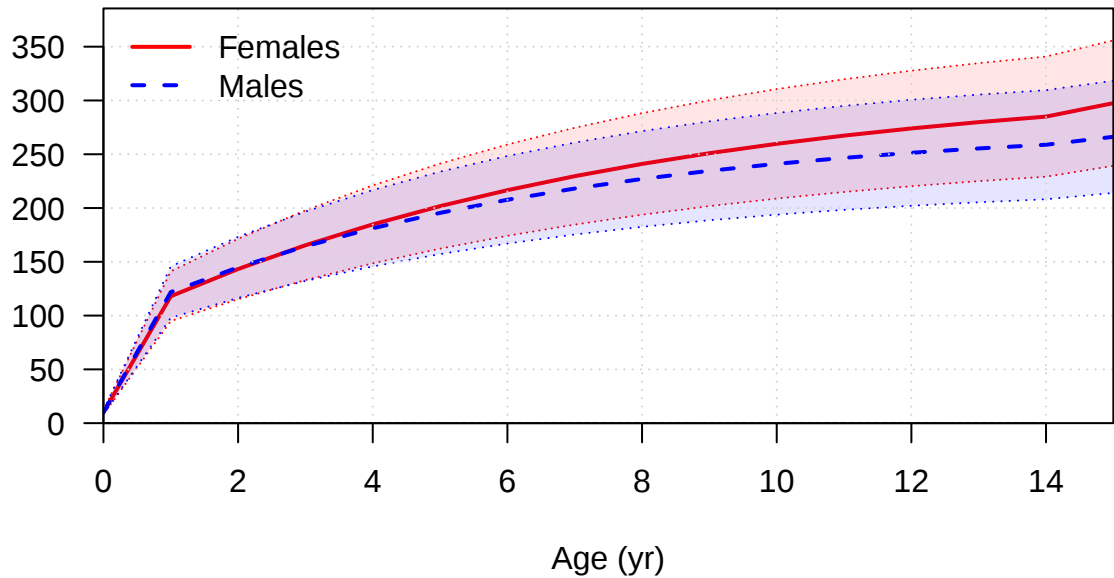
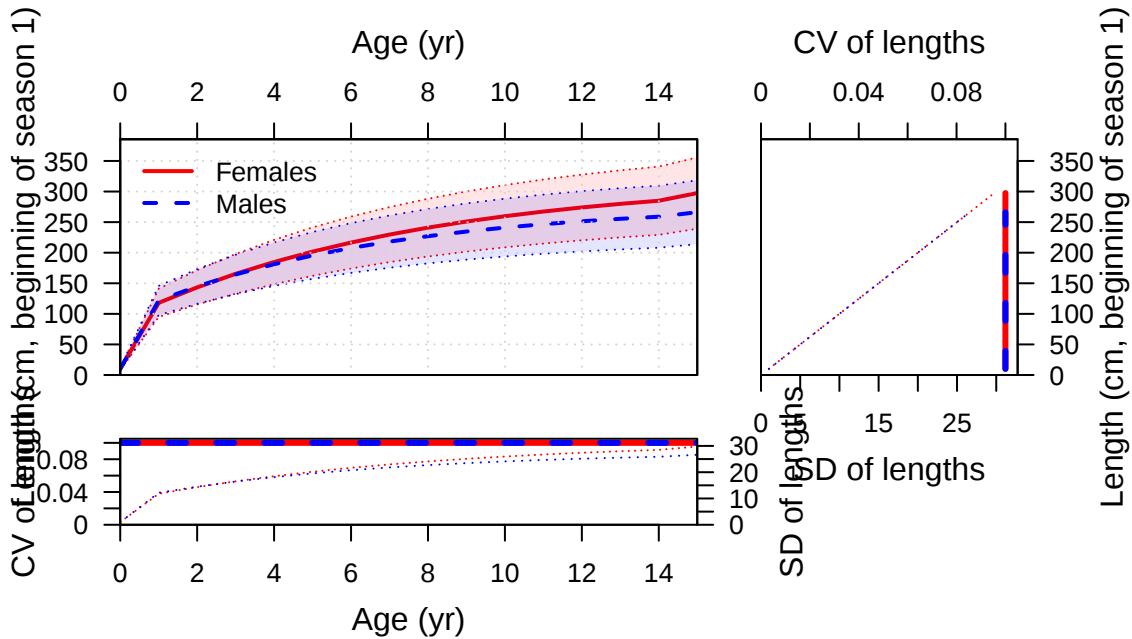
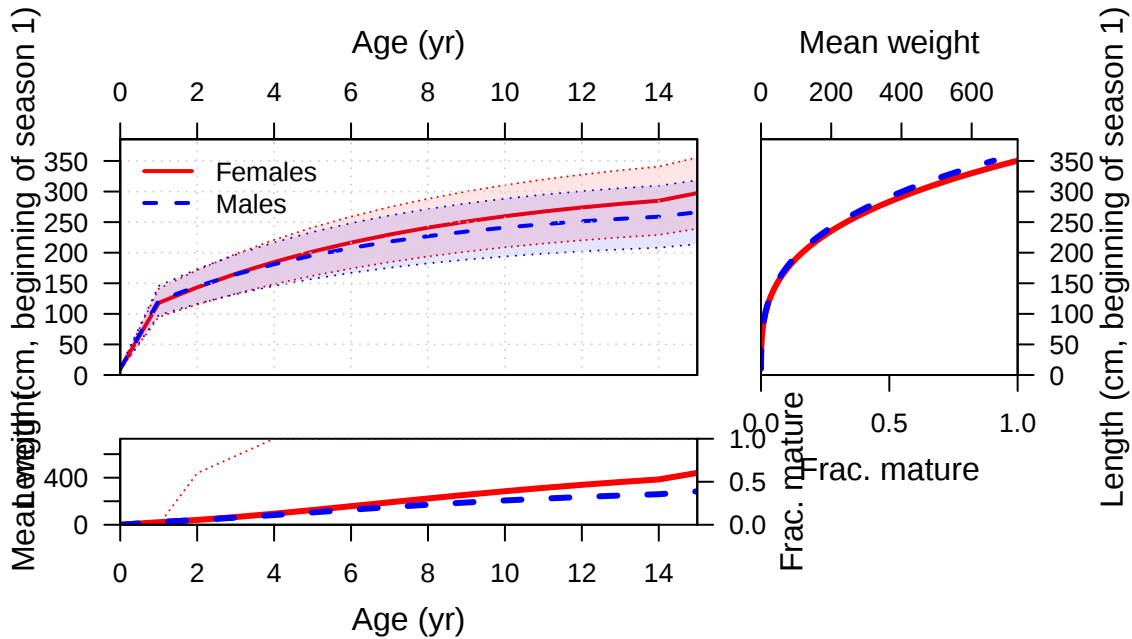


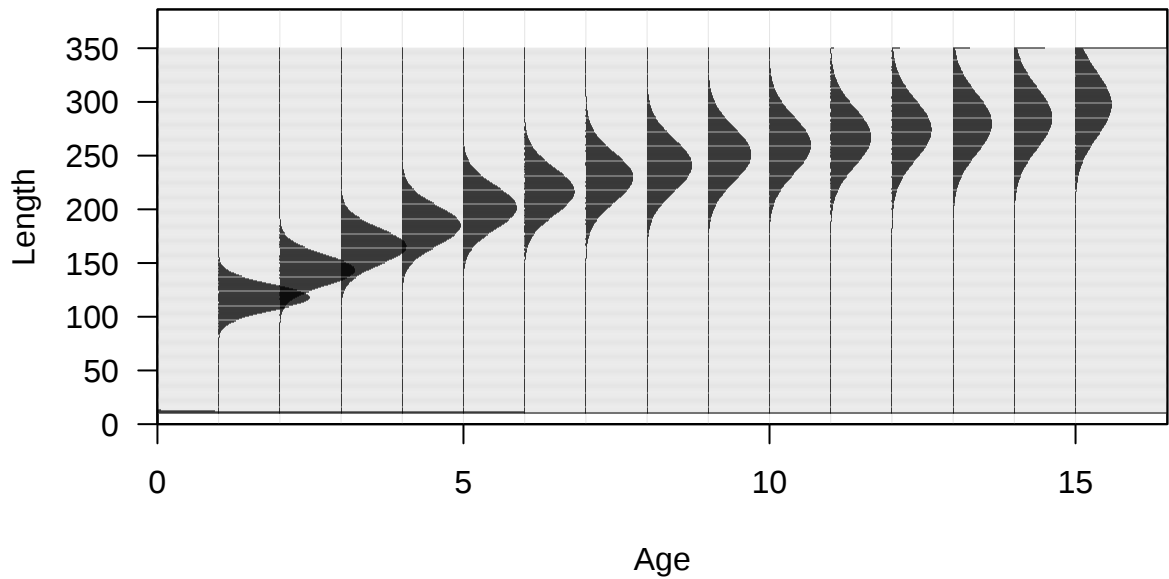
Plots created using the 'r4ss' package in R
Stock Synthesis version: 3.30.19.0
StartTime: Sat Jul 02 19:39:36 2022
Data_File: SWO_data.ss
Control_File: SWO_control.ss

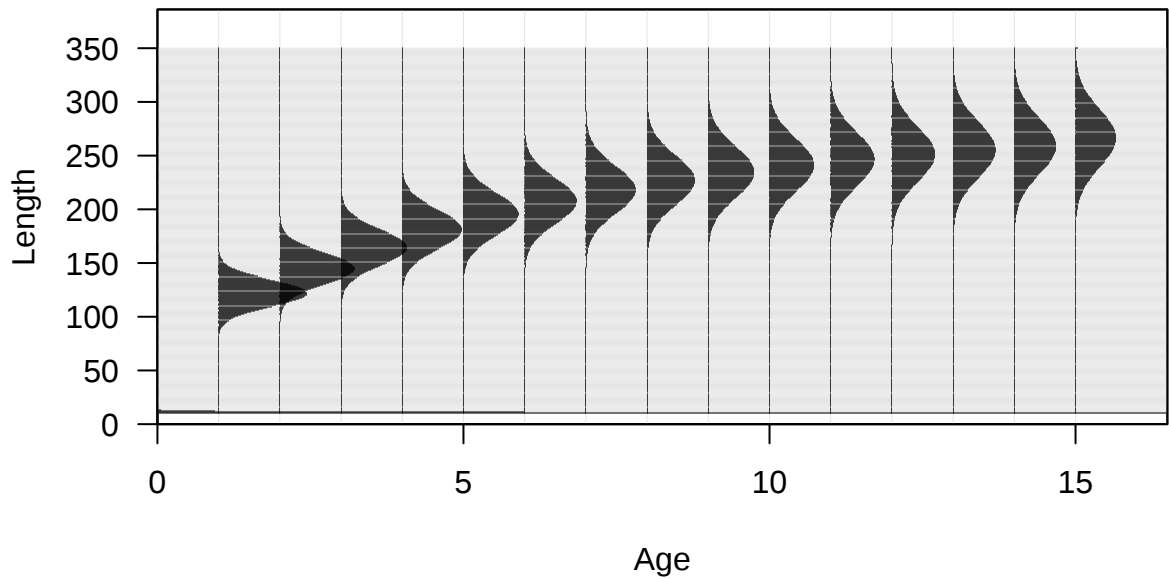
Length (cm, beginning of season 1)

