

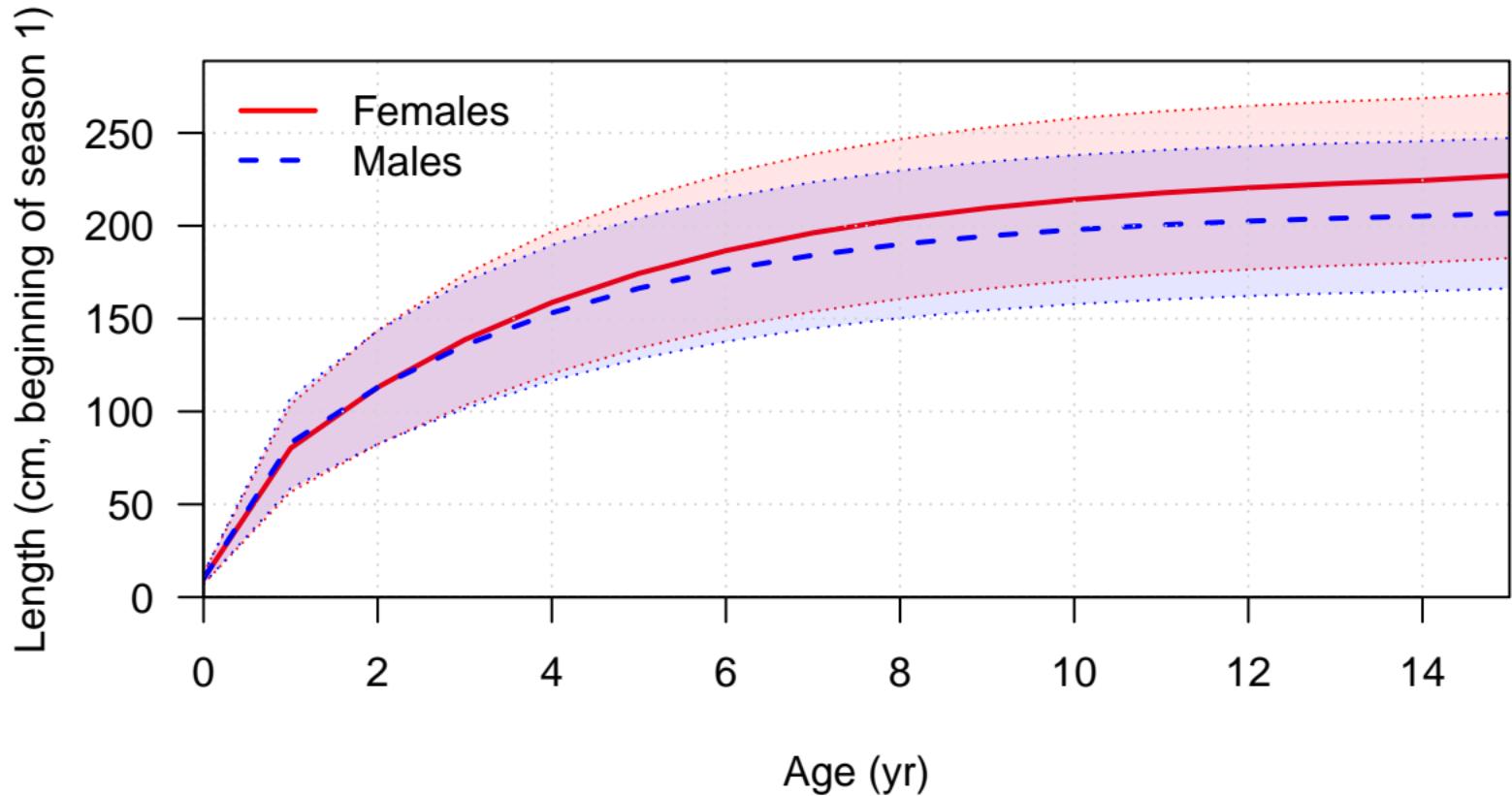
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