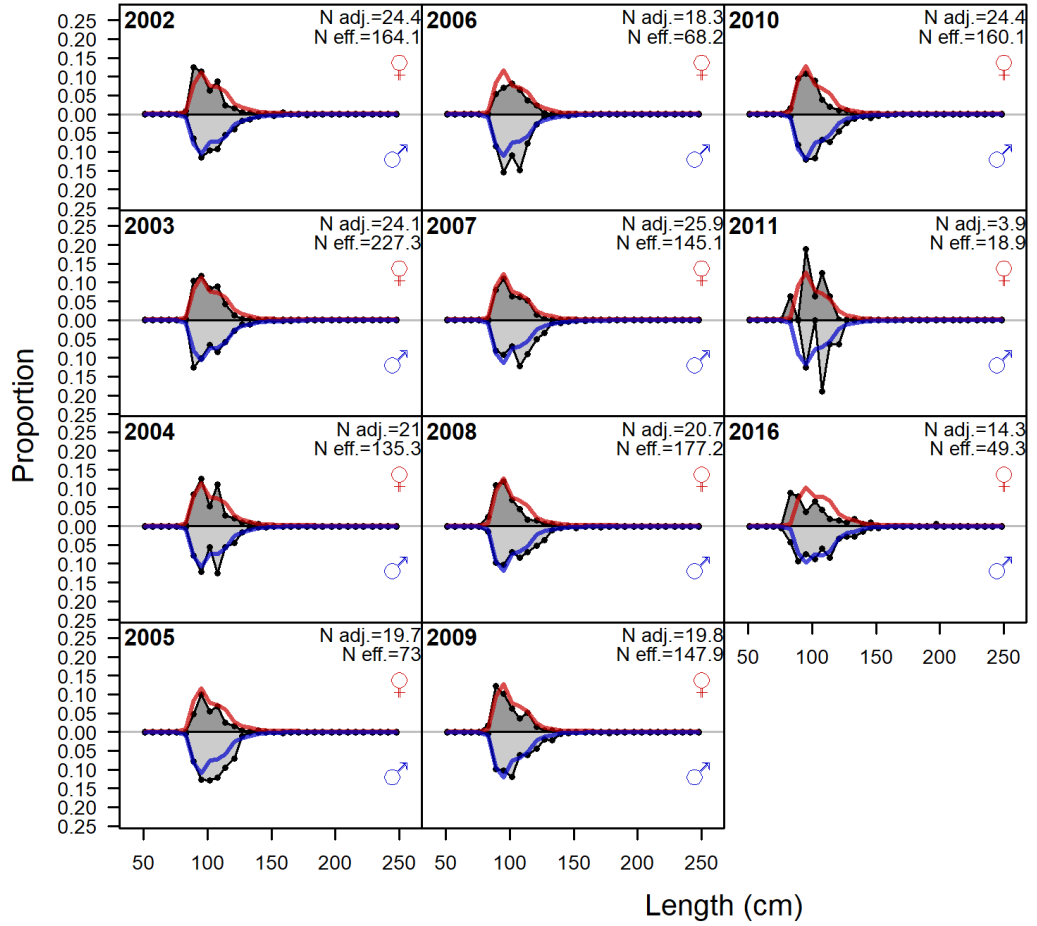
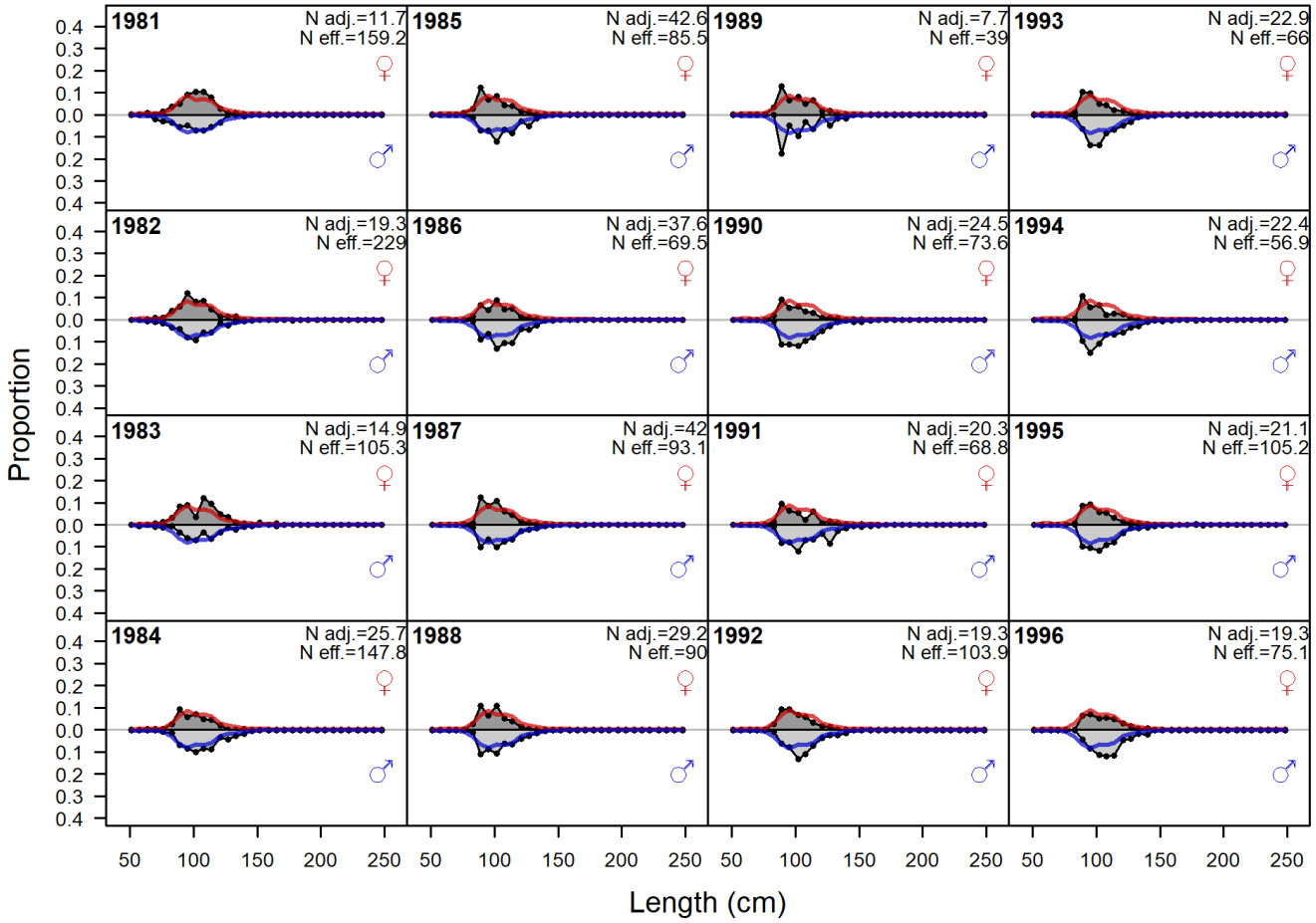
250
Length (cm)
Selectivity
Retention
Discard mortality
Keep = Sel*Ret
Dead = Sel*(Ret+(1-Ret)*Mort)
Discard = Sel*(1-Ret)

