

Plots created using the 'r4ss' package in R

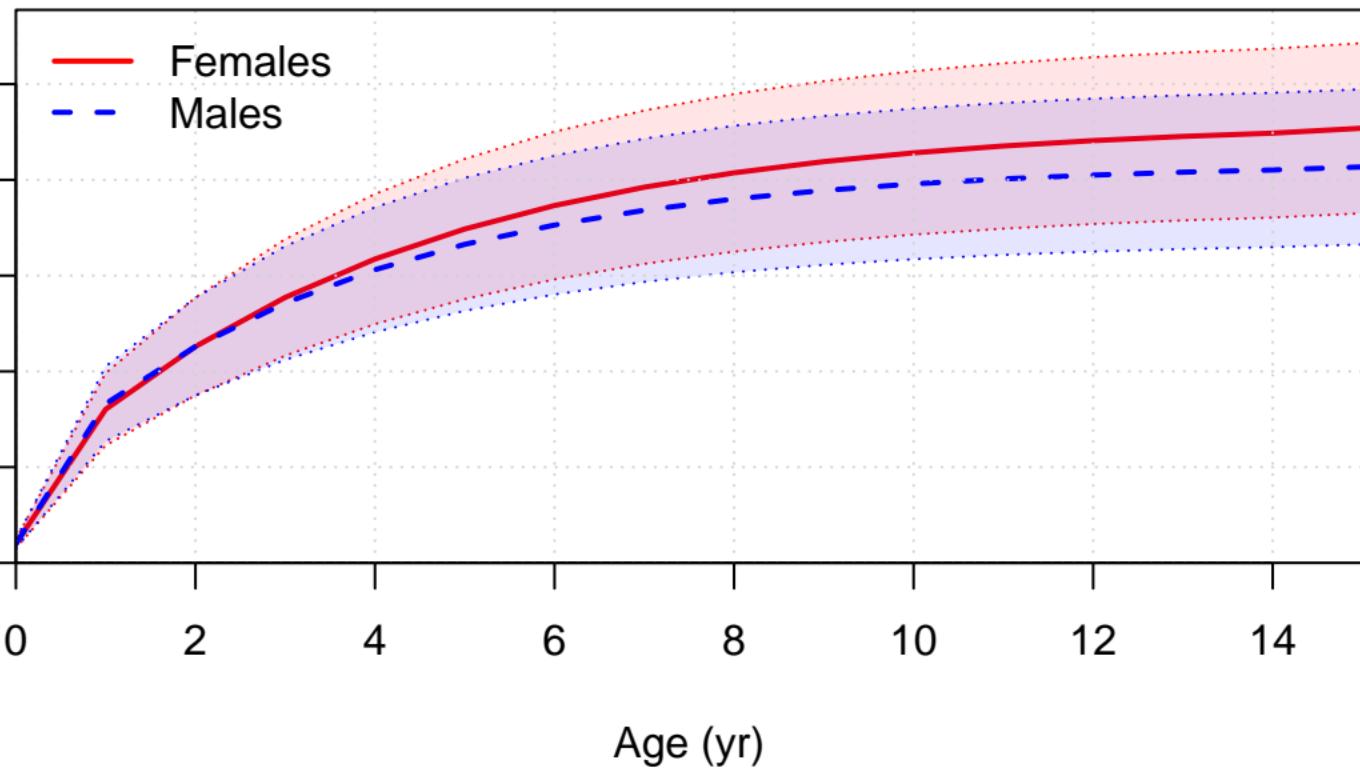
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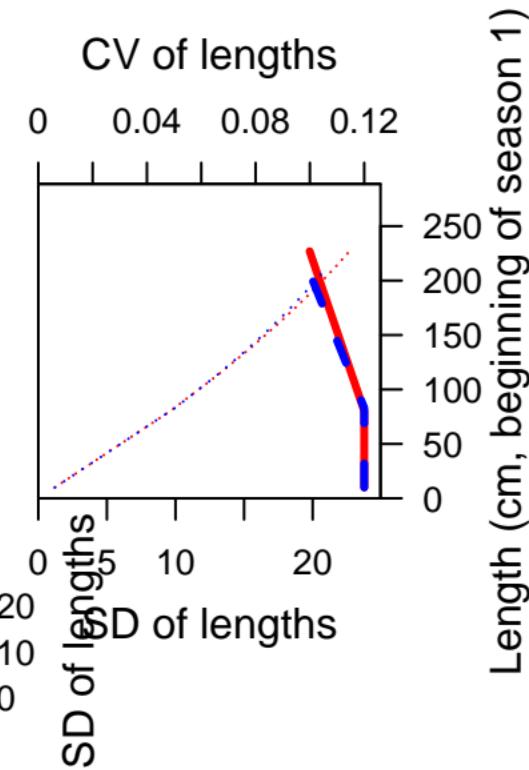
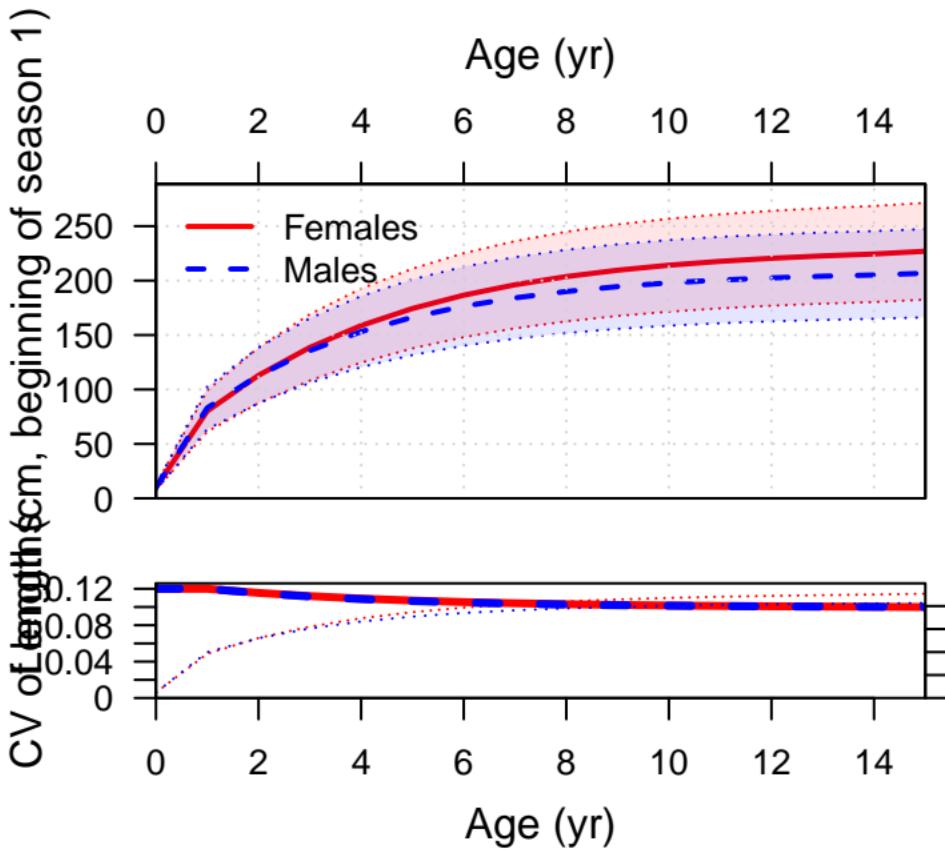
StartTime: Fri Apr 14 12:35:51 2023

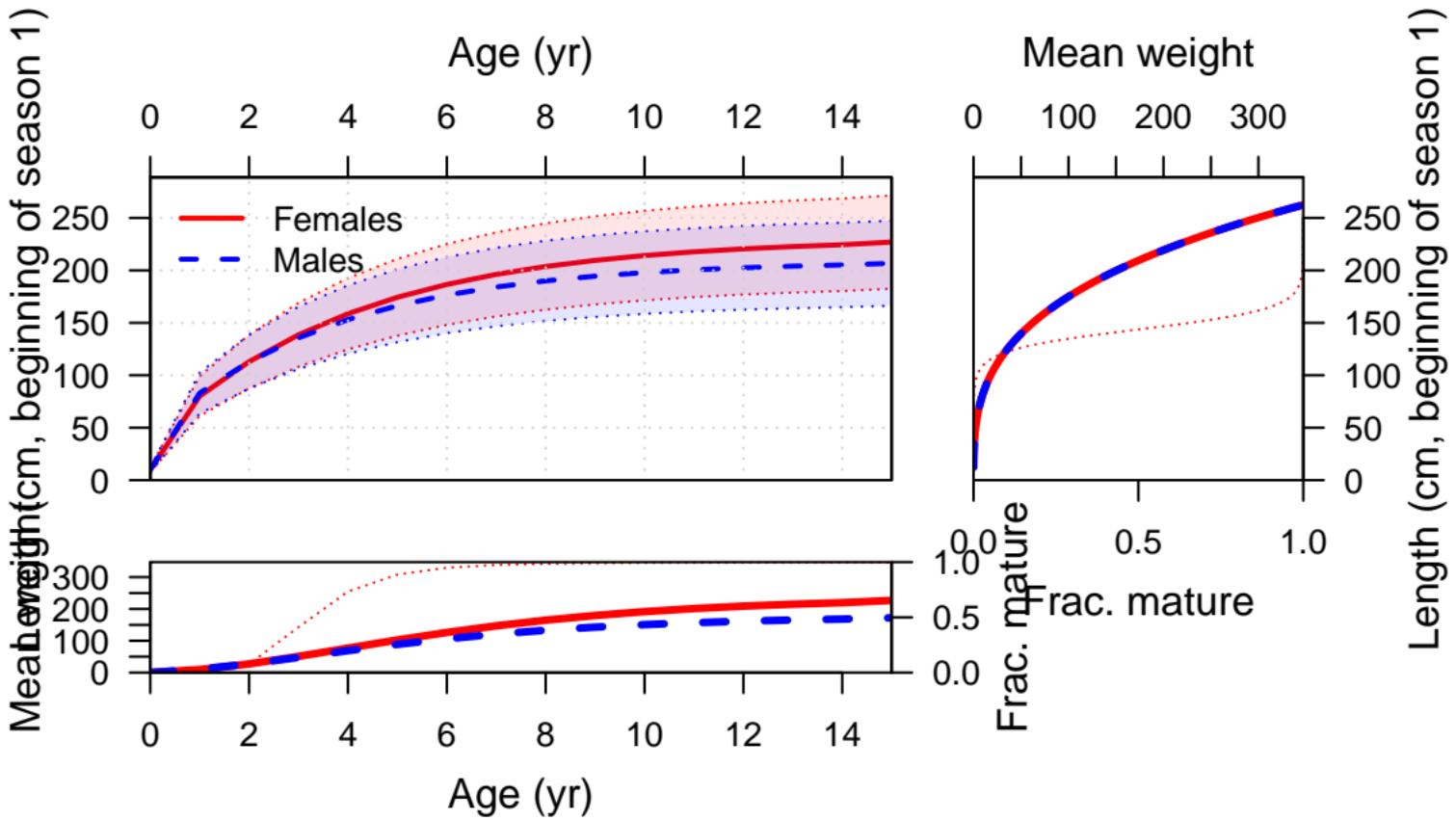
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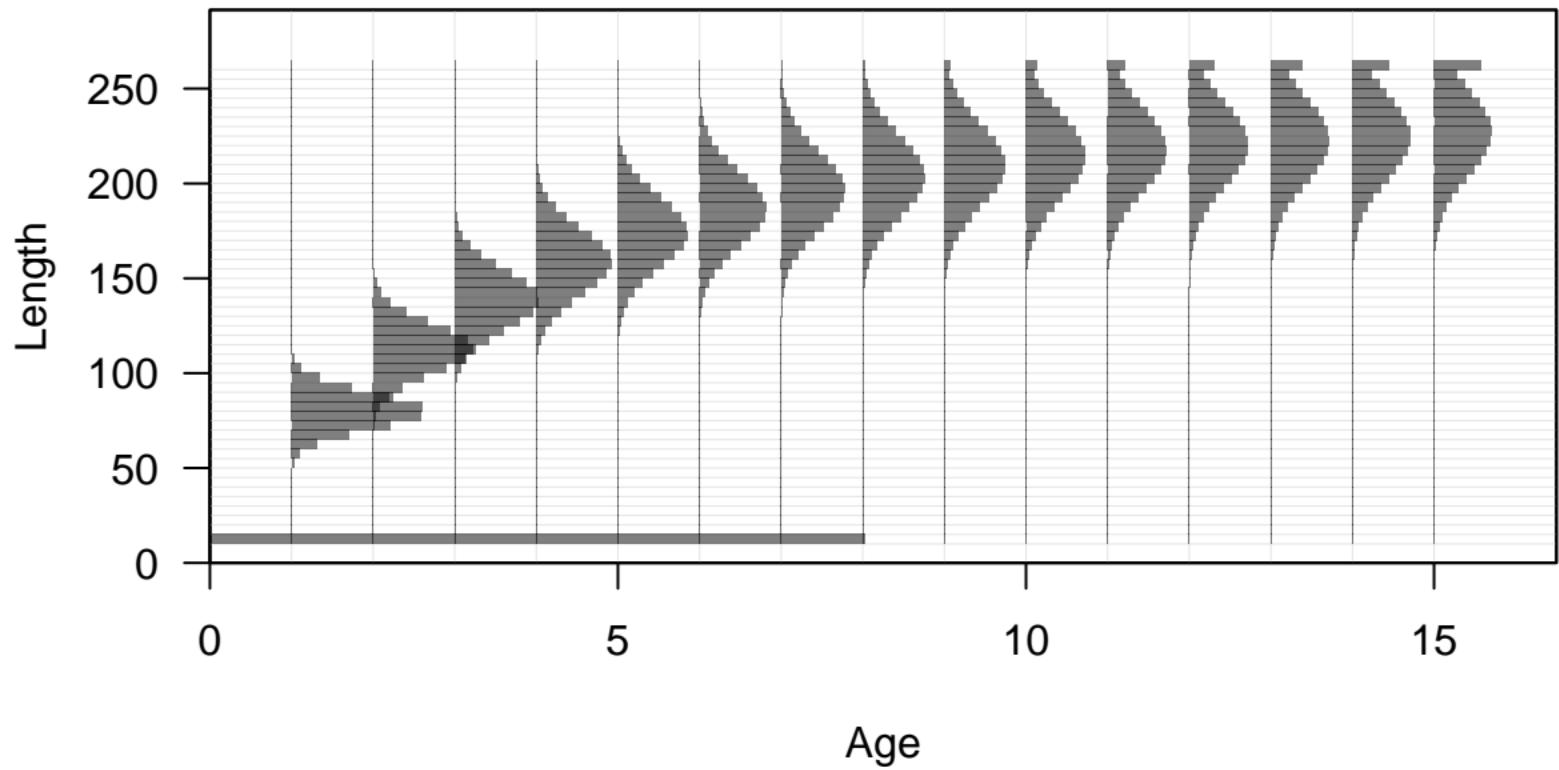
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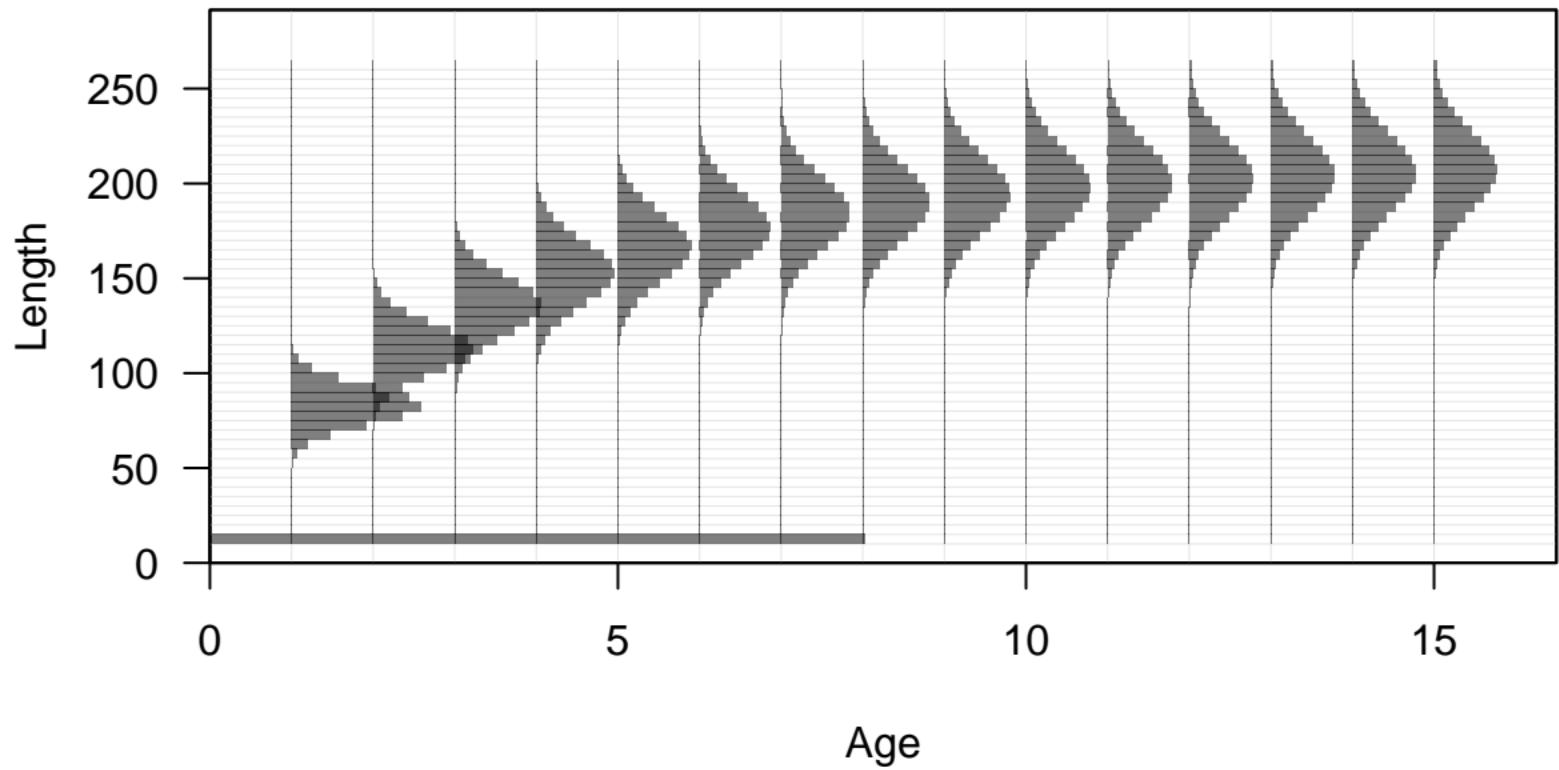
Length (cm, beginning of season 1)

