

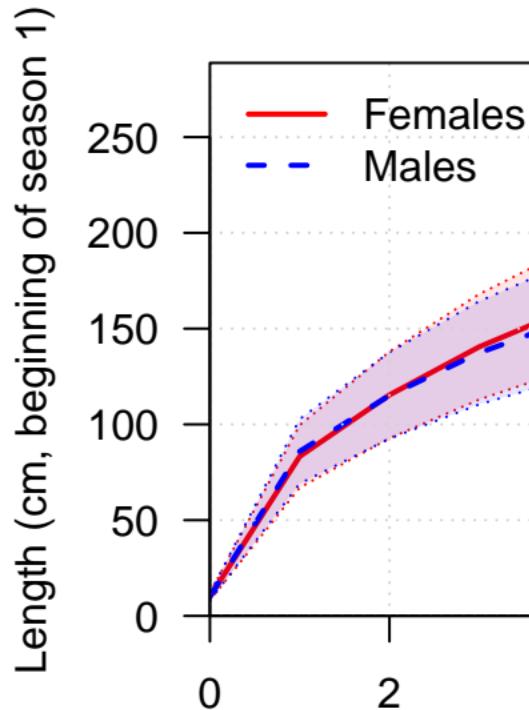
Plots created using the 'r4ss' package in R

Stock Synthesis version: 3.30.20.0

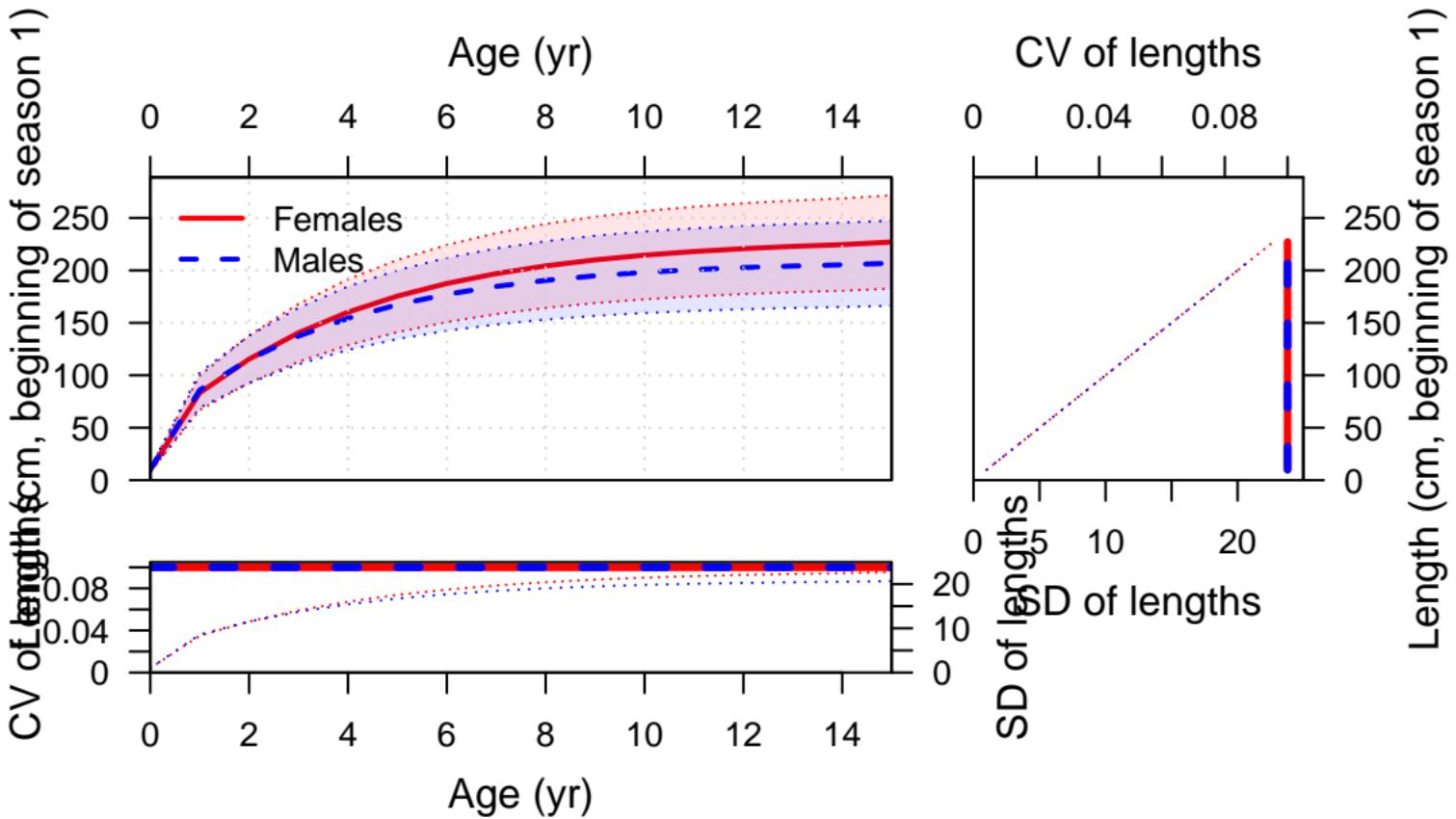
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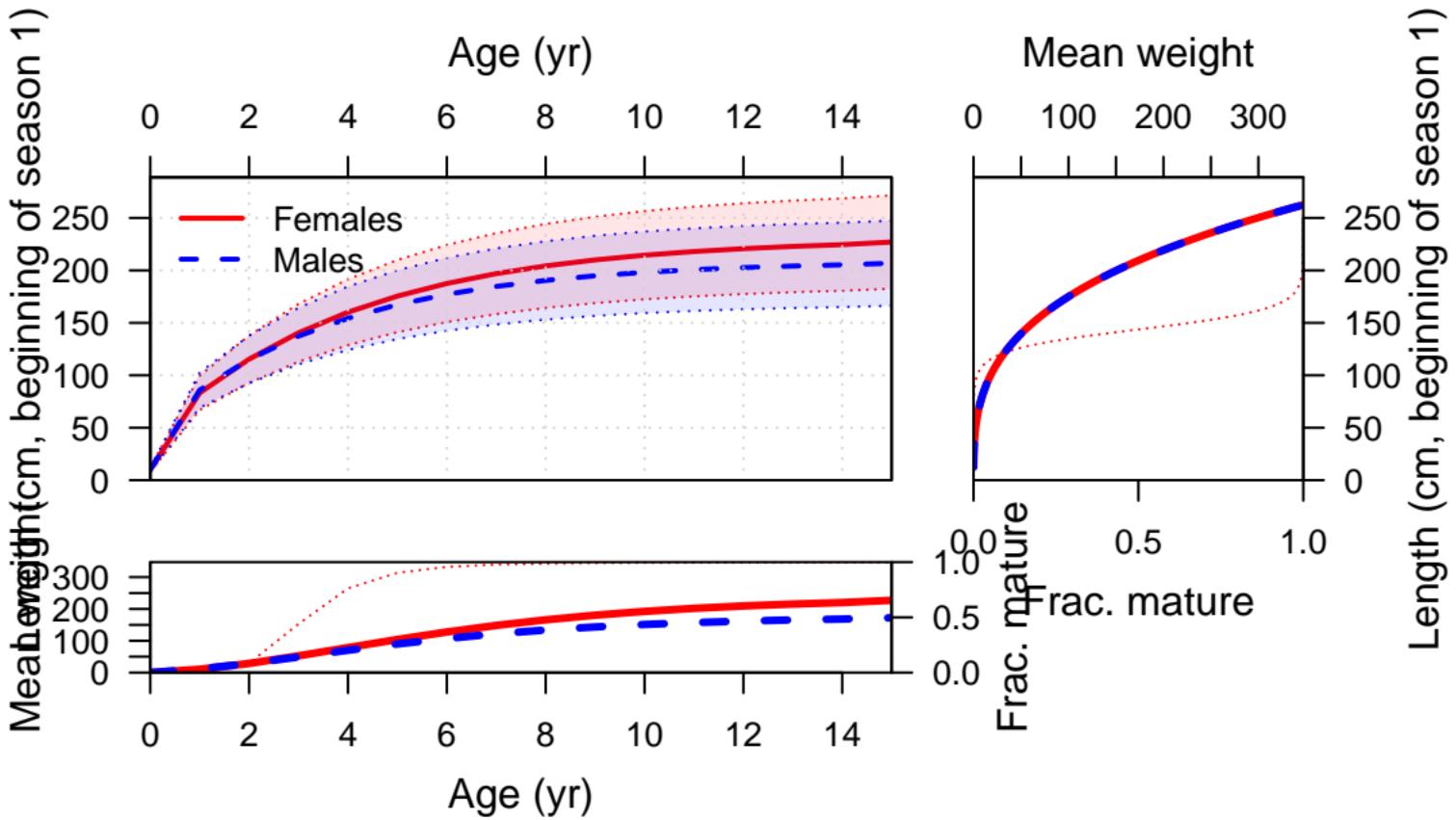
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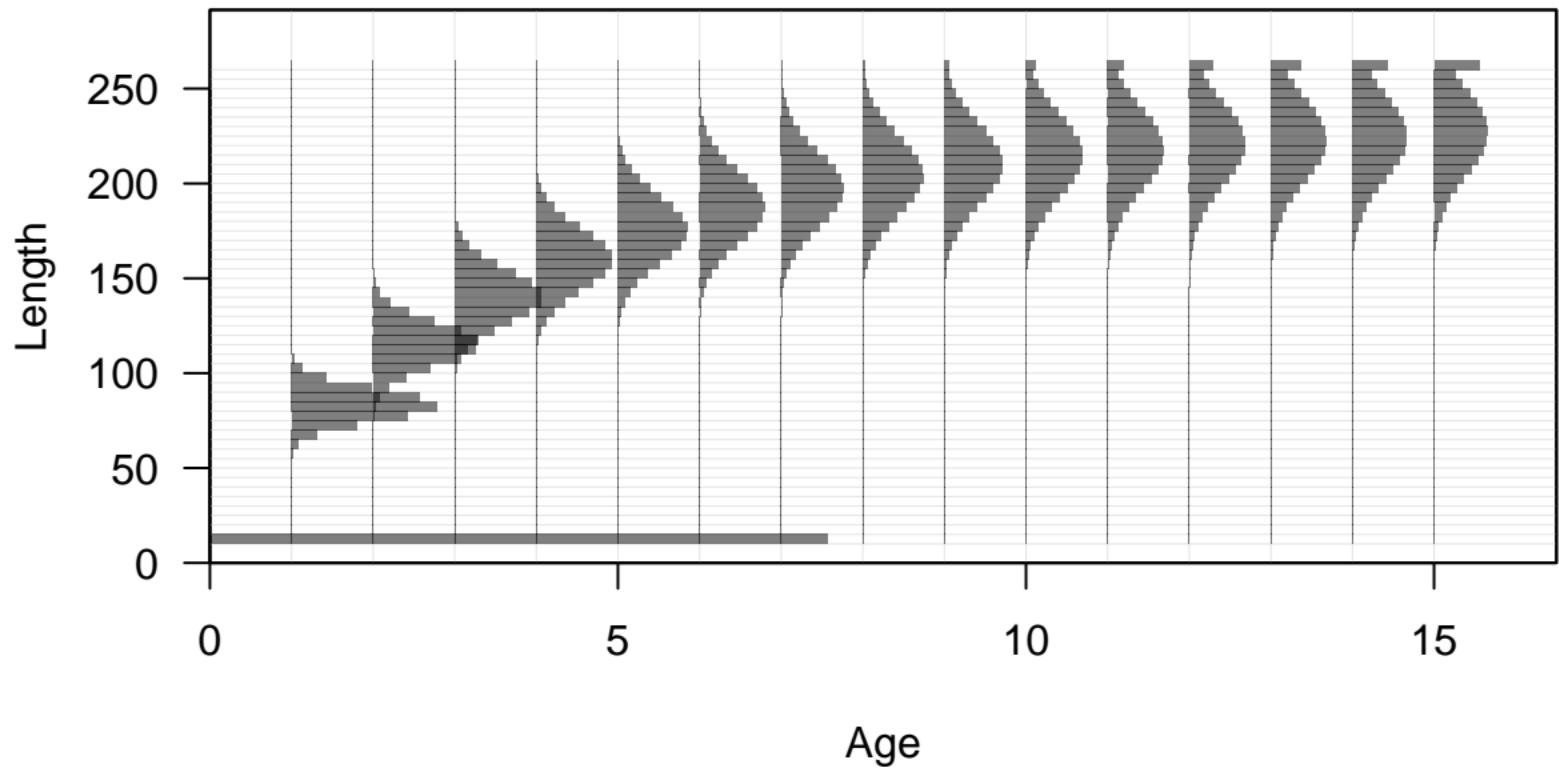
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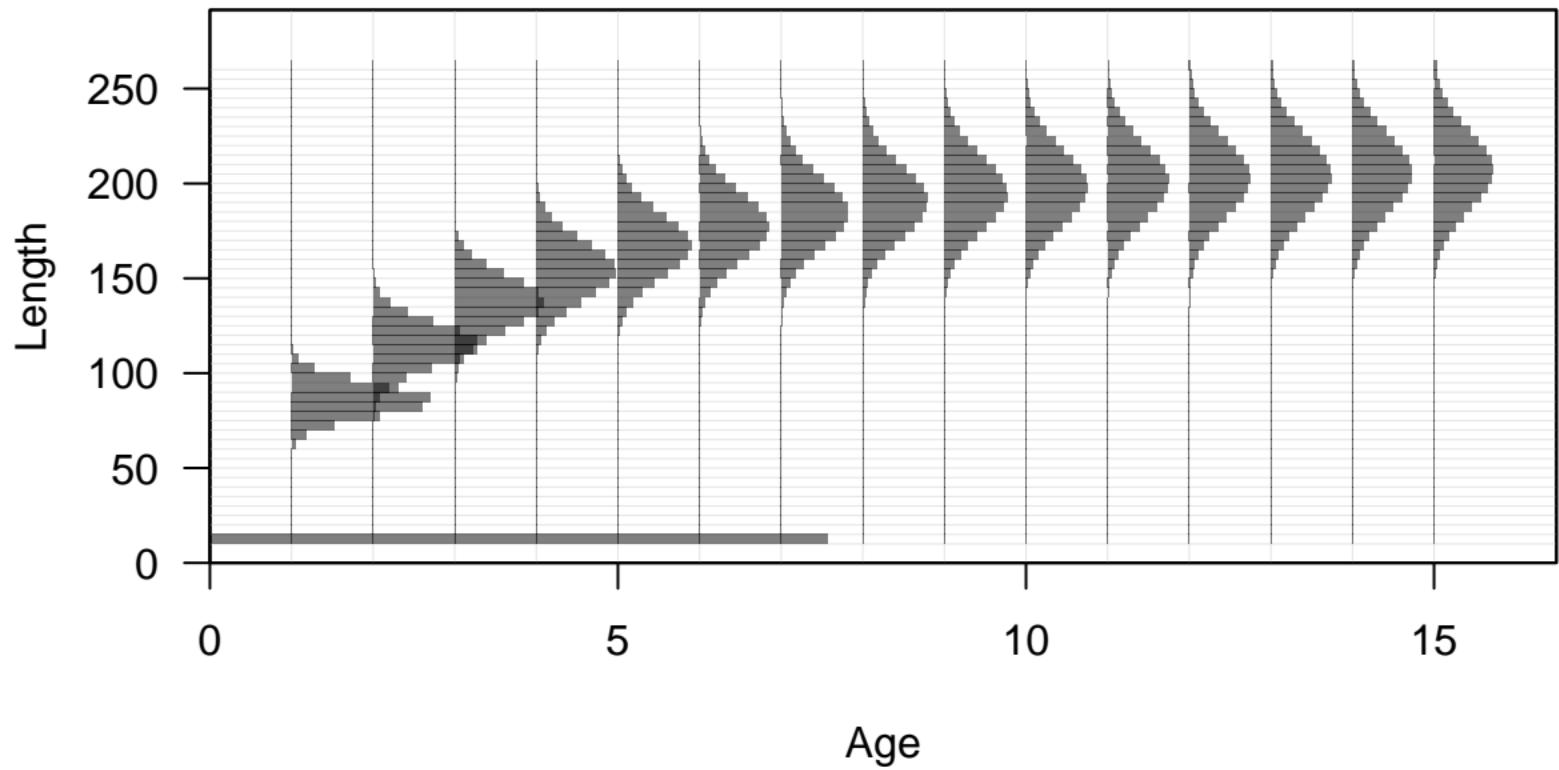


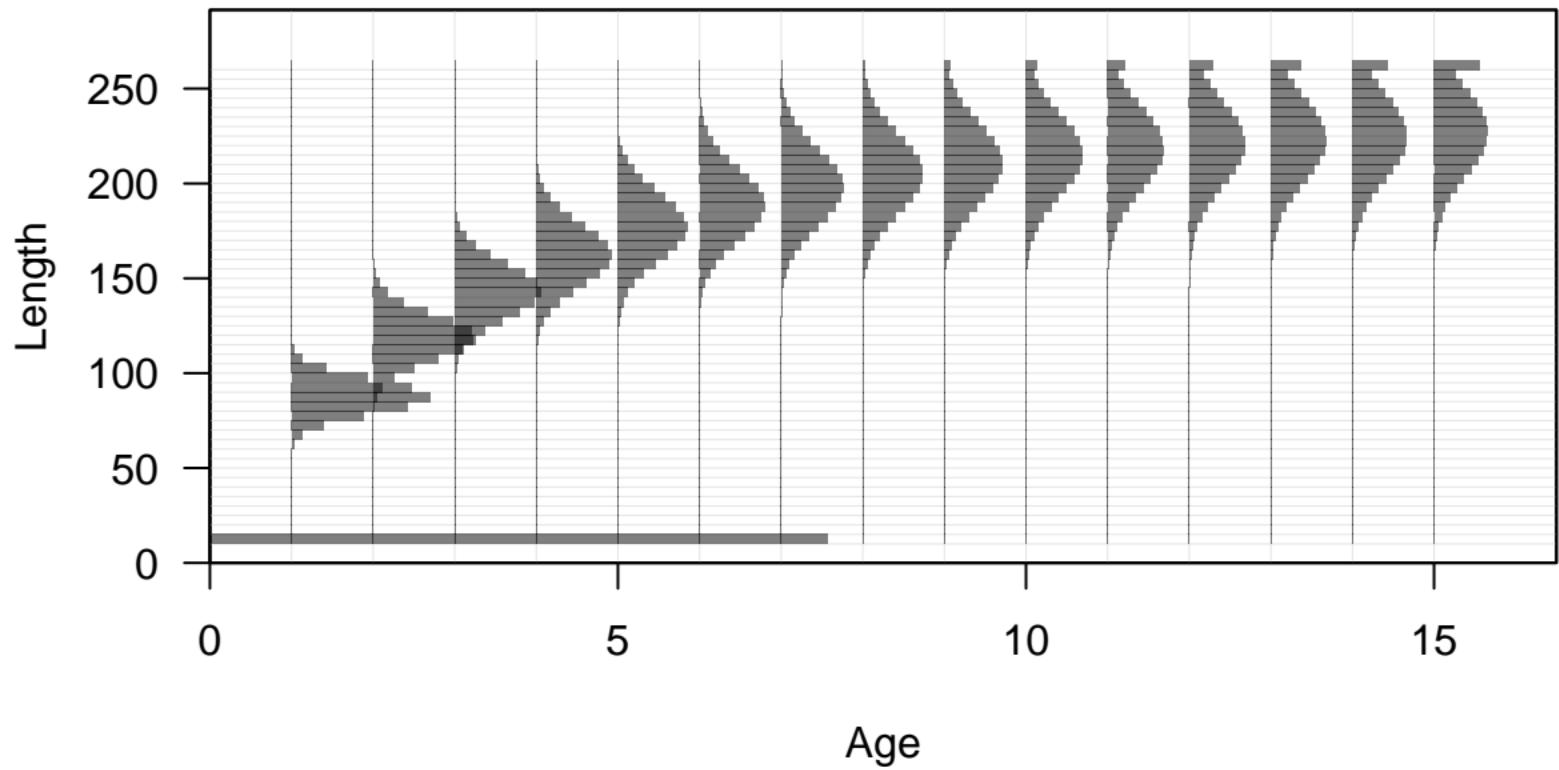
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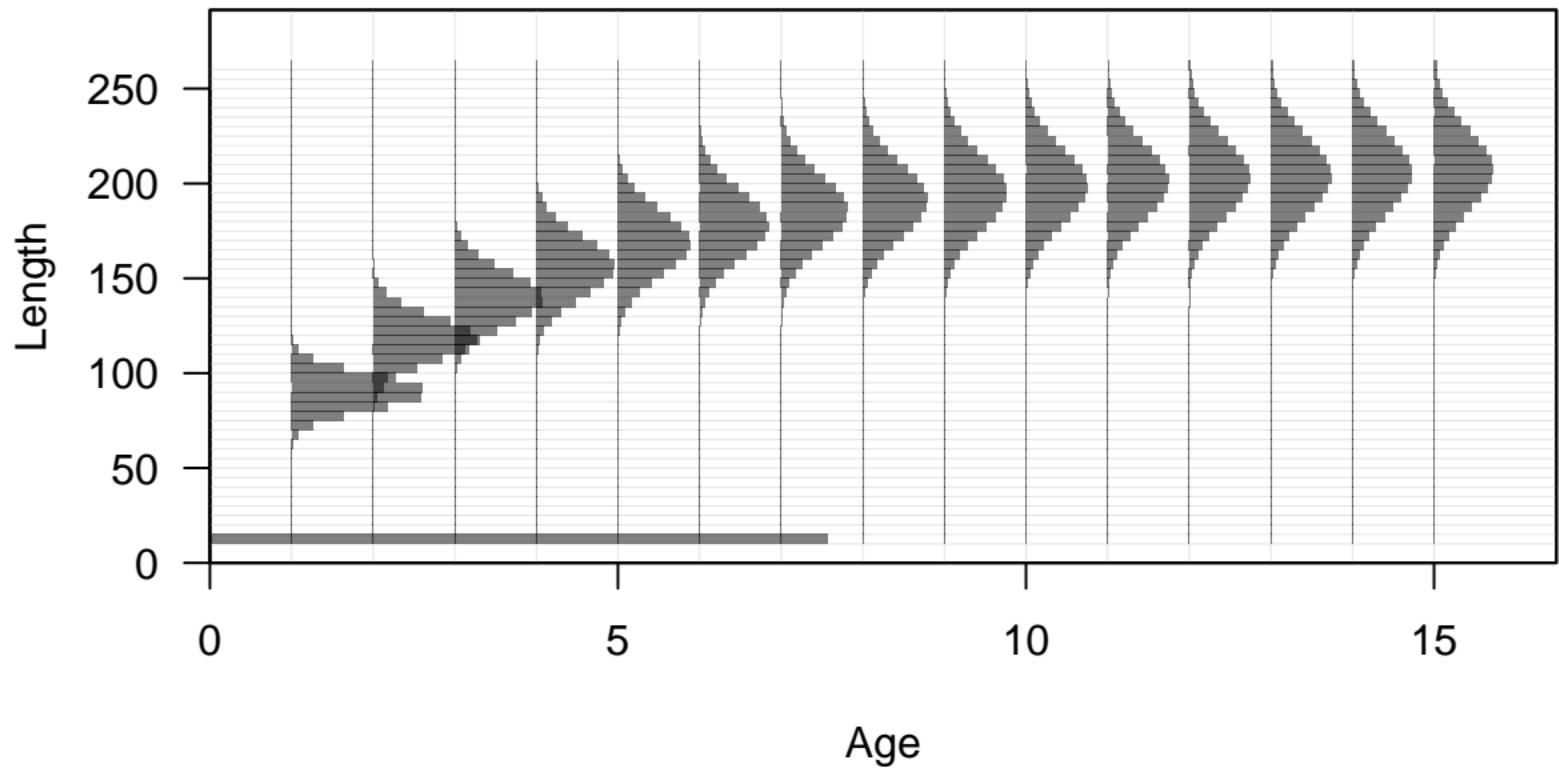