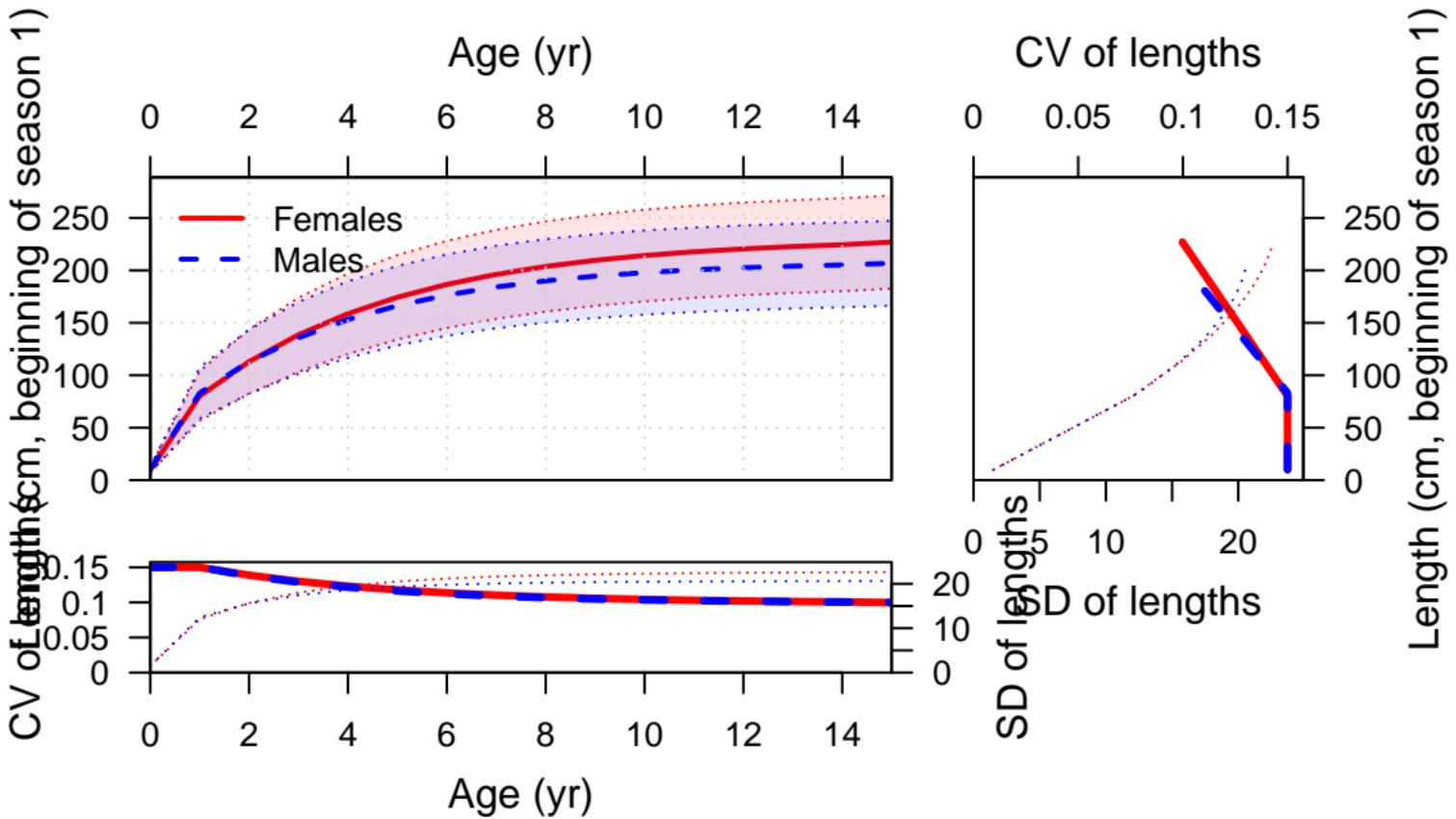