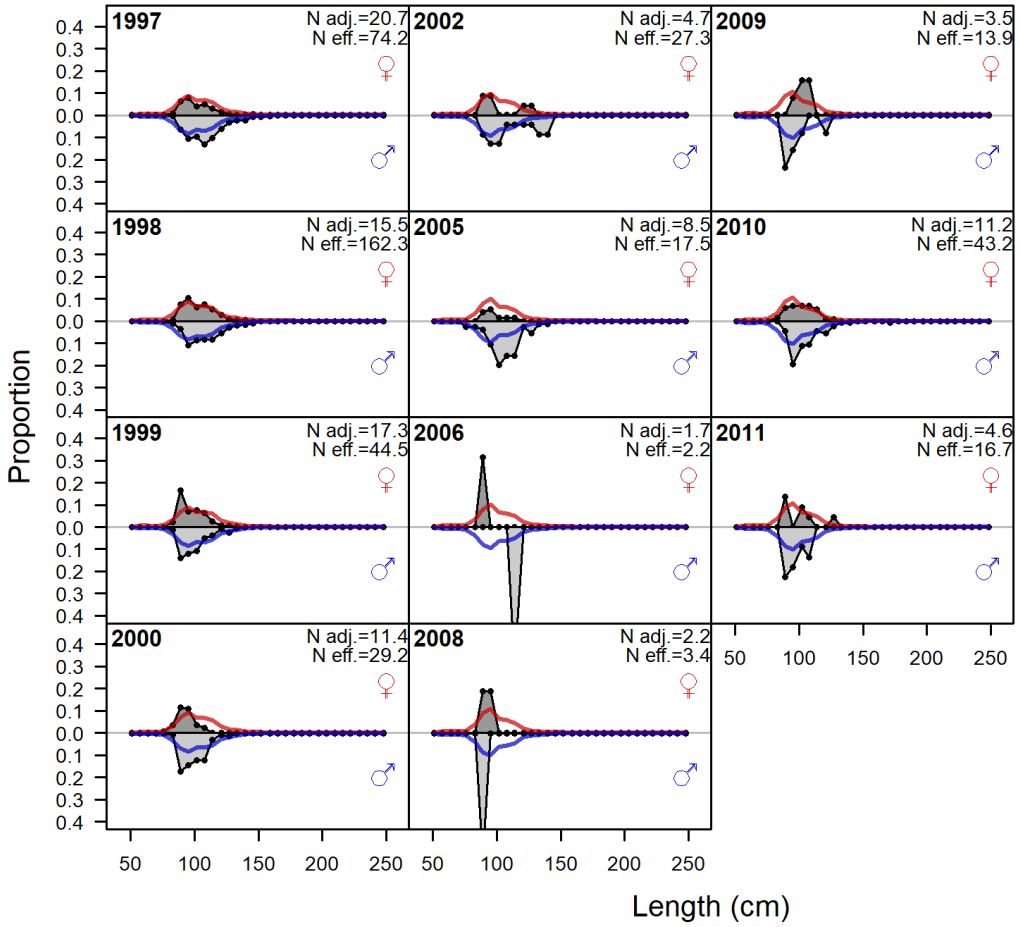
Dive


1982 N adj.=8.9 N eff.=31.9
1987 N adj.=4 N eff.=18.6
1994 N adj.=17.2 N eff.=105.2
1998 N adj.=17.1 N eff.=140.7
1983 N adj.=10.4 N eff.=136.6
1991 N adj.=16.2 N eff.=67.1
1995 N adj.=10 N eff.=40.2
1999 N adj.=17 N eff.=110
1984 N adj.=13.1 N eff.=48.6
1992 N adj.=21.6 N eff.=134.2
1996 N adj.=5.4 N eff.=28.5
2000 N adj.=14.4 N eff.=108.4
1985 N adj.=4 N eff.=16.1
1993 N adj.=18.5 N eff.=108
1997 N adj.=15.2 N eff.=132.2
2001 N adj.=17.5 N eff.=115.1
Proportion
Length (cm)