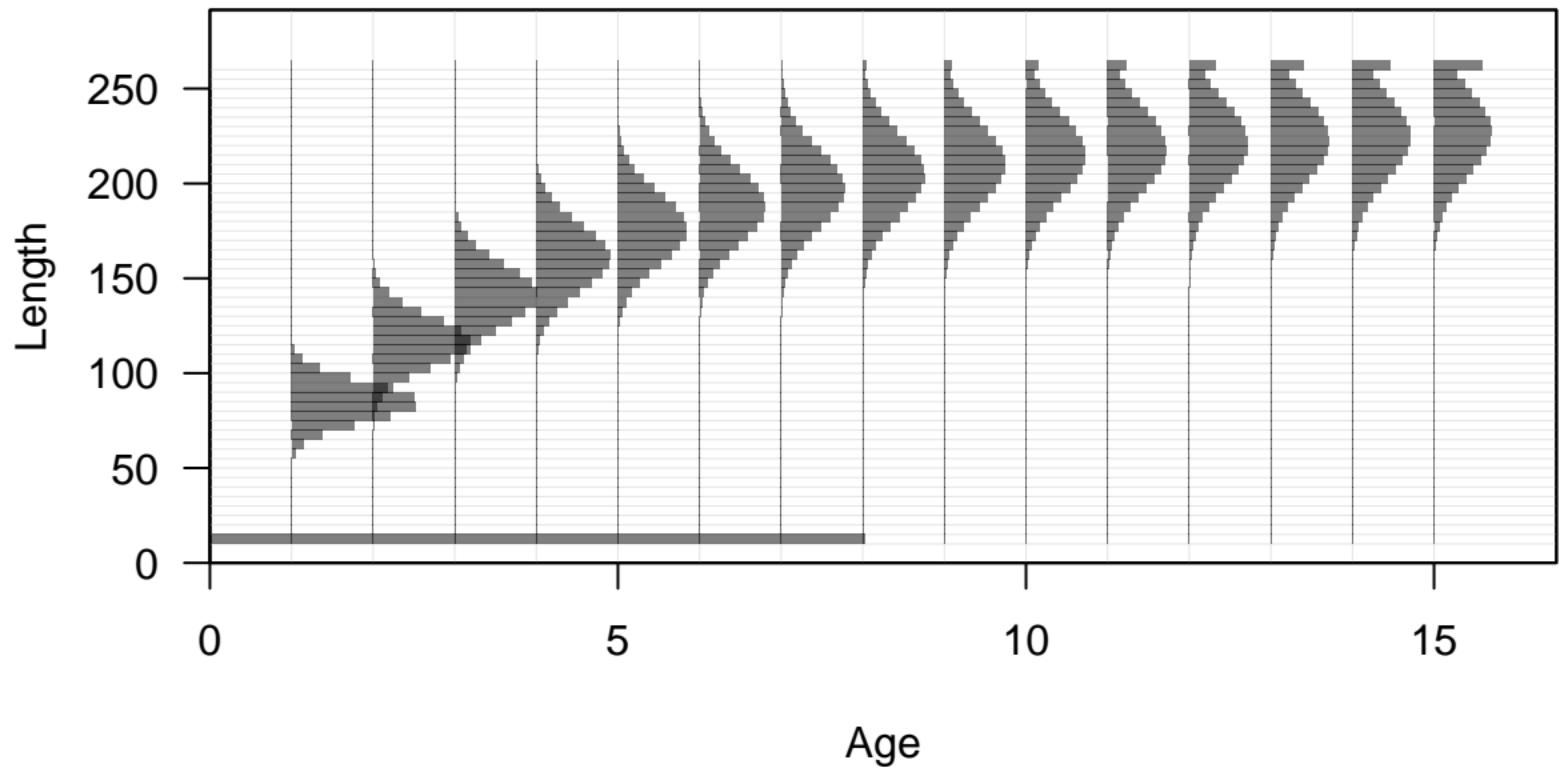


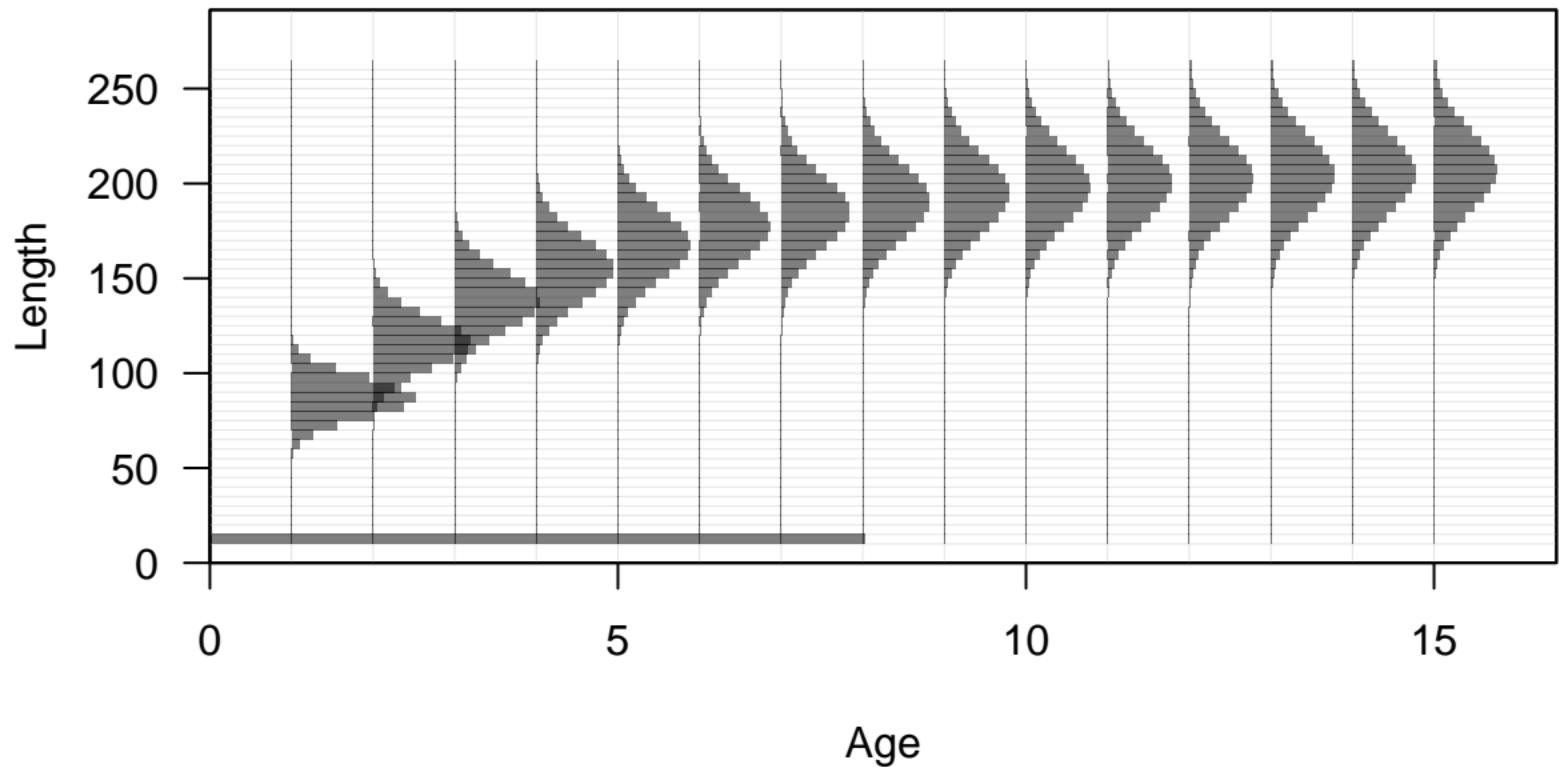


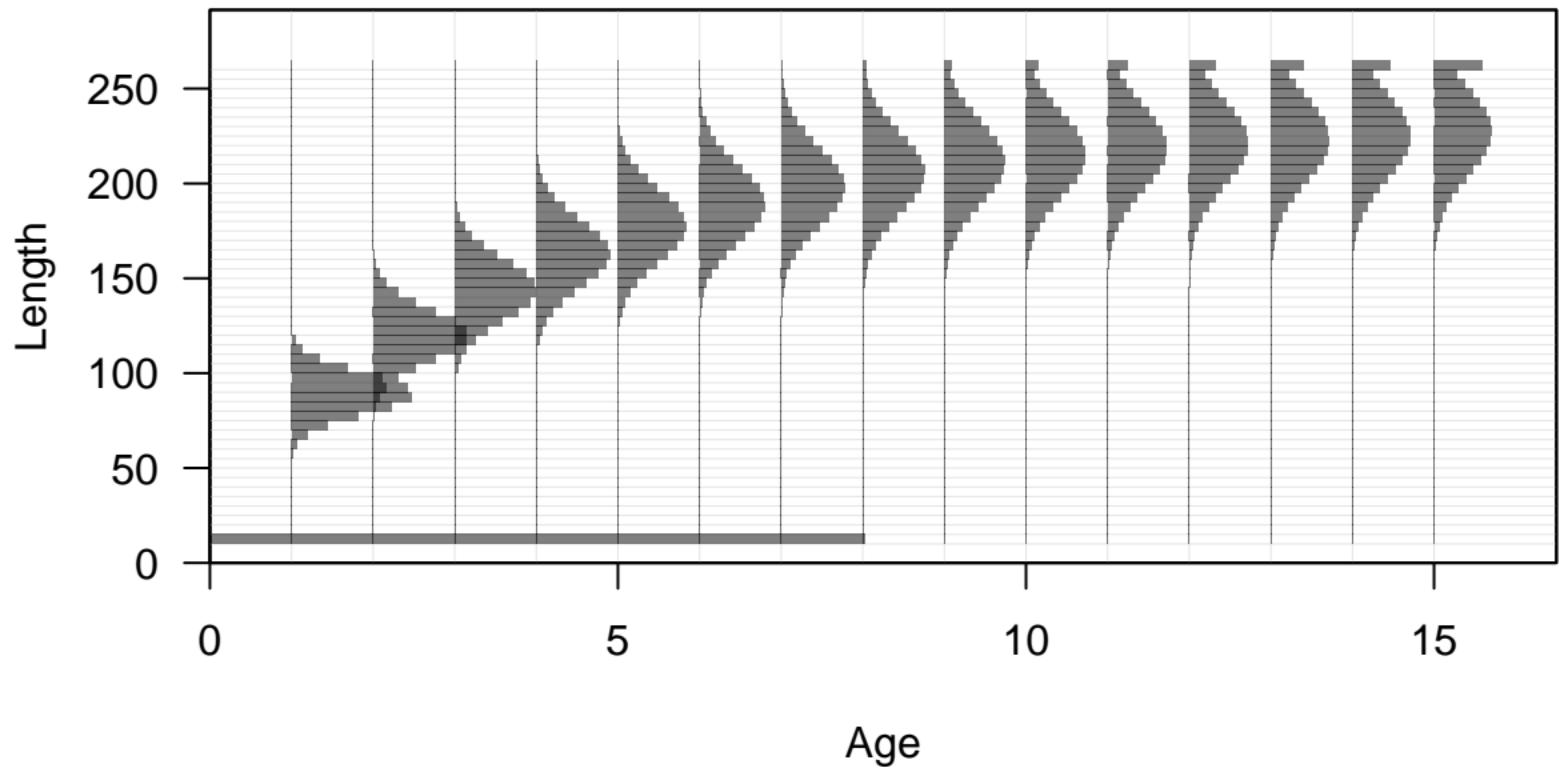


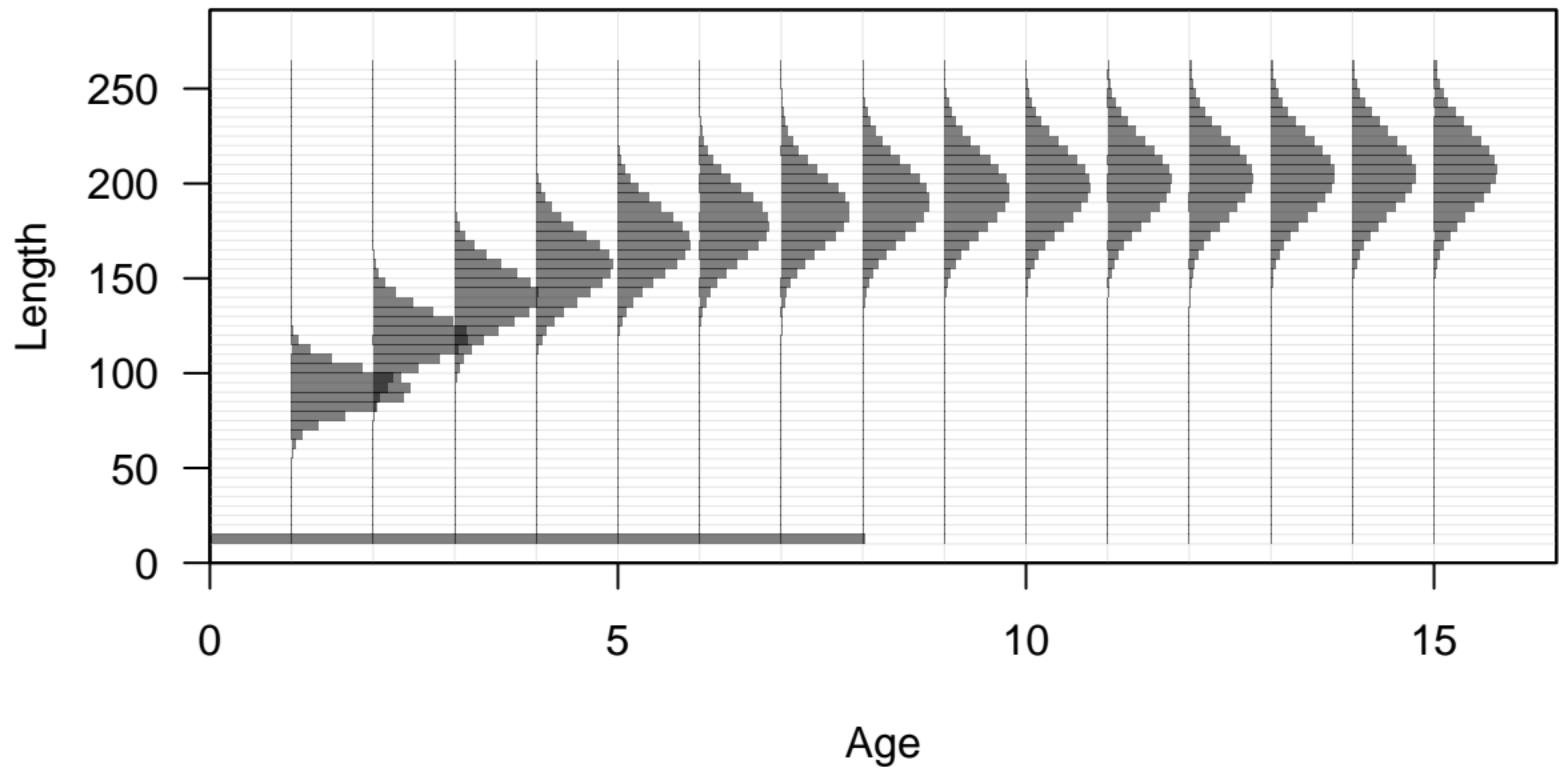


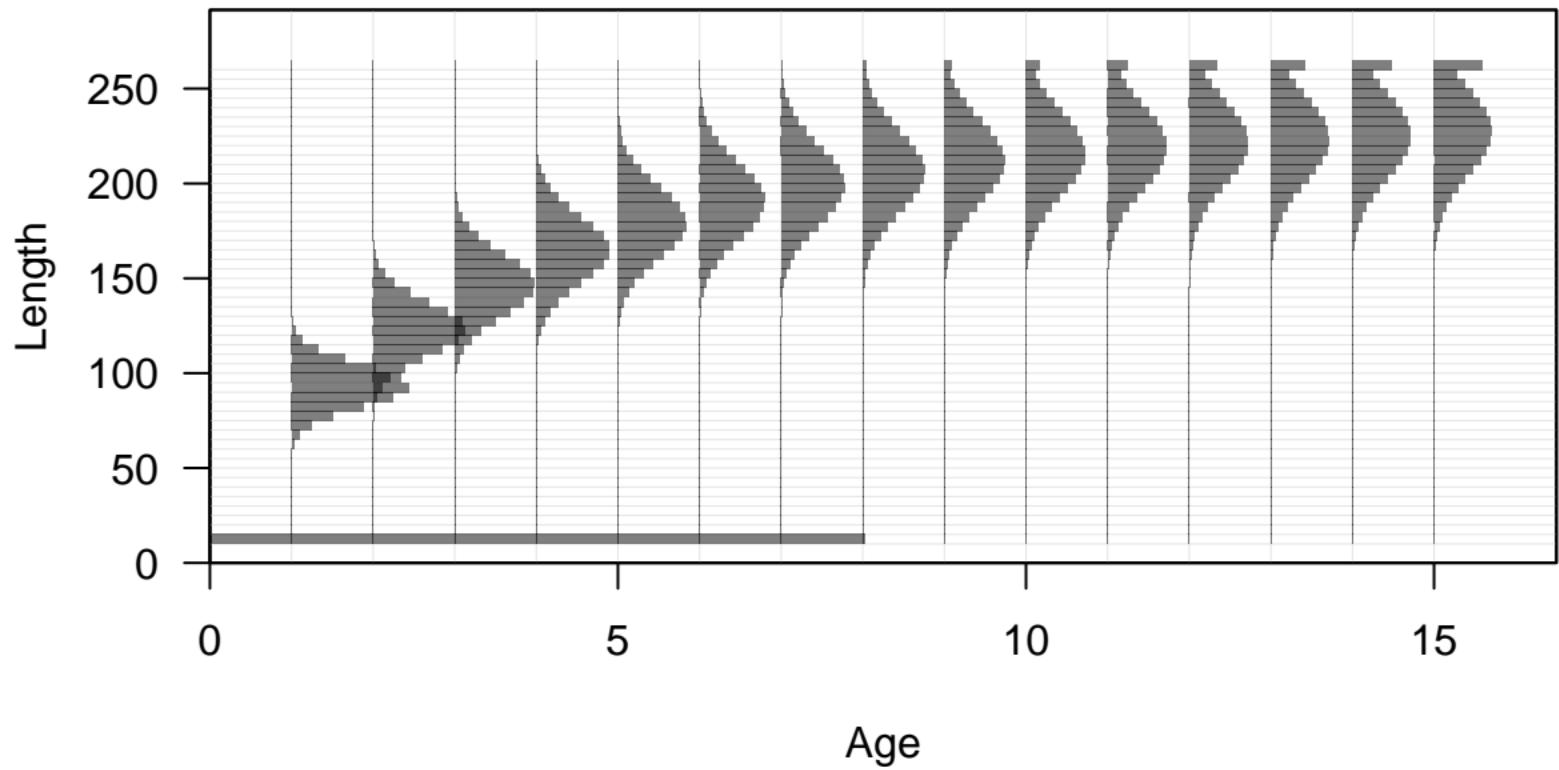


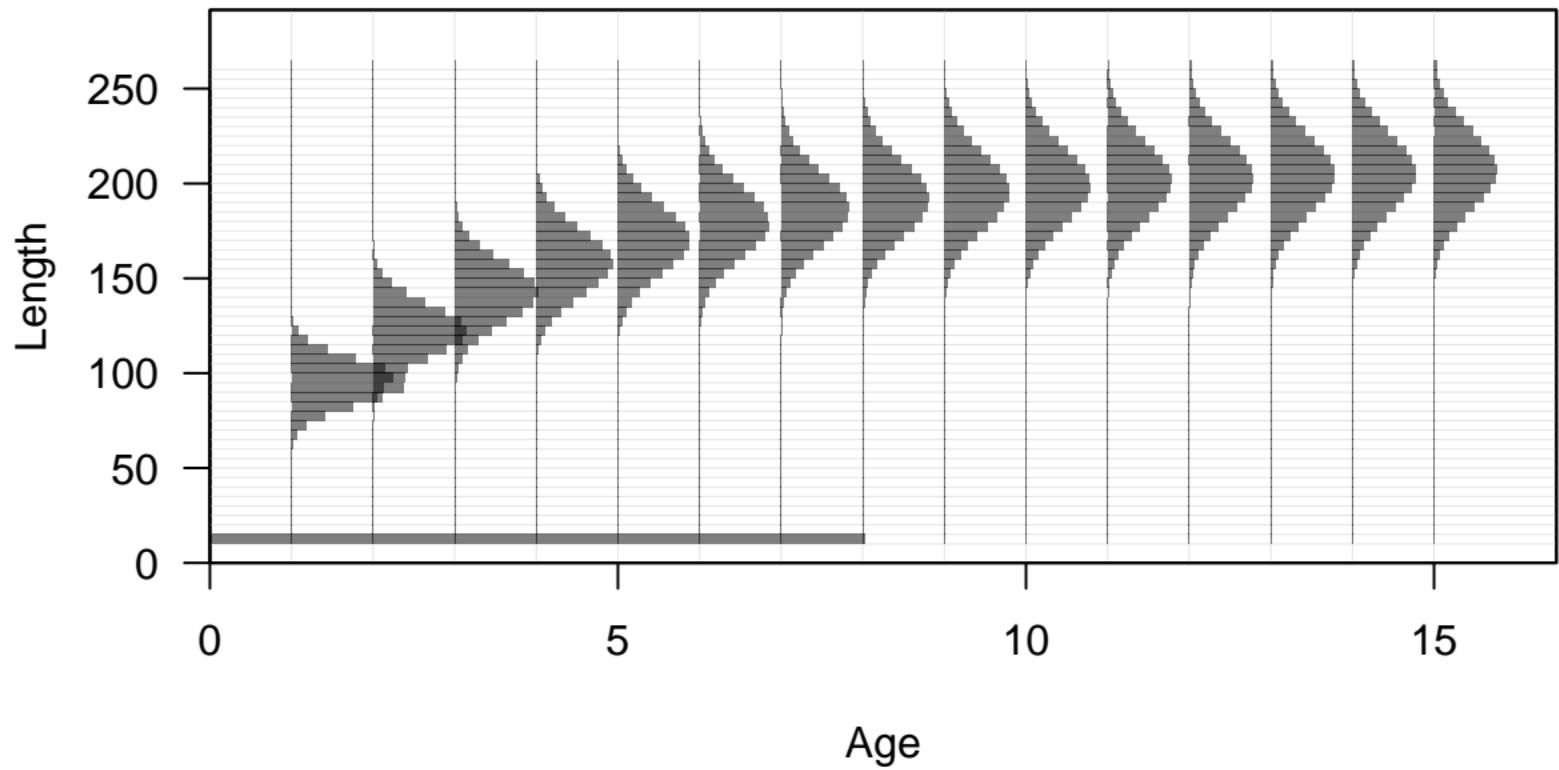


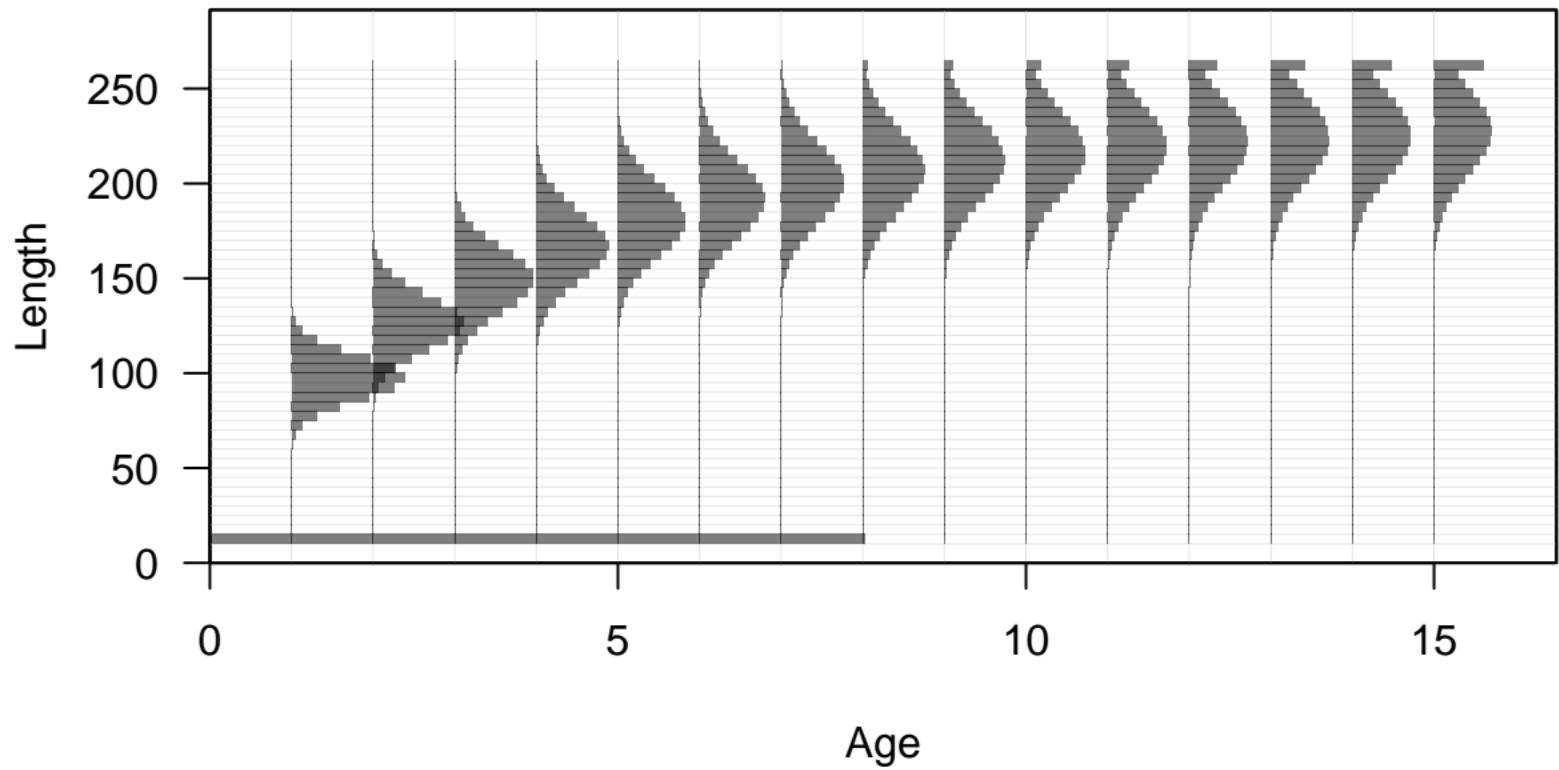


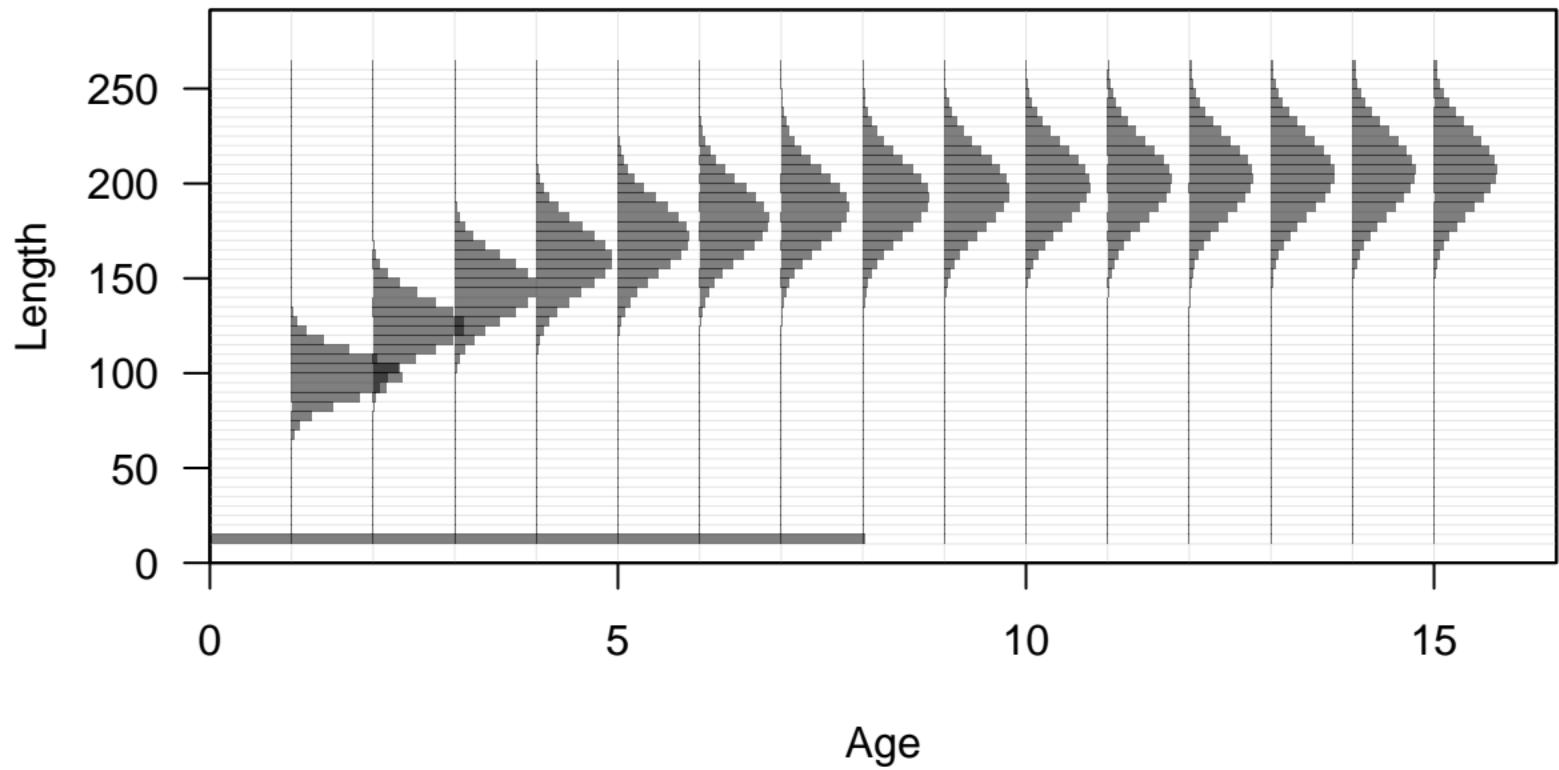


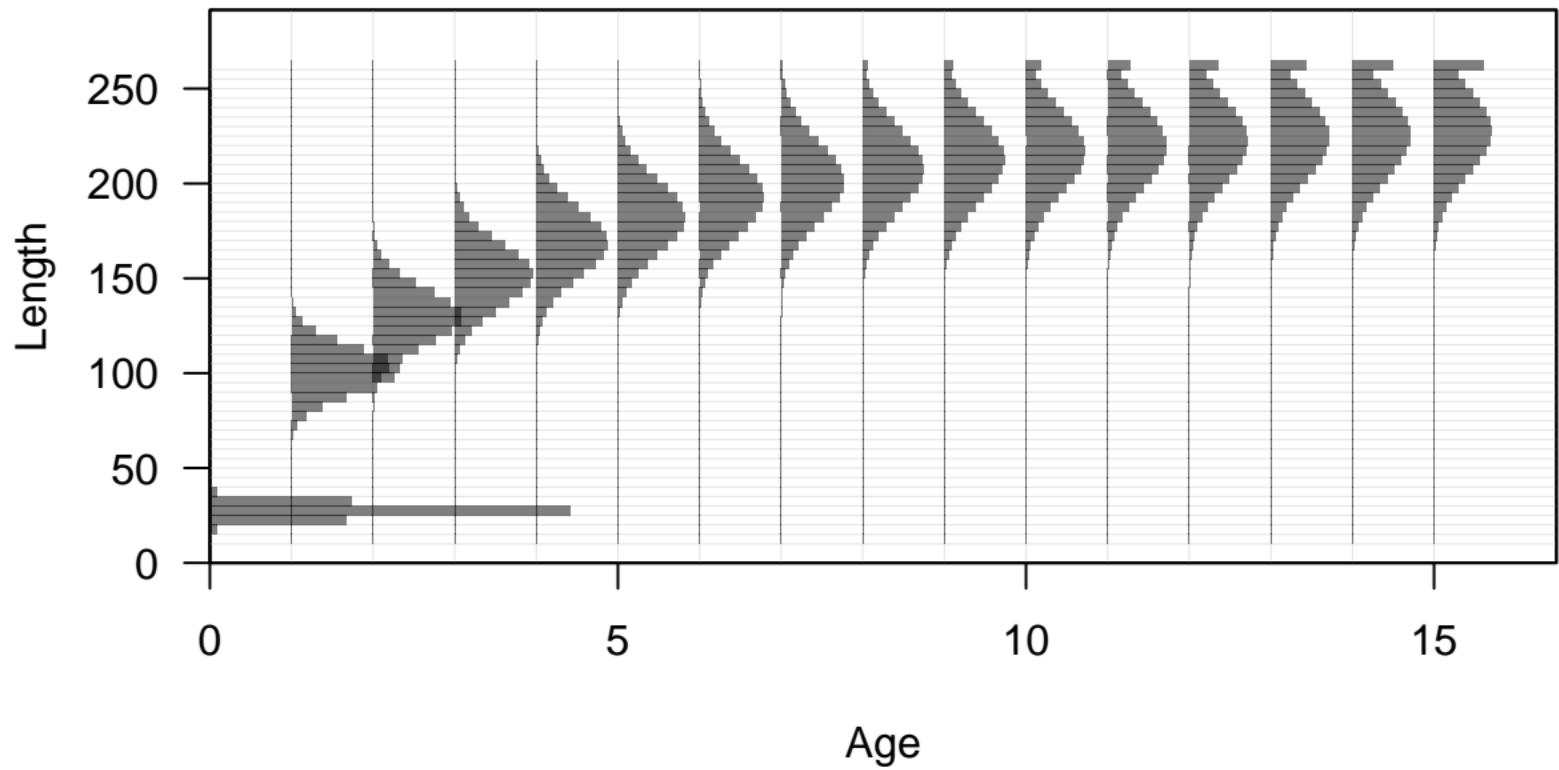


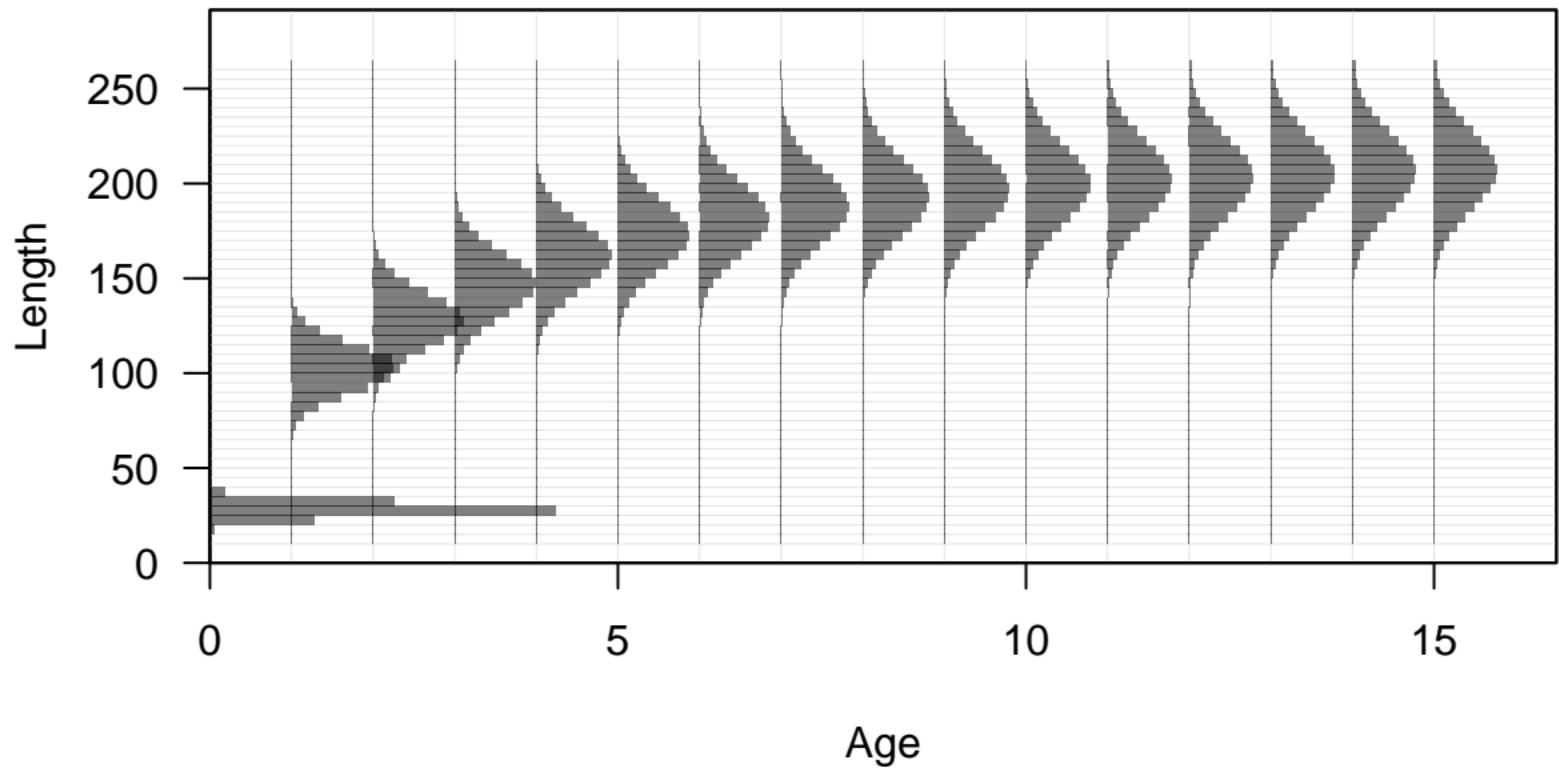


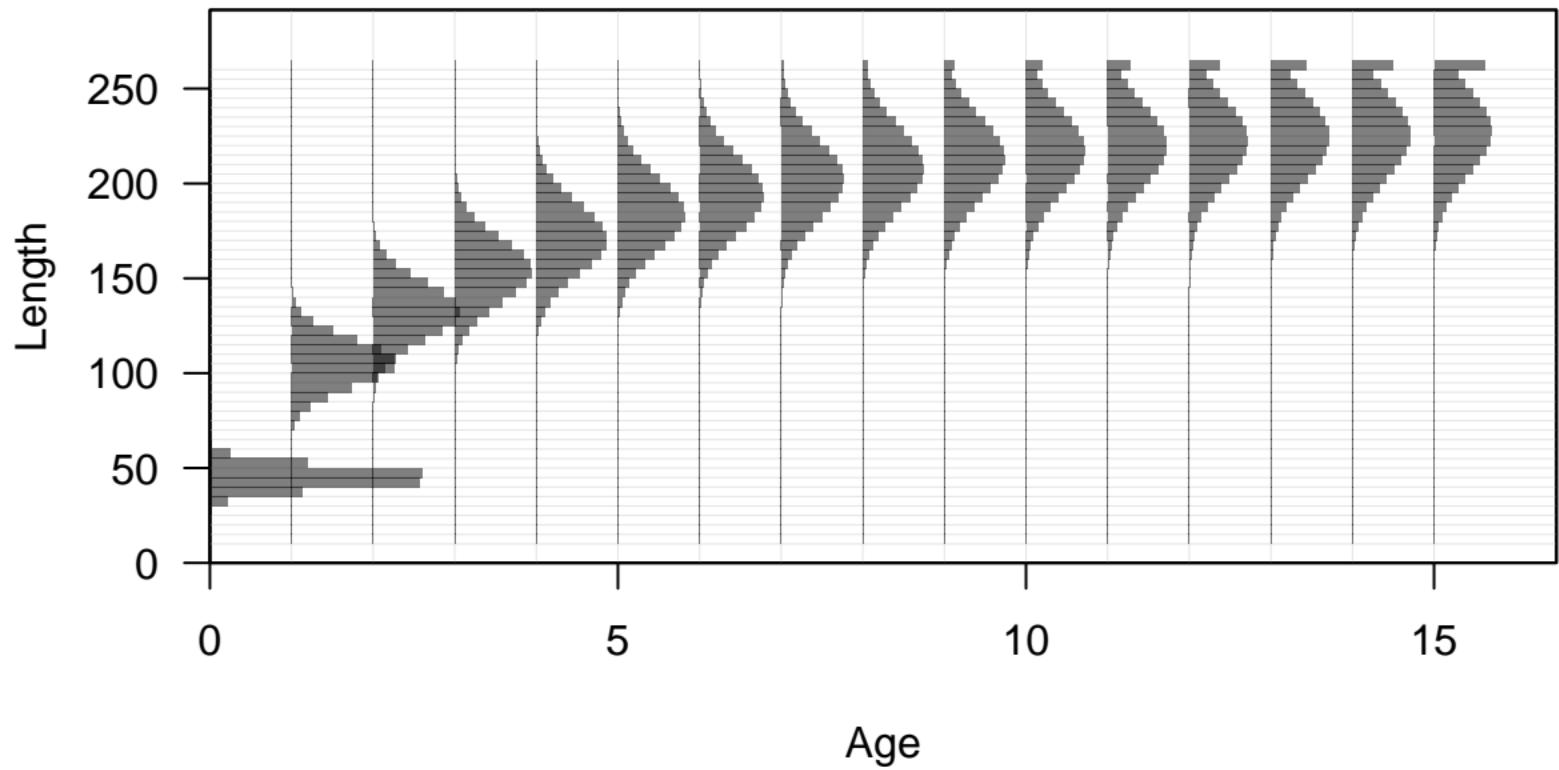


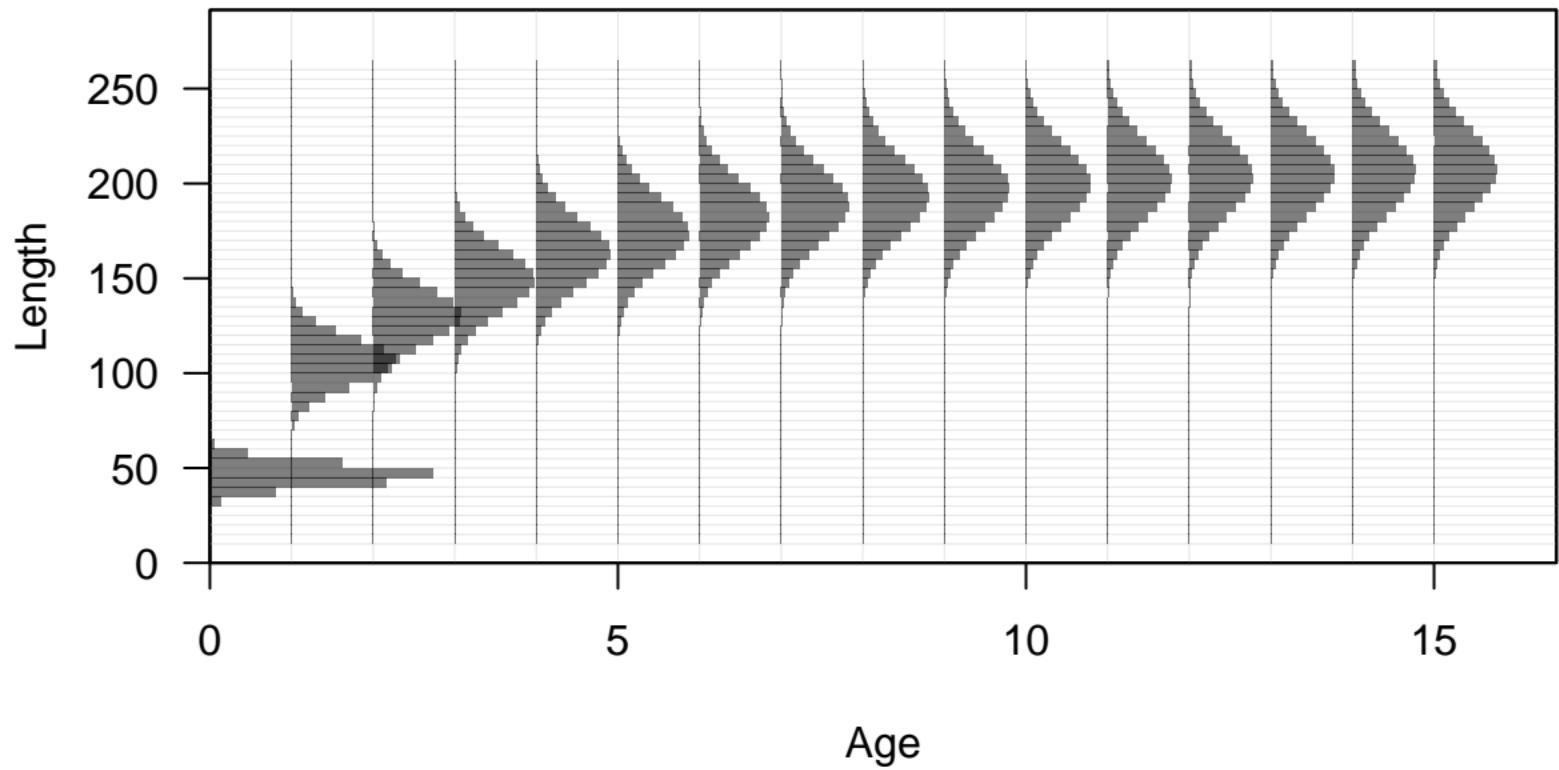


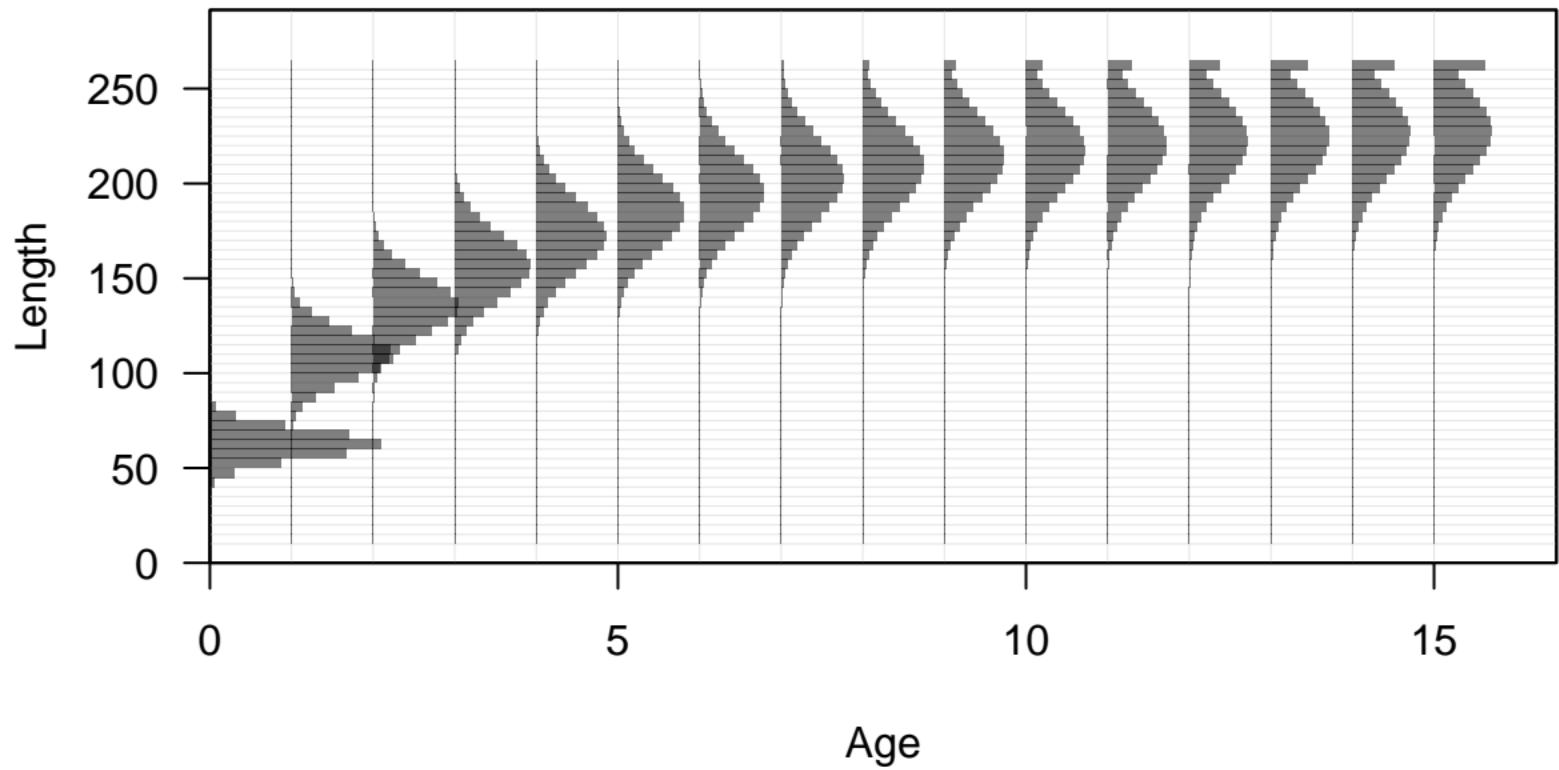


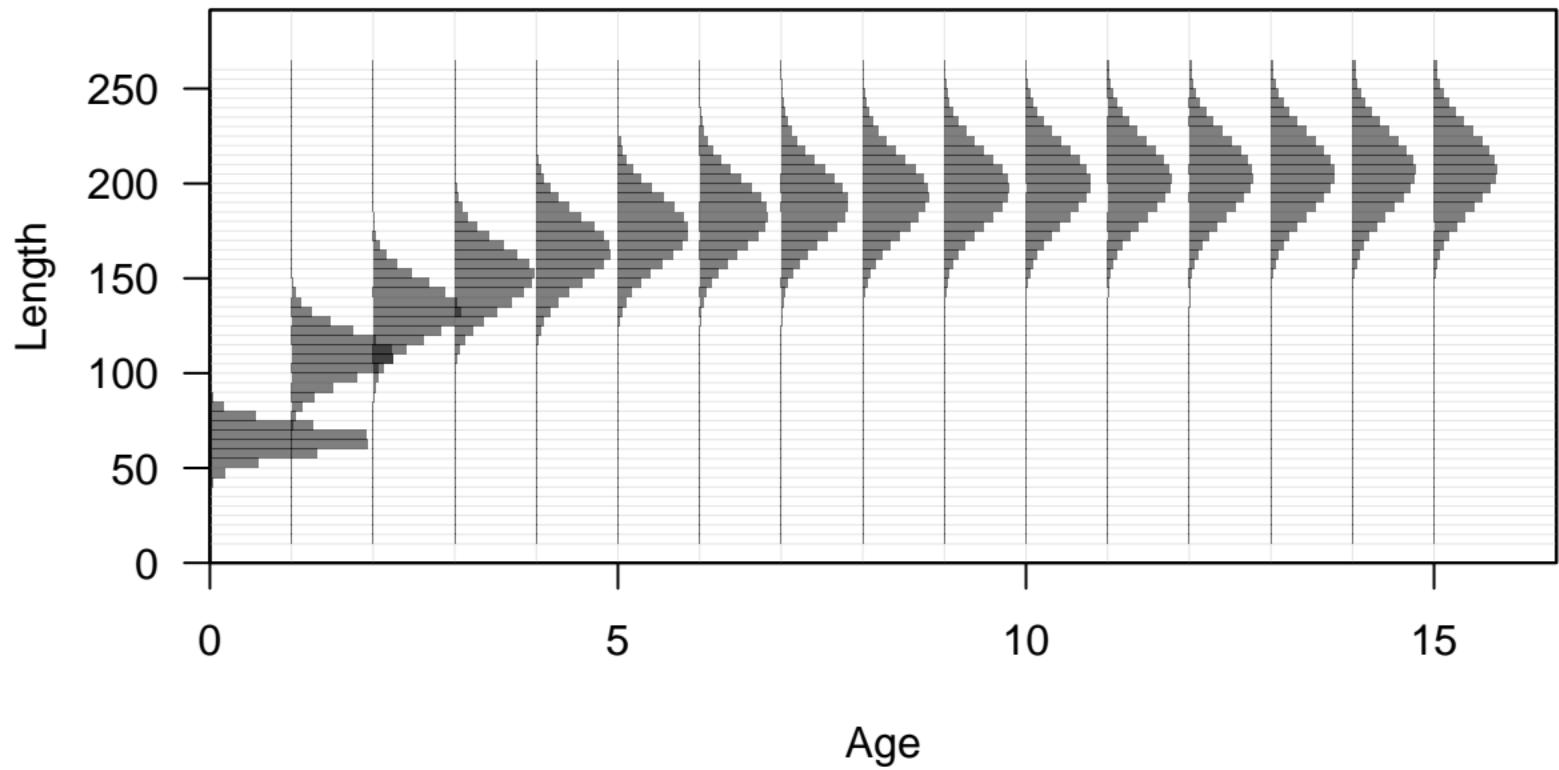


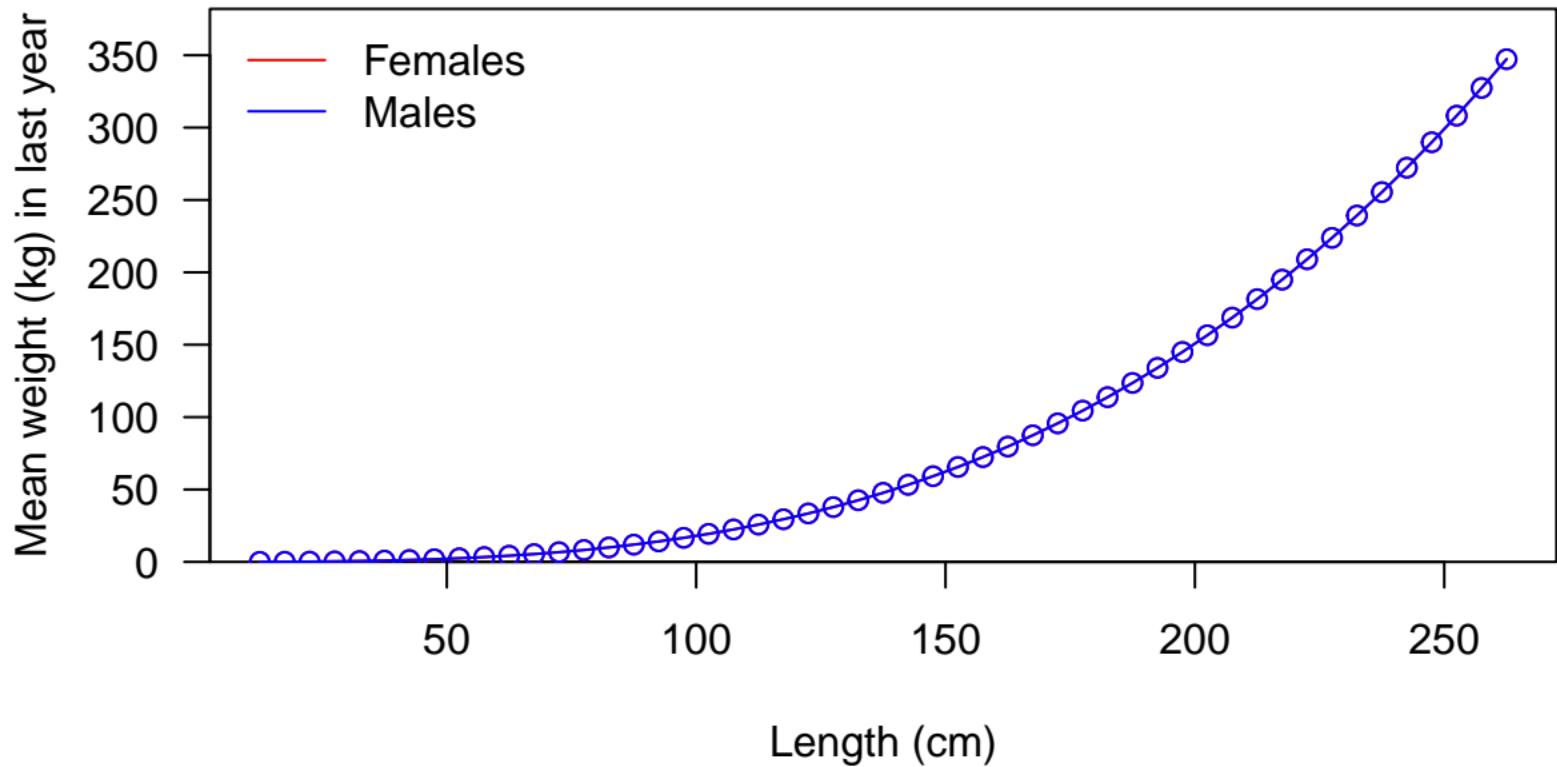


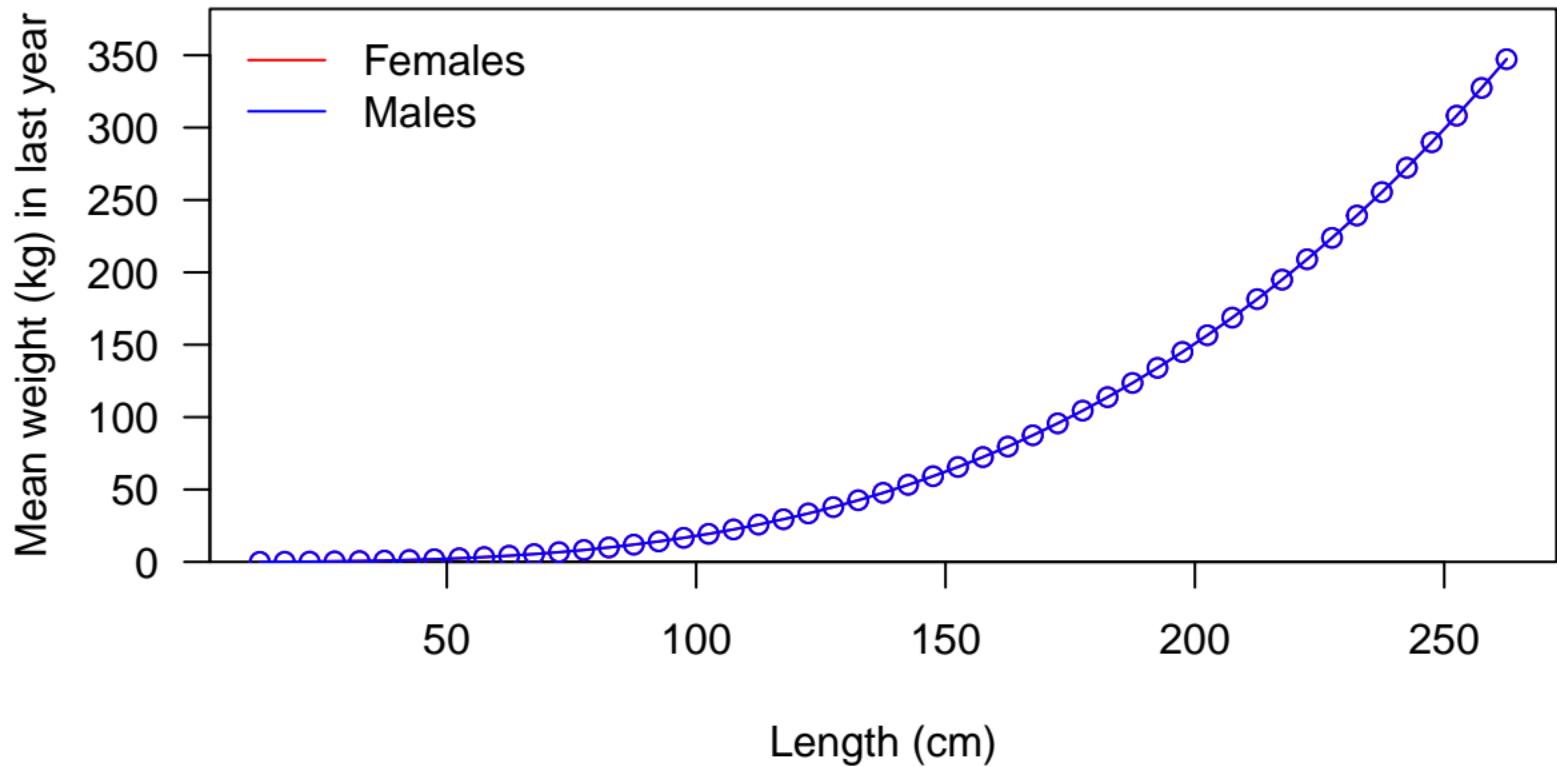


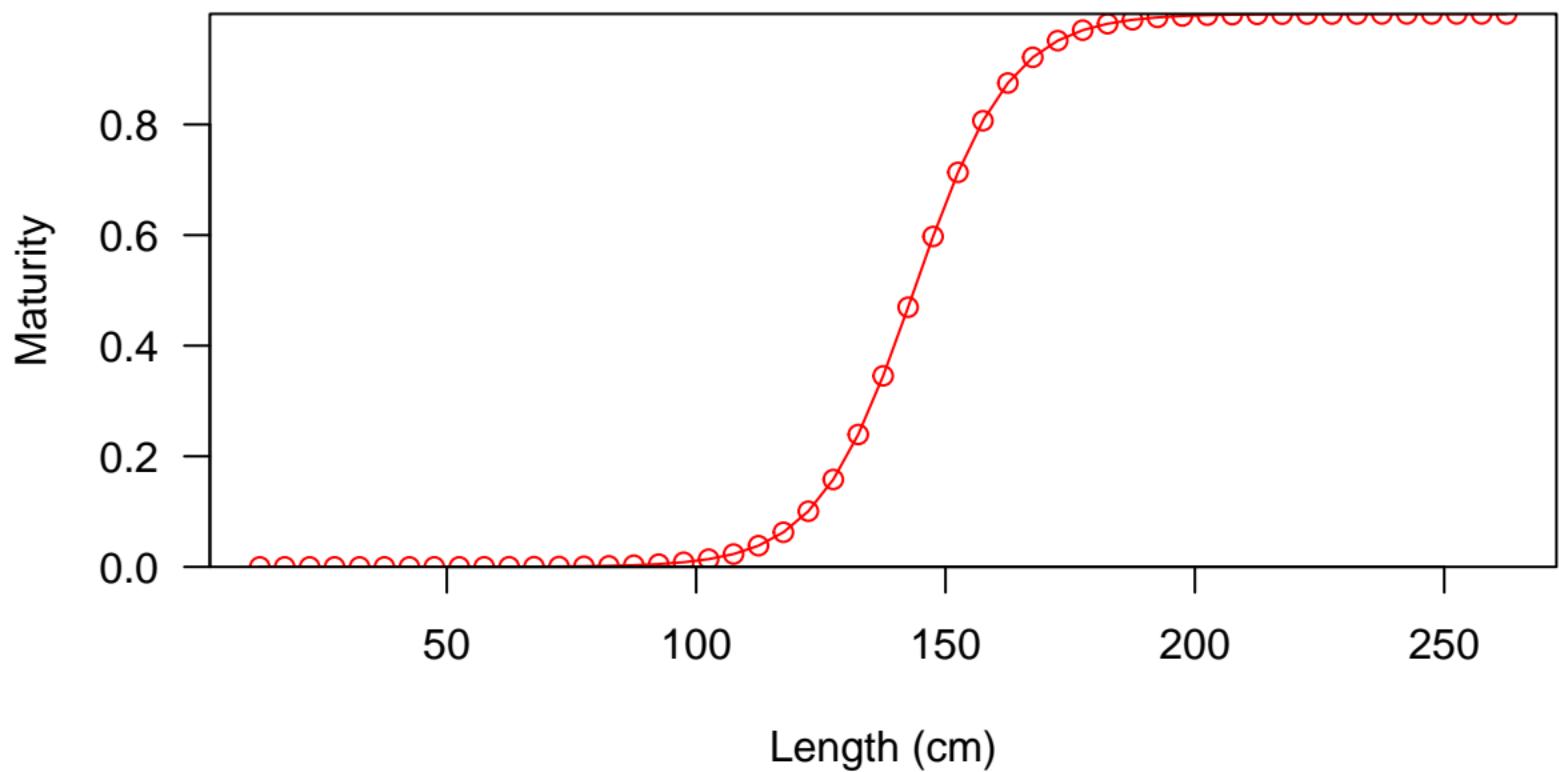


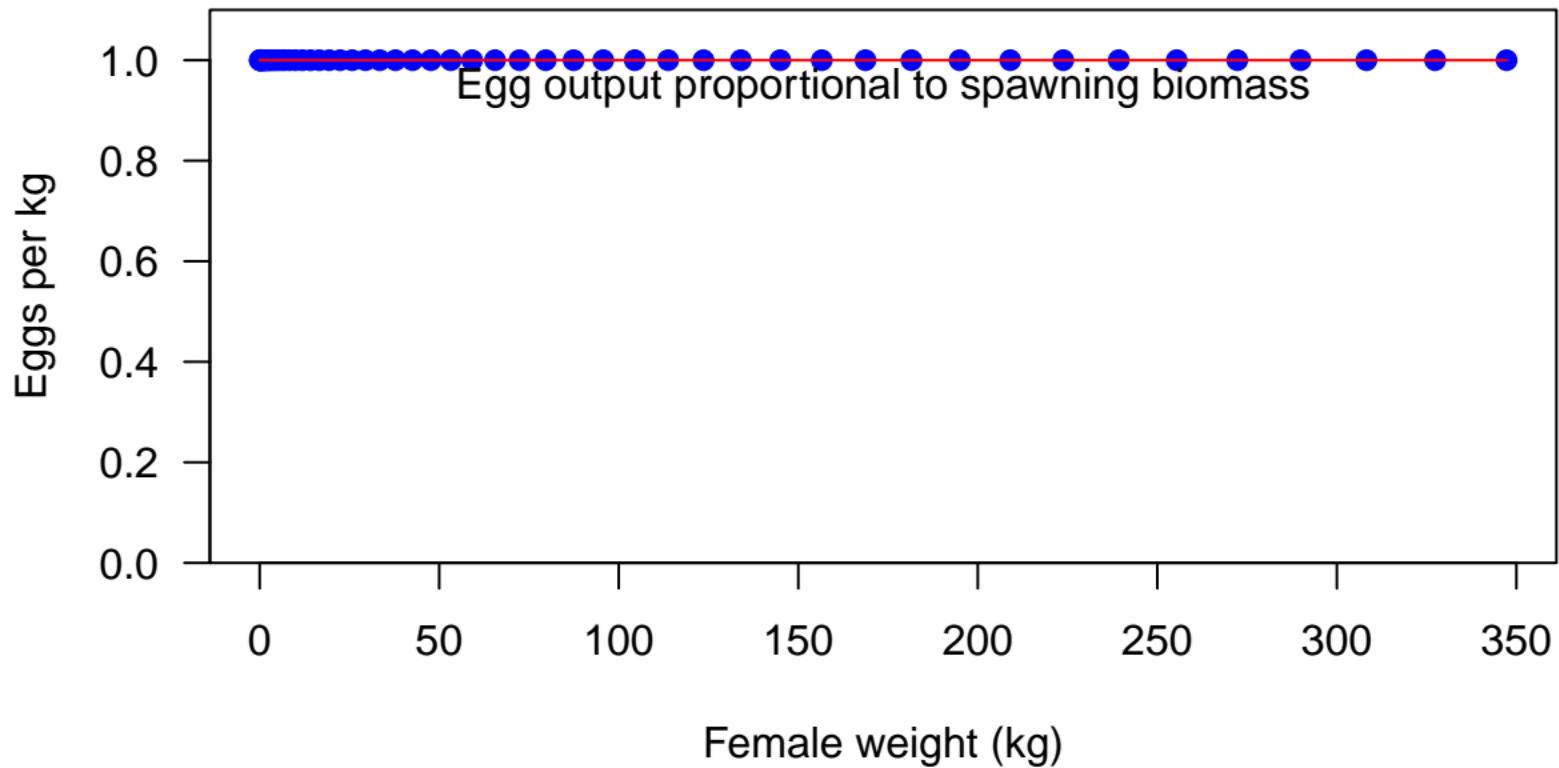


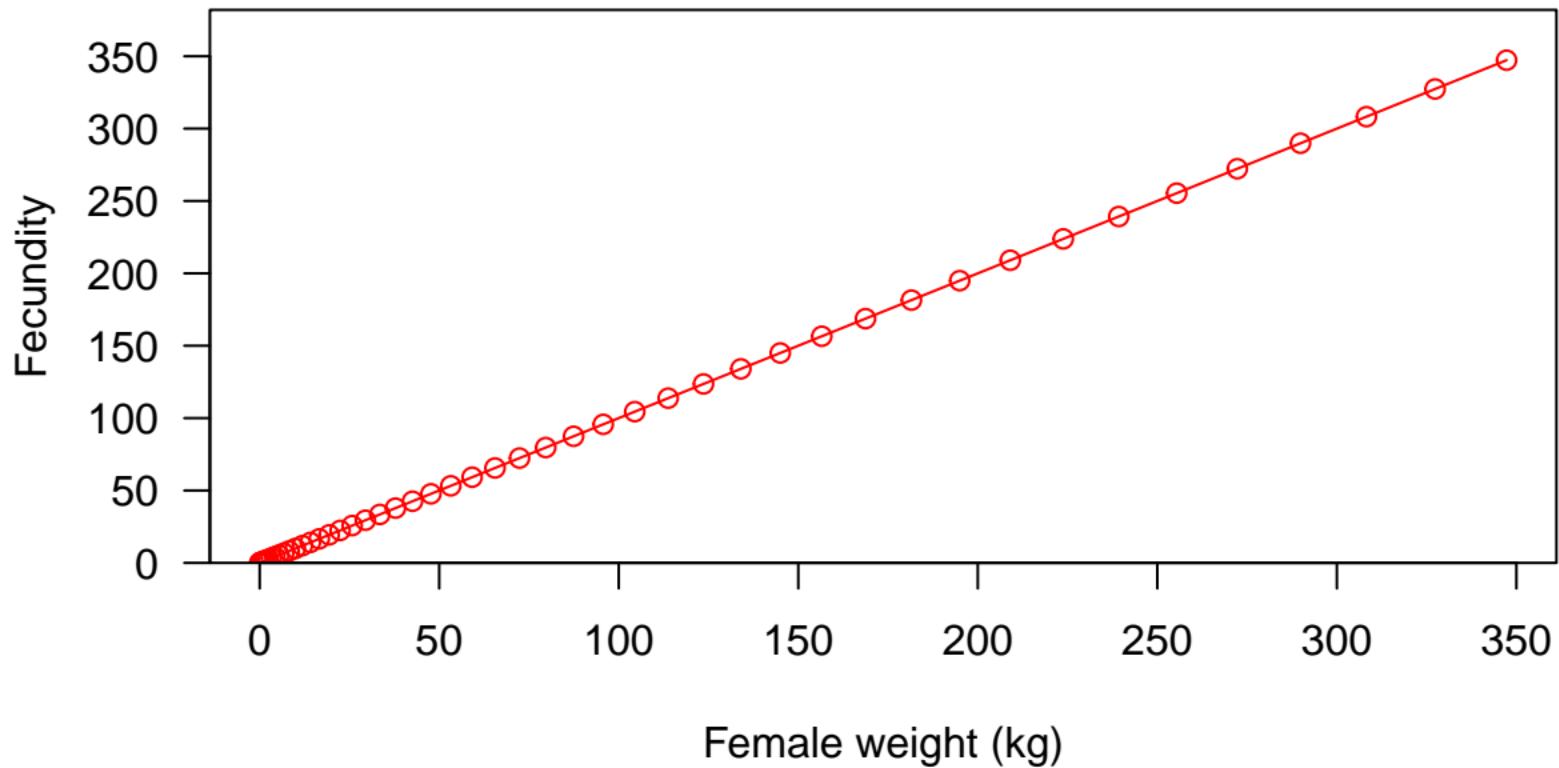


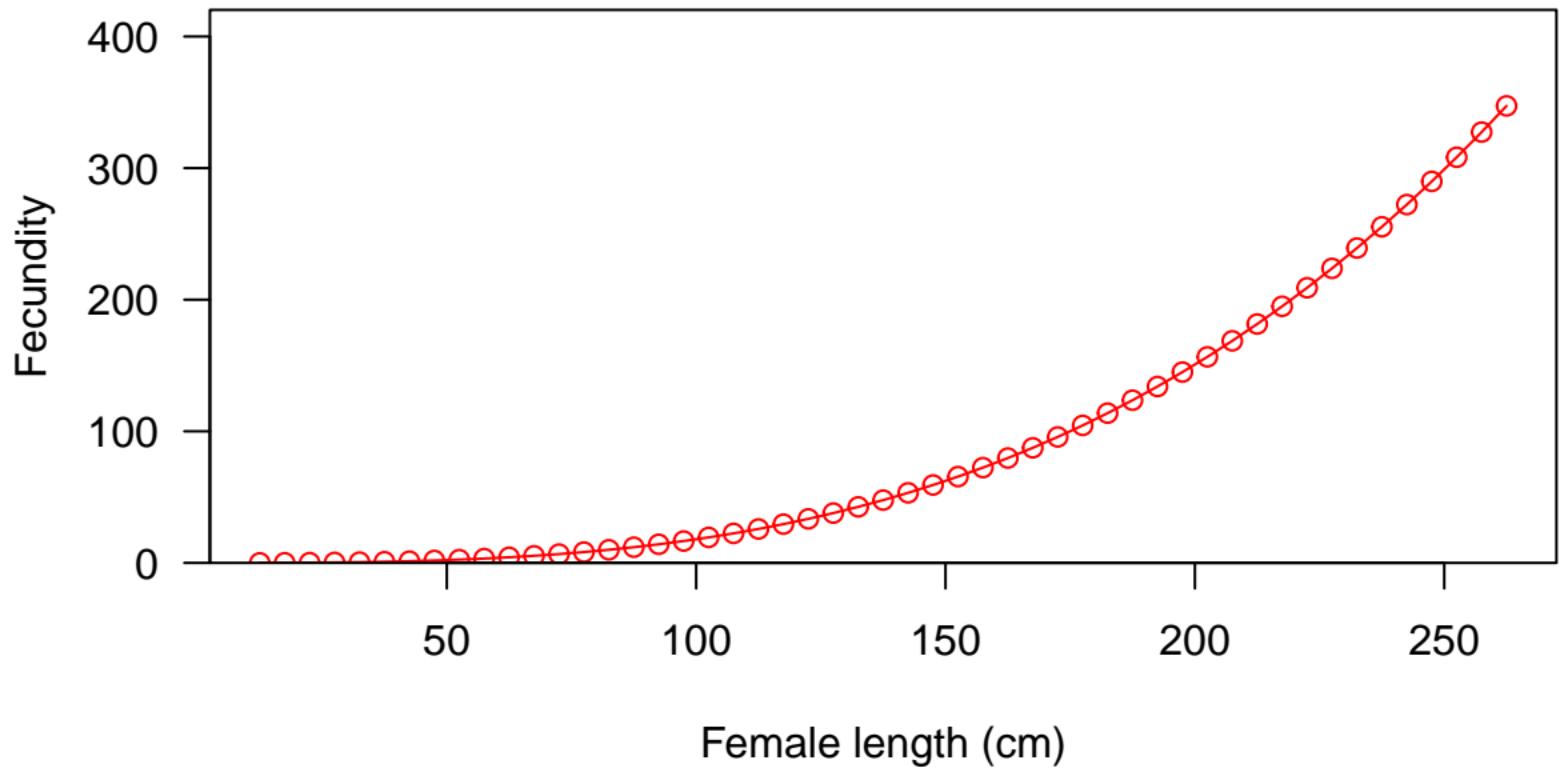


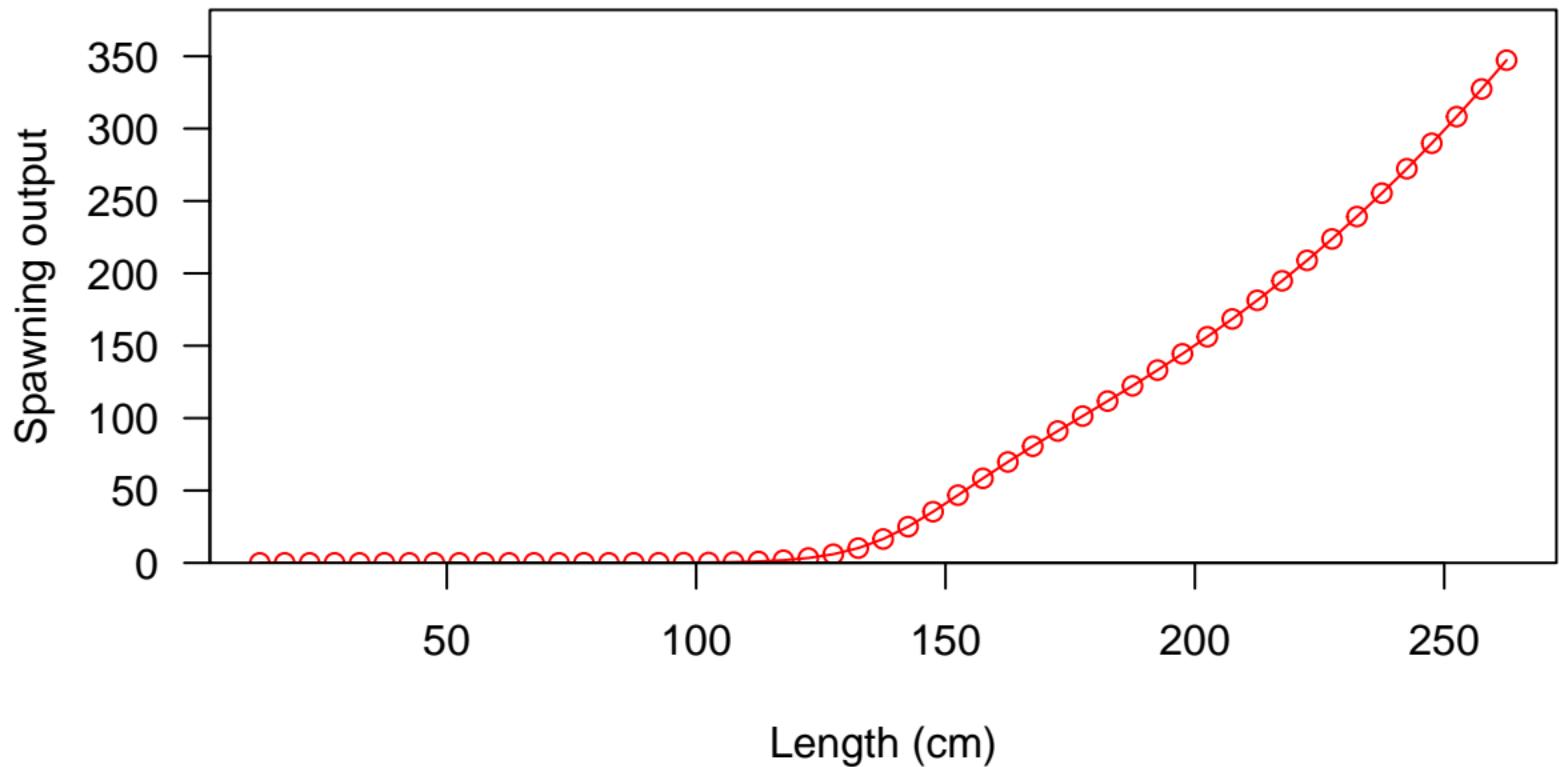


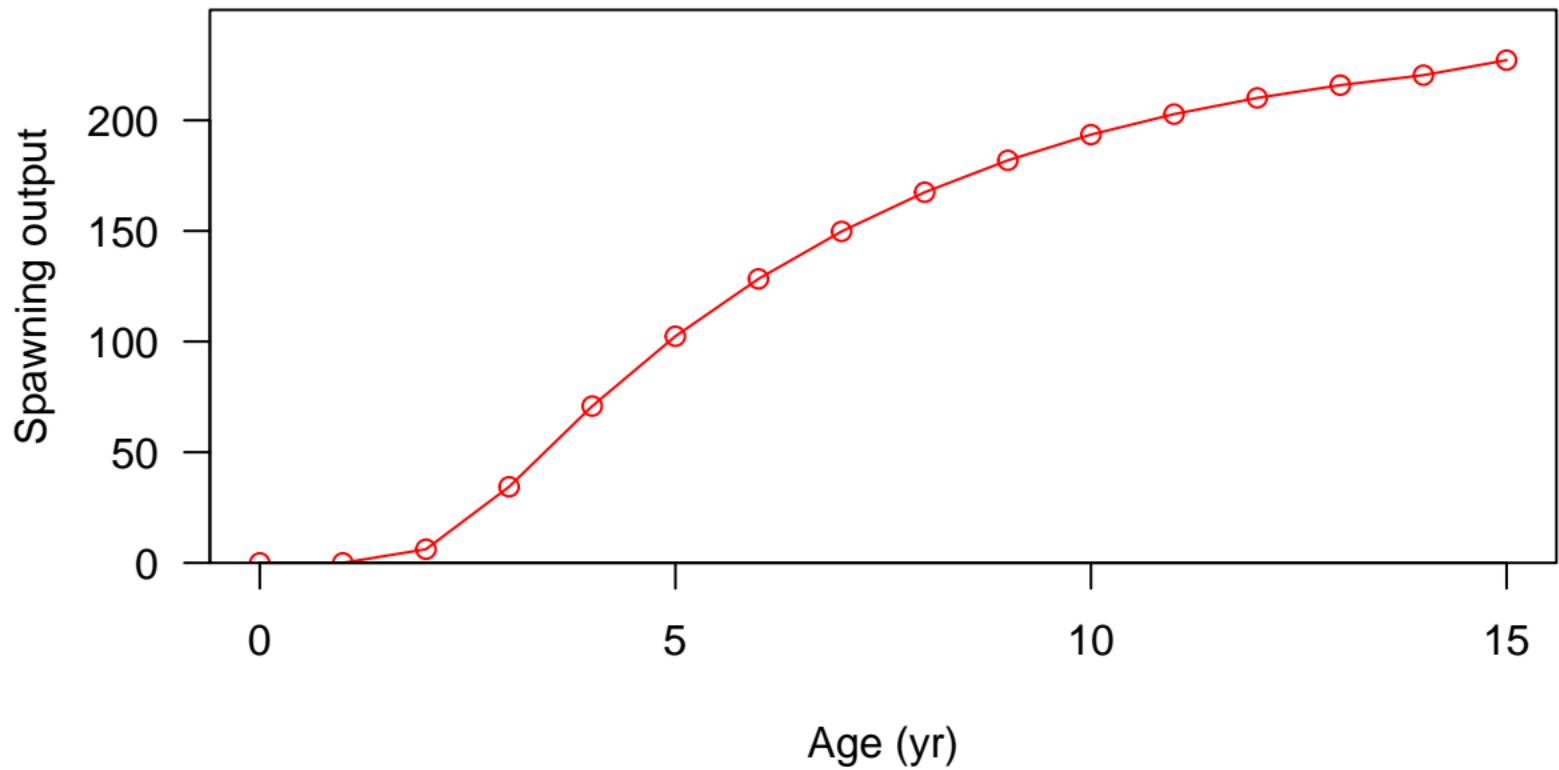


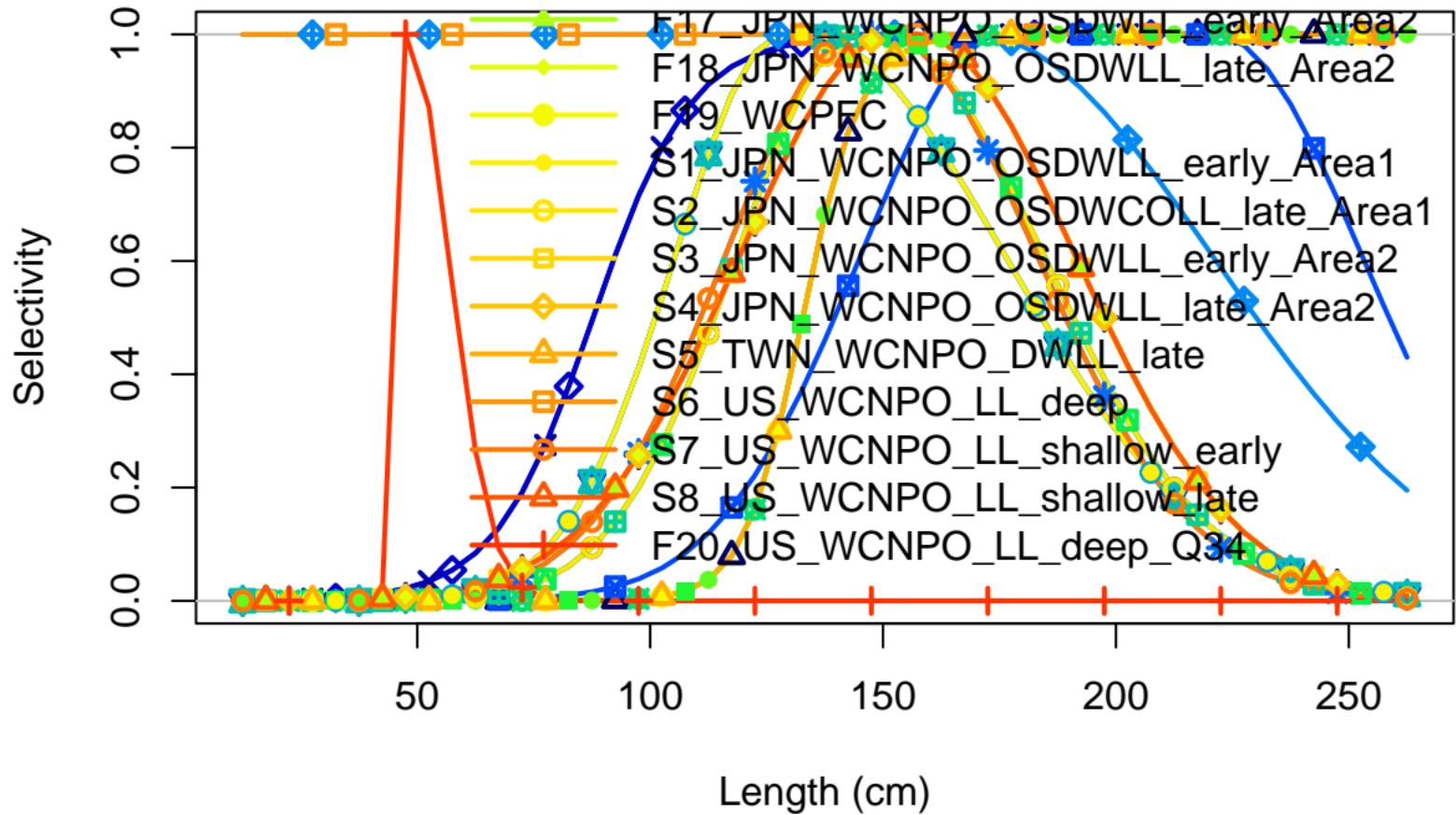


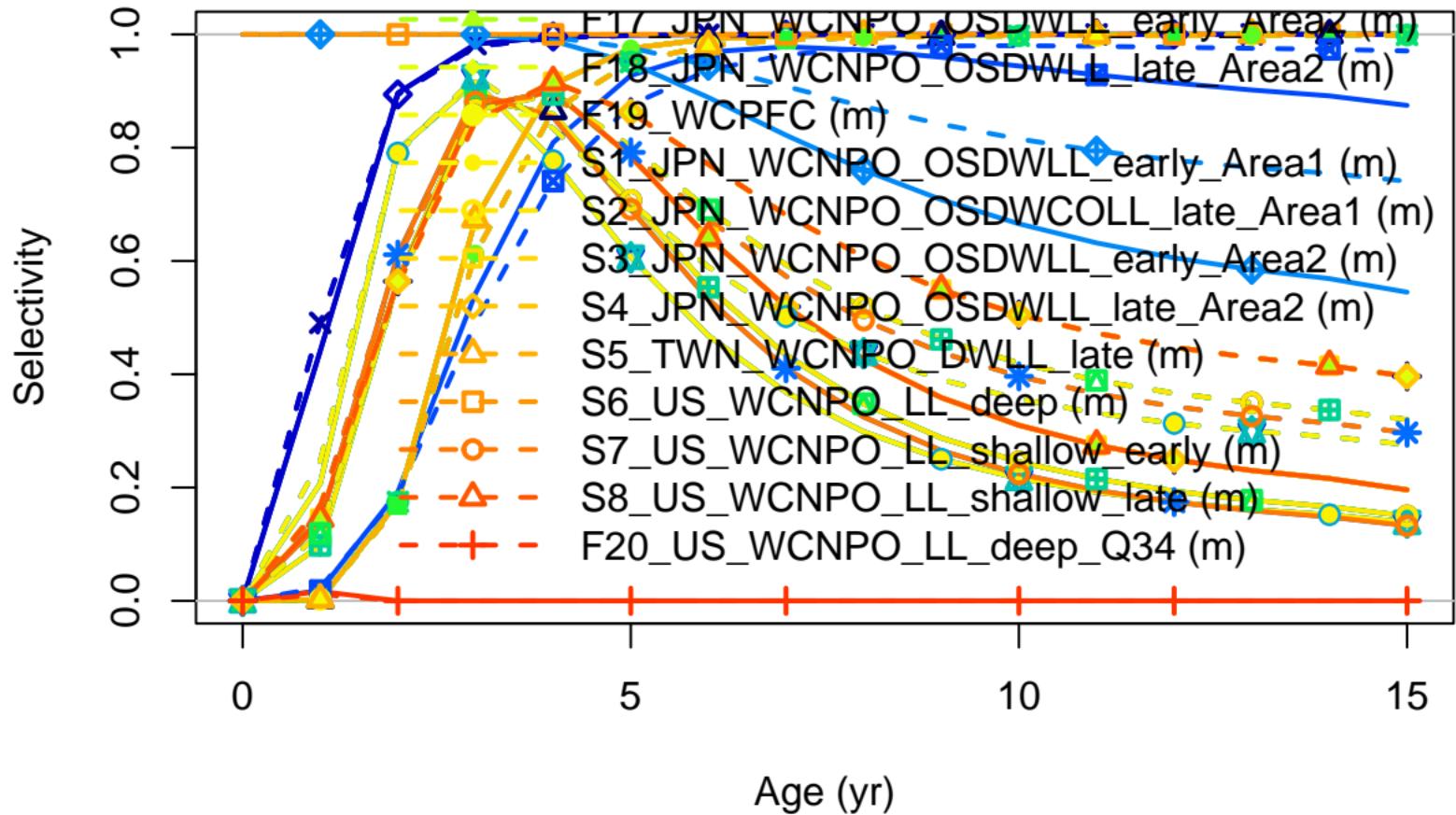


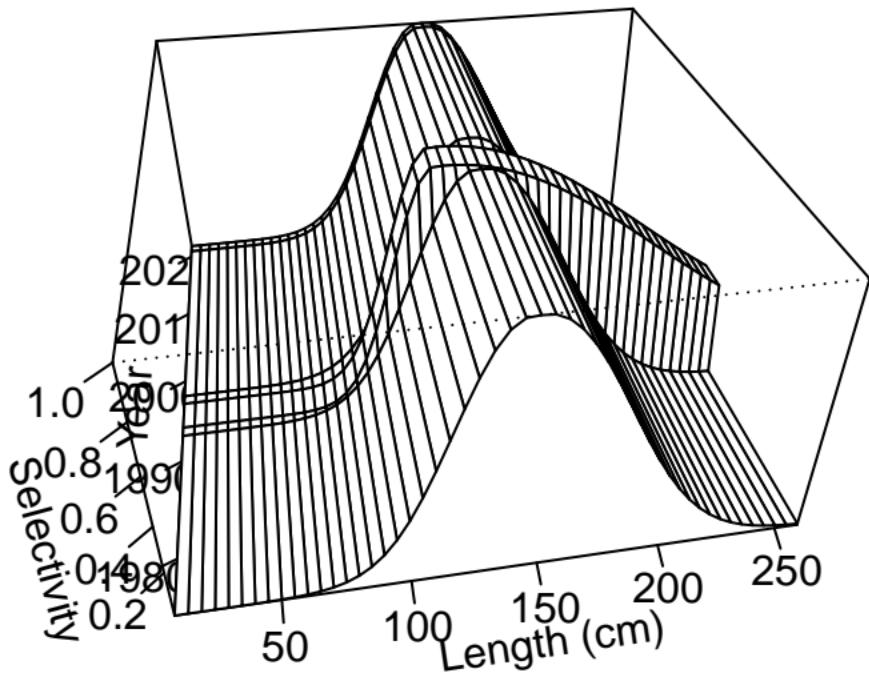


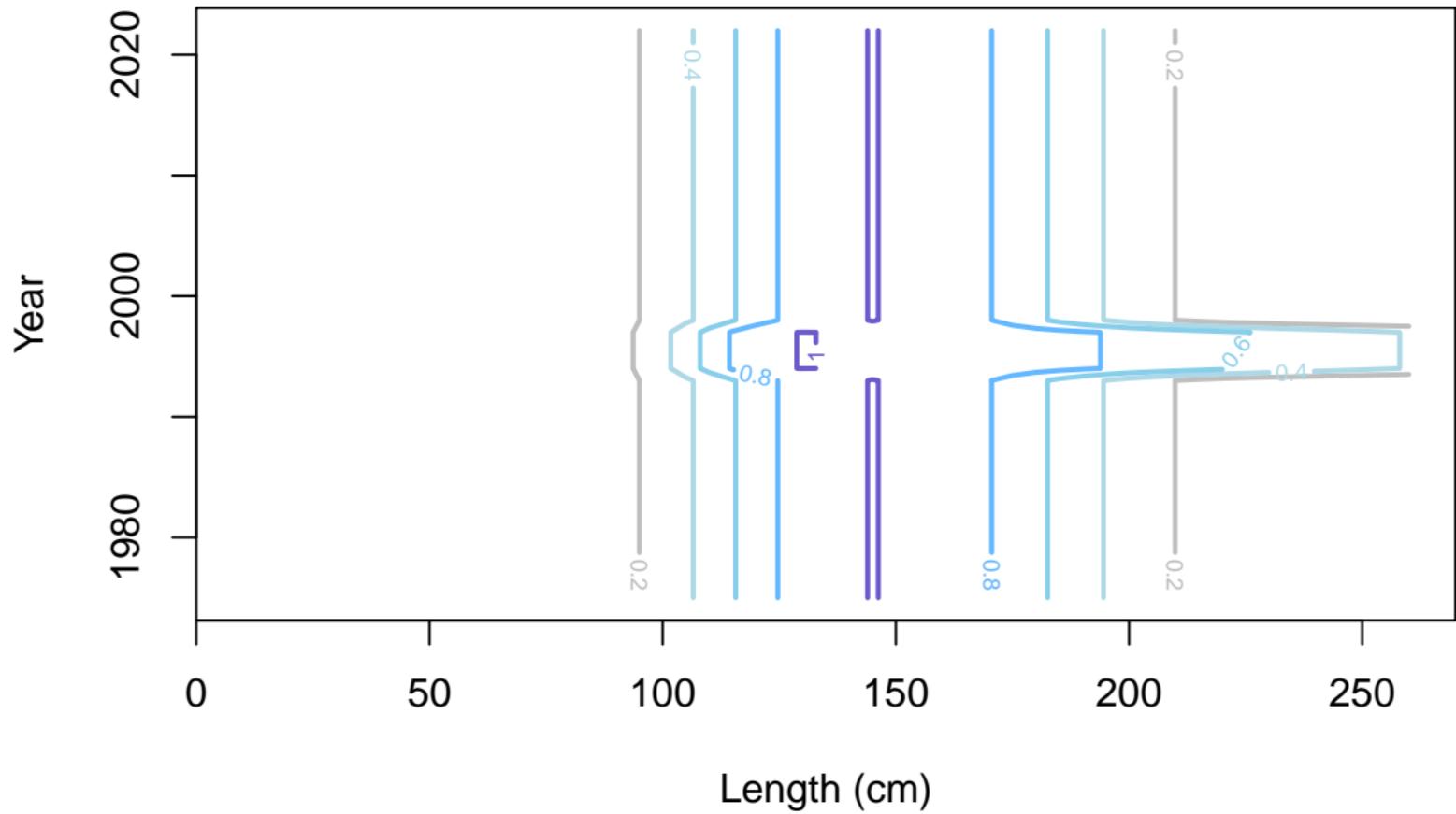


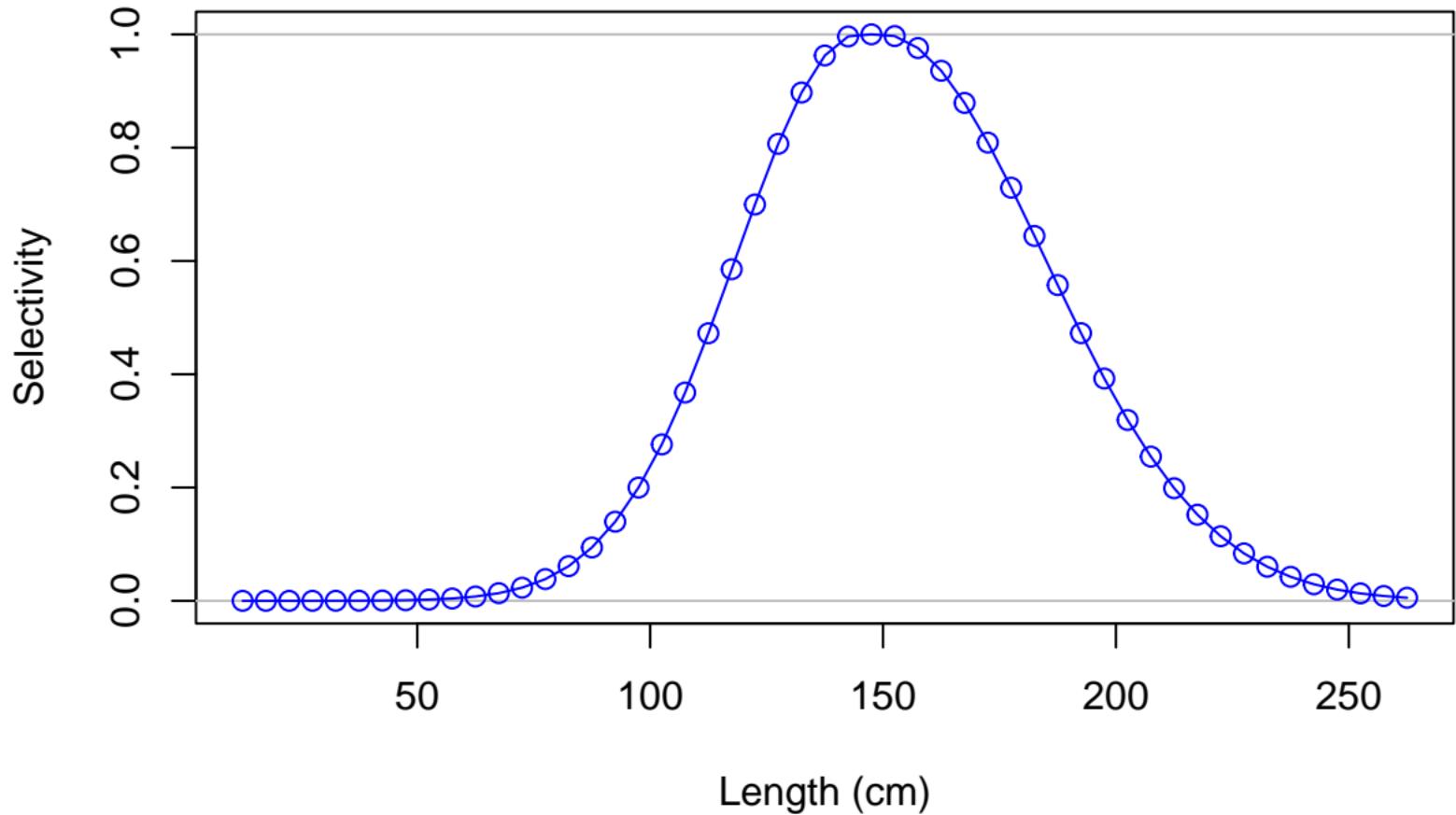


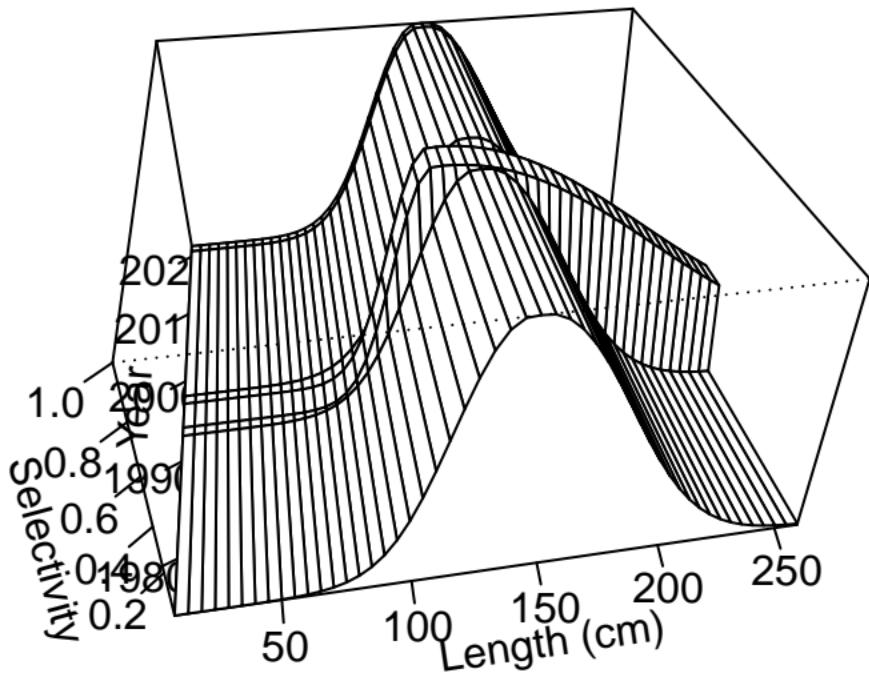


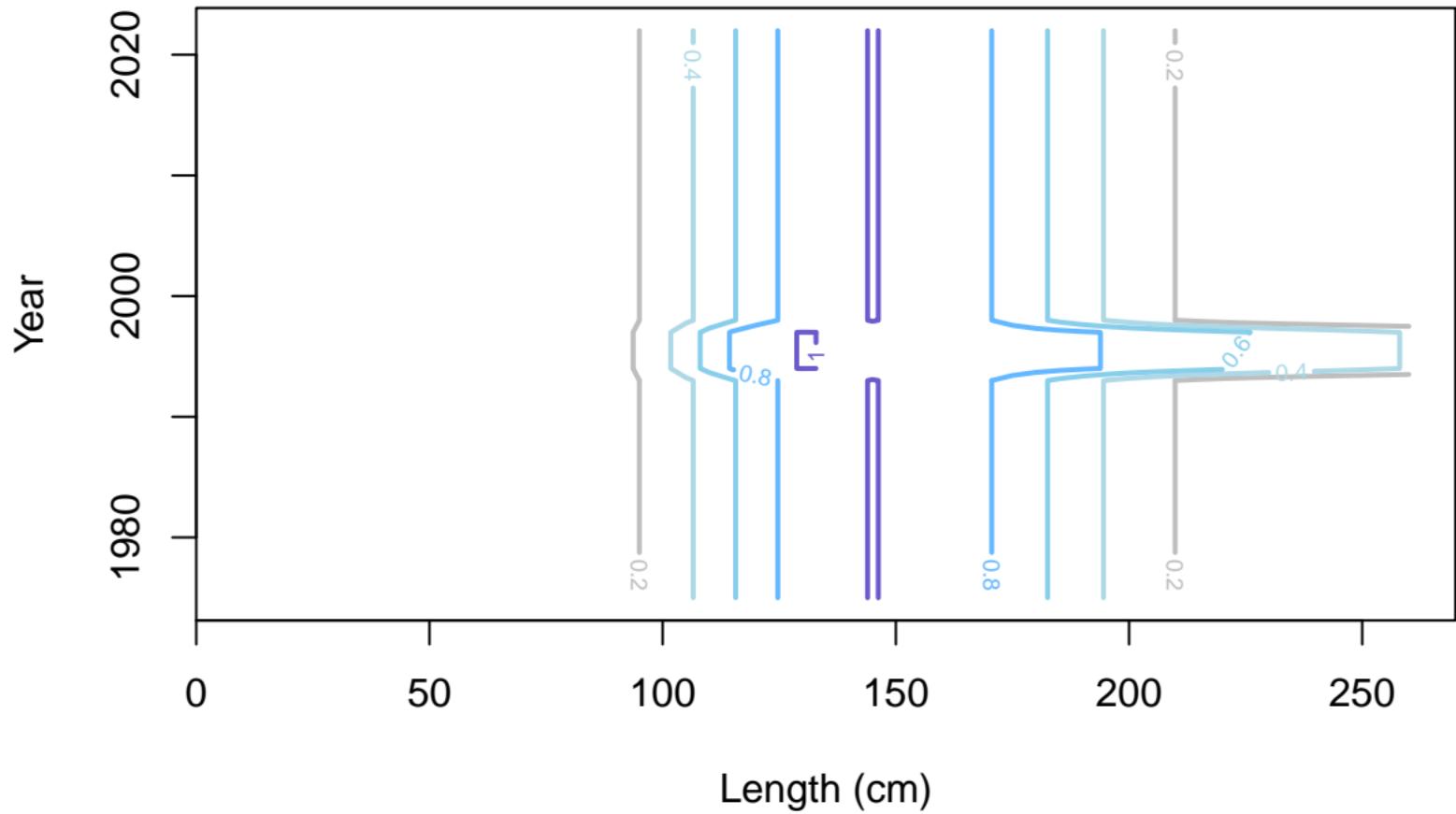


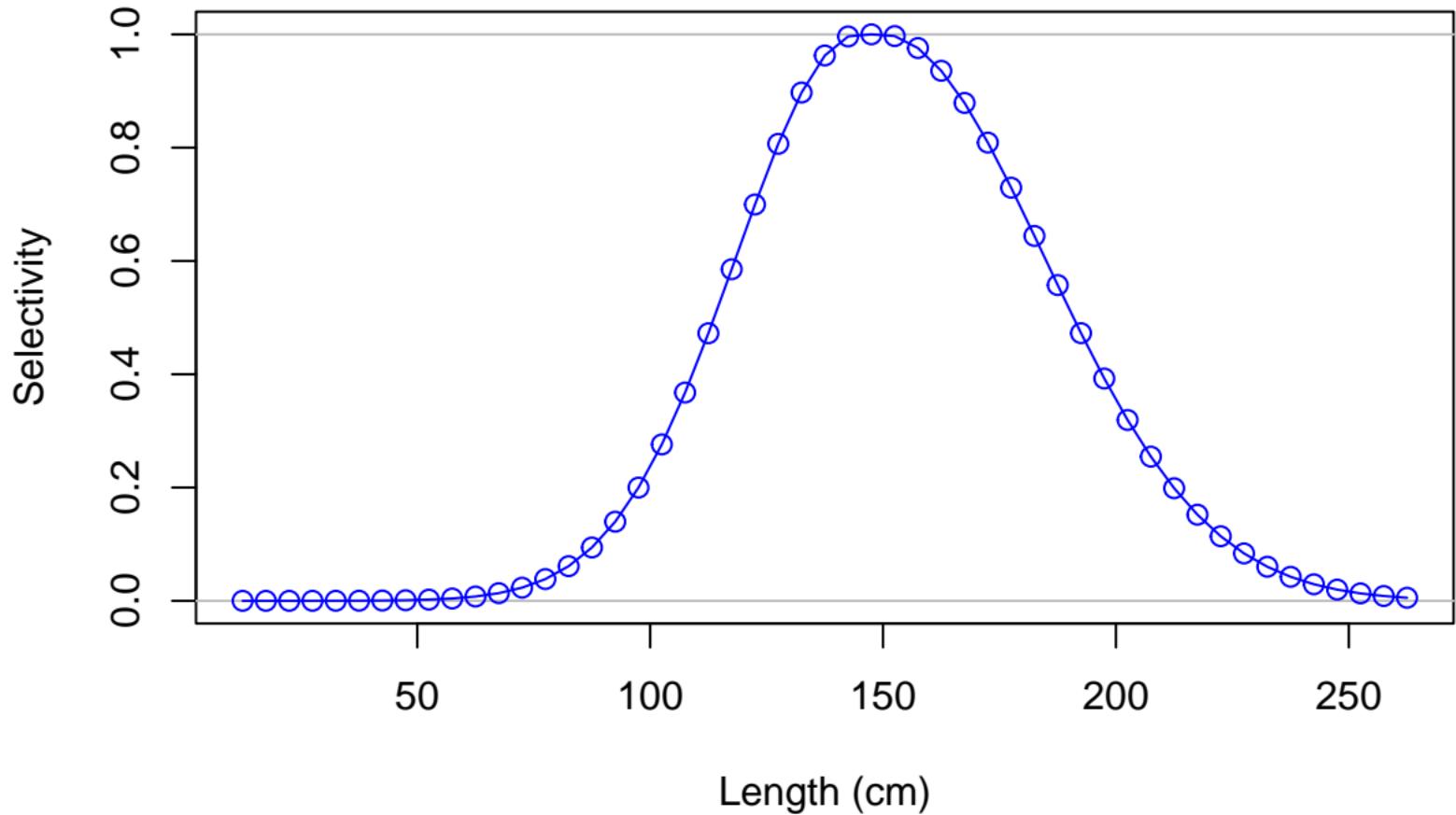


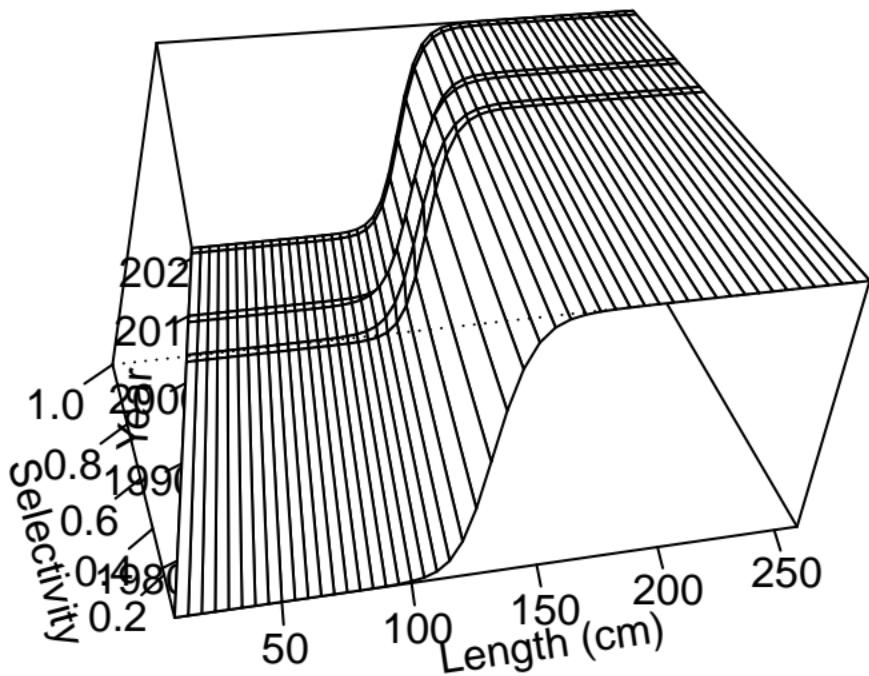


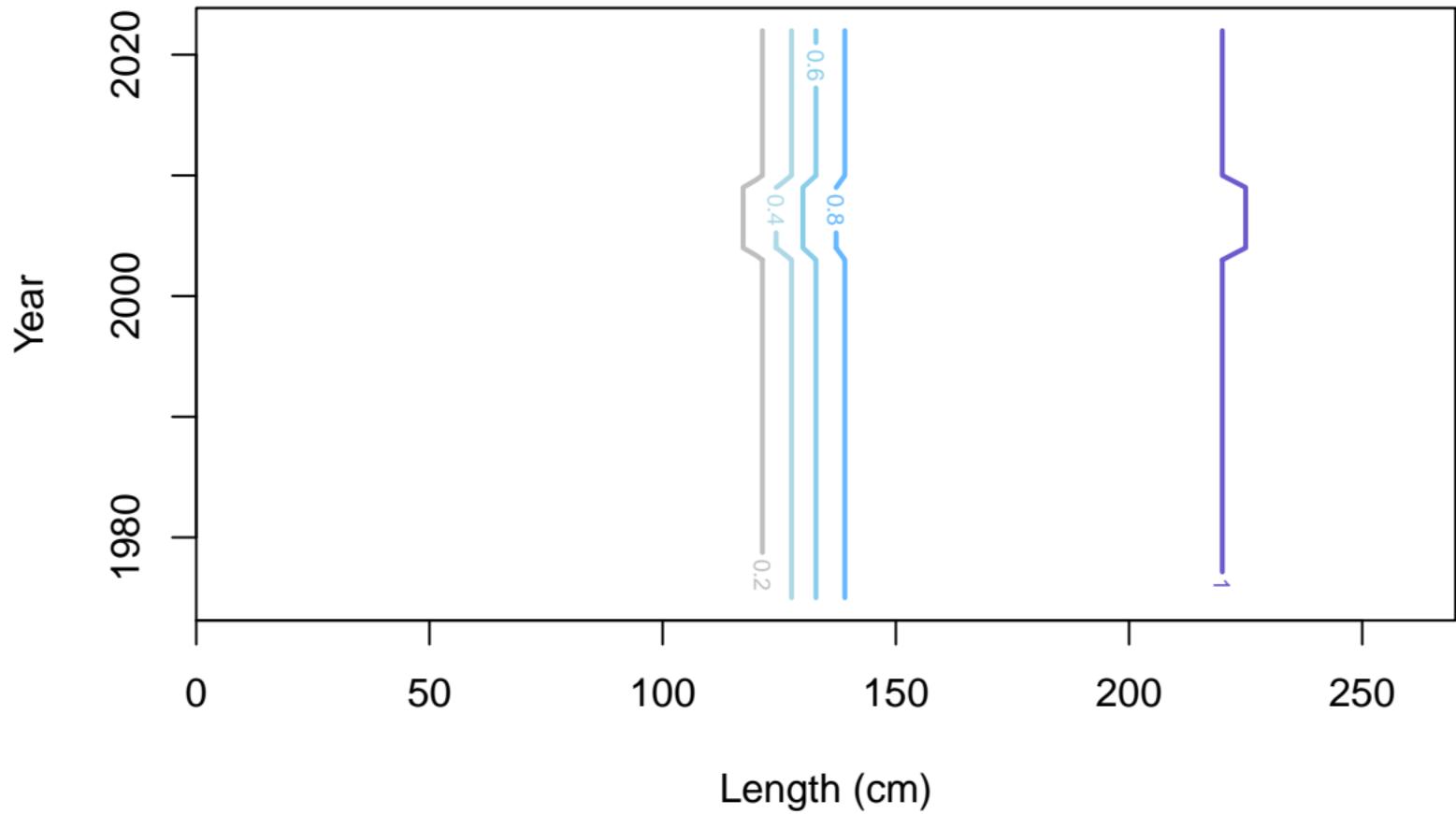


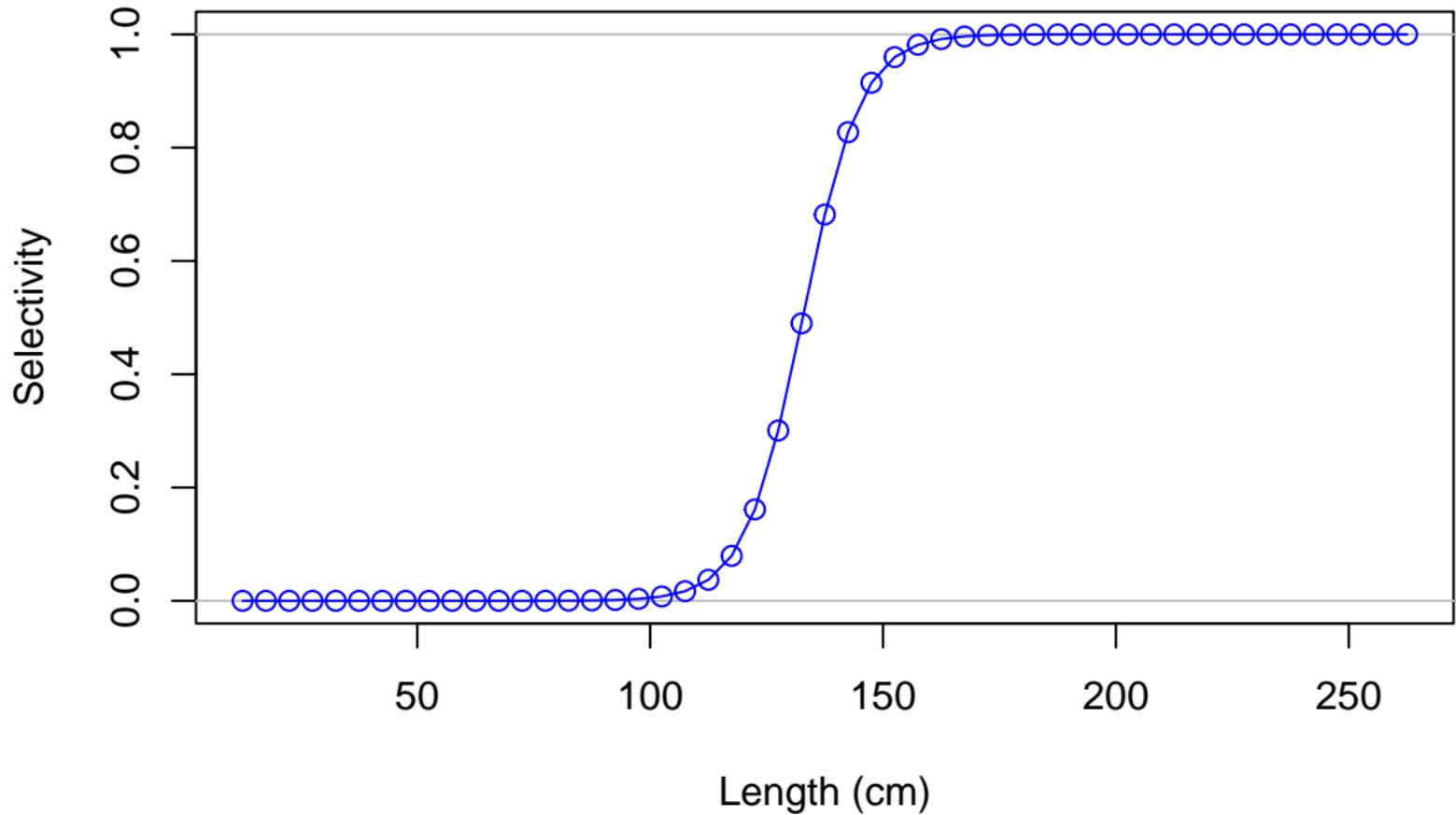


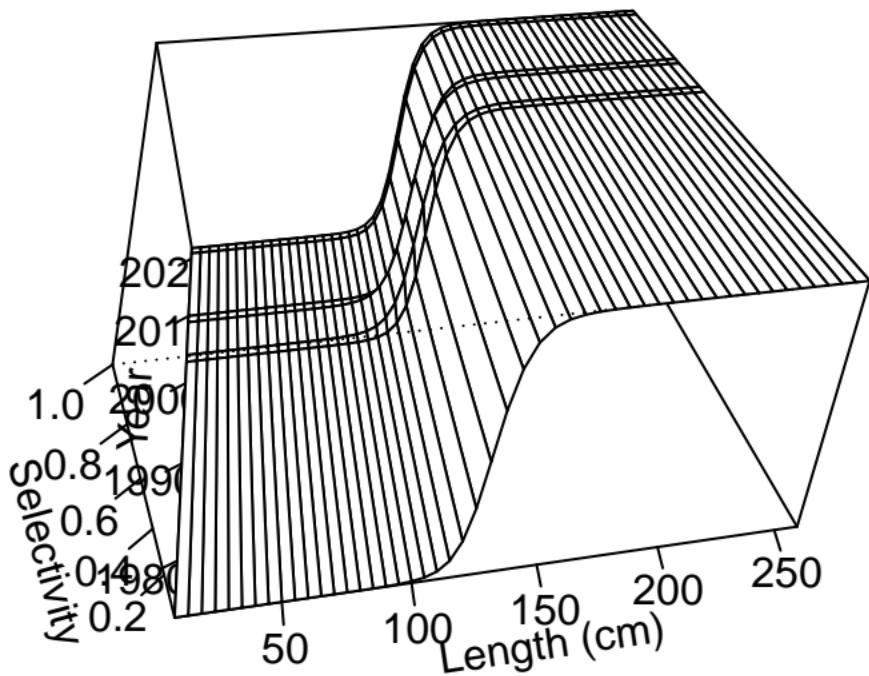


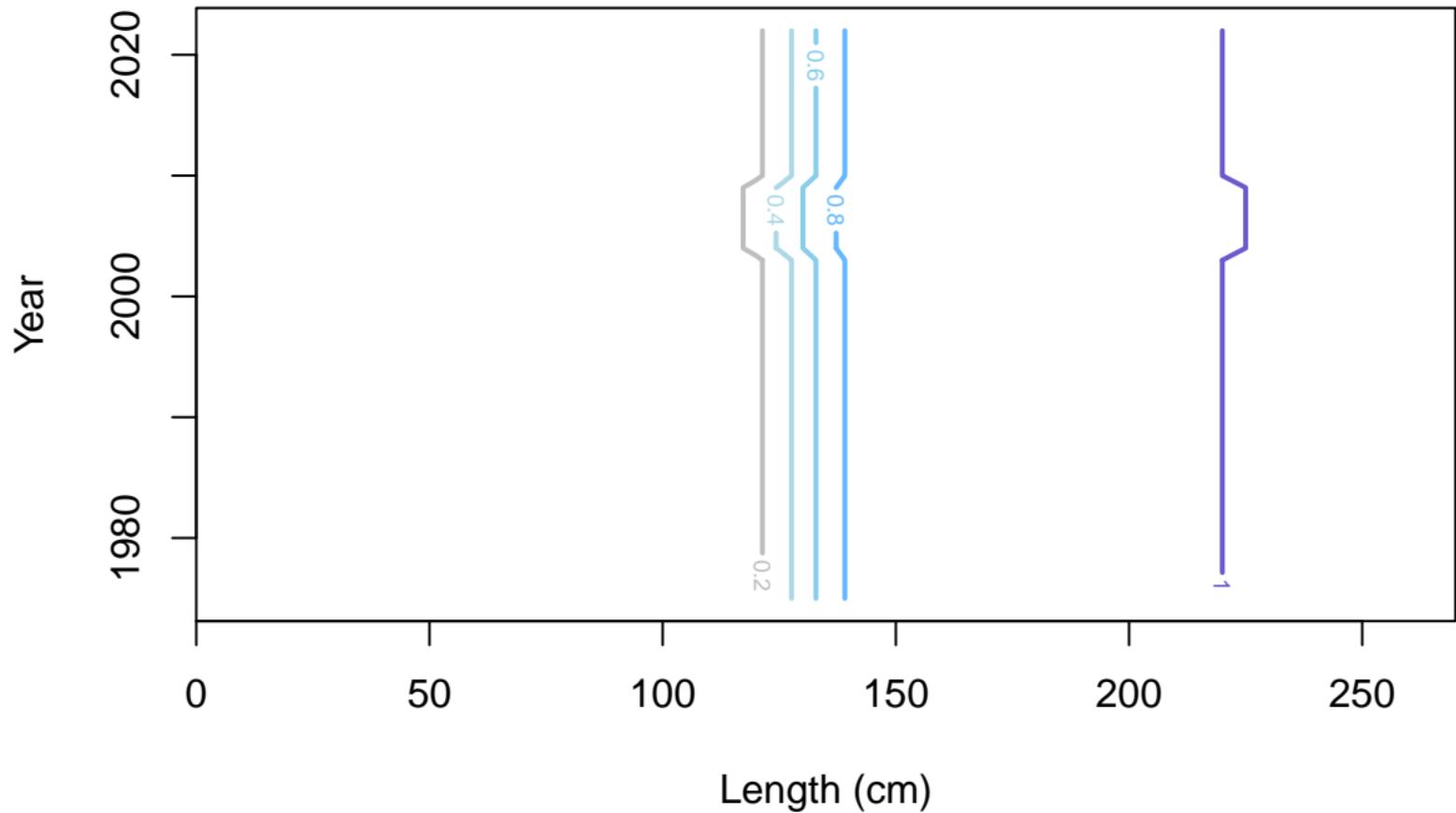


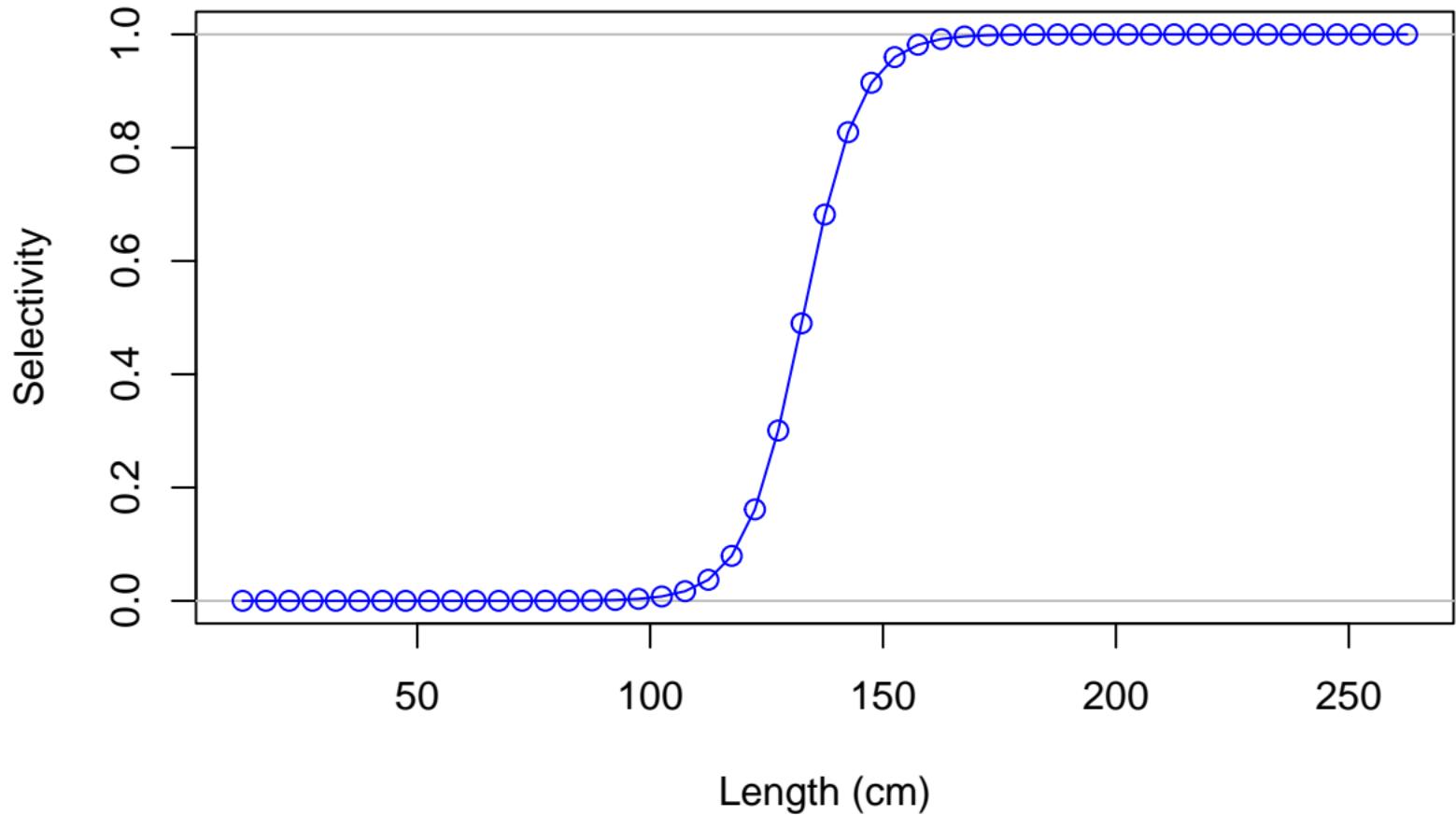


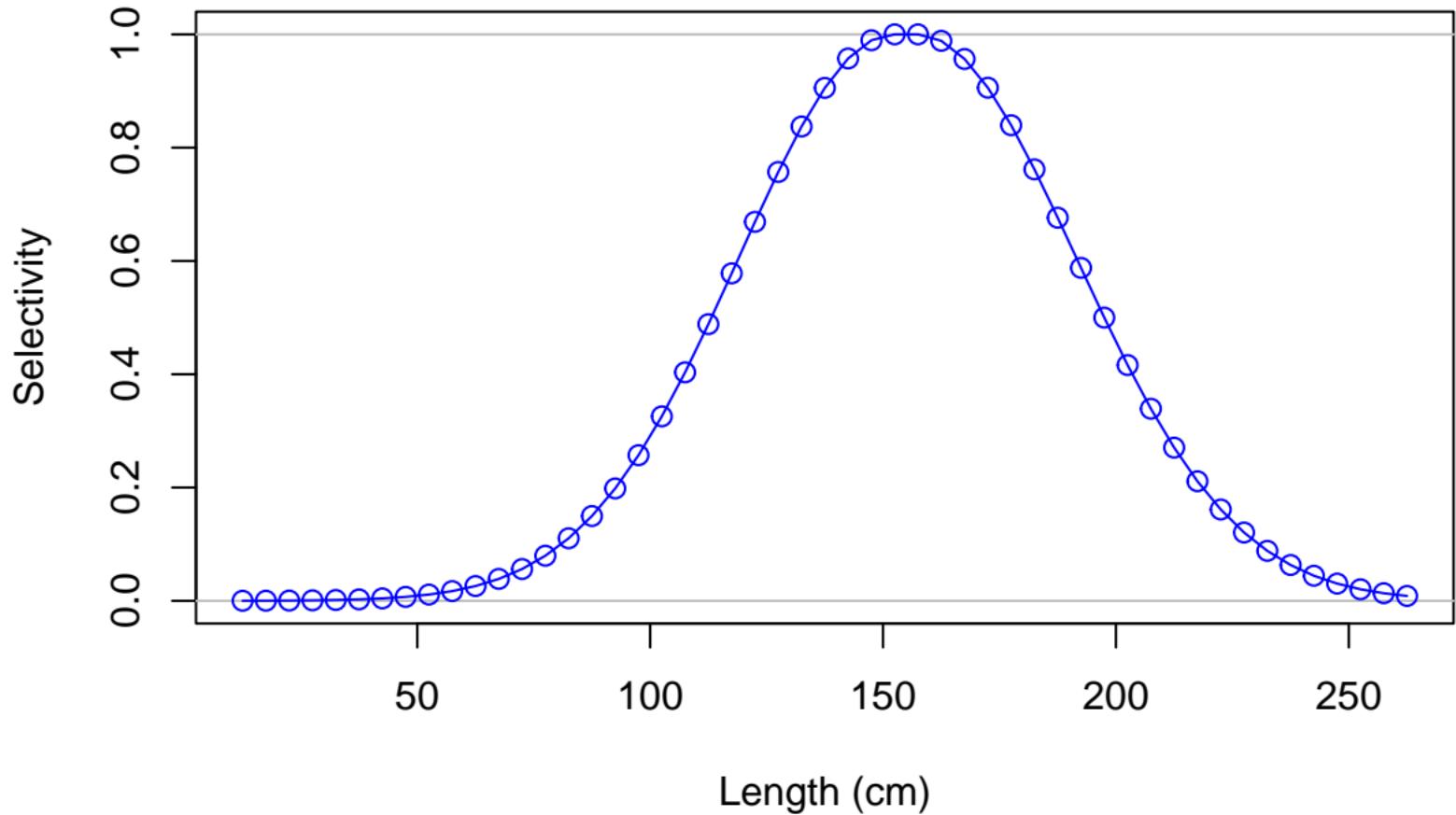


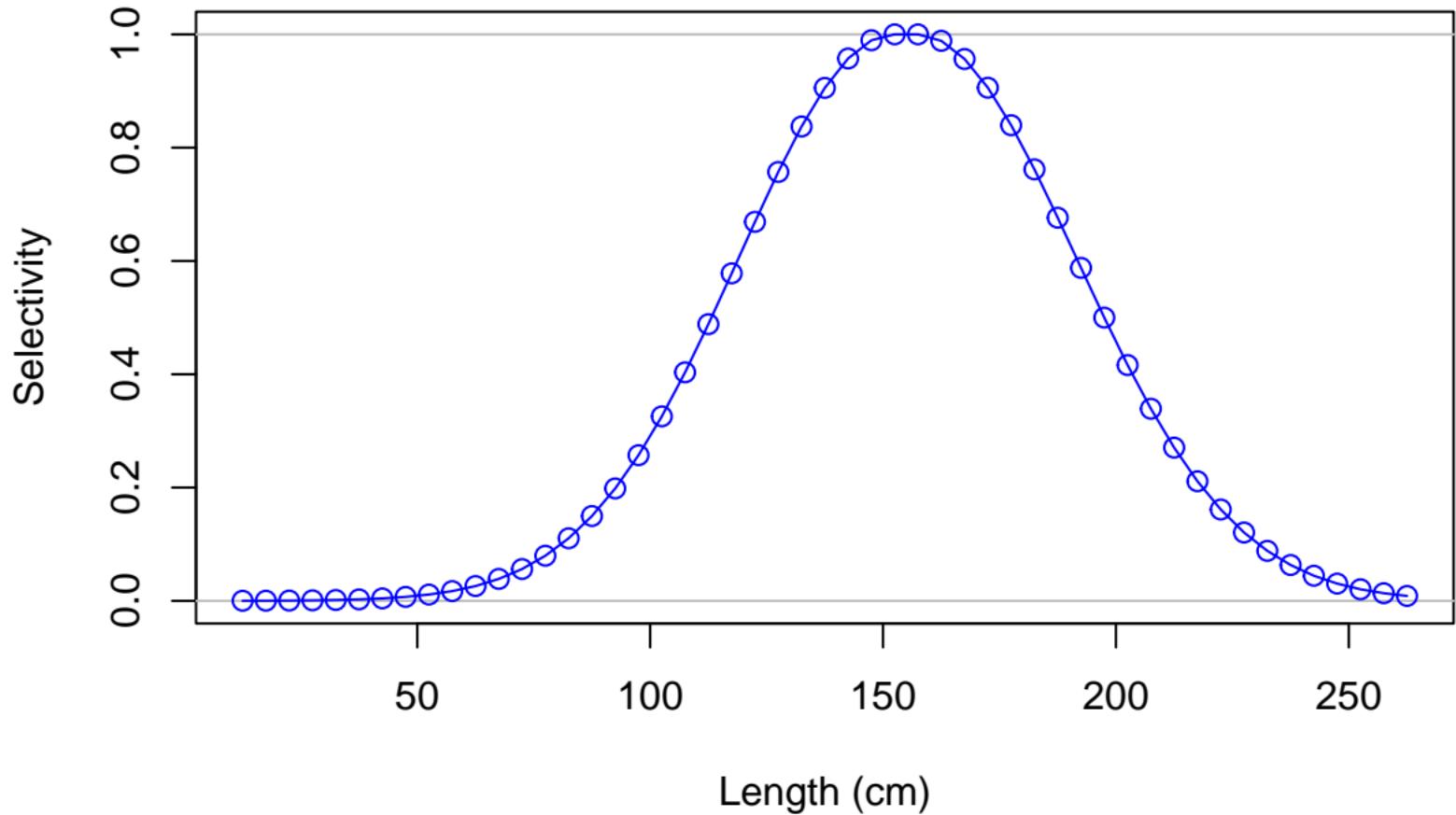


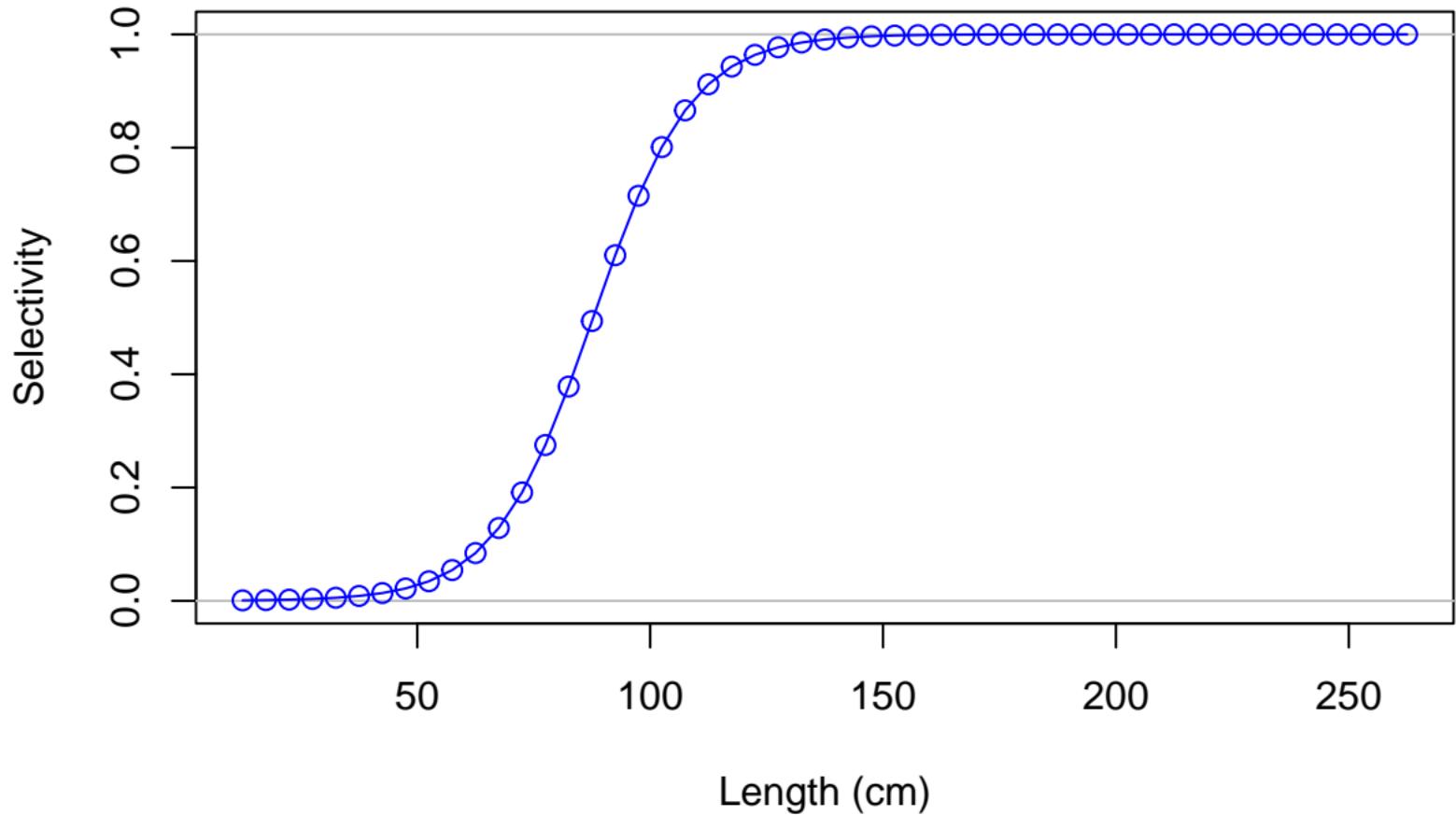


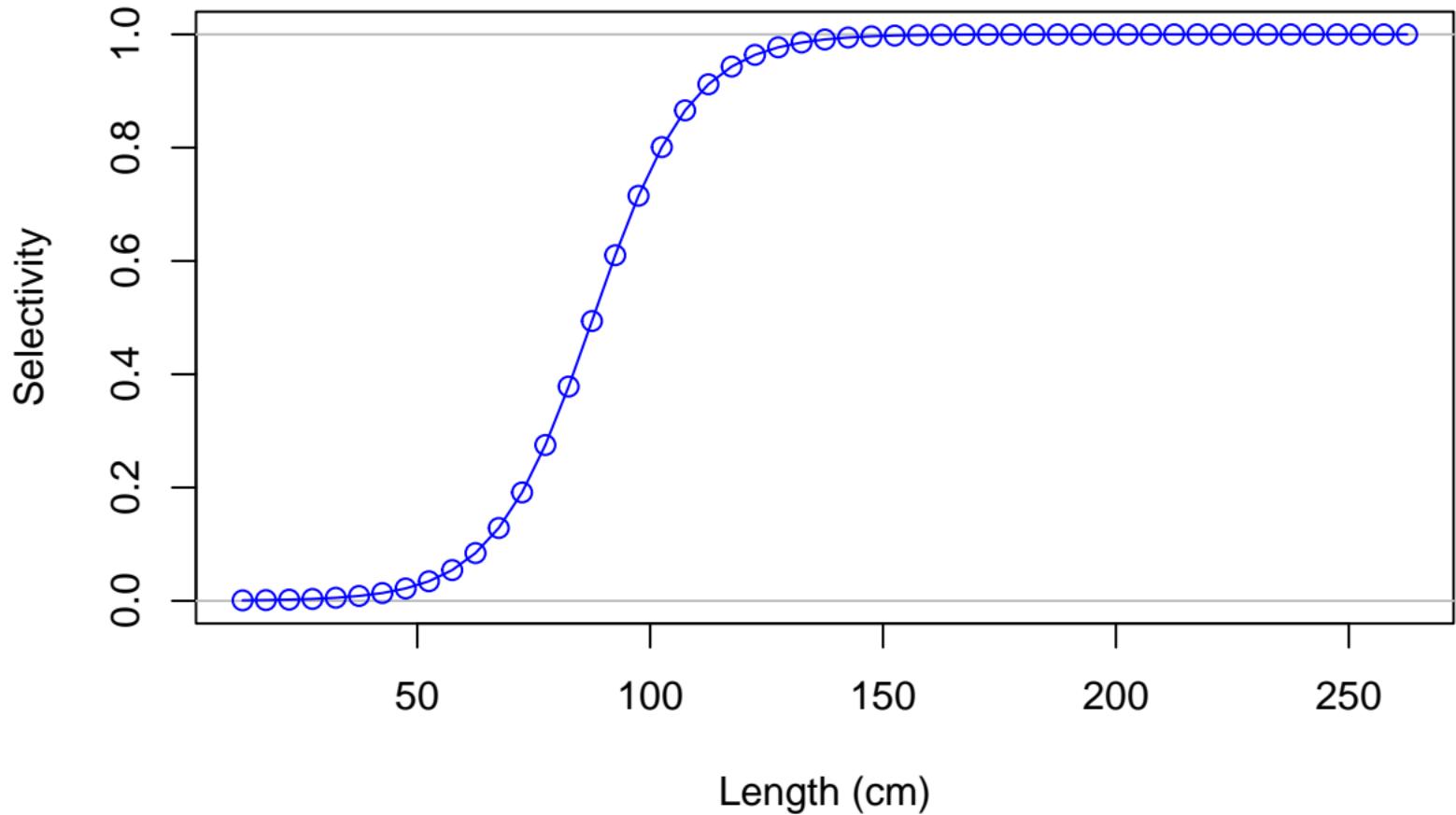


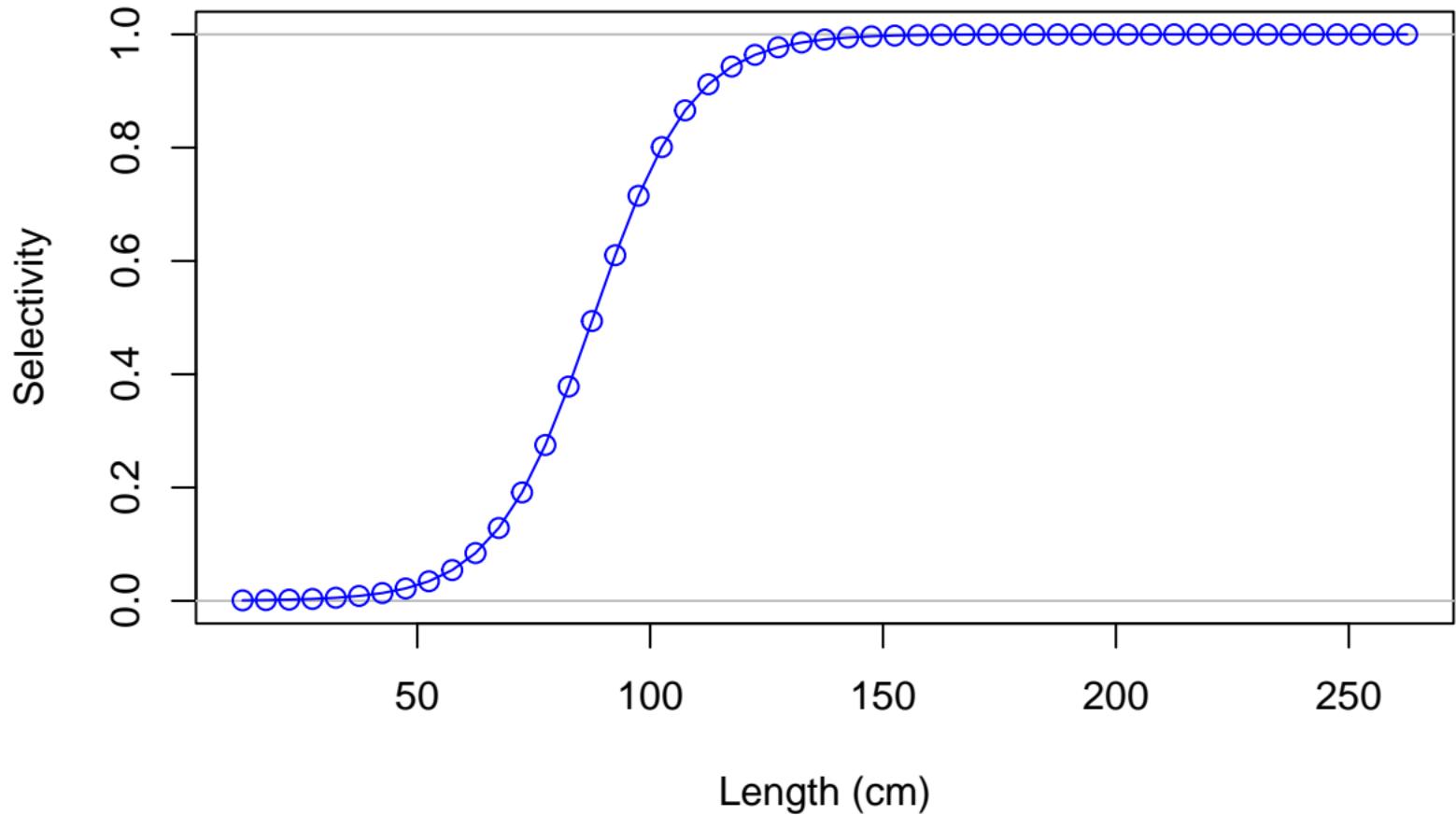


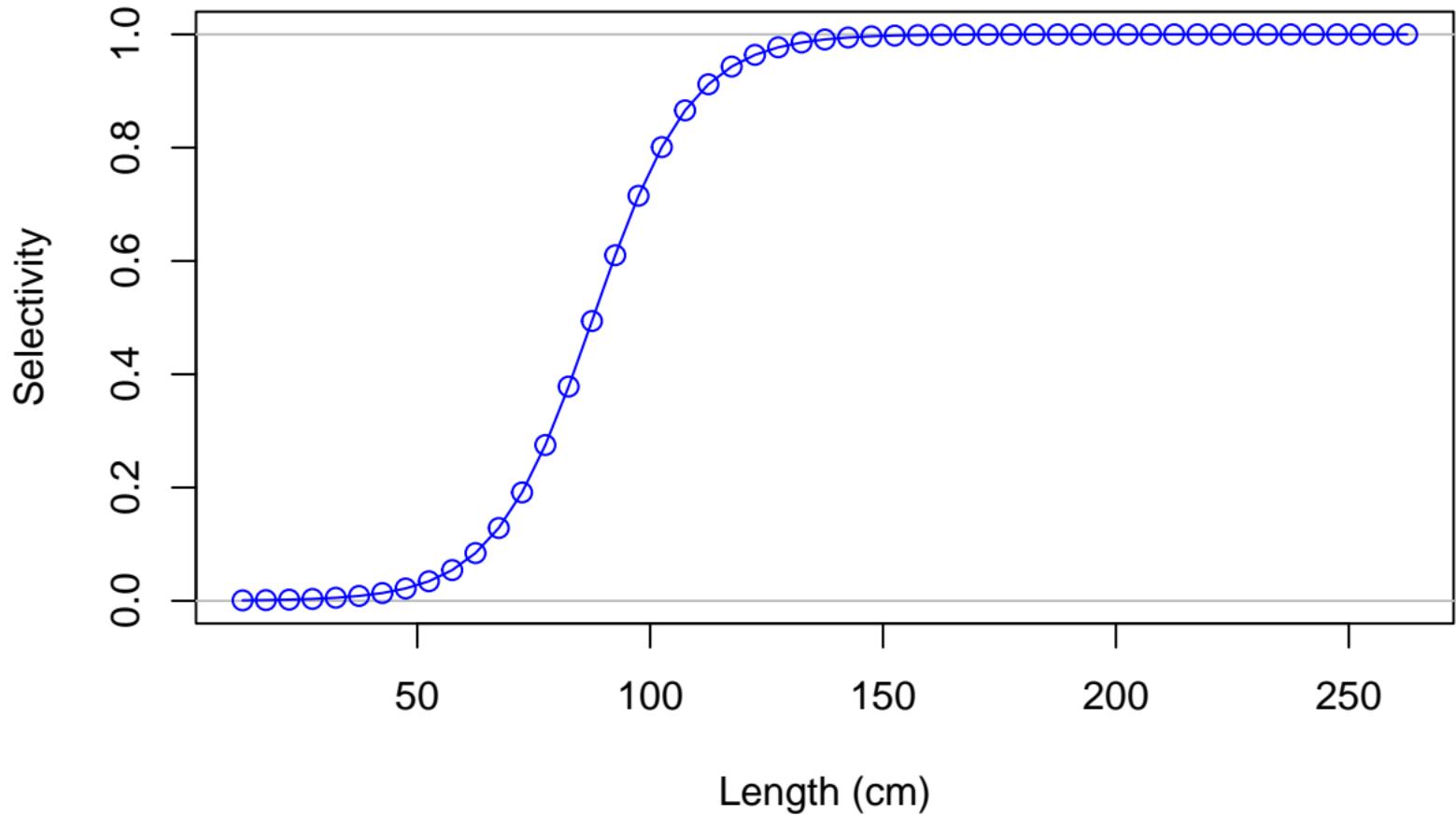


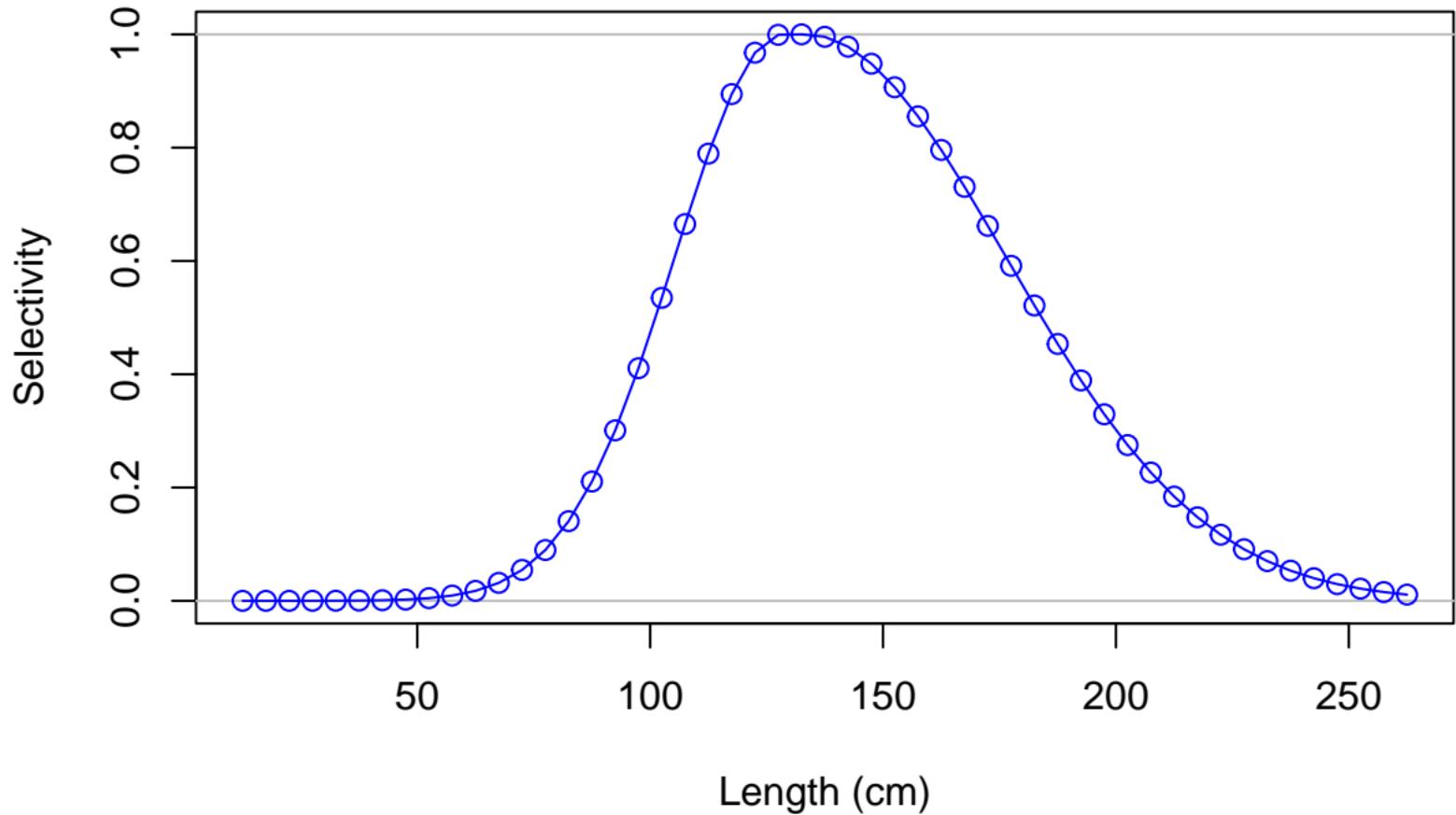


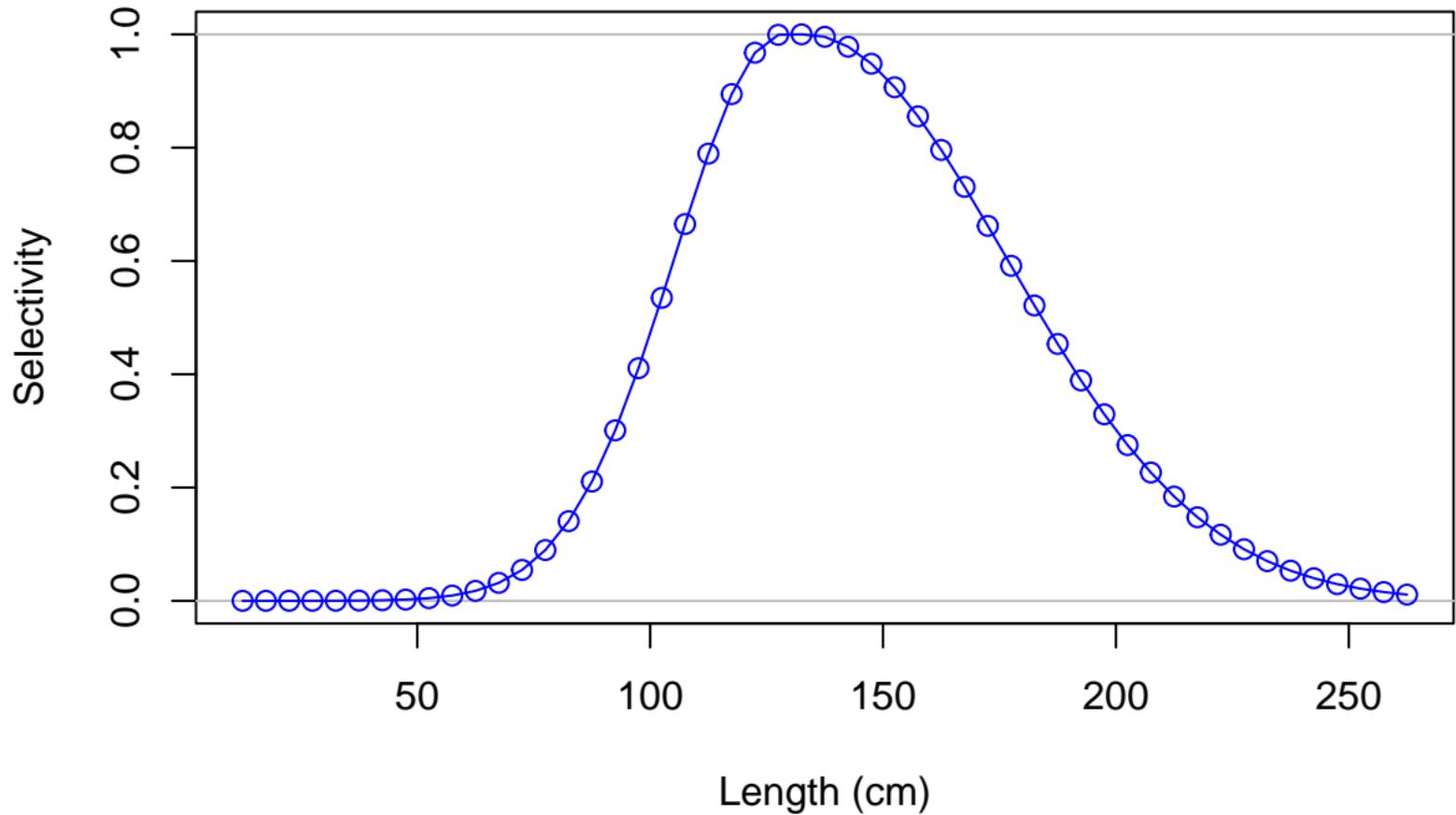


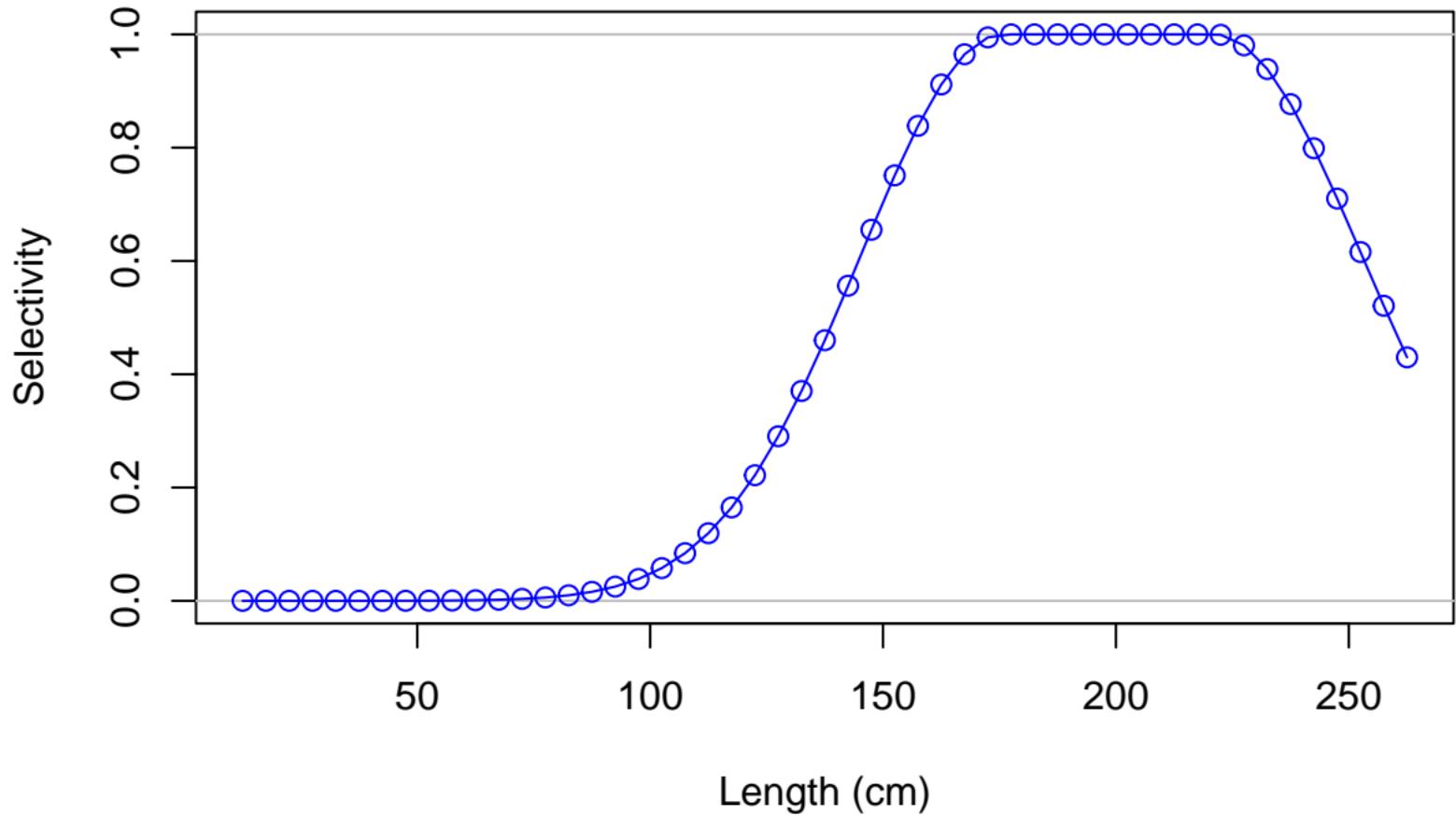


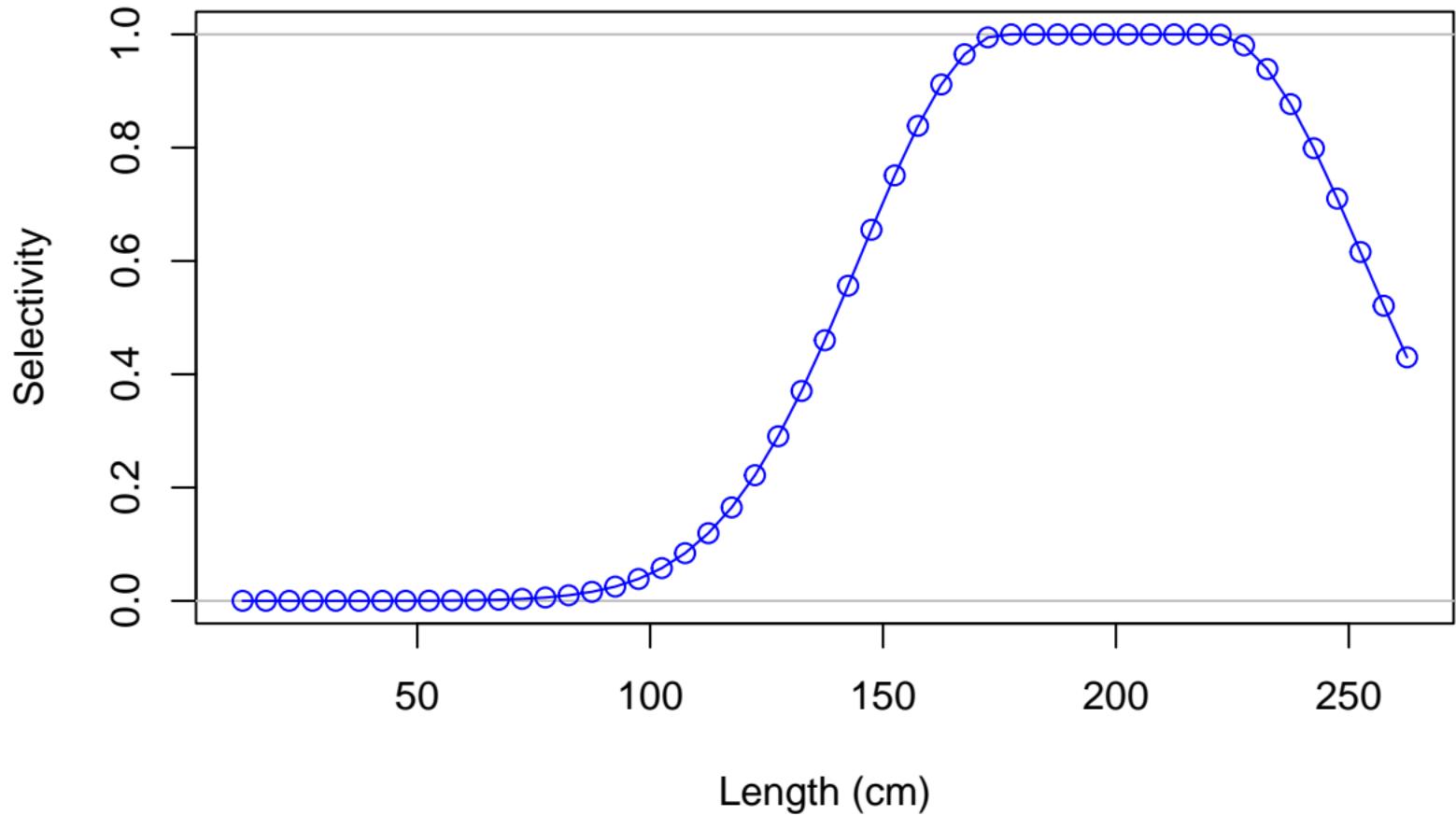


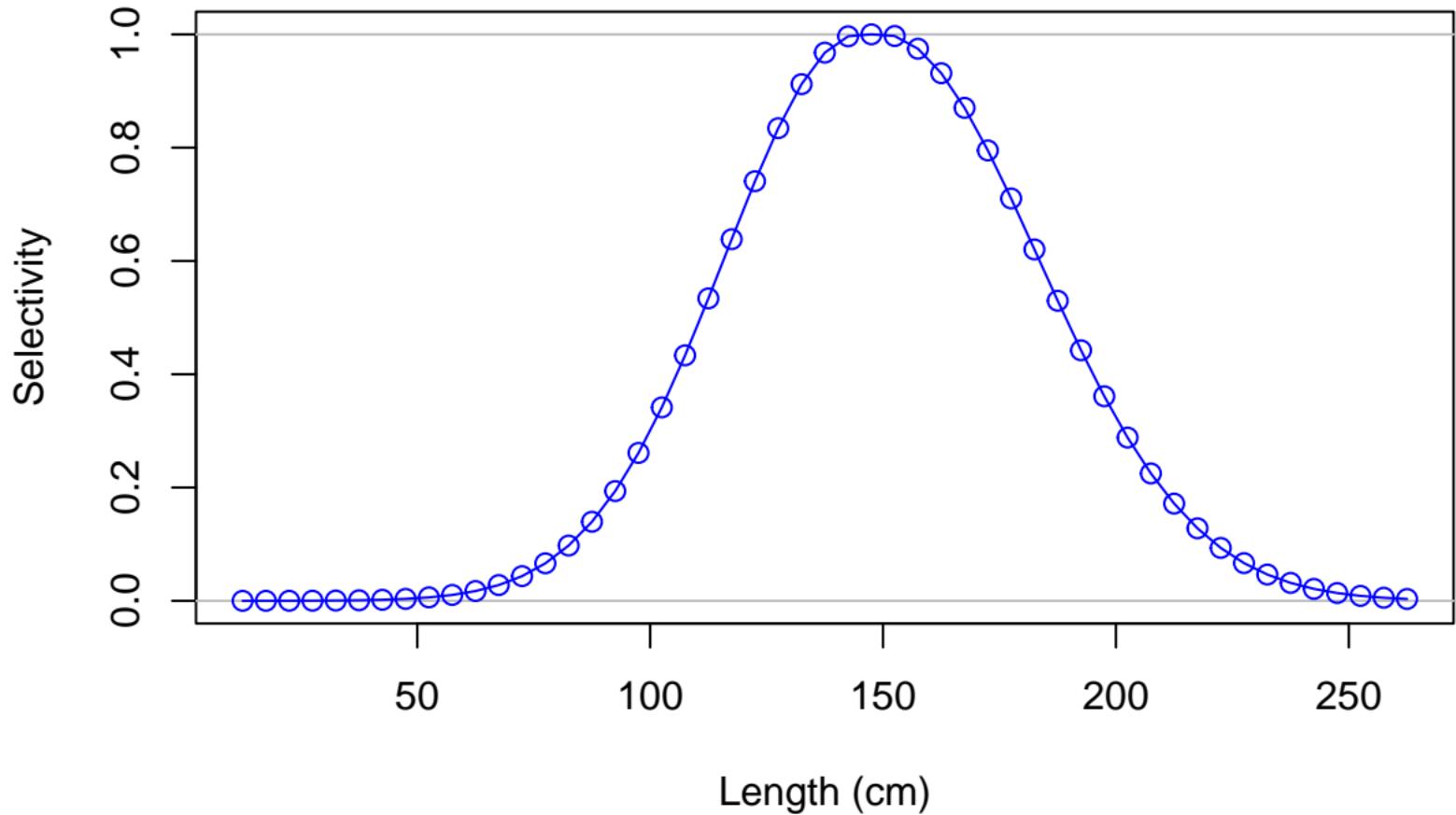


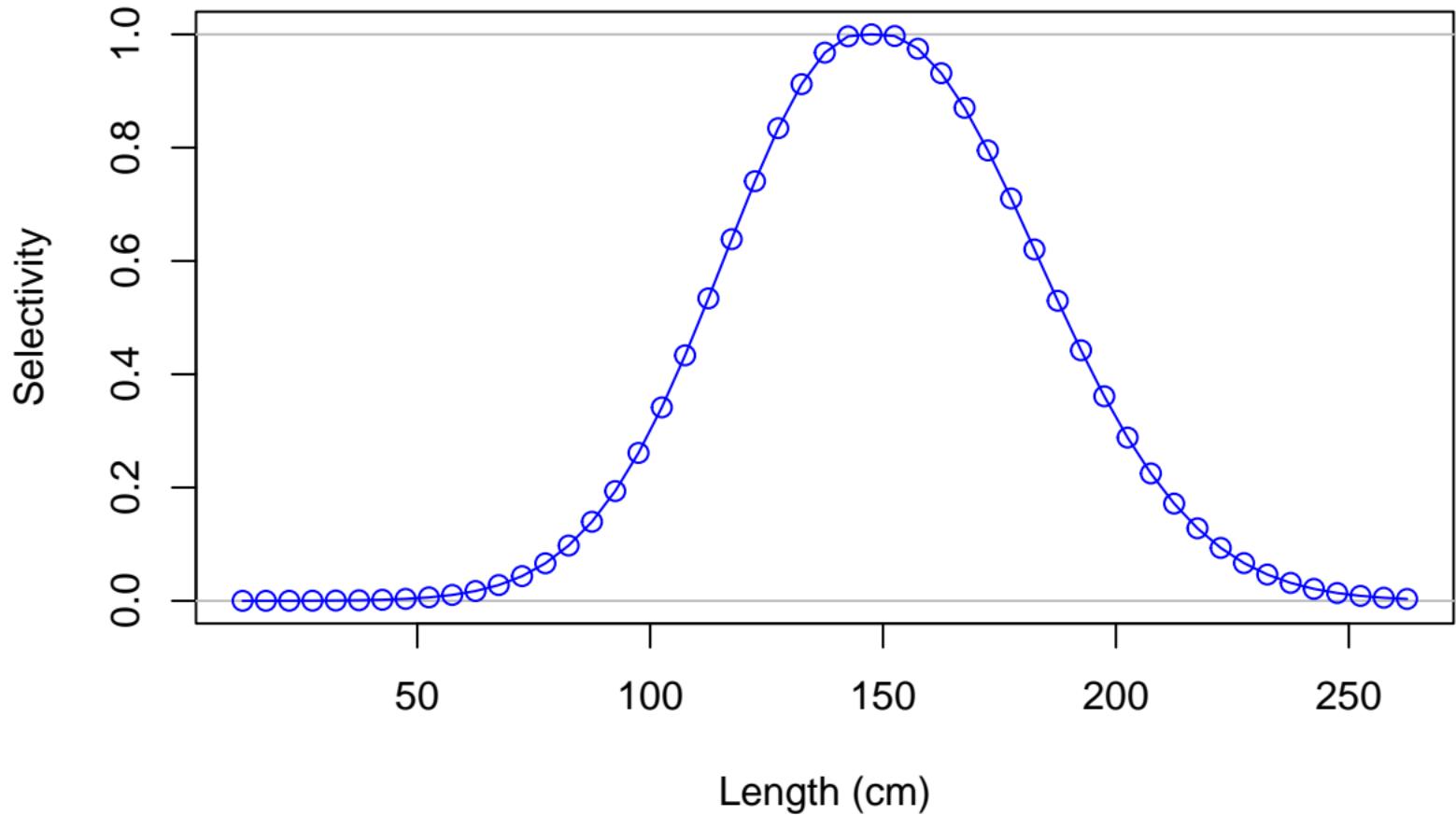


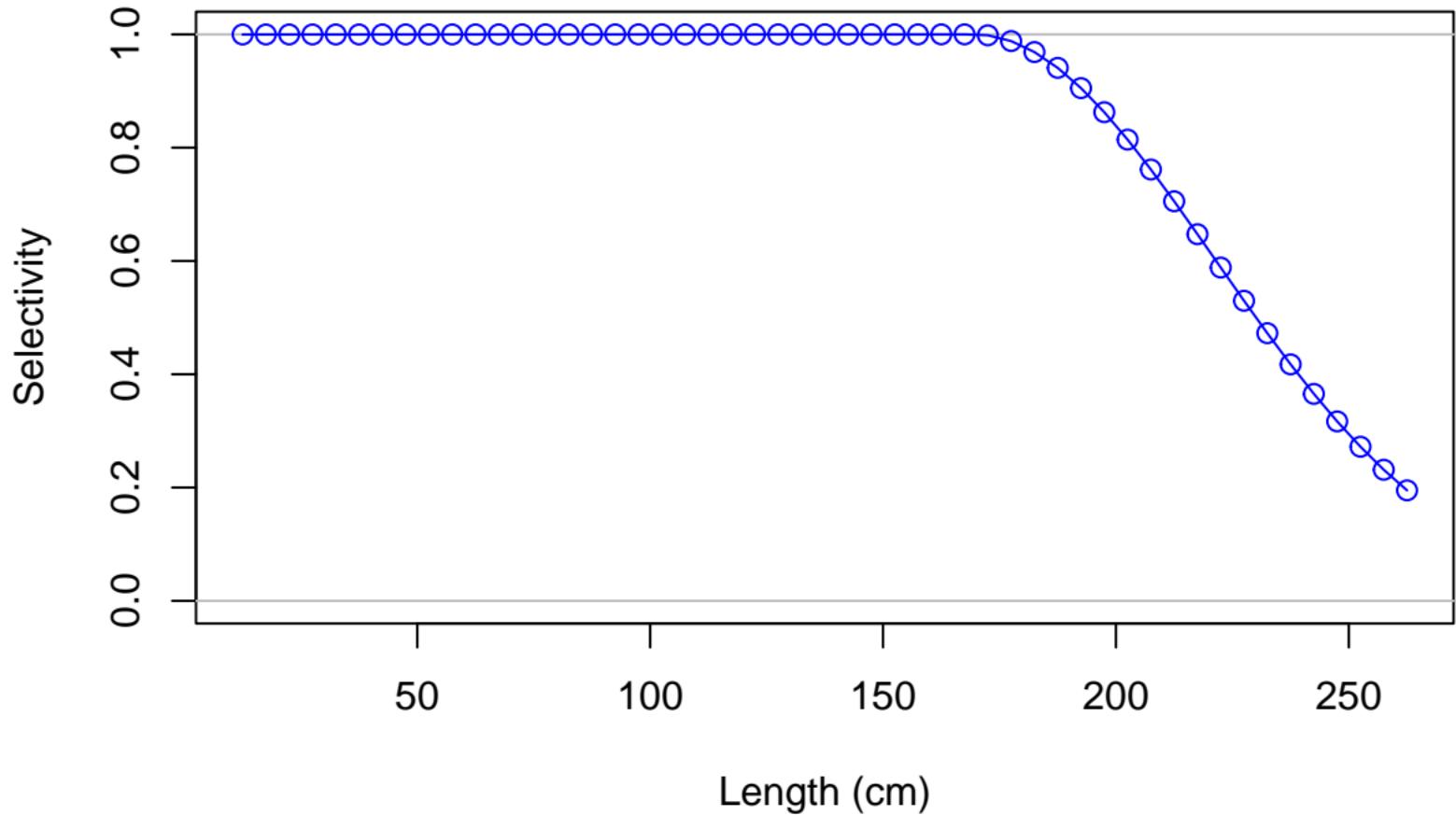


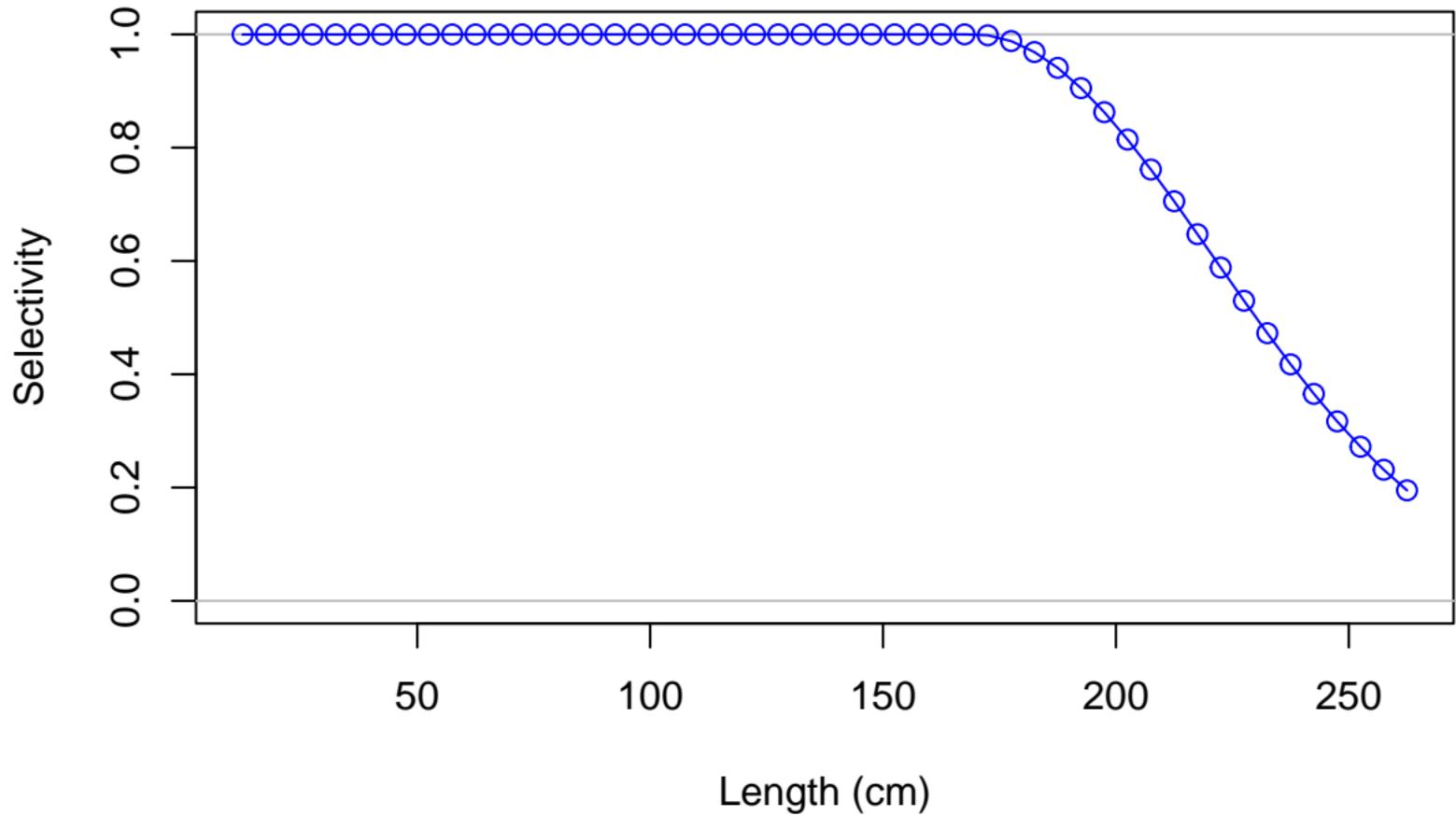


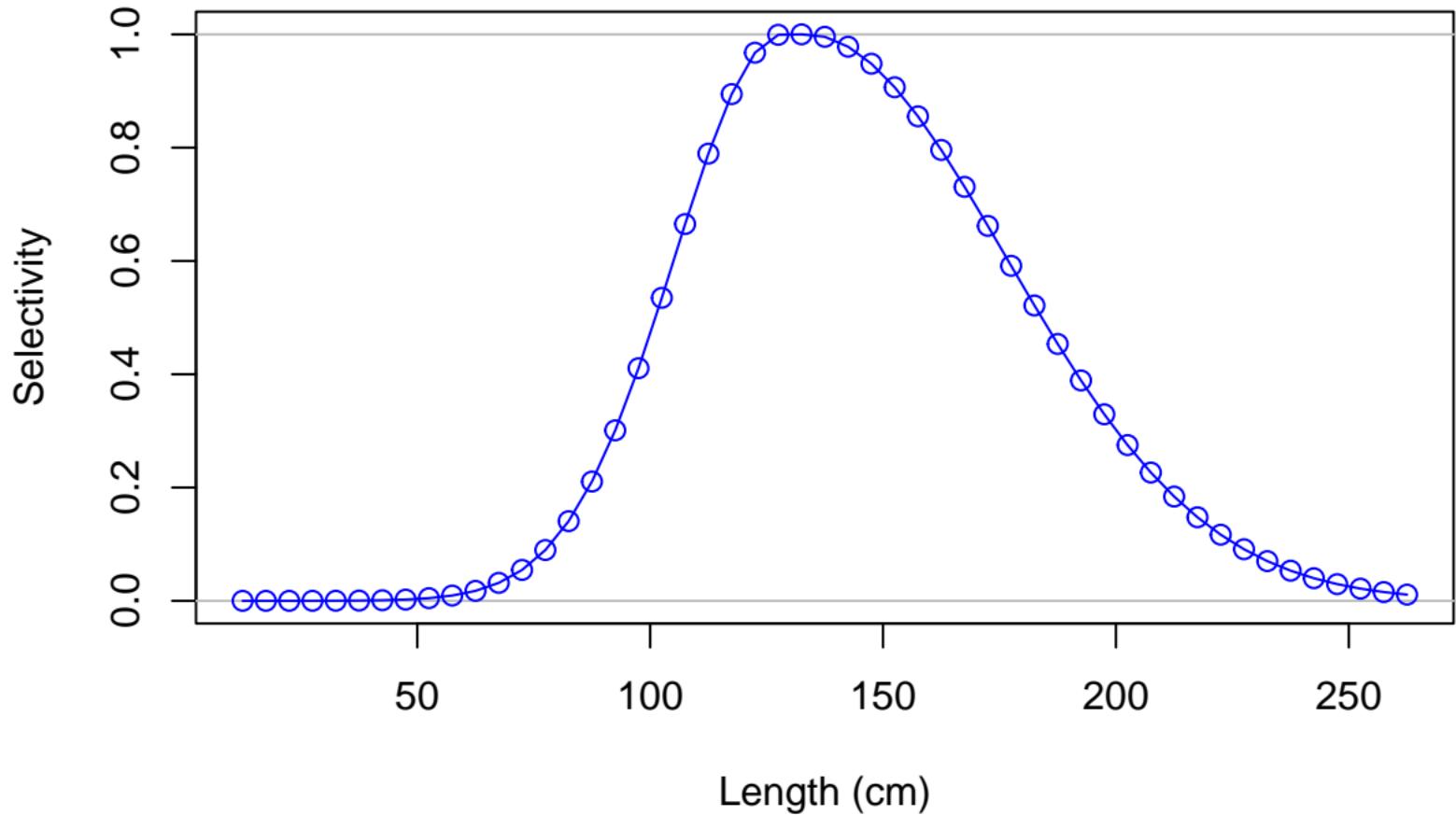


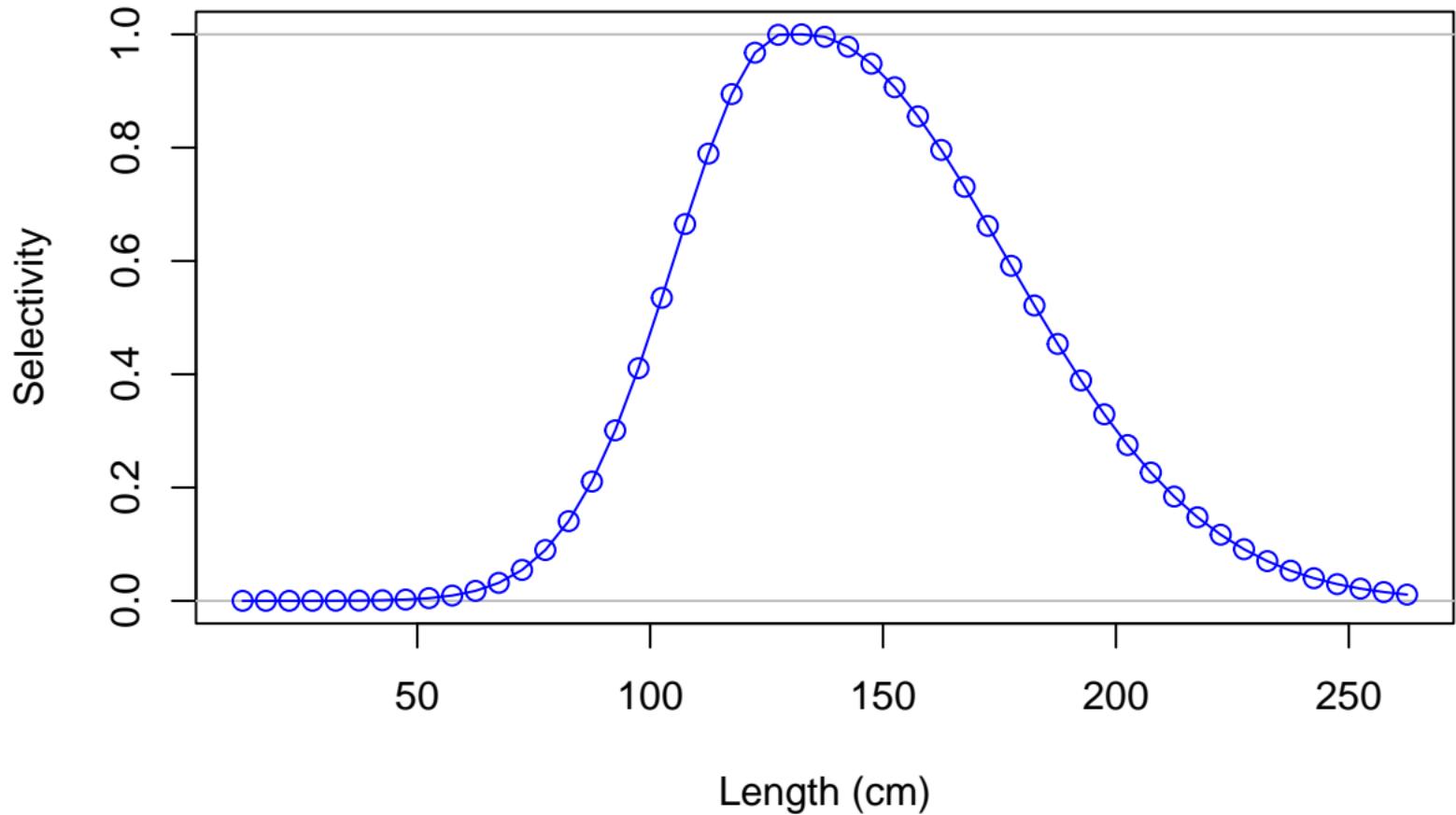


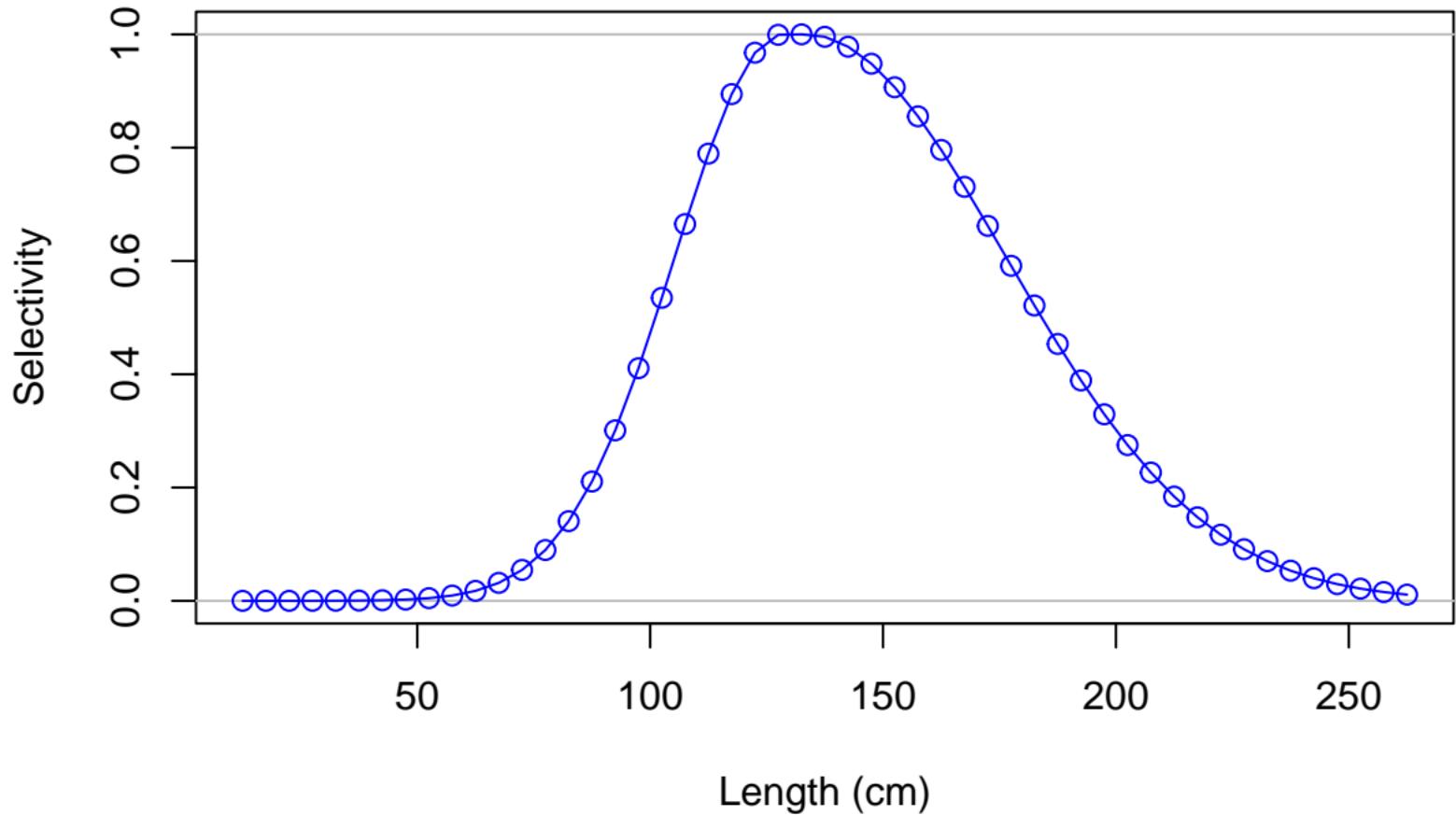


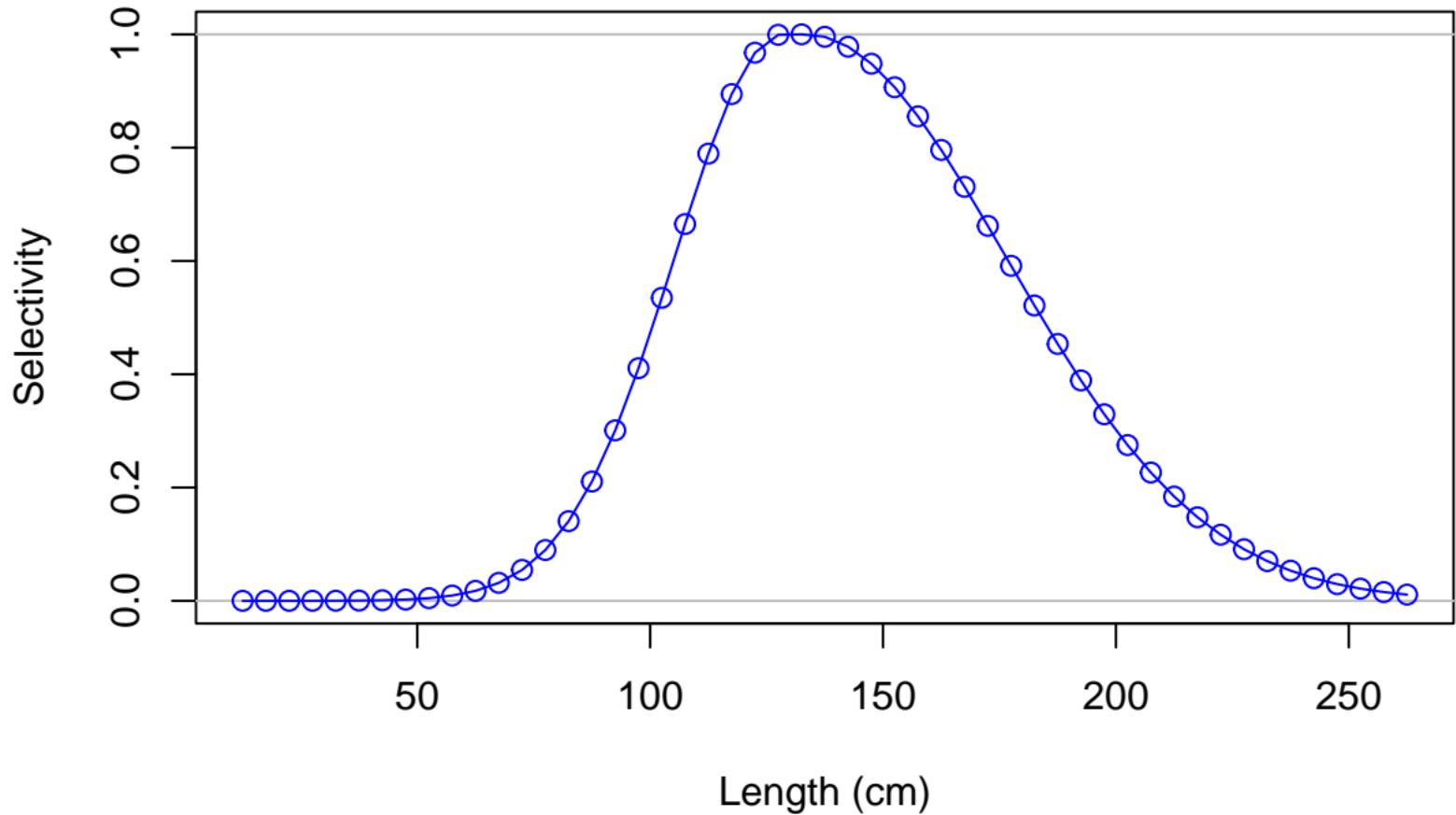


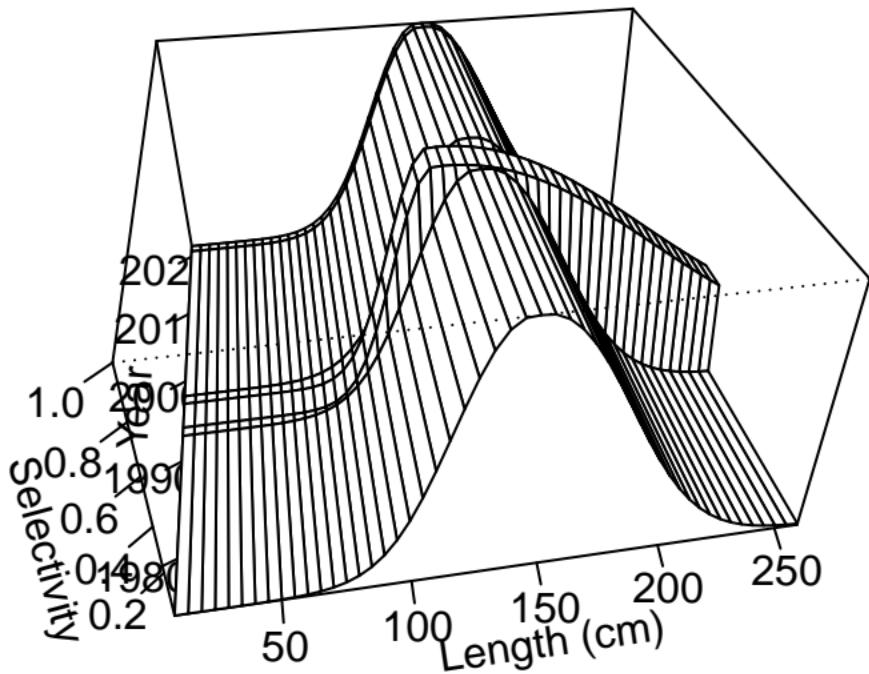


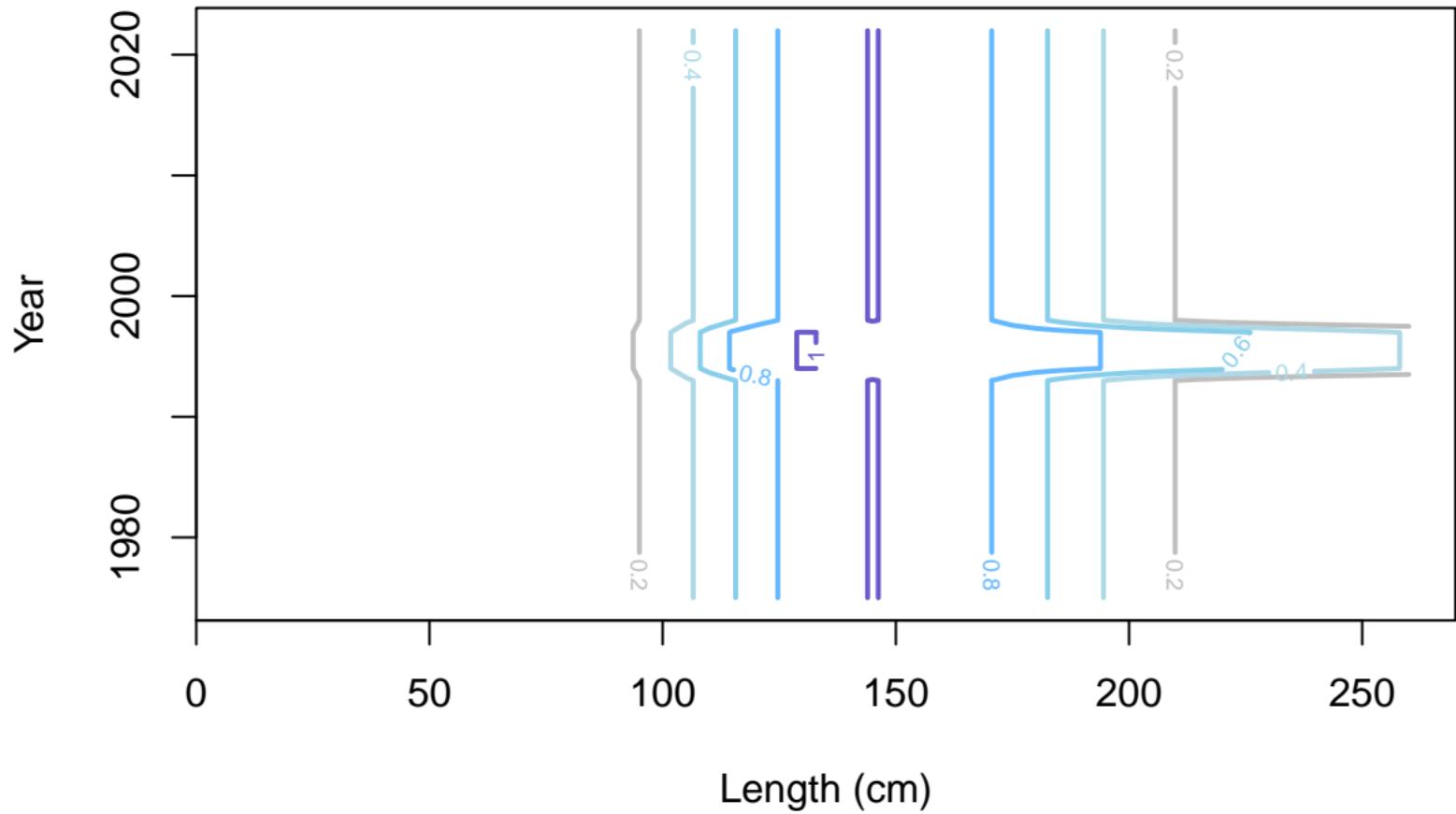


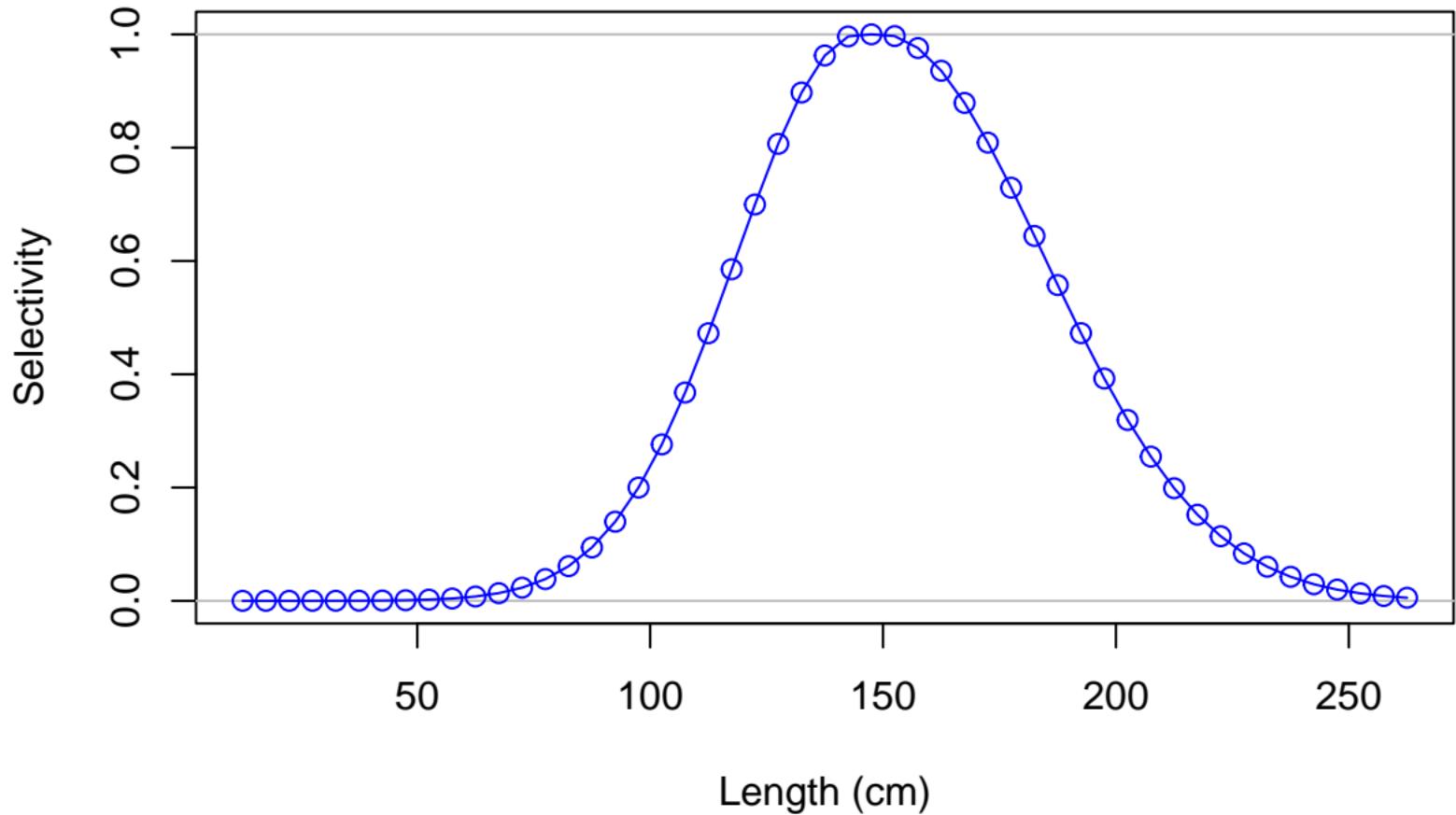


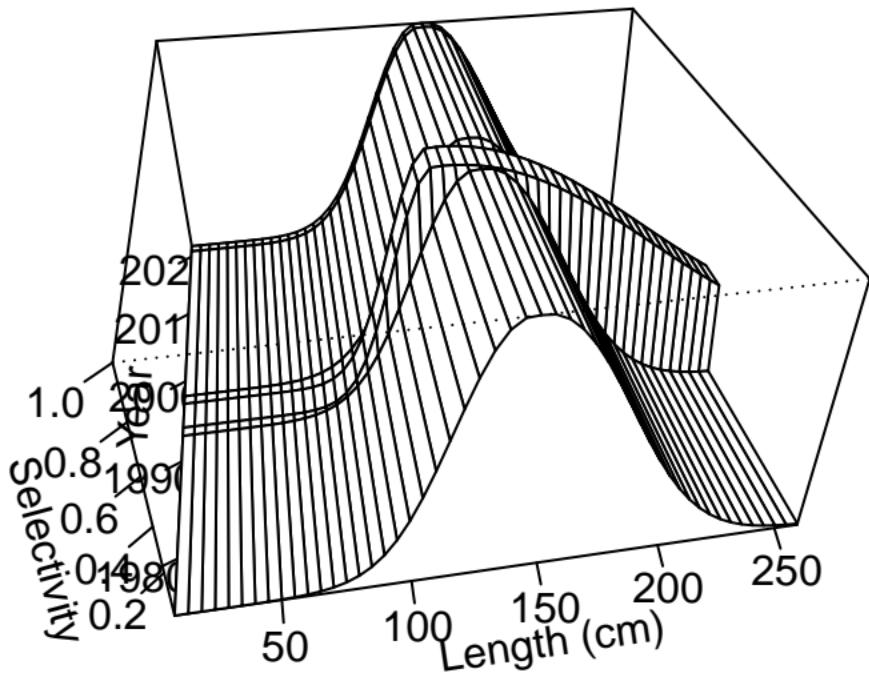


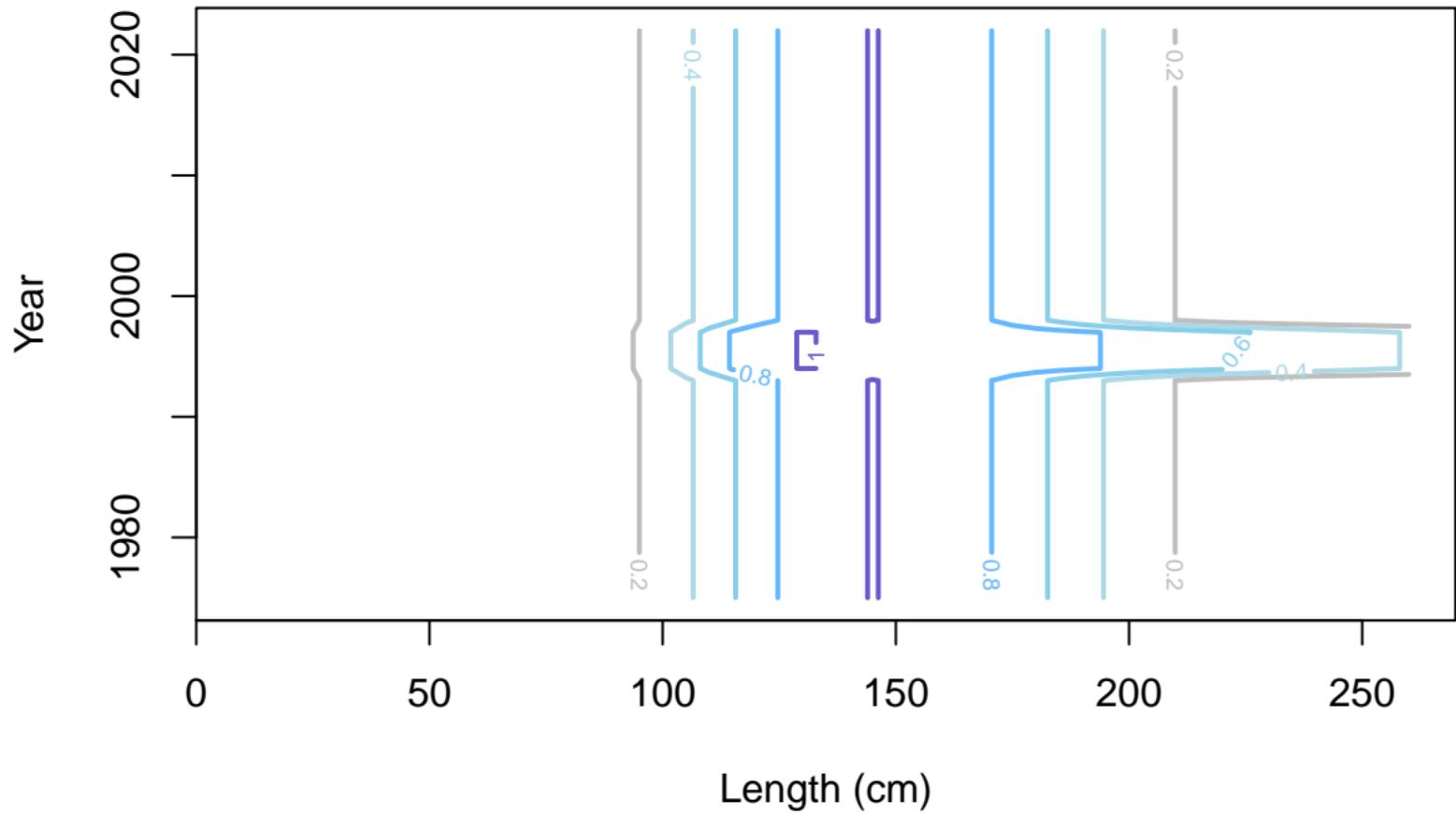


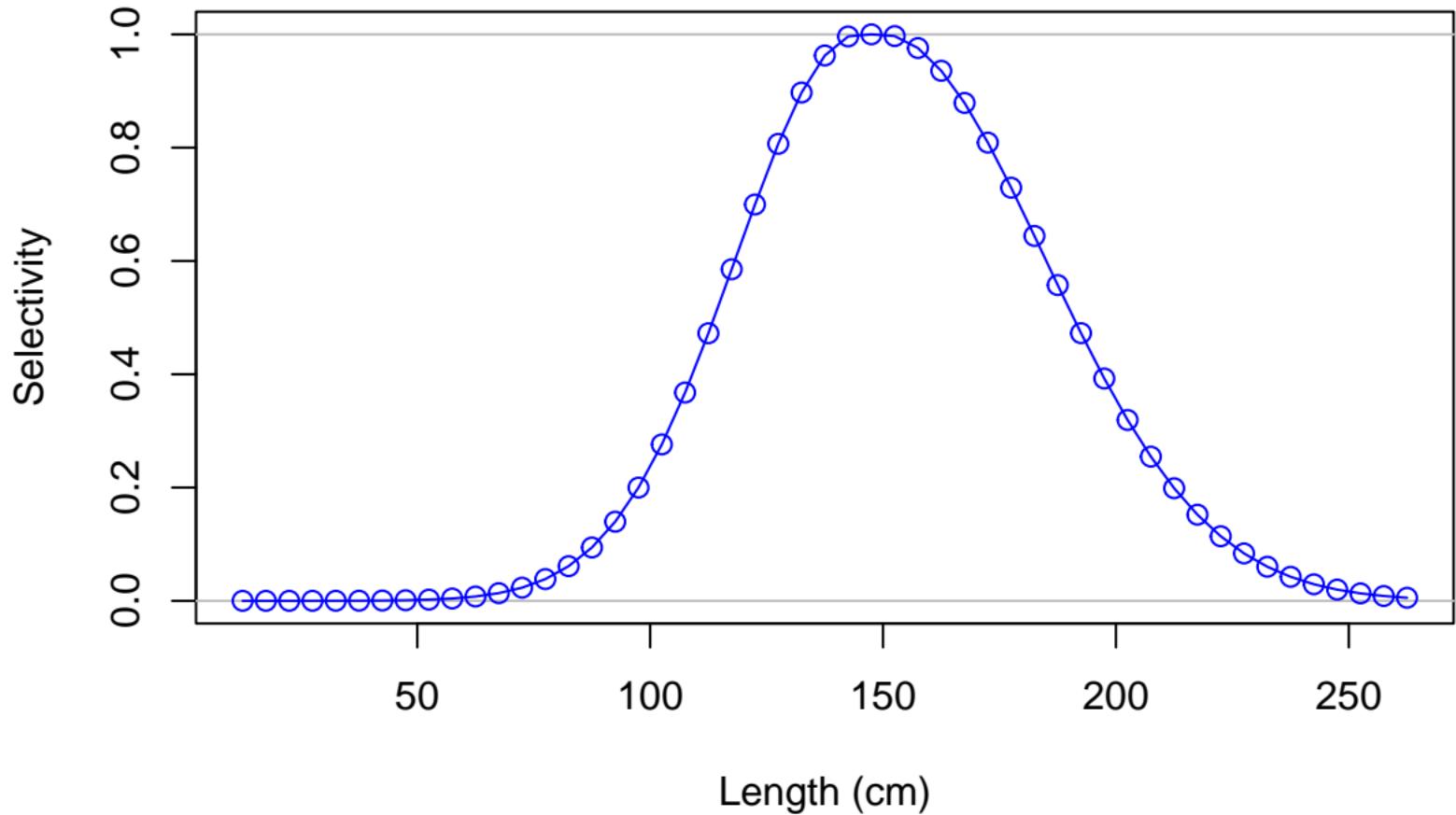


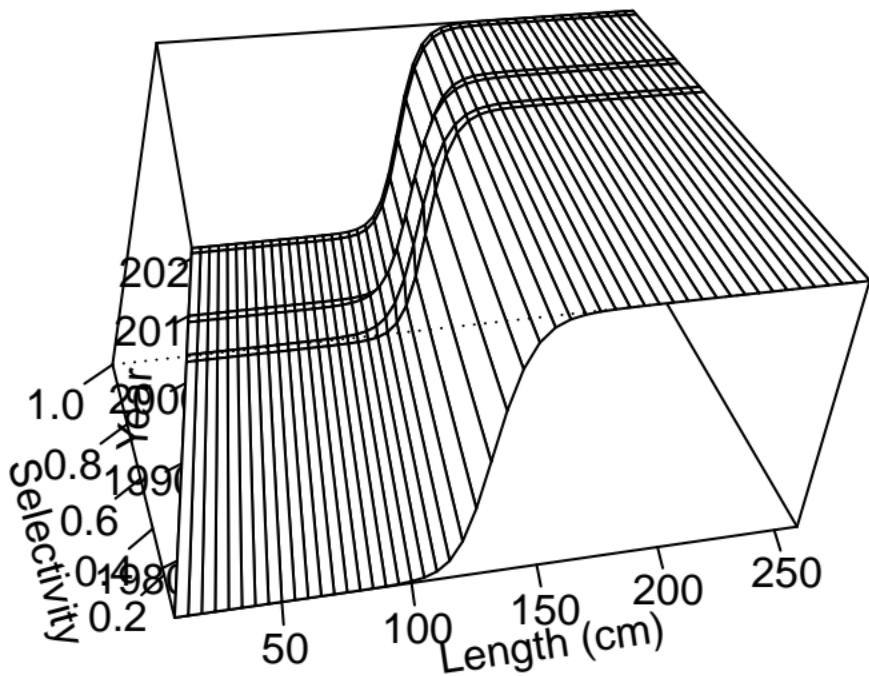


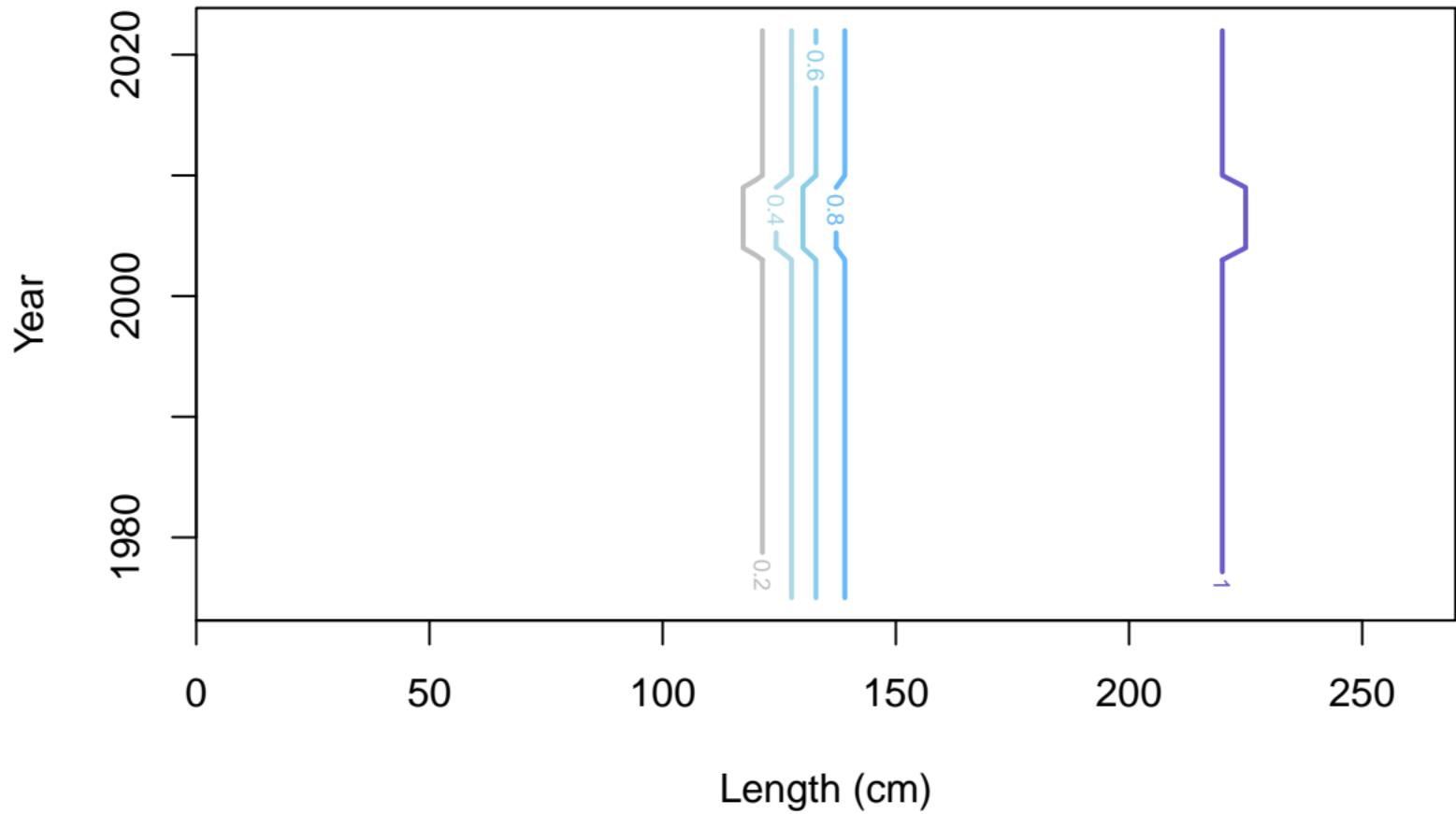


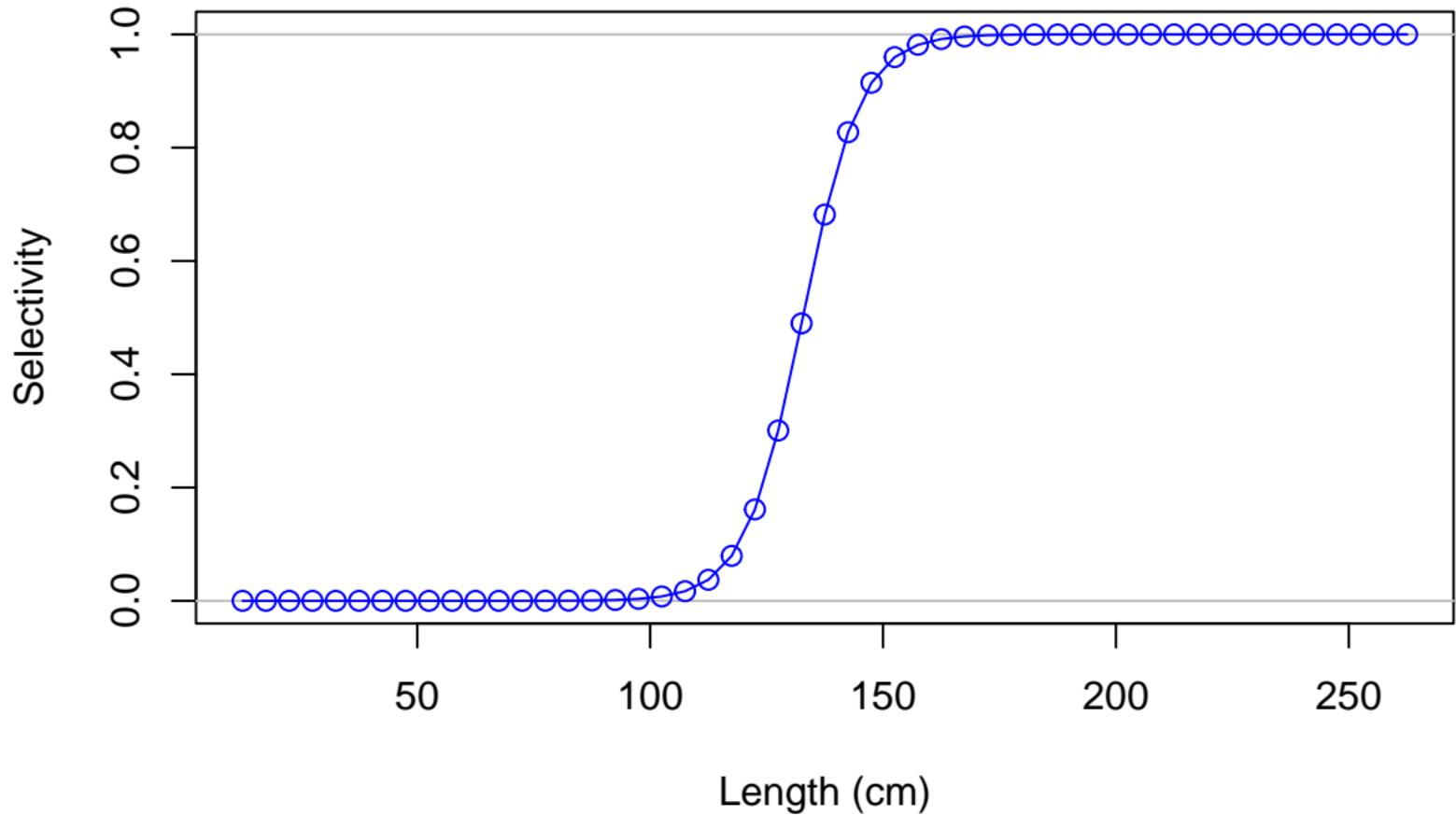


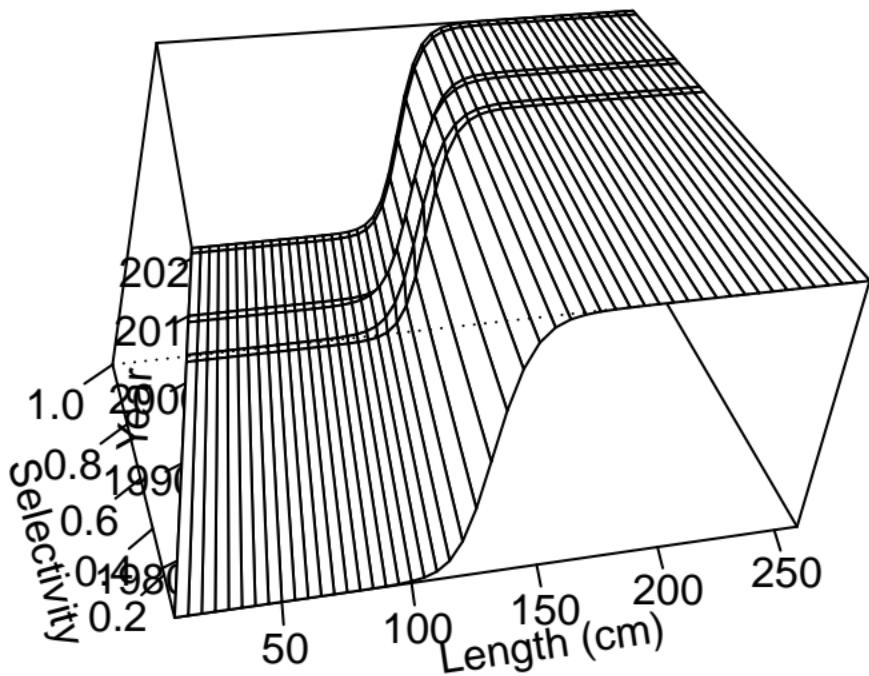


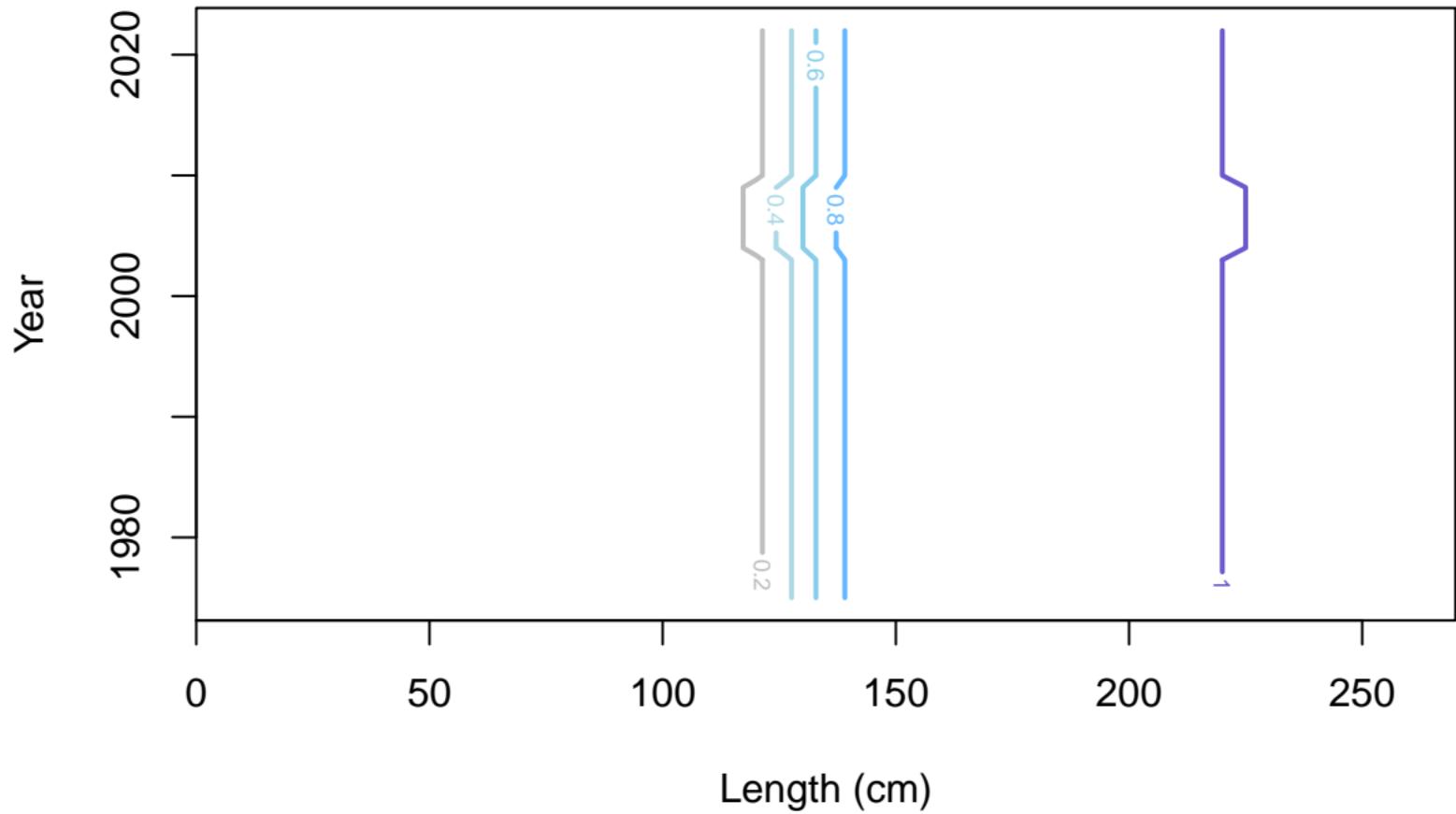


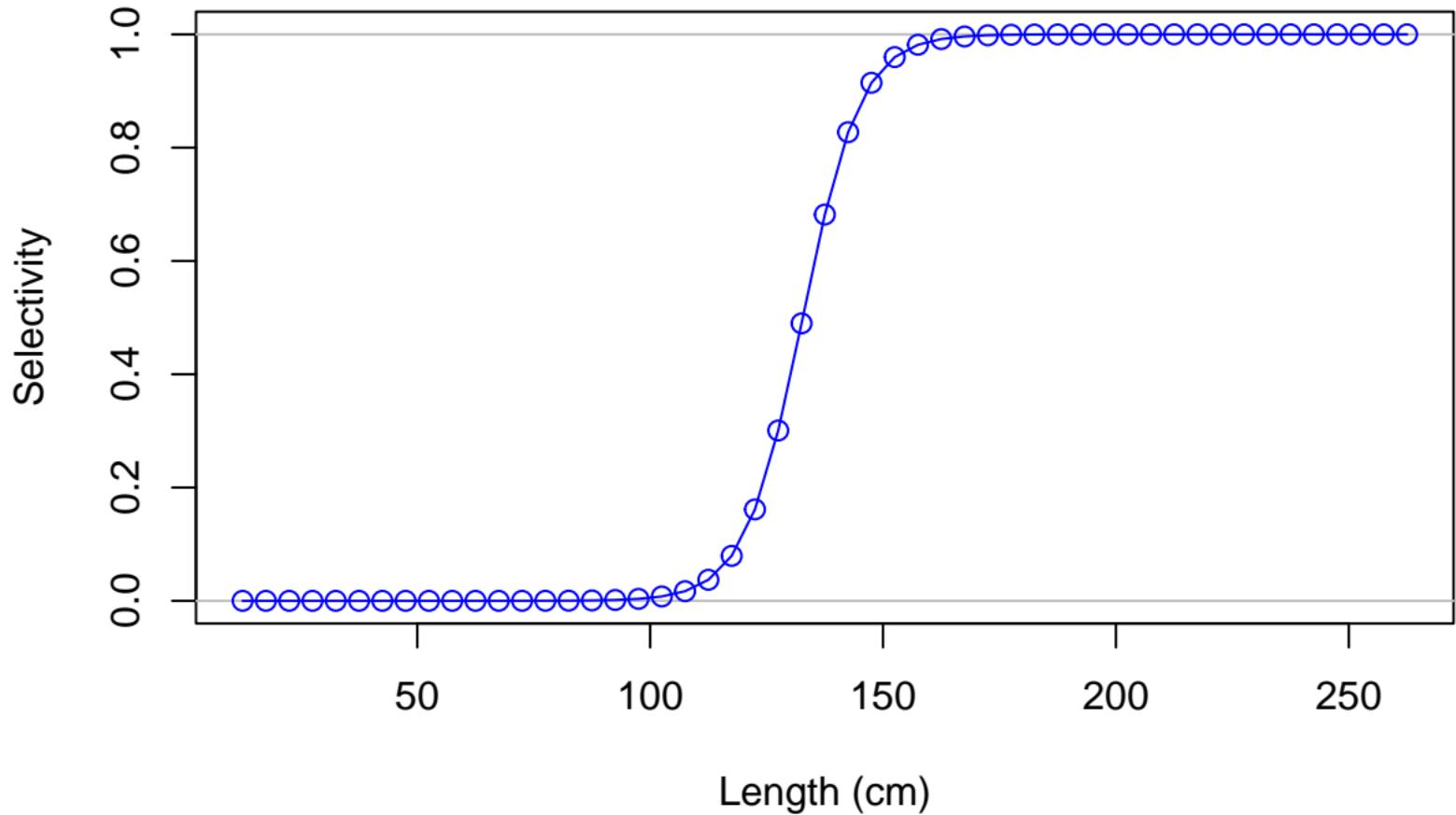


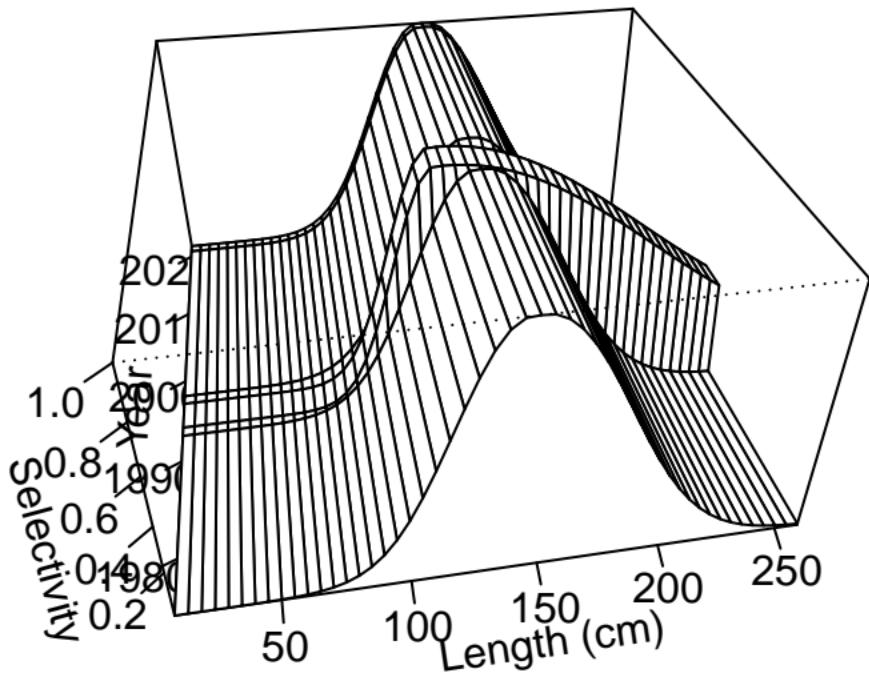