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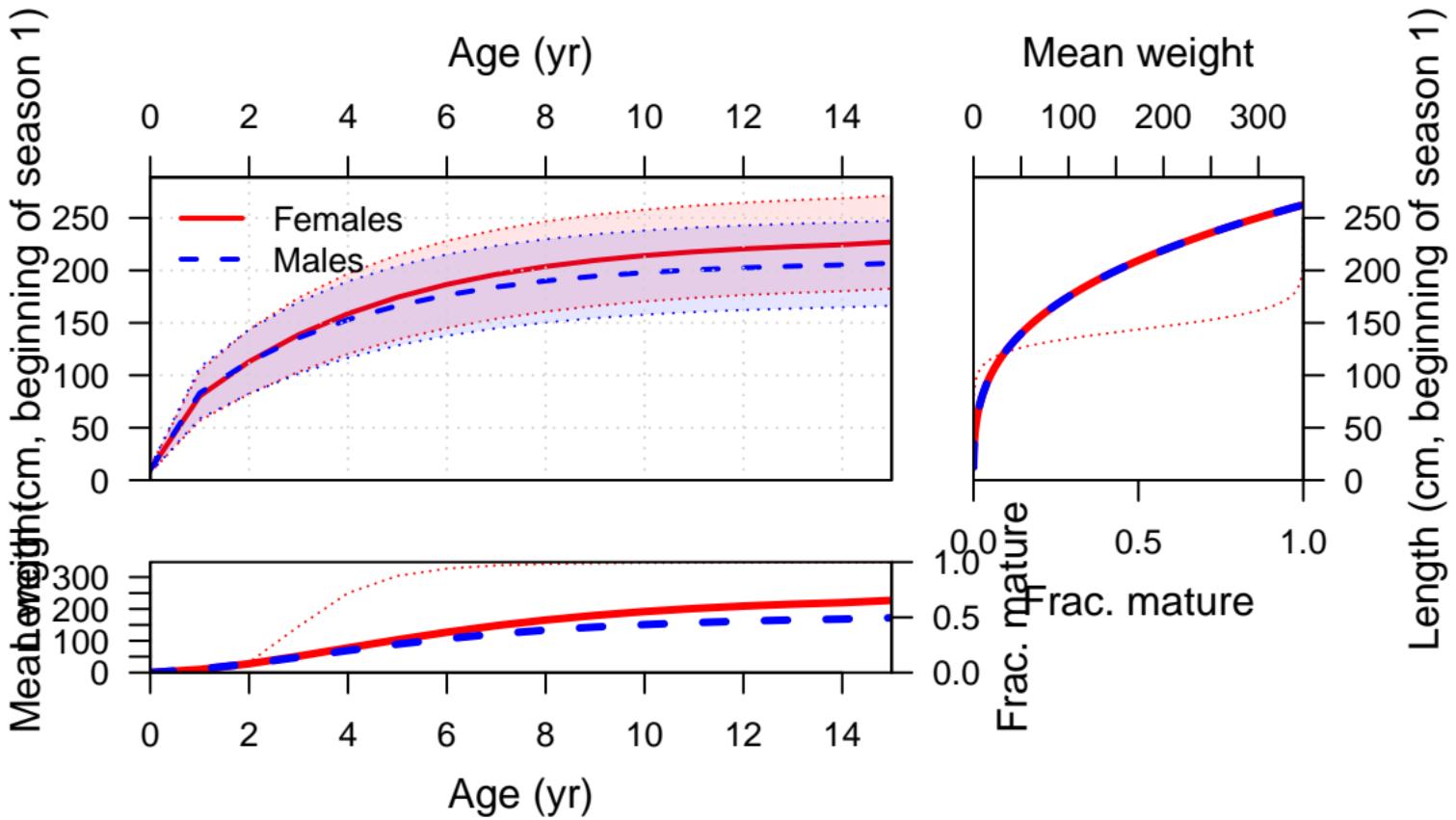