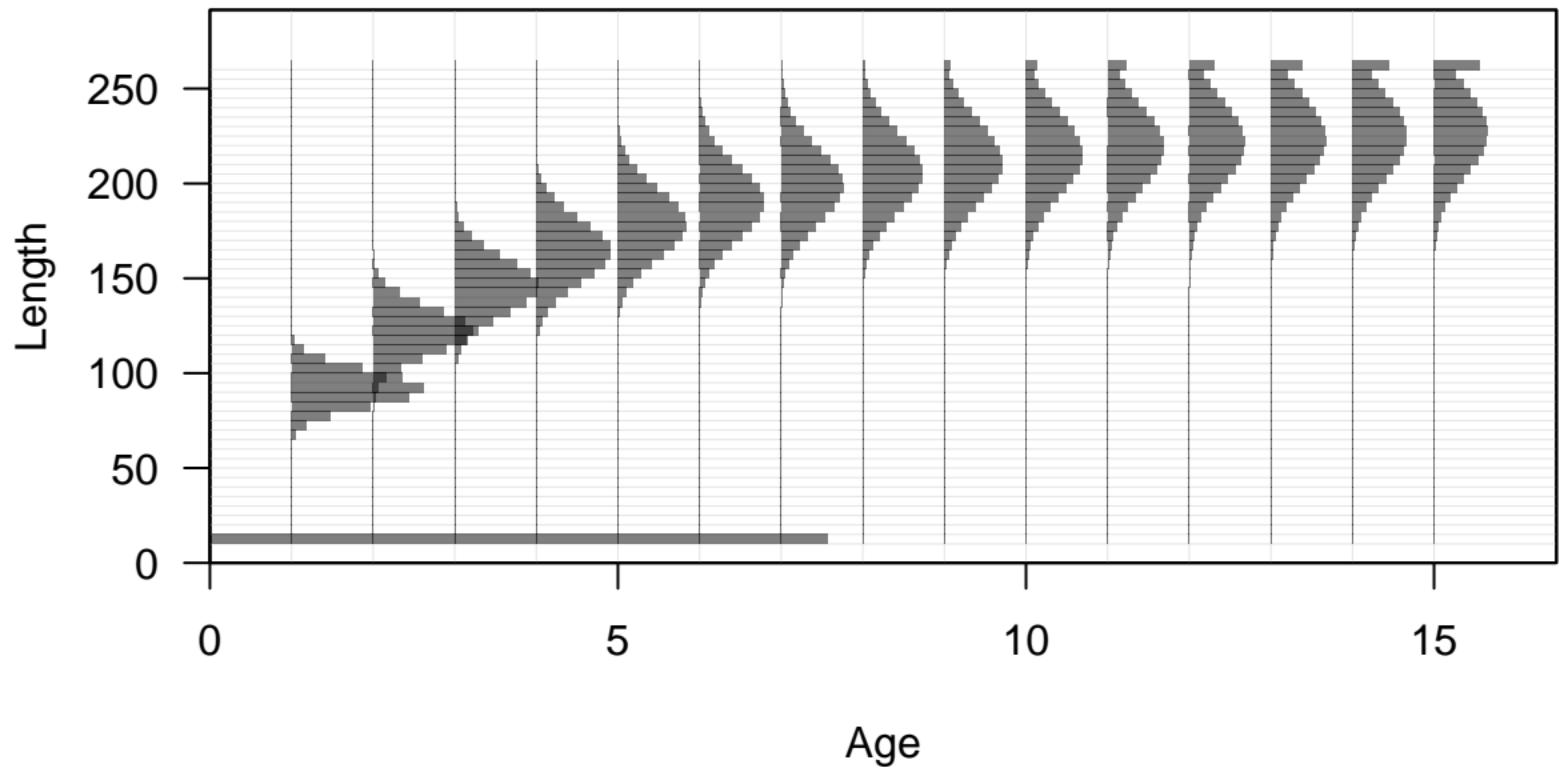


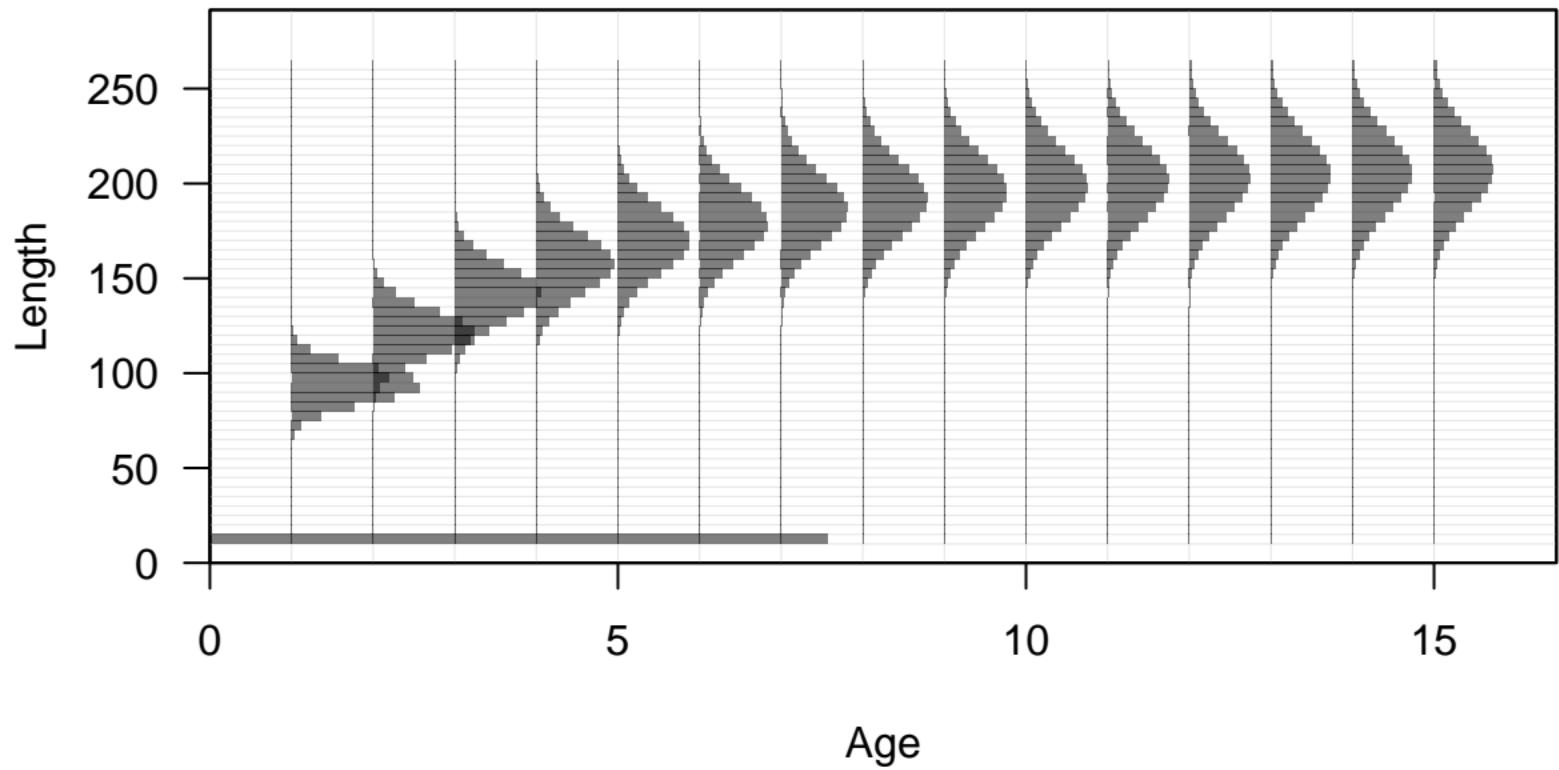


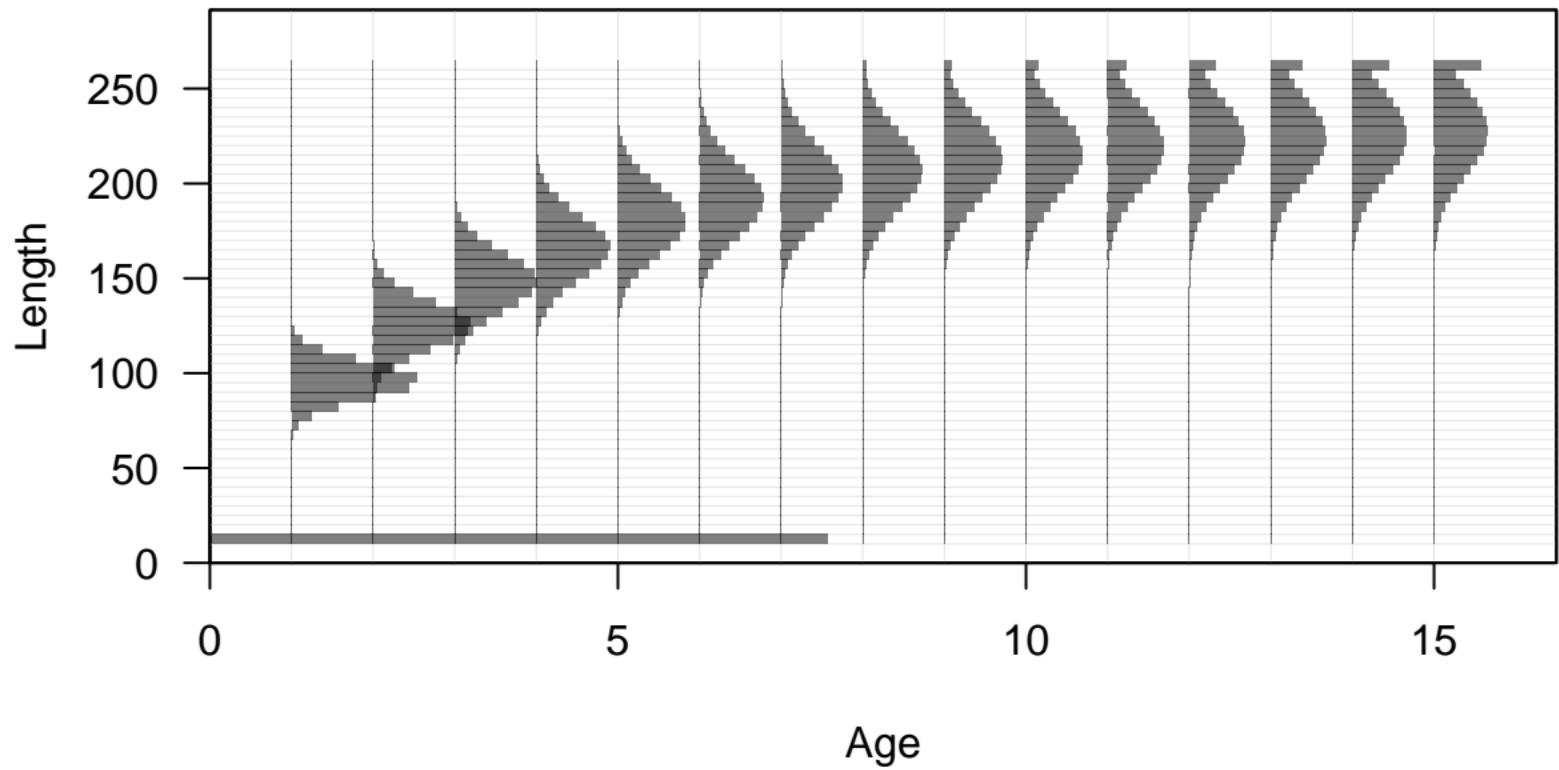


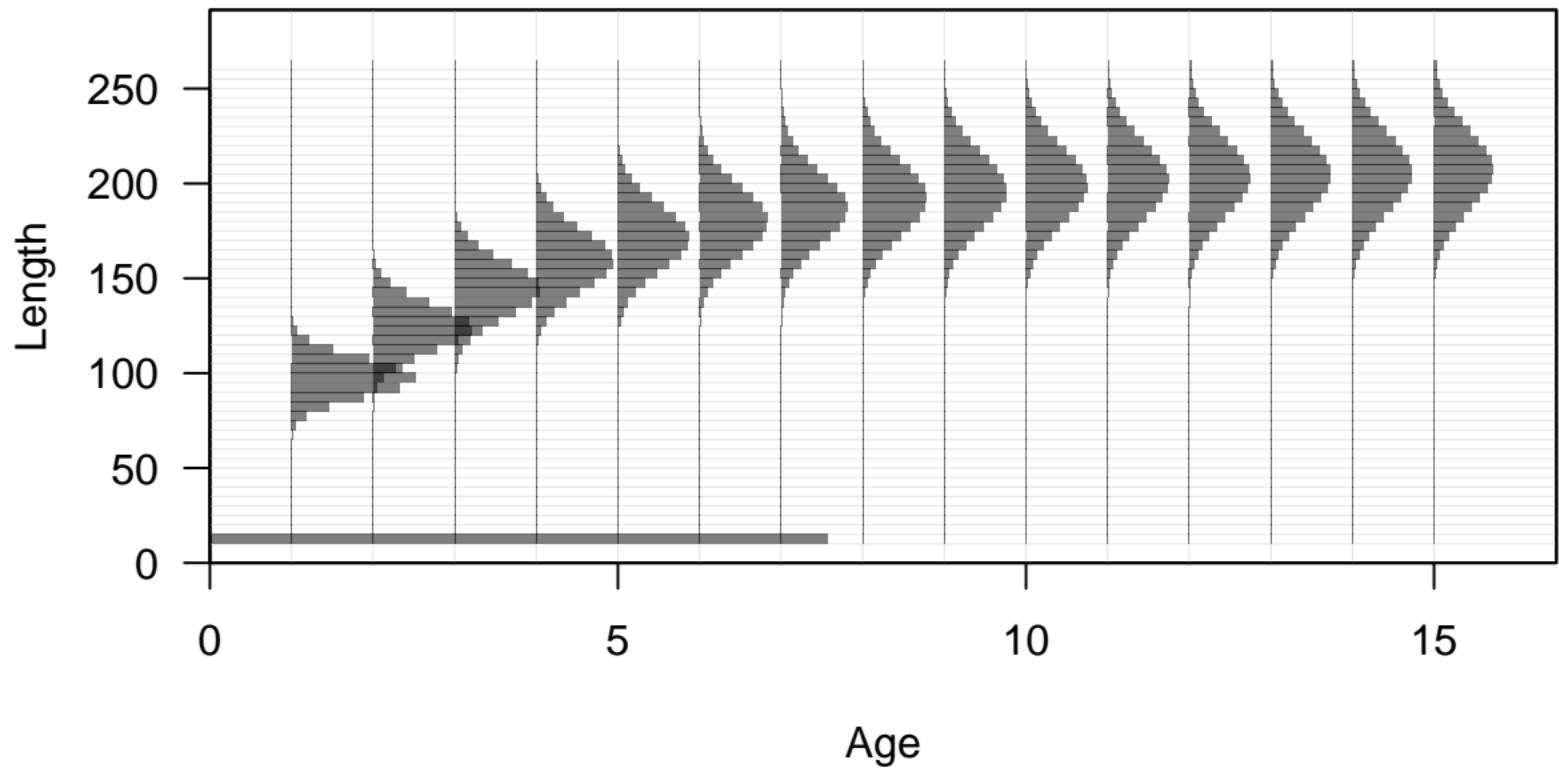


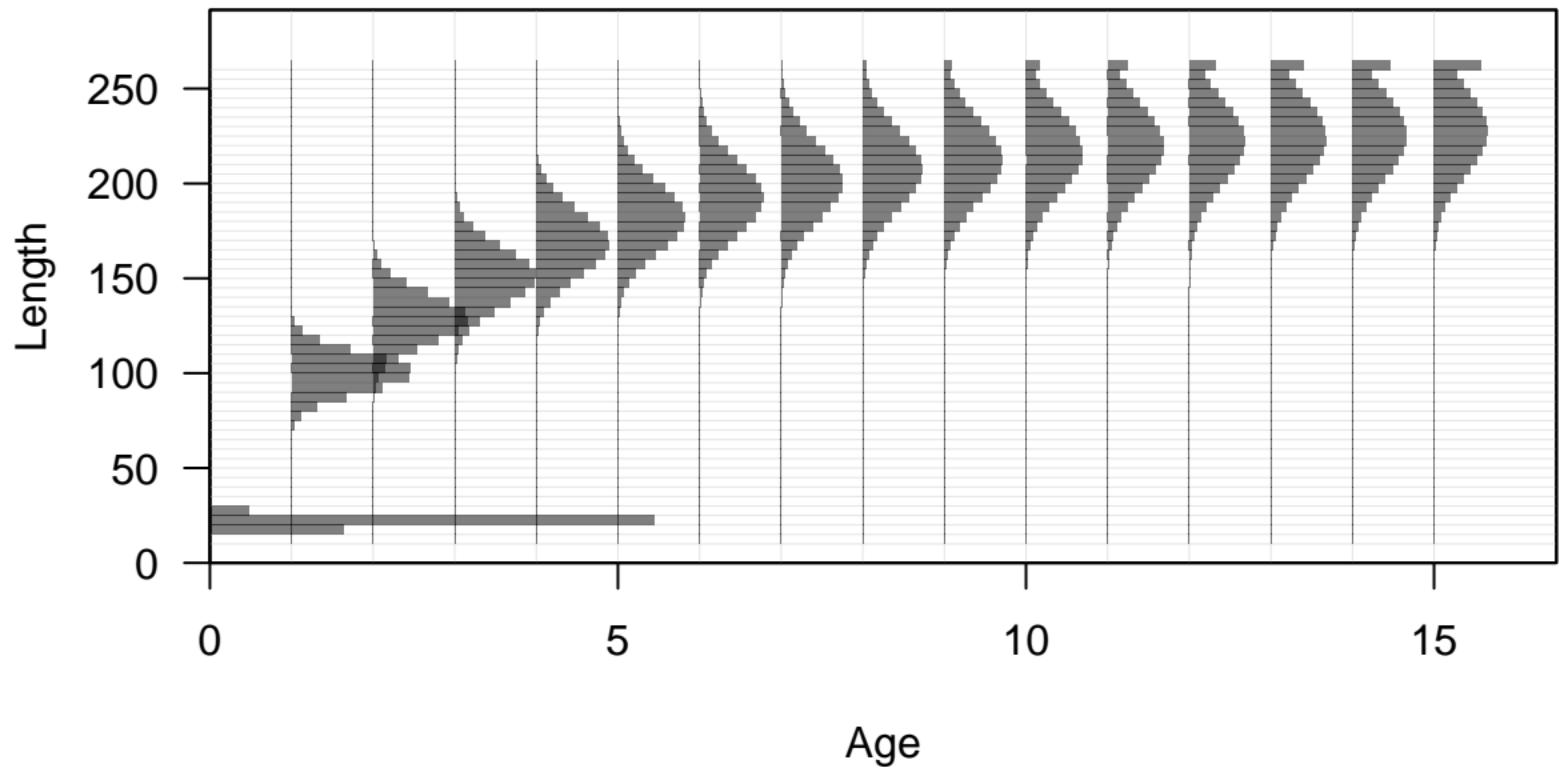


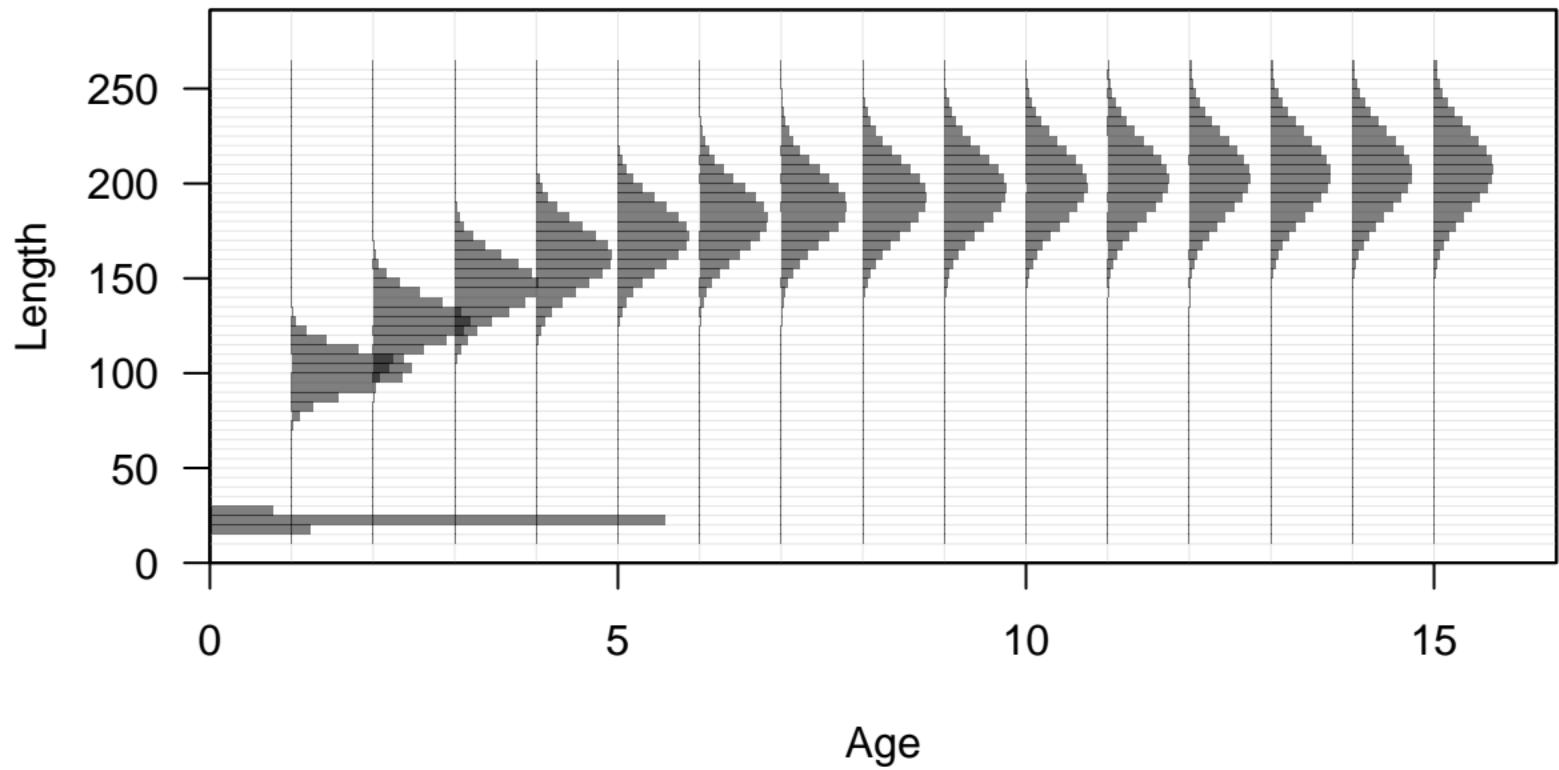


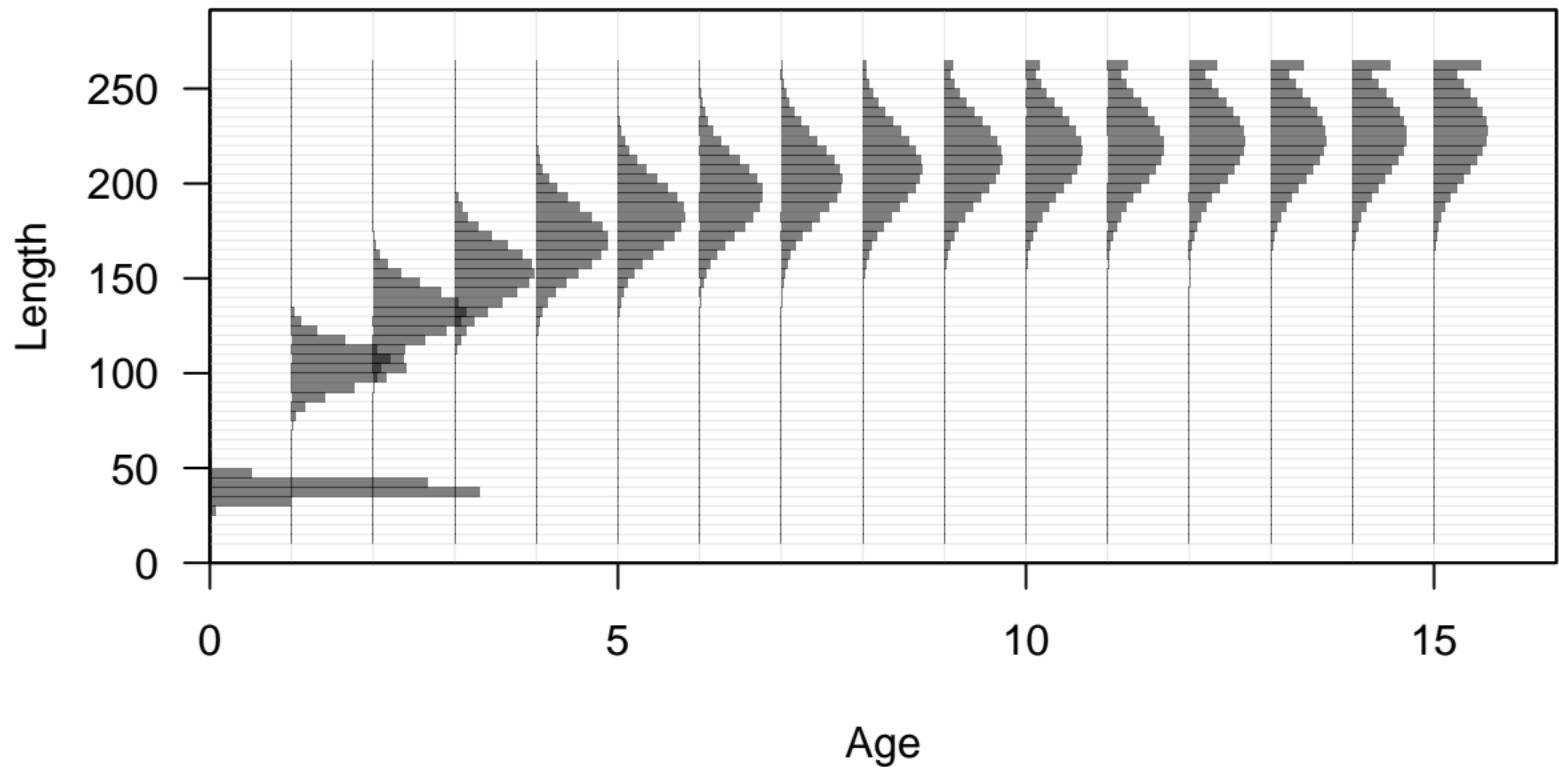


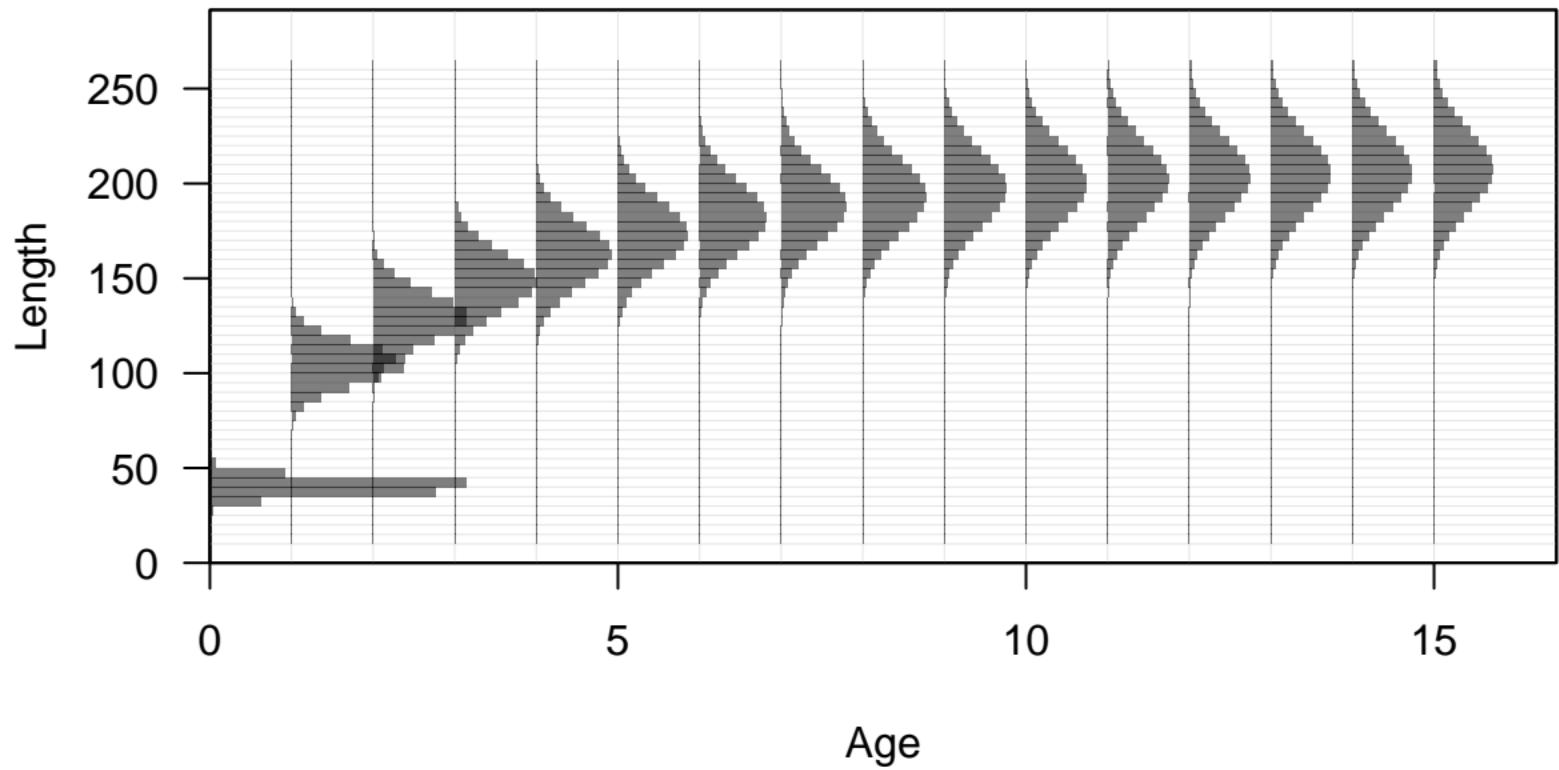


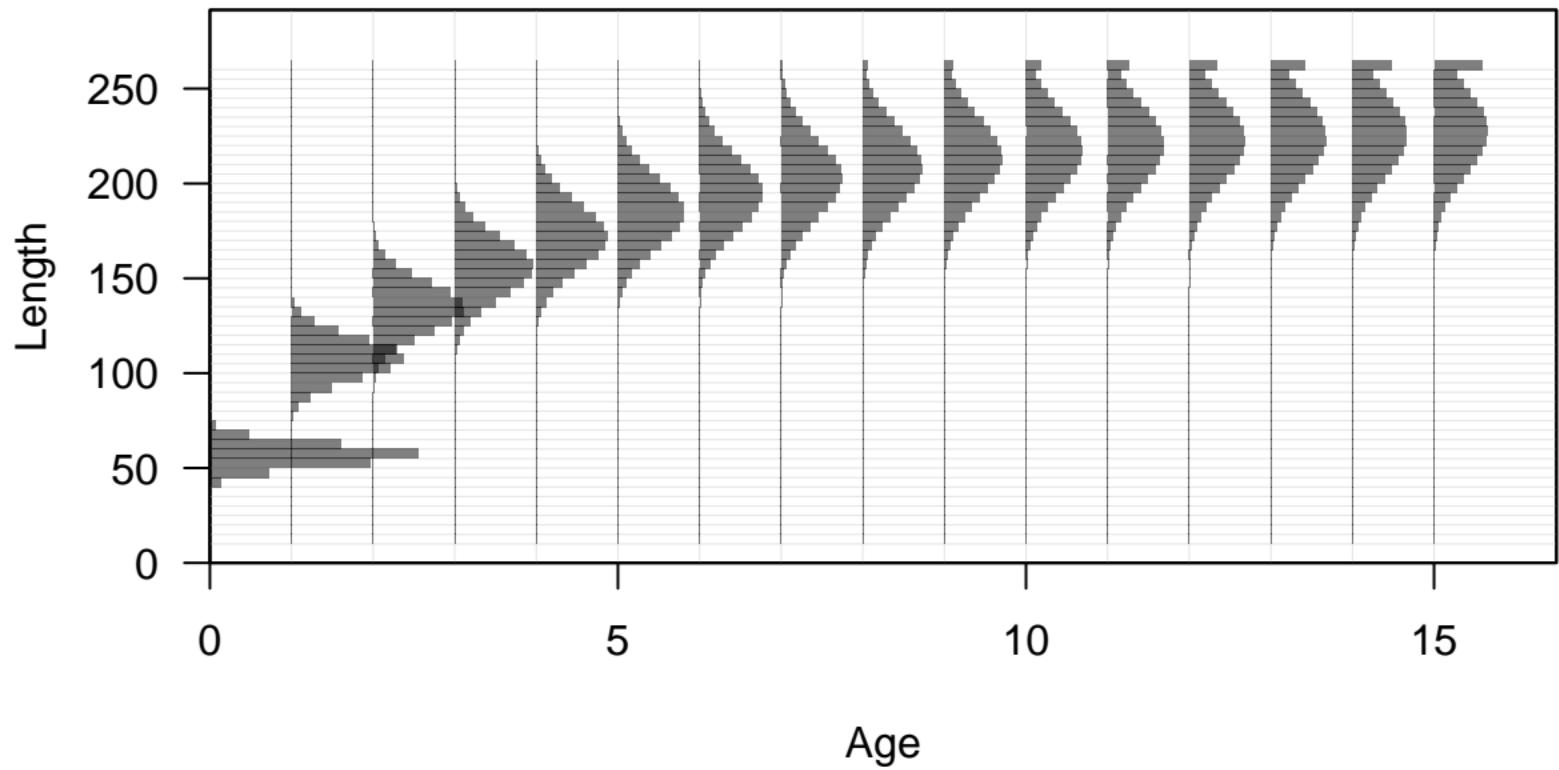


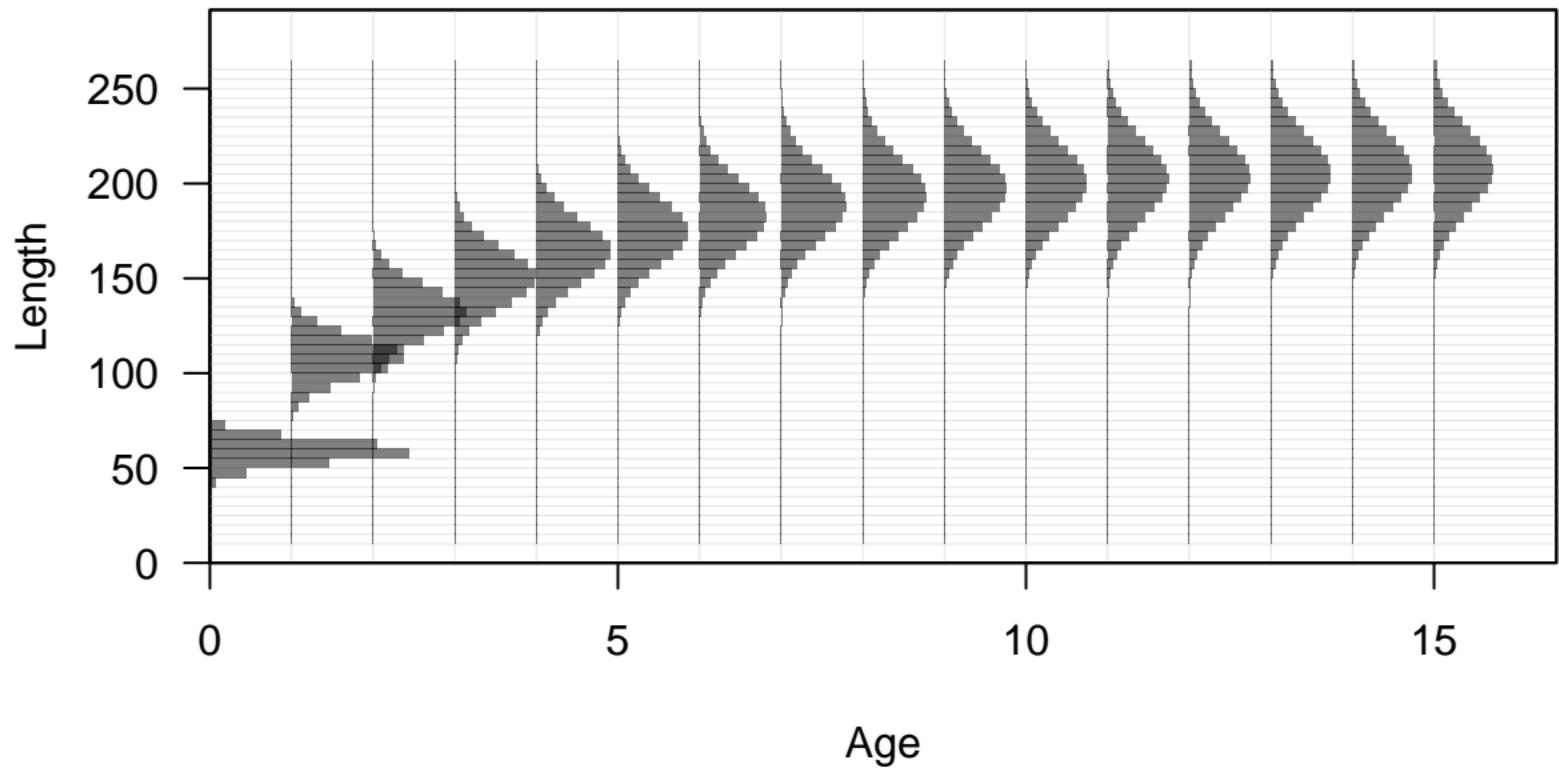


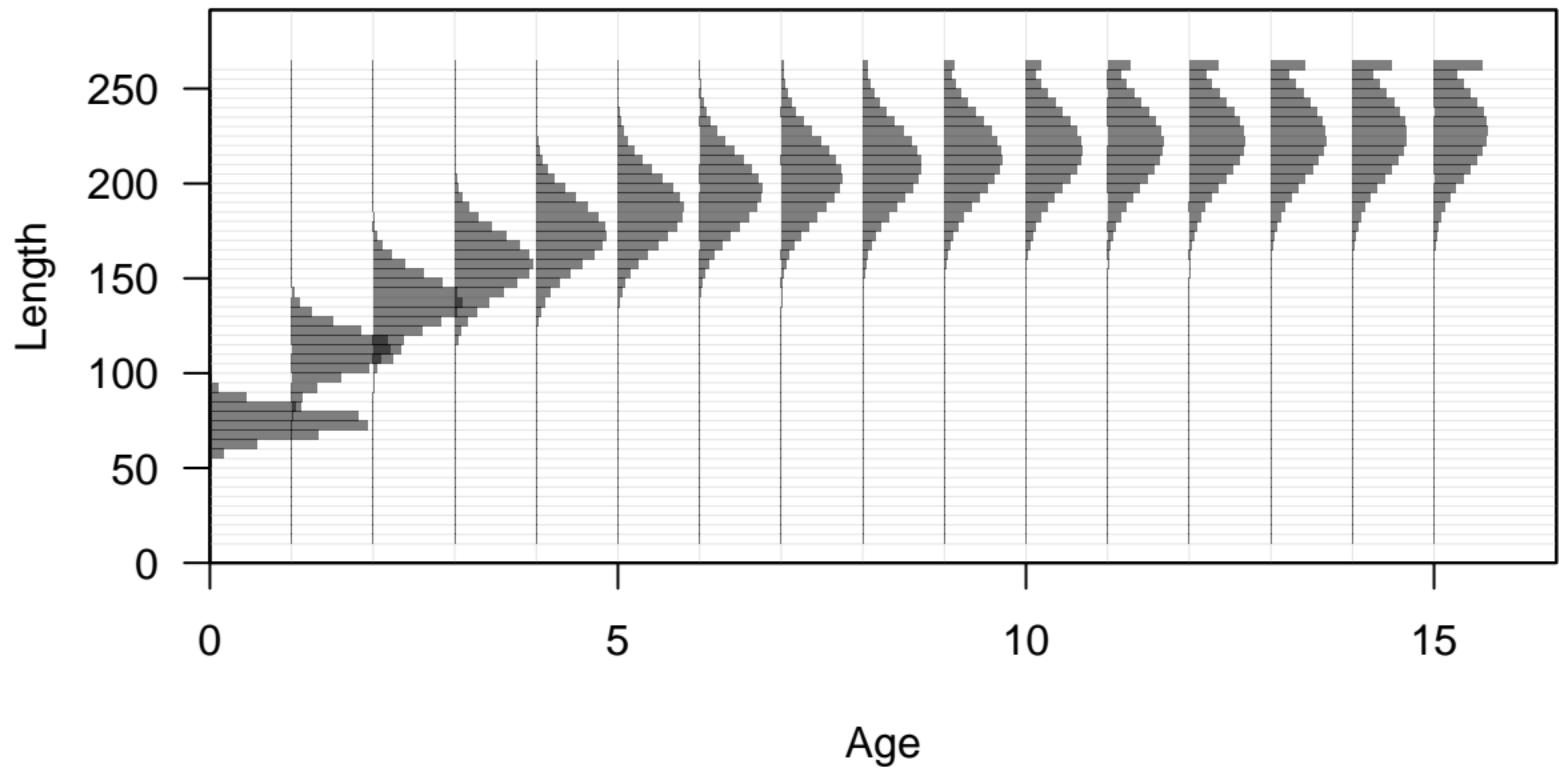


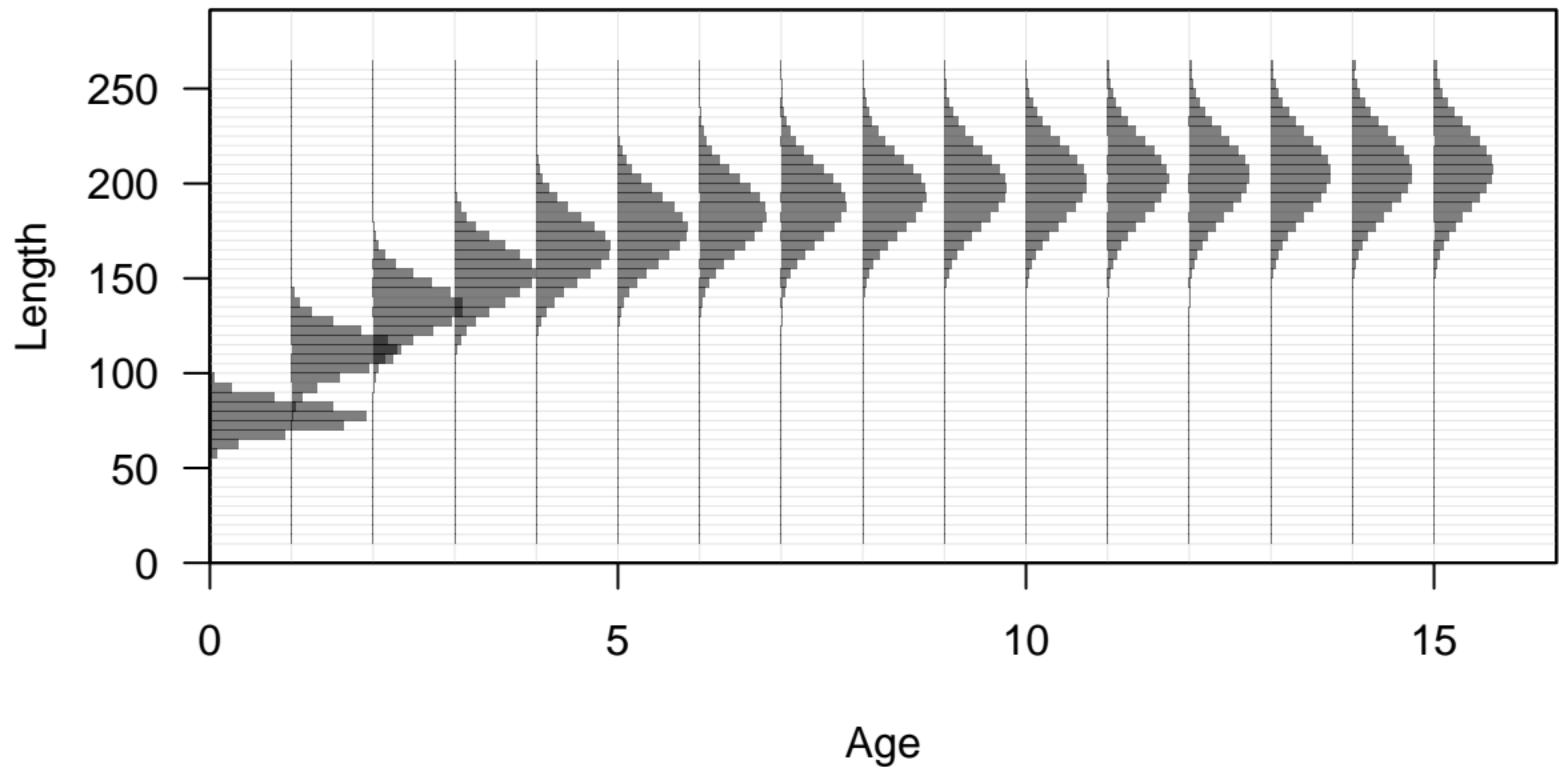


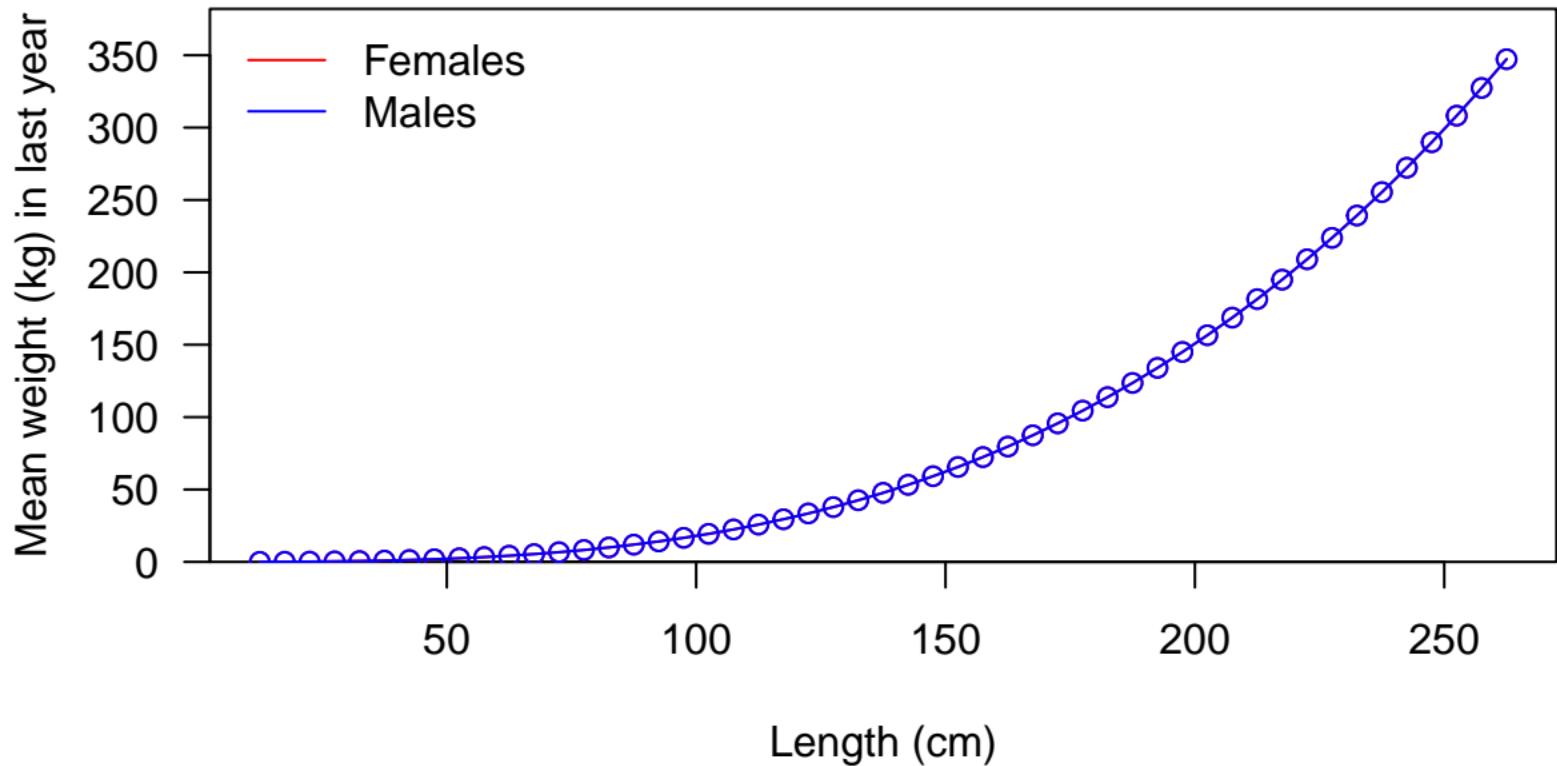


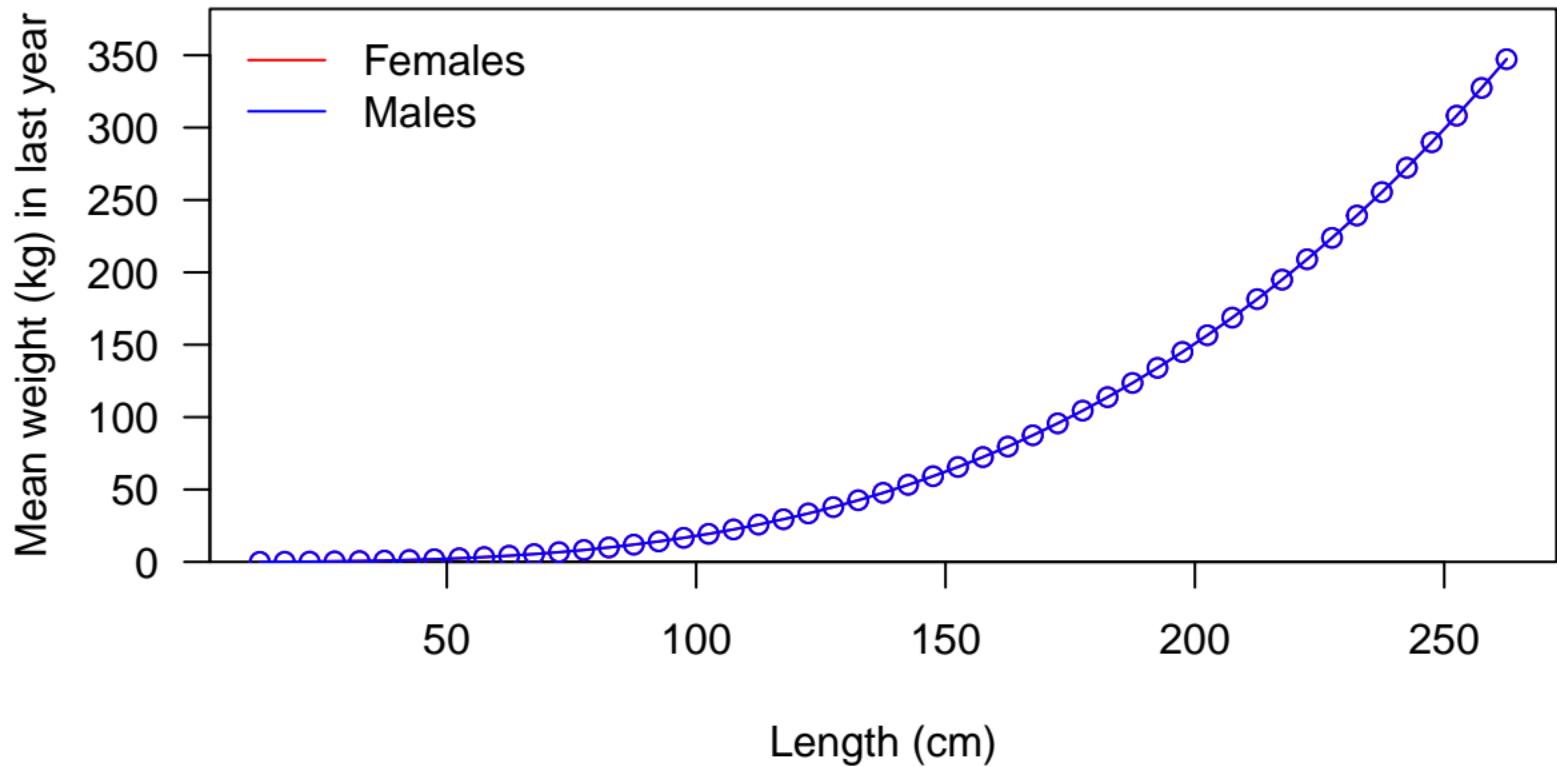


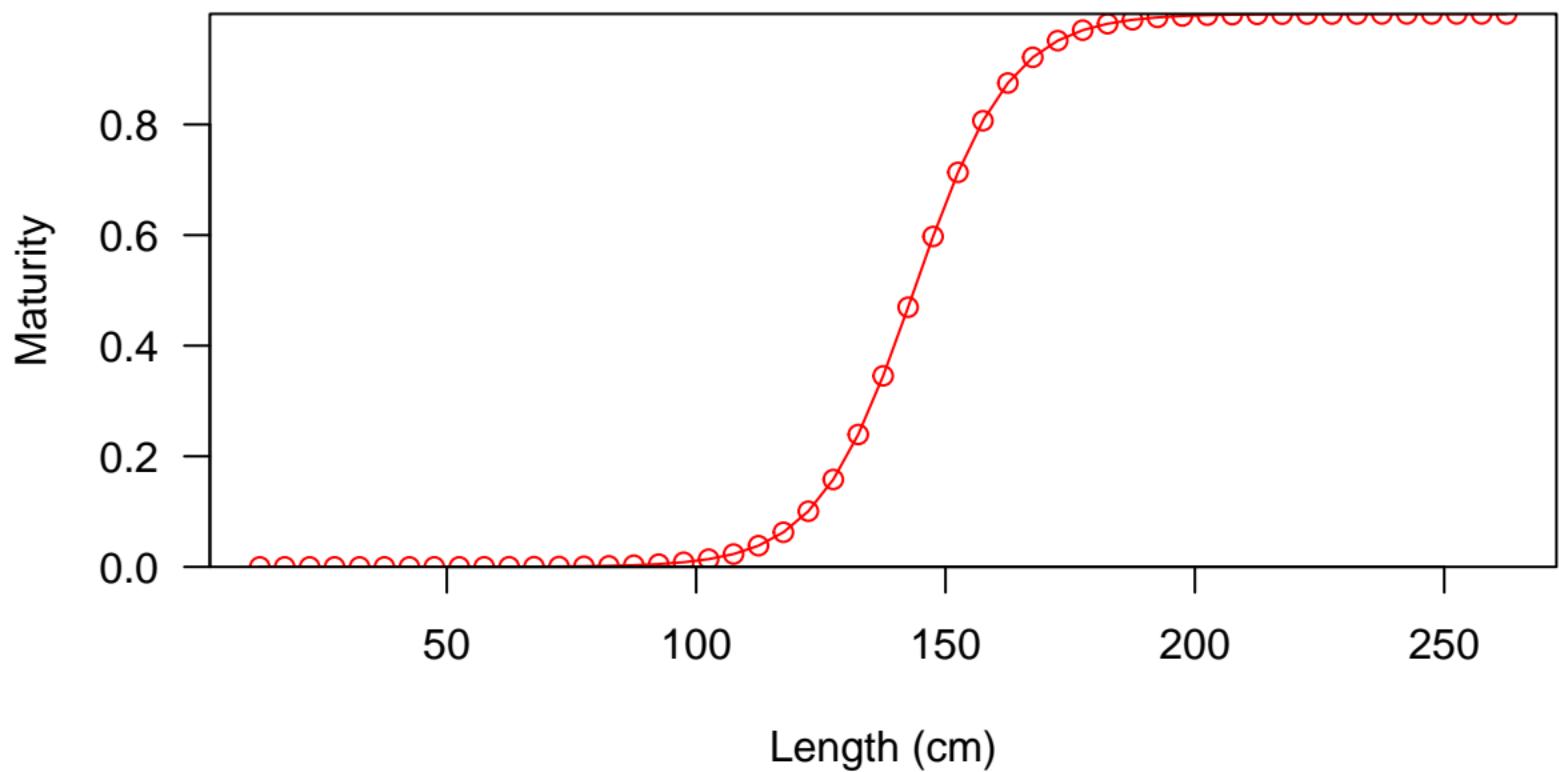


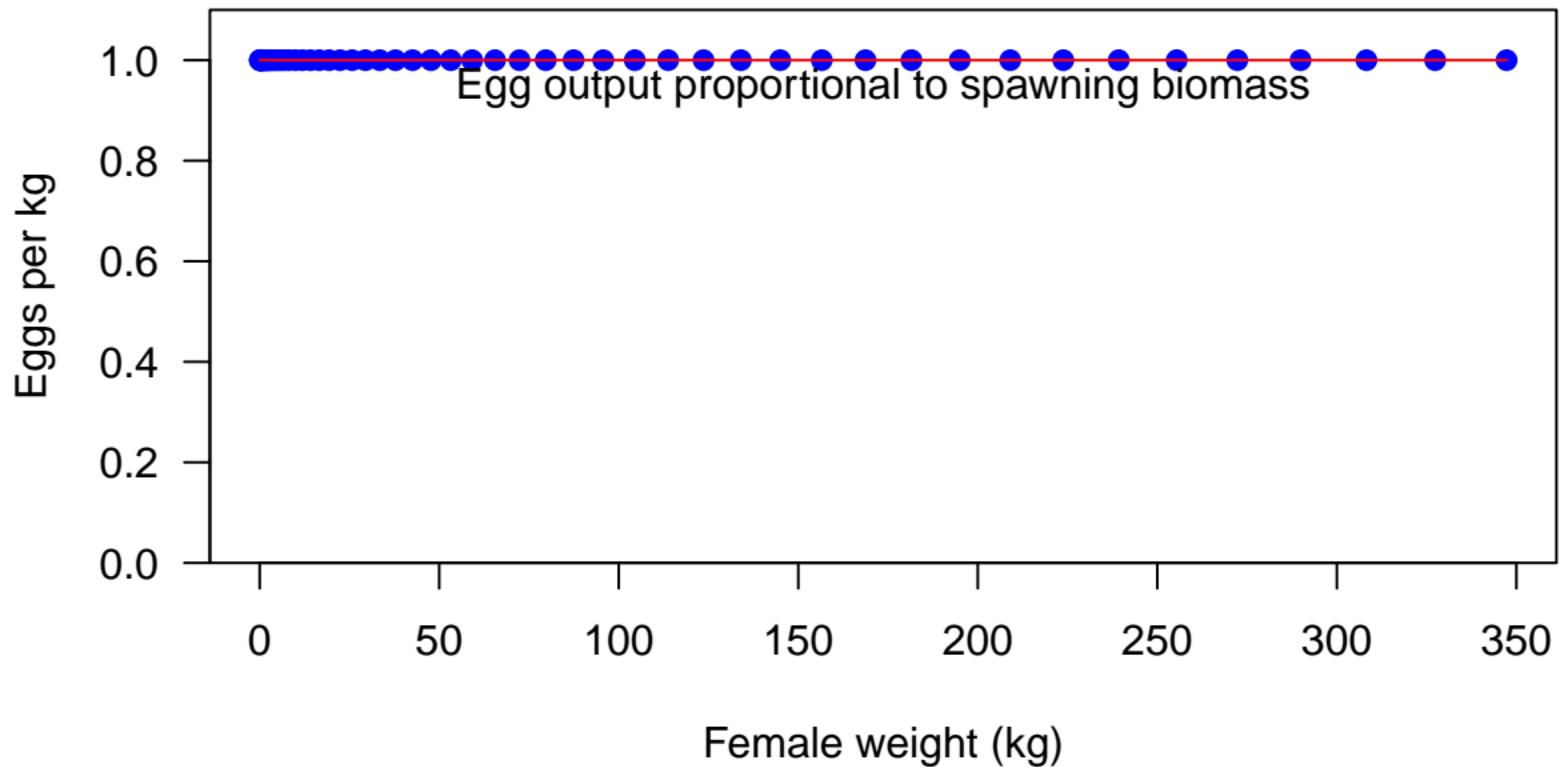


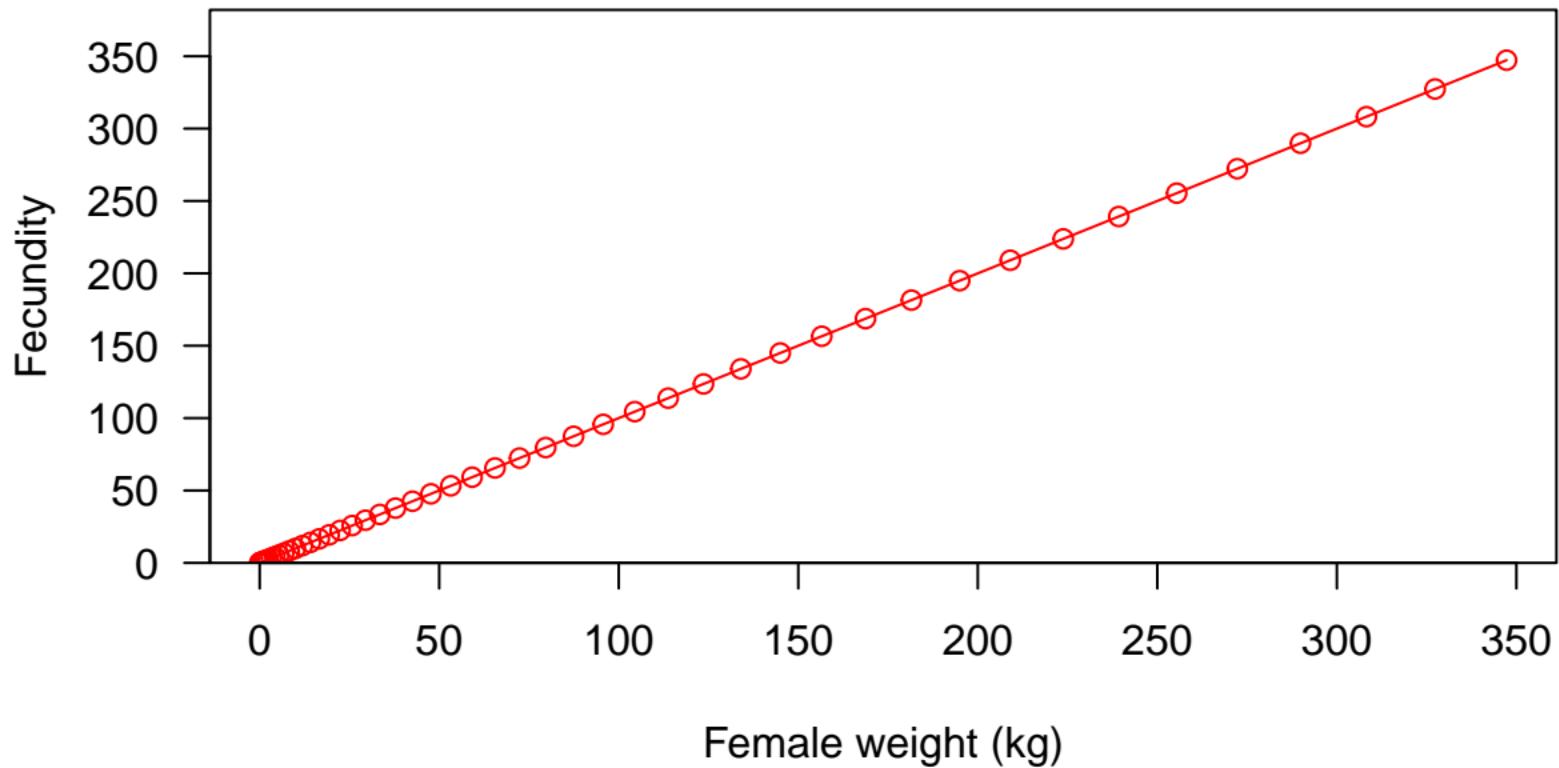


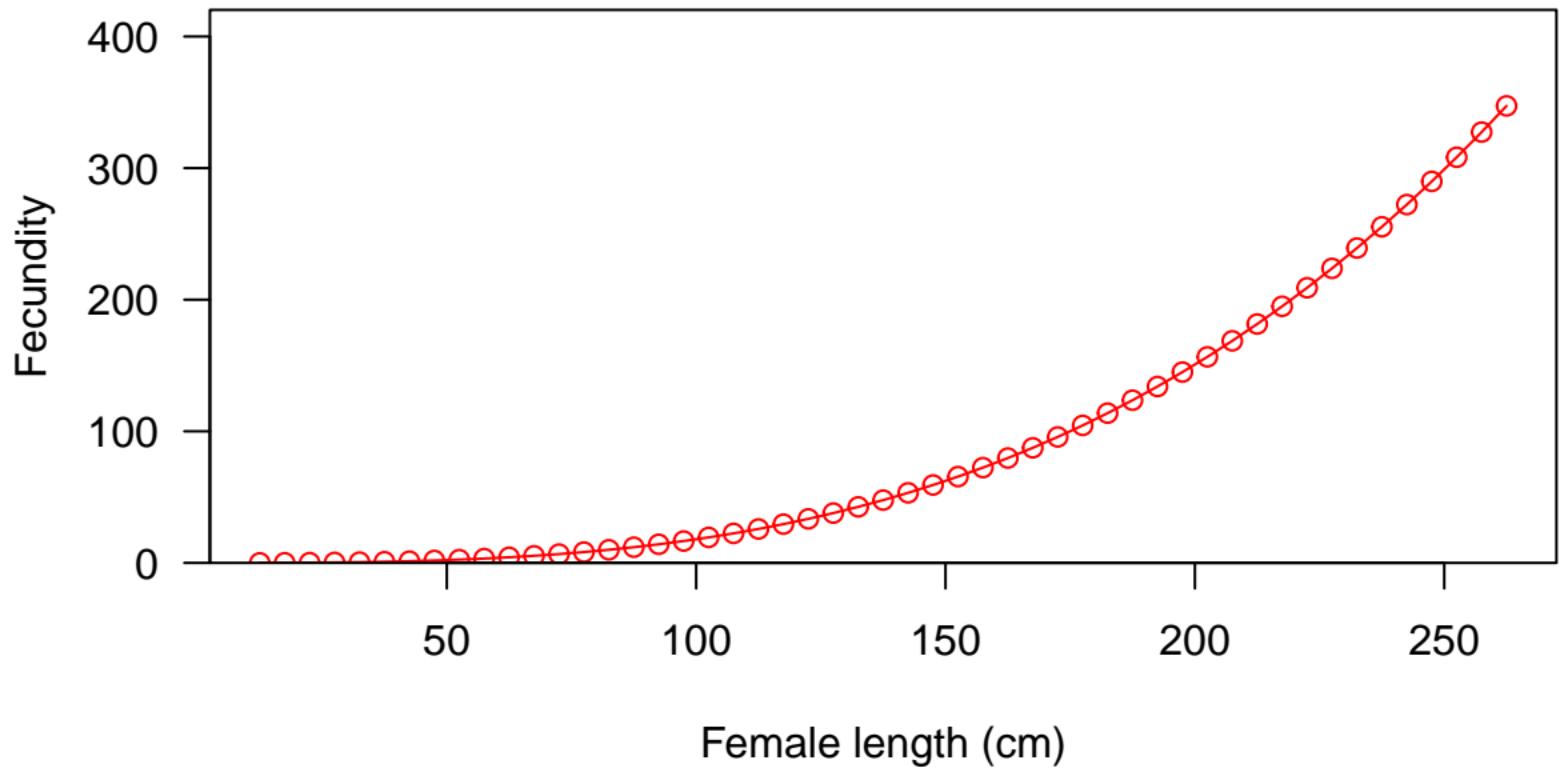


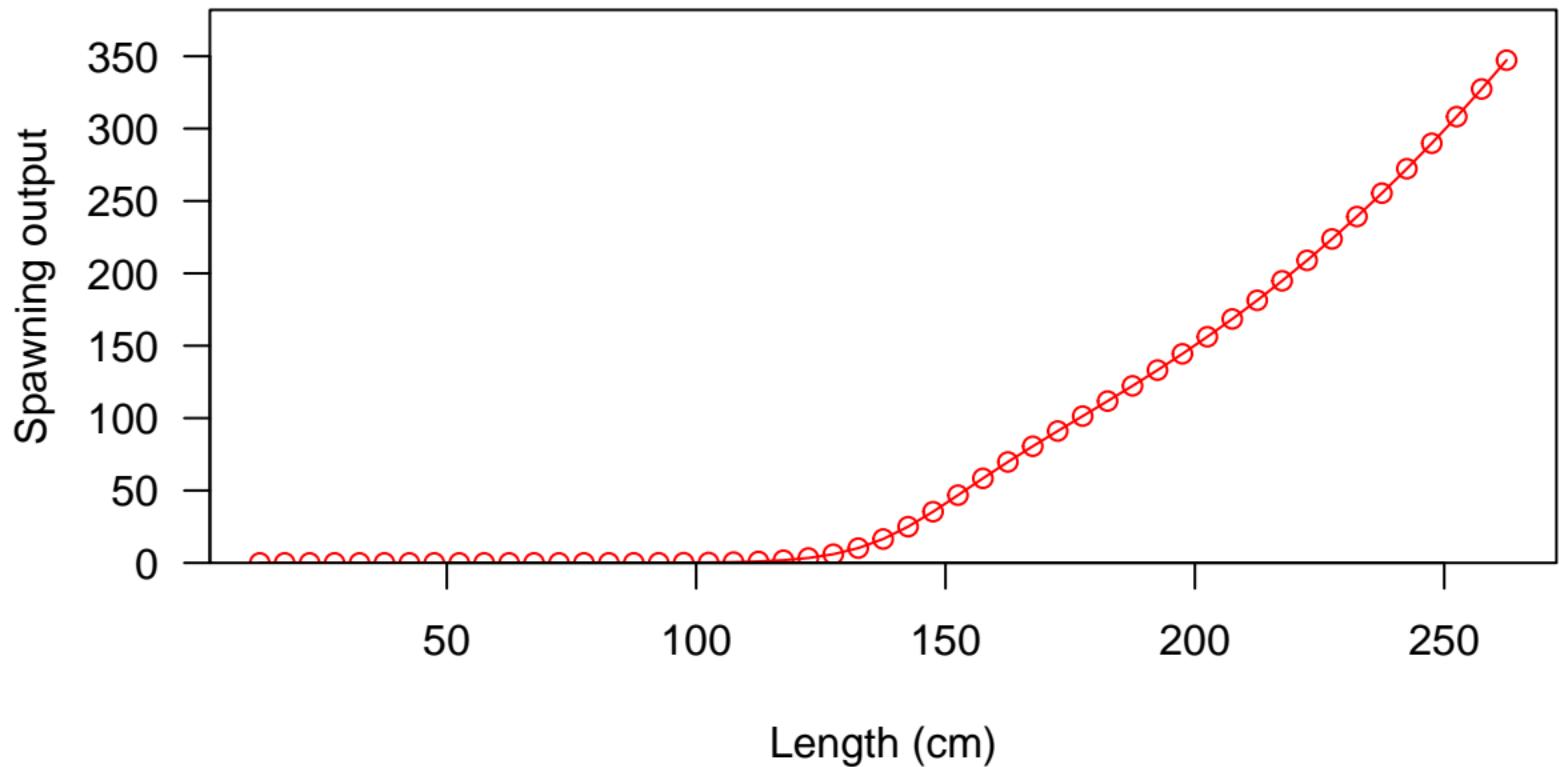


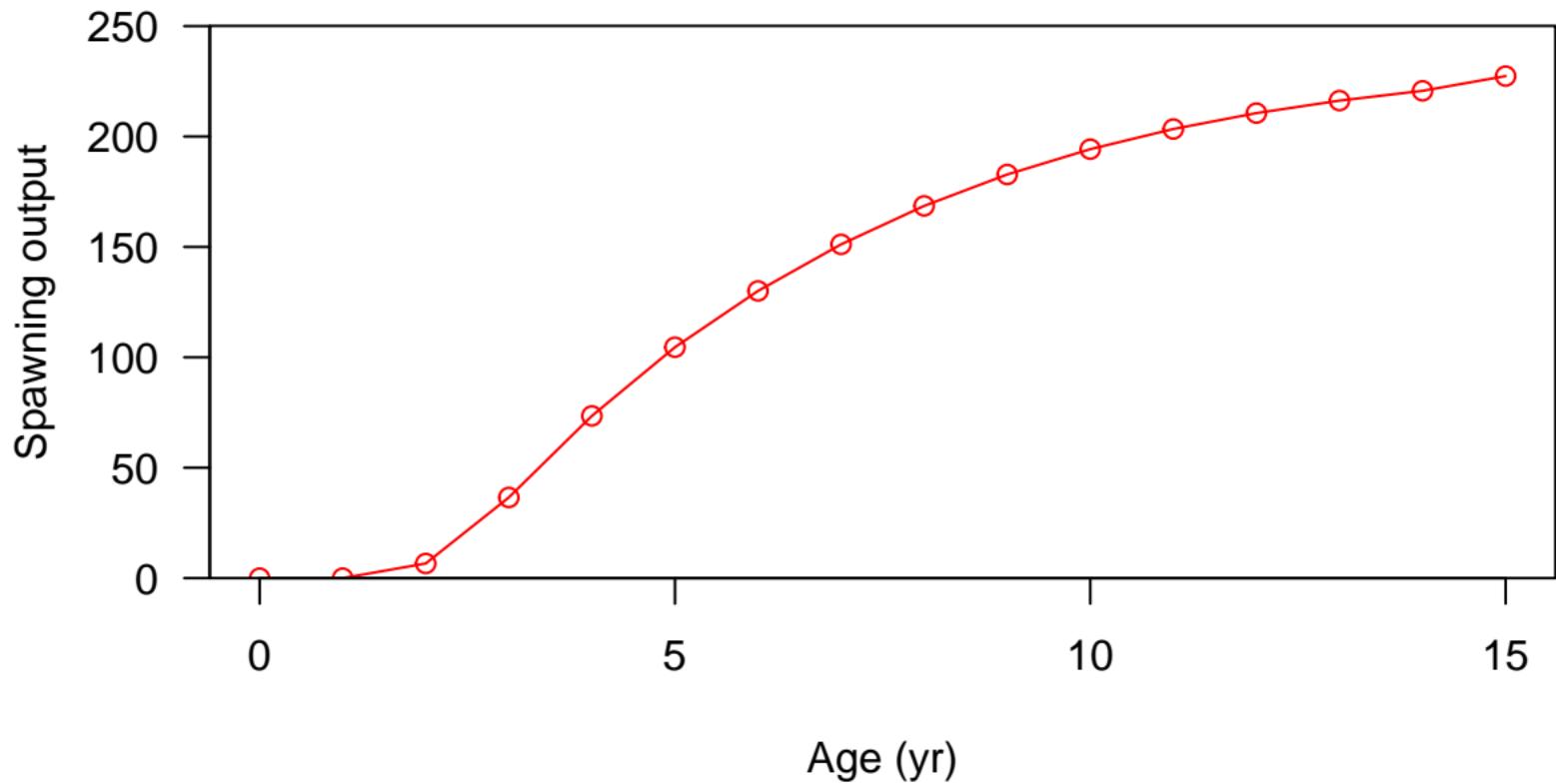


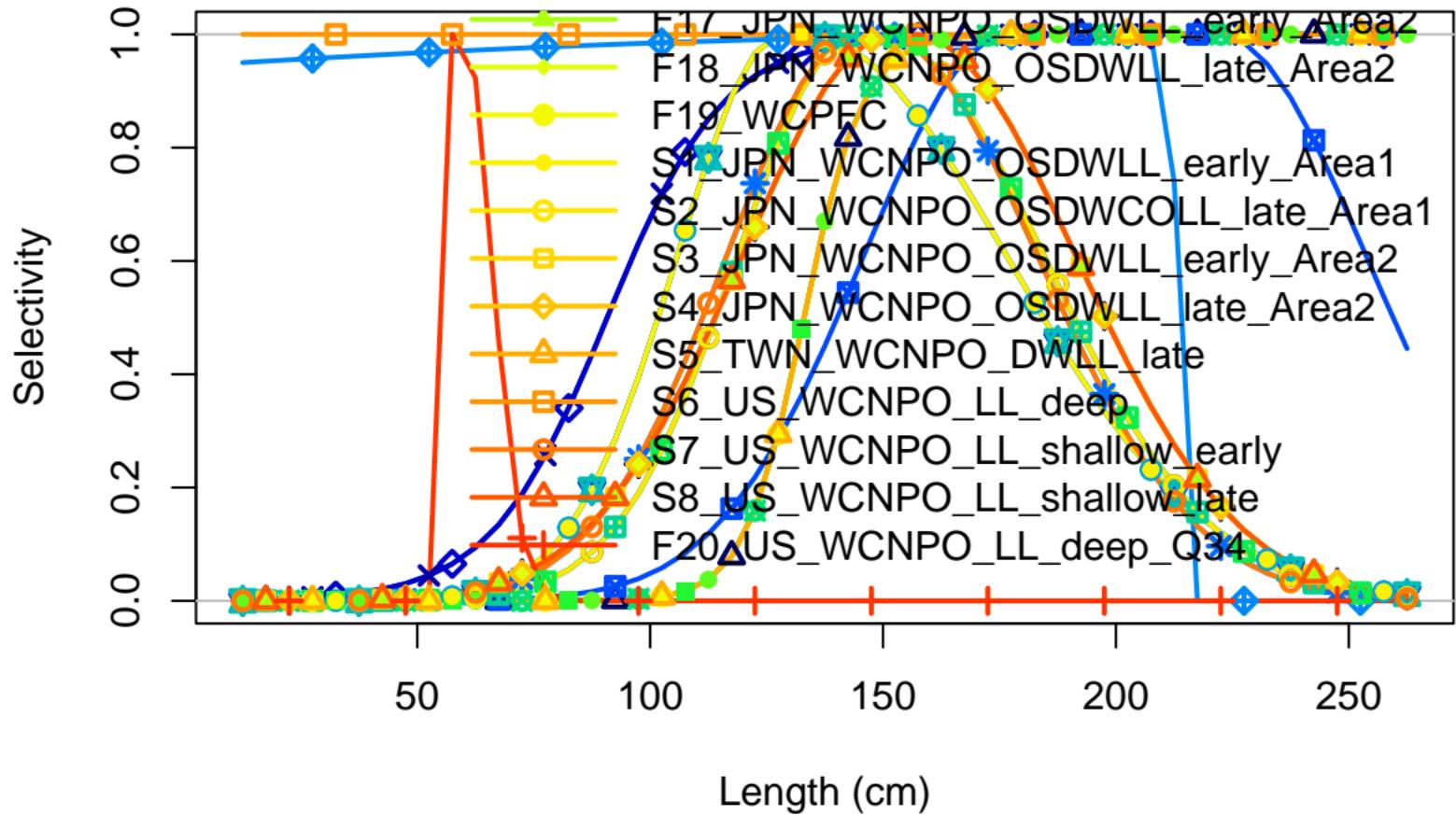


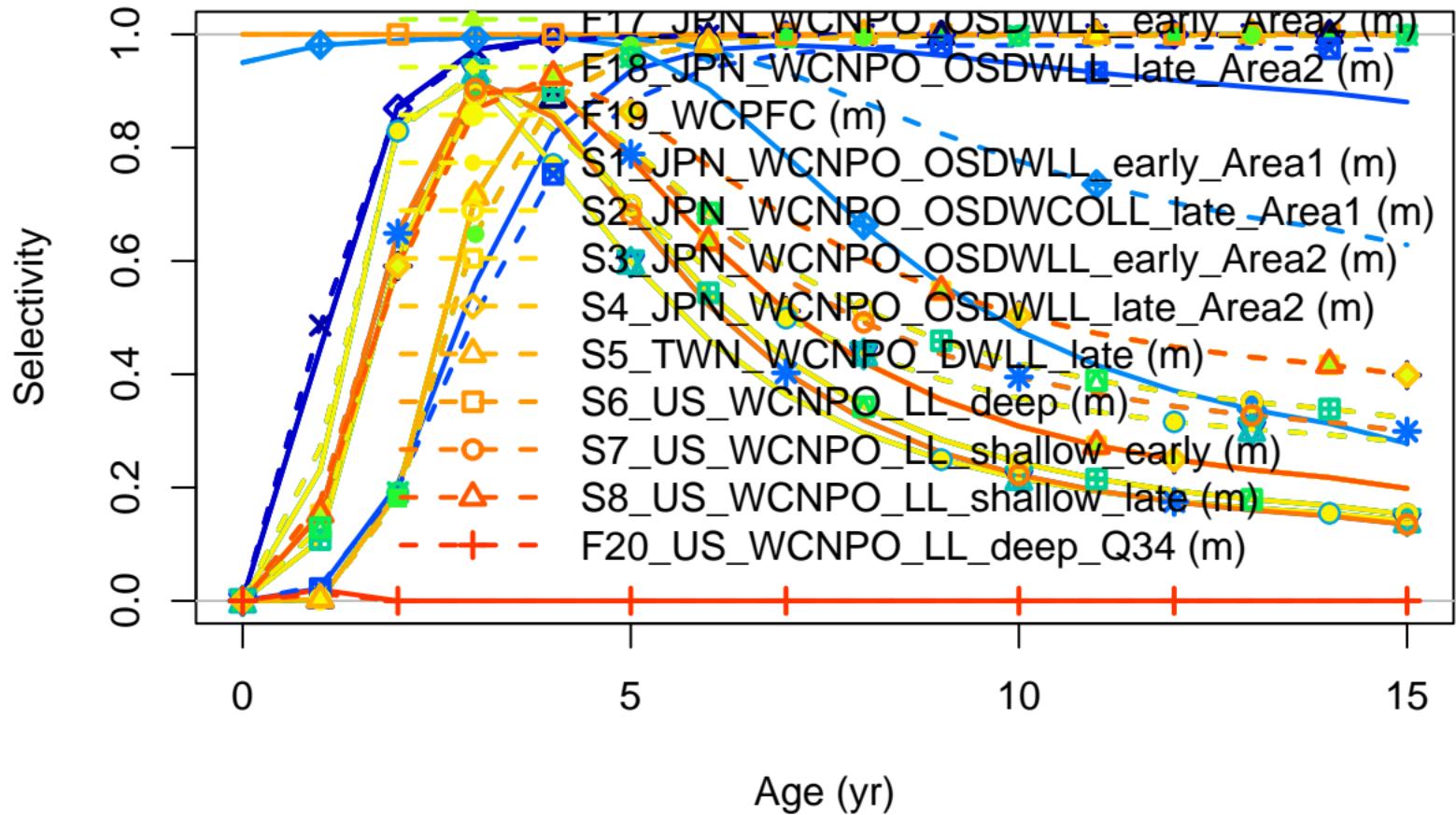


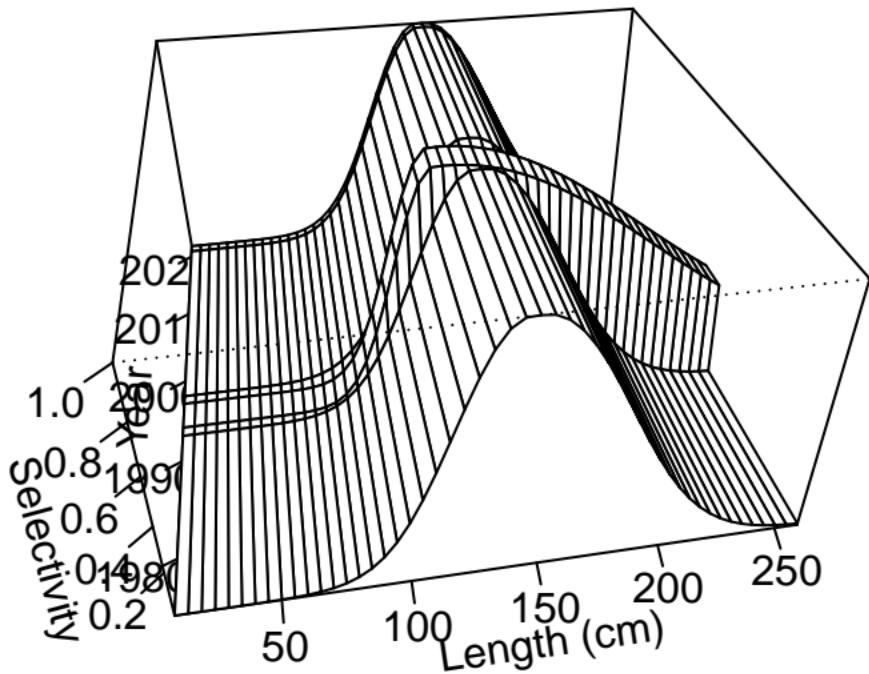


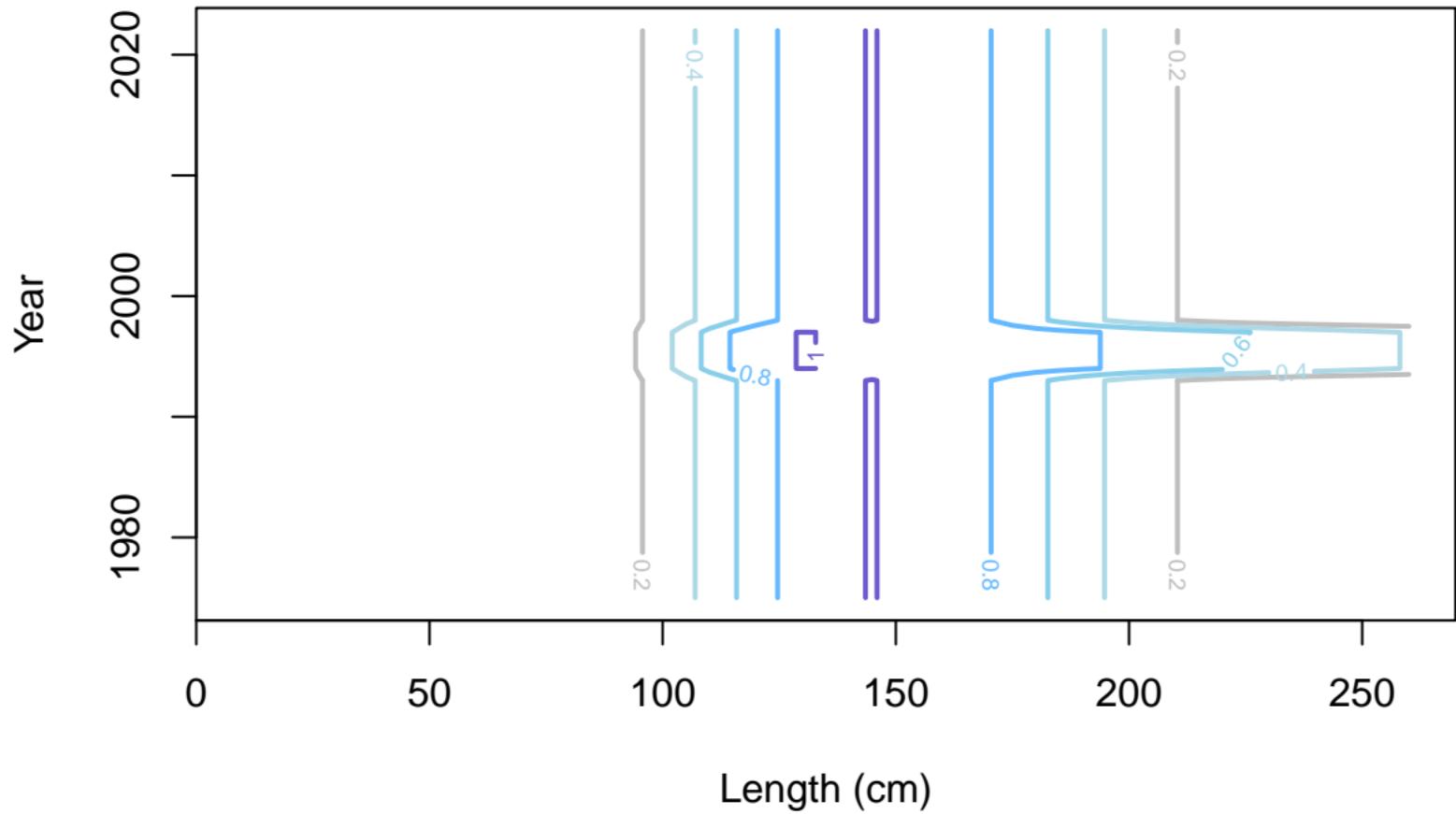


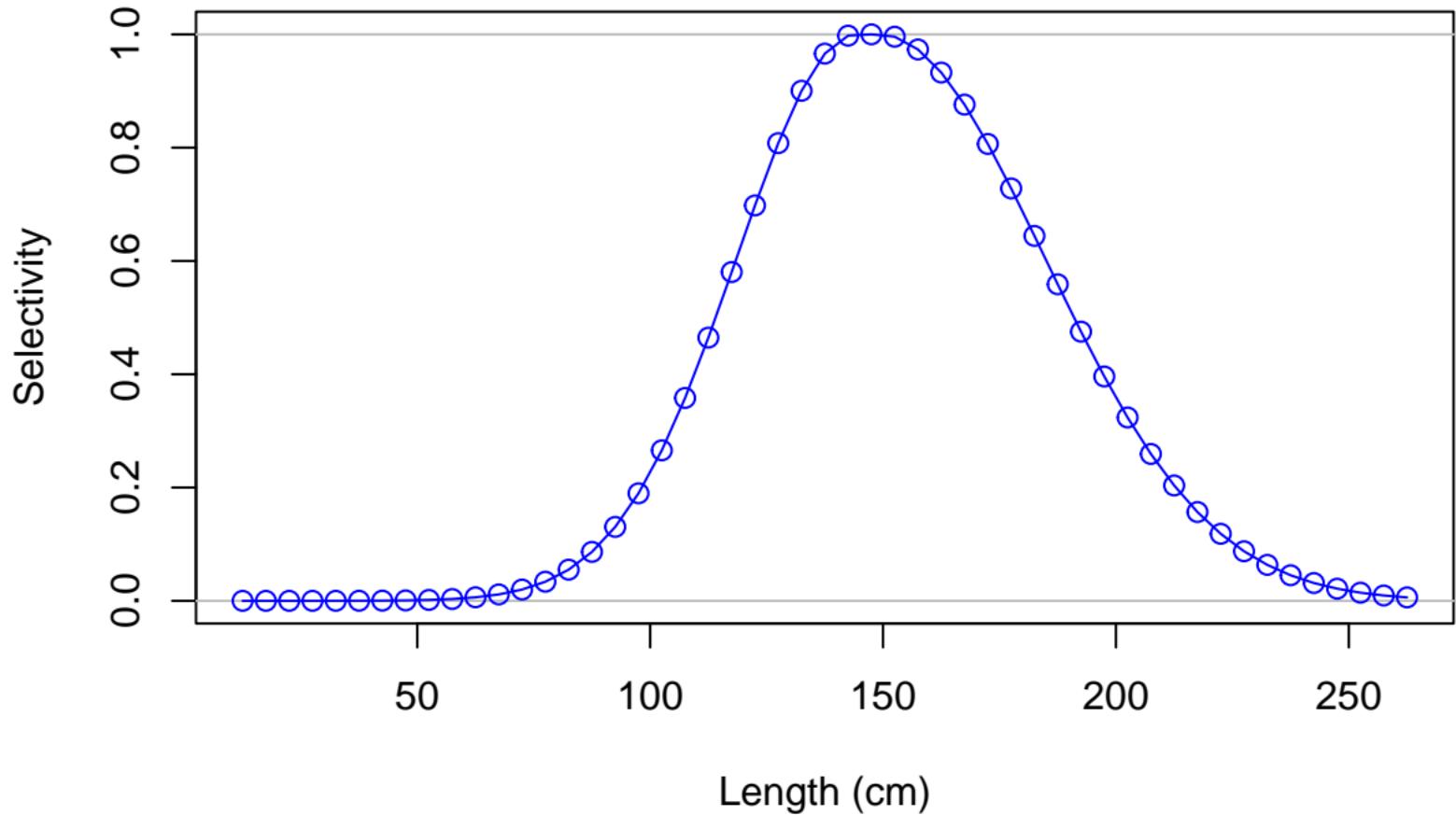


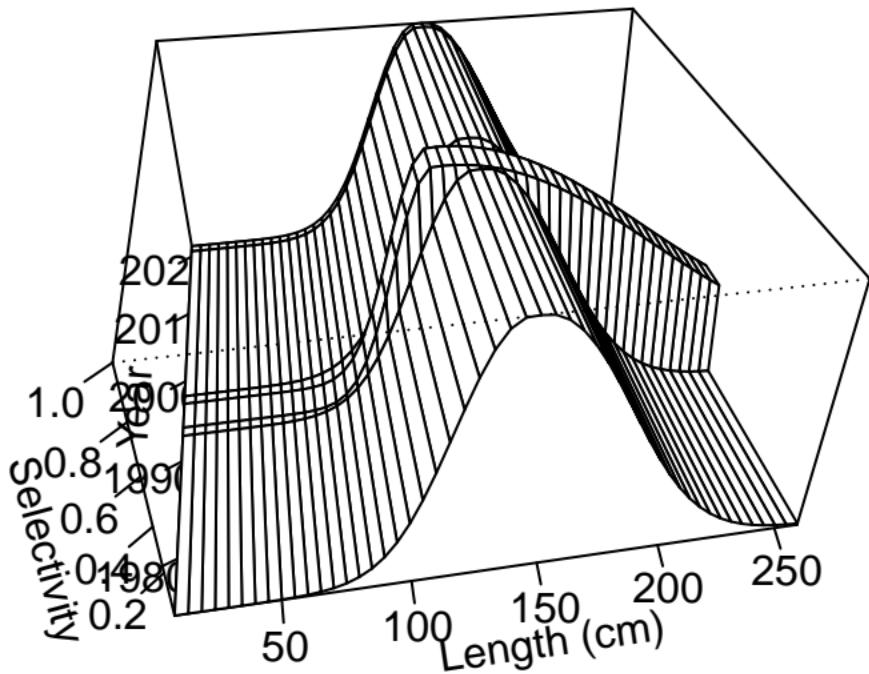


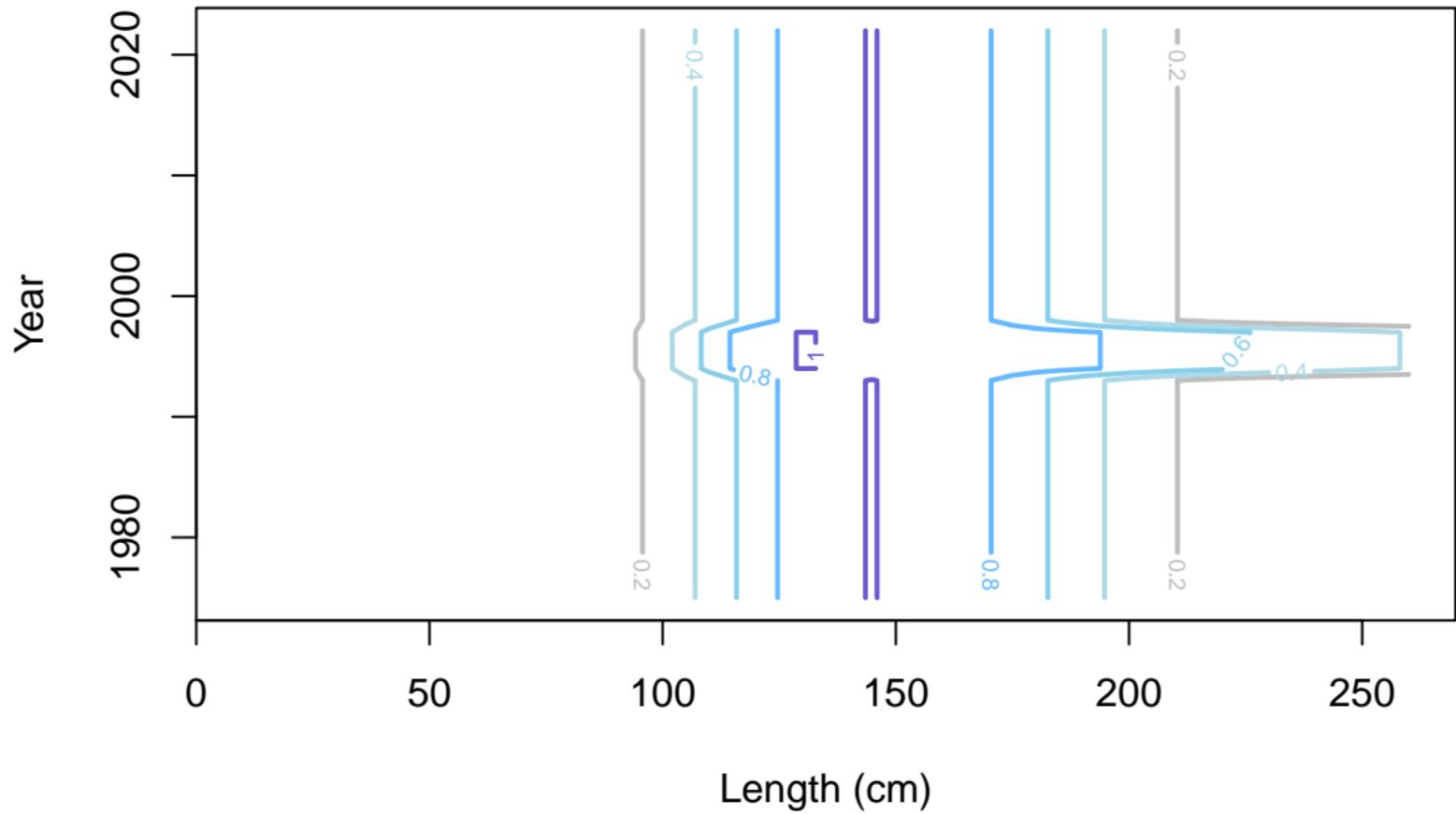


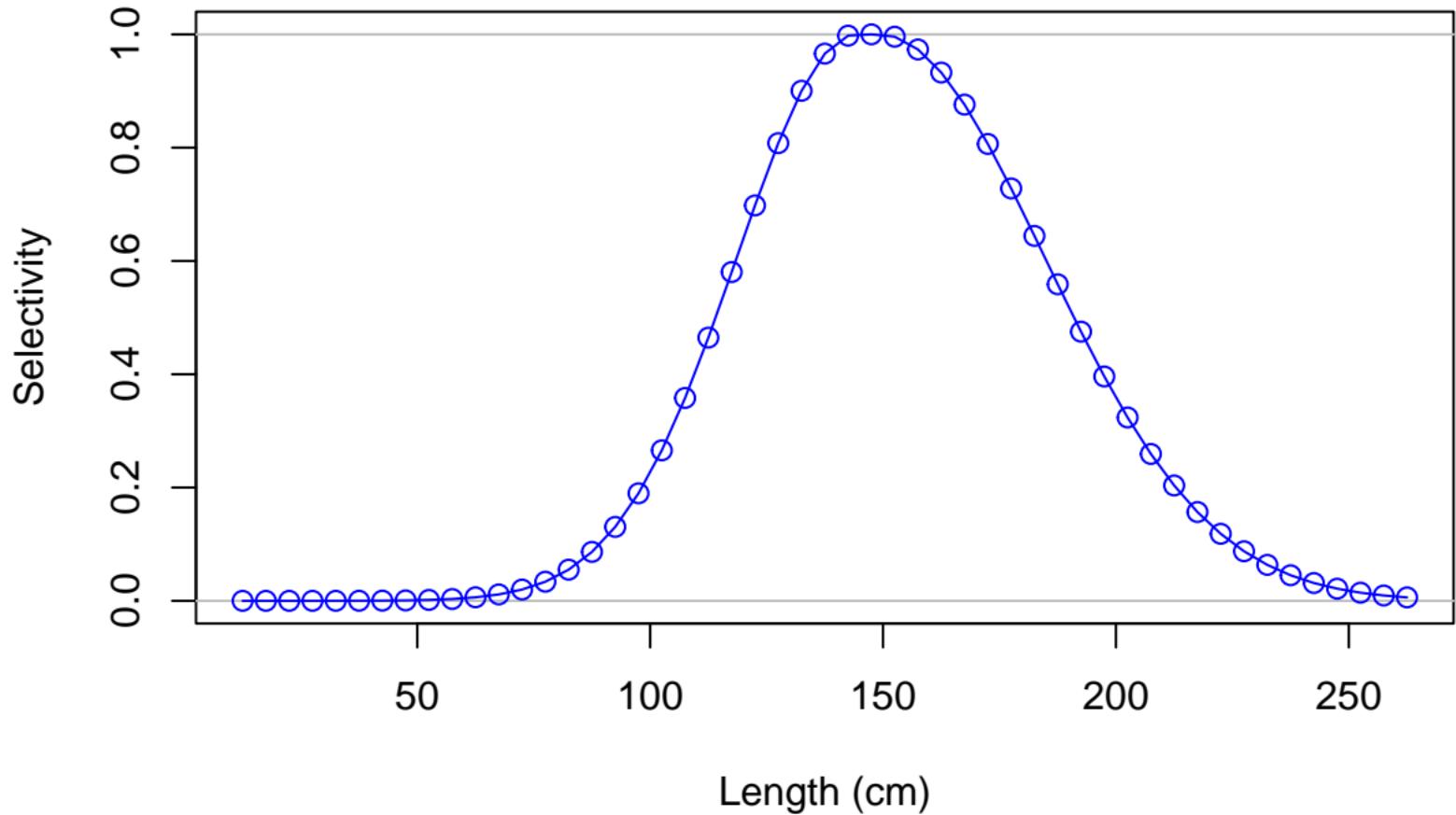


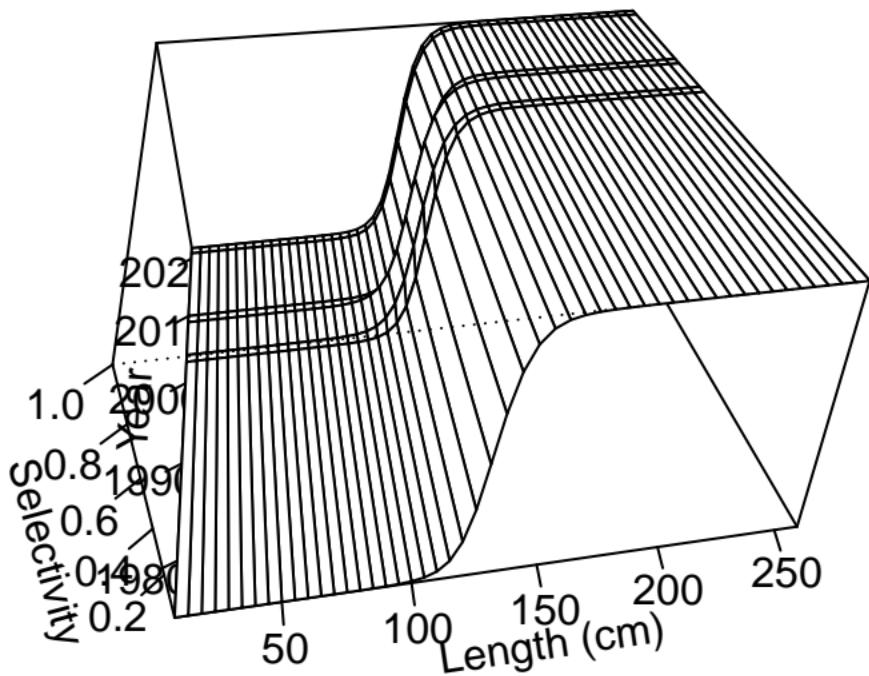


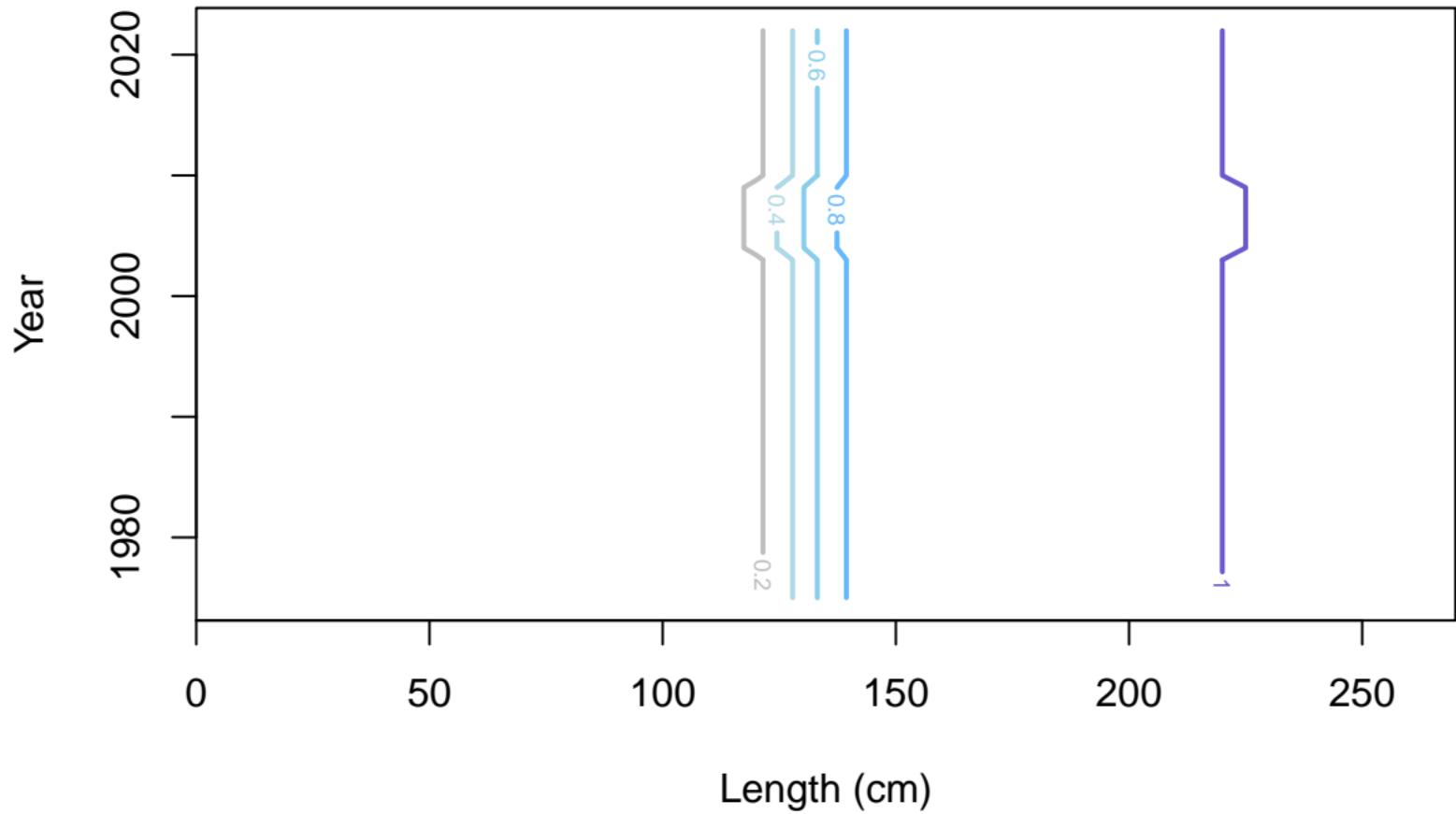


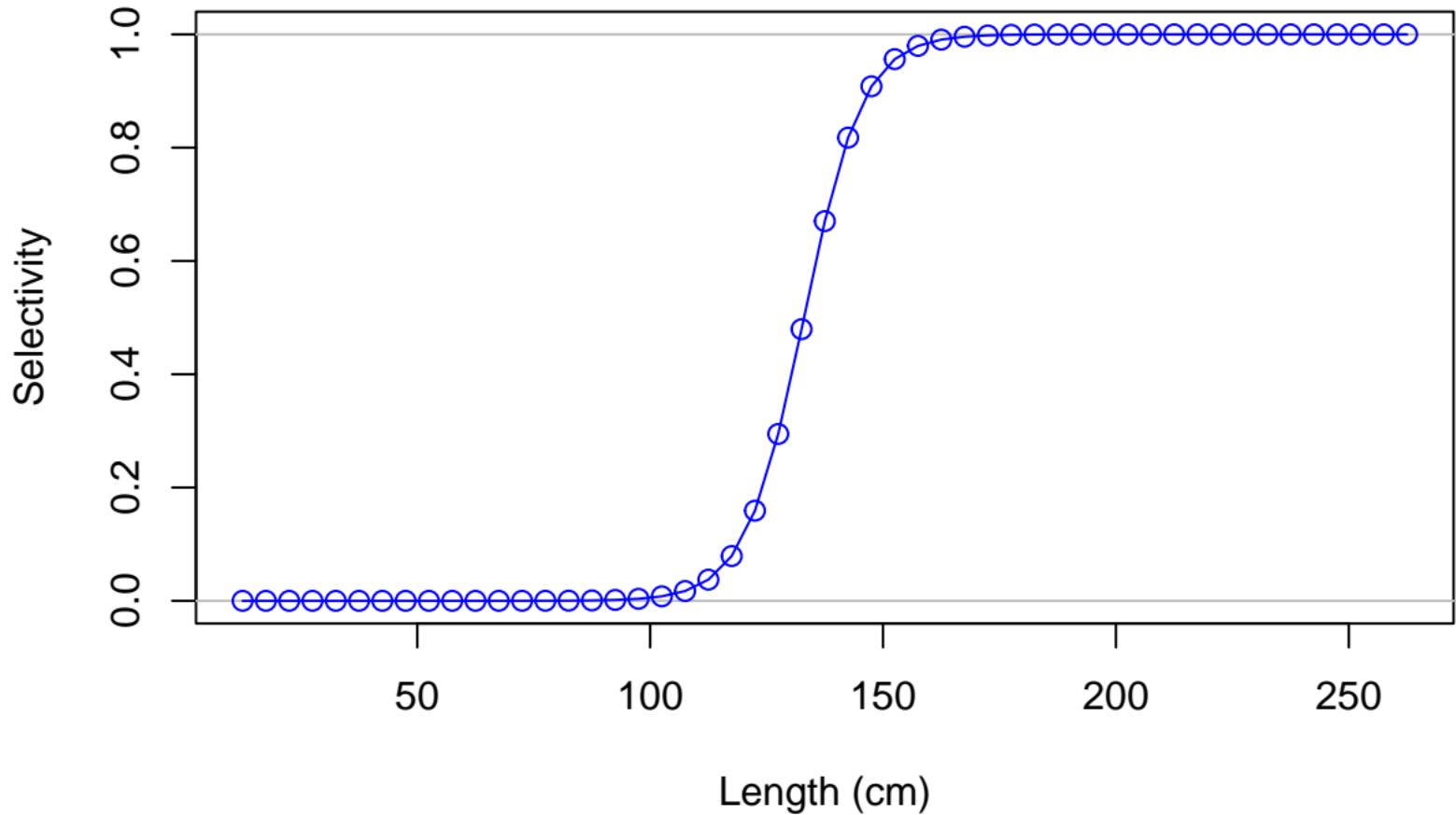


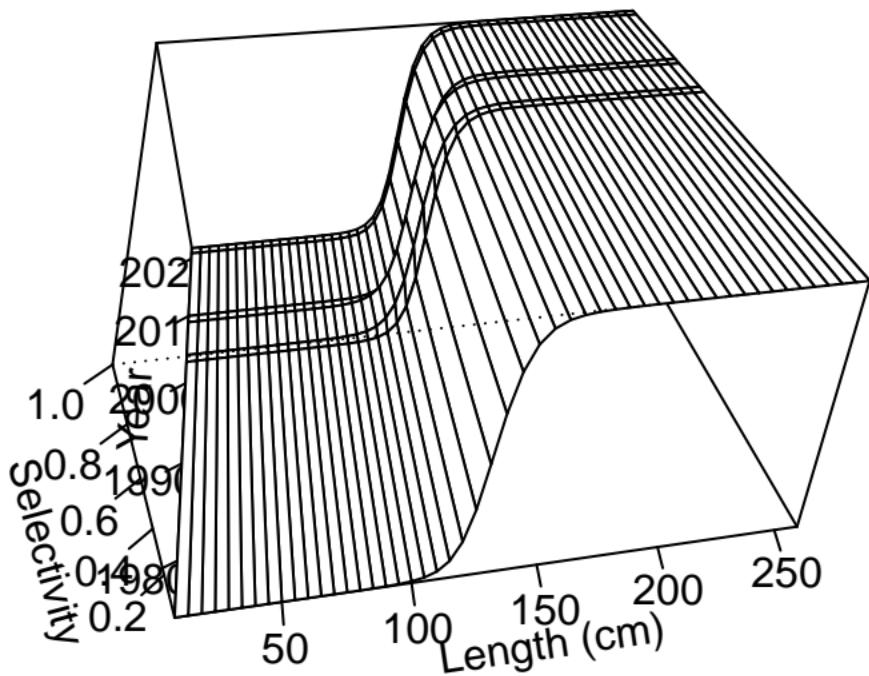


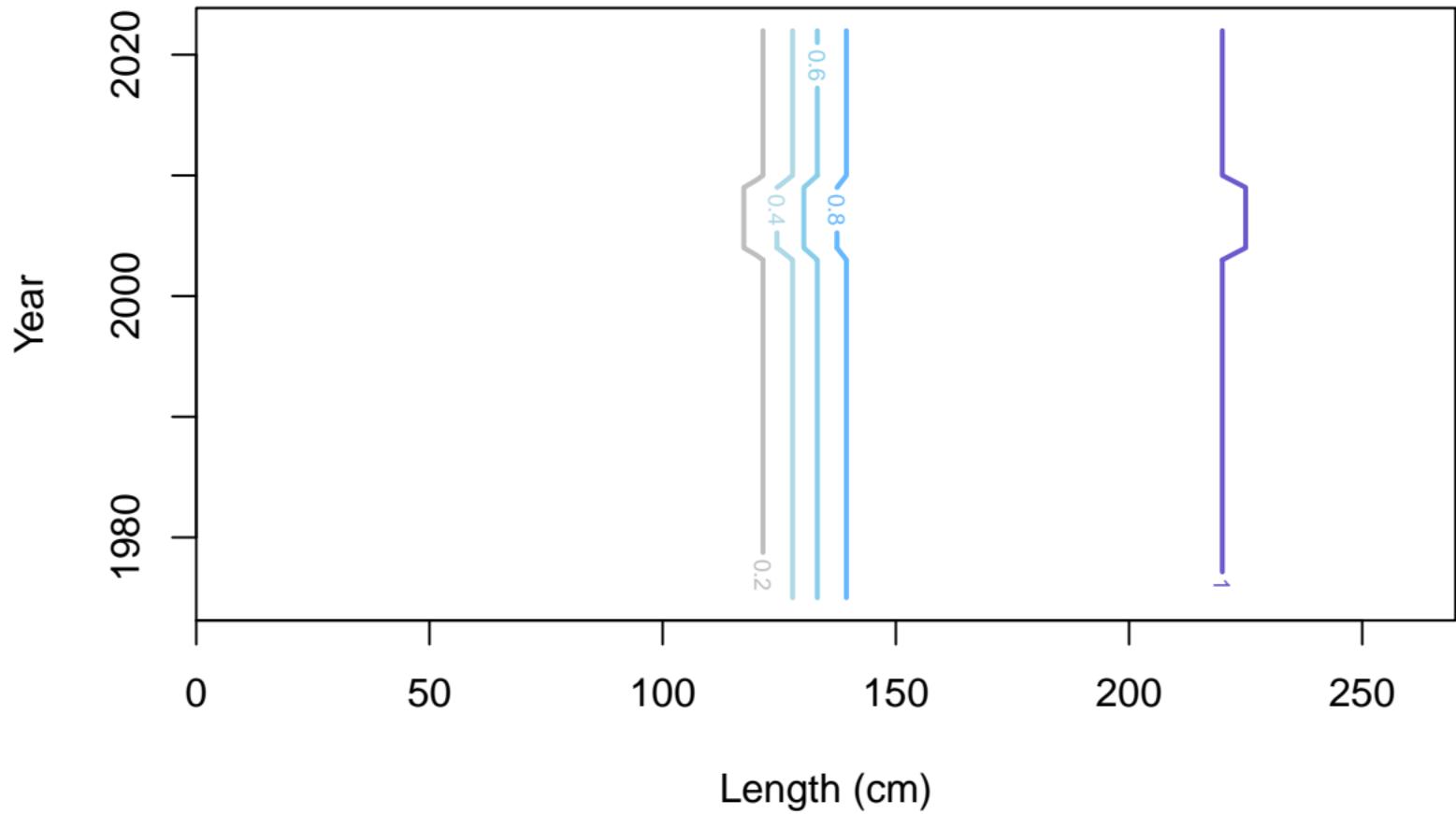


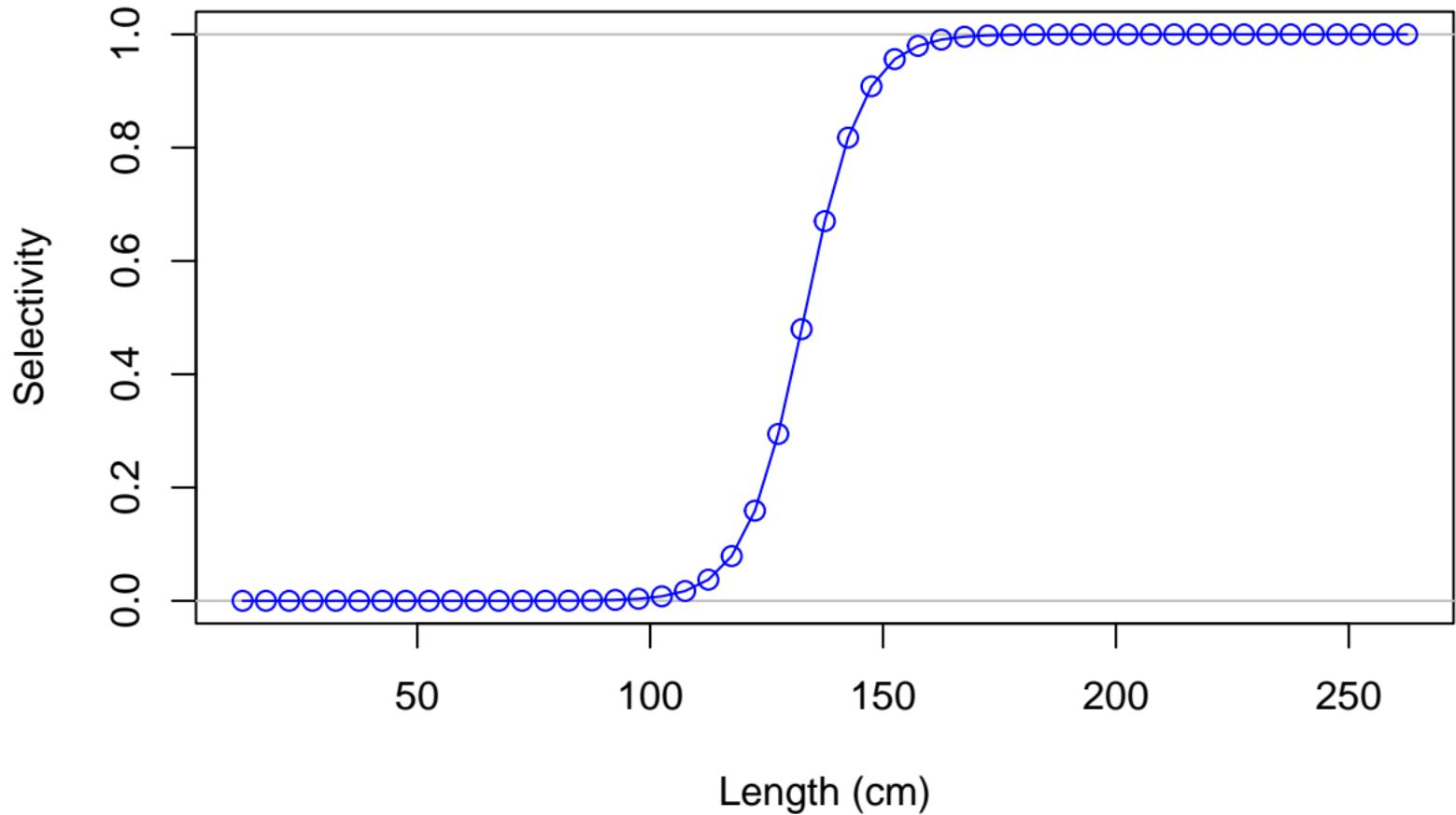


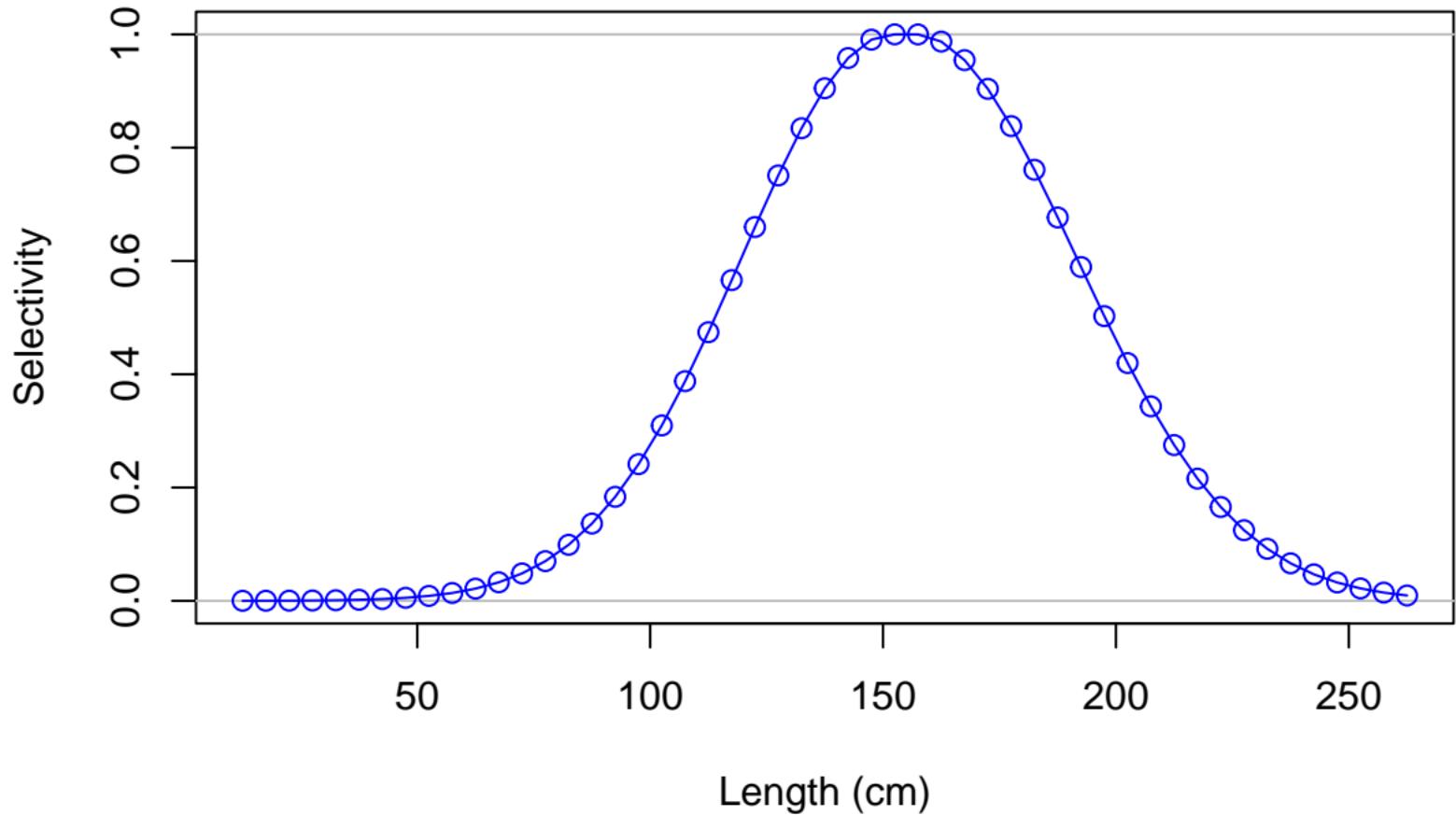


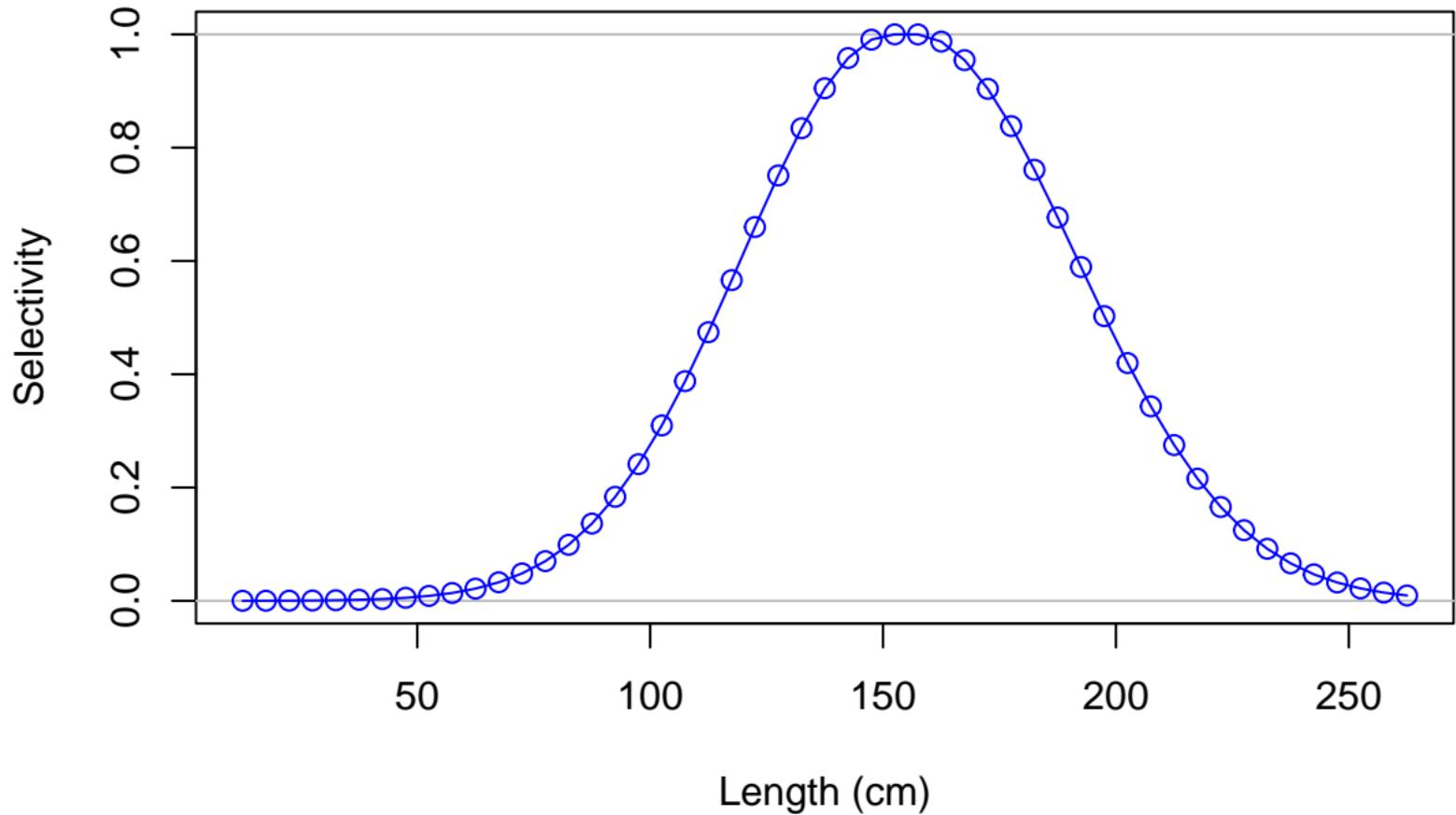


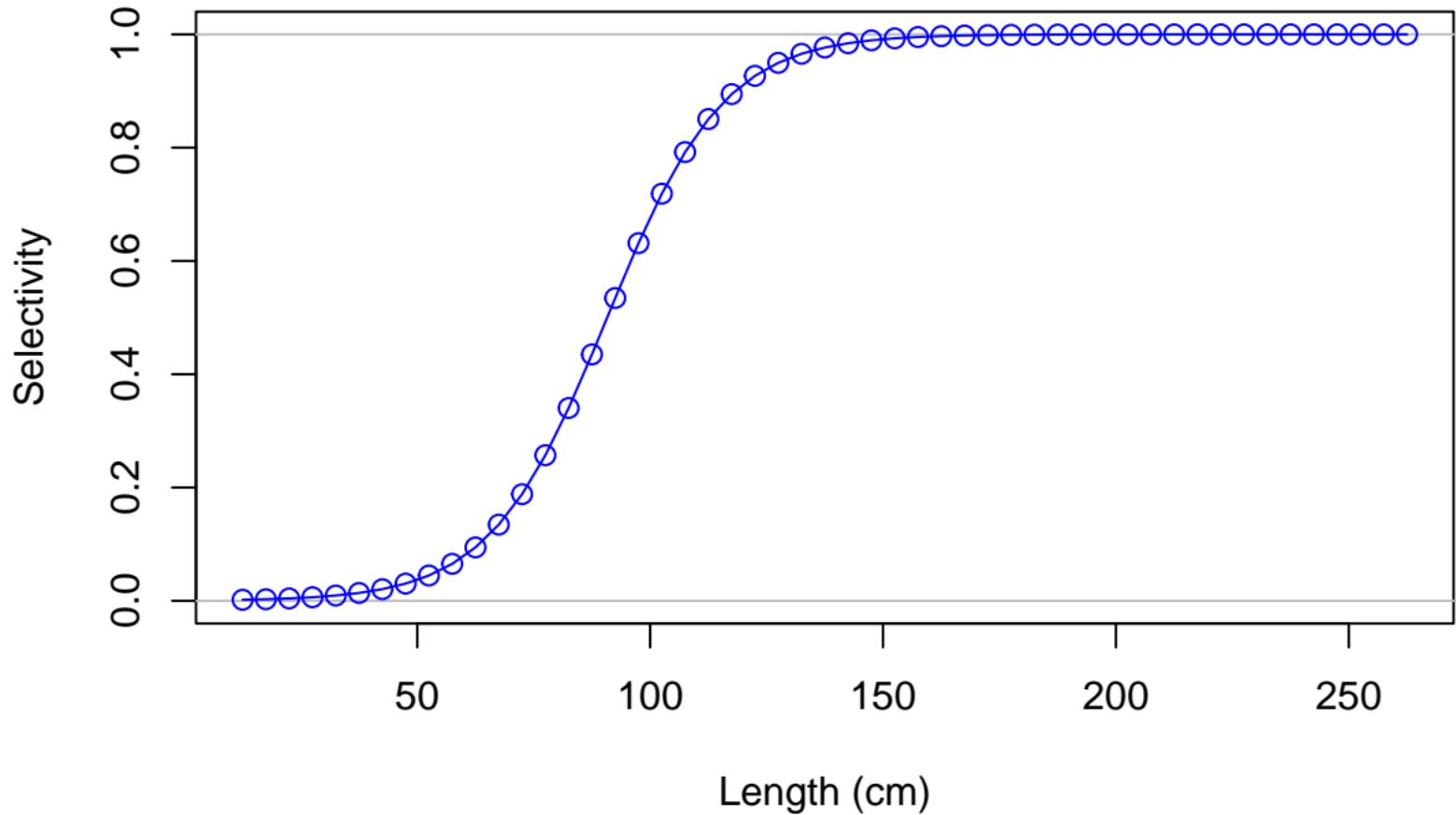


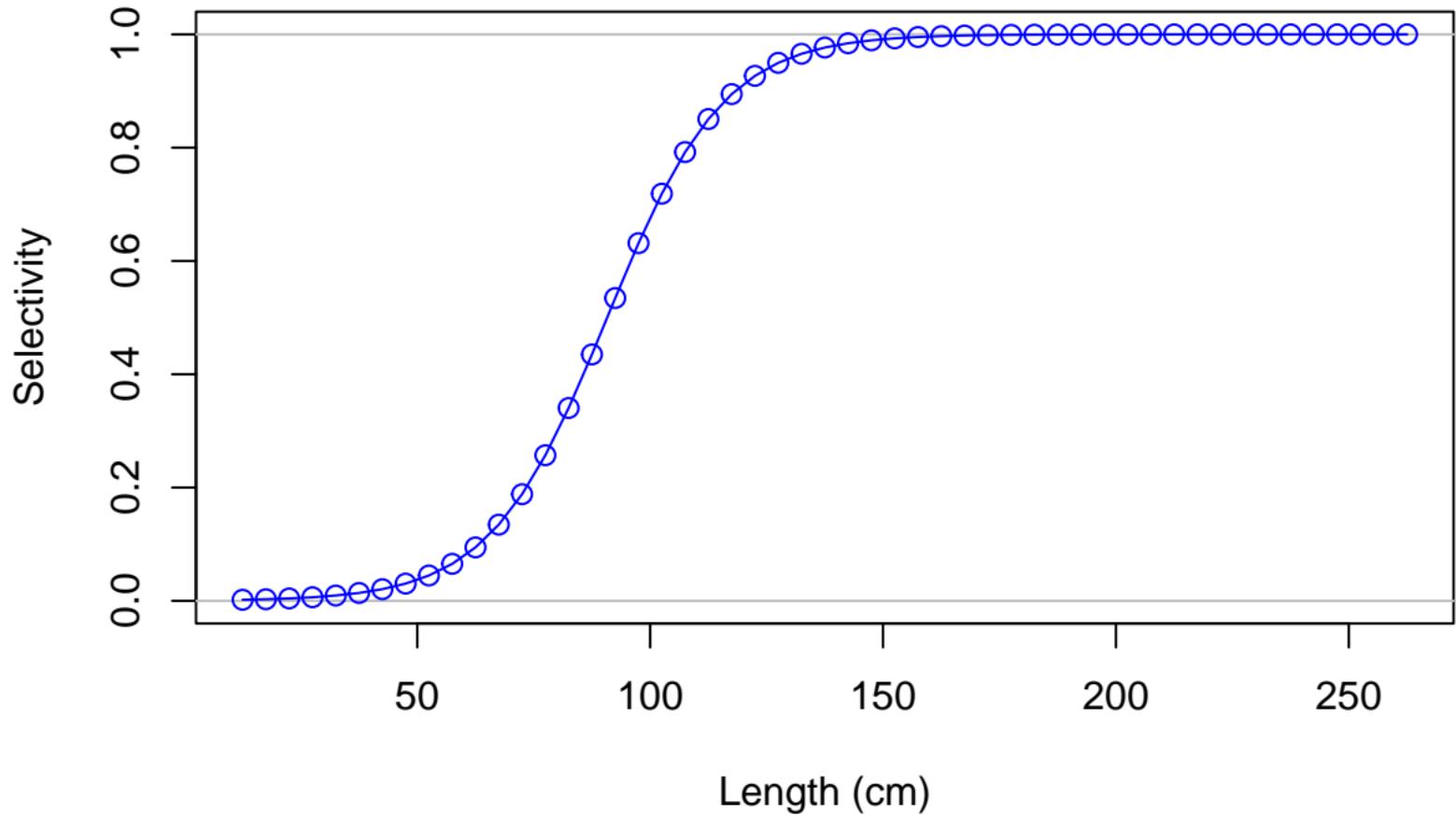


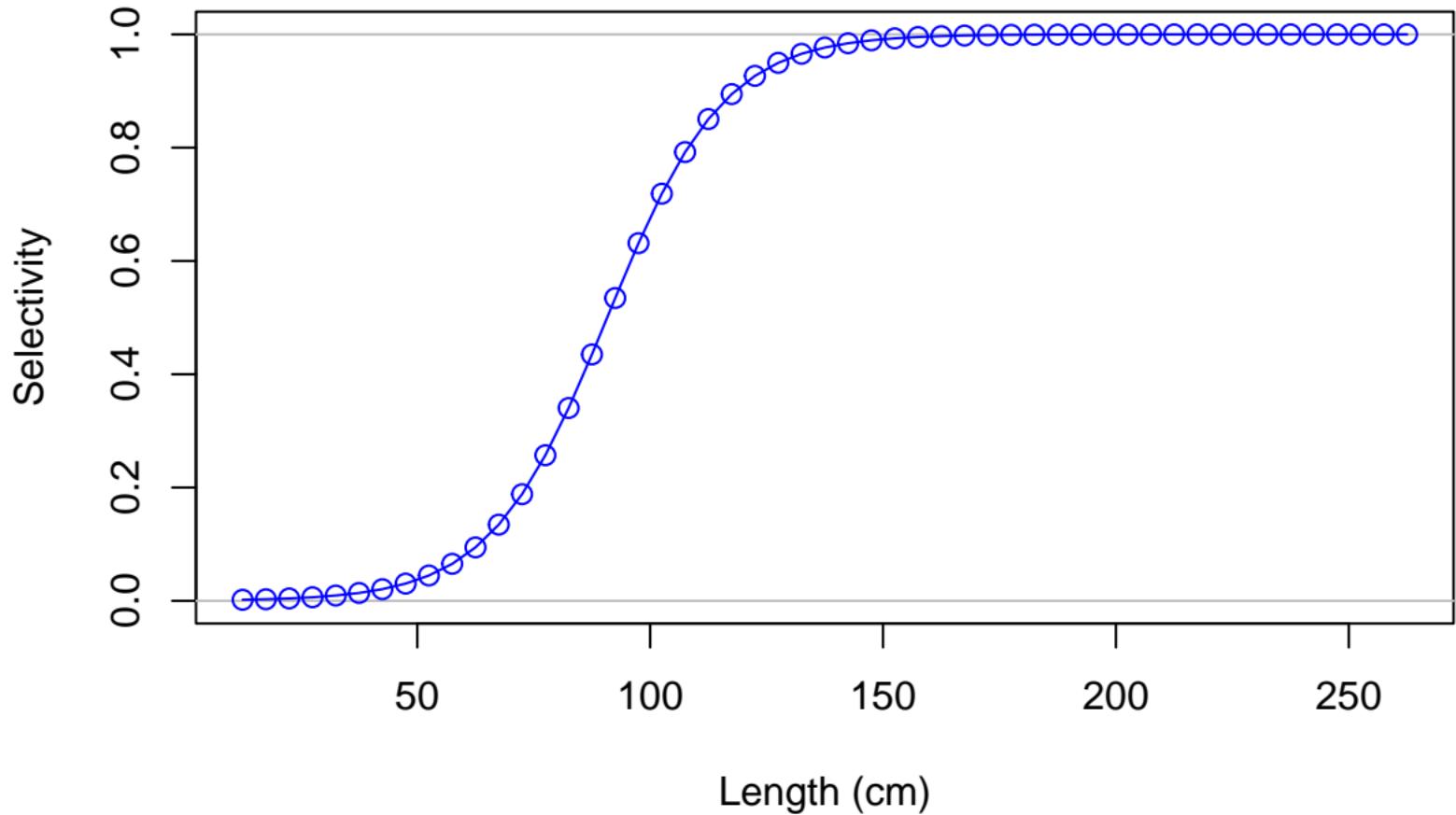


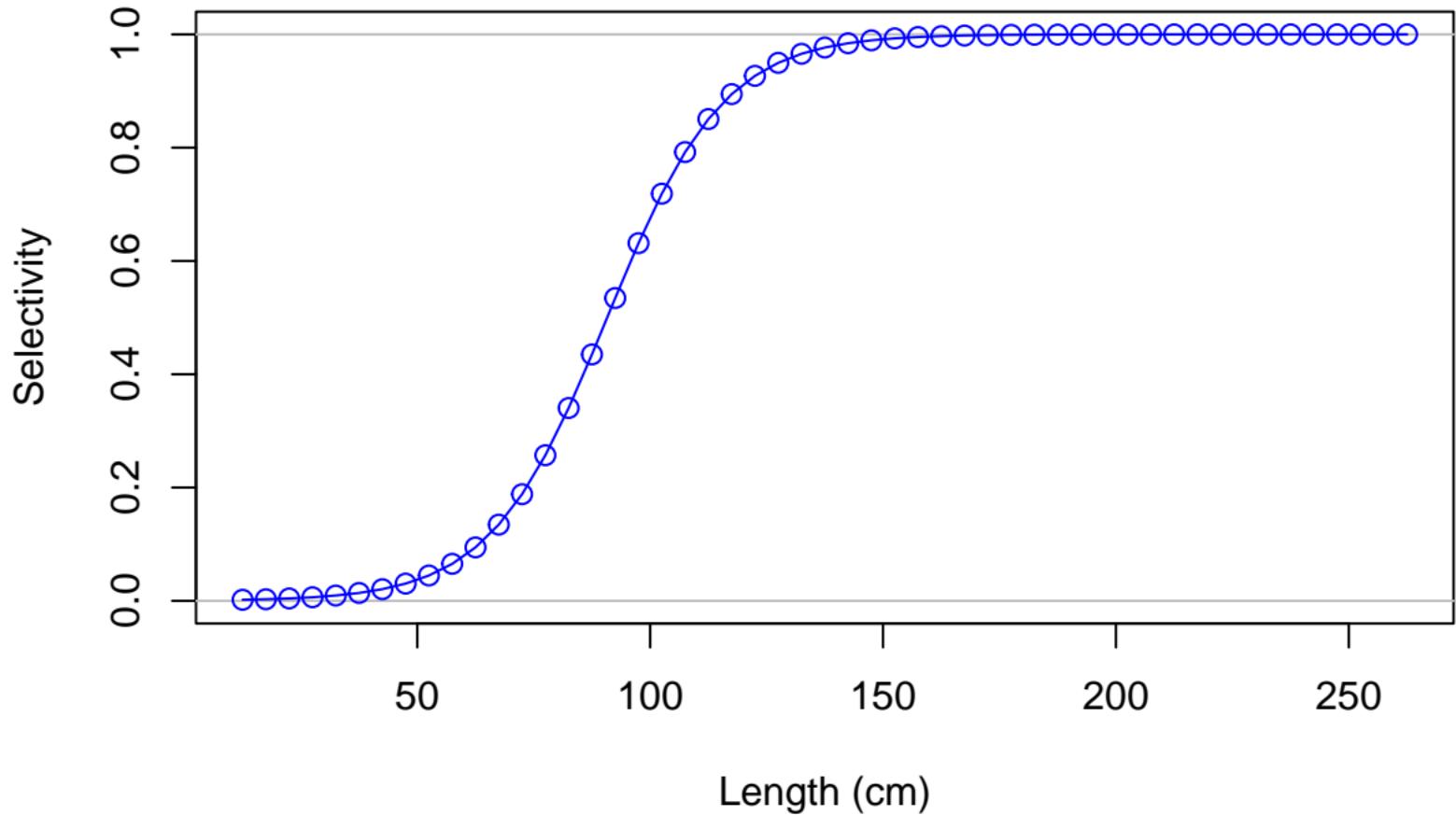


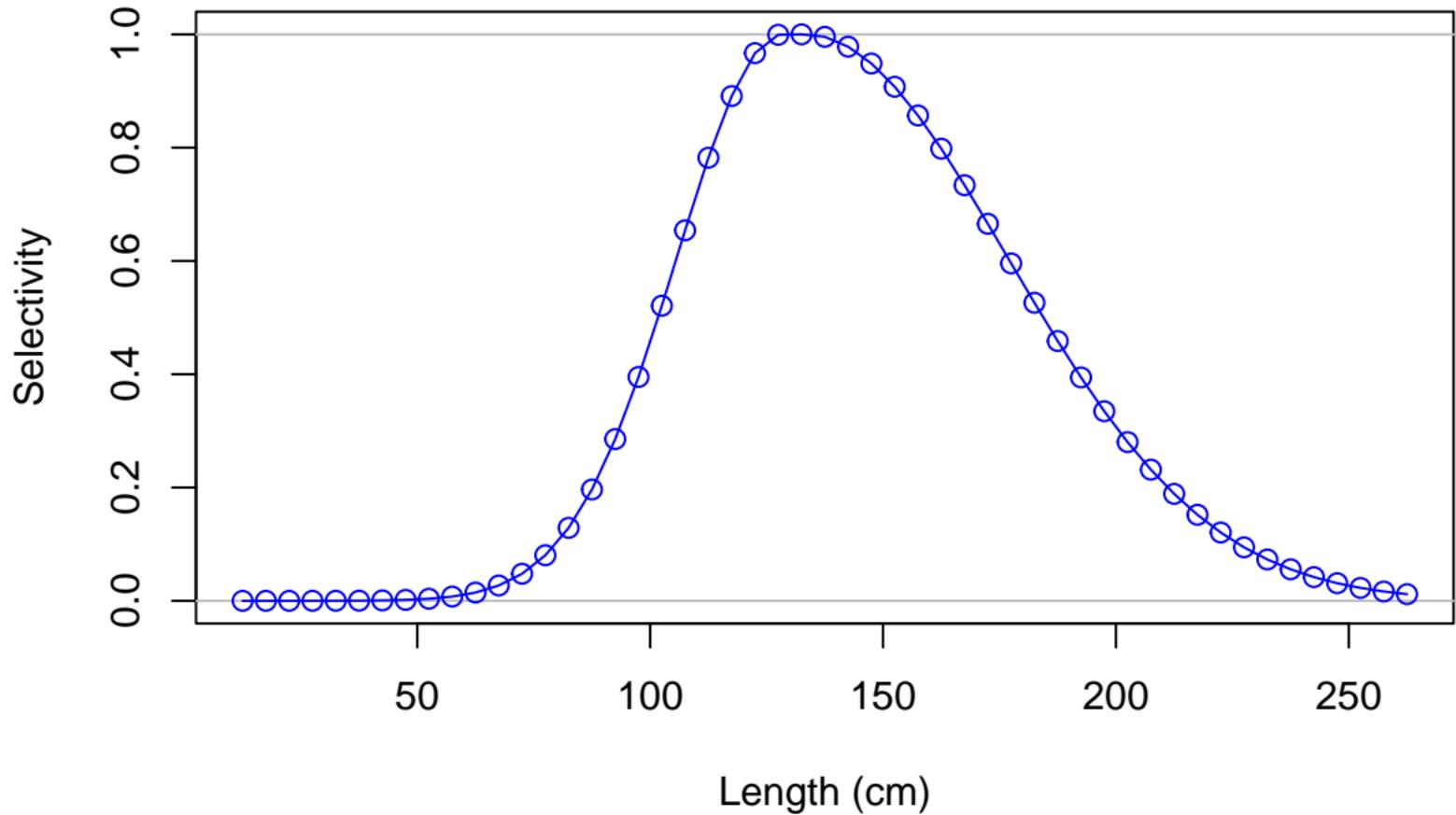


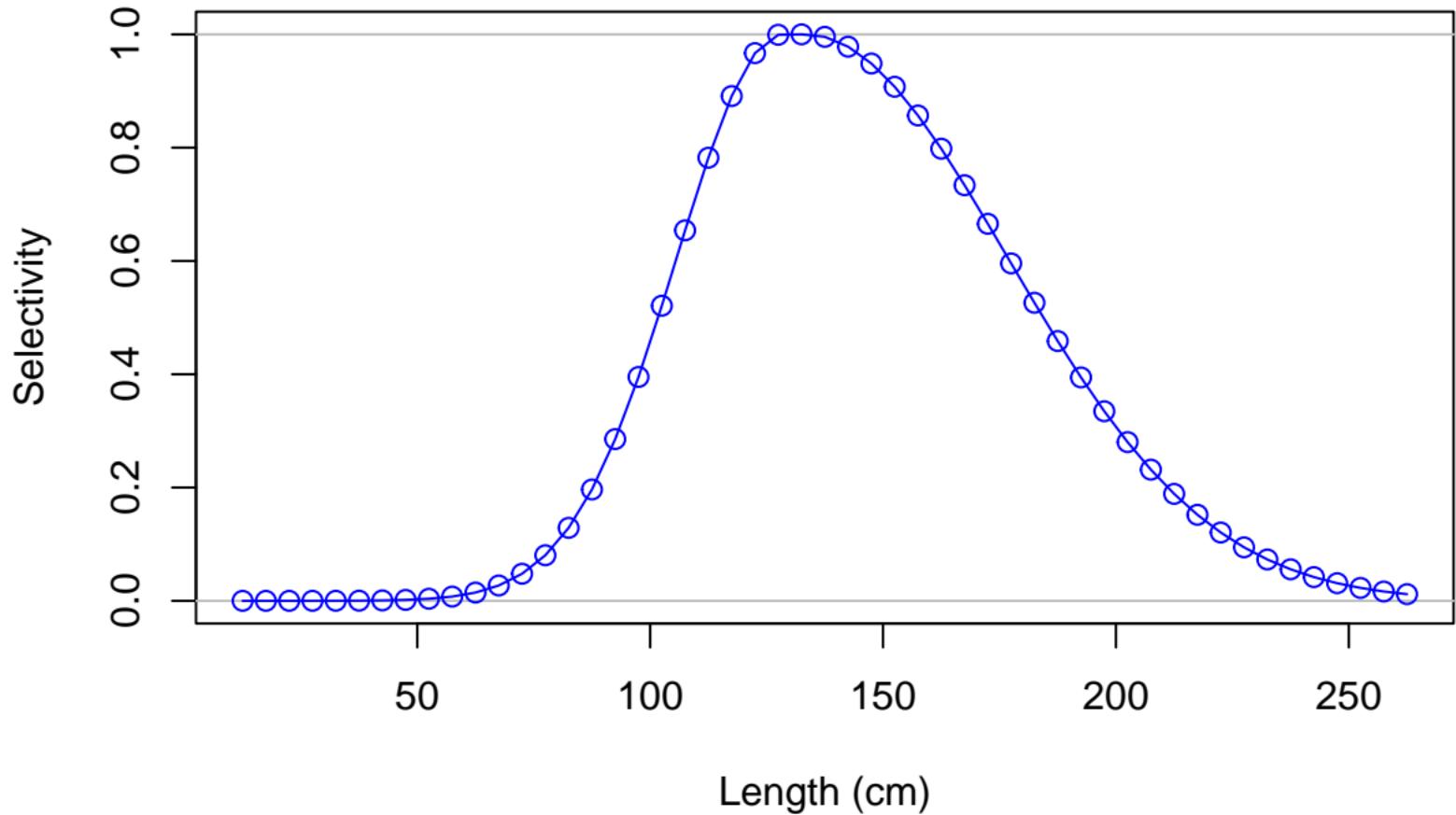


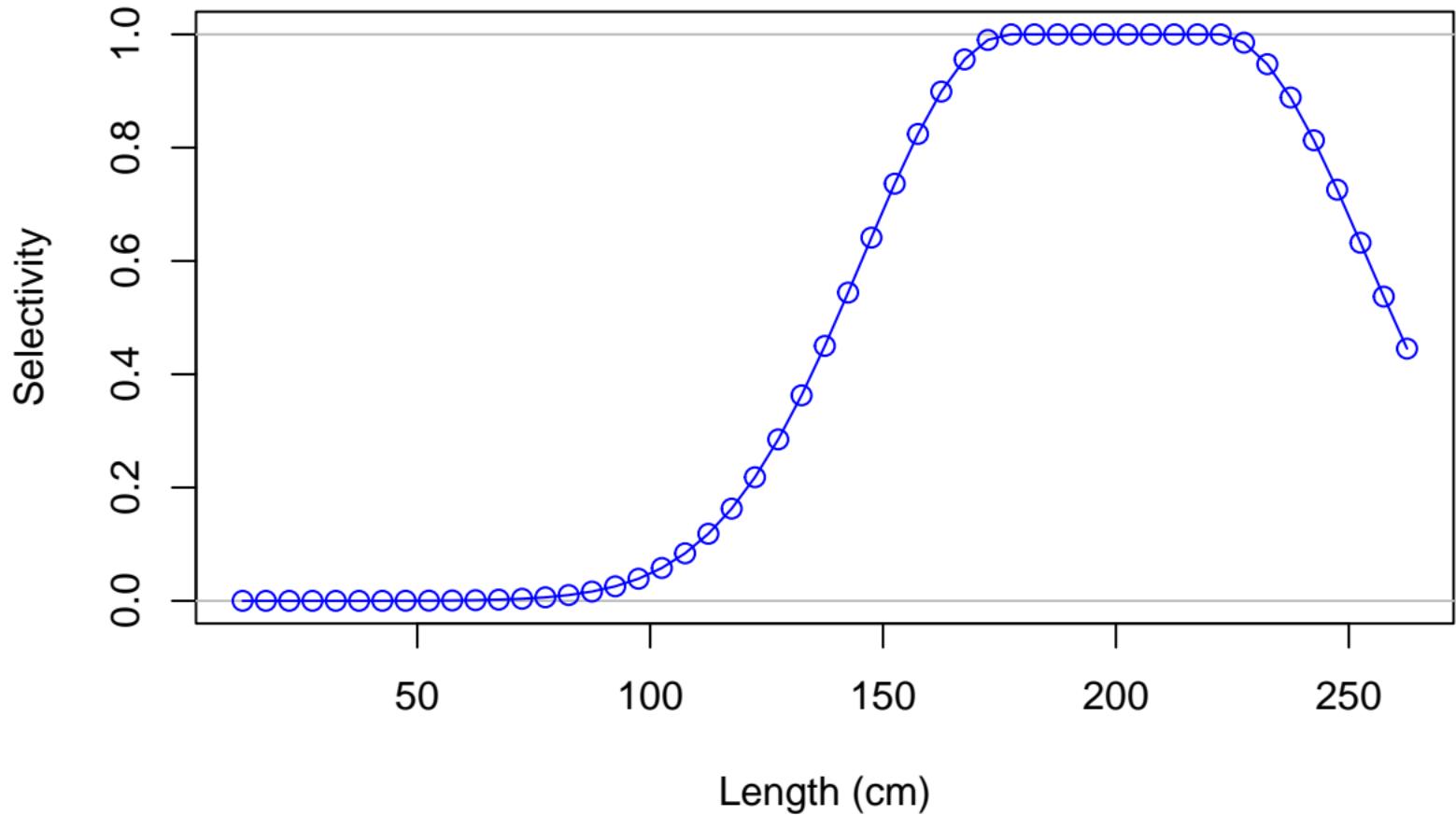


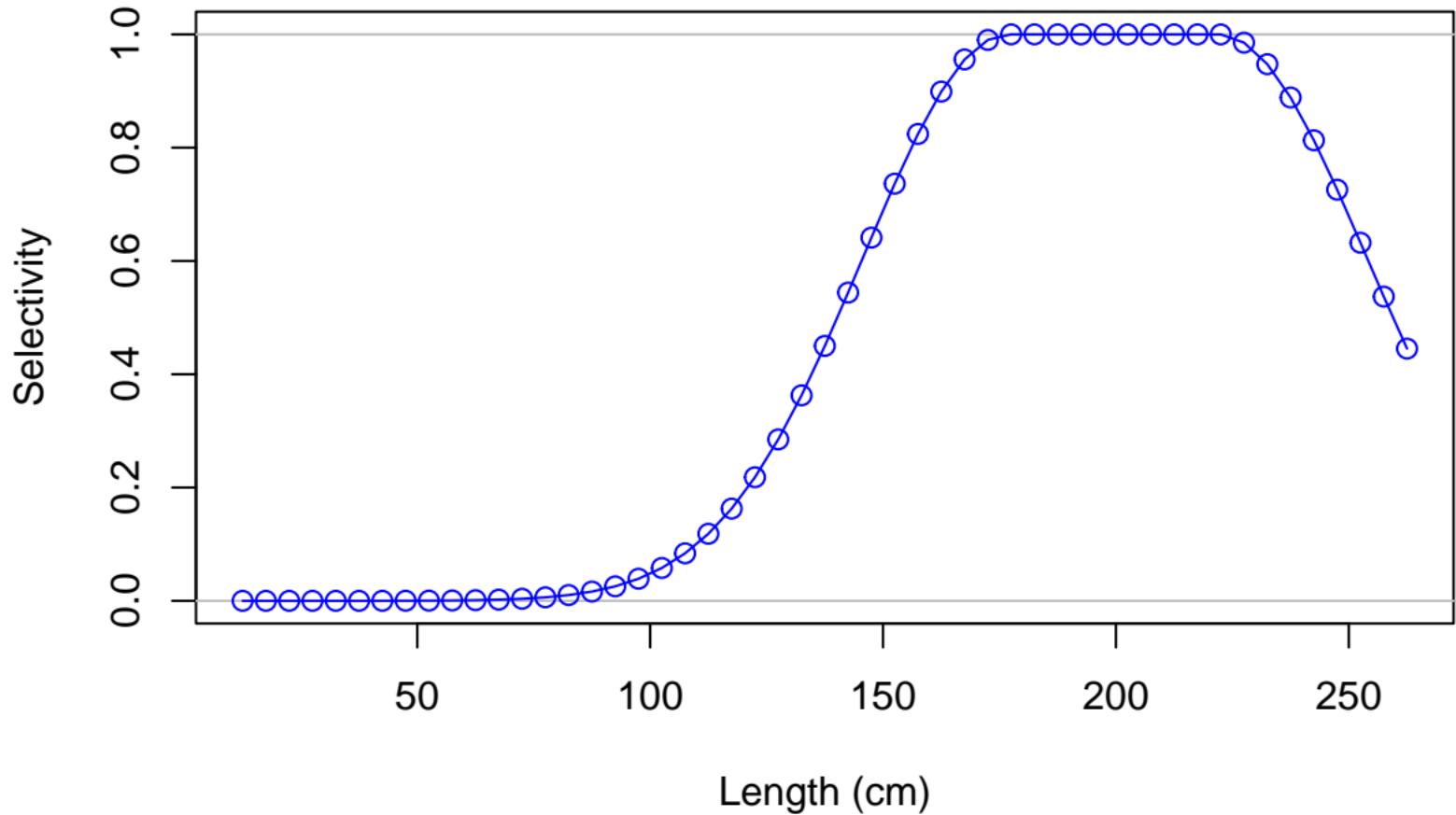


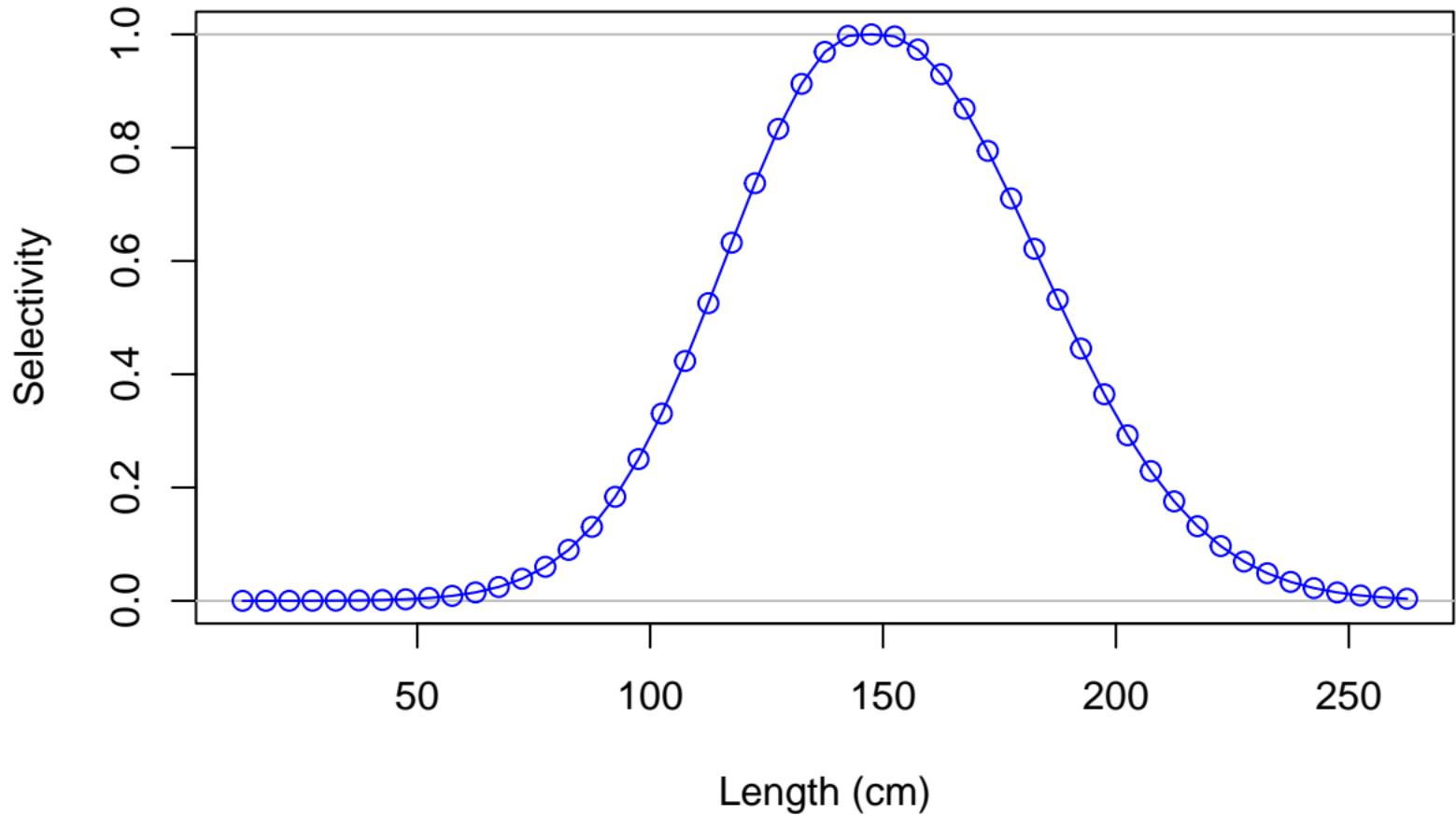


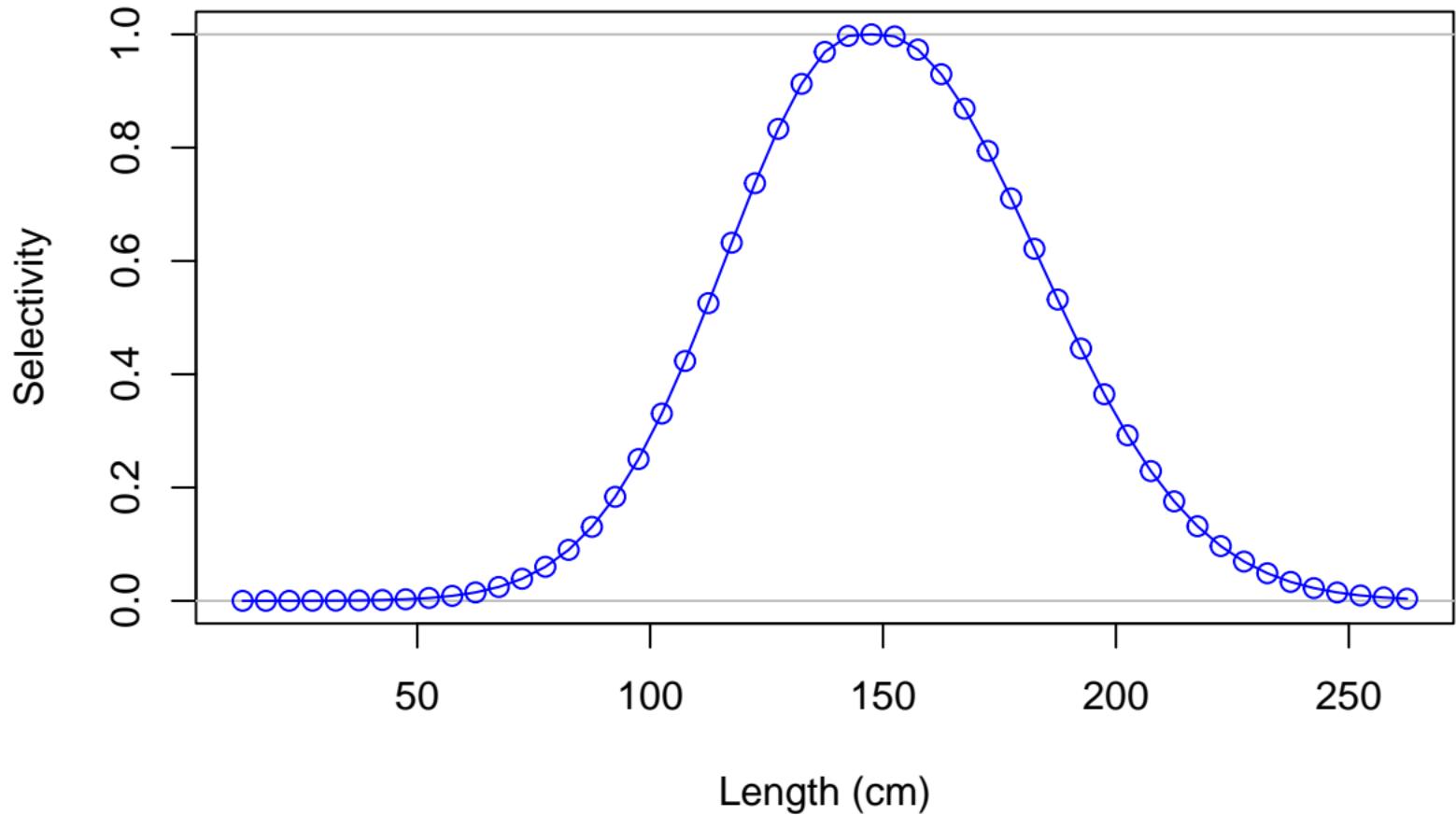


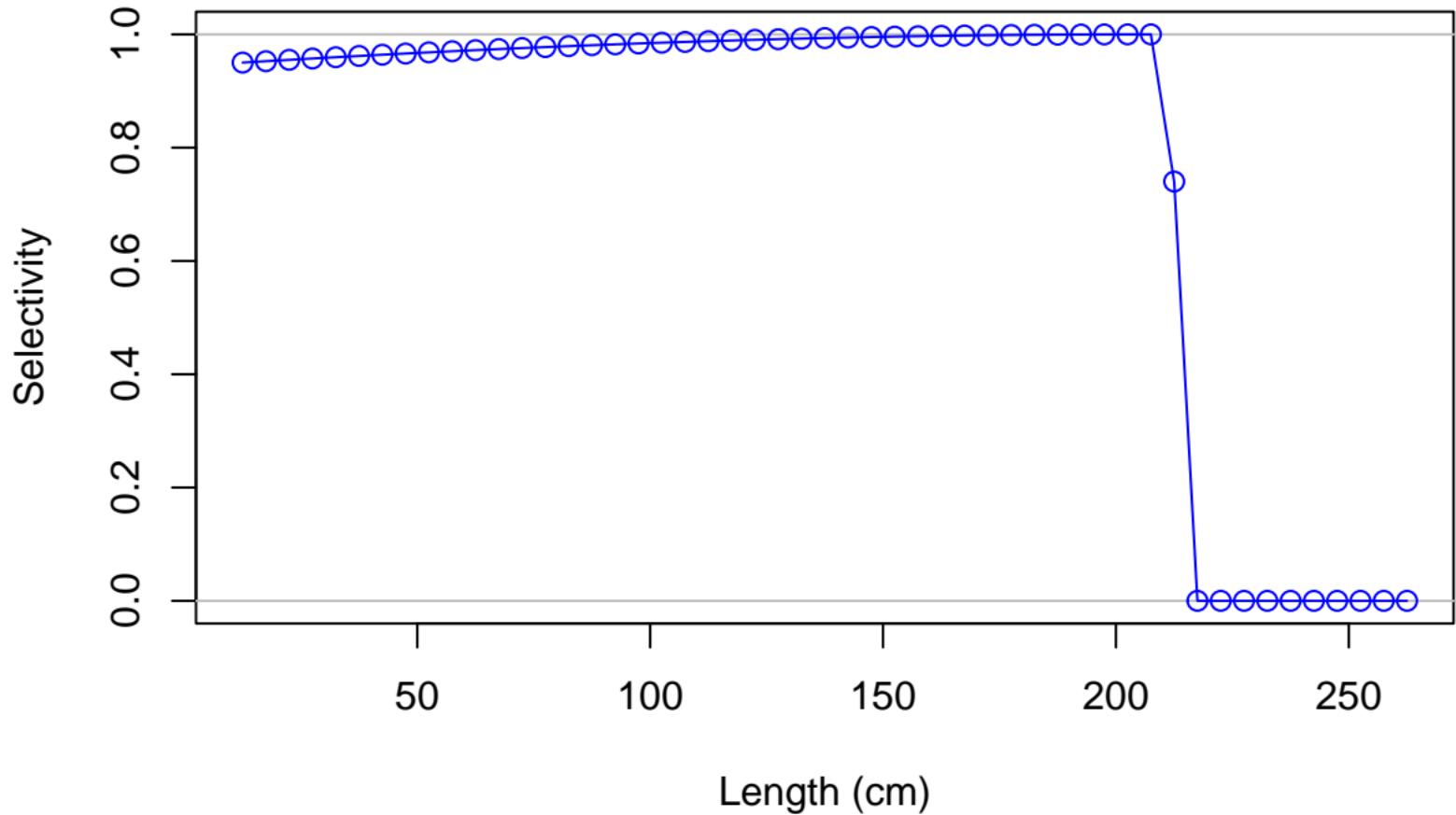


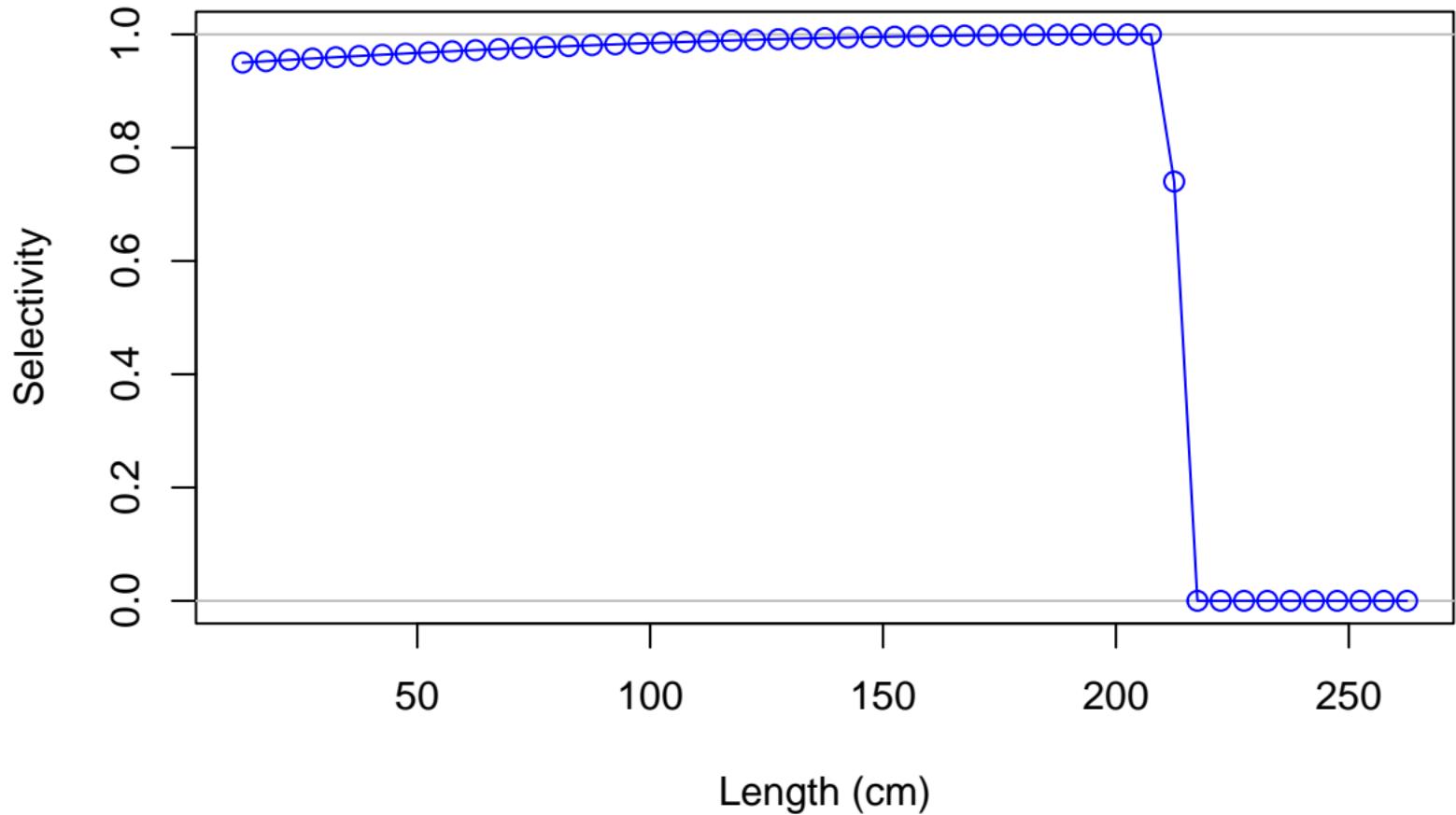


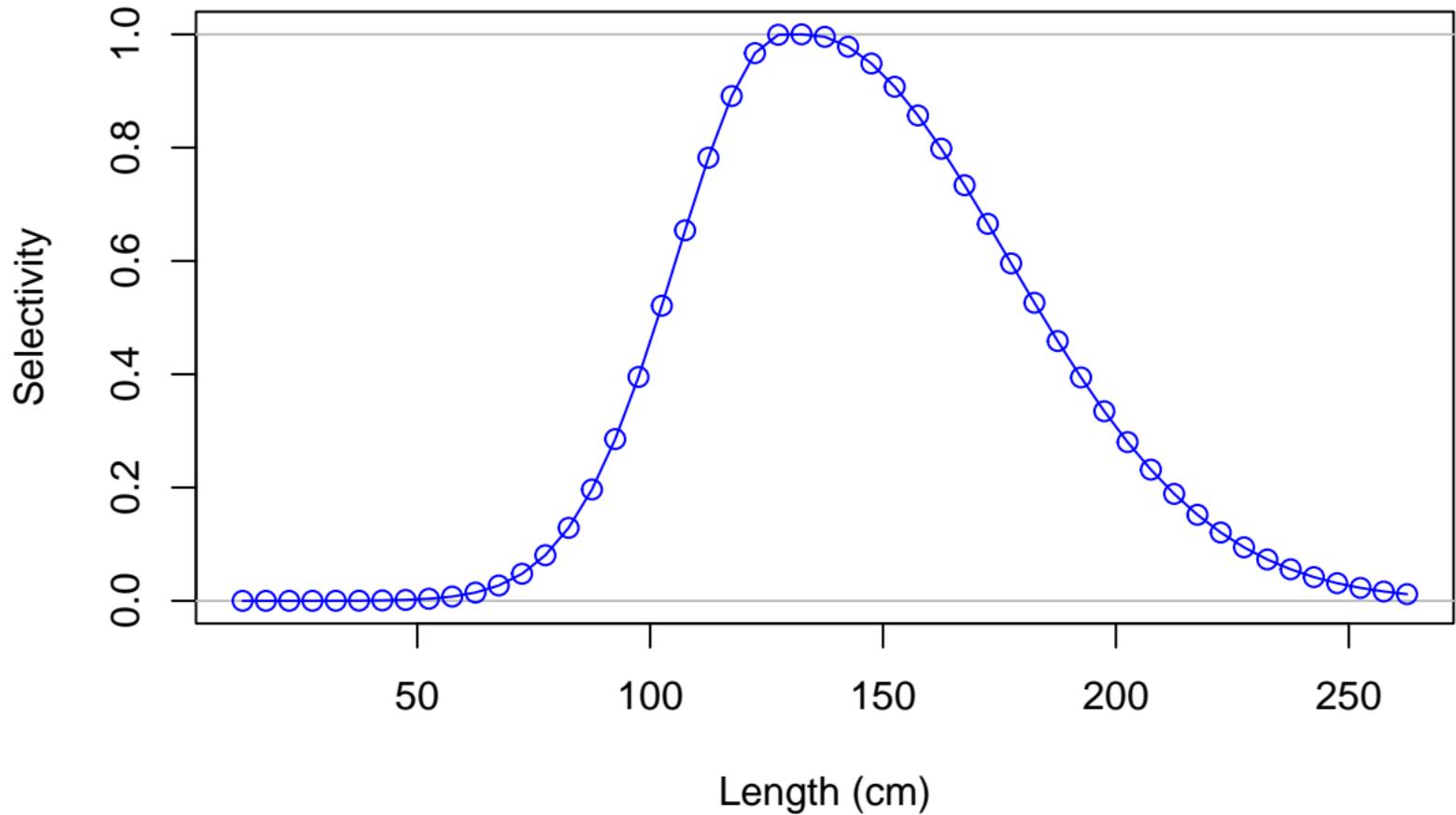


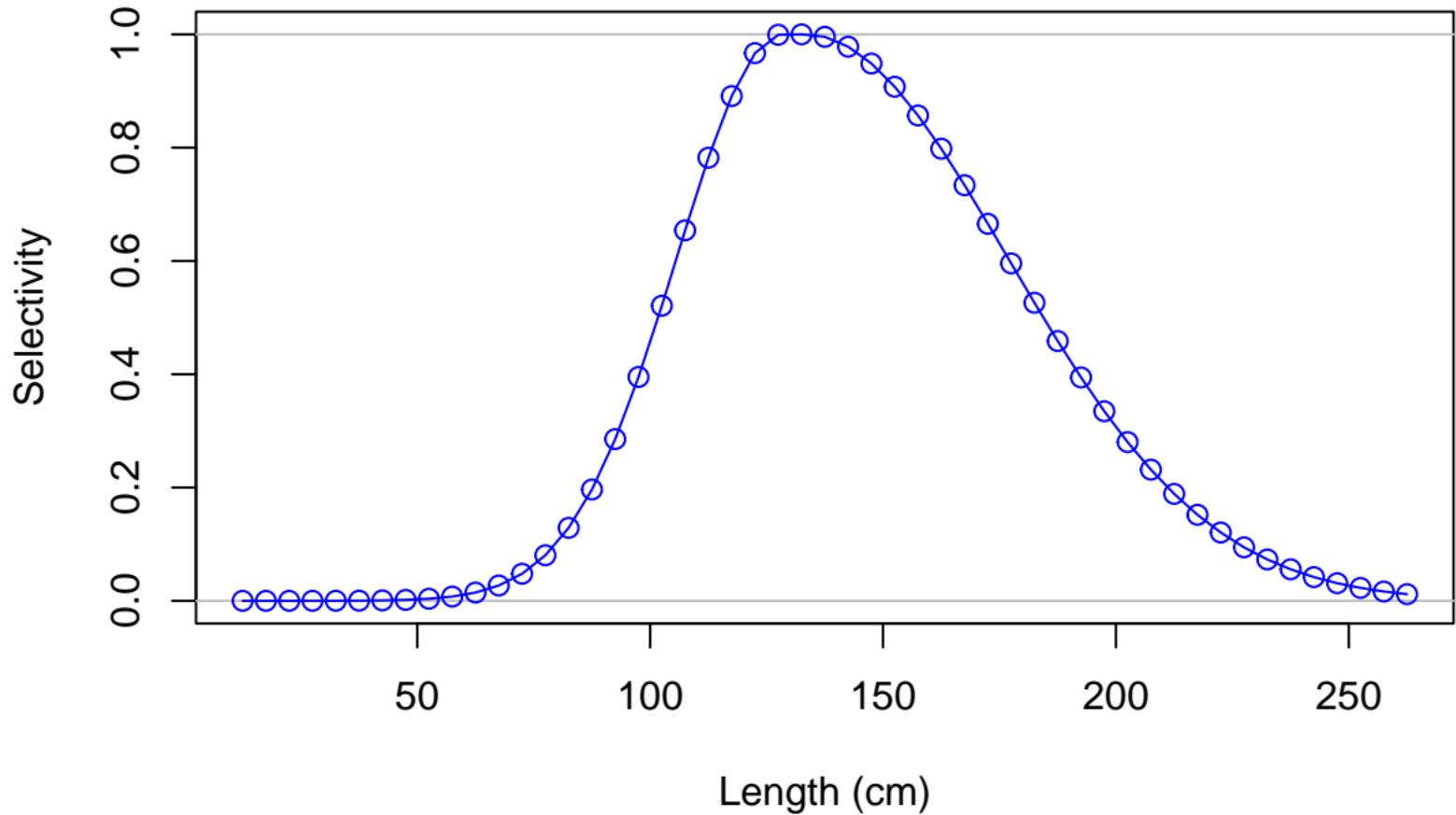


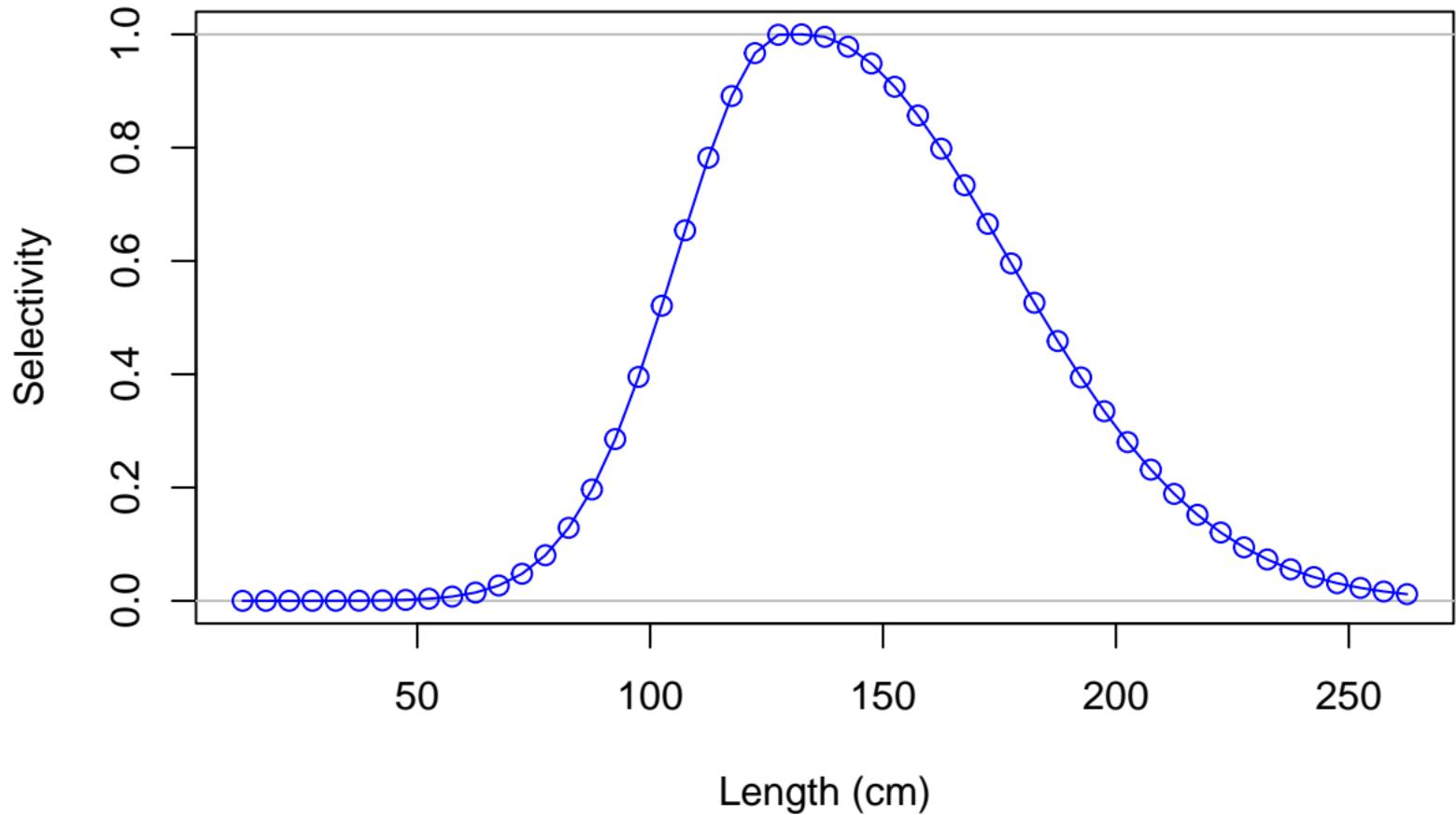


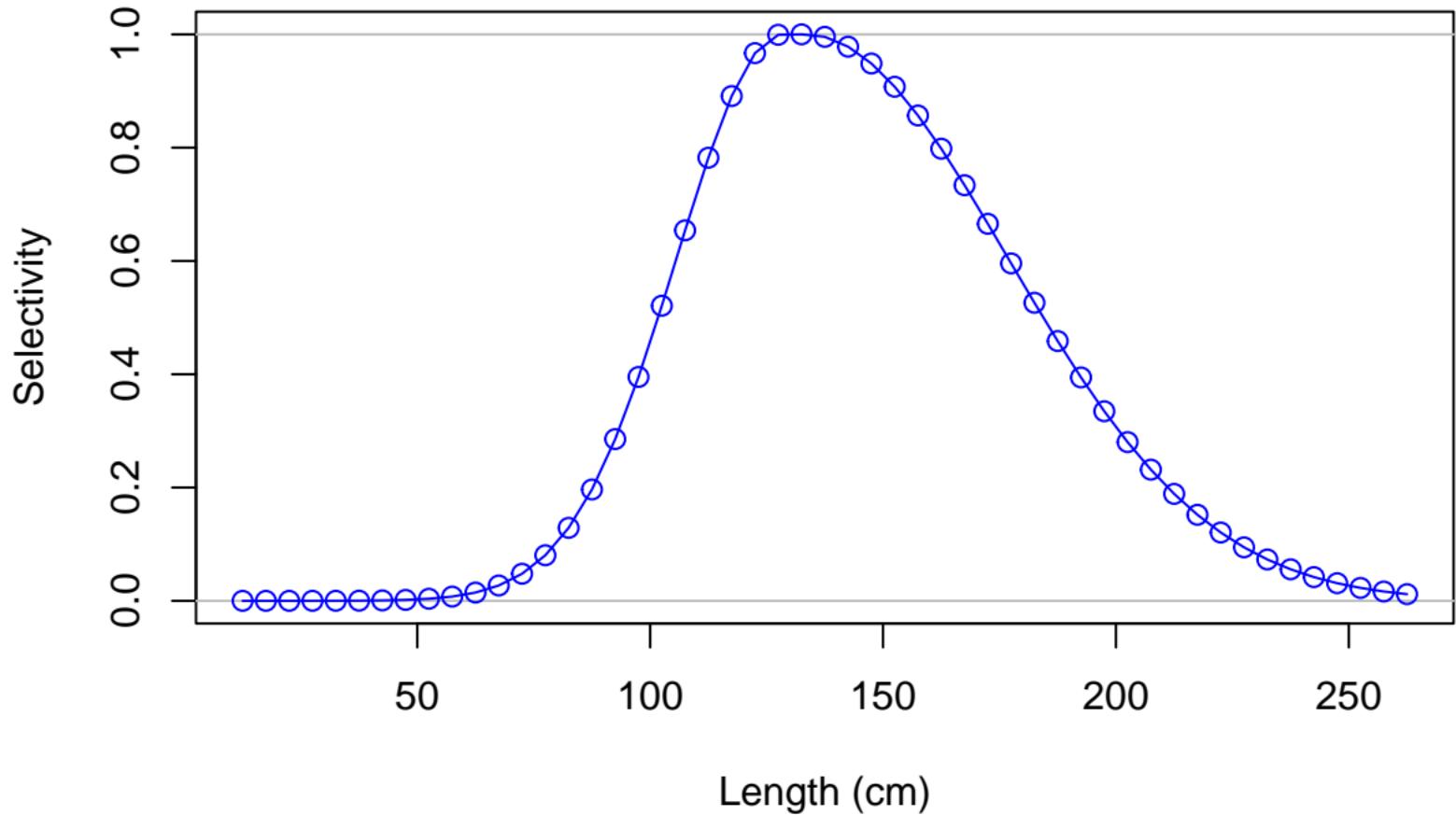


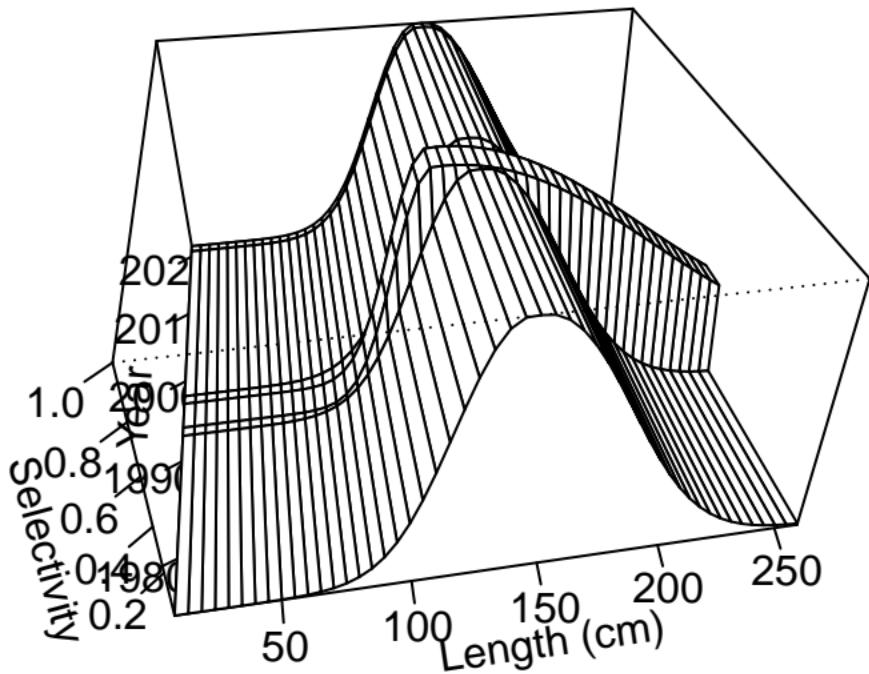


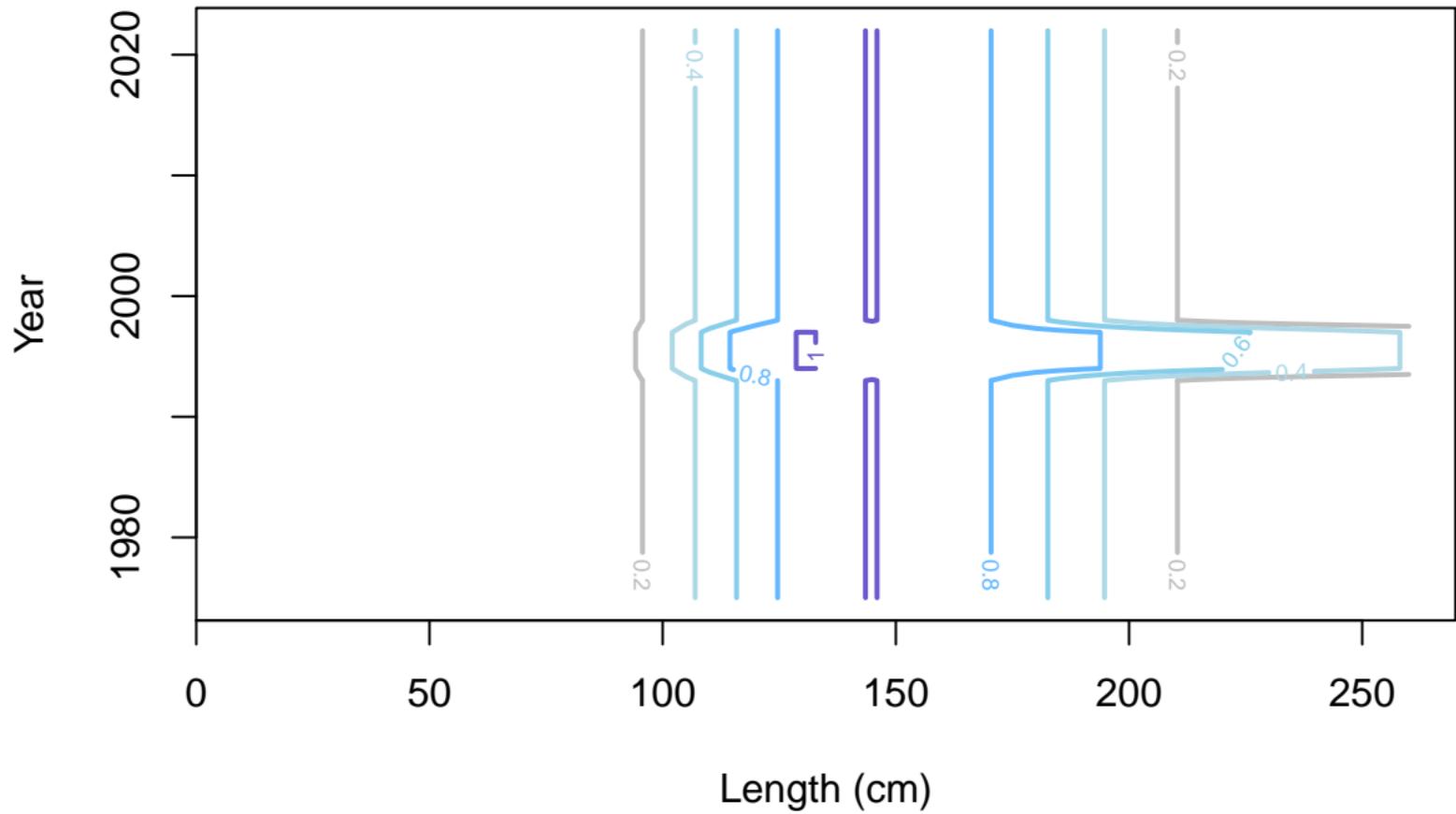


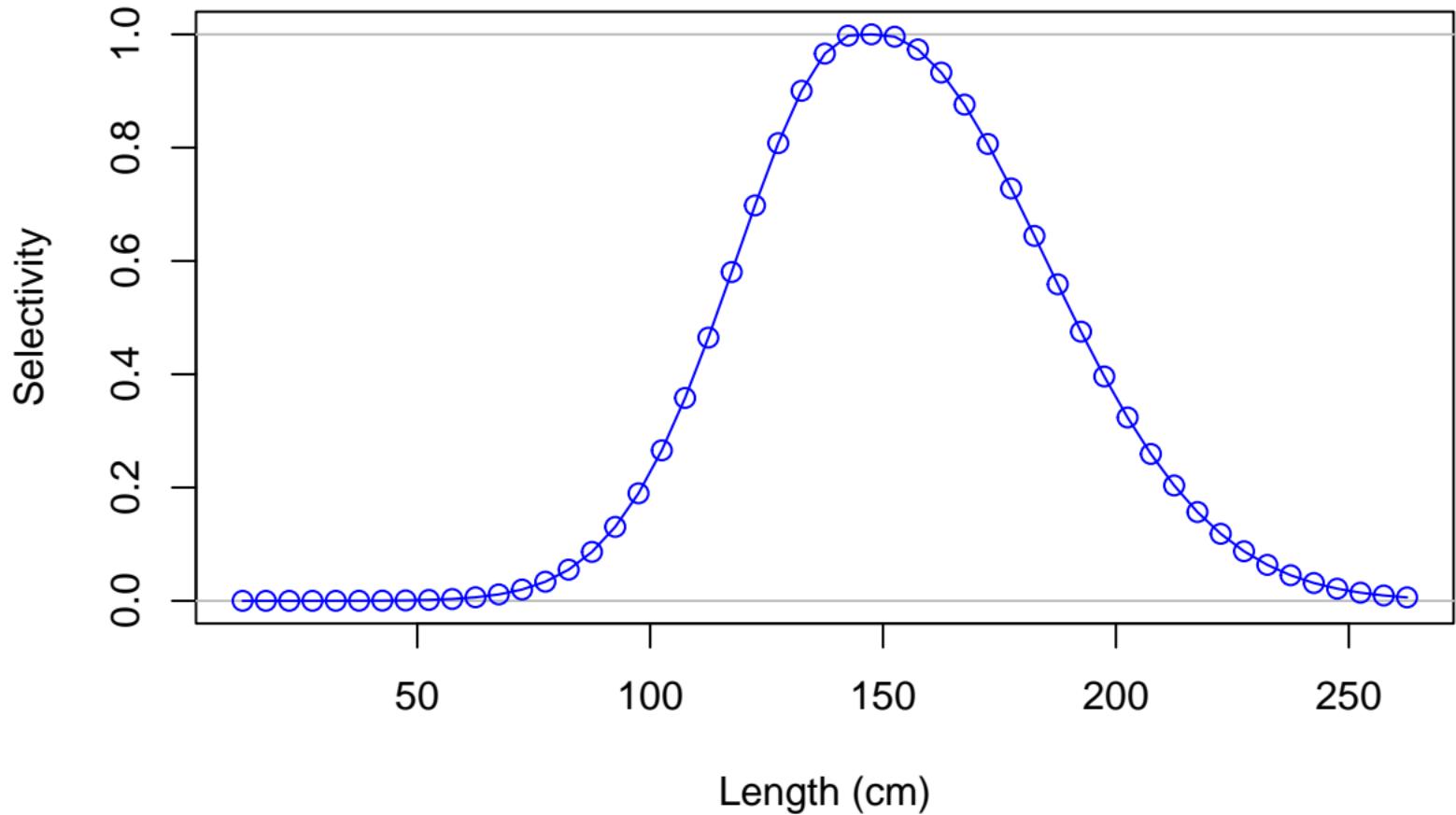


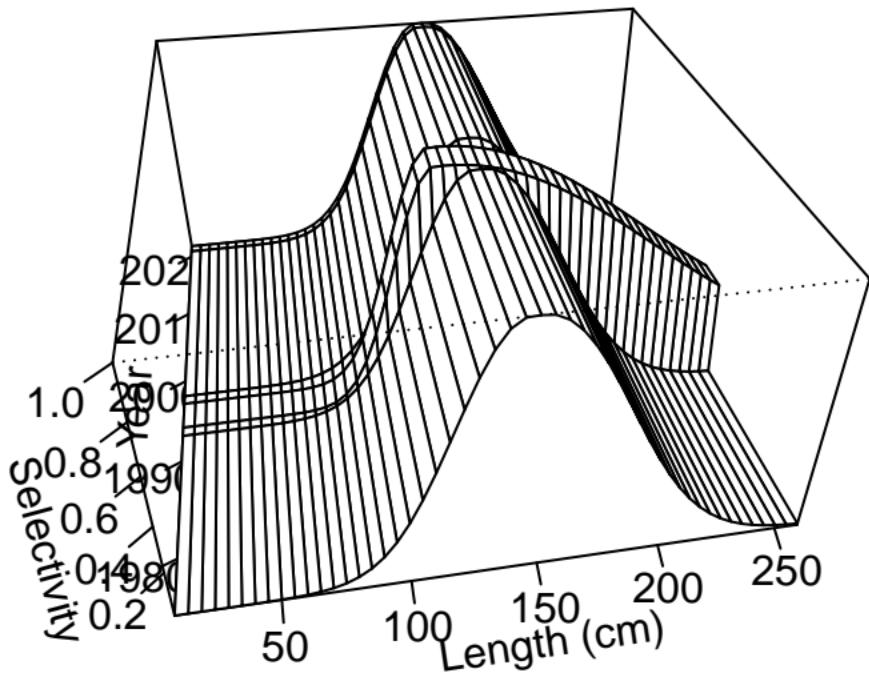


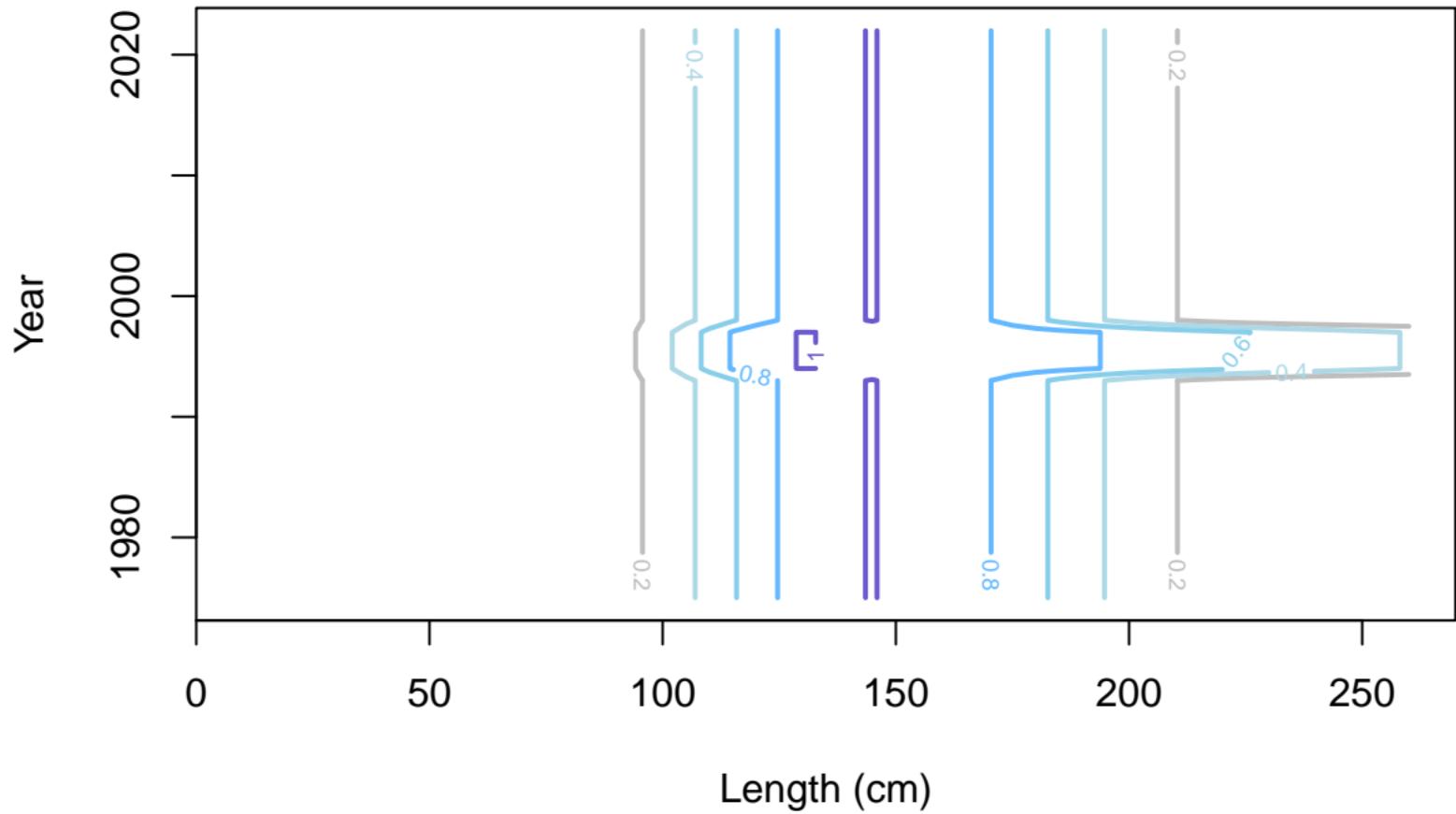


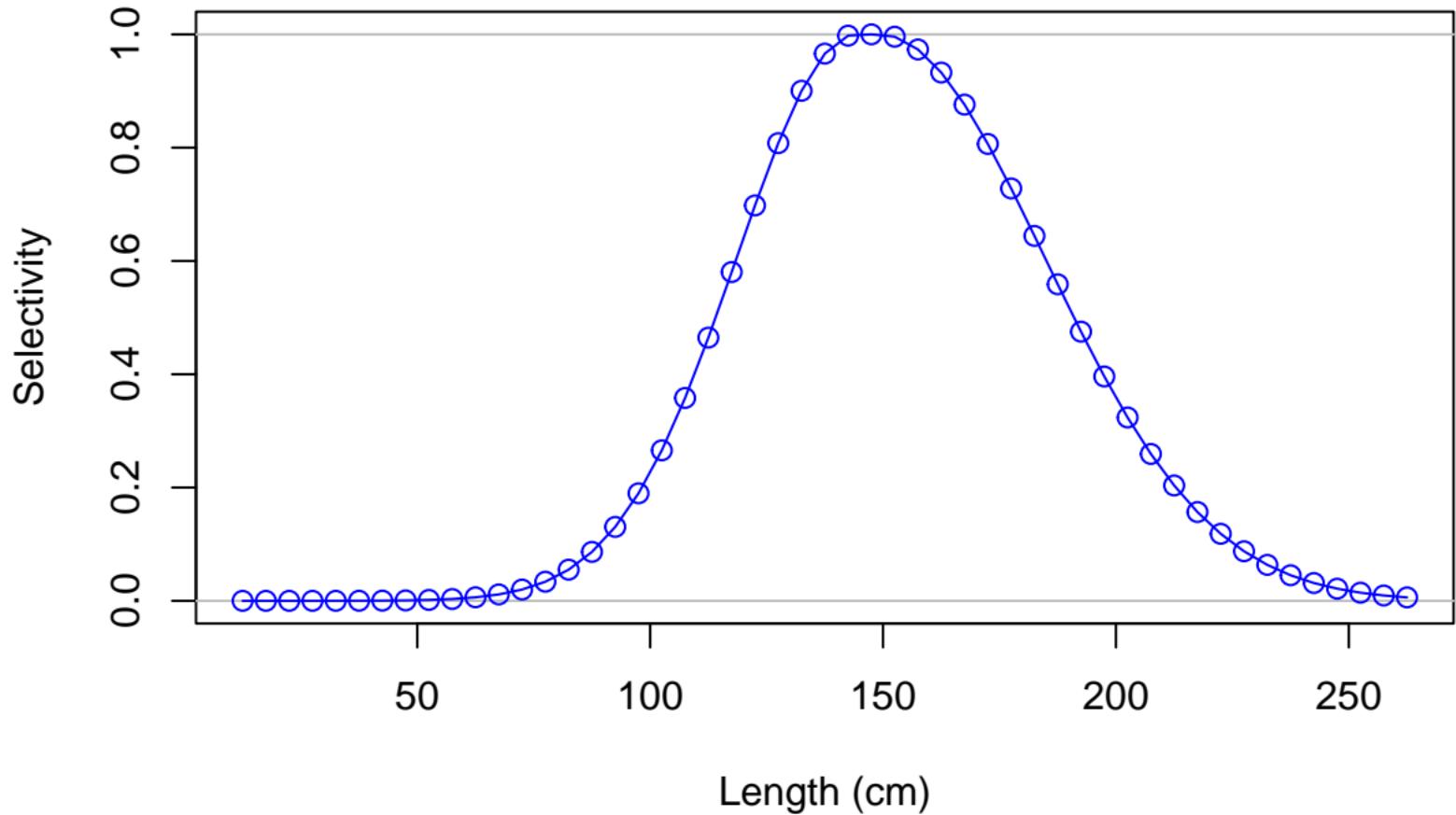


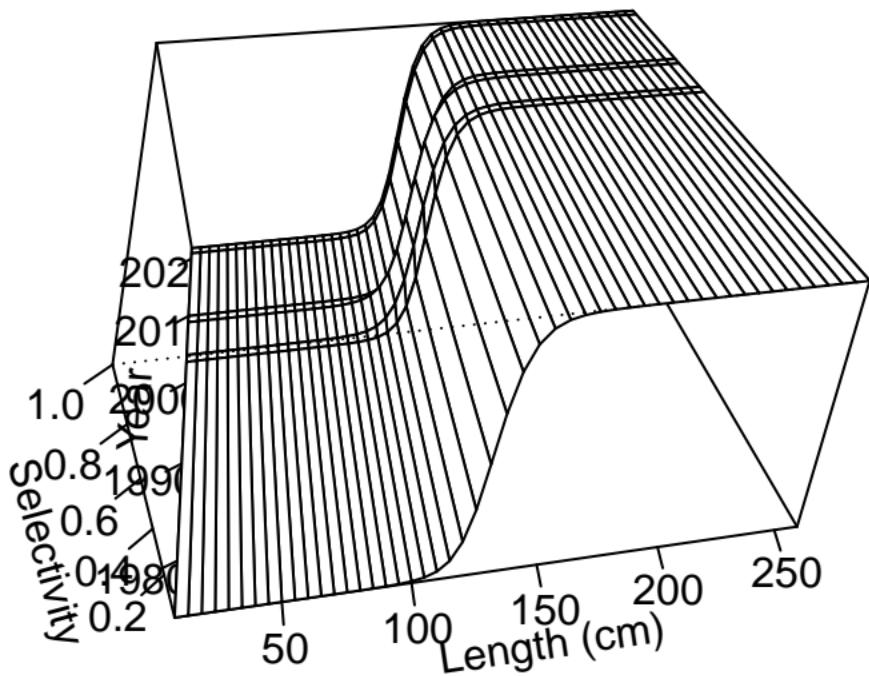


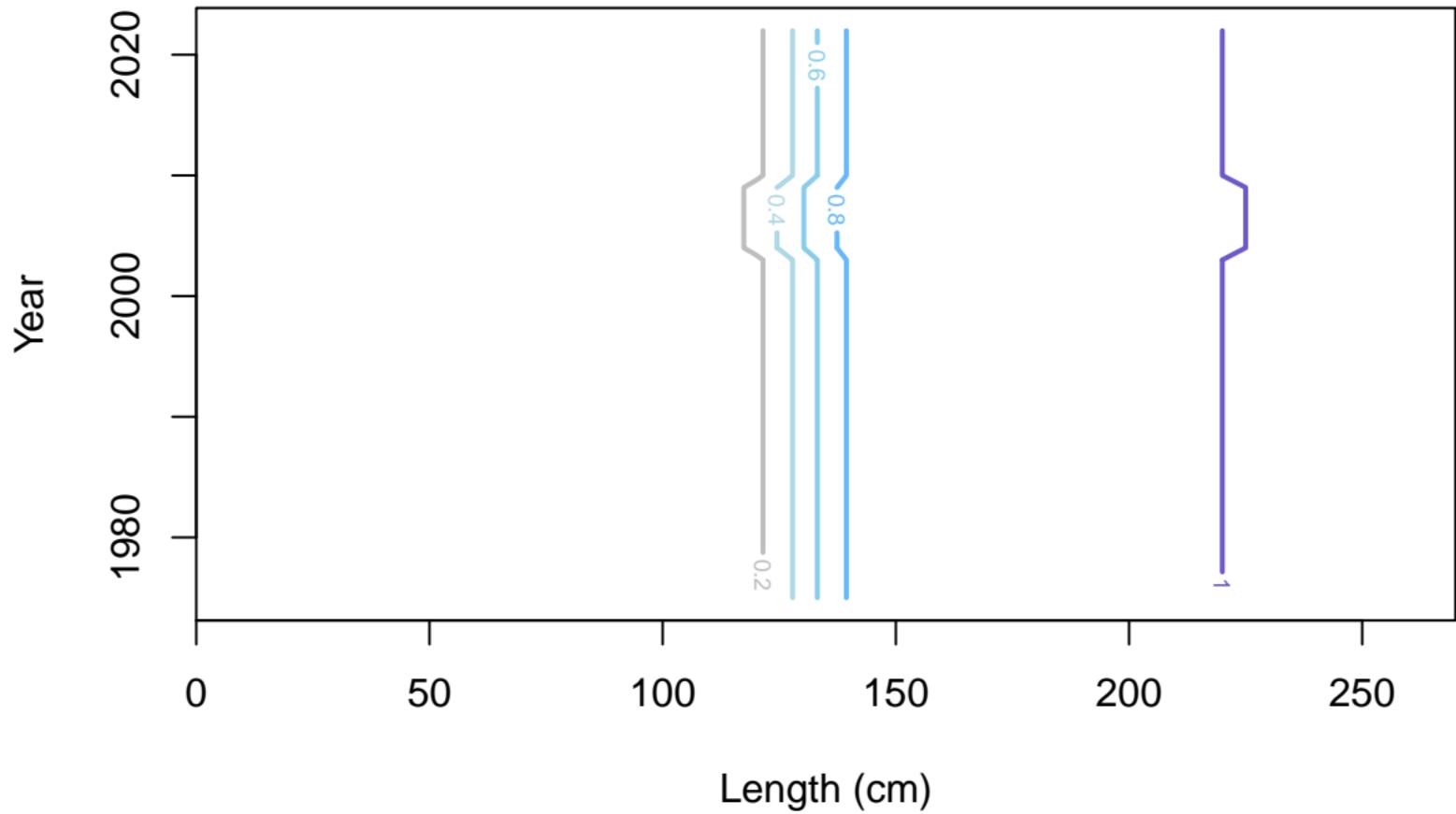


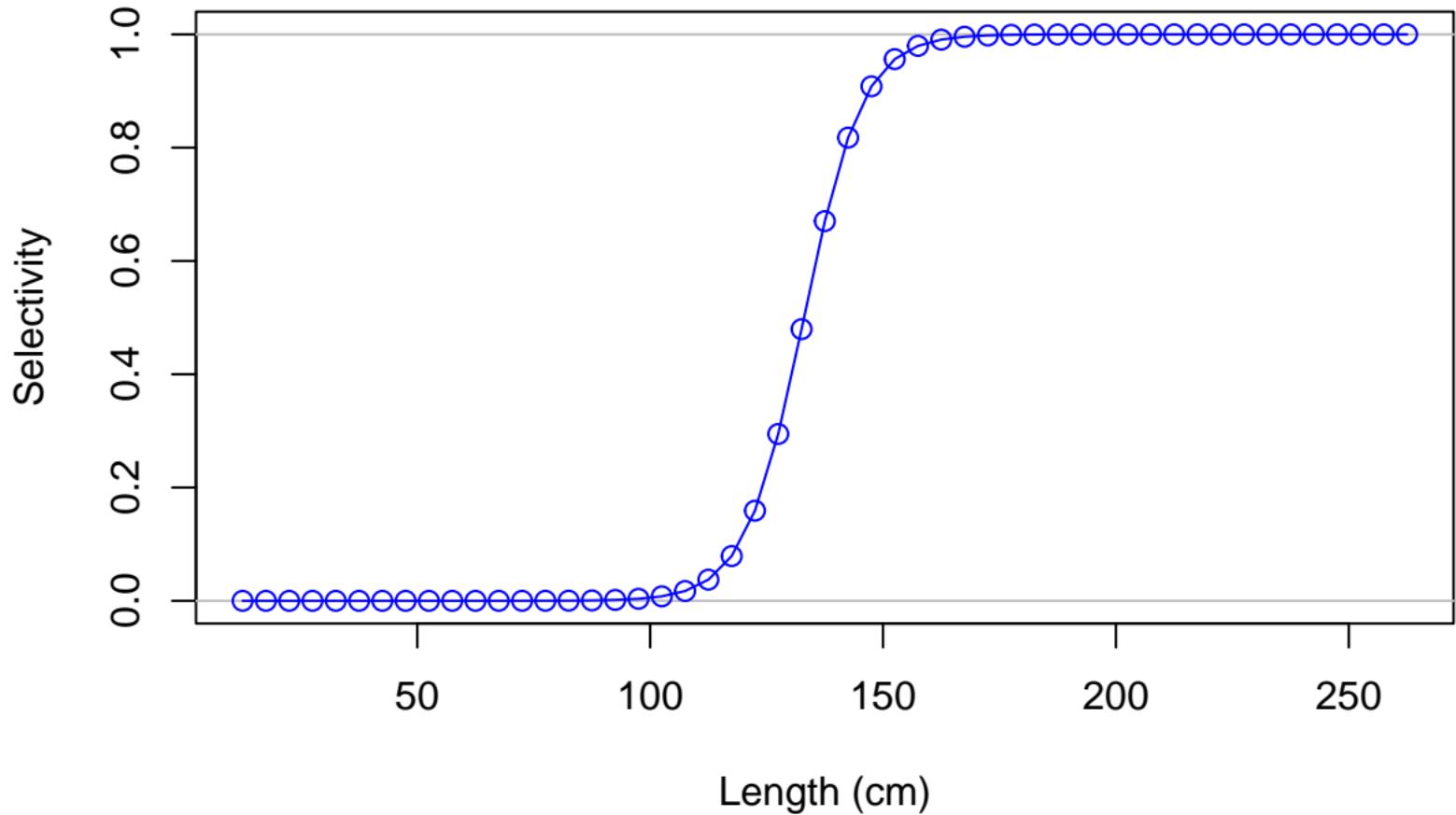


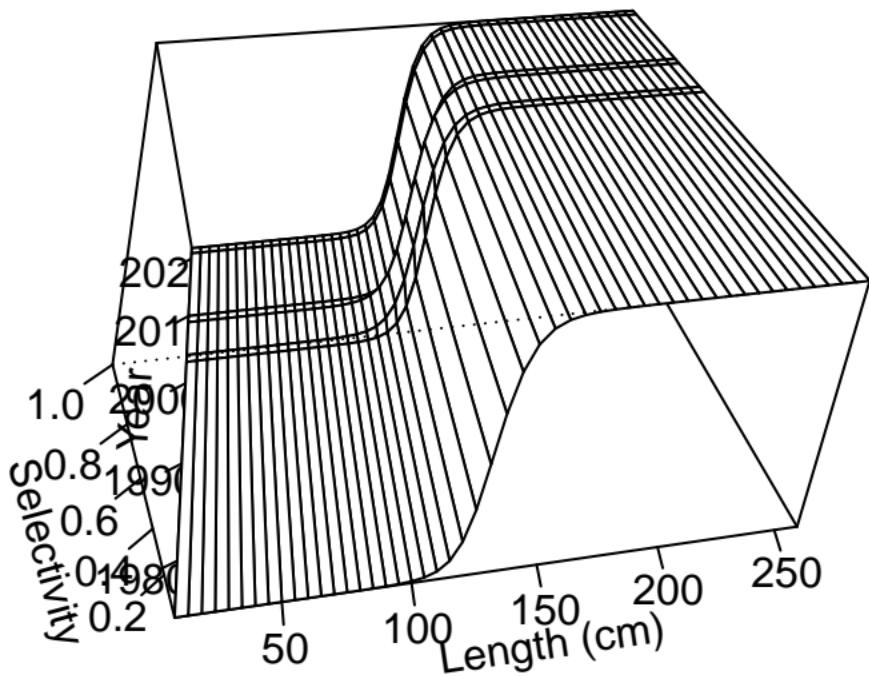


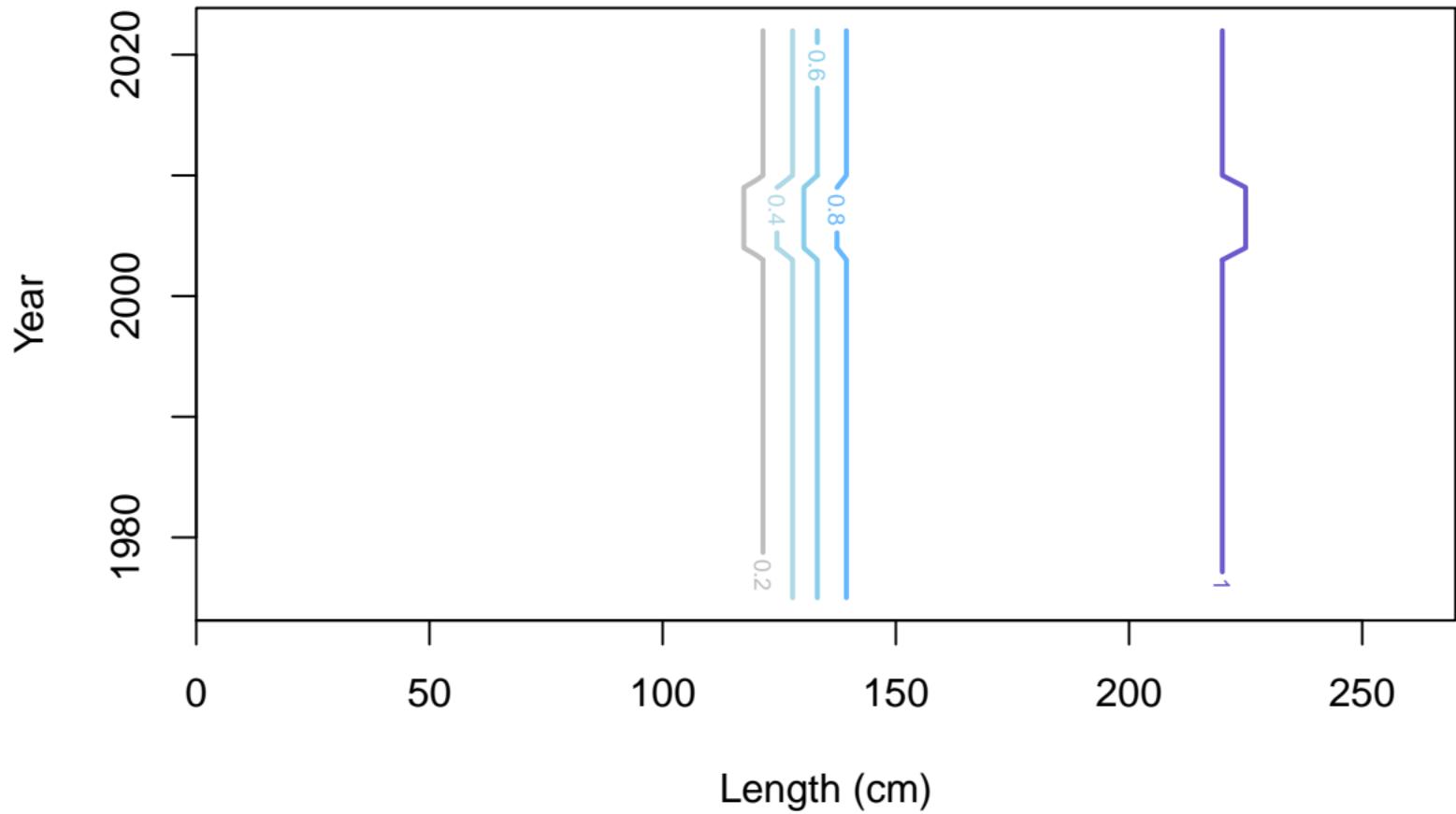


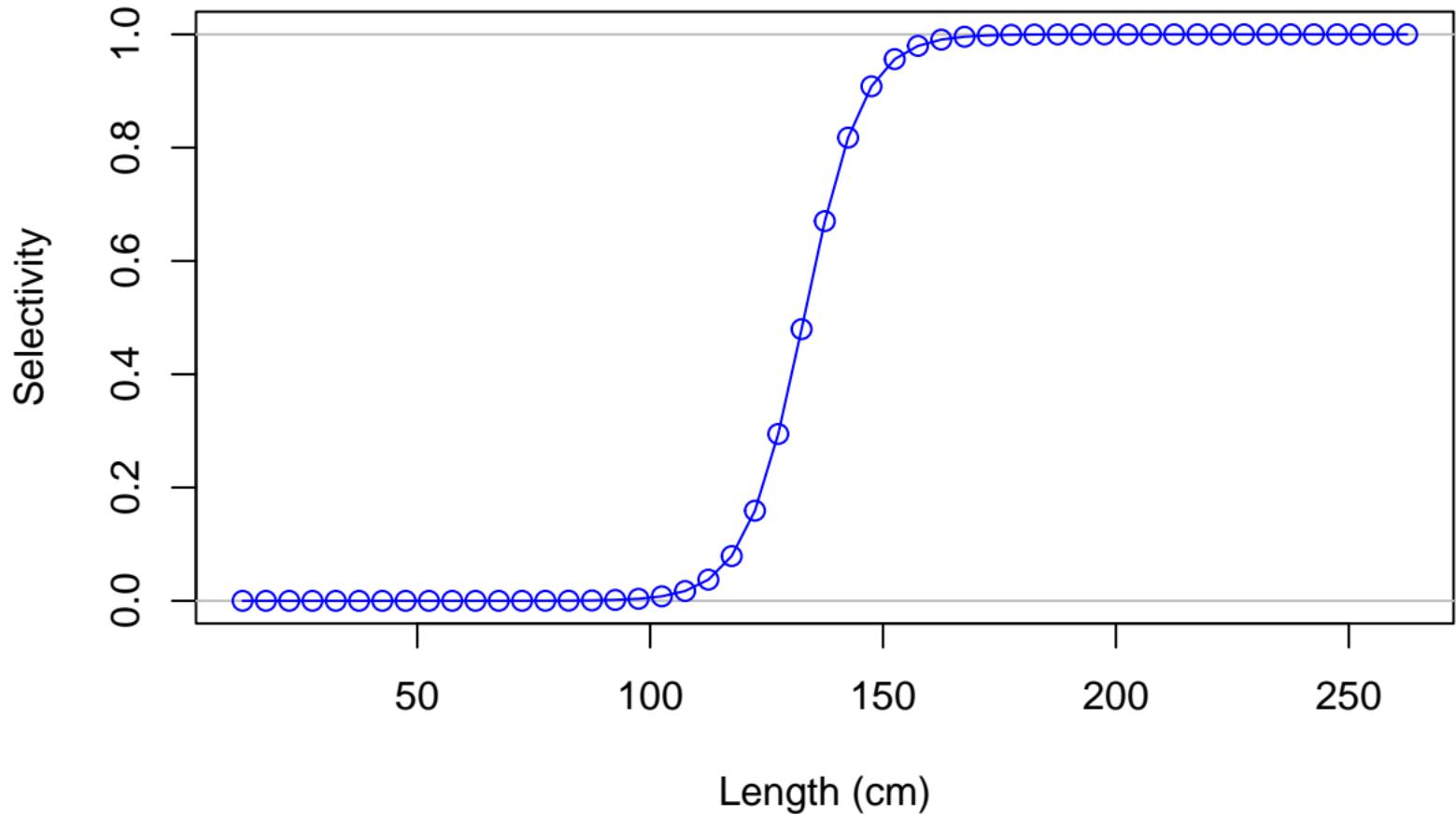


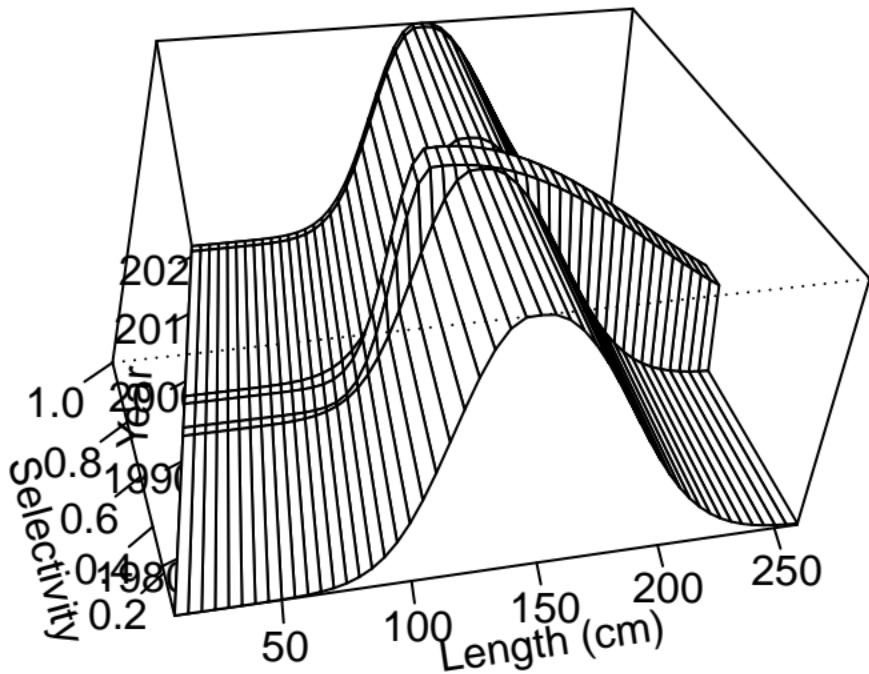


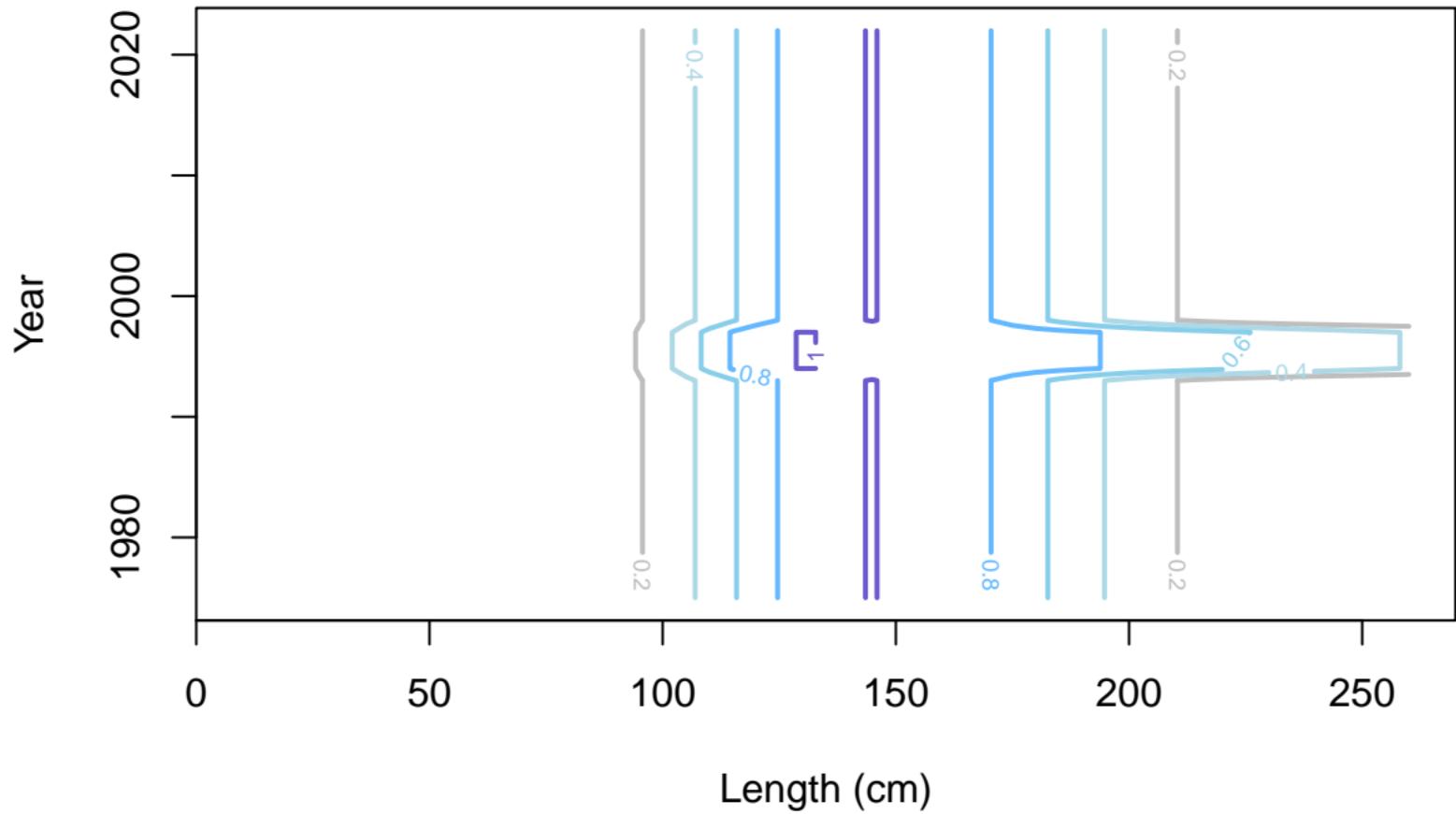