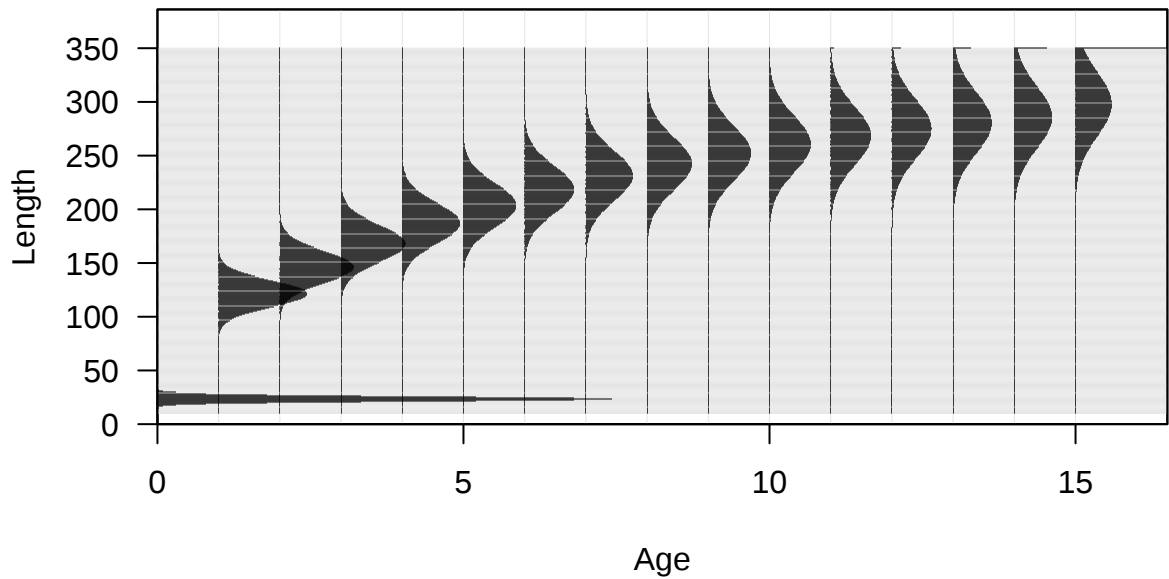


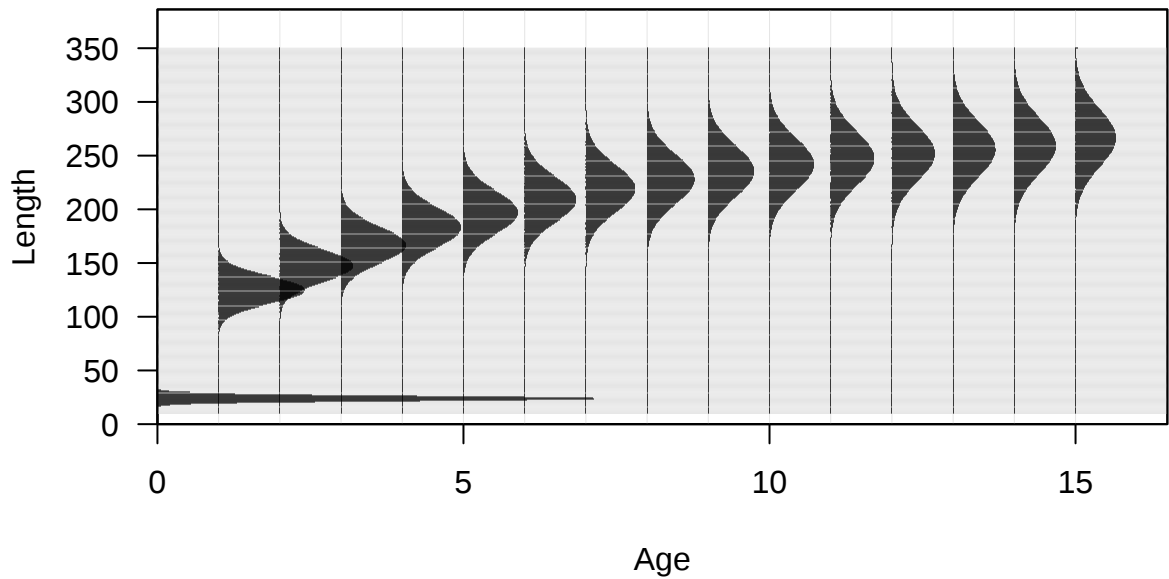


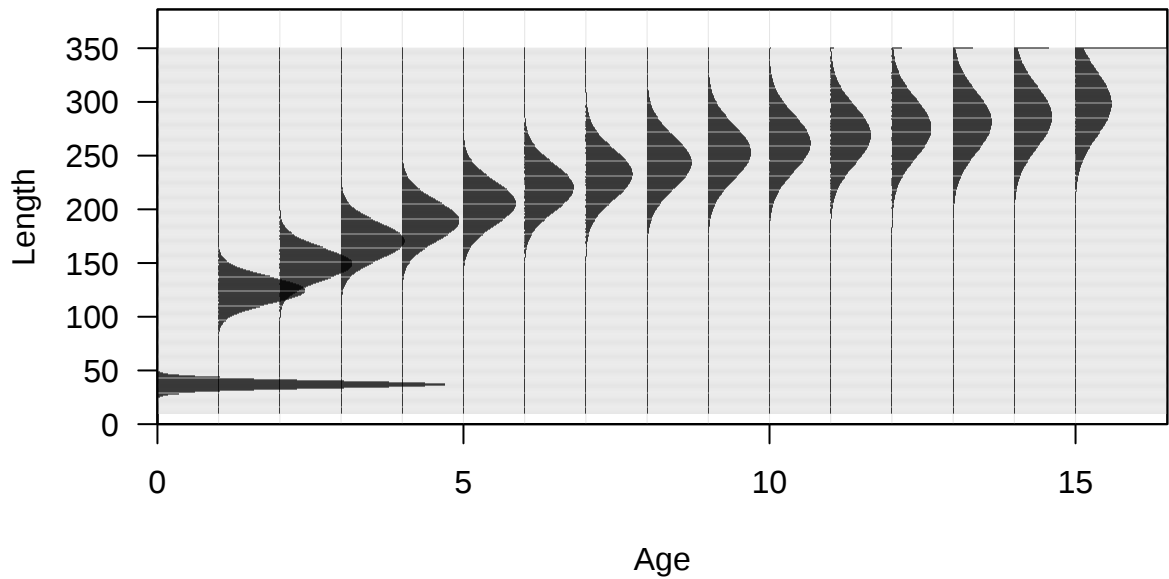


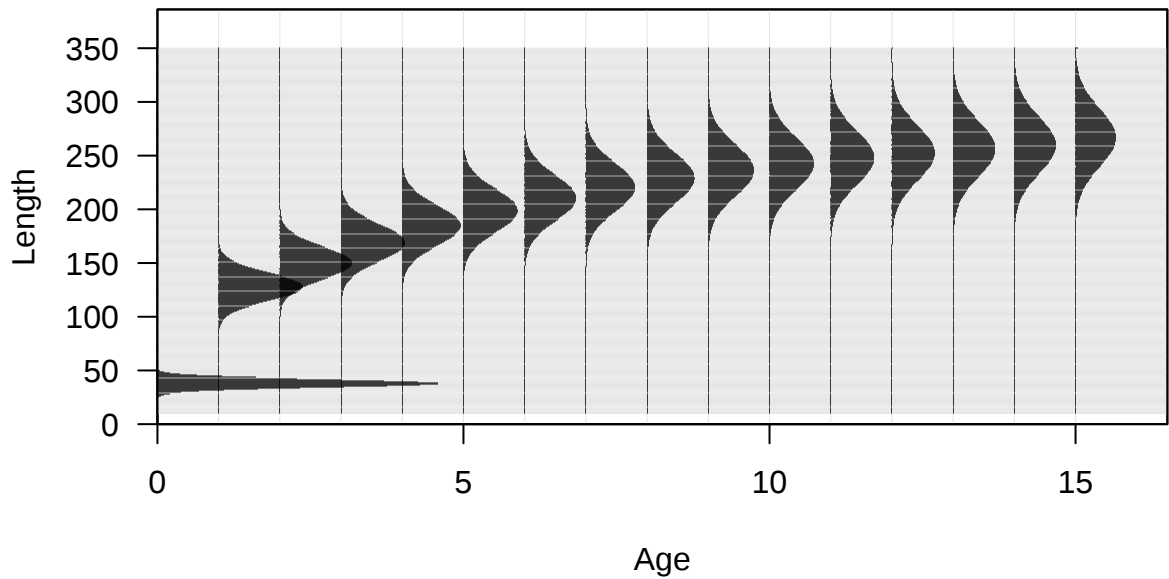


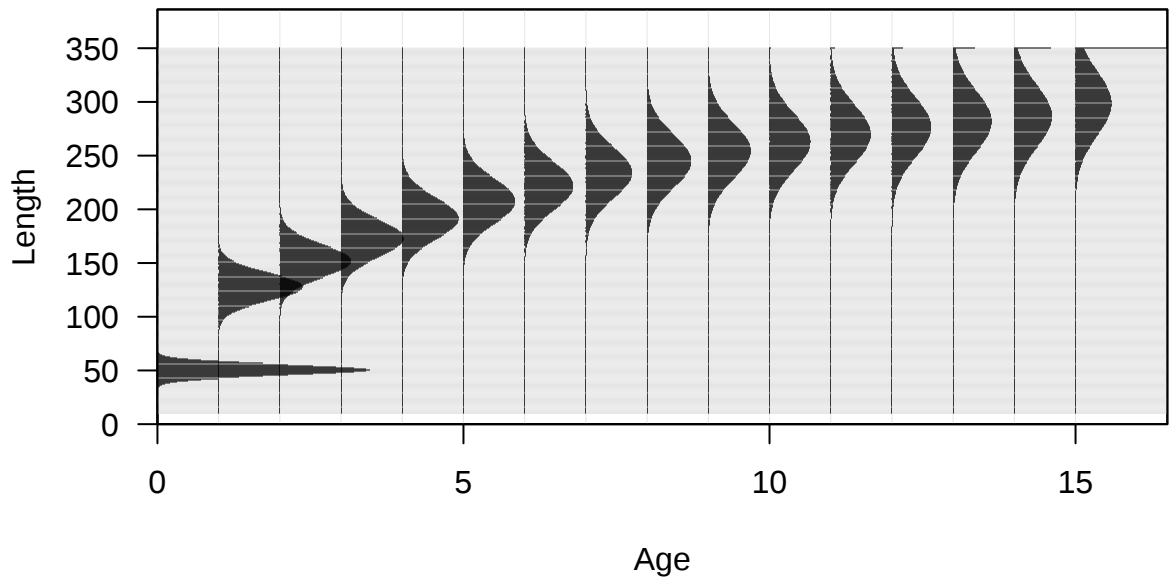


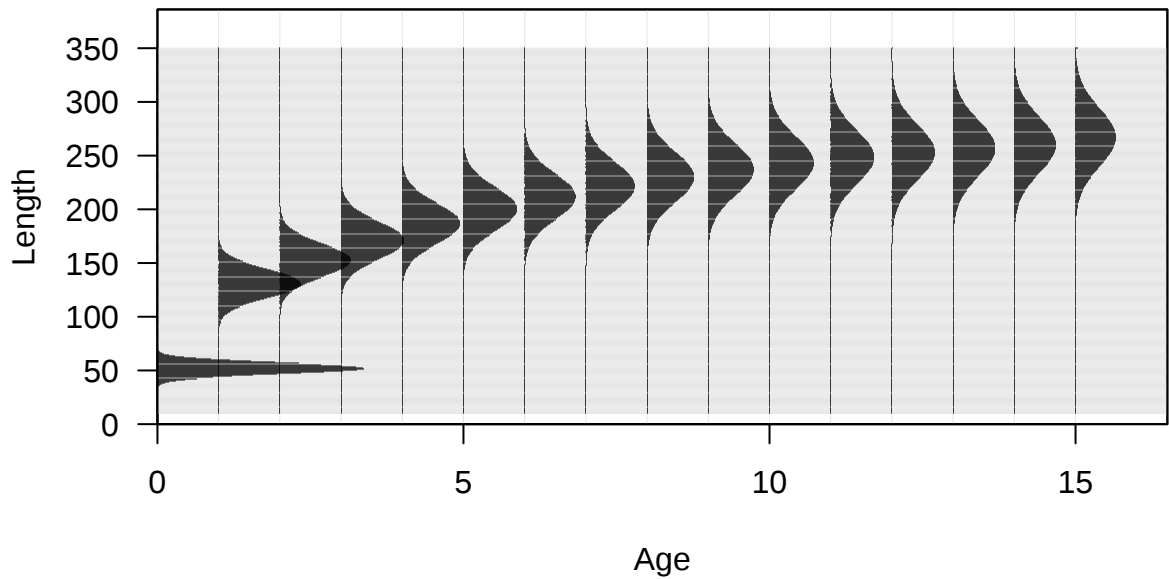


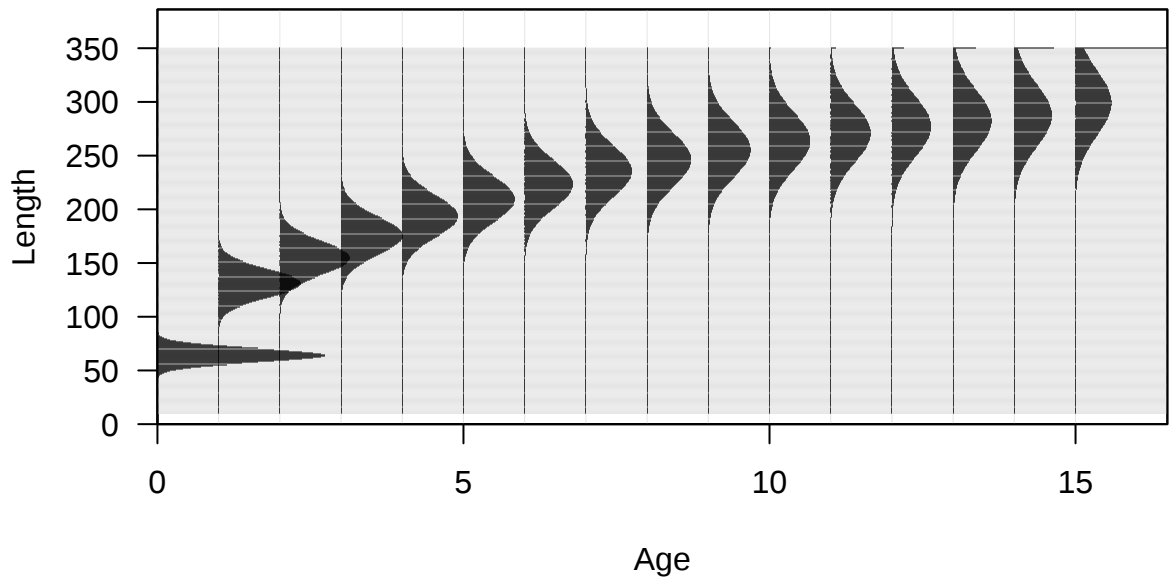


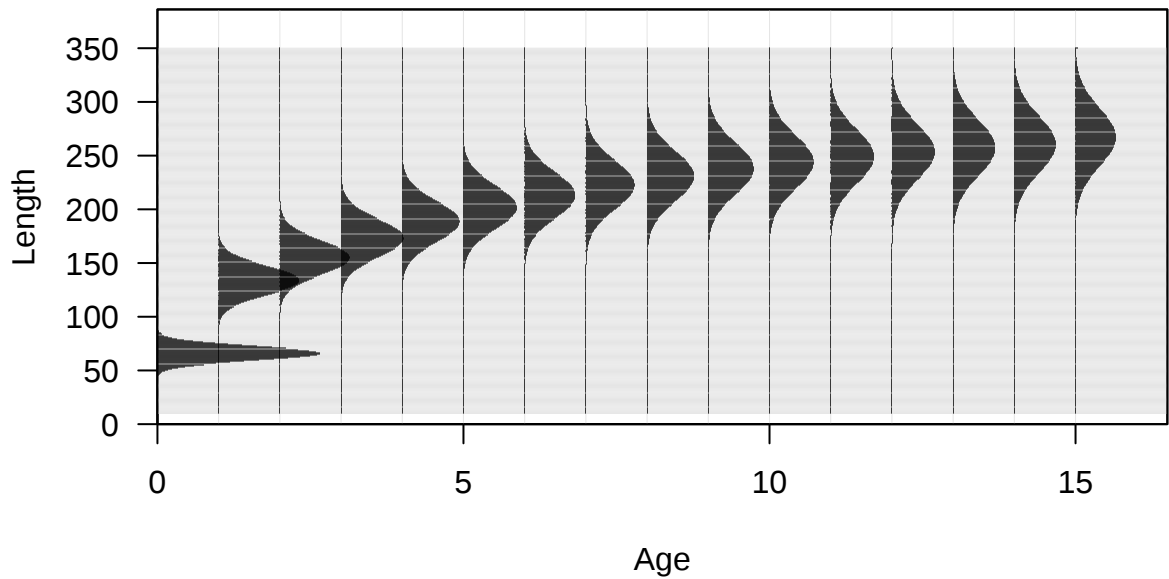


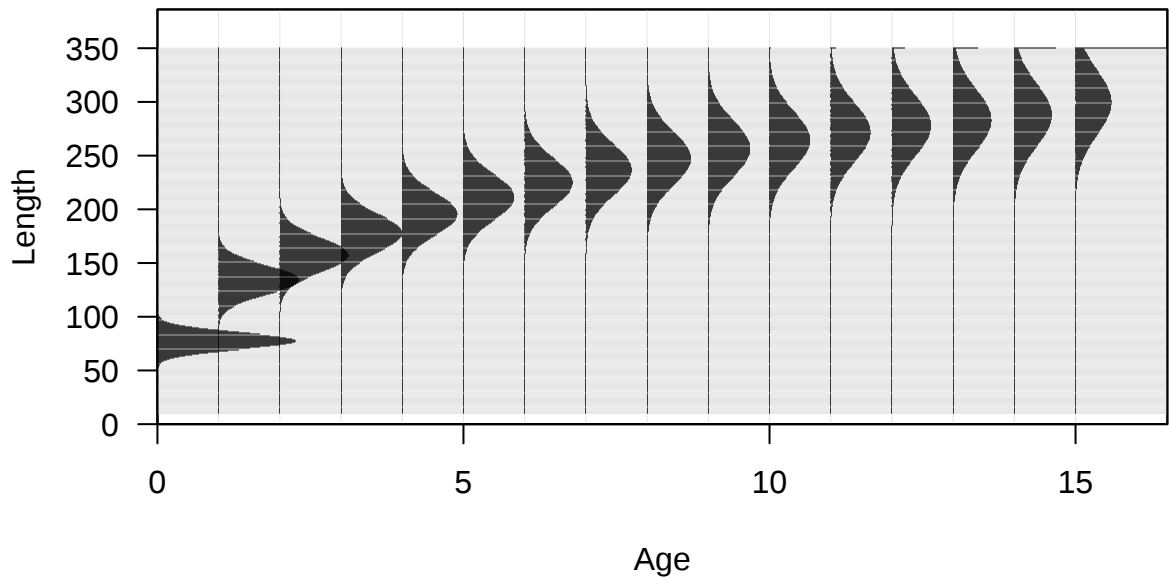


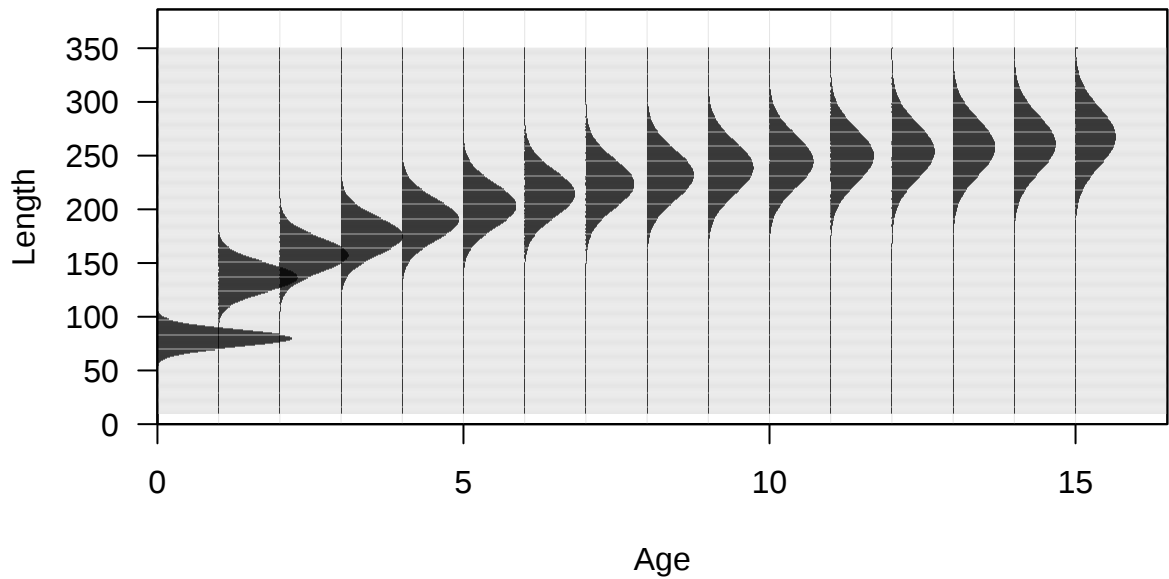


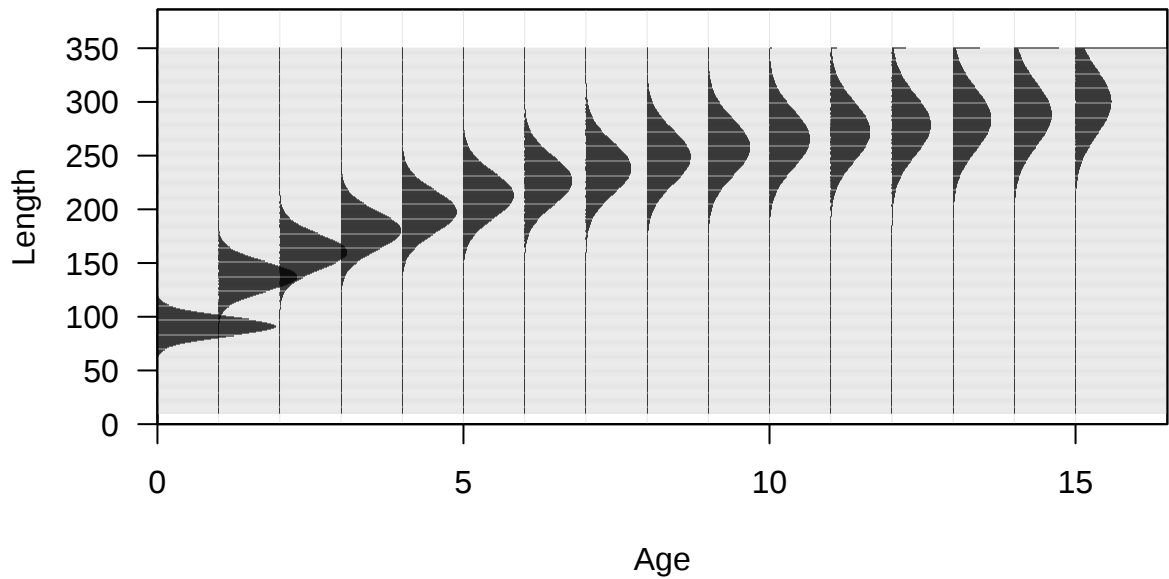


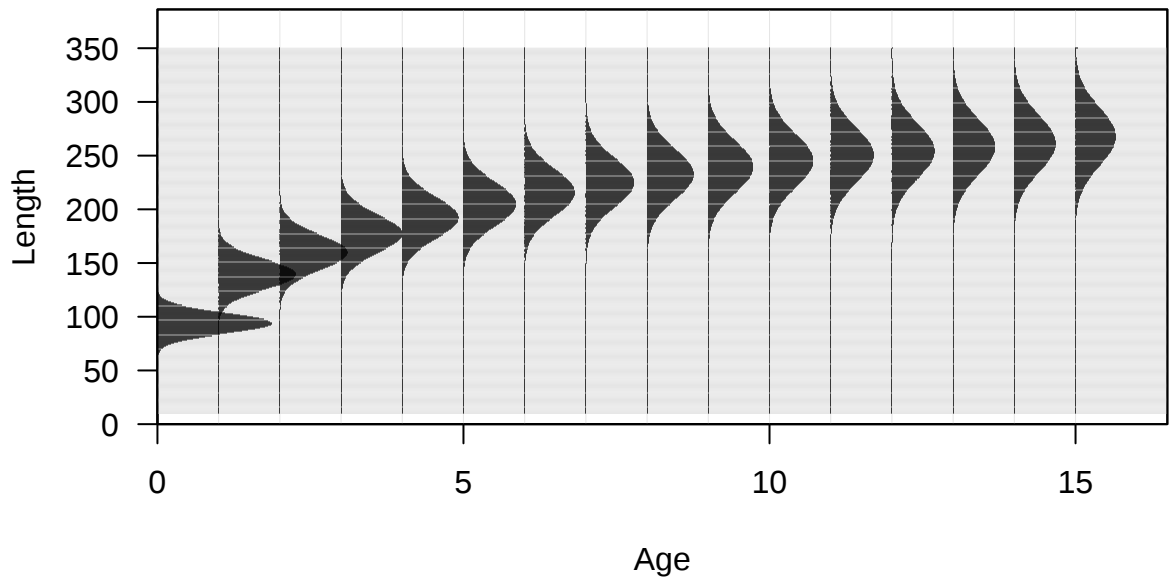


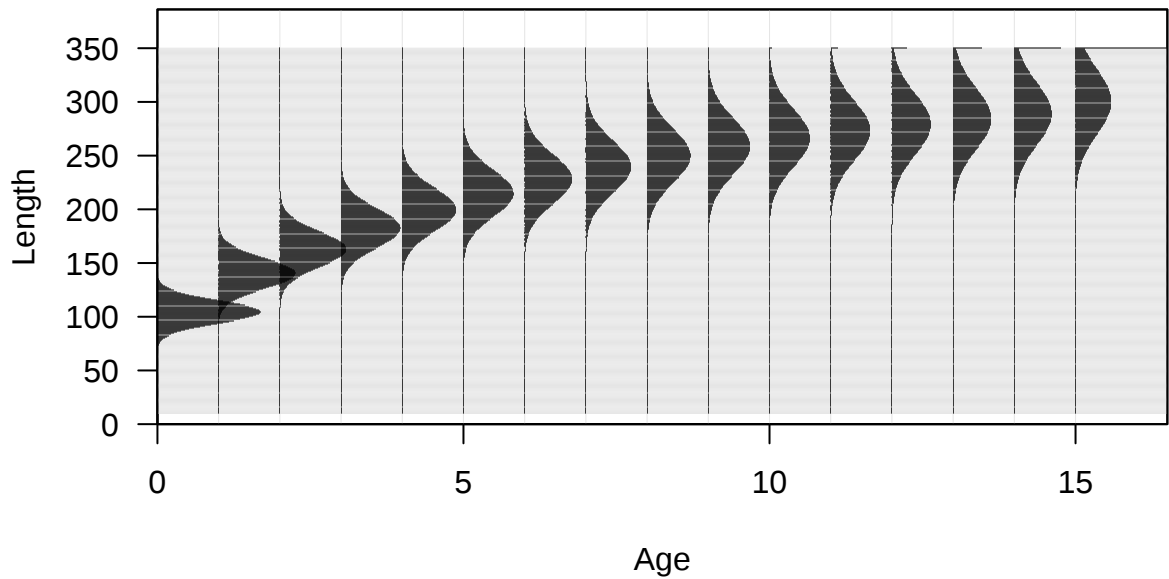


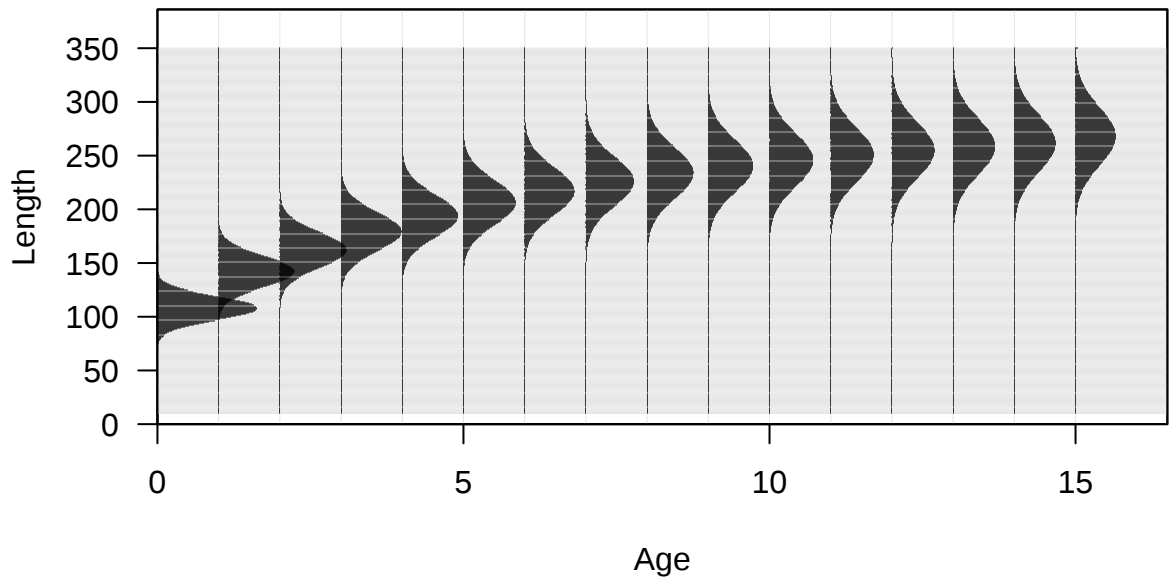


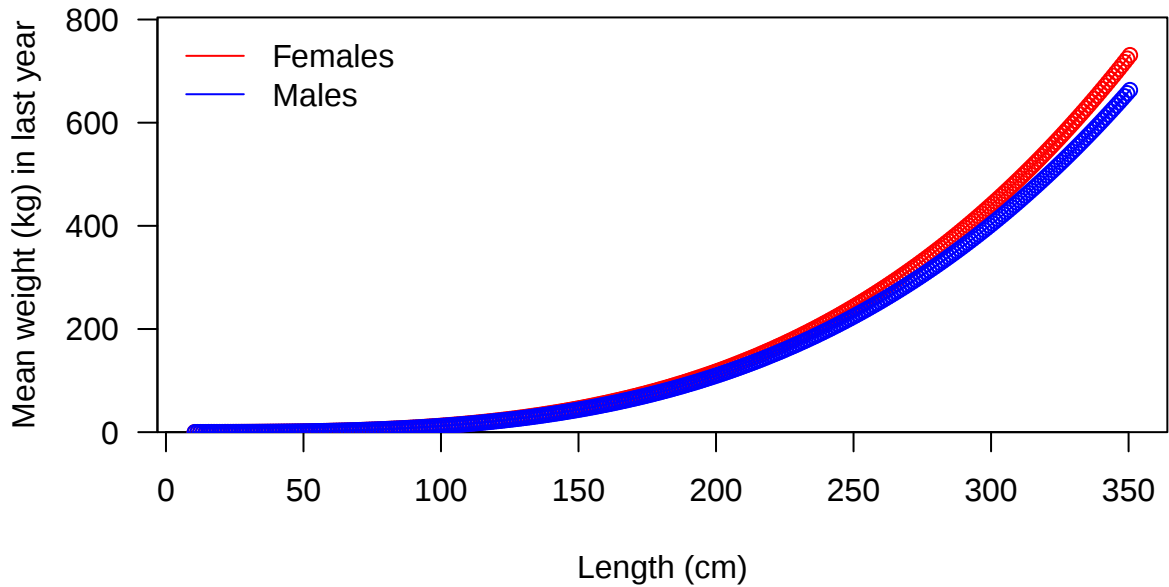


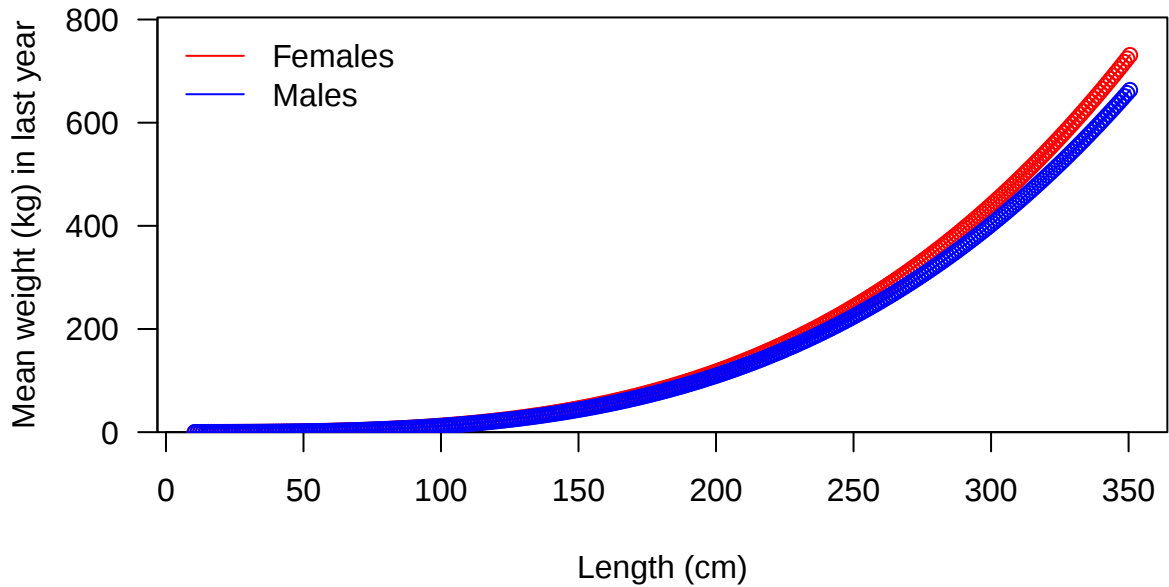


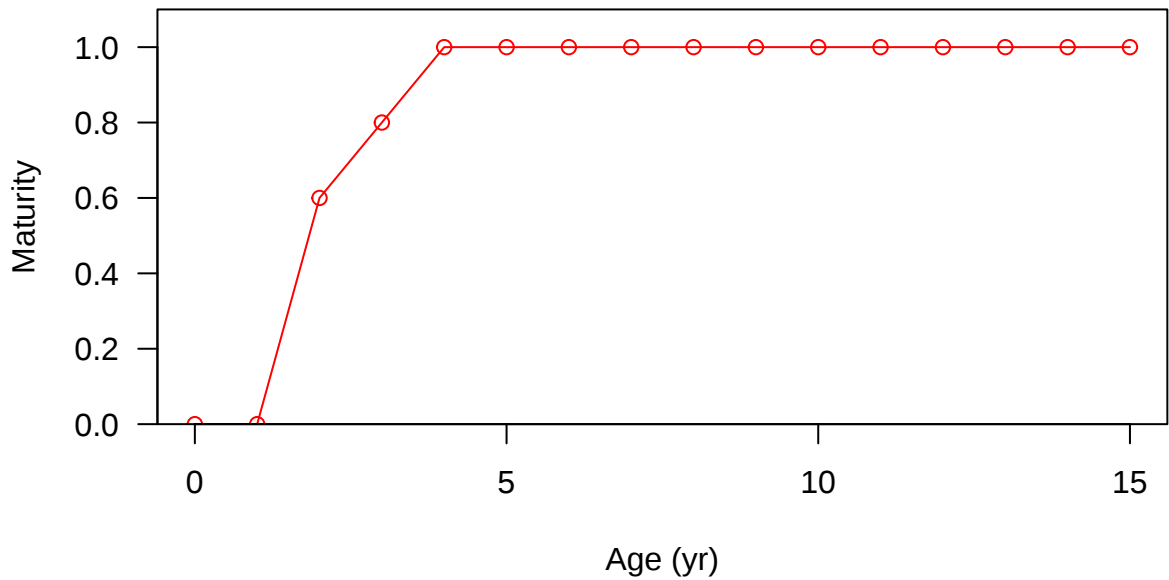


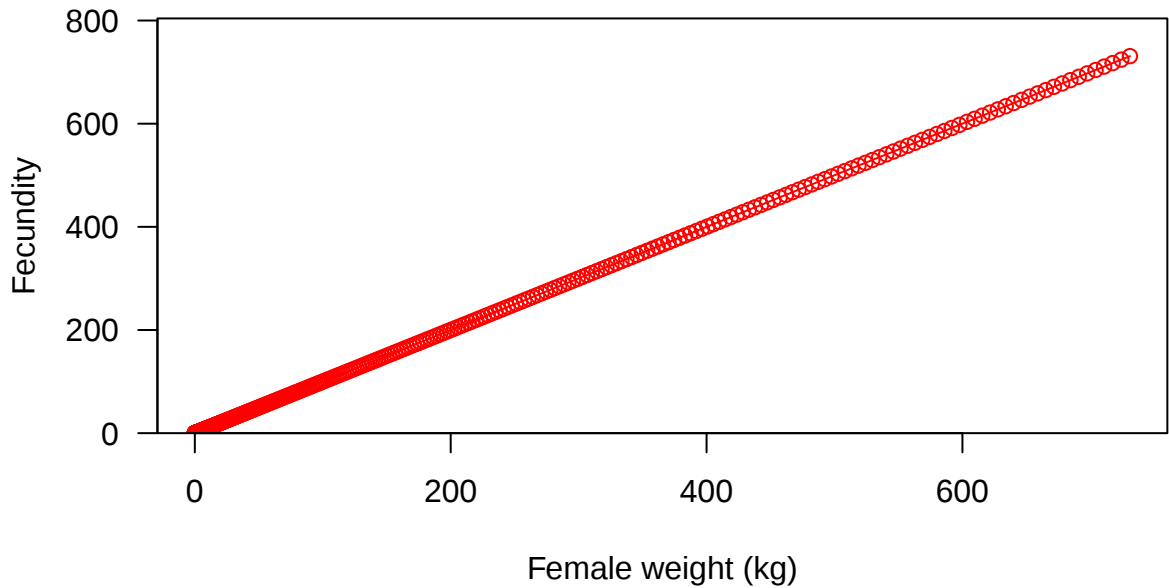


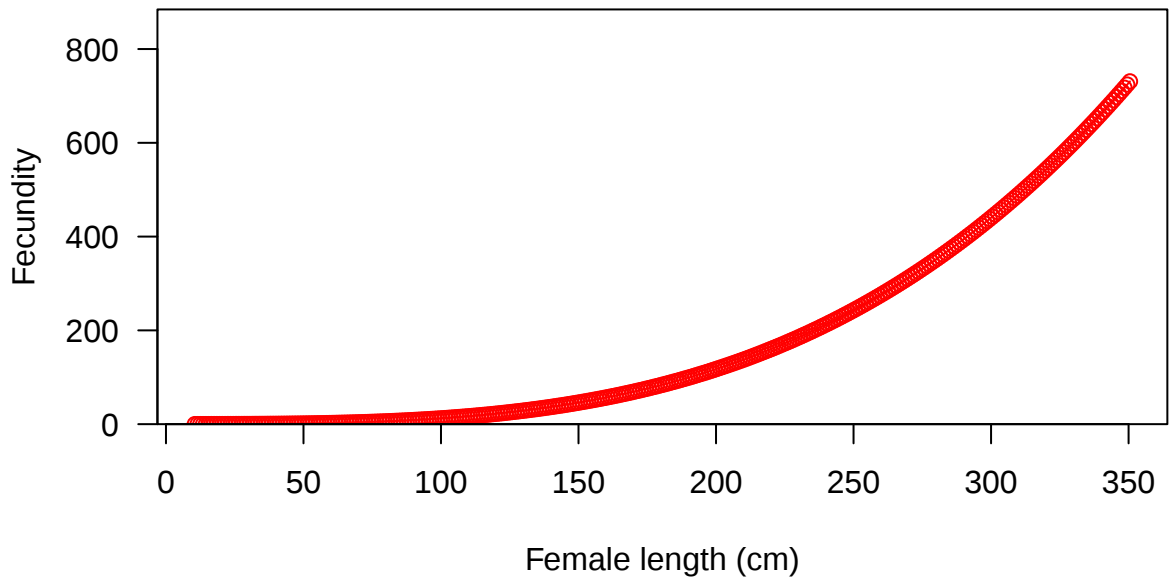


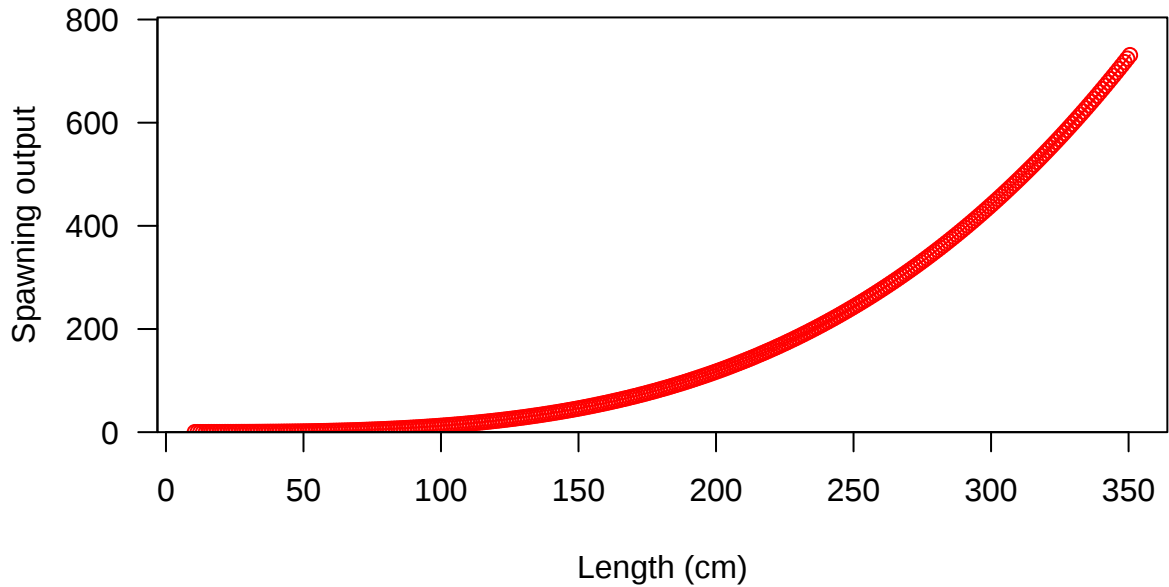


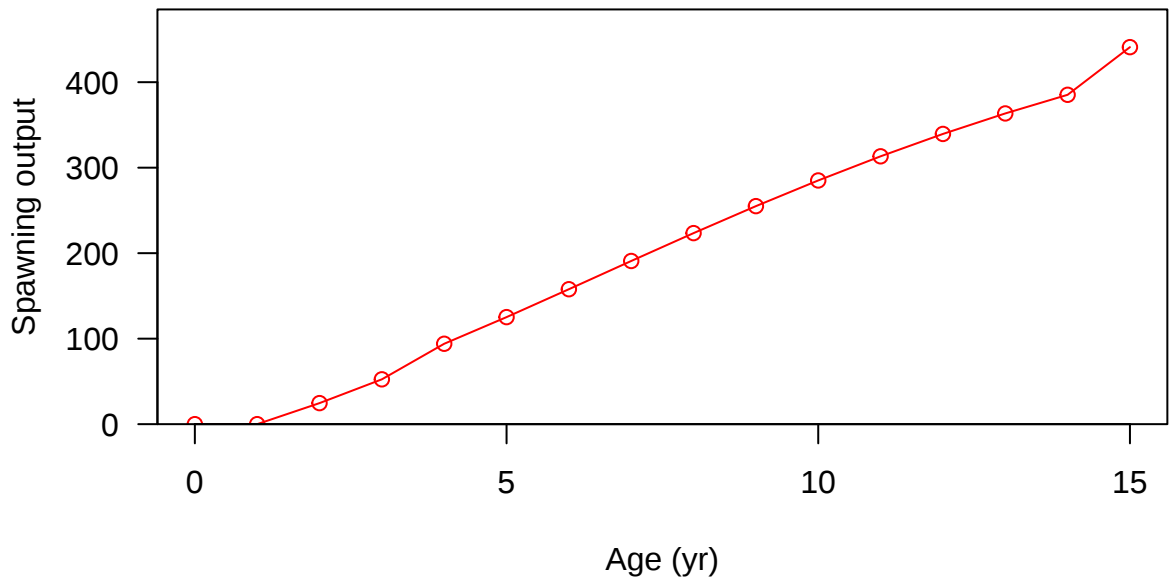




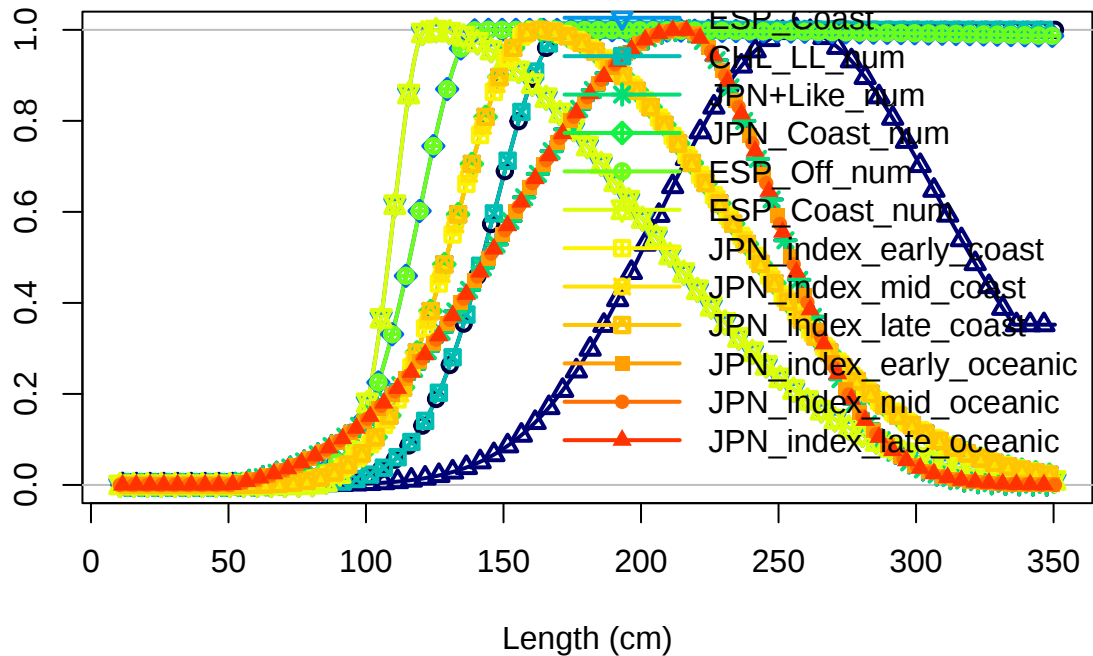


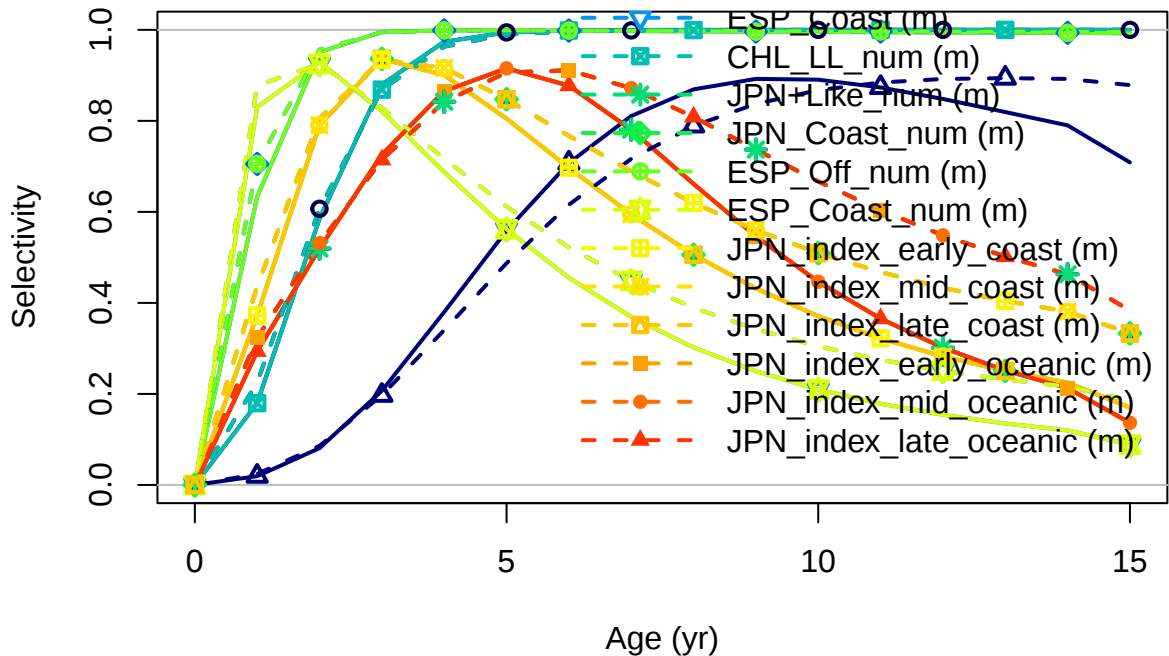




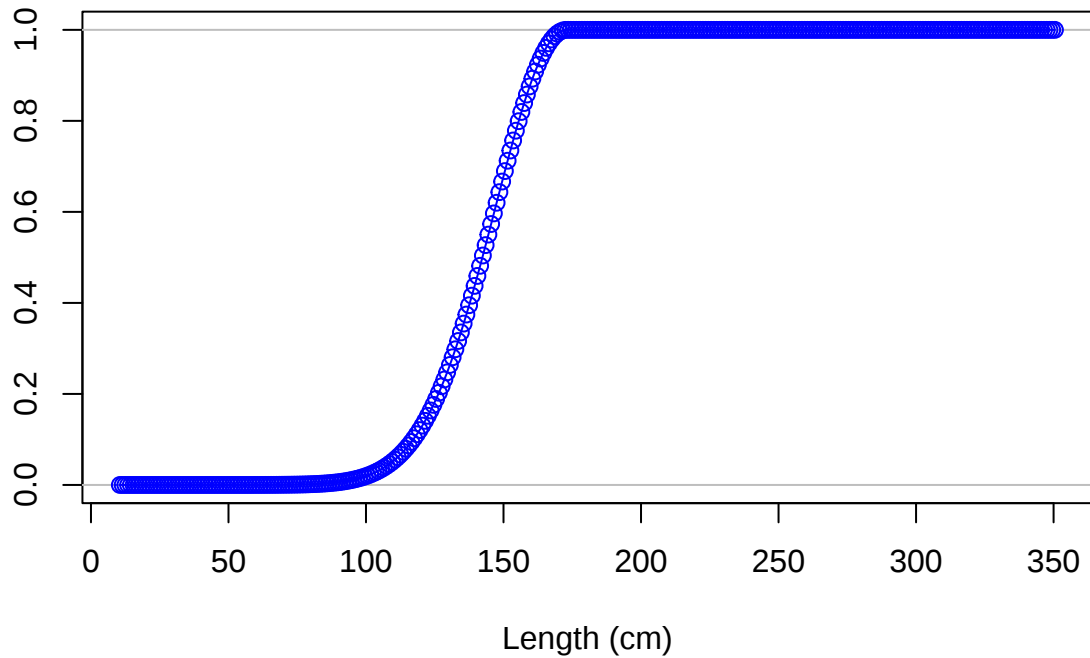


Selectivity

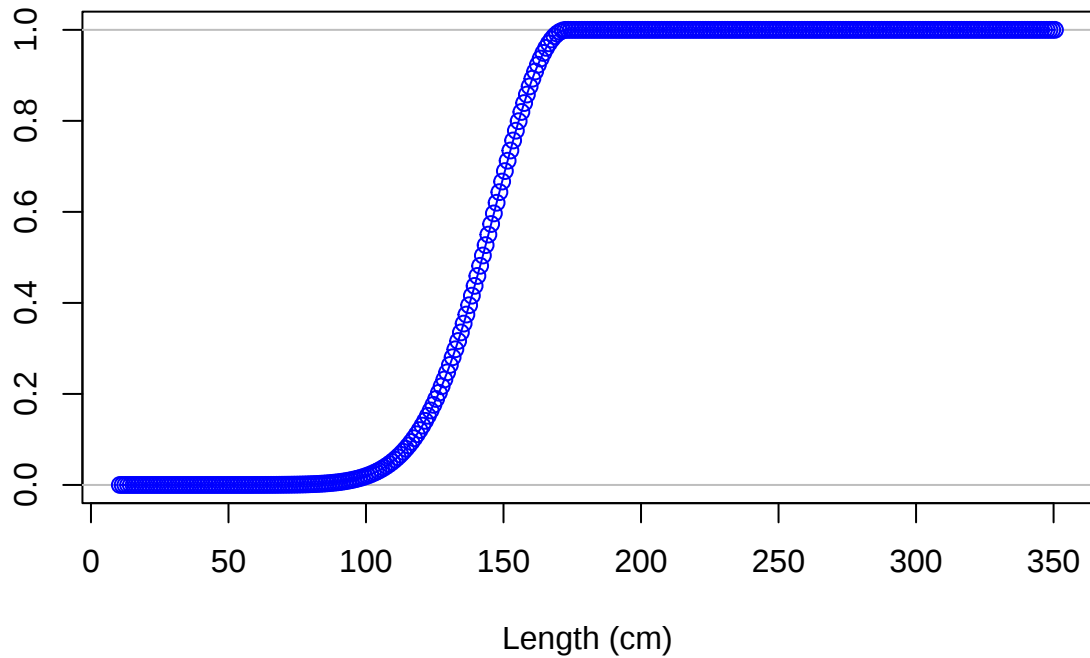




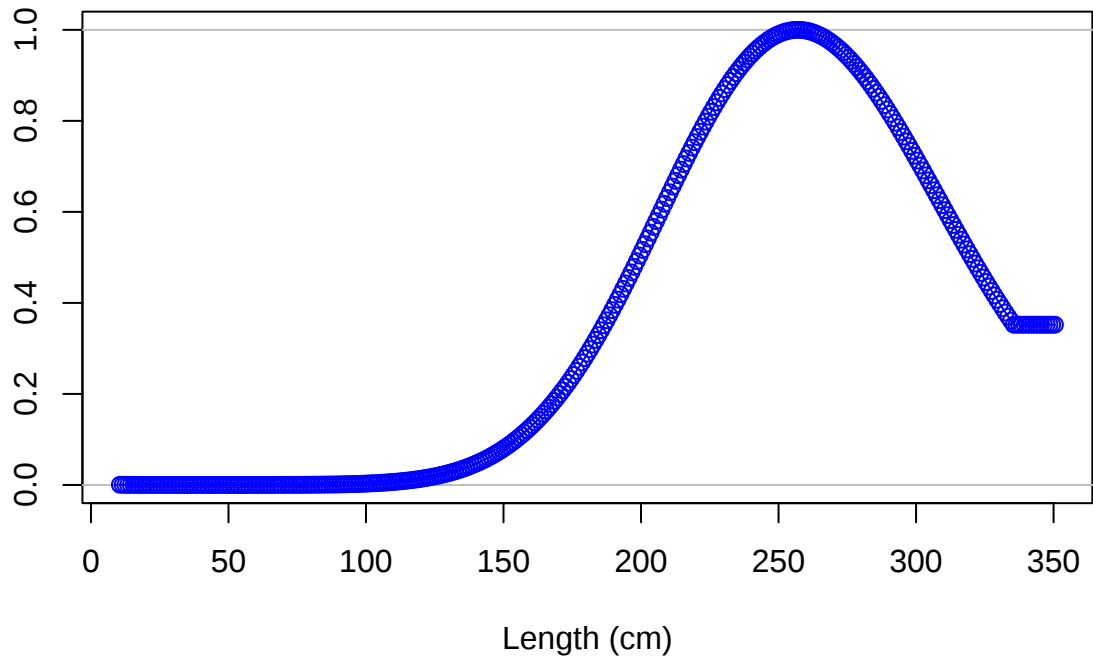
Selectivity



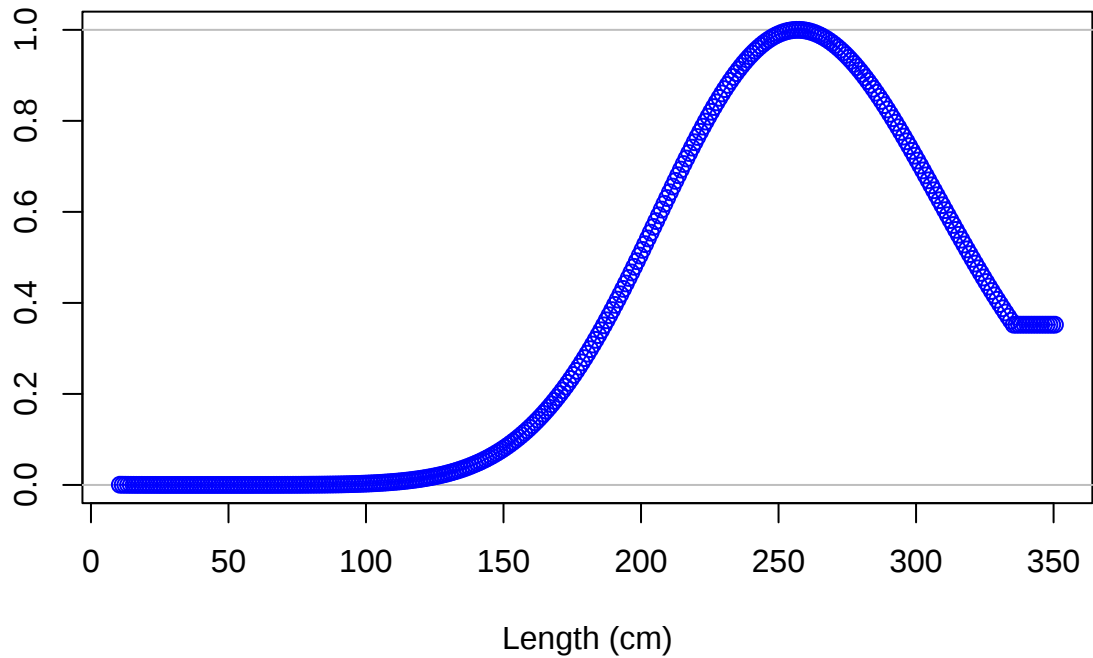
Selectivity



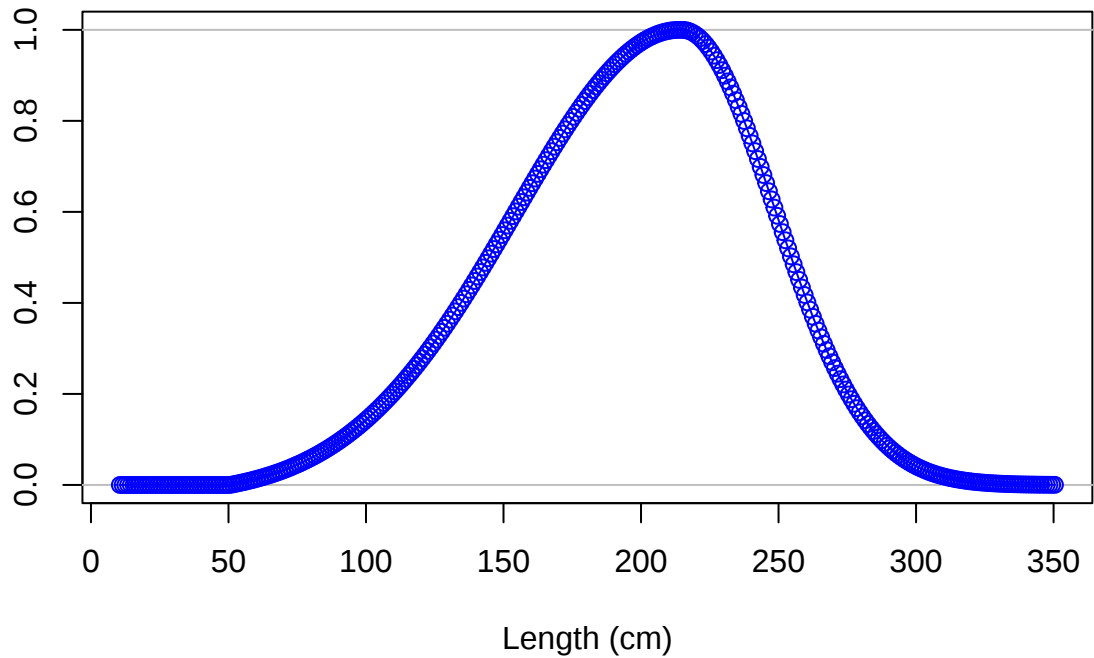
Selectivity



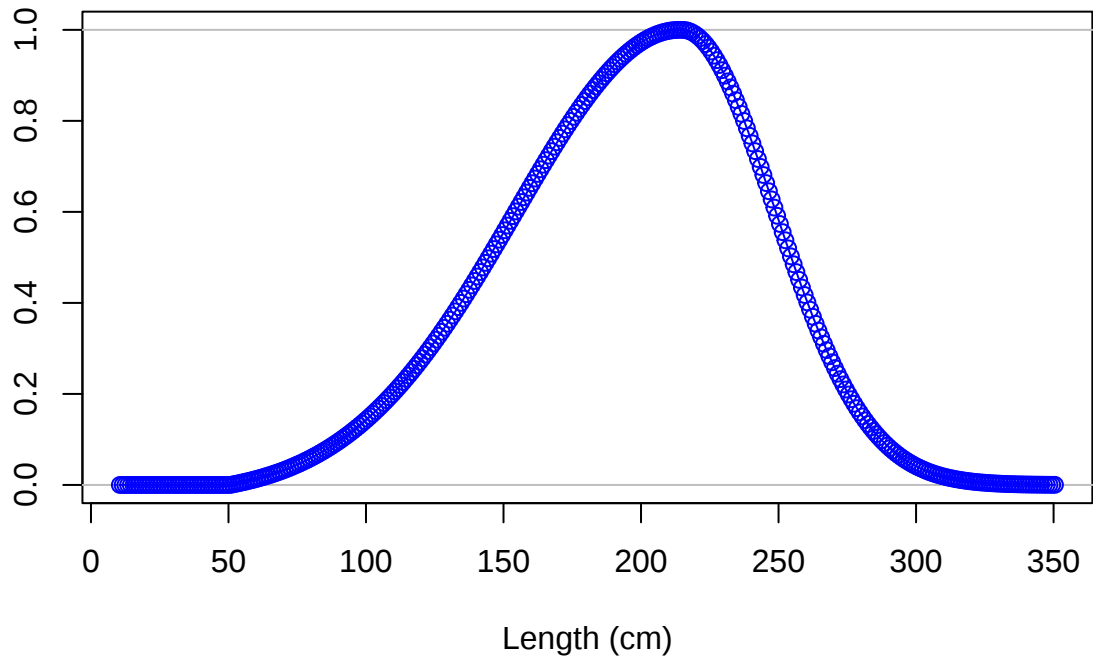
Selectivity



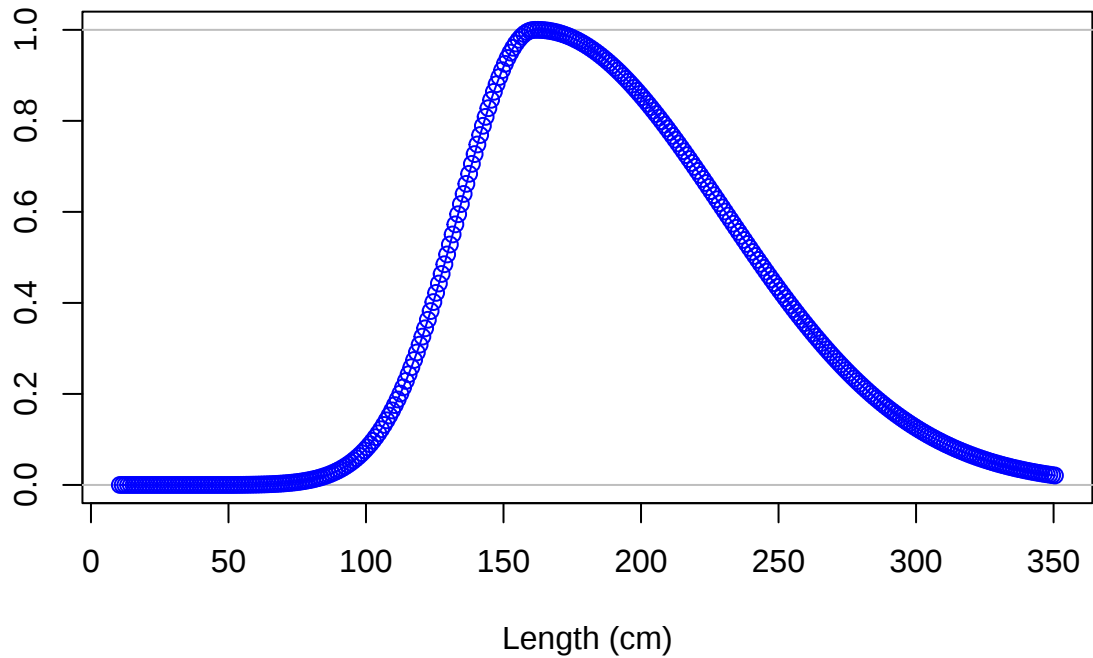
Selectivity



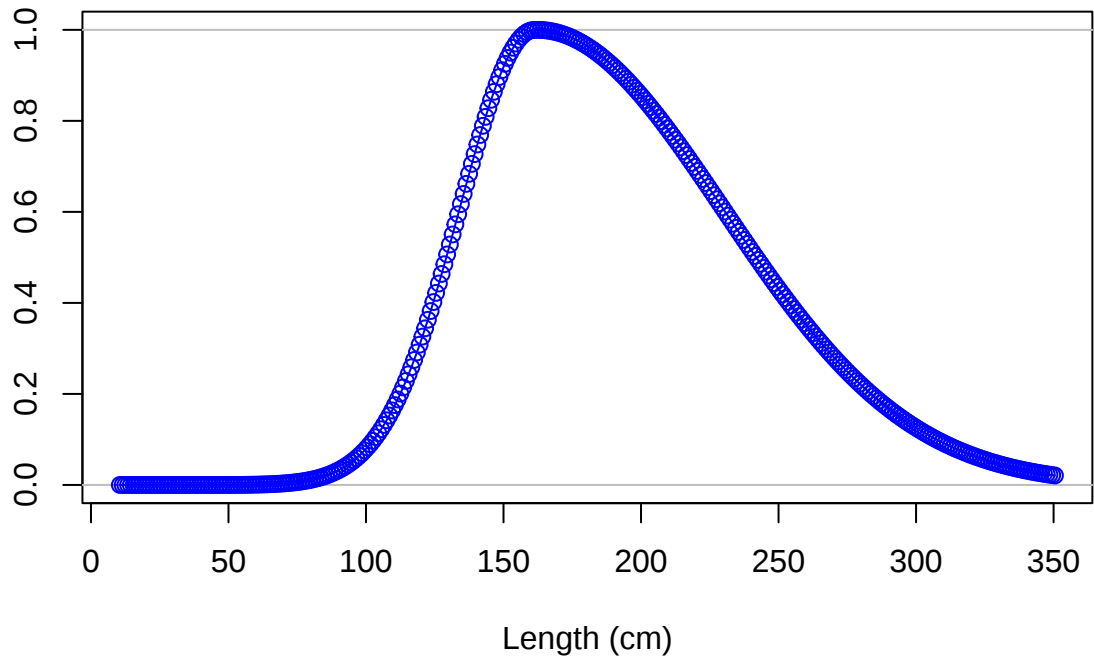
Selectivity



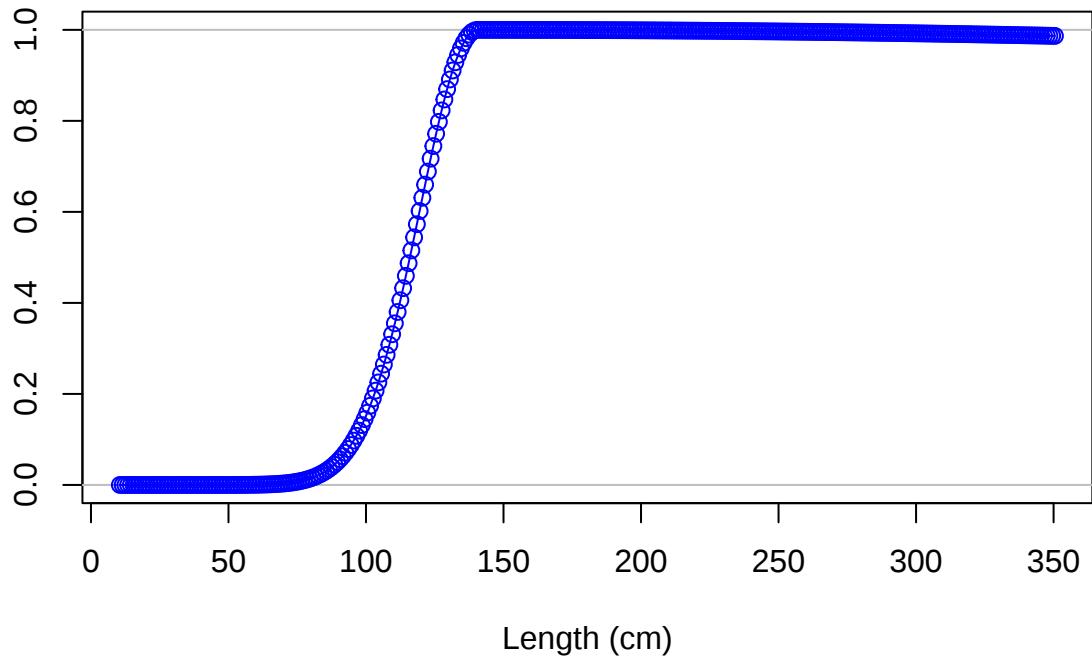
Selectivity



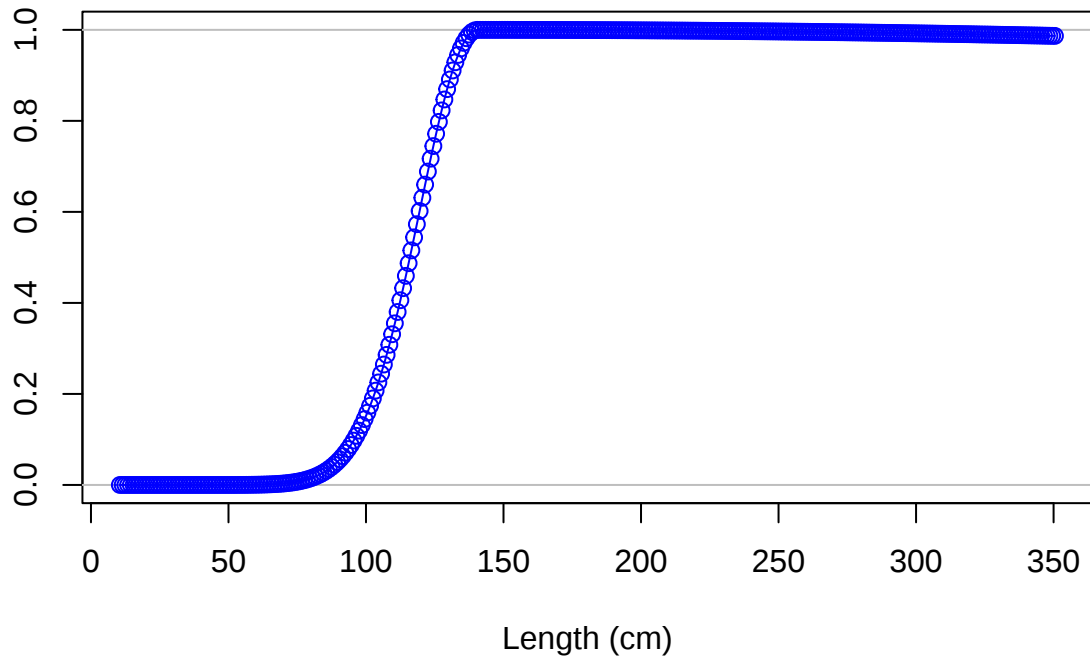
Selectivity

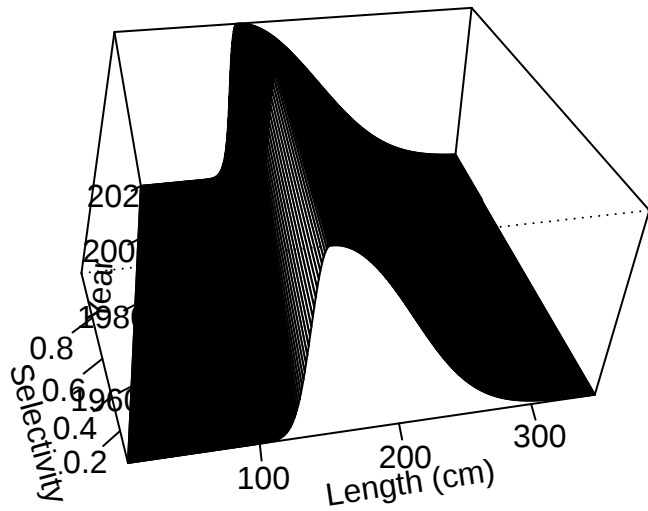


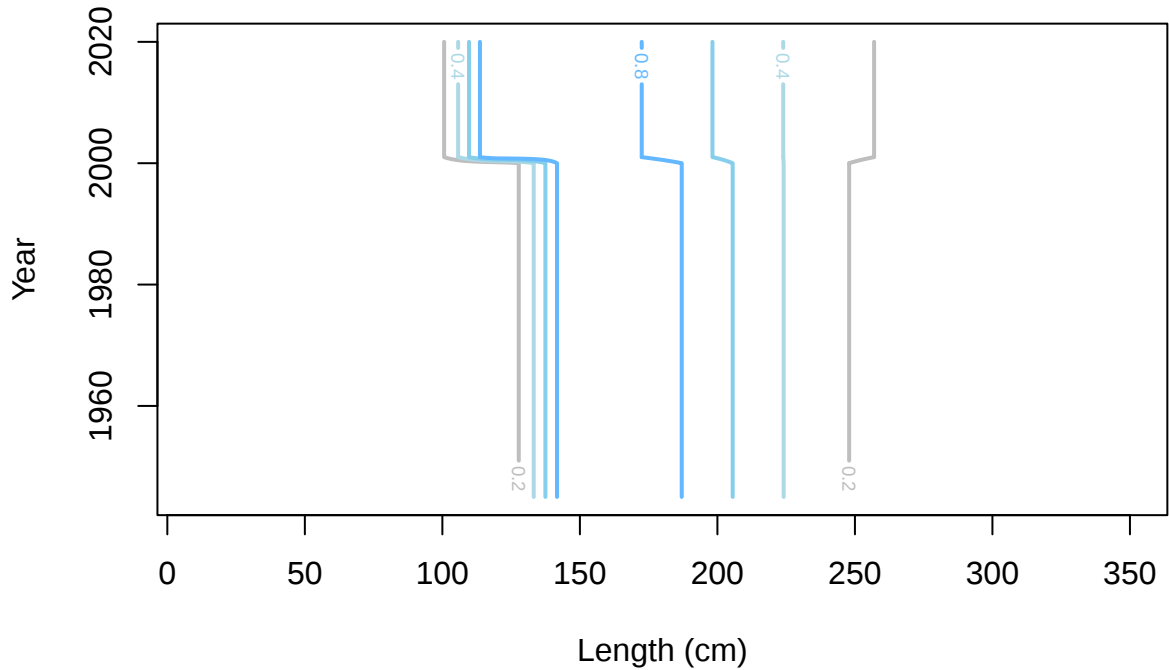
Selectivity



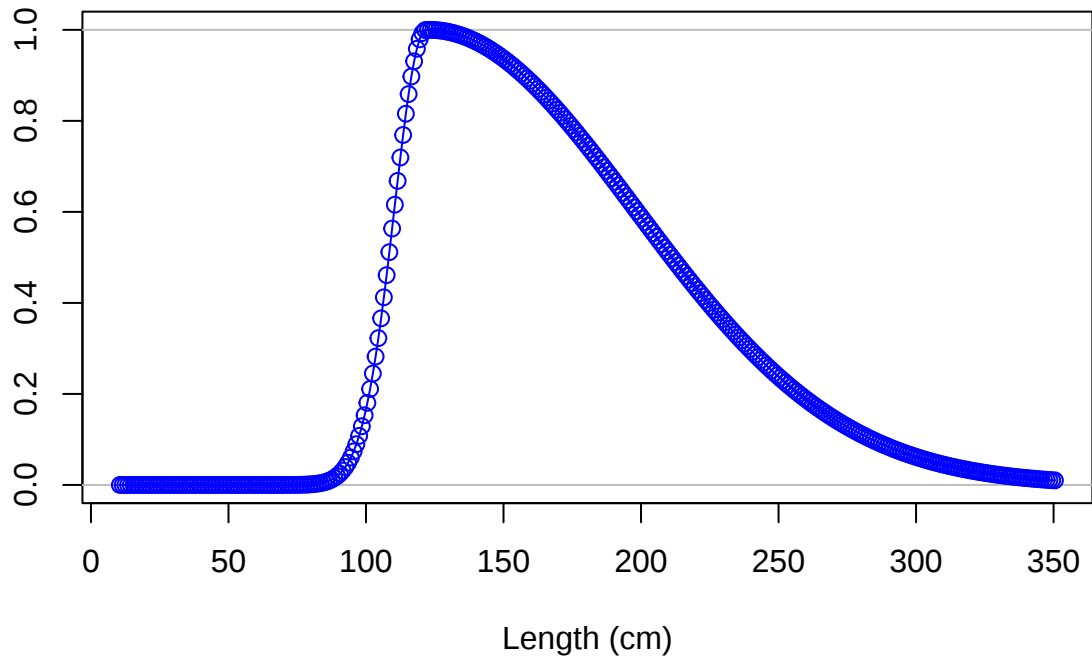
Selectivity

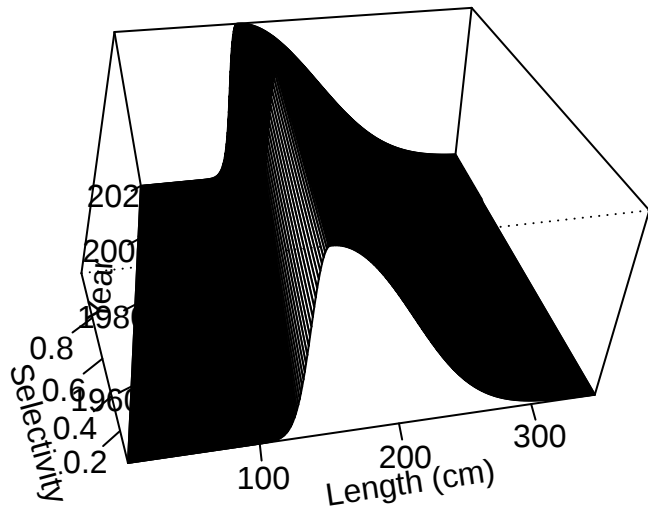


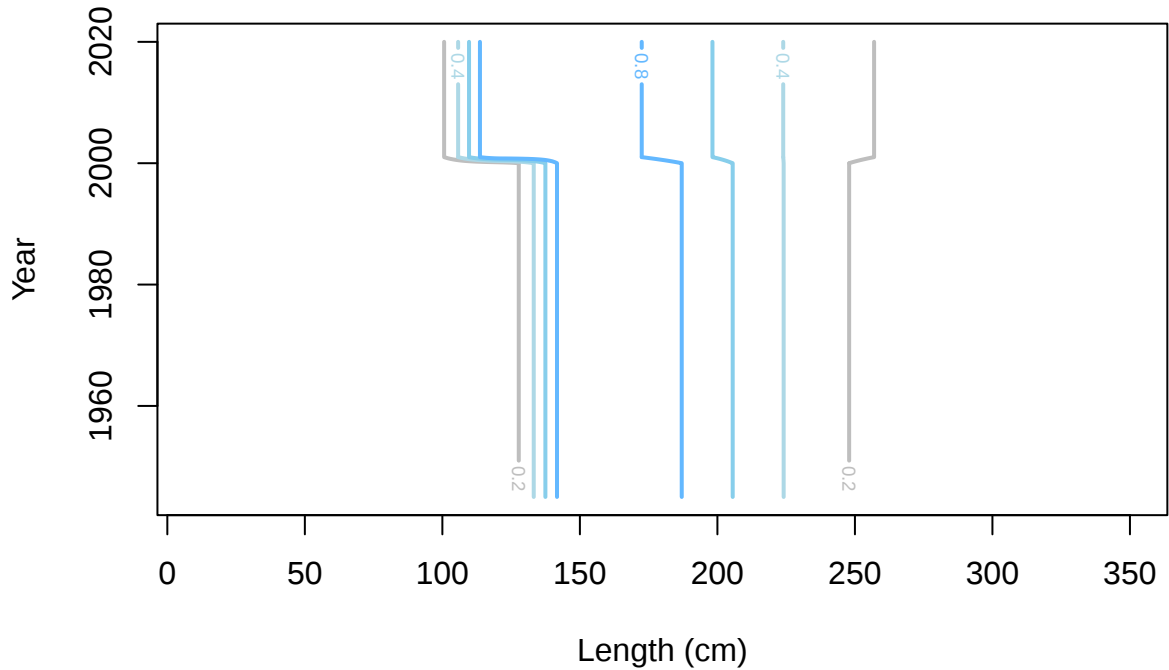




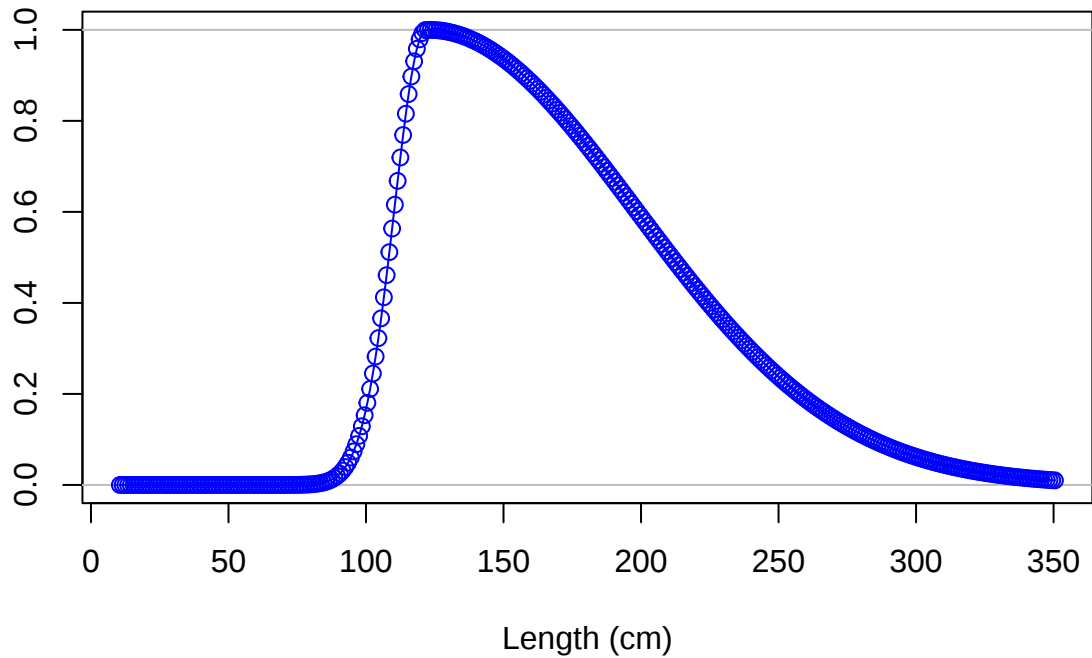
Selectivity



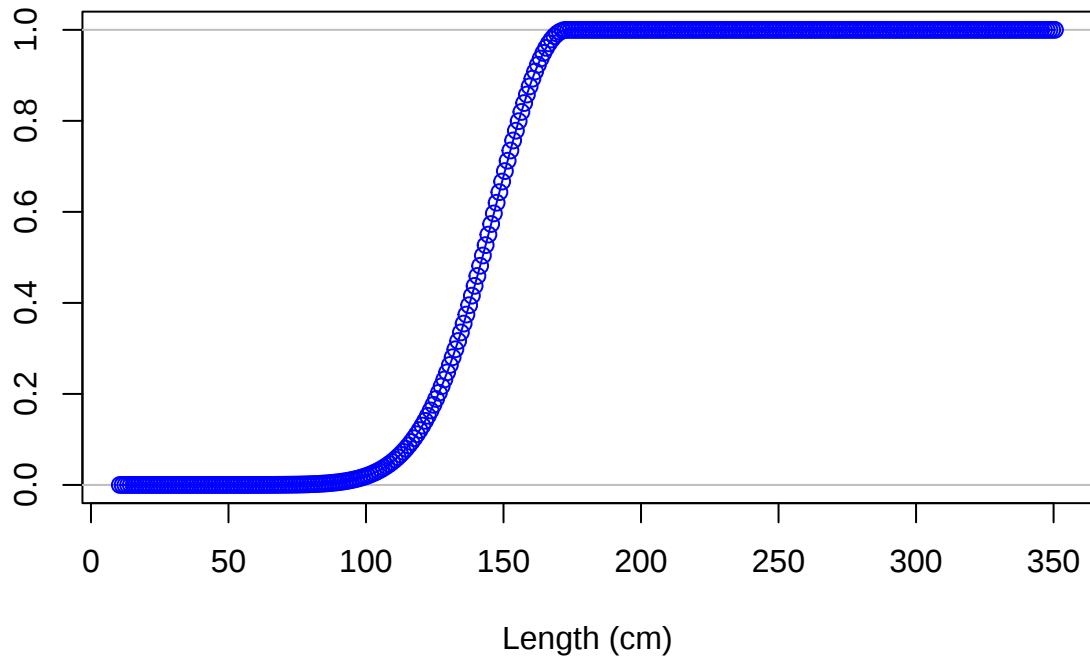




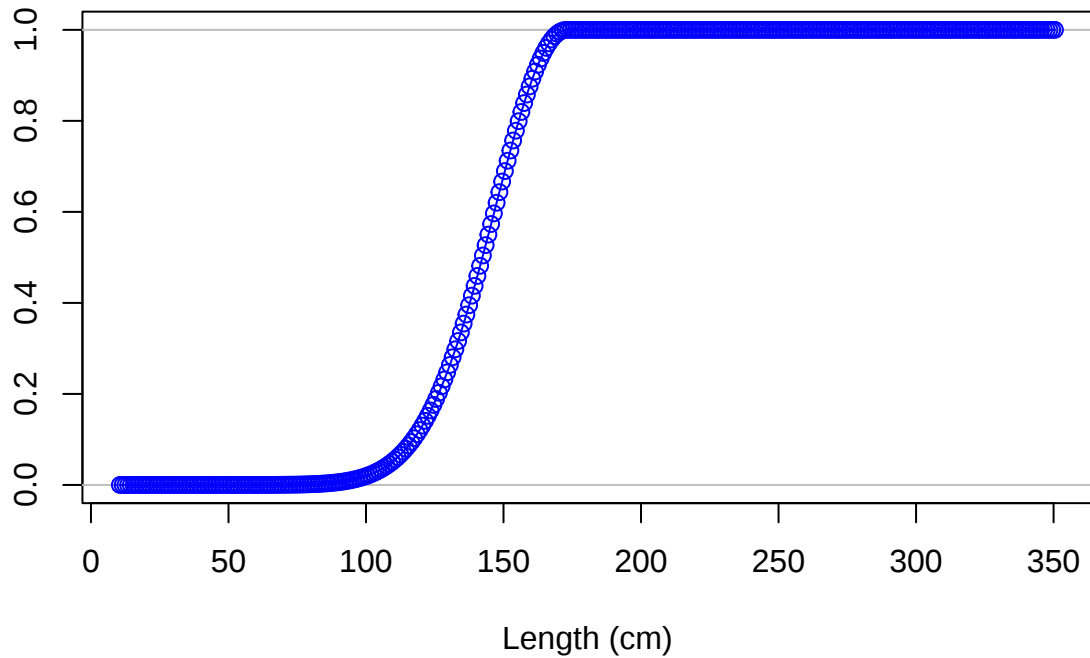
Selectivity



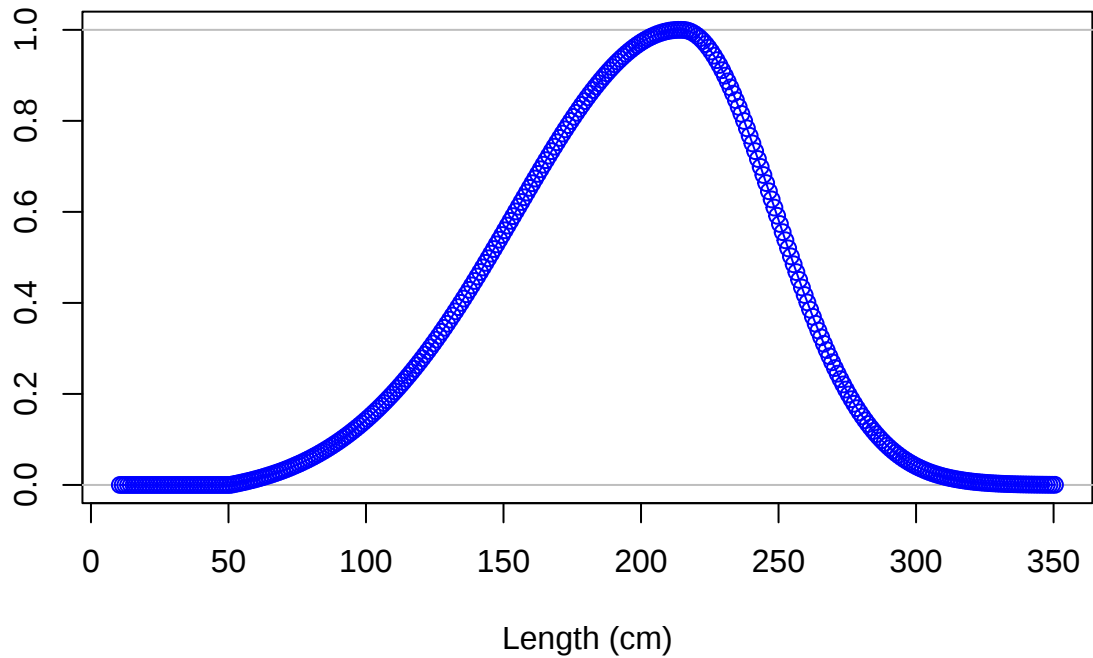
Selectivity



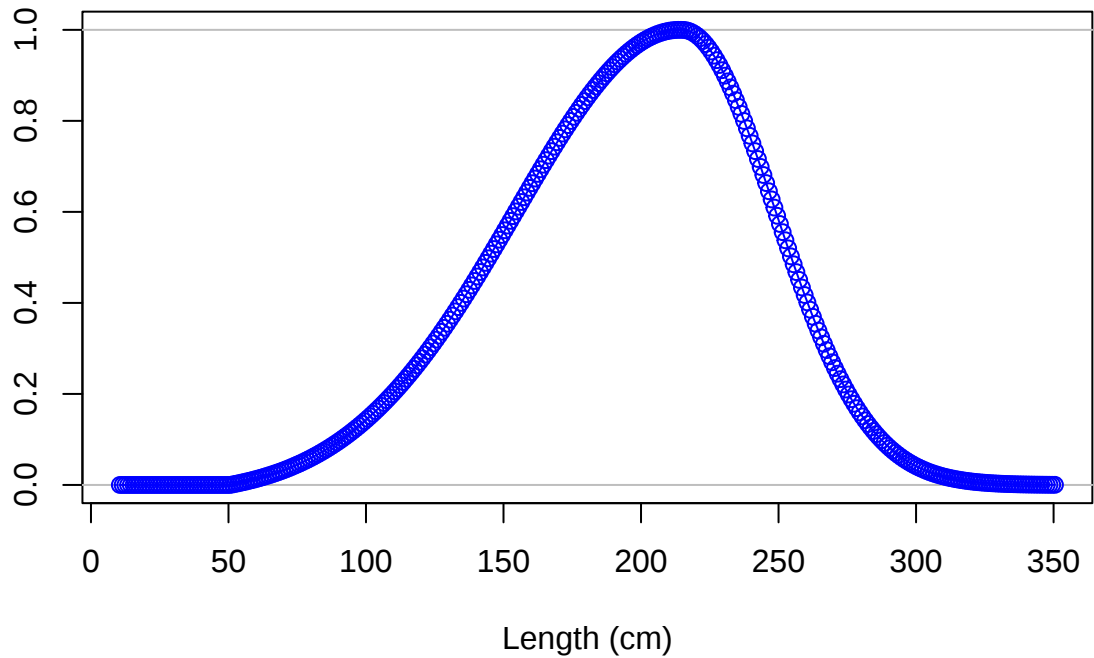
Selectivity



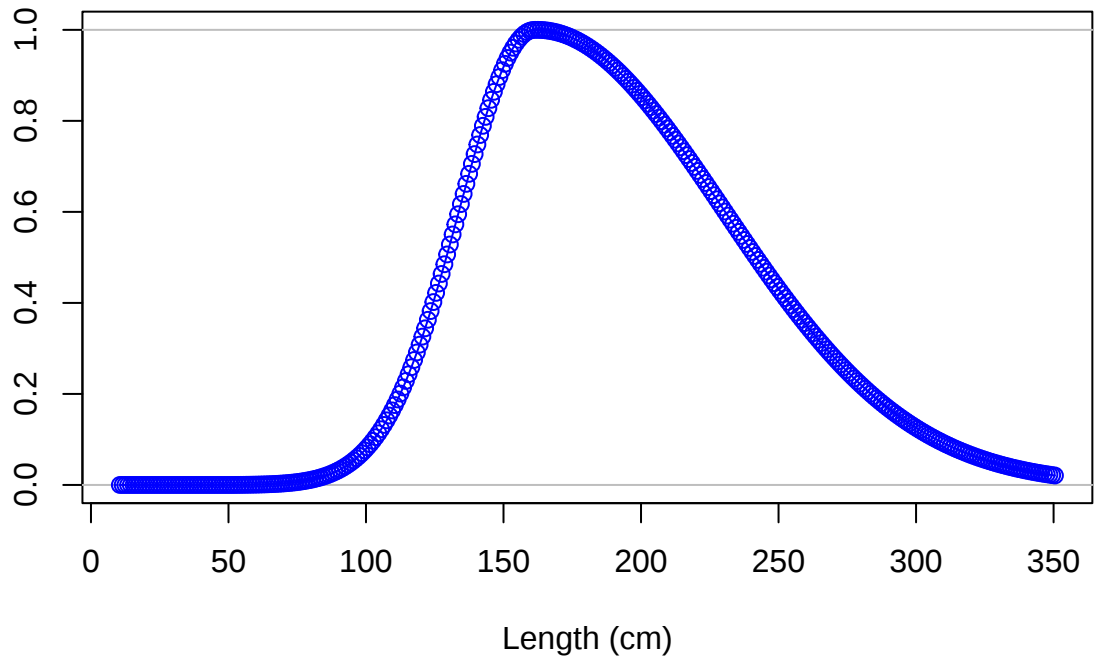
Selectivity



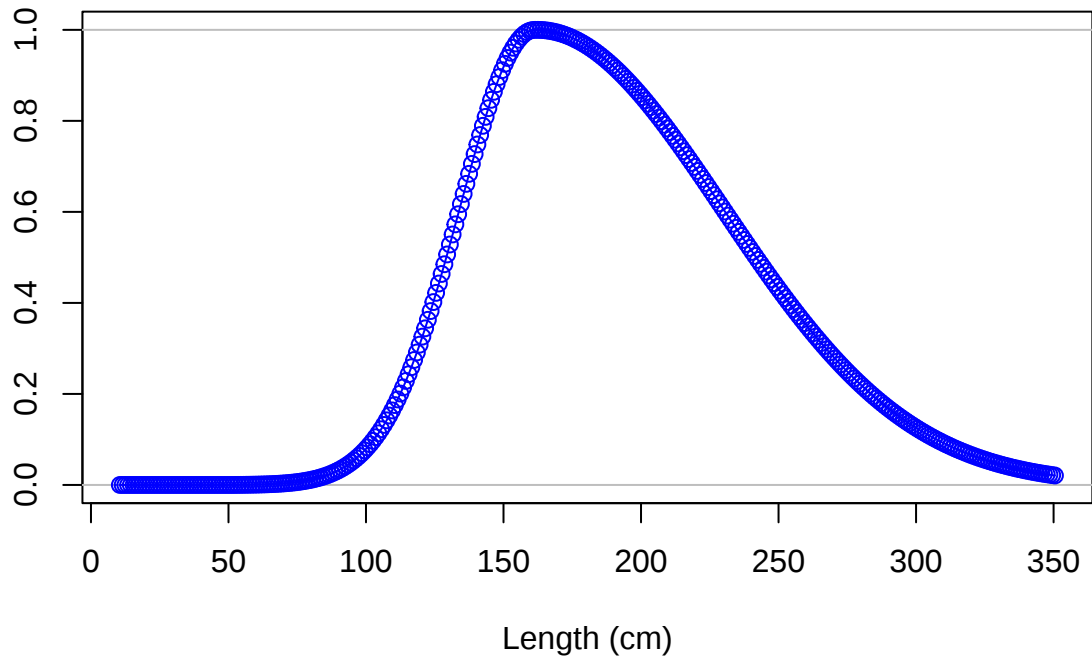
Selectivity



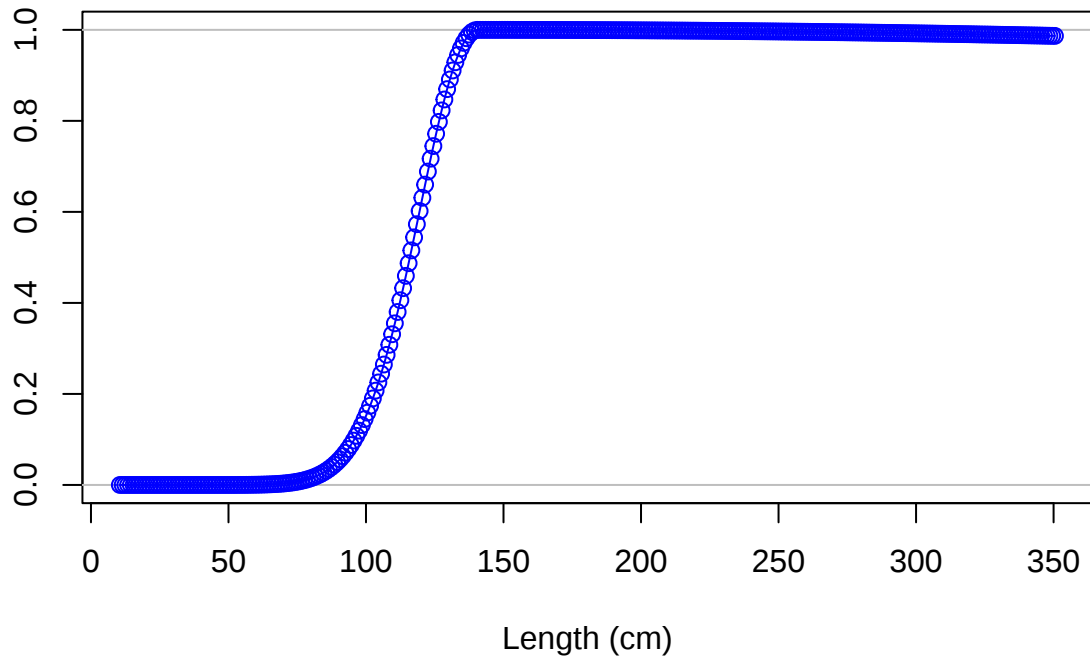
Selectivity



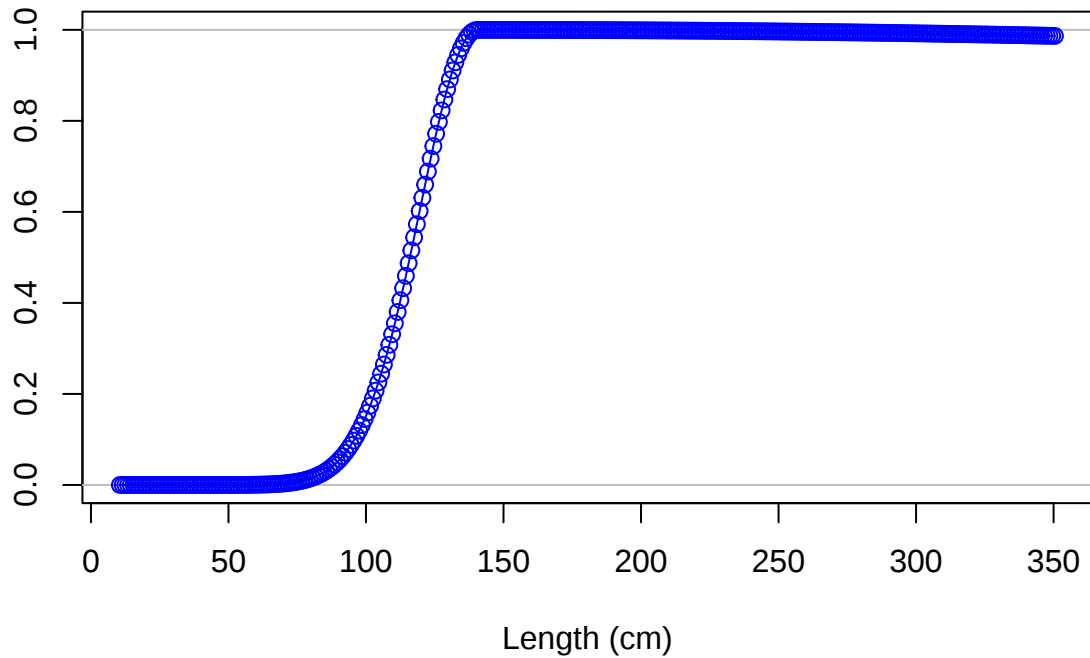
Selectivity

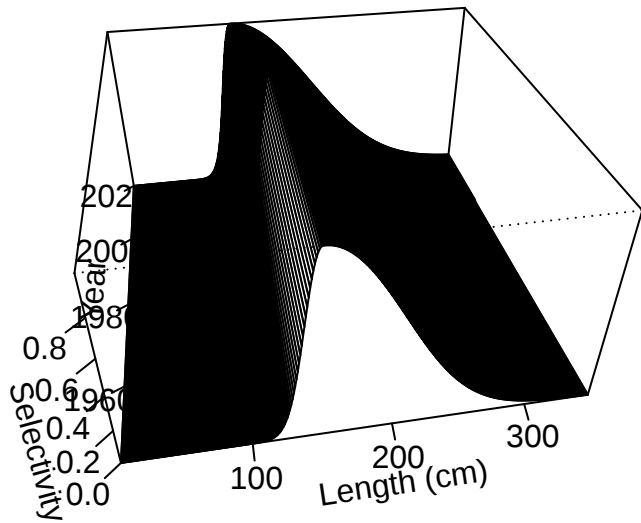


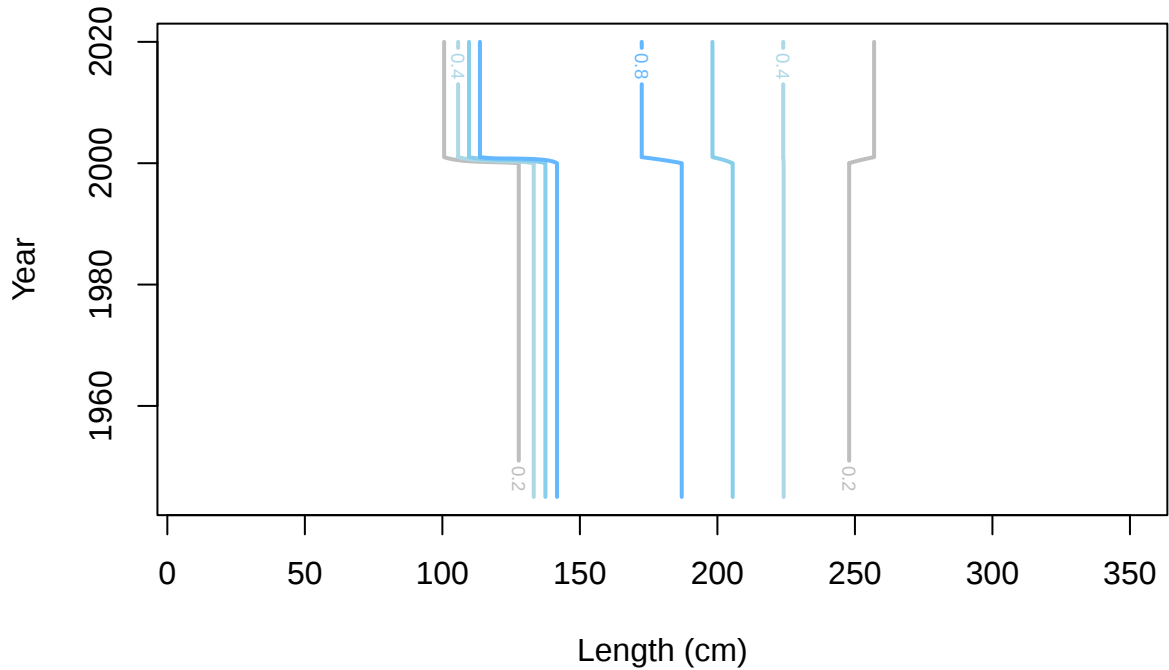
Selectivity



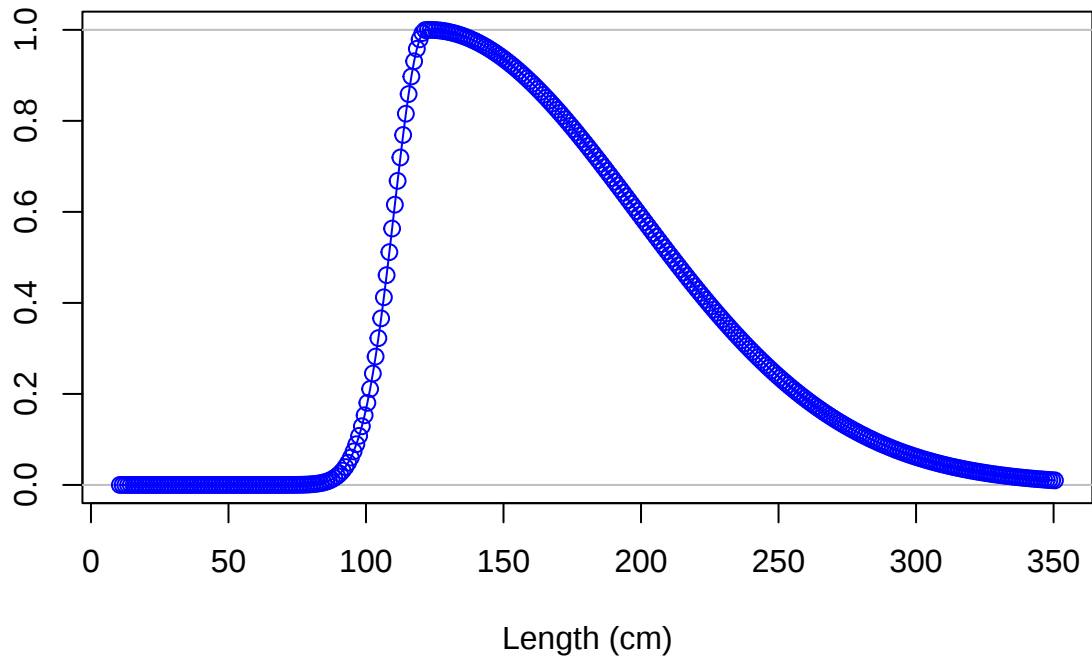
Selectivity

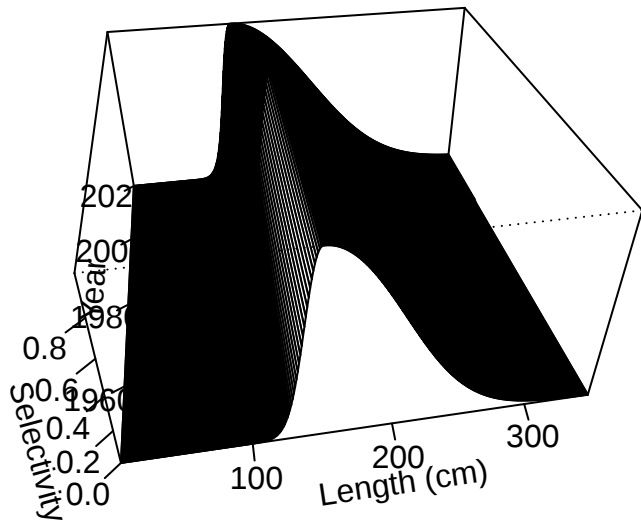


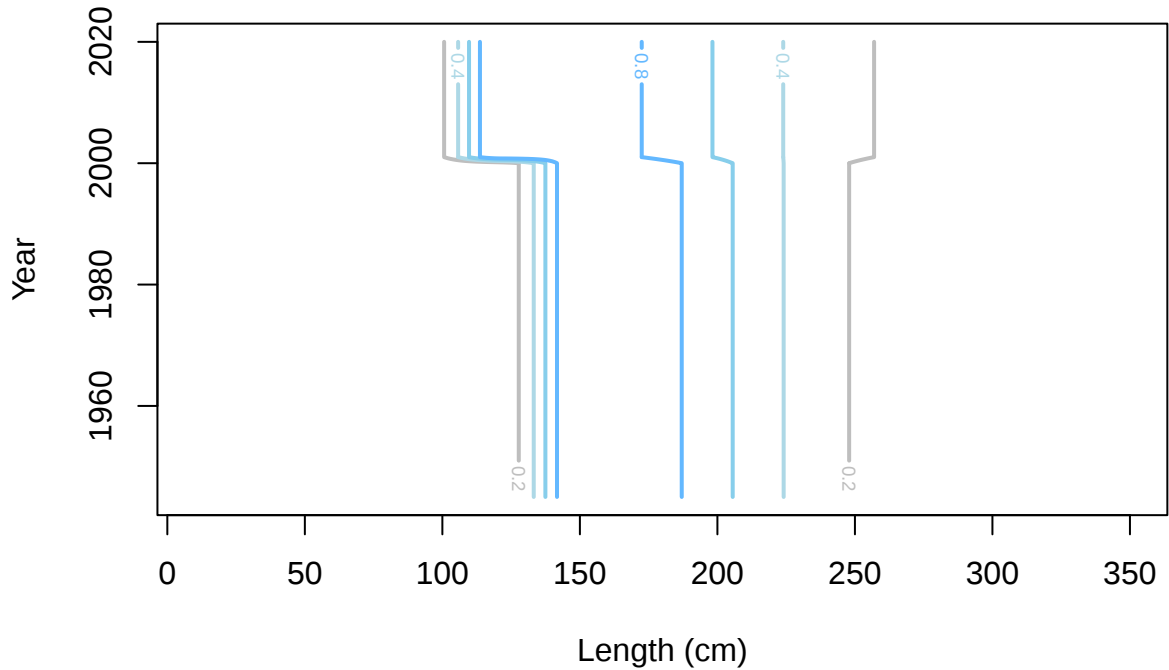




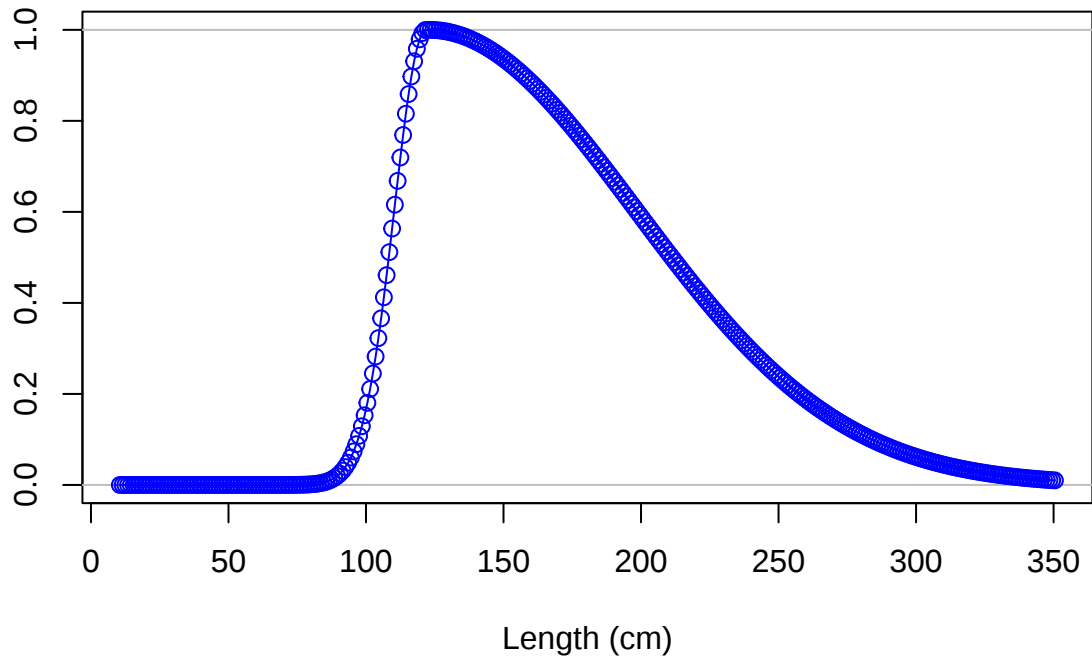
Selectivity



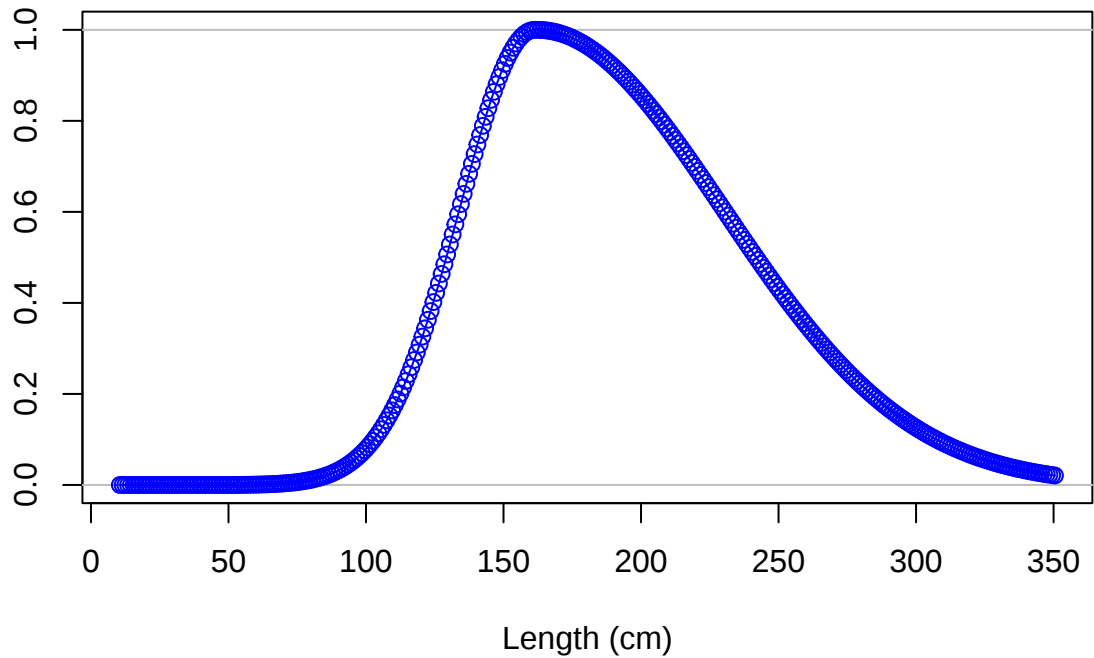




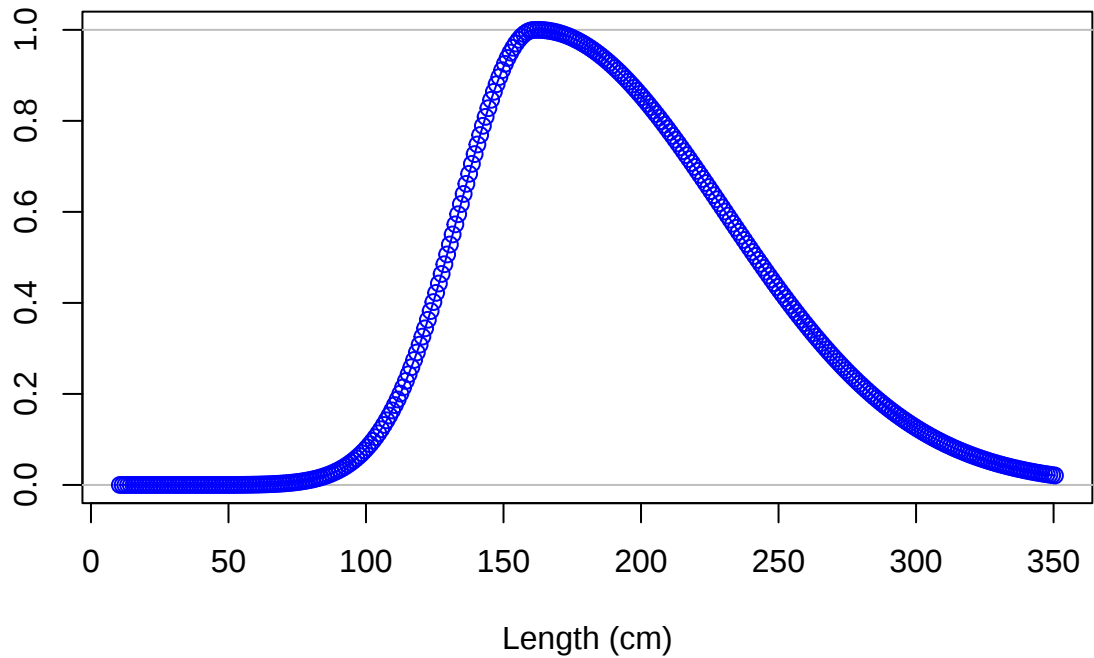
Selectivity



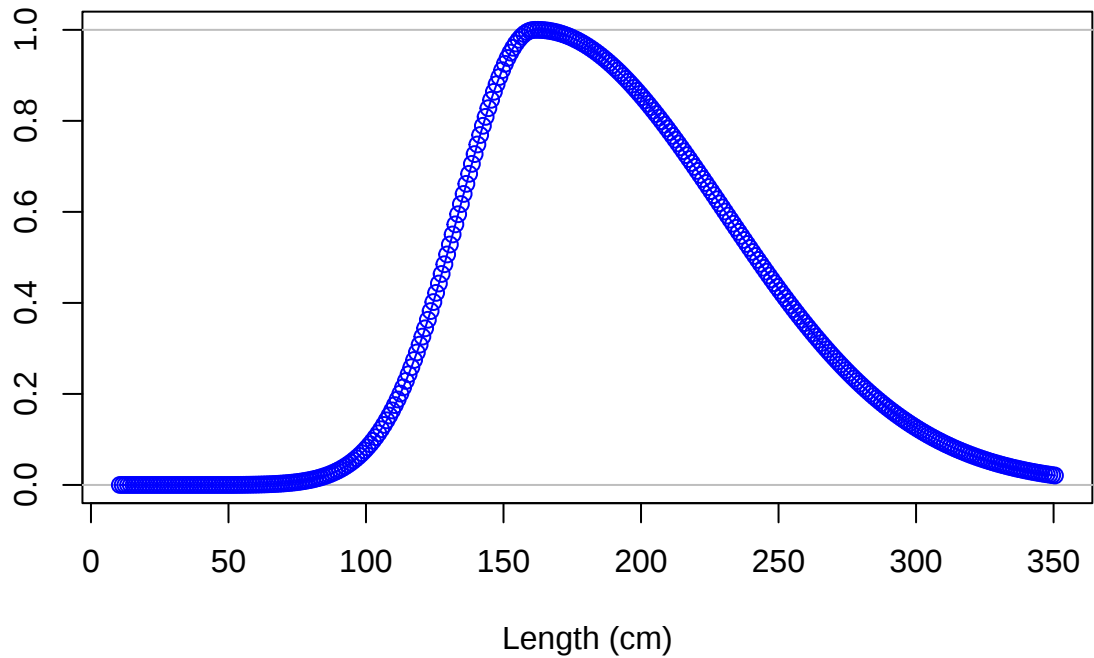
Selectivity



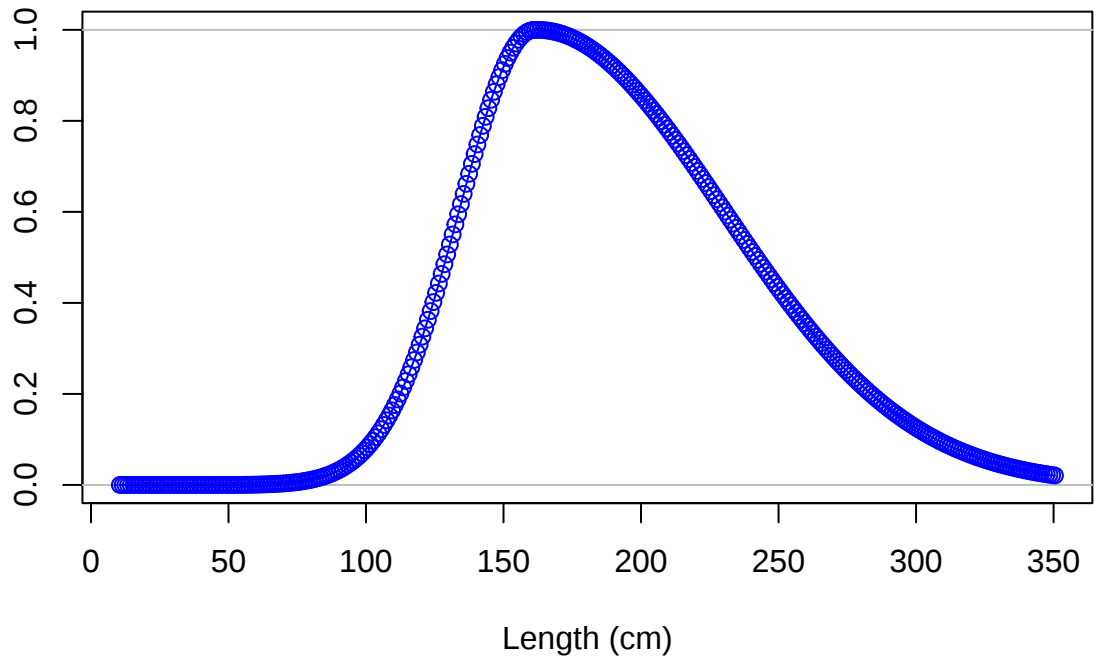
Selectivity