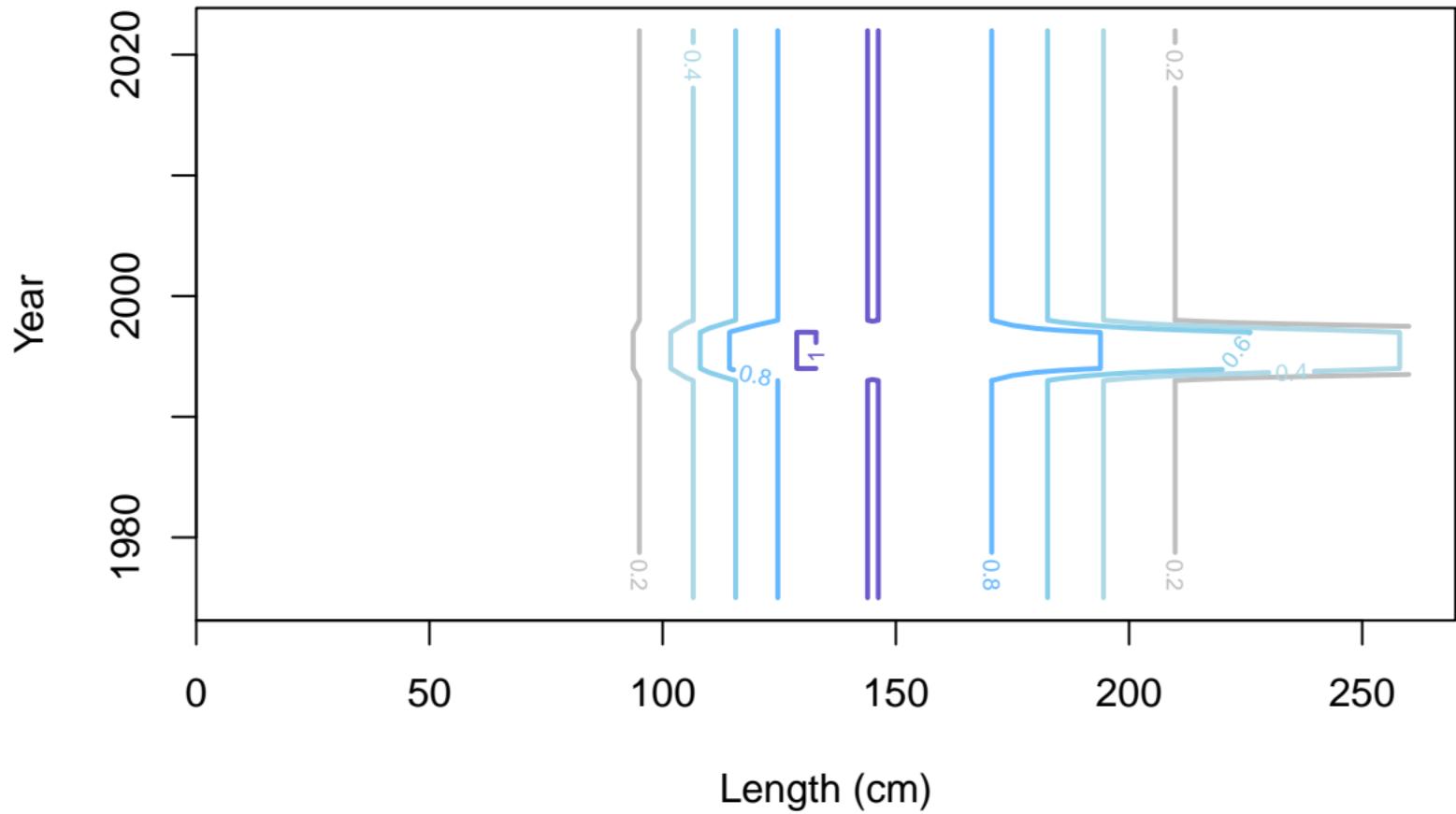


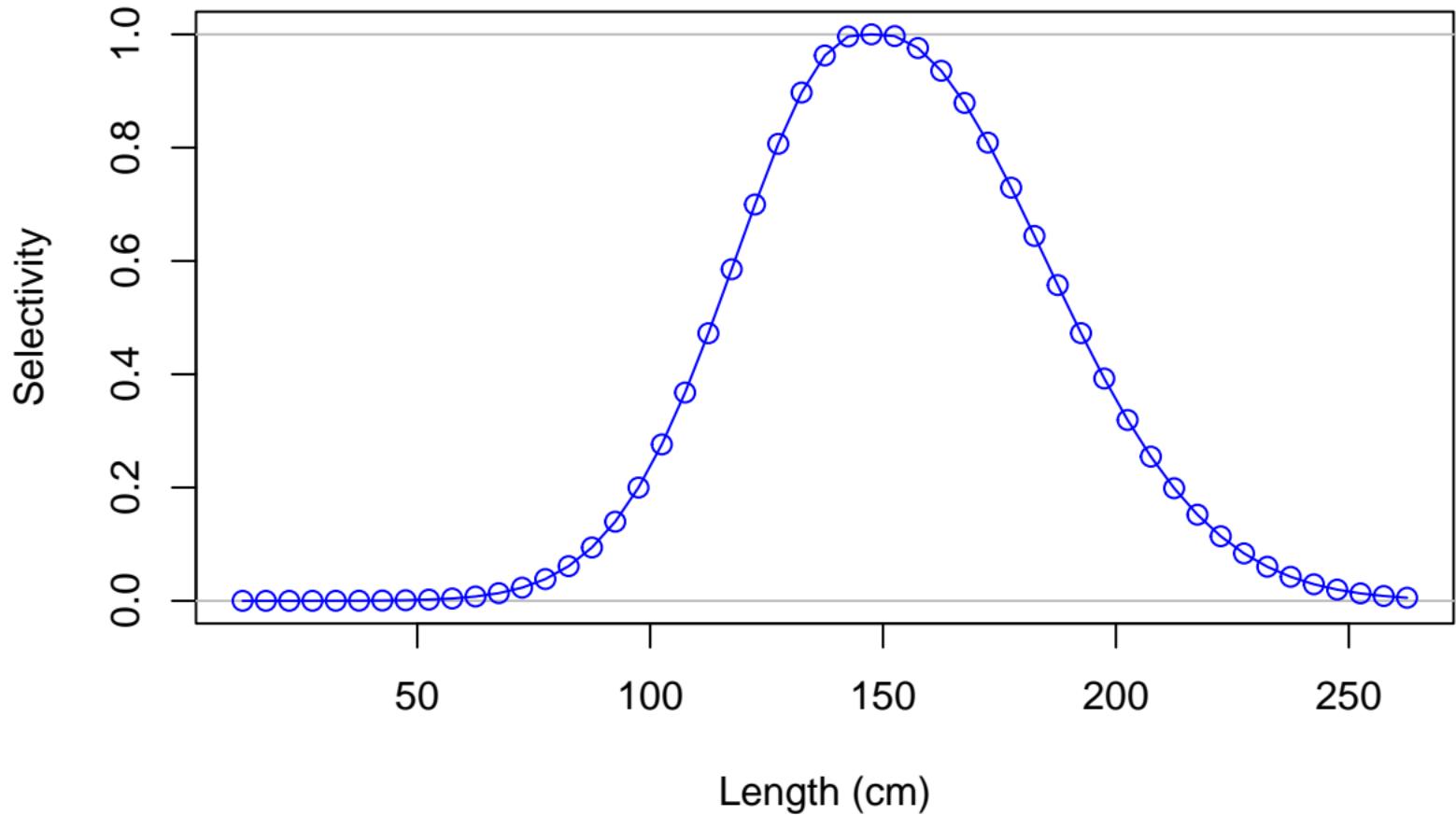


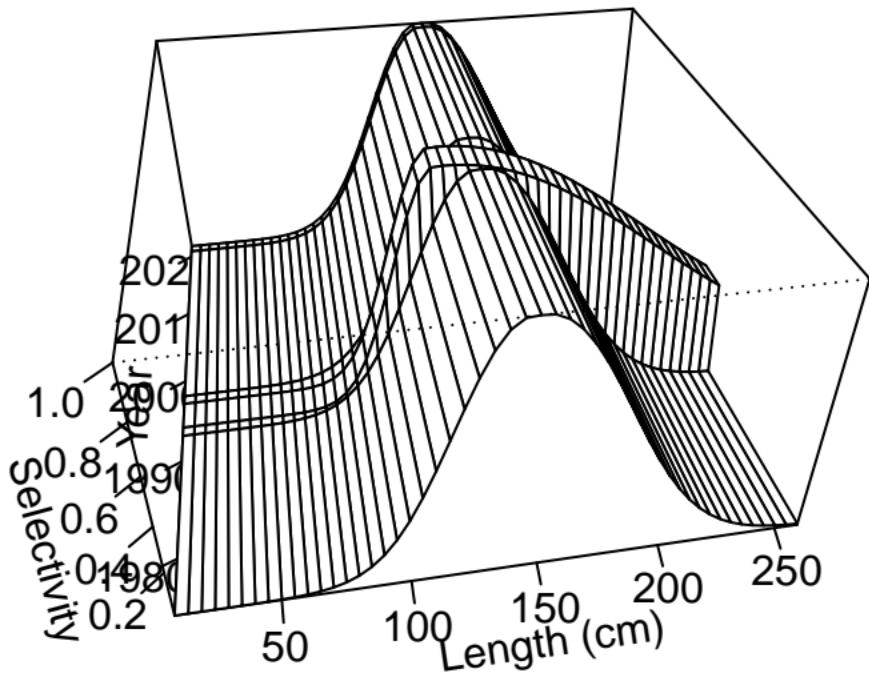


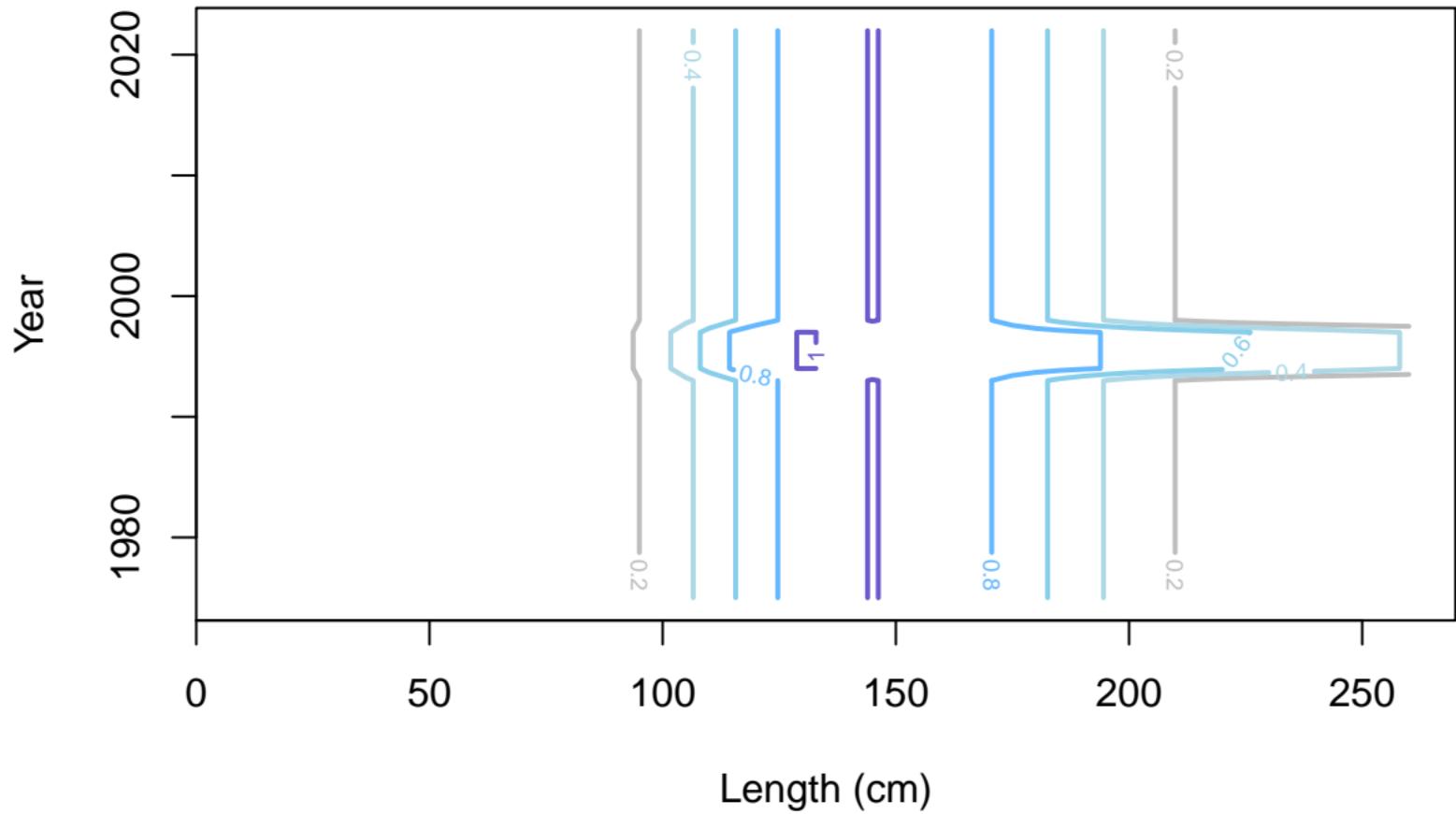


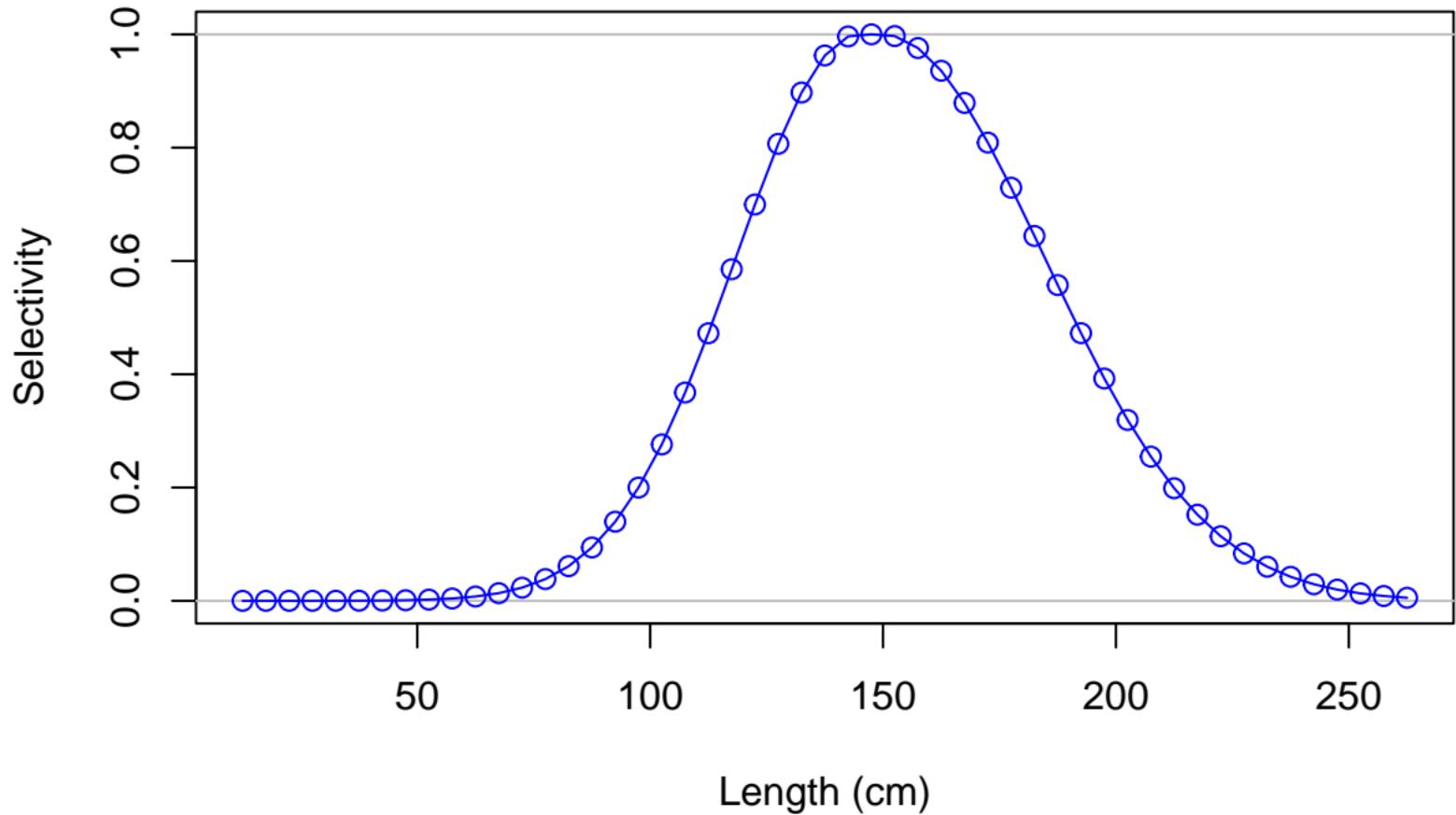


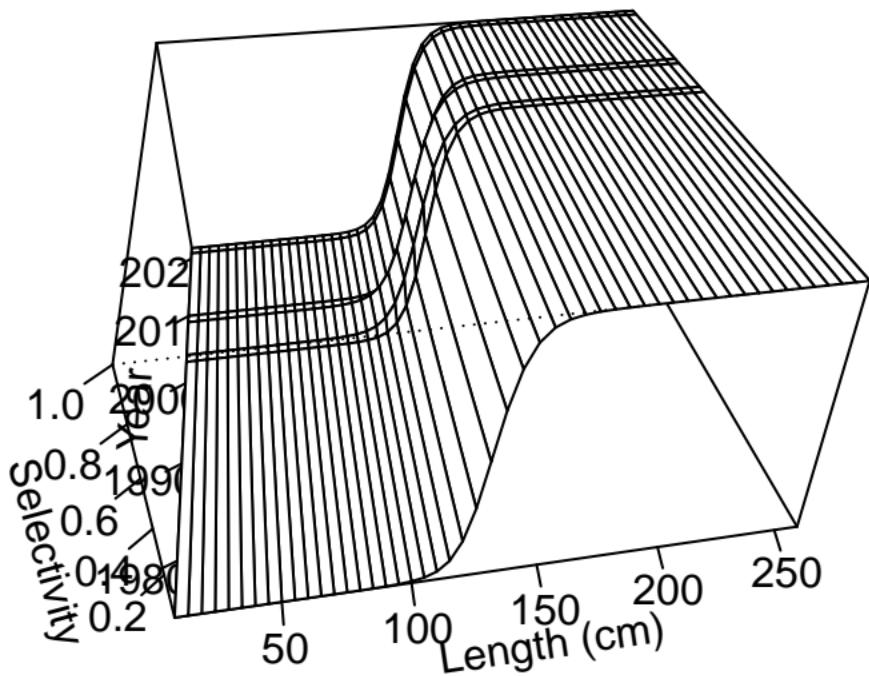


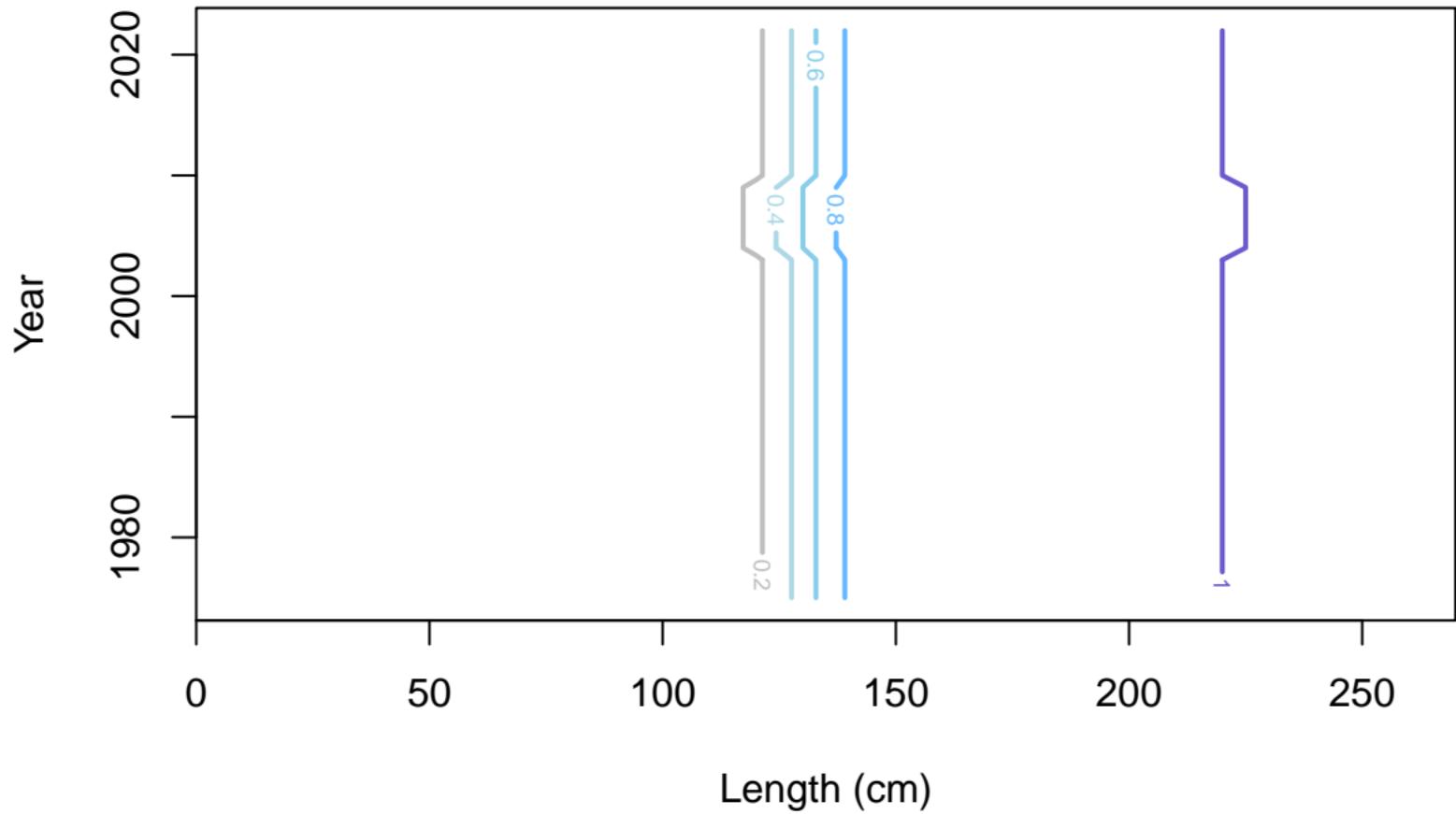


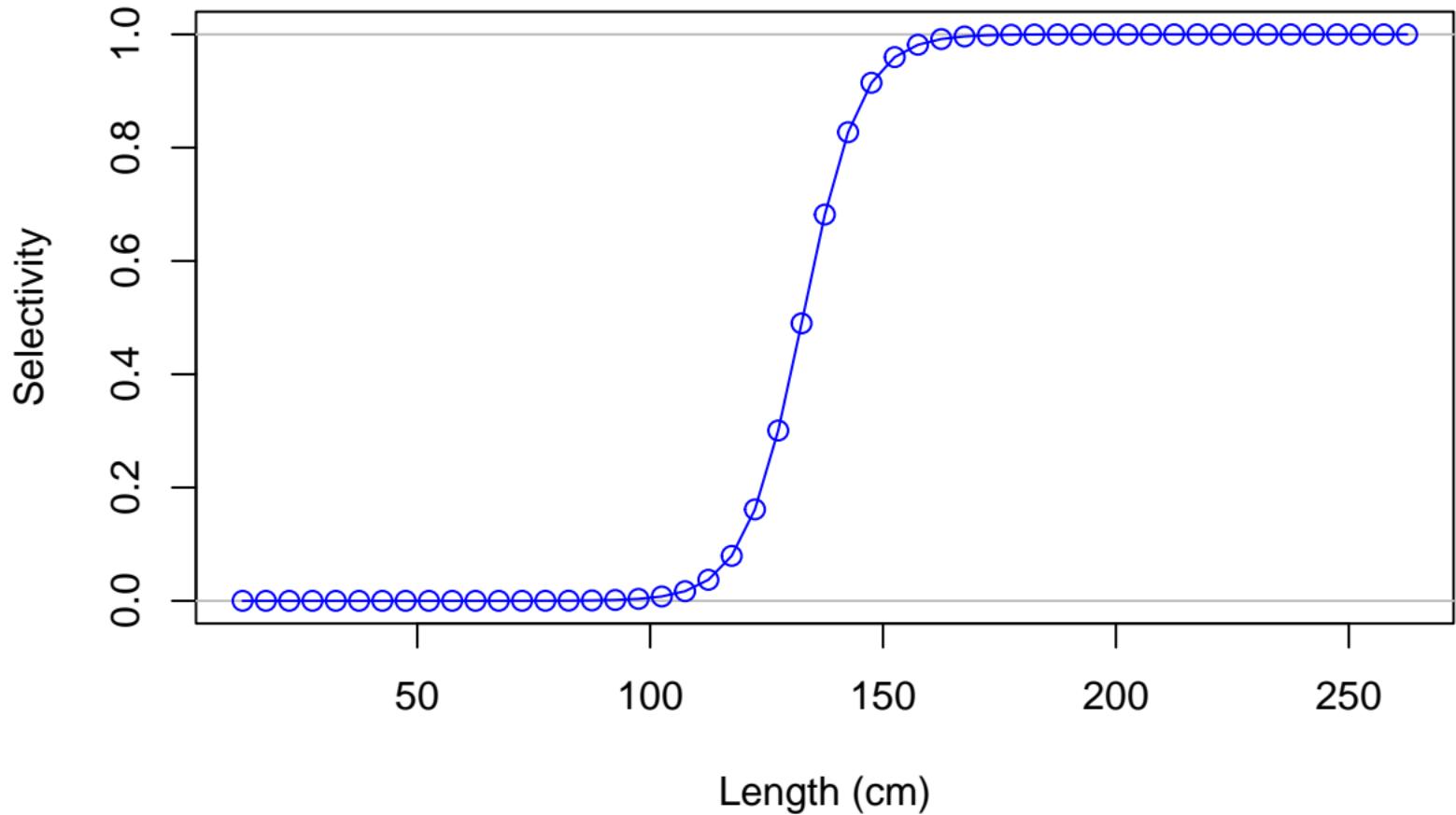


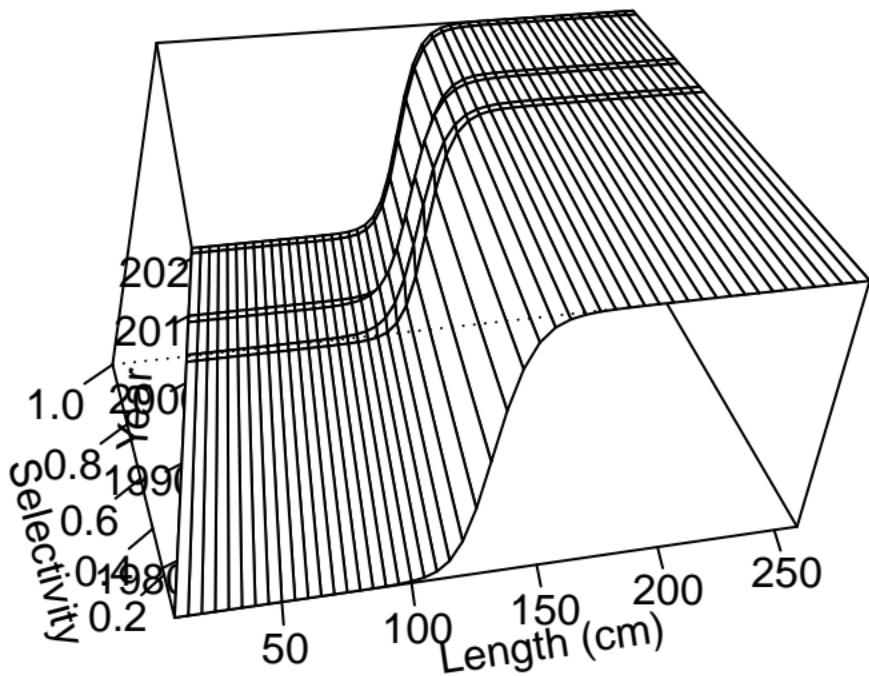


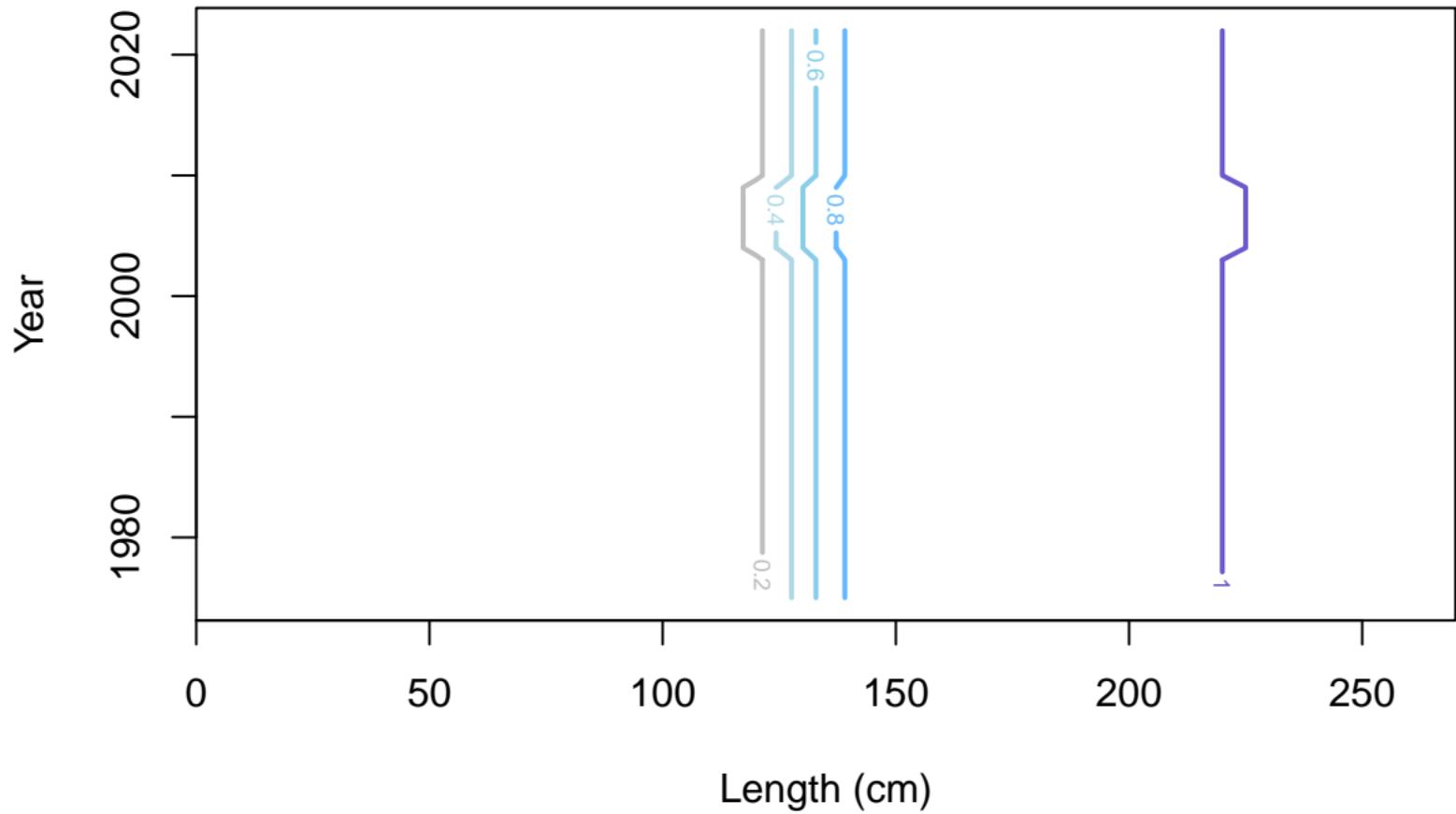


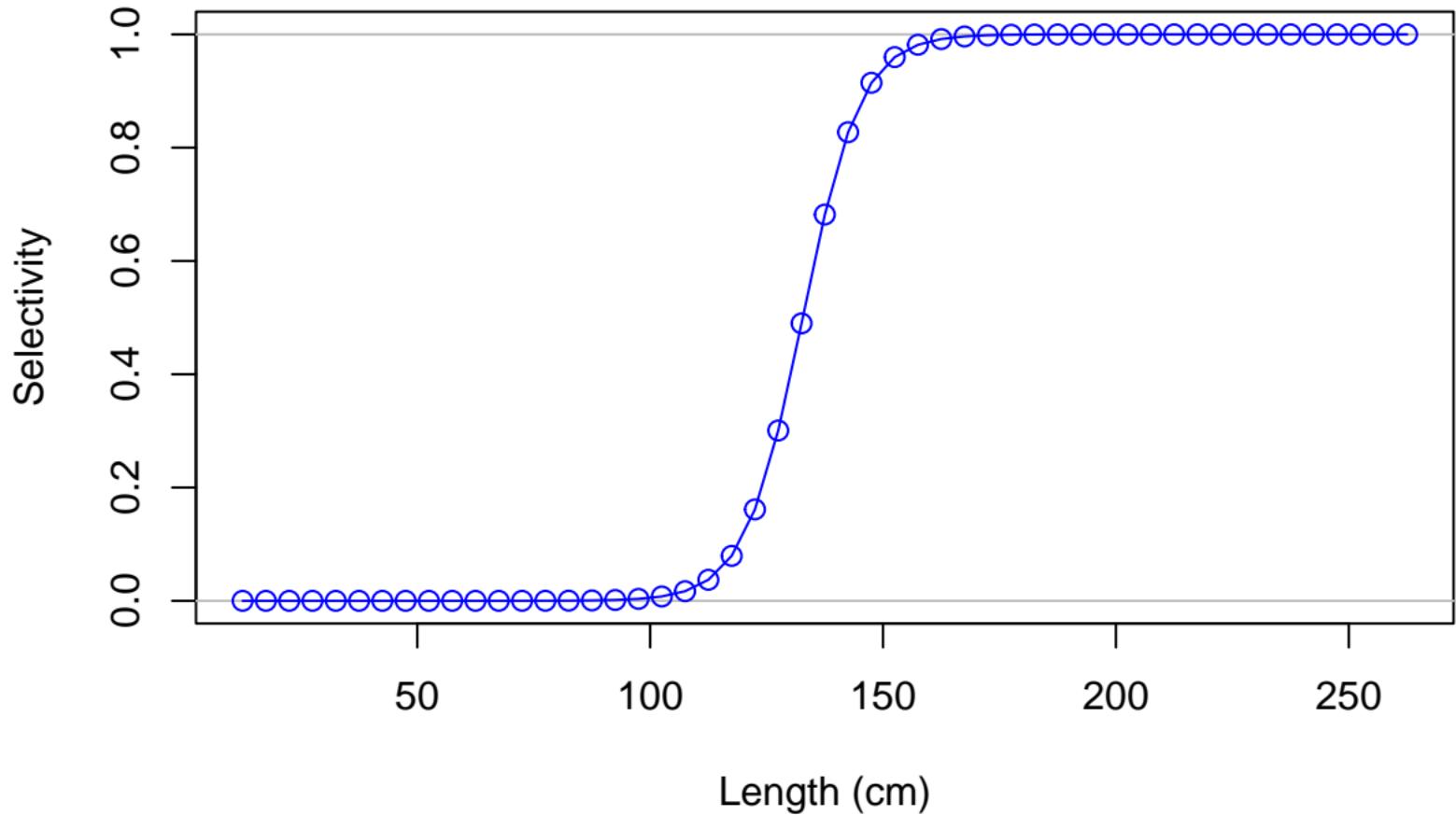


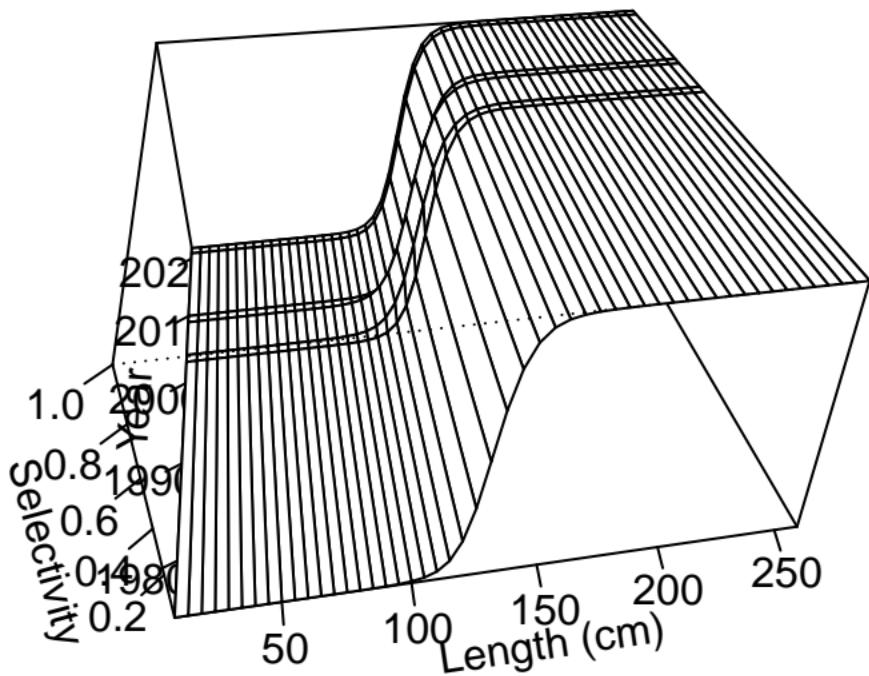


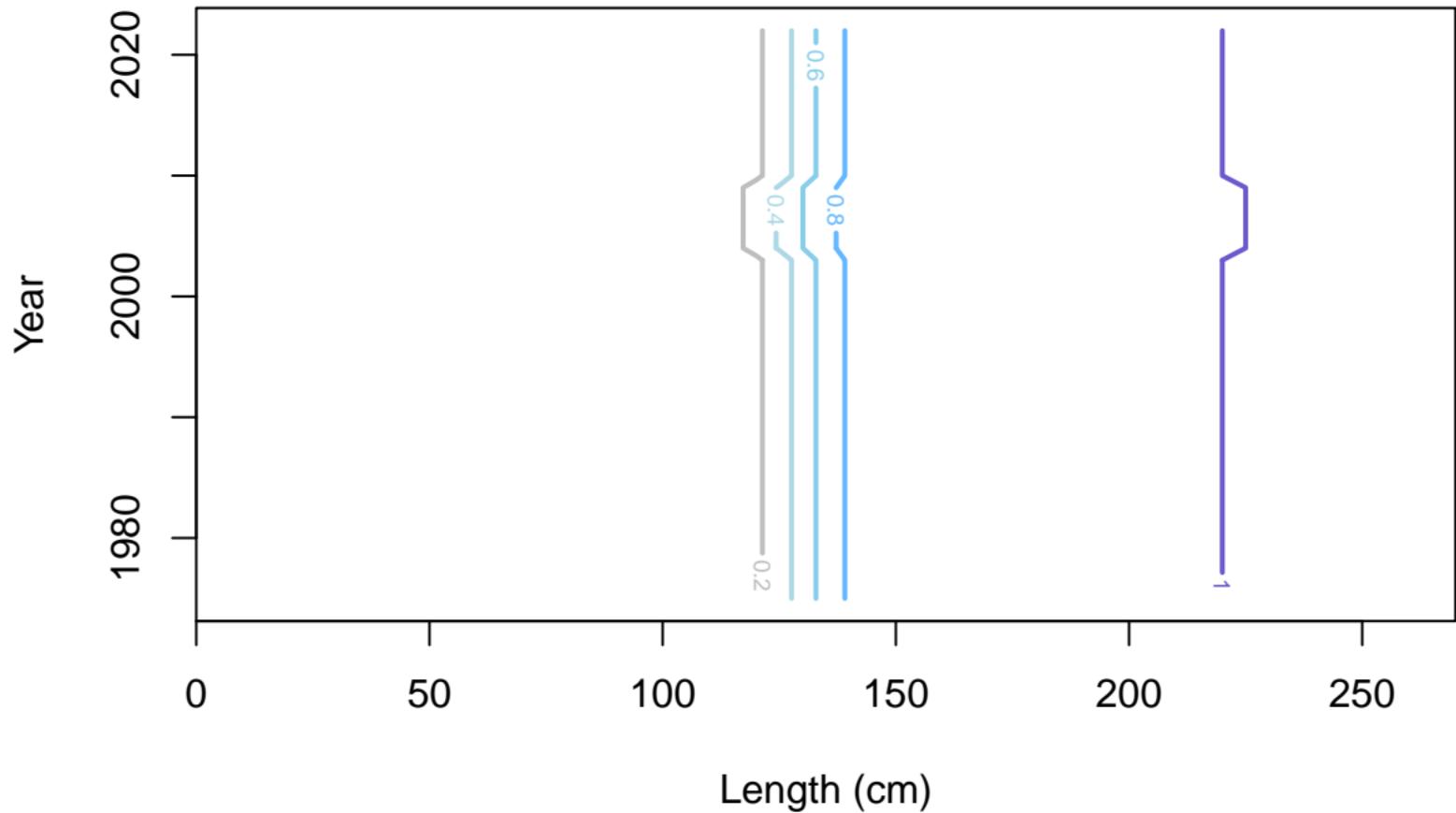


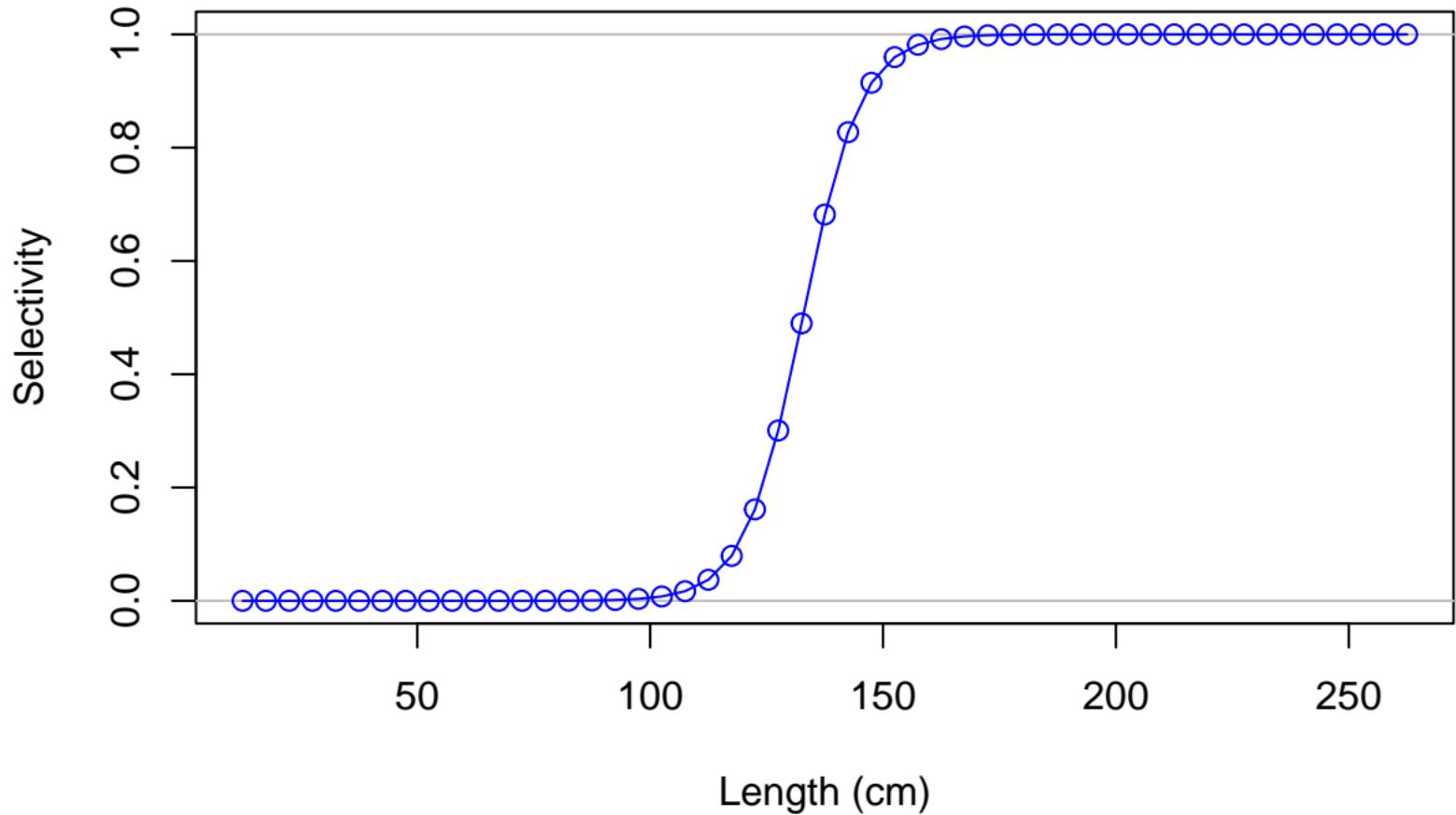


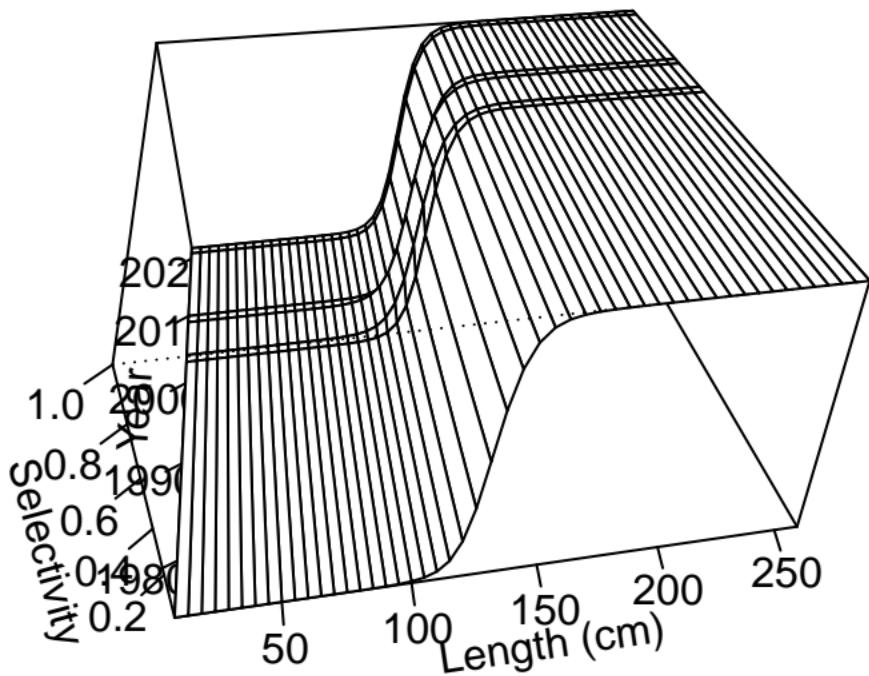


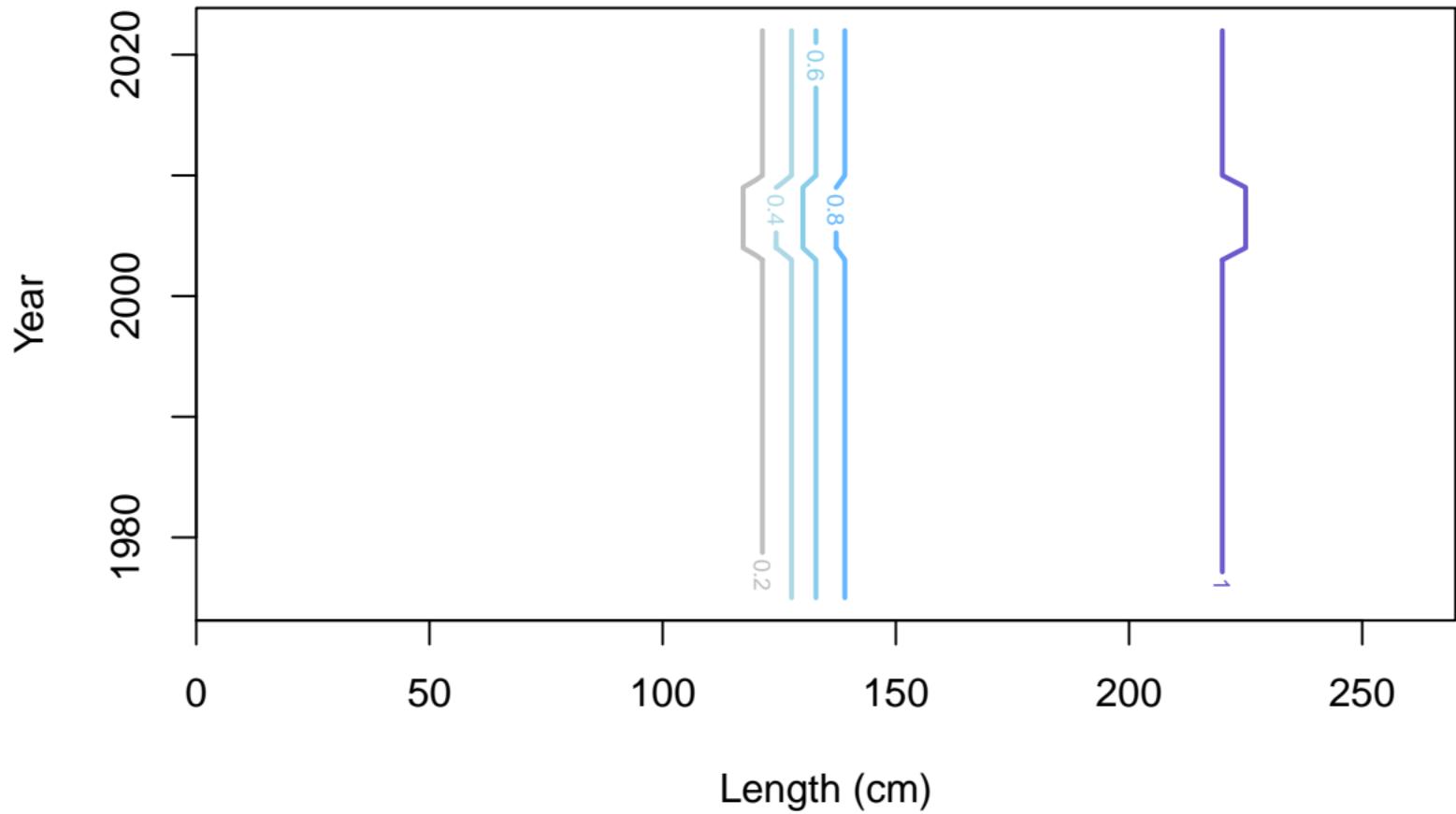


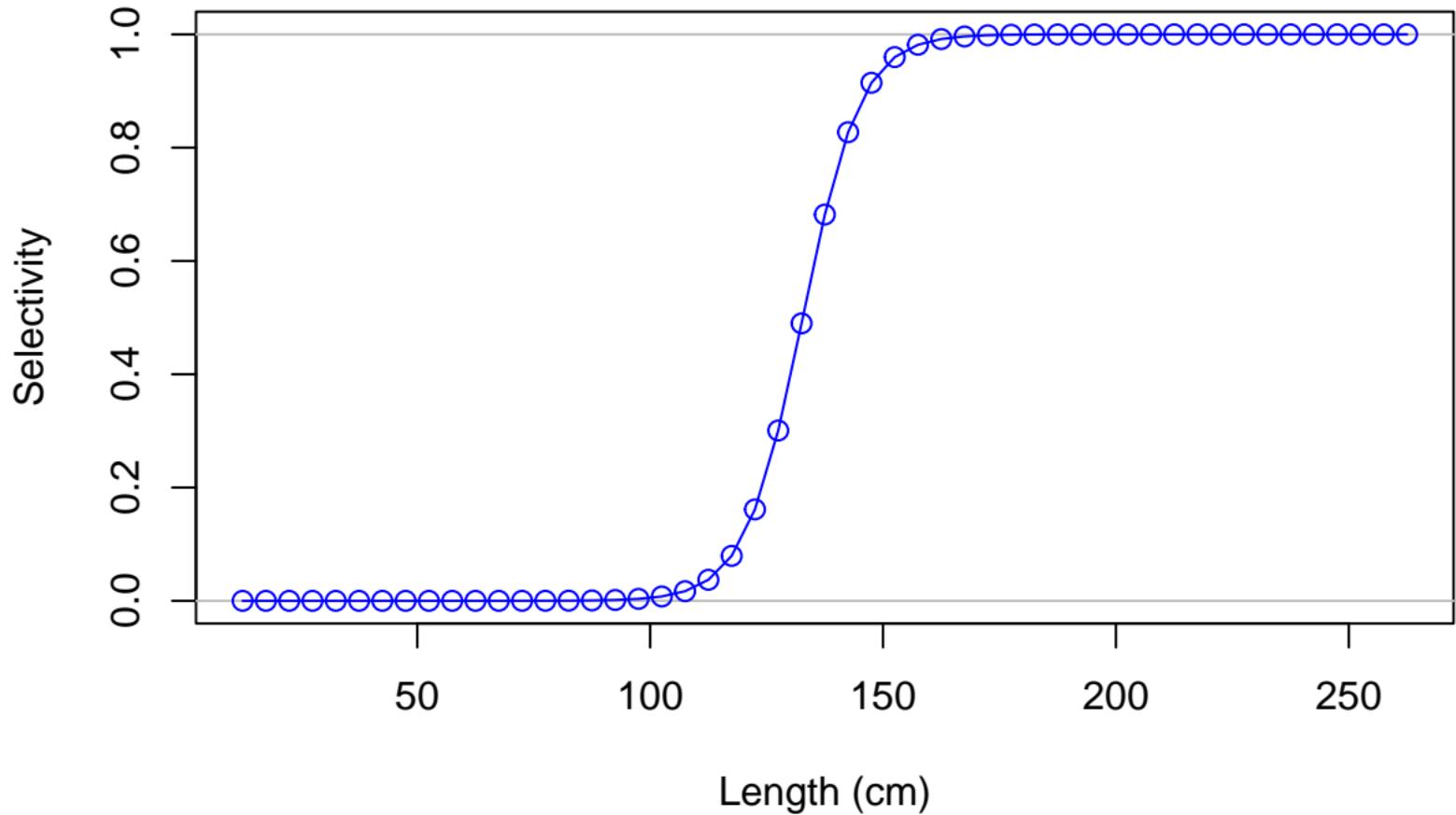


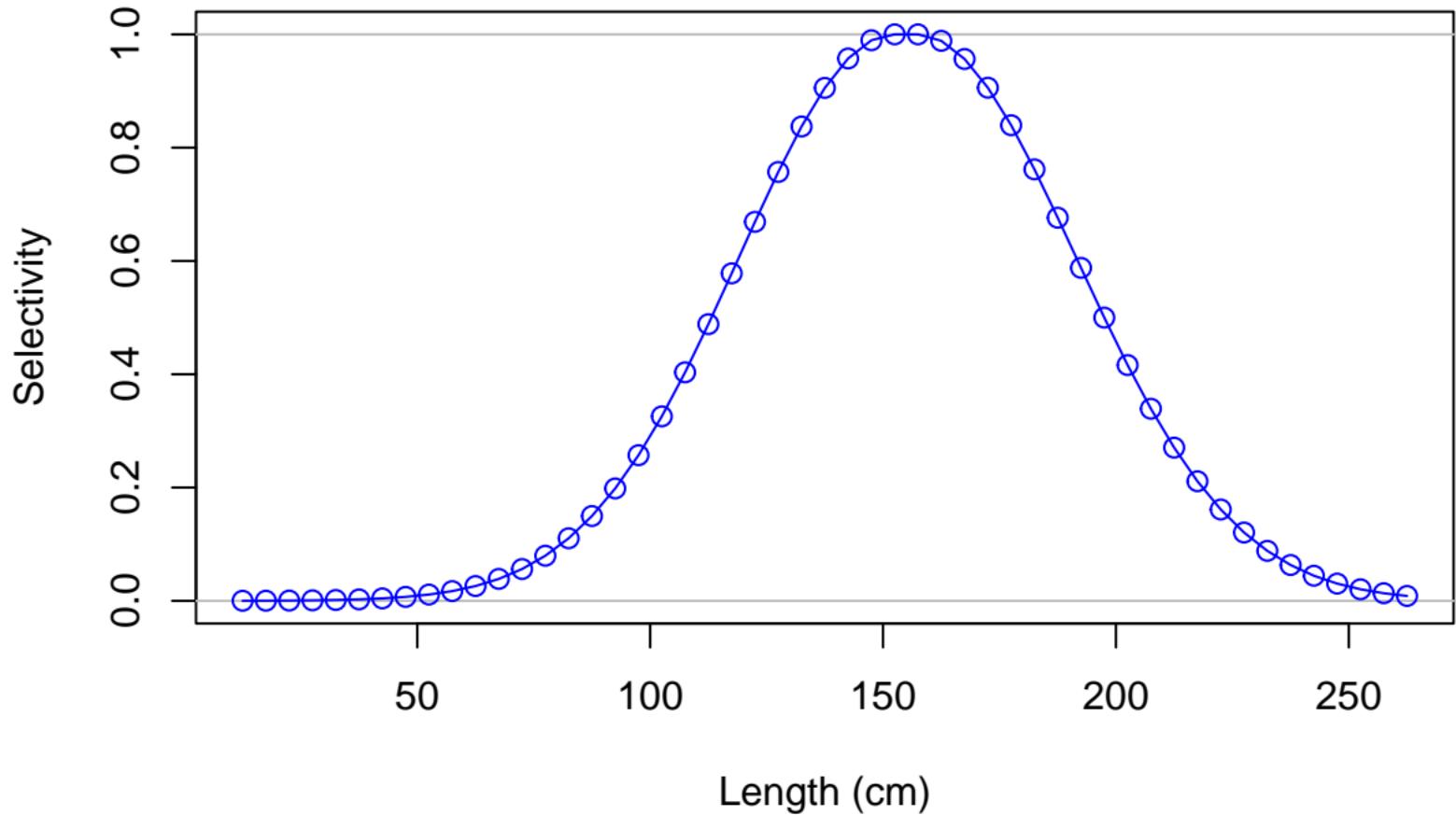


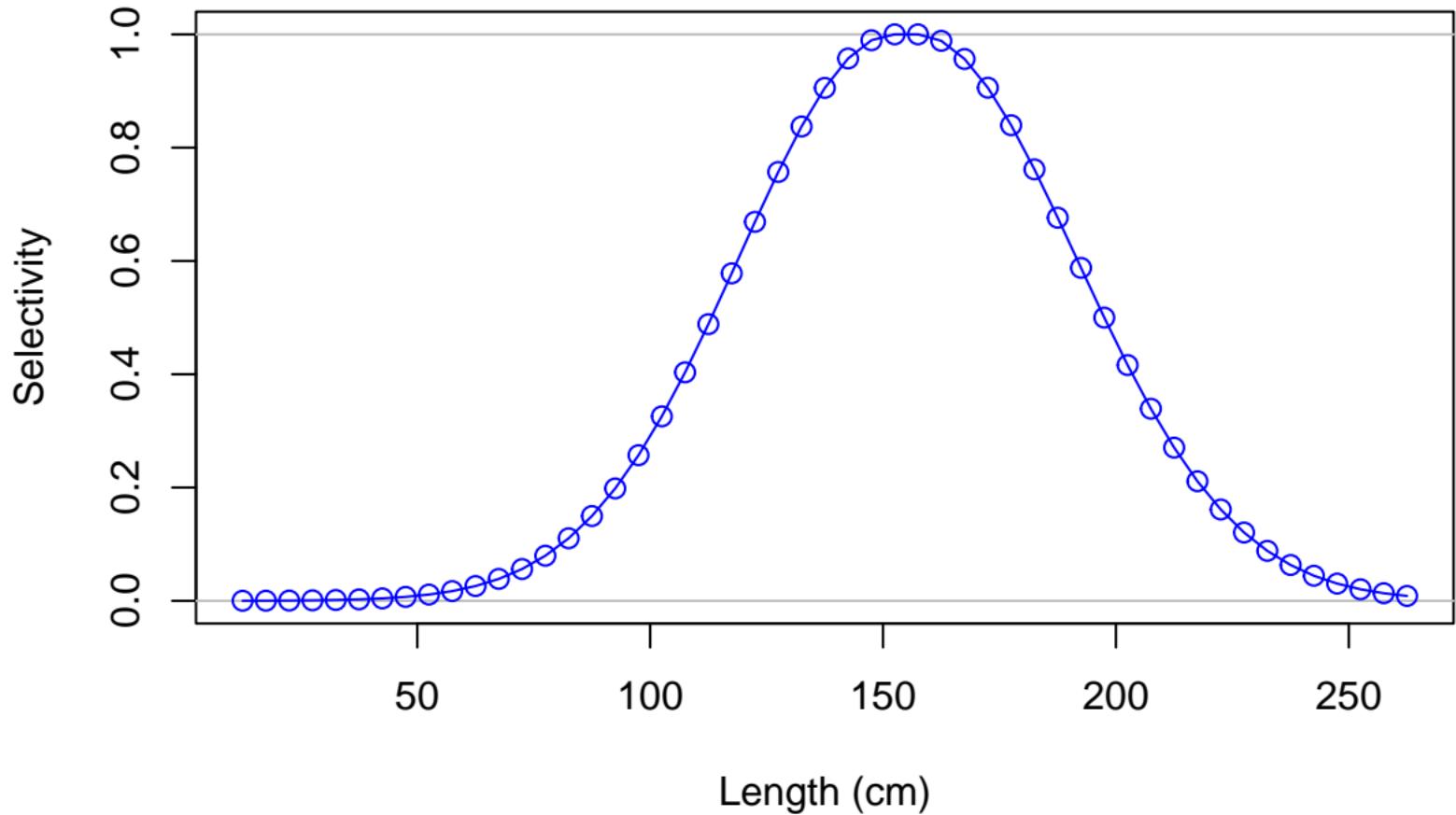


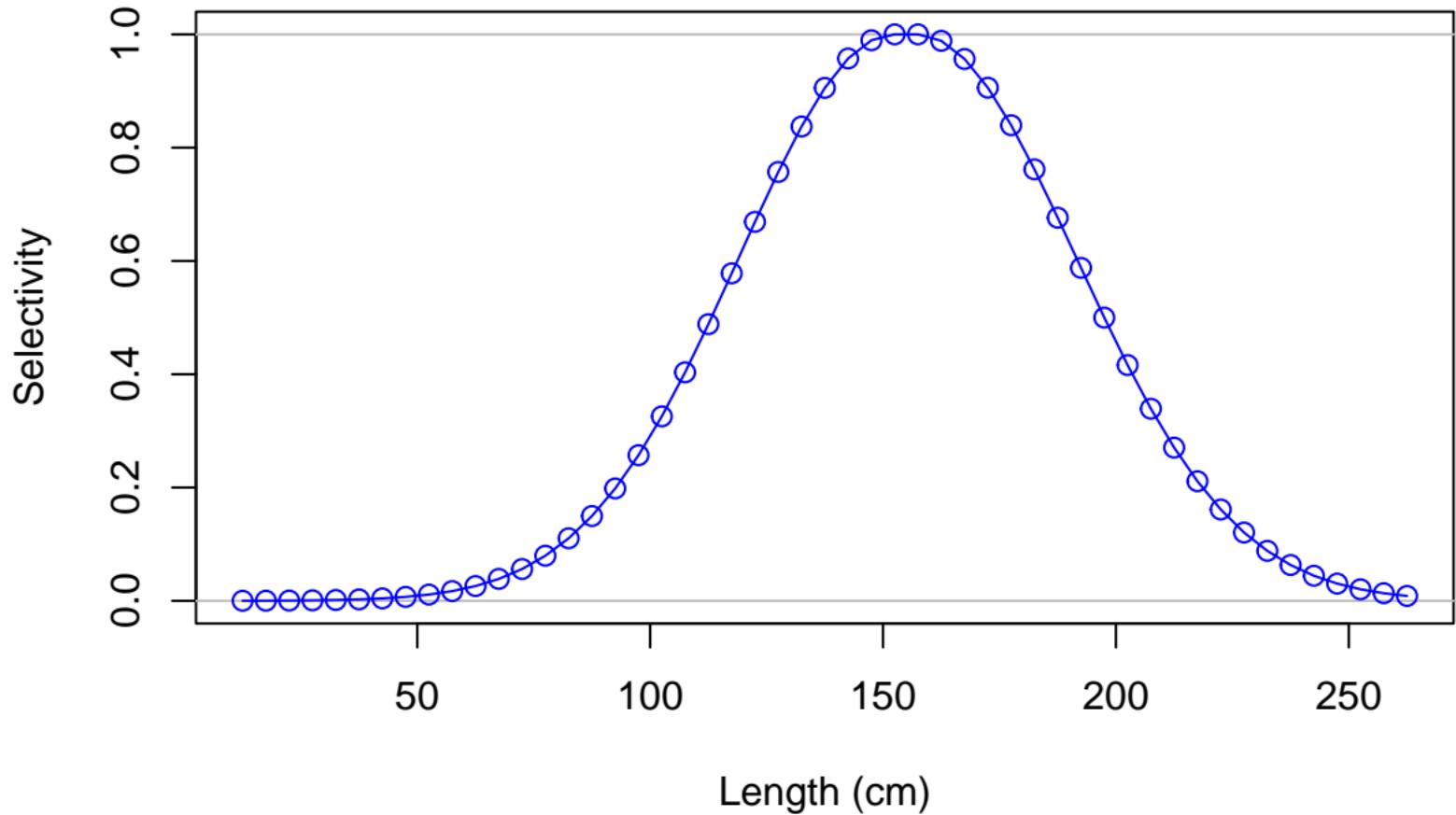


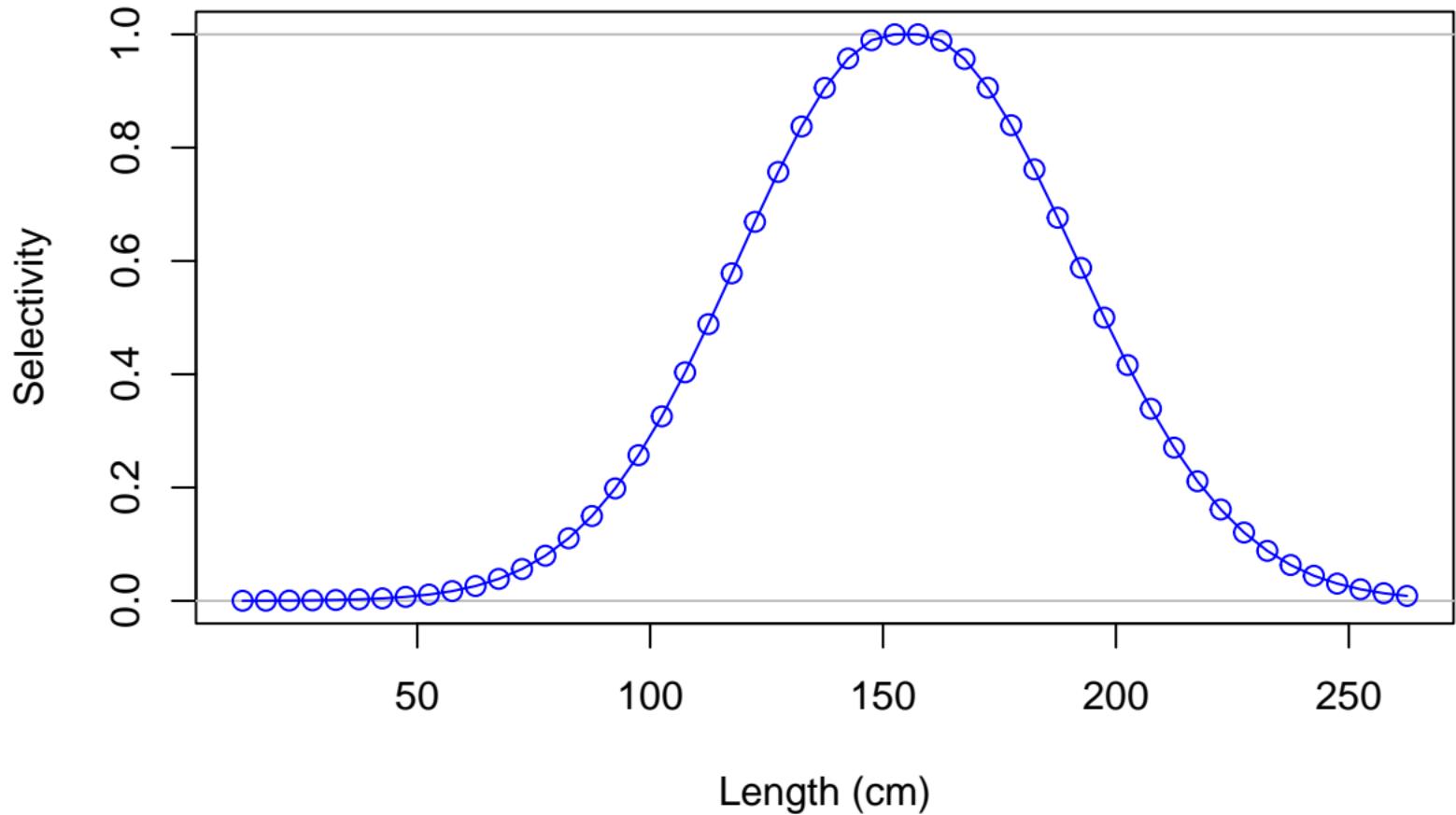


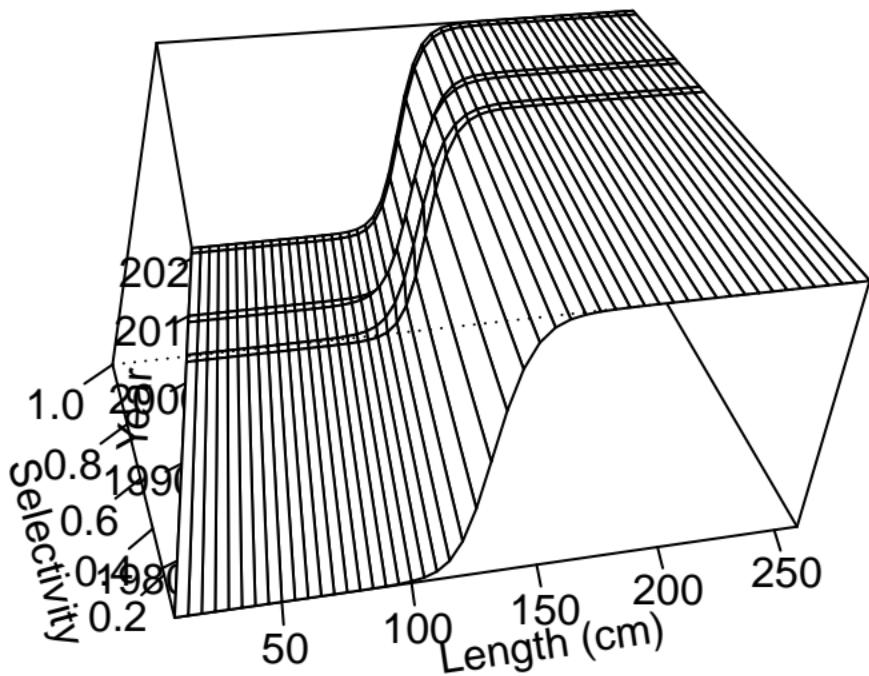


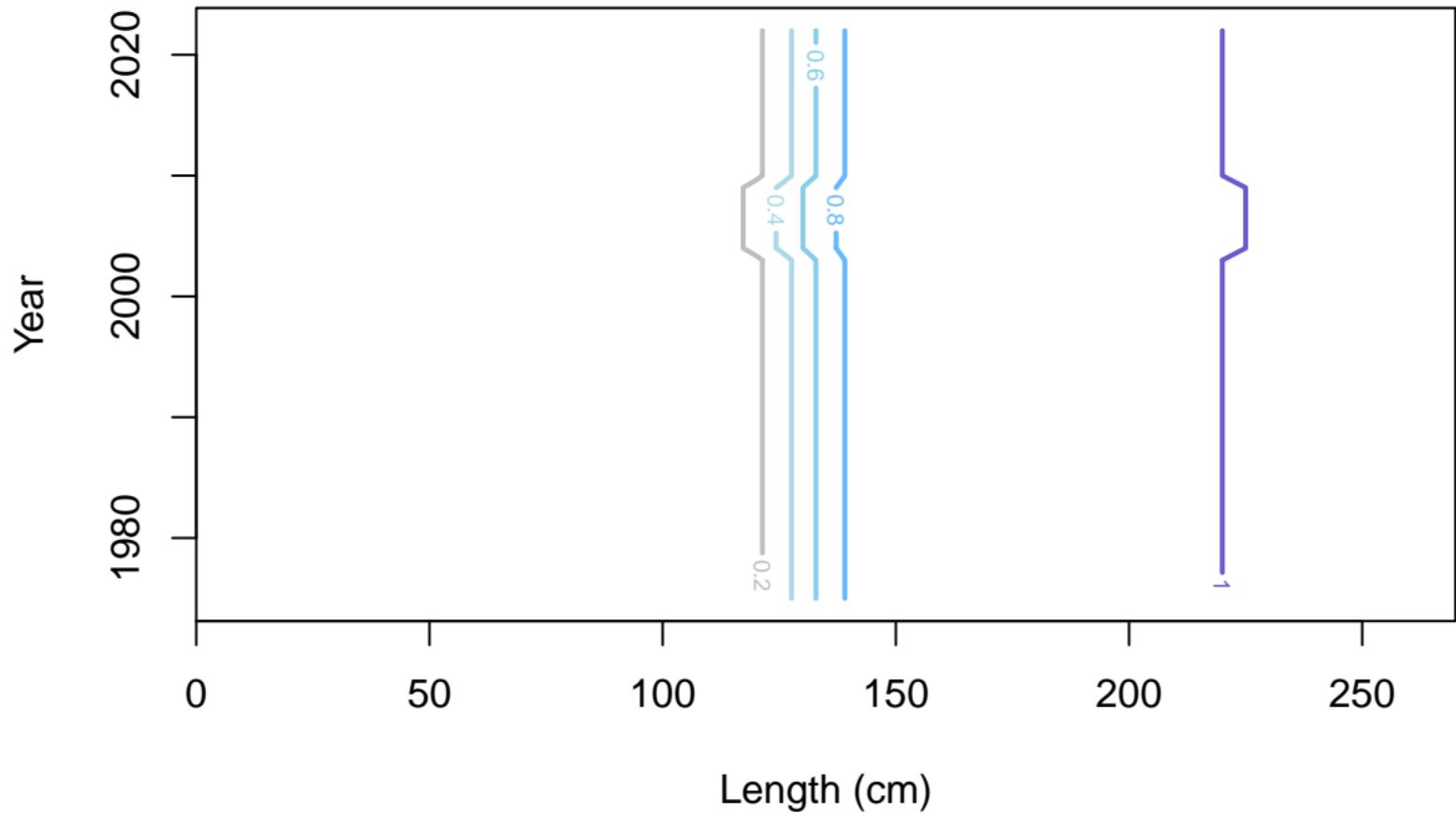


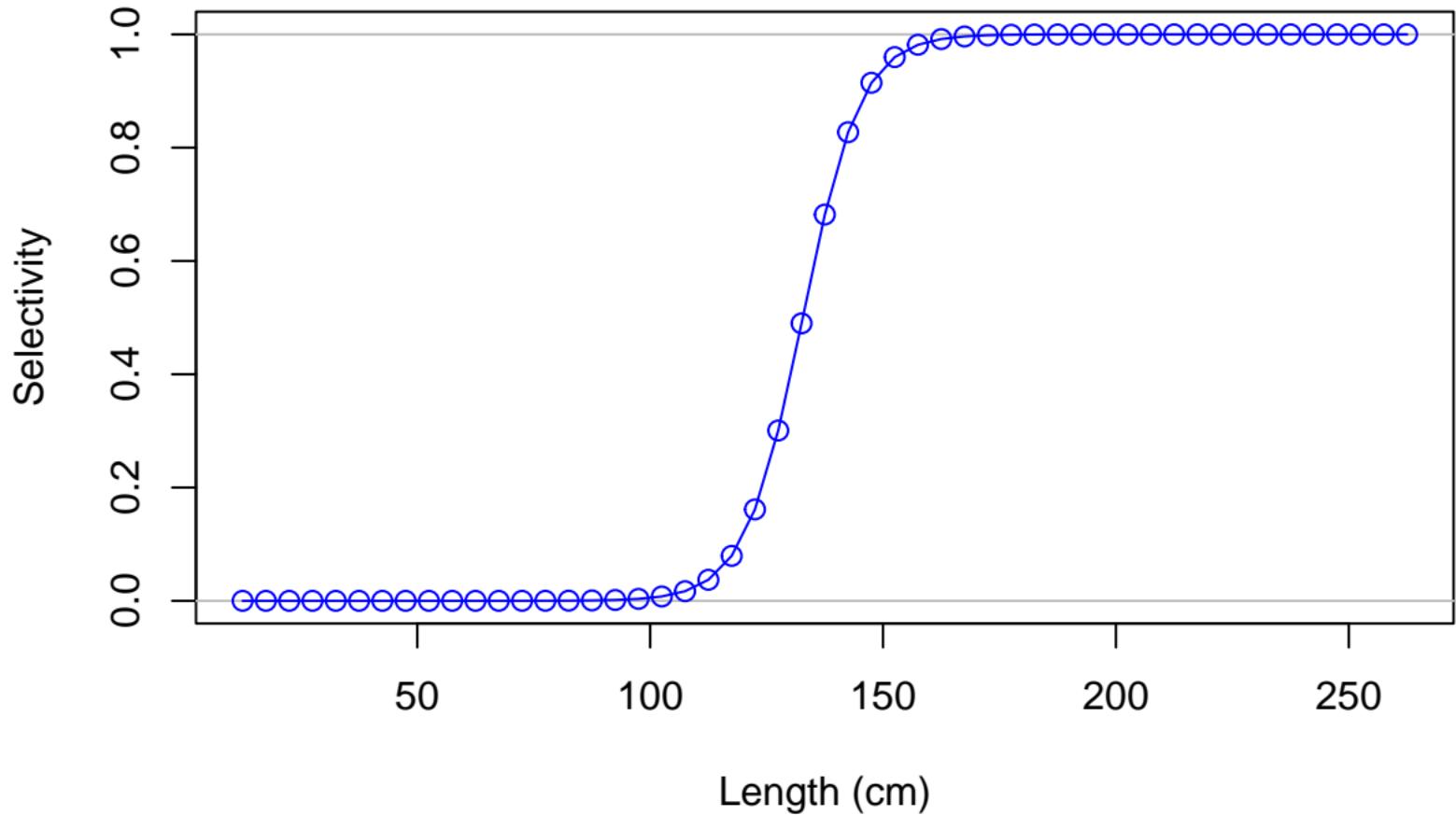


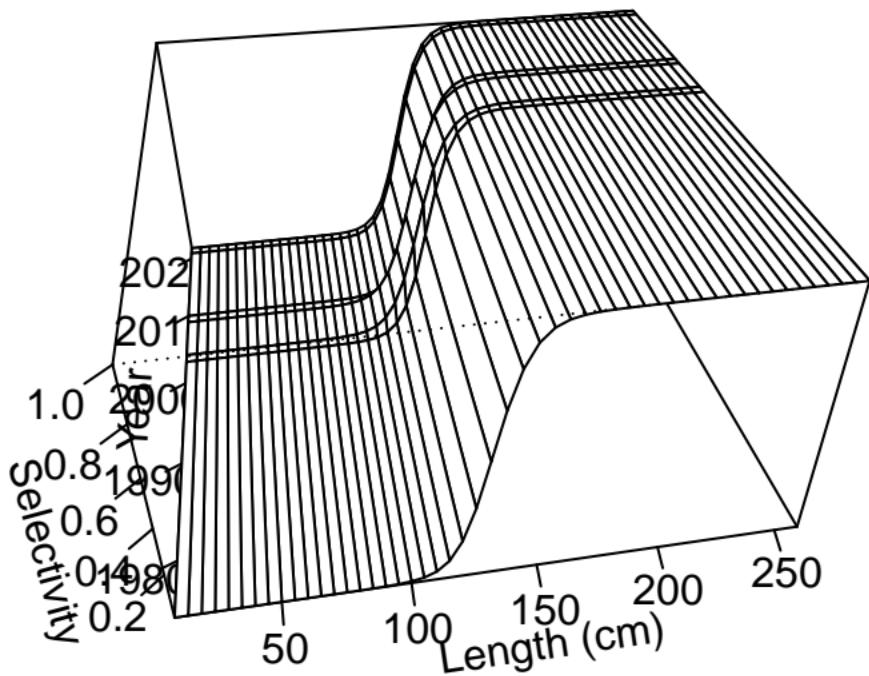


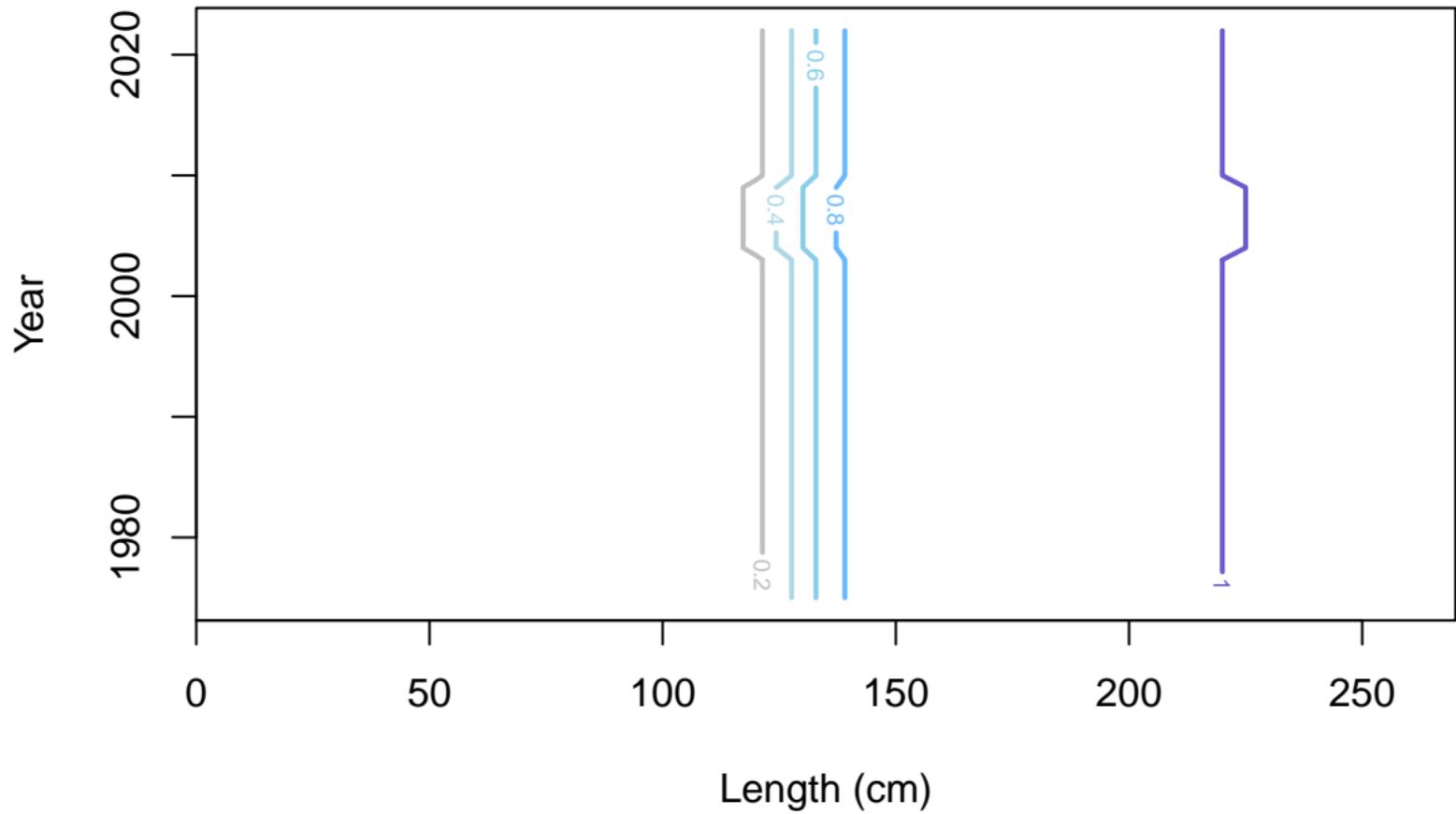


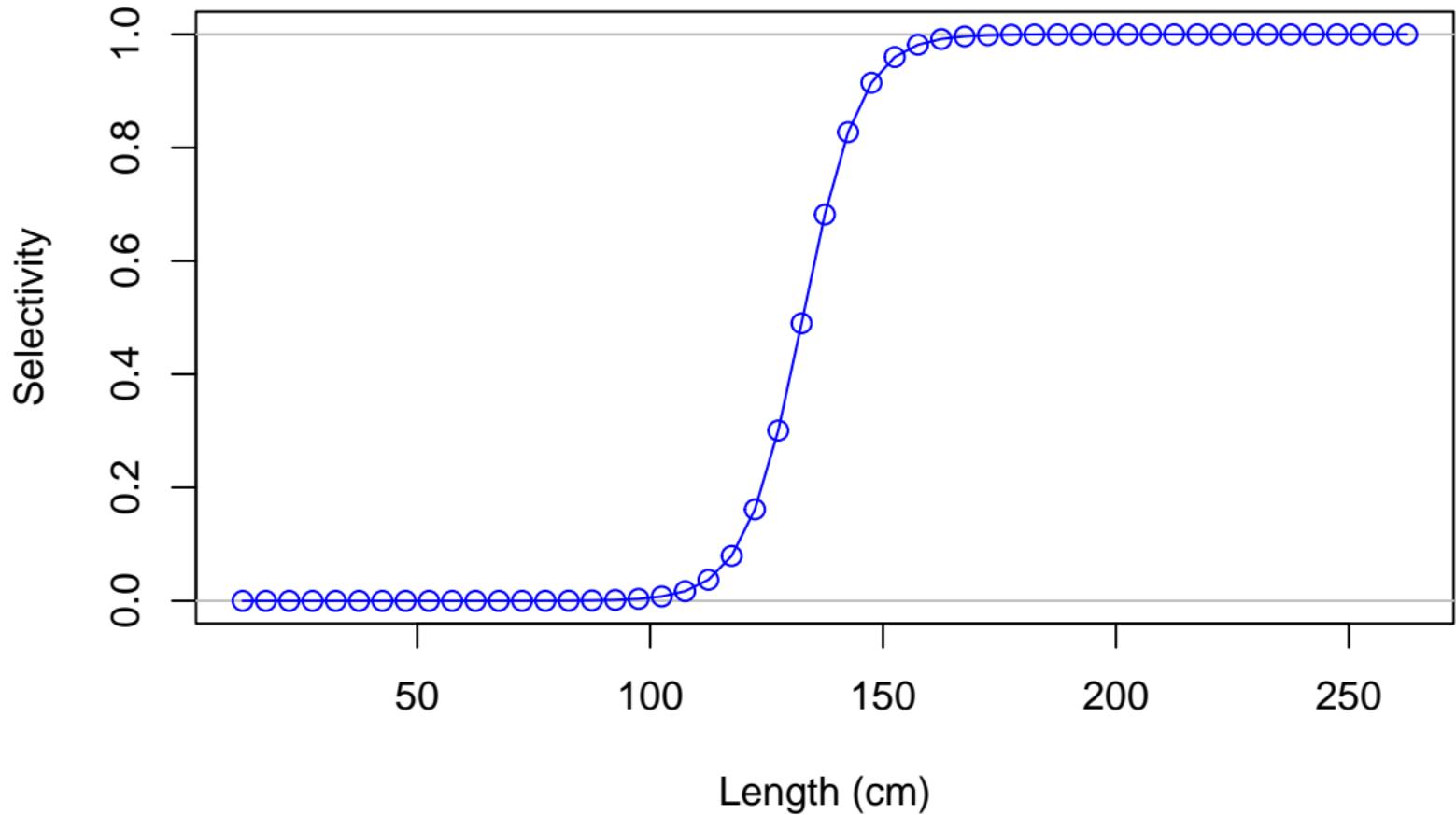


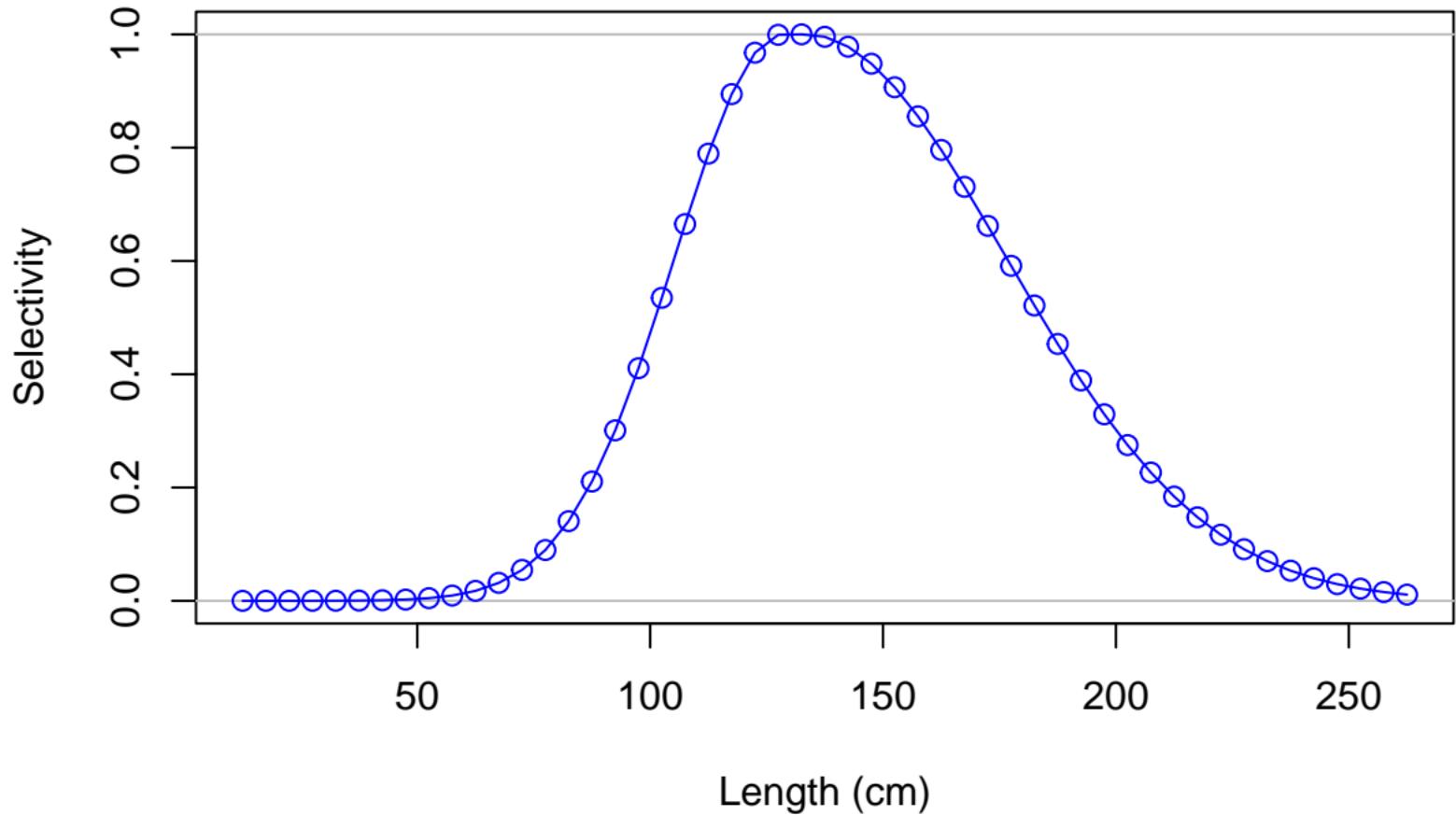


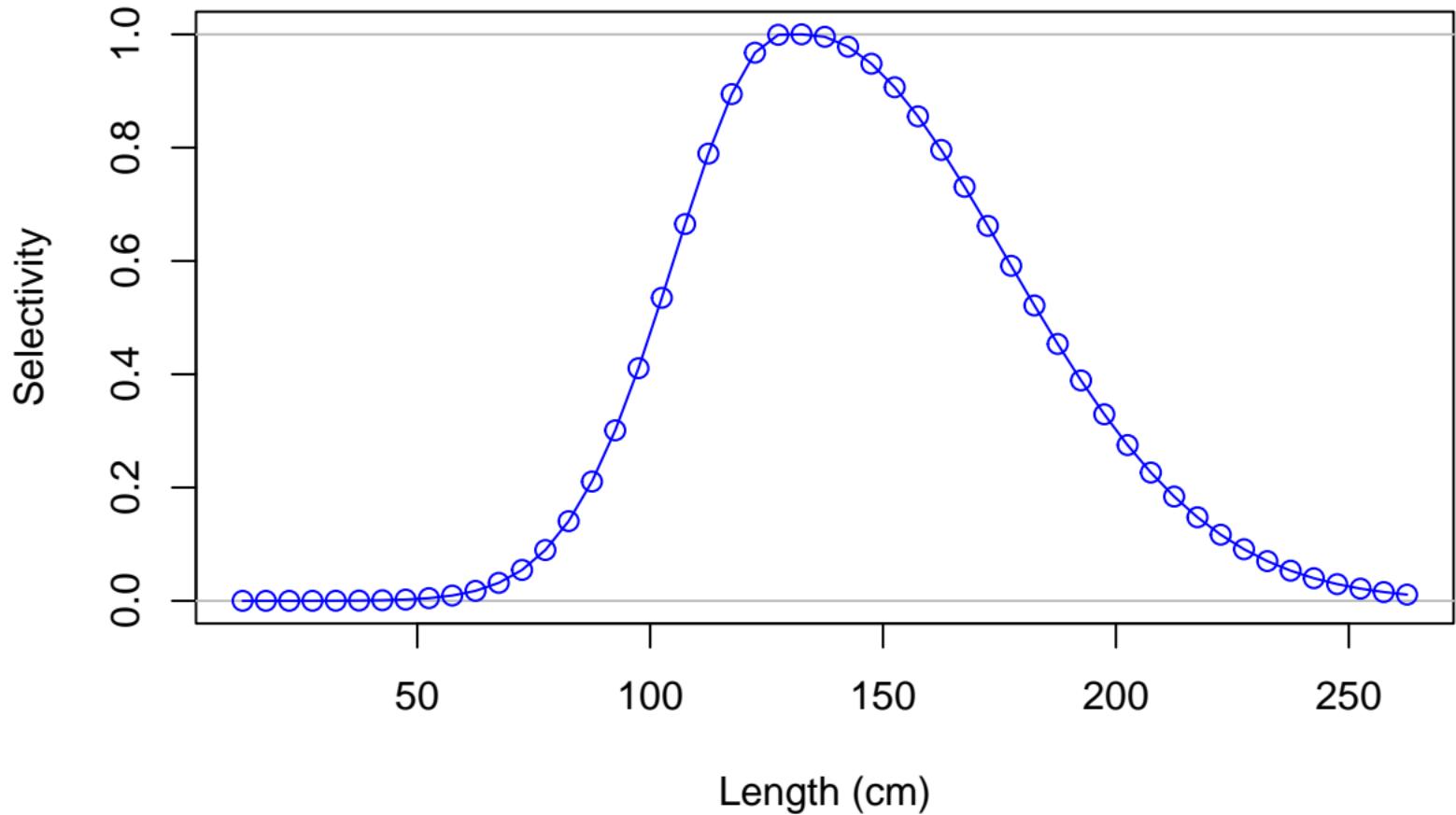


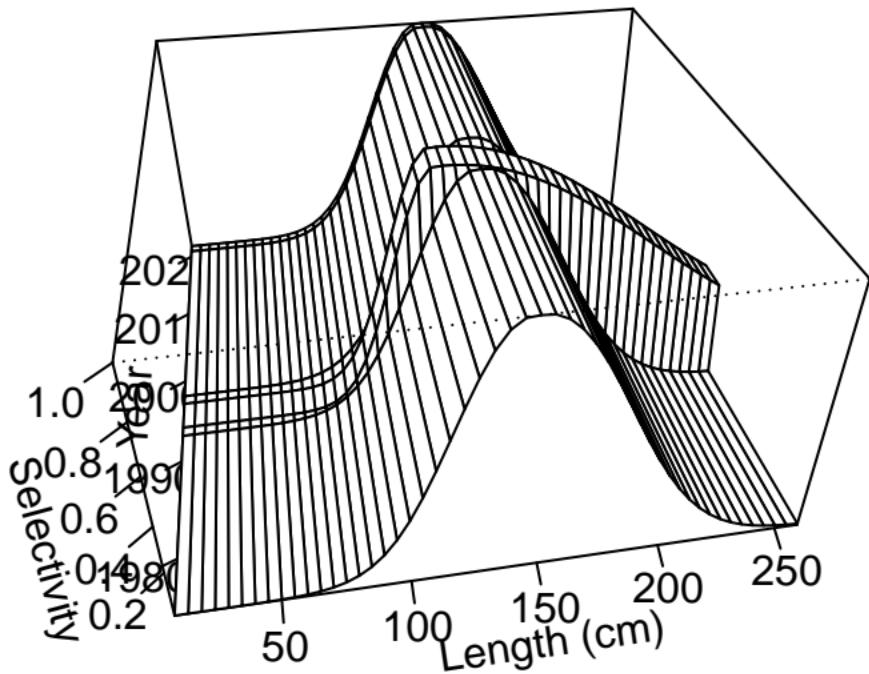


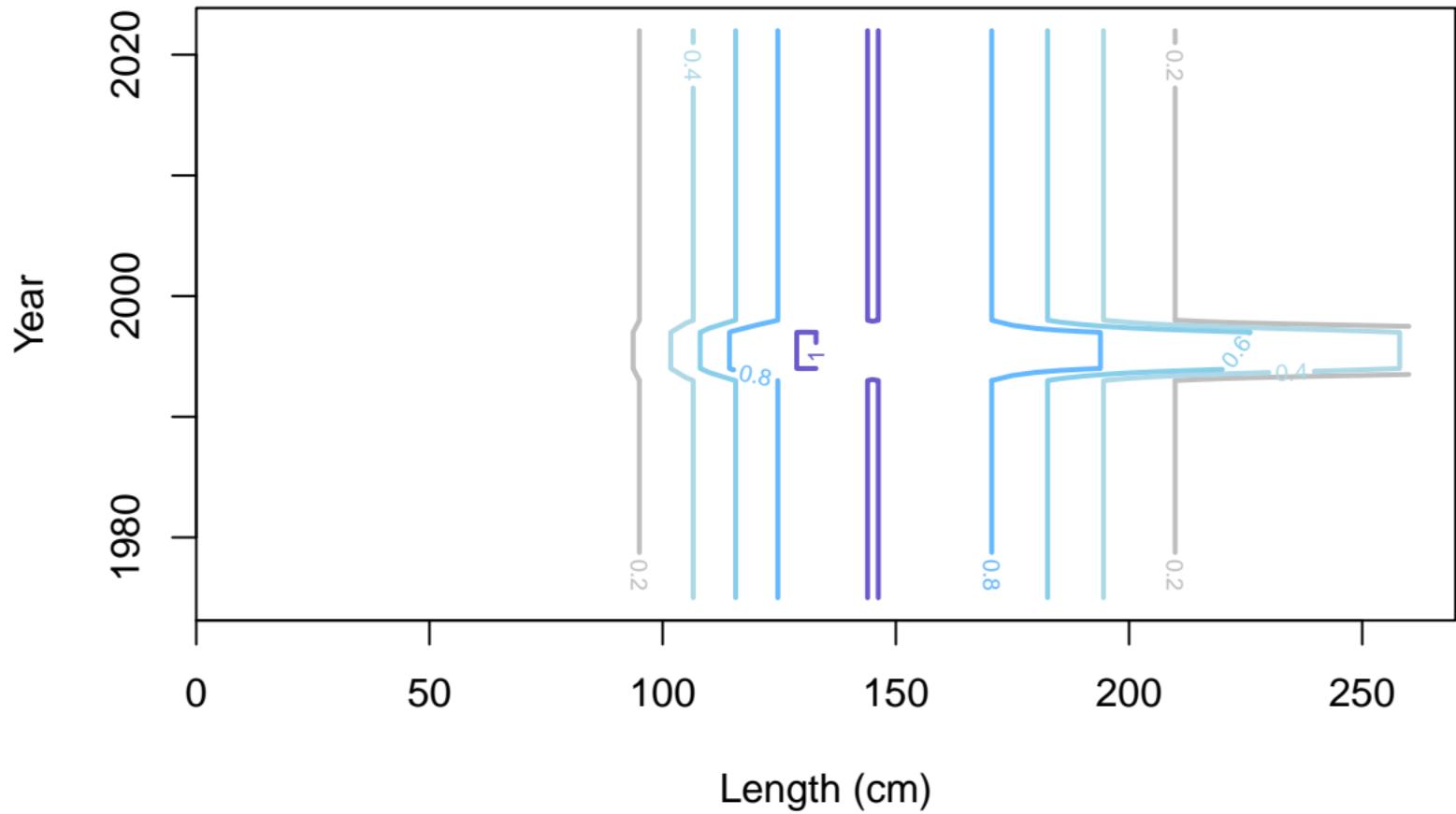


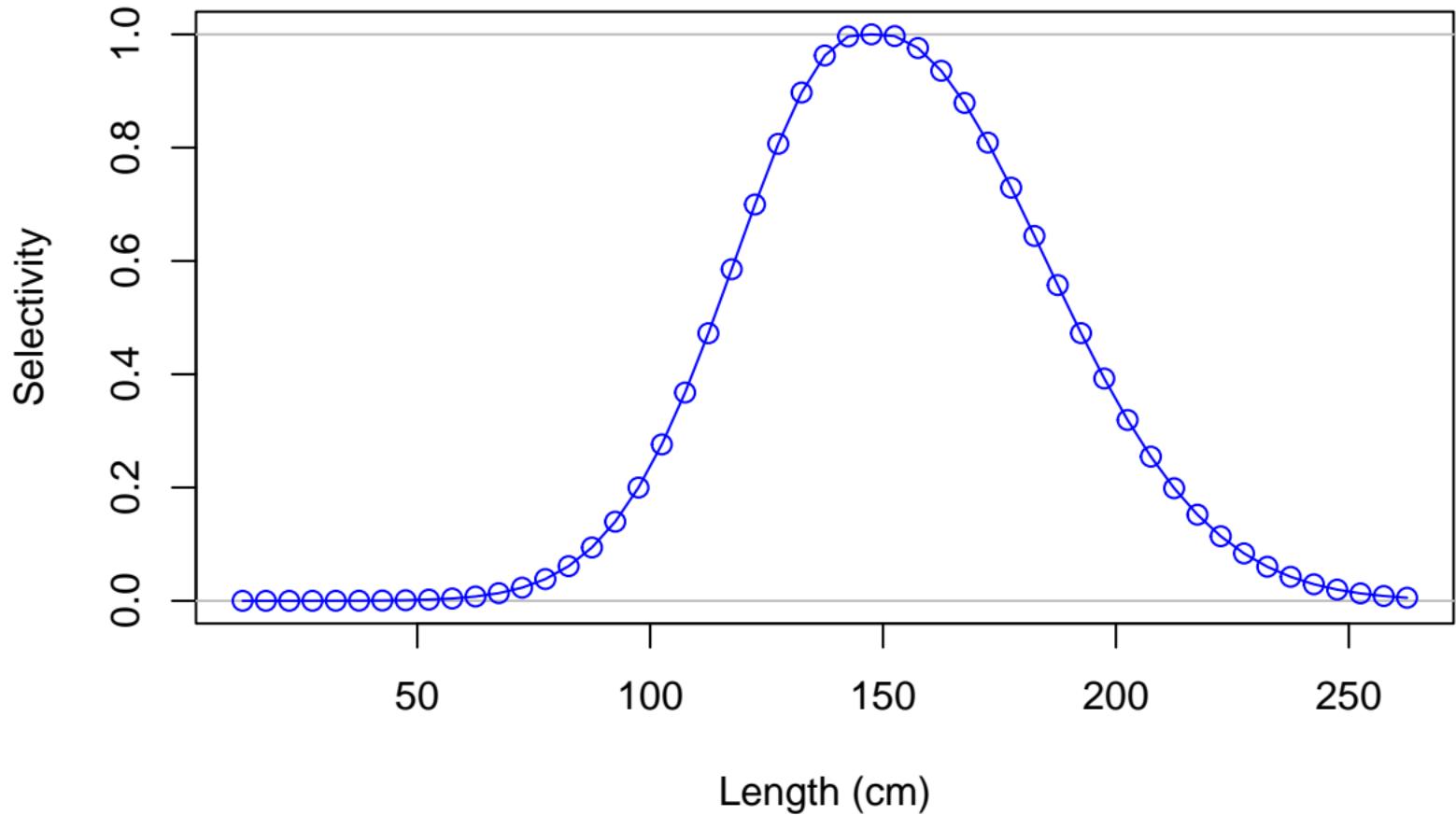


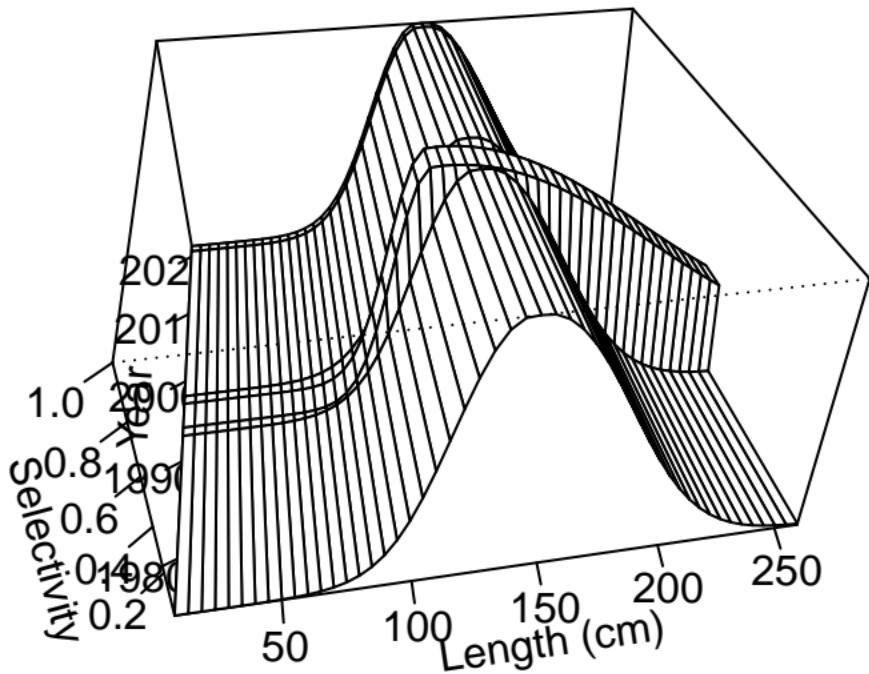


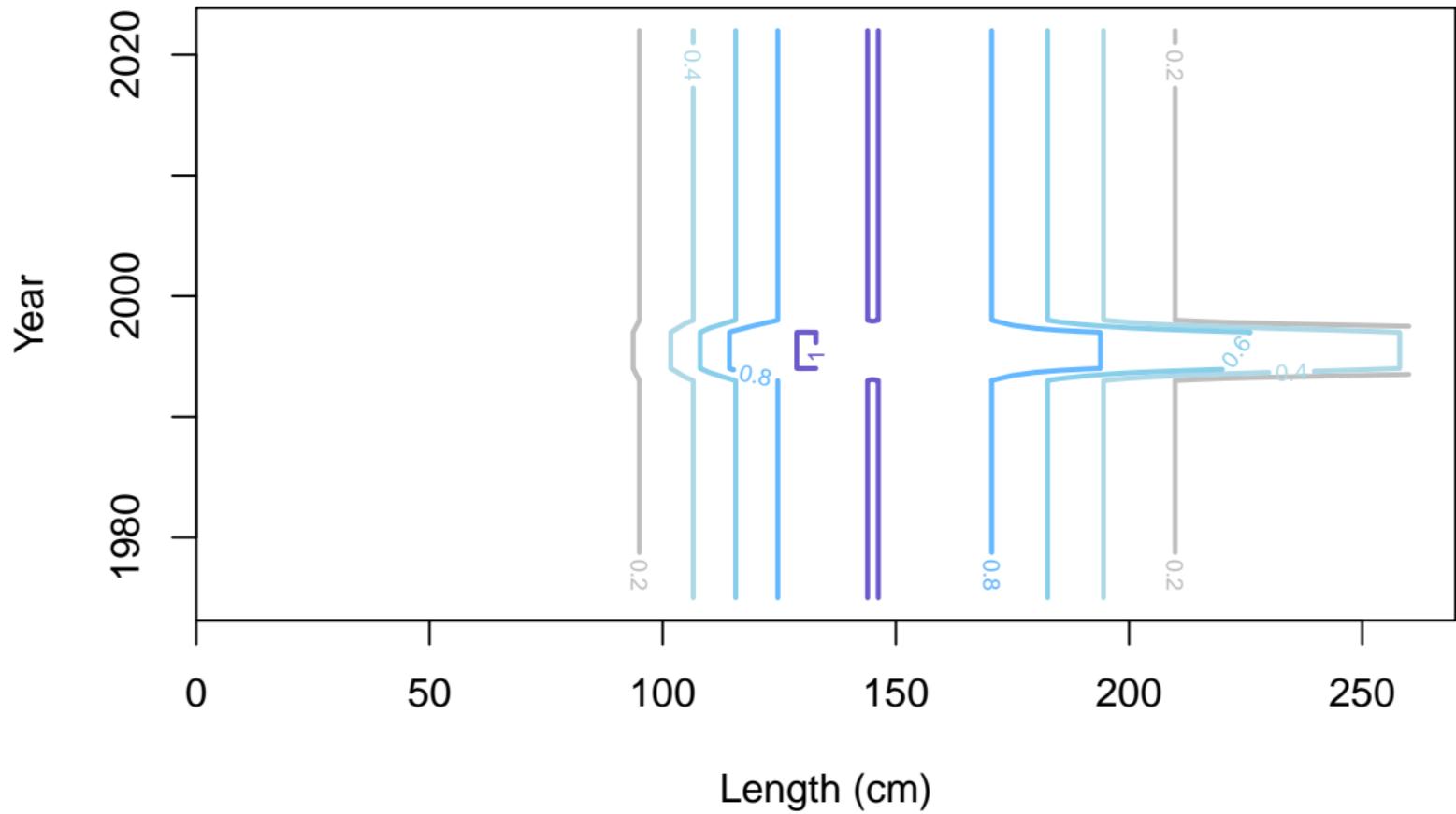


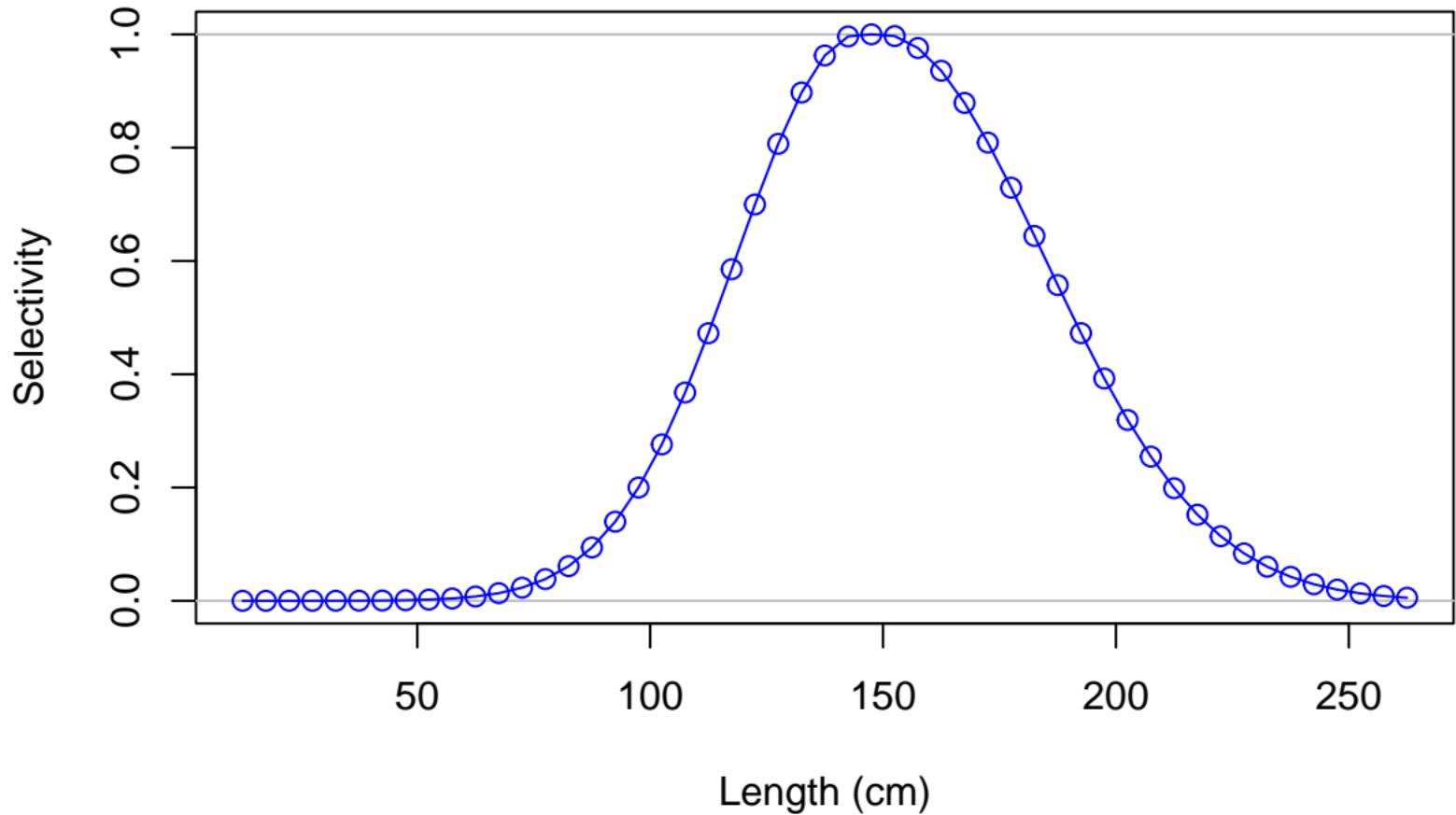


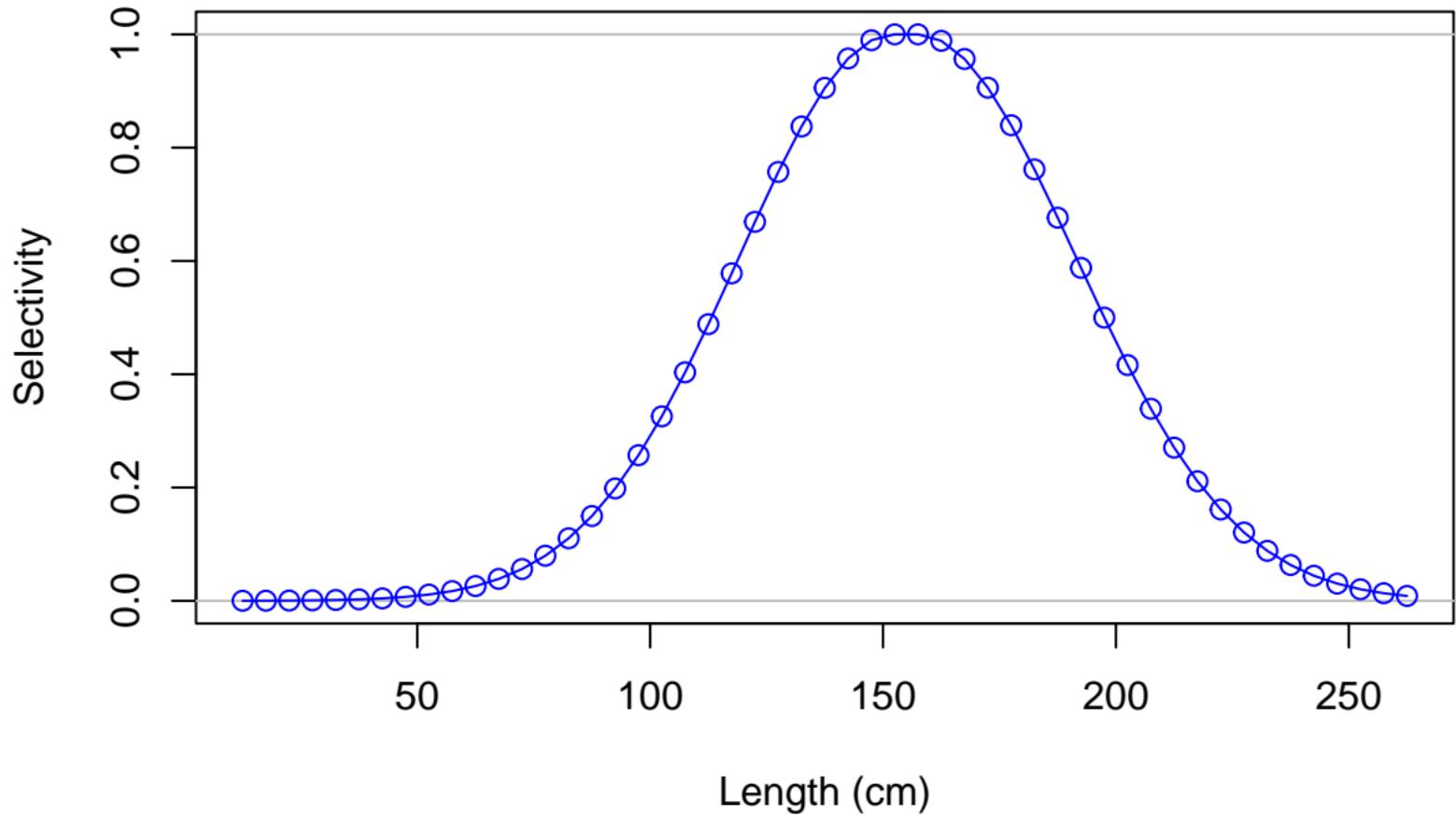


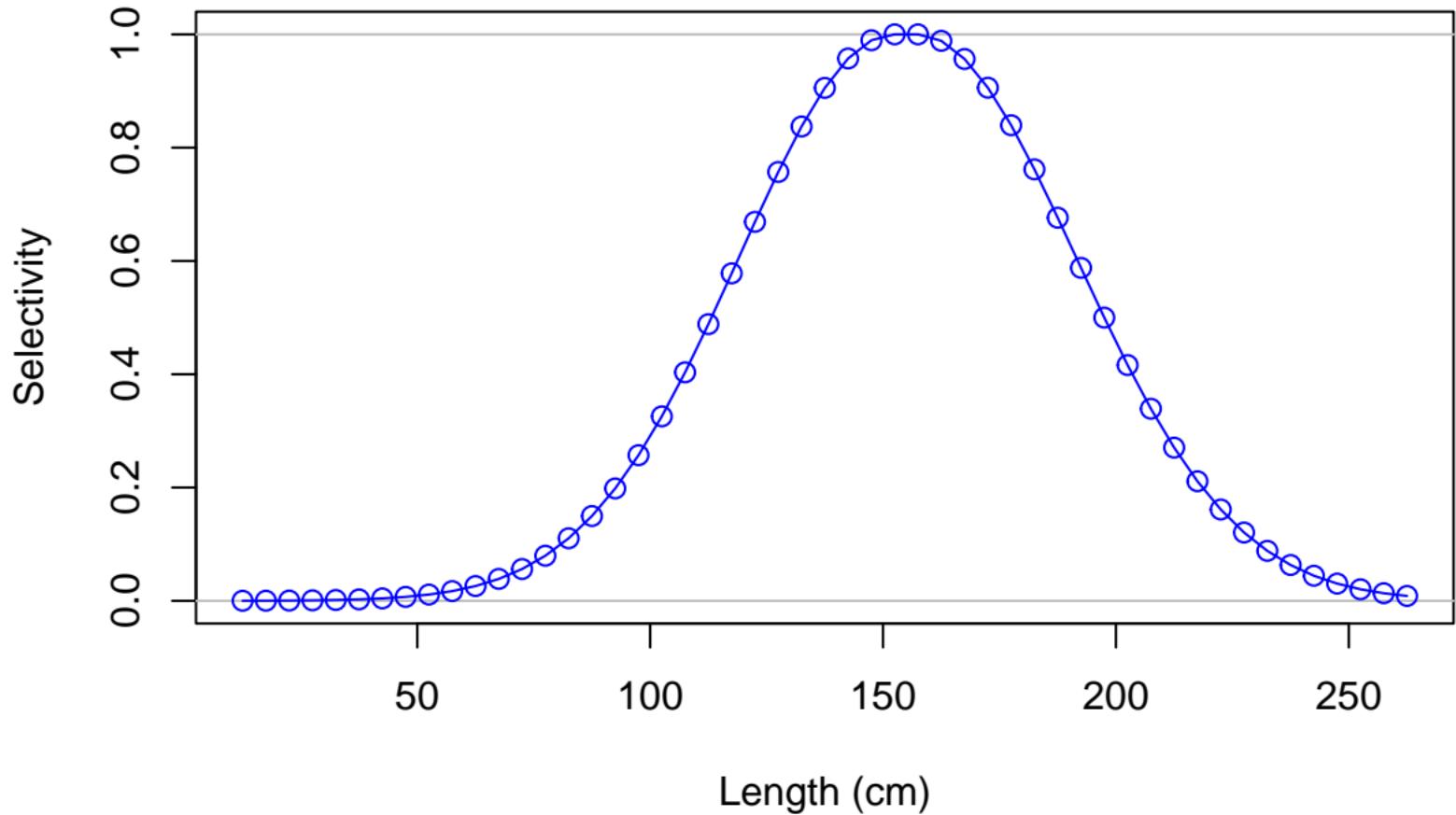


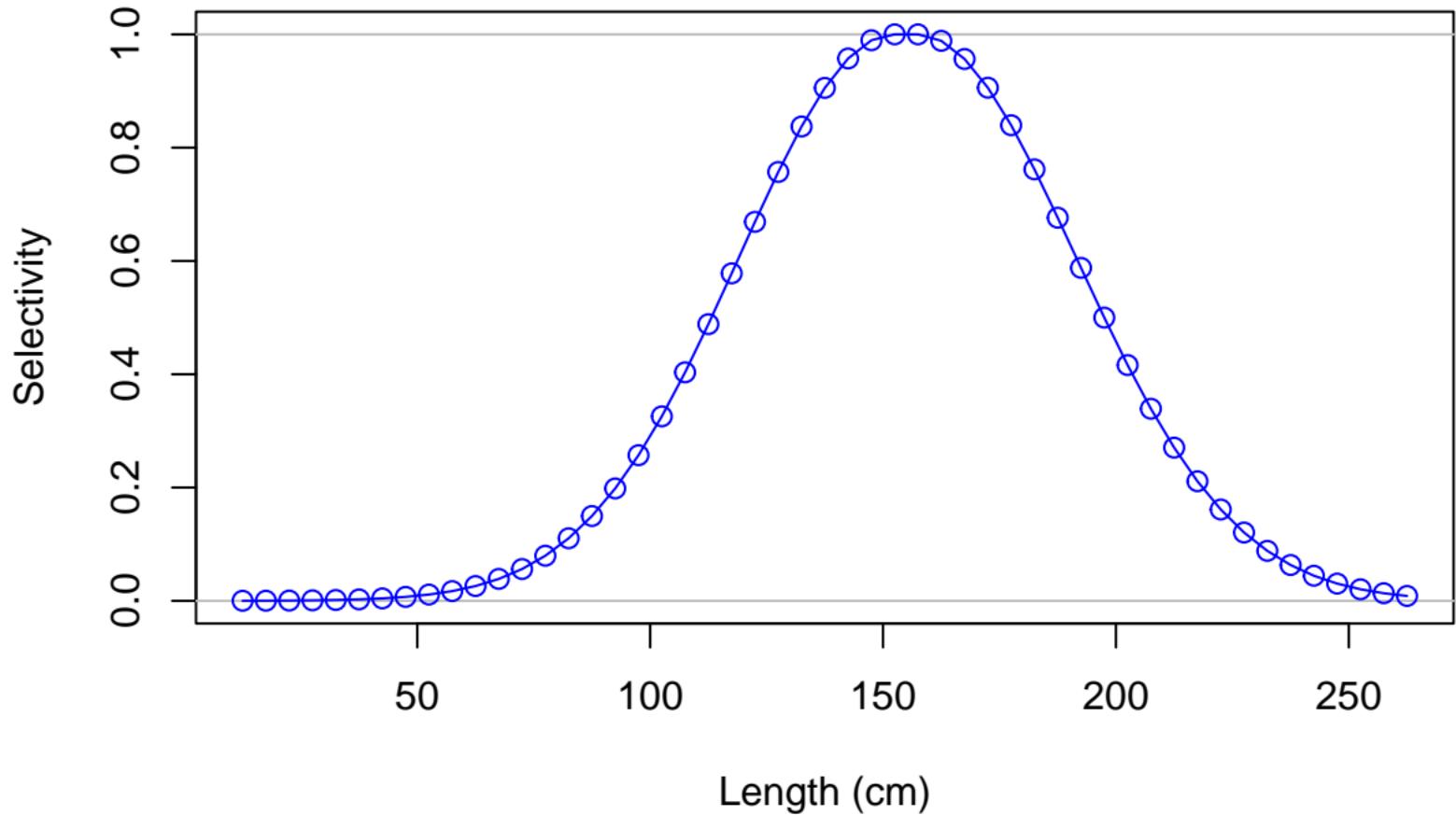


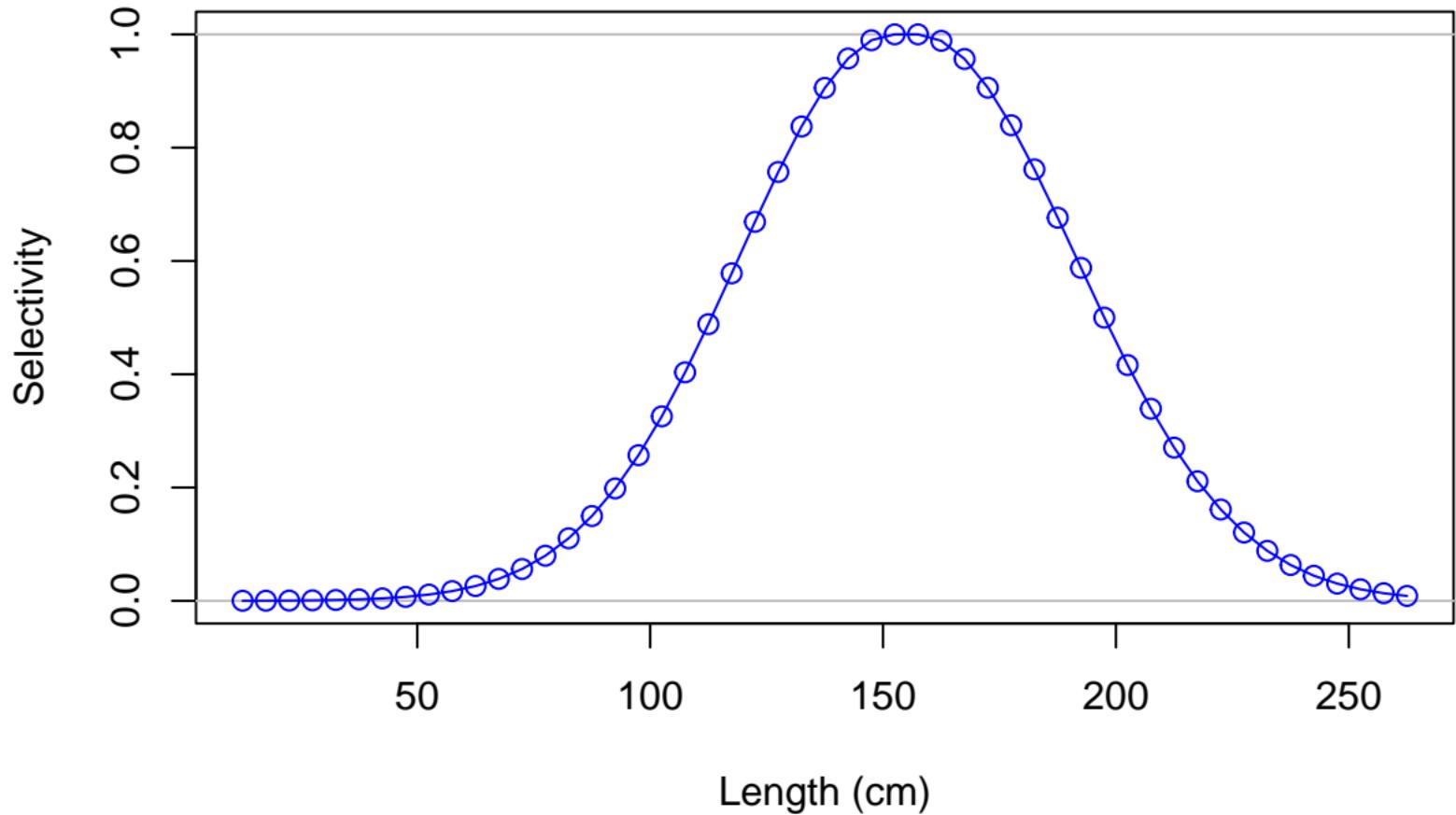


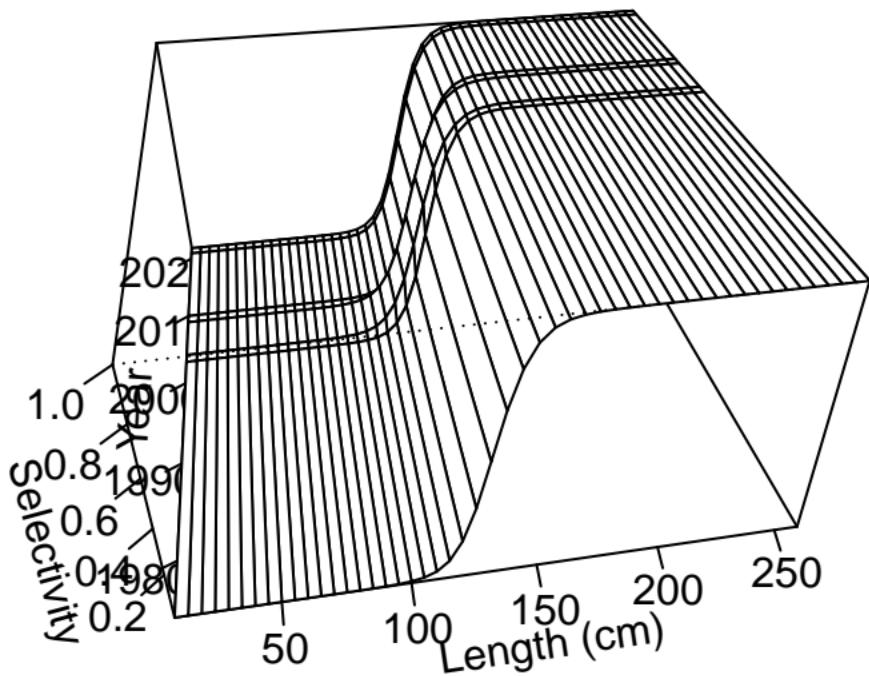


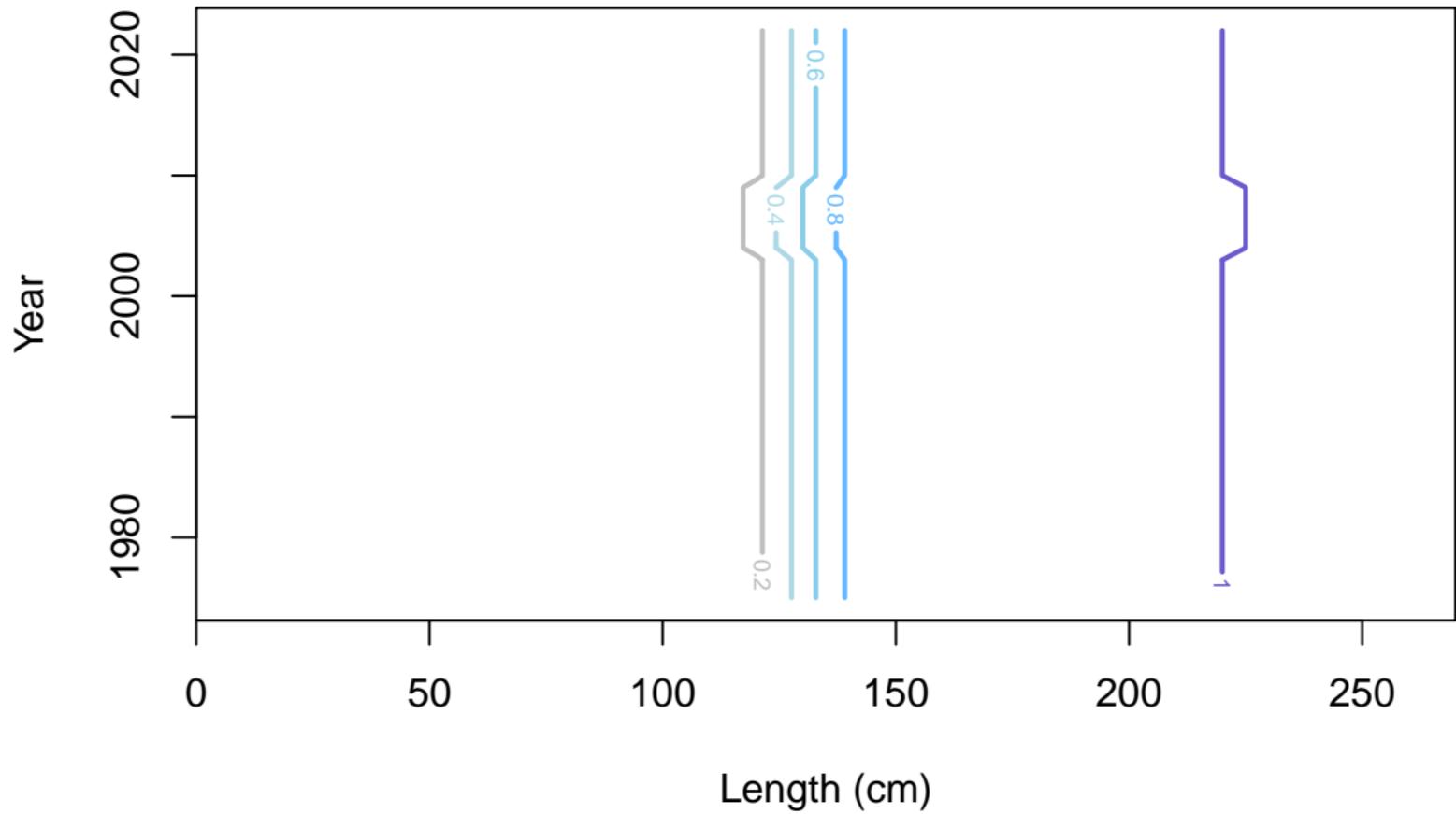


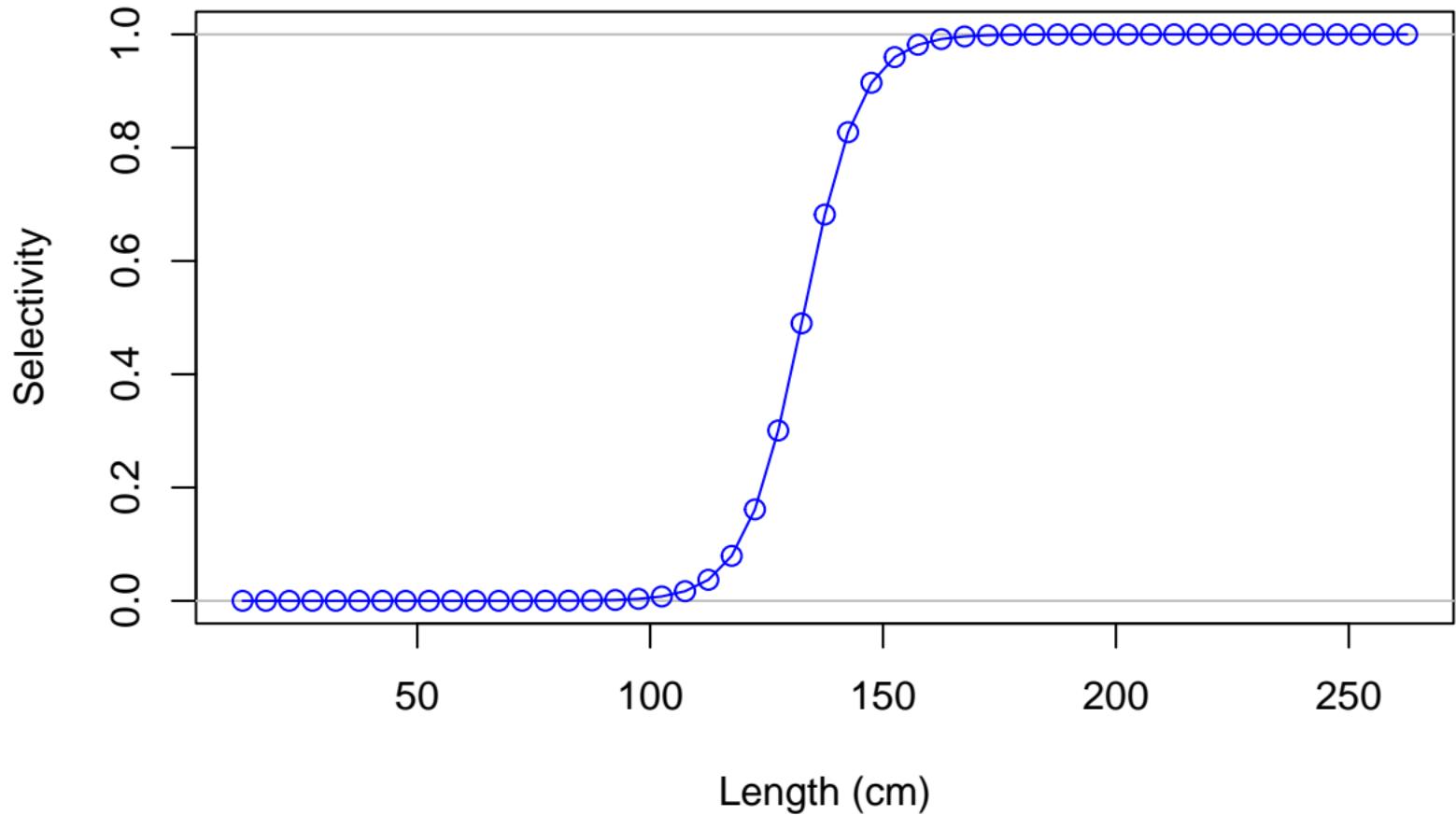


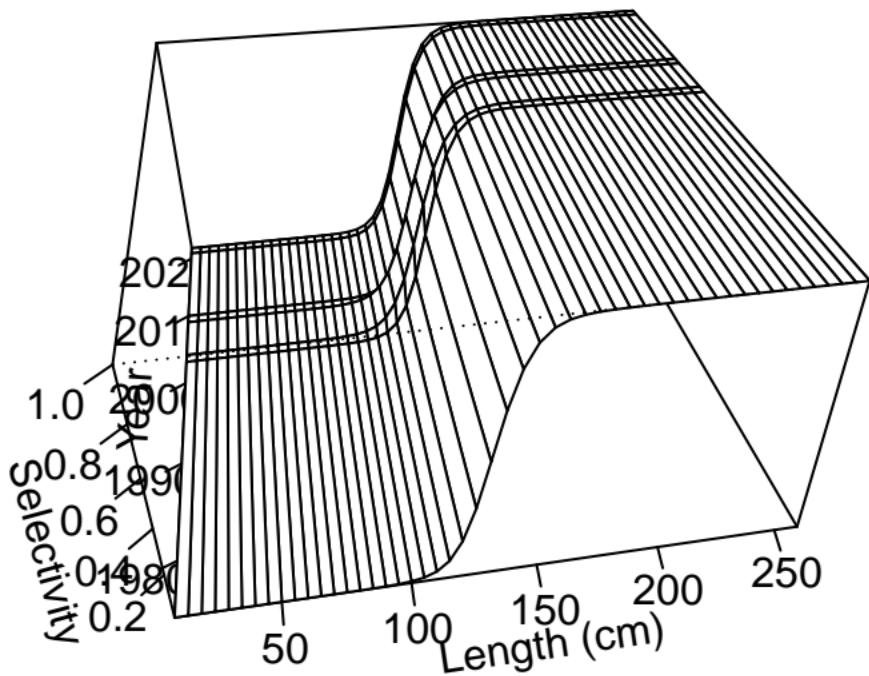


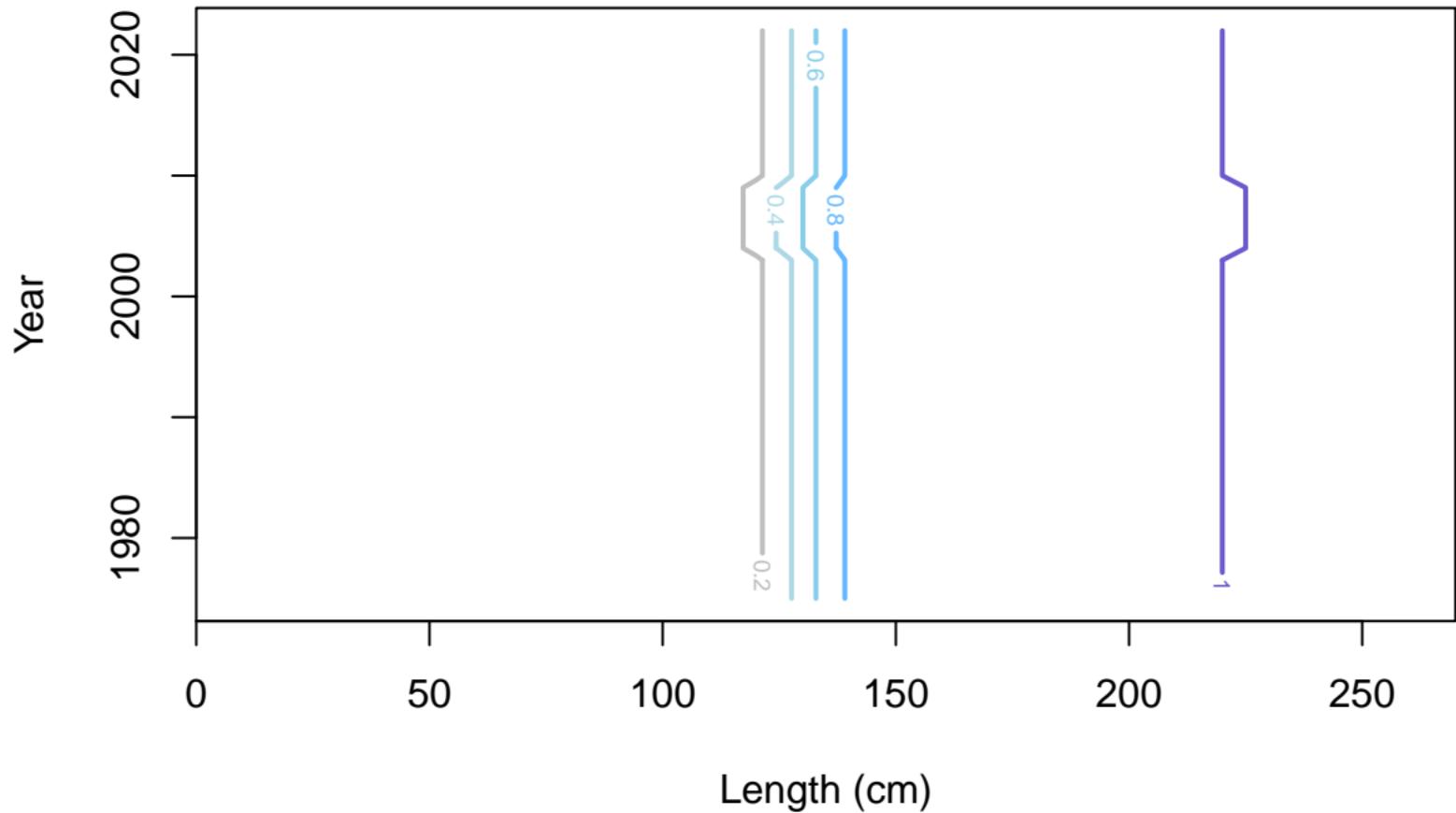


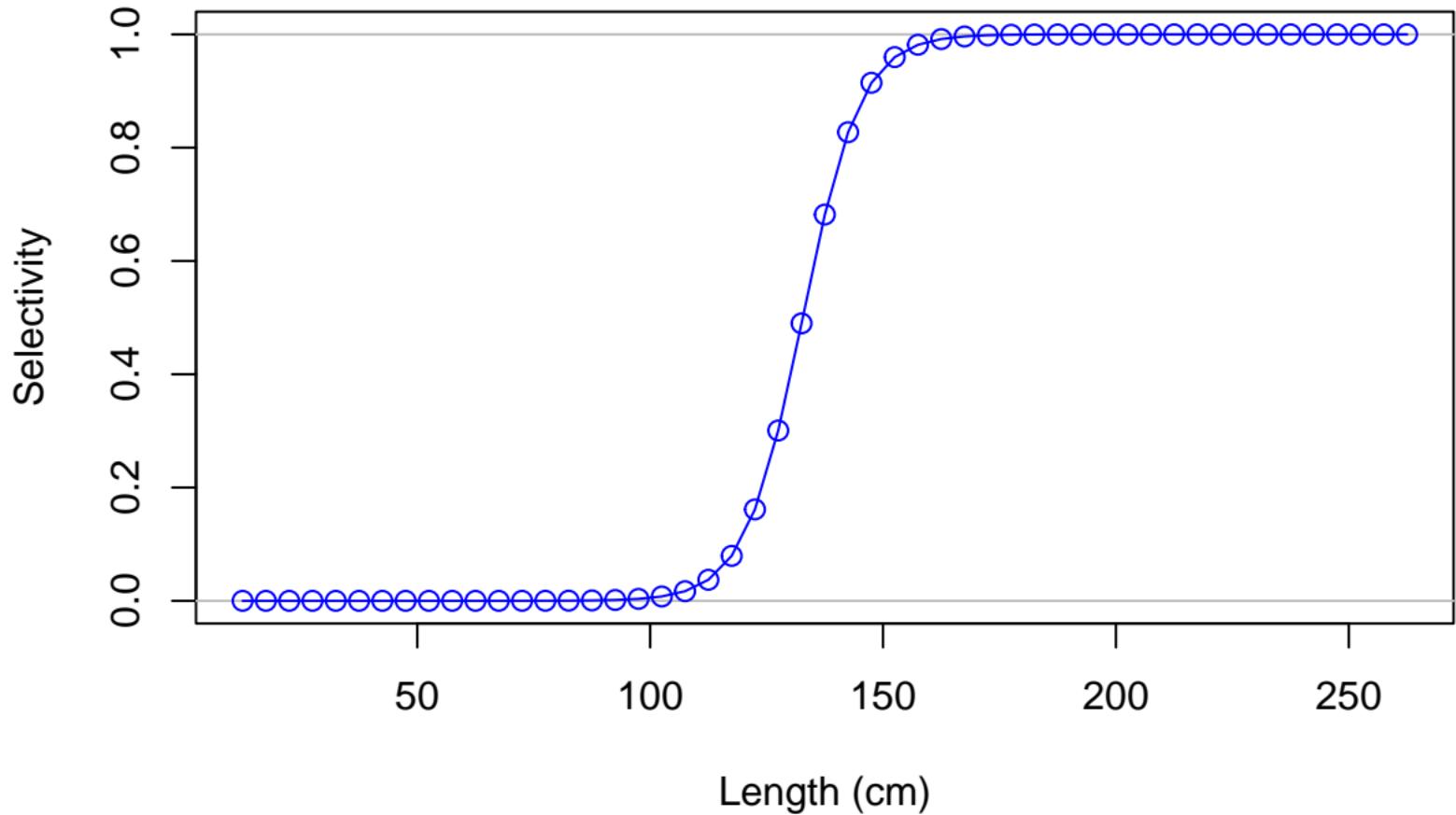


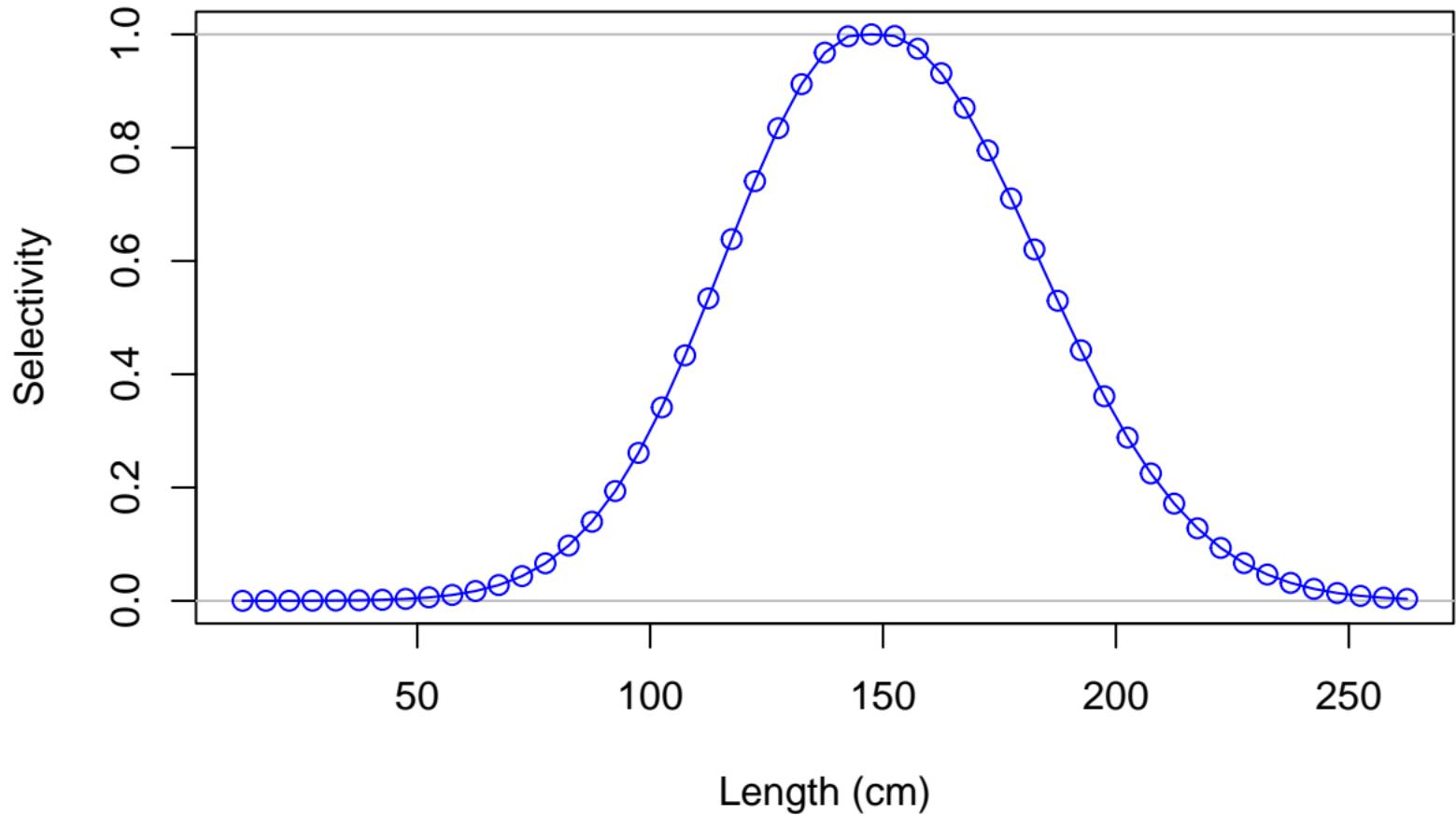


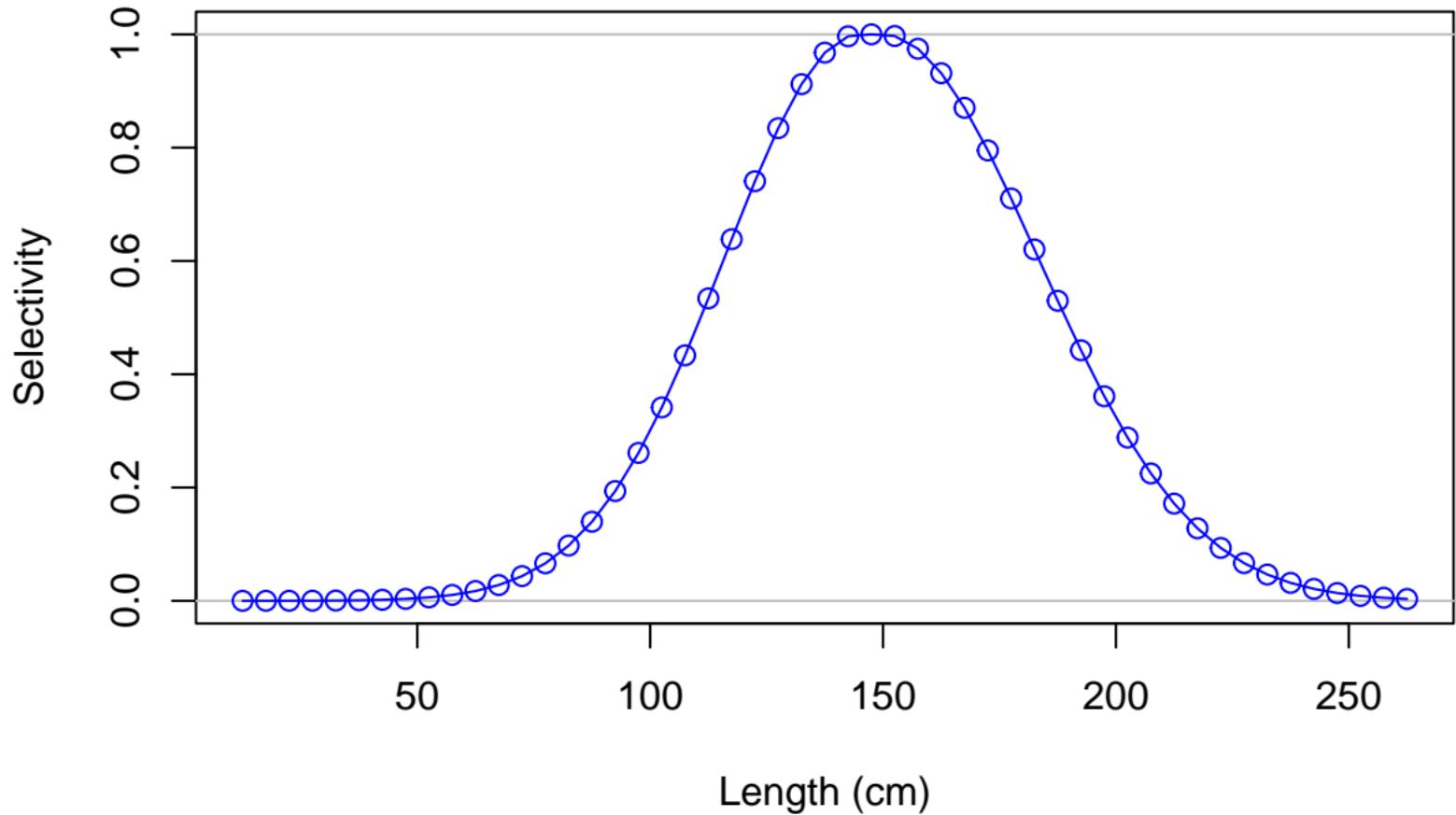


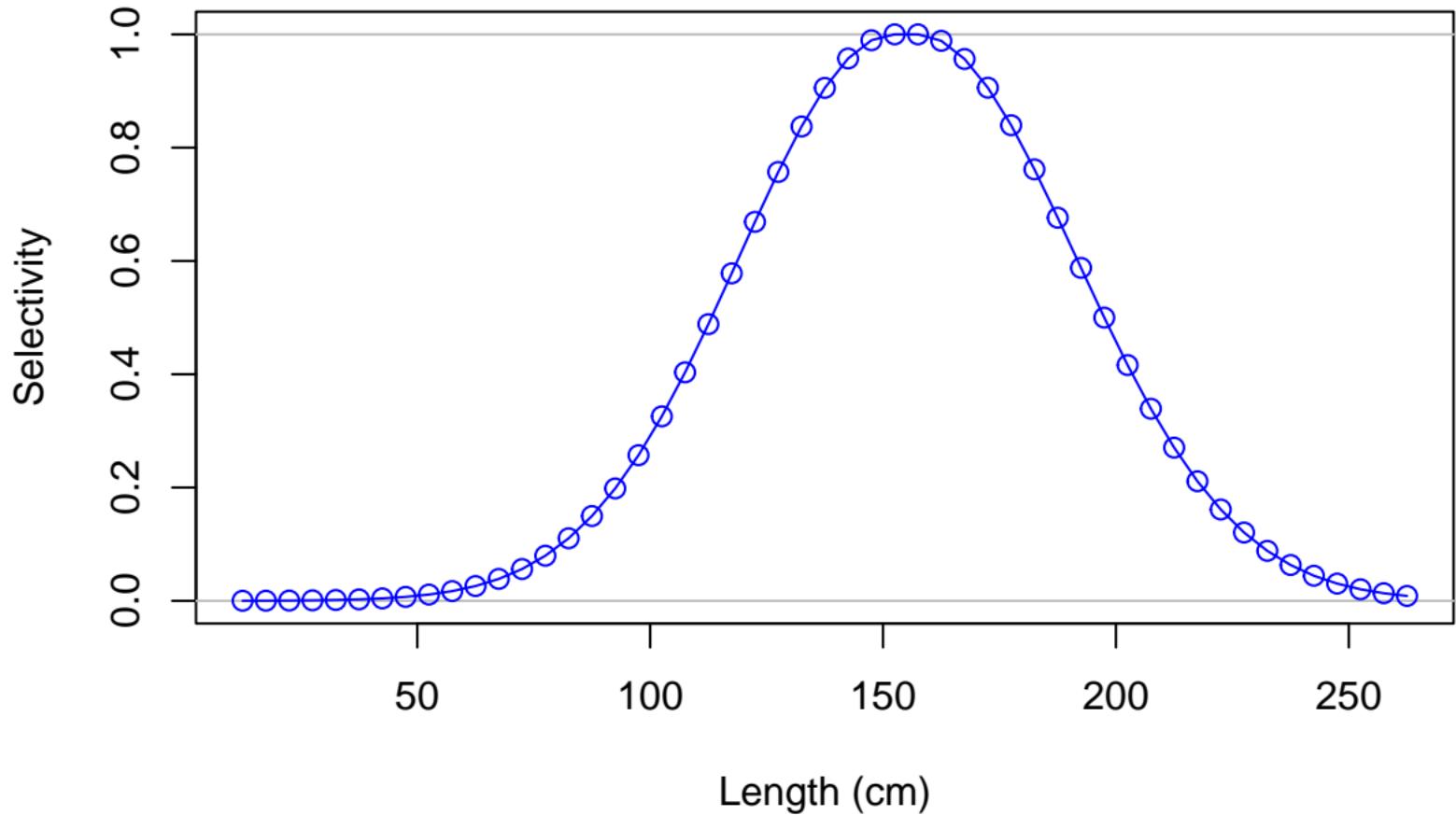


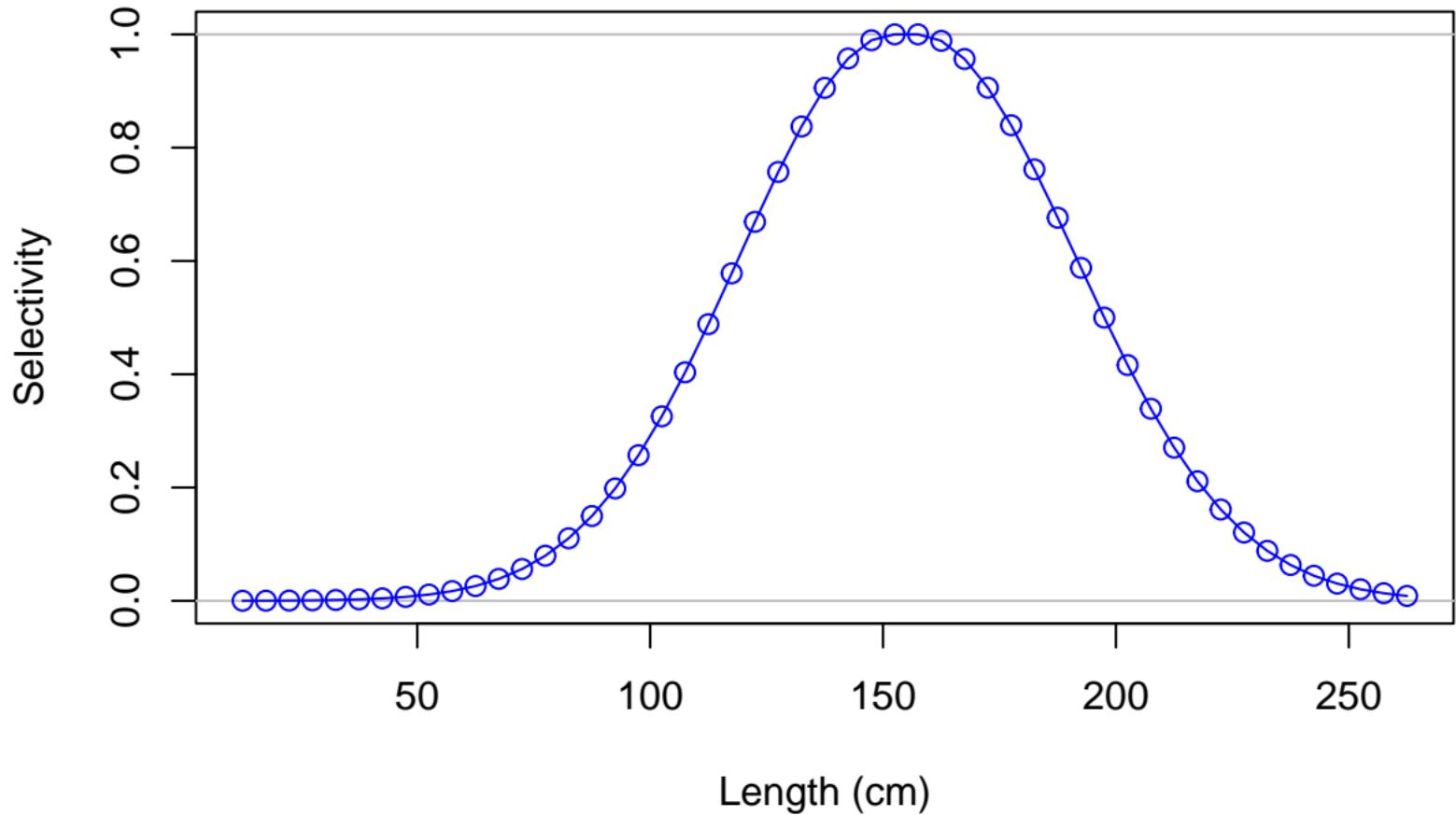


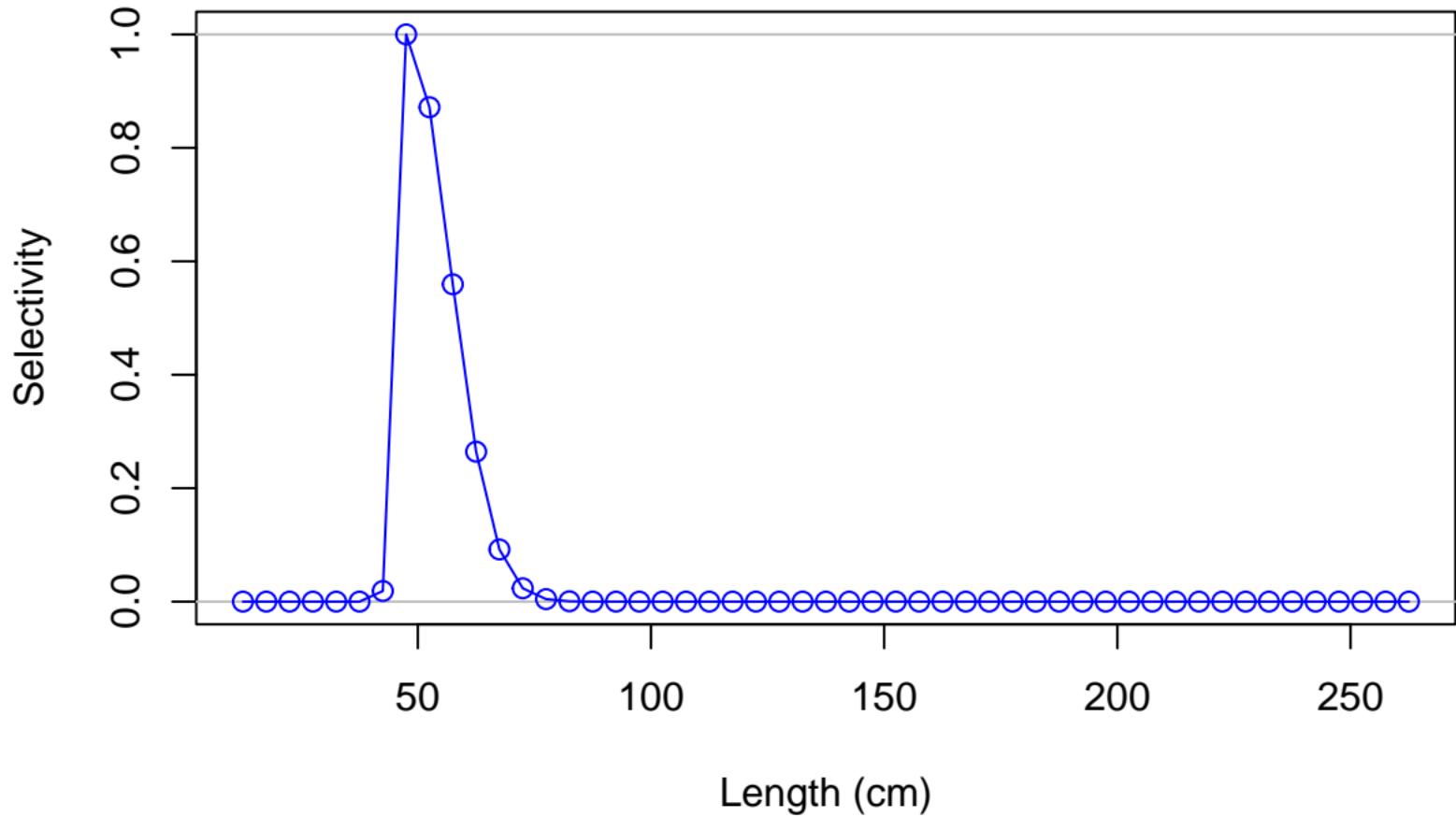


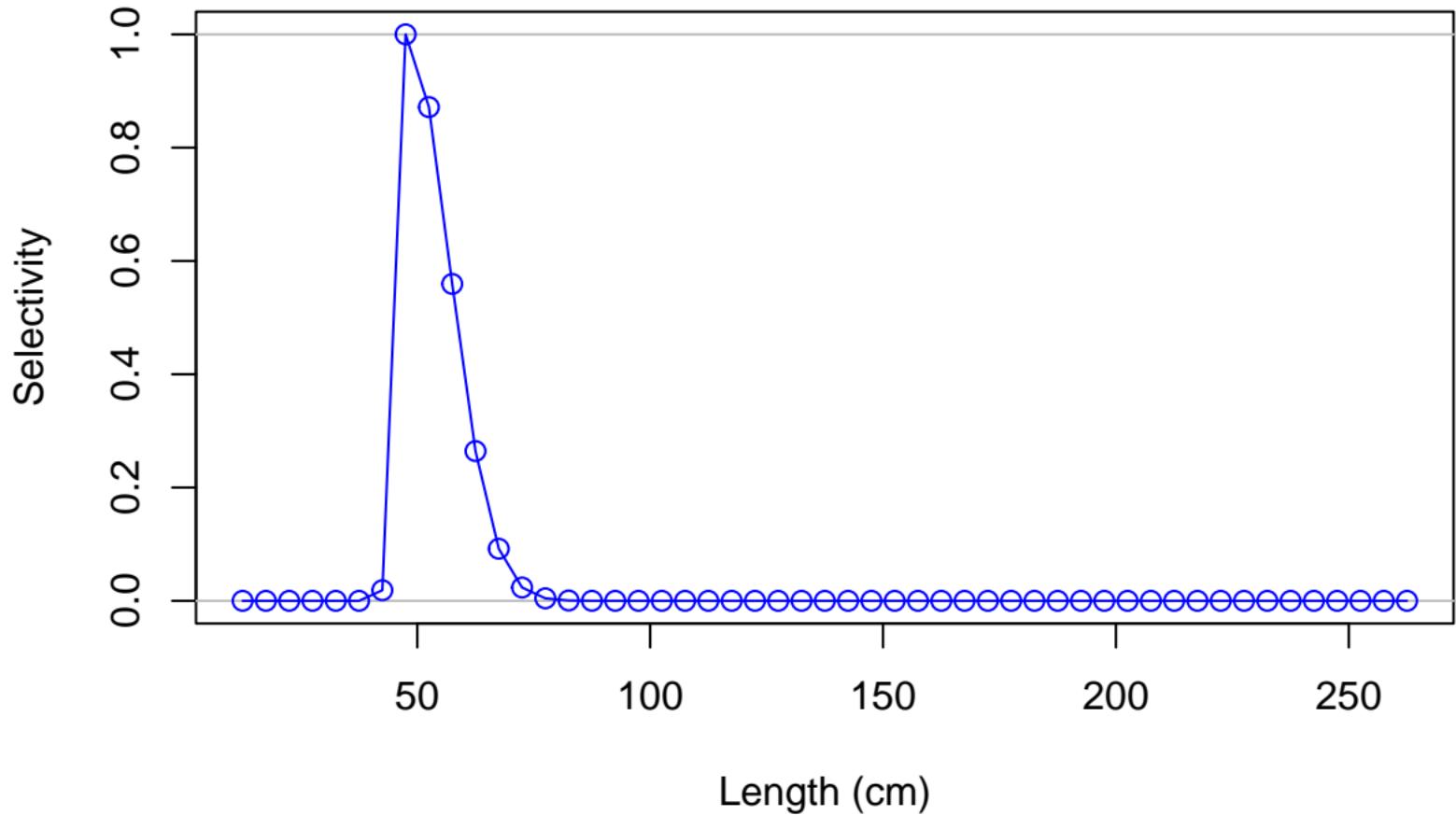


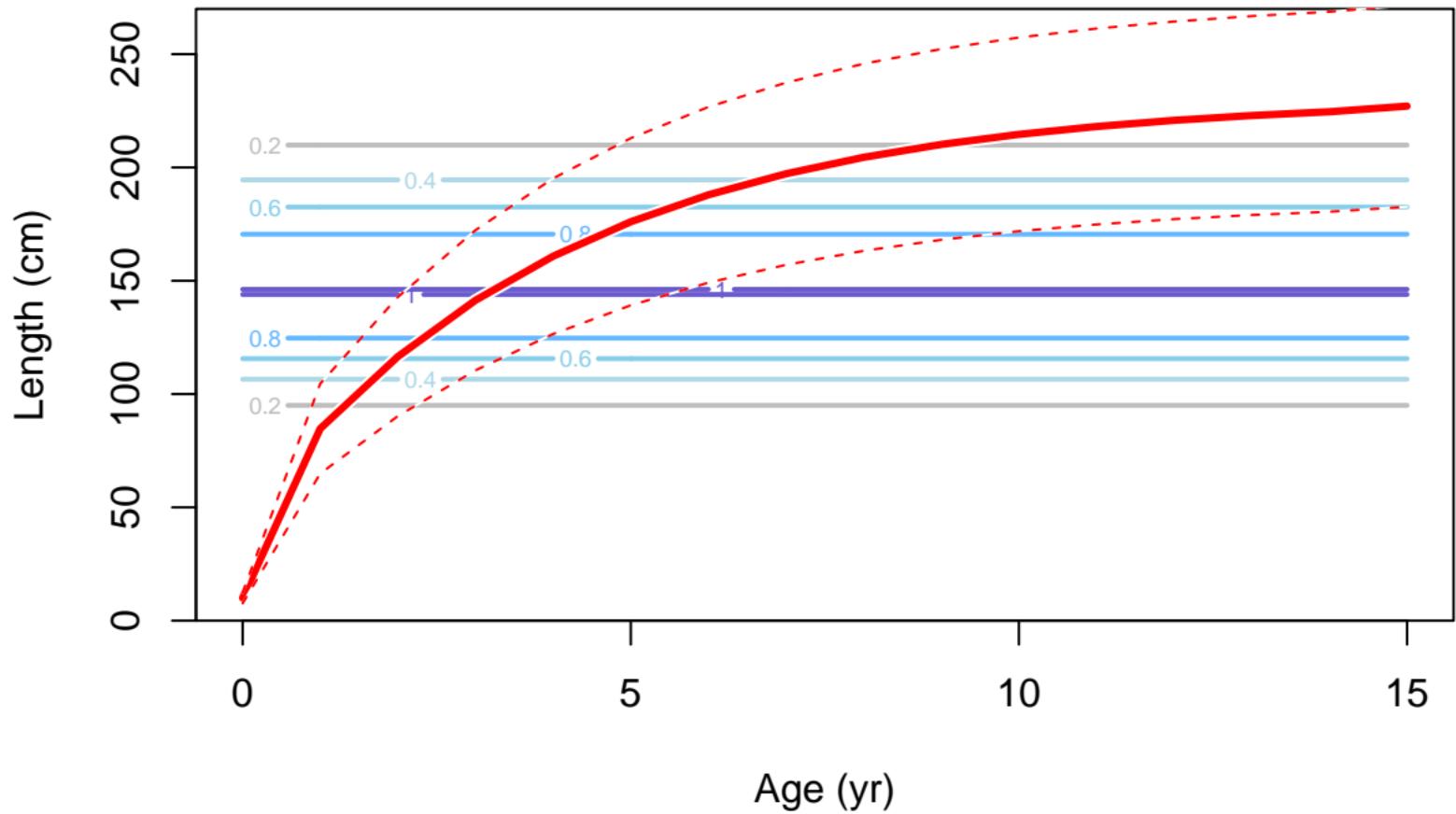


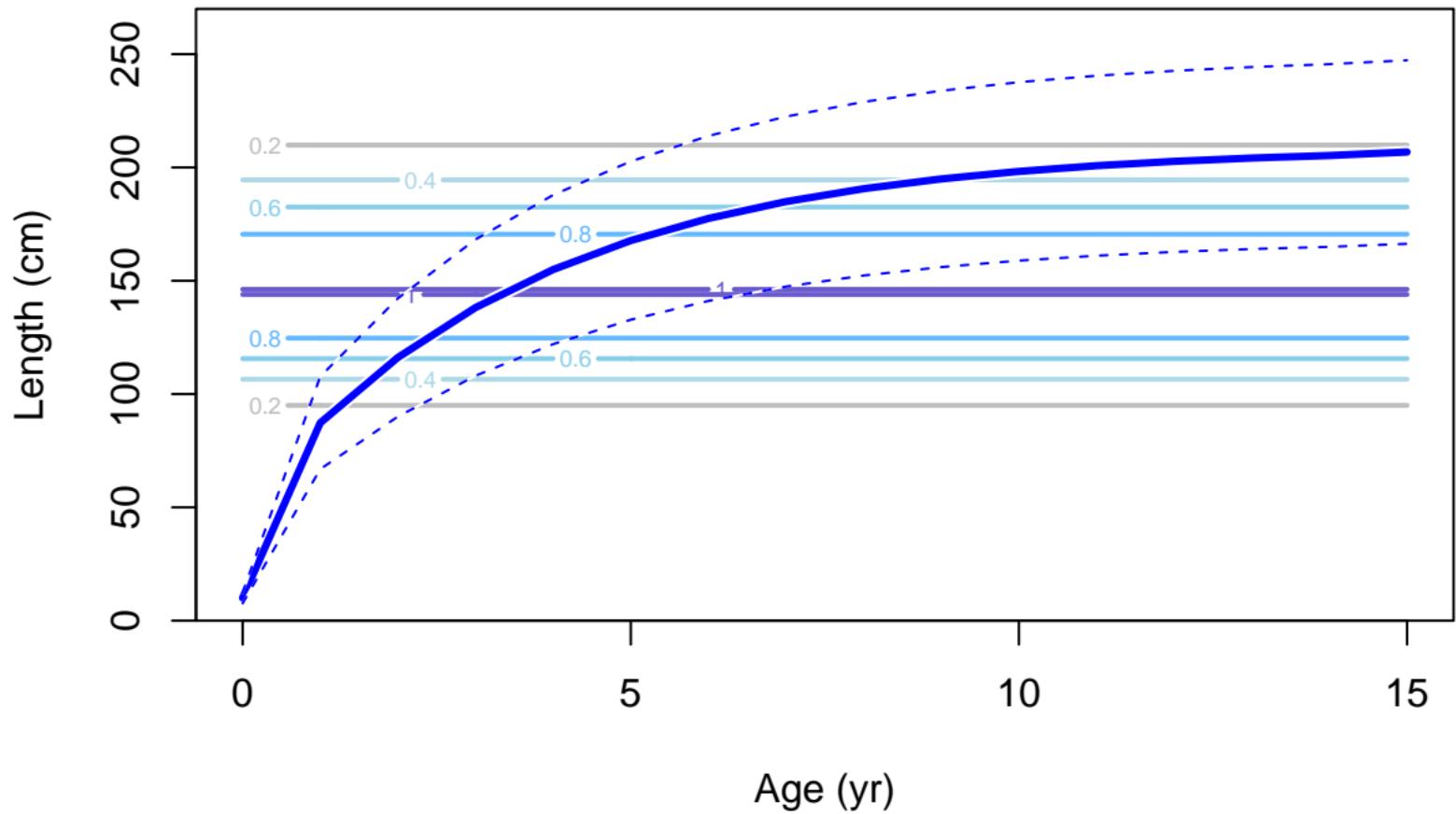


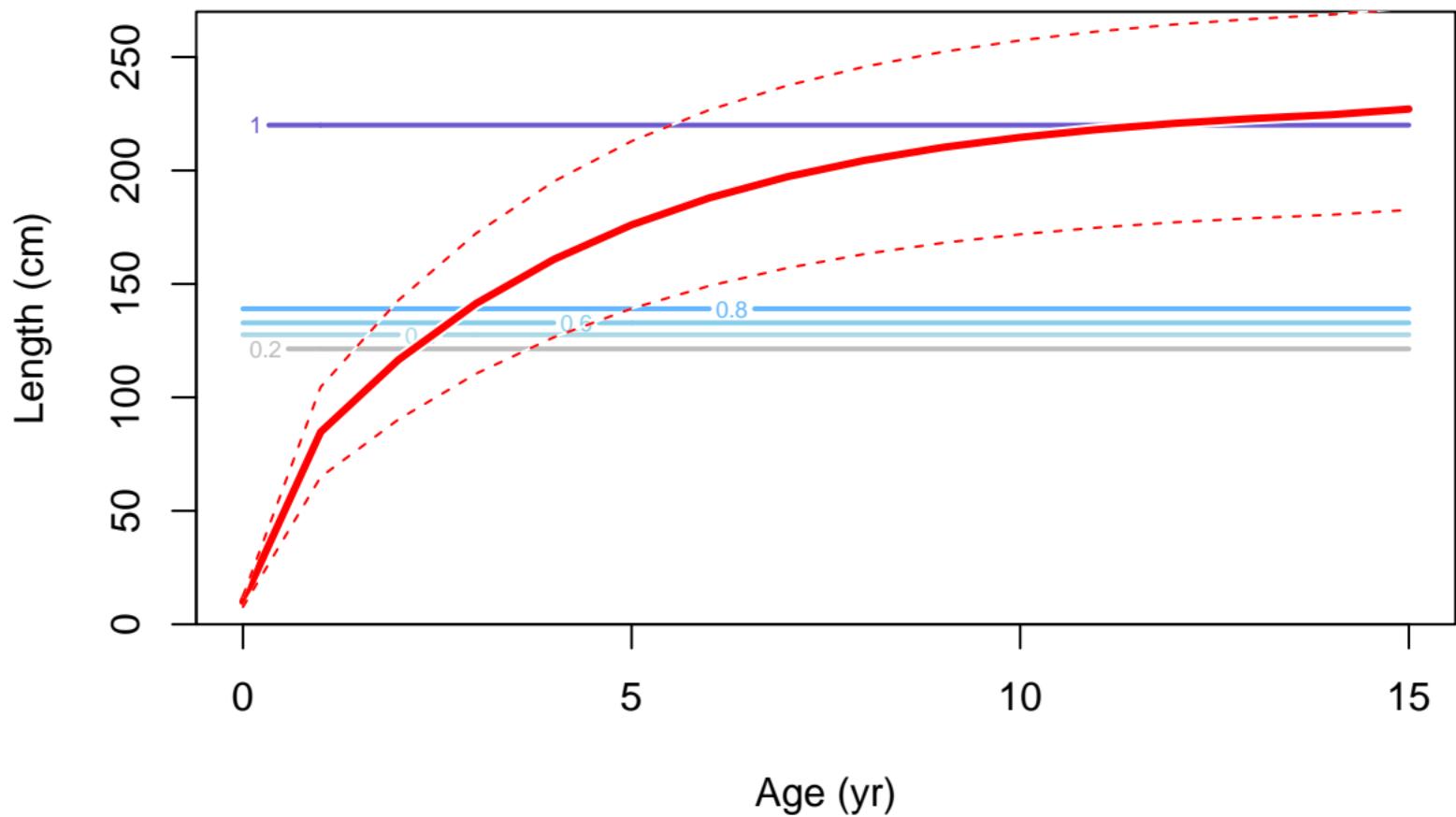


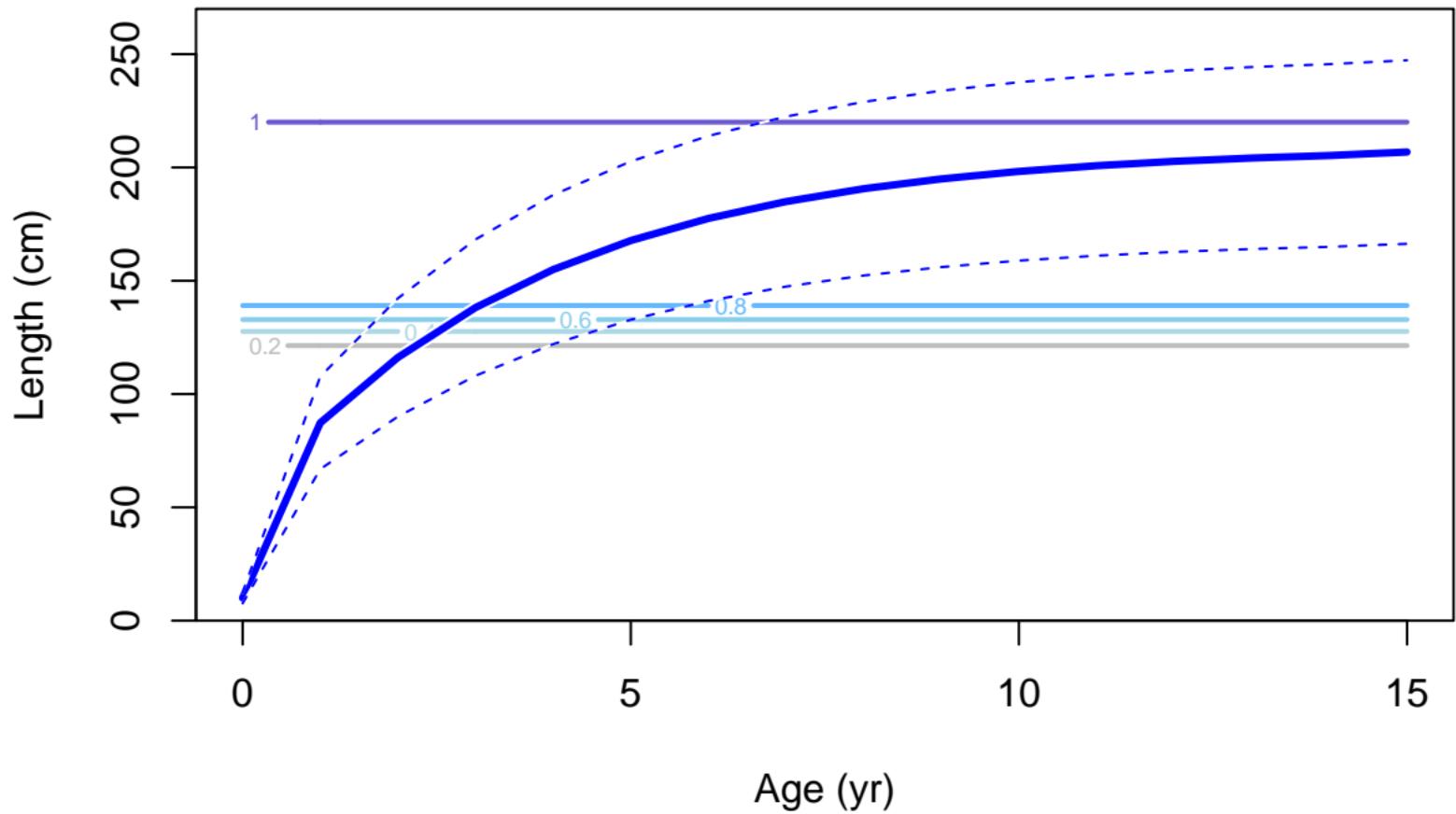


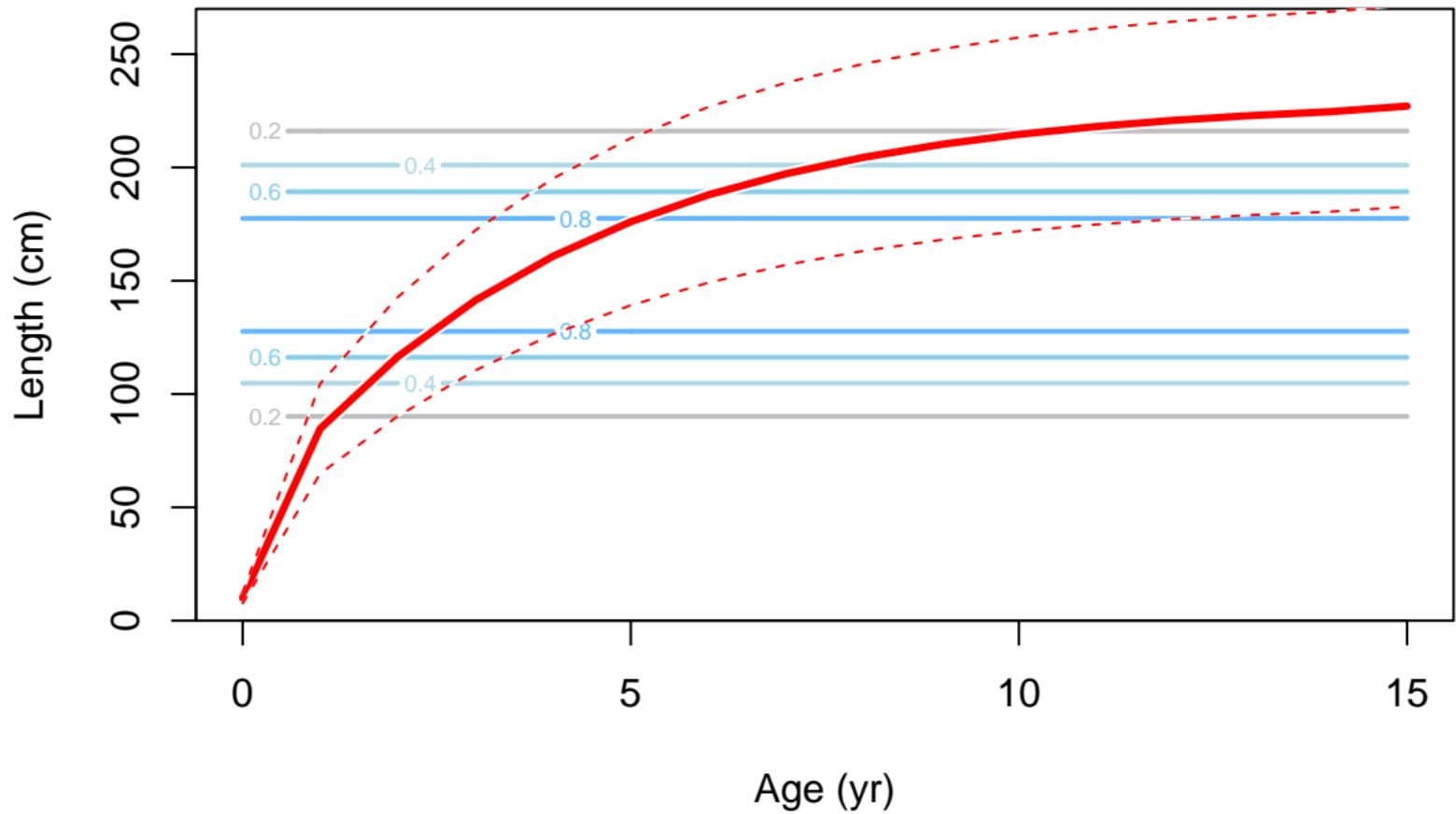


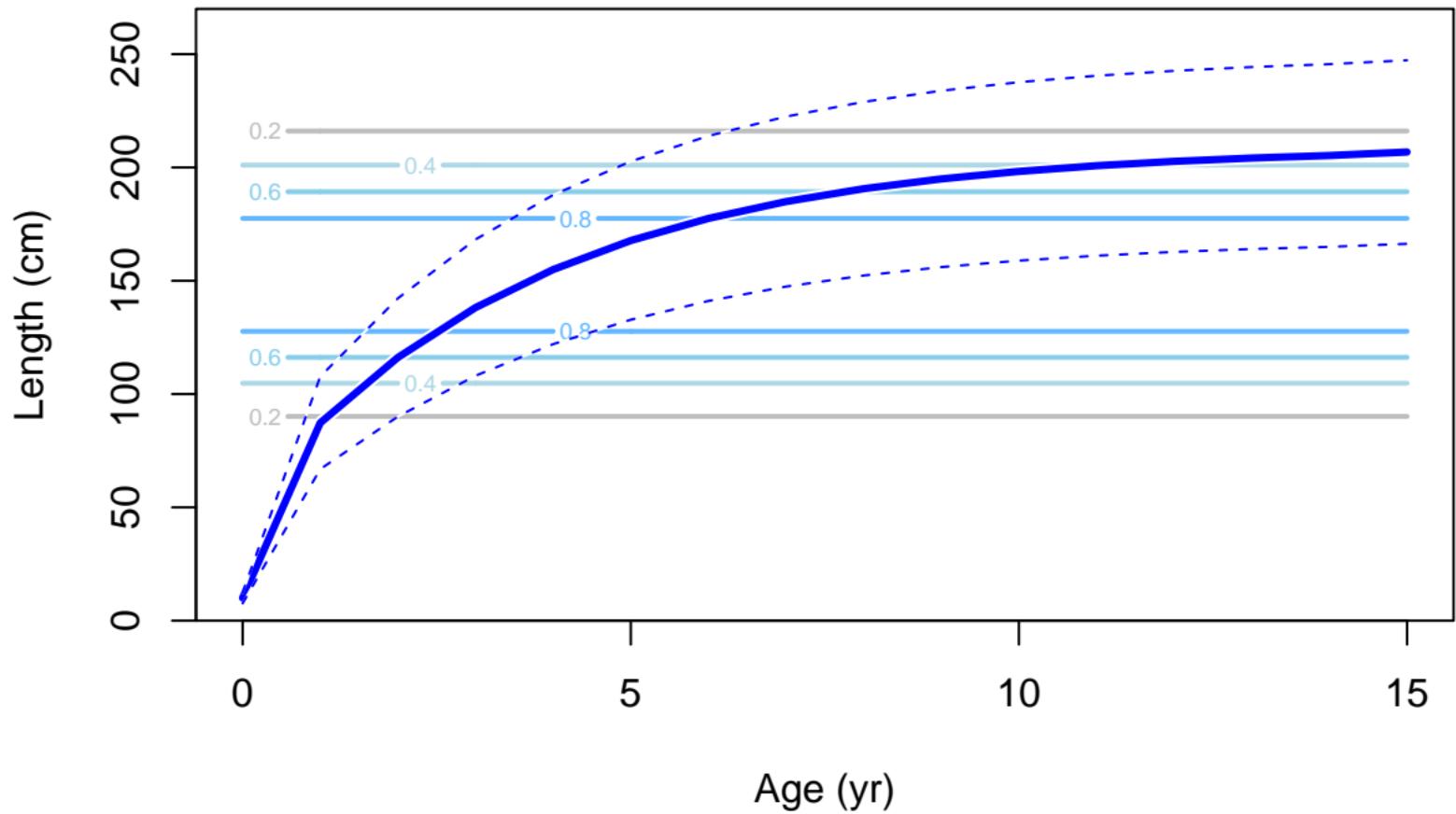


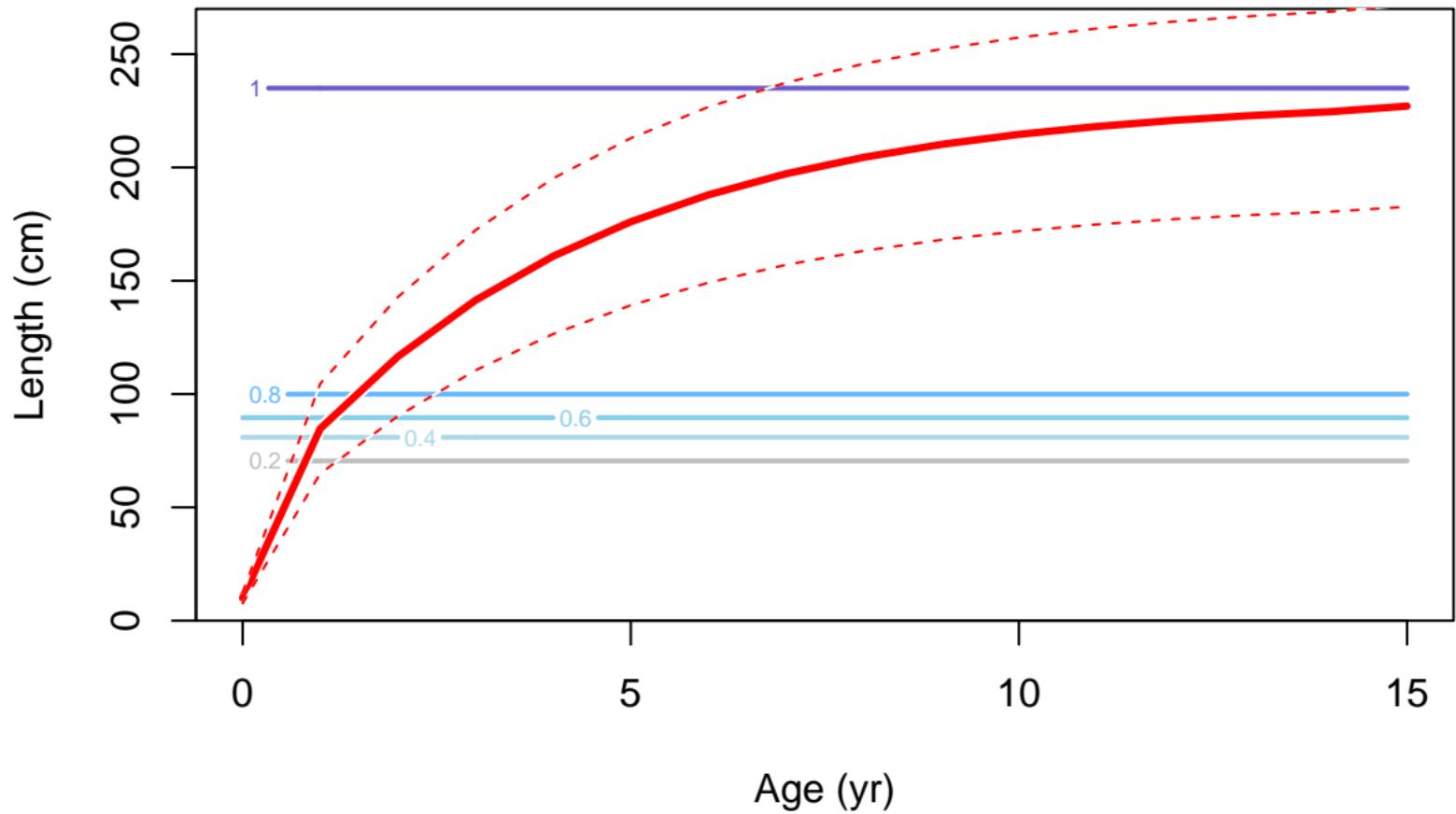


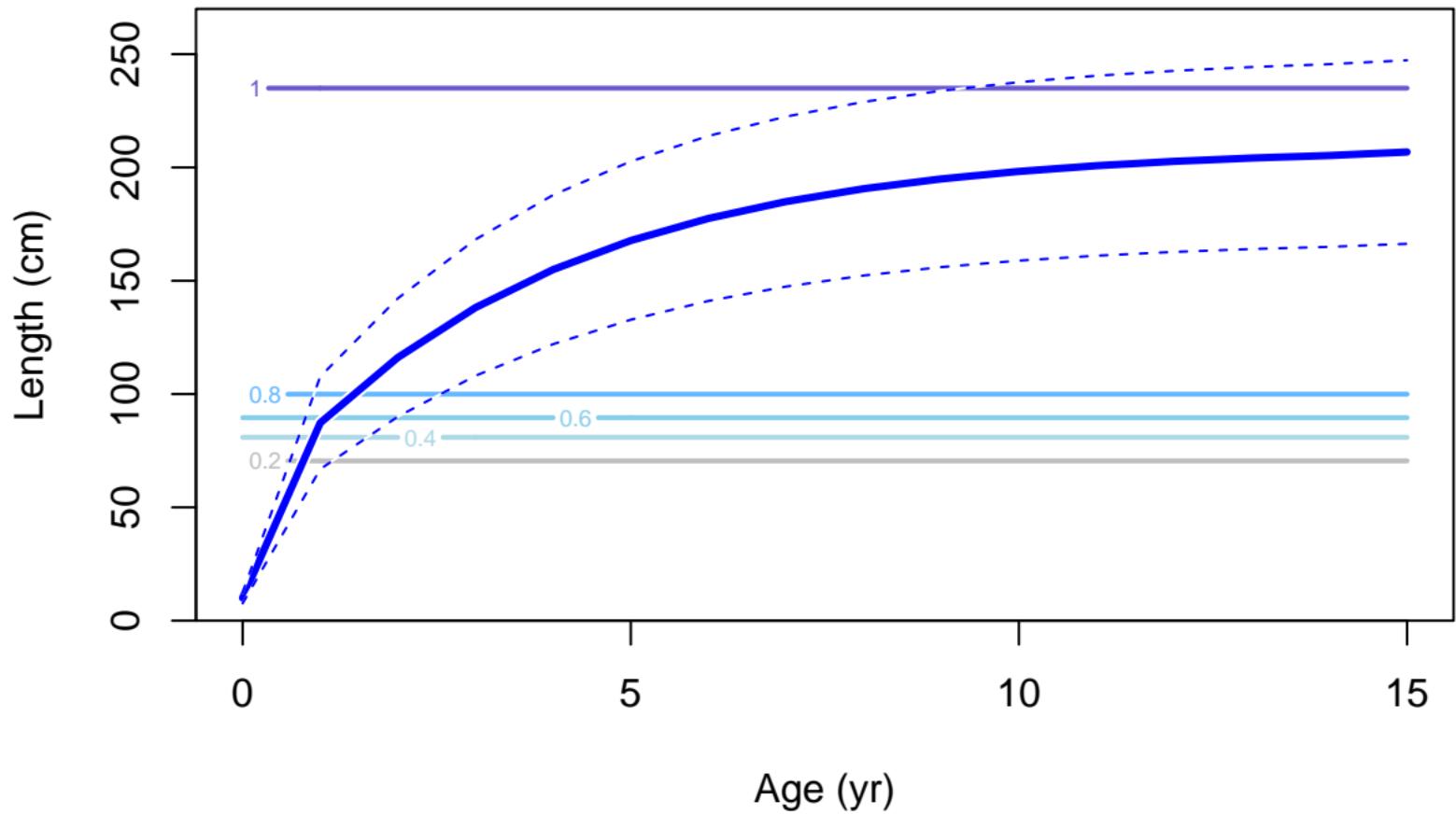


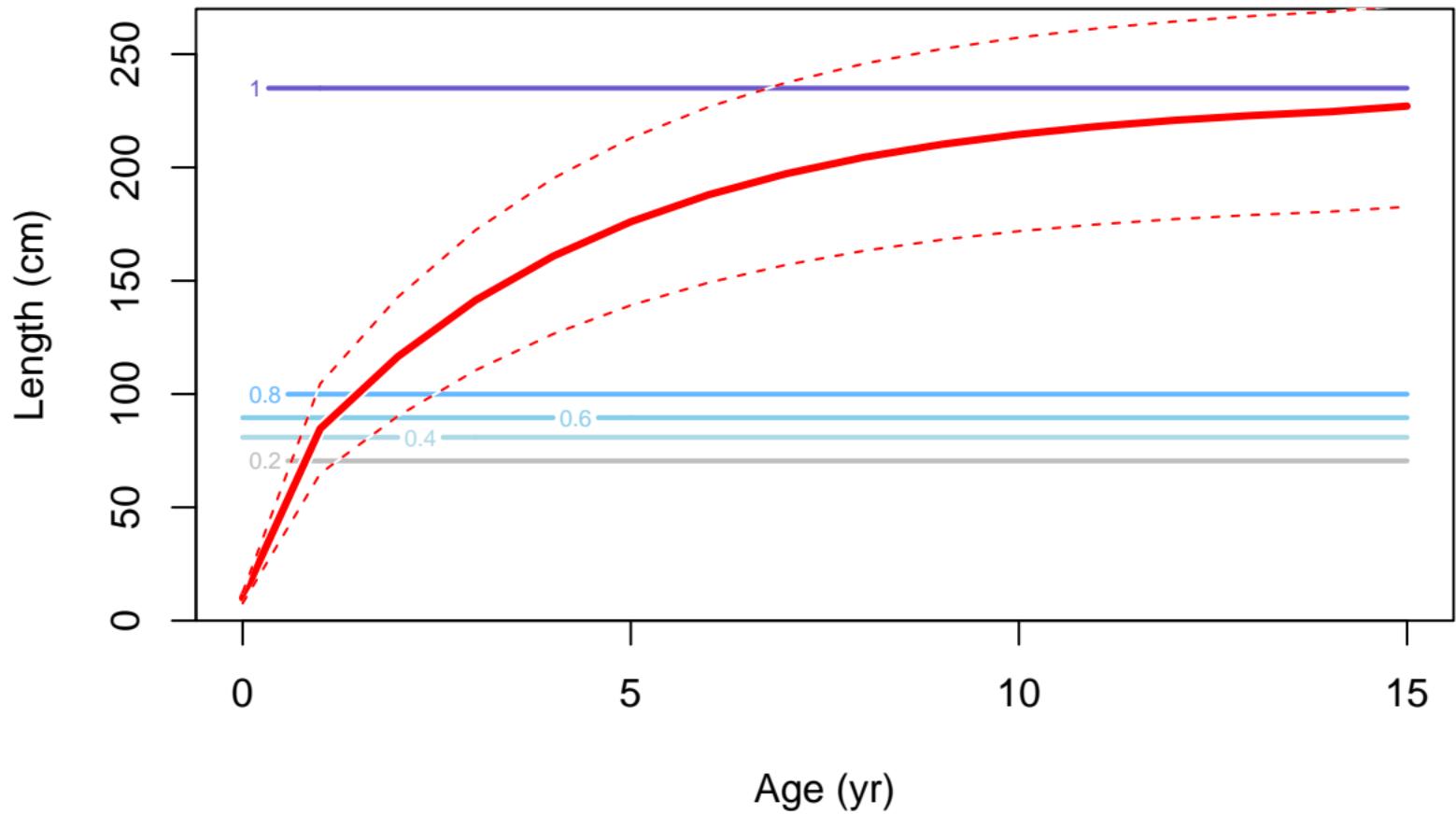


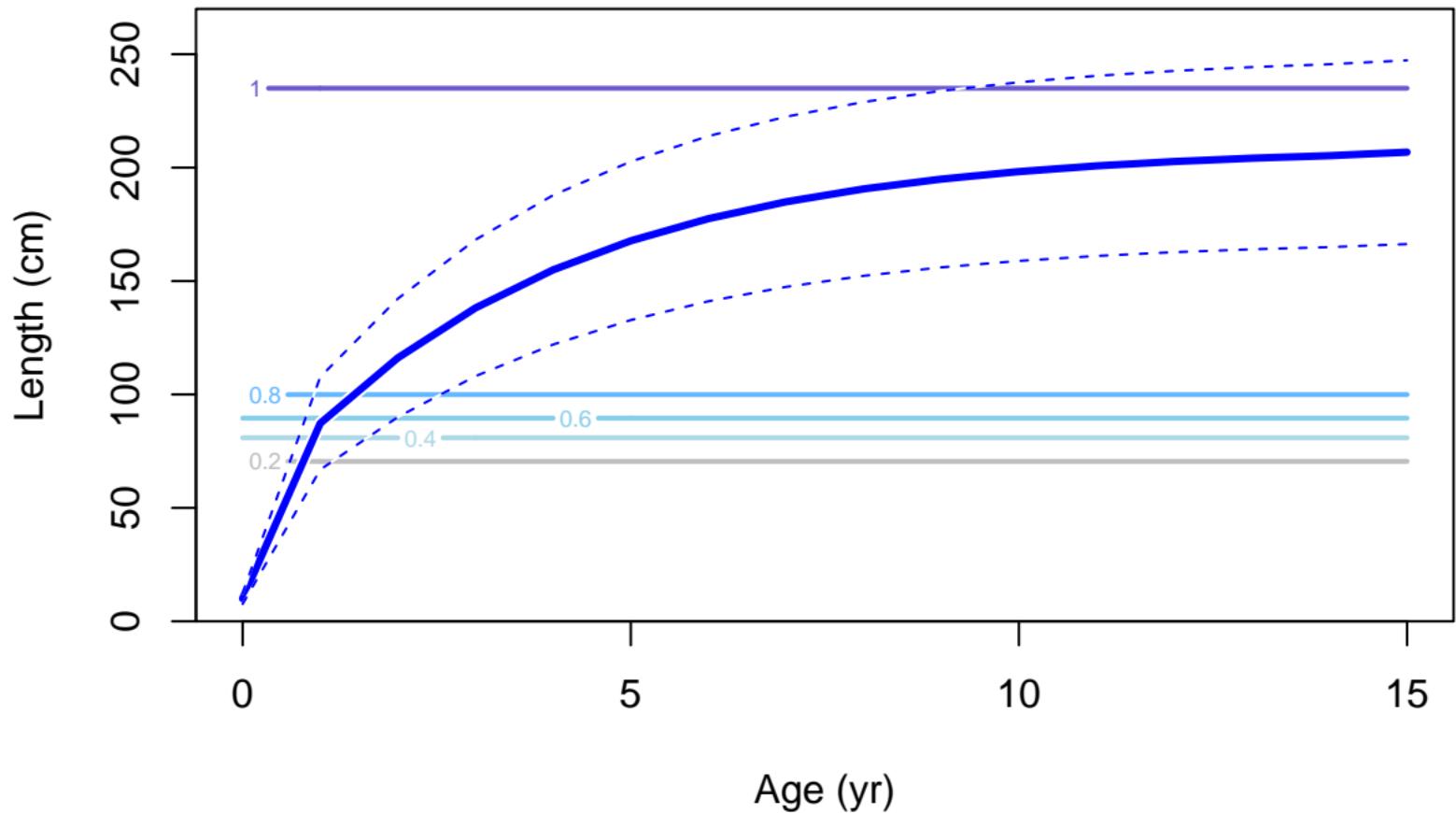


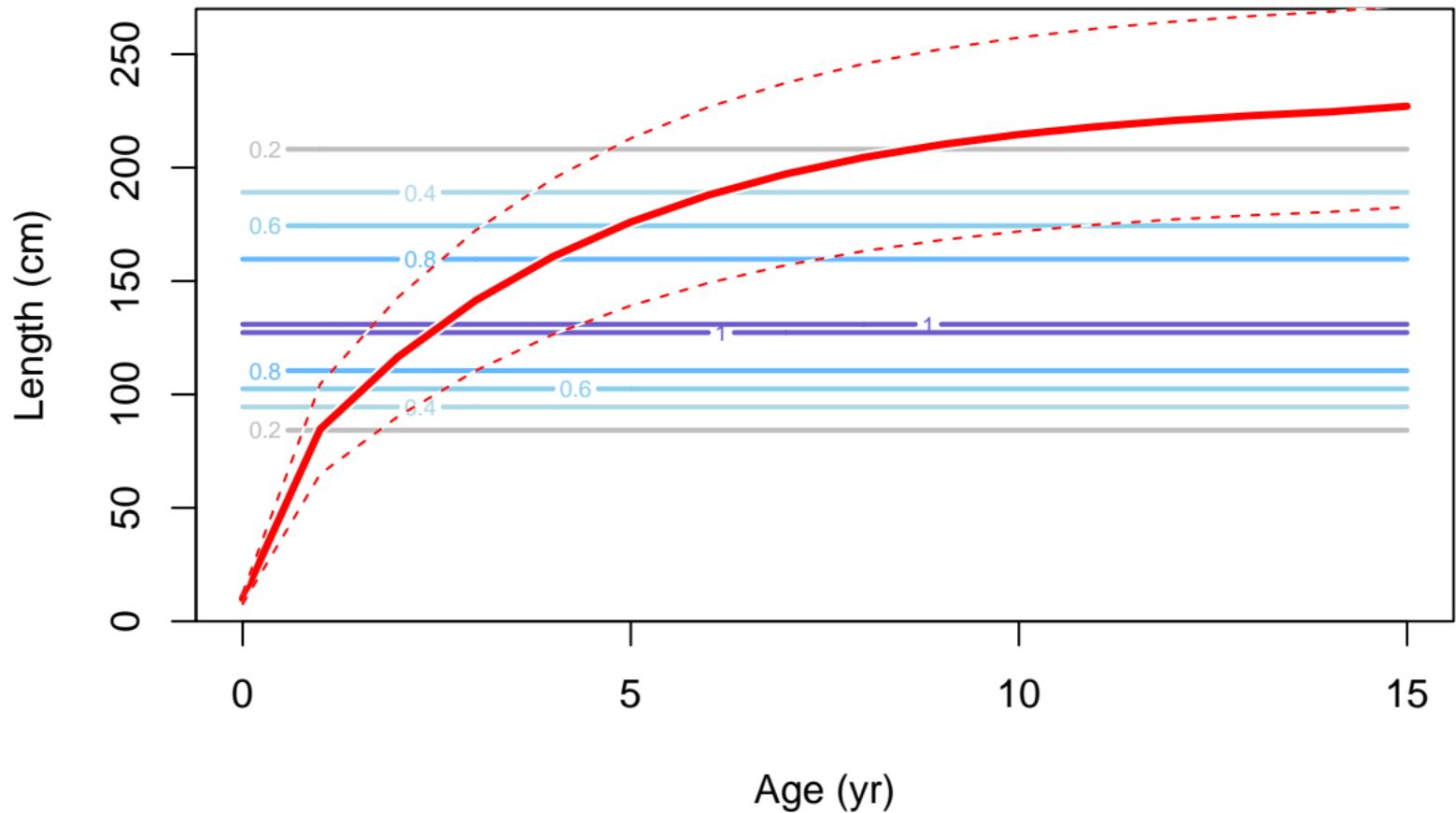


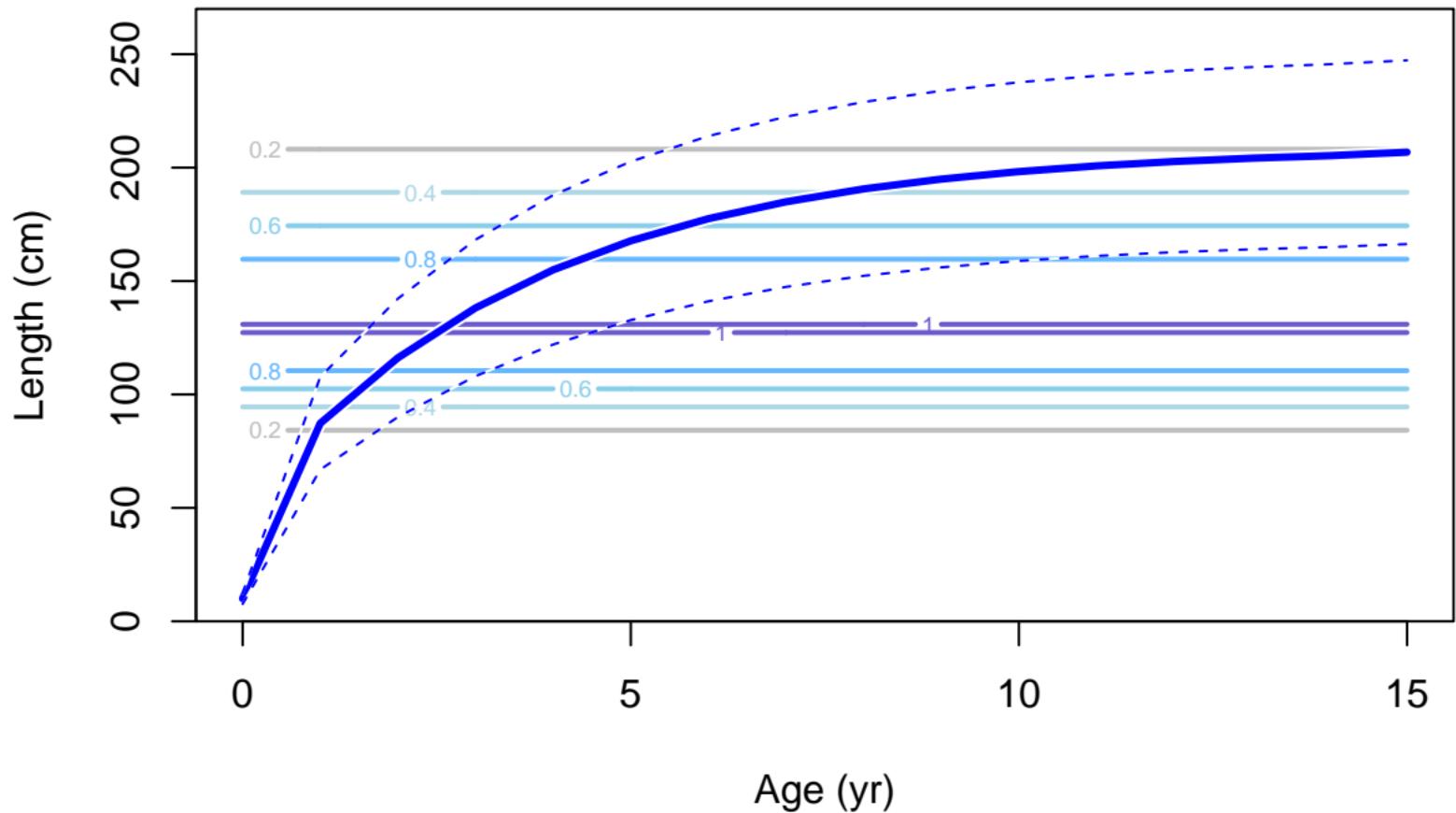


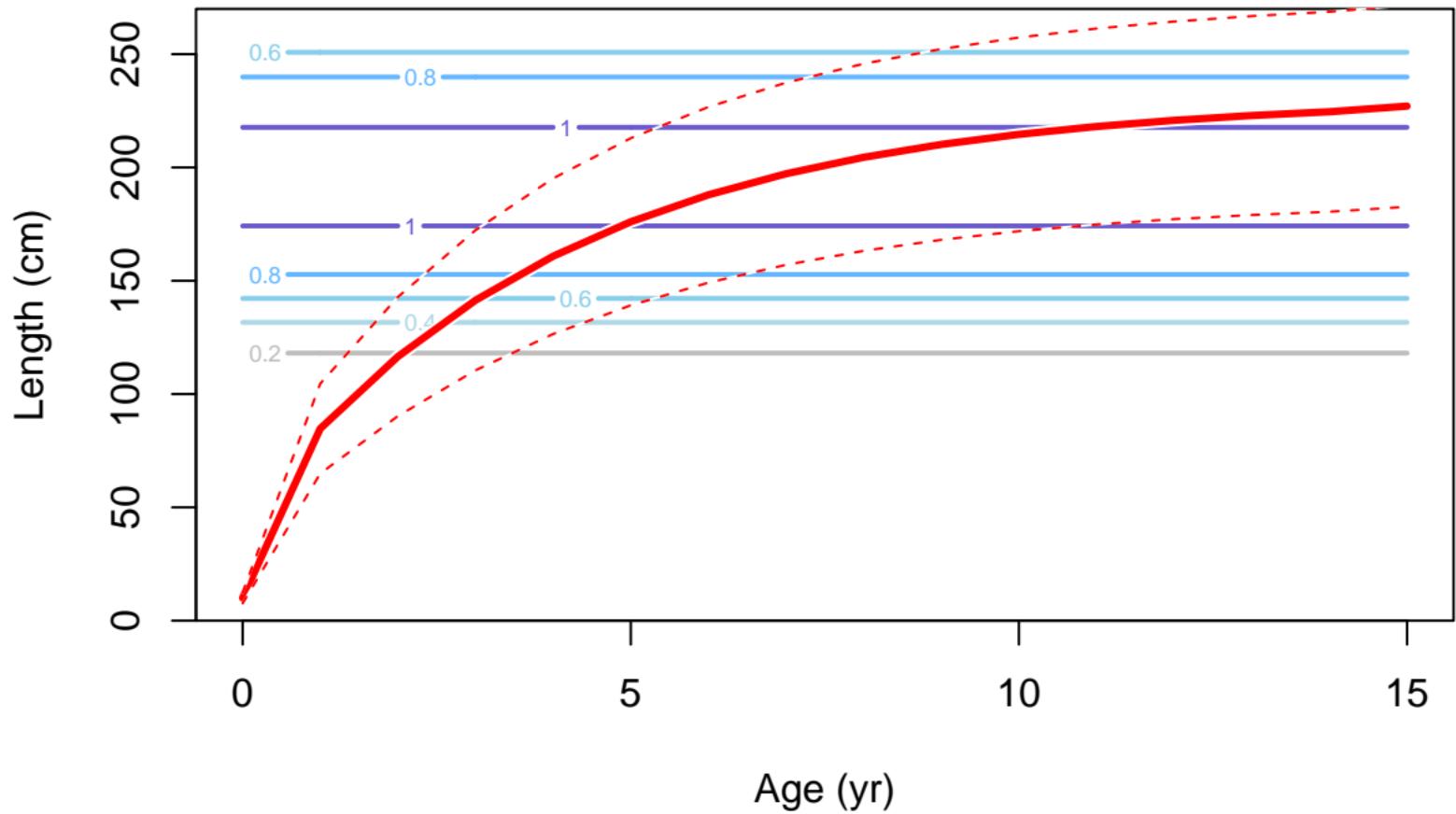


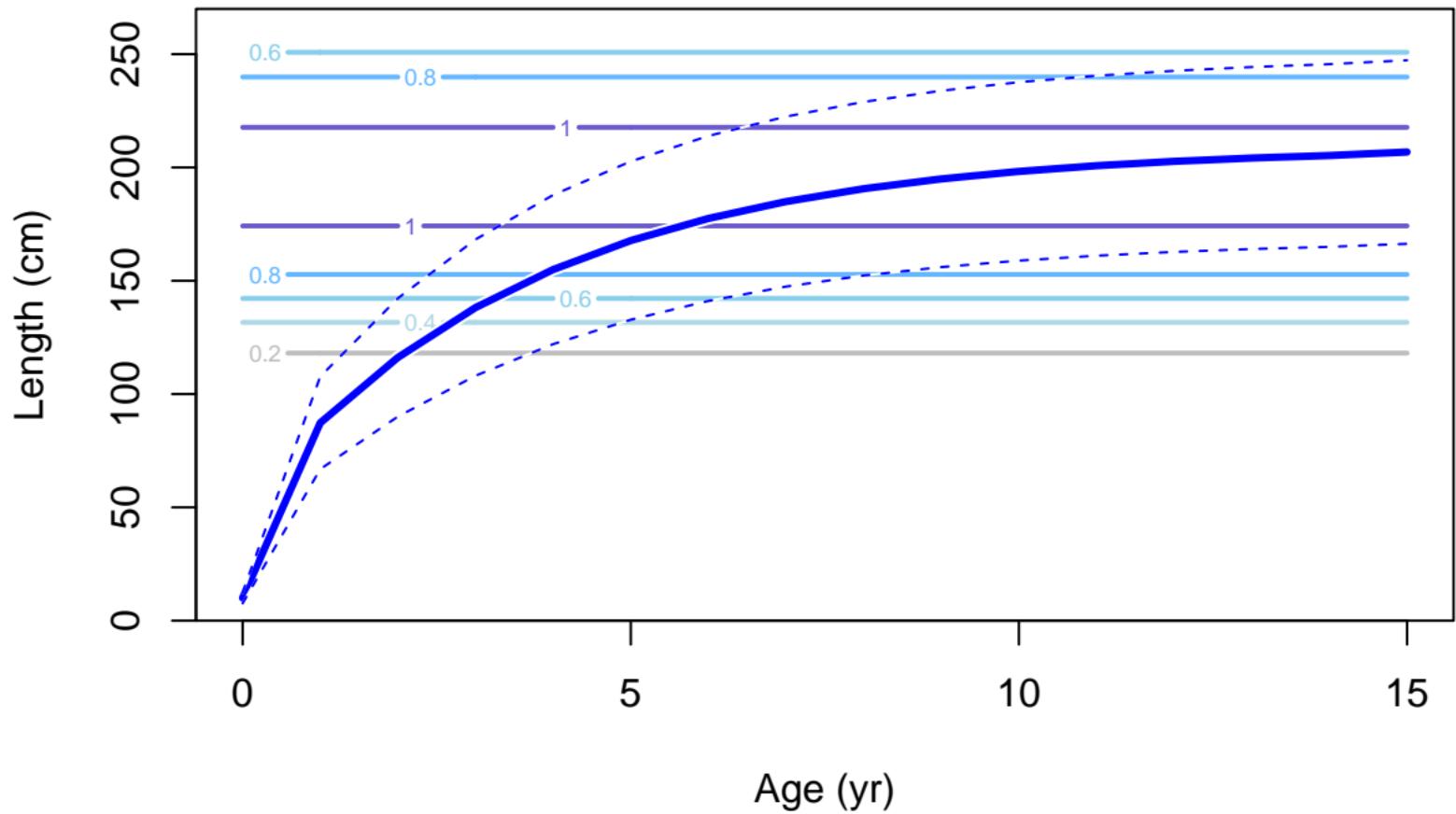


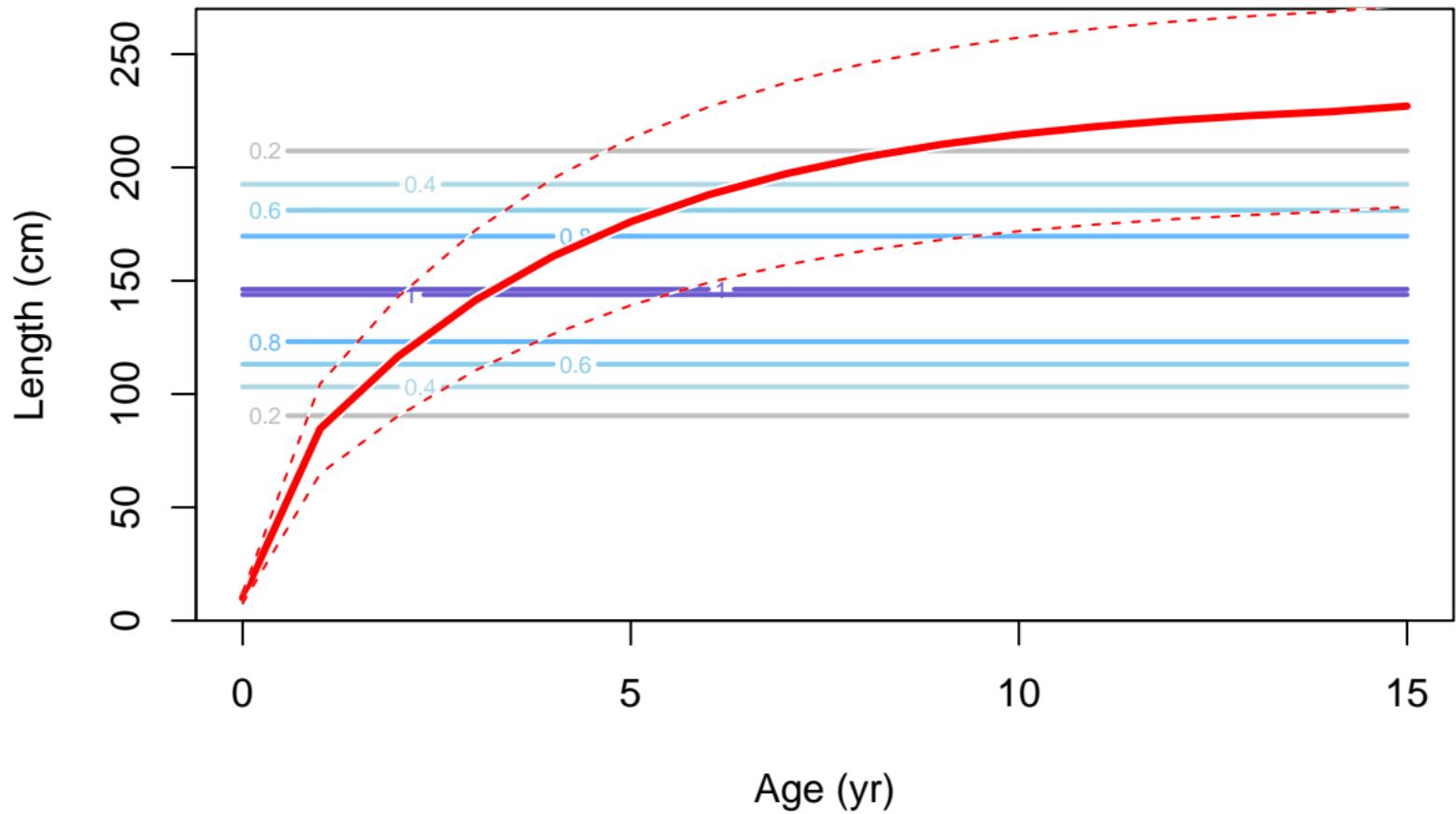


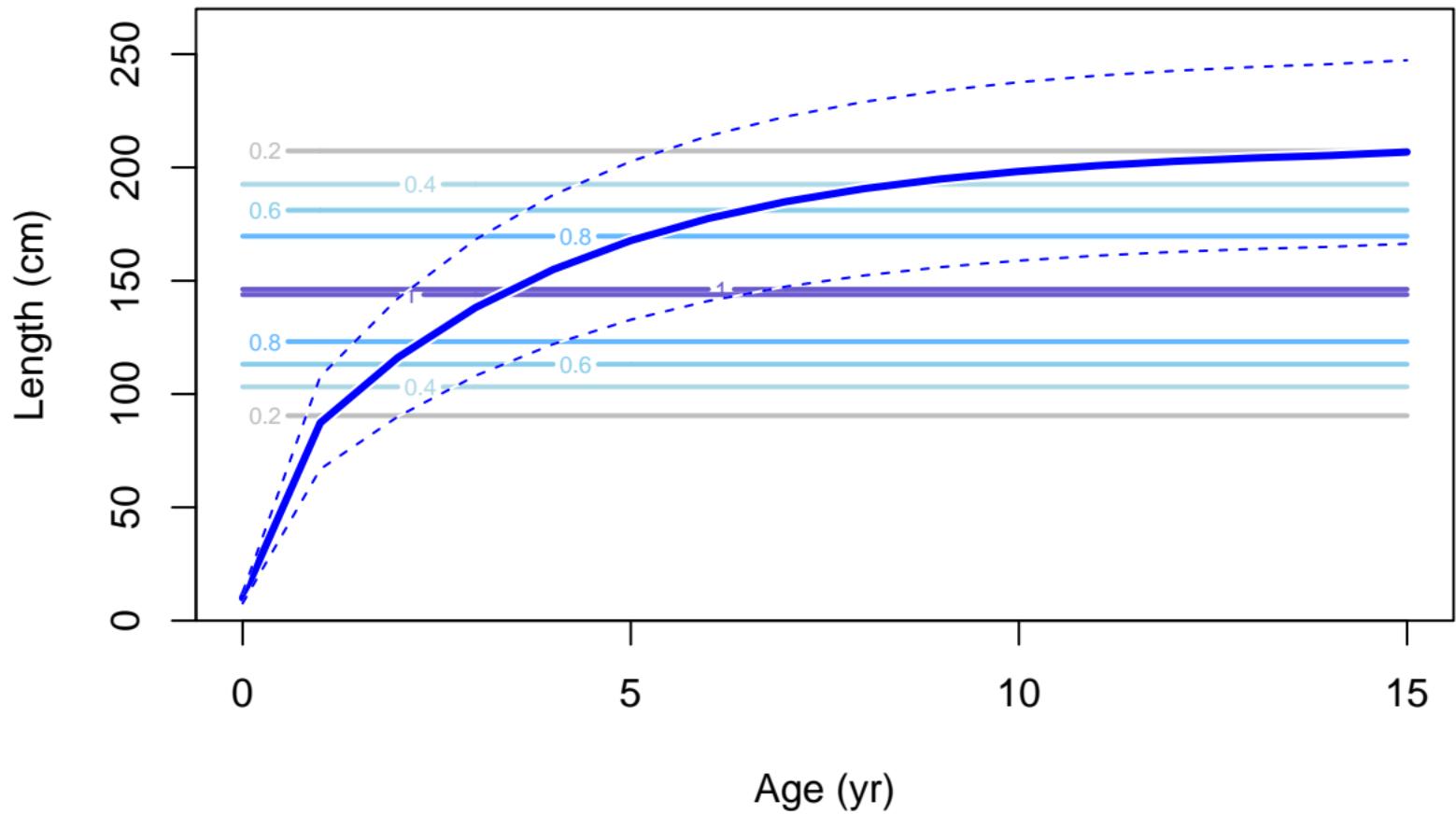


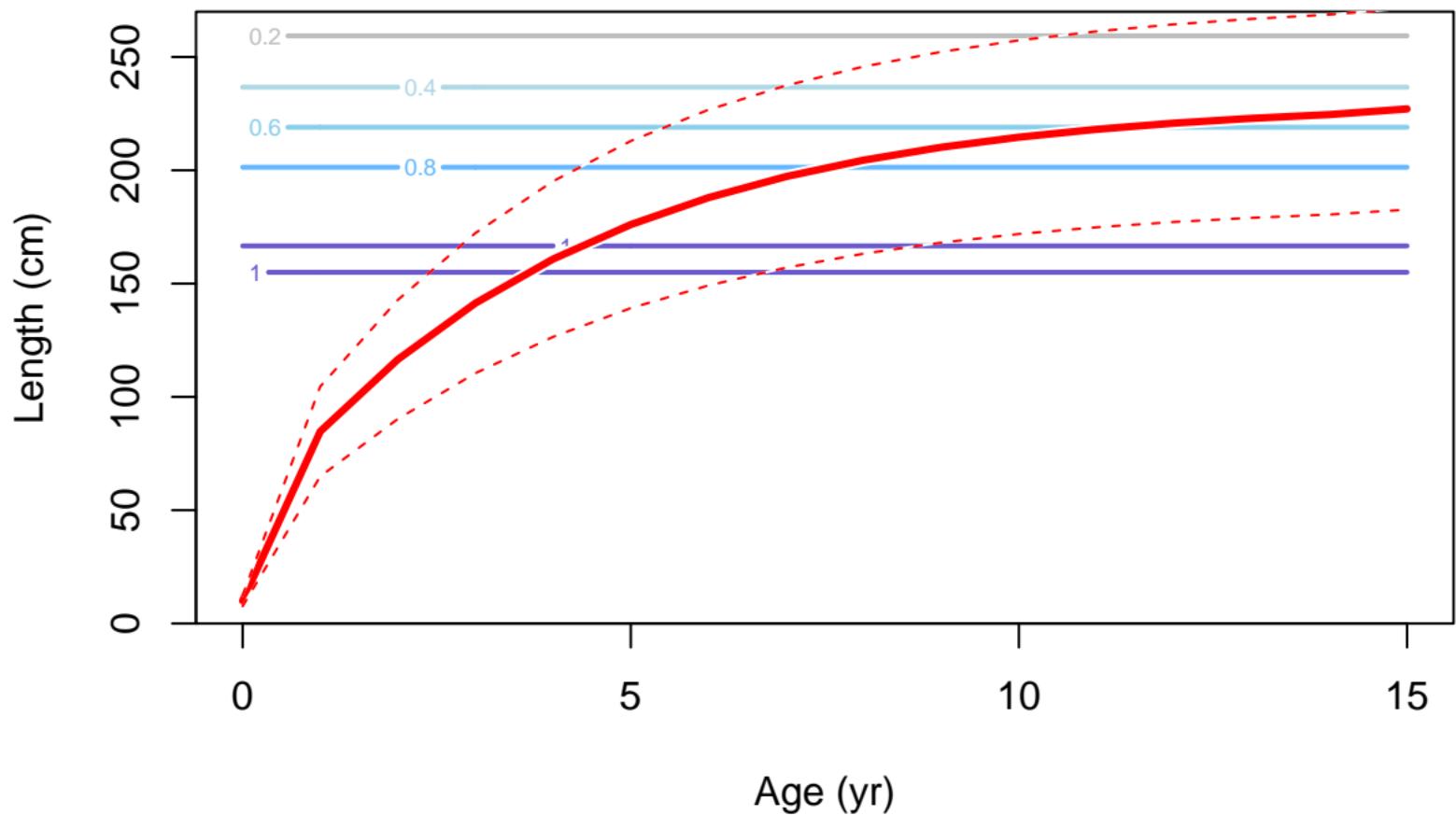