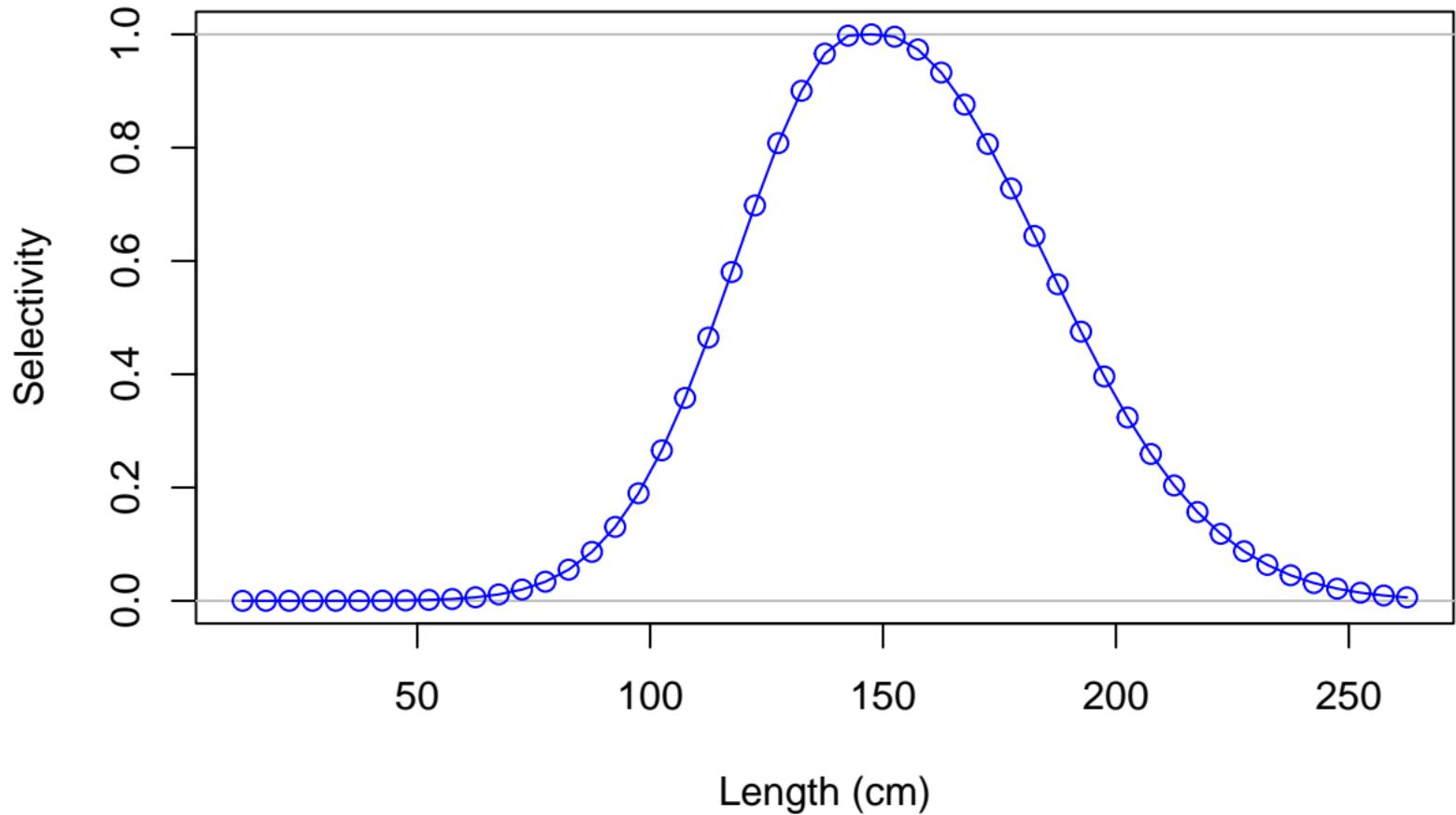


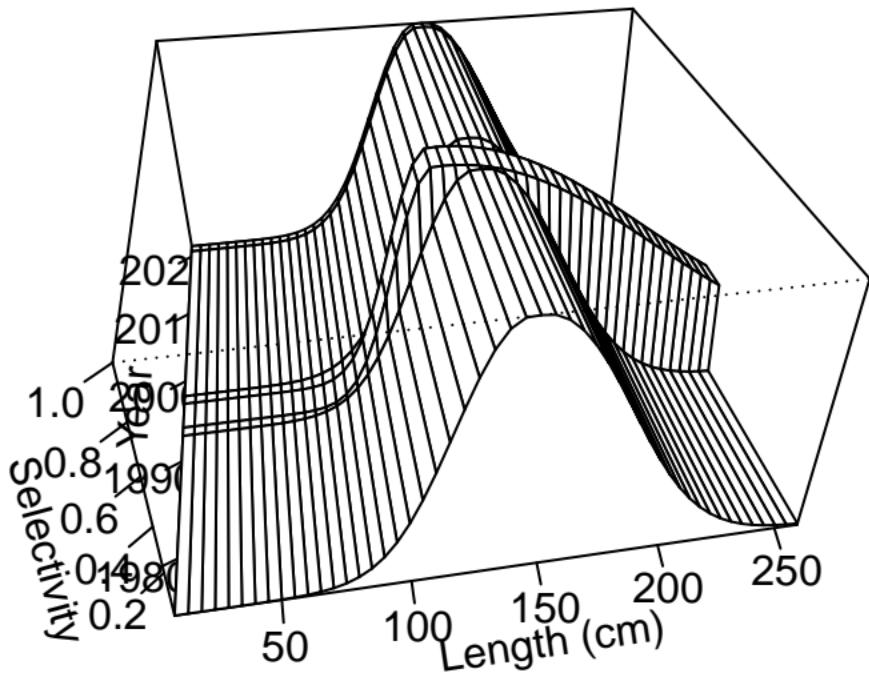


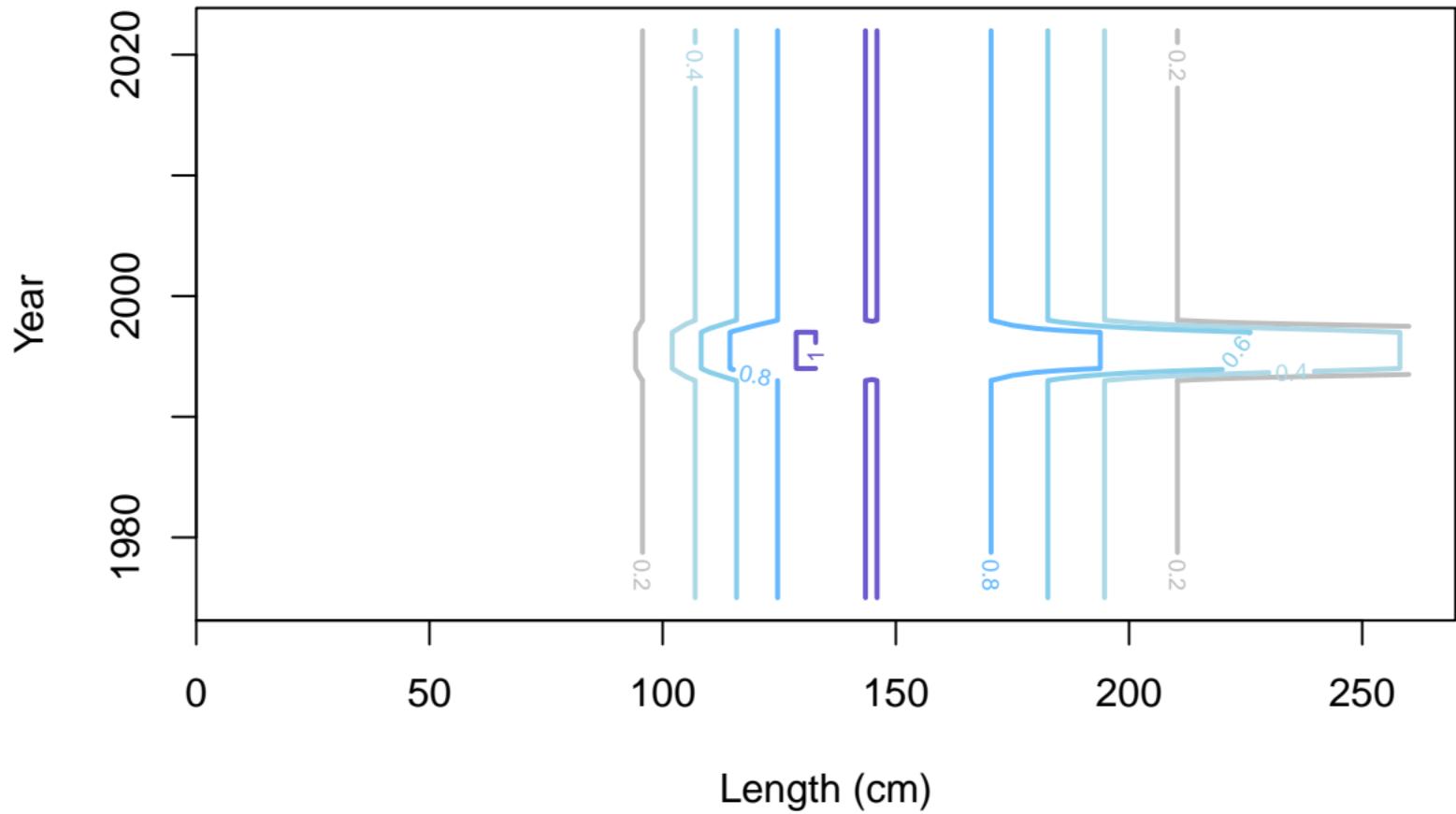


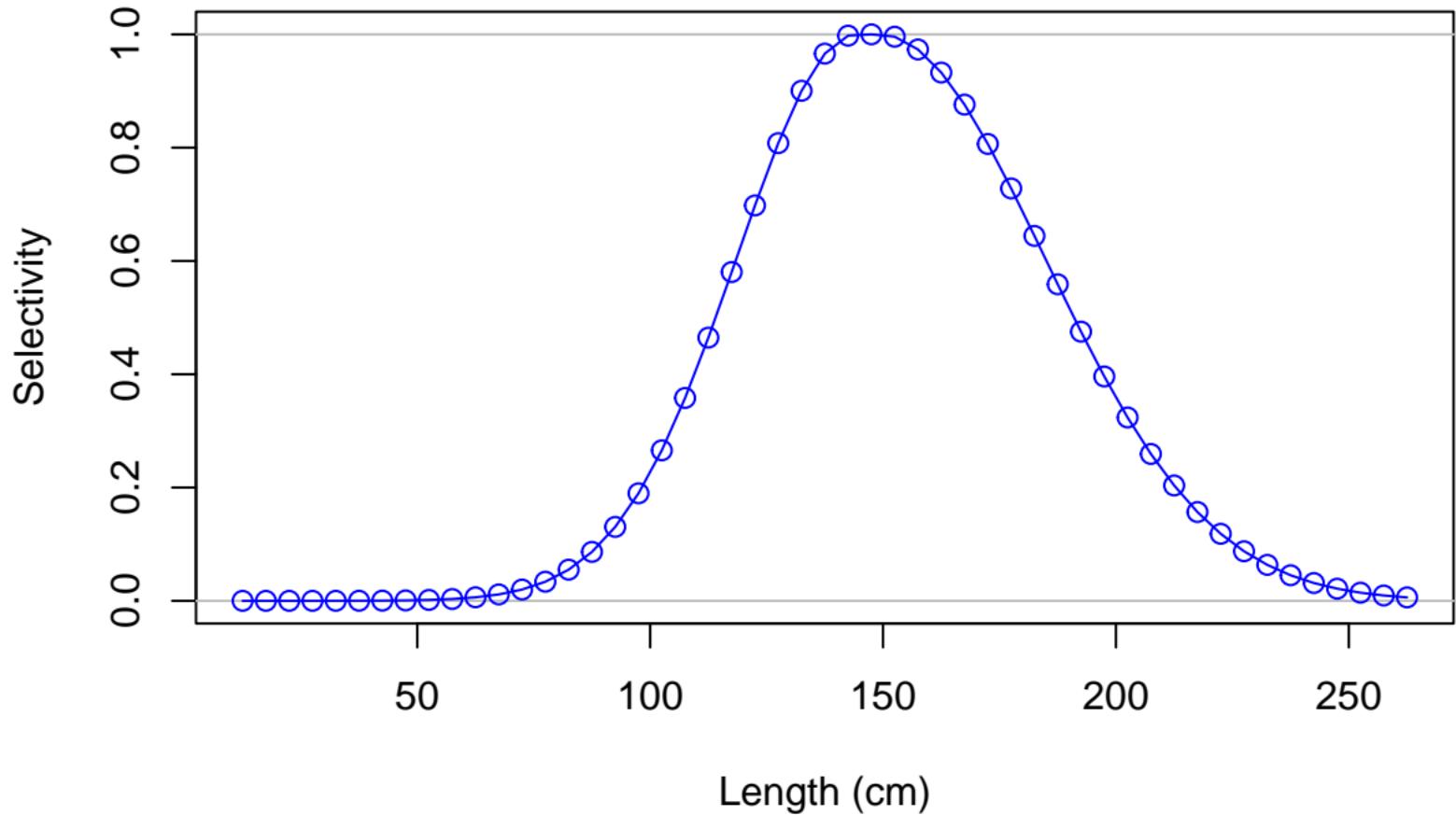


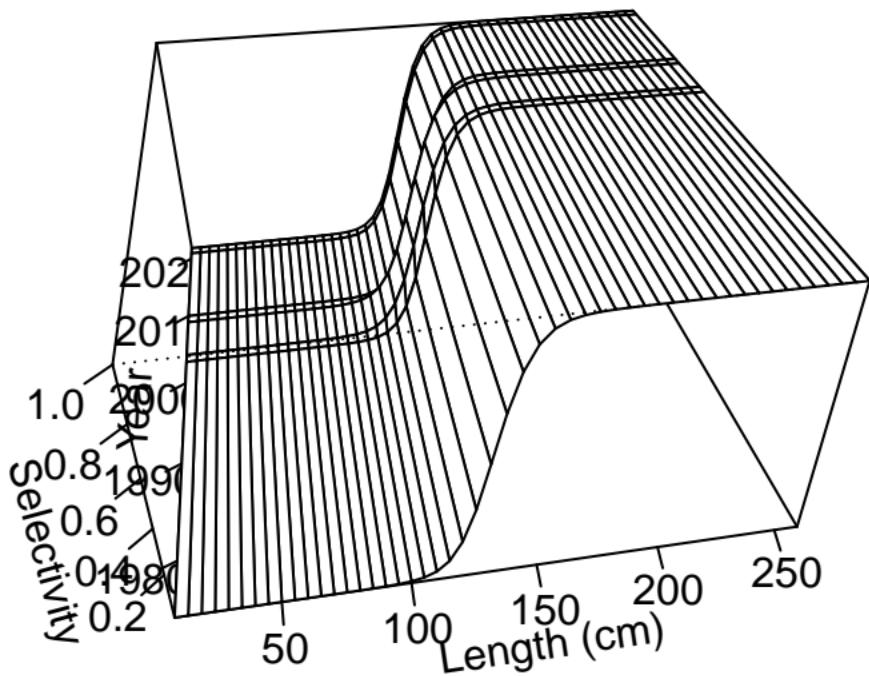


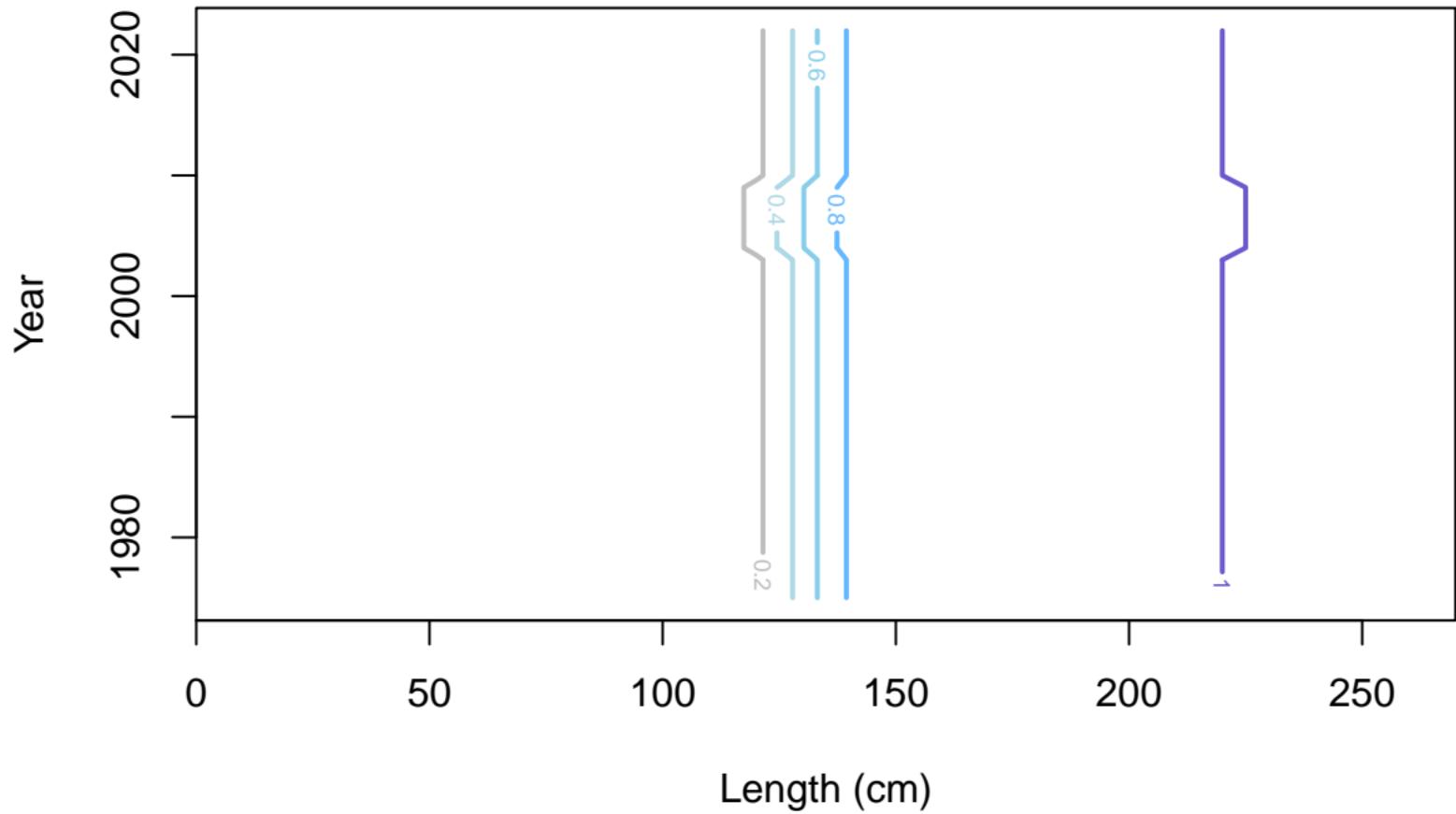


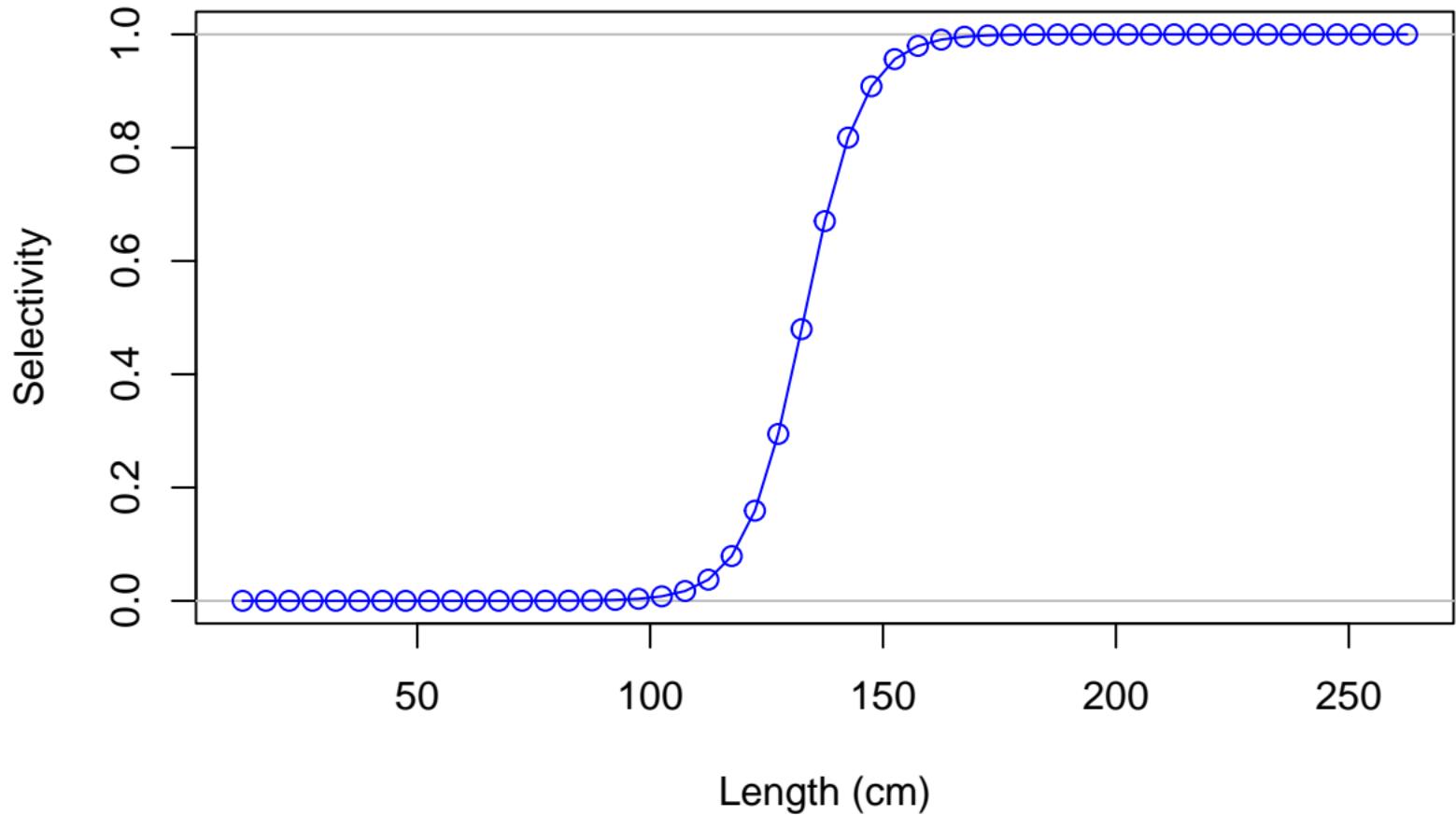


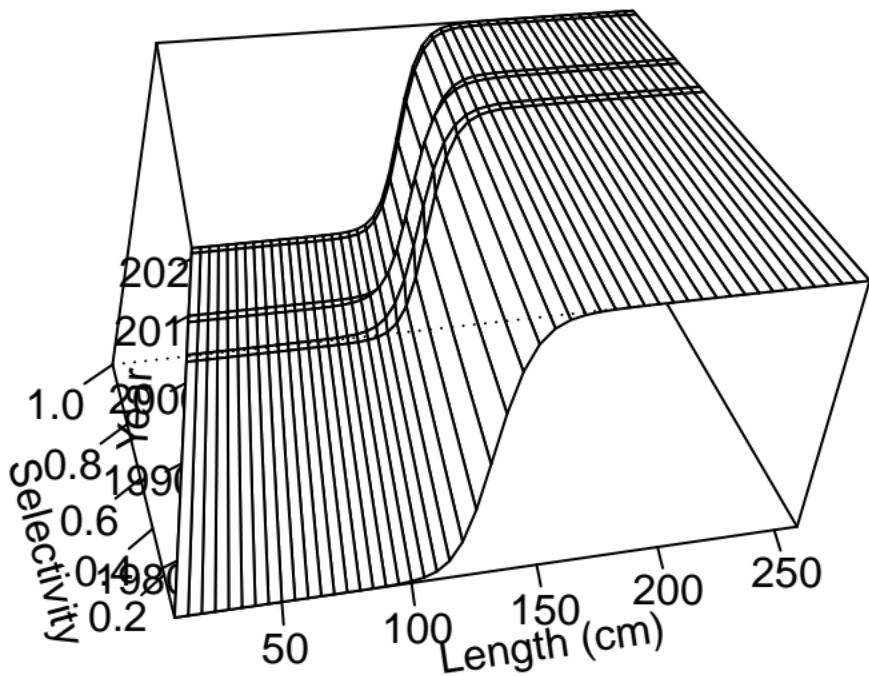


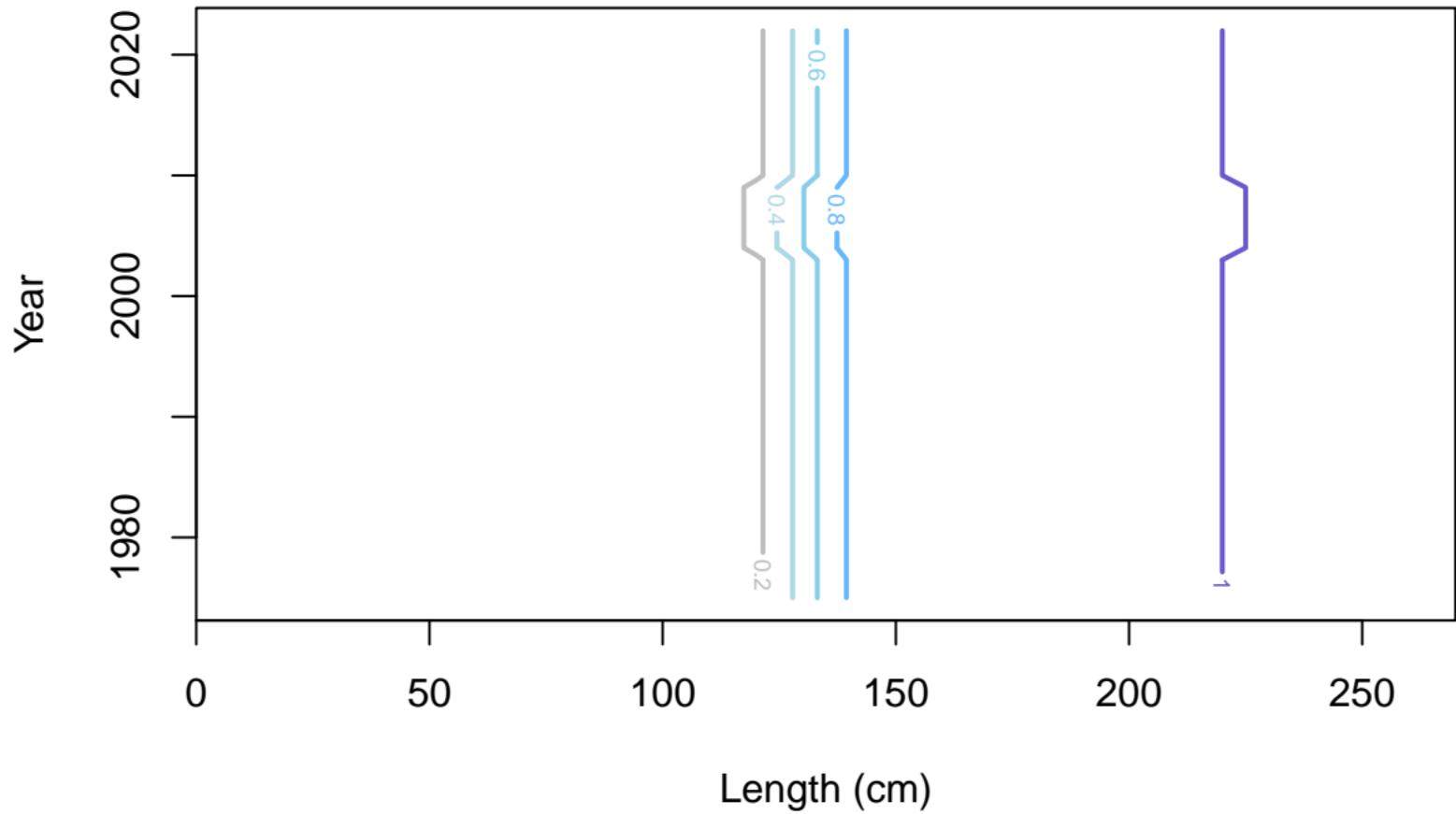


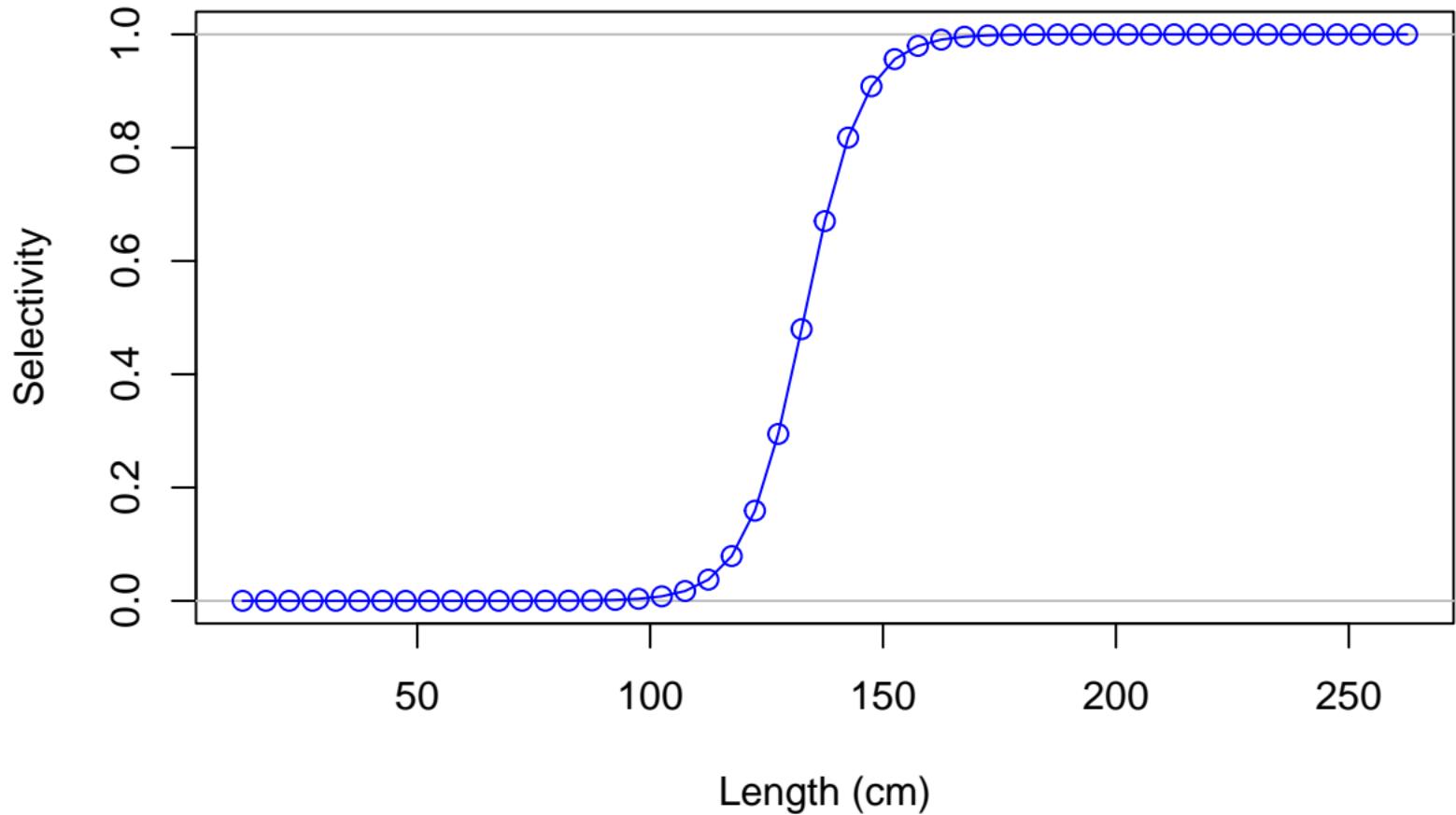


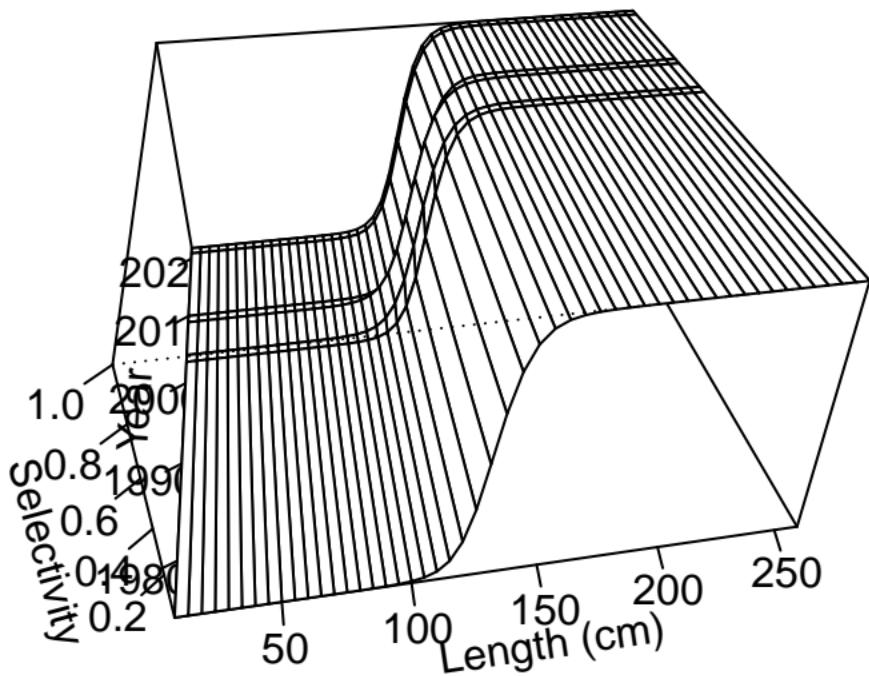


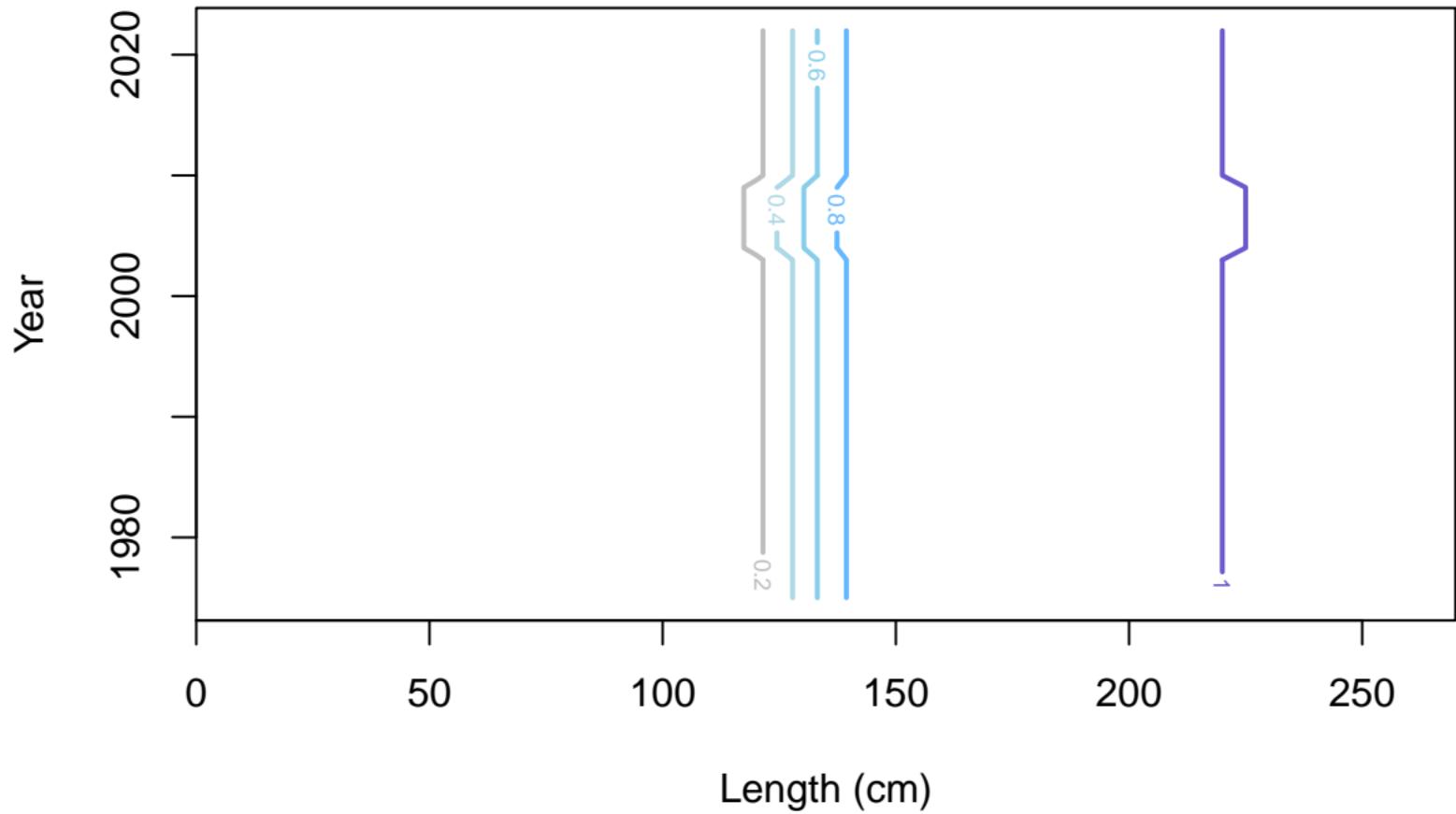


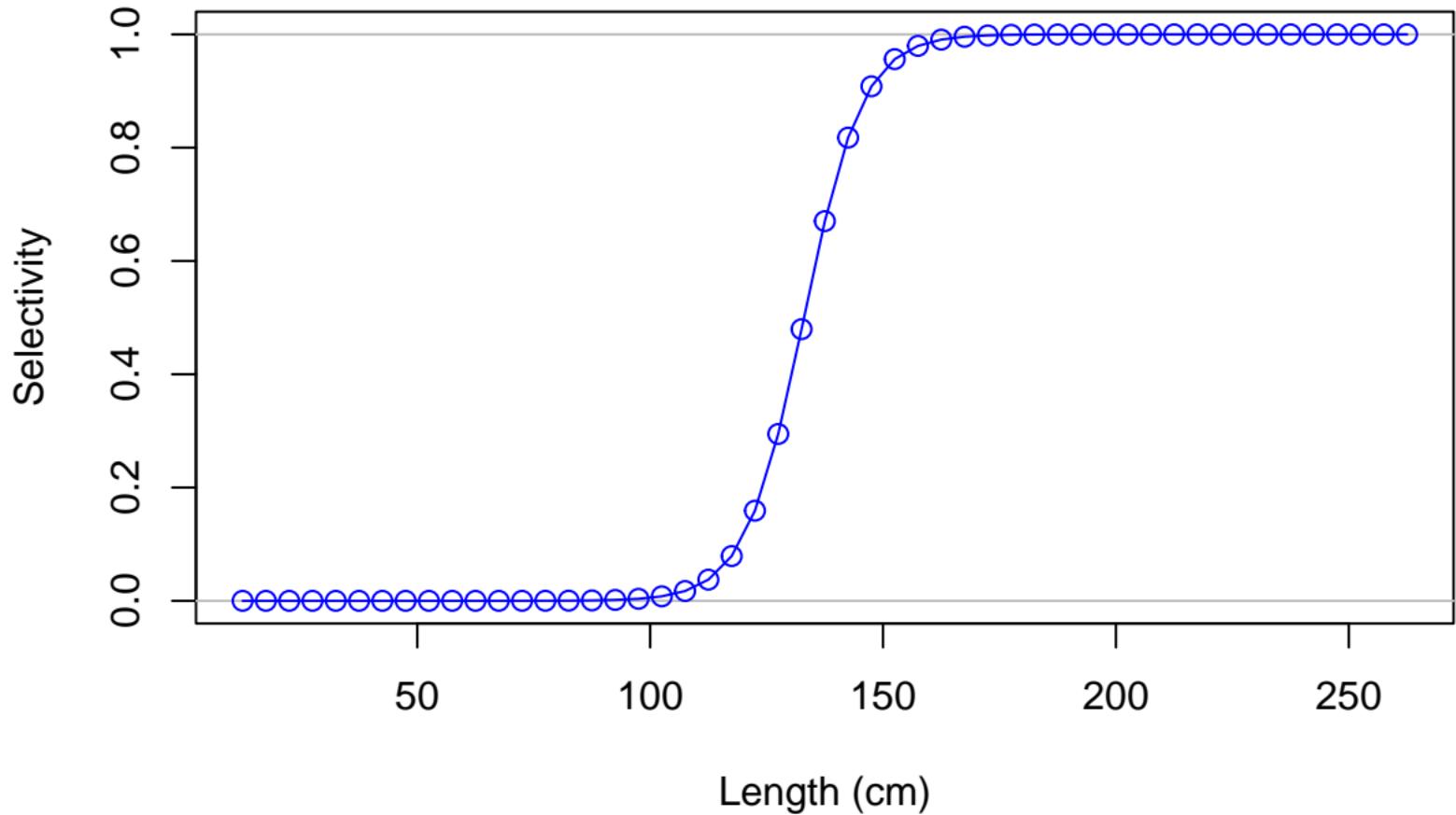


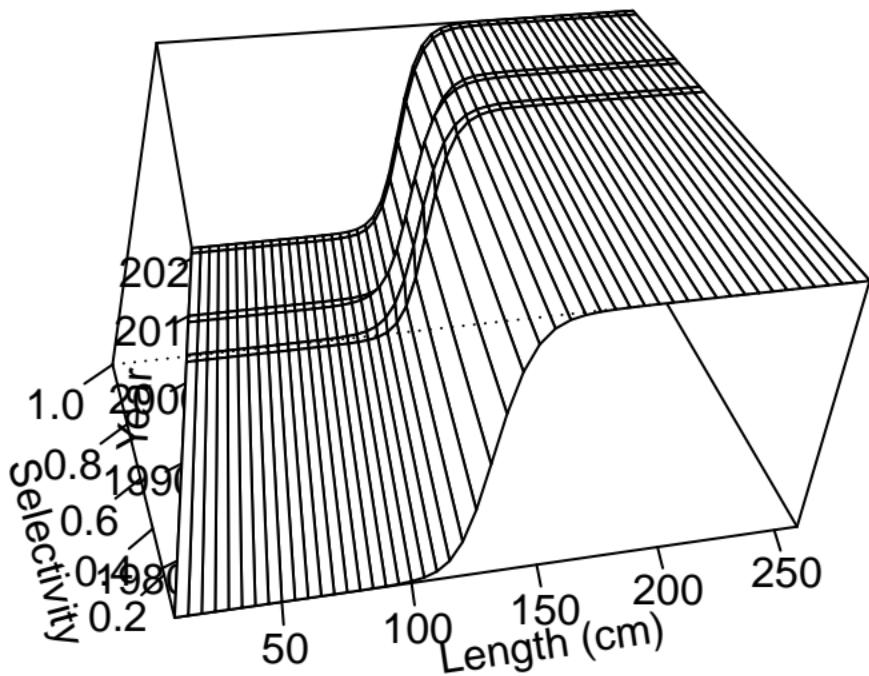


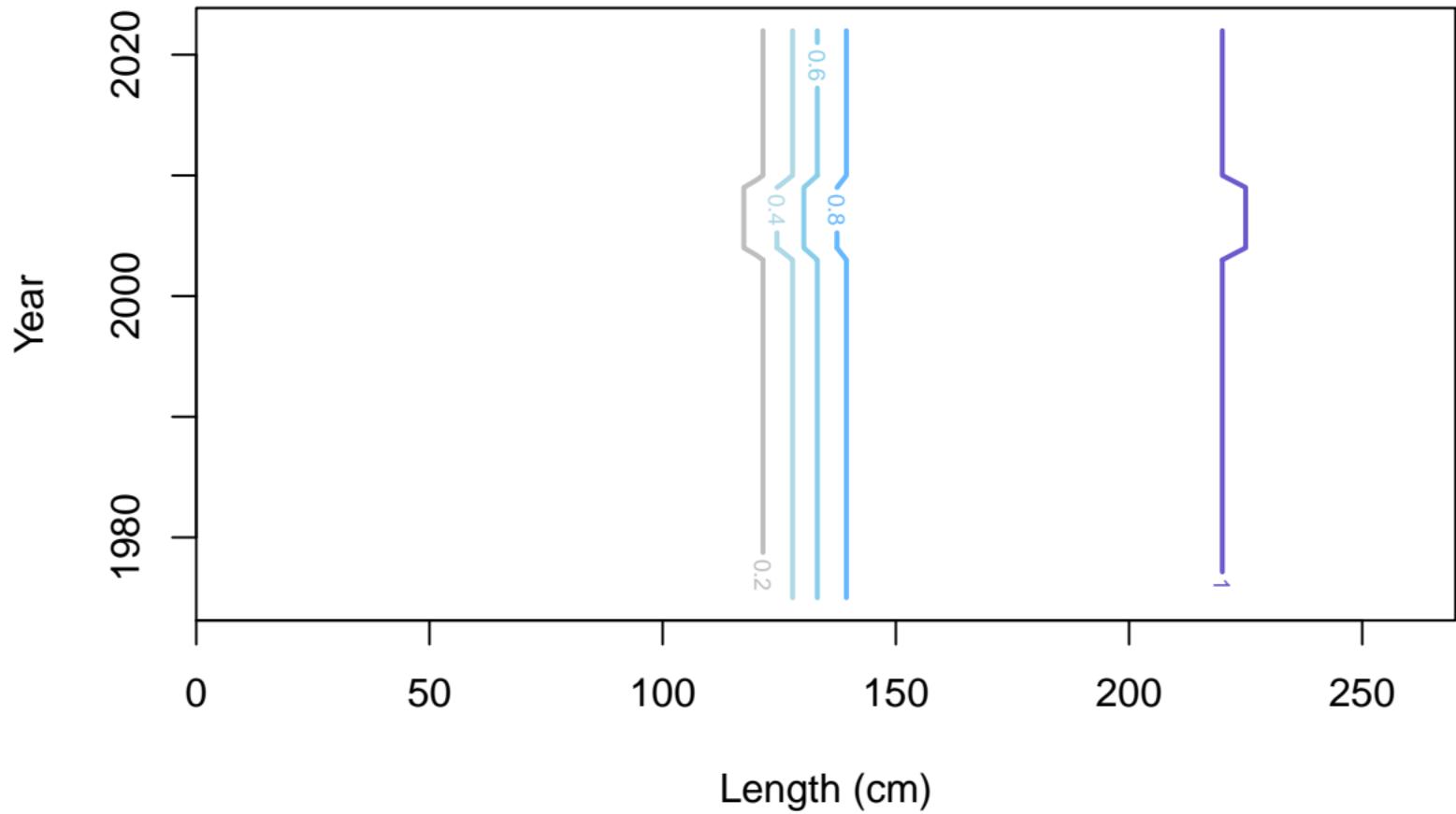


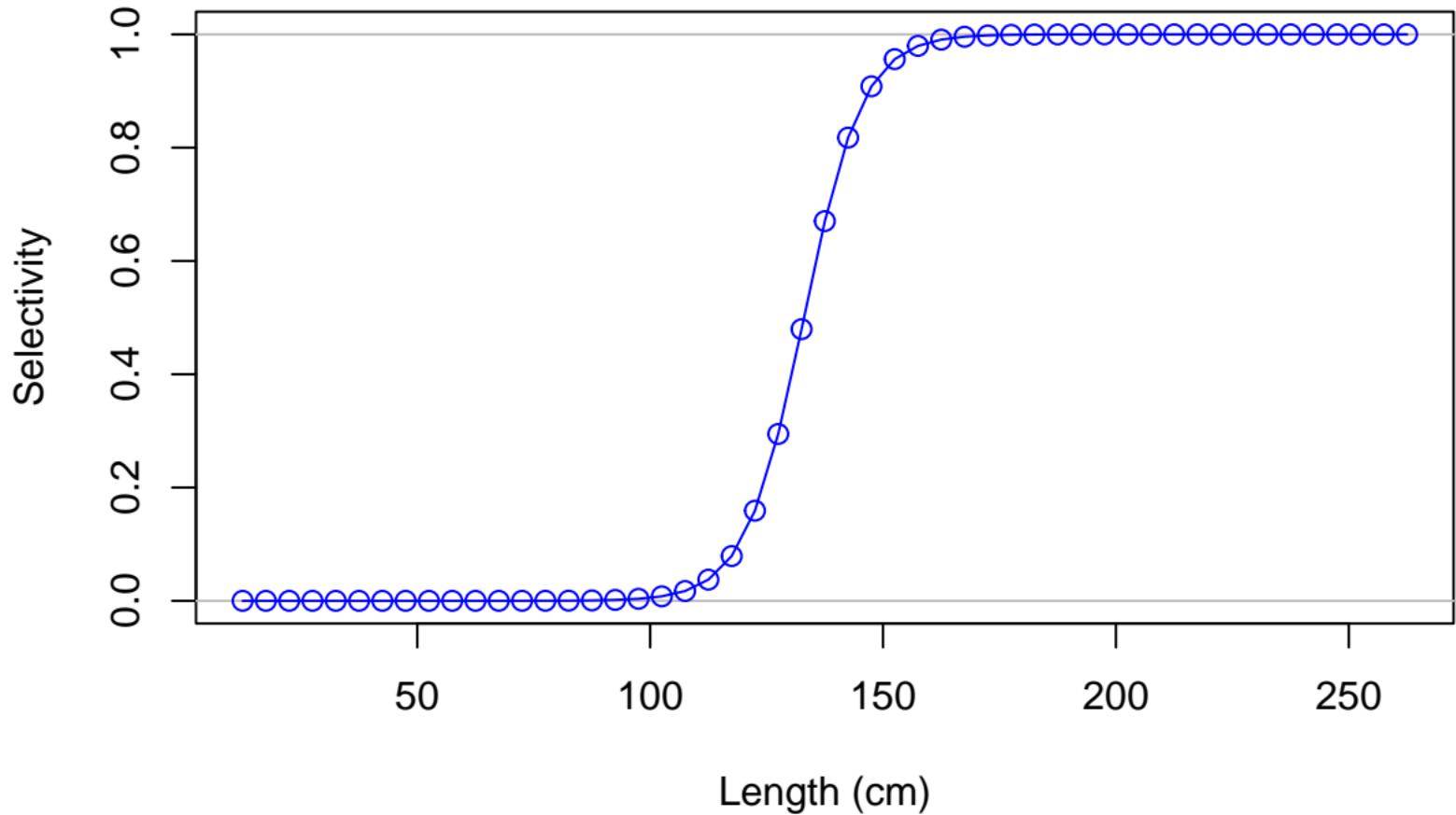


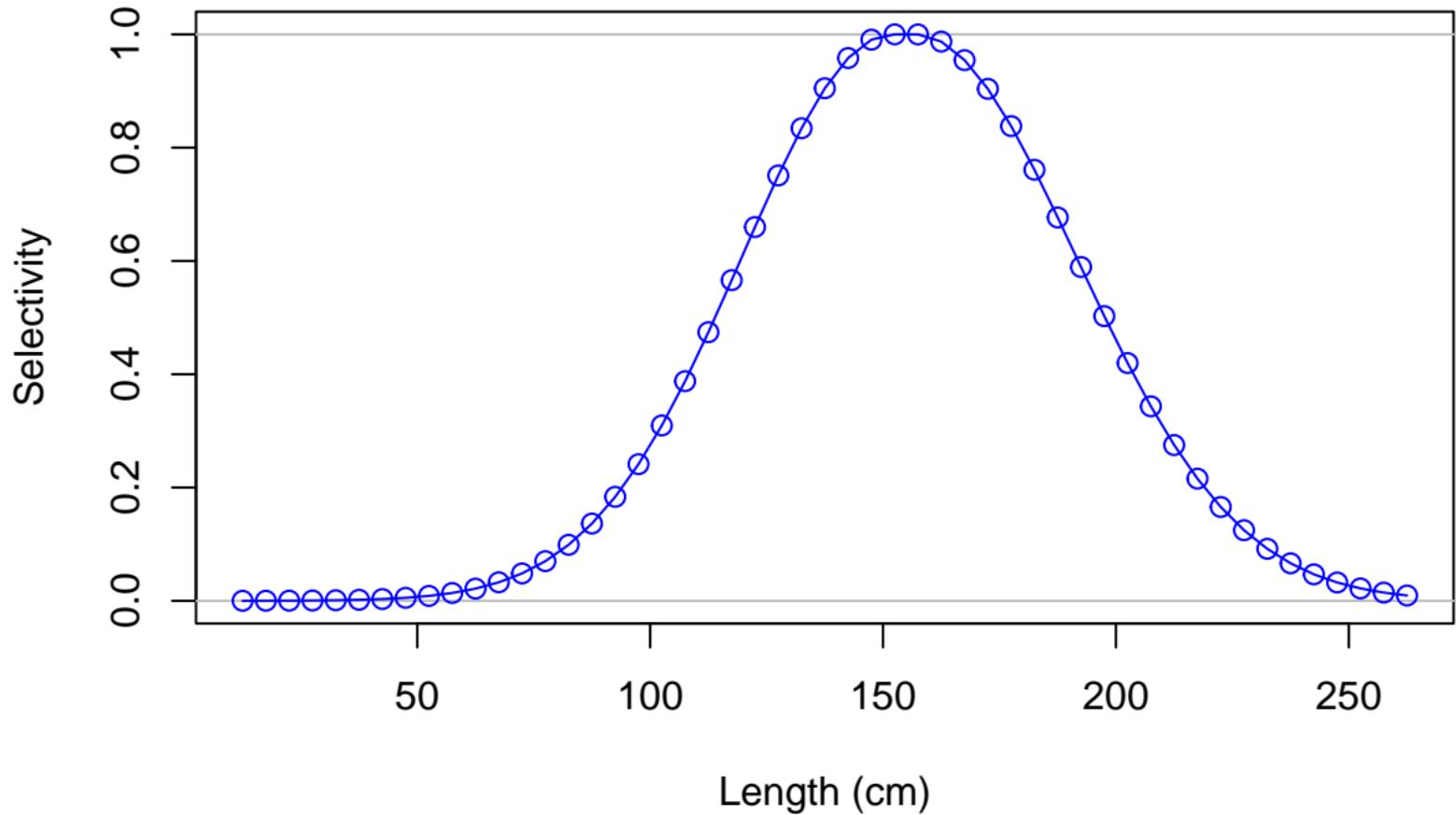


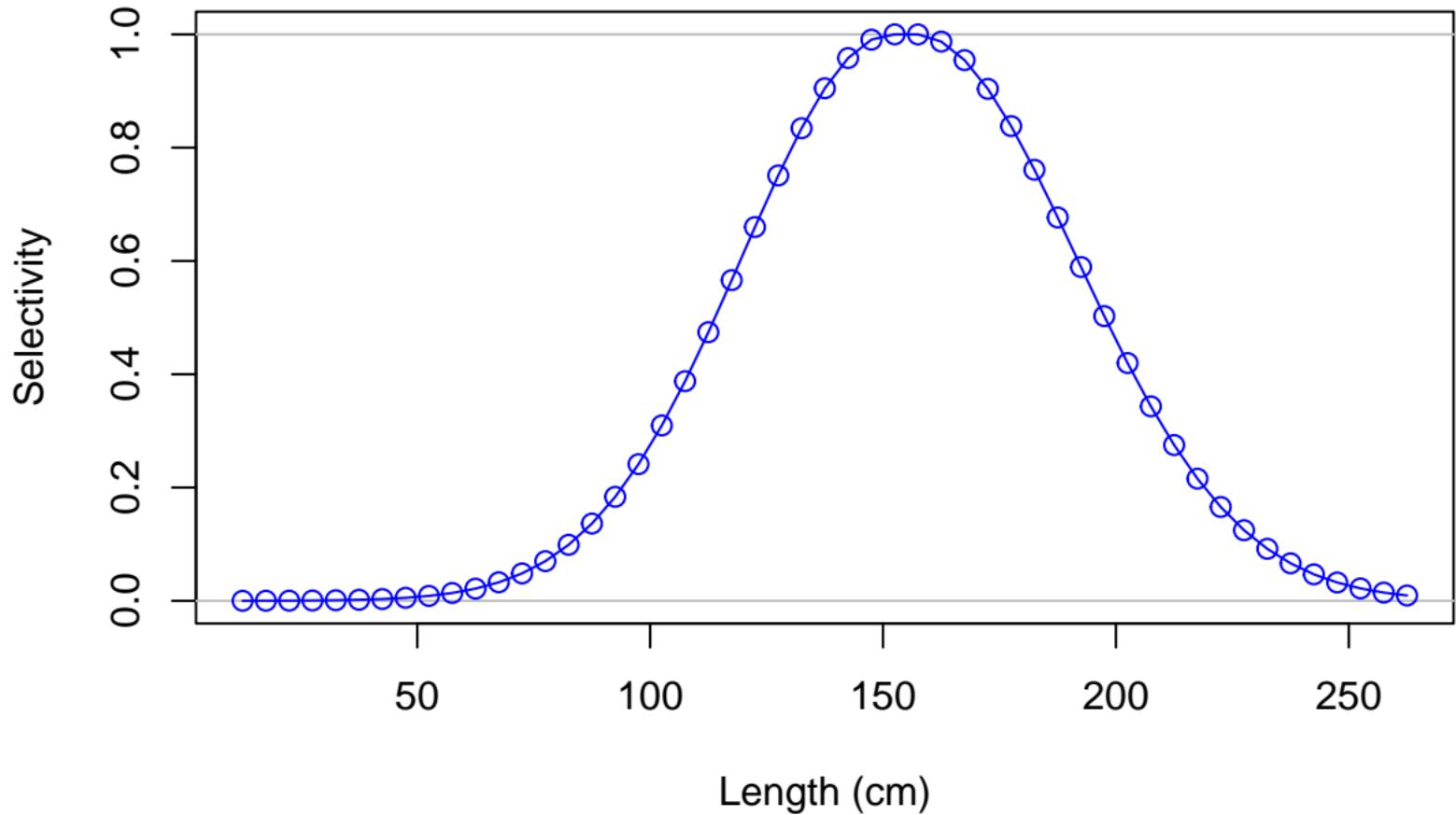


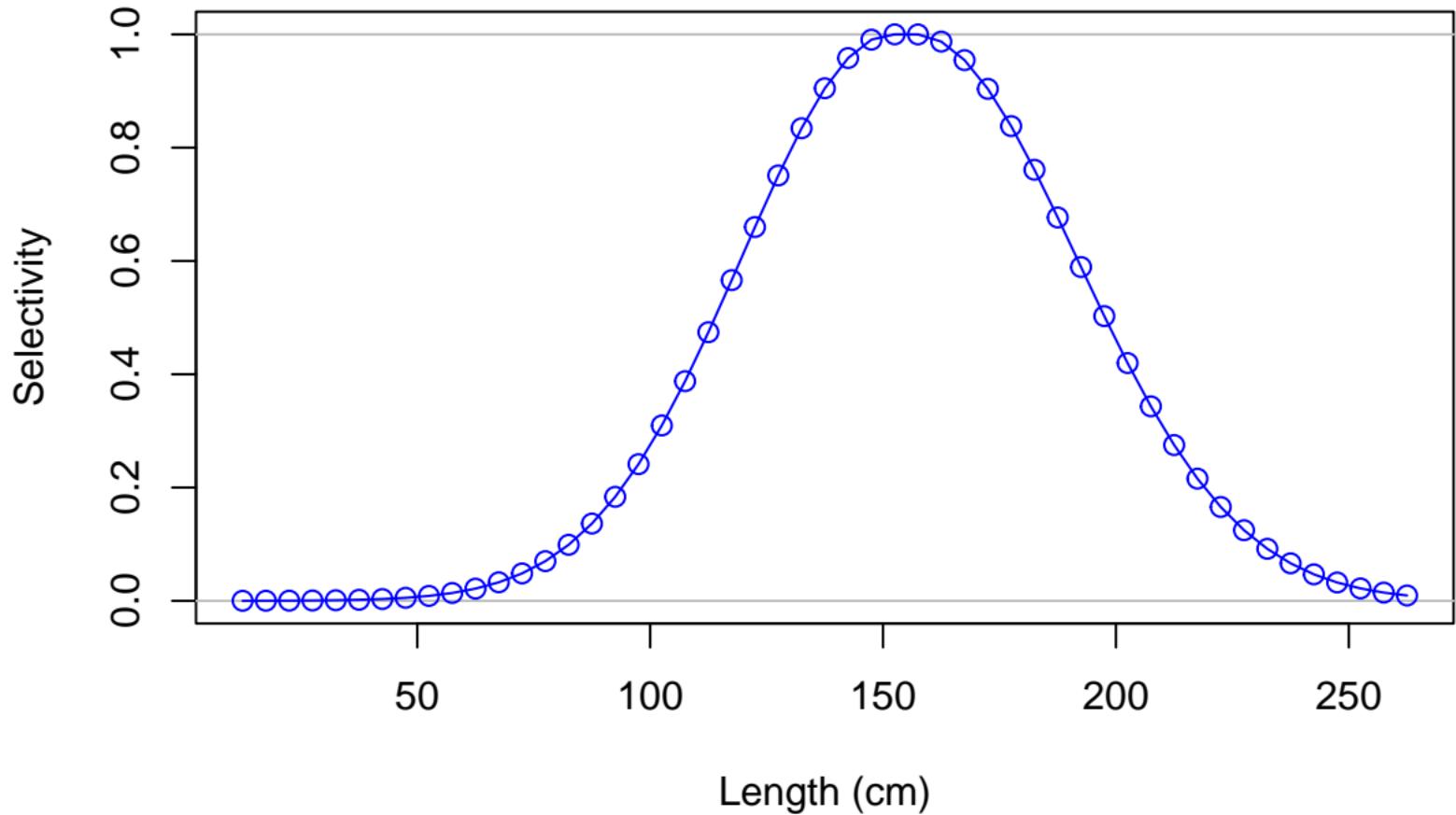


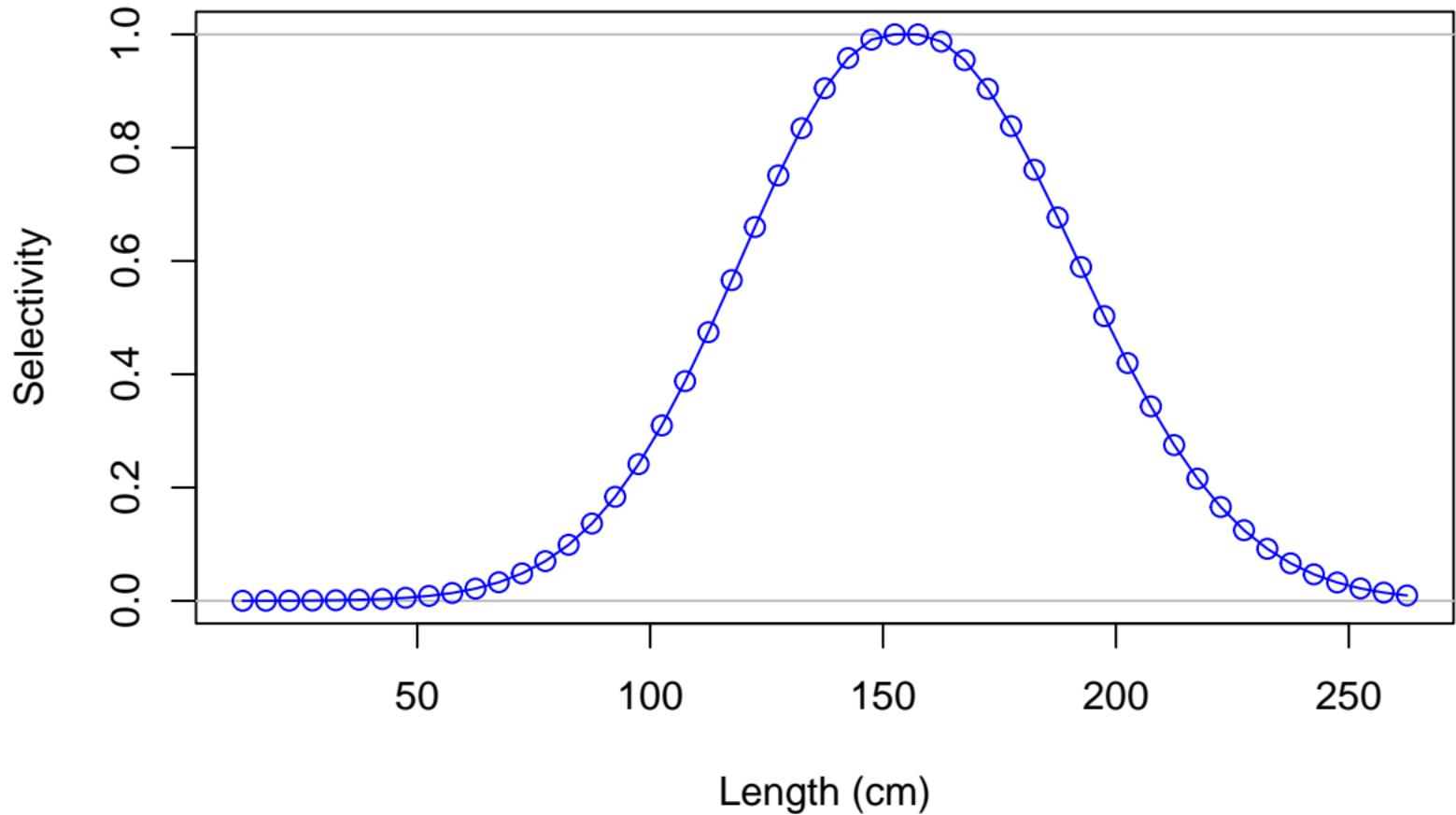


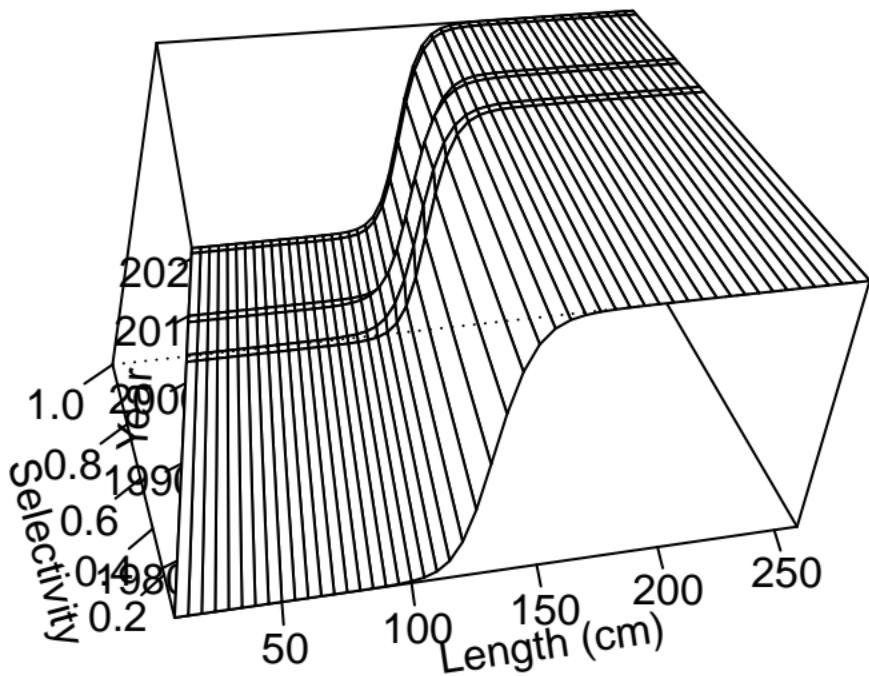


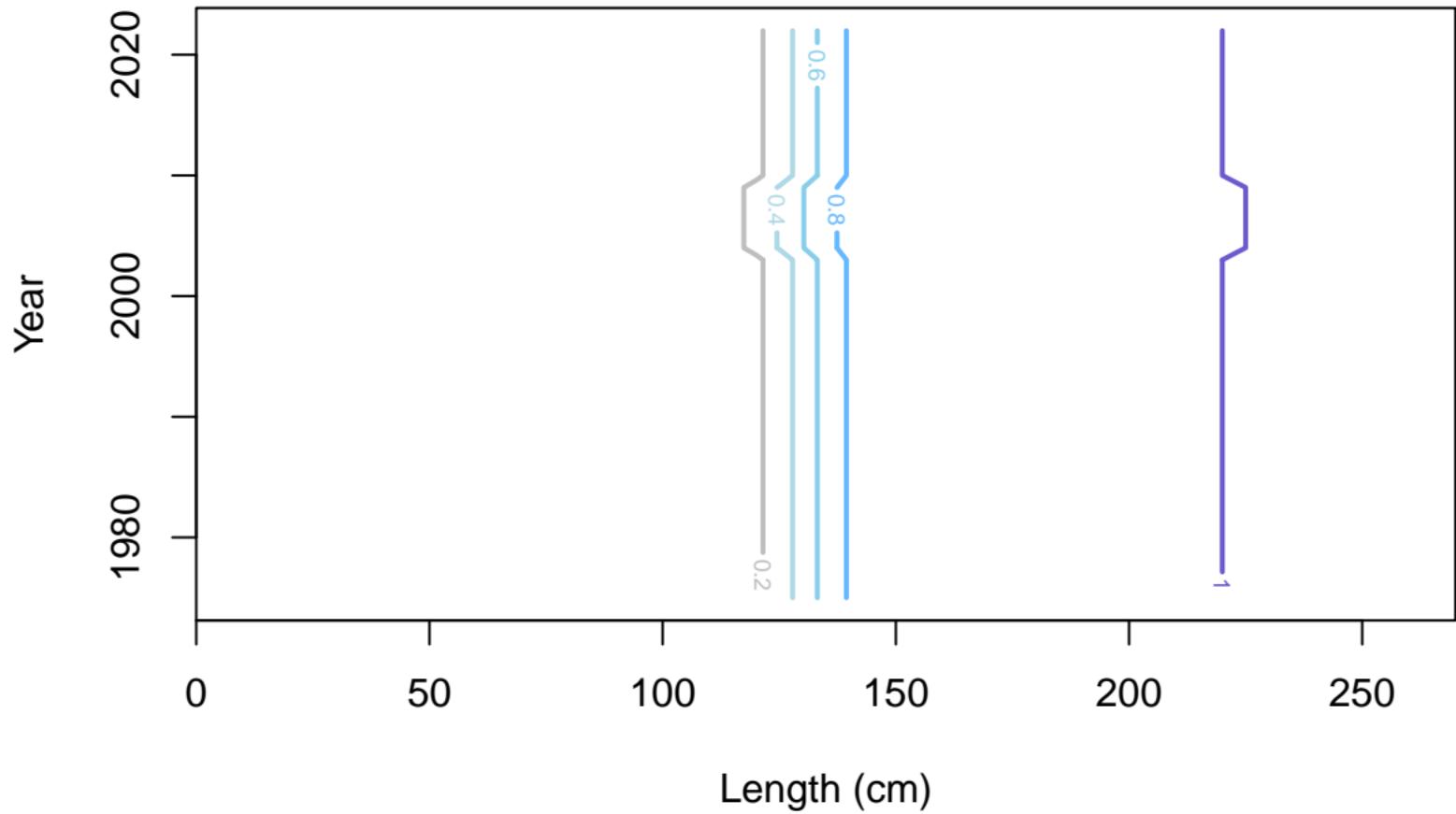


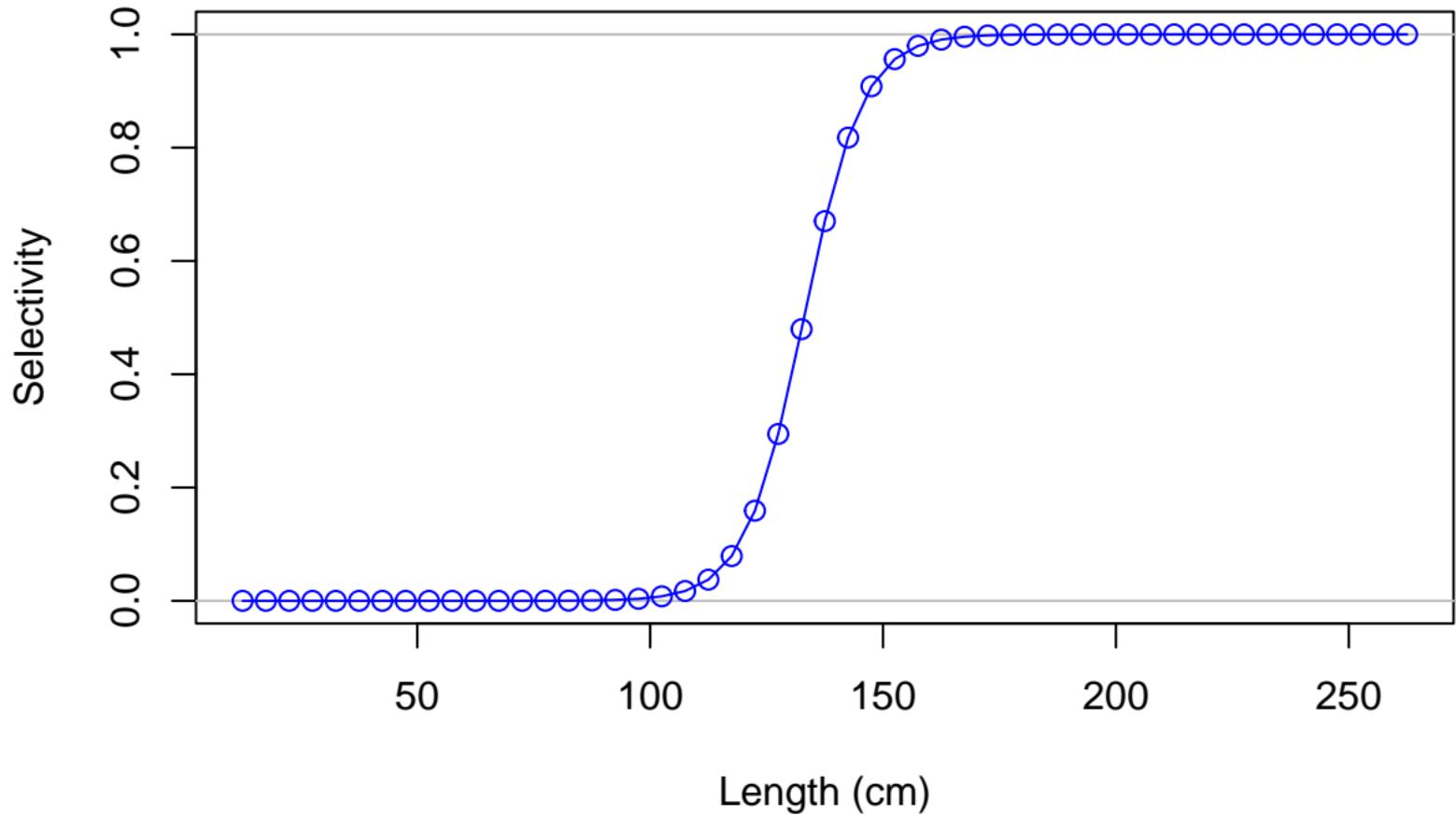


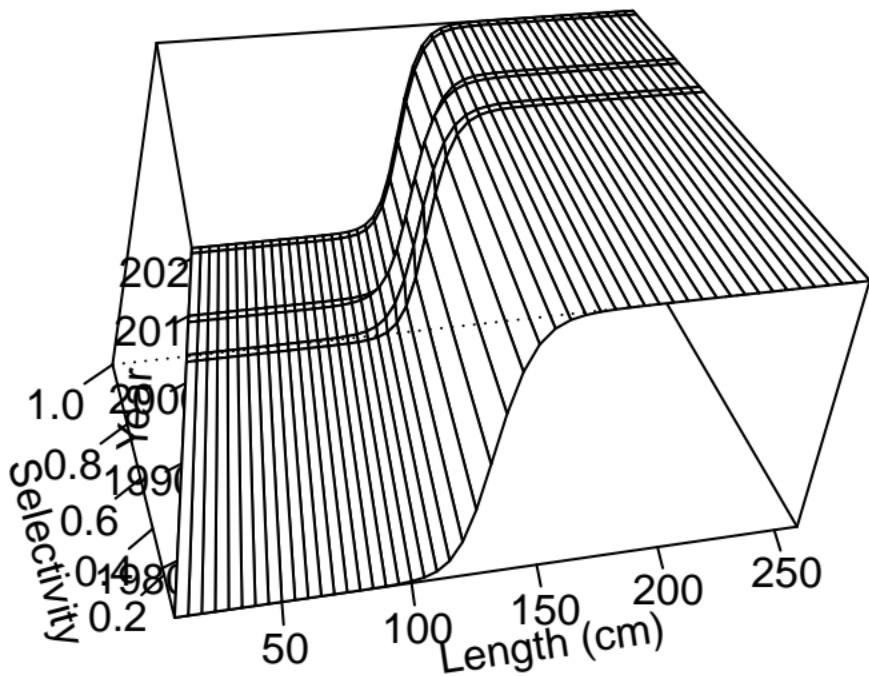


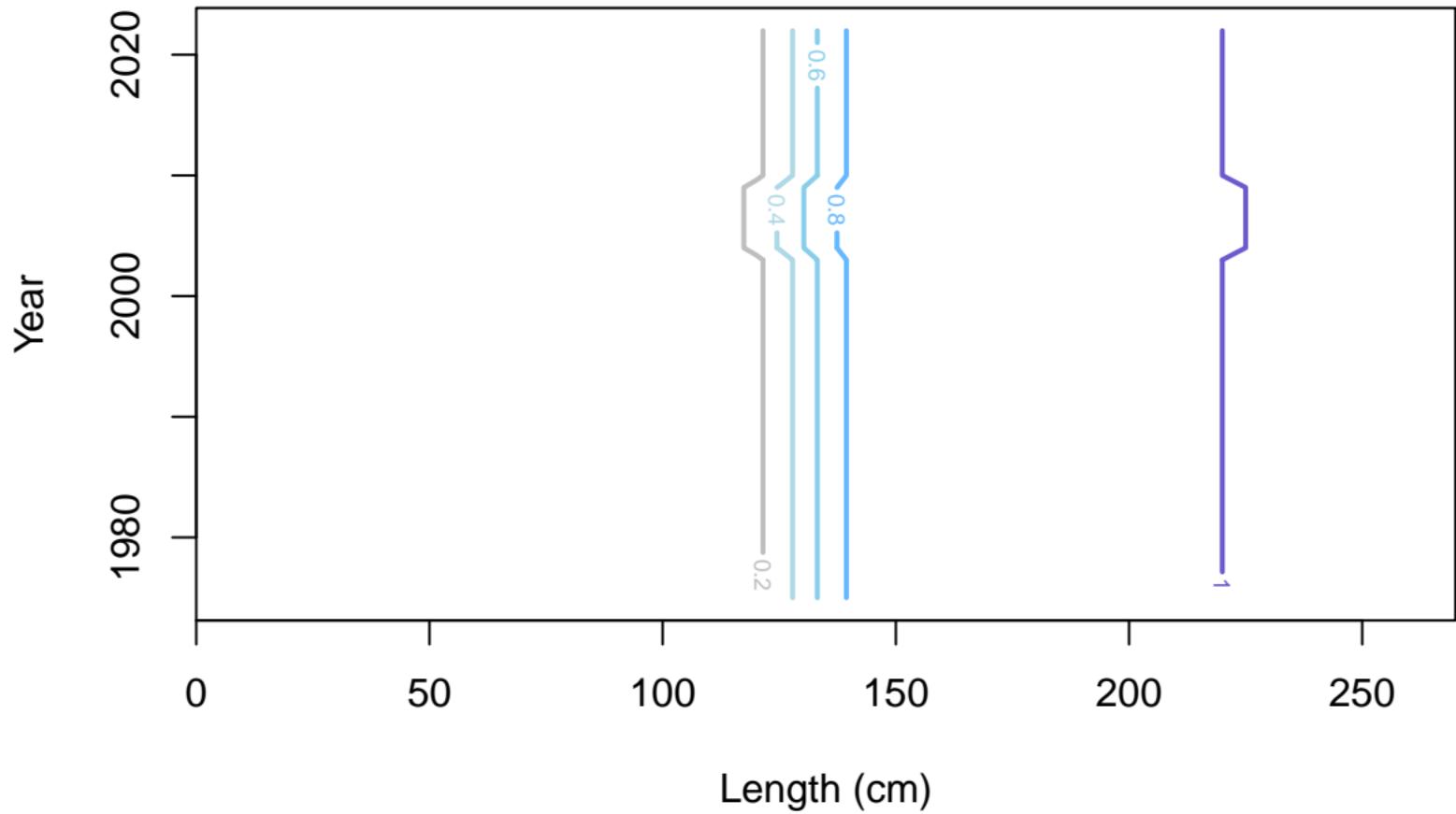


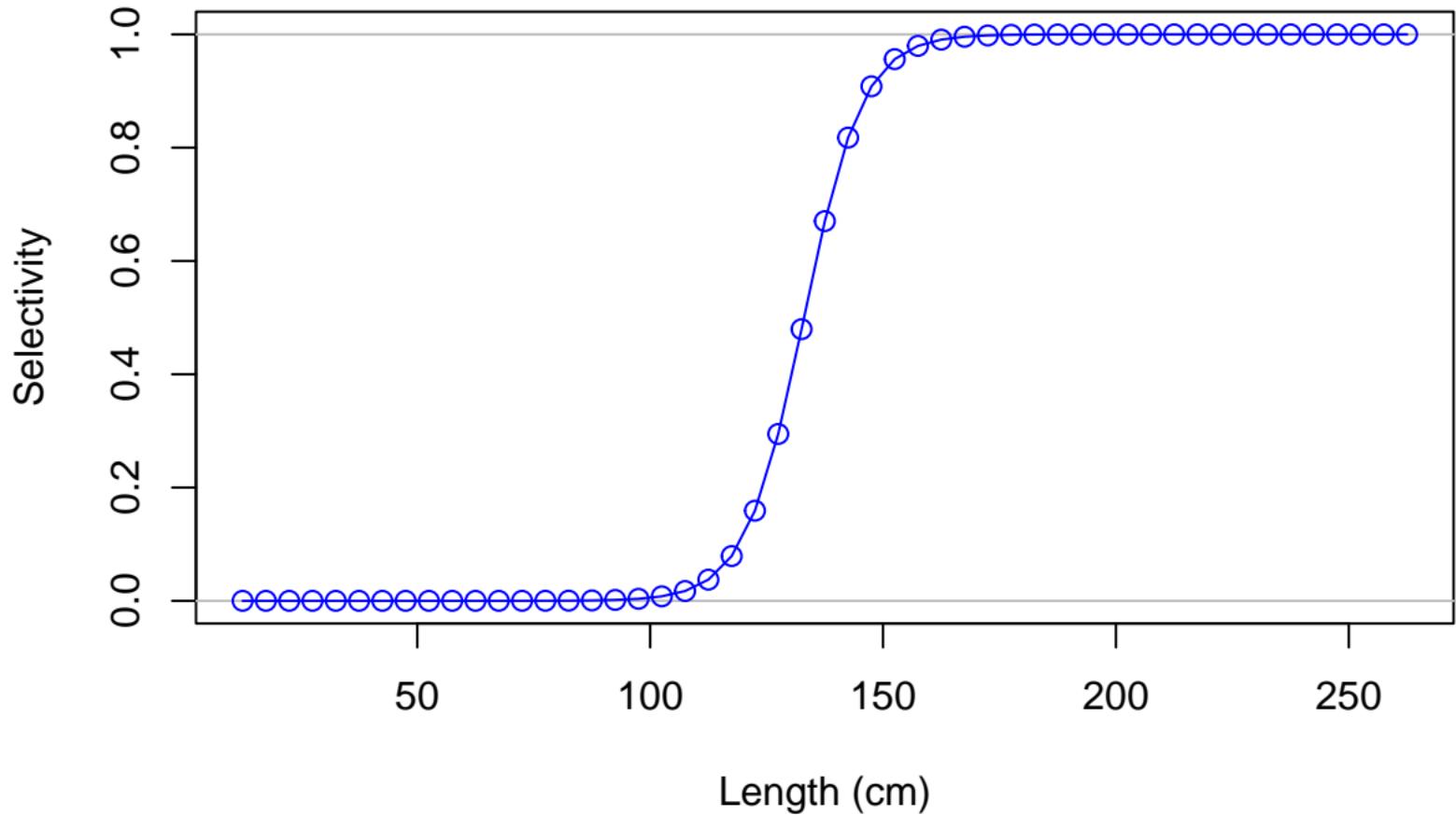


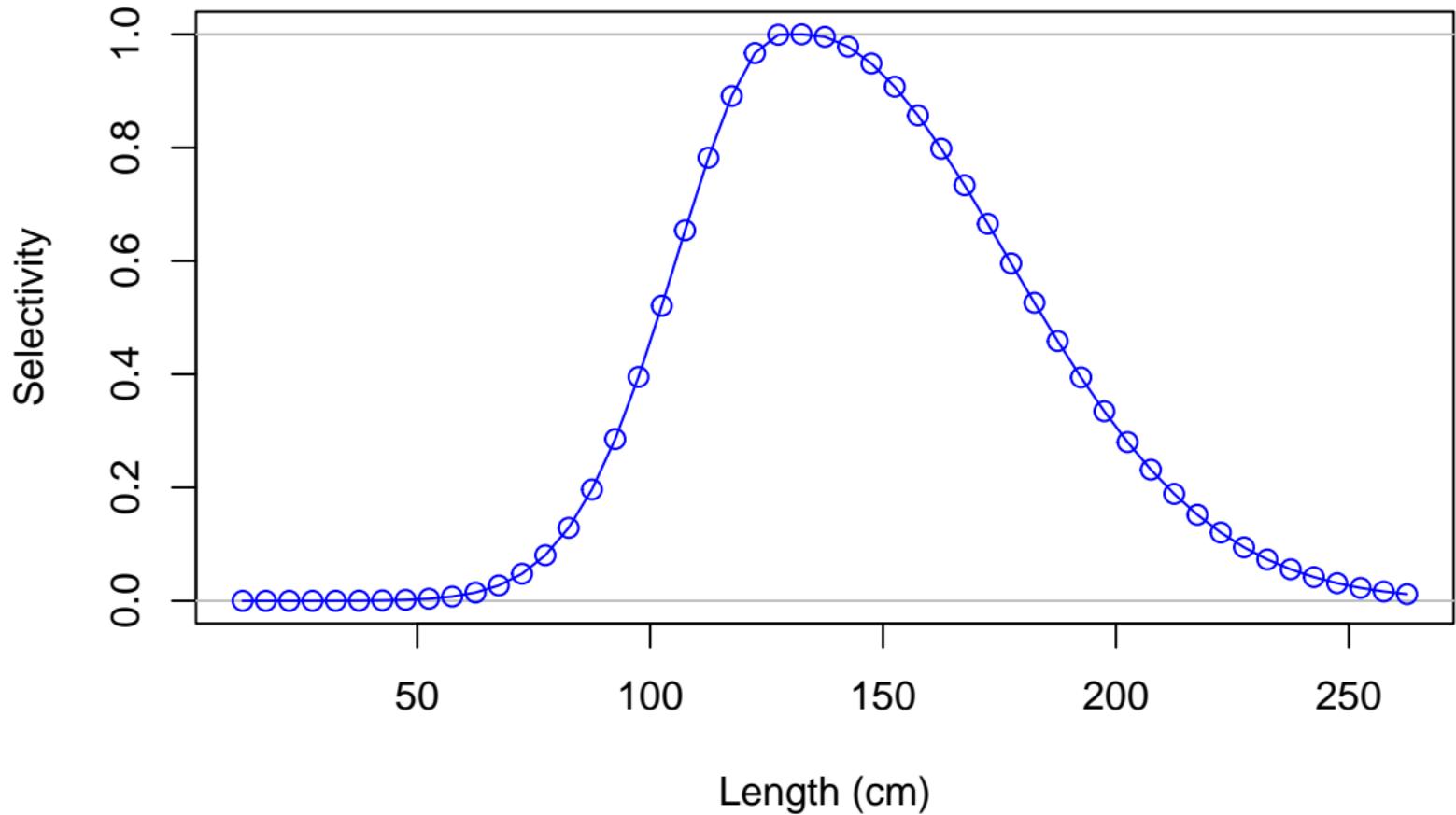


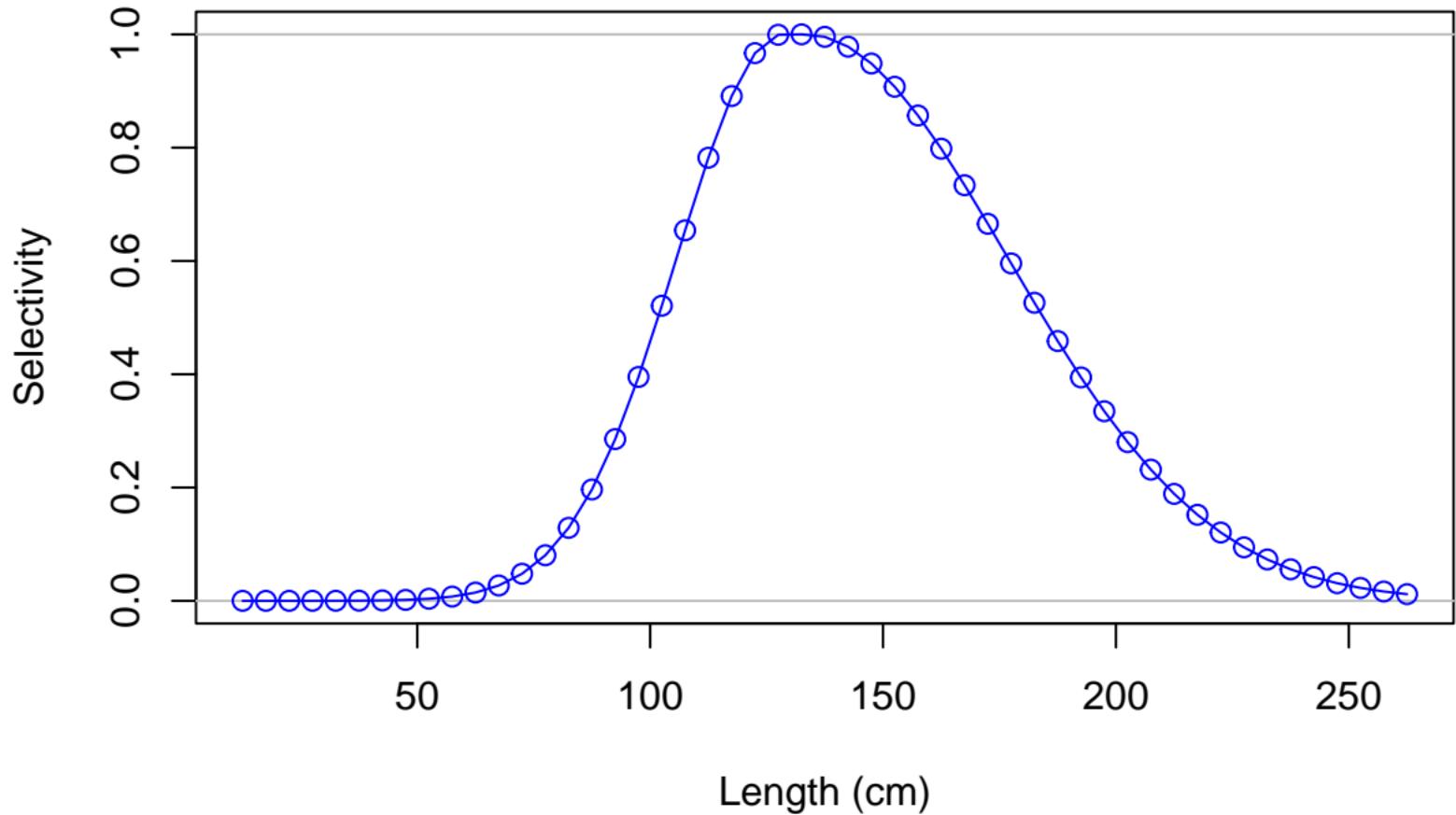


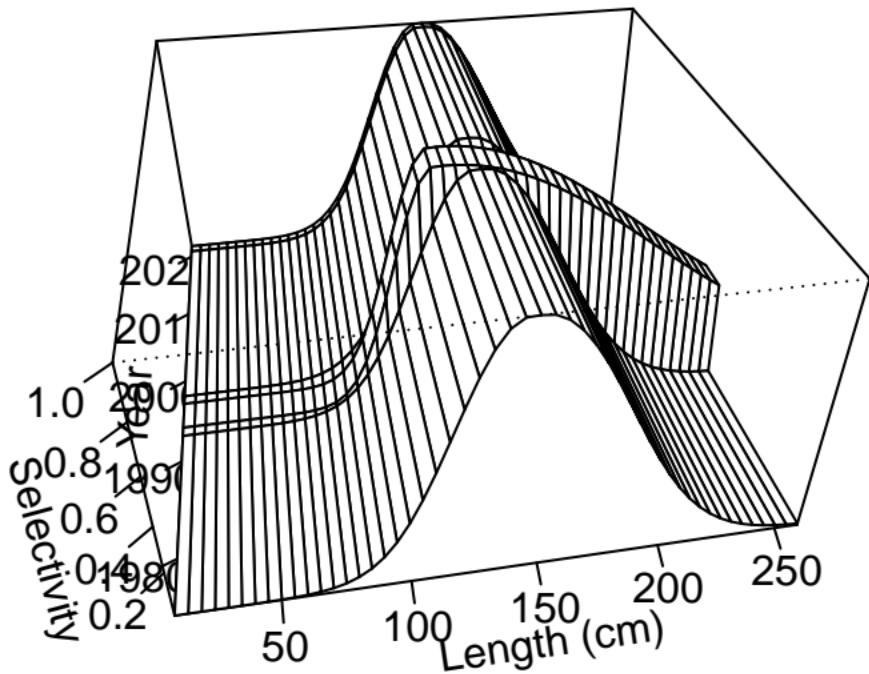


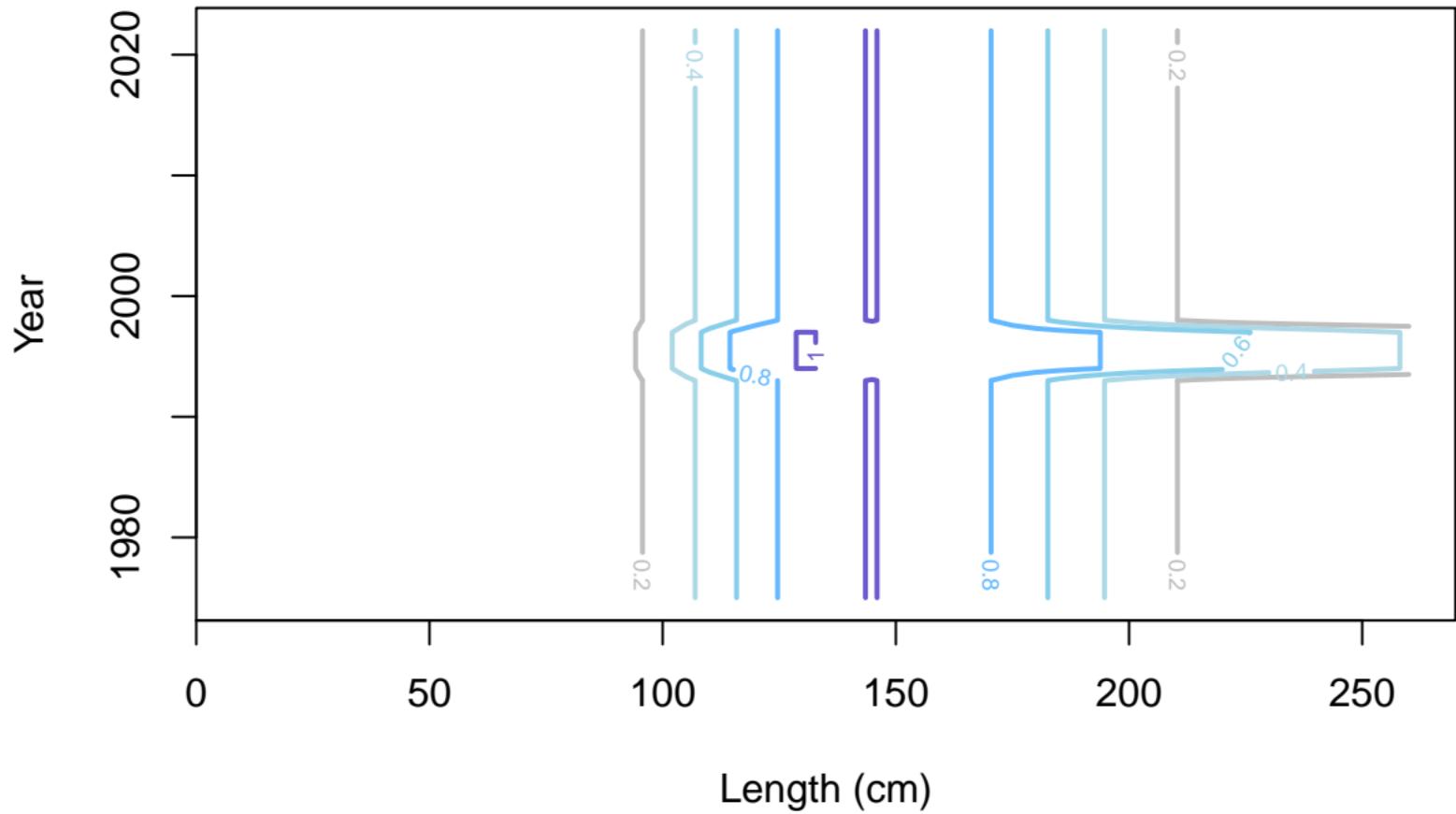


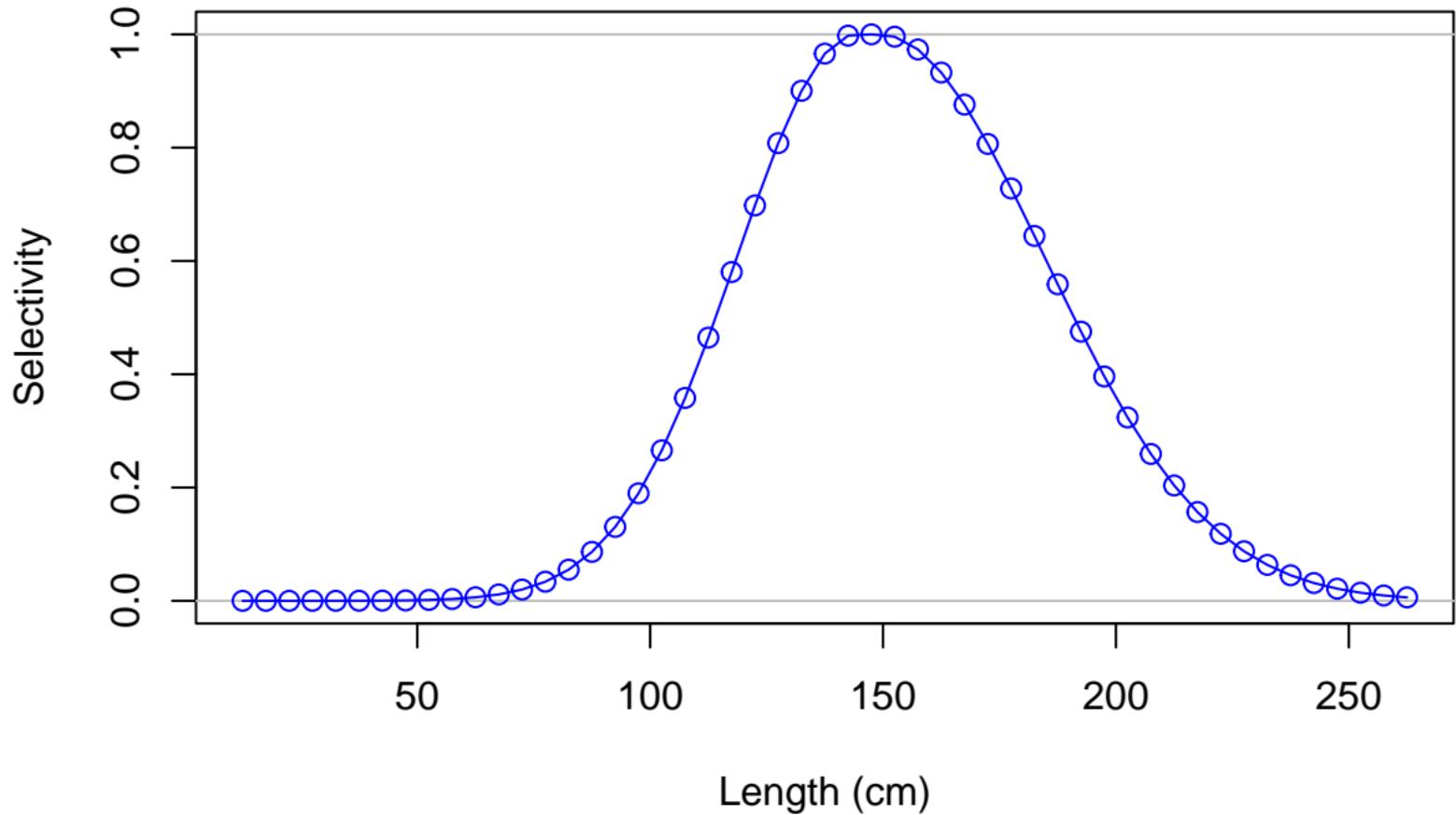


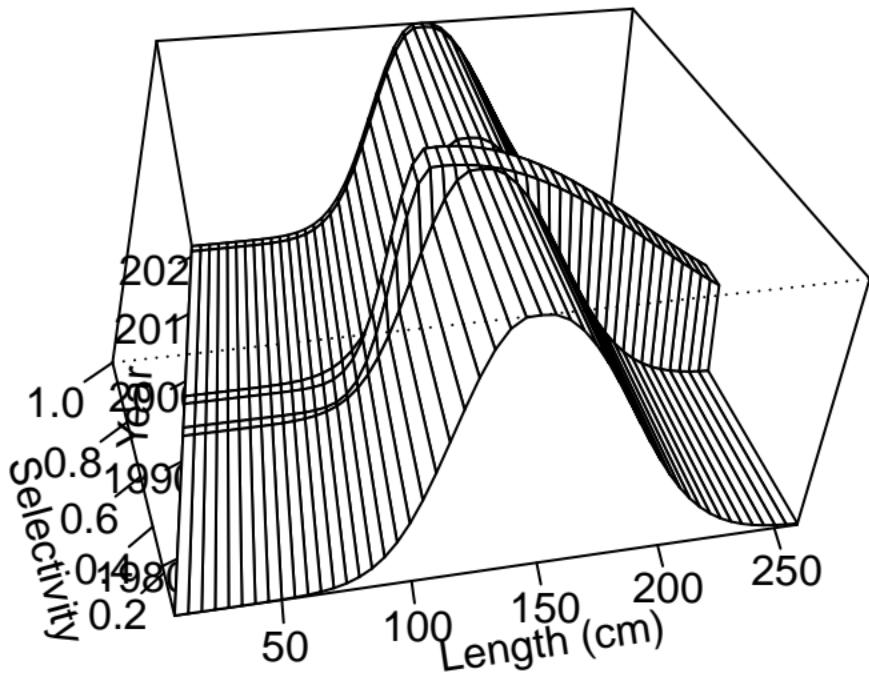


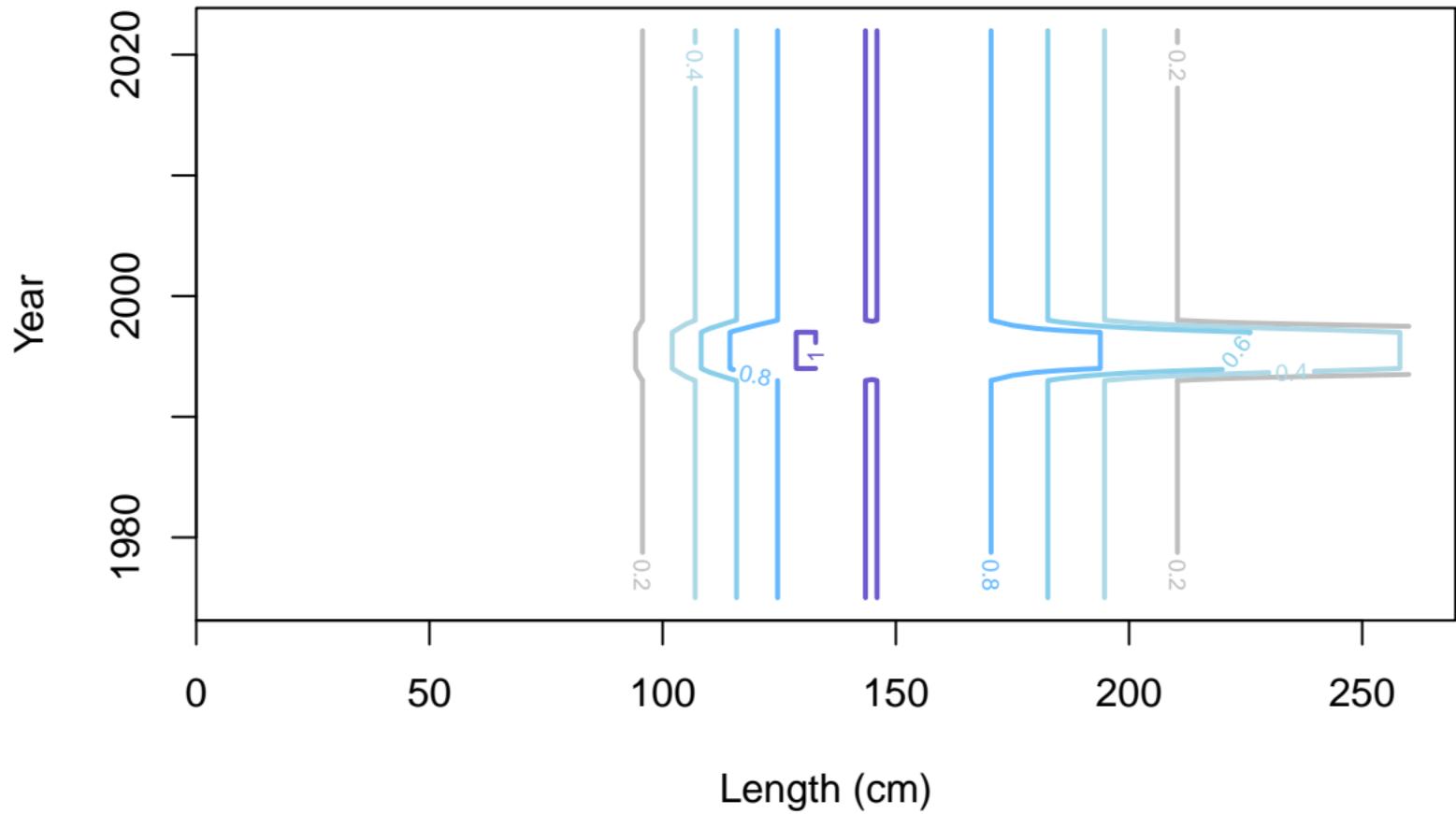


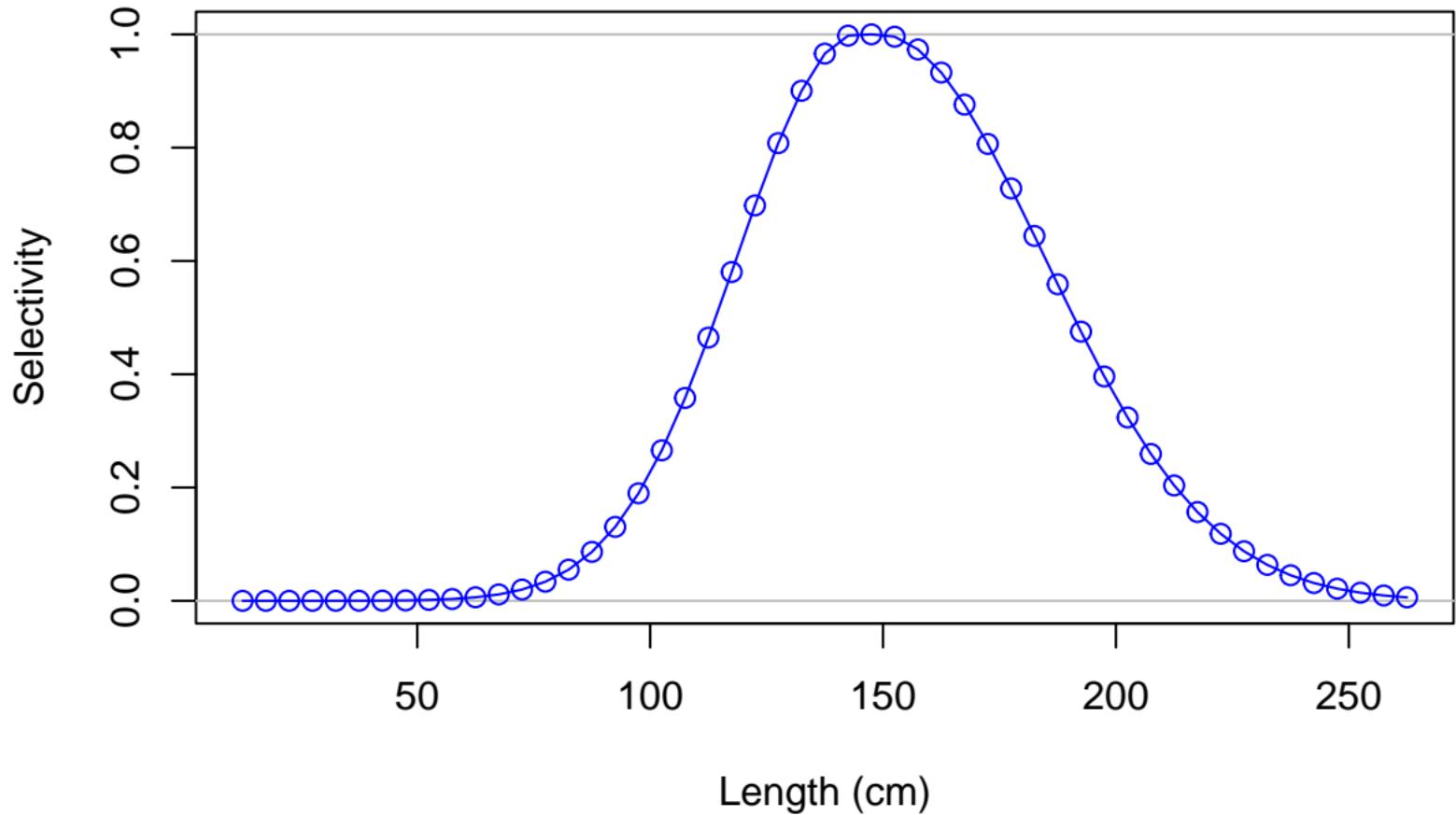


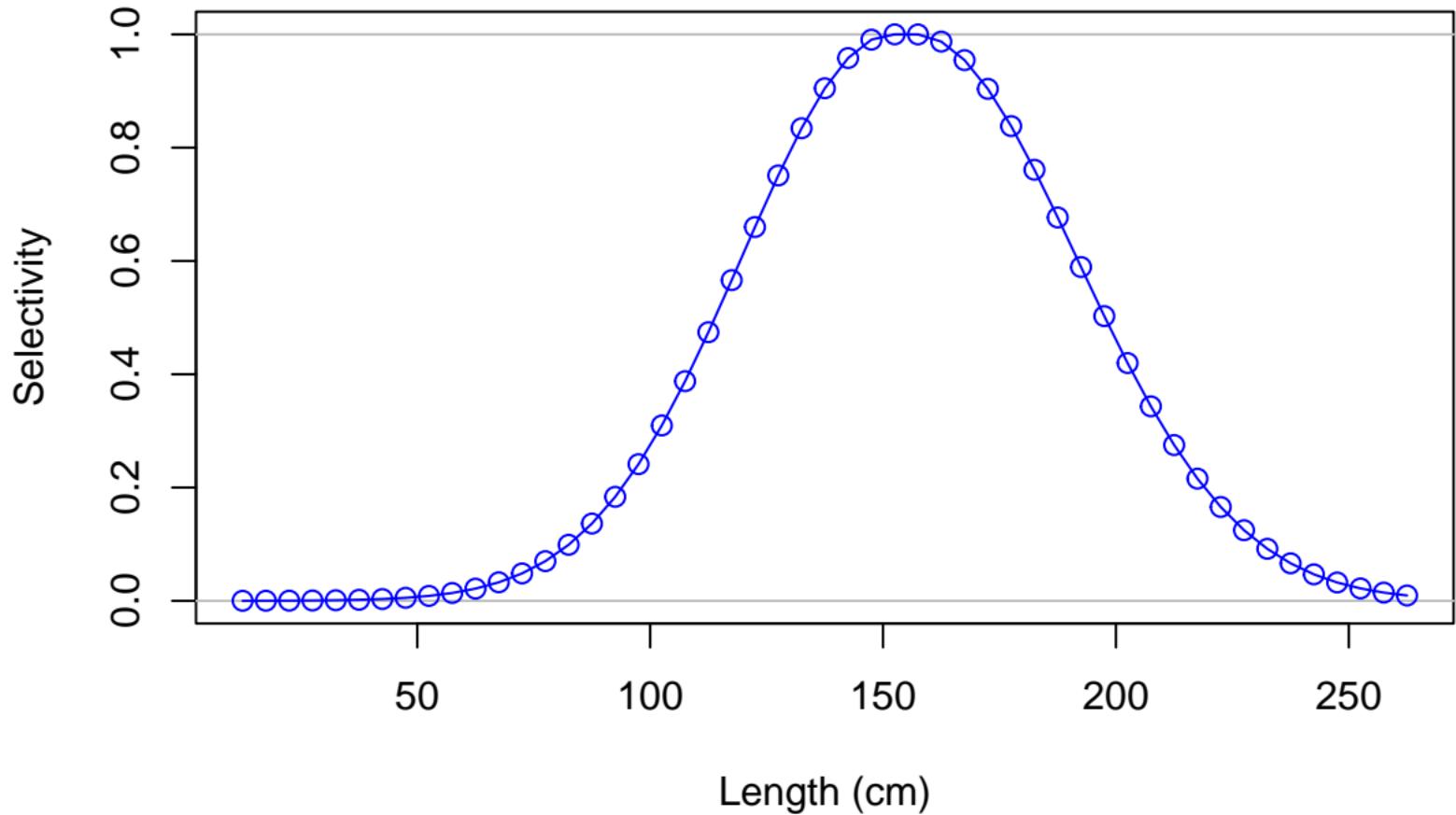


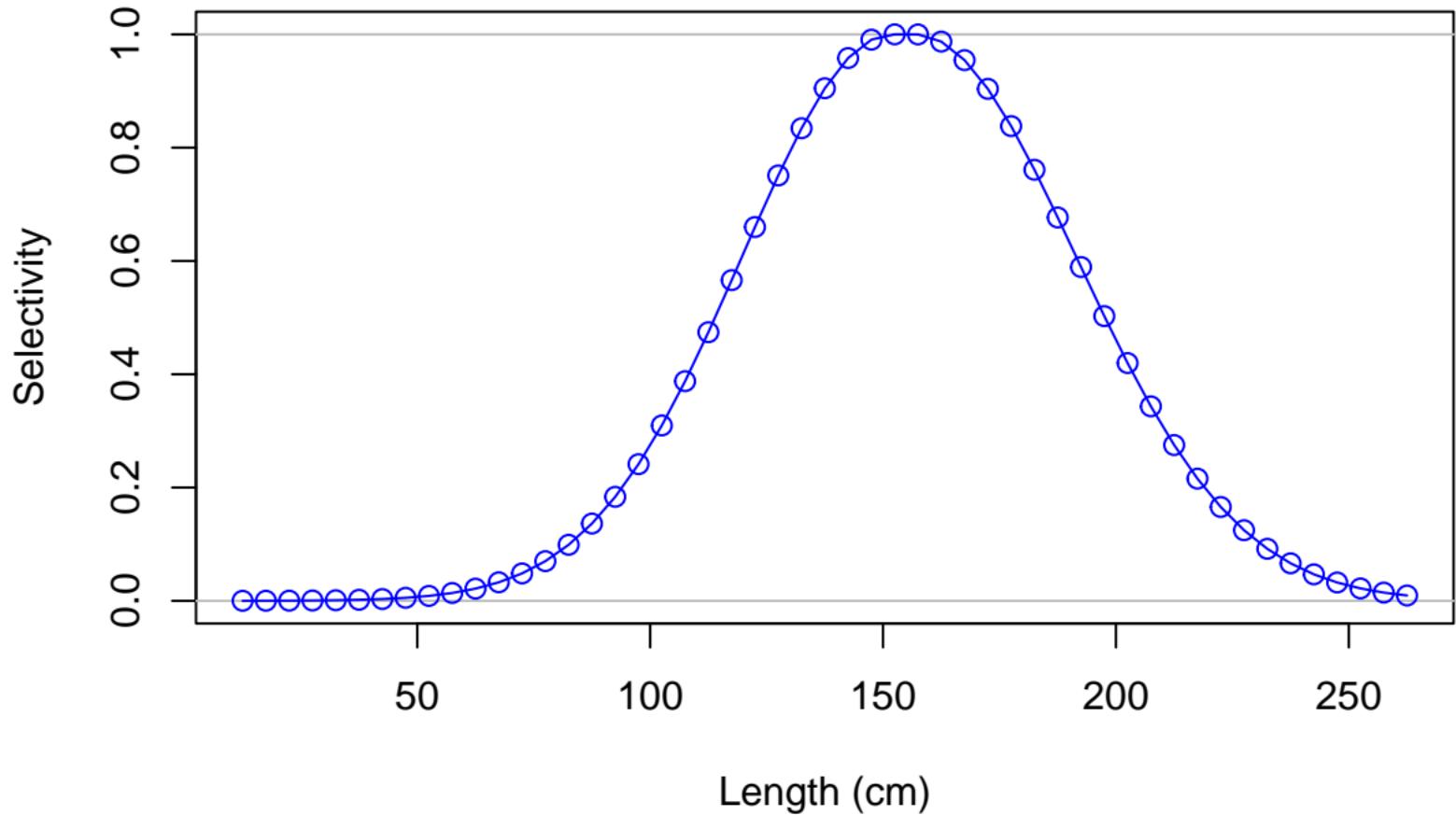


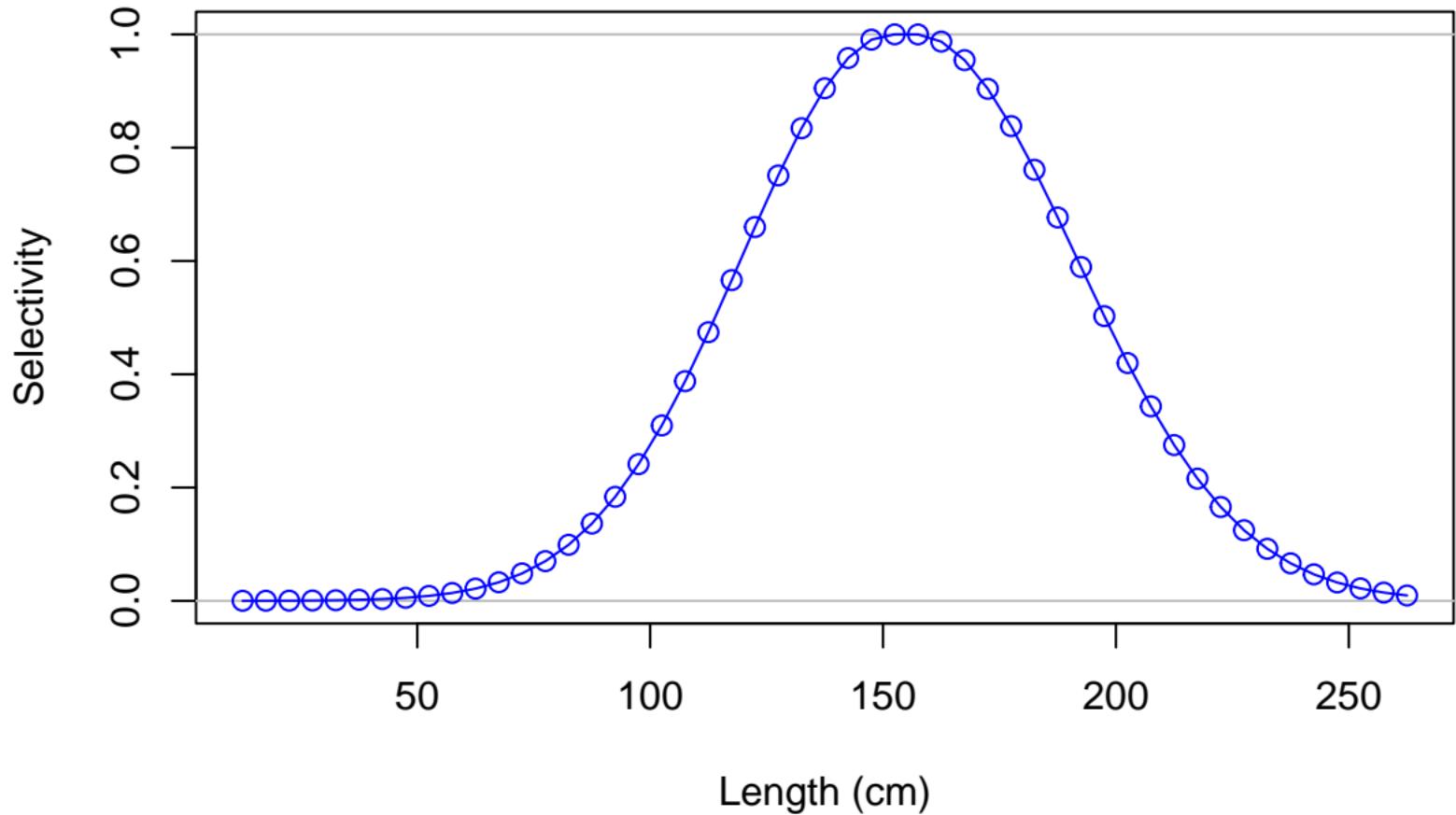


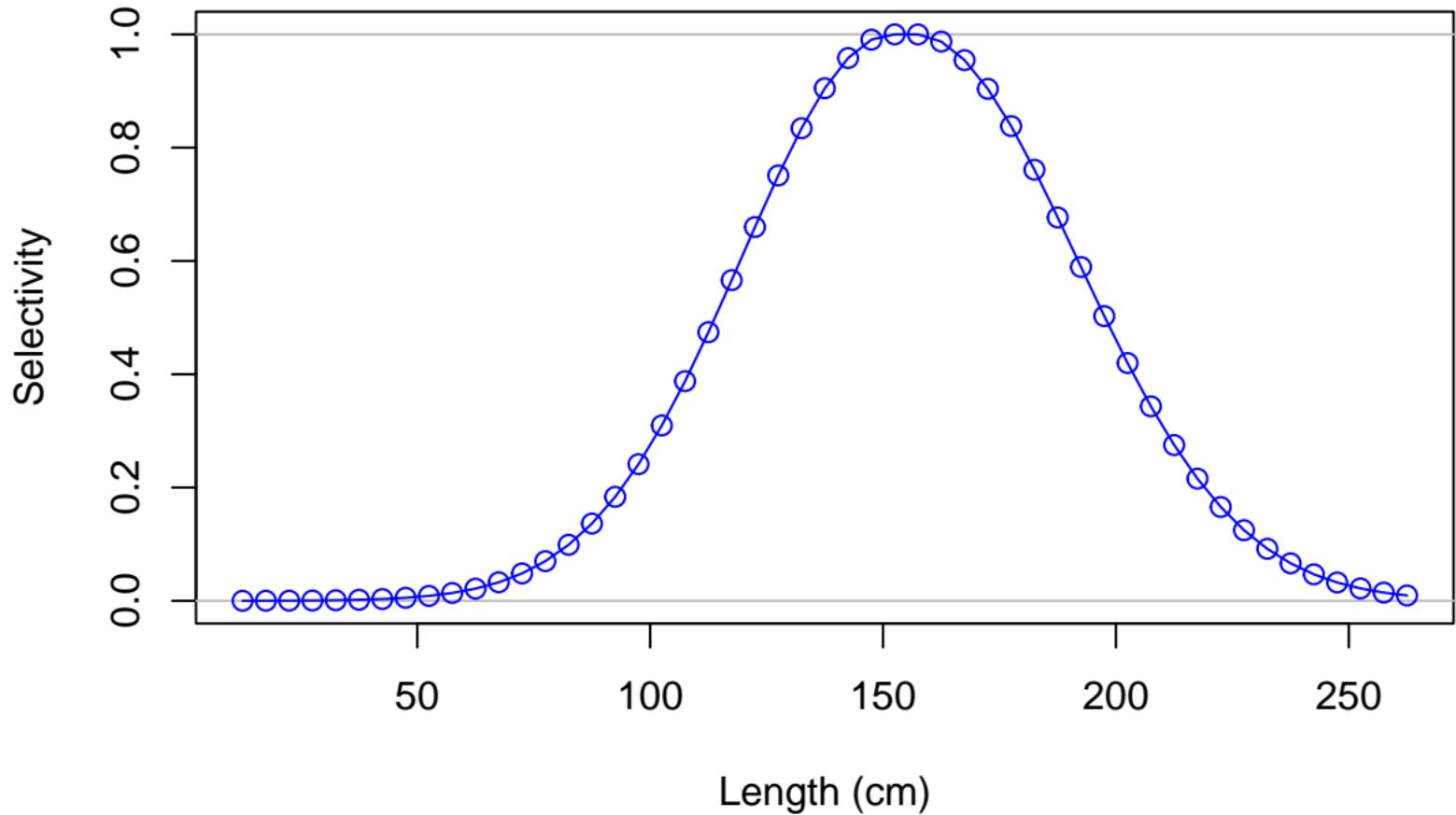


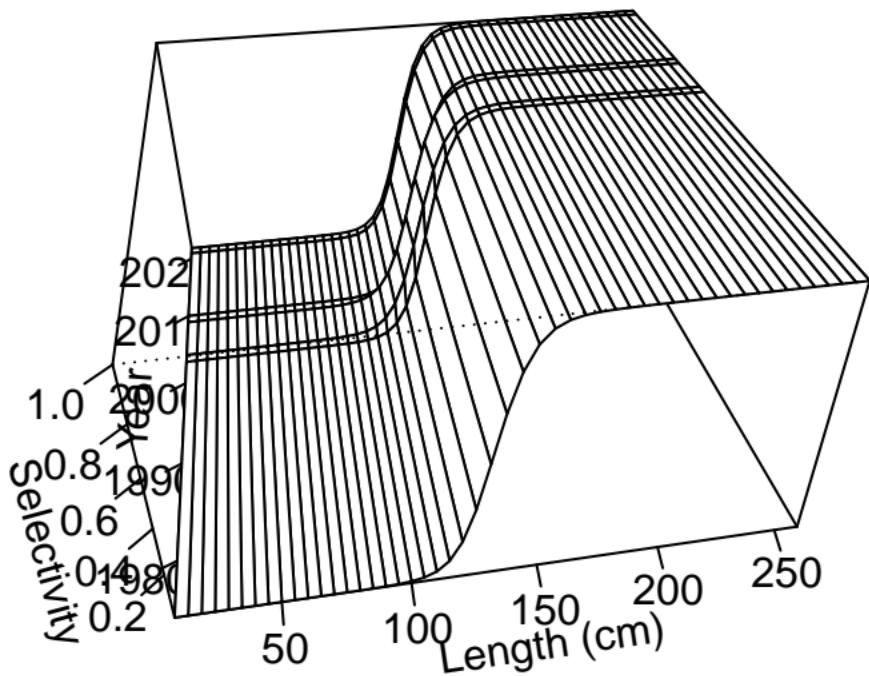


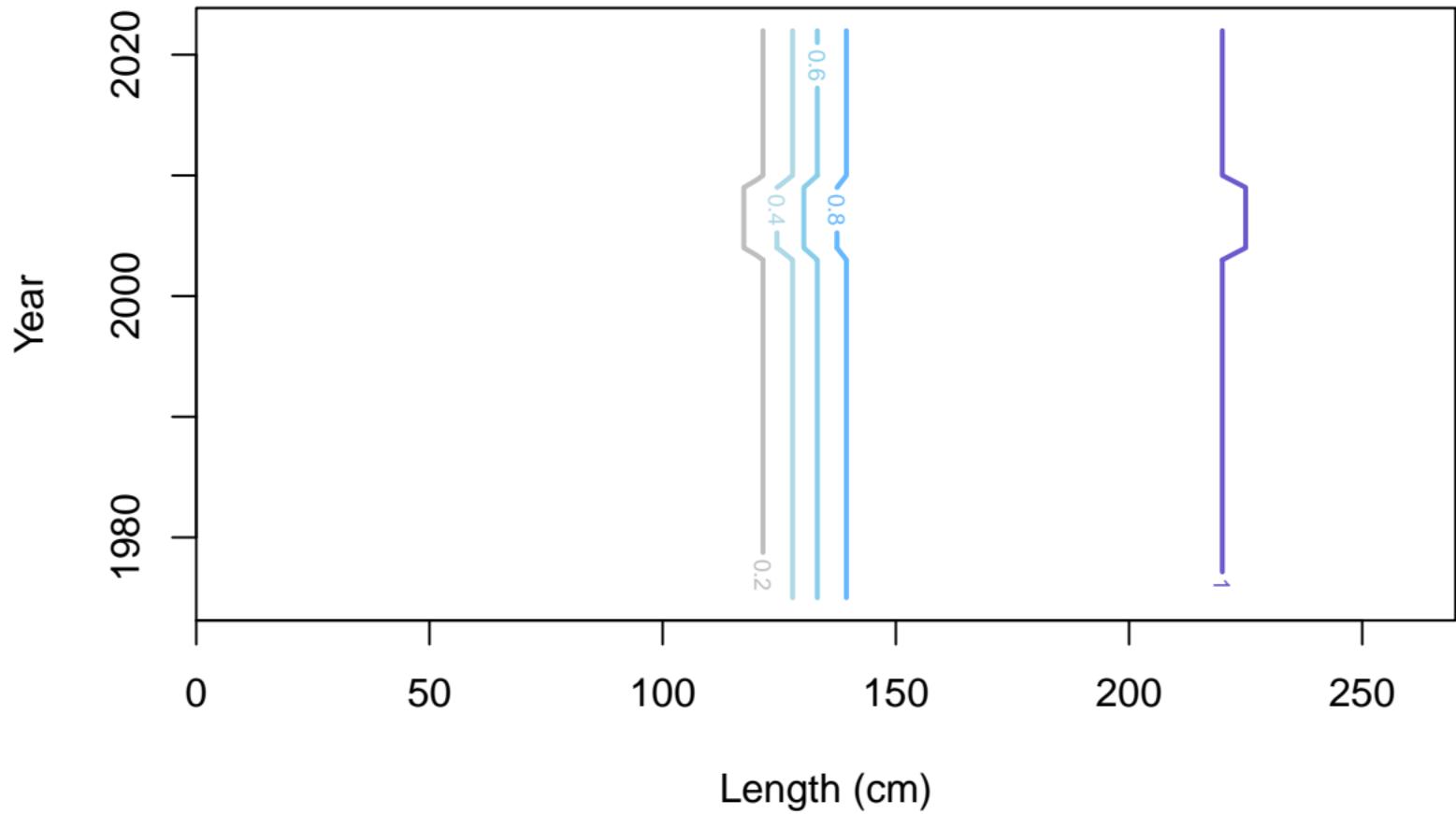


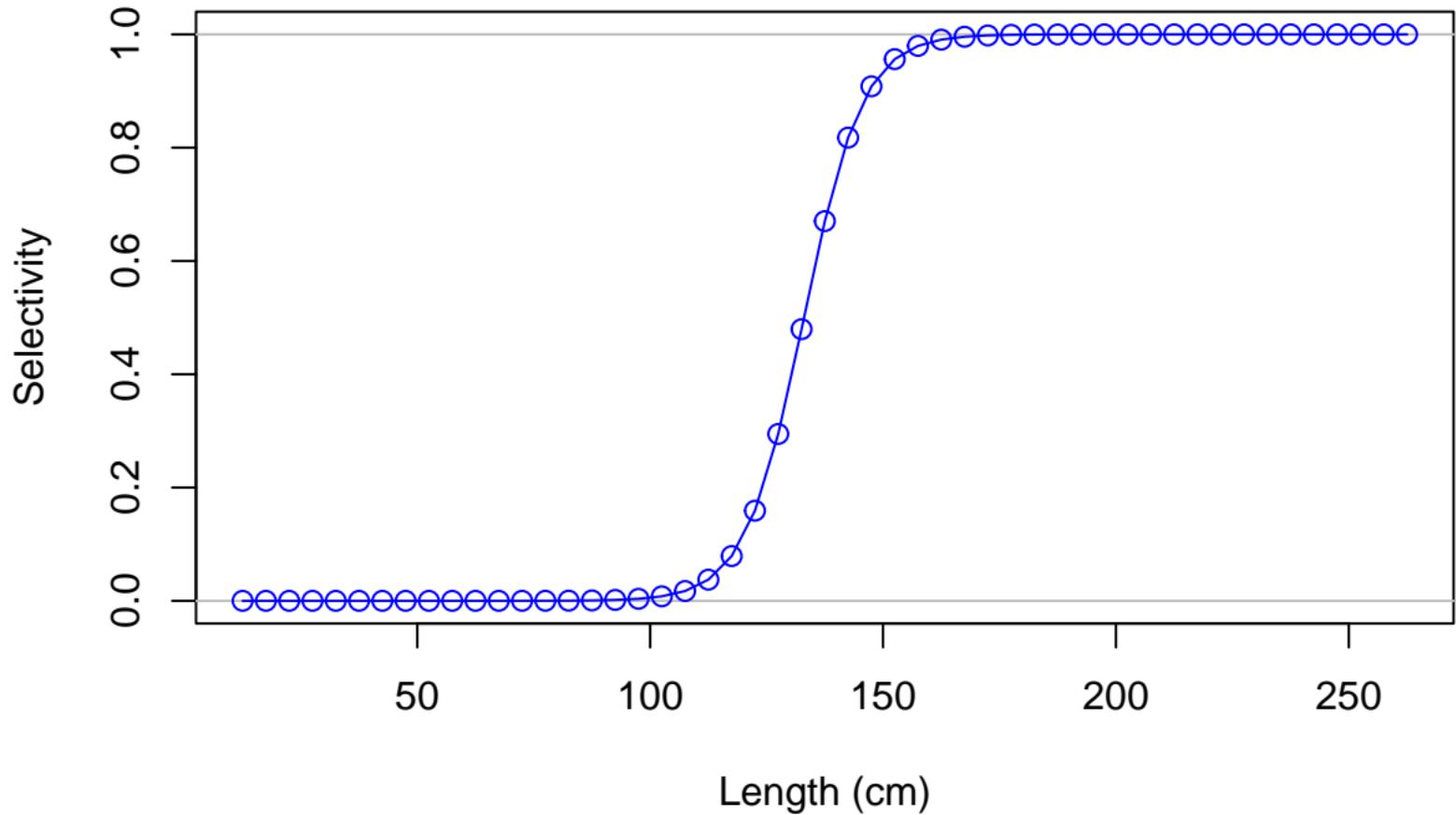


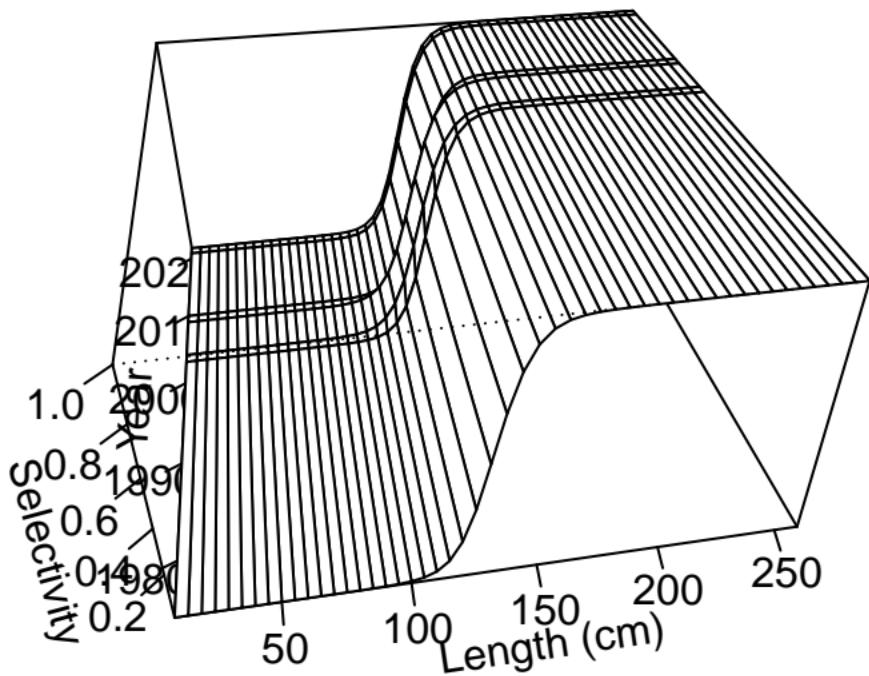


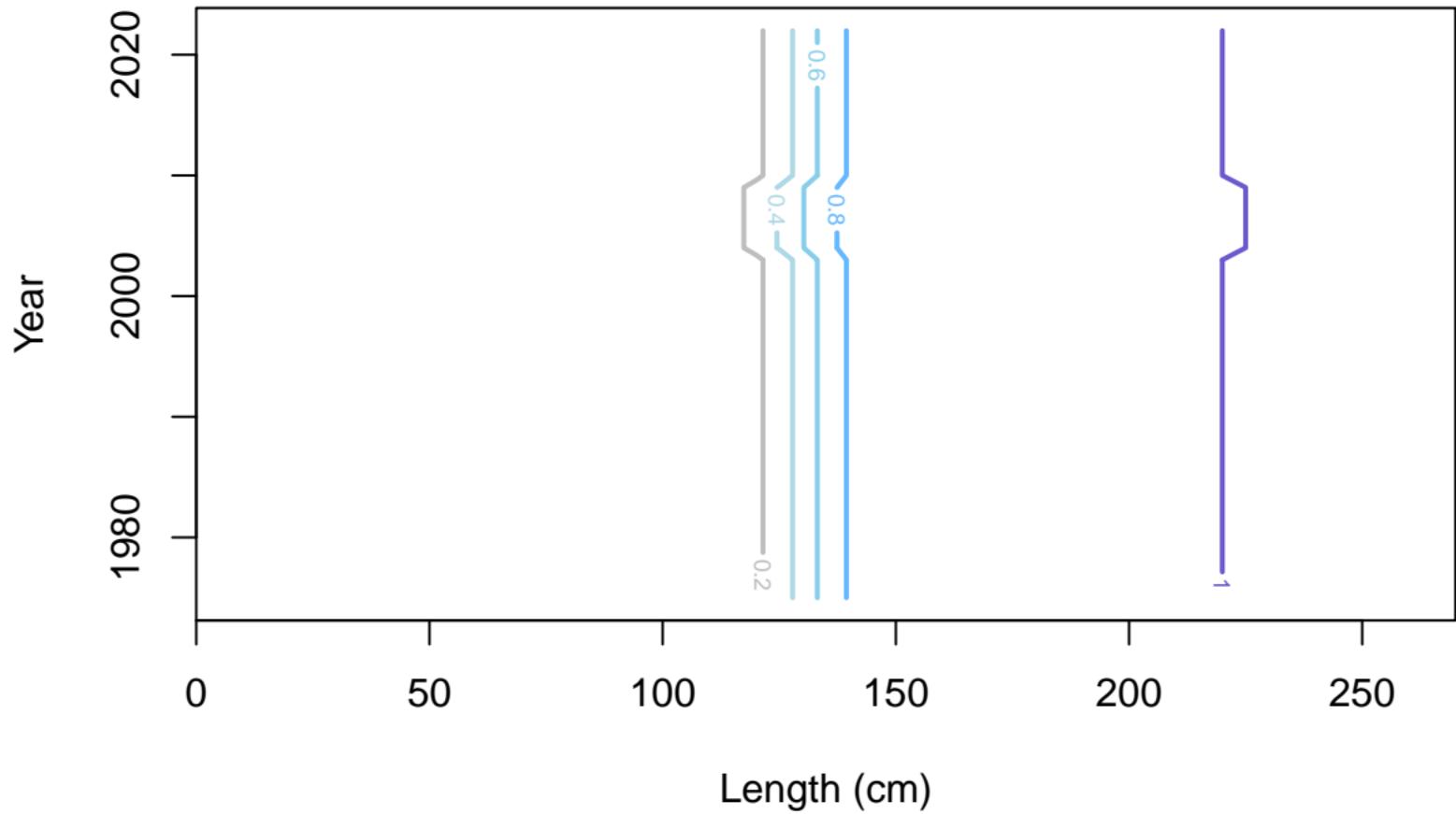


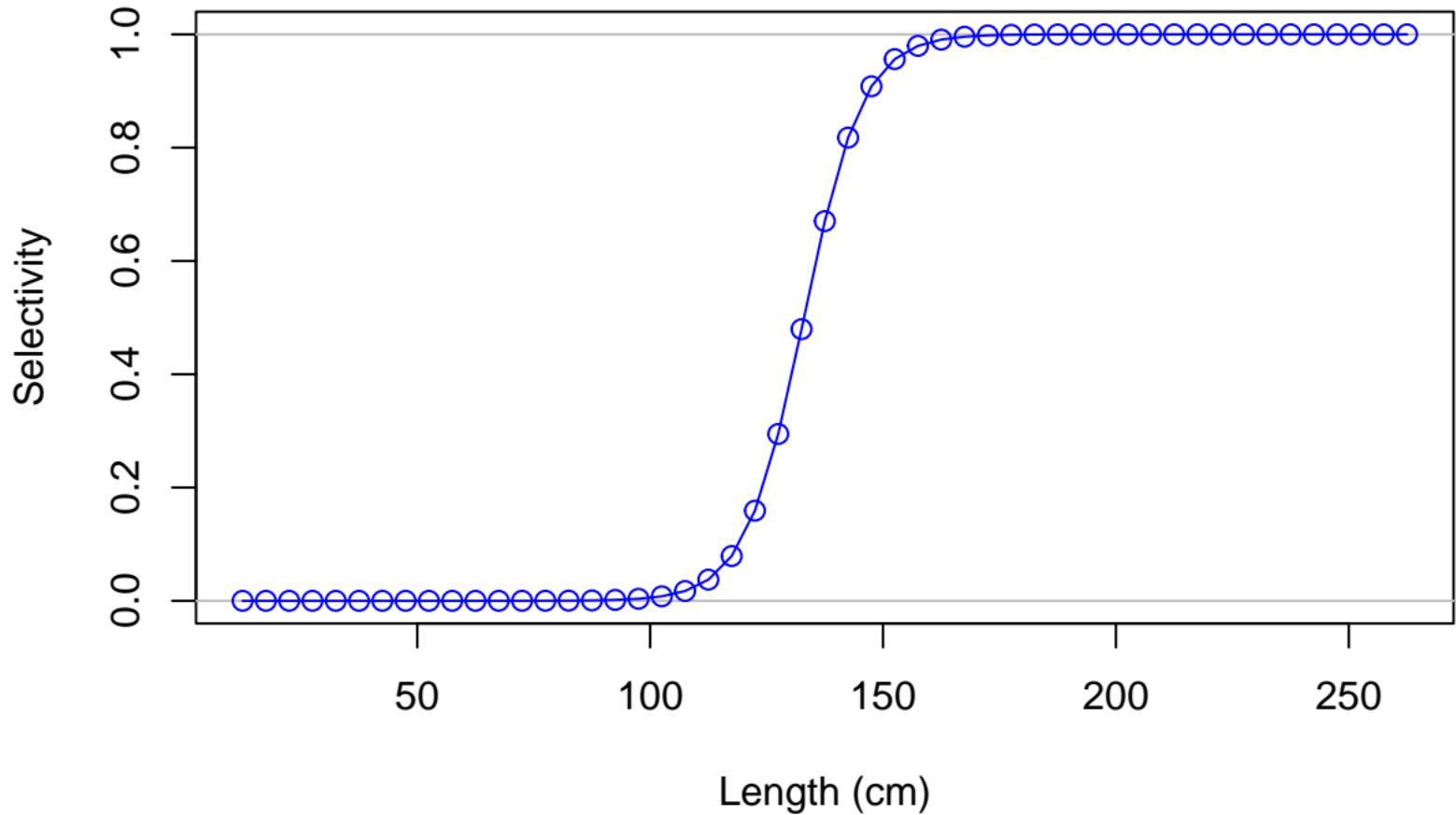


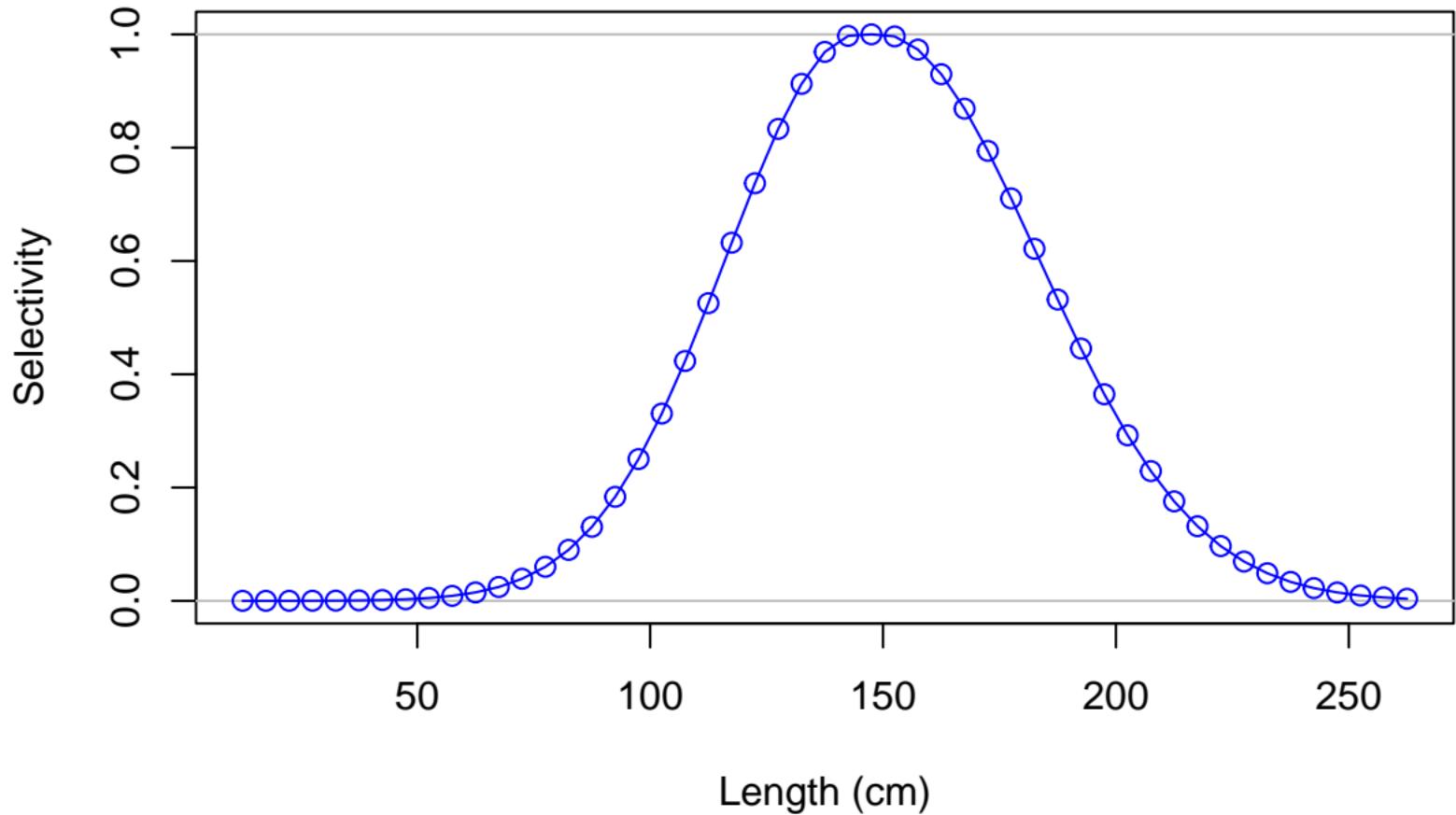


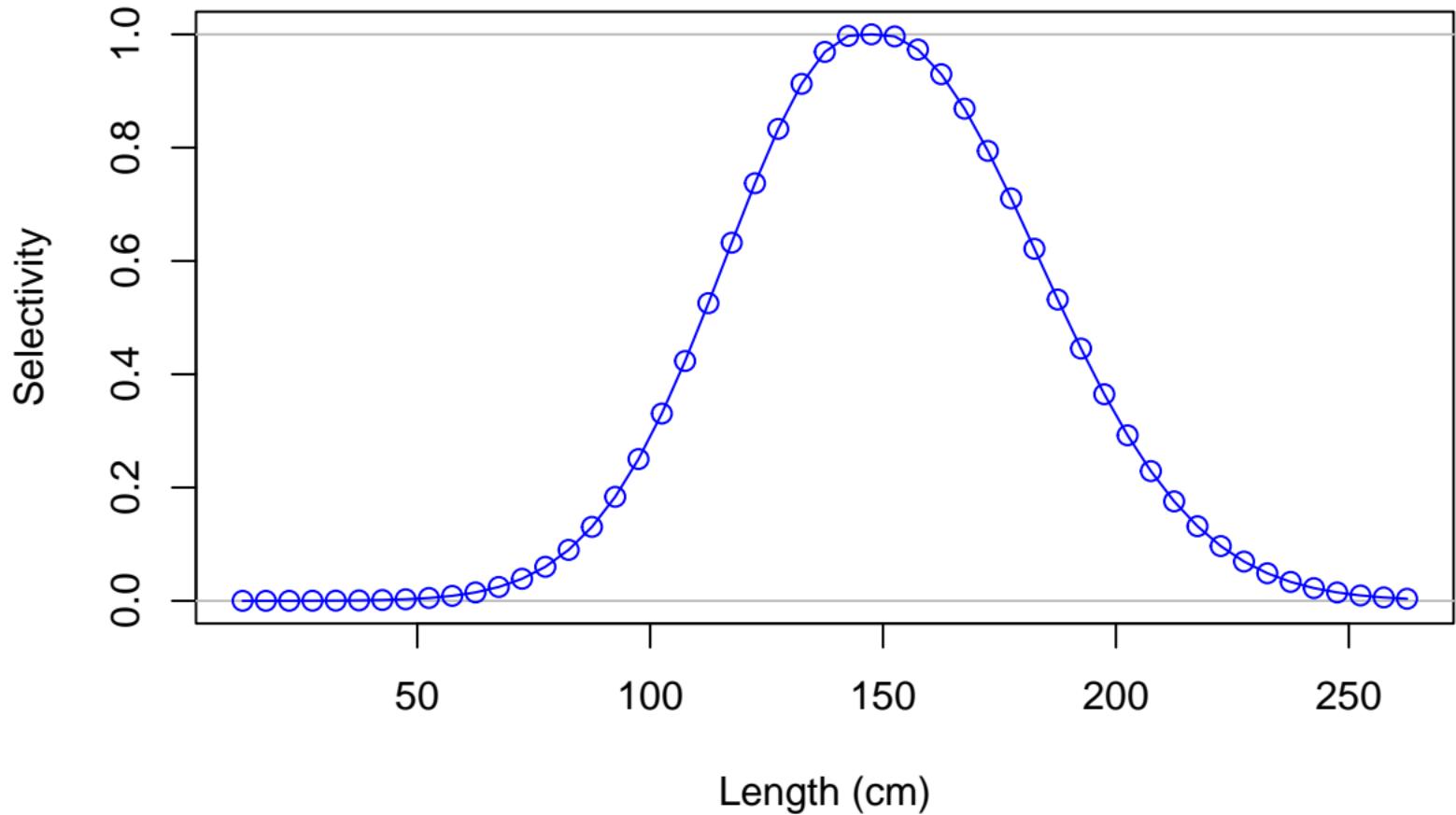


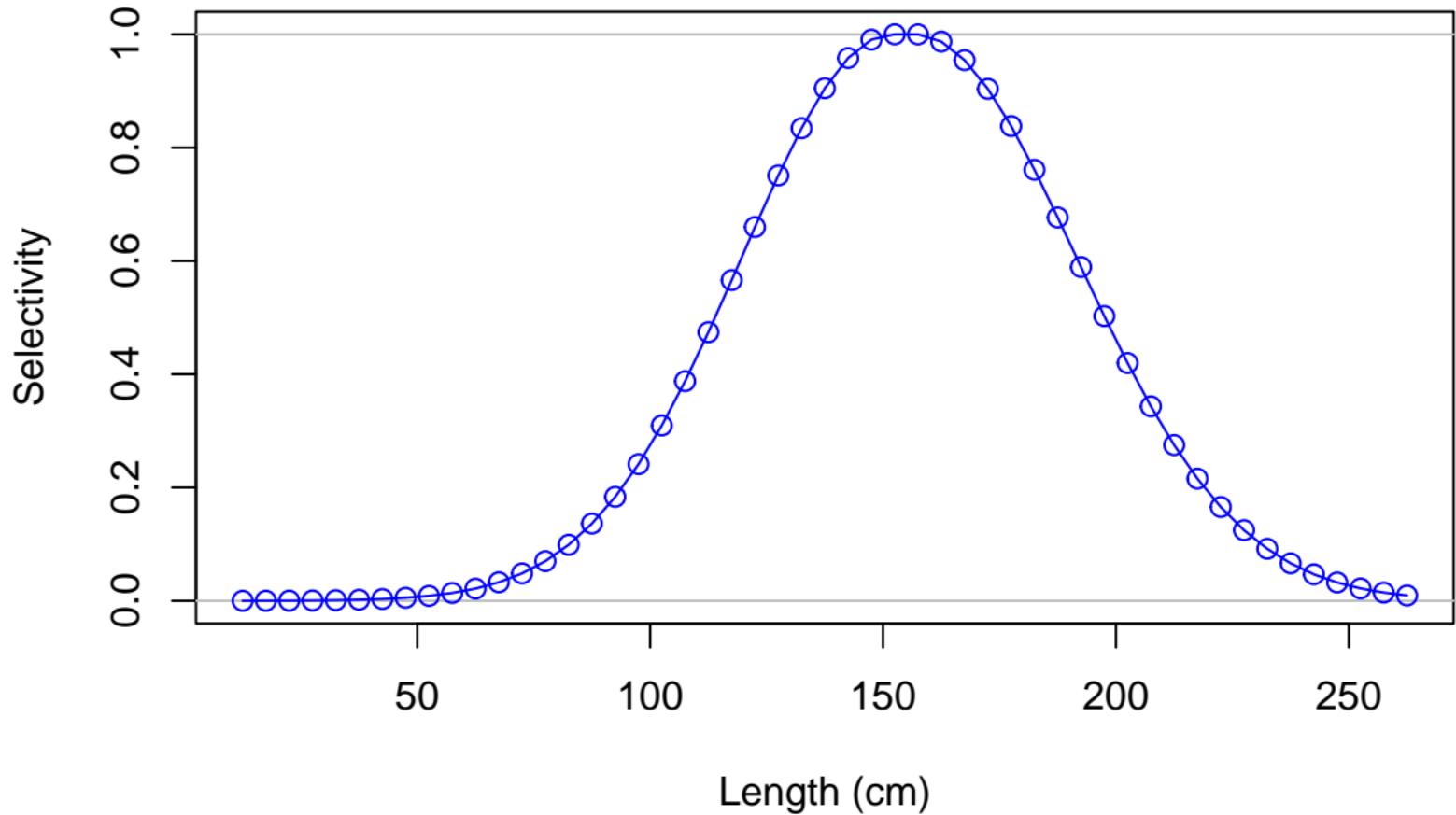


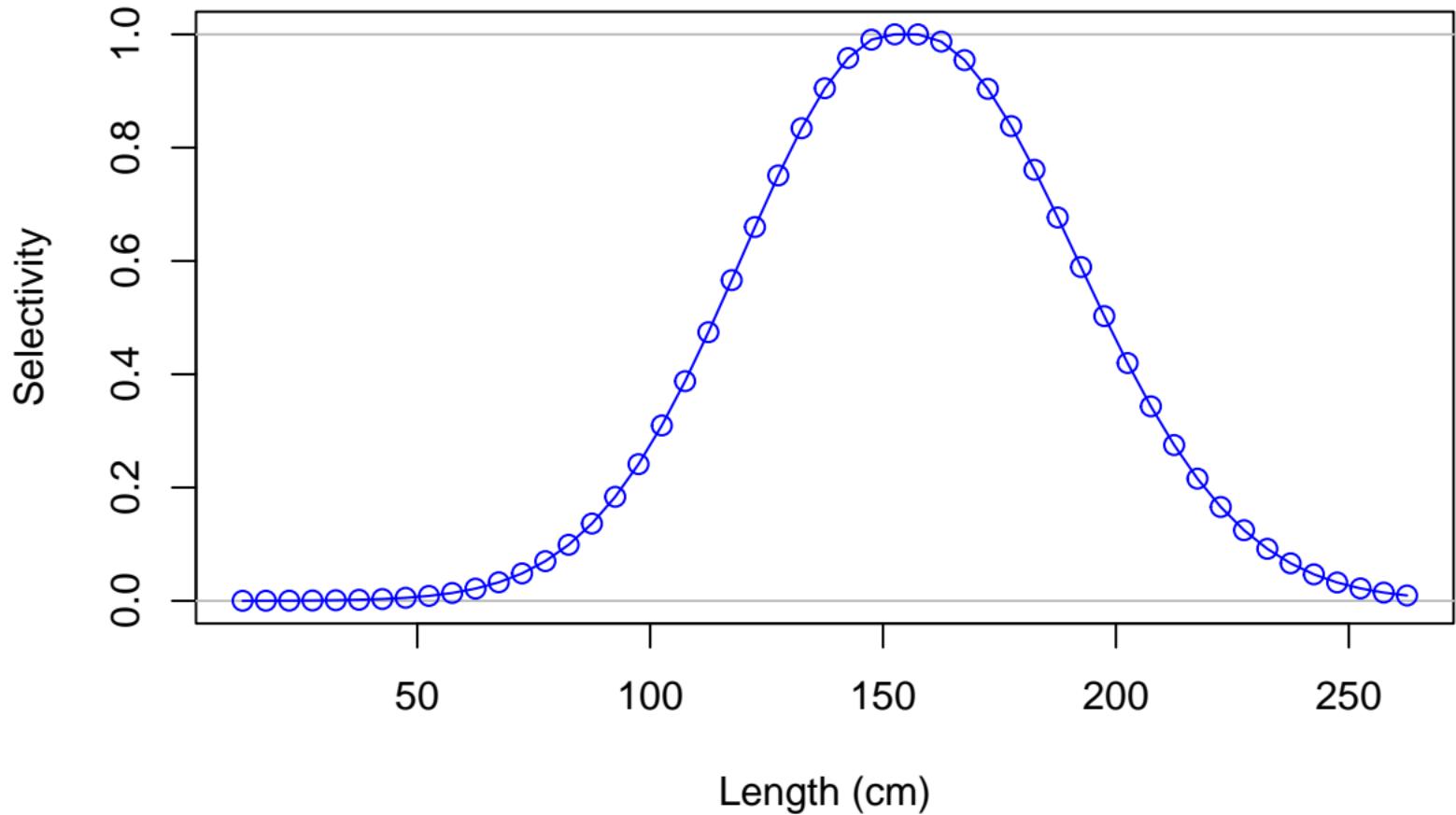


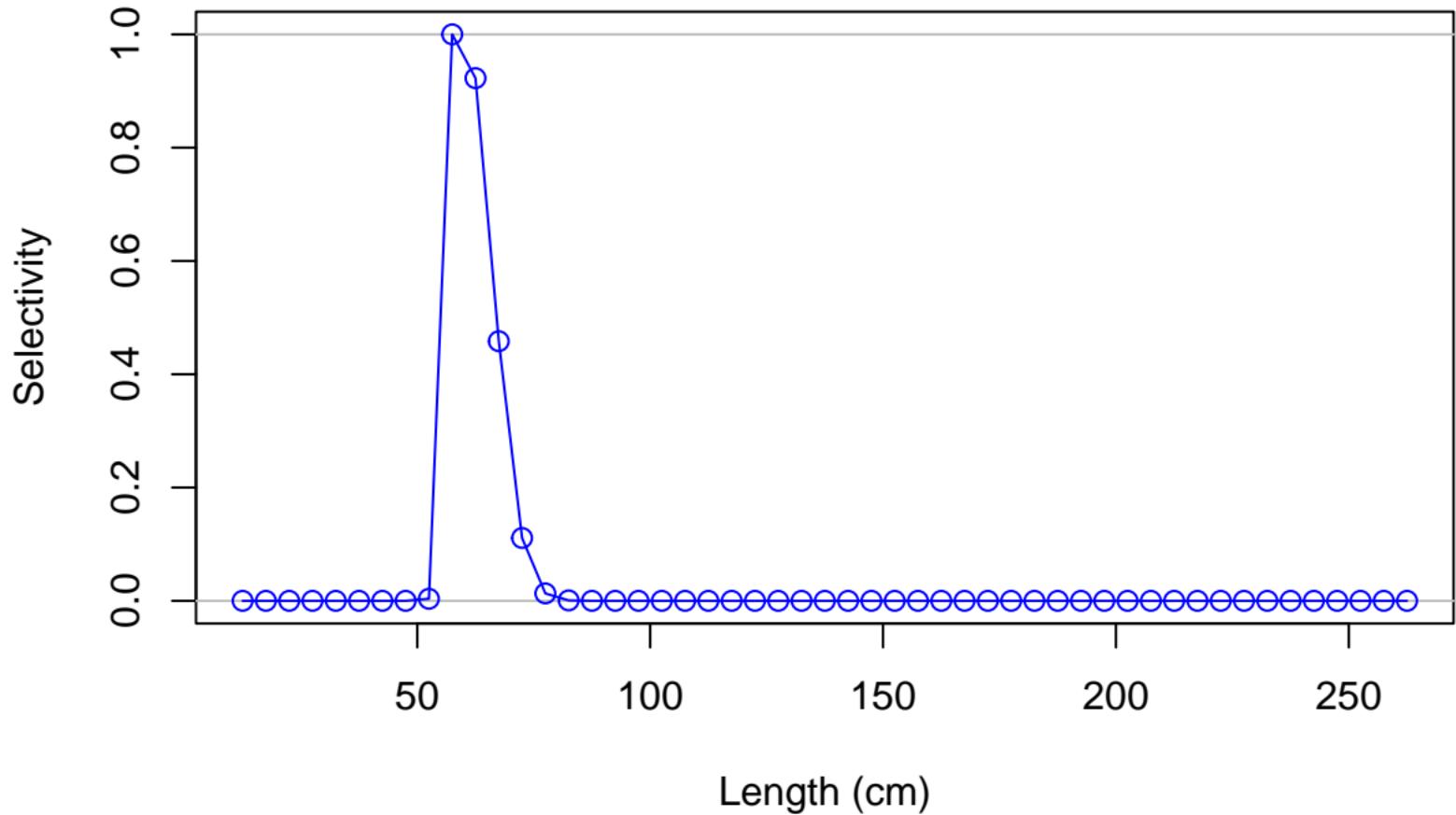


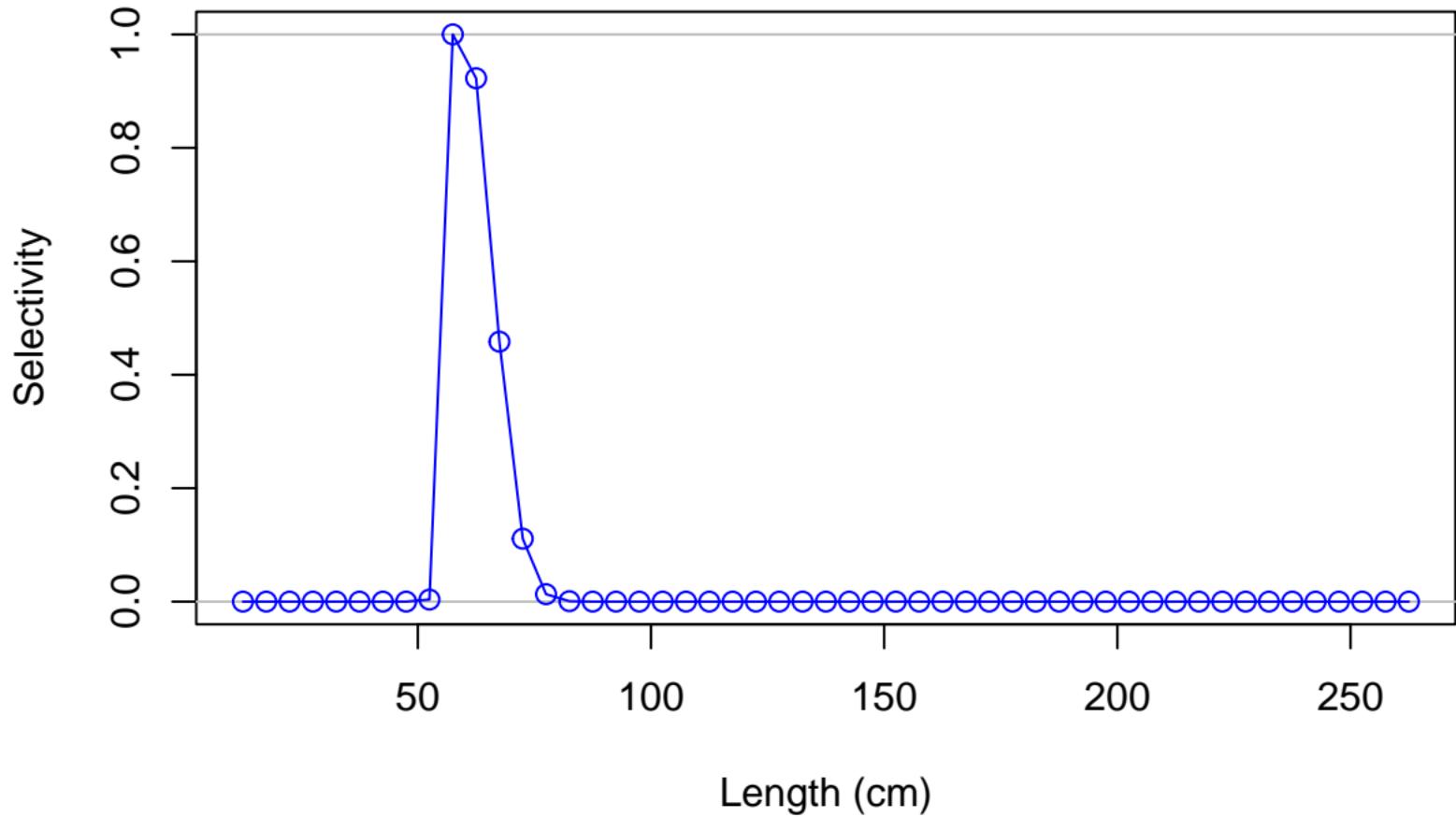


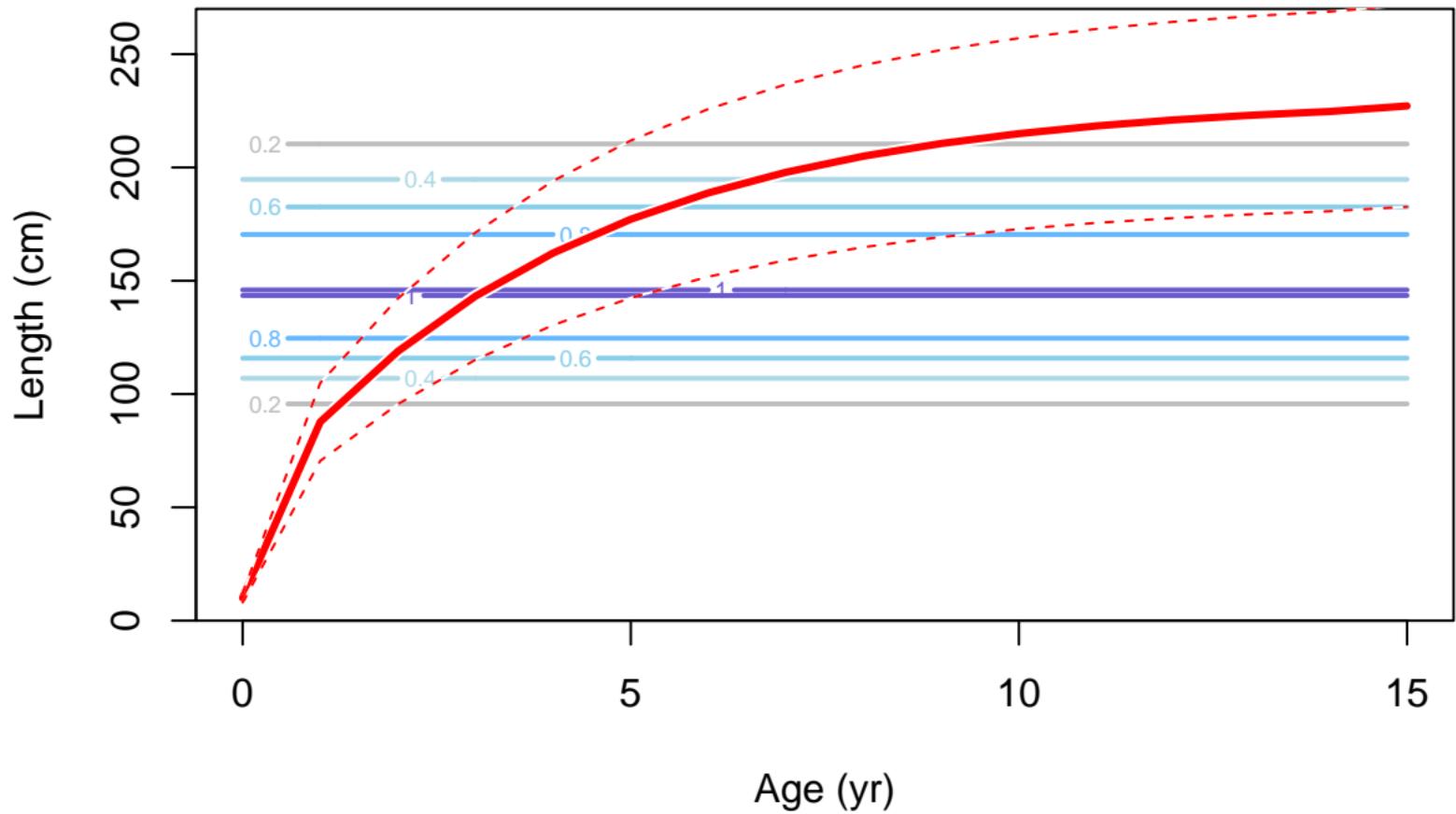


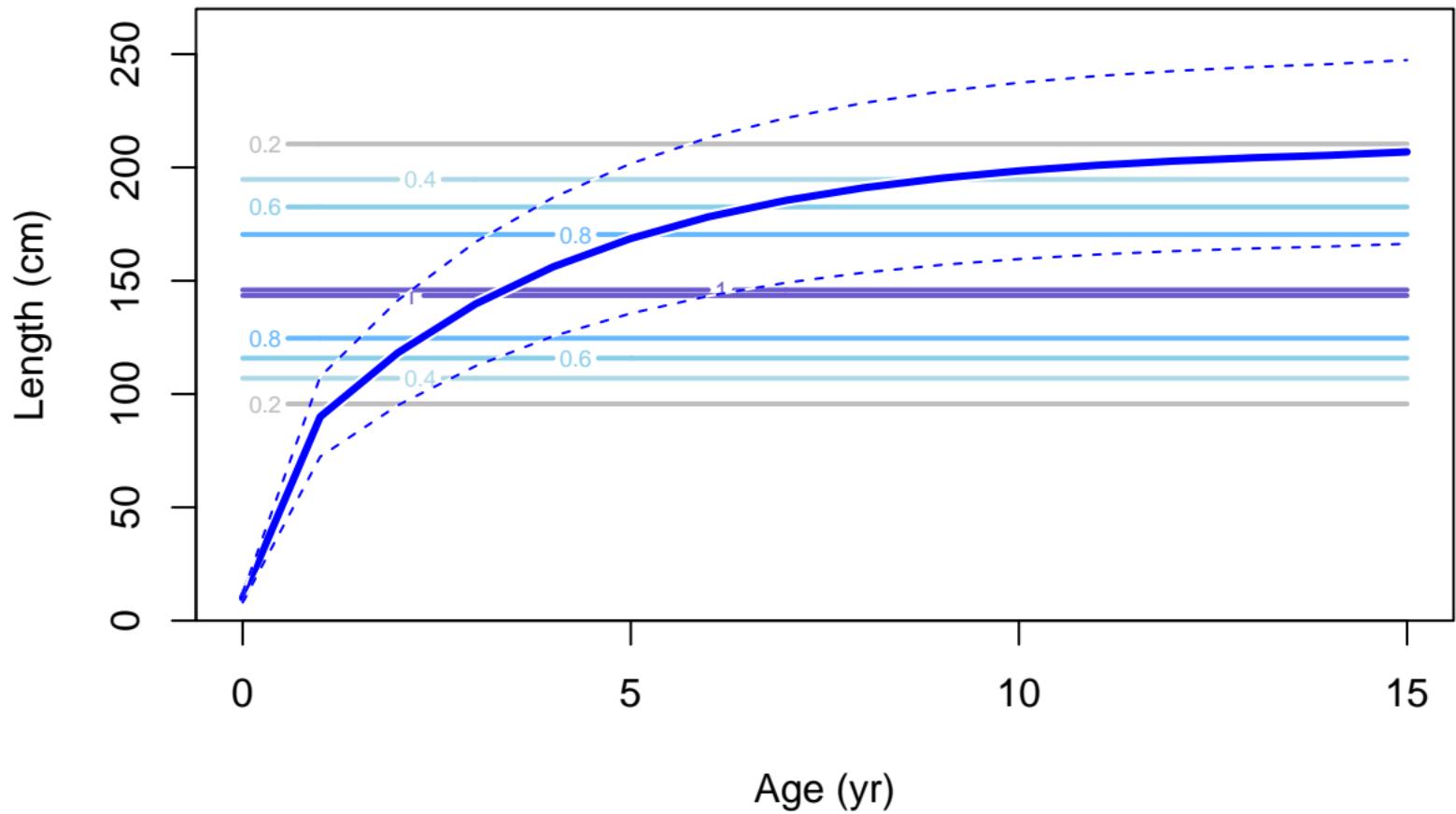


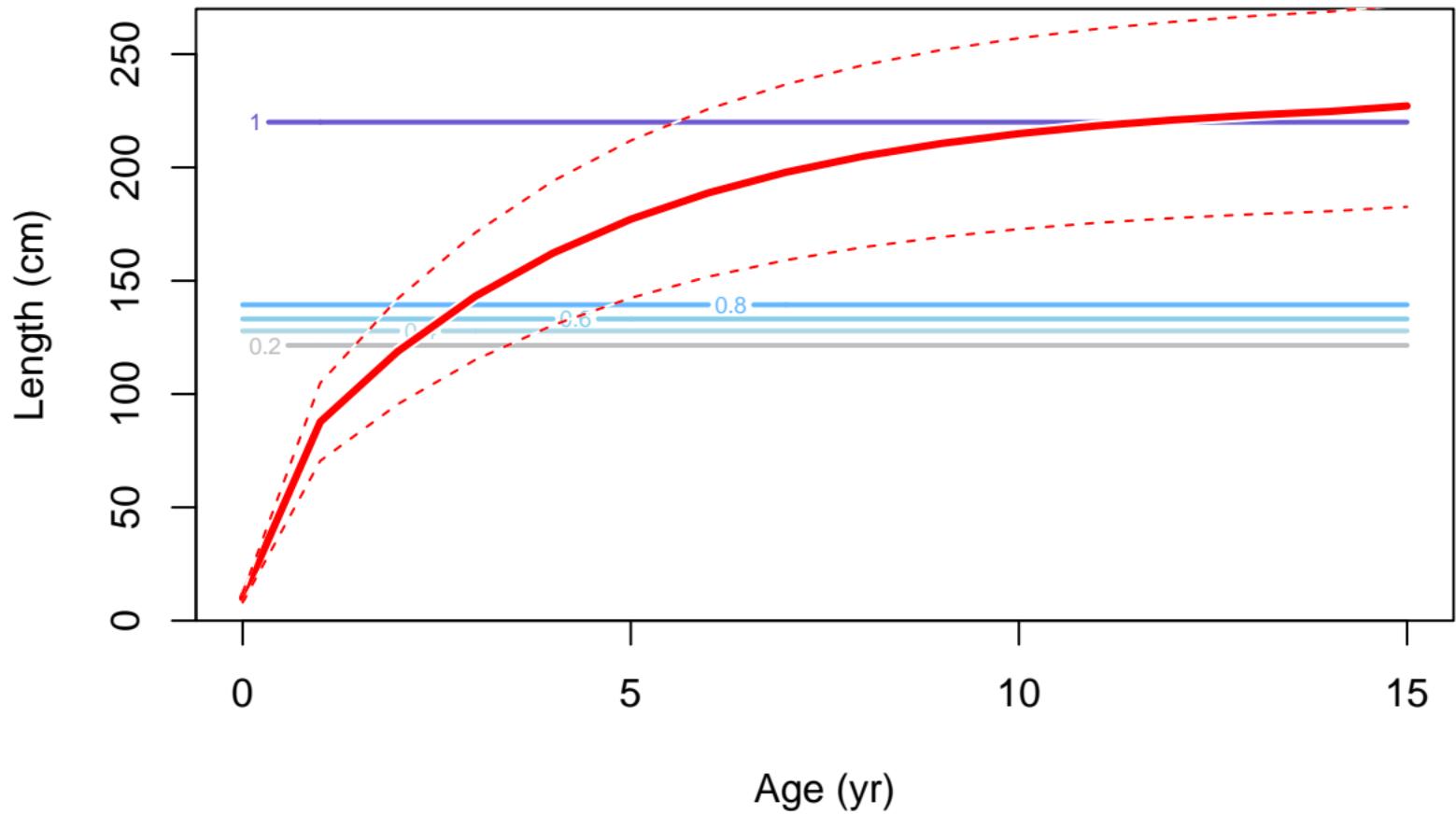


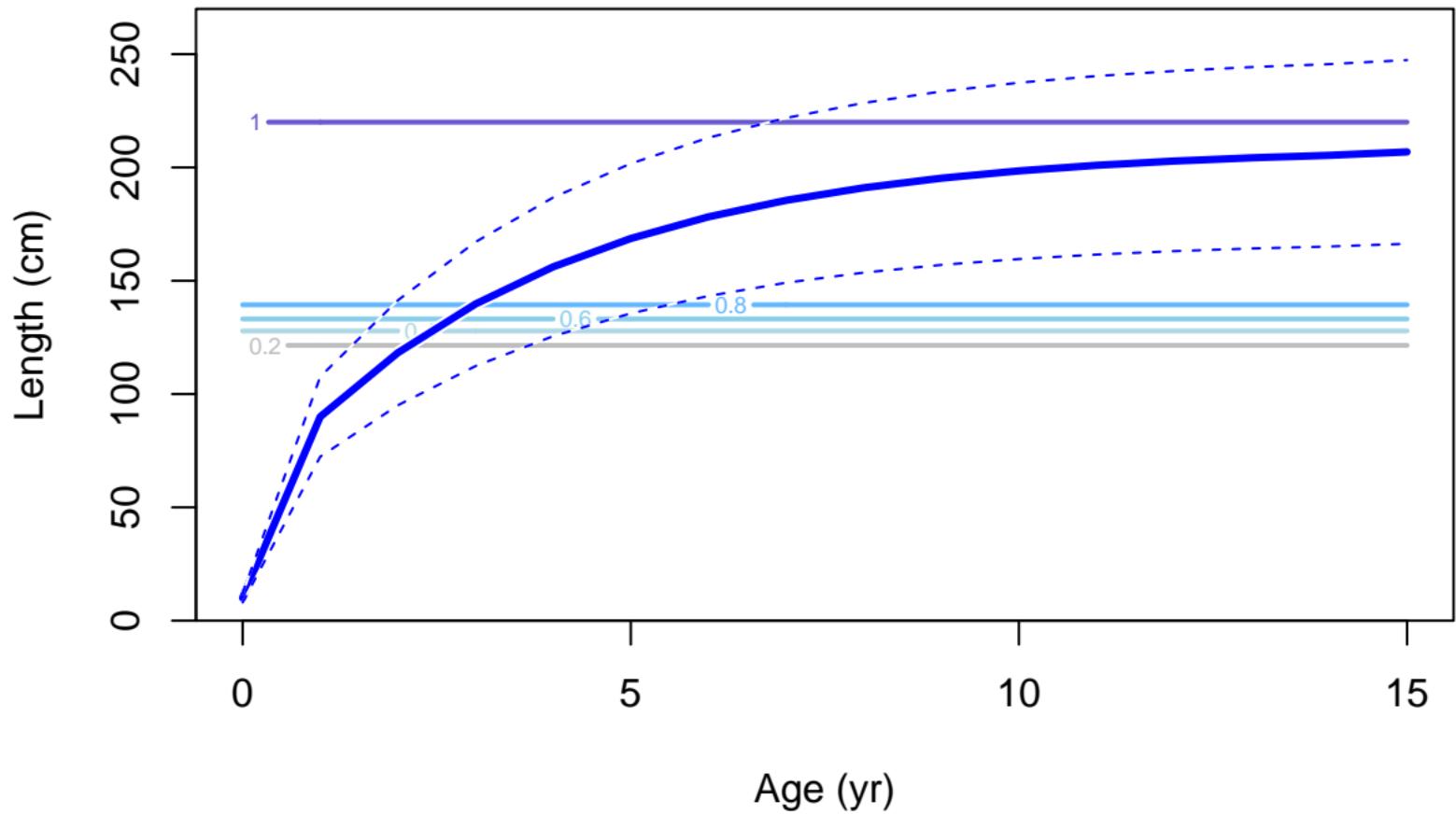


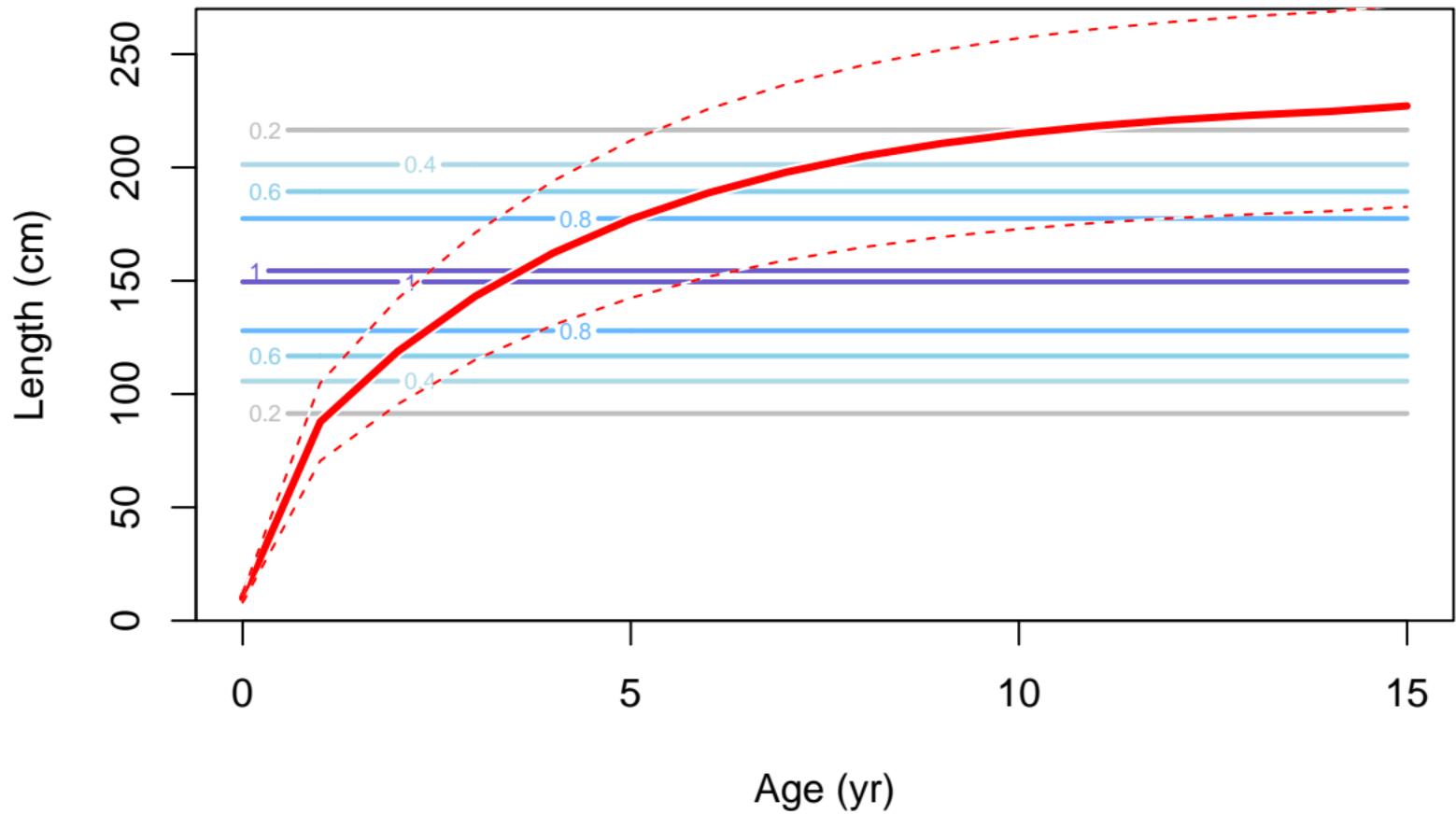


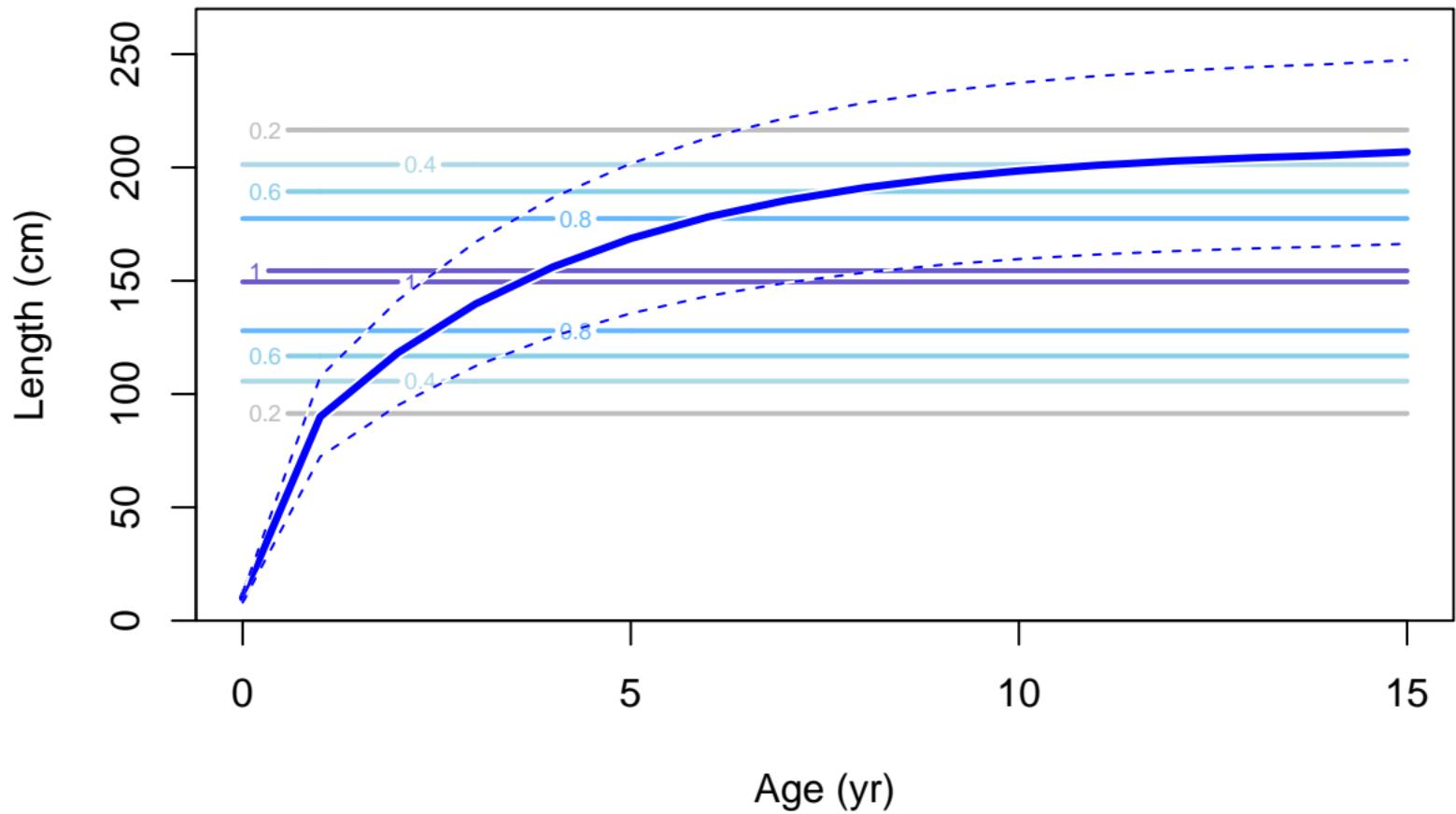


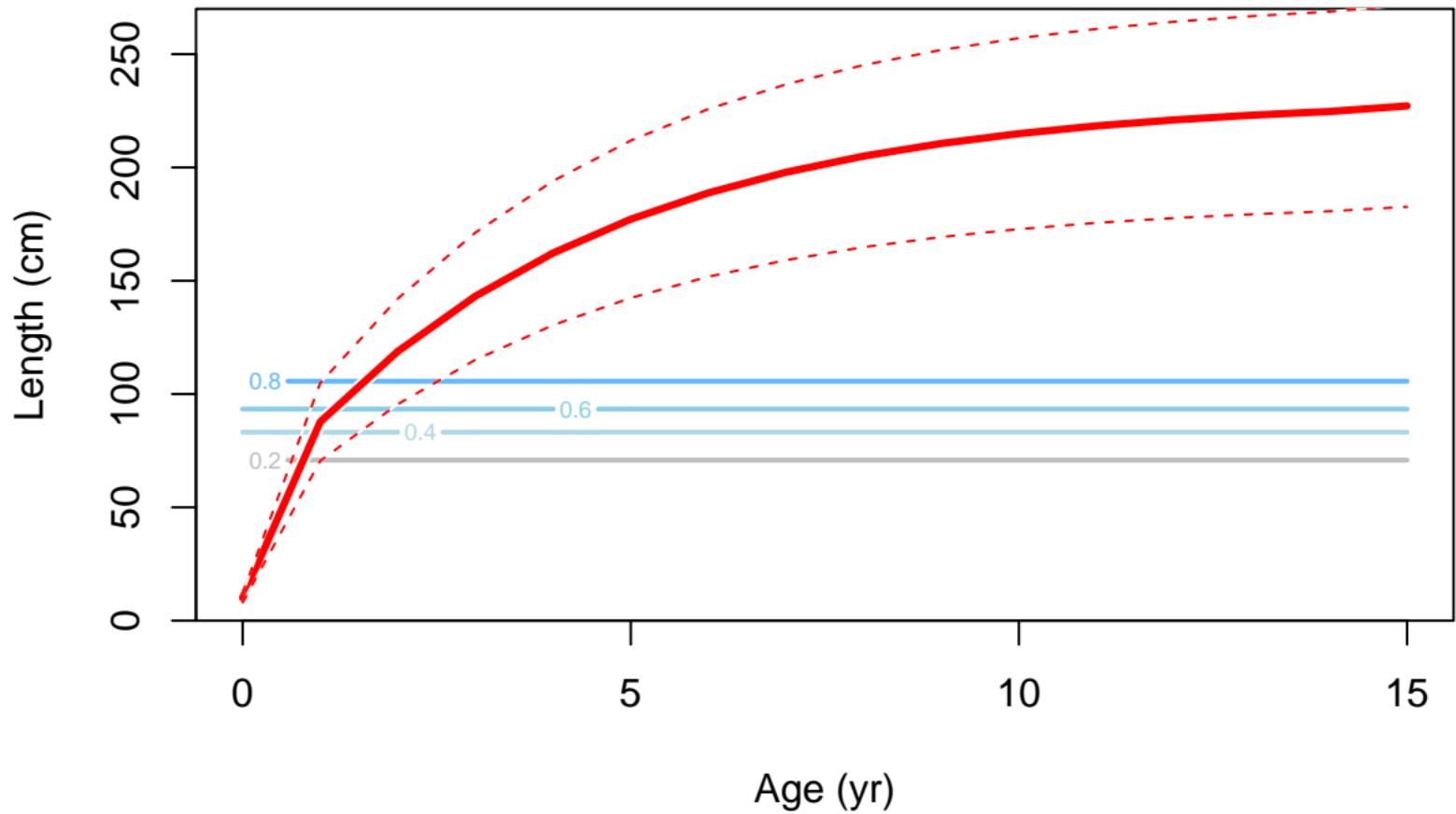


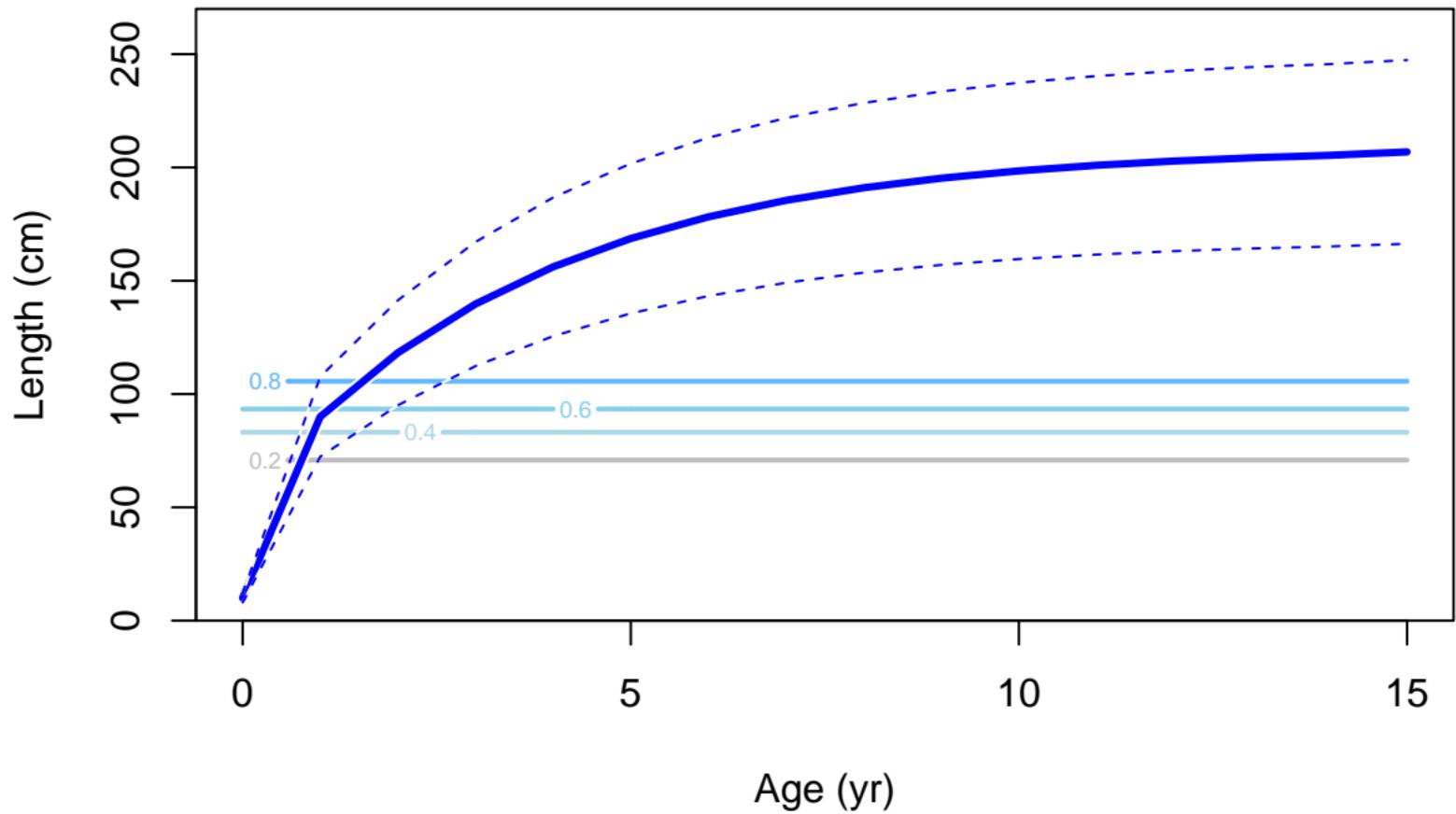


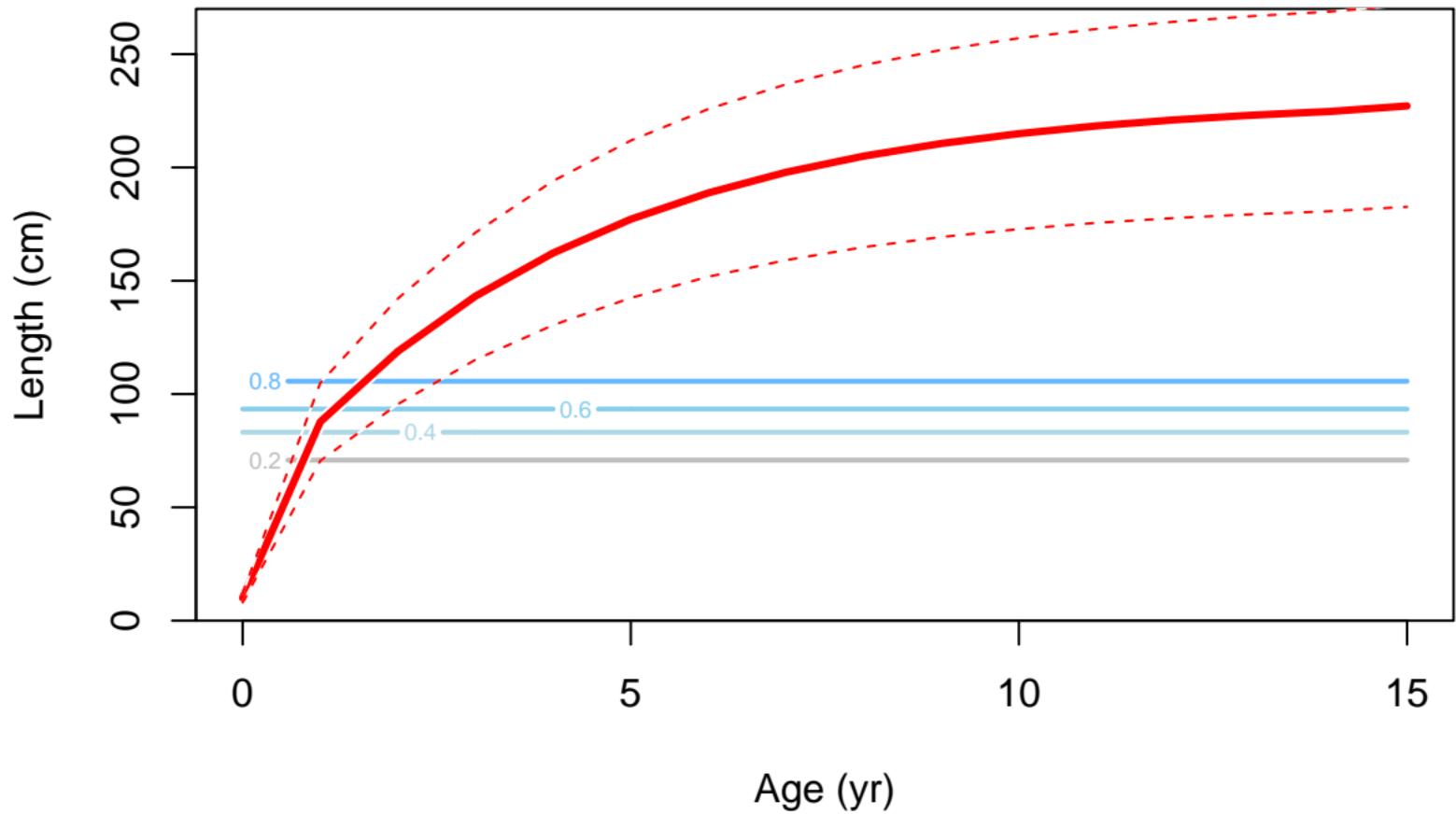


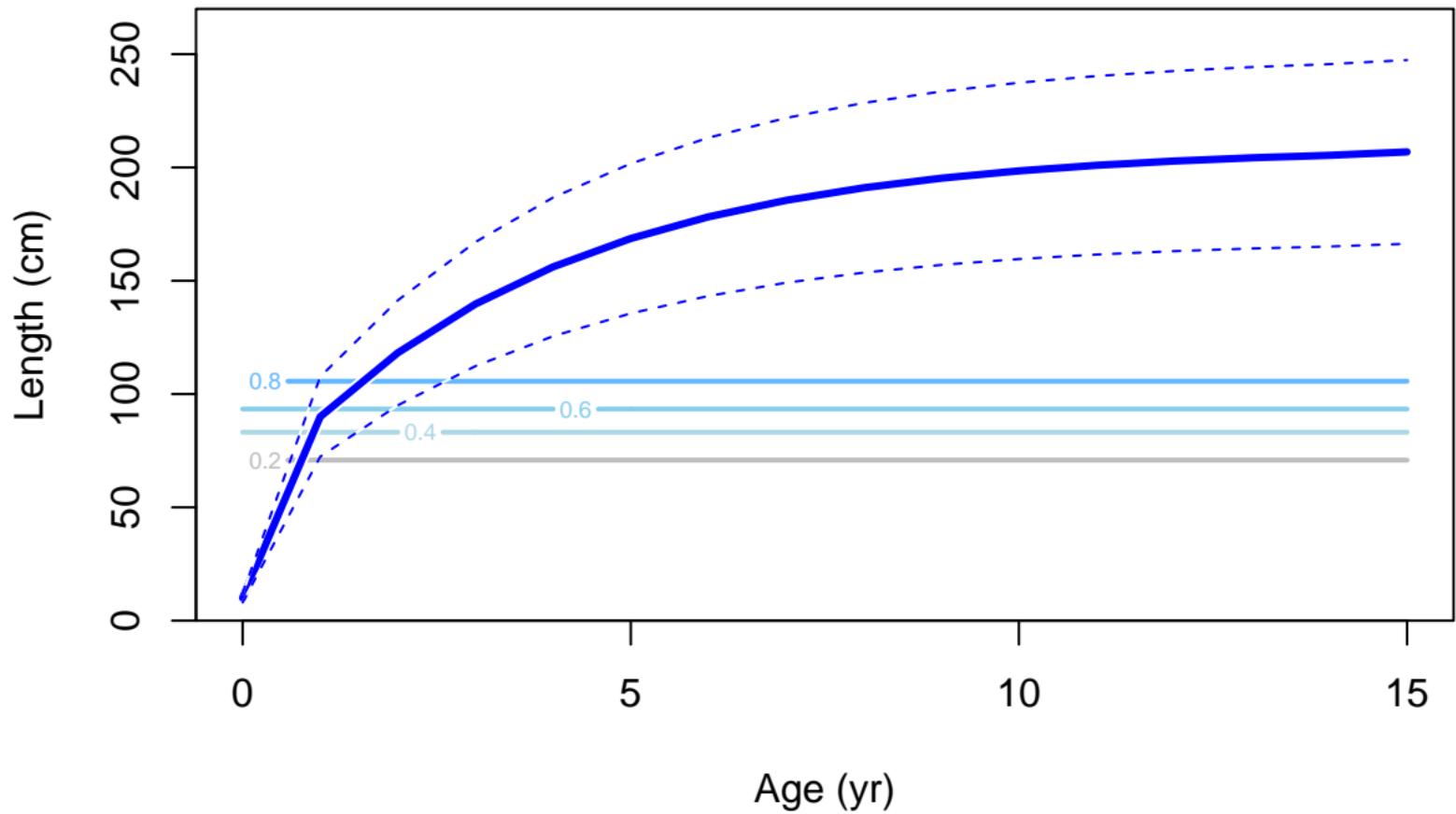


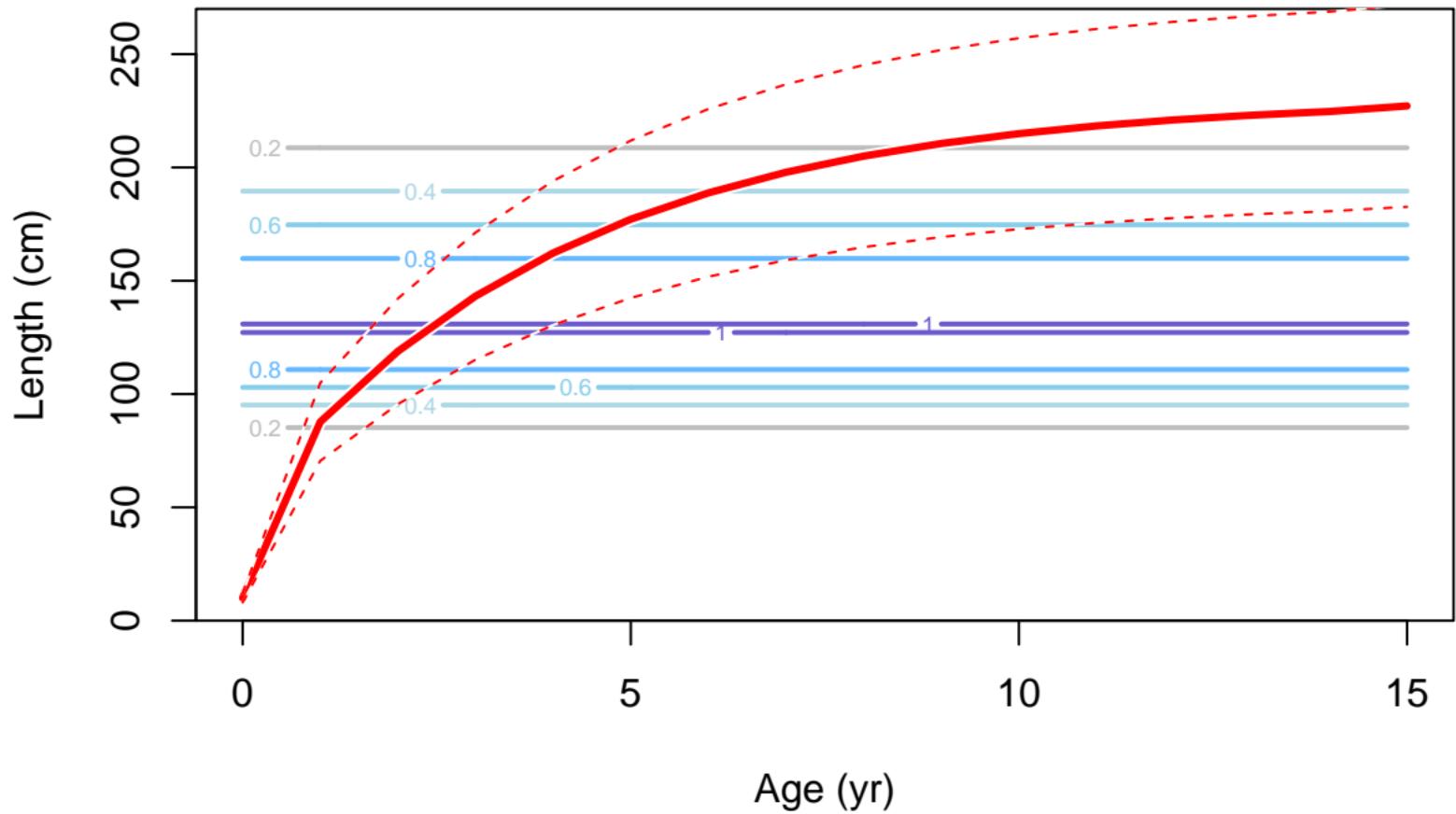


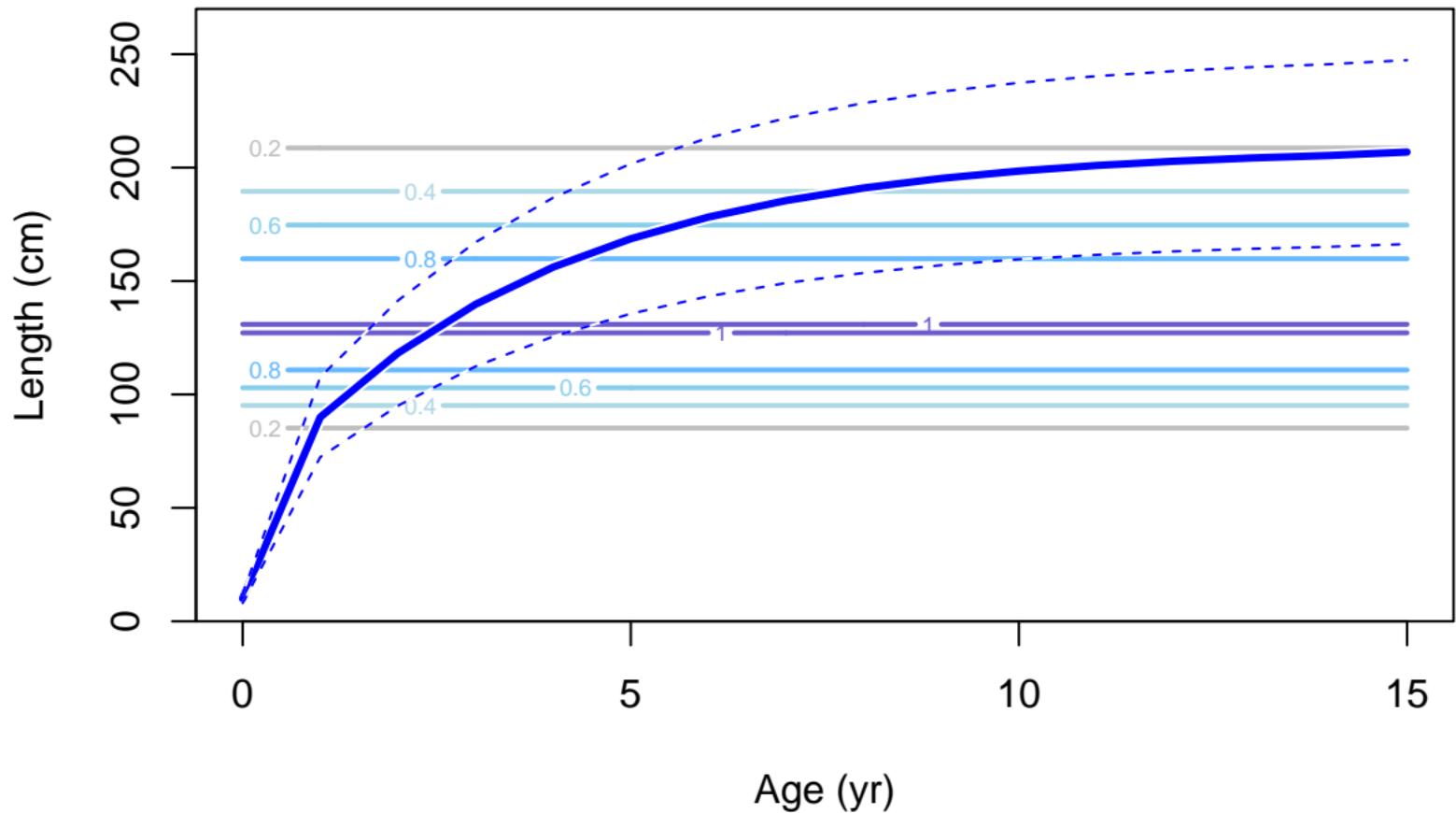


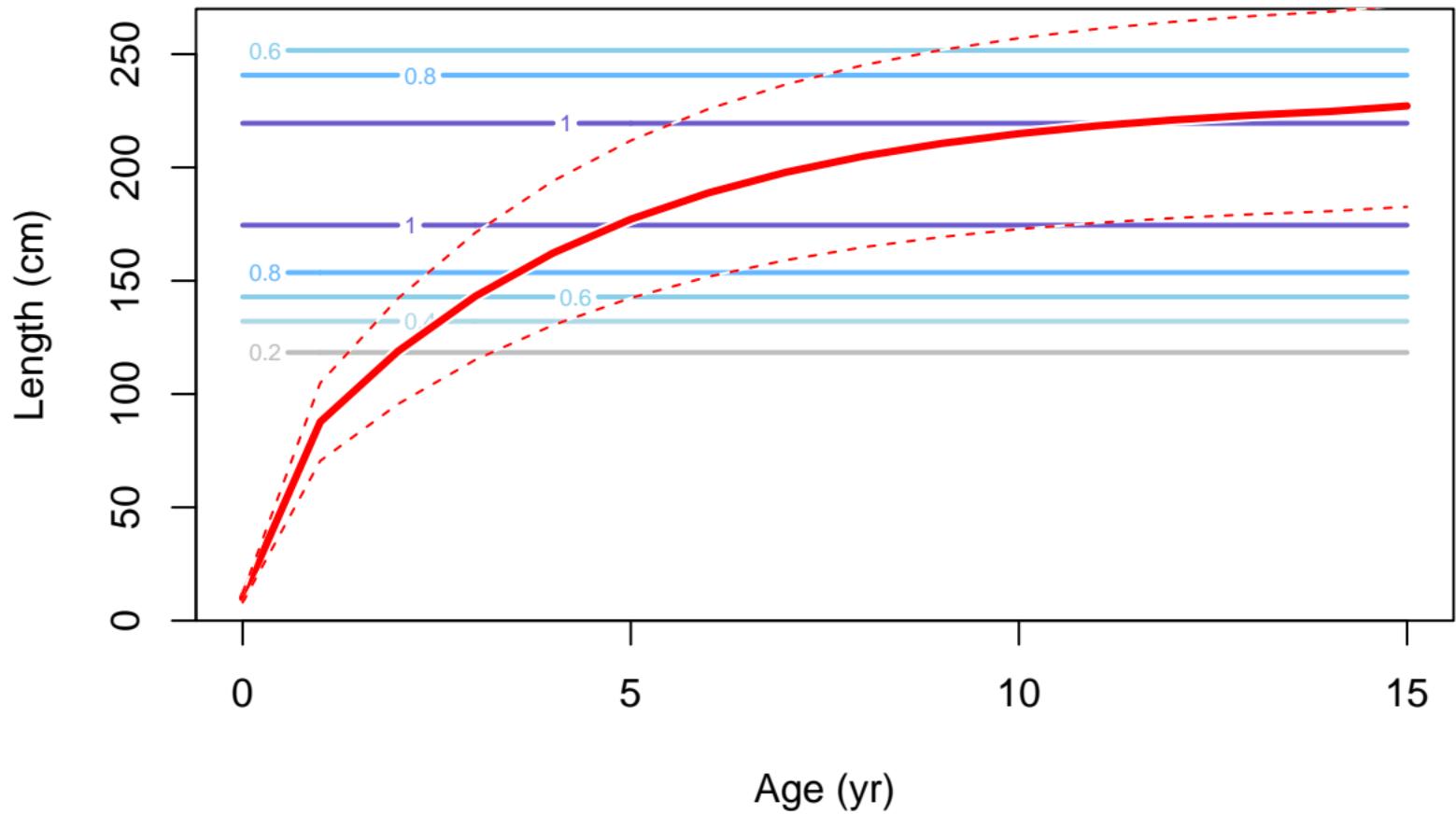


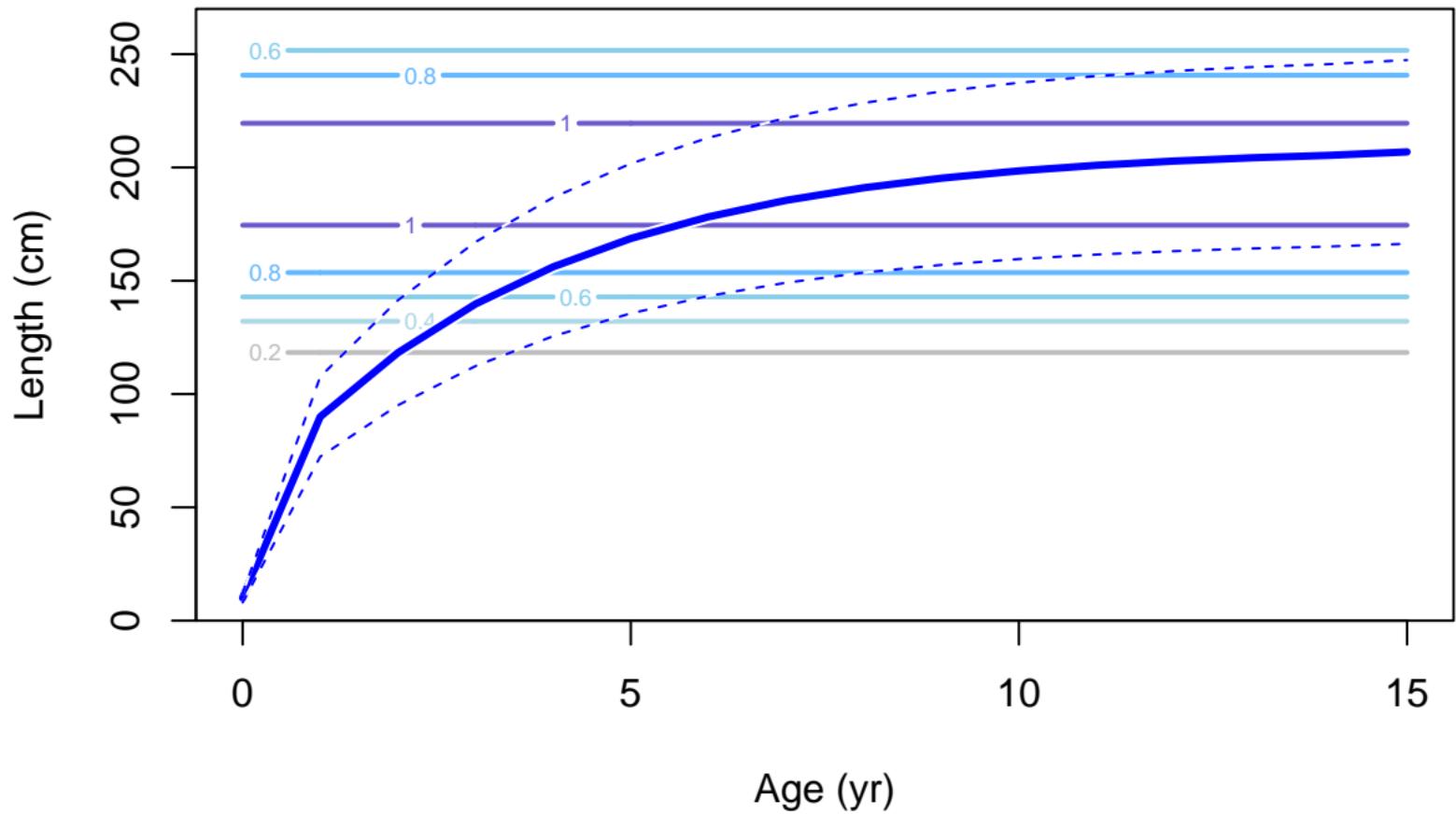


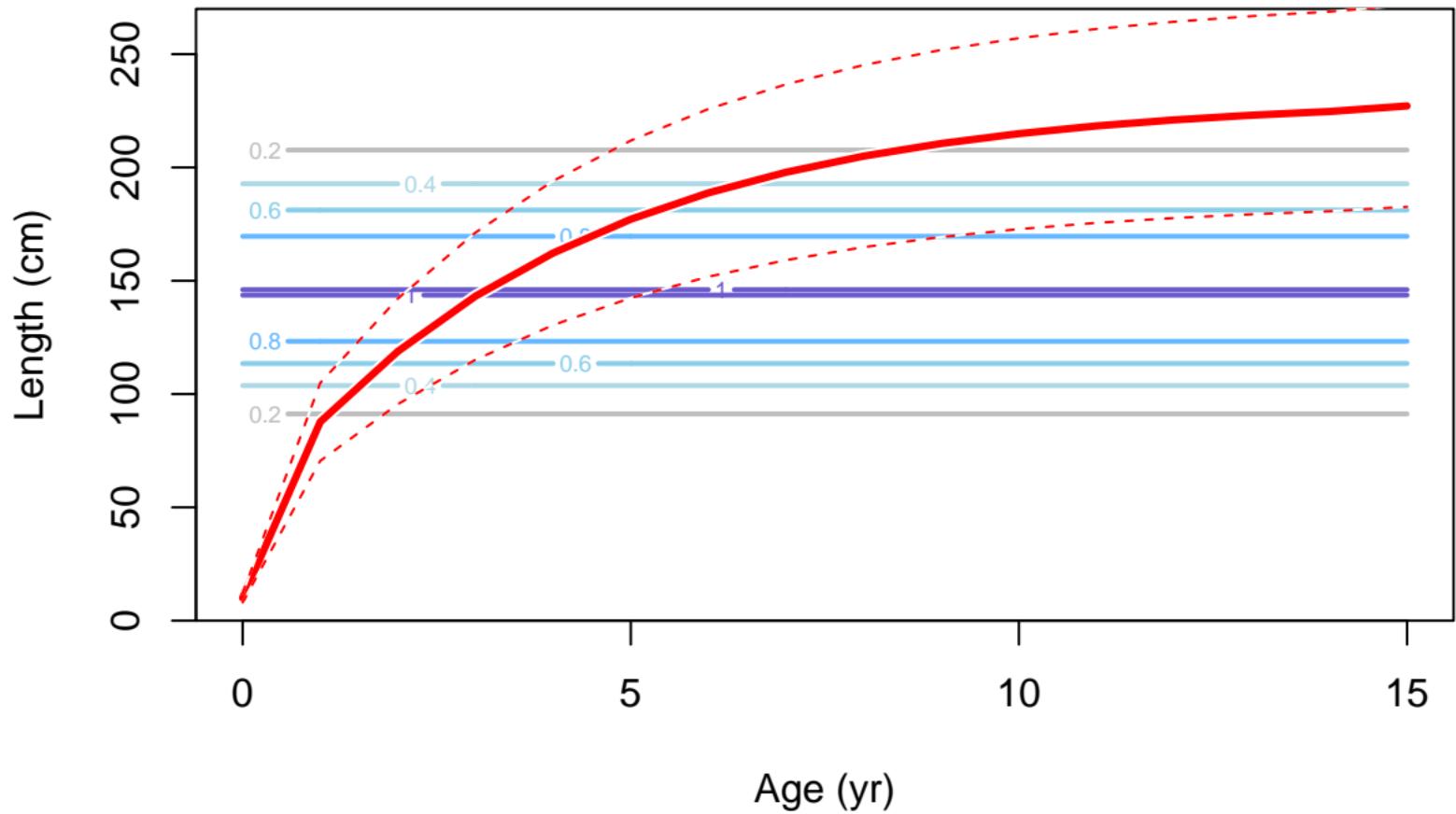


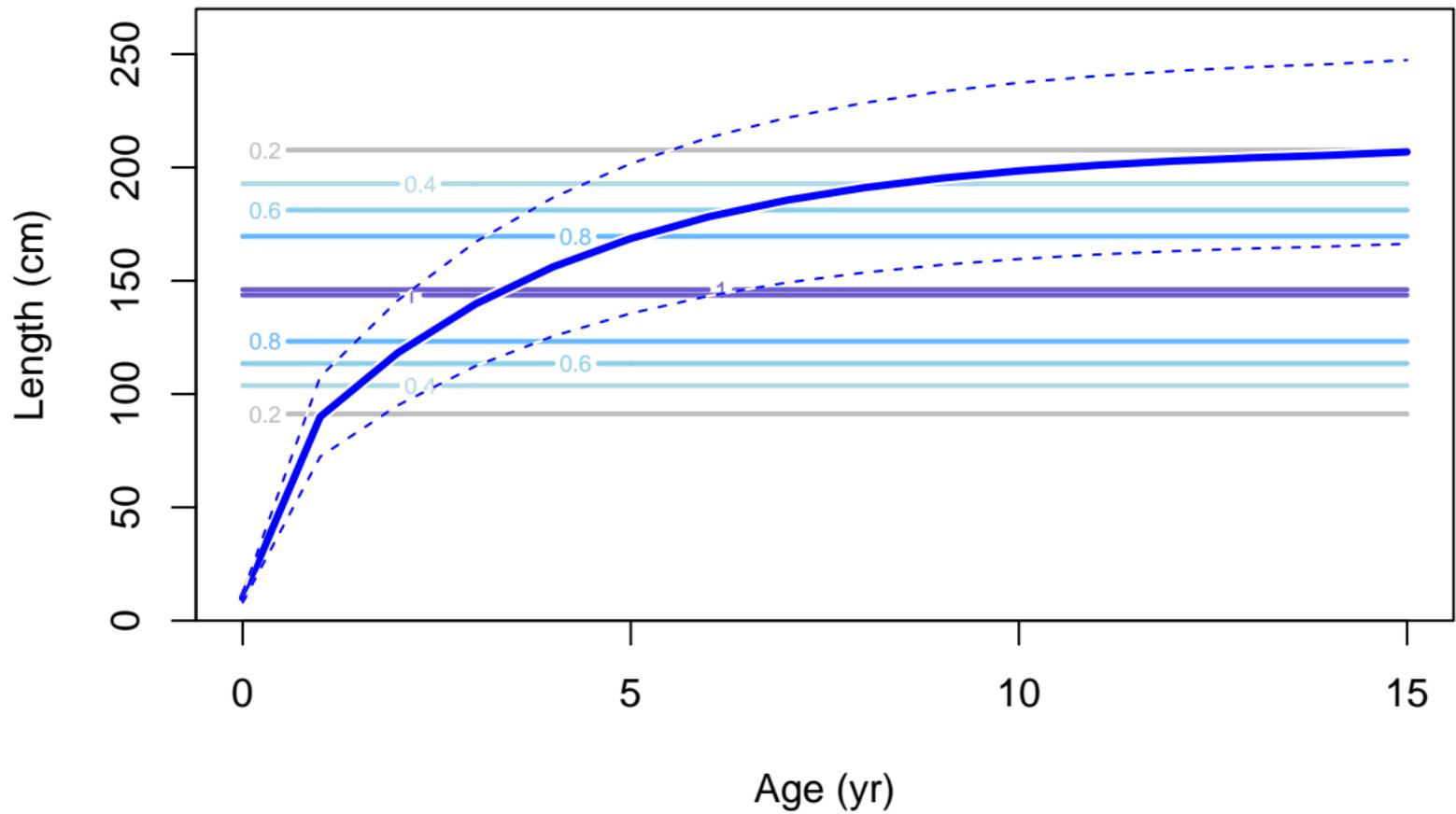


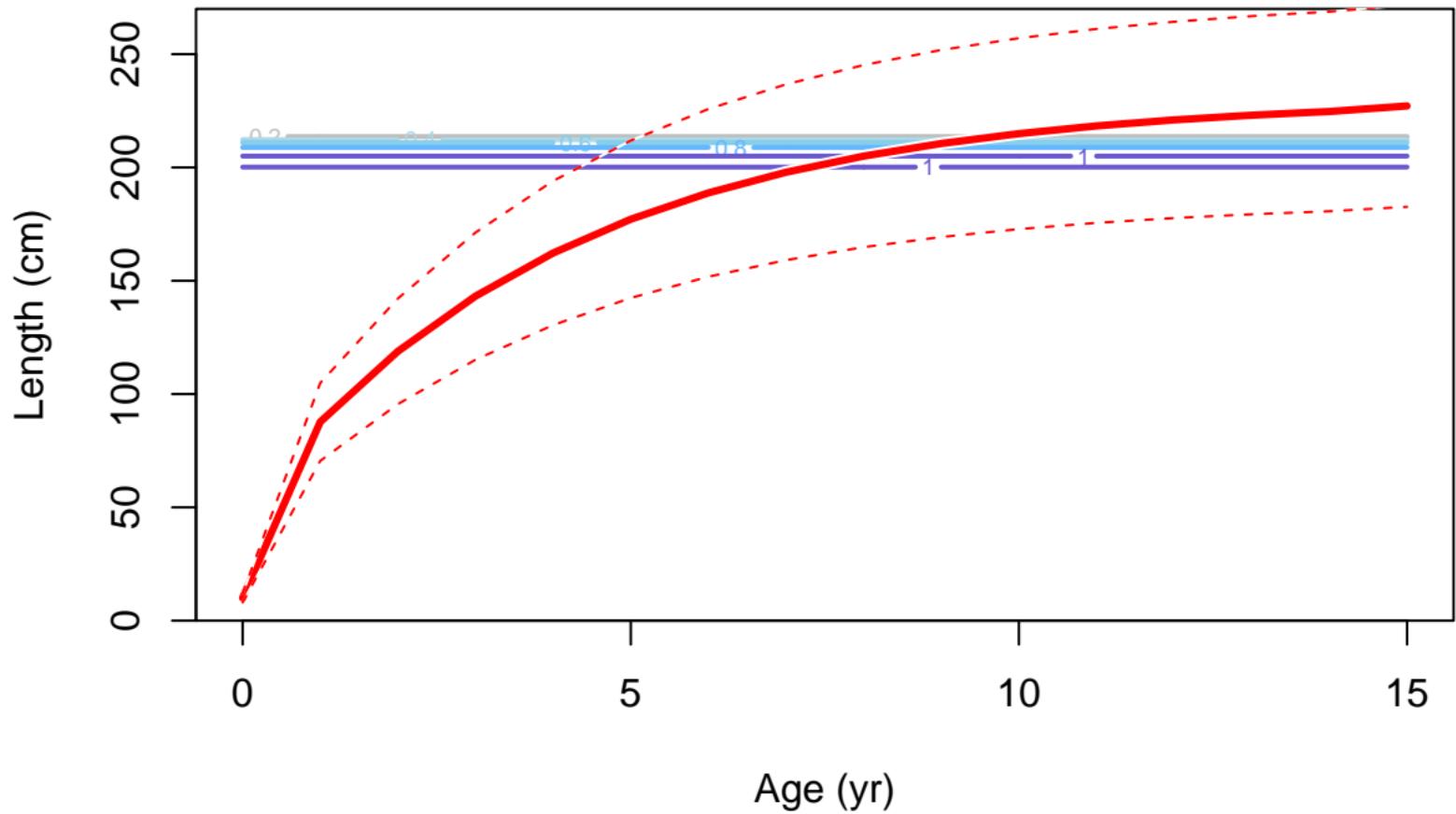