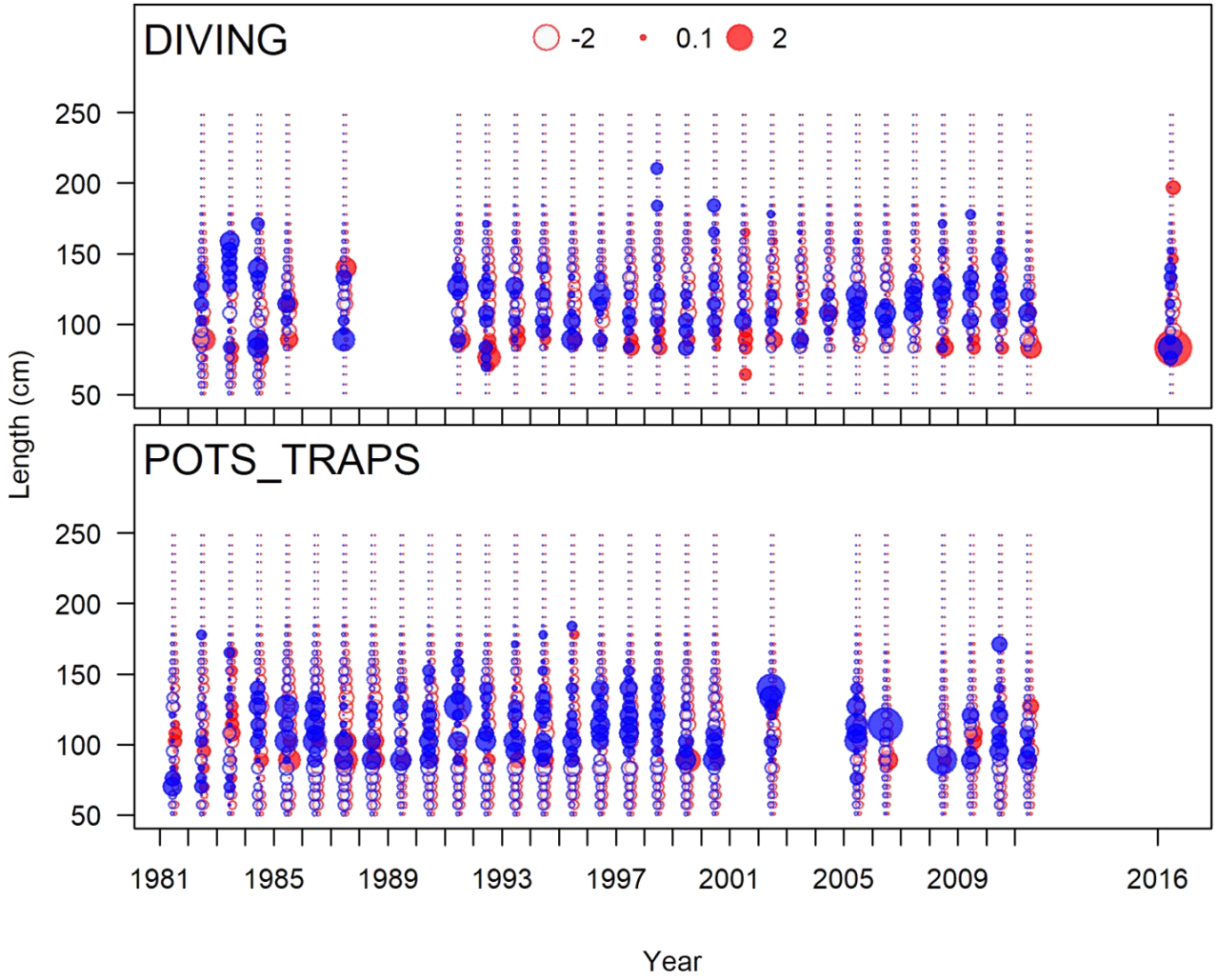

2002 N adj.=24.4 N eff.=164.1
2006 N adj.=18.3 N eff.=68.2
2010 N adj.=24.4 N eff.=160.1
2003 N adj.=24.1 N eff.=227.3
2007 N adj.=25.9 N eff.=145.1
2011 N adj.=3.9 N eff.=18.9
2004 N adj.=21 N eff.=135.3
2008 N adj.=20.7 N eff.=177.2
2016 N adj.=14.3 N eff.=49.3
2005 N adj.=19.7 N eff.=73
2009 N adj.=19.8 N eff.=147.9
Proportion
Length (cm)