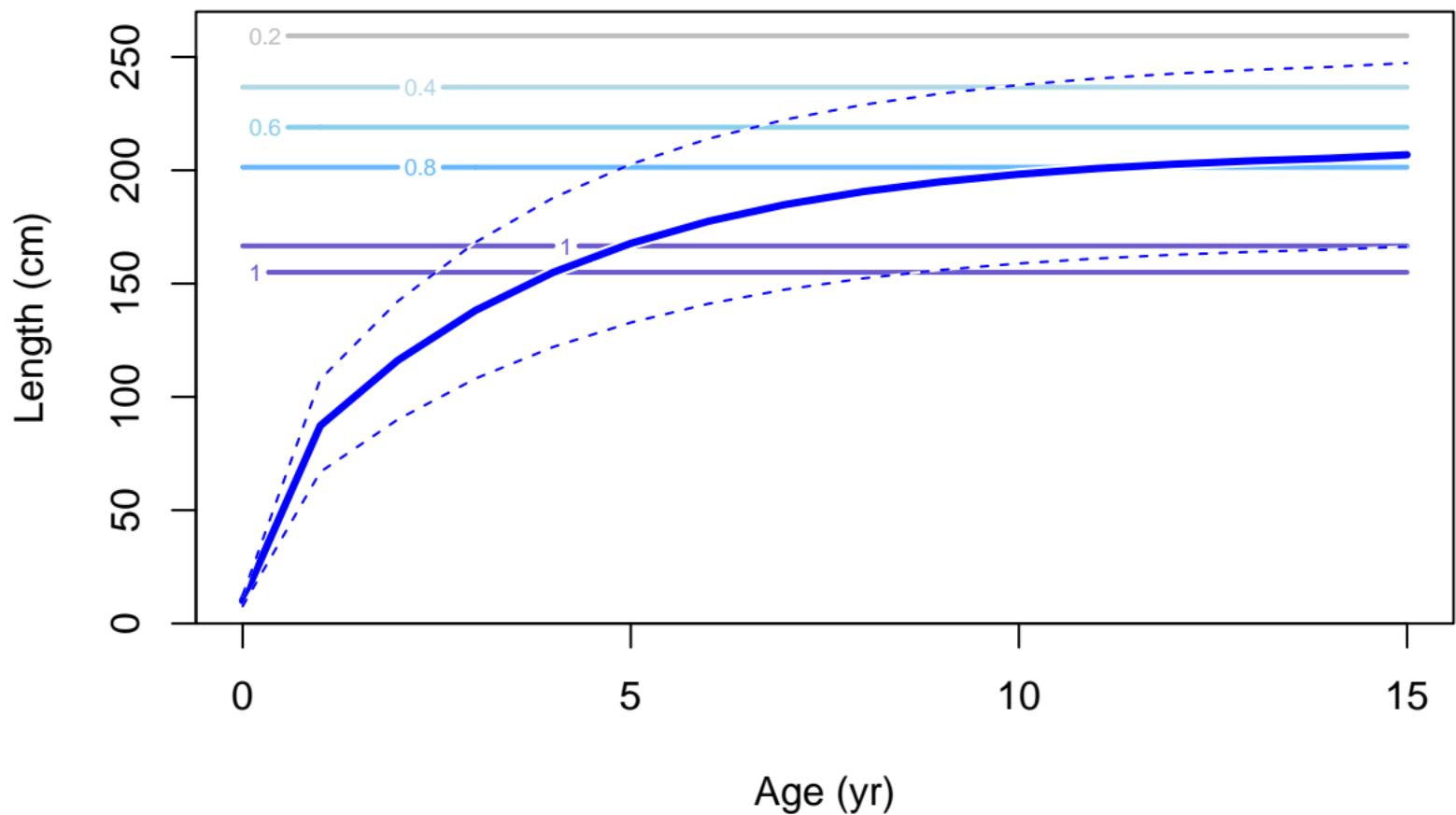


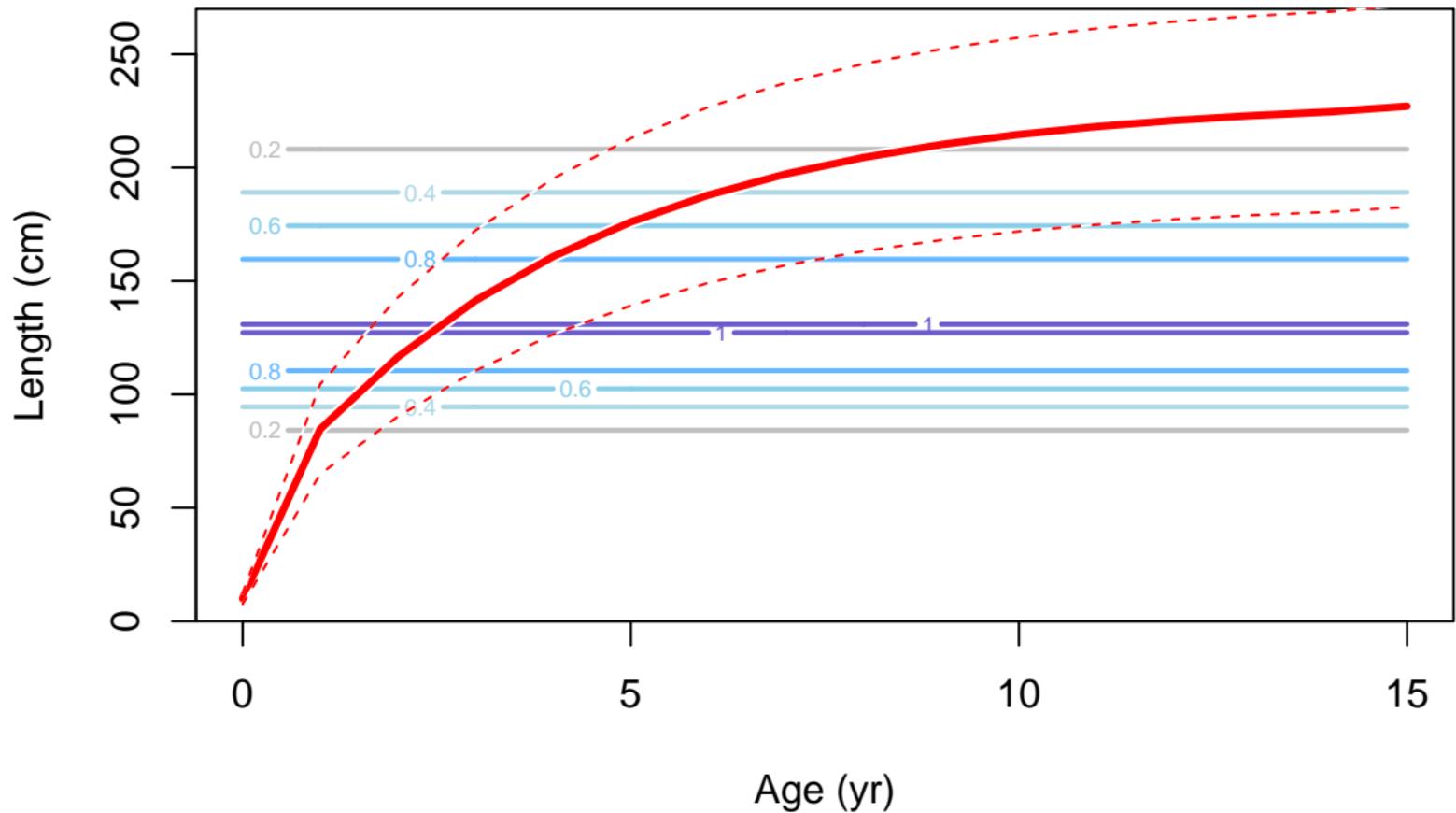


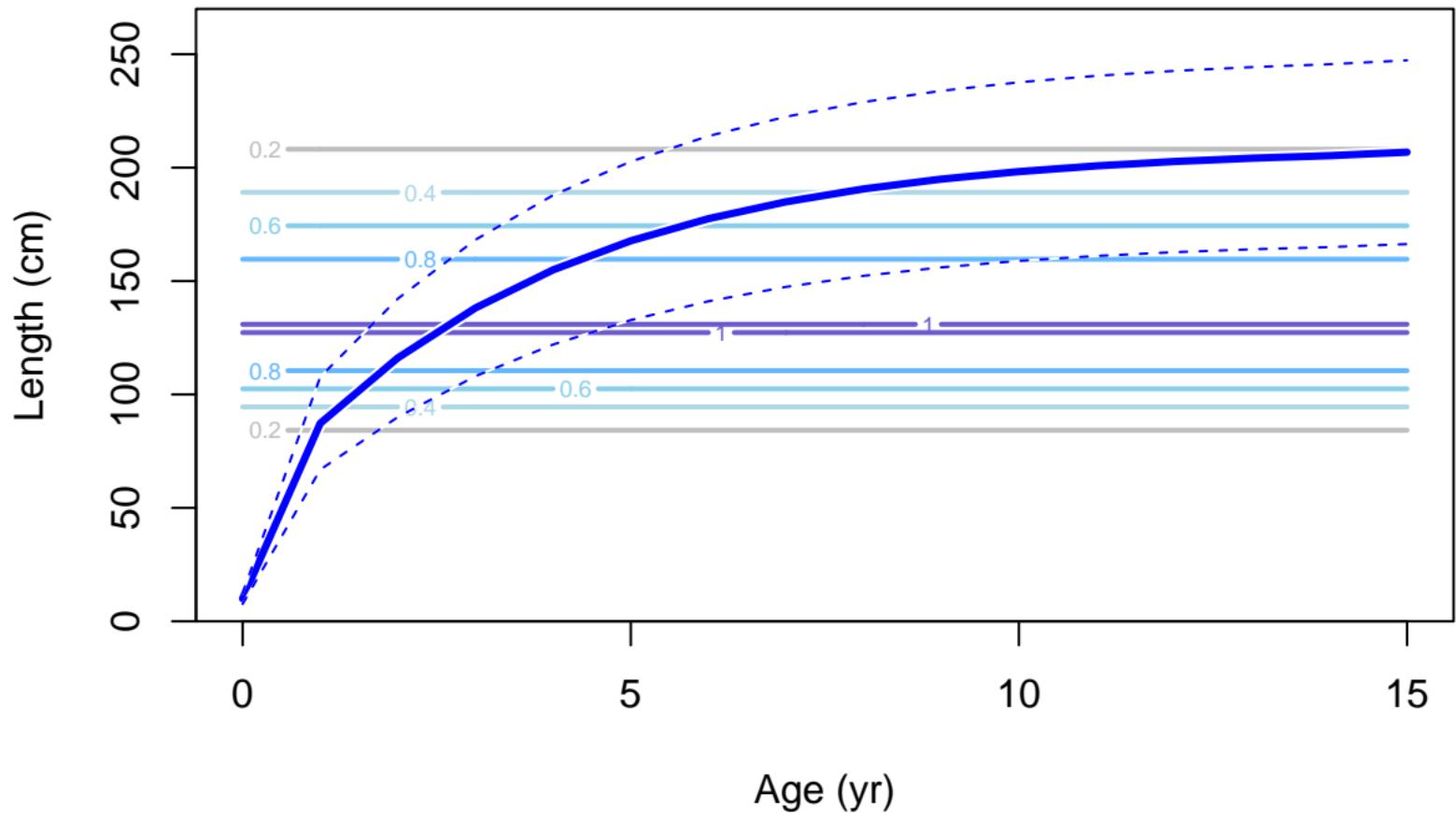


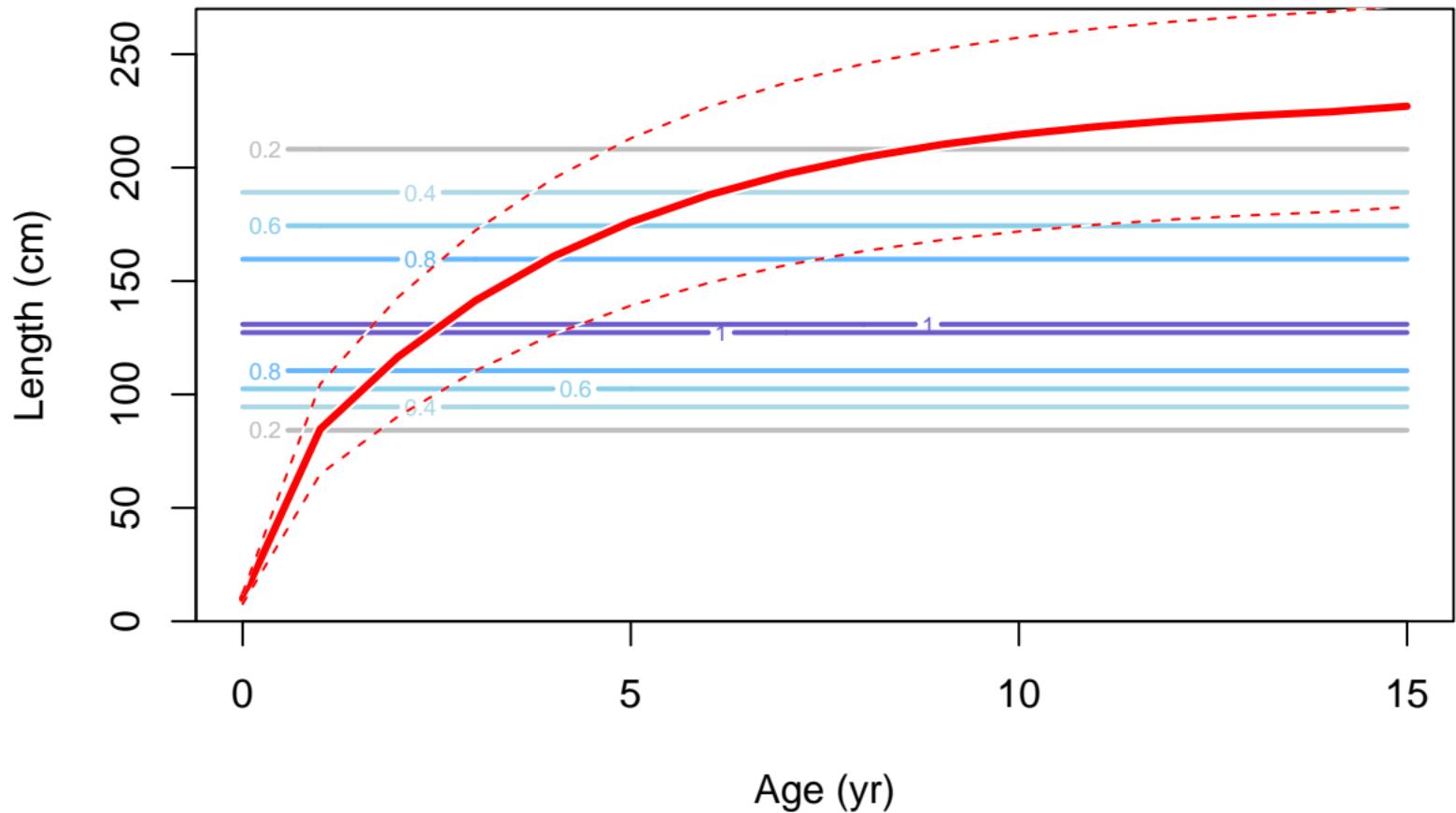


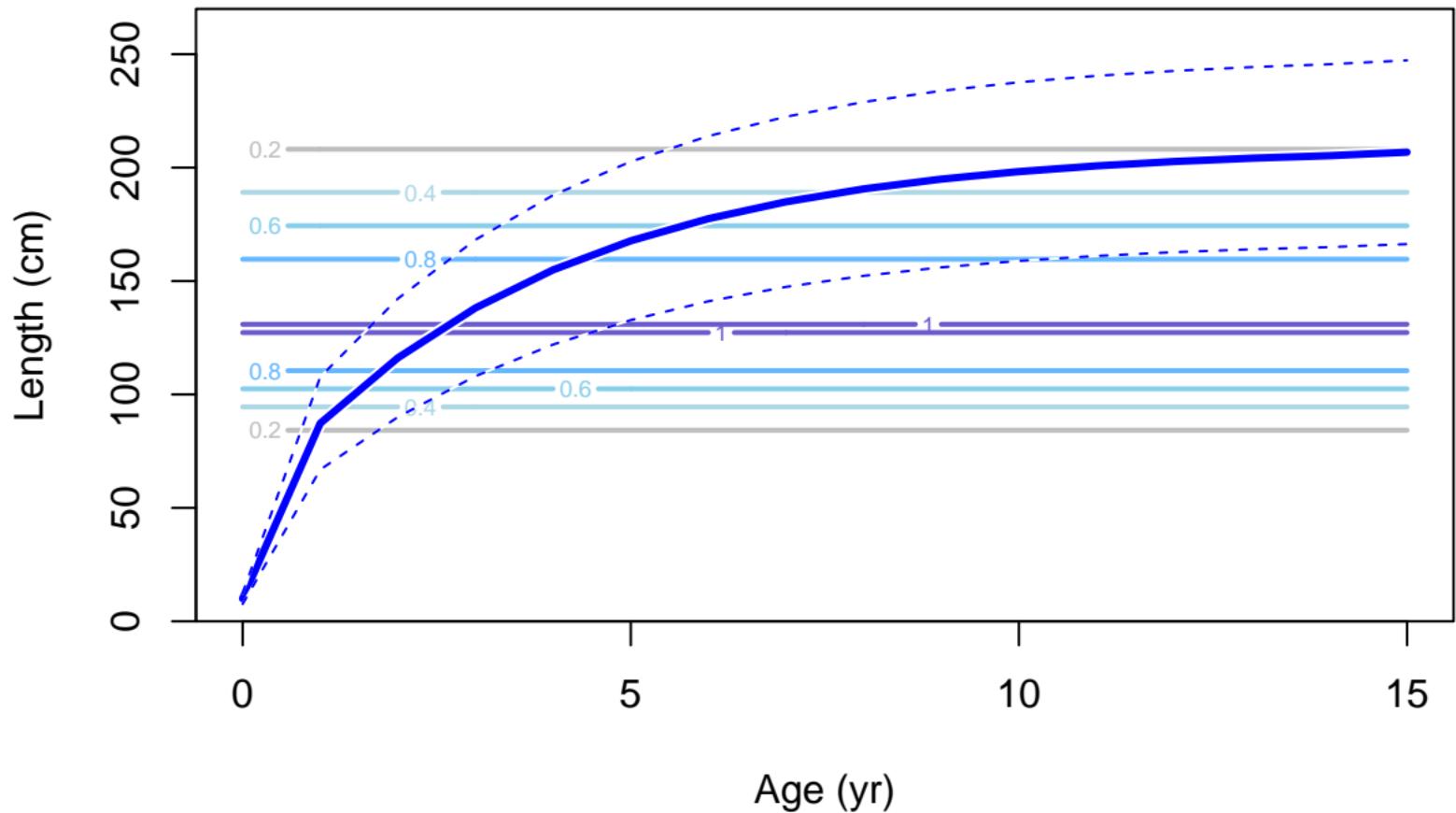


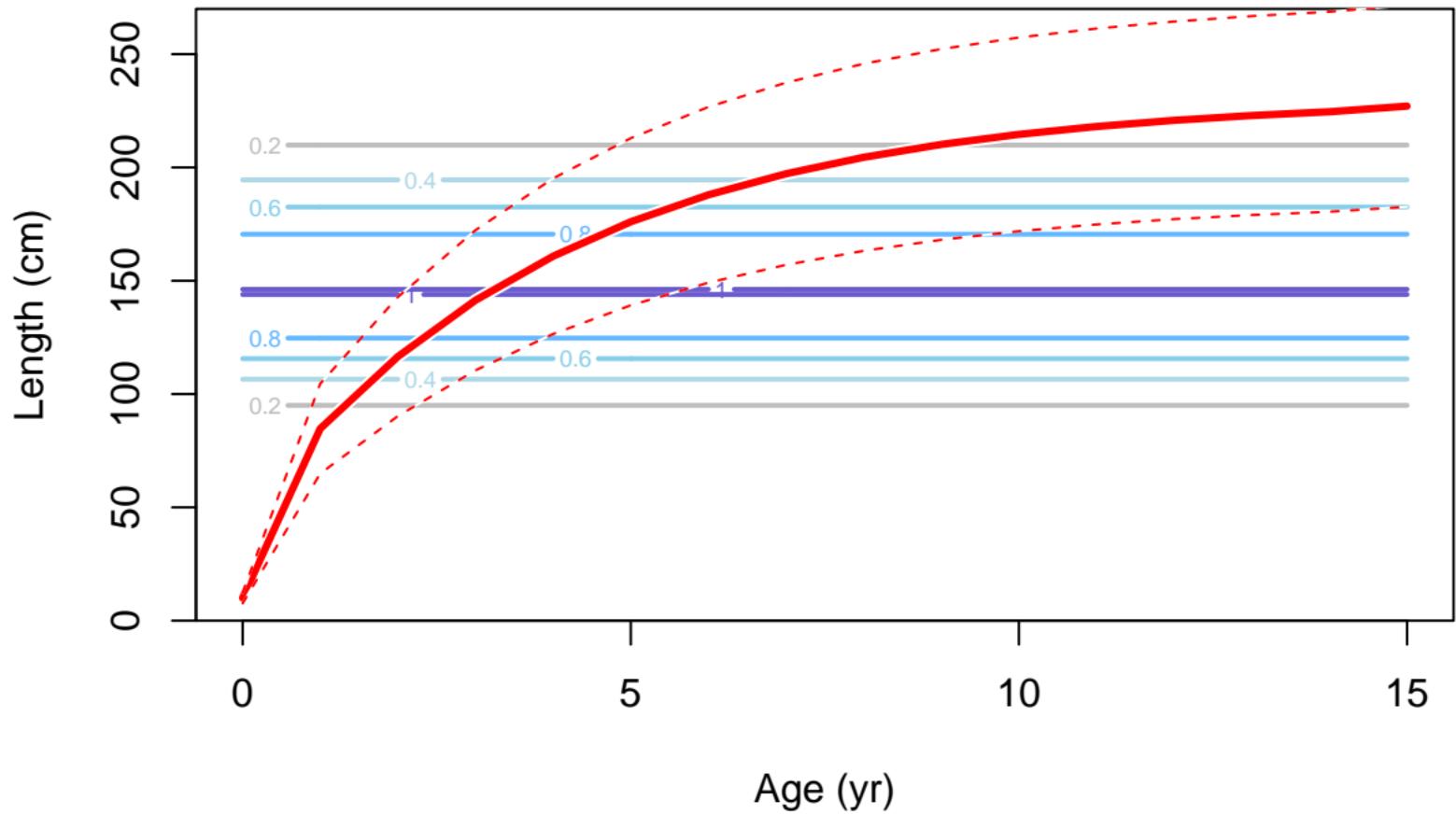


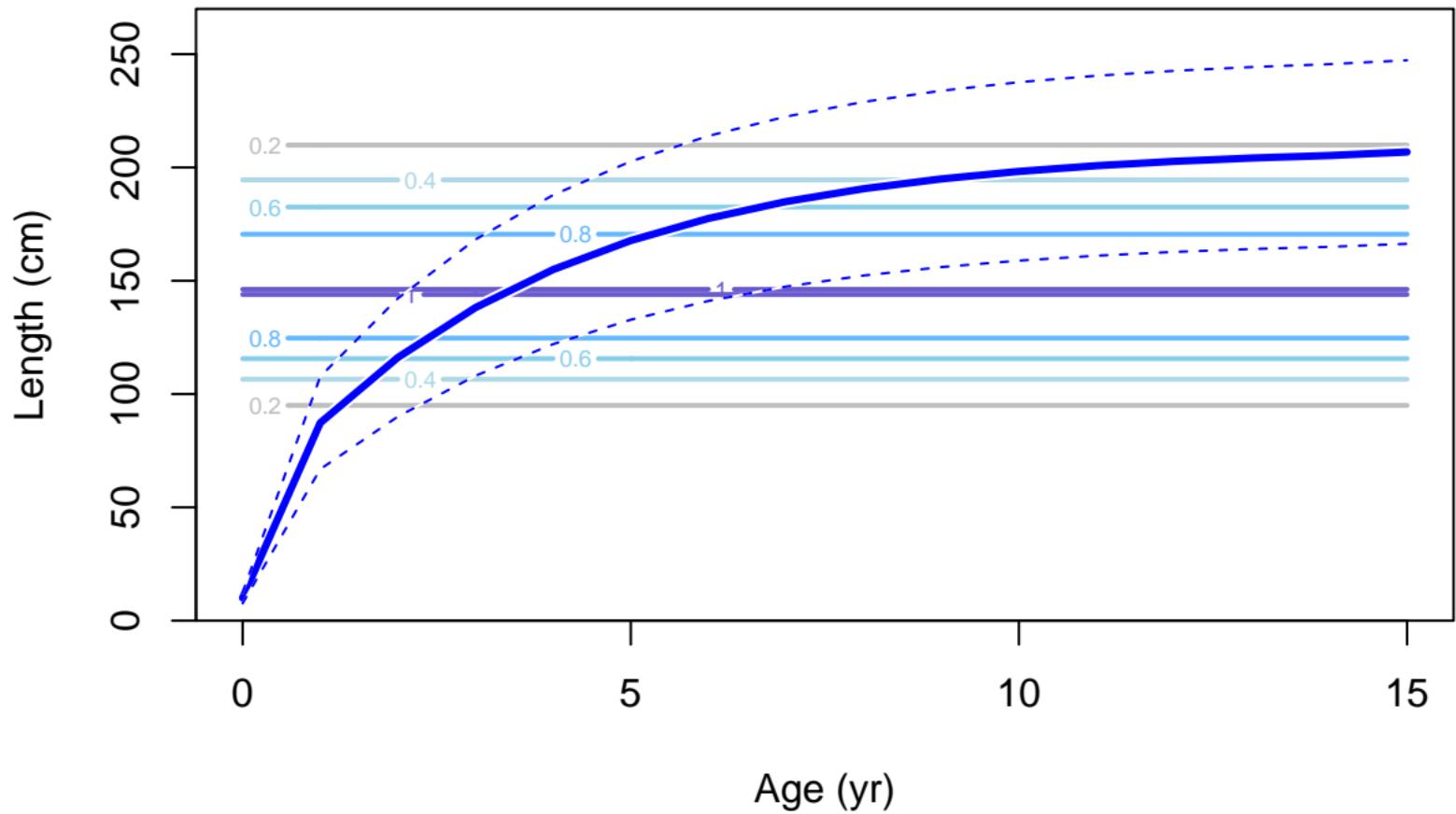


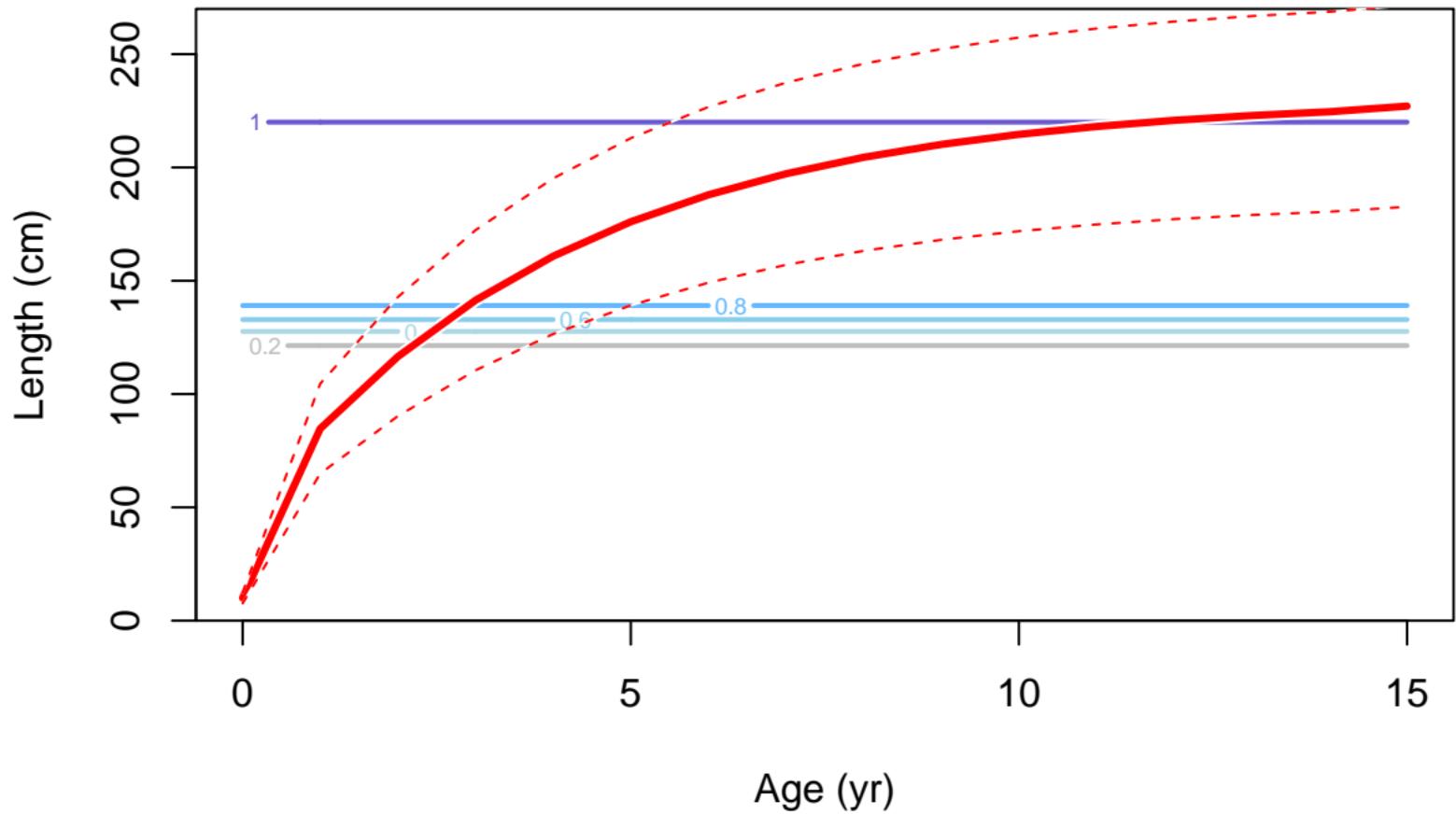


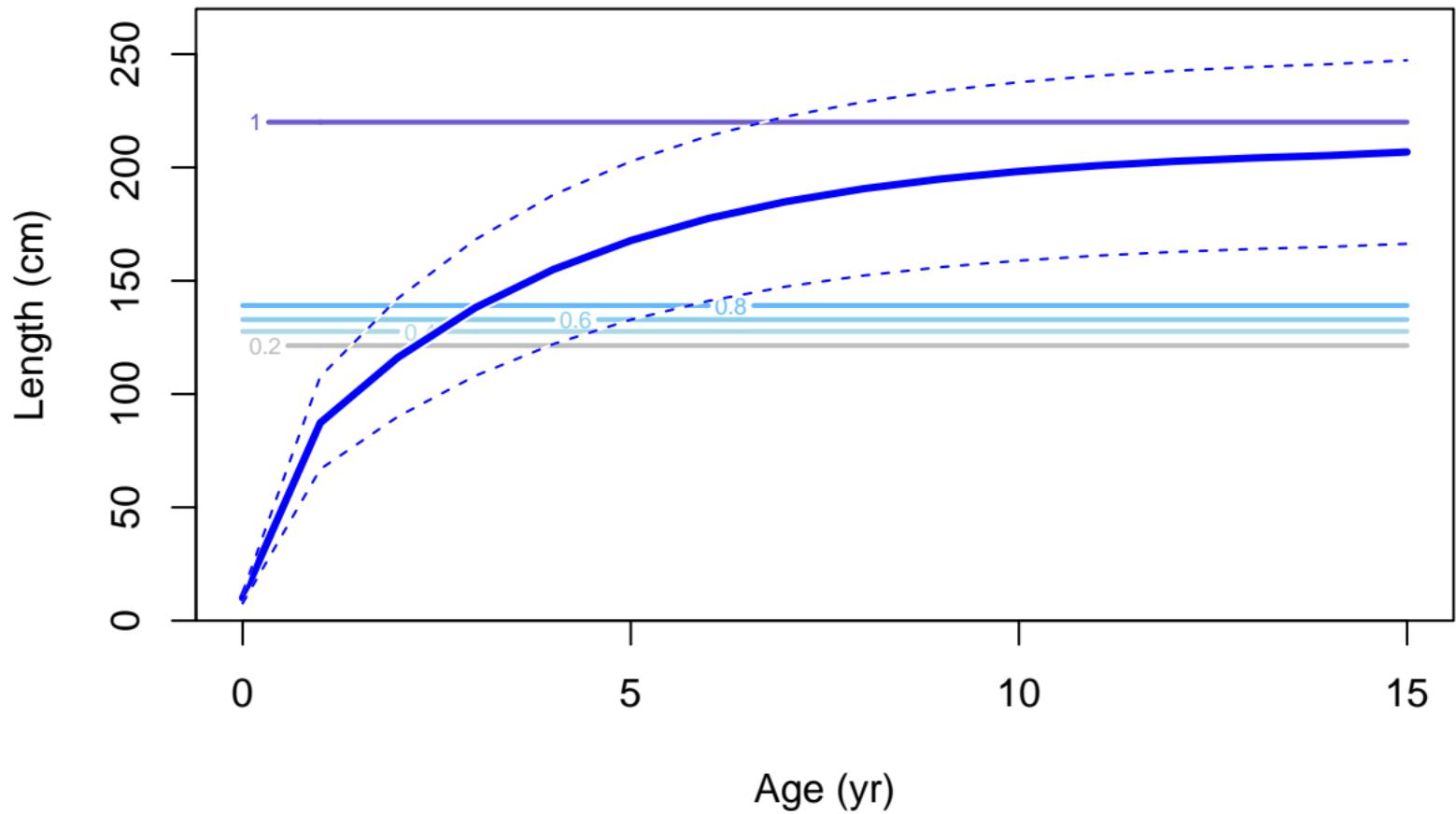


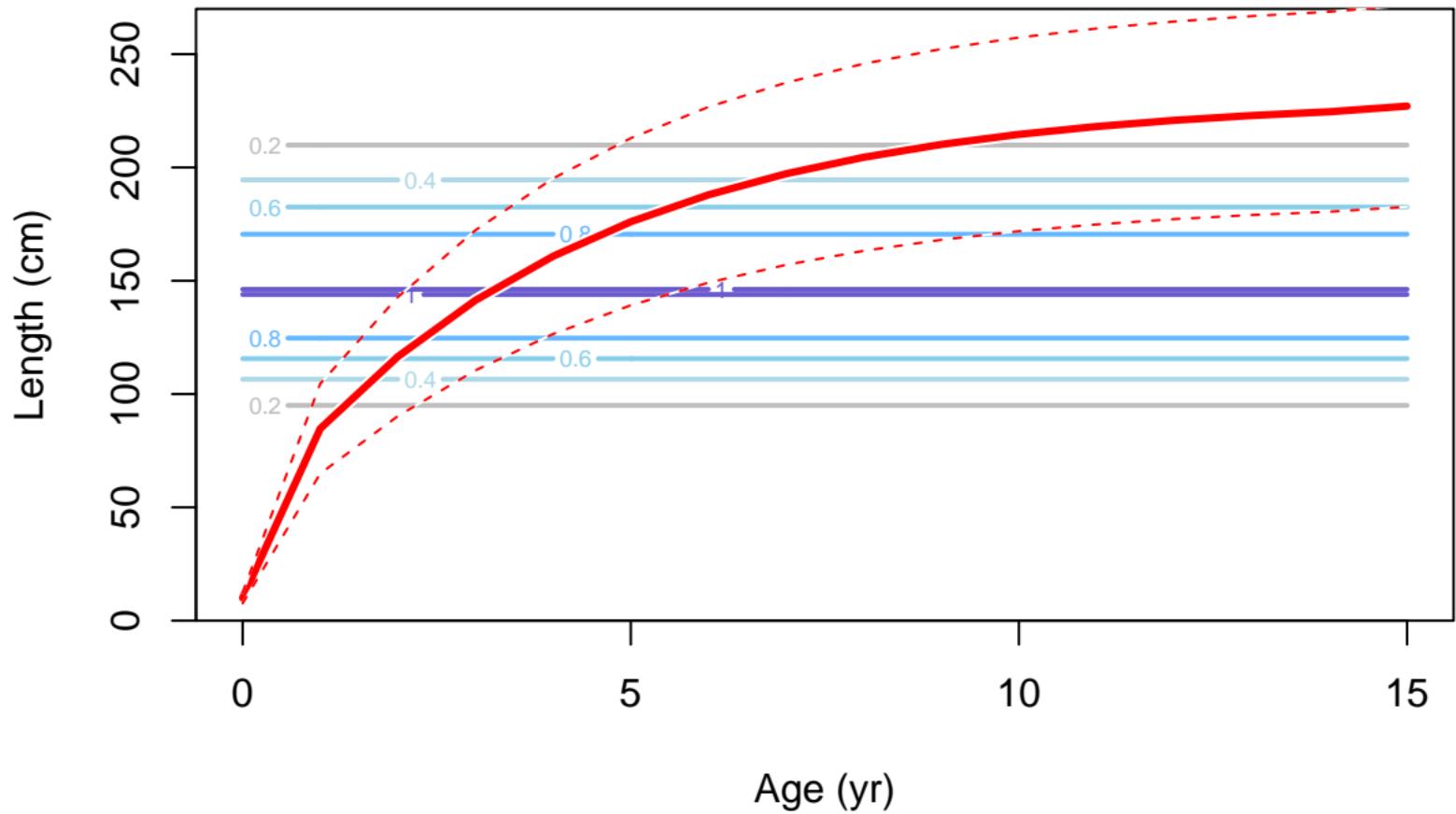


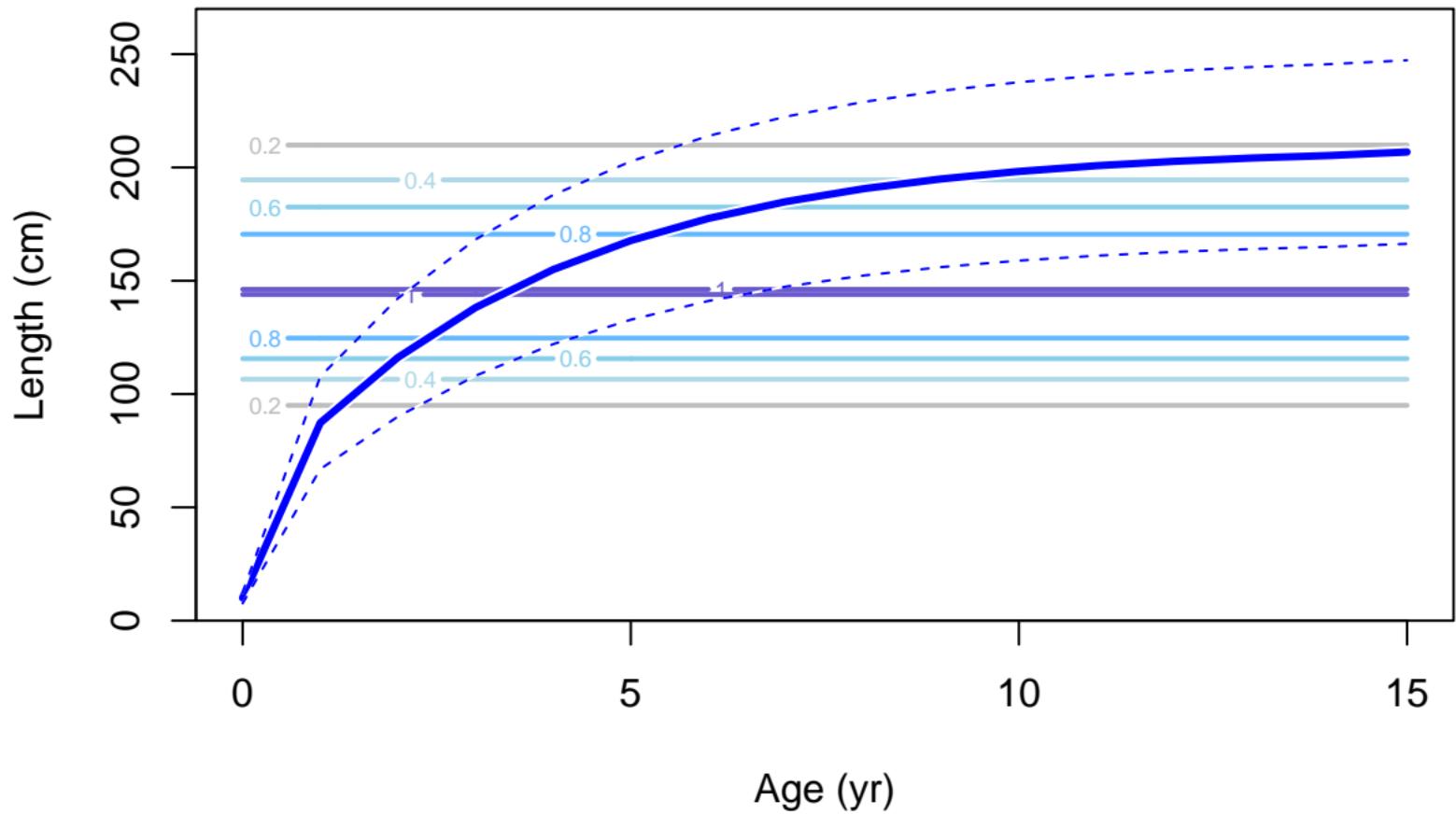


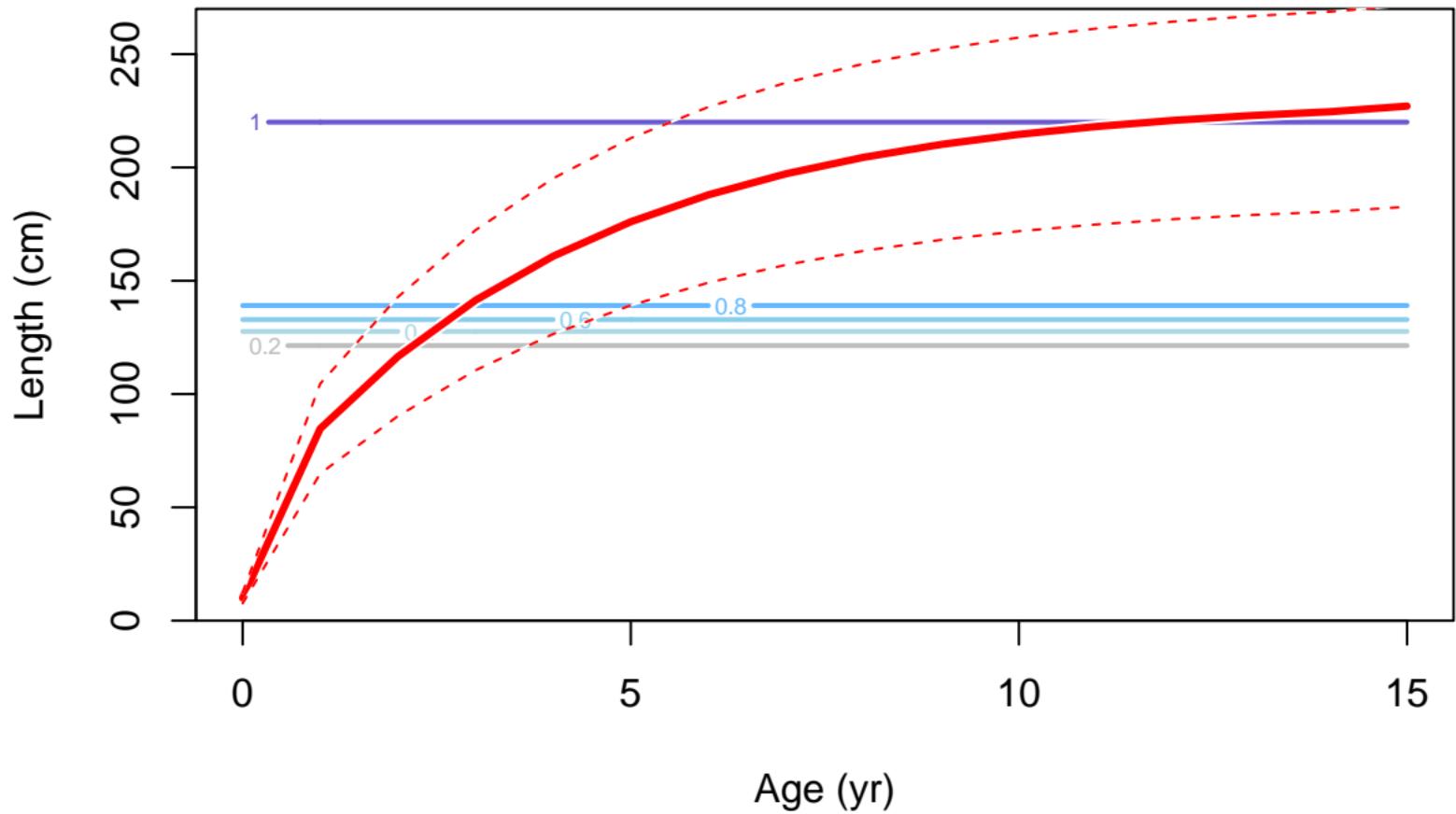


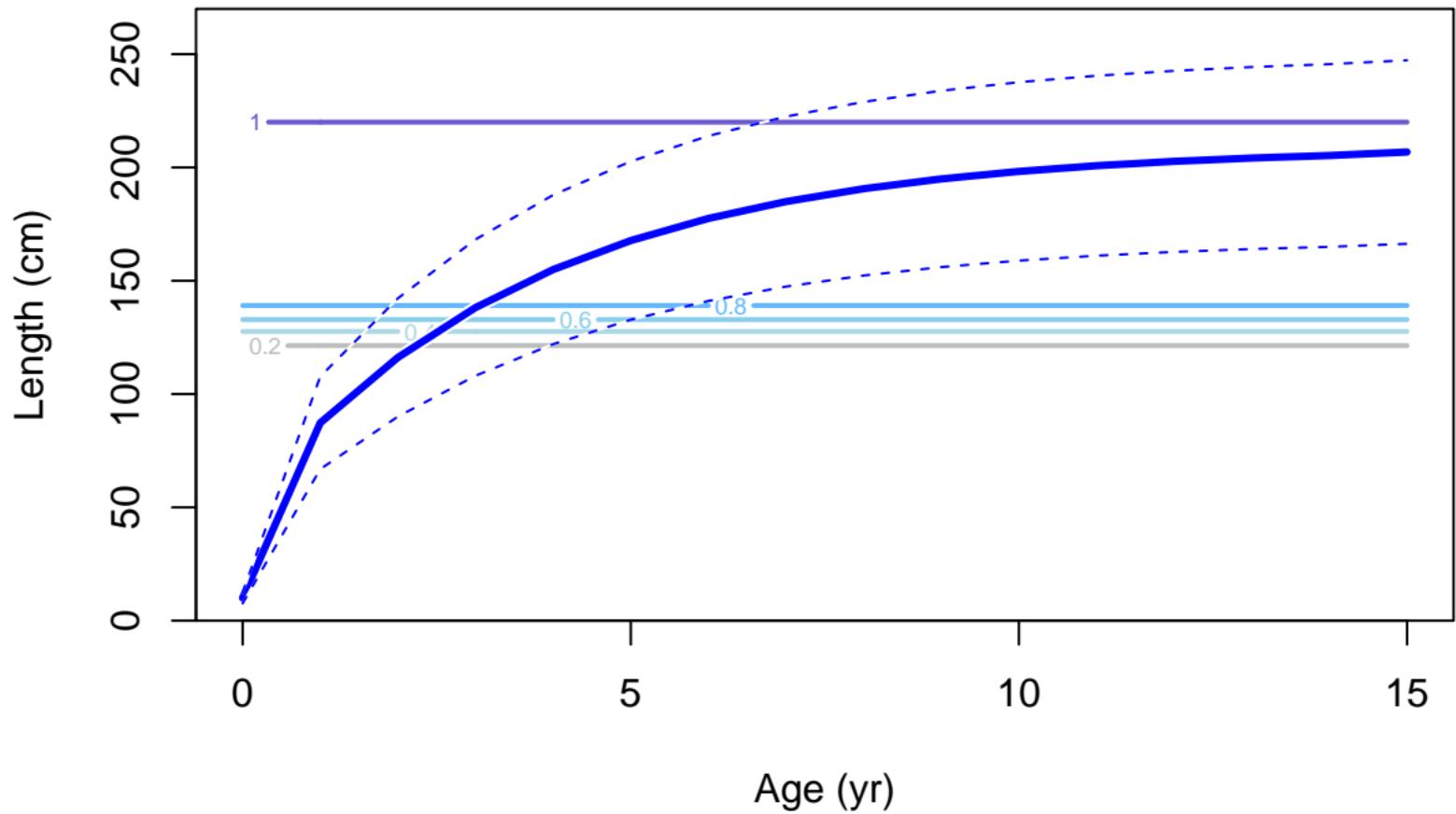


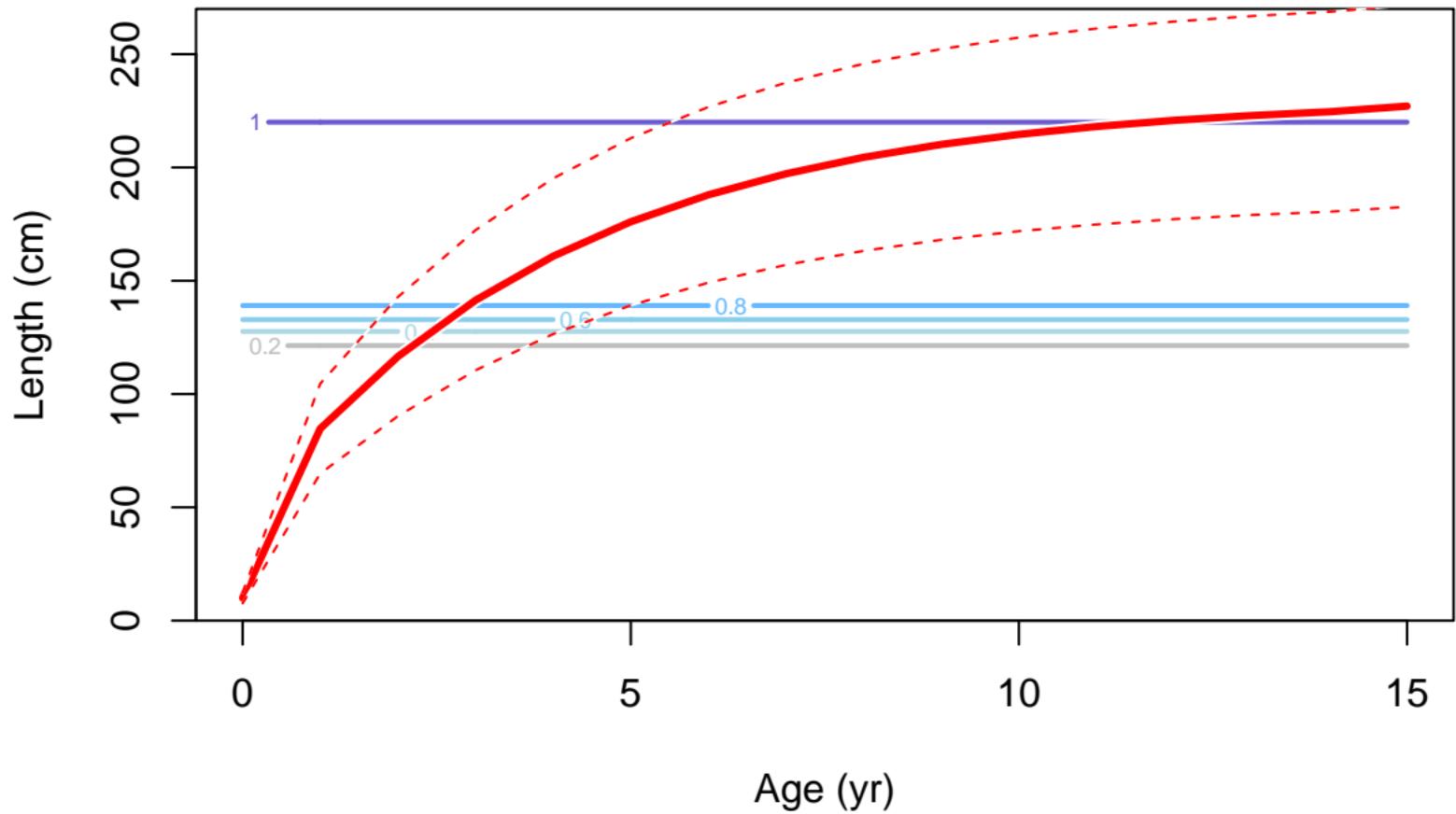


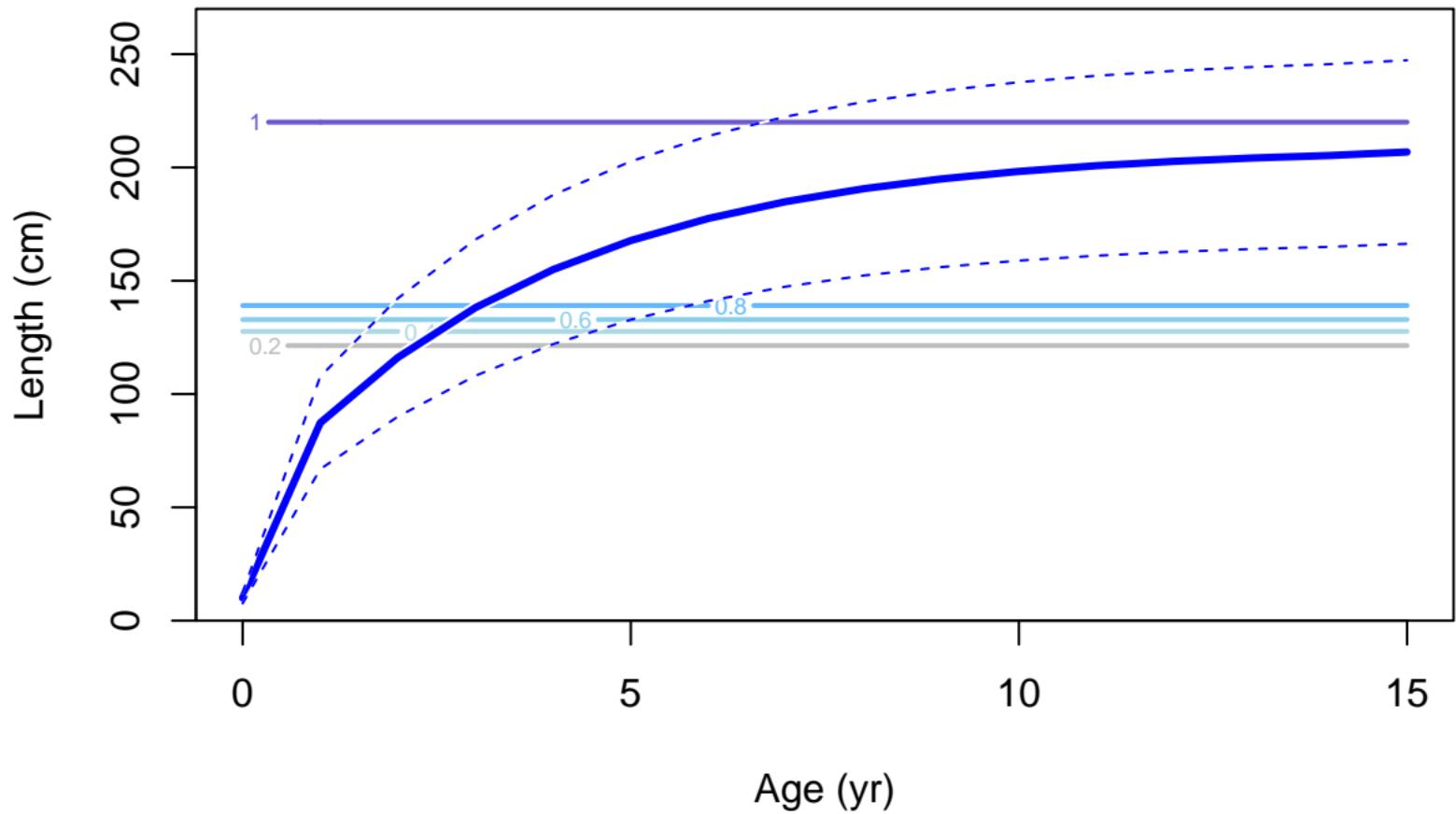


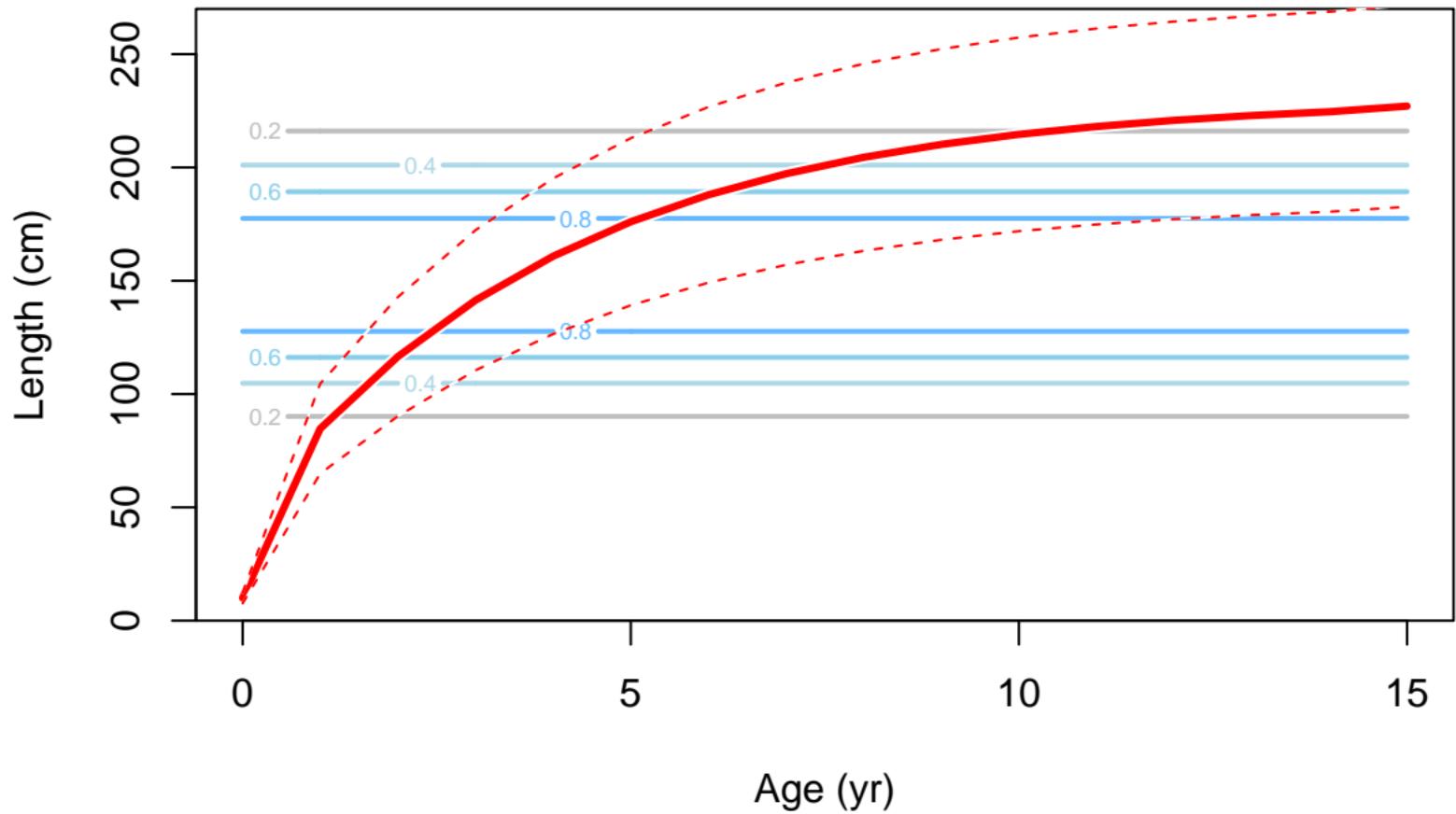


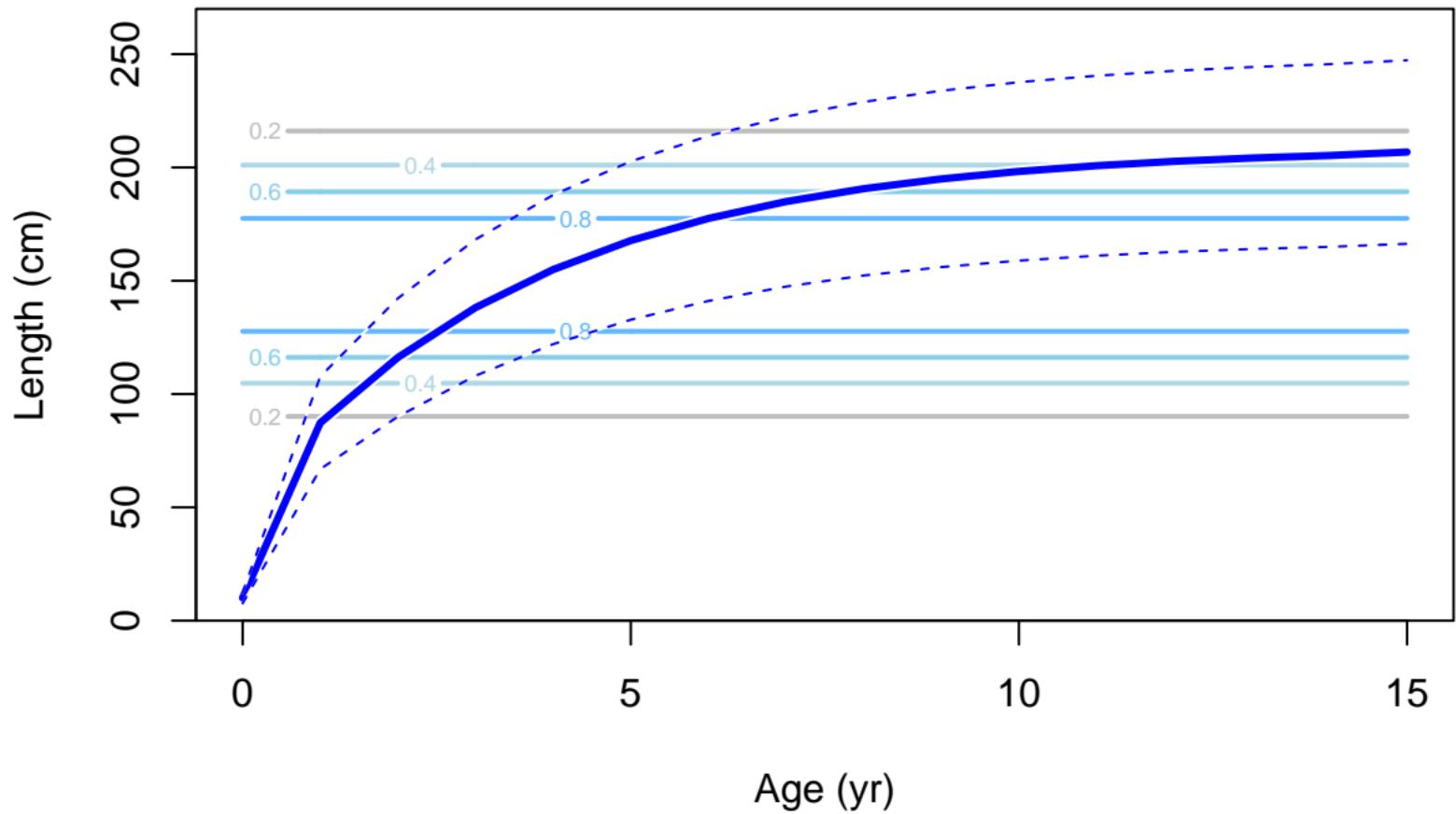


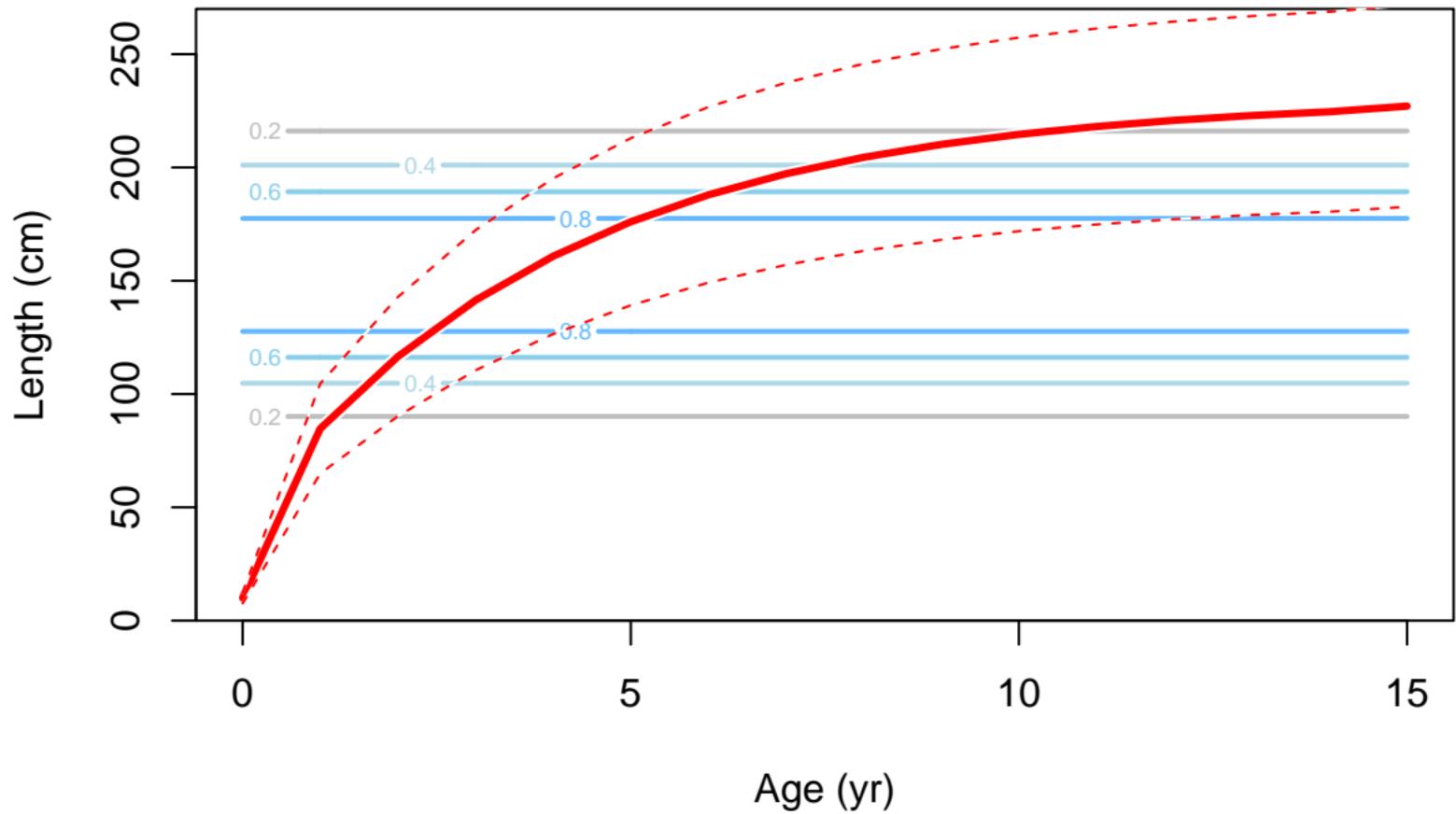


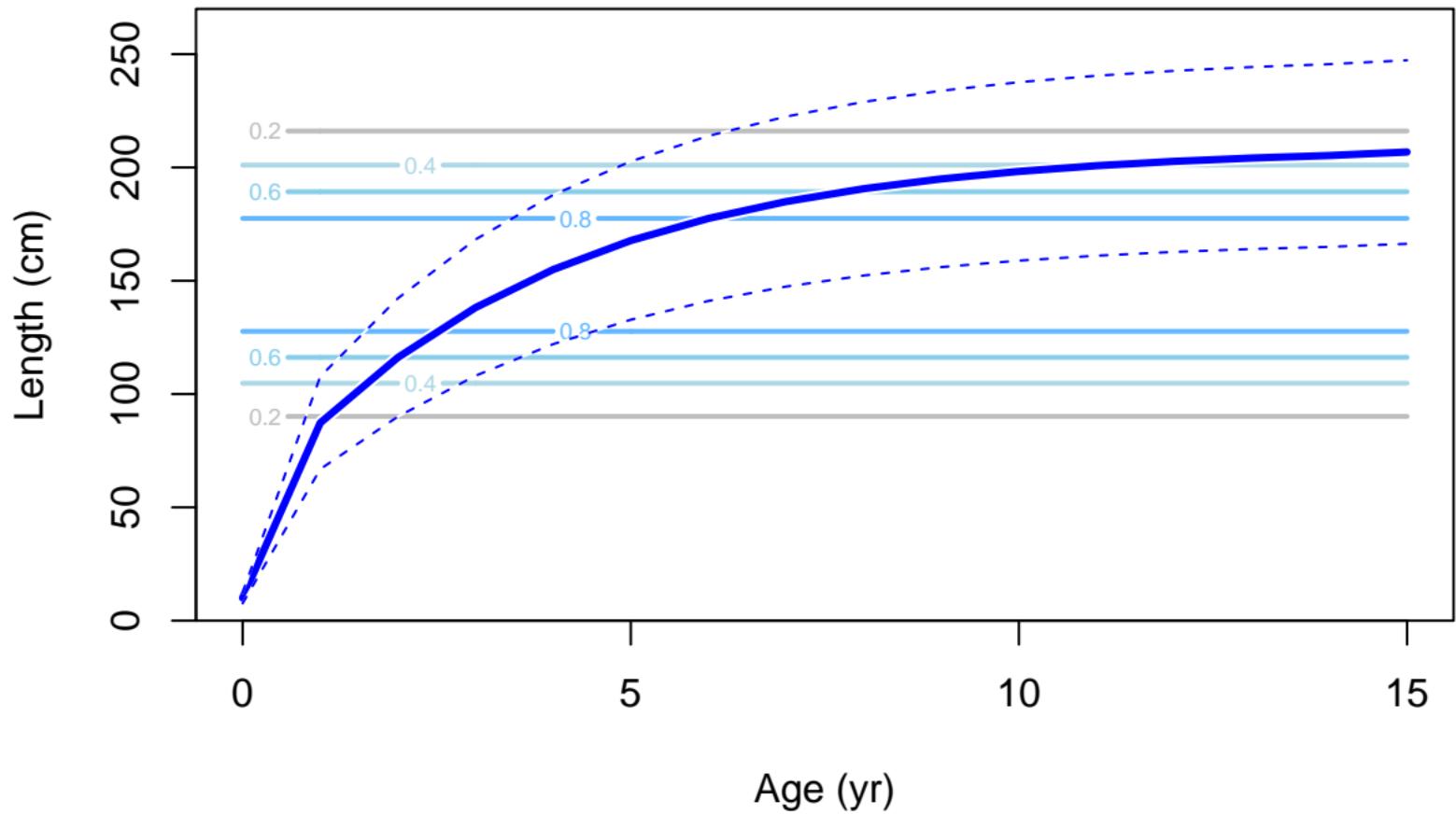


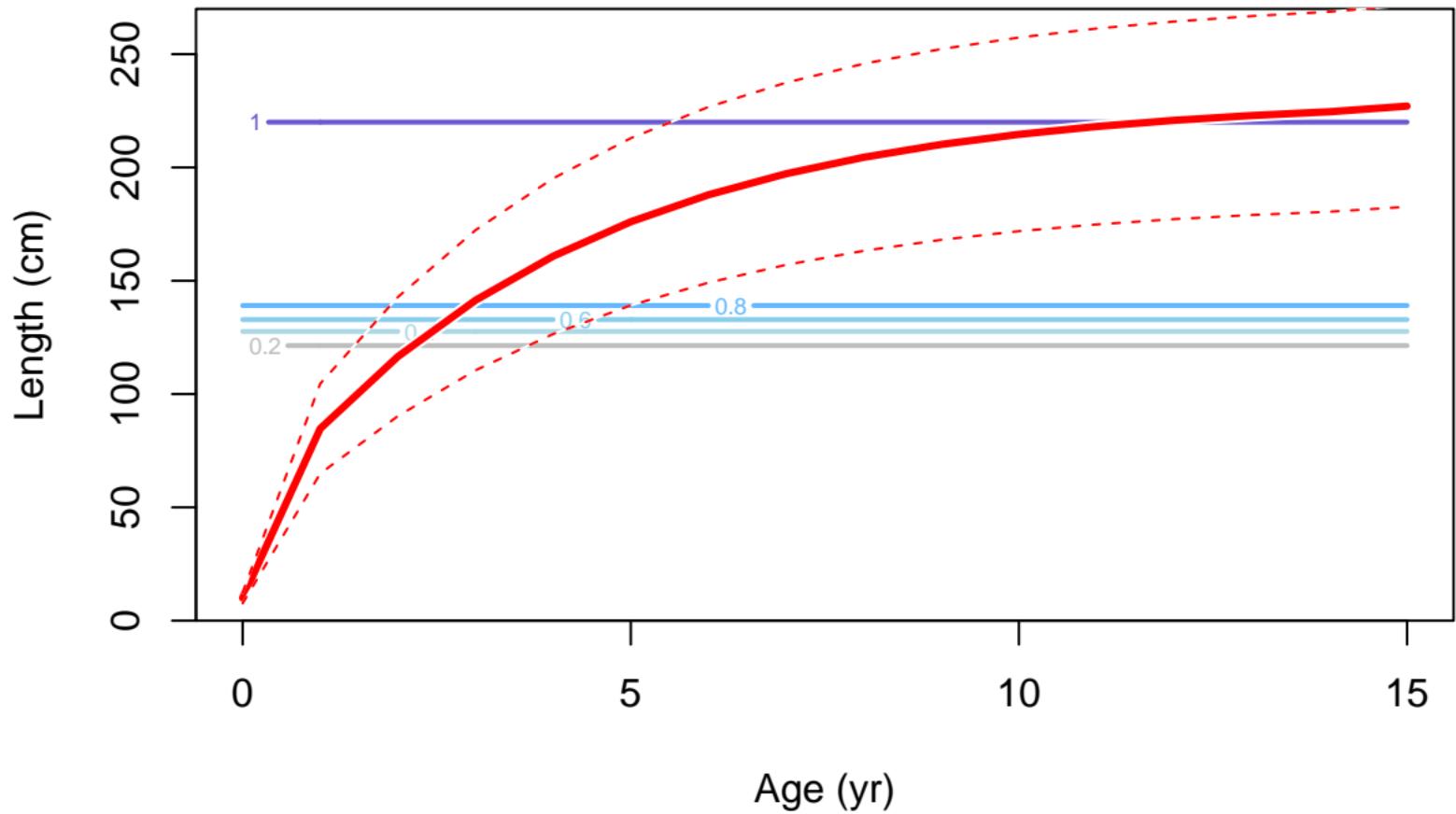


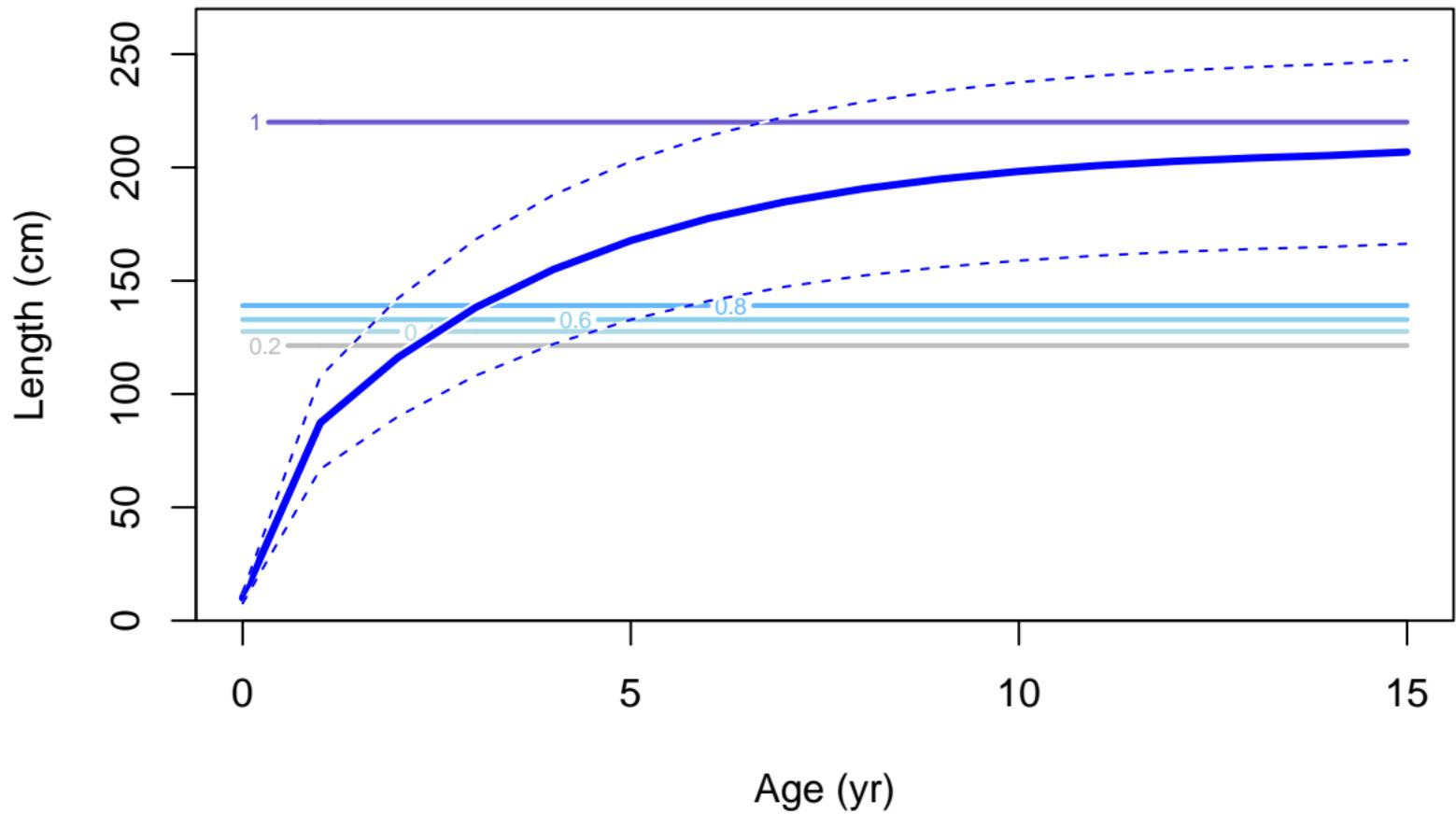


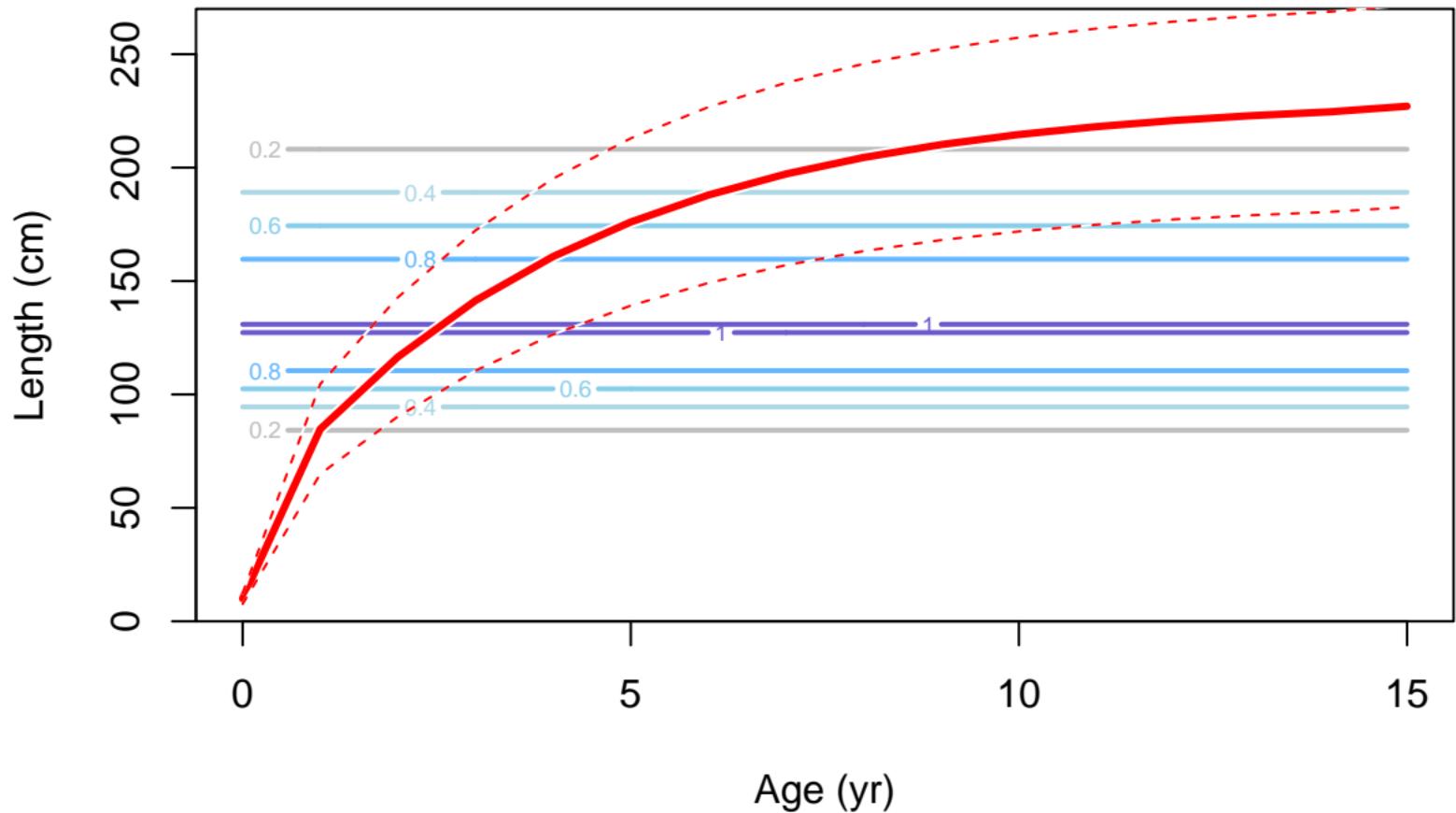


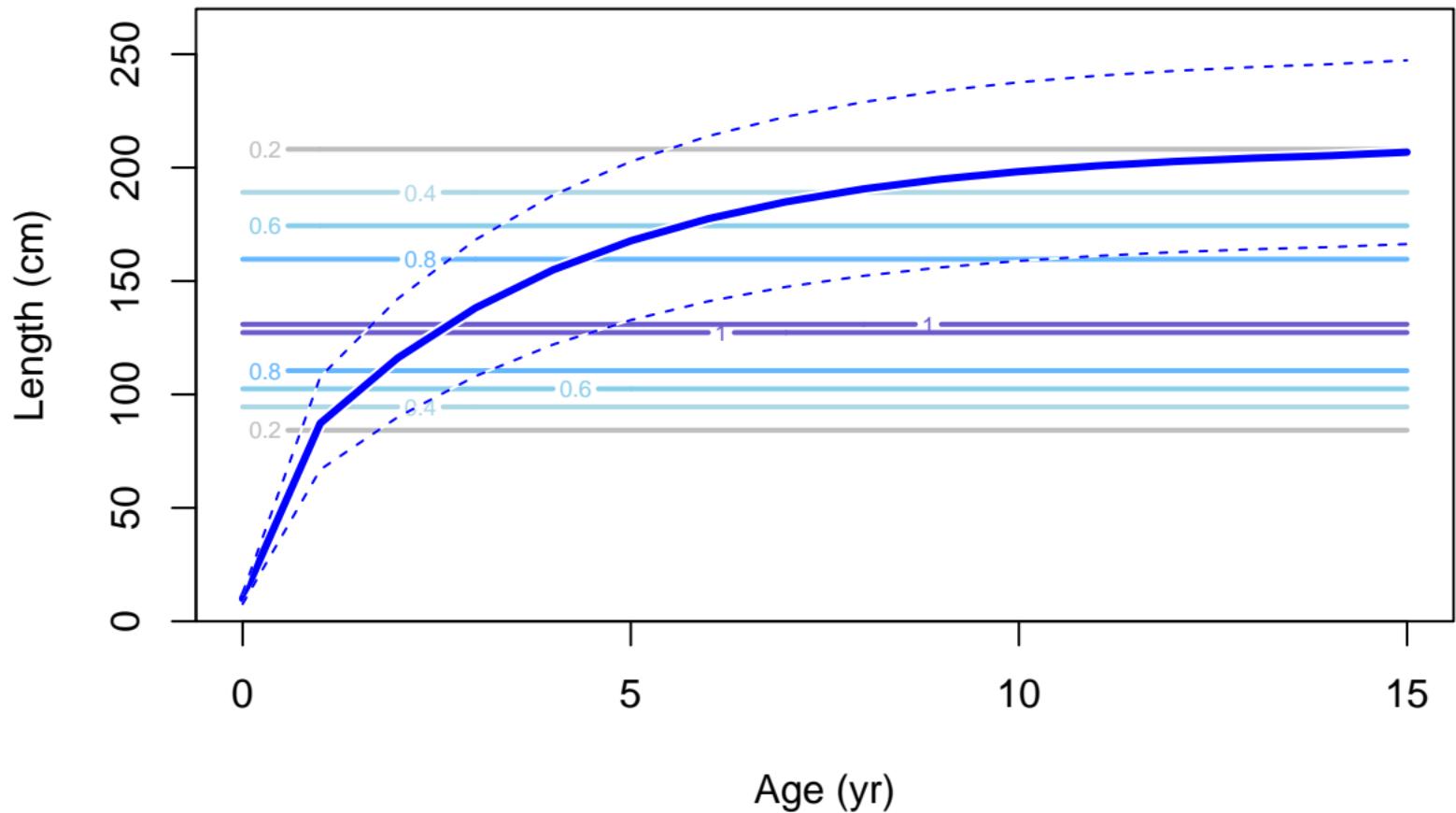


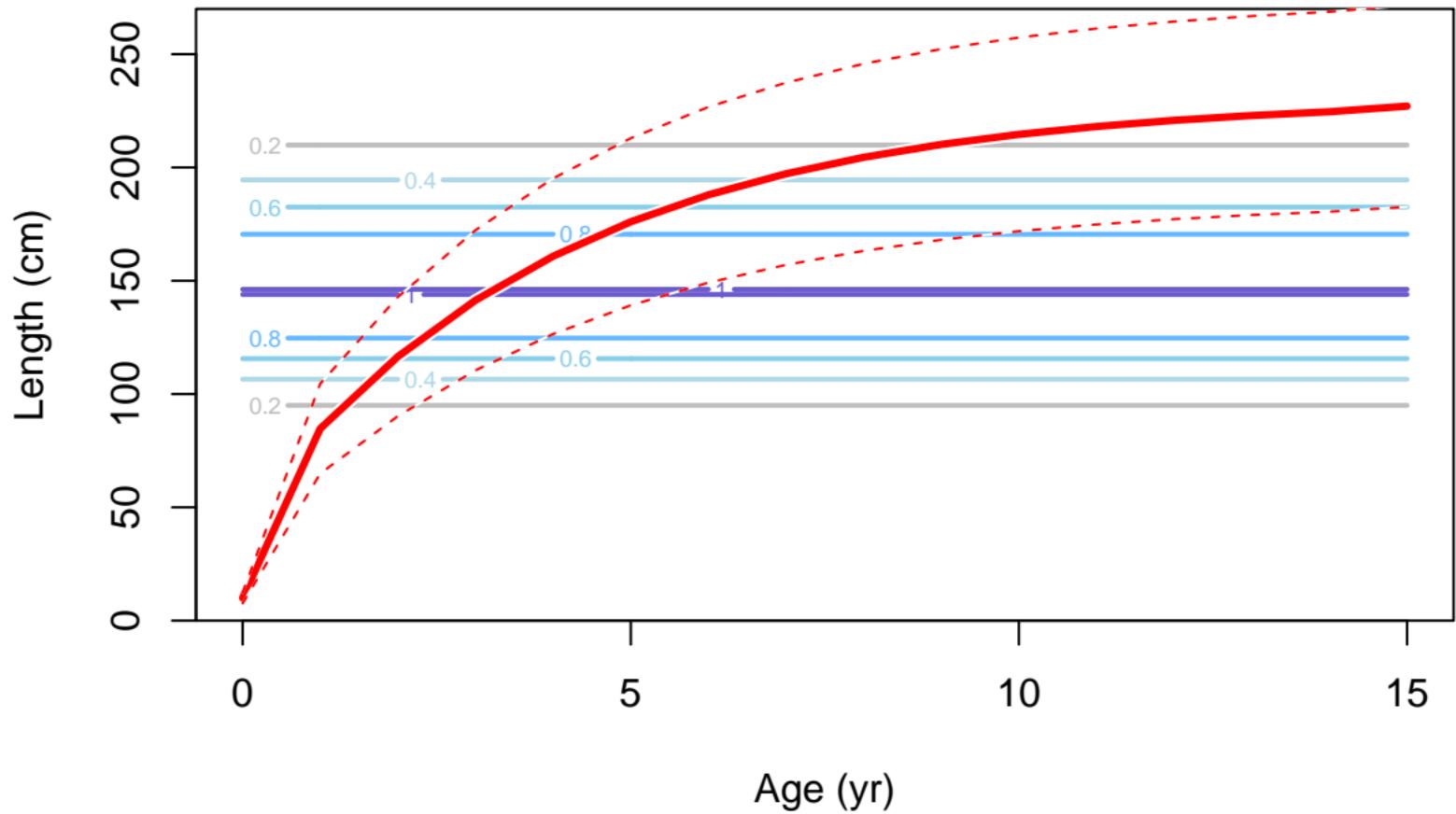


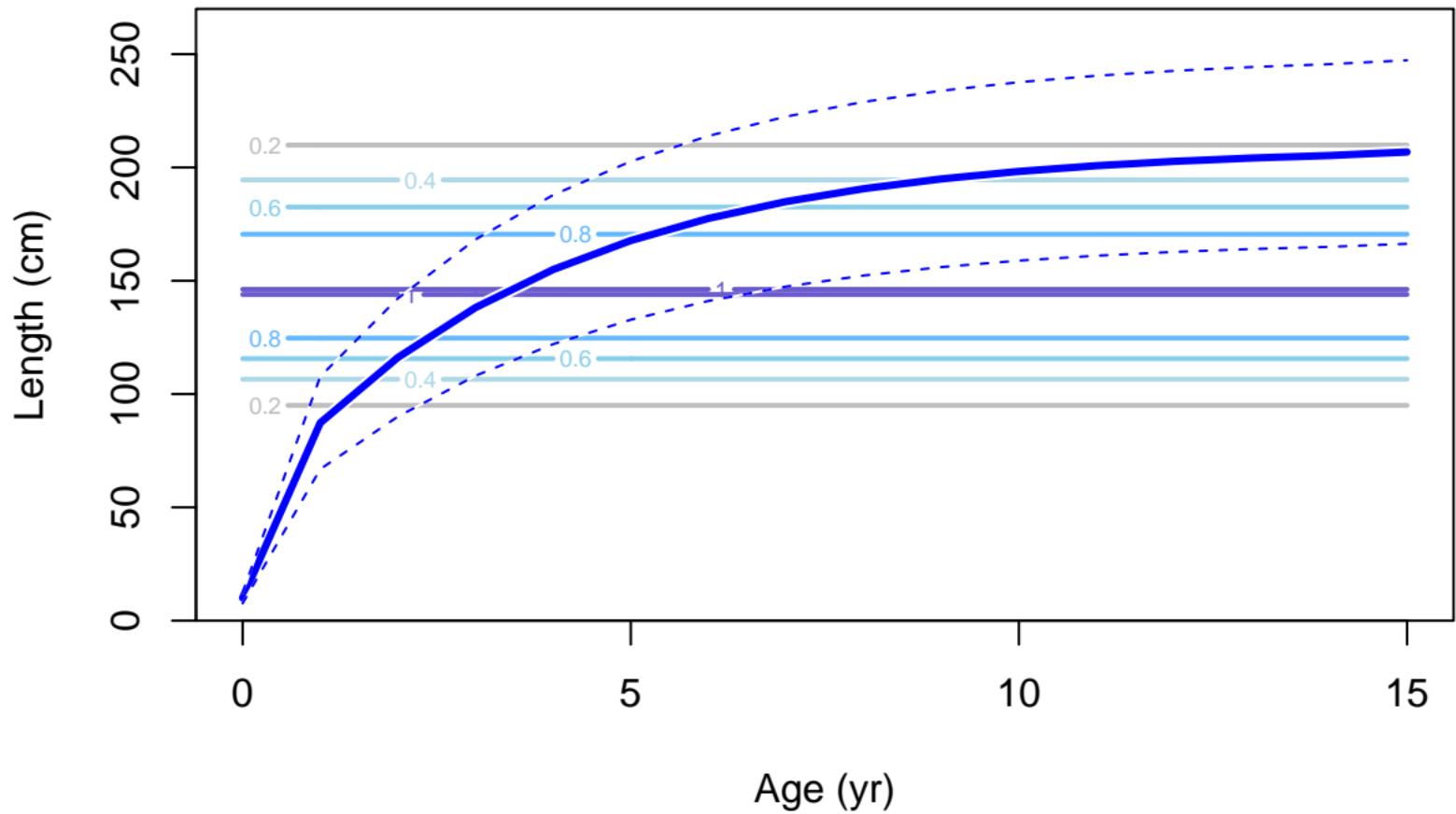


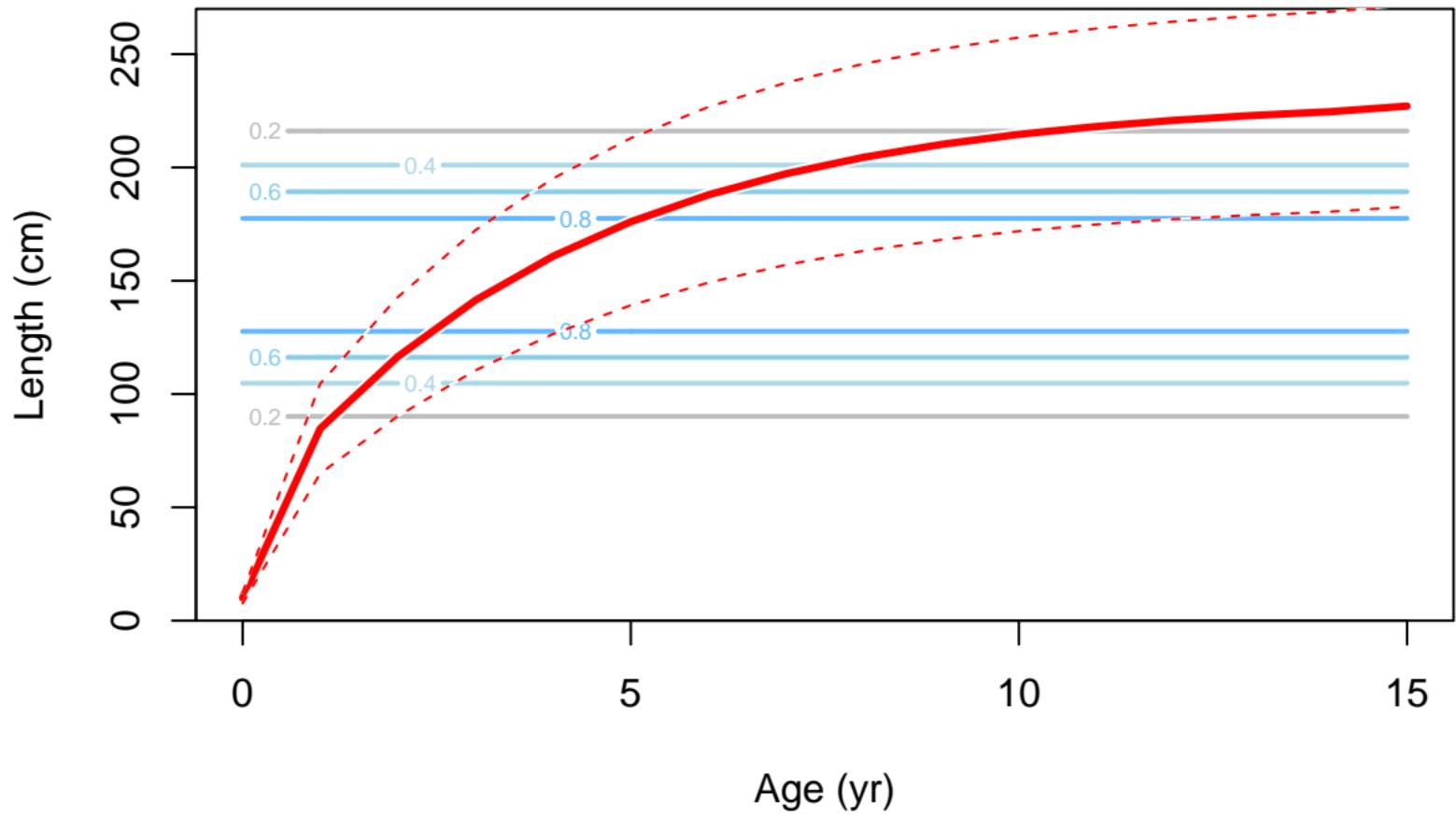


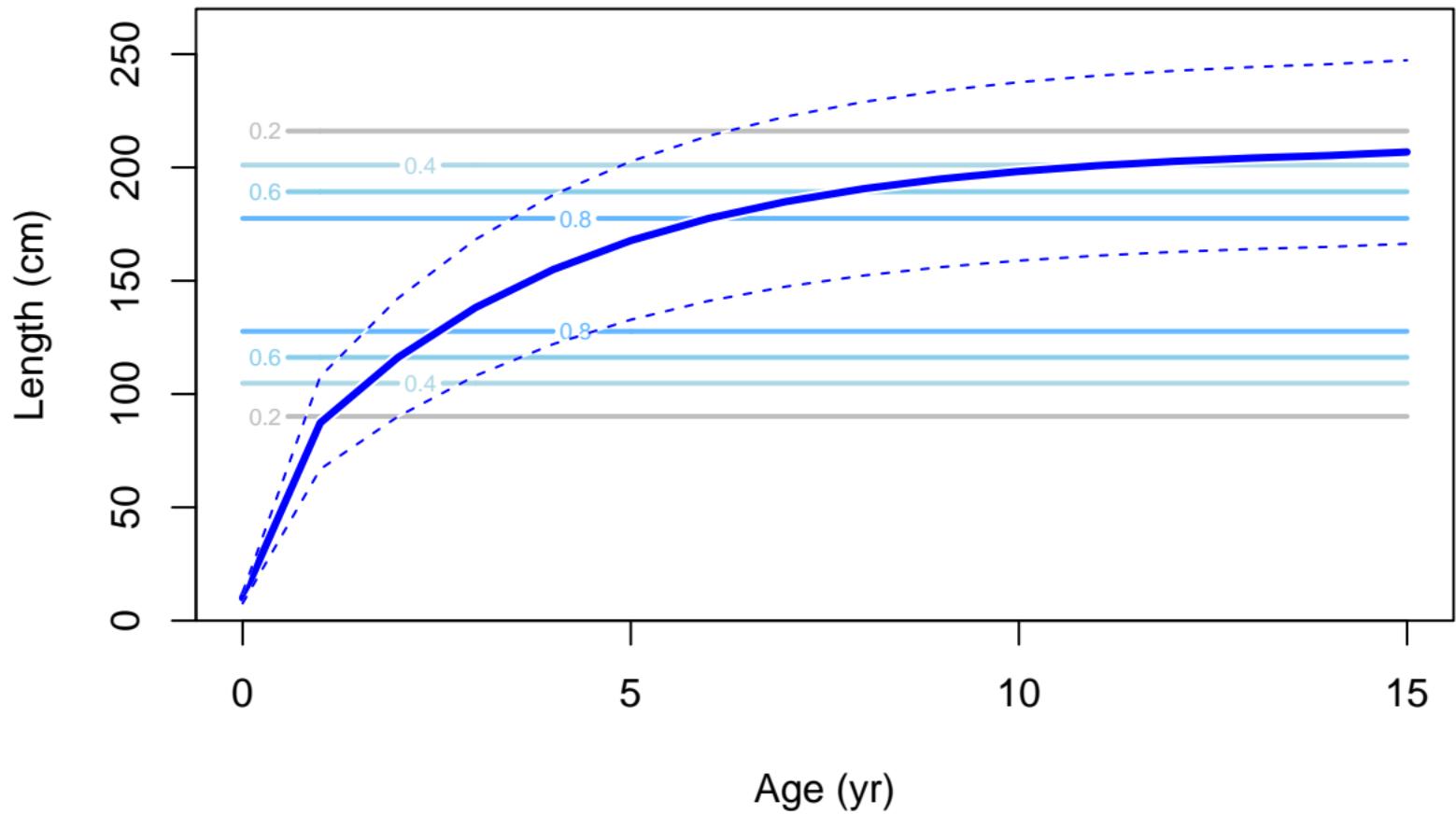


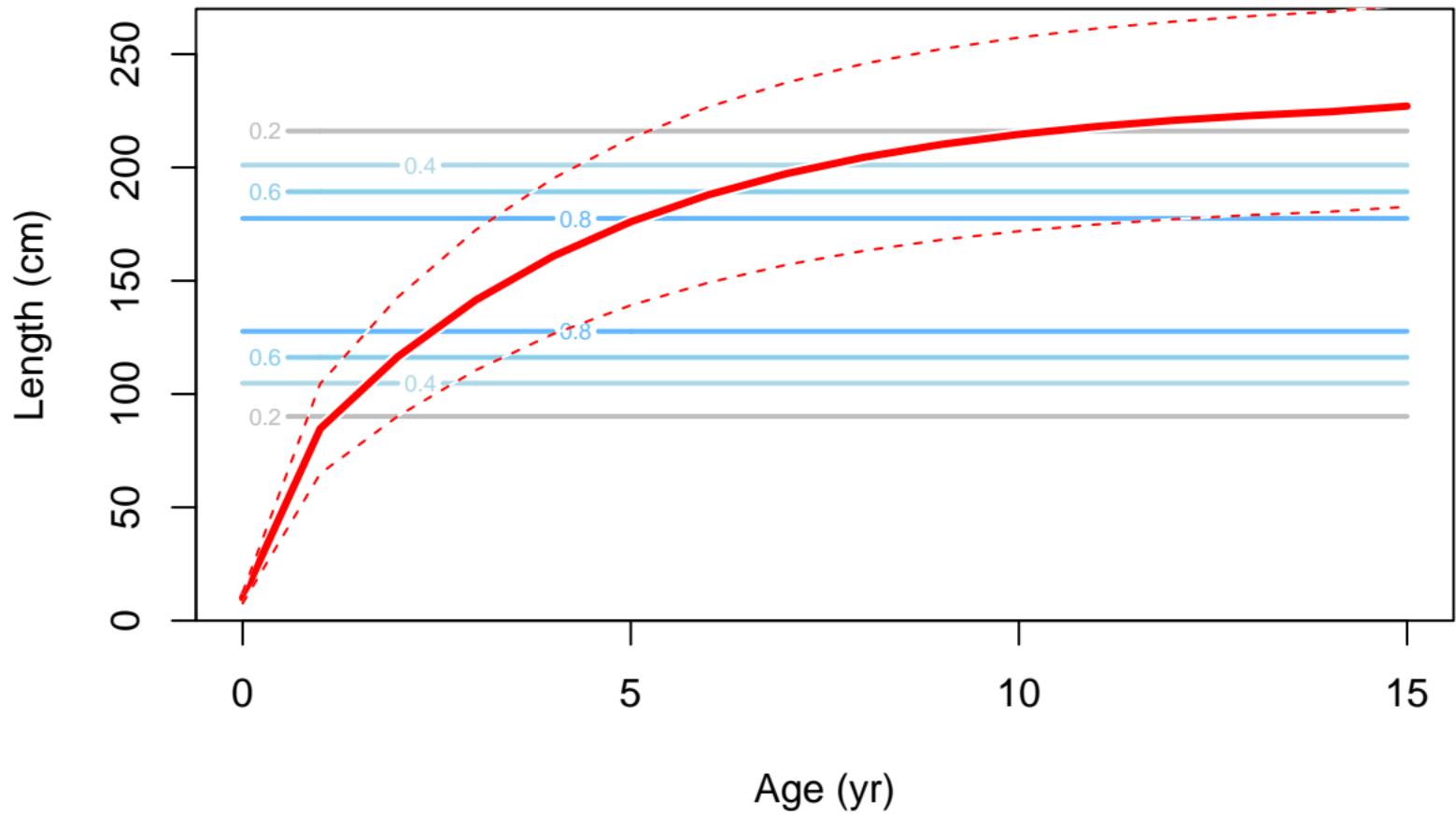


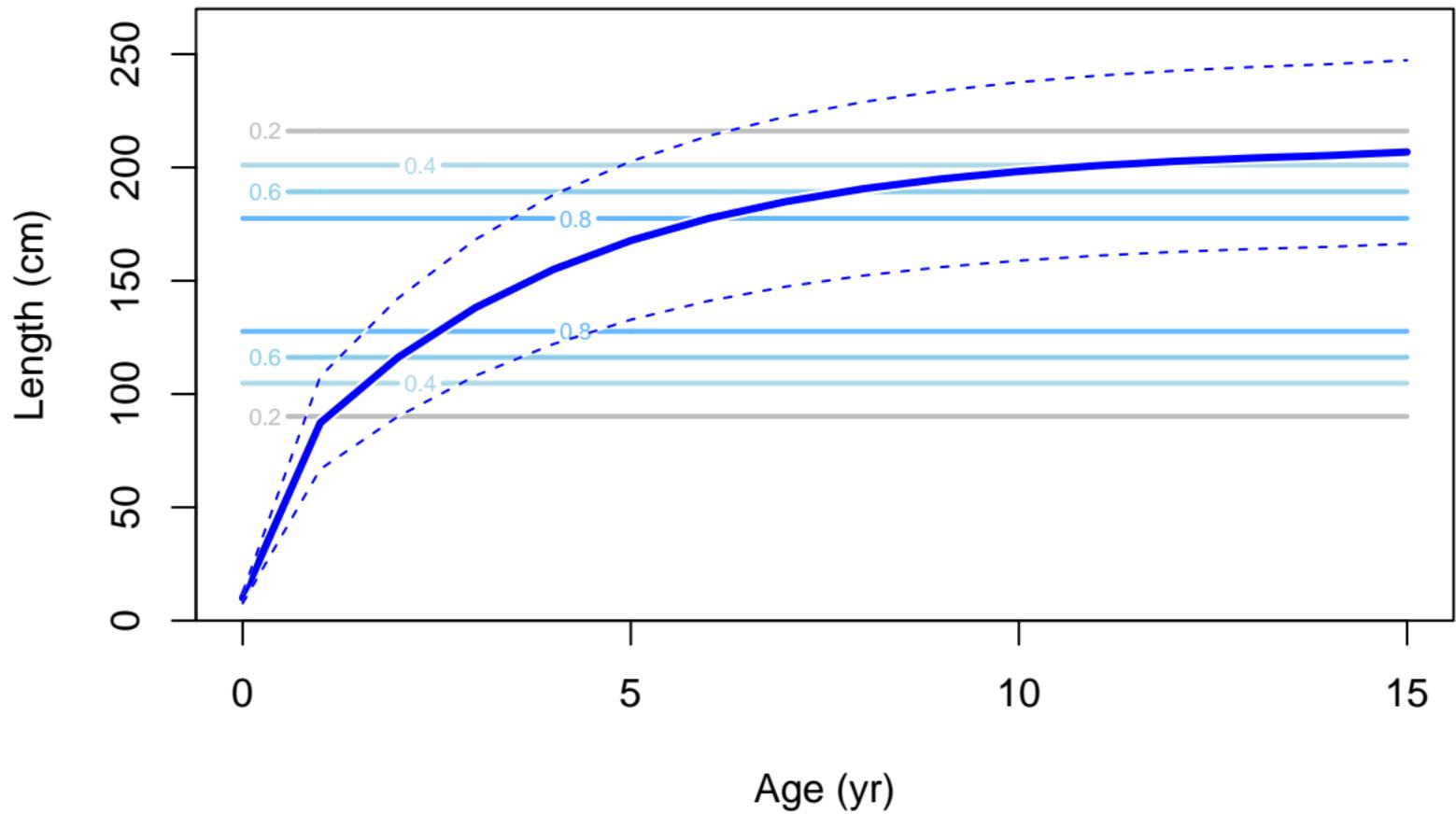


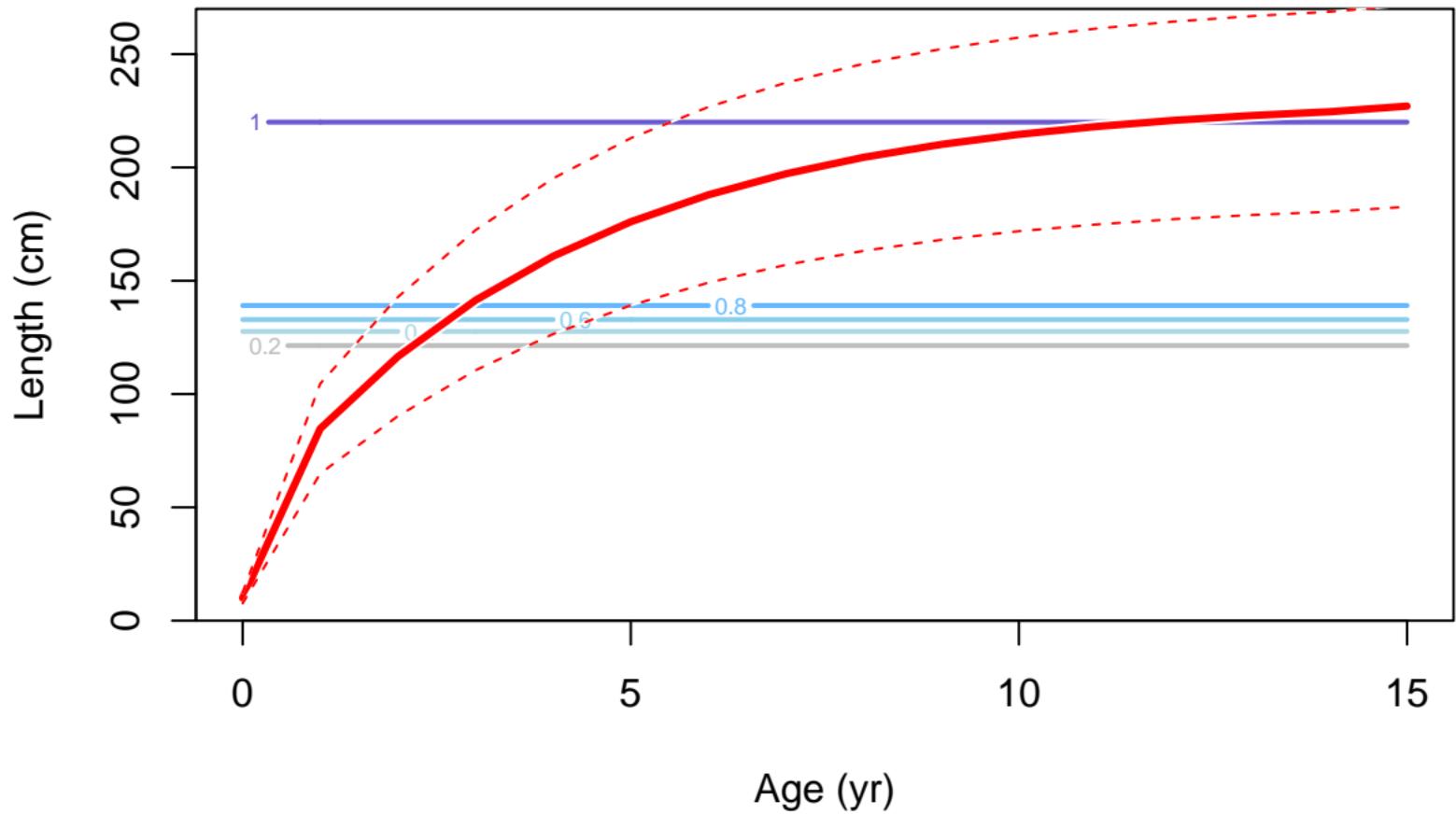


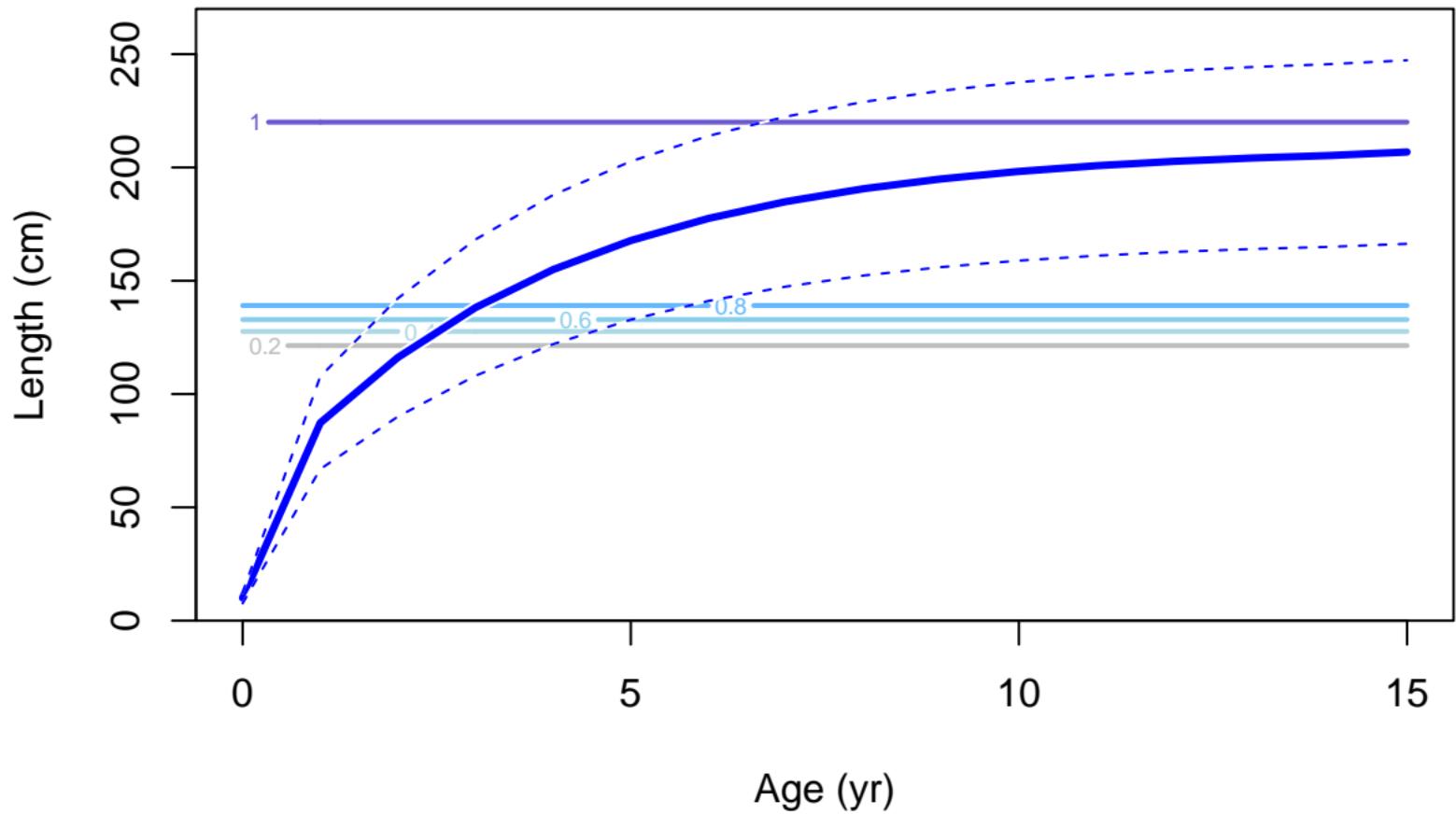


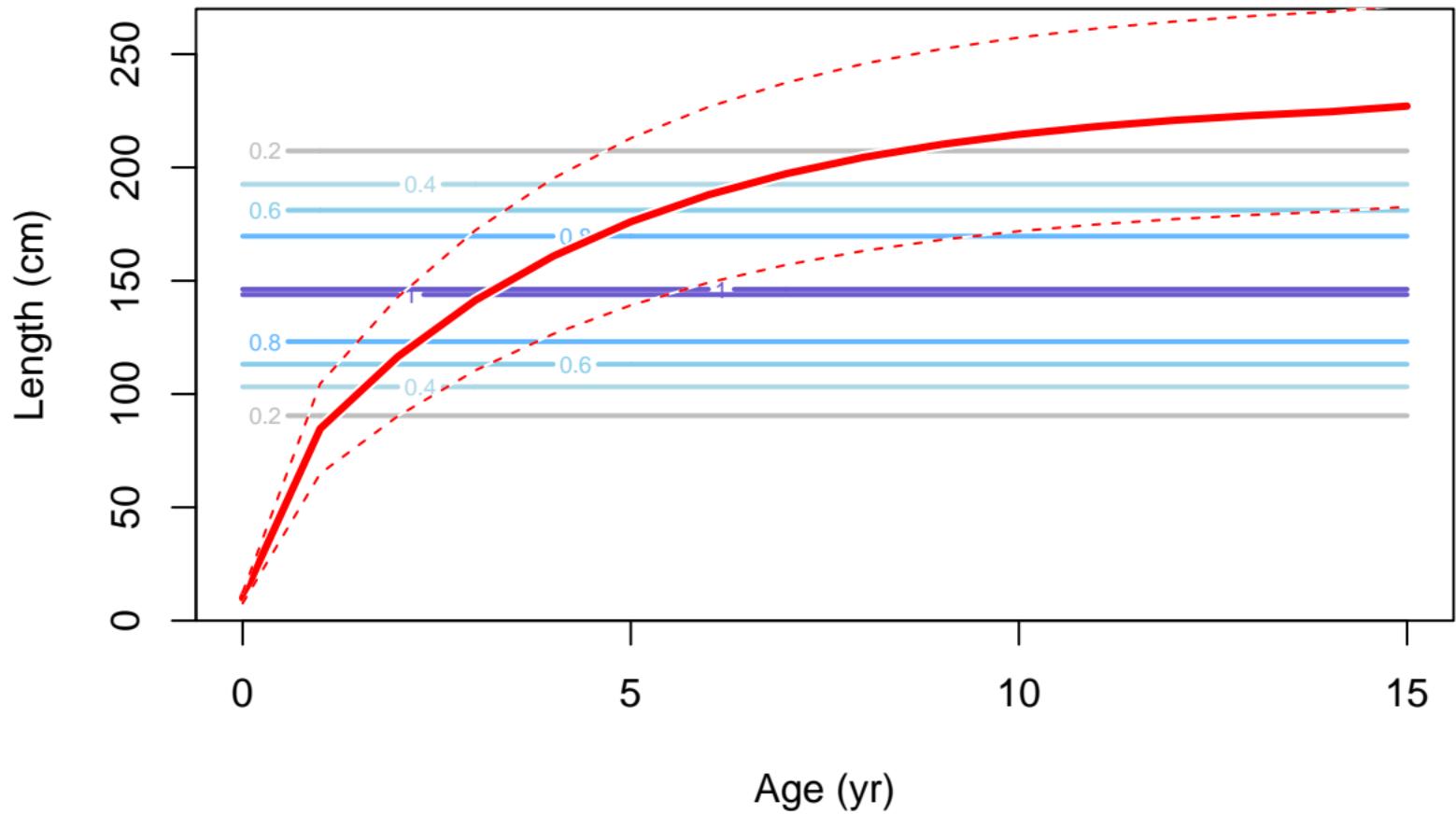


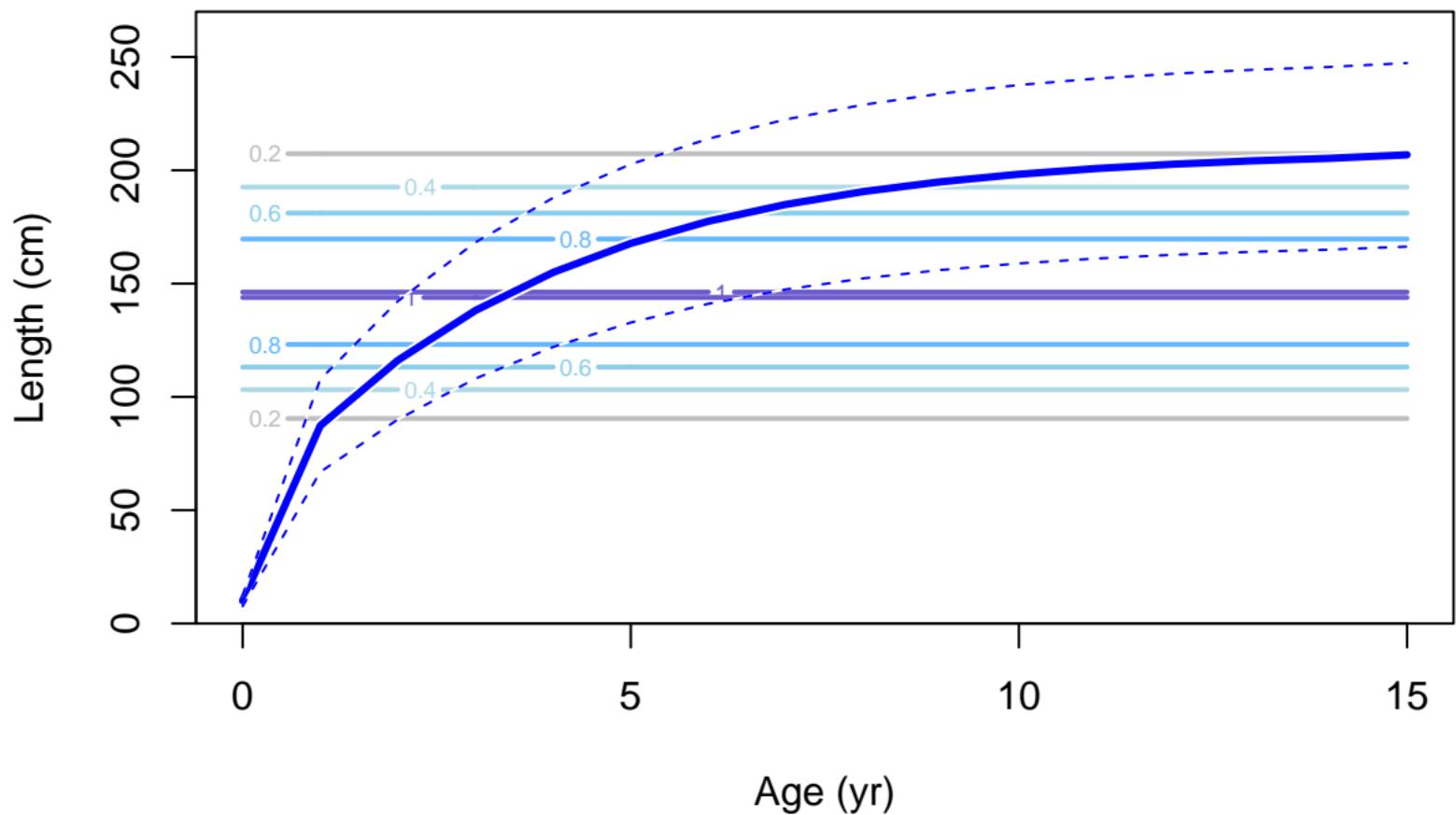


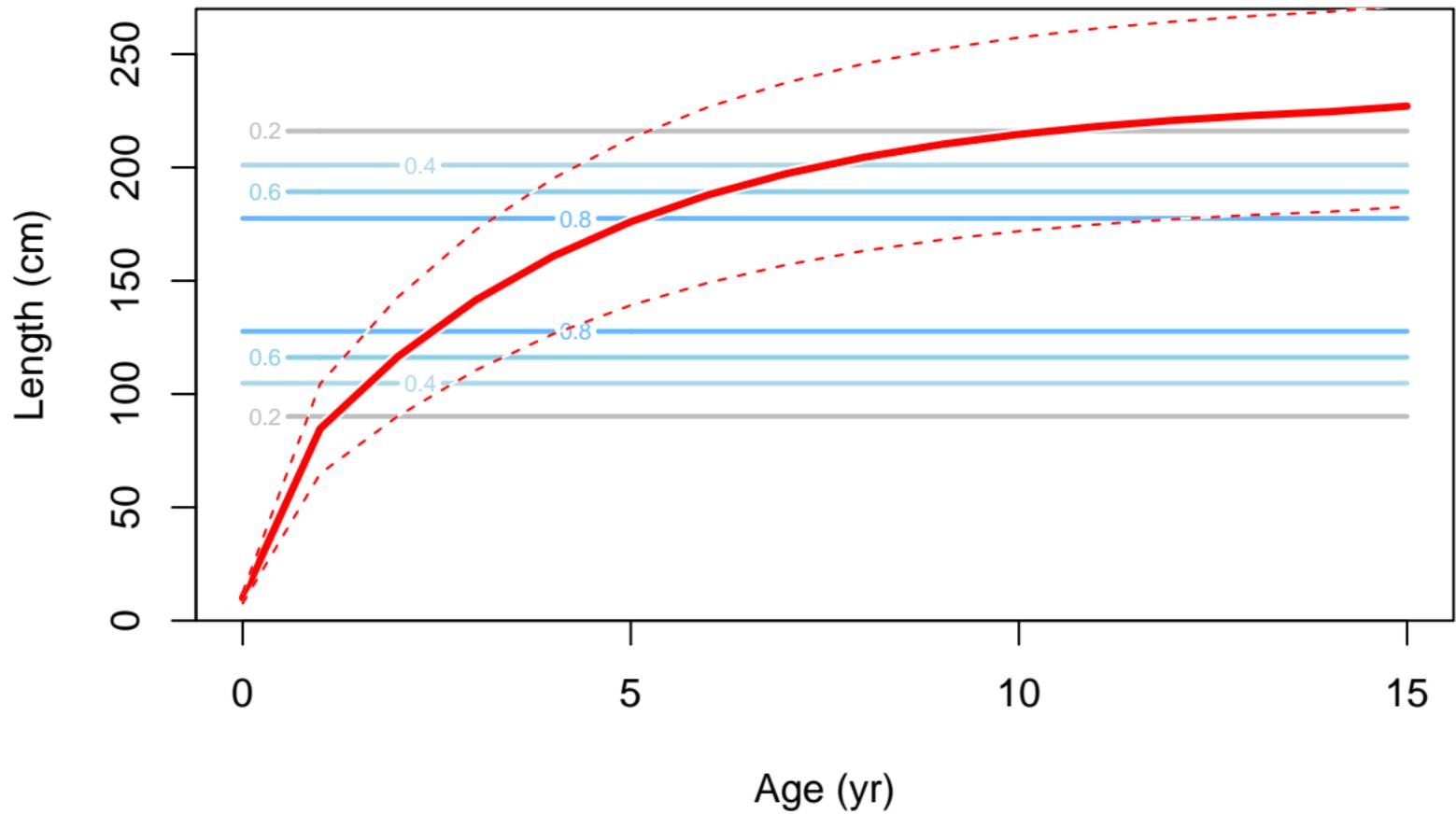


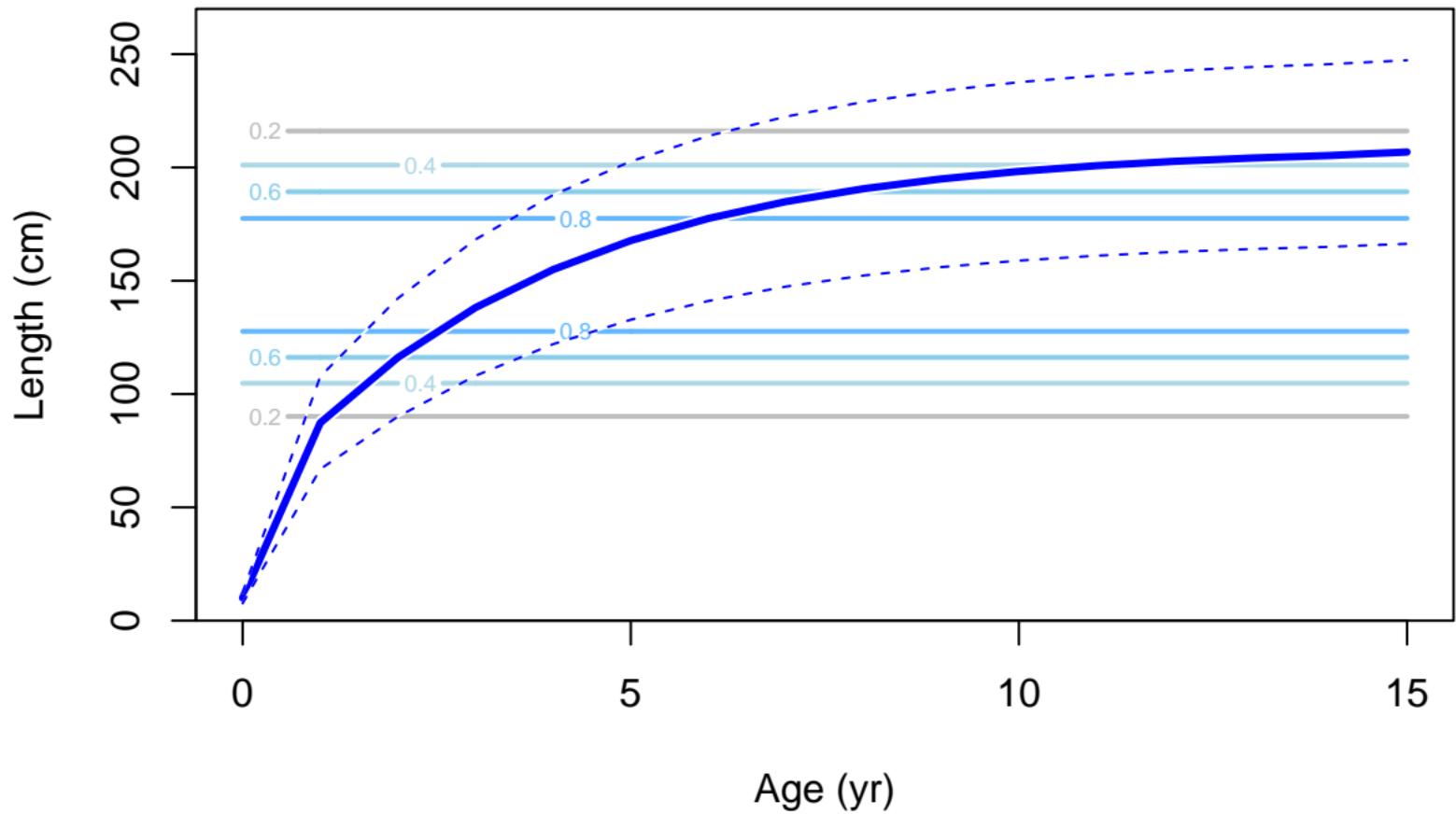


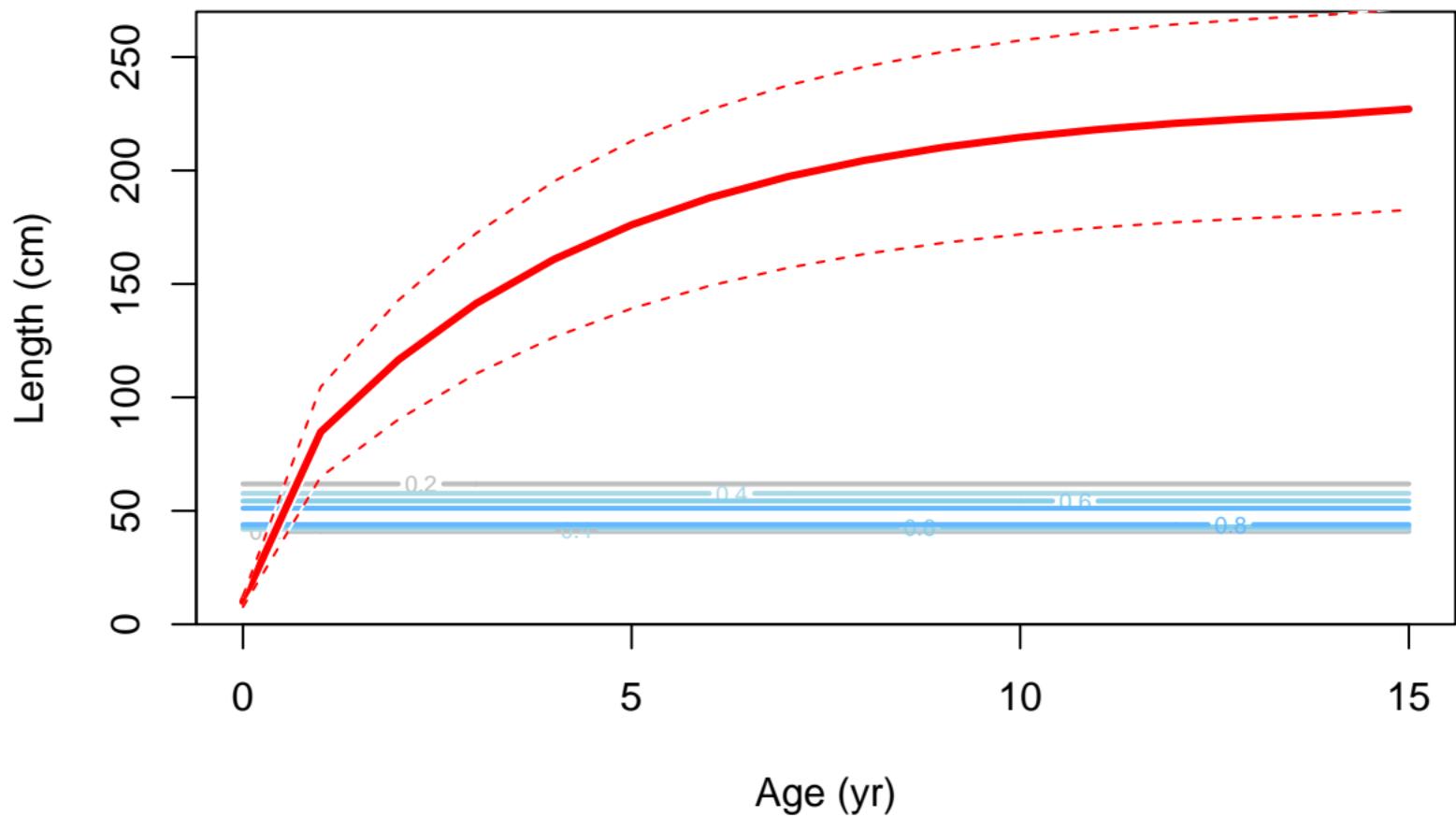


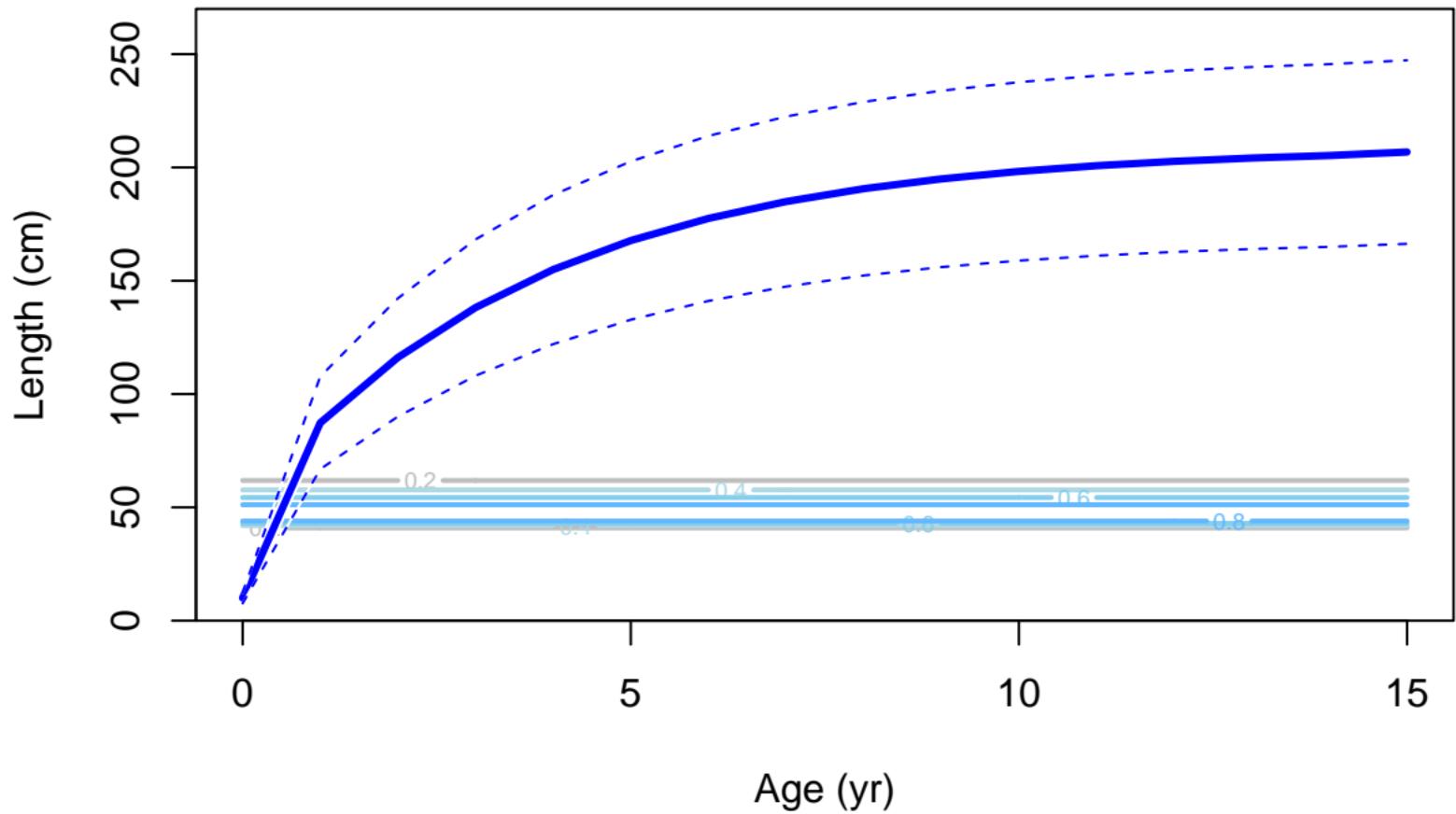


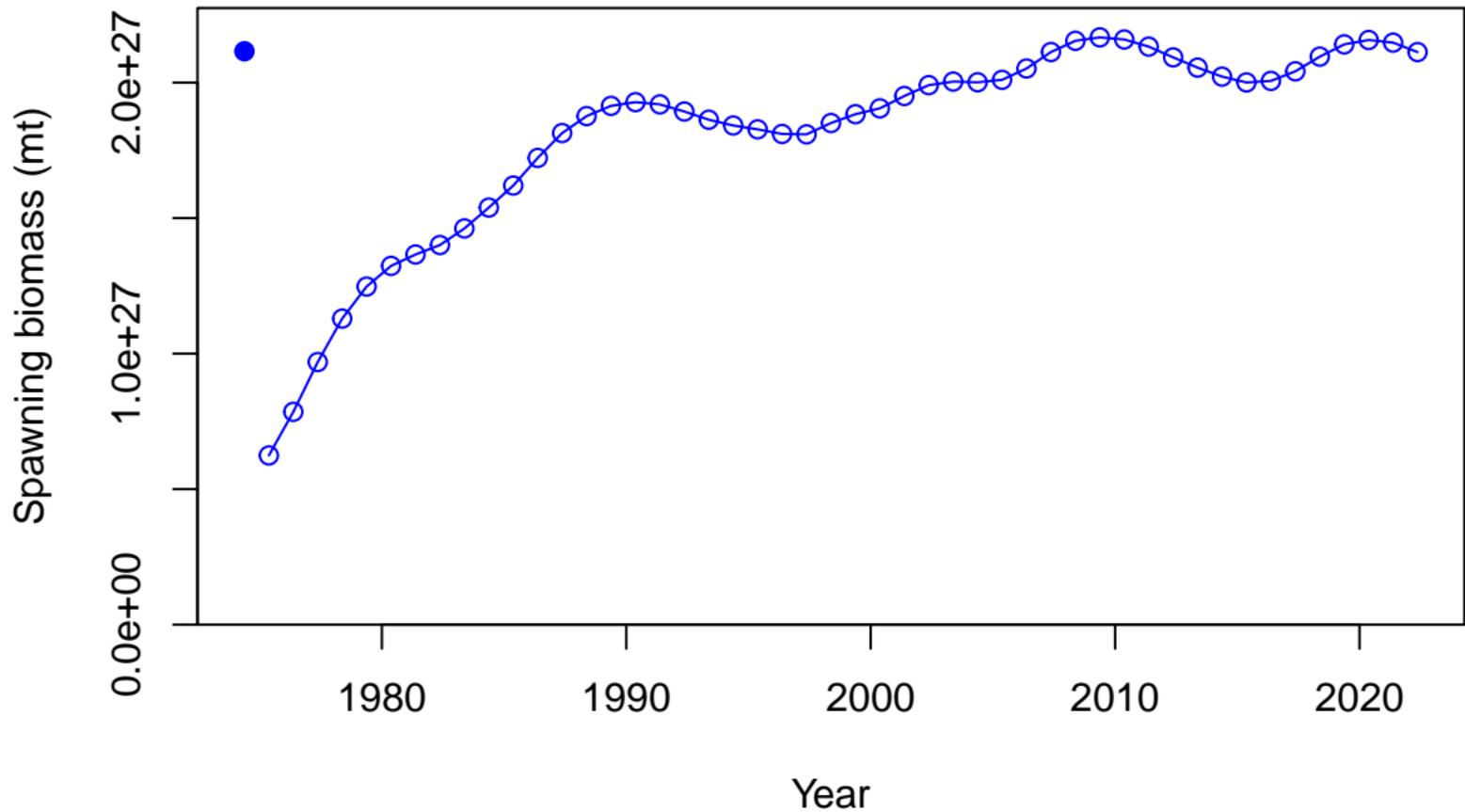


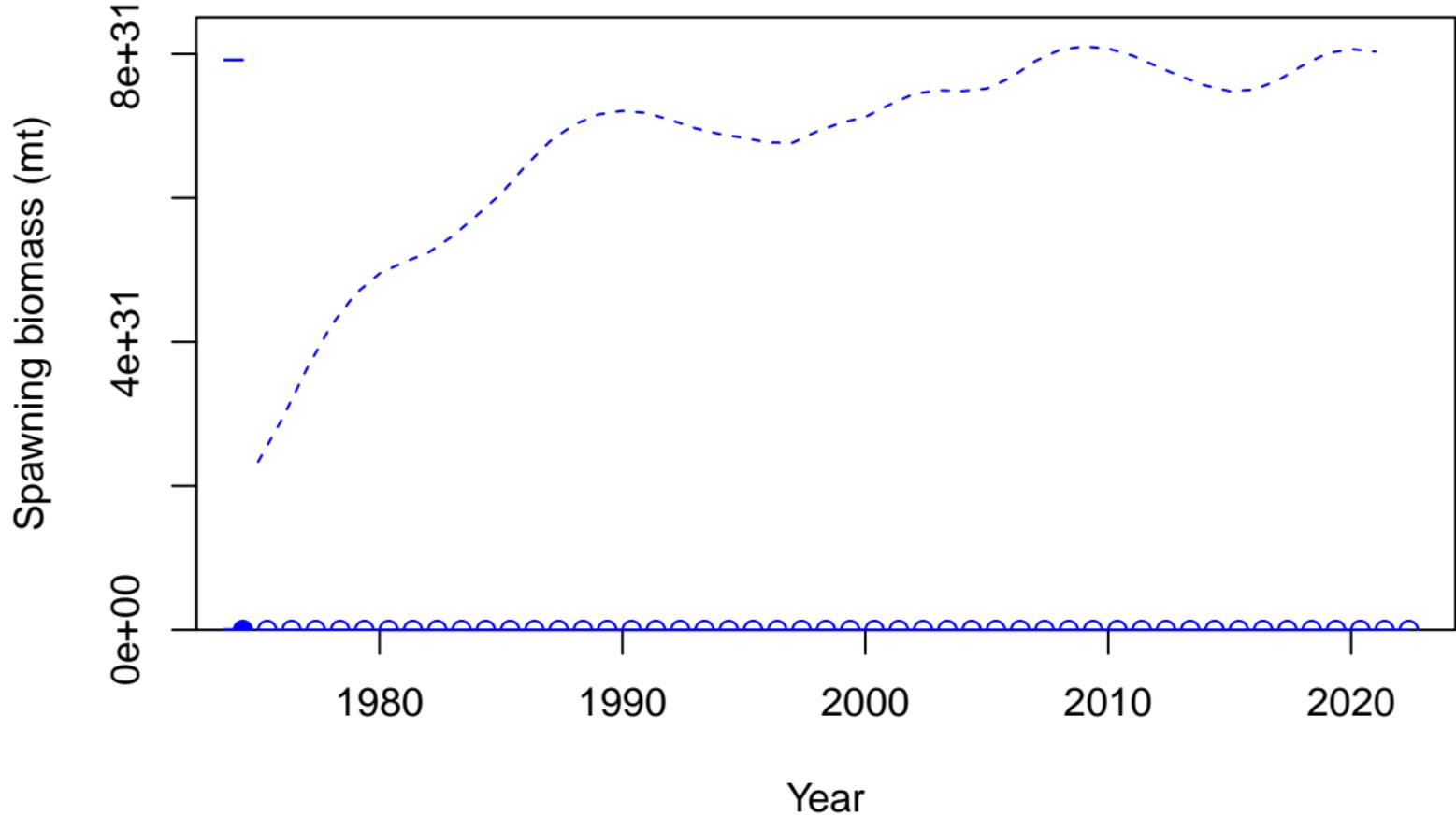




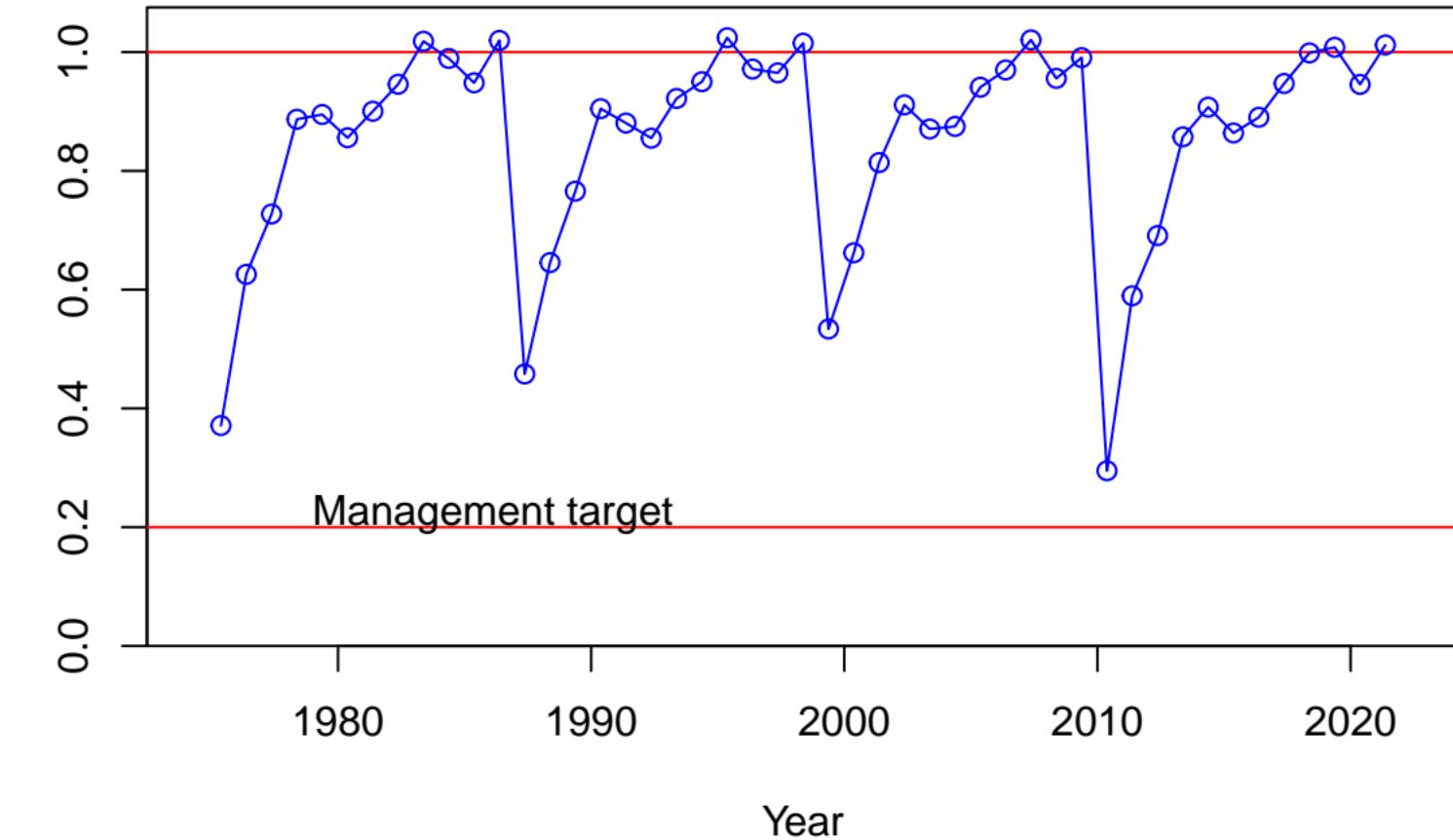




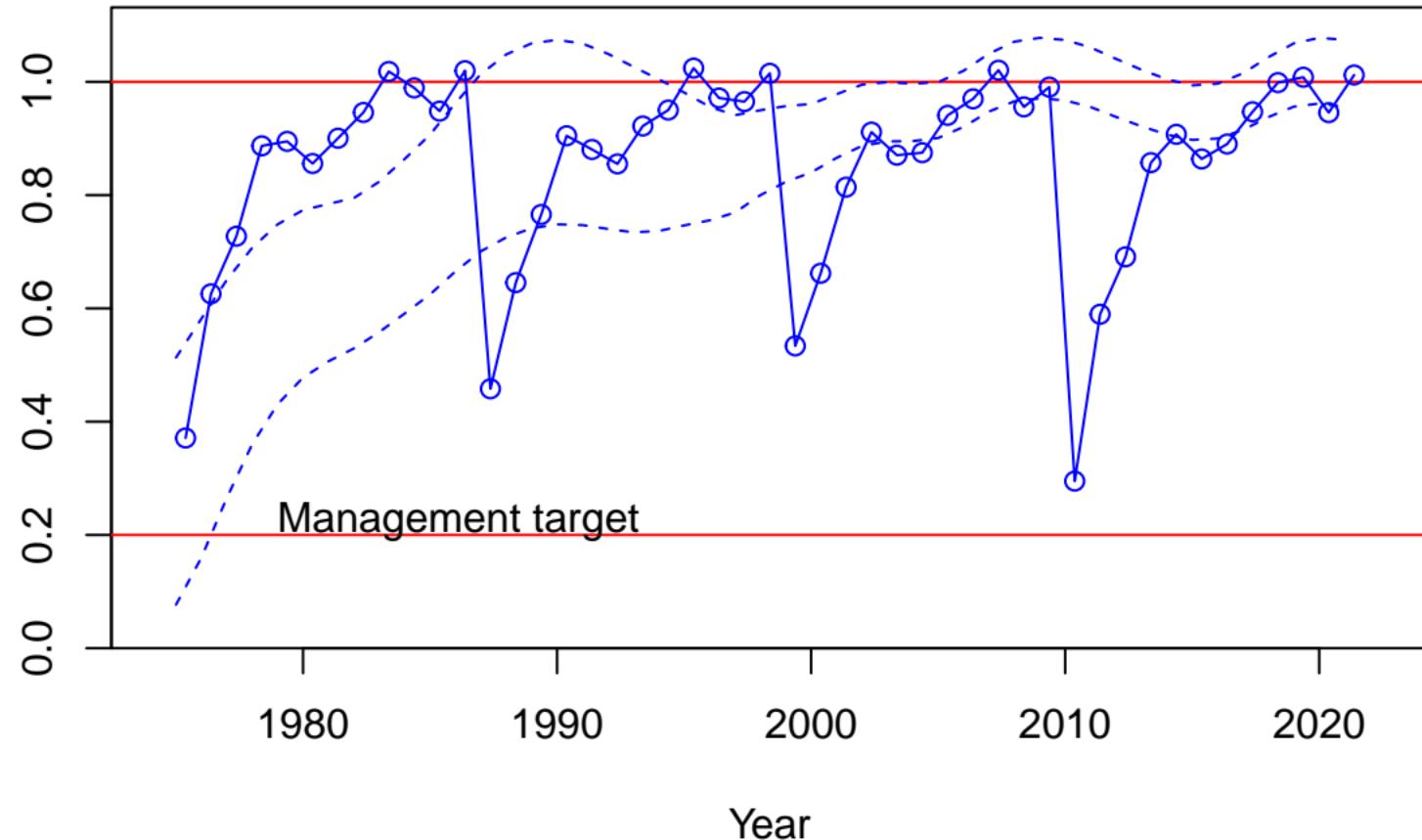


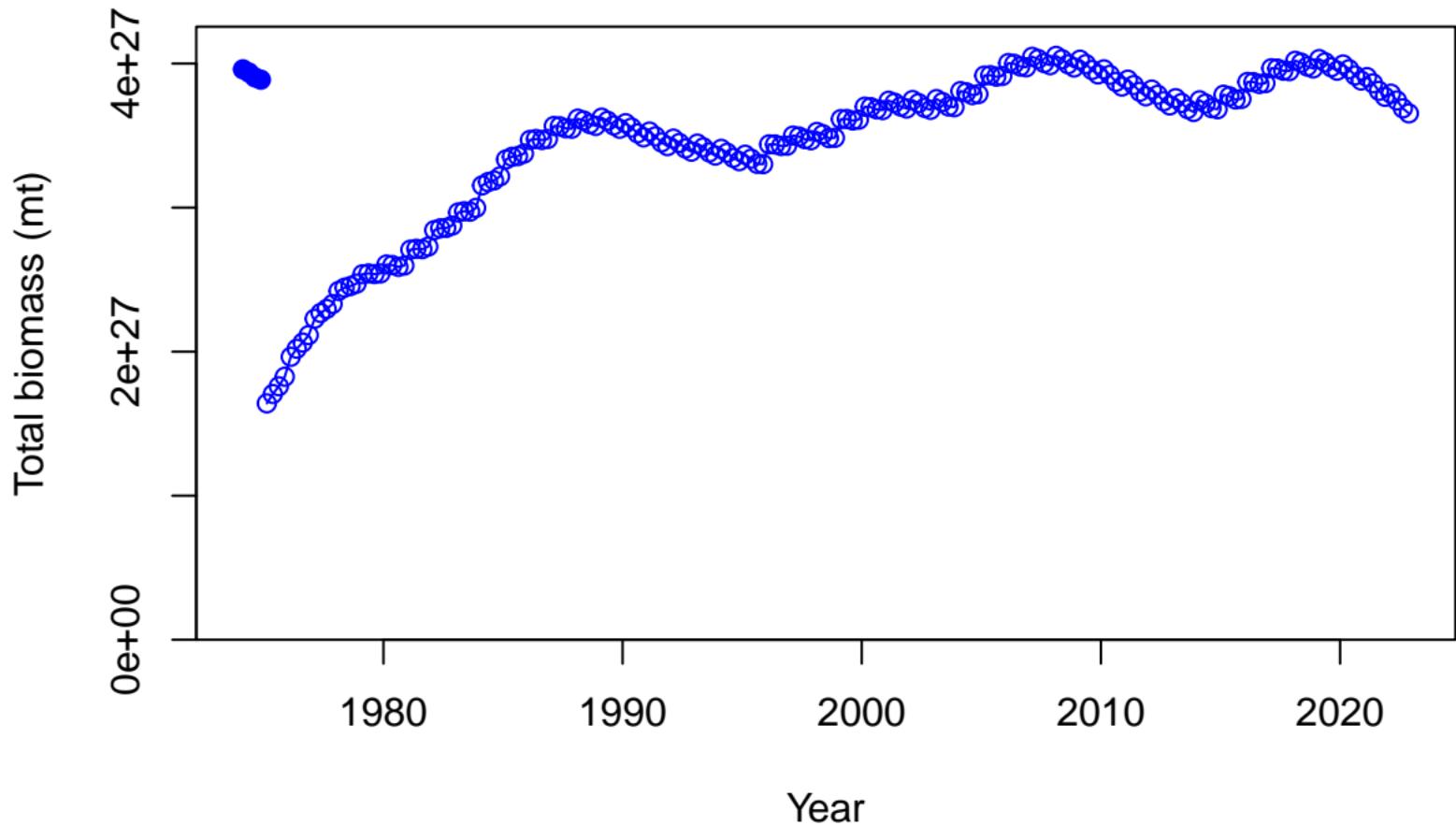


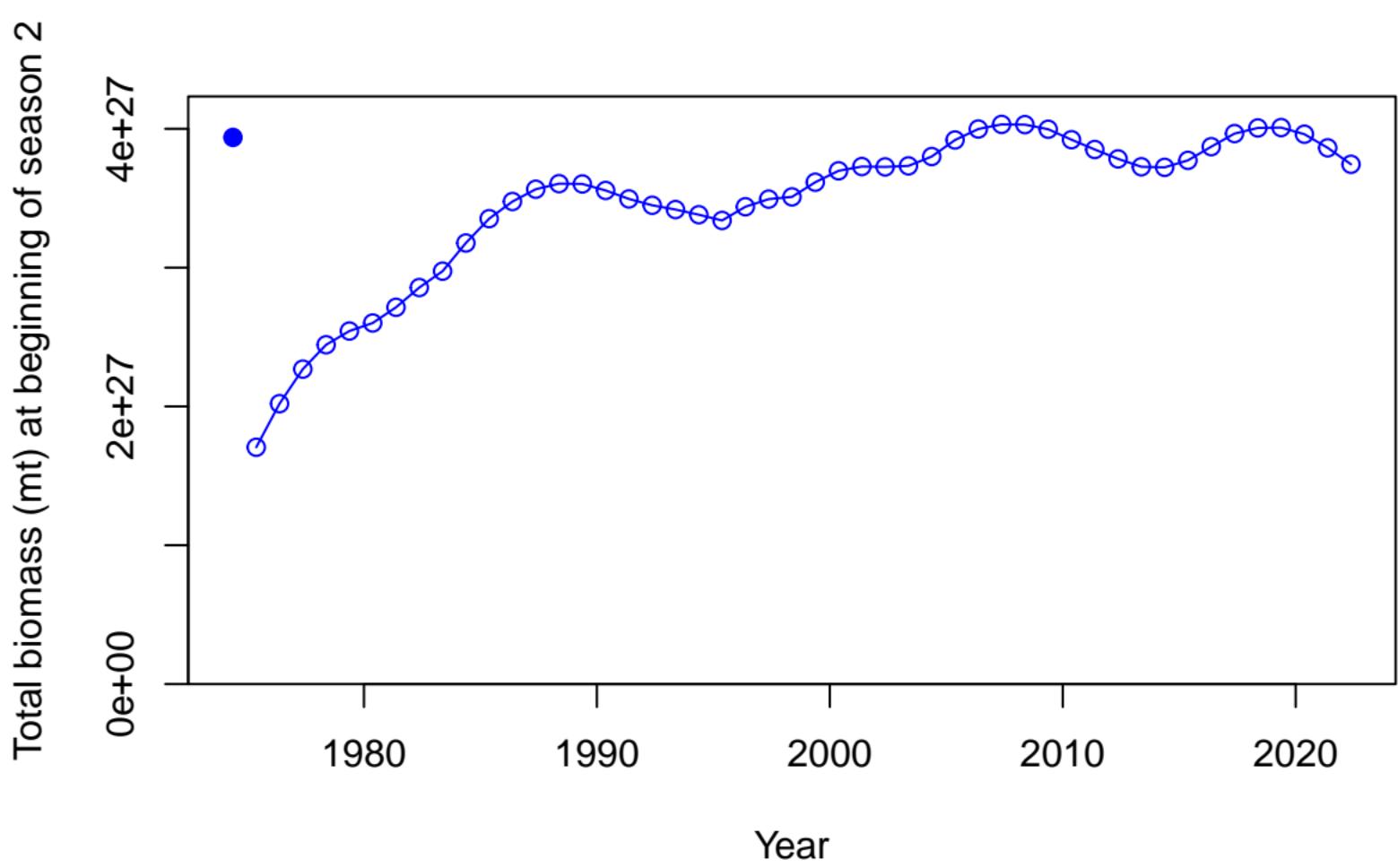
Relative spawning biomass: B/B_0

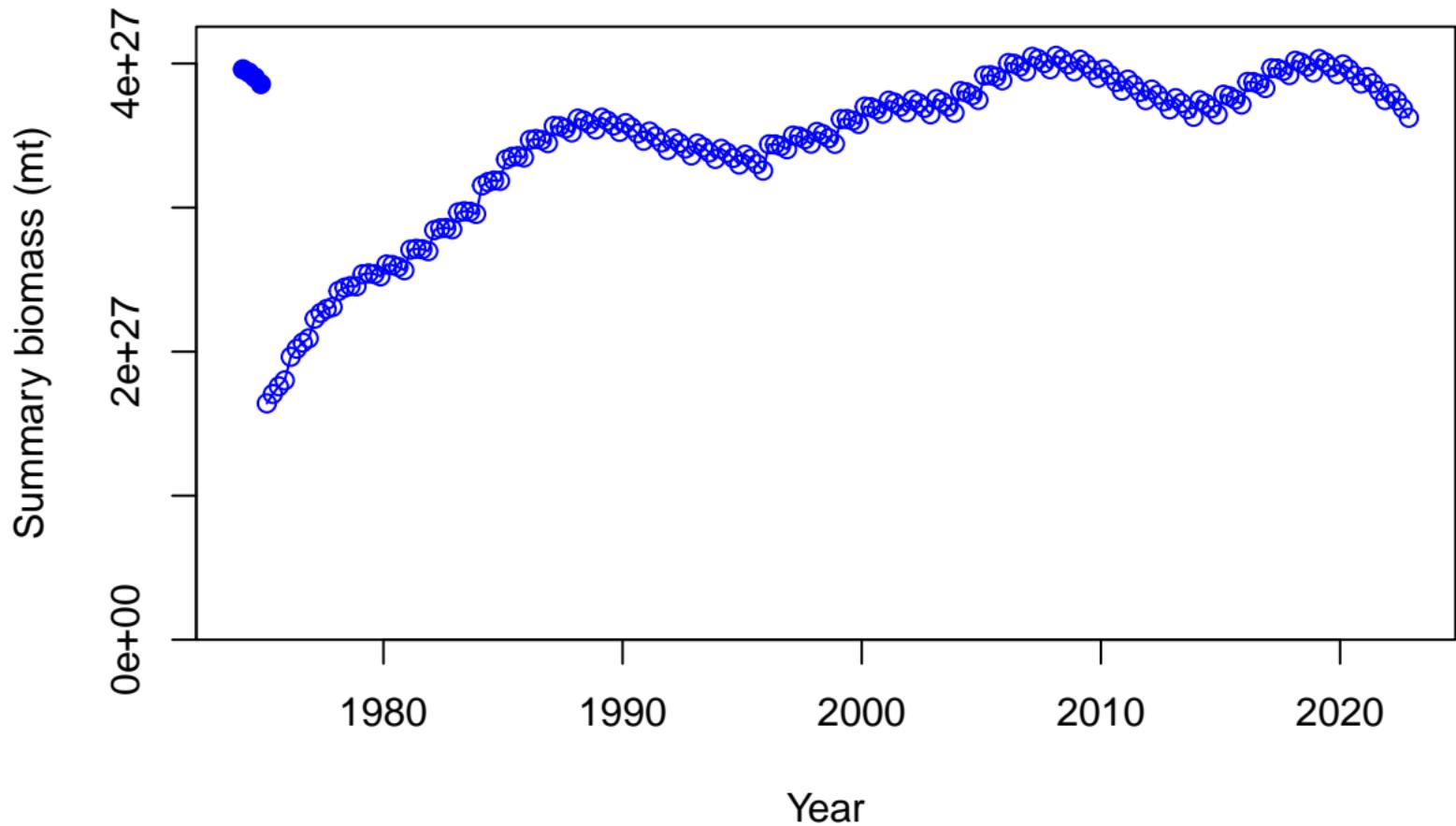


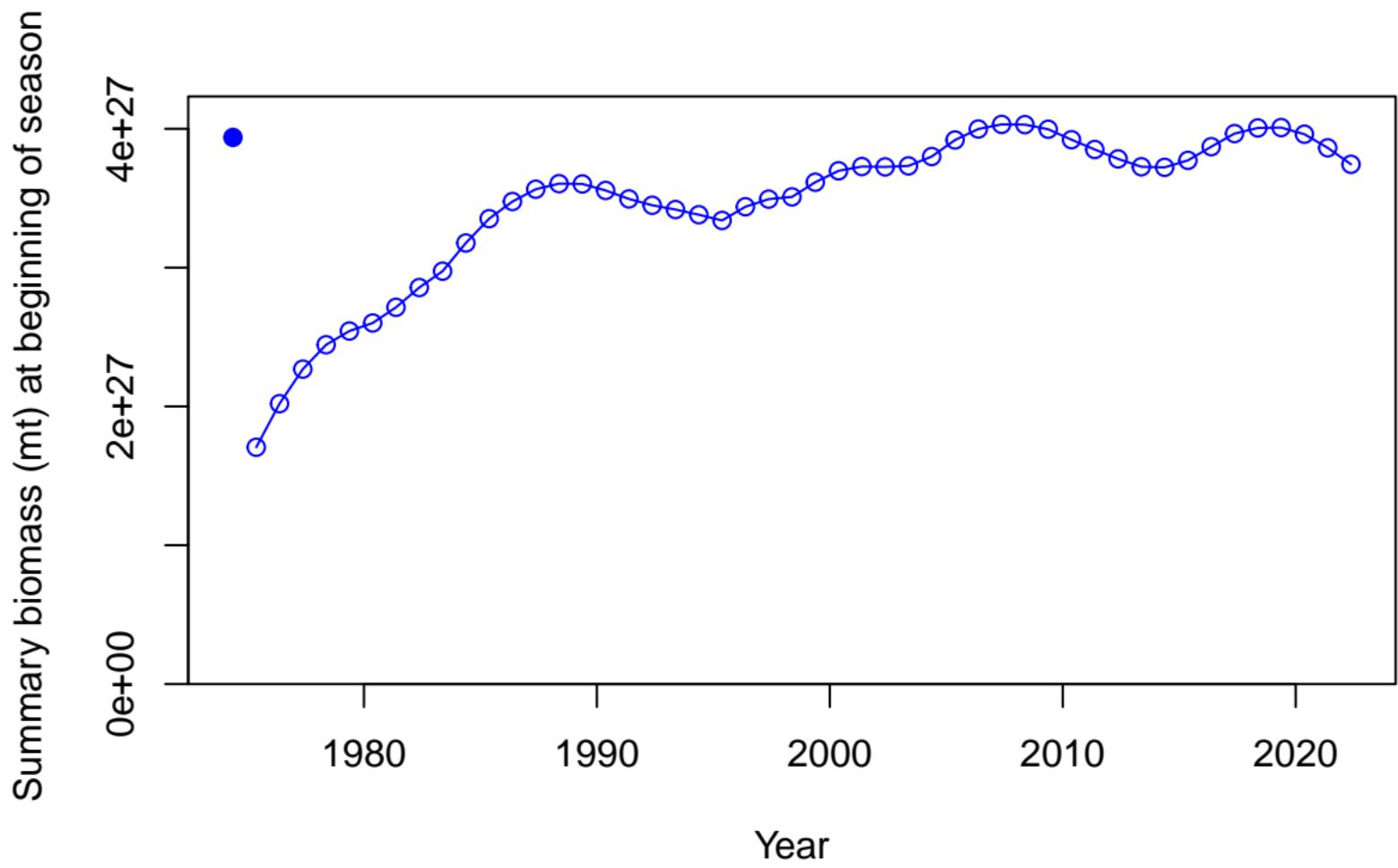
Relative spawning biomass: B/B_0

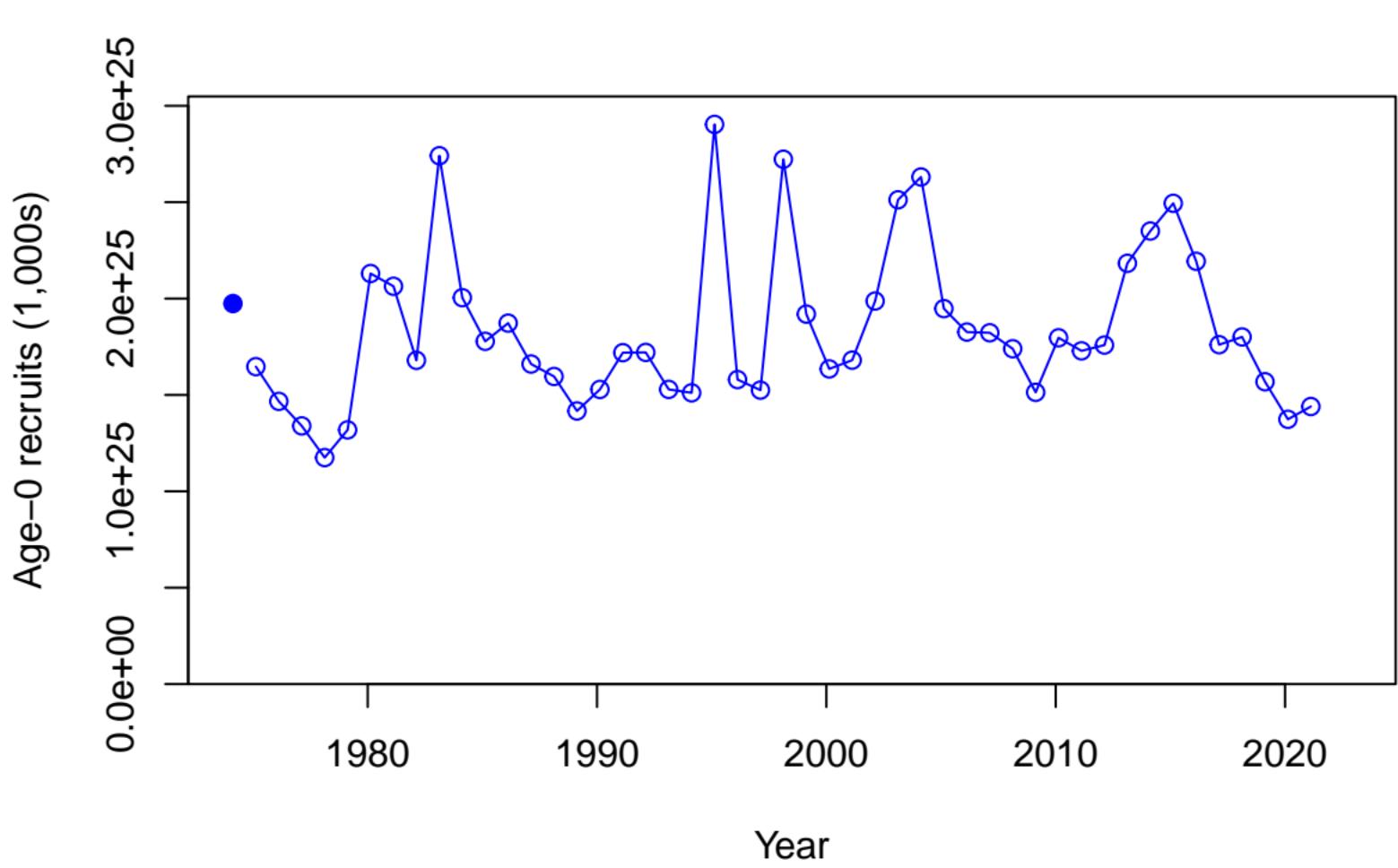












Age-0 recruits (1,000s)

1.0e+29

0.0e+00

1980

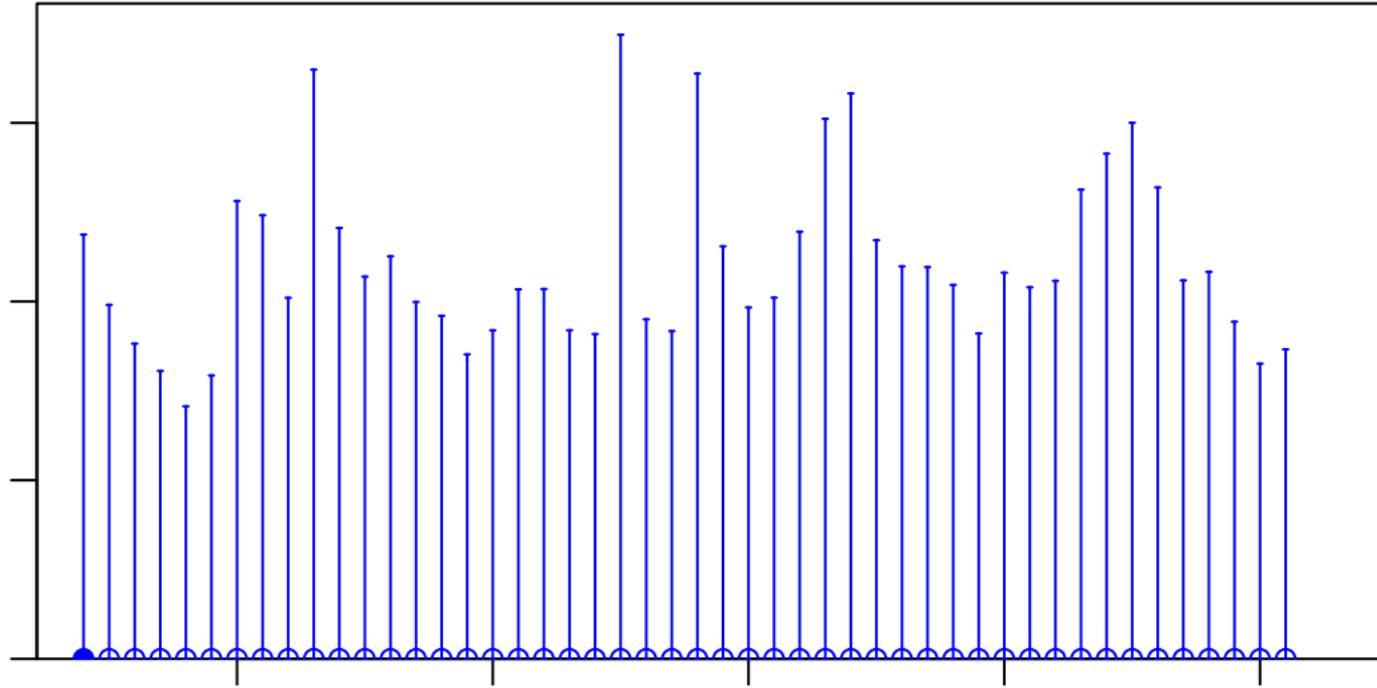
1990

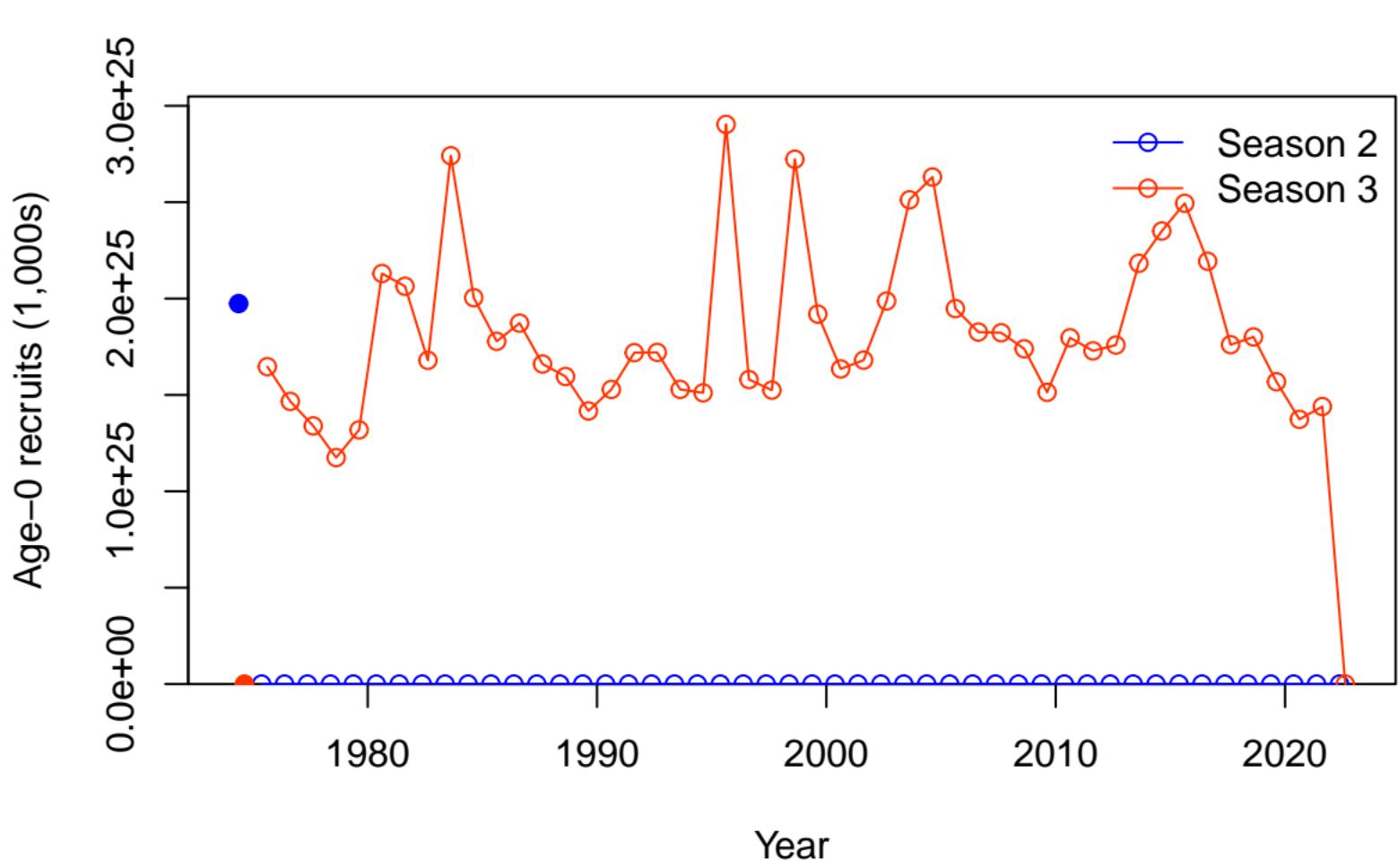
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2010

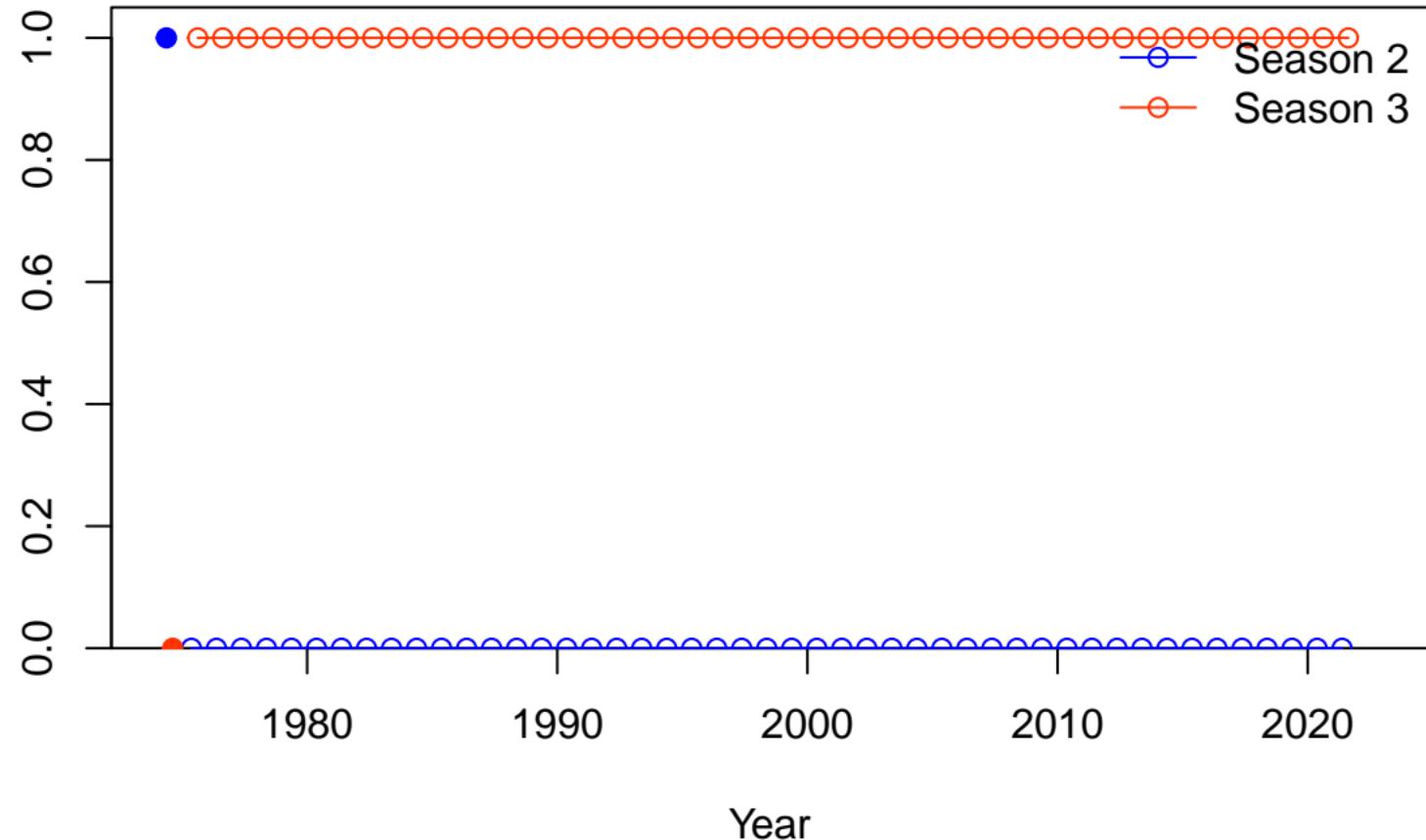
2020

Year

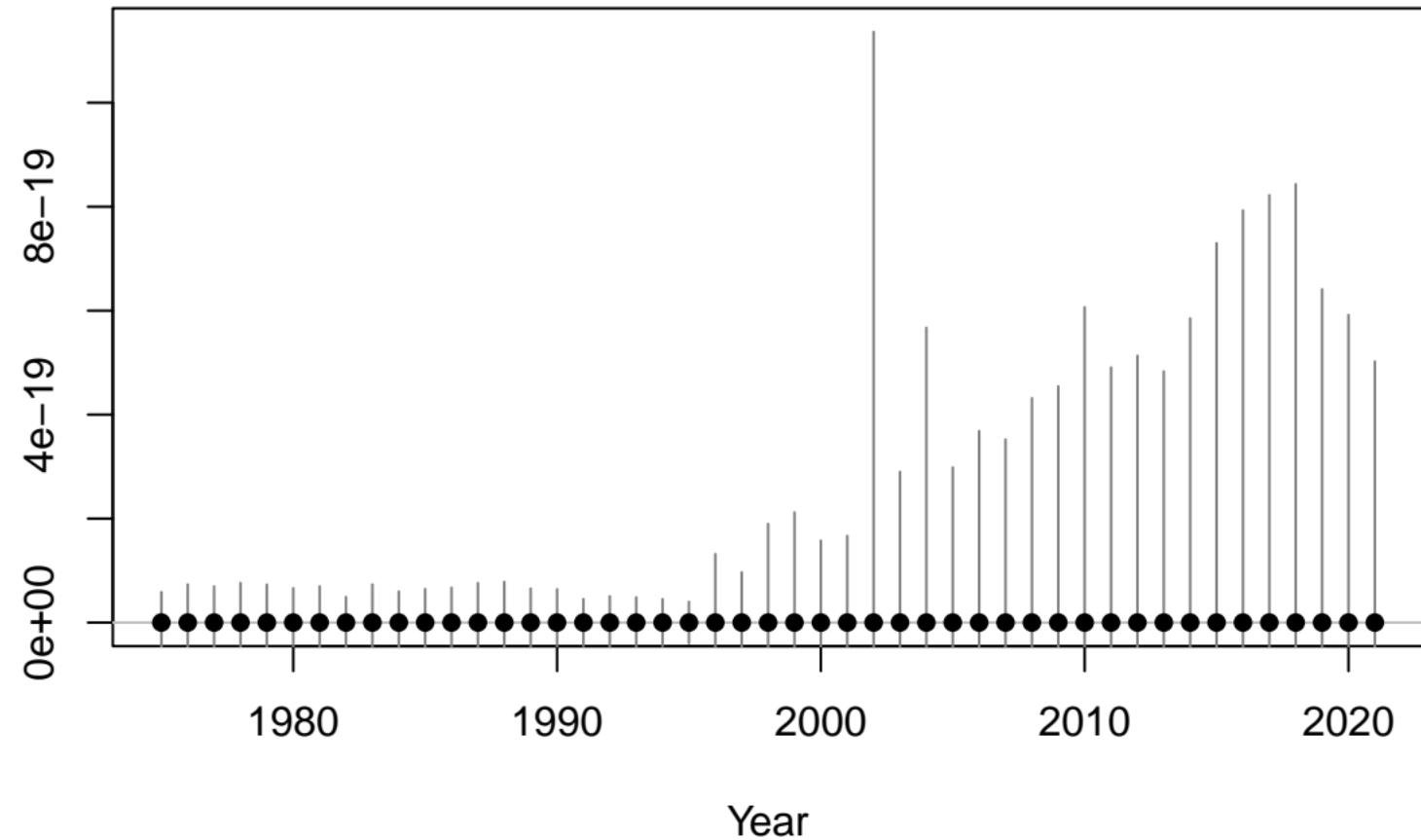


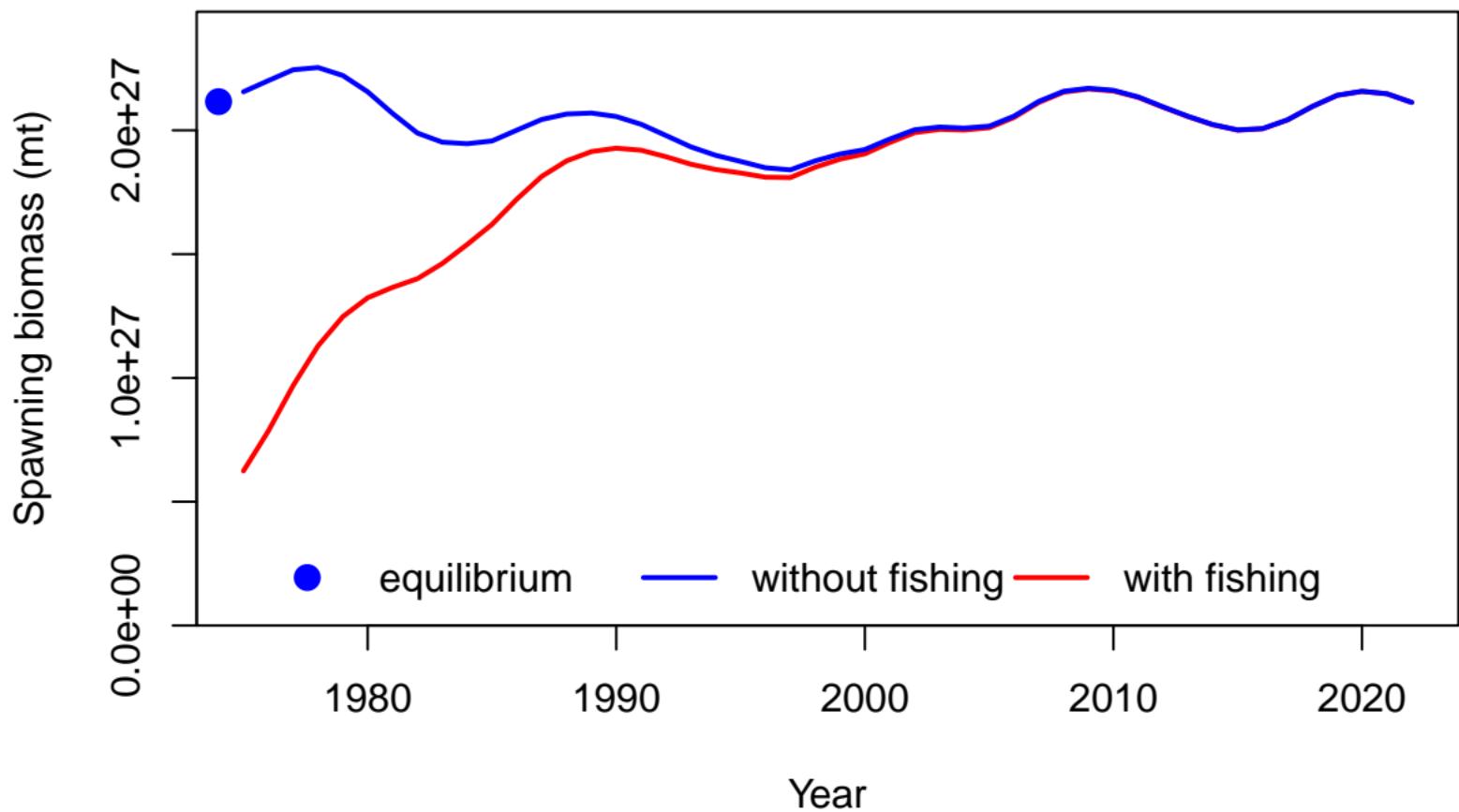


Fraction of total Age-0 recruits

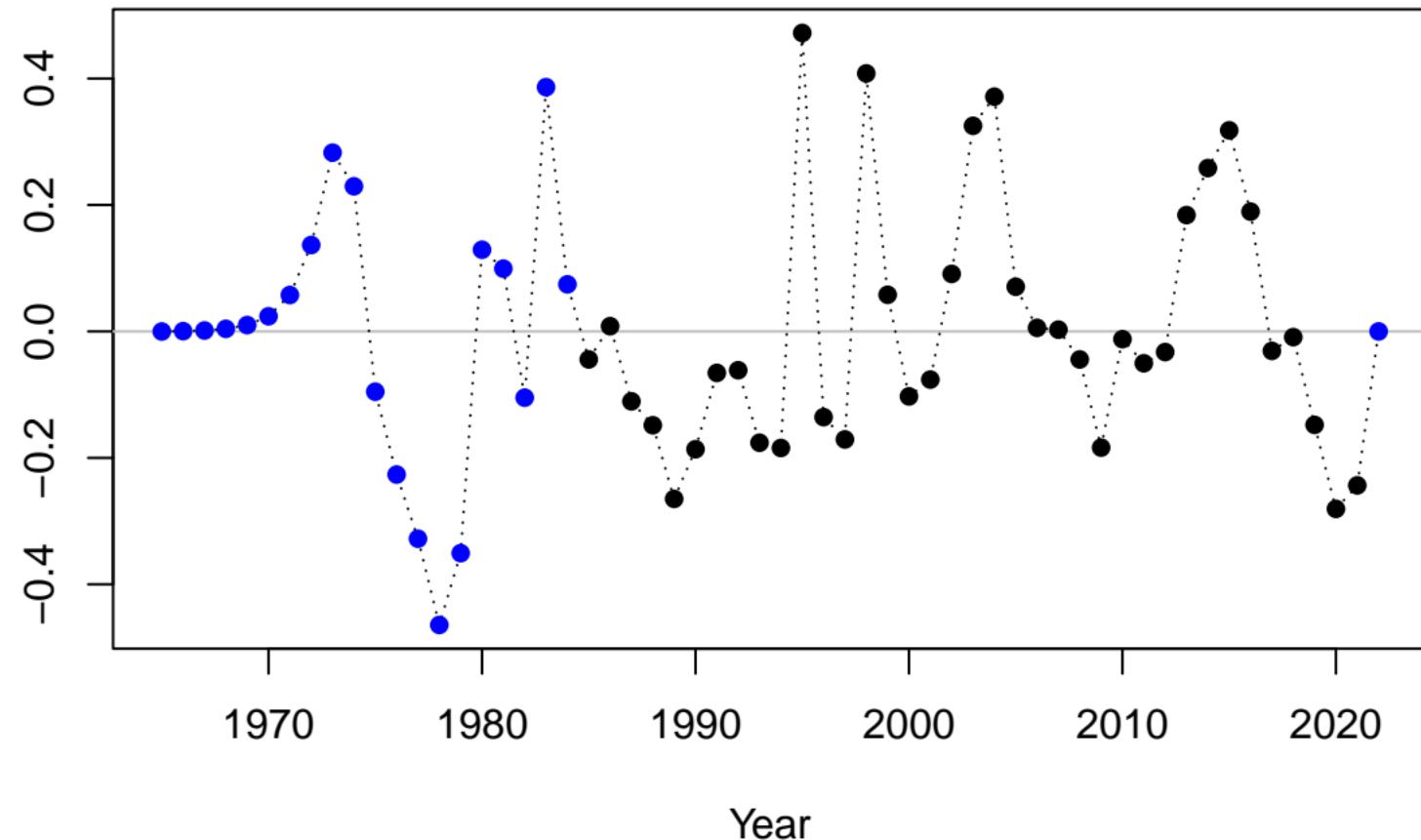


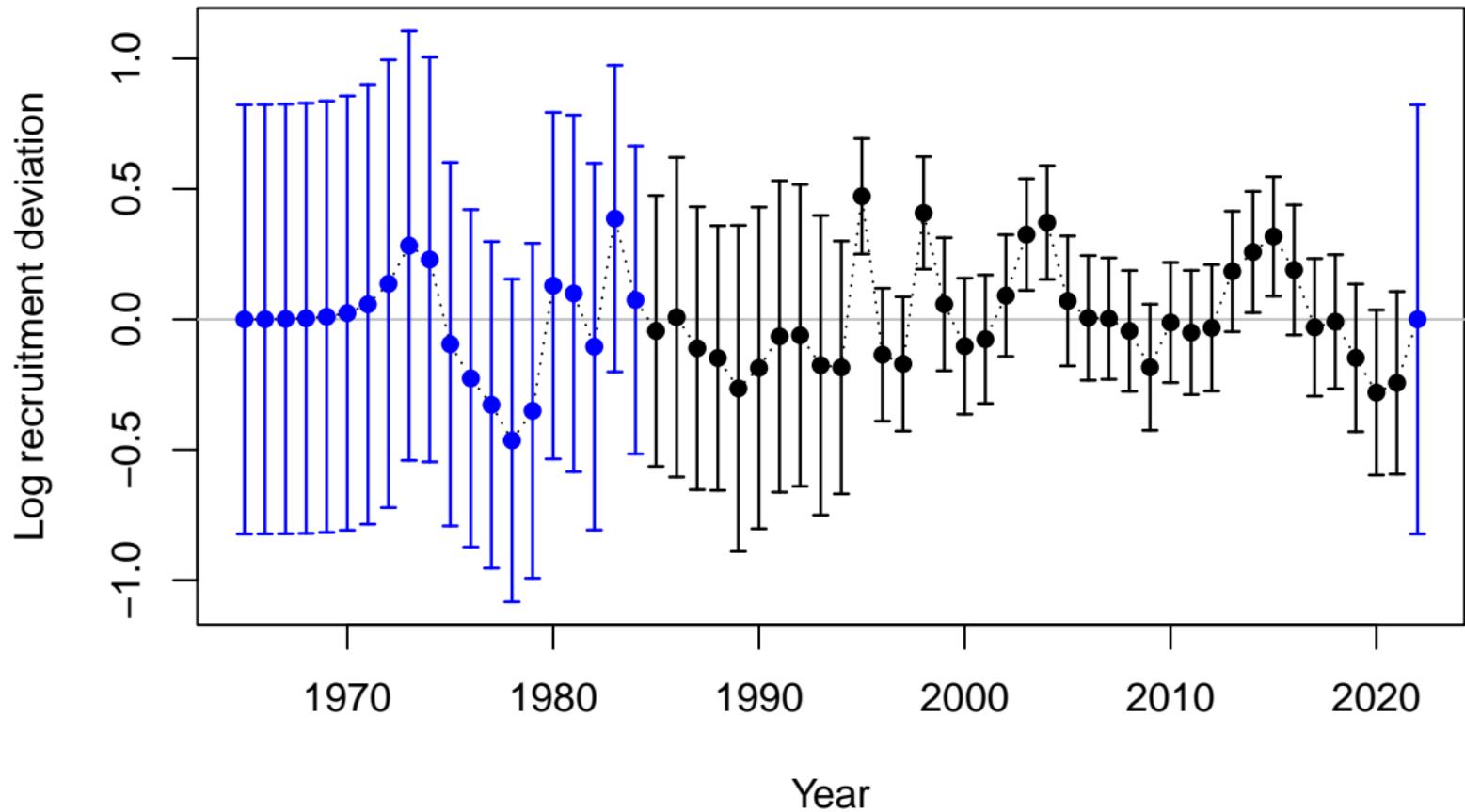
Summary Fishing Mortality



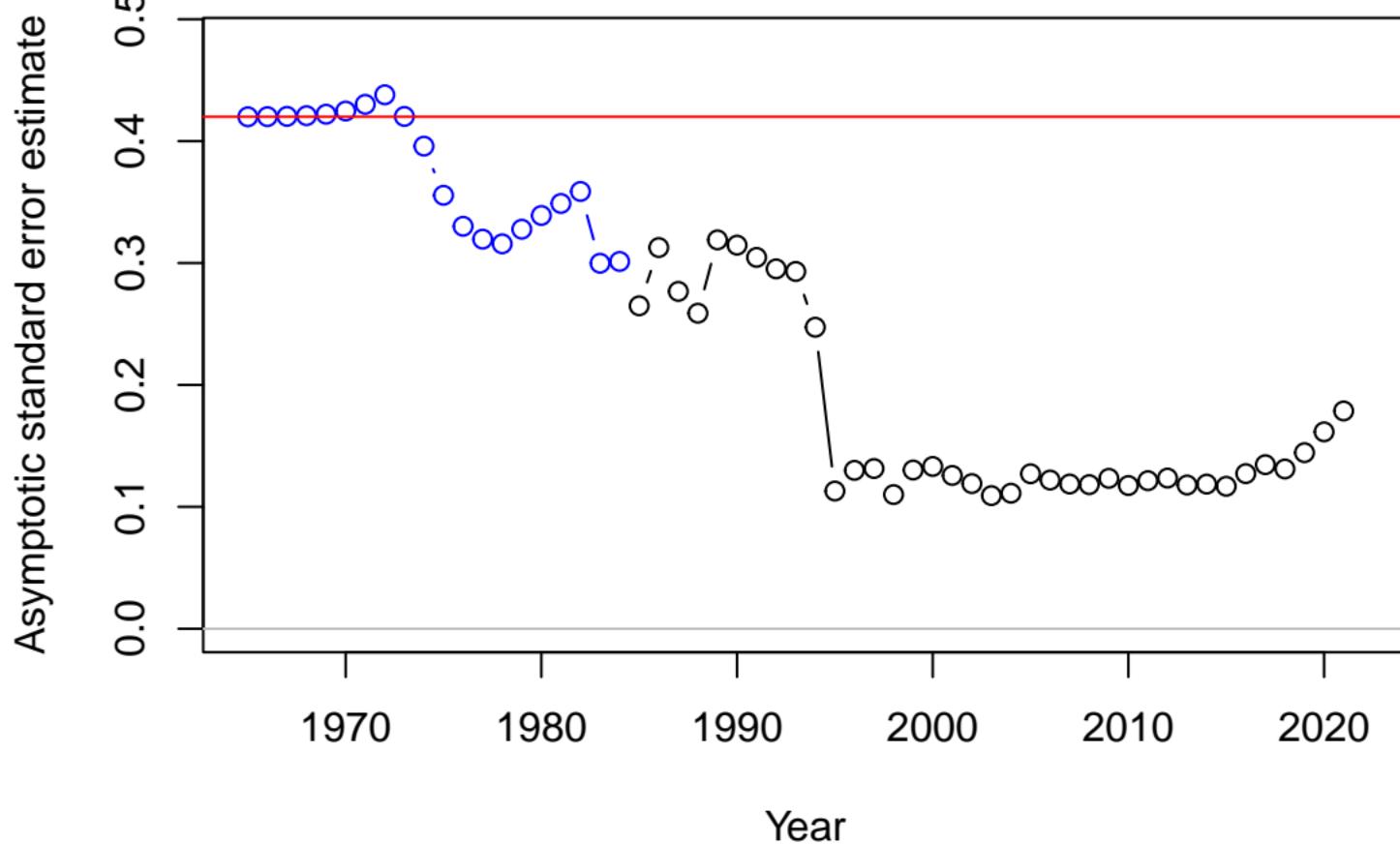


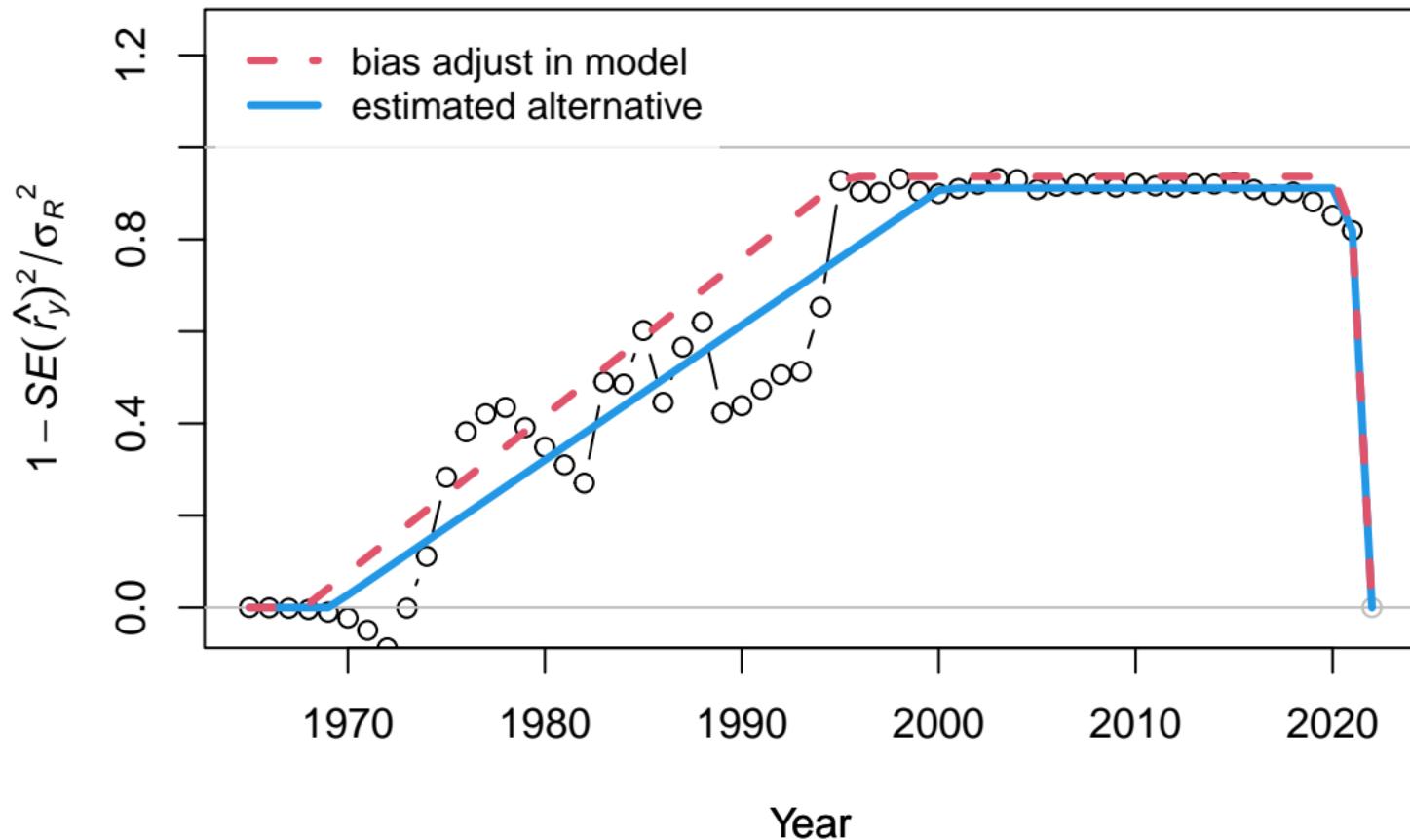
Log recruitment deviation

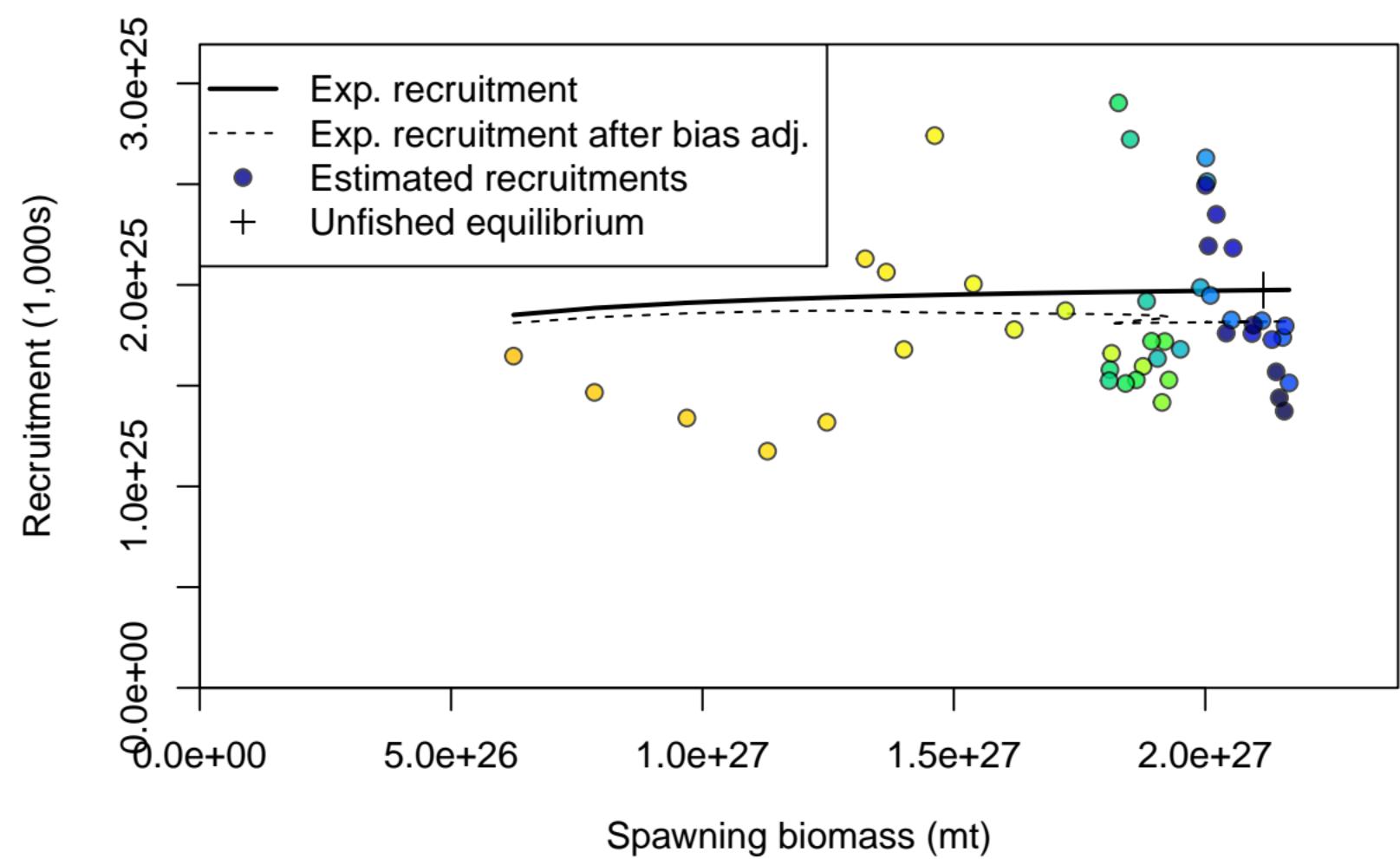


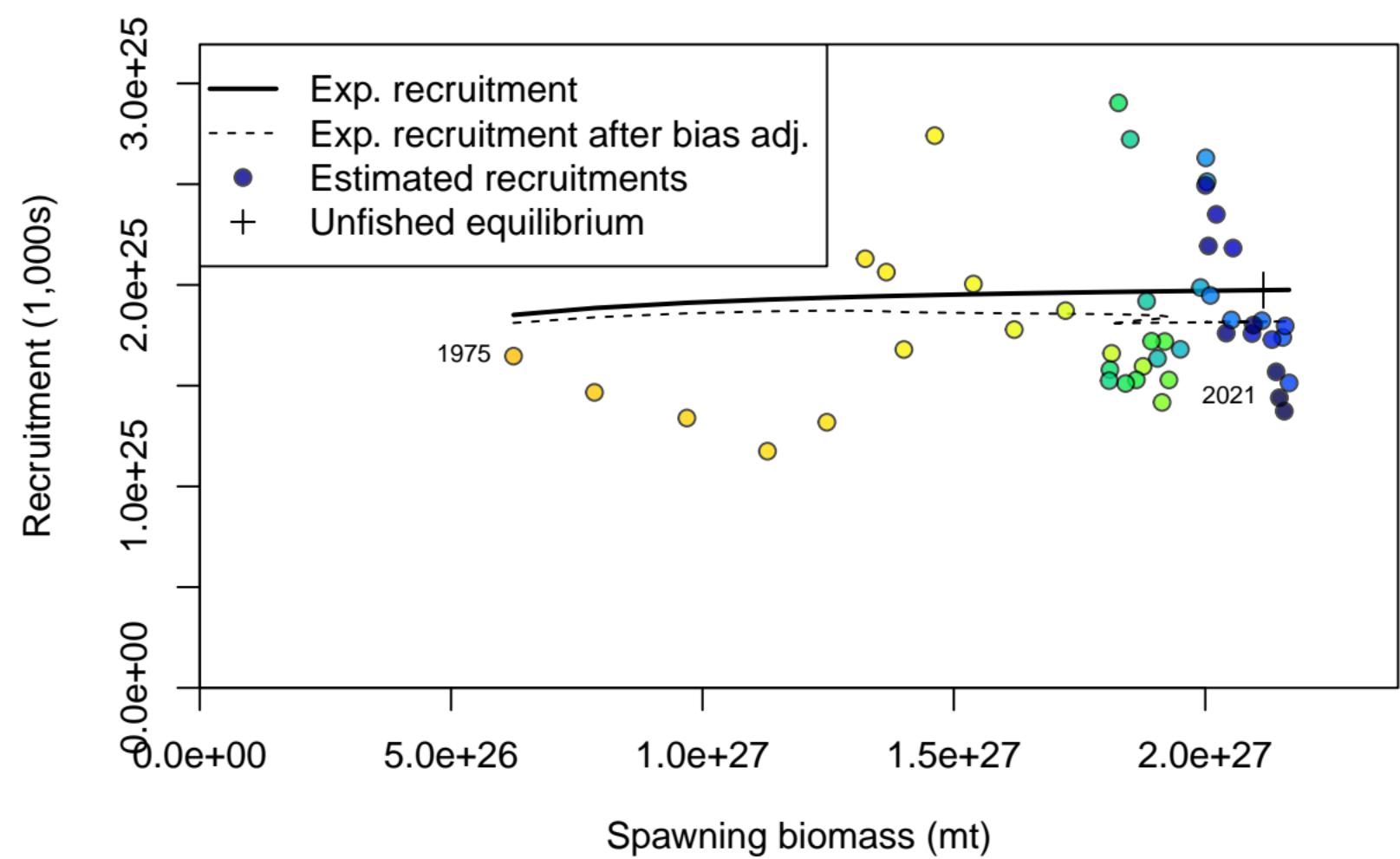


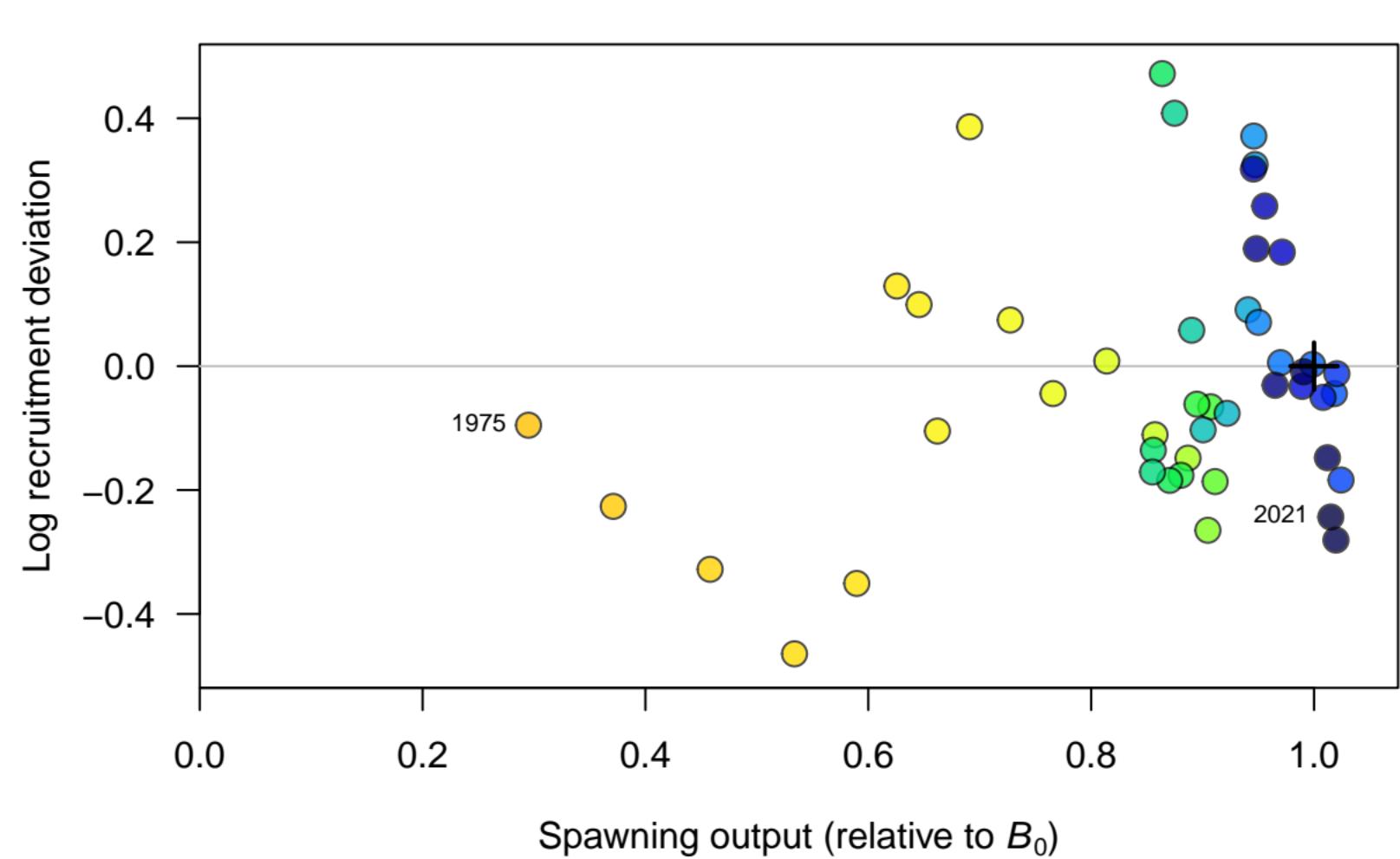
Recruitment deviation variance









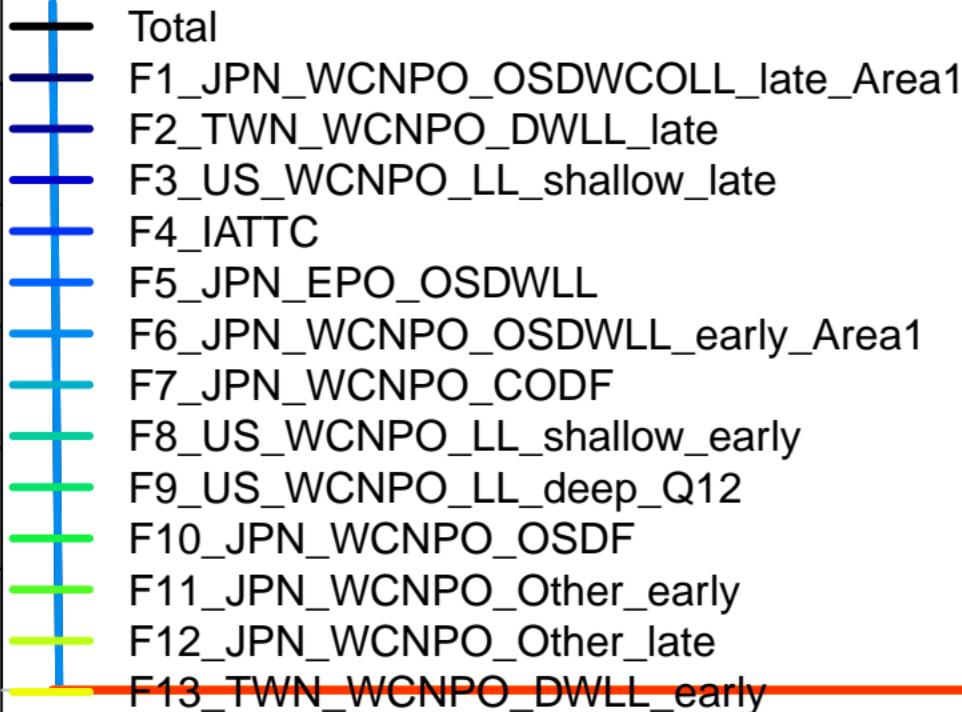


Landings (numbers x1000)