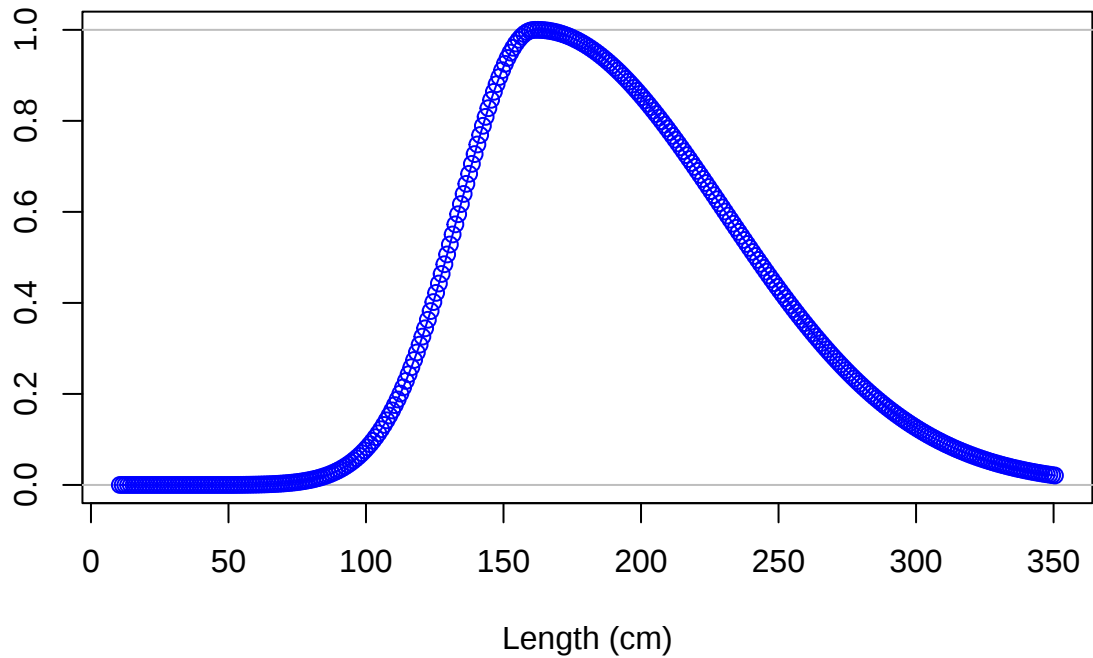
Selectivity



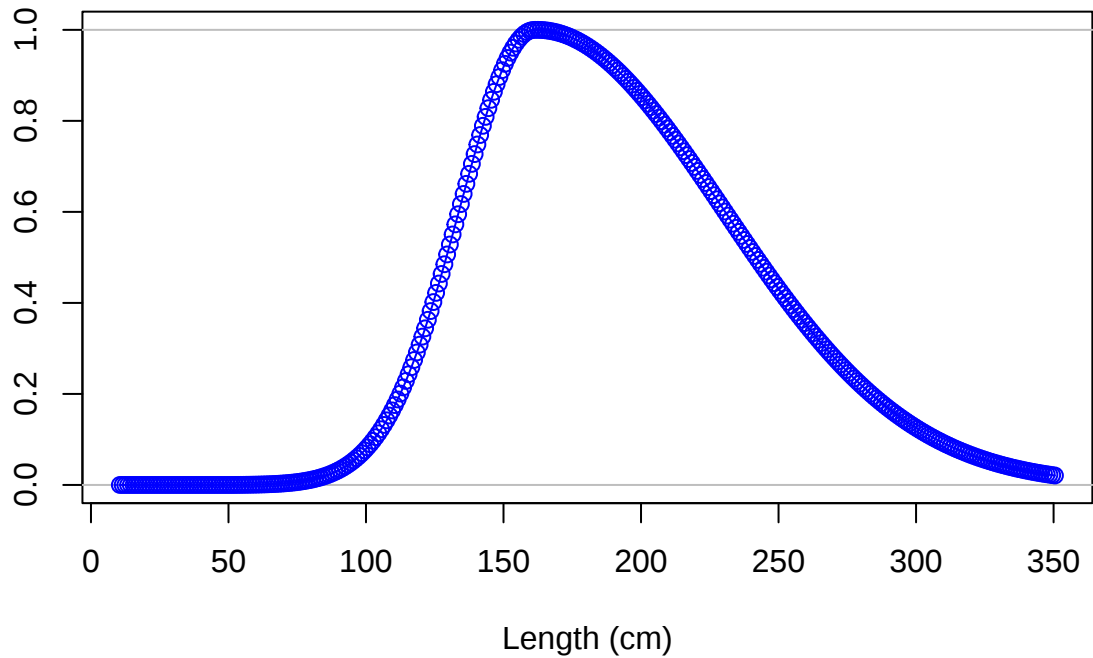
Selectivity



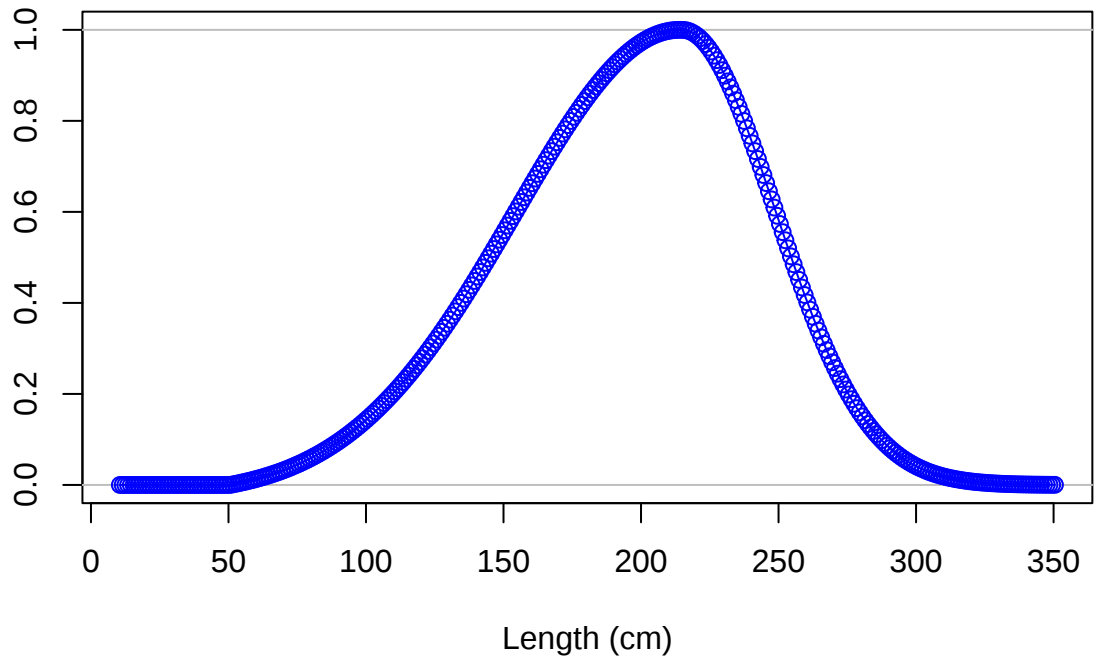
Selectivity



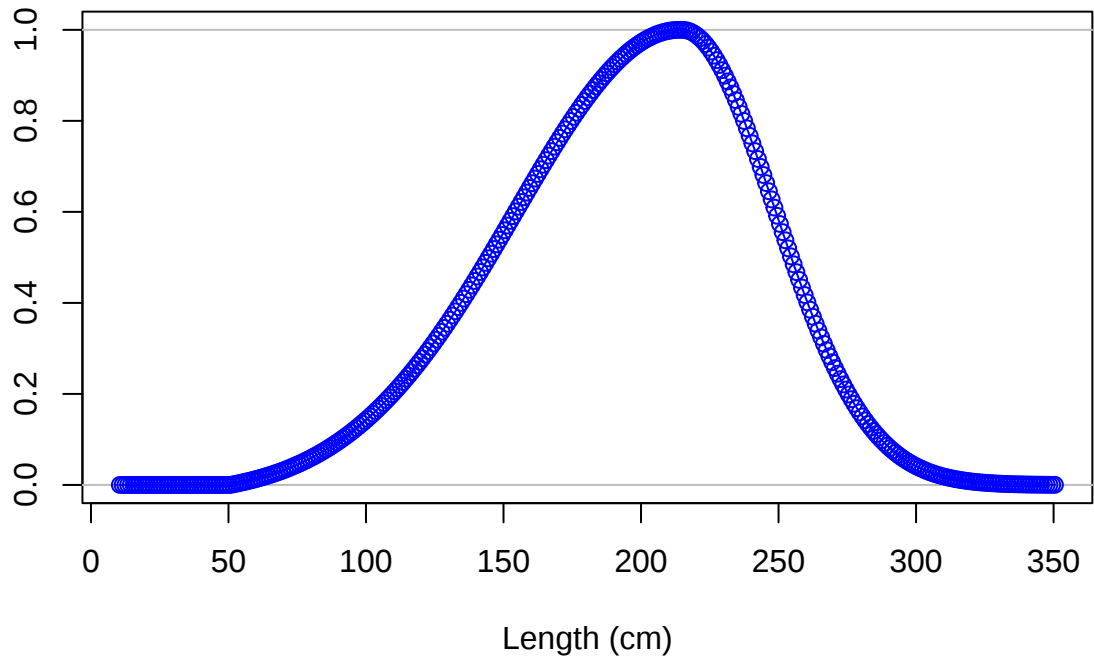
Selectivity



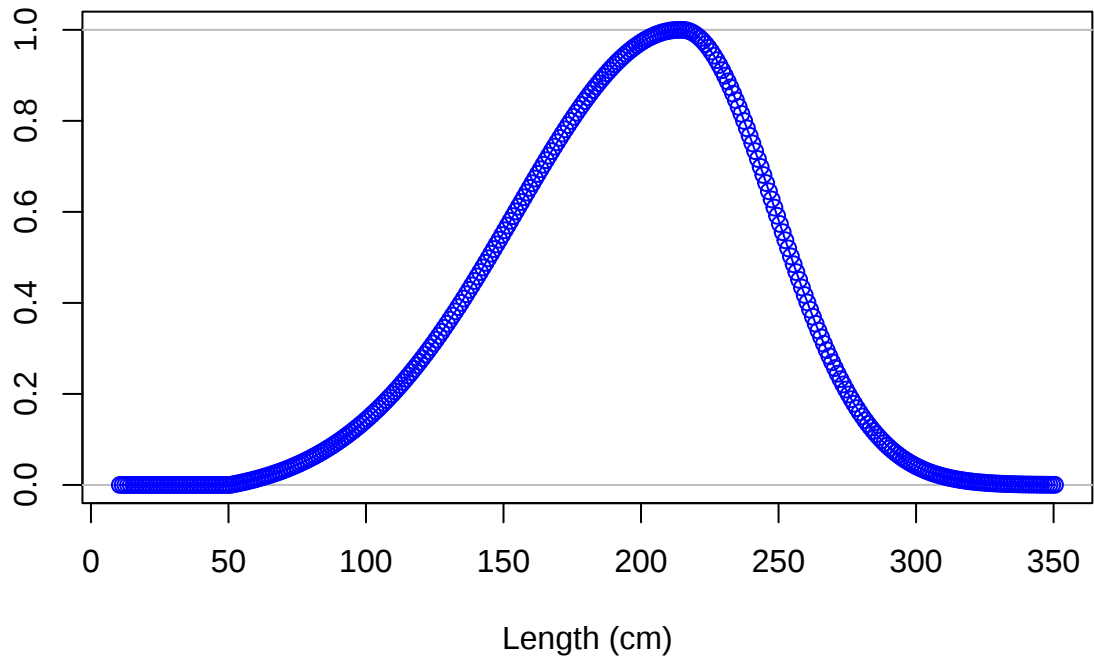
Selectivity



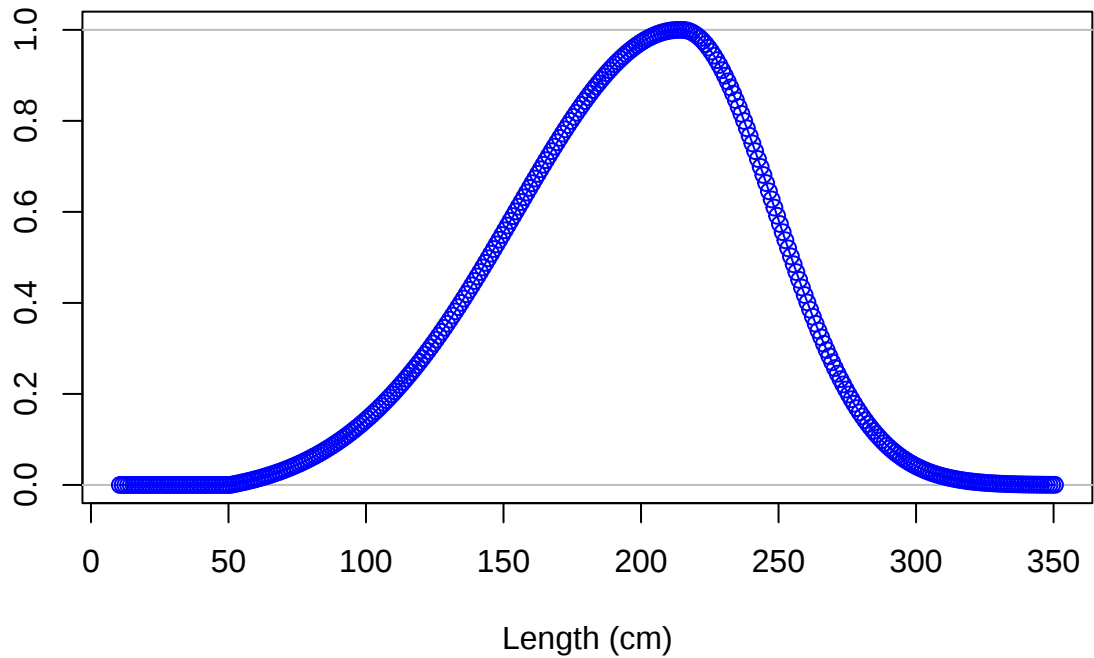
Selectivity



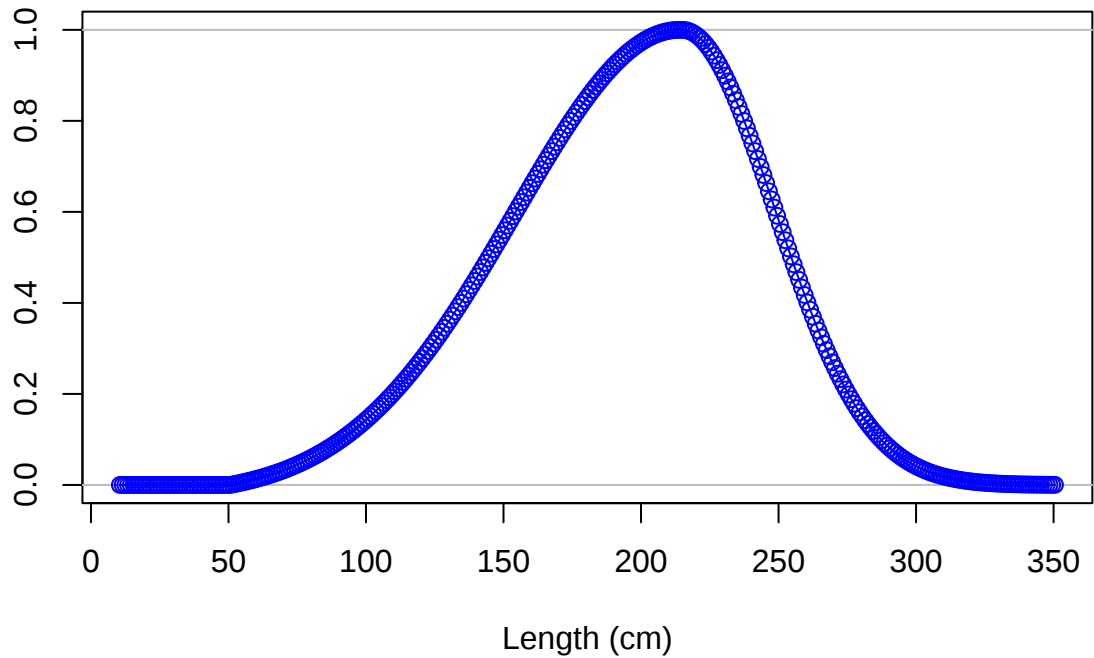
Selectivity



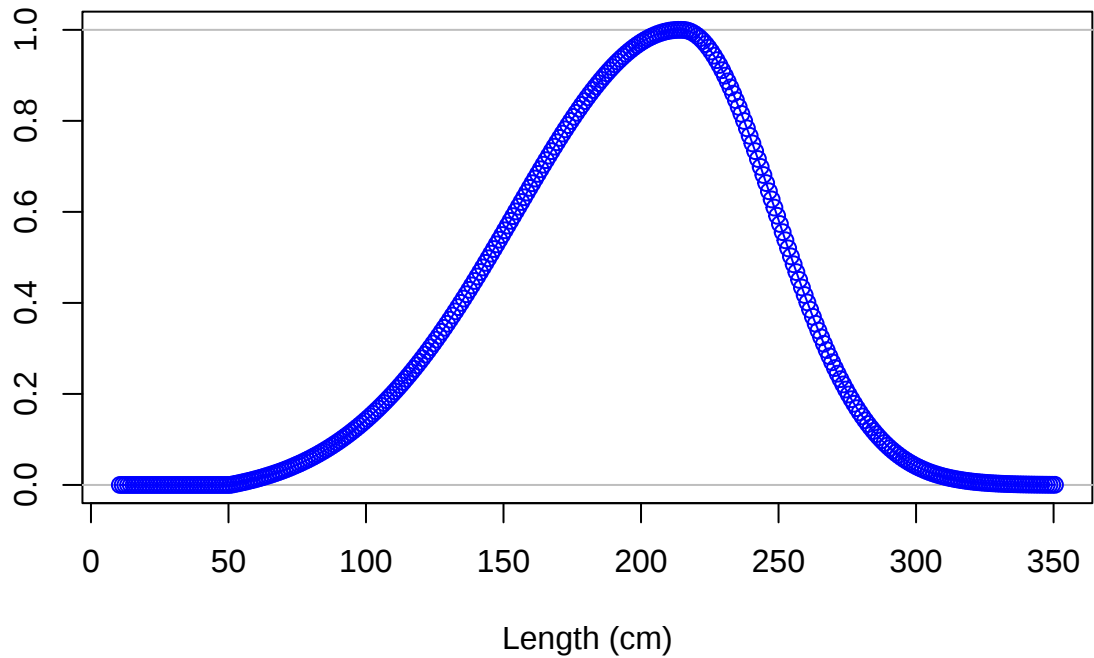
Selectivity

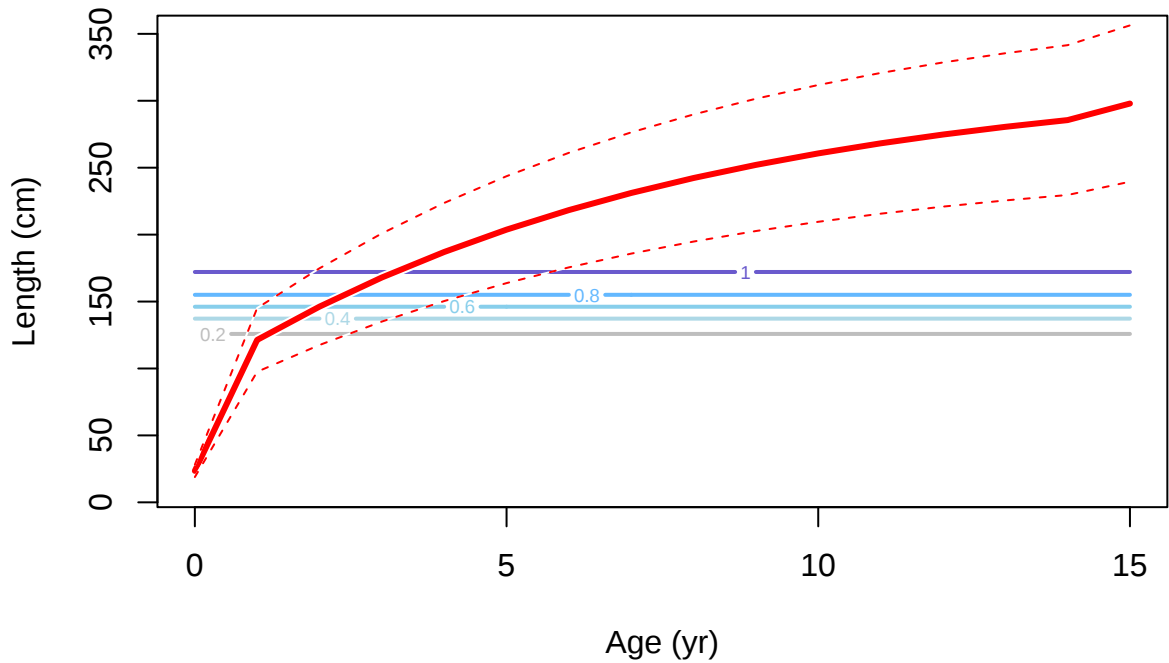


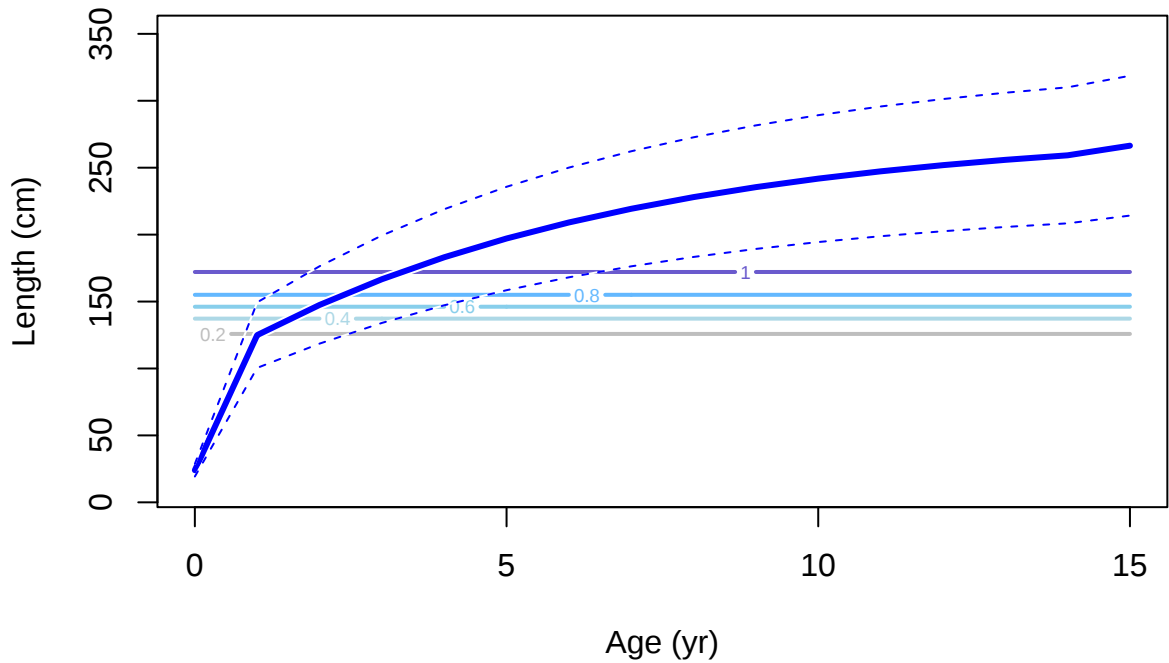
Selectivity

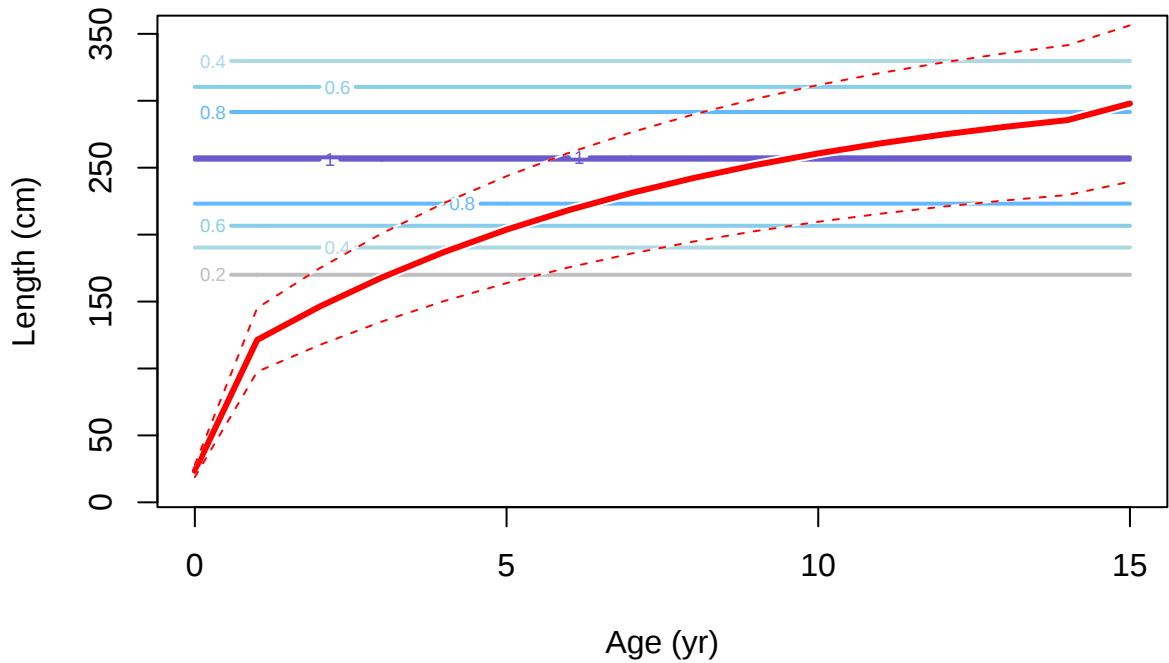


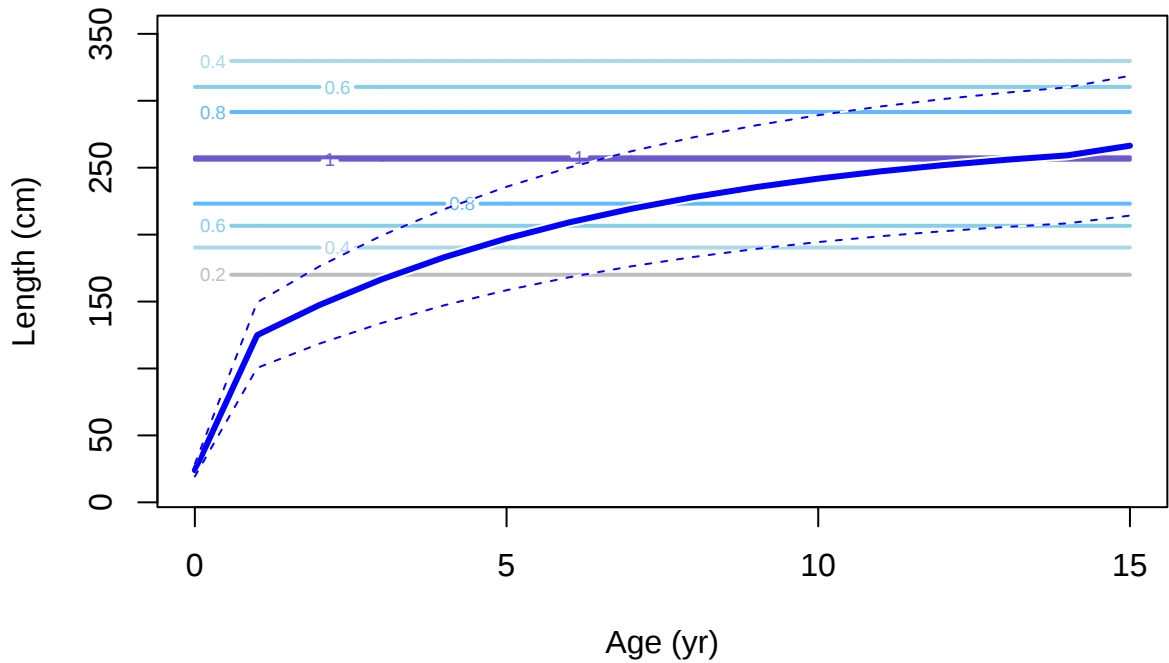
Selectivity

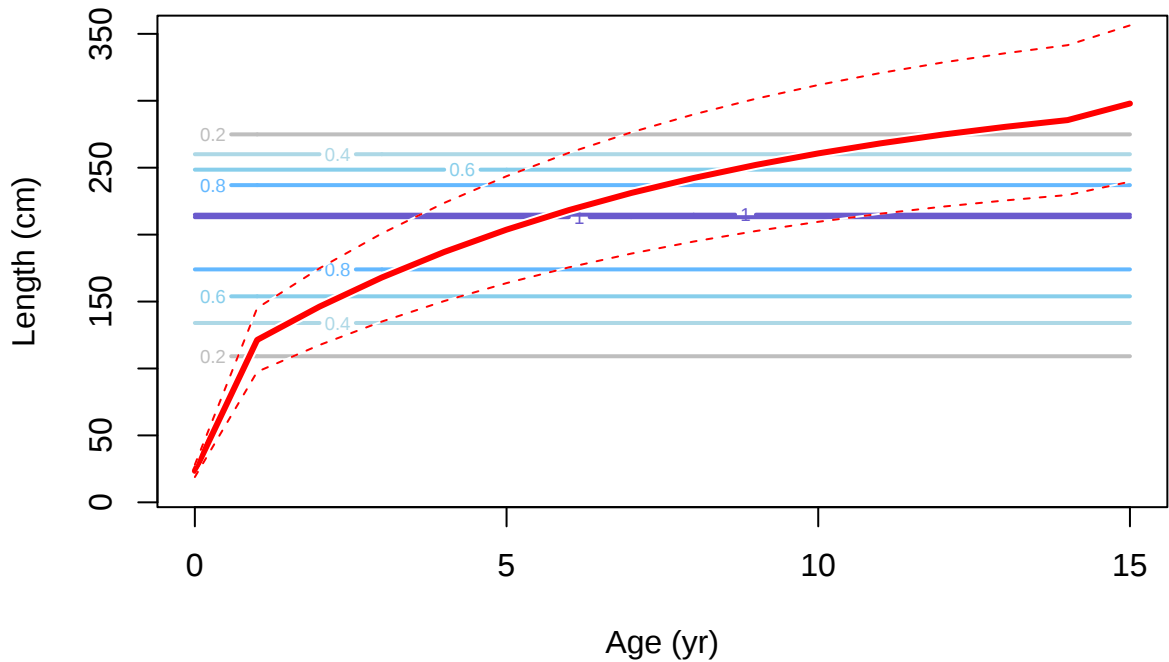


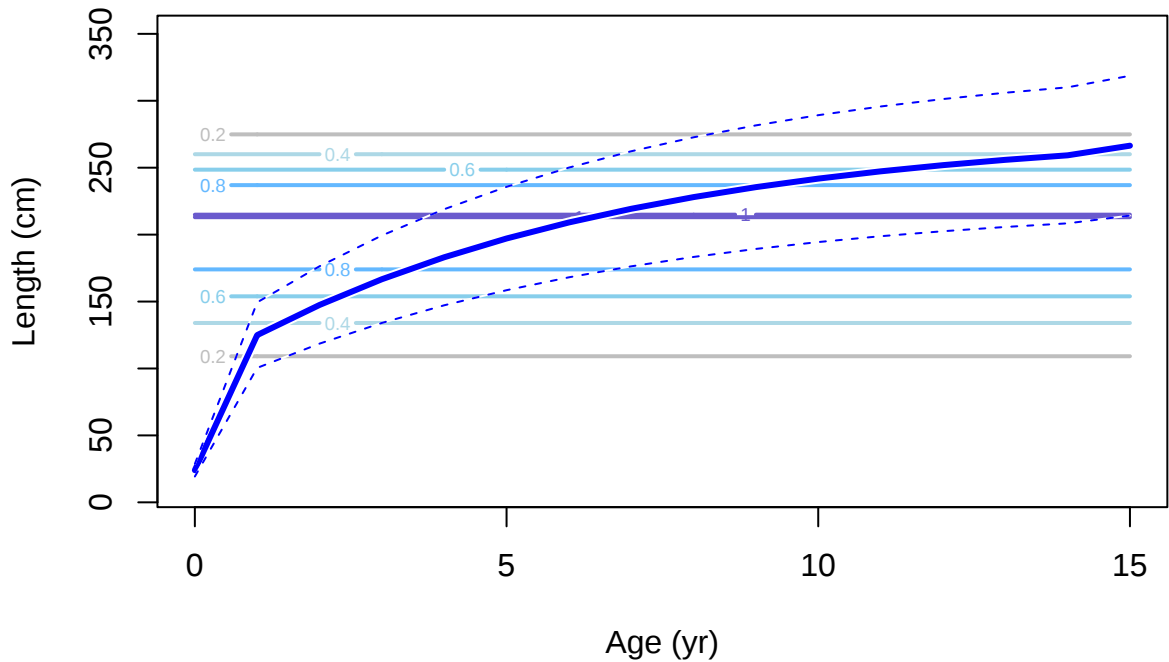


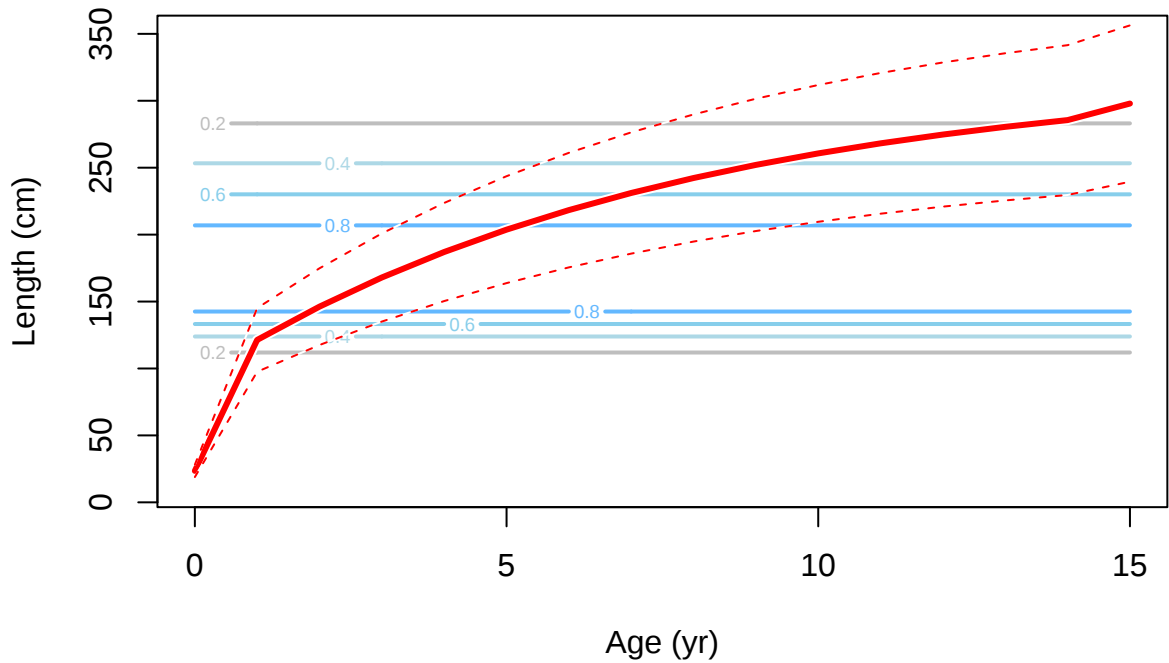


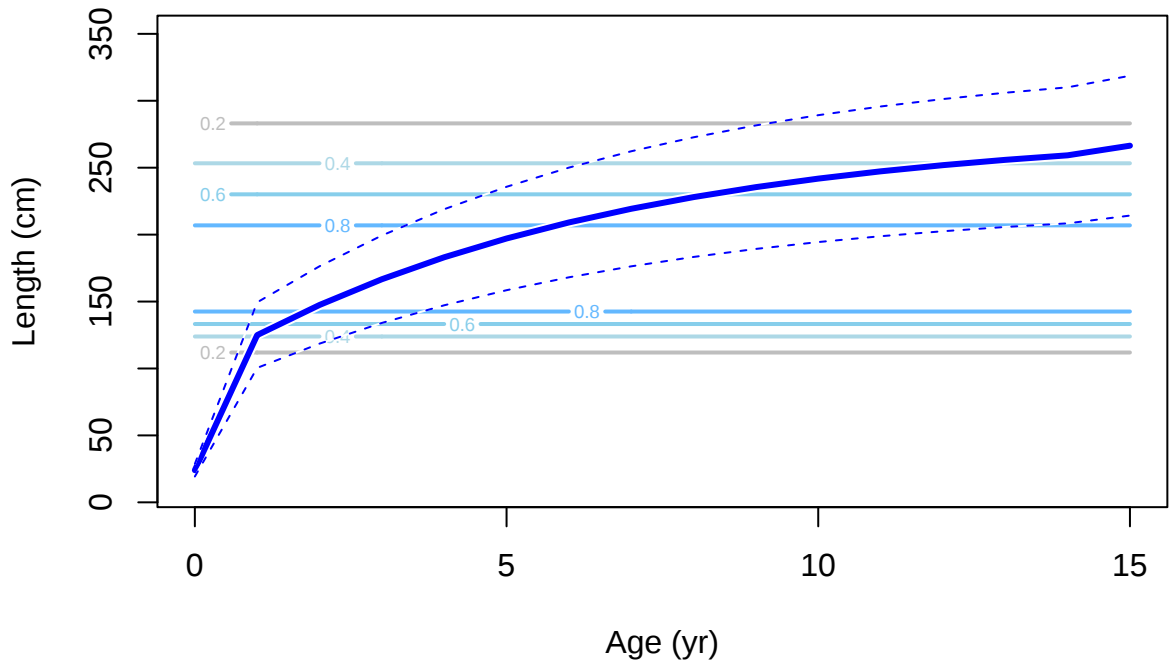


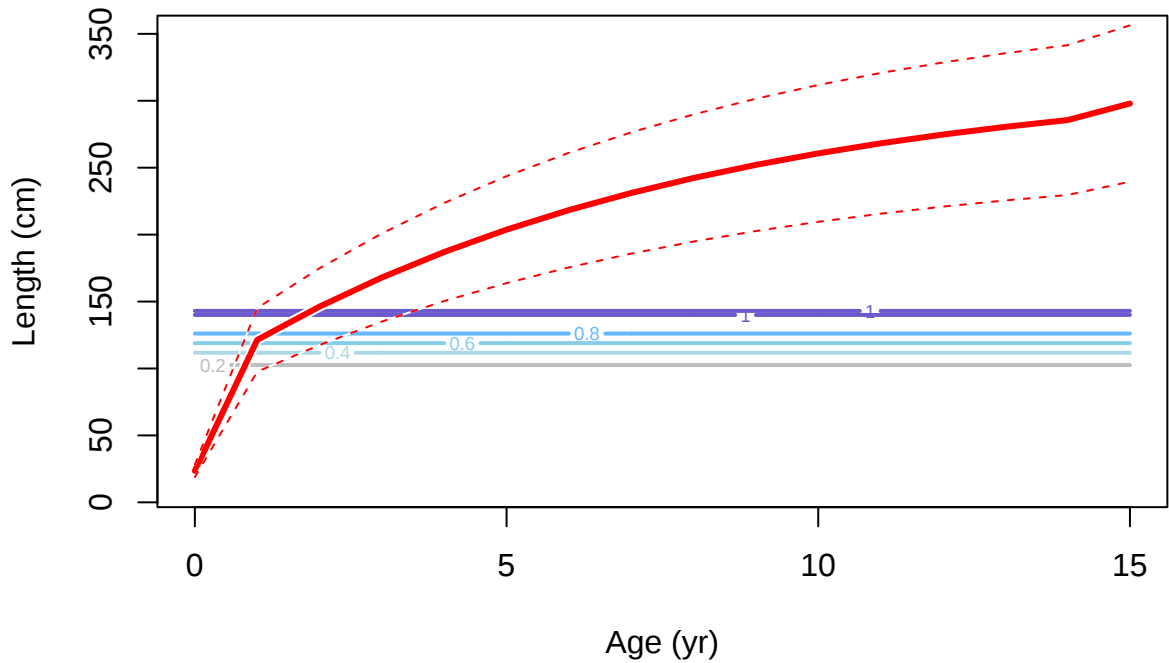


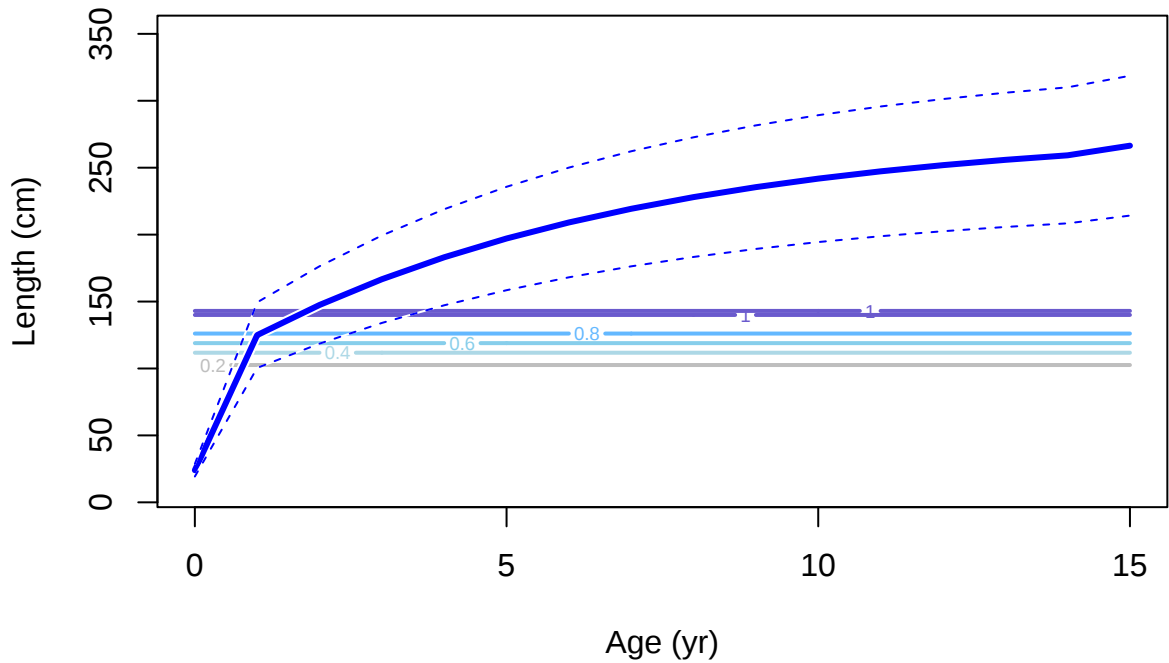


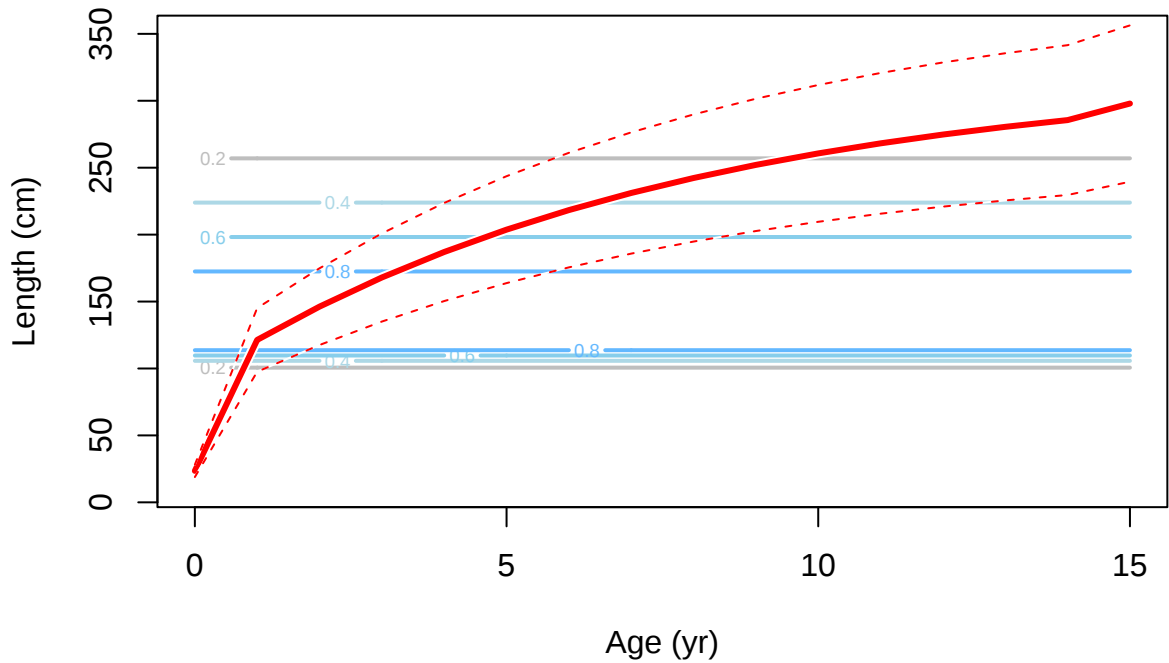


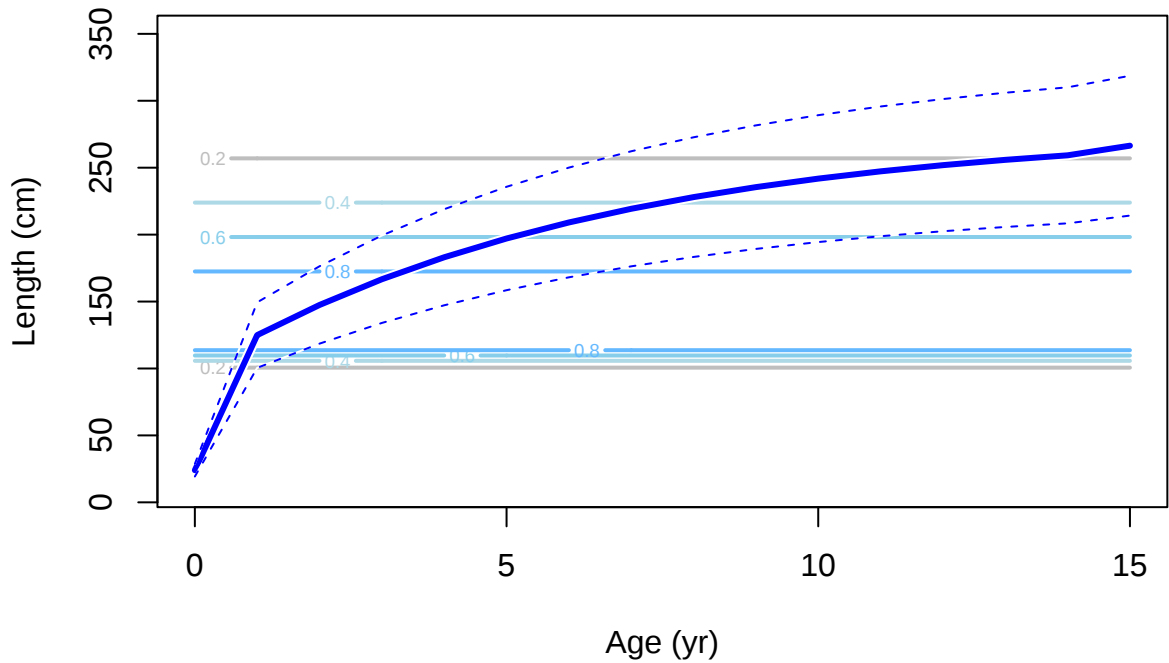


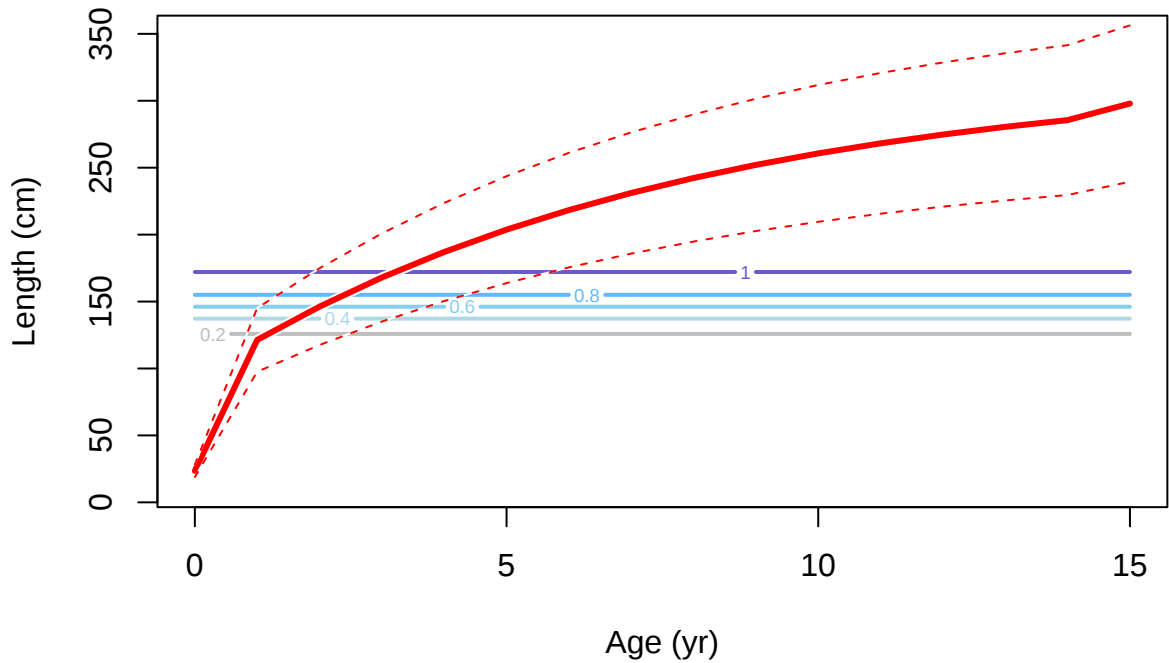


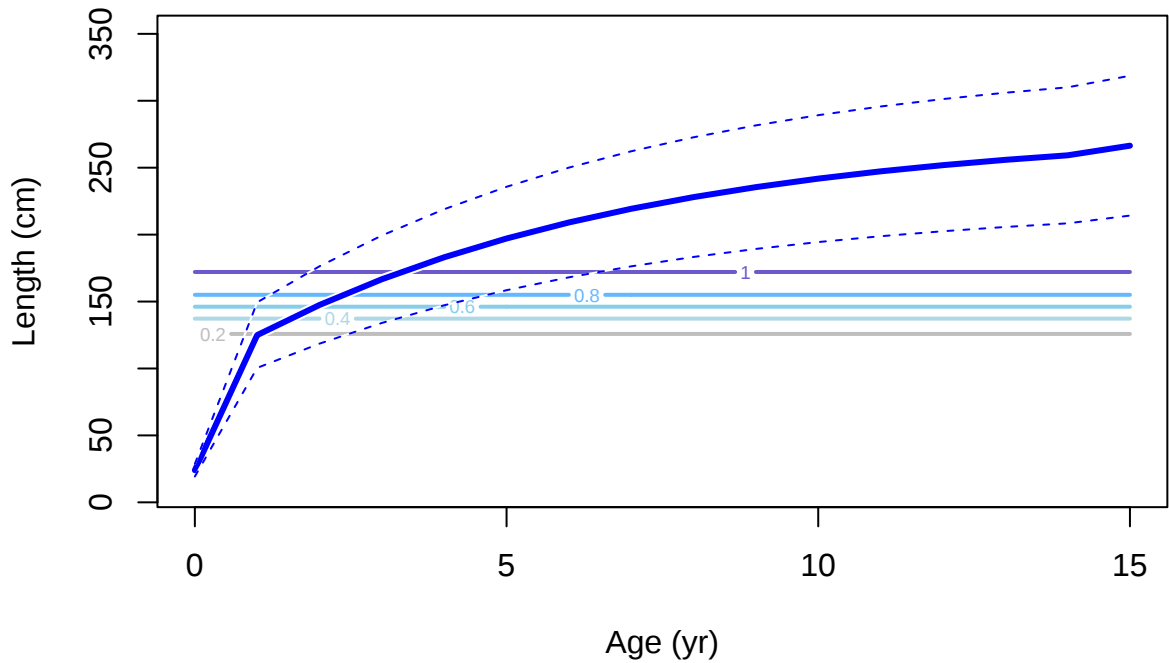


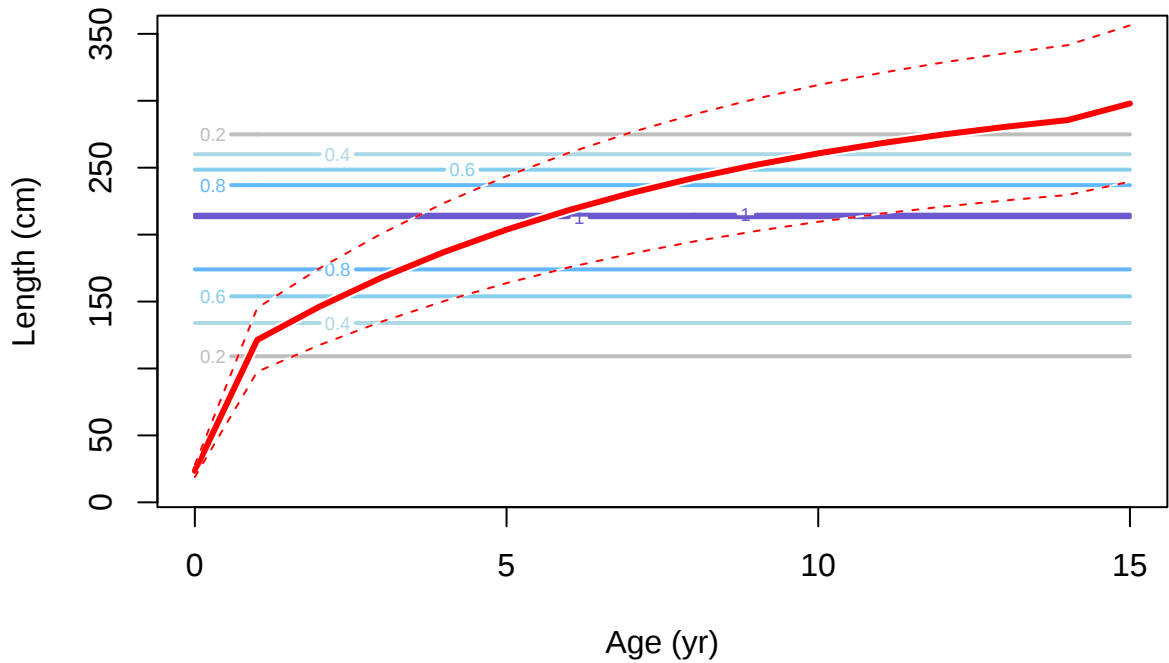


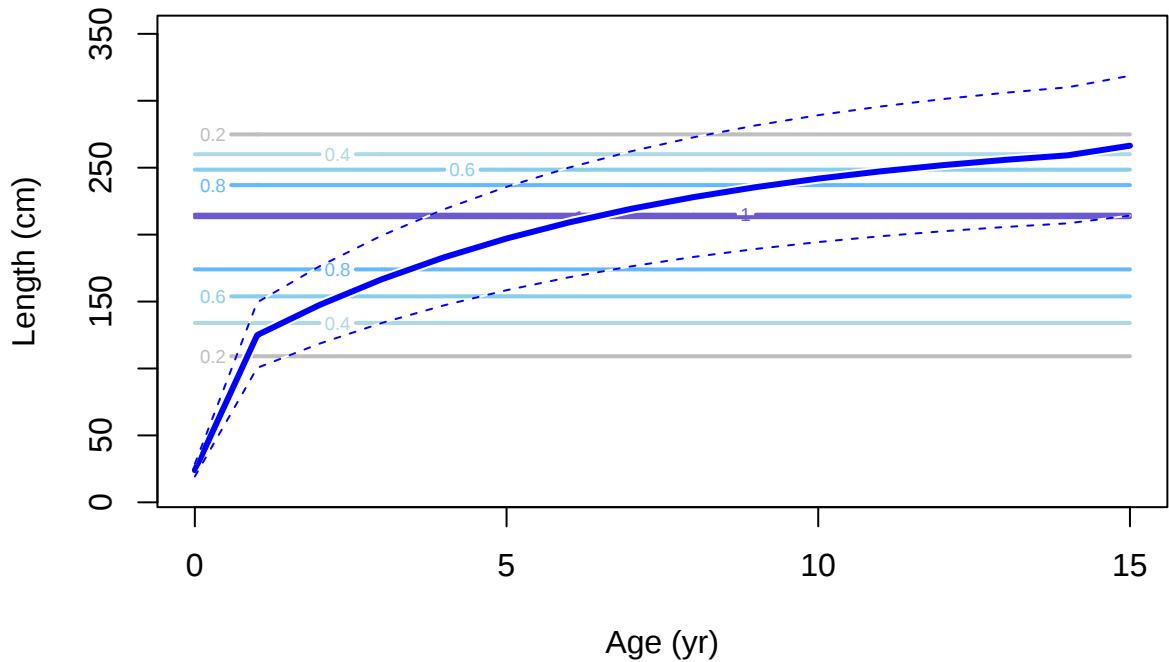


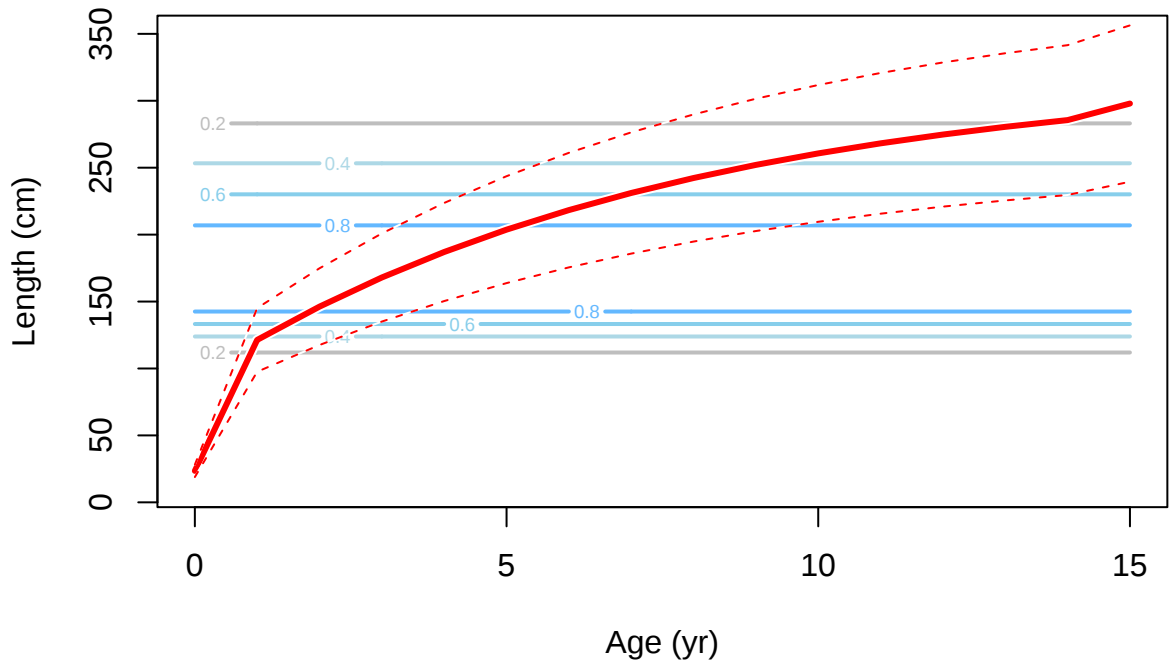


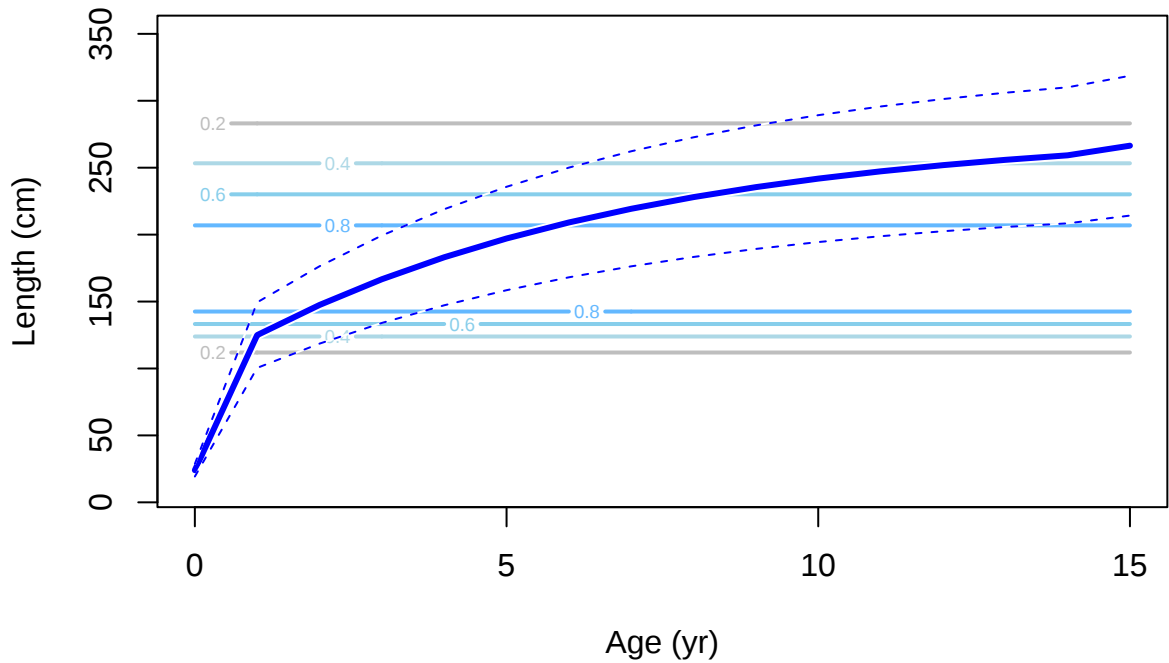


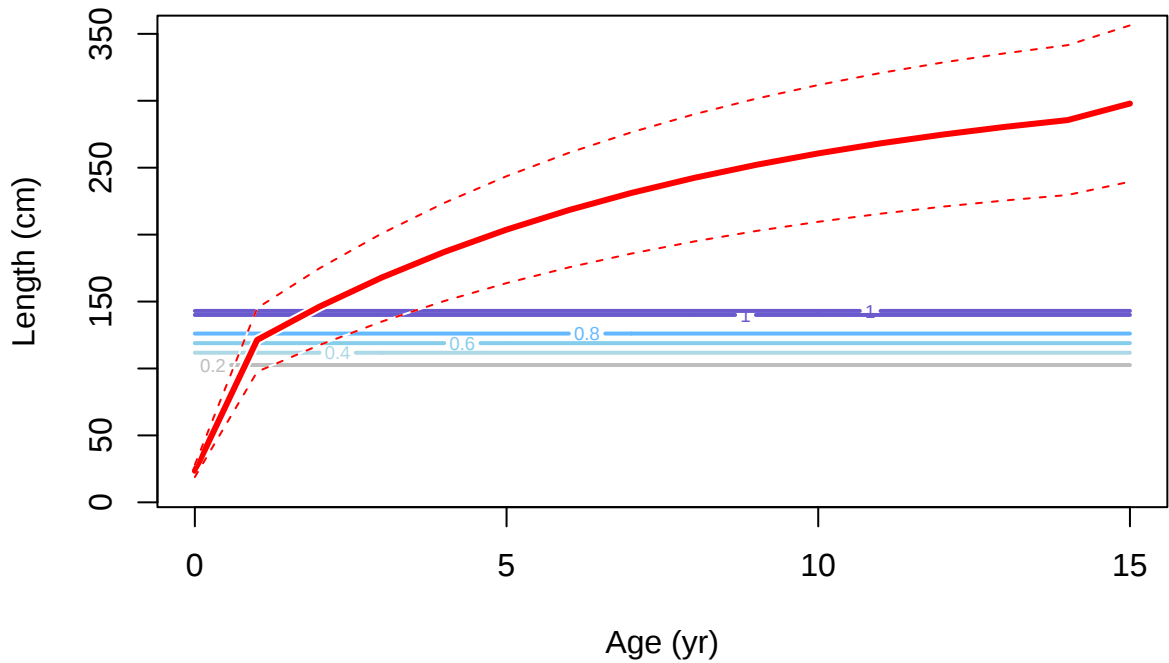


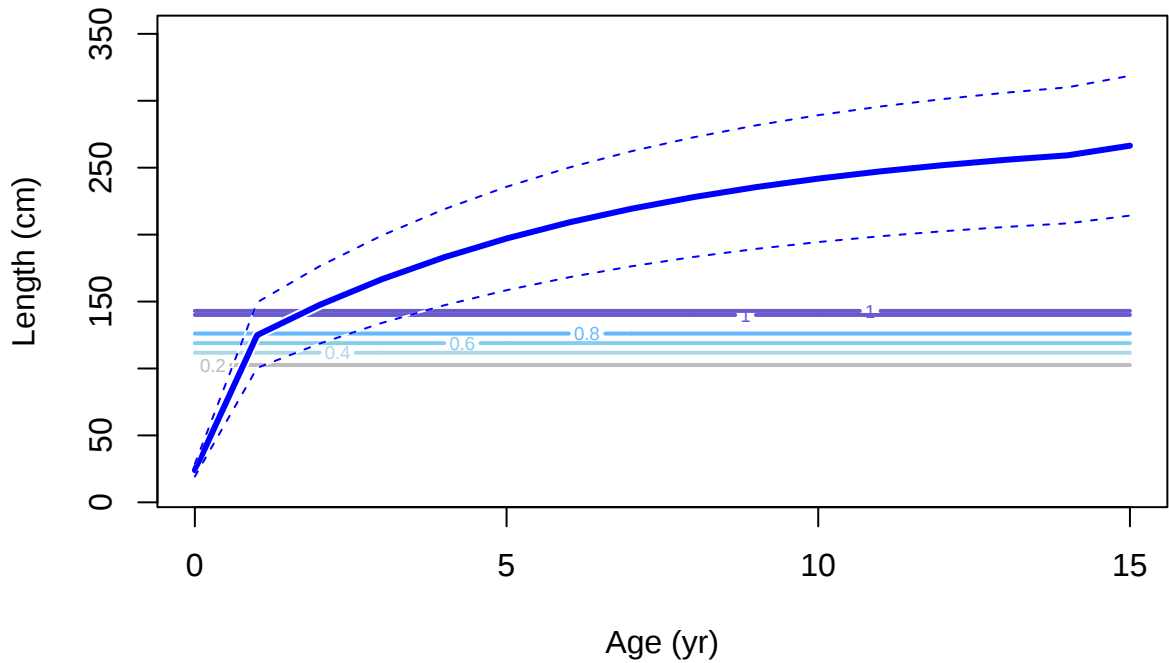


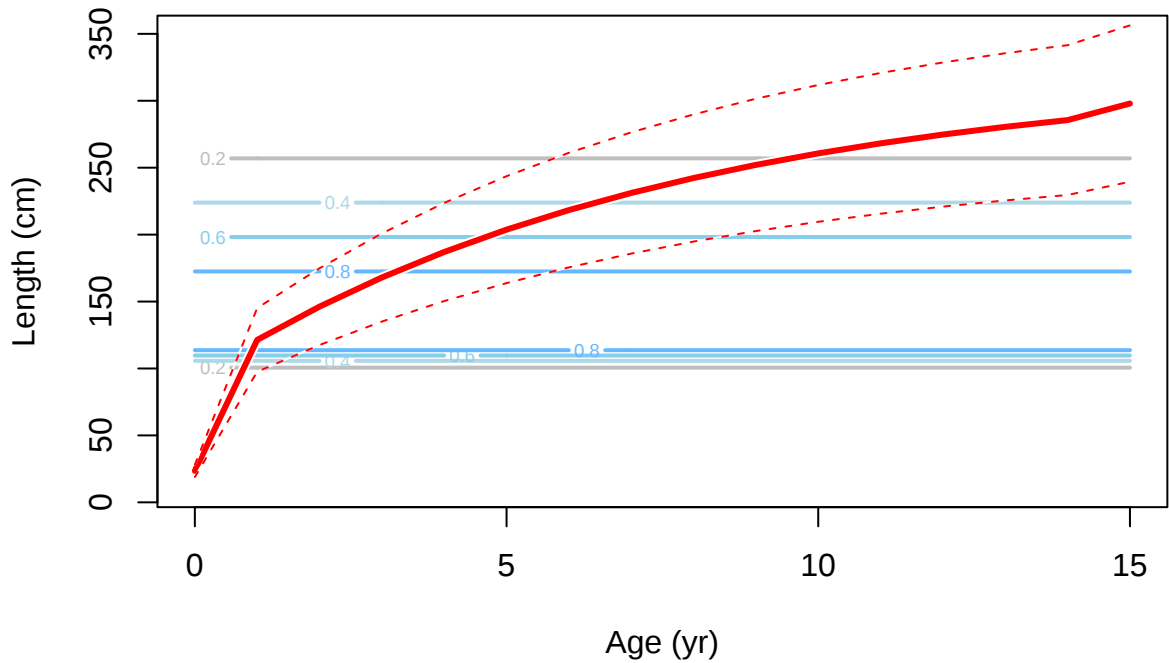


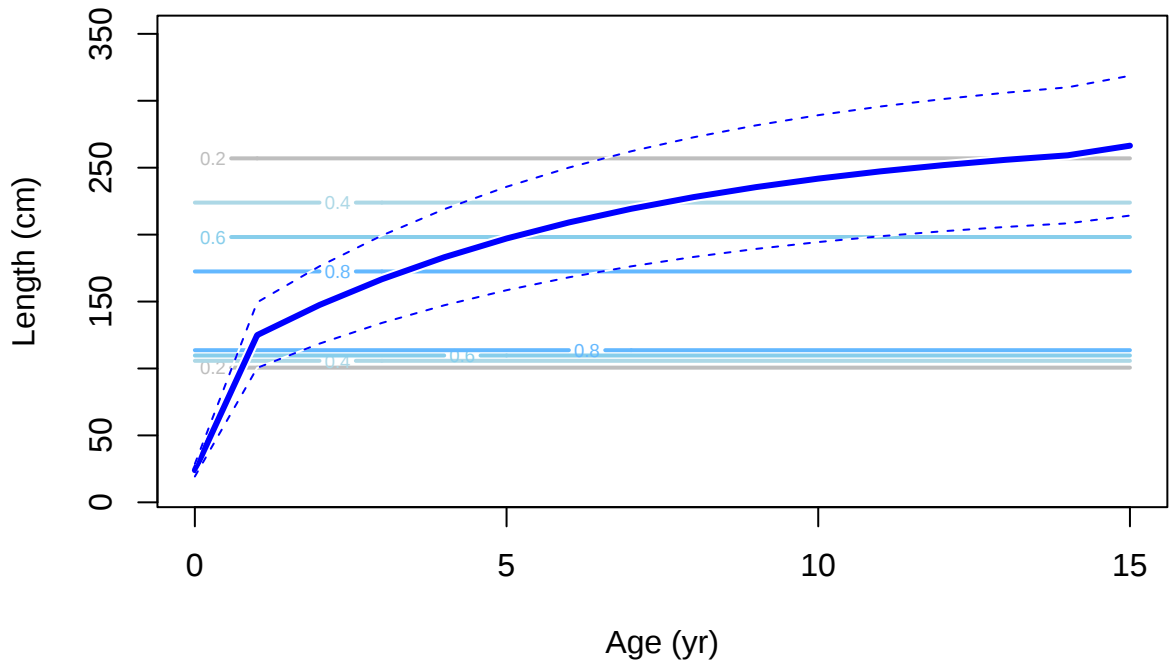


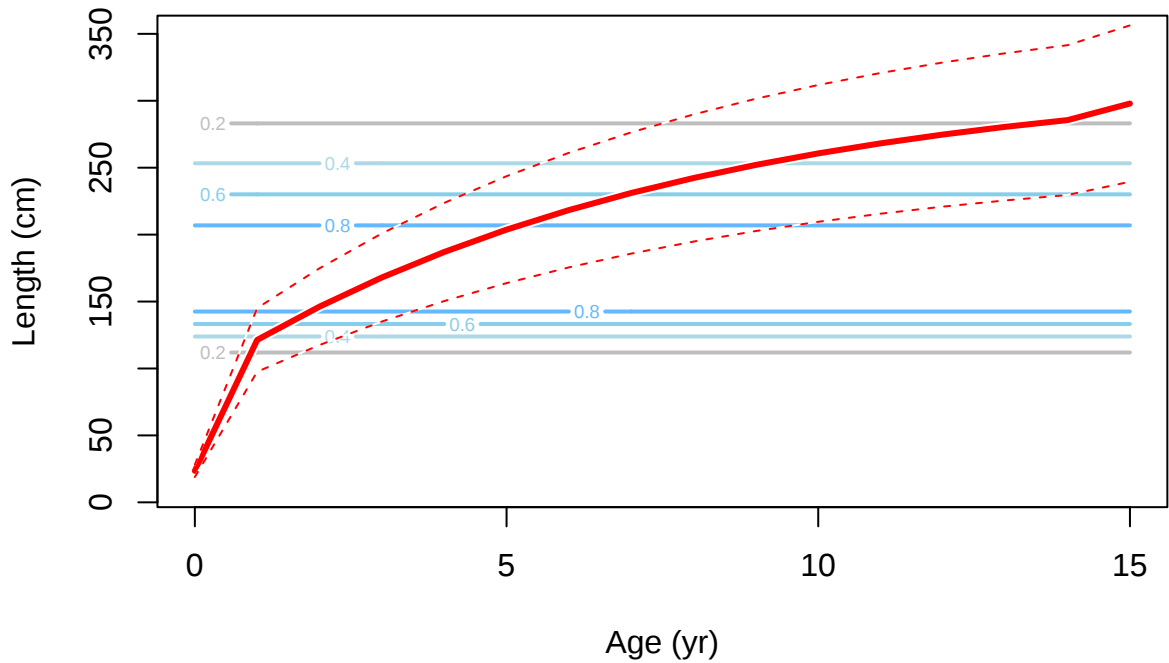


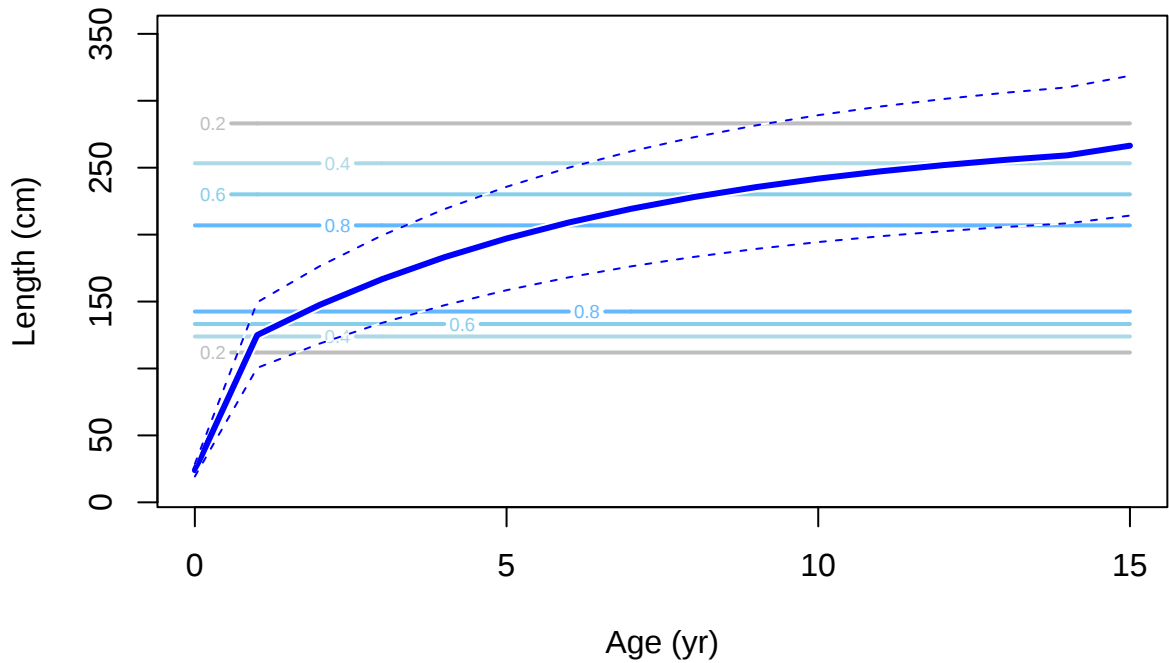


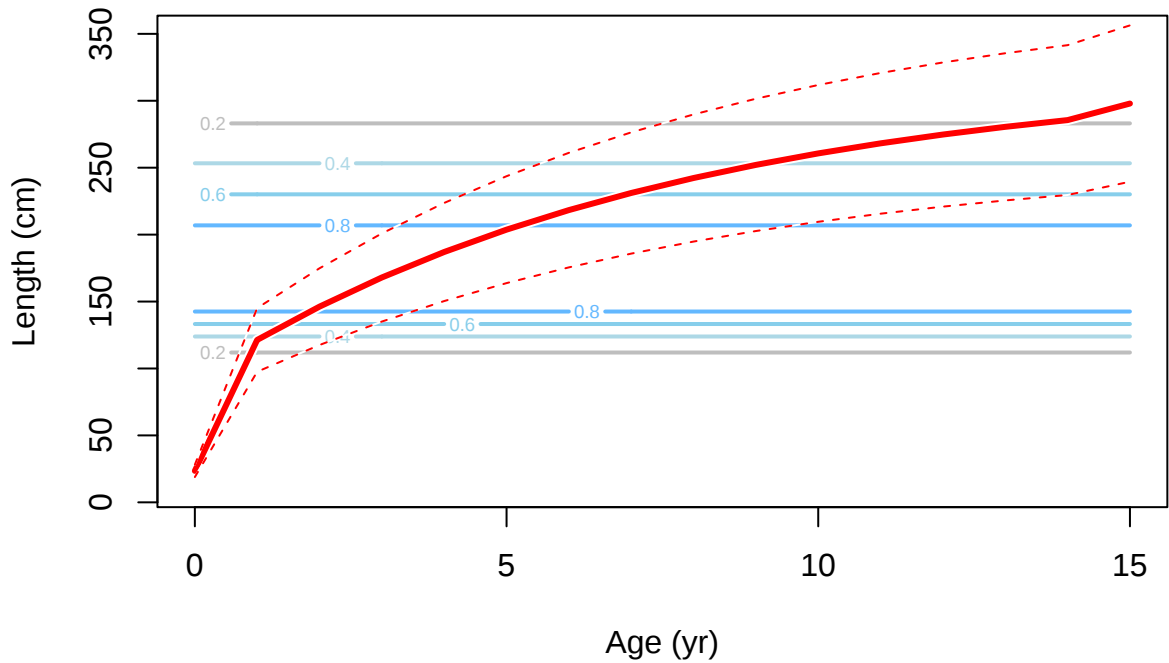


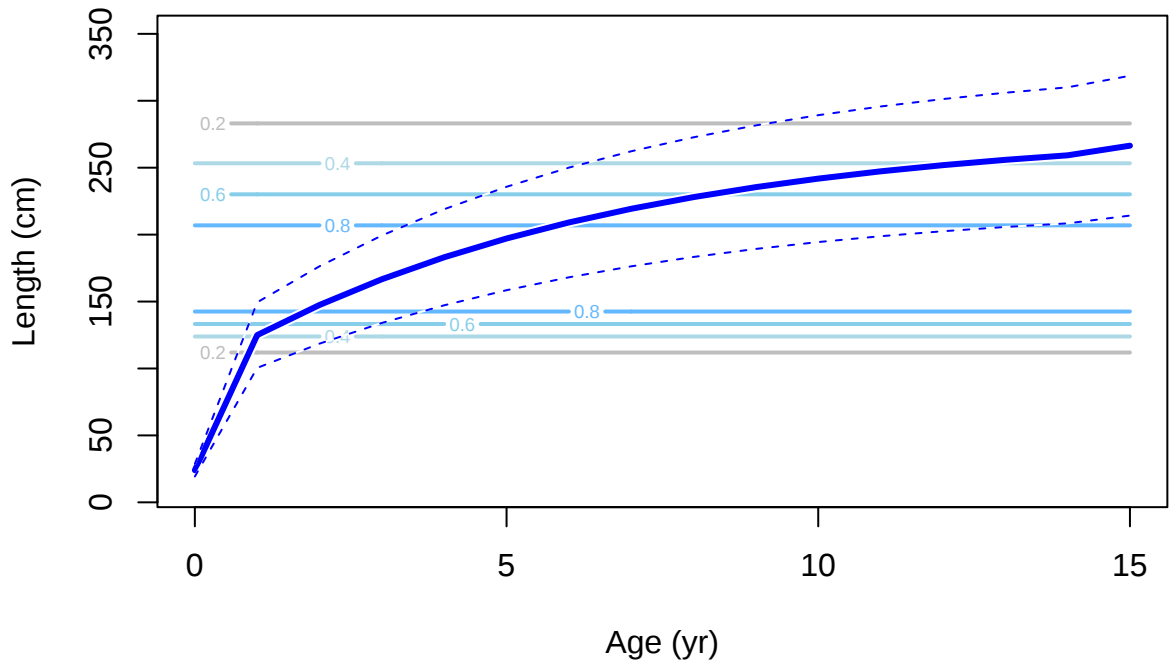


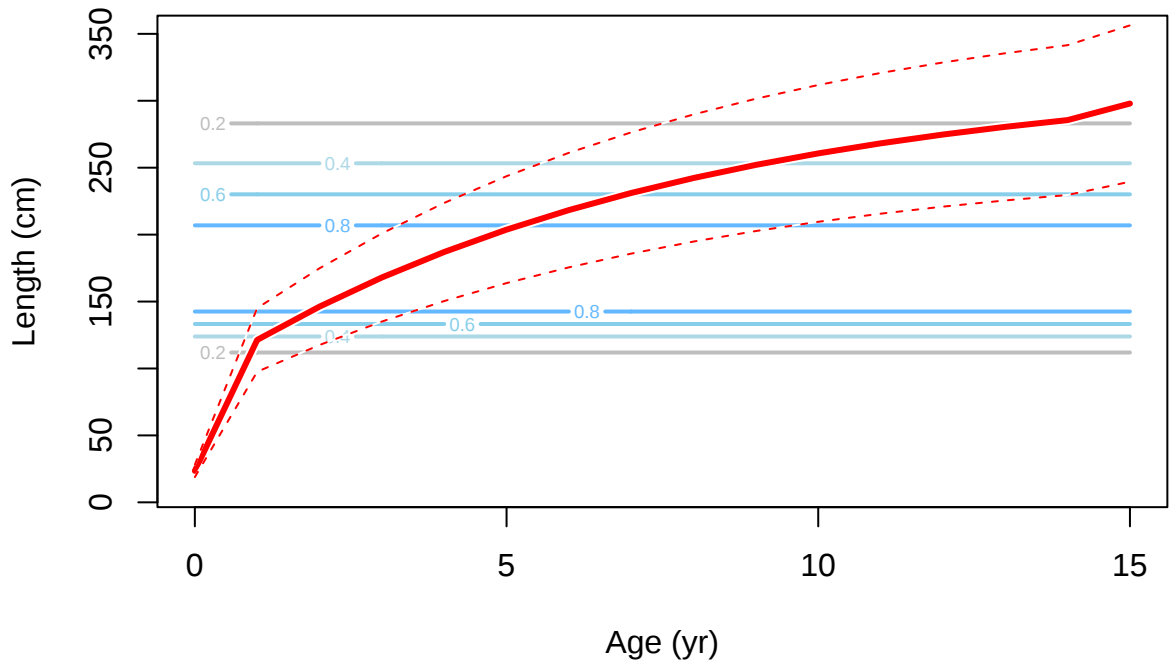


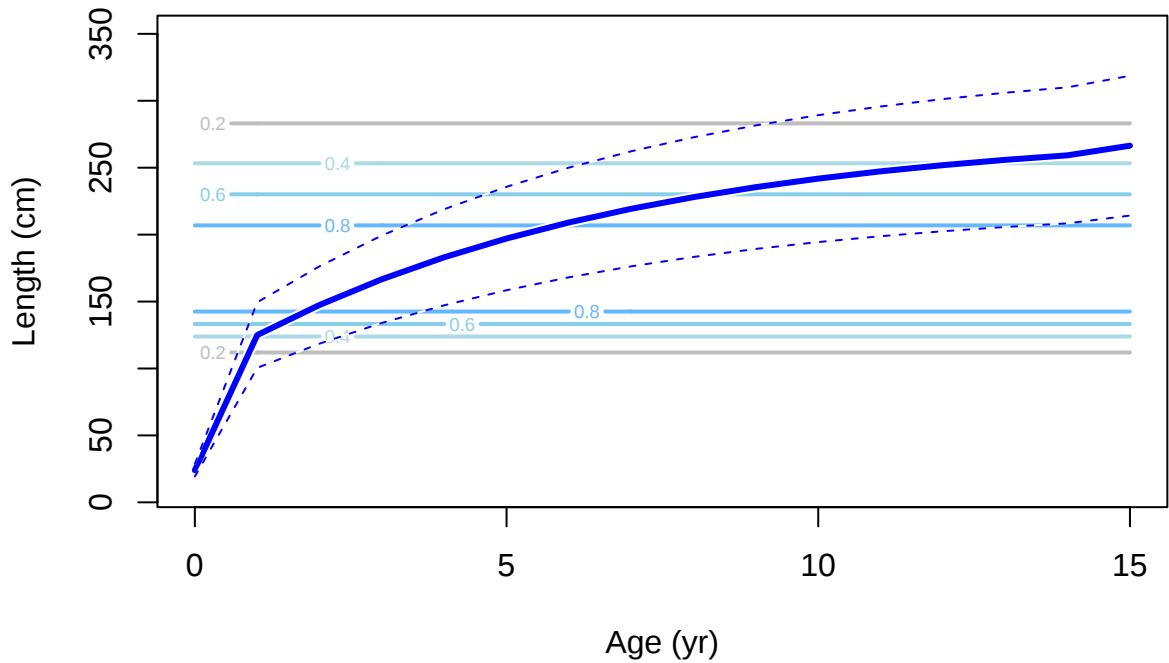


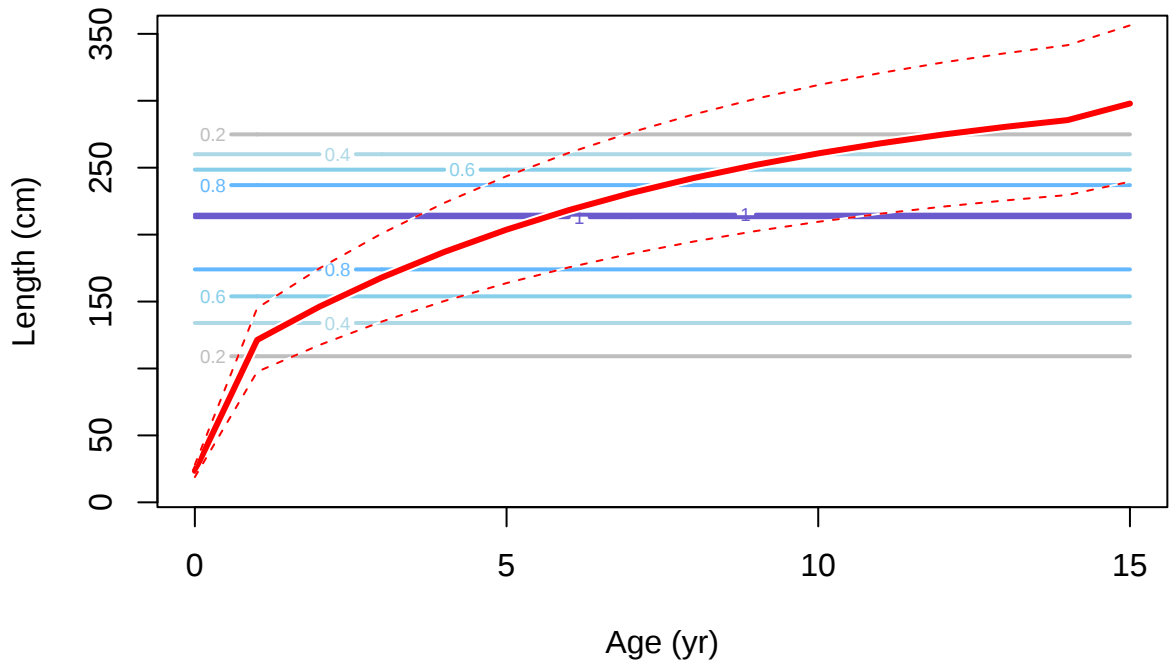


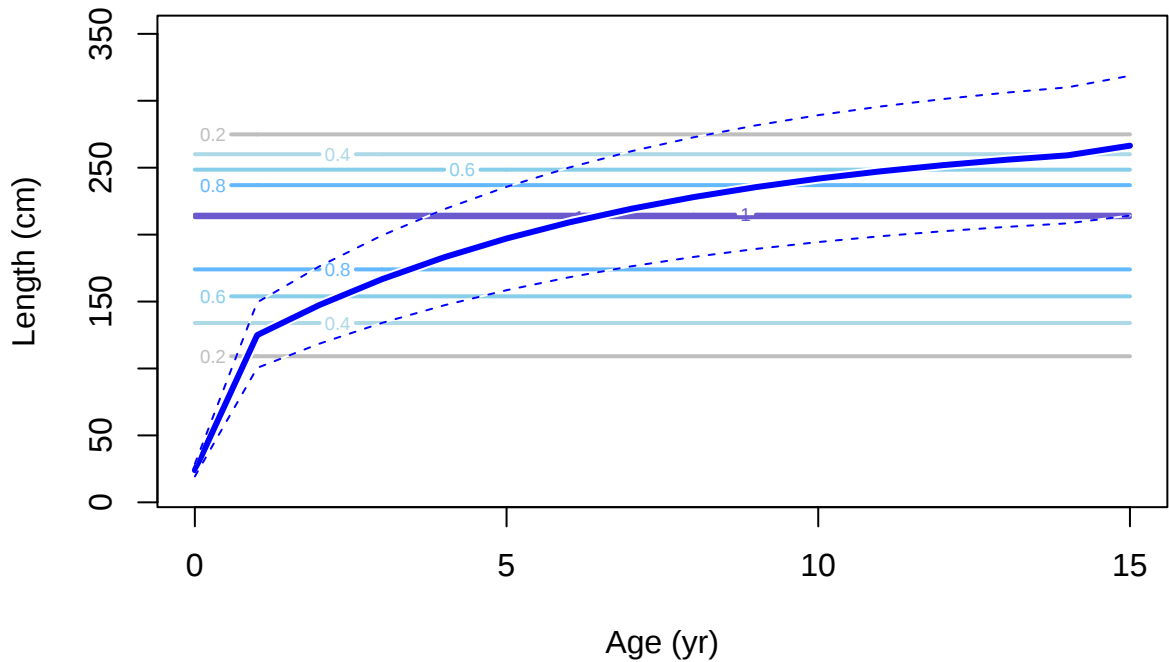


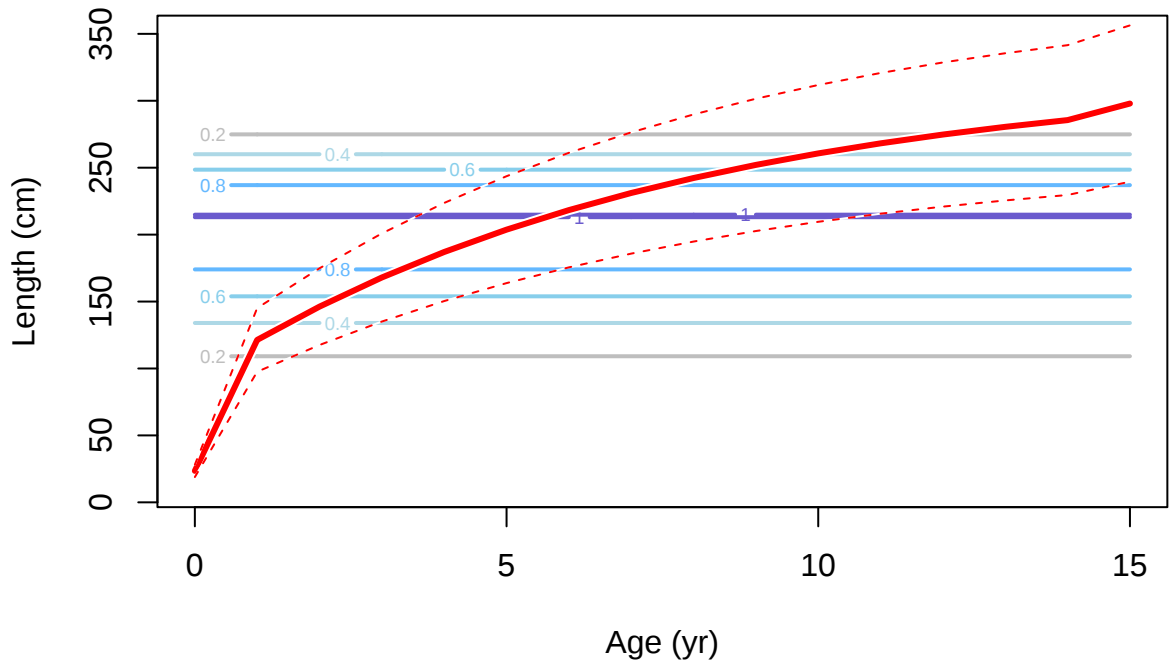


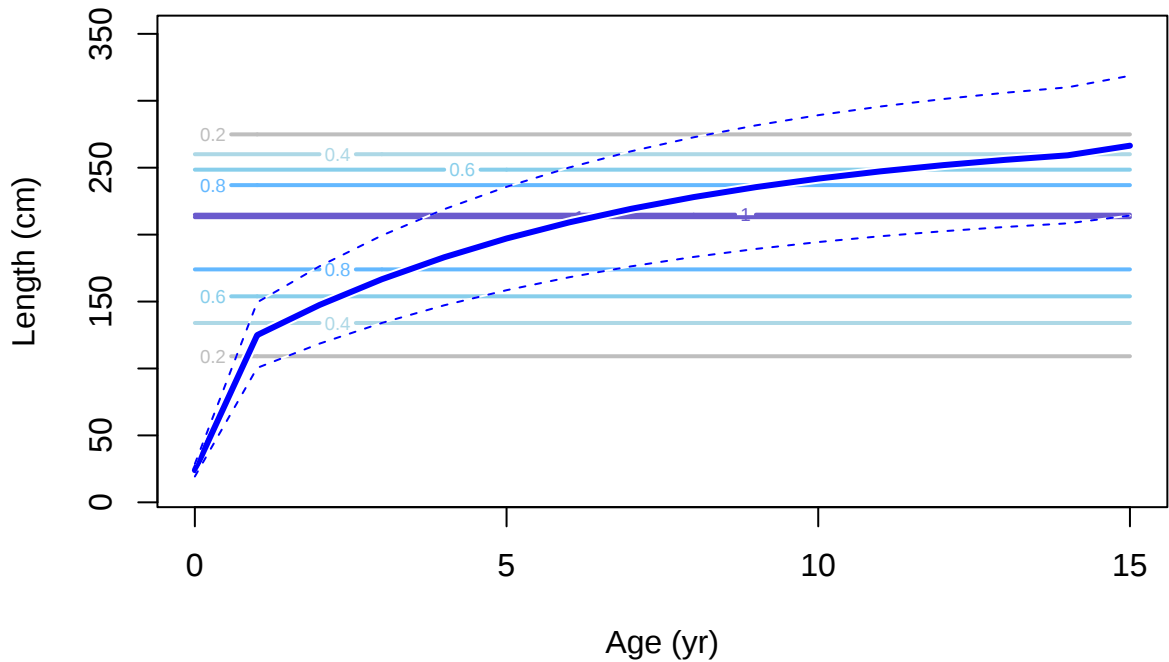


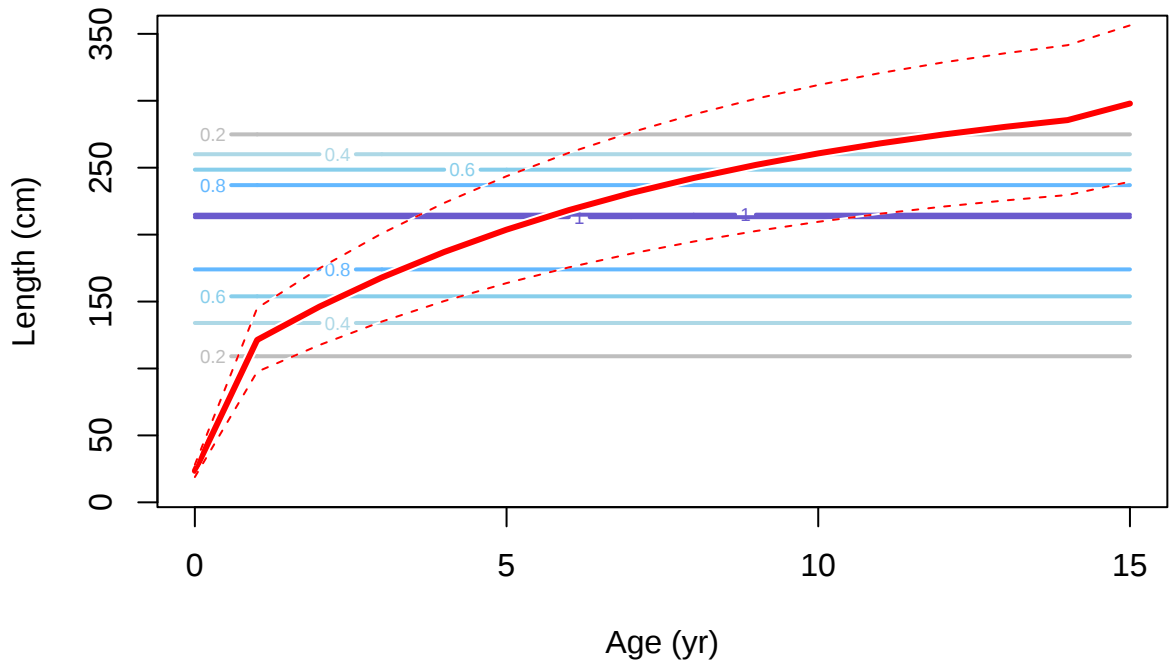


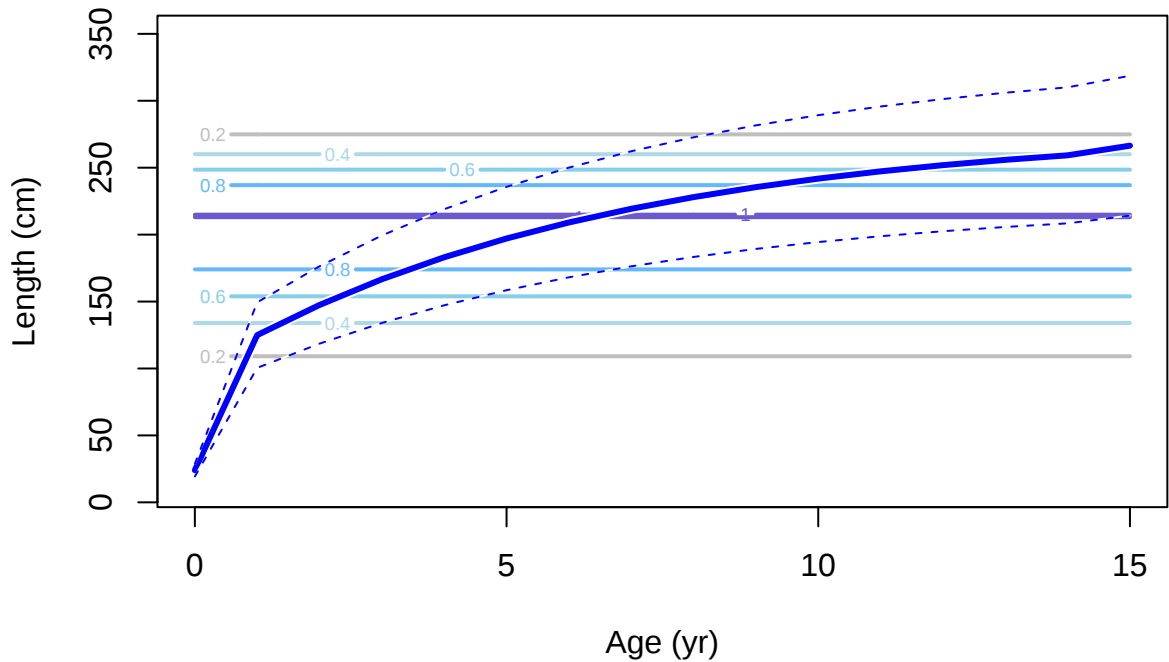




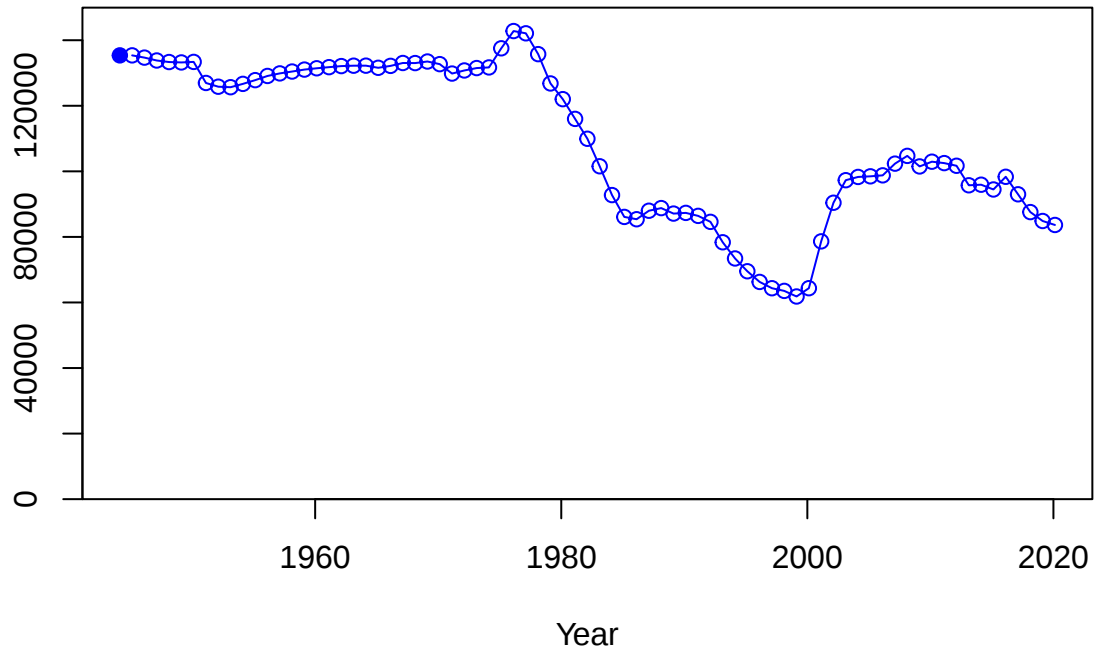




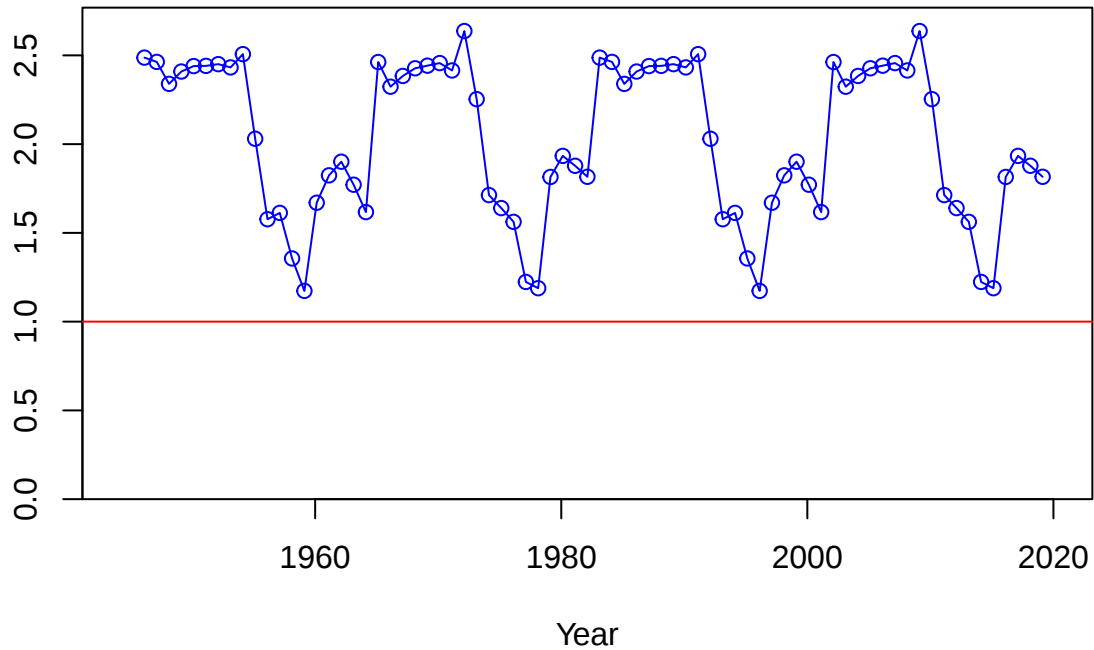


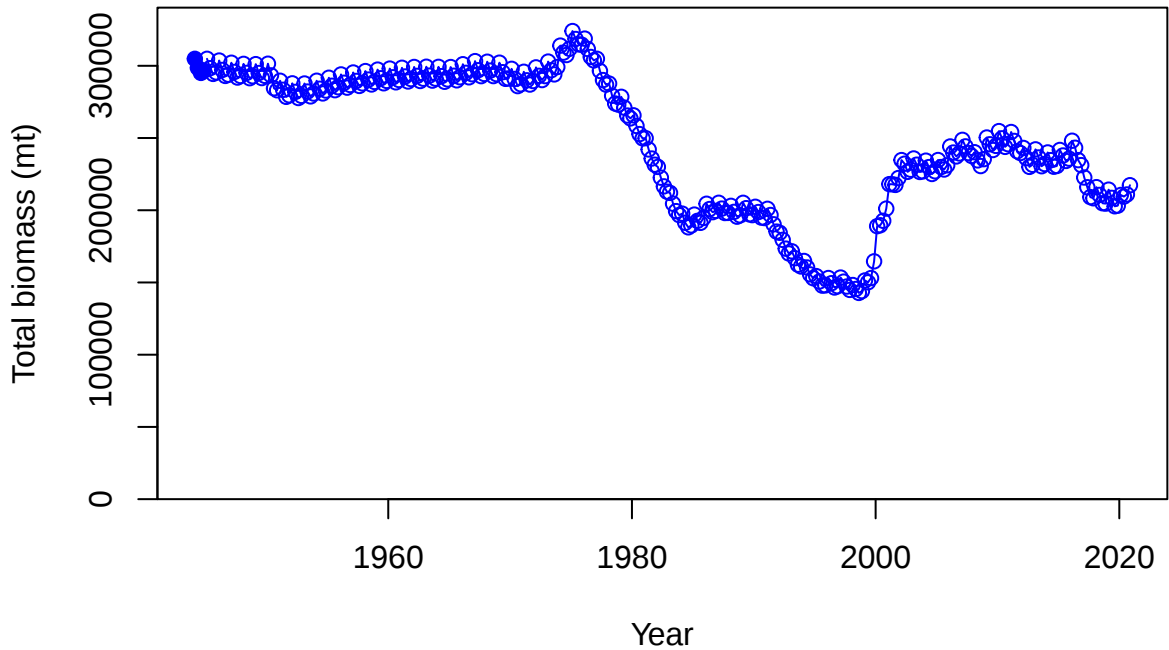


Spawning biomass (mt)

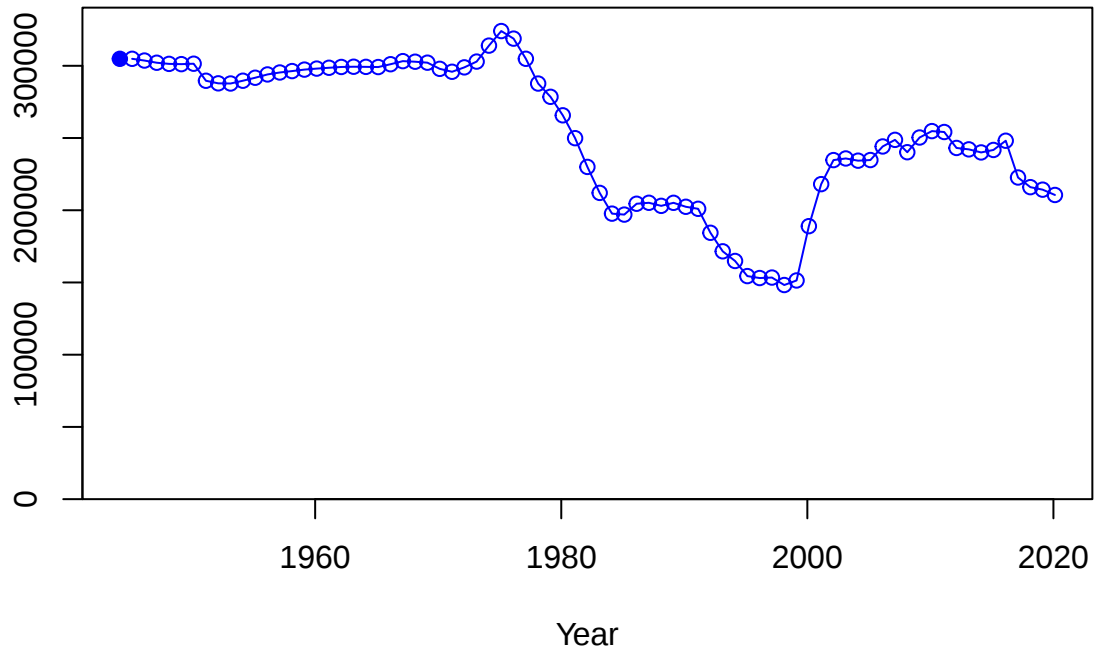


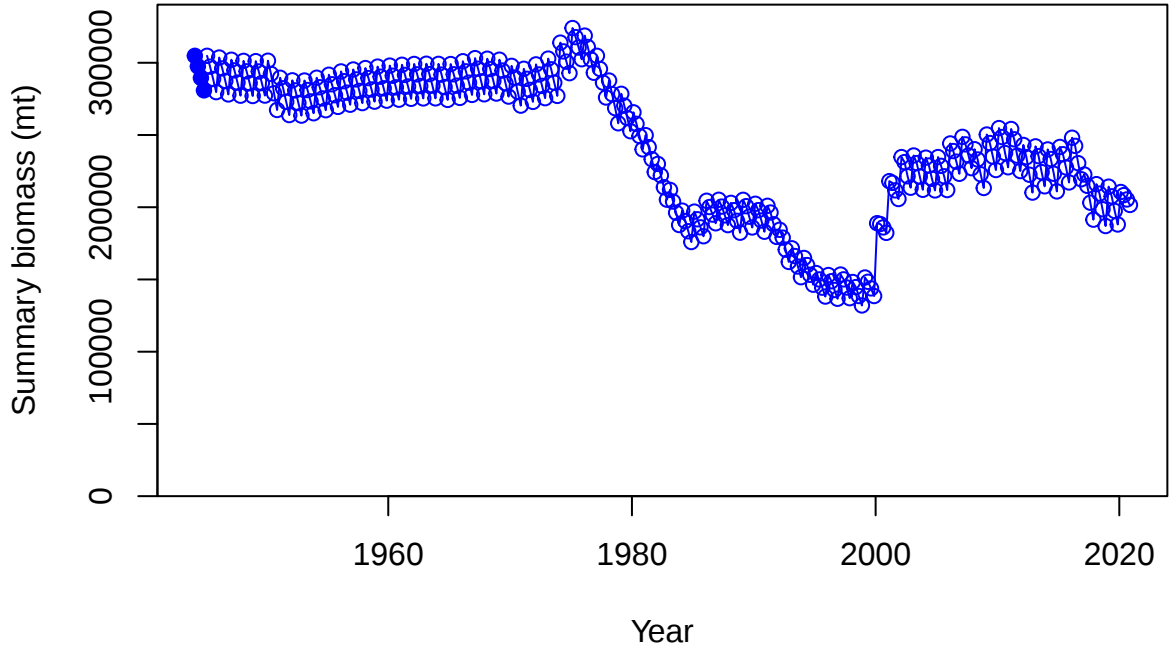
Relative spawning biomass: $B/(40\% \times \text{Virgin_Biomass})$



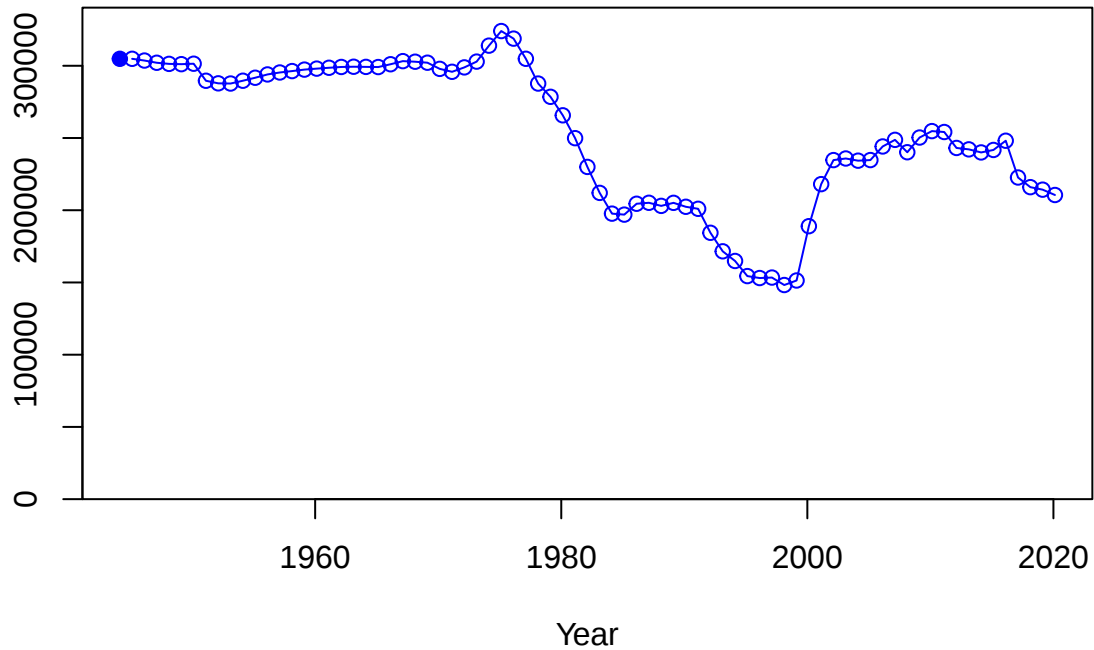


Total biomass (mt) at beginning of season 1

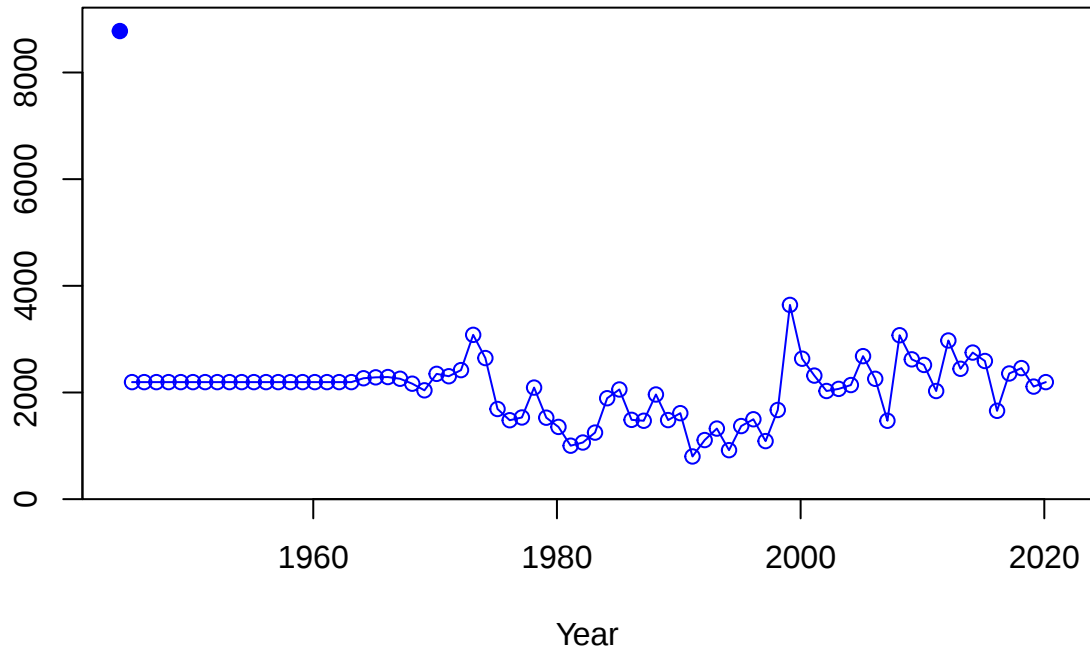




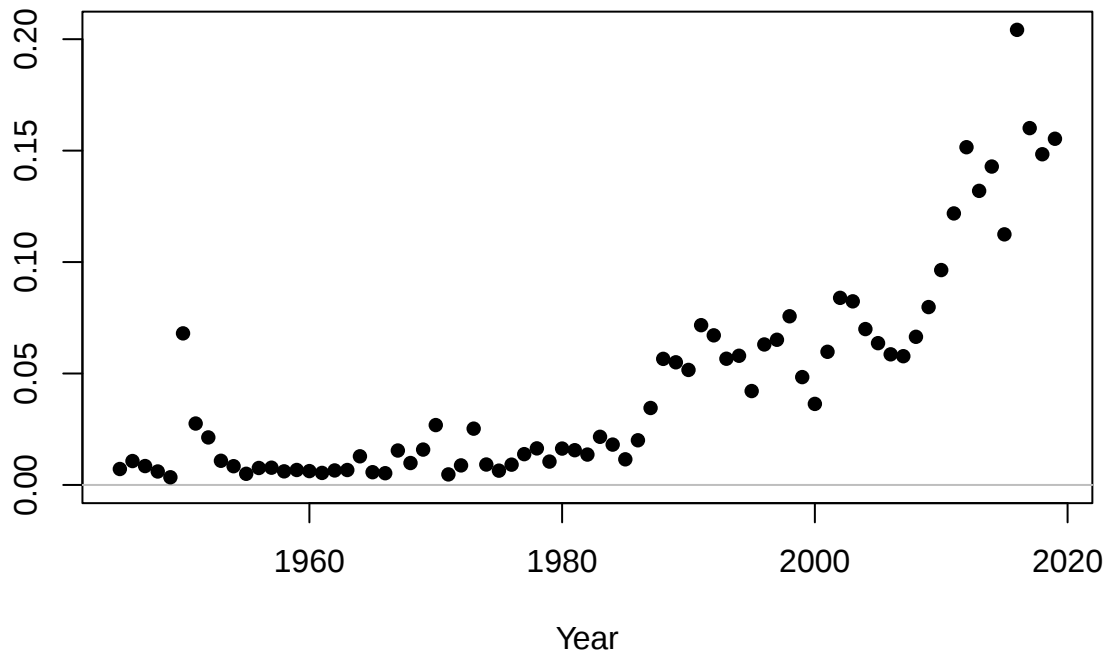
Summary biomass (mt) at beginning of season

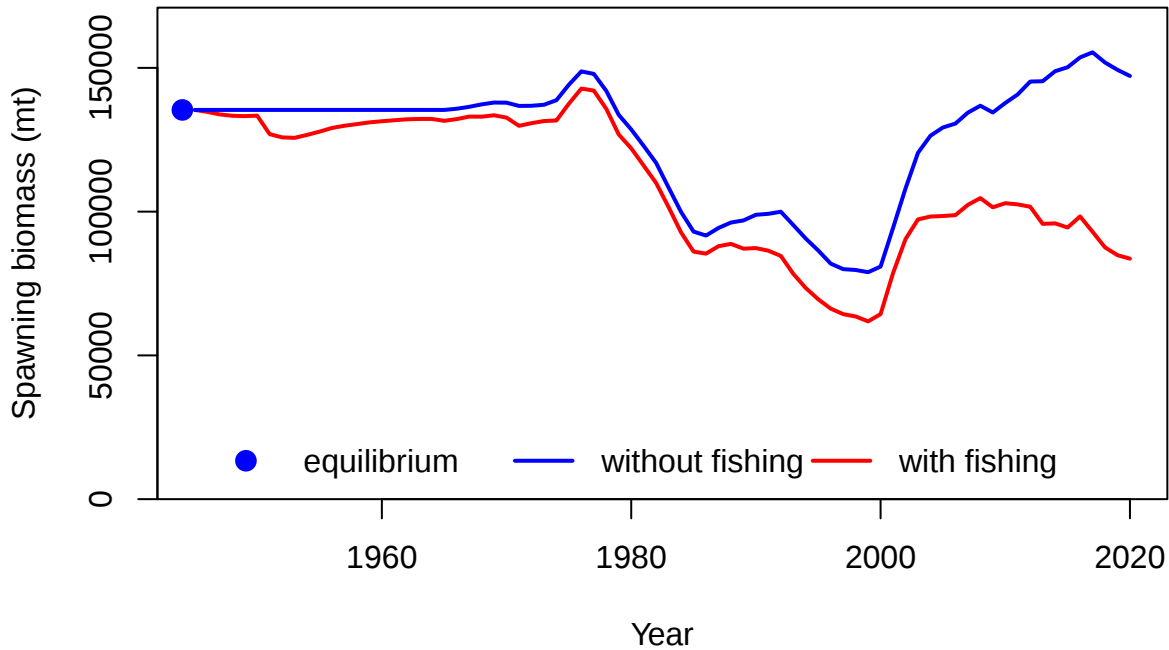


Age-0 recruits (1,000s)

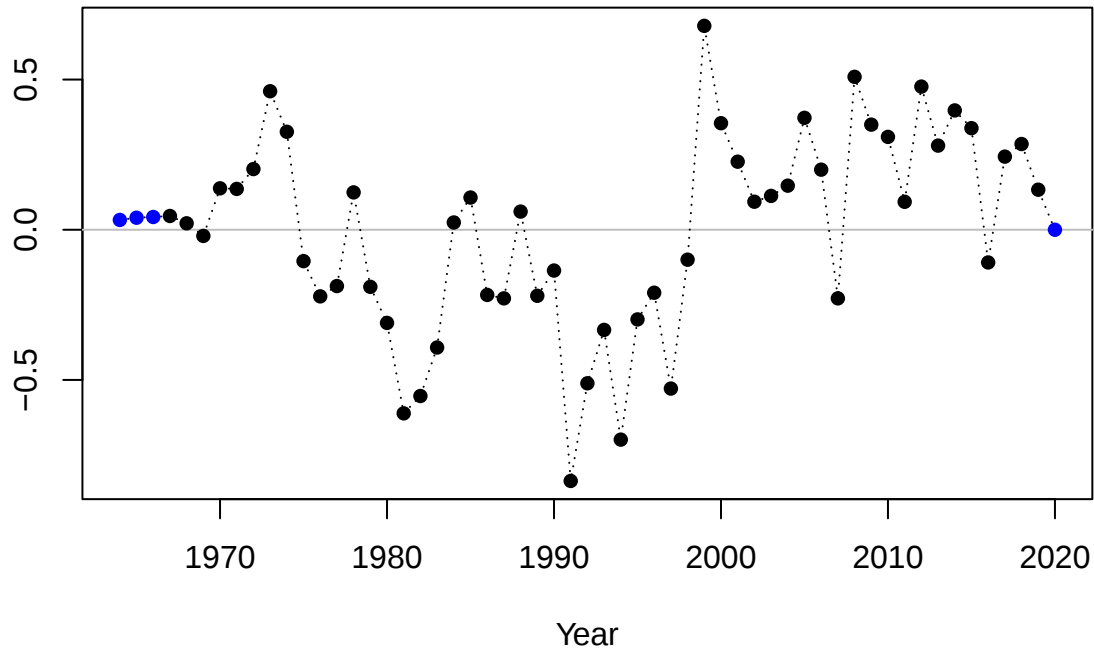


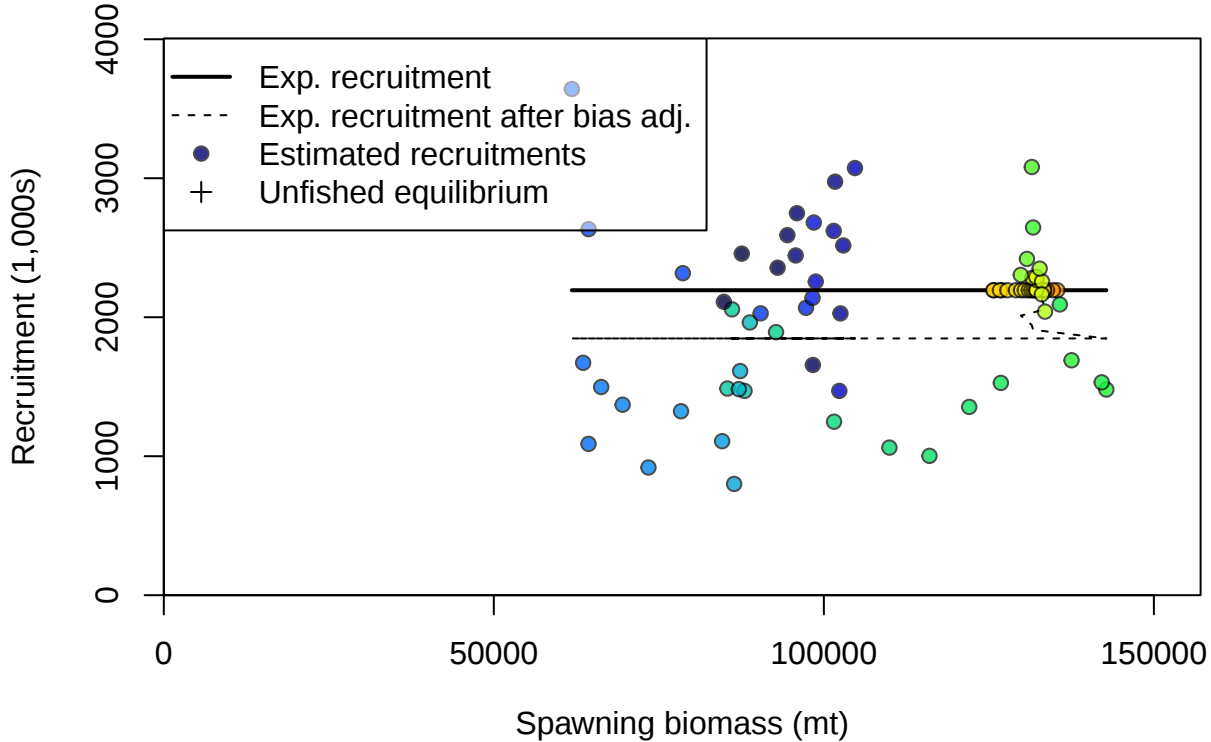
Summary Fishing Mortality

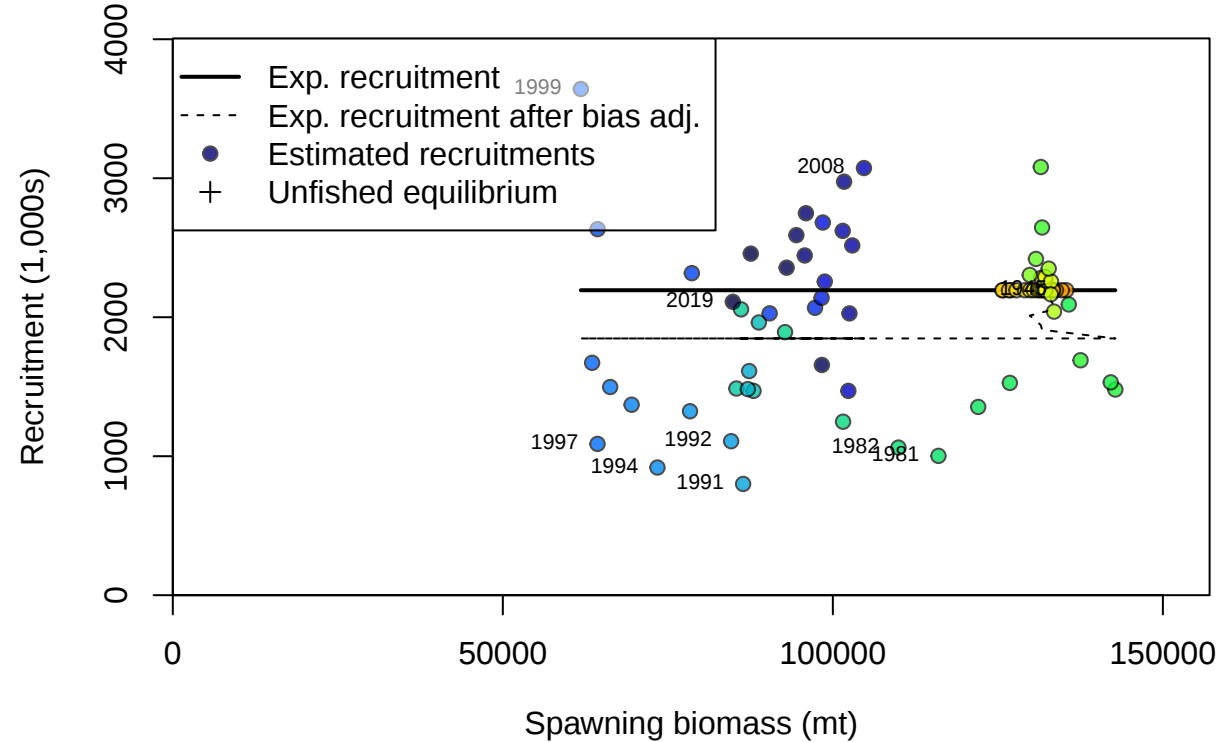




Log recruitment deviation







Log recruitment deviation

0.5
0.0
-0.5

0.0

0.2

0.4

0.6

0.8

1.0

Spawning output (relative to B_0)