Pots and traps

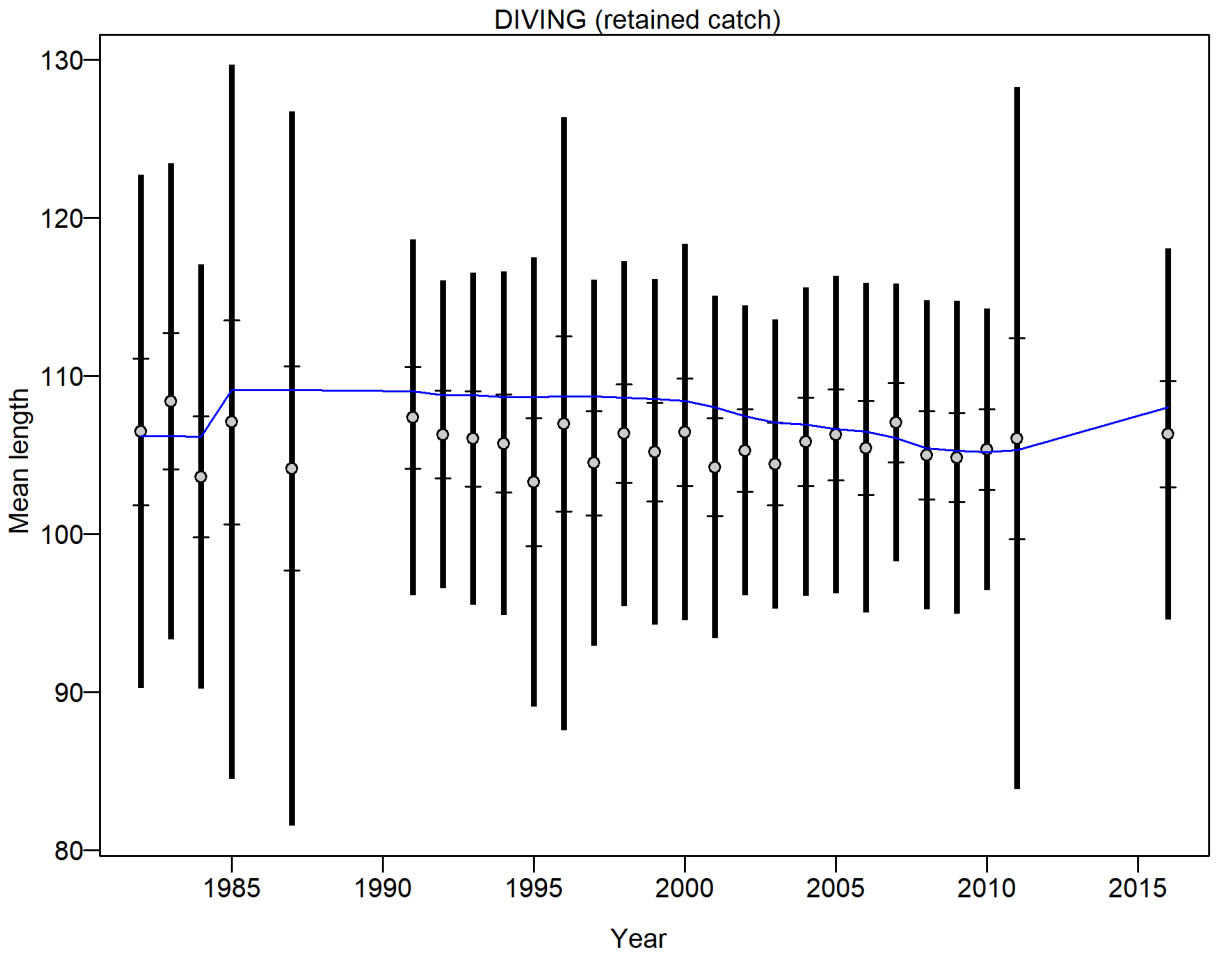




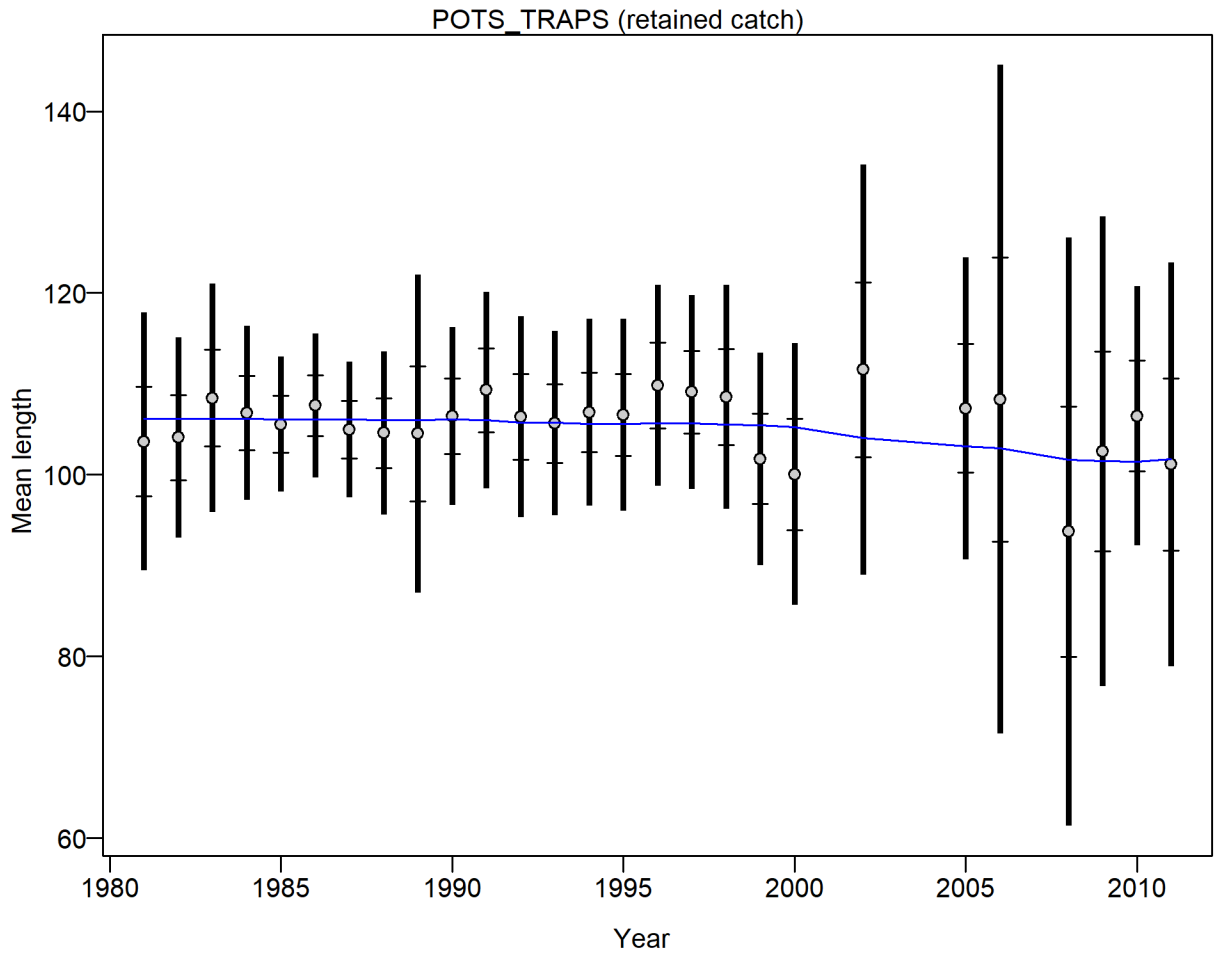
Length composition residuals



Dive


DIVING (retained catch)
Mean length
130
120
110
100
90
80
1985
1990
1995
2000
2005
2010
2015
Year