4e+24

2e+24

0e+00



1980

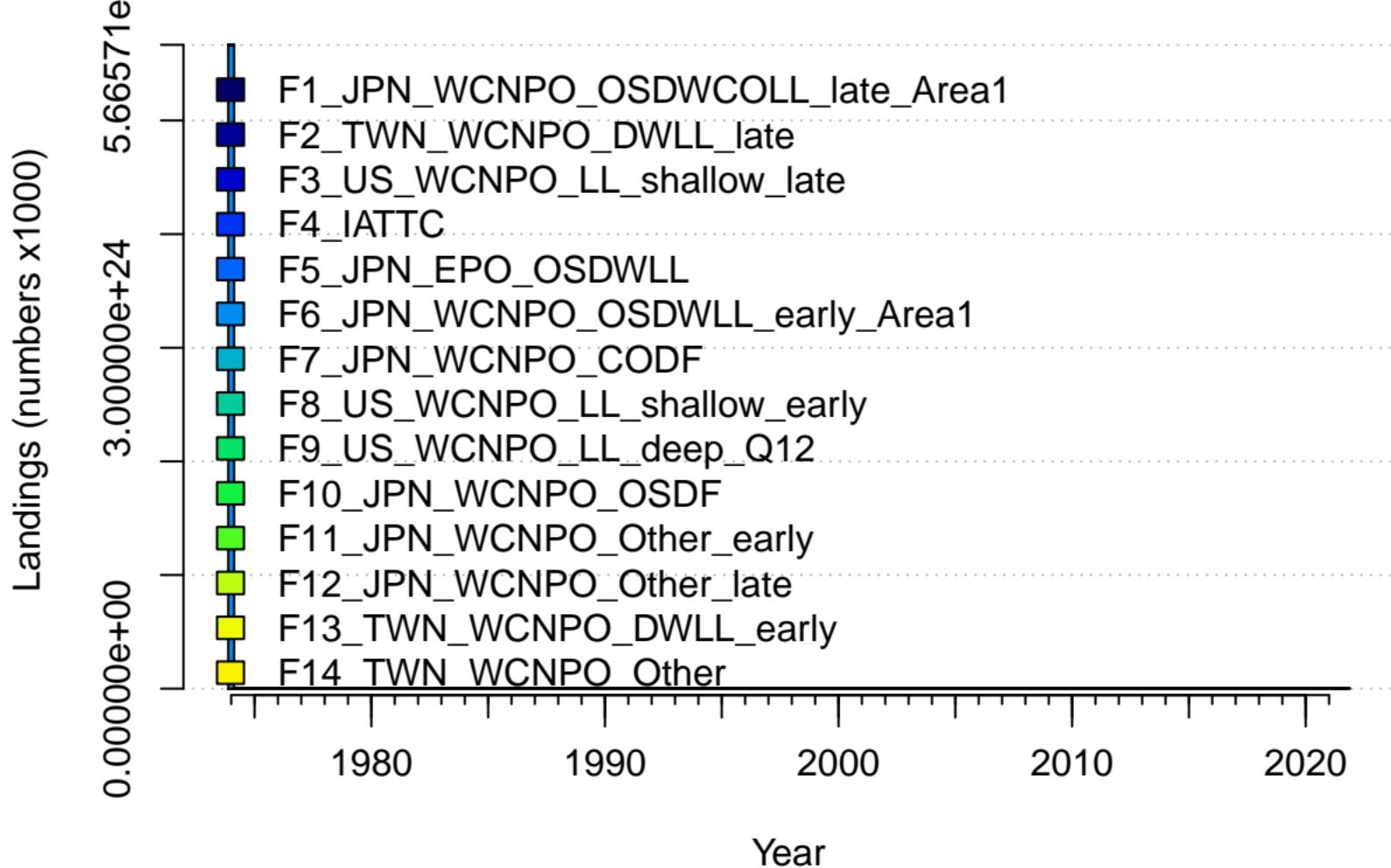
1990

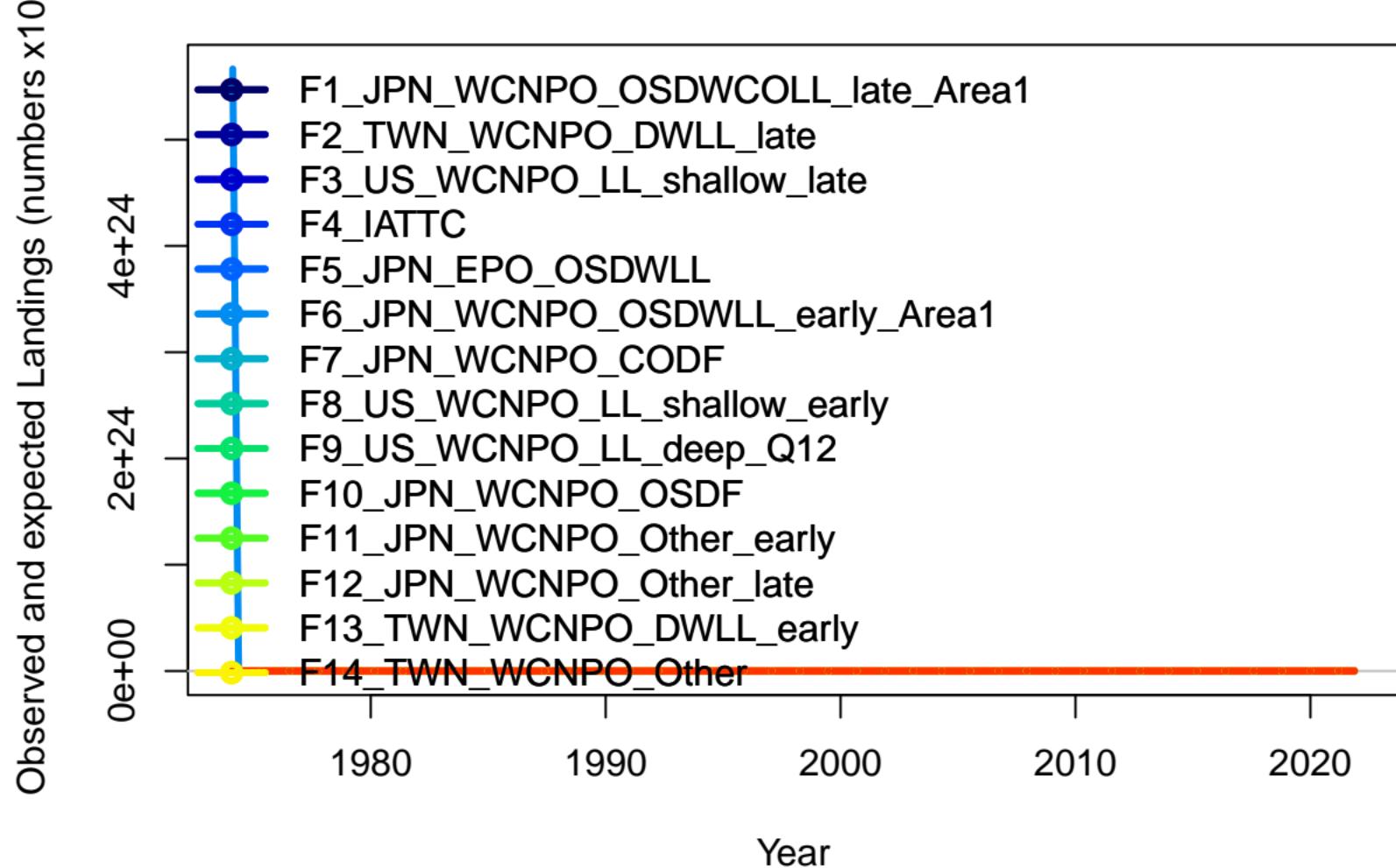
2000

2010

2020

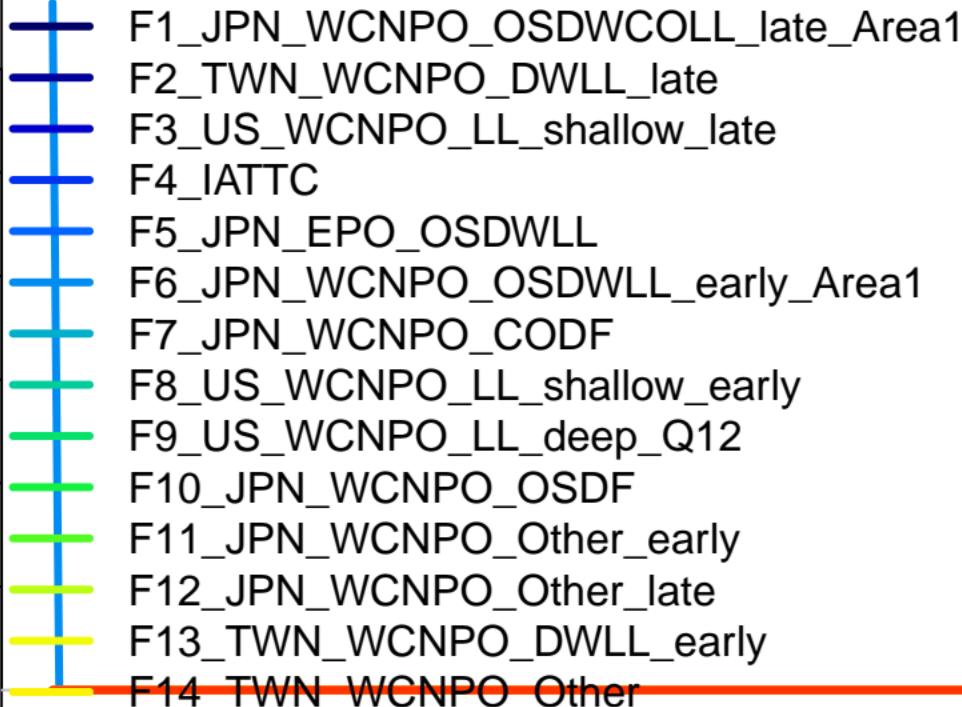
Year





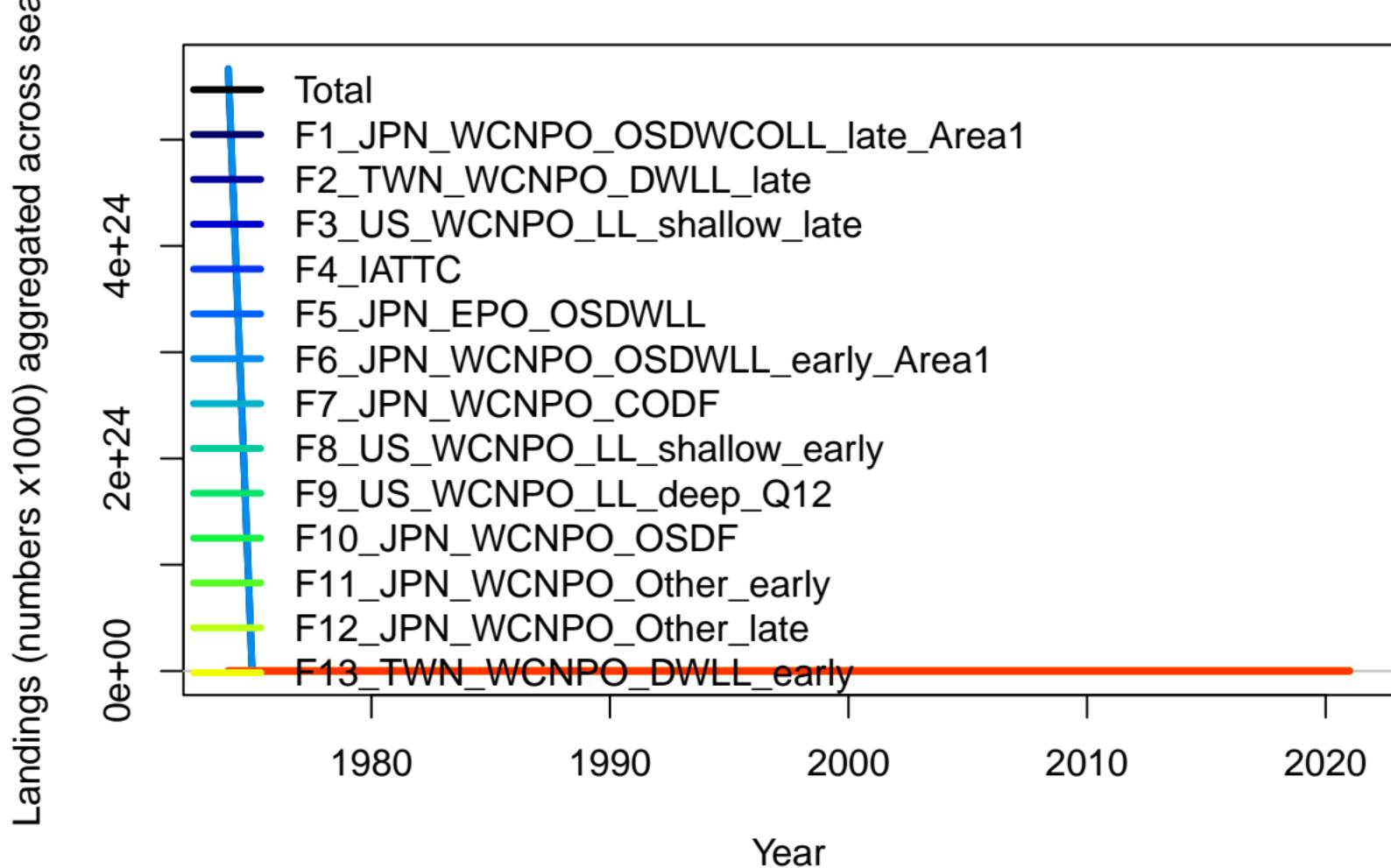
Continuous F

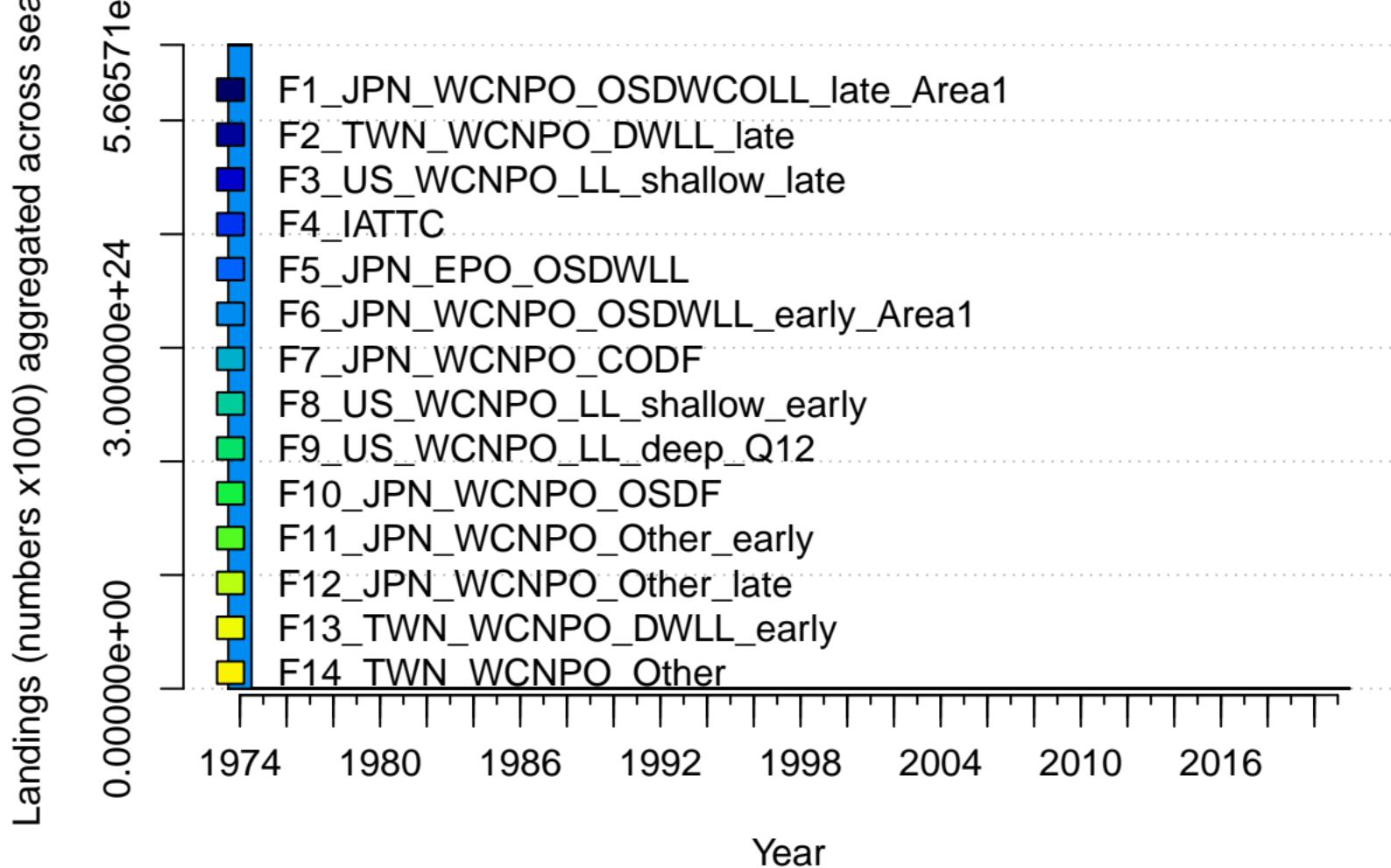
1.2
1.0
0.8
0.6
0.4
0.2
0.0

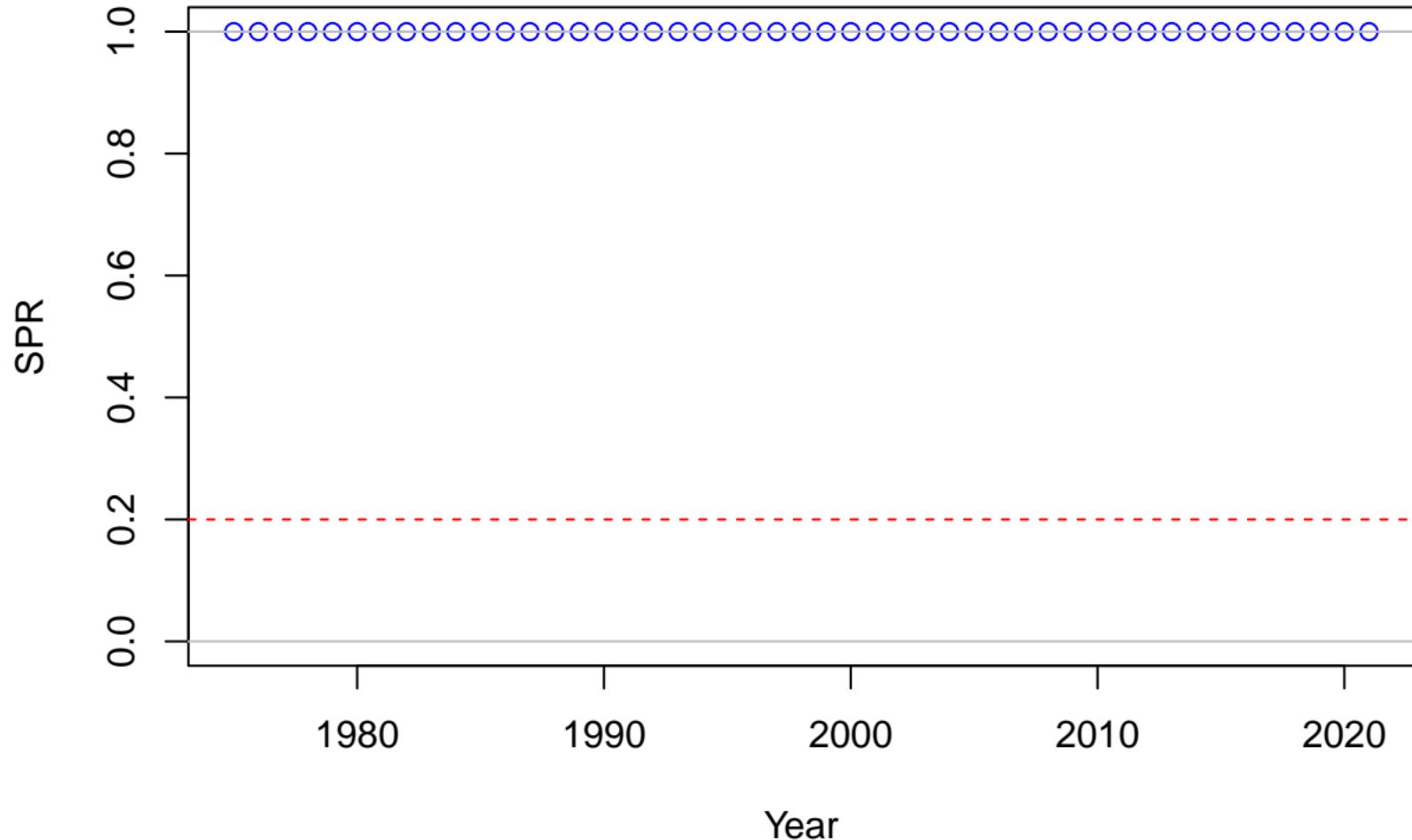


1980 1990 2000 2010 2020

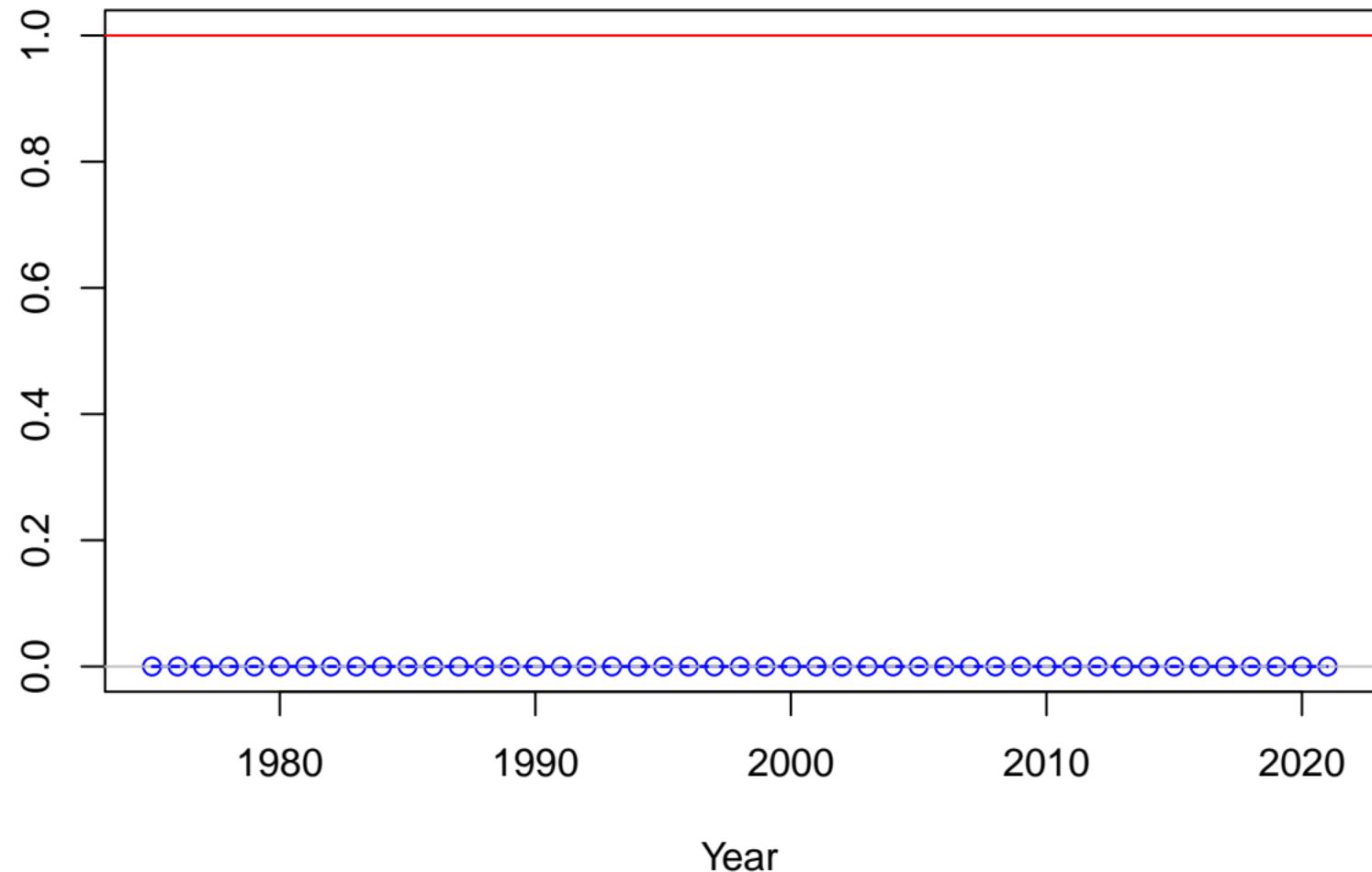
Year



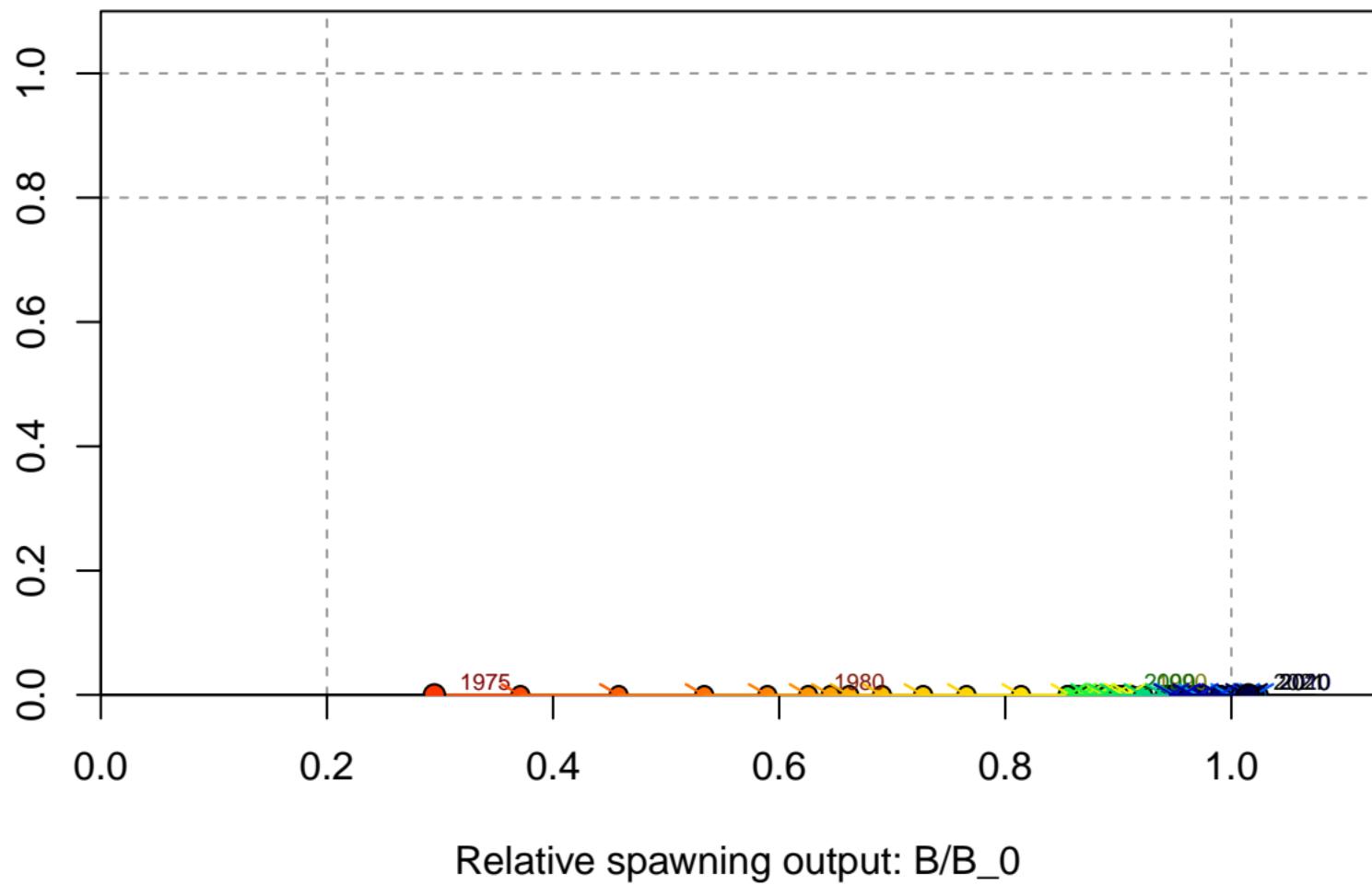


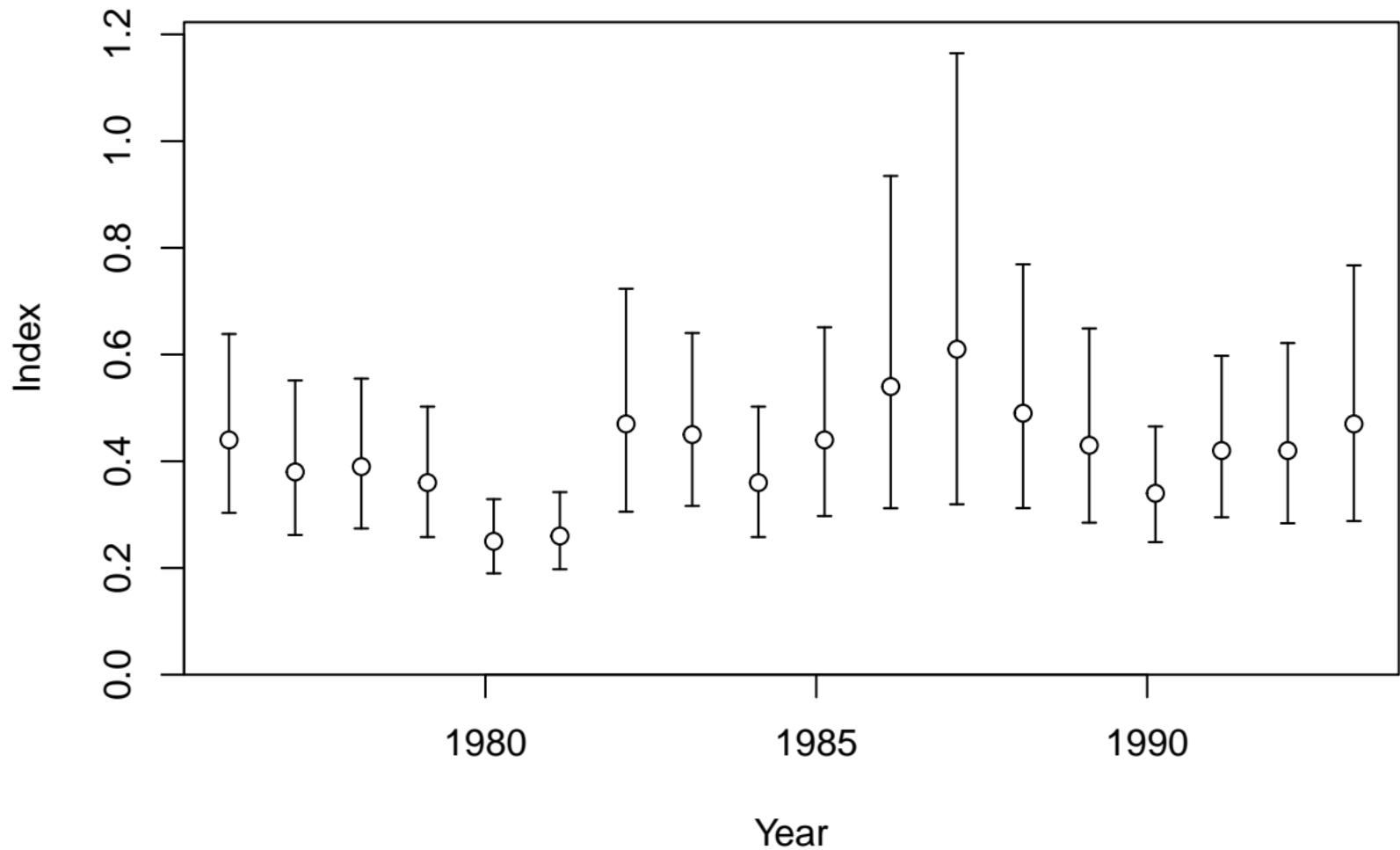


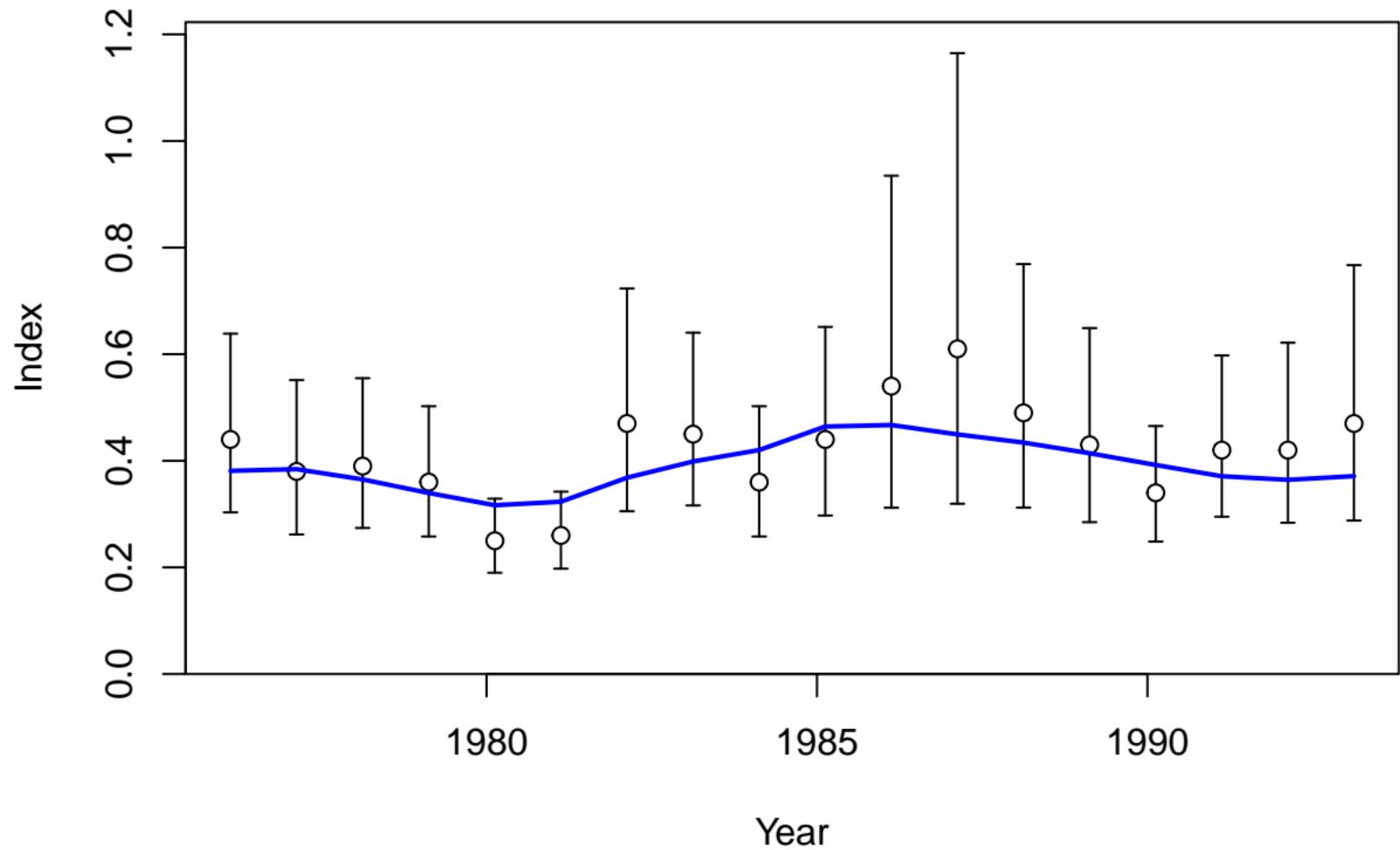
Fishing intensity: 1-SPR



Fishing intensity: 1-SPR





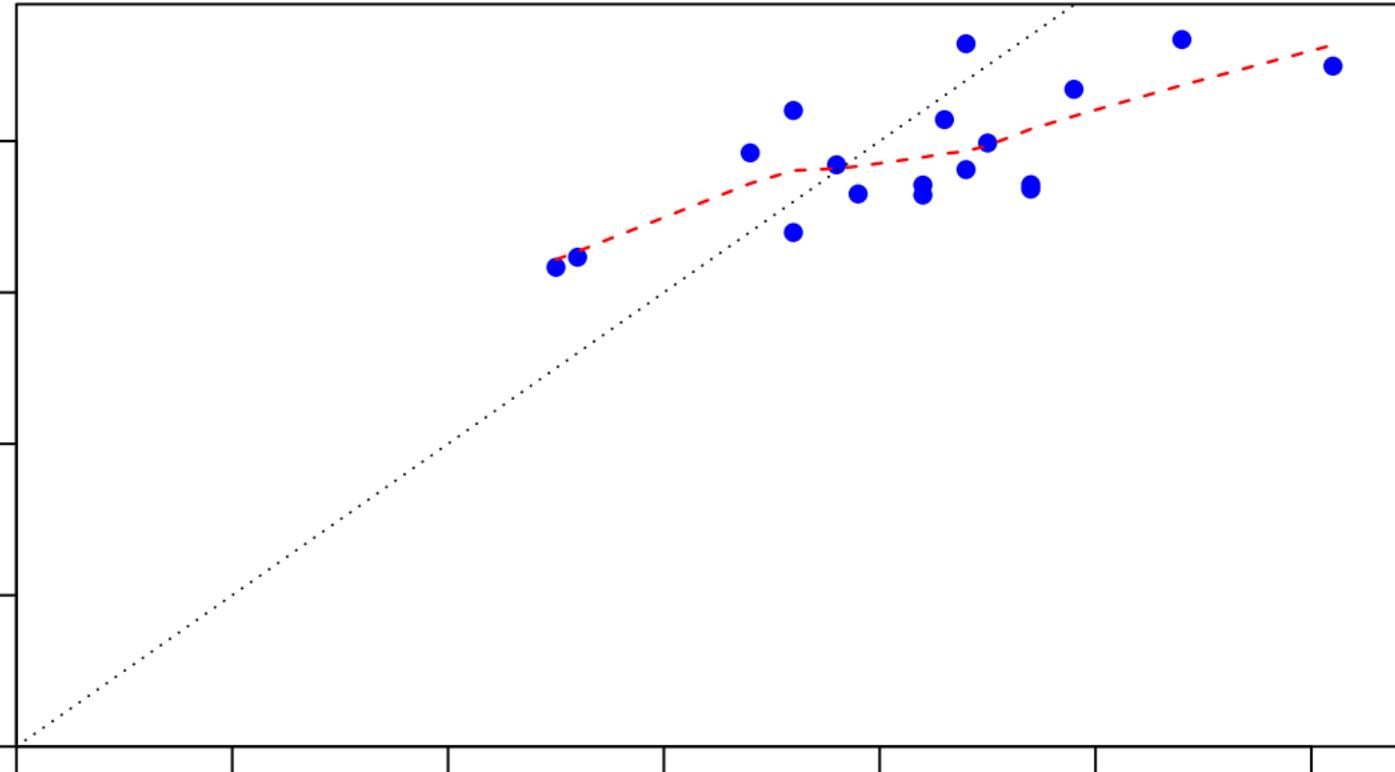


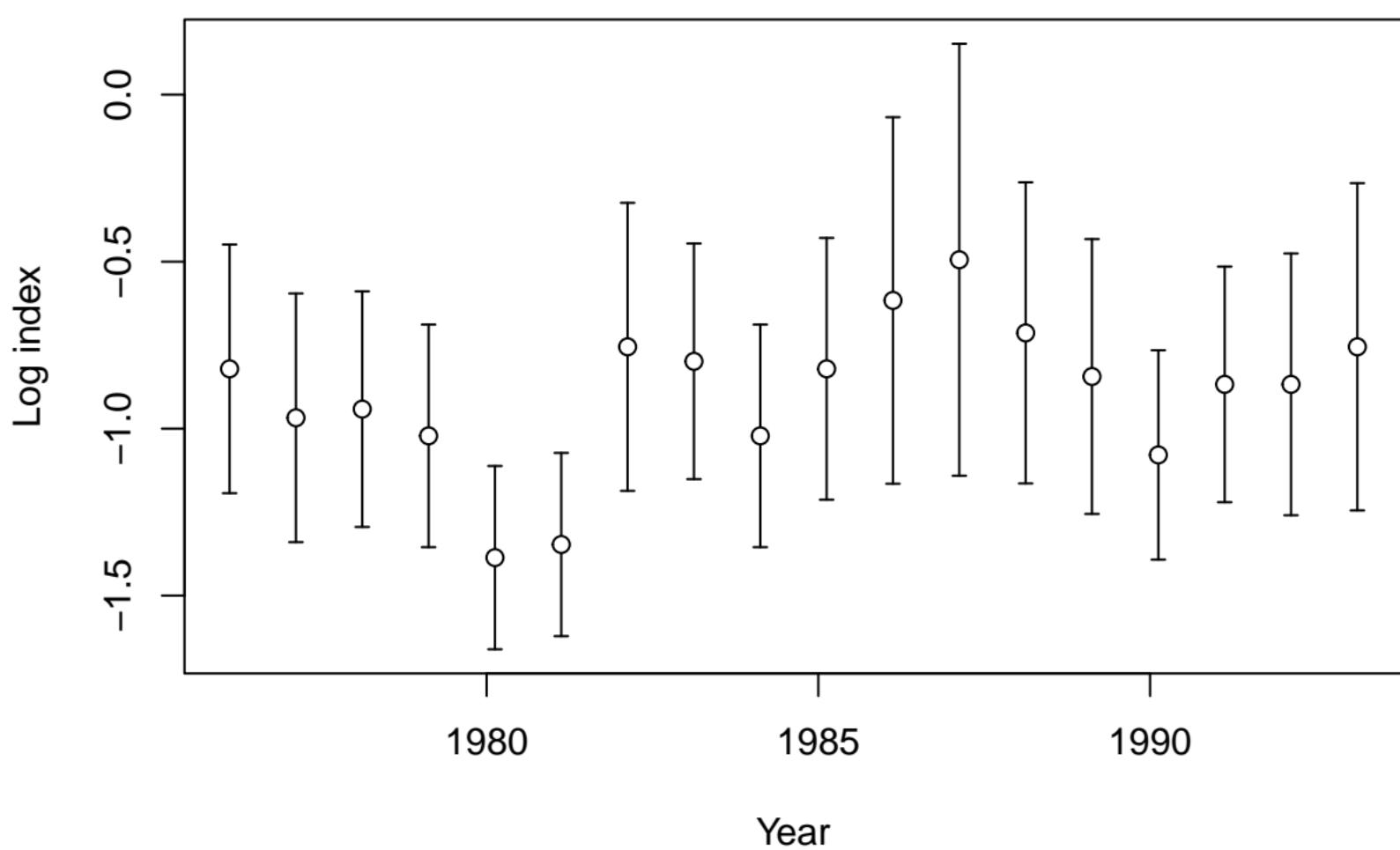
Expected index

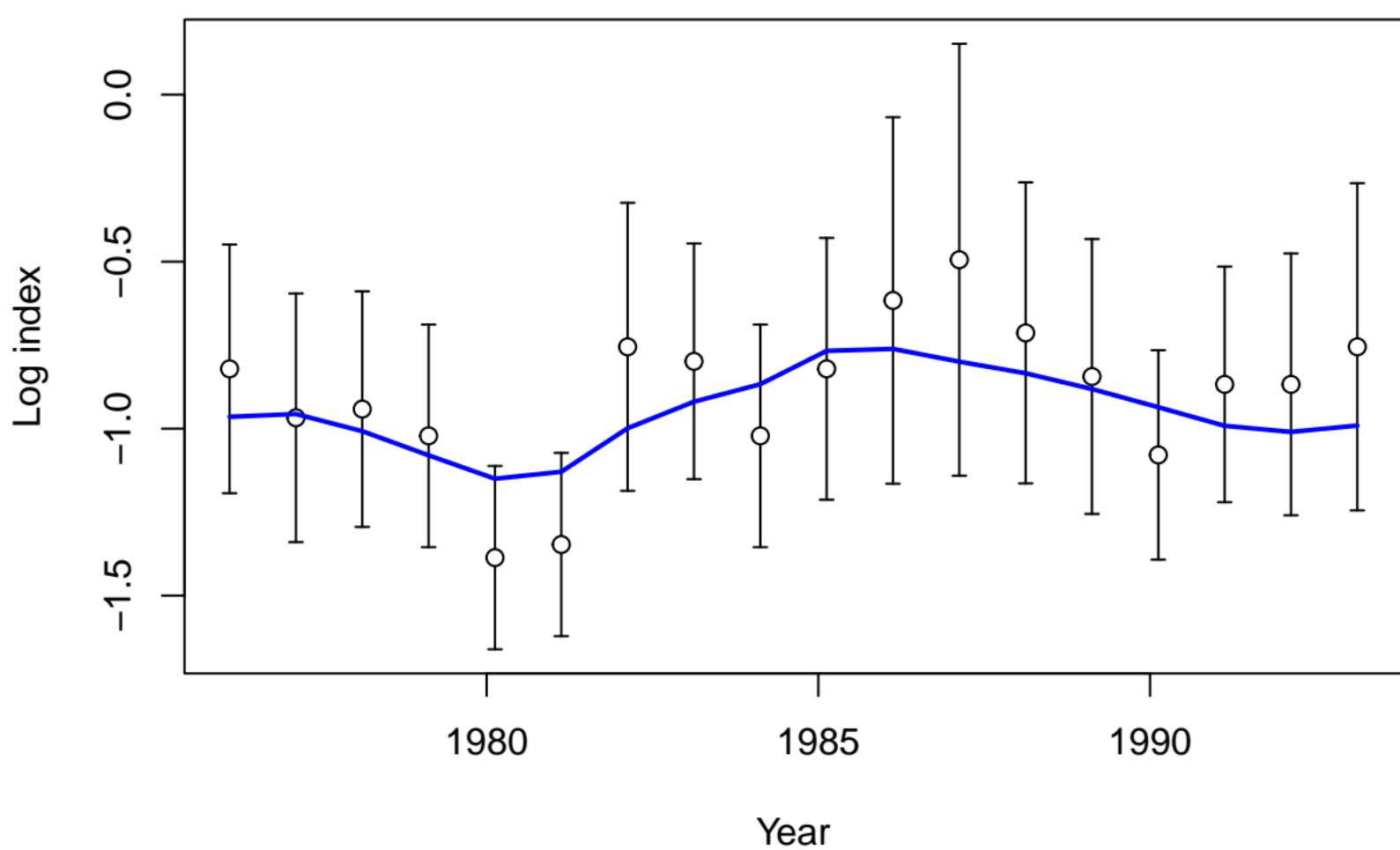
0.0 0.1 0.2 0.3 0.4

0.0 0.1 0.2 0.3 0.4 0.5 0.6

Observed index







Log expected index

-0.8
-0.9
-1.0
-1.1

-1.4

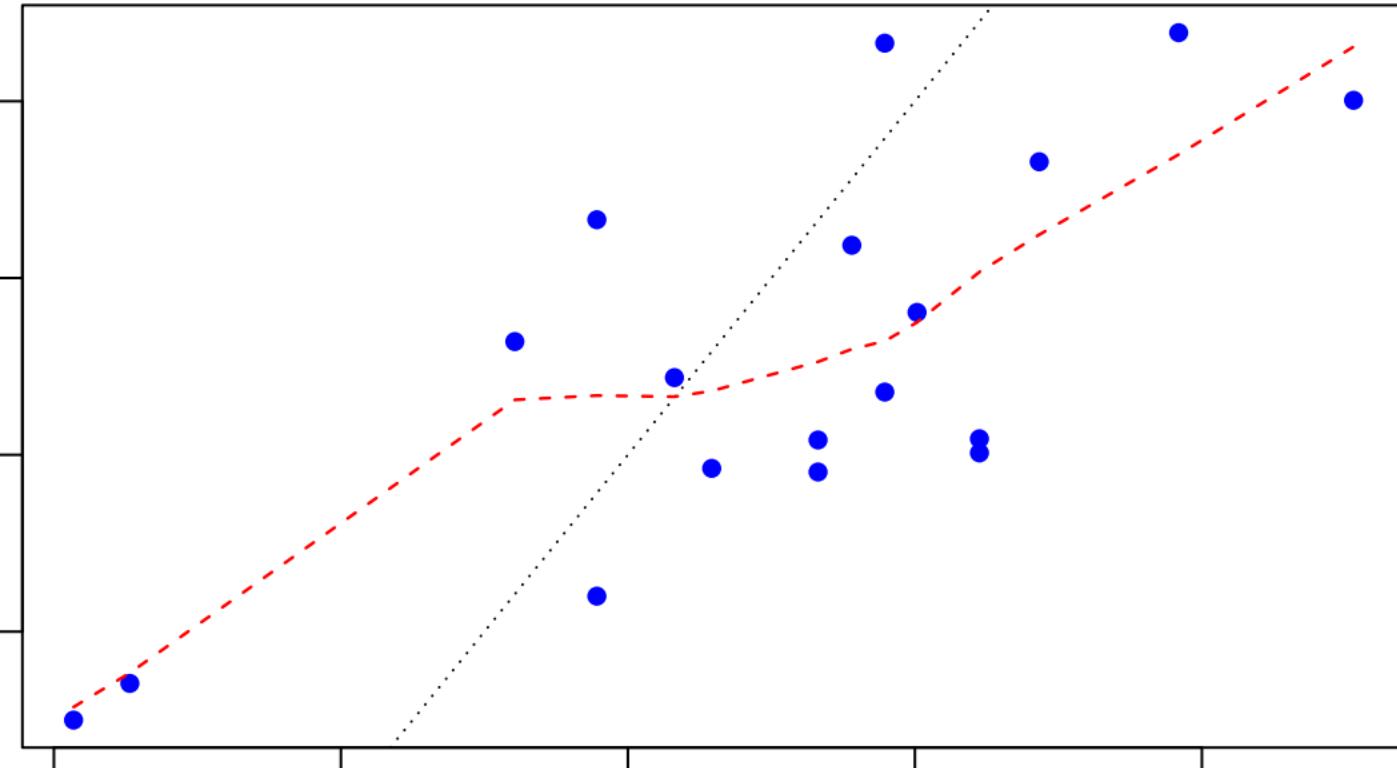
-1.2

Log observed index

-1.0

-0.8

-0.6

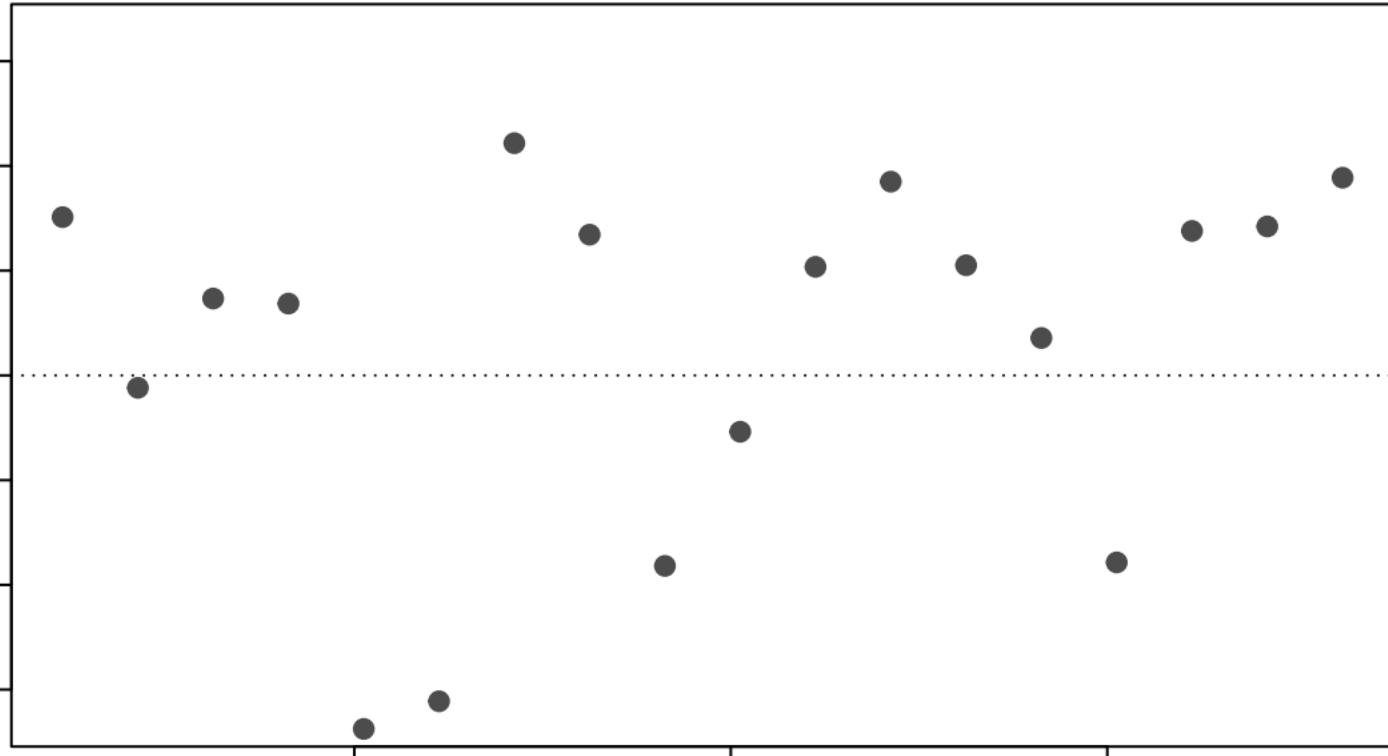


Residual

-1.5
-0.5
0.5
1.0
1.5

1980 1985 1990

Year



Deviation

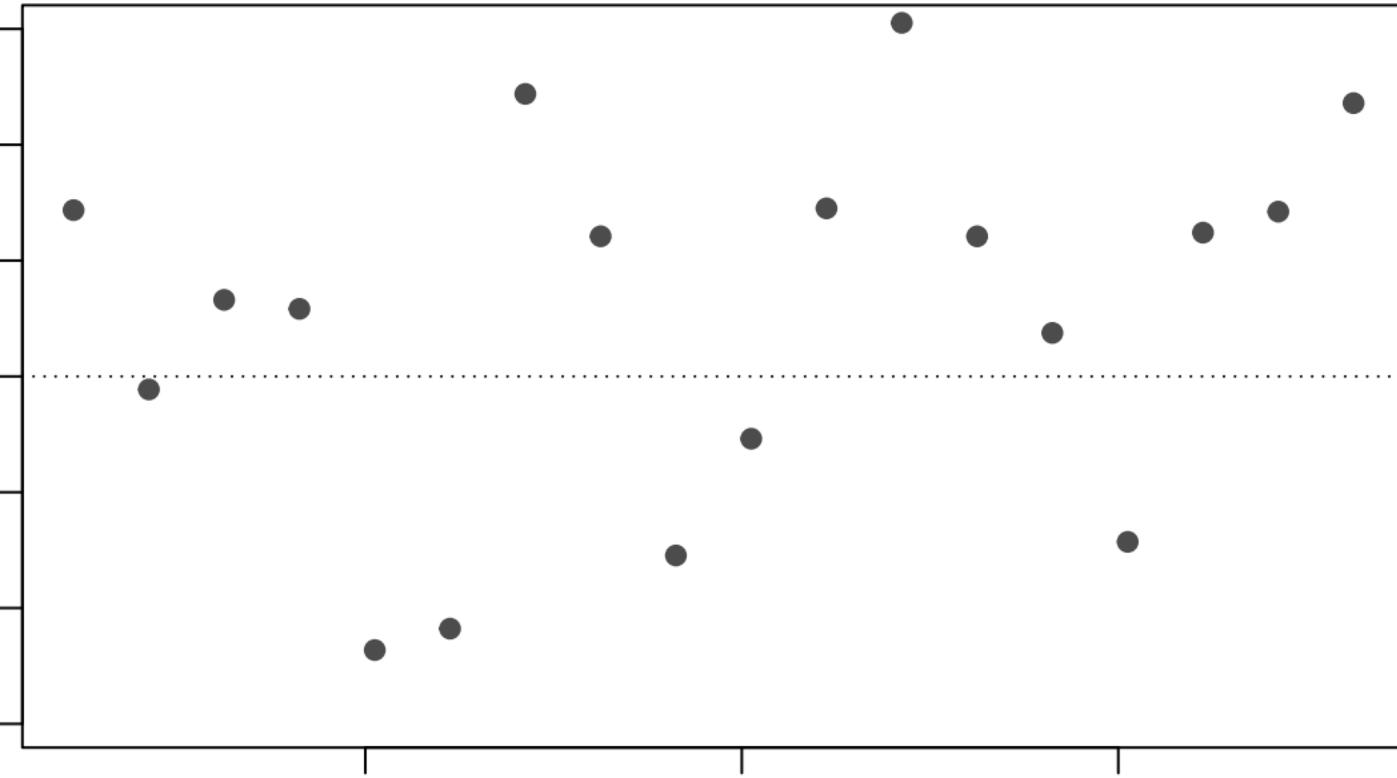
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3