1999

2019

2008

1997

1992

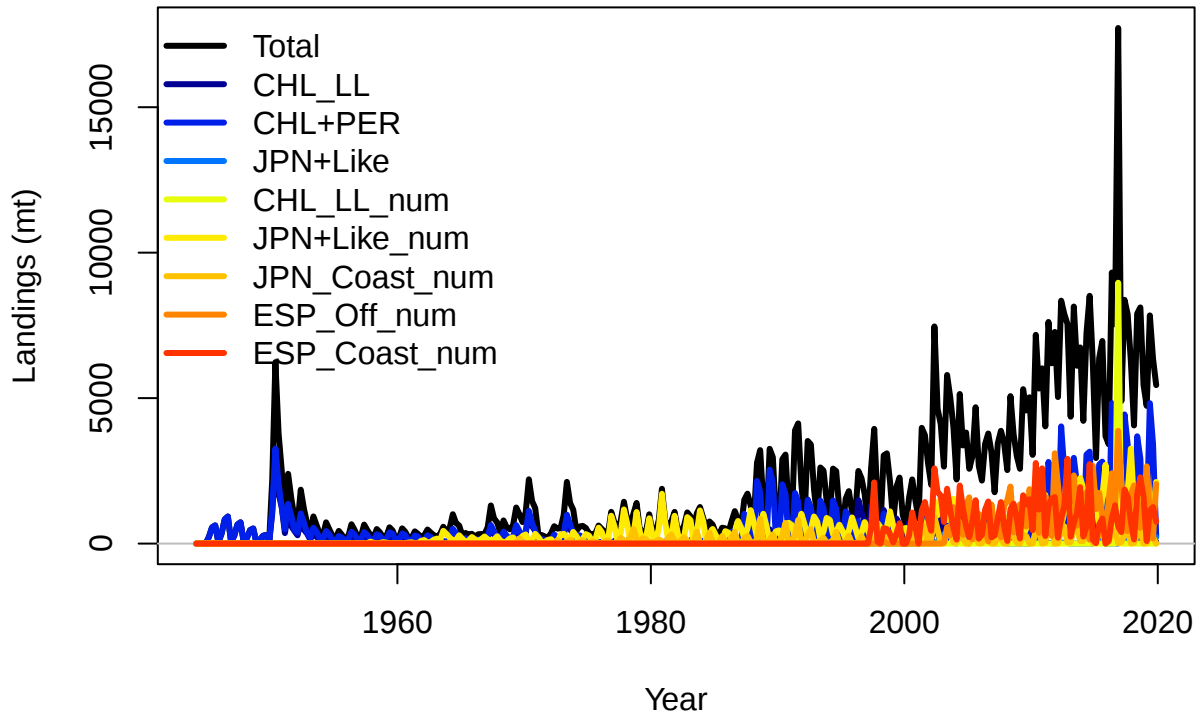
1994

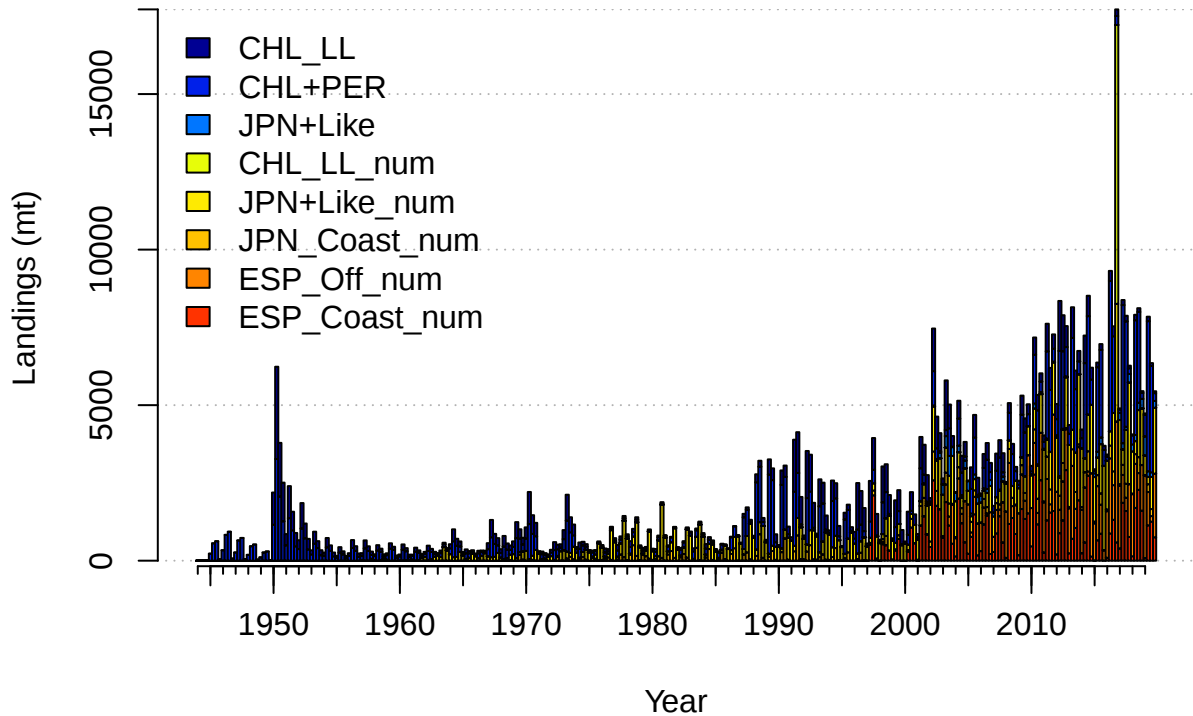
1991

1982

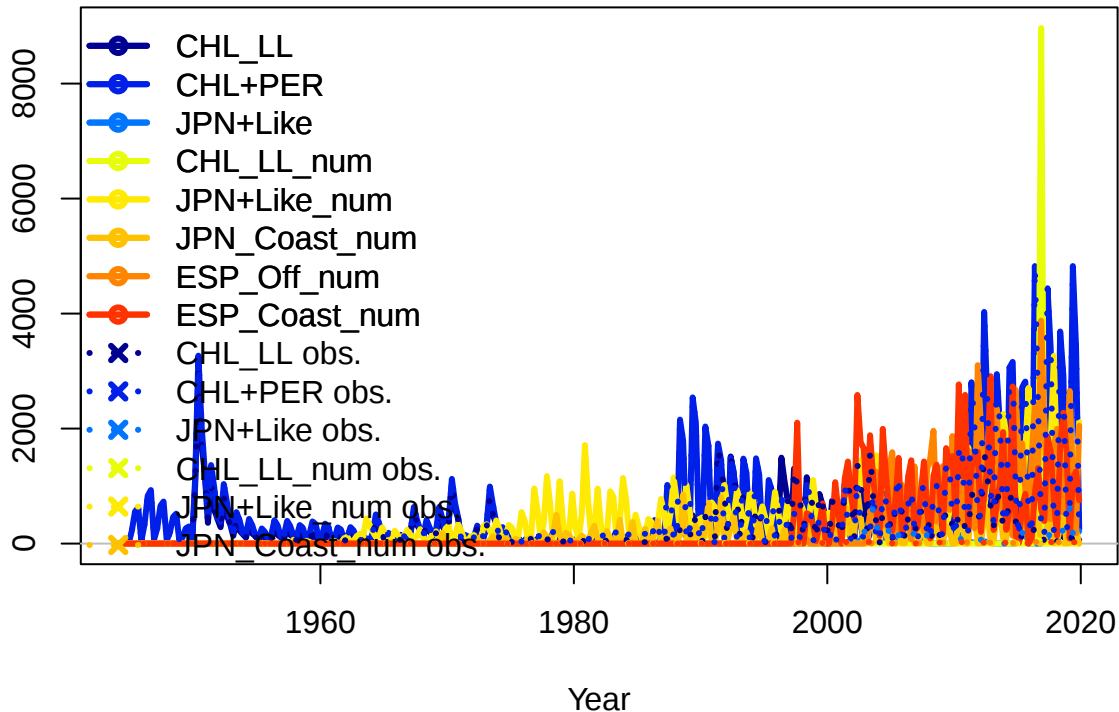
1981

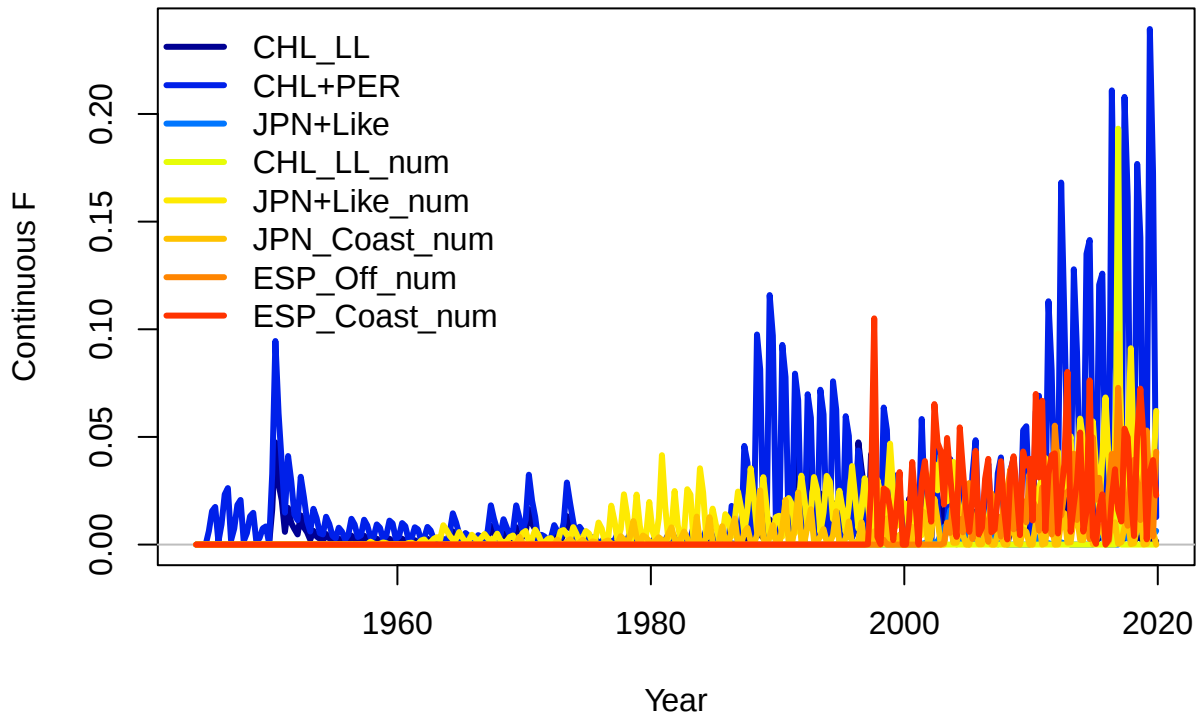
+



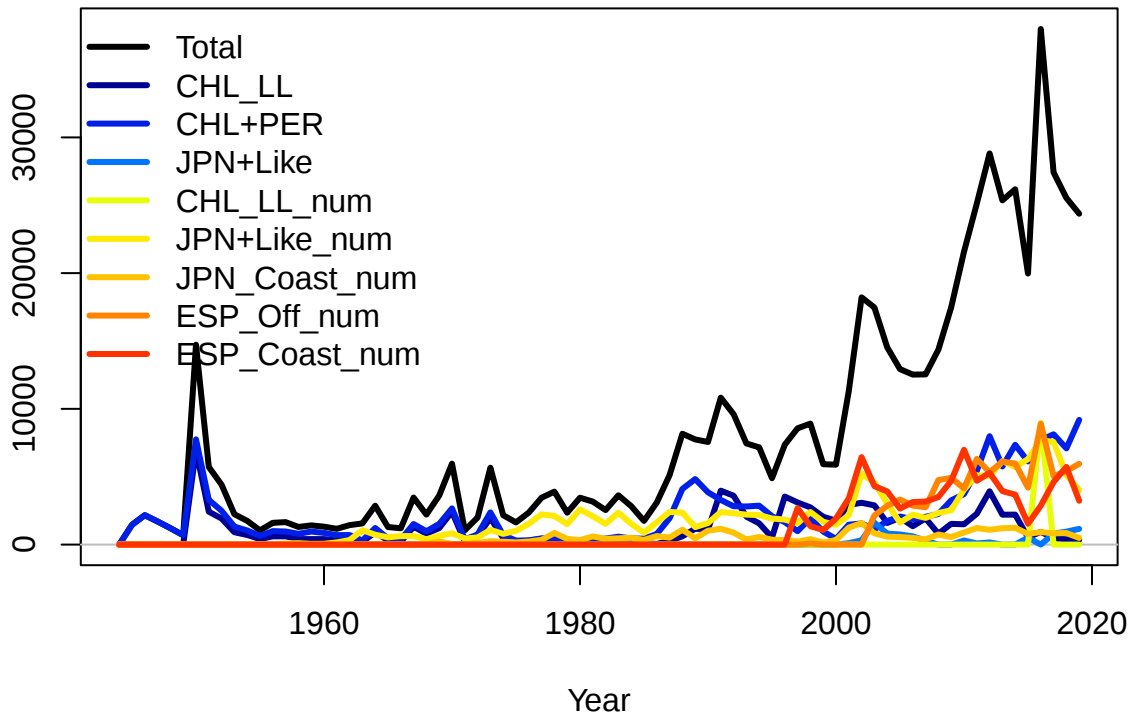


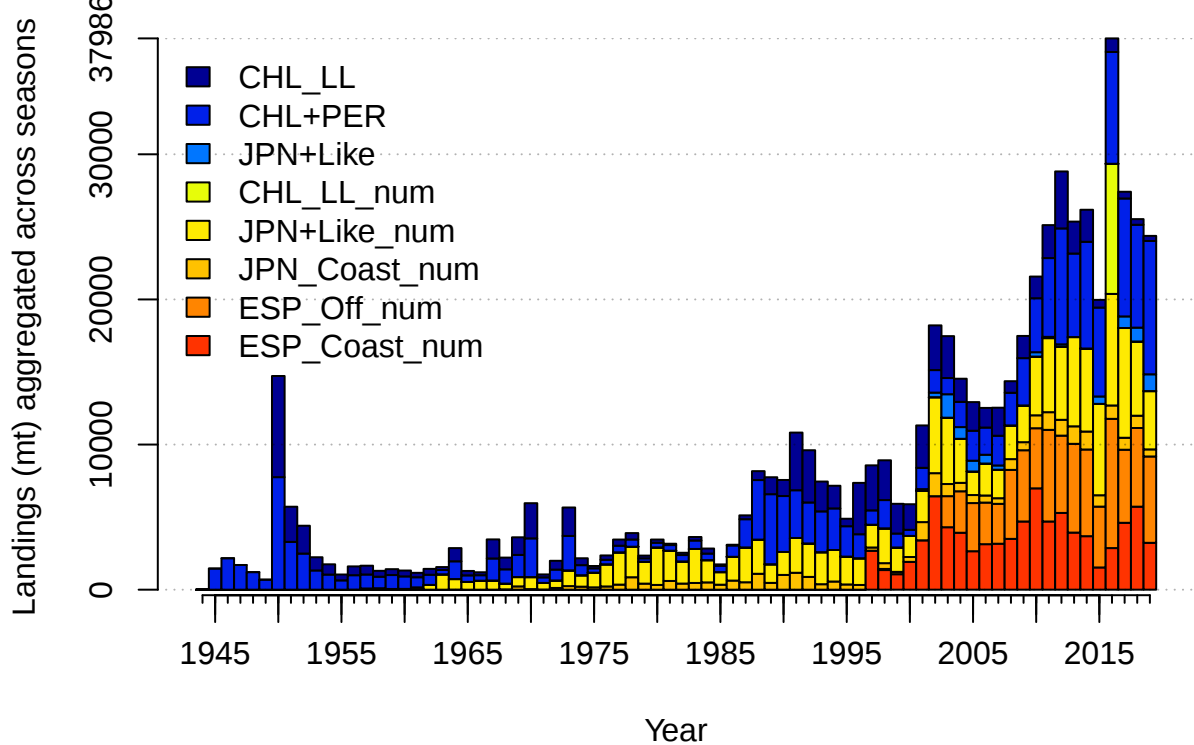
Observed and expected Landings (mt)



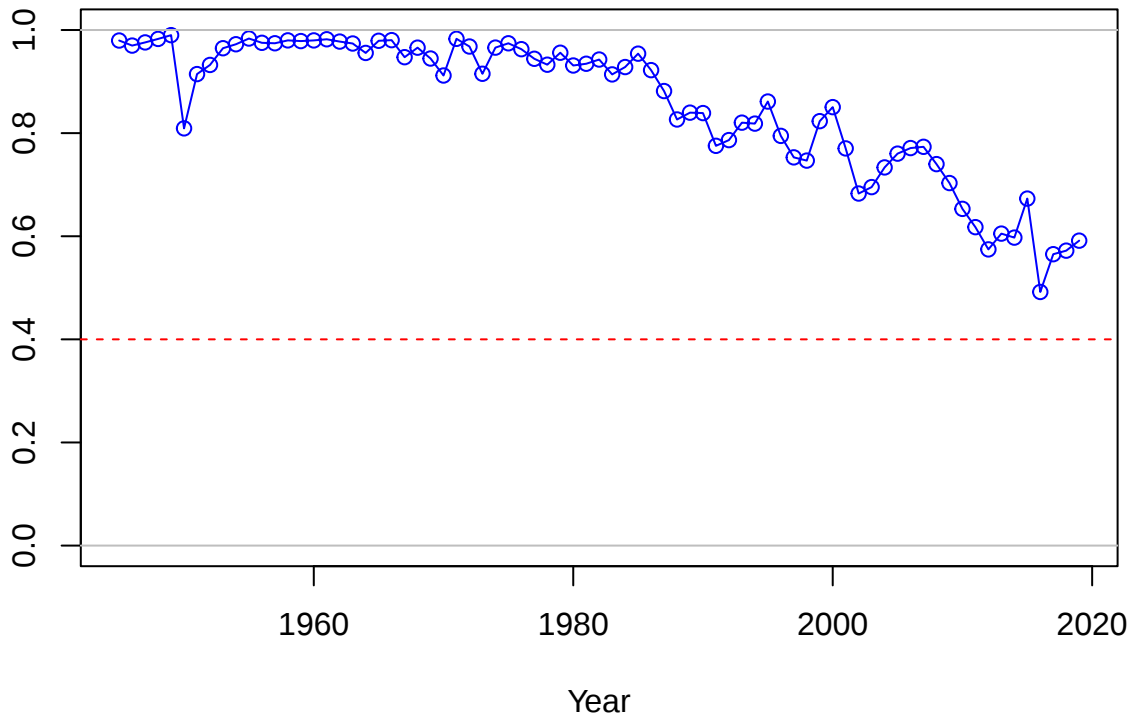


Landings (mt) aggregated across seasons

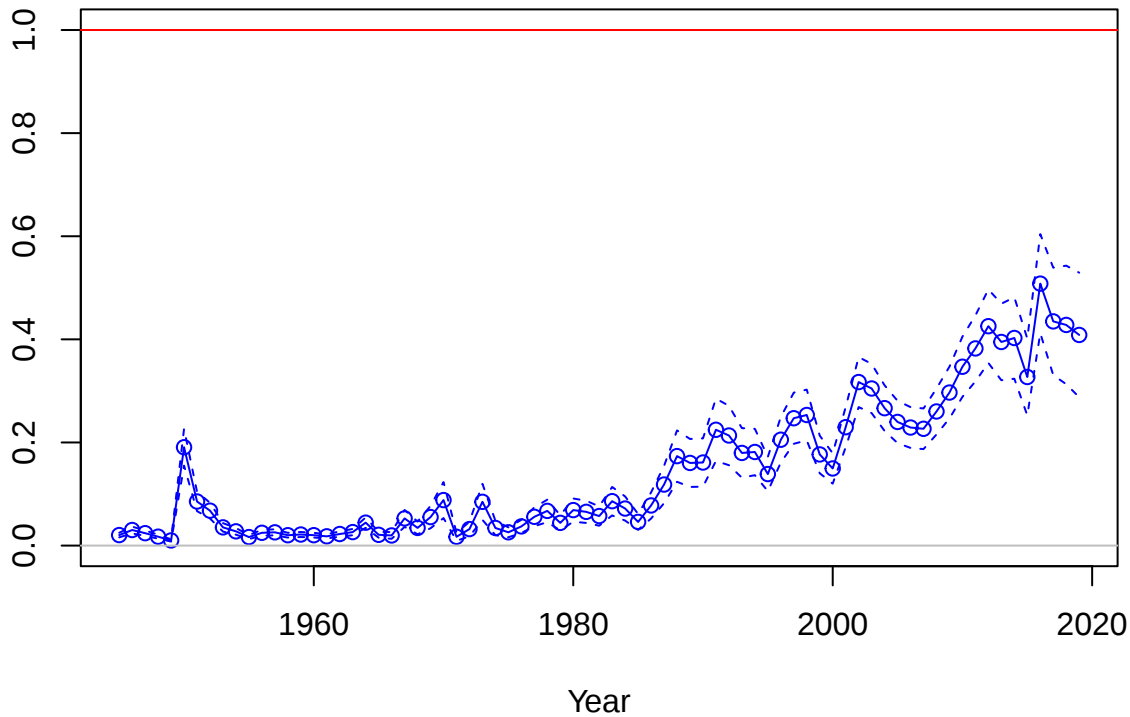




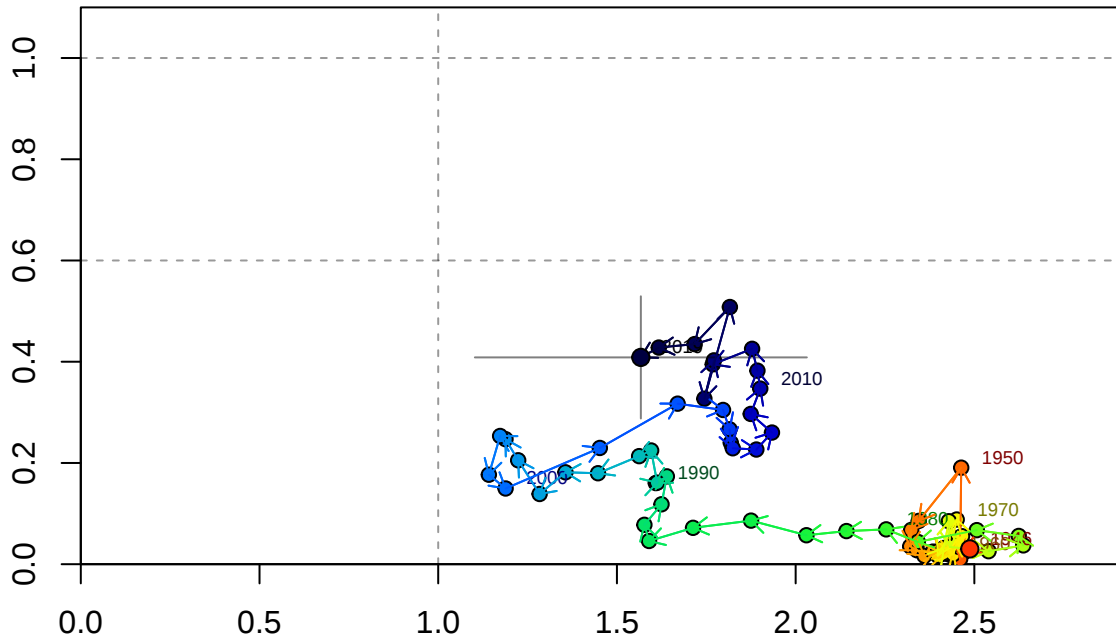
SPR



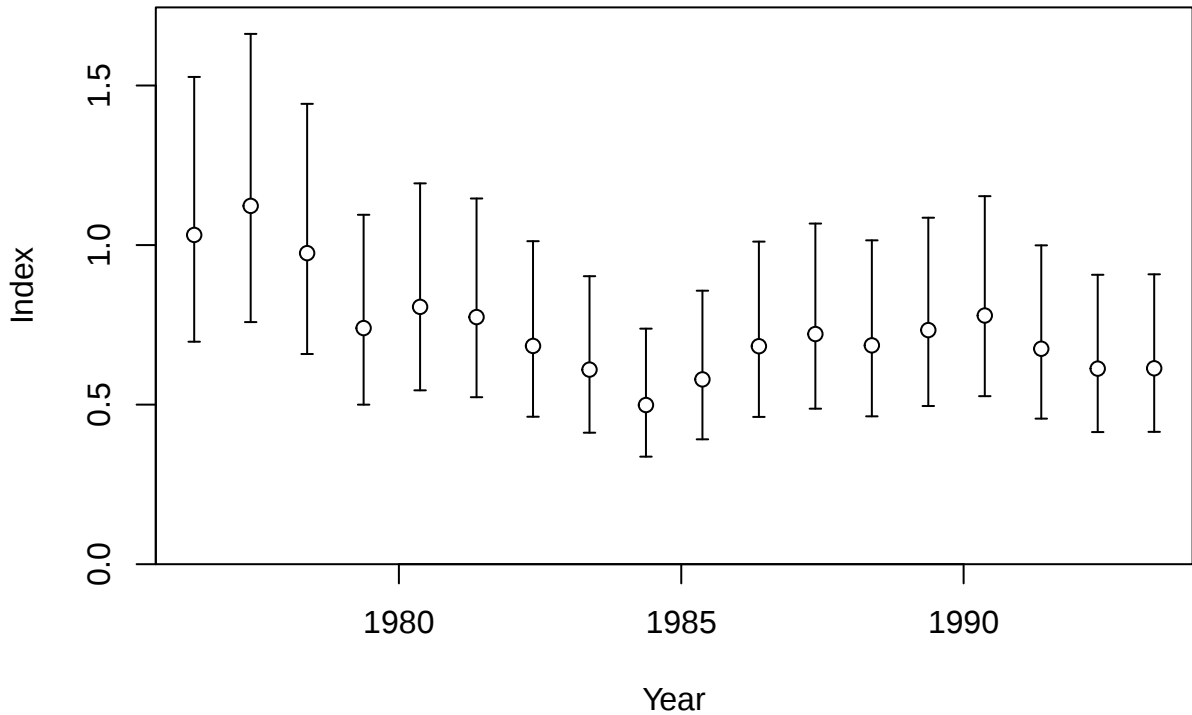
Fishing intensity: 1-SPR

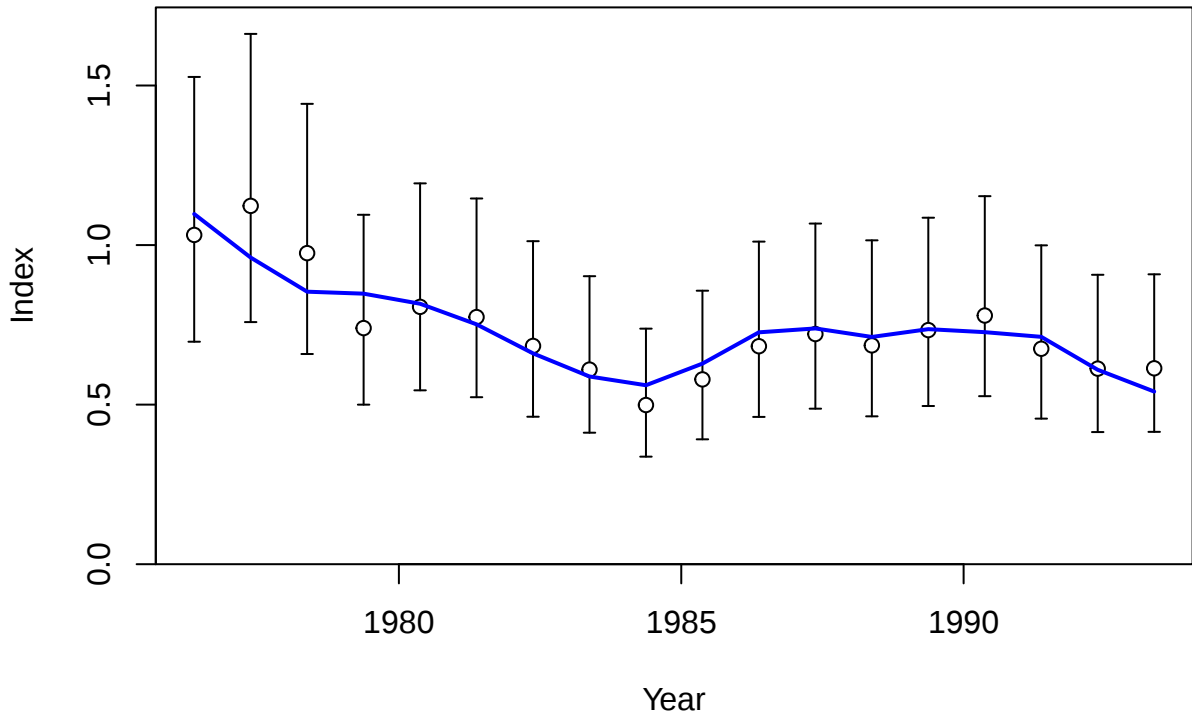


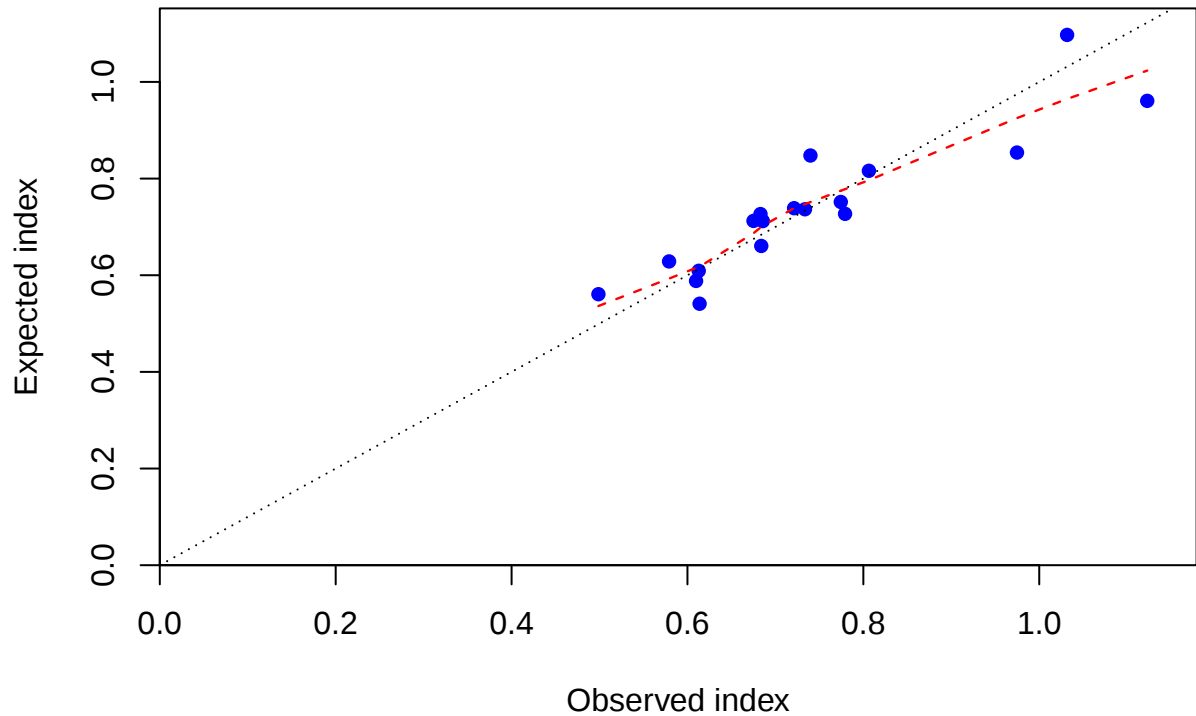
Fishing intensity: 1-SPR

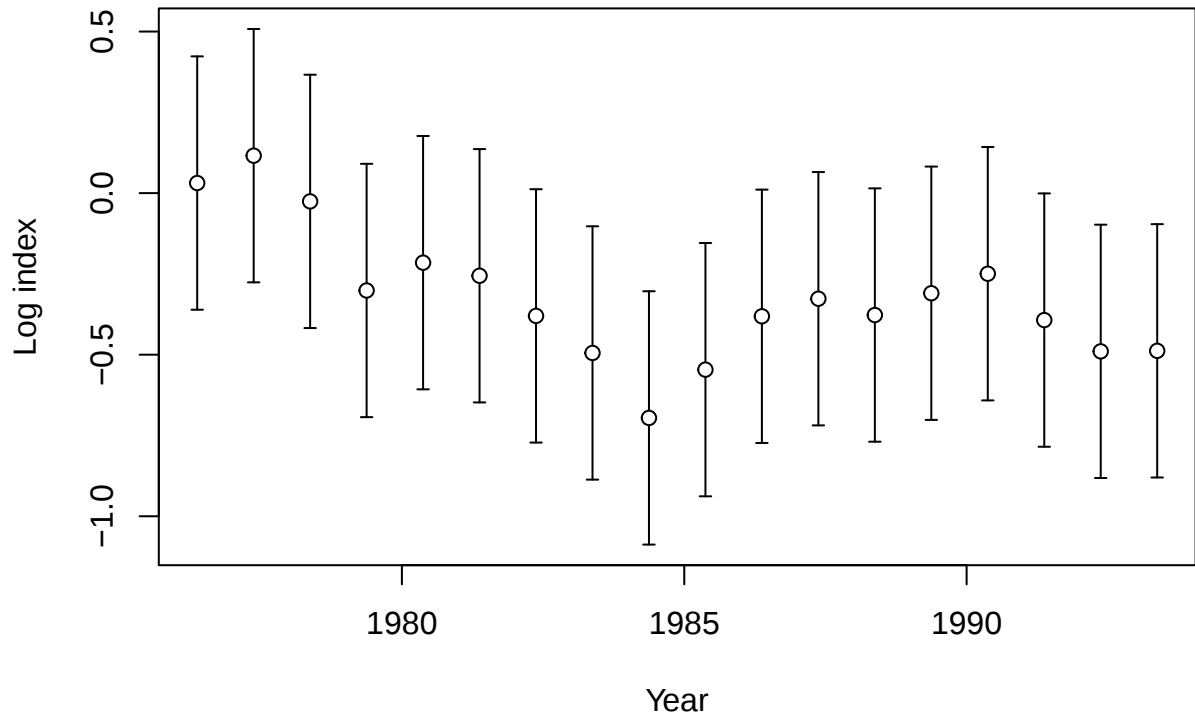


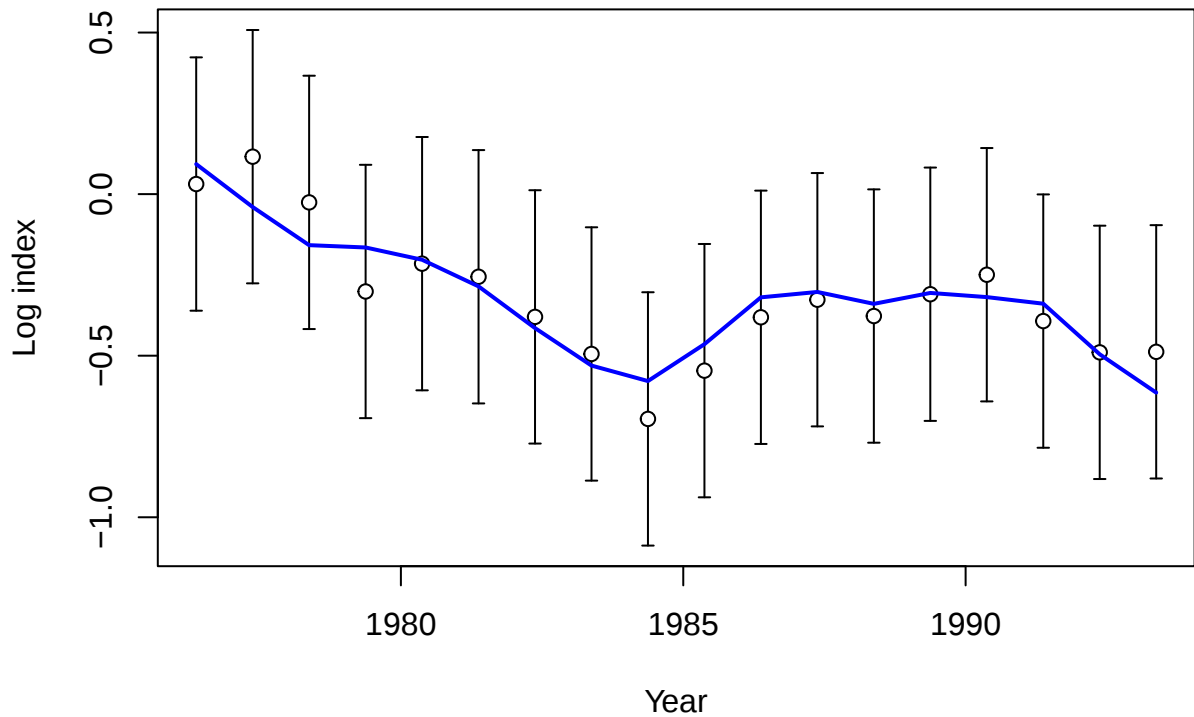
Relative spawning output: $B/(40\% \times \text{Virgin_Biomass})$