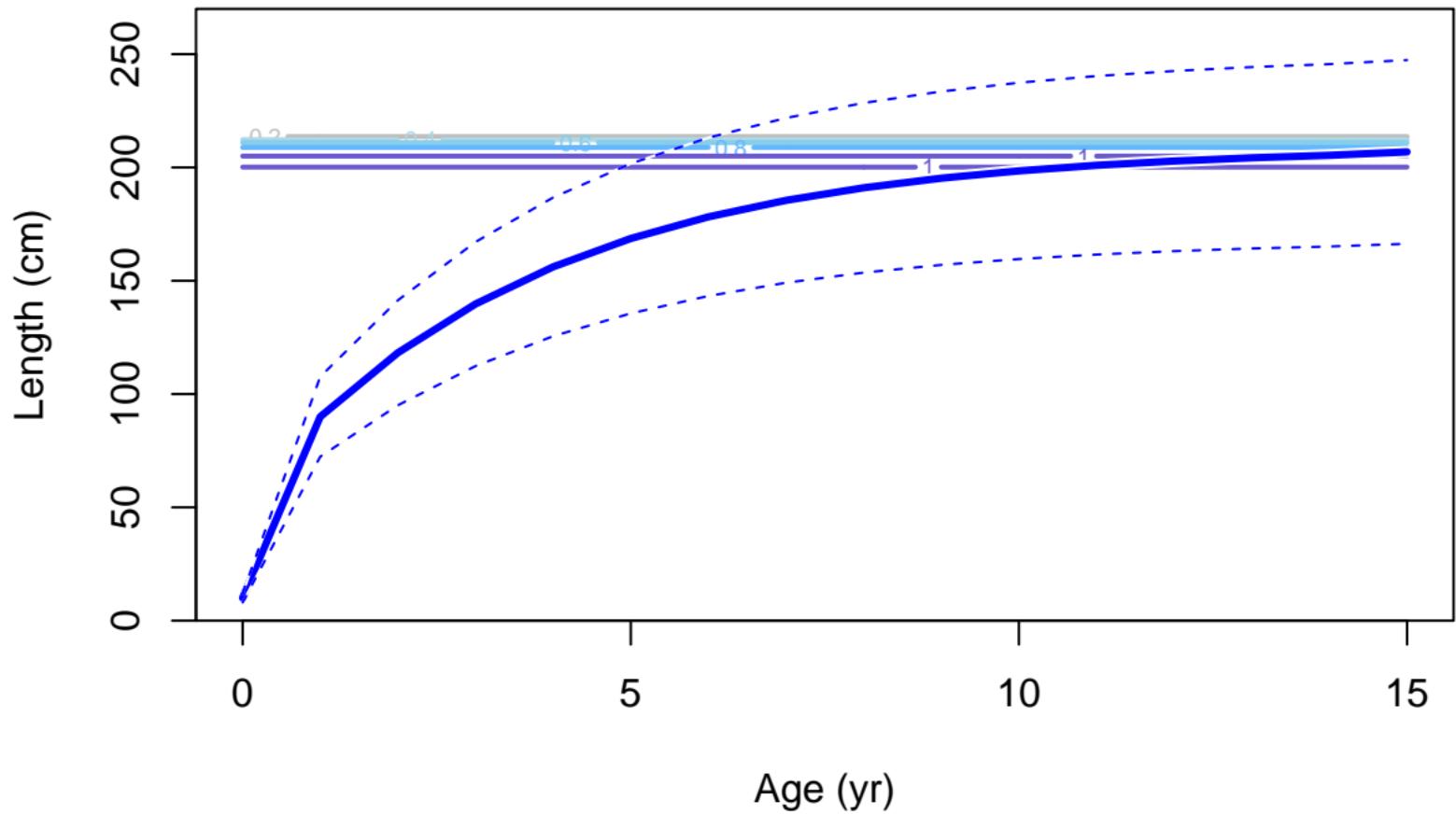


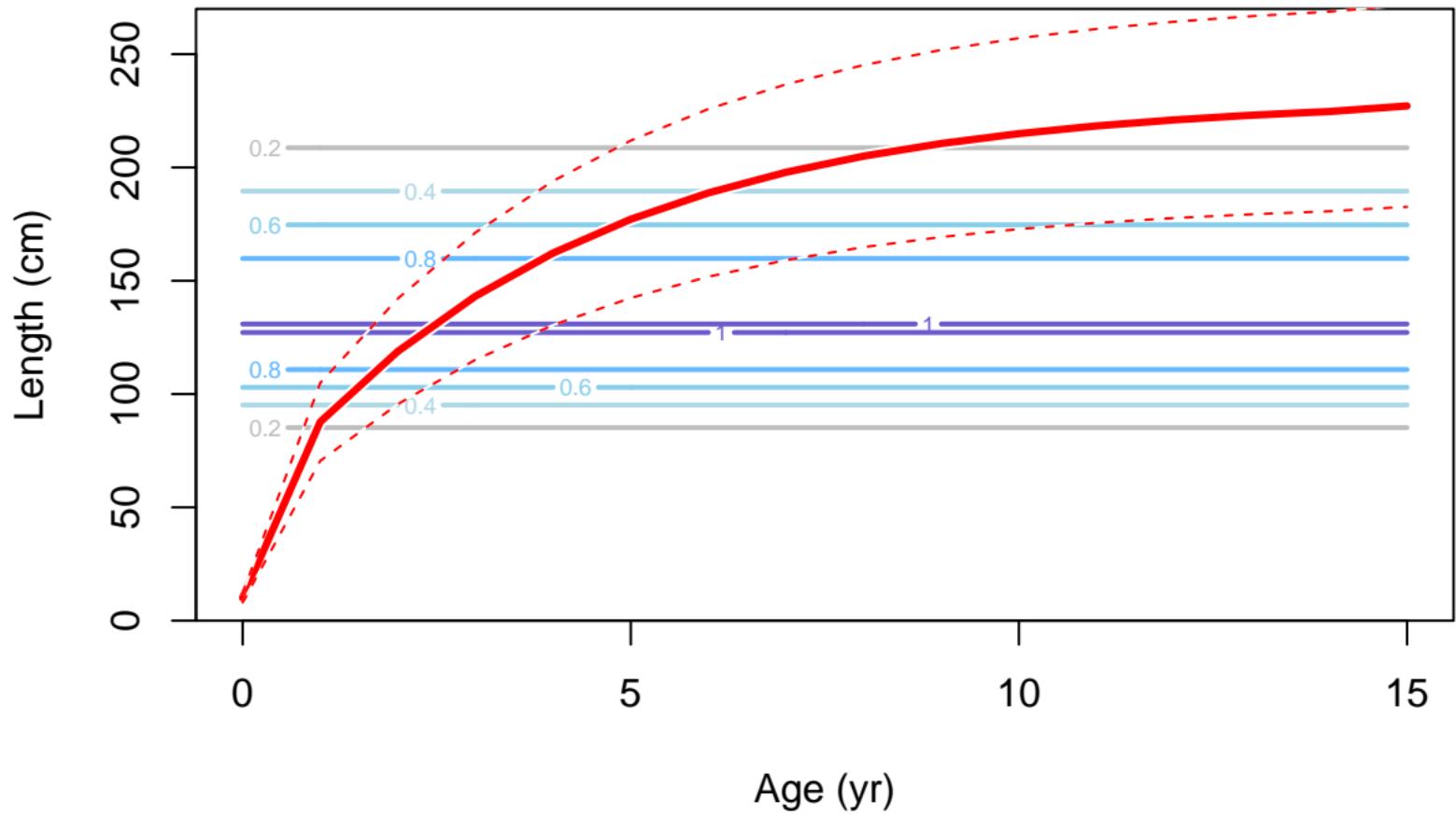


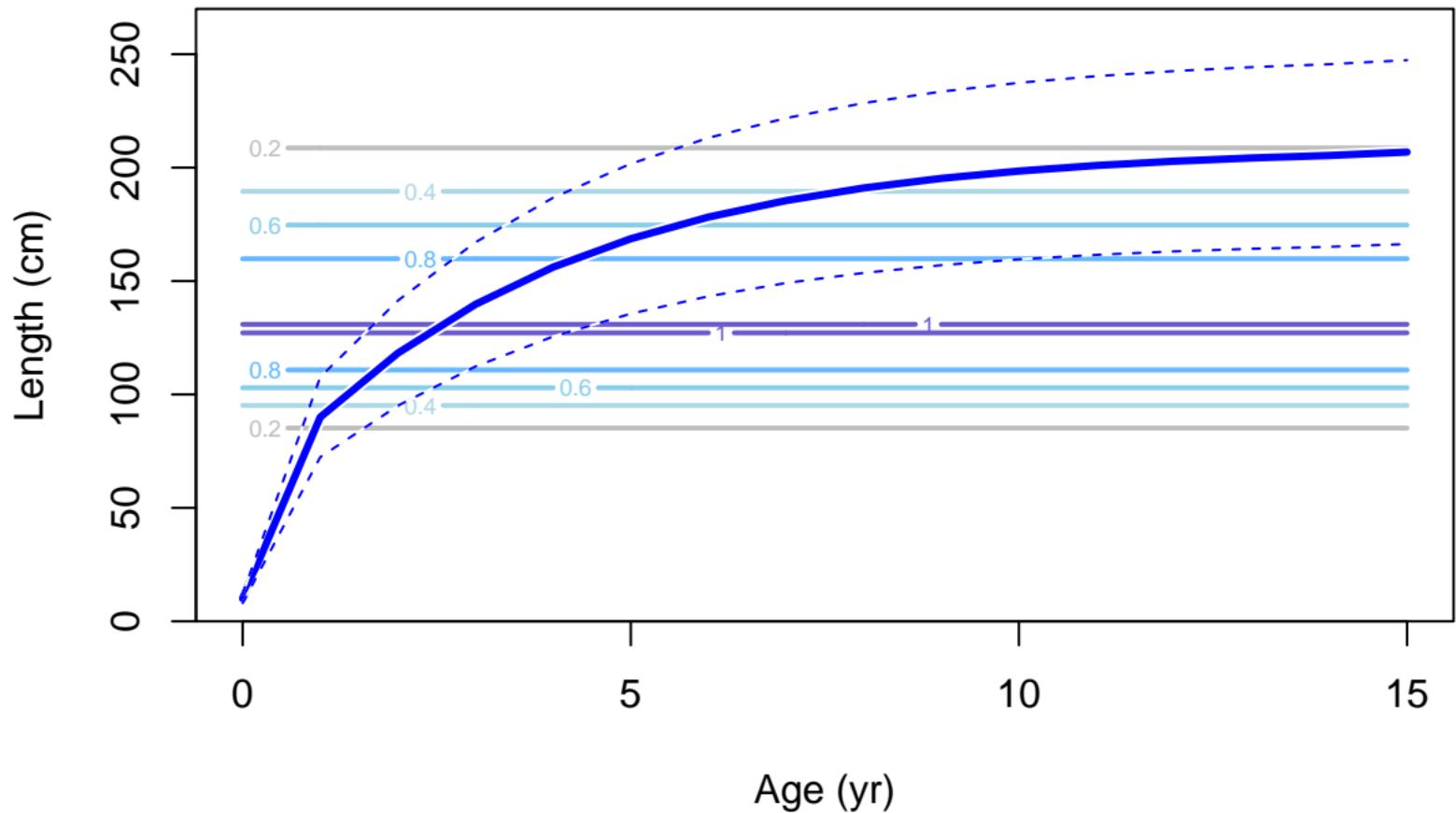


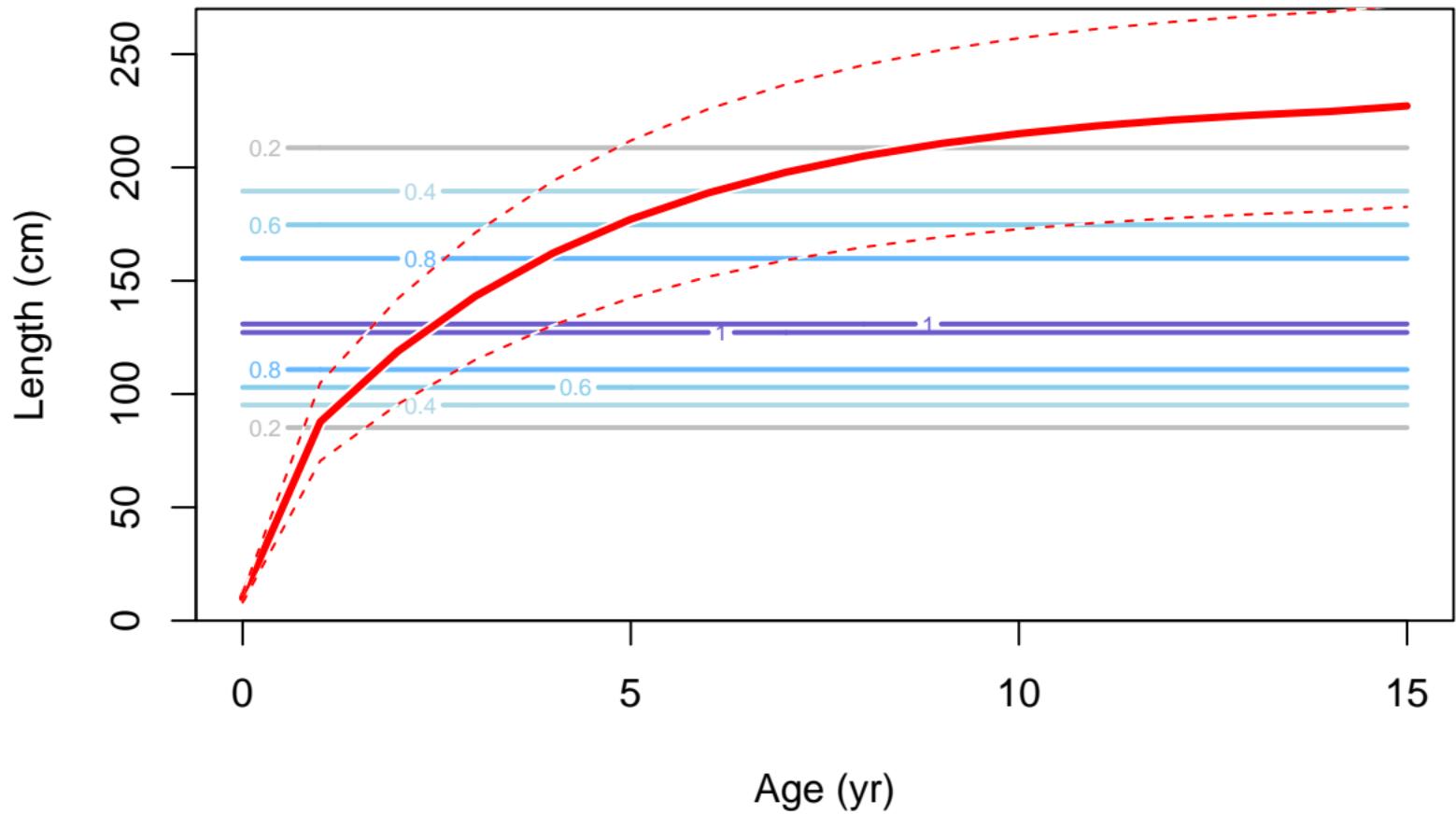


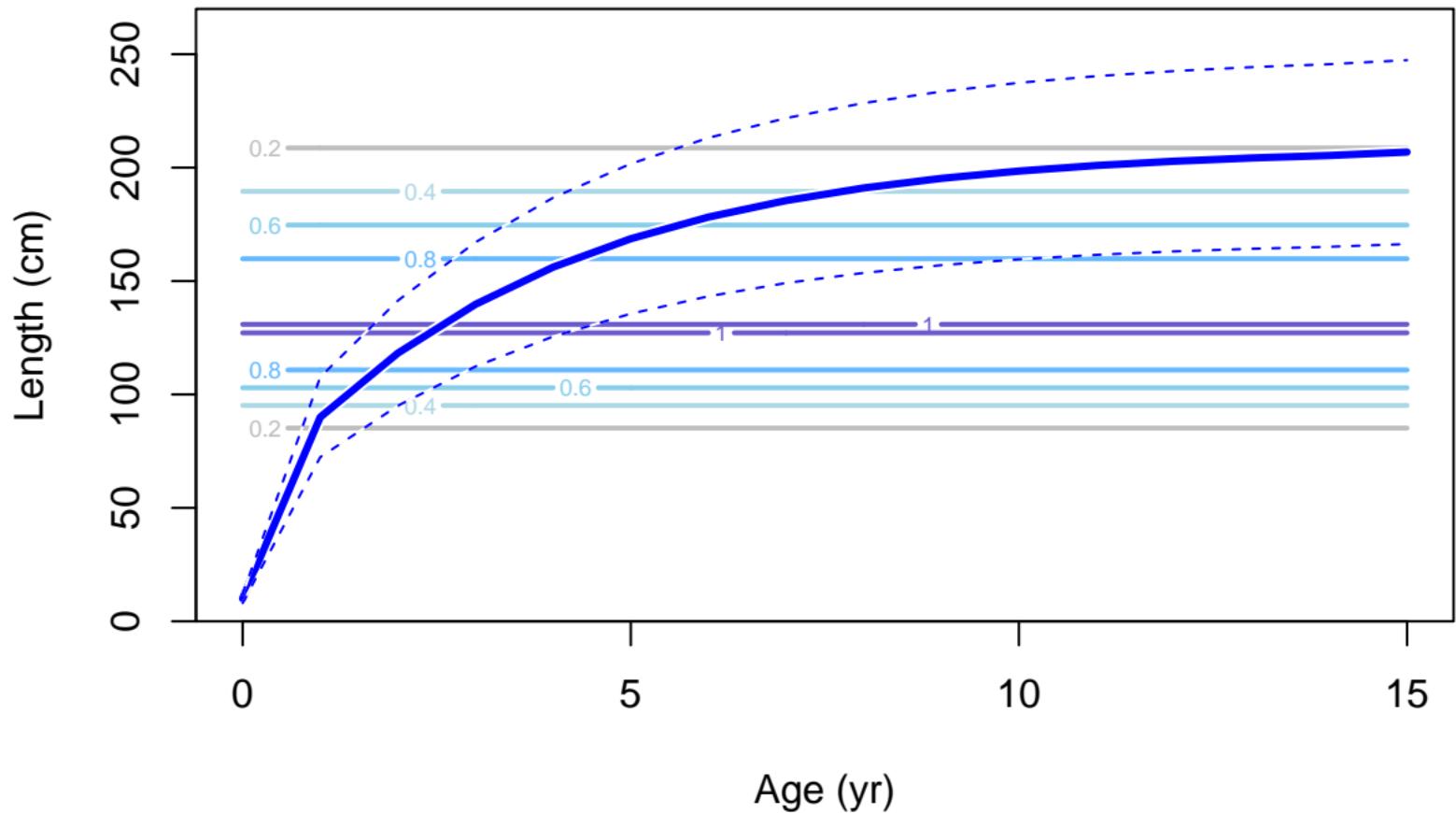


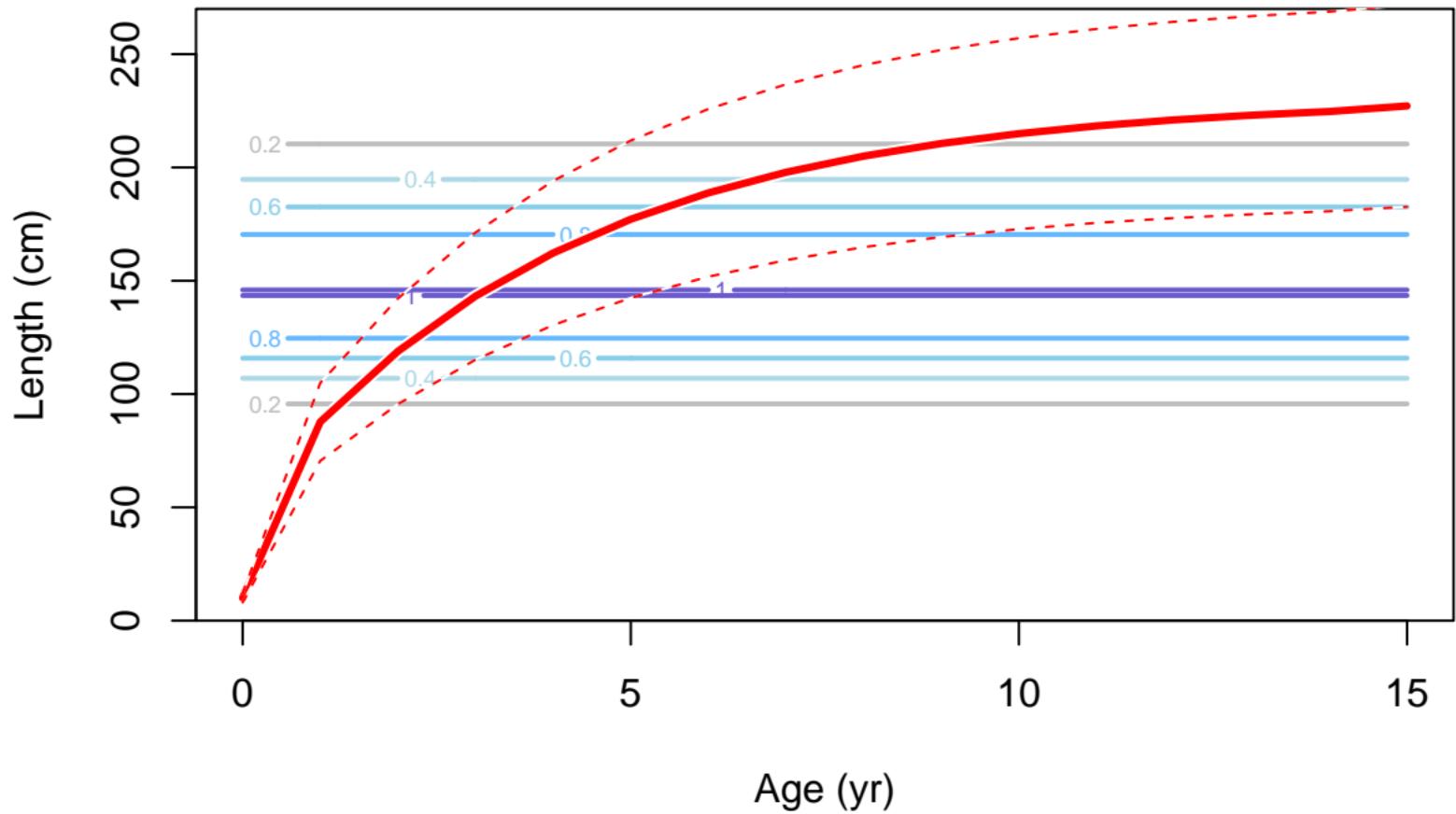


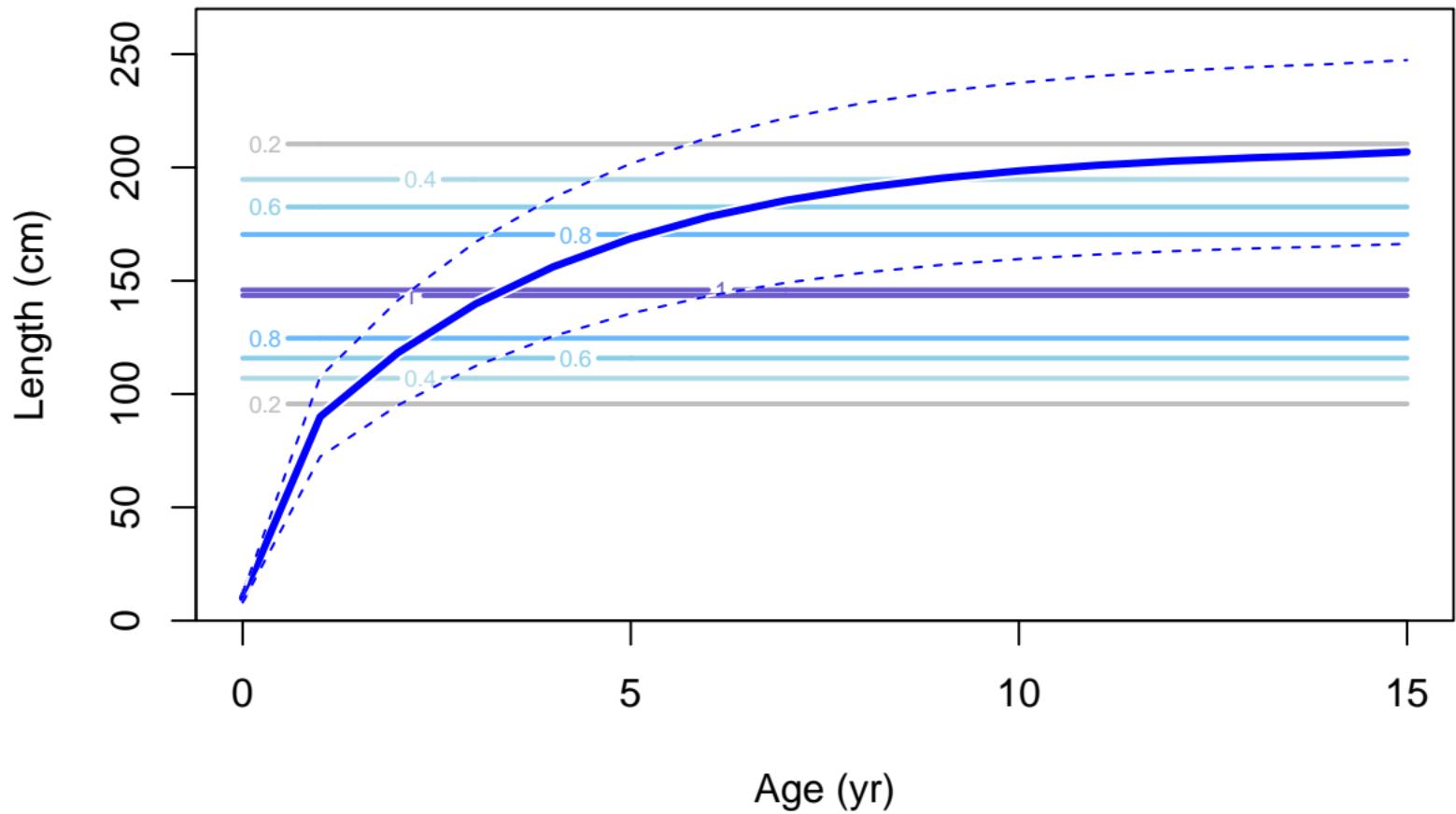


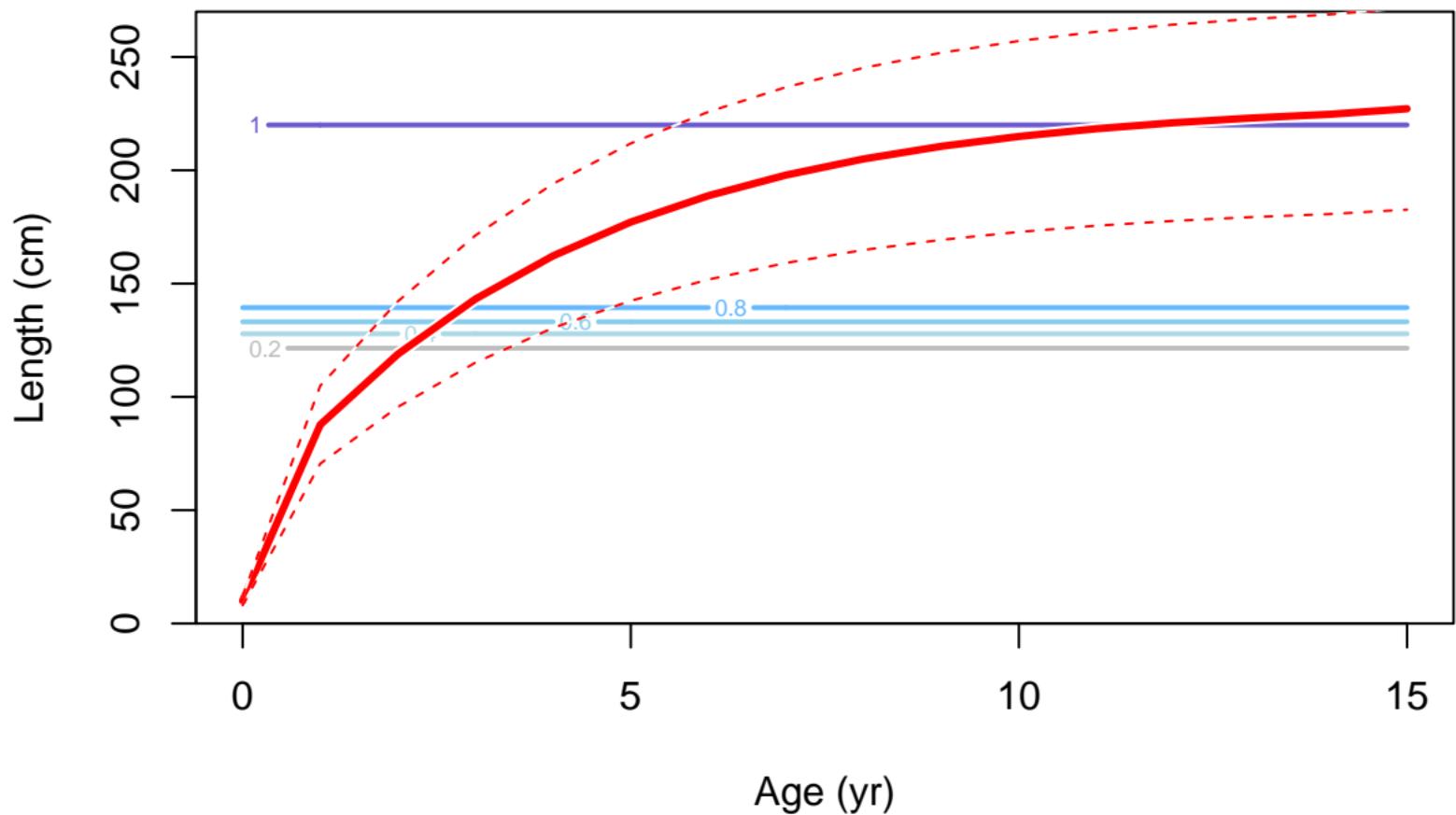


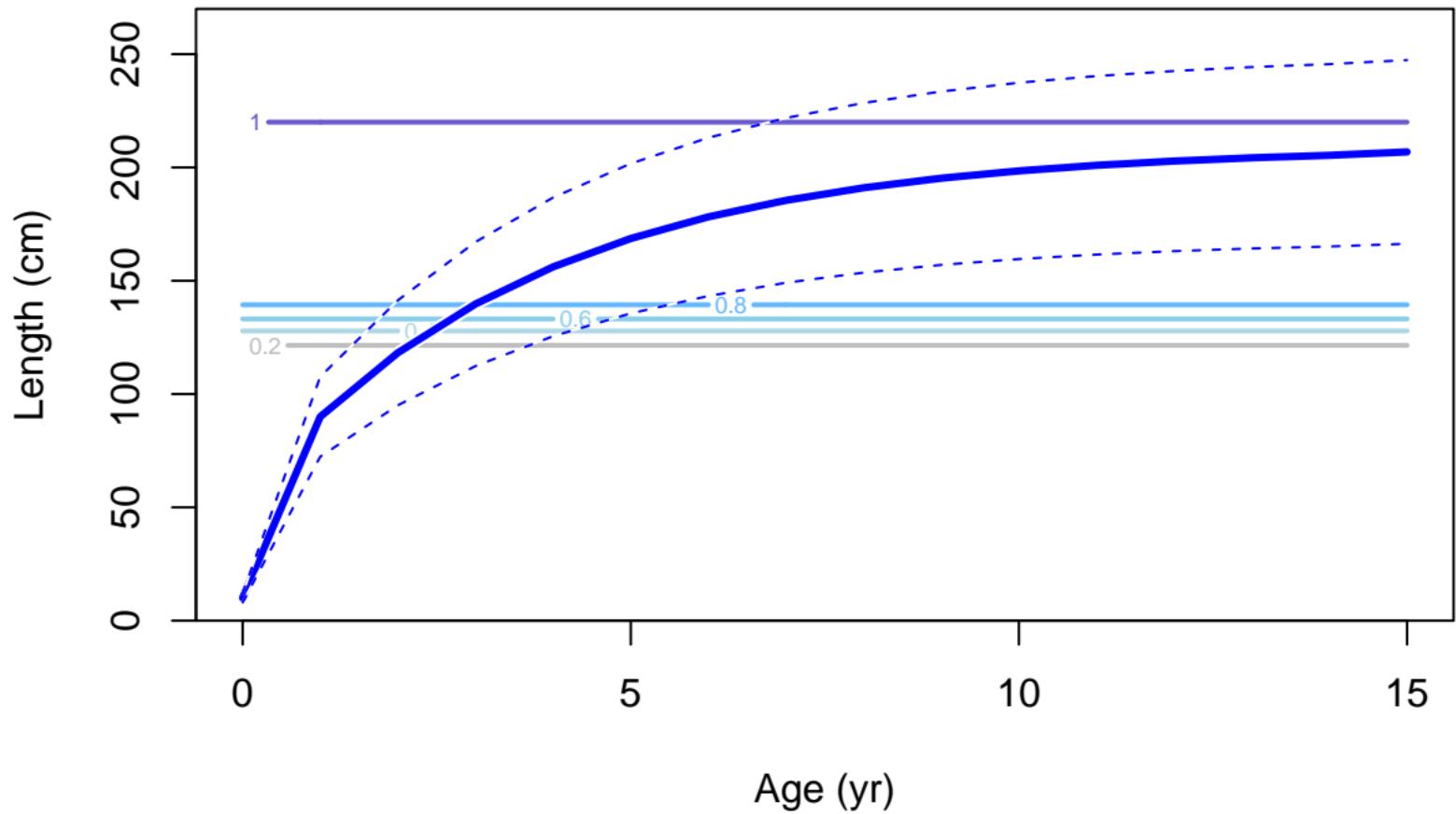


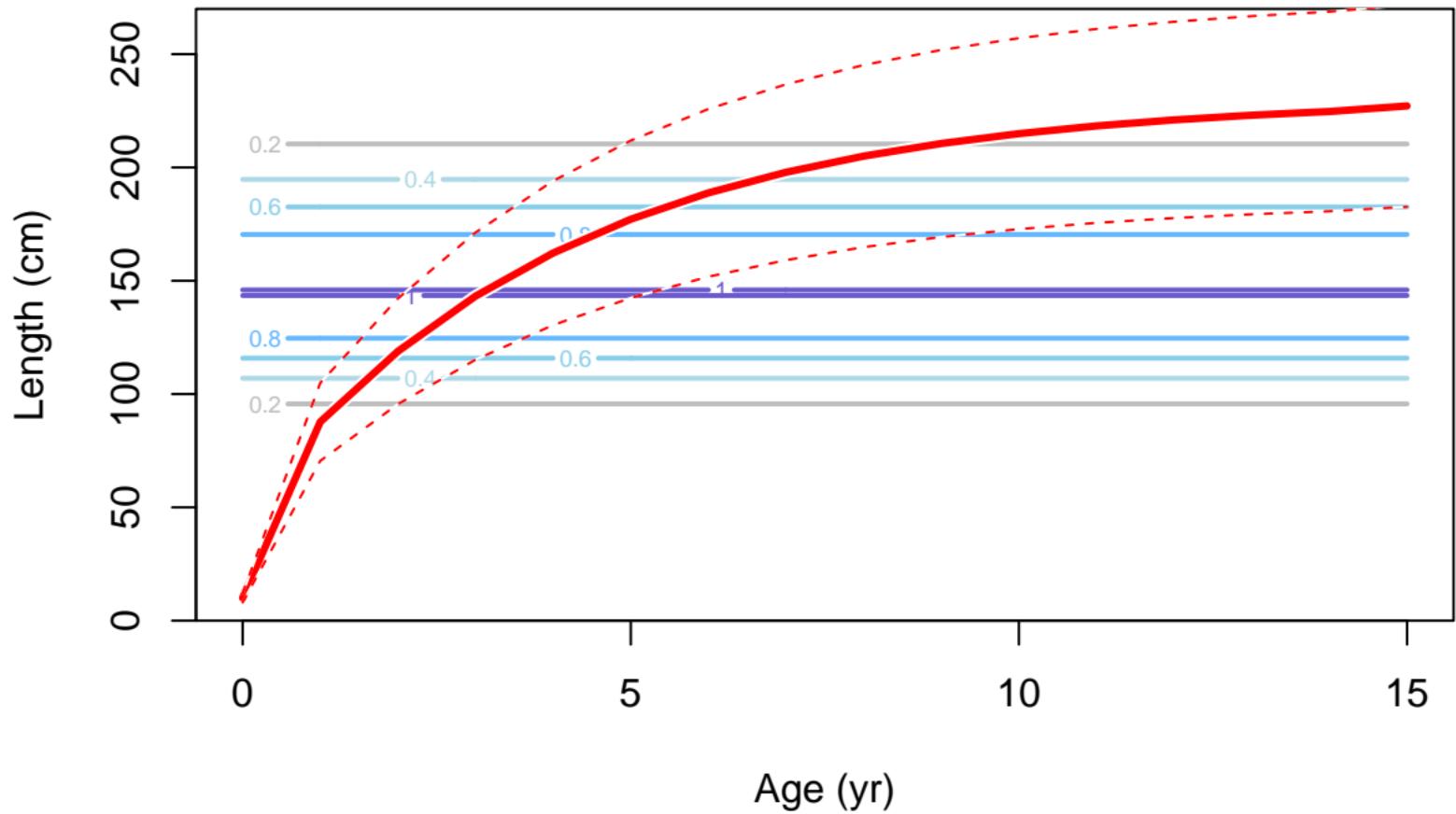


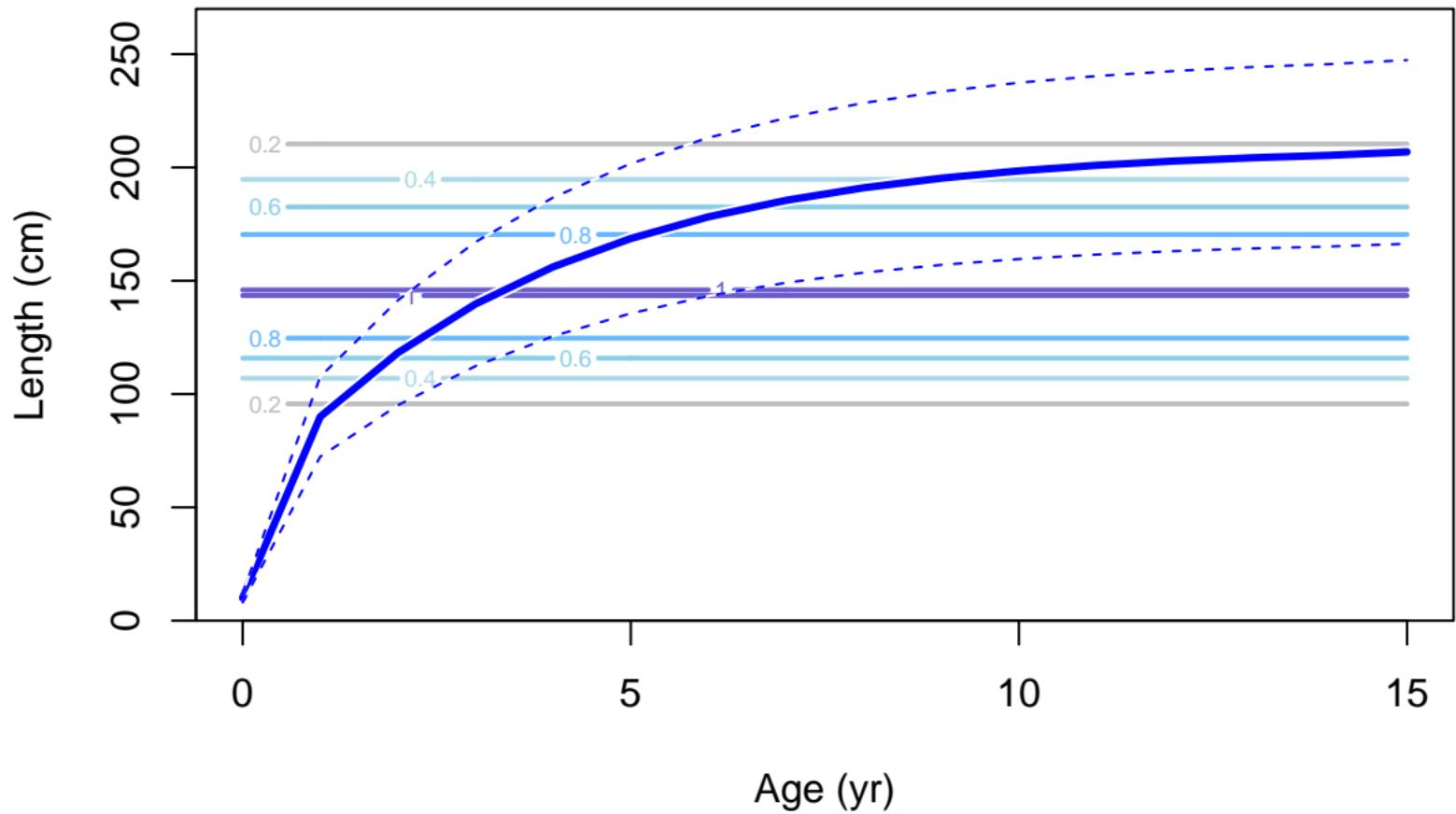


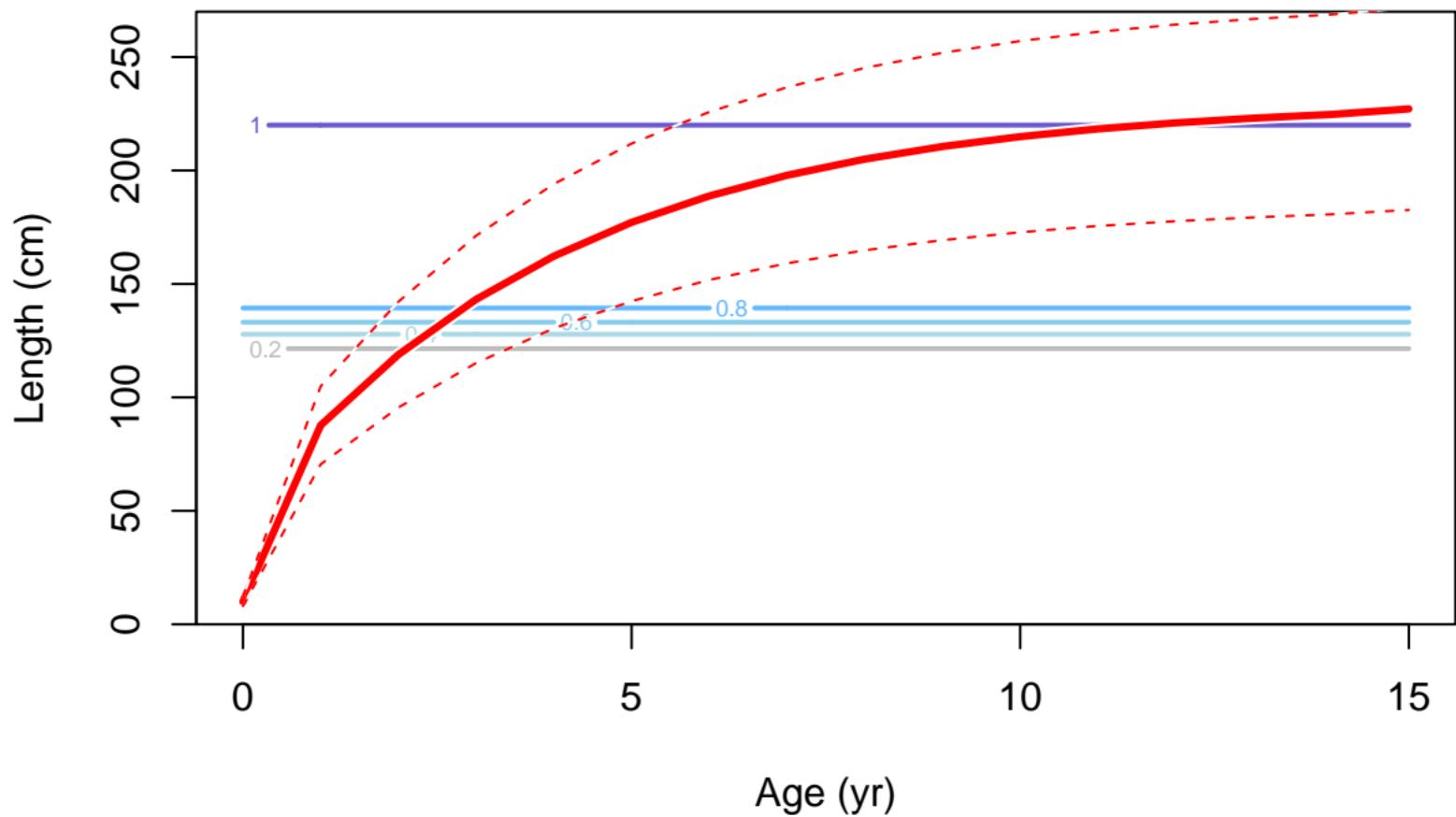


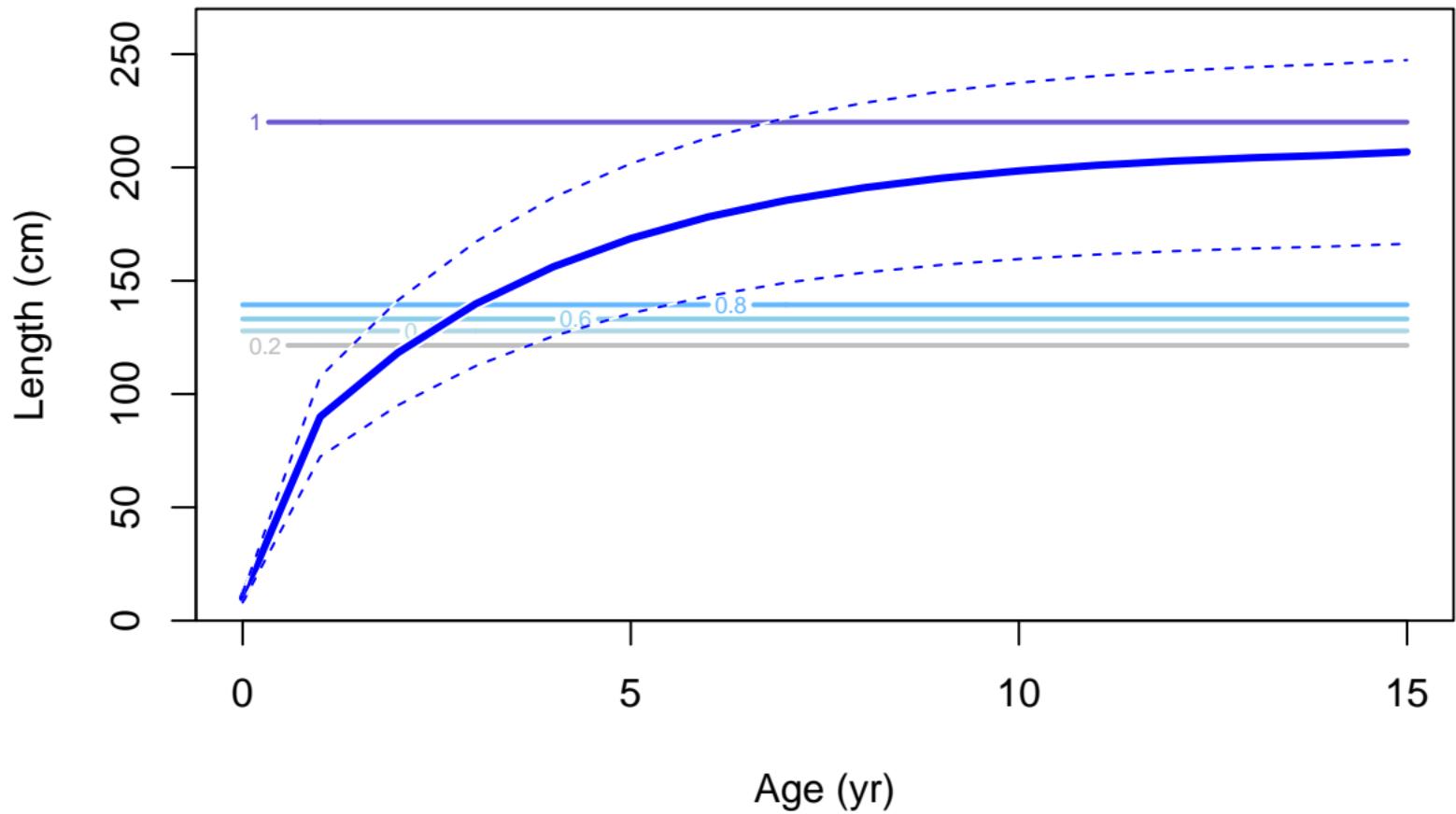


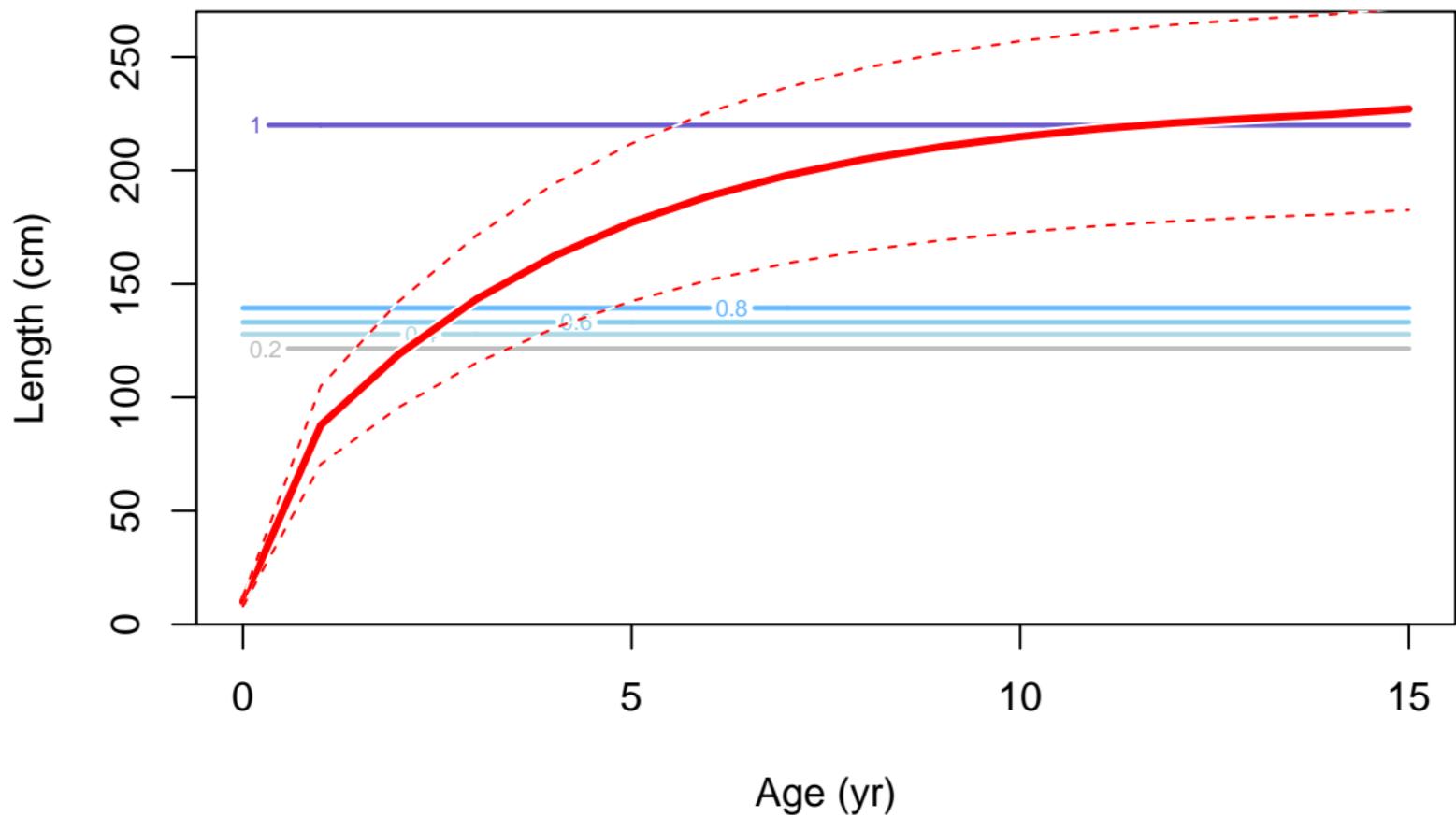


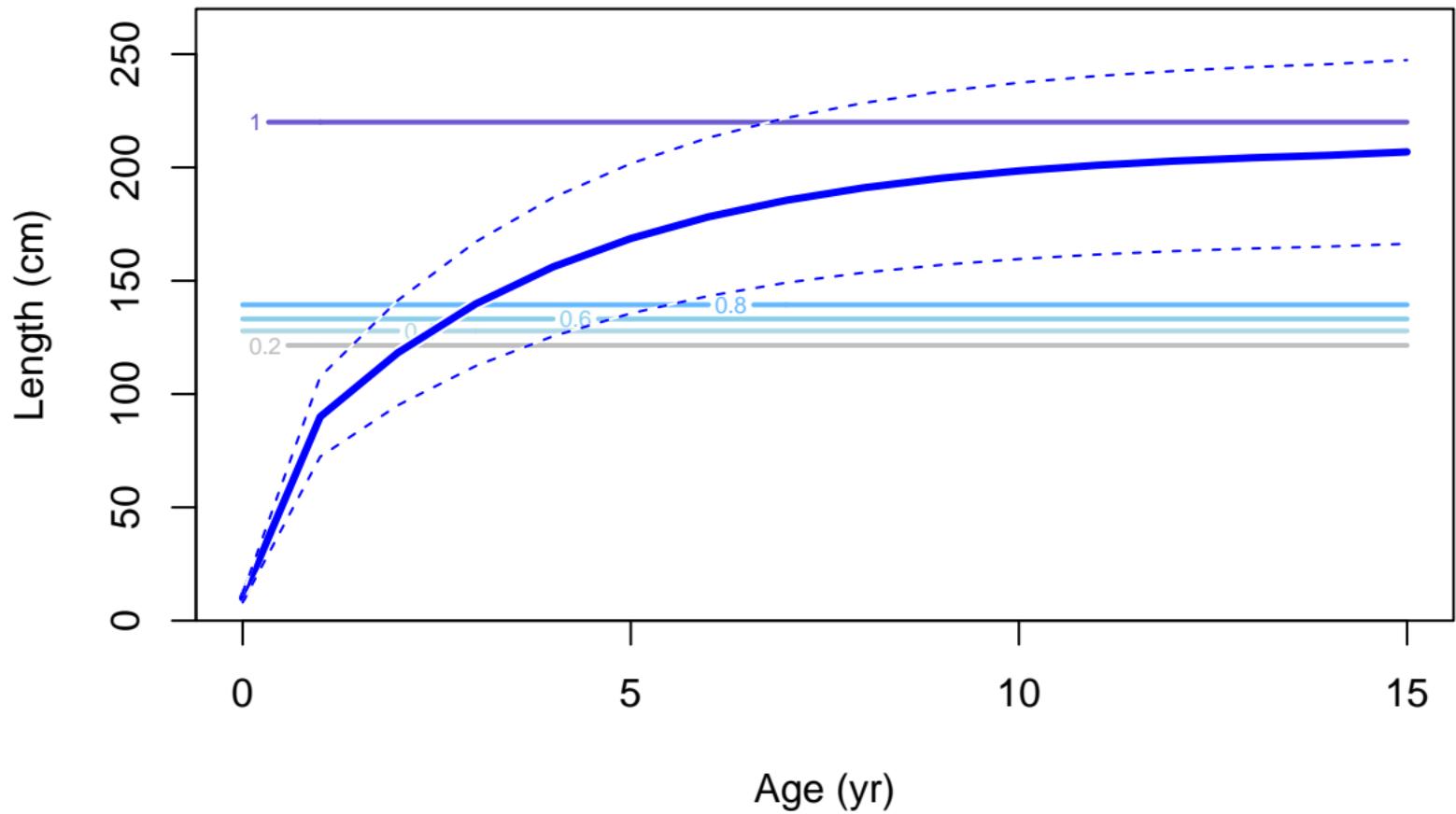


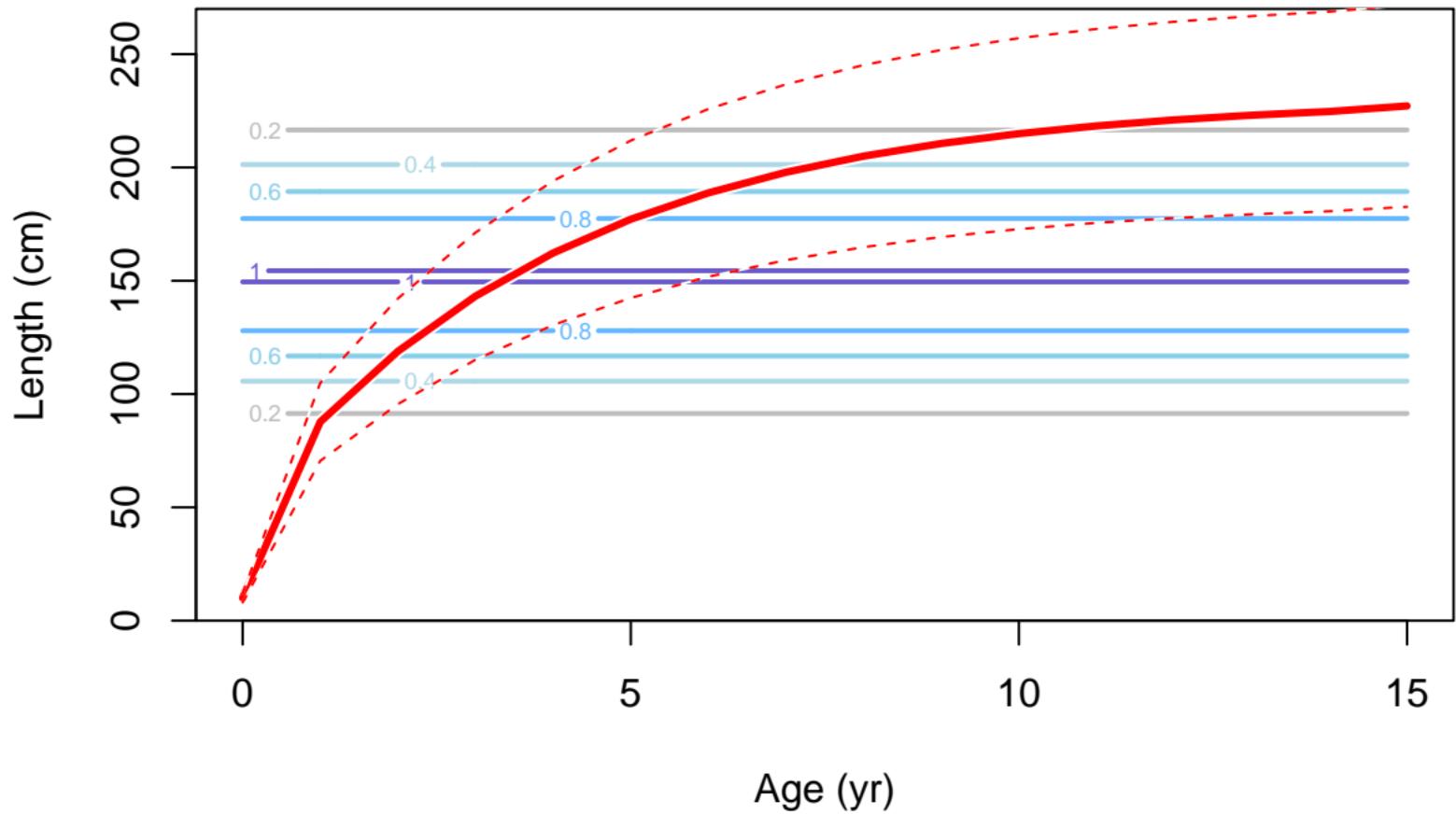


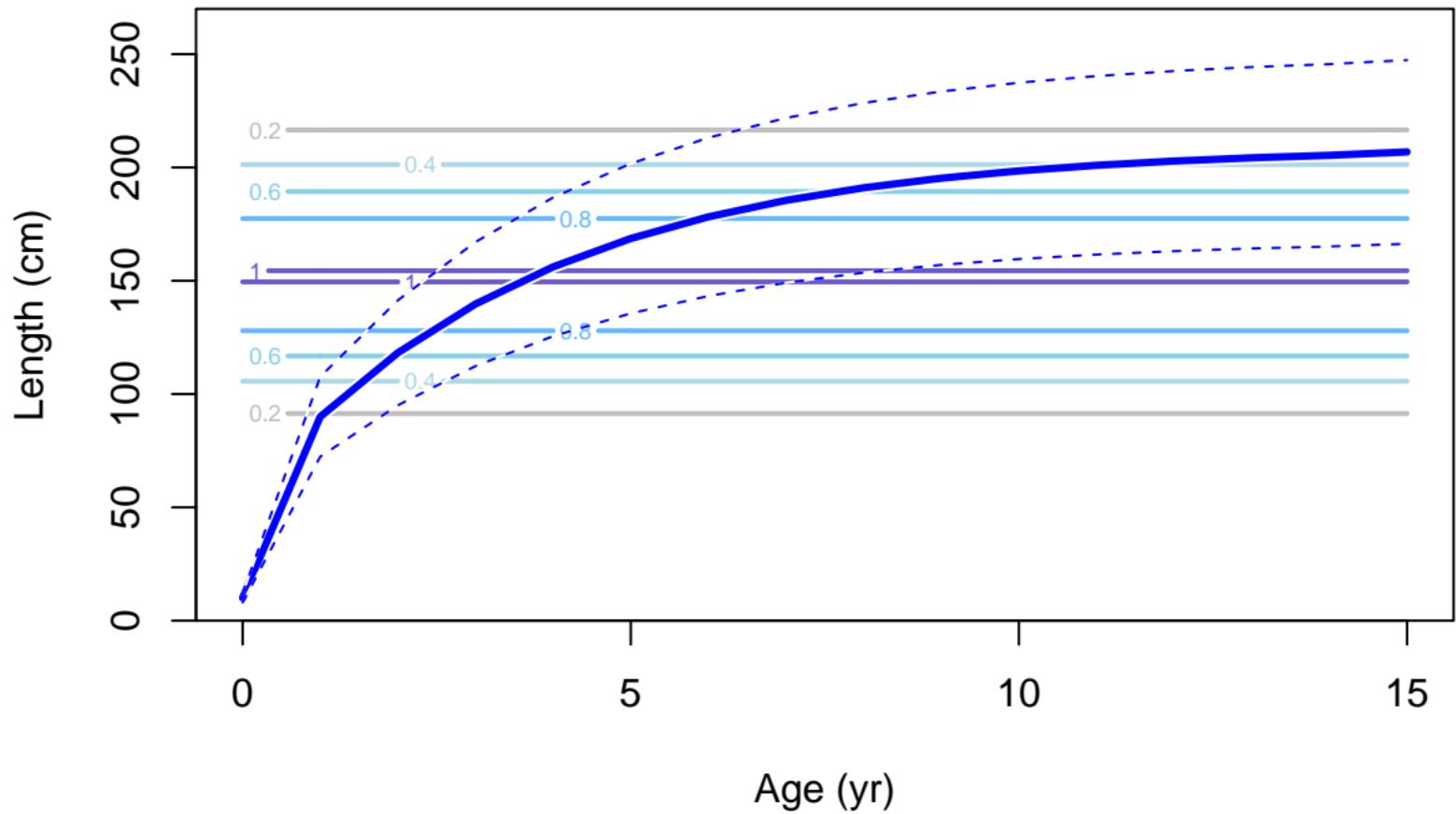


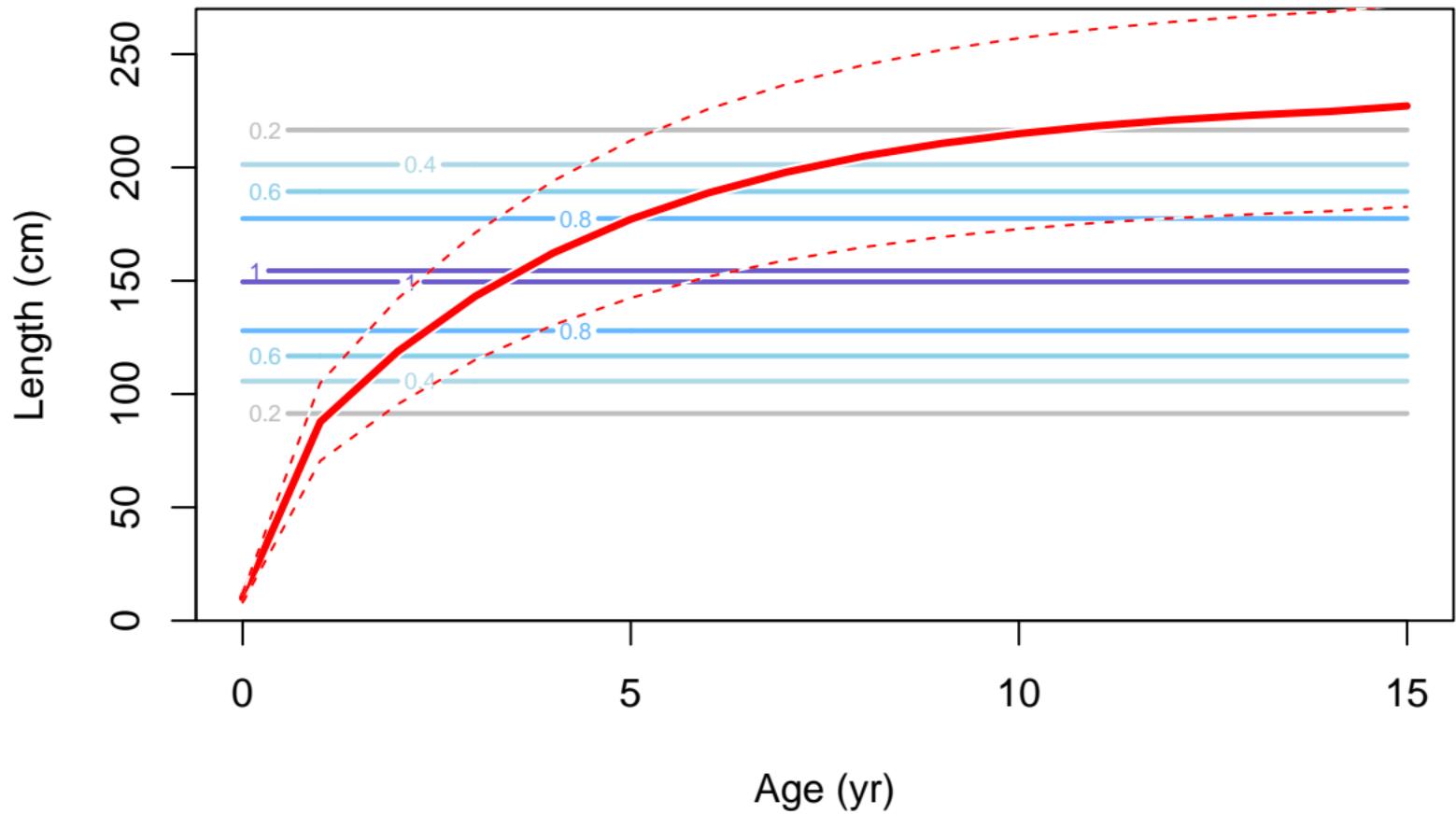


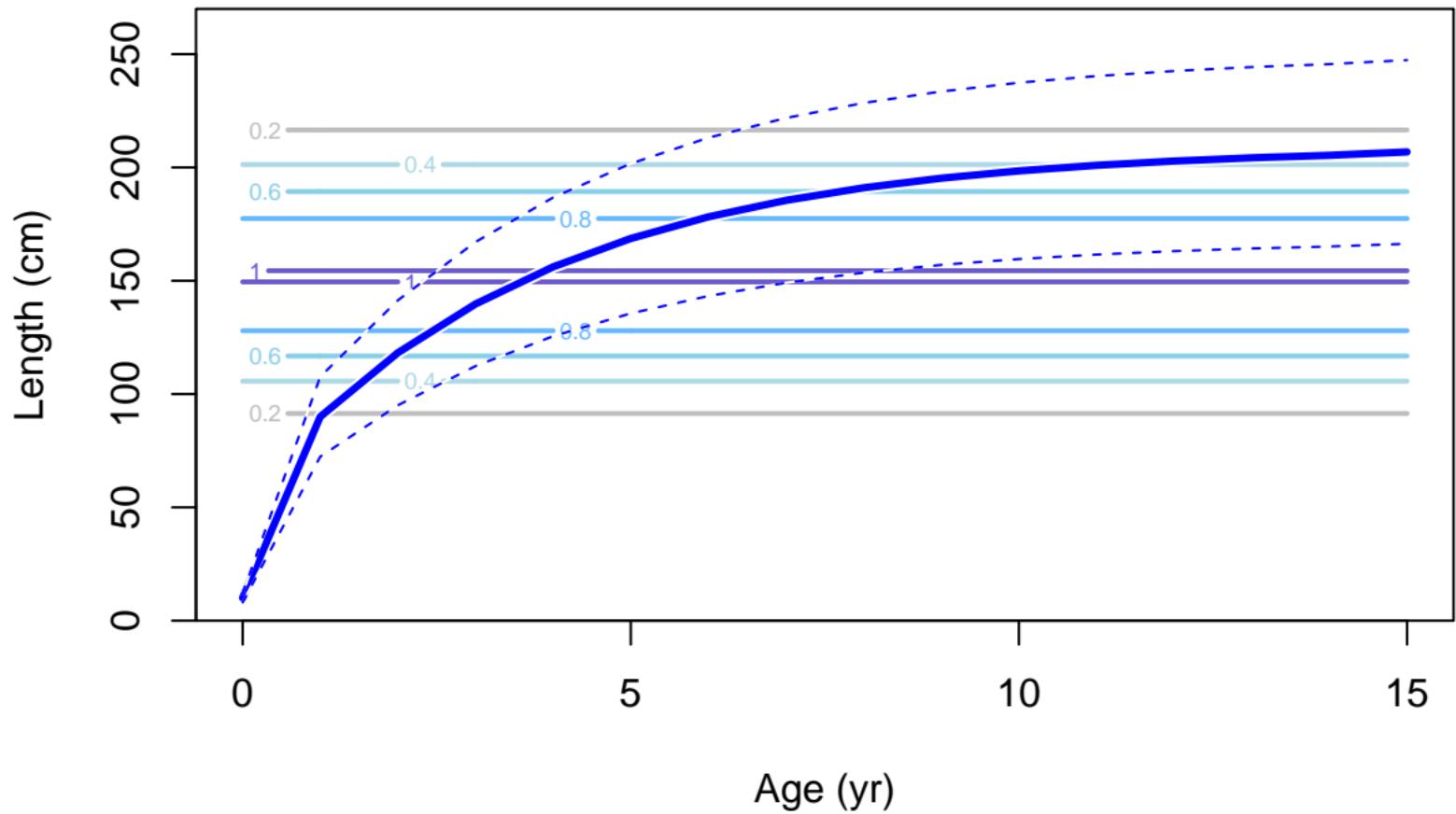


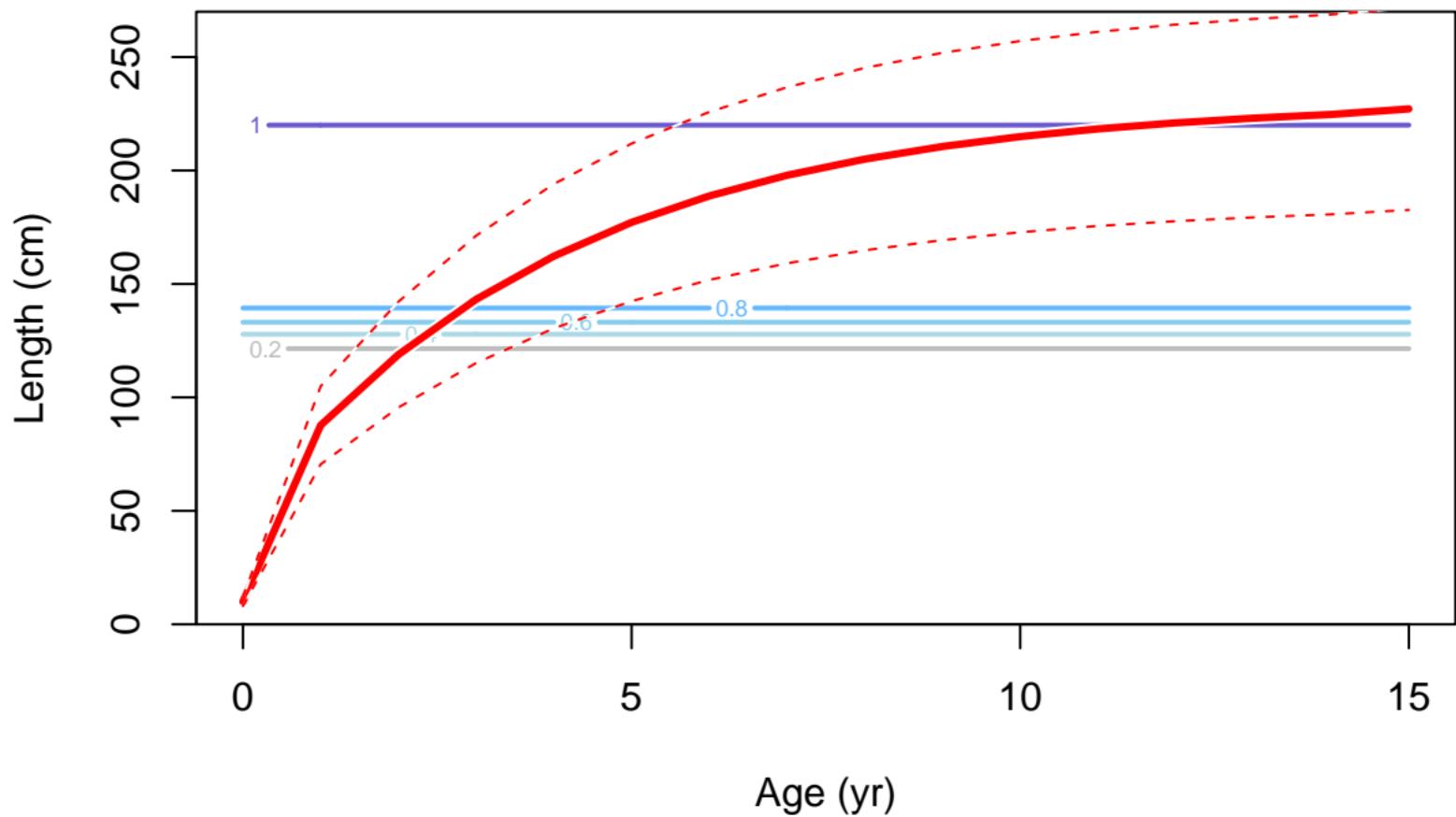


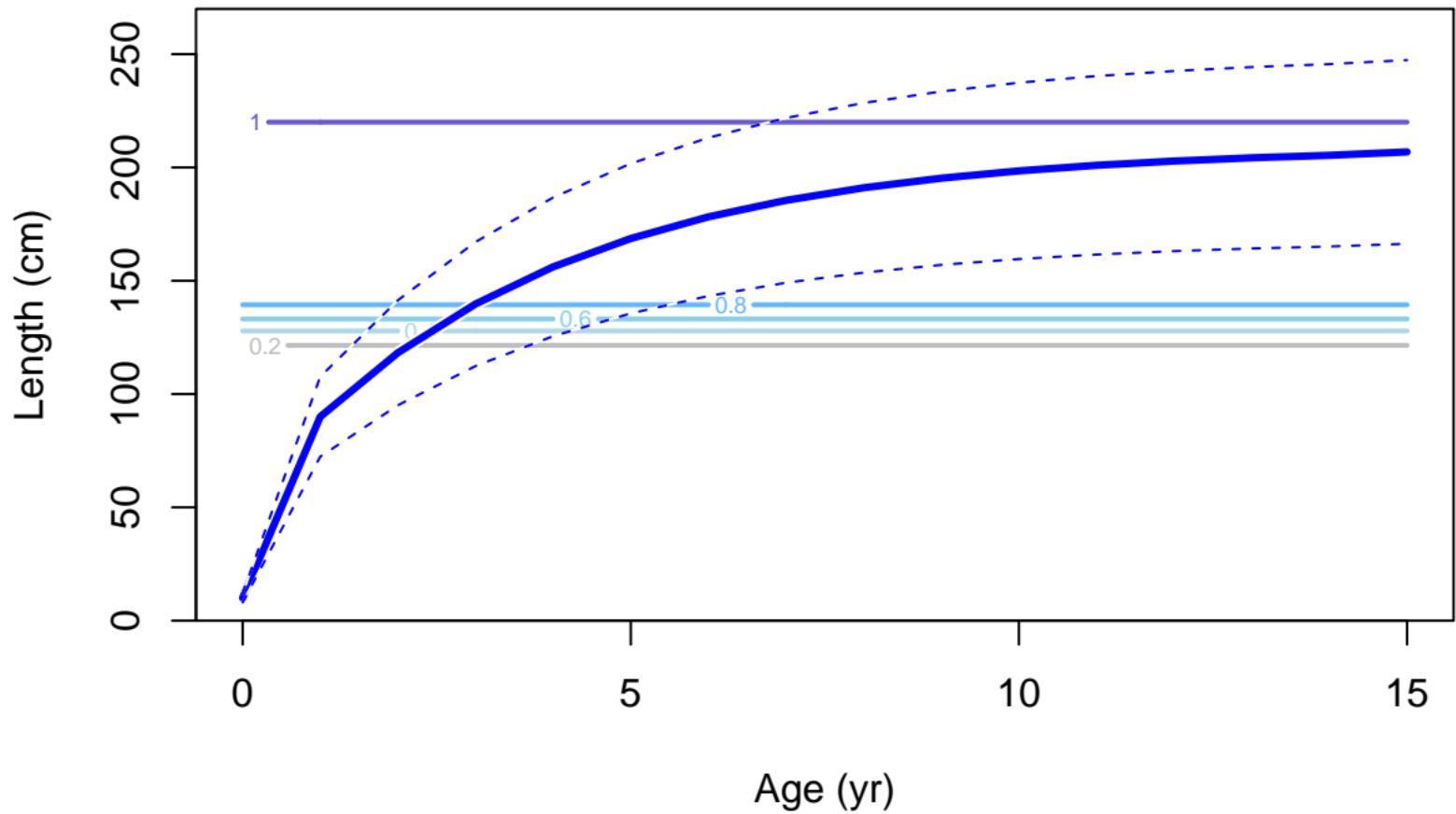


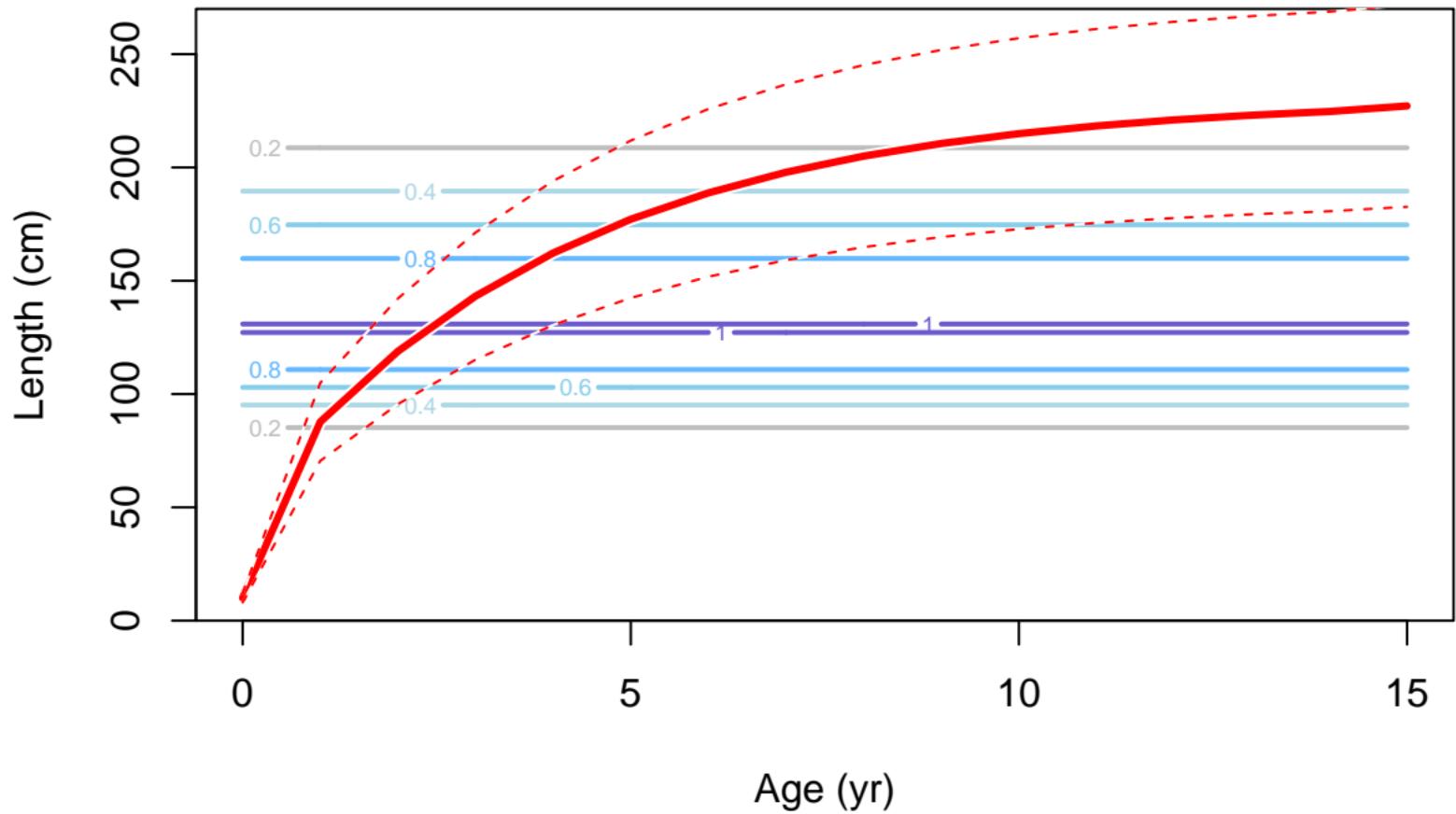


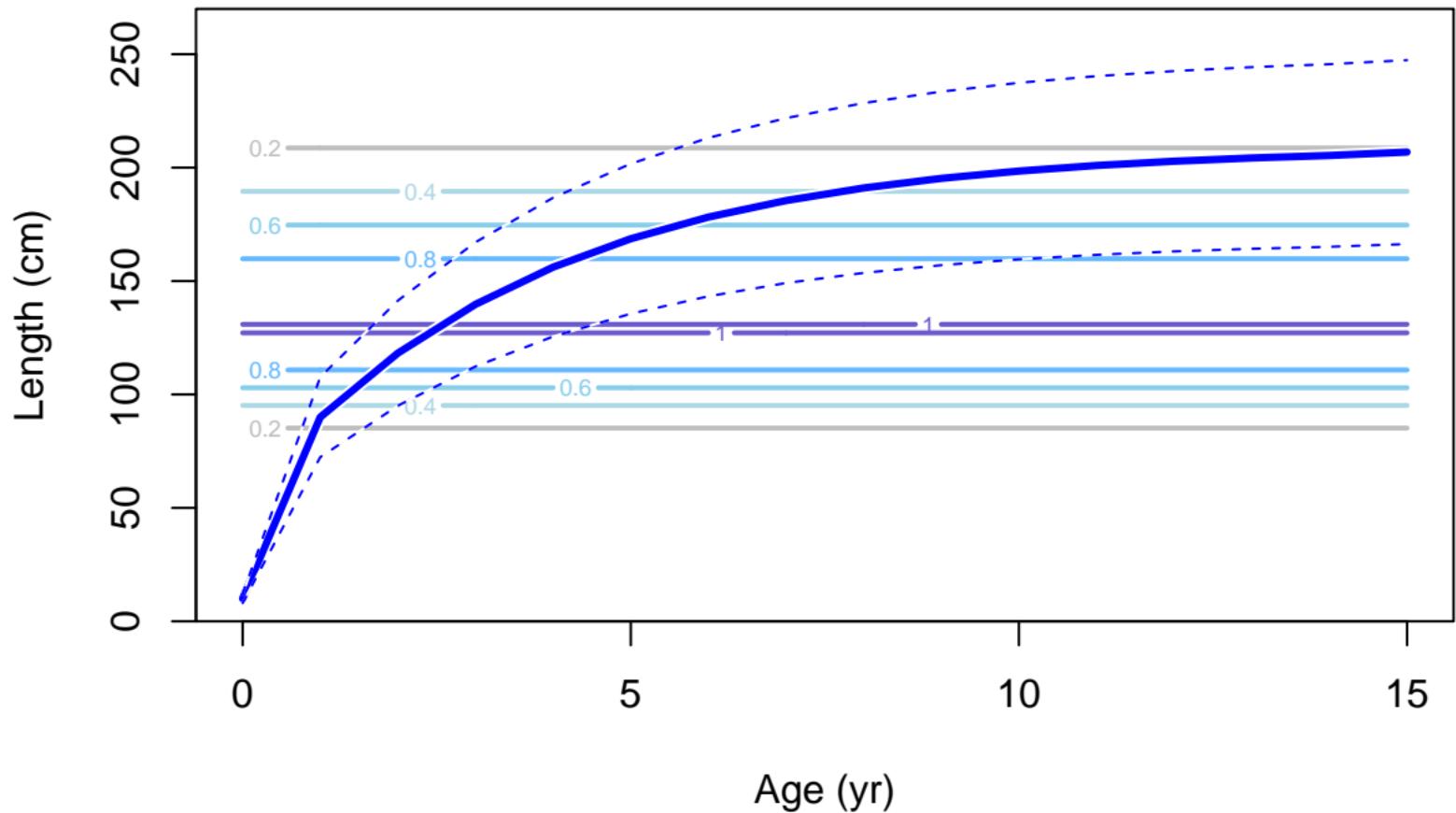


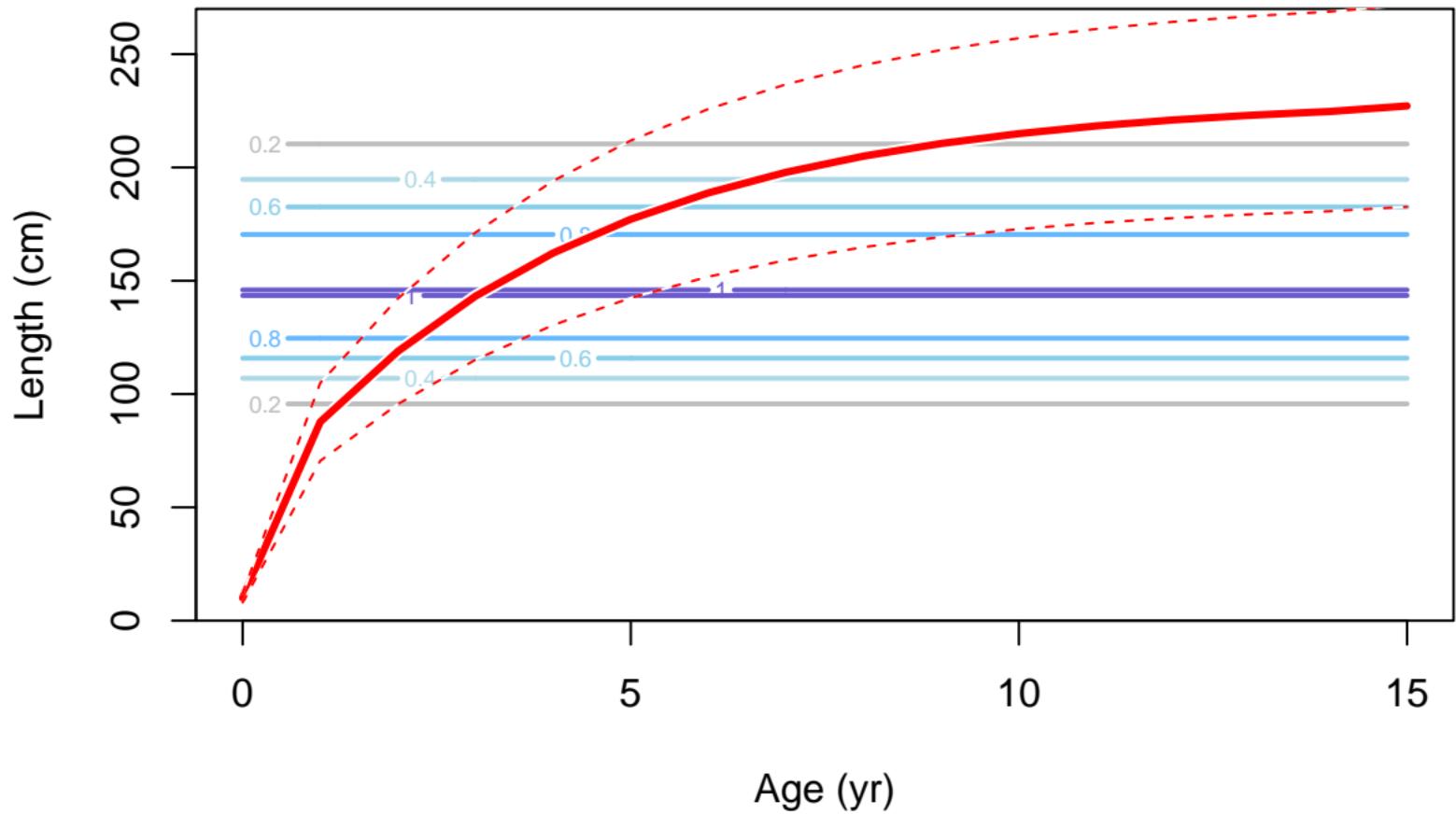


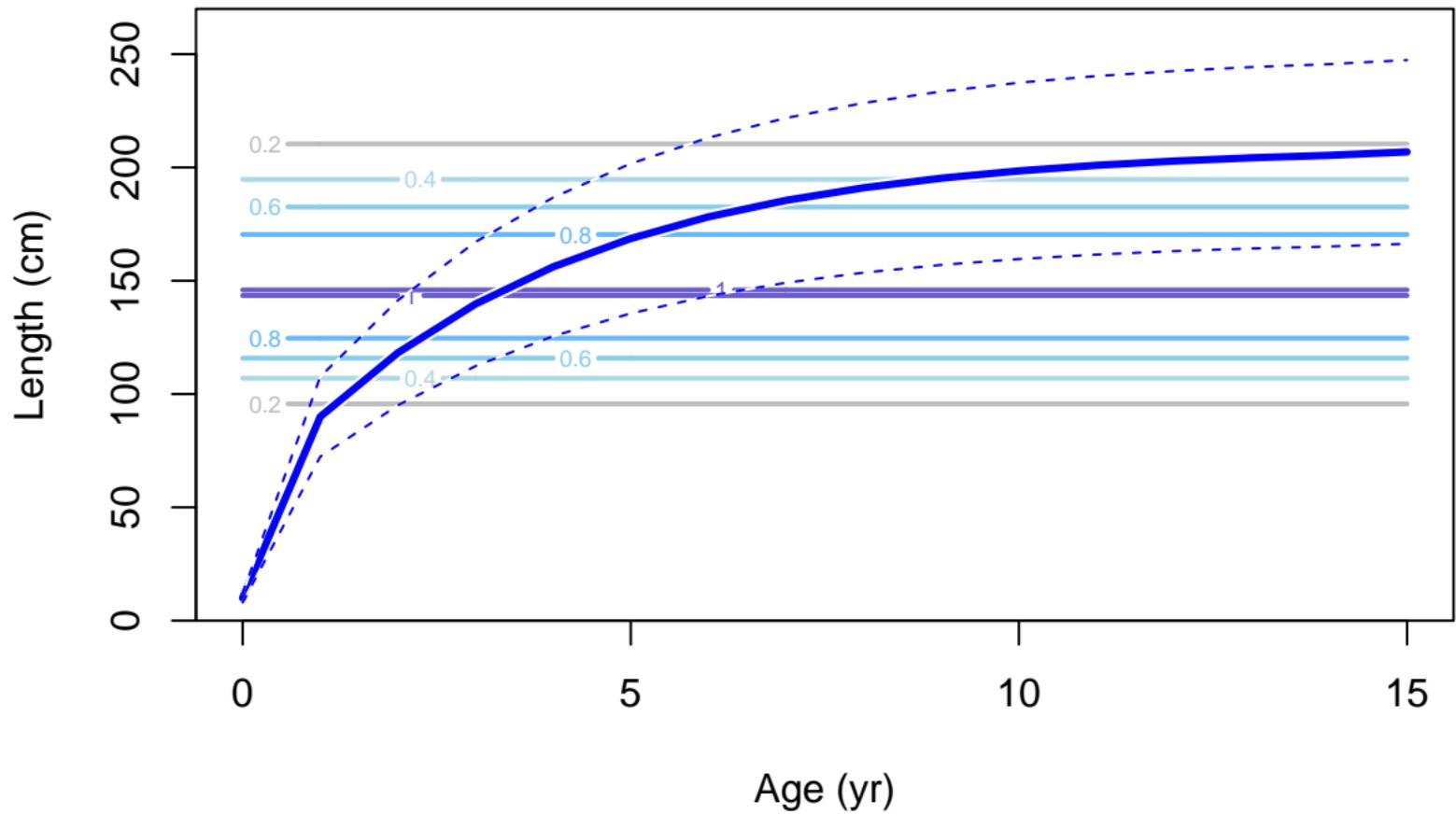


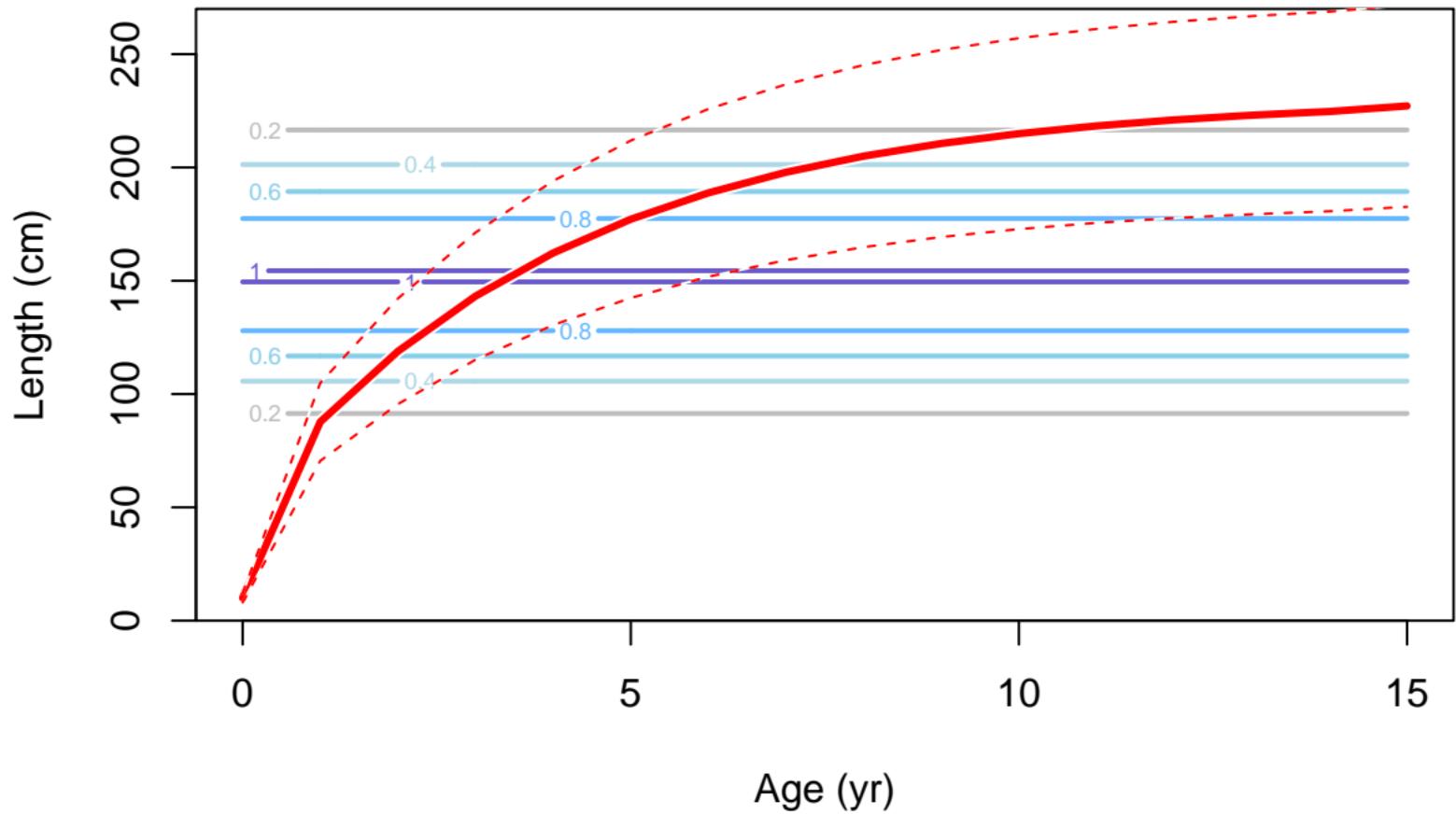


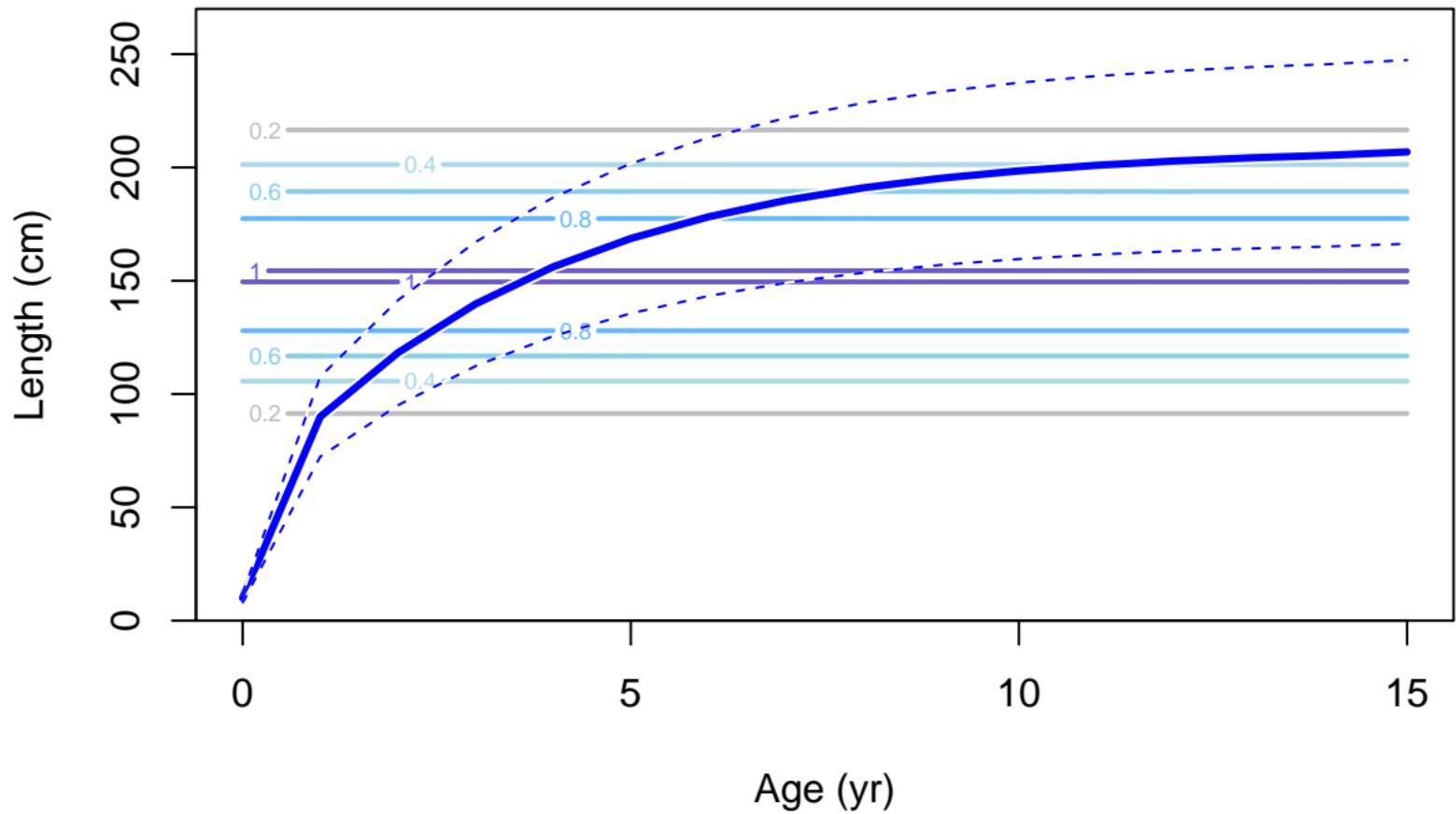


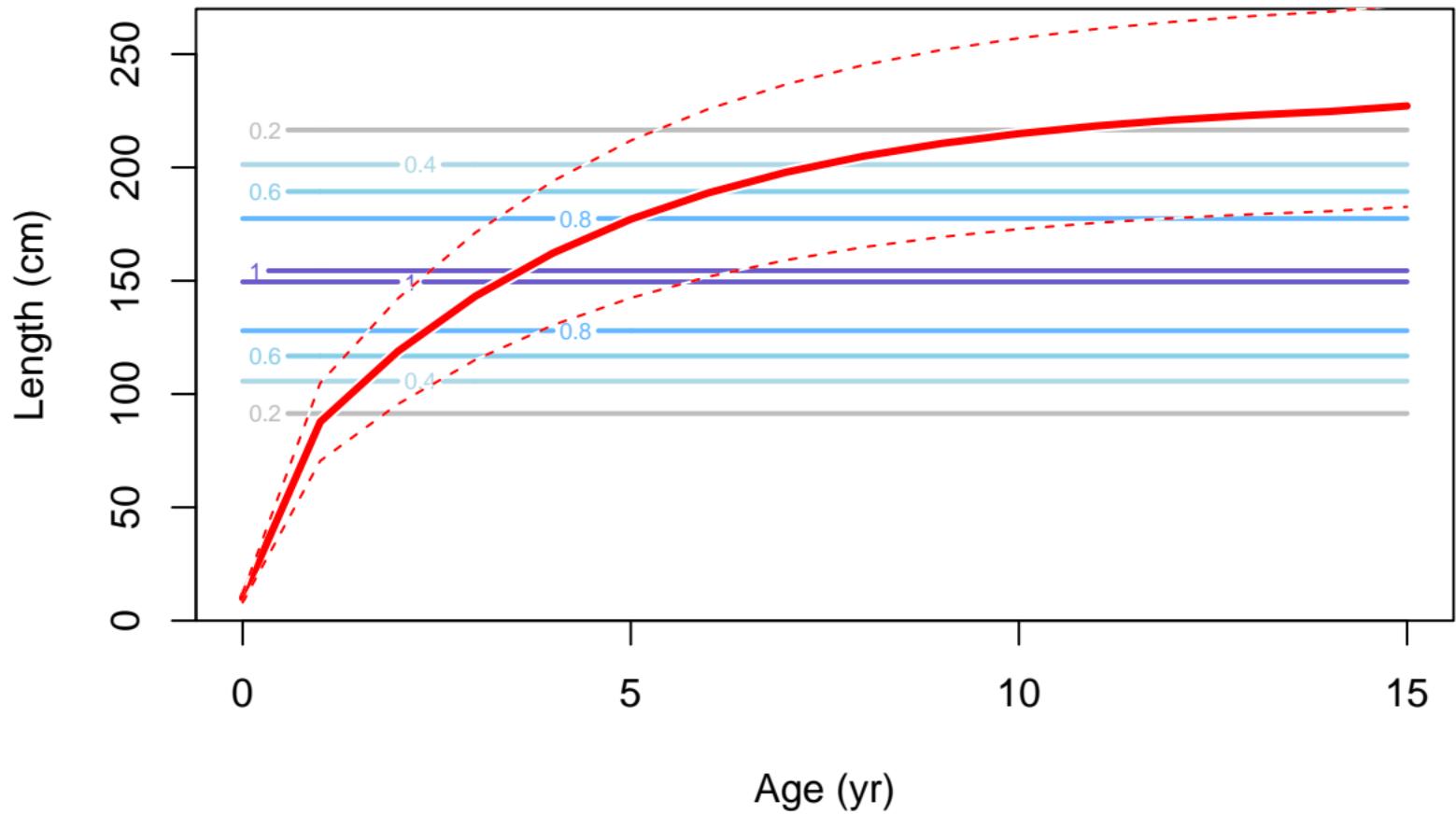


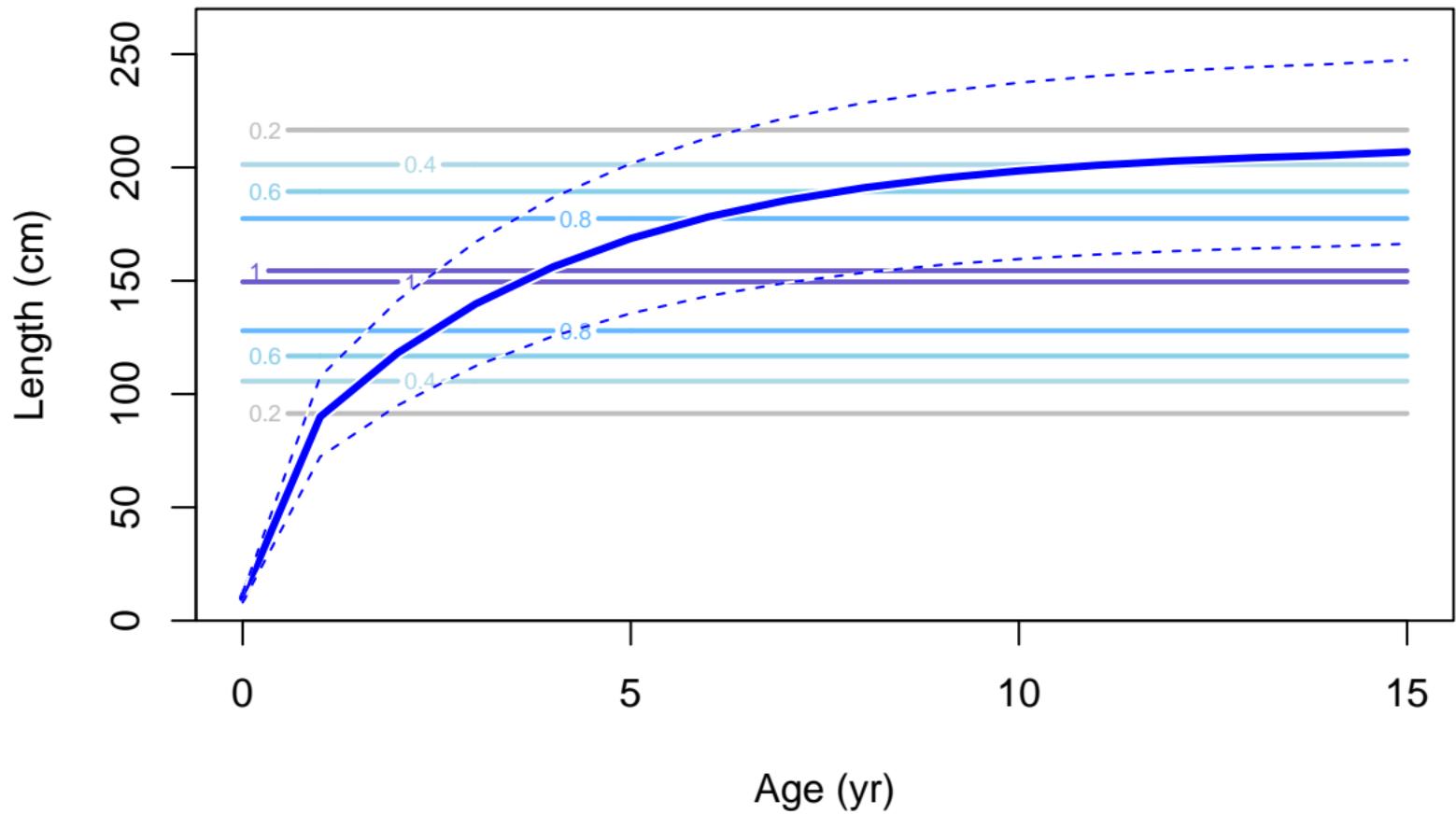


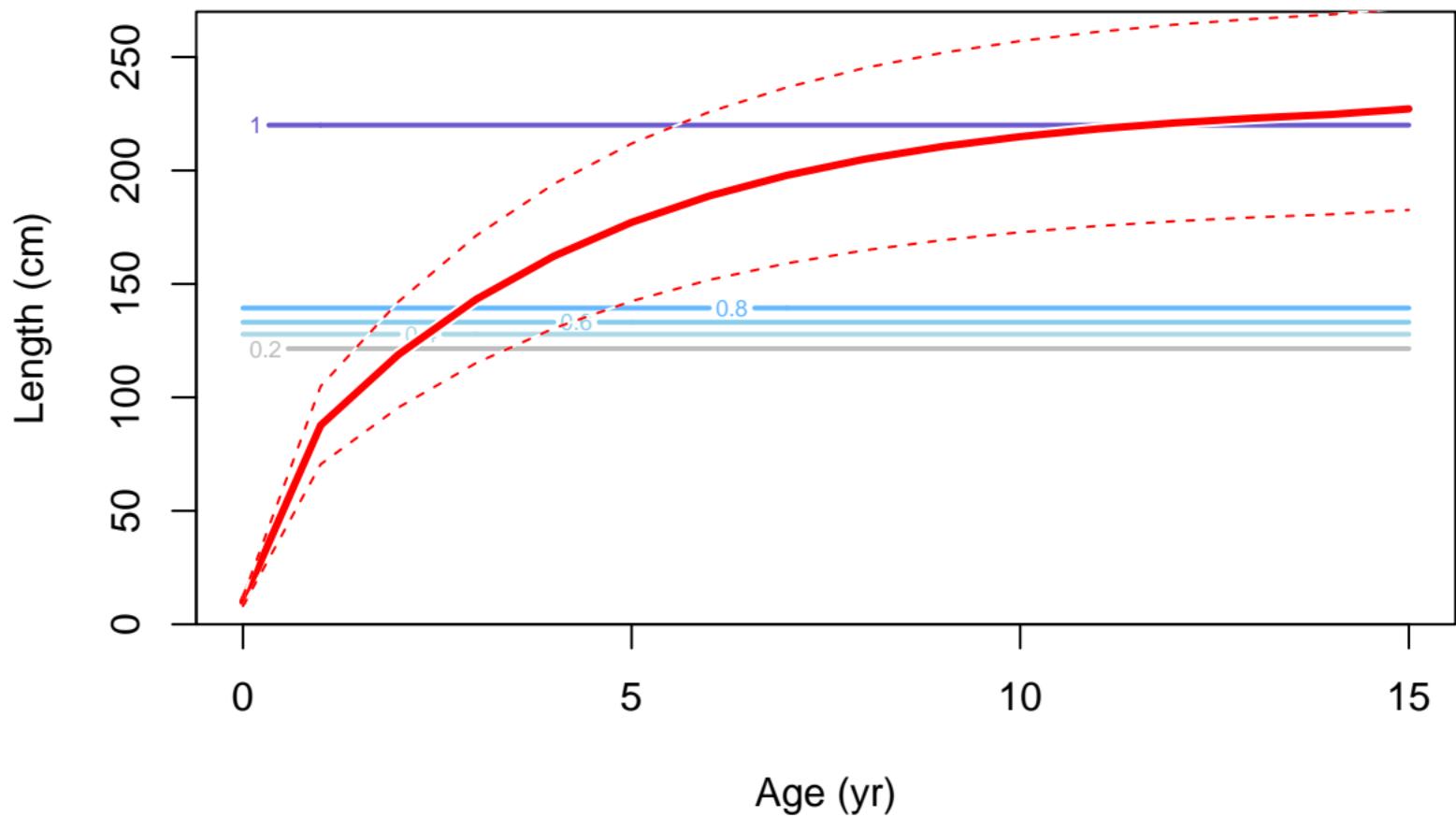


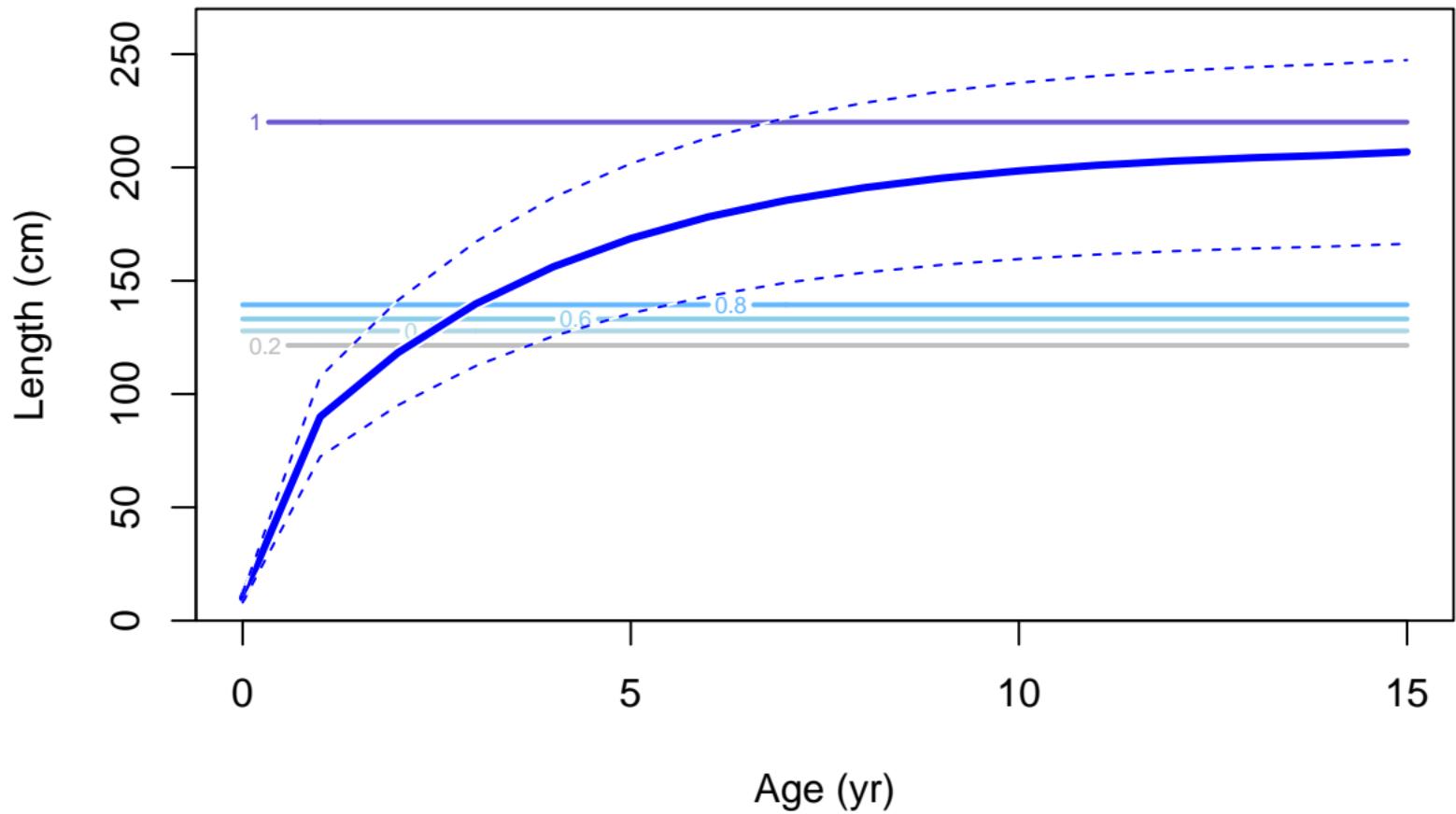


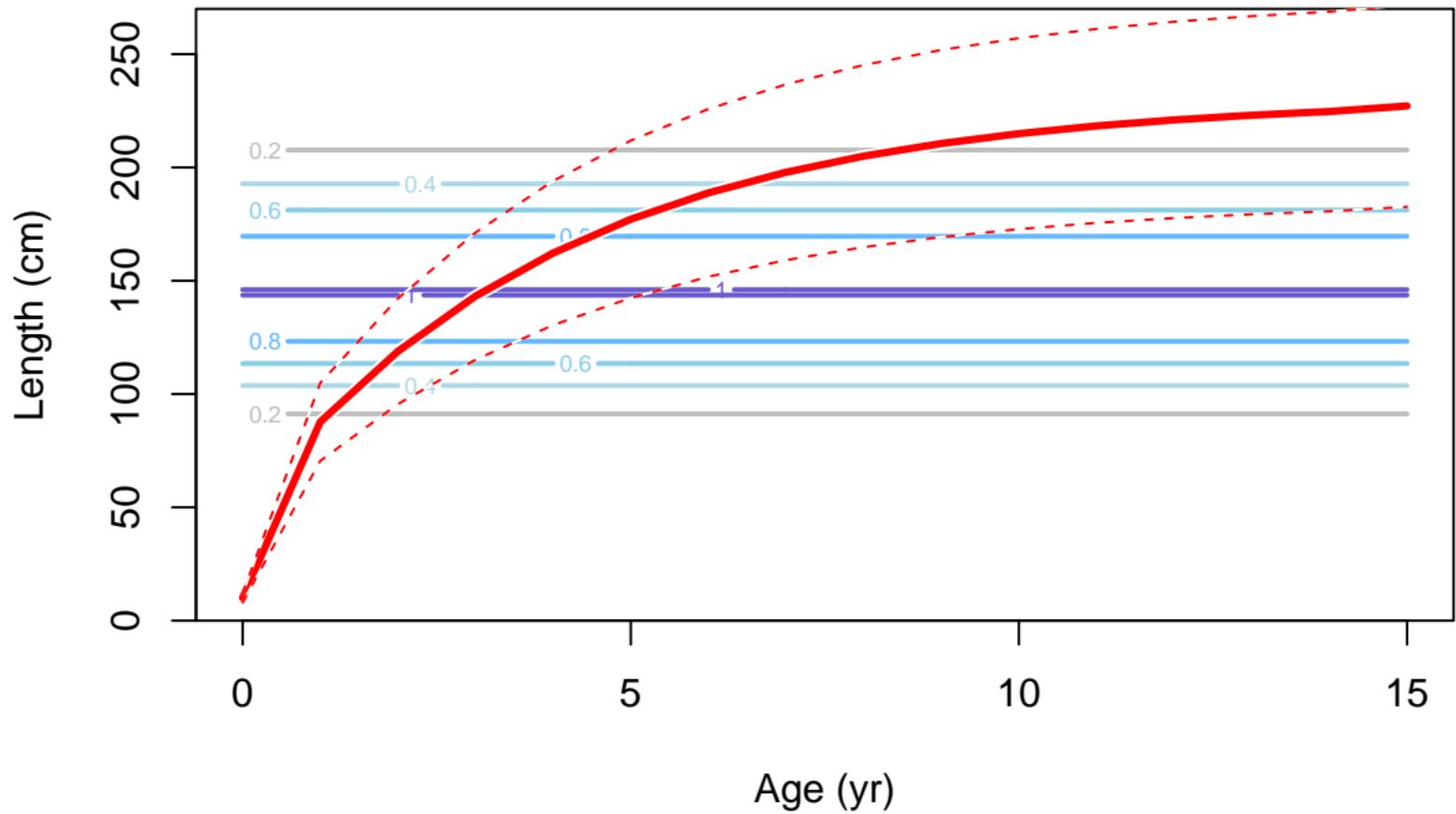


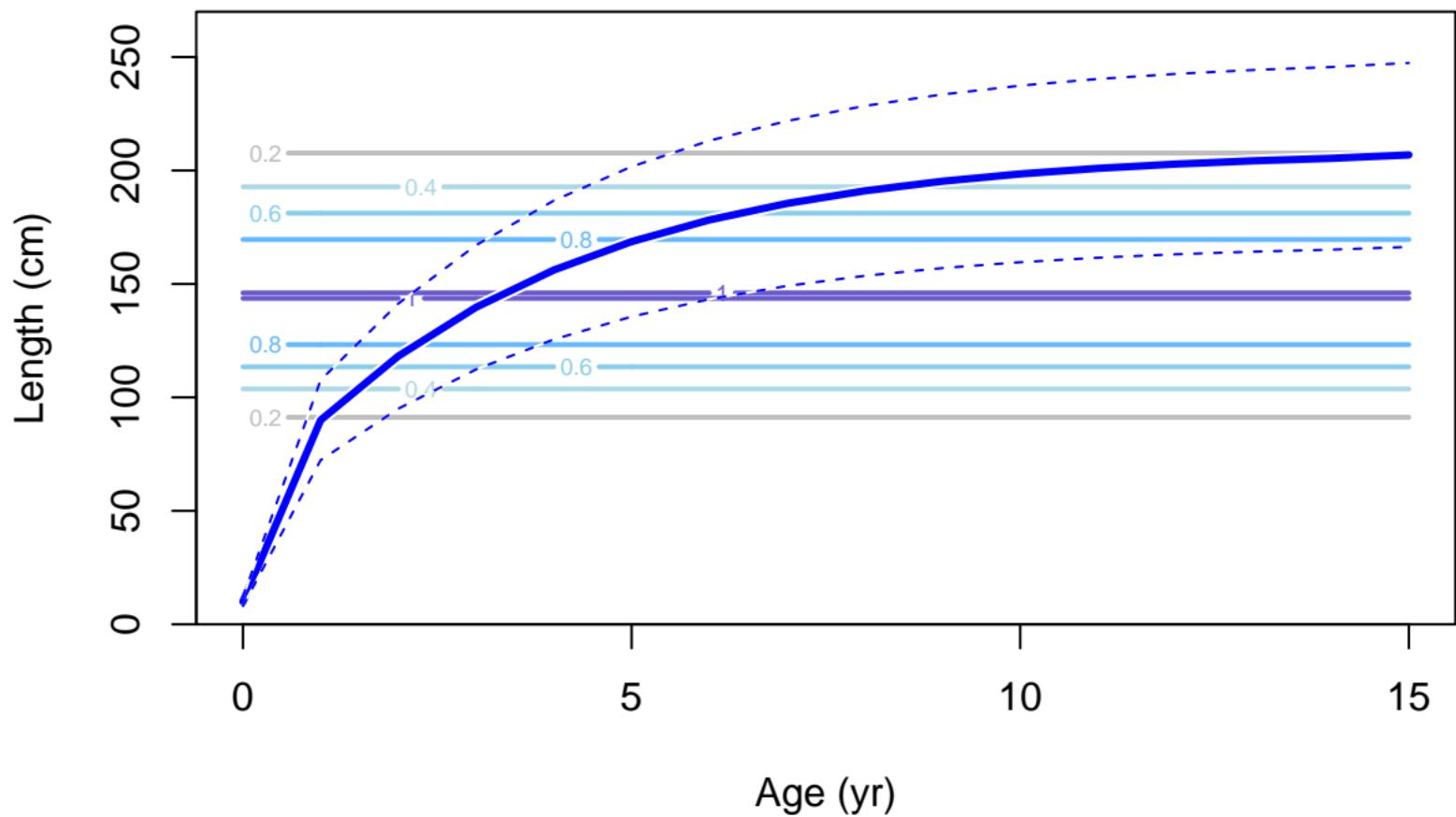


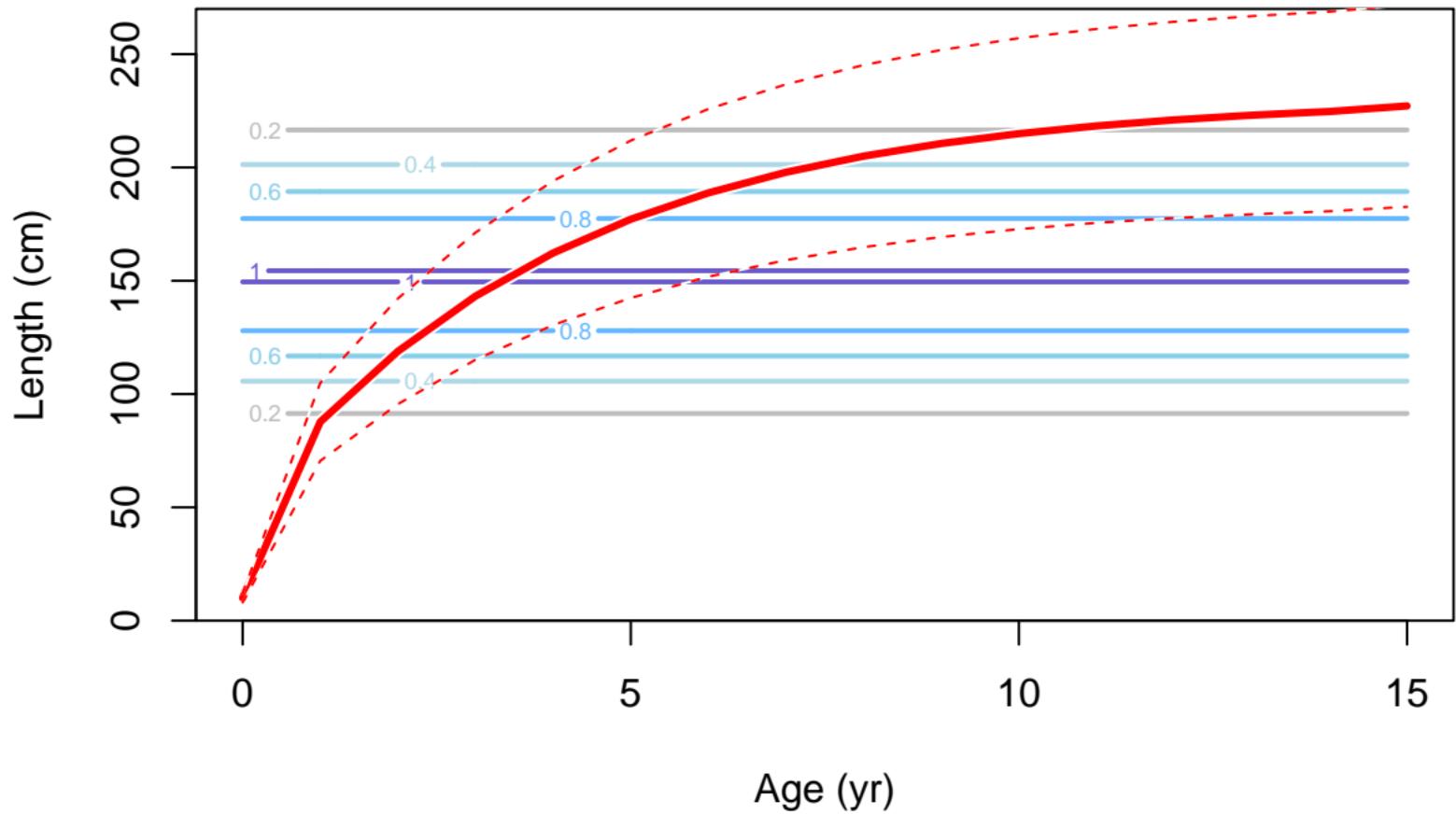


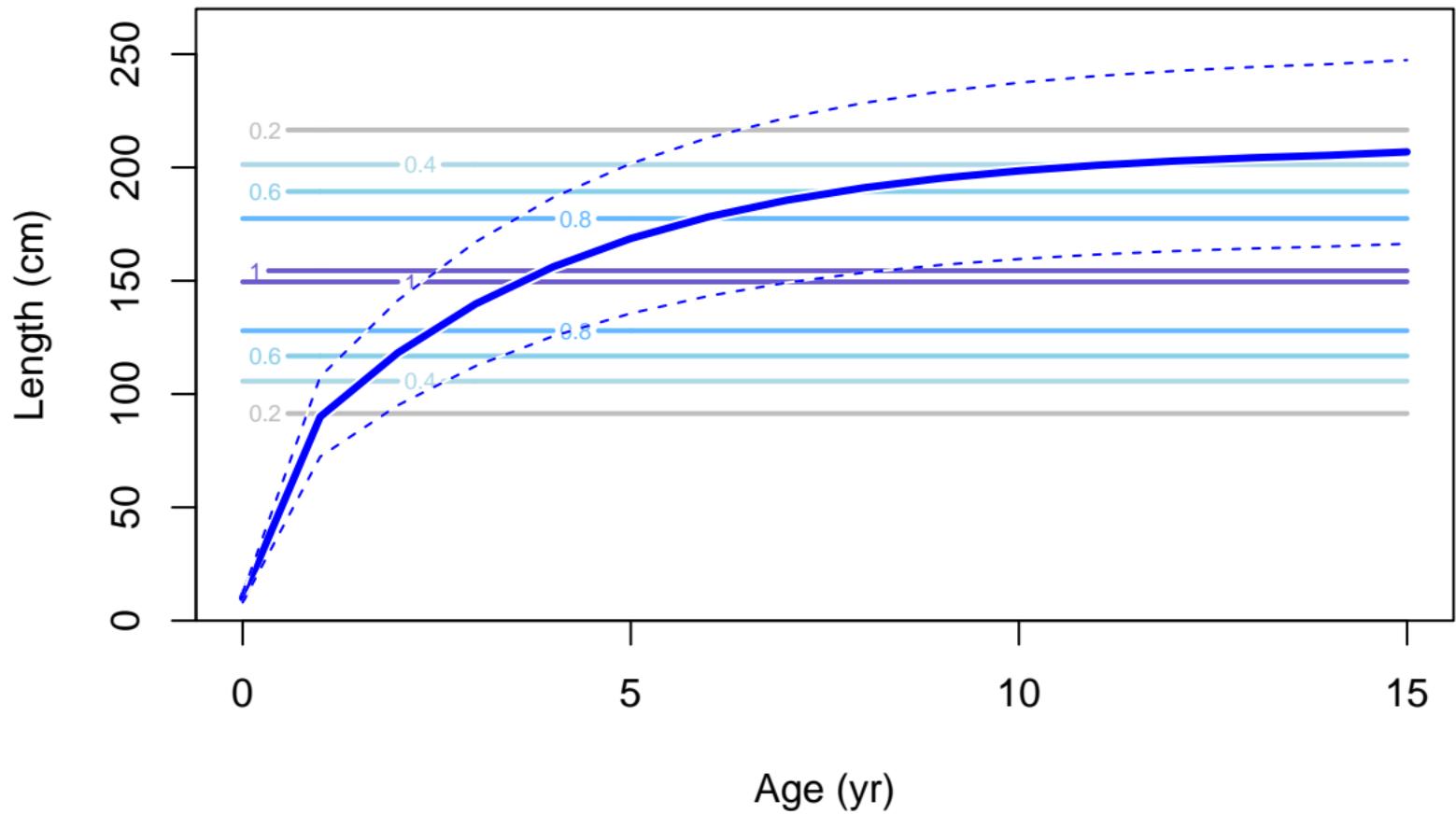


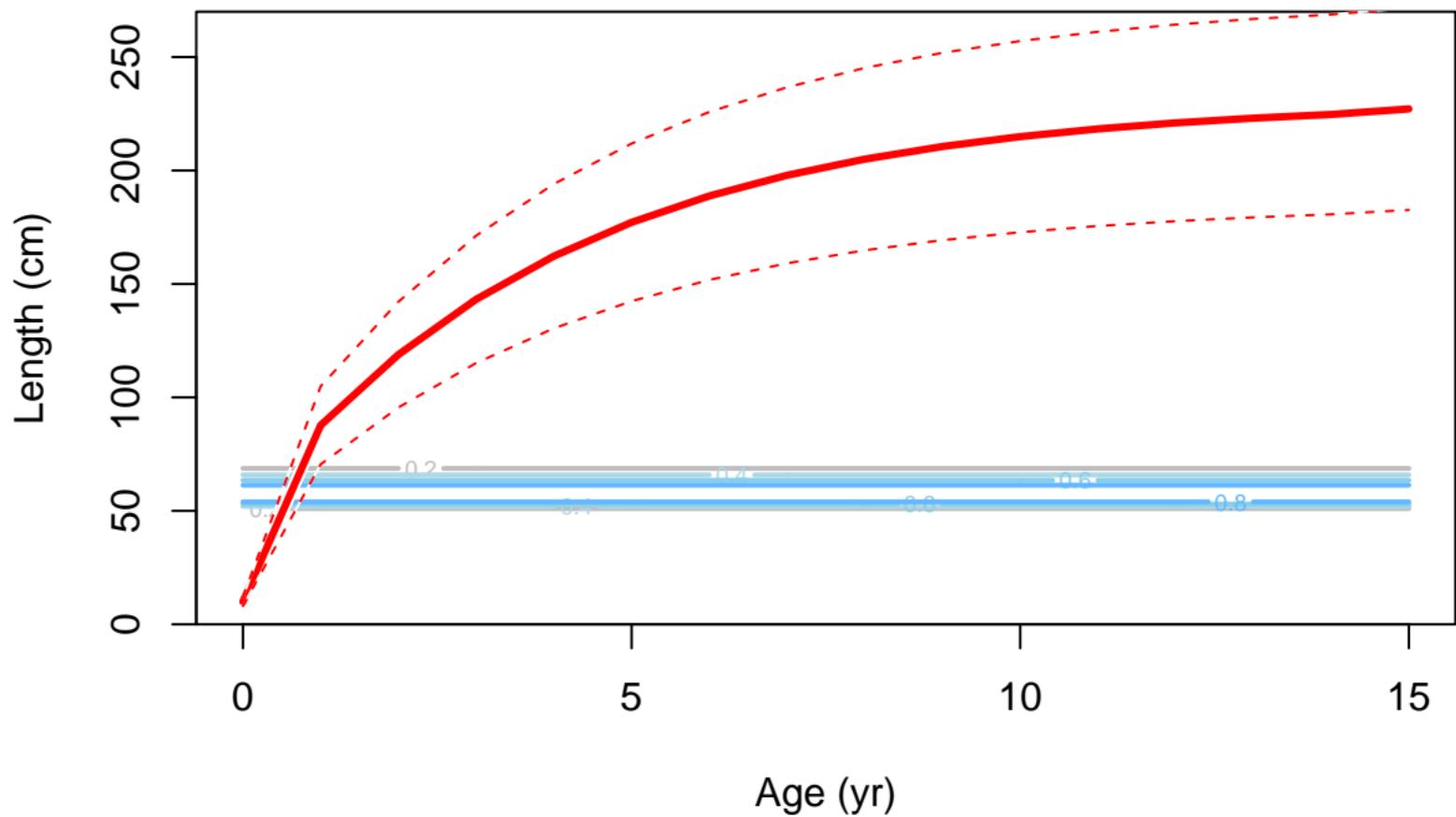


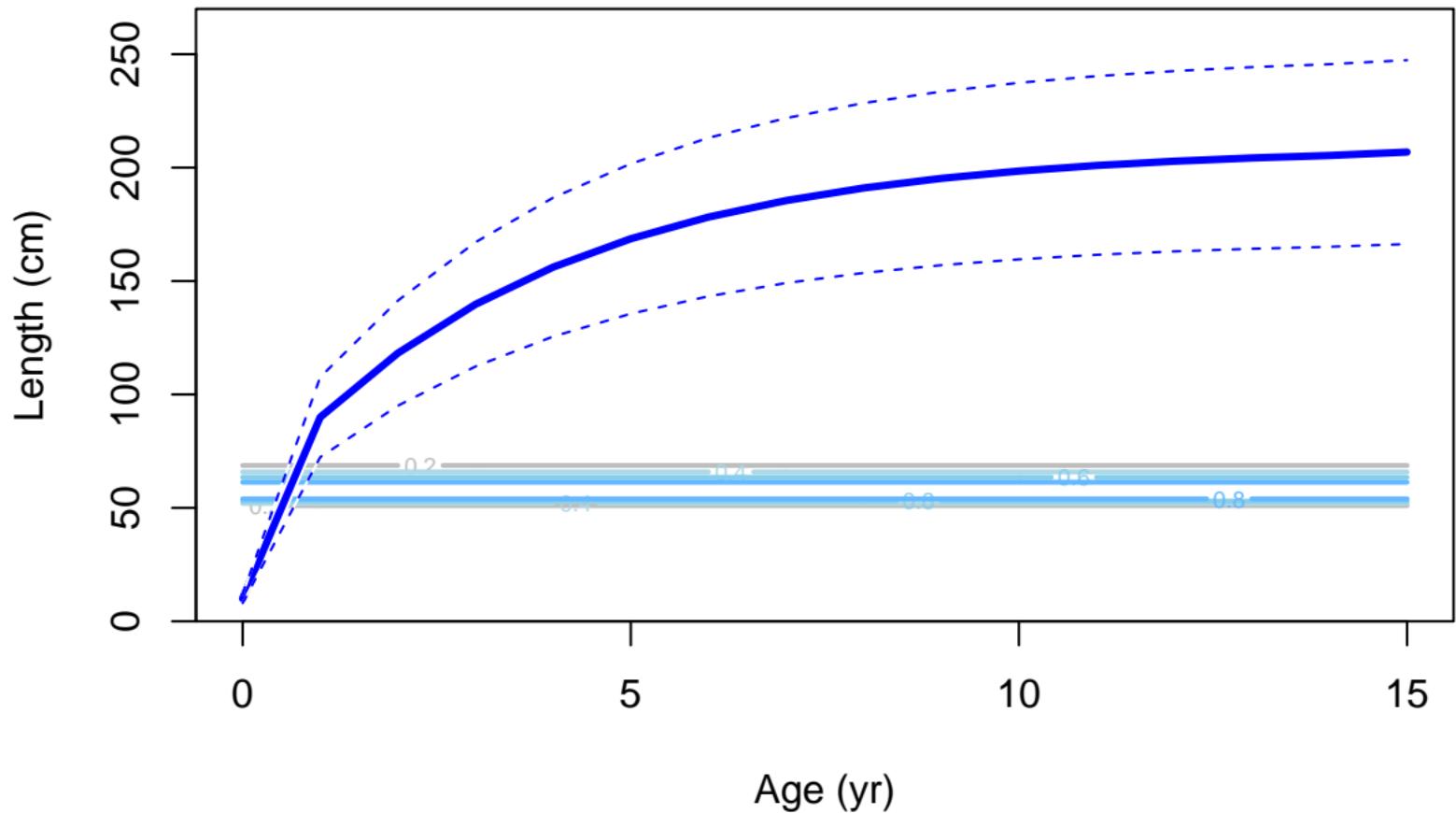


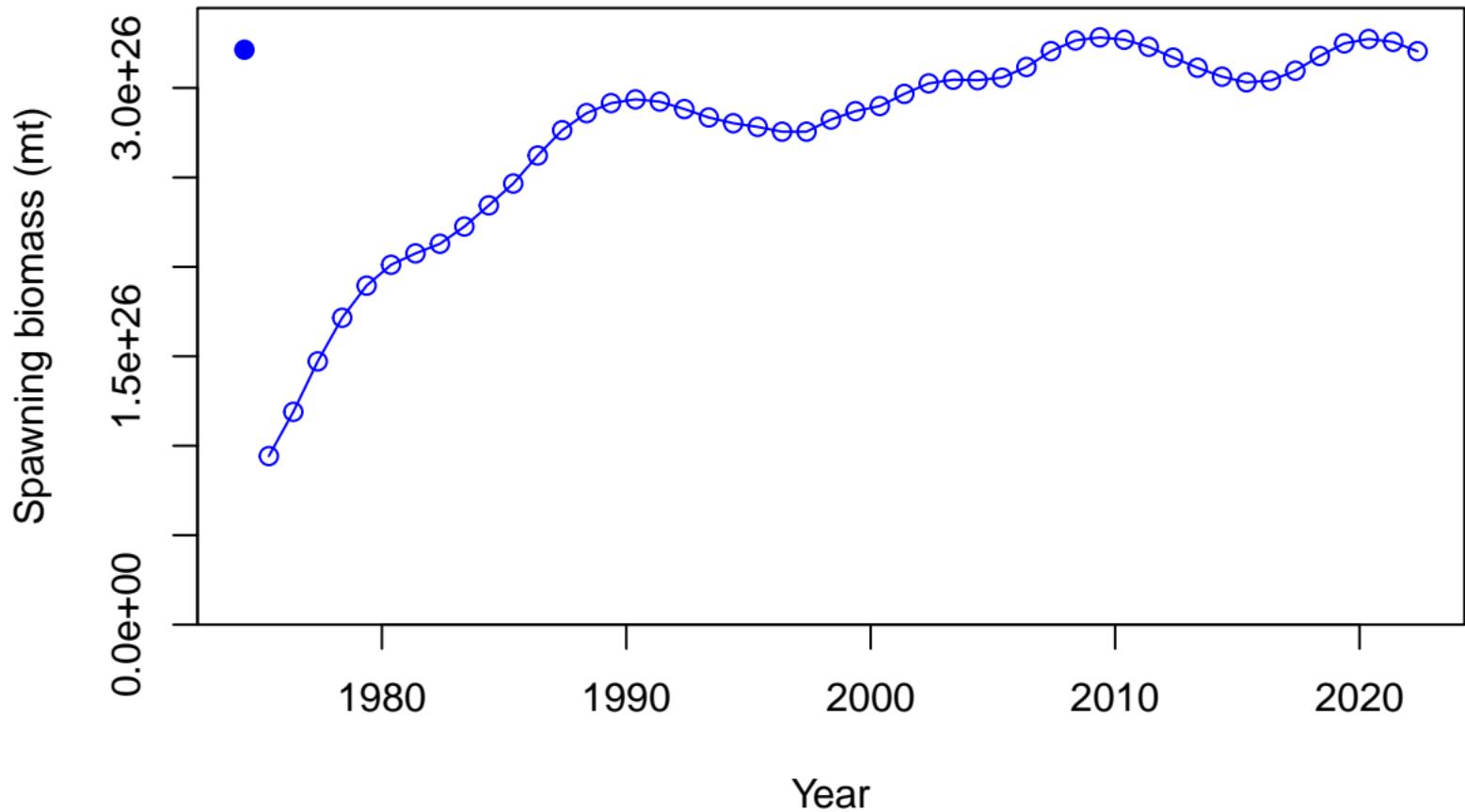


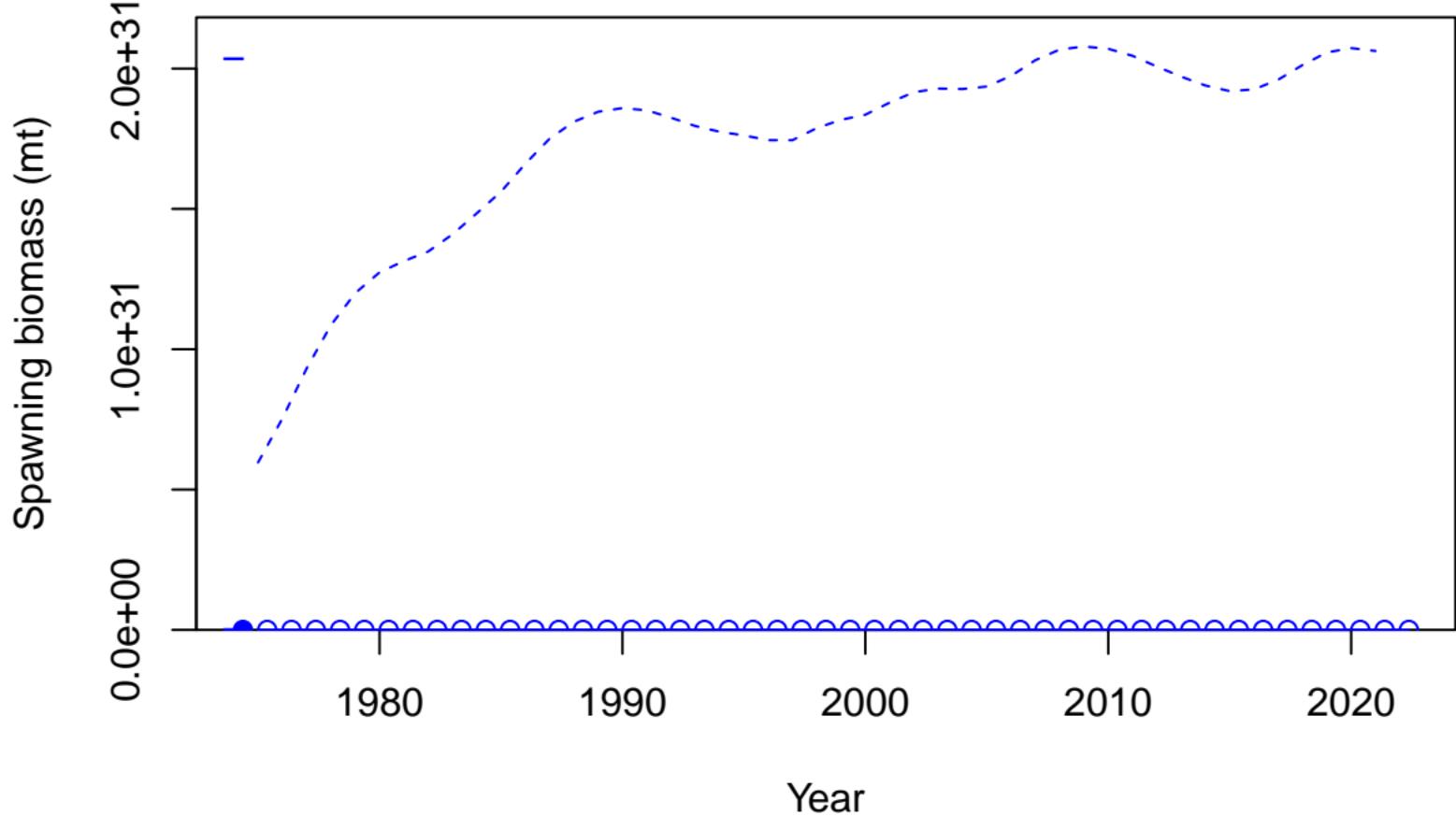




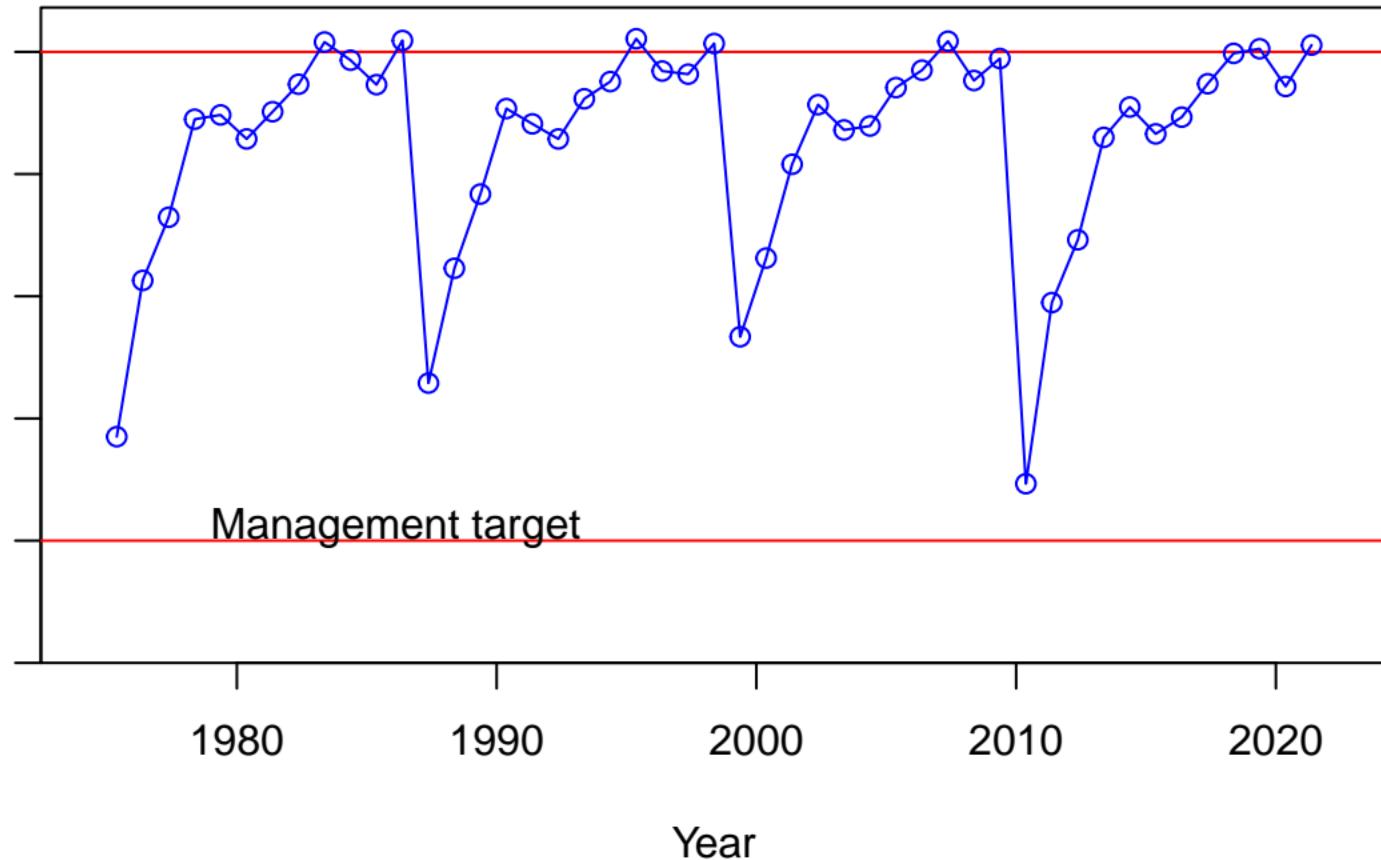




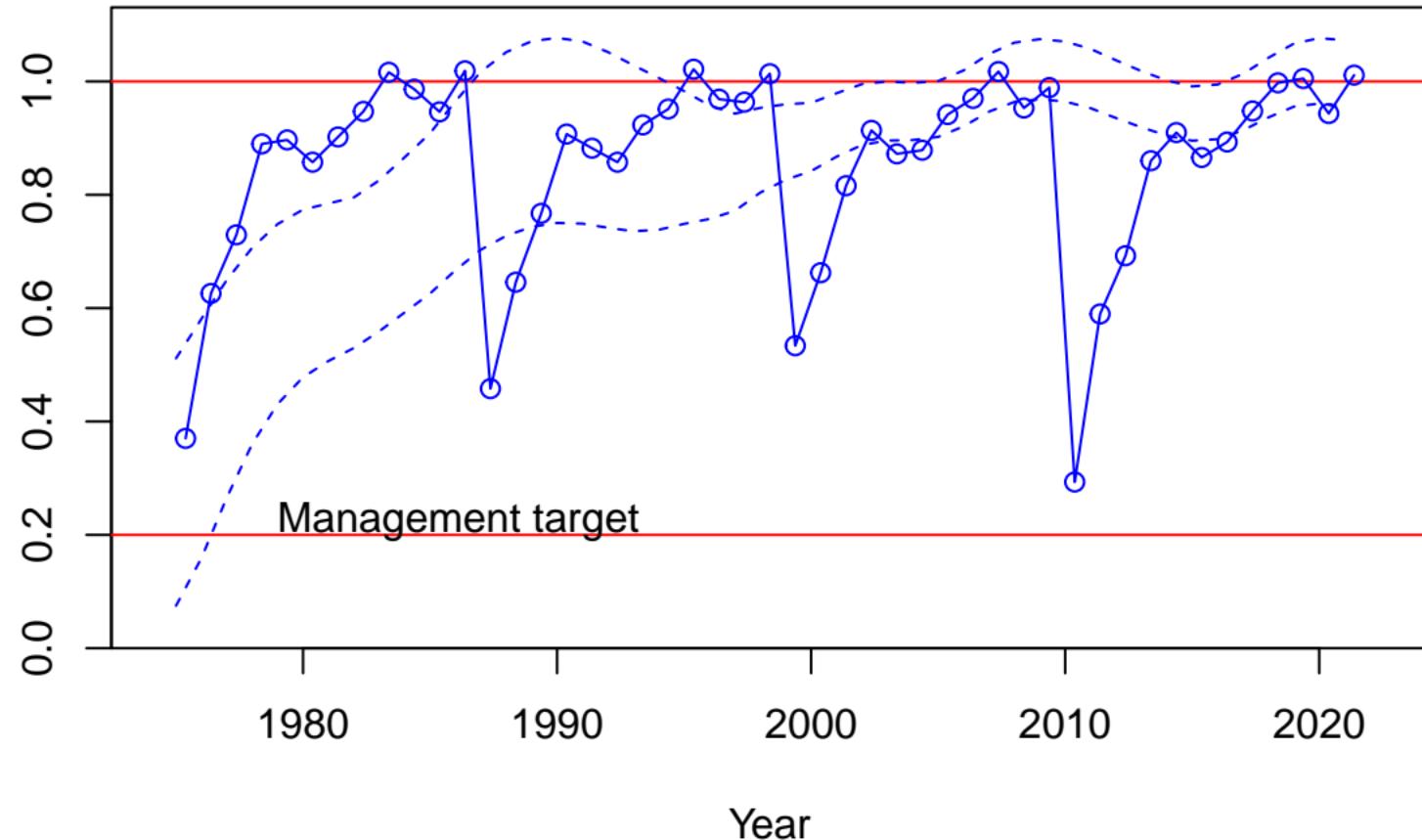


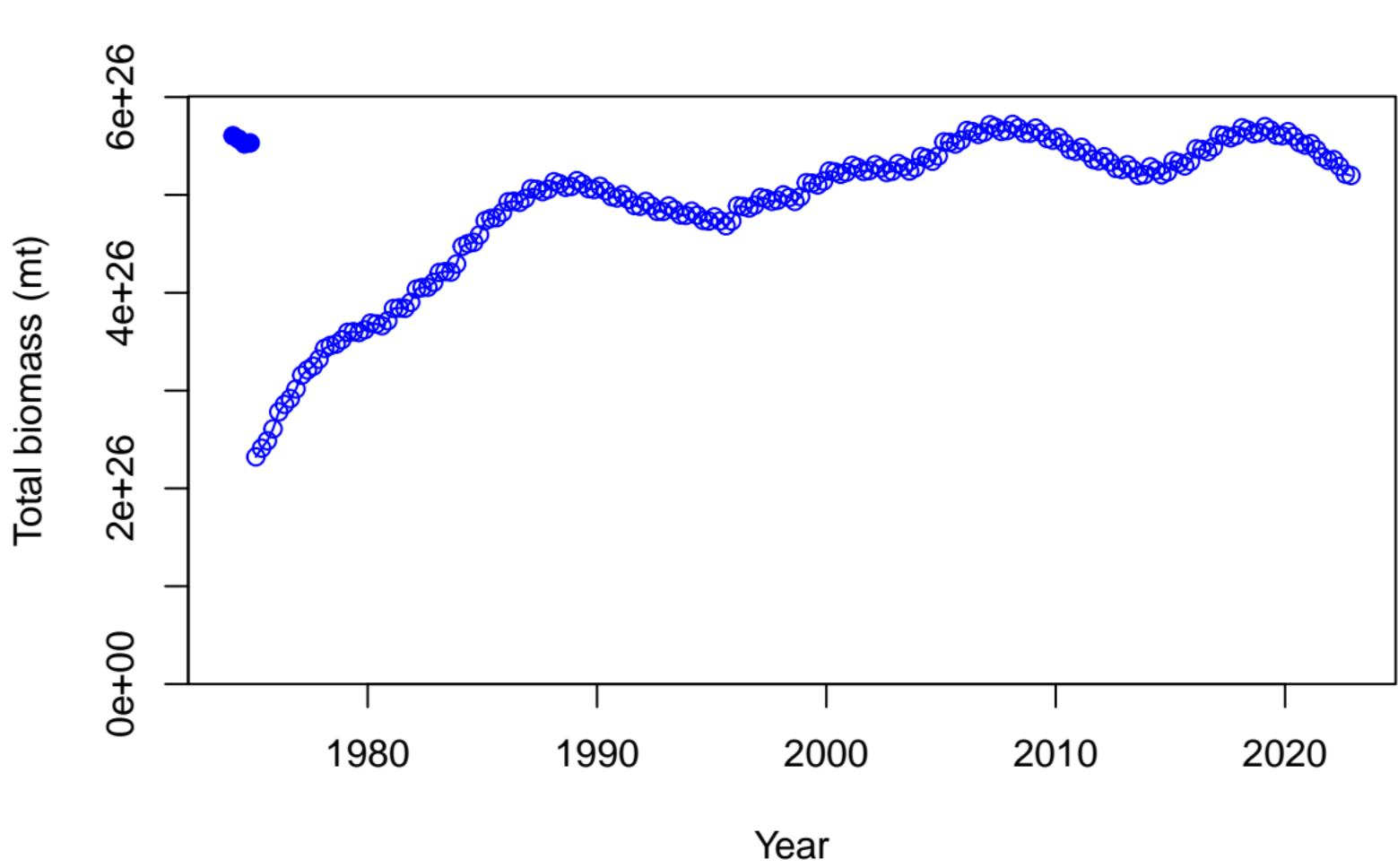


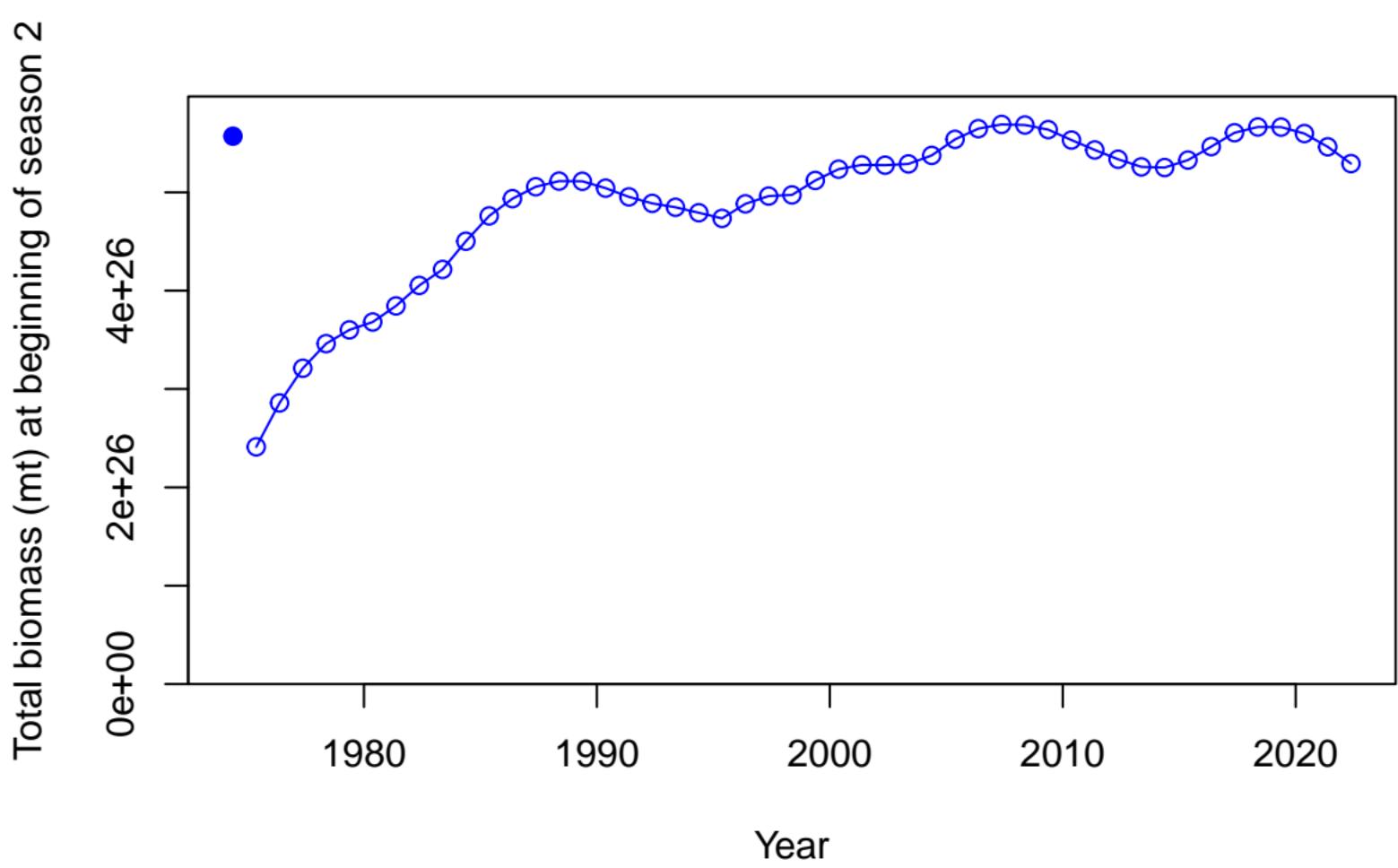
Relative spawning biomass: B/B_0

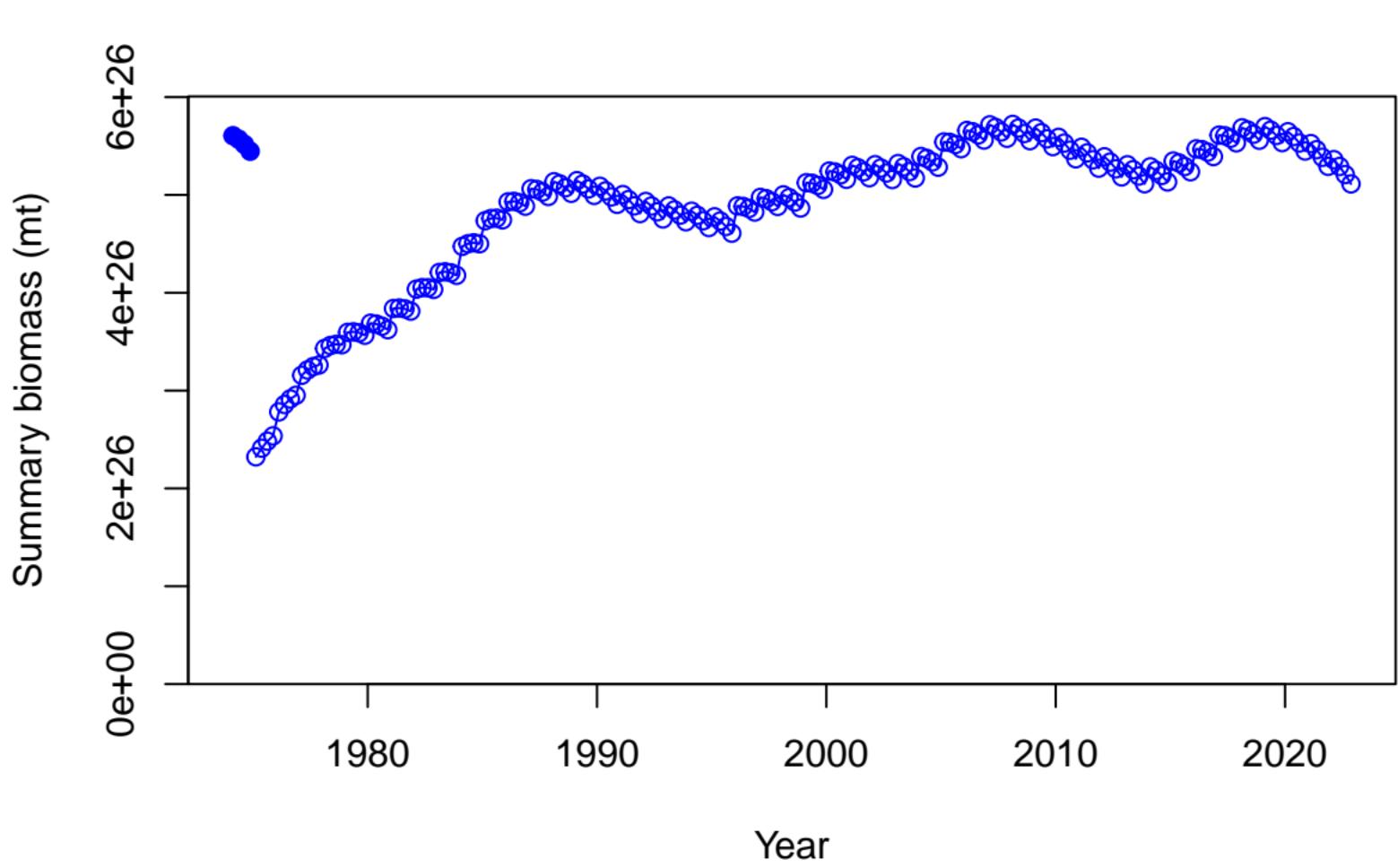


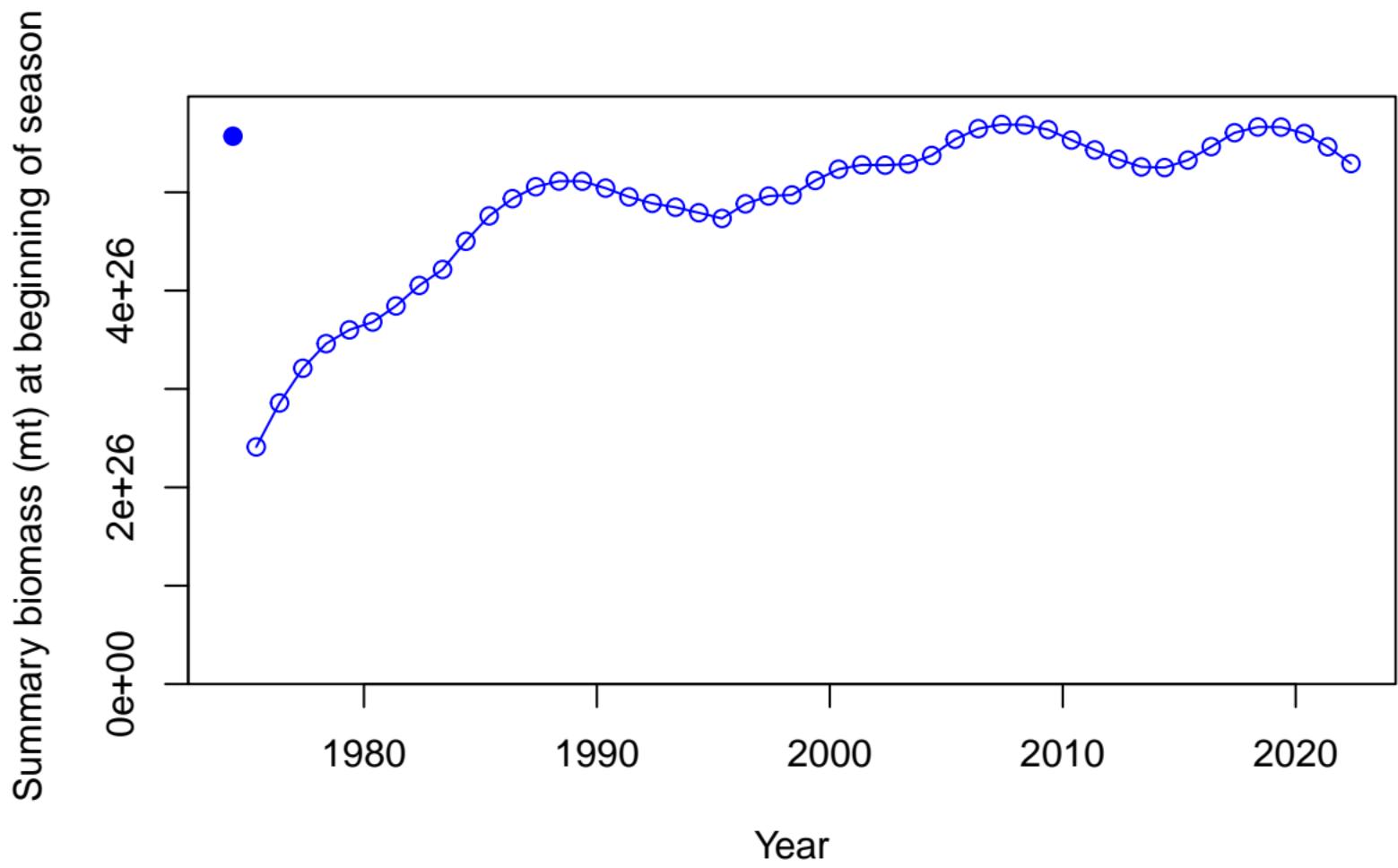
Relative spawning biomass: B/B_0

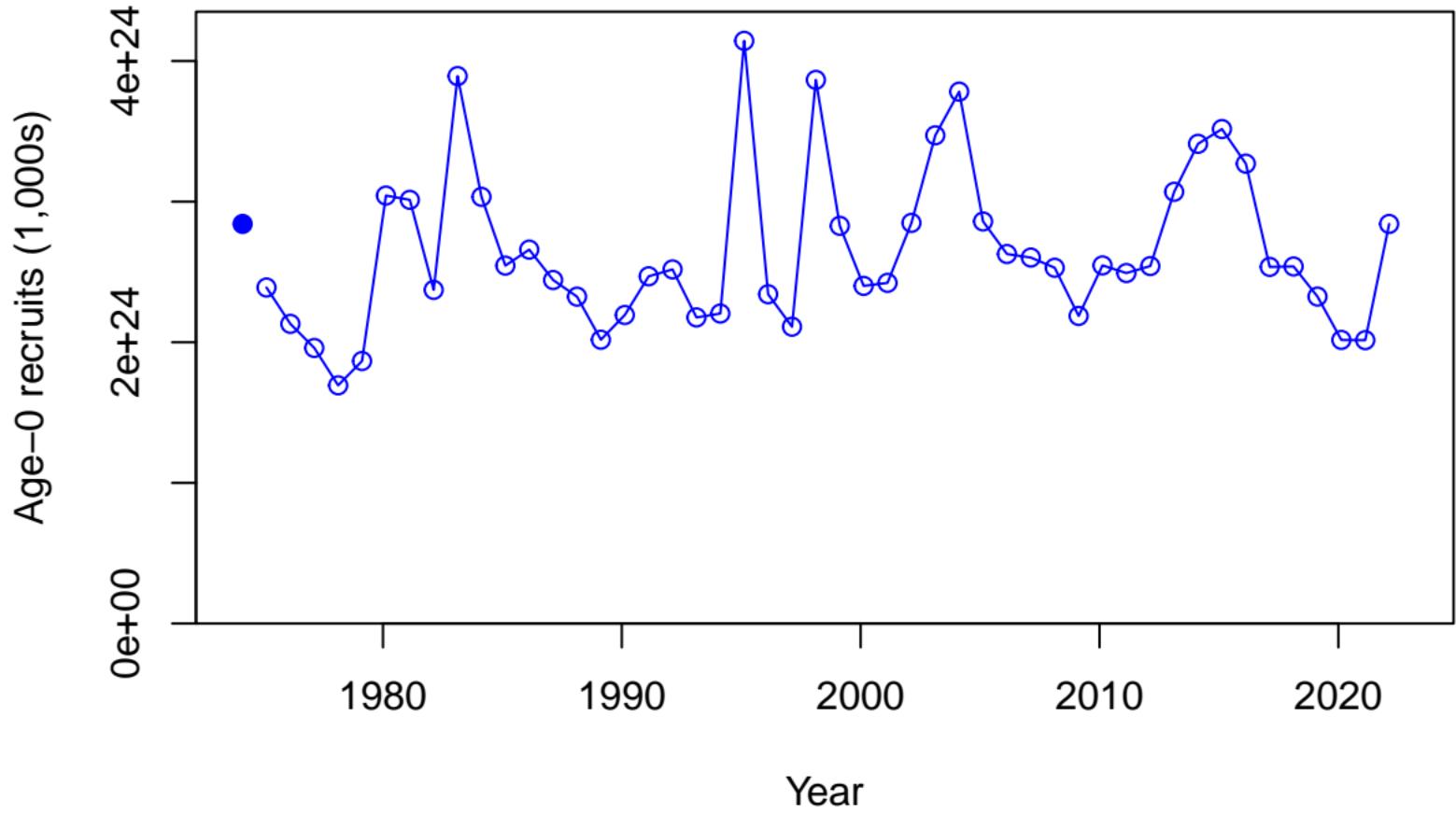


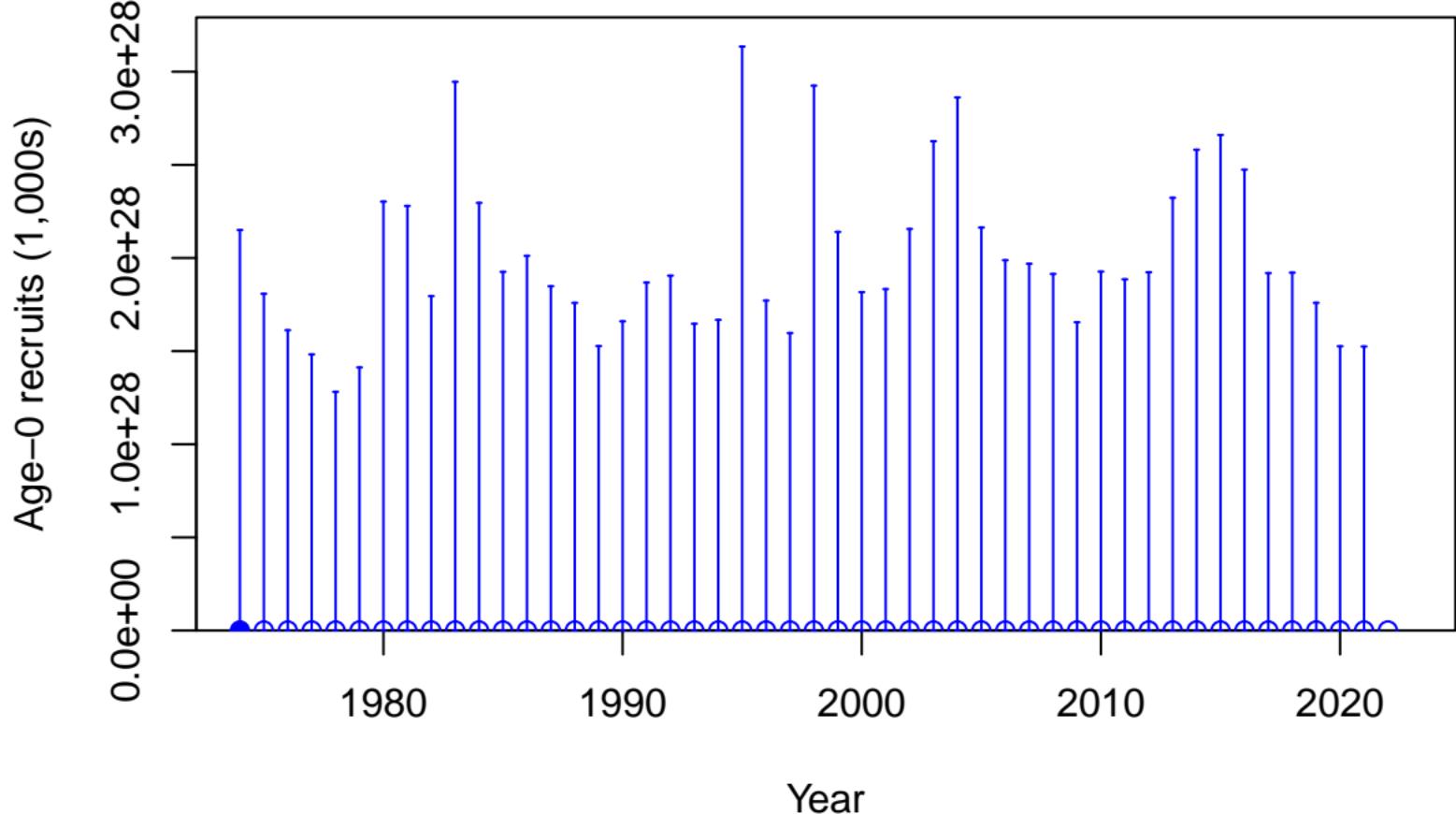


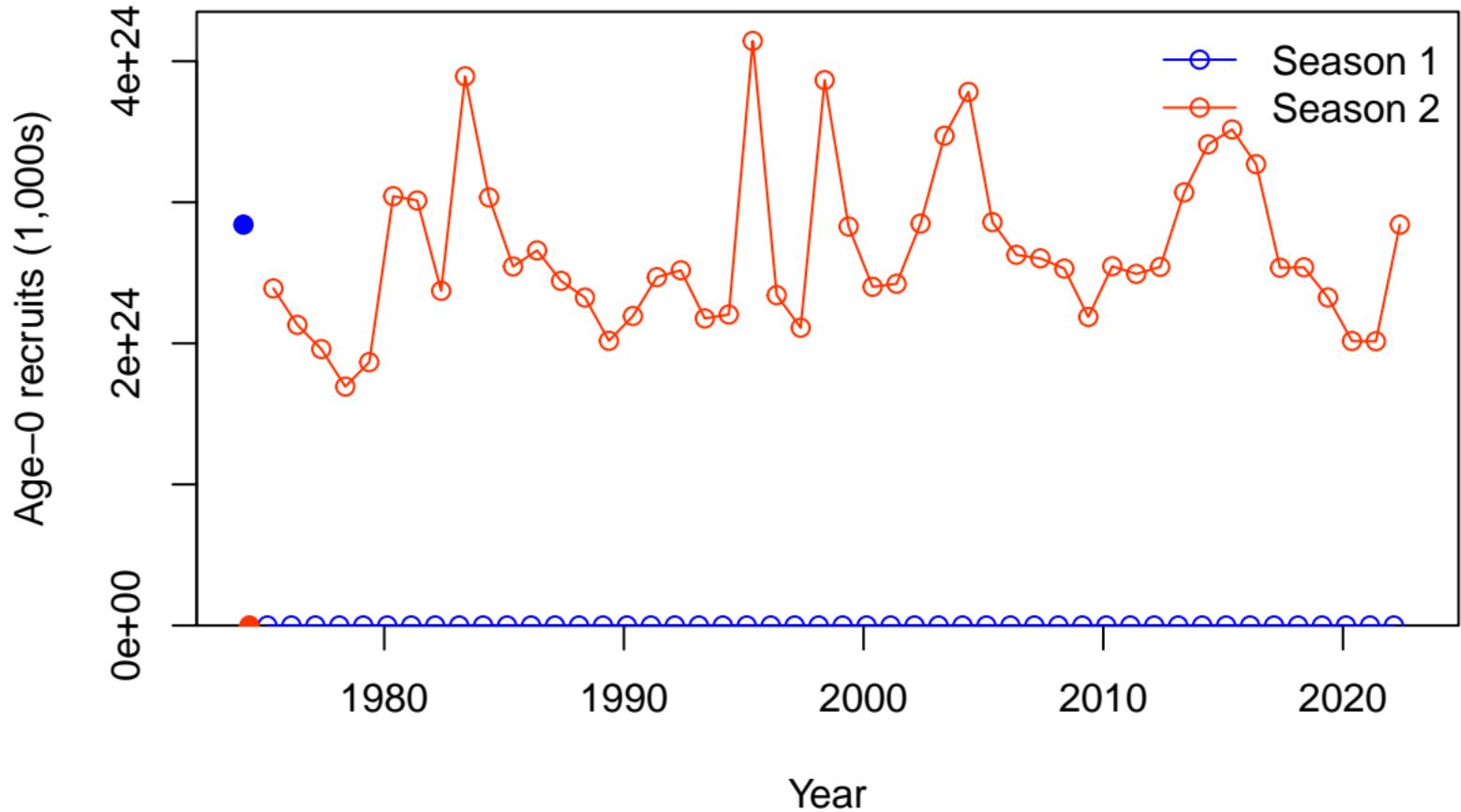




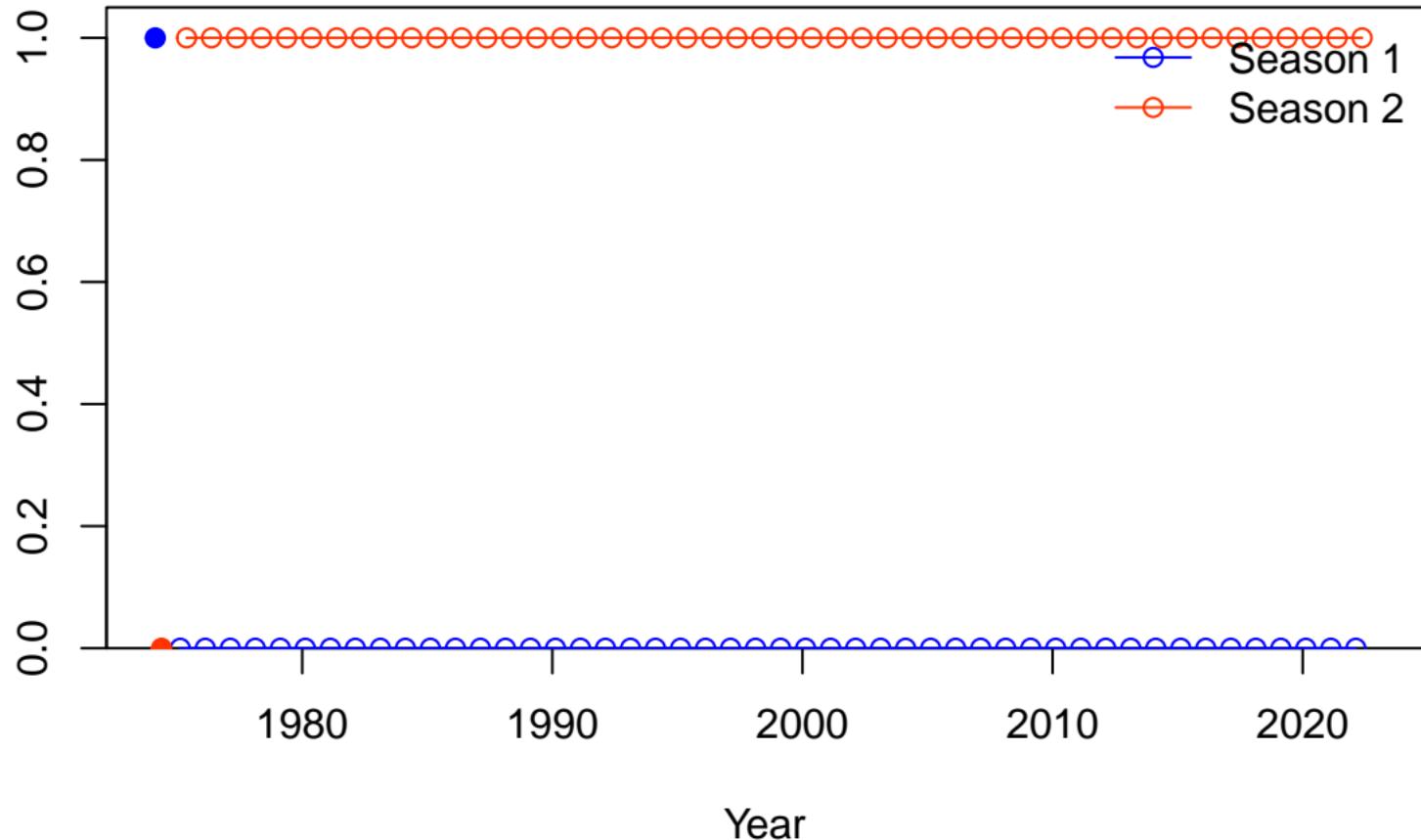




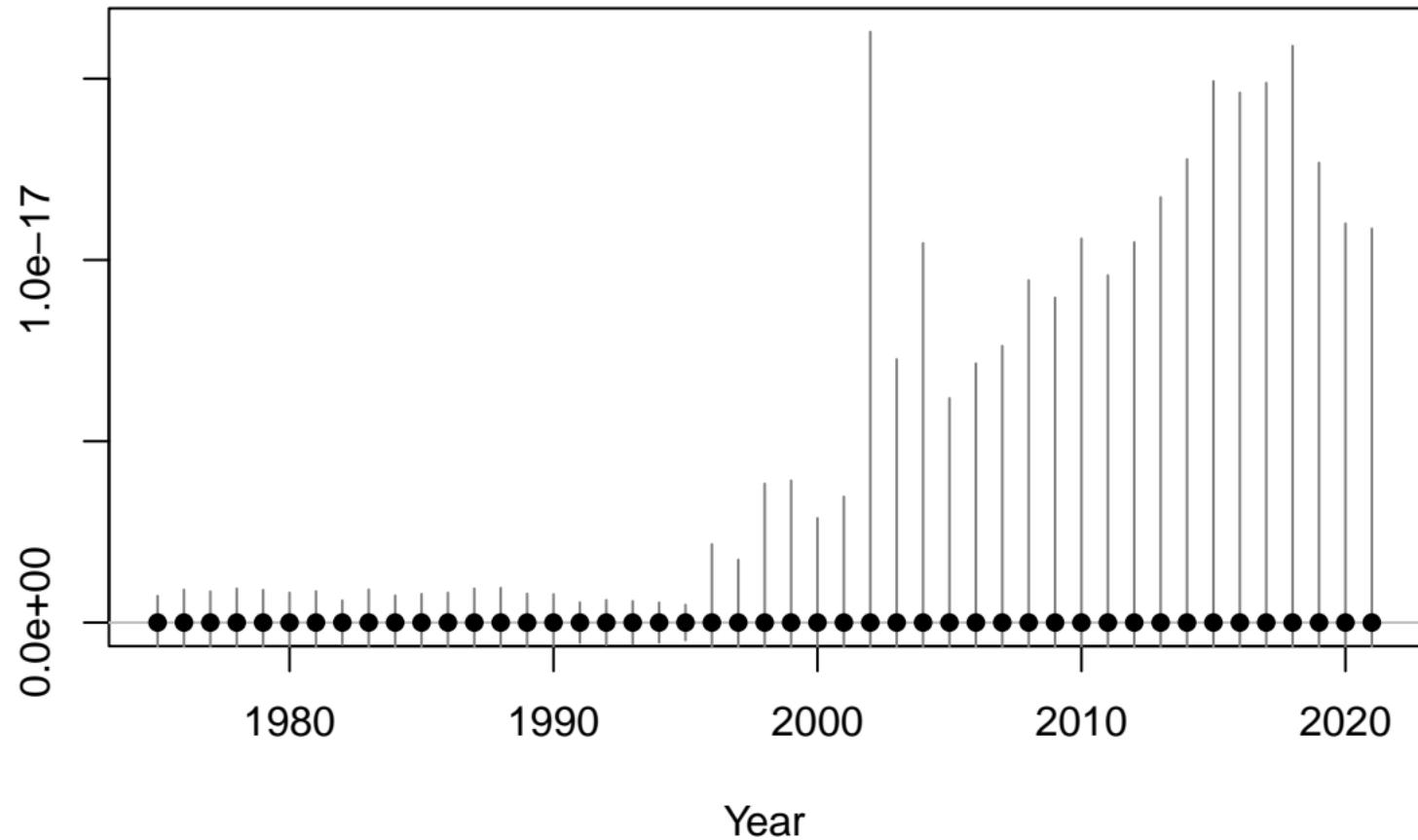


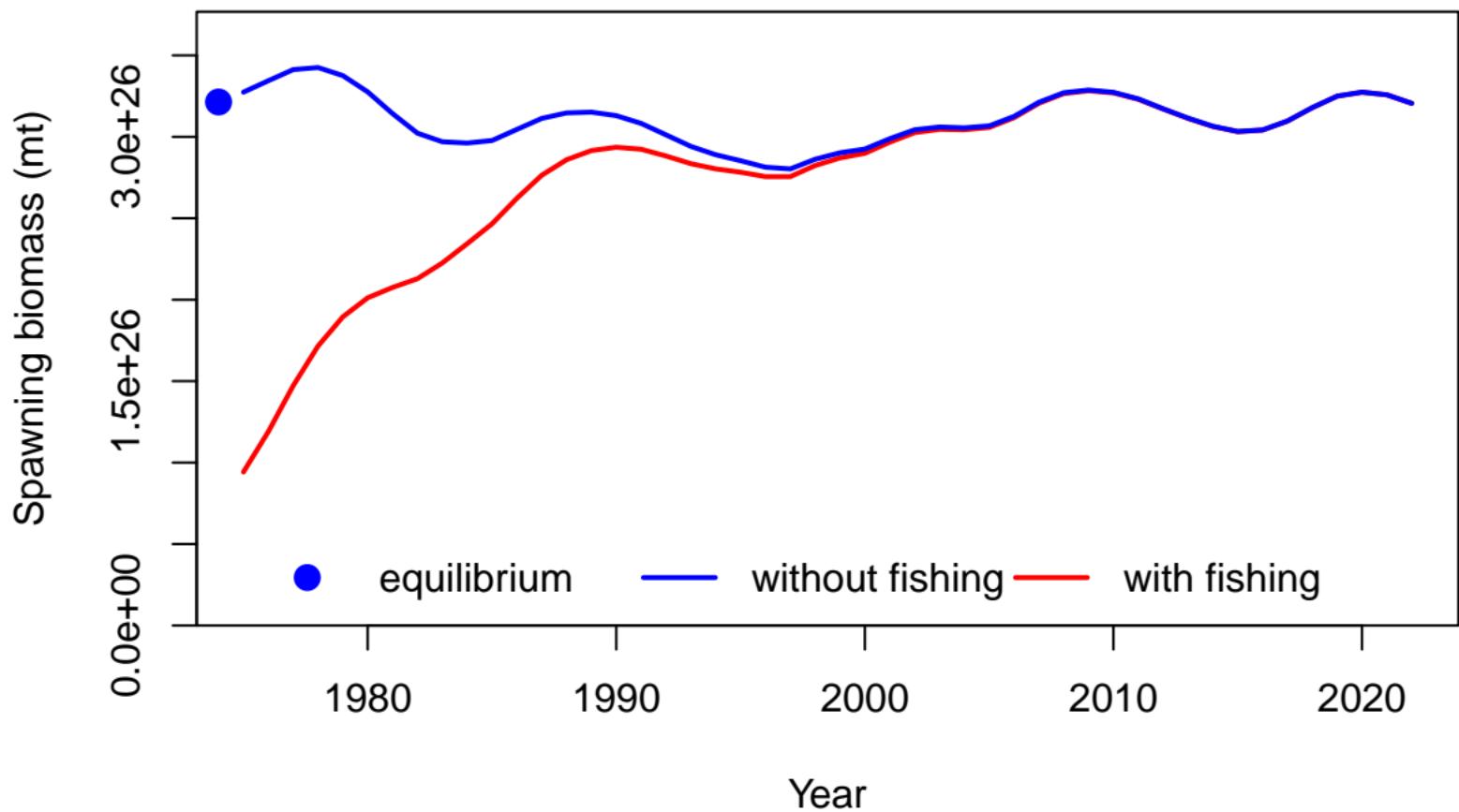


Fraction of total Age-0 recruits

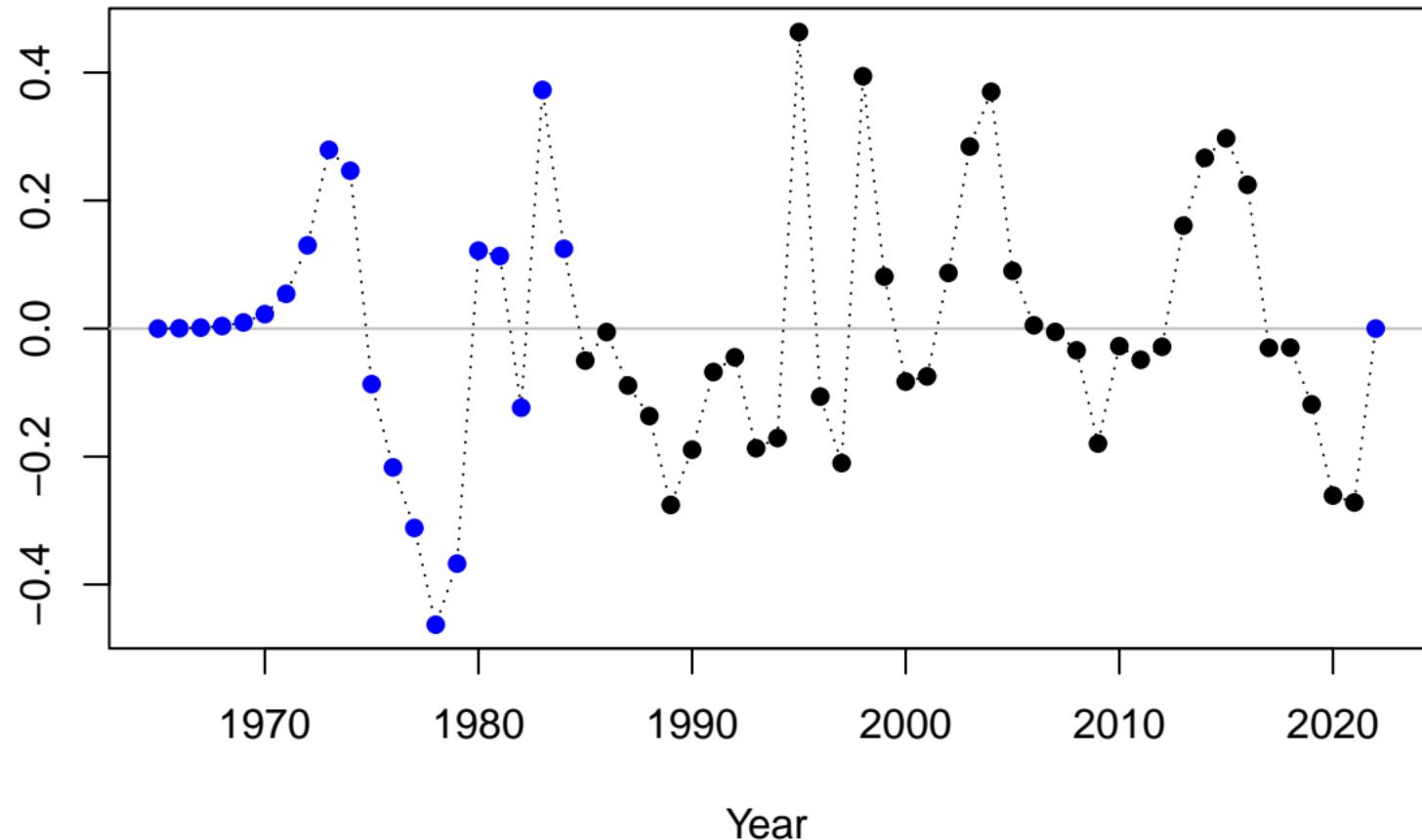


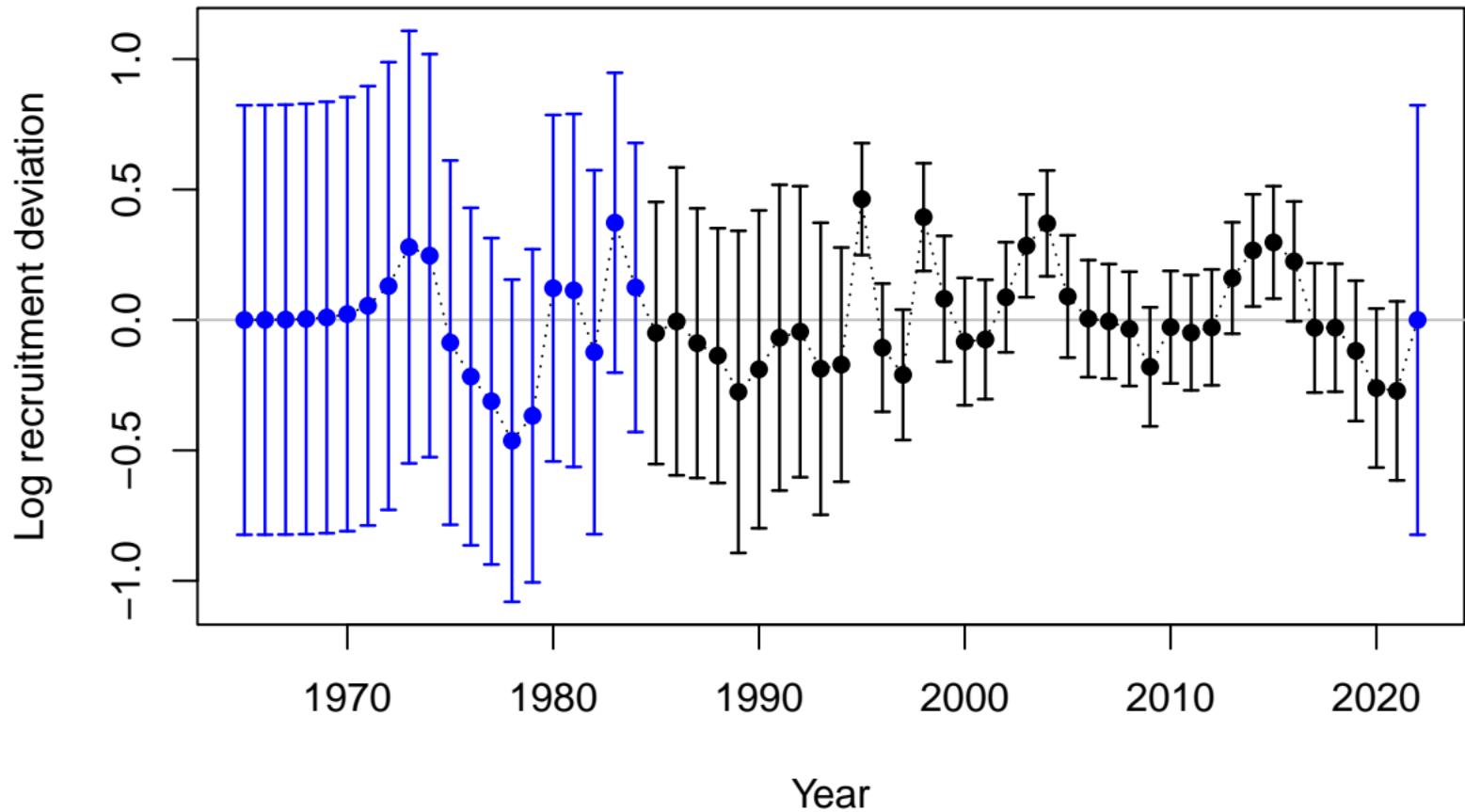
Summary Fishing Mortality



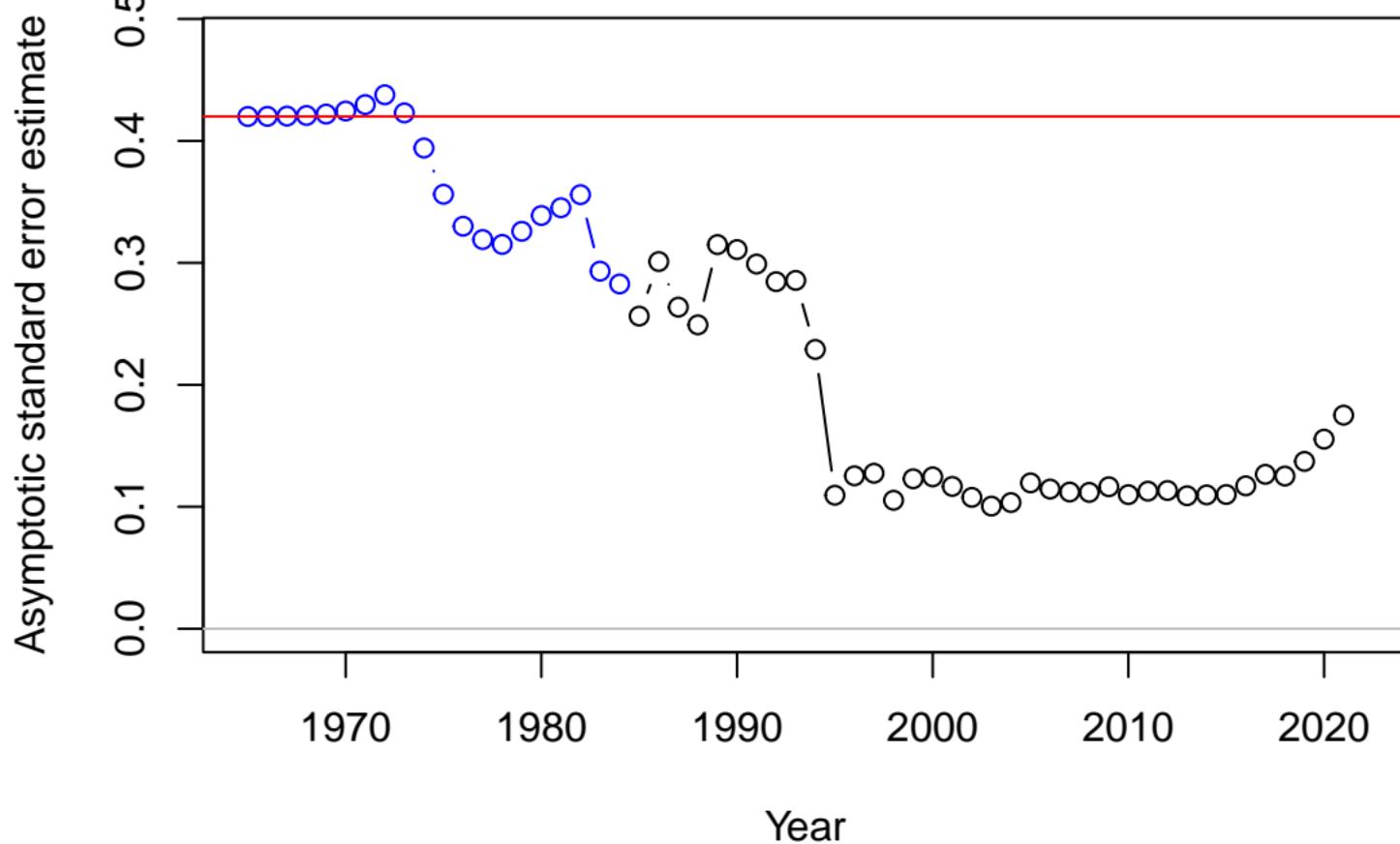


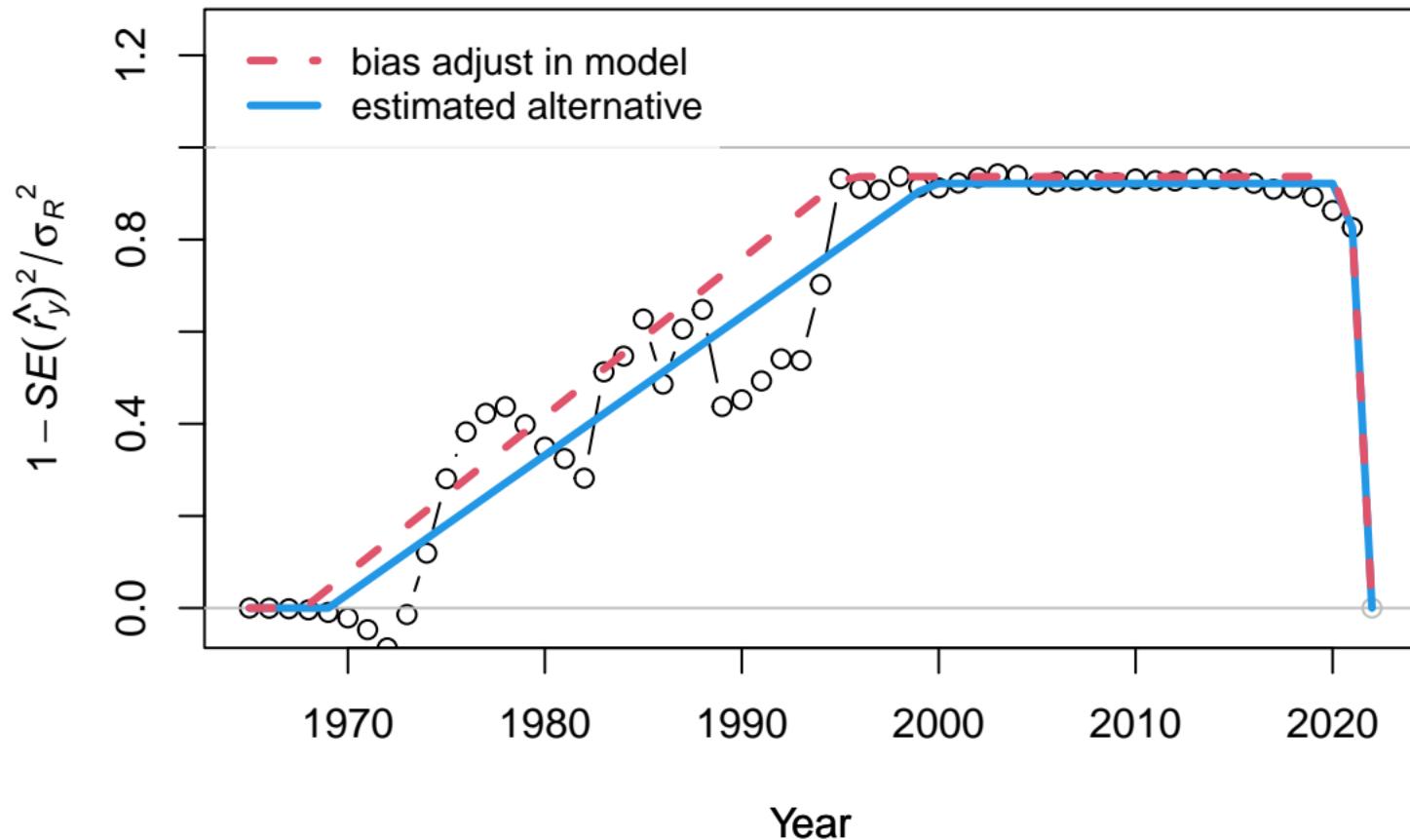
Log recruitment deviation

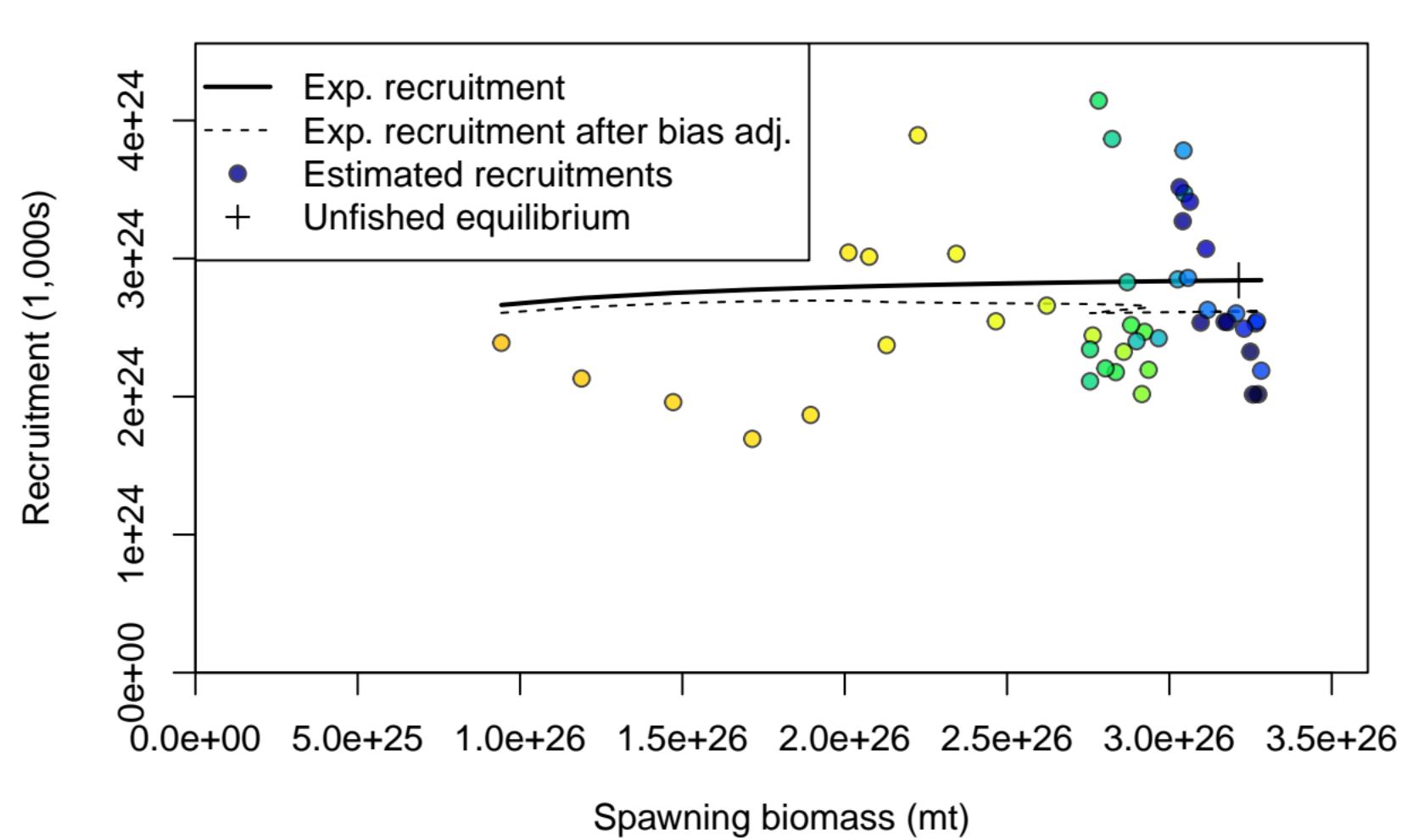


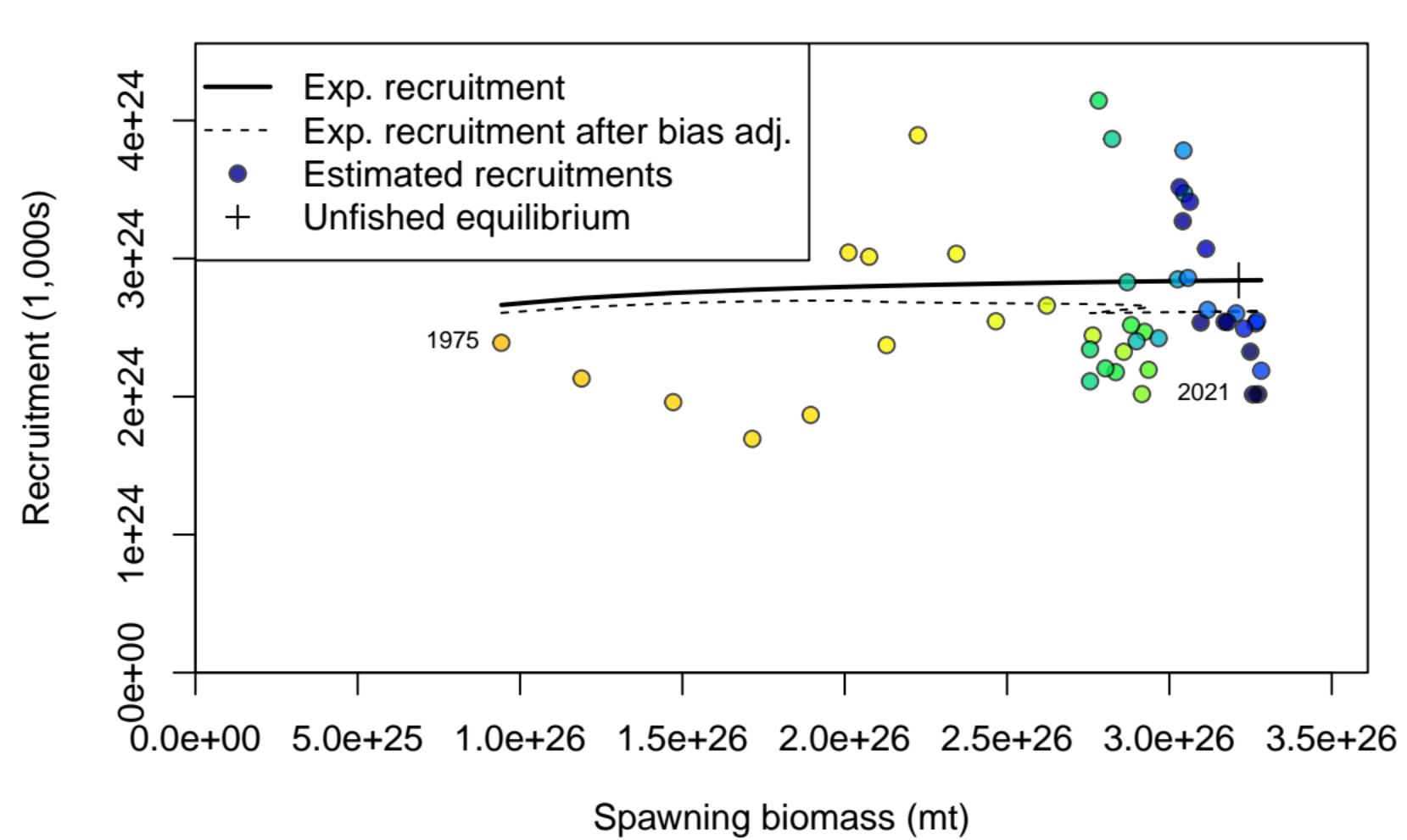


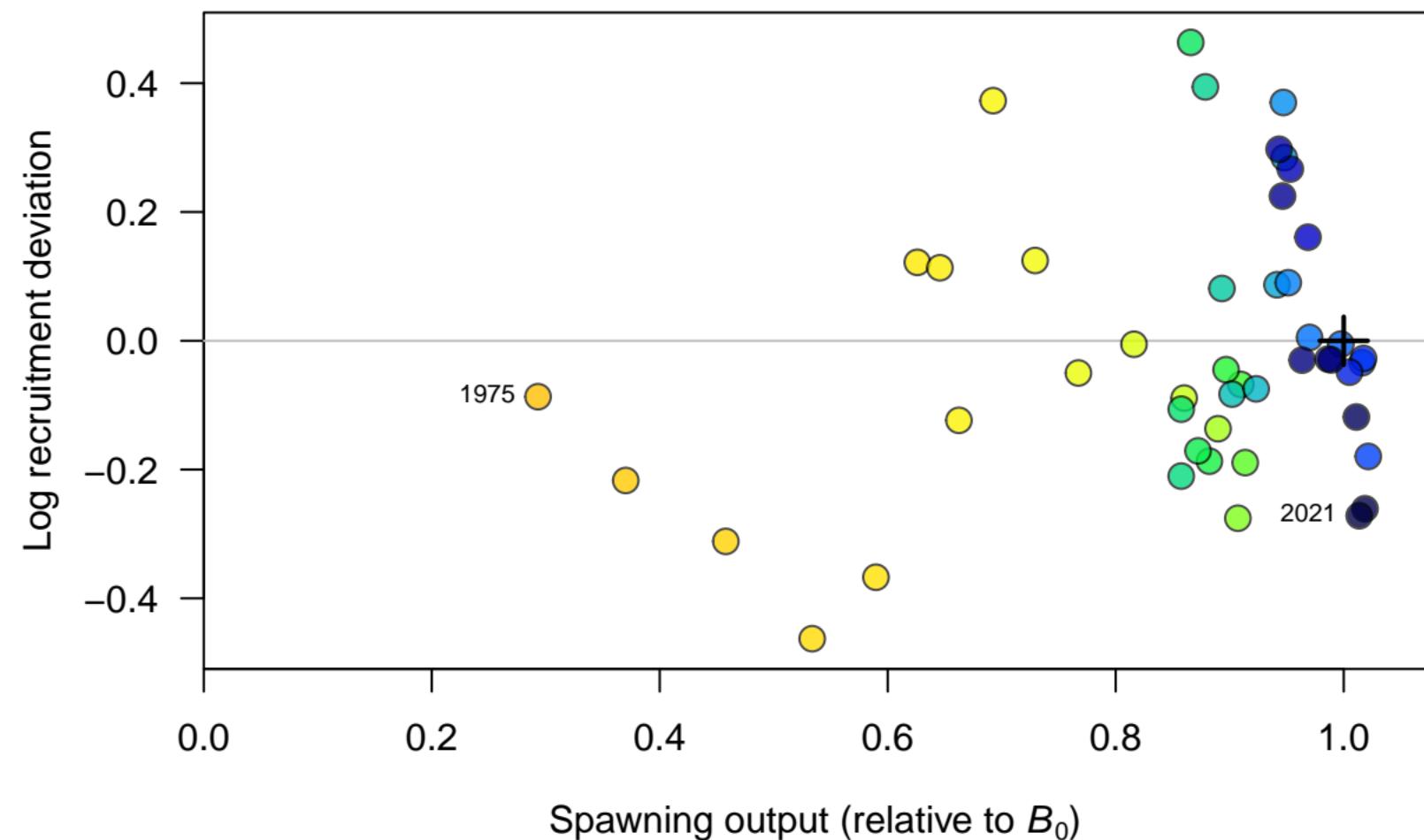
Recruitment deviation variance



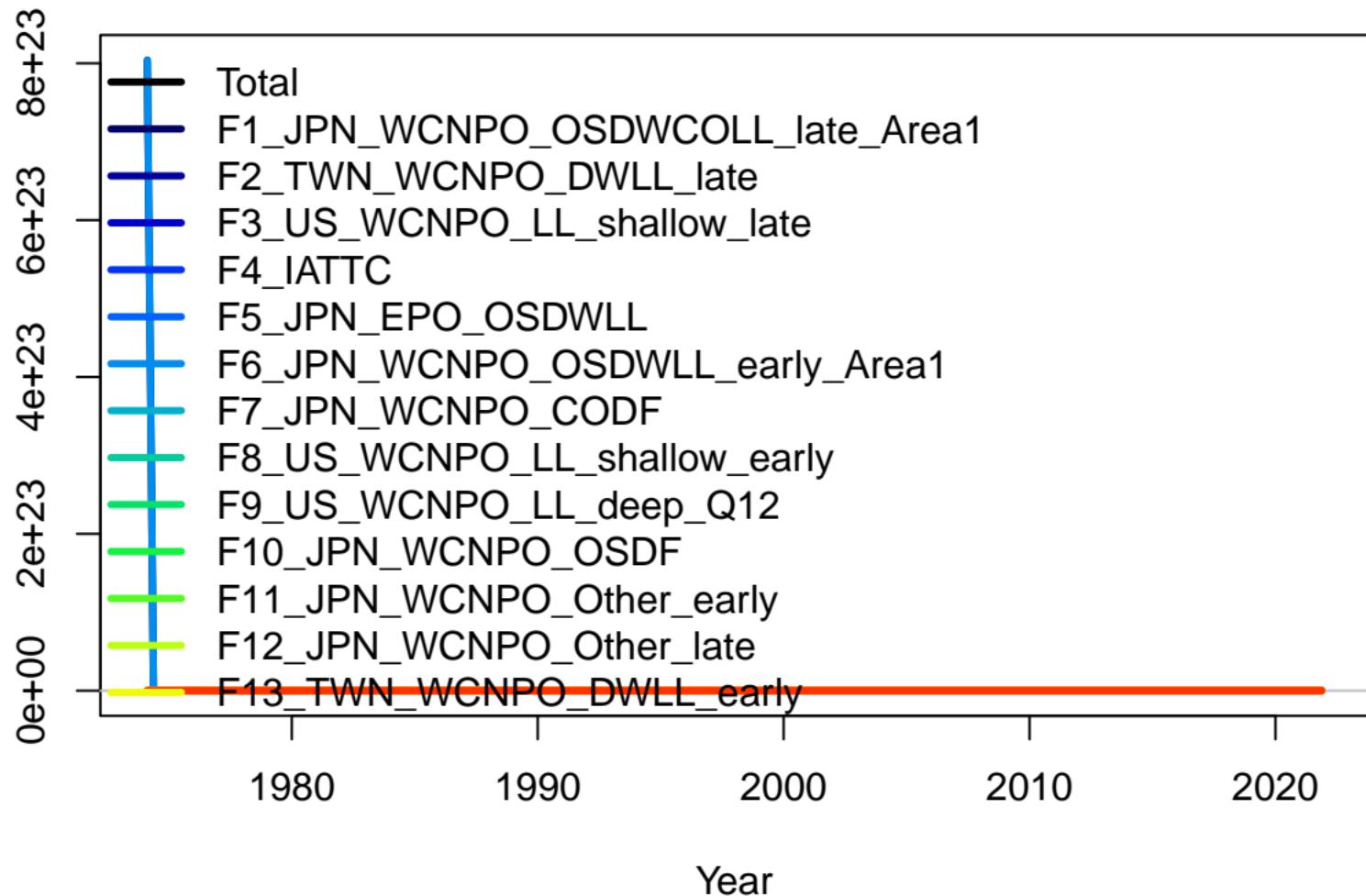


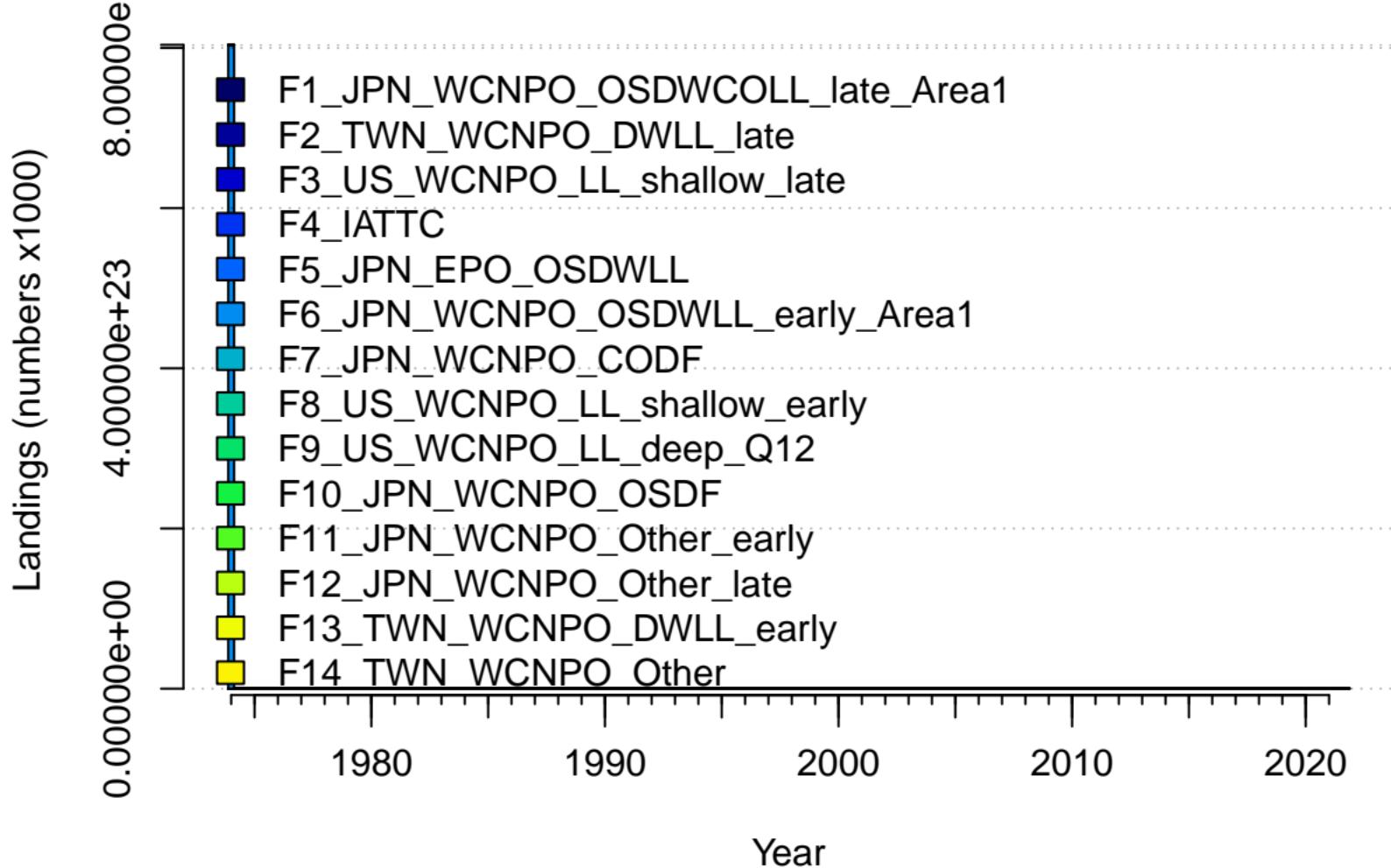


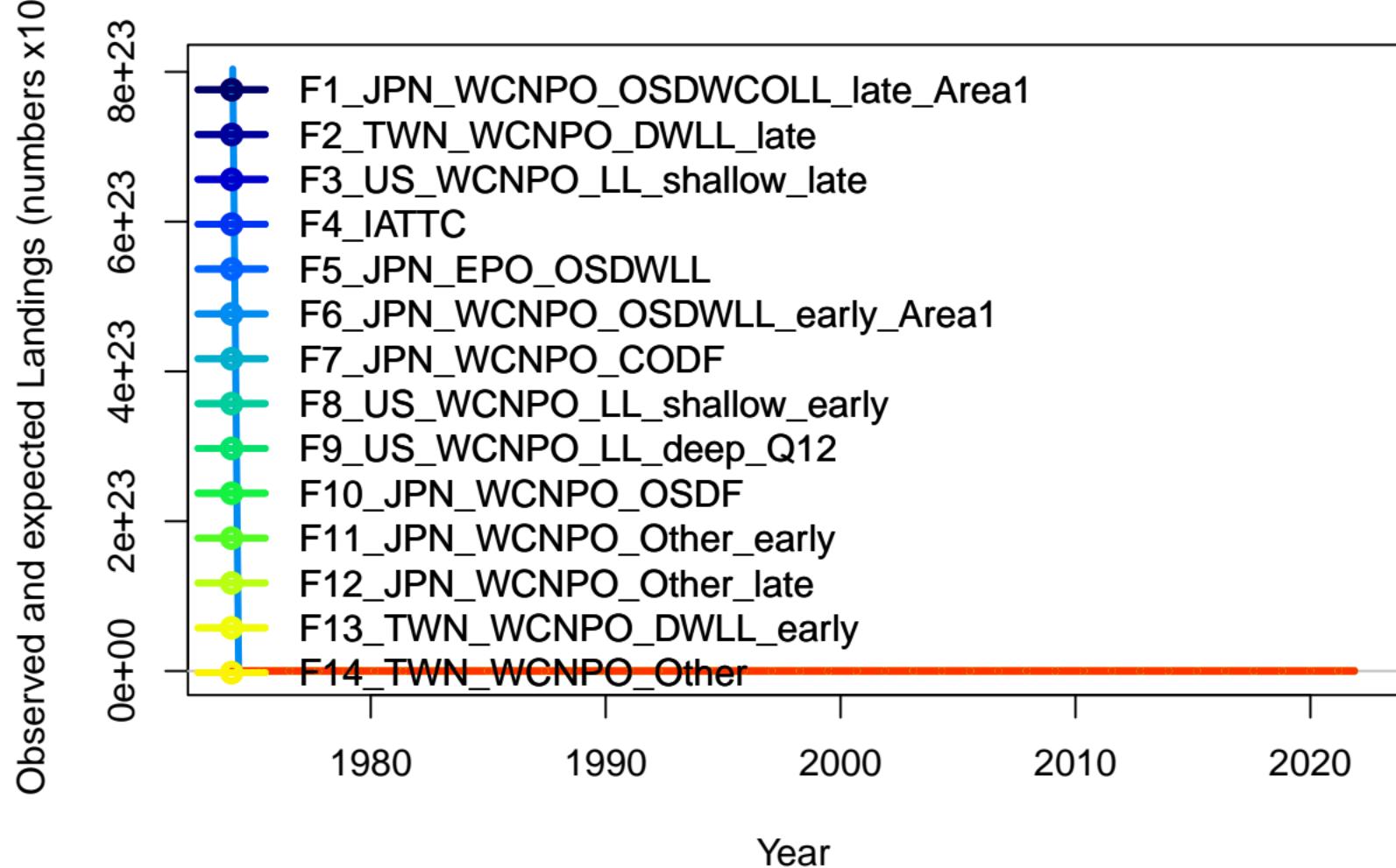




Landings (numbers x1000)