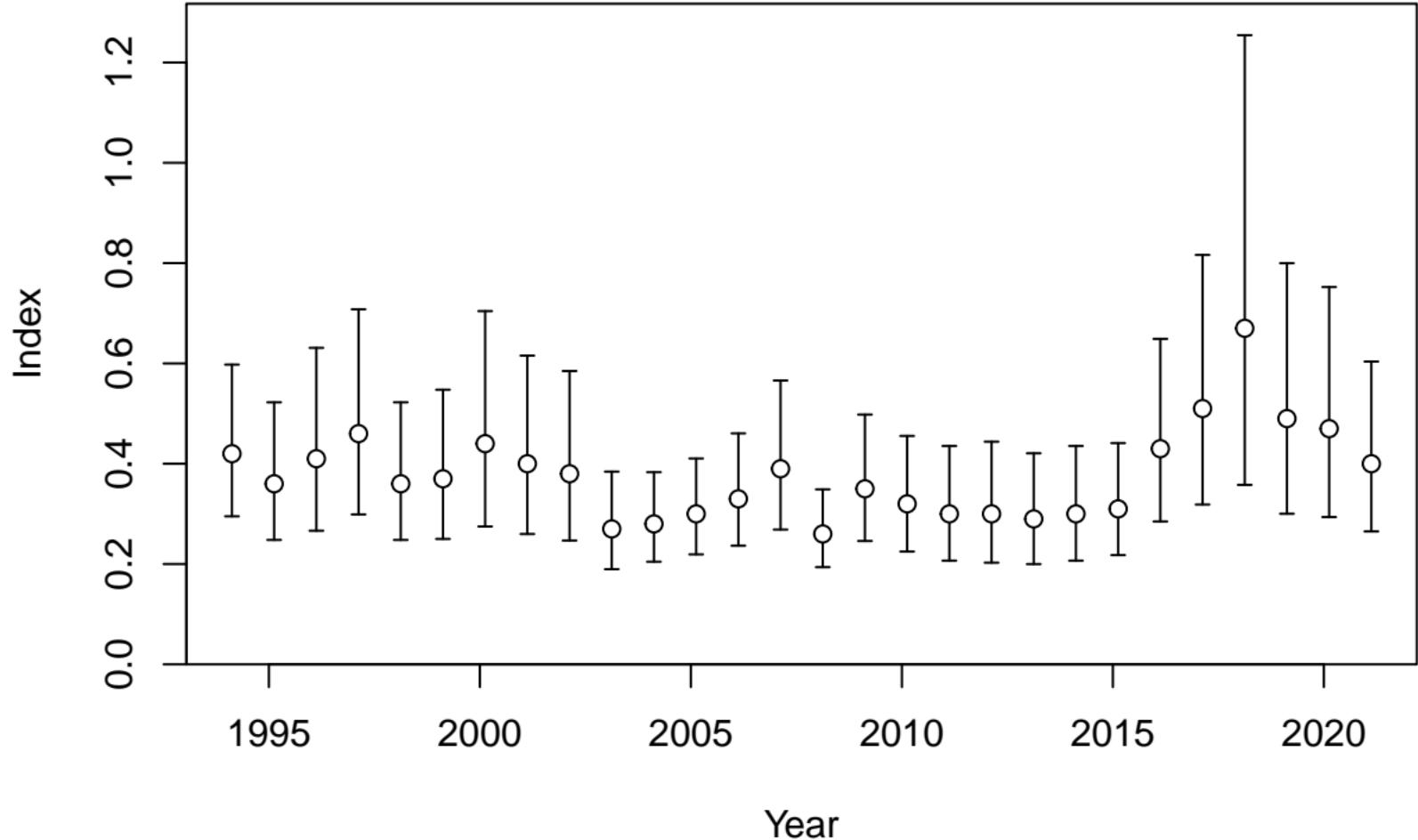
1980

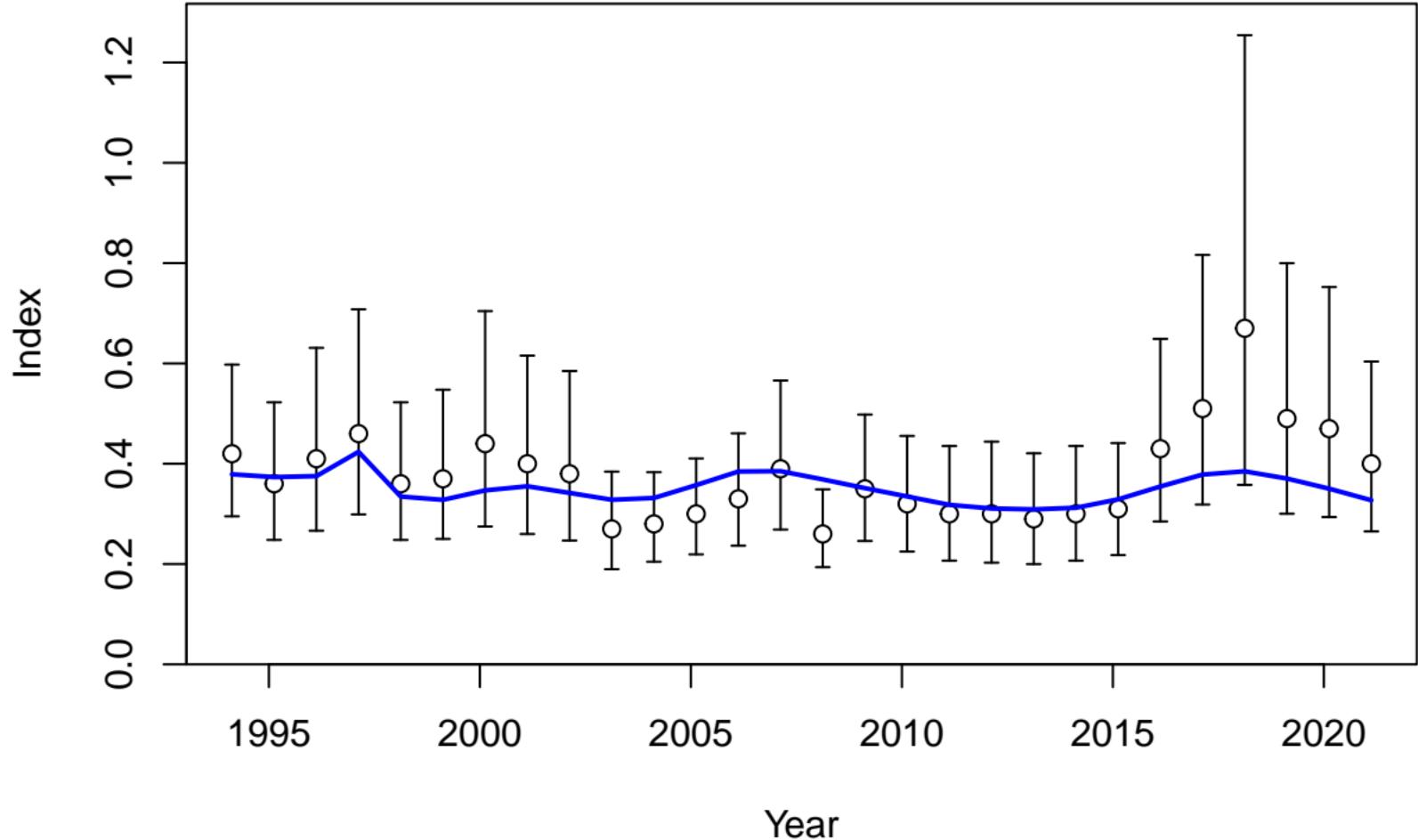
1985

1990

Year





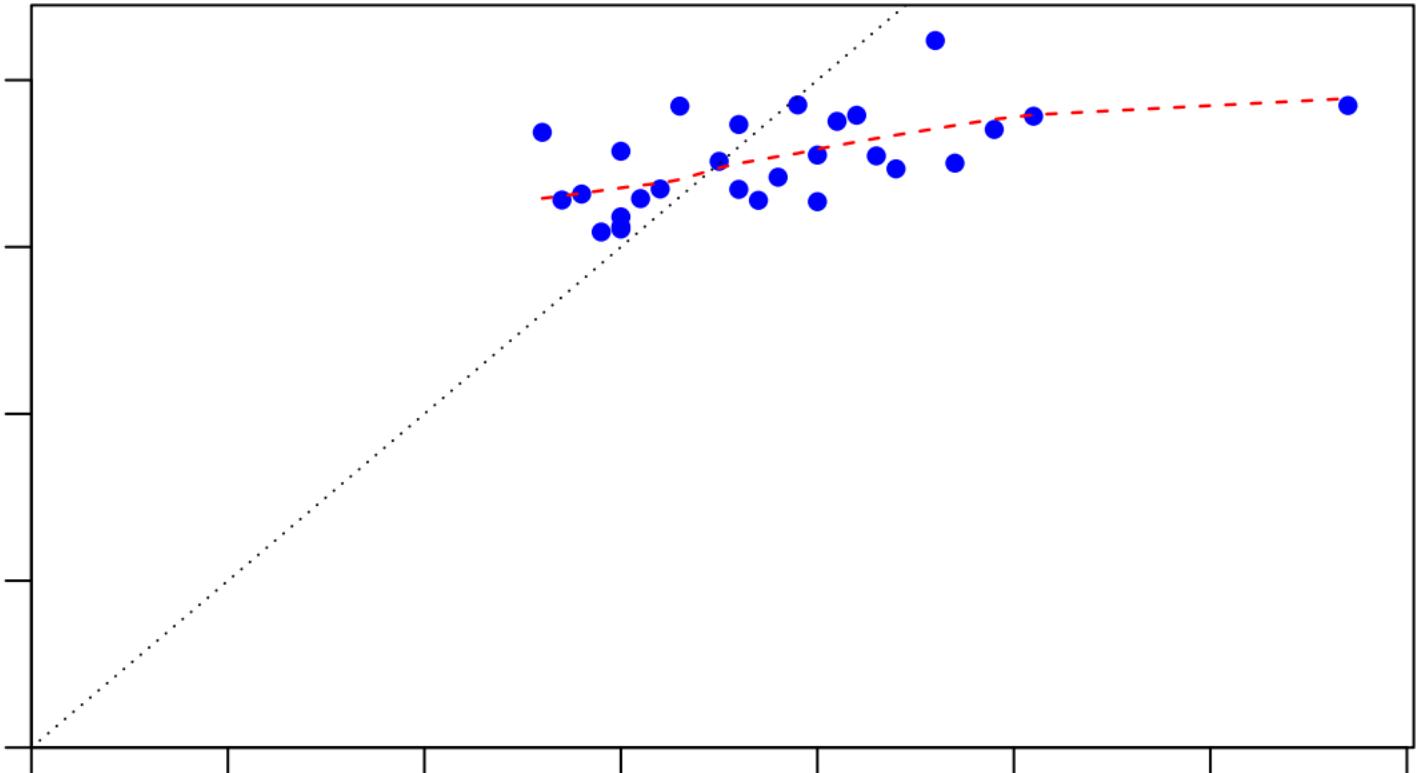


Expected index

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

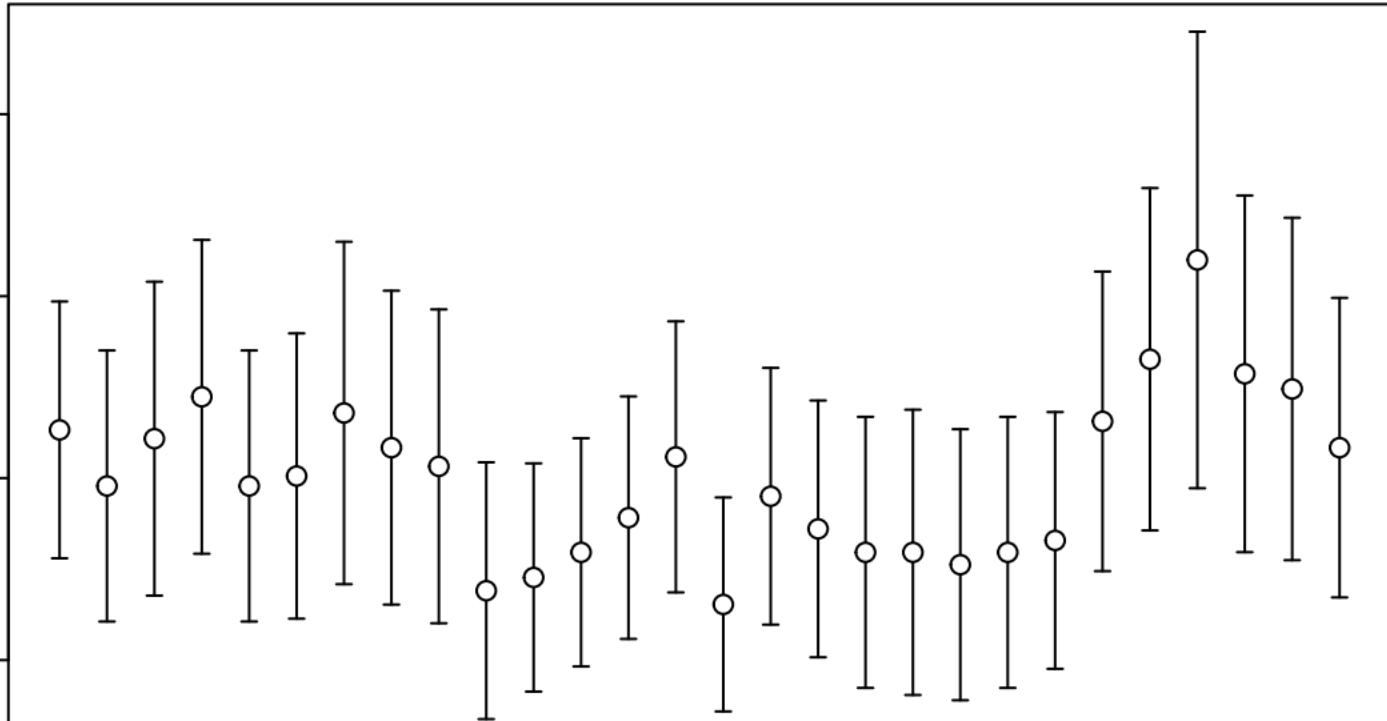


Log index

-1.5 -1.0 -0.5 0.0

1995 2000 2005 2010 2015 2020

Year

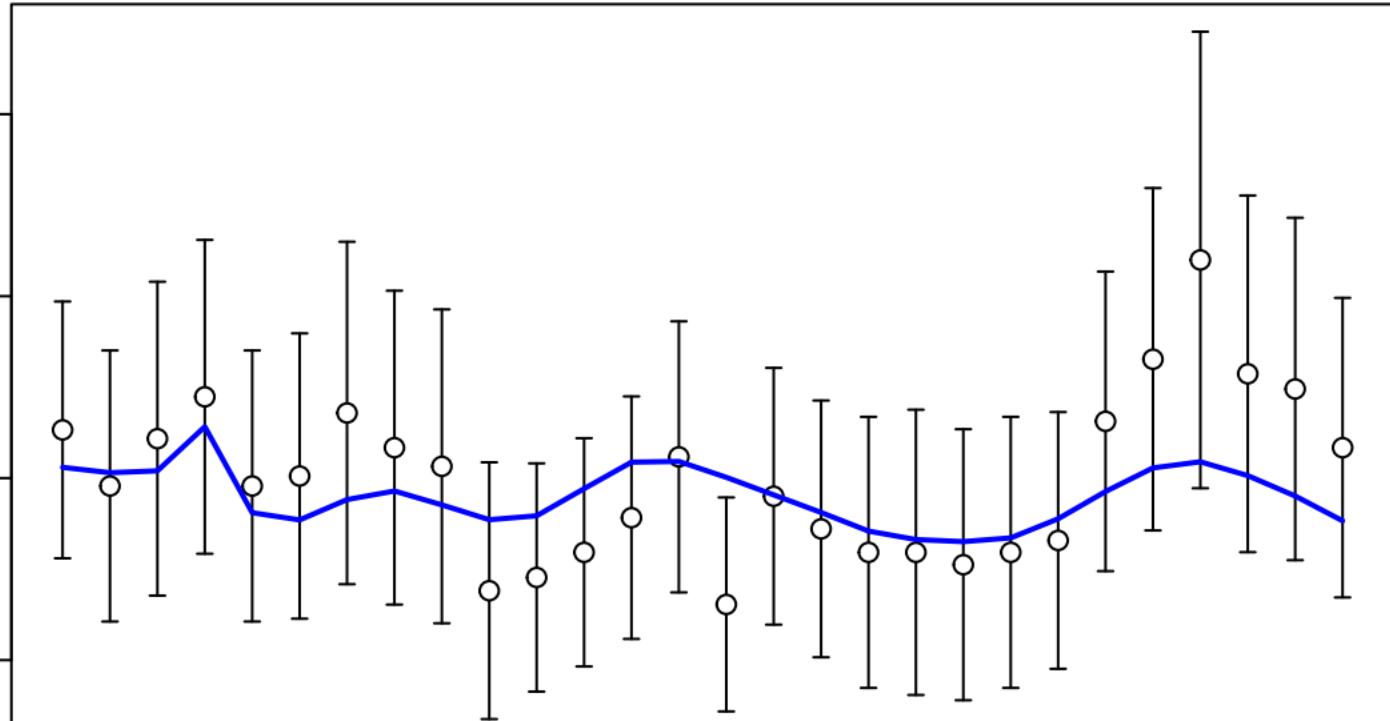


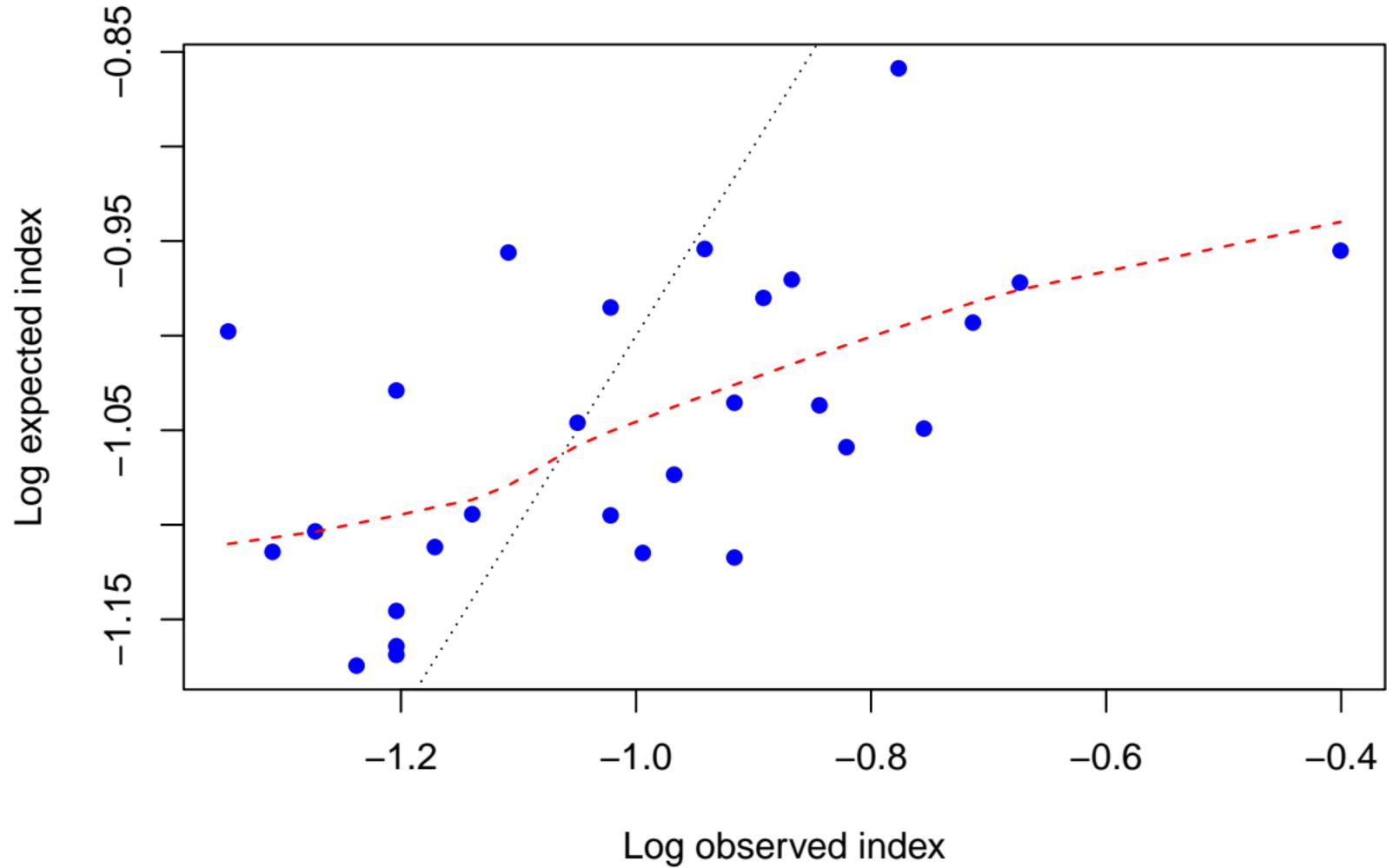
Log index

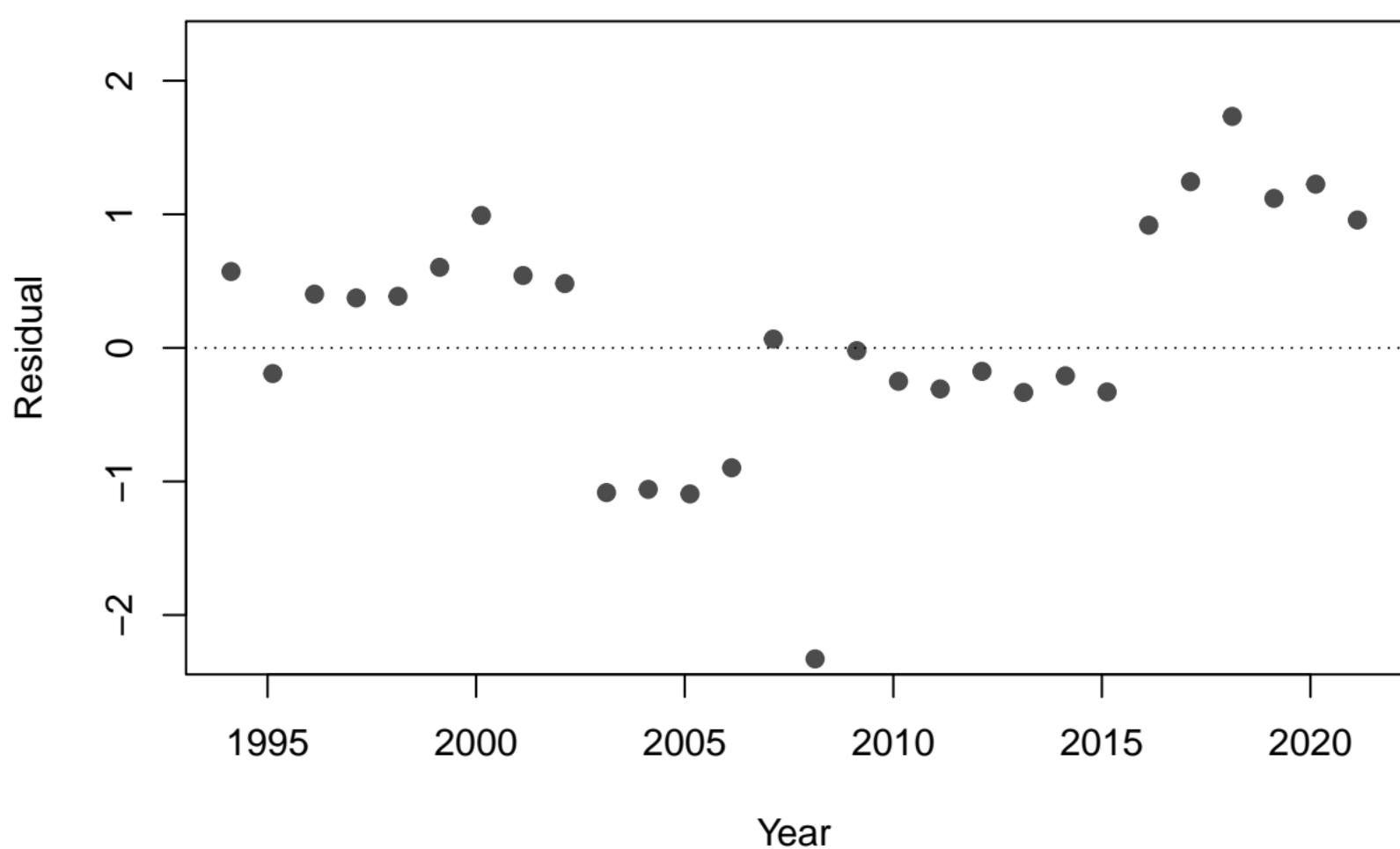
-1.5 -1.0 -0.5 0.0

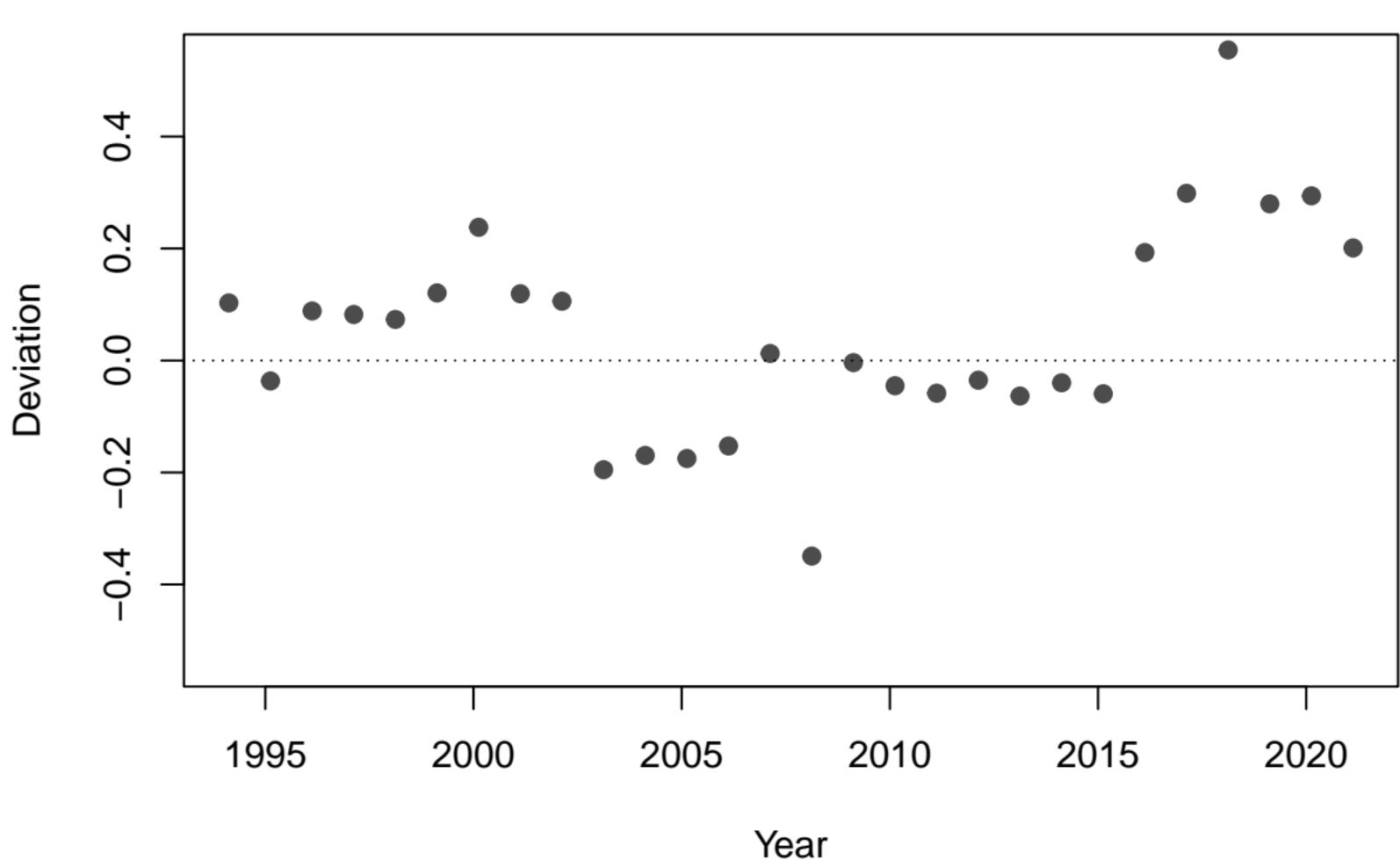
1995 2000 2005 2010 2015 2020

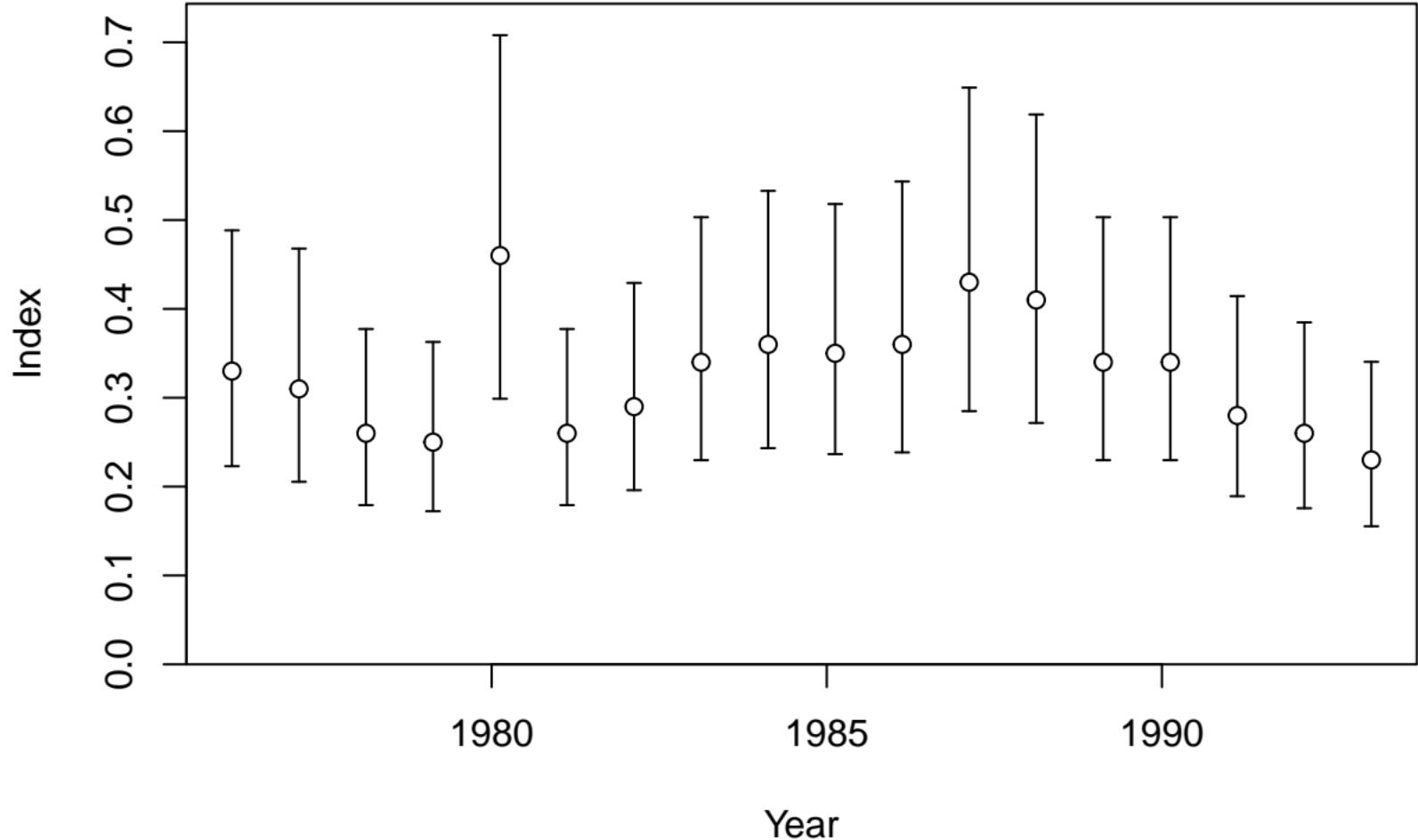
Year

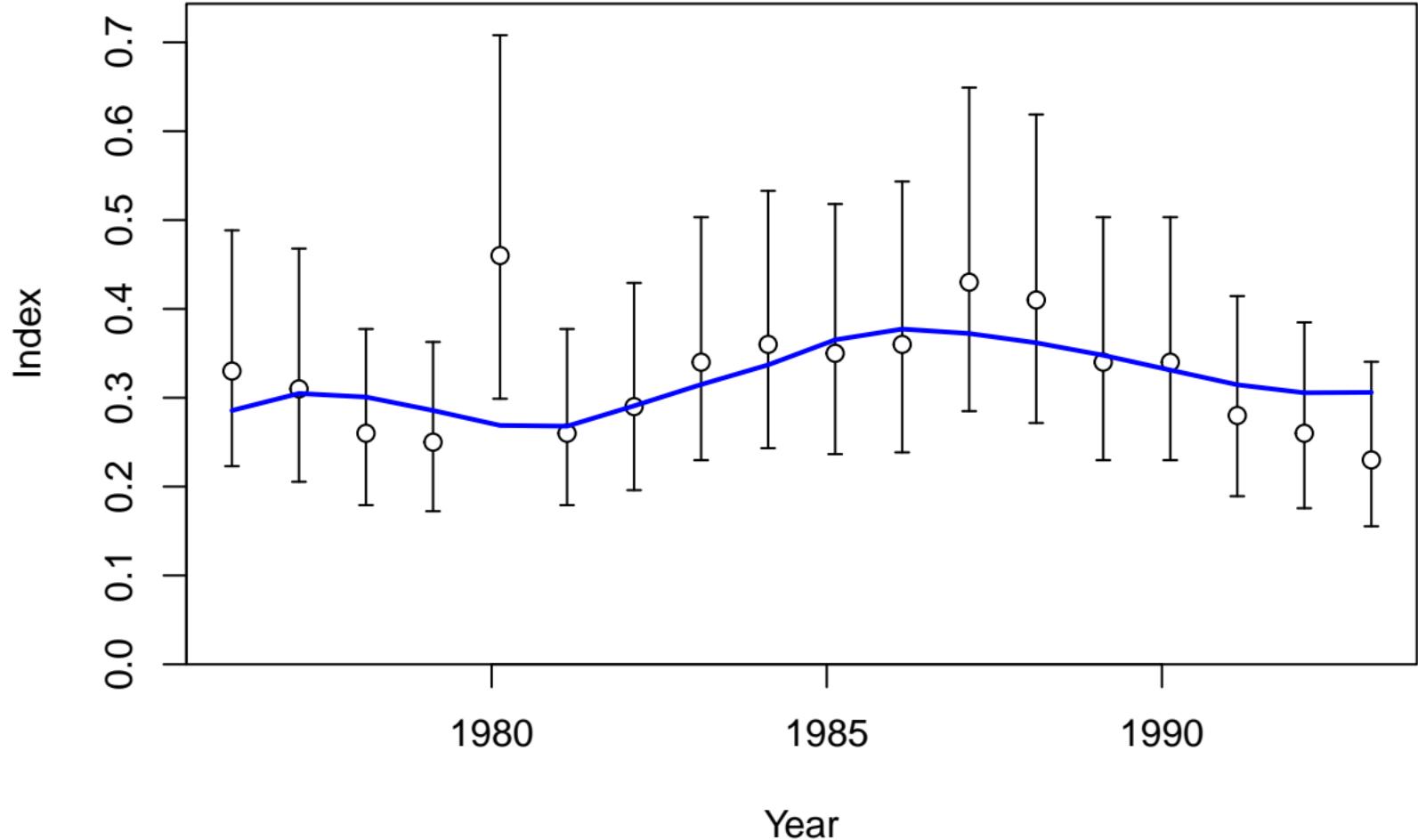










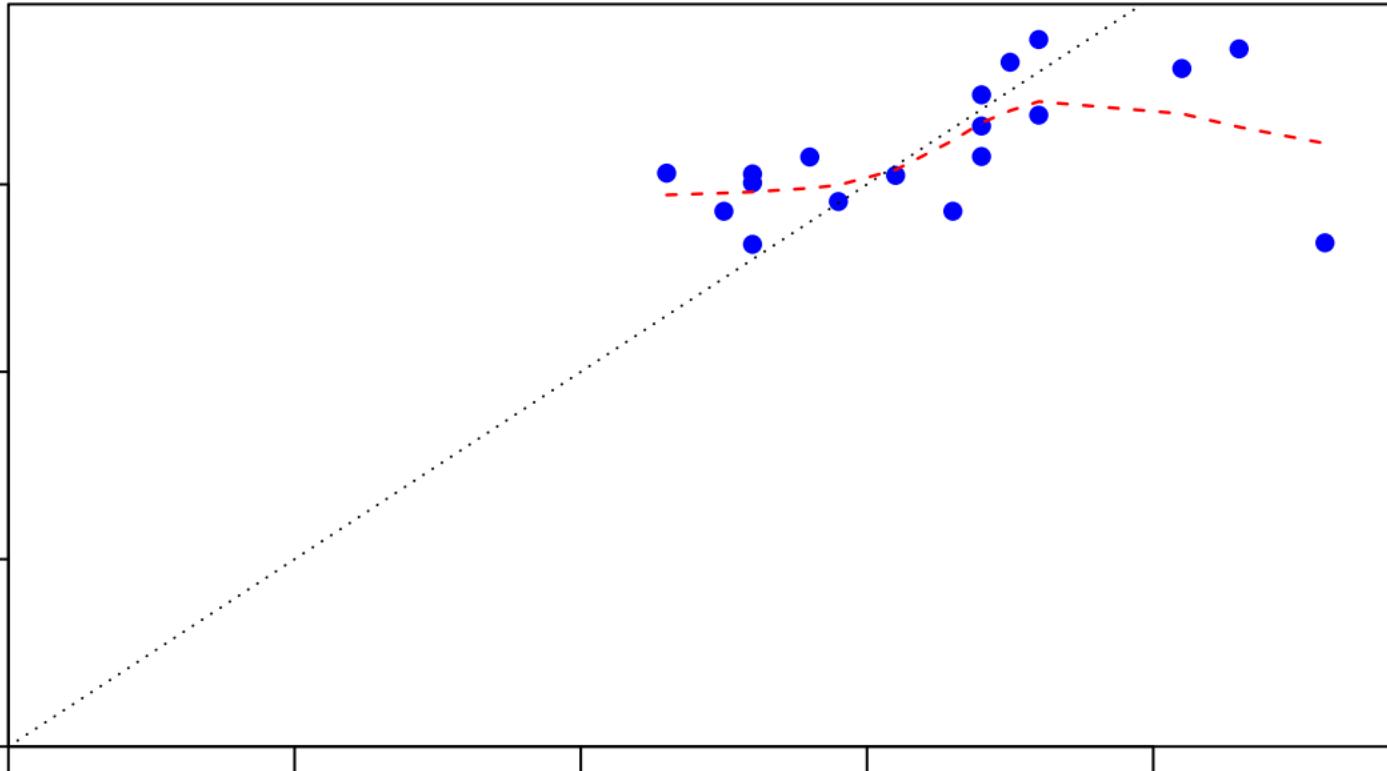


Expected index

0.0
0.1
0.2
0.3

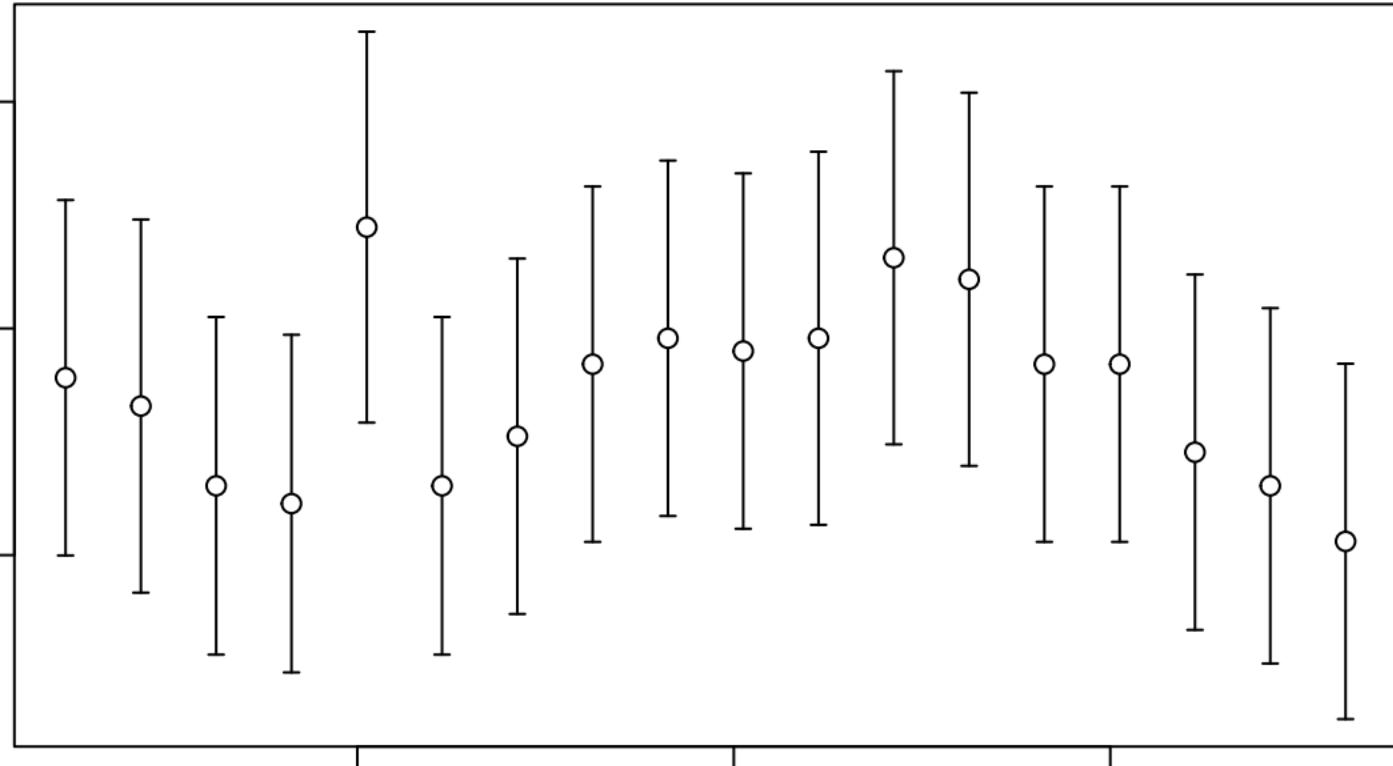
0.0 0.1 0.2 0.3 0.4

Observed index



Log index

-0.5
-1.0
-1.5



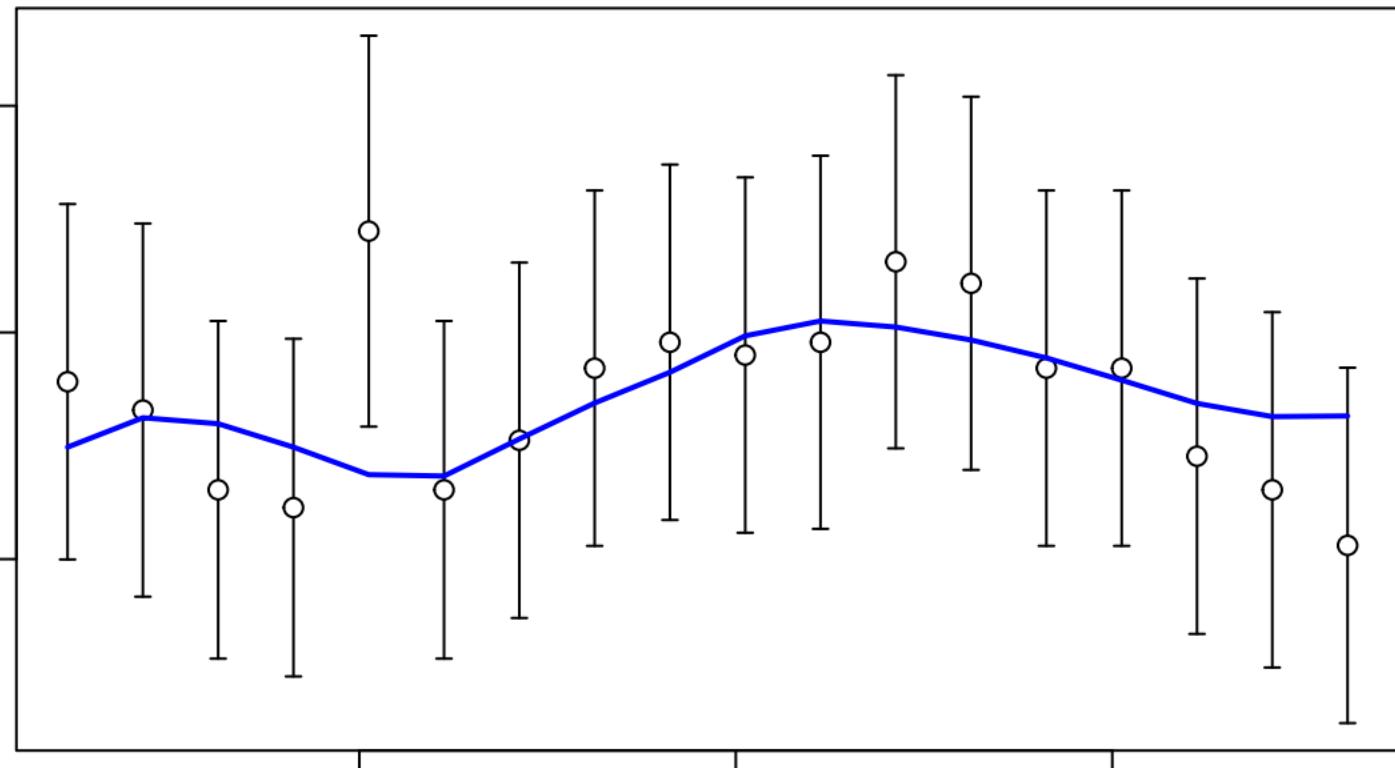
Year

Log index

-0.5
-1.0
-1.5

1980 1985 1990

Year

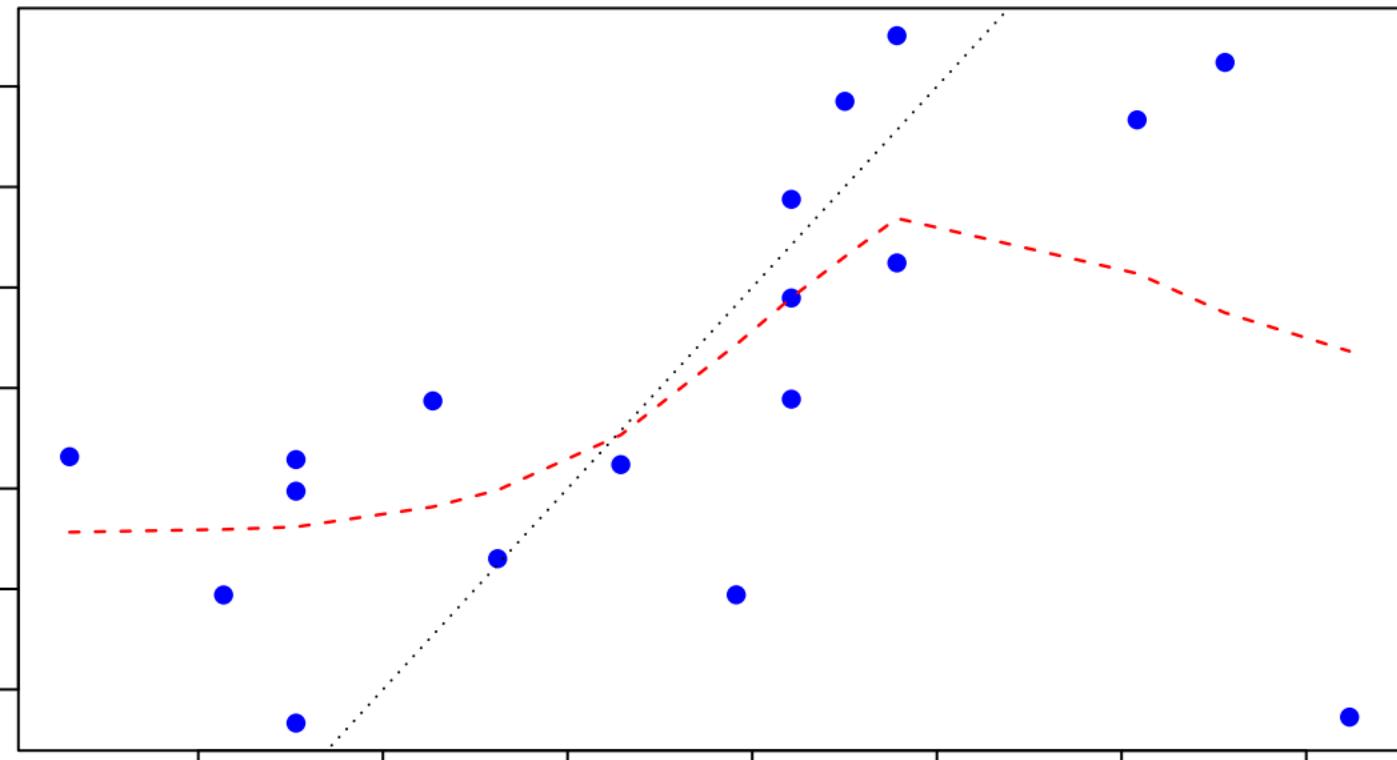


Log expected index

-1.00
-1.10
-1.20
-1.30

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

Log observed index



Residual

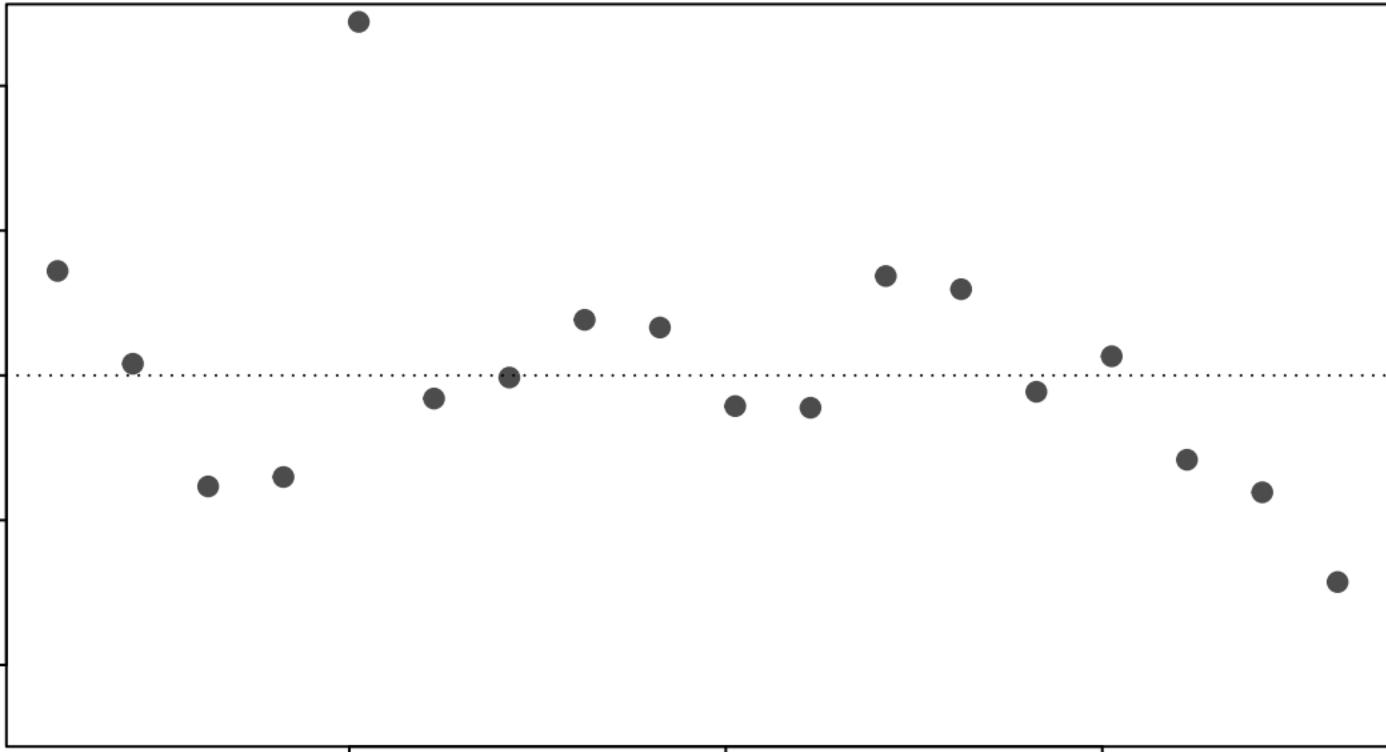
2
1
0
-1
-2

1980

Year

1985

1990



Deviation

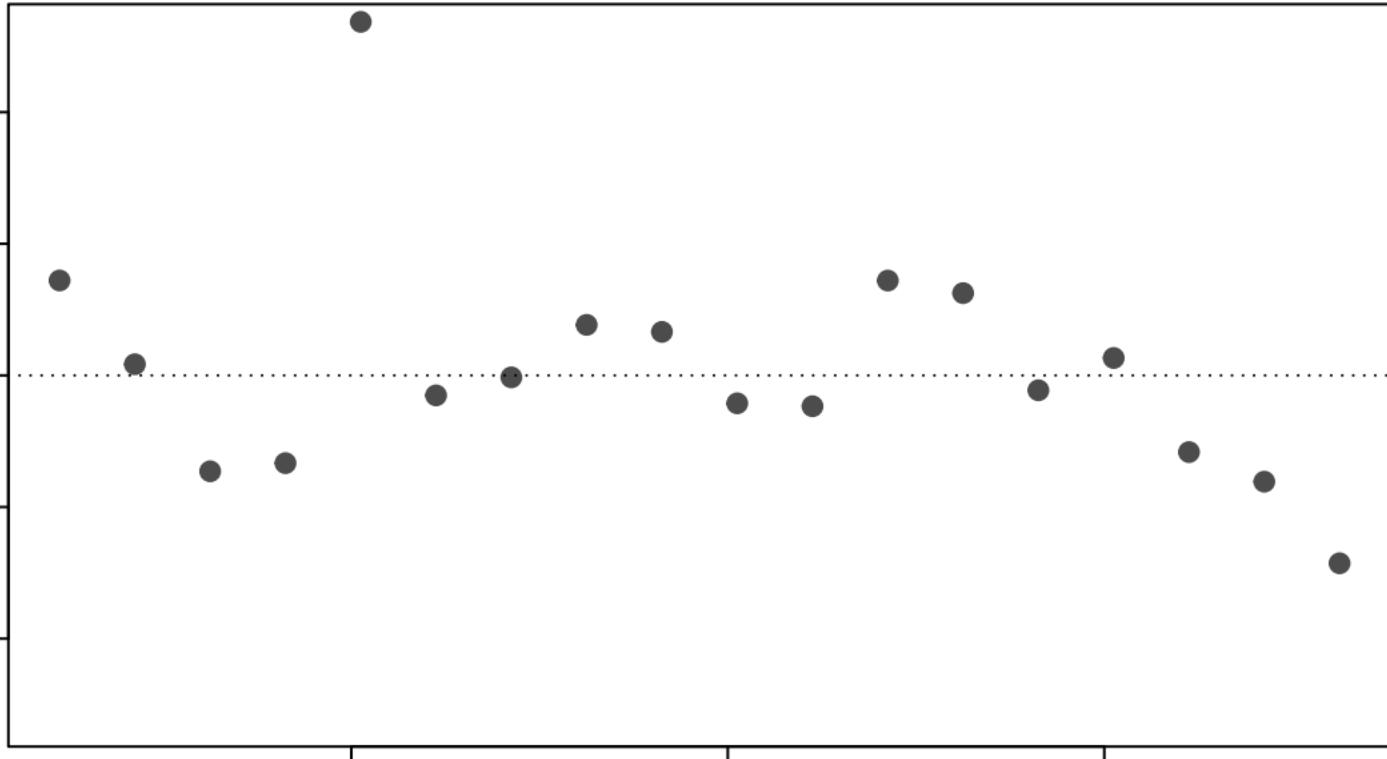
-0.4
-0.2
0.0
0.2
0.4

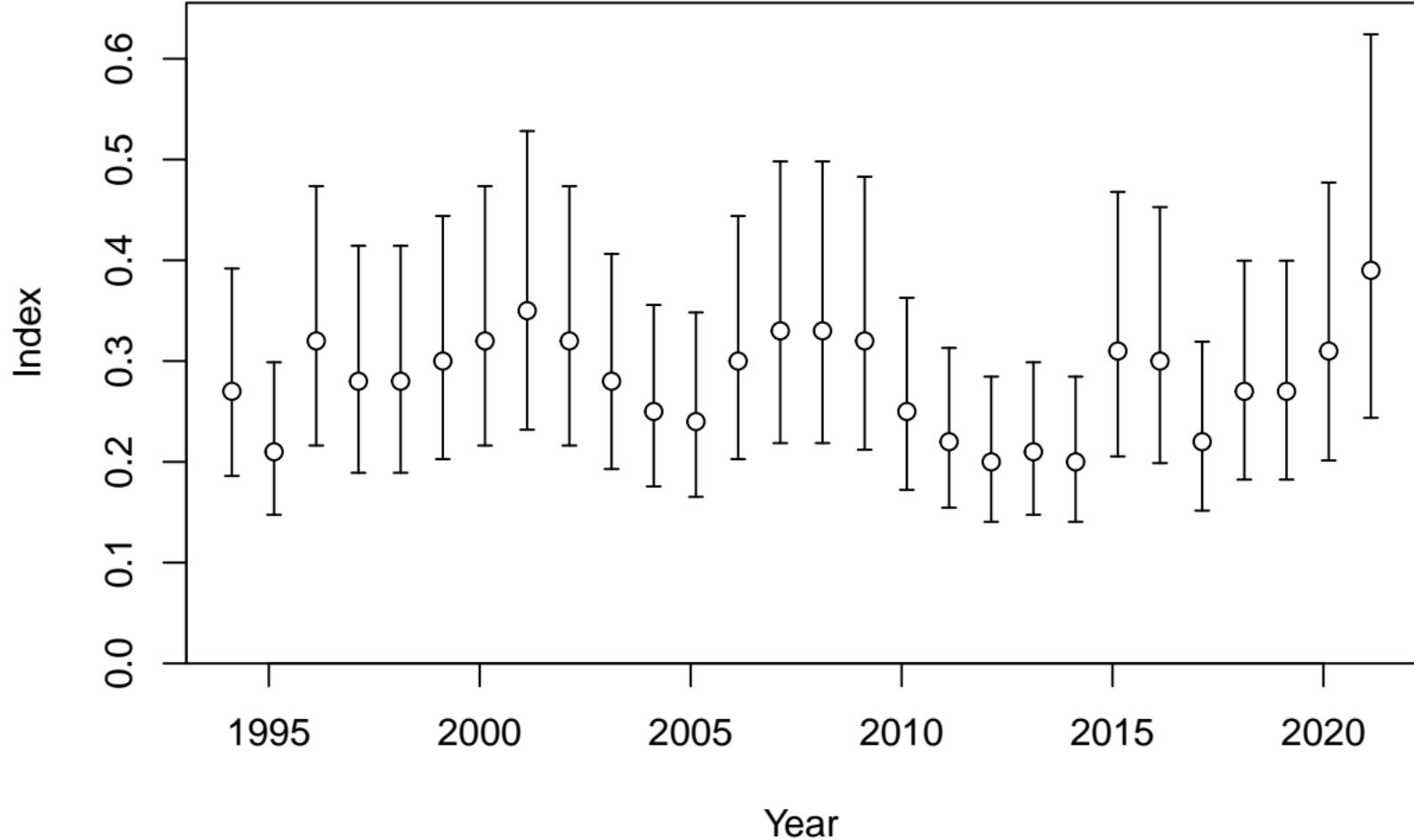
1980

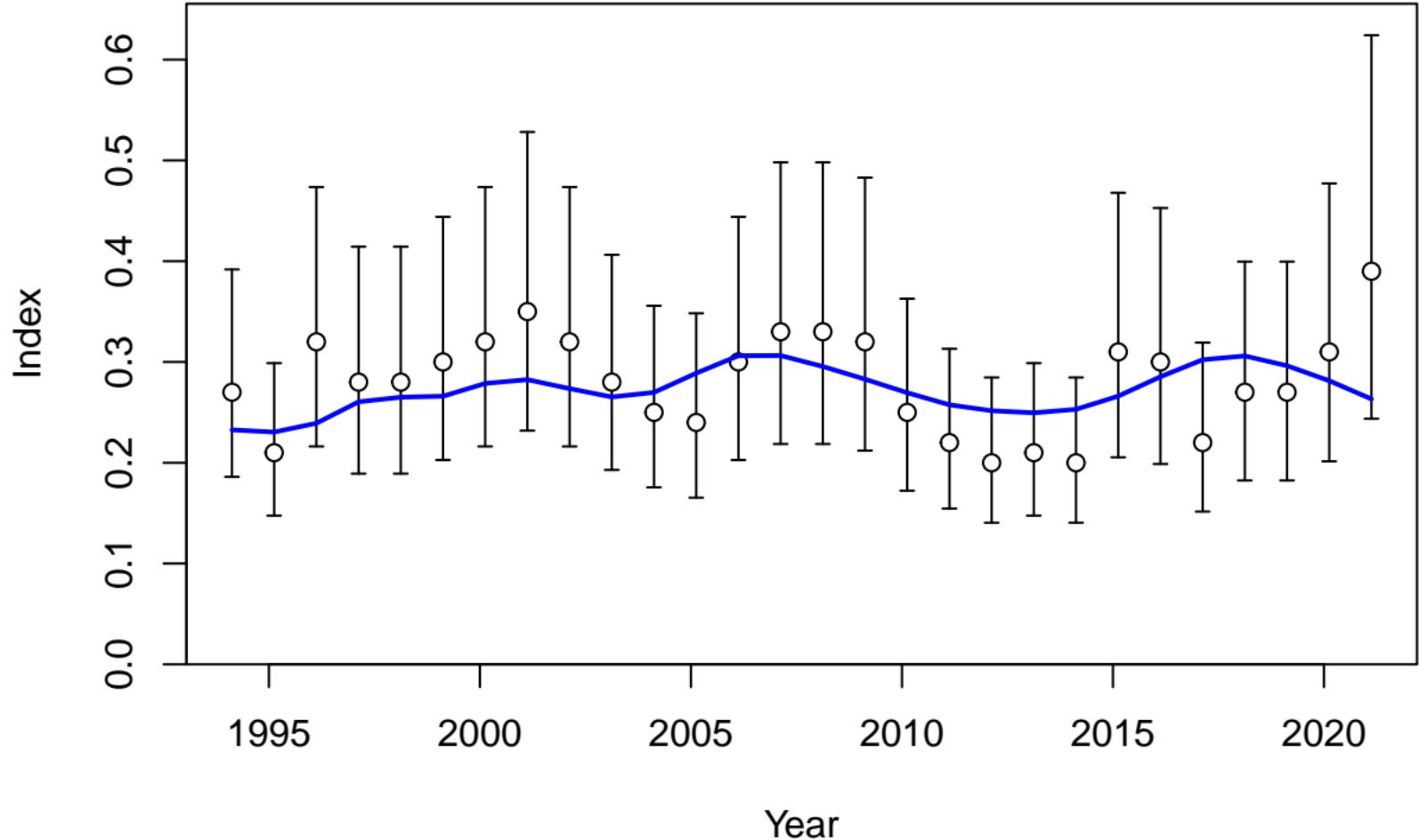
Year

1985

1990





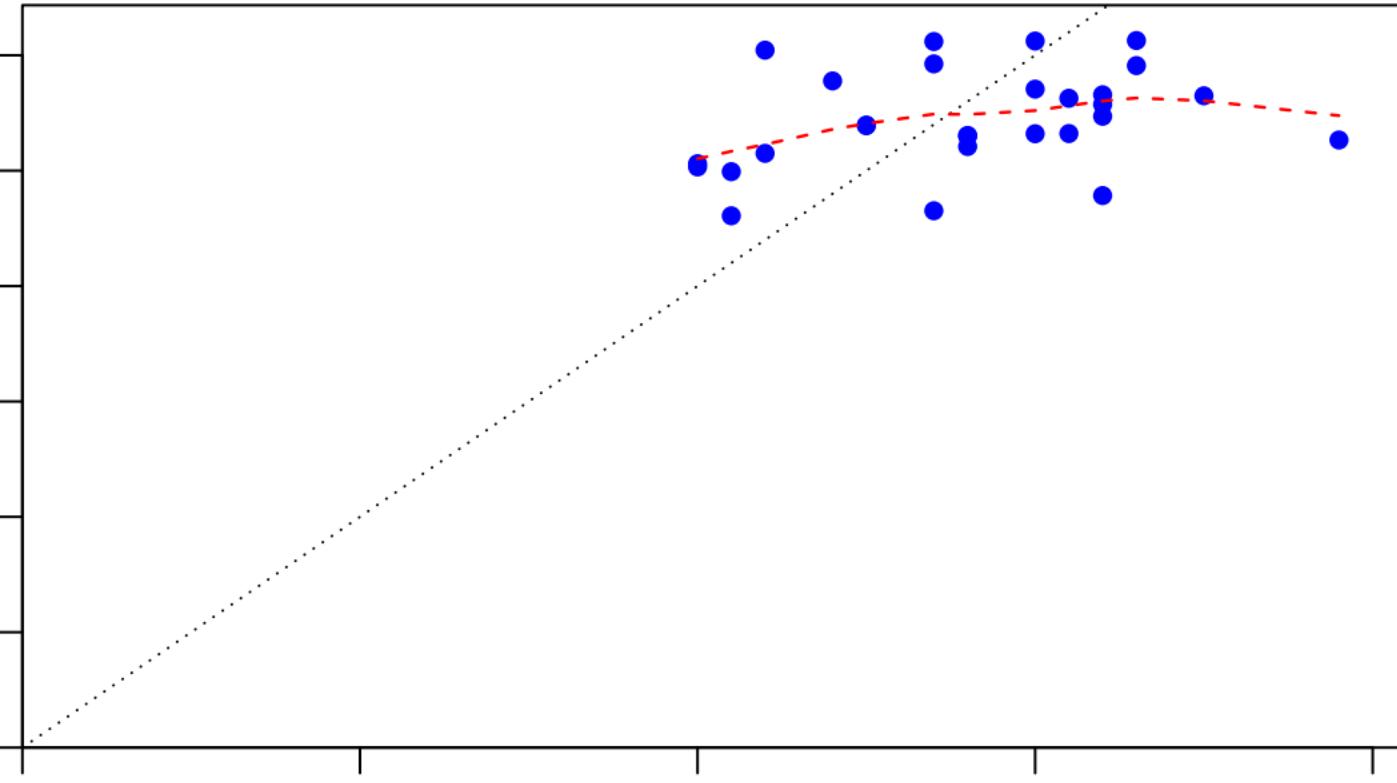


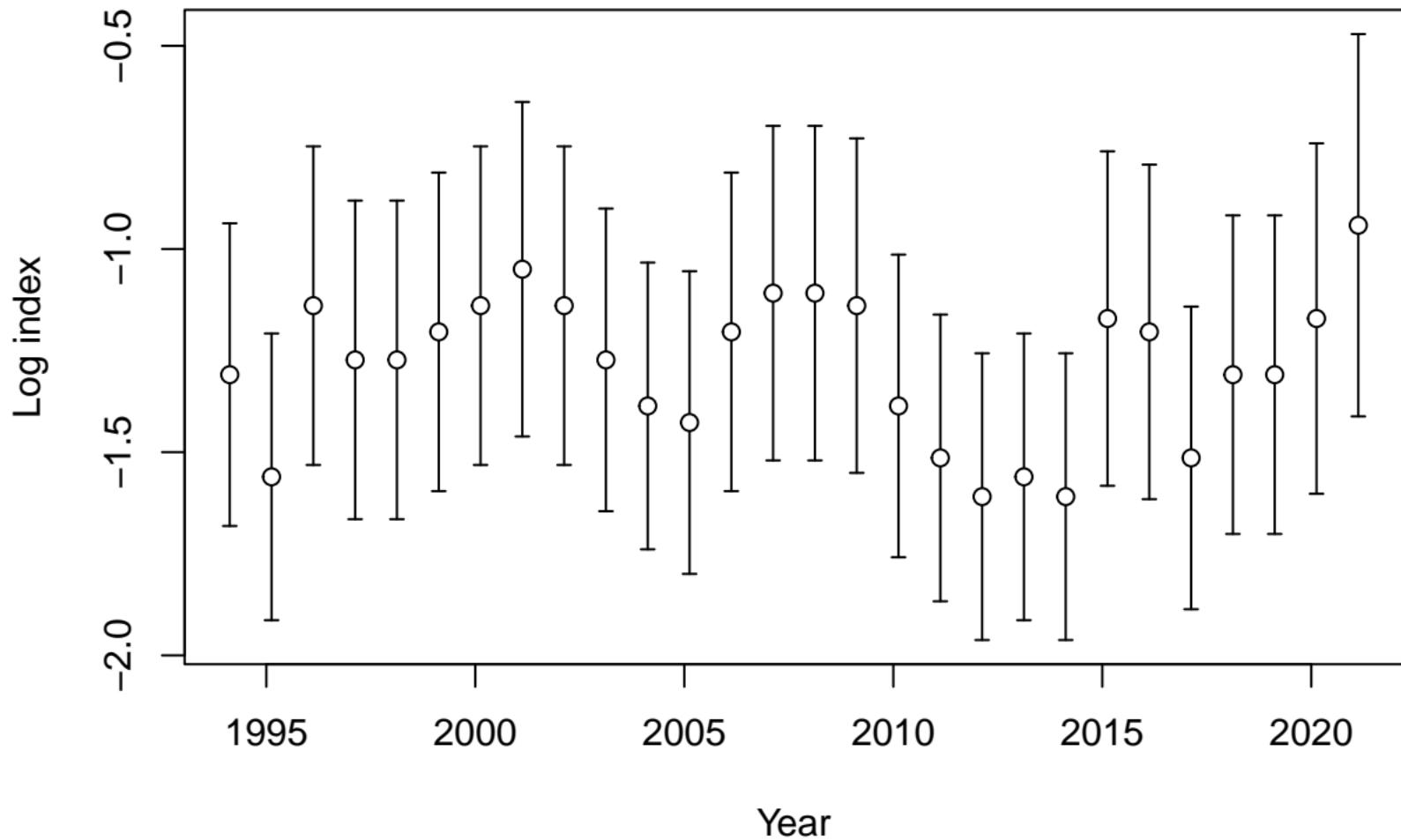
Expected index

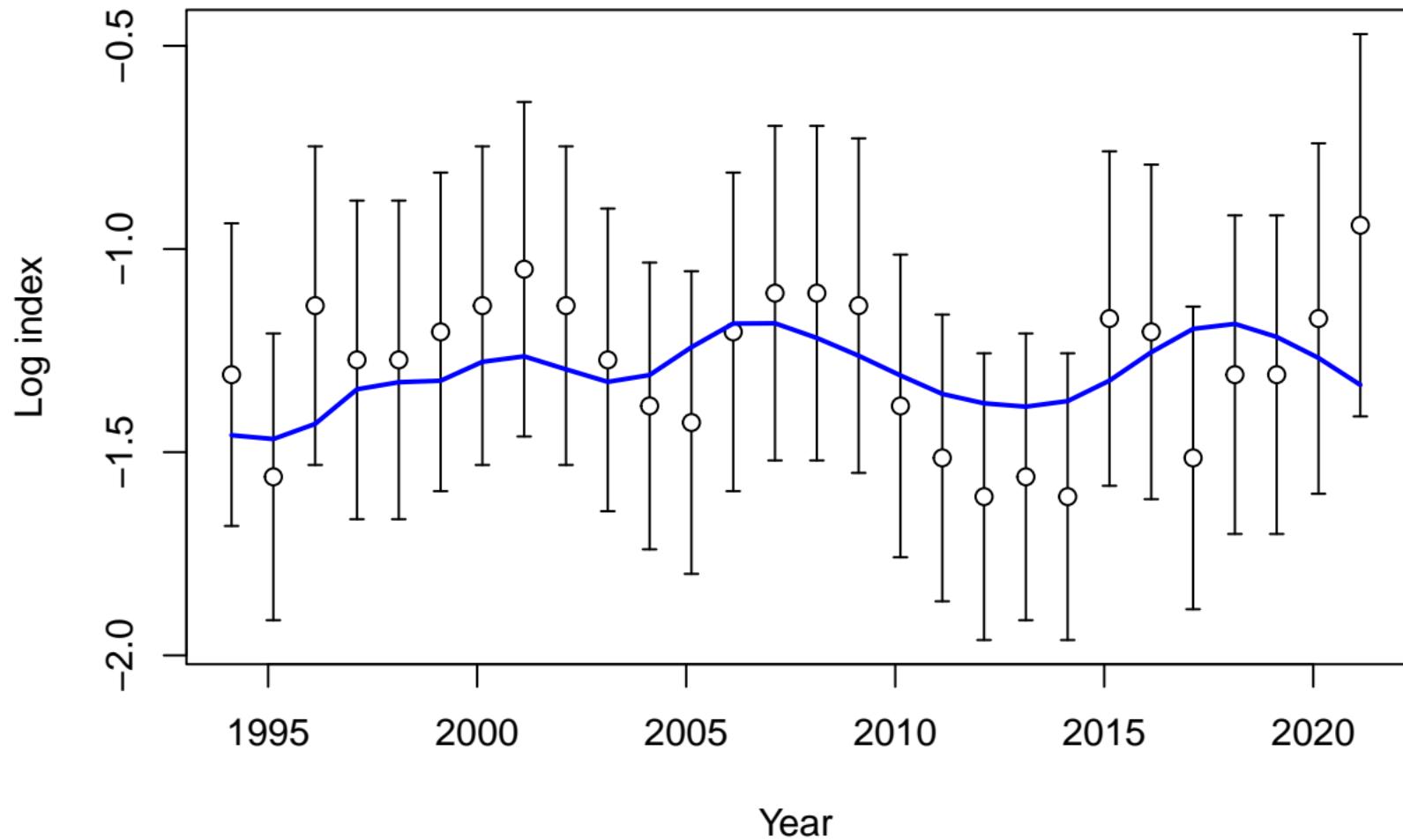
0.30
0.20
0.10
0.00

0.0 0.1 0.2 0.3 0.4

Observed index





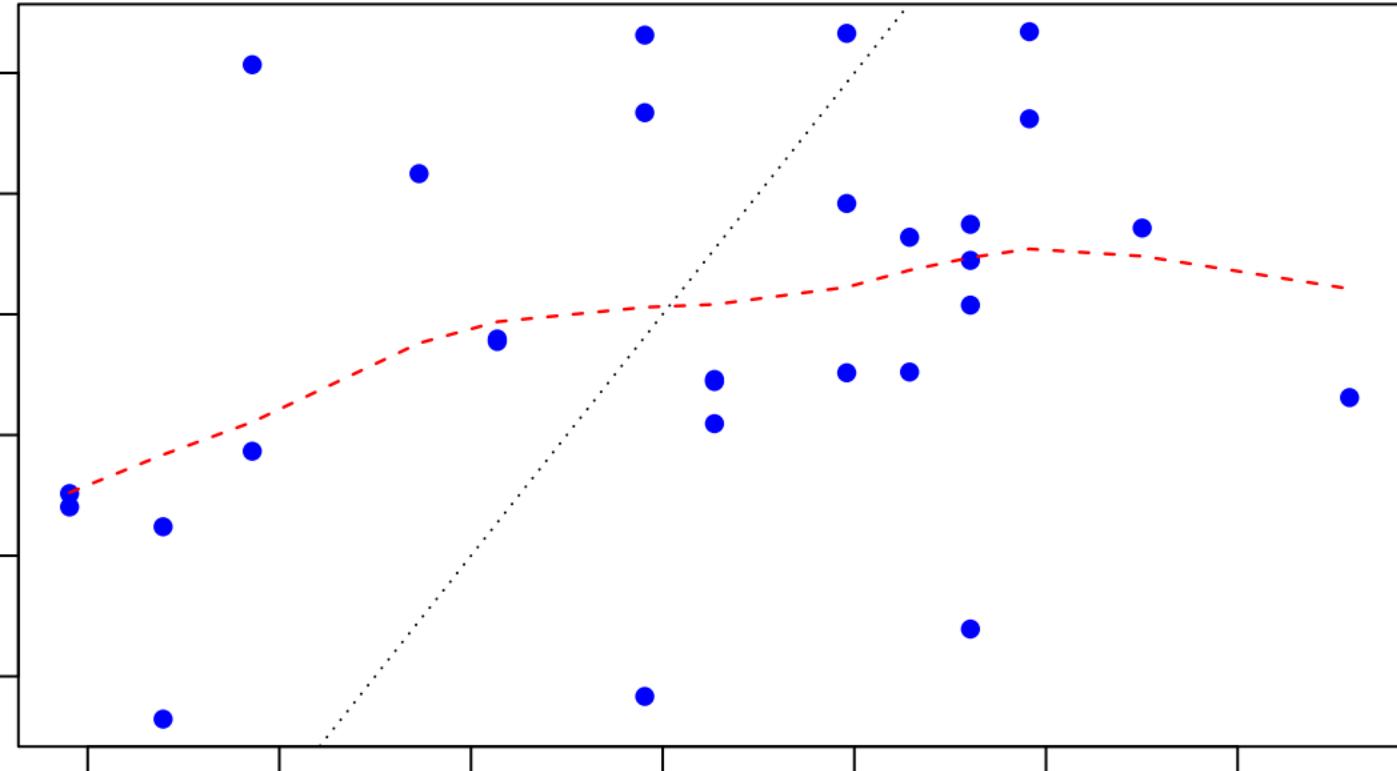


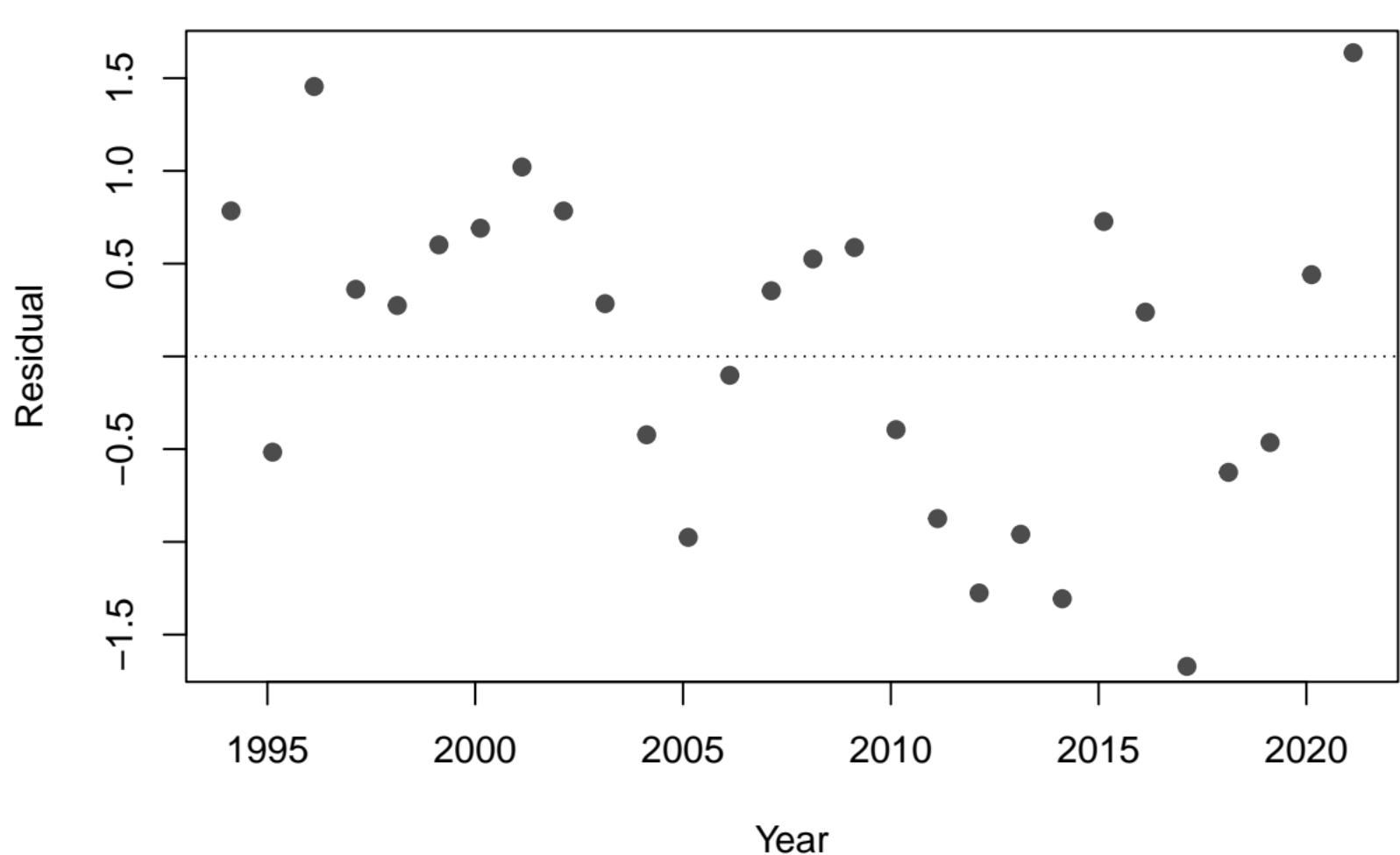
Log expected index

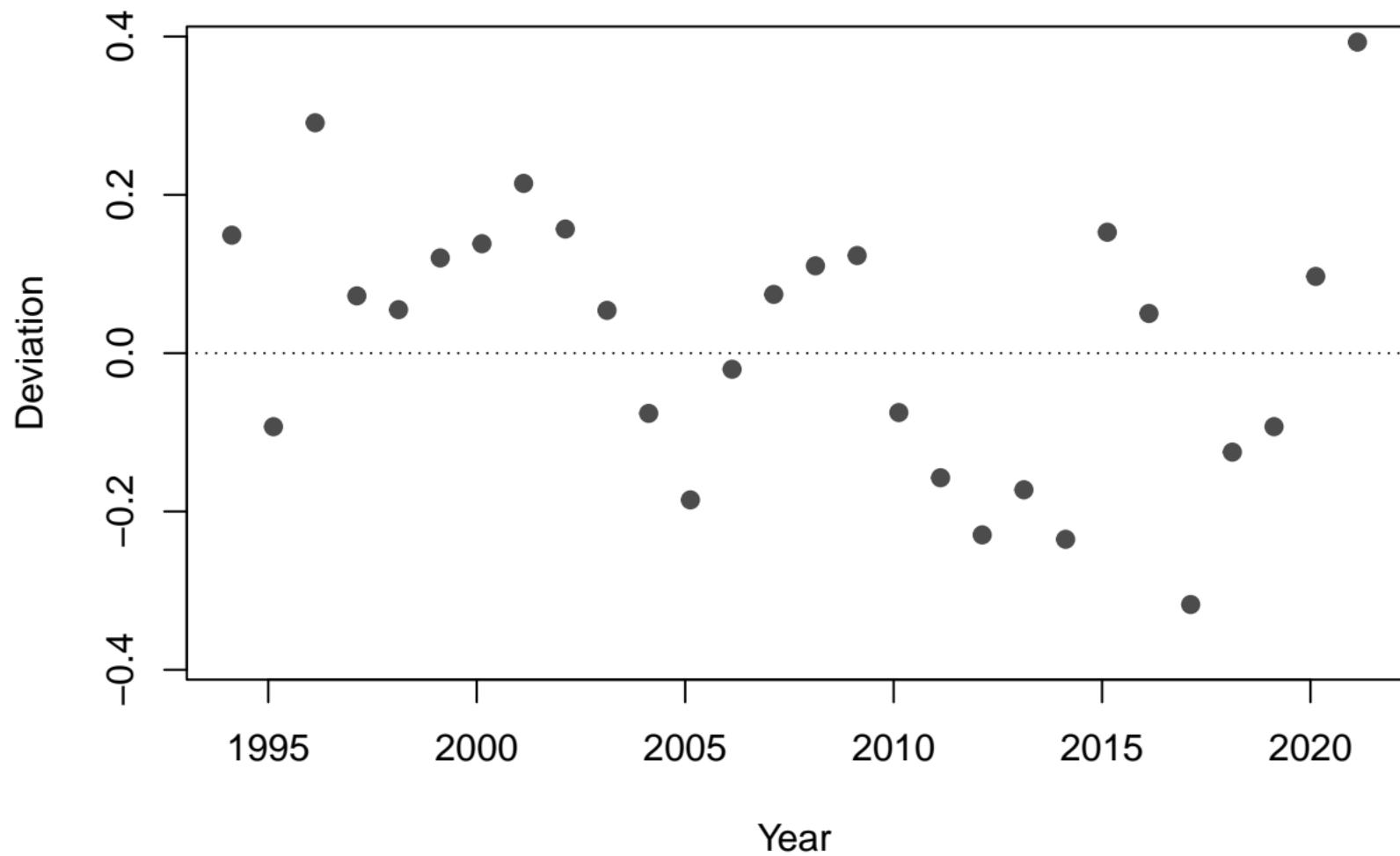
-1.25
-1.35
-1.45

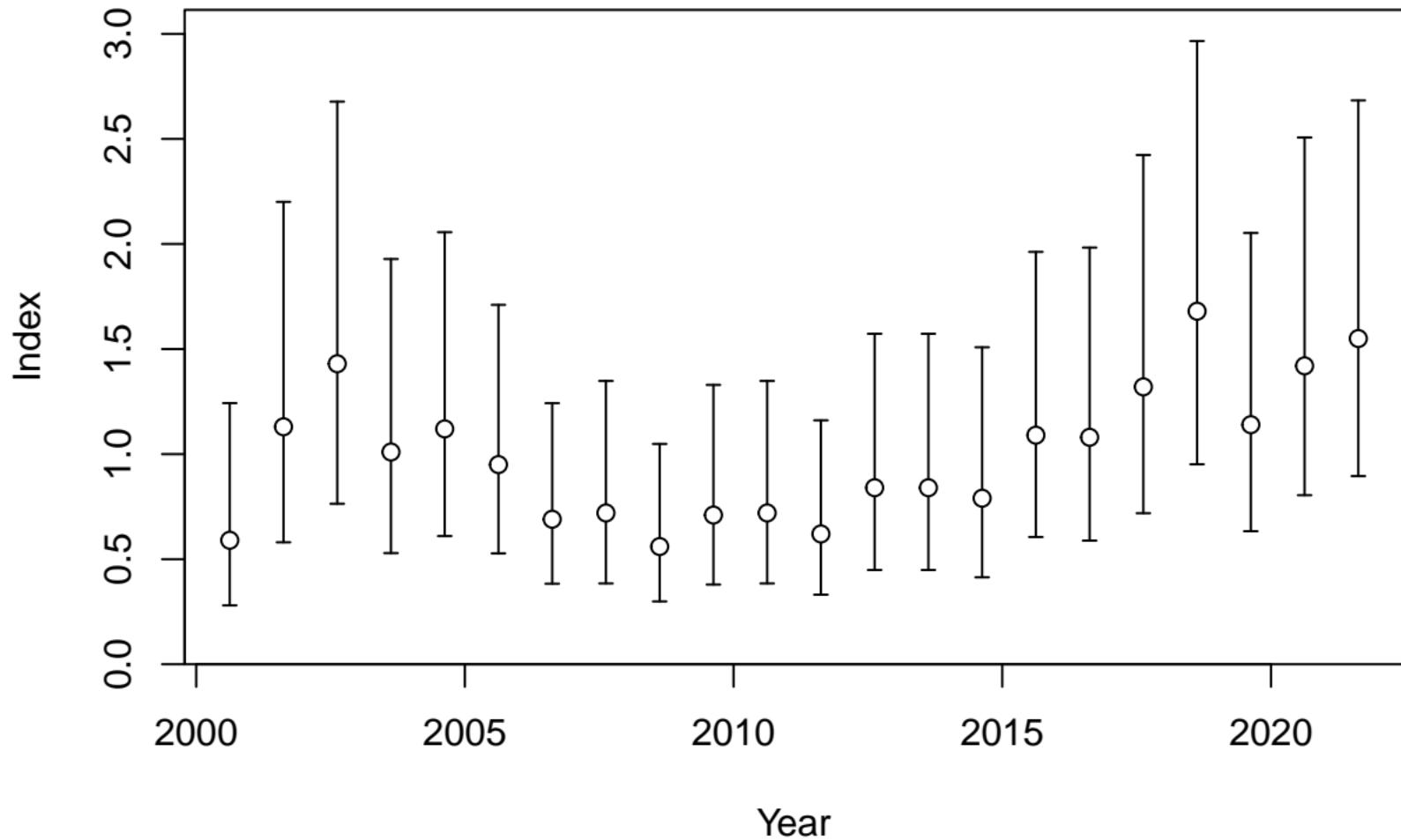
-1.6 -1.5 -1.4 -1.3 -1.2 -1.1 -1.0

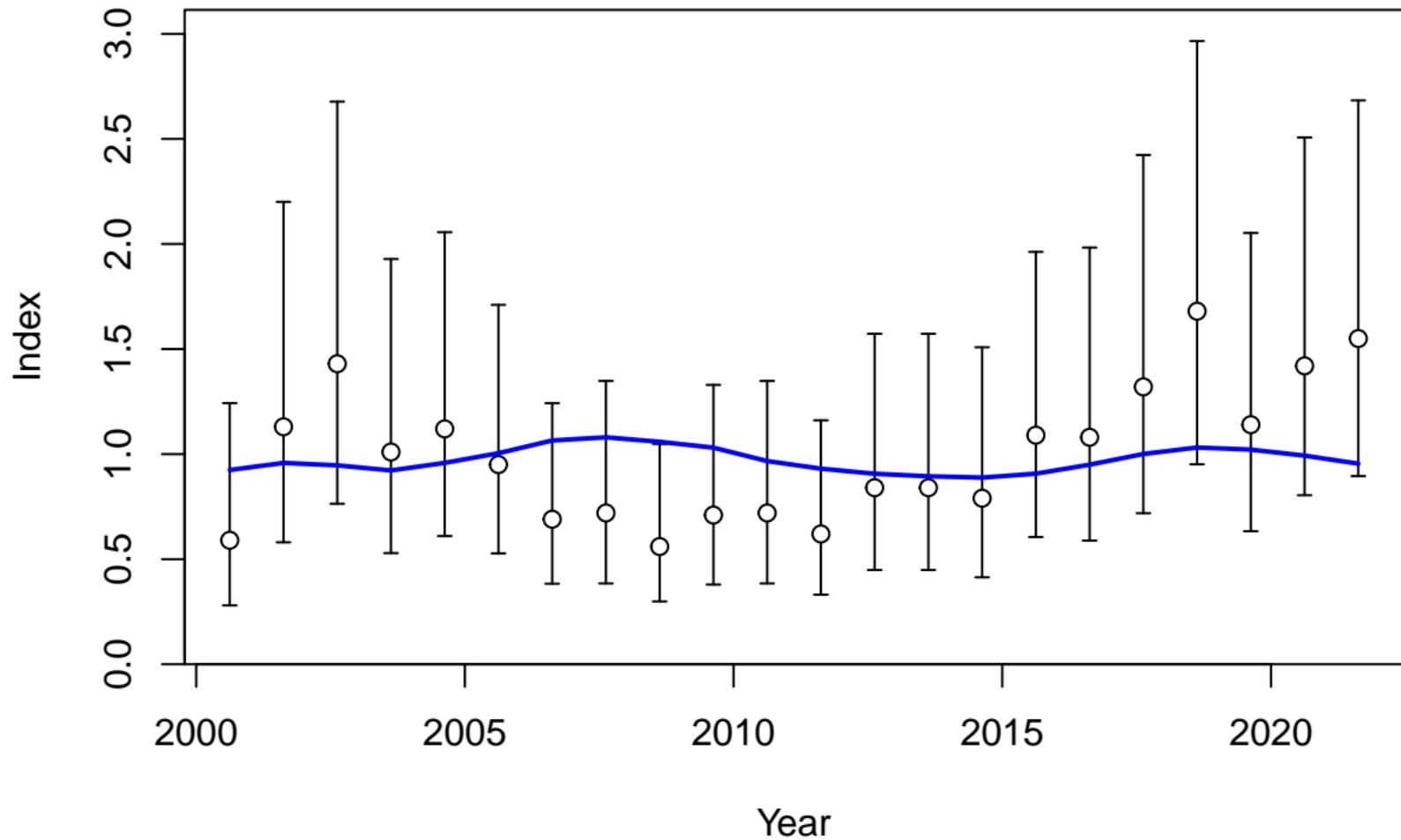
Log observed index











Expected index

1.0
0.8
0.6
0.4
0.2
0.0

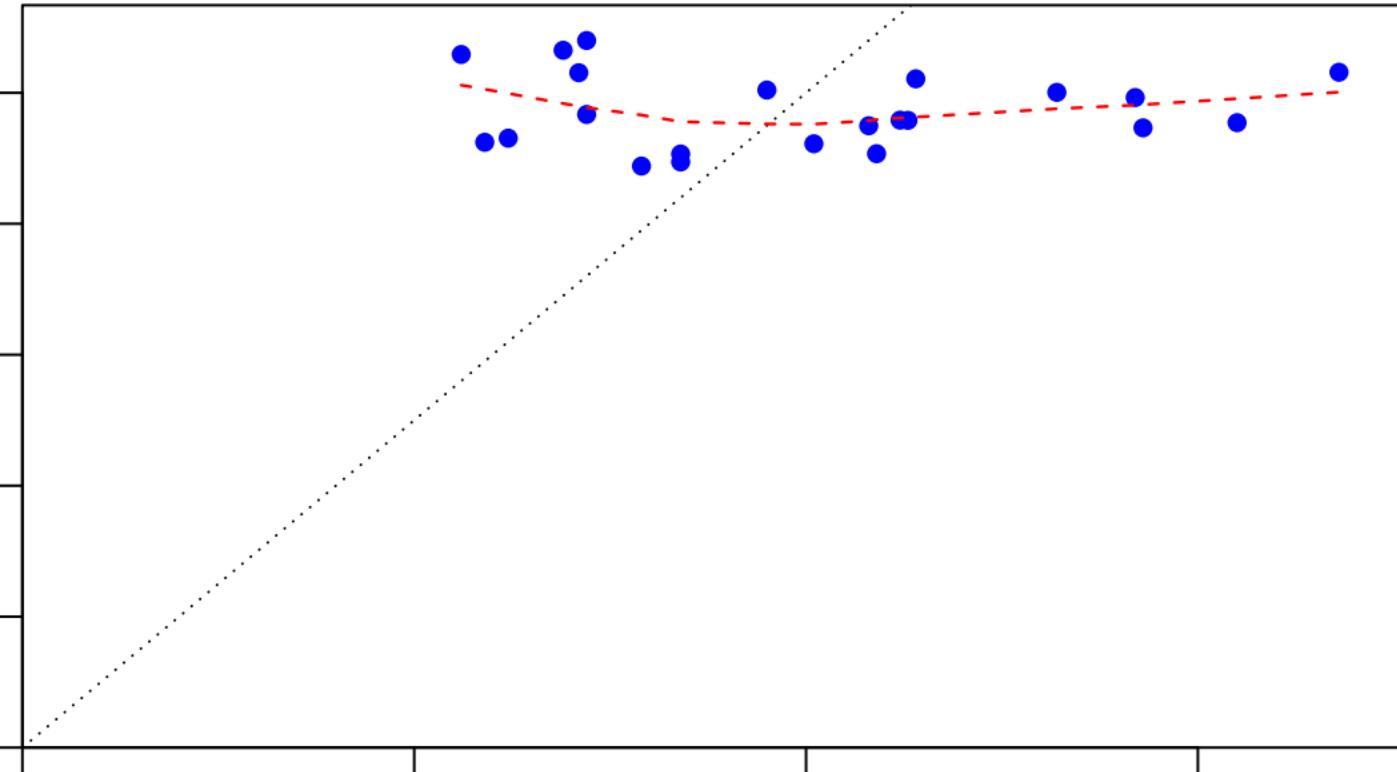
0.0

0.5

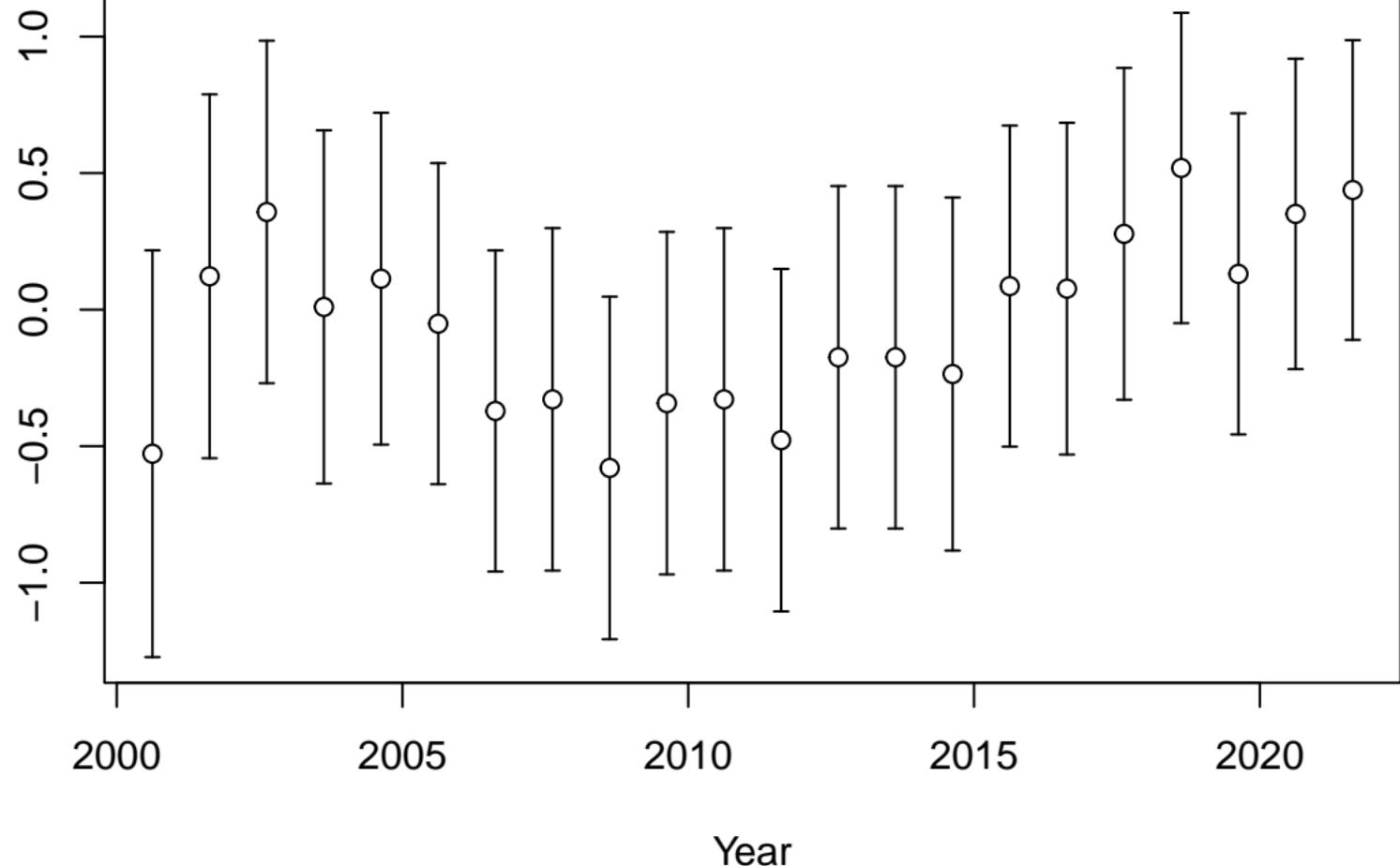
1.0

1.5

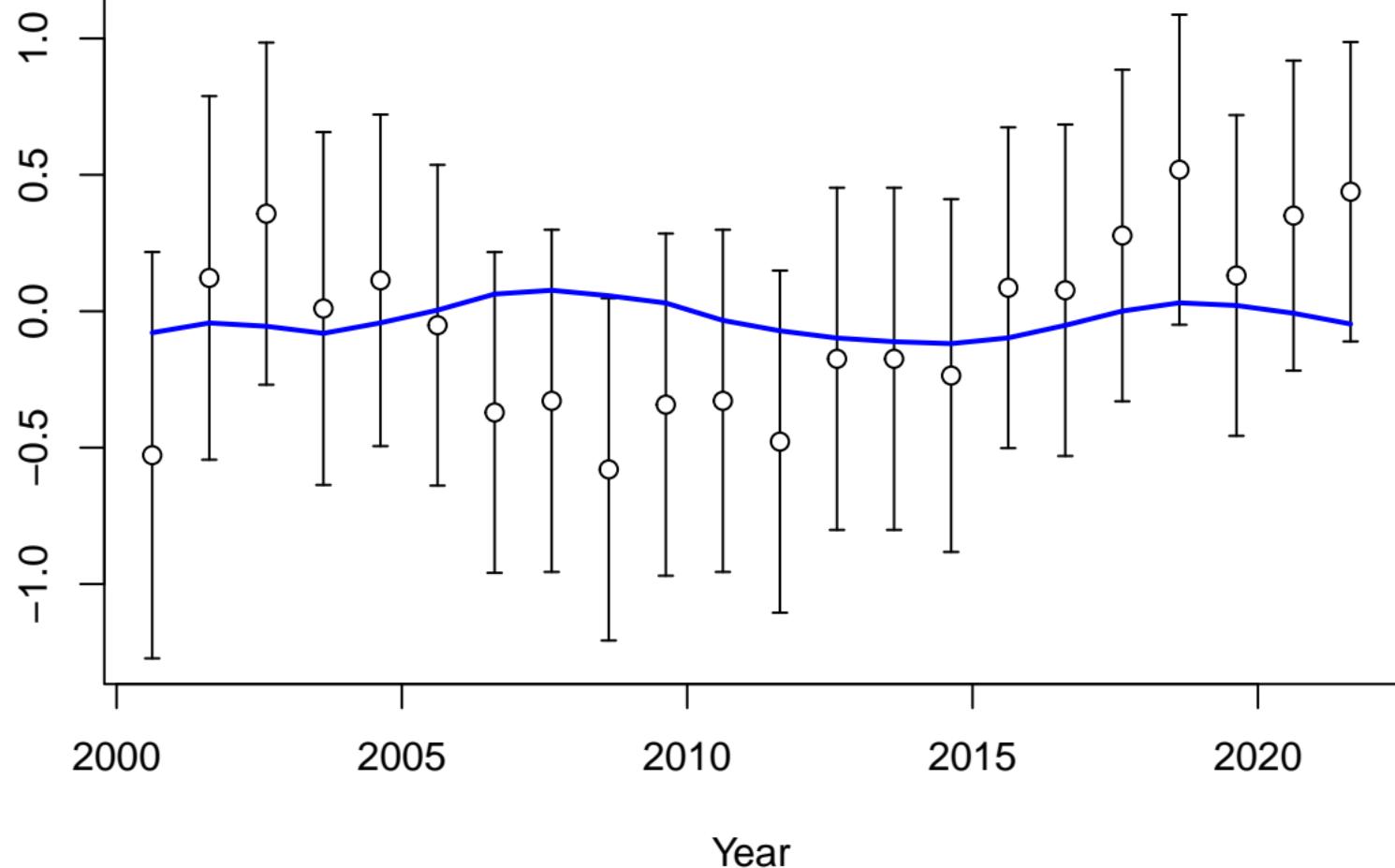
Observed index



Log index



Log index

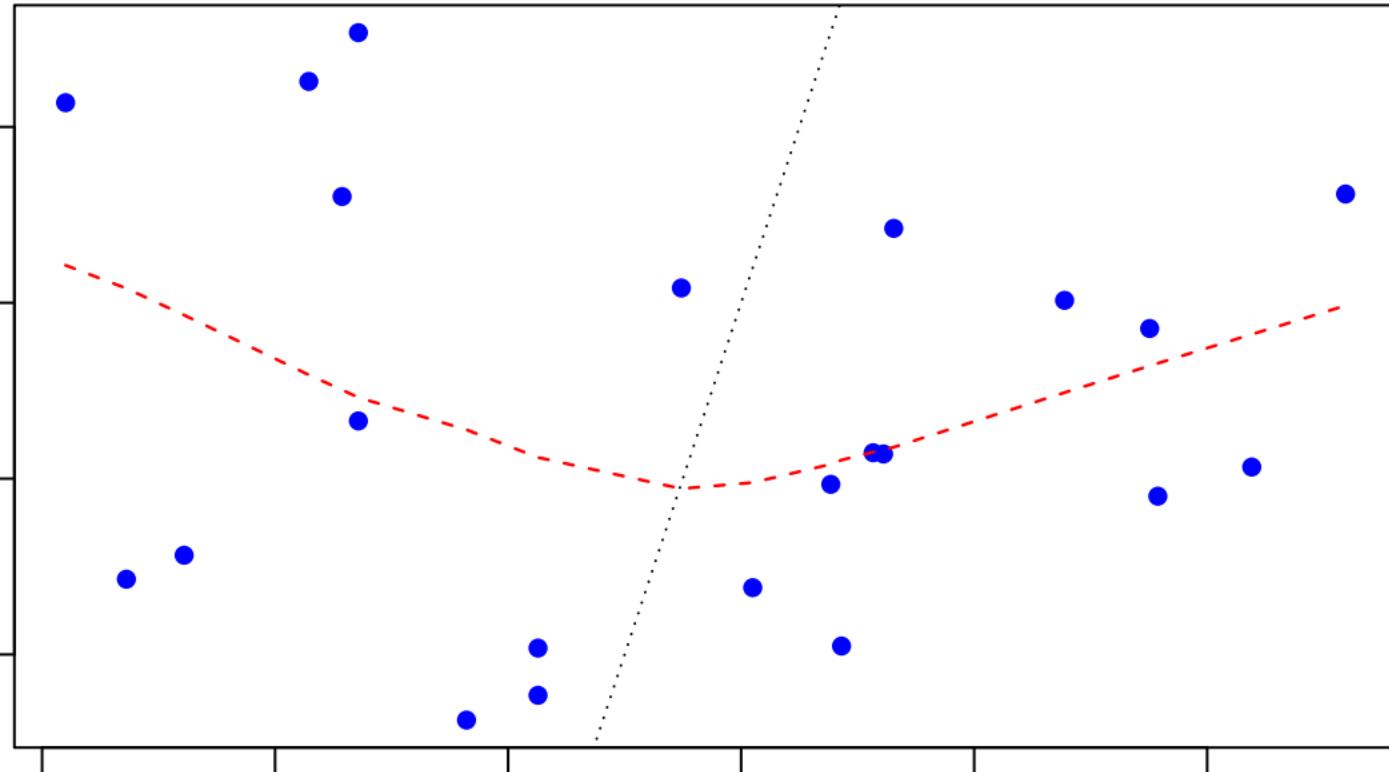


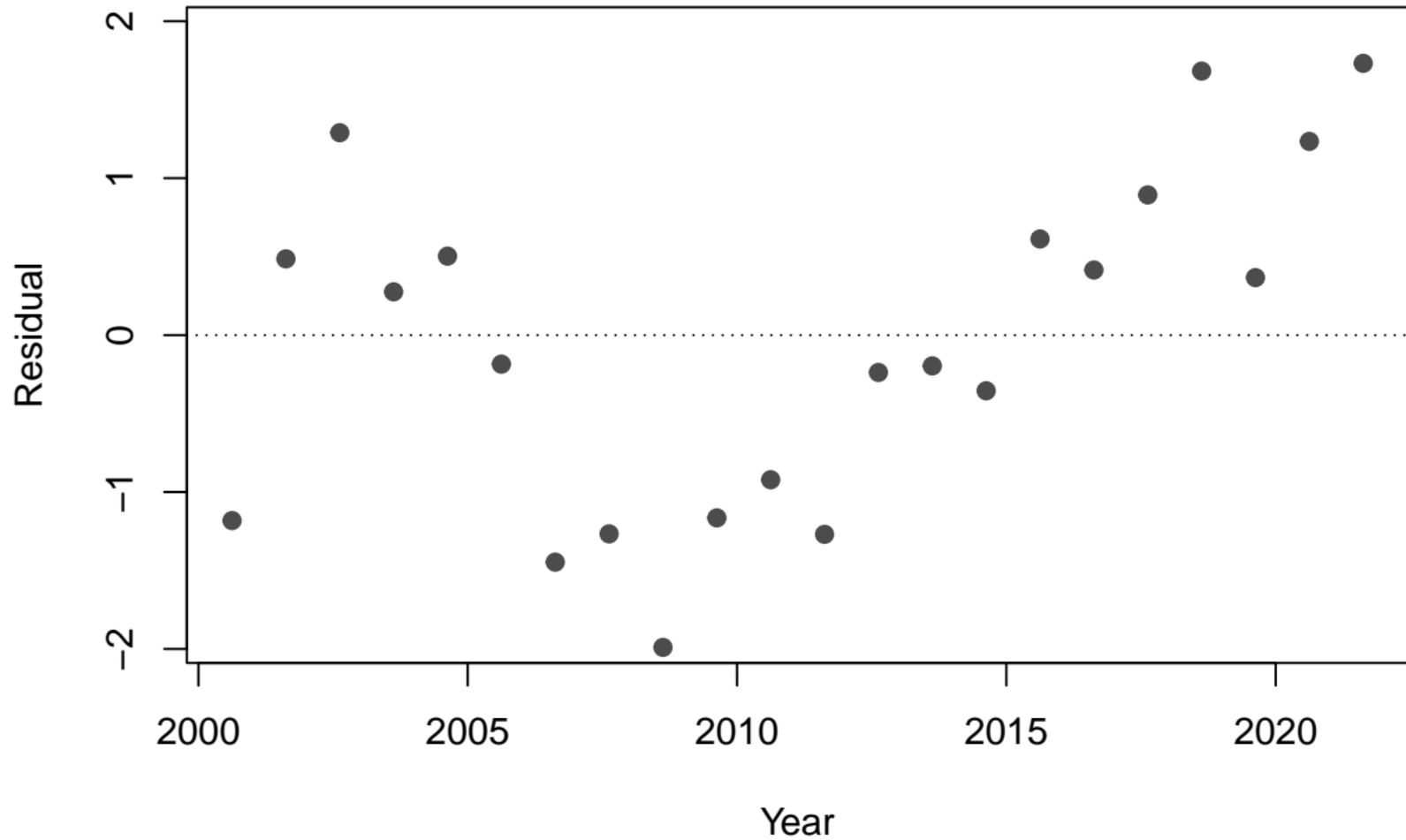
Log expected index

-0.10 -0.05 0.00 0.05

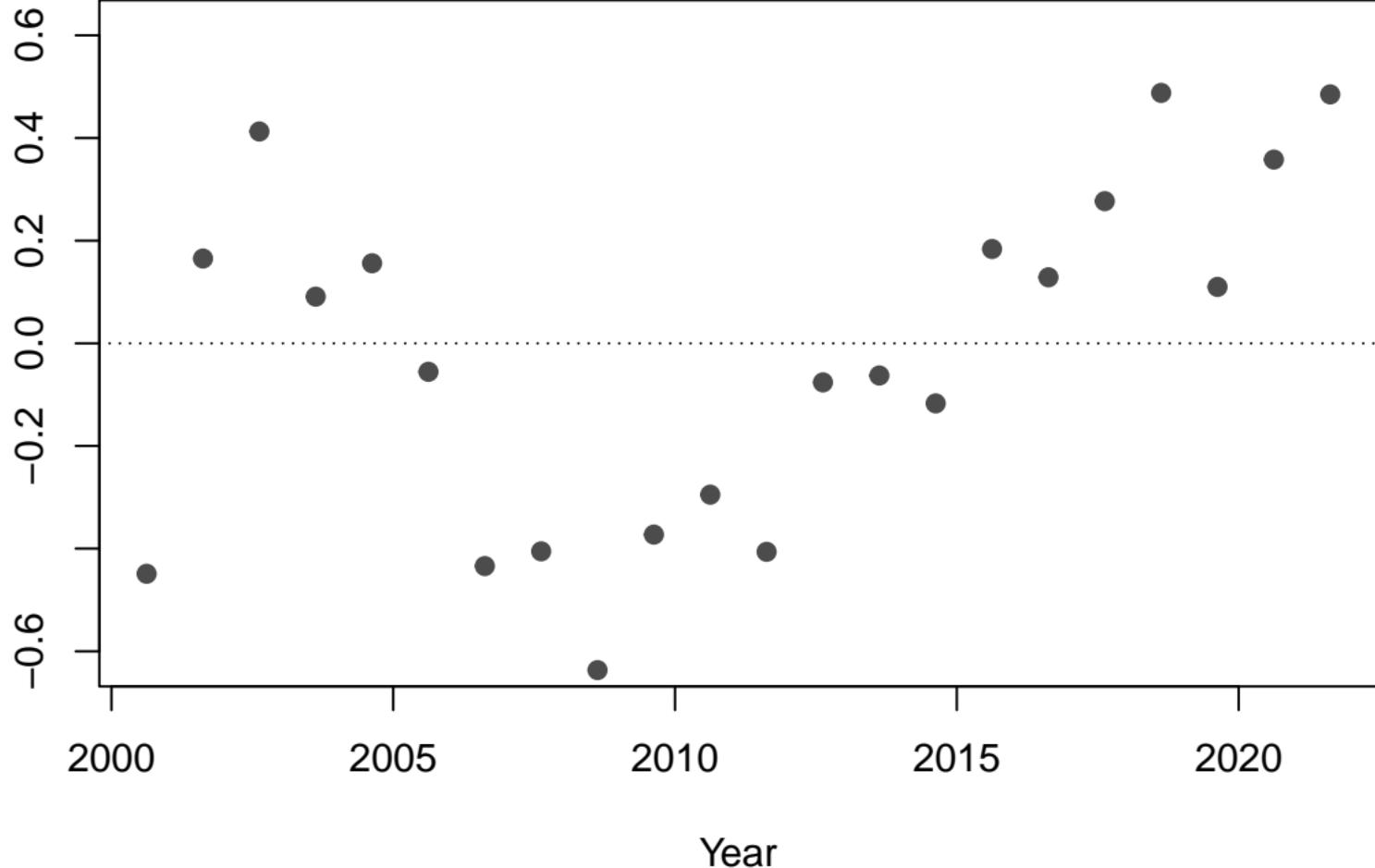
-0.6 -0.4 -0.2 0.0 0.2 0.4

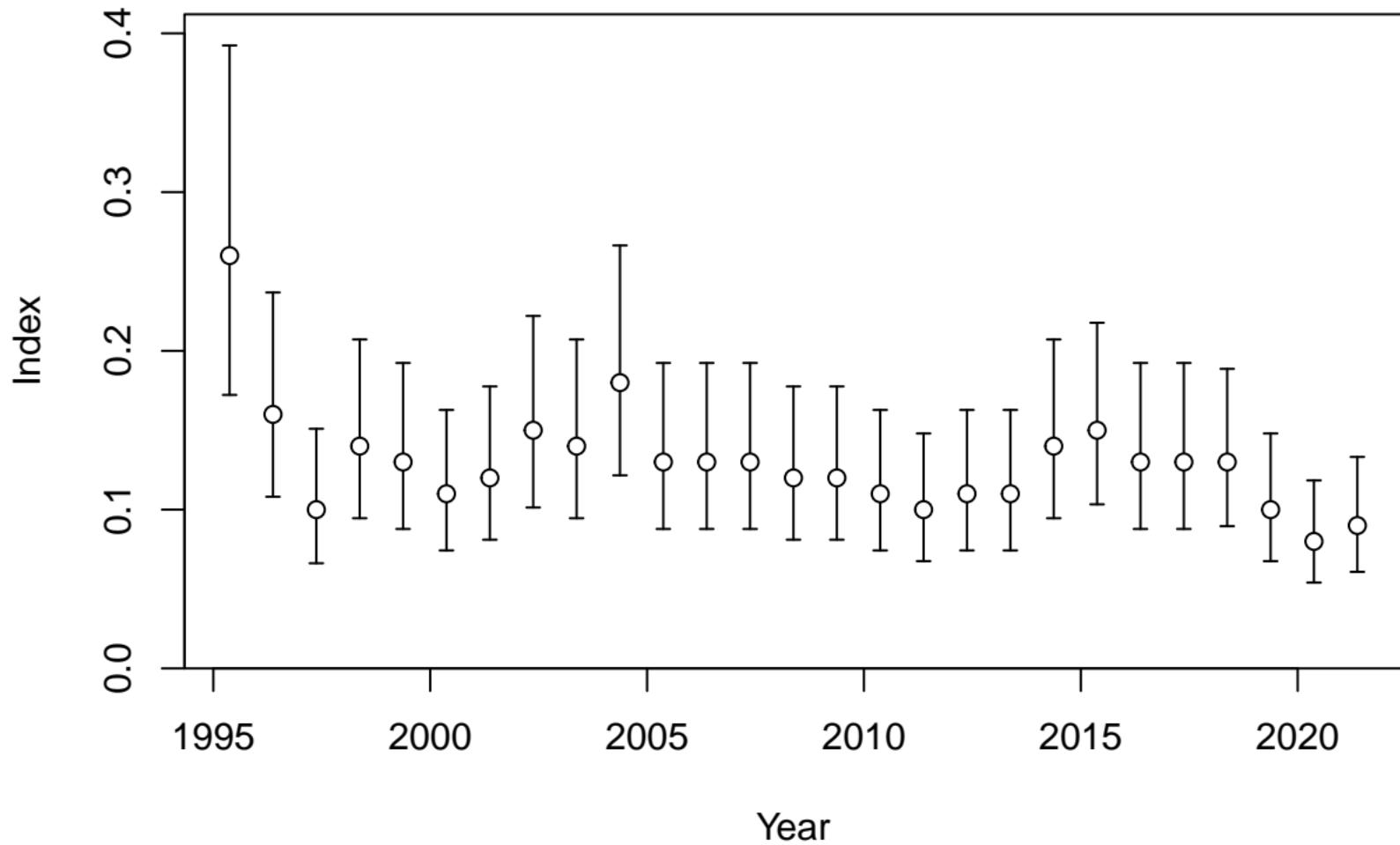
Log observed index

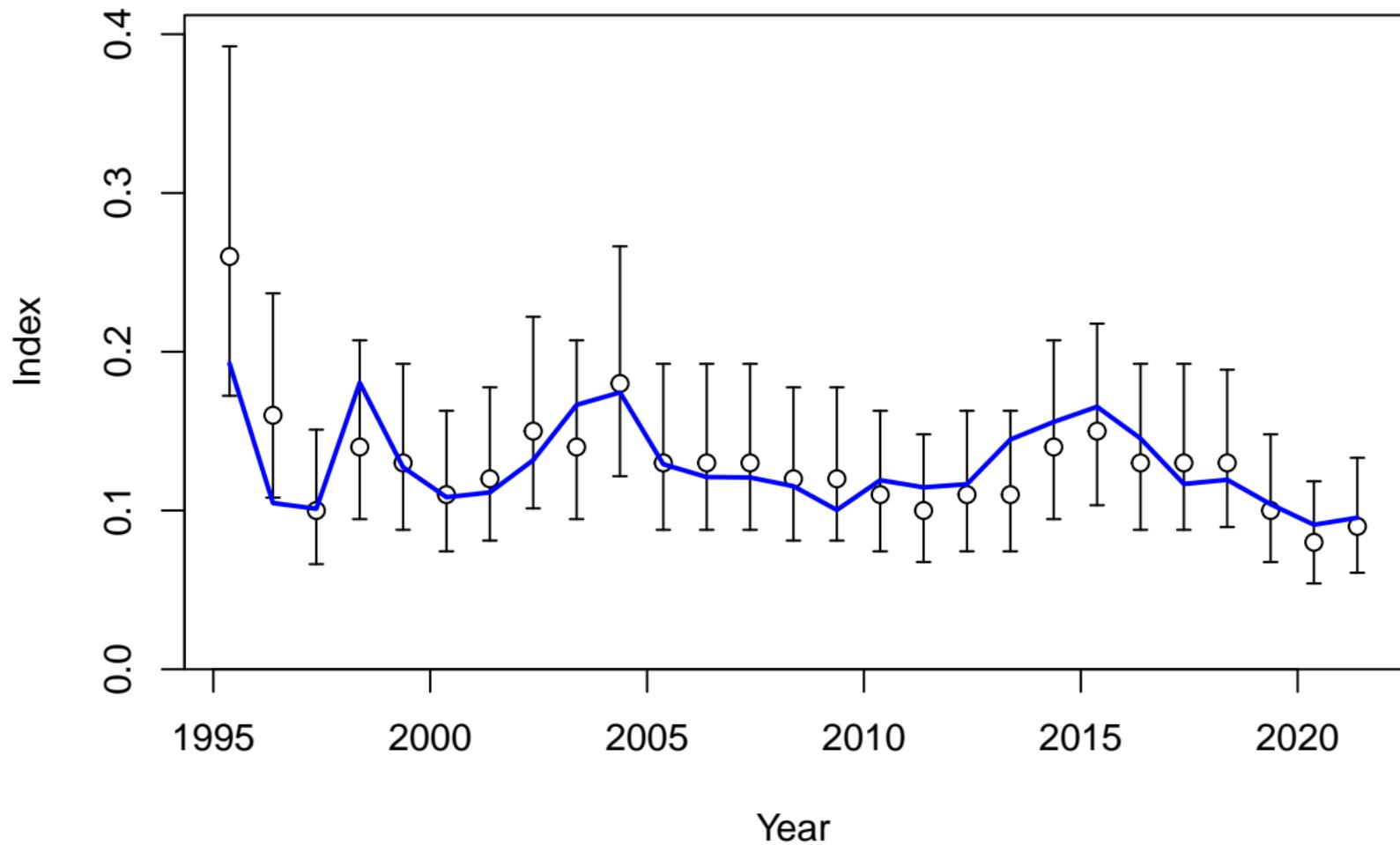


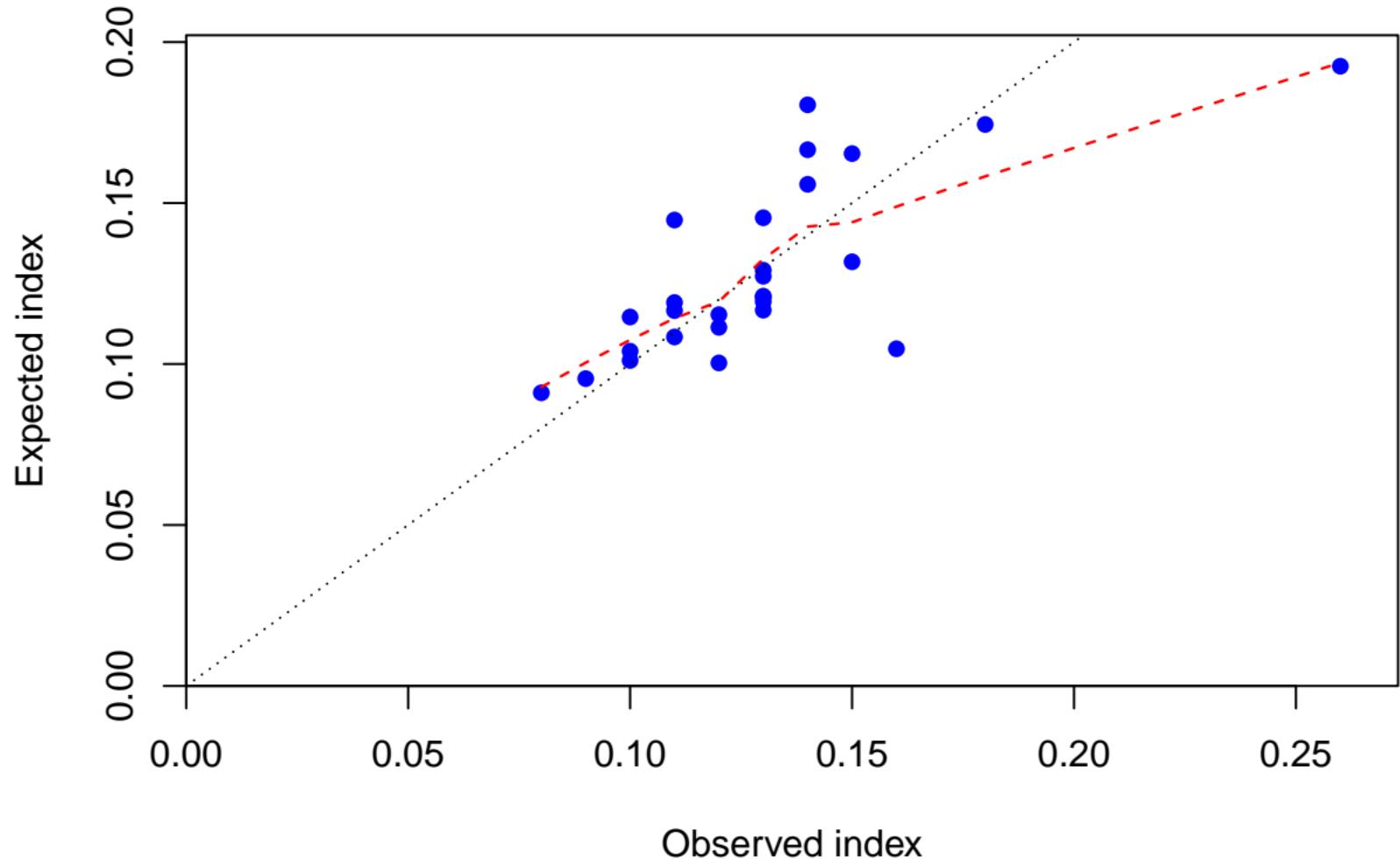


Deviation

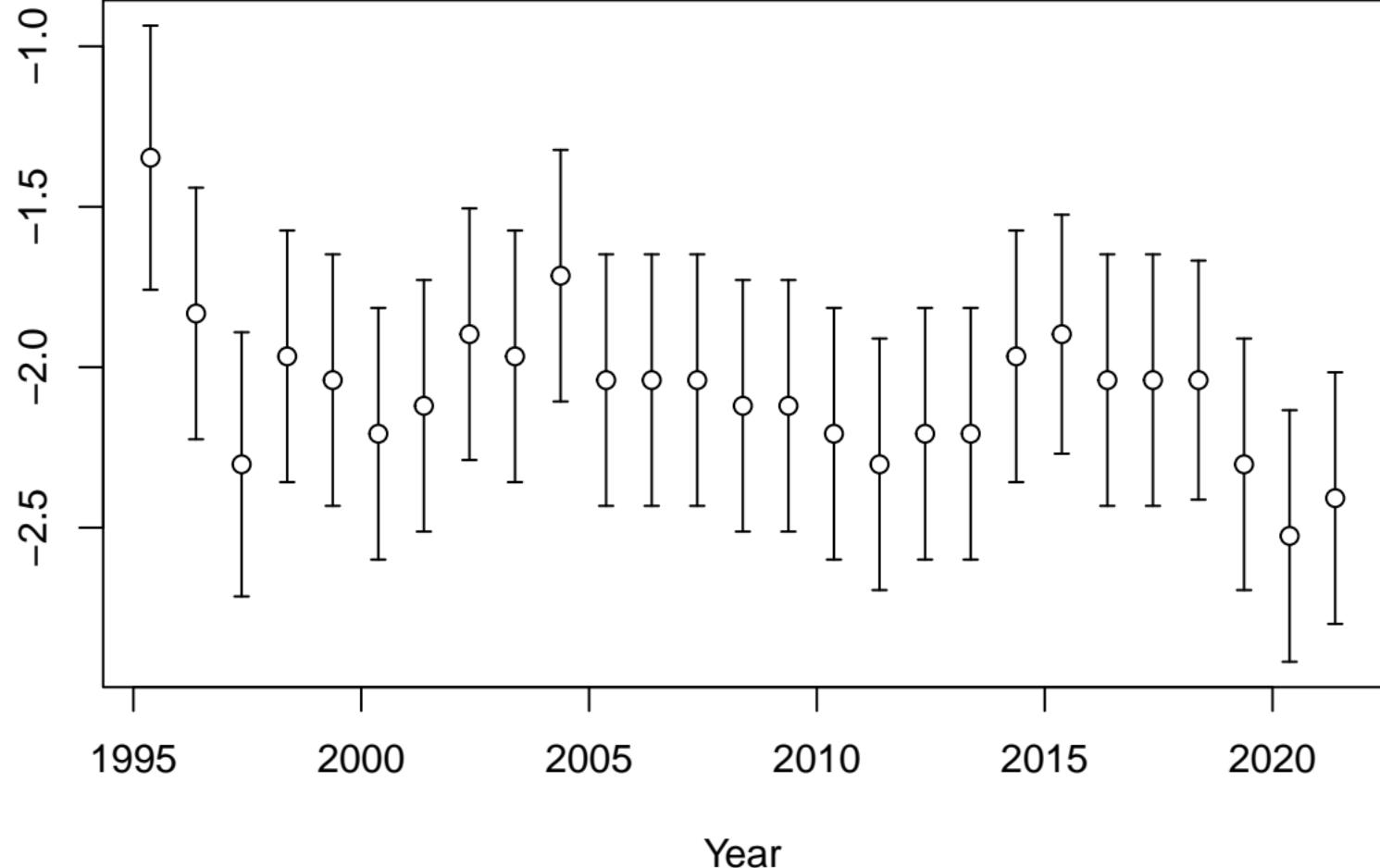




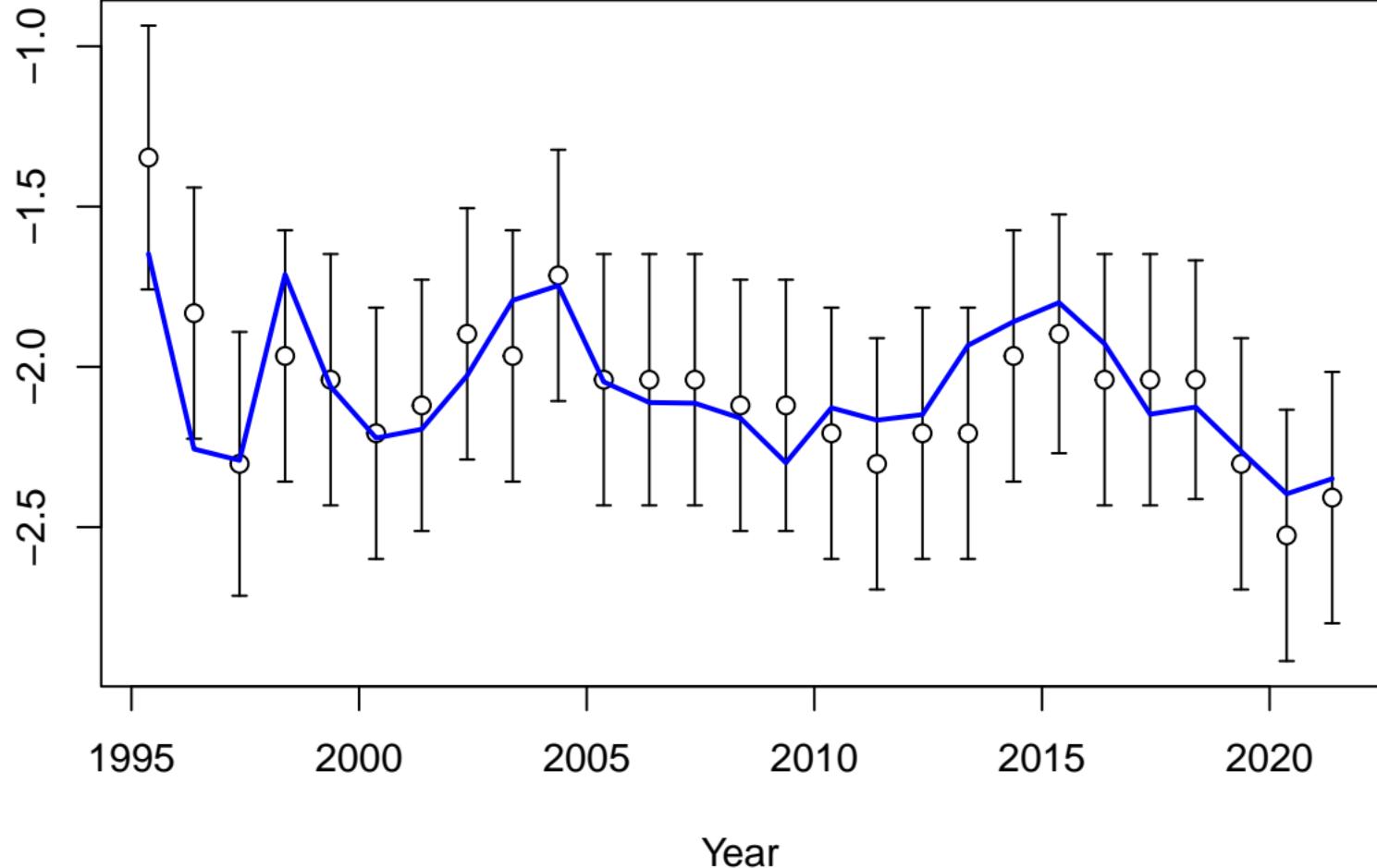




Log index

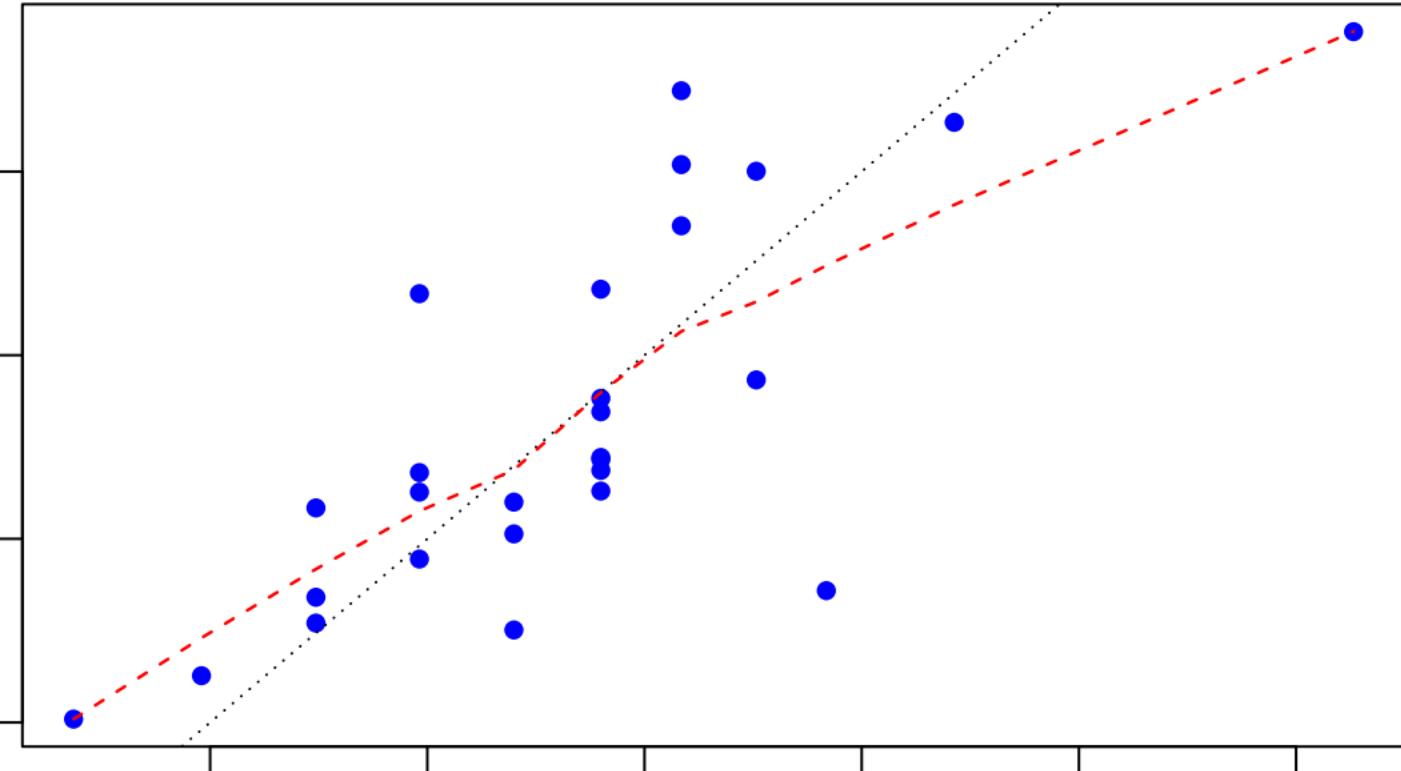


Log index



Log expected index

-2.4 -2.2 -2.0 -1.8



Log observed index

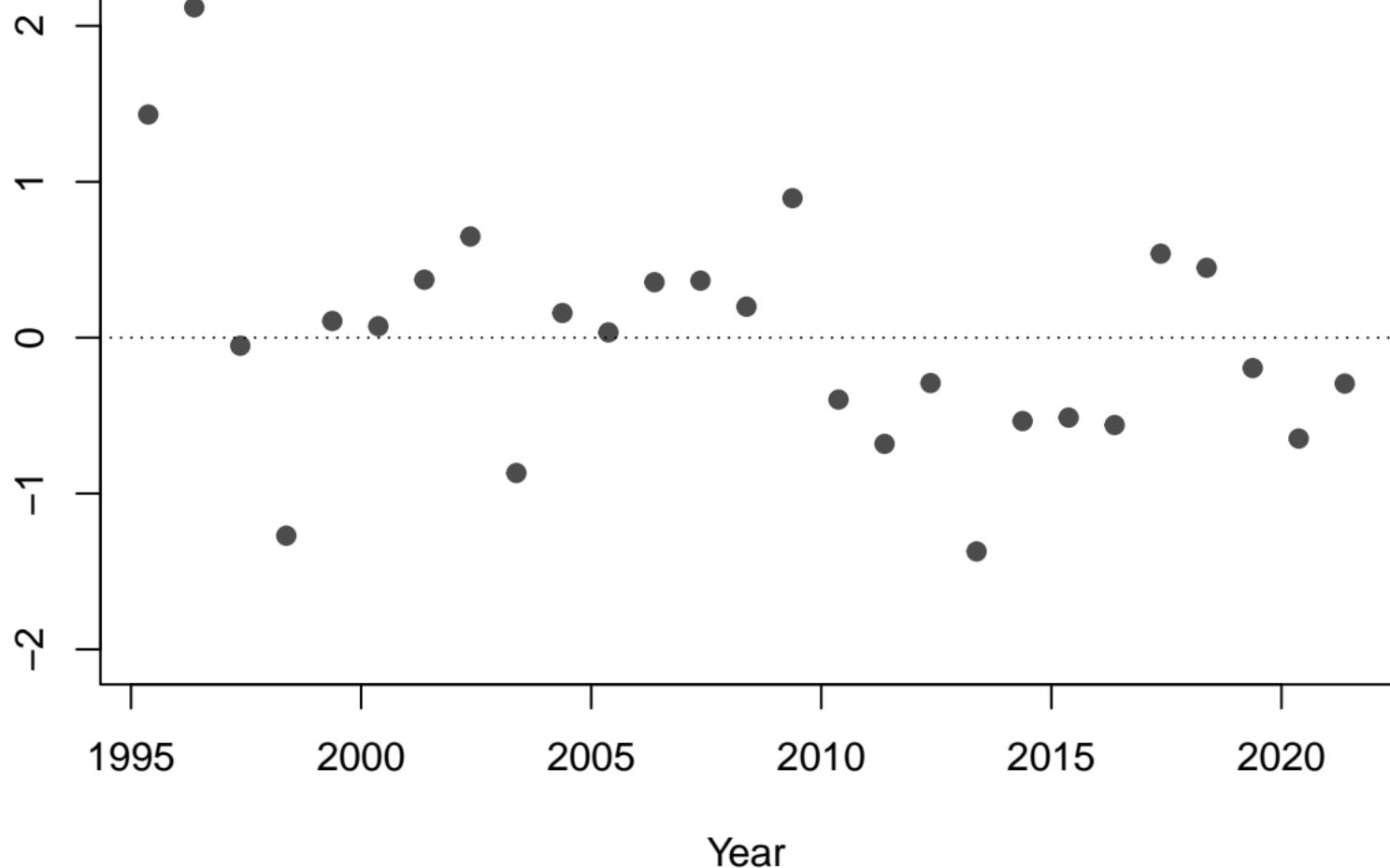
-1.4

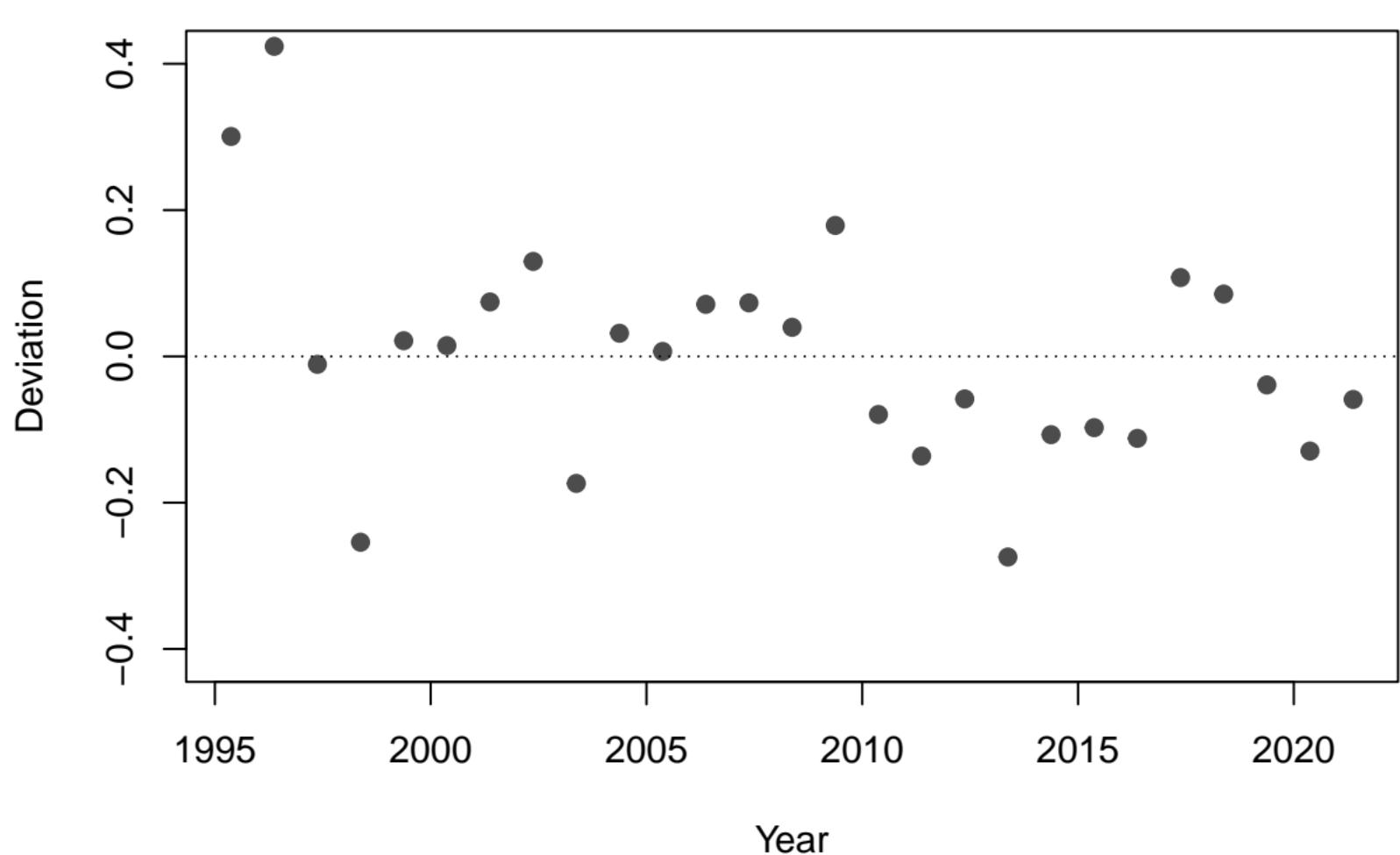
-1.6

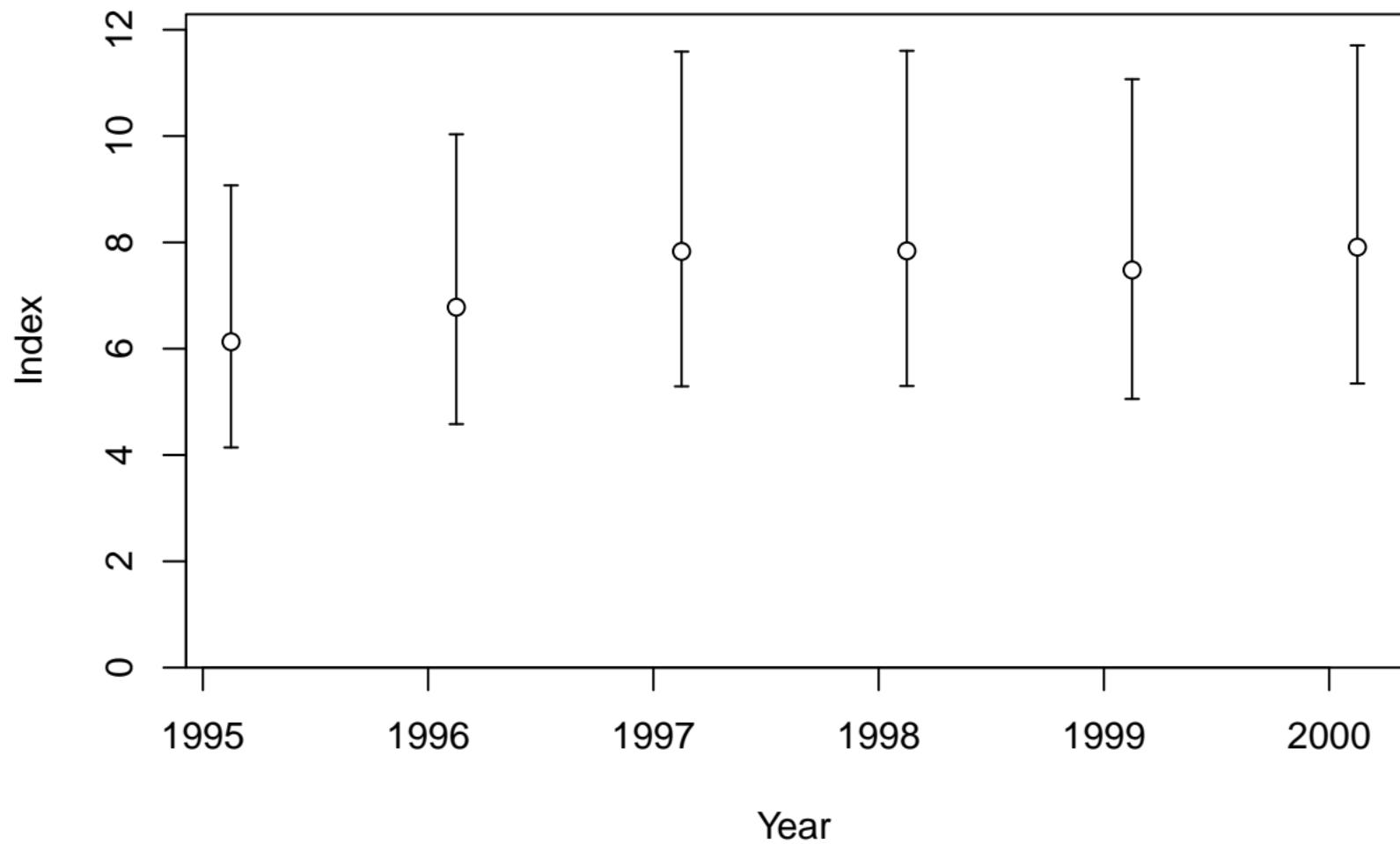
-1.8

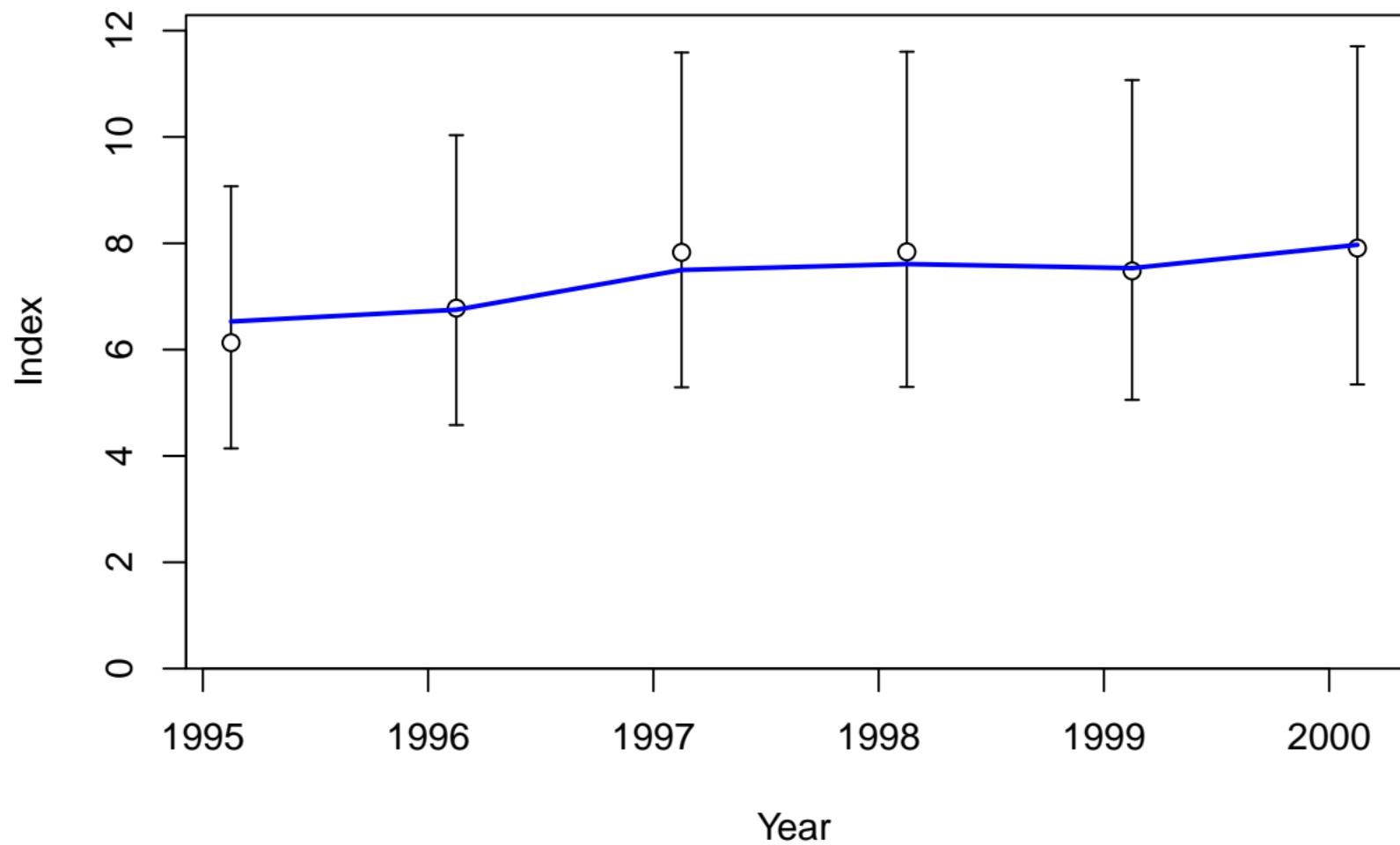
-2.4

Residual

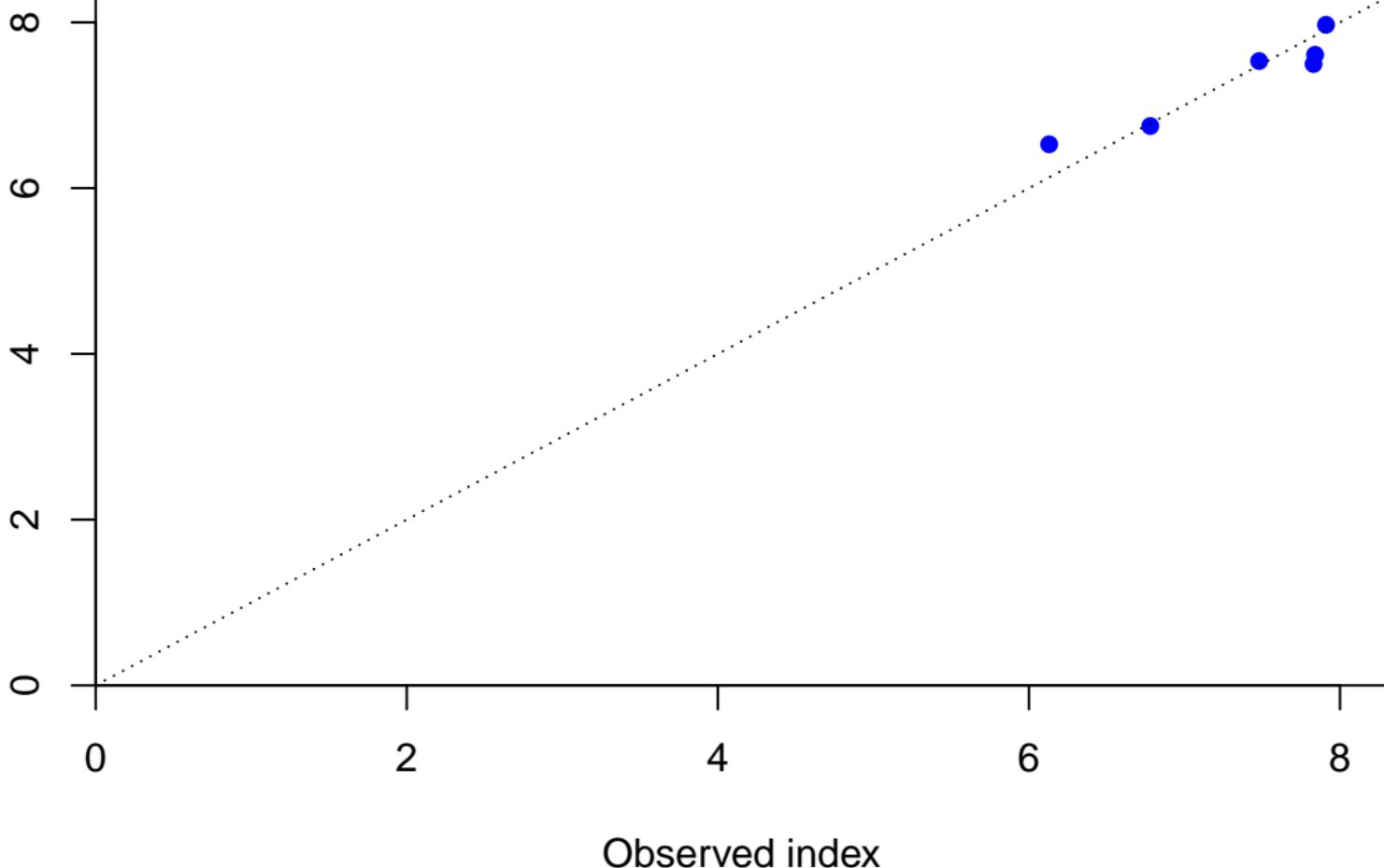








Expected index



Log index

1.4 1.6 1.8 2.0 2.2 2.4

1995

1996

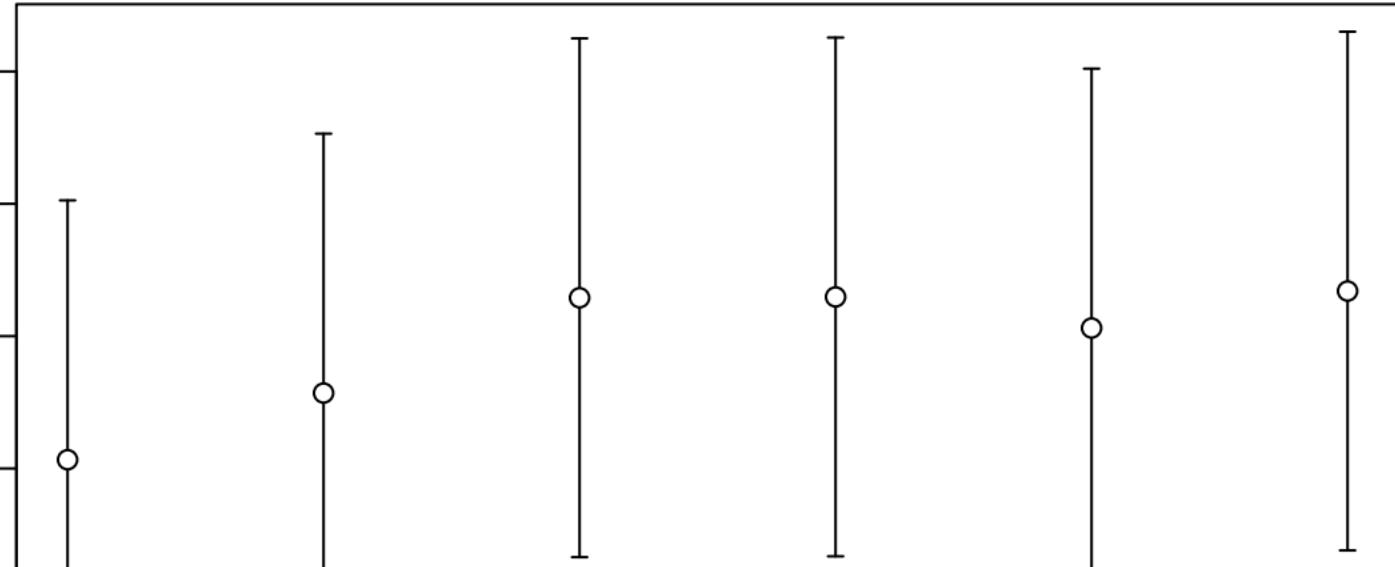
1997

1998

1999

2000

Year

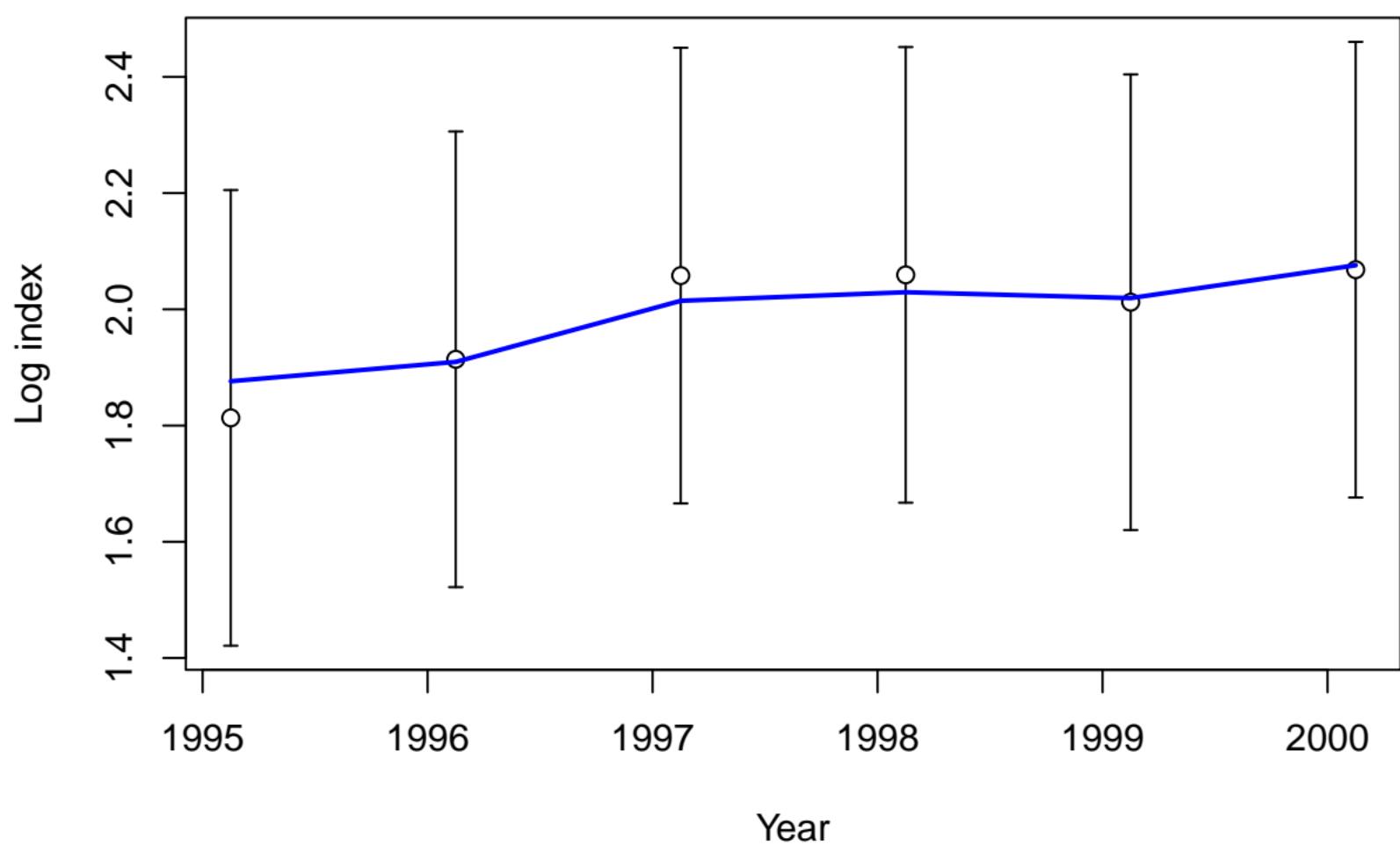


Log index

2.4
2.2
2.0
1.8
1.6
1.4

1995 1996 1997 1998 1999 2000

Year

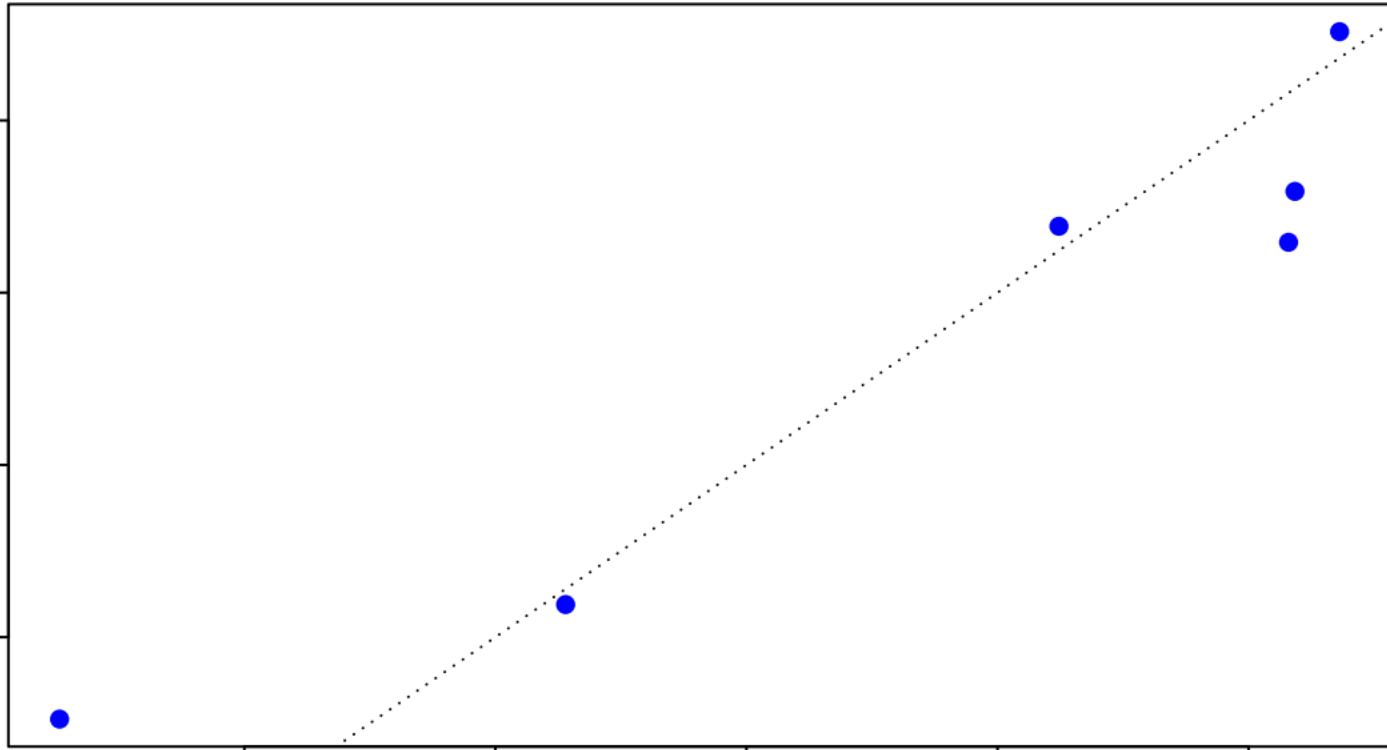


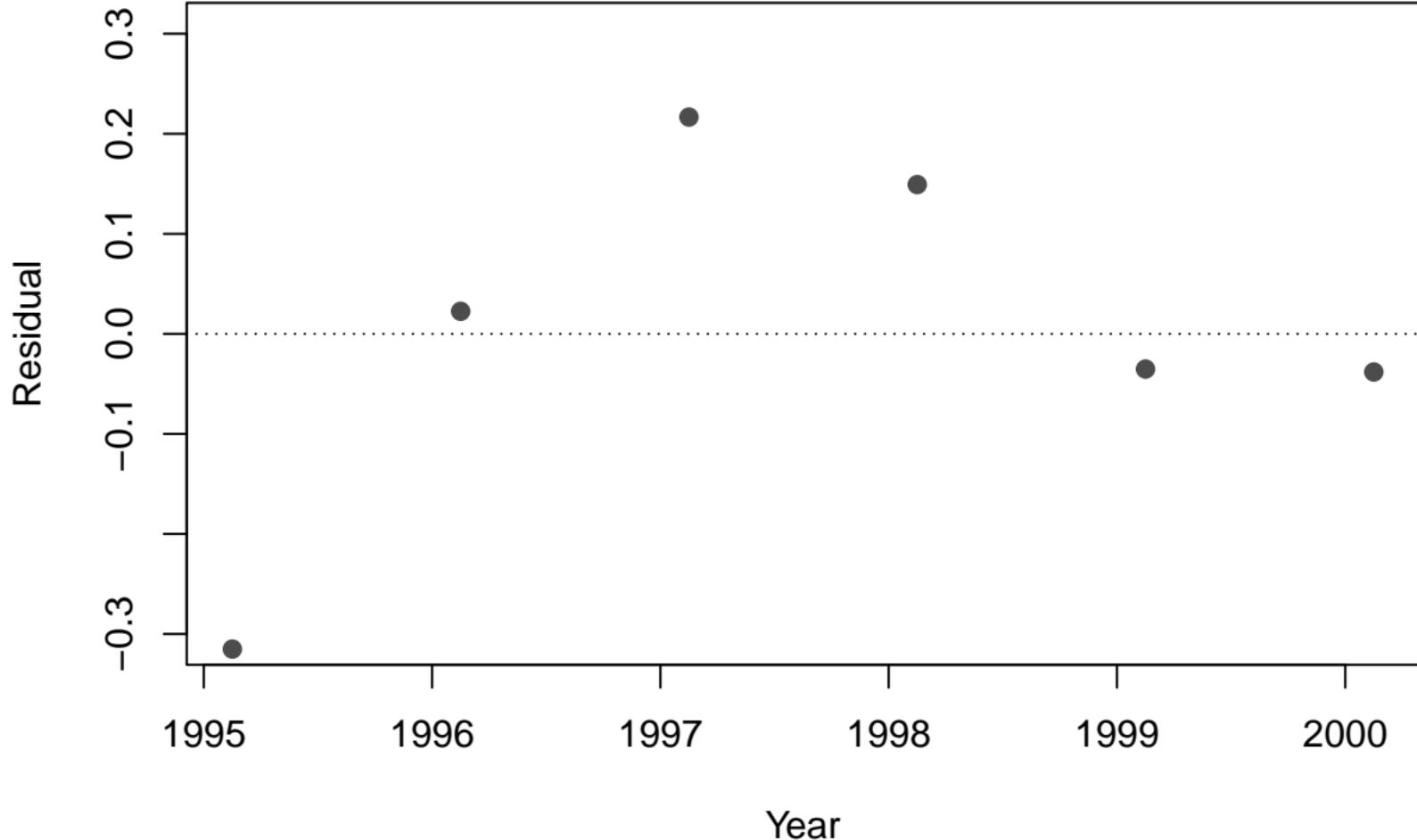
Log expected index

2.05
2.00
1.95
1.90

1.85 1.90 1.95 2.00 2.05

Log observed index





Deviation

0.06

0.02

-0.02

-0.06

1995

1996

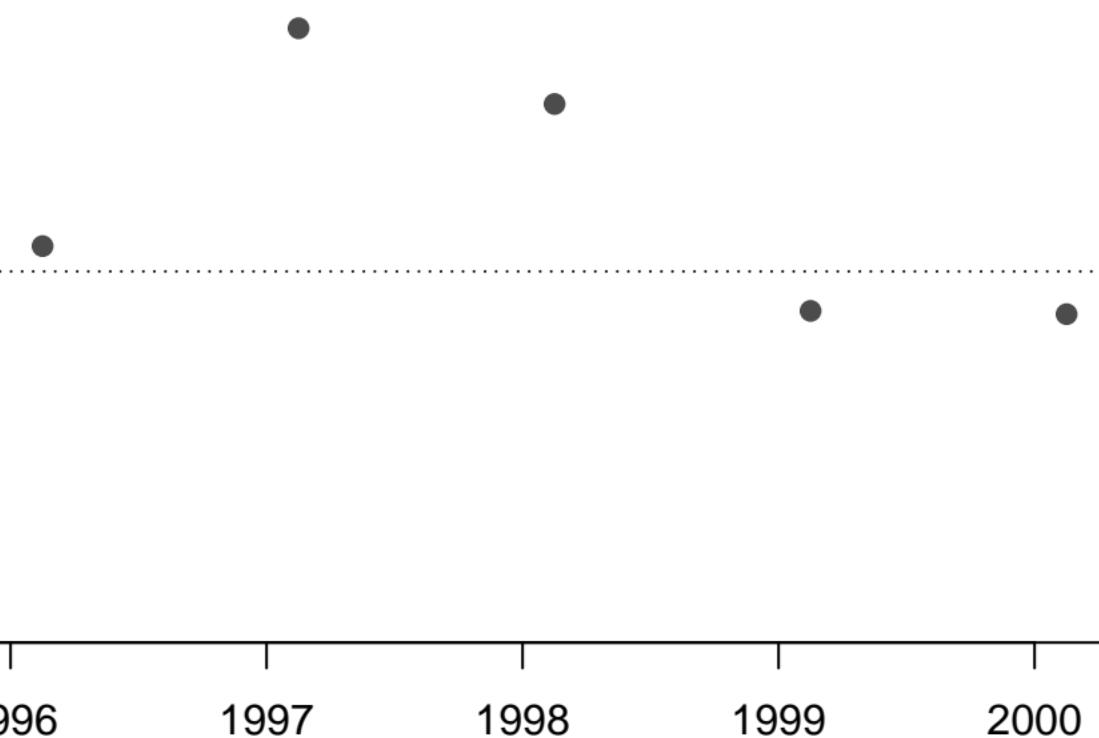
1997

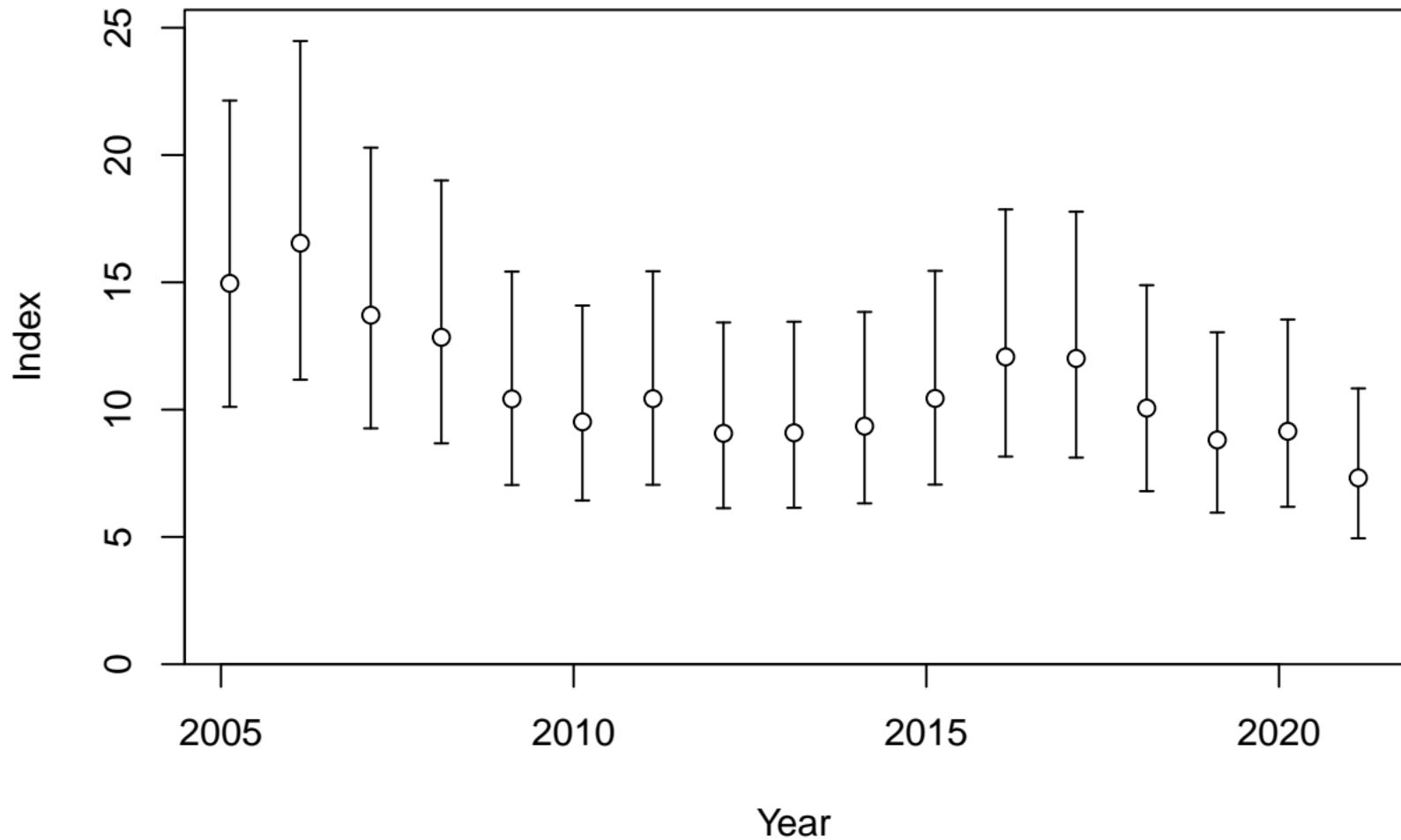
1998

1999

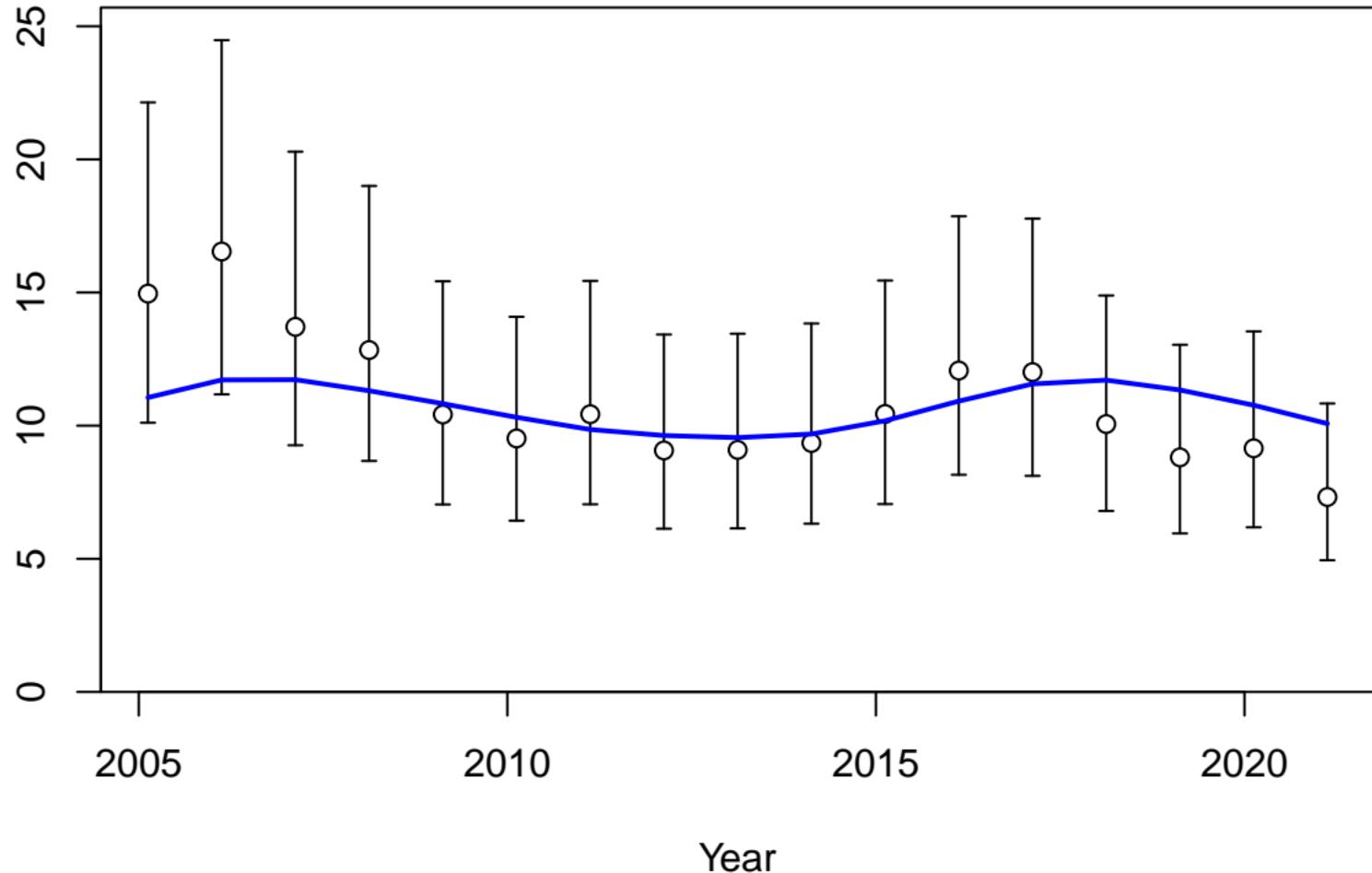
2000

Year

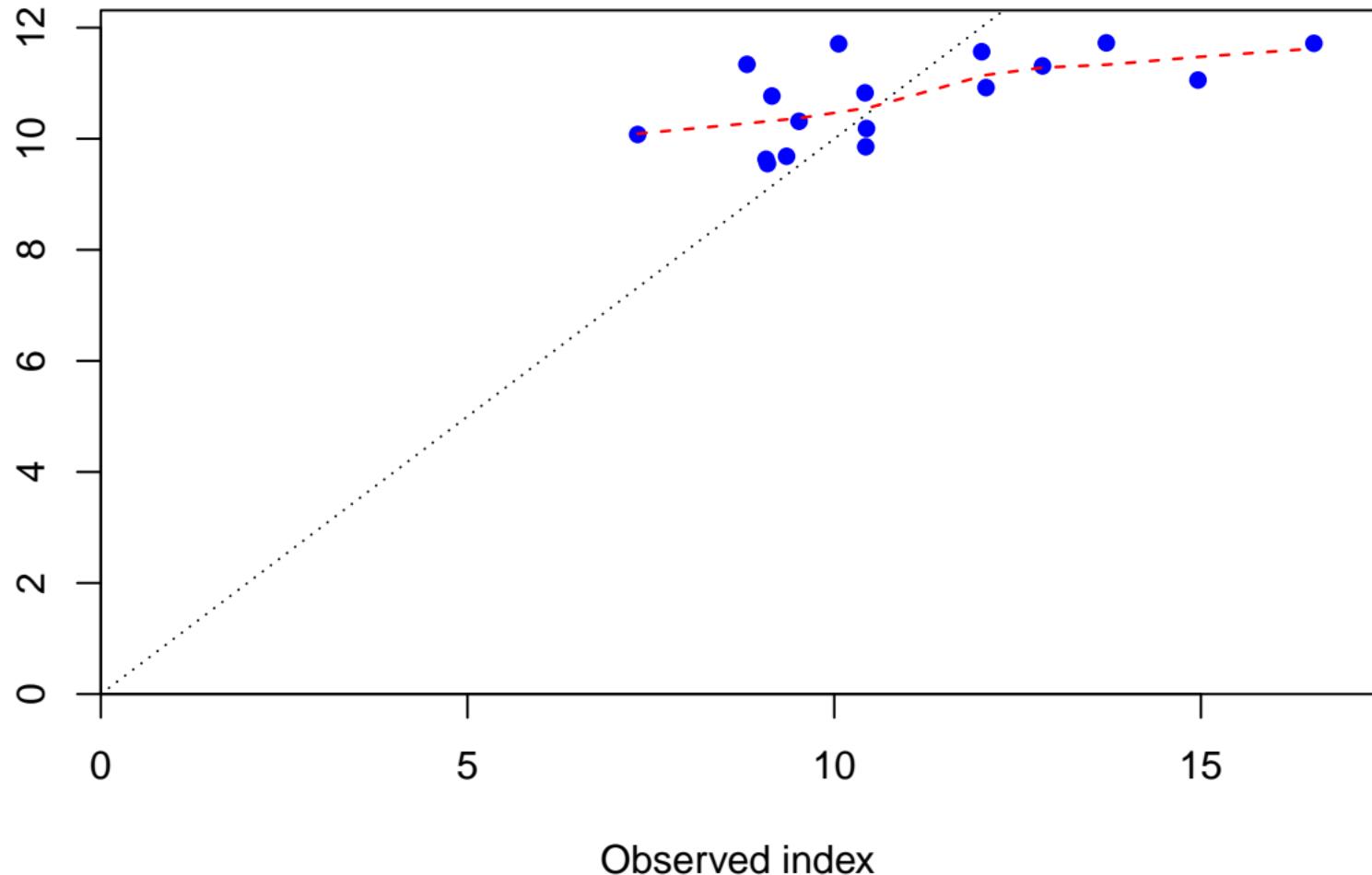




Index



Expected index



Log index

3.0
2.5
2.0

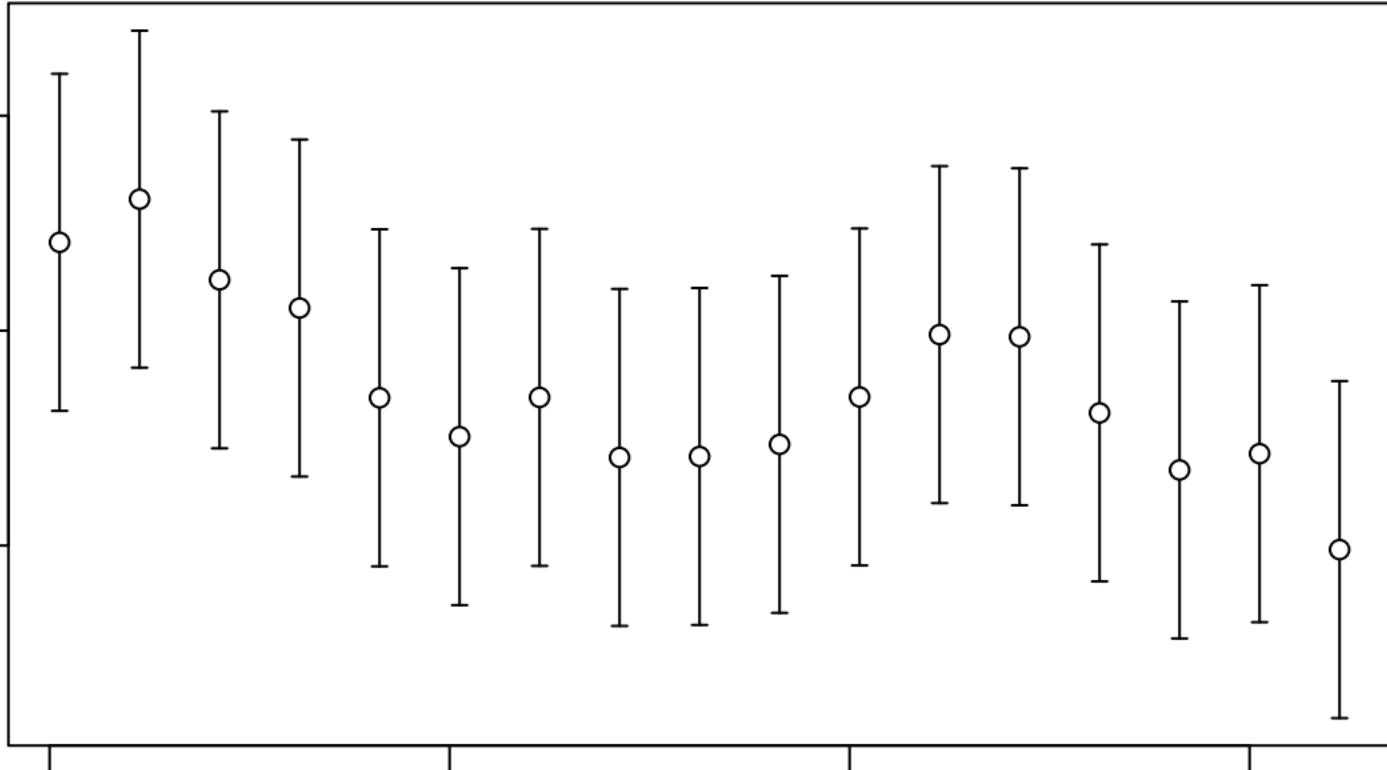
2005

2010

2015

2020

Year

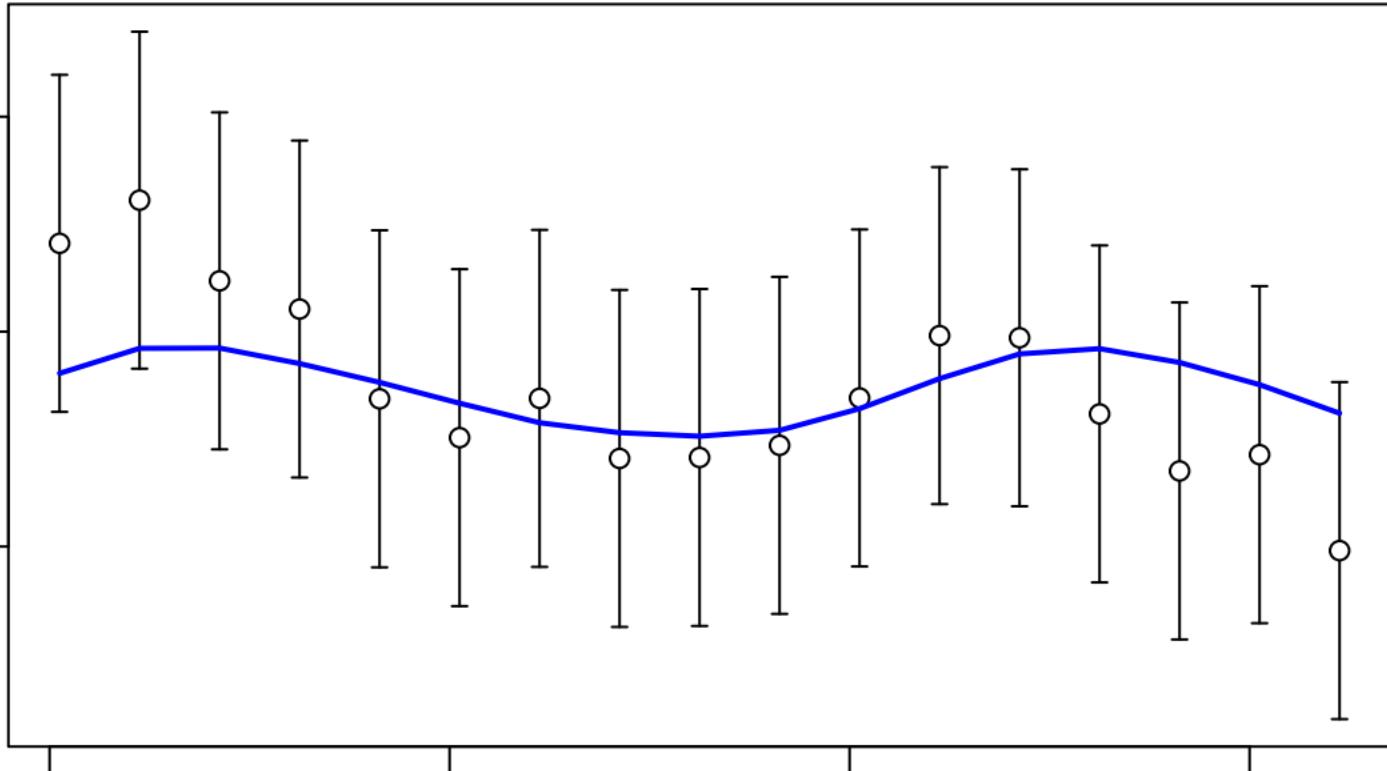


Log index

3.0
2.5
2.0

2005 2010 2015 2020

Year

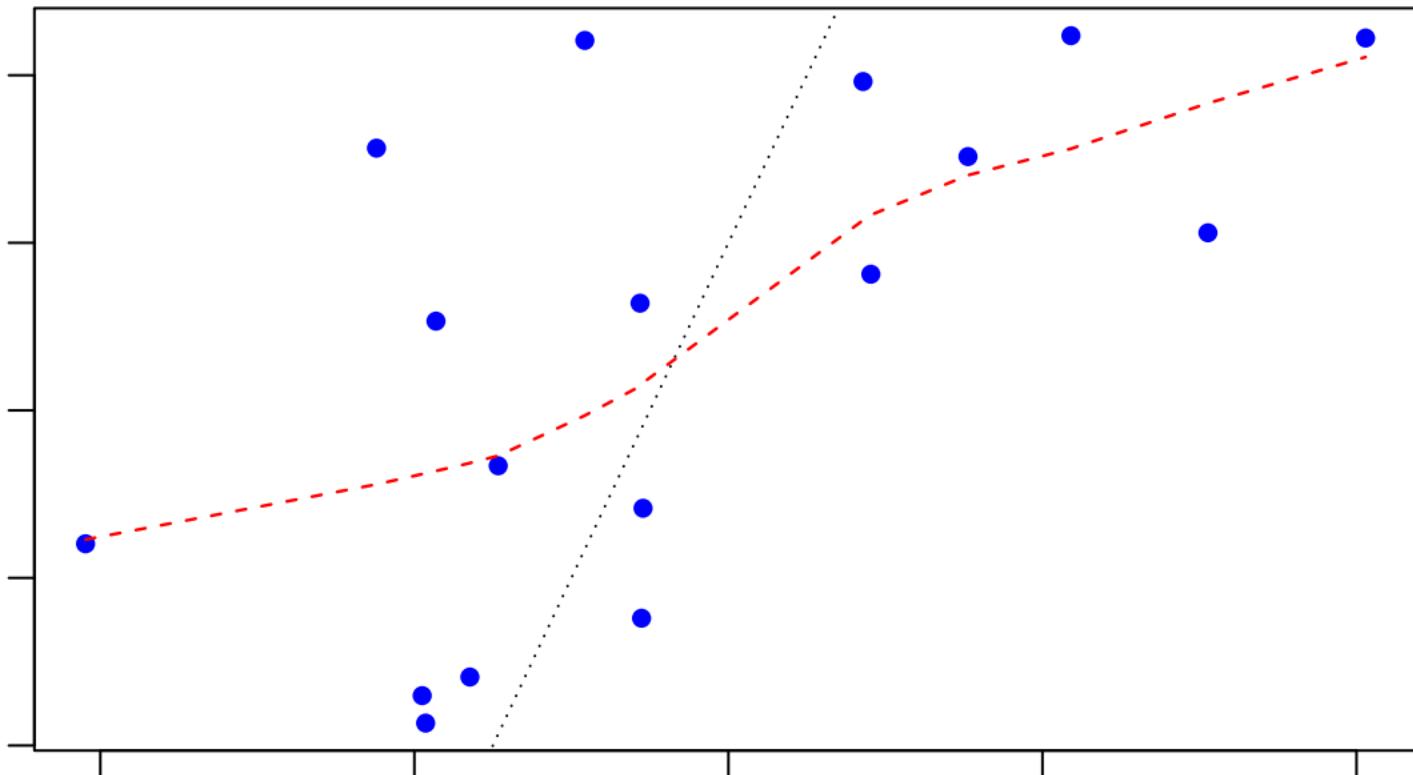


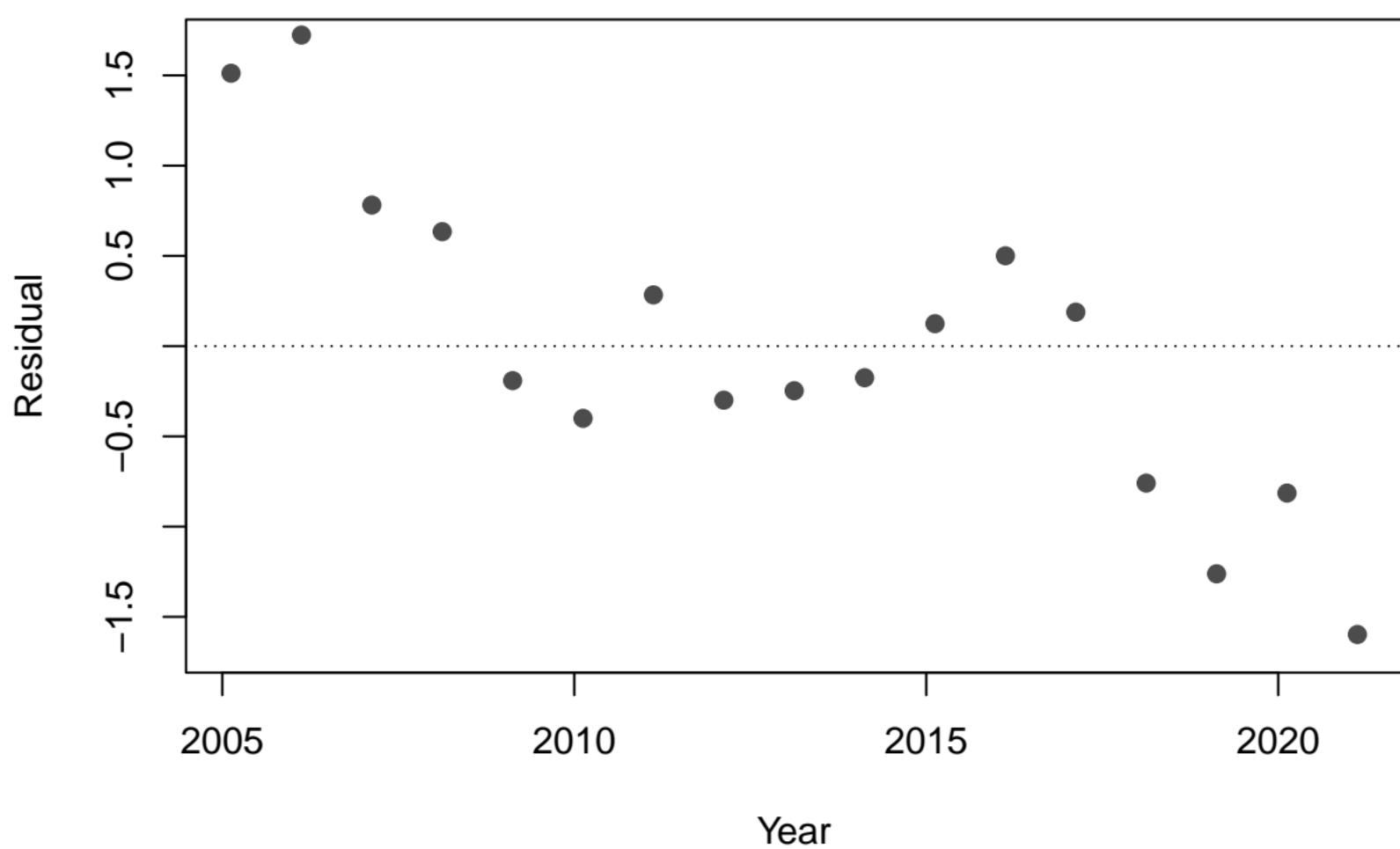
Log expected index

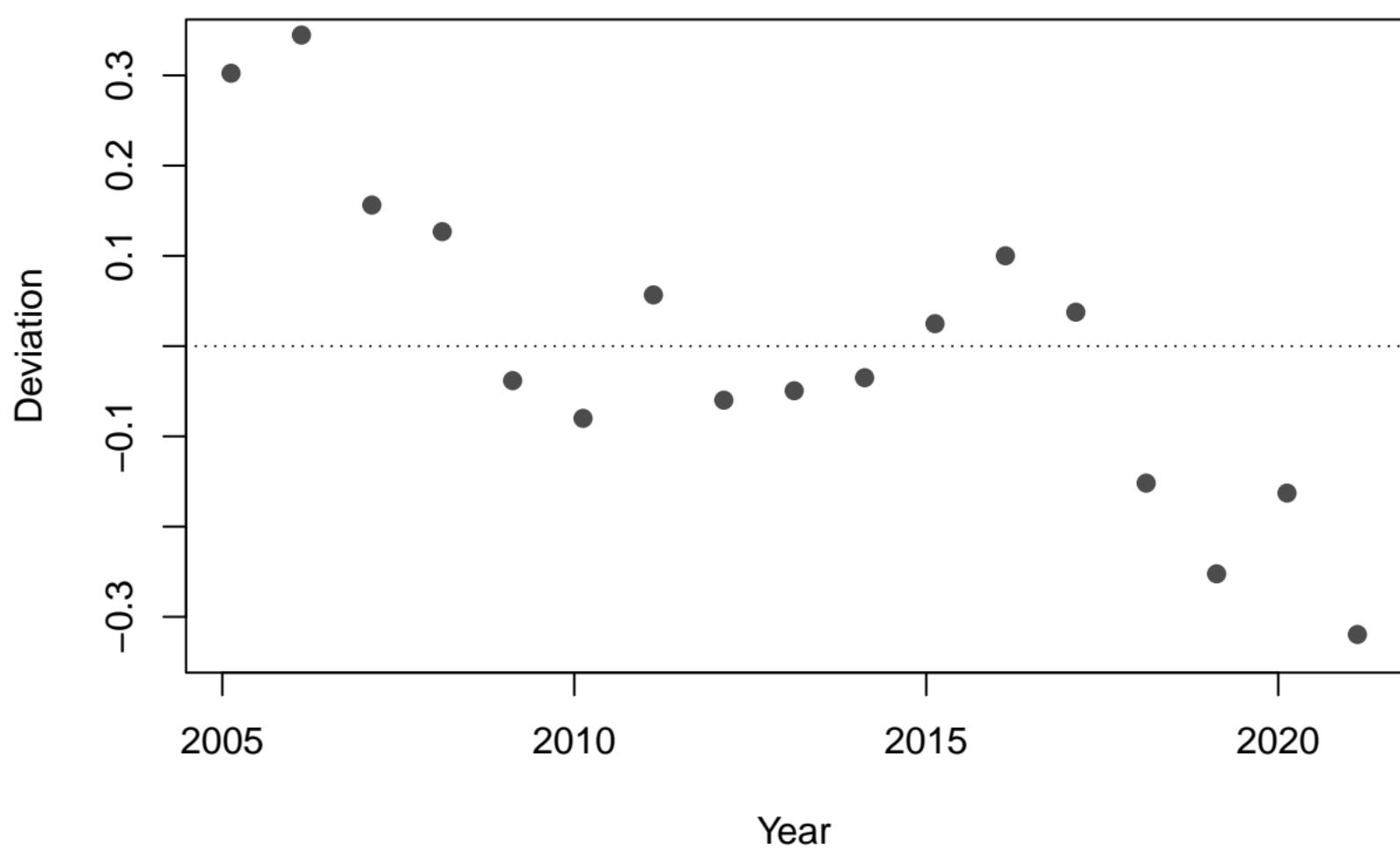
2.45
2.40
2.35
2.30
2.25

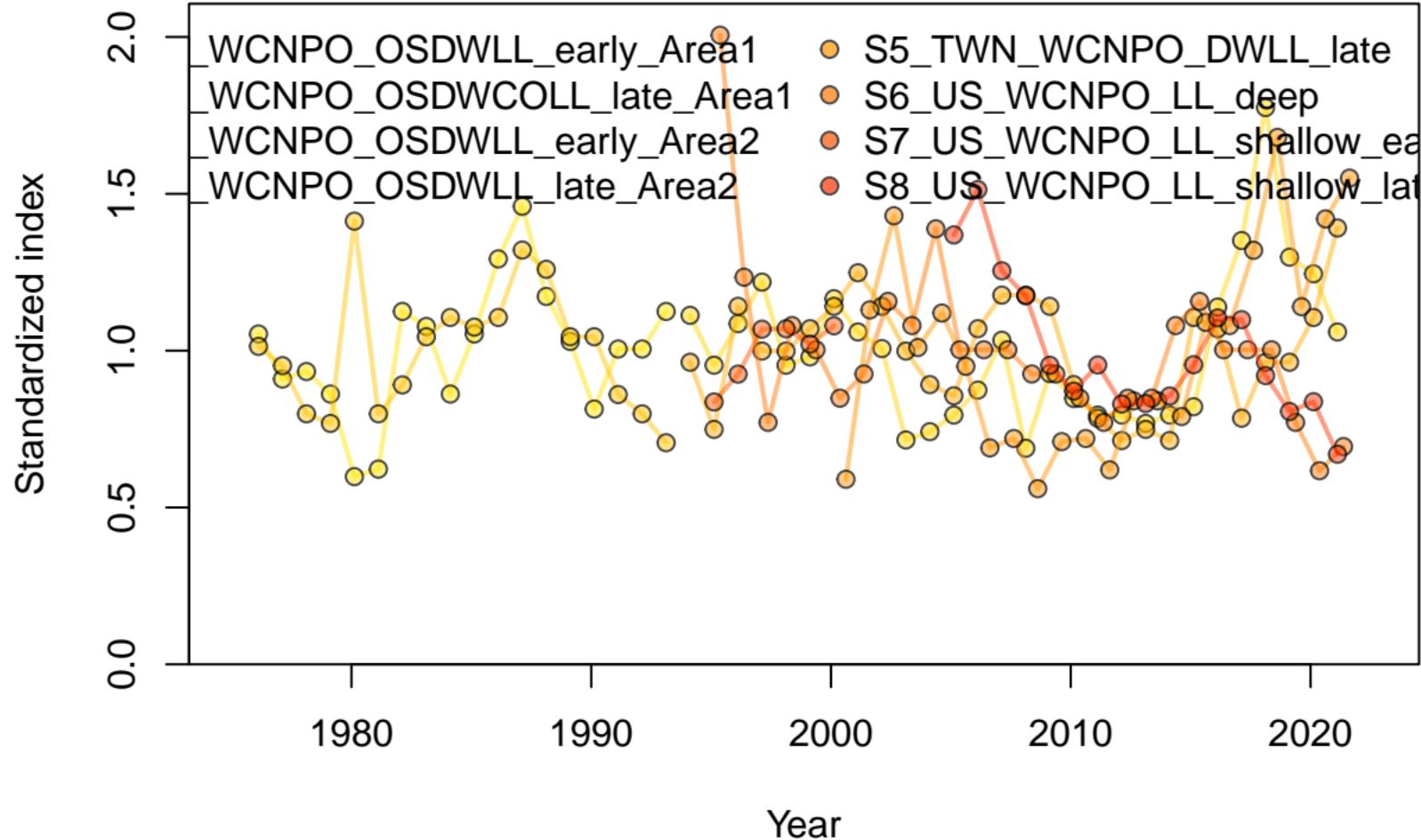
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Log observed index







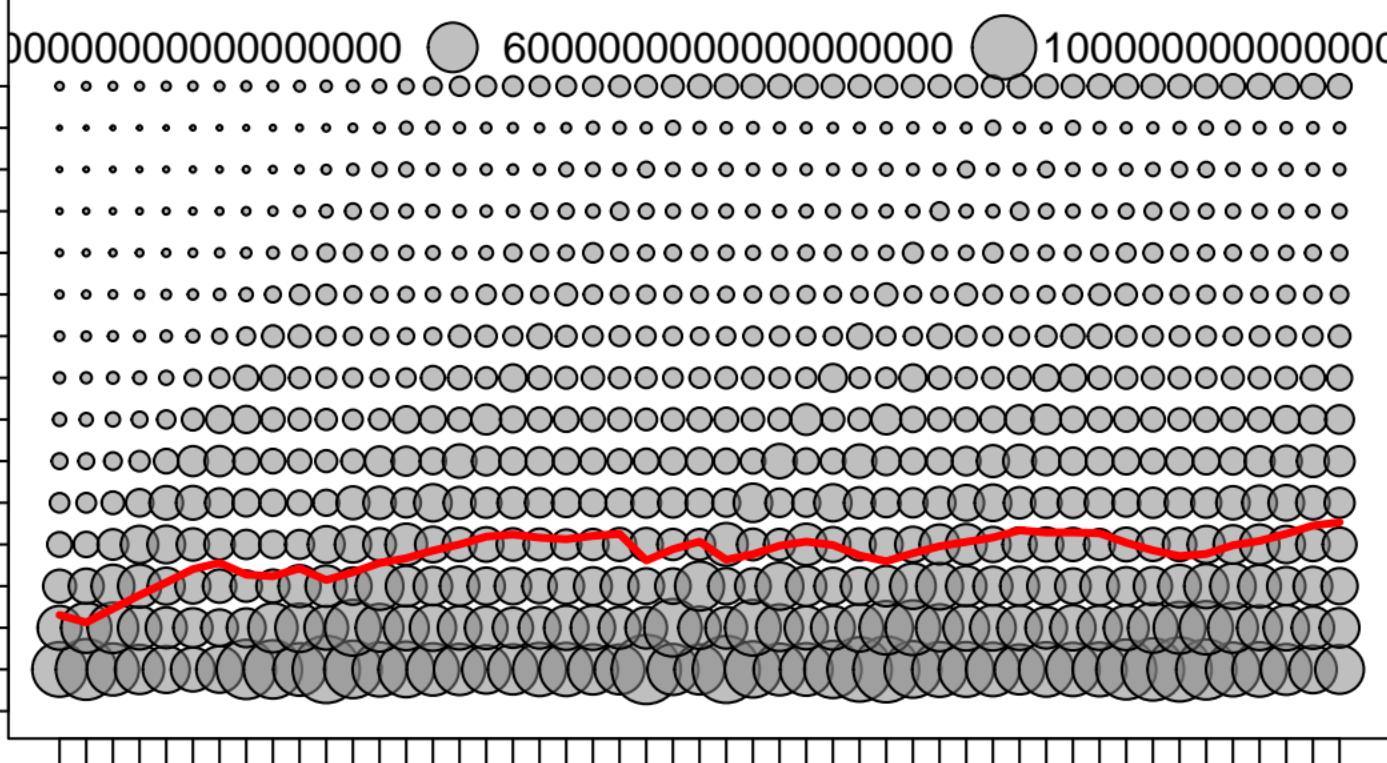


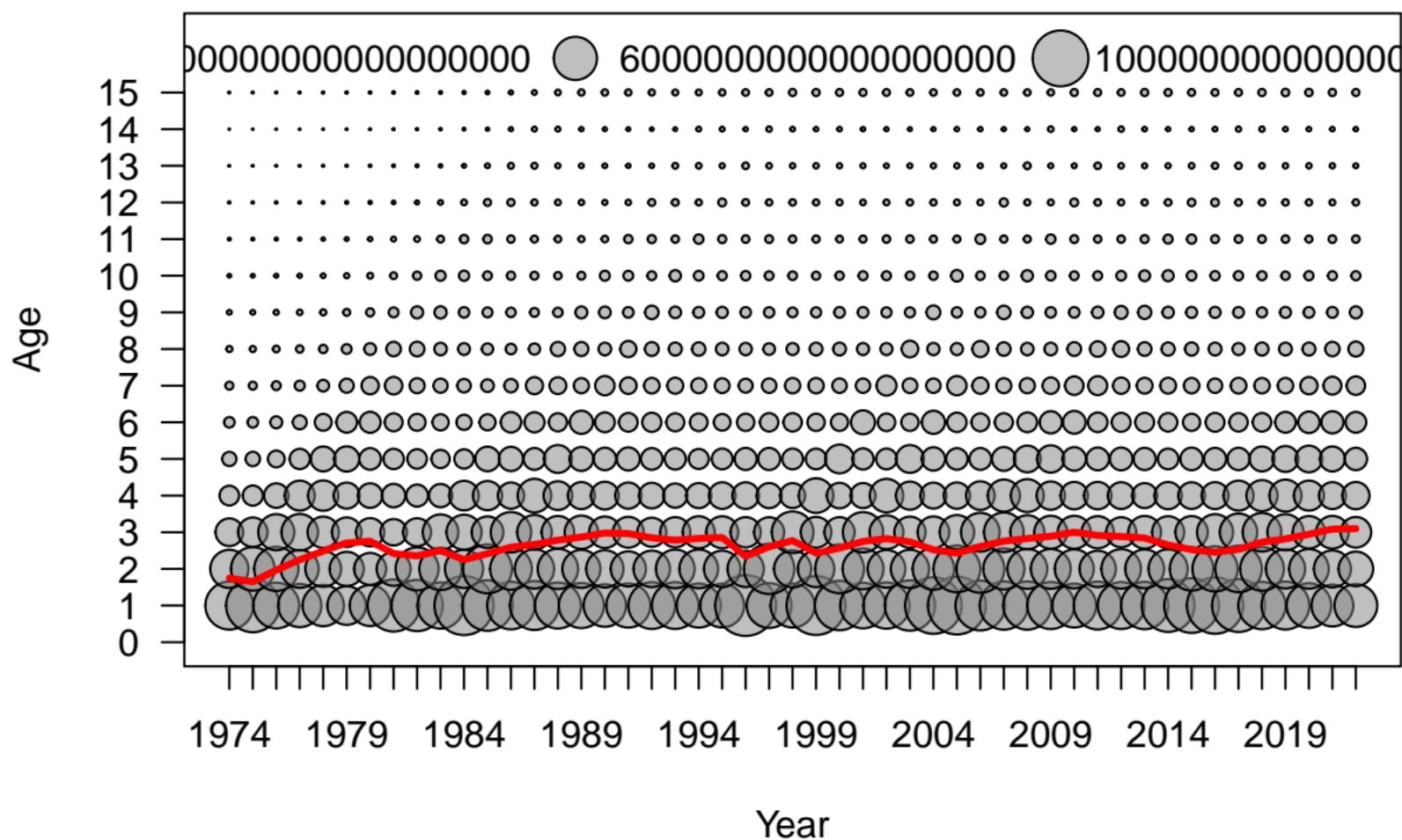
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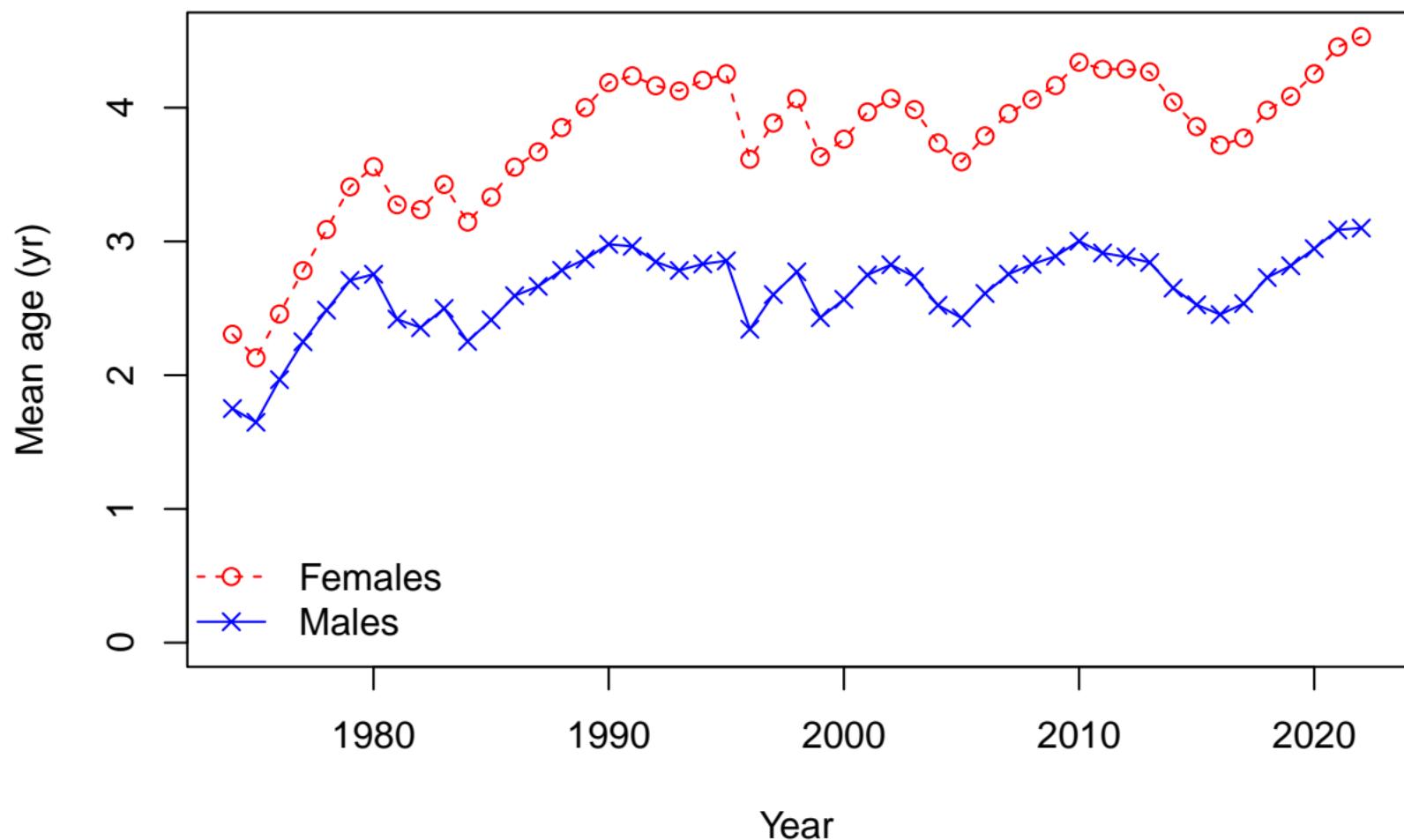
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Year





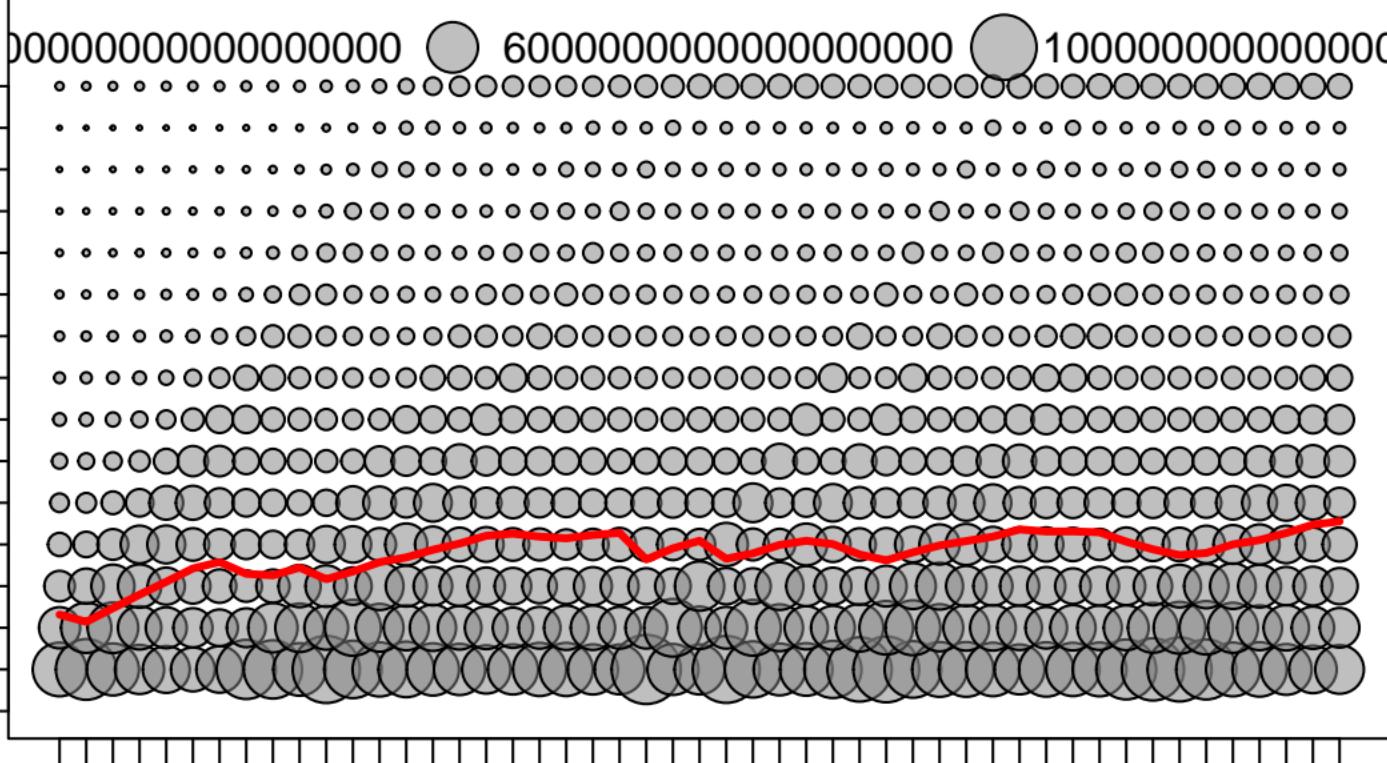


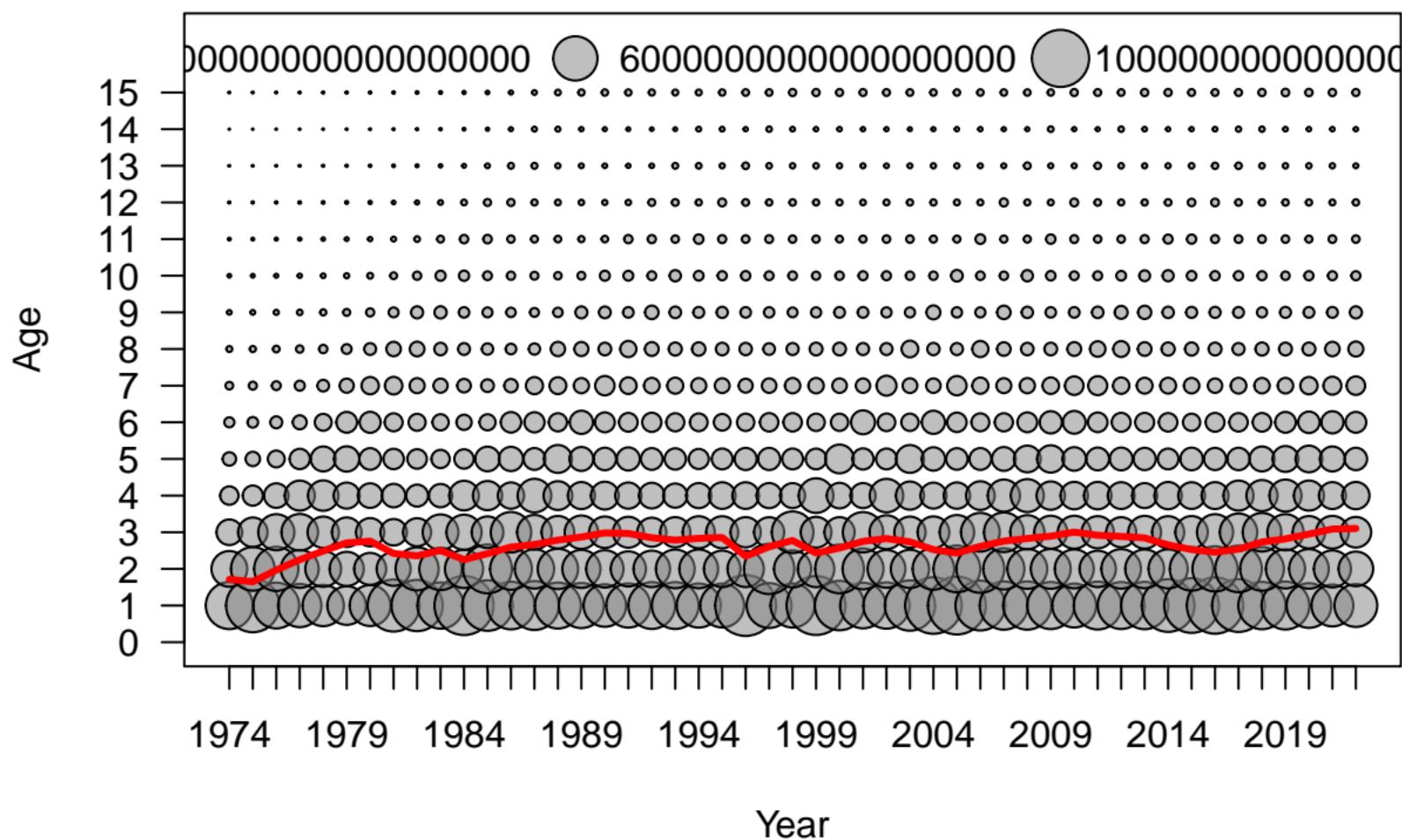
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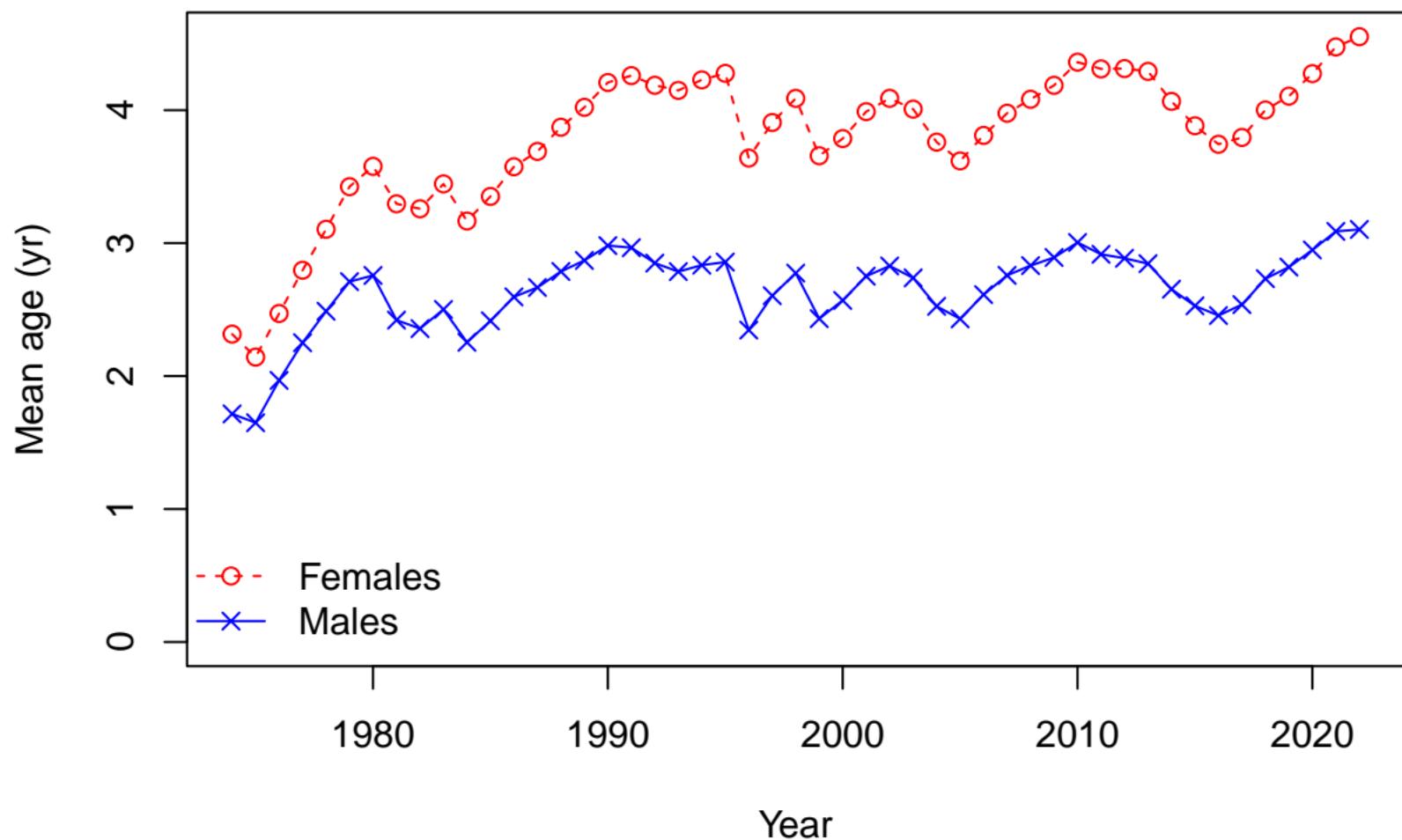
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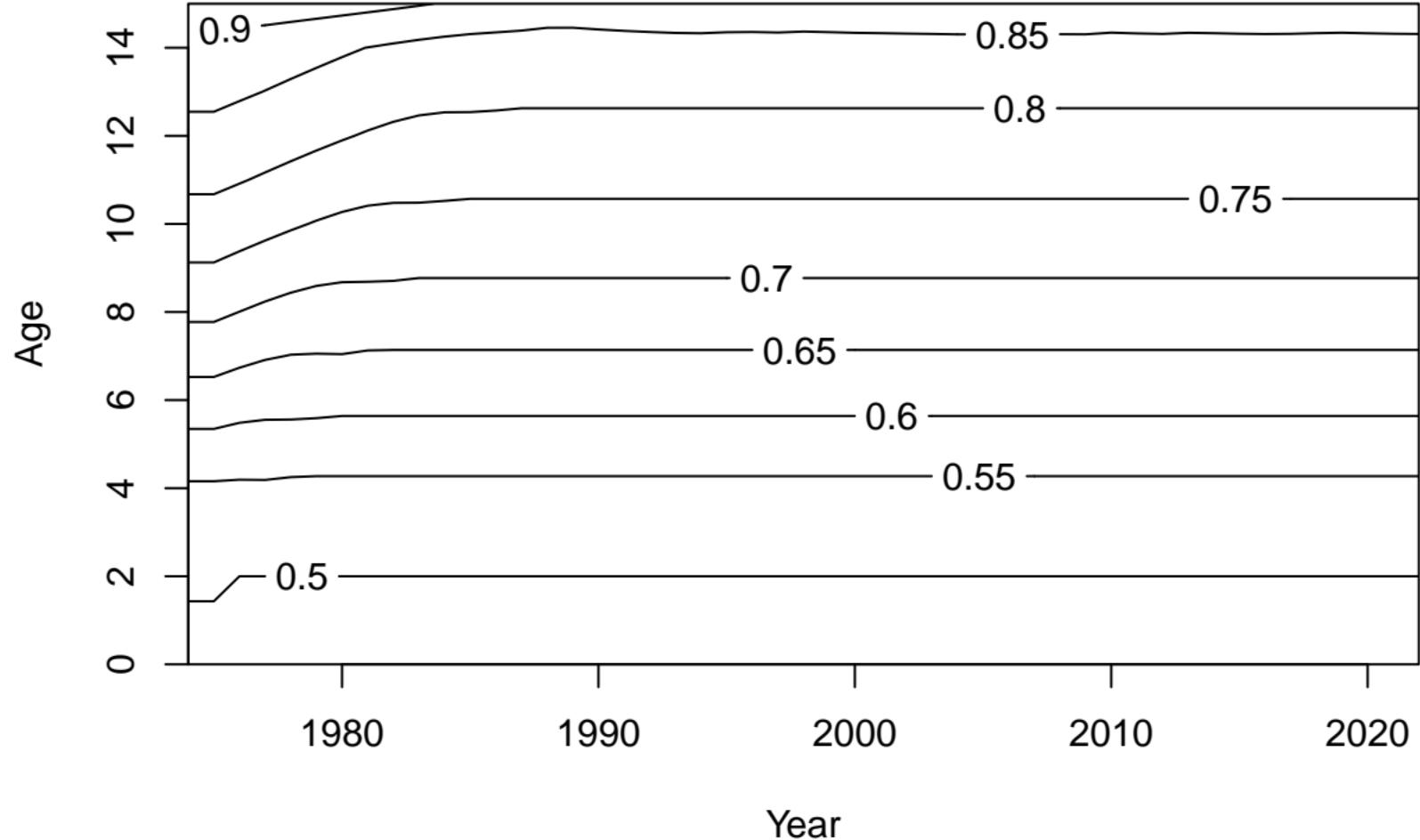
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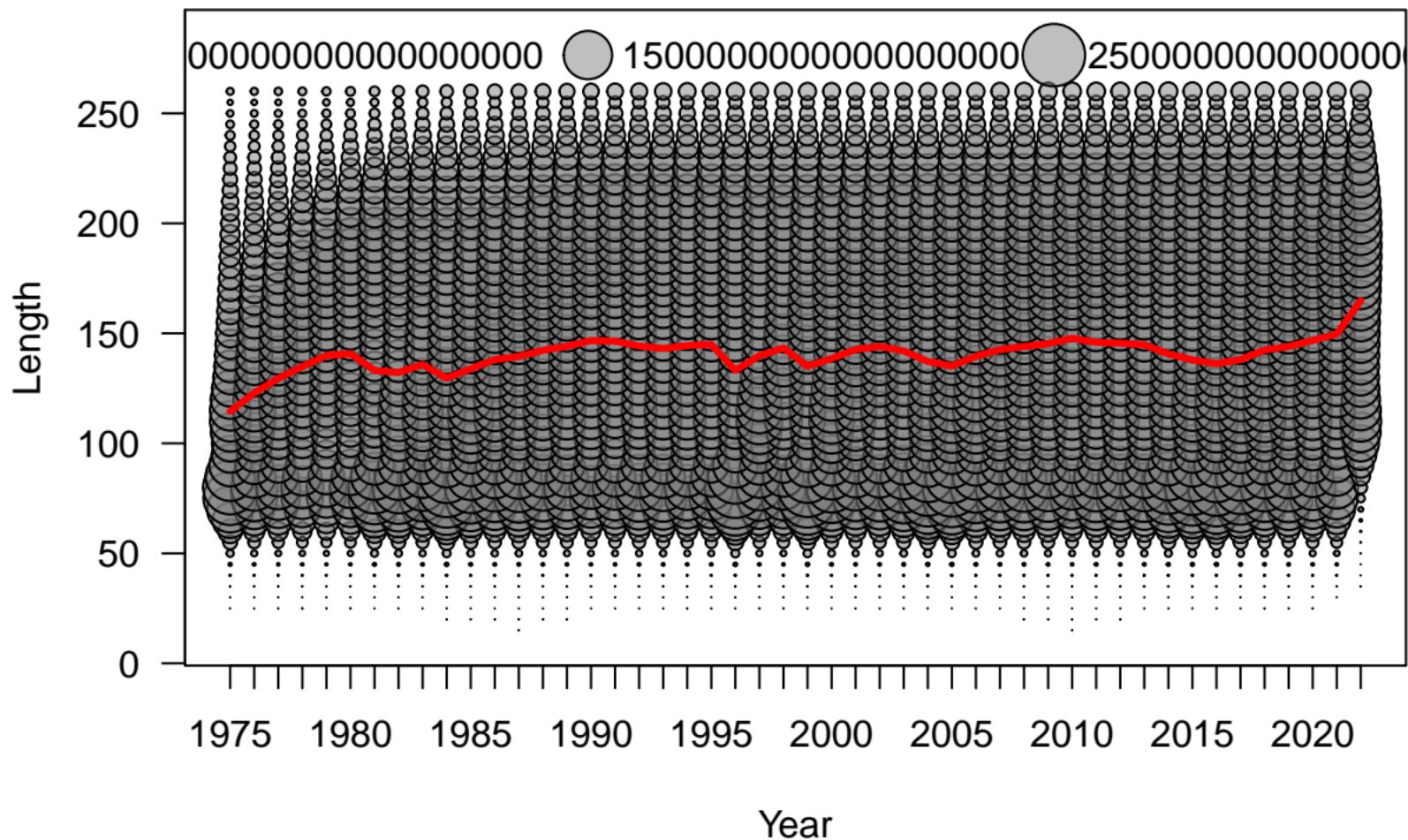
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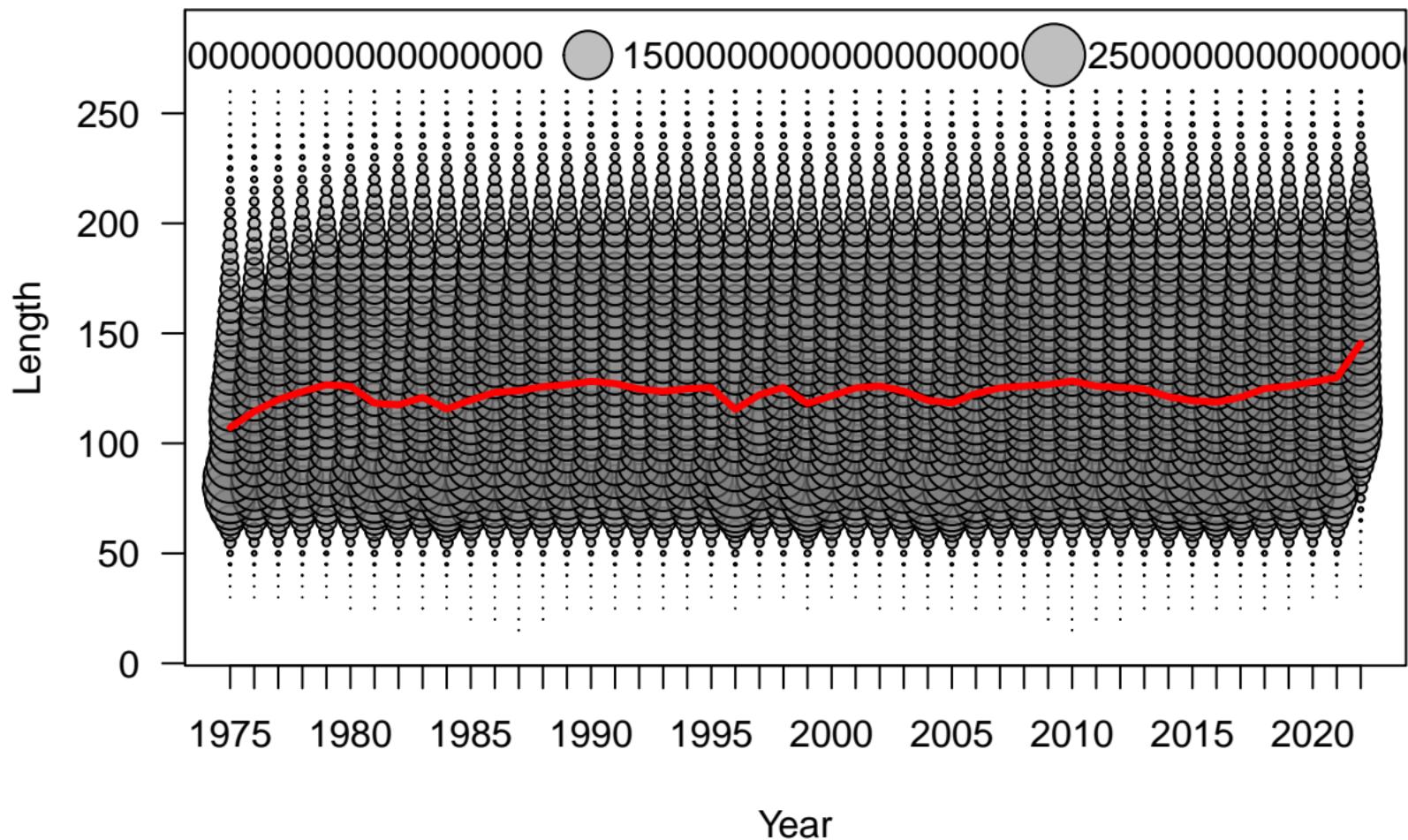


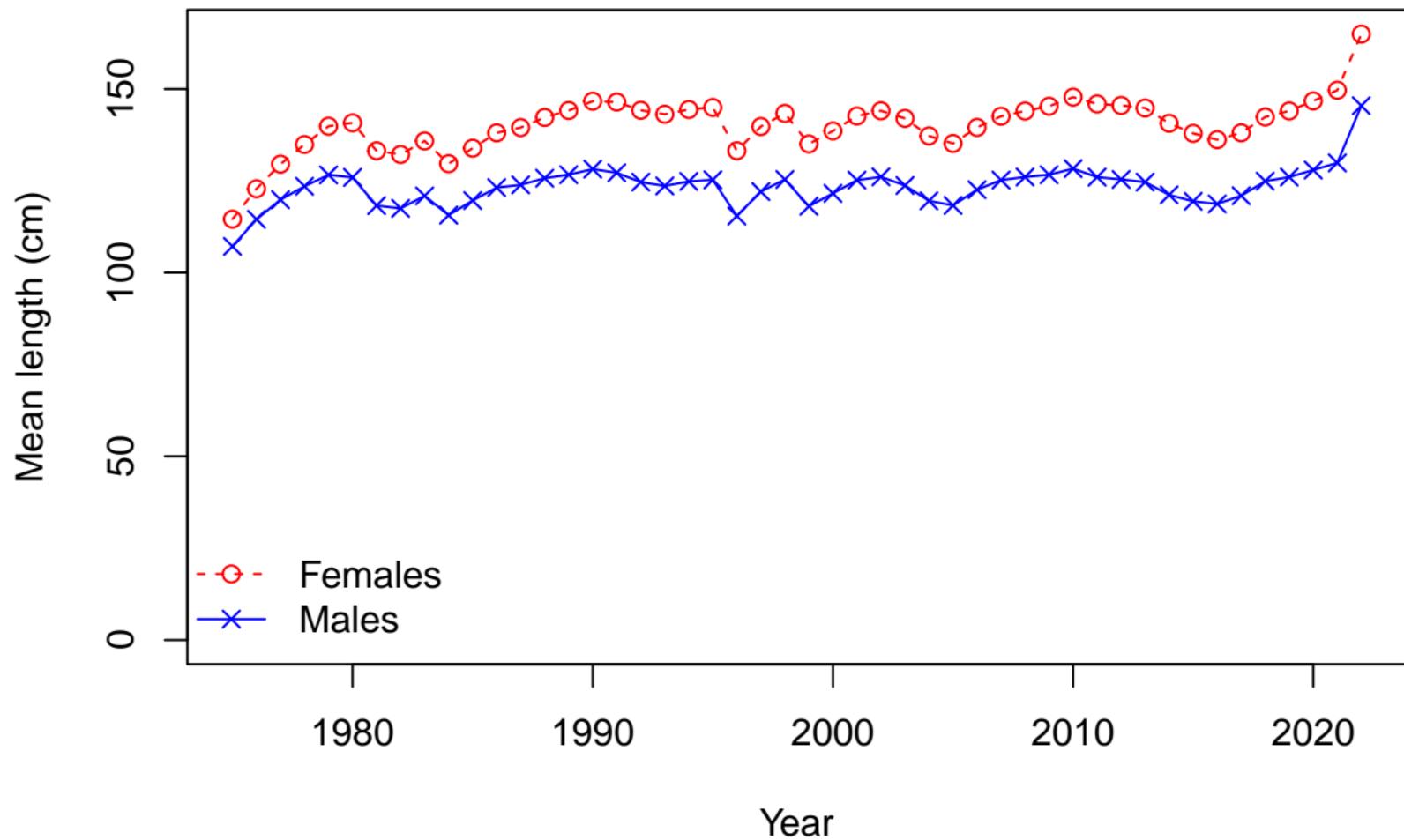


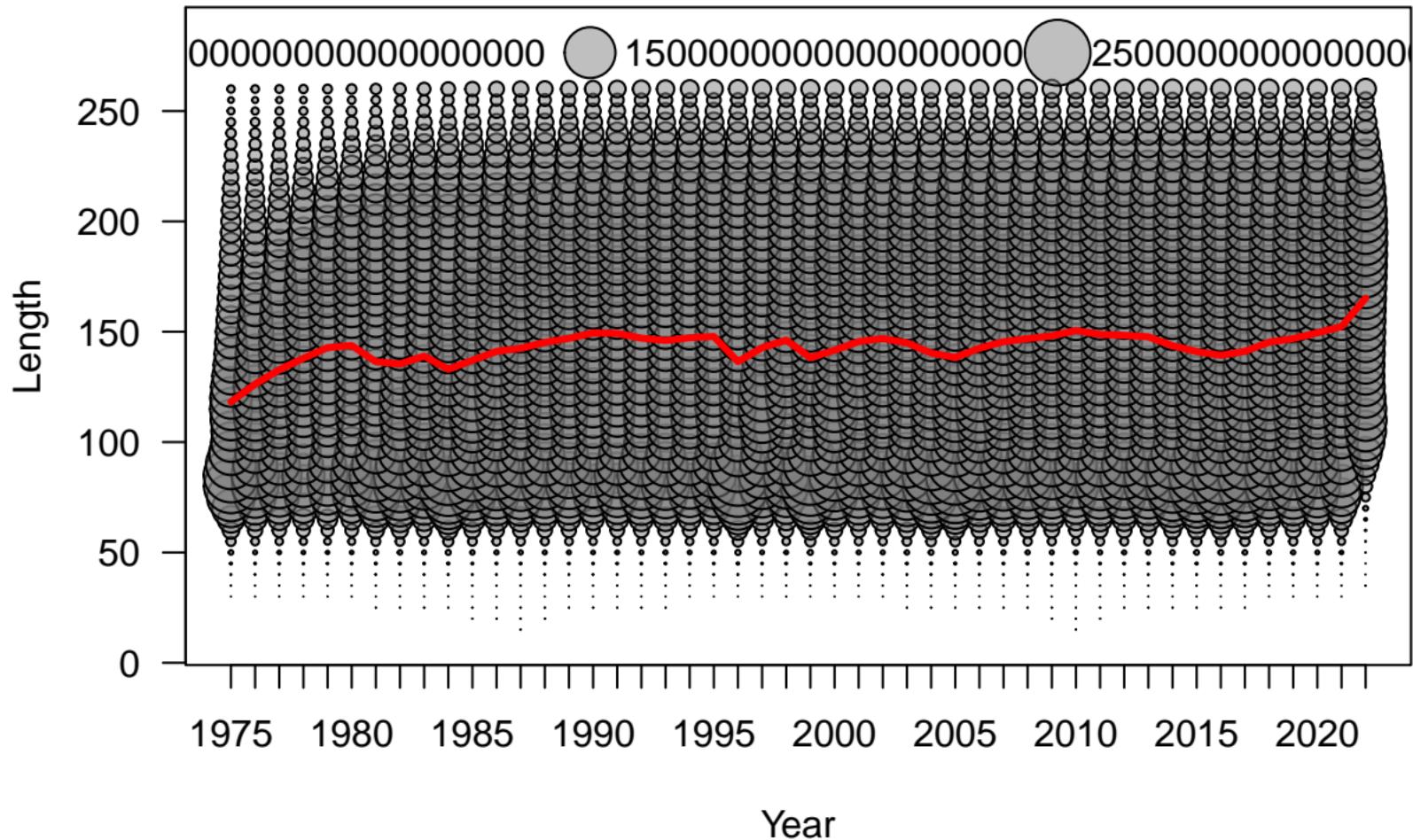


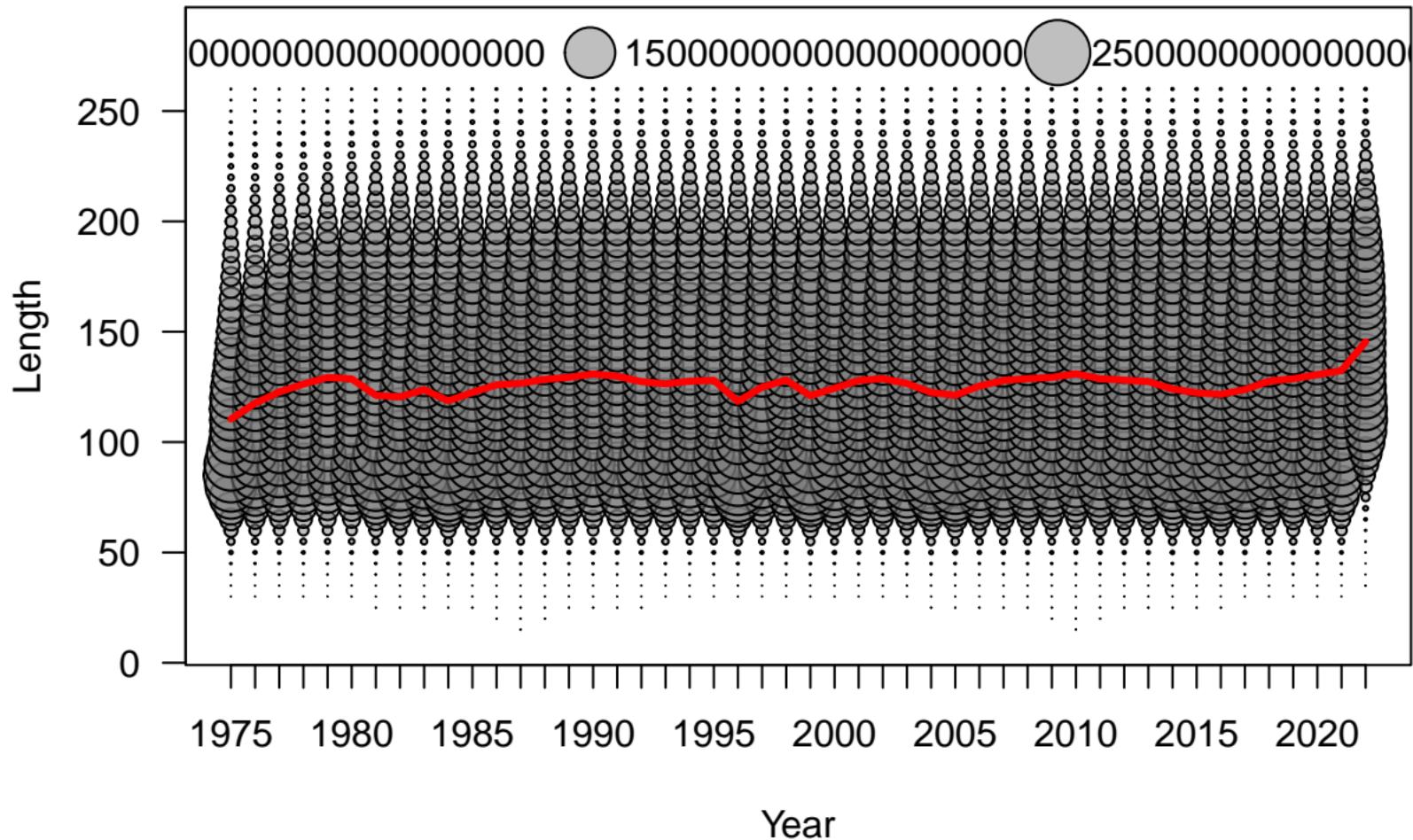


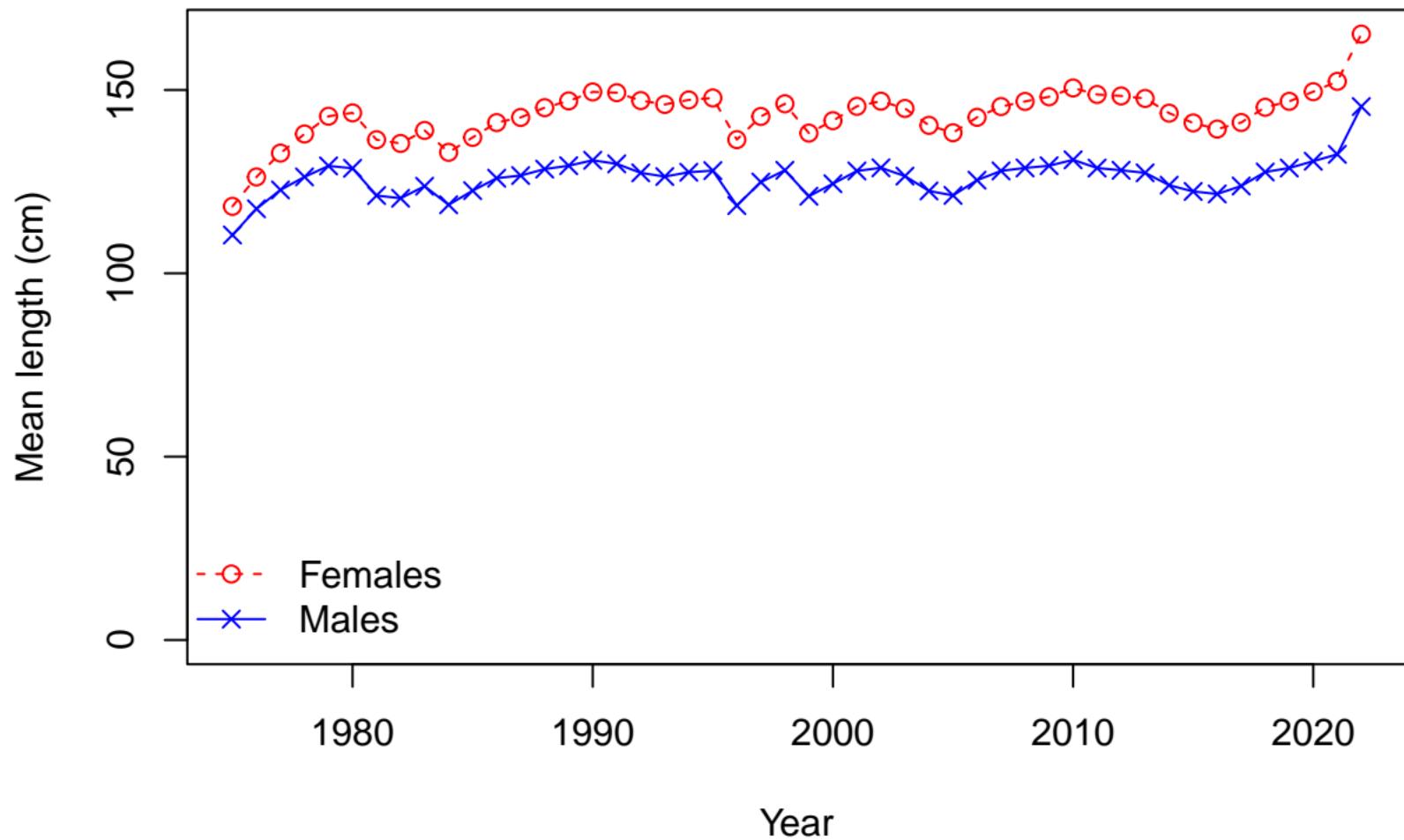


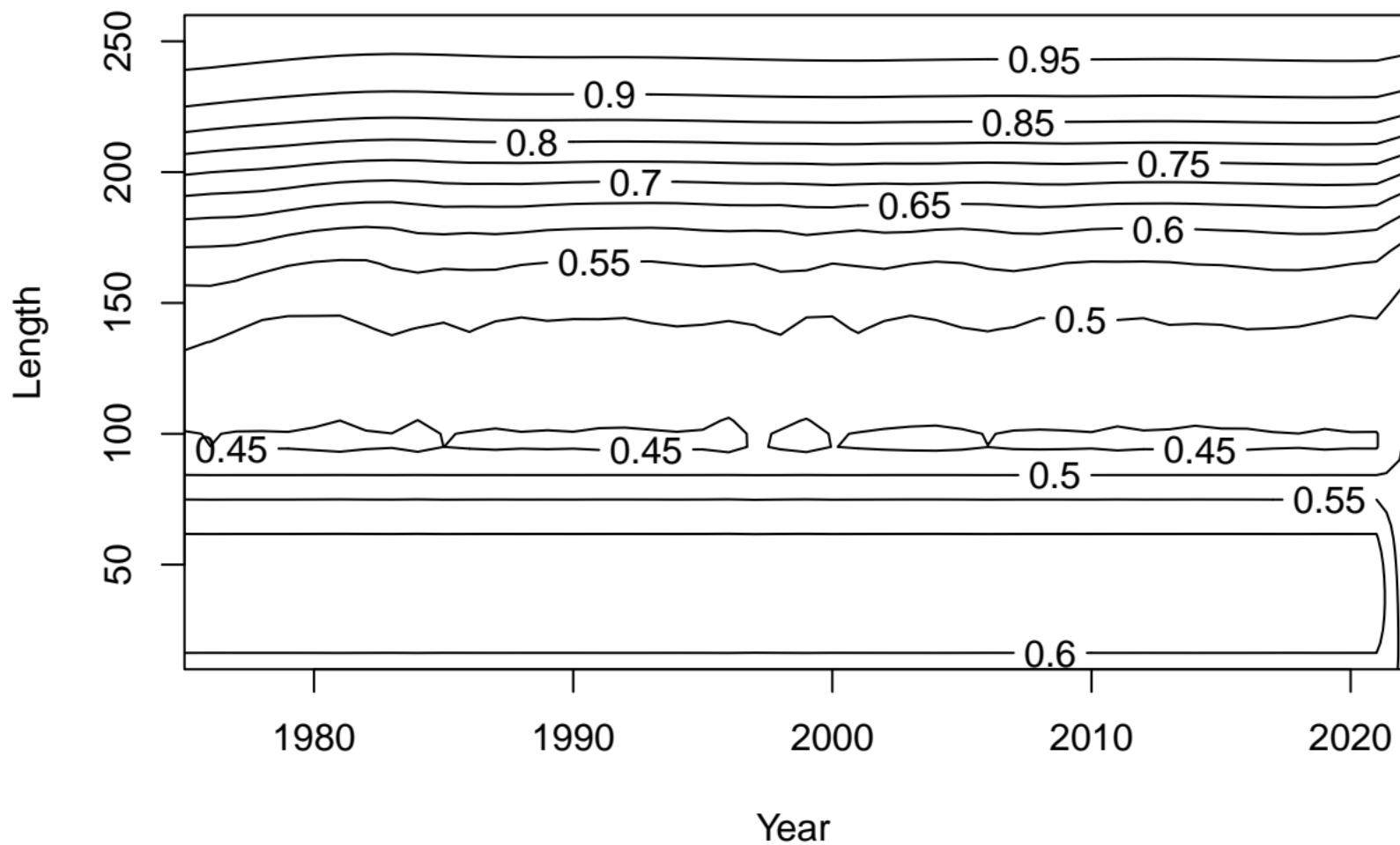




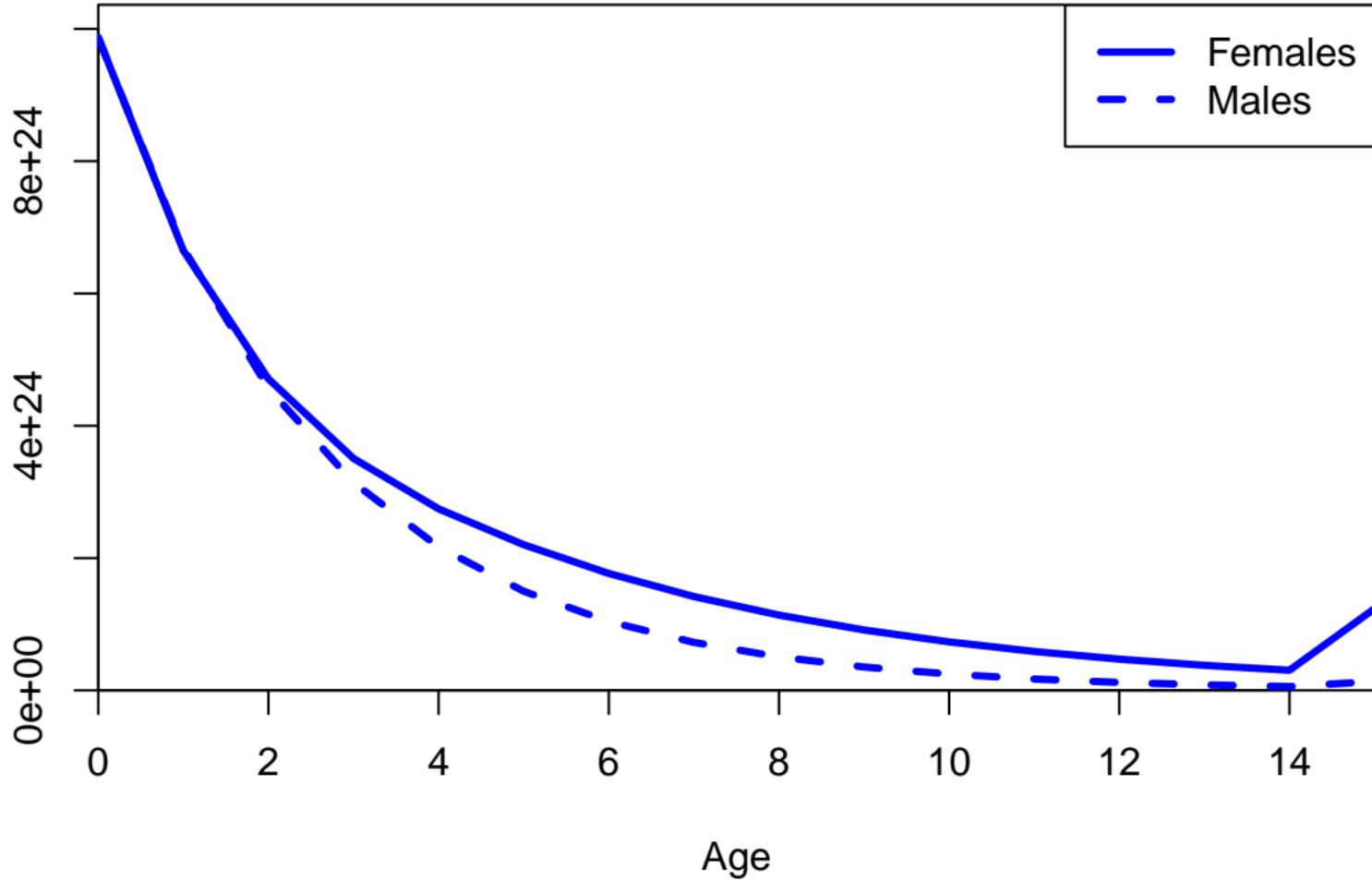


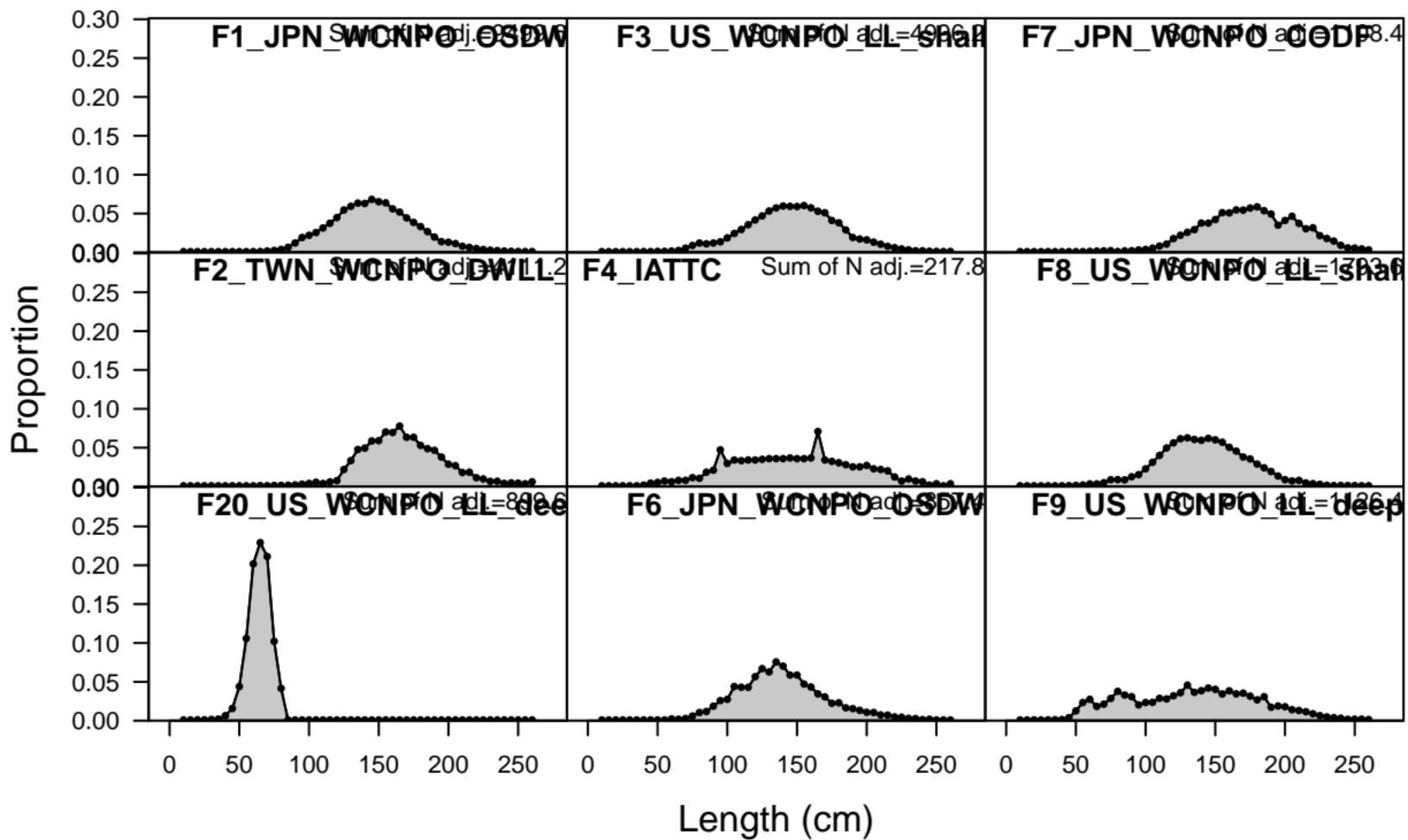


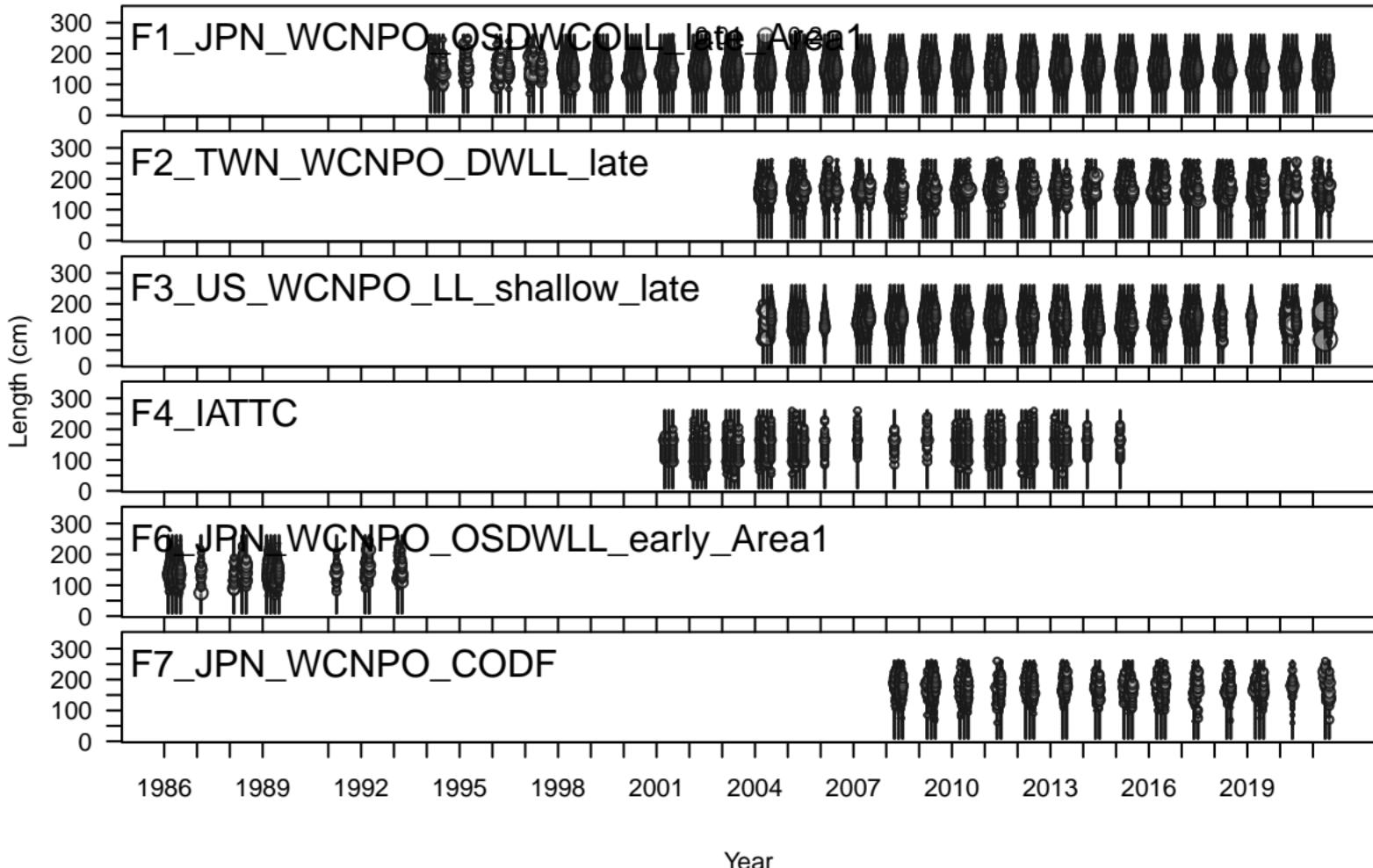


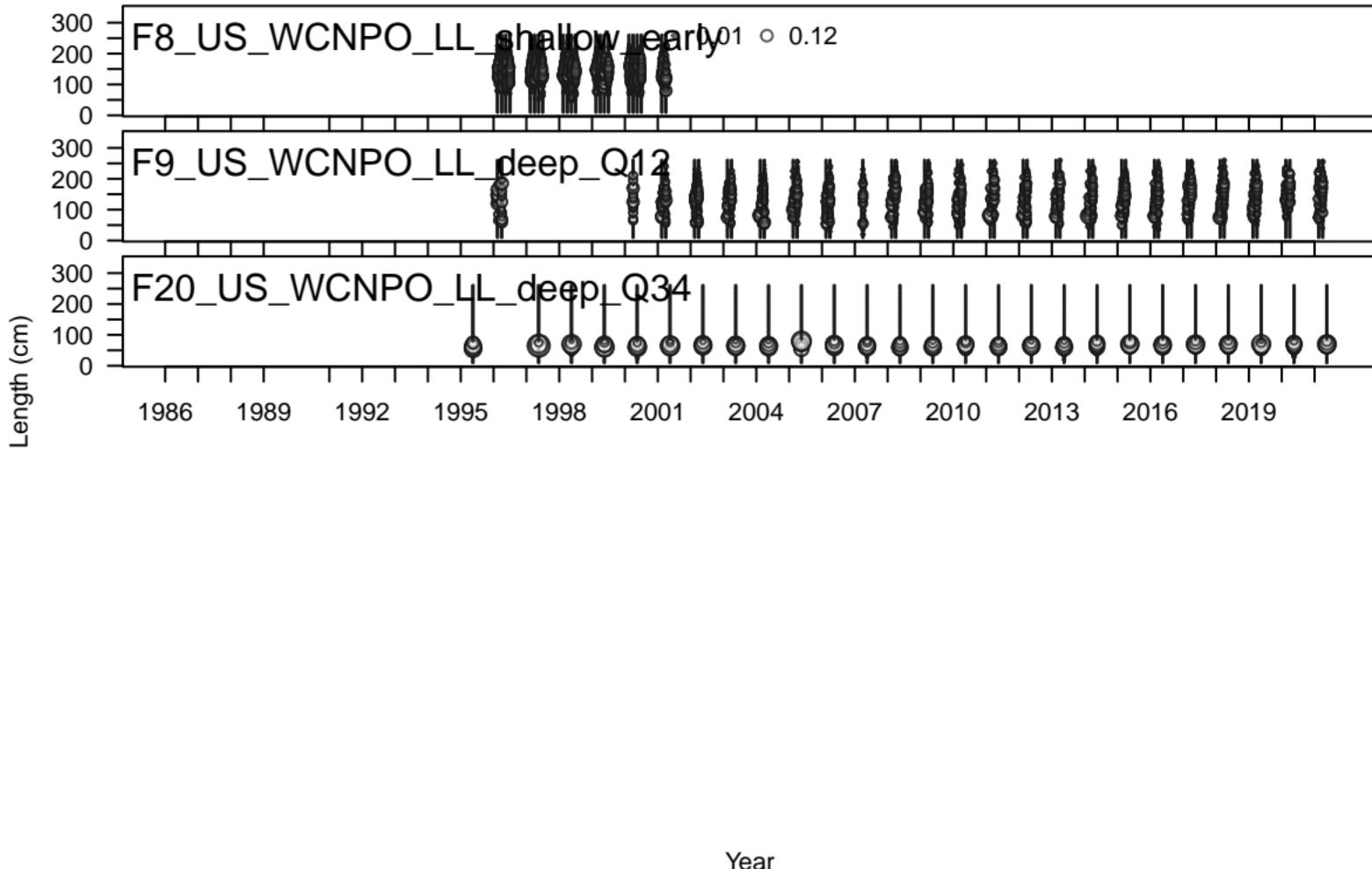


Numbers at age at equilibrium

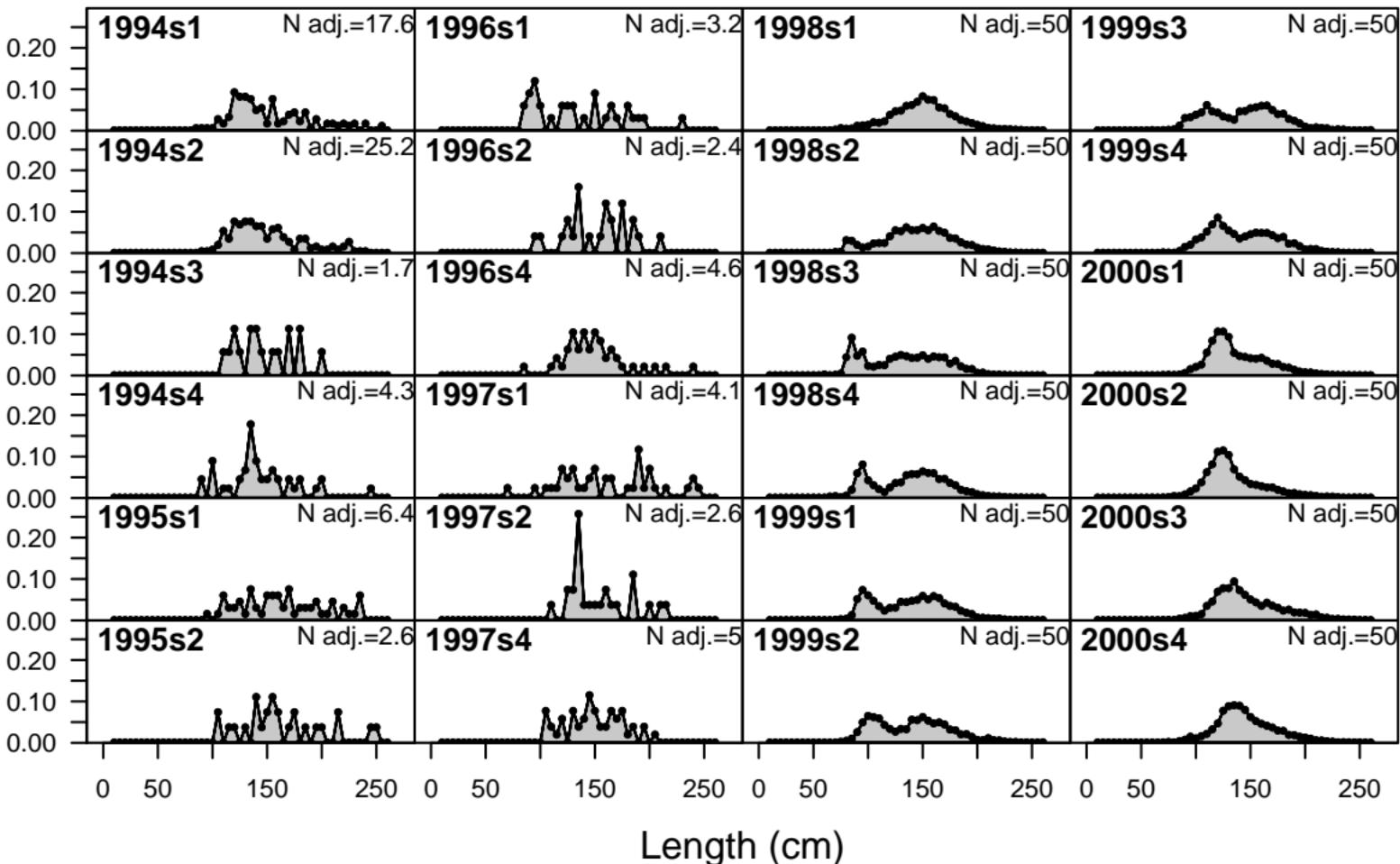




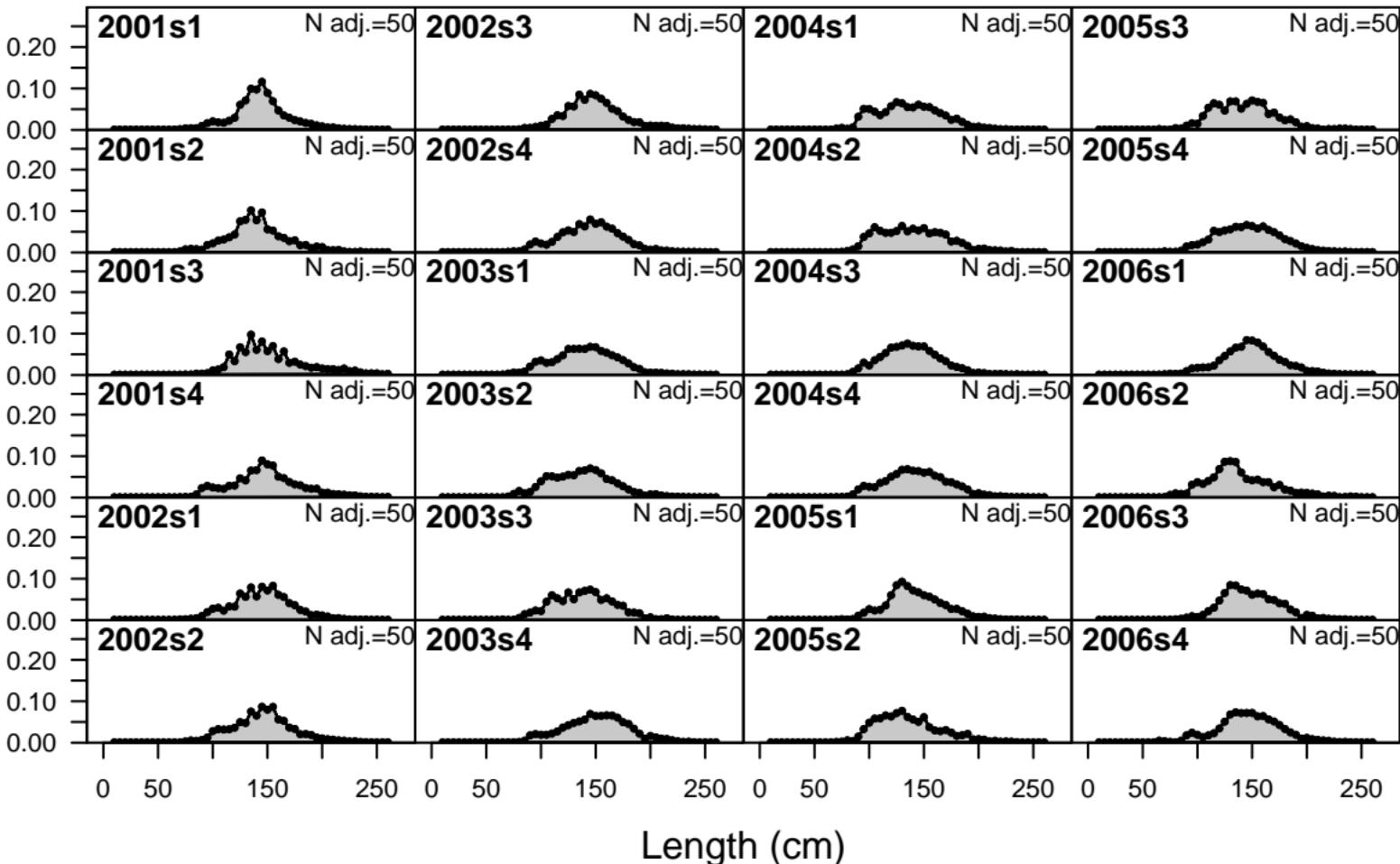




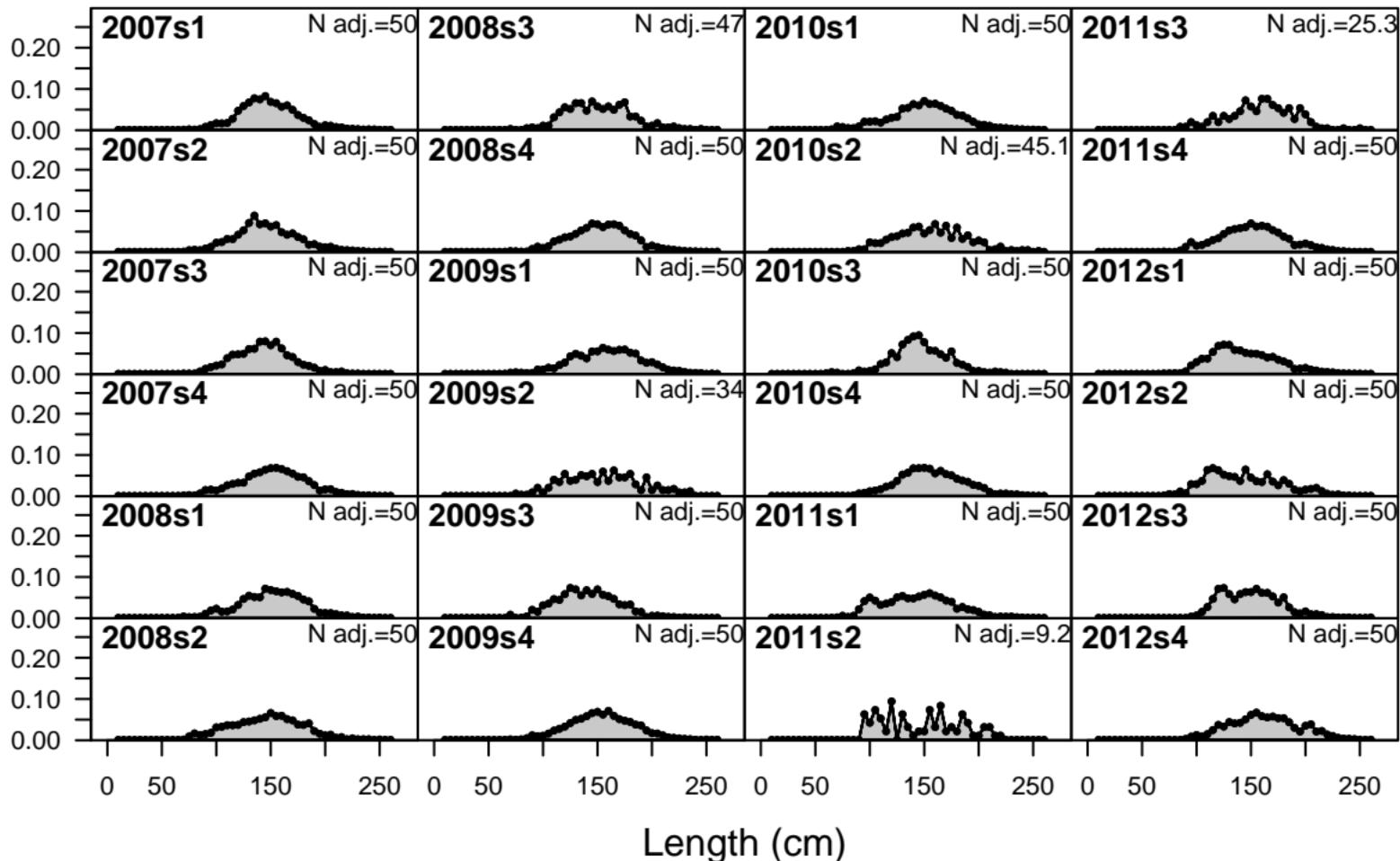
Proportion



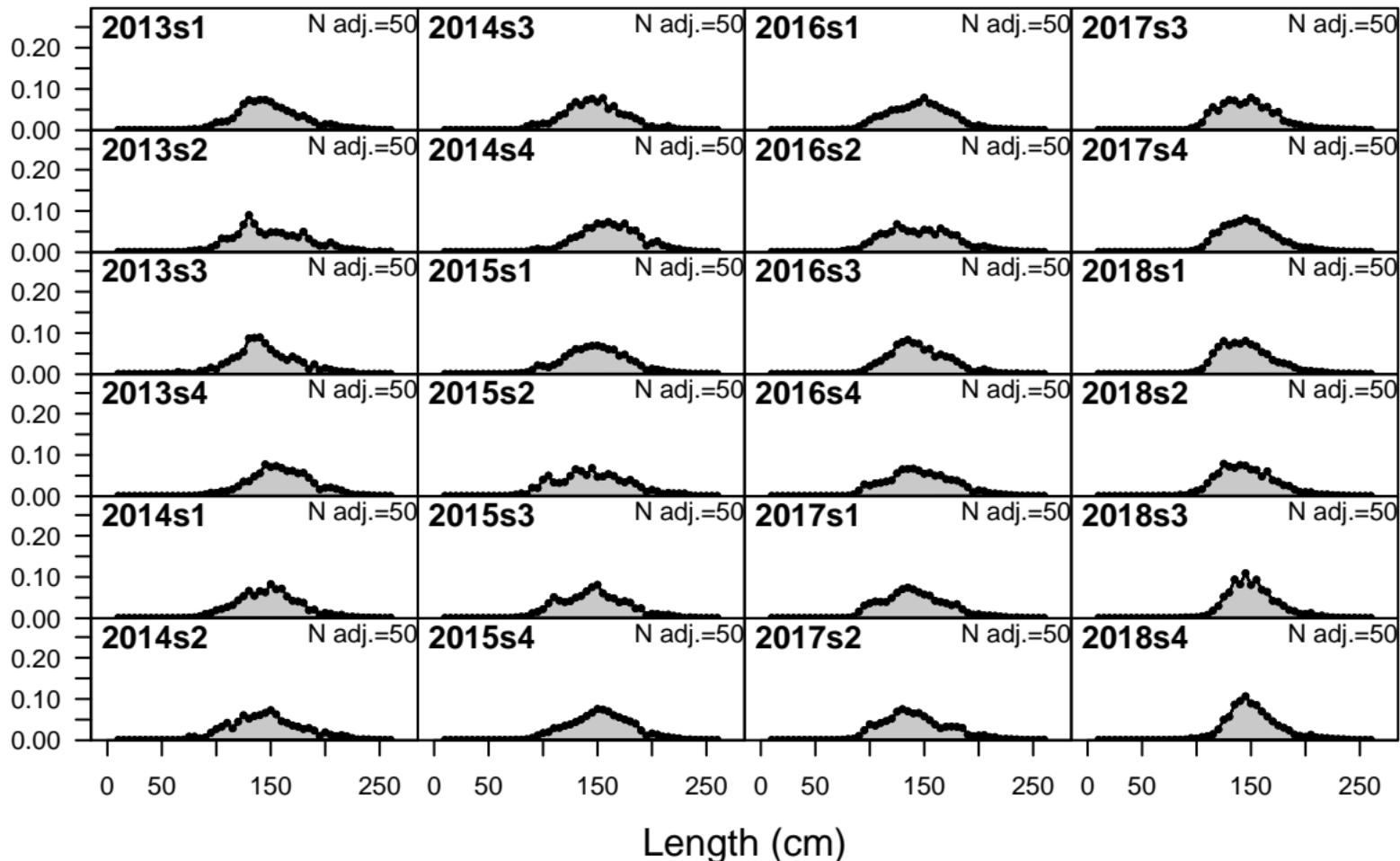
Proportion



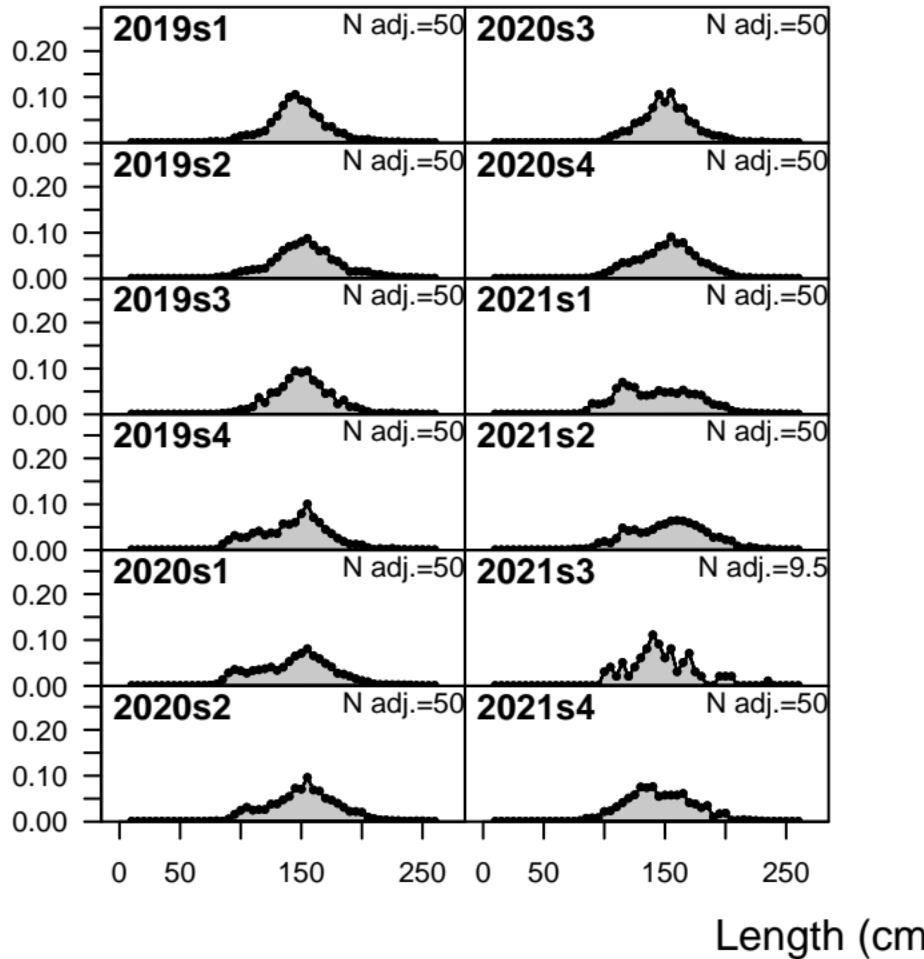
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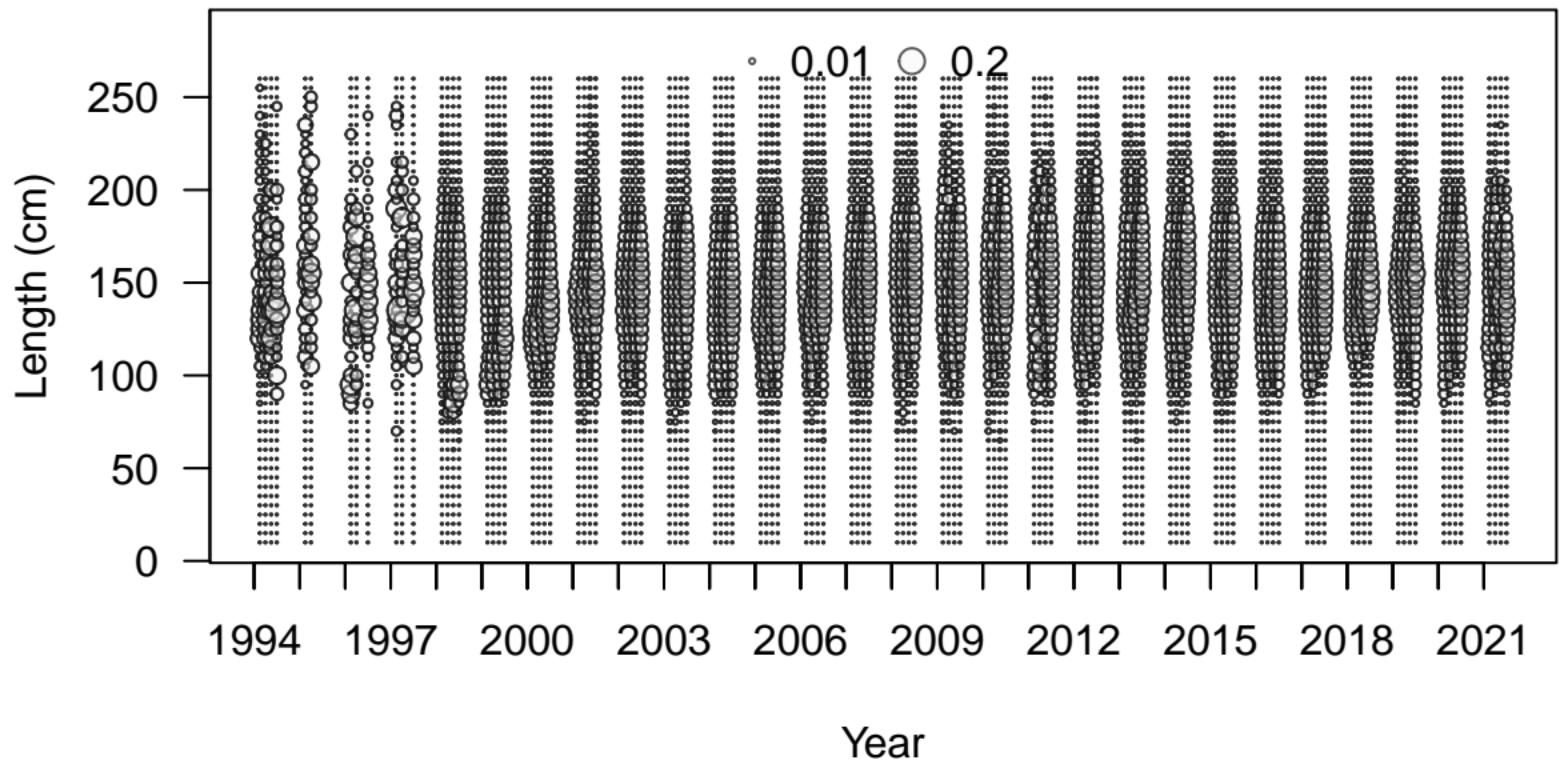