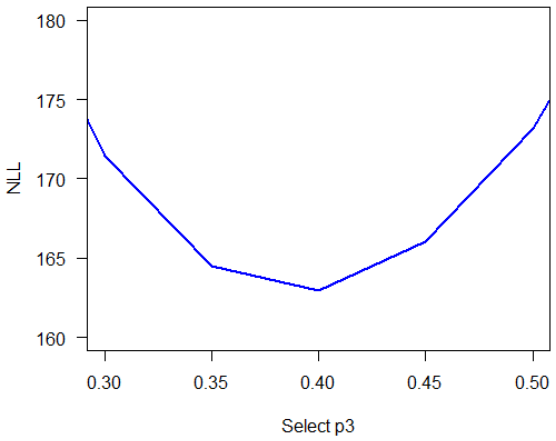
Pots and traps

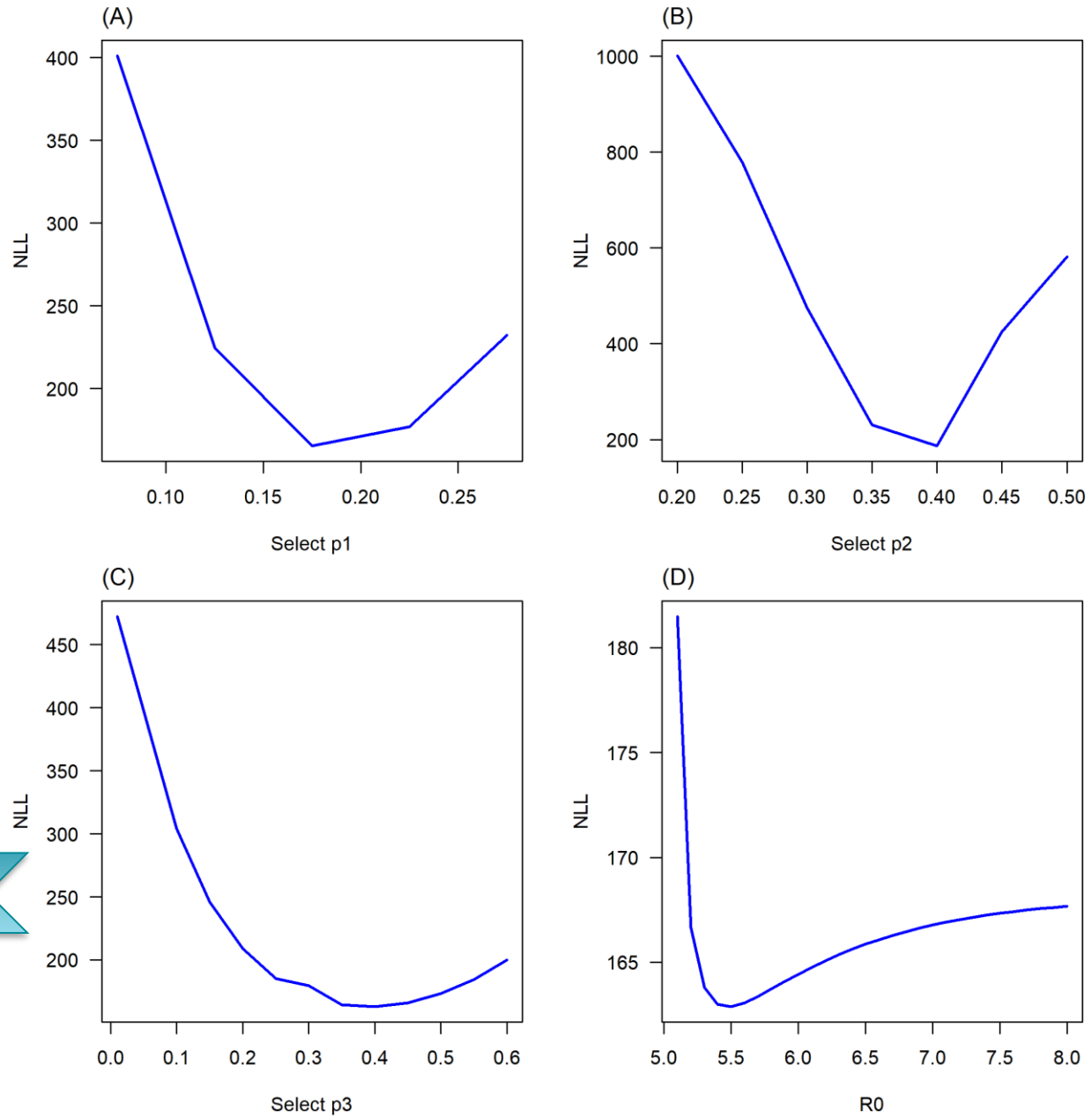


Diagnostics

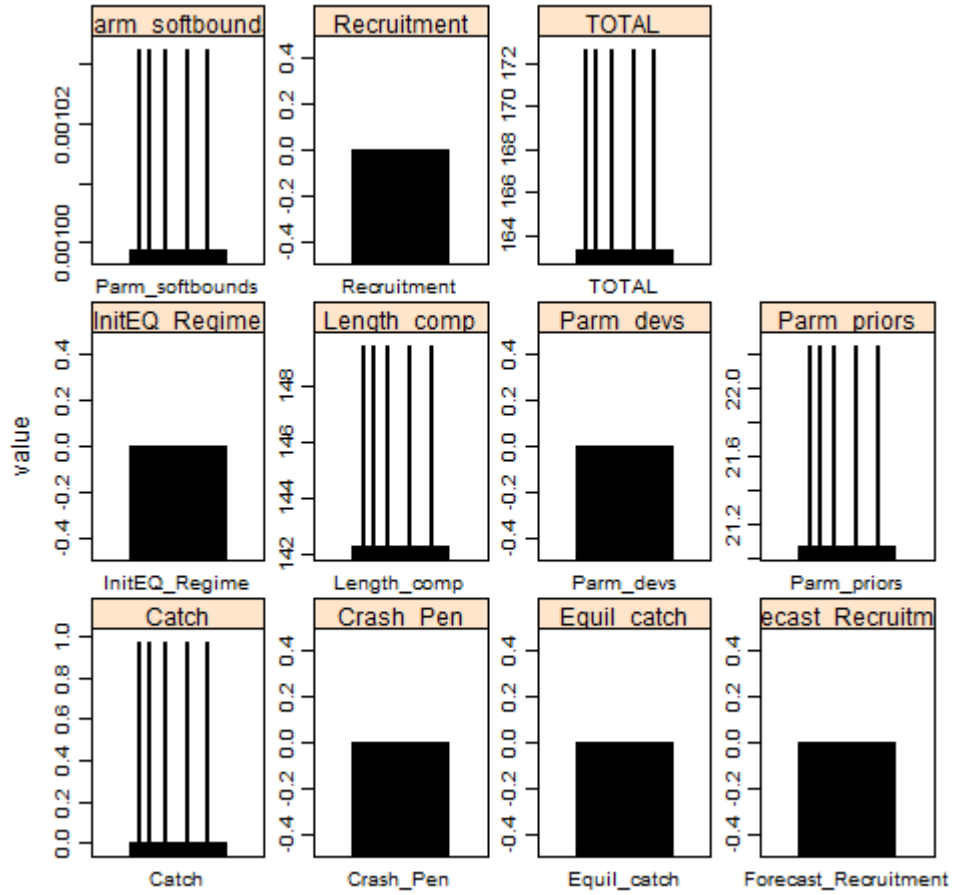
Profile likelihood

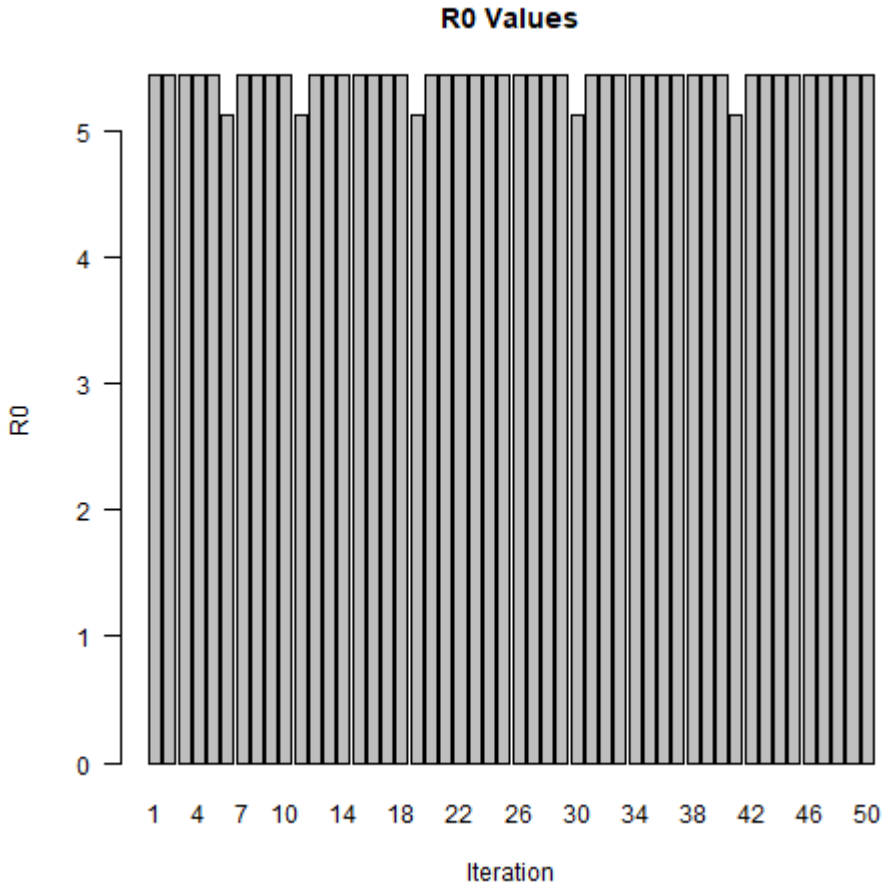
Parameter correlations:
> |0.70|



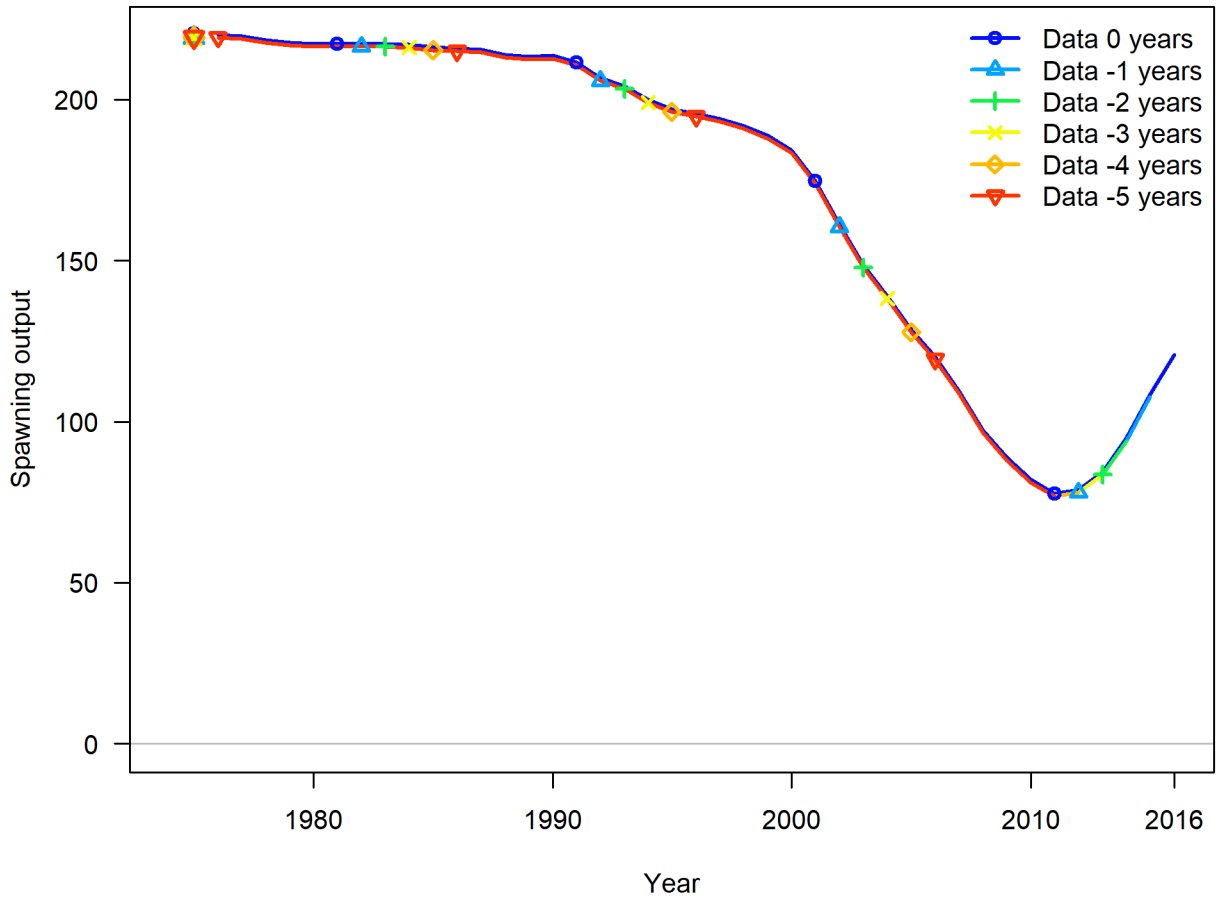


Jitter


arm_softbound
Recruitment
TOTAL
Parm_softbounds
Recruitment
TOTAL
InitEQ_Regime
Length_comp
Parm_devs
Parm_priors
value
InitEQ_Regime
Length_comp
Parm_devs
Parm_priors
Catch
Crash_Pen
Equil_catch
ecast_Recruitm
Catch
Crash_Pen
Equil_catch
Forecast_Recruitment