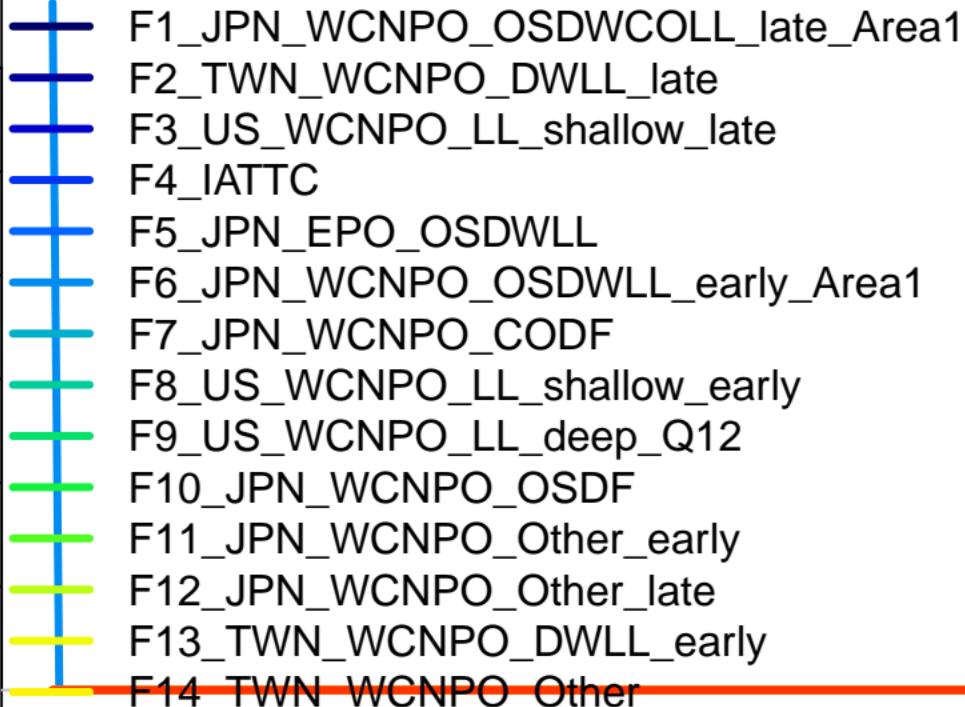






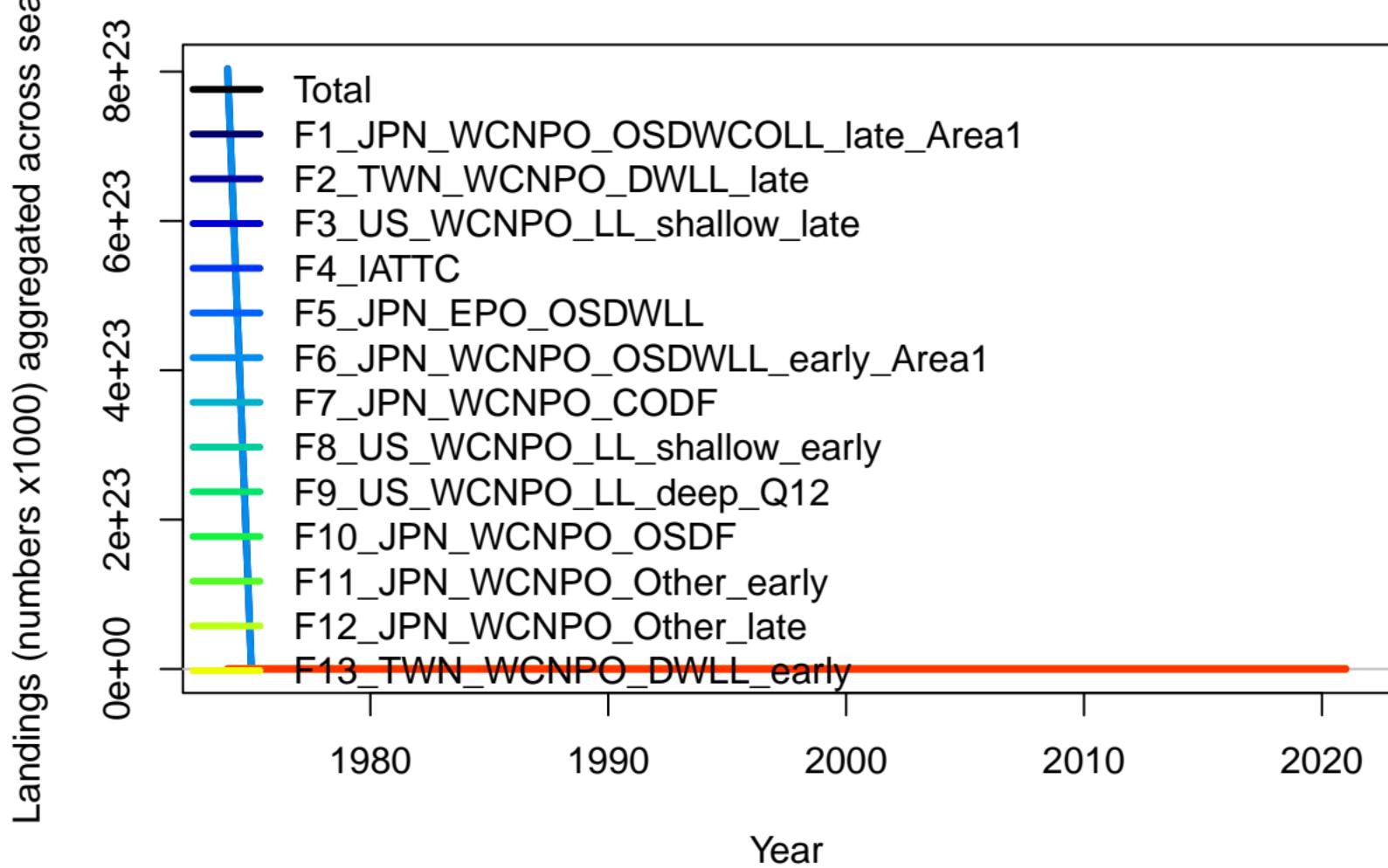
Continuous F

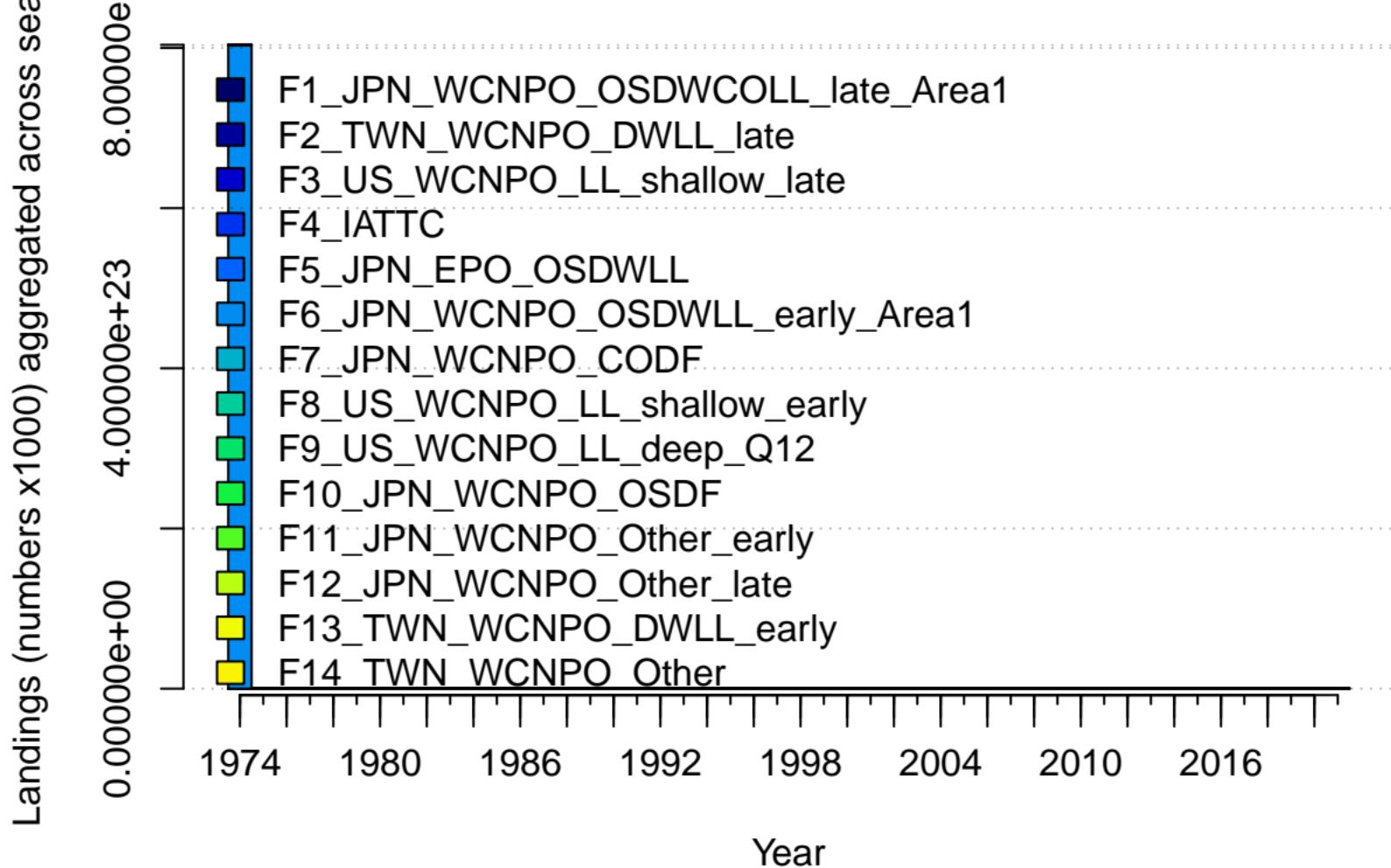
1.2
1.0
0.8
0.6
0.4
0.2
0.0

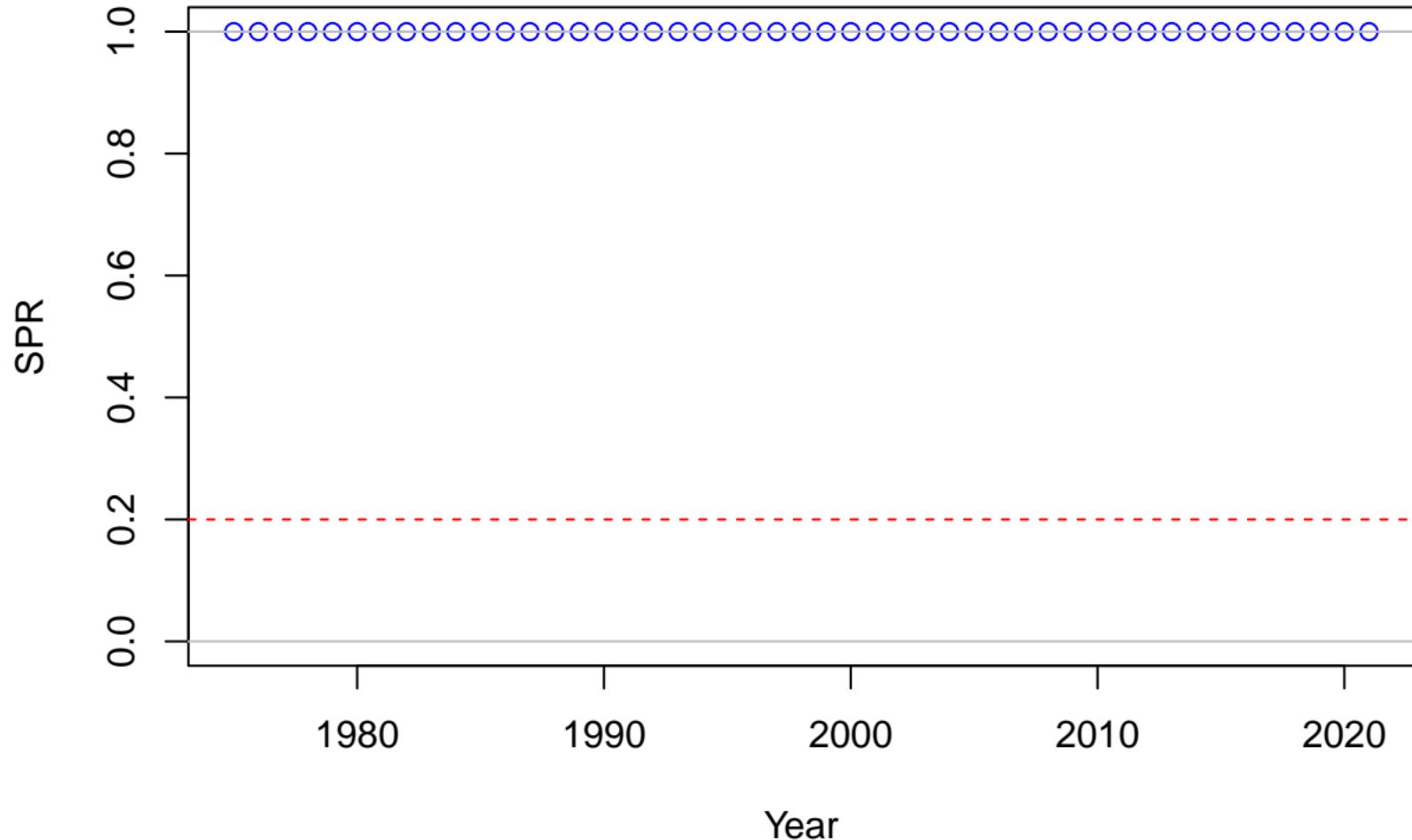


1980 1990 2000 2010 2020

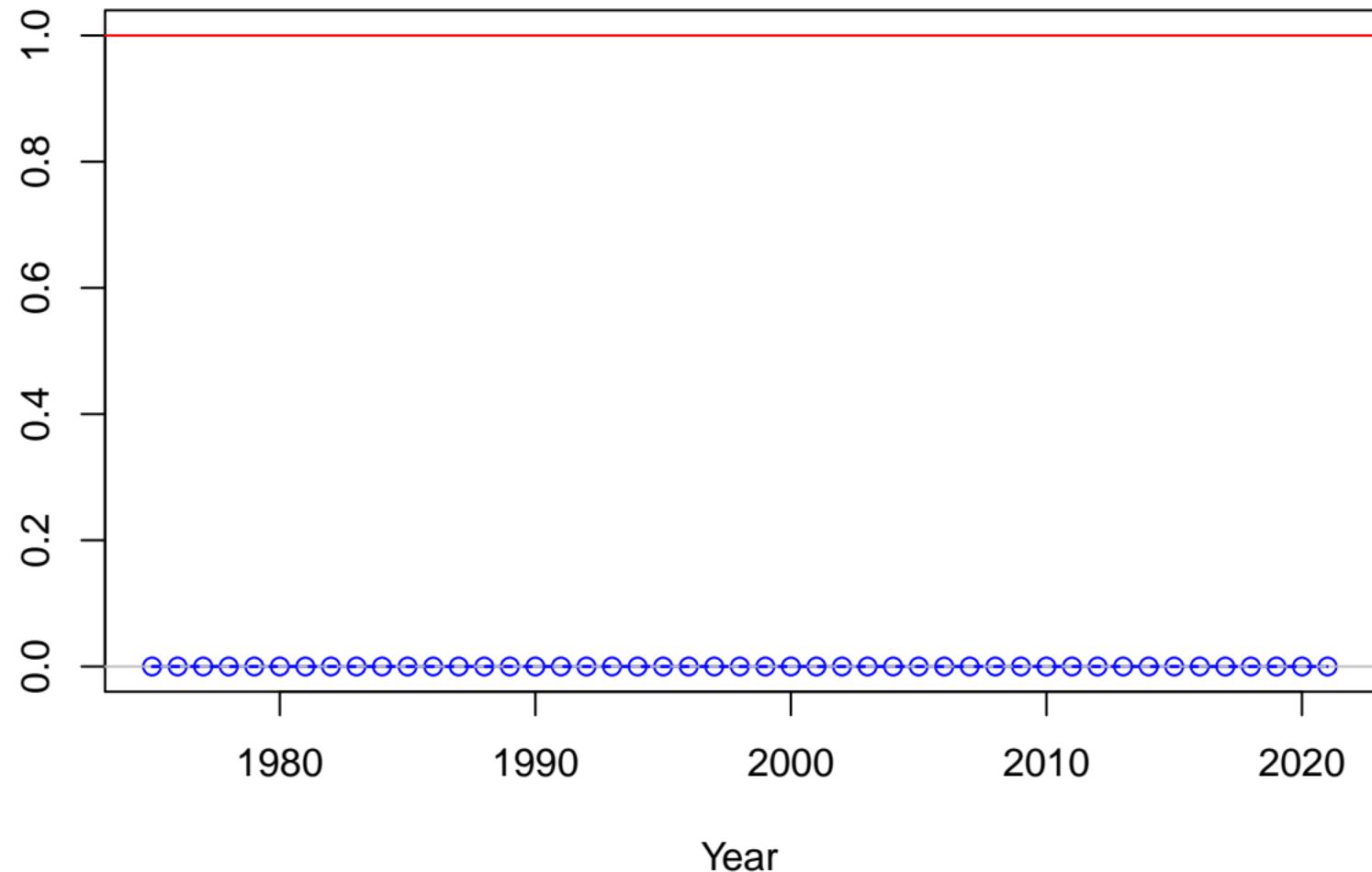
Year



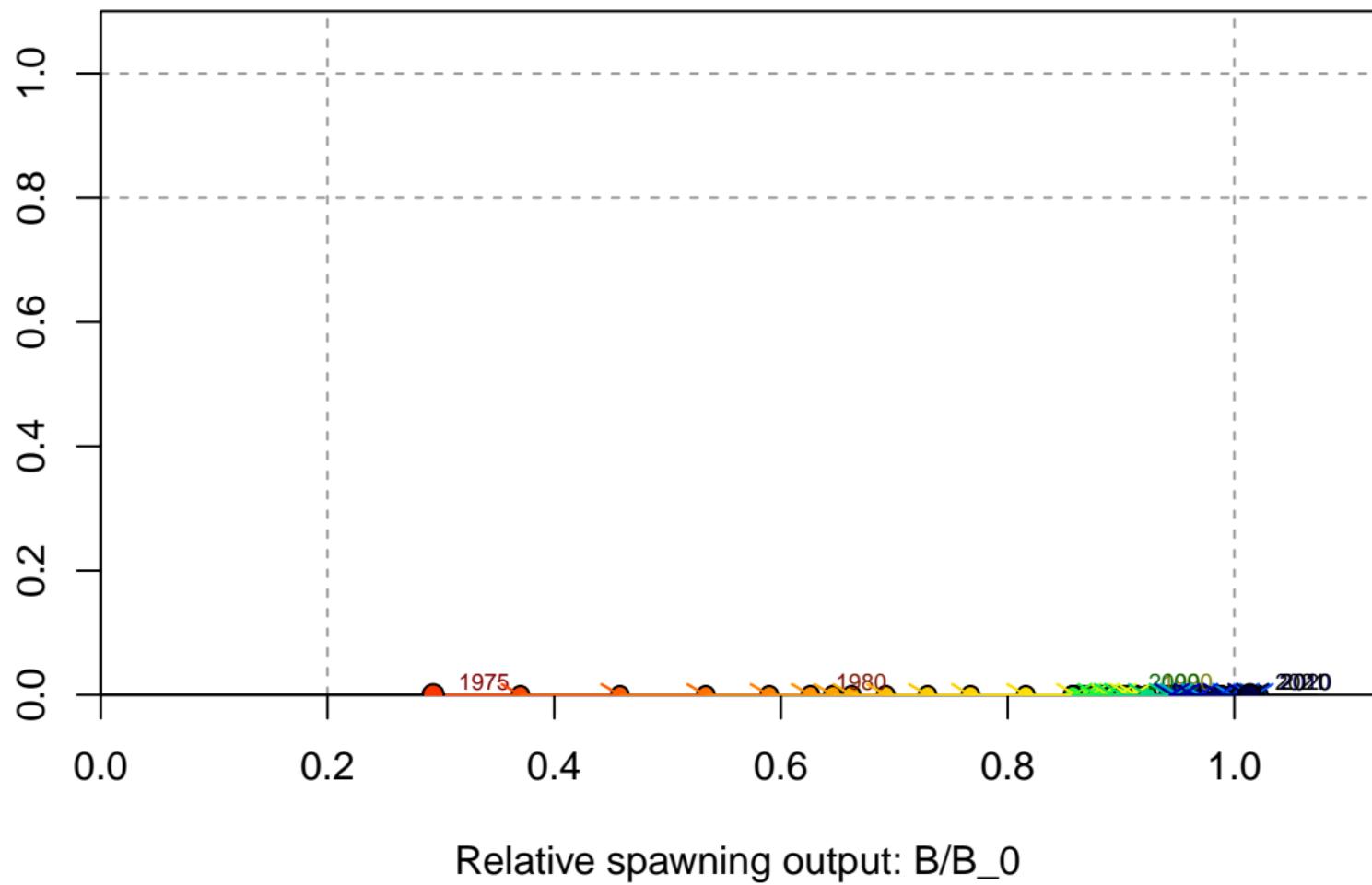


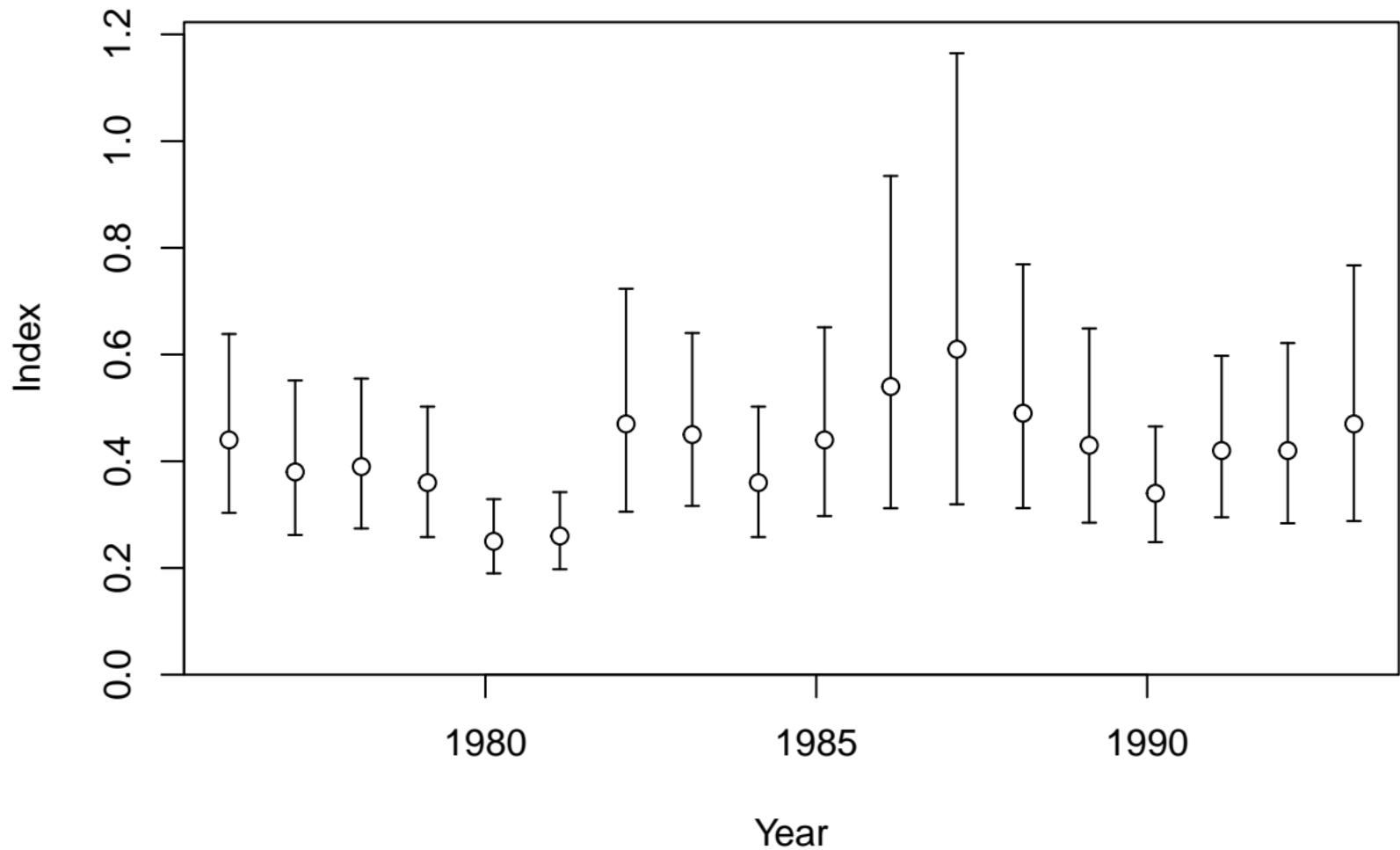


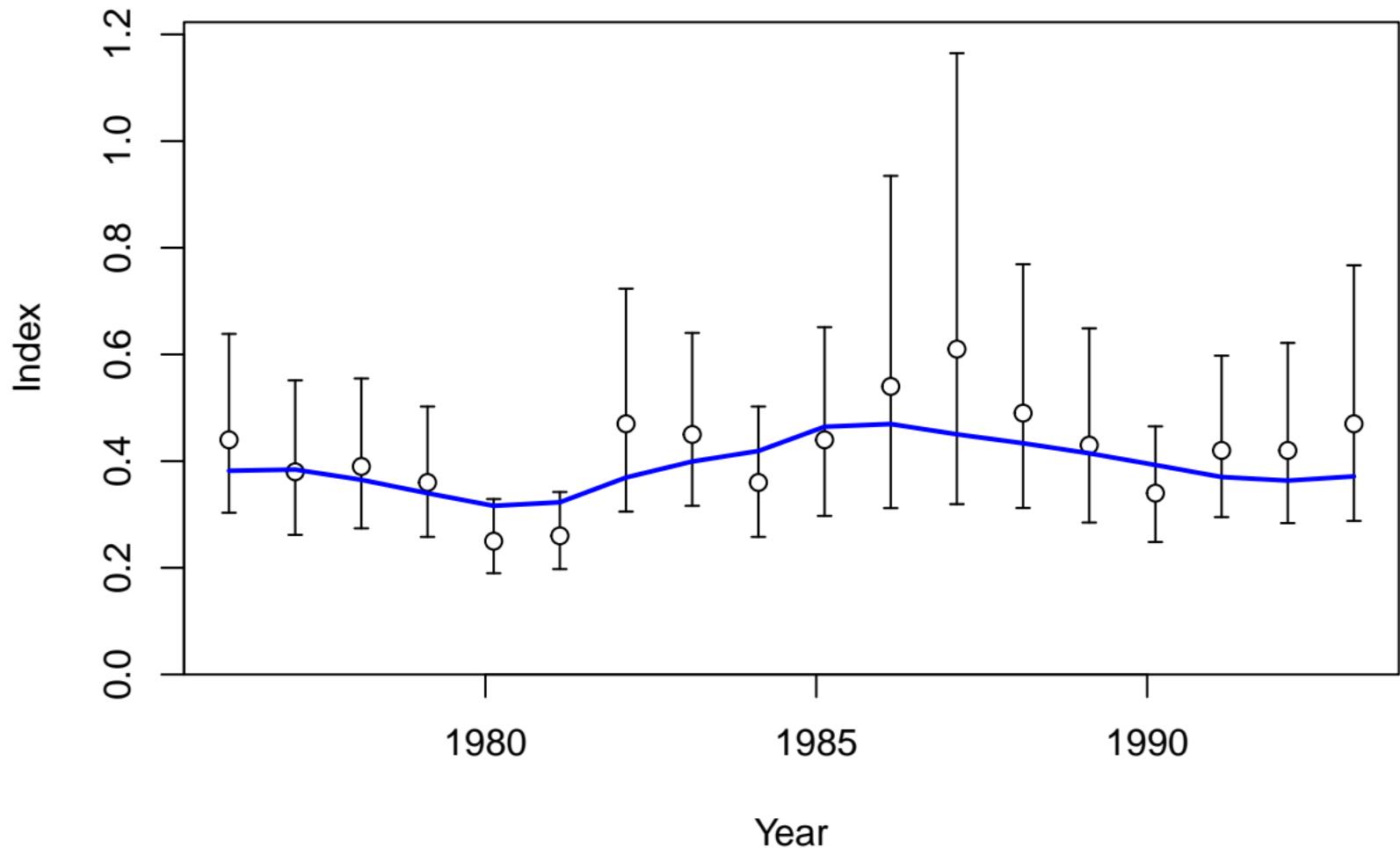
Fishing intensity: 1-SPR



Fishing intensity: 1-SPR





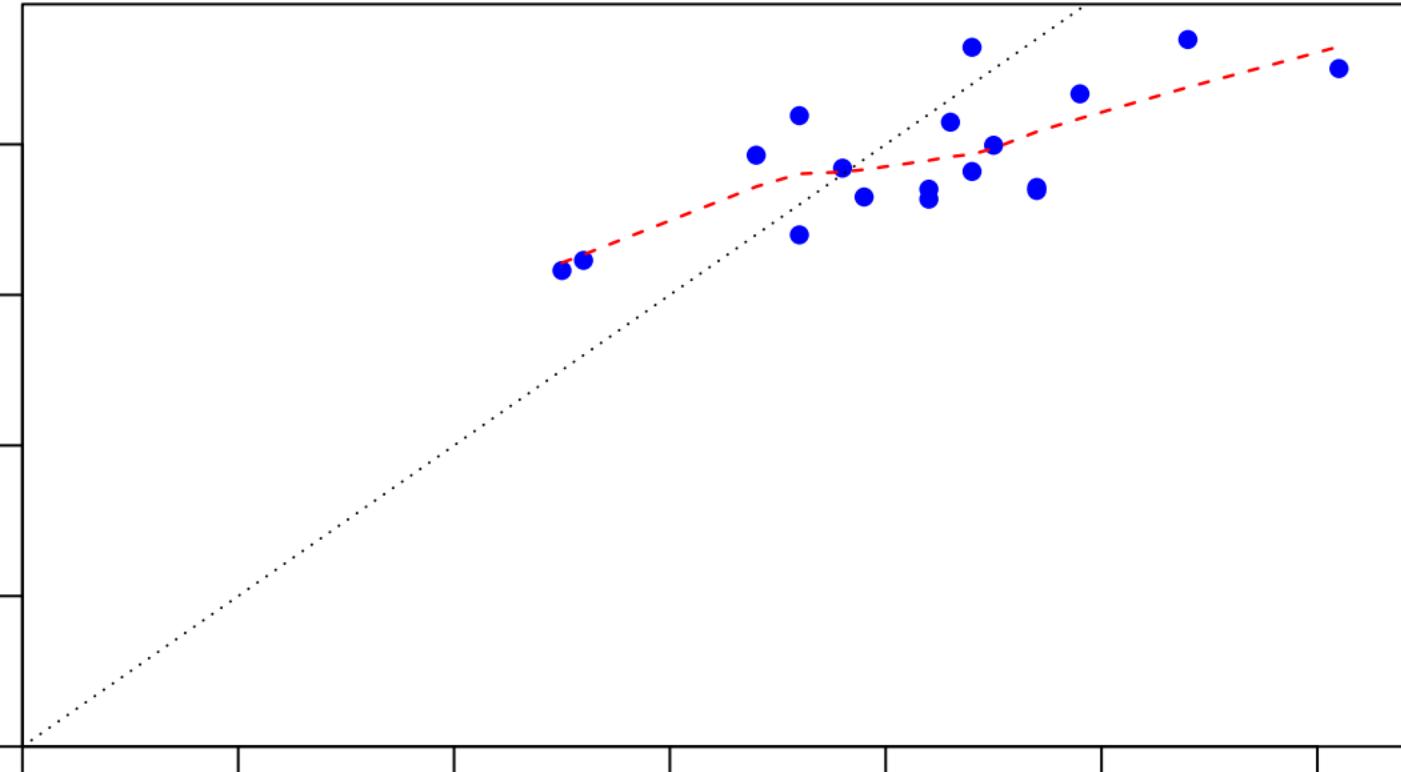


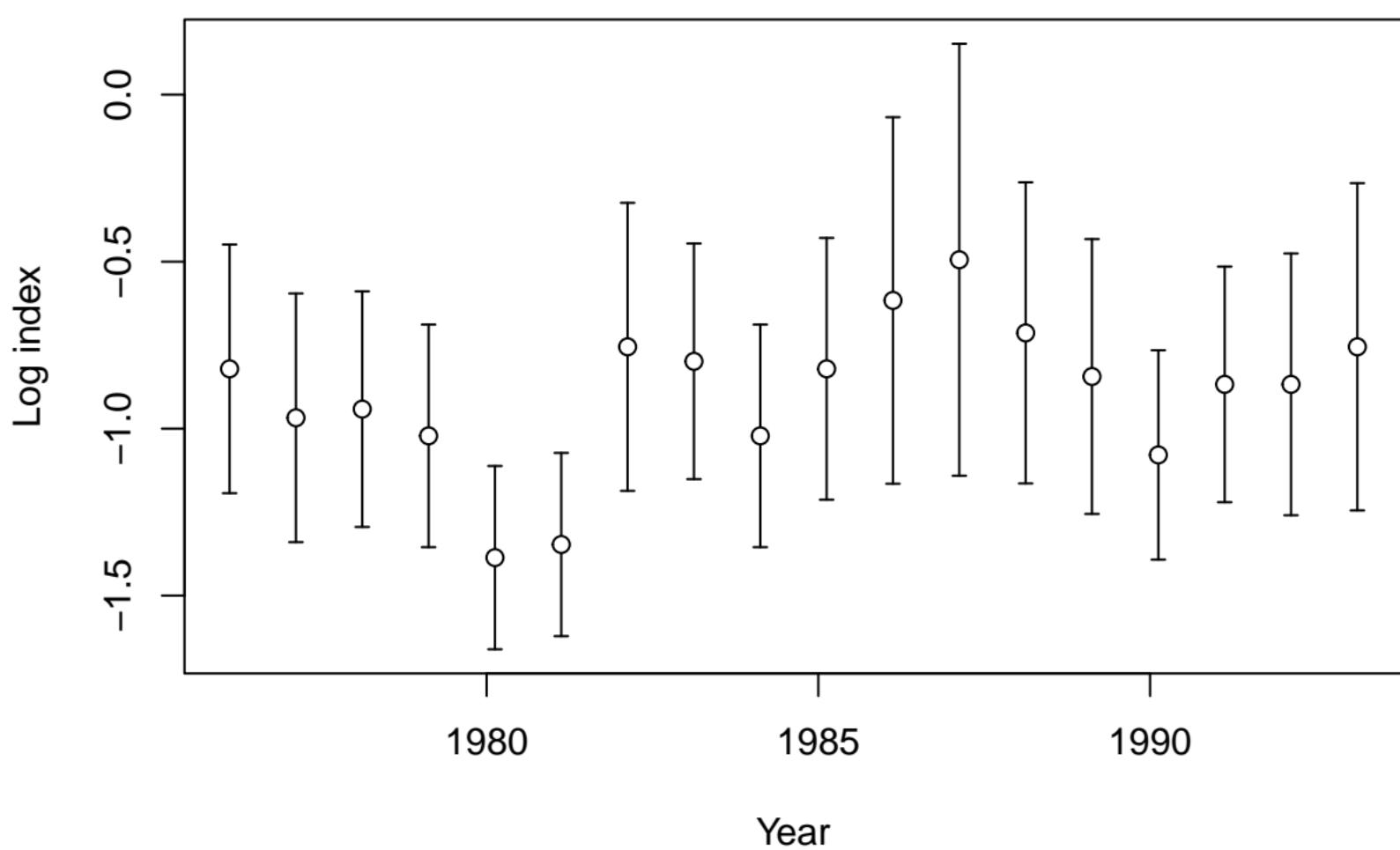
Expected index

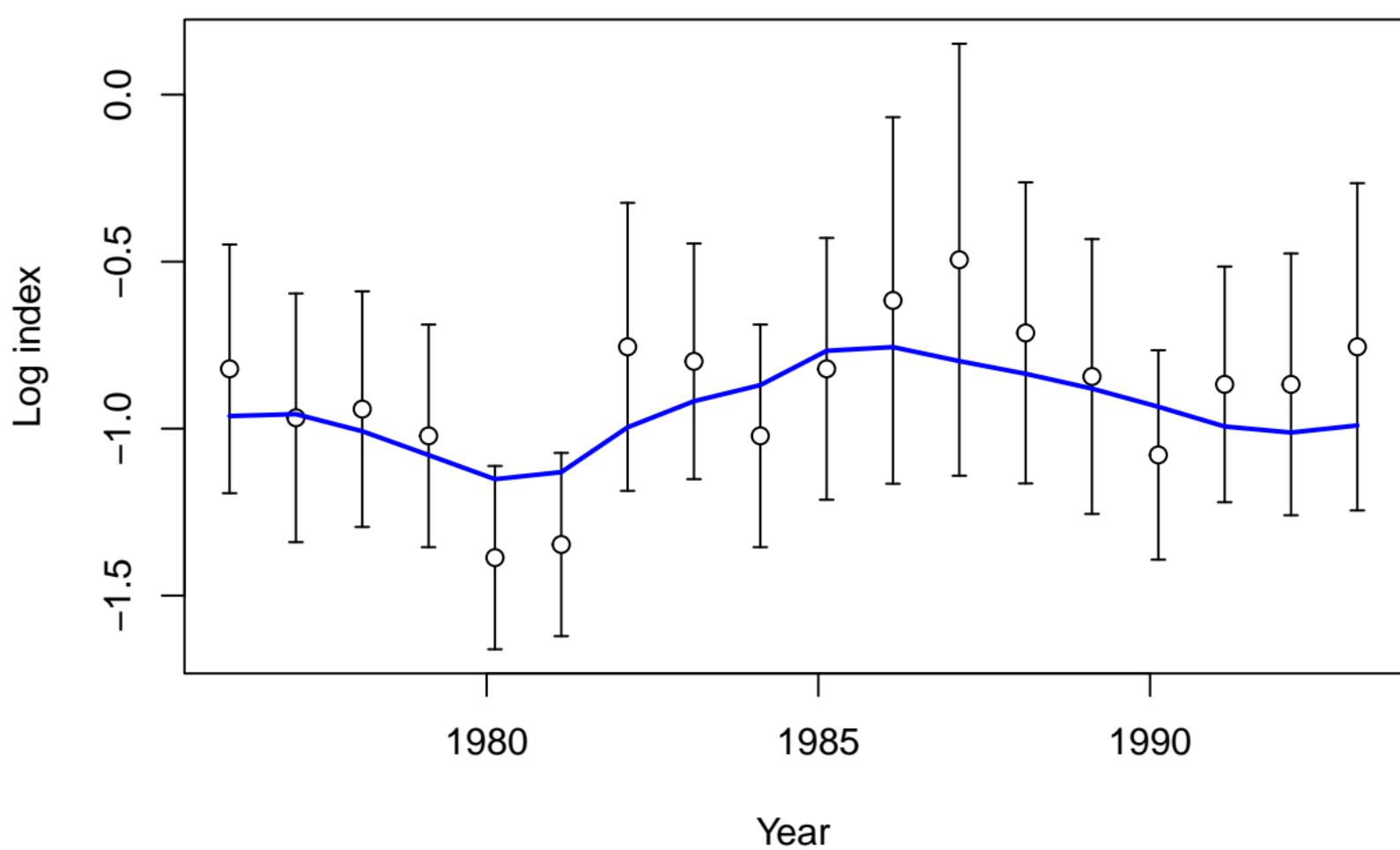
0.0 0.1 0.2 0.3 0.4

0.0 0.1 0.2 0.3 0.4 0.5 0.6

Observed index







Log expected index

-1.1
-1.0
-0.9
-0.8

-1.4

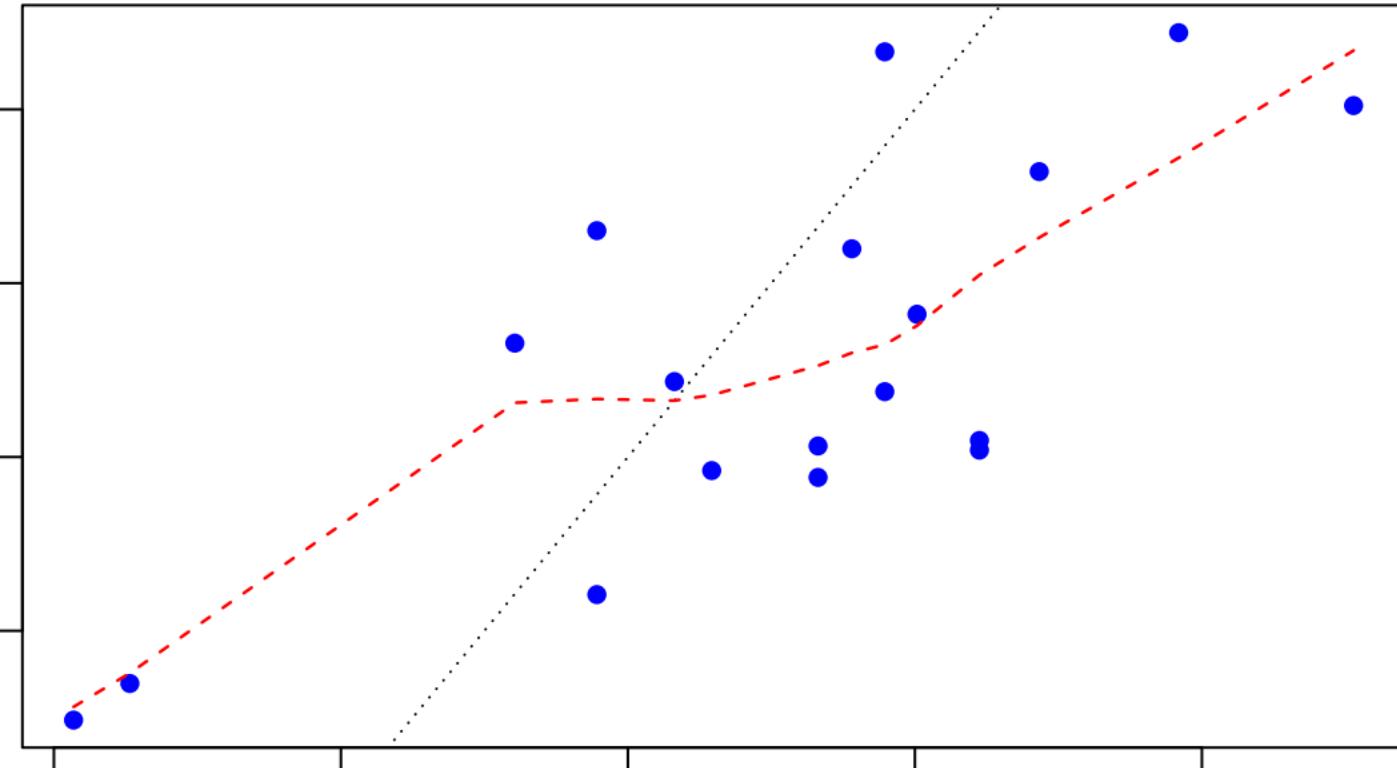
-1.2

Log observed index

-1.0

-0.8

-0.6

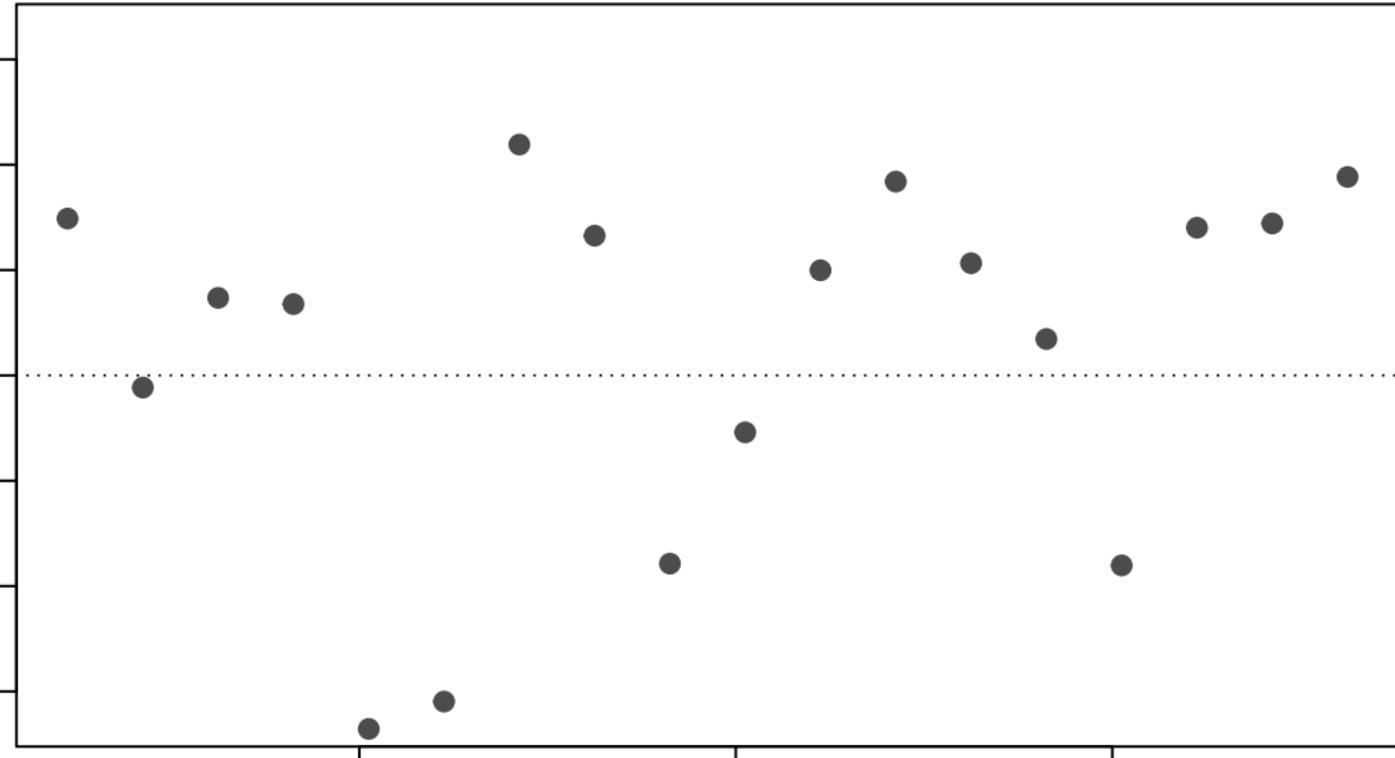


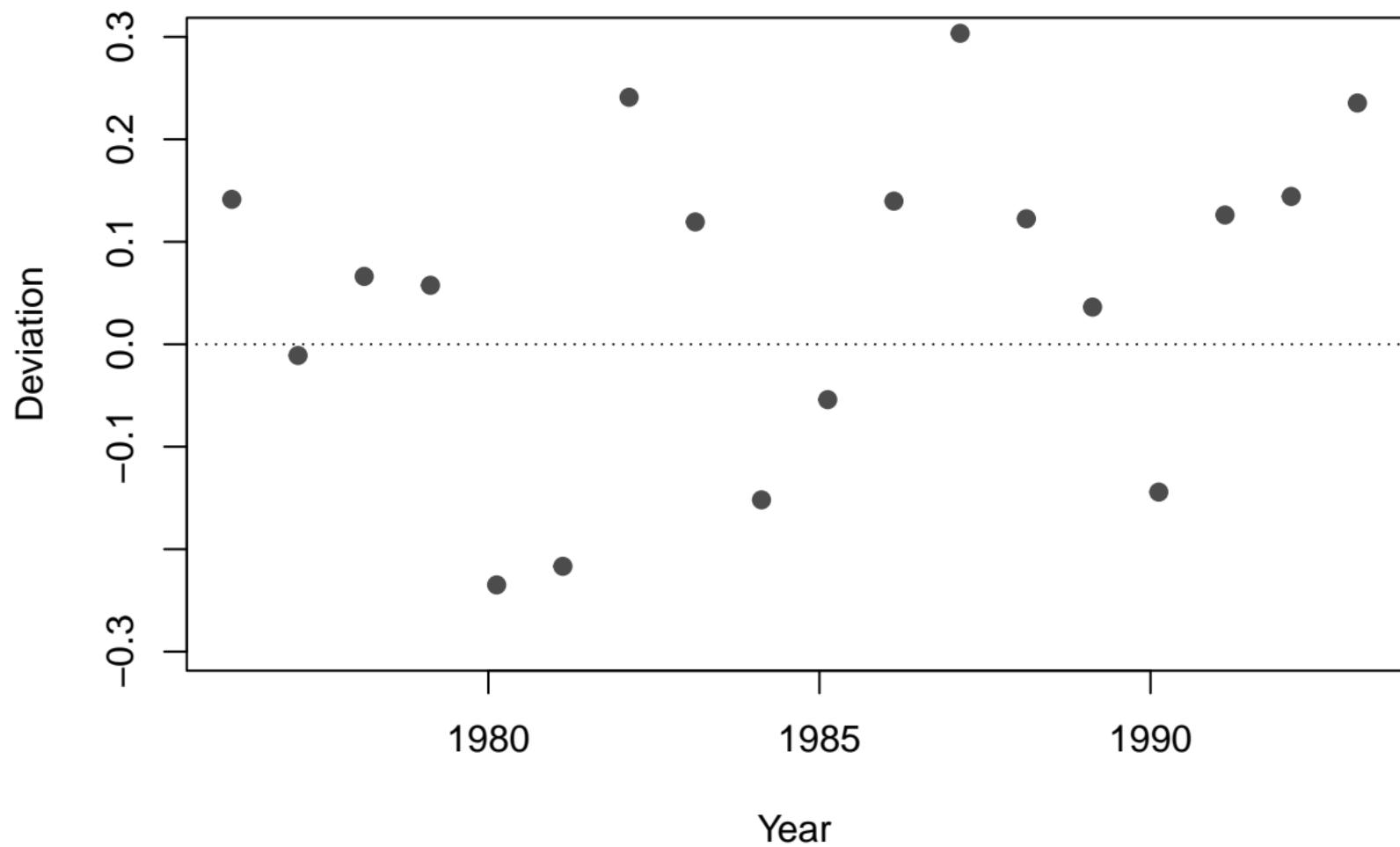
Residual

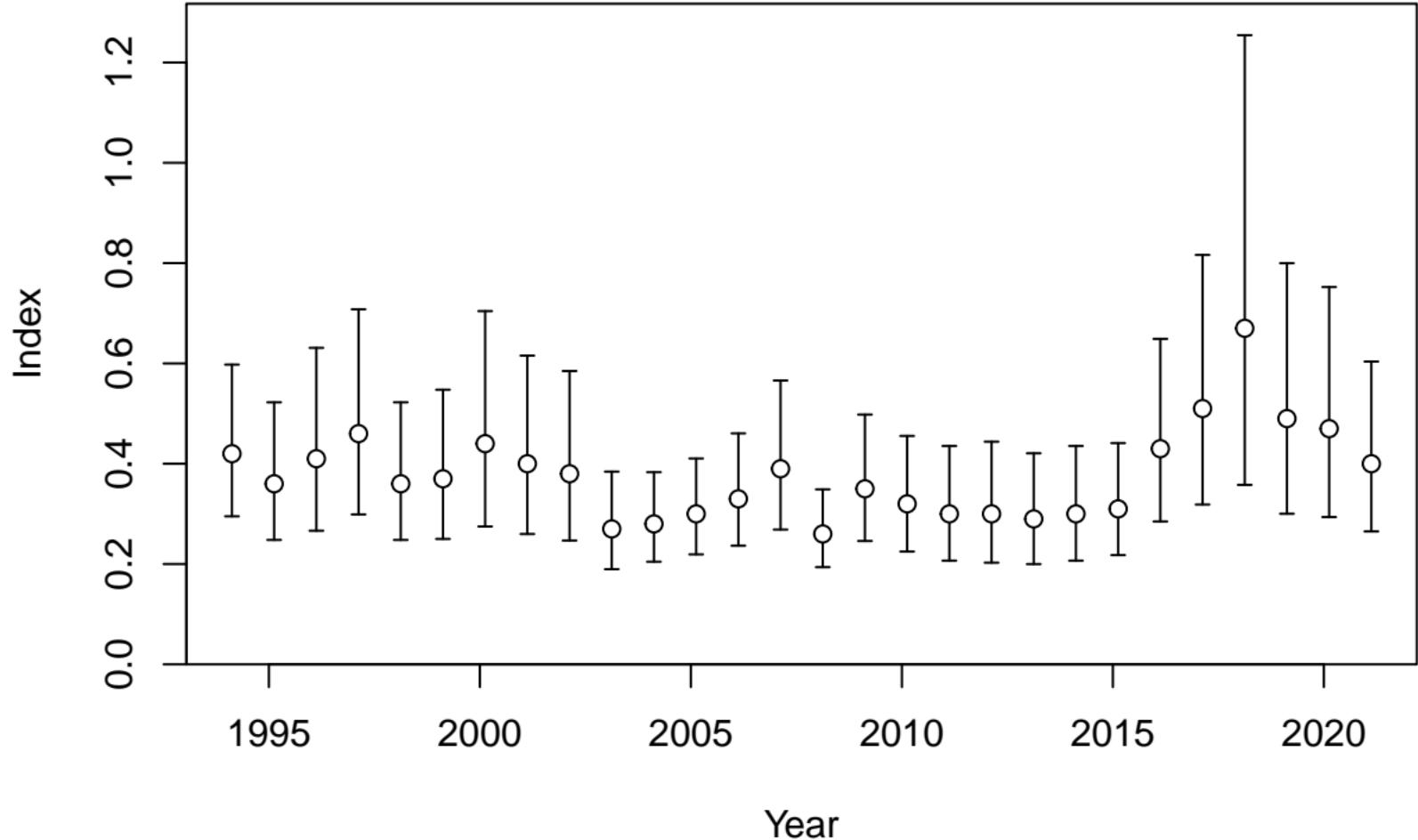
-1.5
-0.5
0.5
1.0
1.5

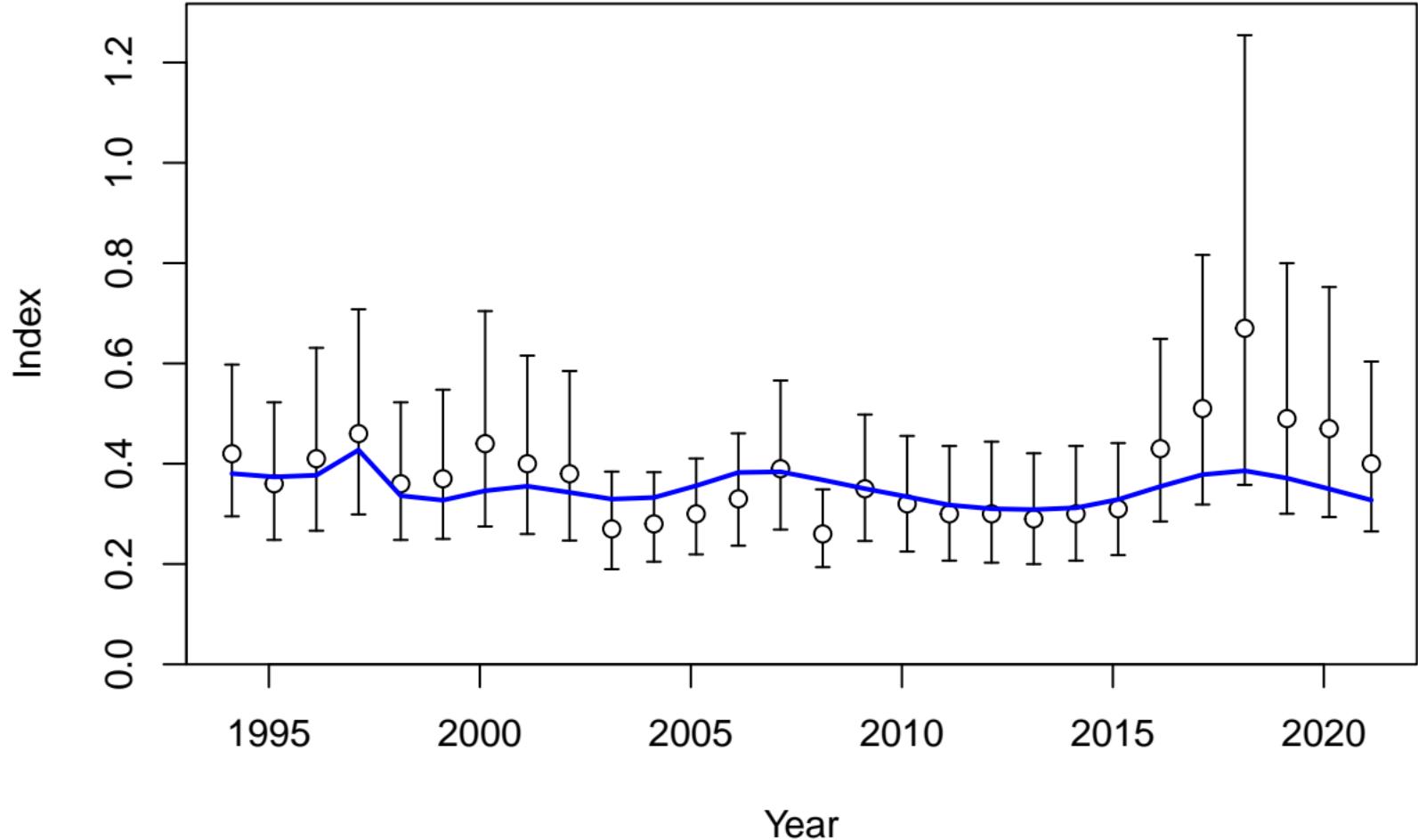
1980 1985 1990

Year







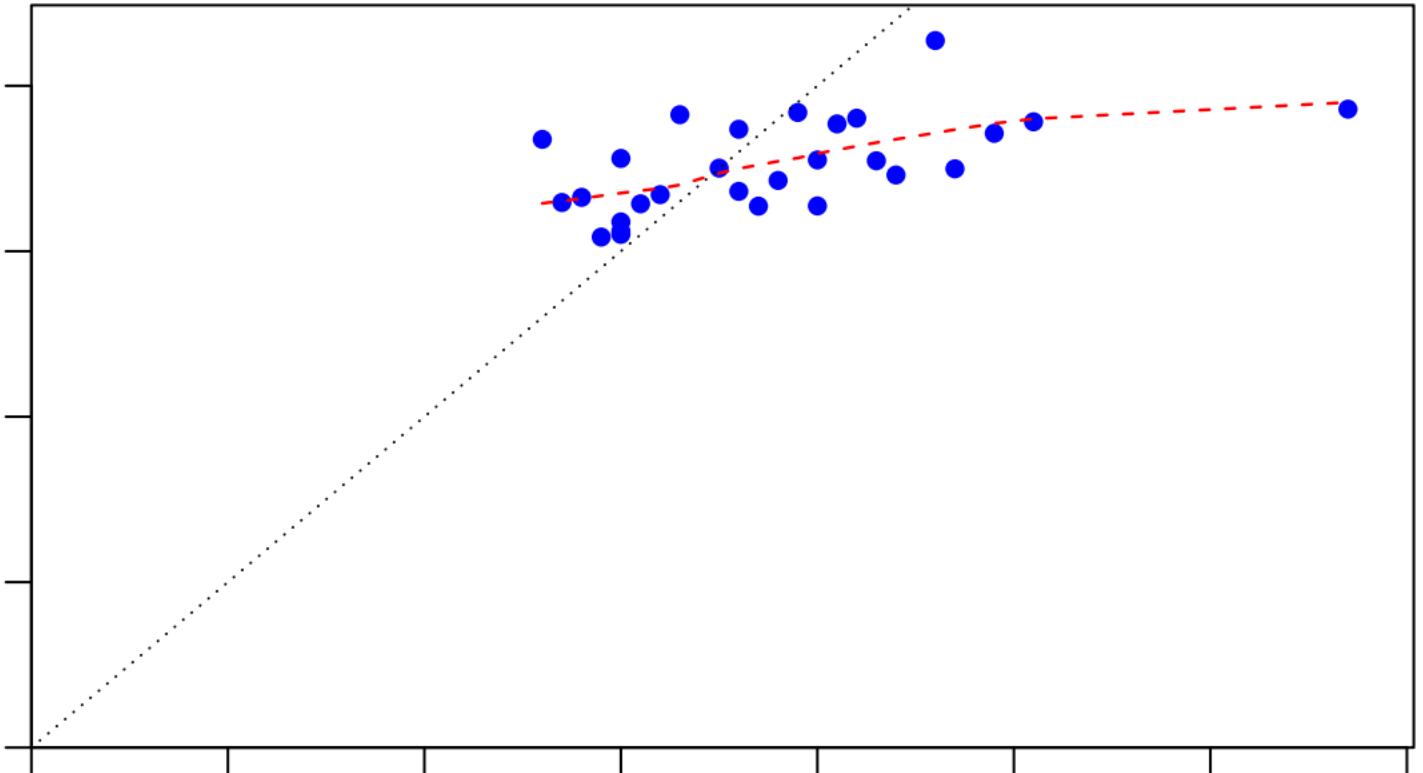


Expected index

0.4
0.3
0.2
0.1
0.0

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7

Observed index

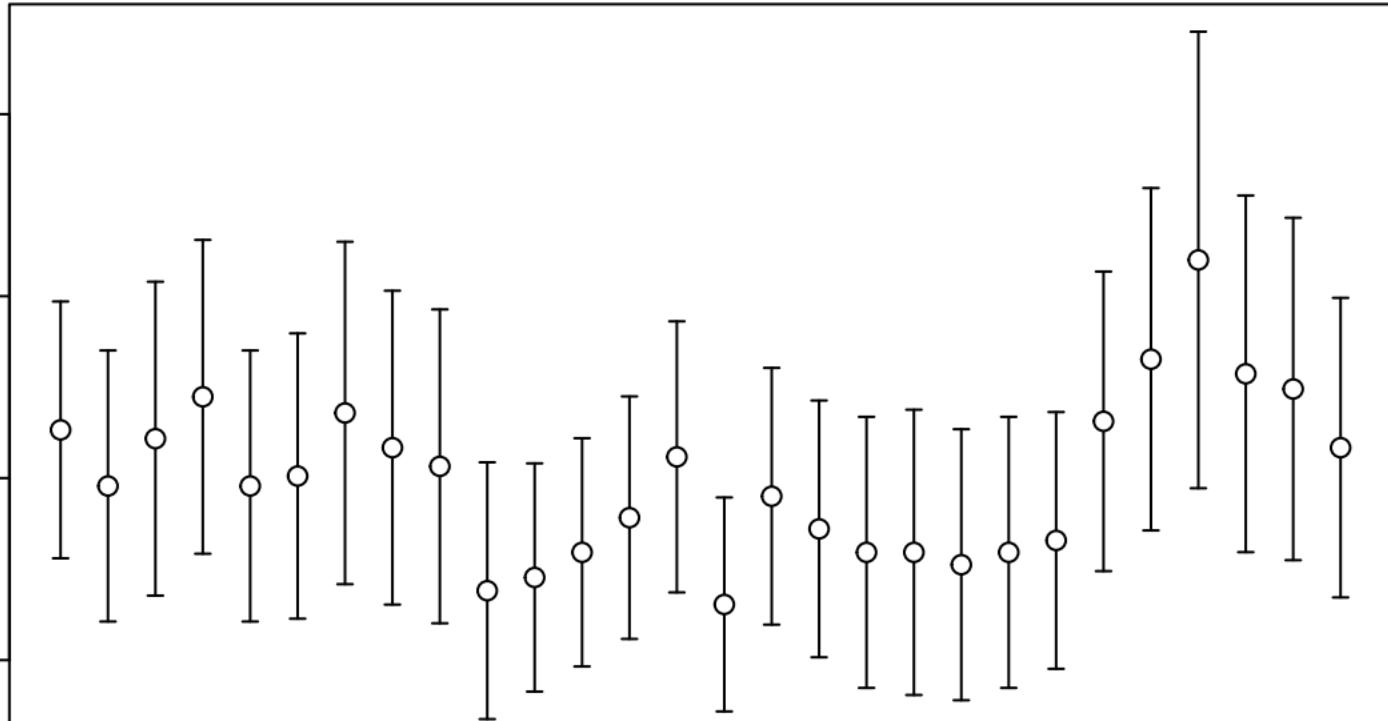


Log index

-1.5 -1.0 -0.5 0.0

1995 2000 2005 2010 2015 2020

Year

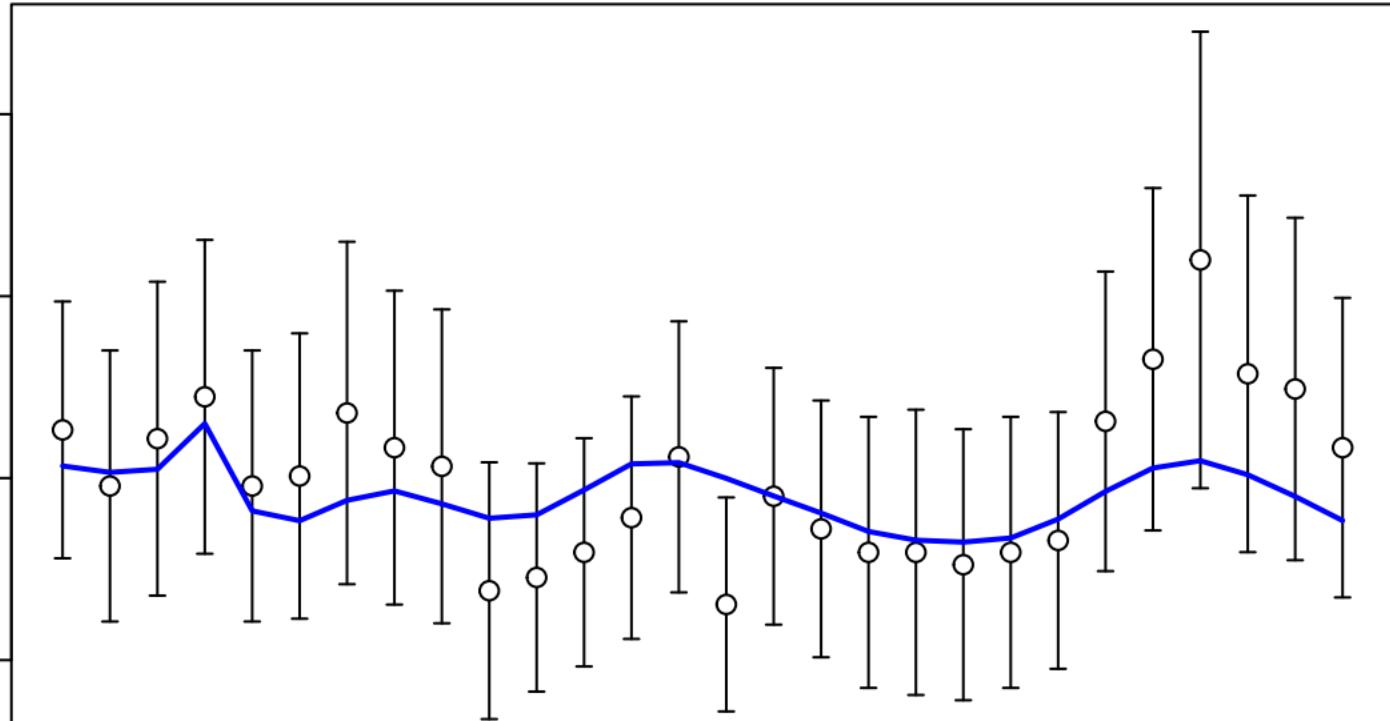


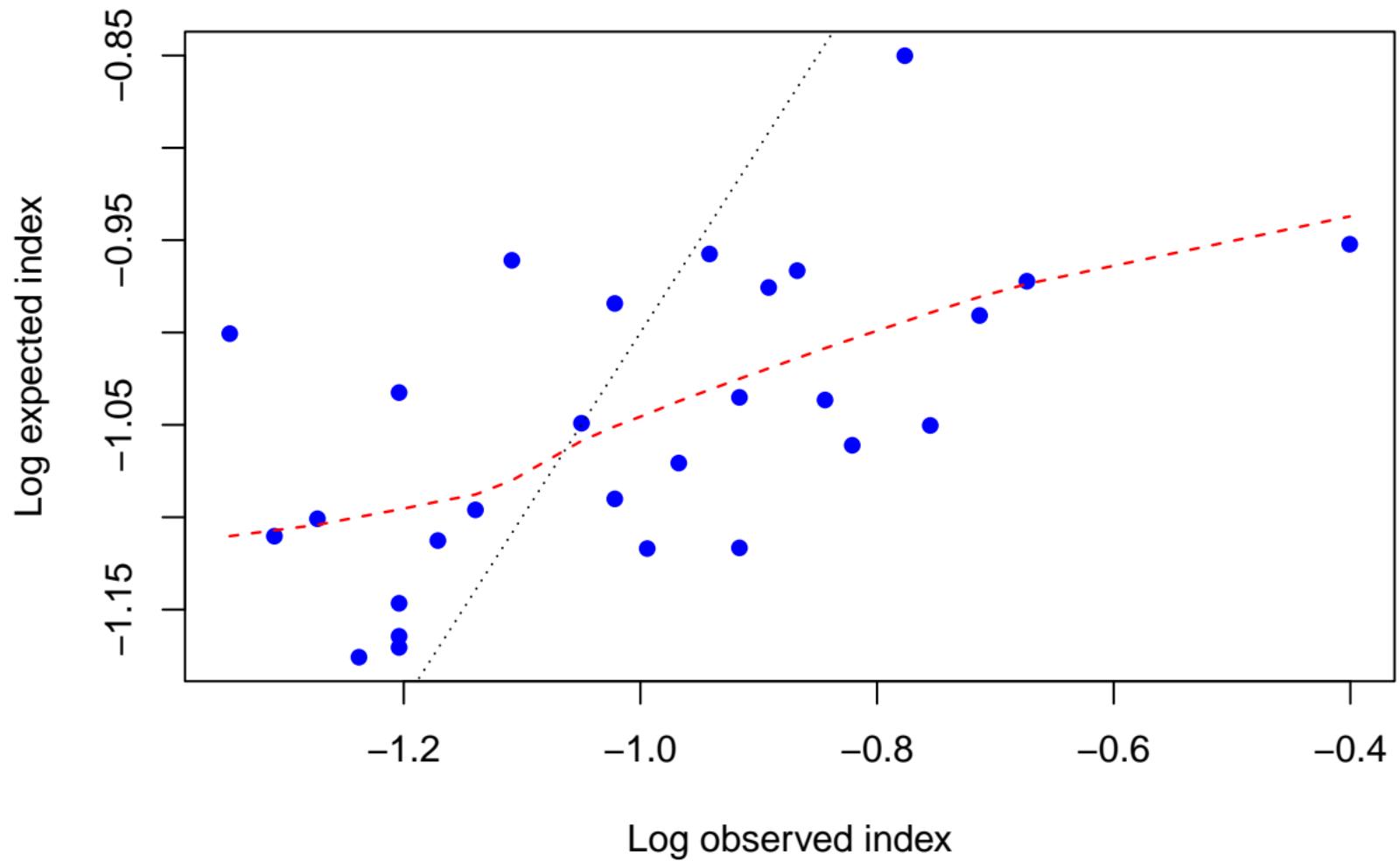
Log index

-1.5 -1.0 -0.5 0.0

1995 2000 2005 2010 2015 2020

Year





Residual

2

1

0

-1

-2

1995

2000

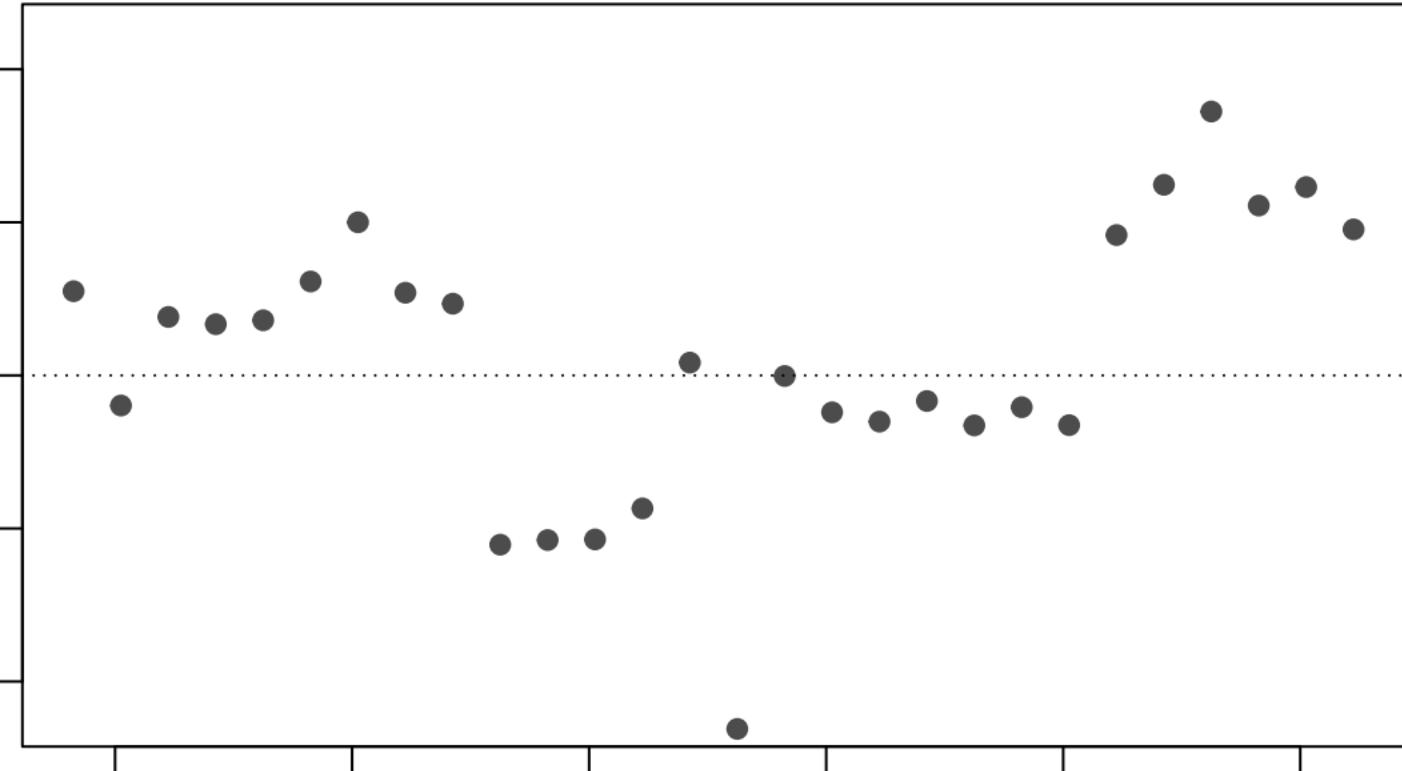
2005

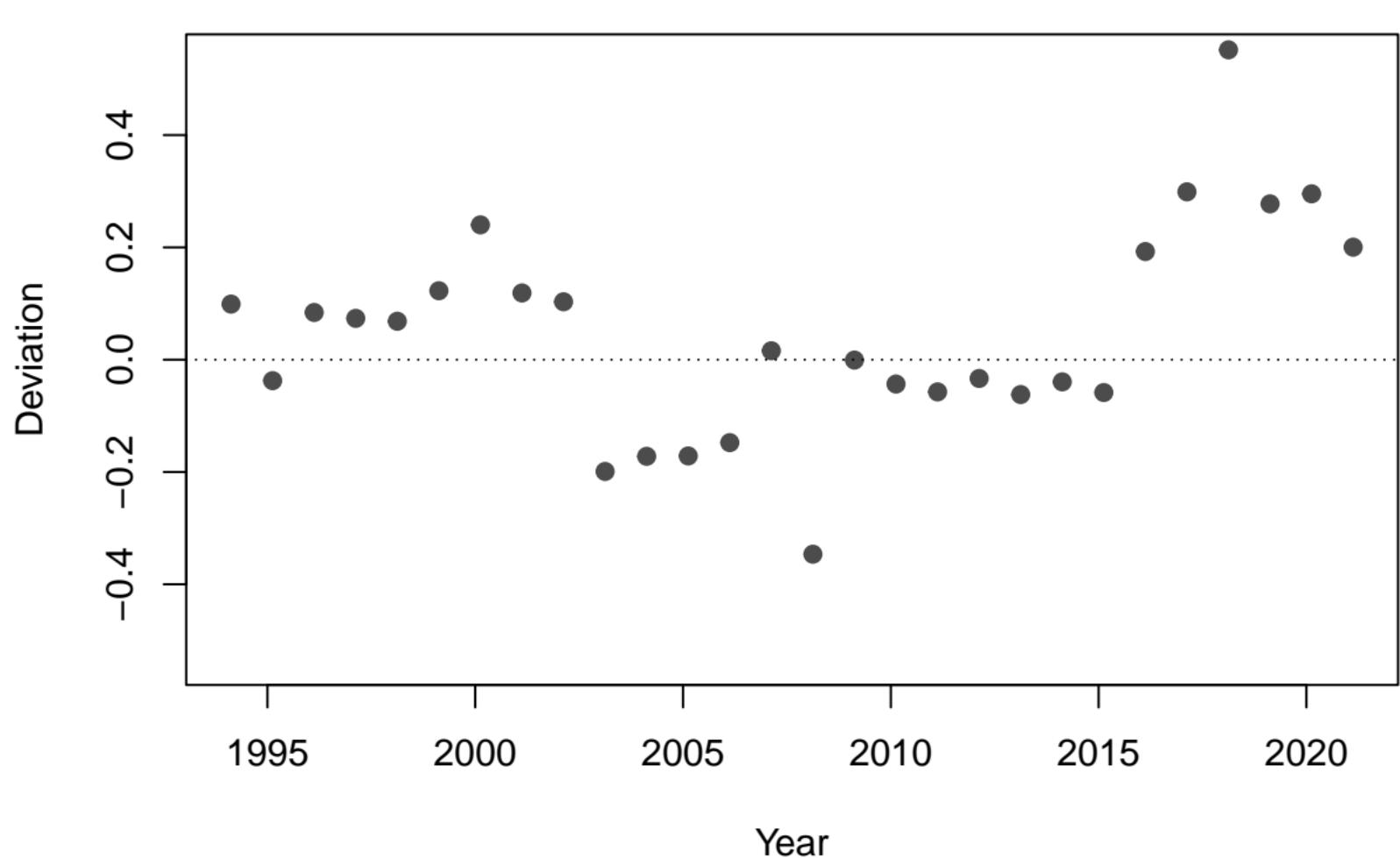
2010

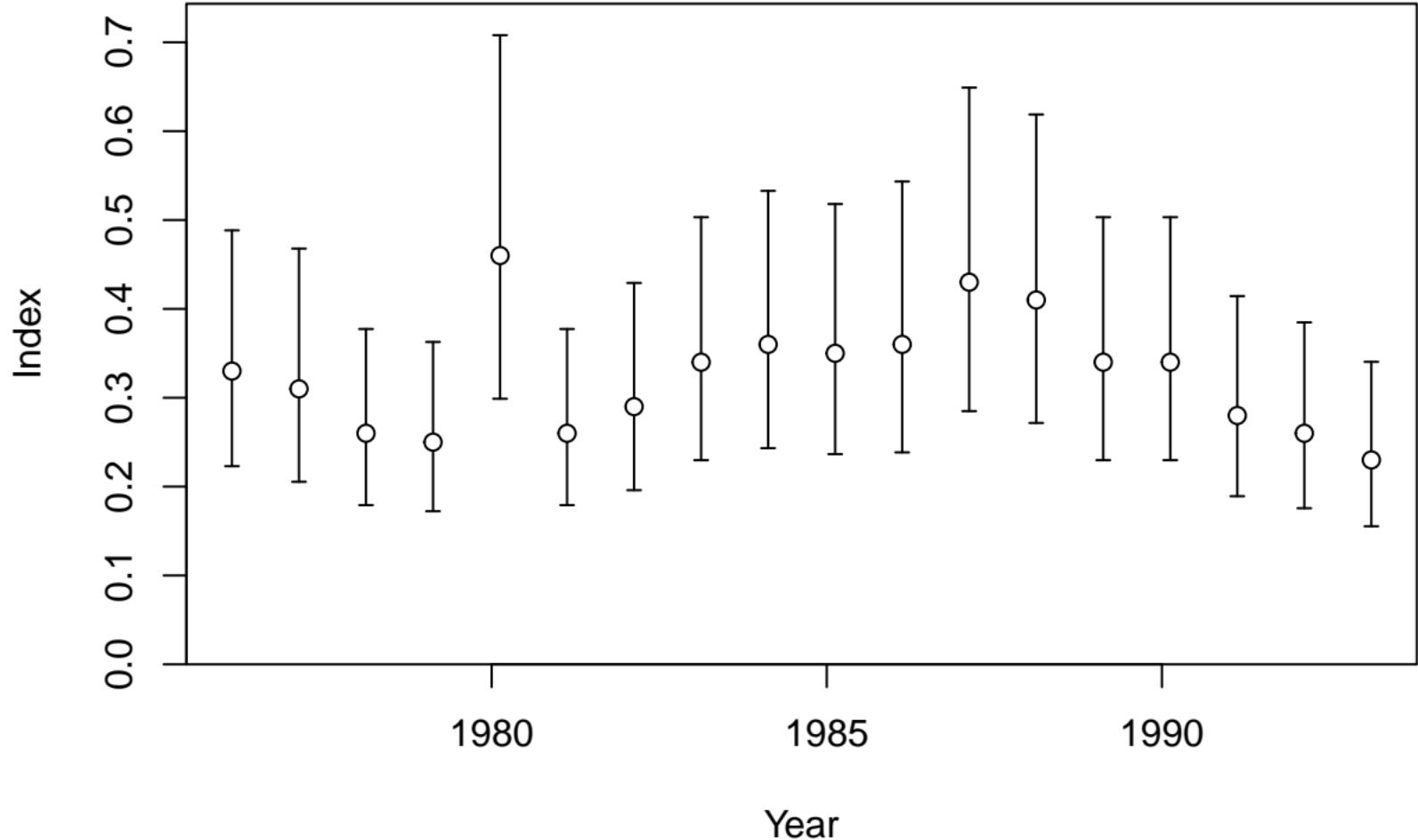
2015

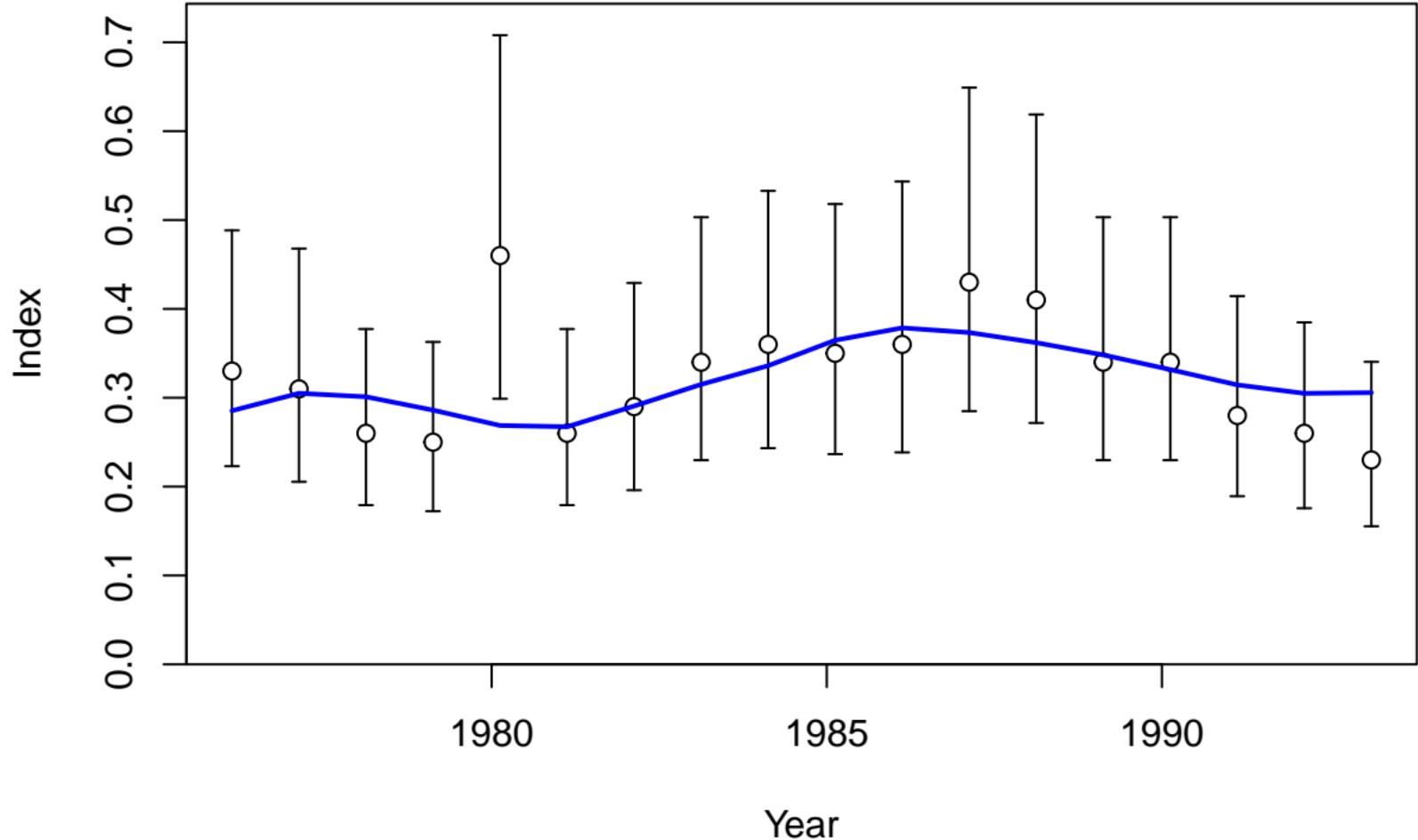
2020

Year







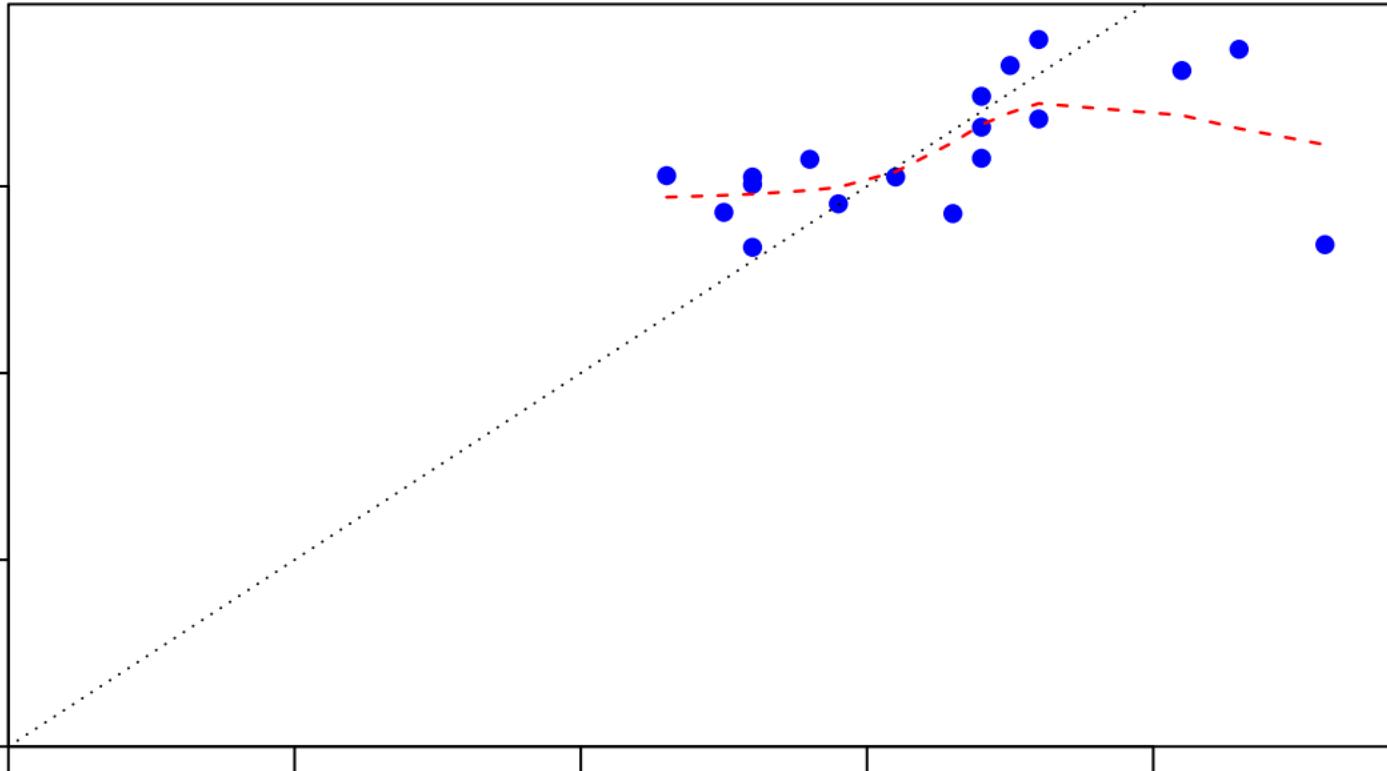


Expected index

0.0
0.1
0.2
0.3

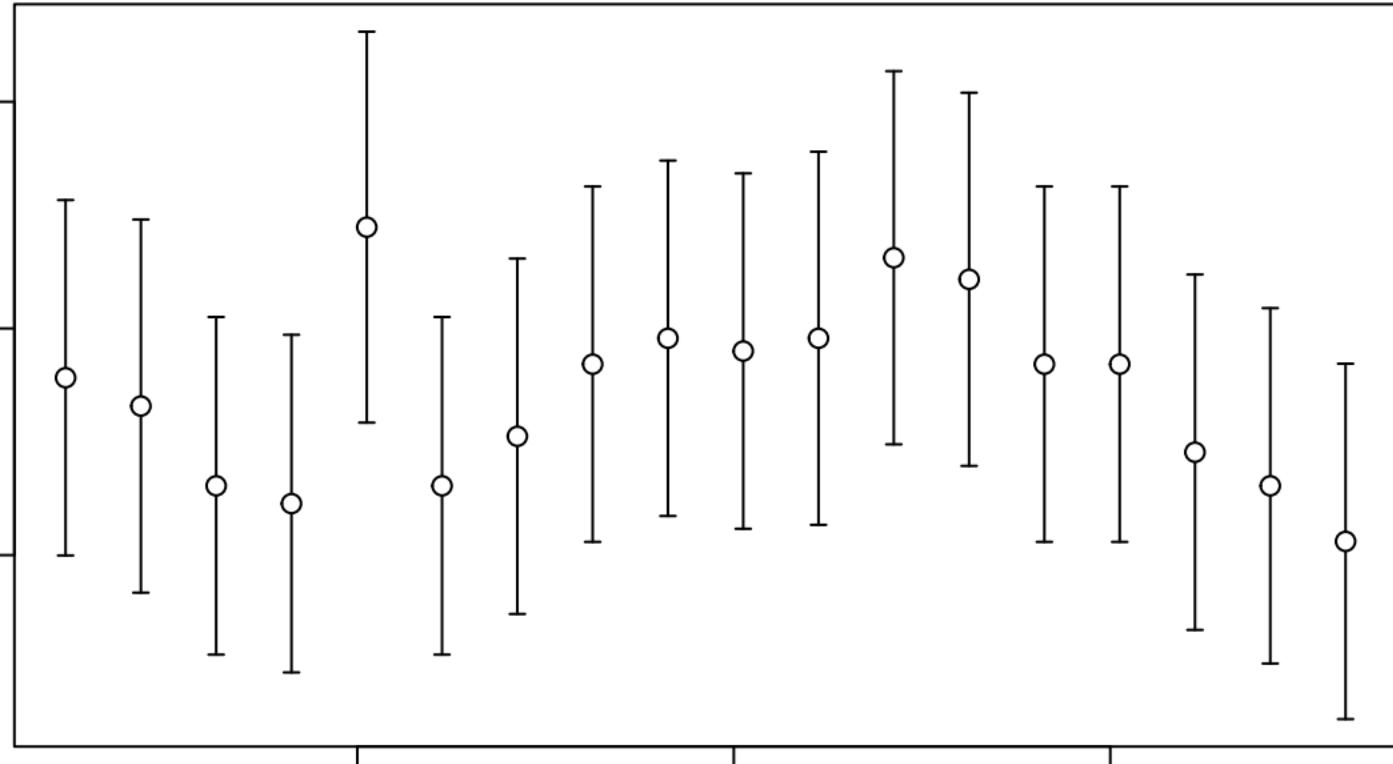
0.0 0.1 0.2 0.3 0.4

Observed index



Log index

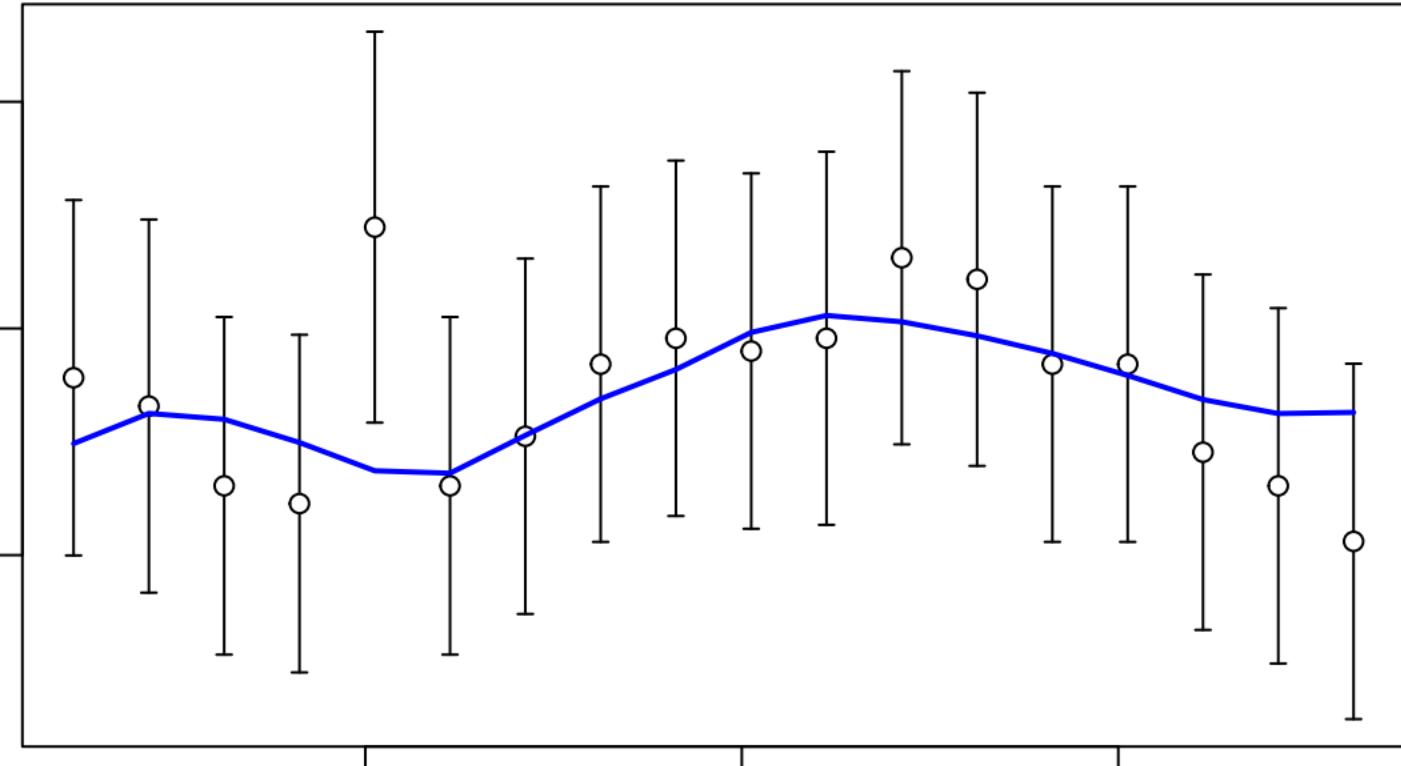
-0.5
-1.0
-1.5



Year

Log index

-0.5
-1.0
-1.5



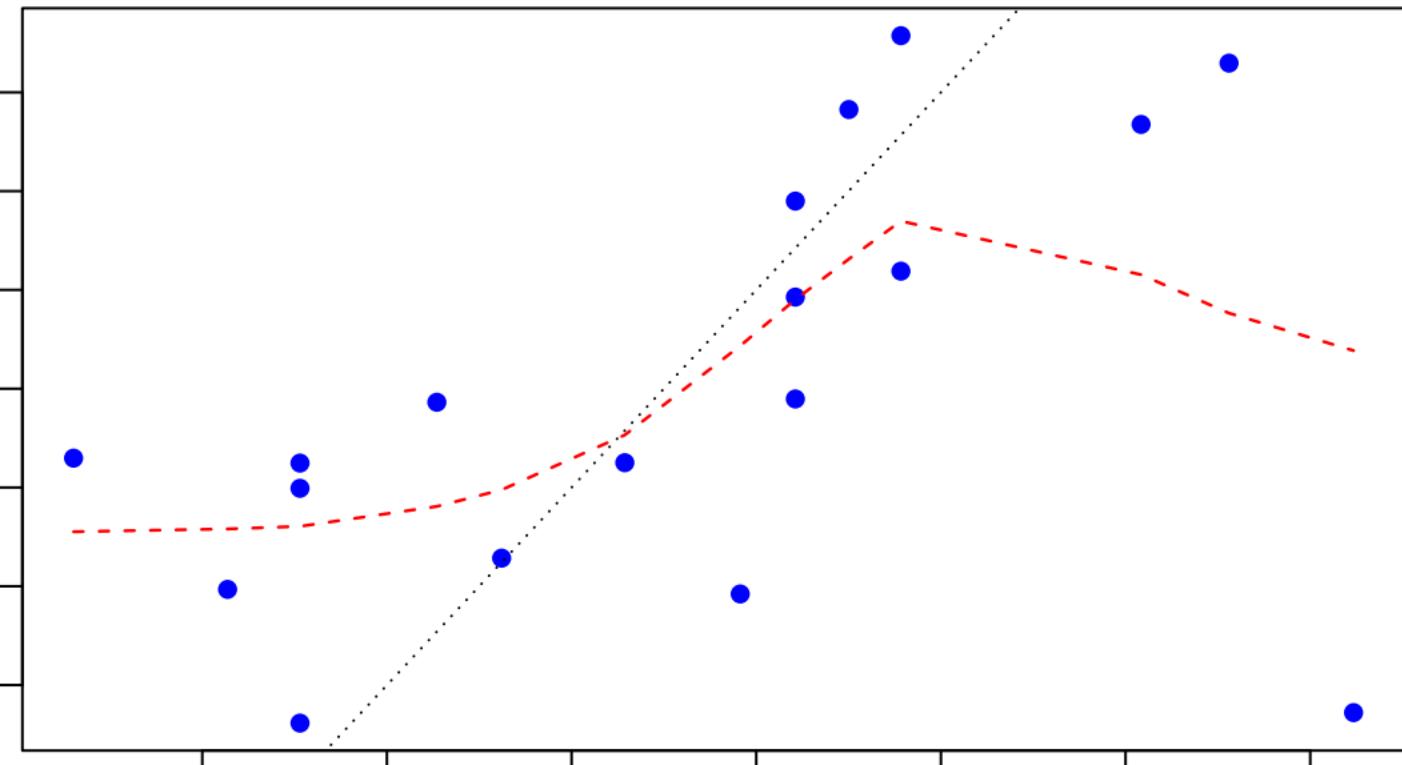
Year

Log expected index

-1.30 -1.20 -1.10 -1.00

-1.4 -1.3 -1.2 -1.1 -1.0 -0.9 -0.8

Log observed index



Residual

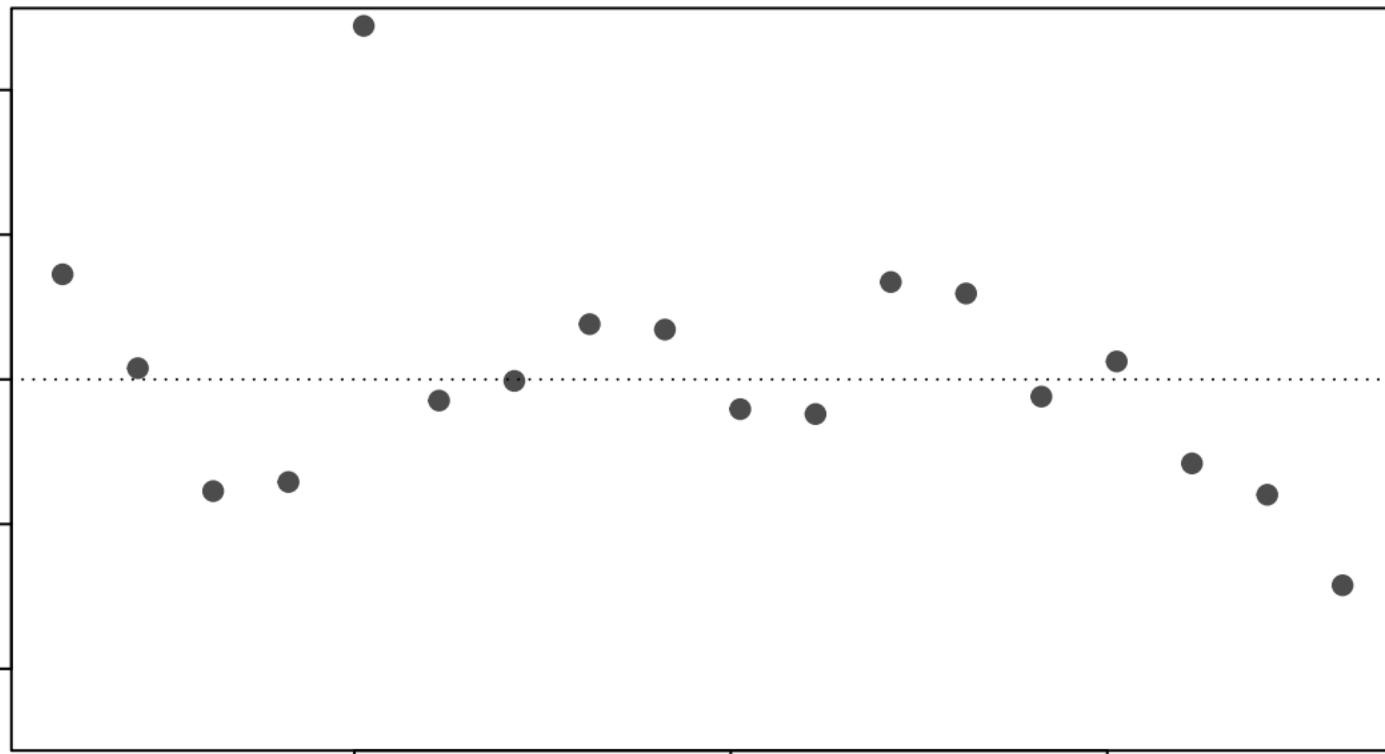
2
1
0
-1
-2

1980

1985

1990

Year



Deviation

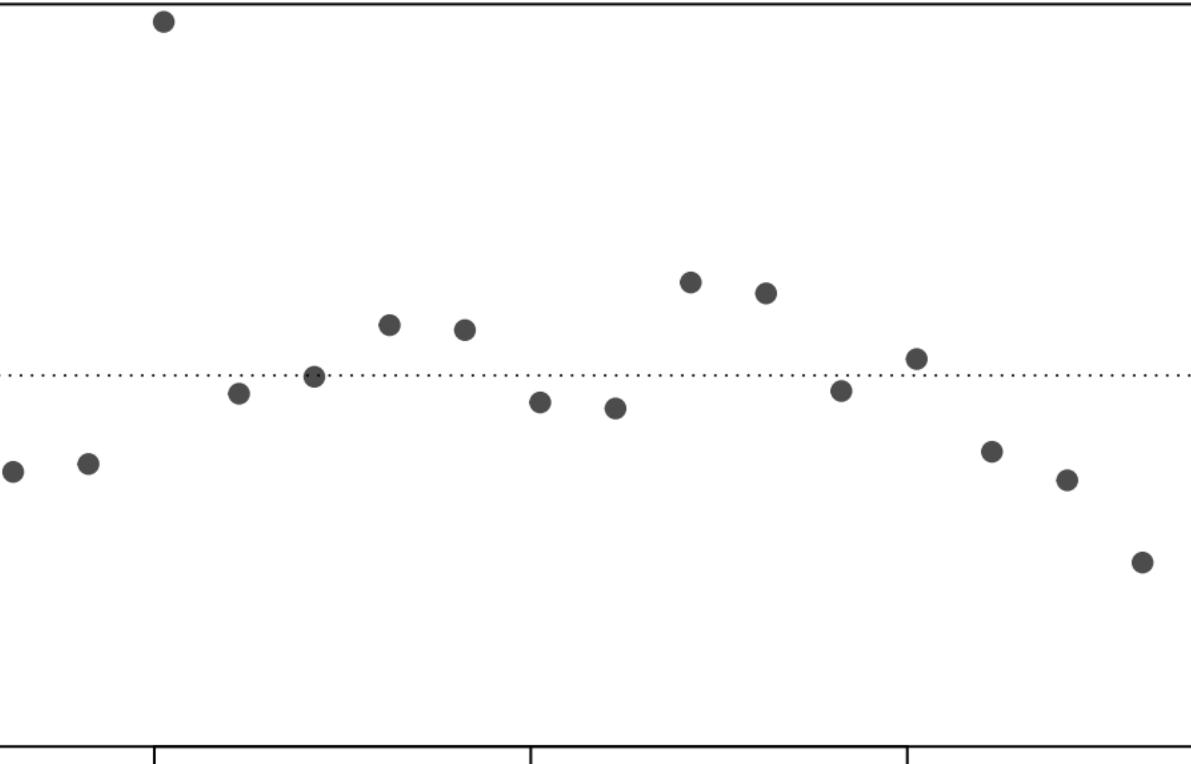
-0.4
-0.2
0.0
0.2
0.4

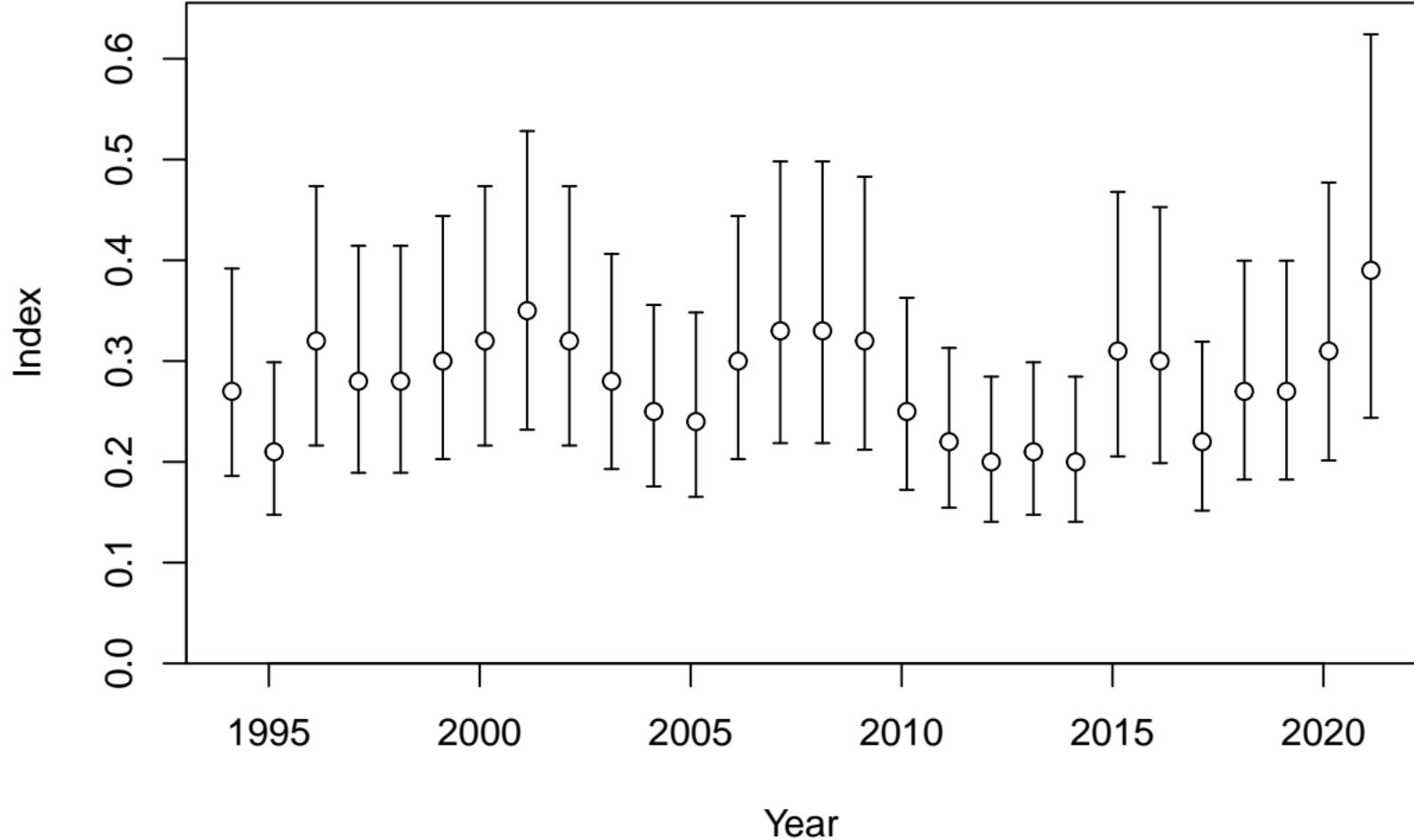
1980

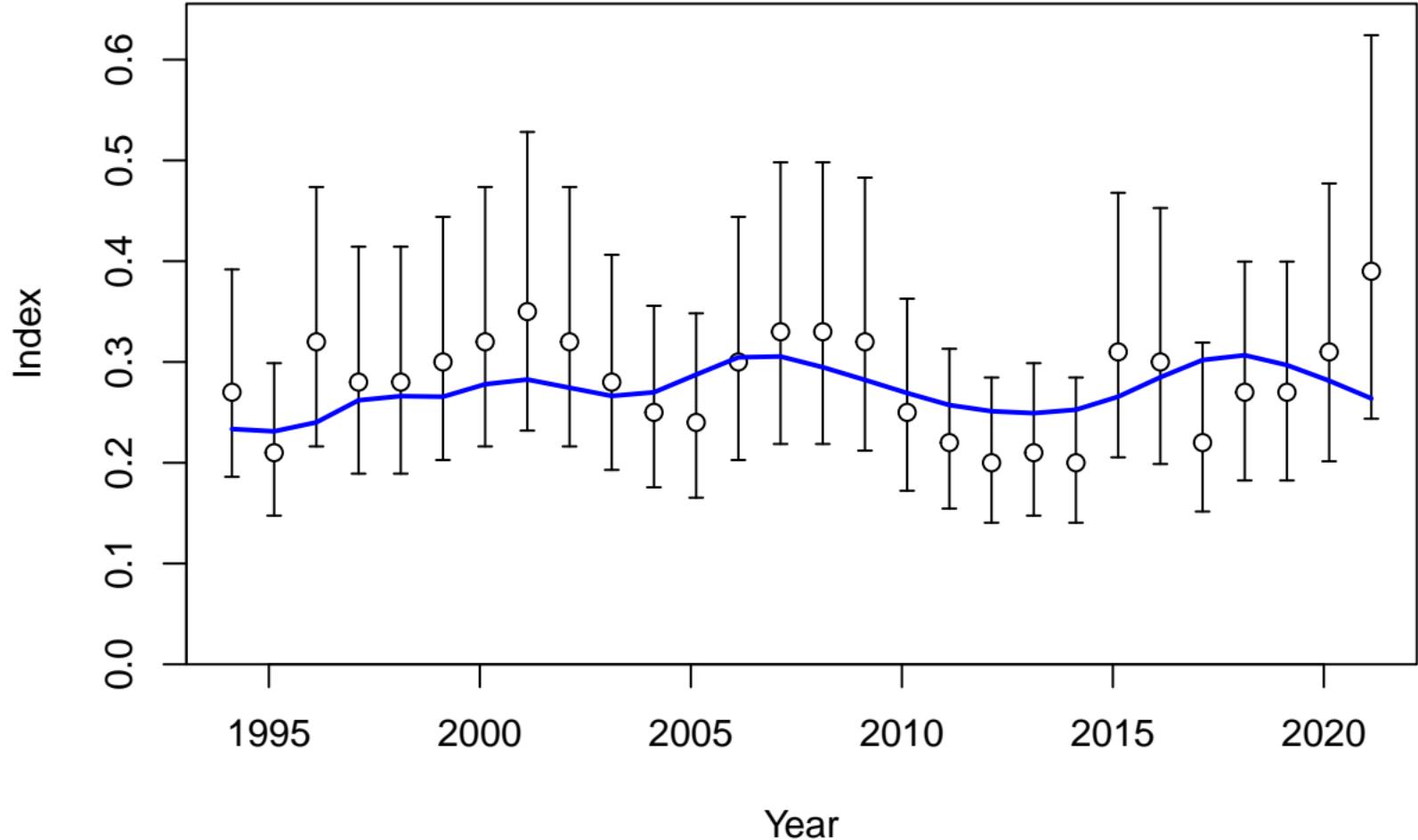
Year

1985

1990





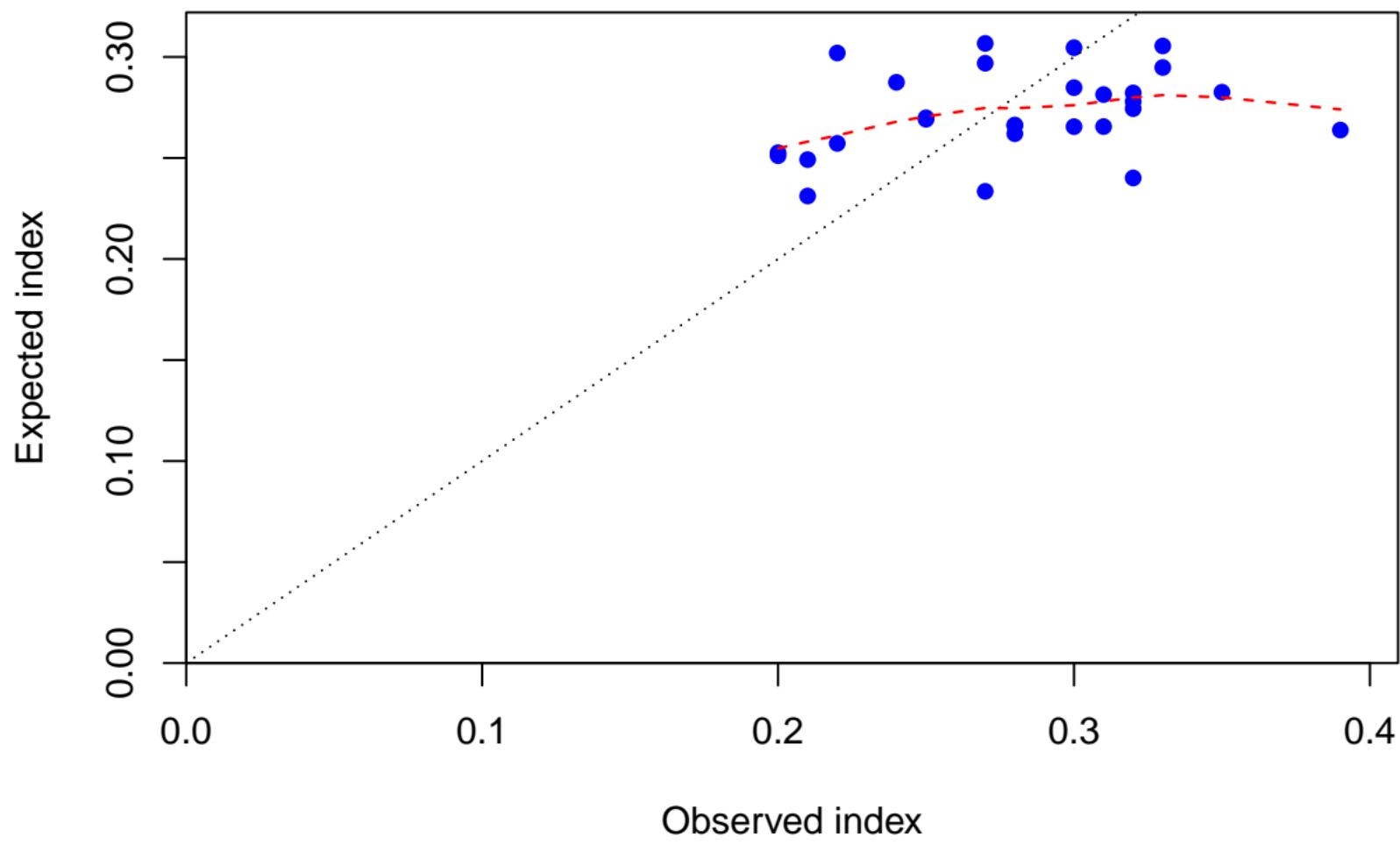


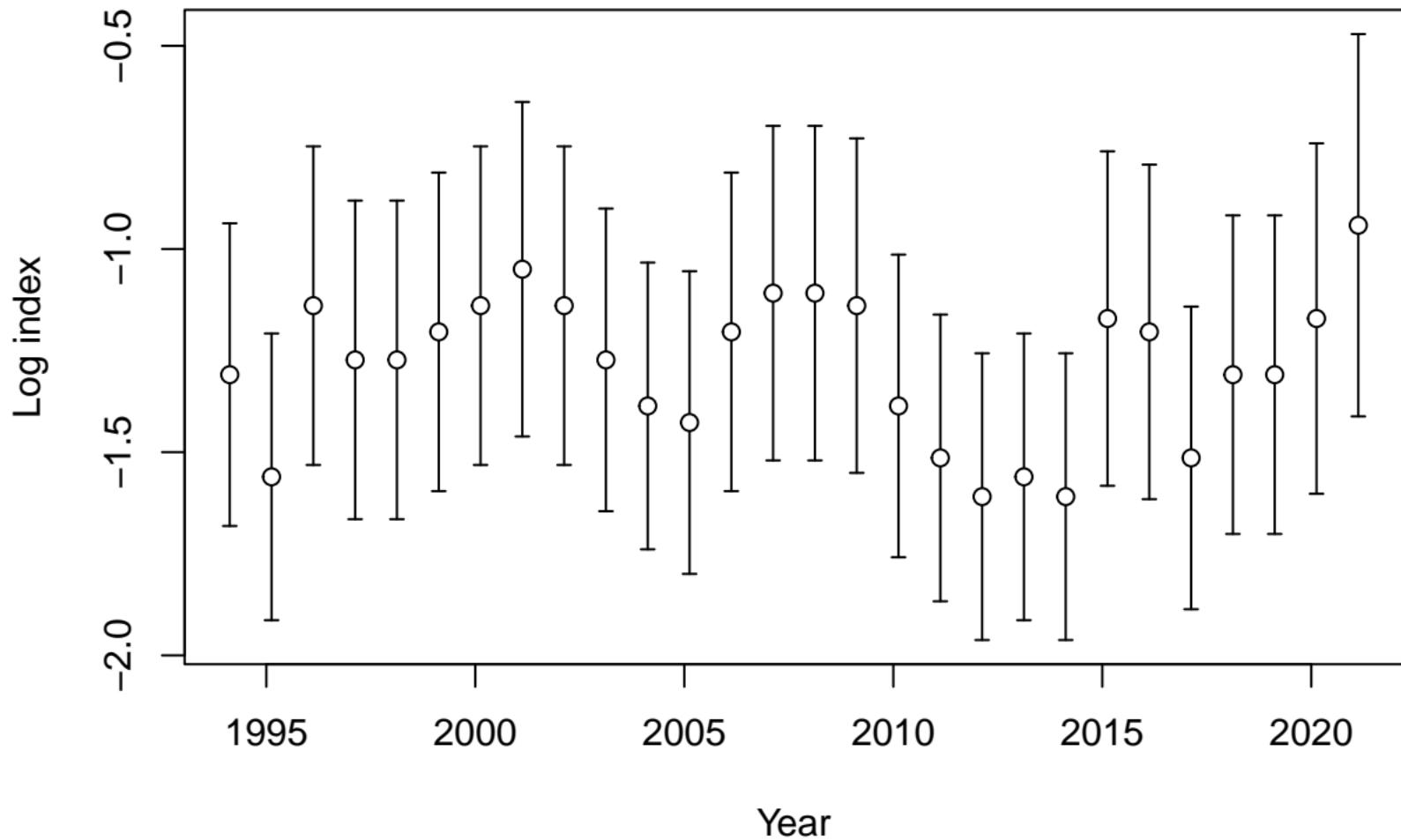
Expected index

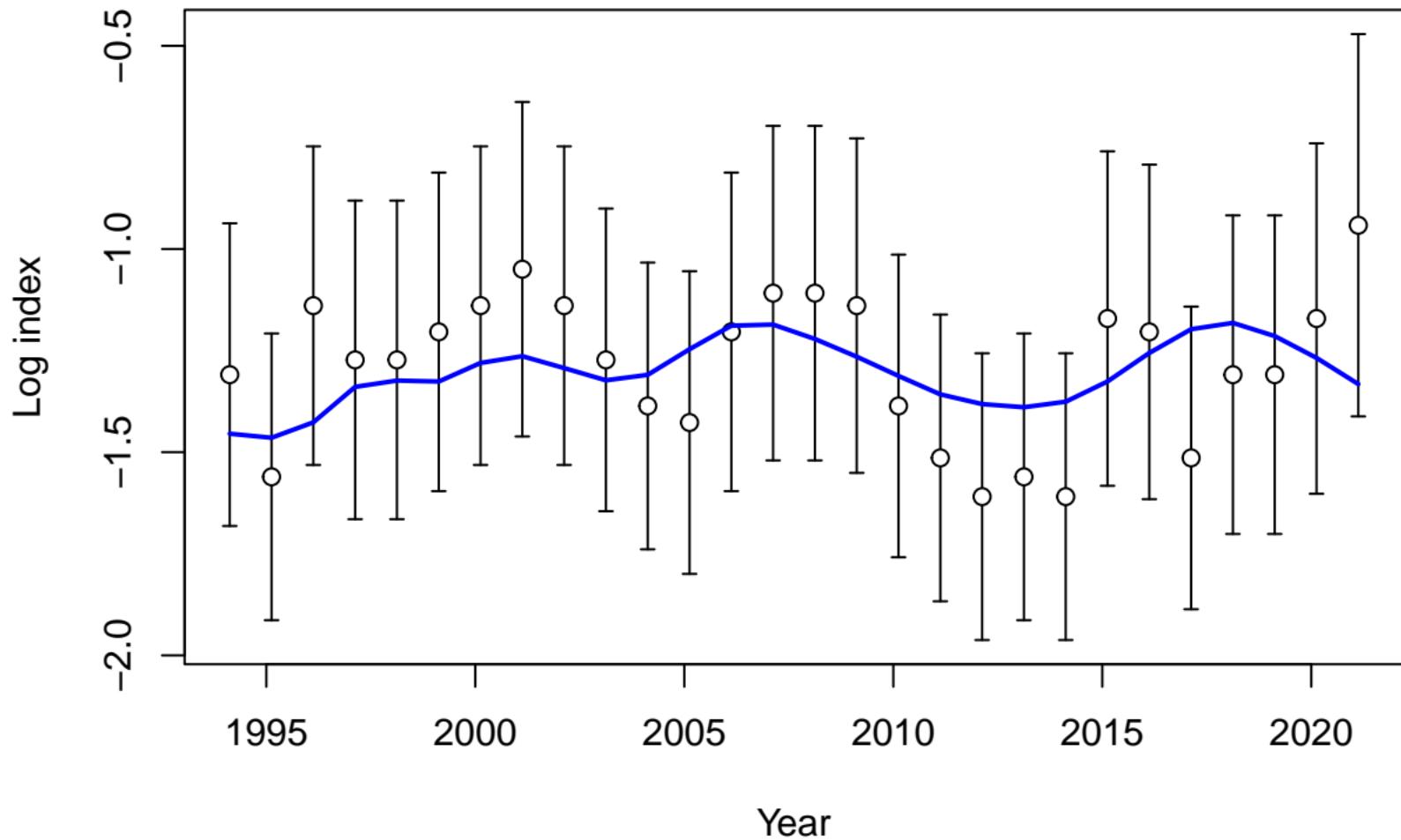
0.30
0.20
0.10
0.00

0.0 0.1 0.2 0.3 0.4

Observed index





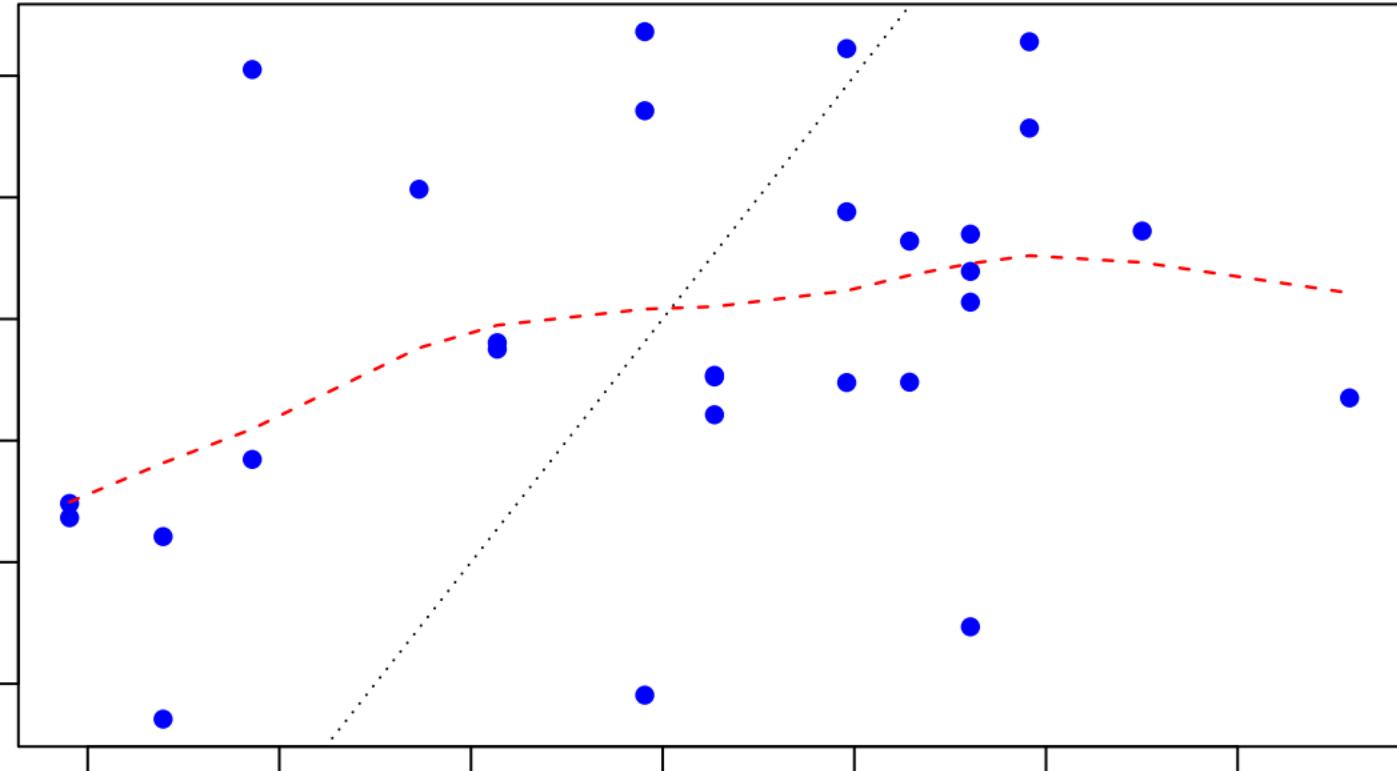


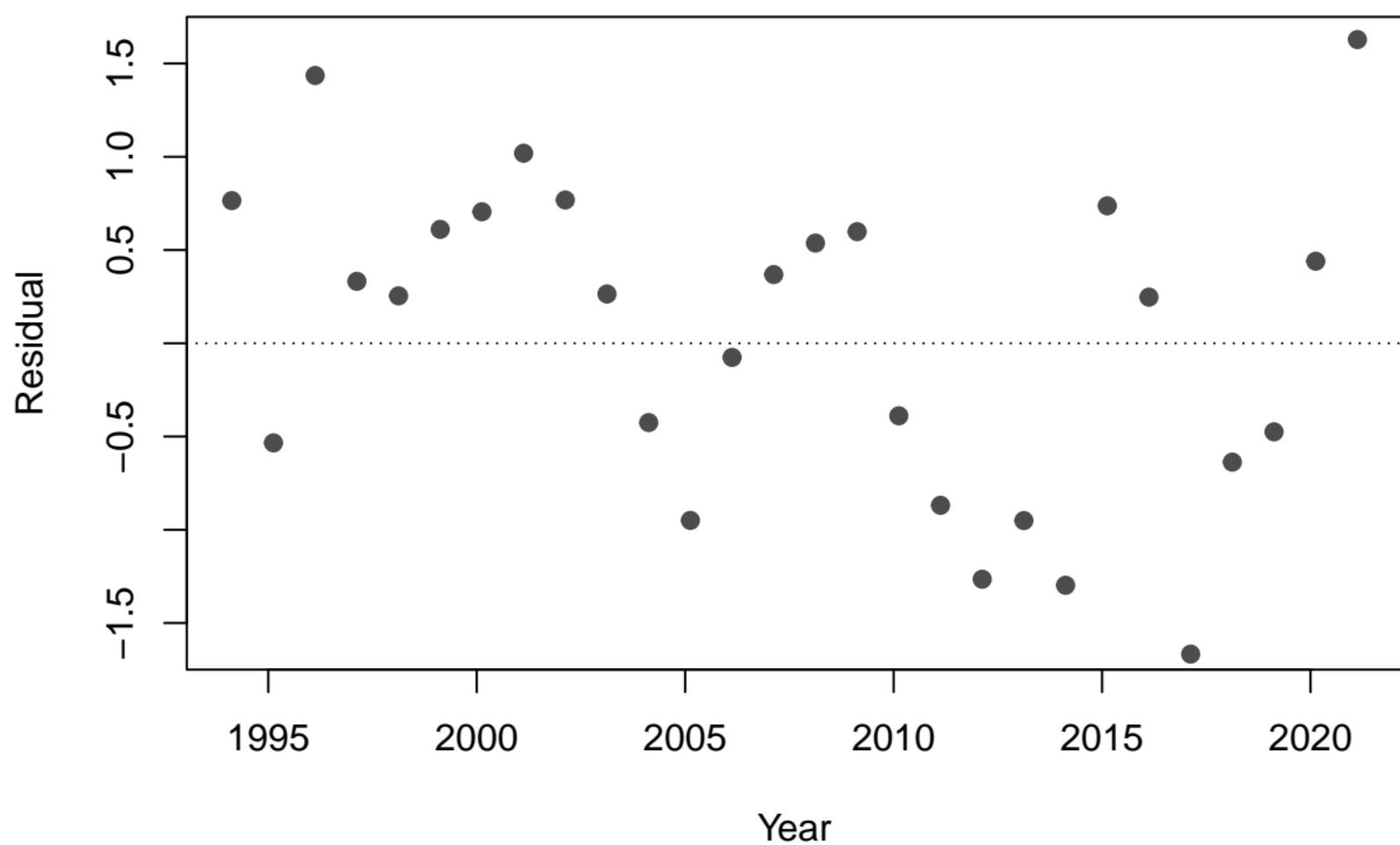
Log expected index

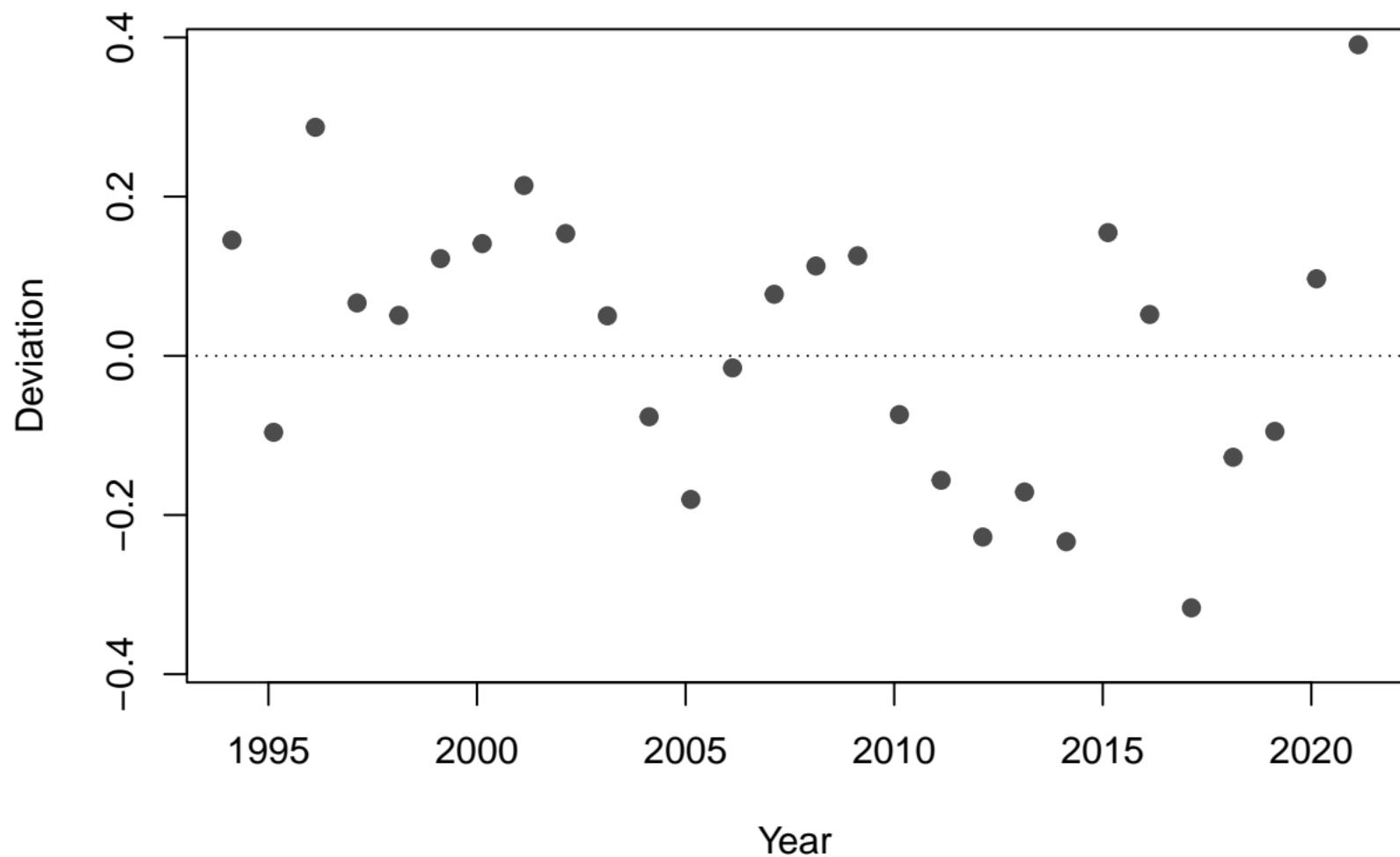
-1.25
-1.35
-1.45

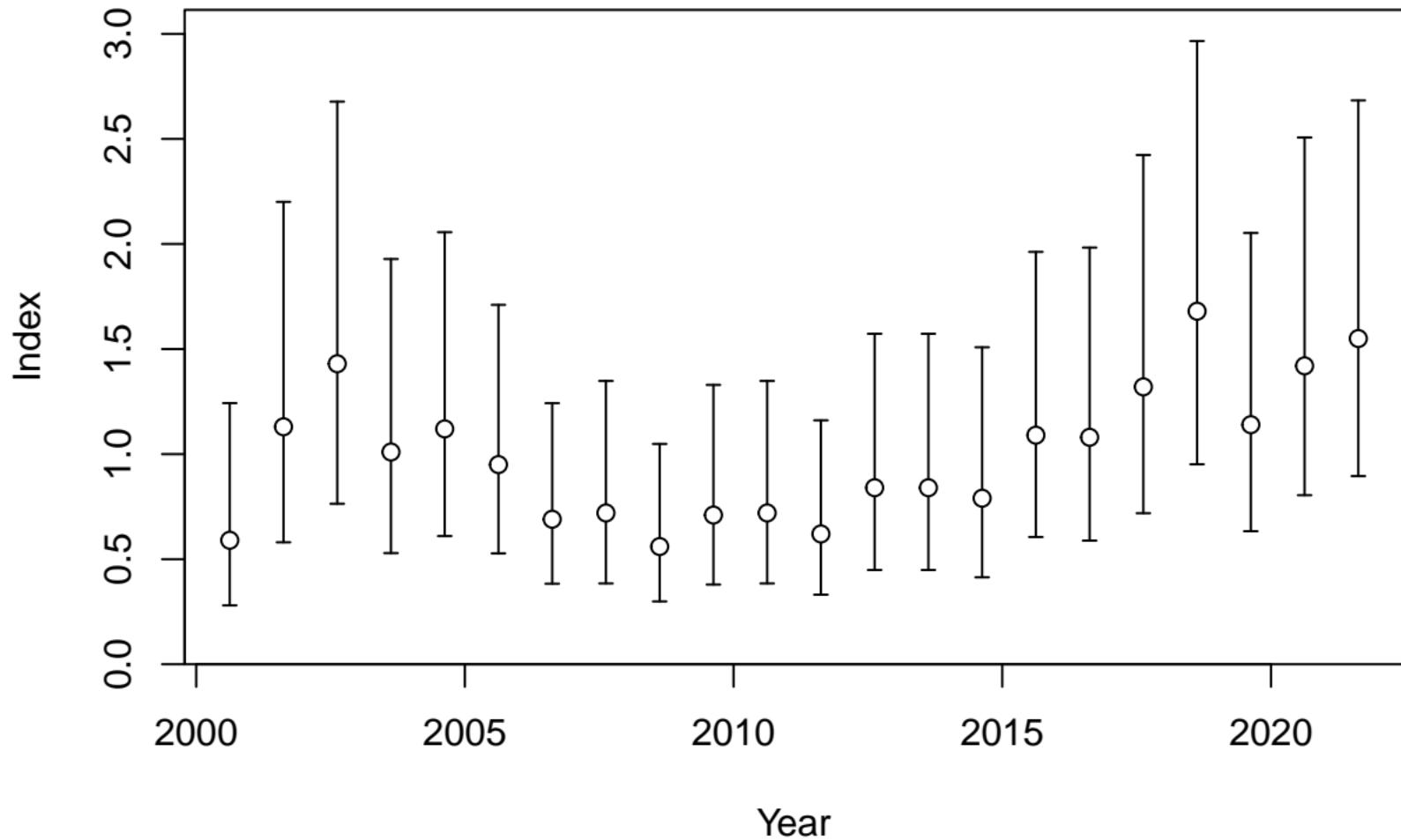
-1.6 -1.5 -1.4 -1.3 -1.2 -1.1 -1.0

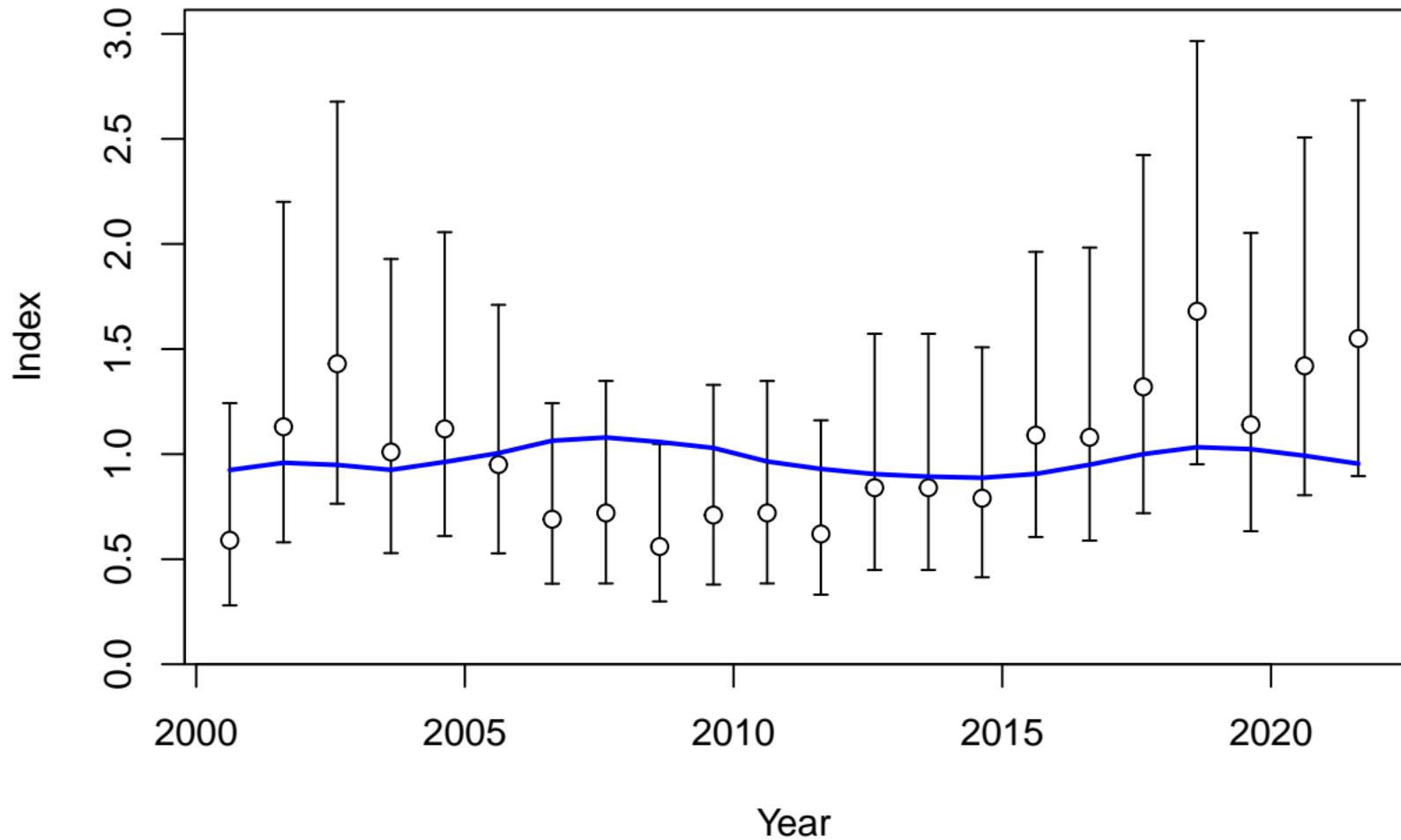
Log observed index











Expected index

1.0
0.8
0.6
0.4
0.2
0.0

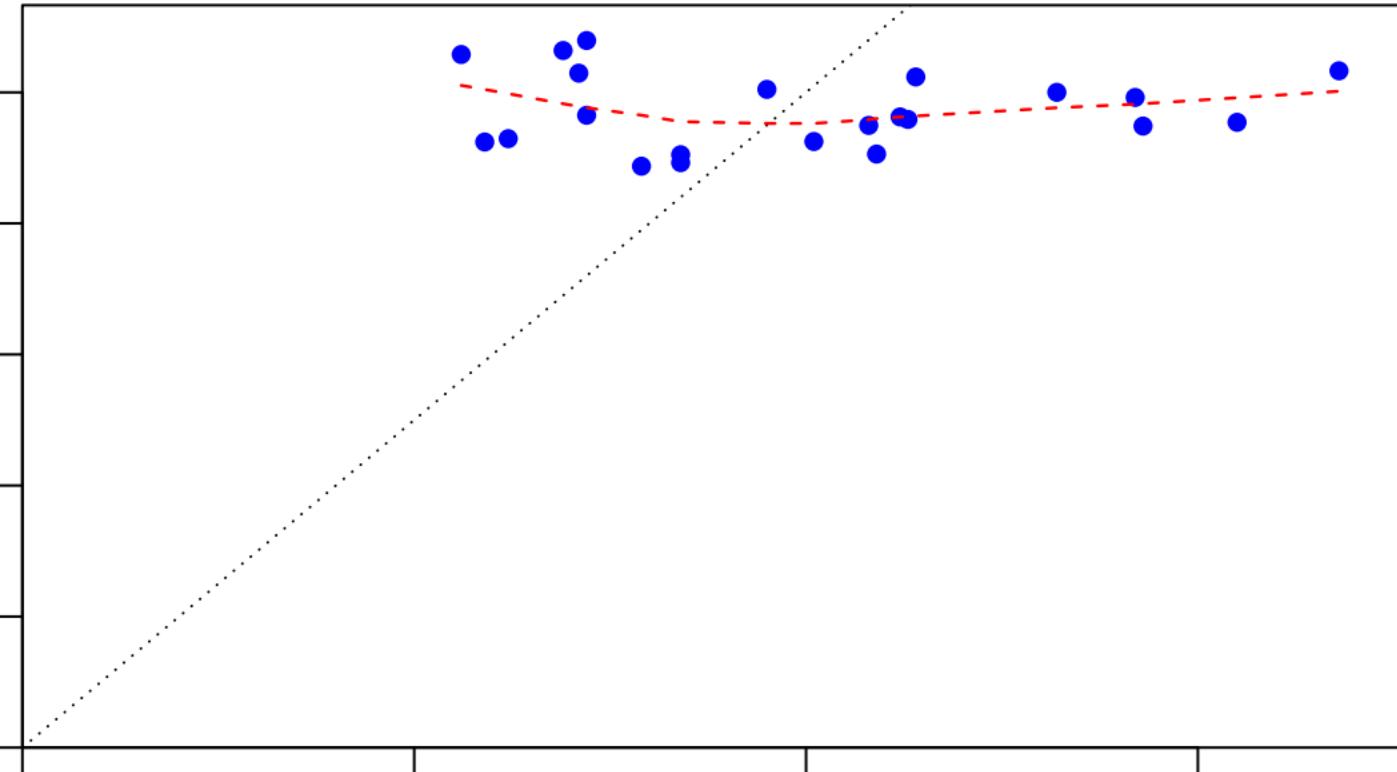
0.0

0.5

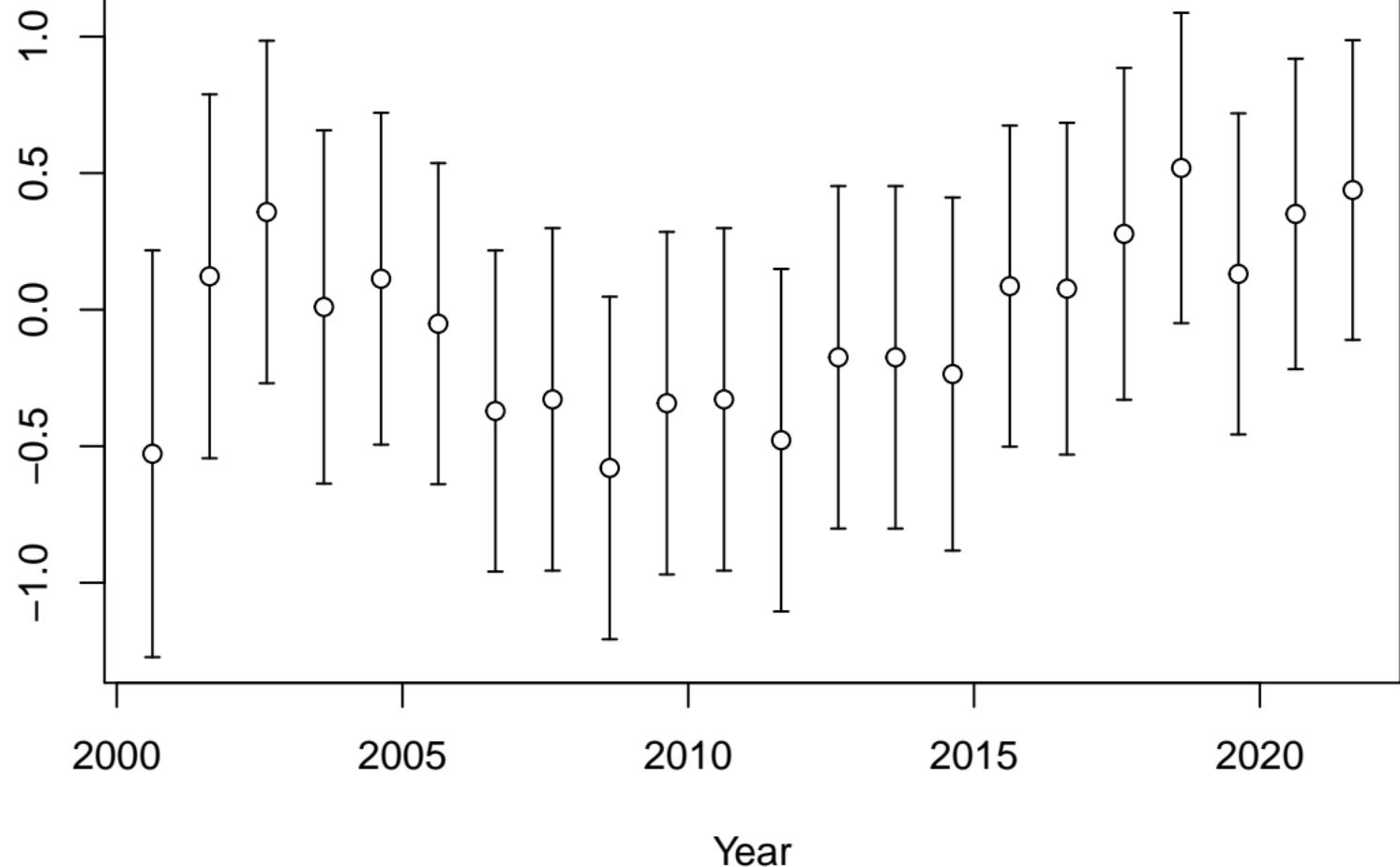
1.0

1.5

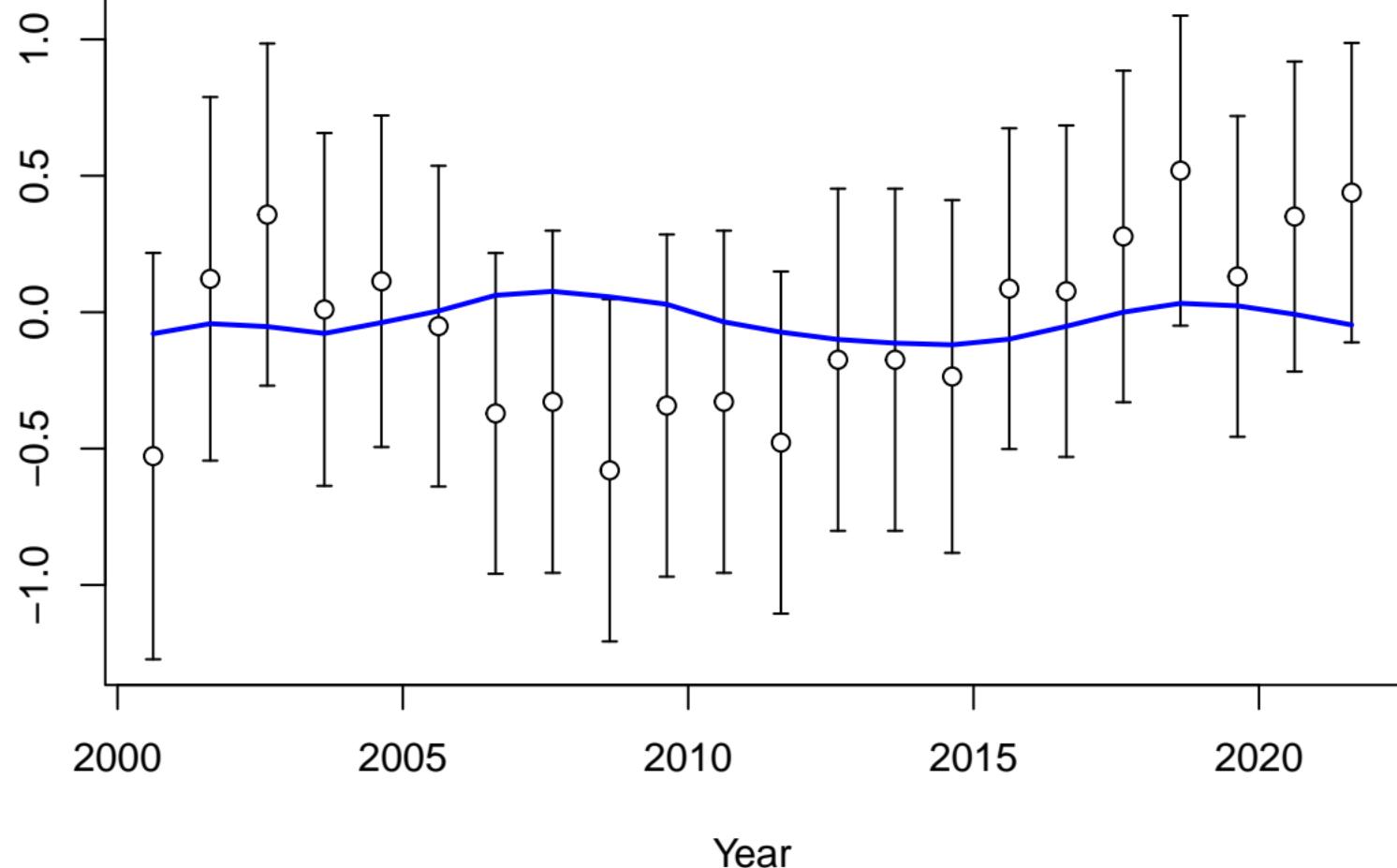