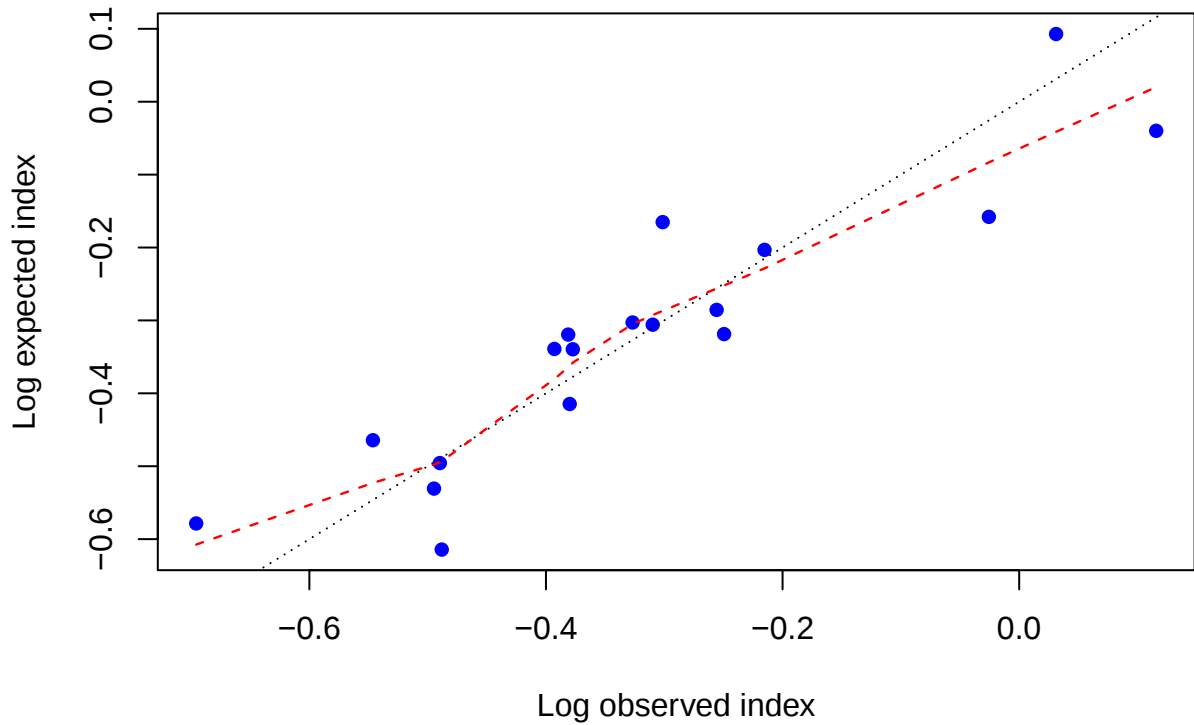


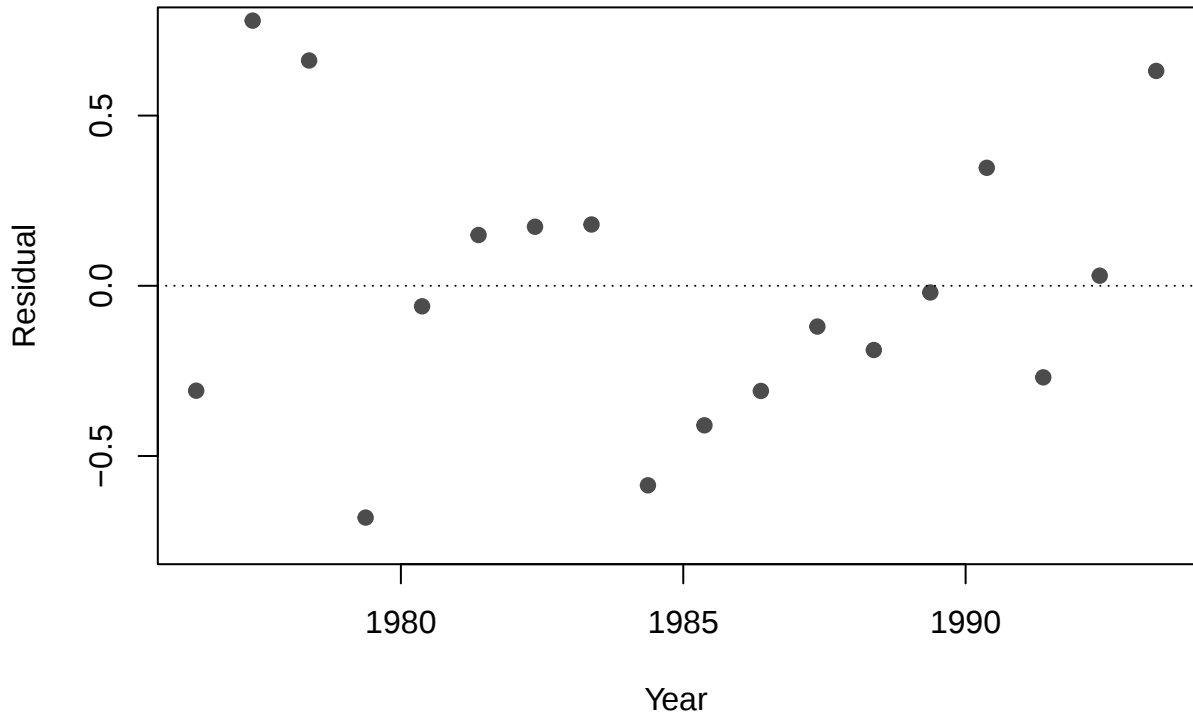












Deviation

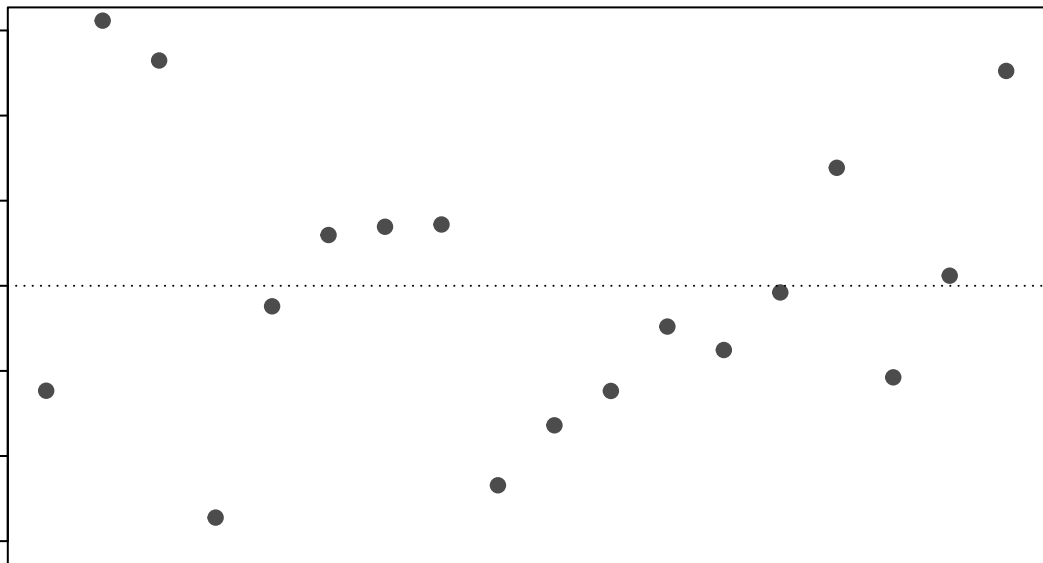
0.15
0.05
-0.05
-0.15

1980

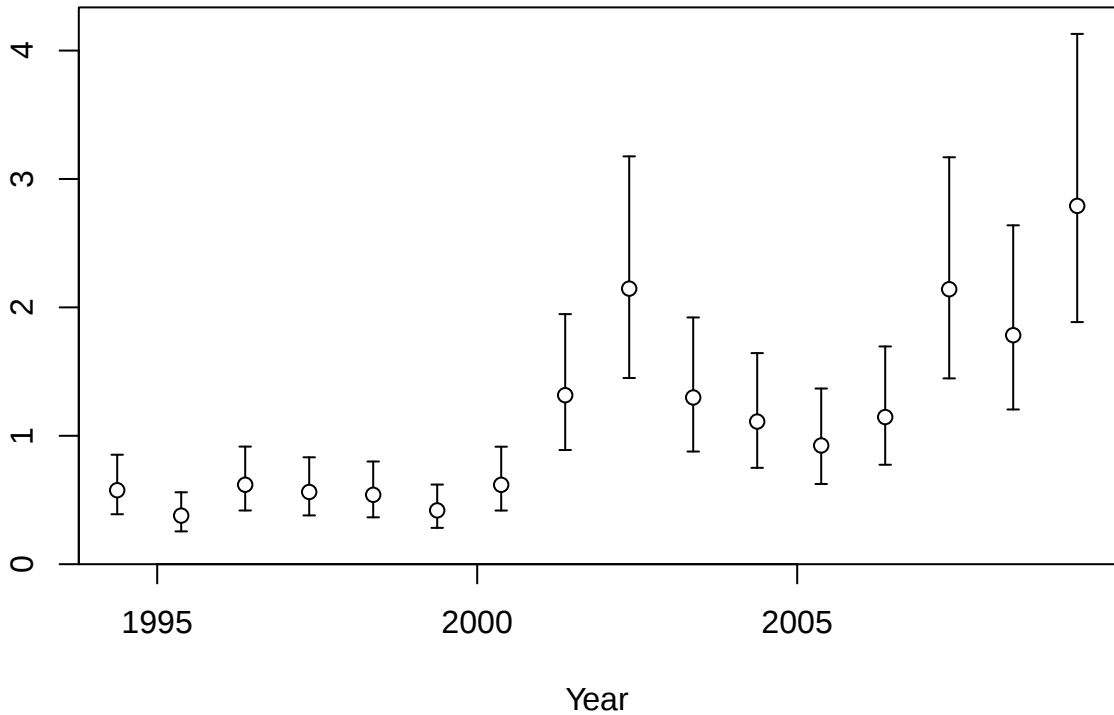
1985

1990

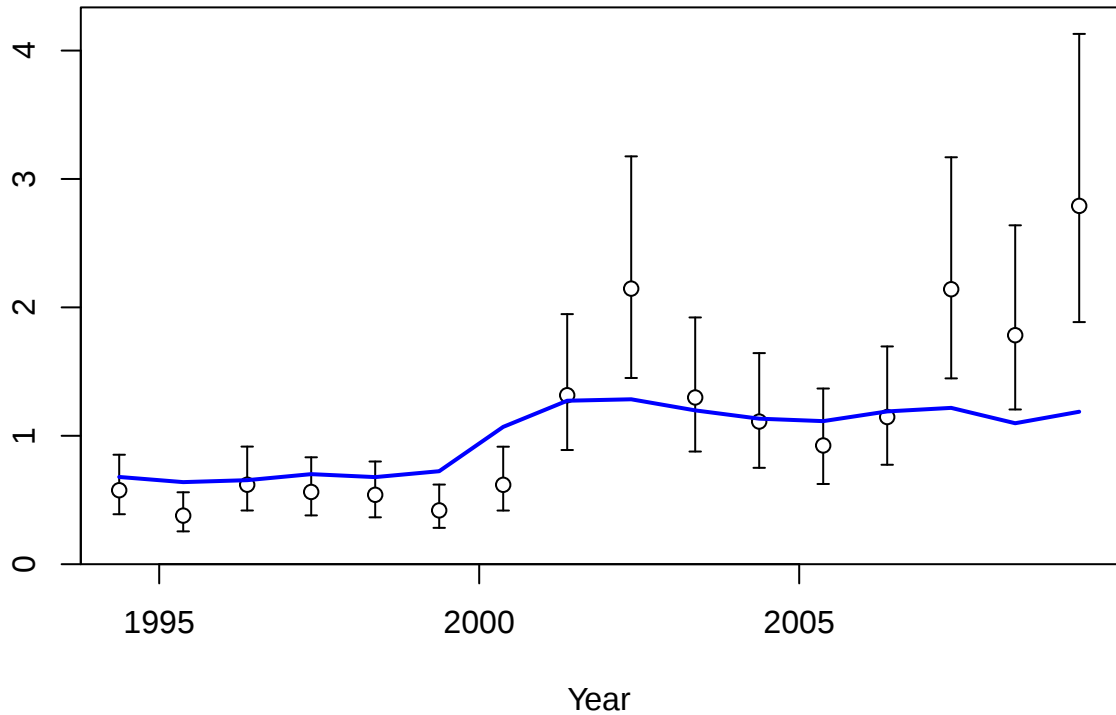
Year

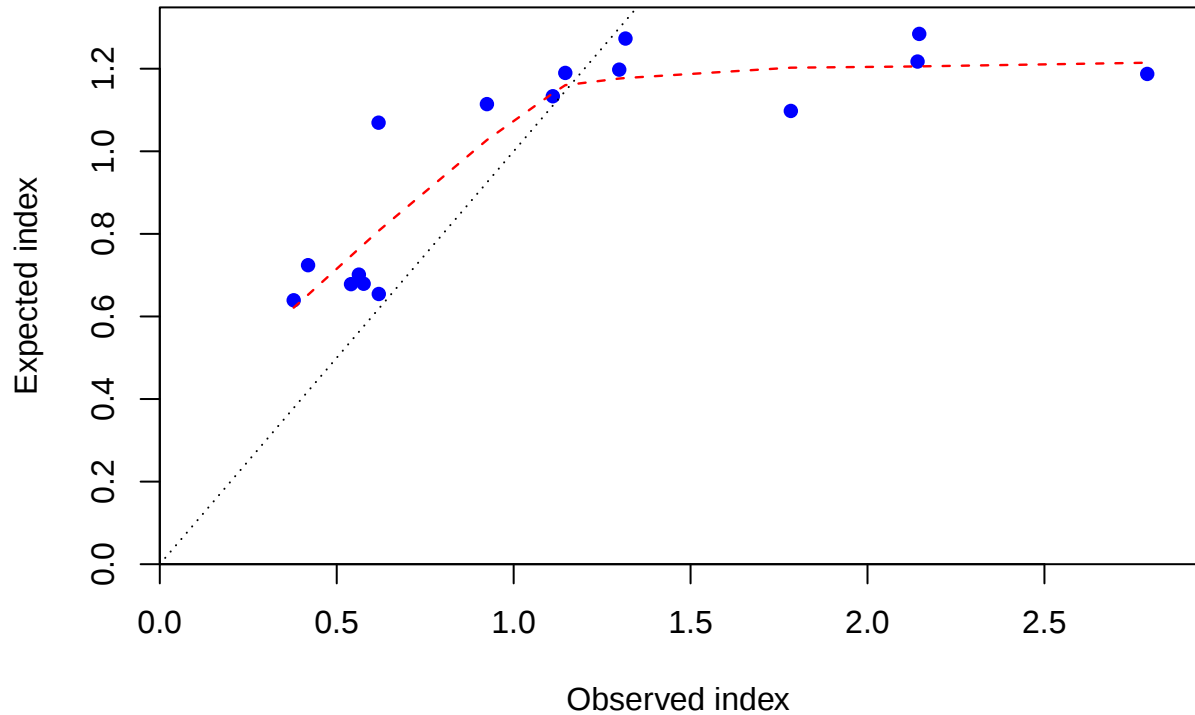


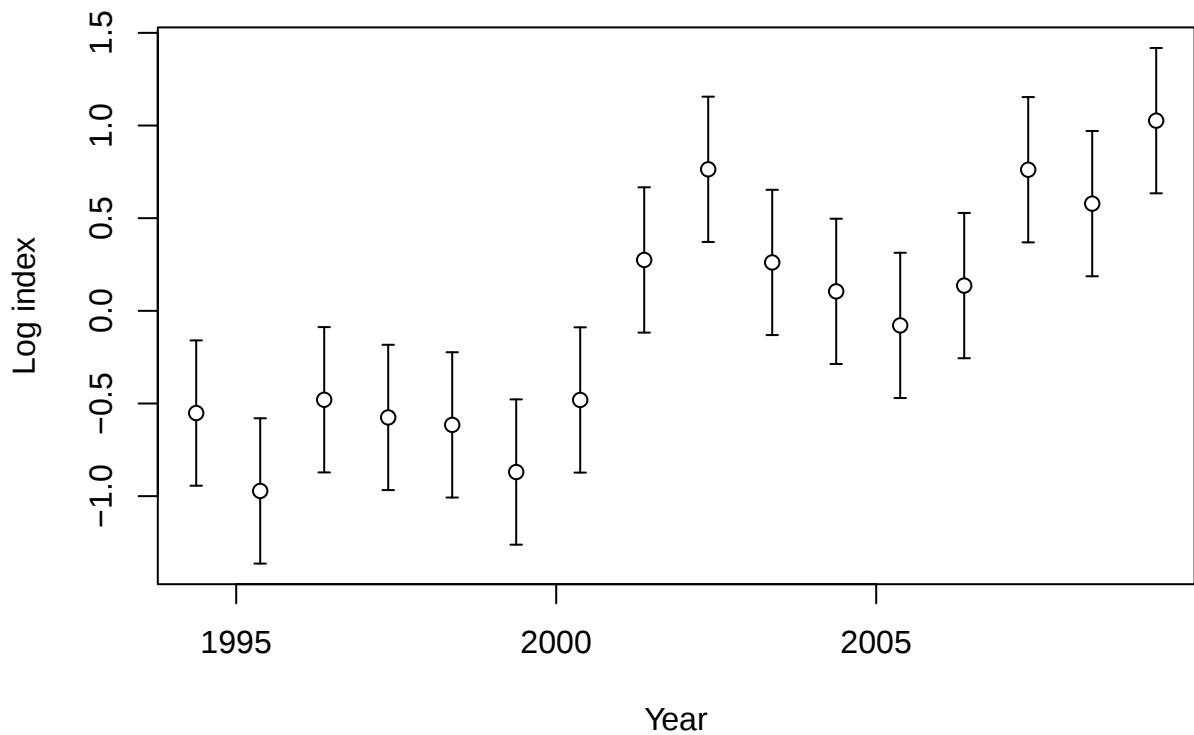
Index

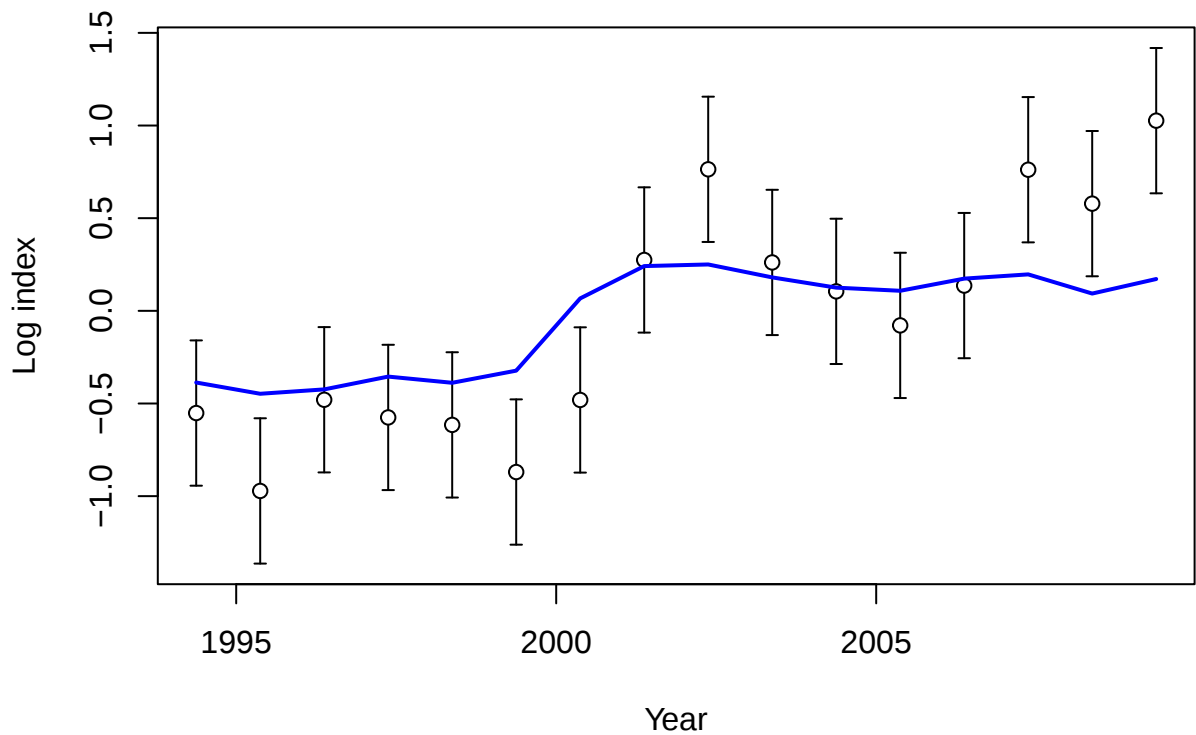


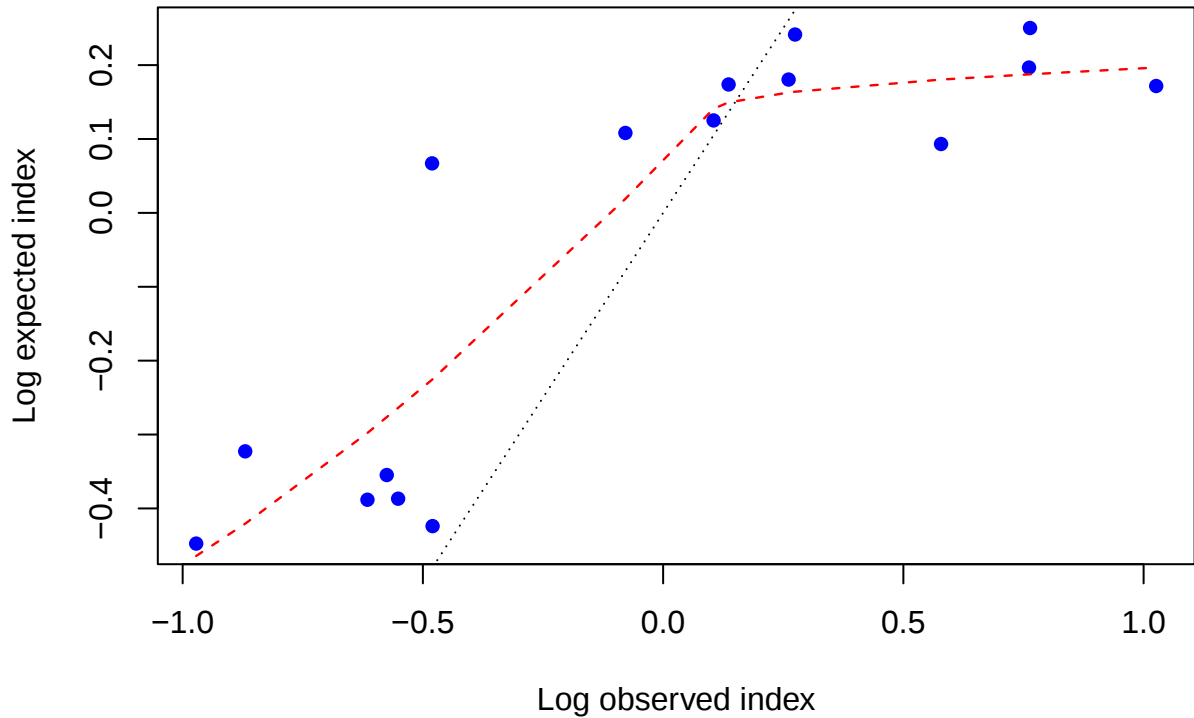
Index

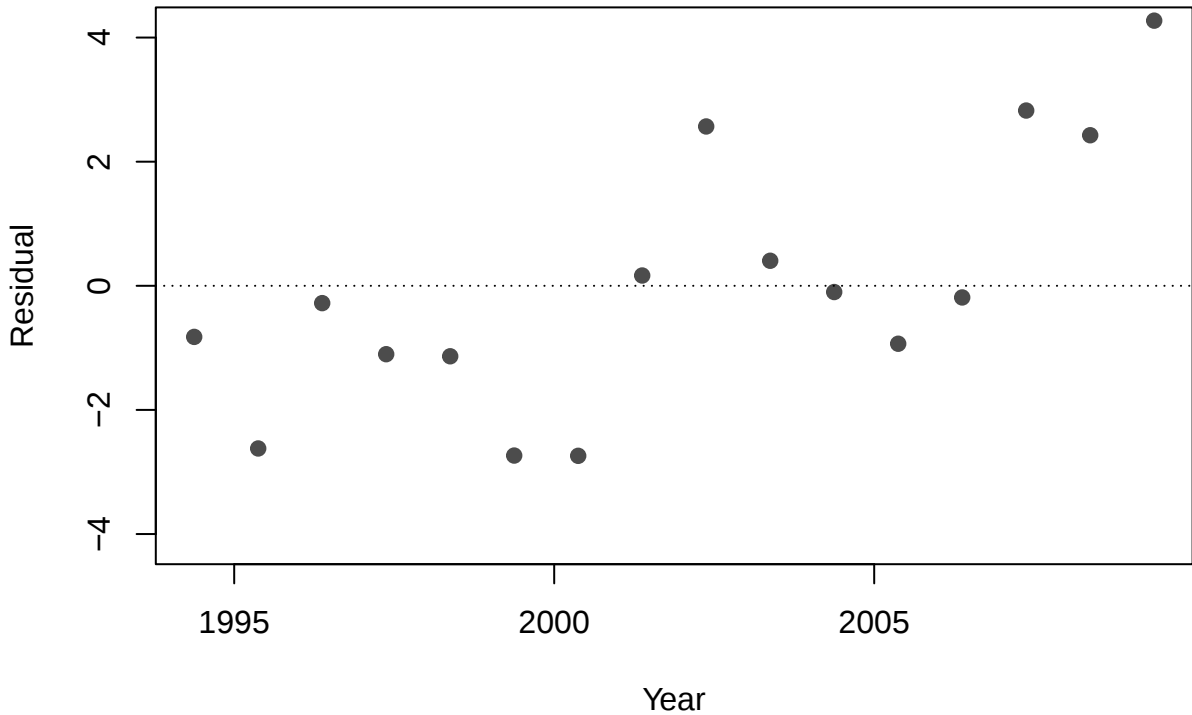


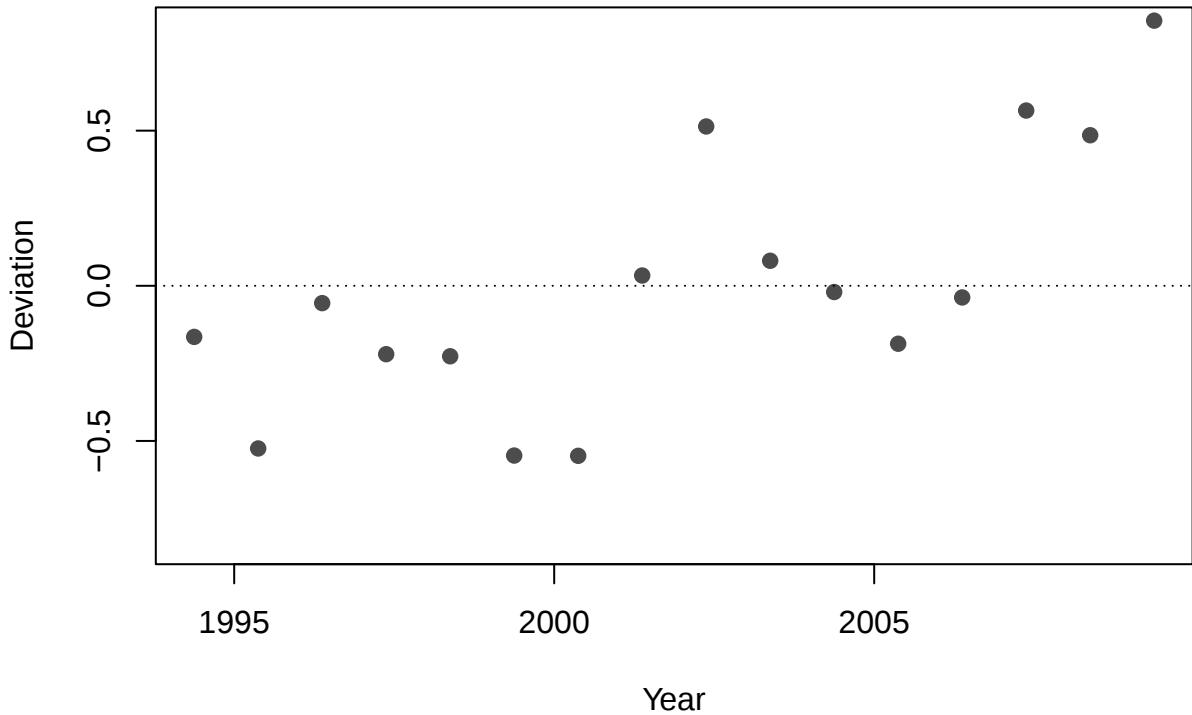


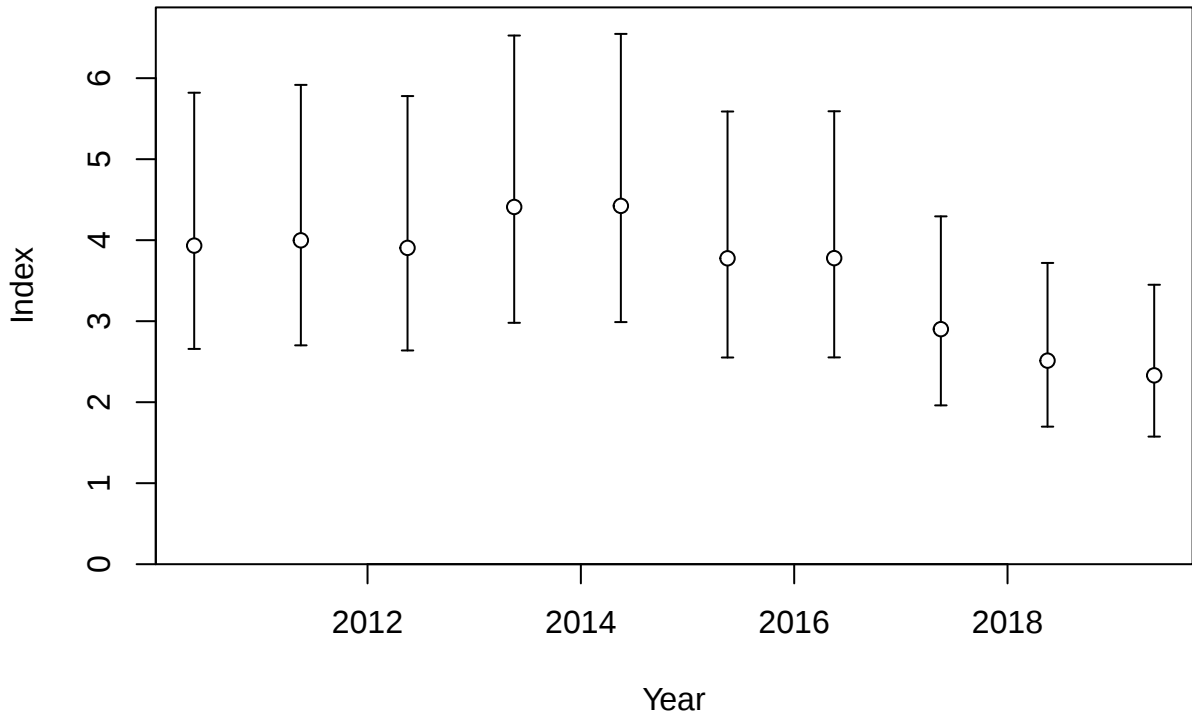


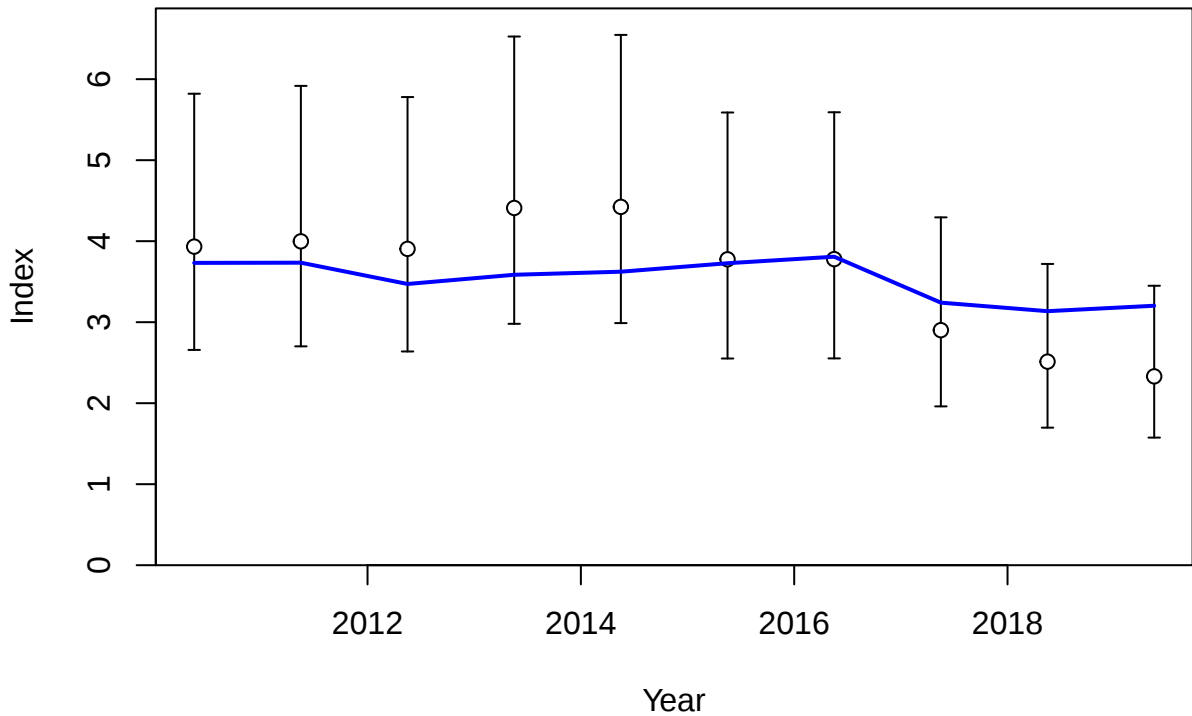


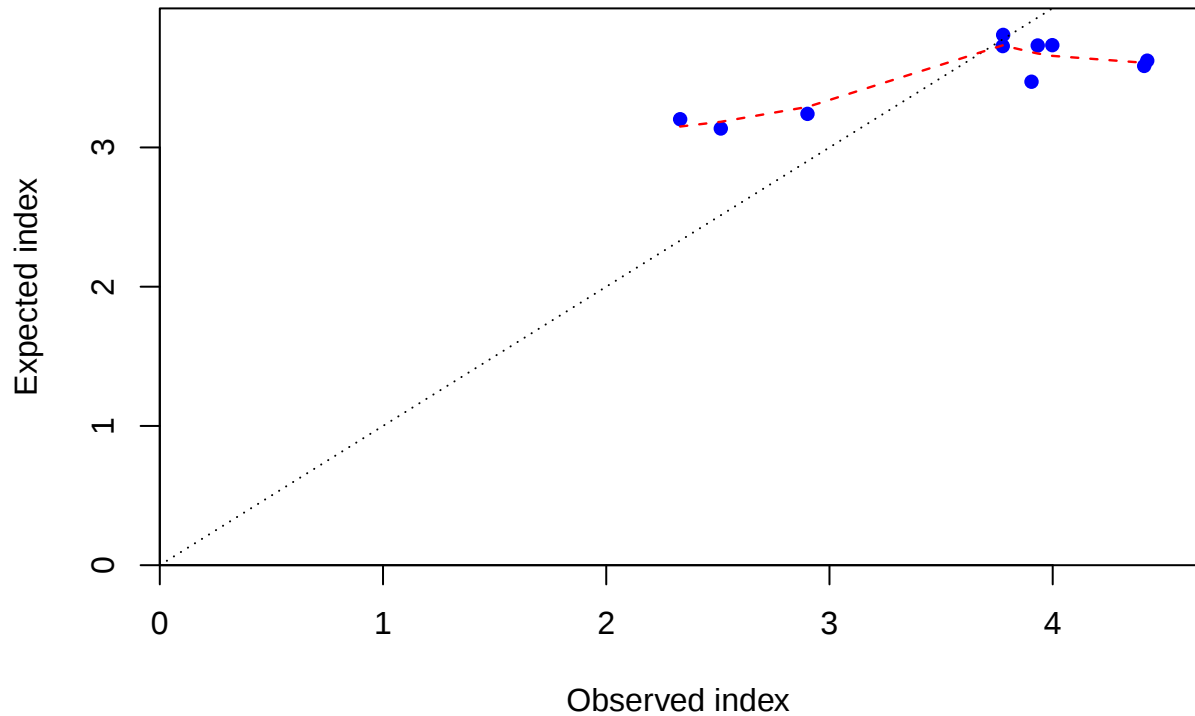


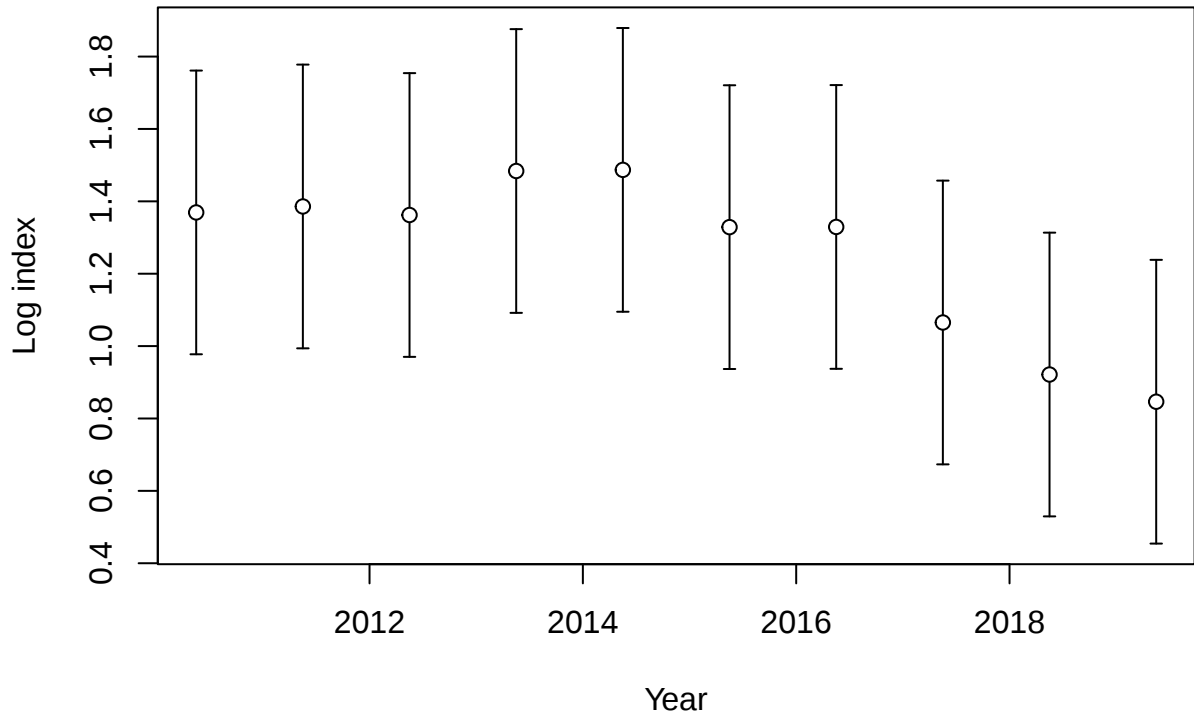


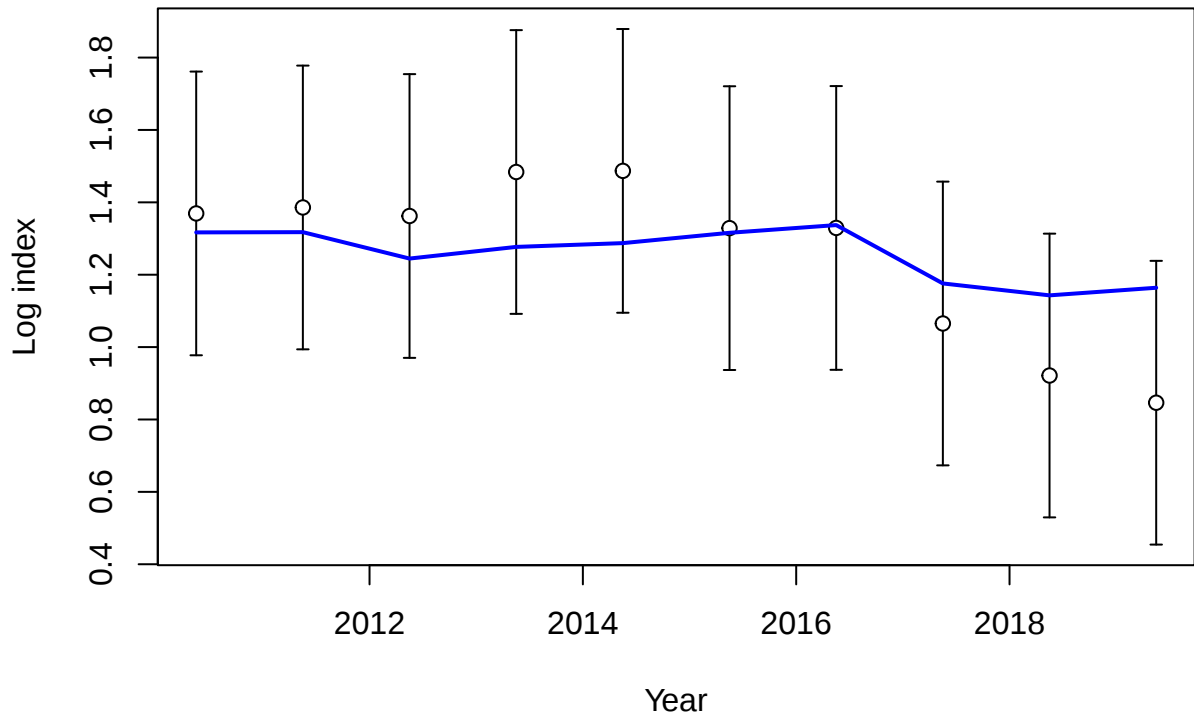


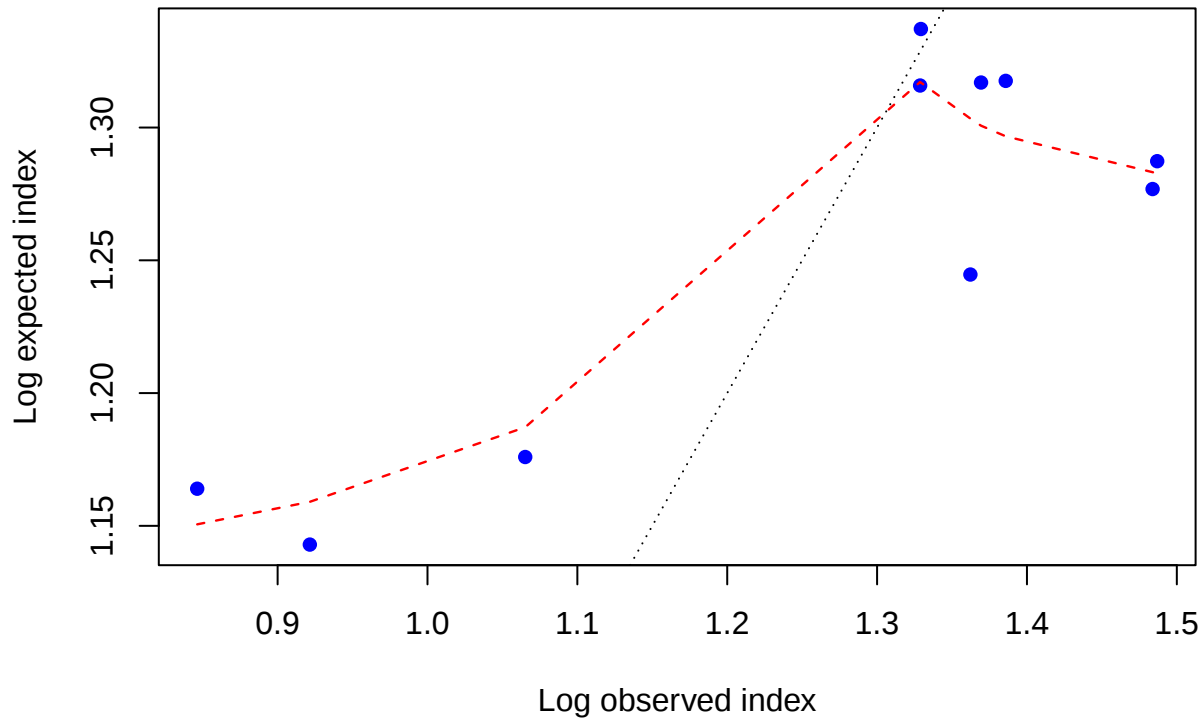




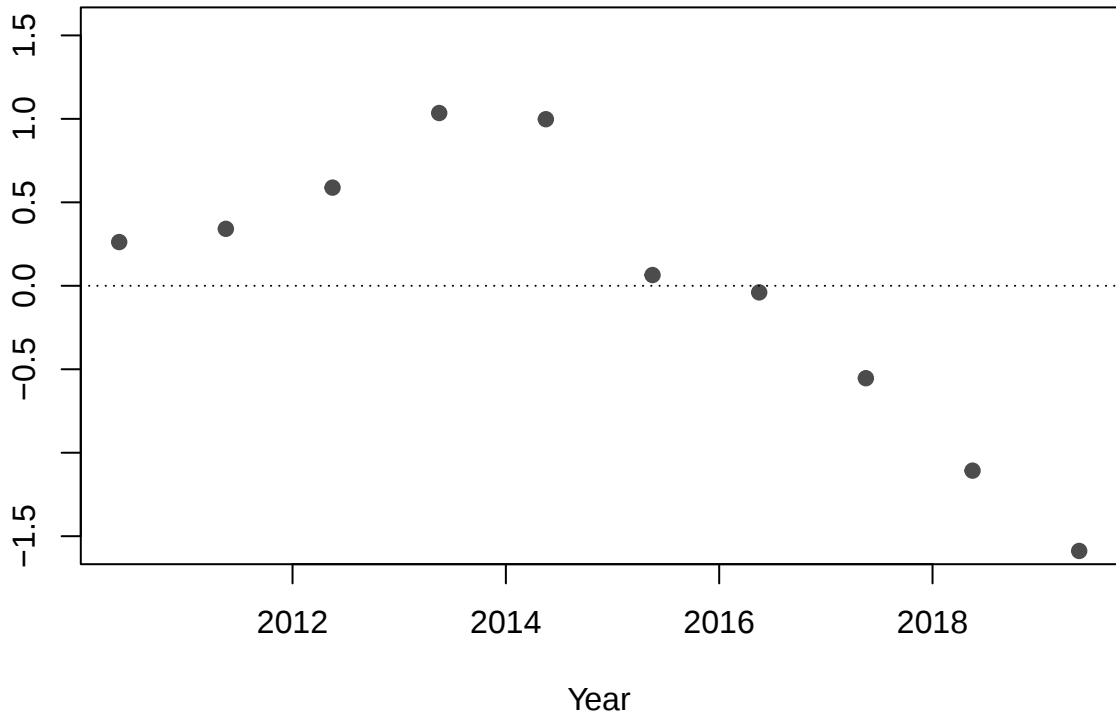


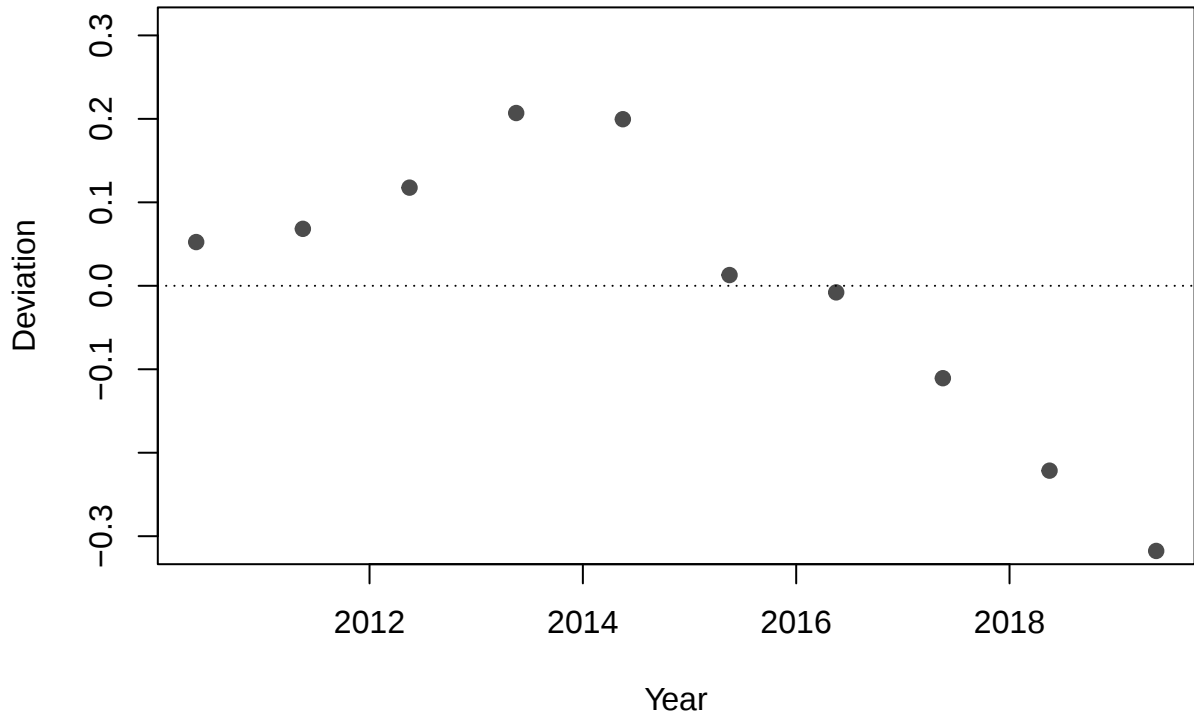




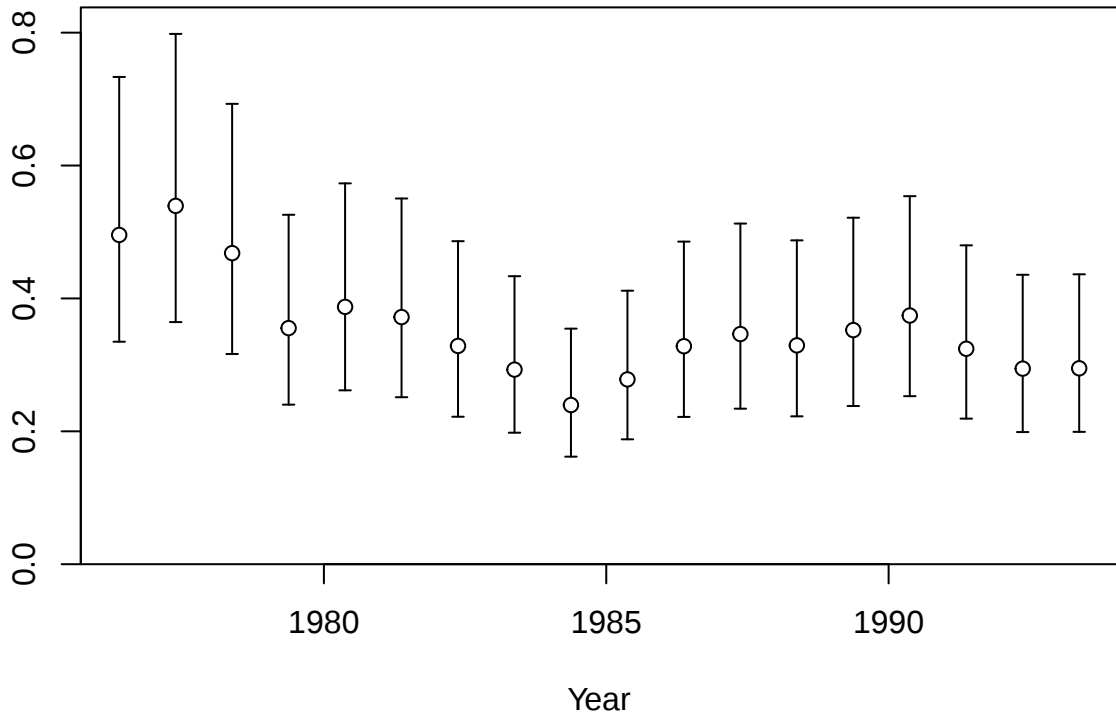


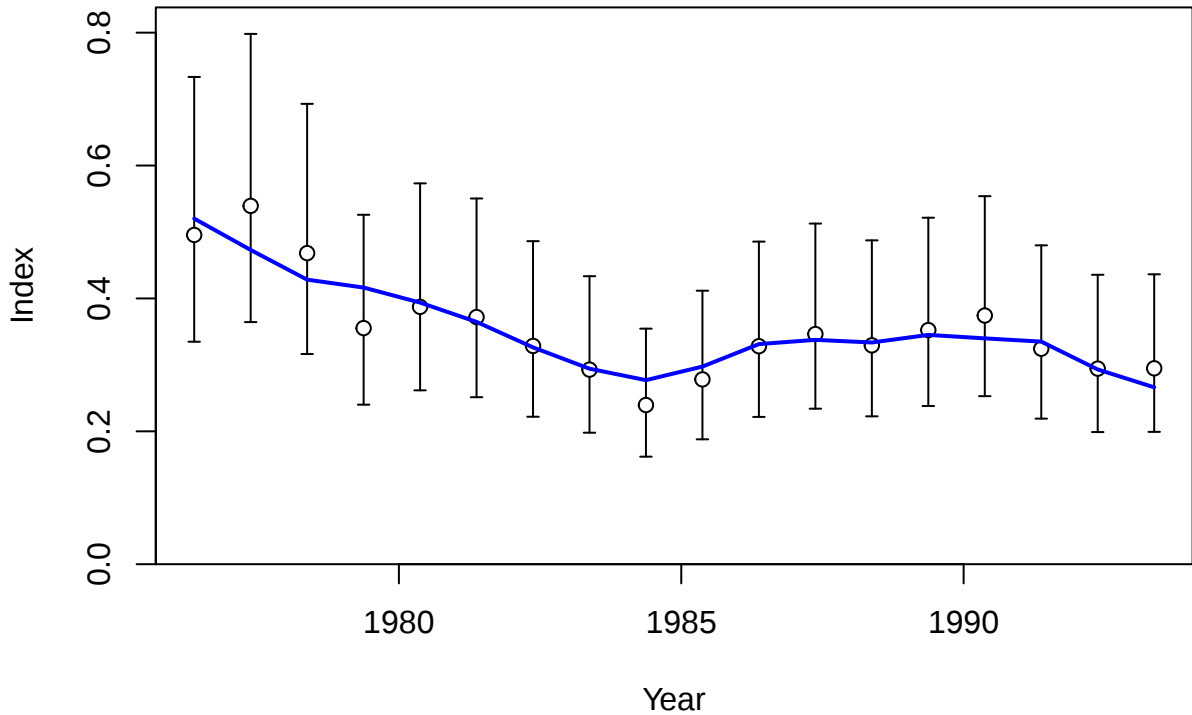
Residual

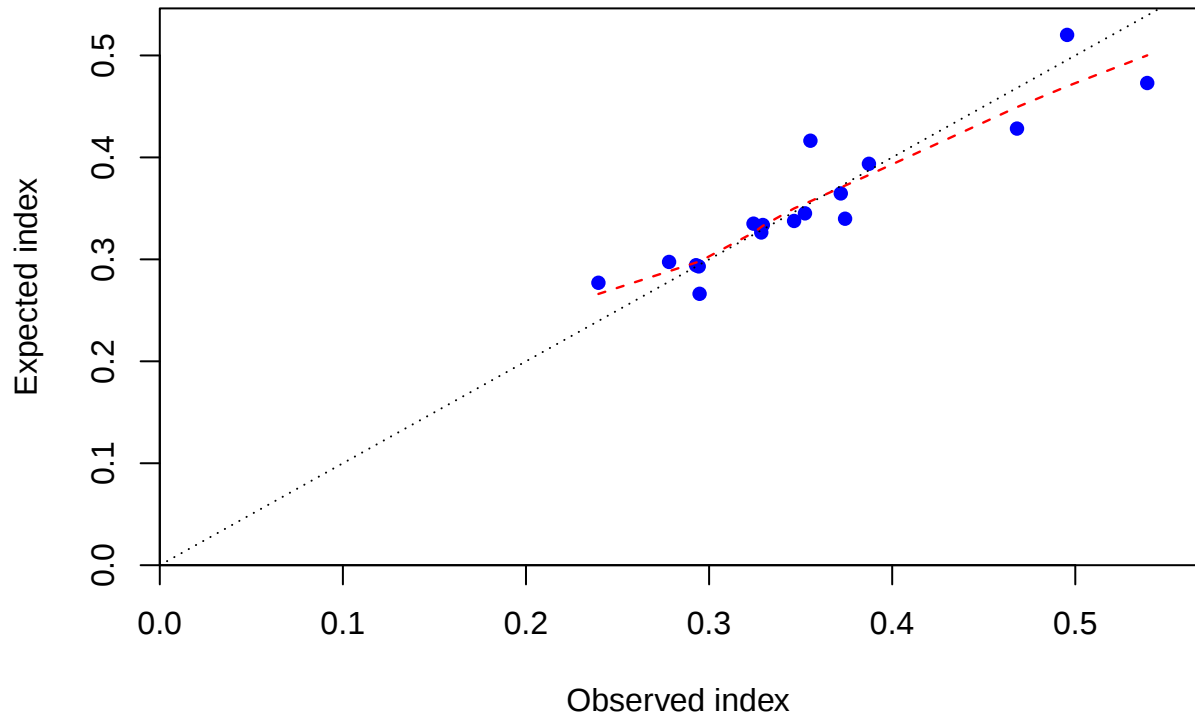




Index







Log index

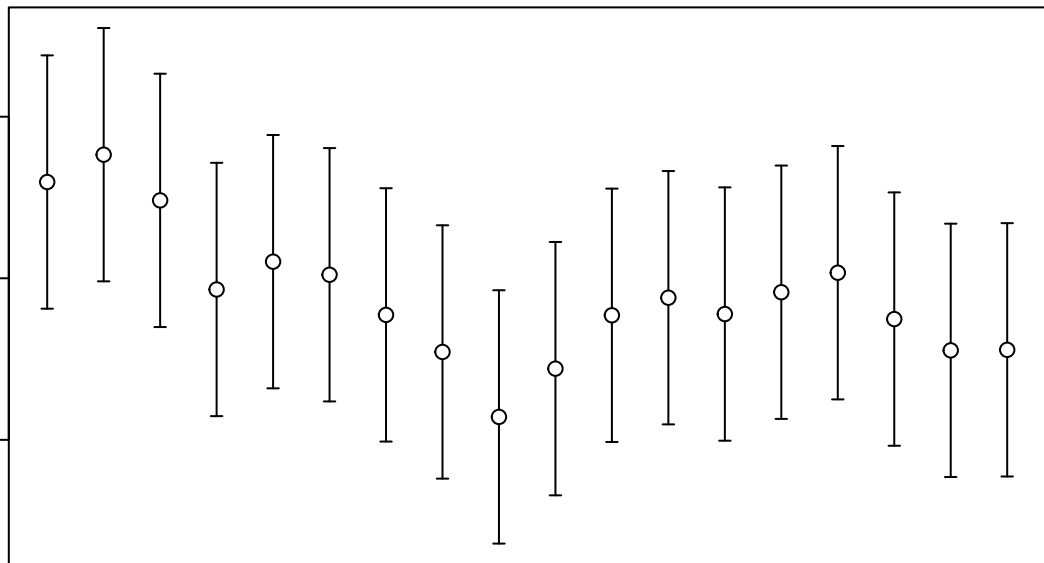
-0.5
-1.0
-1.5

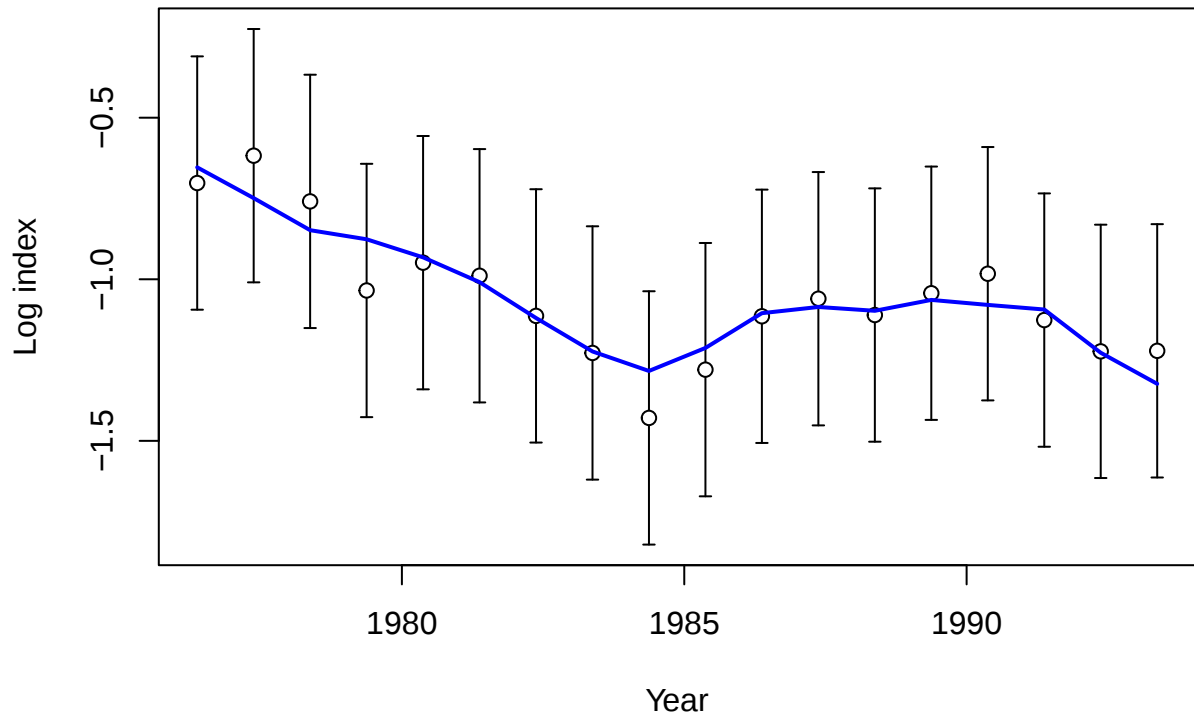
1980

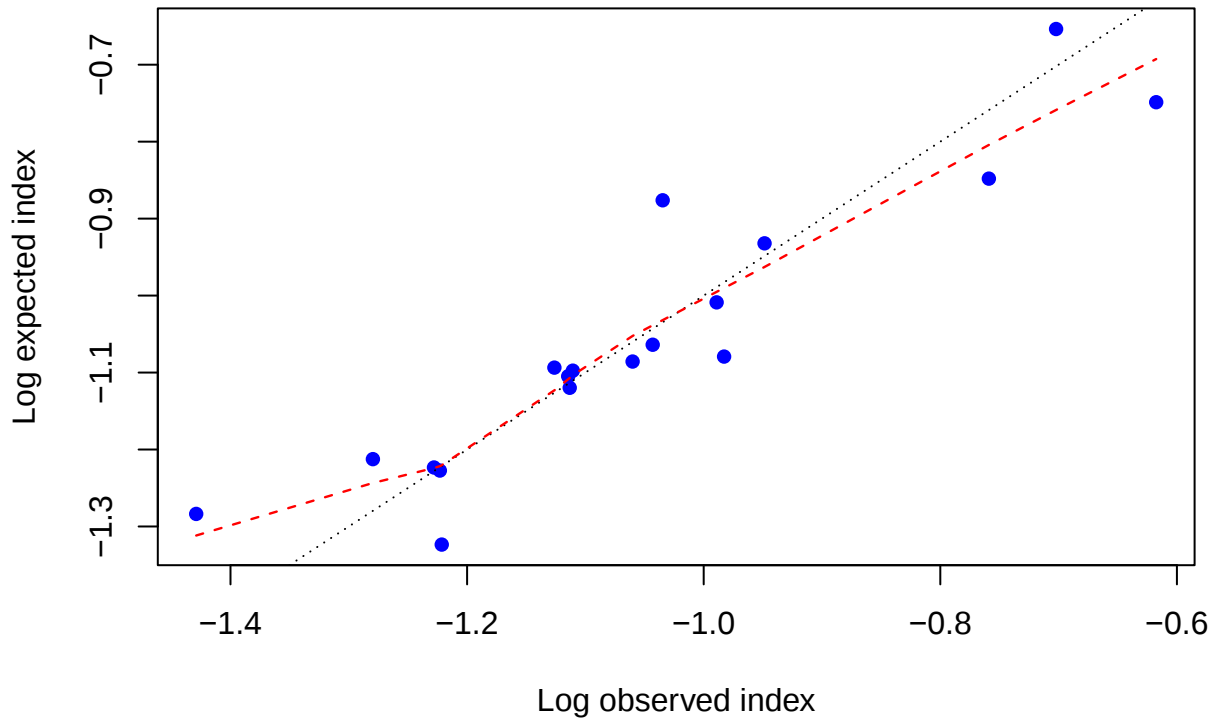
1985

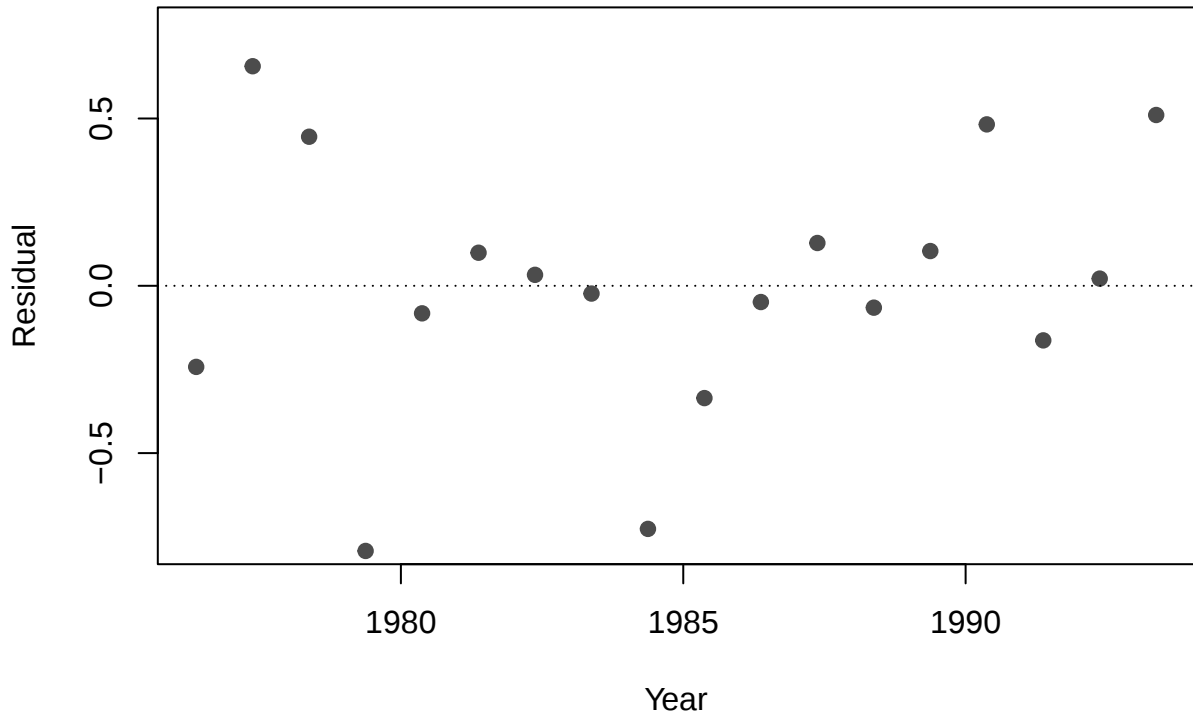
1990

Year

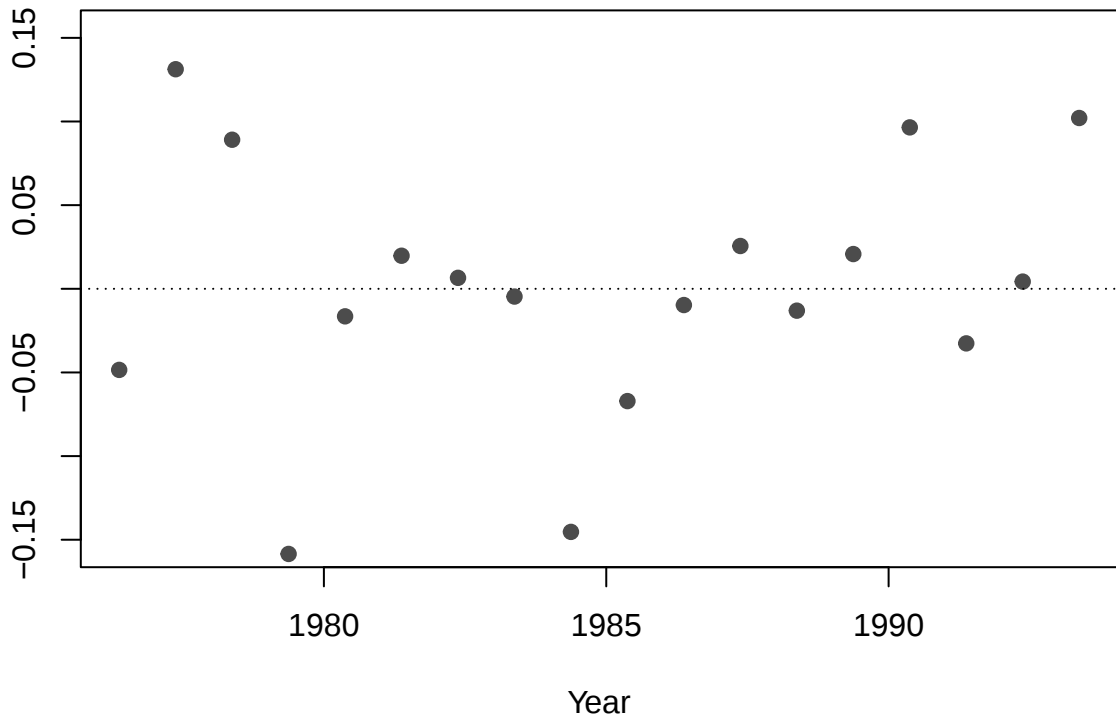


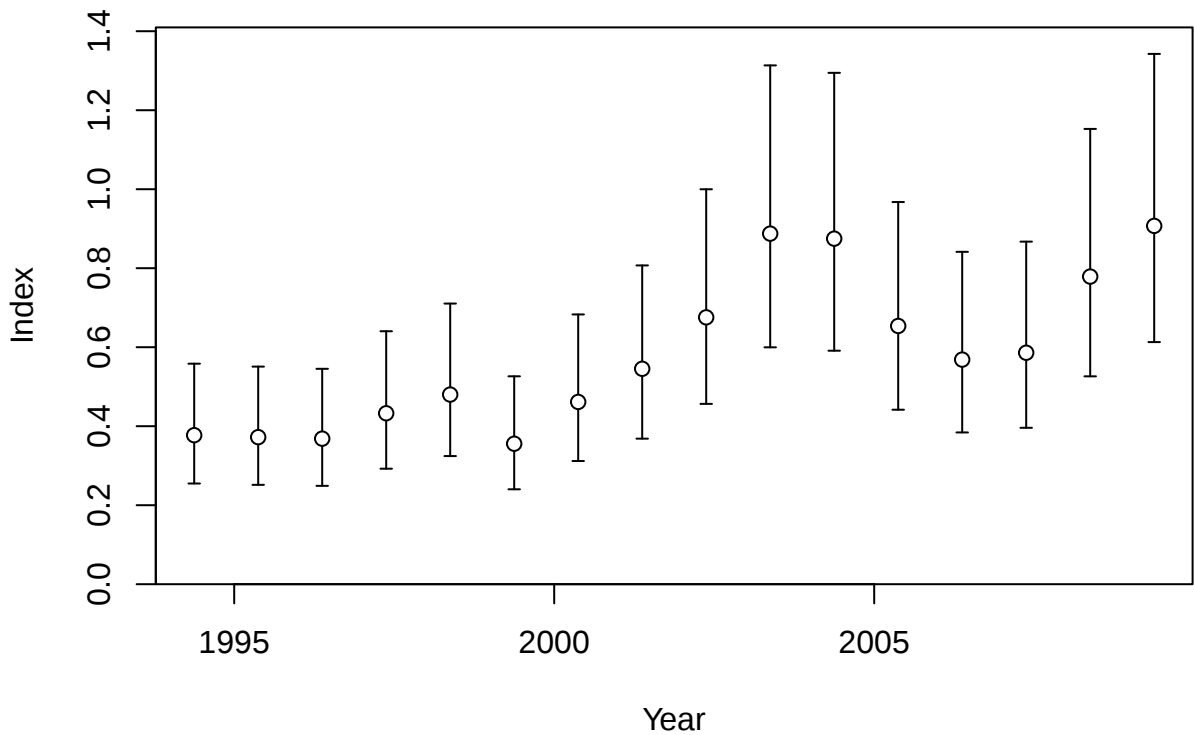


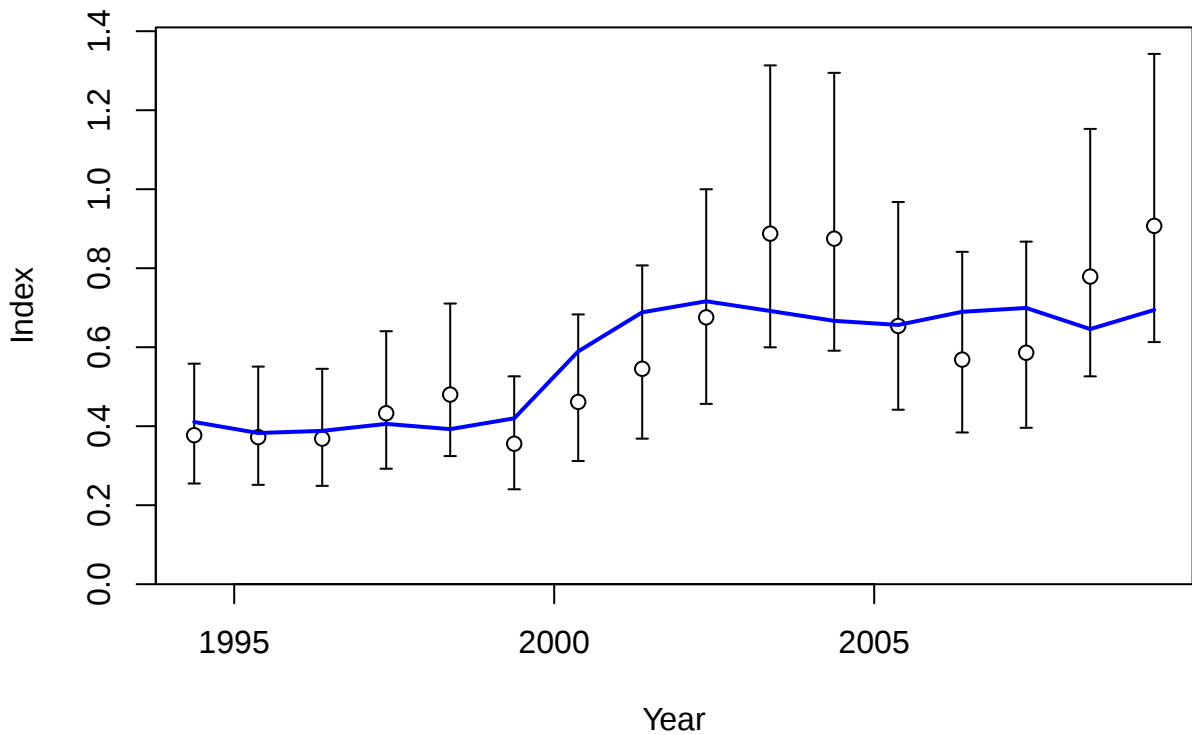




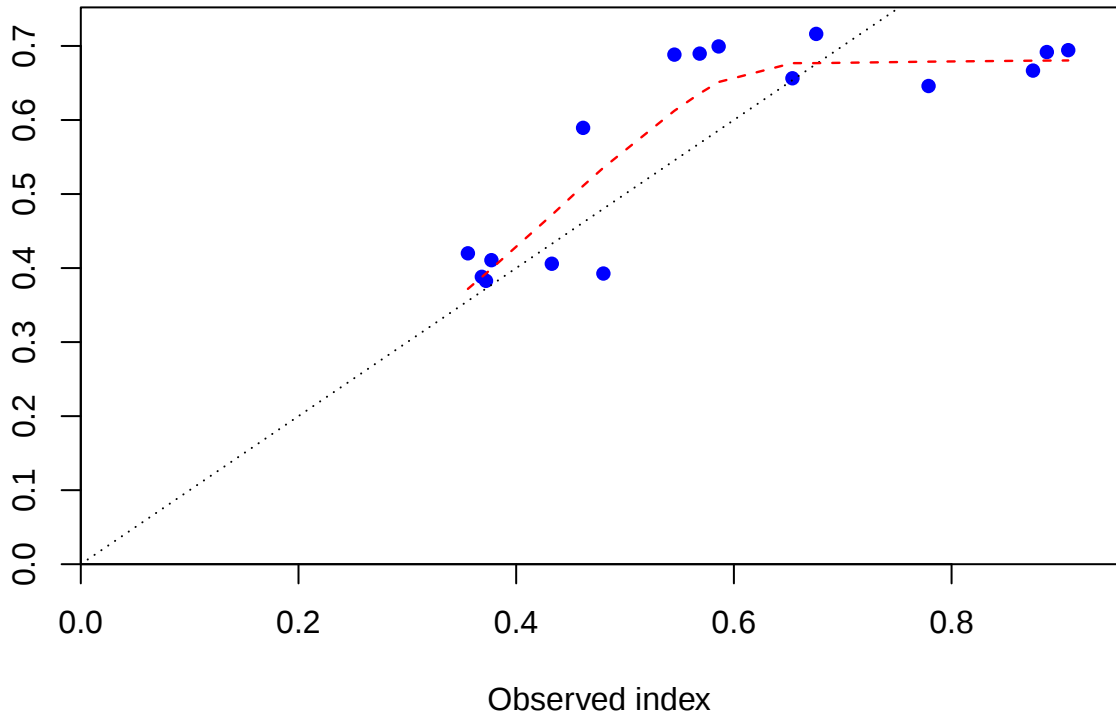
Deviation







Expected index



Log index

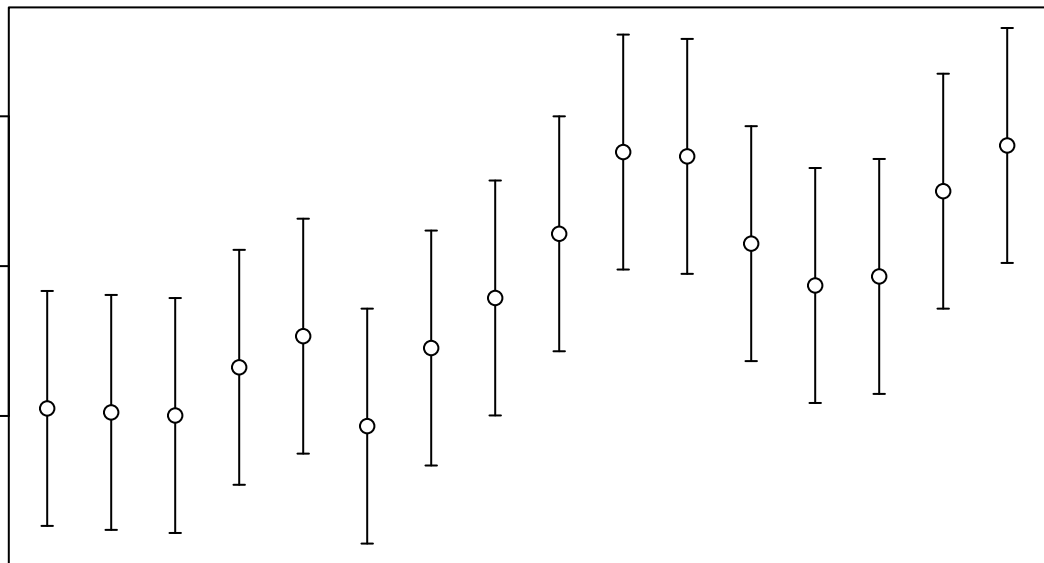
0.0
-0.5
-1.0

1995

2000

2005

Year



Log index

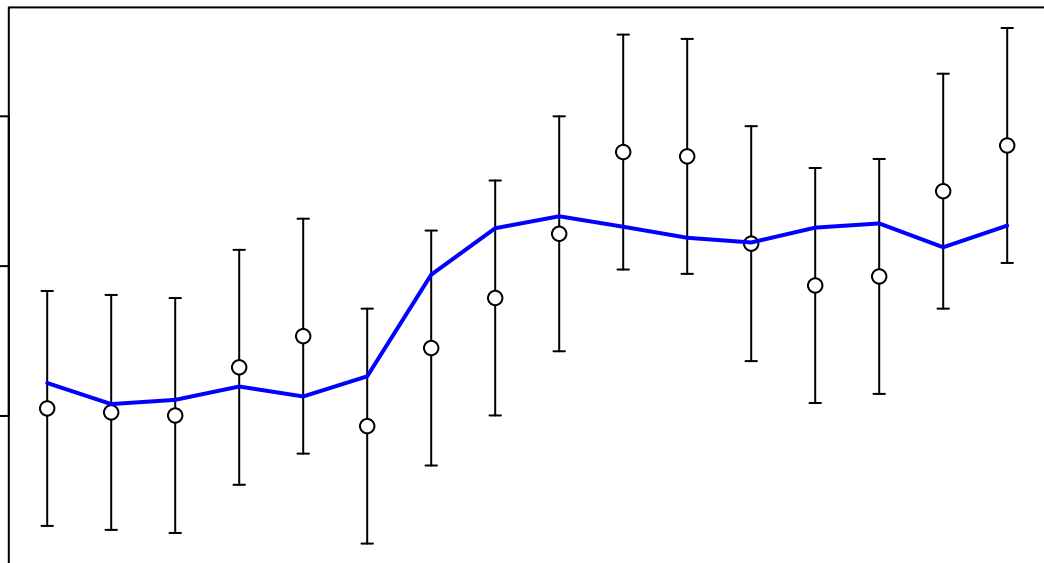
0.0
-0.5
-1.0

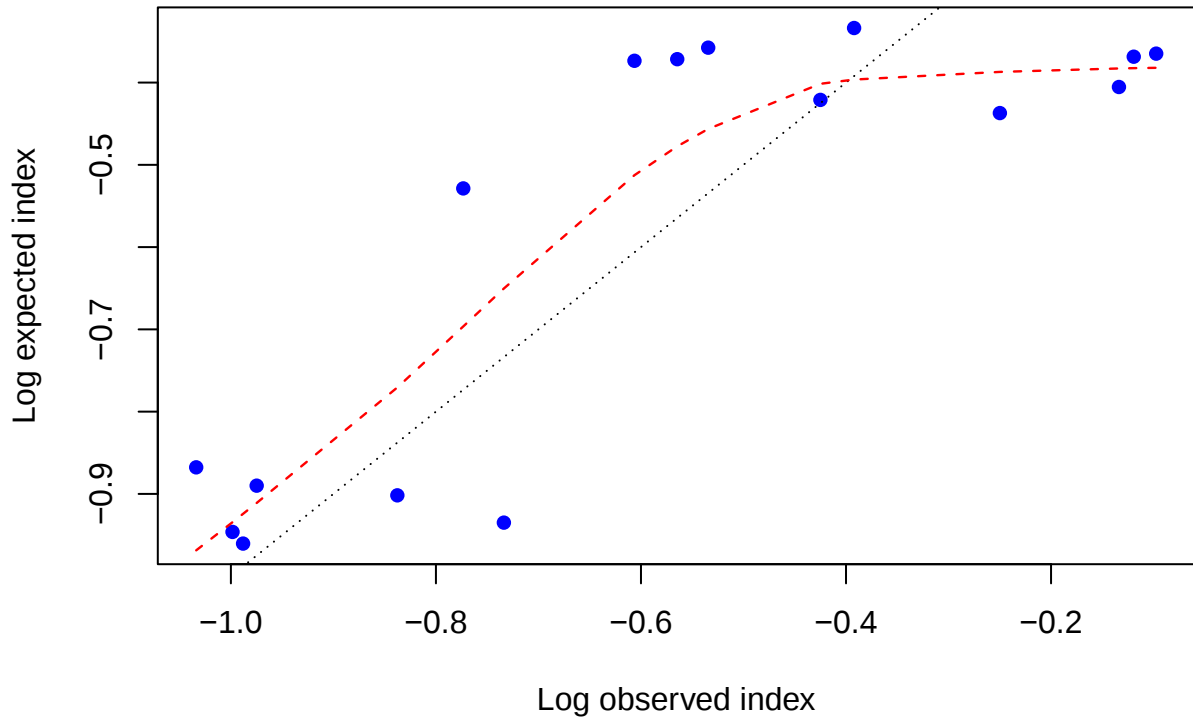
1995

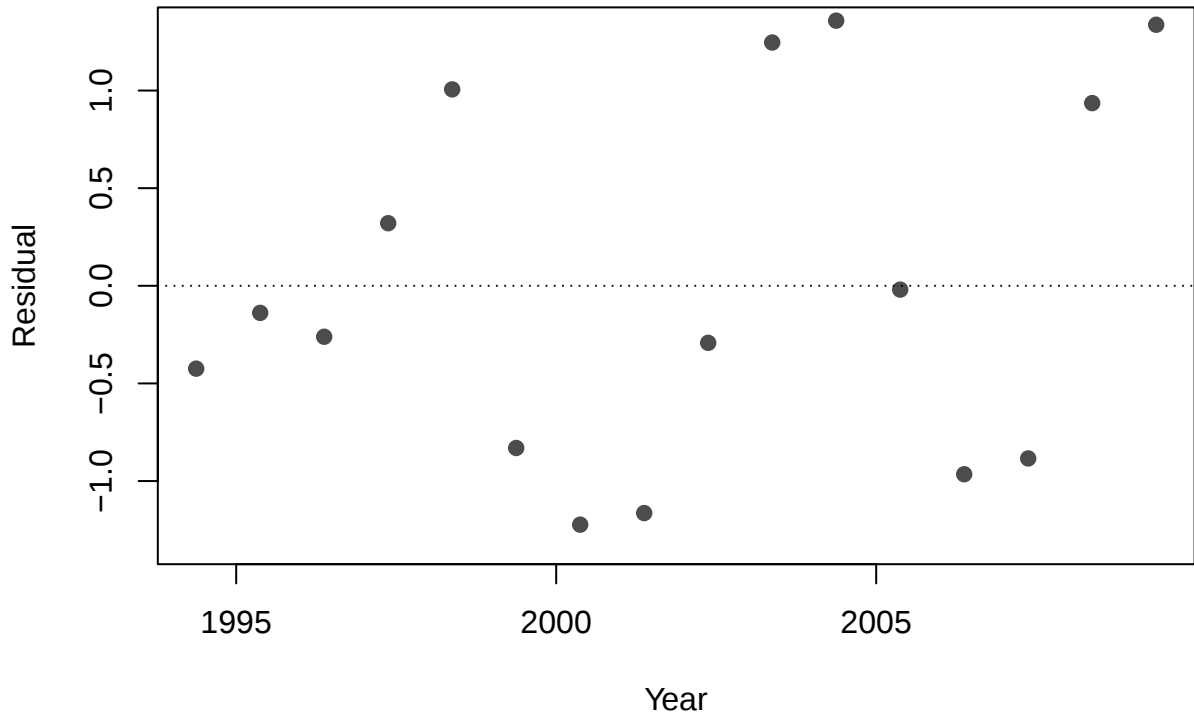
2000

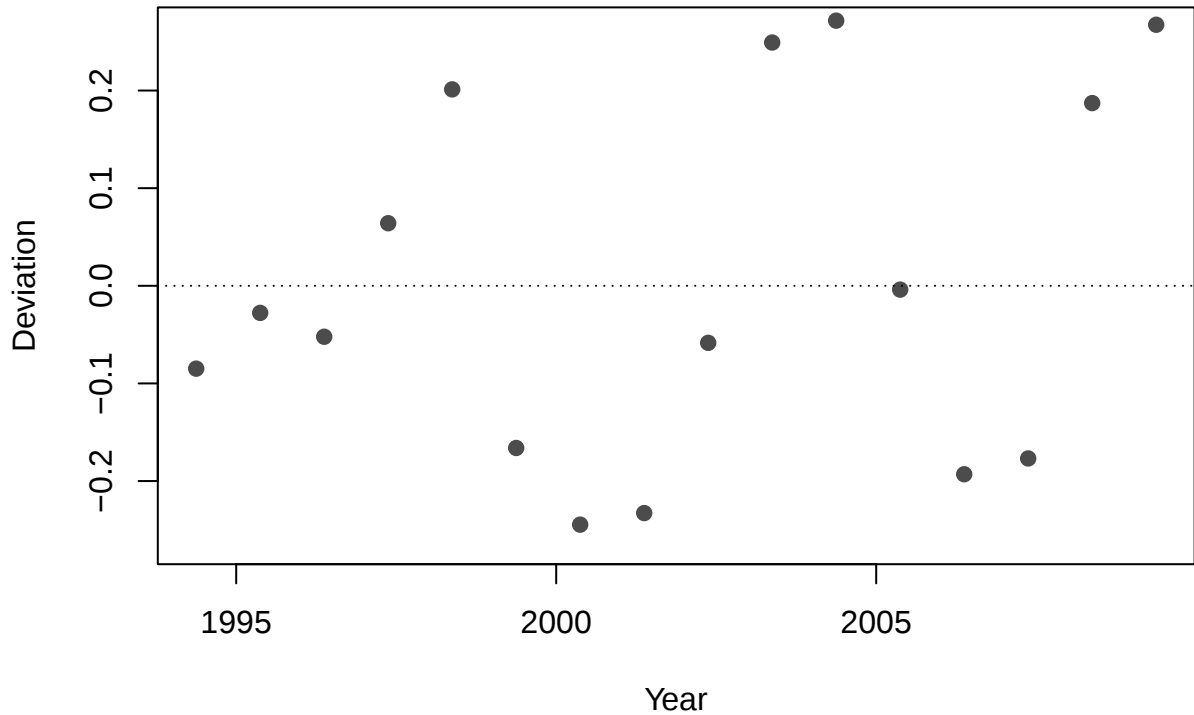
2005

Year









Index

2.0
1.5
1.0
0.5
0.0

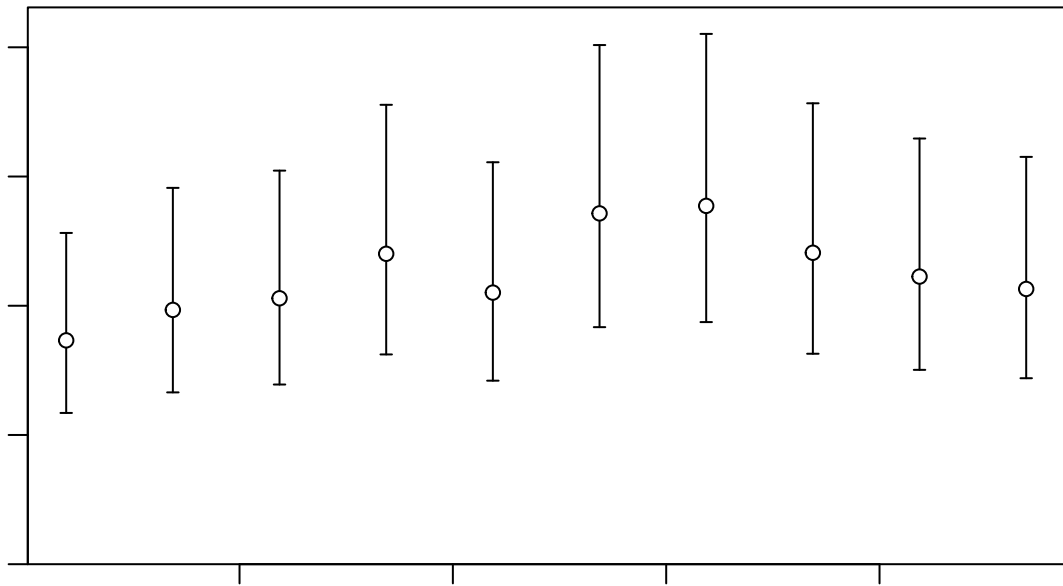
2012

2014

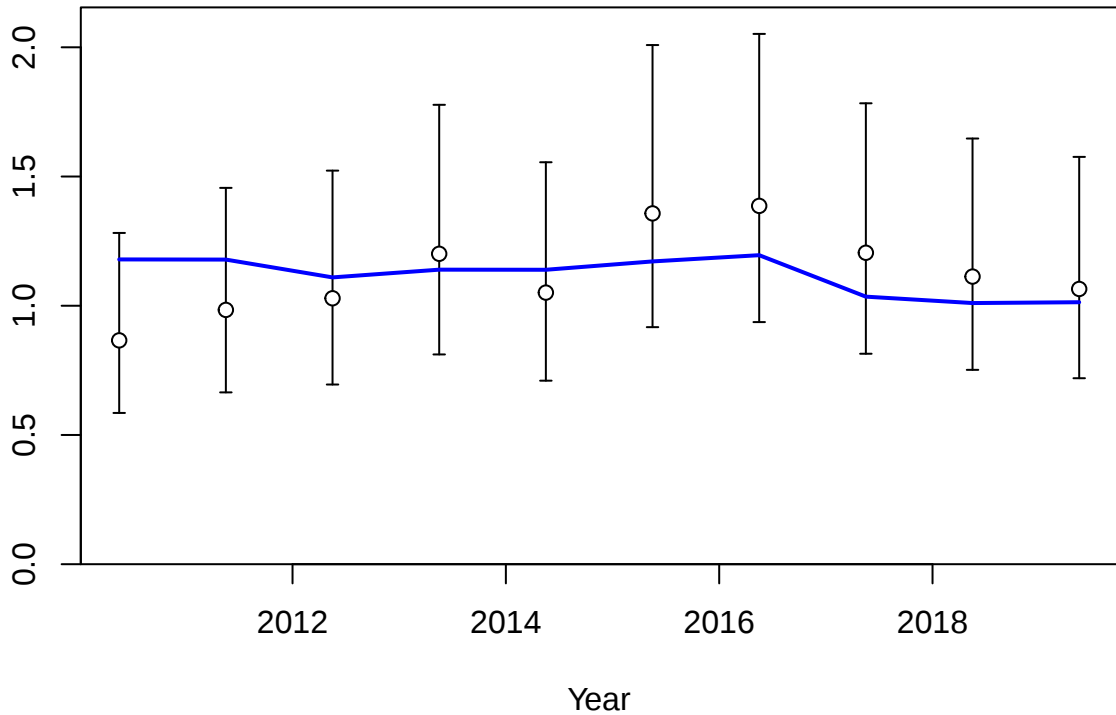
2016

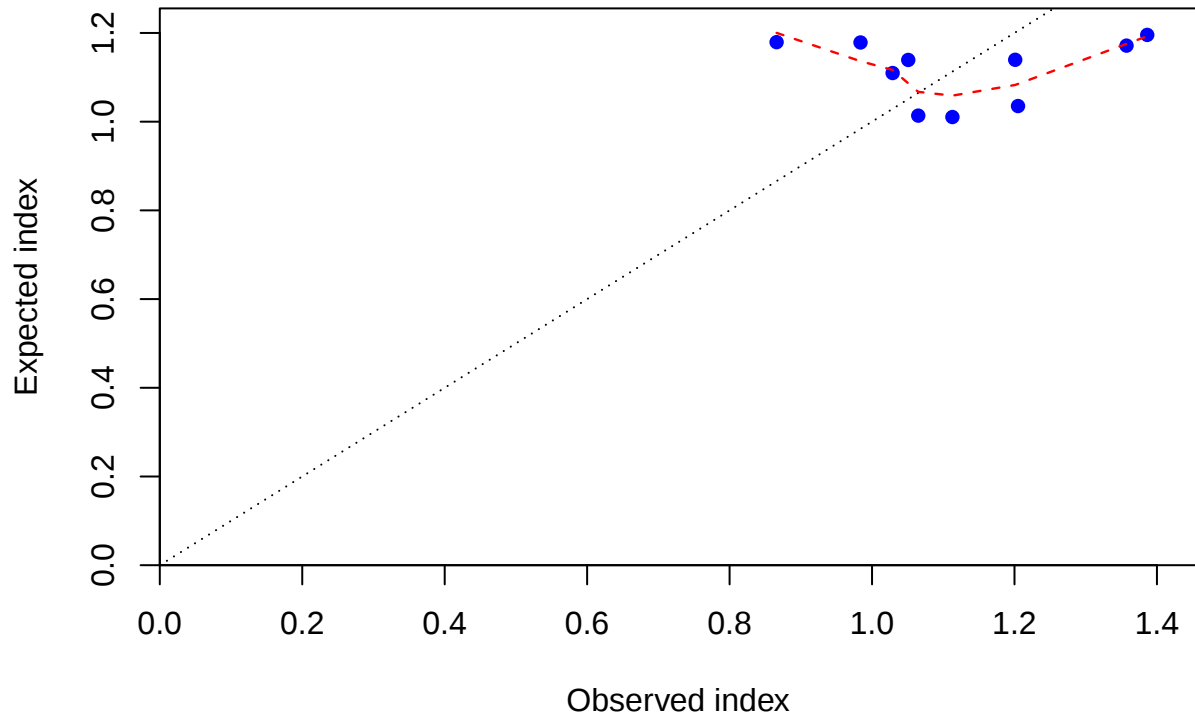
2018

Year



Index





Log index

-0.4
0.0
0.2
0.4
0.6

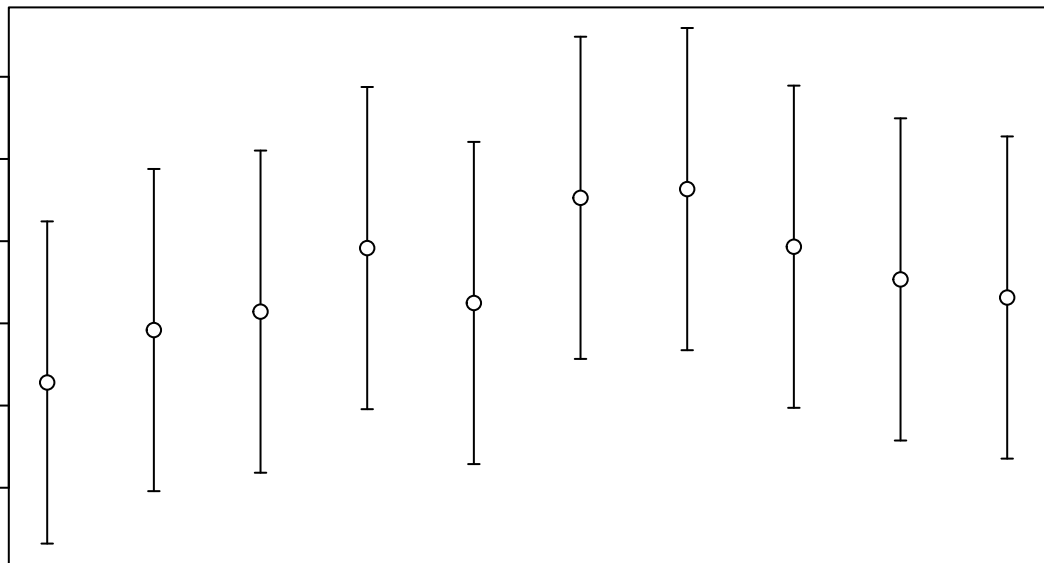
2012

2014

2016

2018

Year



Log index

0.6
0.4
0.2
0.0
-0.4

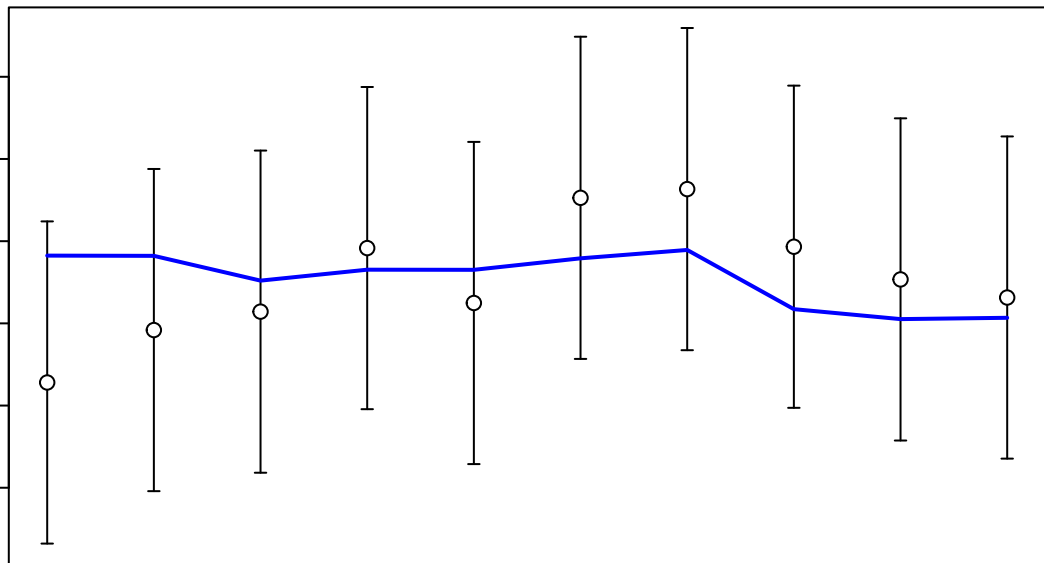
2012

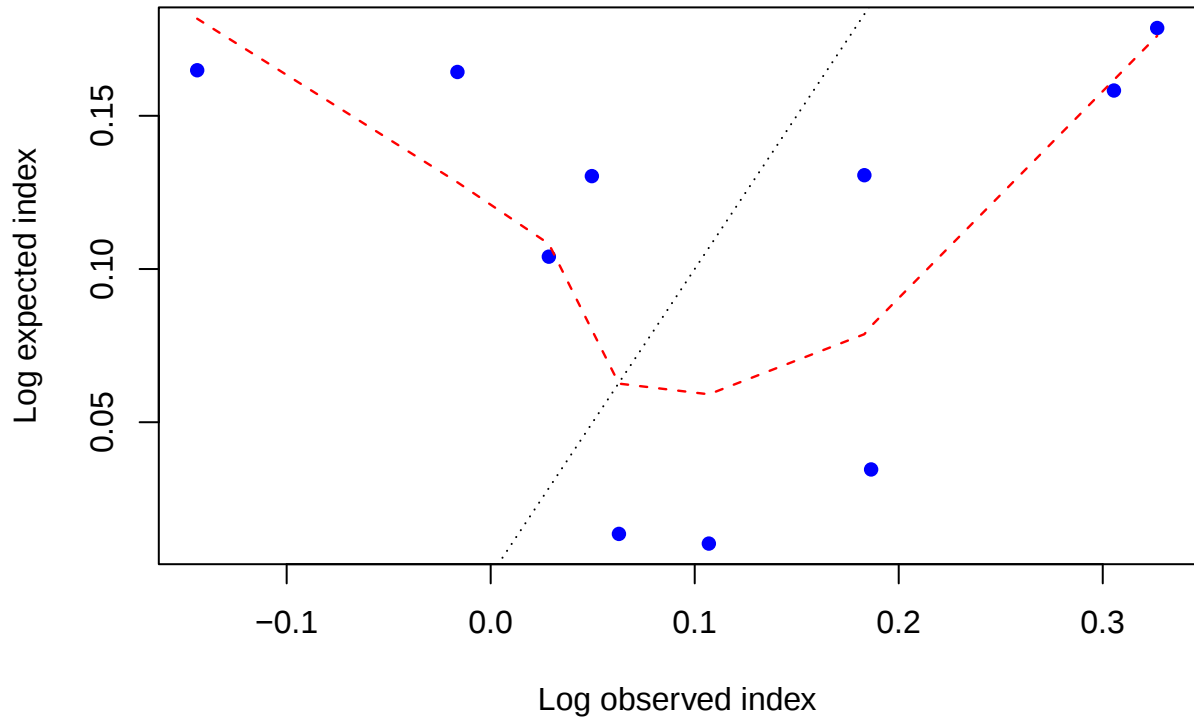
2014

2016

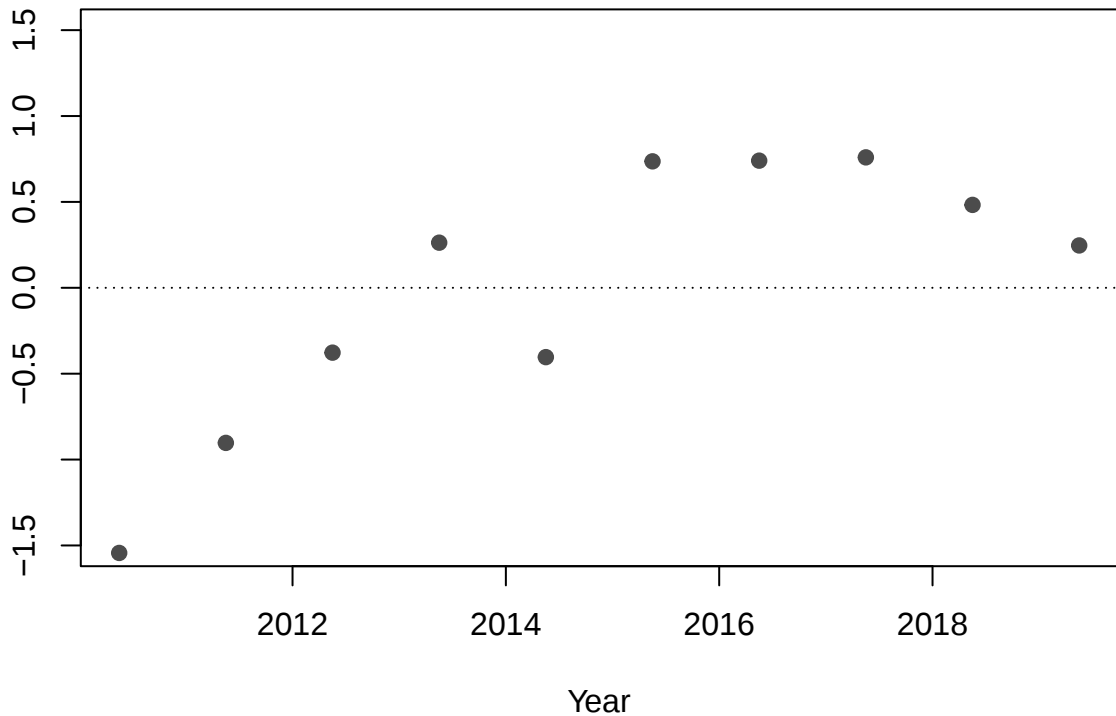
2018

Year

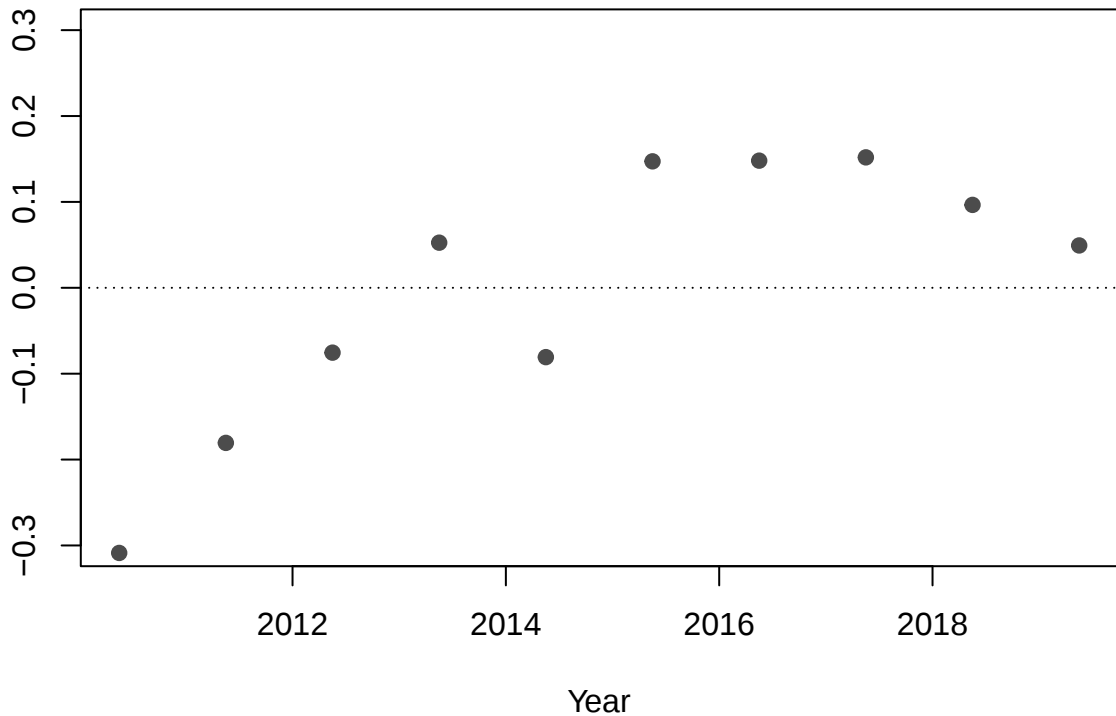




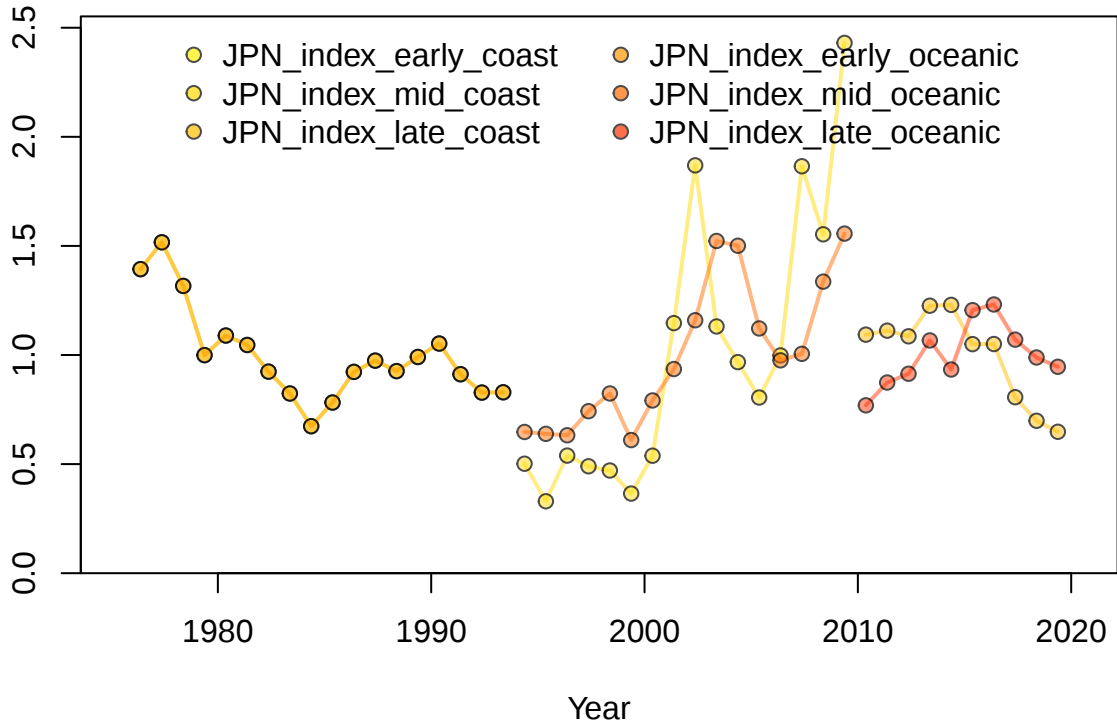
Residual

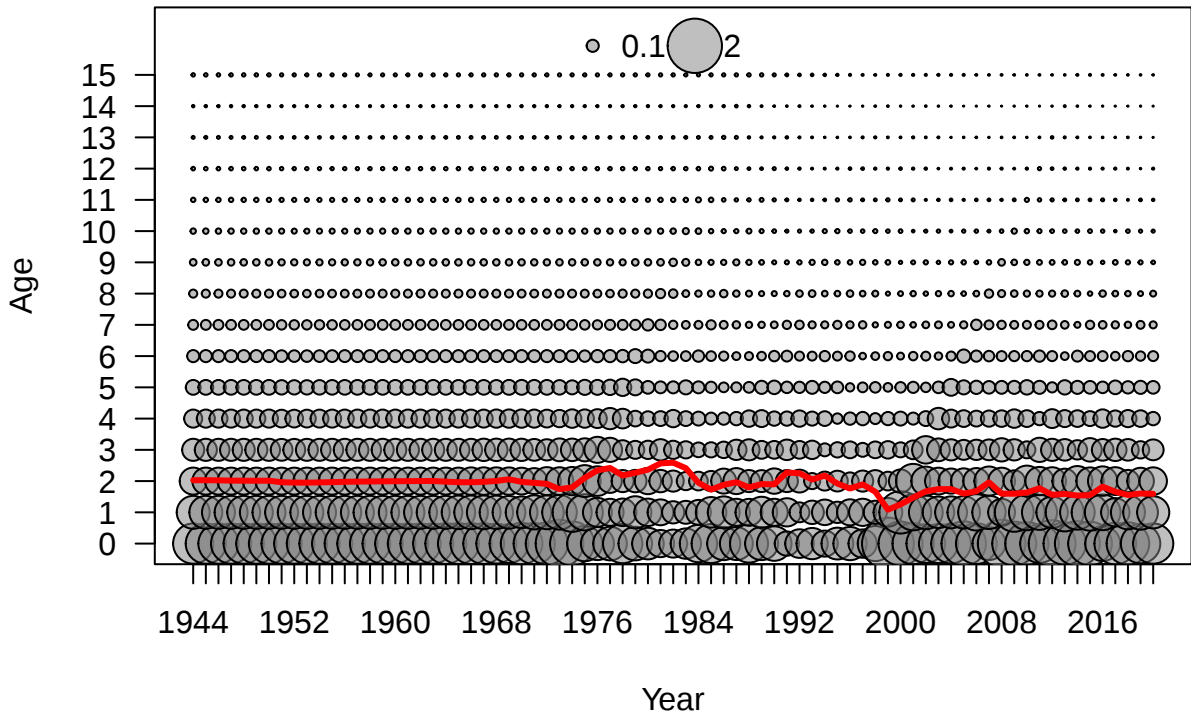


Deviation

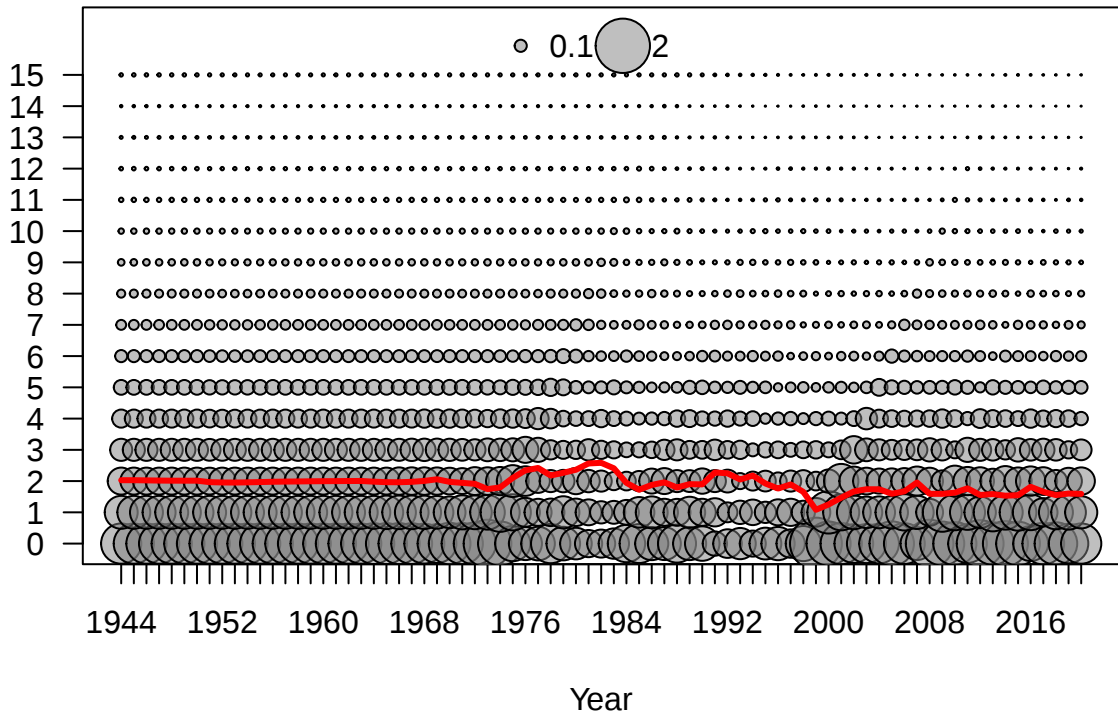