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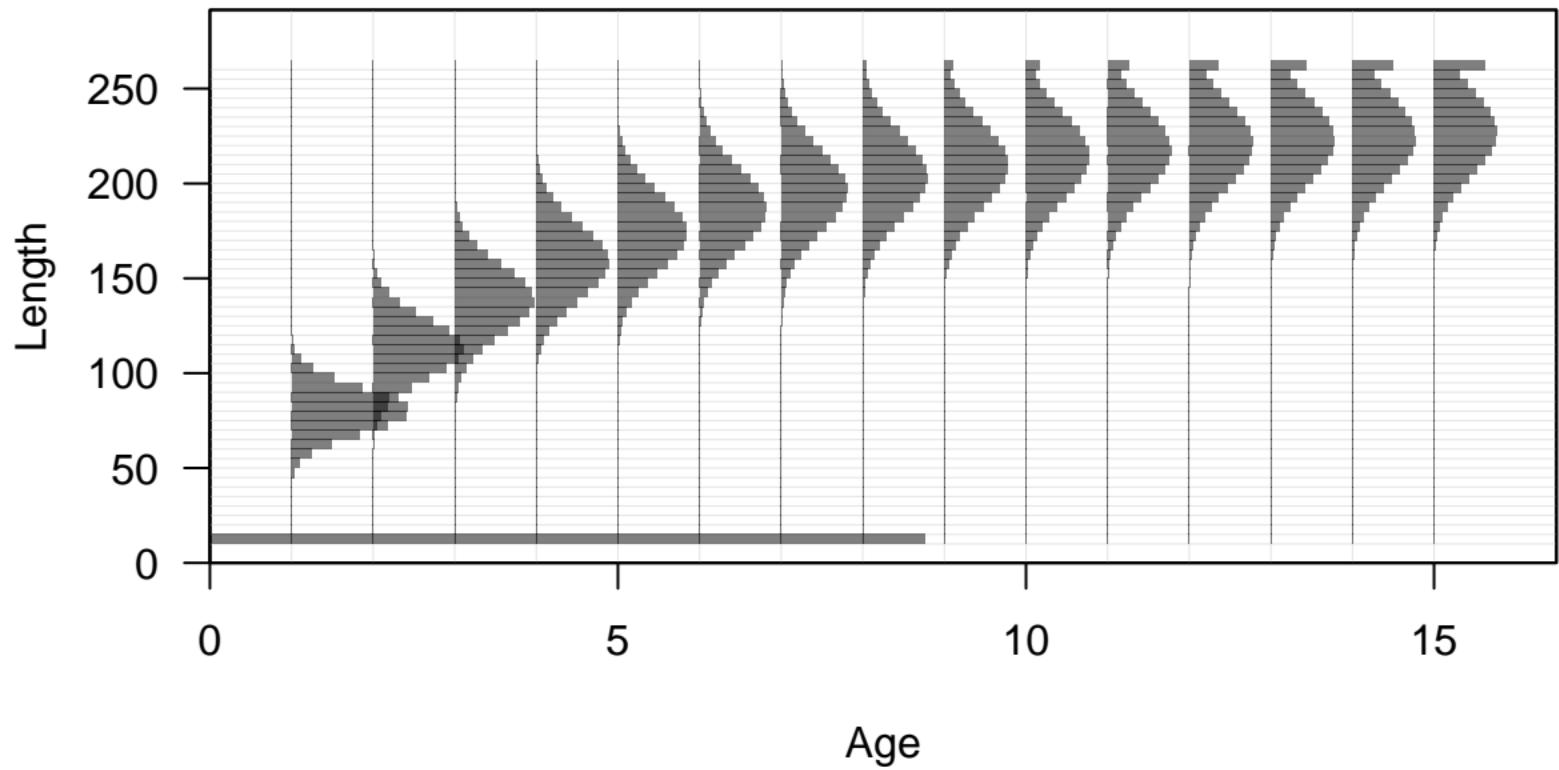
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