Observed index



Log index



Log index

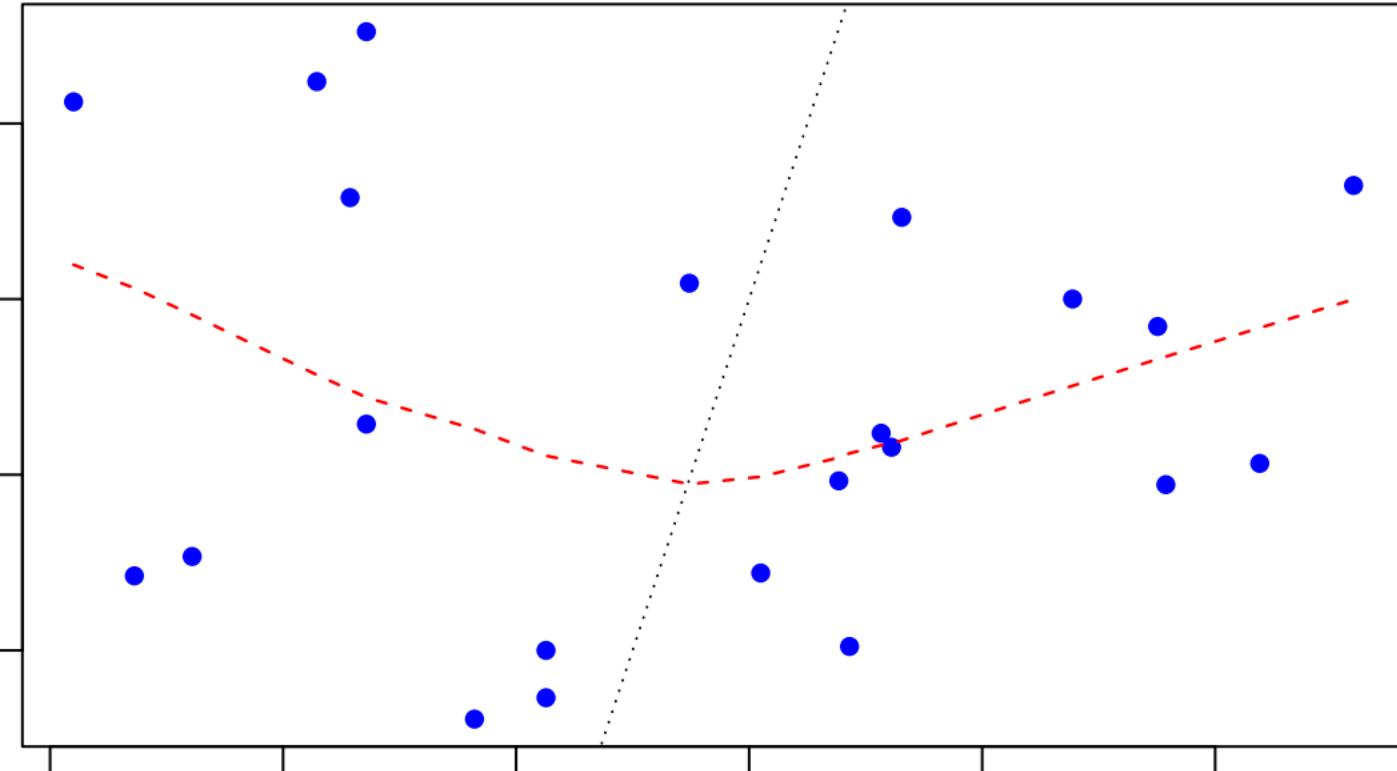


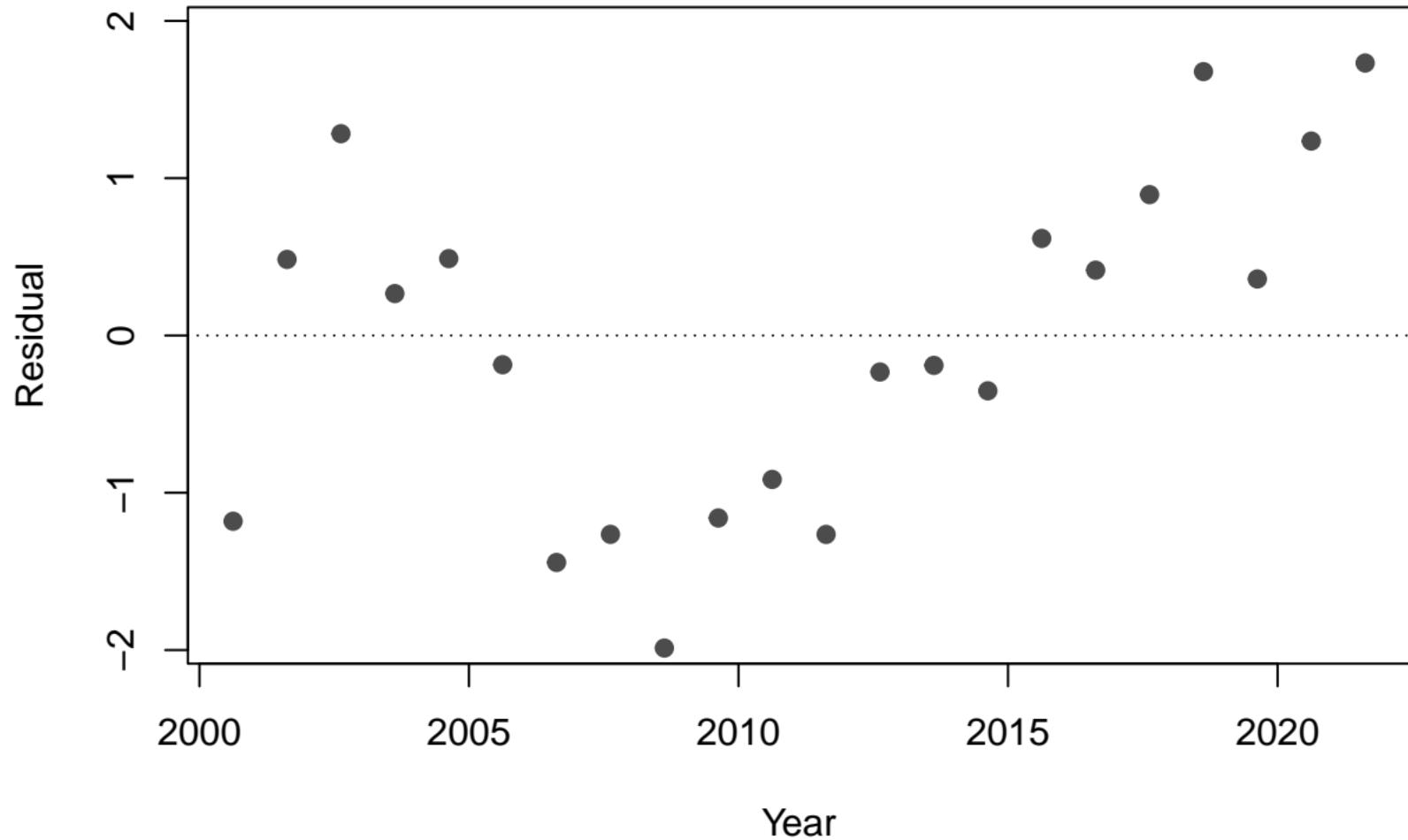
Log expected index

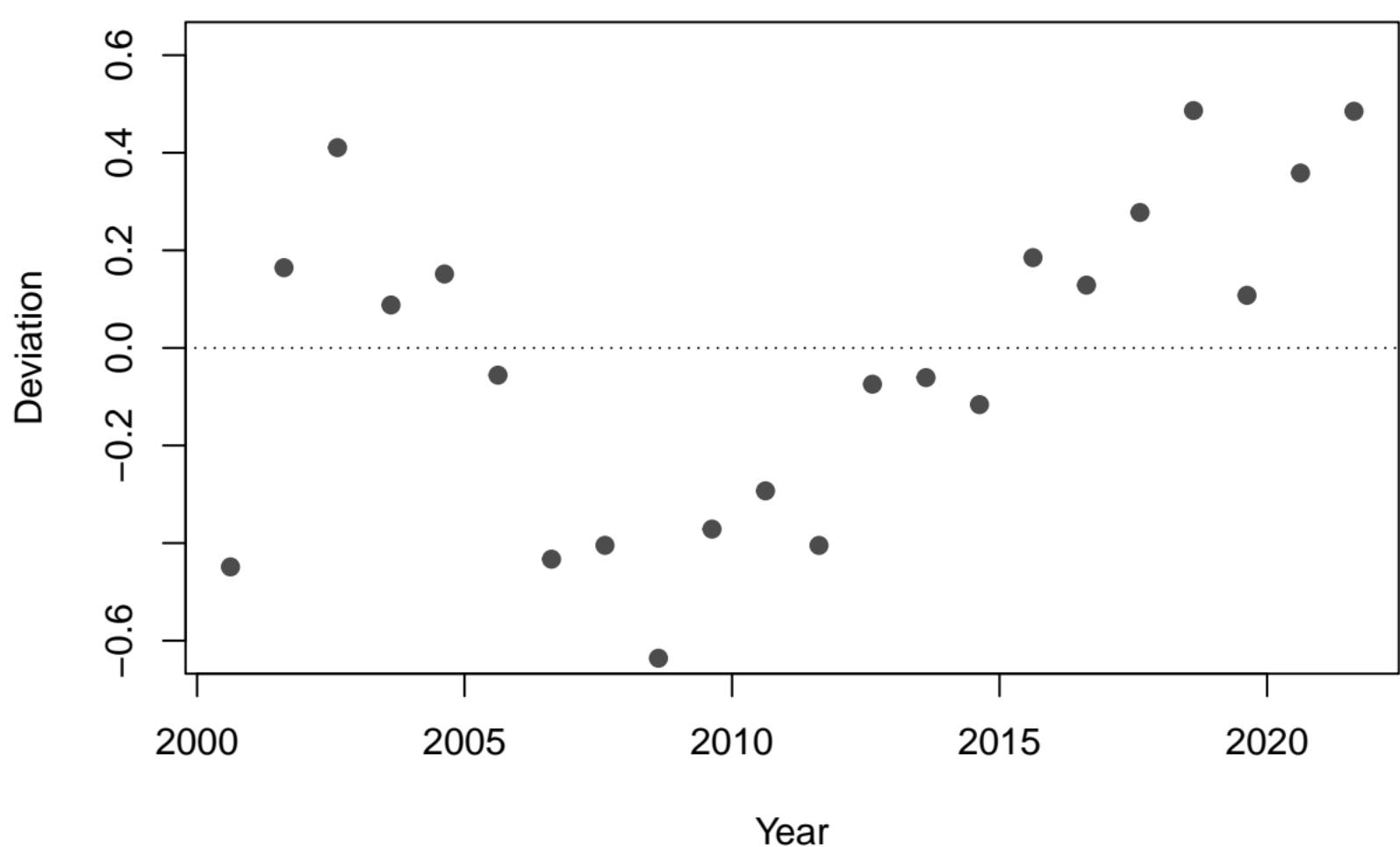
0.05
0.00
-0.05
-0.10

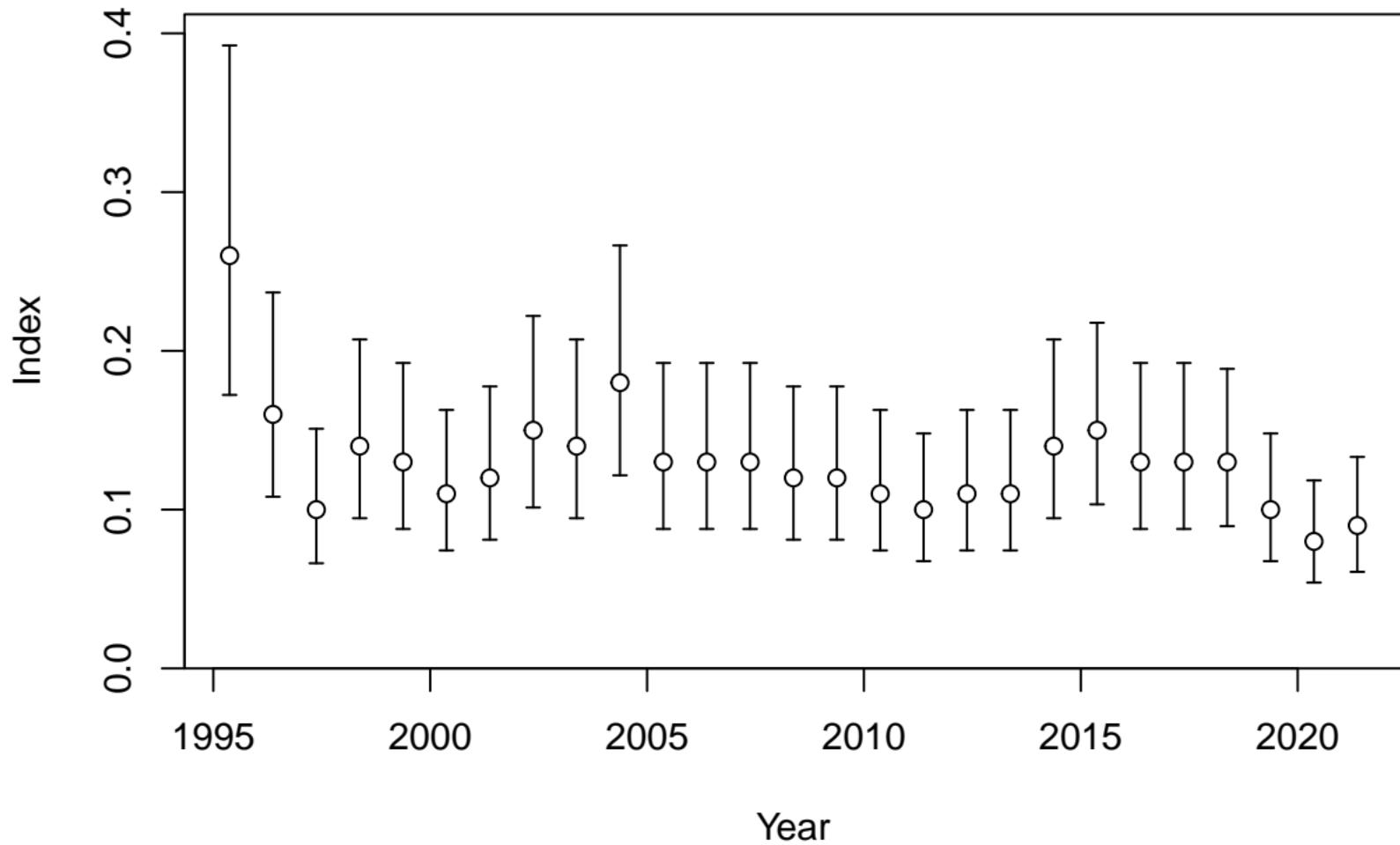
-0.6 -0.4 -0.2 0.0 0.2 0.4

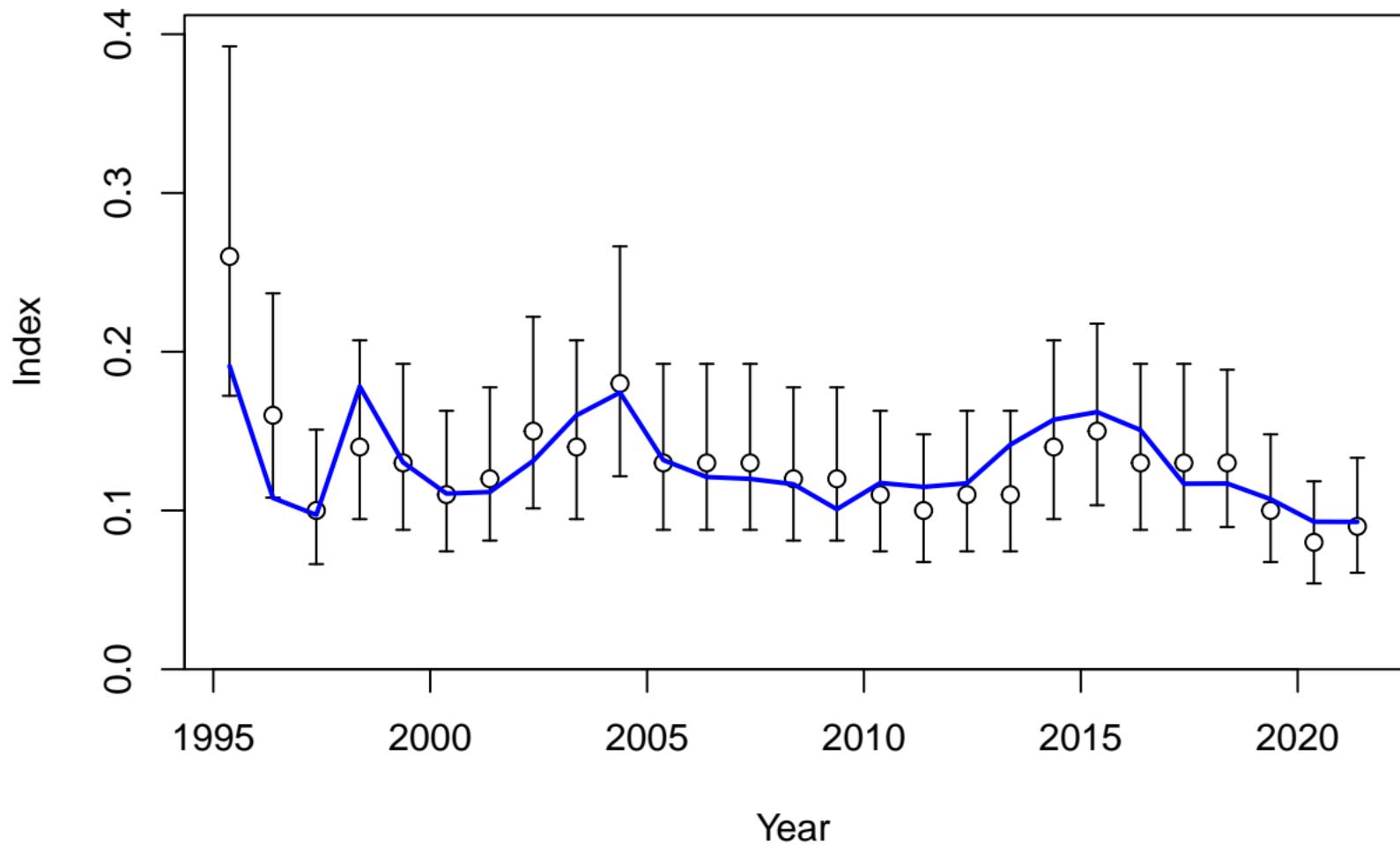
Log observed index

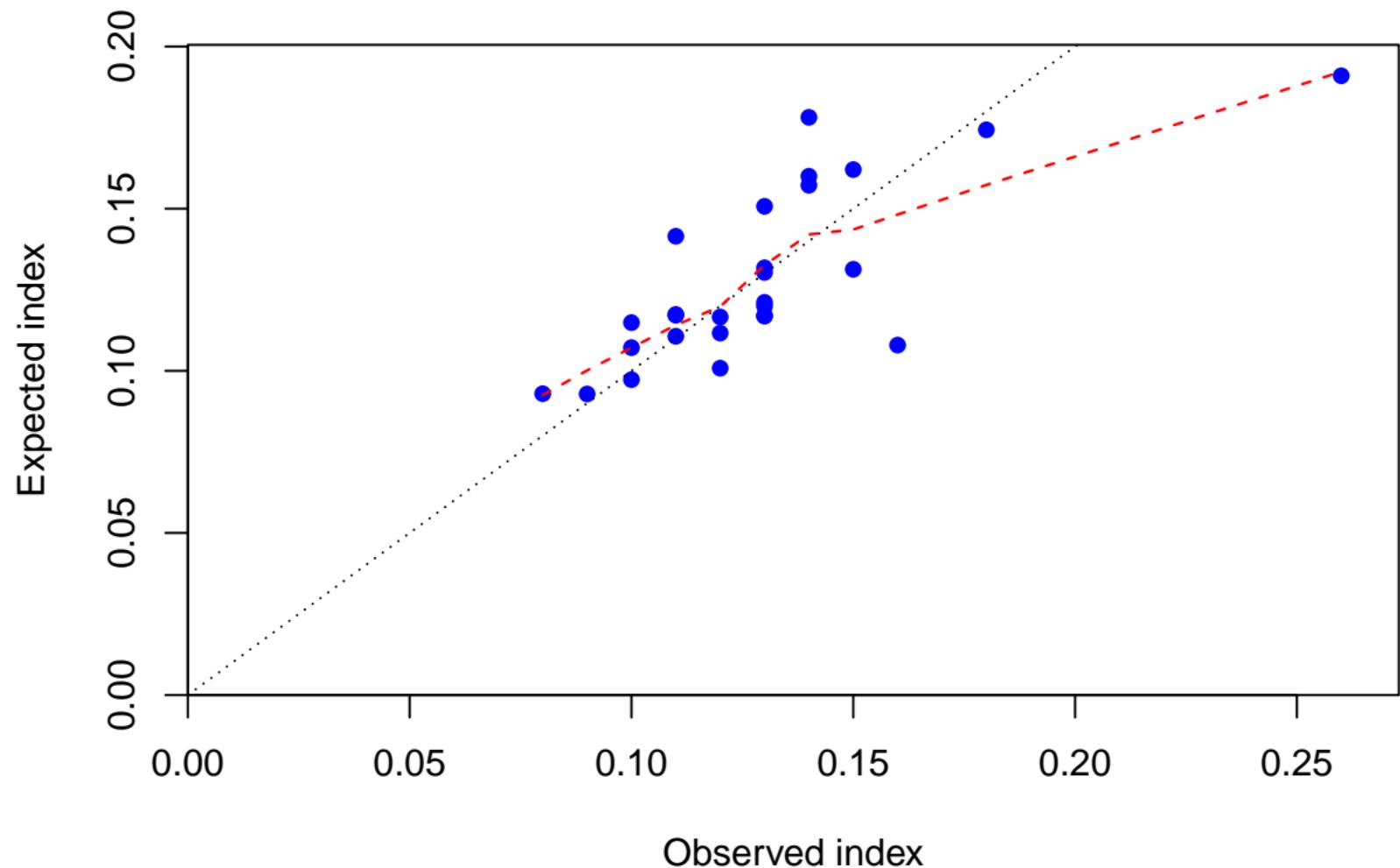




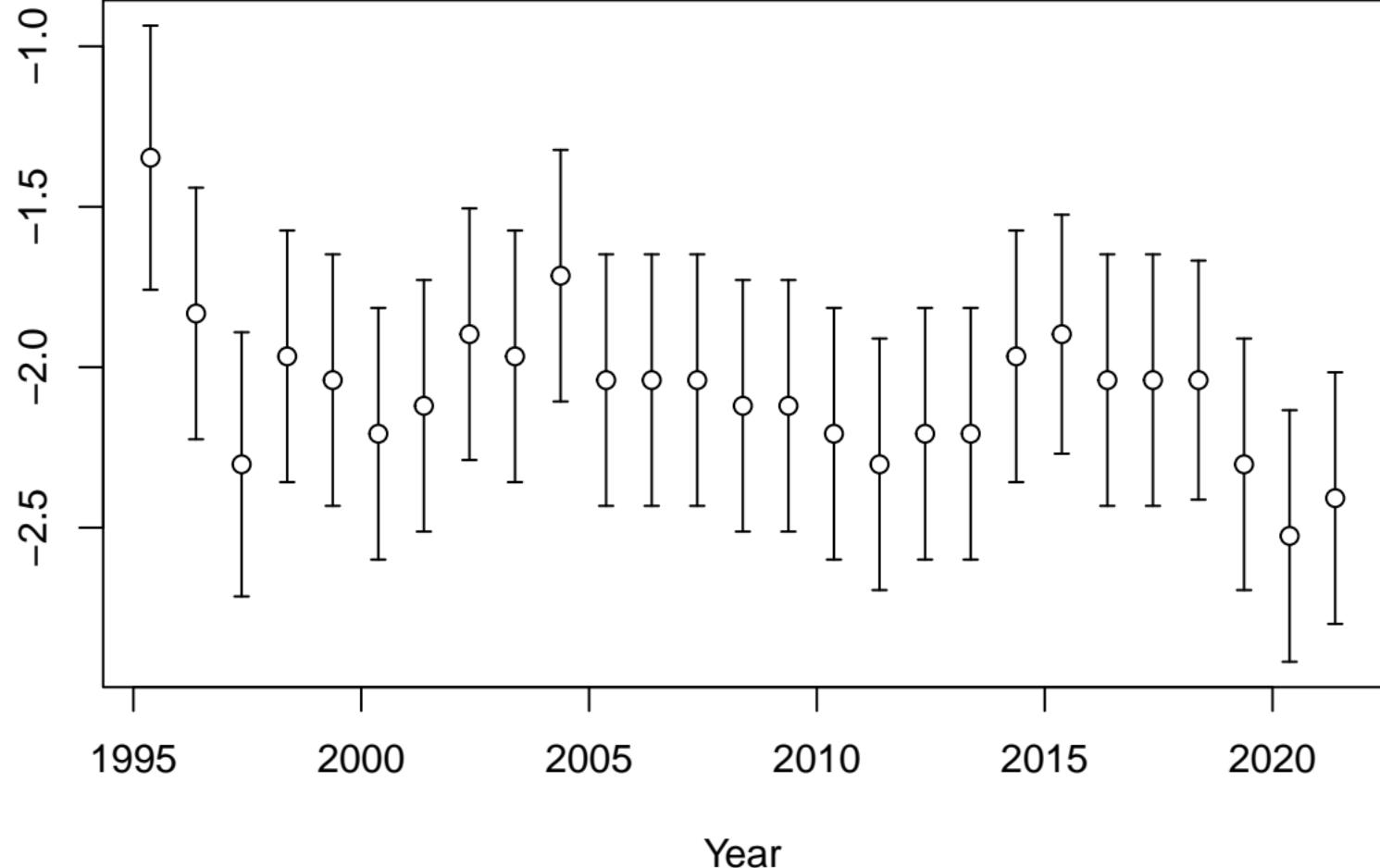




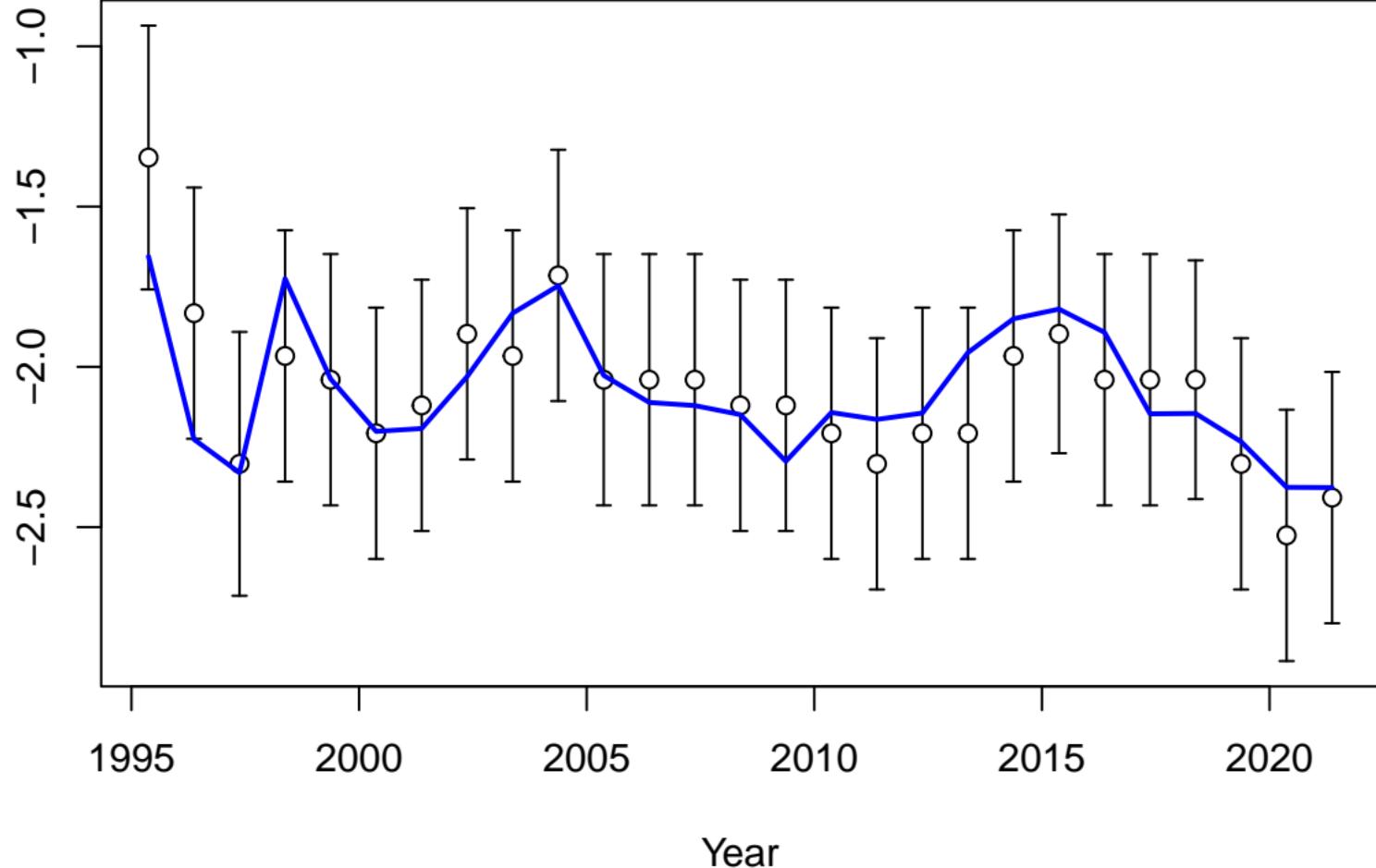




Log index



Log index

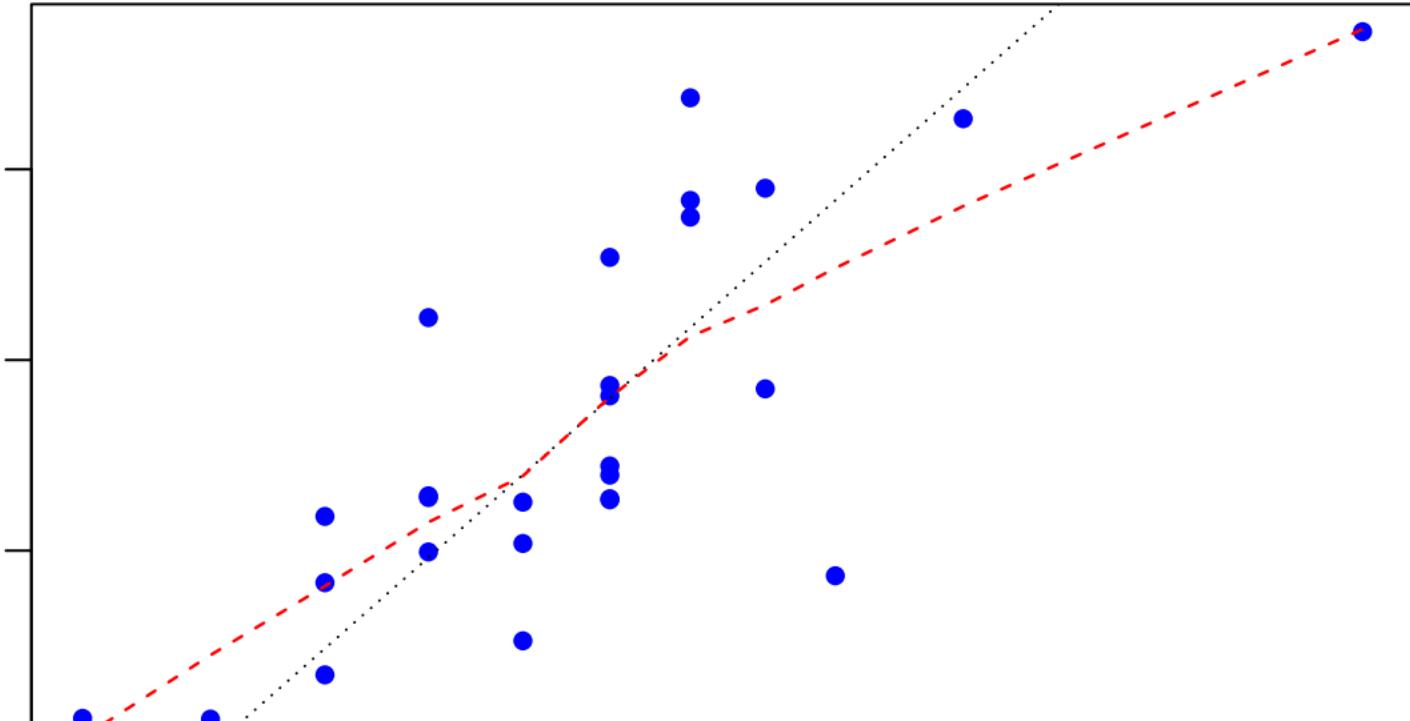


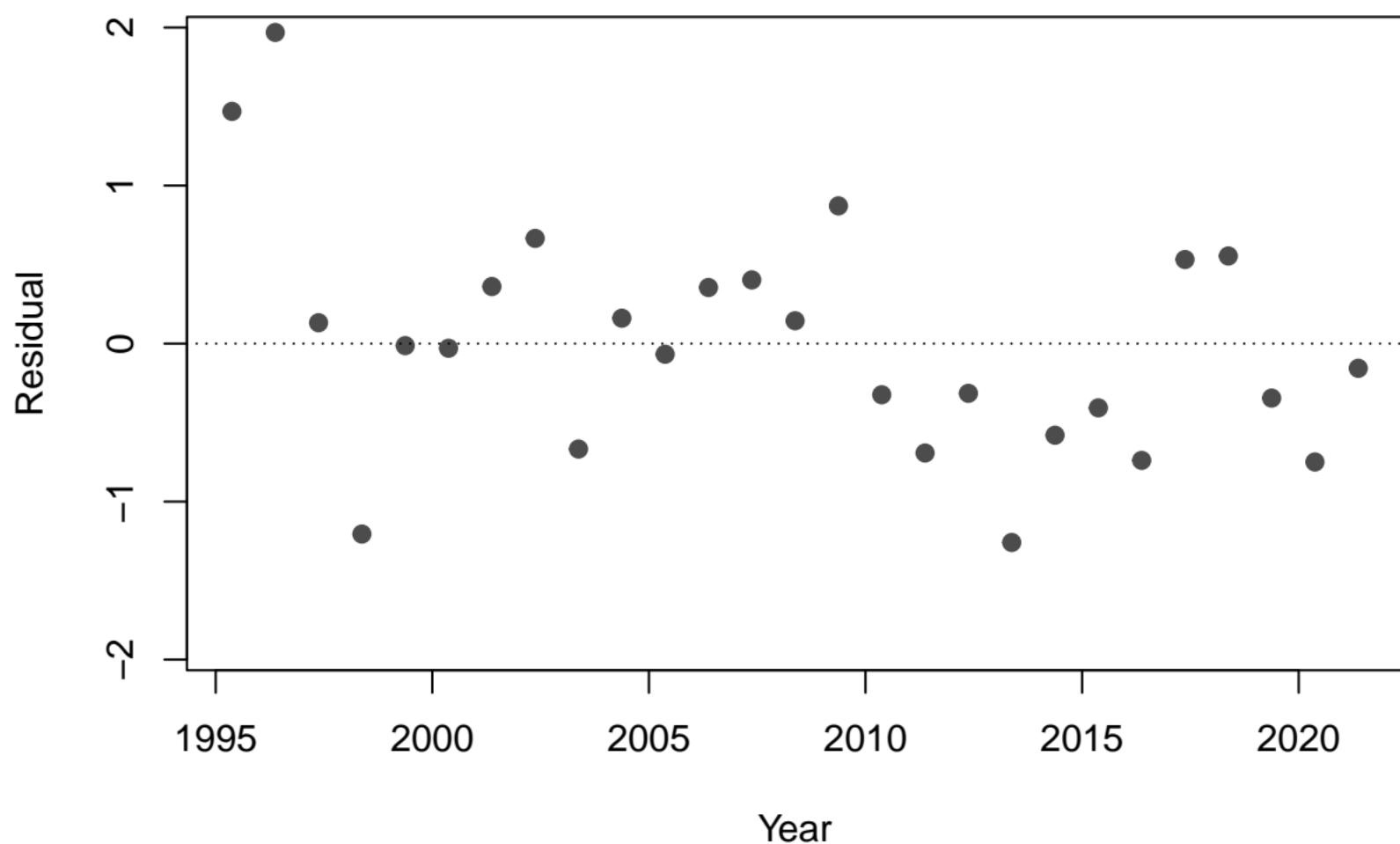
Log expected index

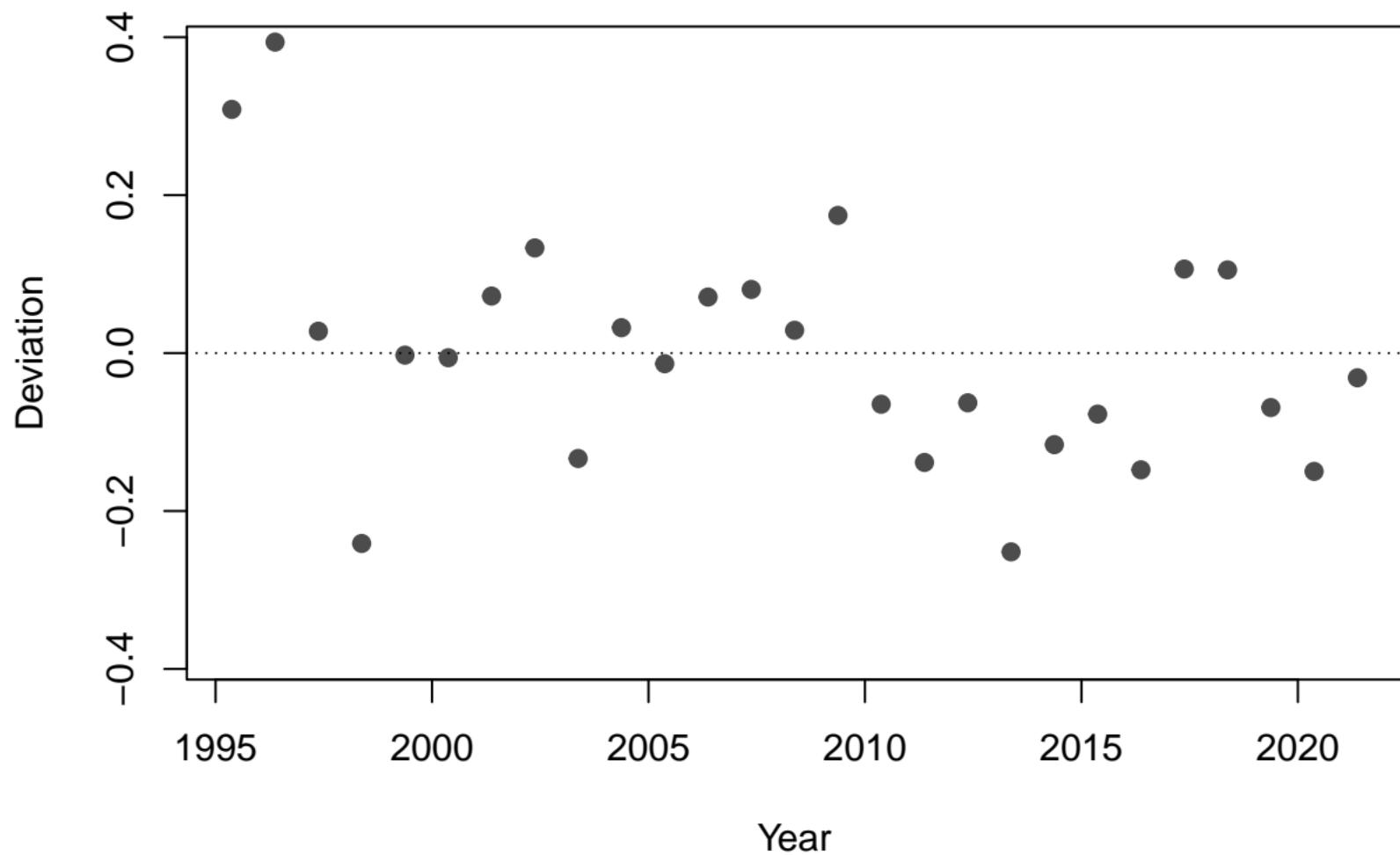
-2.4 -2.2 -2.0 -1.8

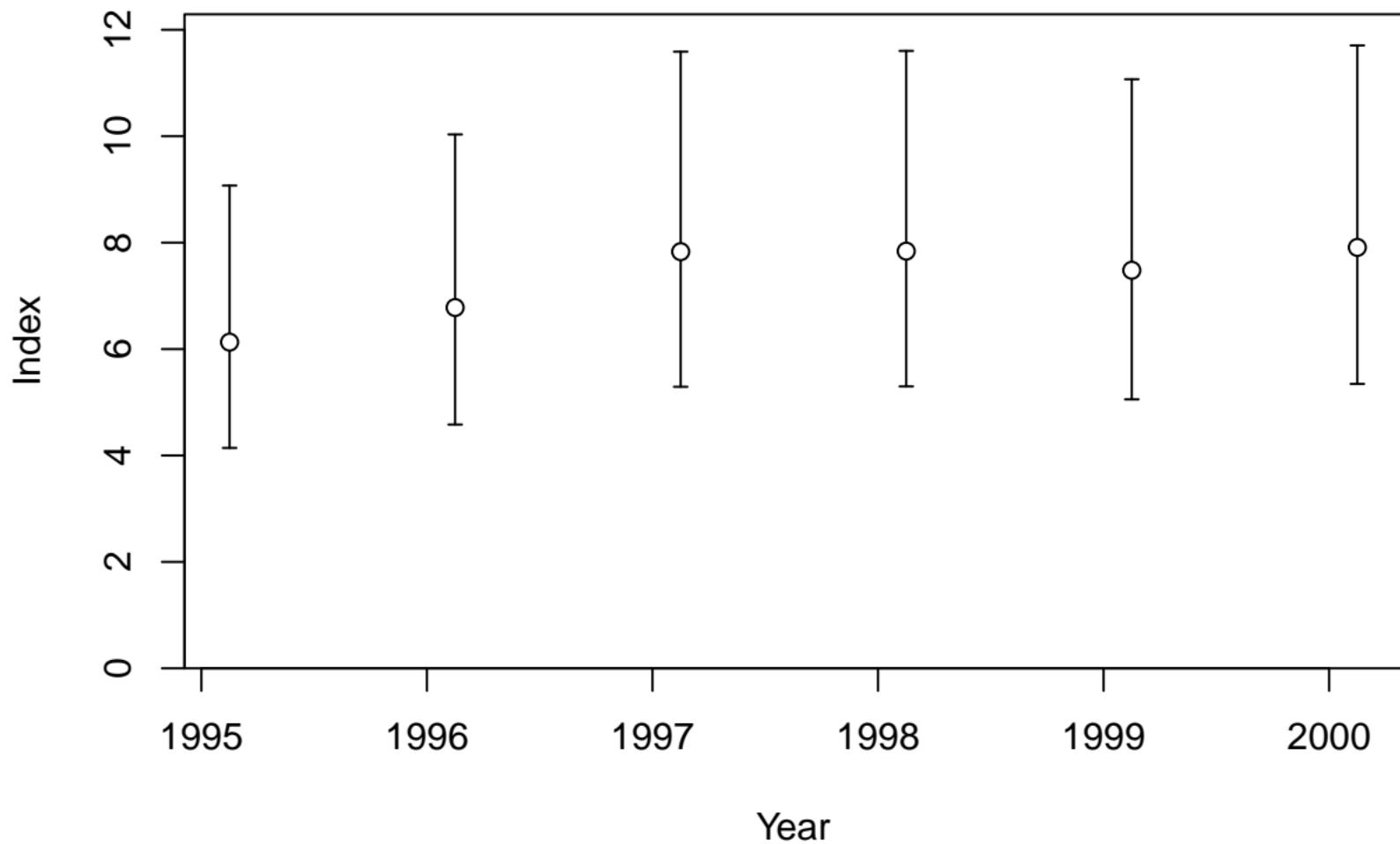
-2.4 -2.2 -2.0 -1.8 -1.6 -1.4

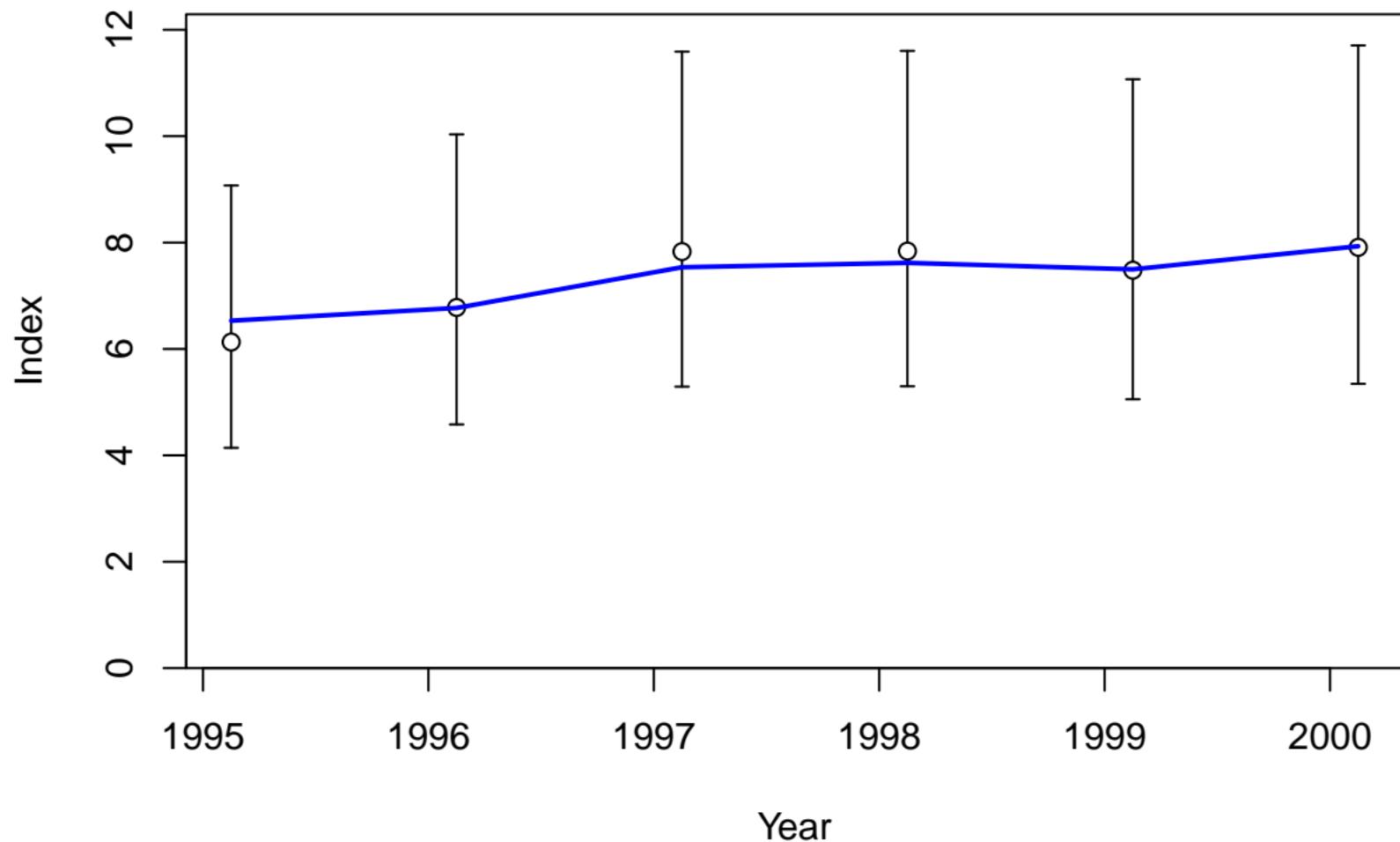
Log observed index



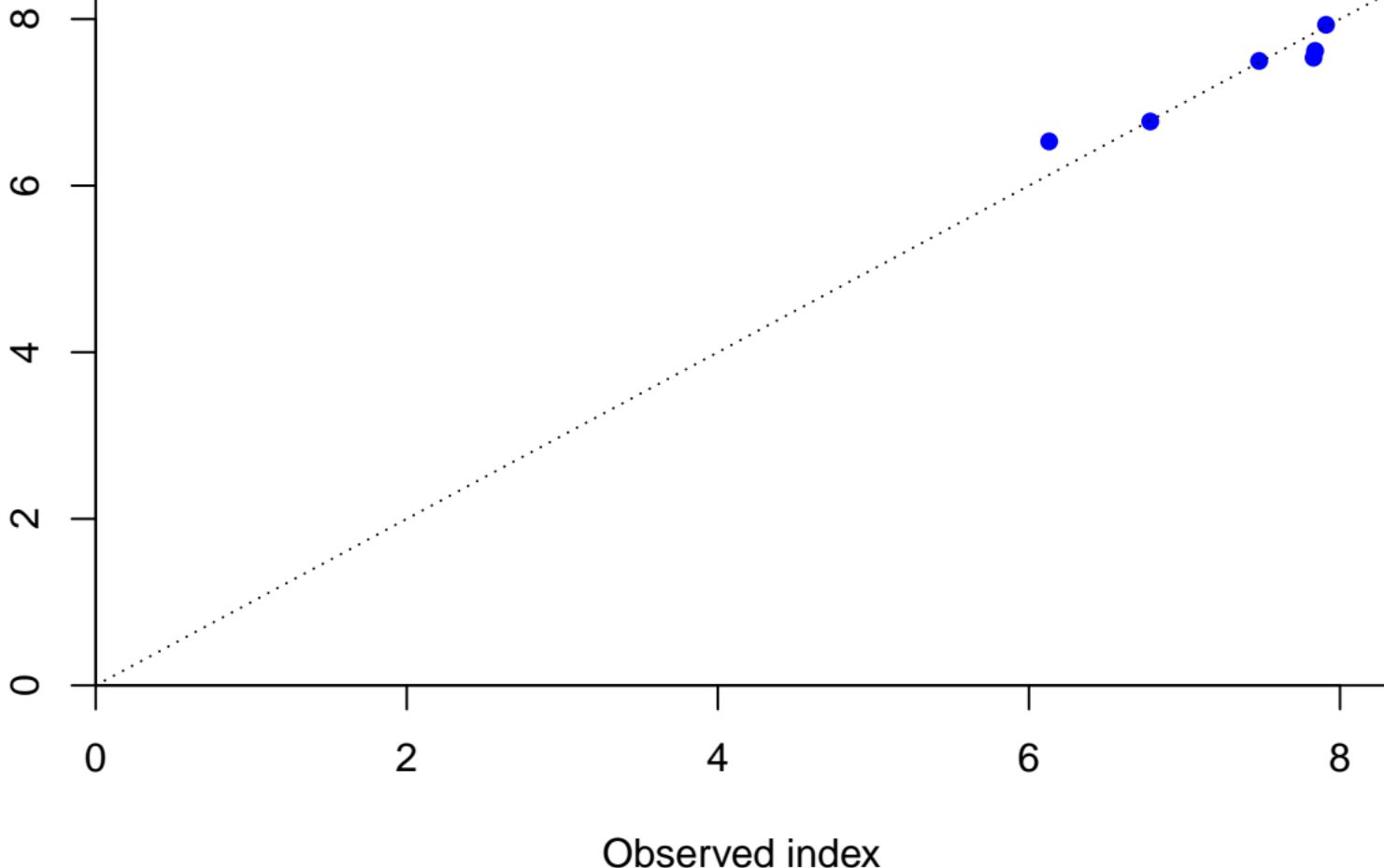








Expected index



Log index

1.4 1.6 1.8 2.0 2.2 2.4

1995

1996

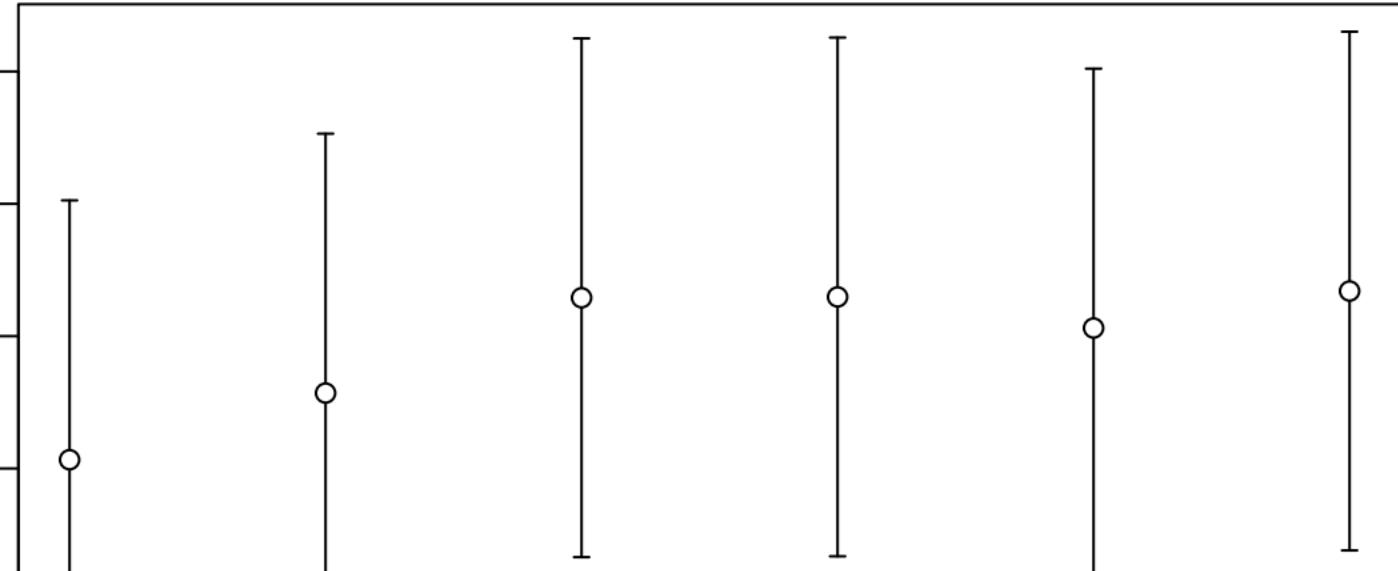
1997

1998

1999

2000

Year

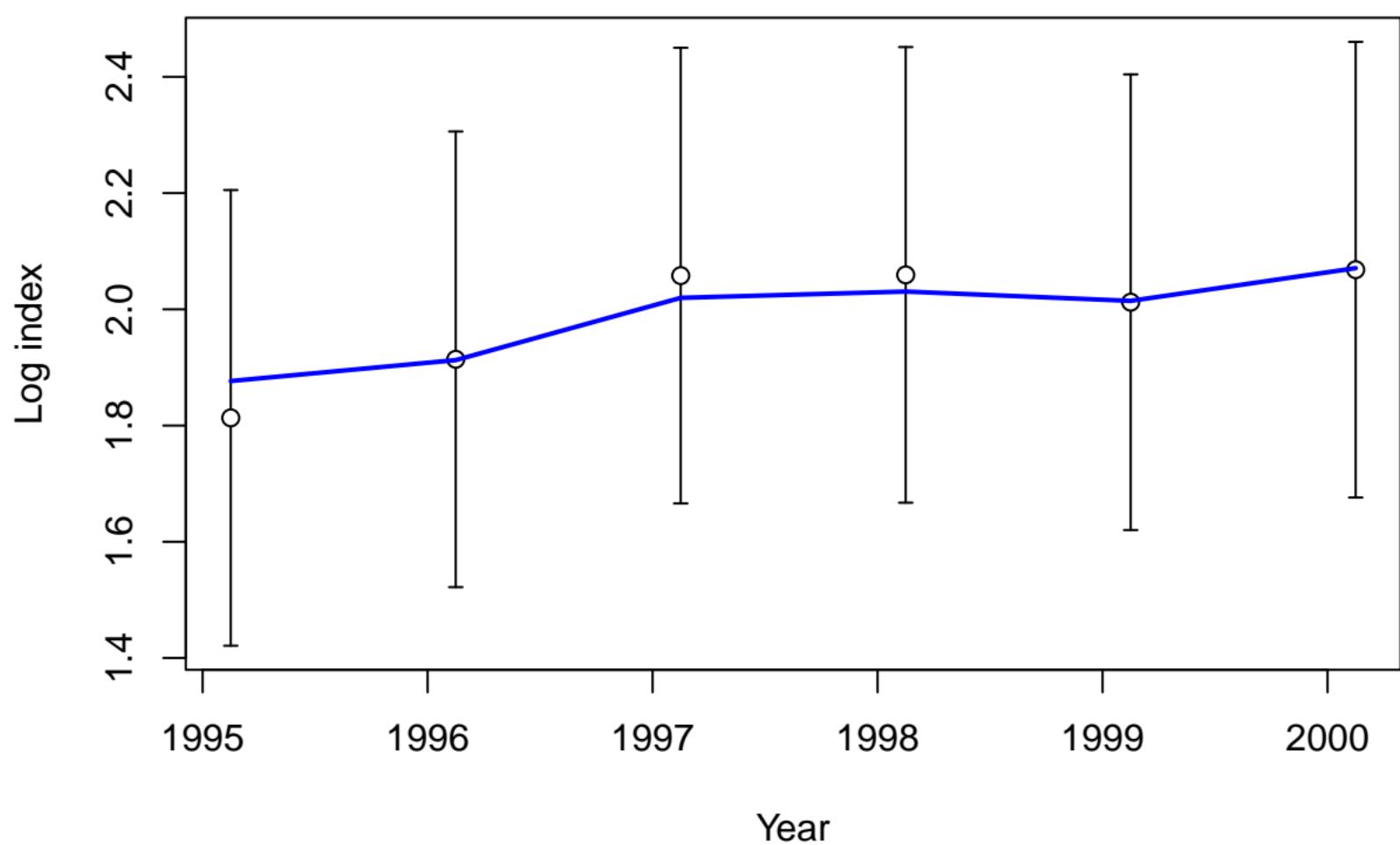


Log index

2.4
2.2
2.0
1.8
1.6
1.4

1995 1996 1997 1998 1999 2000

Year



Log expected index

1.90 1.95 2.00 2.05

1.85

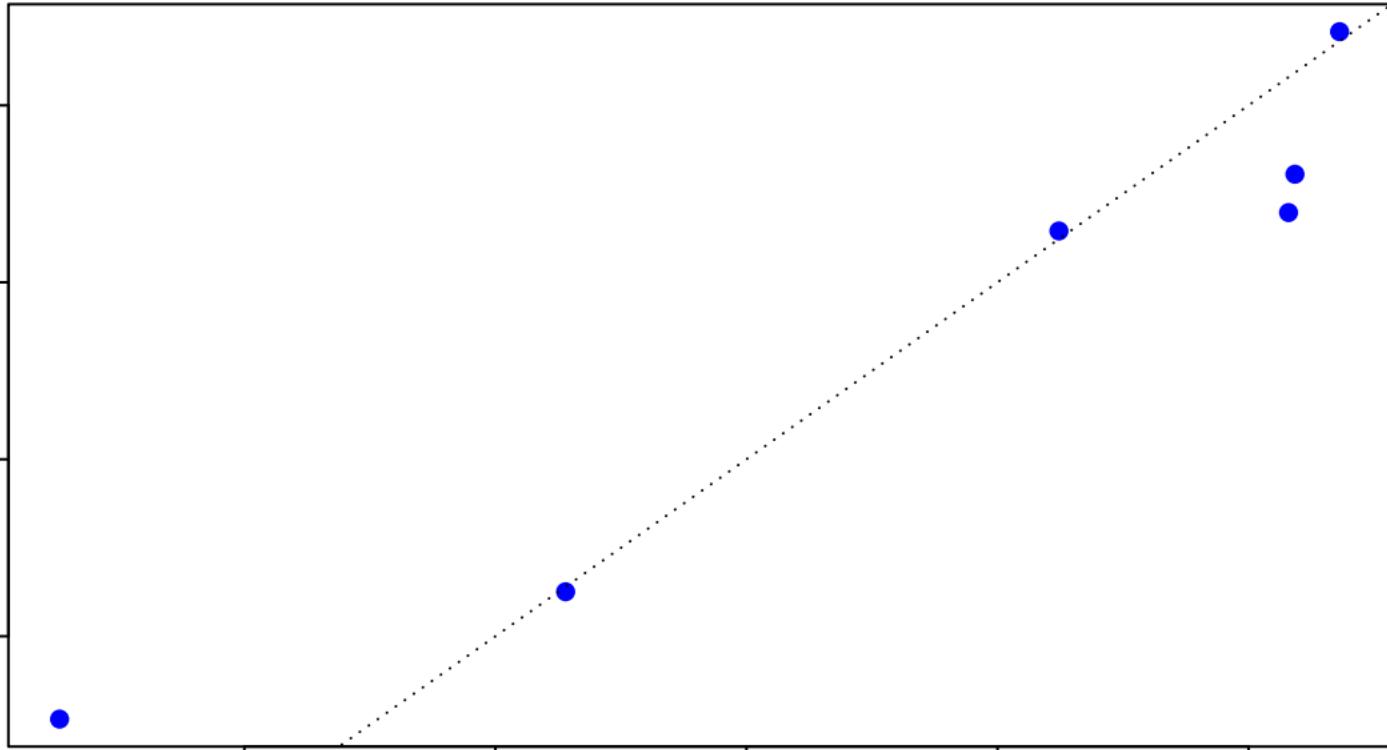
1.90

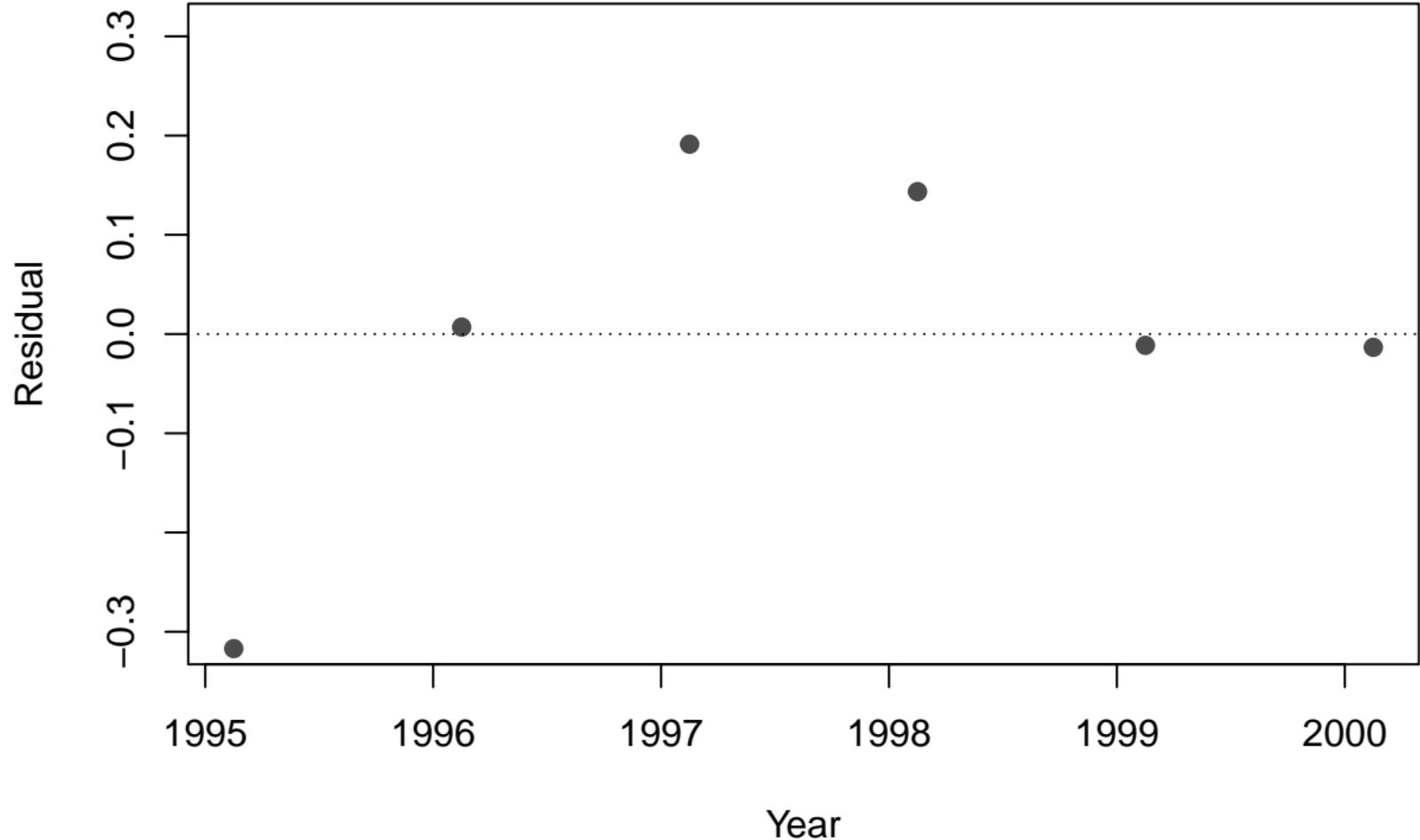
1.95

2.00

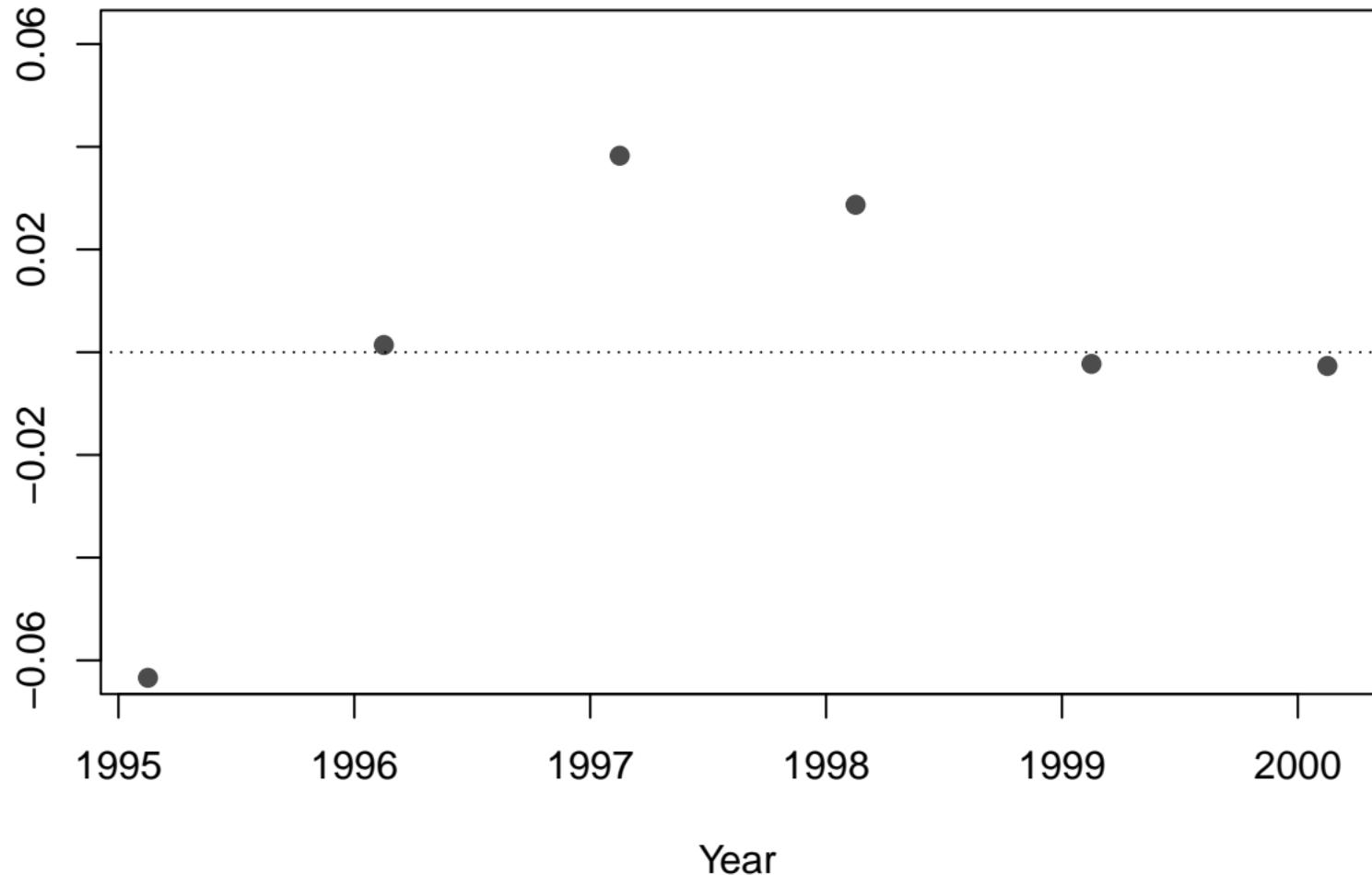
2.05

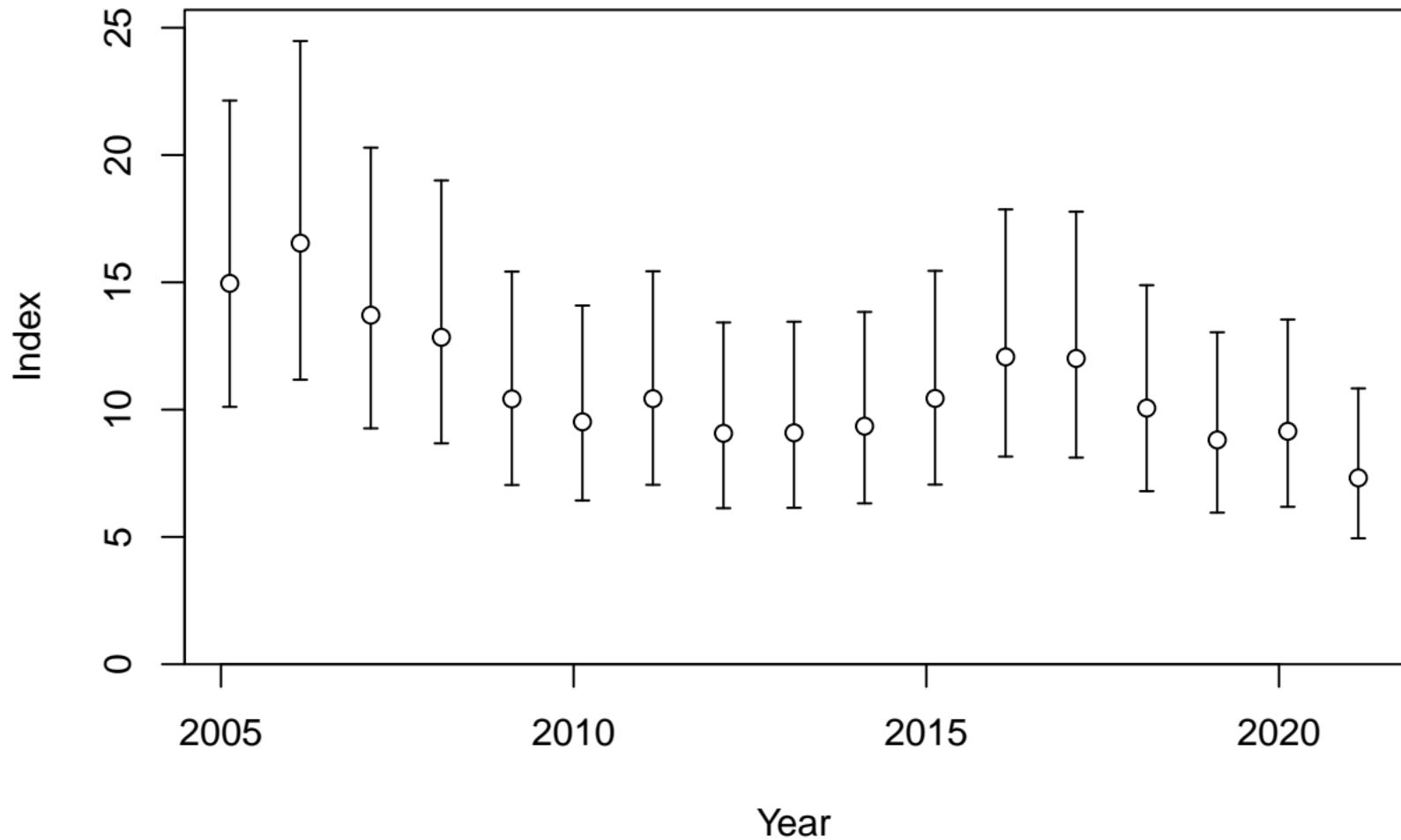
Log observed index



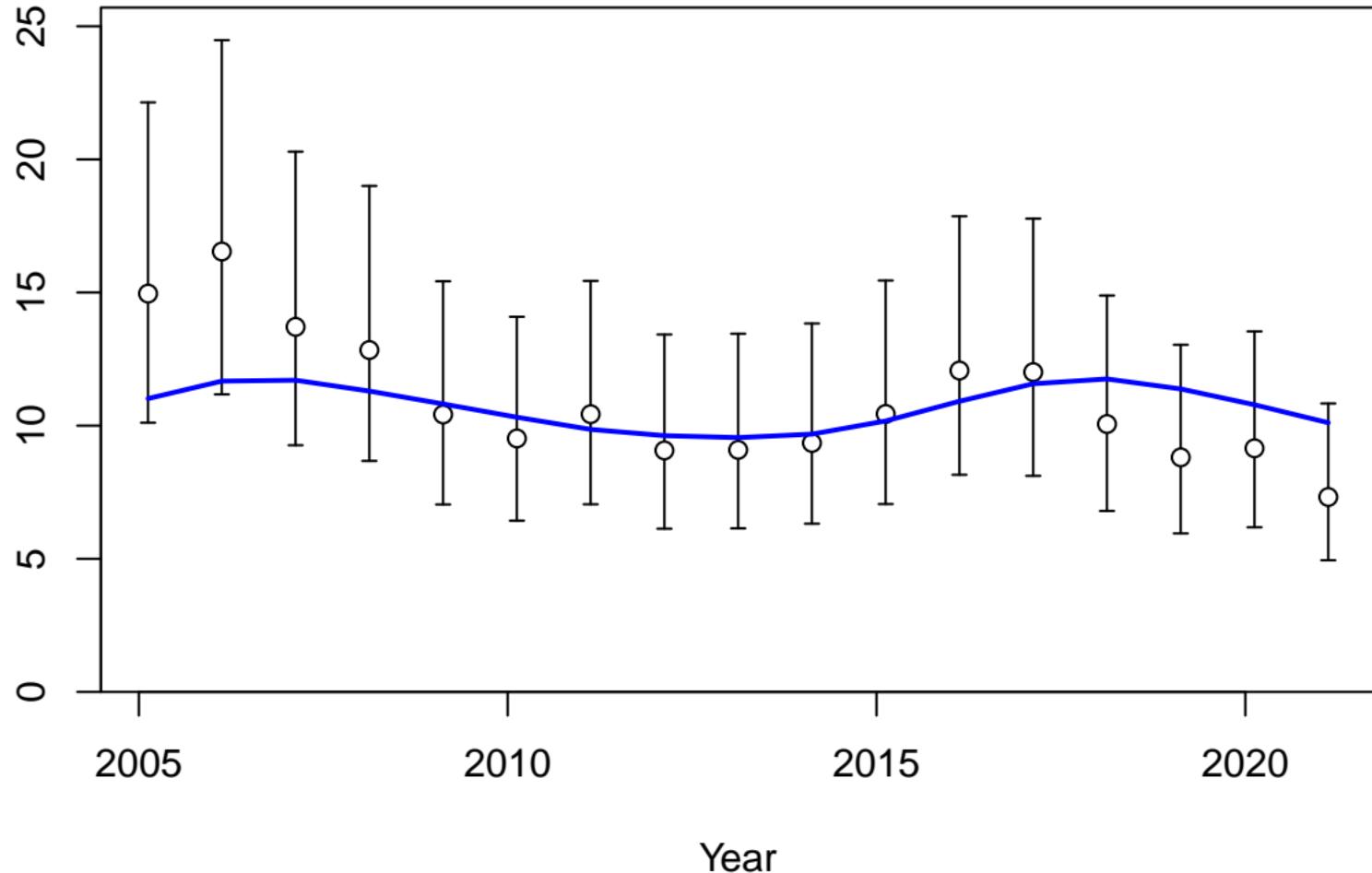


Deviation

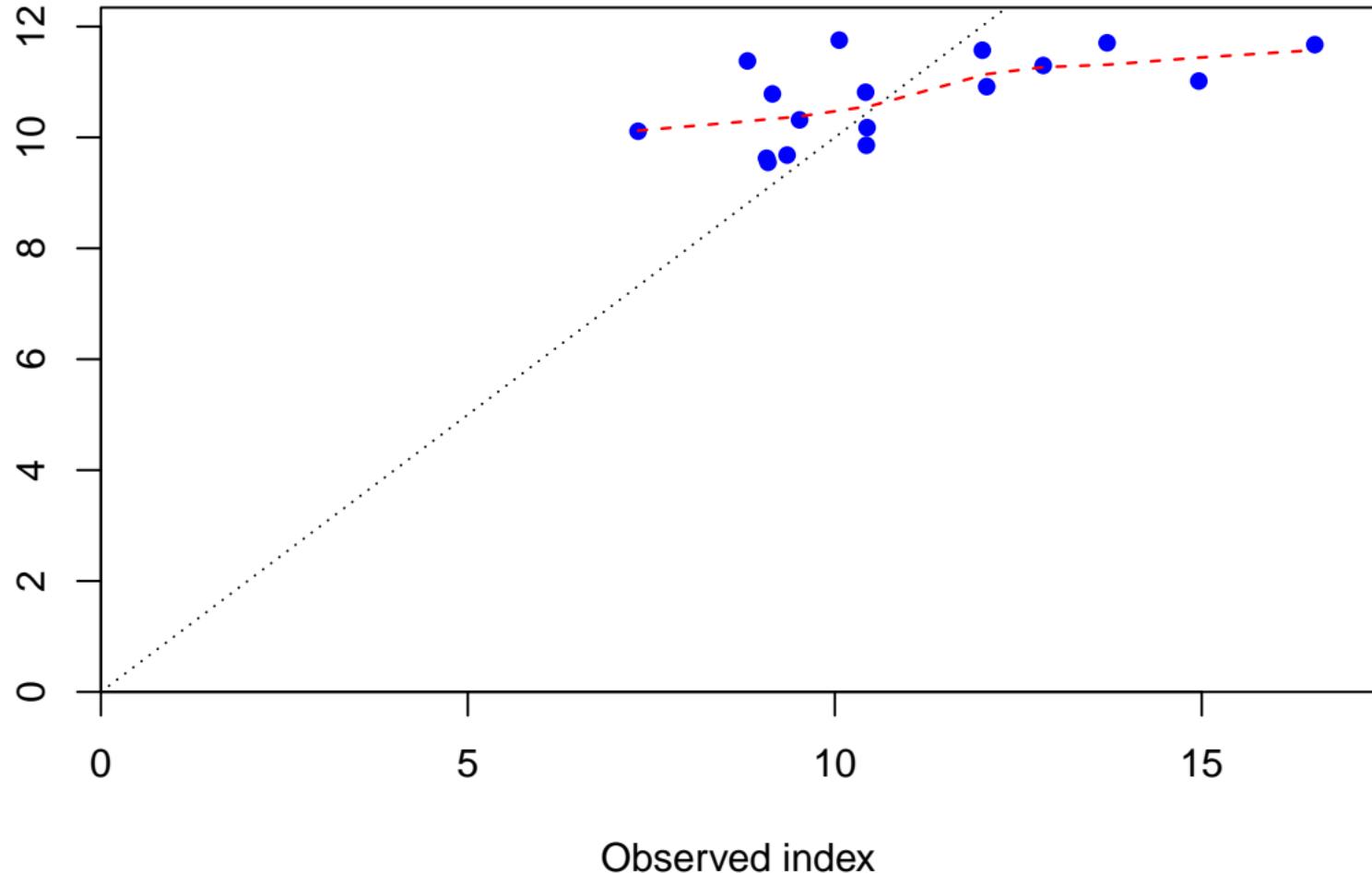




Index



Expected index



Log index

3.0
2.5
2.0

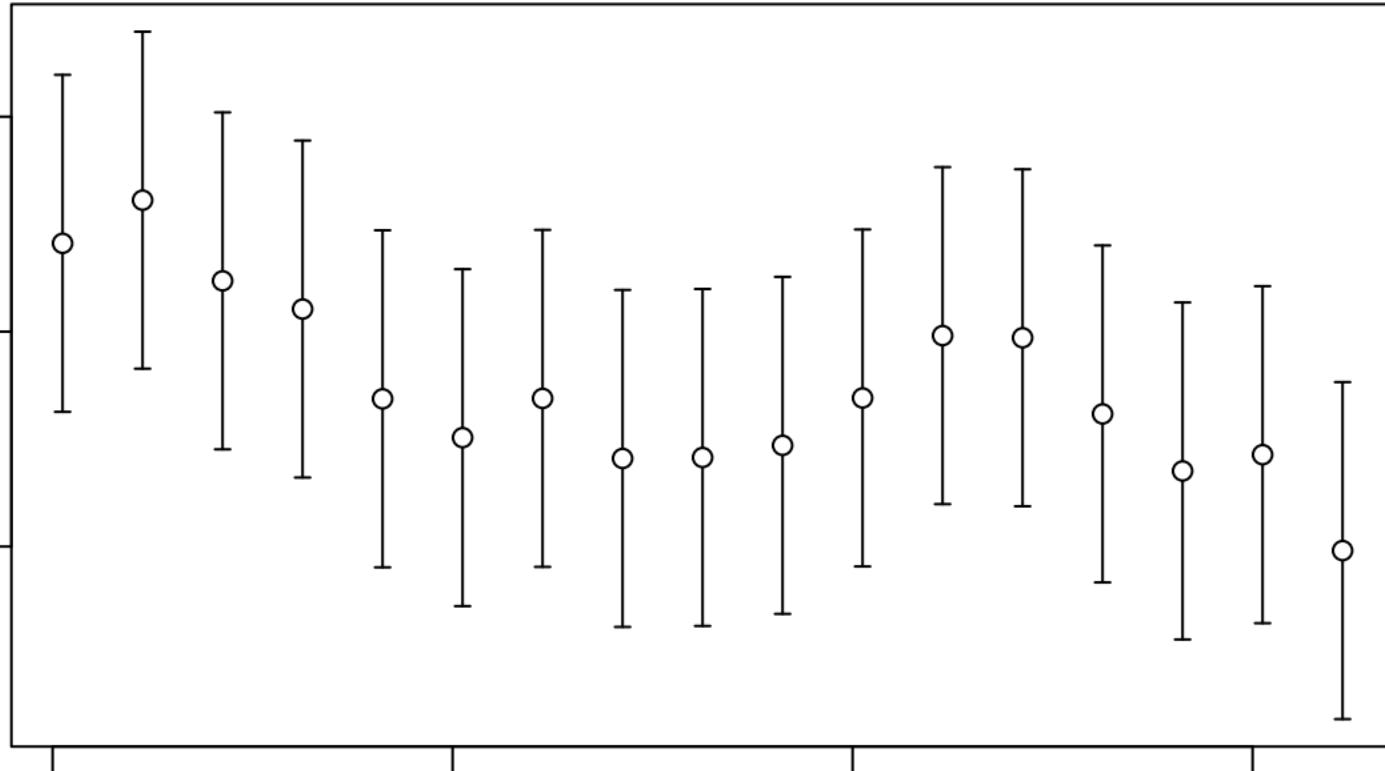
2005

2010

2015

2020

Year

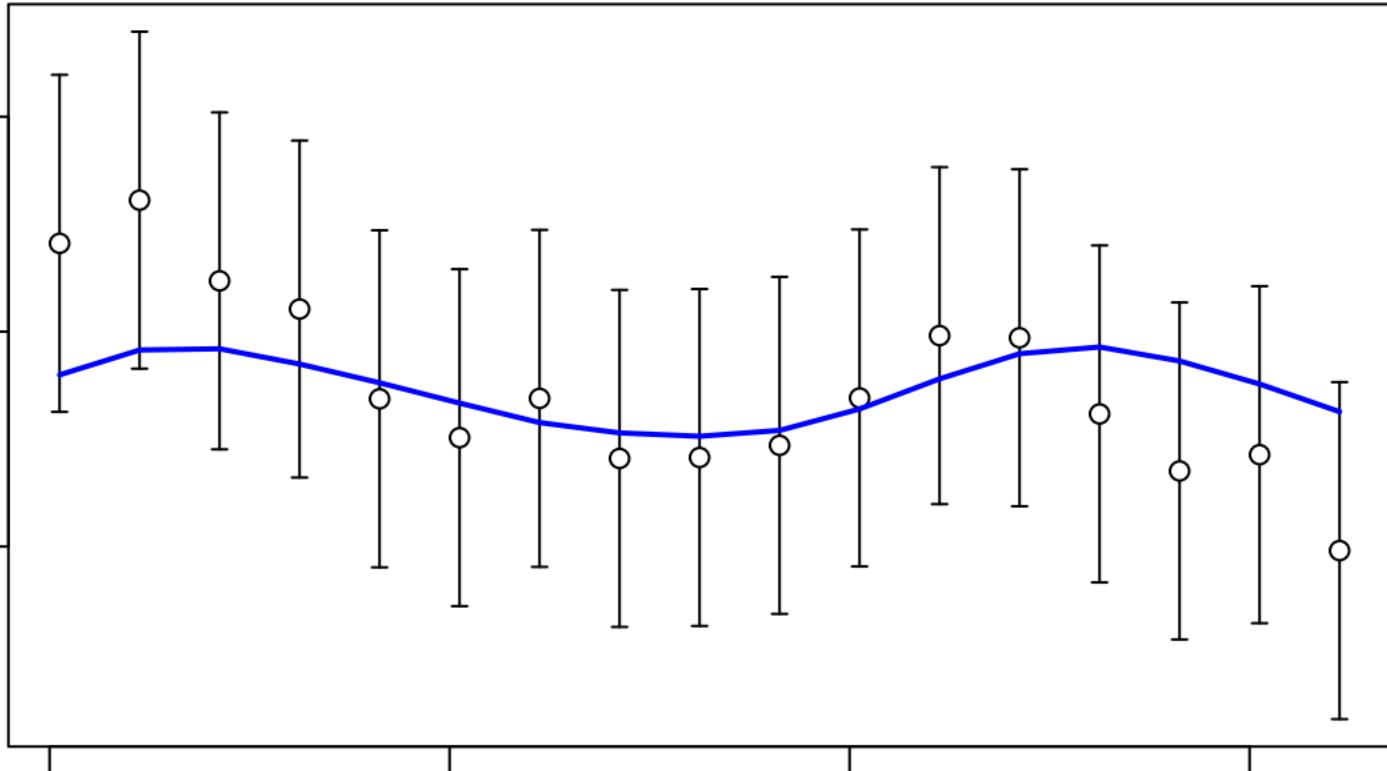


Log index

3.0
2.5
2.0

2005 2010 2015 2020

Year



Log expected index

2.25 2.30 2.35 2.40 2.45

2.0

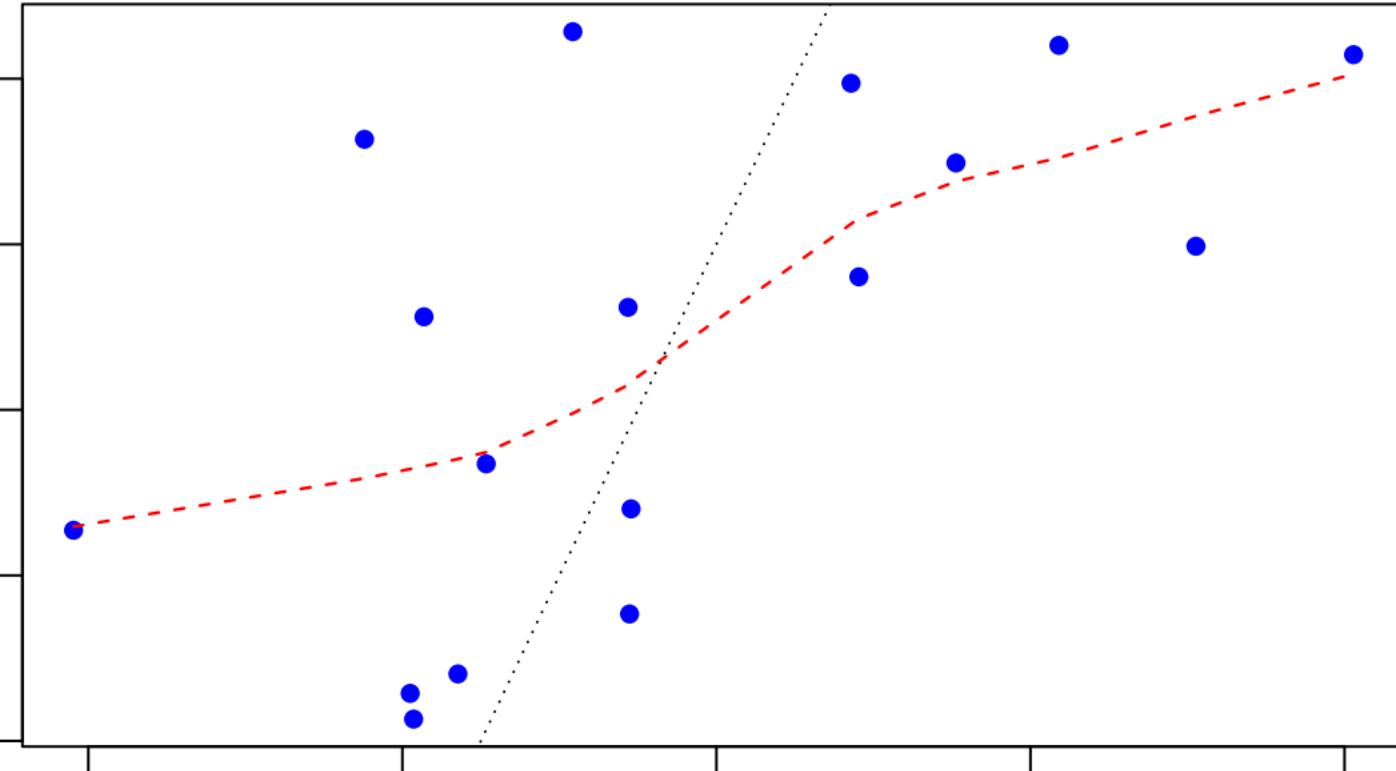
2.2

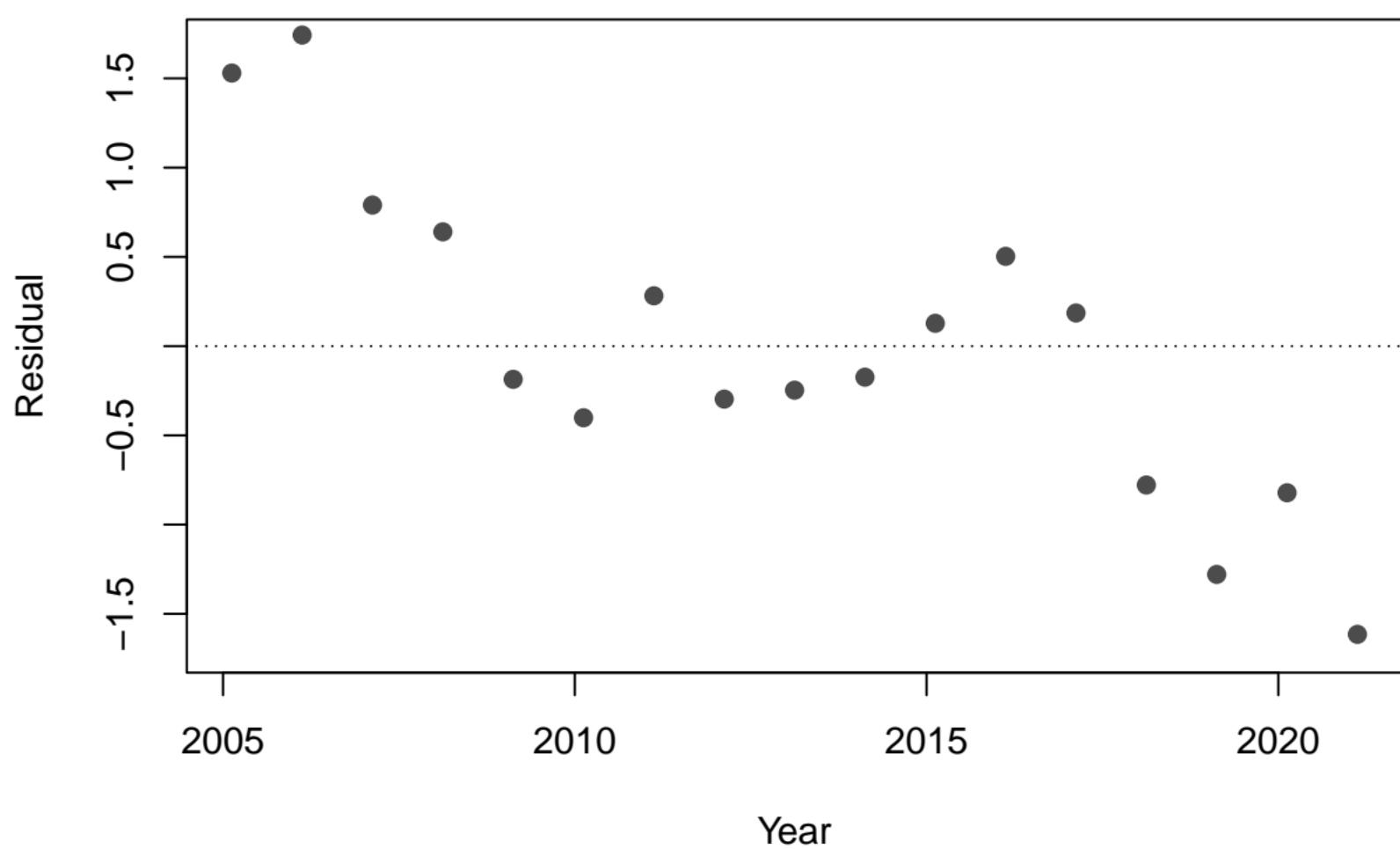
2.4

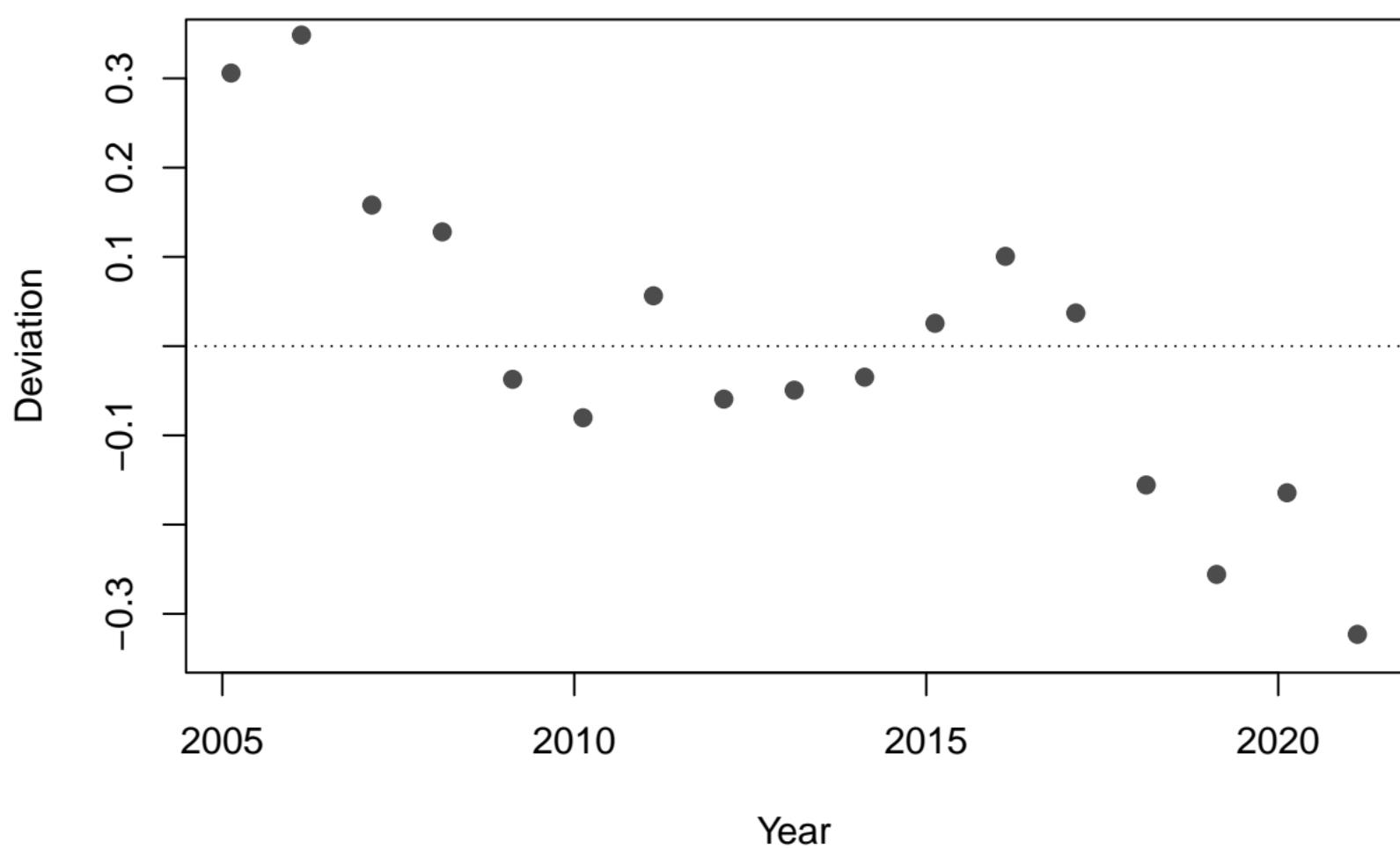
2.6

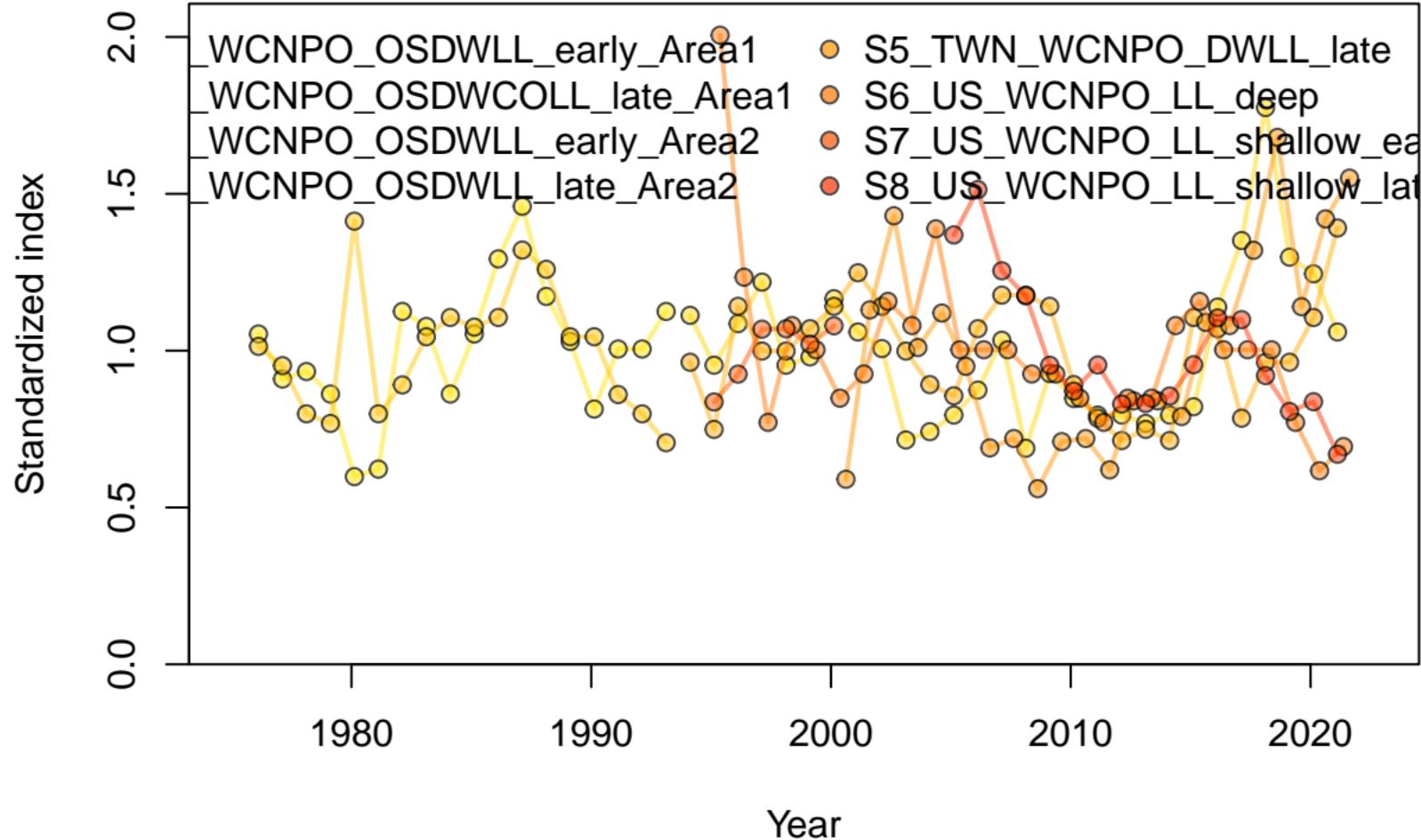
2.8

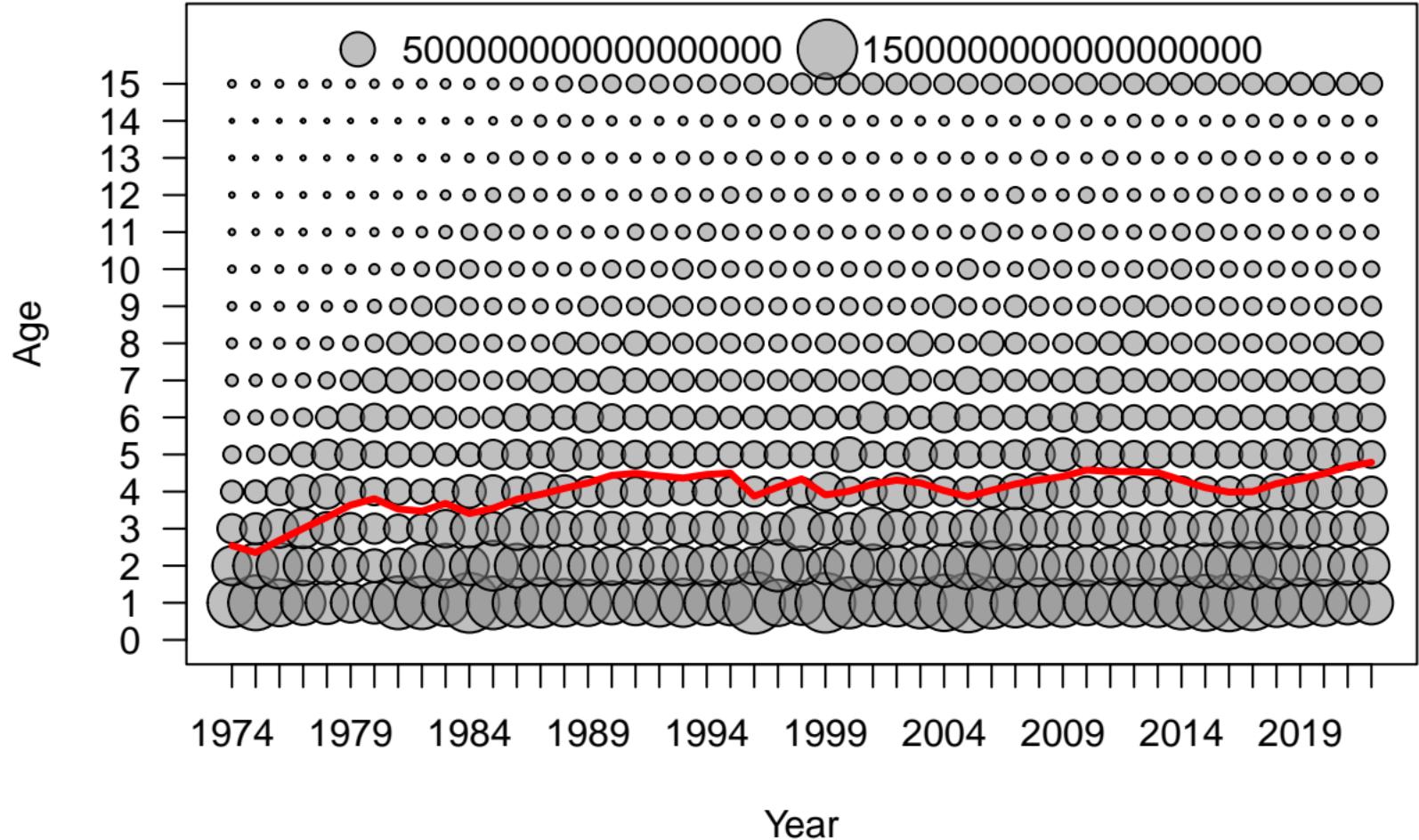
Log observed index

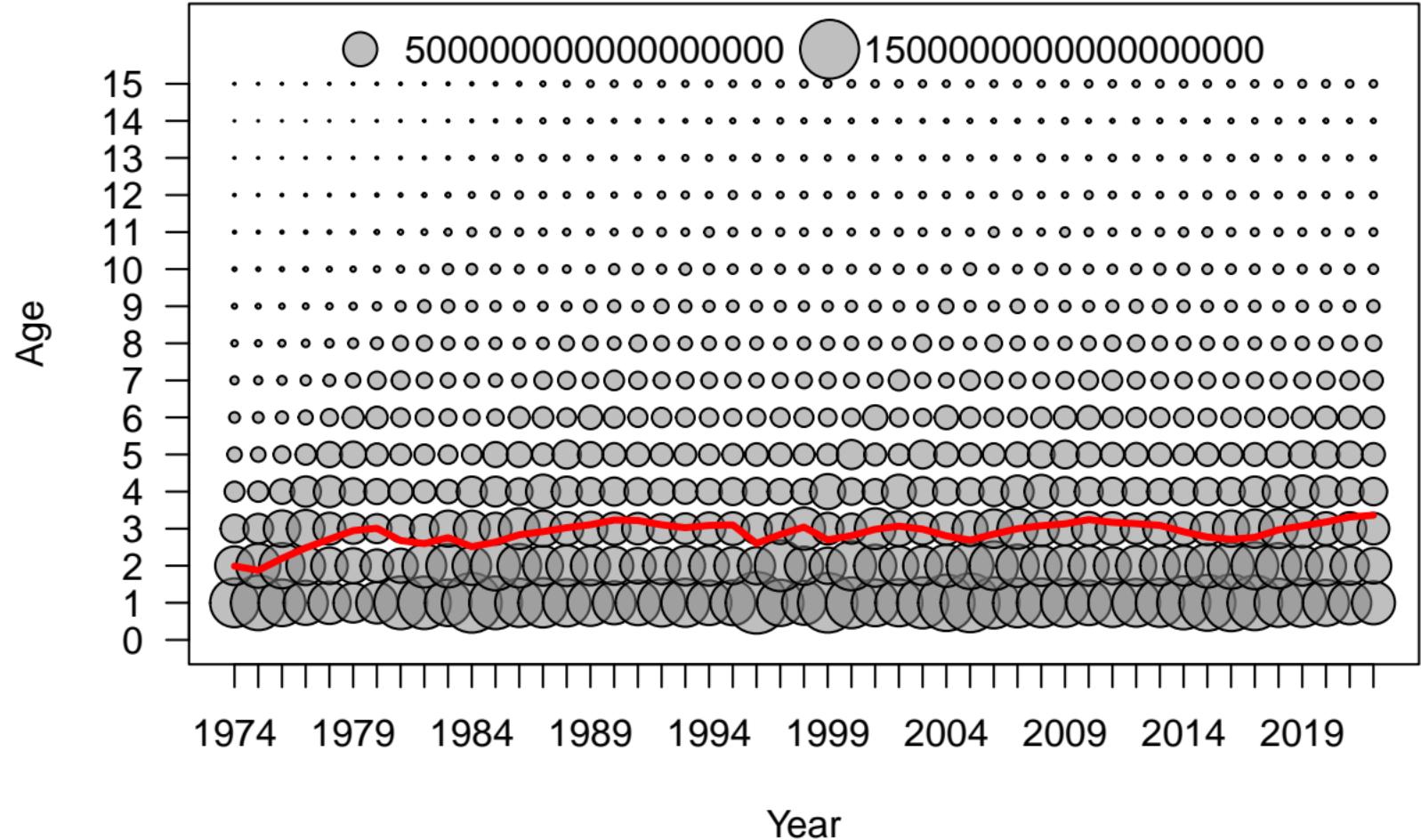


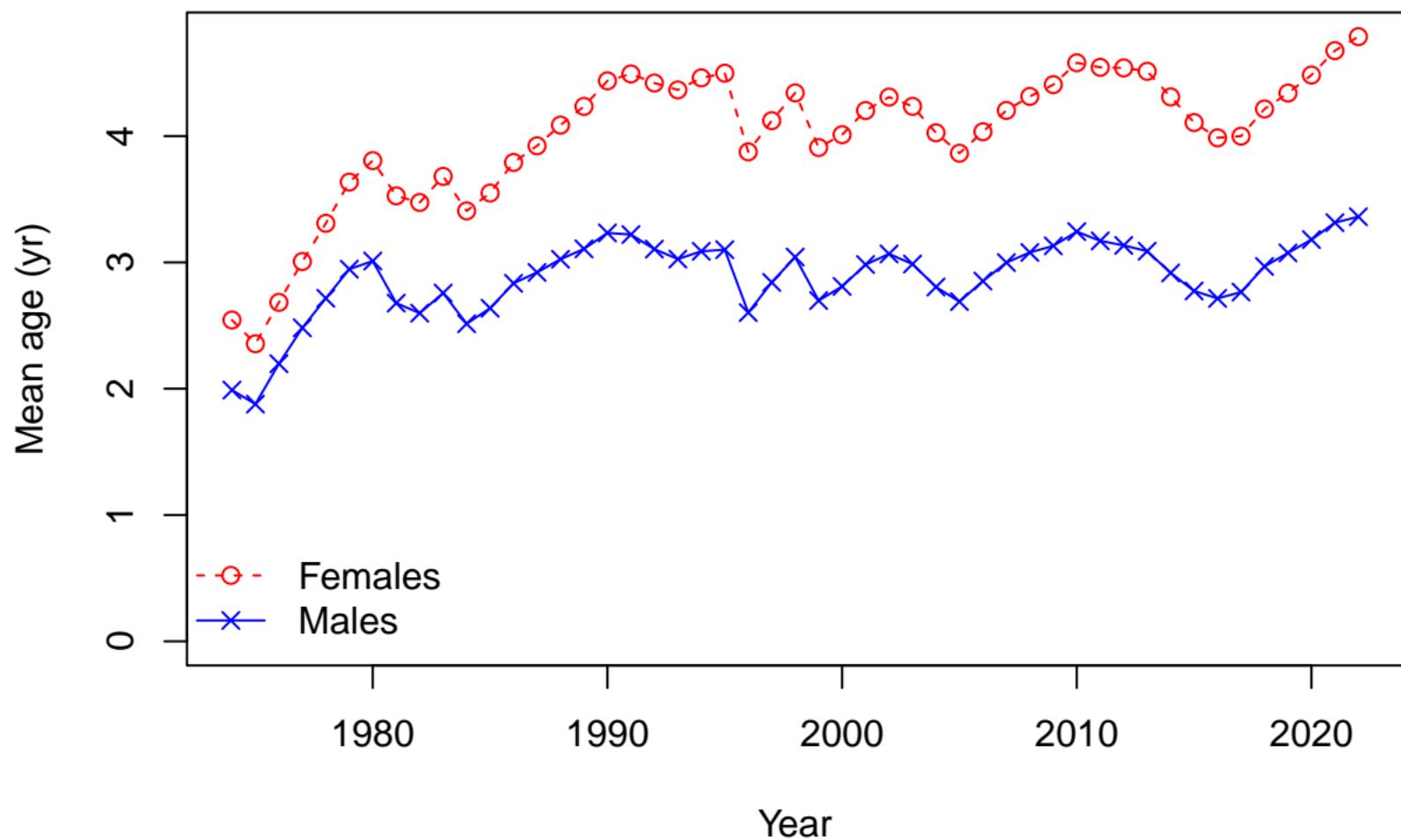


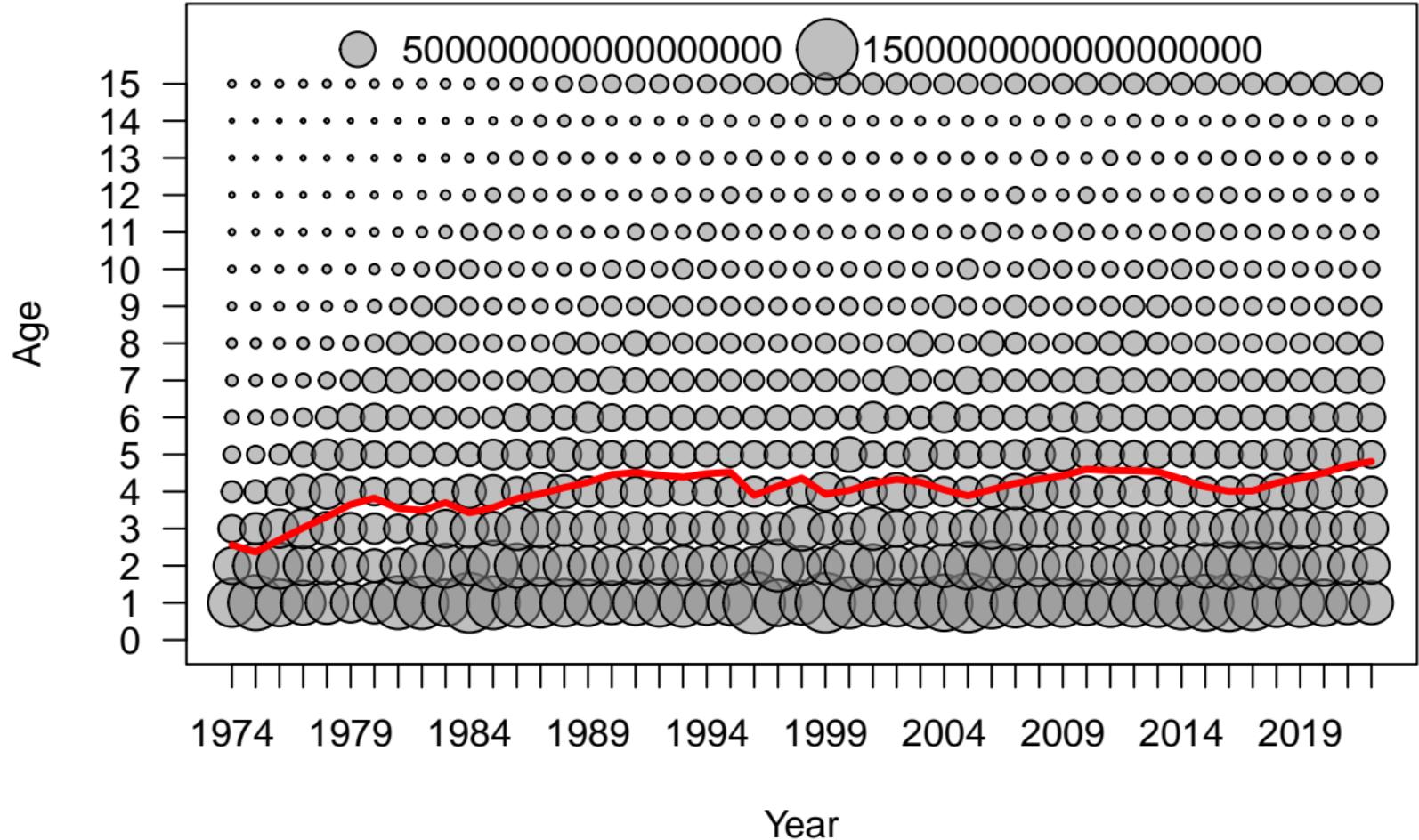


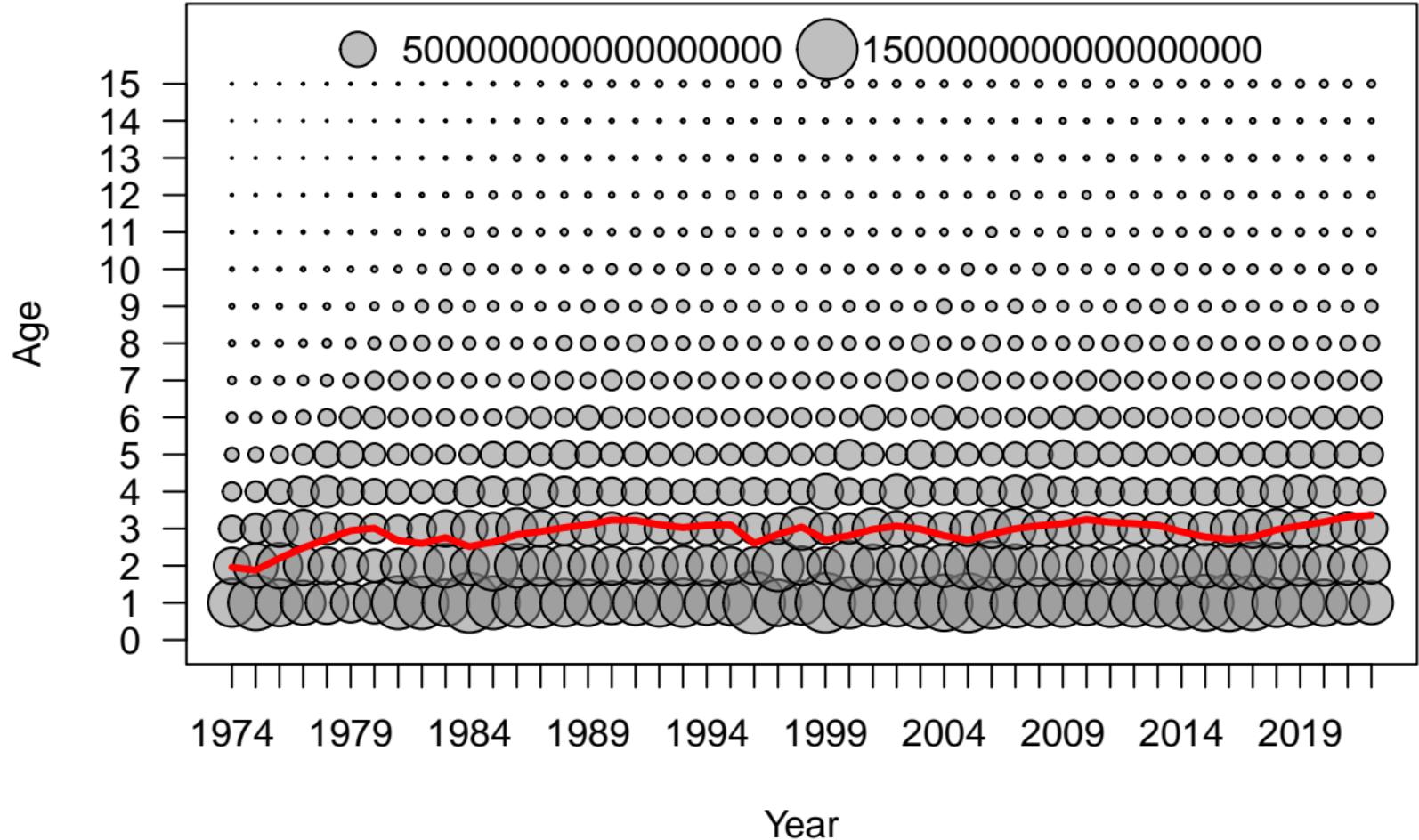


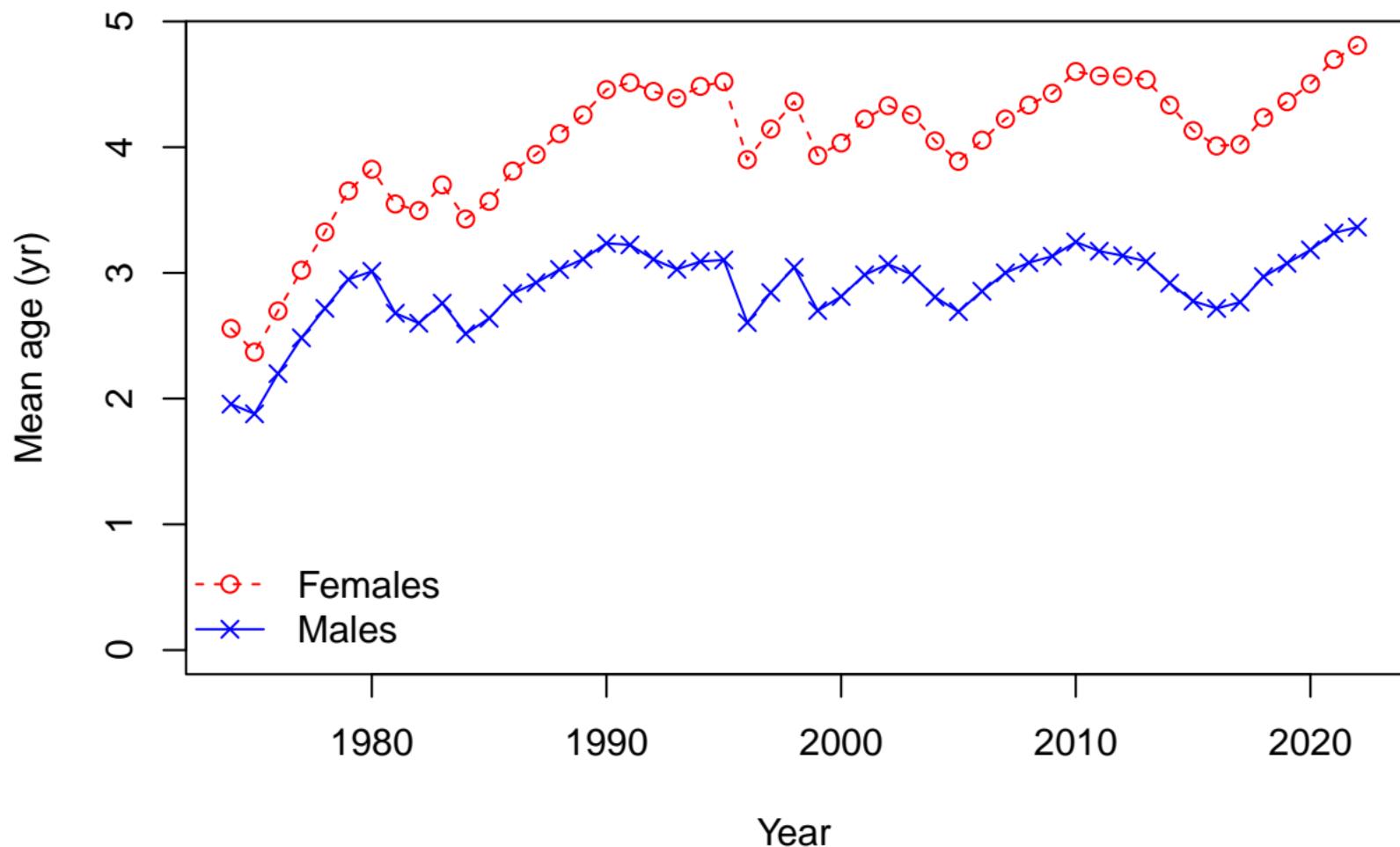


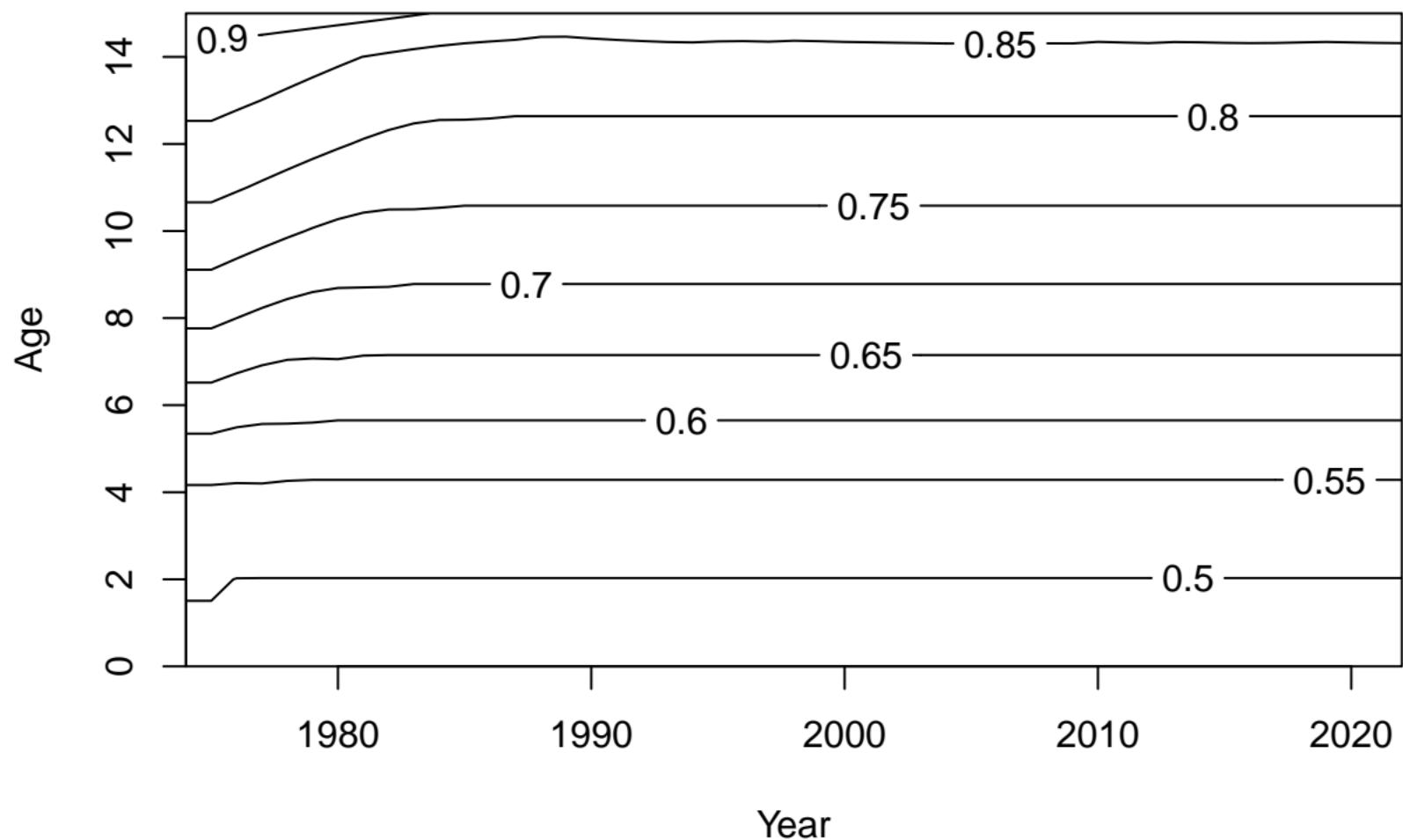


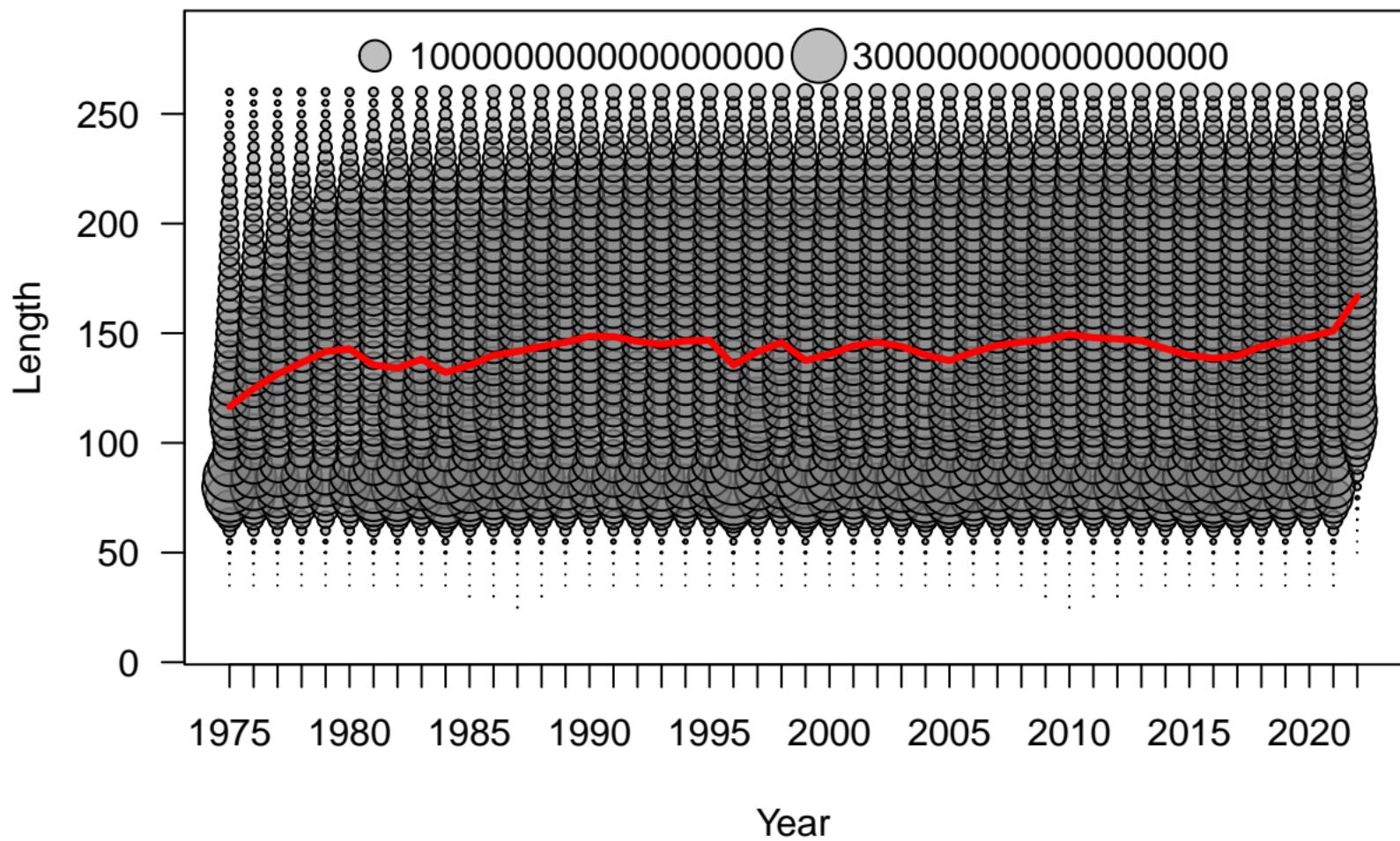


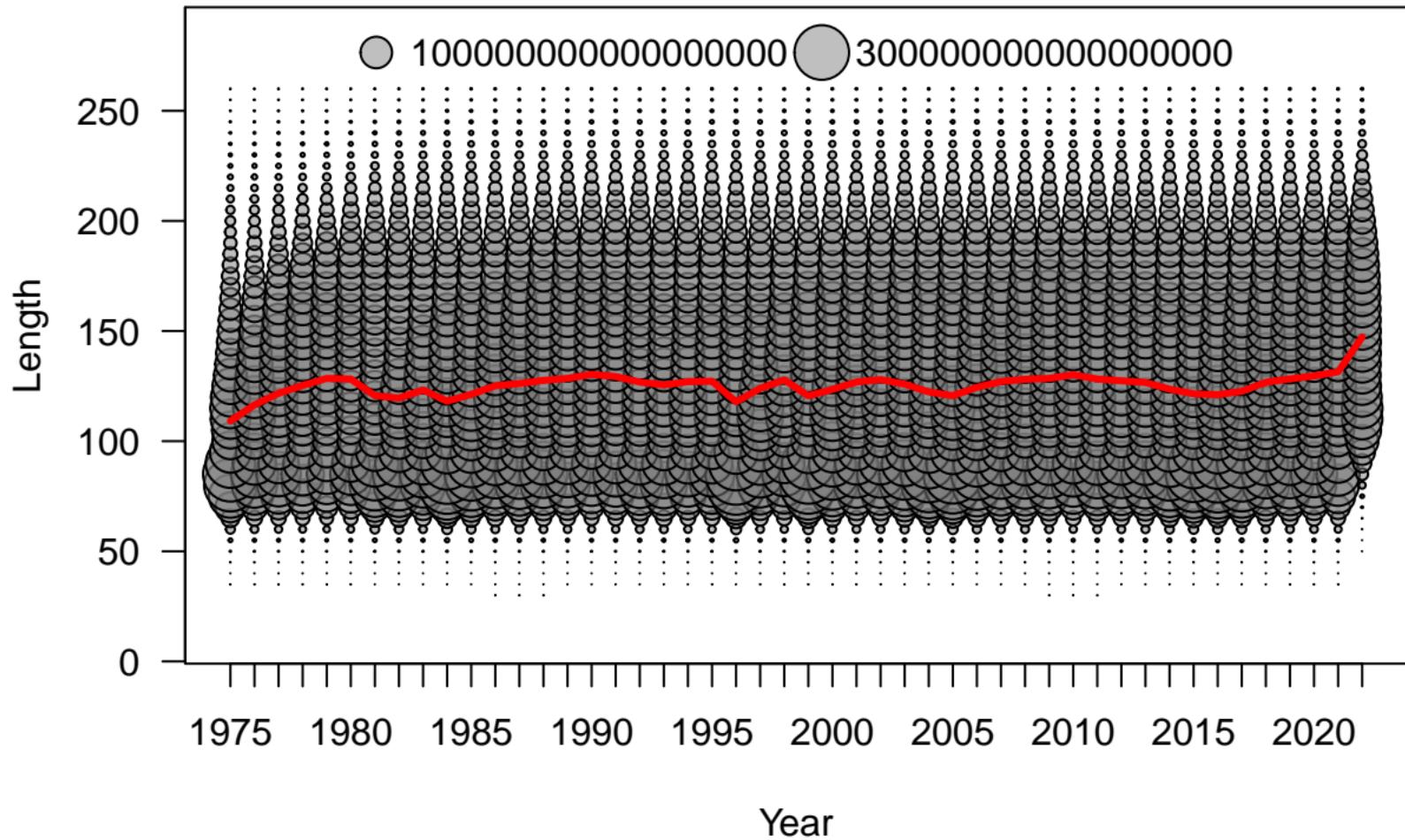


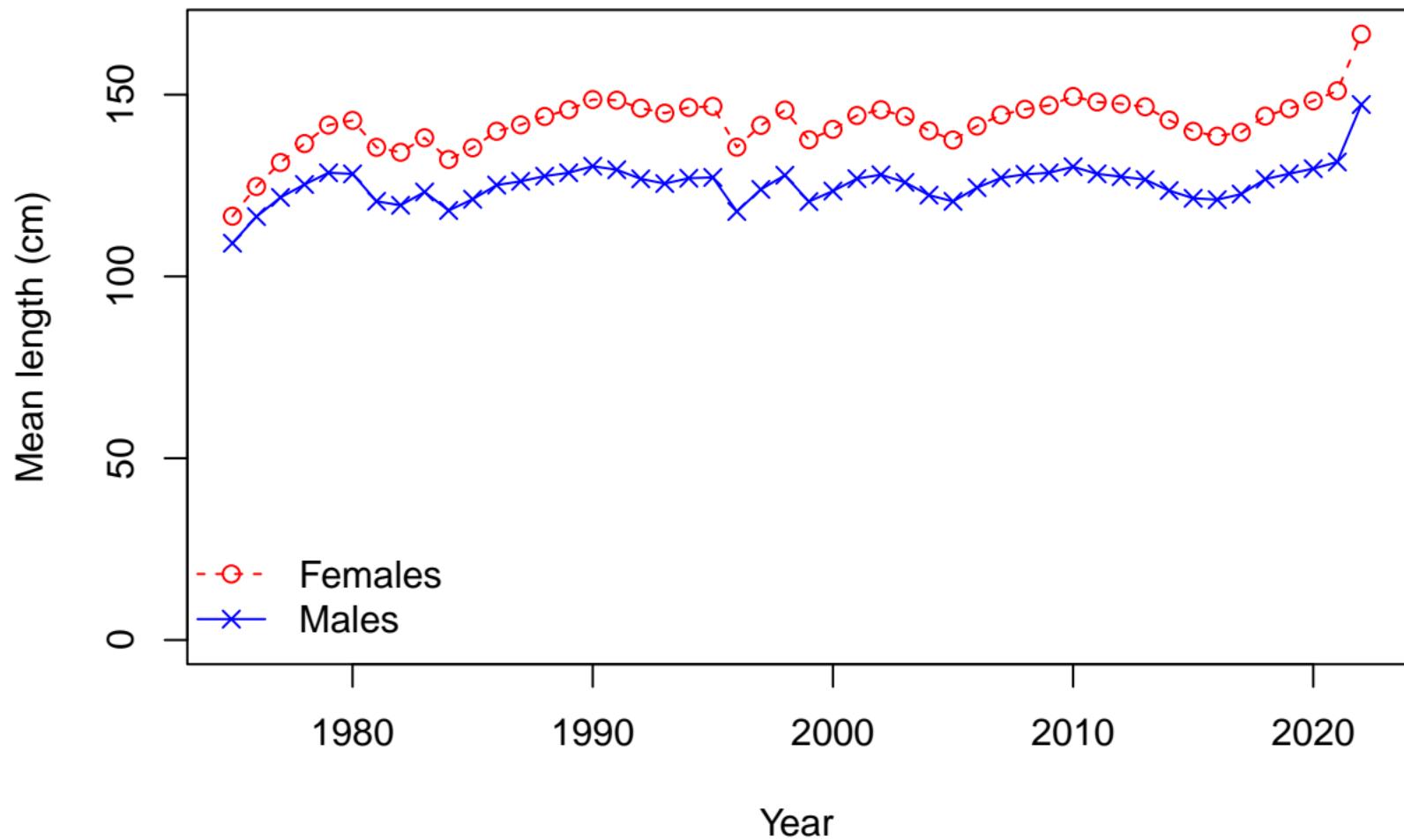


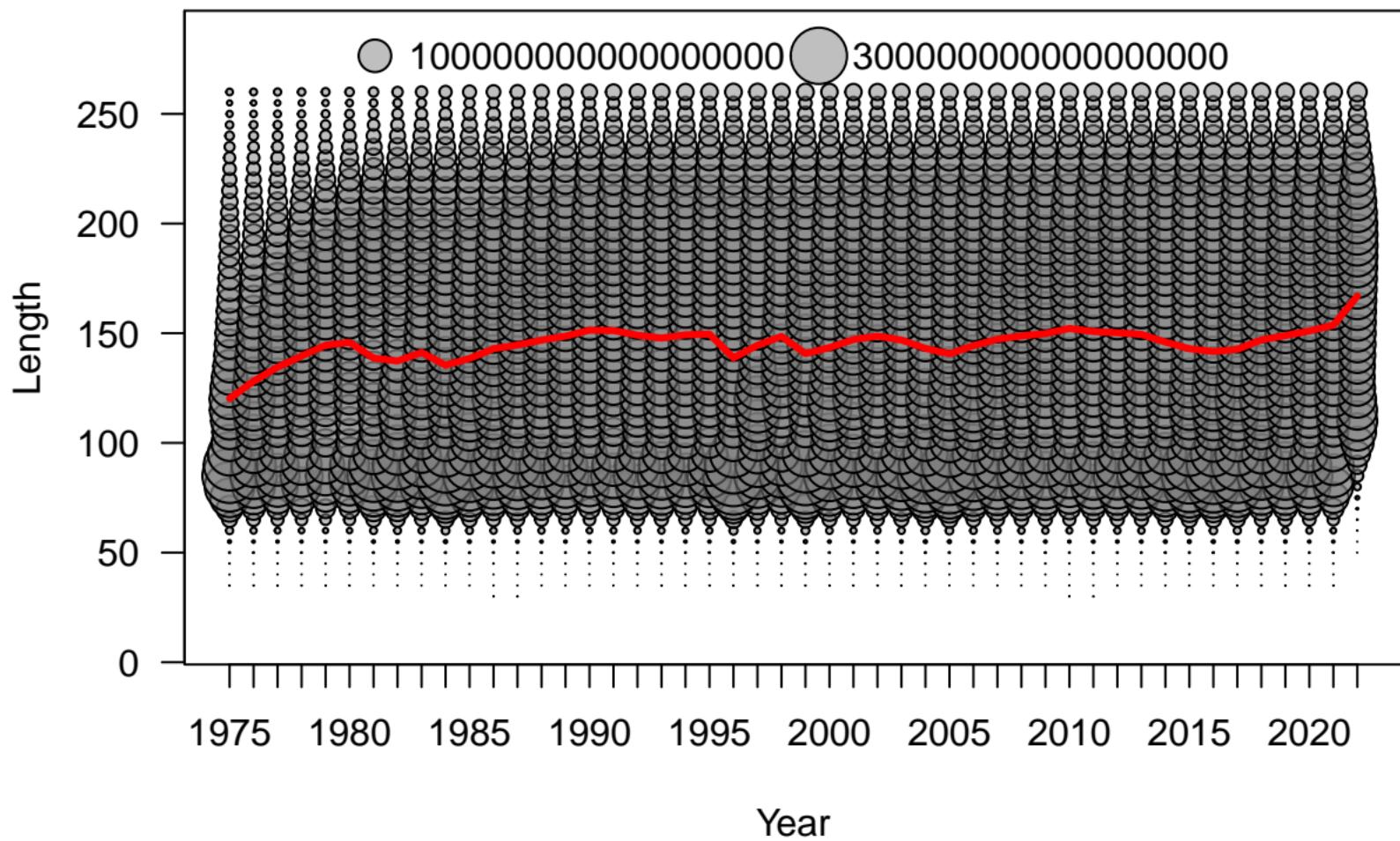


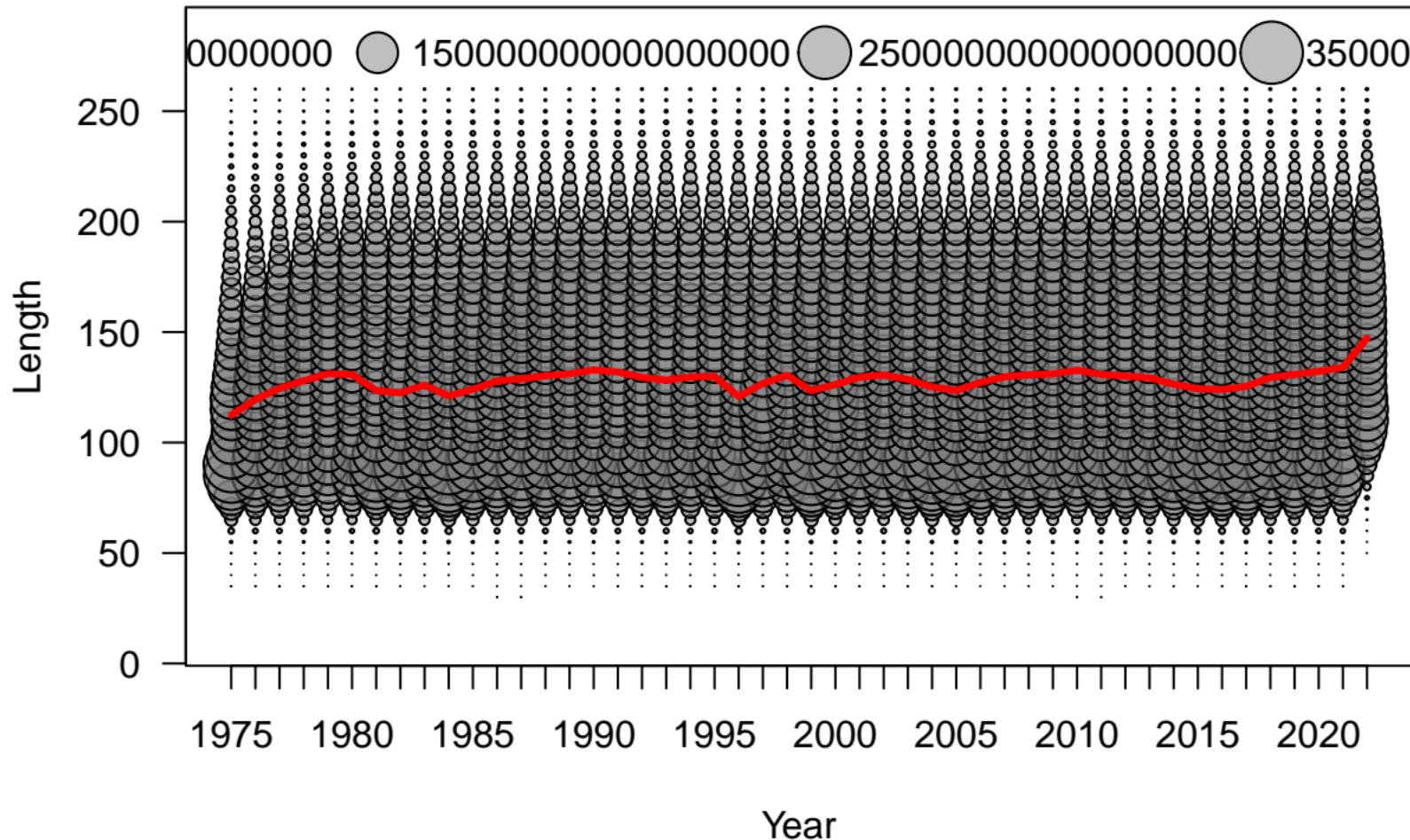


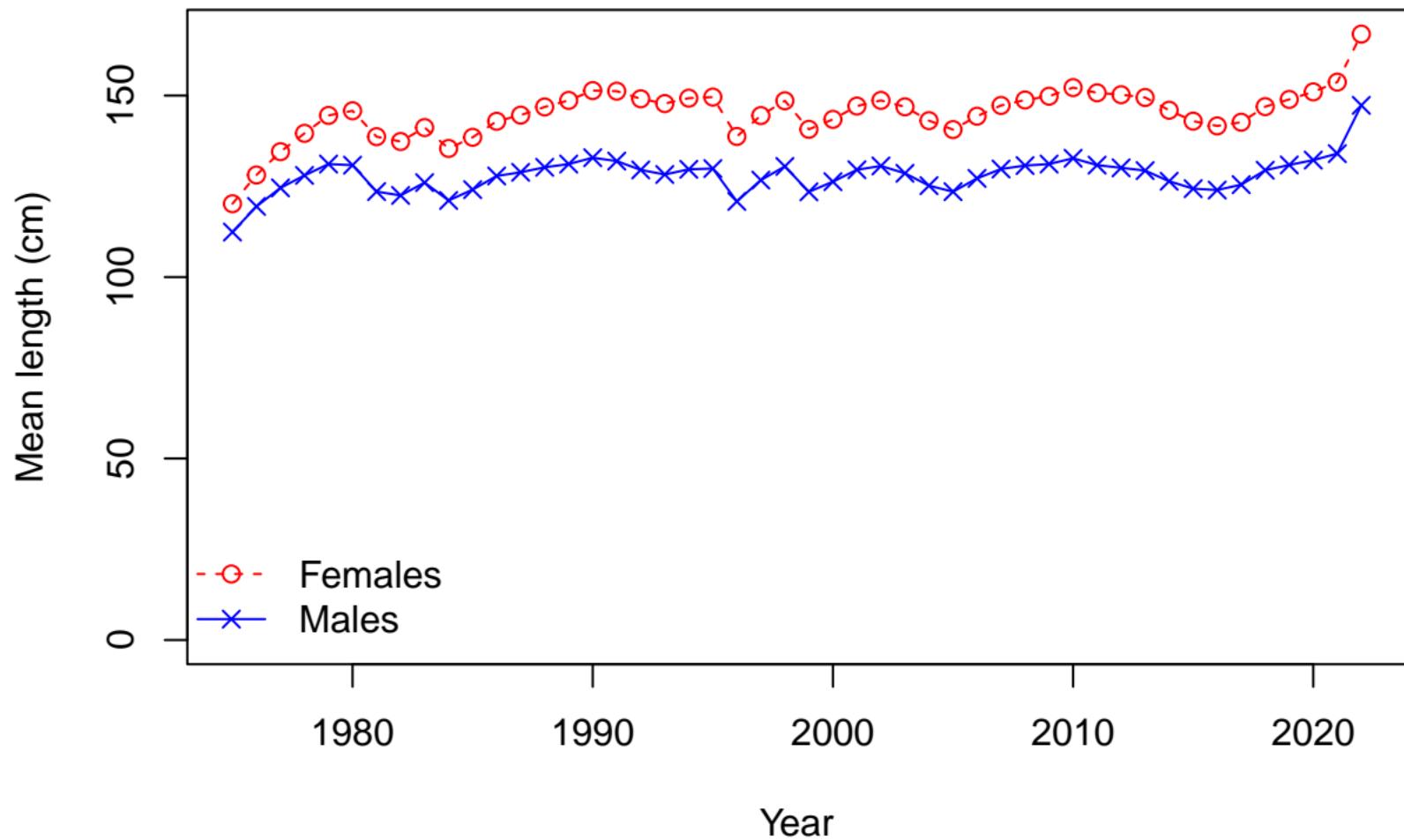


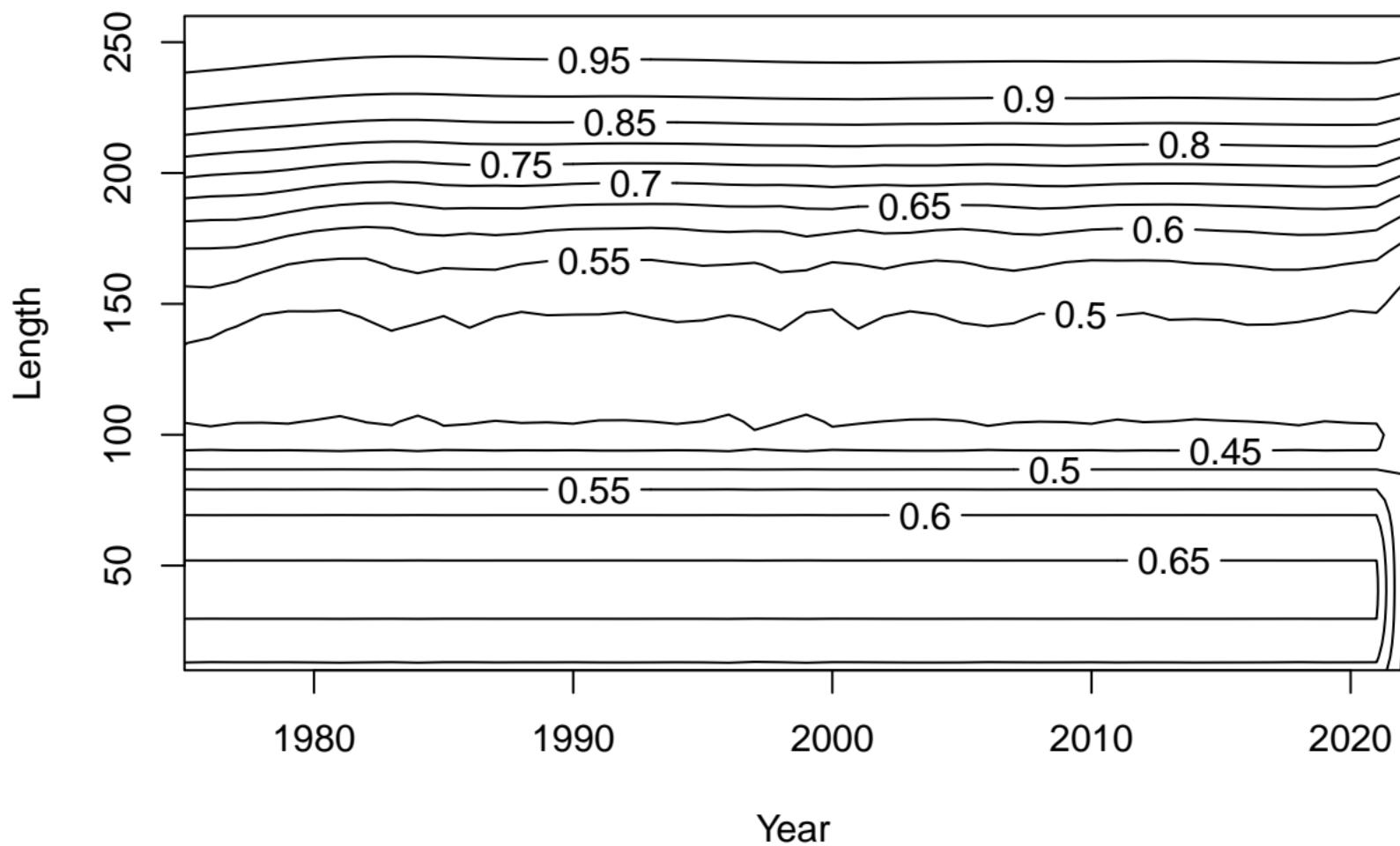




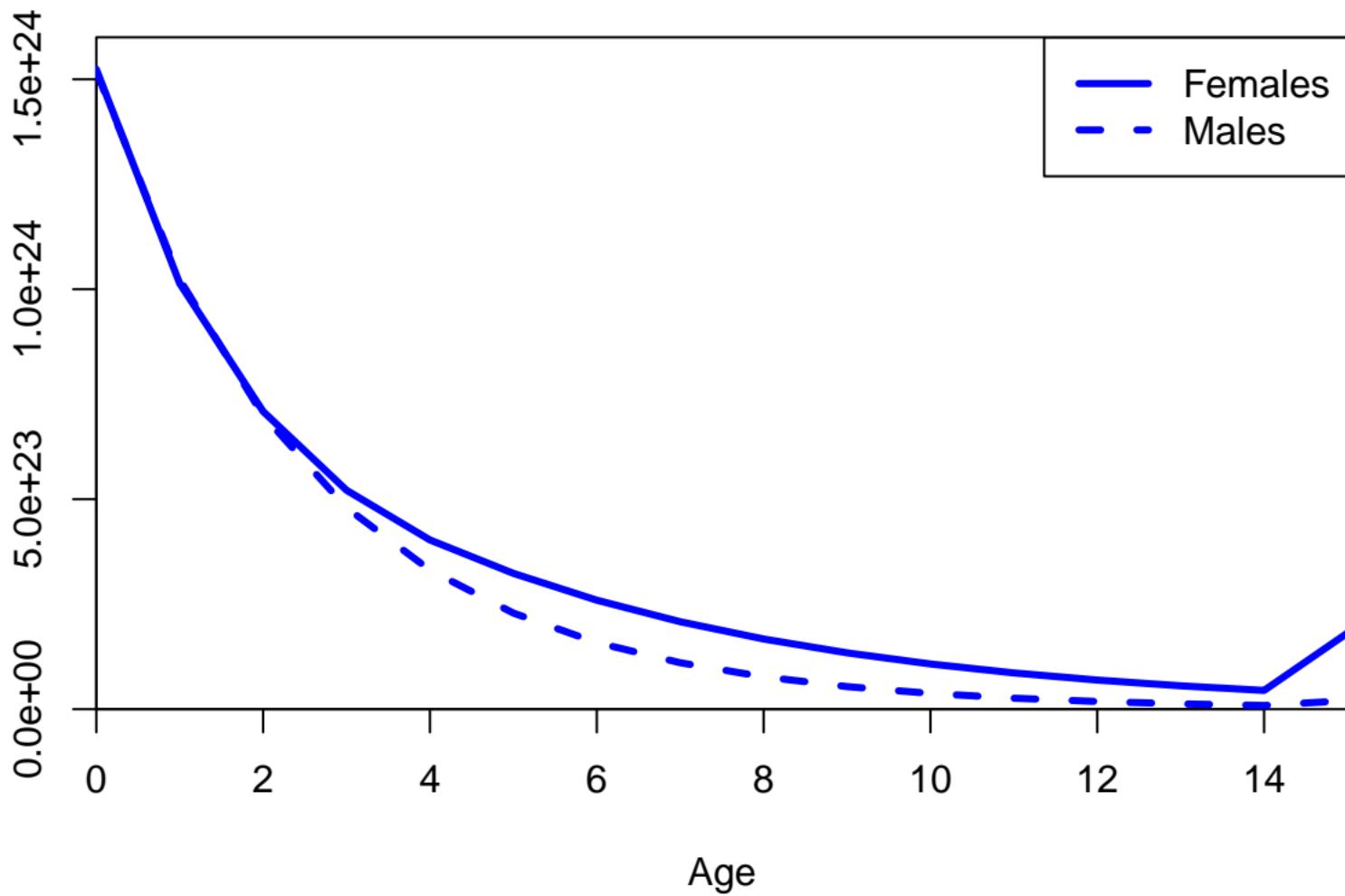


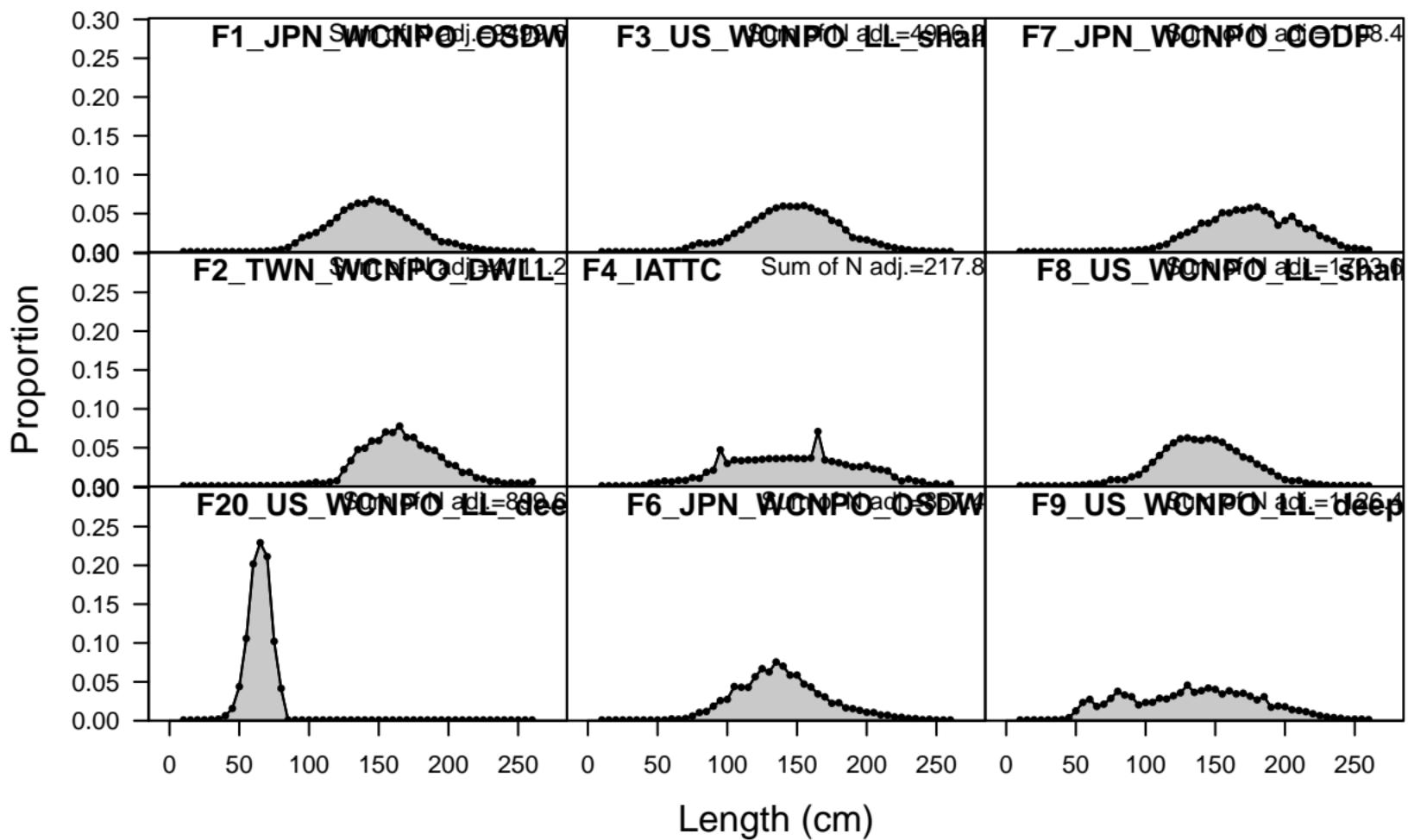


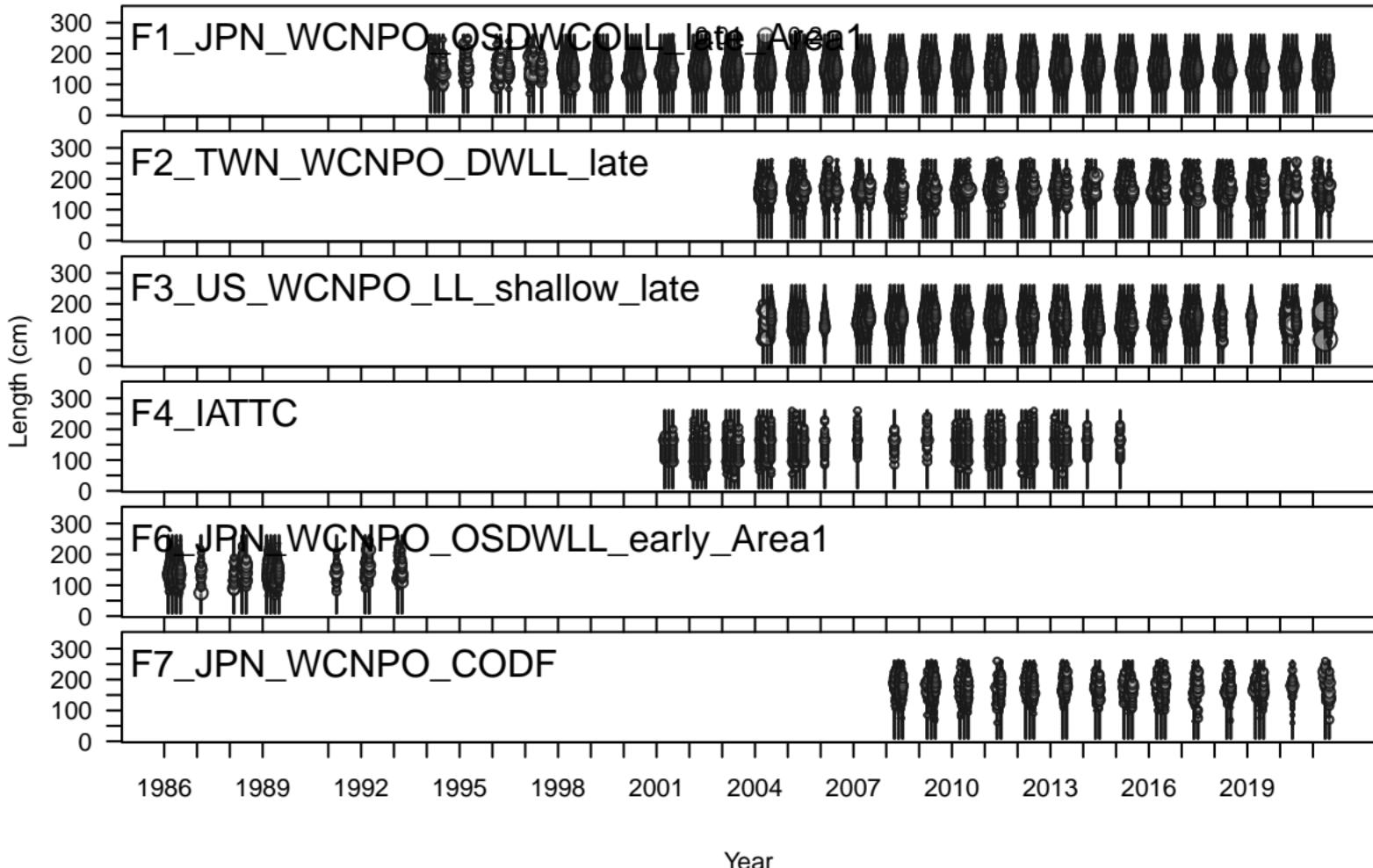


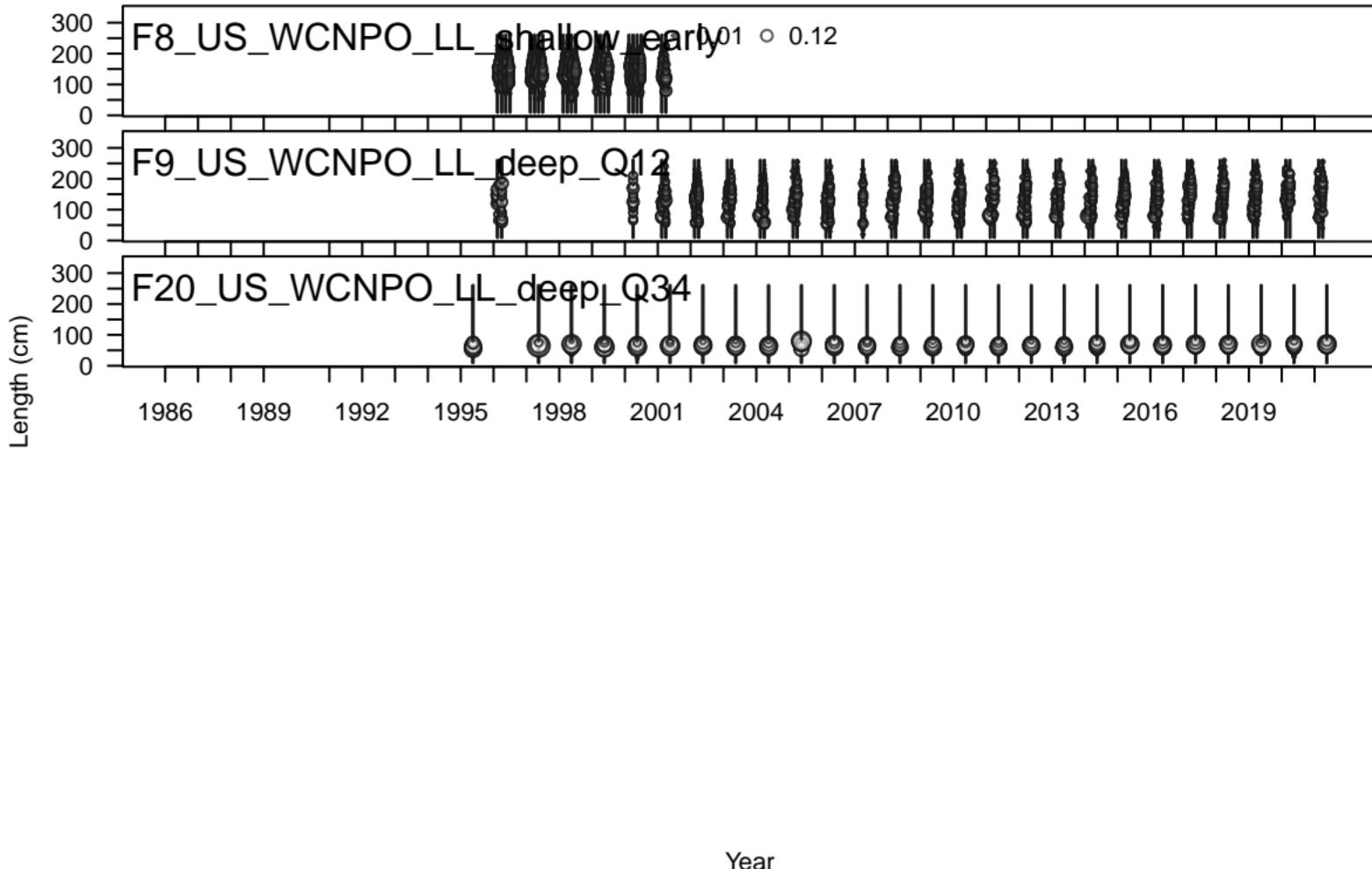


Numbers at age at equilibrium

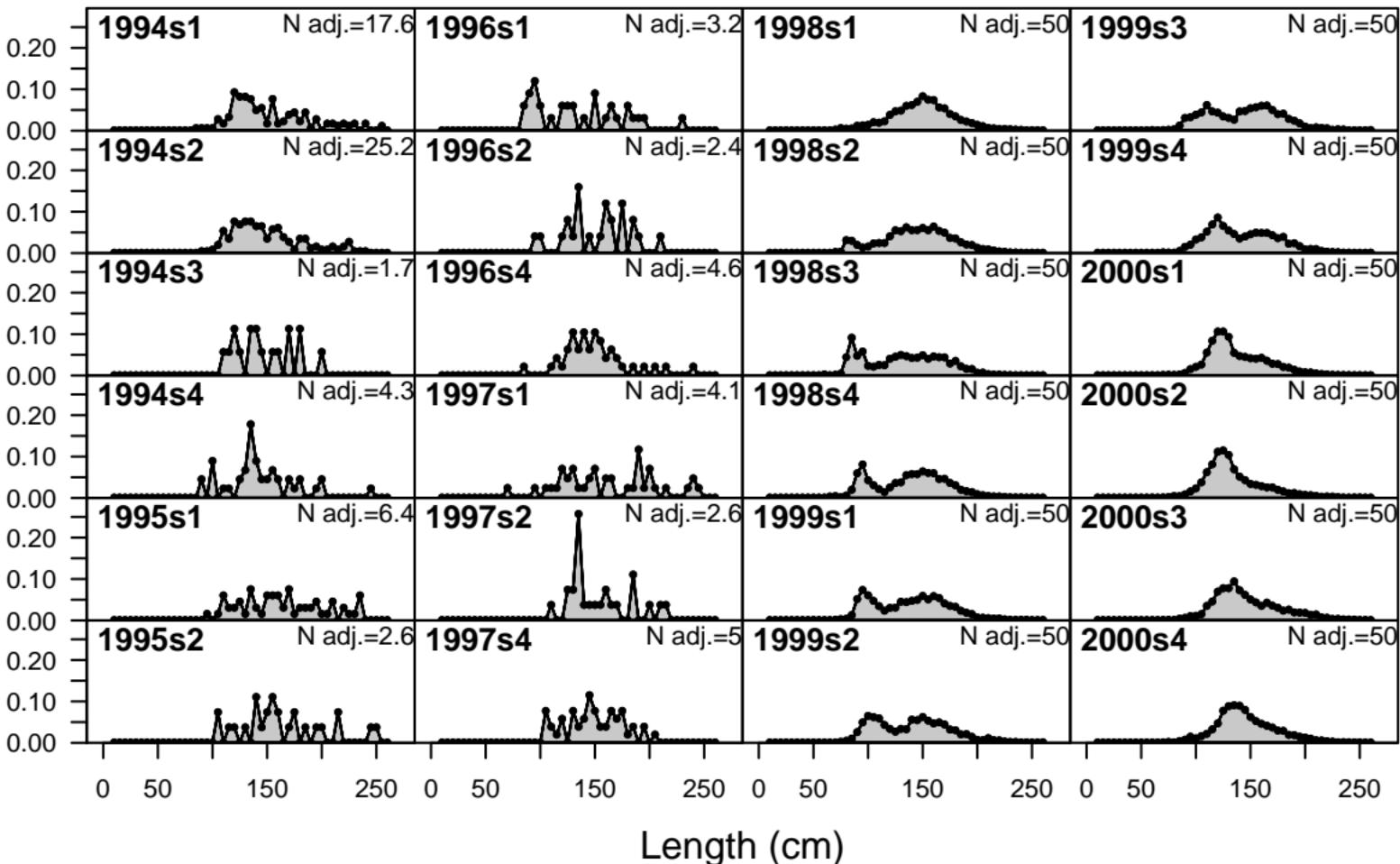




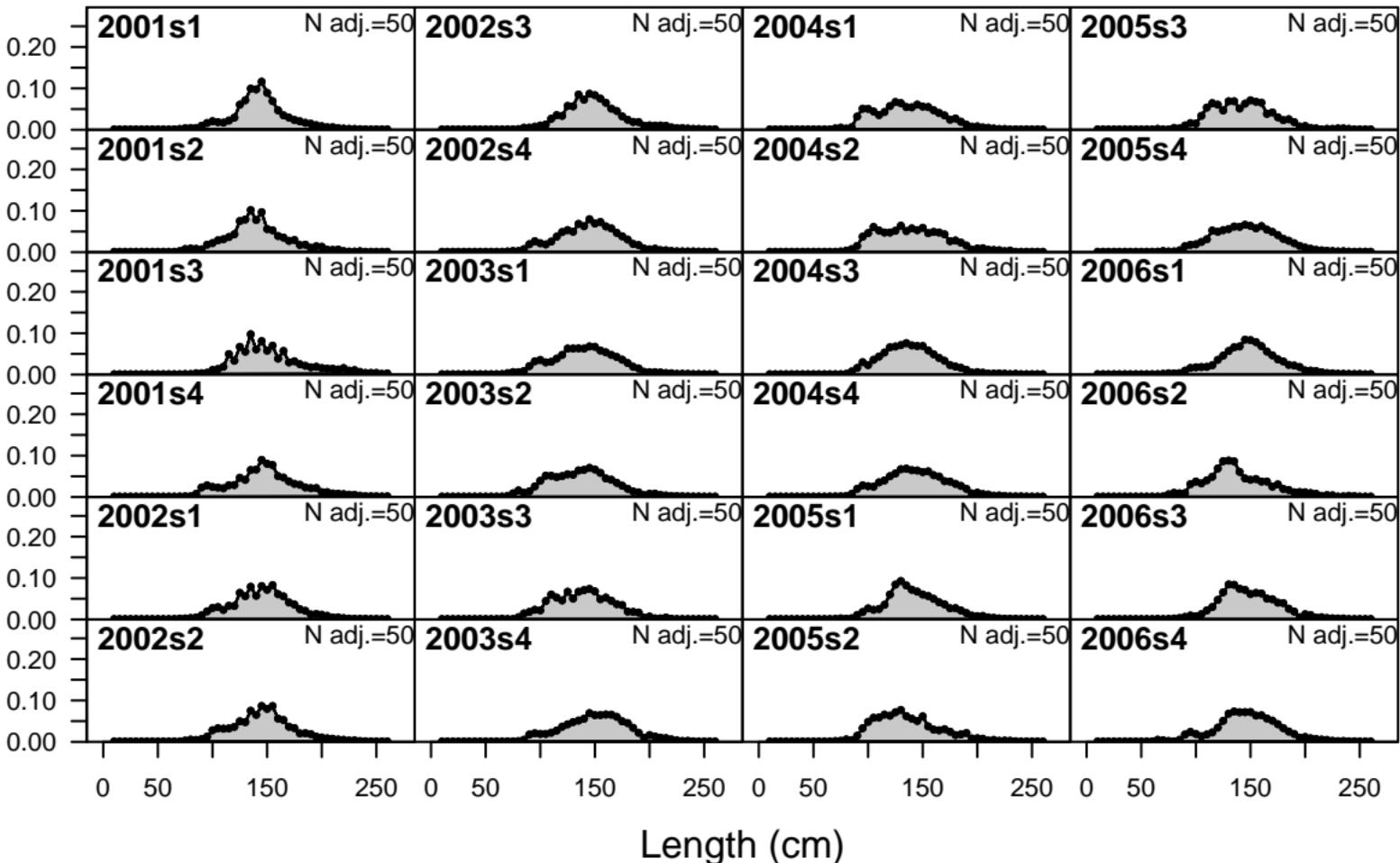




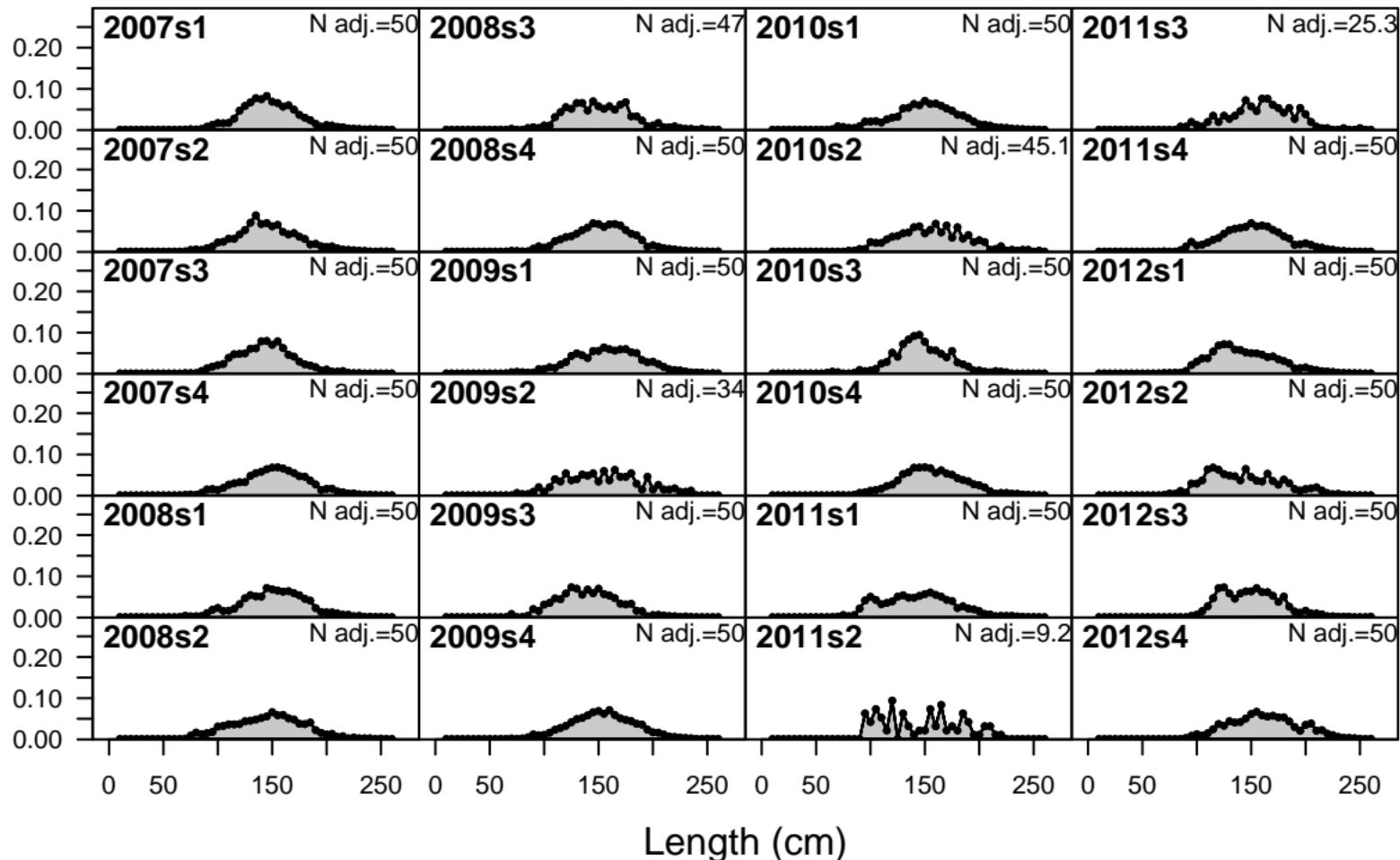
Proportion



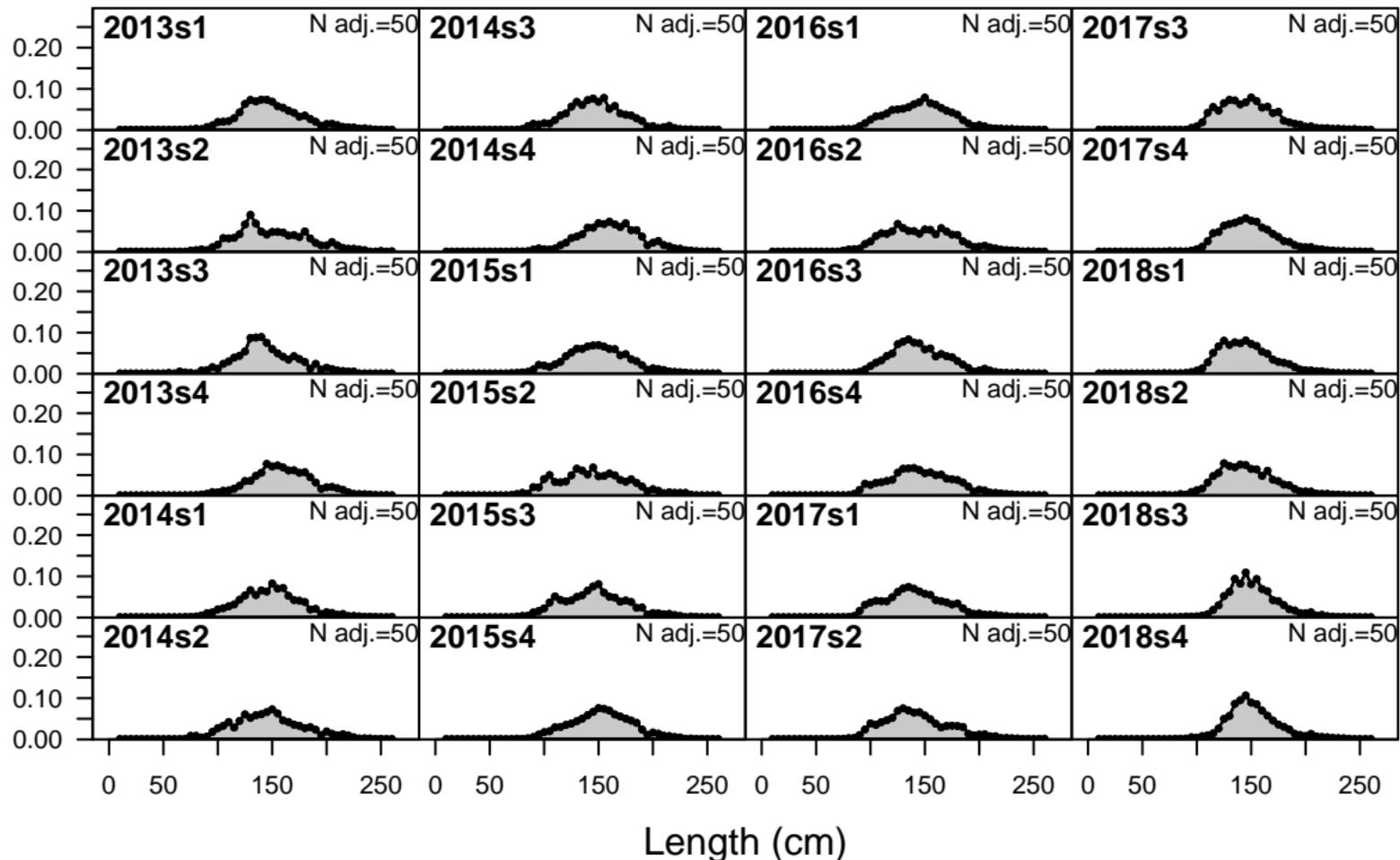
Proportion



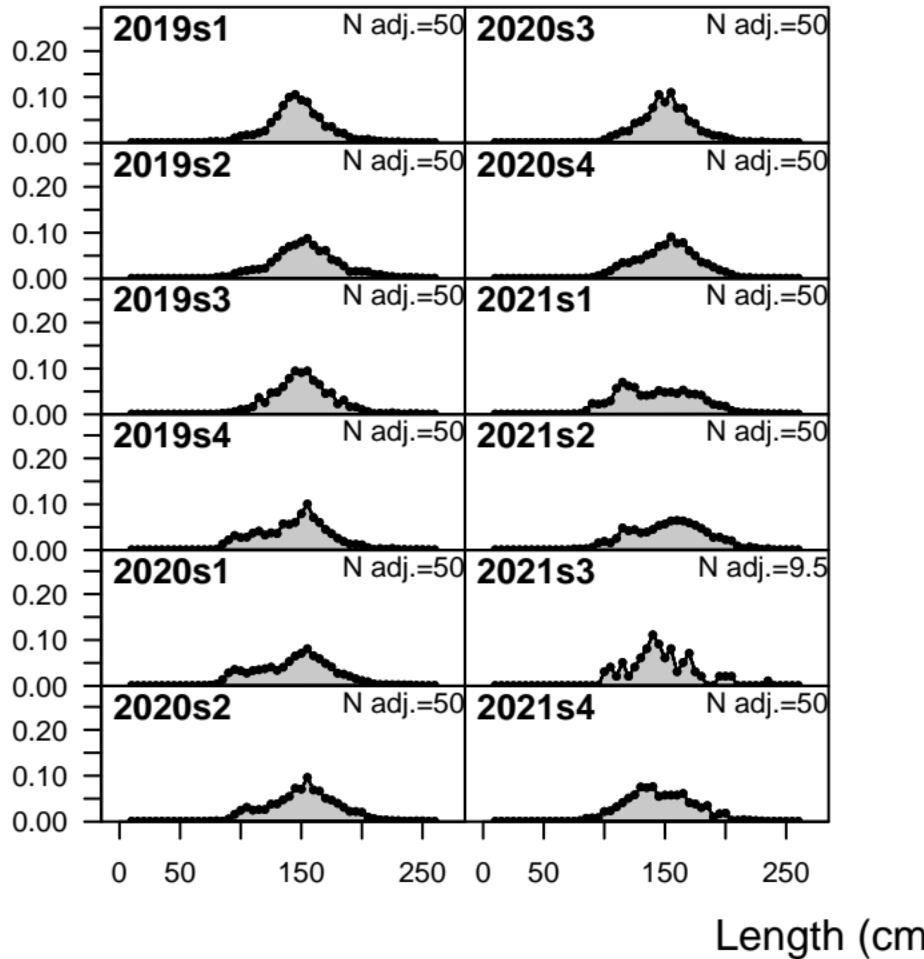
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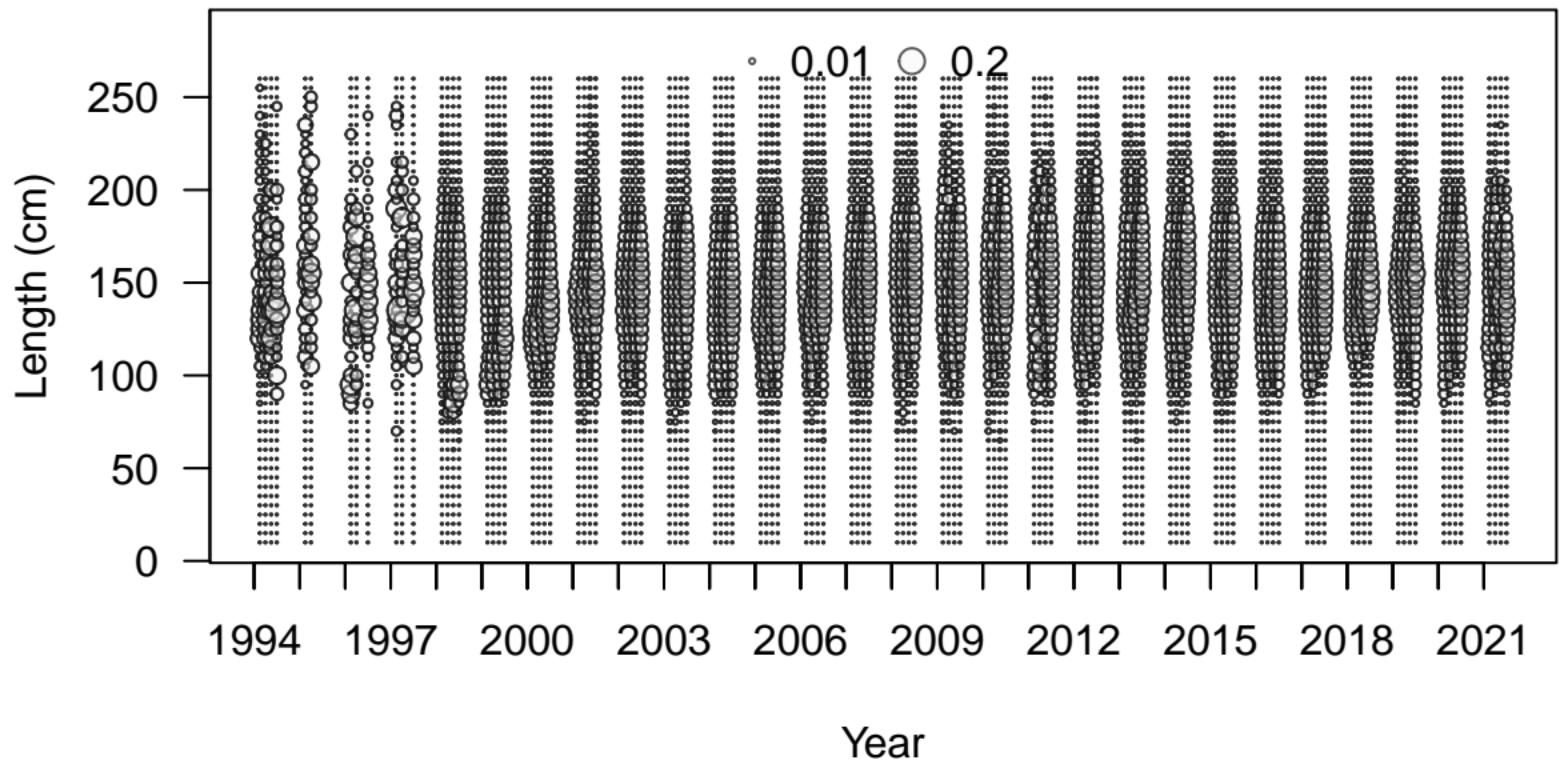