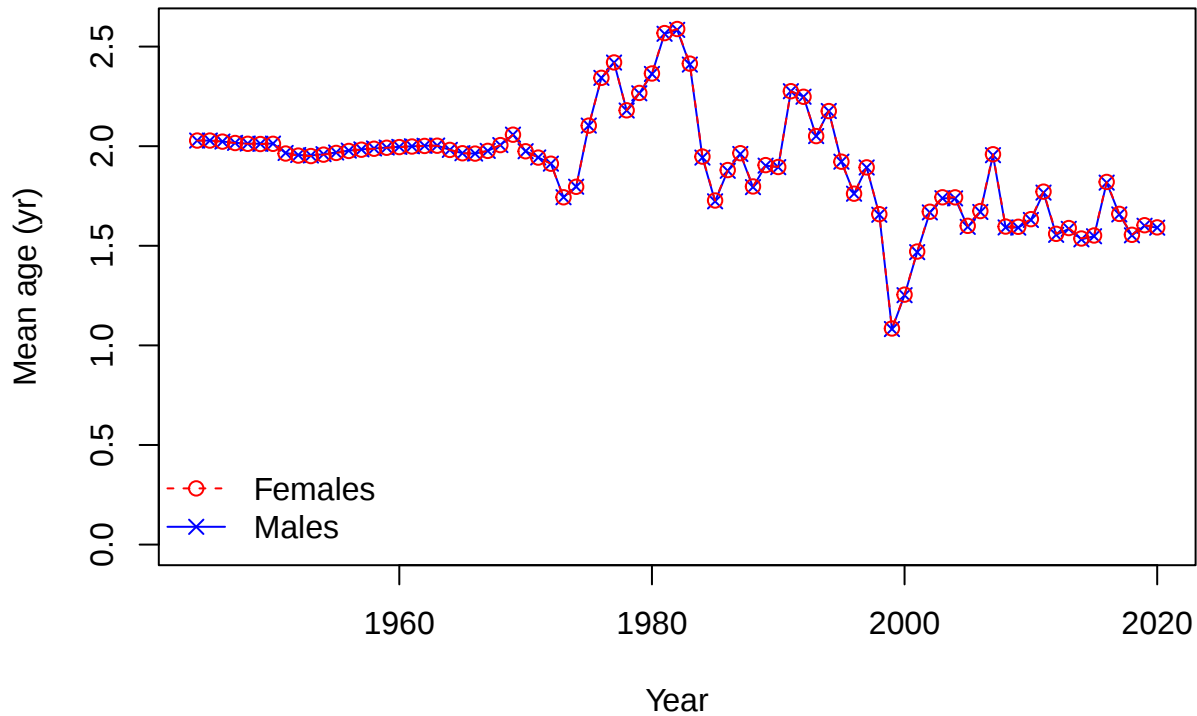
Standardized index



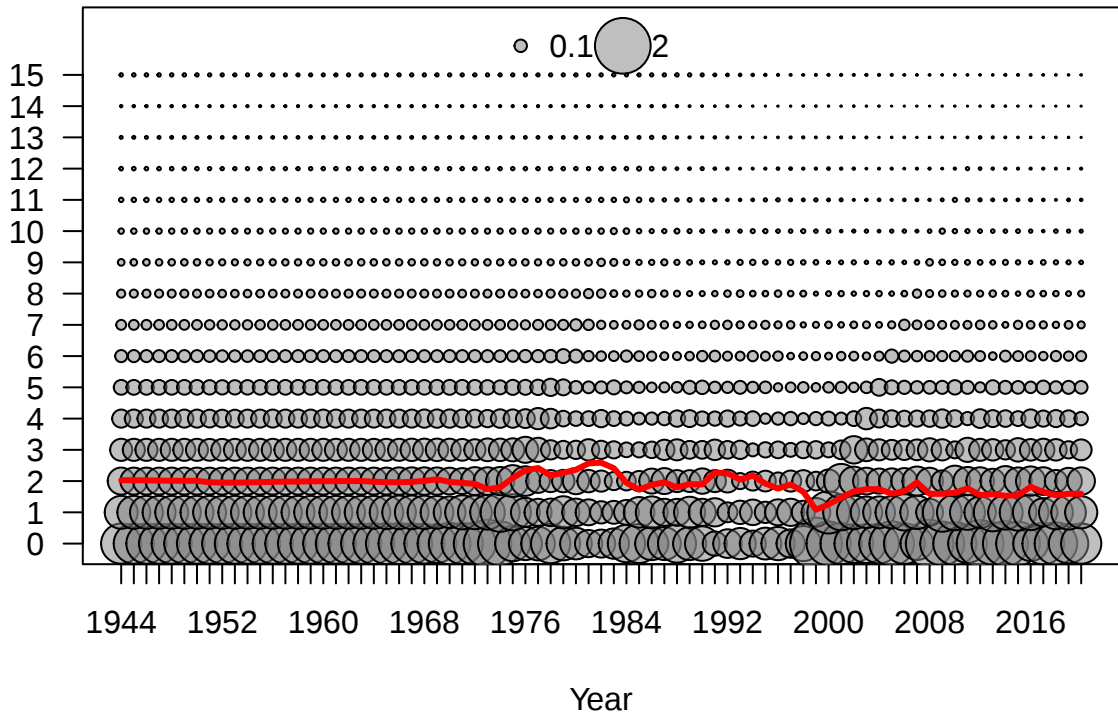


Age

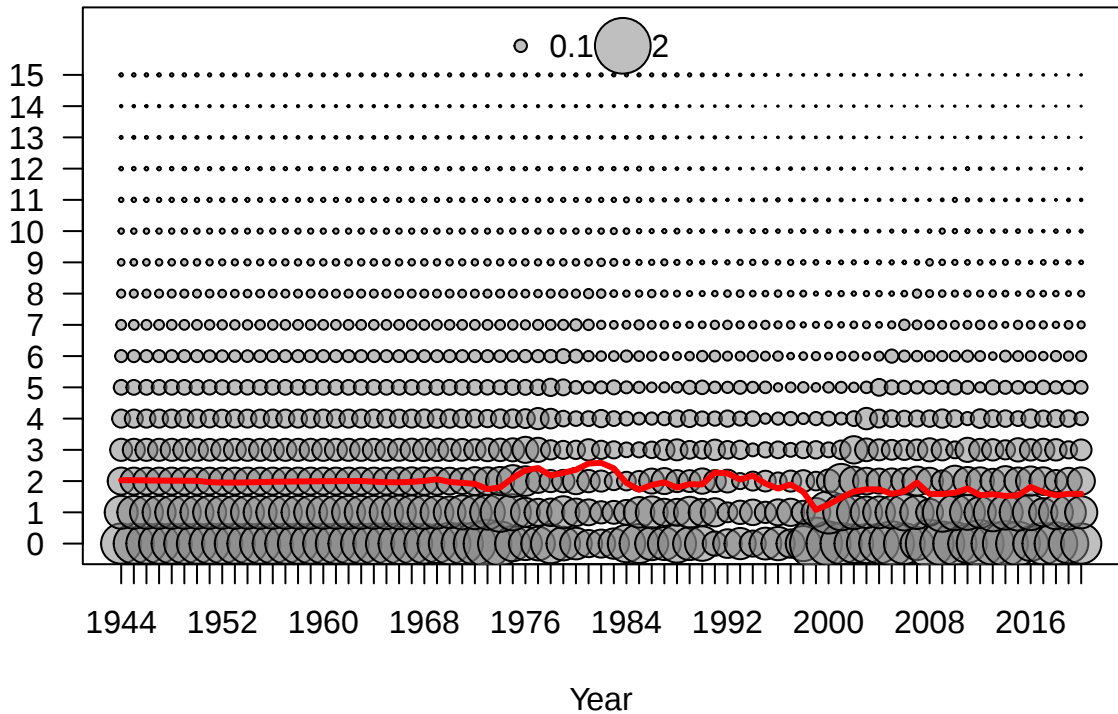


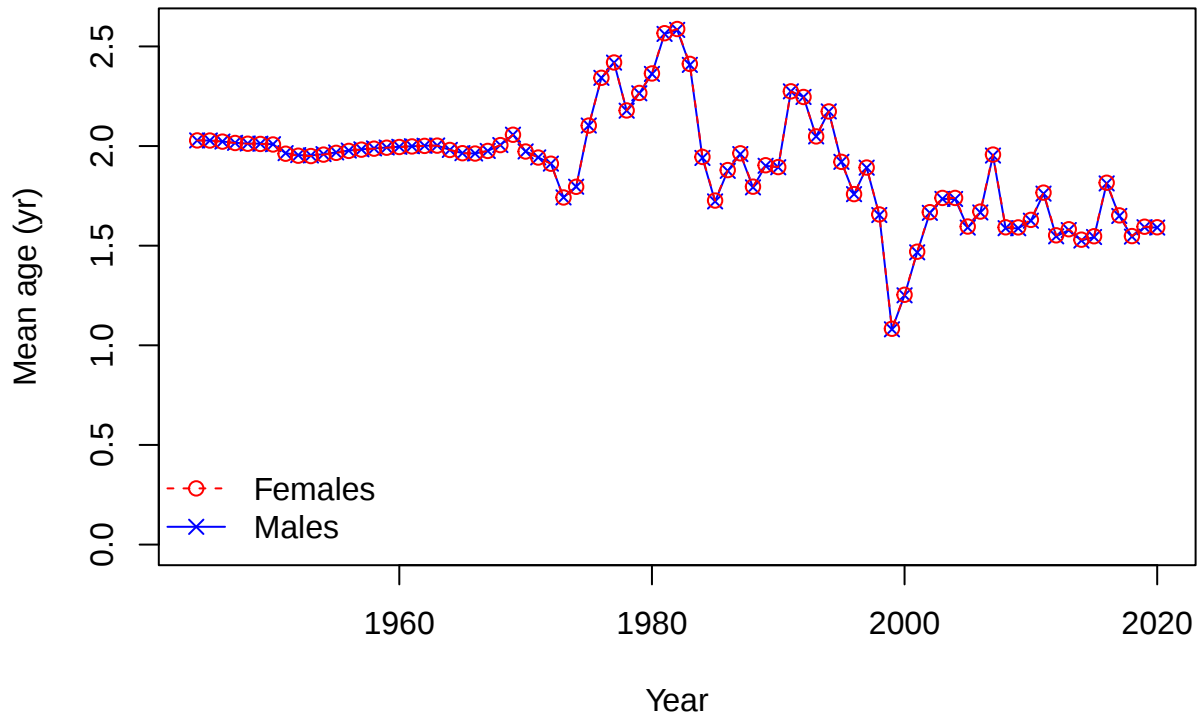


Age

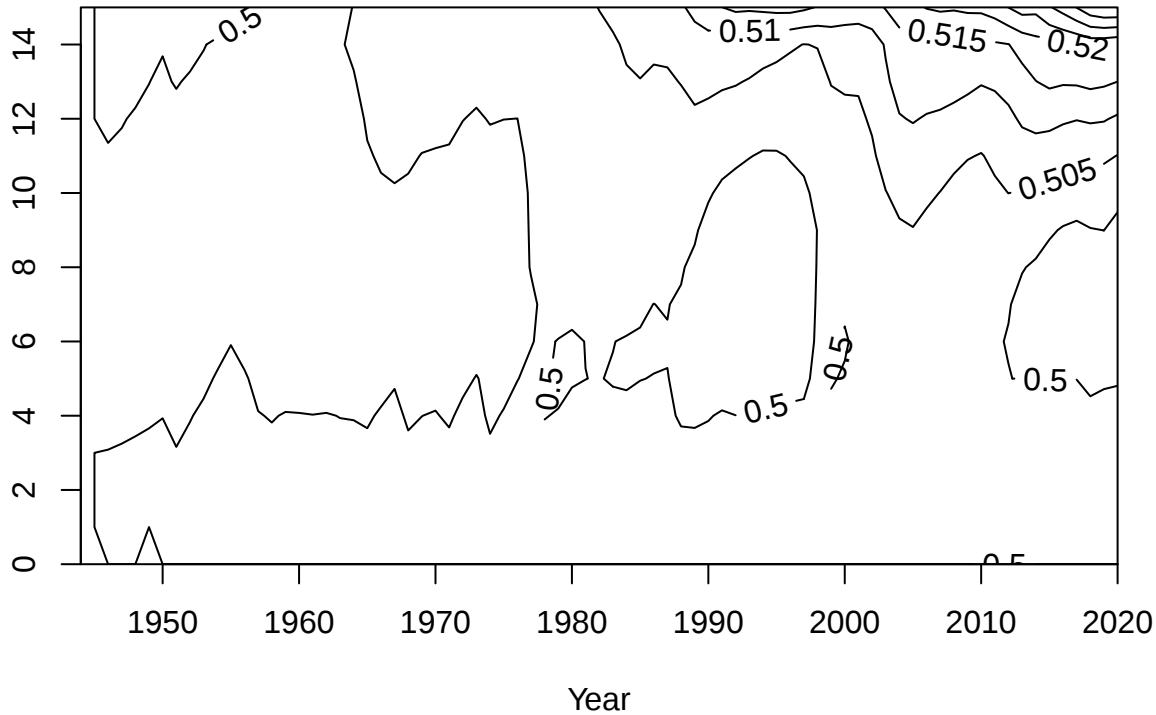


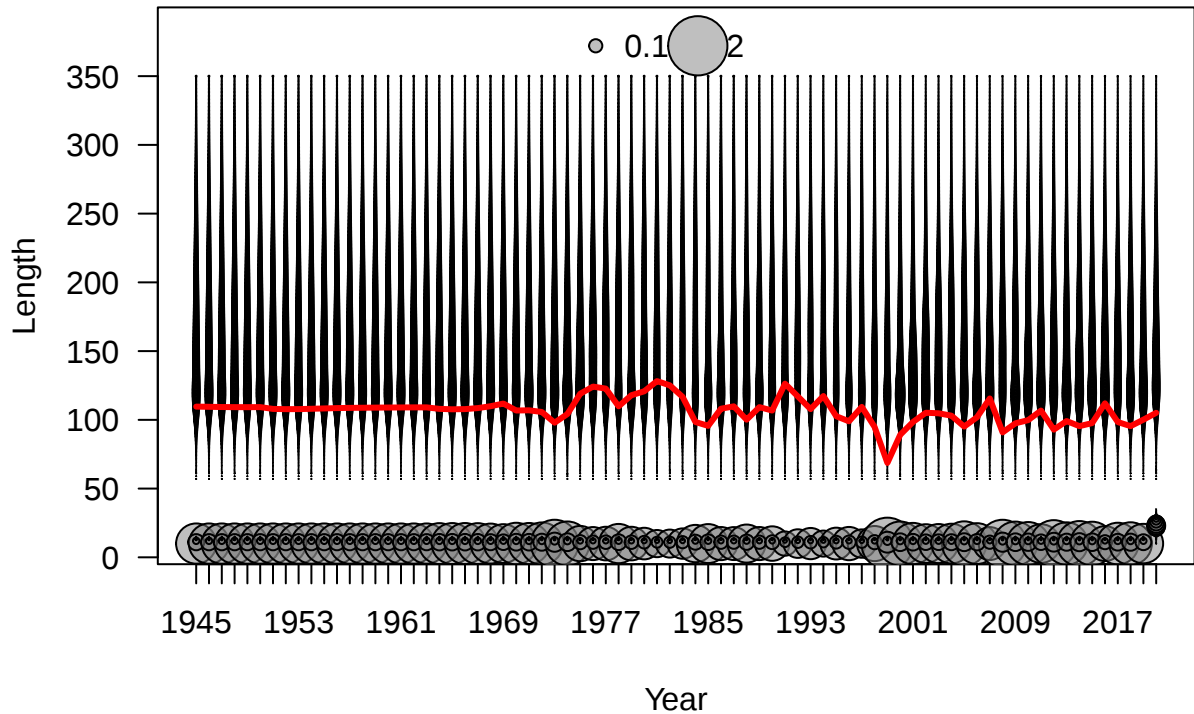
Age

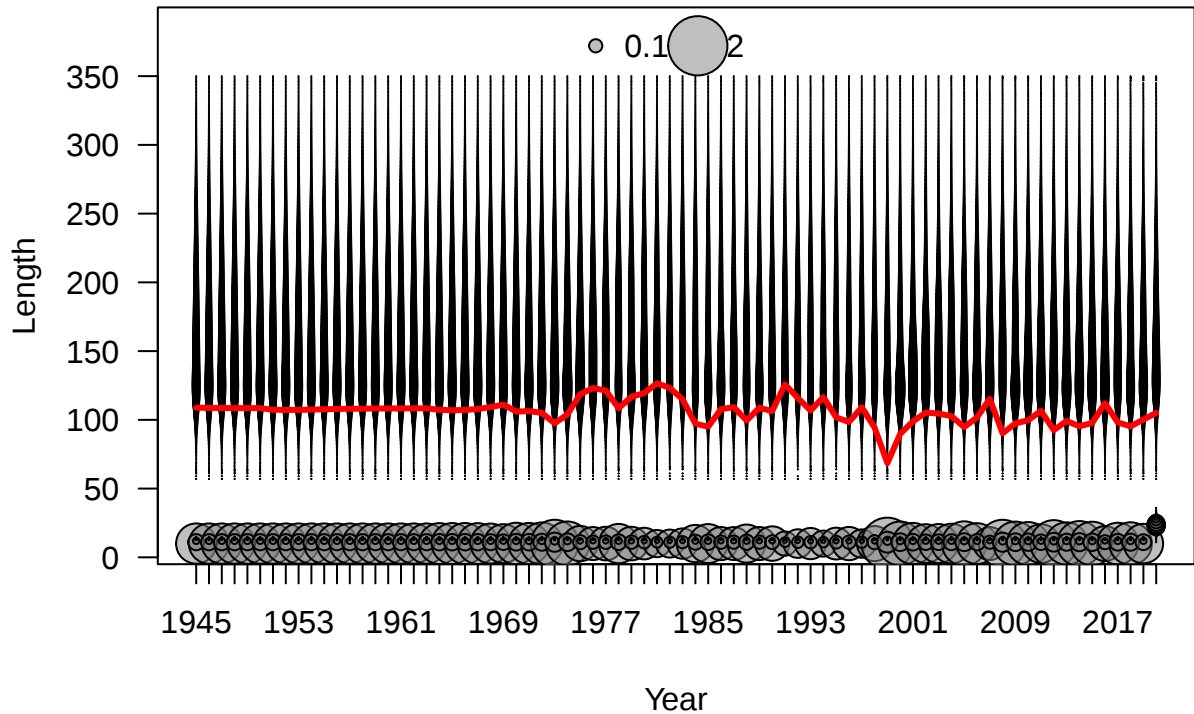


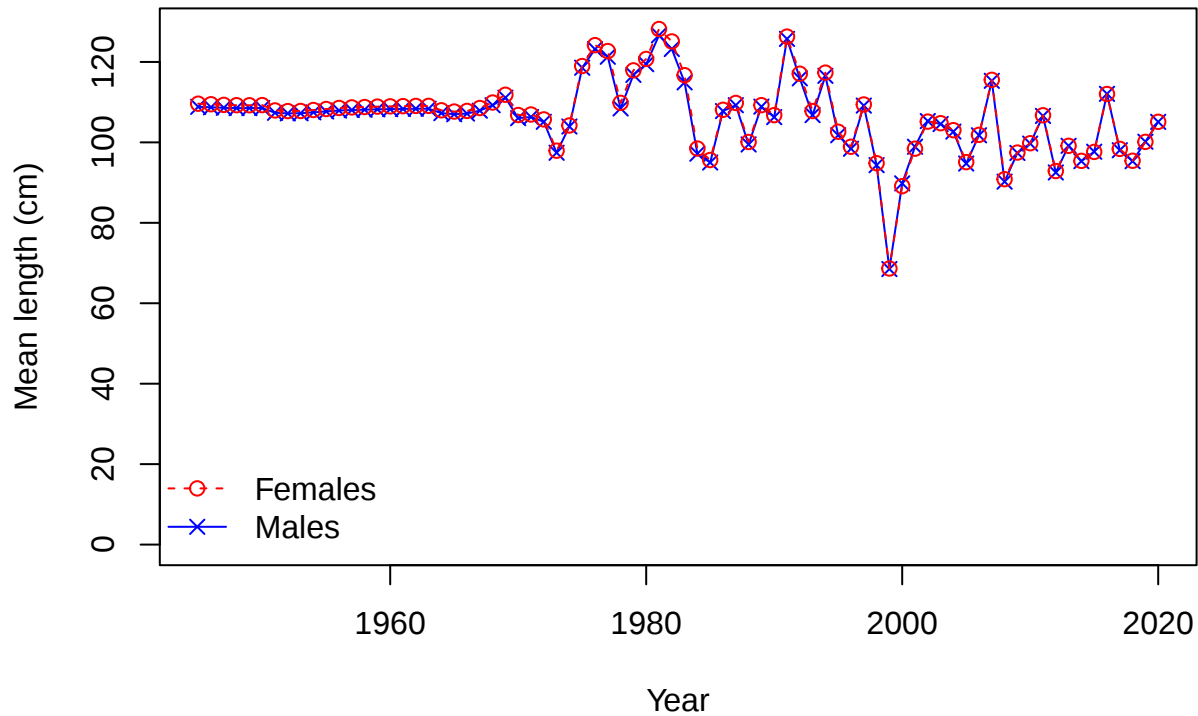


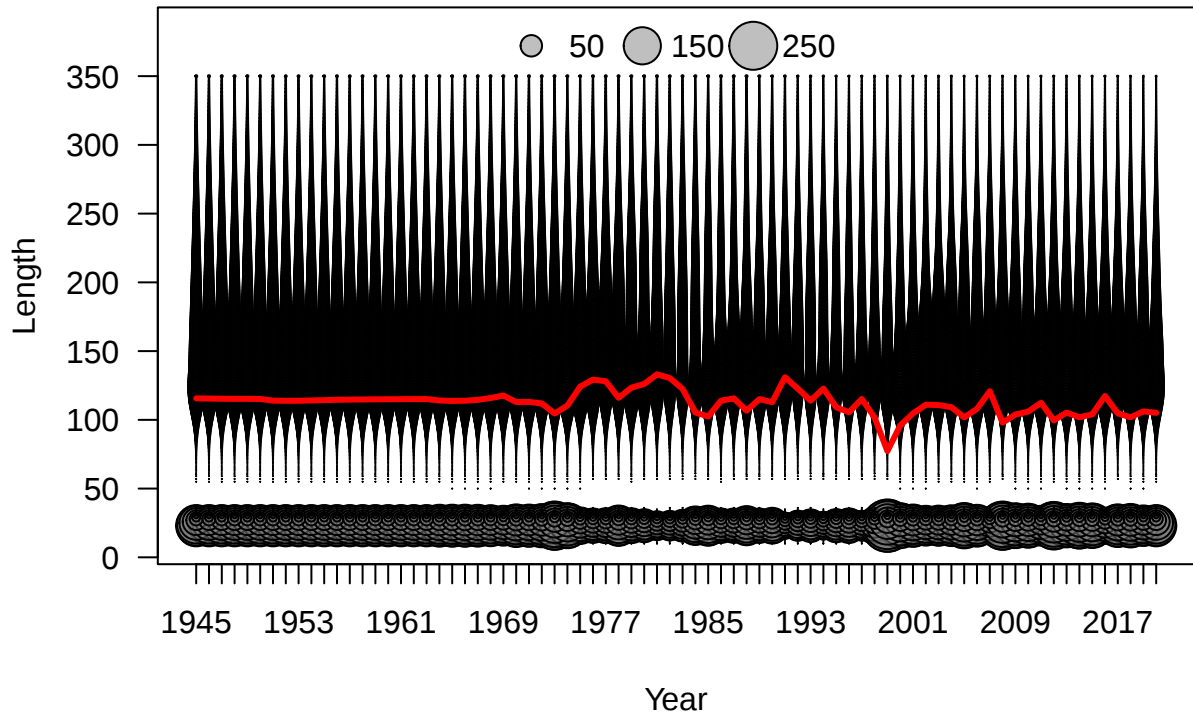
Age

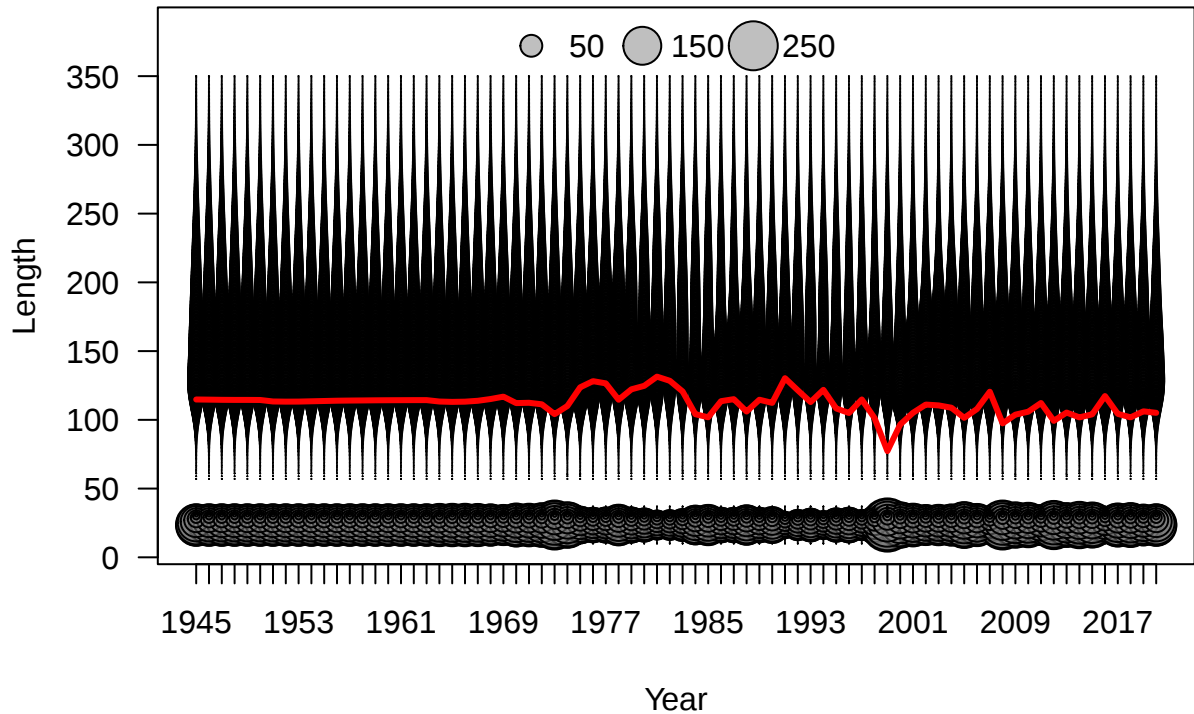


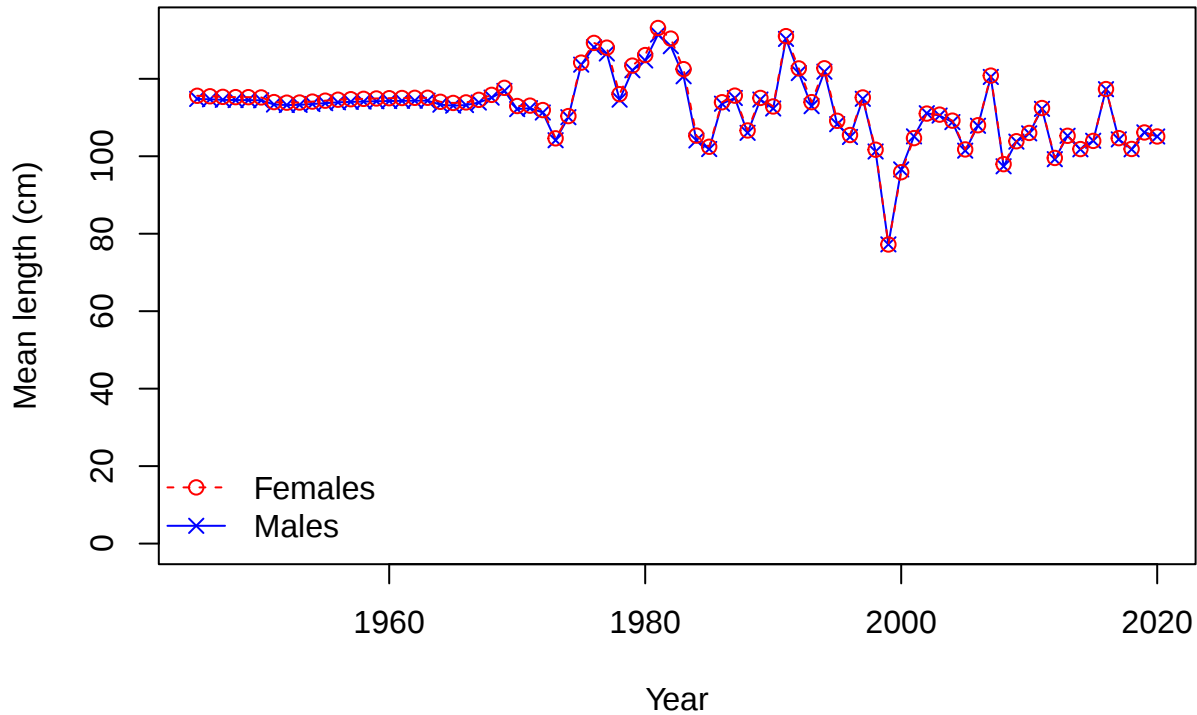


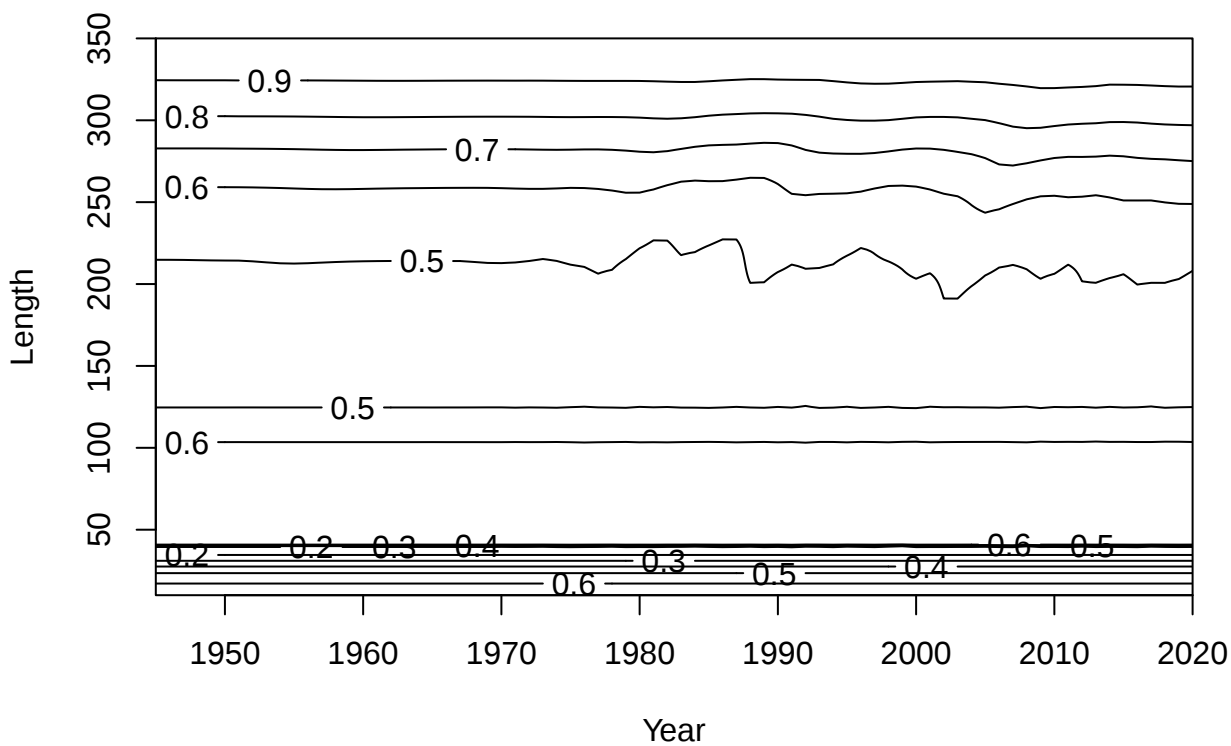


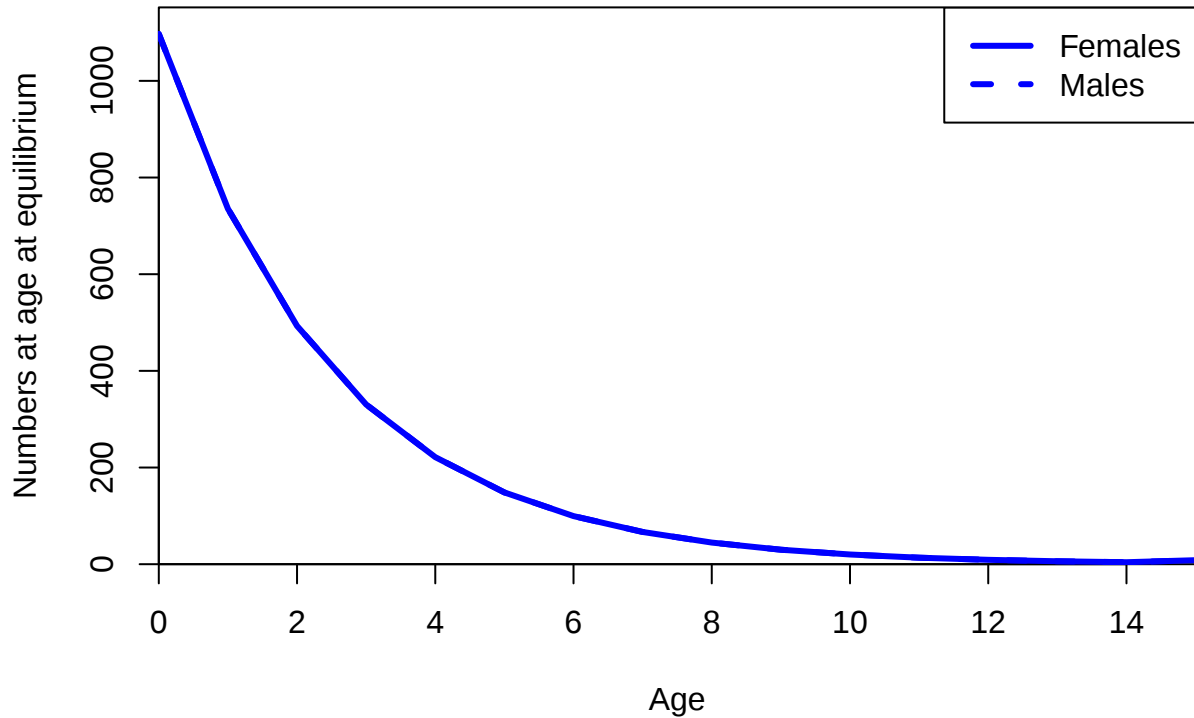


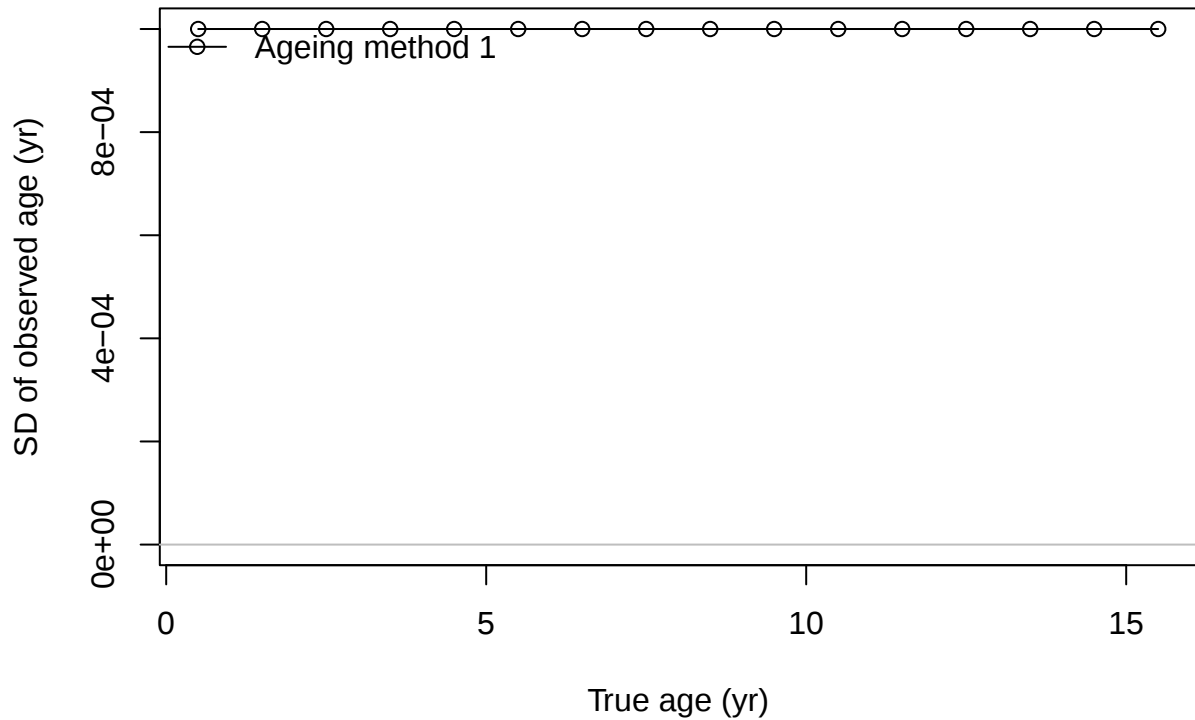


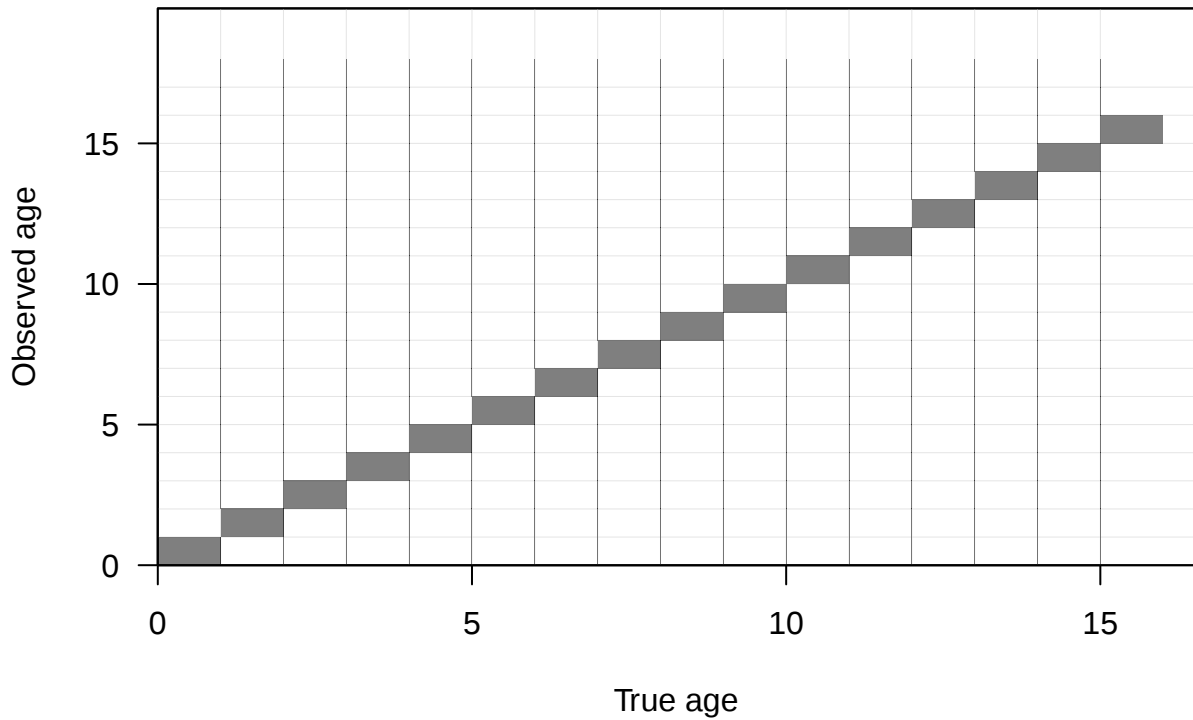


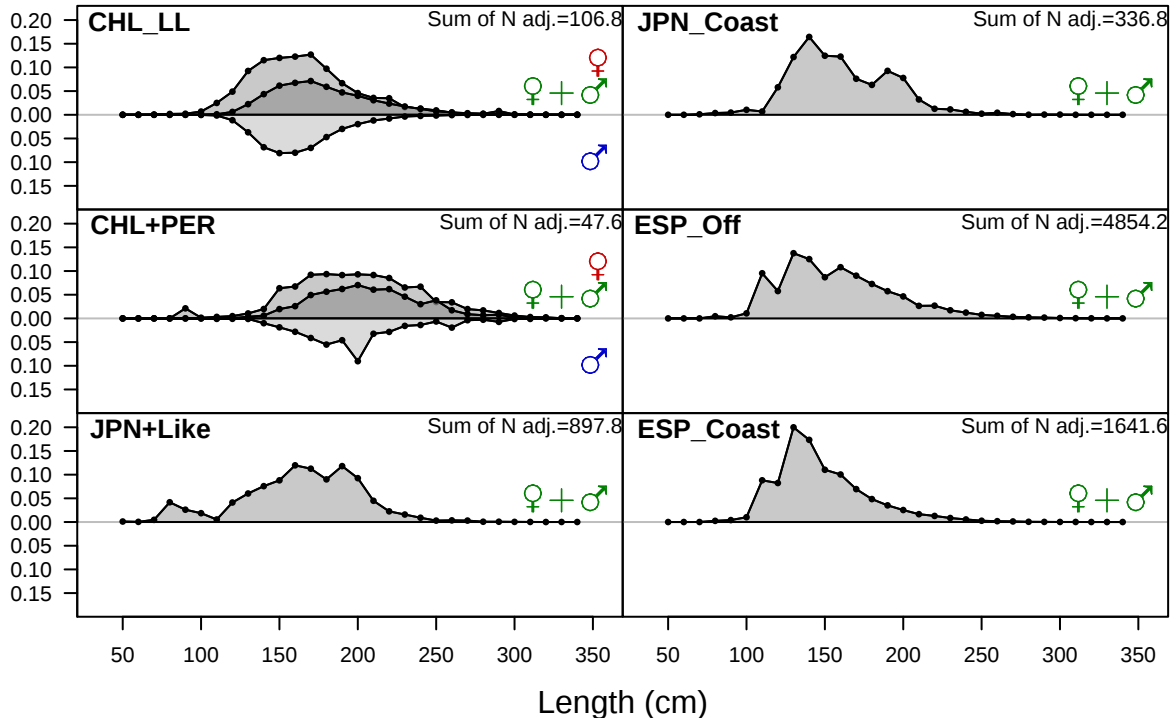


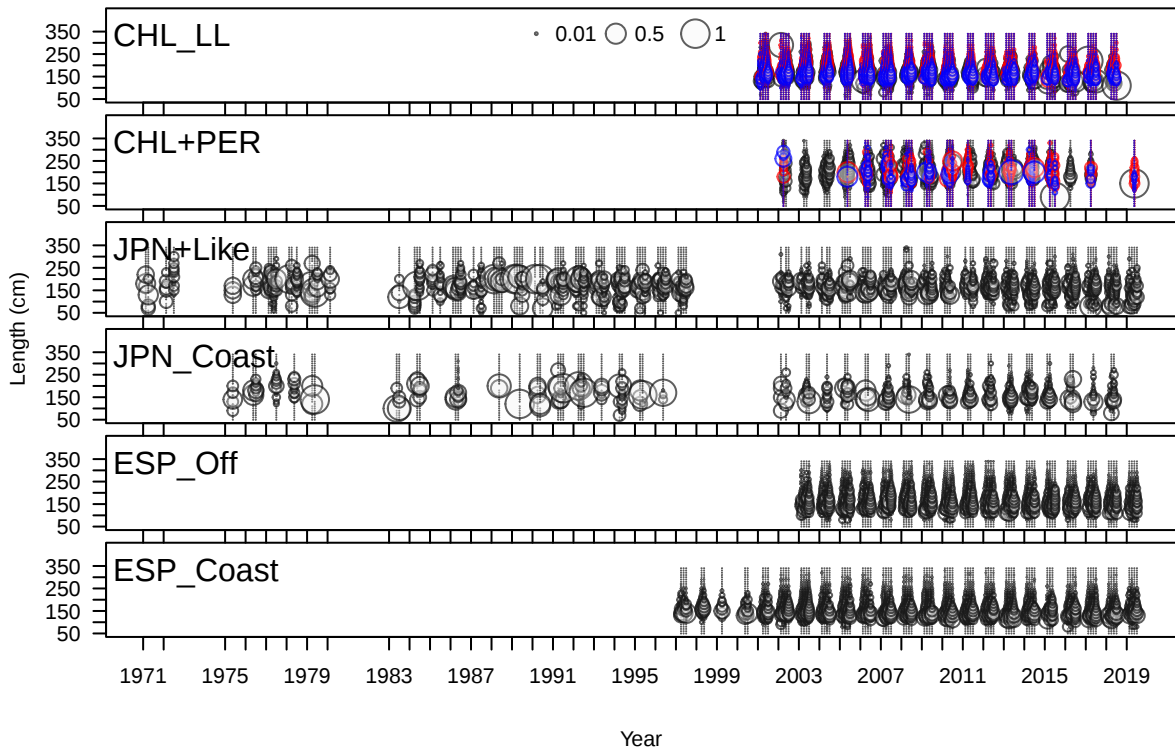




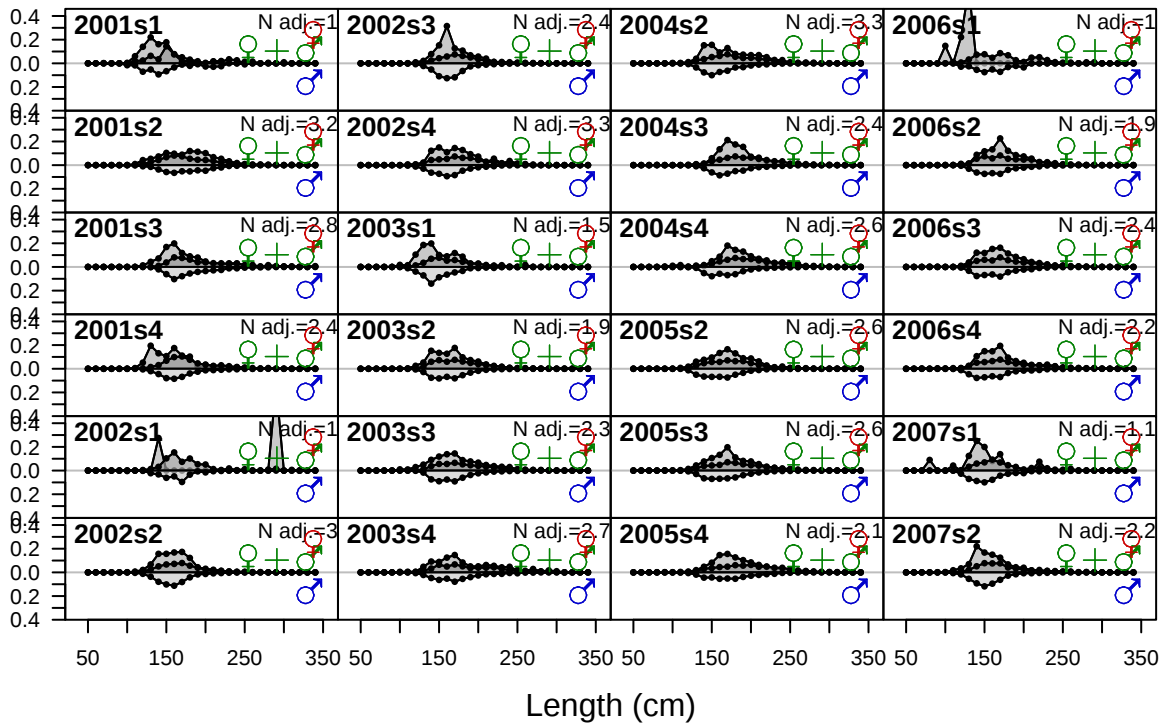




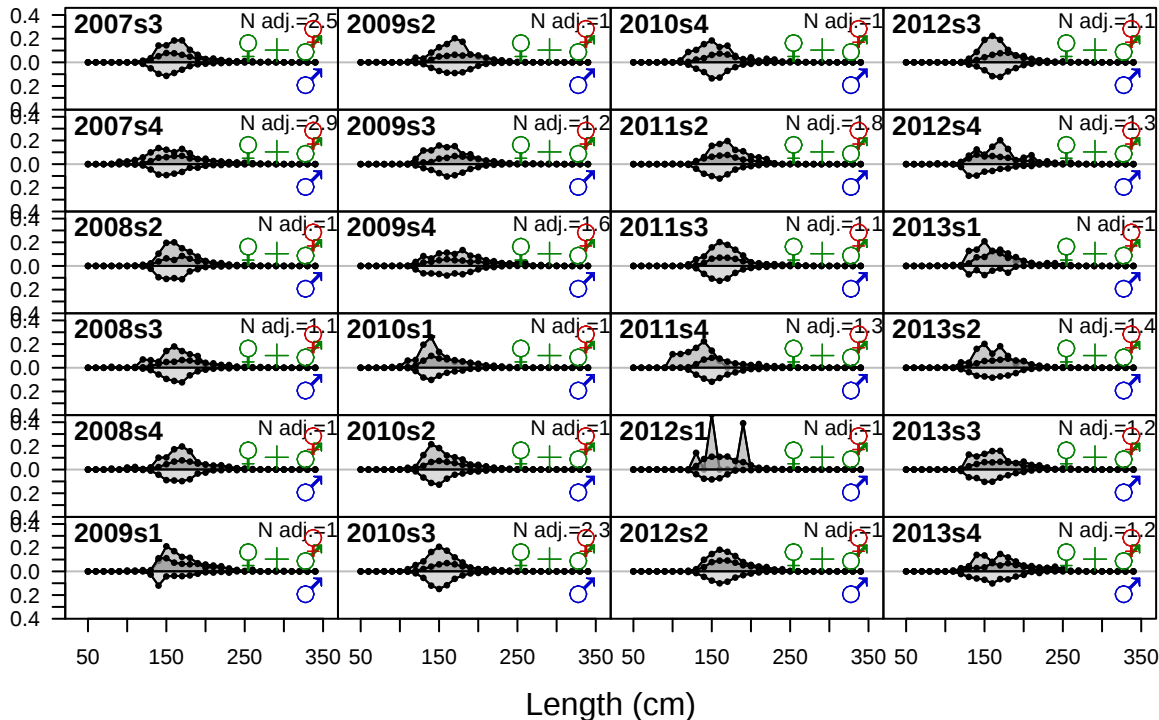




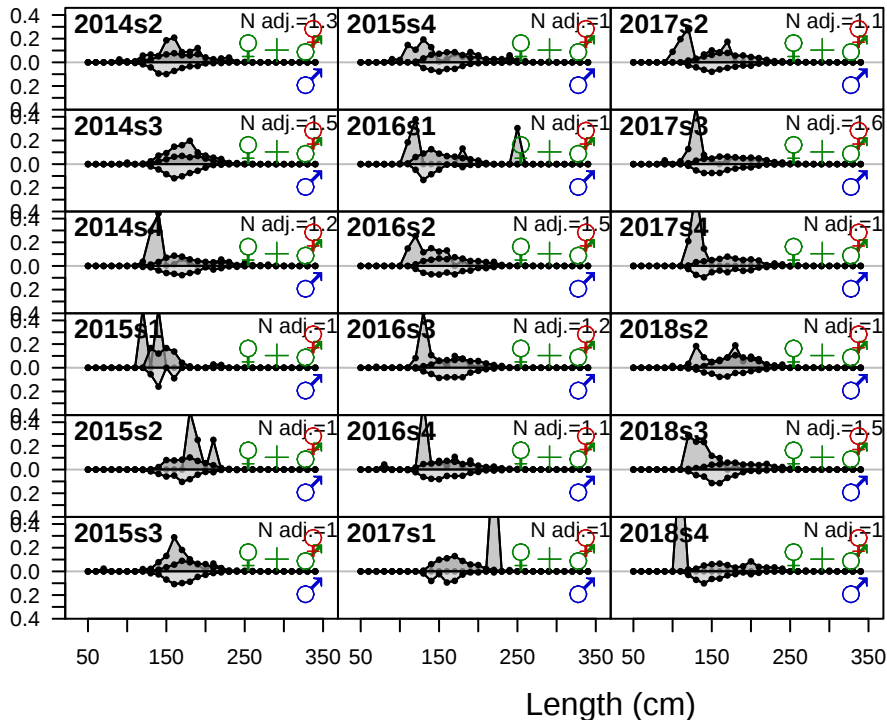
Proportion

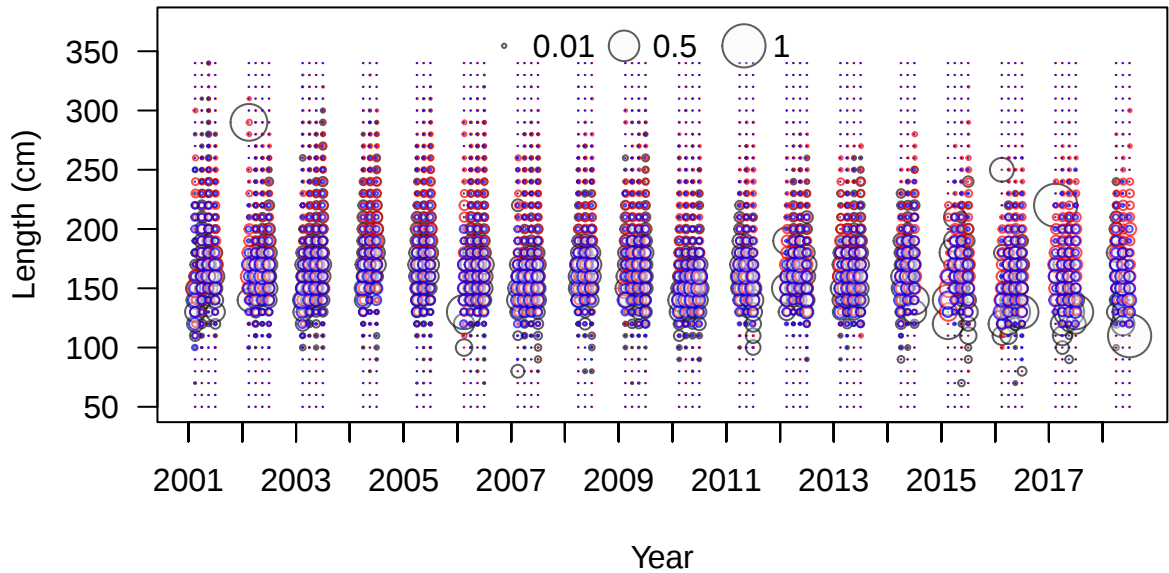


Proportion

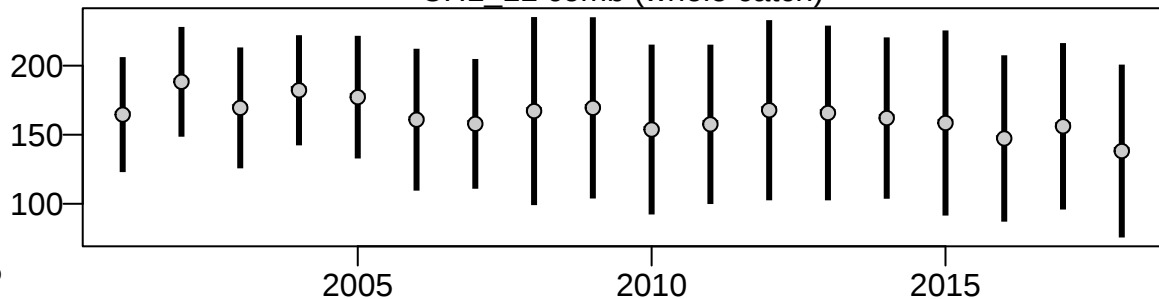


Proportion

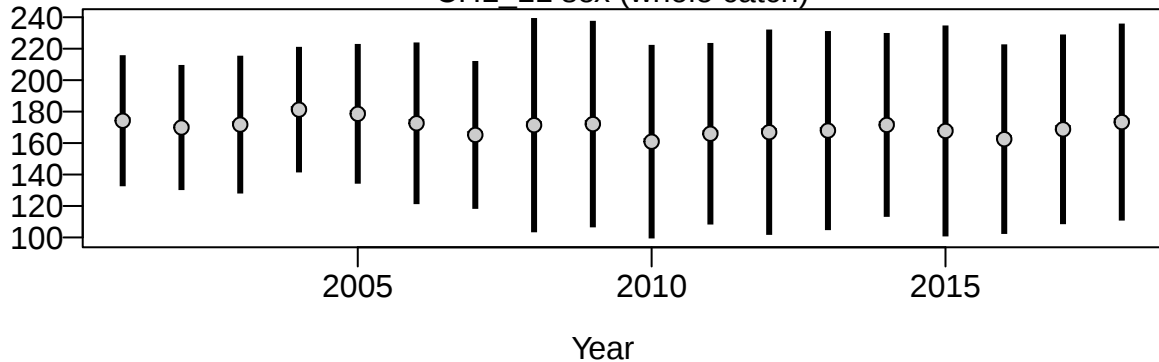




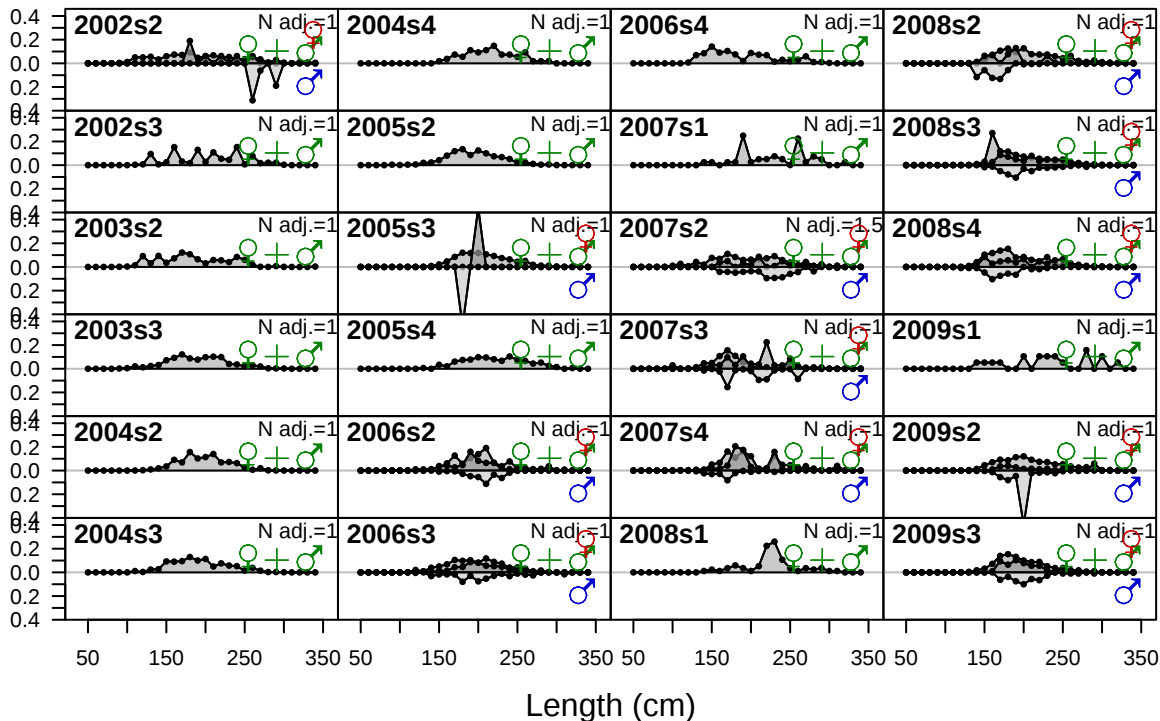
CHL_LL comb (whole catch)



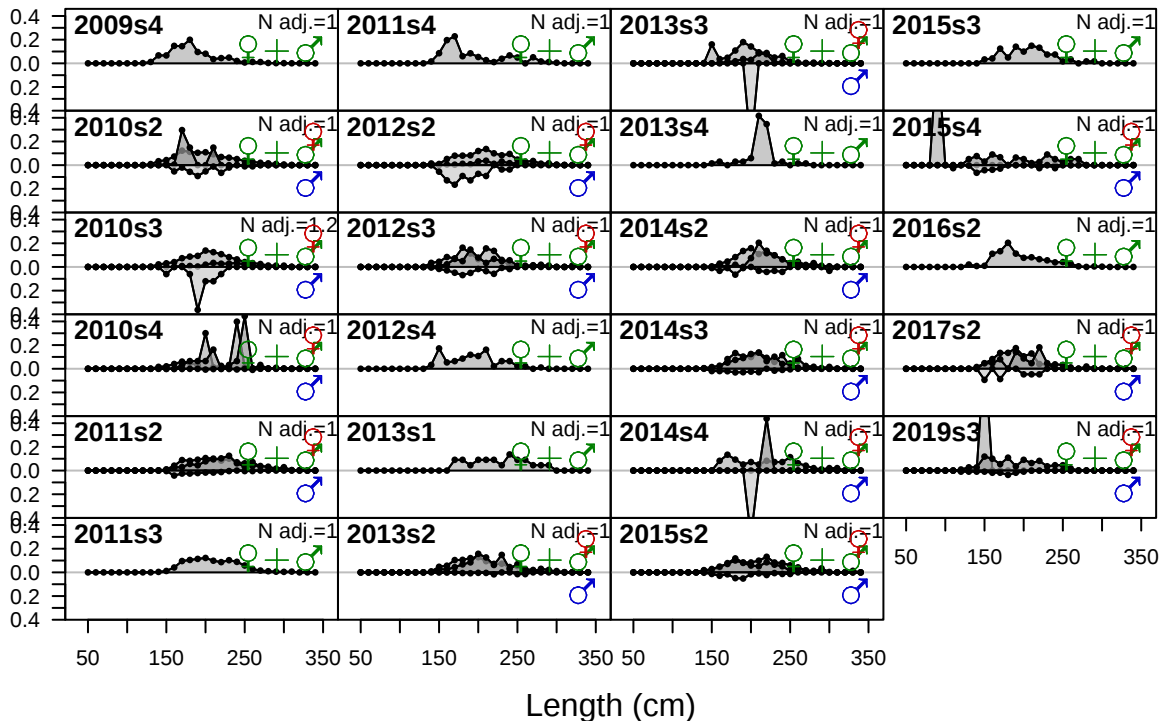
CHL_LL sex (whole catch)

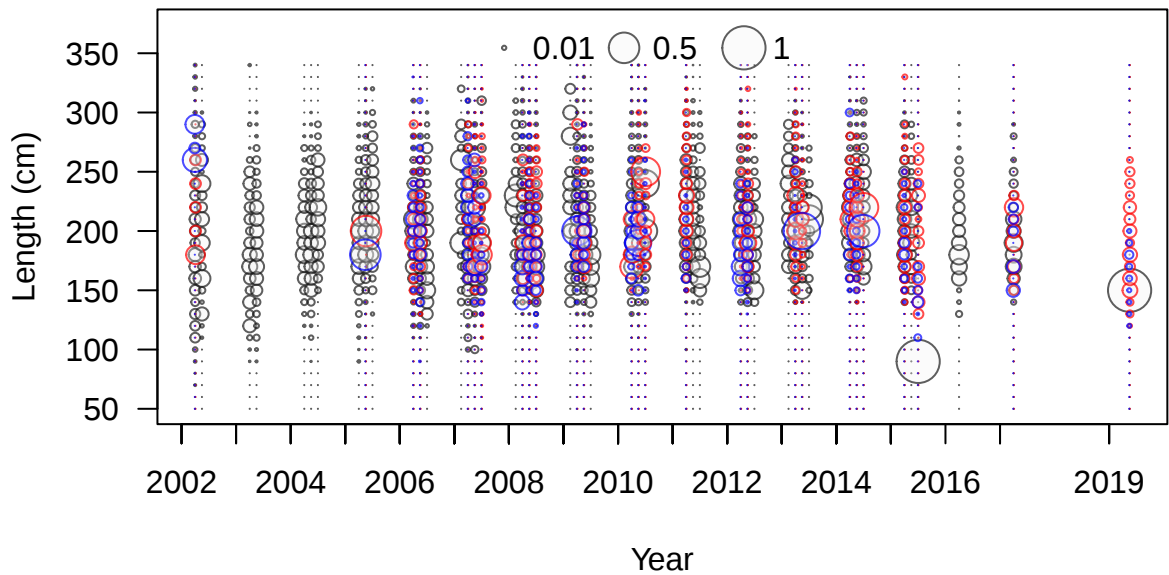


Proportion

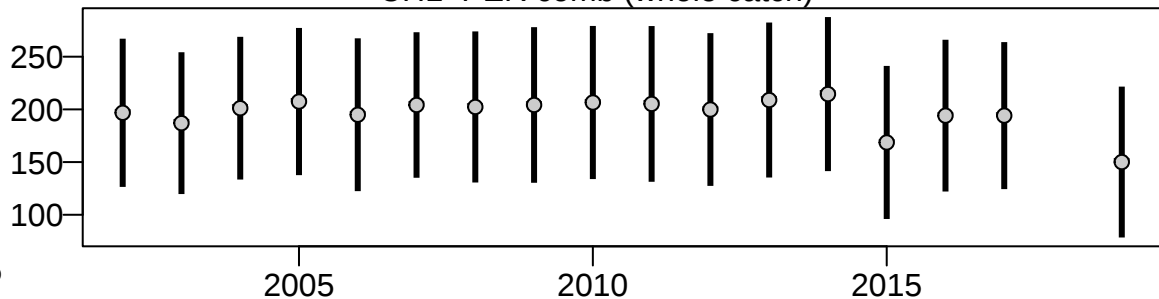


Proportion

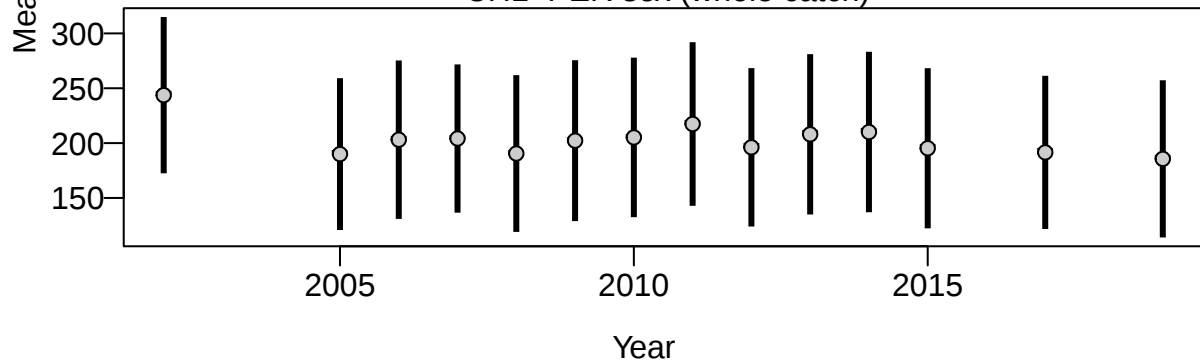




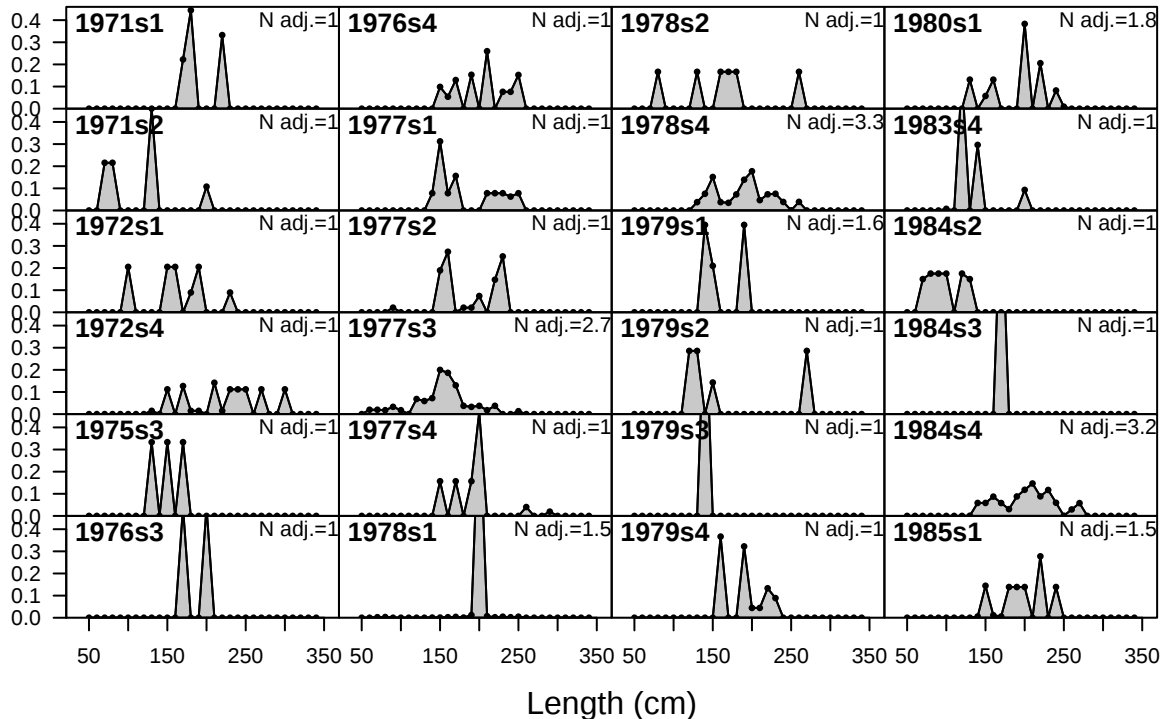
CHL+PER comb (whole catch)



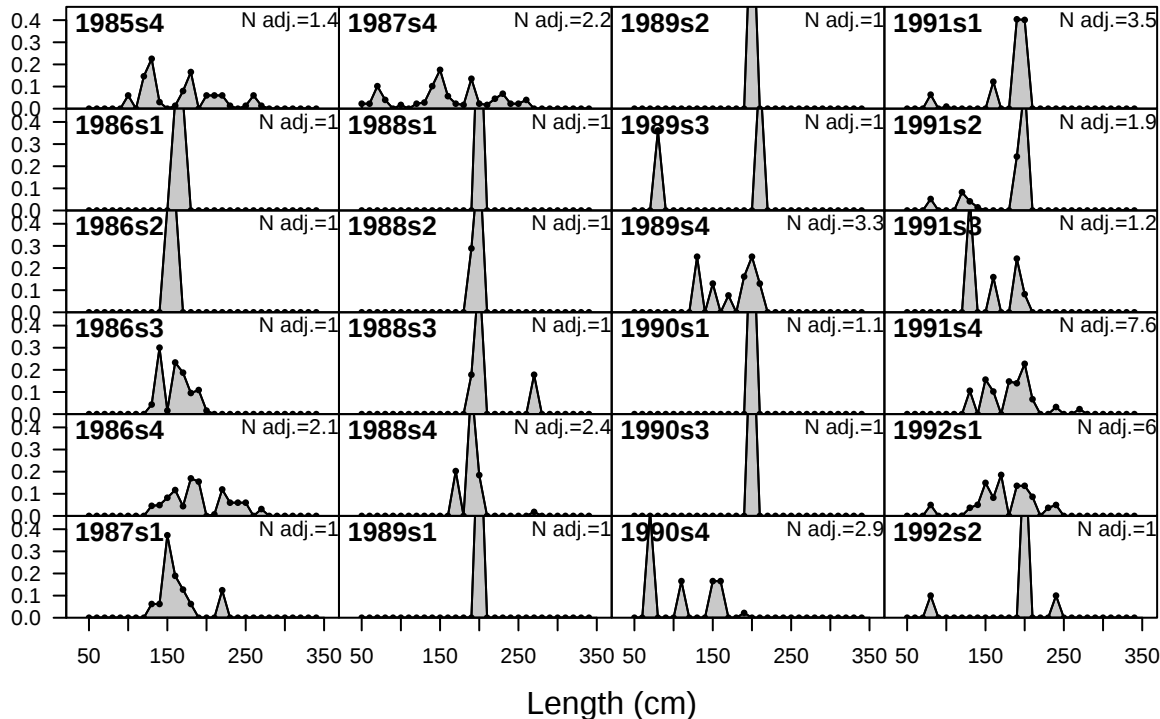
CHL+PER sex (whole catch)



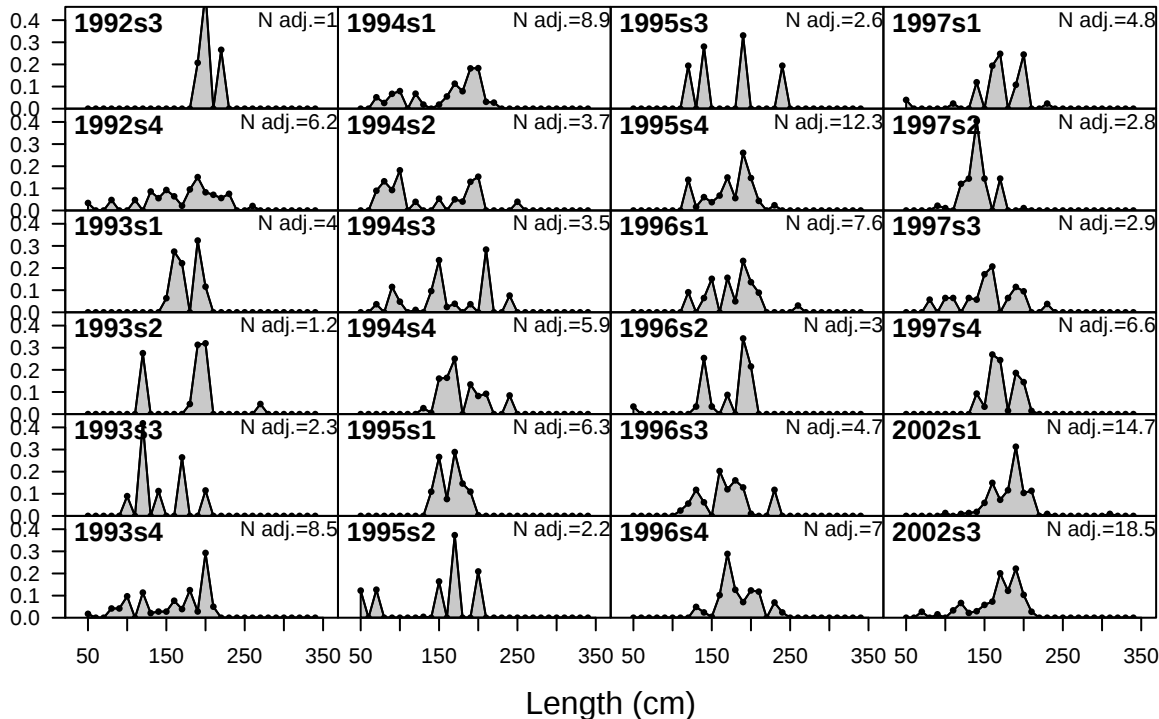
Proportion



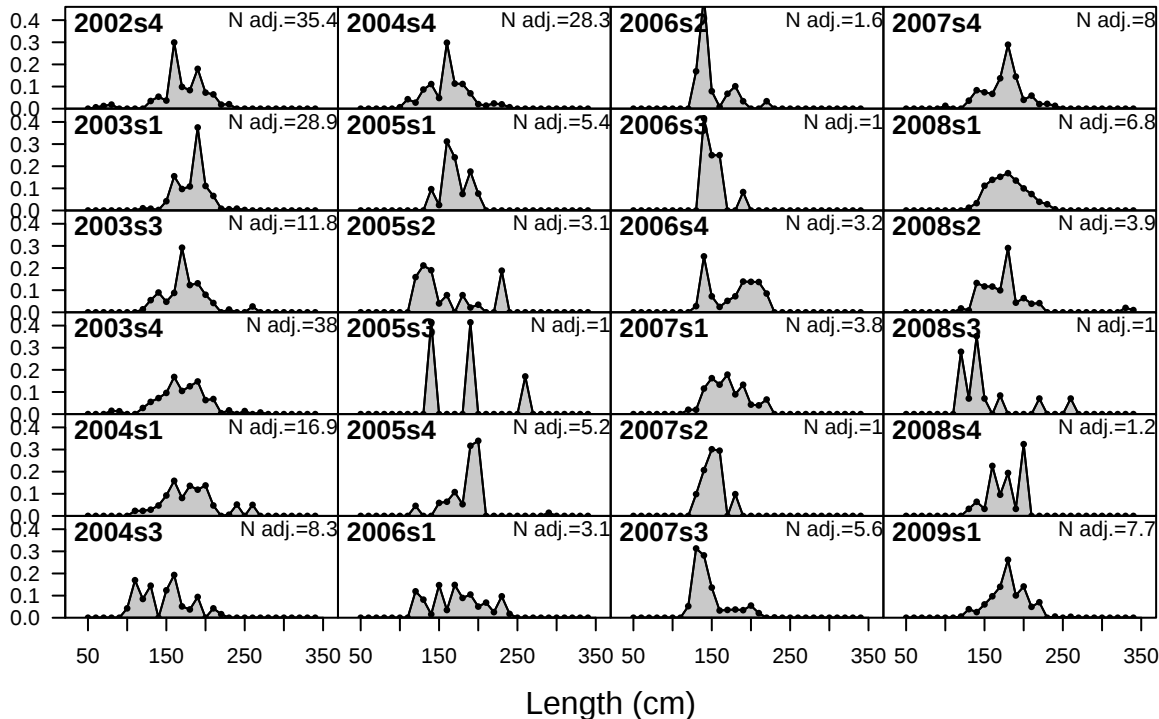
Proportion

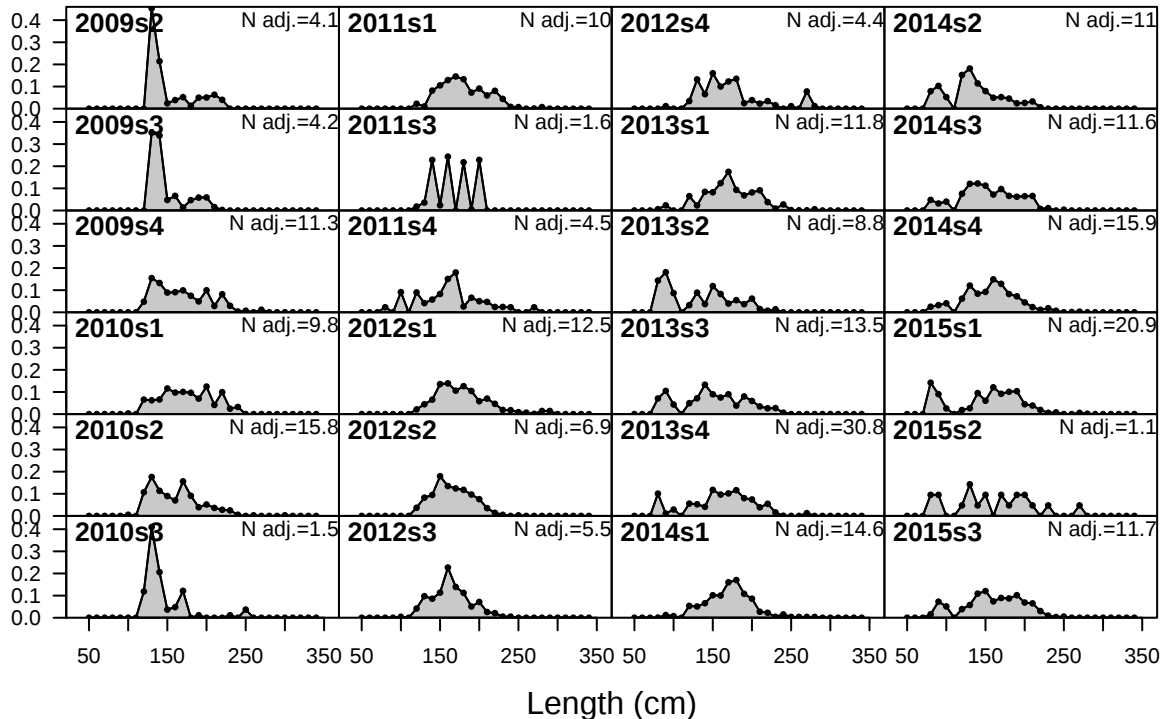


Proportion

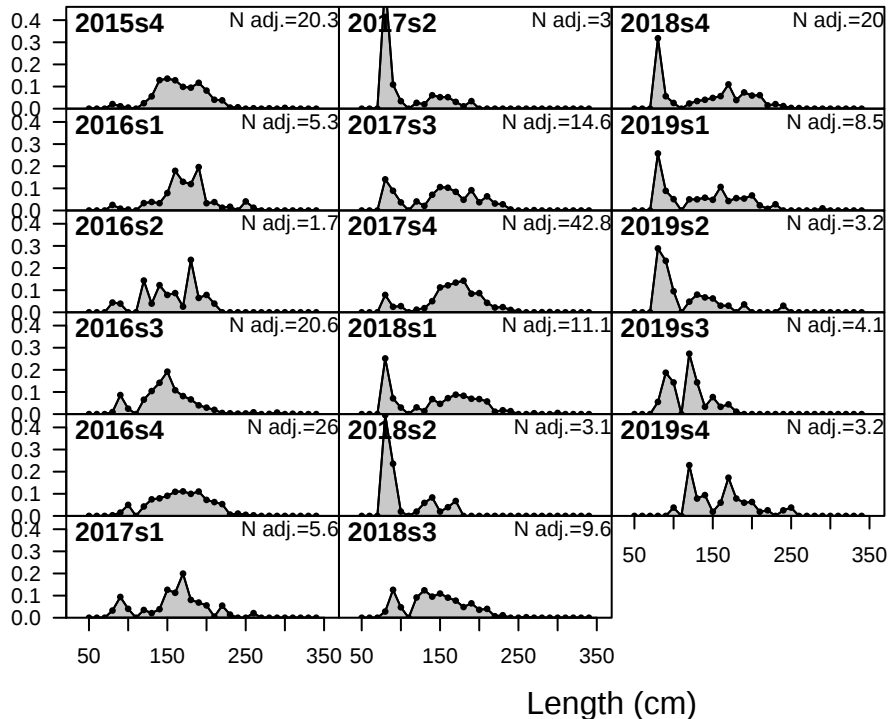


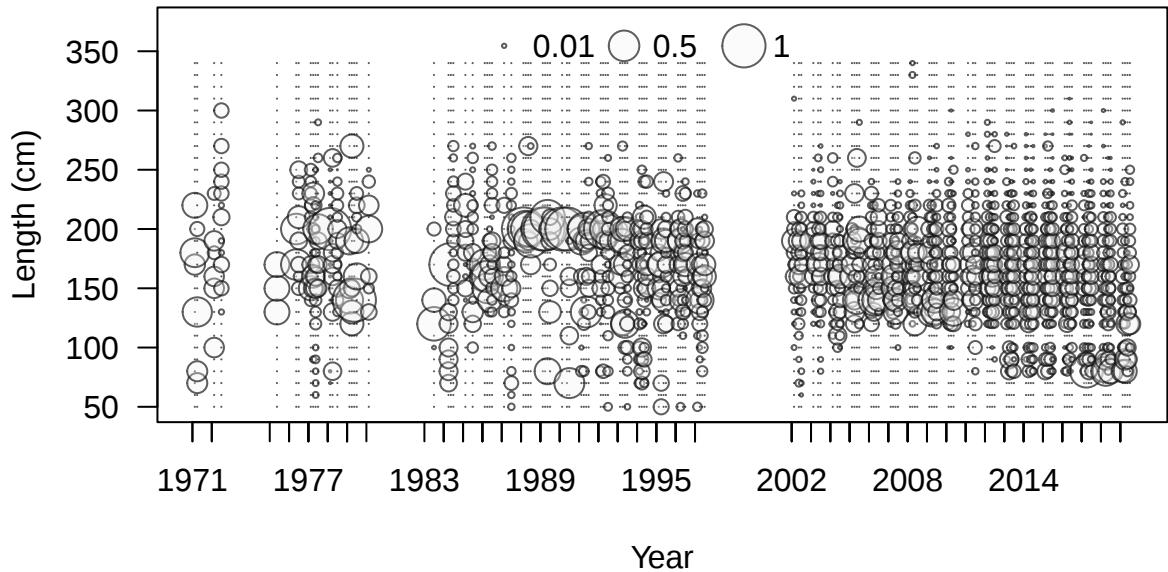
Proportion



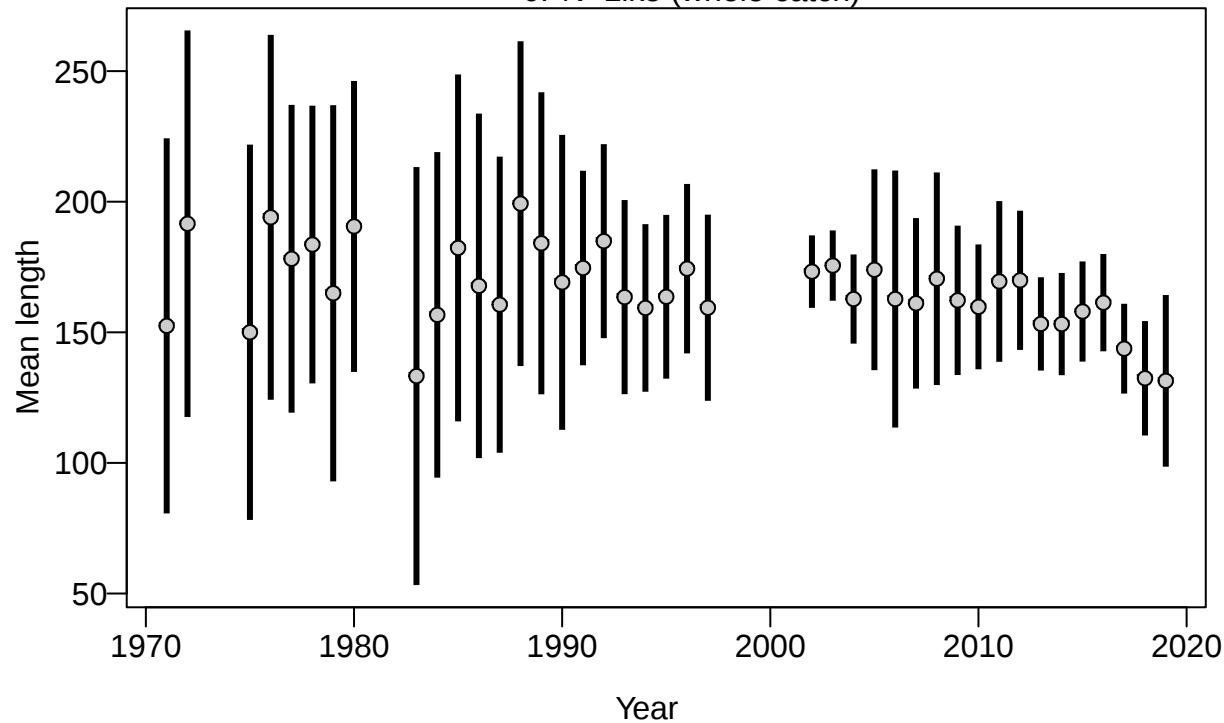


Proportion

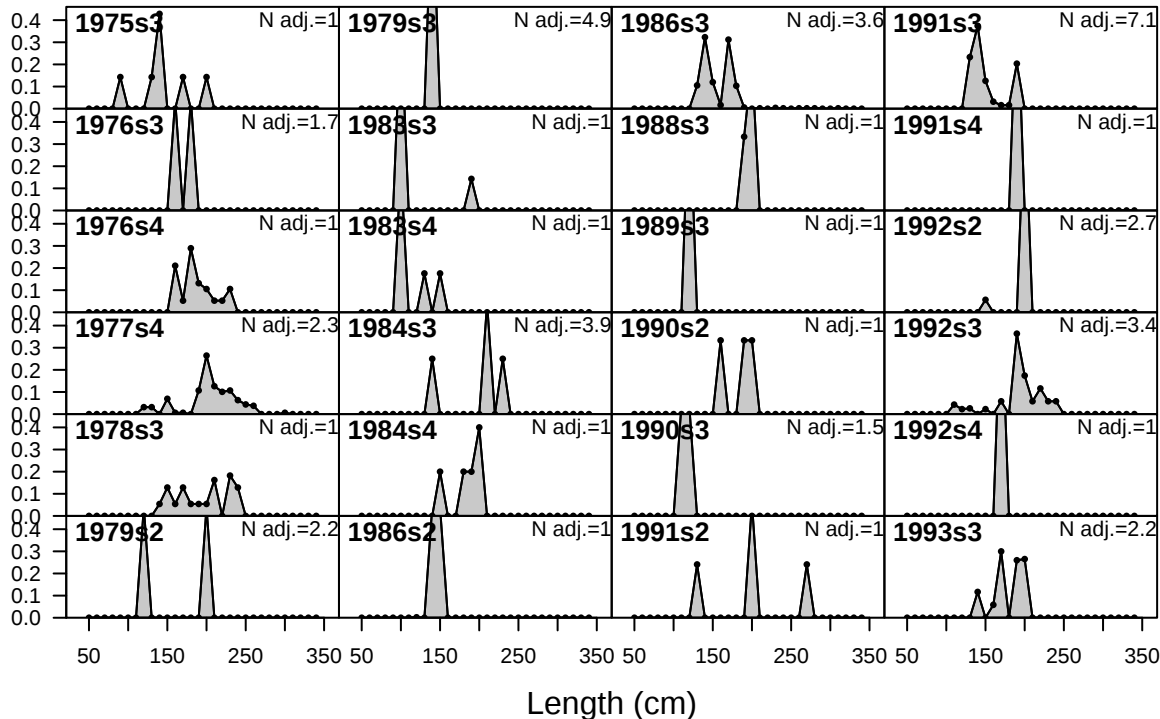


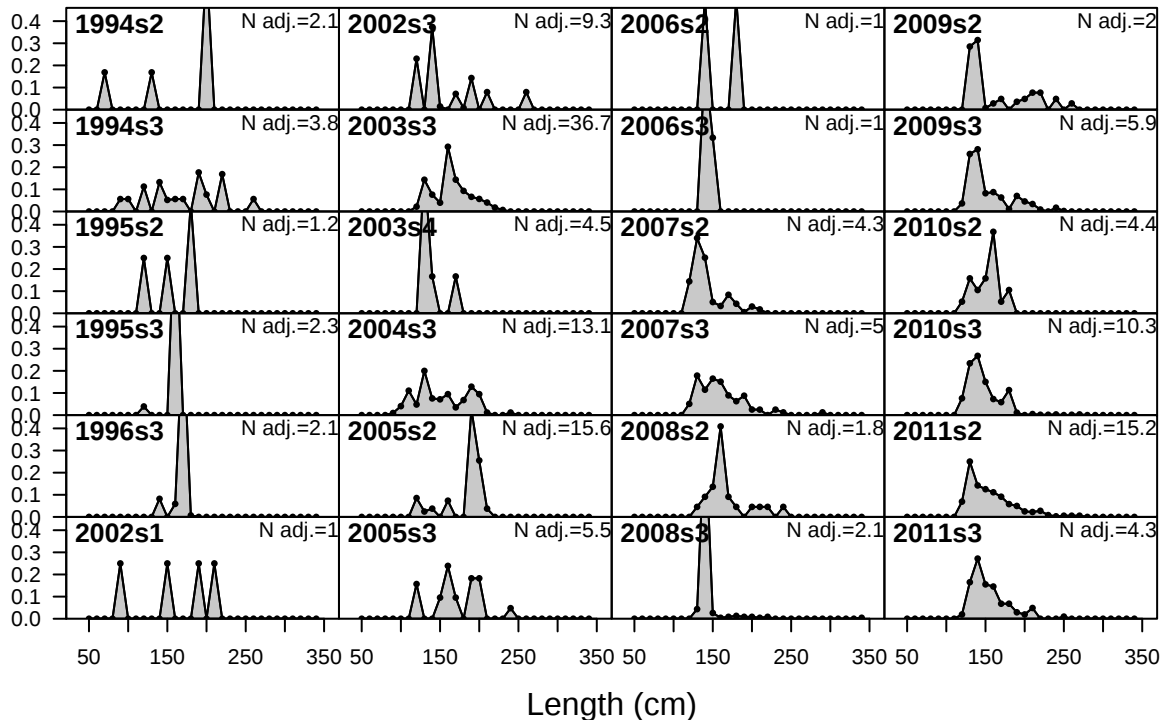


JPN+Like (whole catch)

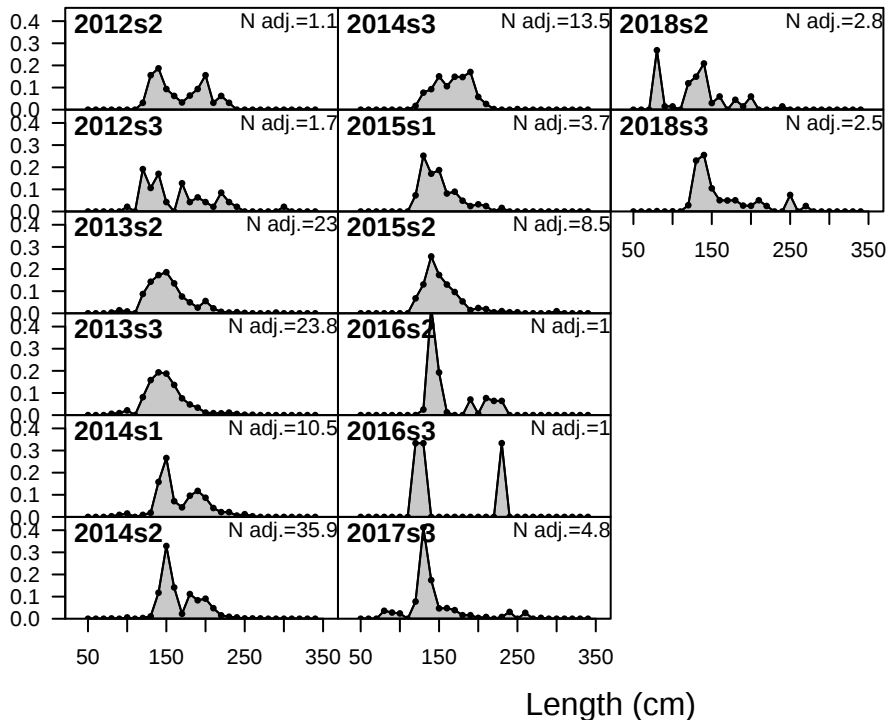


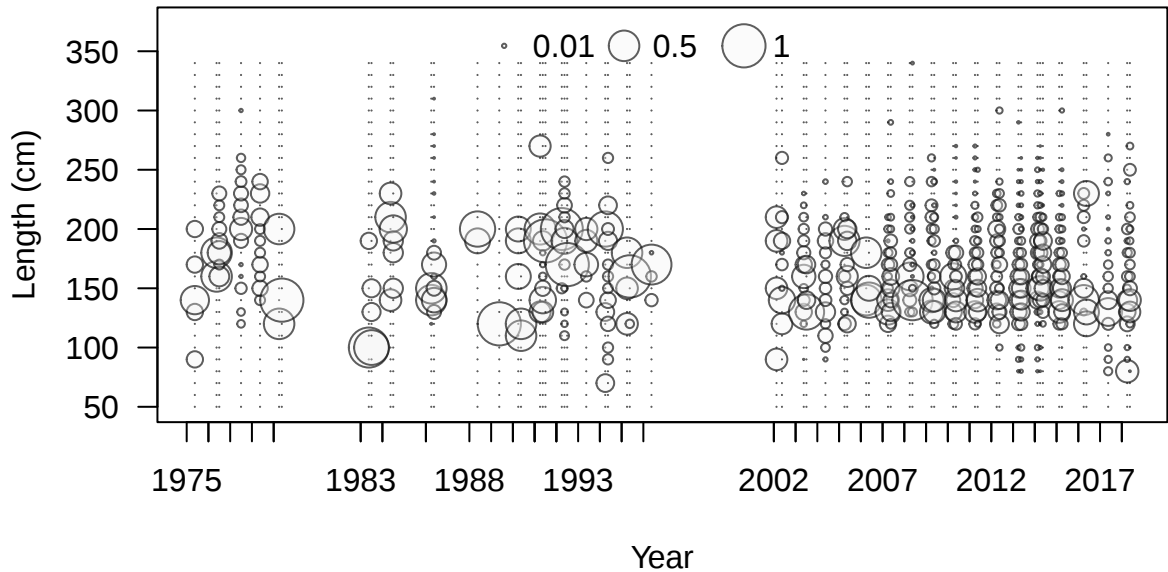
Proportion



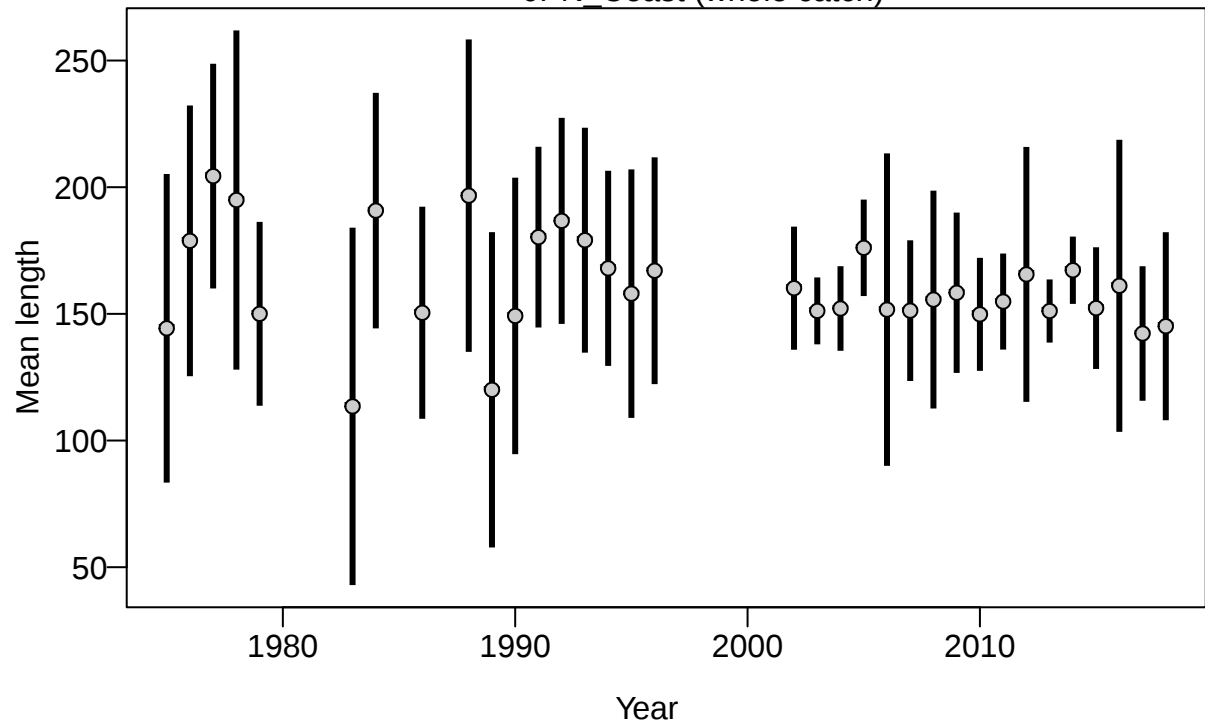


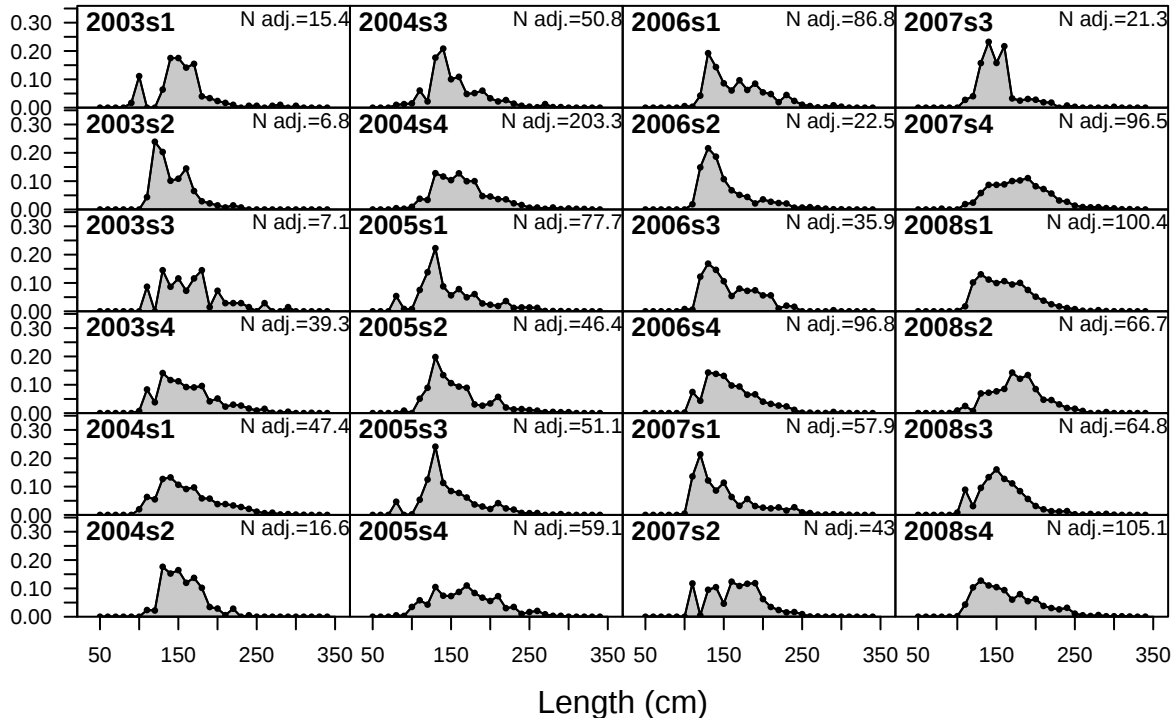
Proportion

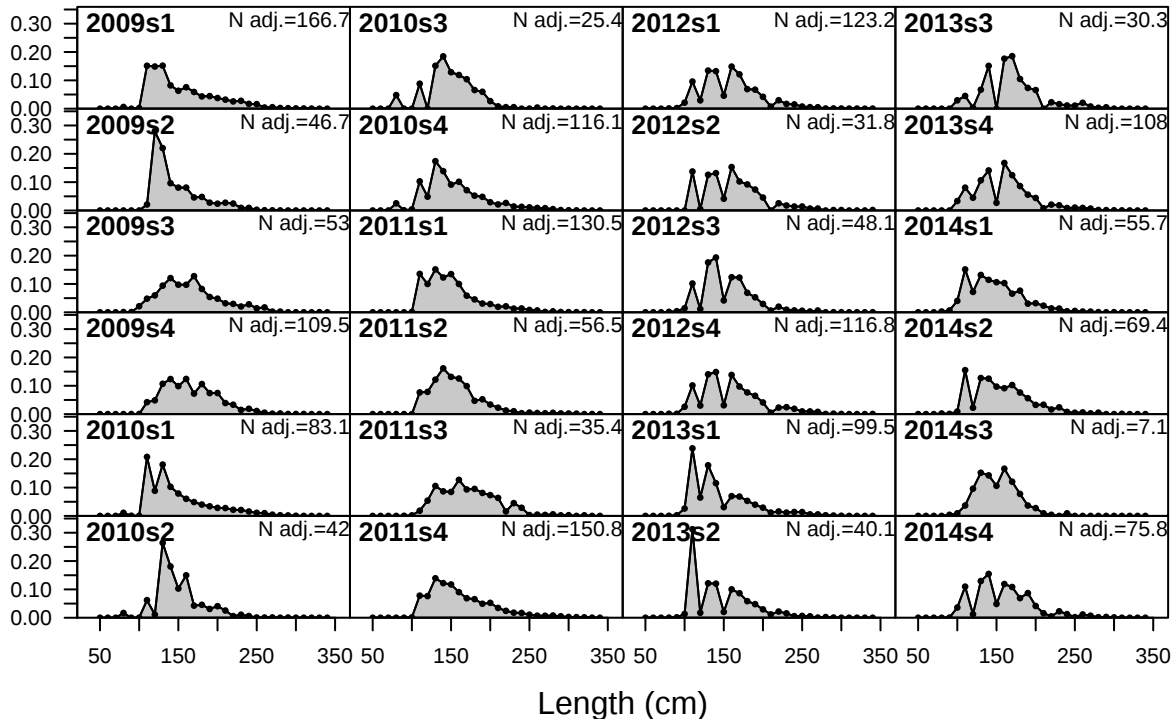


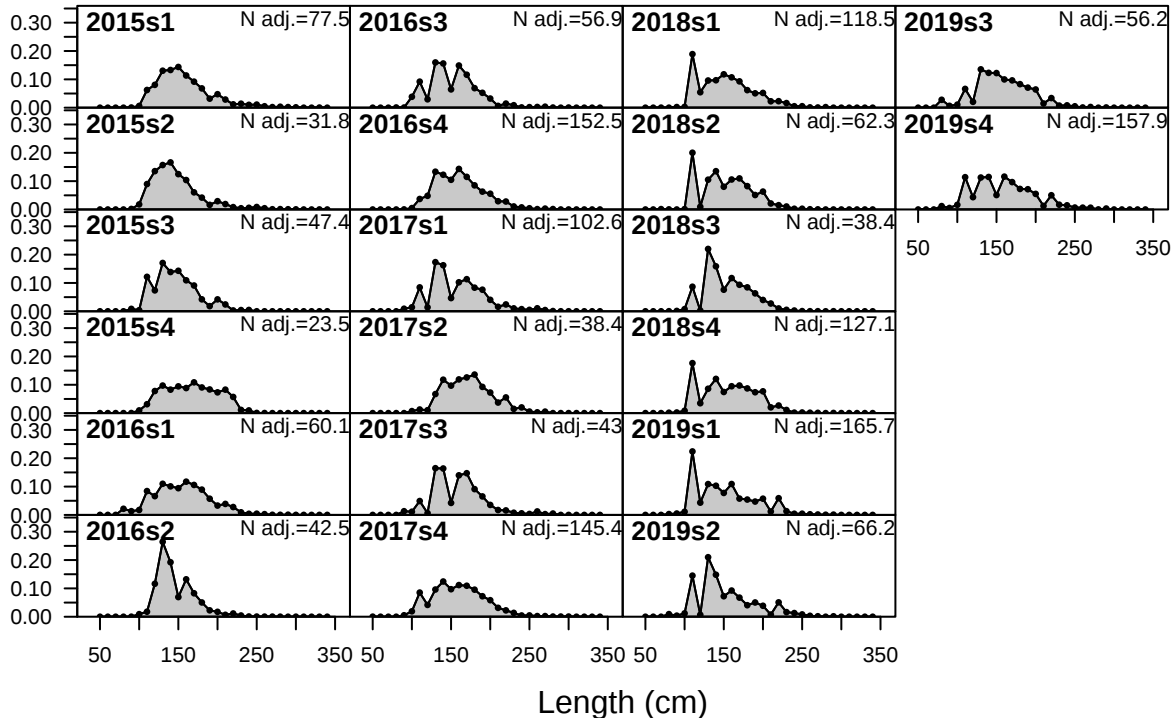


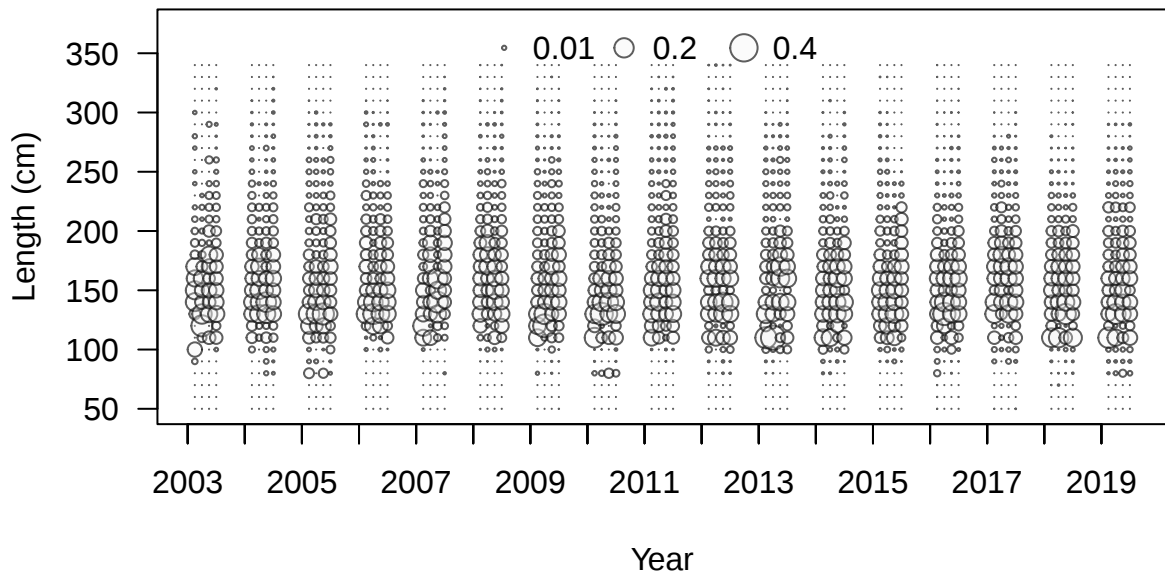
JPN_Coast (whole catch)



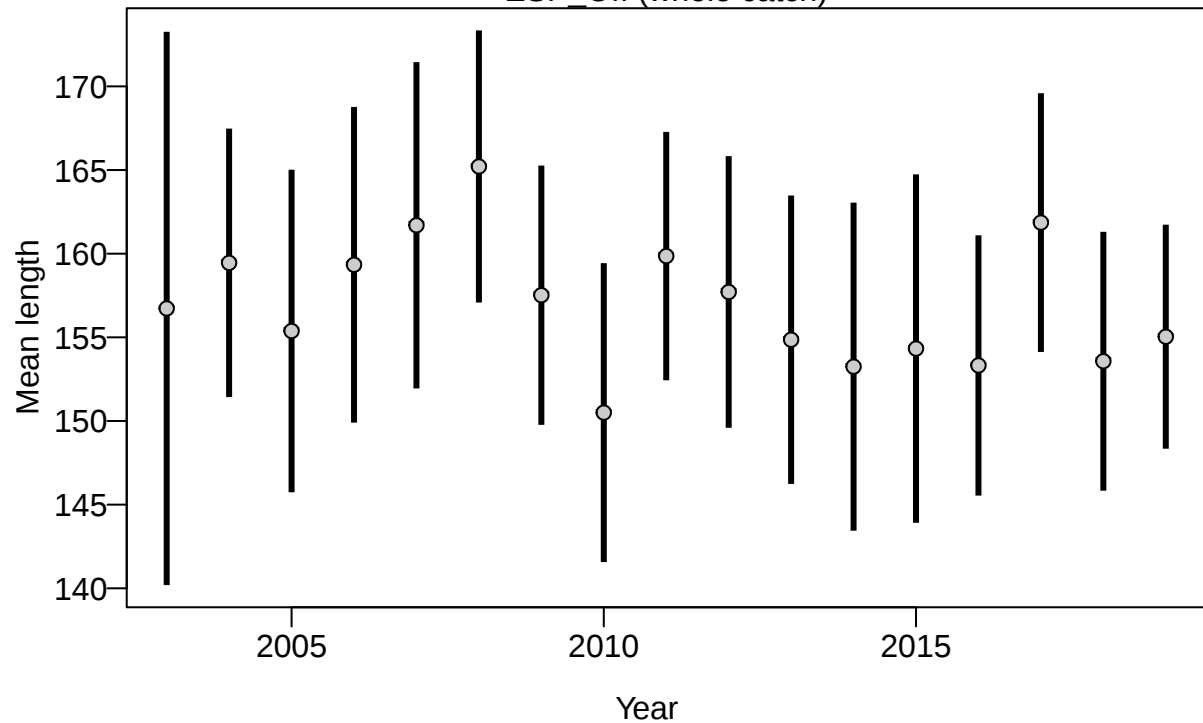


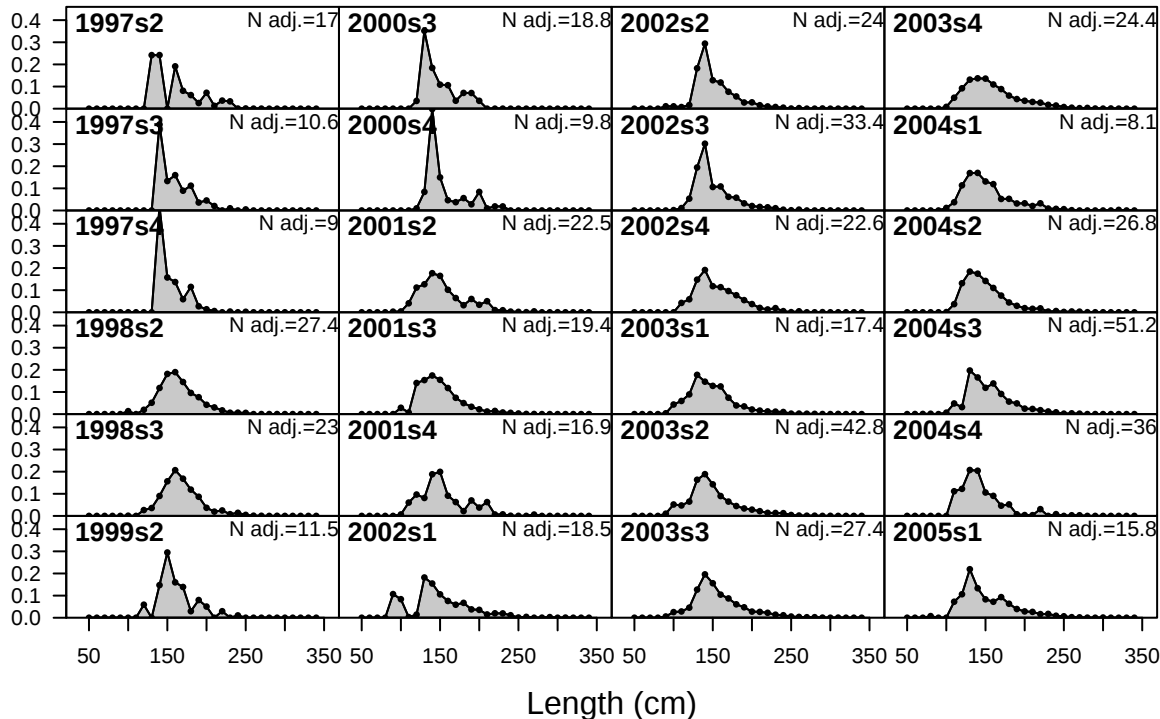




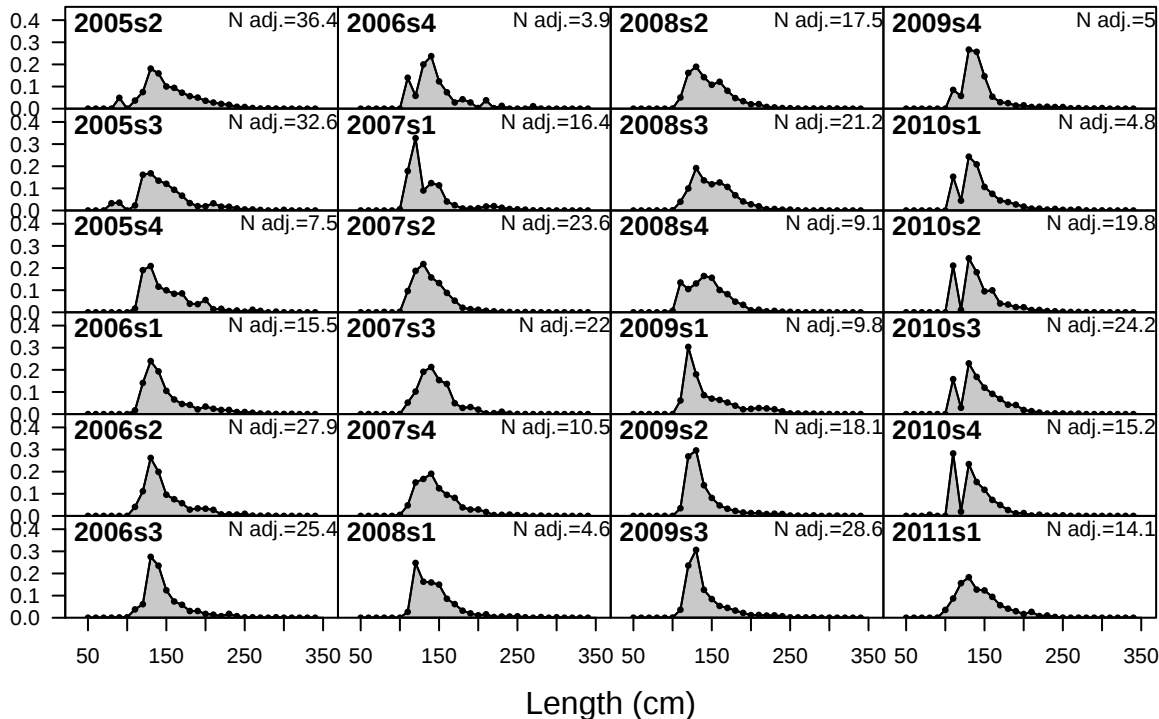


ESP_Off (whole catch)