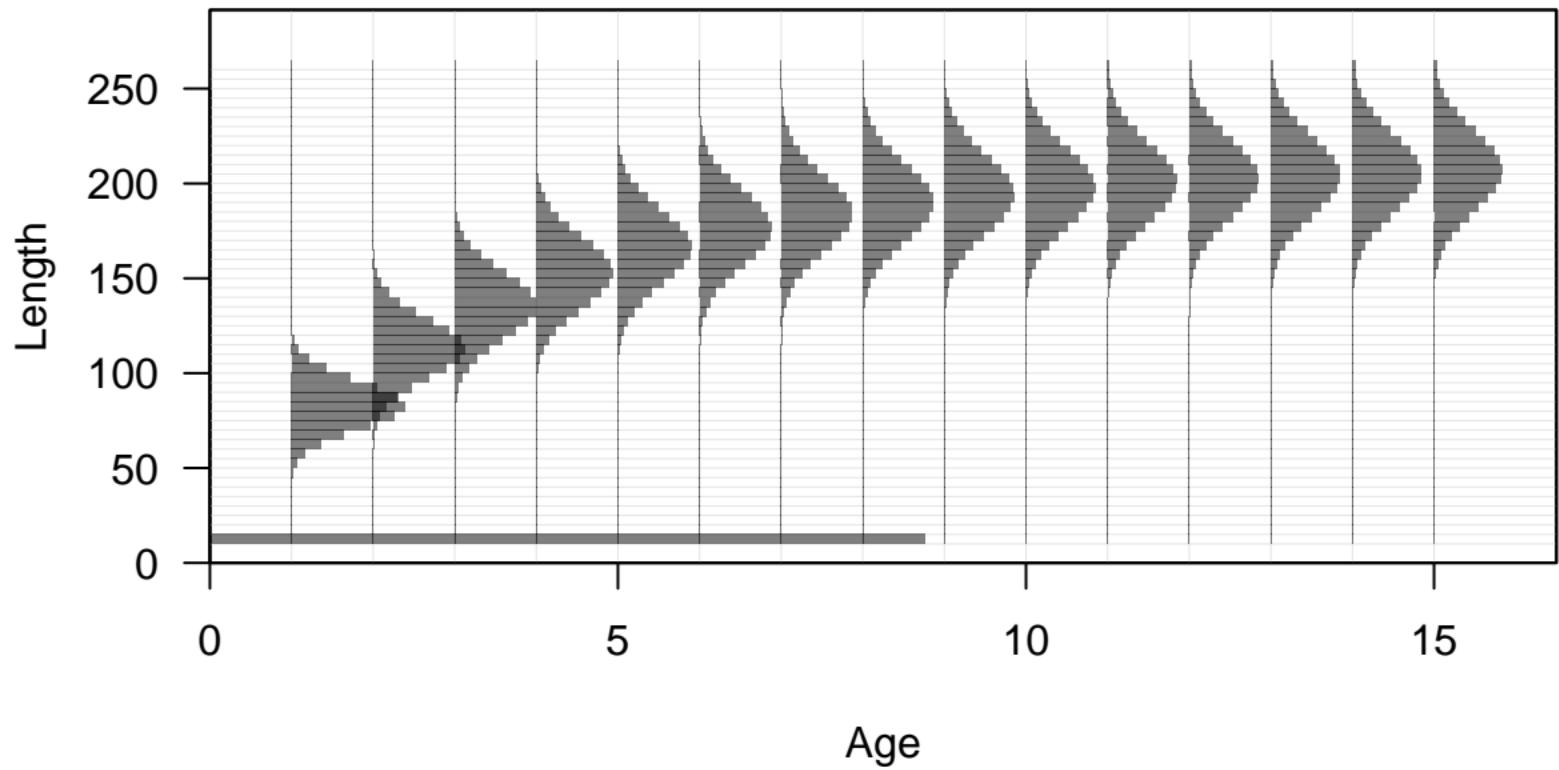
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