Proportion

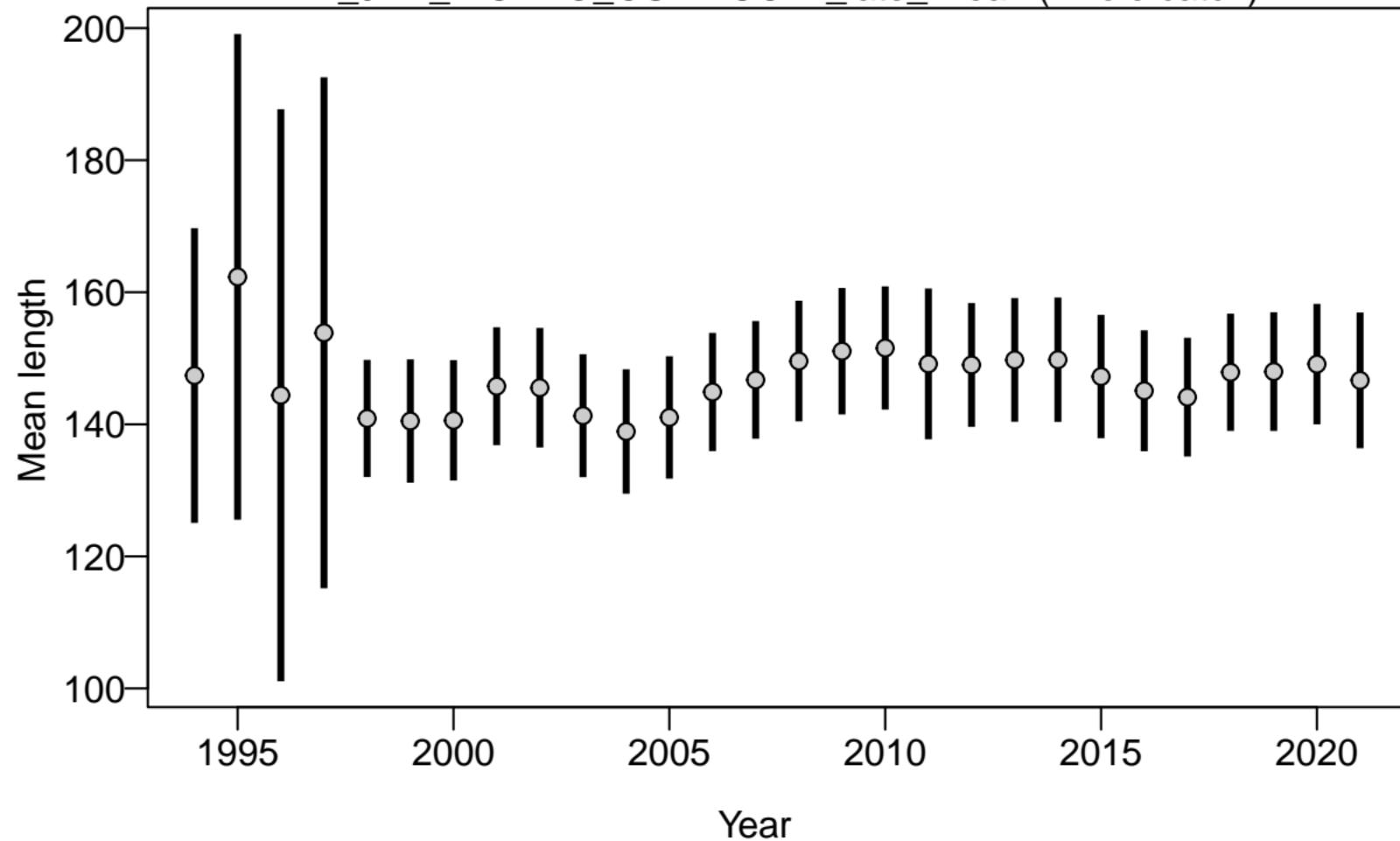


Proportion

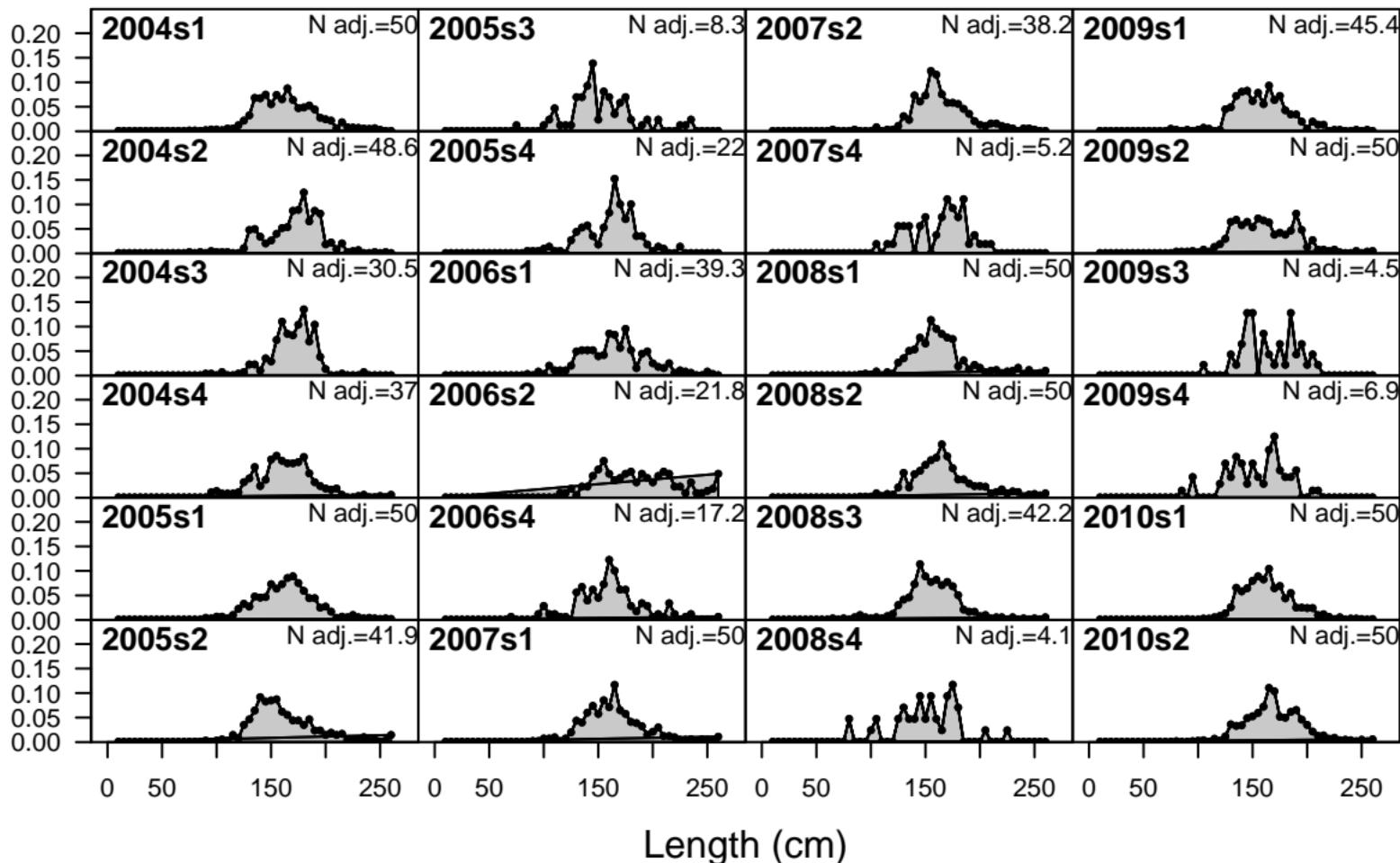




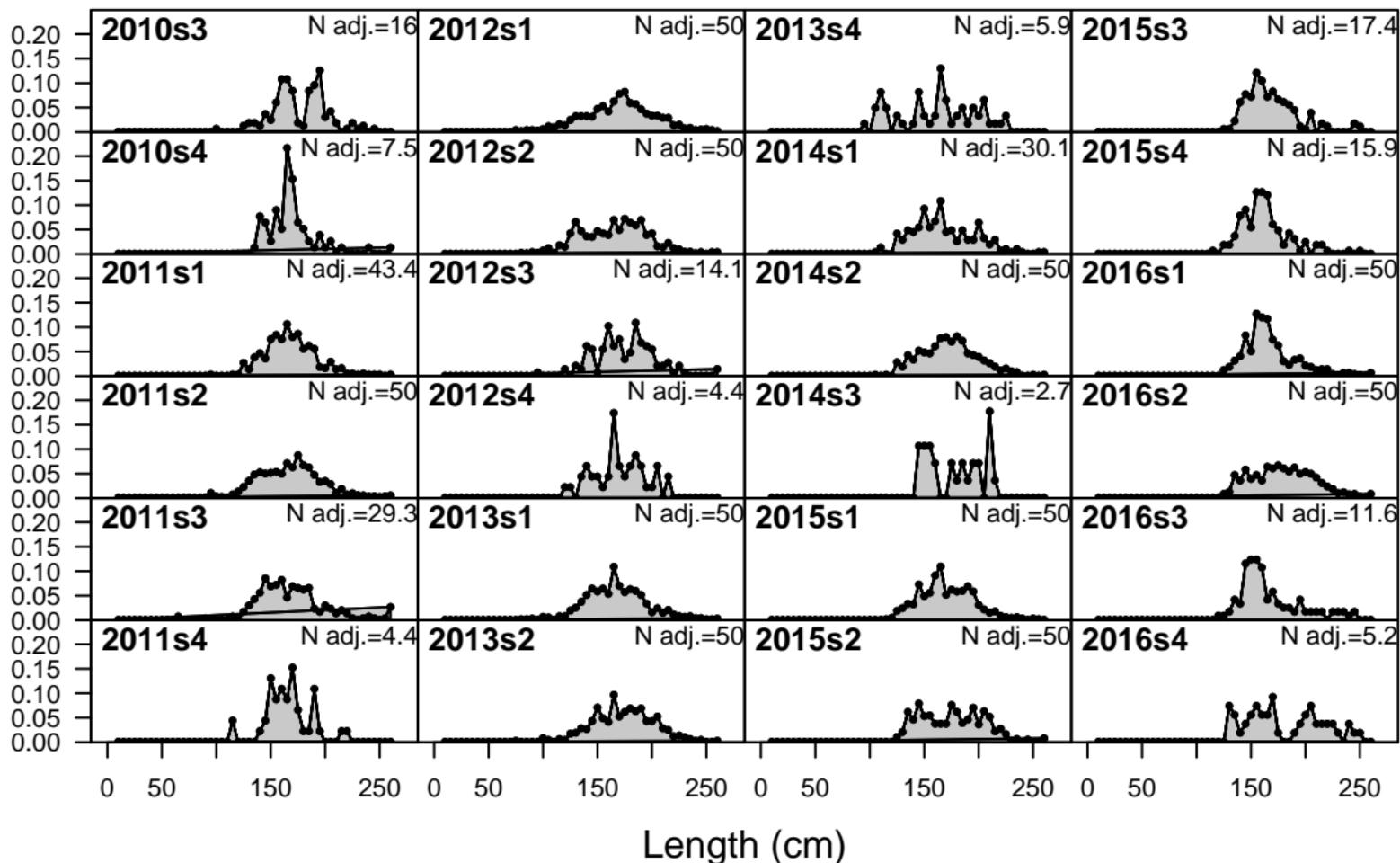
F1_JPN_WCNPO OSDWCOLL late Area1 (whole catch)



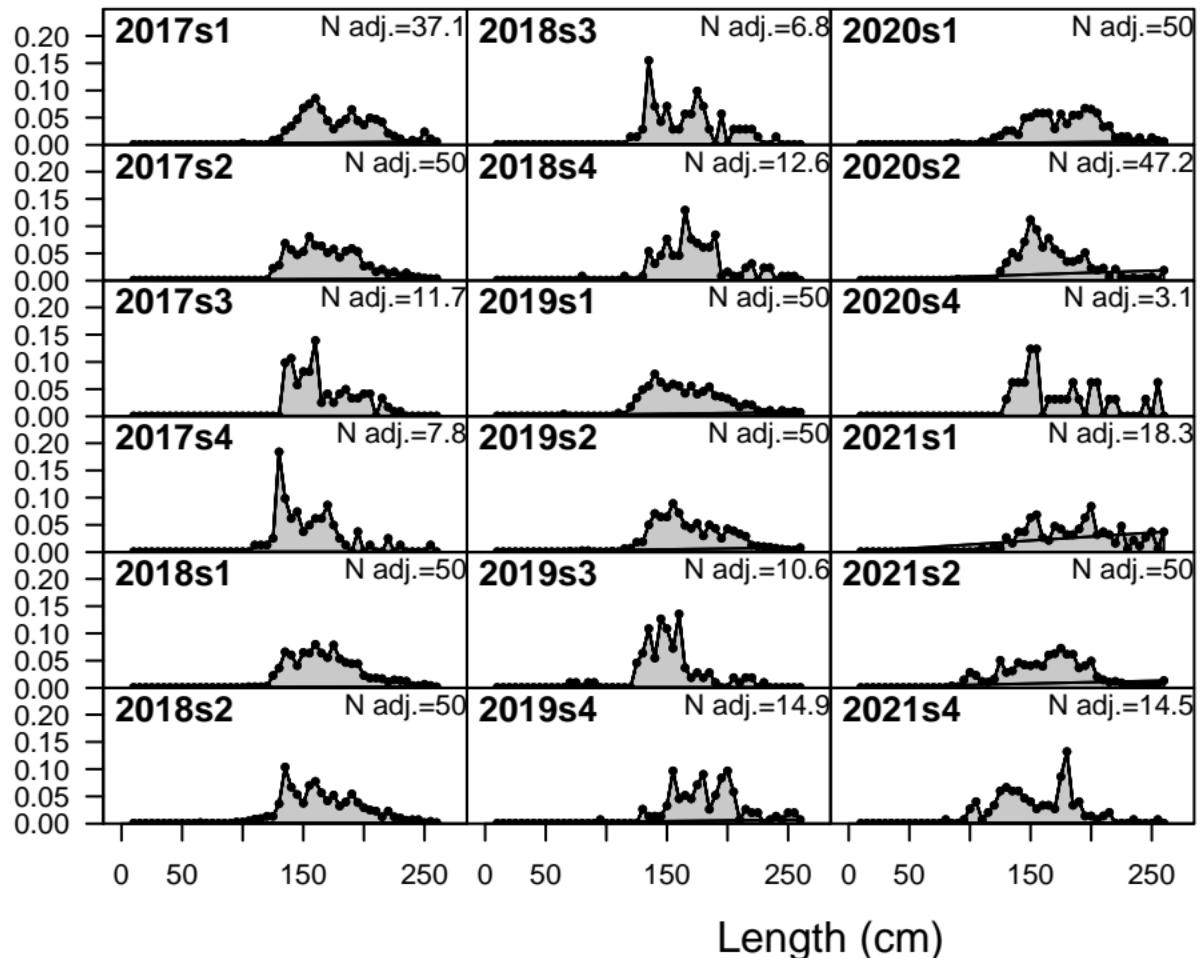
Proportion

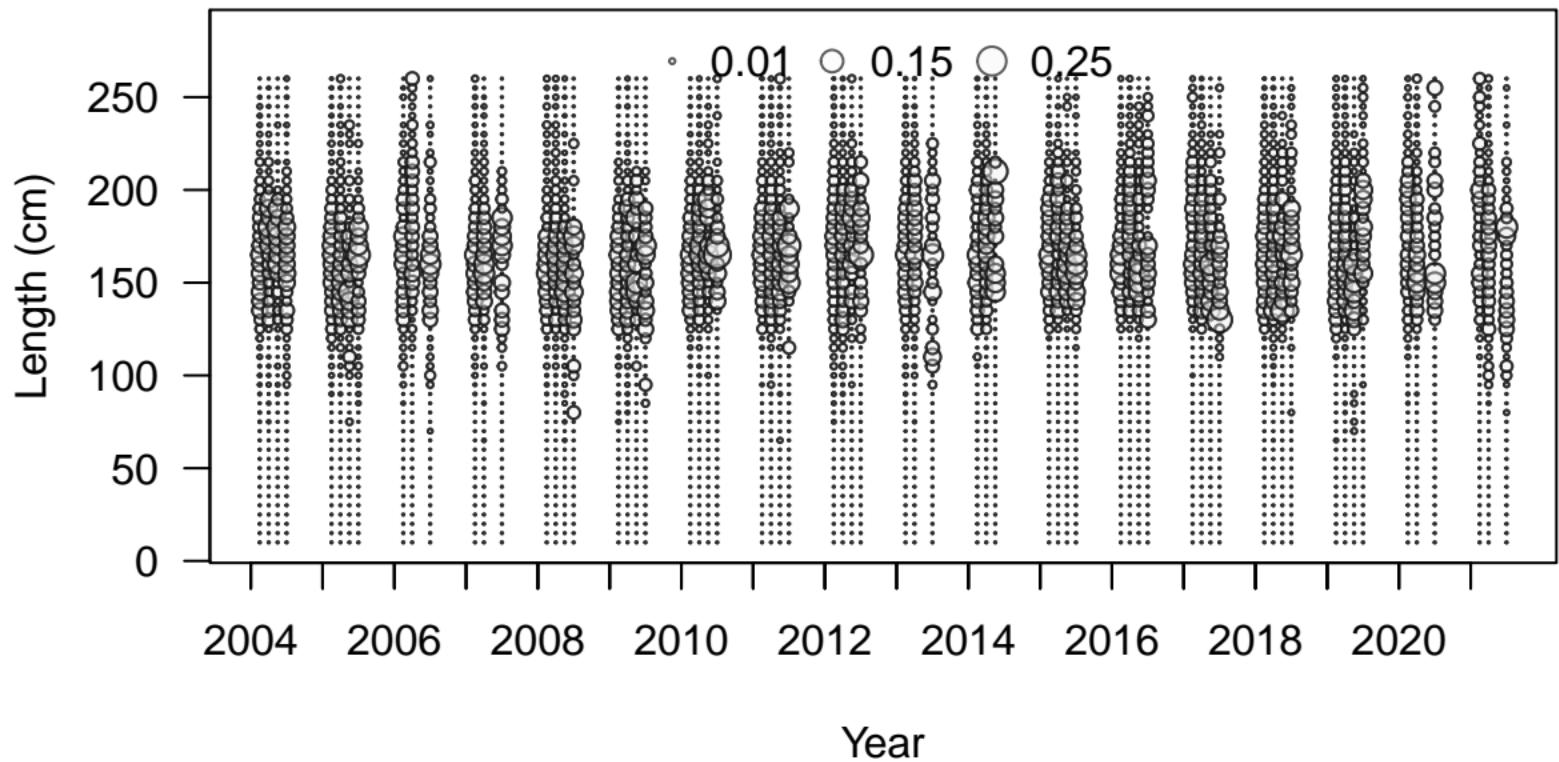


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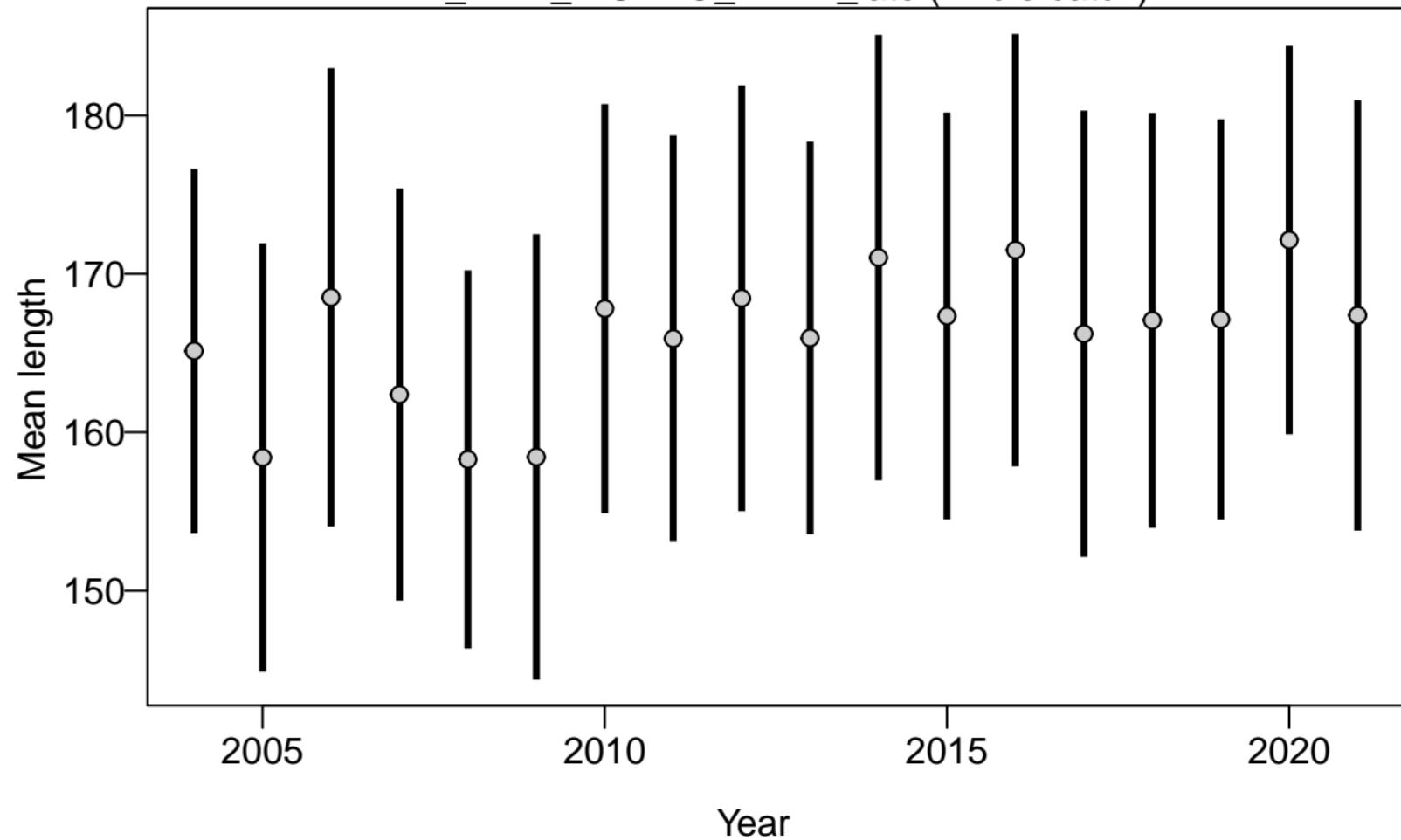


Proportion

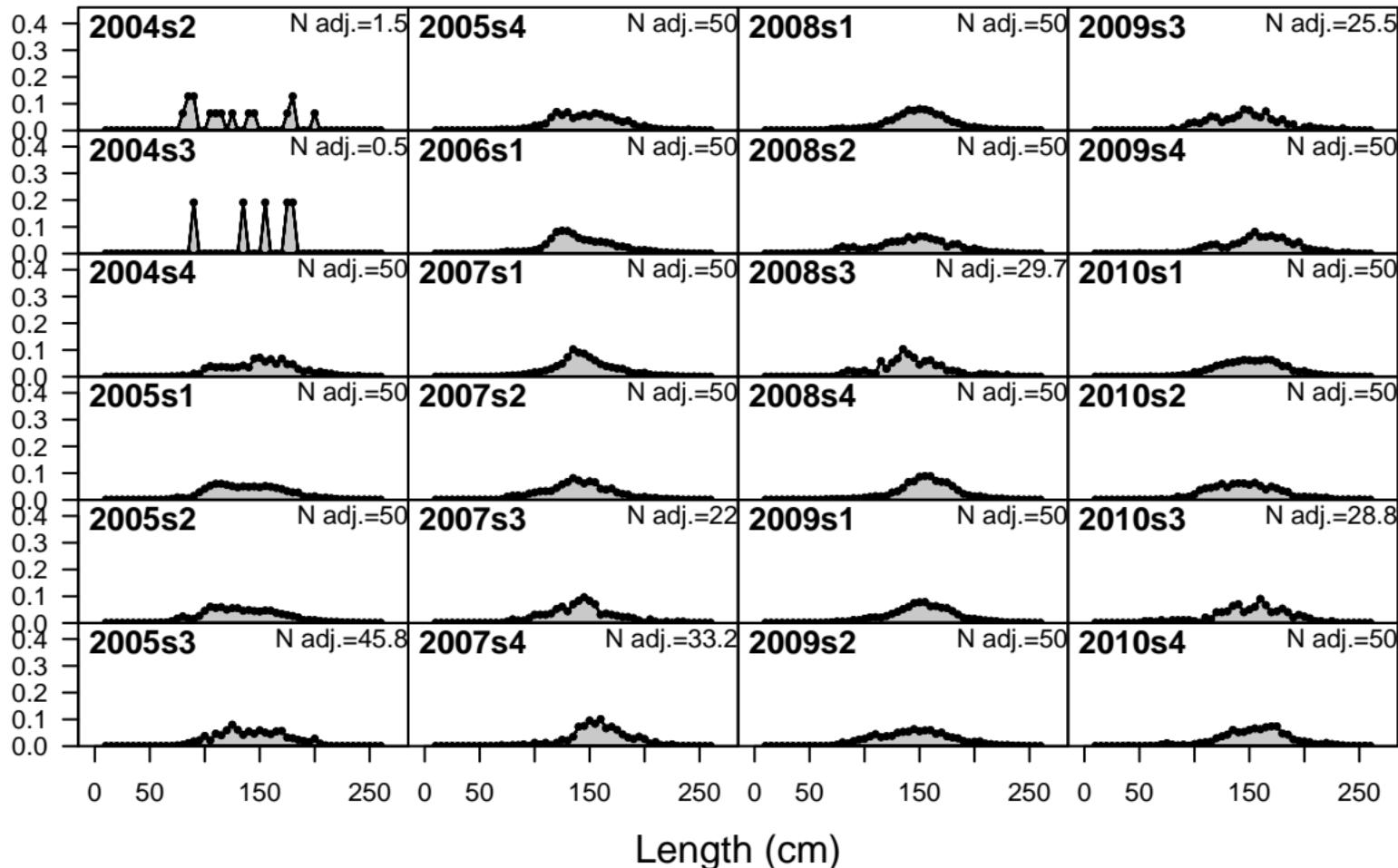




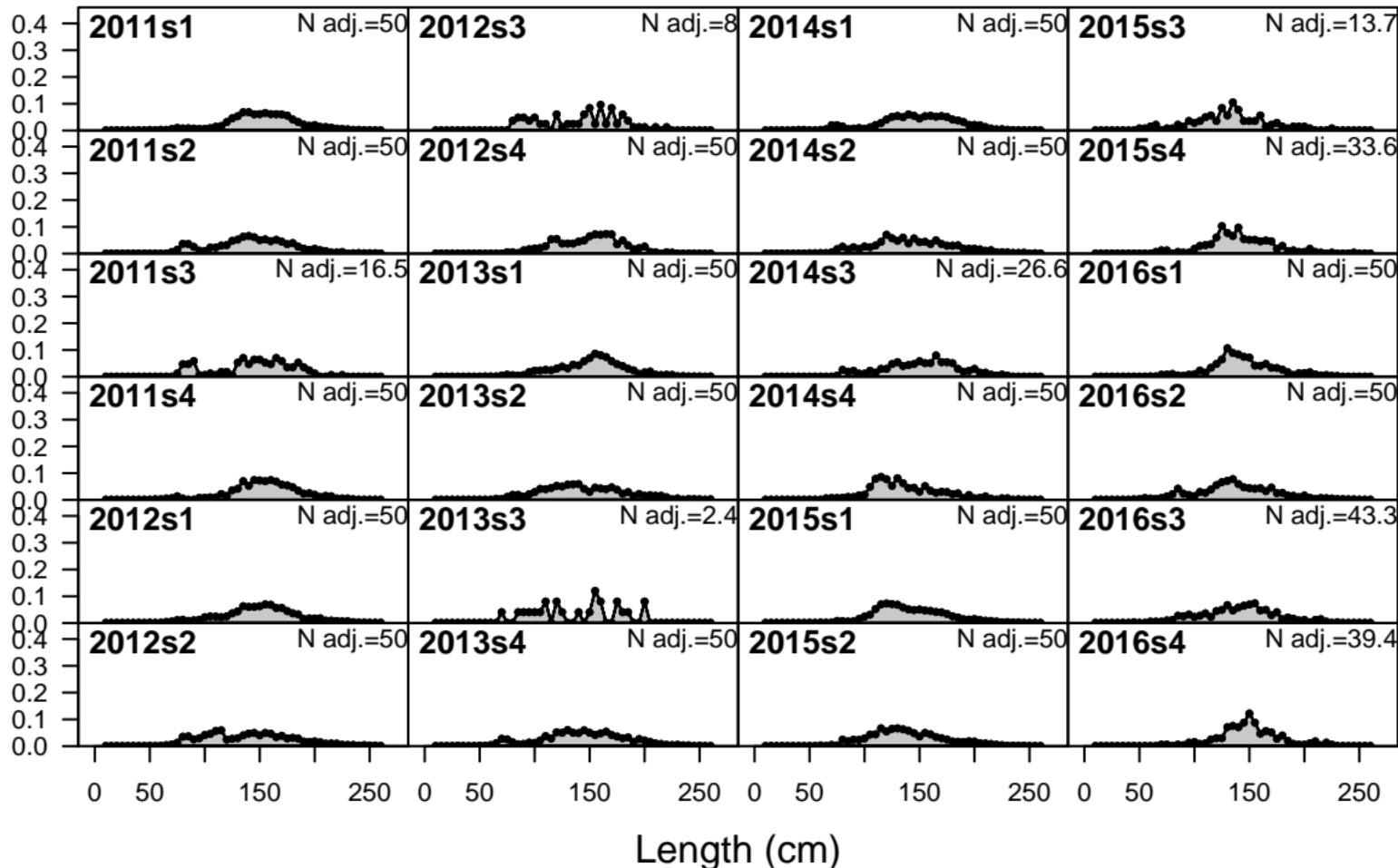
F2_TWN_WCNPO_DWLL_late (whole catch)



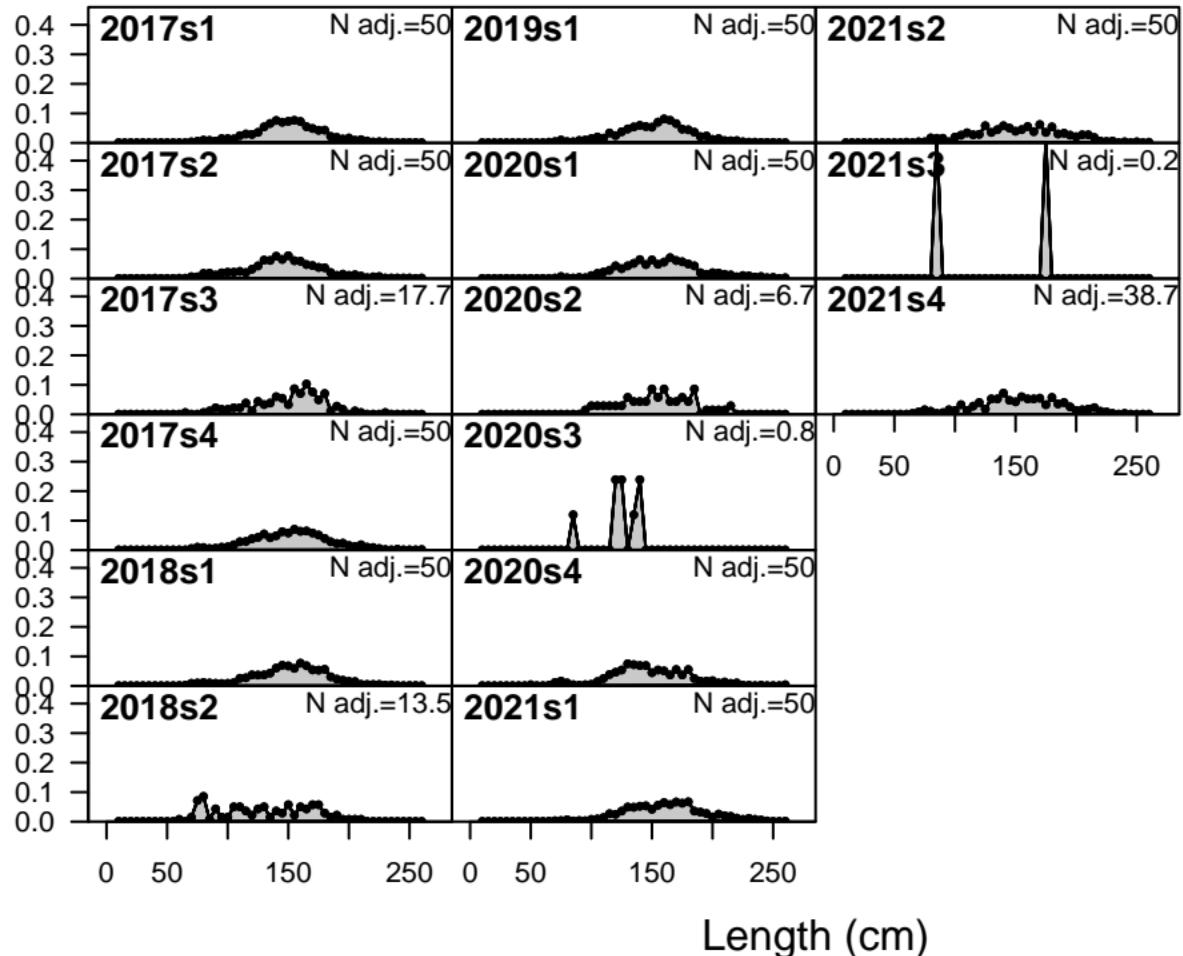
Proportion

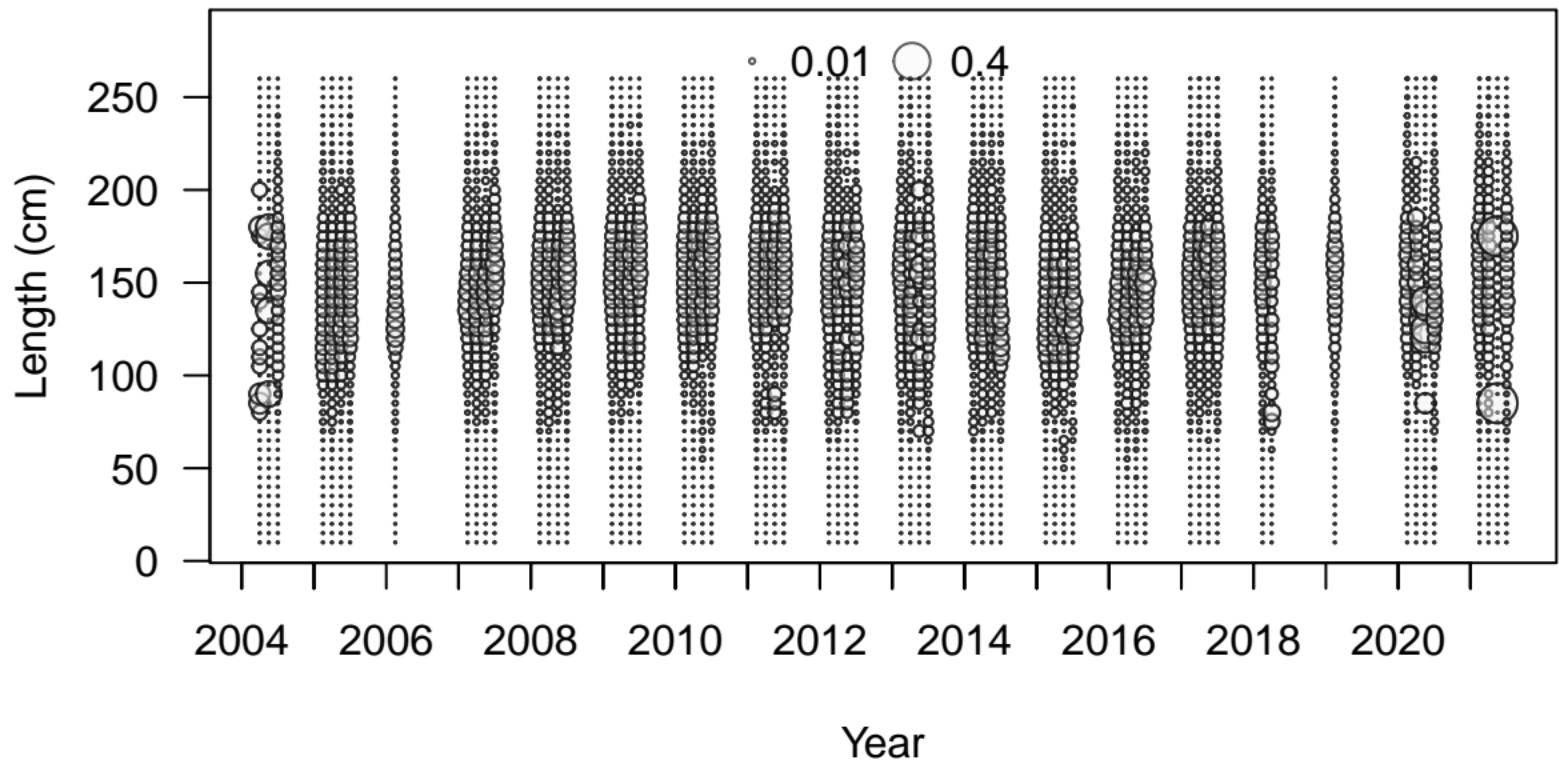


Proportion

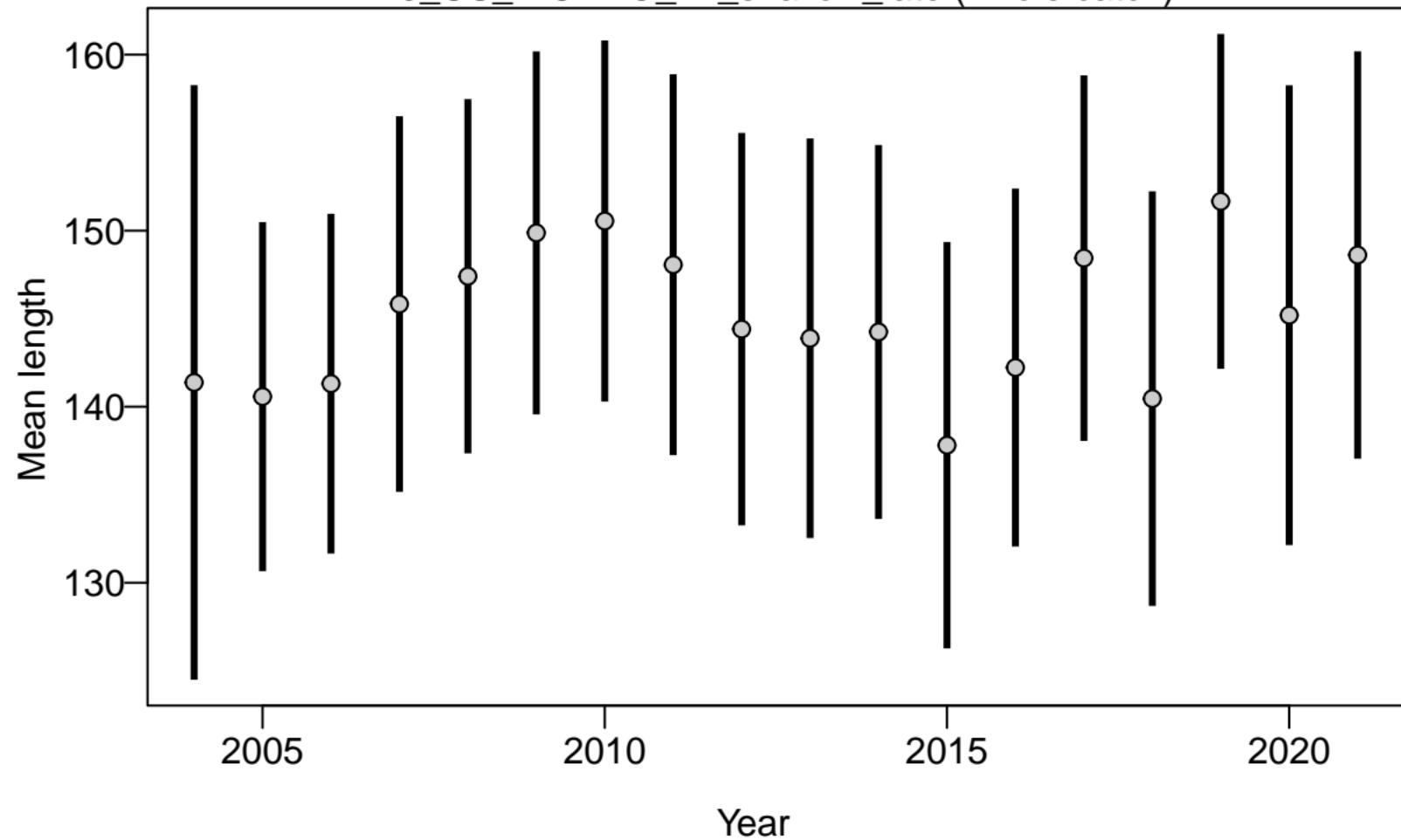


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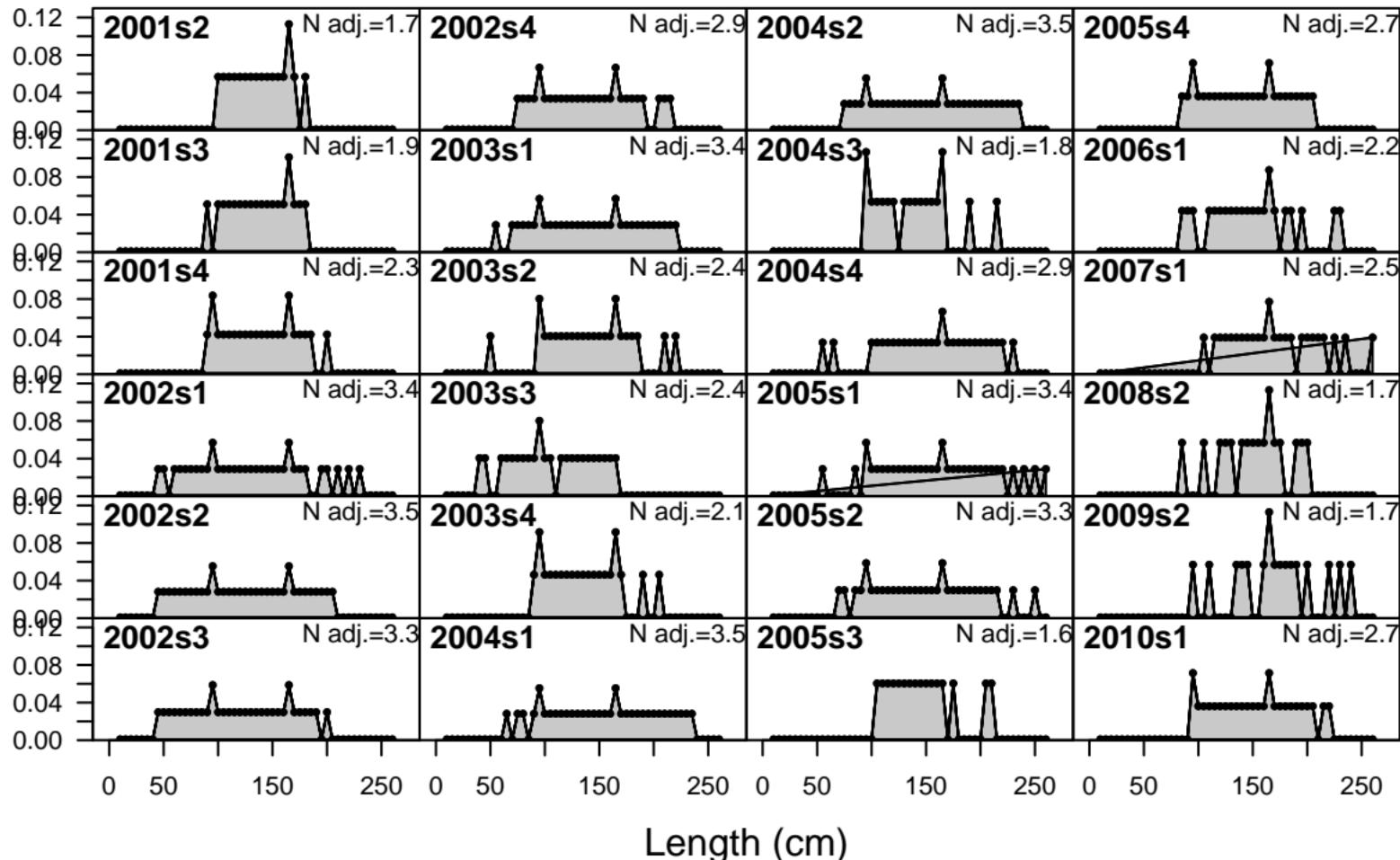




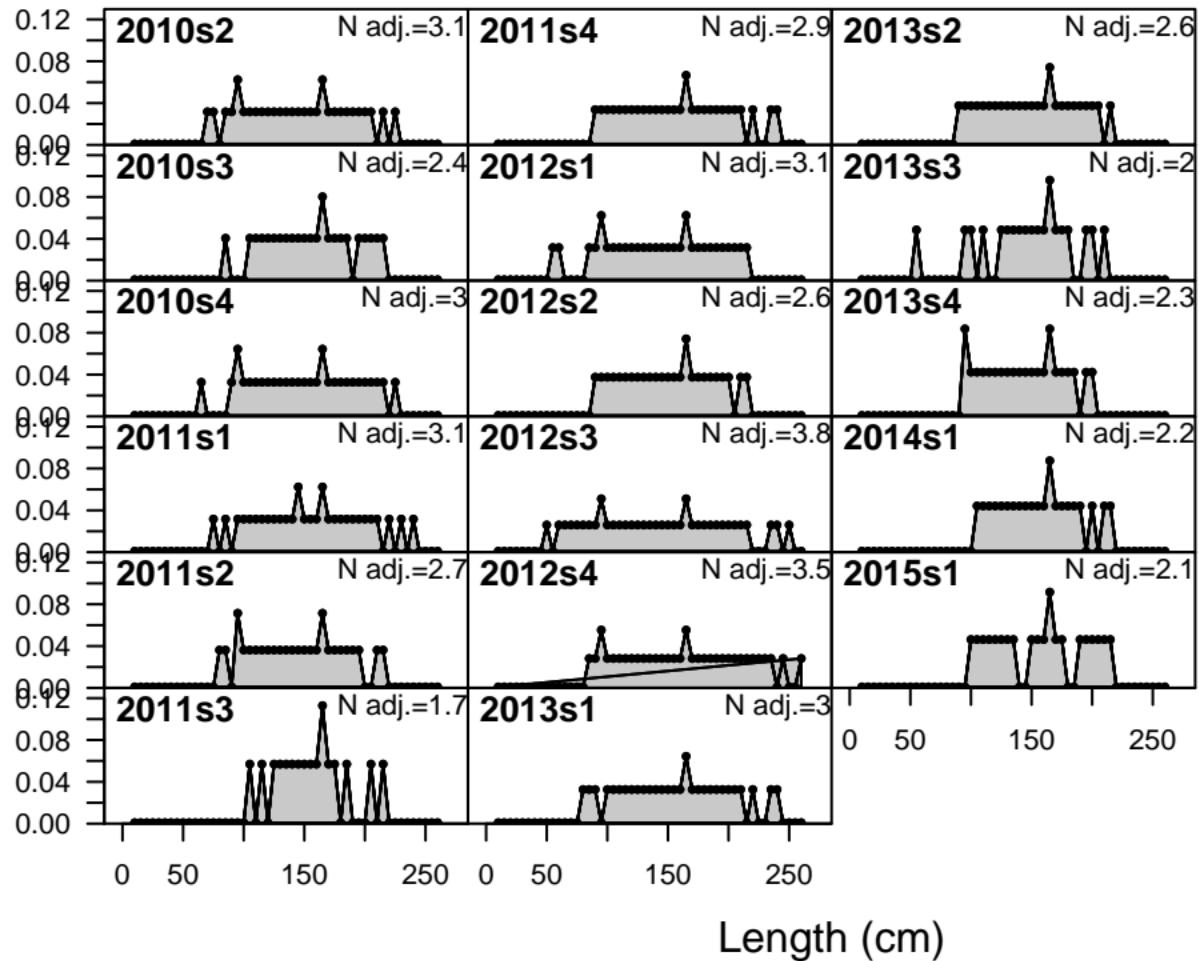
F3_US_WCNPO_LL_shallow_late (whole catch)

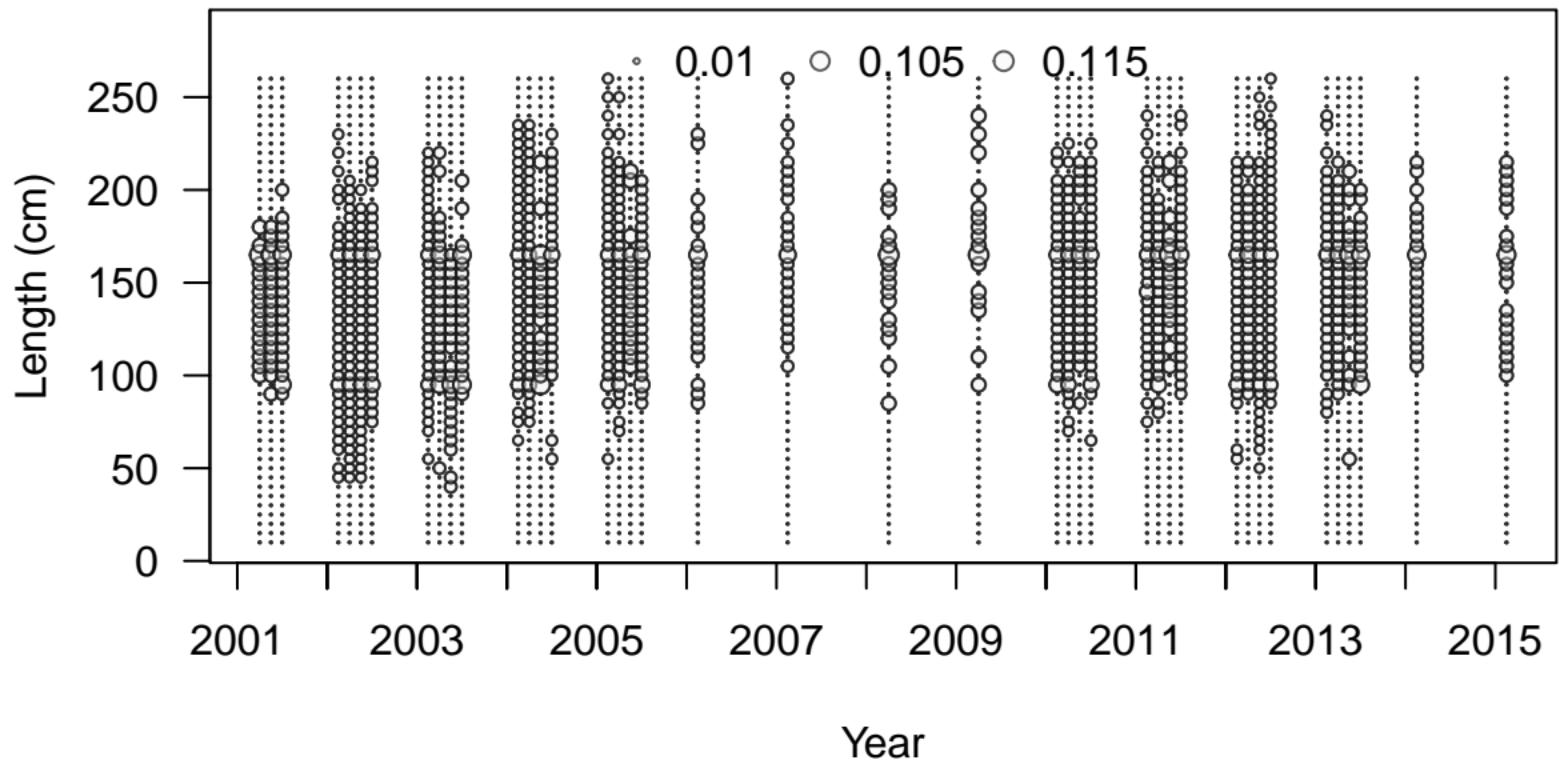


Proportion

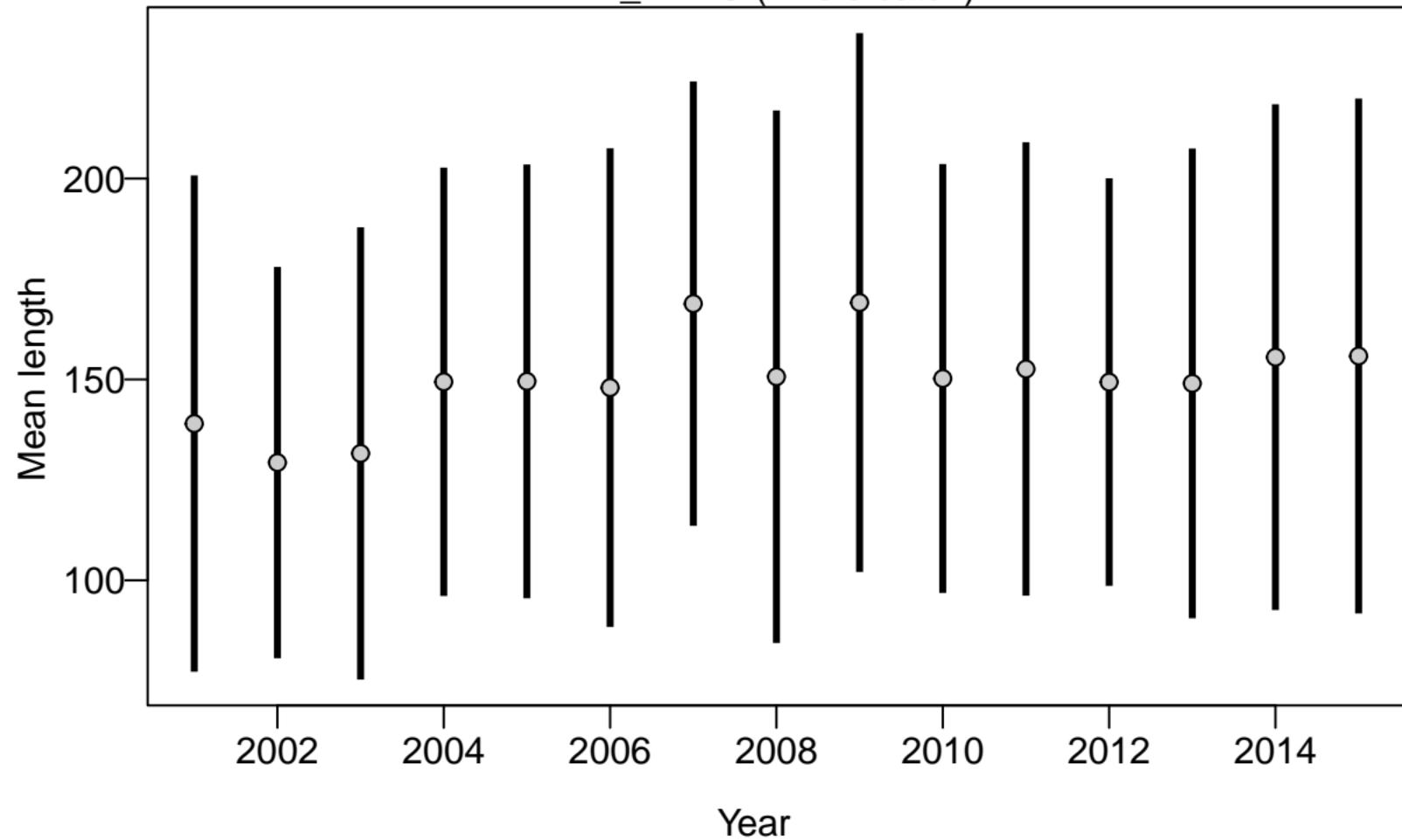


Proportion

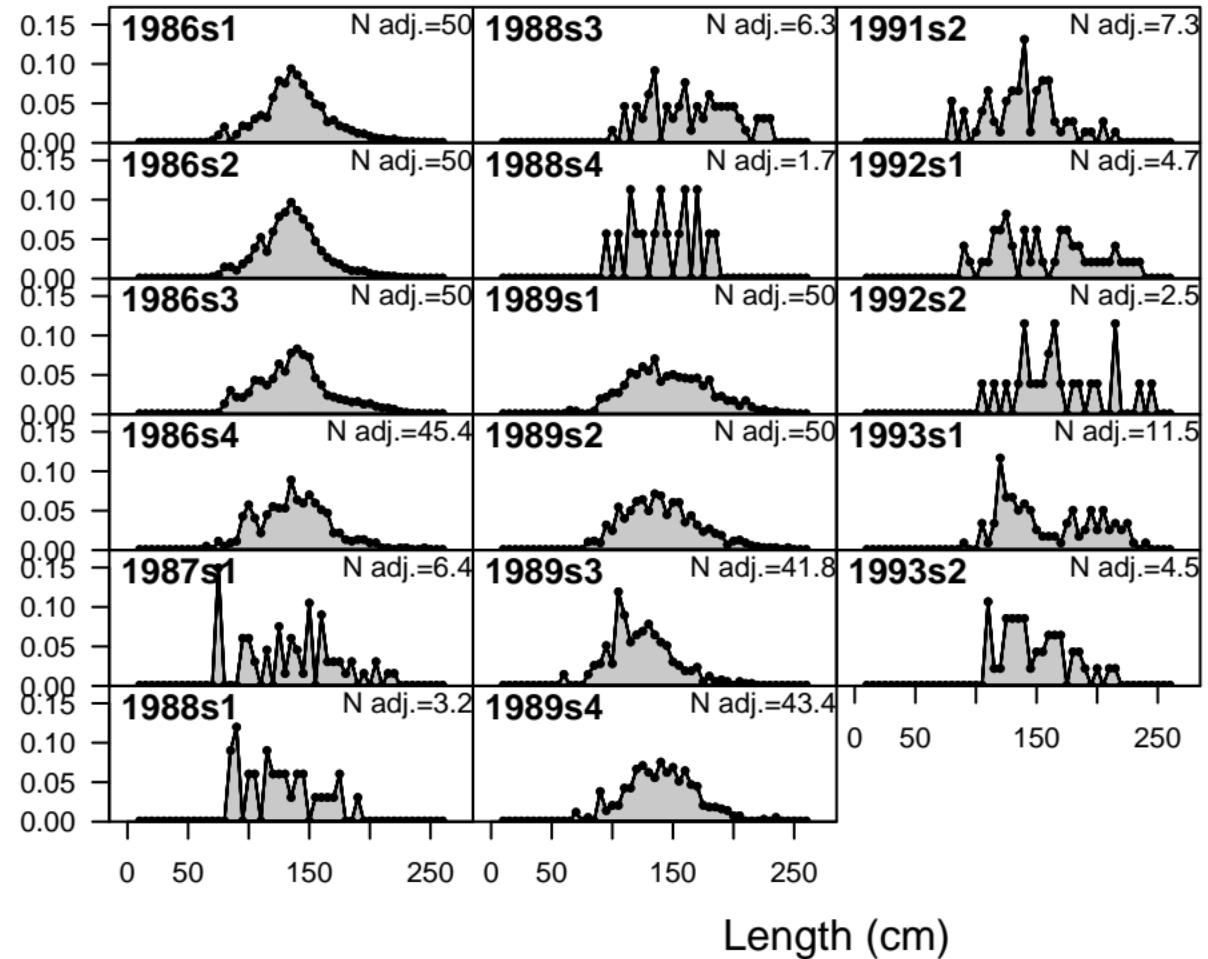


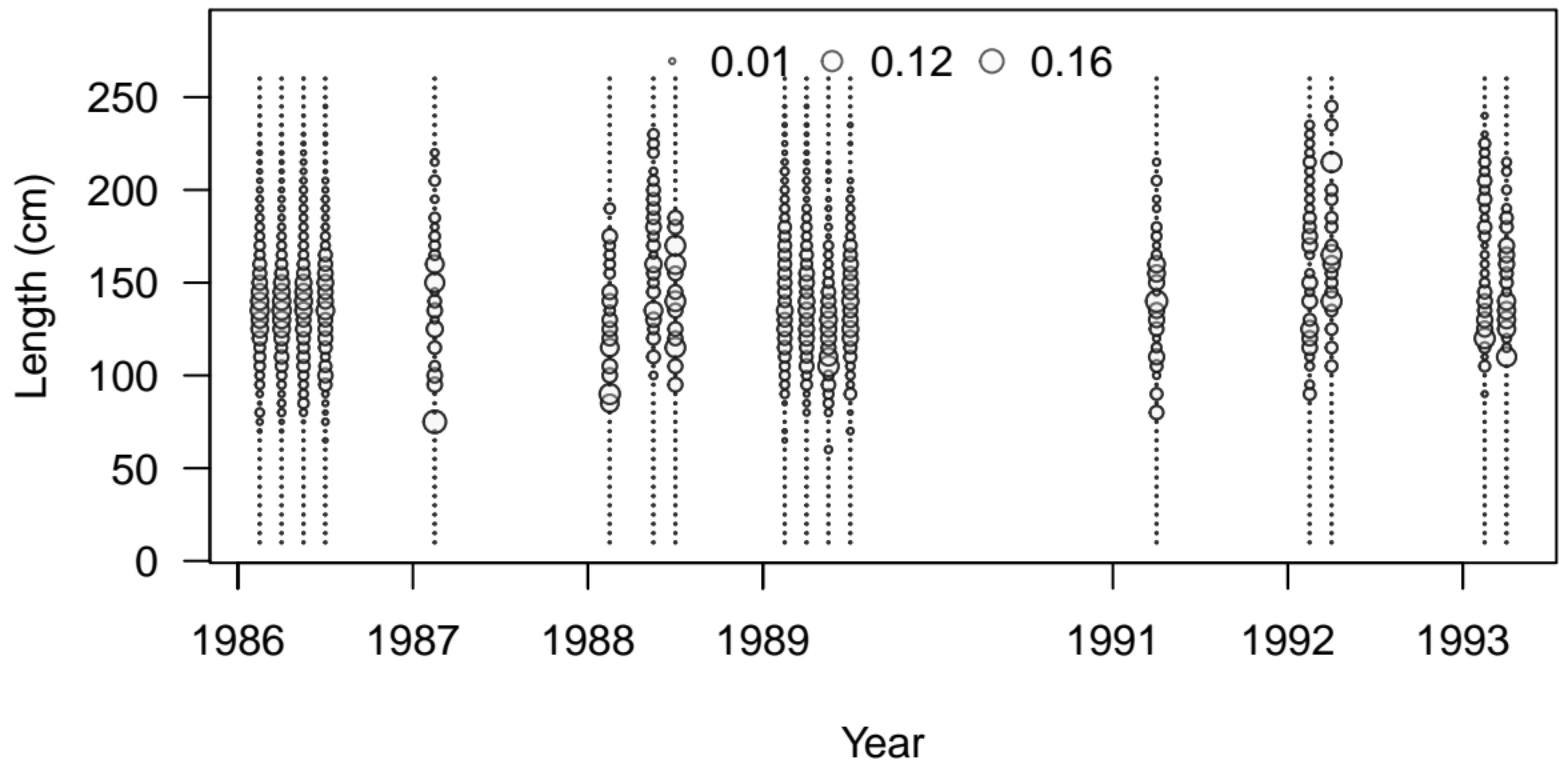


F4_IATTC (whole catch)

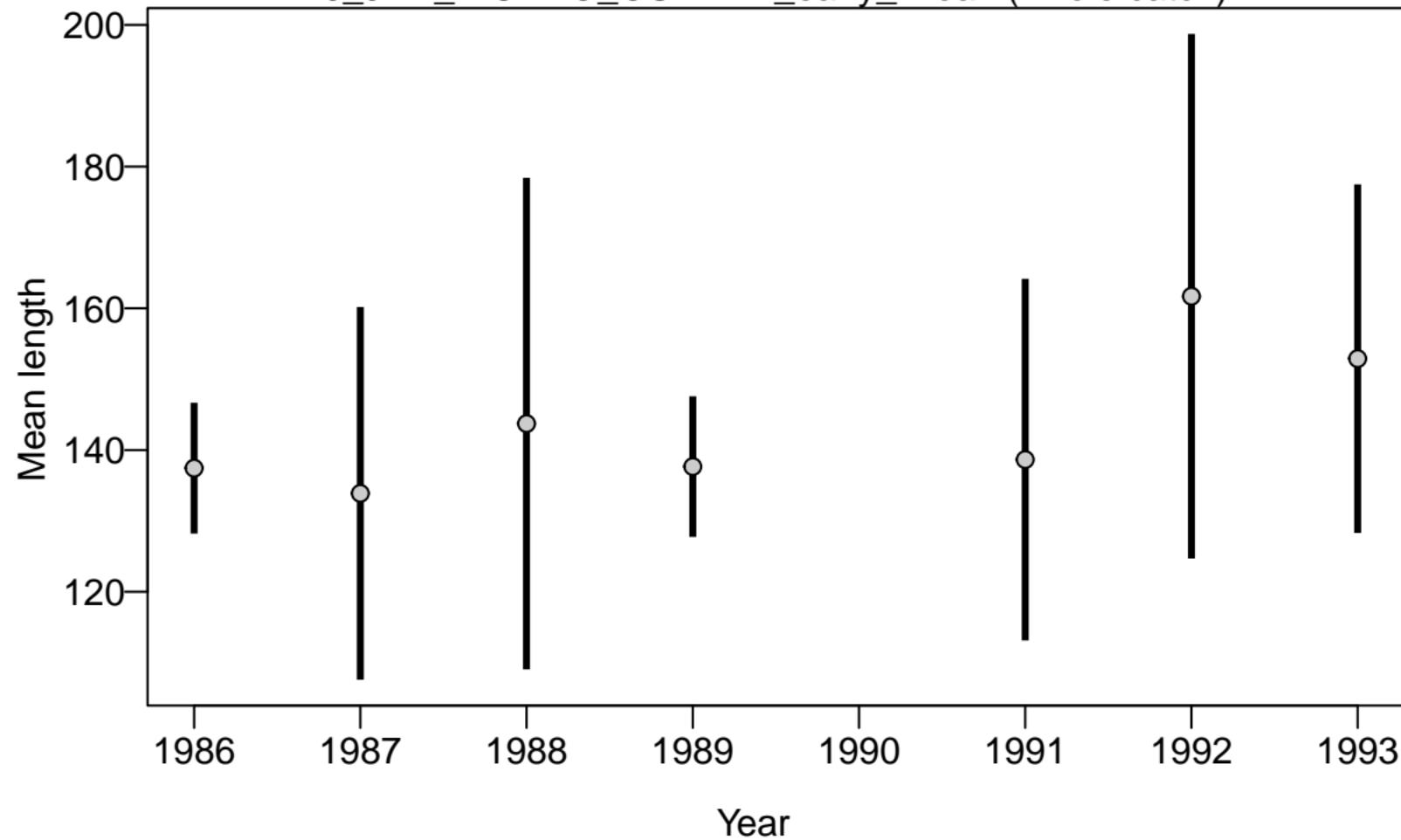


Proportion

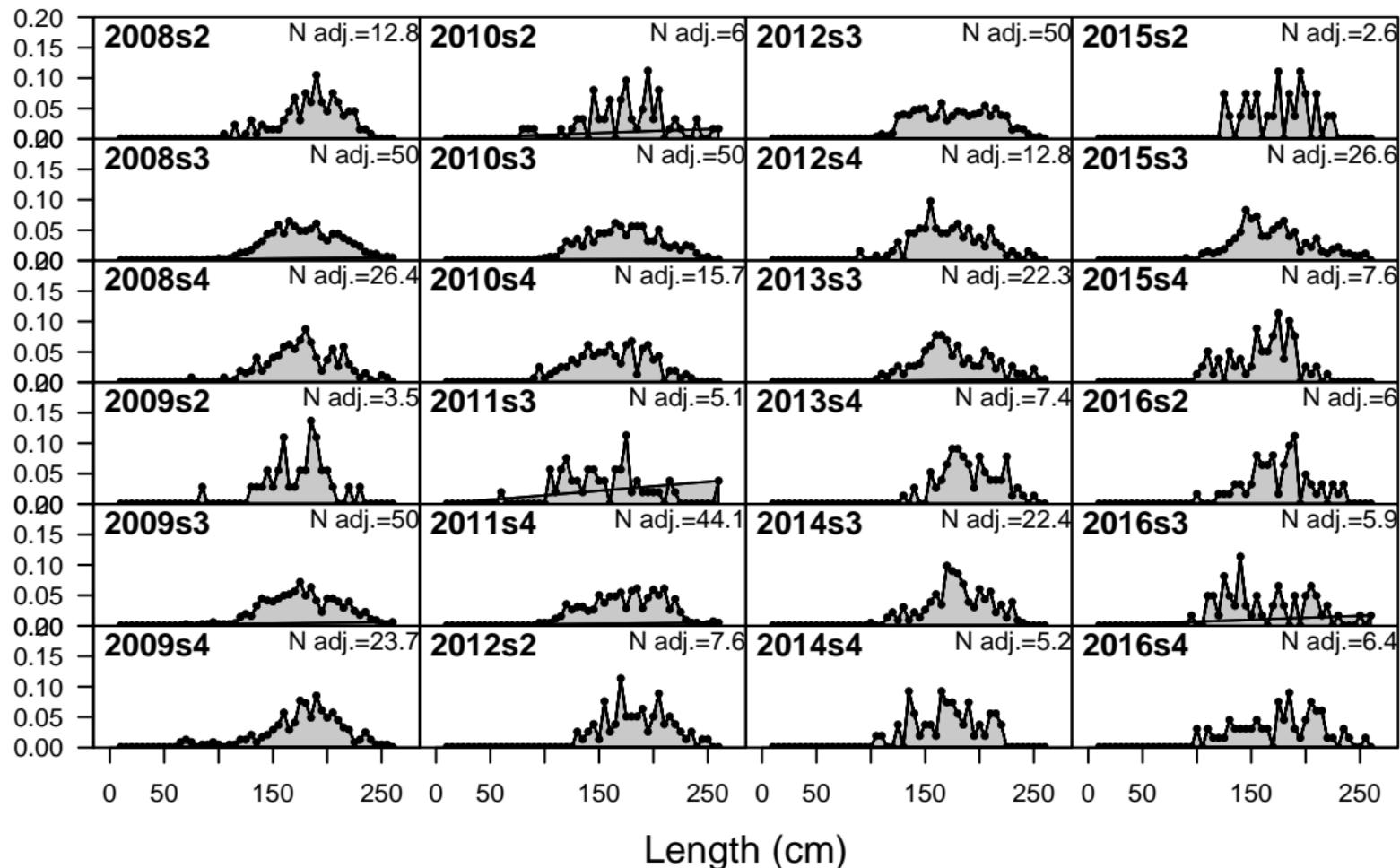




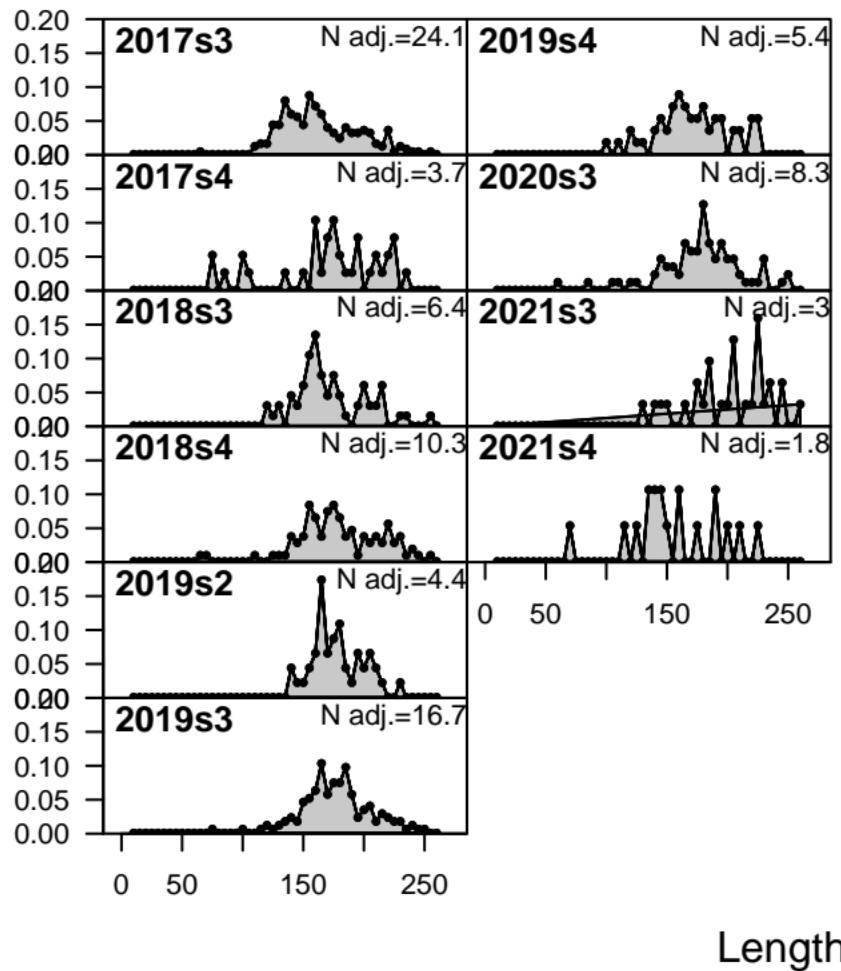
F6_JPN_WCNPO OSDWLL_early_Area1 (whole catch)

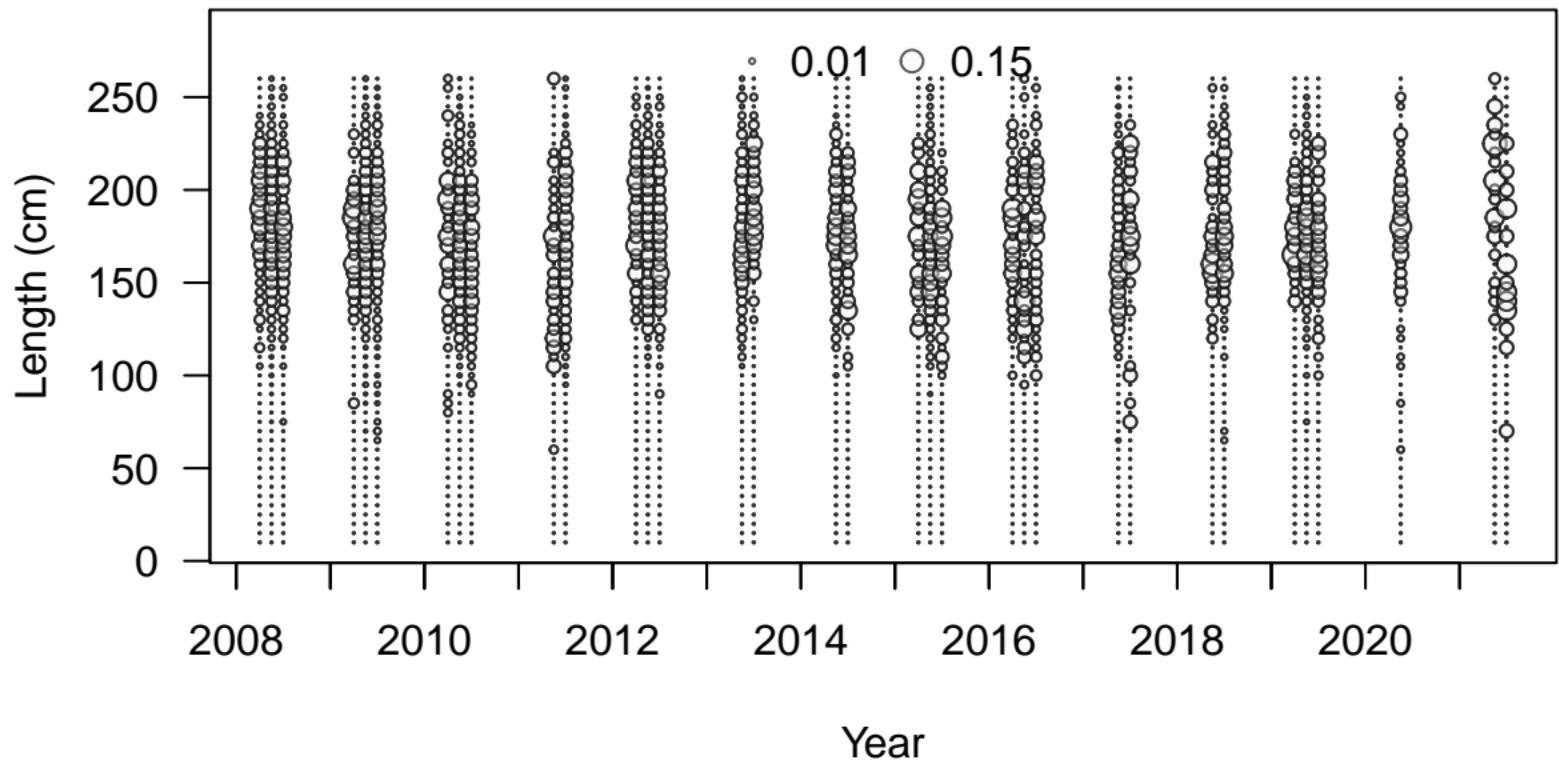


Proportion

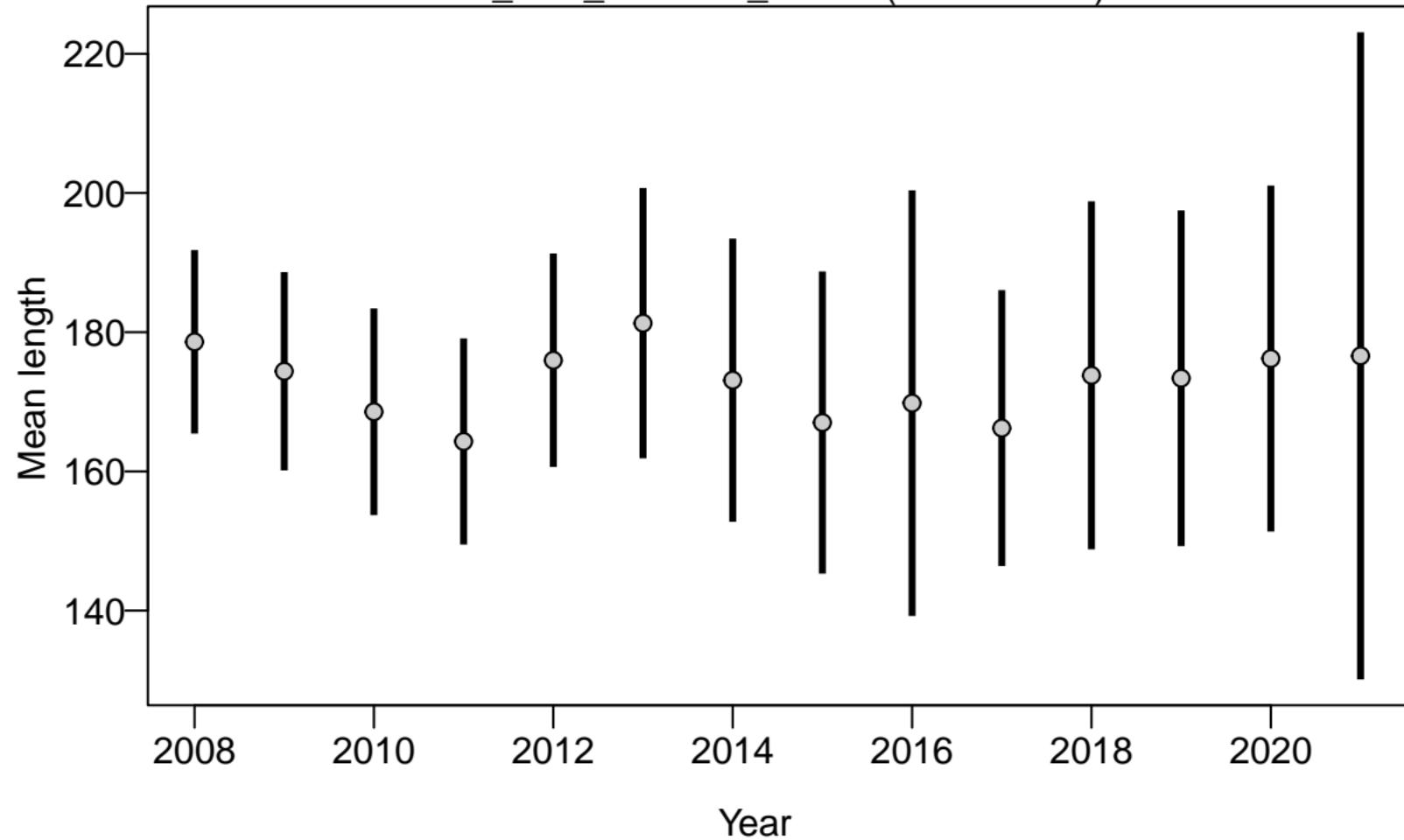


Proportion

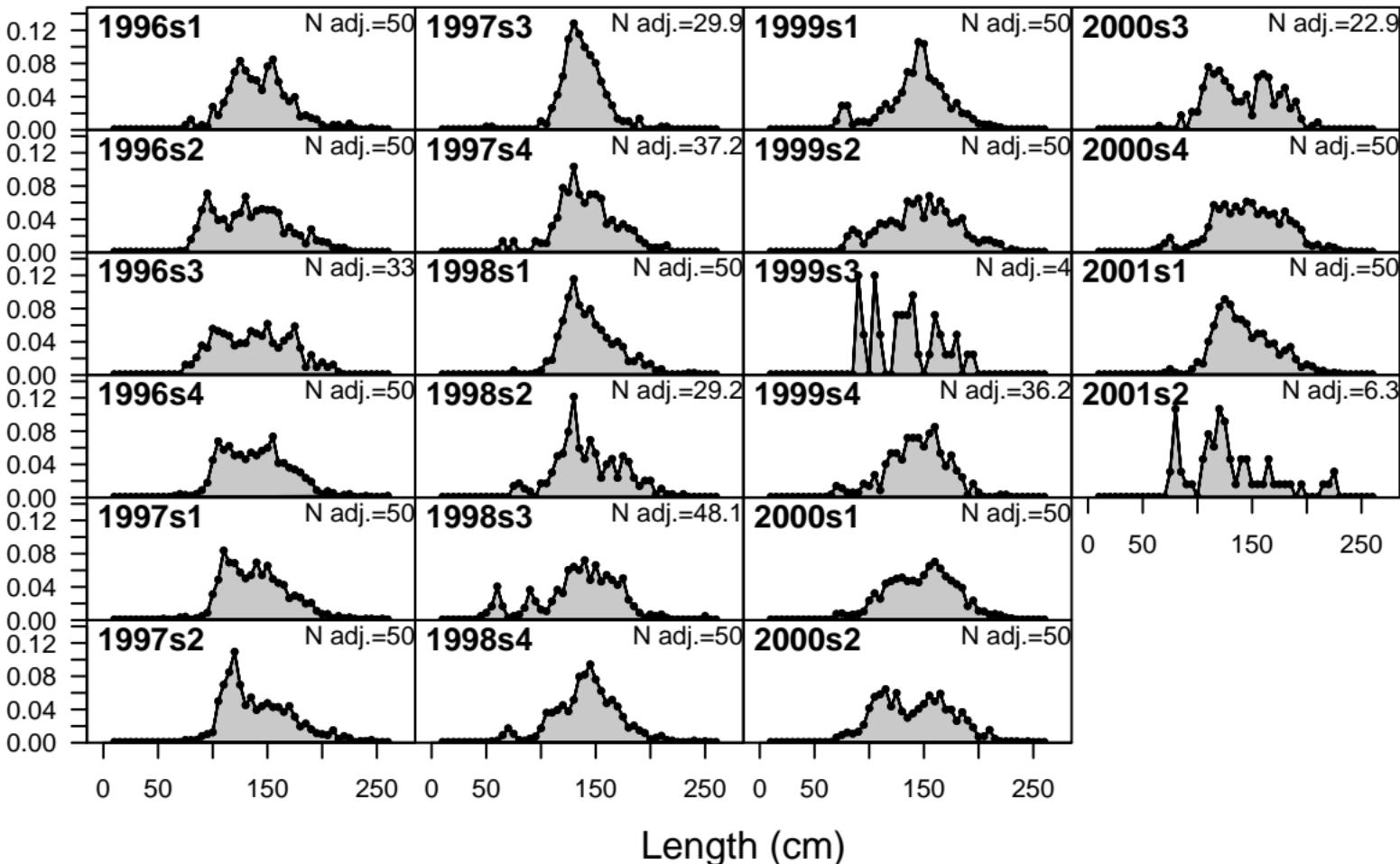


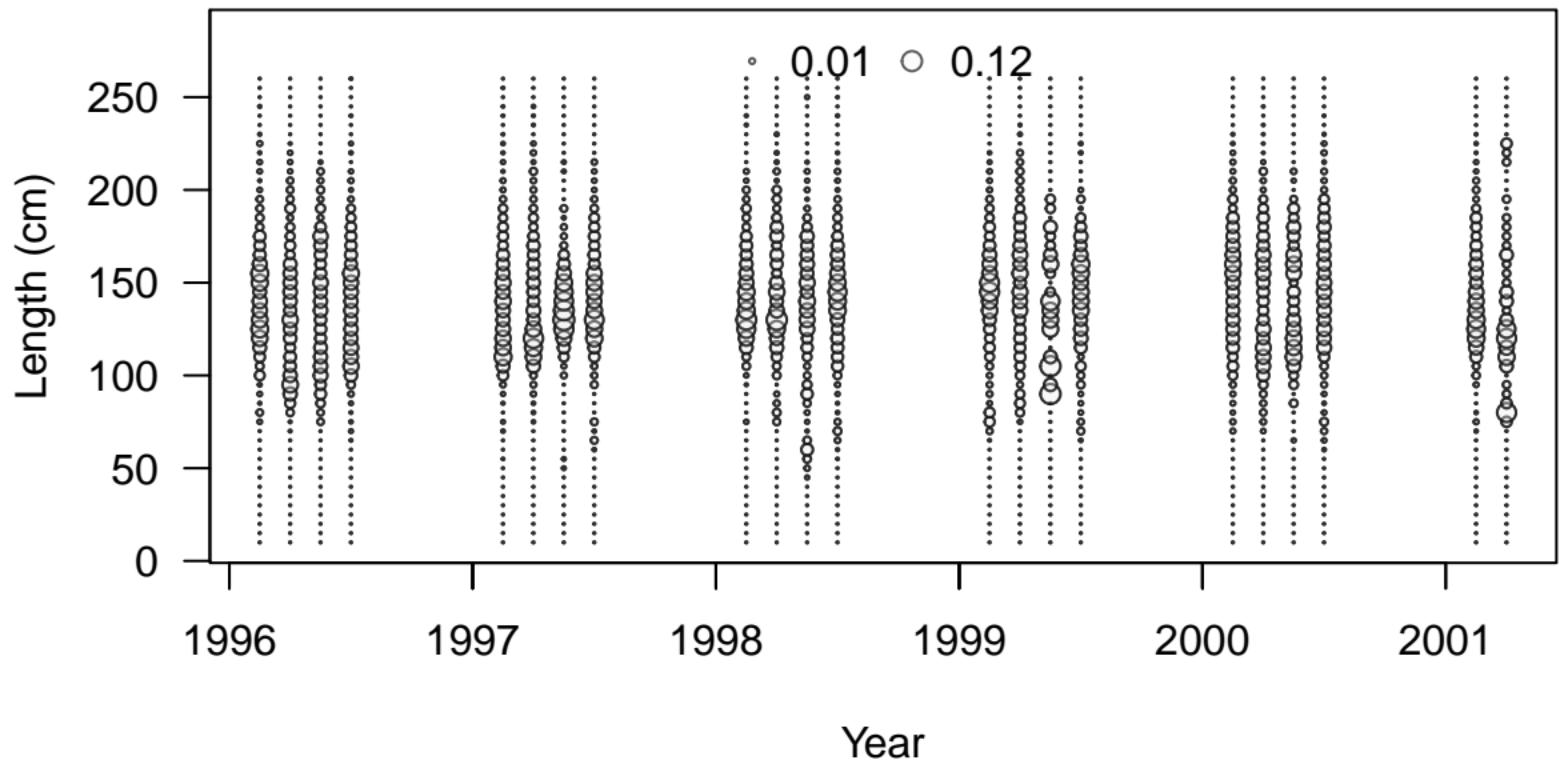


F7_JPN_WCNPO_CODF (whole catch)

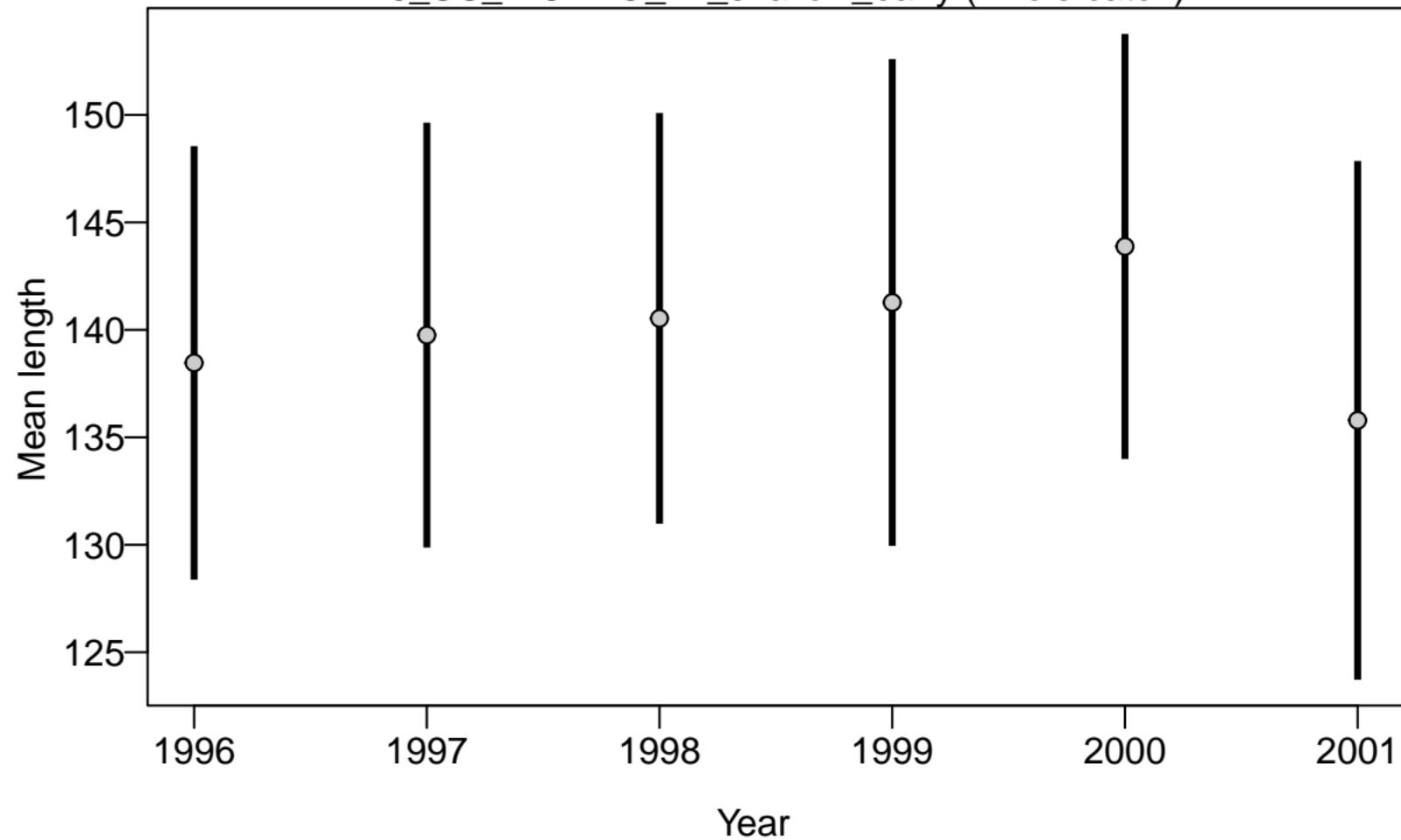


Proportion

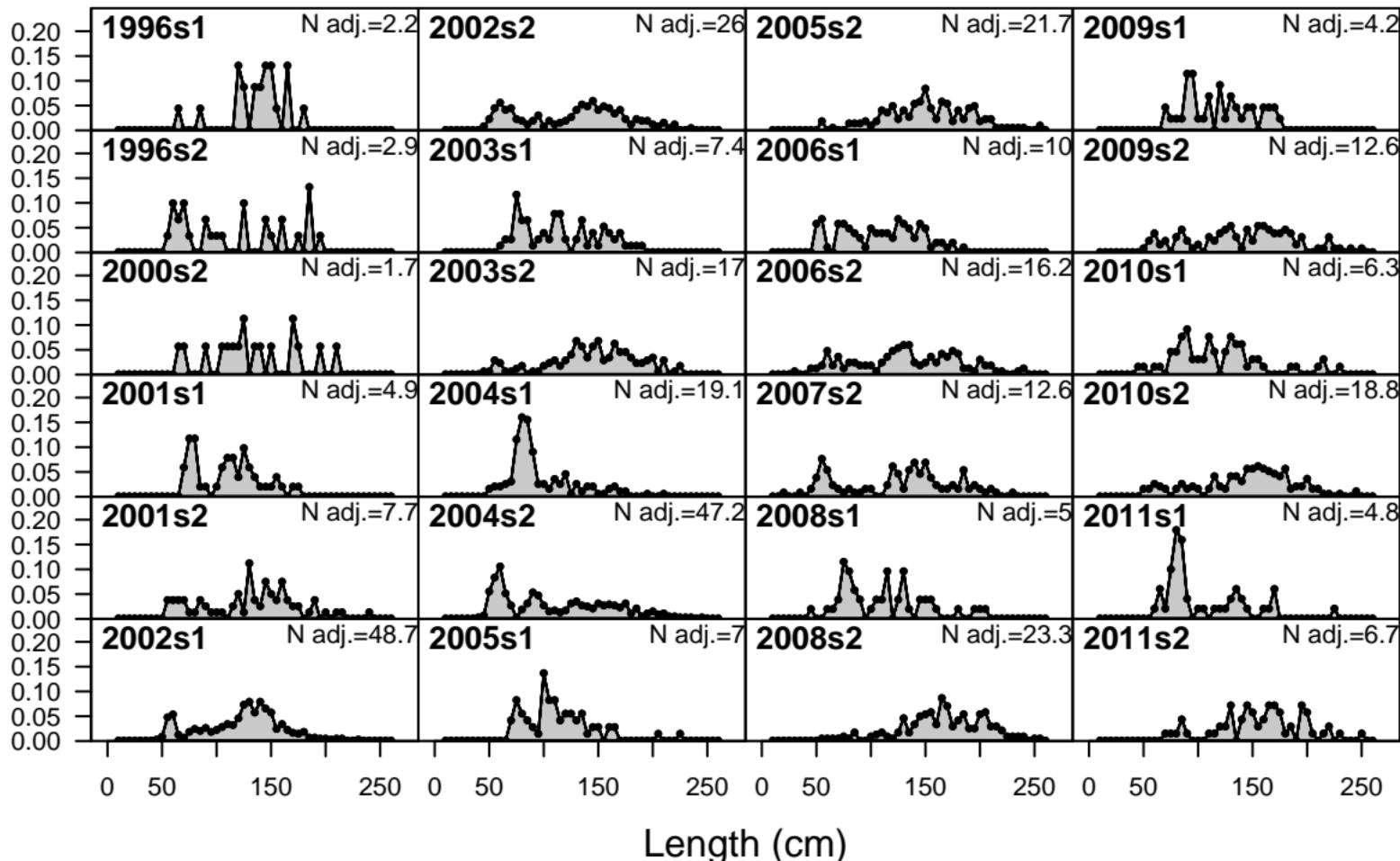




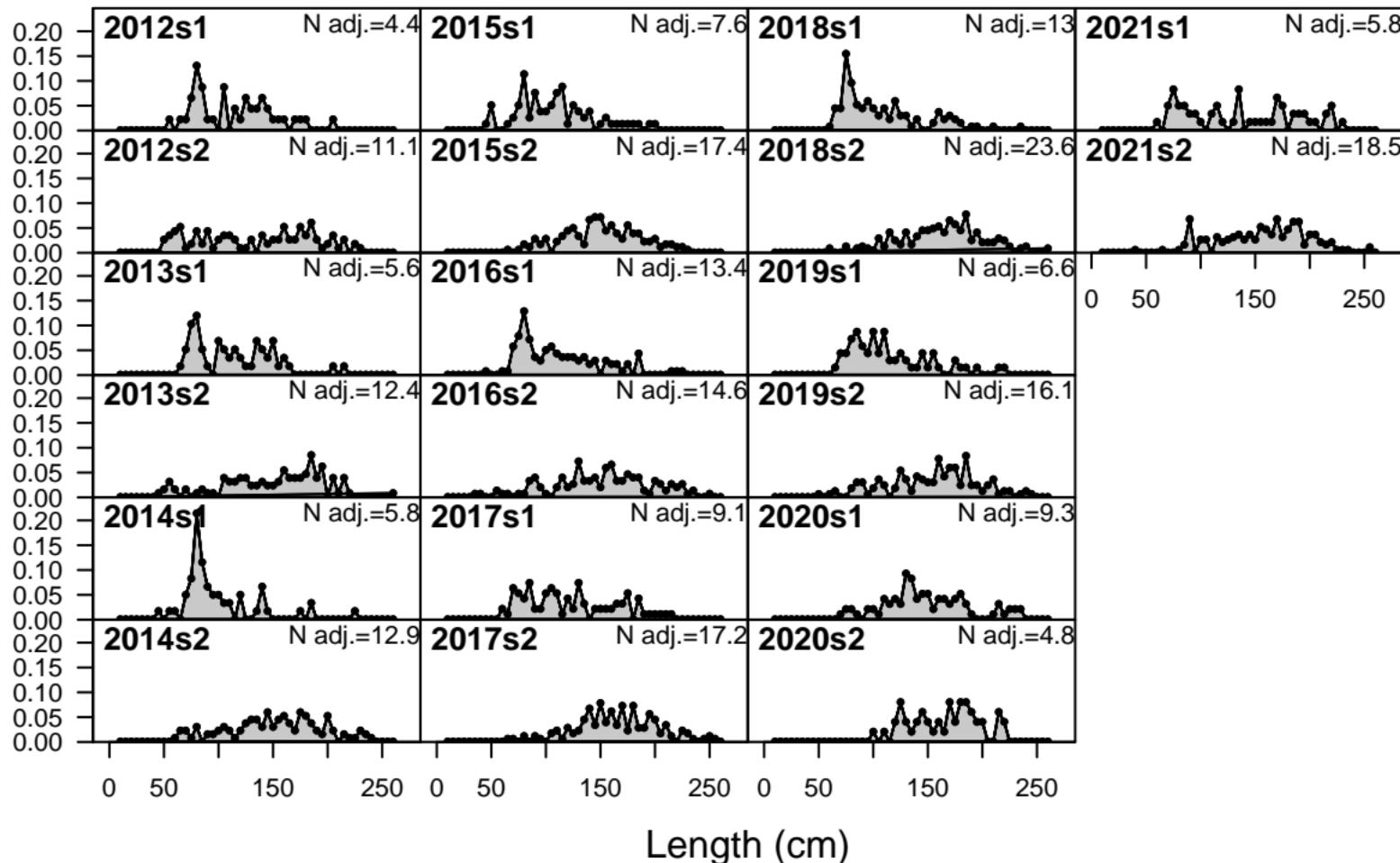
F8_US_WCNPO_LL_shallow_early (whole catch)

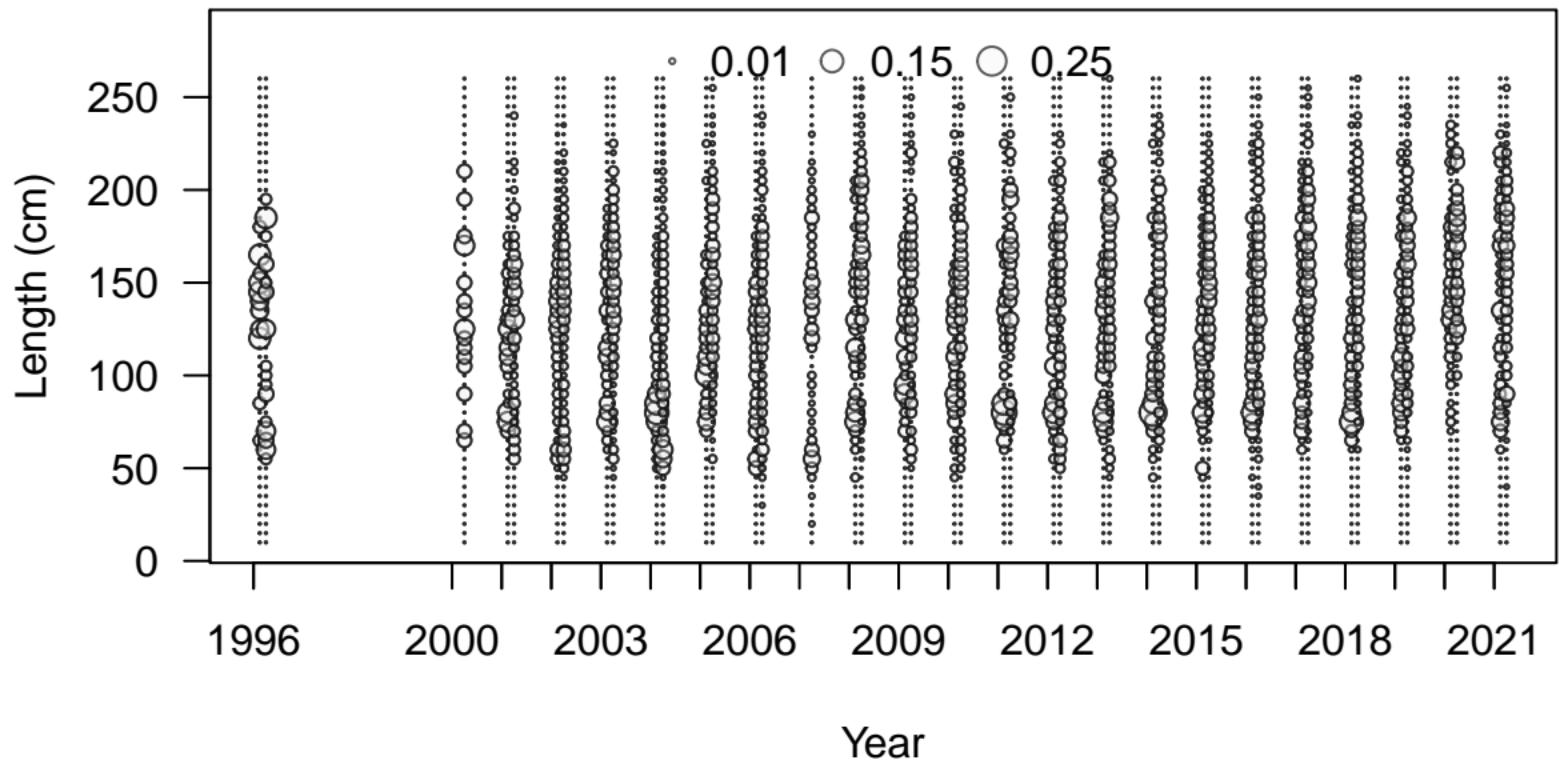


Proportion

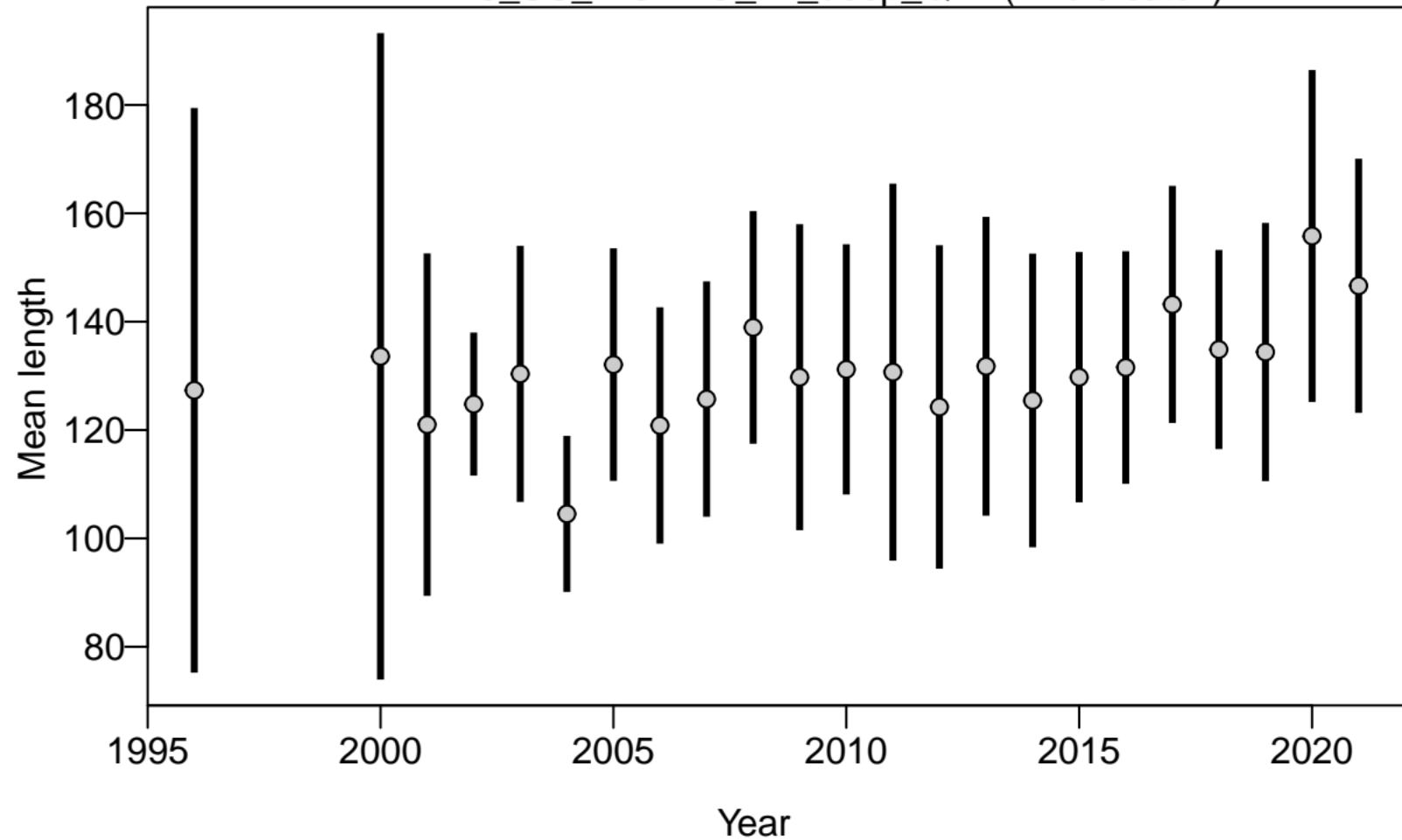


Proportion

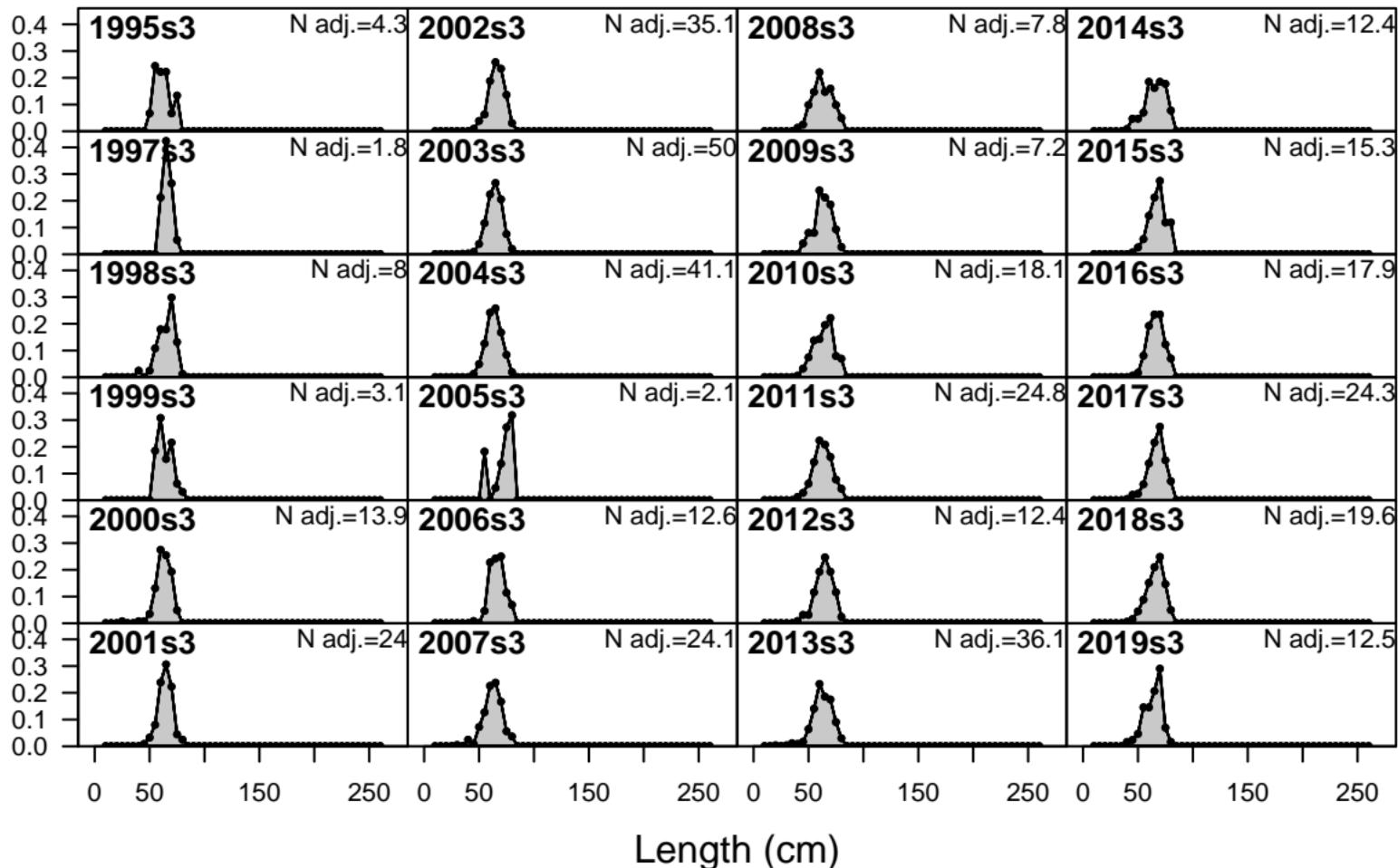




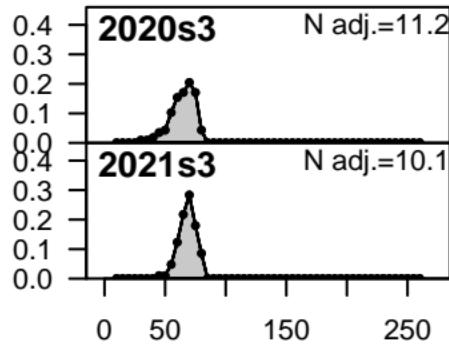
F9_US_WCNPO_LL_deep_Q12 (whole catch)

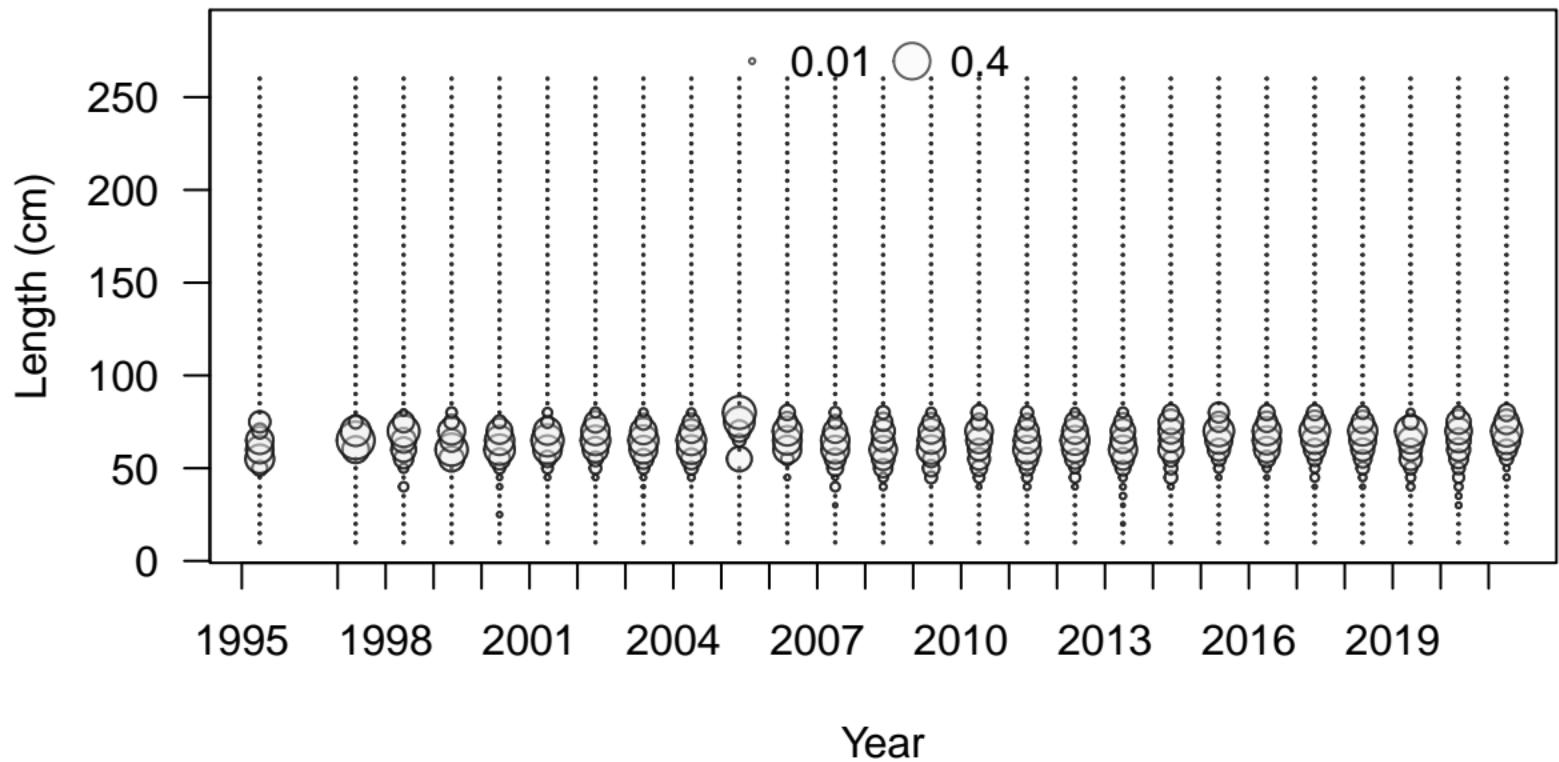


Proportion

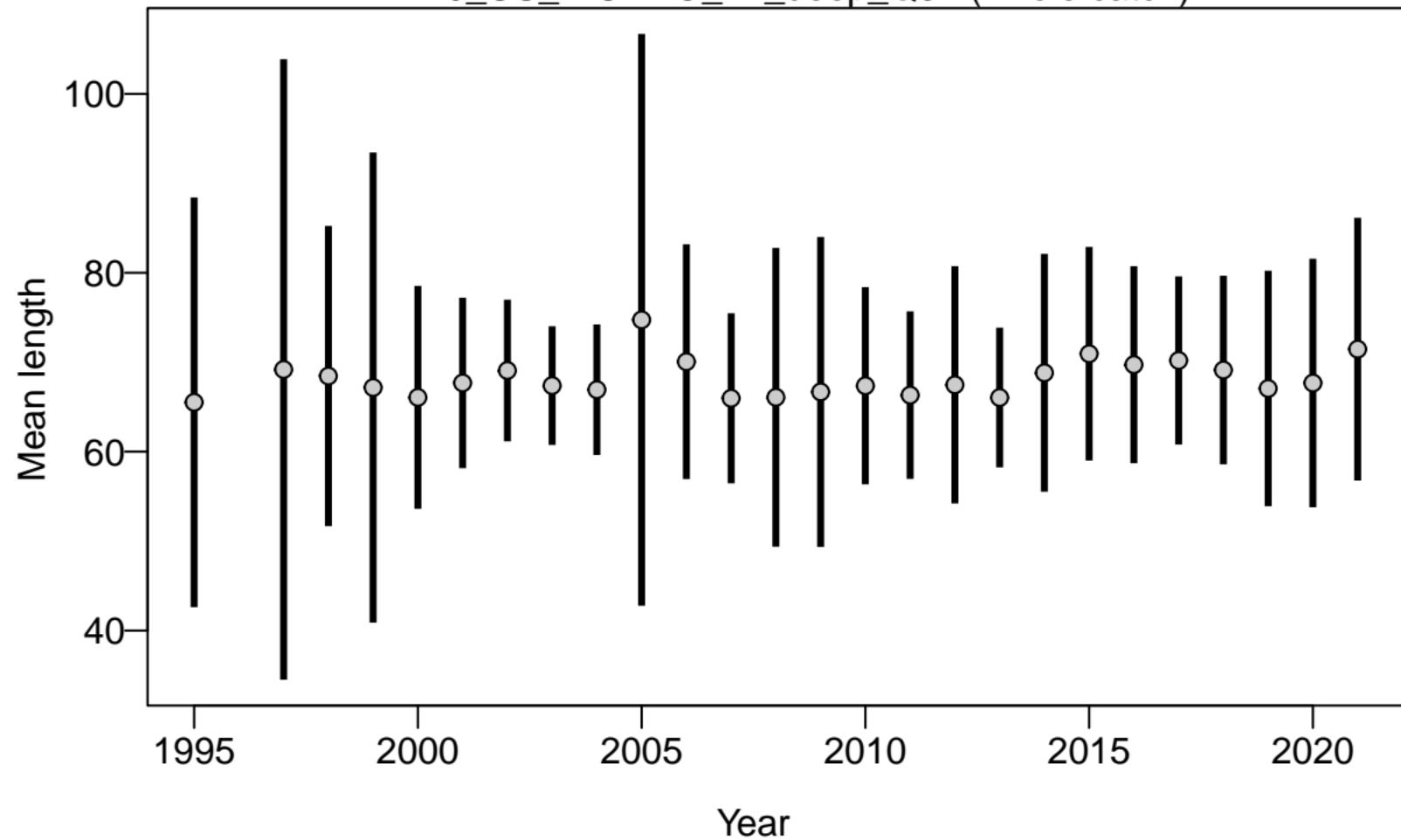


Proportion

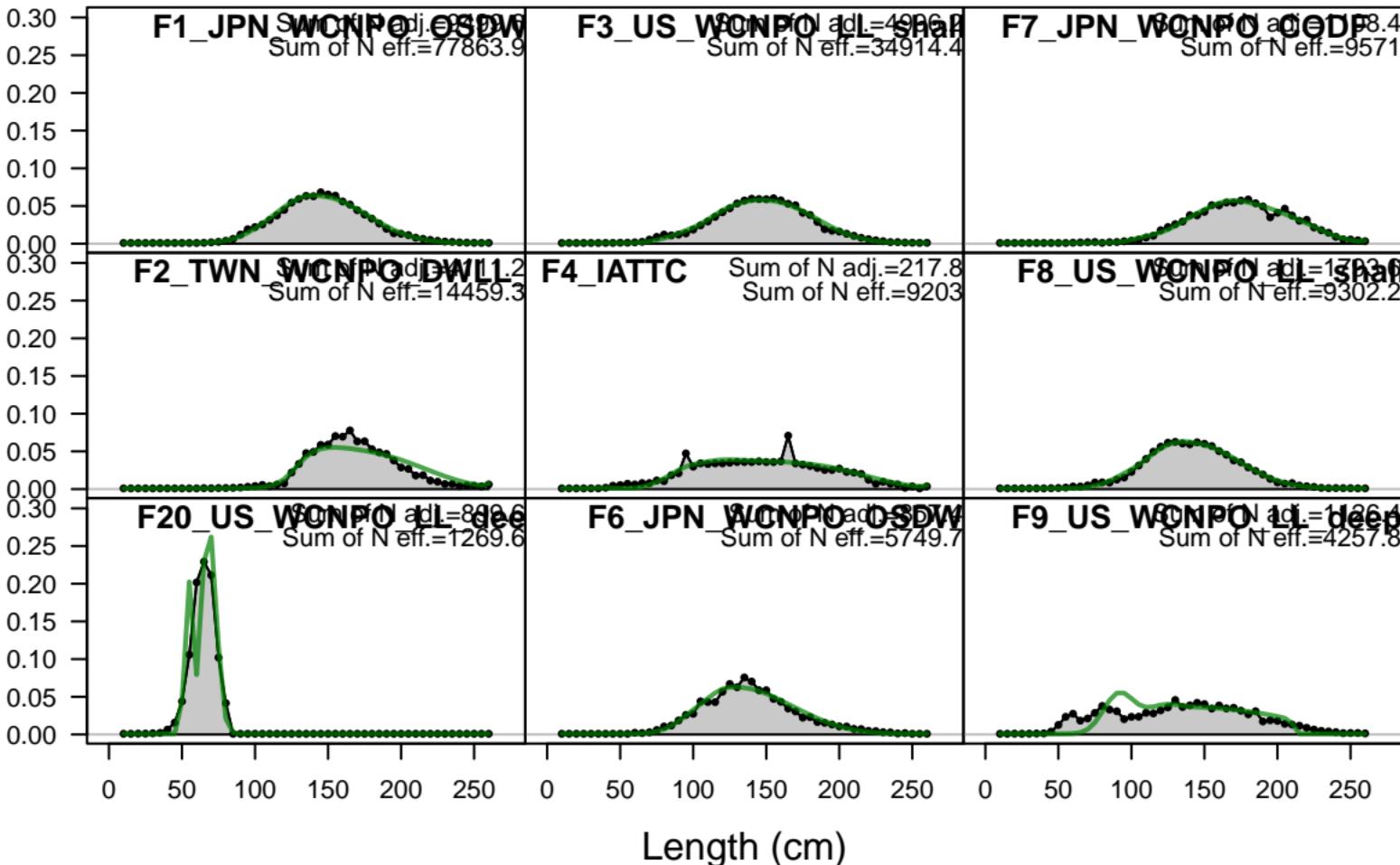


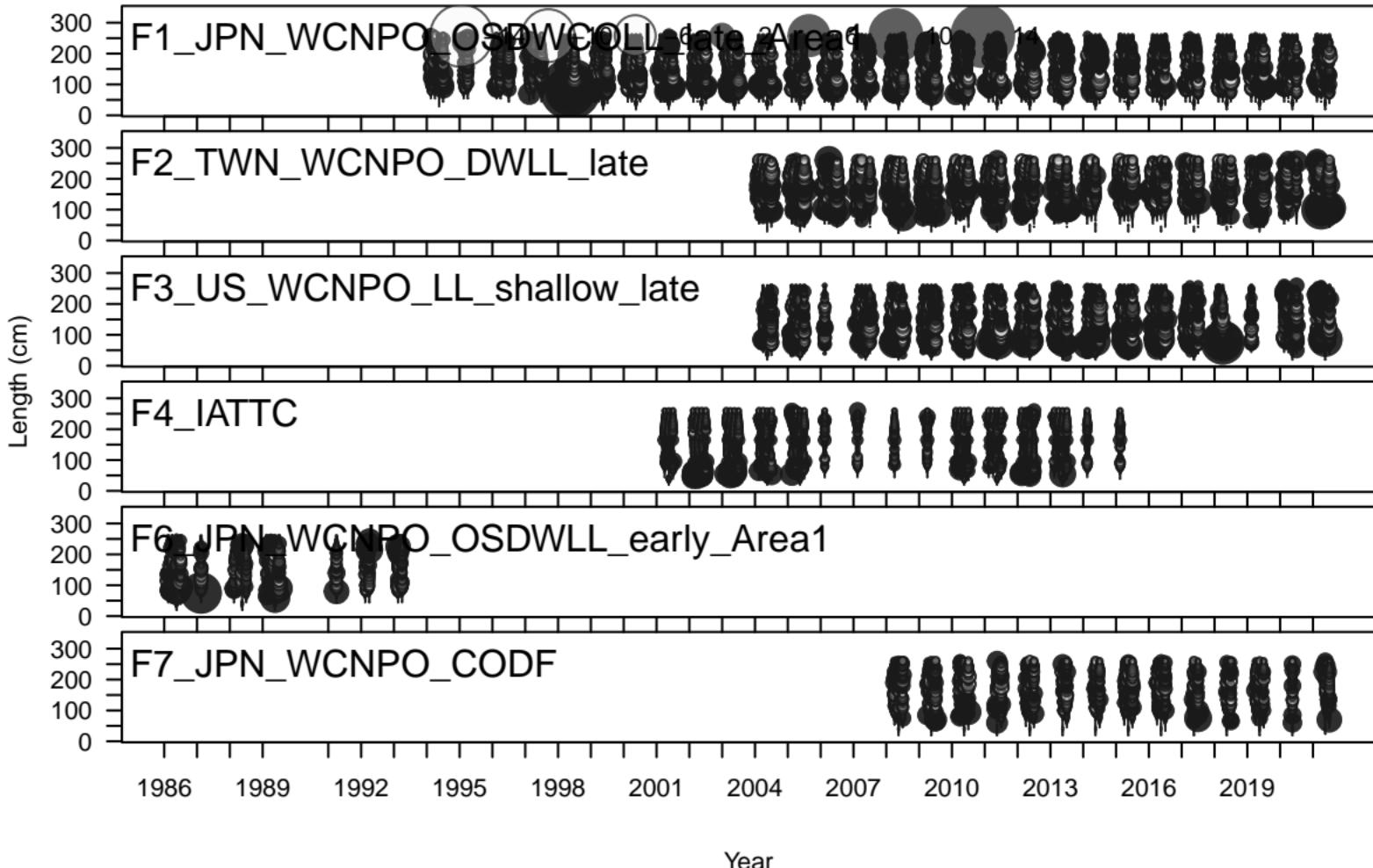


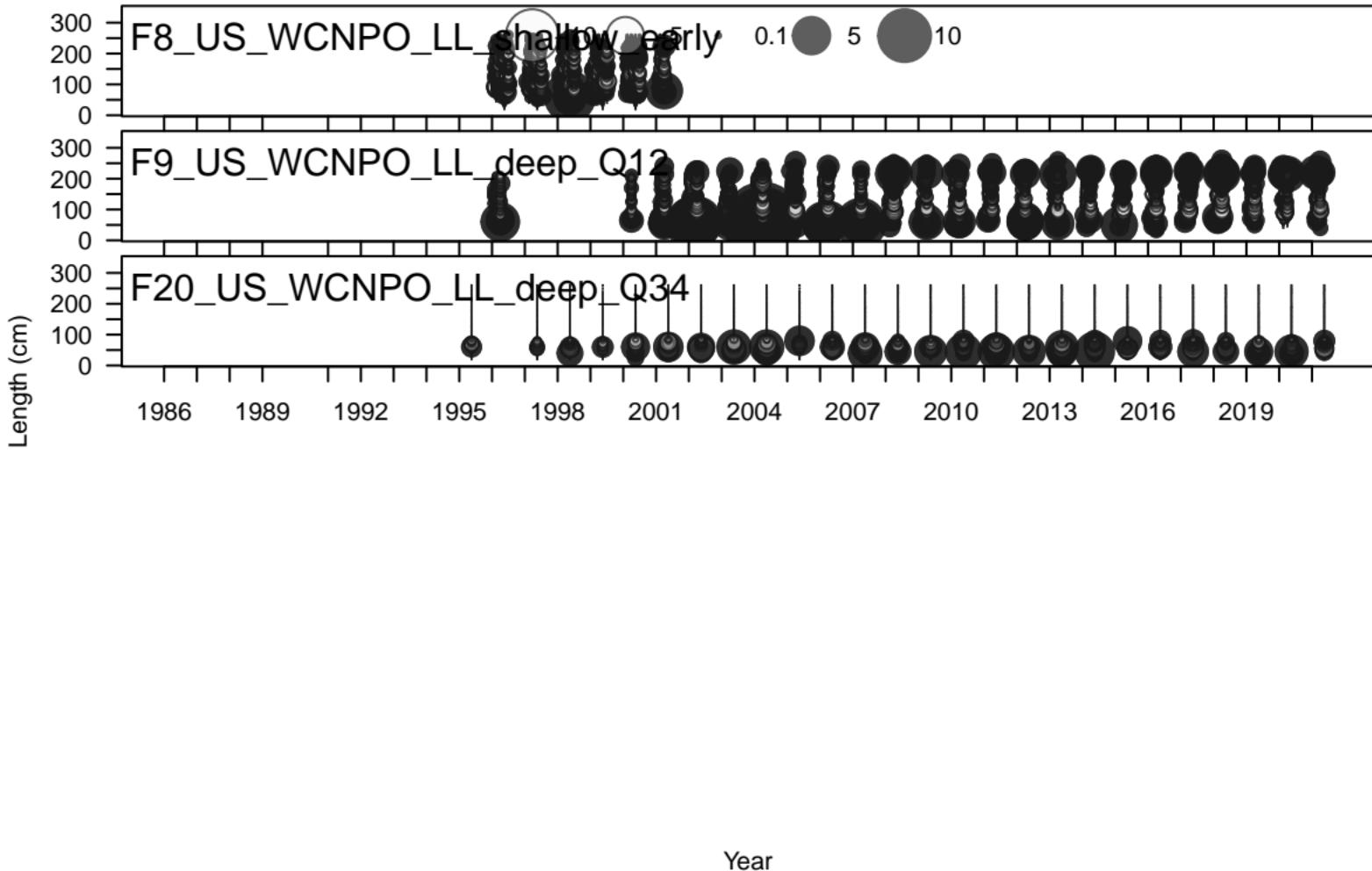
F20_US_WCNPO_LL_deep_Q34 (whole catch)



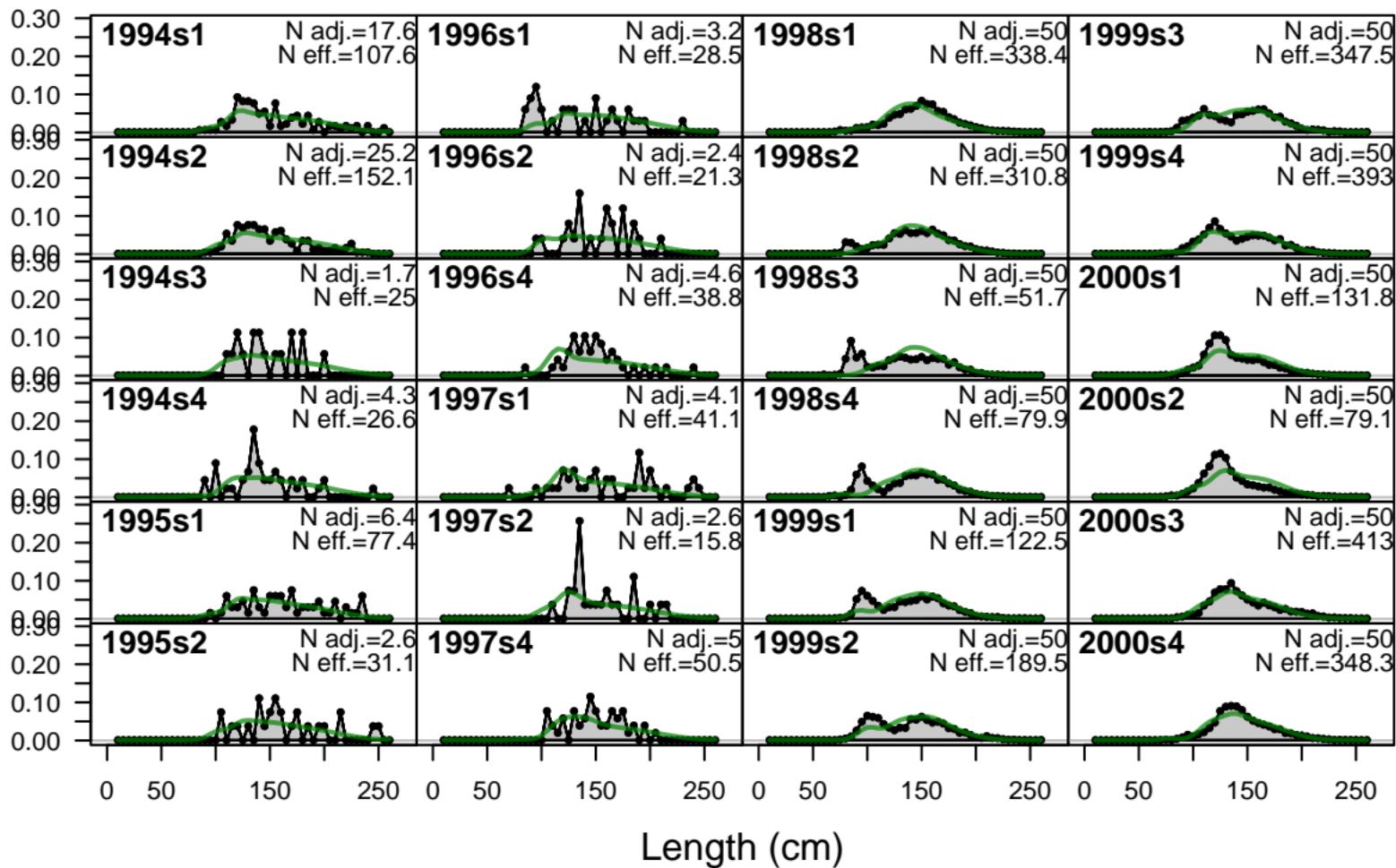
Proportion



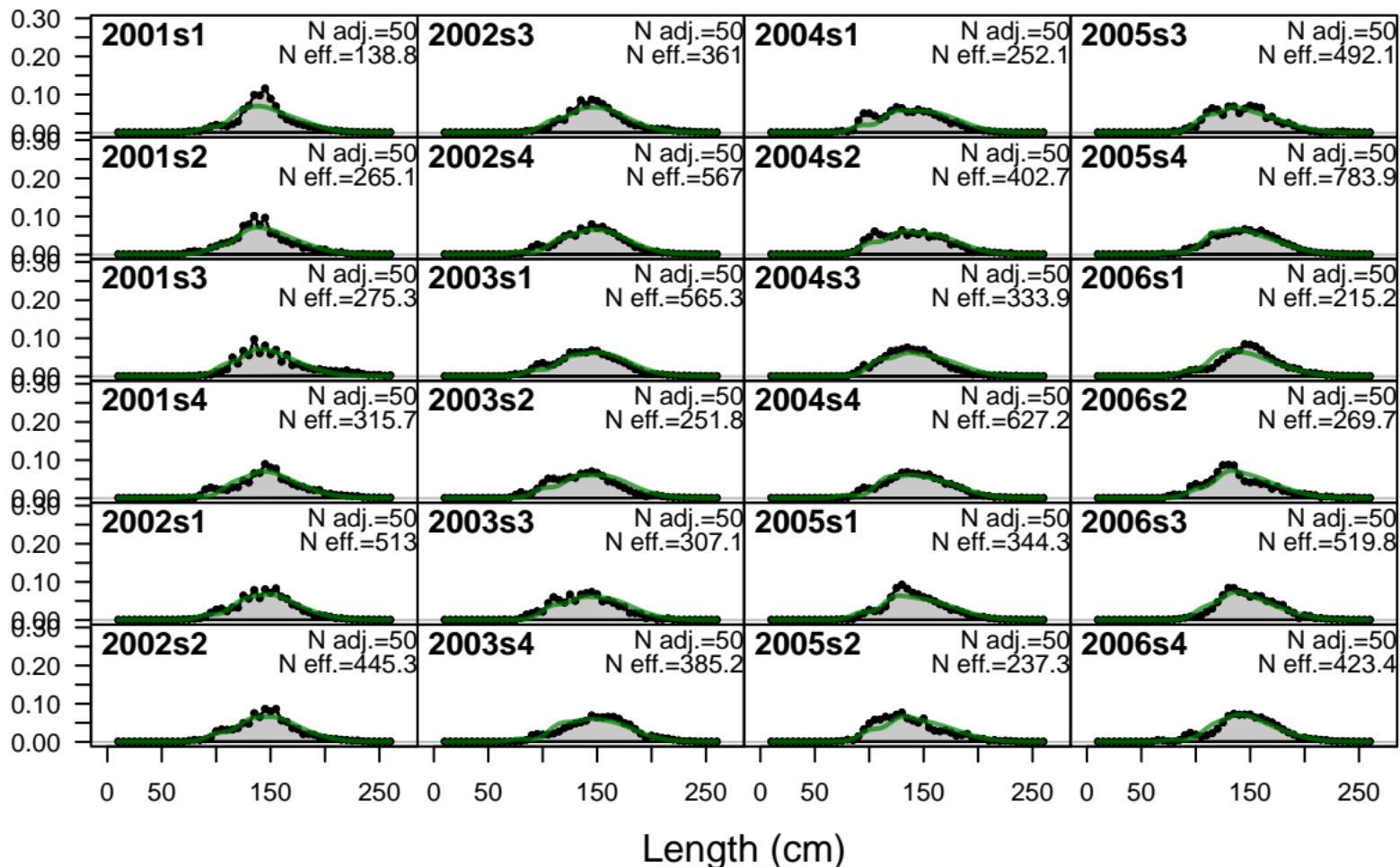




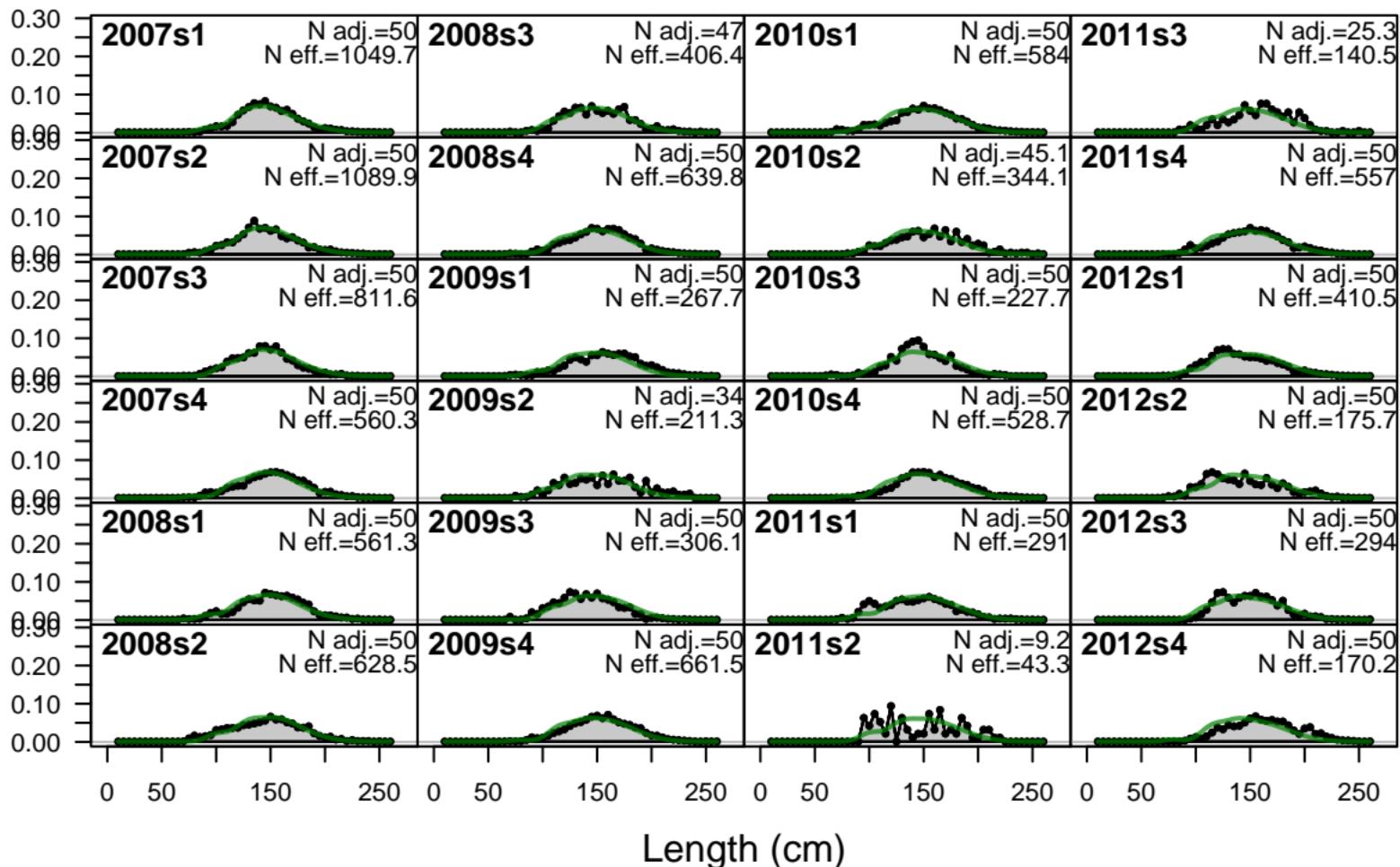
Proportion



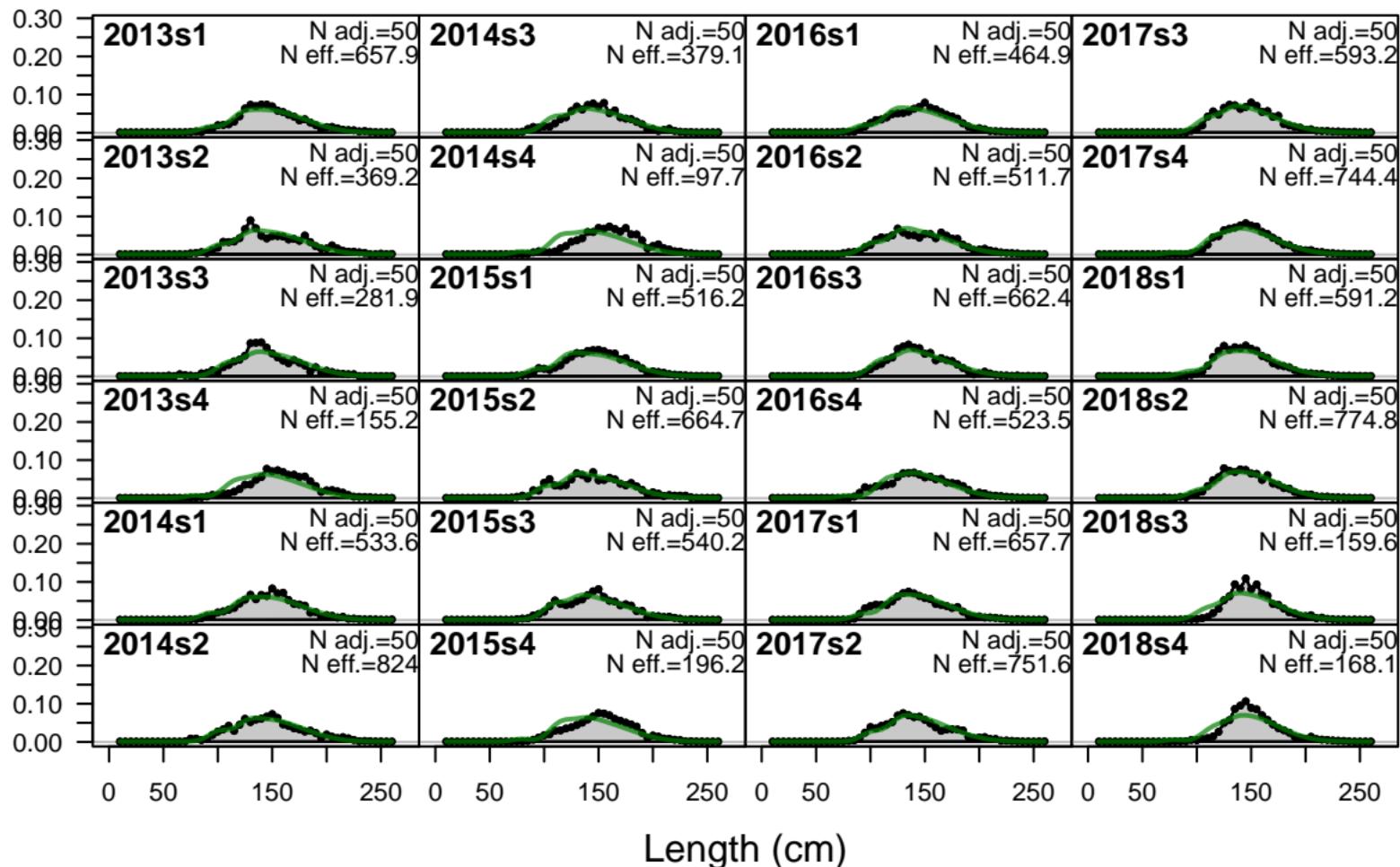
Proportion



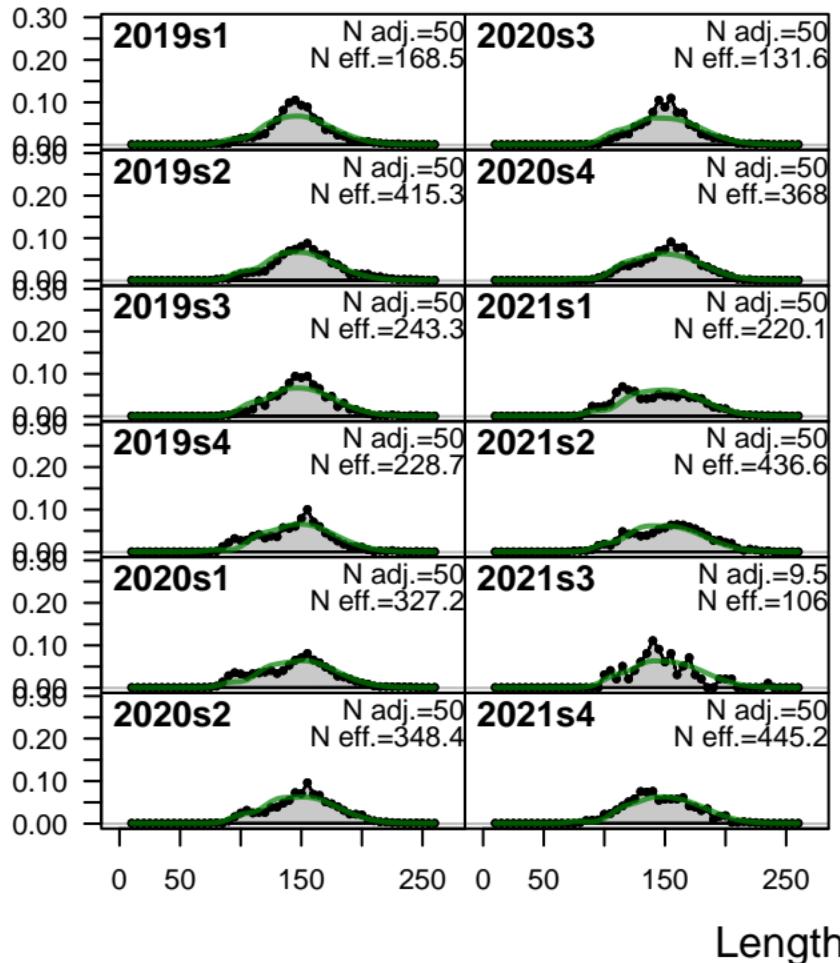
Proportion

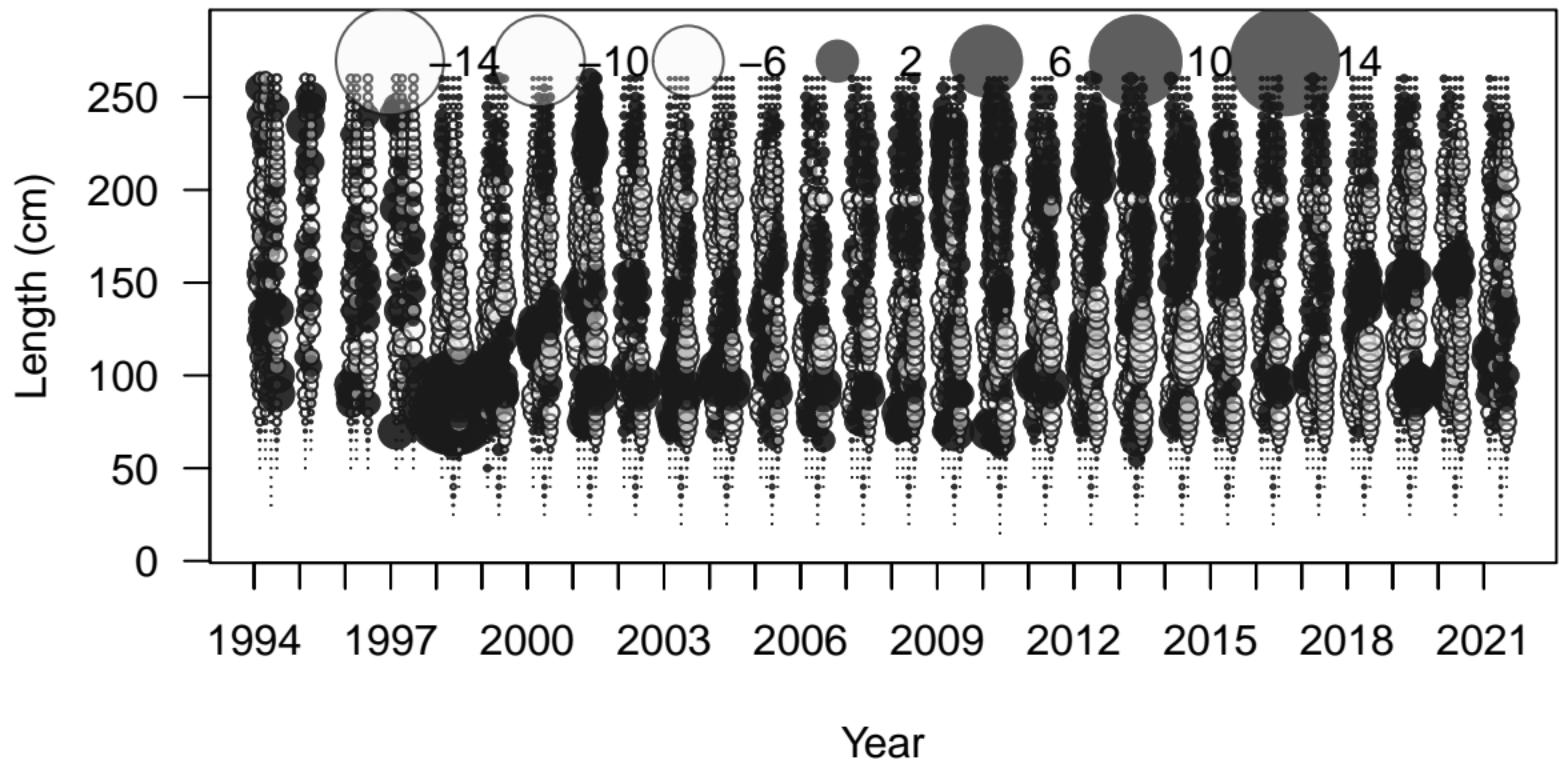


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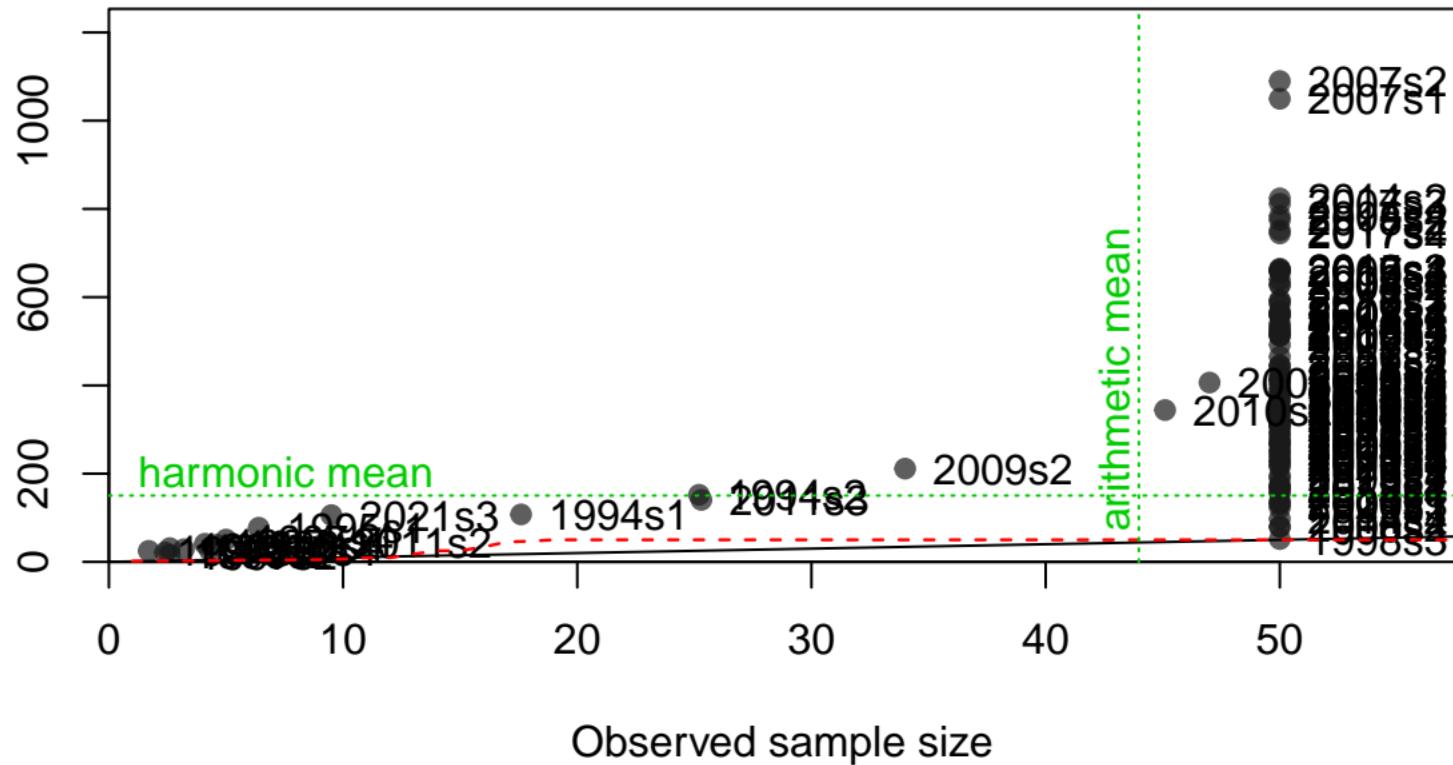


Proportion

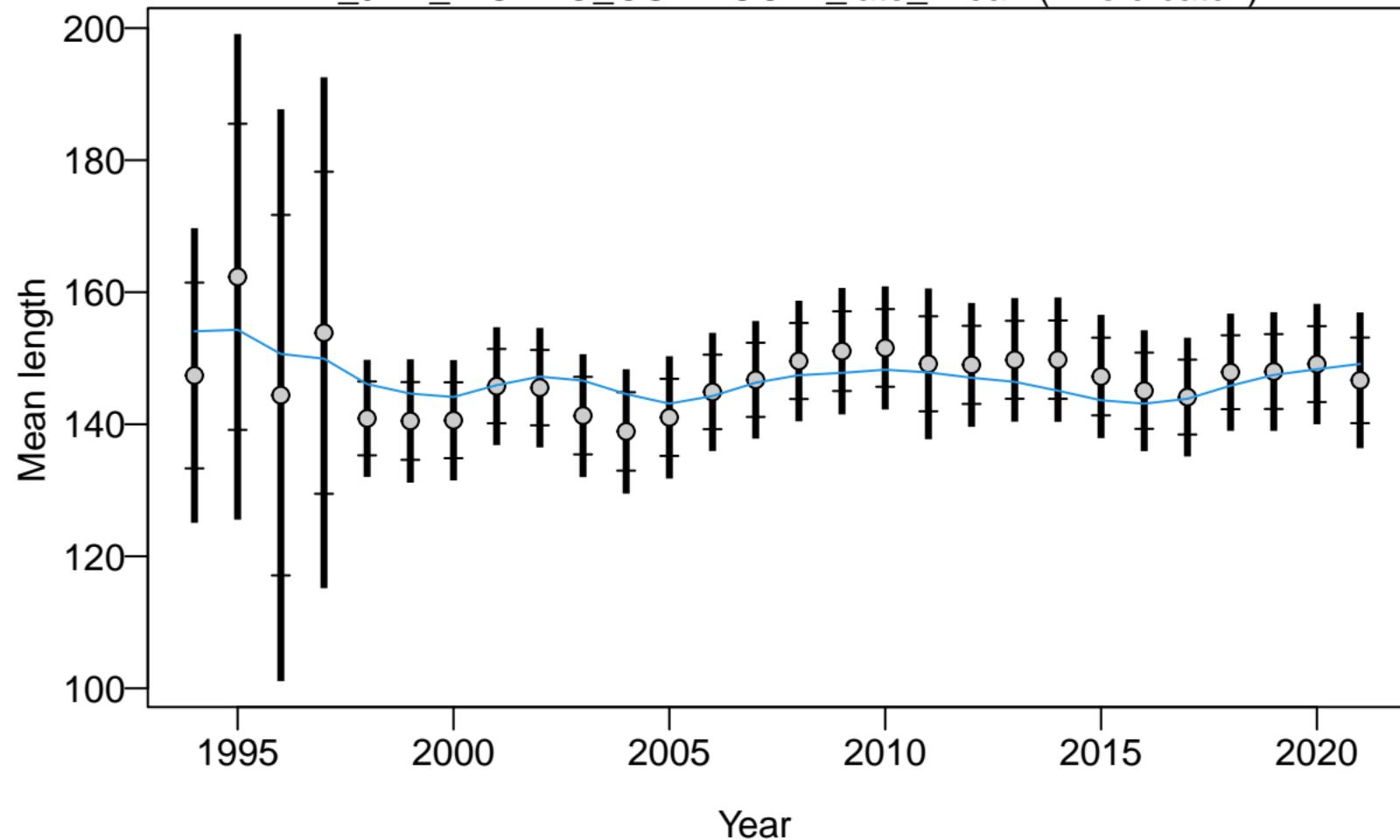




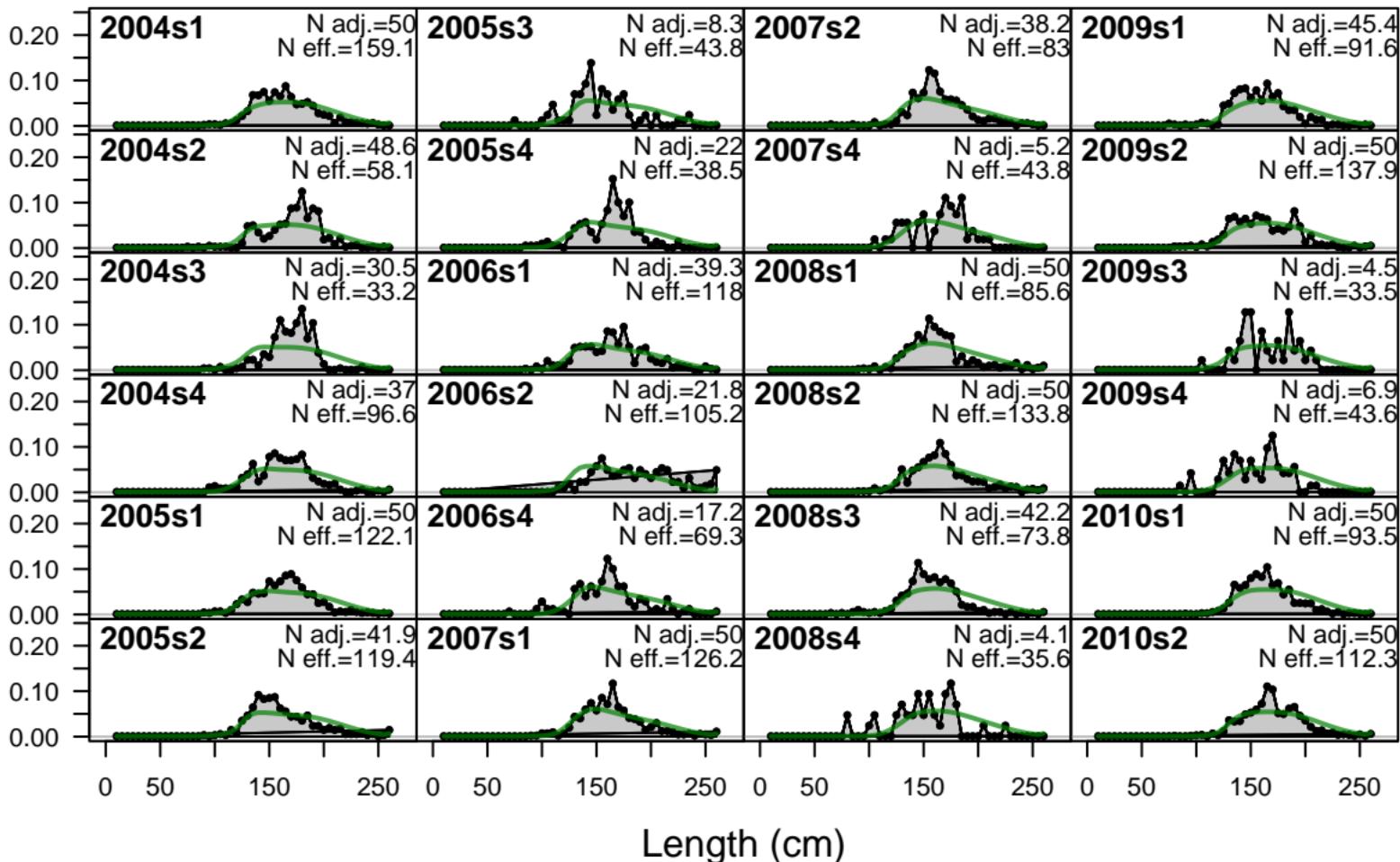
Effective sample size



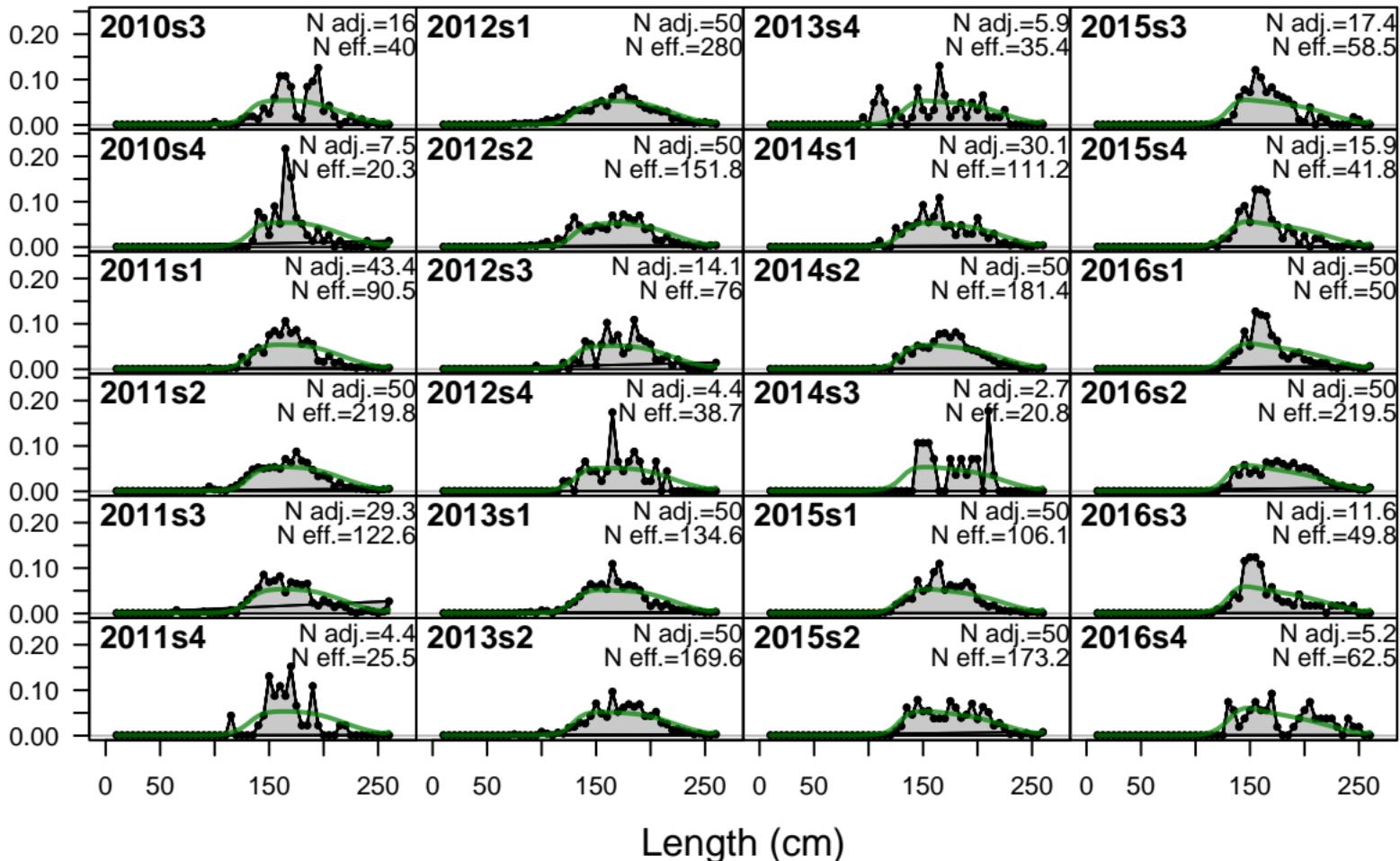
F1_JPN_WCNPO OSDWCOLL_late_Area1 (whole catch)