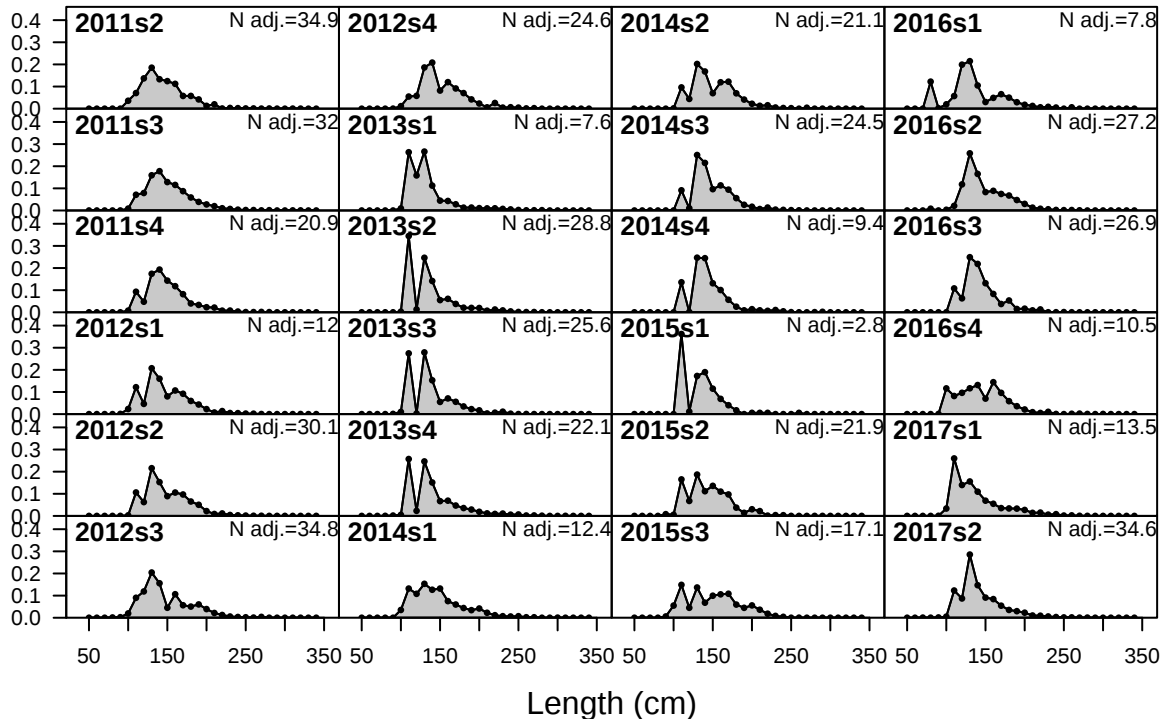




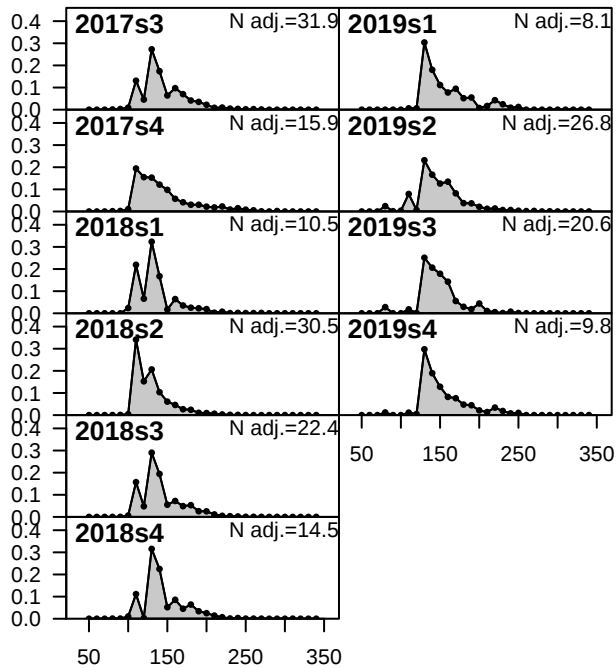
Proportion



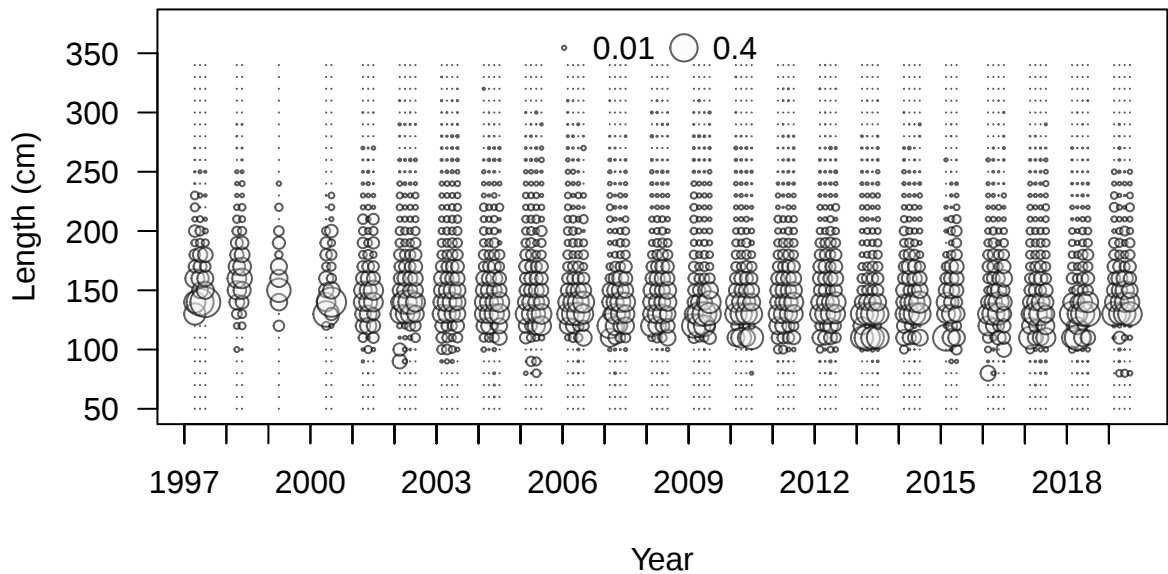
Proportion



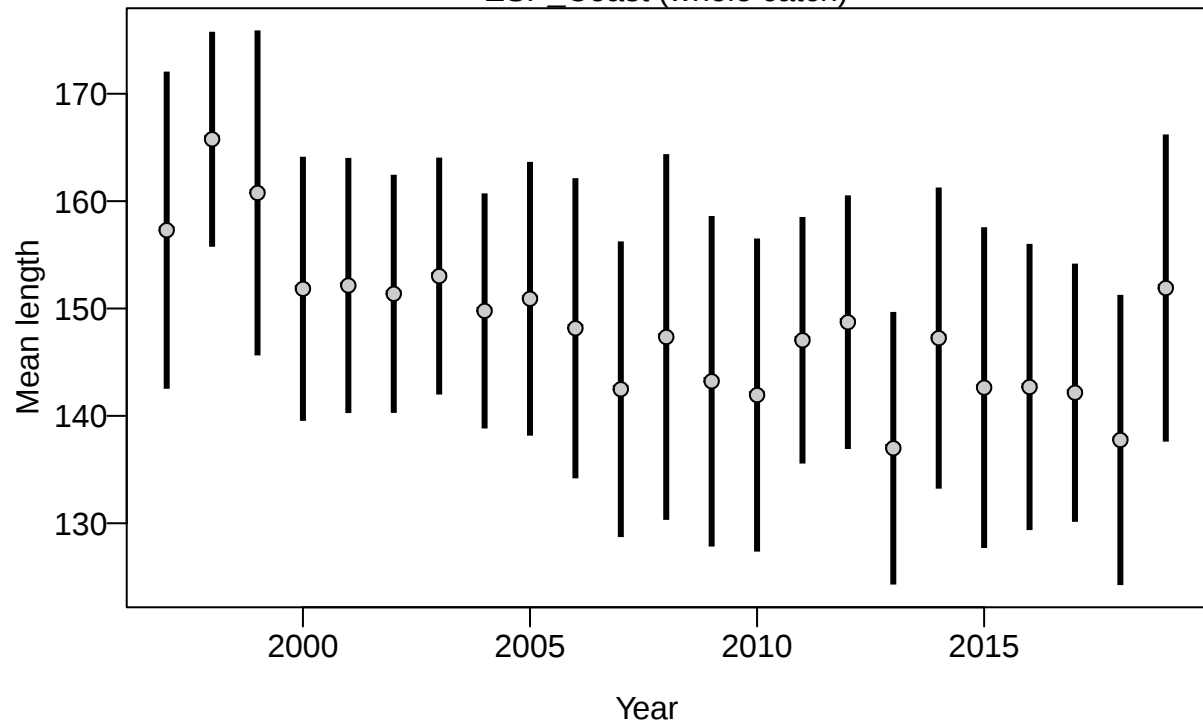
Proportion



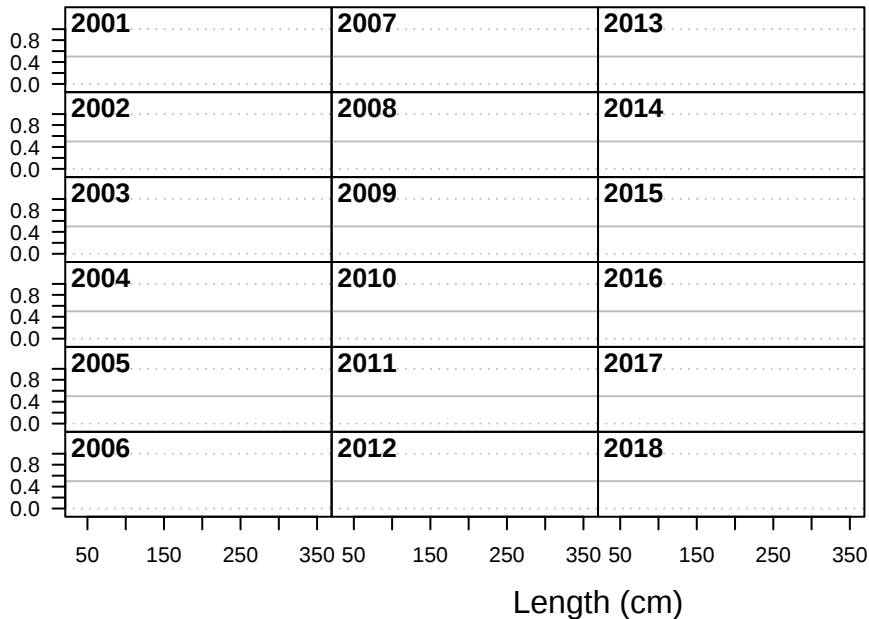
Length (cm)

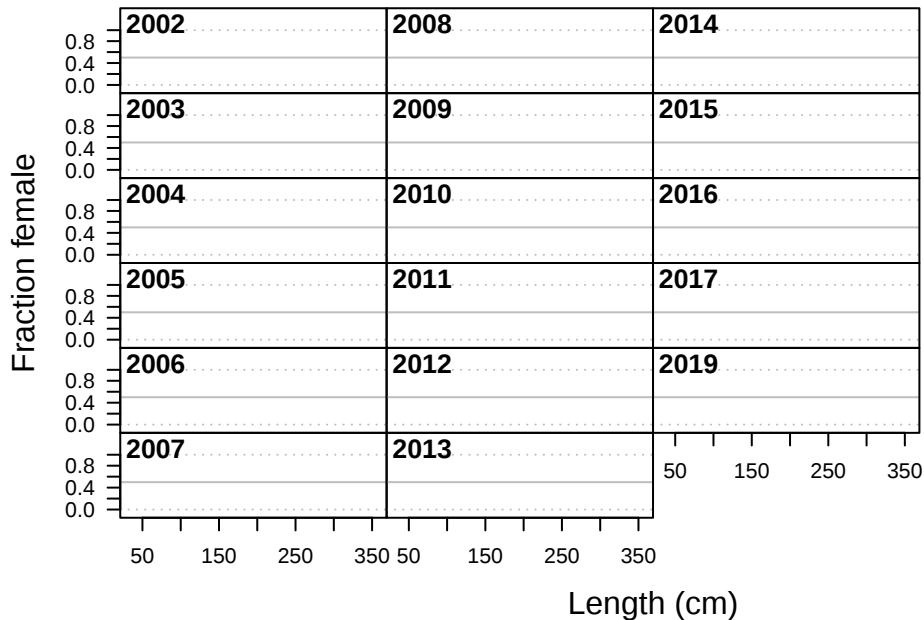


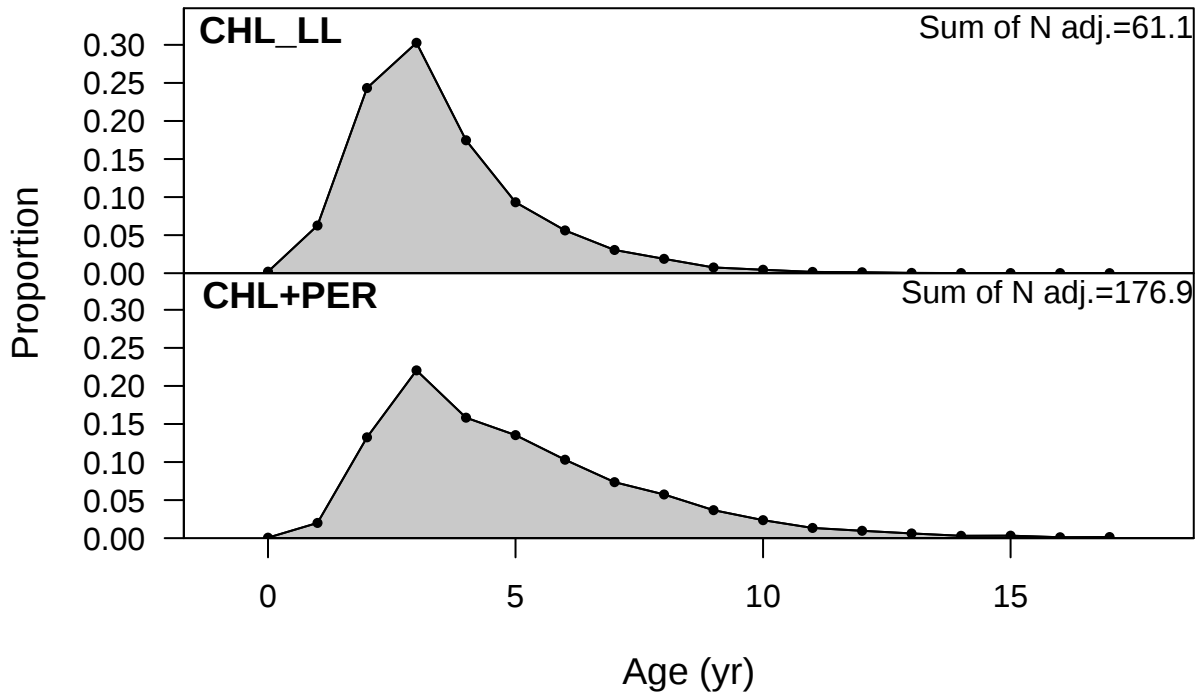
ESP_Coast (whole catch)



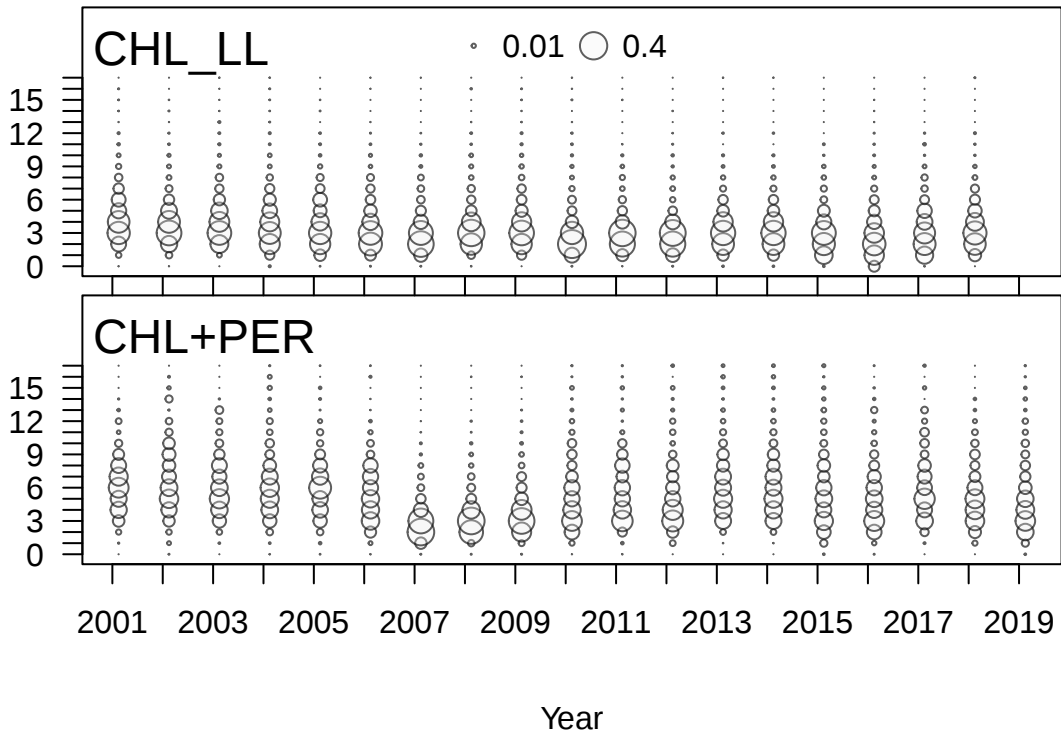
Fraction female



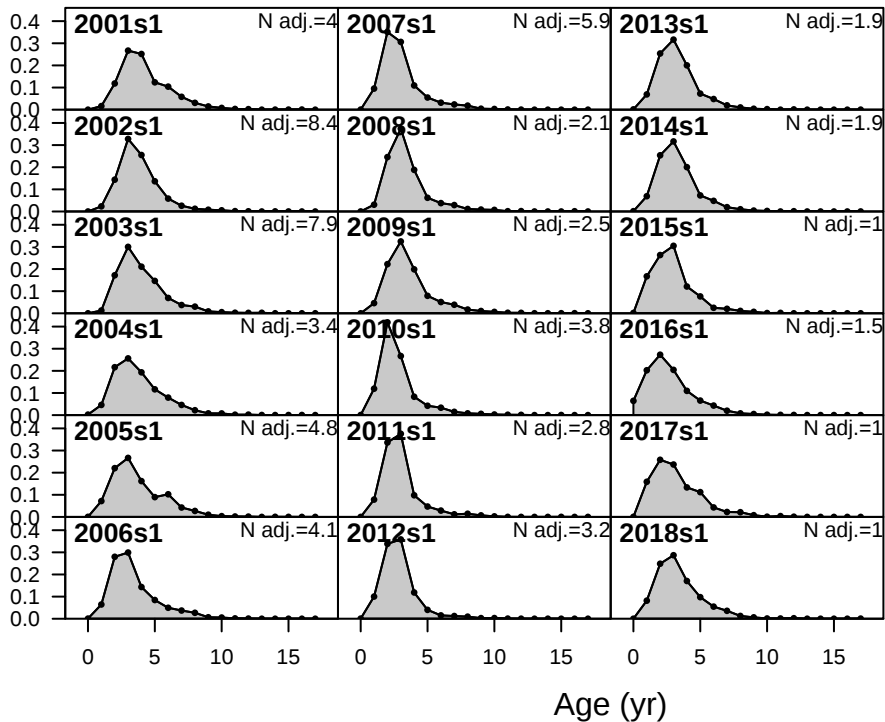


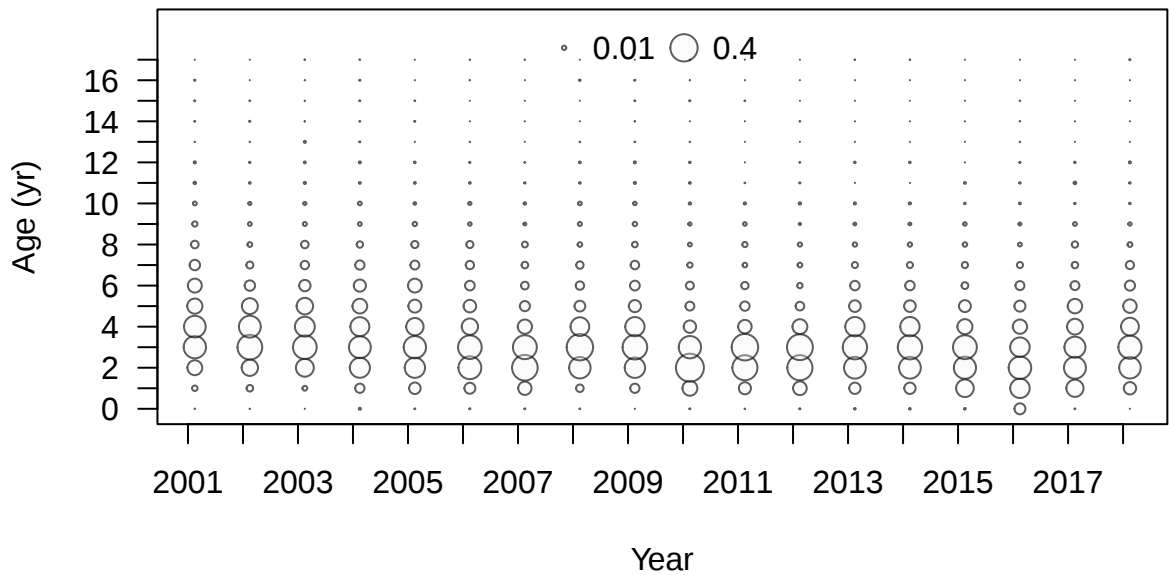


Age (yr)

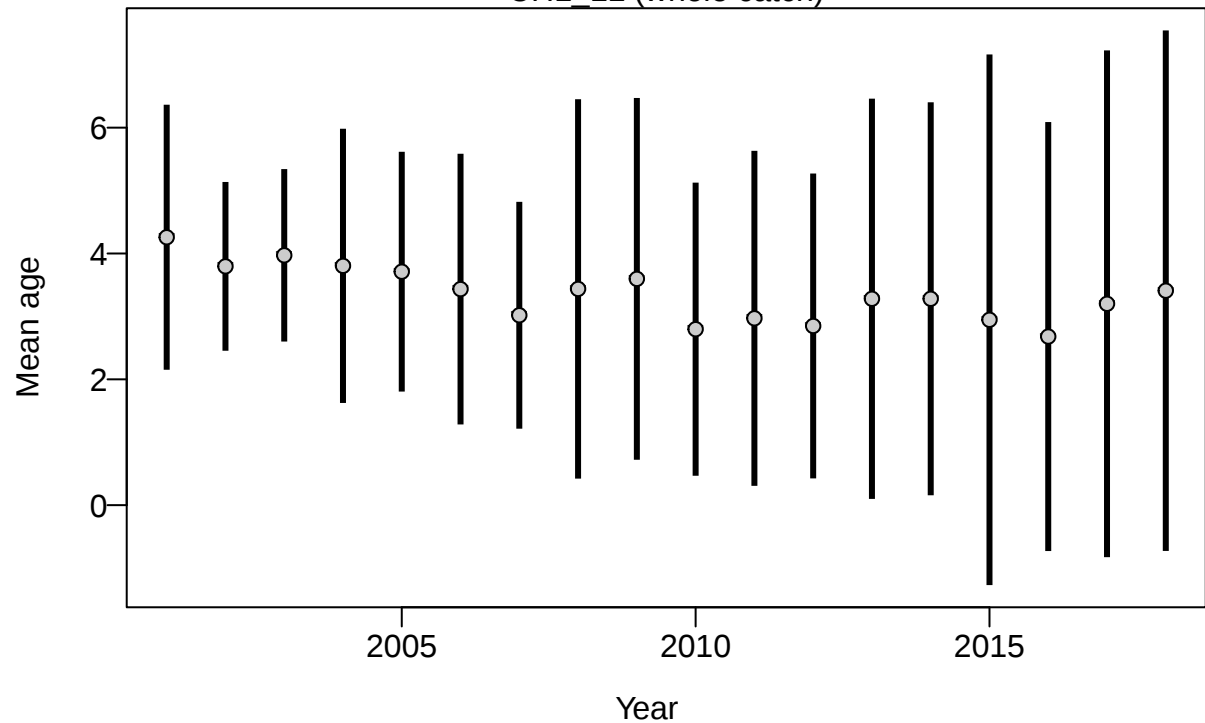


Proportion

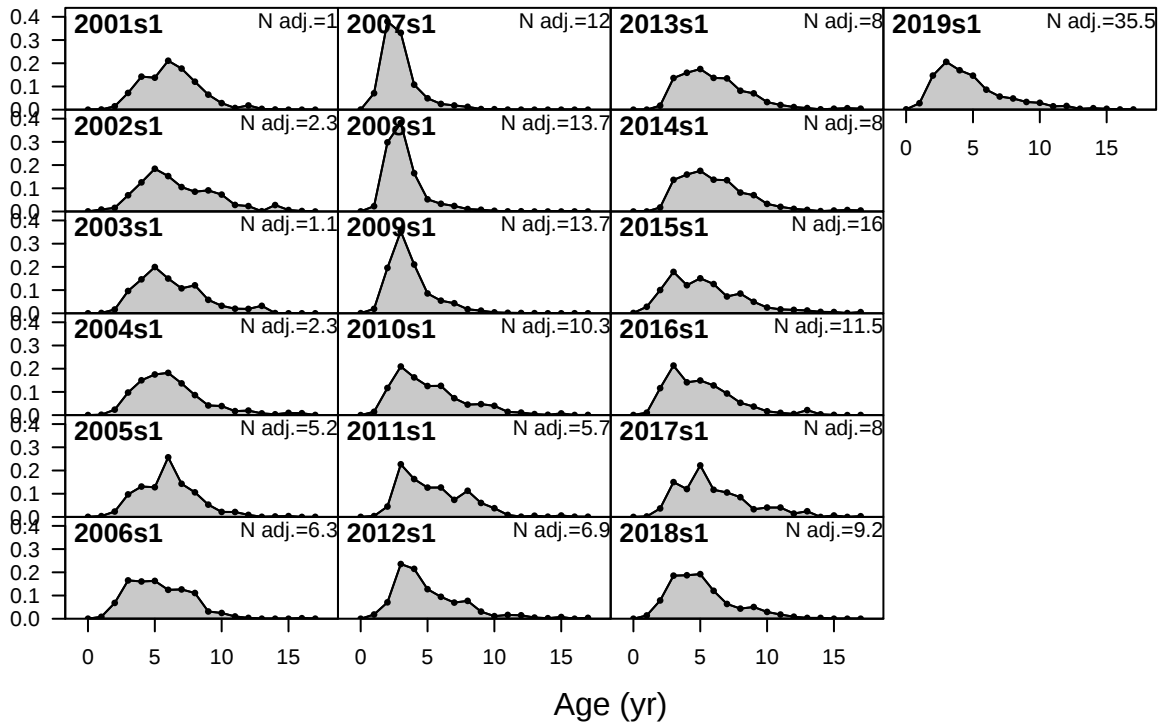


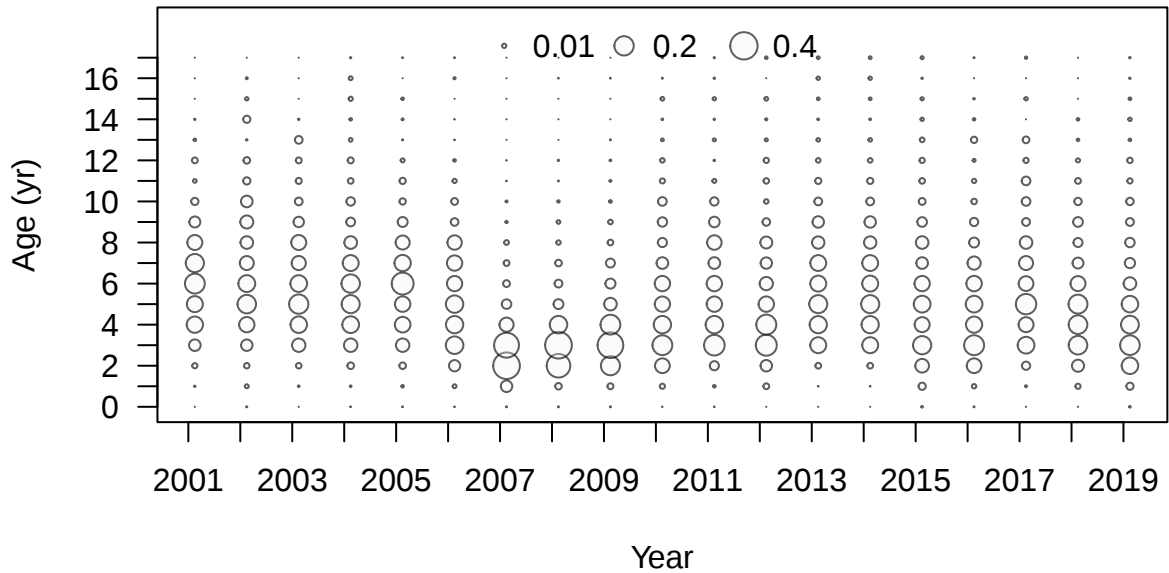


CHL_LL (whole catch)

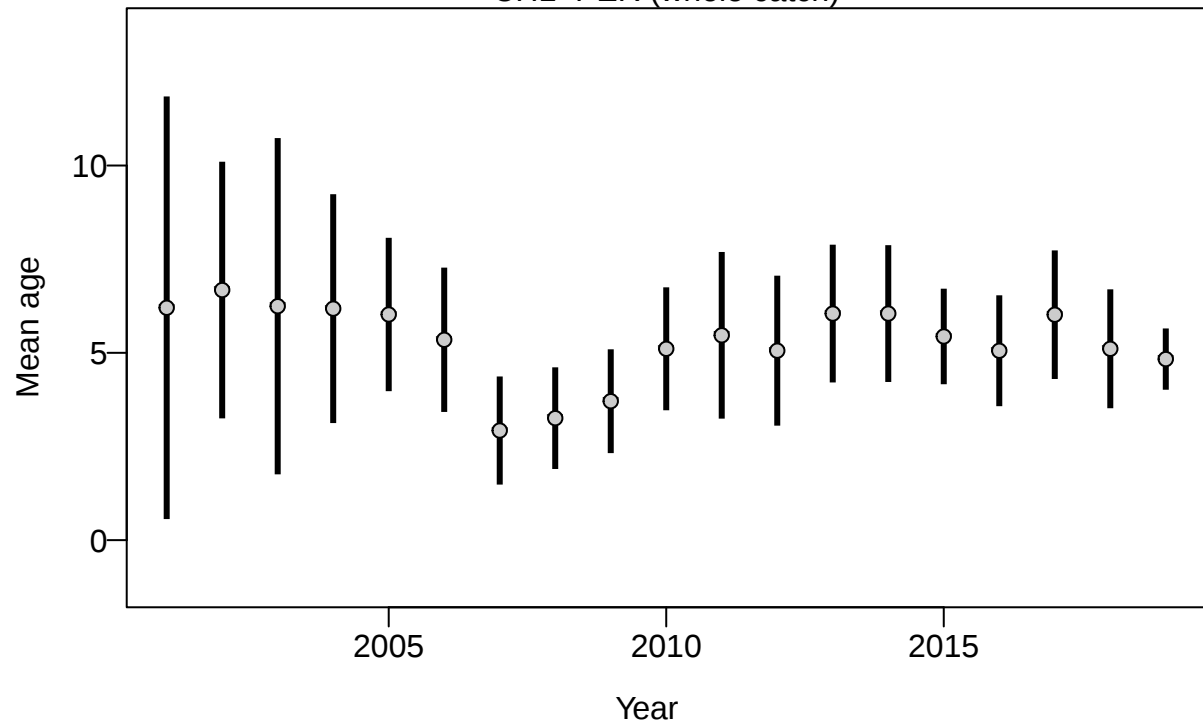


Proportion

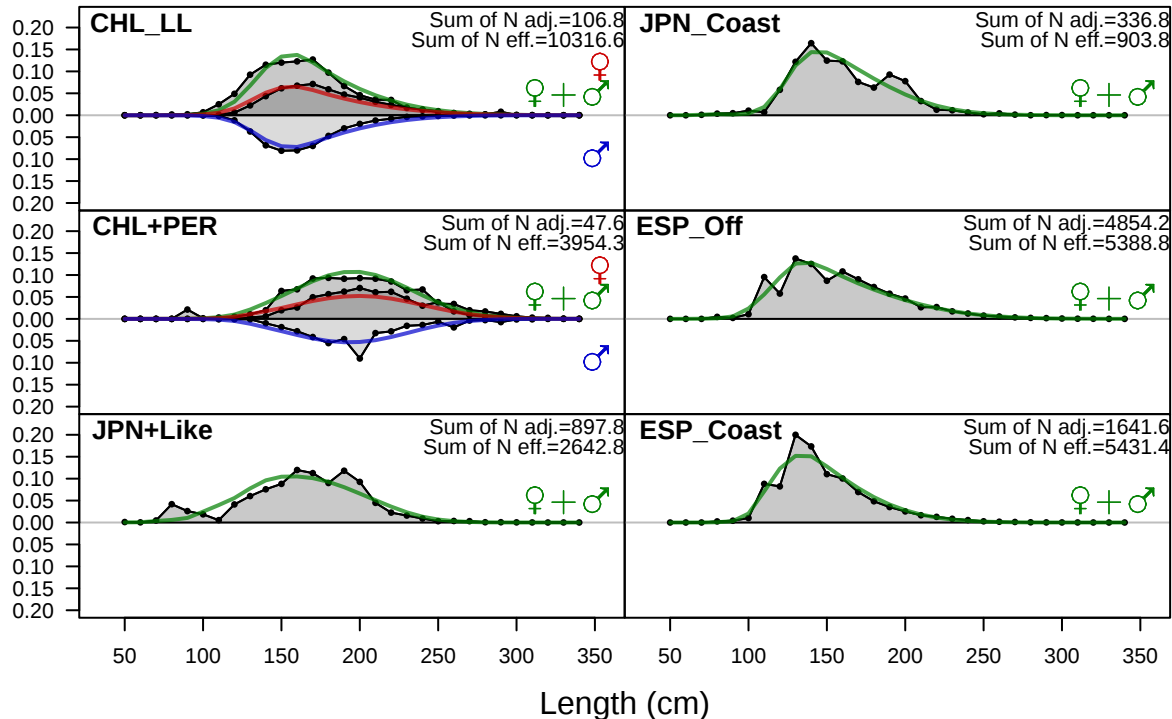


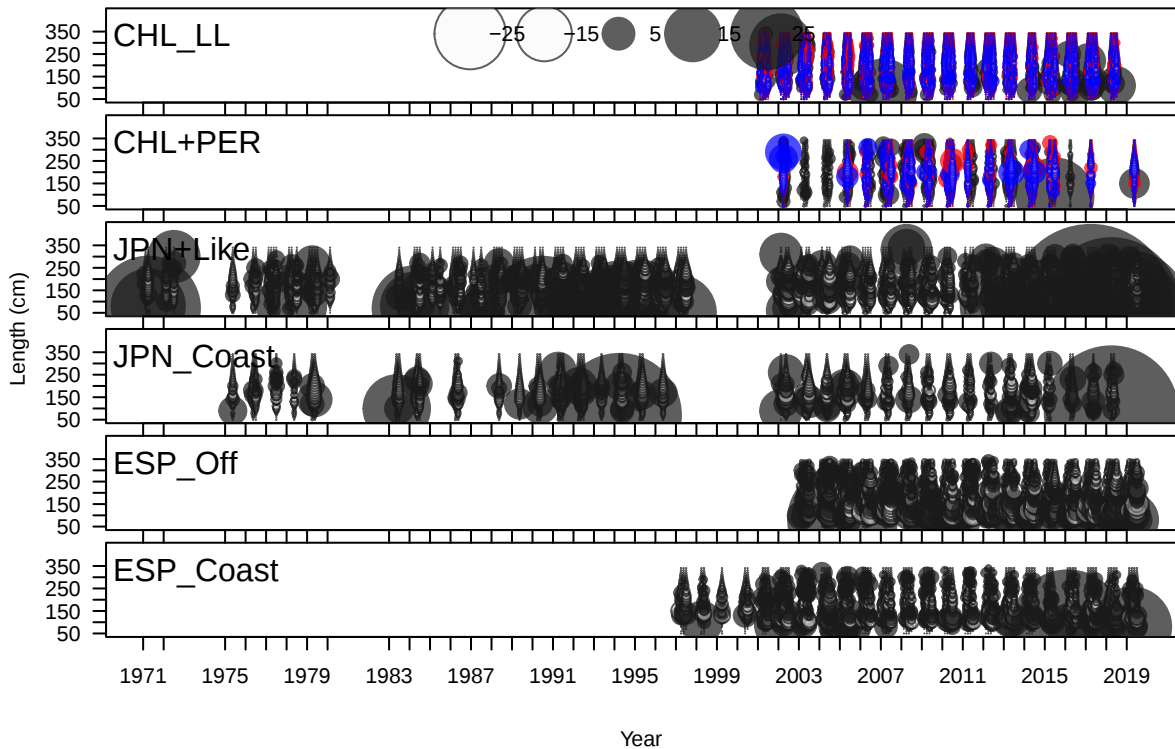


CHL+PER (whole catch)

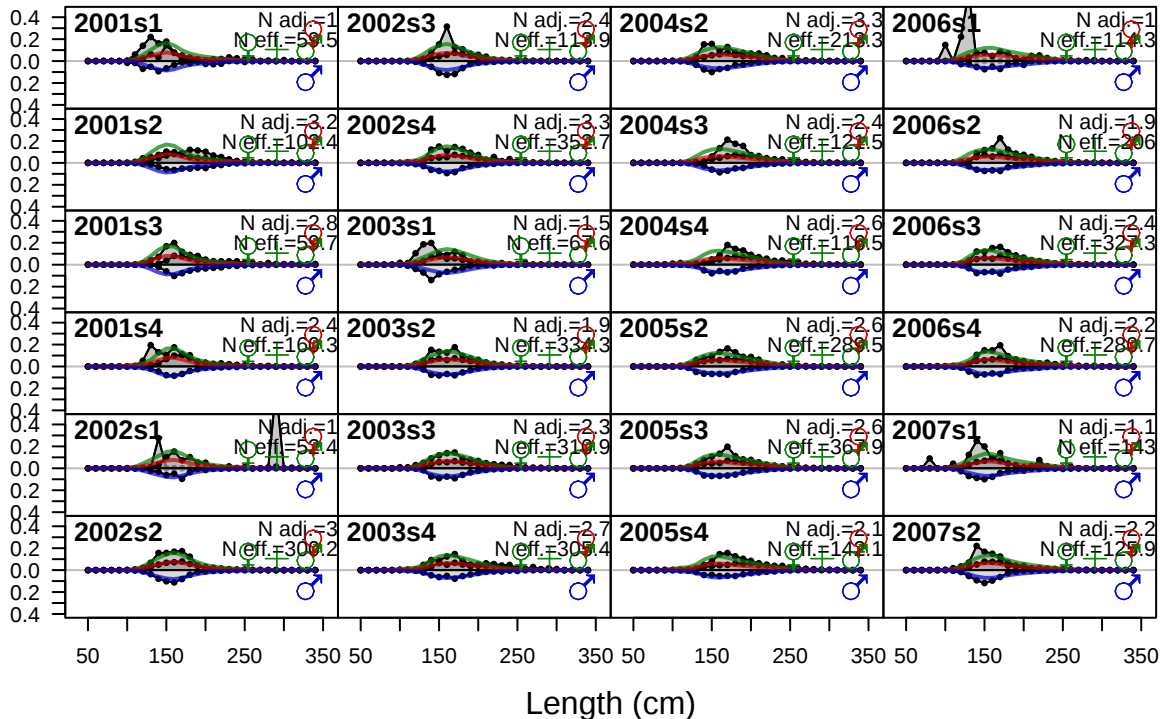


Proportion

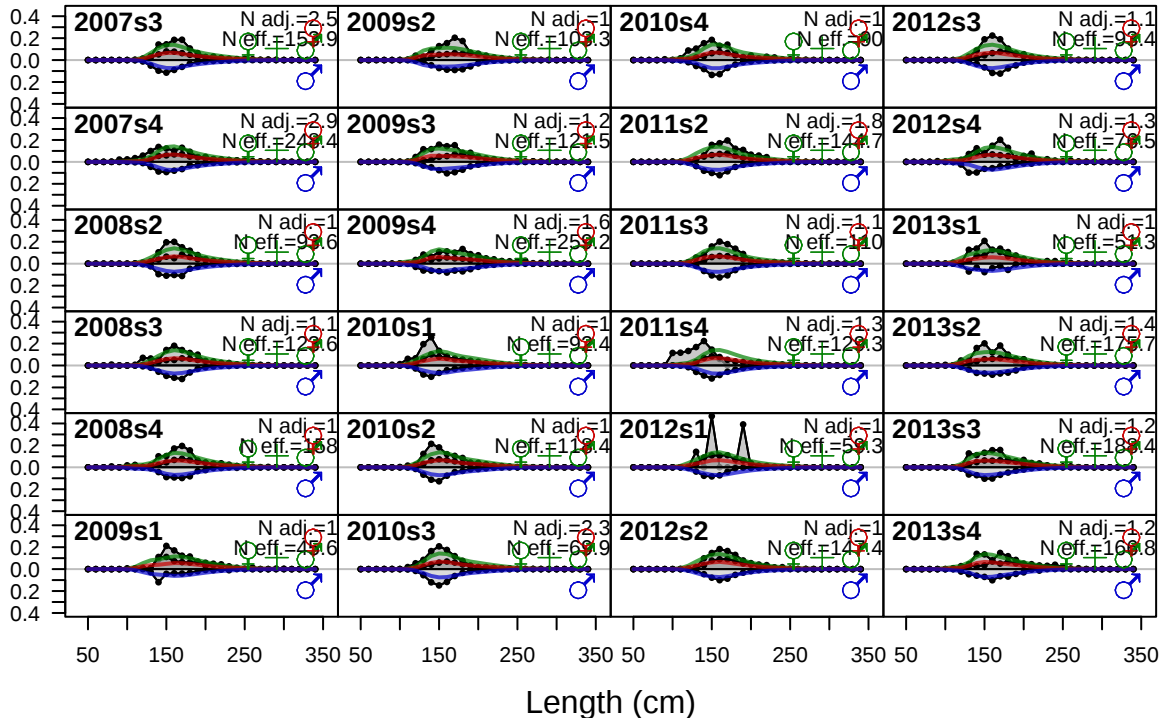




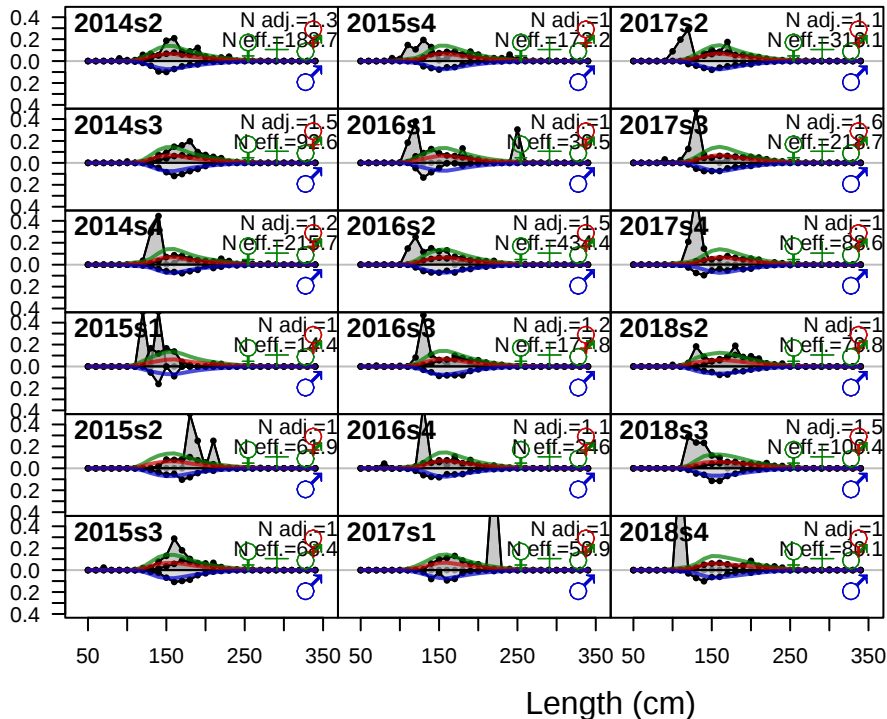
Proportion

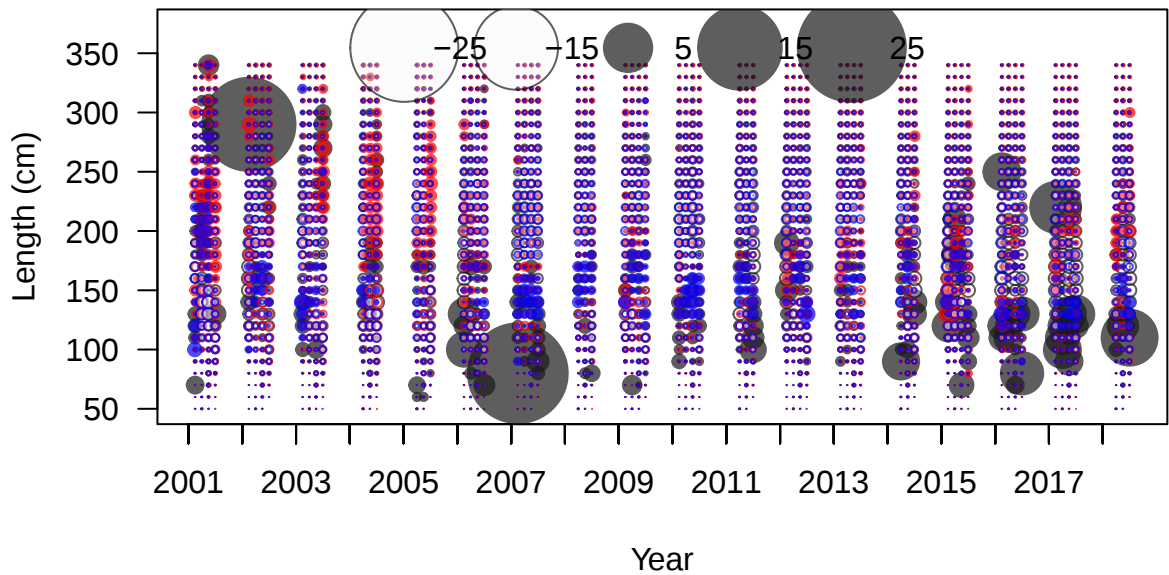


Proportion

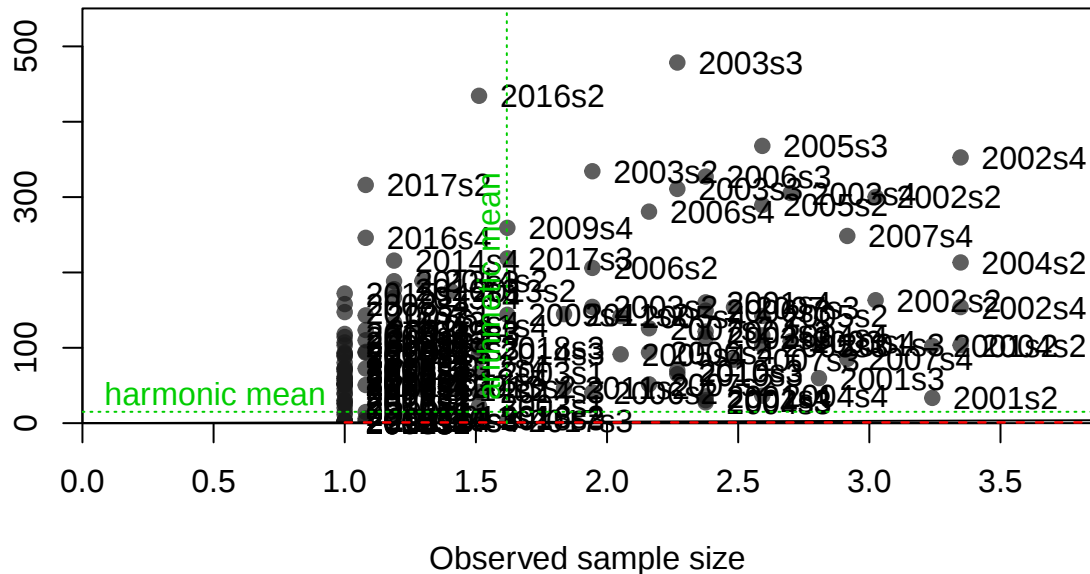


Proportion

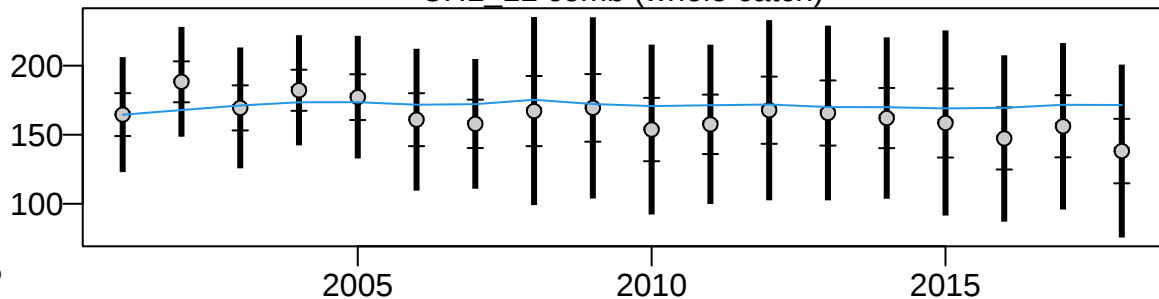




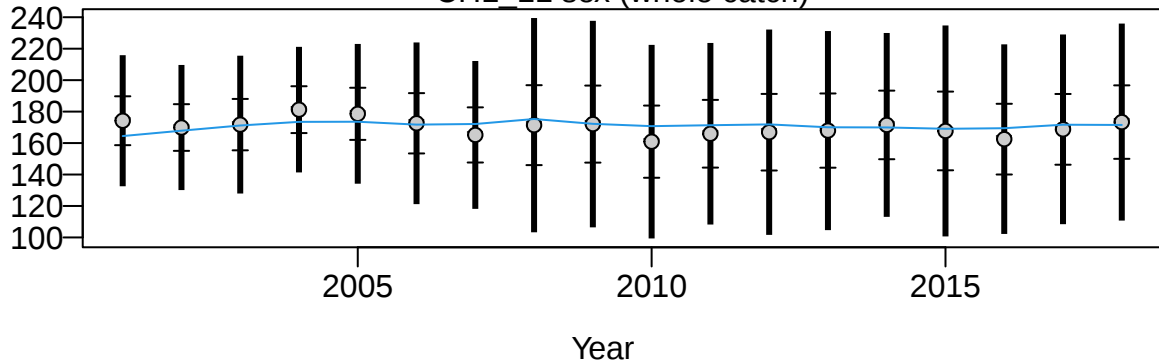
Effective sample size



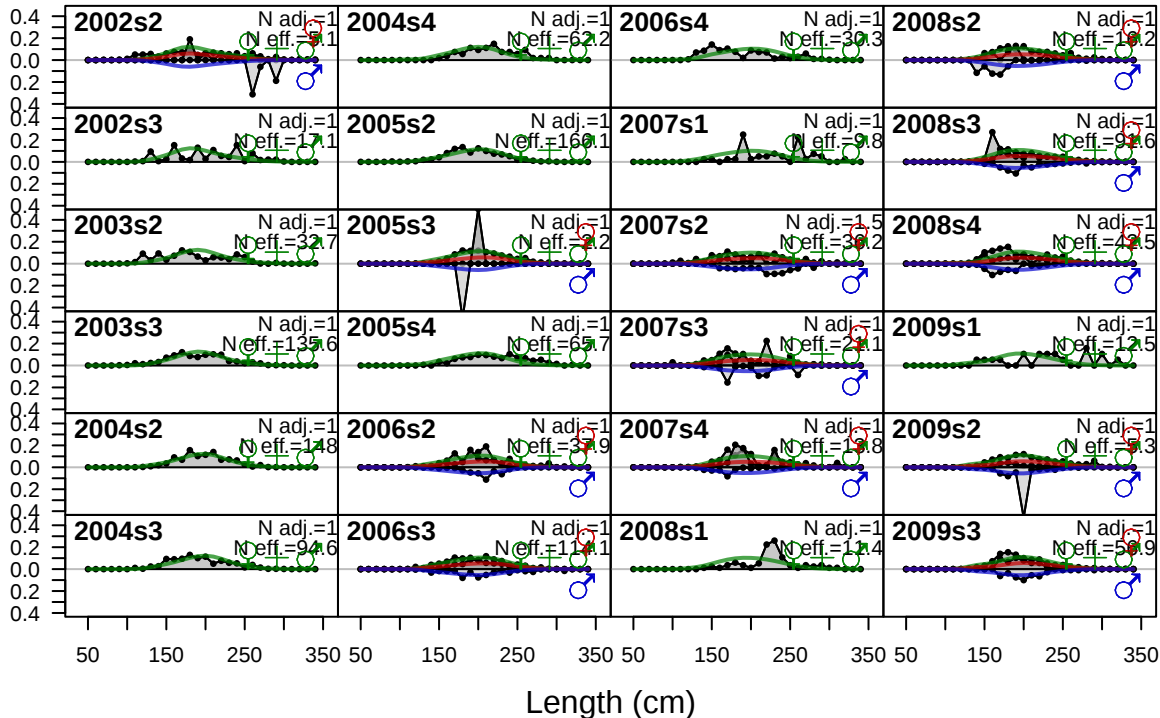
CHL_LL comb (whole catch)



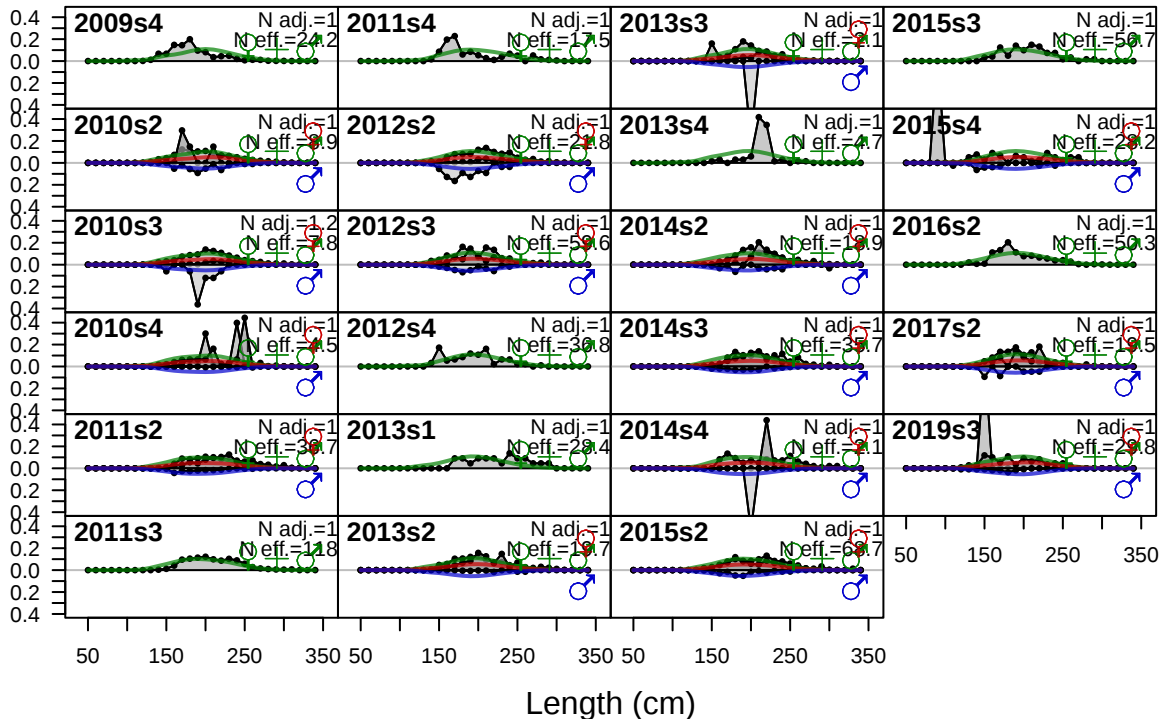
CHL_LL sex (whole catch)

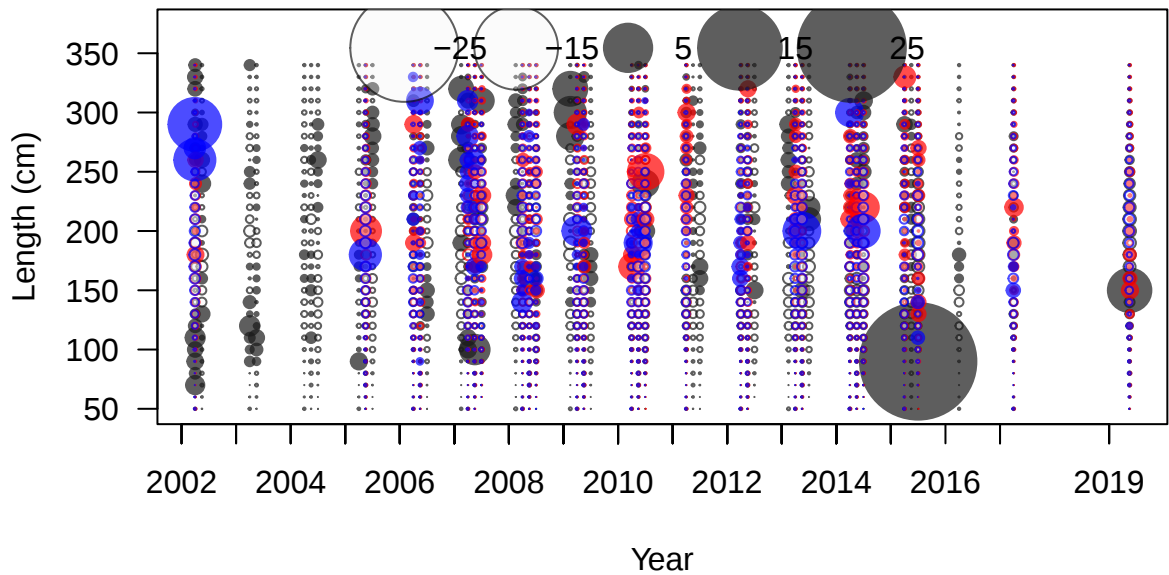


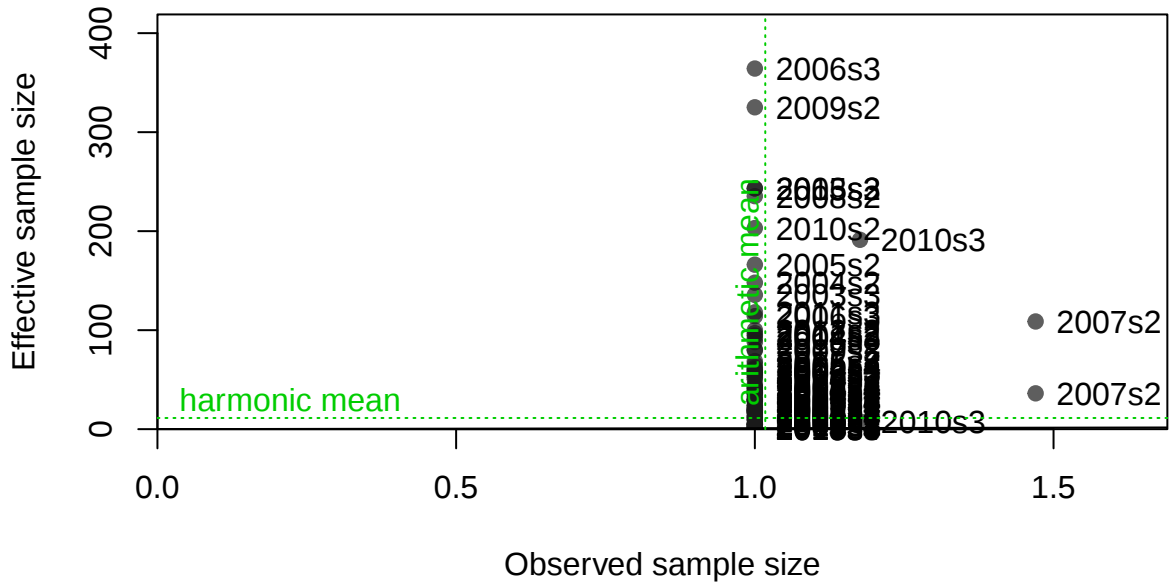
Proportion



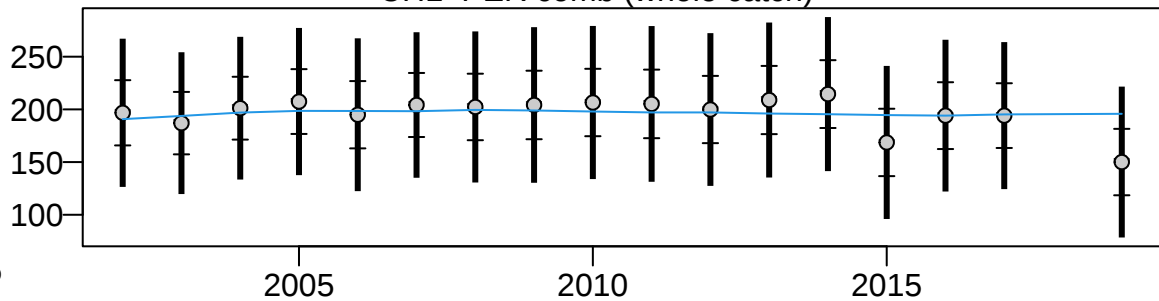
Proportion



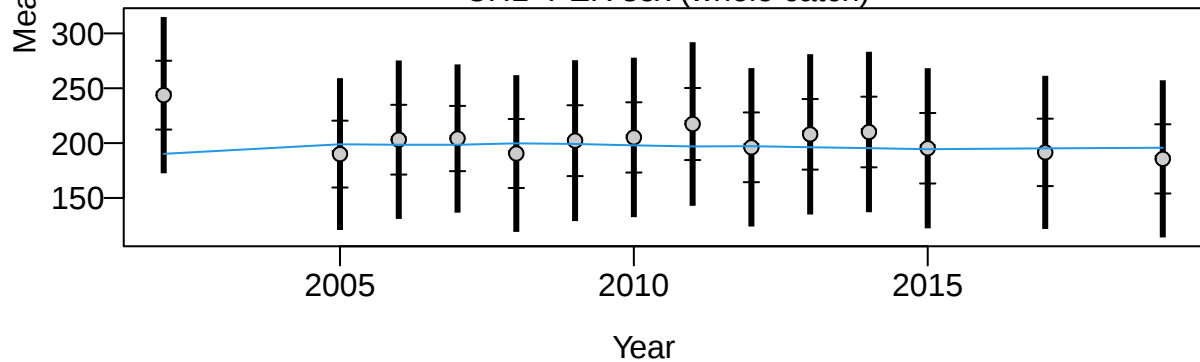




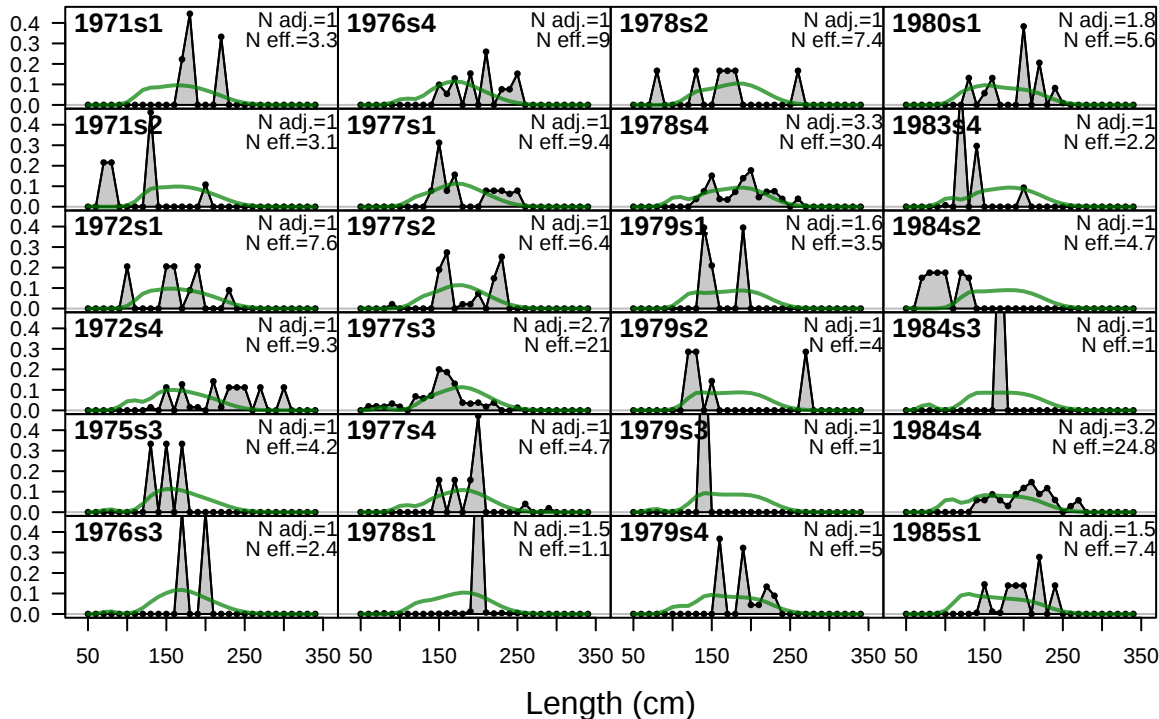
CHL+PER comb (whole catch)



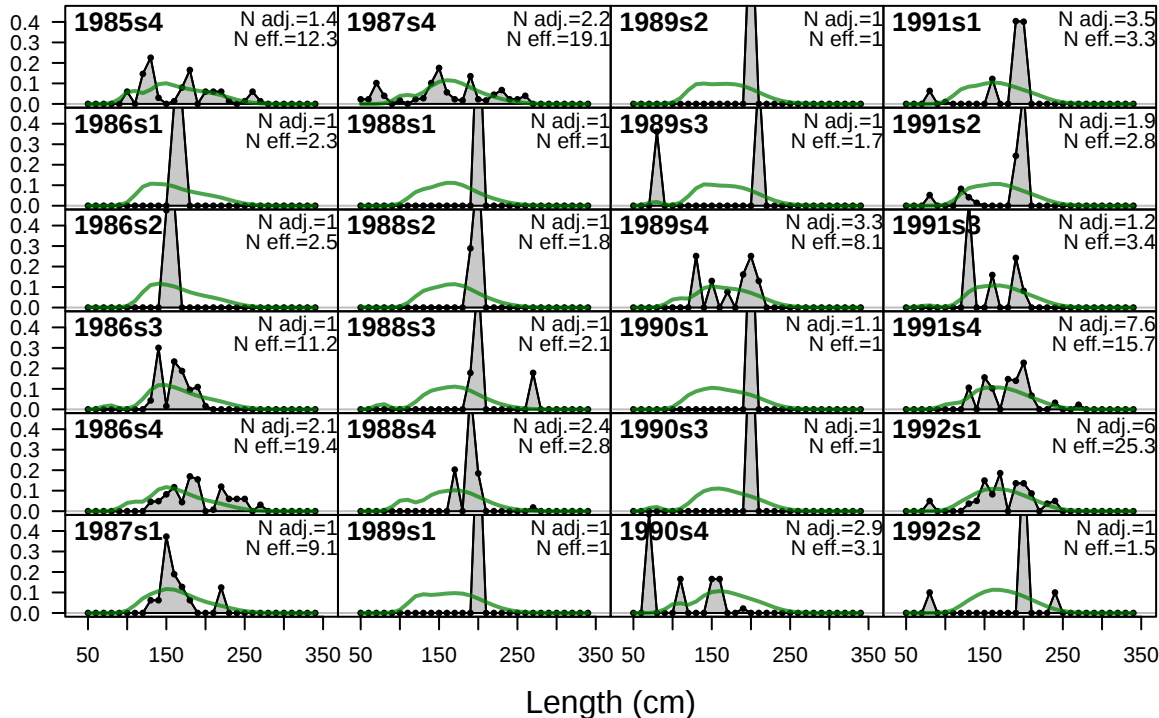
CHL+PER sex (whole catch)



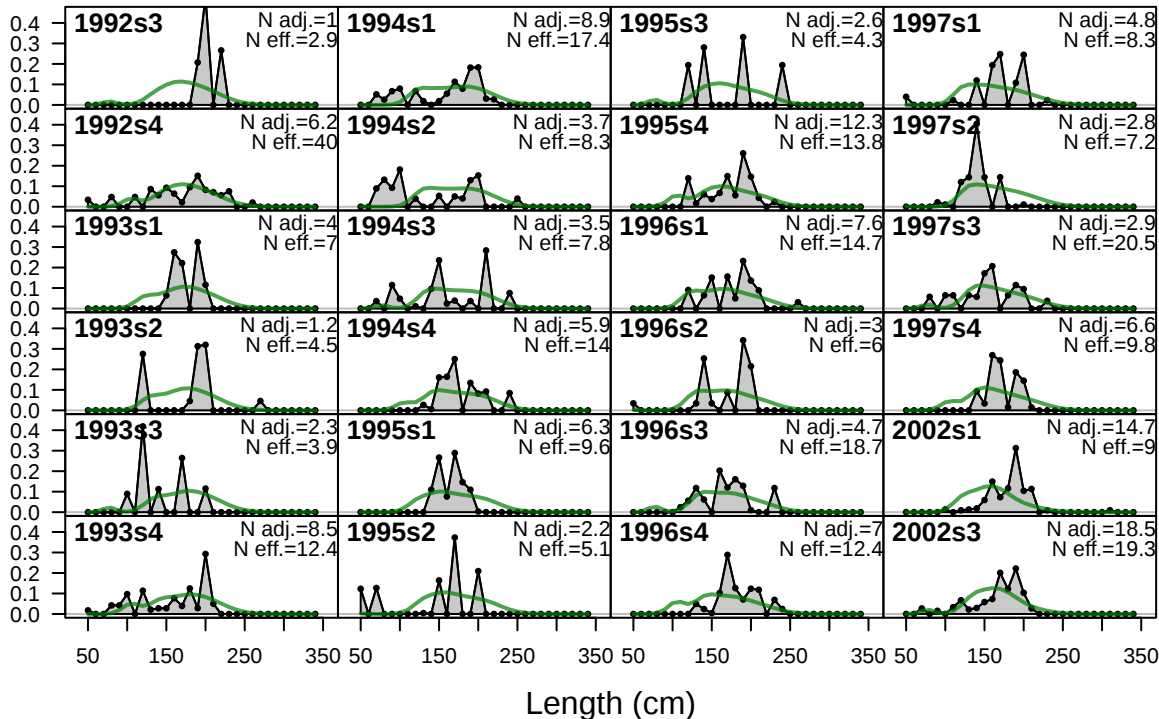
Proportion



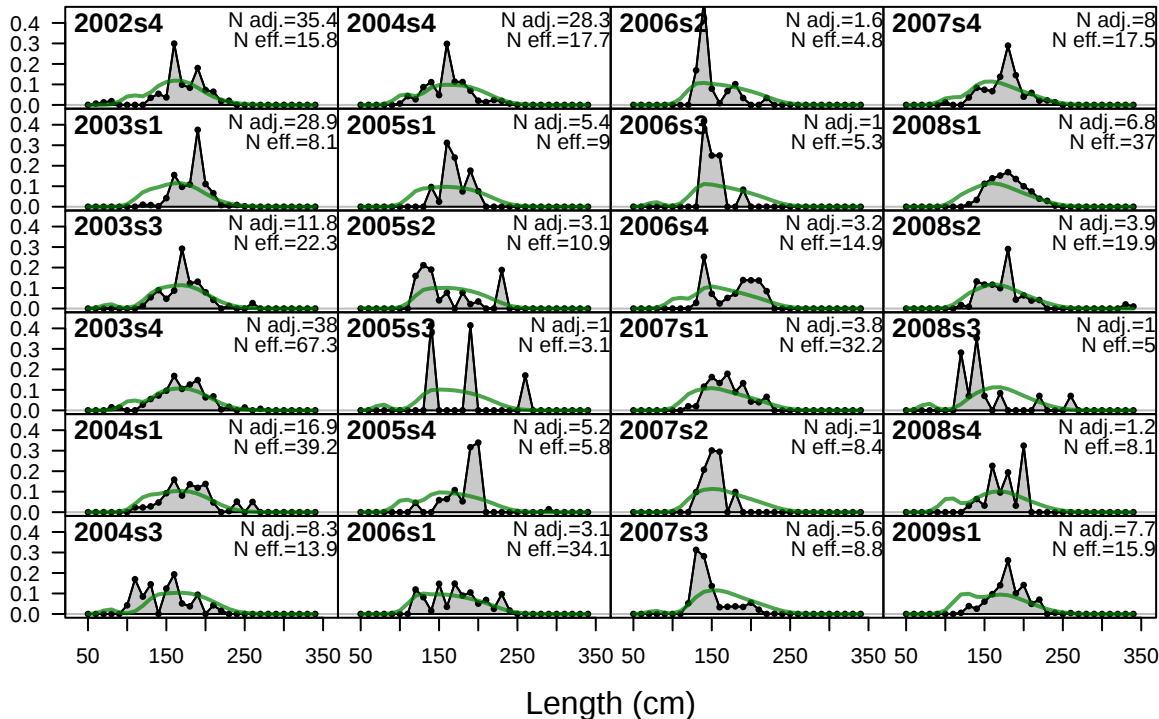
Proportion



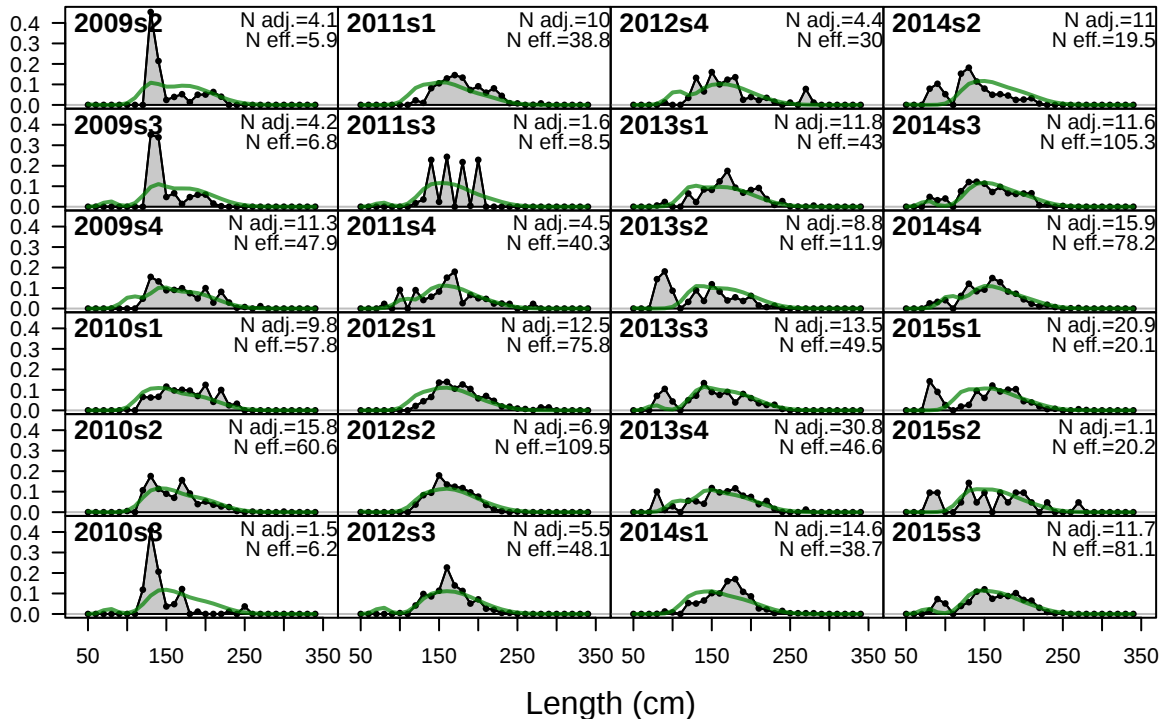
Proportion



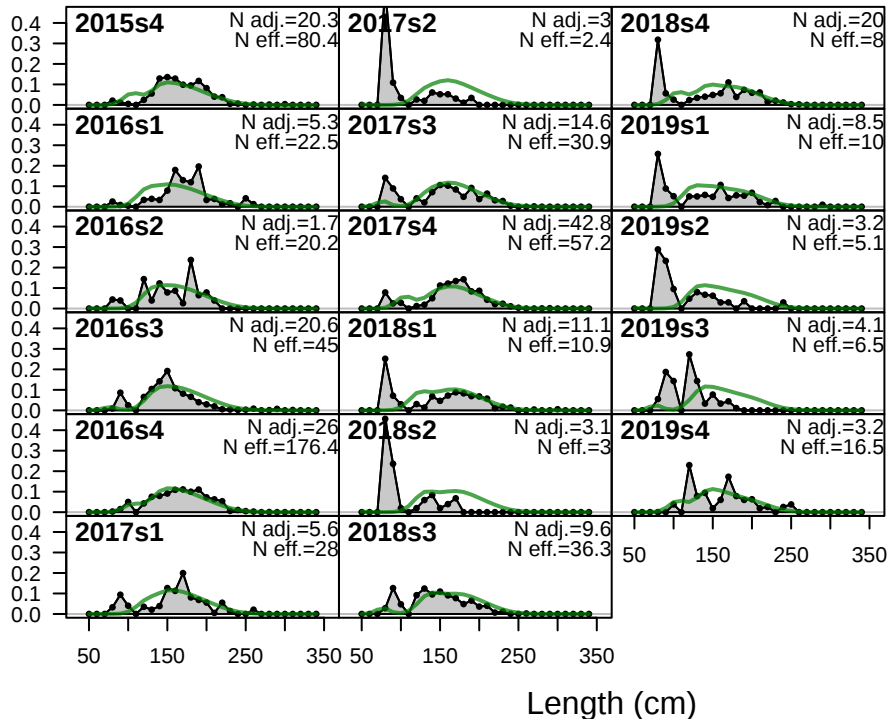
Proportion

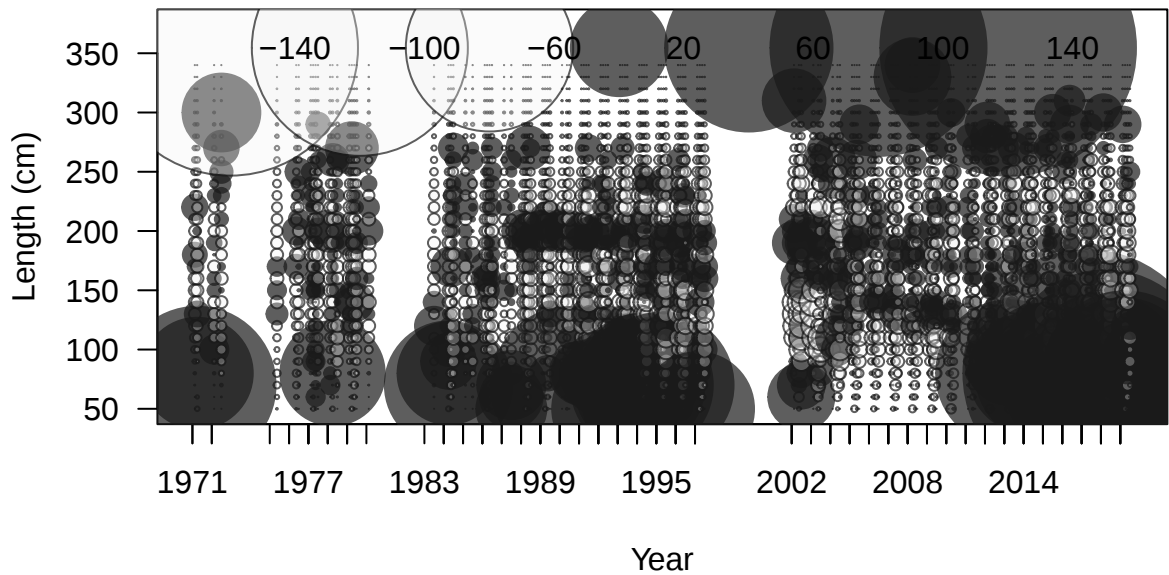


Proportion

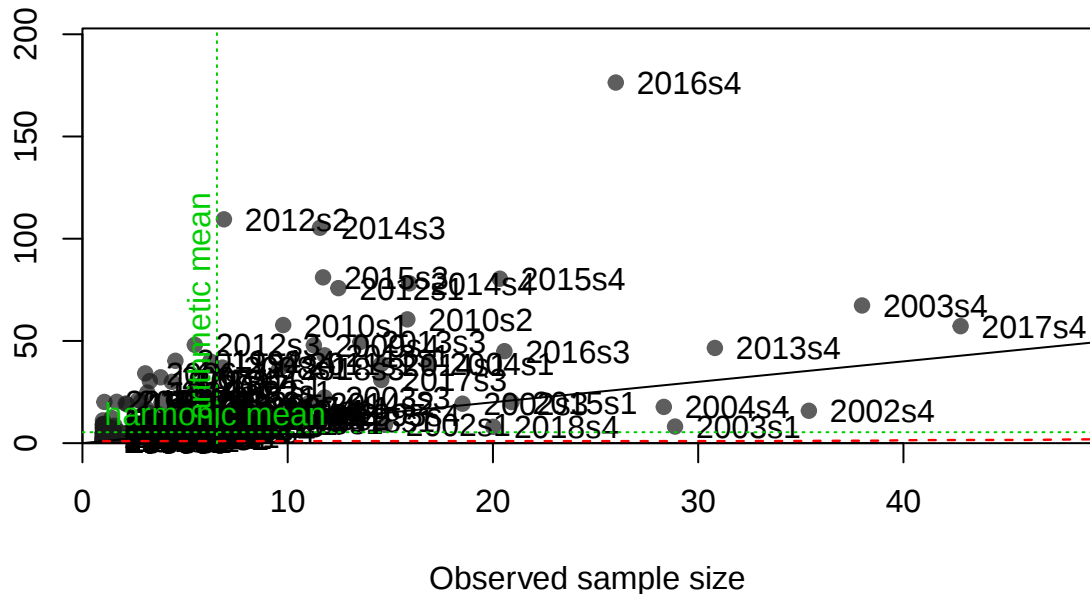


Proportion

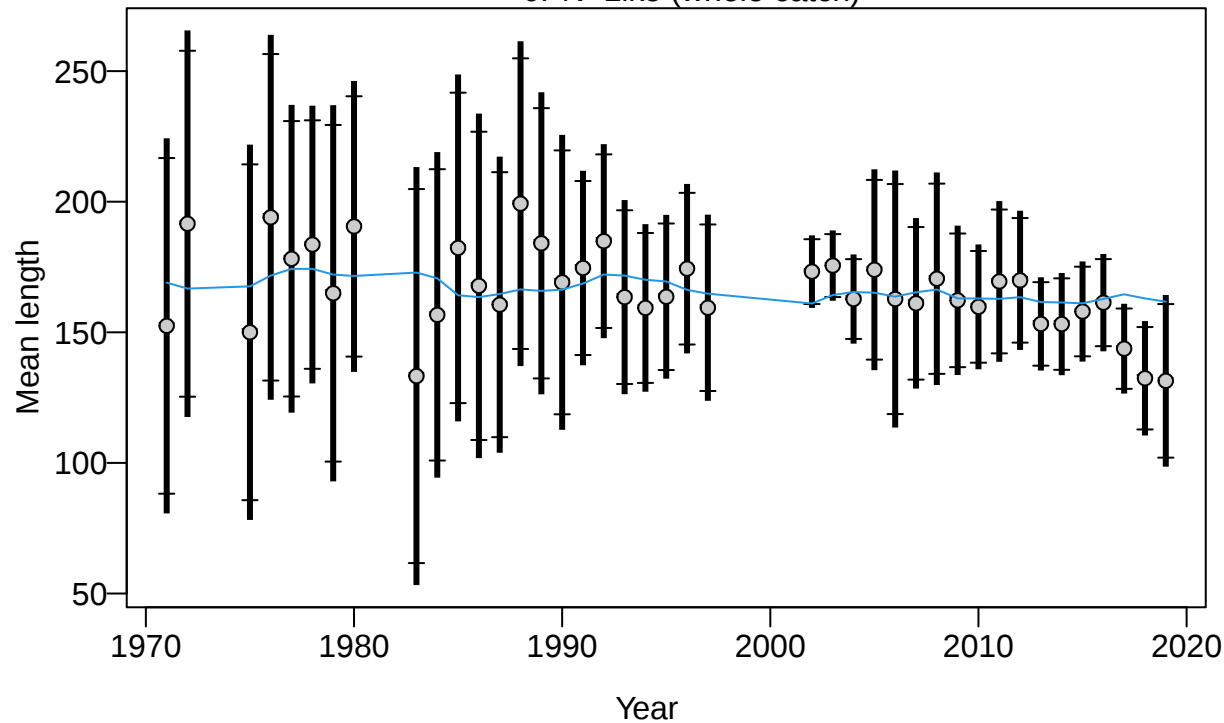




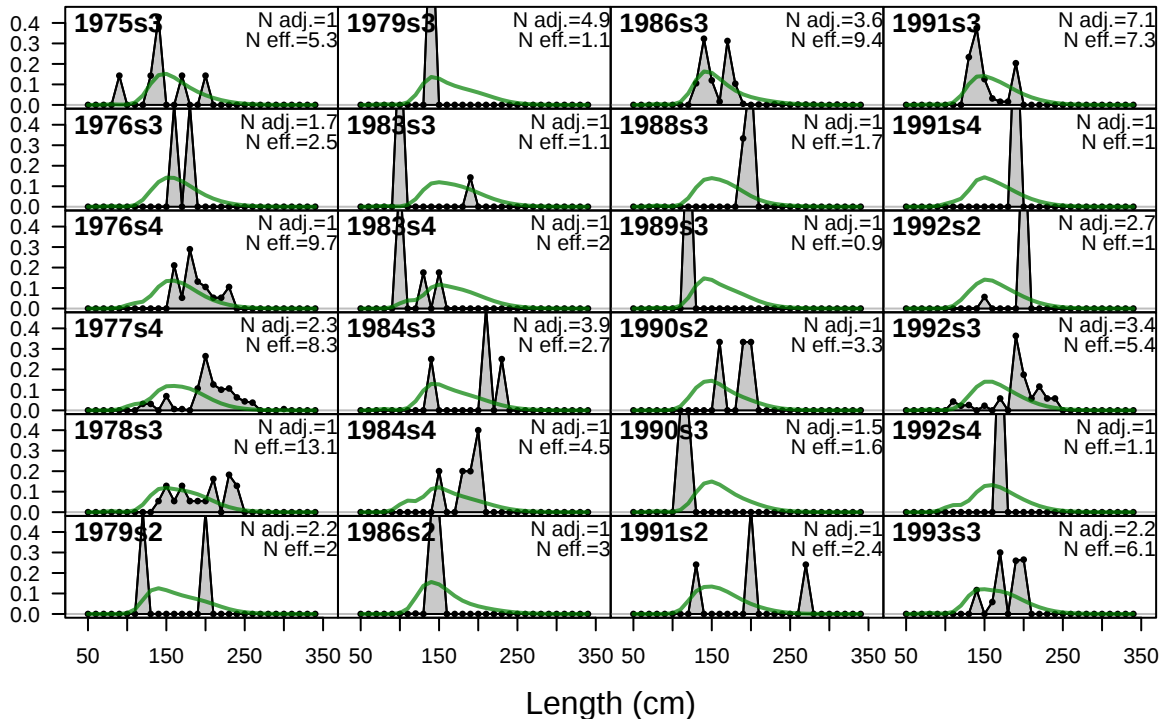
Effective sample size



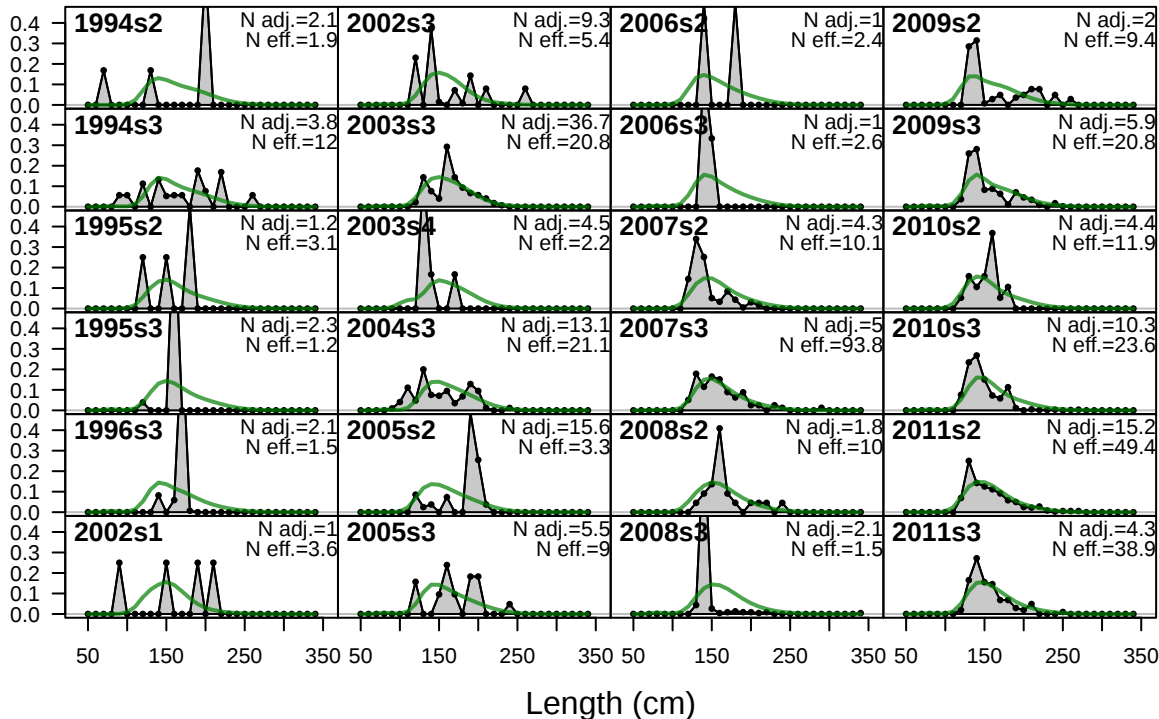
JPN+Like (whole catch)