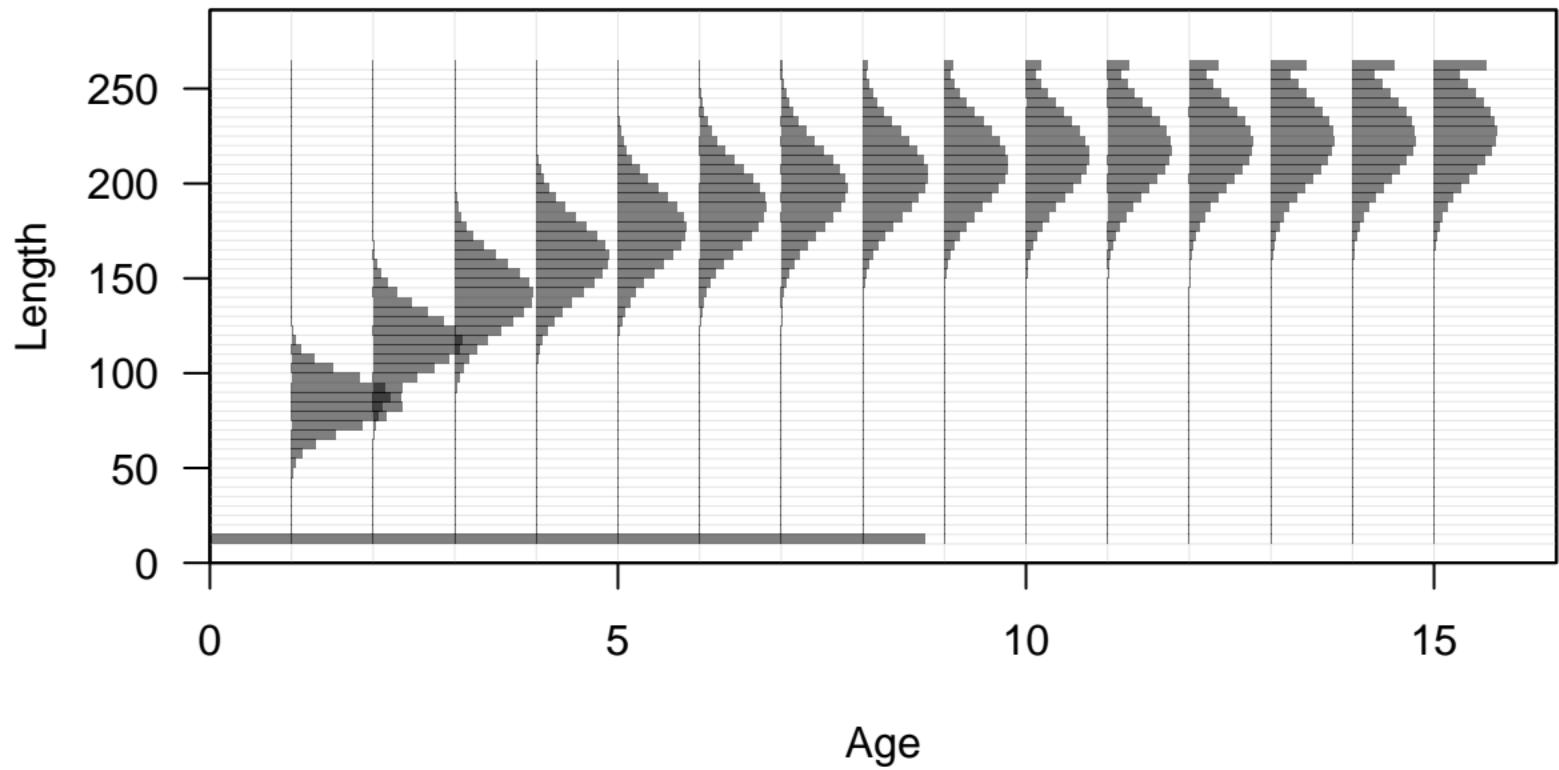