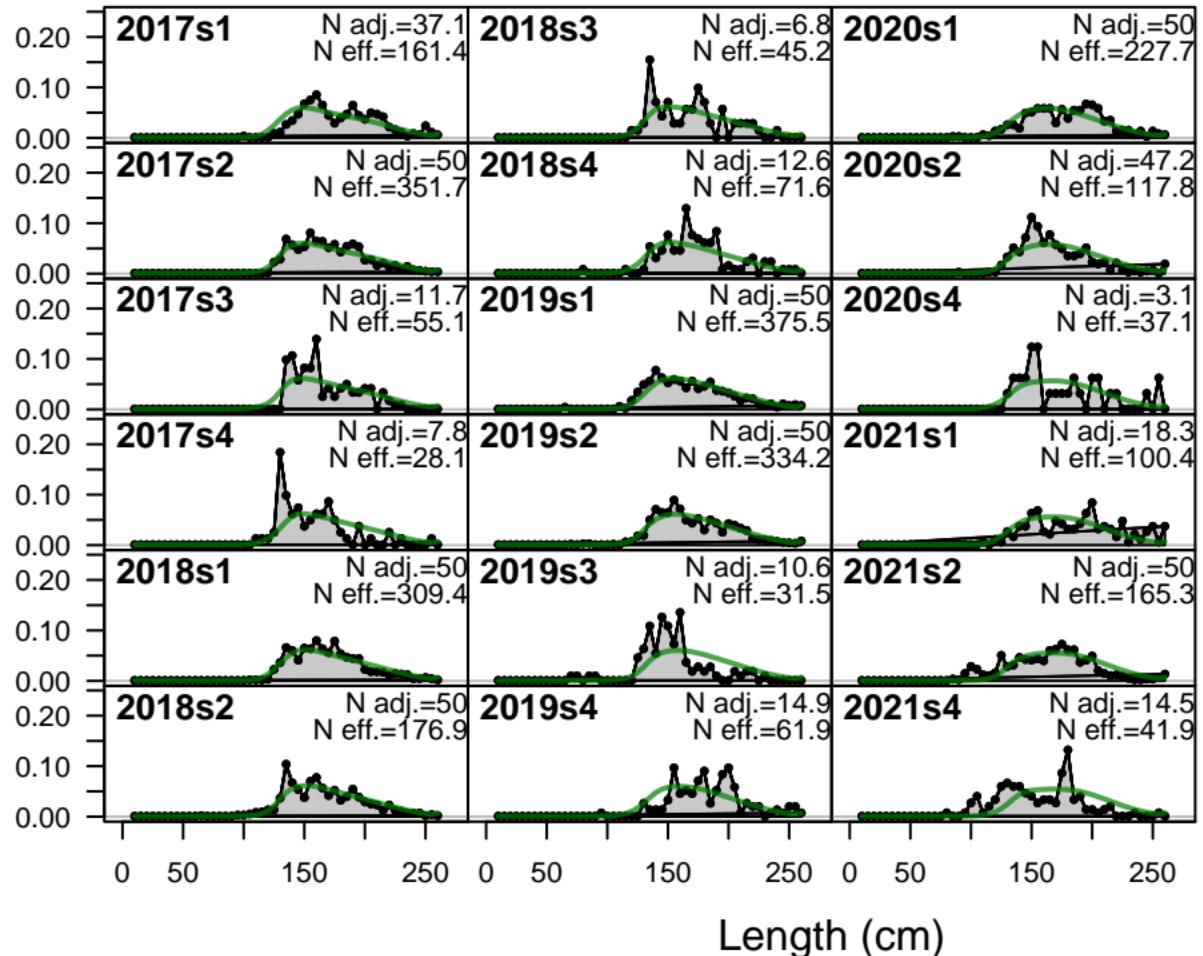
Proportion

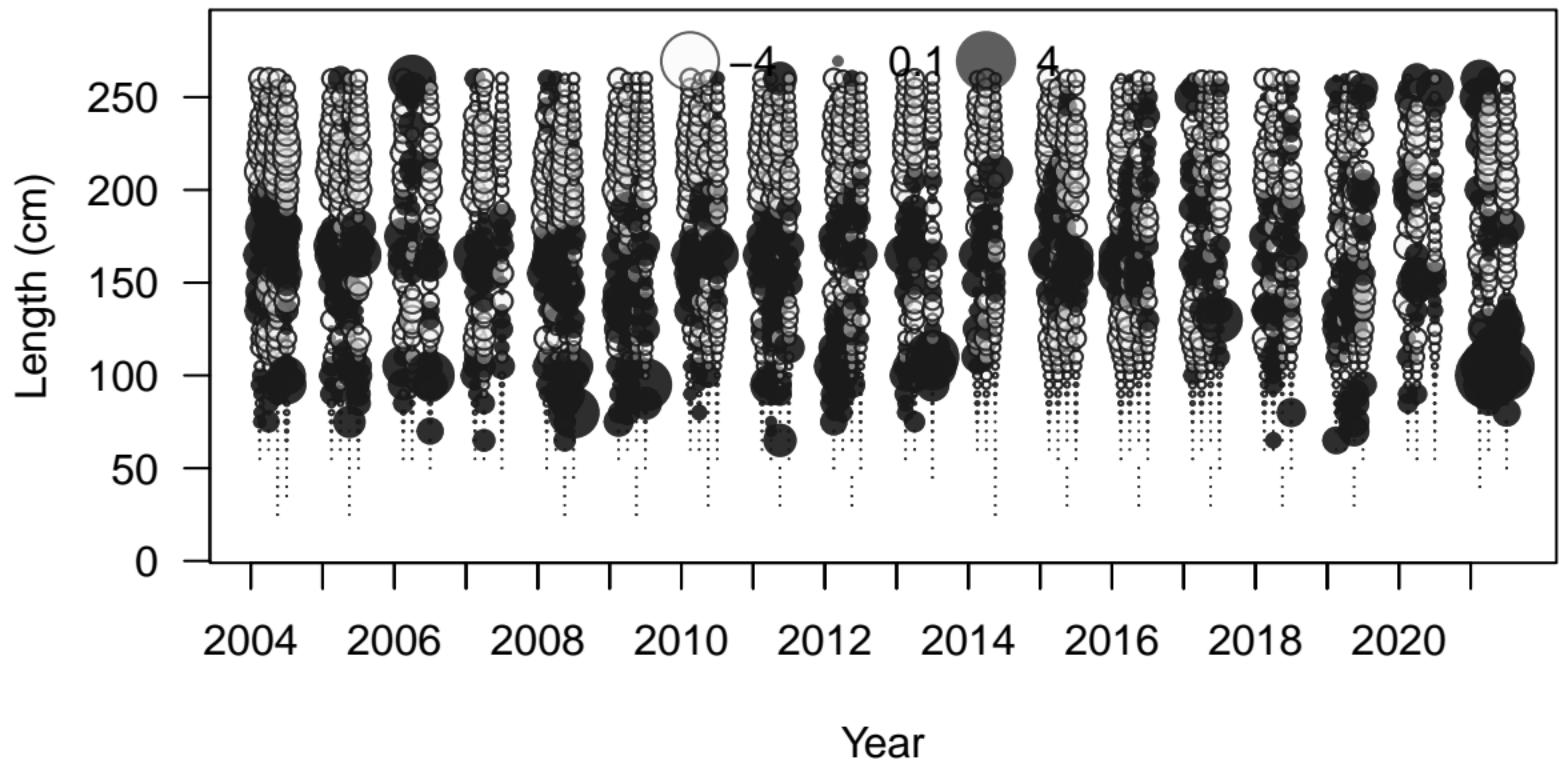


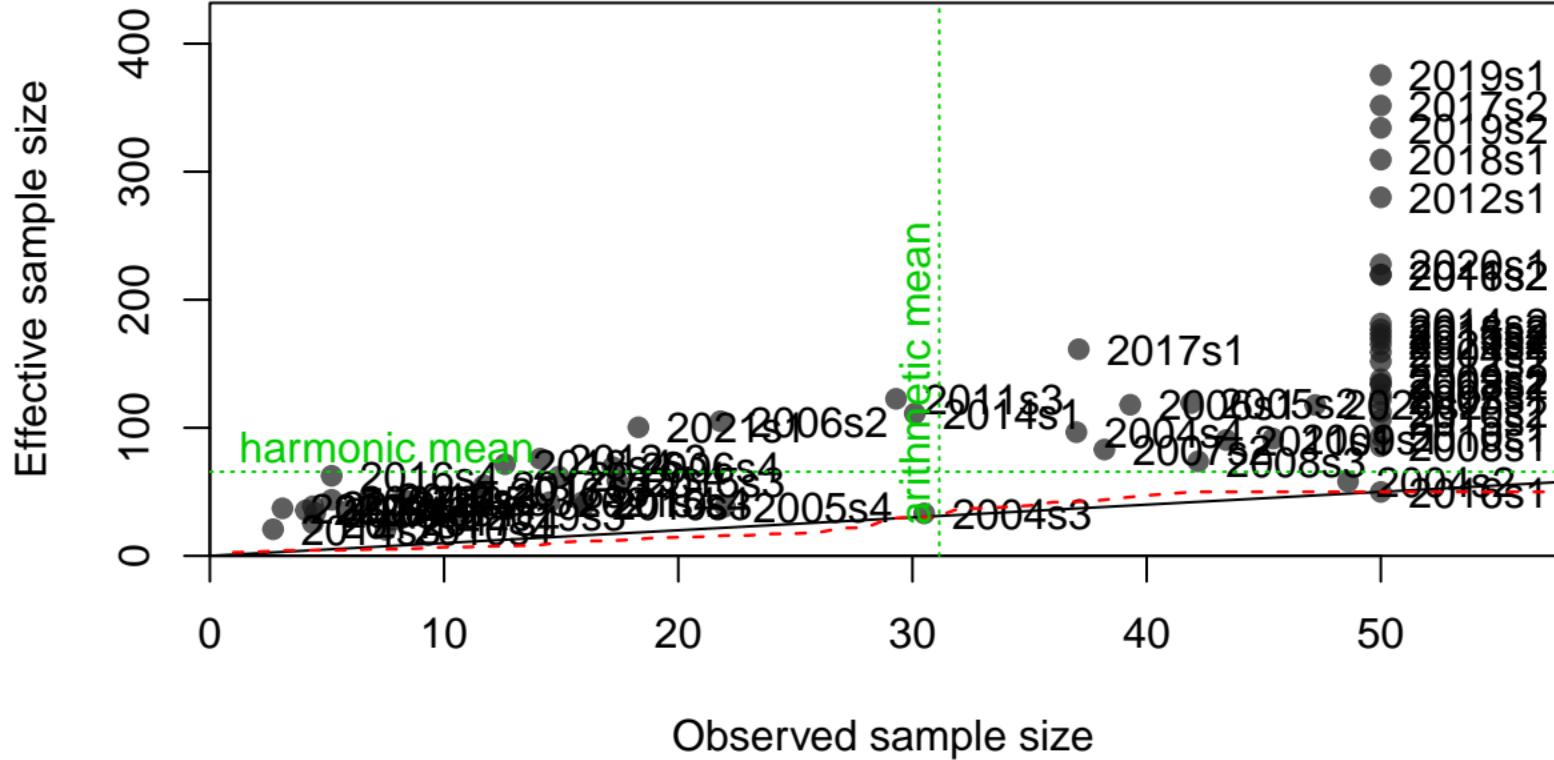
Proportion



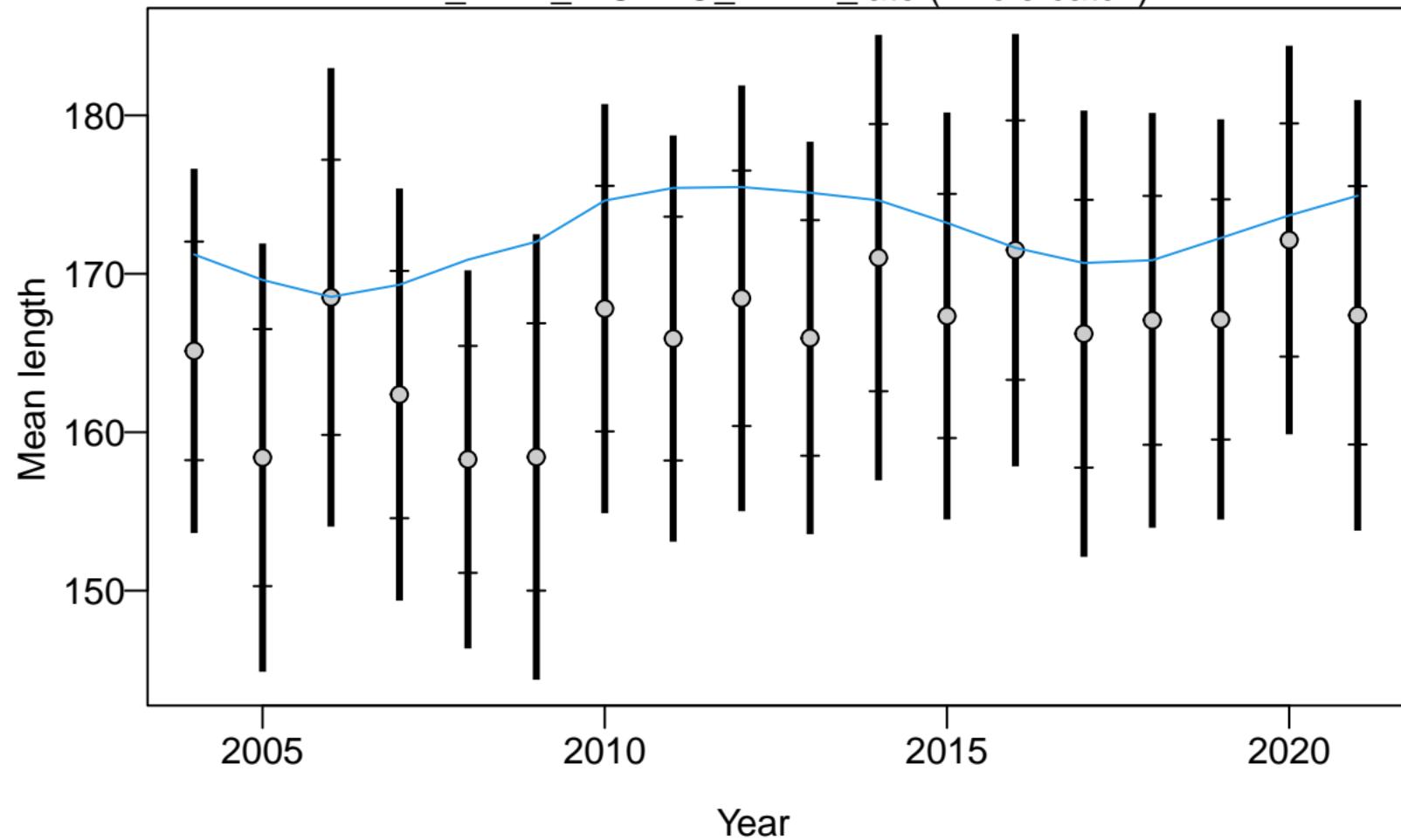
Proportion



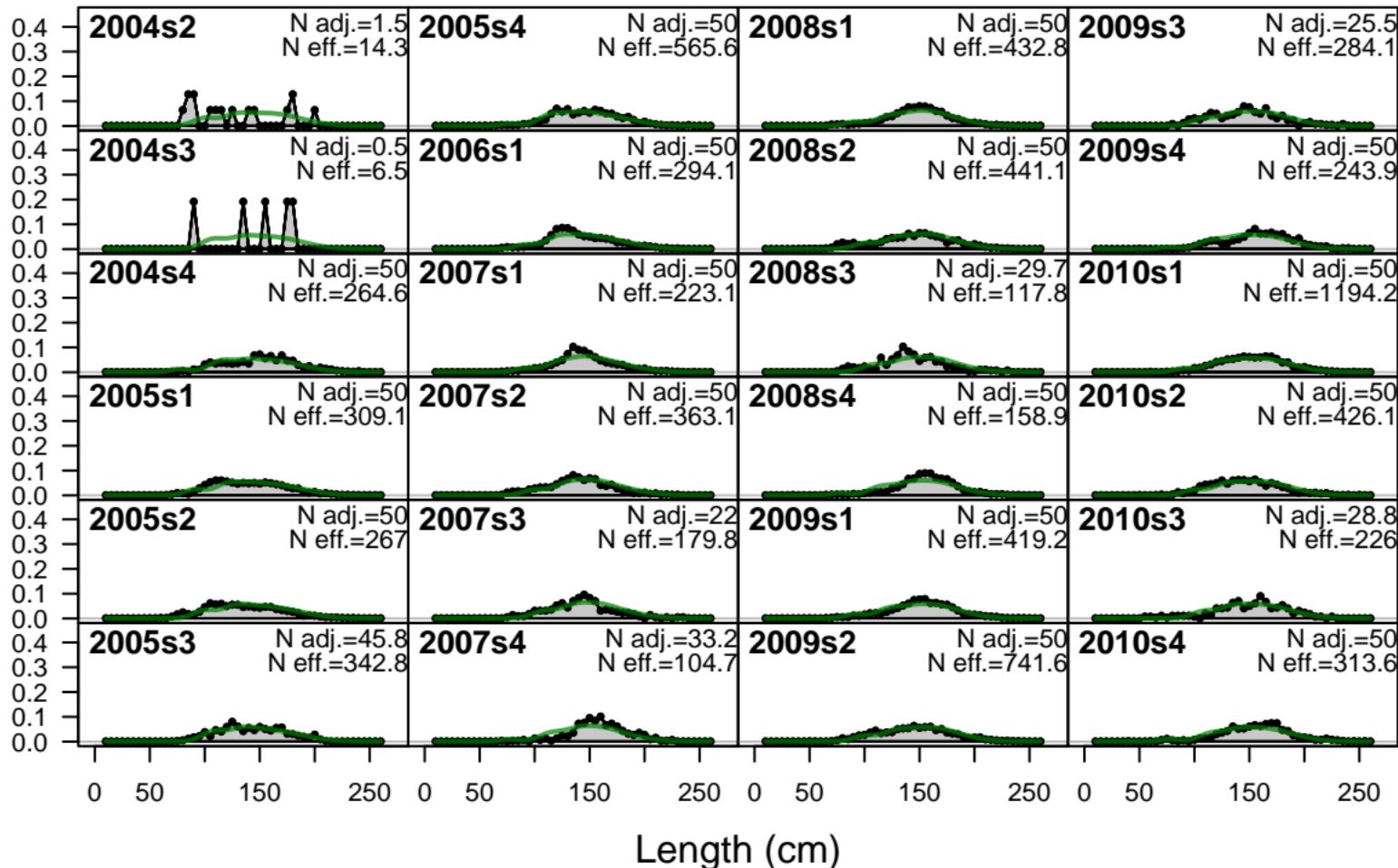




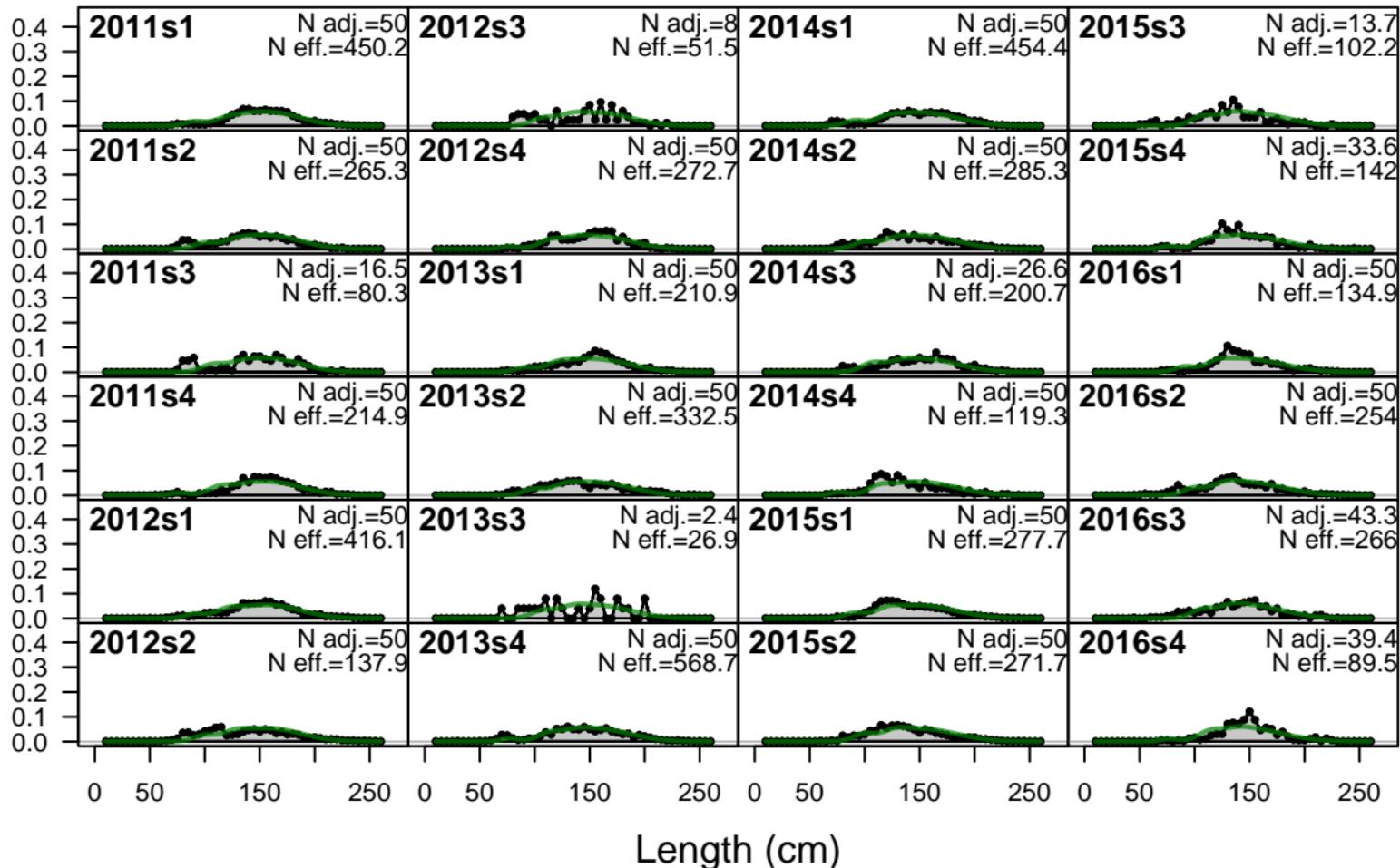
F2_TWN_WCNPO_DWLL_late (whole catch)



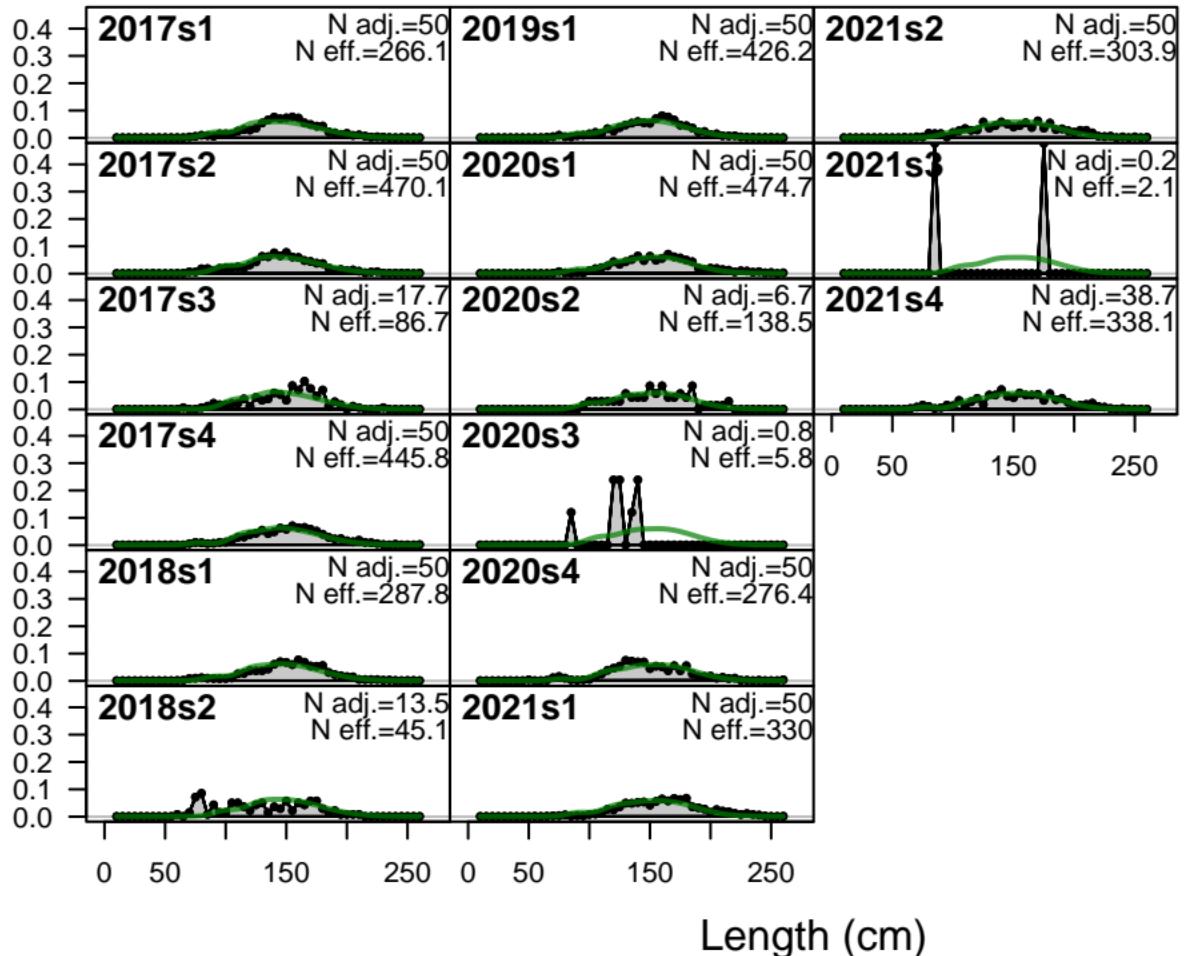
Proportion

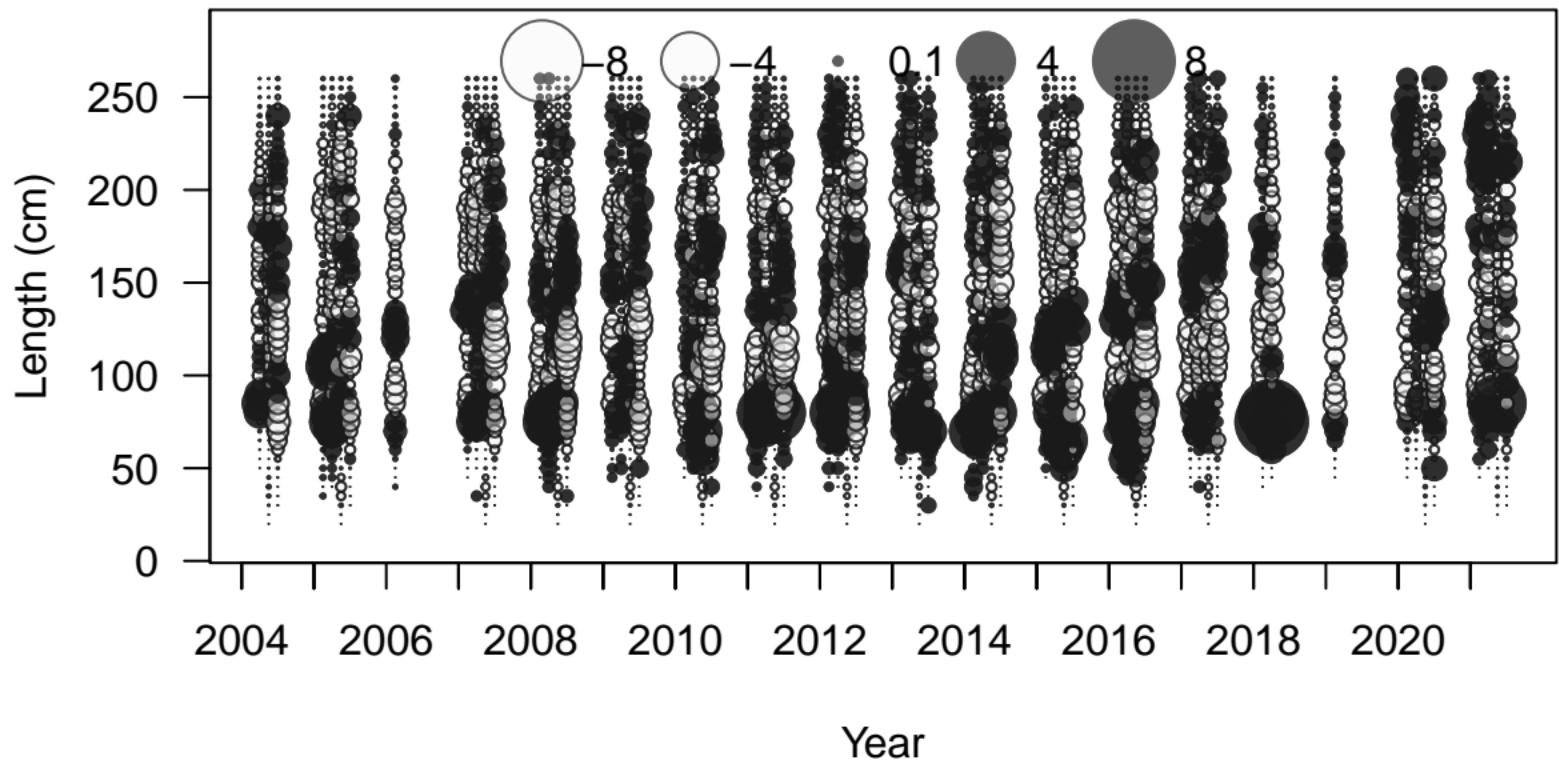


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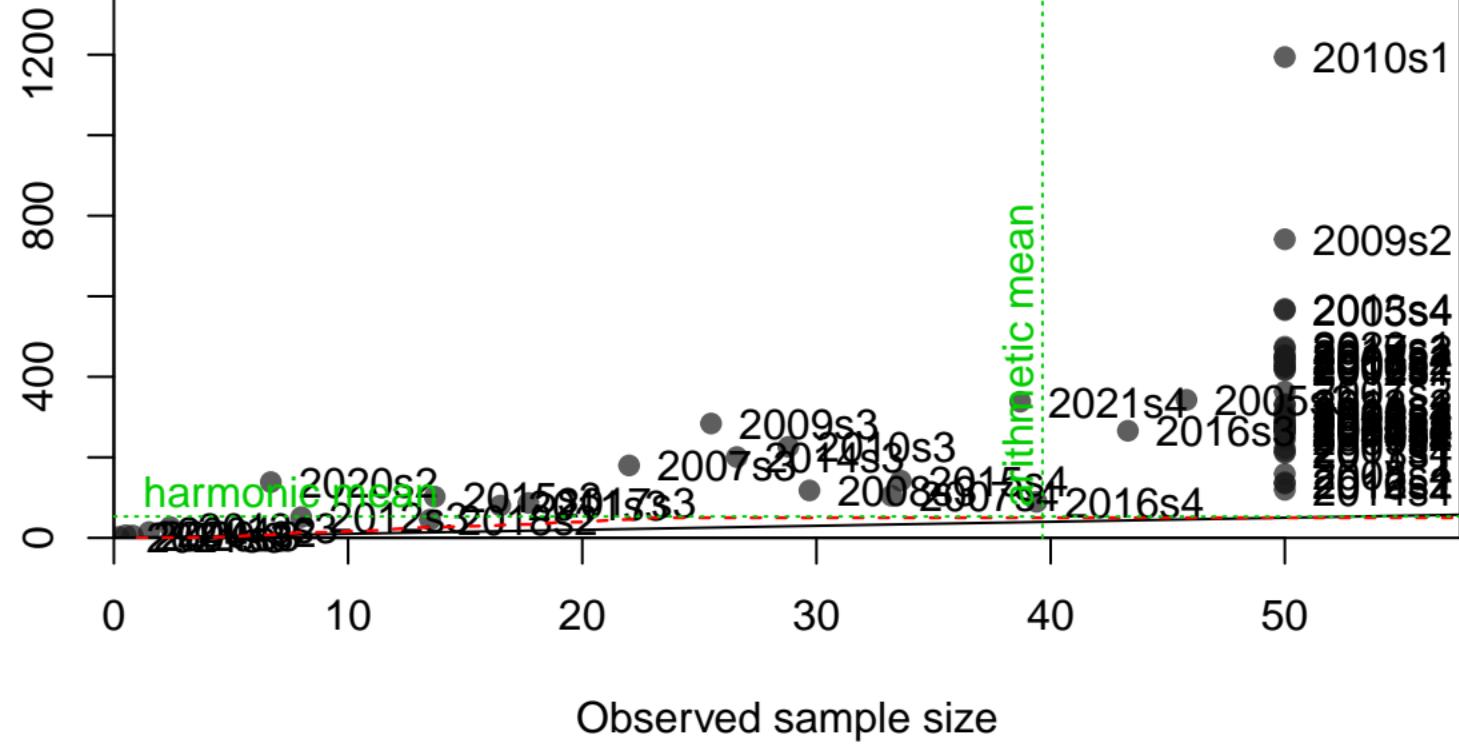


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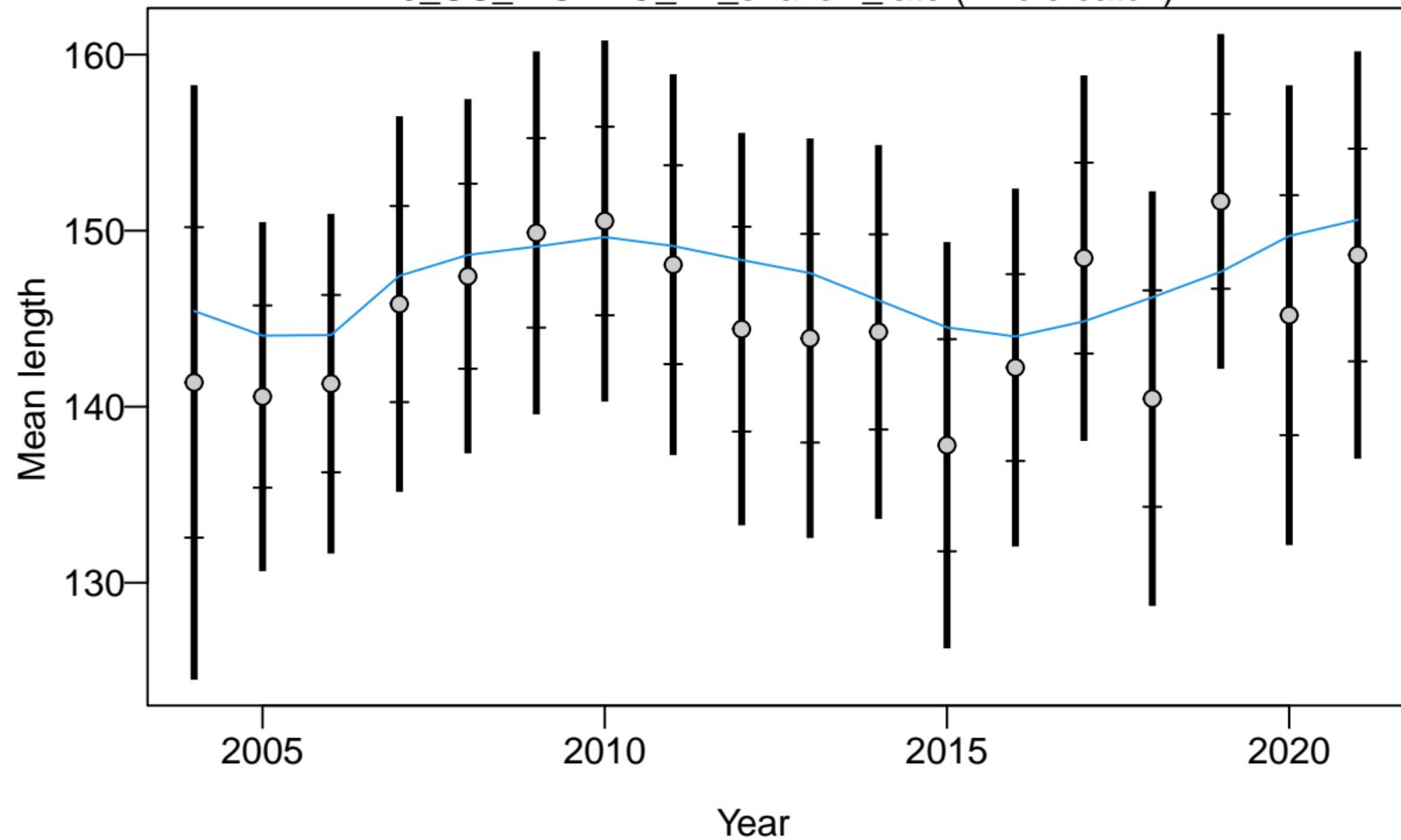




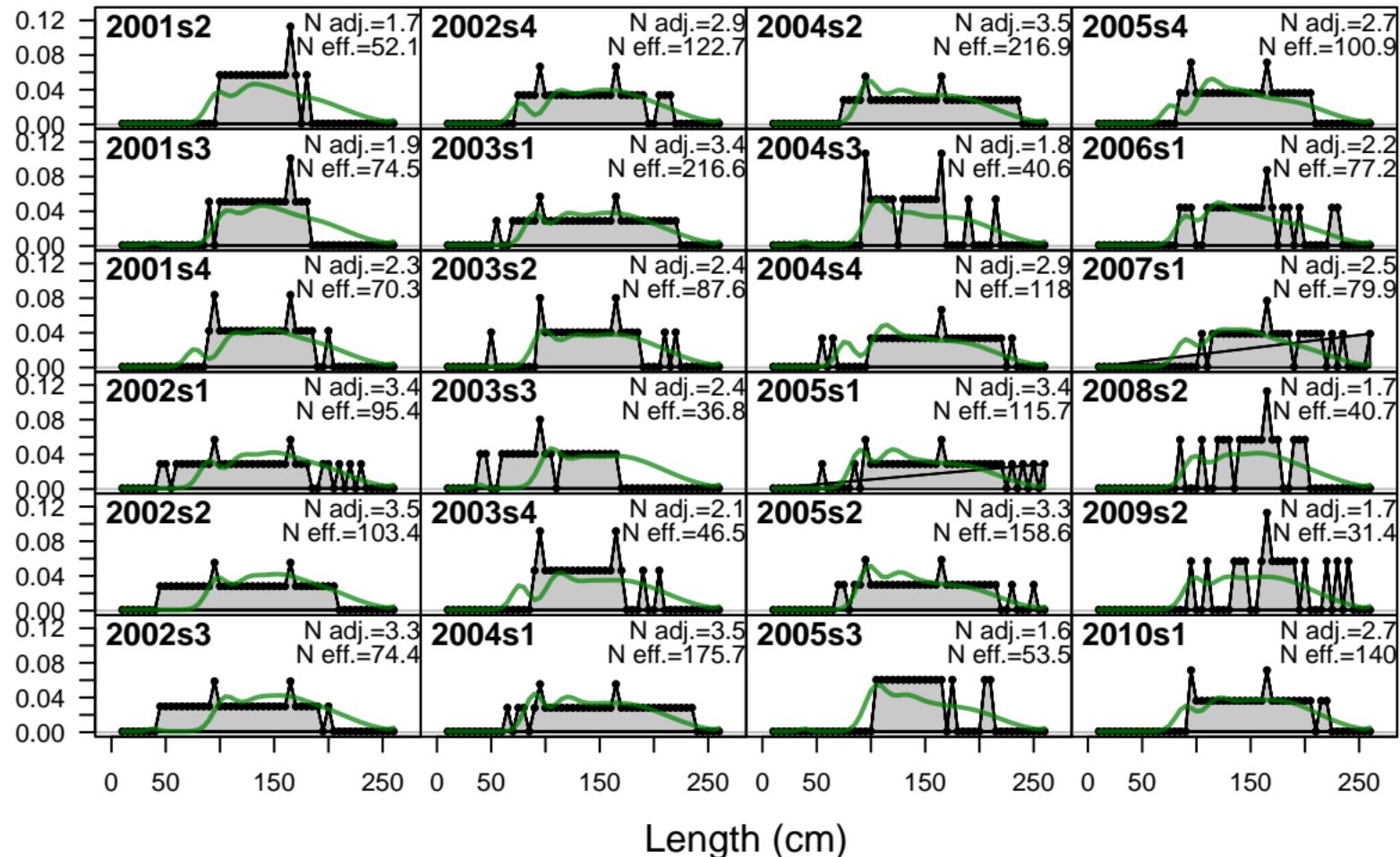
Effective sample size



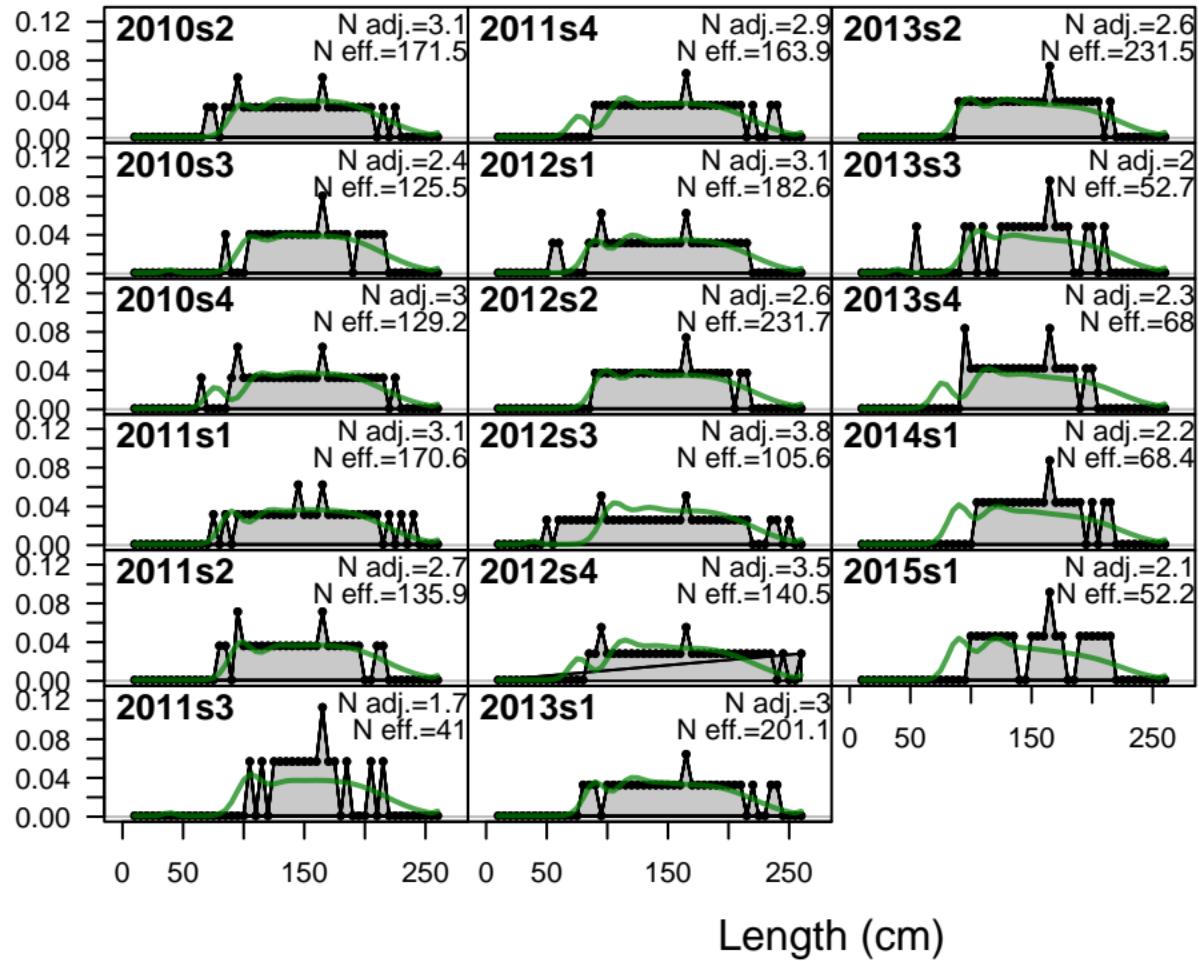
F3_US_WCNPO_LL_shallow_late (whole catch)

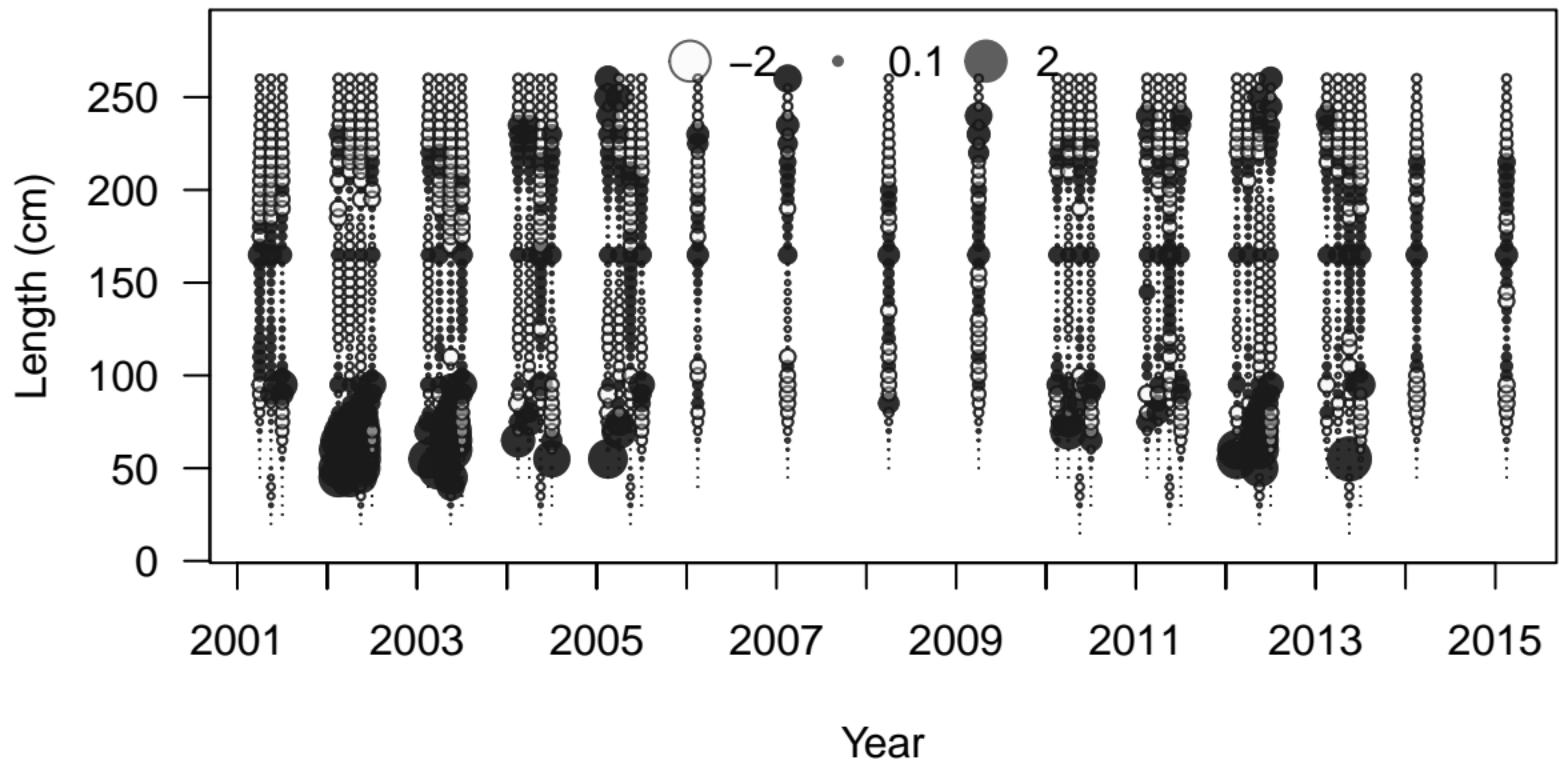


Proportion



Proportion





Effective sample size

200

100

0

harmonic mean

0

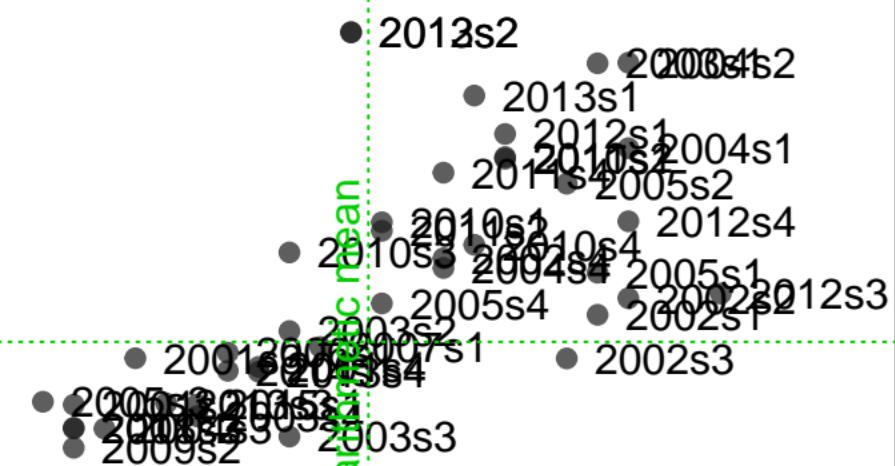
1

2

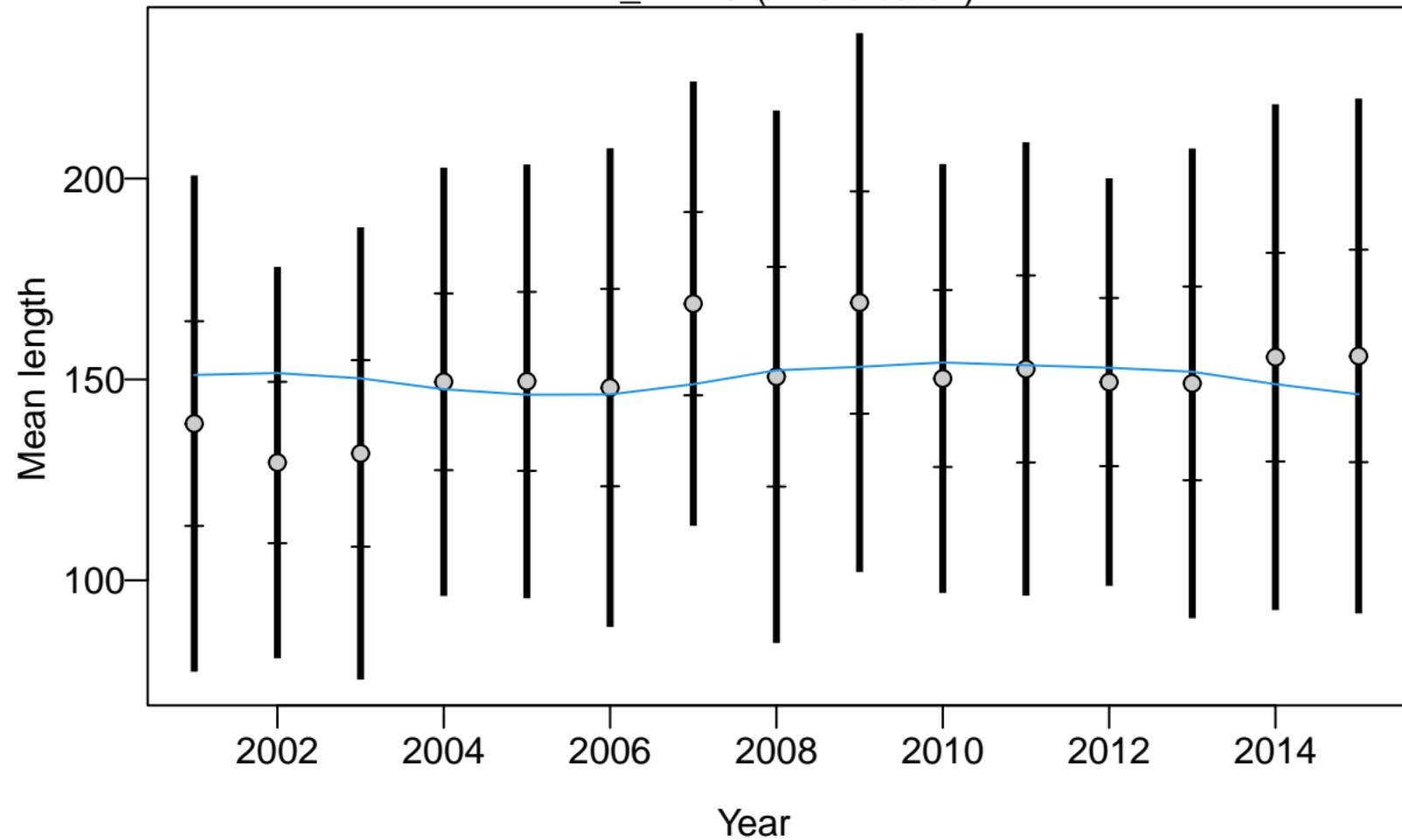
3

4

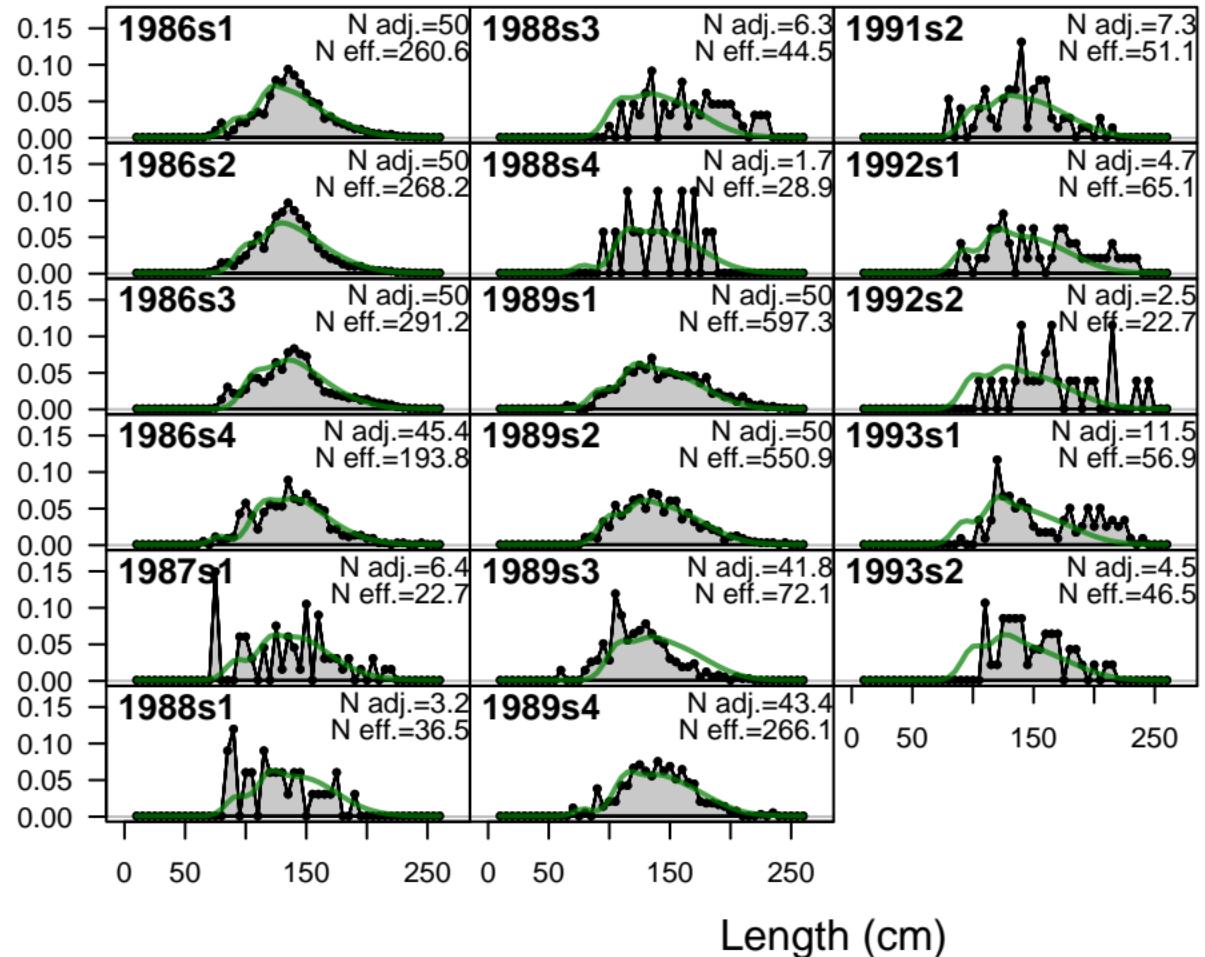
Observed sample size

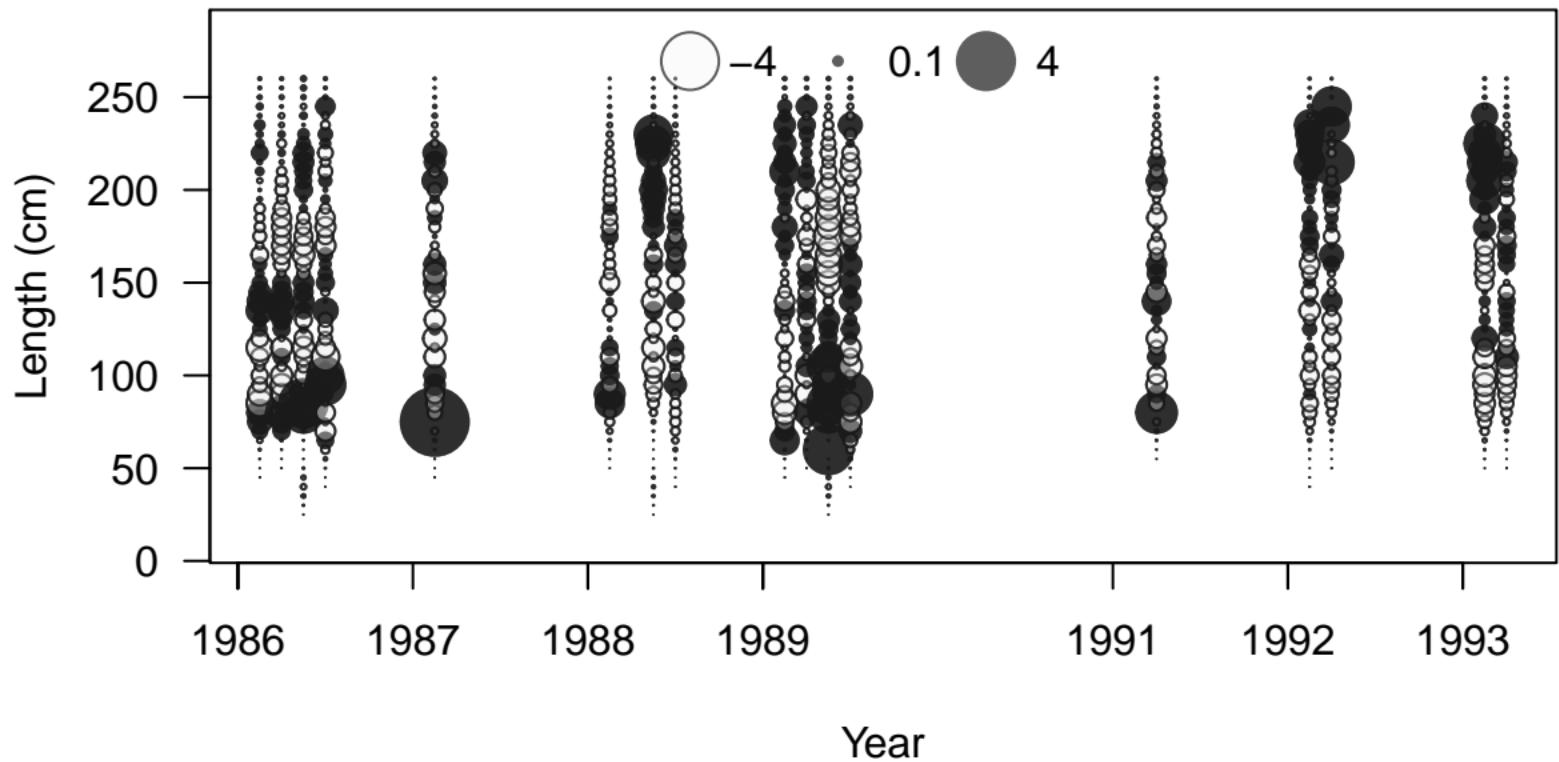


F4_IATTC (whole catch)

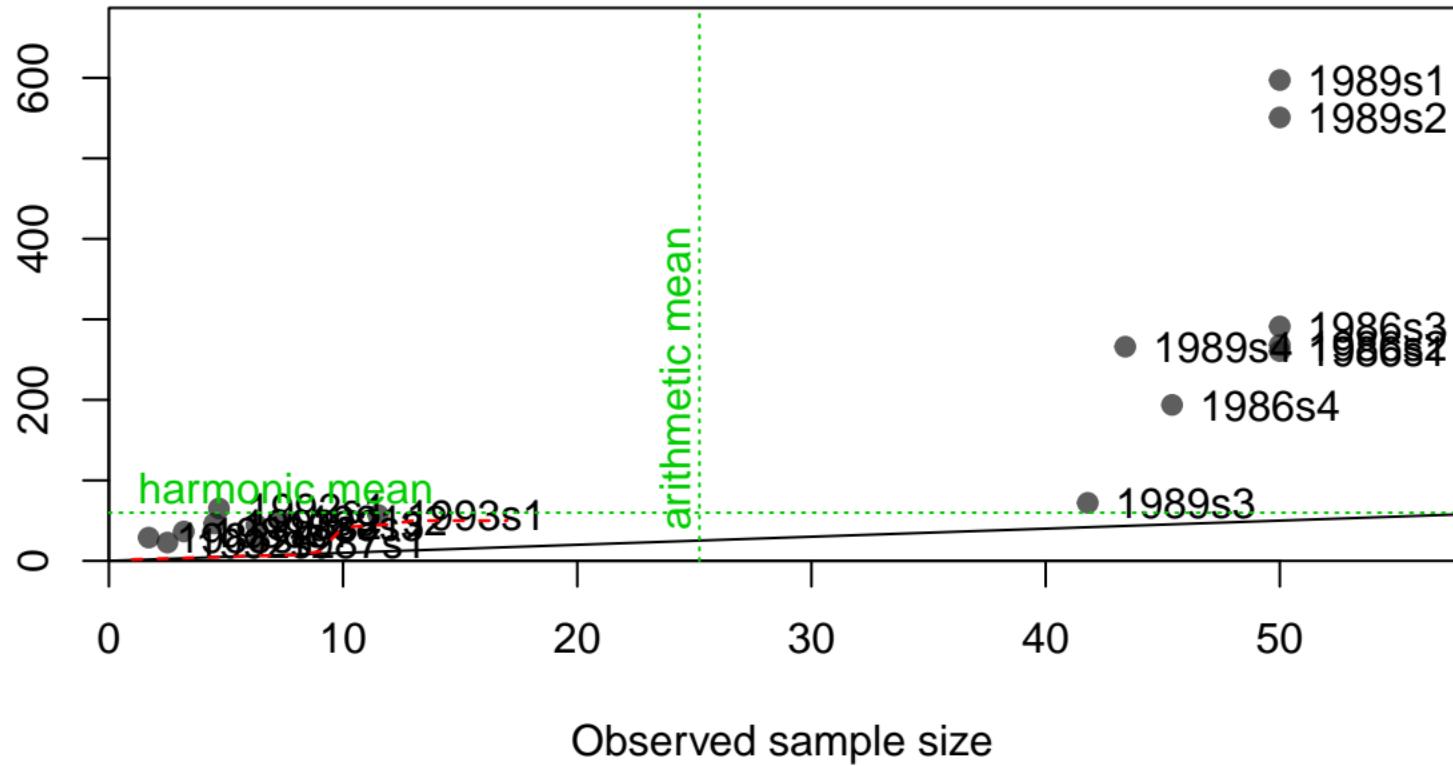


Proportion

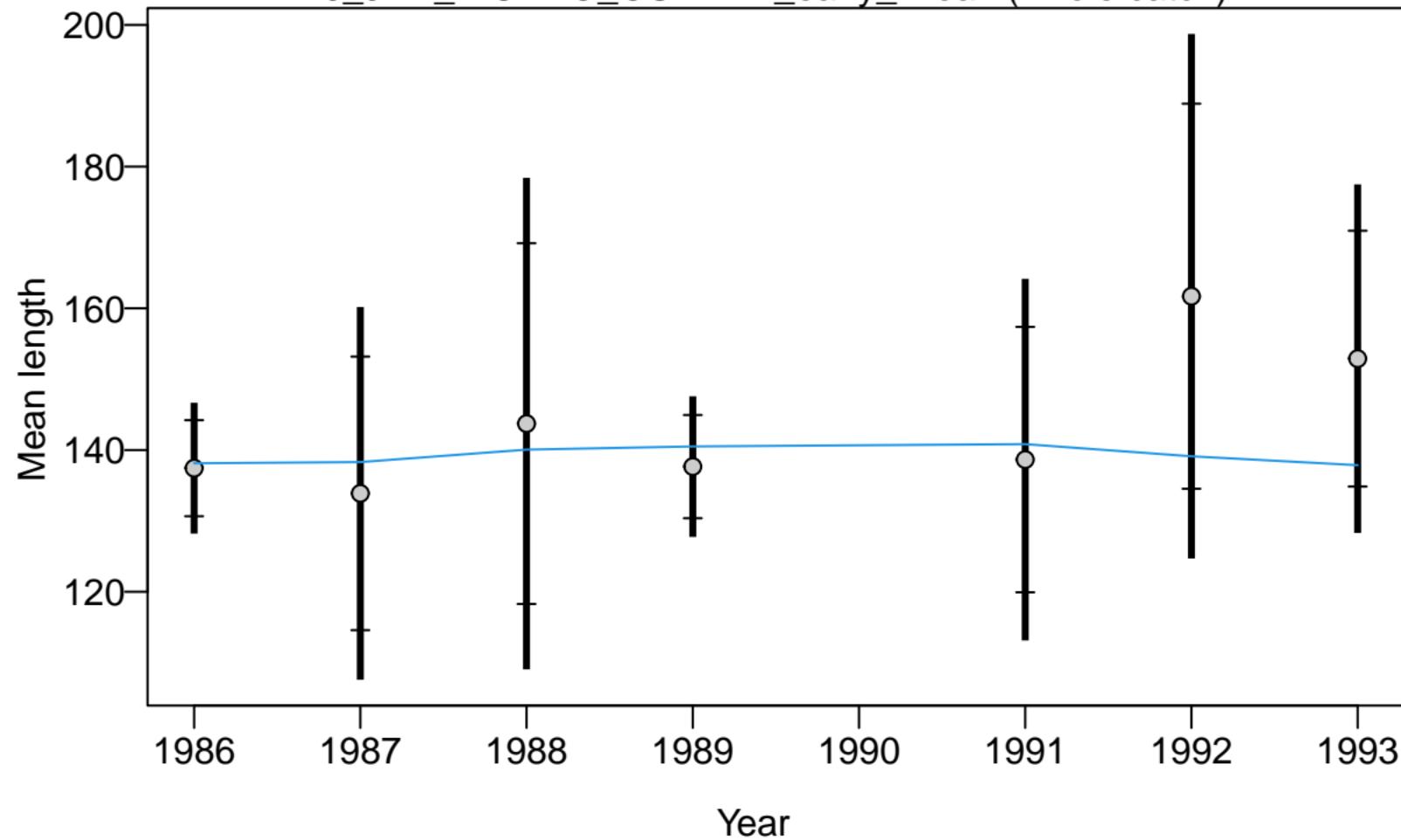




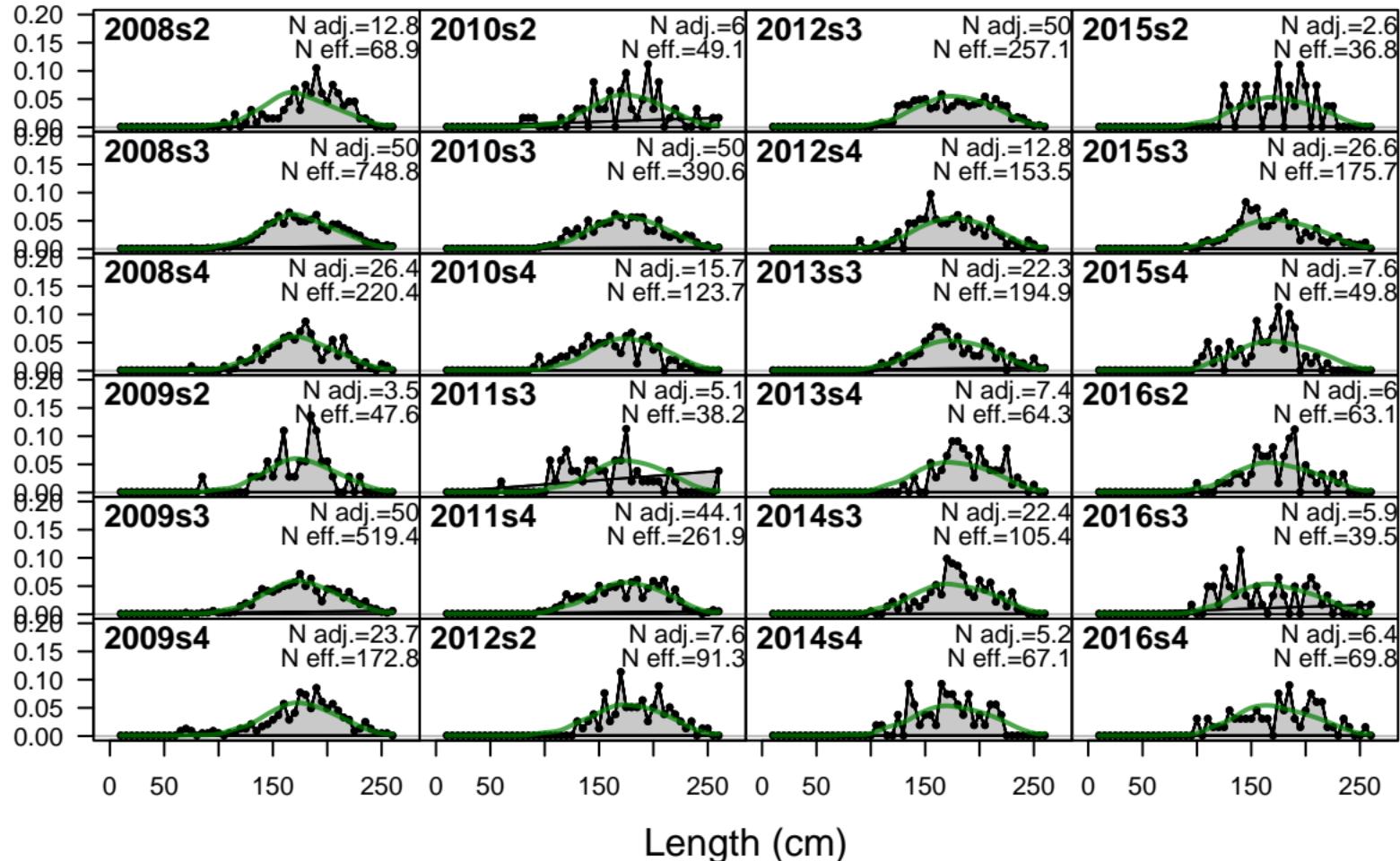
Effective sample size



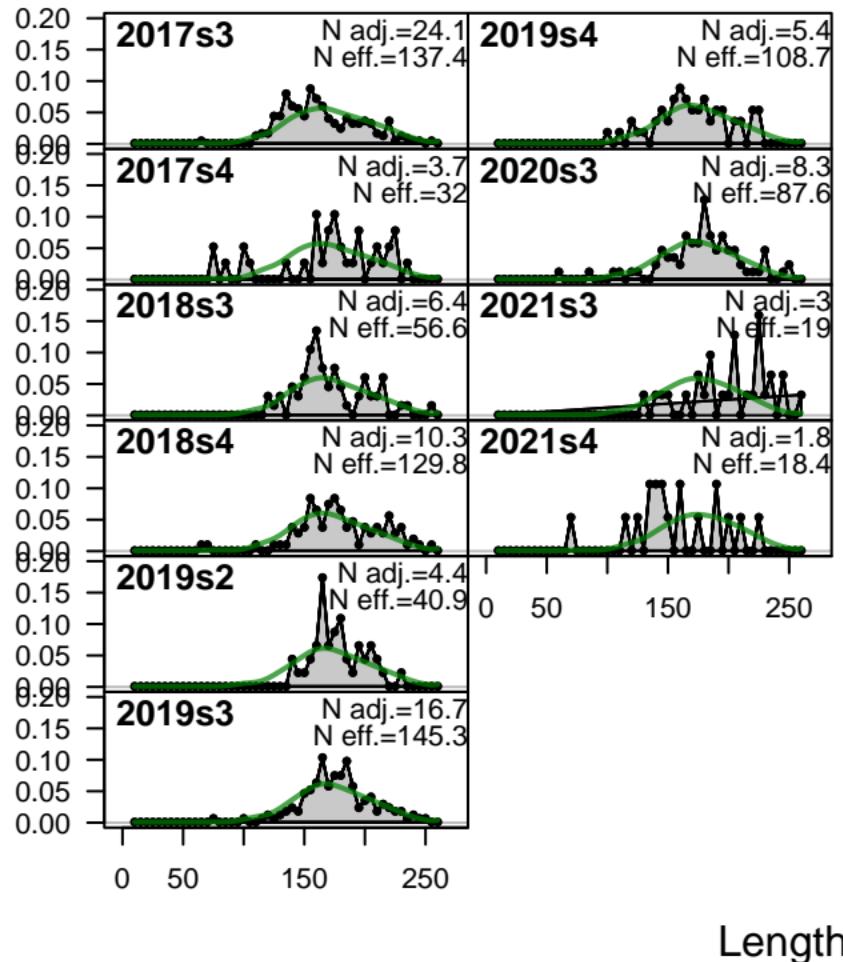
F6_JPN_WCNPO OSDWLL_early_Area1 (whole catch)

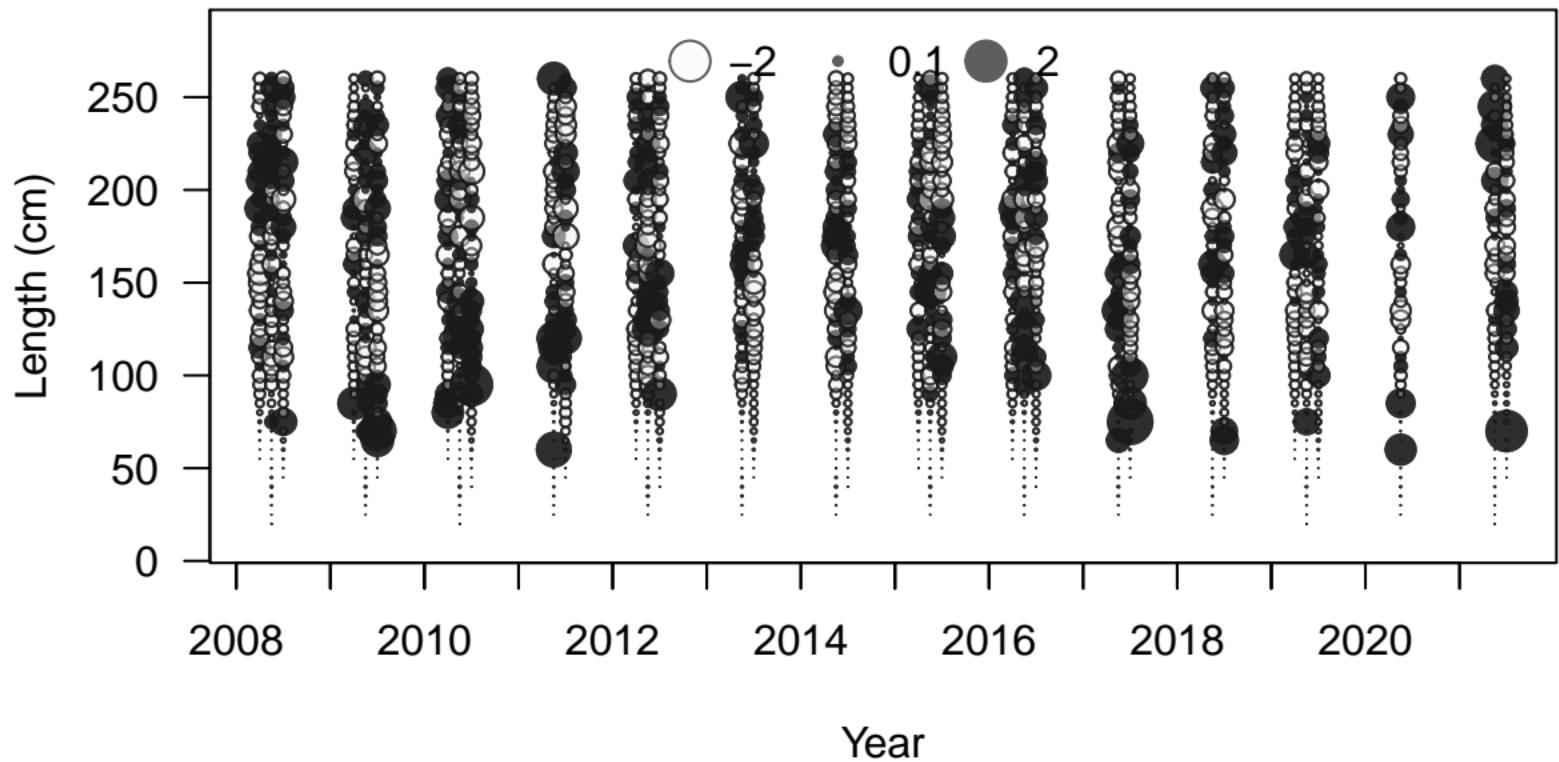


Proportion

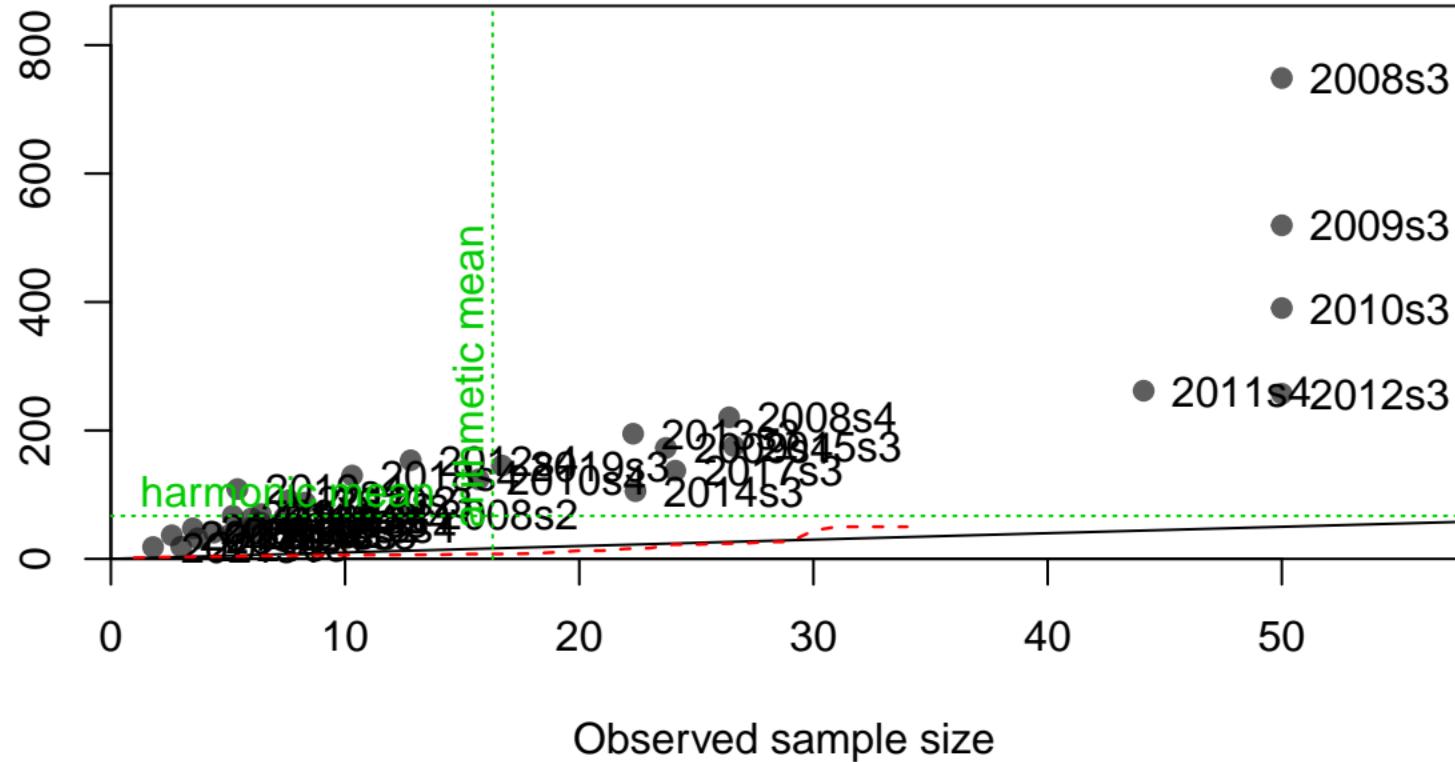


Proportion

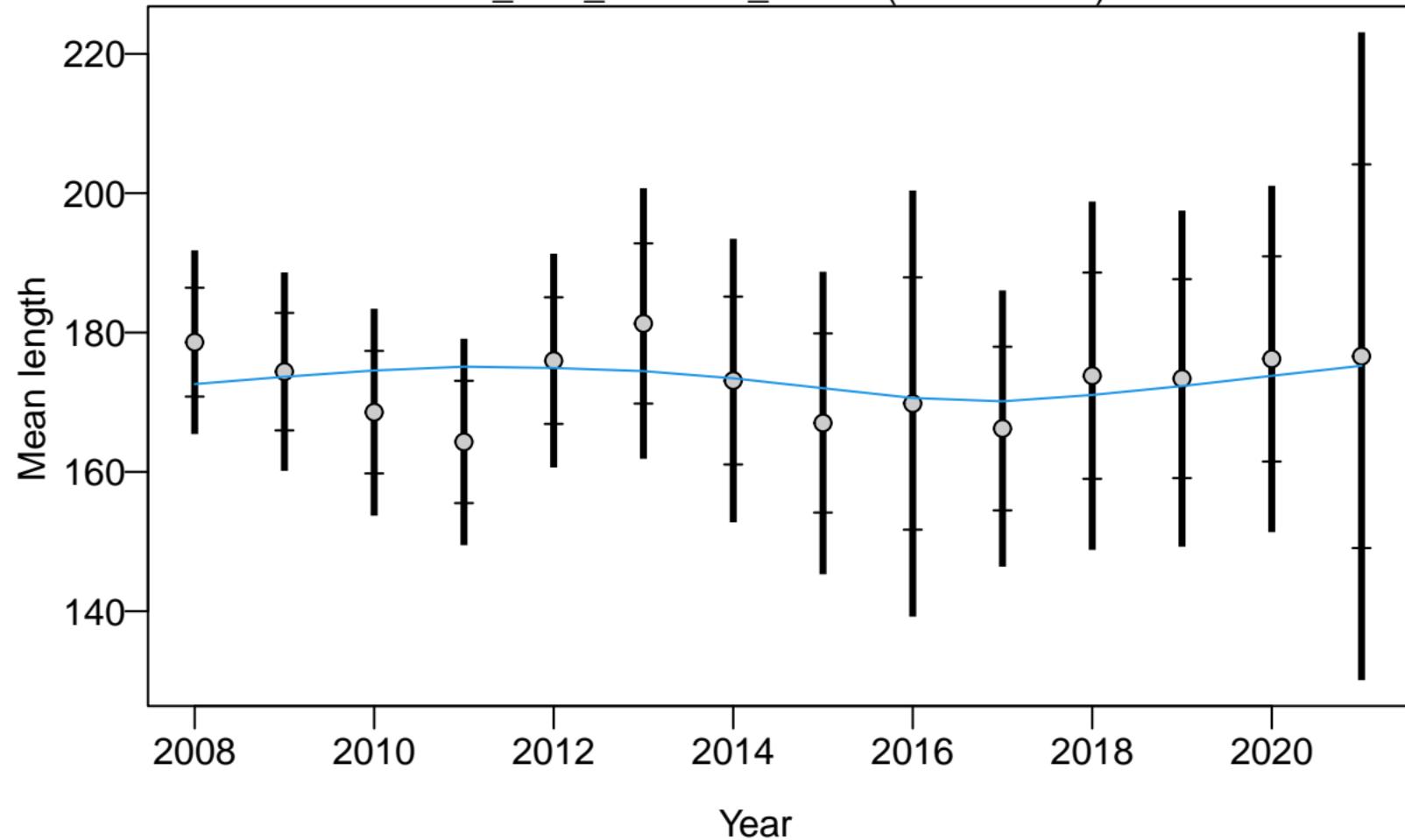




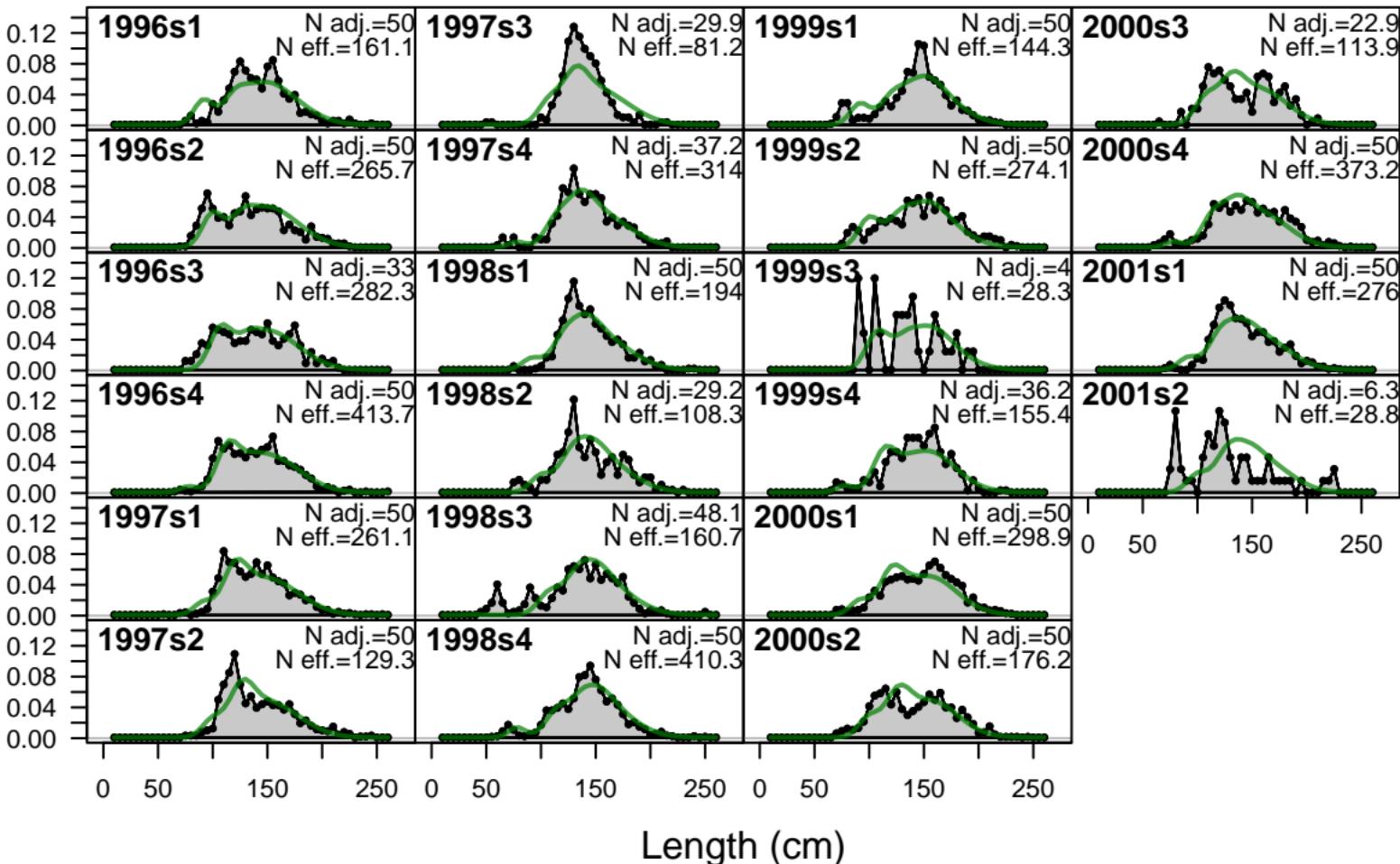
Effective sample size

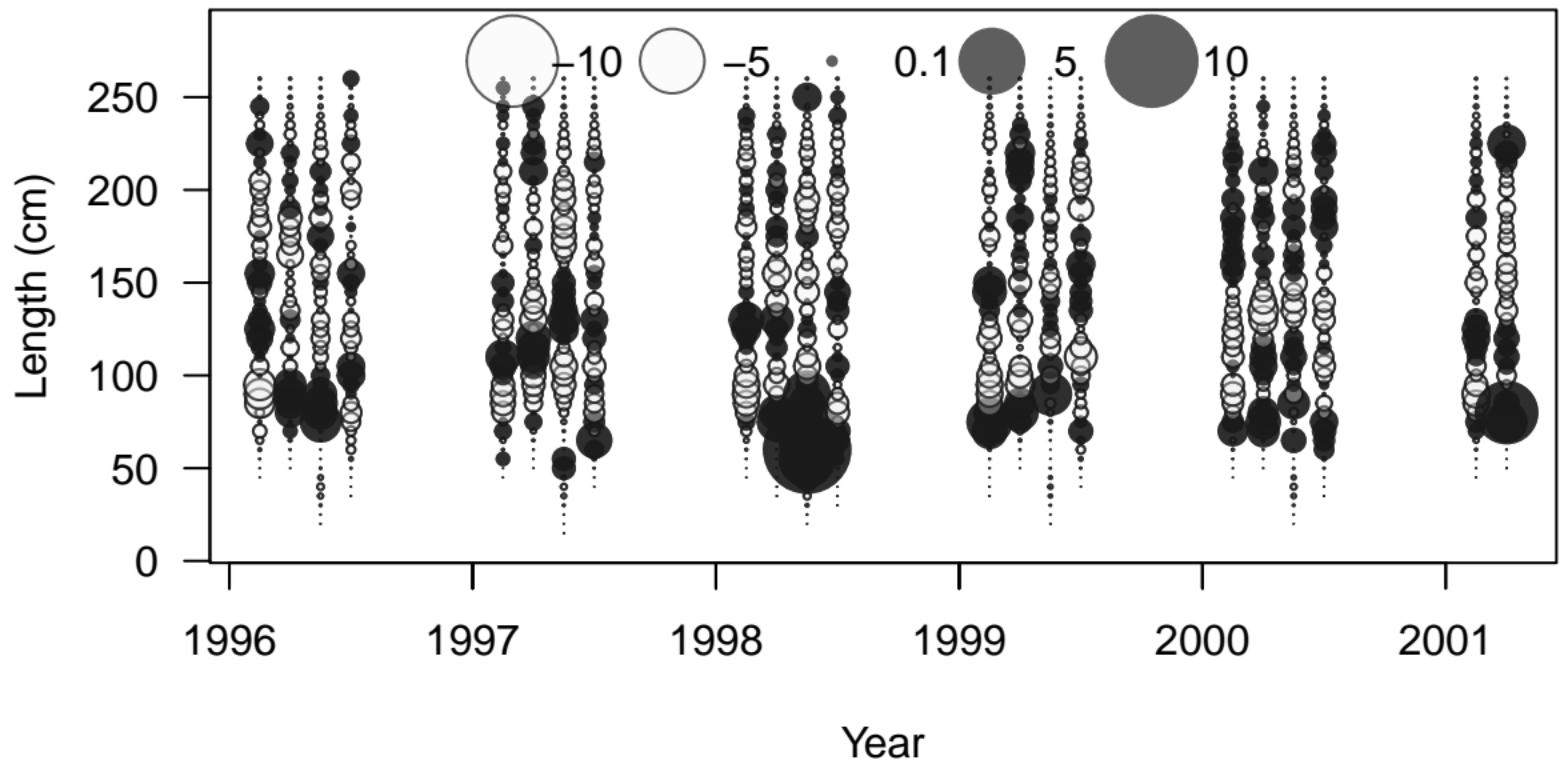


F7_JPN_WCNPO_CODF (whole catch)

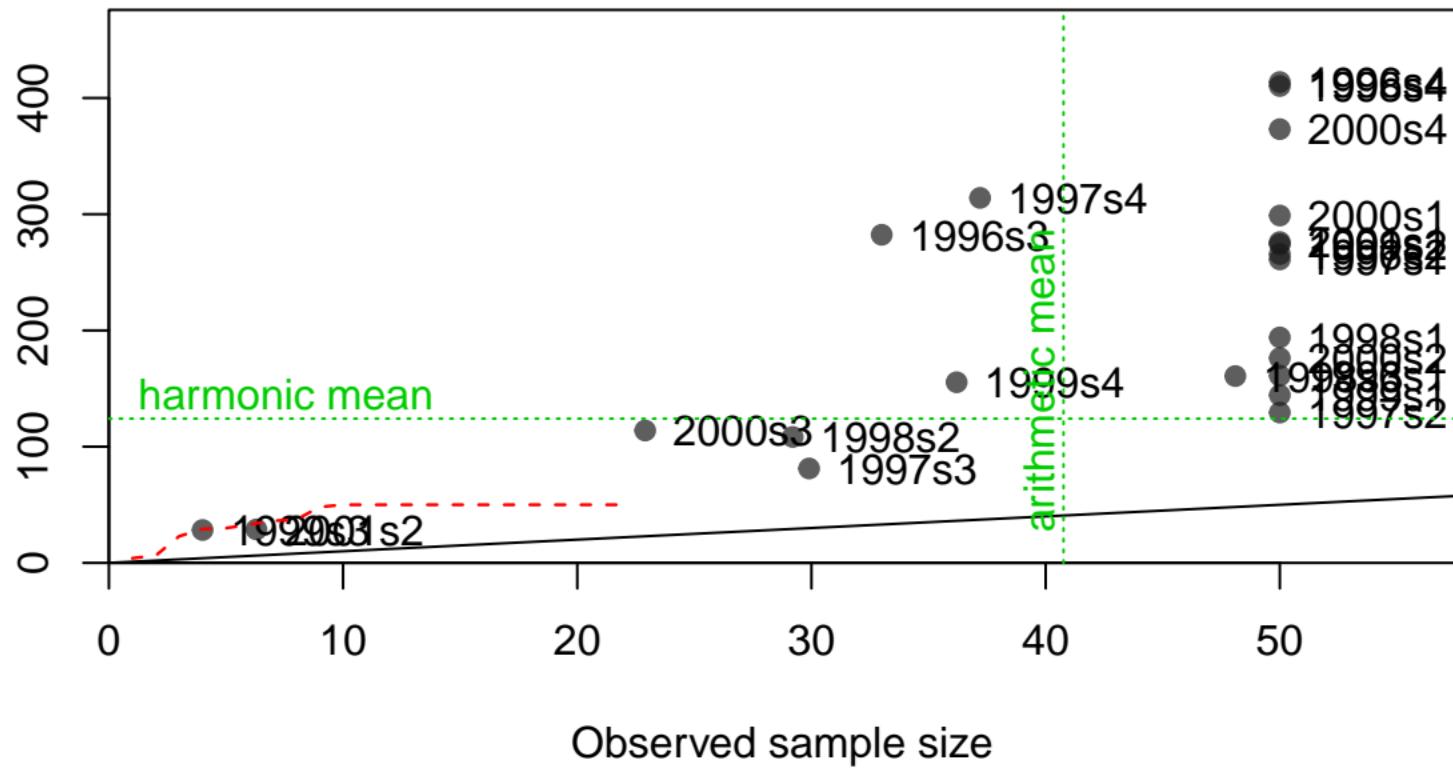


Proportion

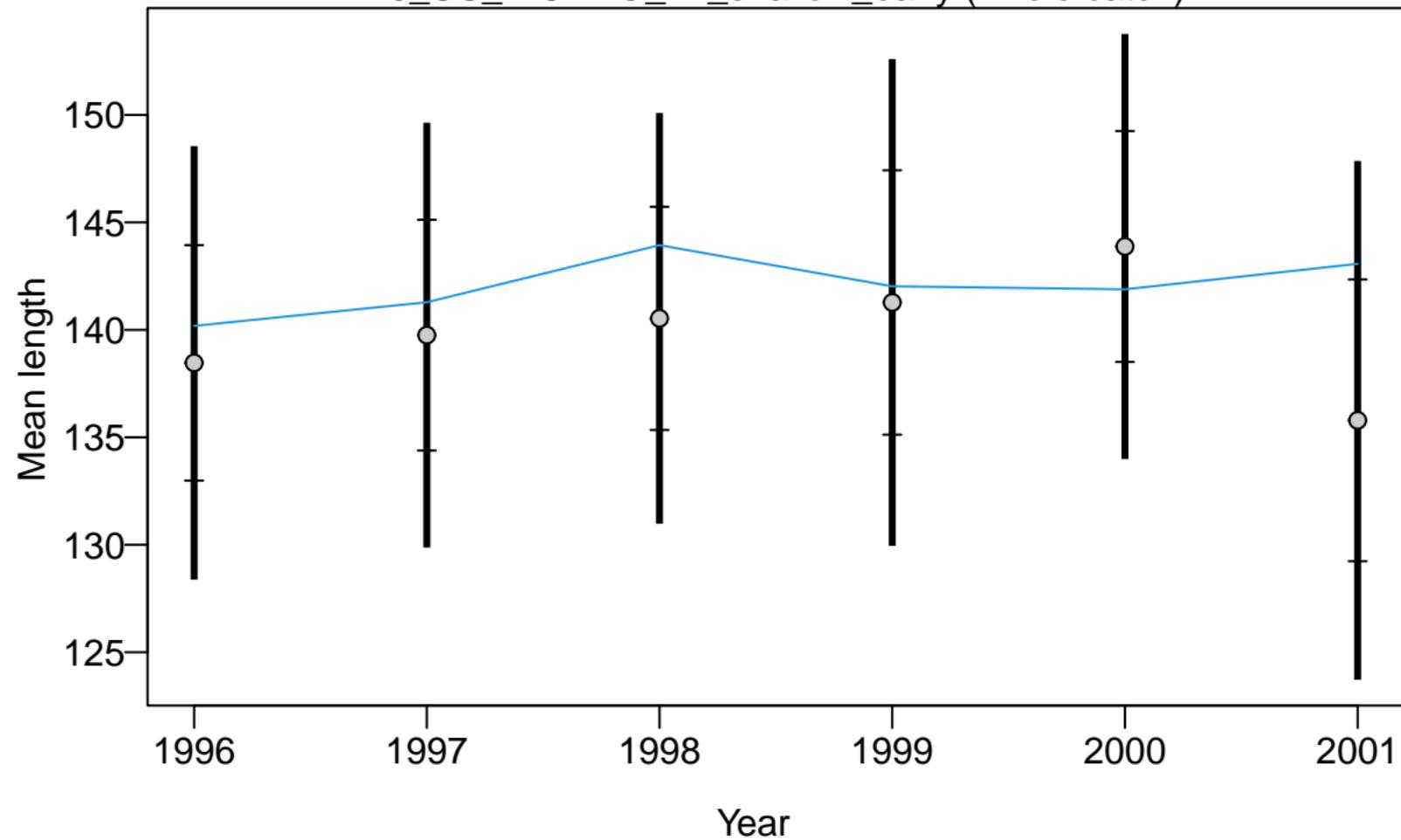




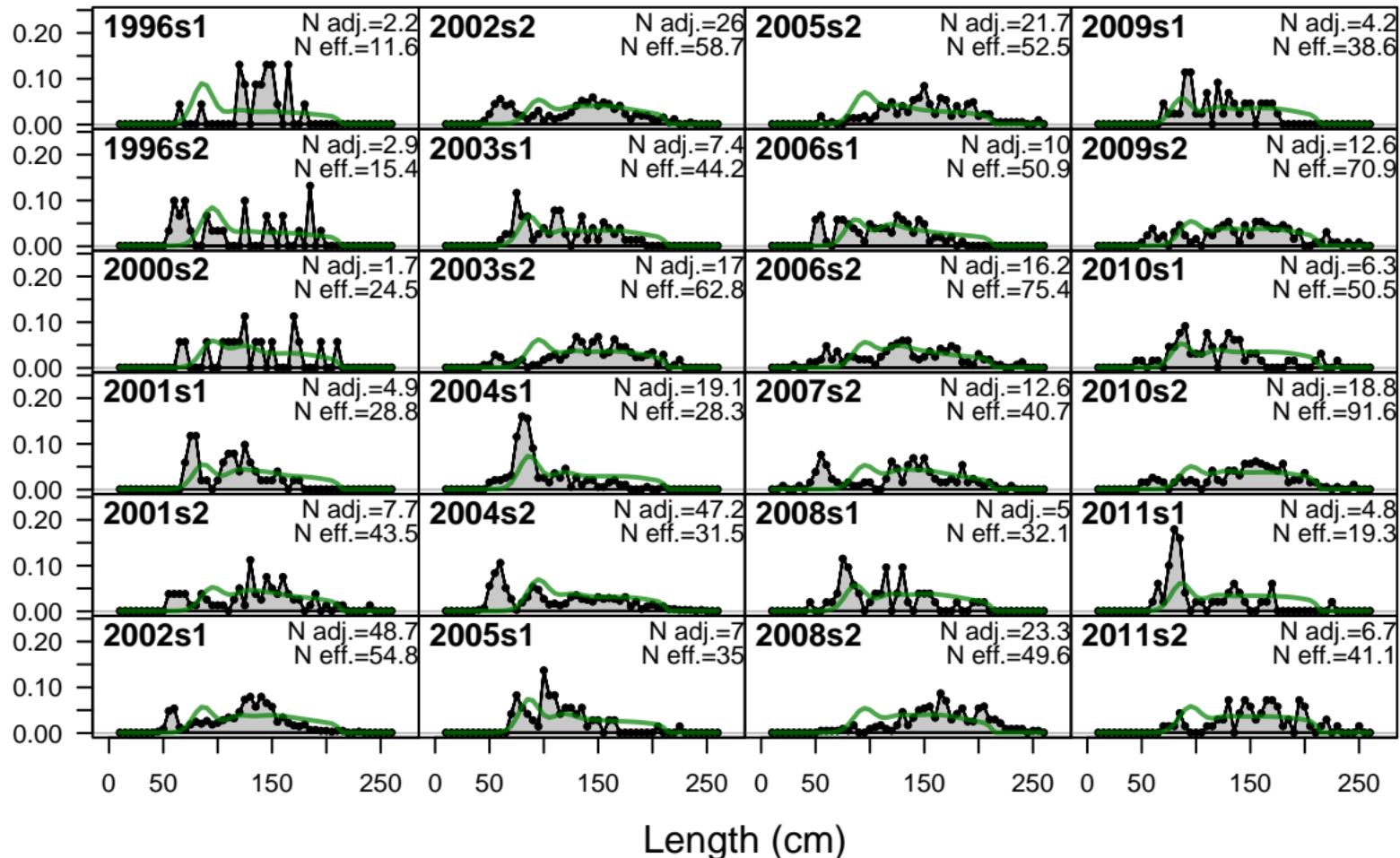
Effective sample size



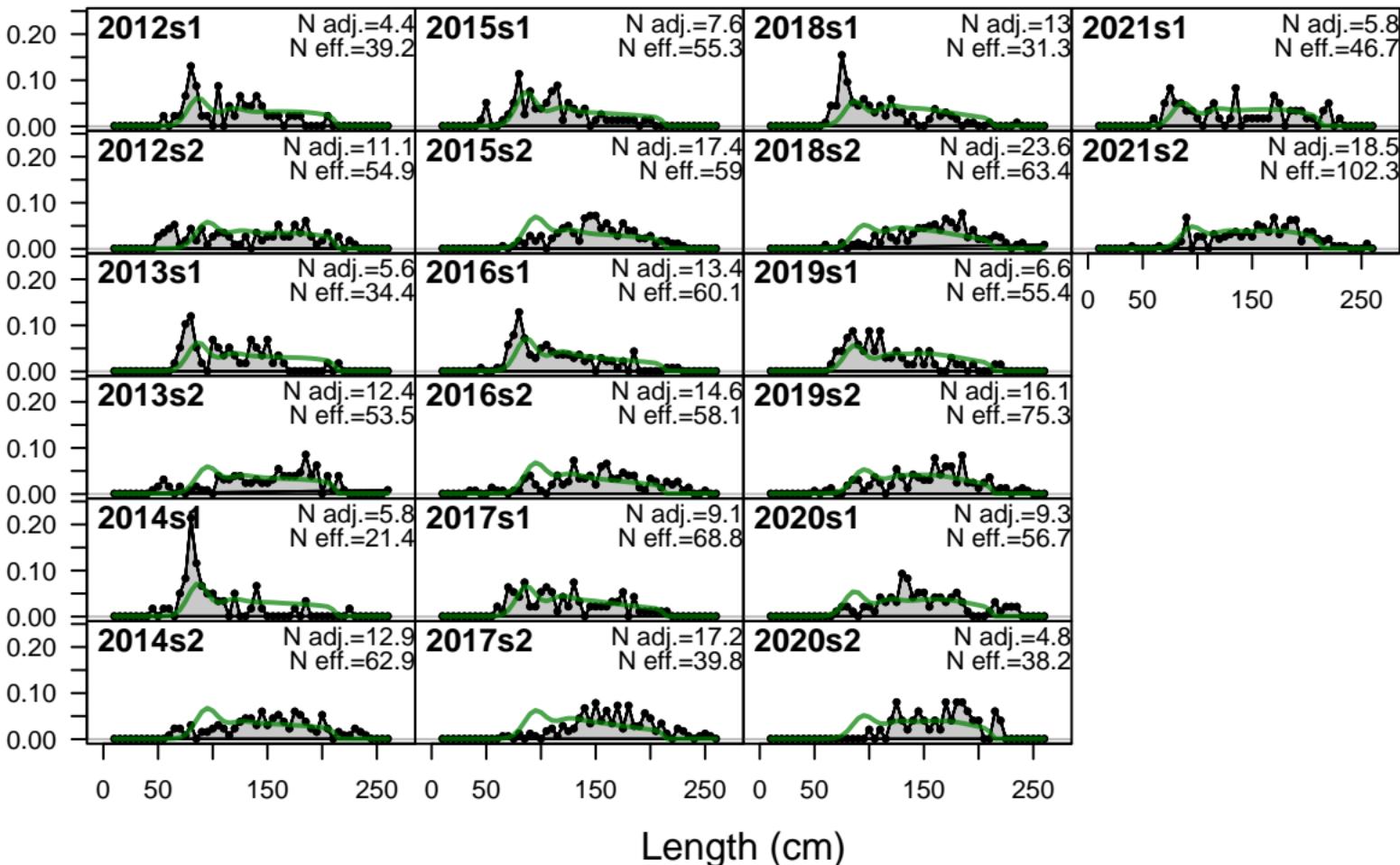
F8_US_WCNPO_LL_shallow_early (whole catch)

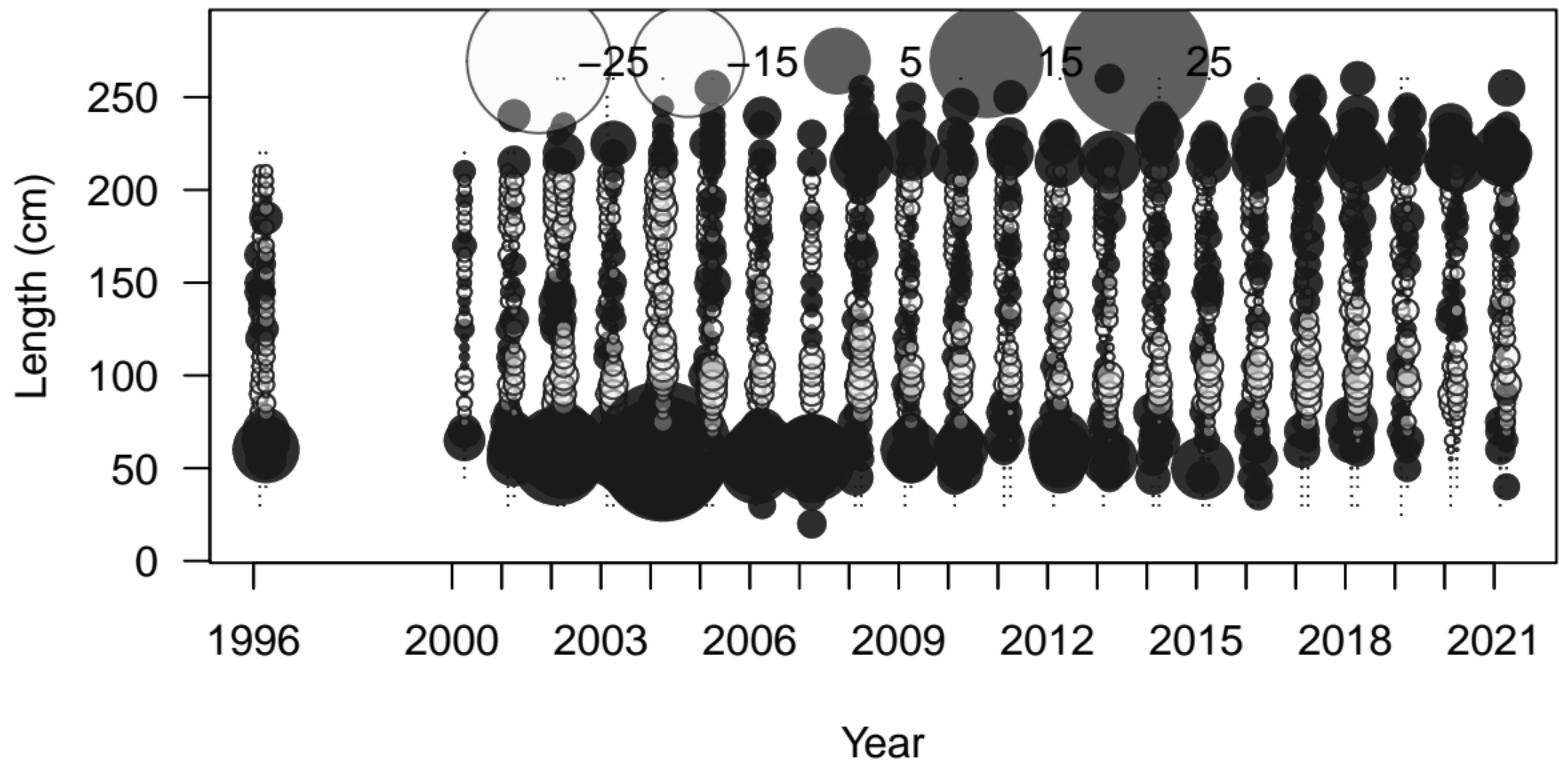


Proportion

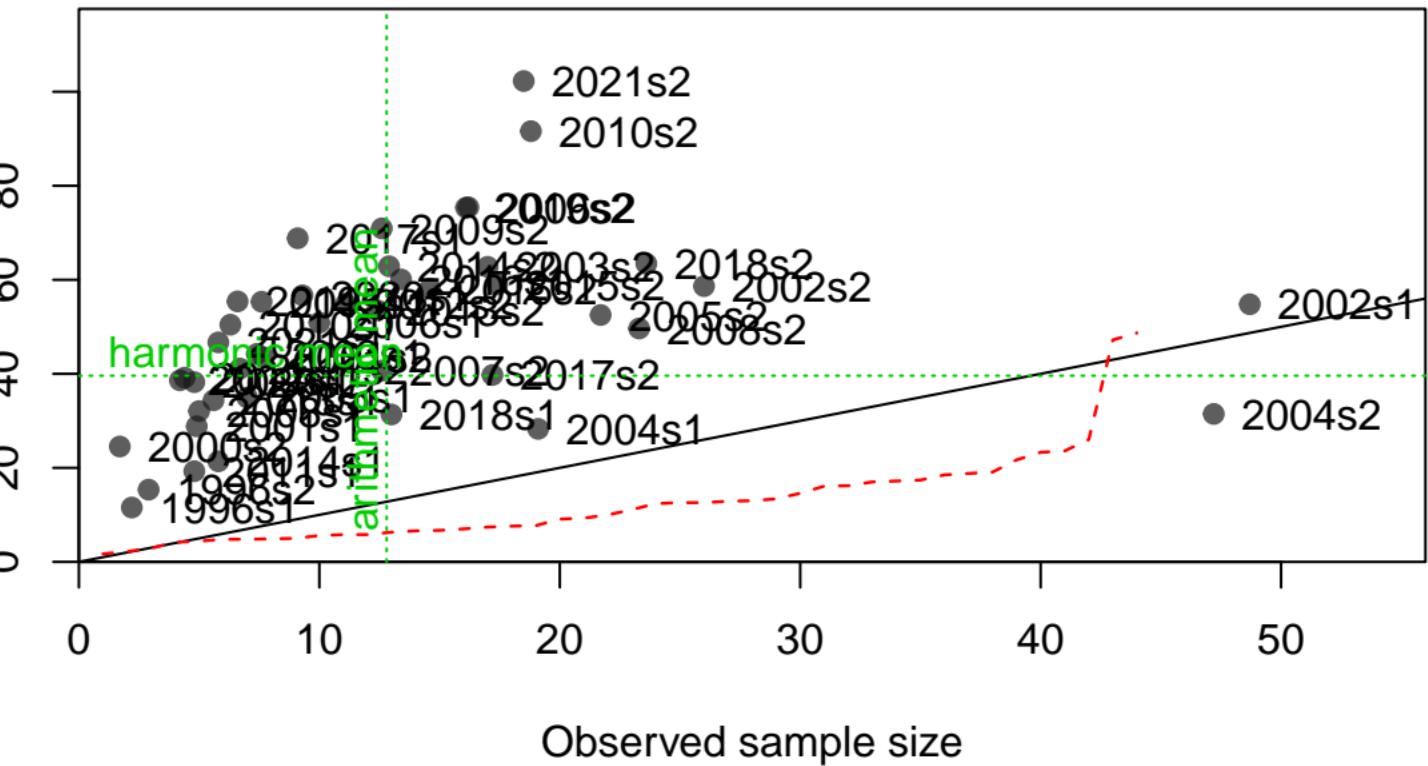


Proportion

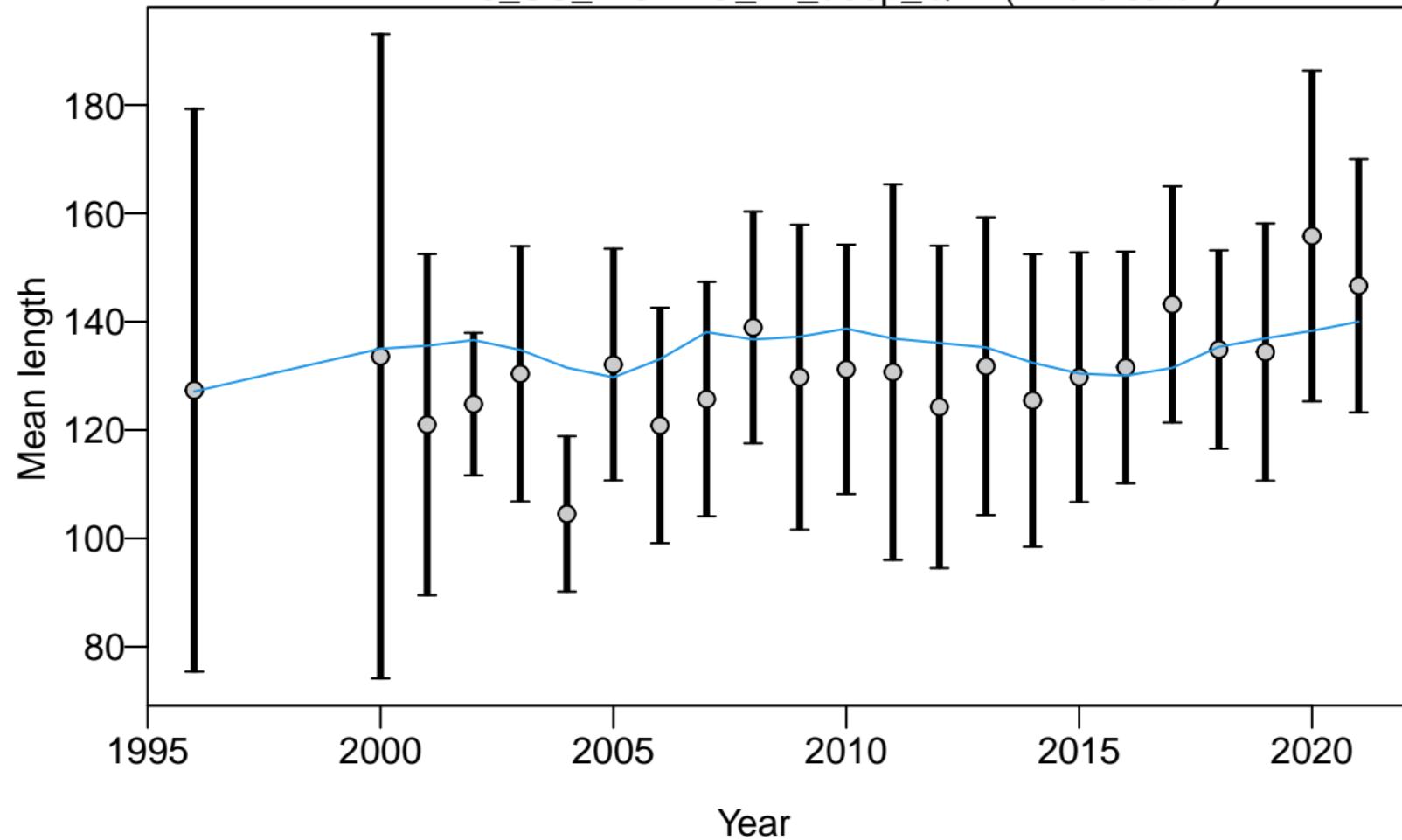




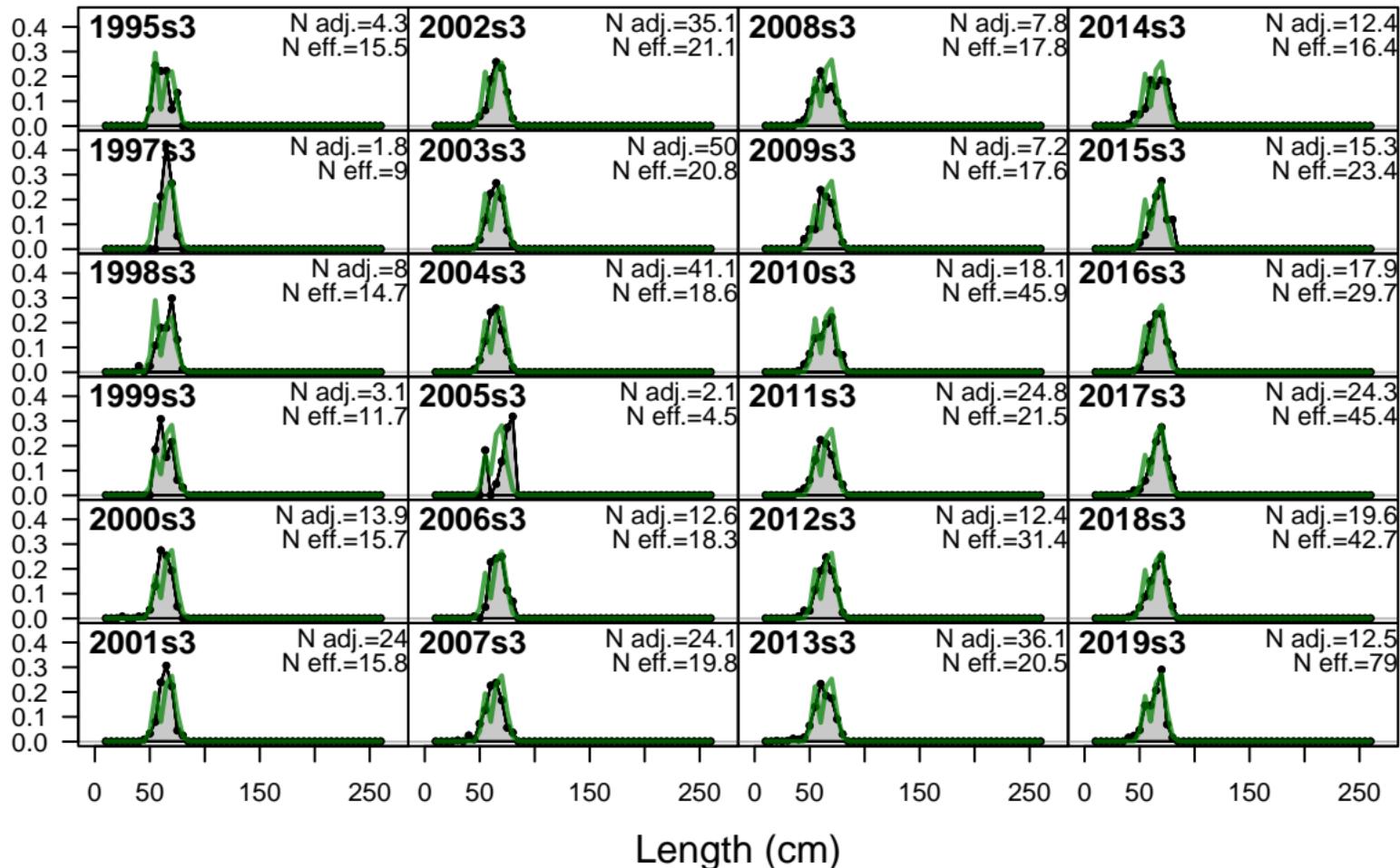
Effective sample size



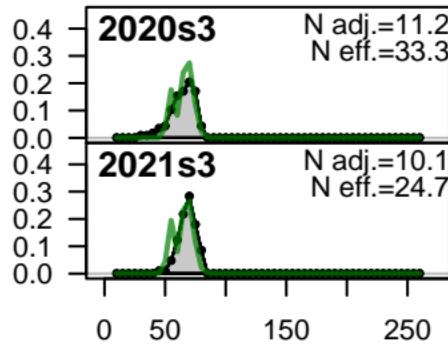
F9_US_WCNPO_LL_deep_Q12 (whole catch)

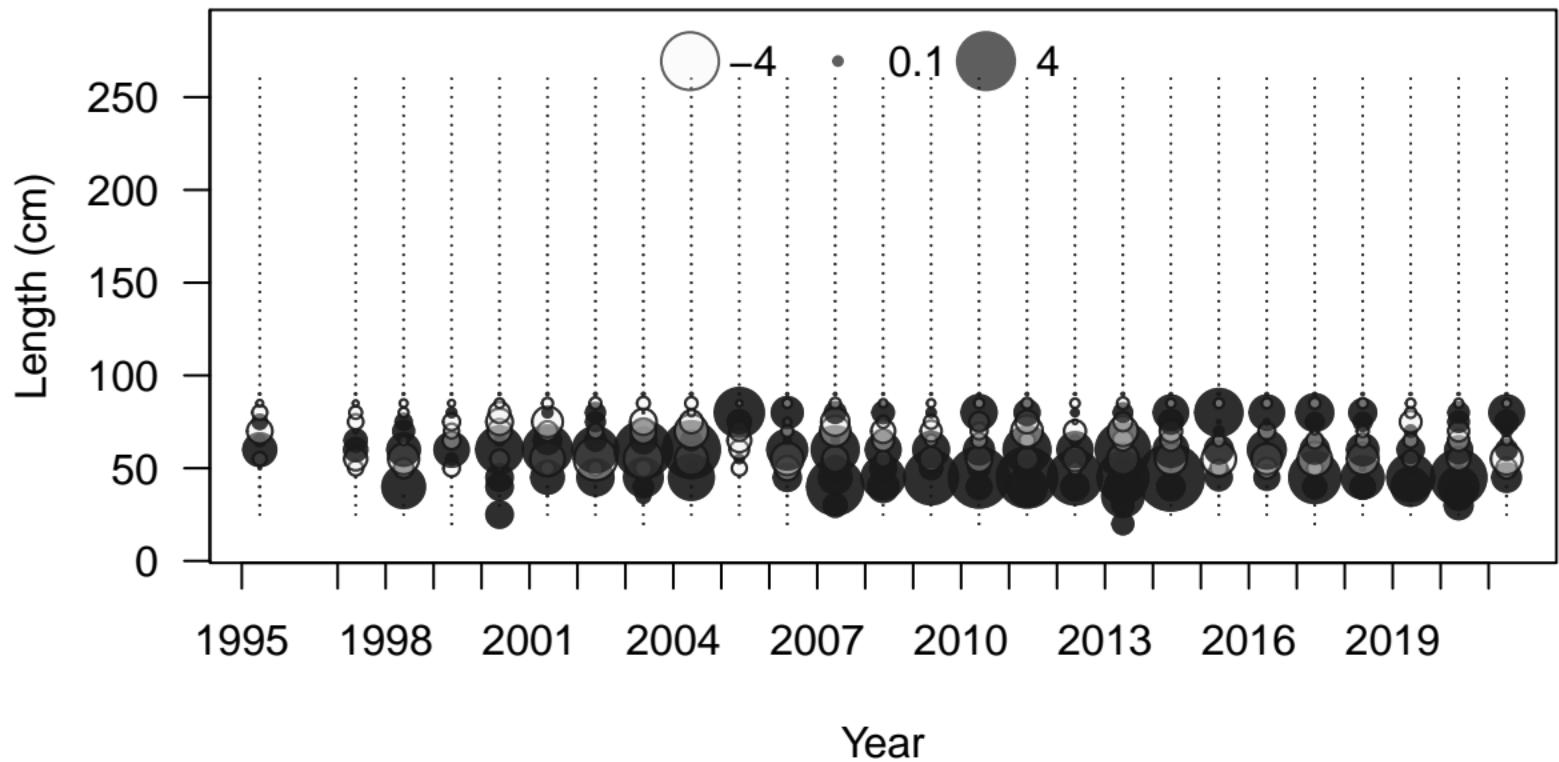


Proportion

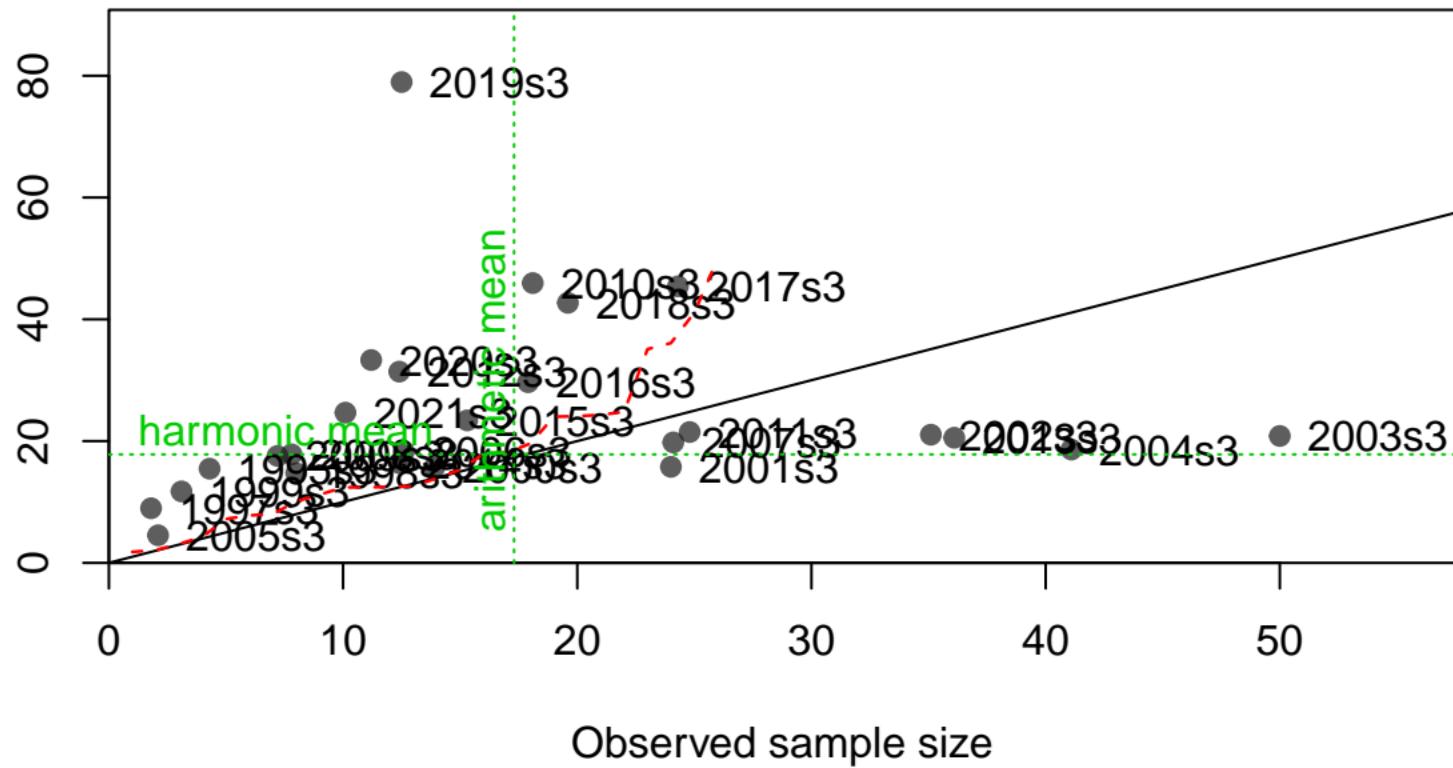


Proportion

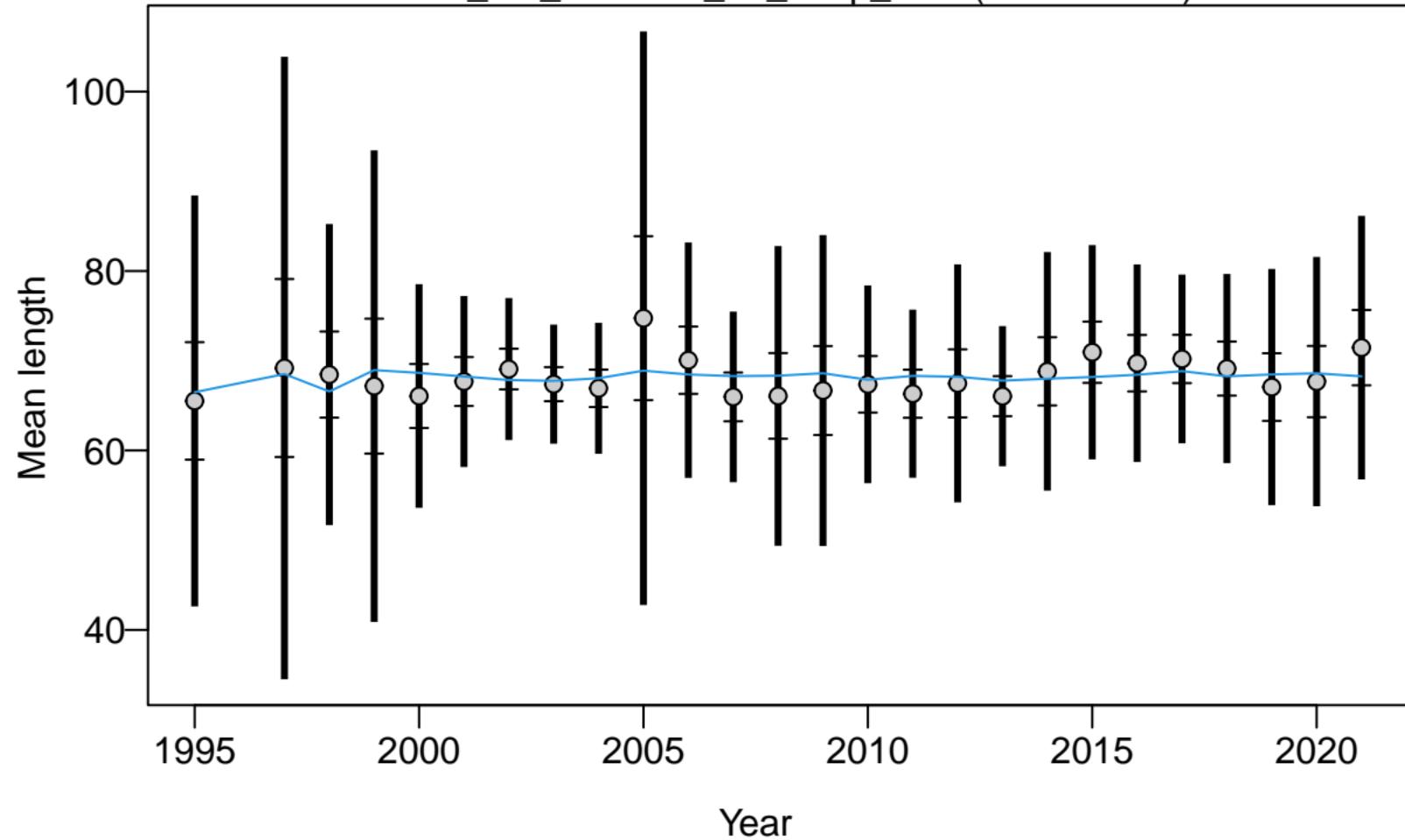




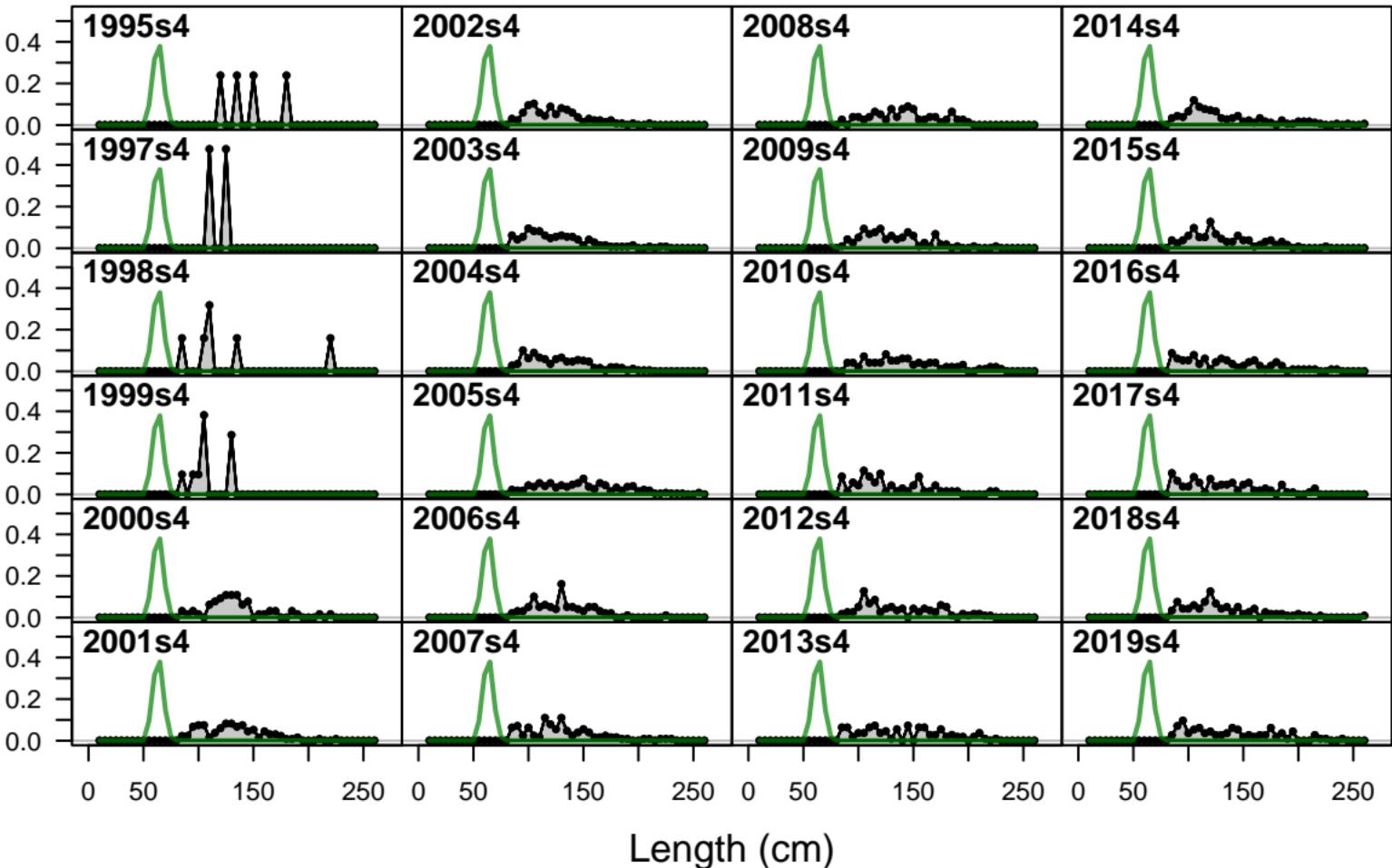
Effective sample size



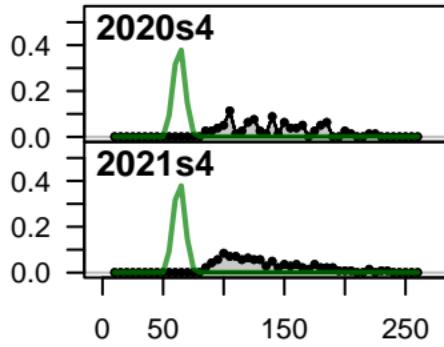
F20_US_WCNPO_LL_deep_Q34 (whole catch)



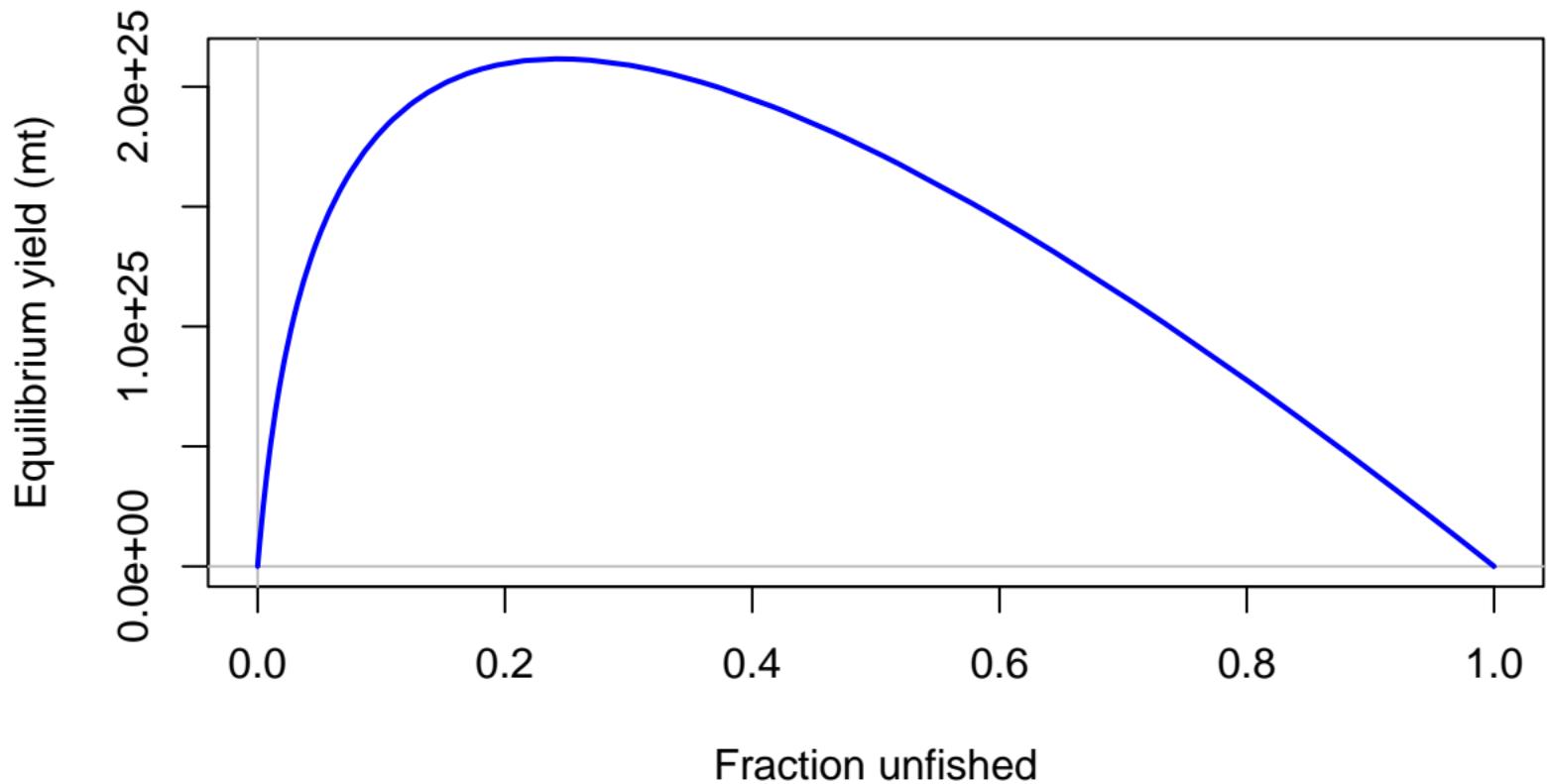
Proportion

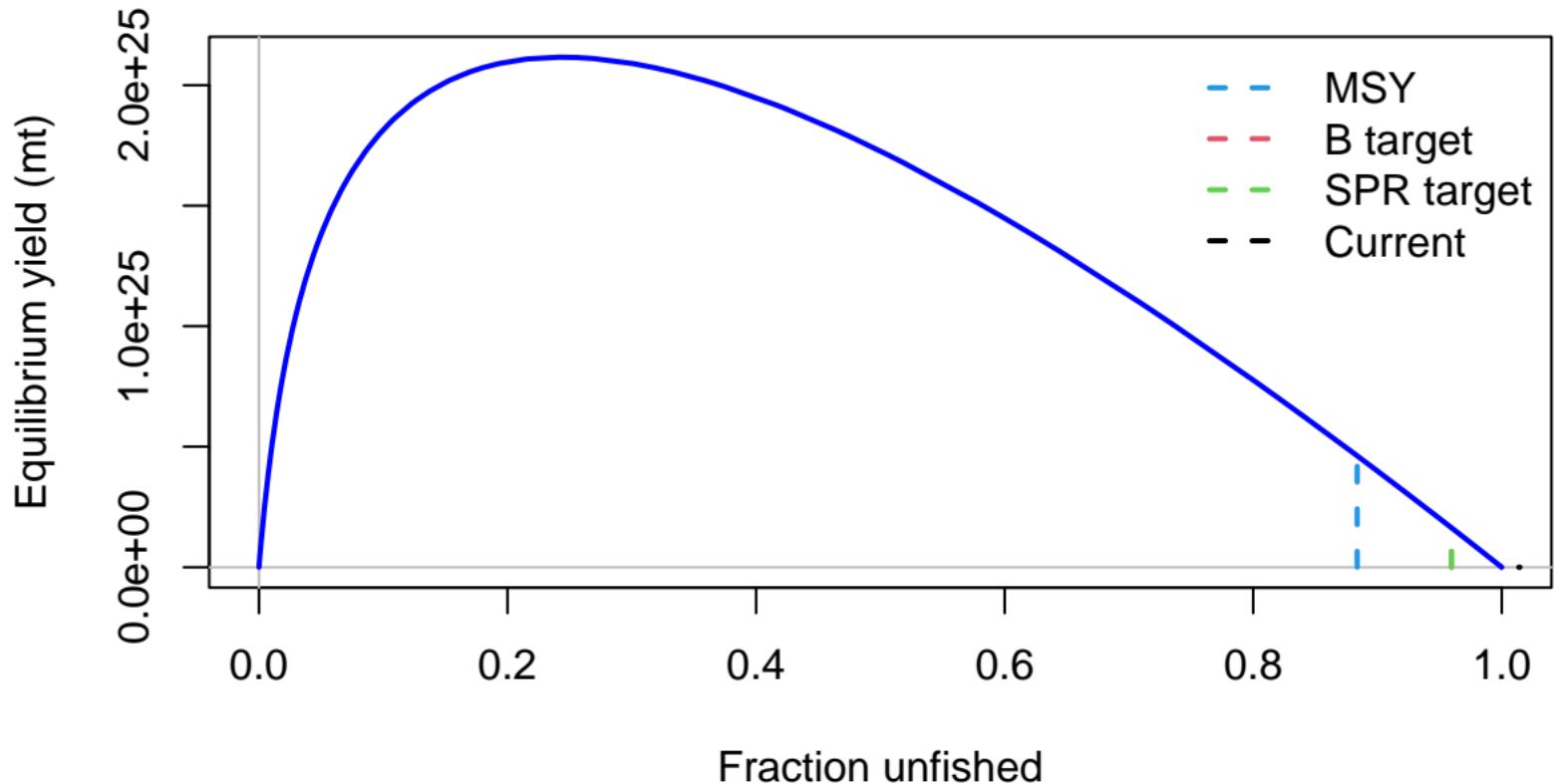


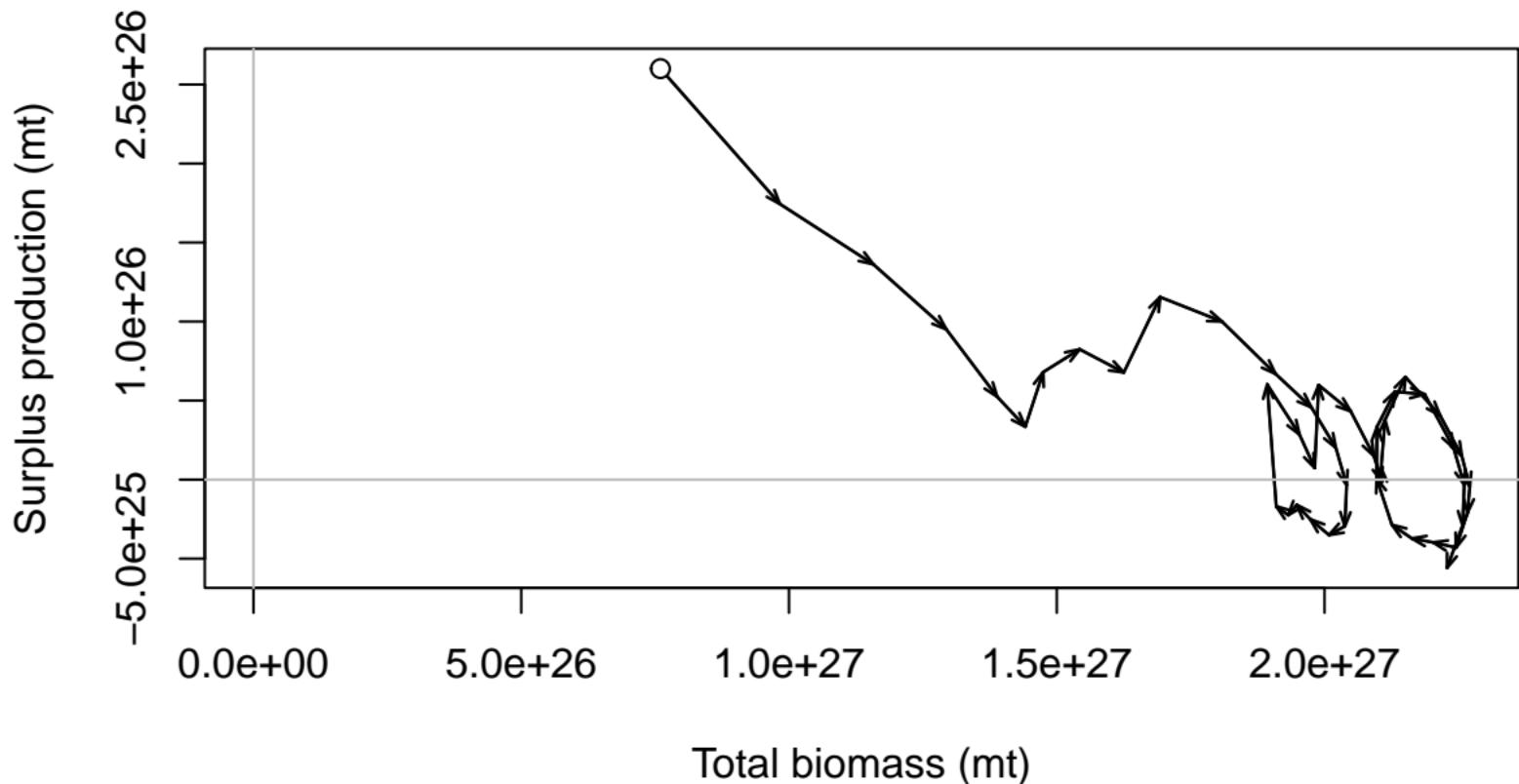
Proportion

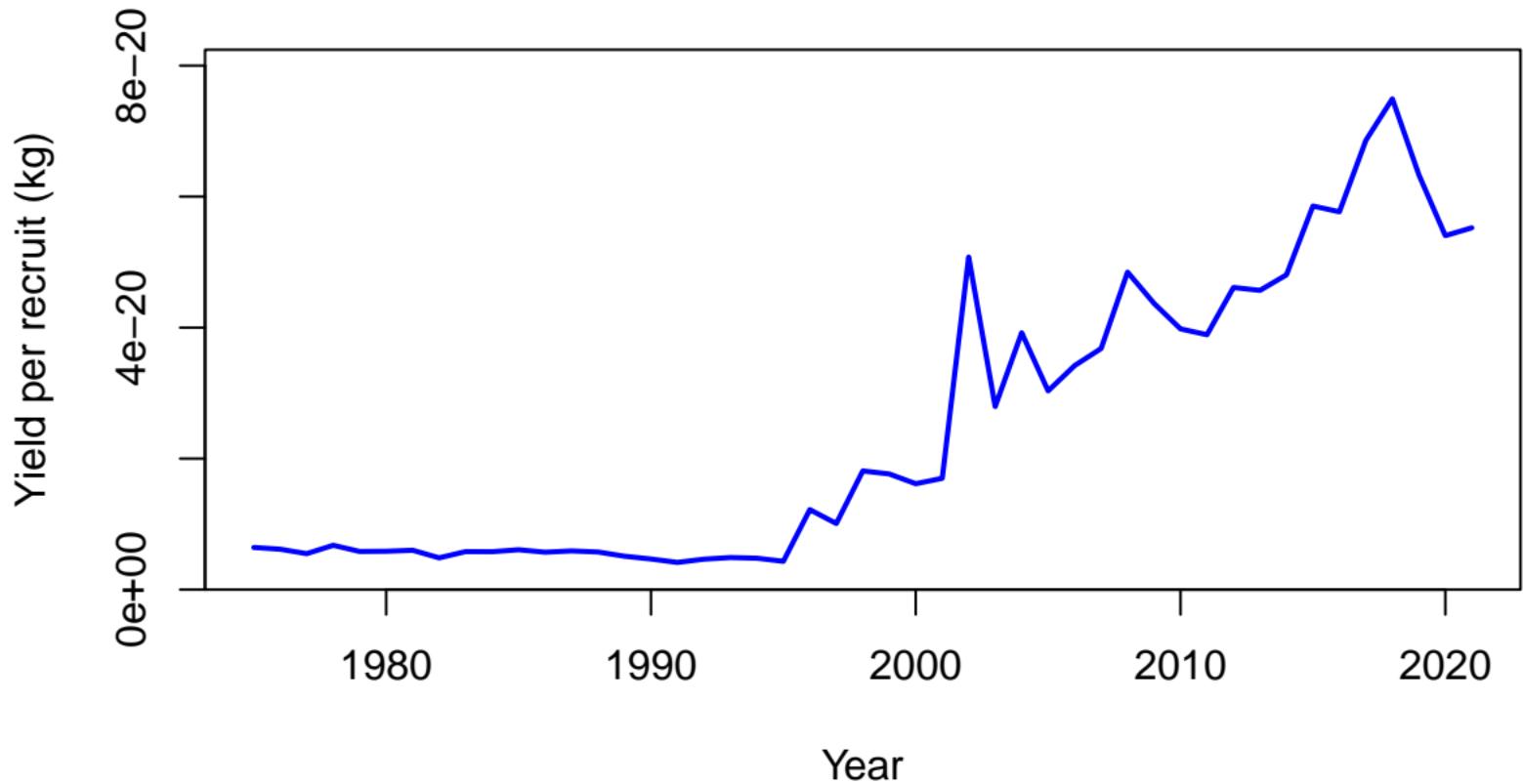


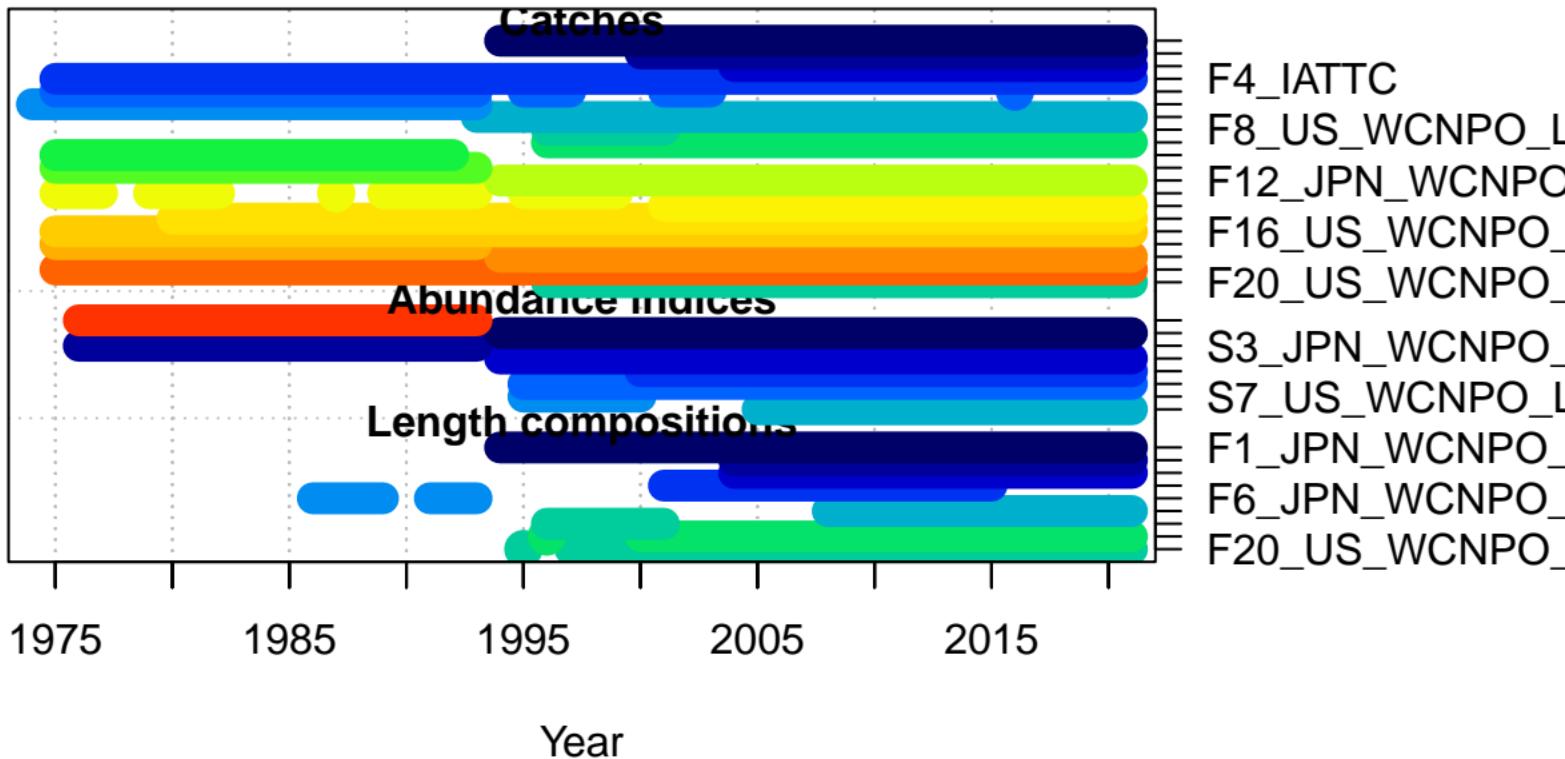
Length (cm)

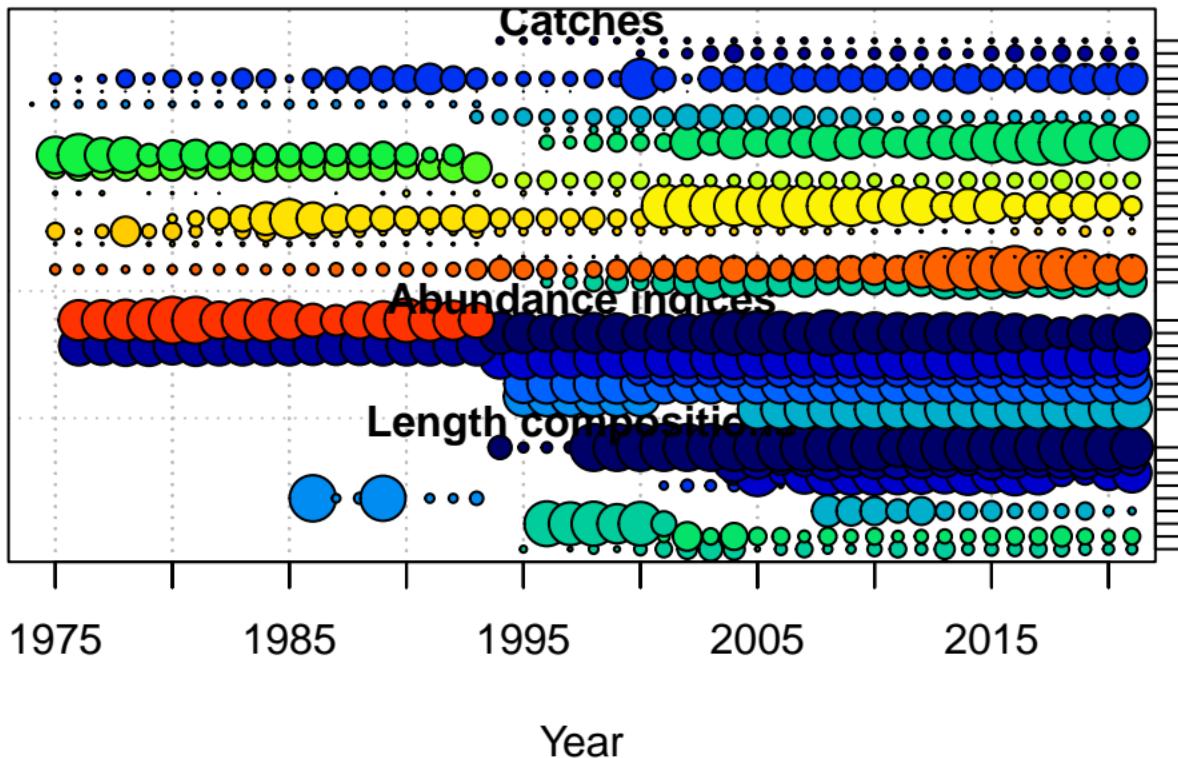








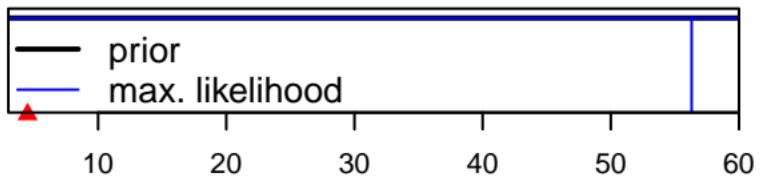




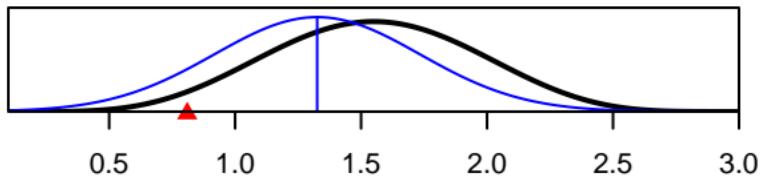
F4_IATTC
F8_US_WCNPO_L
F12_JPN_WCNPO_L
F16_US_WCNPO_L
F20_US_WCNPO_L
S3_JPN_WCNPO_L
S7_US_WCNPO_L
F1_JPN_WCNPO_L
F6_JPN_WCNPO_L
F20_US_WCNPO_L

Density

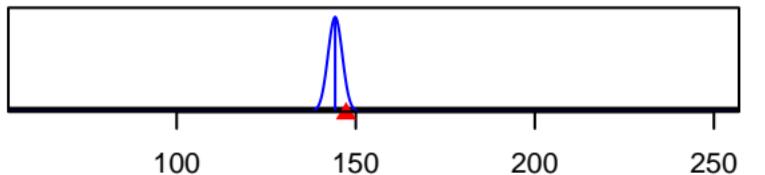
SR_LN(R0)



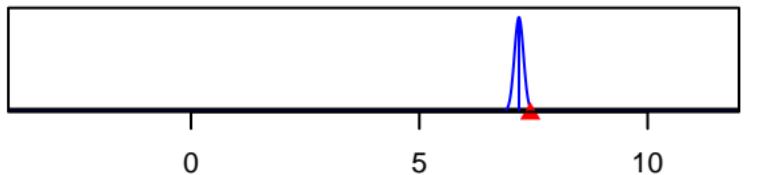
InitF_seas_1_flt_6F6_JPN_WCNPO_OSDWLL_early_Area1



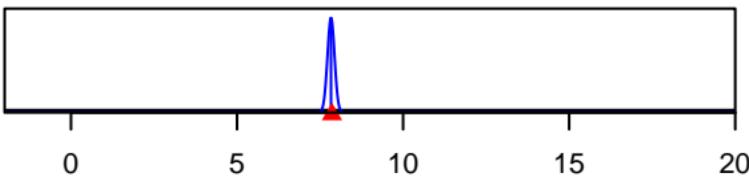
Size_DbIN_peak_F1_JPN_WCNPO_OSDWCOLL_late_Area1(



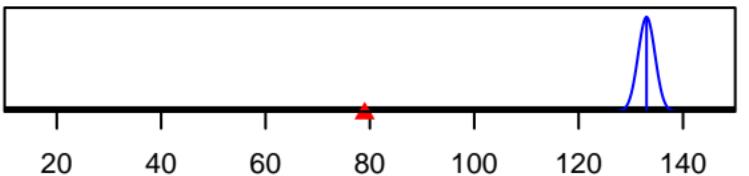
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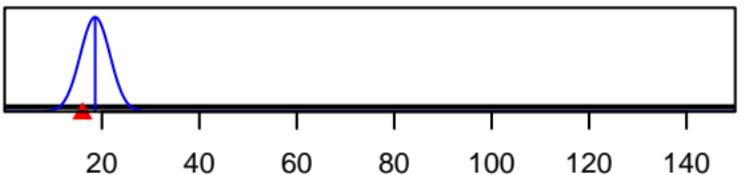
DbIN_descend_se_F1_JPN_WCNPO_OSDWCOLL_late_Are



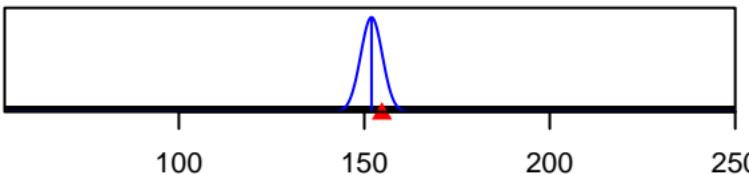
Size_inflection_F2_TWN_WCNPO_DWLL_late(2)



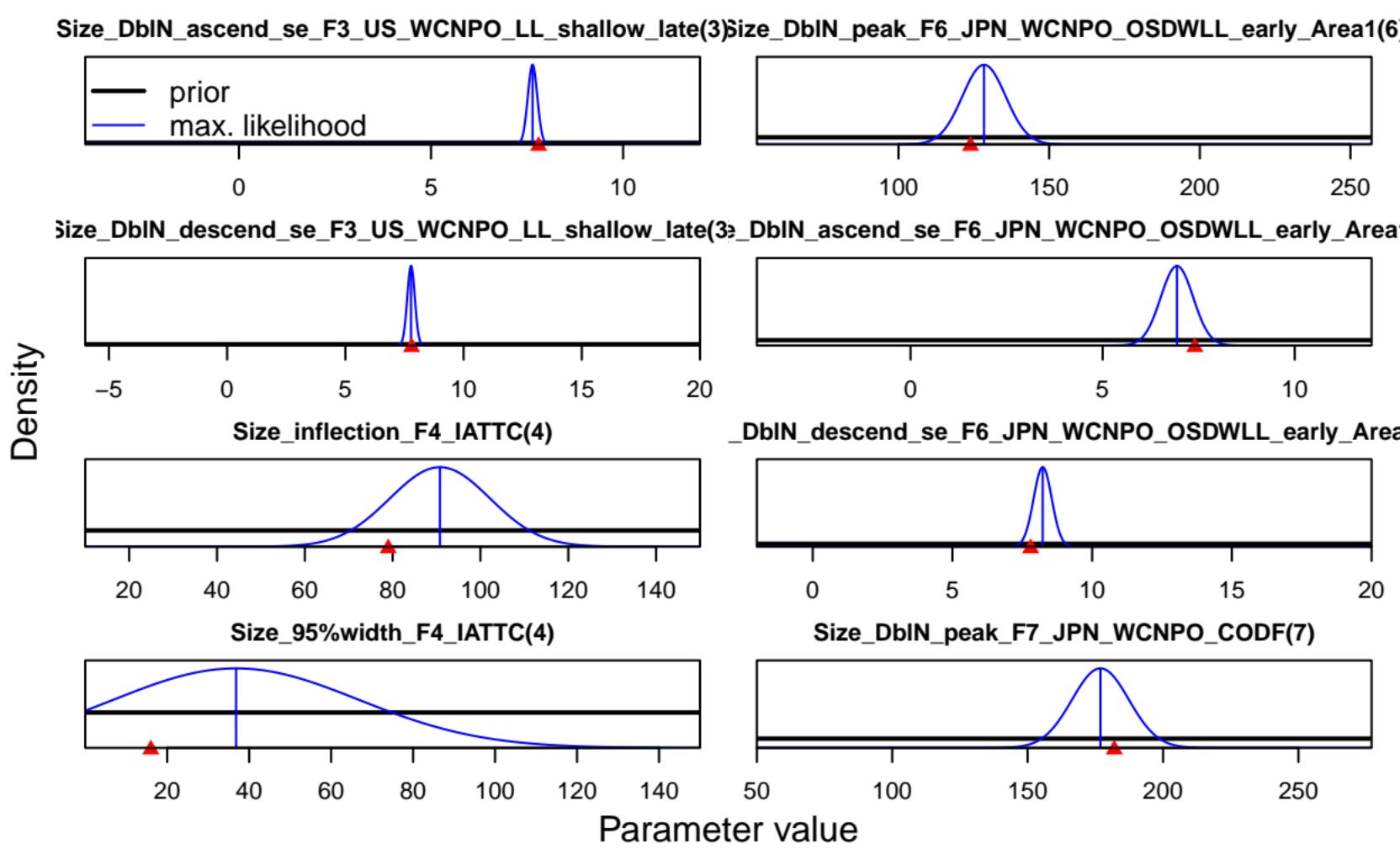
Size_95%width_F2_TWN_WCNPO_DWLL_late(2)



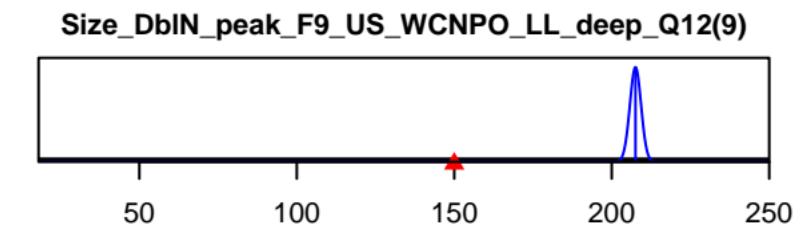
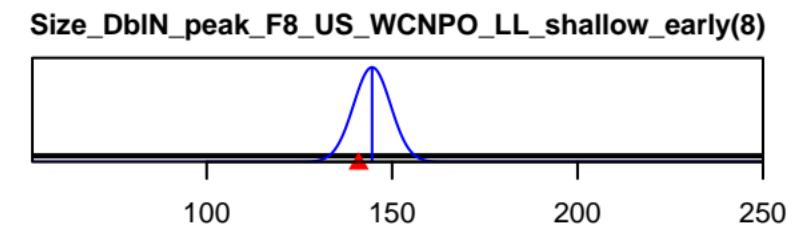
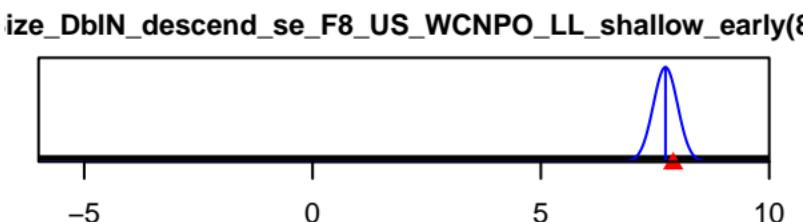
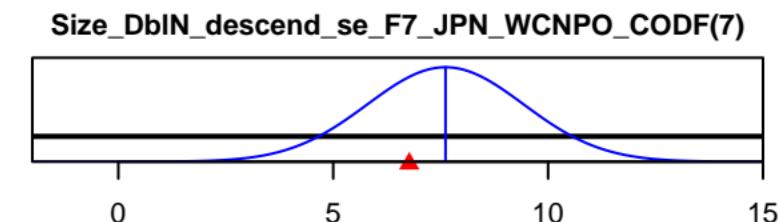
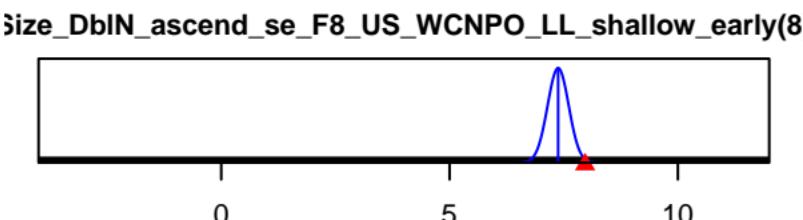
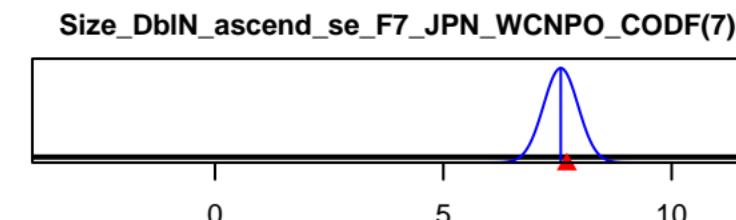
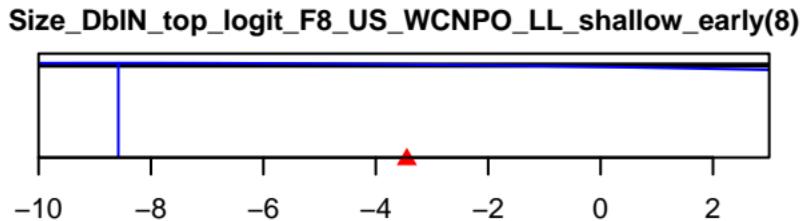
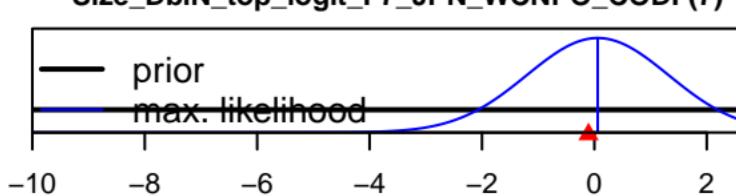
Size_DbIN_peak_F3_US_WCNPO_LL_shallow_late(3)



Parameter value

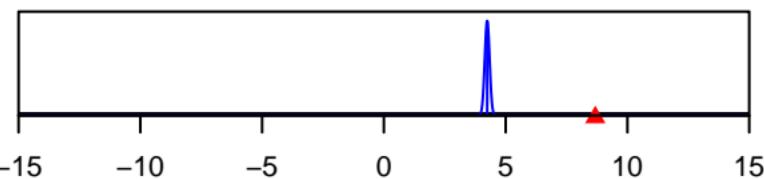
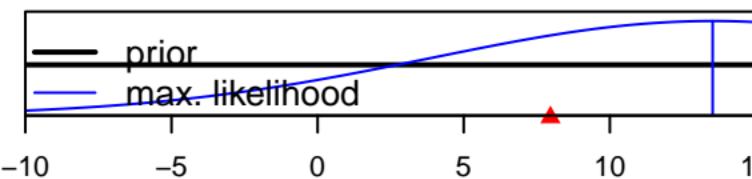


Density

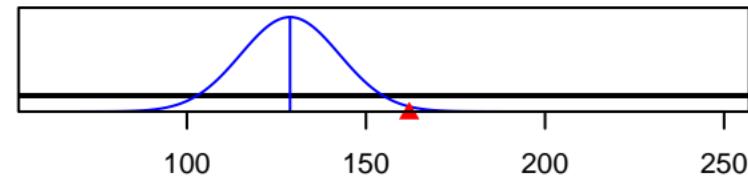
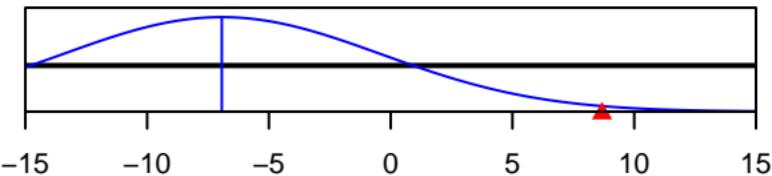


Parameter value

Size_DbIN_ascend_se_F9_US_WCNPO_LL_deep_Q12(9) Size_DbIN_descend_se_F20_US_WCNPO_LL_deep_Q34(28)

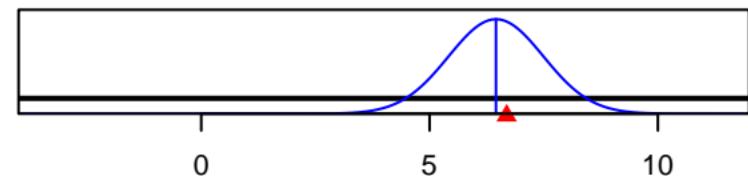
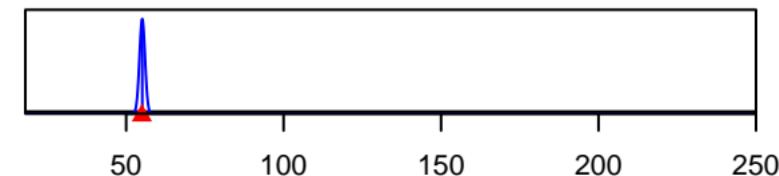


Size_DbIN_descend_se_F9_US_WCNPO_LL_deep_Q12(9) l_peak_F1_JPN_WCNPO OSDWCOLL_late_Area1(1)_BLK2

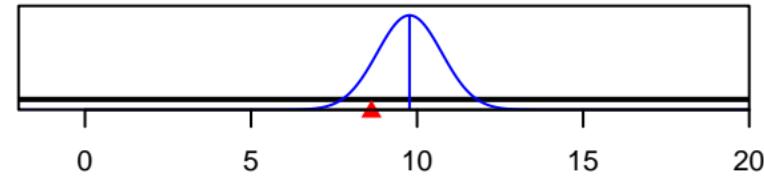
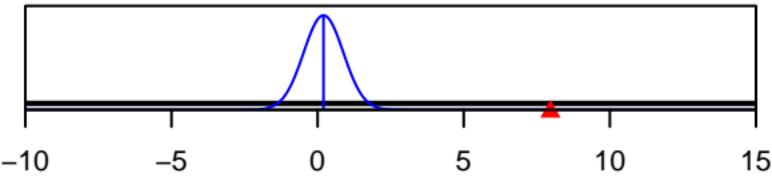


Size_DbIN_peak_F20_US_WCNPO_LL_deep_Q34(28)

scend_se_F1_JPN_WCNPO OSDWCOLL_late_Area1(1)_BL

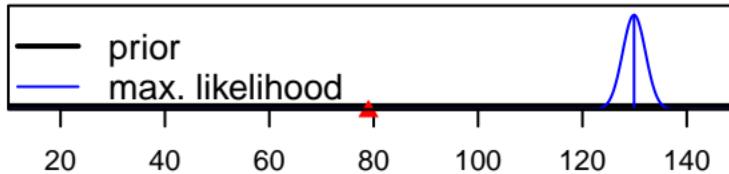


Size_DbIN_ascend_se_F20_US_WCNPO_LL_deep_Q34(28) scend_se_F1_JPN_WCNPO OSDWCOLL_late_Area1(1)_BL

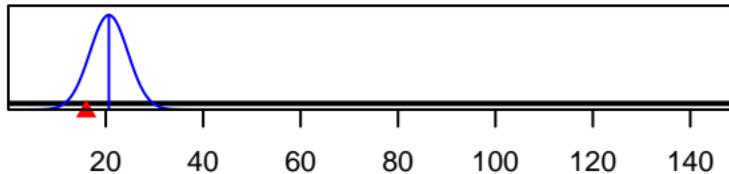


Parameter value

:e_inflection_F2_TWN_WCNPO_DWLL_late(2)_BLK1repl_20



:e_95%width_F2_TWN_WCNPO_DWLL_late(2)_BLK1repl_20



Density

Parameter value