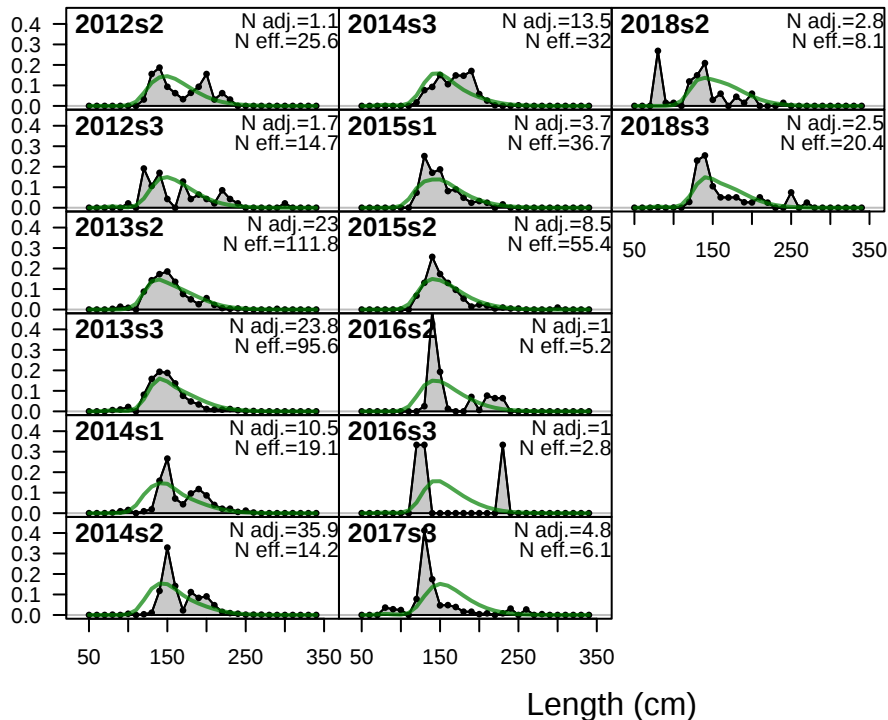
Proportion

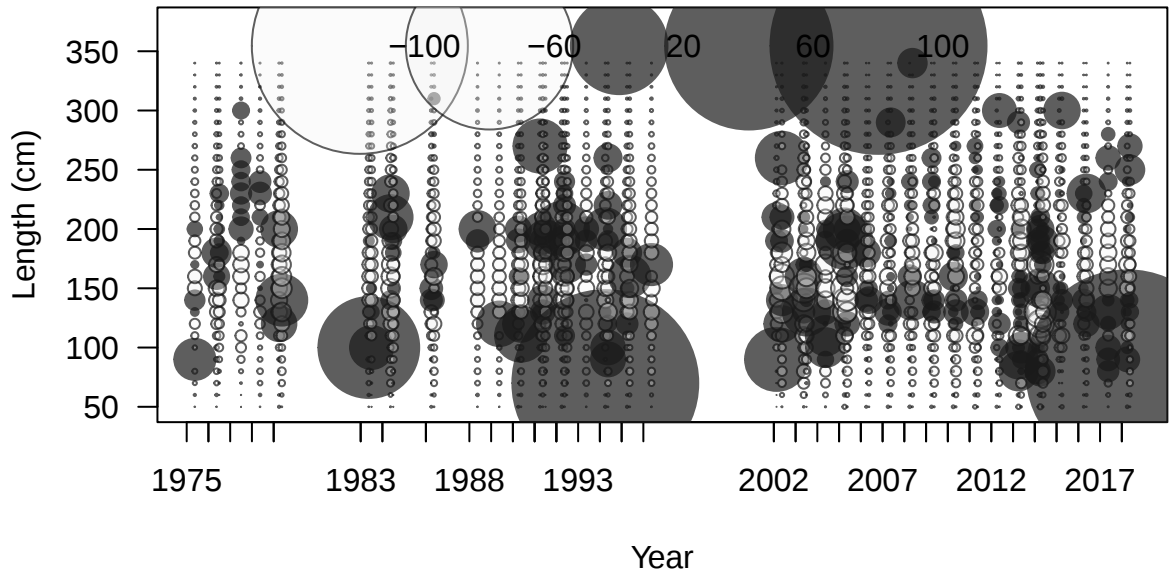


Proportion

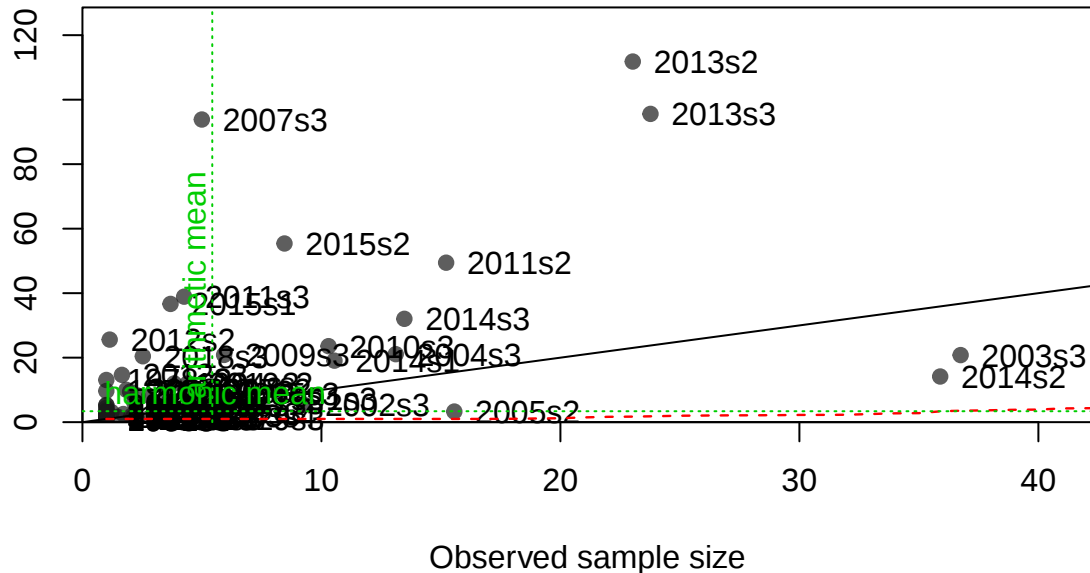


Proportion

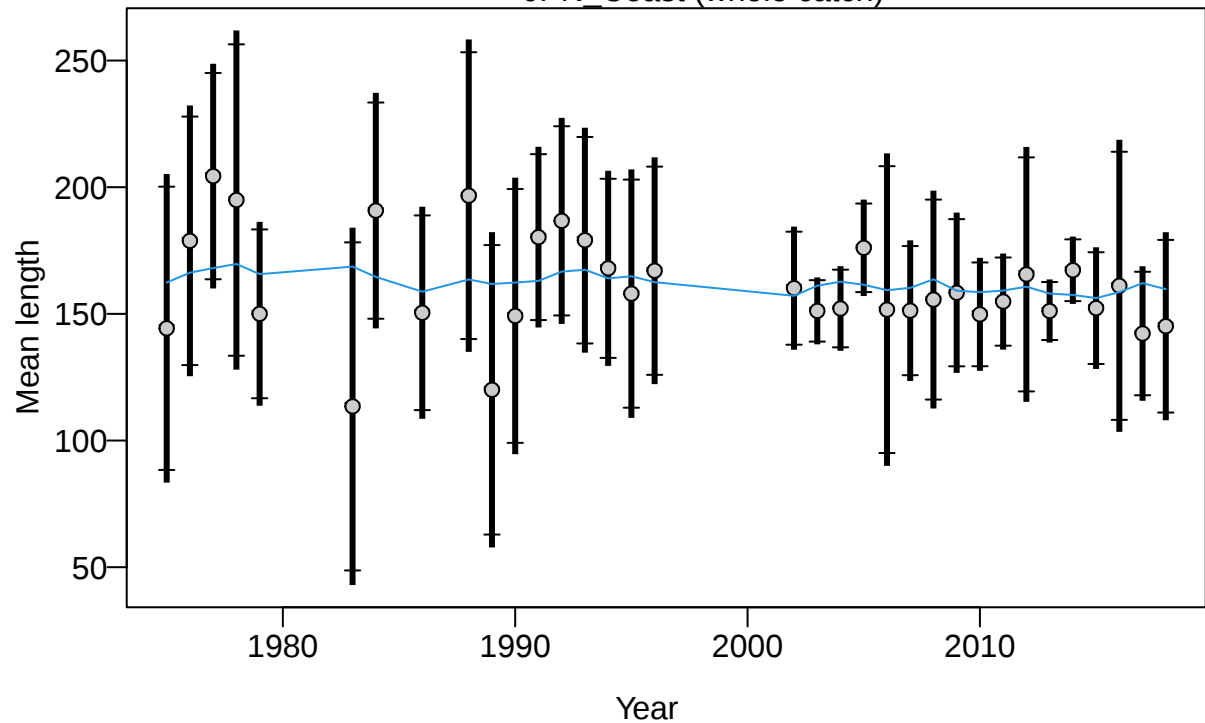


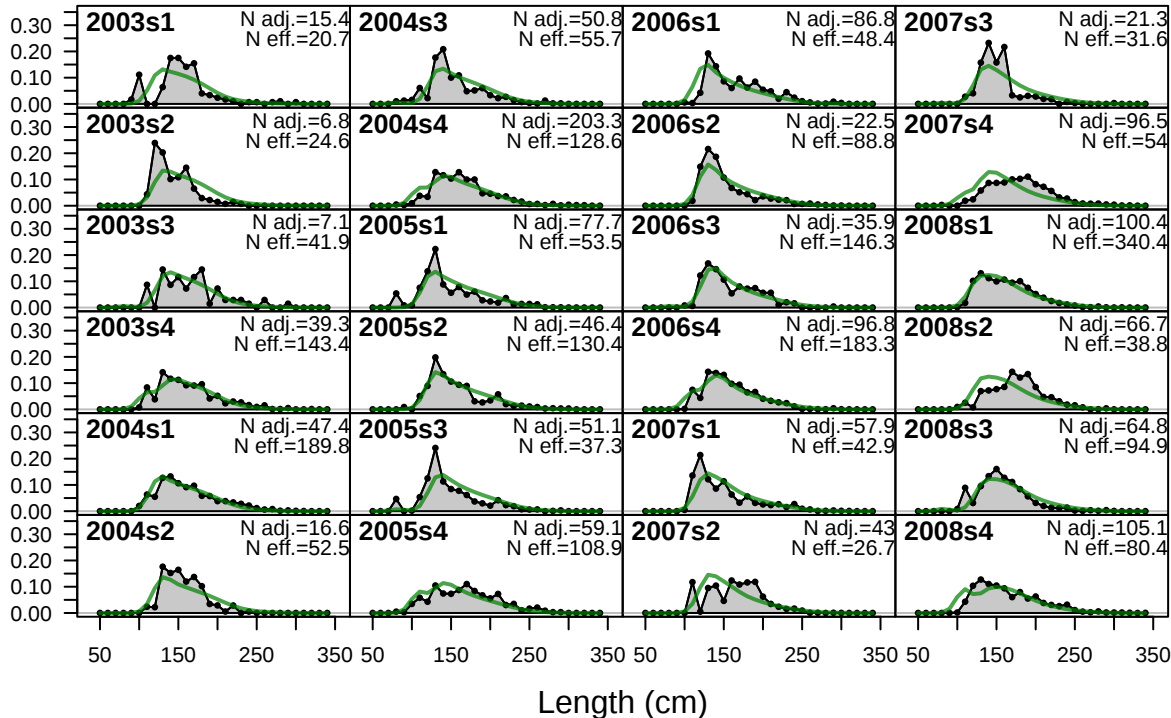


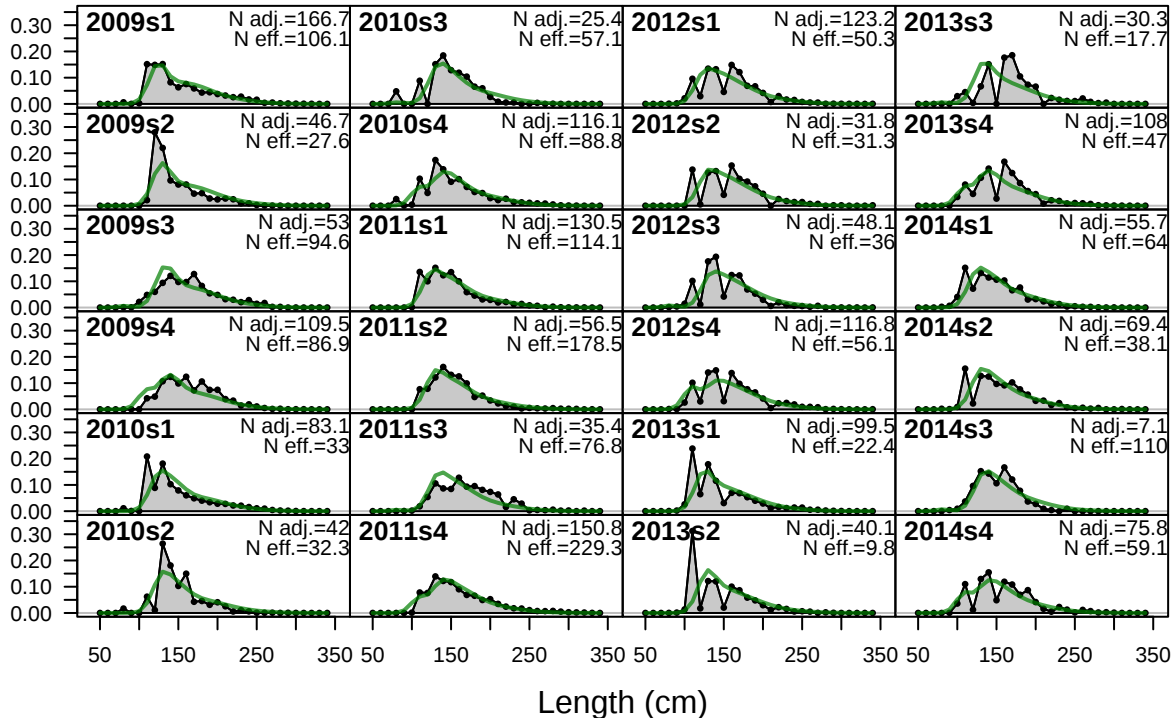
Effective sample size

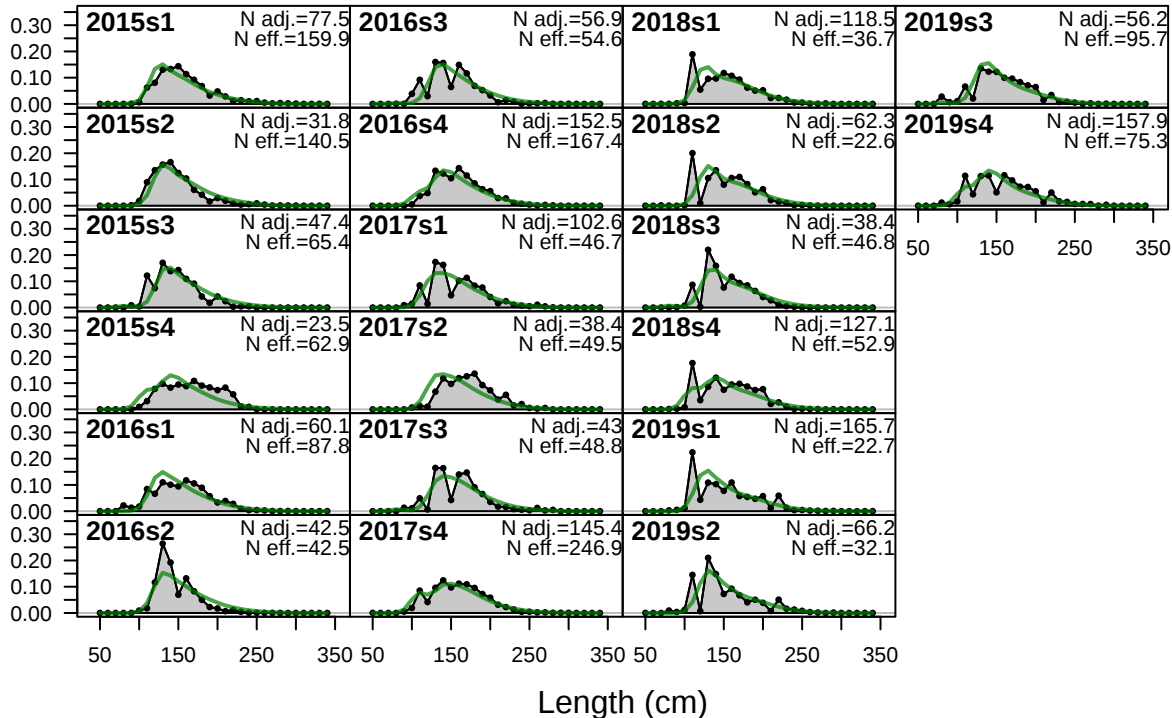


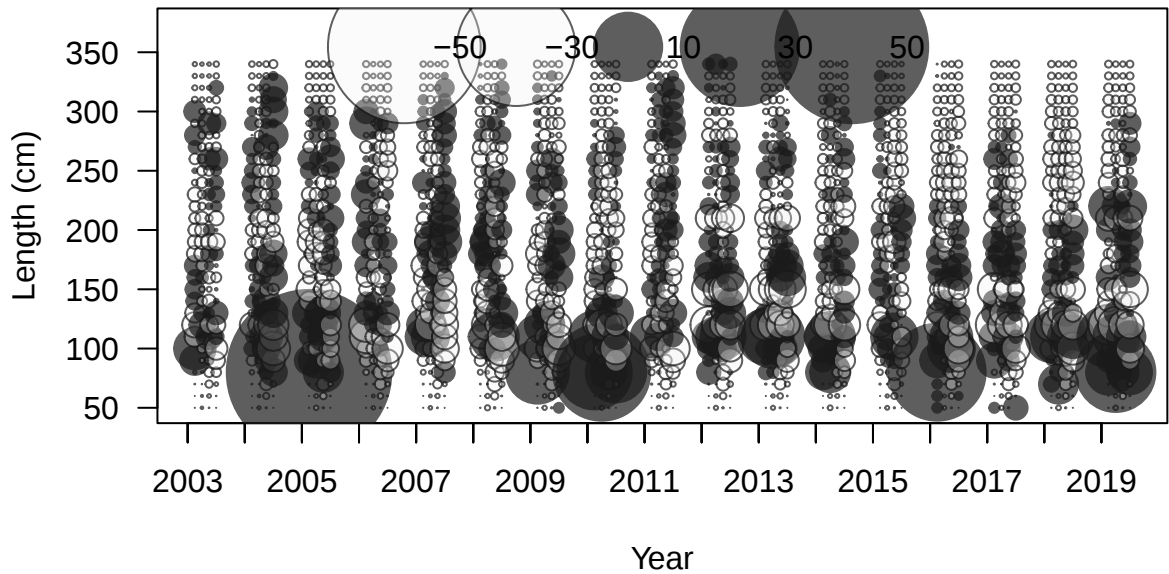
JPN_Coast (whole catch)



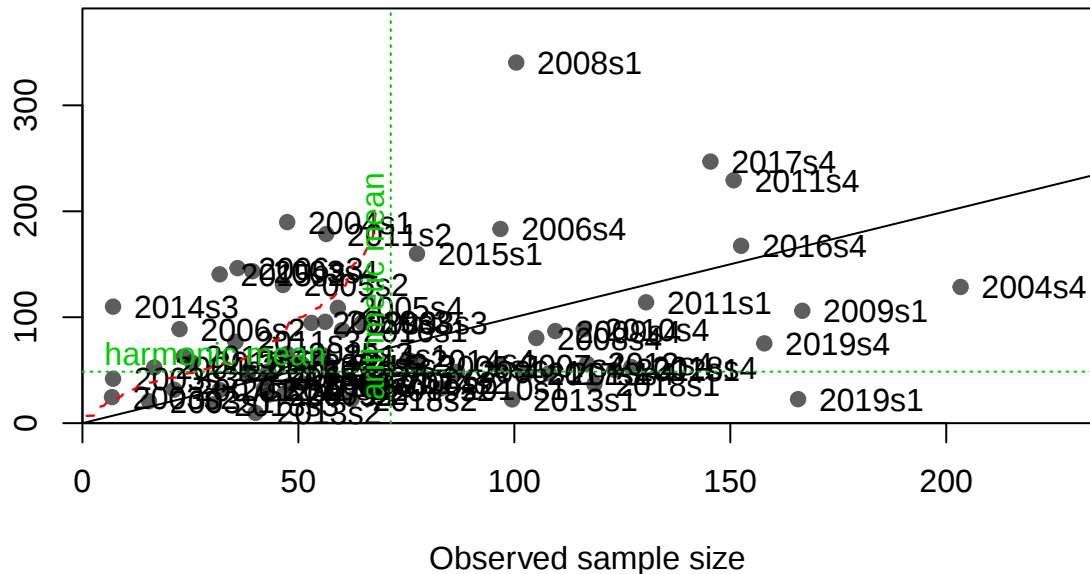




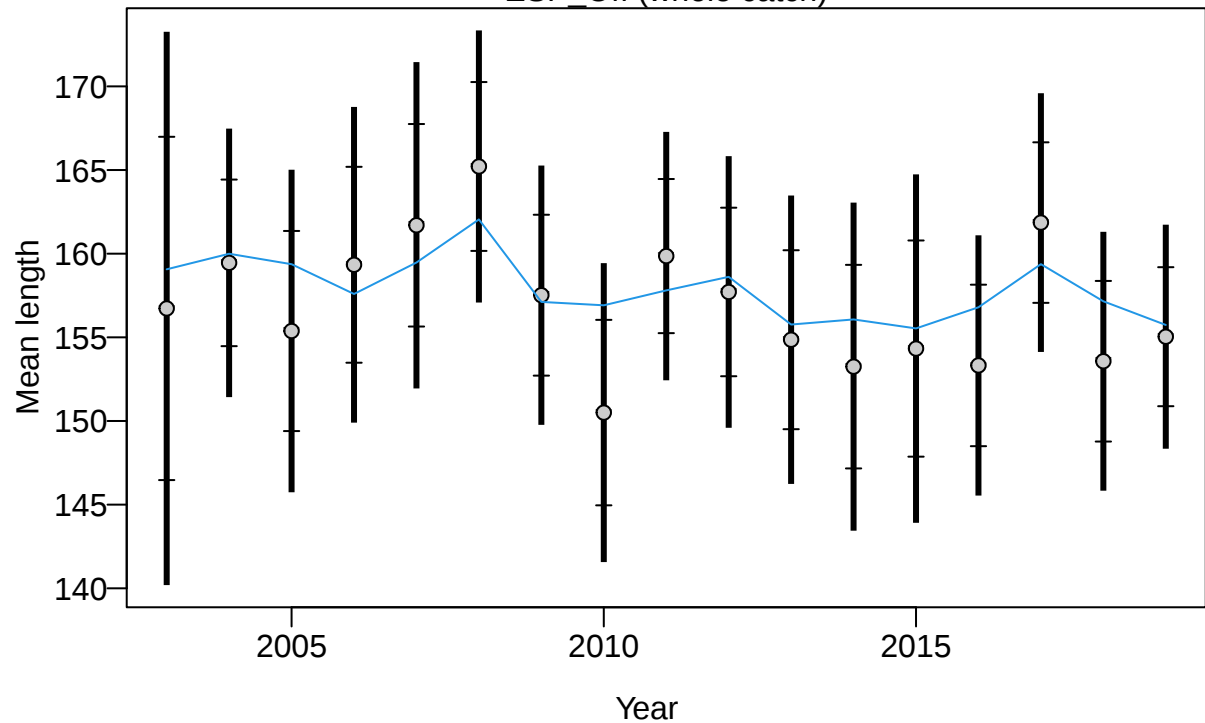




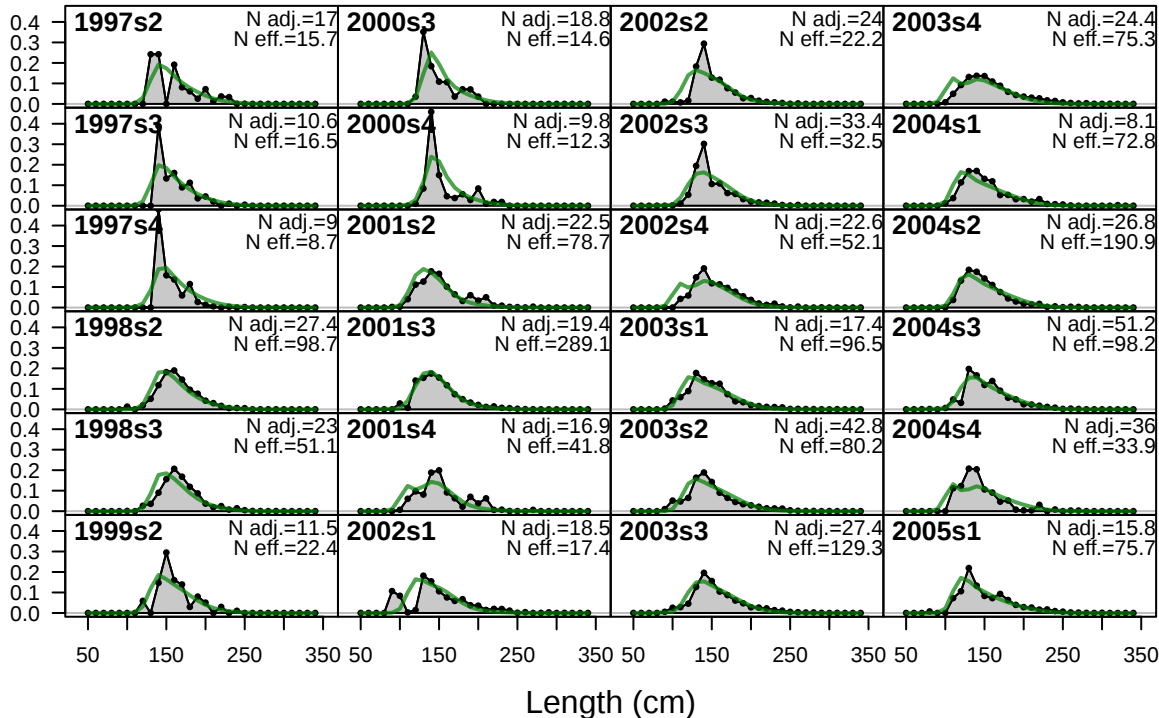
Effective sample size



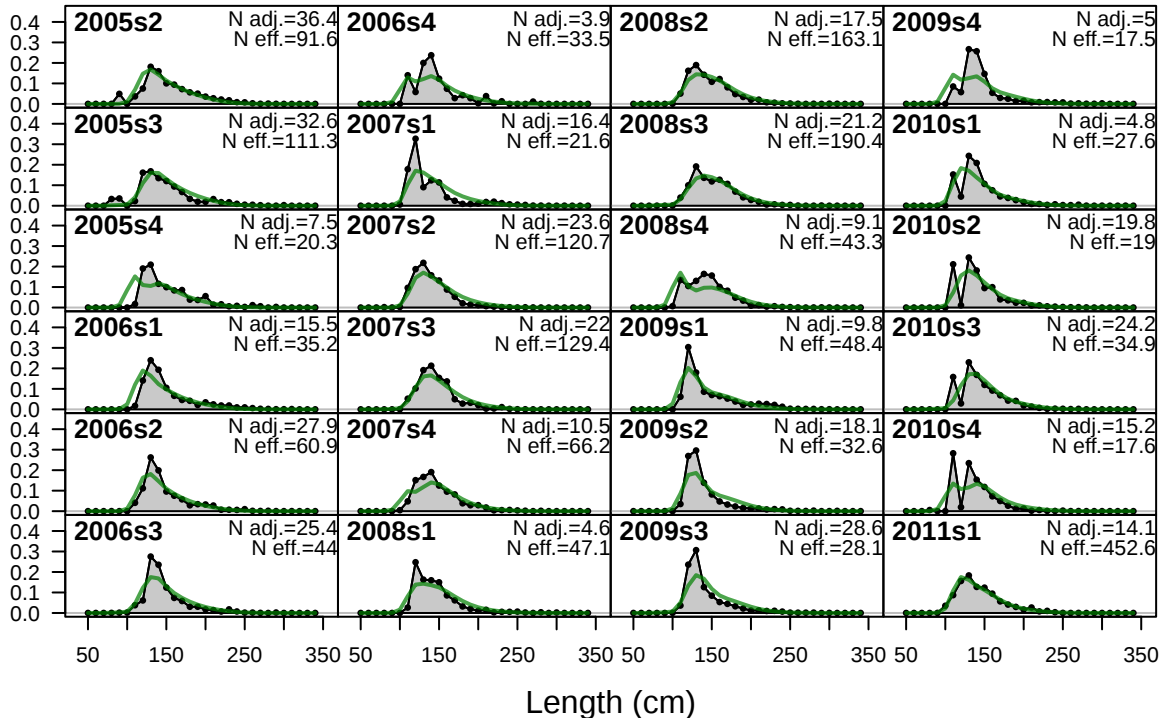
ESP_Off (whole catch)

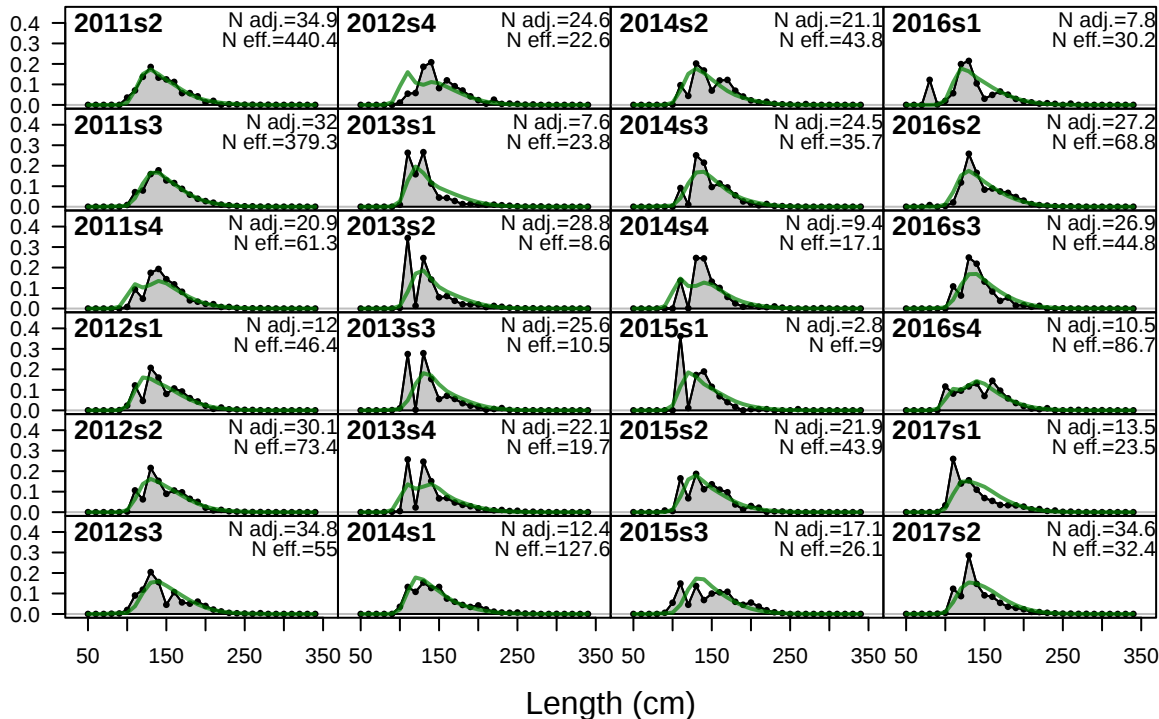


Proportion

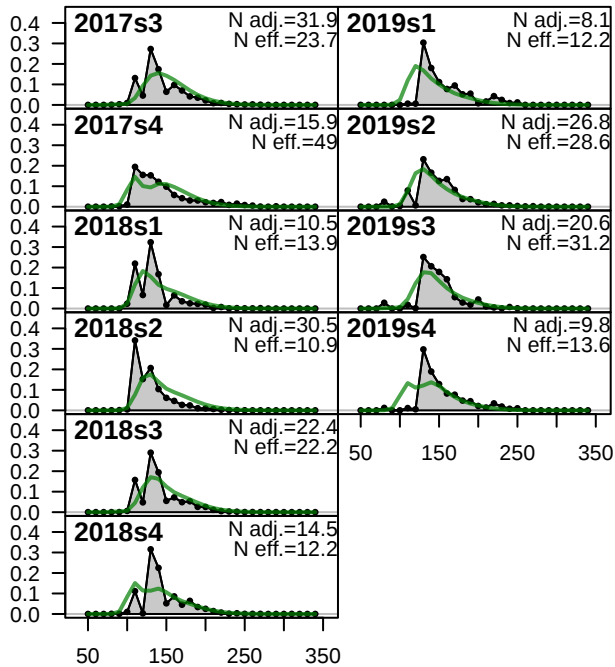


Proportion

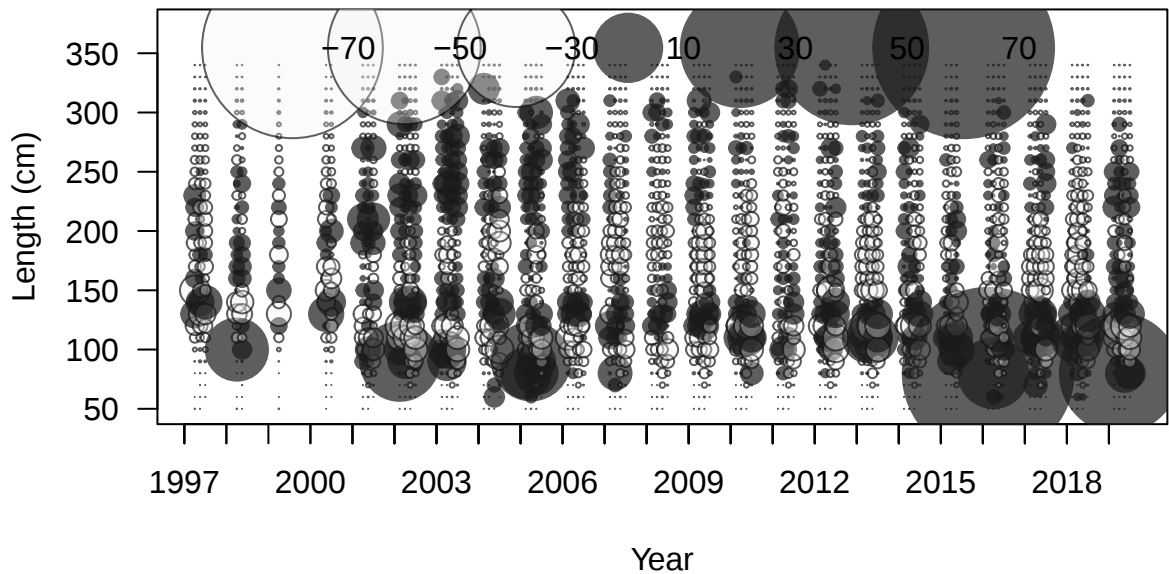




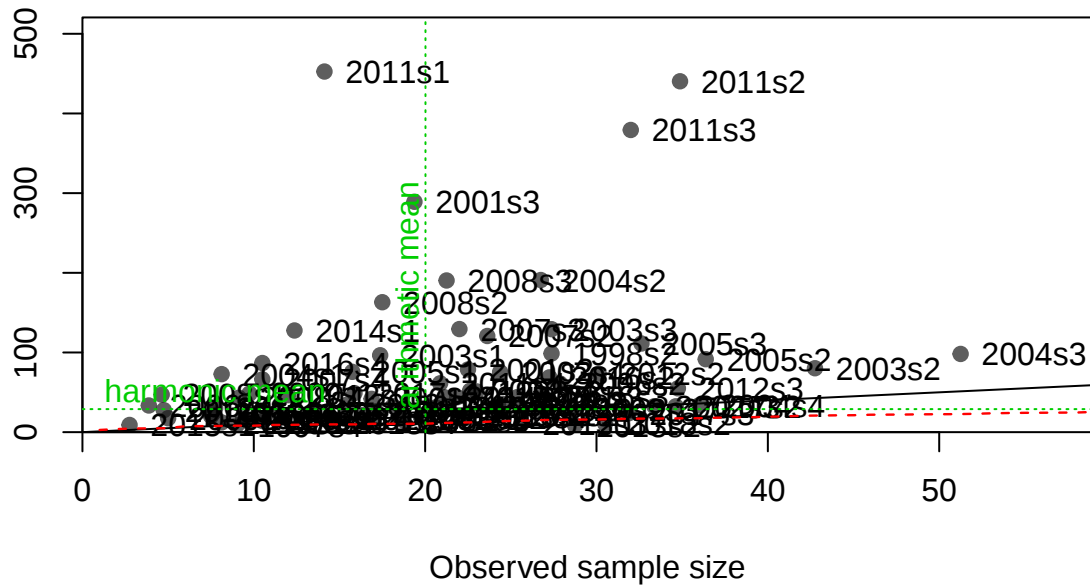
Proportion



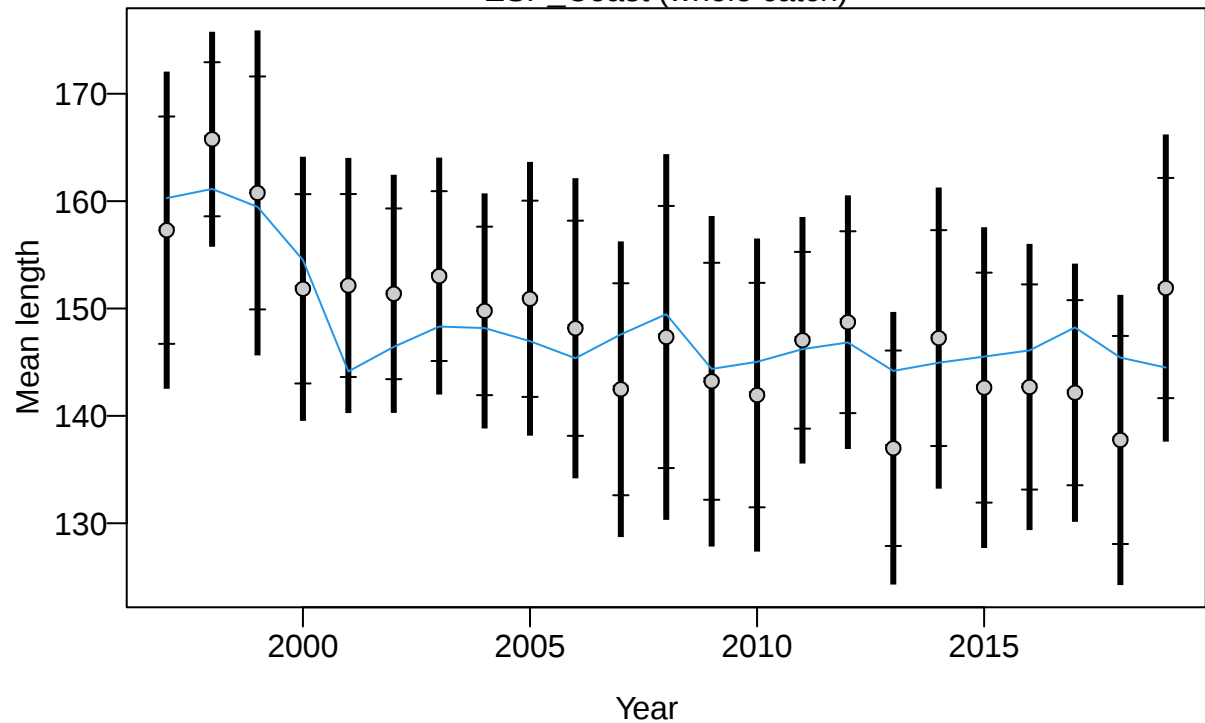
Length (cm)

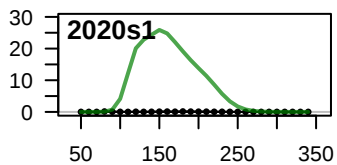


Effective sample size



ESP_Coast (whole catch)

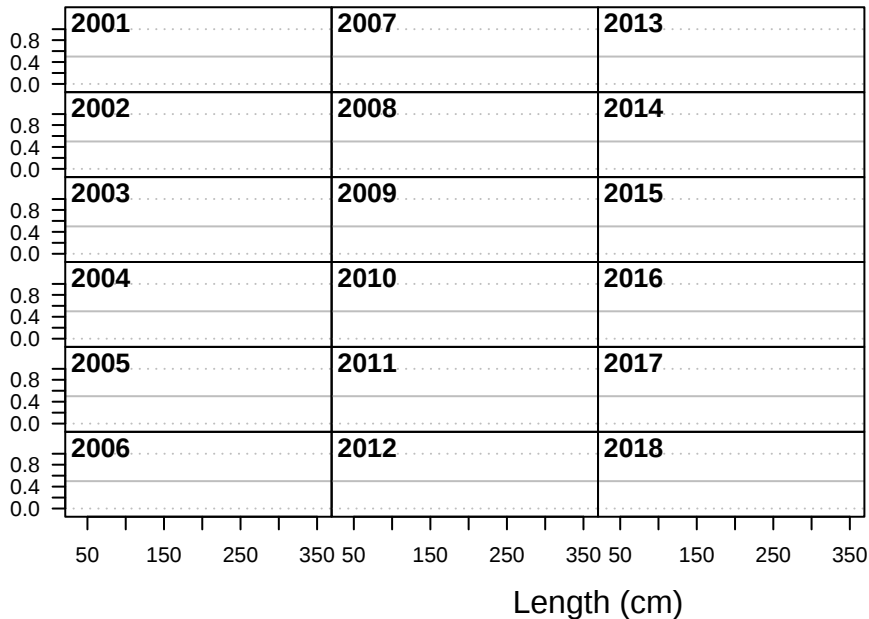


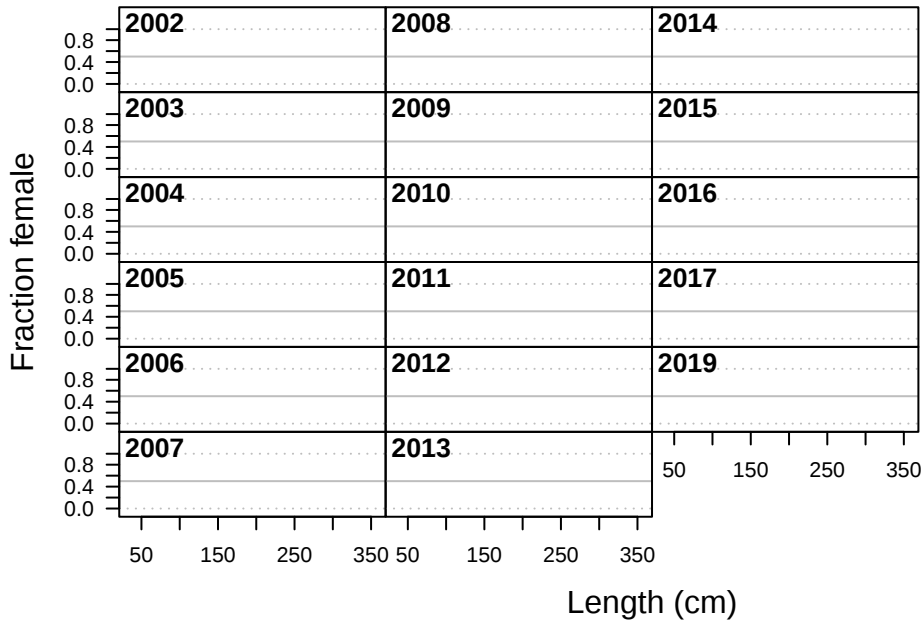


Proportion

Length (cm)

Fraction female

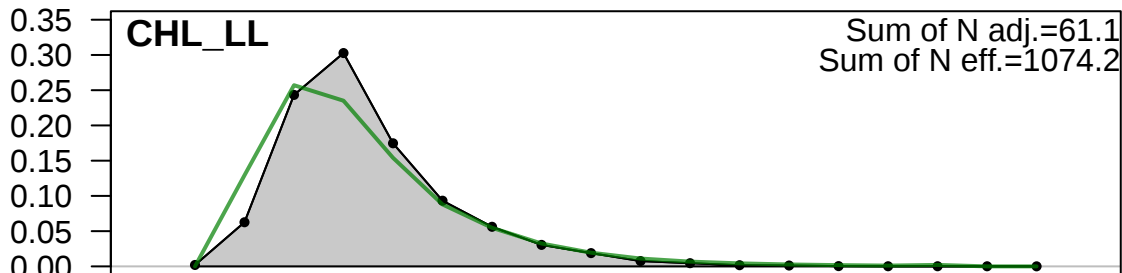




Proportion

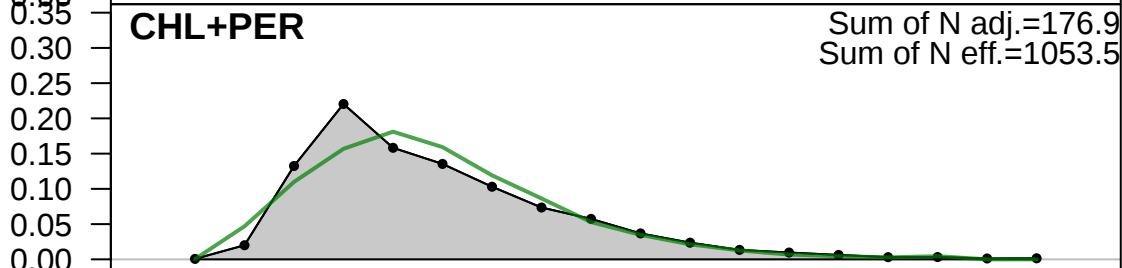
CHL_LL

Sum of N adj.=61.1
Sum of N eff.=1074.2



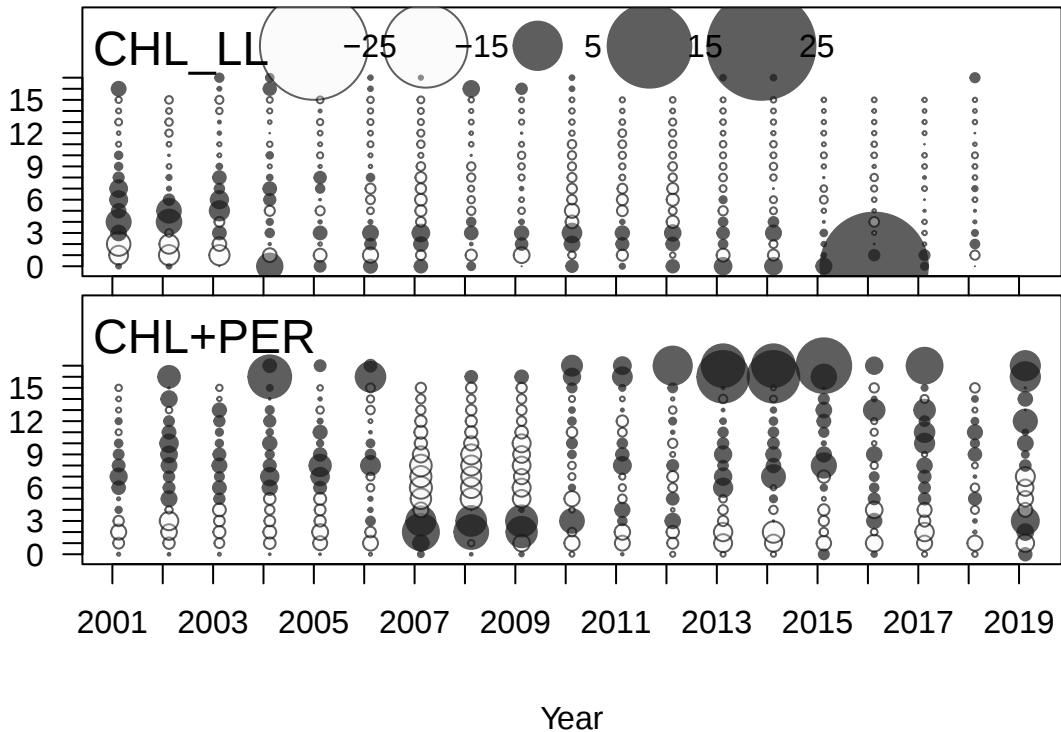
CHL+PER

Sum of N adj.=176.9
Sum of N eff.=1053.5

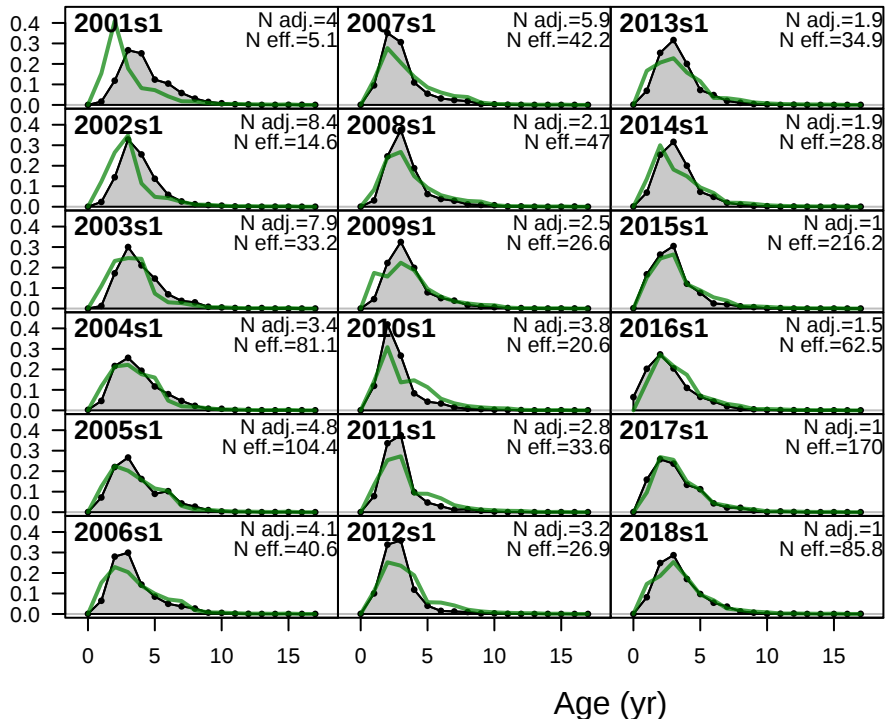


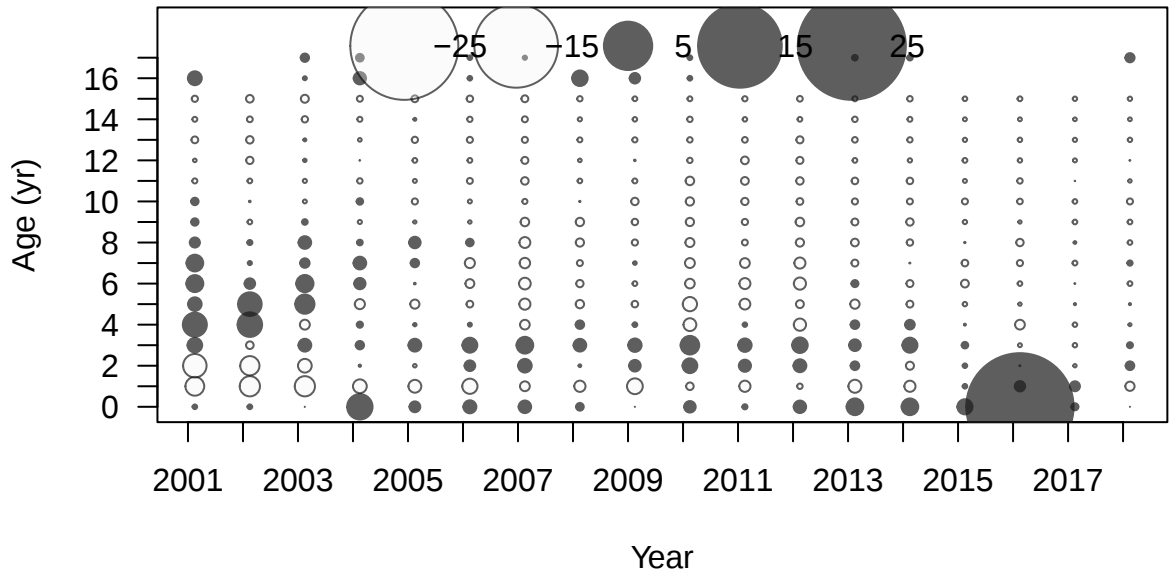
Age (yr)

Age (yr)

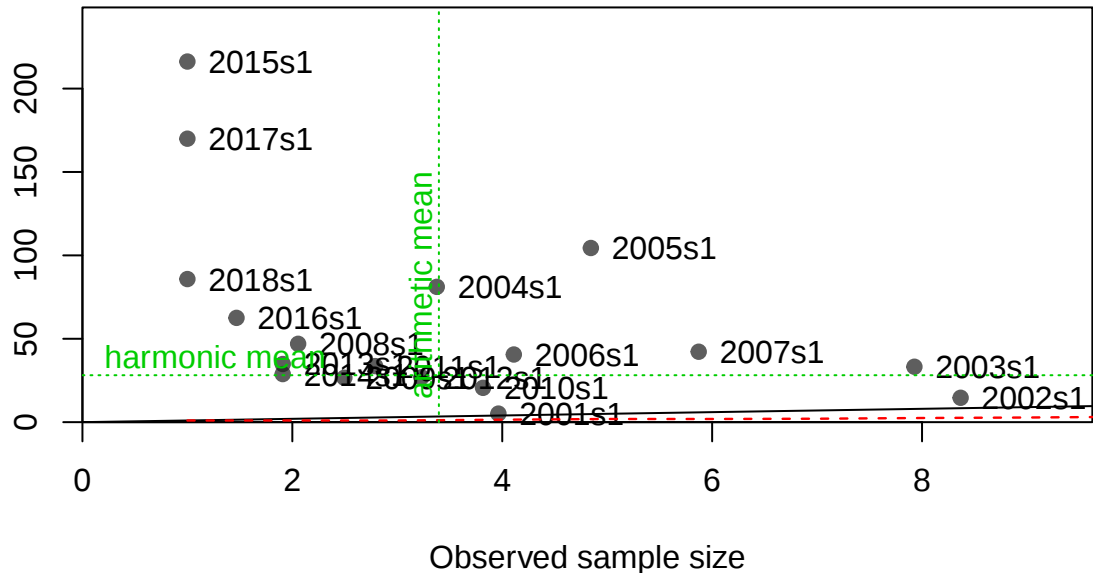


Proportion

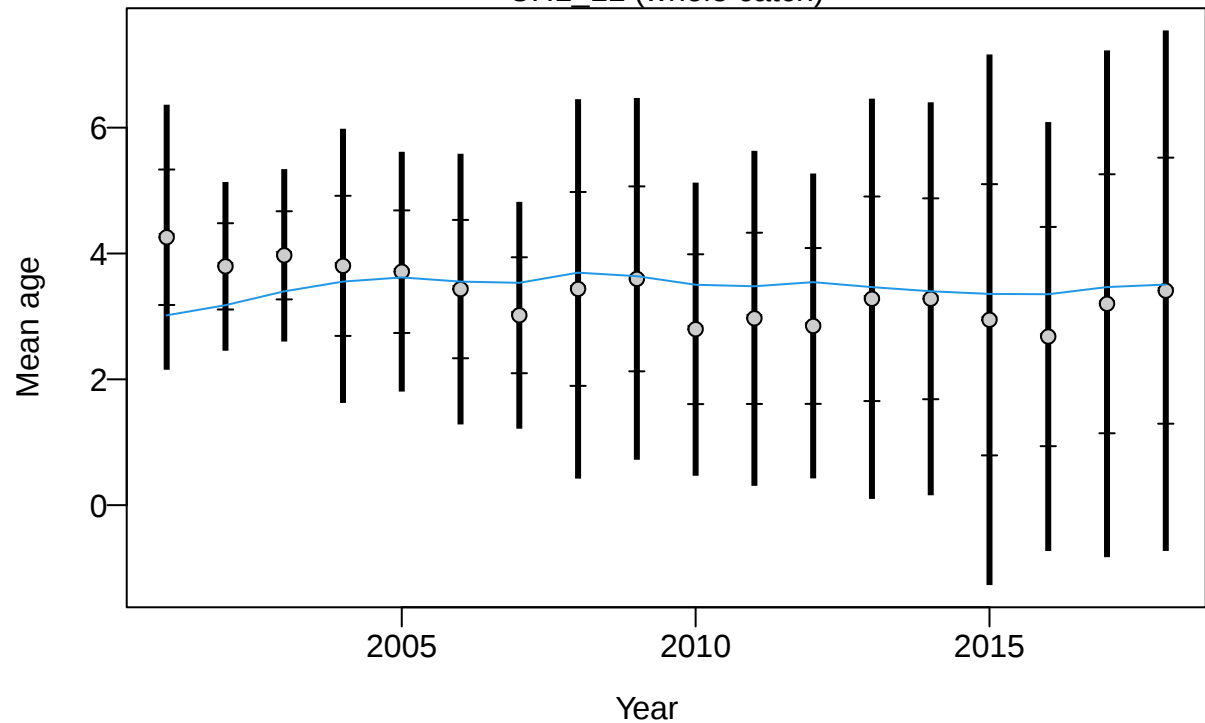




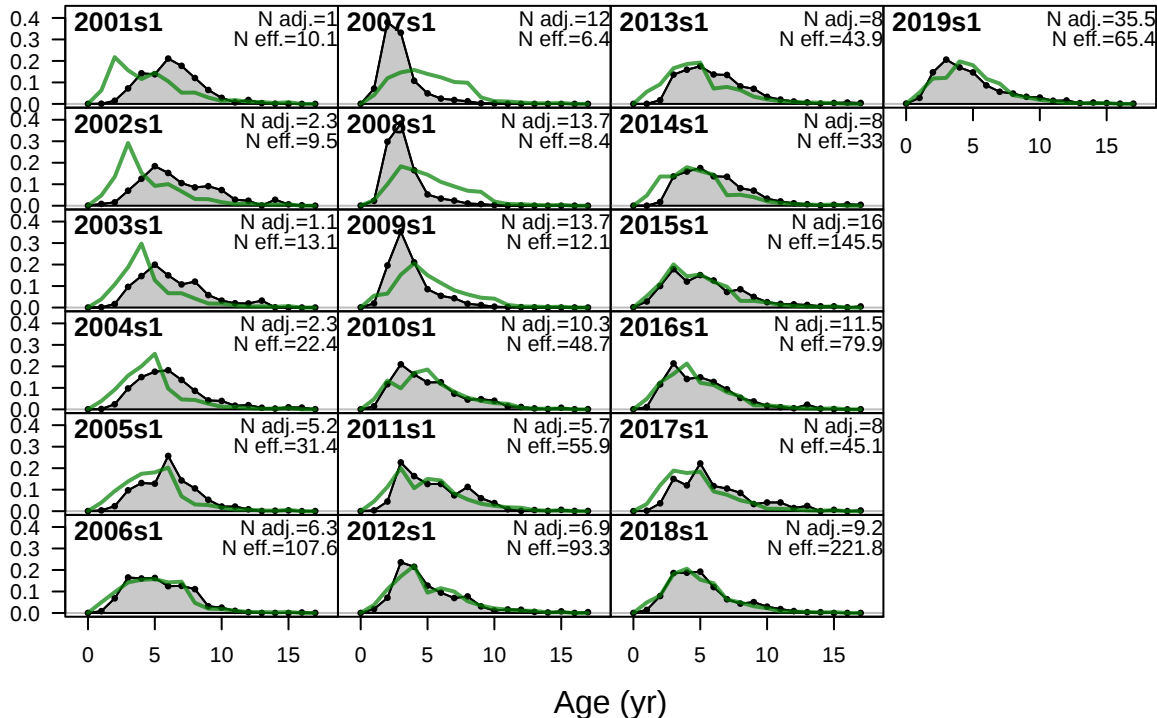
Effective sample size

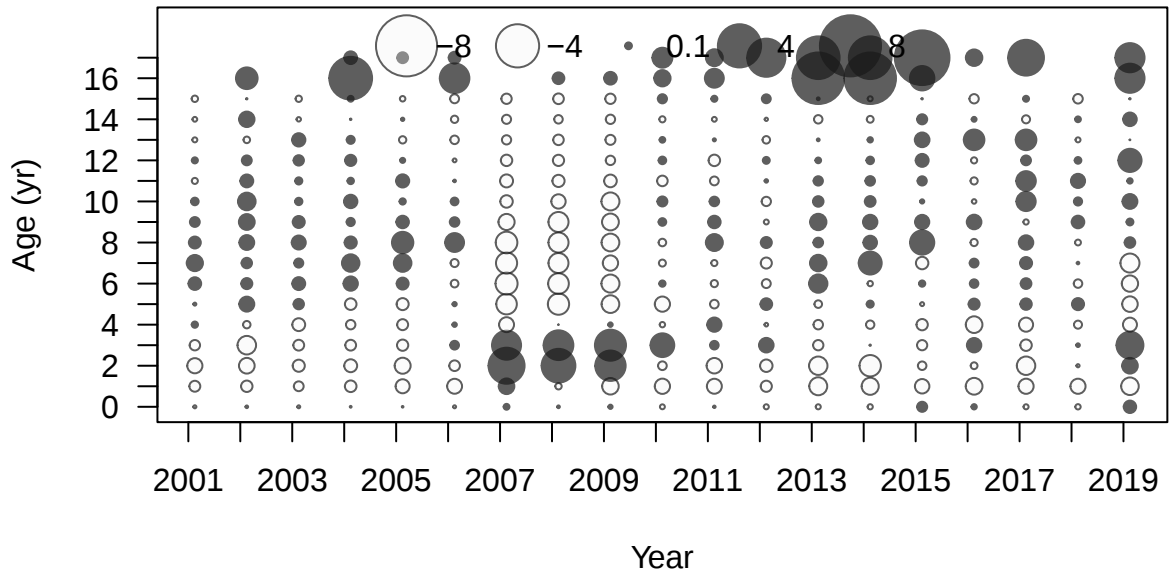


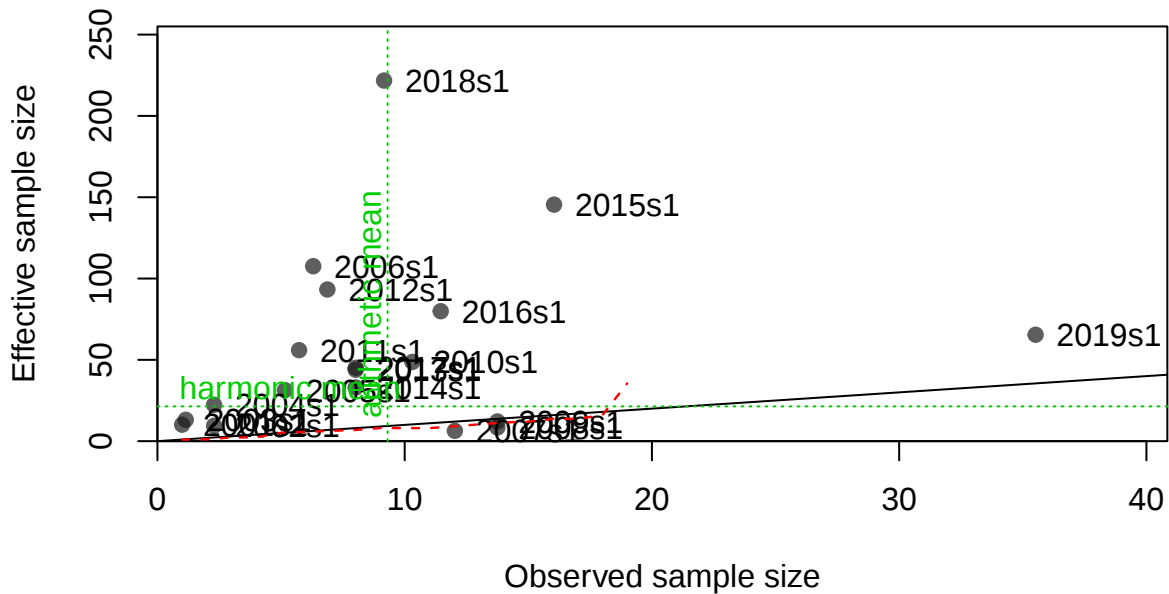
CHL_LL (whole catch)



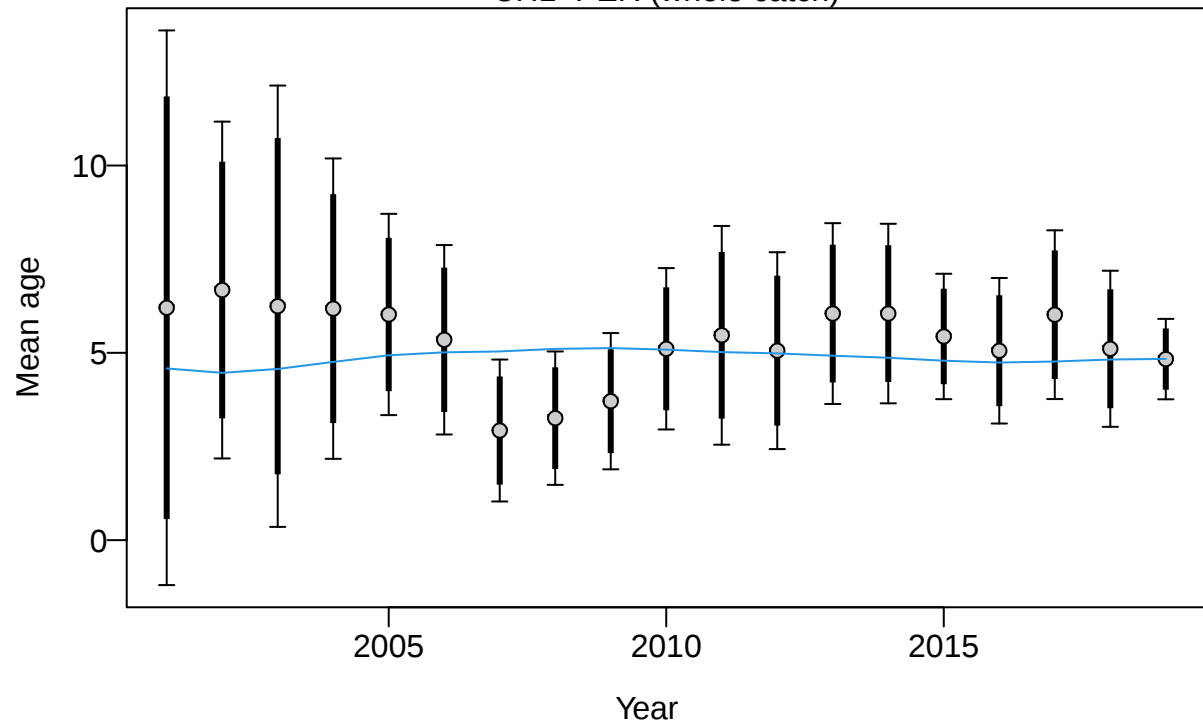
Proportion

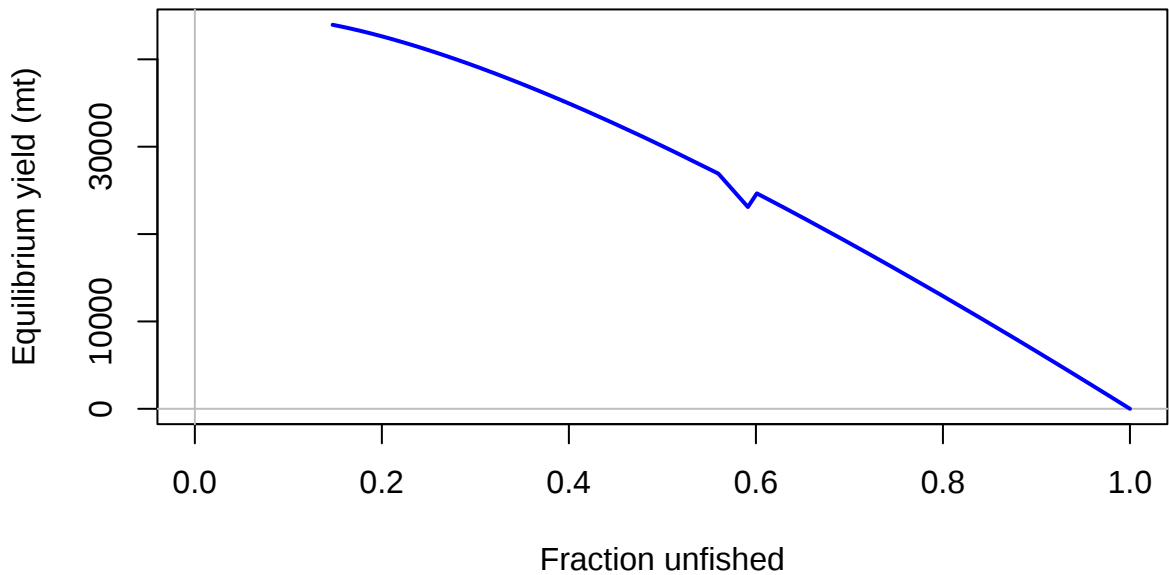


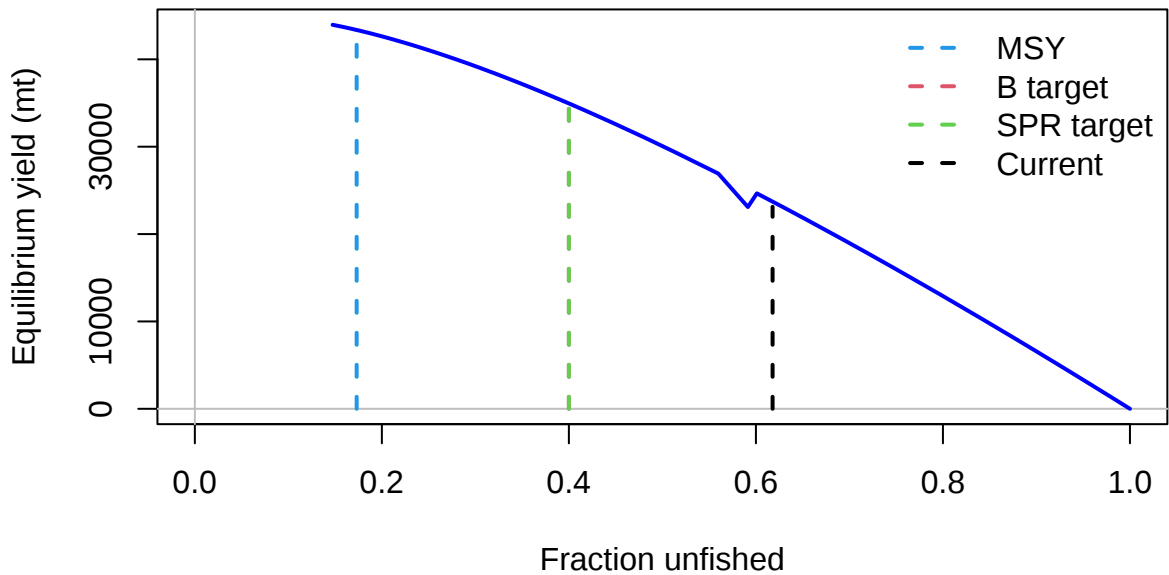


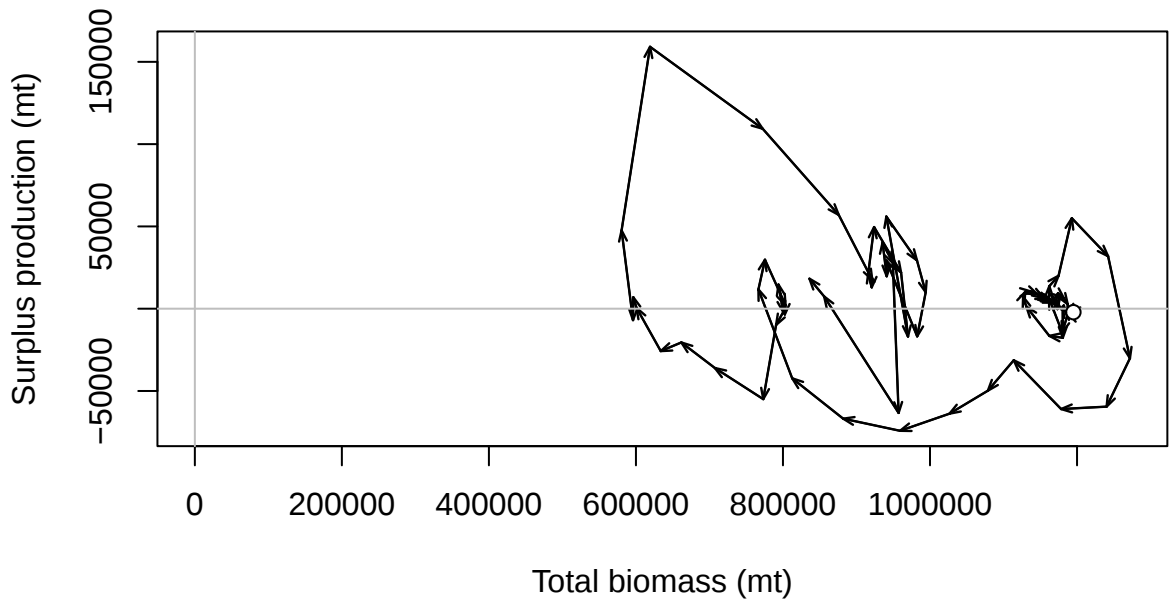


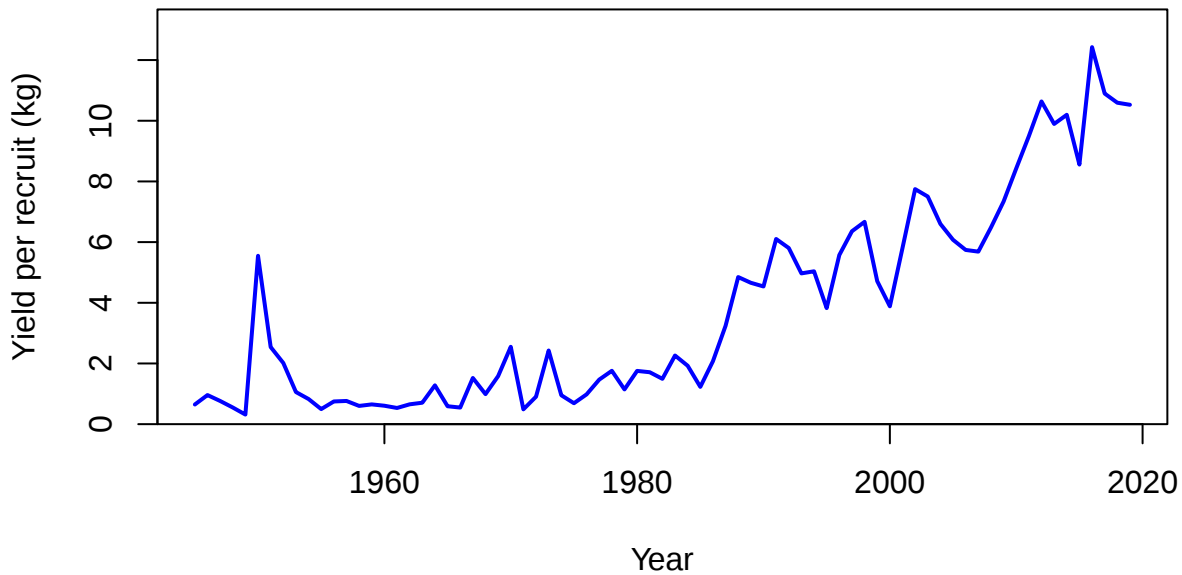
CHL+PER (whole catch)

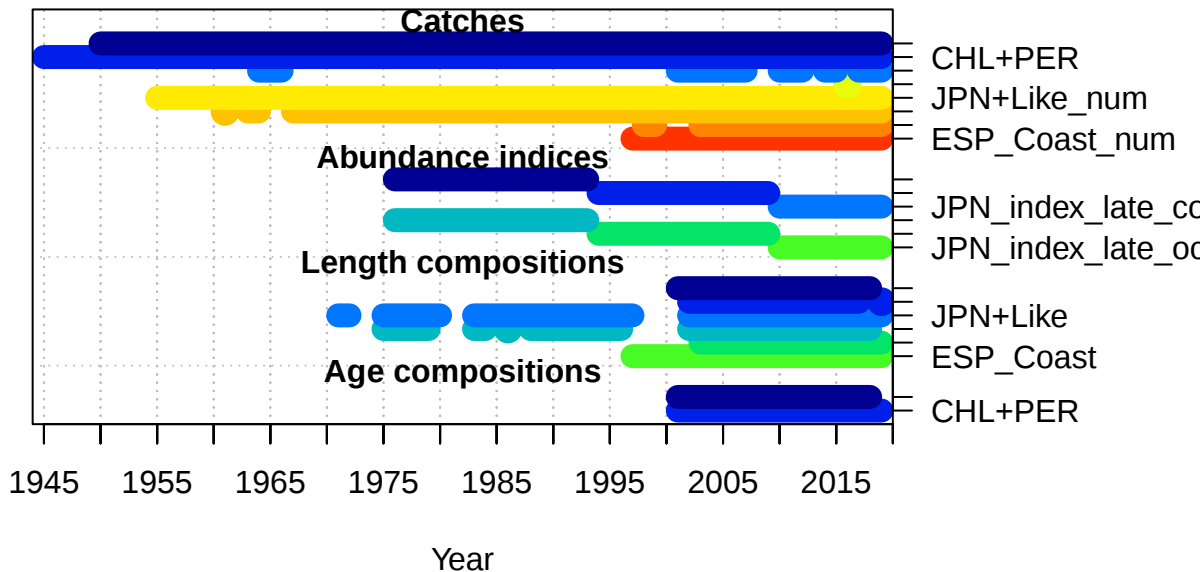


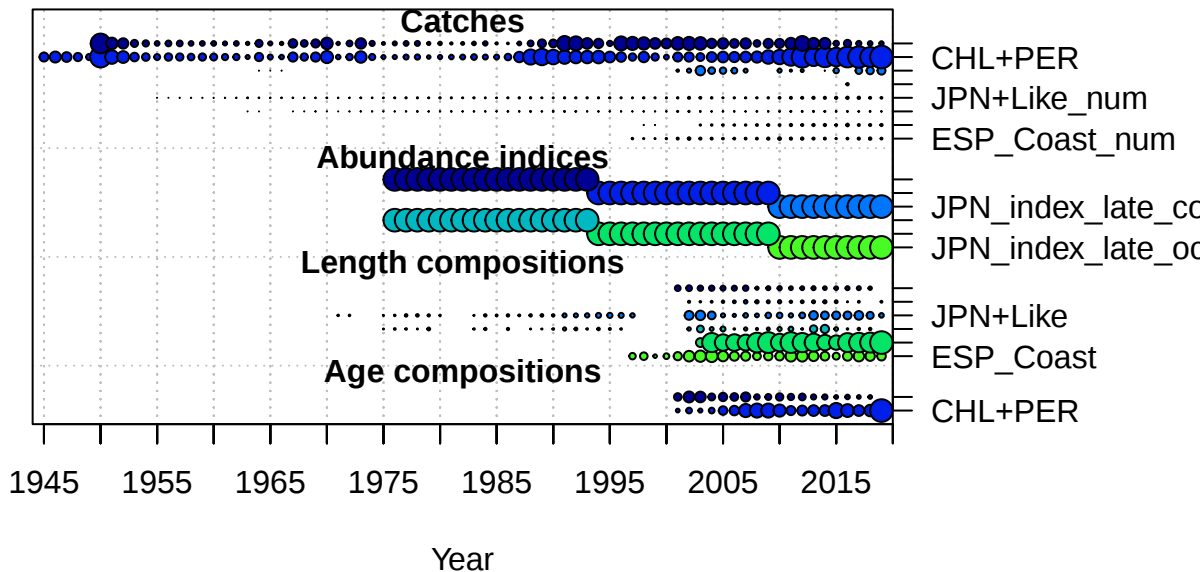


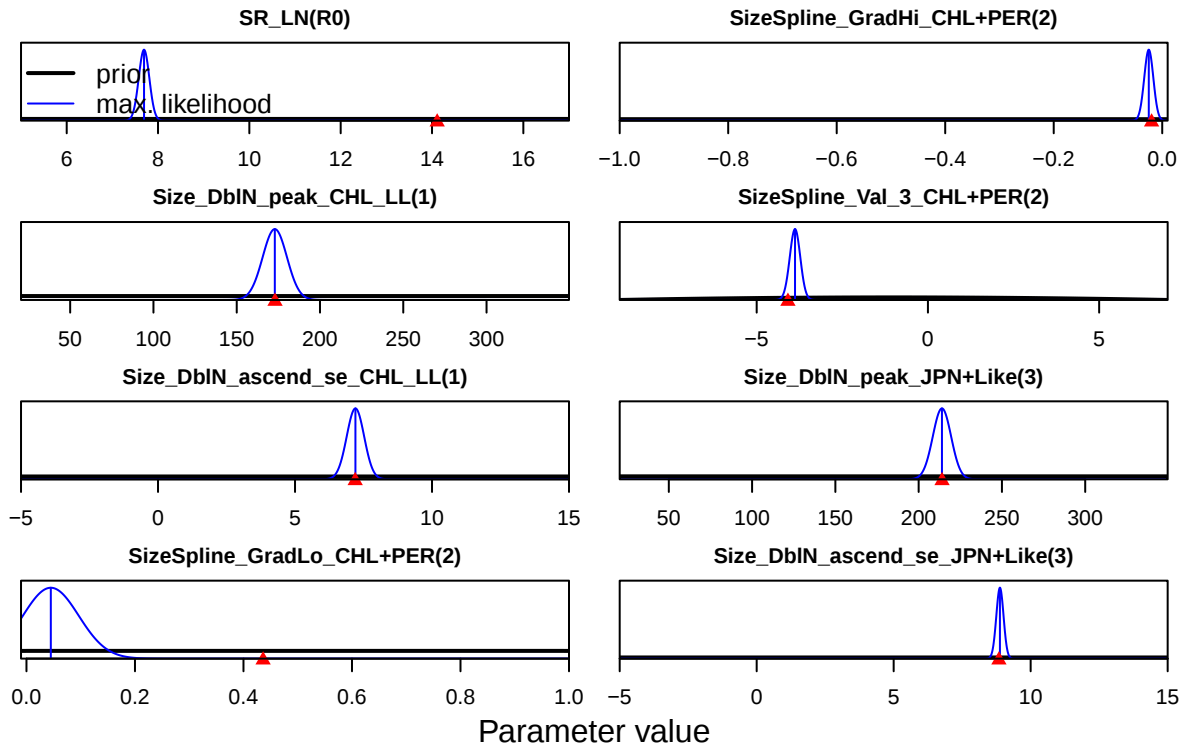


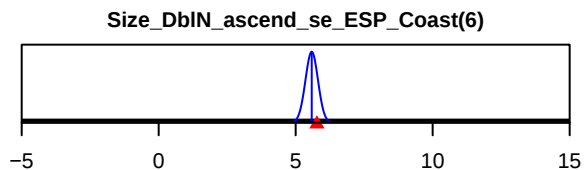
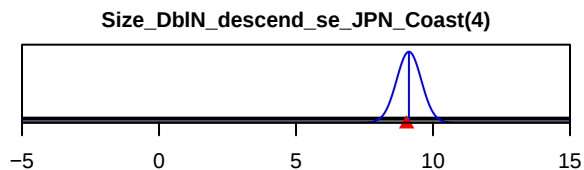
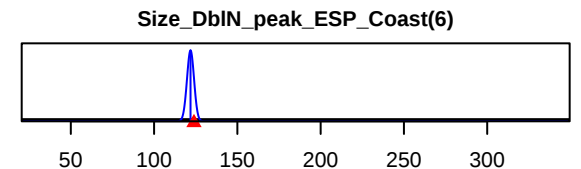
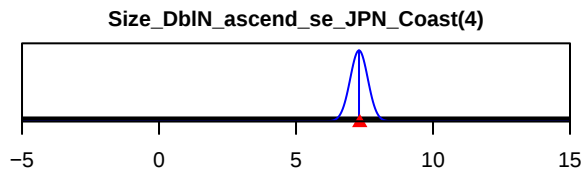
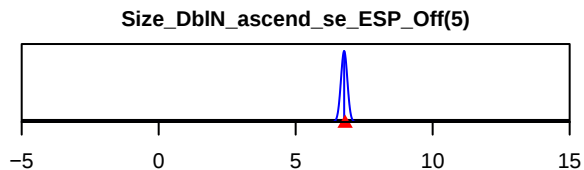
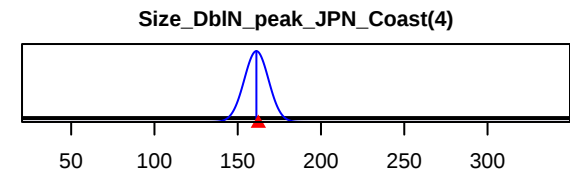
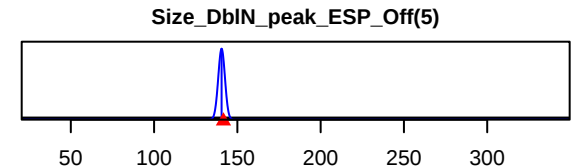
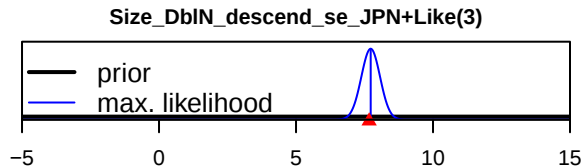




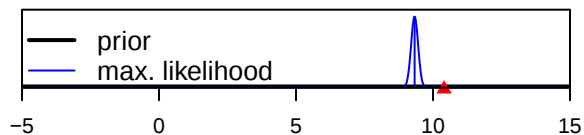




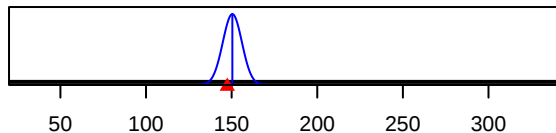




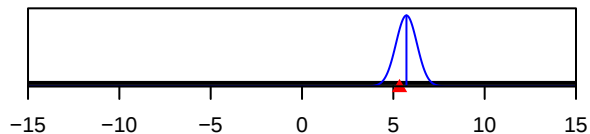
Size_DbIN_descend_se_ESP_Coast(6)



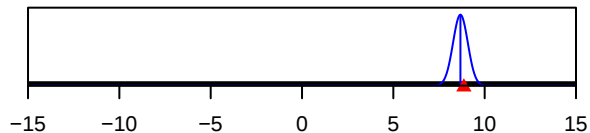
Size_DbIN_peak_ESP_Coast(6)_BLK1repl_1945



Size_DbIN_ascend_se_ESP_Coast(6)_BLK1repl_1945



Size_DbIN_descend_se_ESP_Coast(6)_BLK1repl_1945



Parameter value