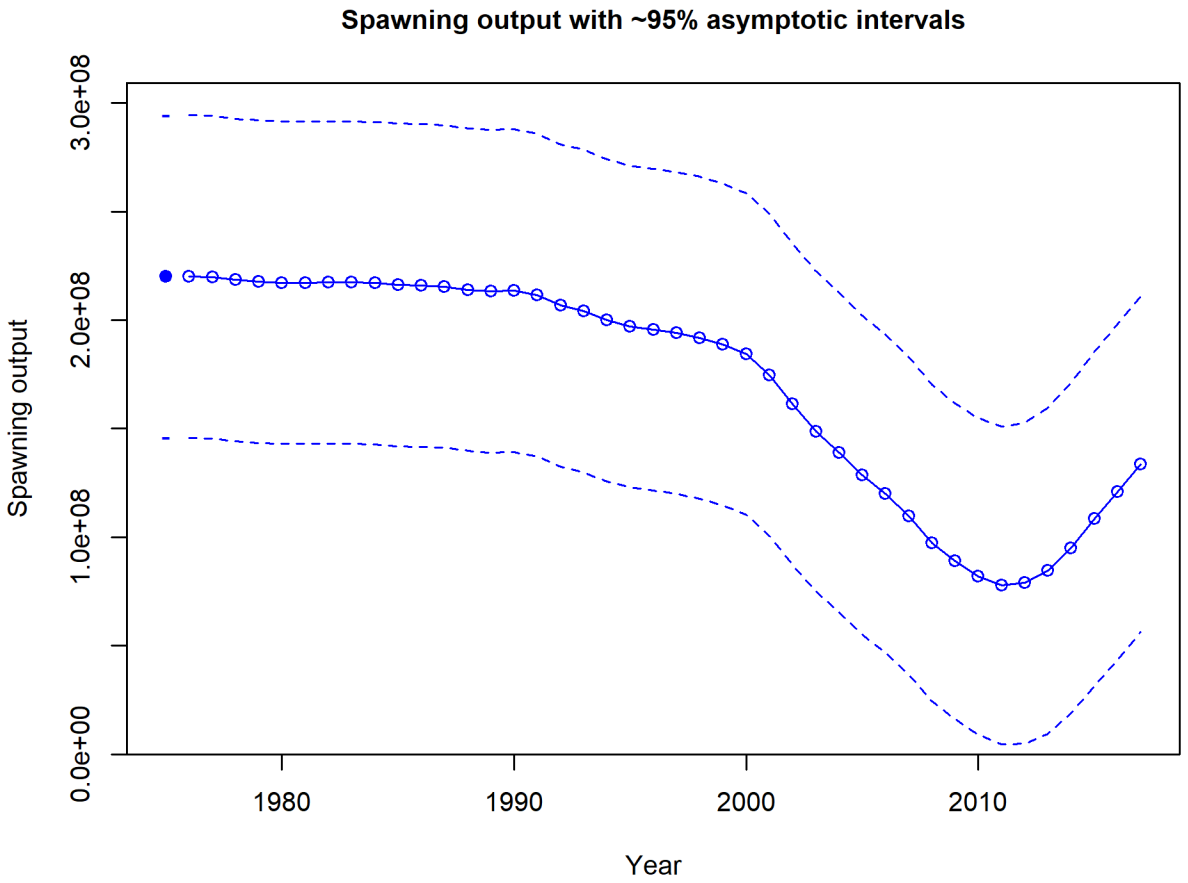

R0 Values
R0
Iteration
0
1
2
3
4
5
1
4
7
10
14
18
22
26
30
34
38
42
46
50

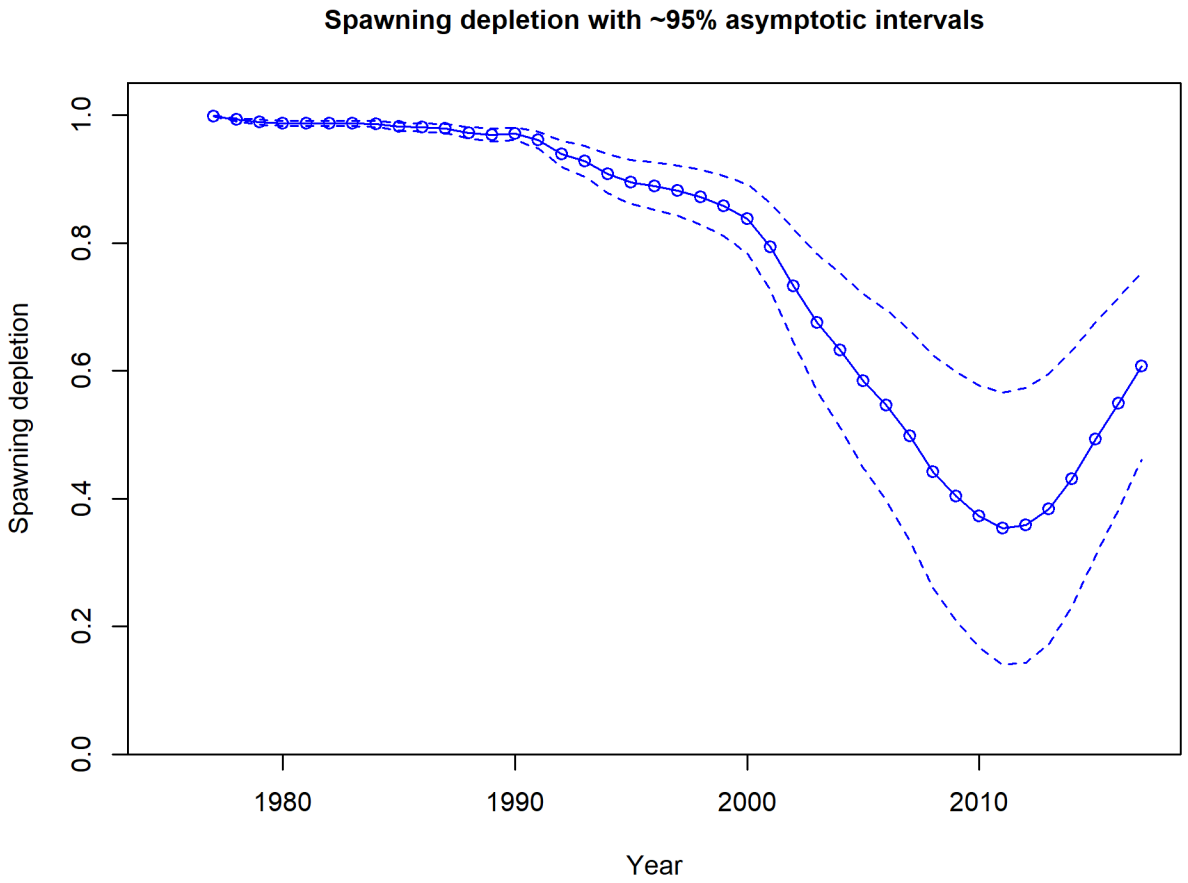
Retrospective patterns