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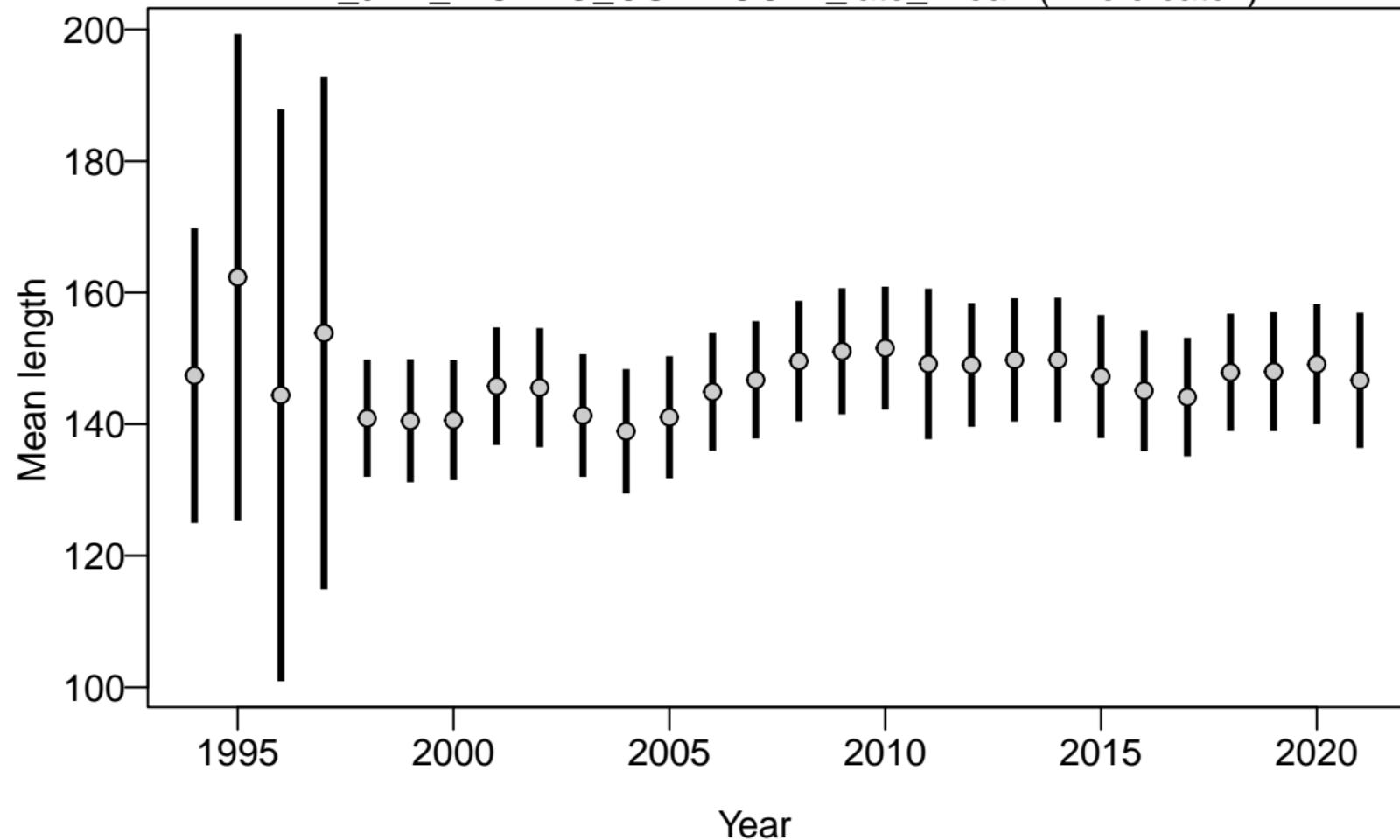


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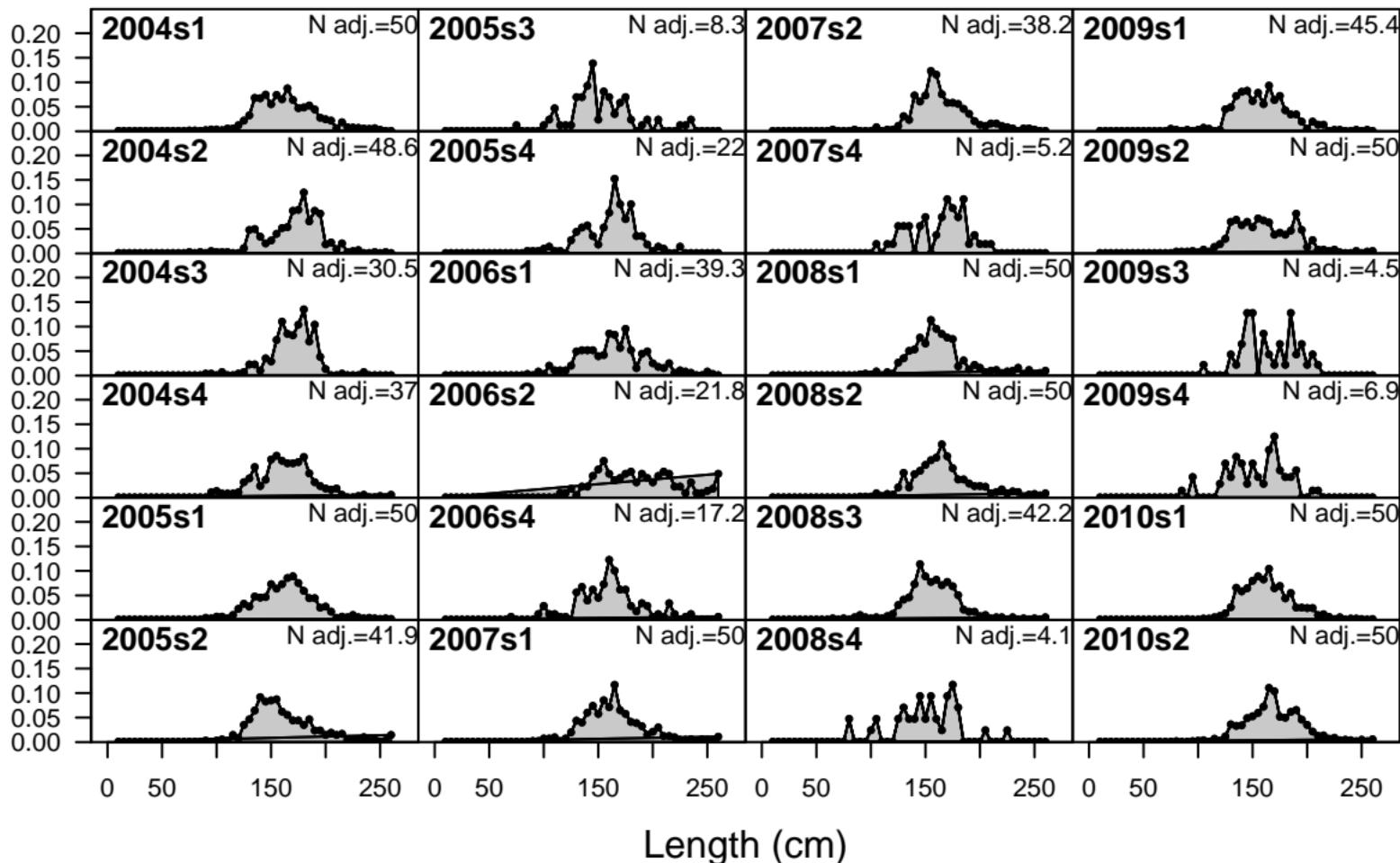




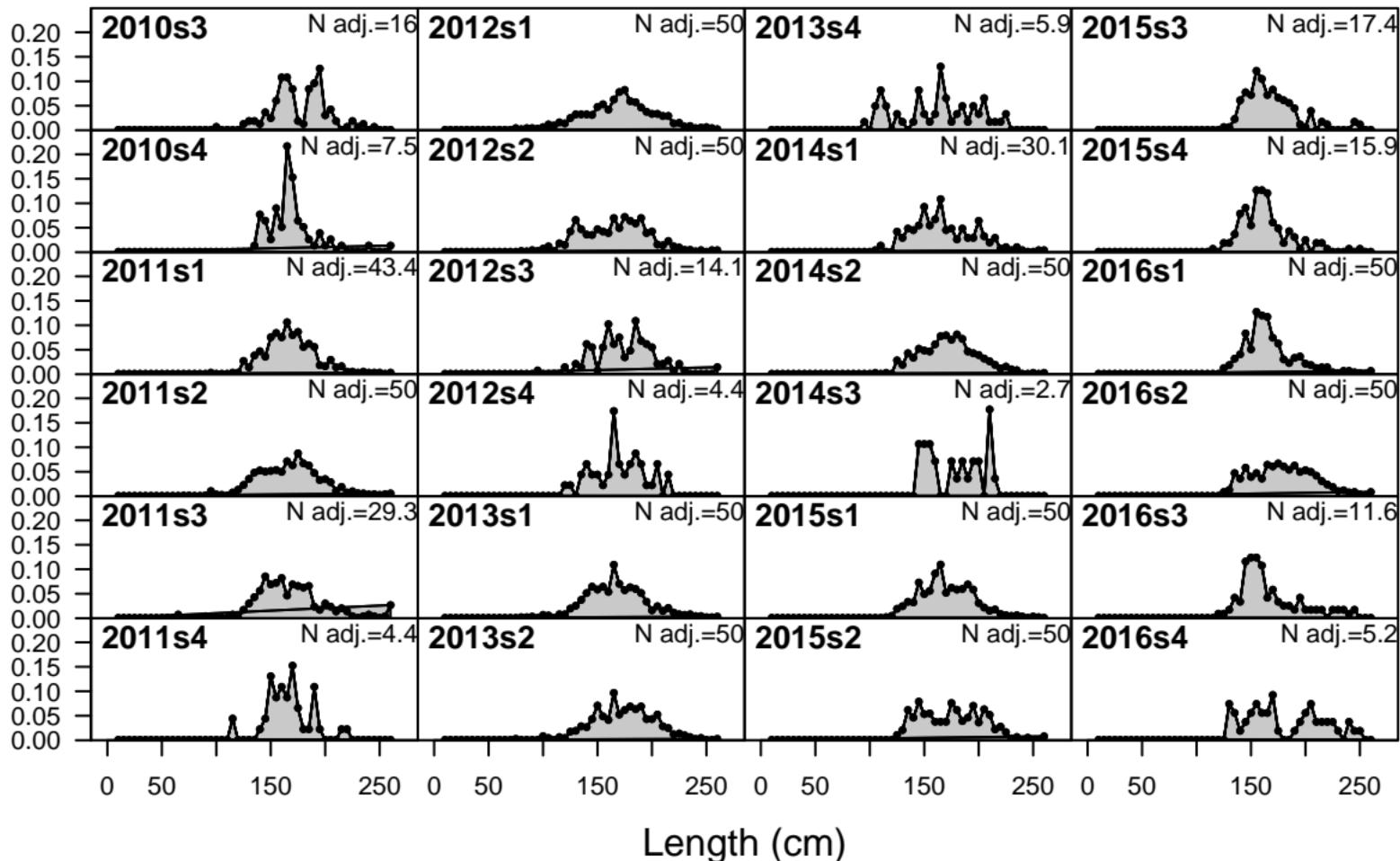
F1_JPN_WCNPO OSDWCOLL_late_Area1 (whole catch)



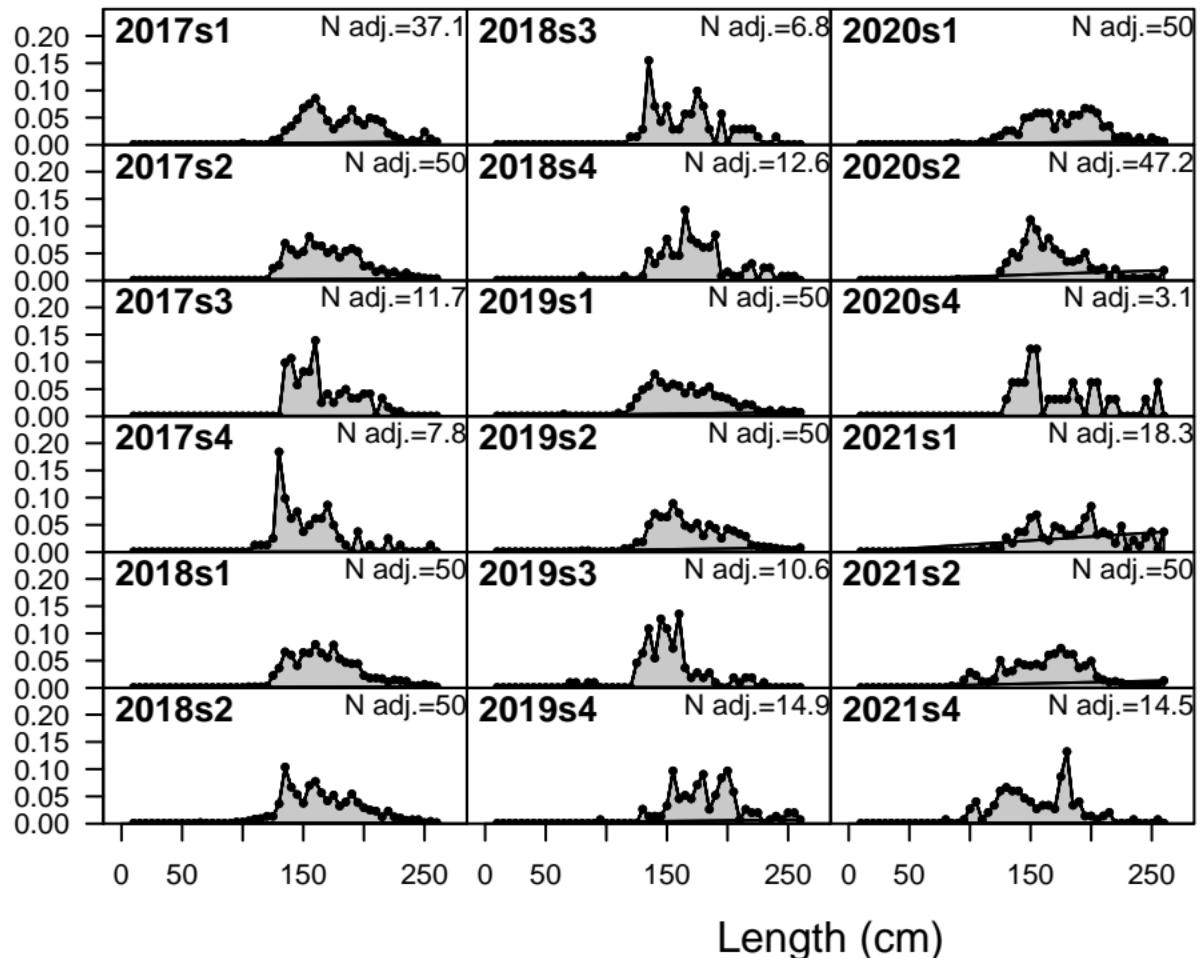
Proportion

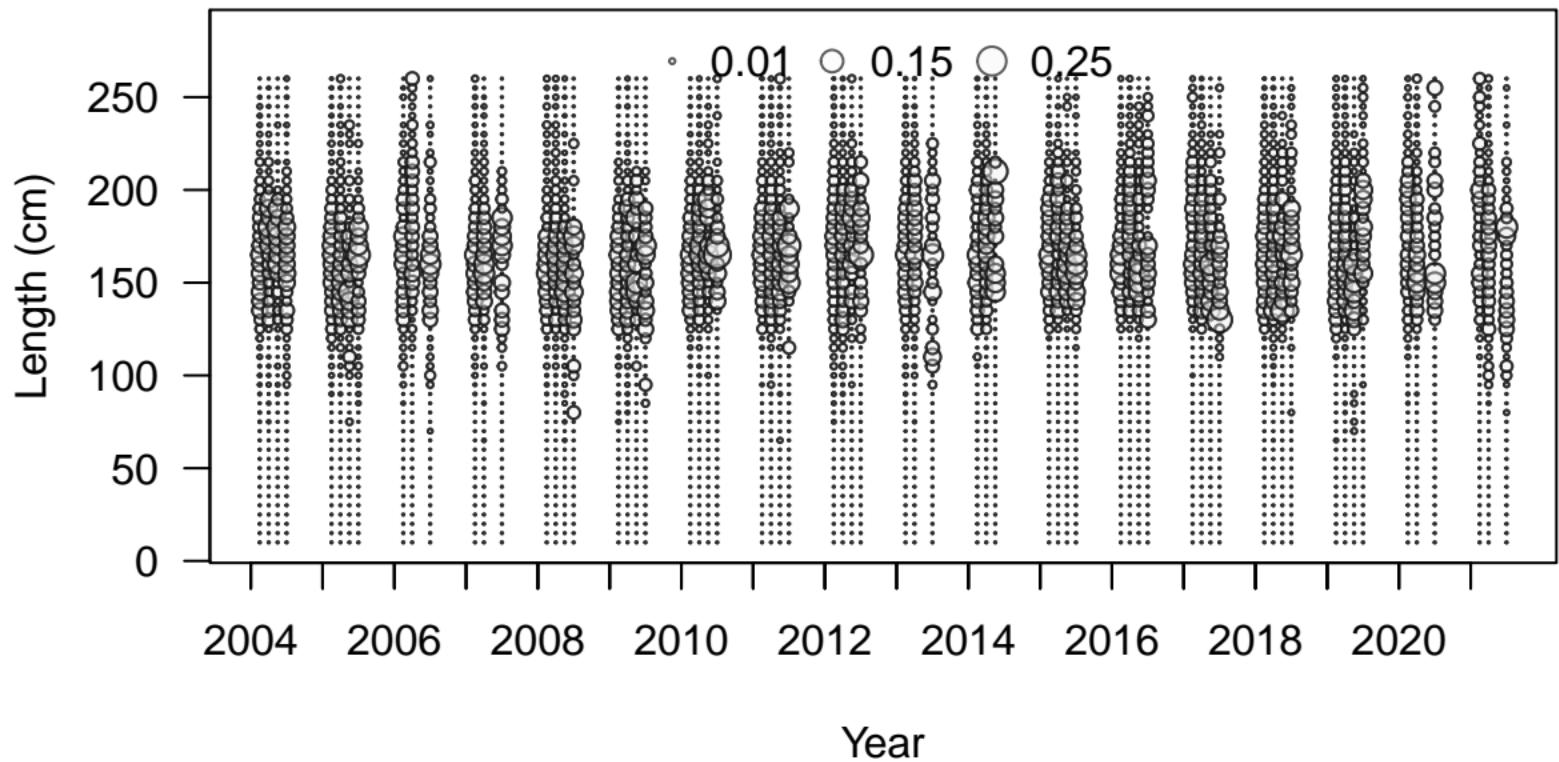


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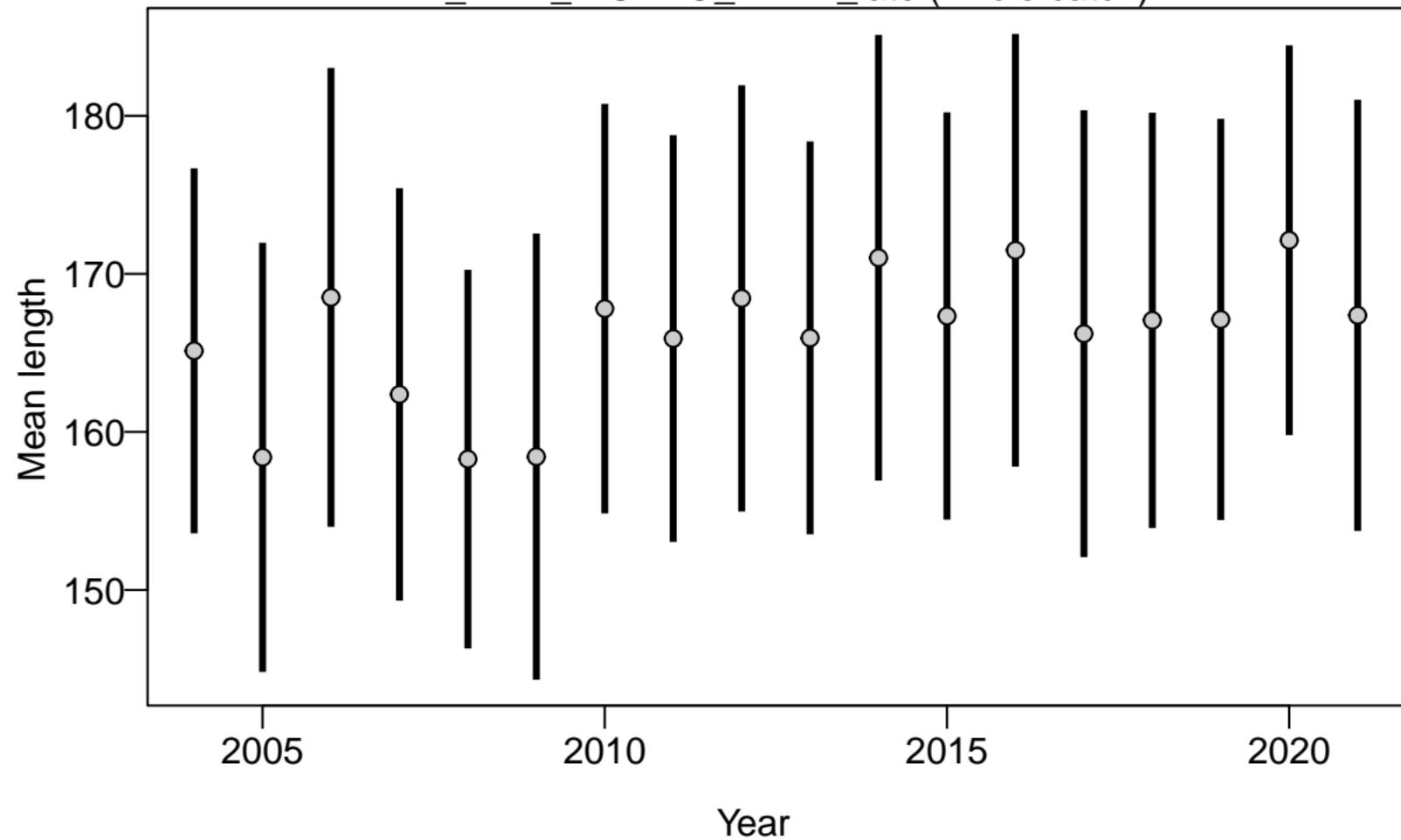


Proportion

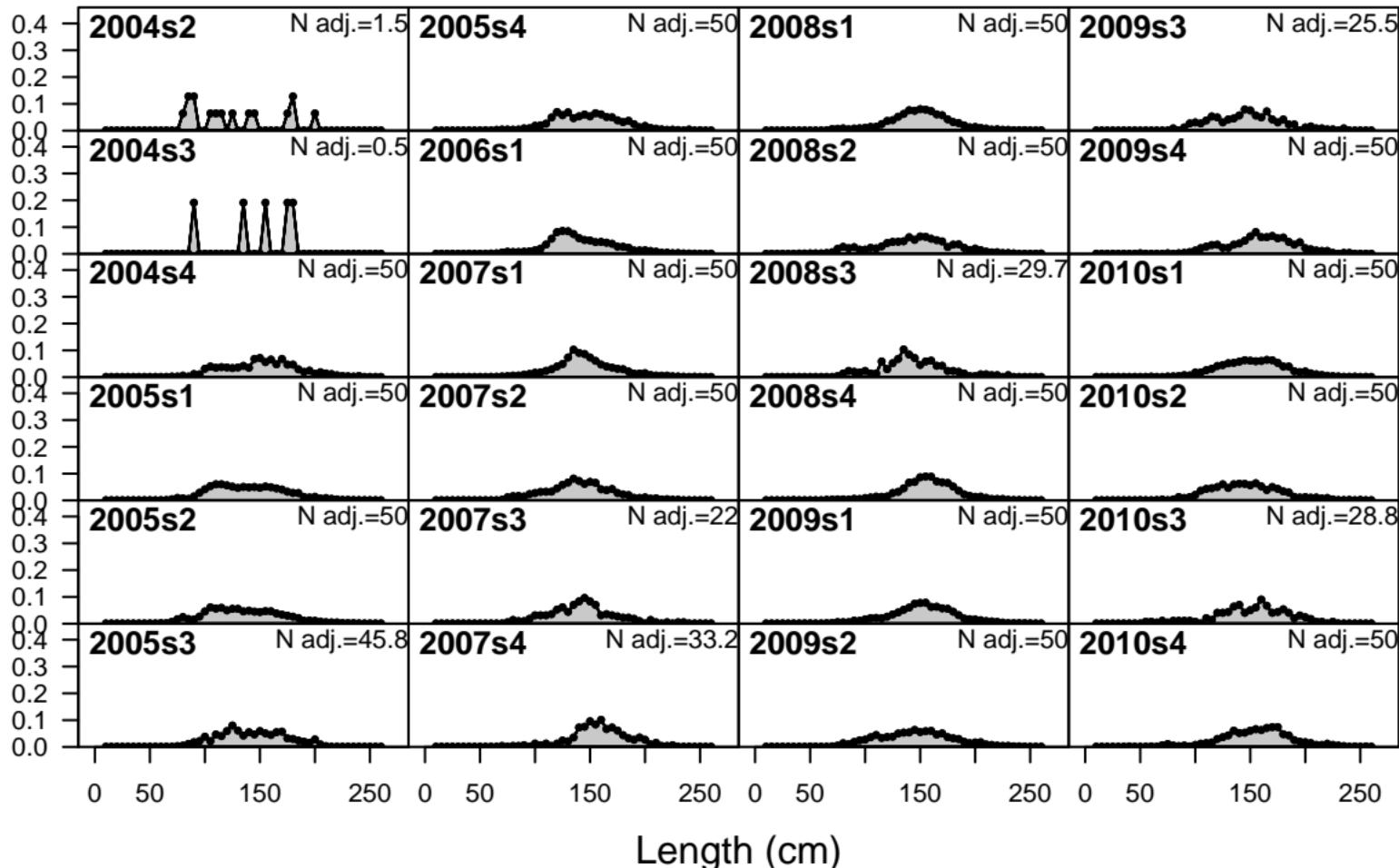




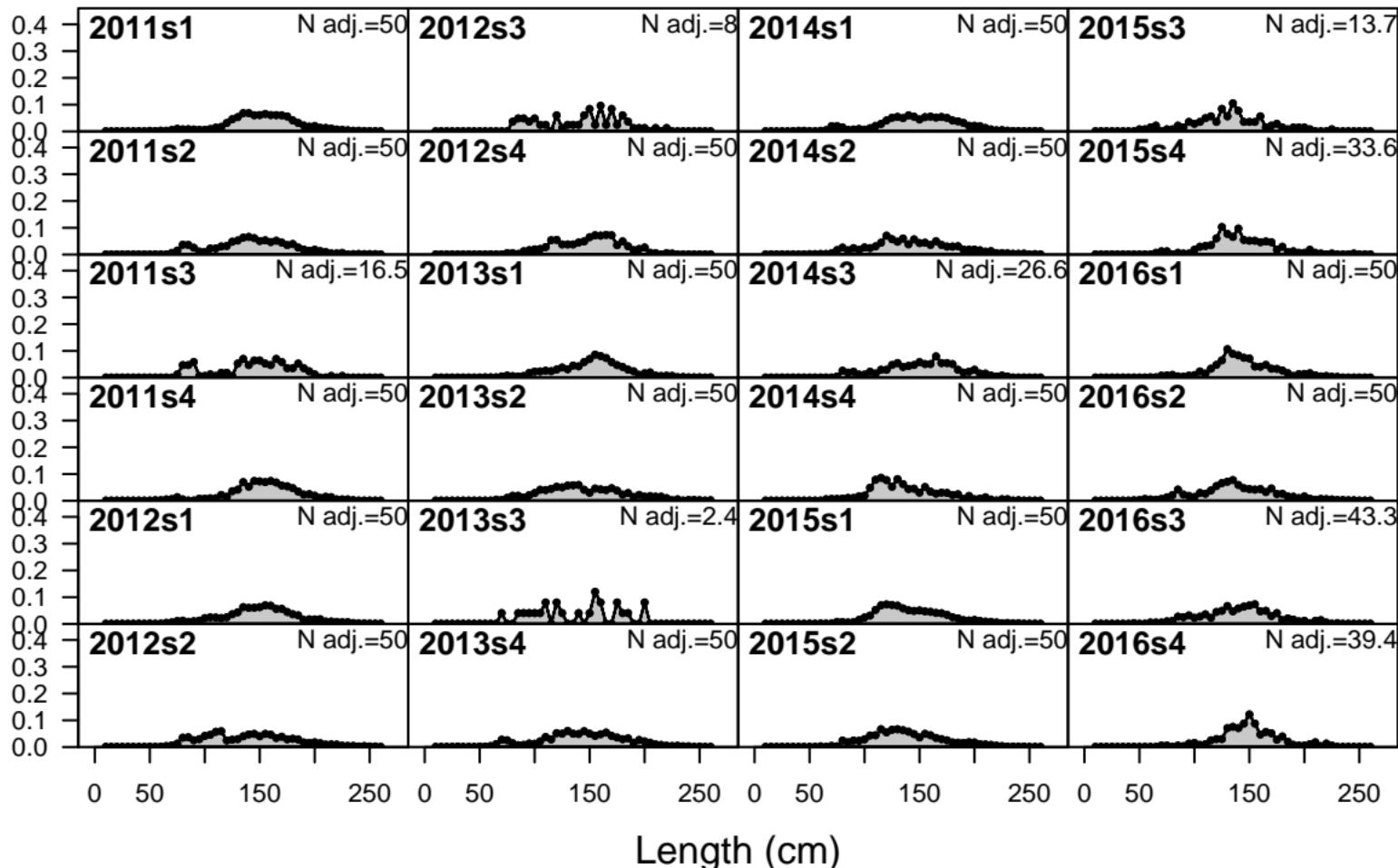
F2_TWN_WCNPO_DWLL_late (whole catch)



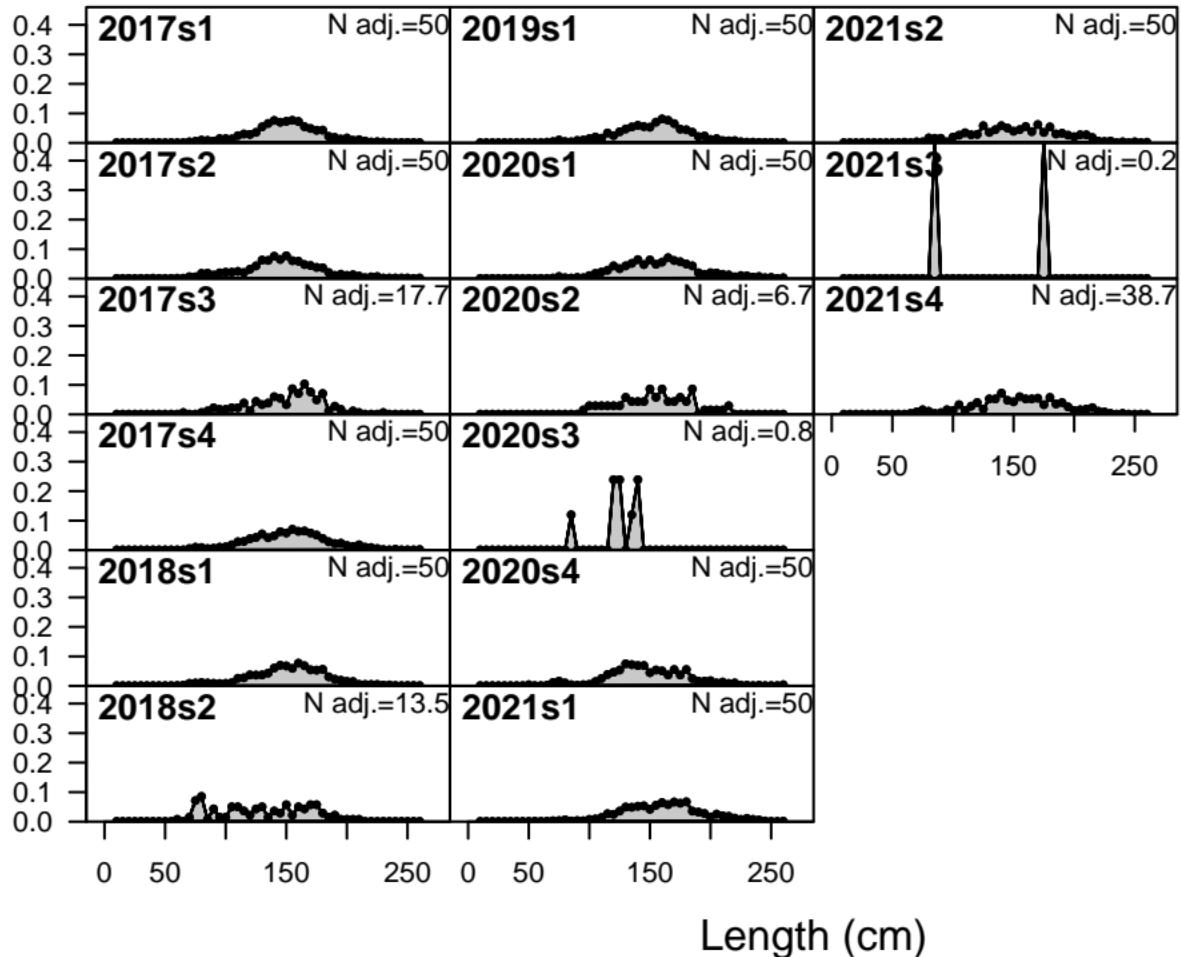
Proportion

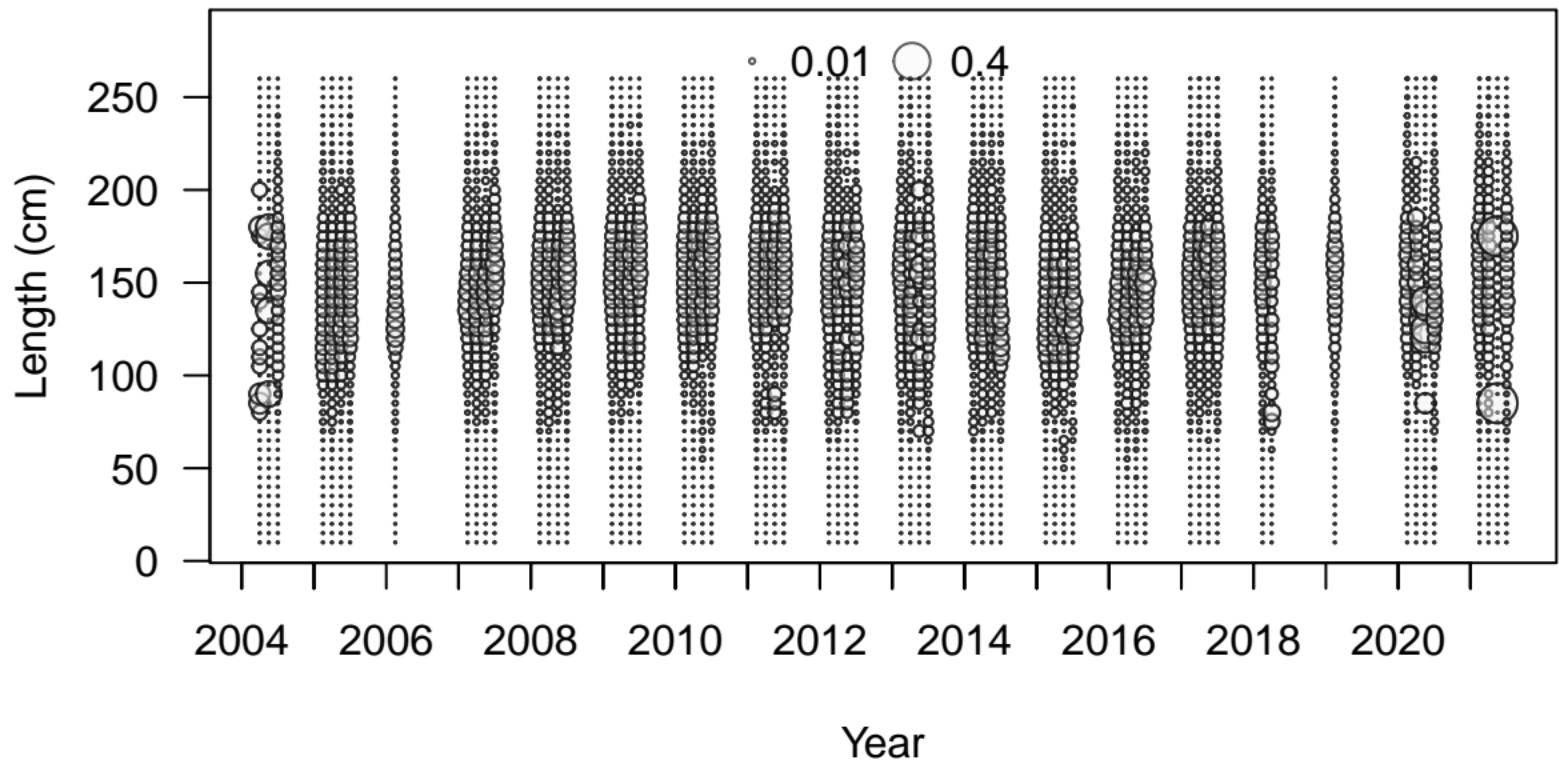


Proportion

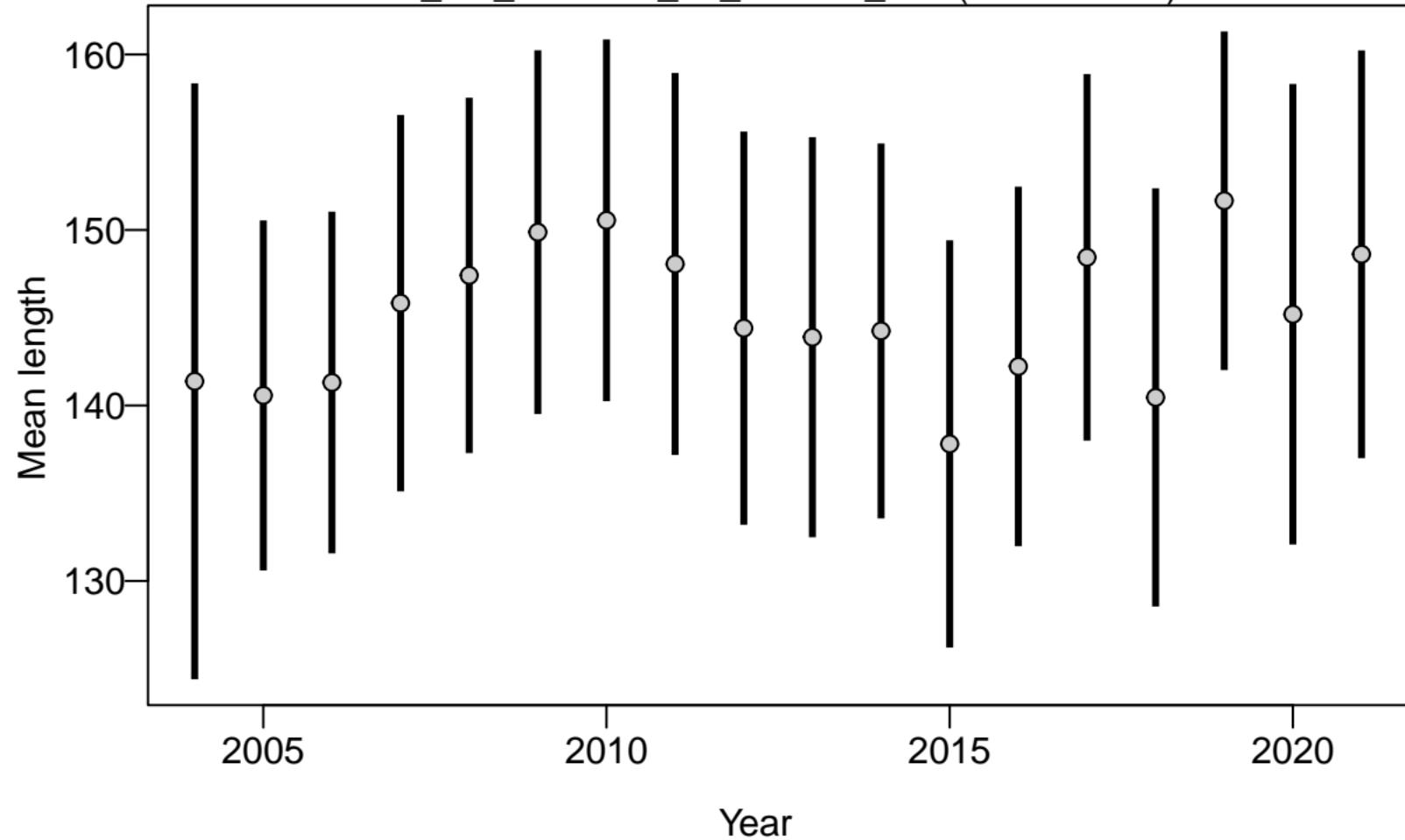


Proportion

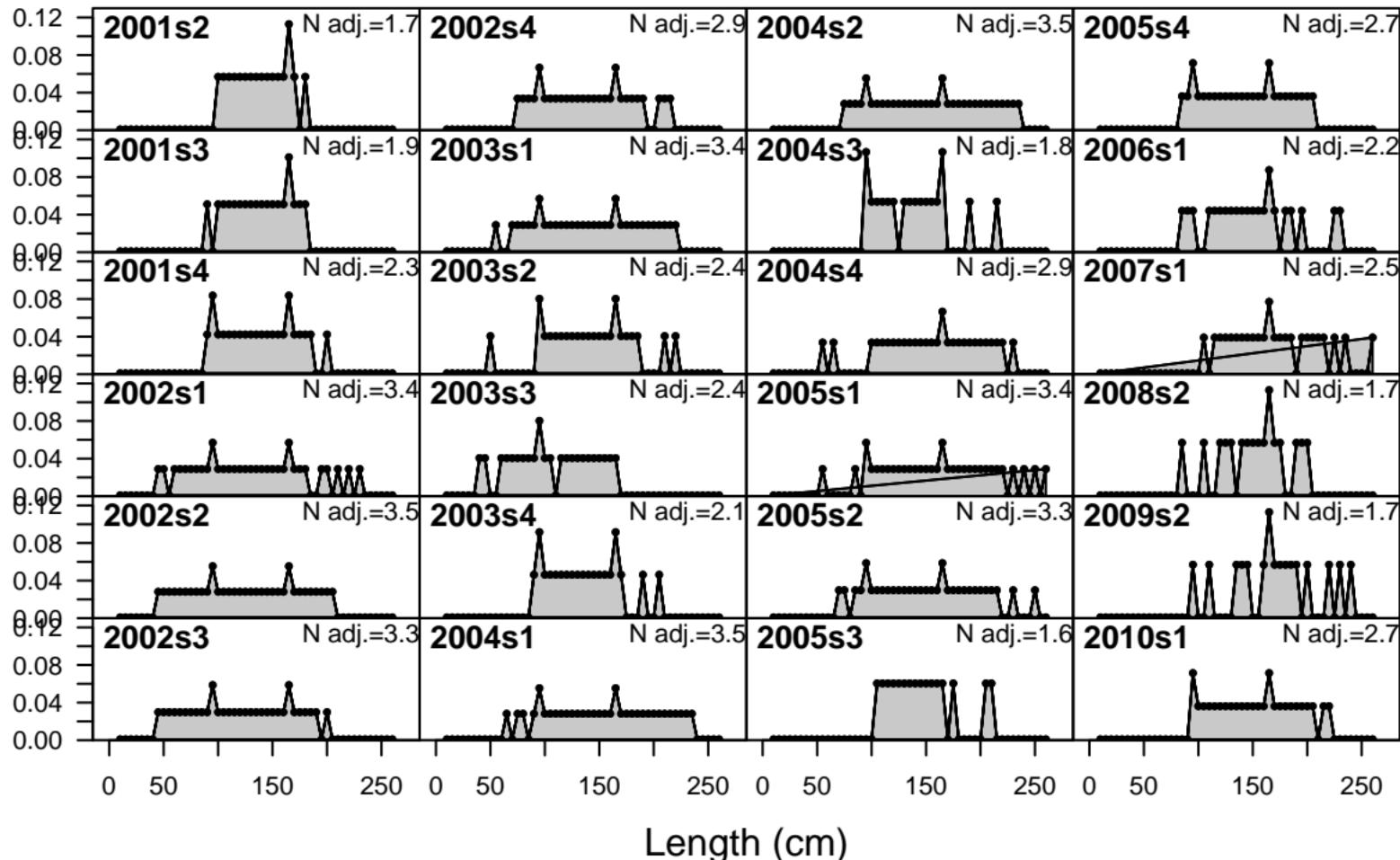




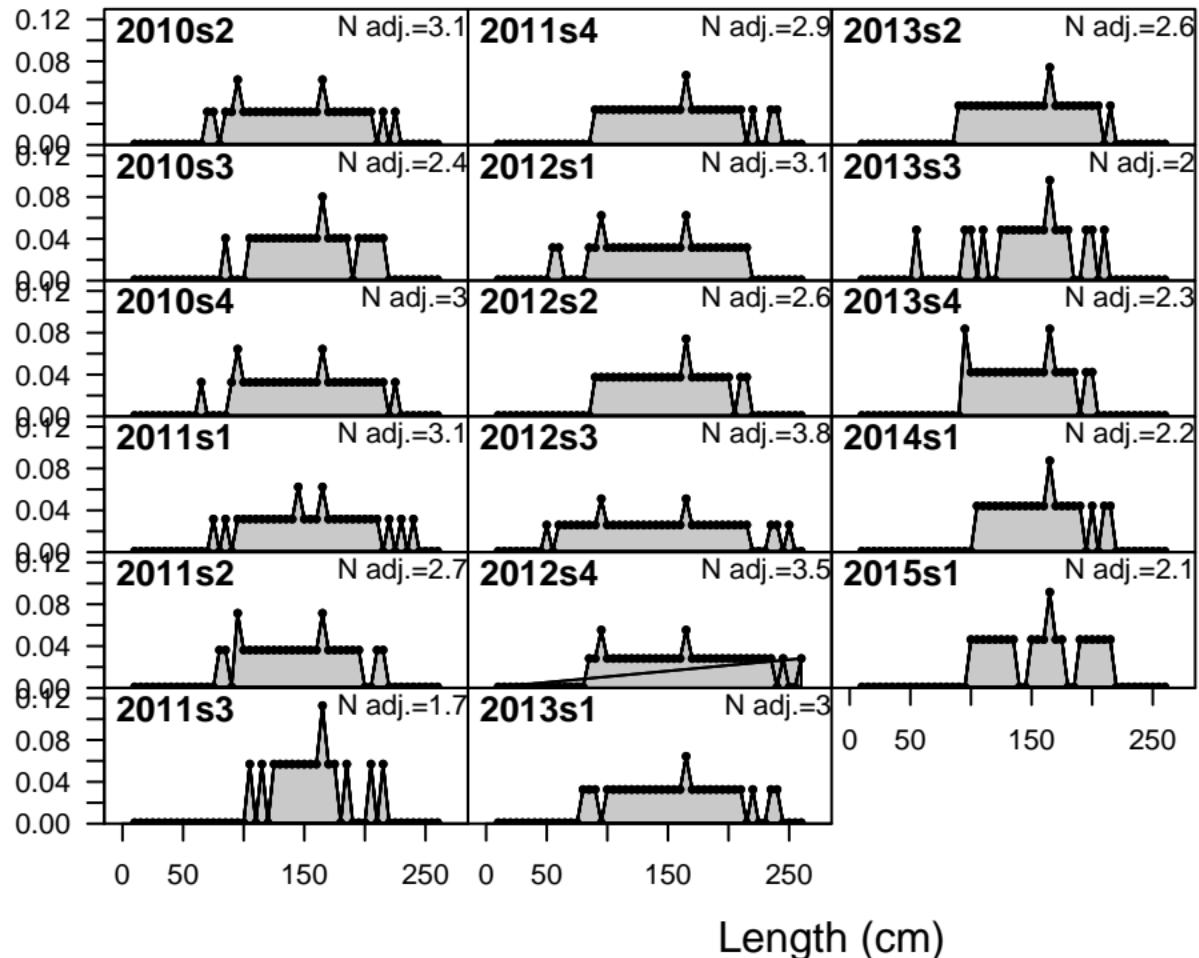
F3_US_WCNPO_LL_shallow_late (whole catch)

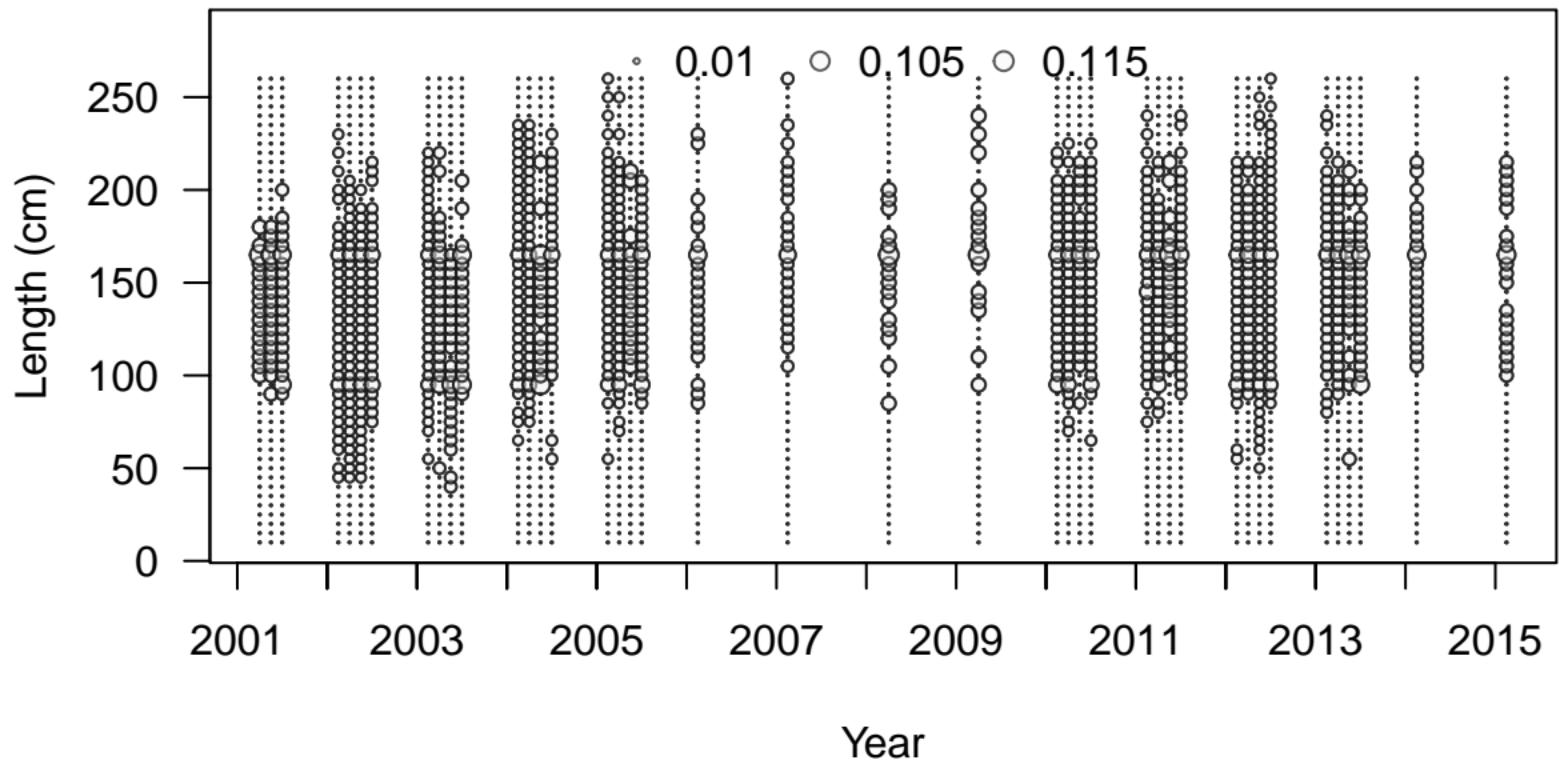


Proportion

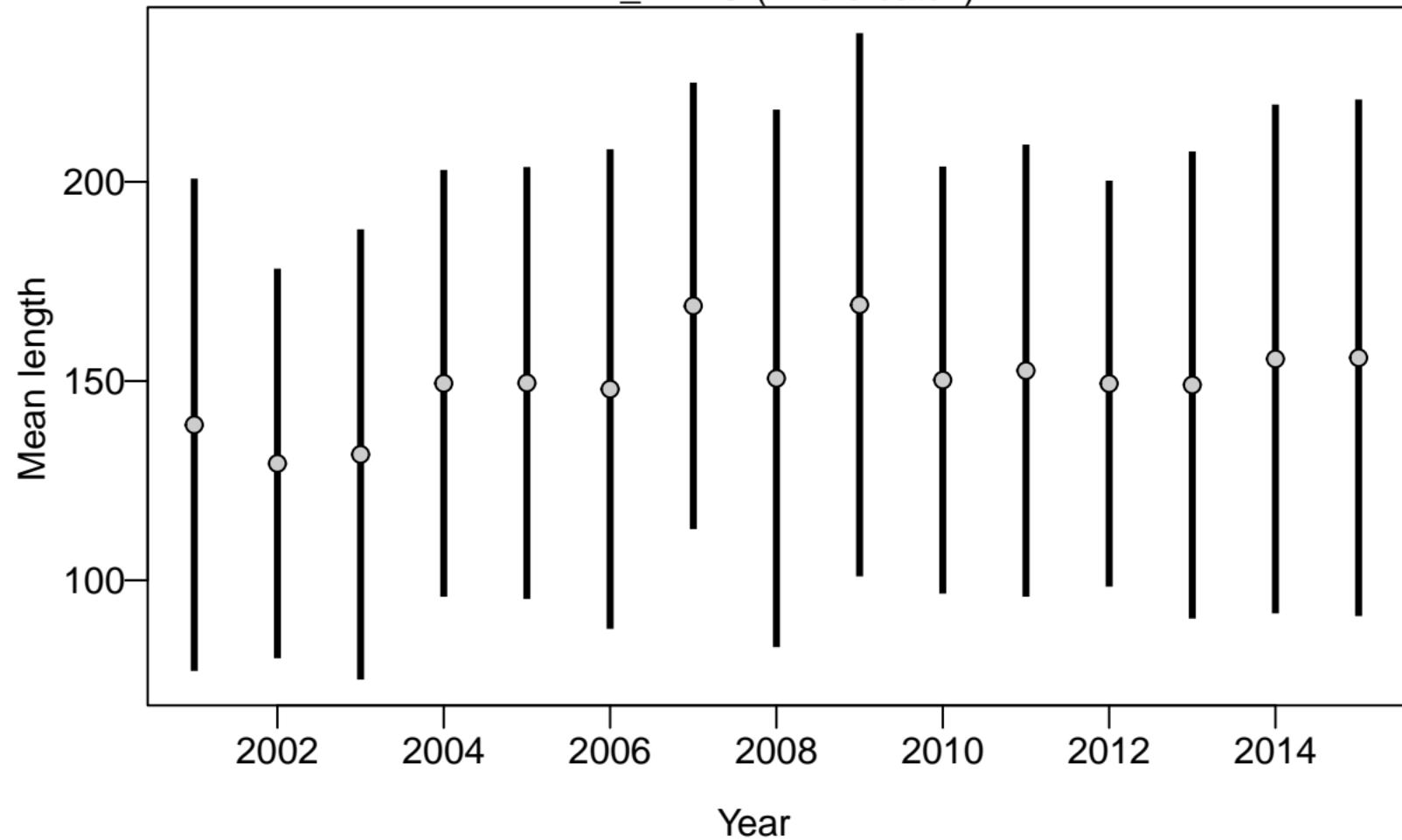


Proportion

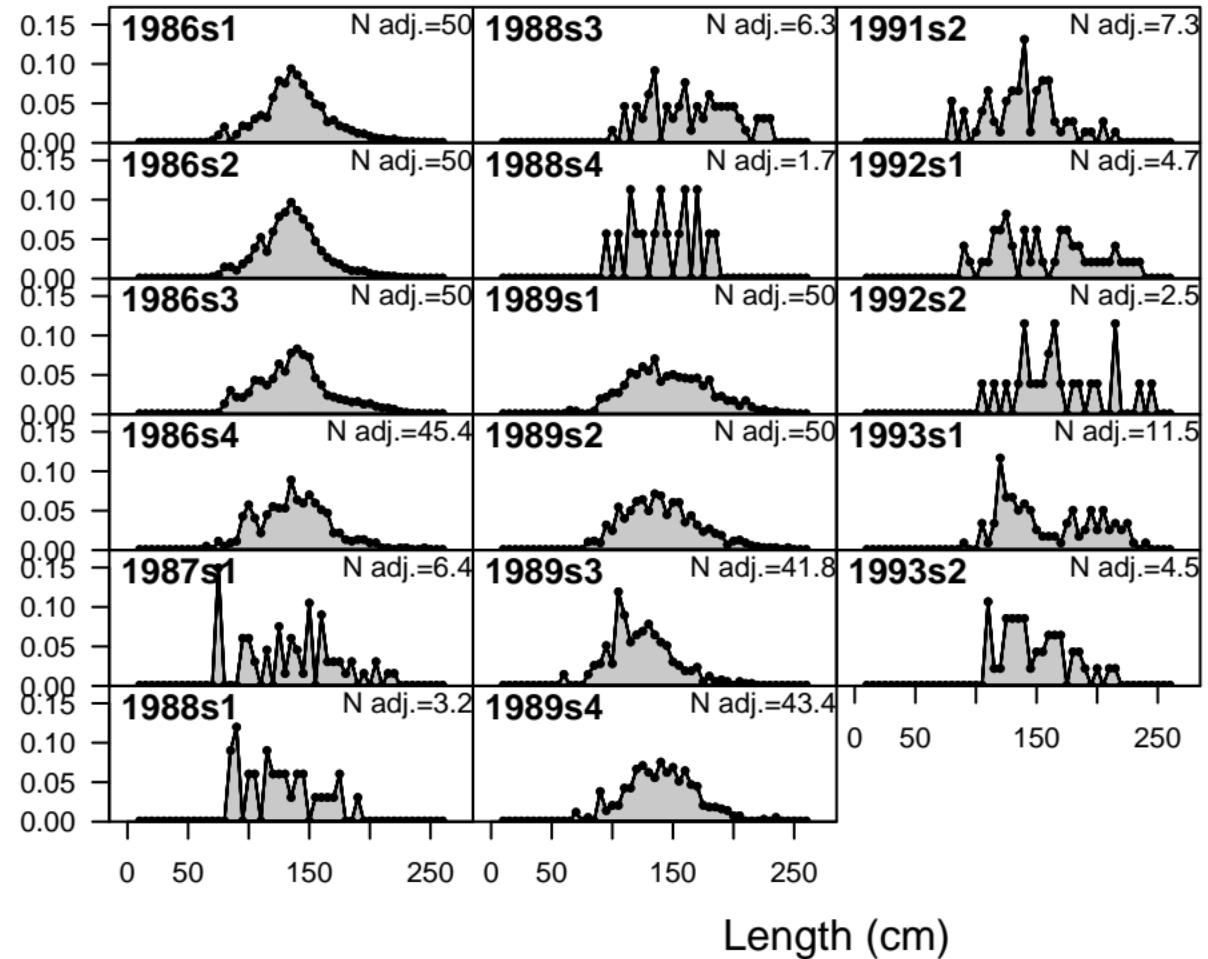


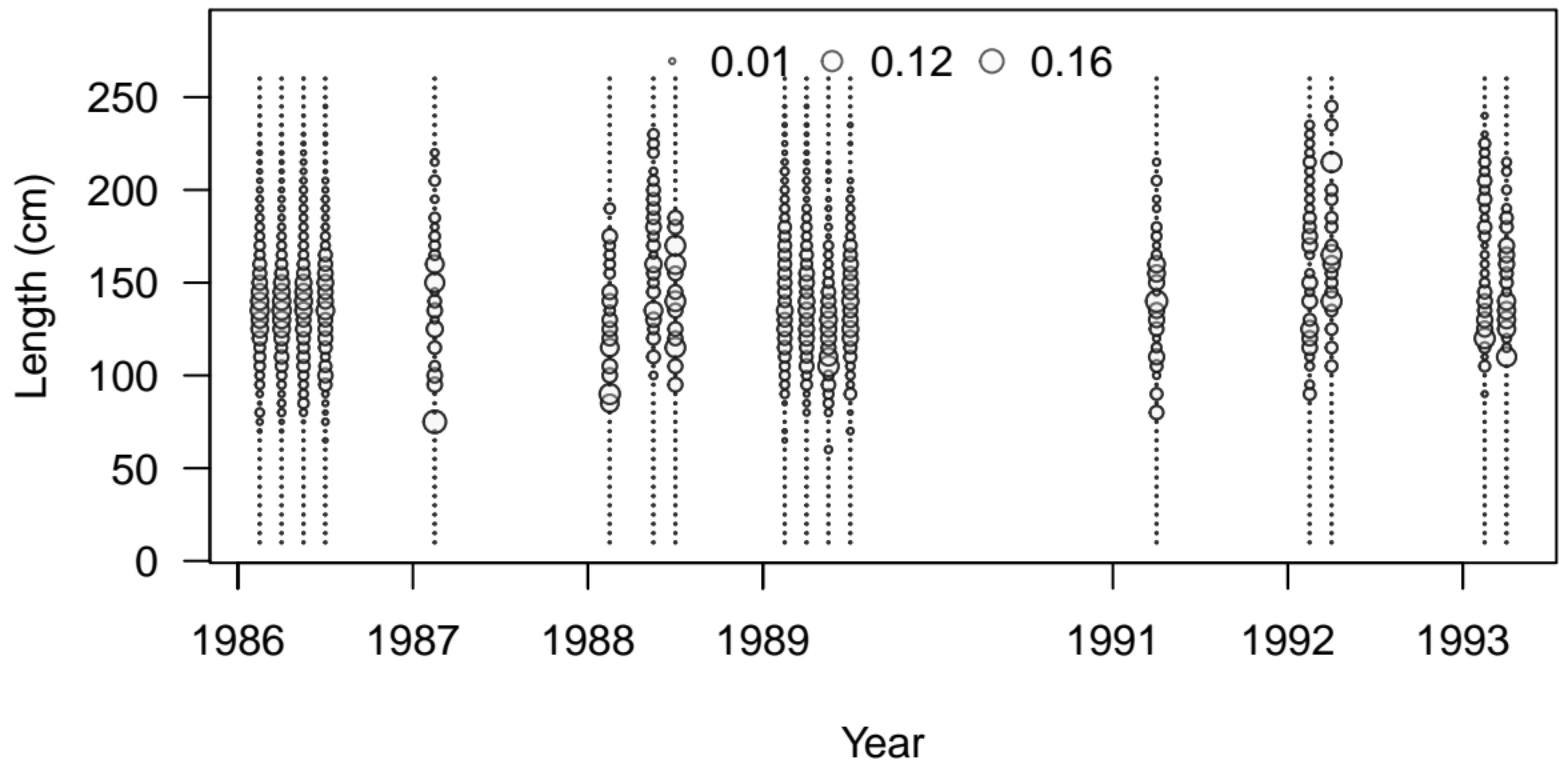


F4_IATTC (whole catch)

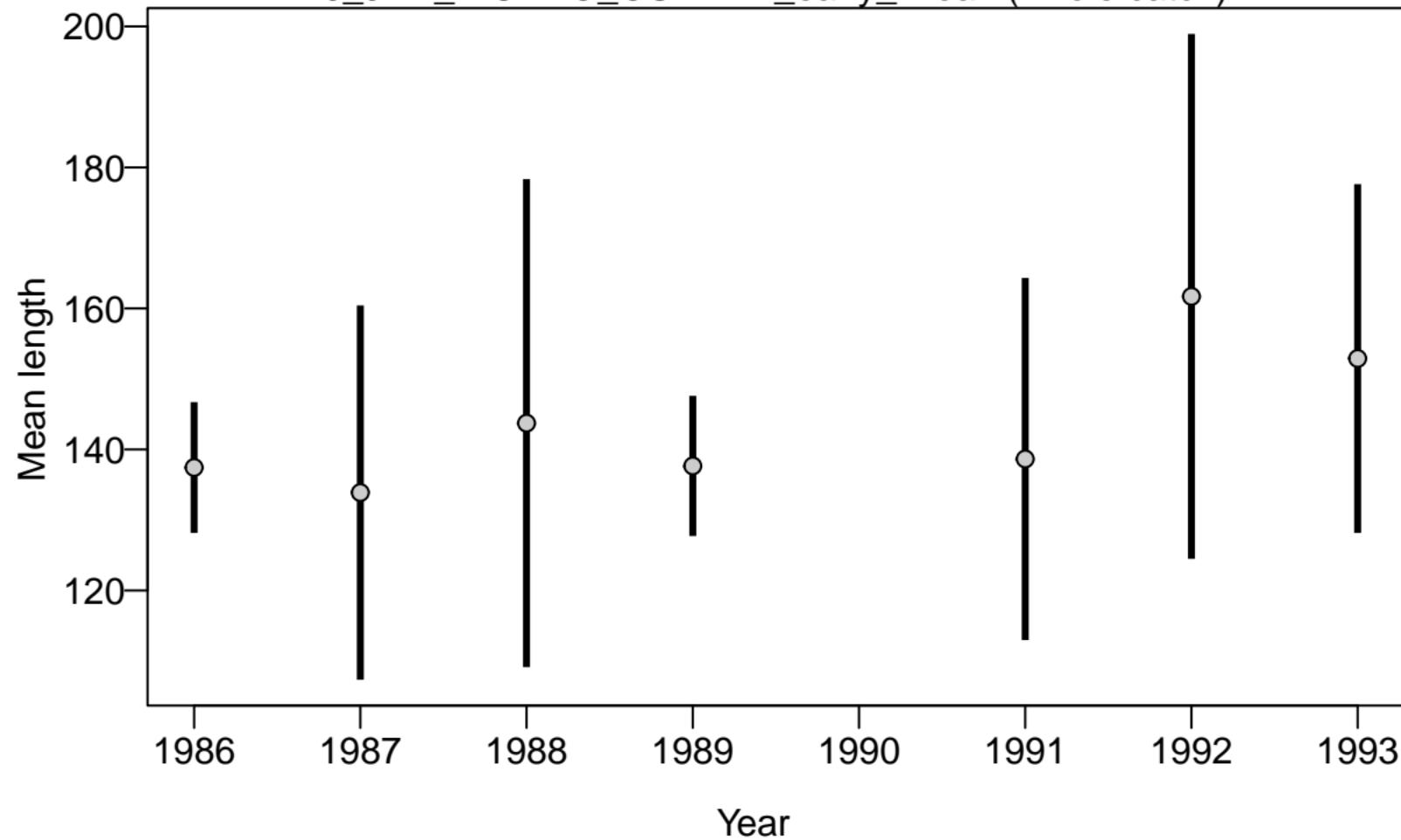


Proportion

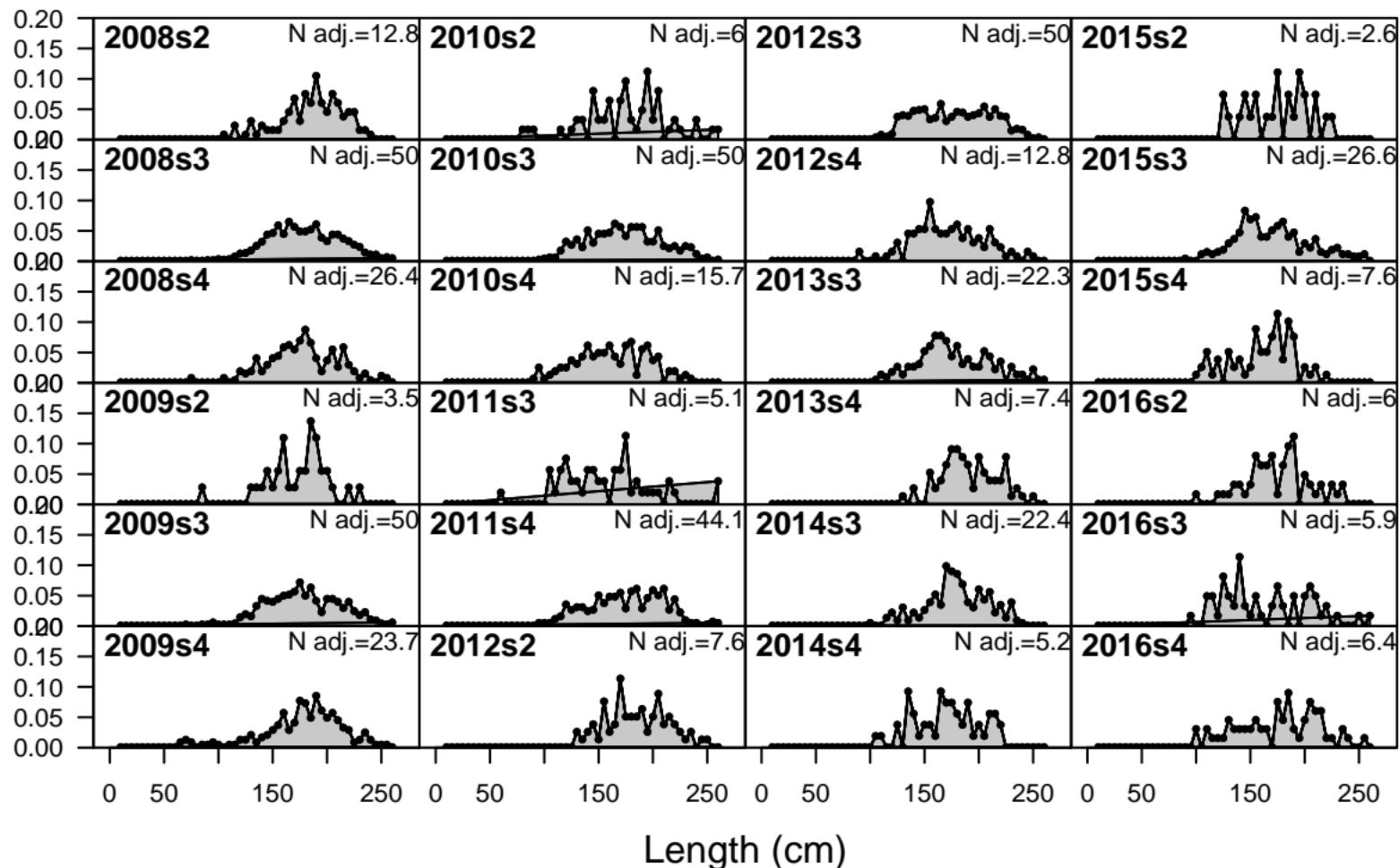




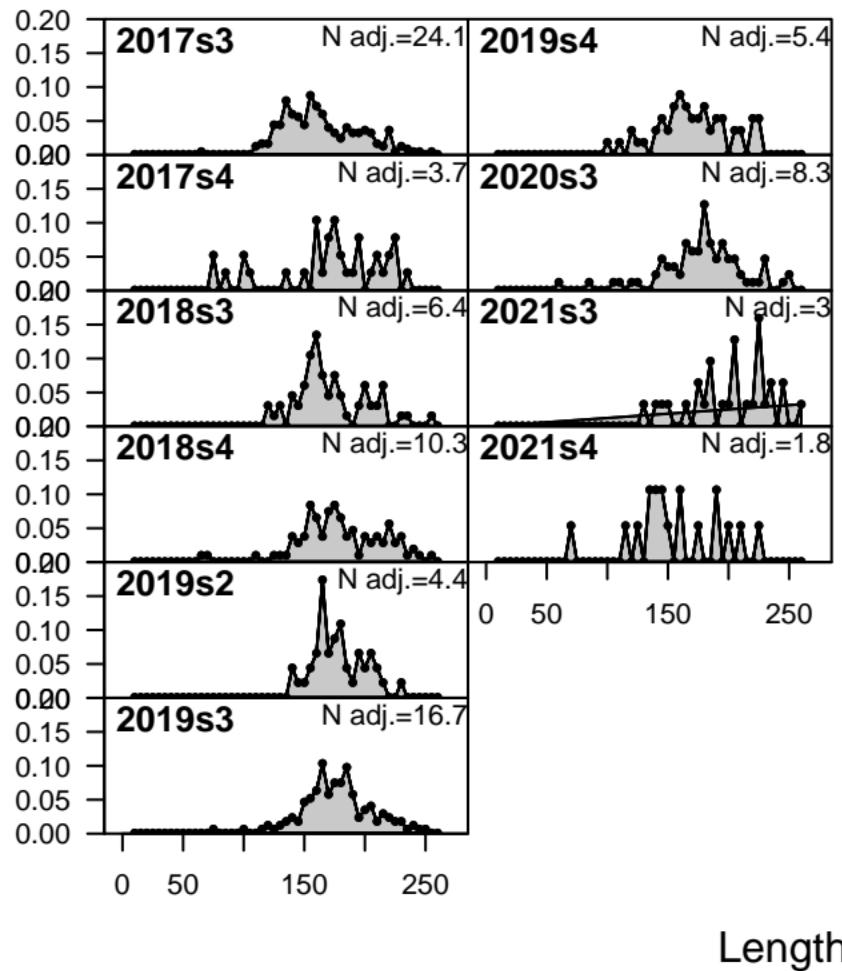
F6_JPN_WCNPO OSDWLL_early_Area1 (whole catch)

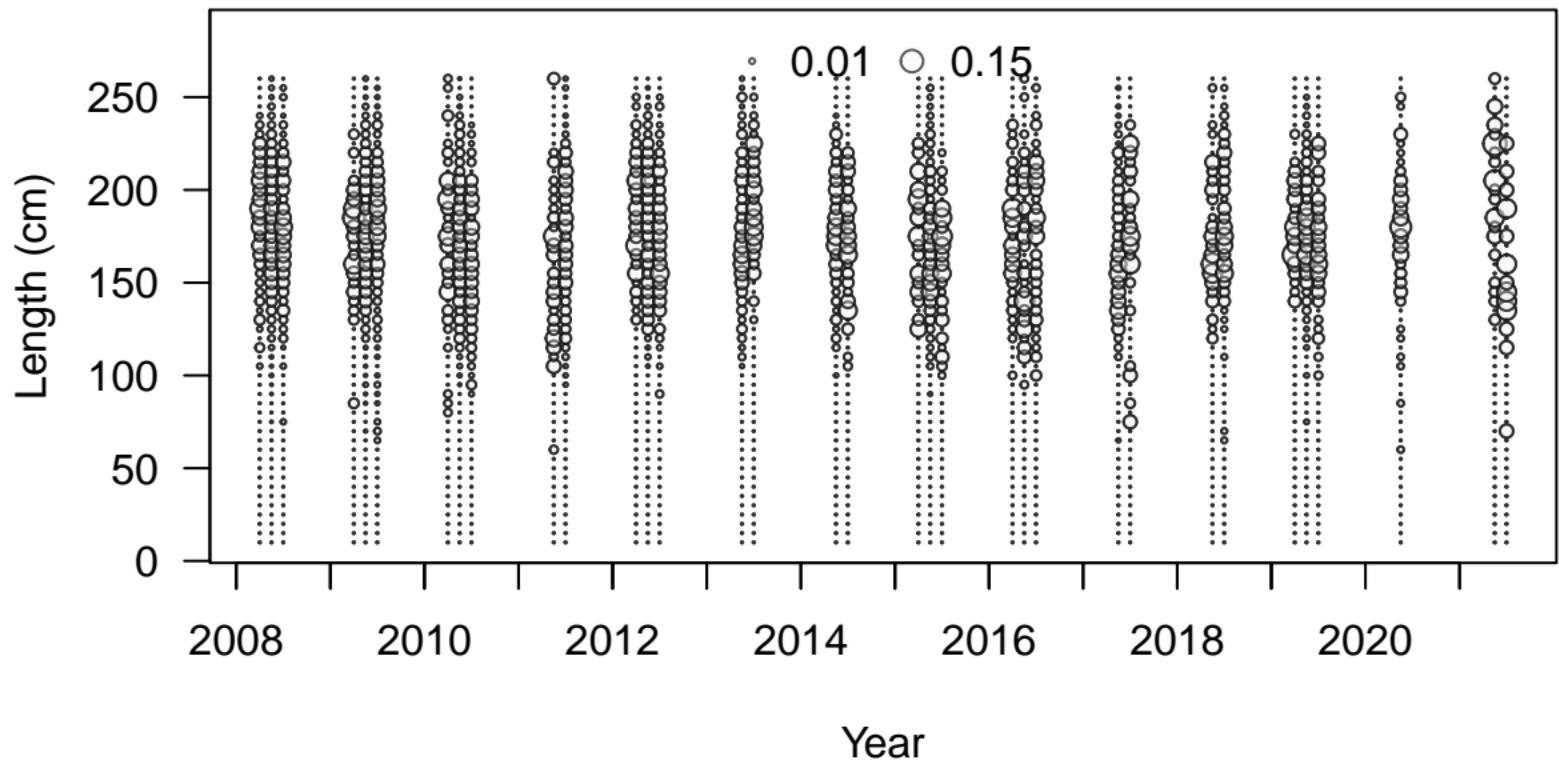


Proportion

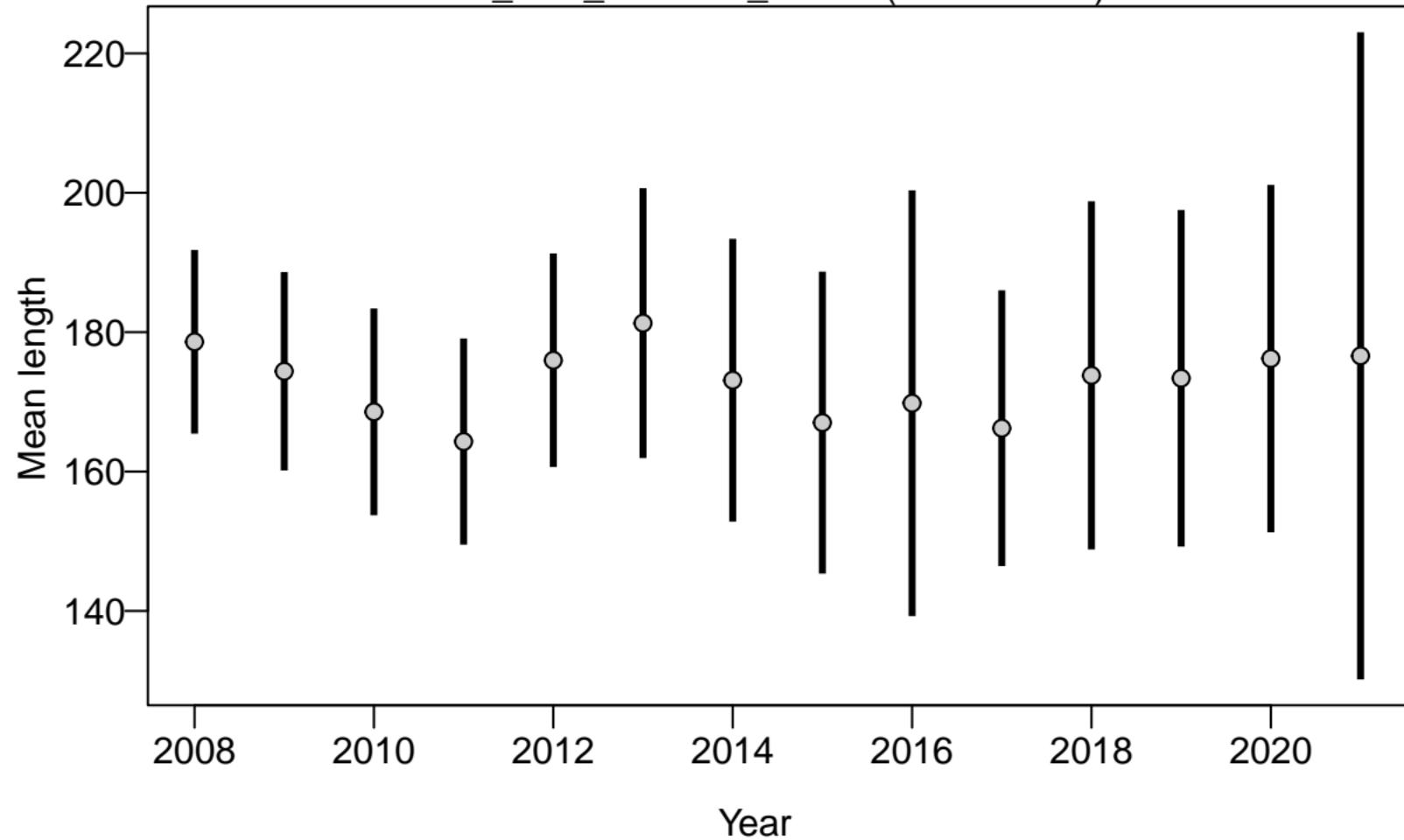


Proportion

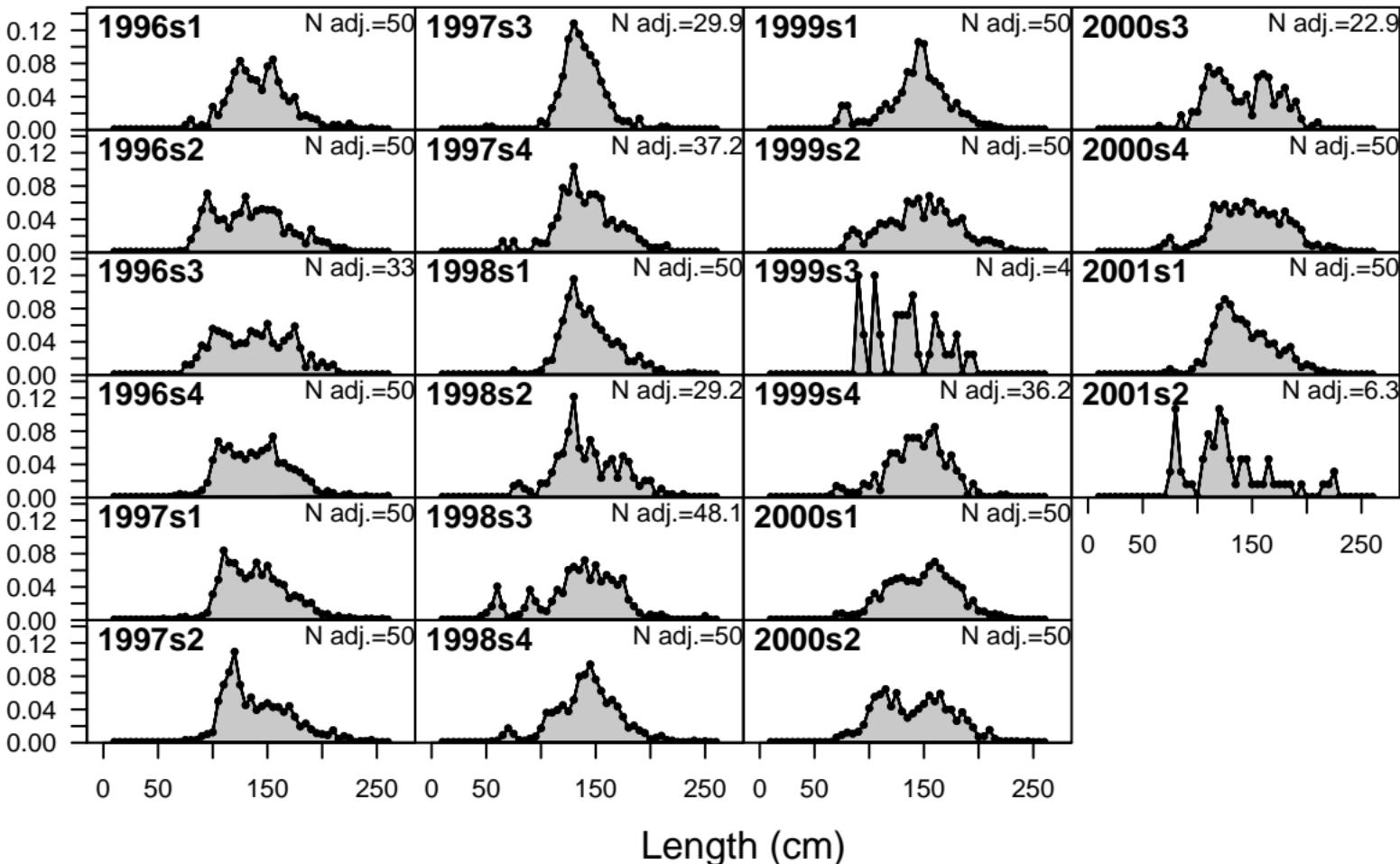


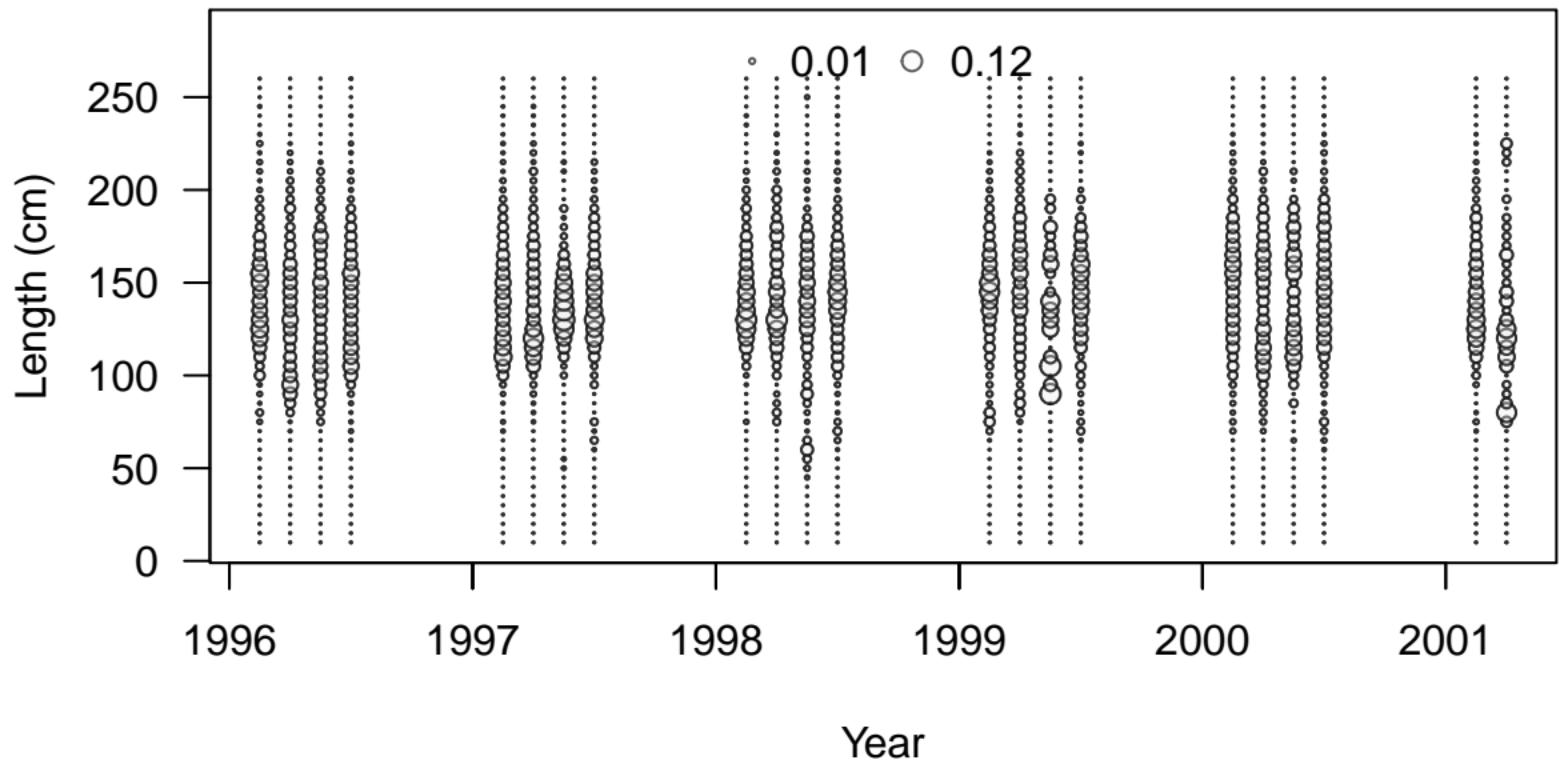


F7_JPN_WCNPO_CODF (whole catch)

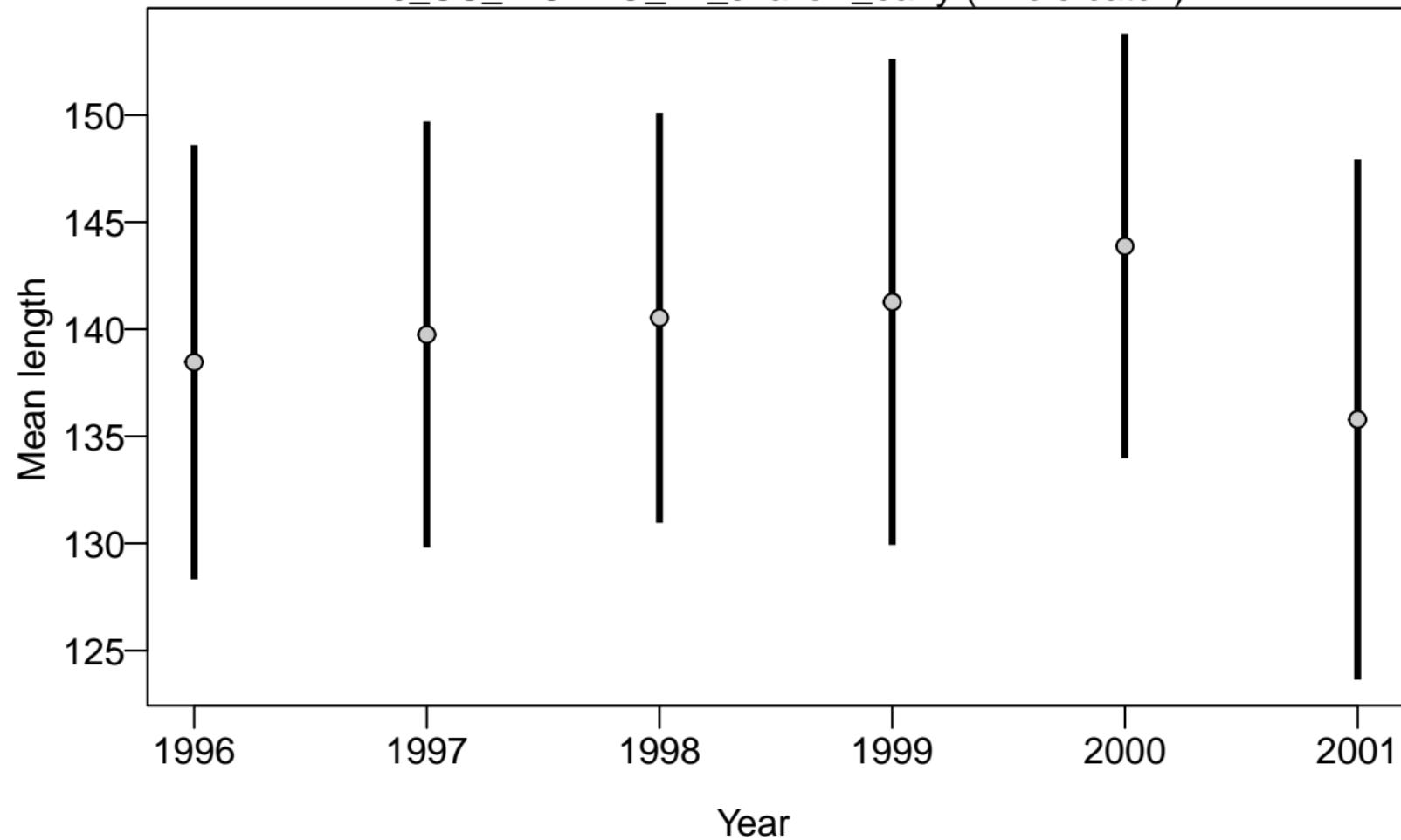


Proportion

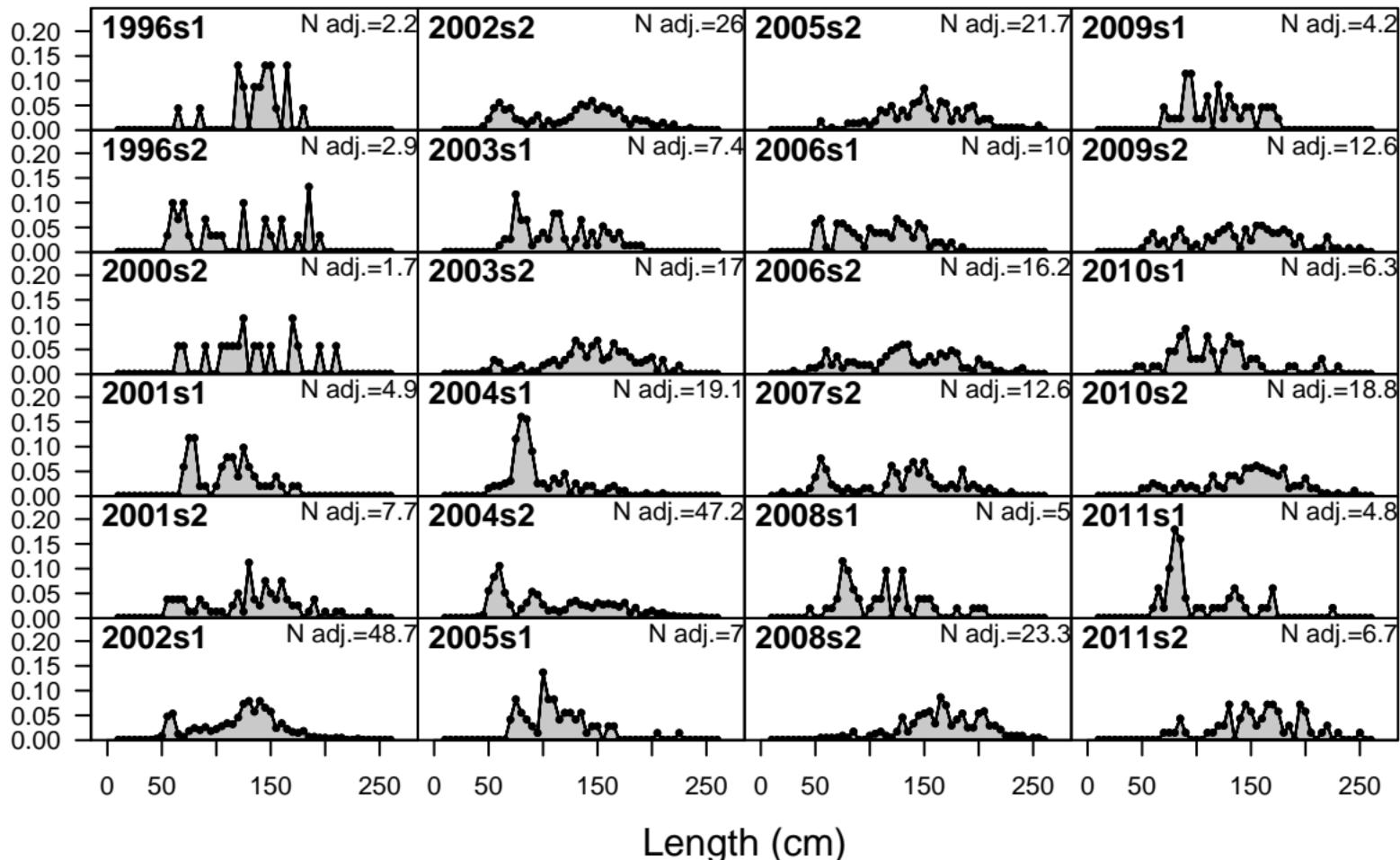




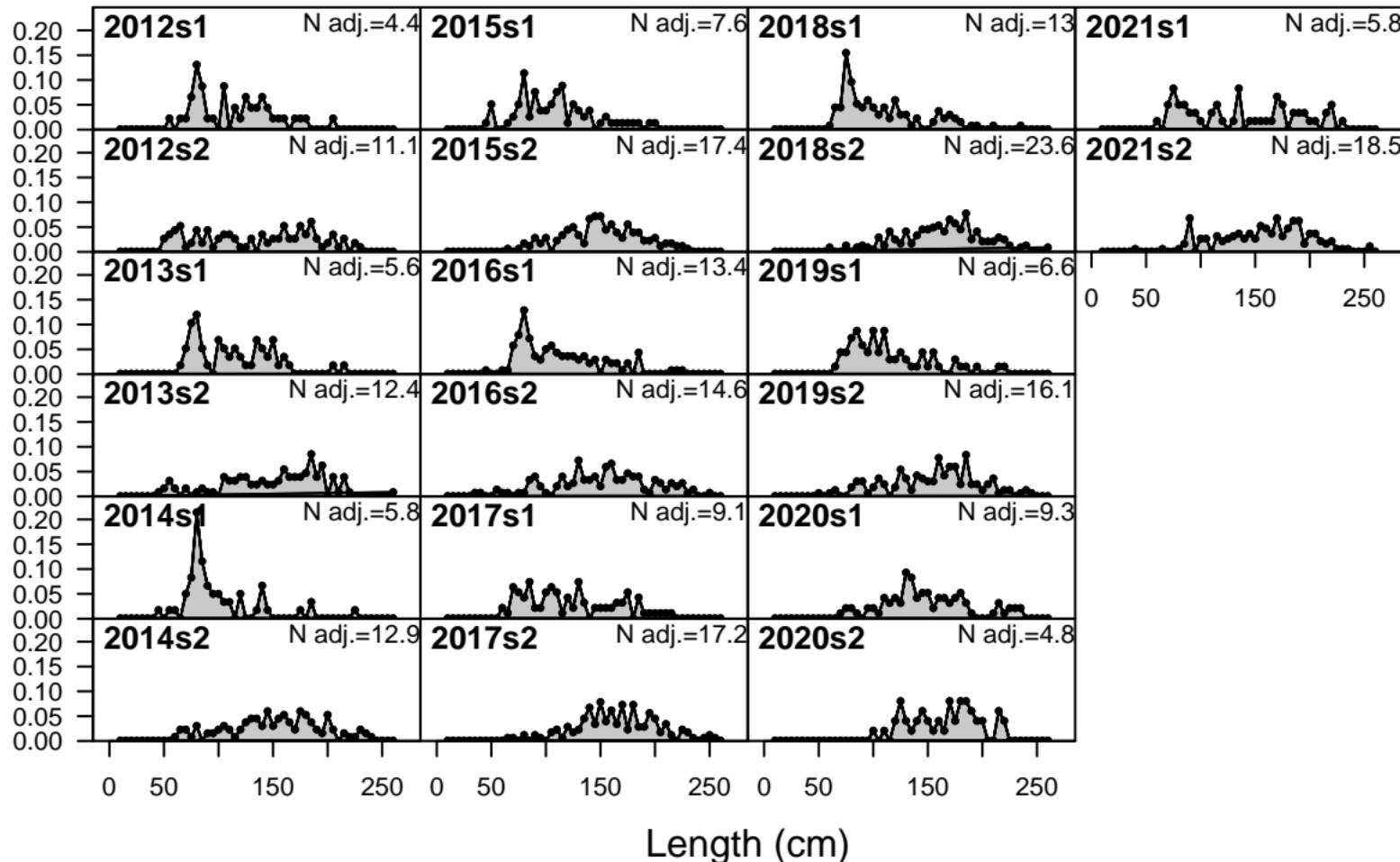
F8_US_WCNPO_LL_shallow_early (whole catch)

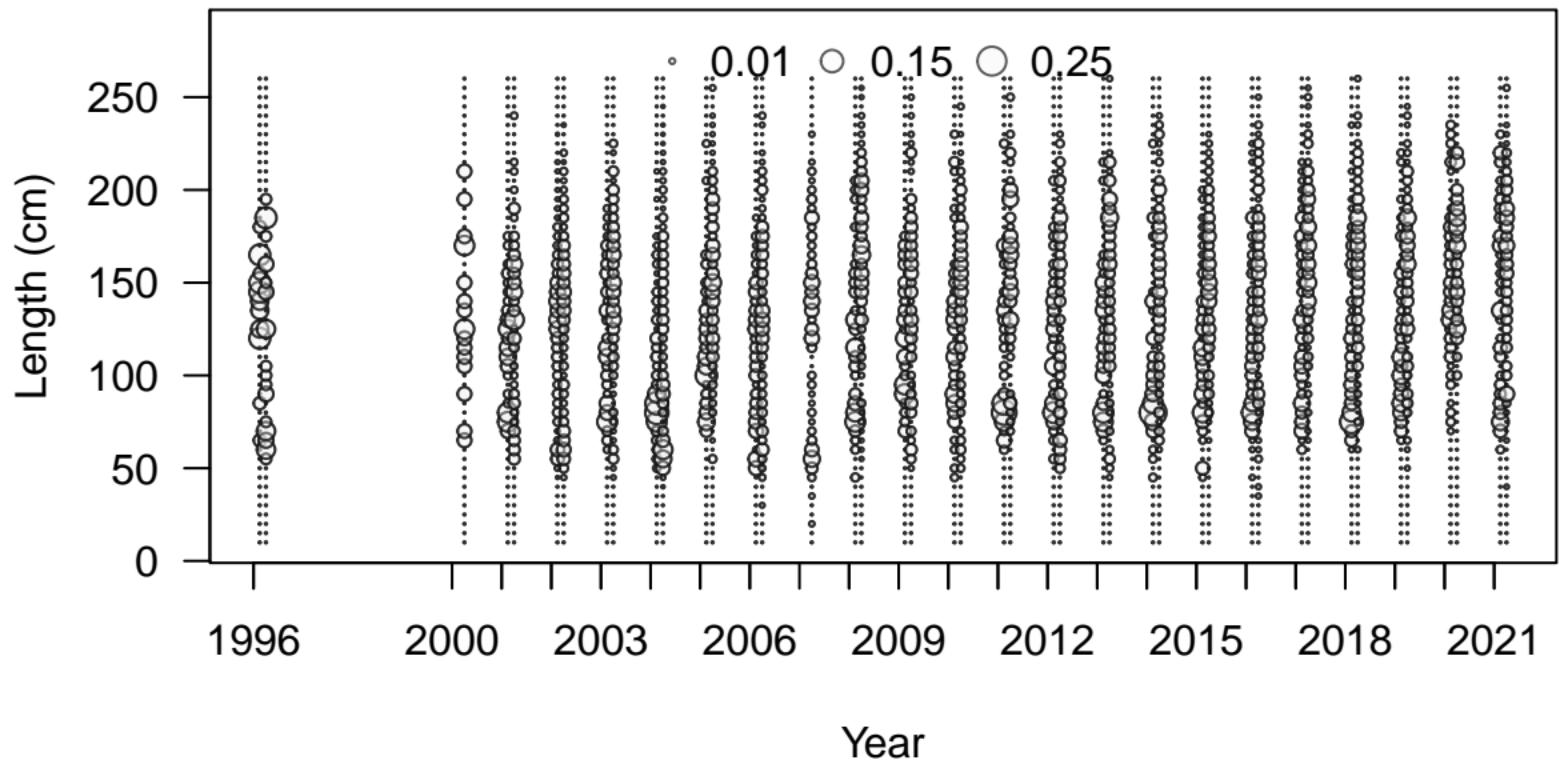


Proportion

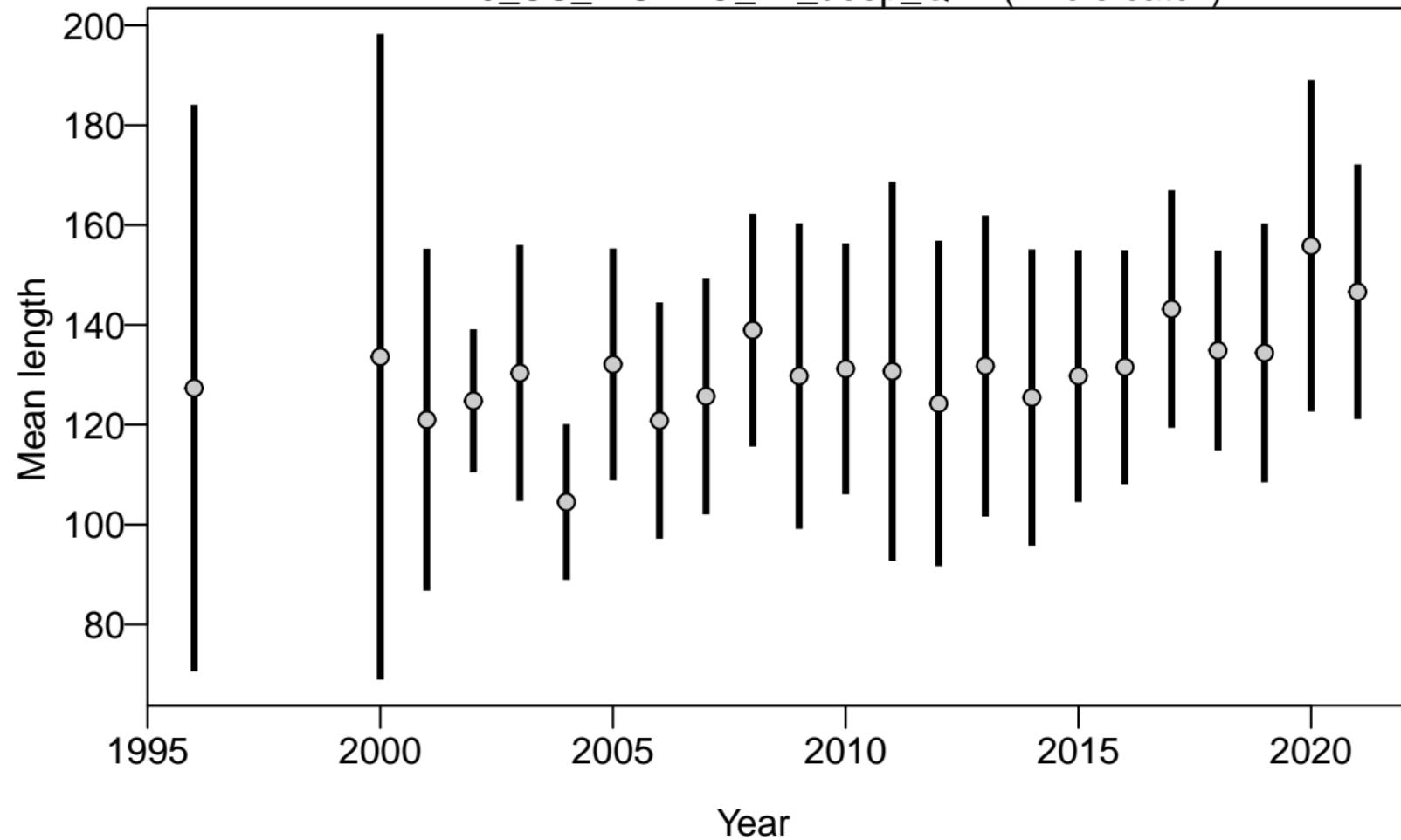


Proportion

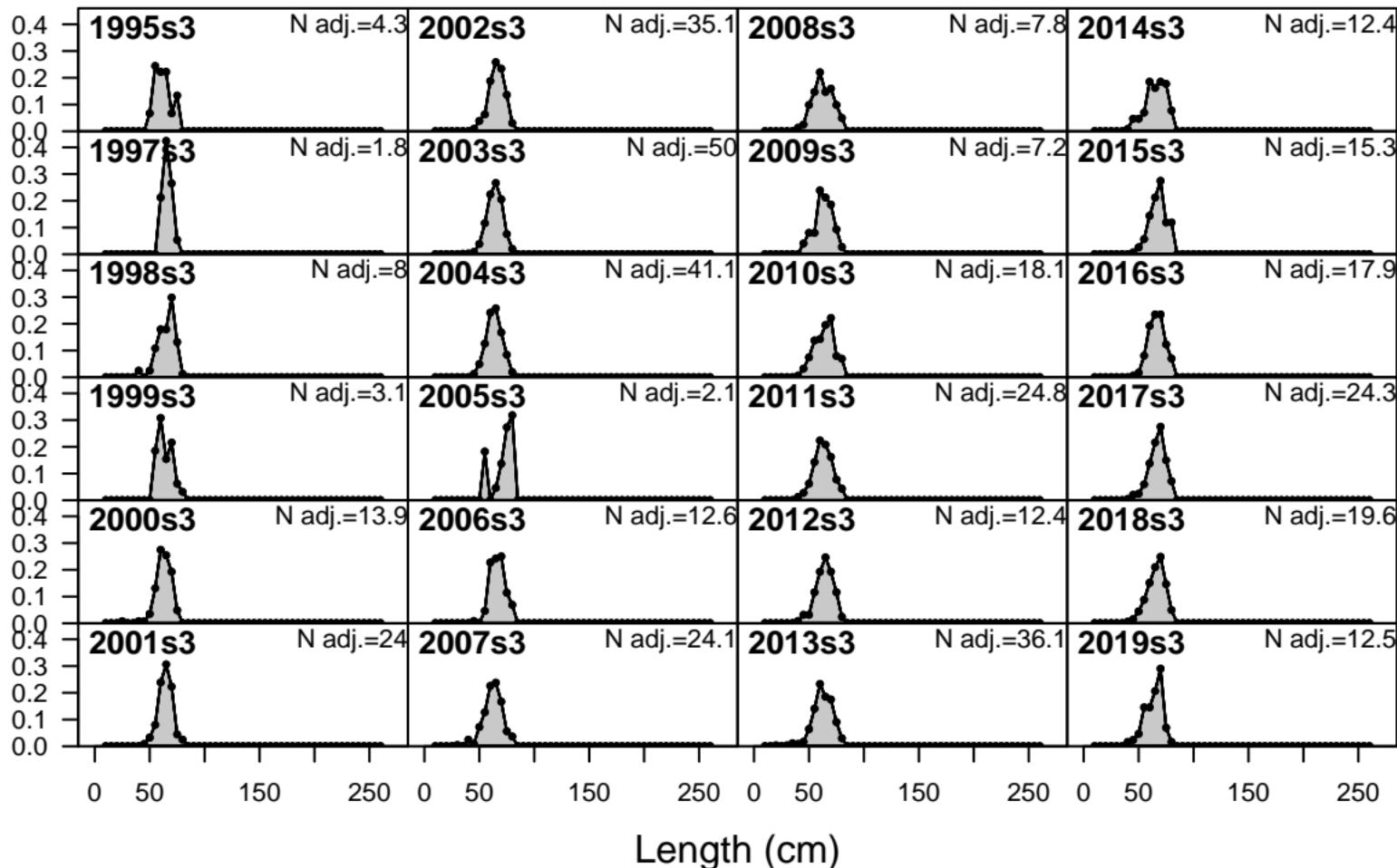




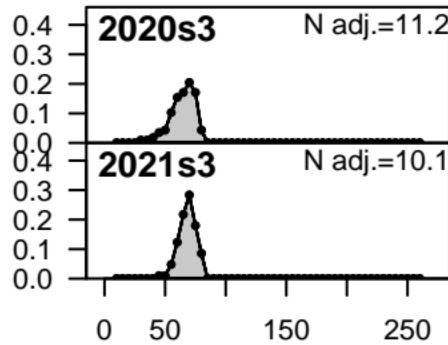
F9_US_WCNPO_LL_deep_Q12 (whole catch)



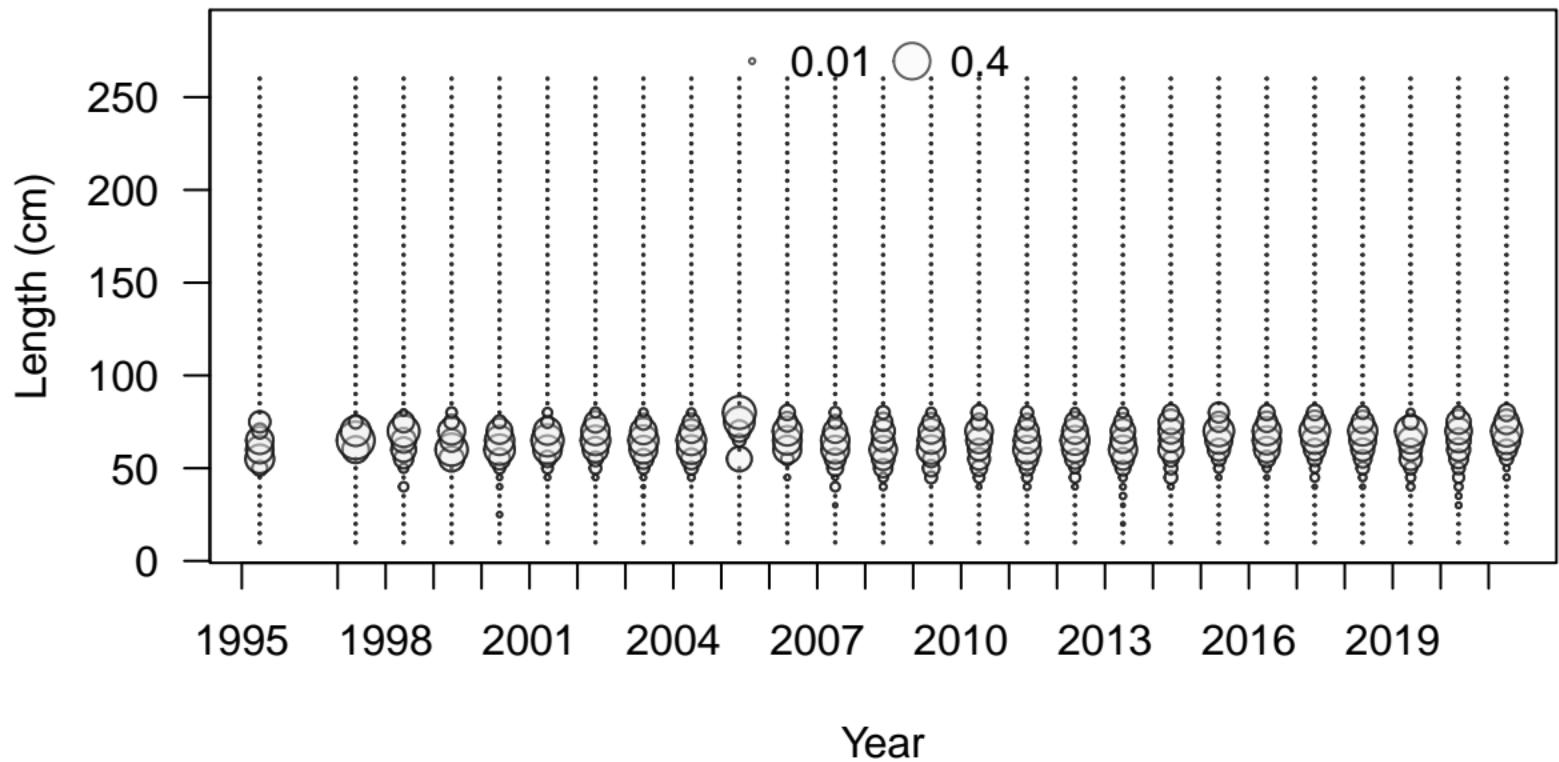
Proportion



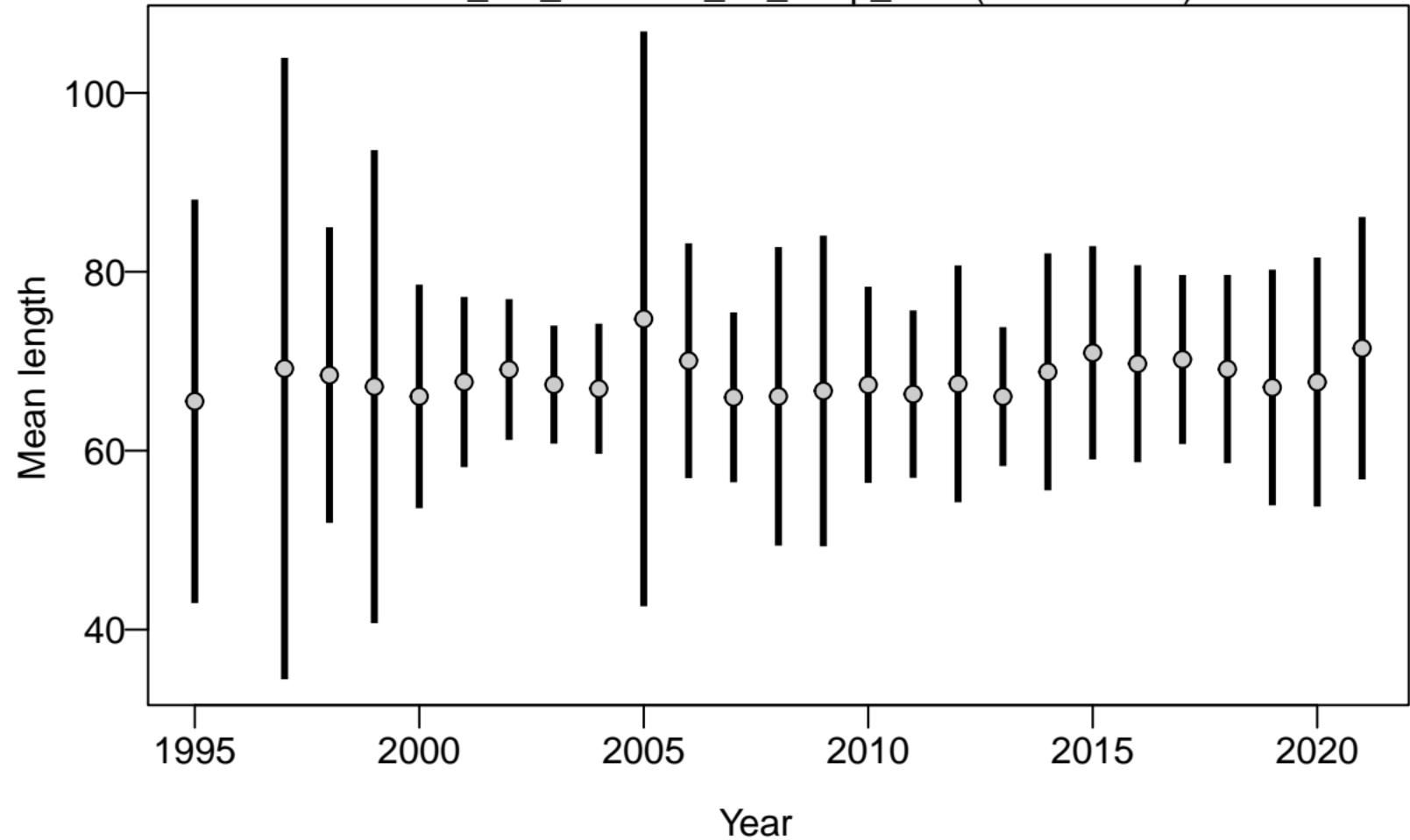
Proportion



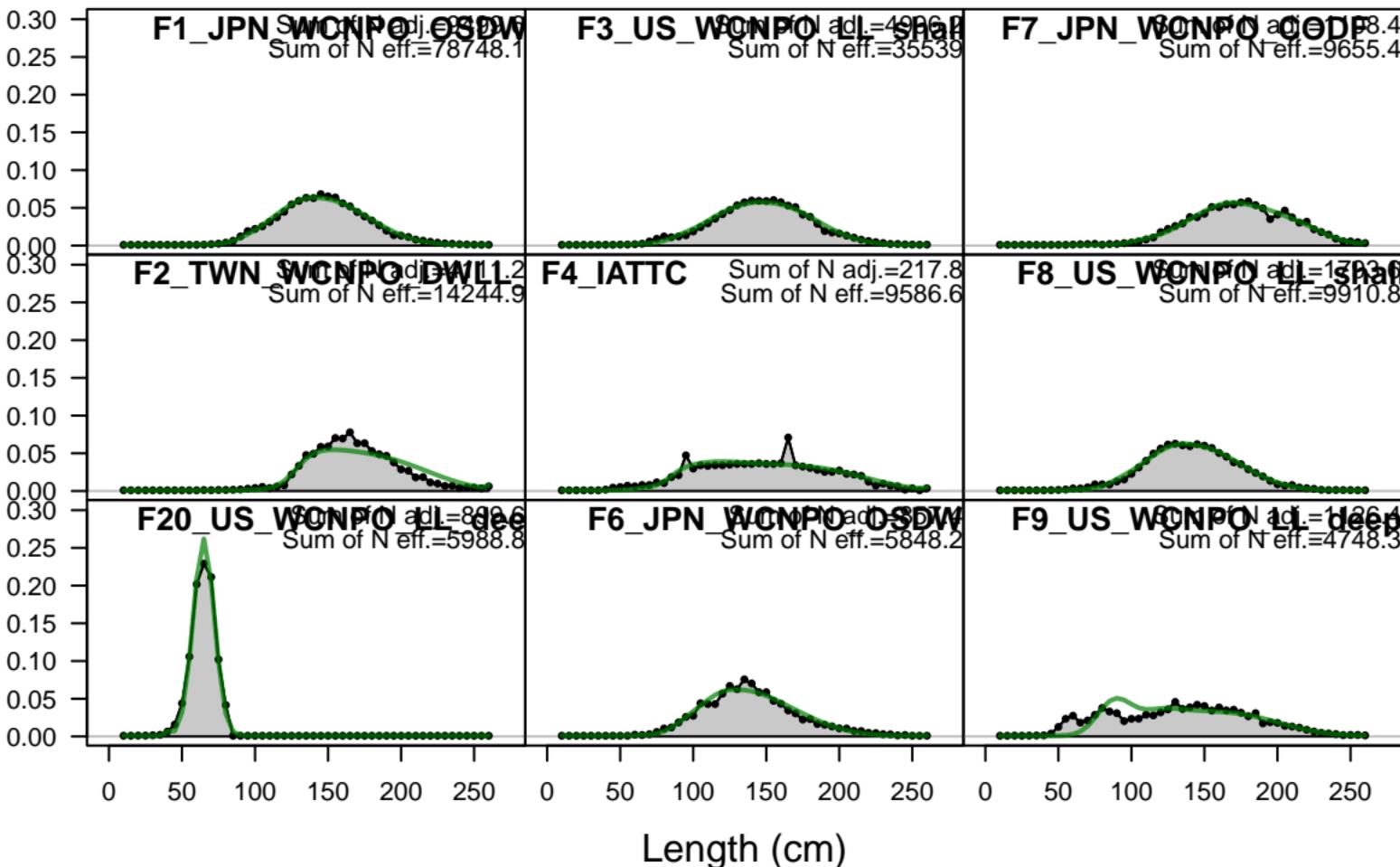
Length (cm)

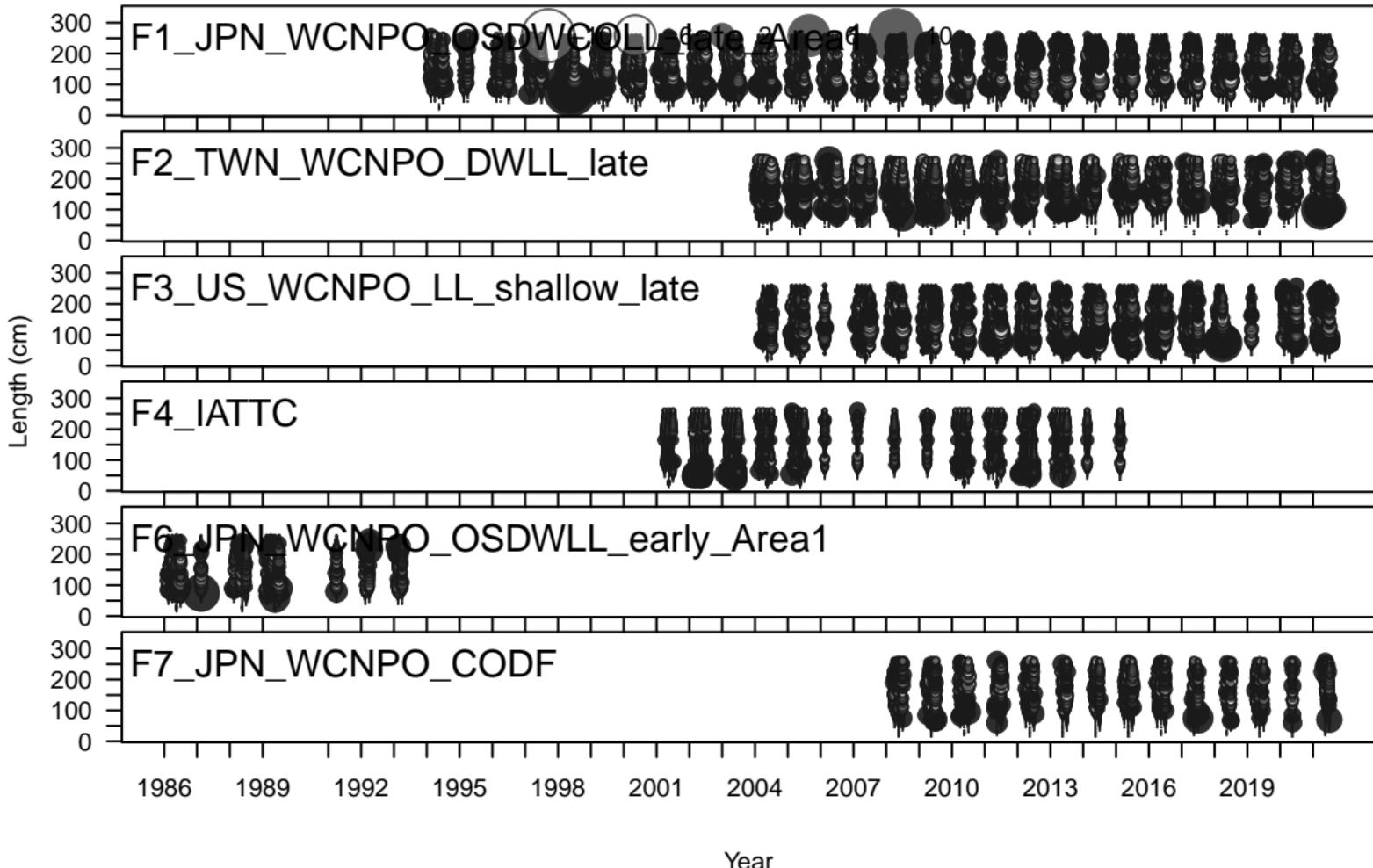


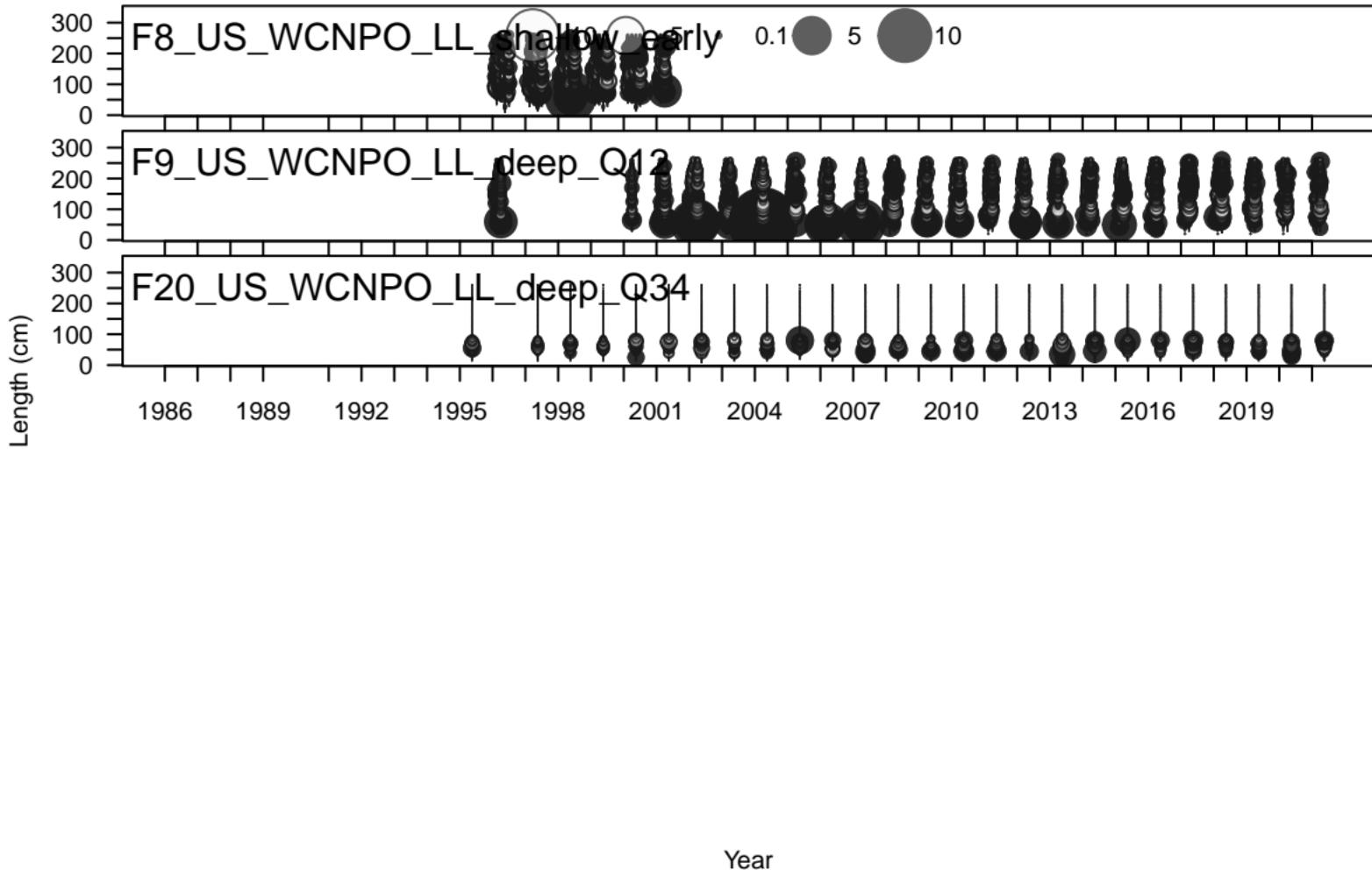
F20_US_WCNPO_LL_deep_Q34 (whole catch)



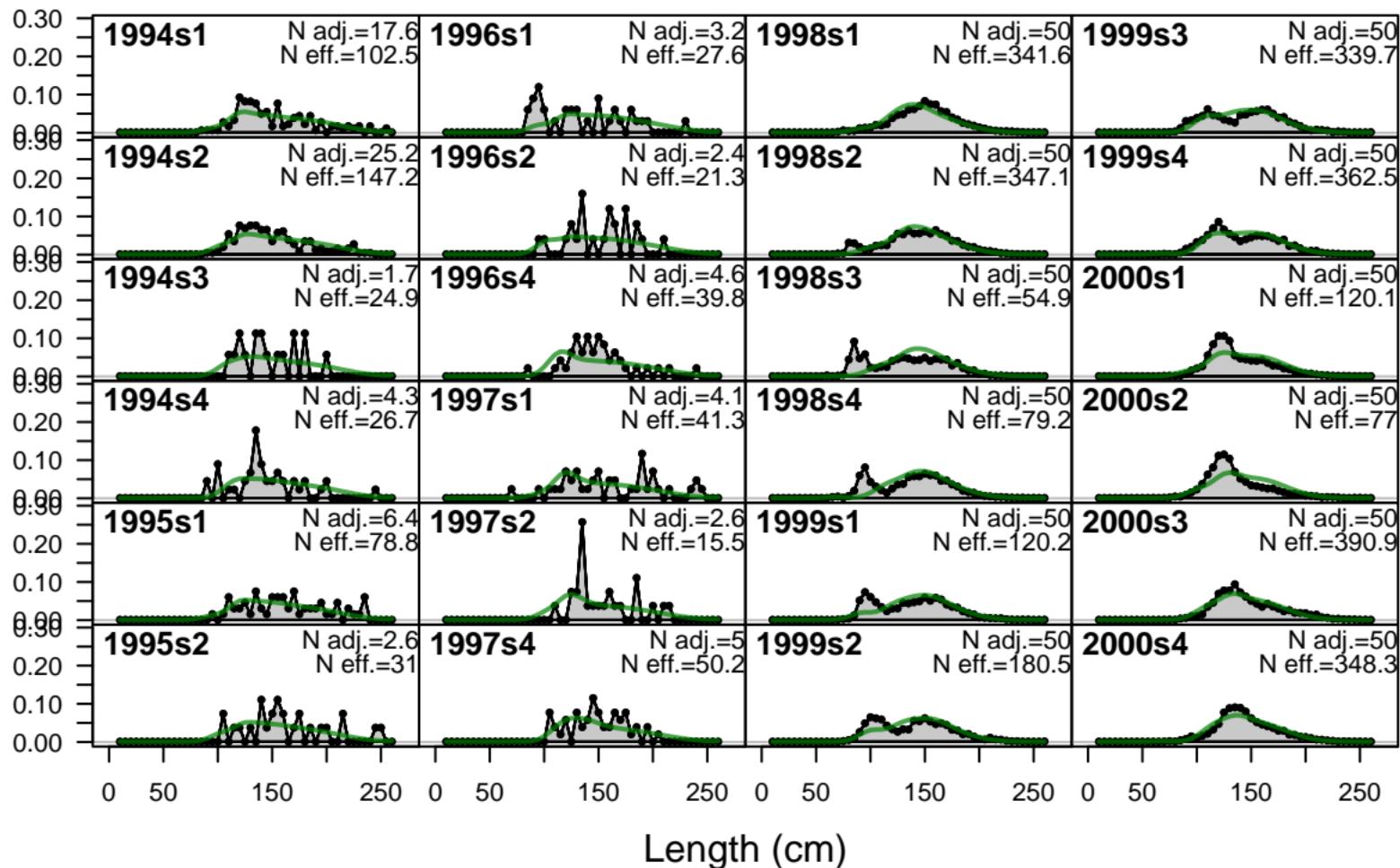
Proportion



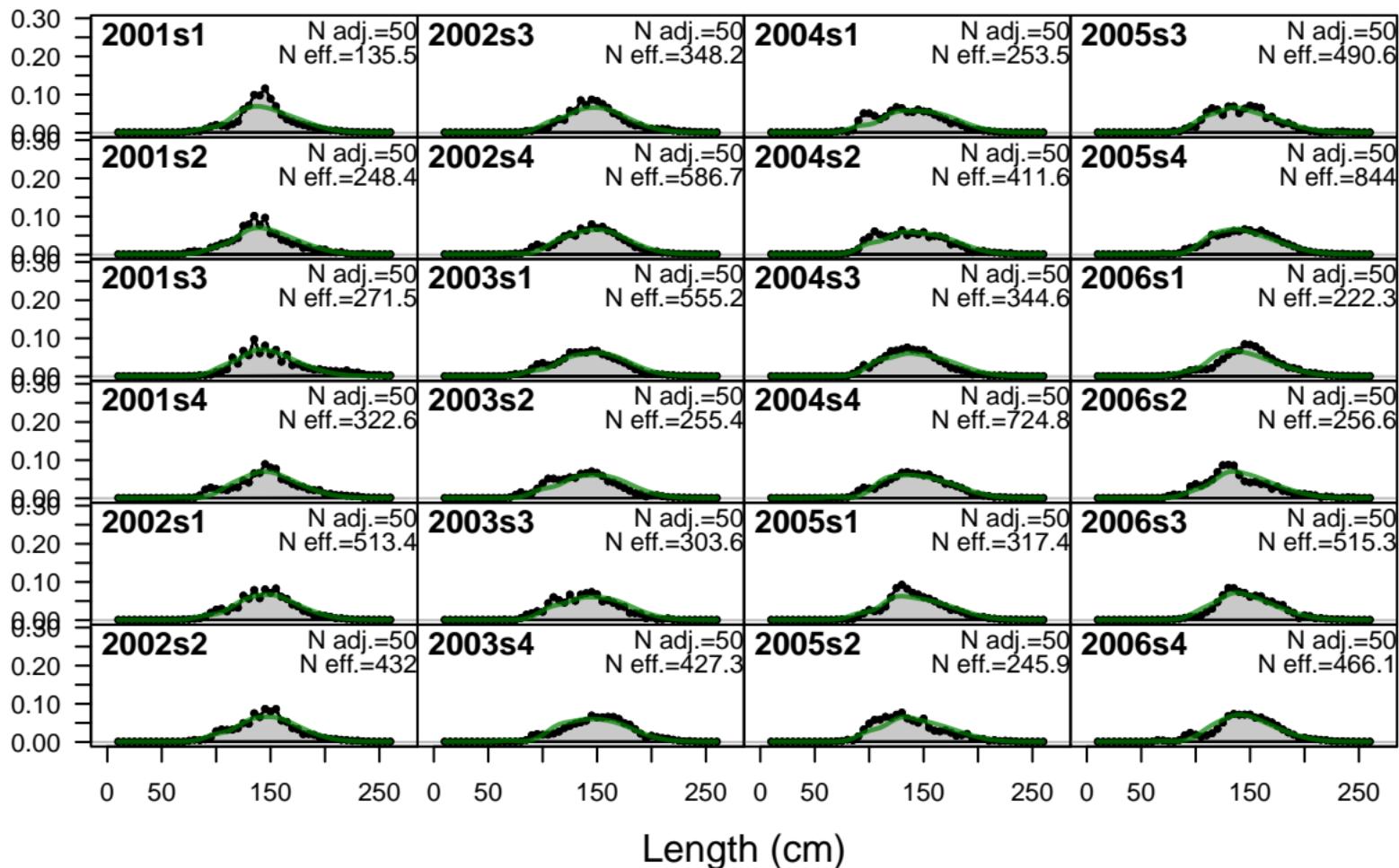




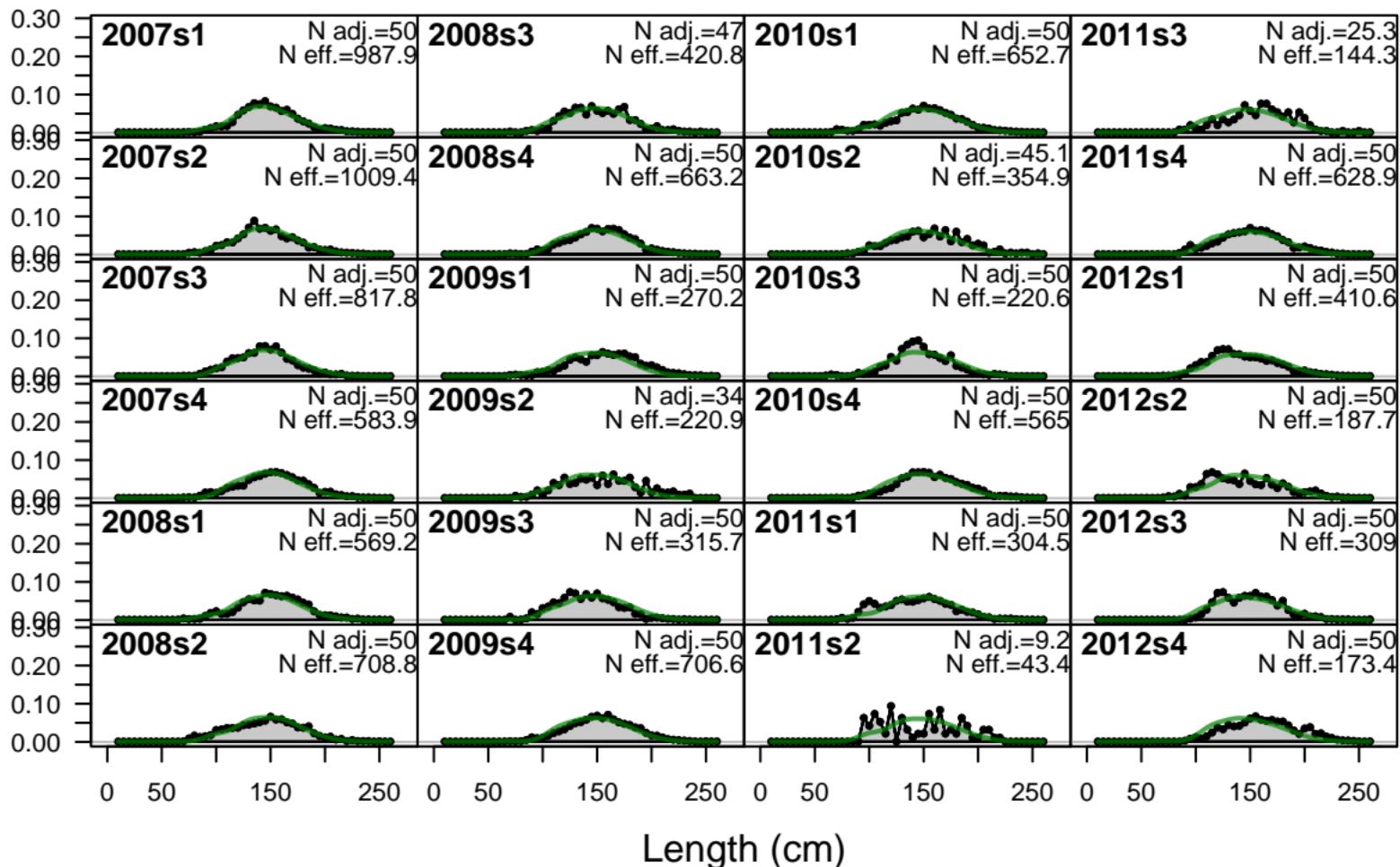
Proportion



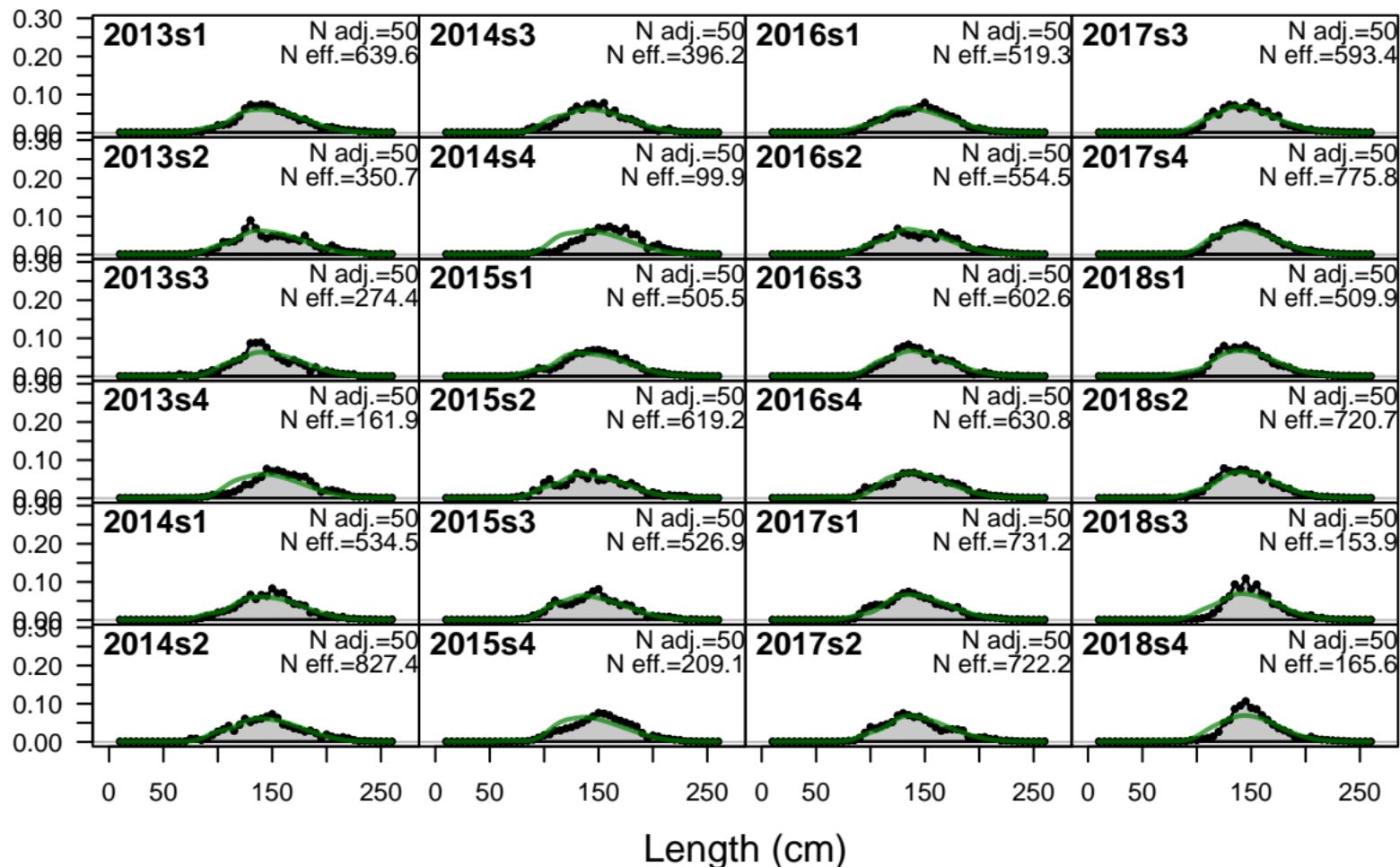
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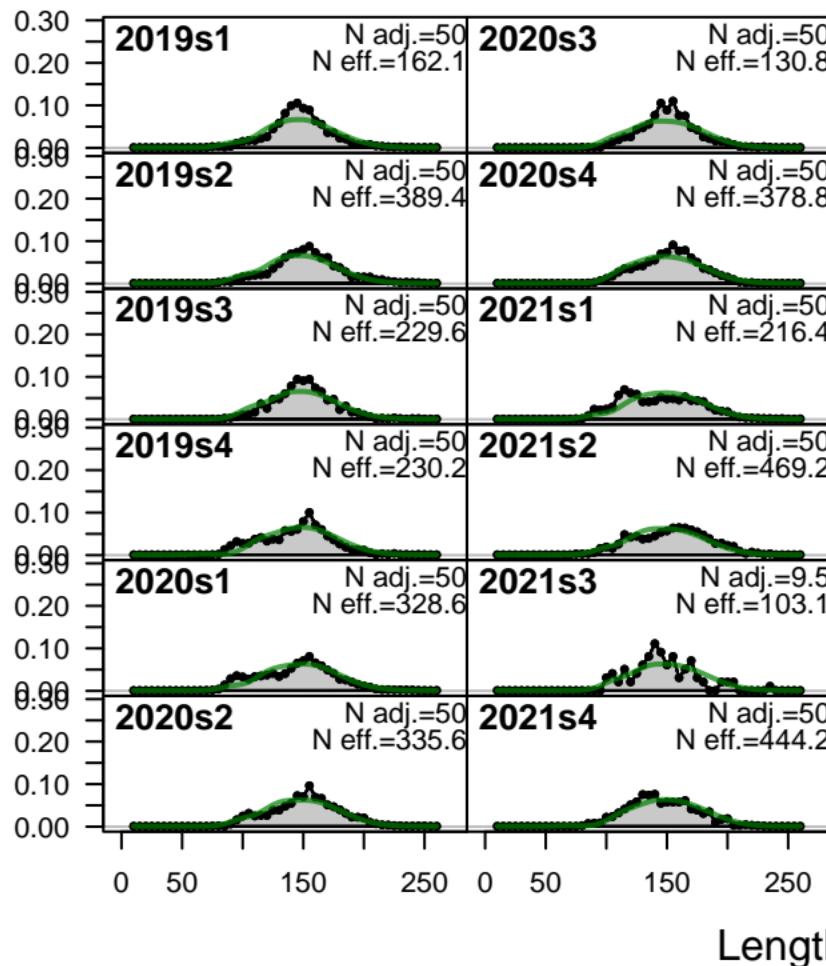
Proportion

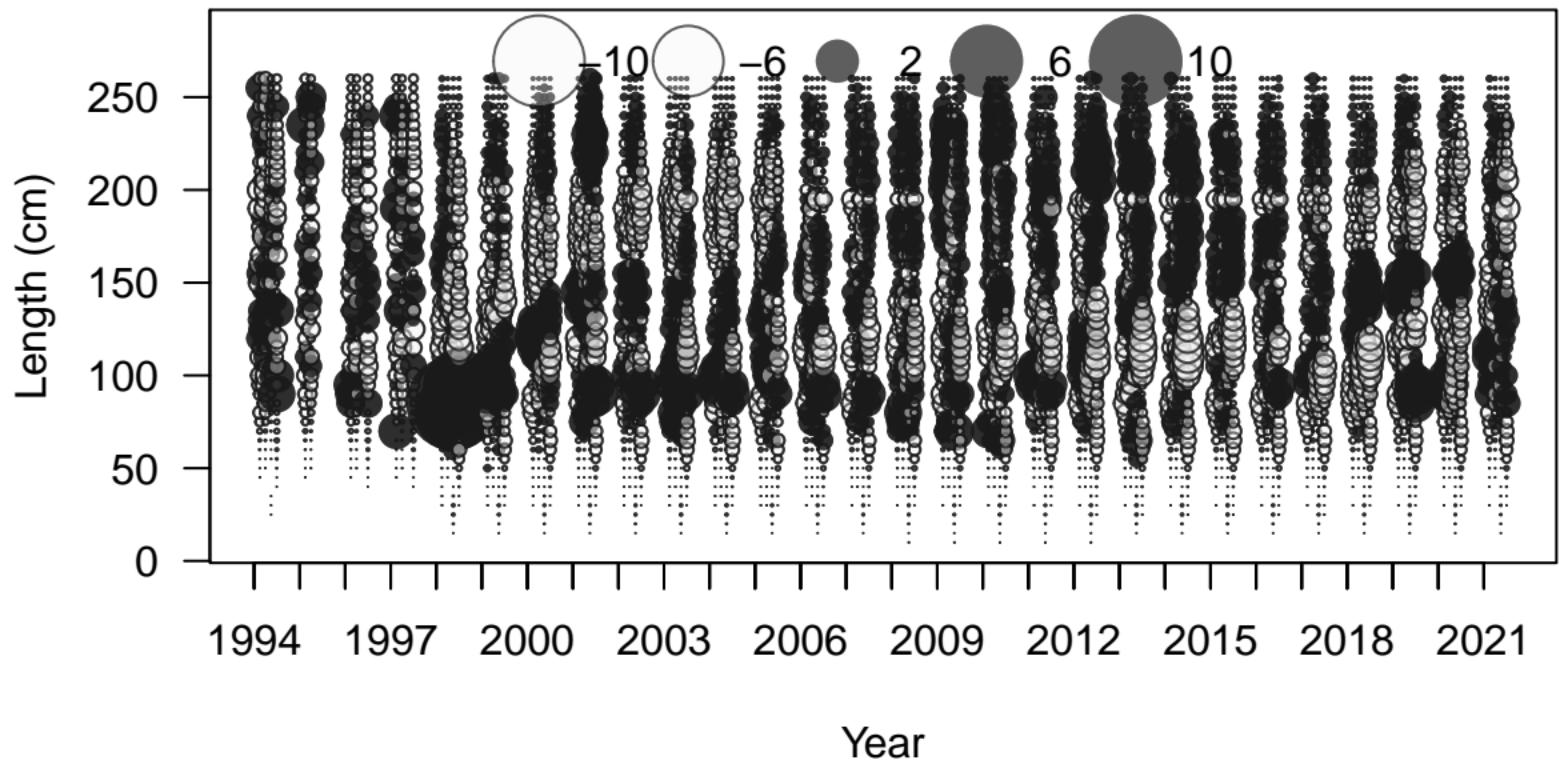


Proportion

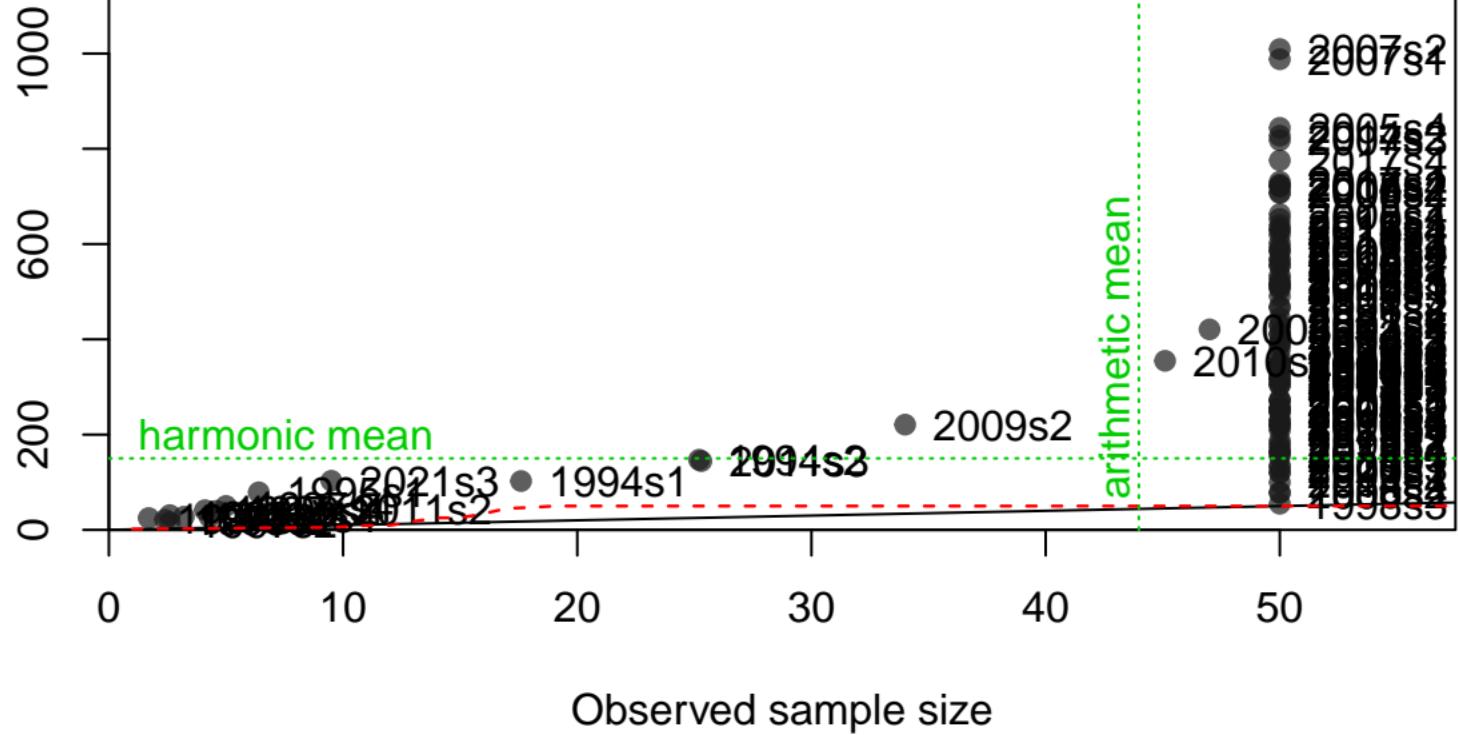


Proportion

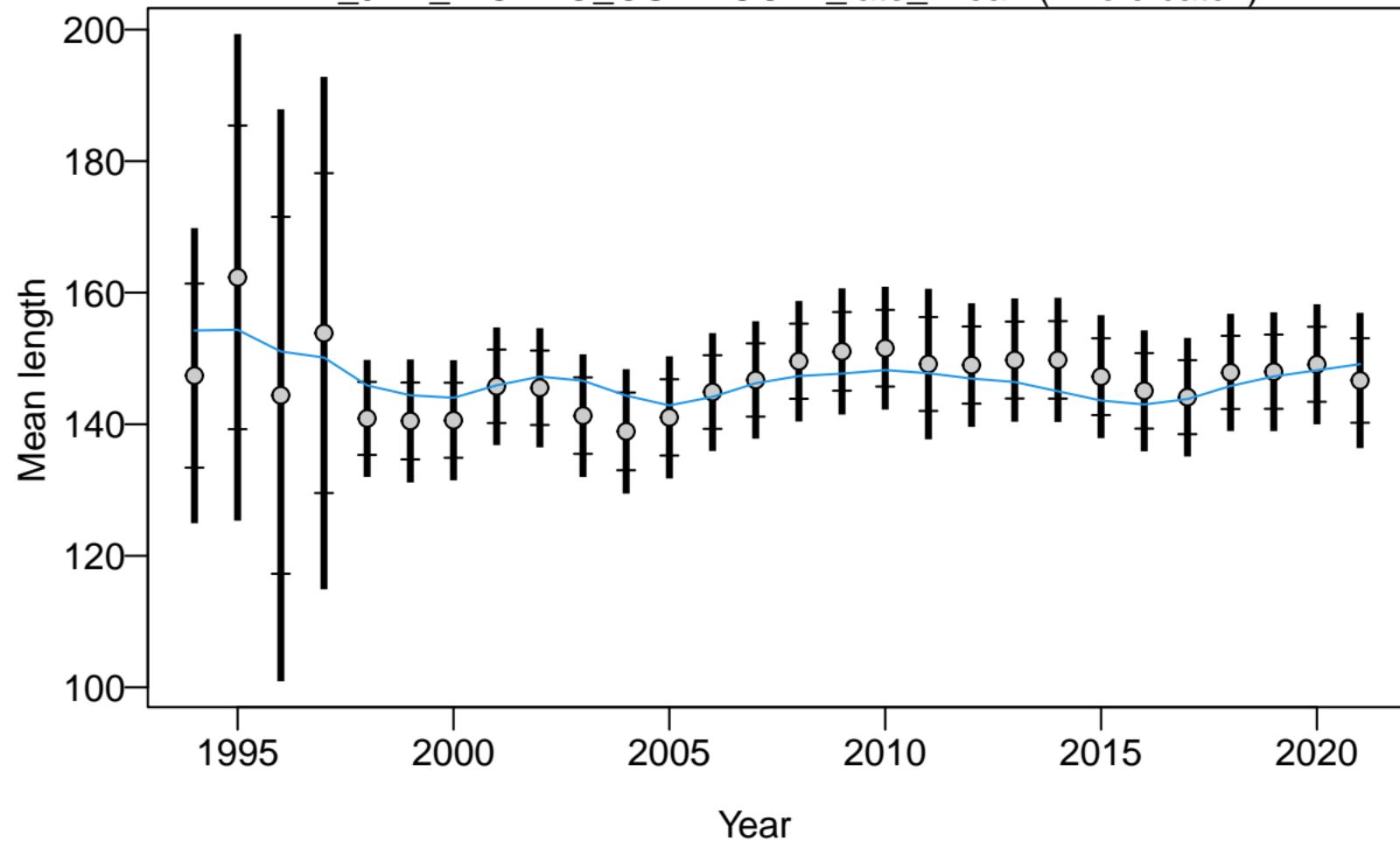




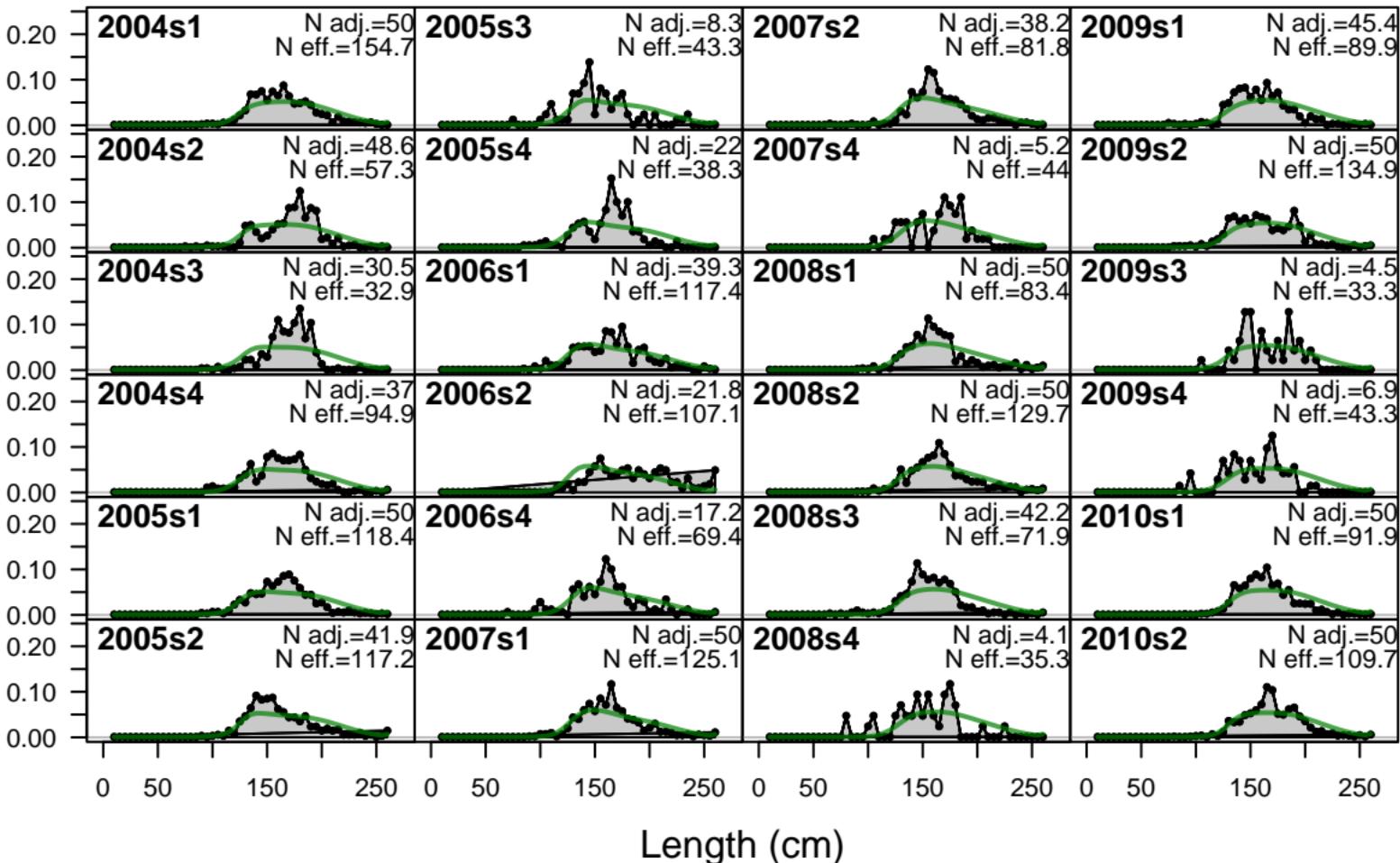
Effective sample size



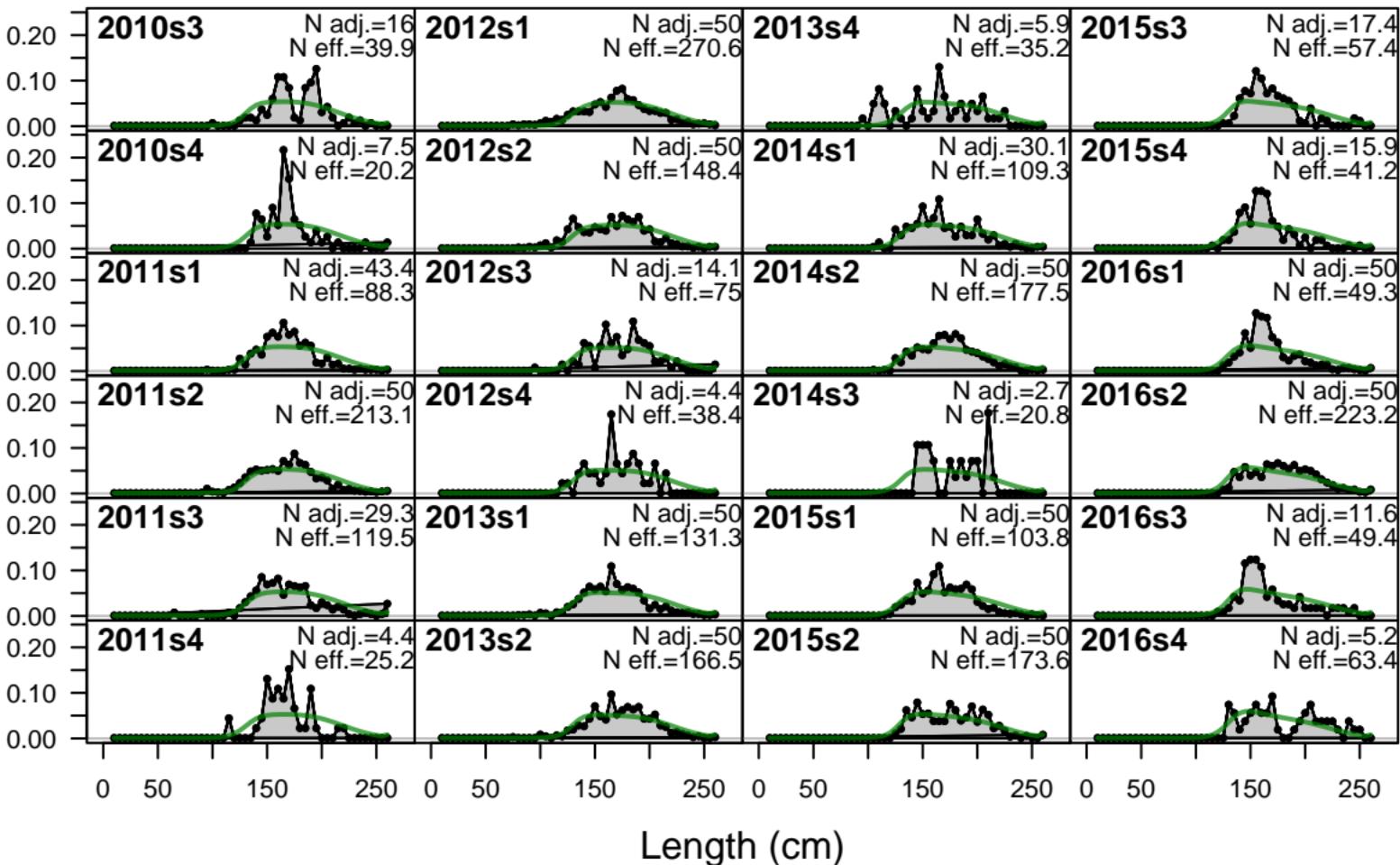
F1_JPN_WCNPO OSDWCOLL late Area1 (whole catch)