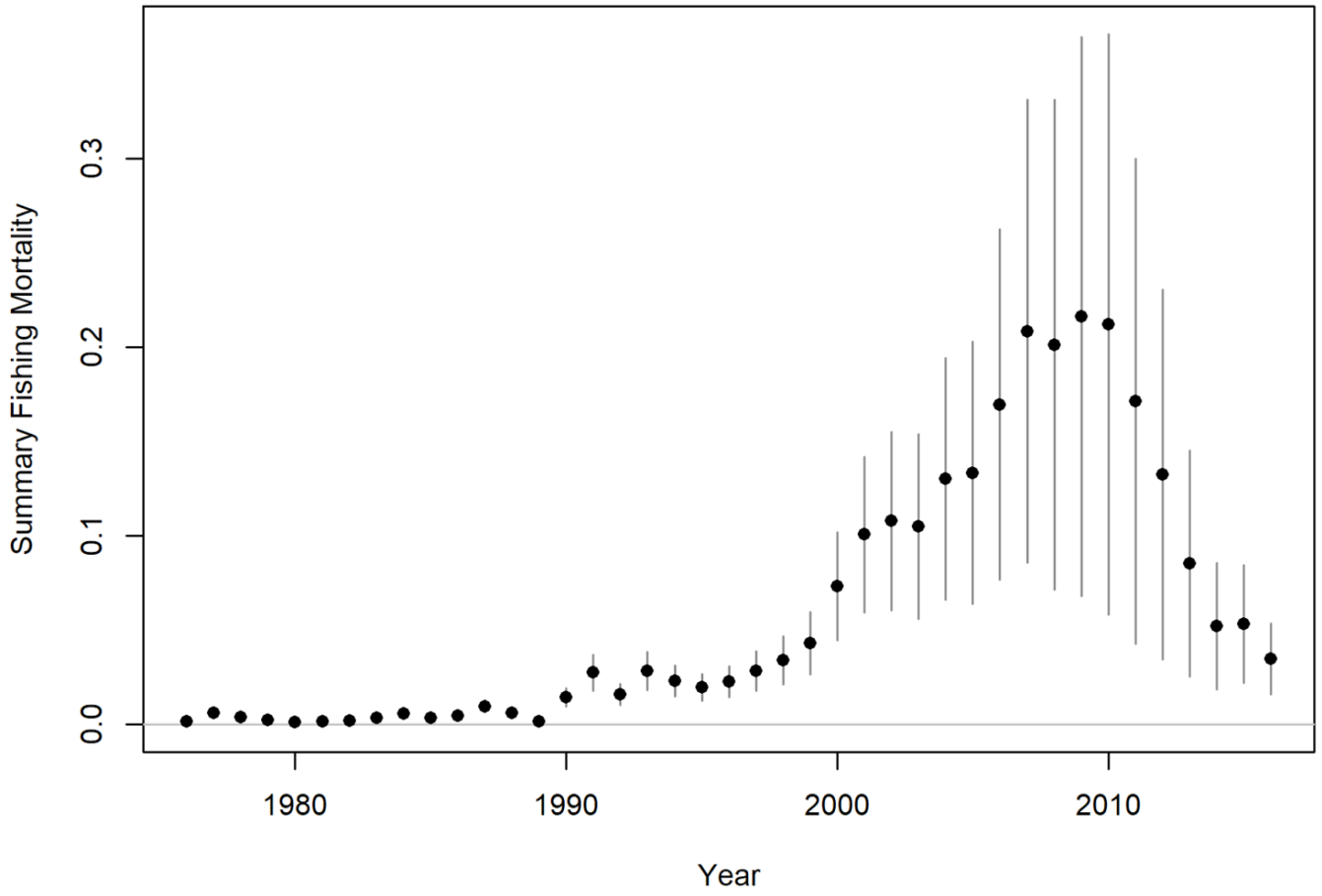
Derived Quantities

Biomass trend





Harvest rate (biomass landed / total biomass)



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