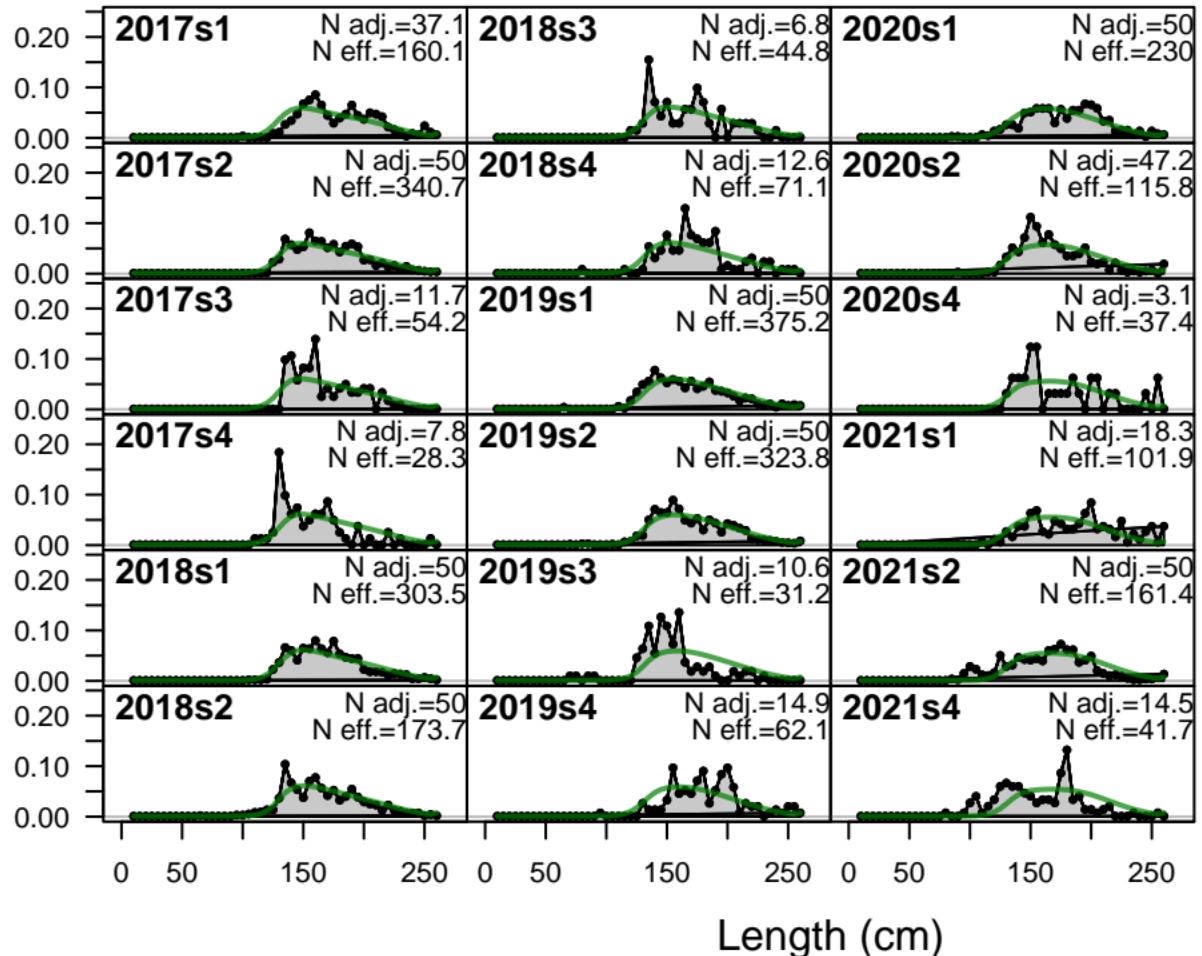
Proportion

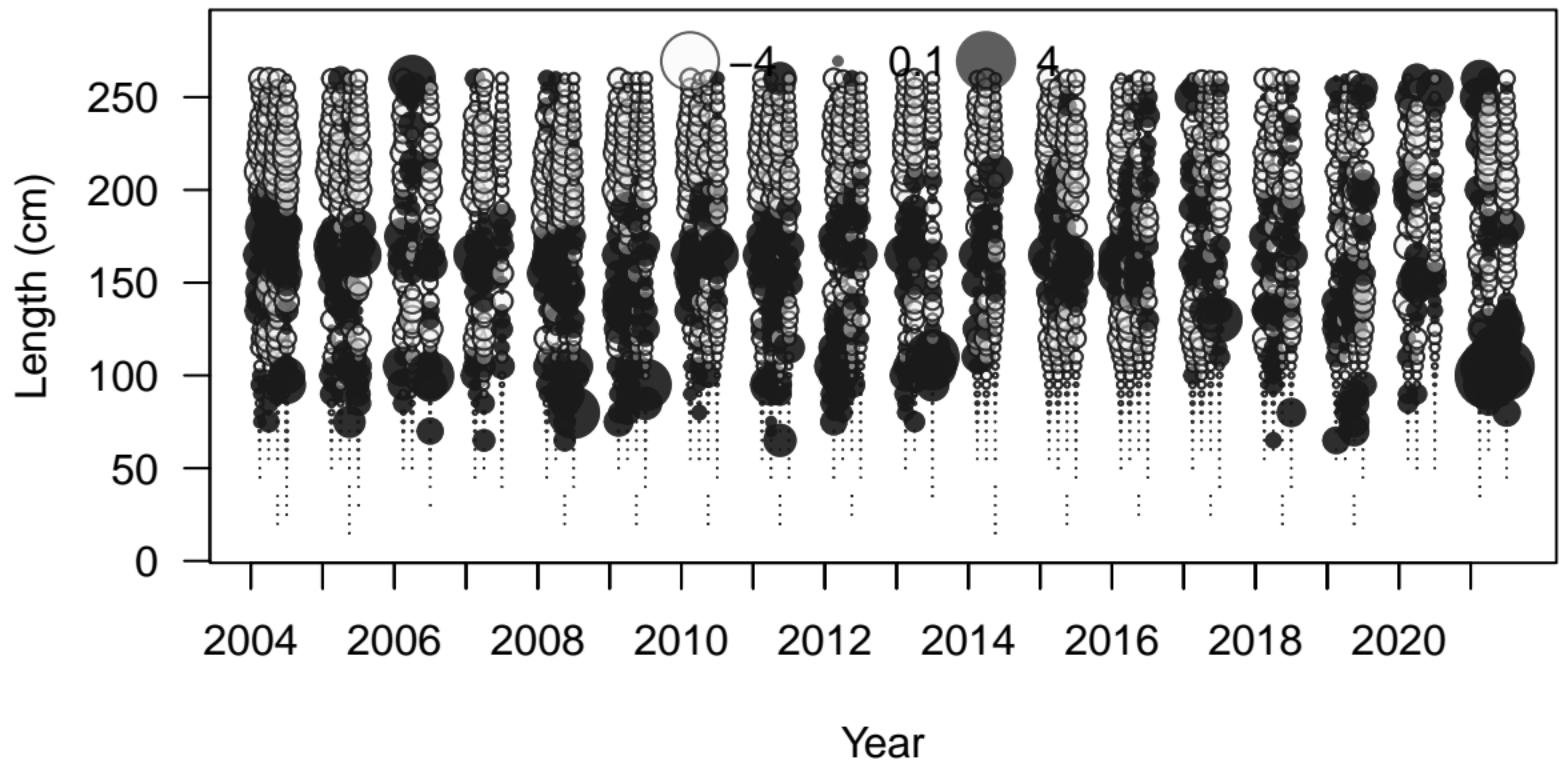


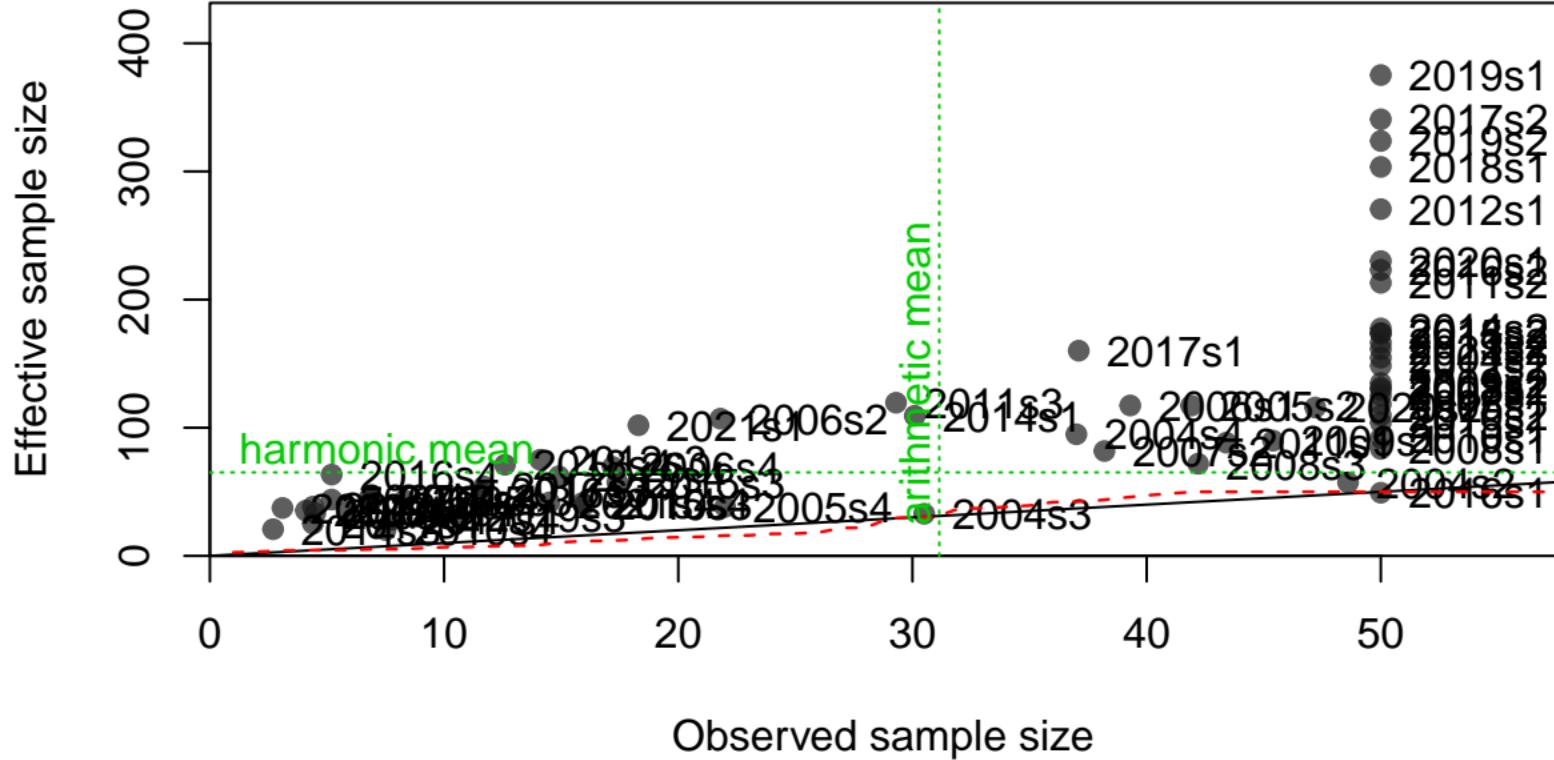
Proportion



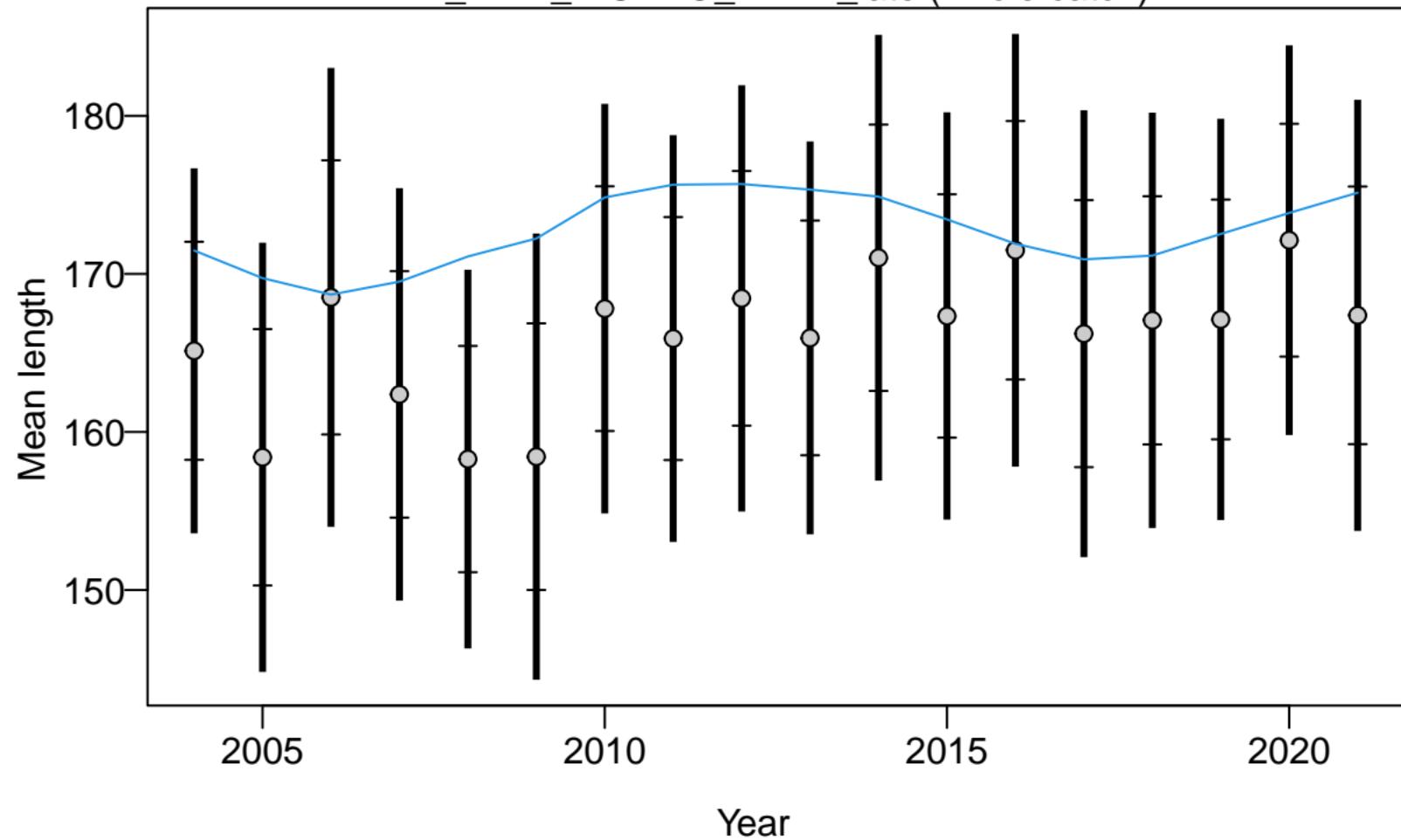
Proportion



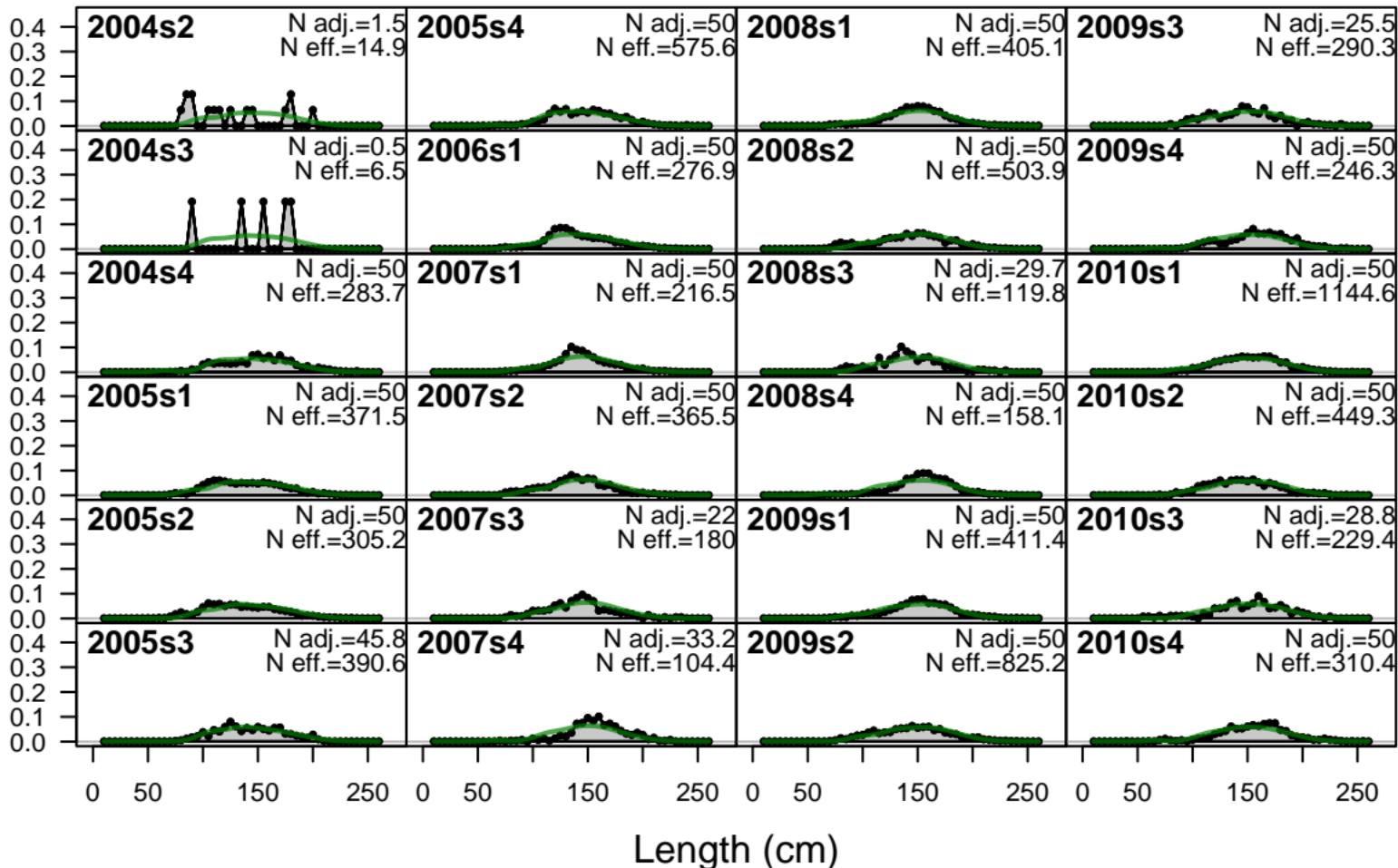




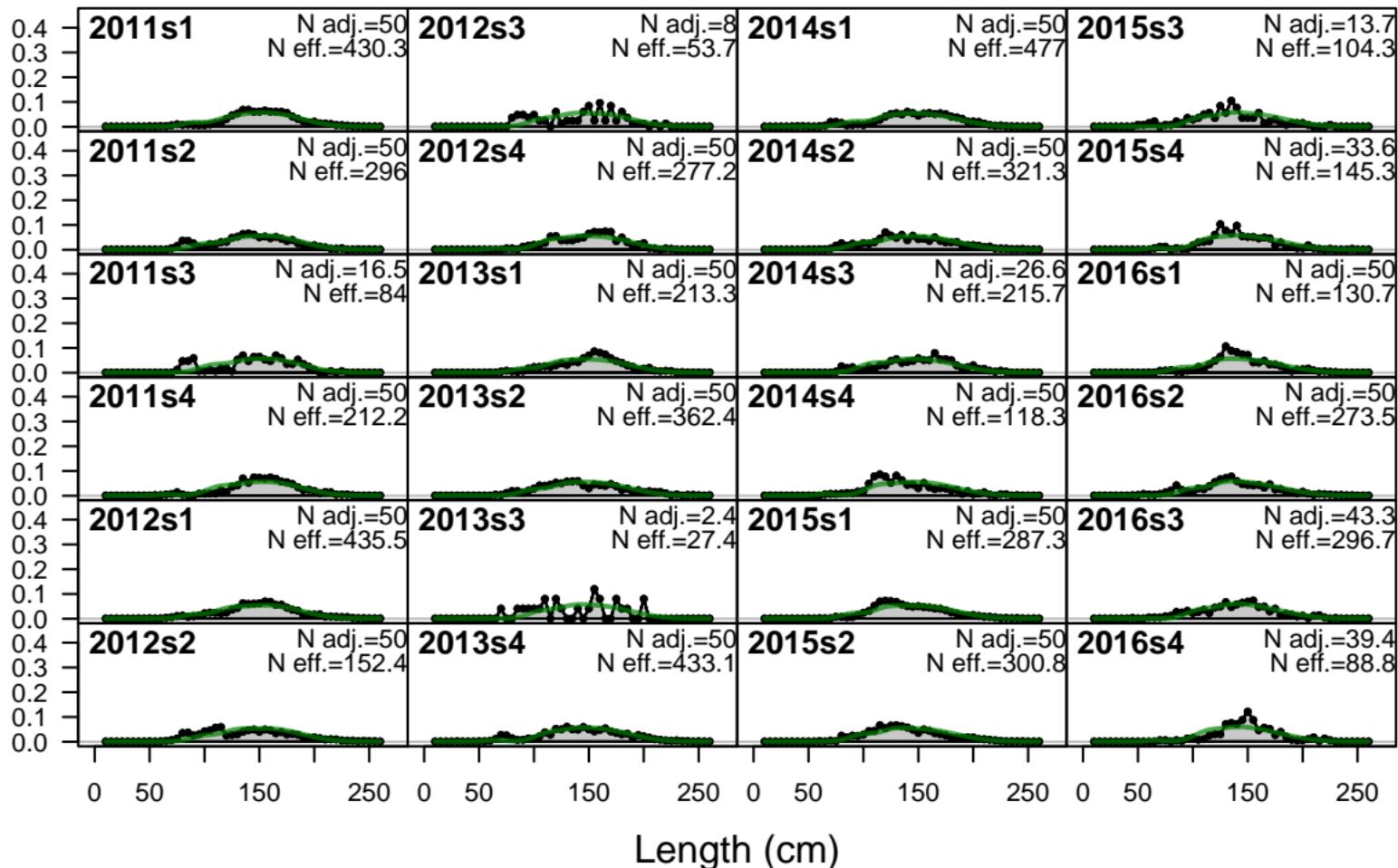
F2_TWN_WCNPO_DWLL_late (whole catch)



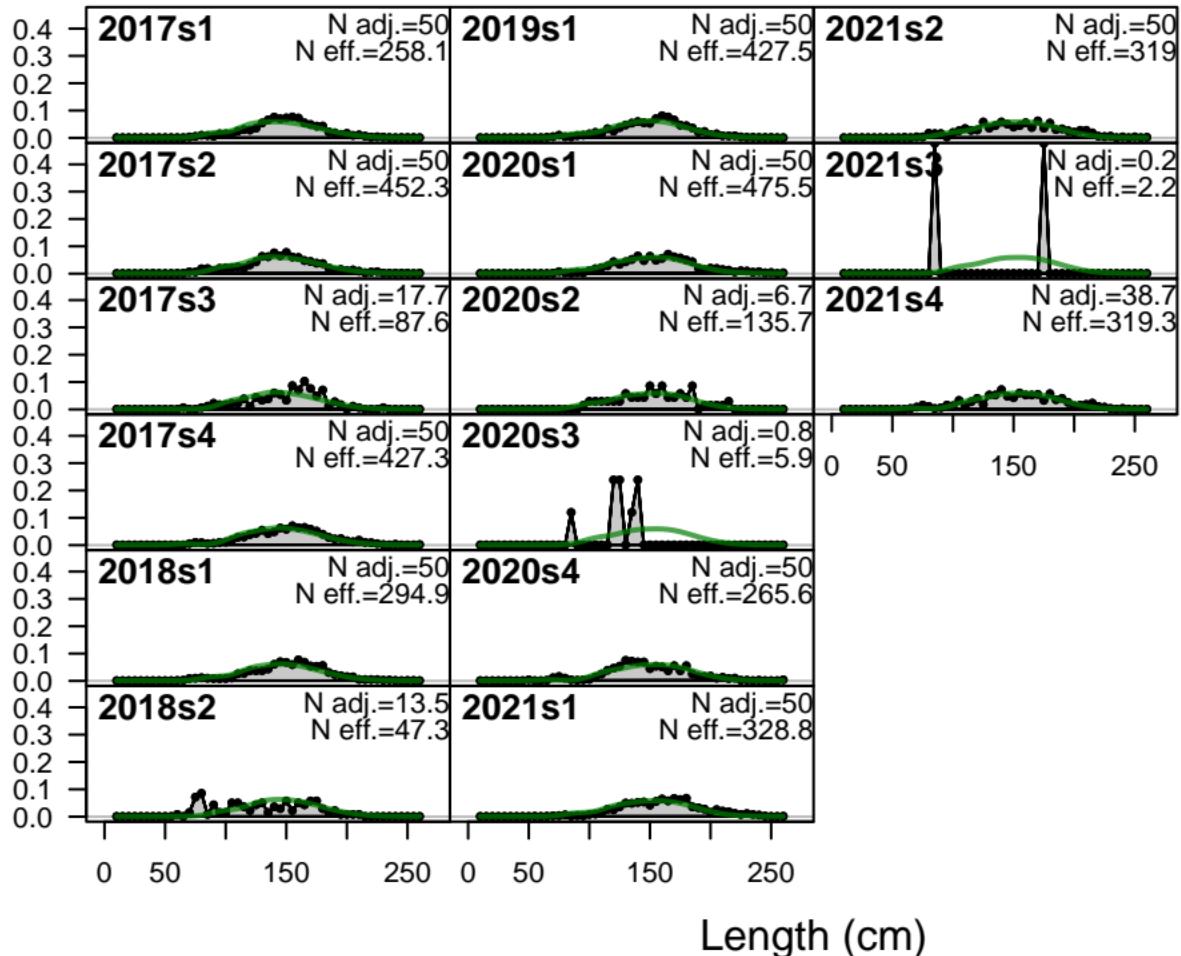
Proportion

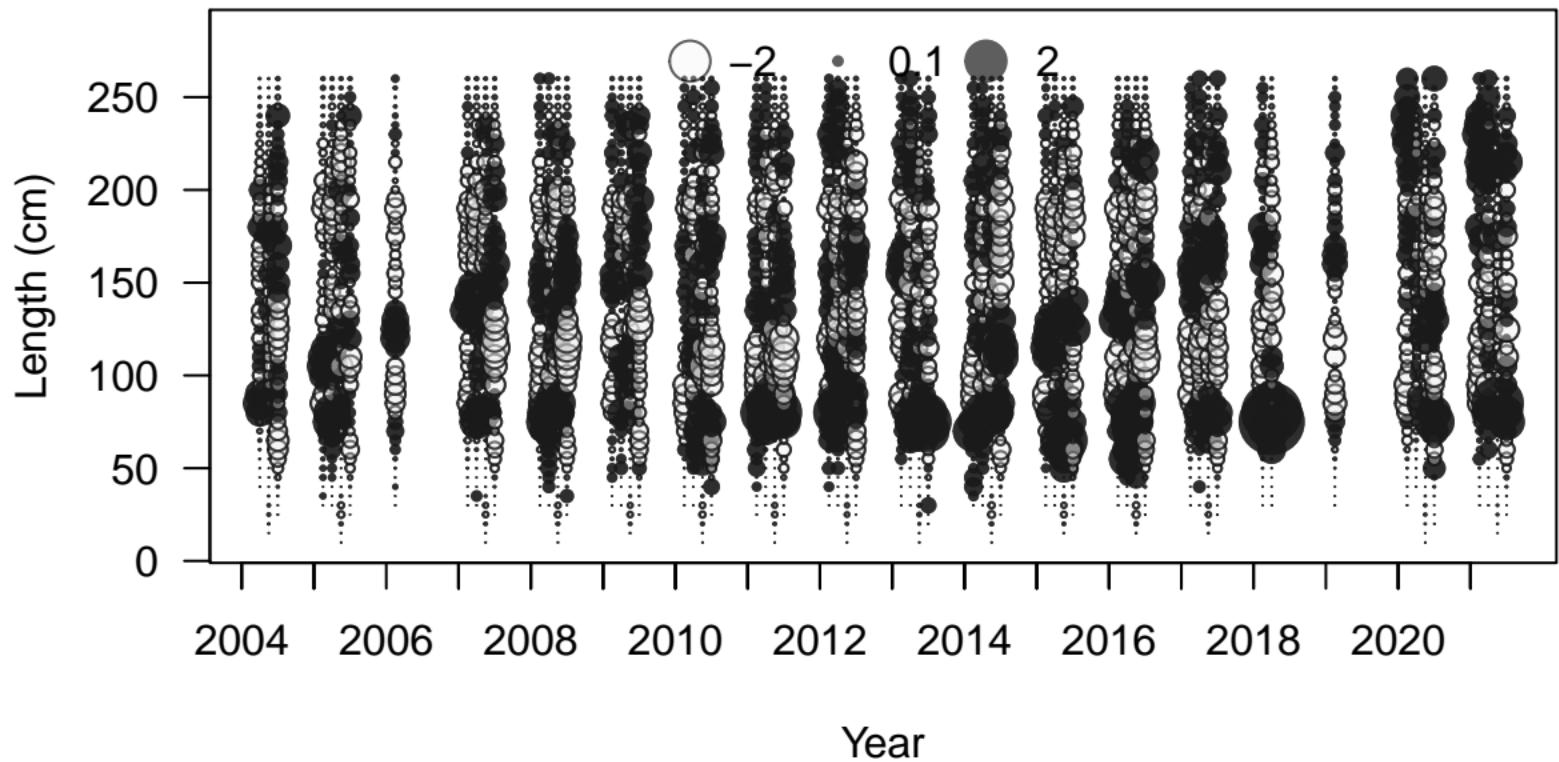


Proportion



Proportion





Effective sample size

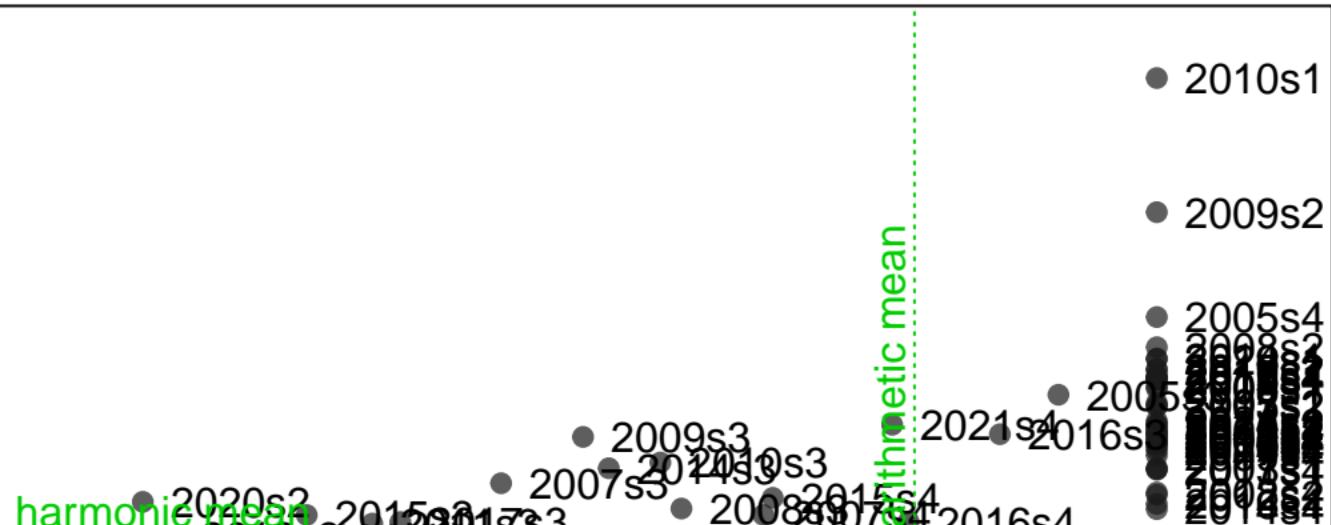
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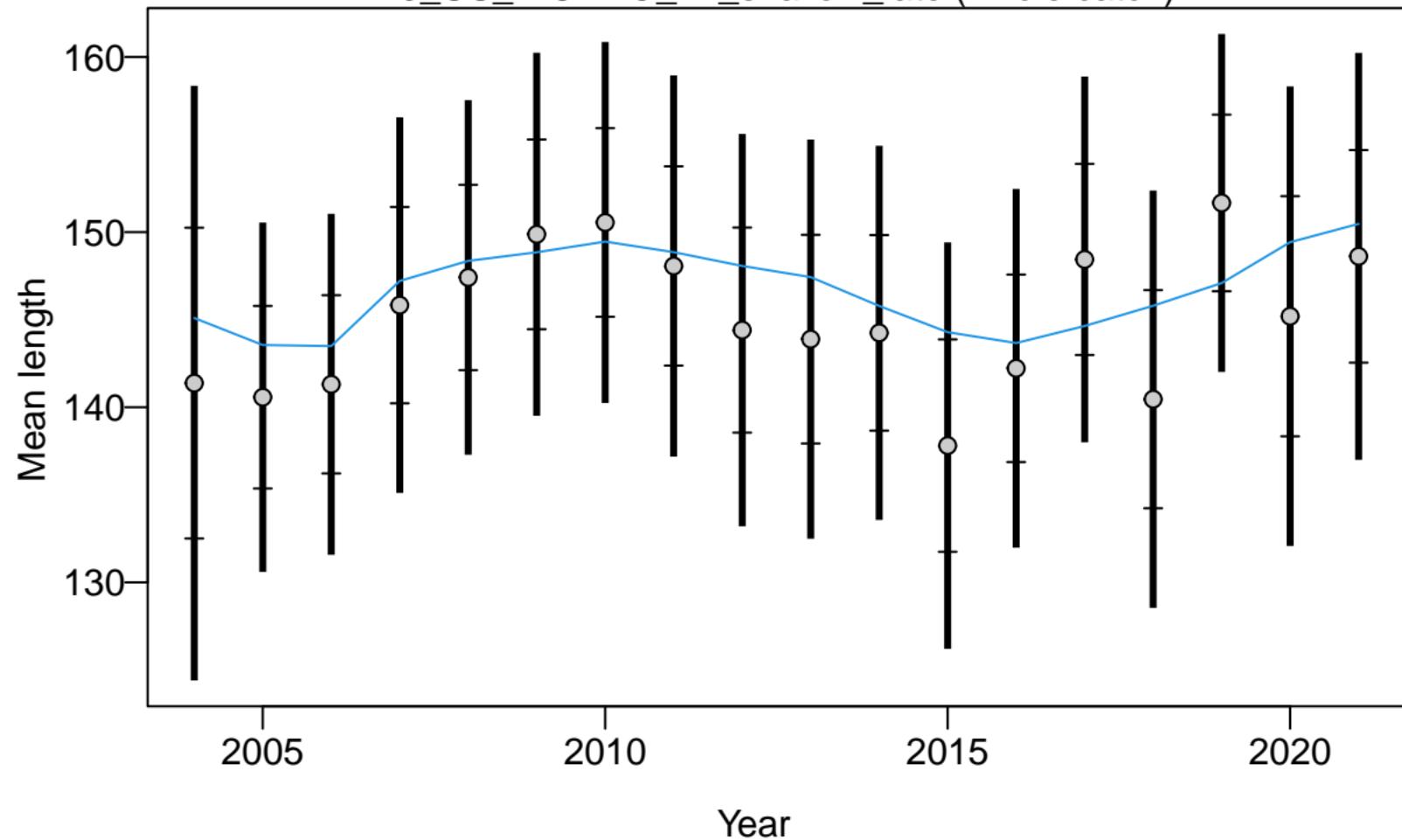
Observed sample size

harmonic mean

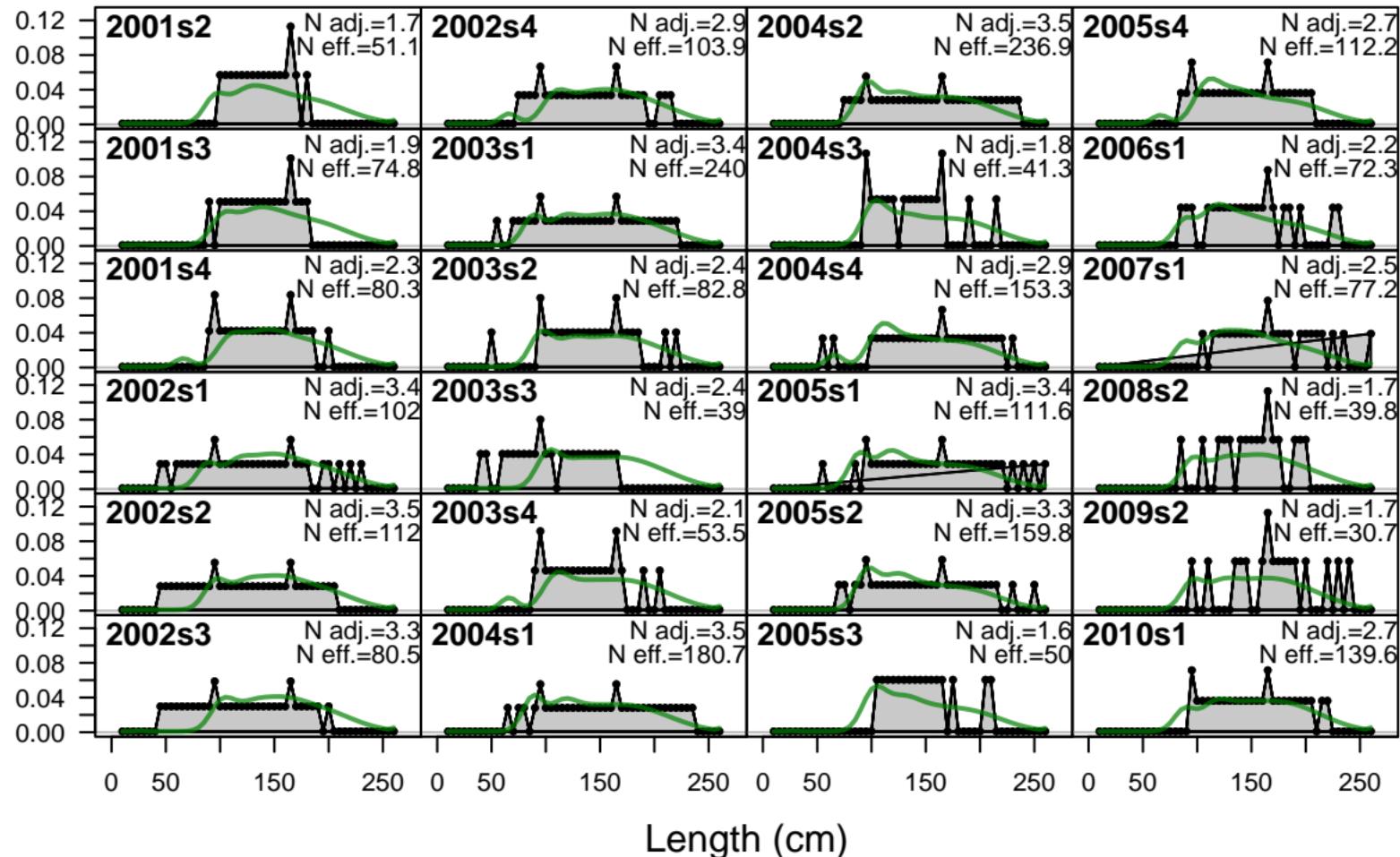
geometric mean



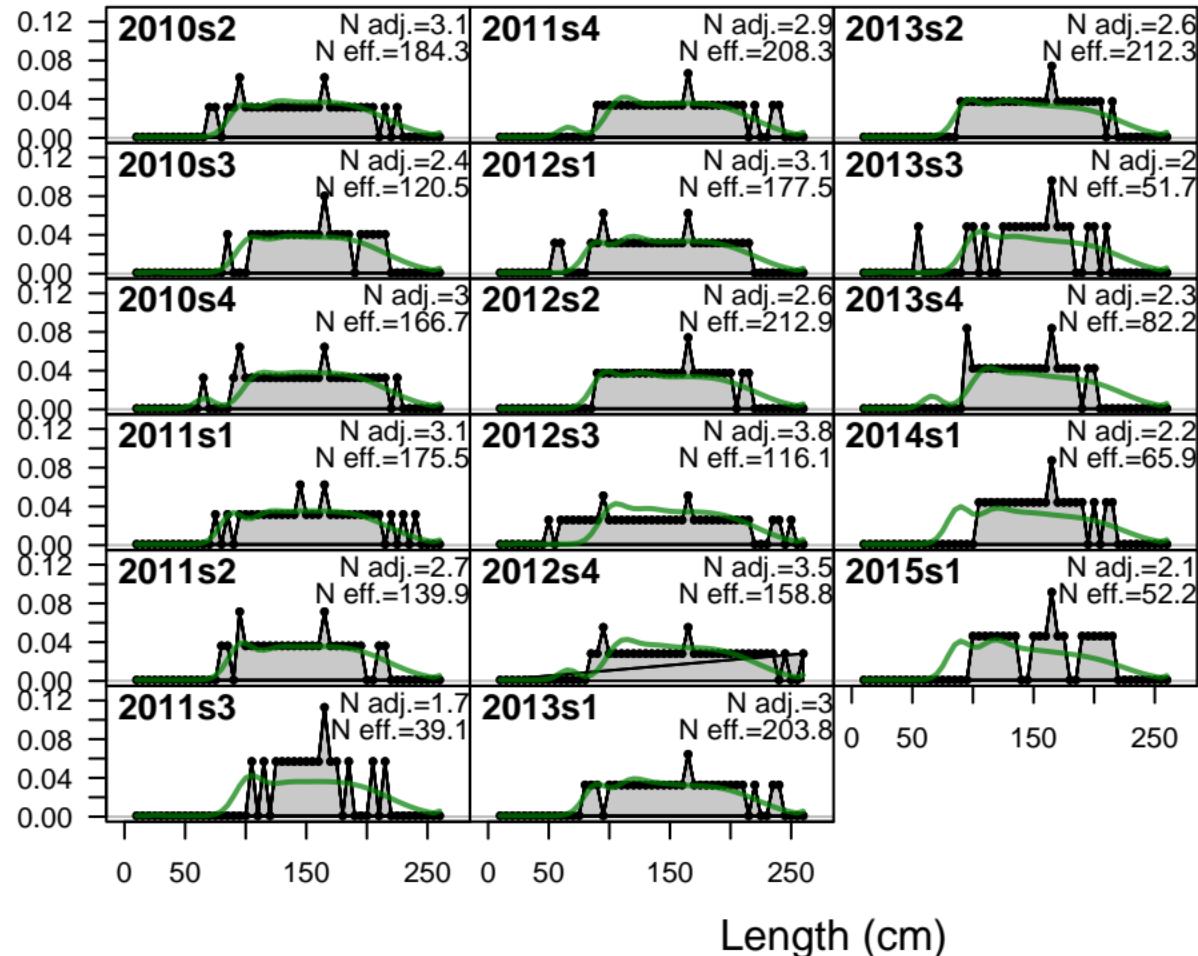
F3_US_WCNPO_LL_shallow_late (whole catch)

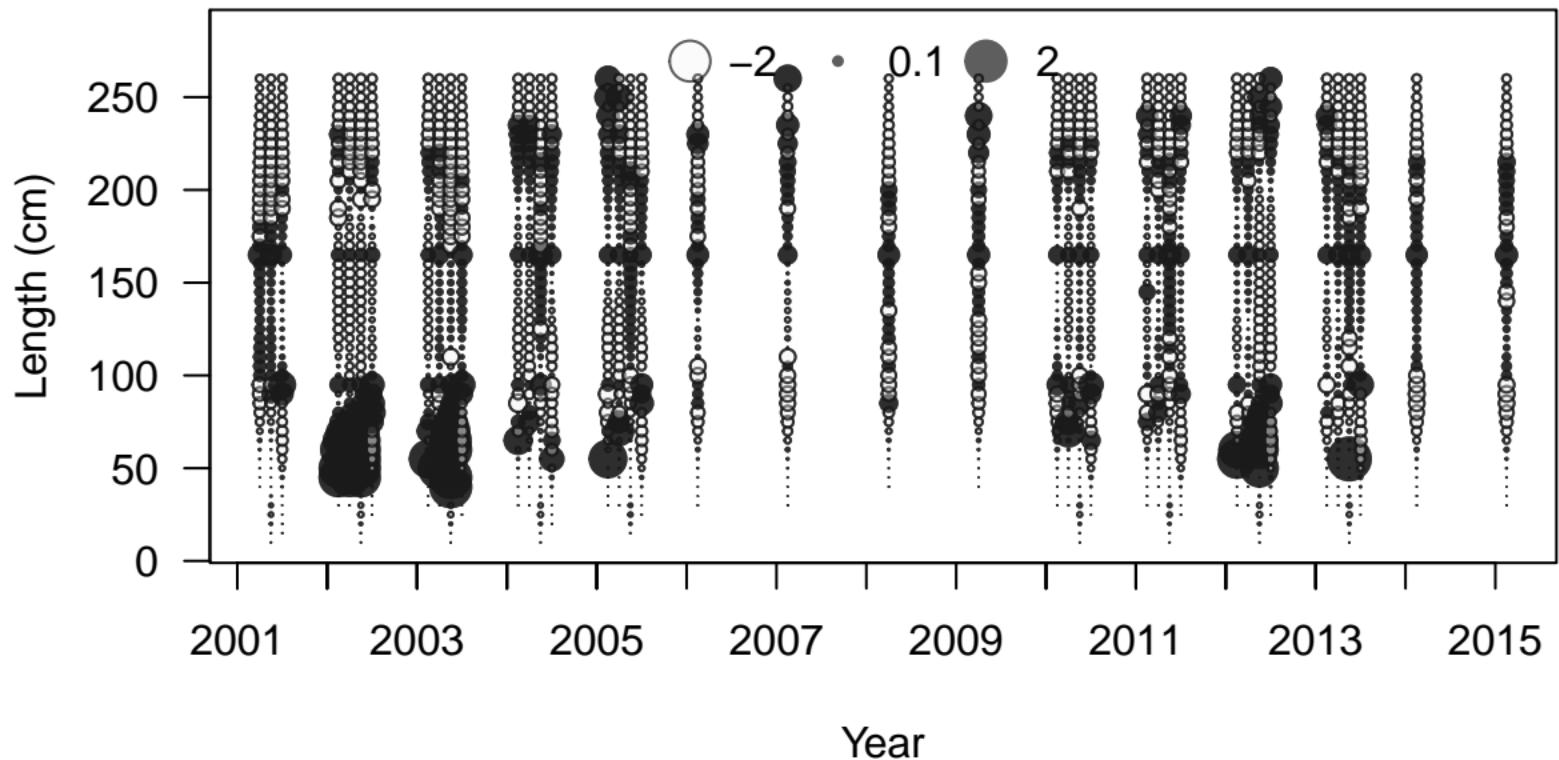


Proportion

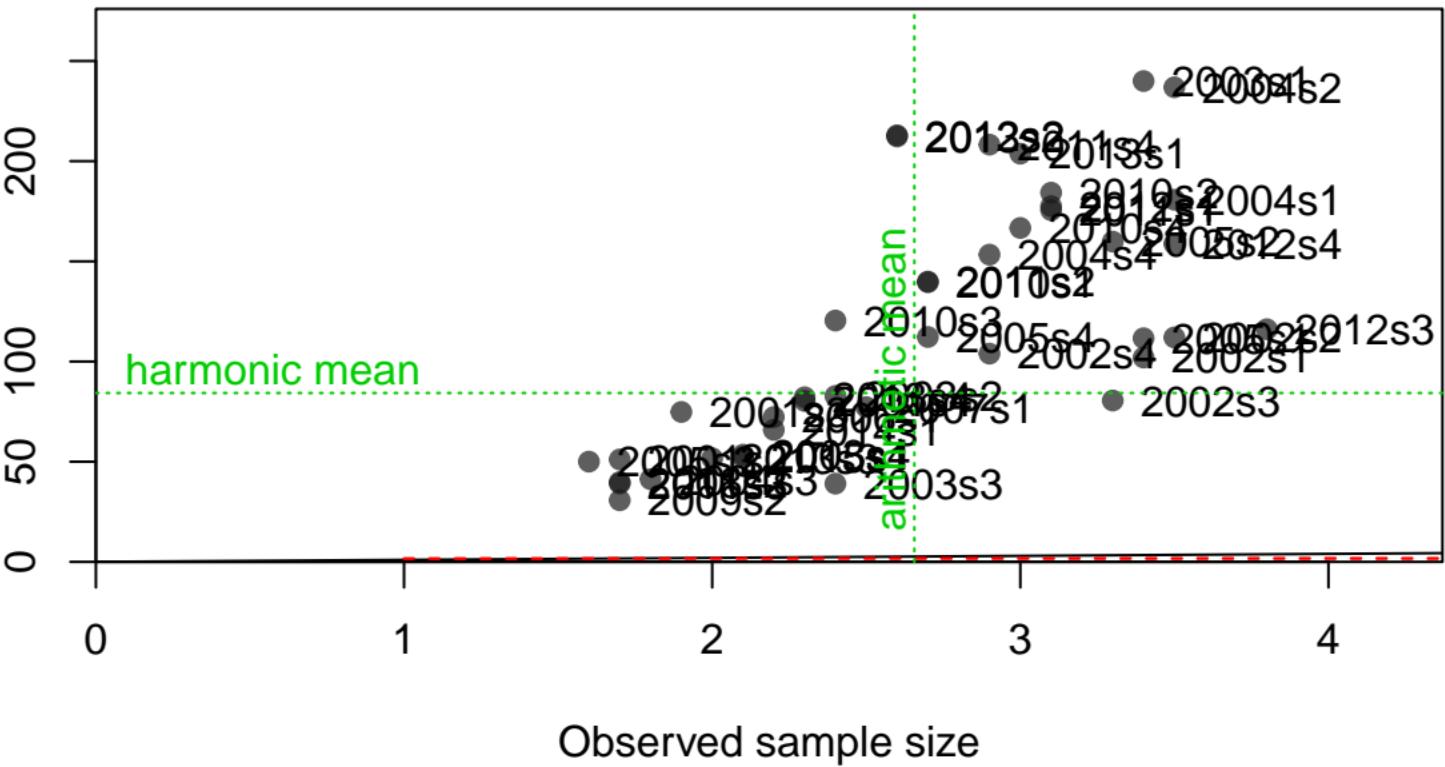


Proportion

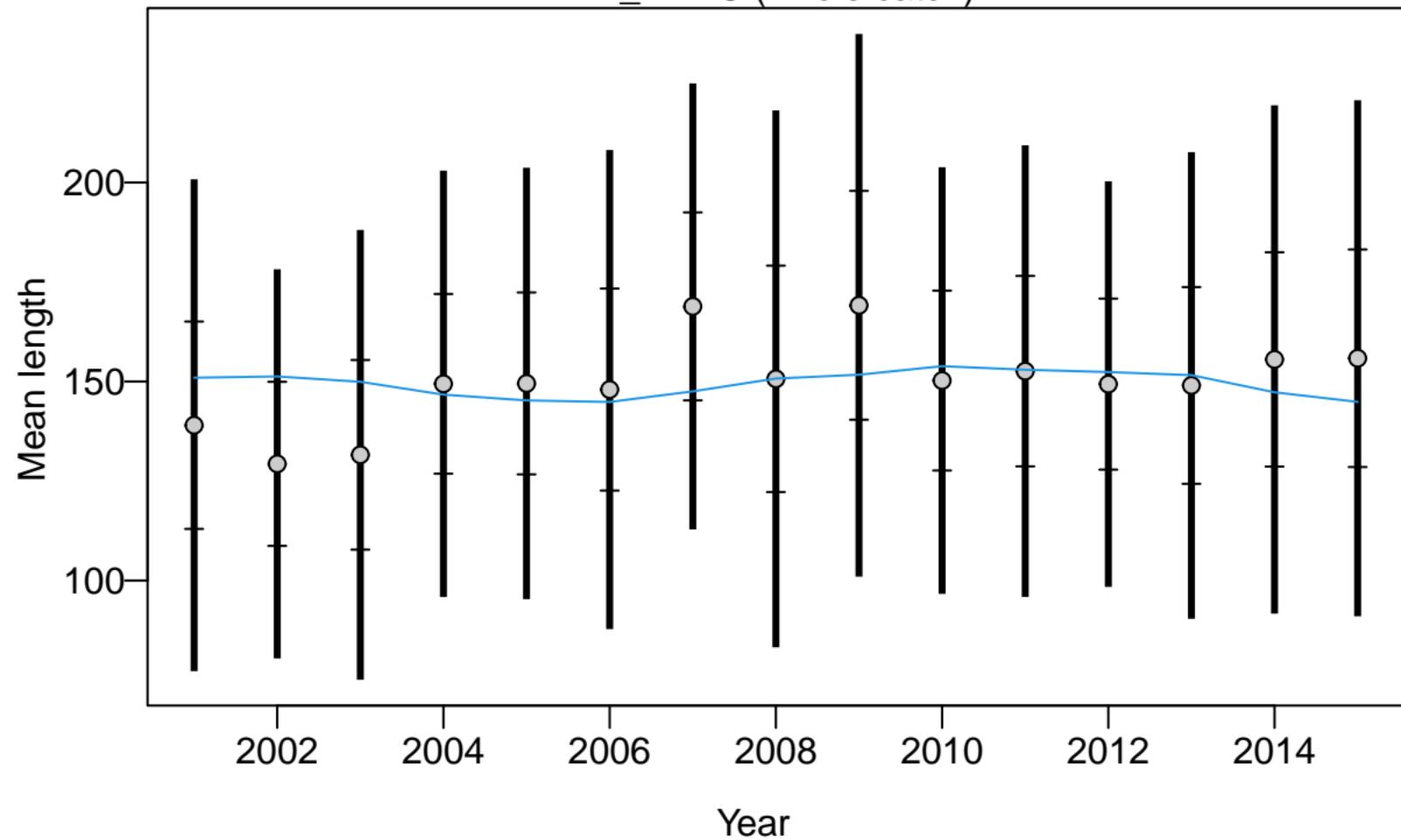




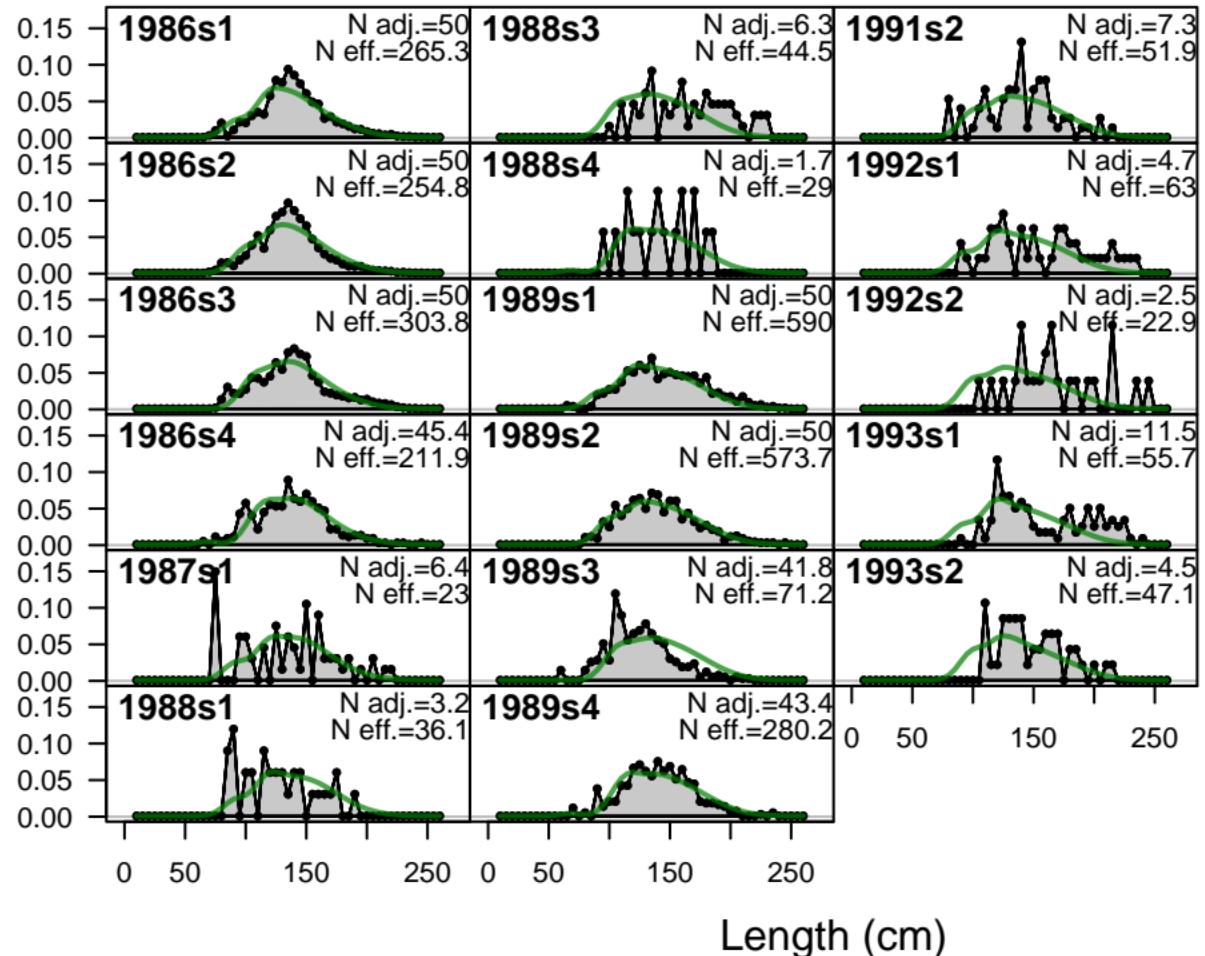
Effective sample size

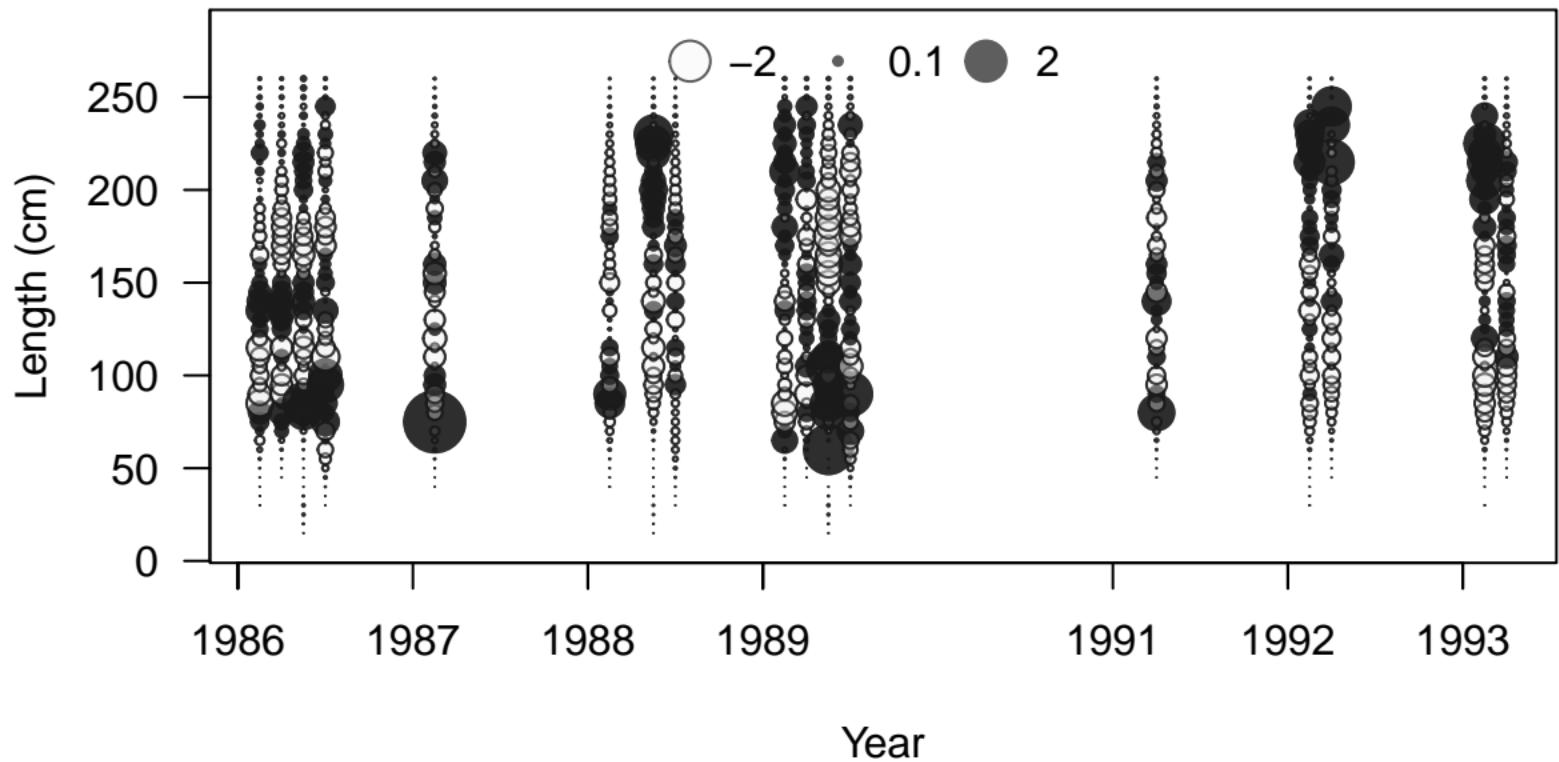


F4_IATTC (whole catch)

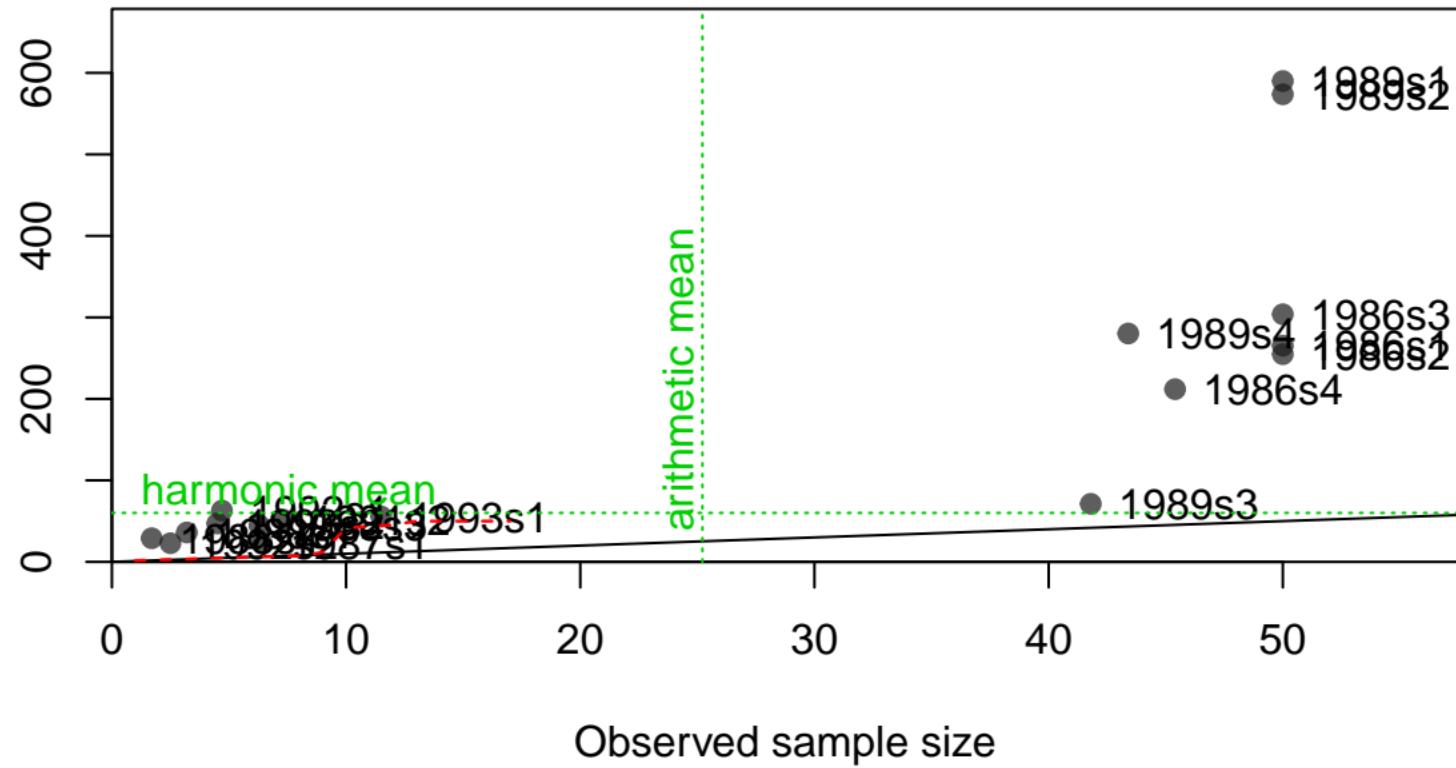


Proportion

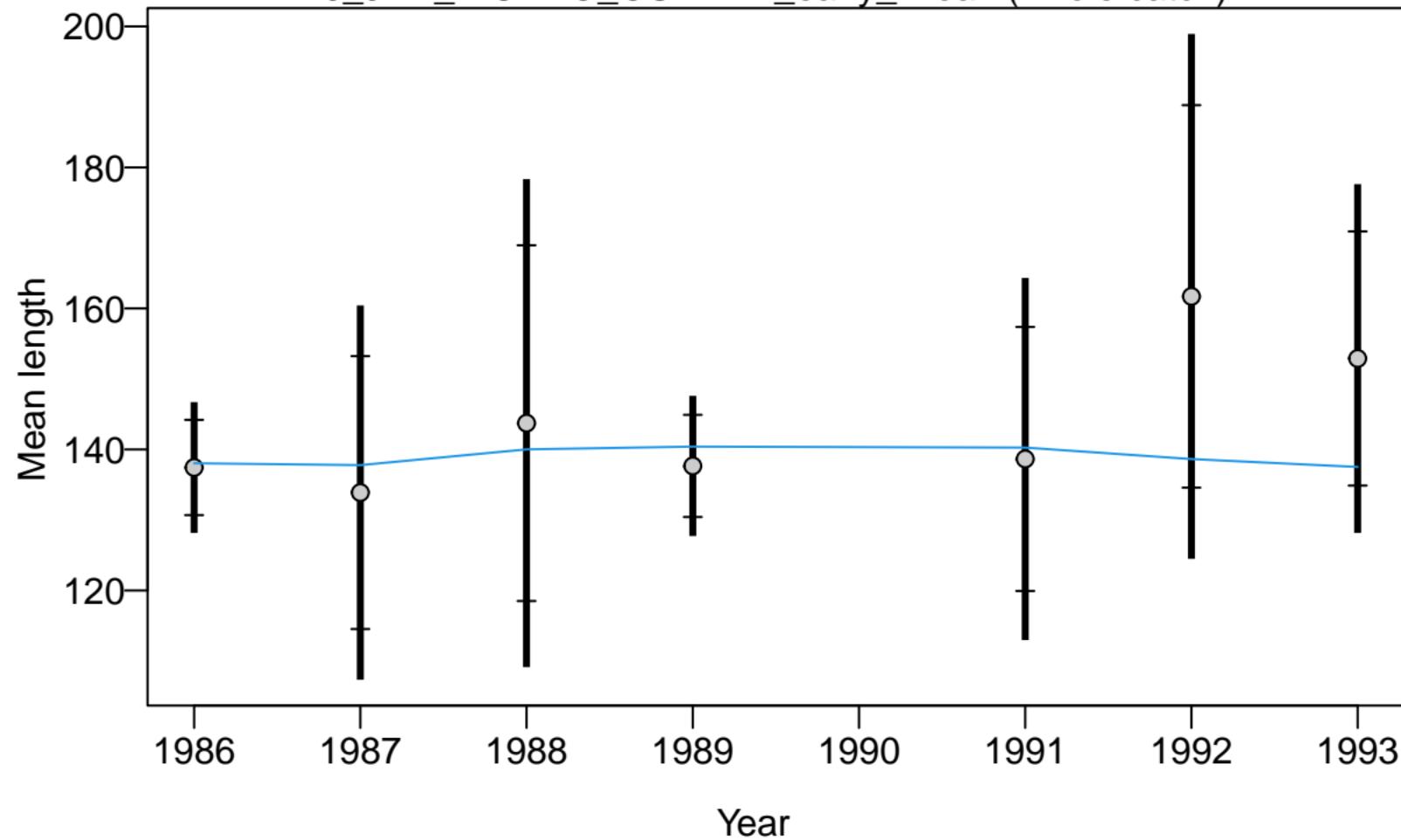




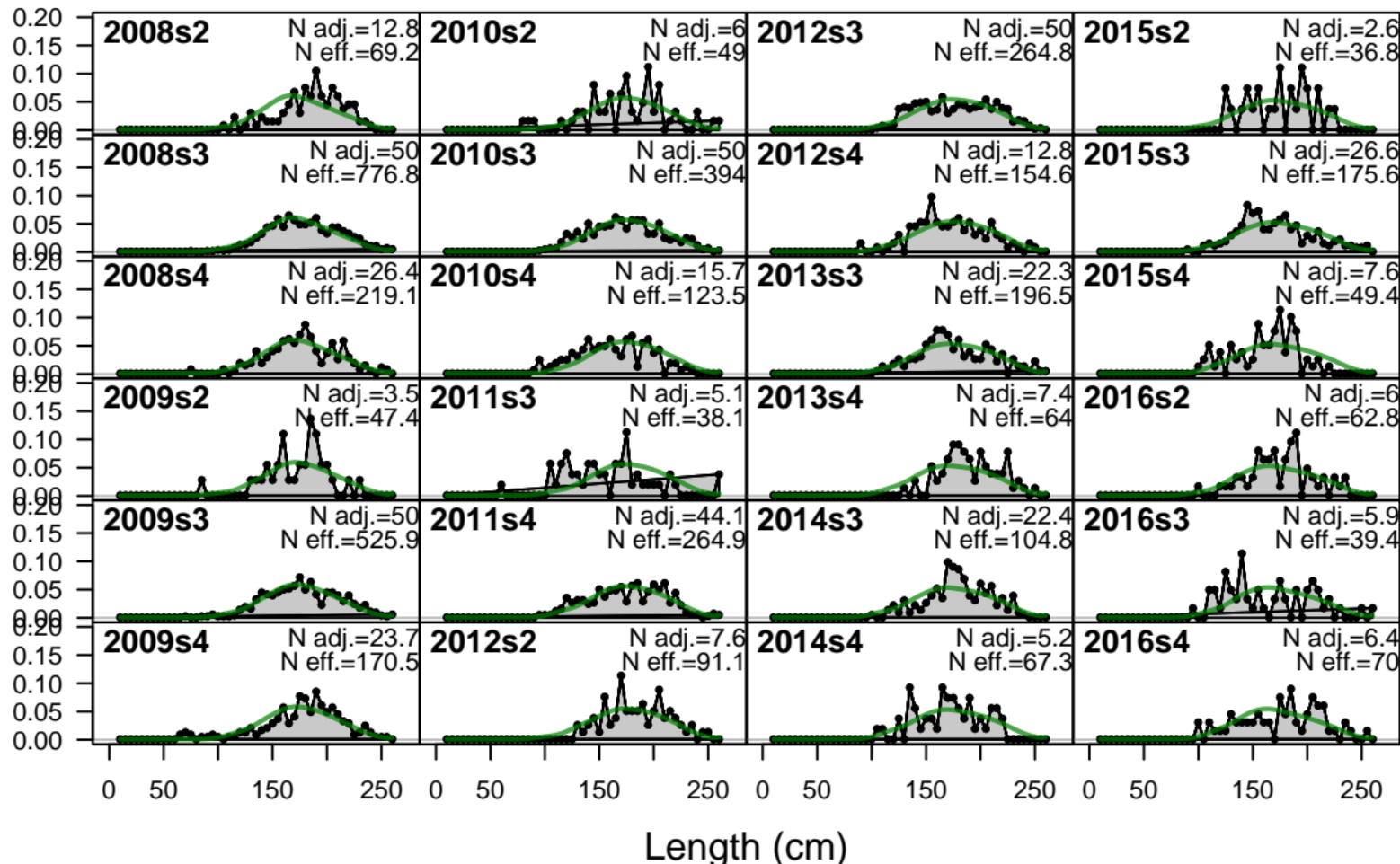
Effective sample size



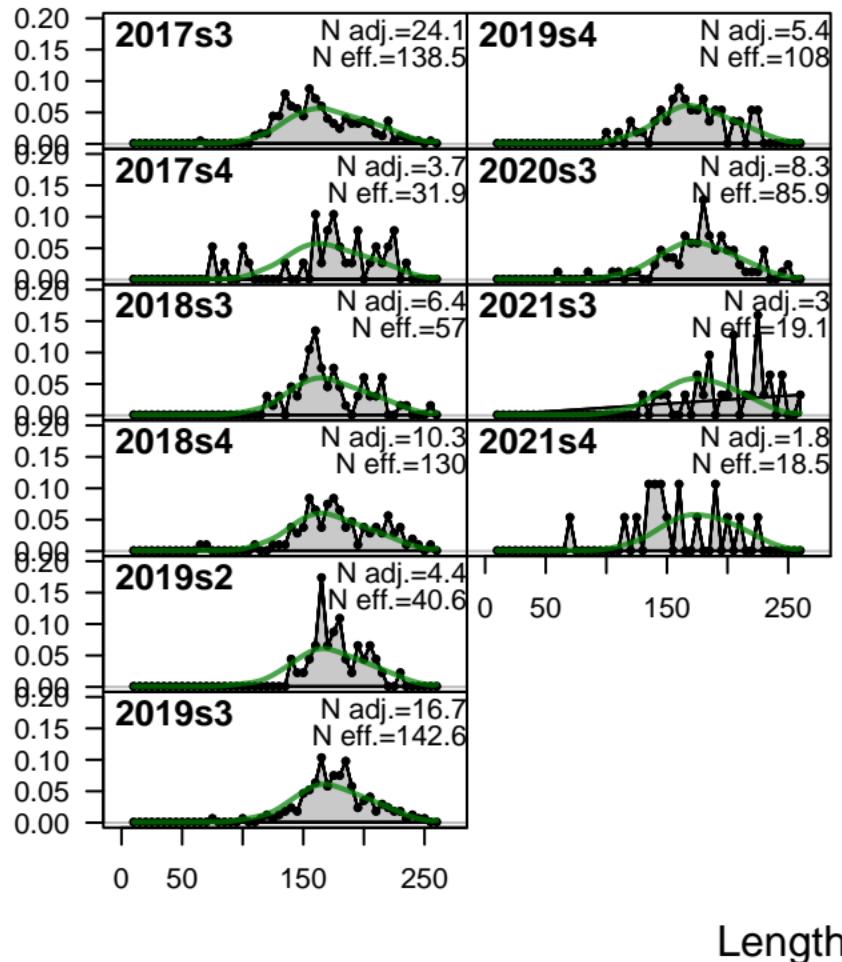
F6_JPN_WCNPO OSDWLL_early_Area1 (whole catch)

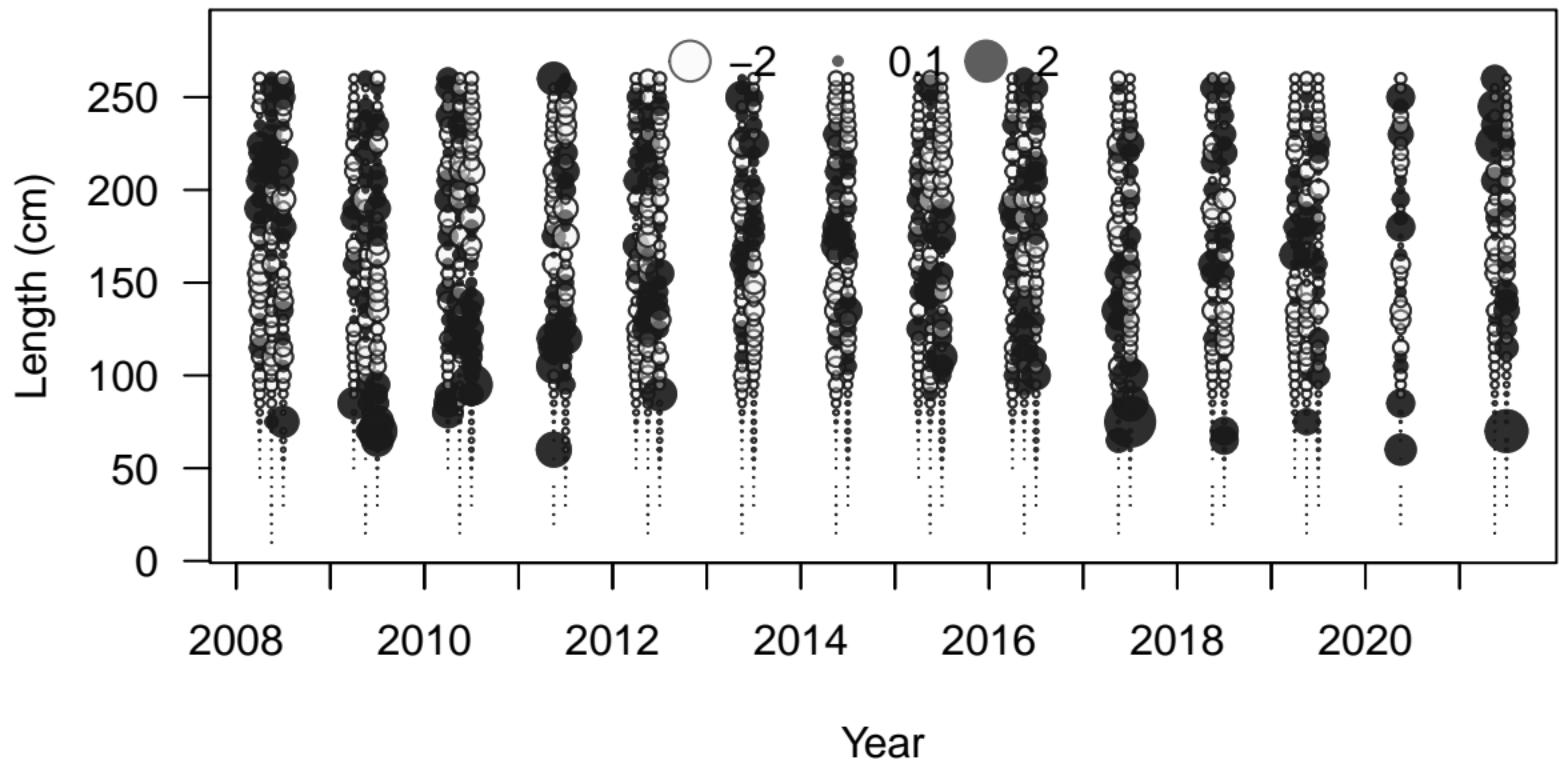


Proportion

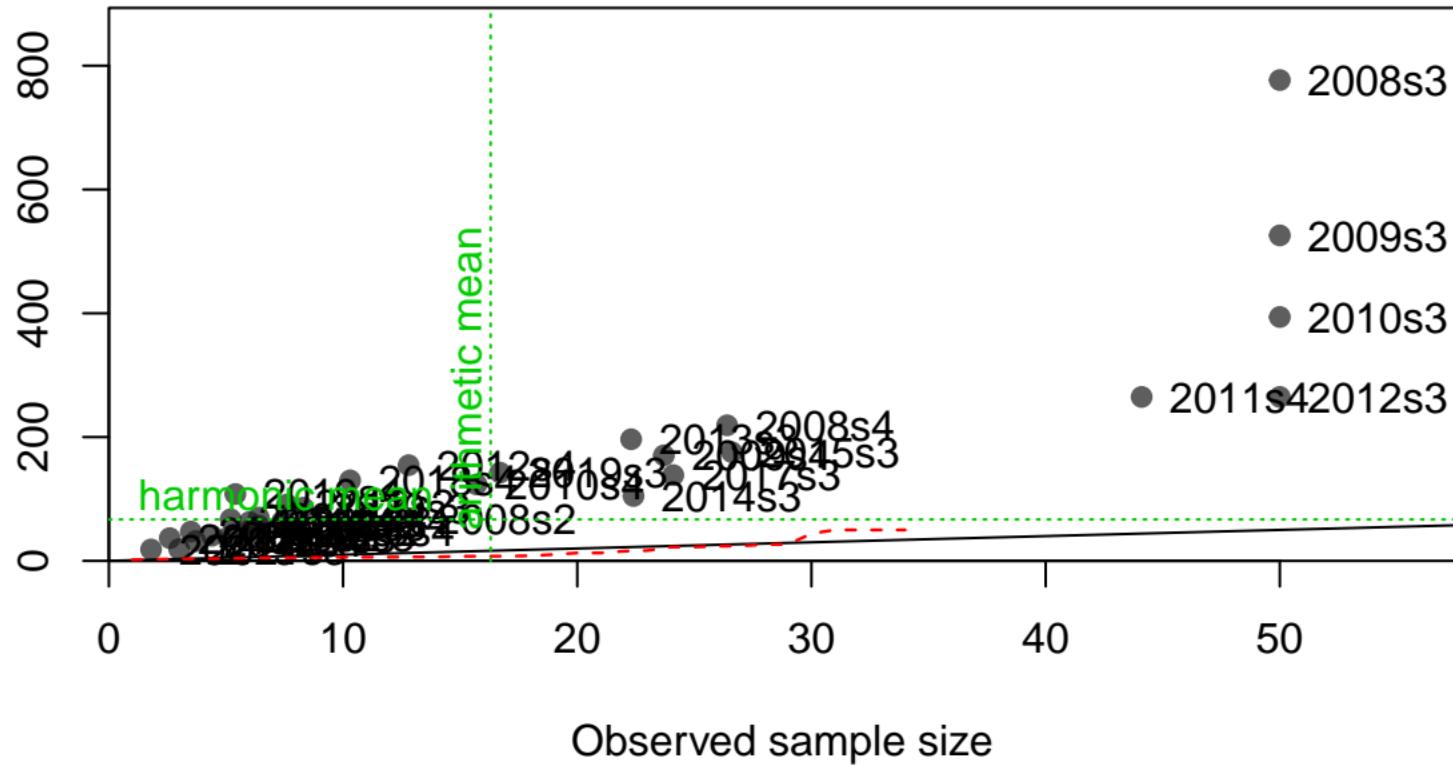


Proportion

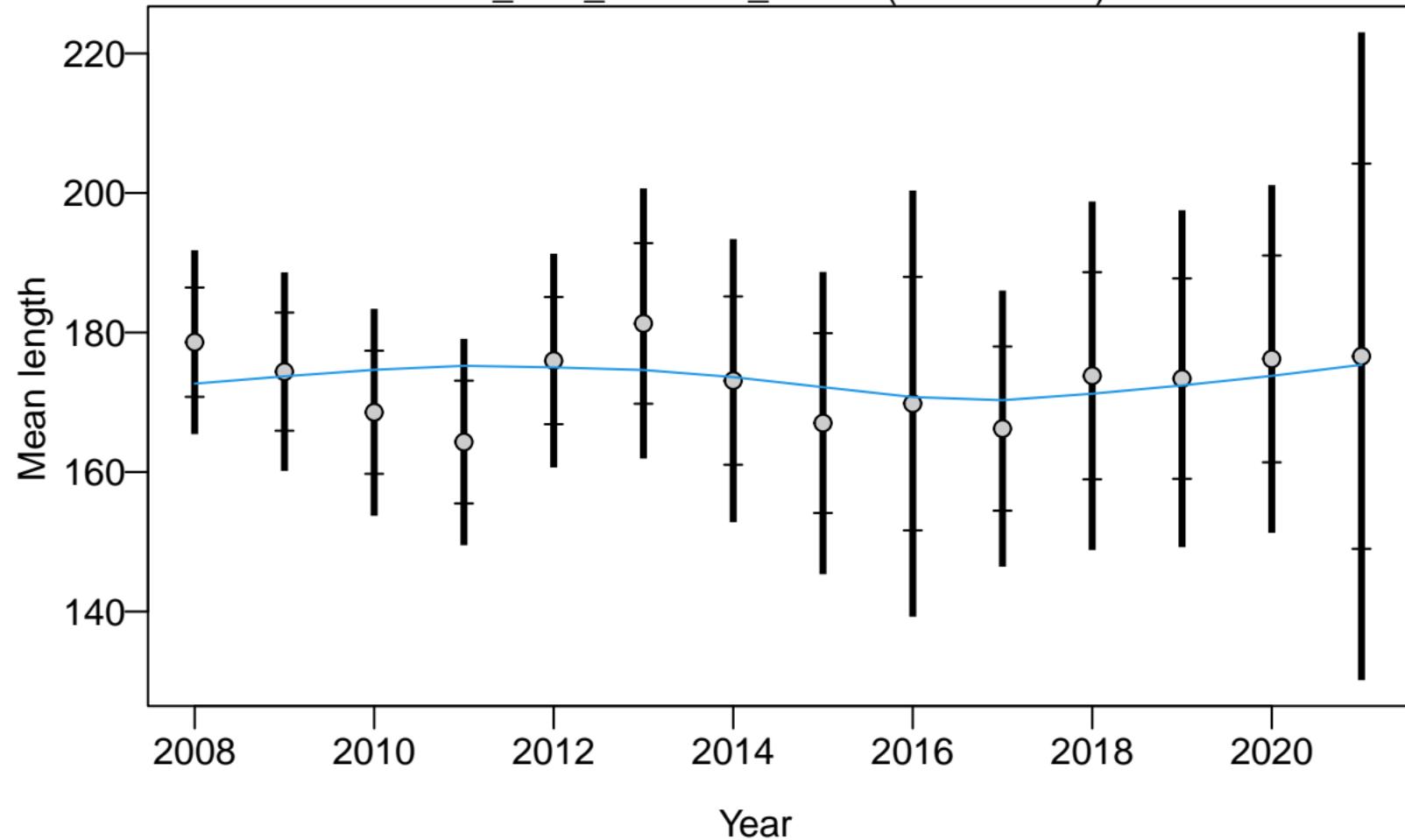




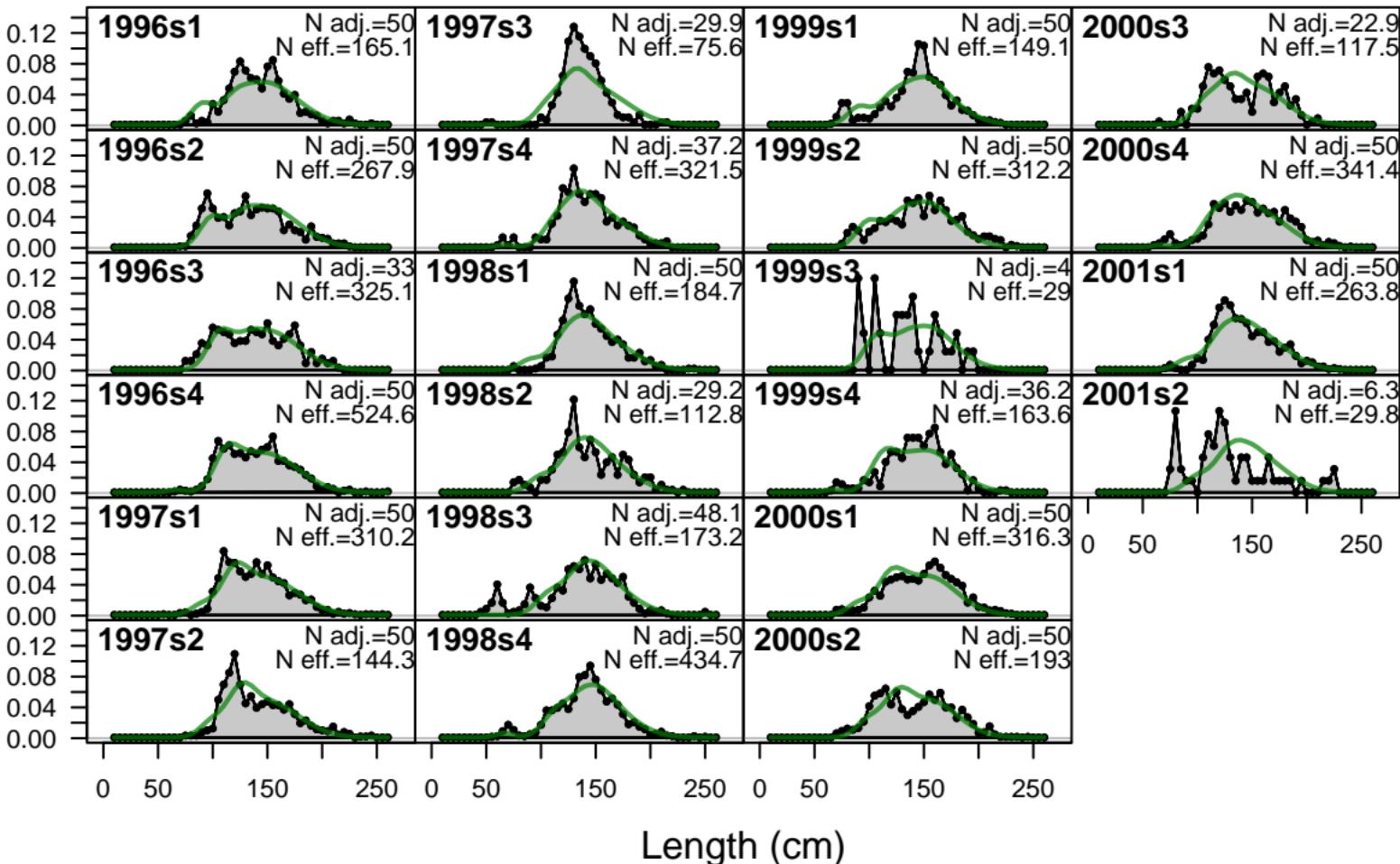
Effective sample size

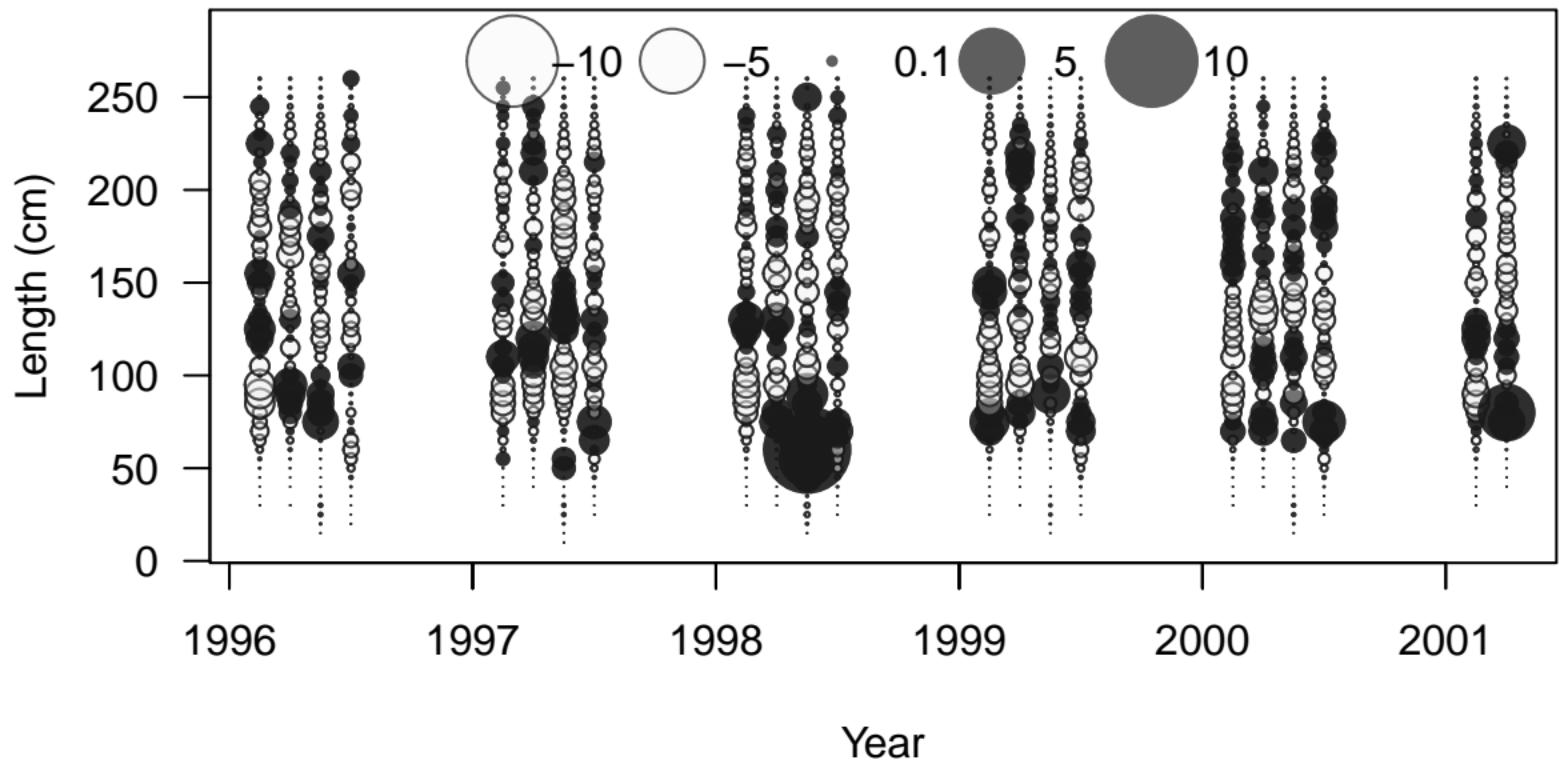


F7_JPN_WCNPO_CODF (whole catch)

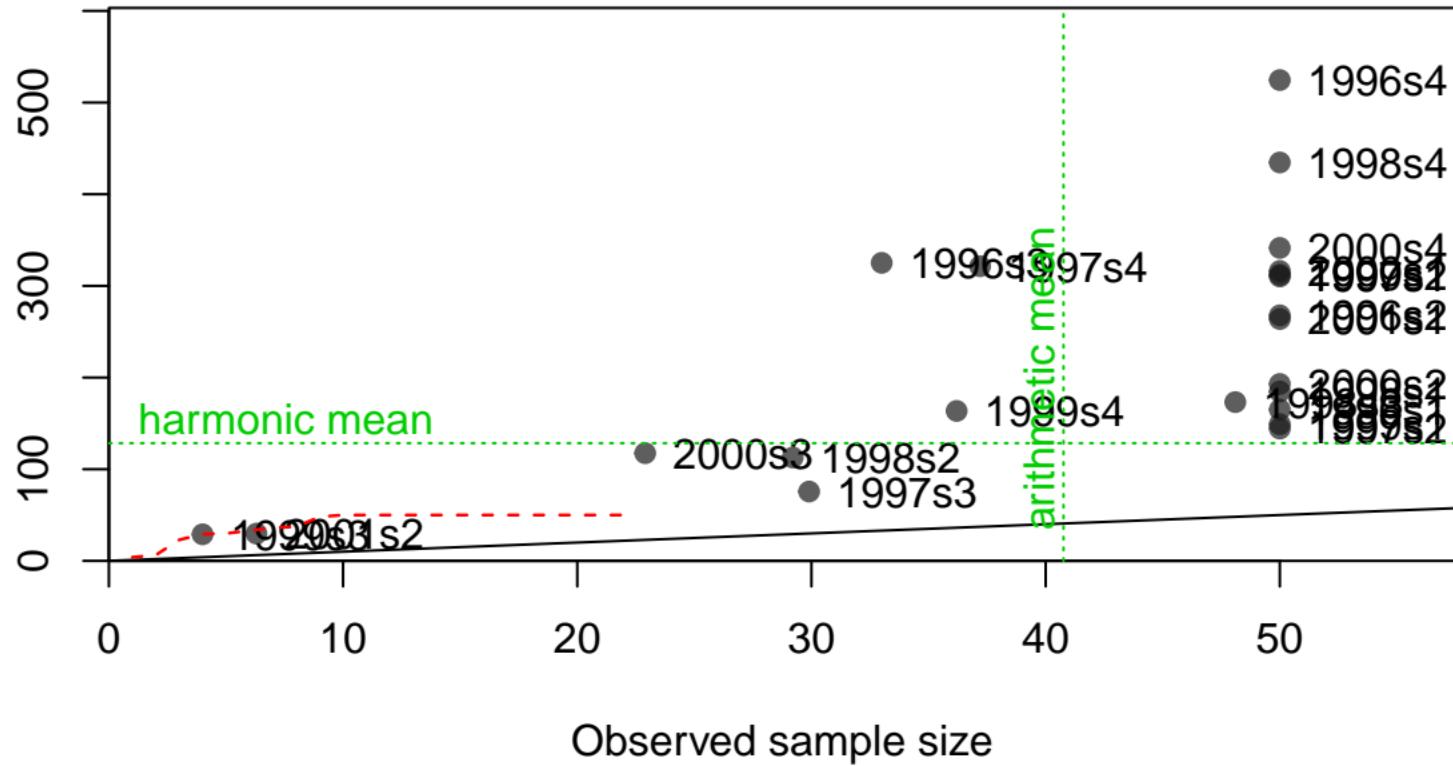


Proportion

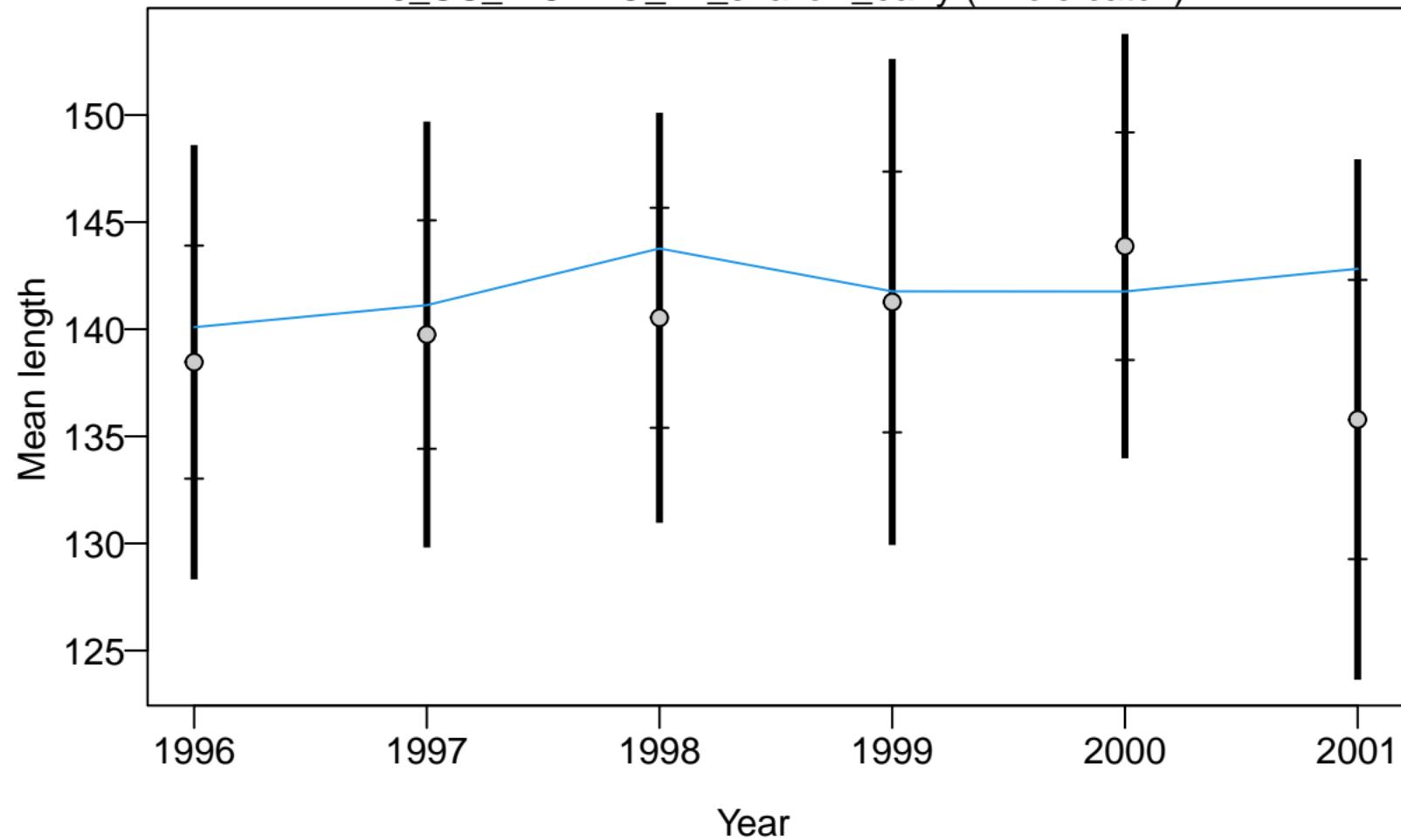




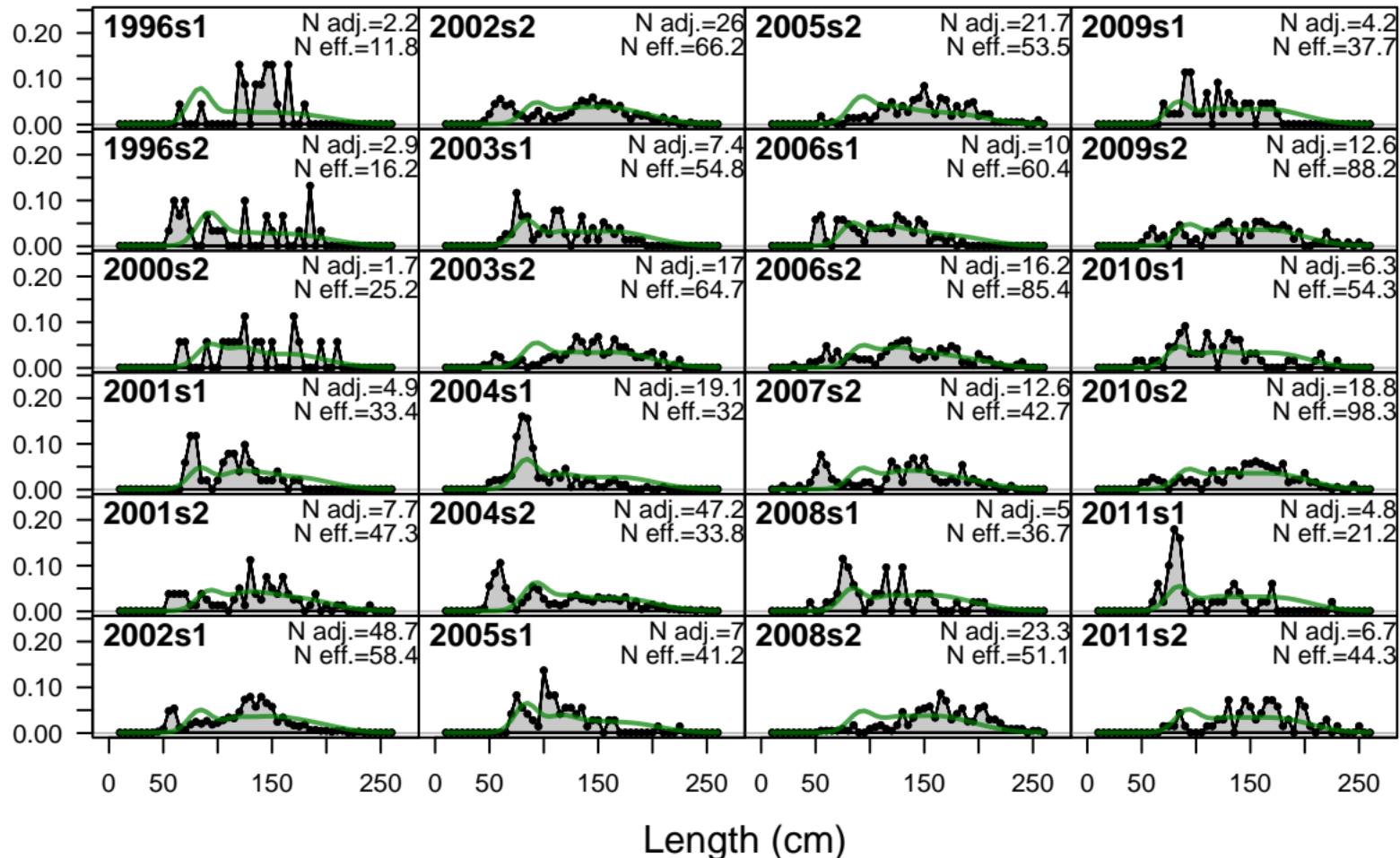
Effective sample size



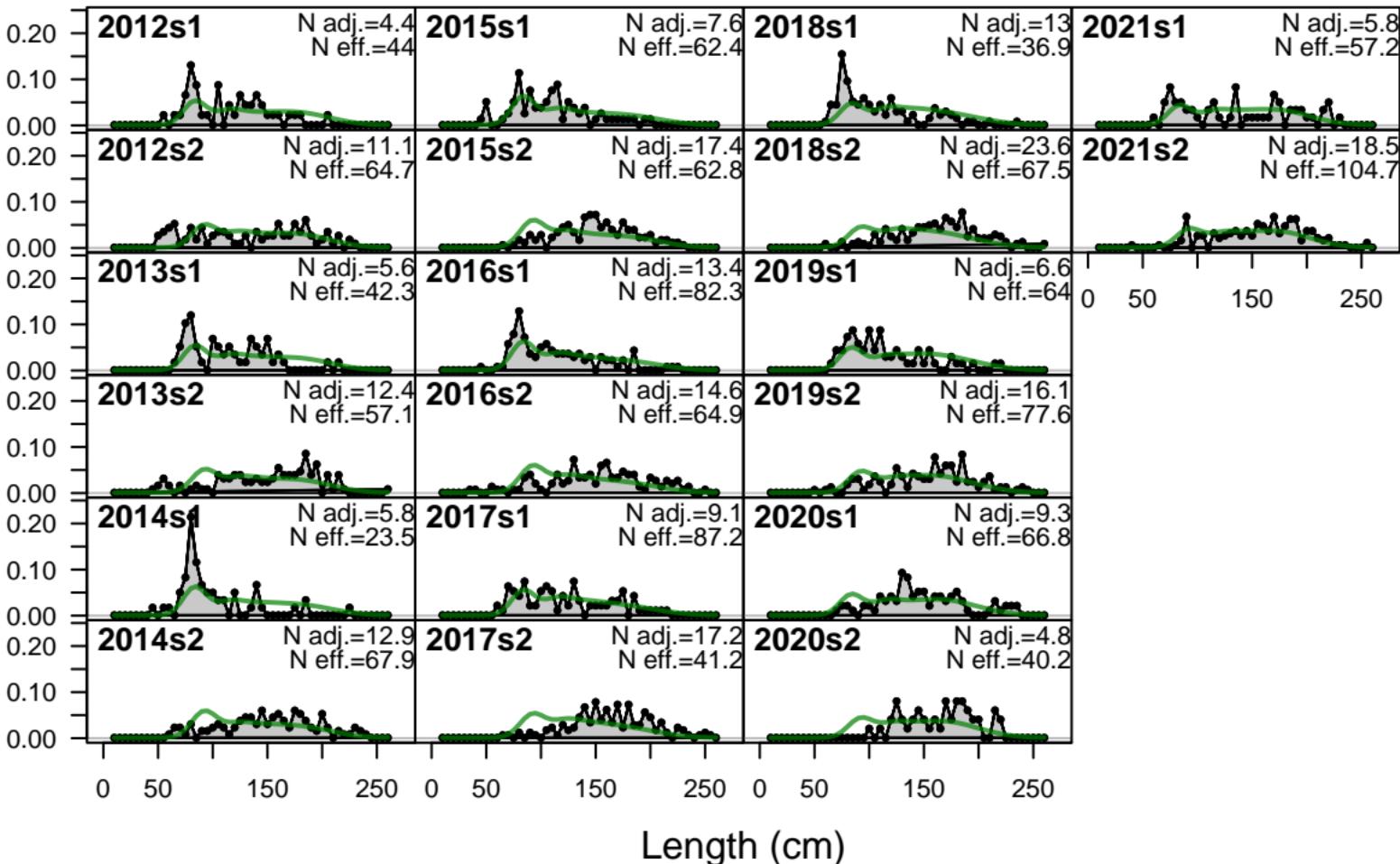
F8_US_WCNPO_LL_shallow_early (whole catch)

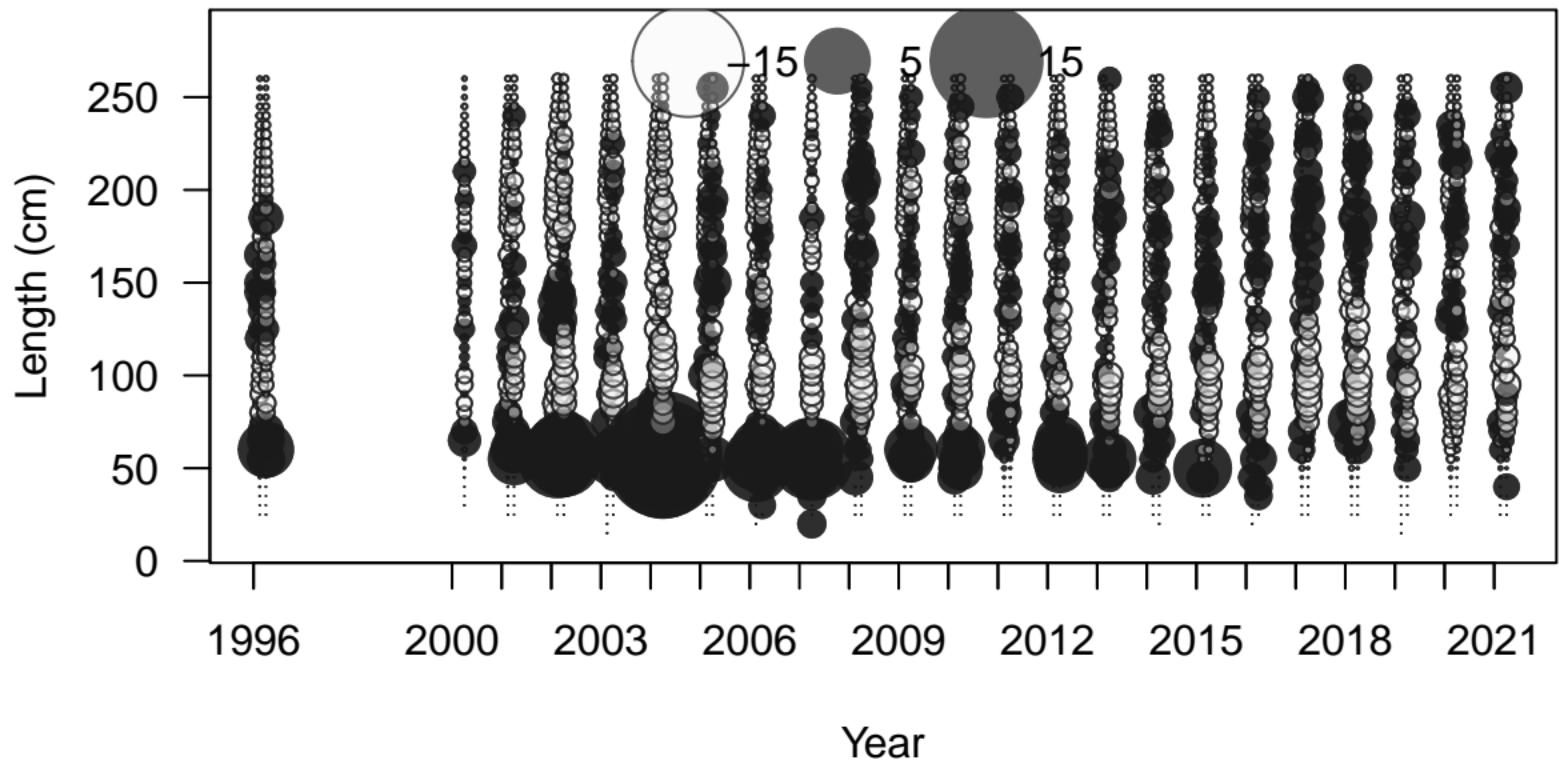


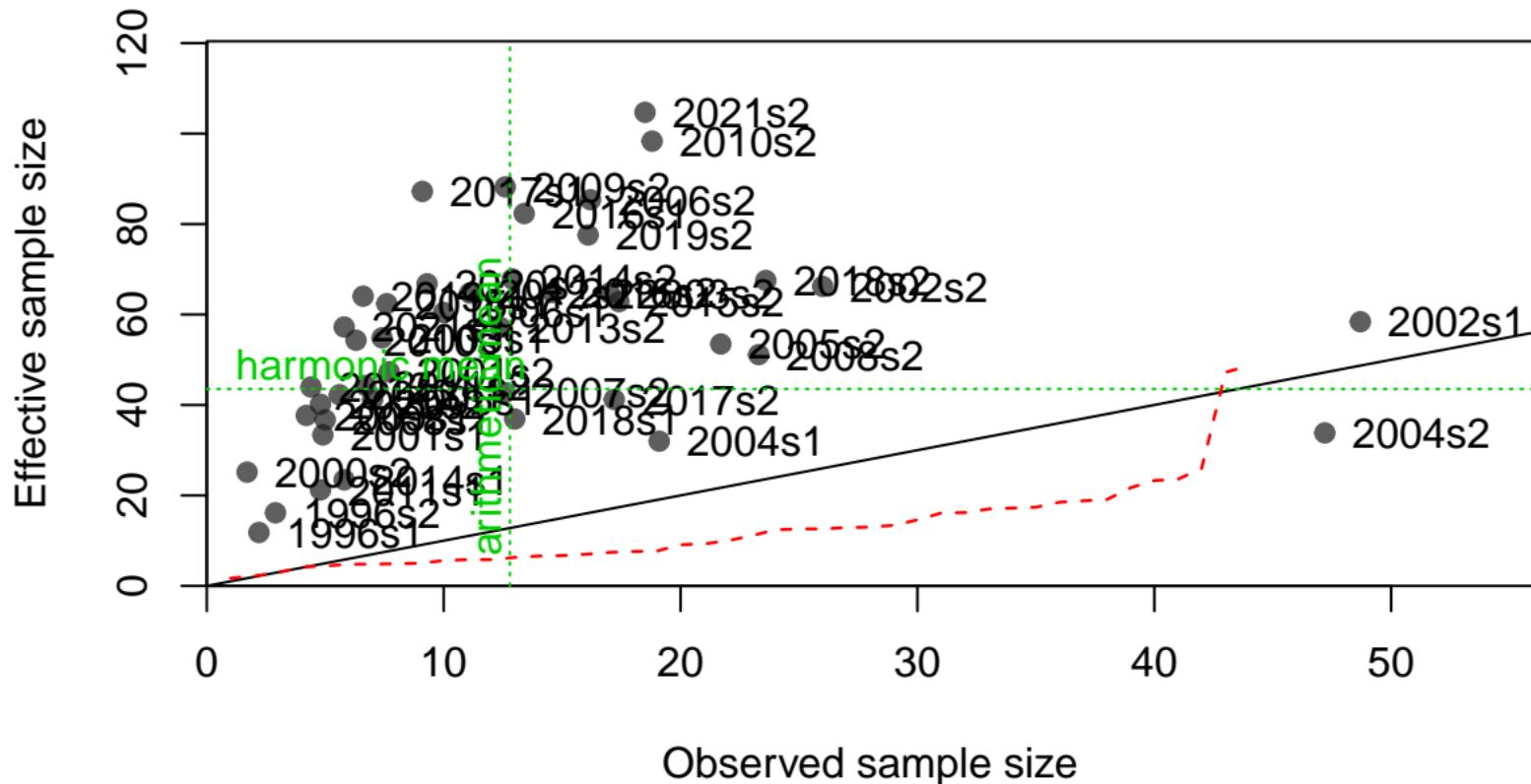
Proportion



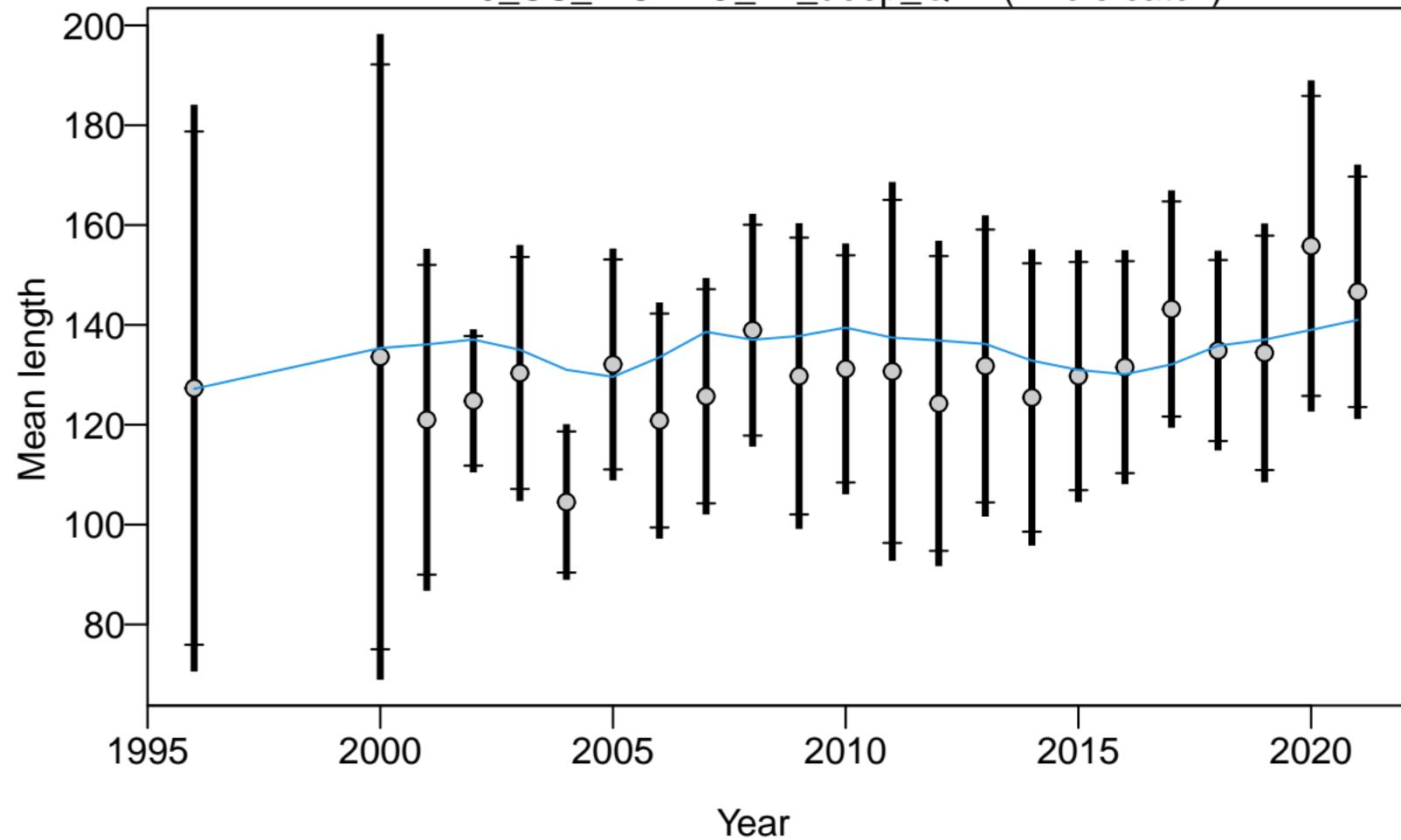
Proportion



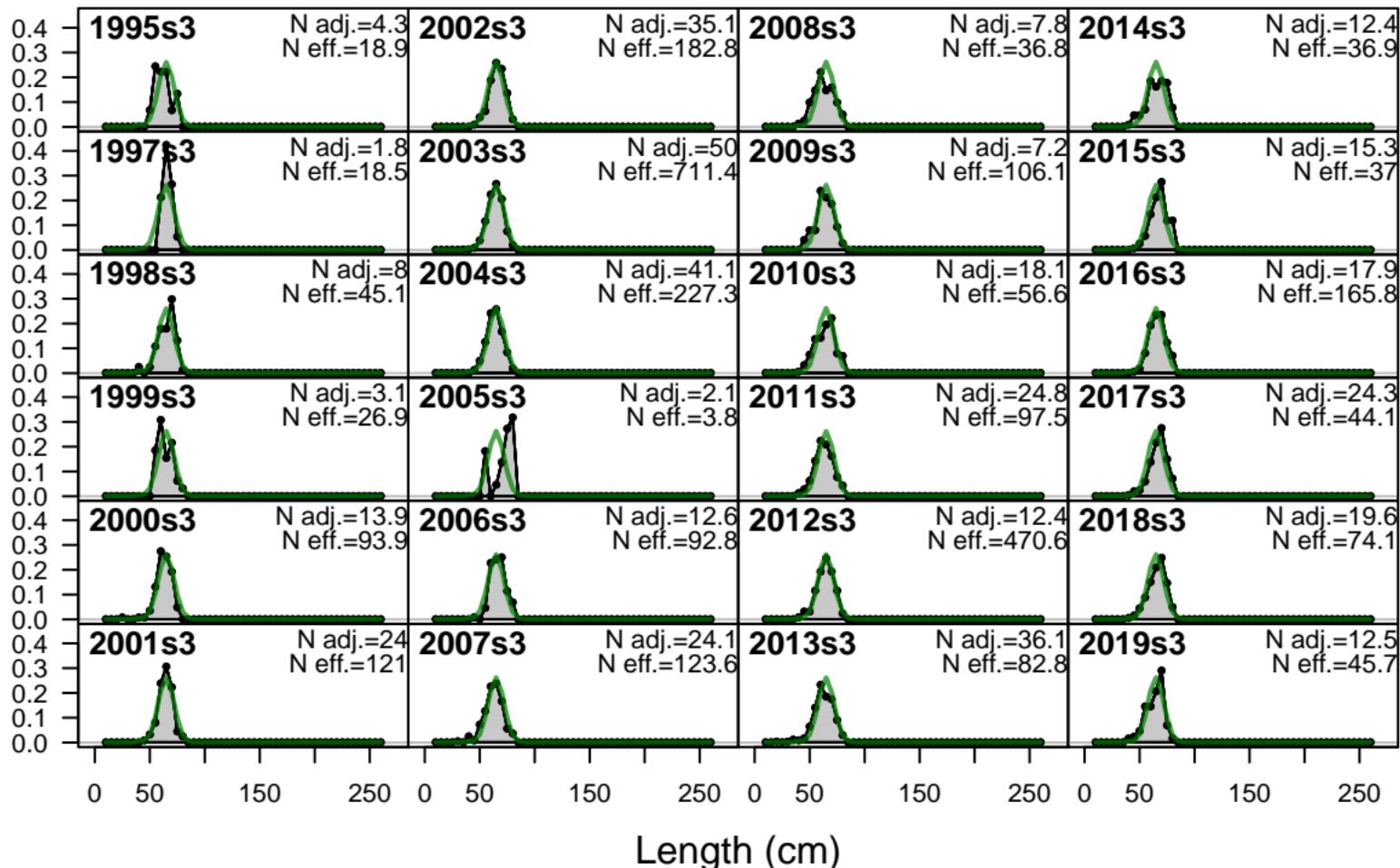




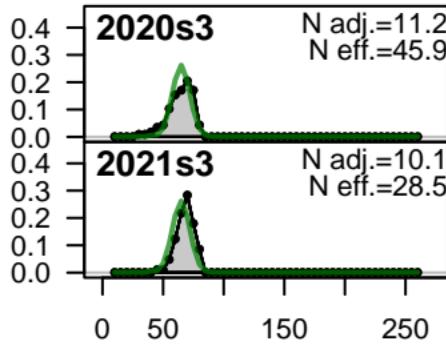
F9_US_WCNPO_LL_deep_Q12 (whole catch)

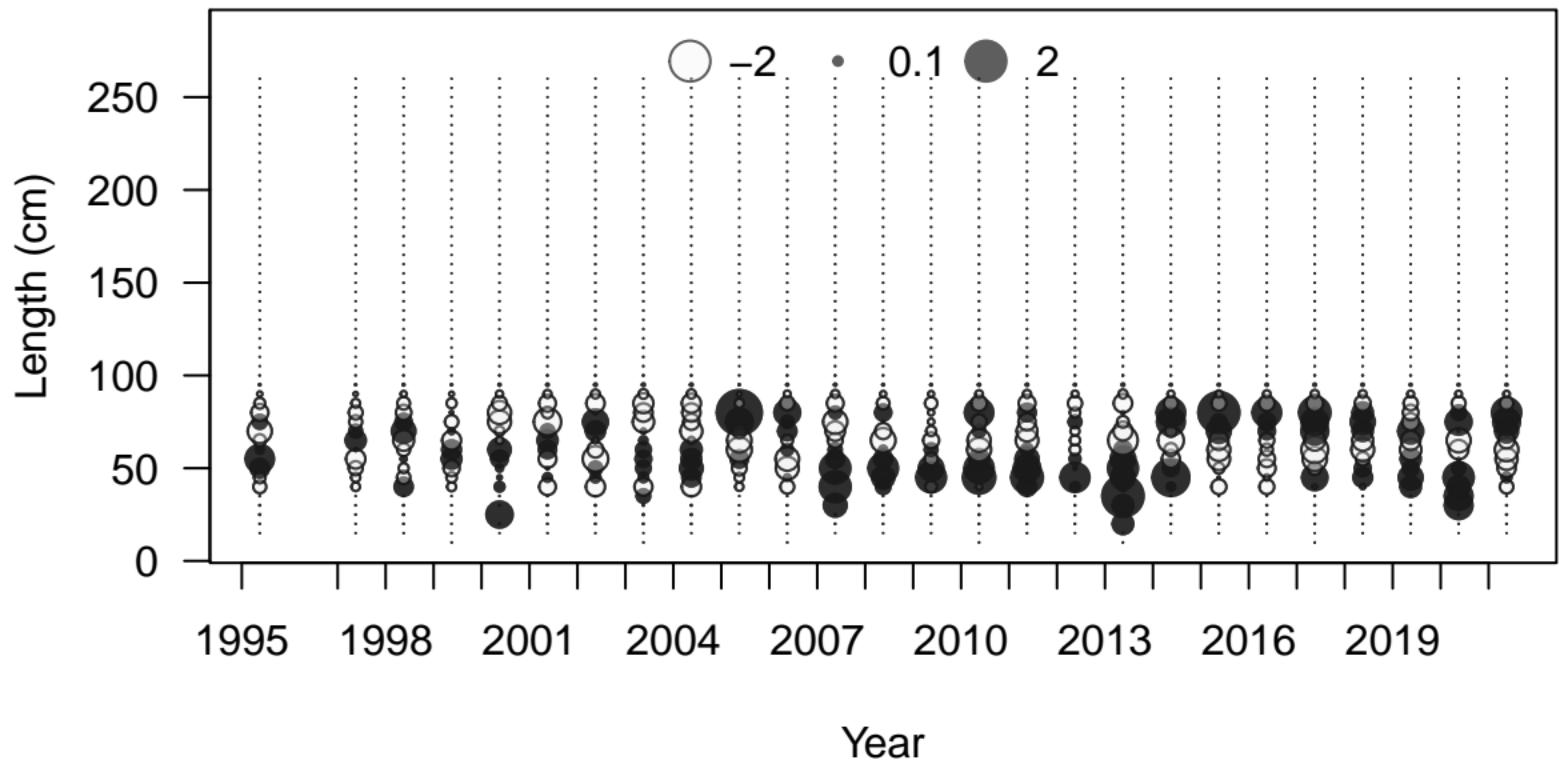


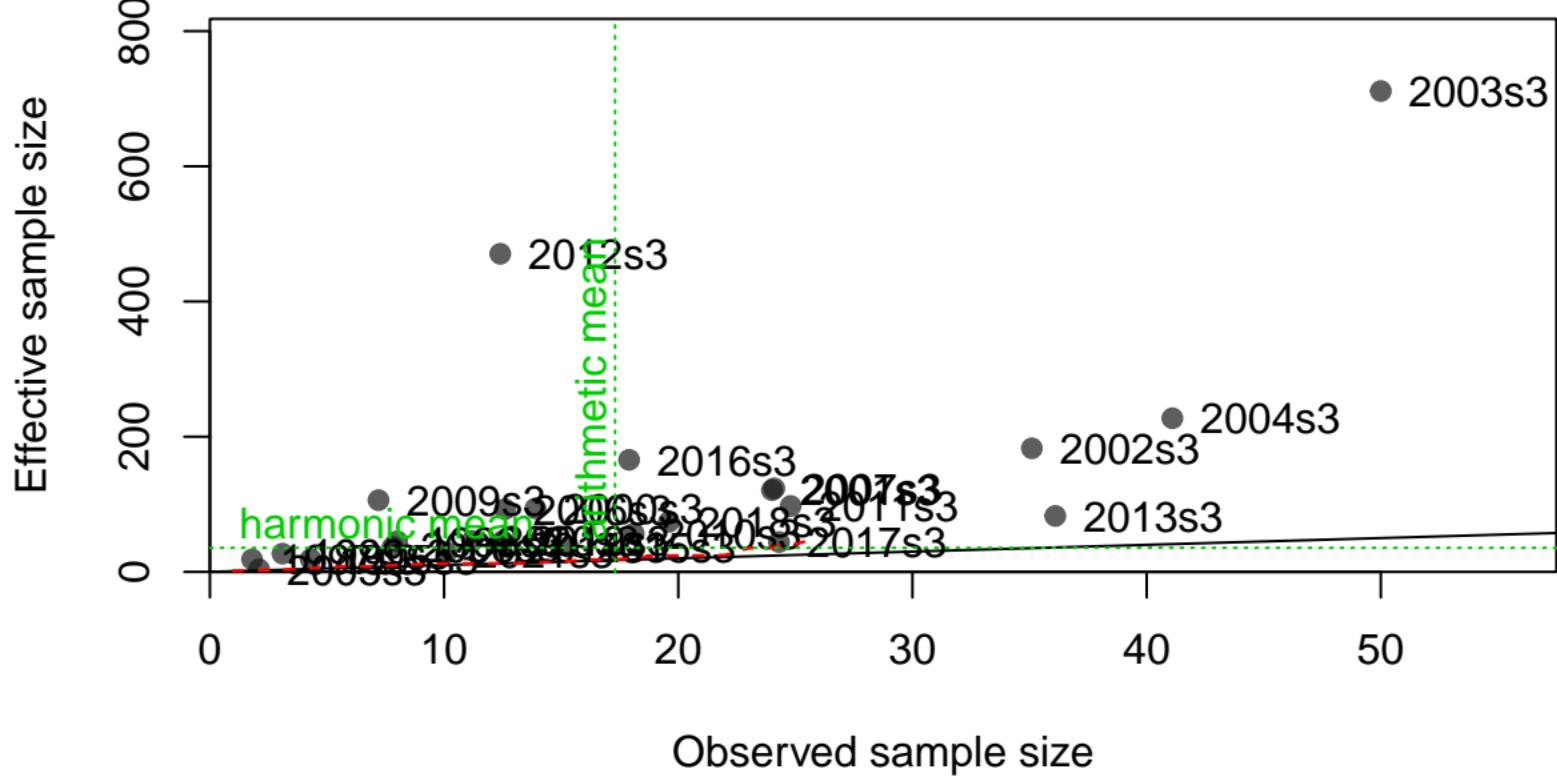
Proportion



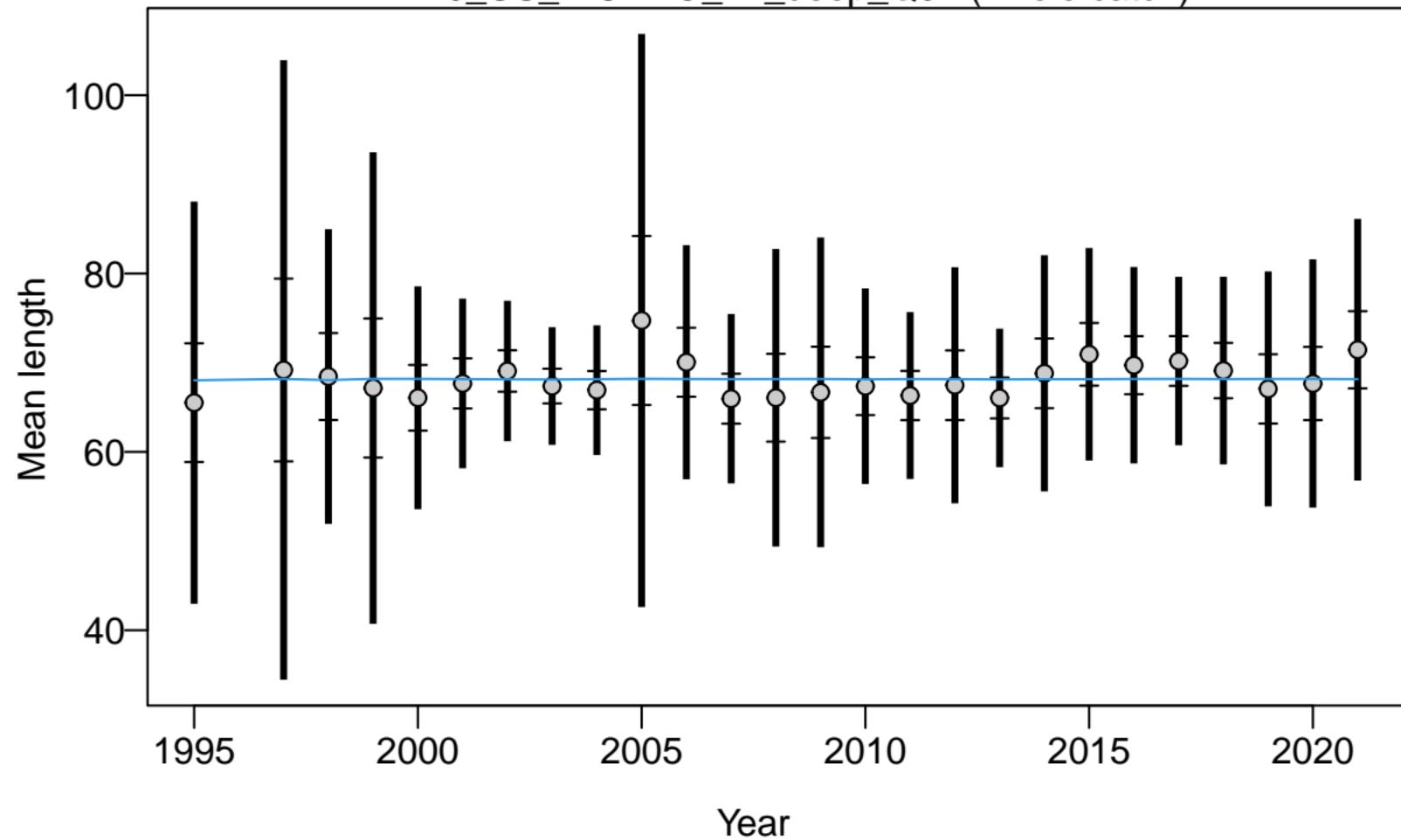
Proportion



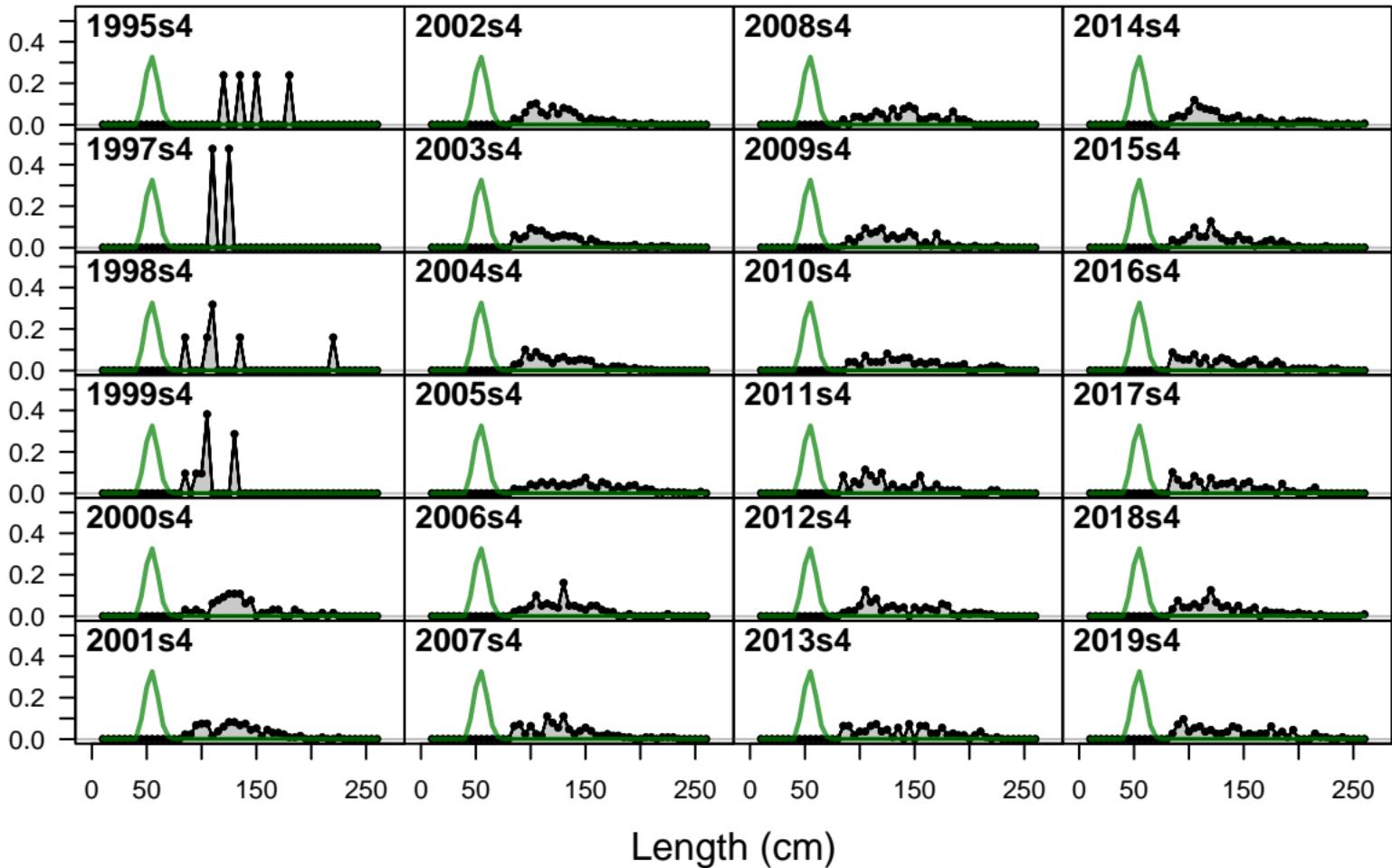




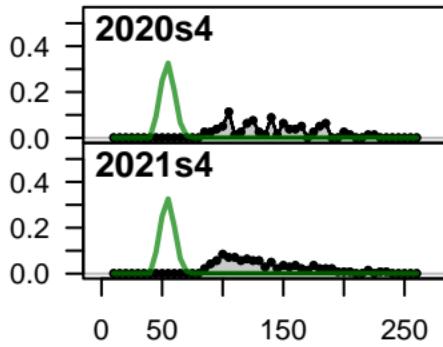
F20_US_WCNPO_LL_deep_Q34 (whole catch)



Proportion



Proportion



Length (cm)

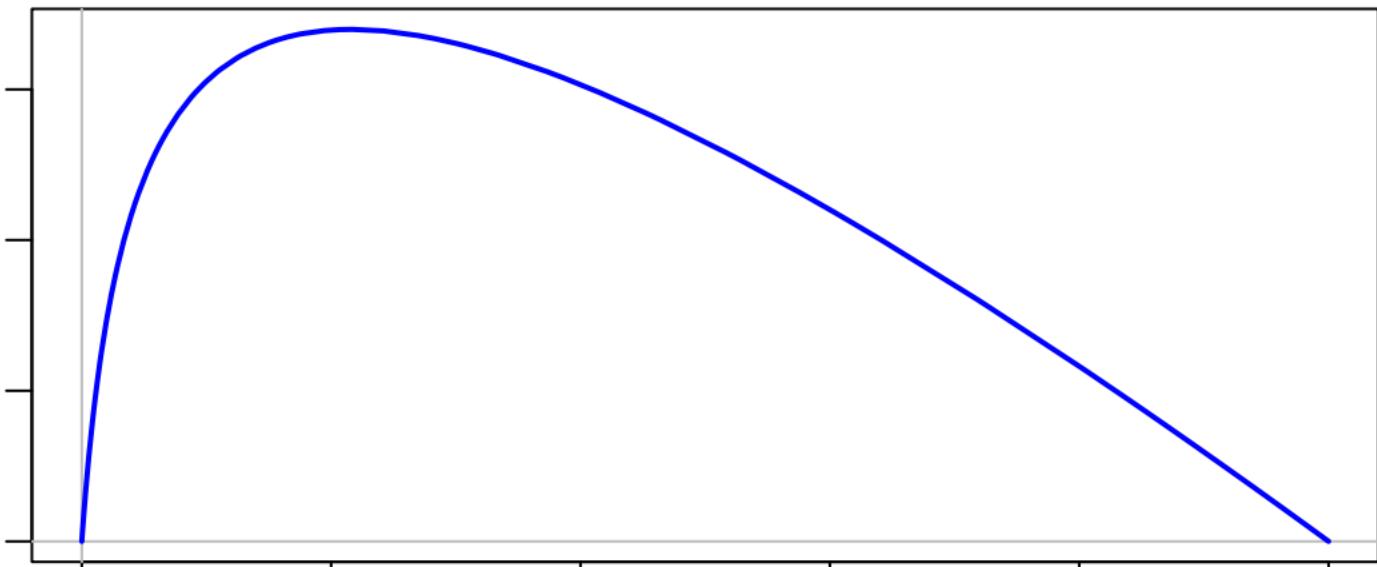
Equilibrium yield (mt)

1.0e+26

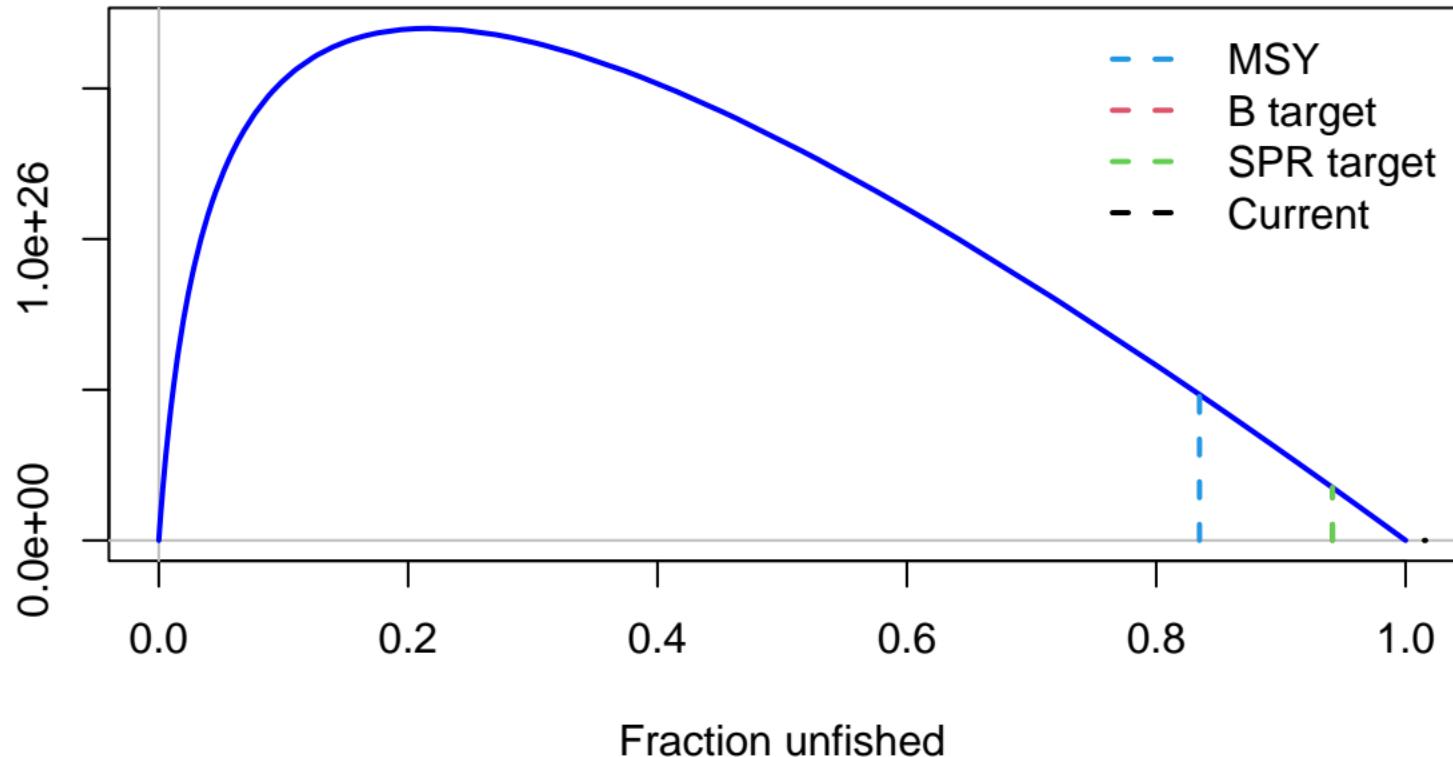
0.0e+00

0.0 0.2 0.4 0.6 0.8 1.0

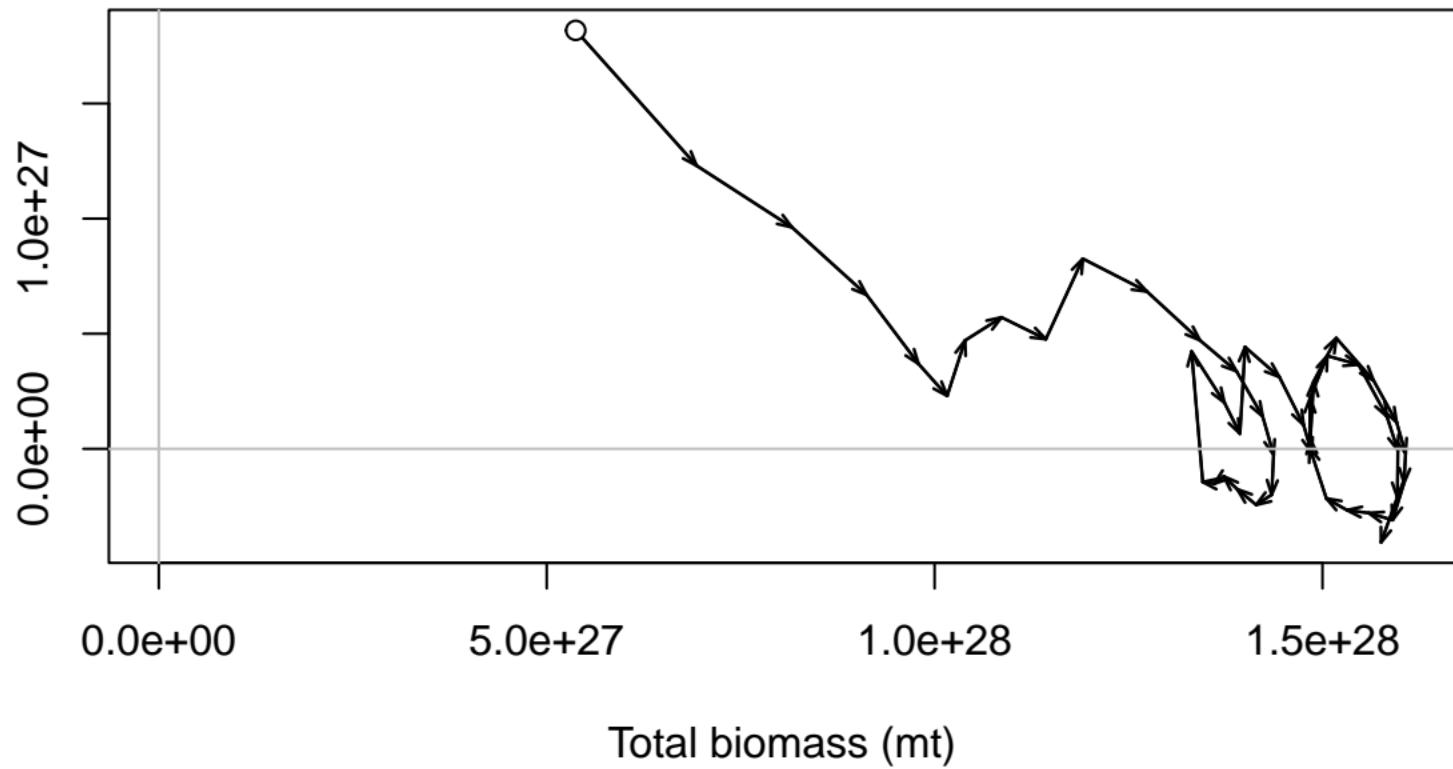
Fraction unfished



Equilibrium yield (mt)

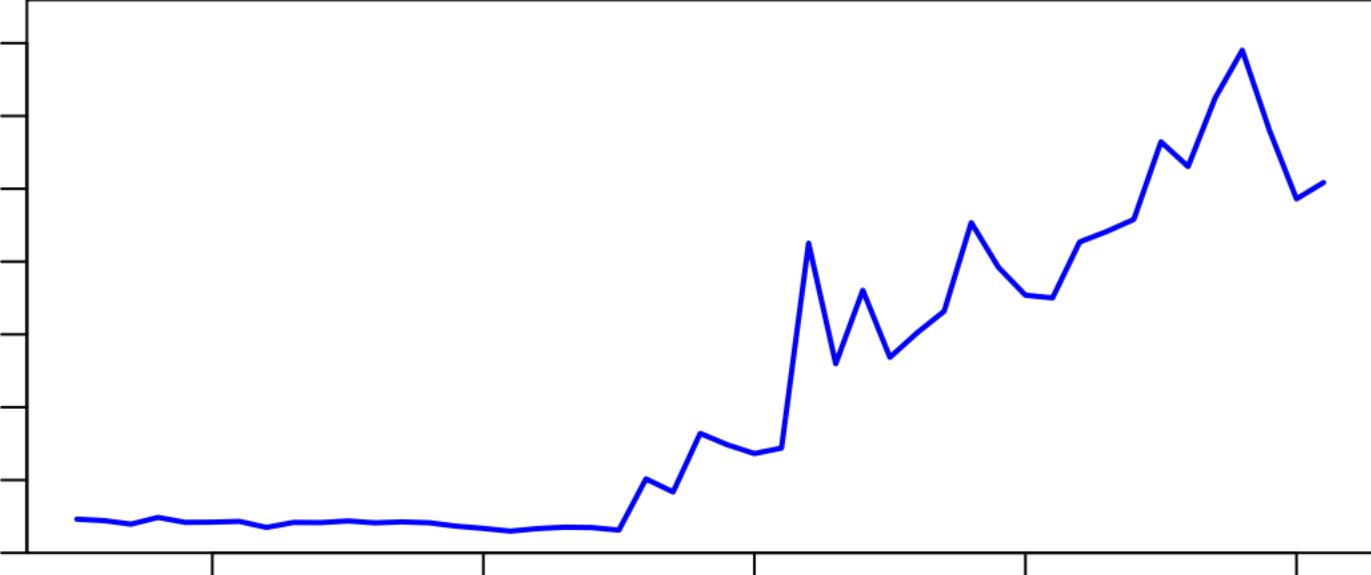


Surplus production (mt)

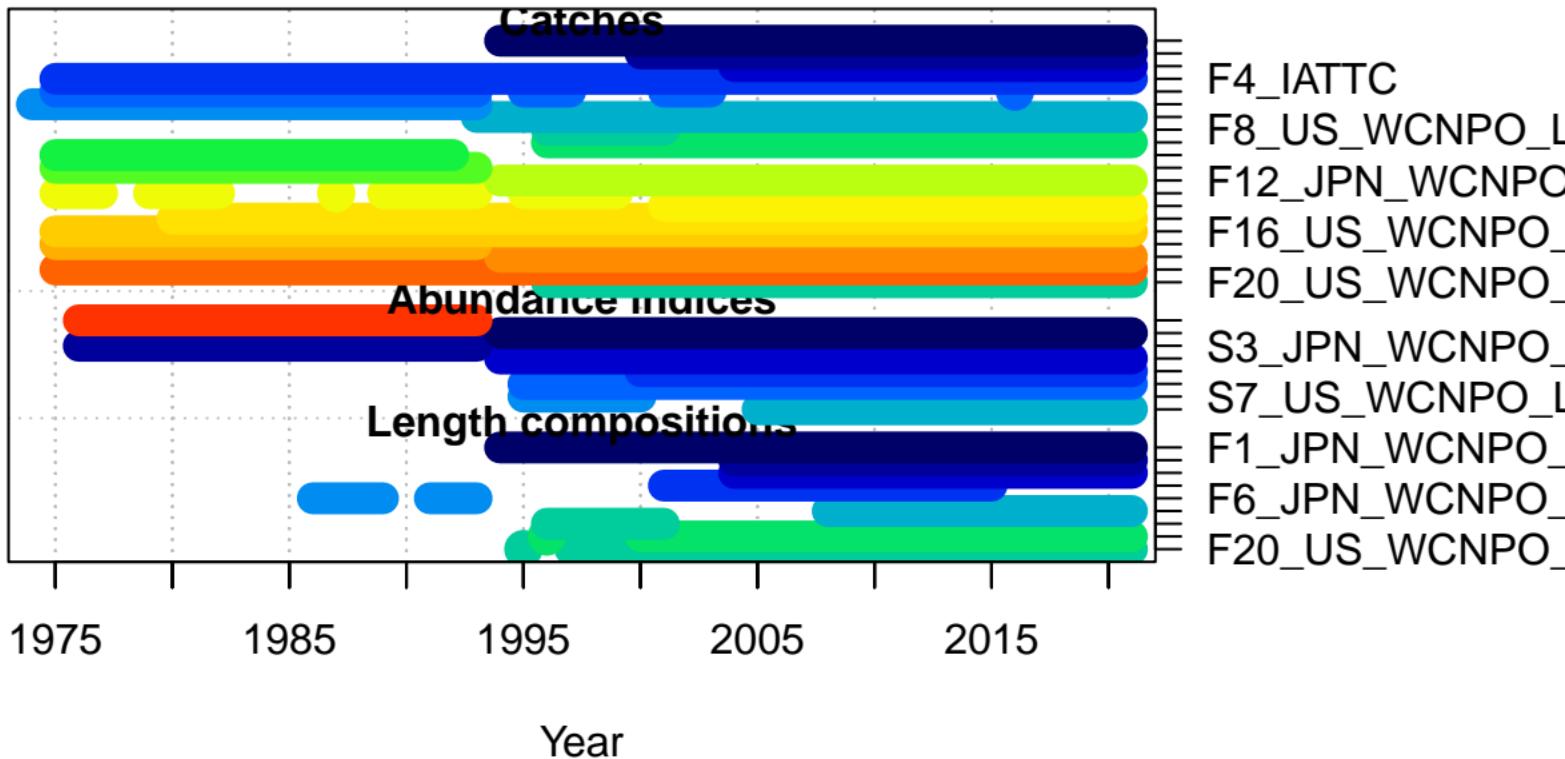


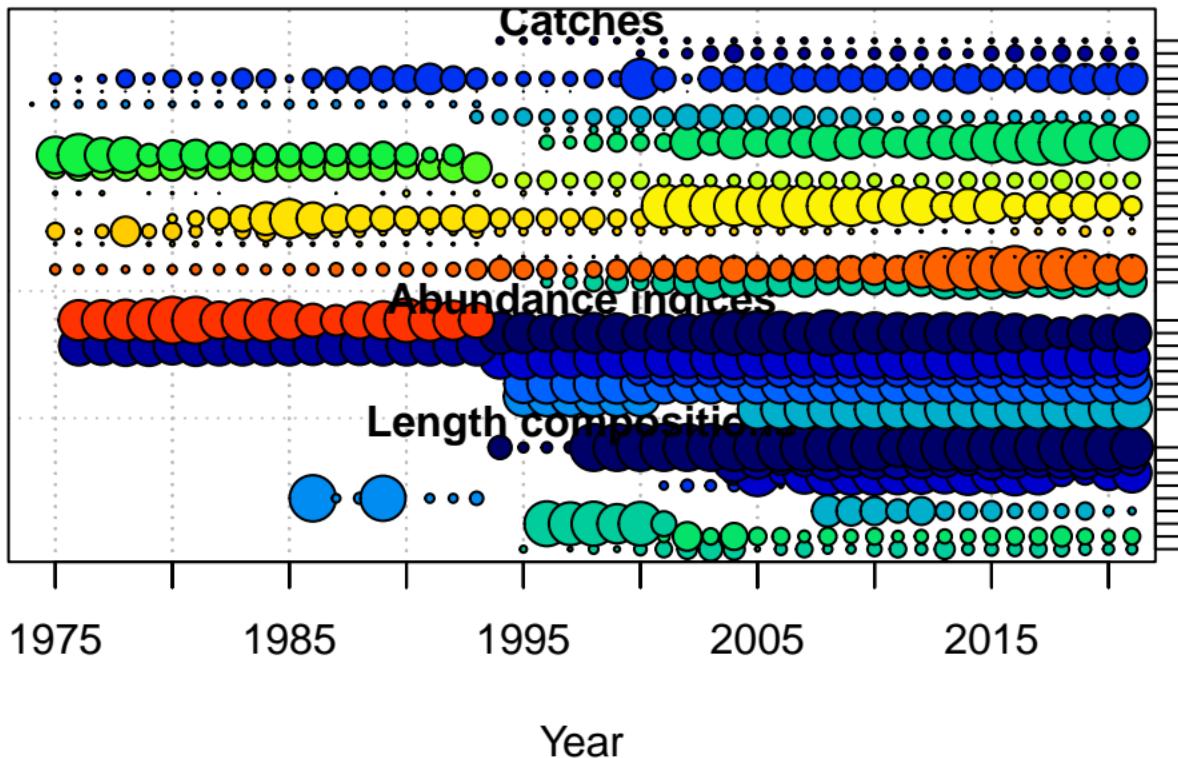
Yield per recruit (kg)

0.0e+00 6.0e-21 1.2e-20



Year

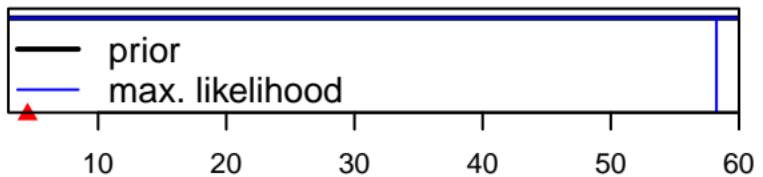




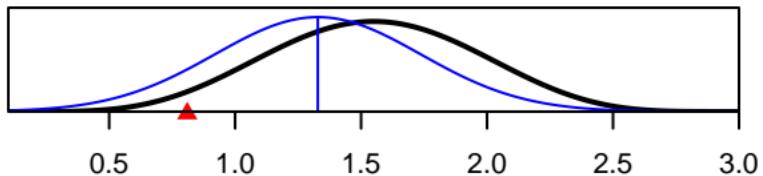
F4_IATTC
F8_US_WCNPO_L
F12_JPN_WCNPO_L
F16_US_WCNPO_L
F20_US_WCNPO_L
S3_JPN_WCNPO_L
S7_US_WCNPO_L
F1_JPN_WCNPO_L
F6_JPN_WCNPO_L
F20_US_WCNPO_L

Density

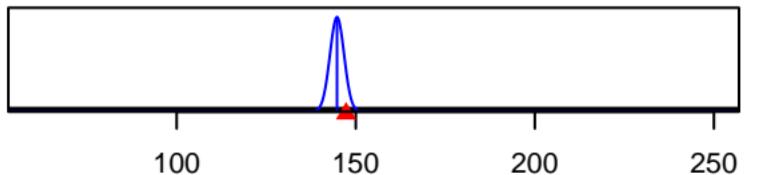
SR_LN(R0)



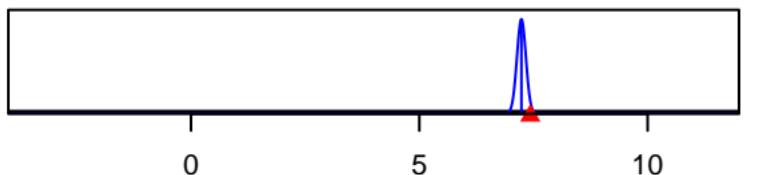
InitF_seas_1_flt_6F6_JPN_WCNPO_OSDWLL_early_Area1



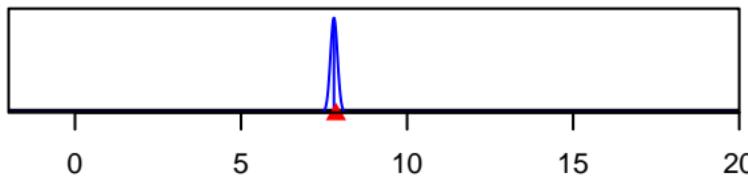
Size_DbIN_peak_F1_JPN_WCNPO_OSDWCOLL_late_Area1(



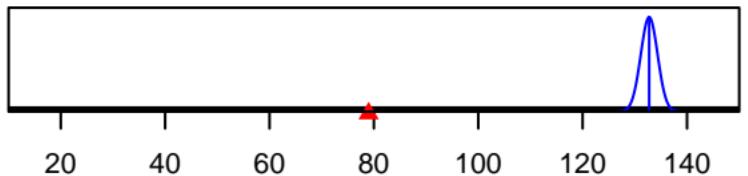
_DbIN_ascend_se_F1_JPN_WCNPO_OSDWCOLL_late_Are



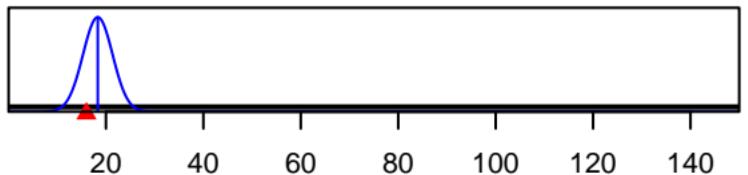
DbIN_descend_se_F1_JPN_WCNPO_OSDWCOLL_late_Are



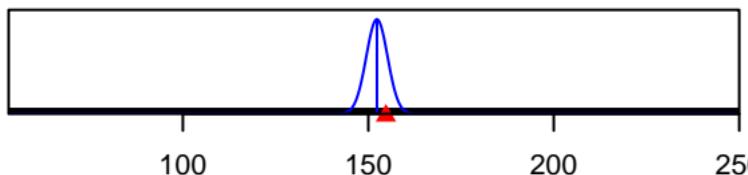
Size_inflection_F2_TWN_WCNPO_DWLL_late(2)



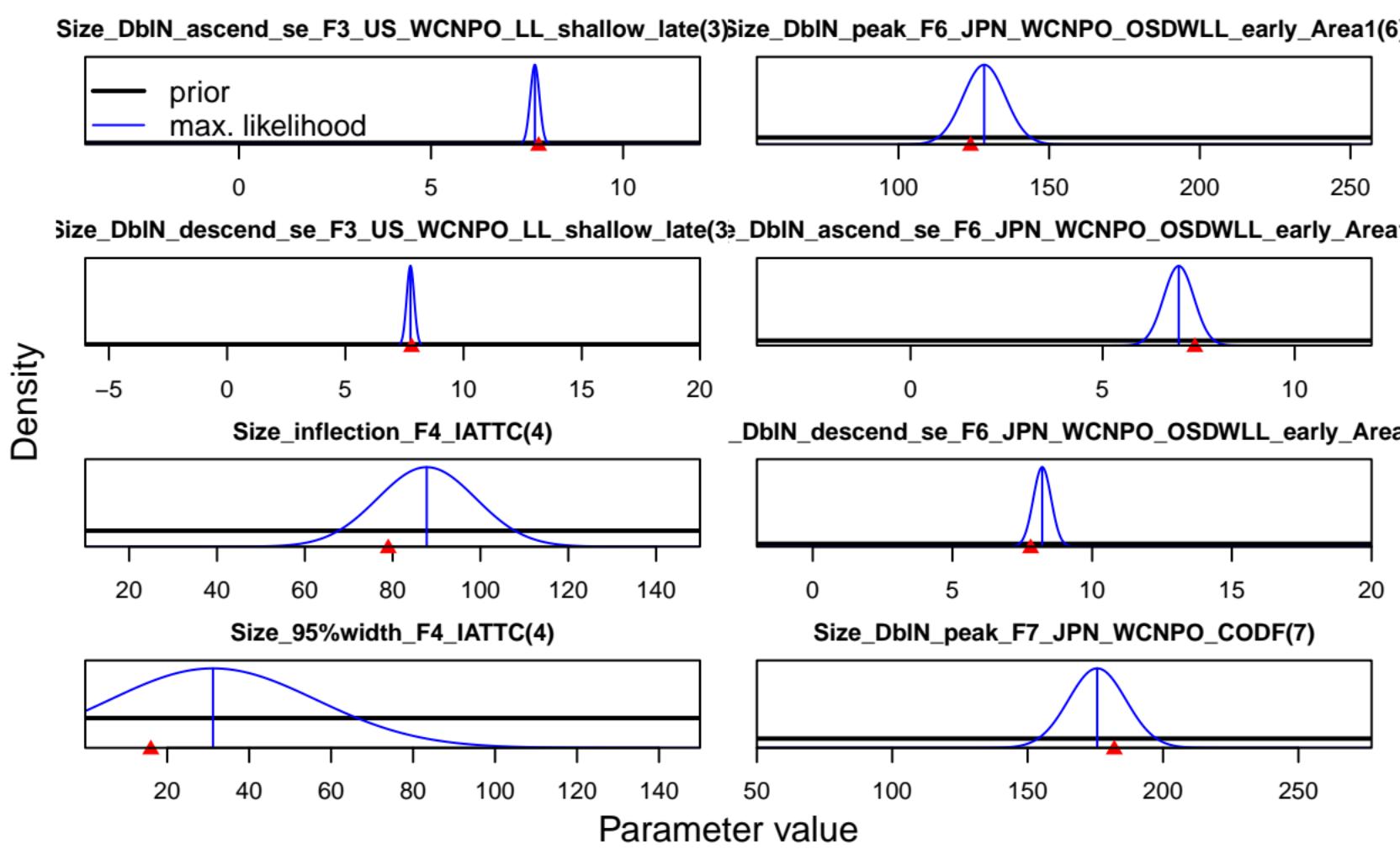
Size_95%width_F2_TWN_WCNPO_DWLL_late(2)



Size_DbIN_peak_F3_US_WCNPO_LL_shallow_late(3)

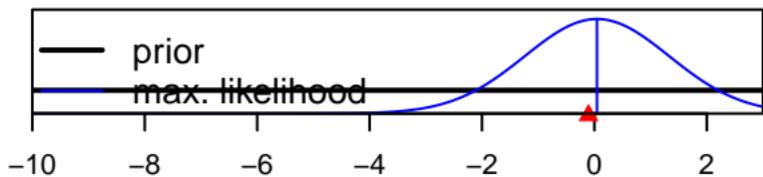


Parameter value

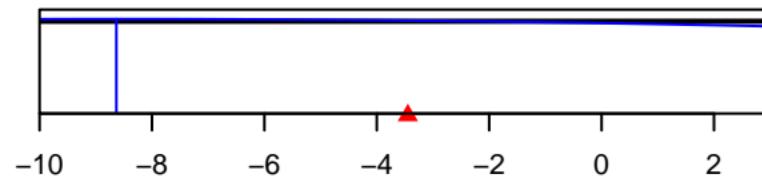


Density

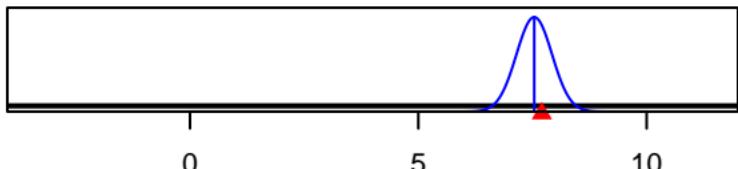
Size_DbIN_top_logit_F7_JPN_WCNPO_CODF(7)



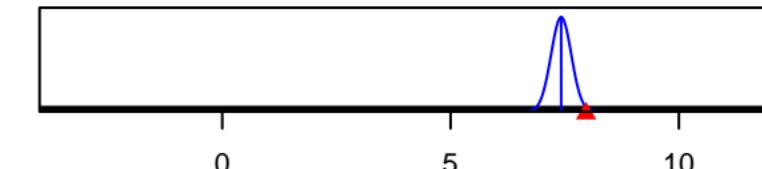
Size_DbIN_top_logit_F8_US_WCNPO_LL_shallow_early(8)



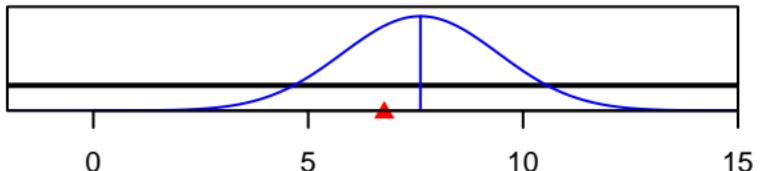
Size_DbIN_ascend_se_F7_JPN_WCNPO_CODF(7)



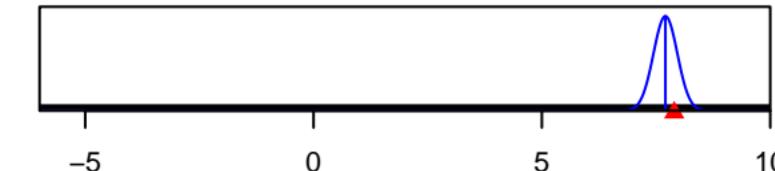
Size_DbIN_ascend_se_F8_US_WCNPO_LL_shallow_early(8)



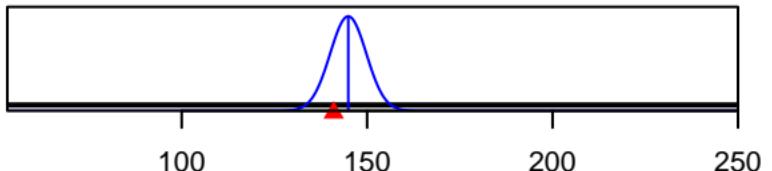
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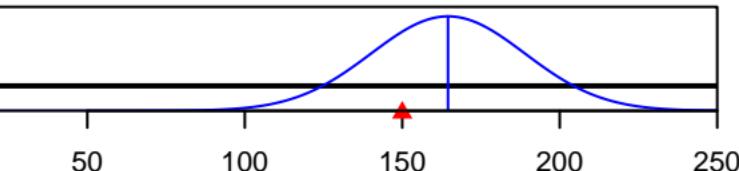
Size_DbIN_descend_se_F8_US_WCNPO_LL_shallow_early(8)



Size_DbIN_peak_F8_US_WCNPO_LL_shallow_early(8)

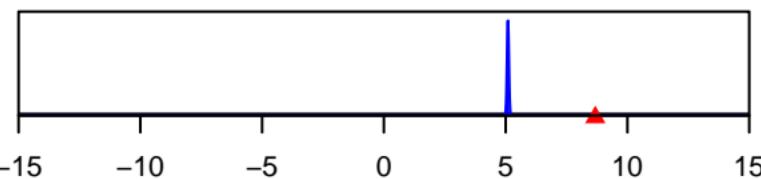
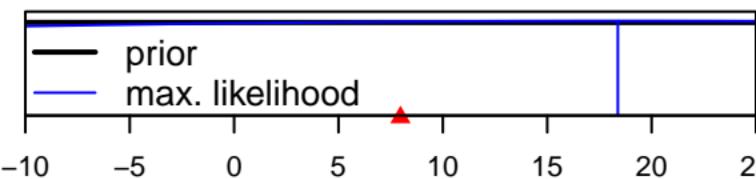


Size_DbIN_peak_F9_US_WCNPO_LL_deep_Q12(9)

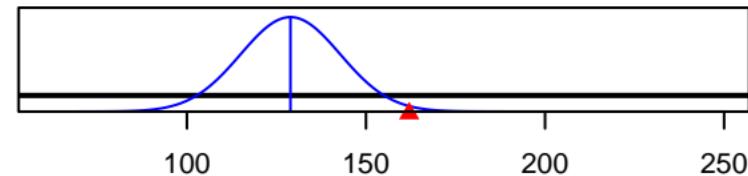
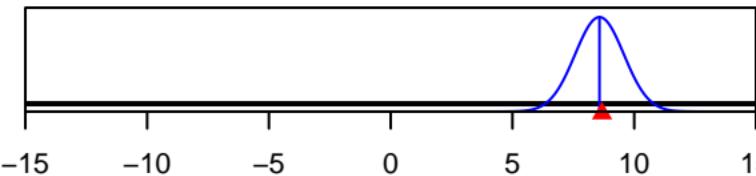


Parameter value

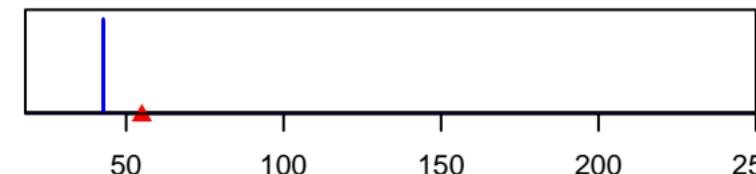
Size_DbIN_ascend_se_F9_US_WCNPO_LL_deep_Q12(9) Size_DbIN_descend_se_F20_US_WCNPO_LL_deep_Q34(28)



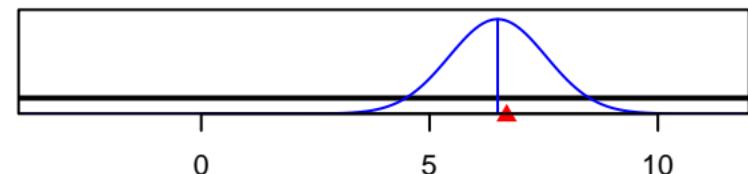
Size_DbIN_descend_se_F9_US_WCNPO_LL_deep_Q12(9) |_peak_F1_JPN_WCNPO OSDWCOLL_late_Area1(1)_BLK2



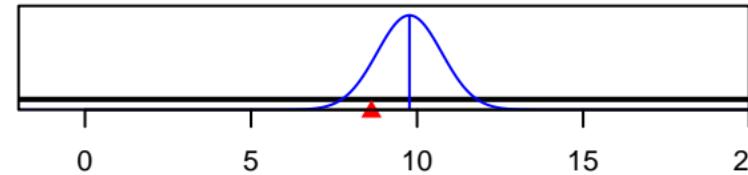
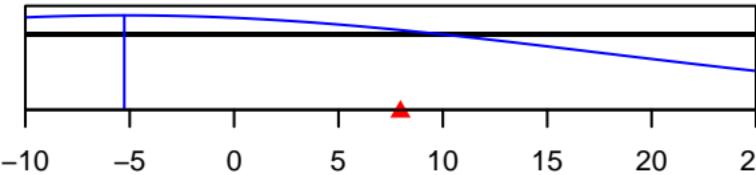
Size_DbIN_peak_F20_US_WCNPO_LL_deep_Q34(28)



scend_se_F1_JPN_WCNPO OSDWCOLL_late_Area1(1)_BL

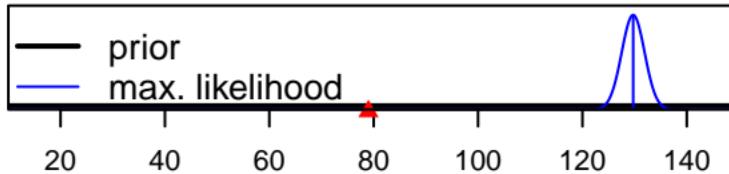


Size_DbIN_ascend_se_F20_US_WCNPO_LL_deep_Q34(28) :ascend_se_F1_JPN_WCNPO OSDWCOLL_late_Area1(1)_BL

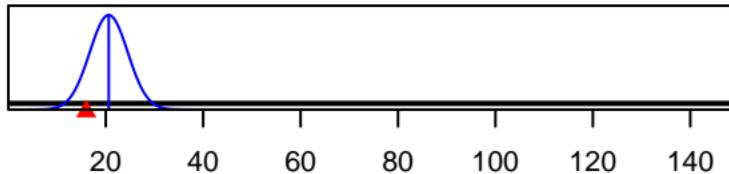


Parameter value

:e_inflection_F2_TWN_WCNPO_DWLL_late(2)_BLK1repl_20



:e_95%width_F2_TWN_WCNPO_DWLL_late(2)_BLK1repl_20



Density

Parameter value