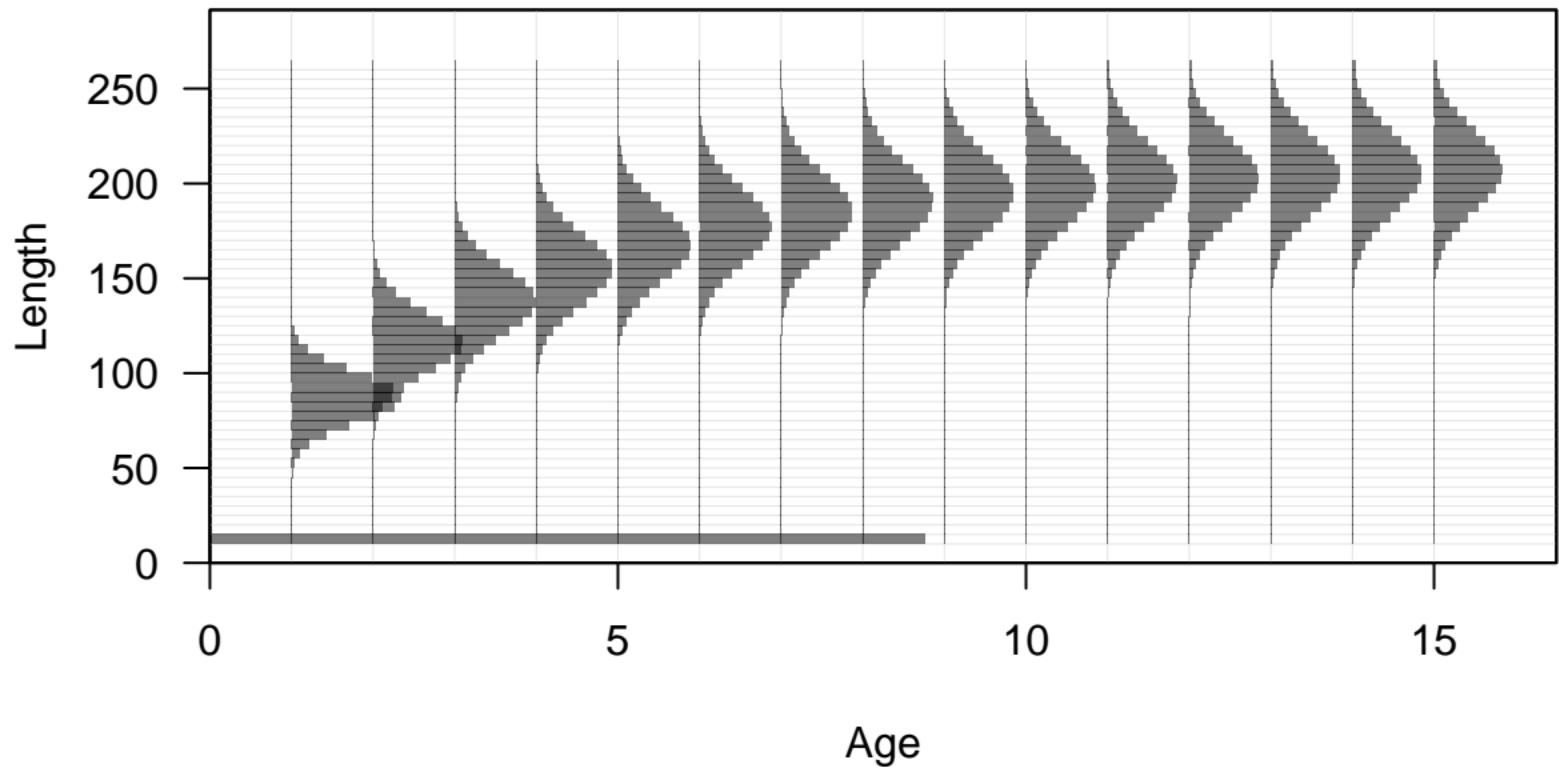


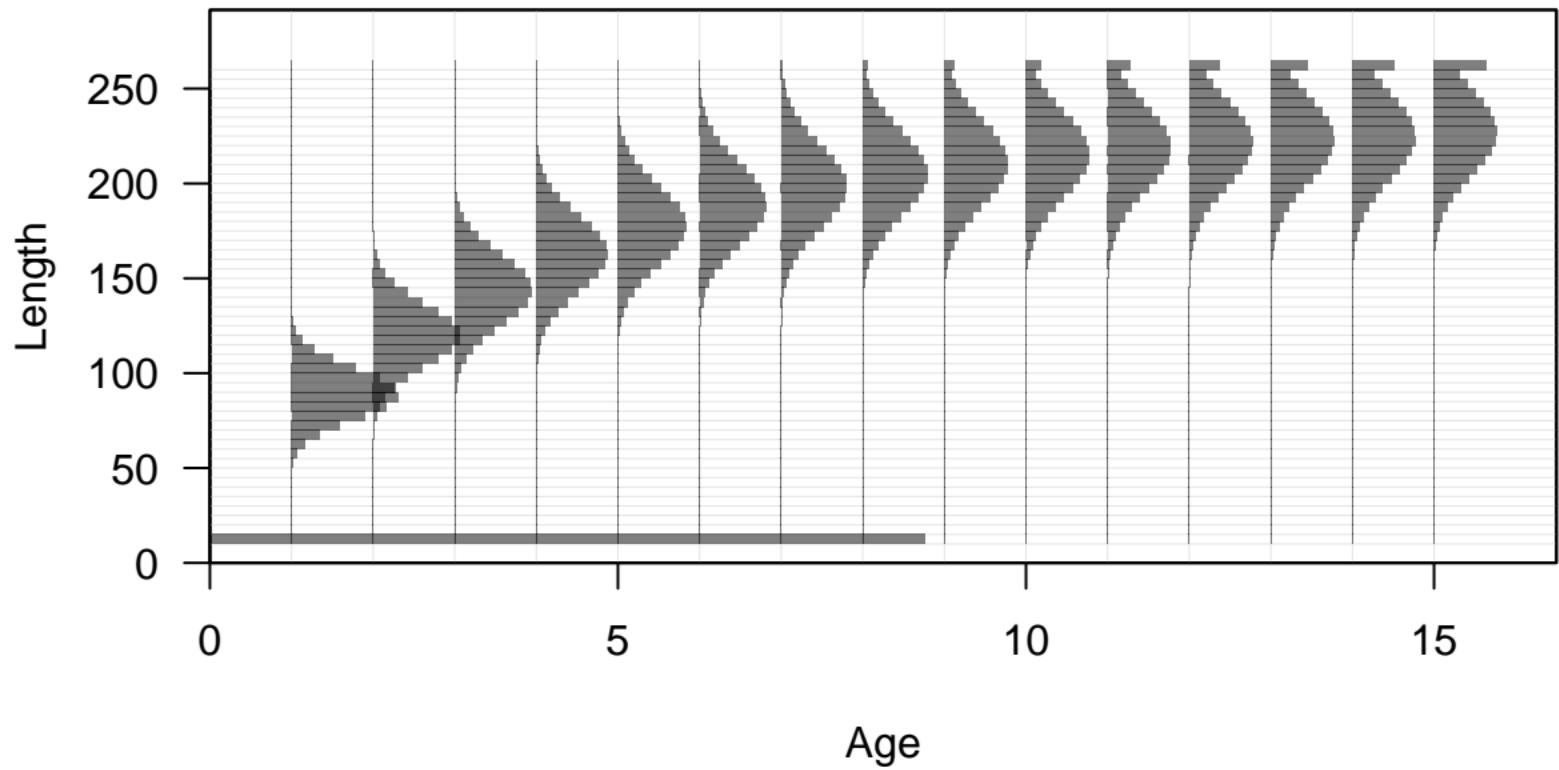


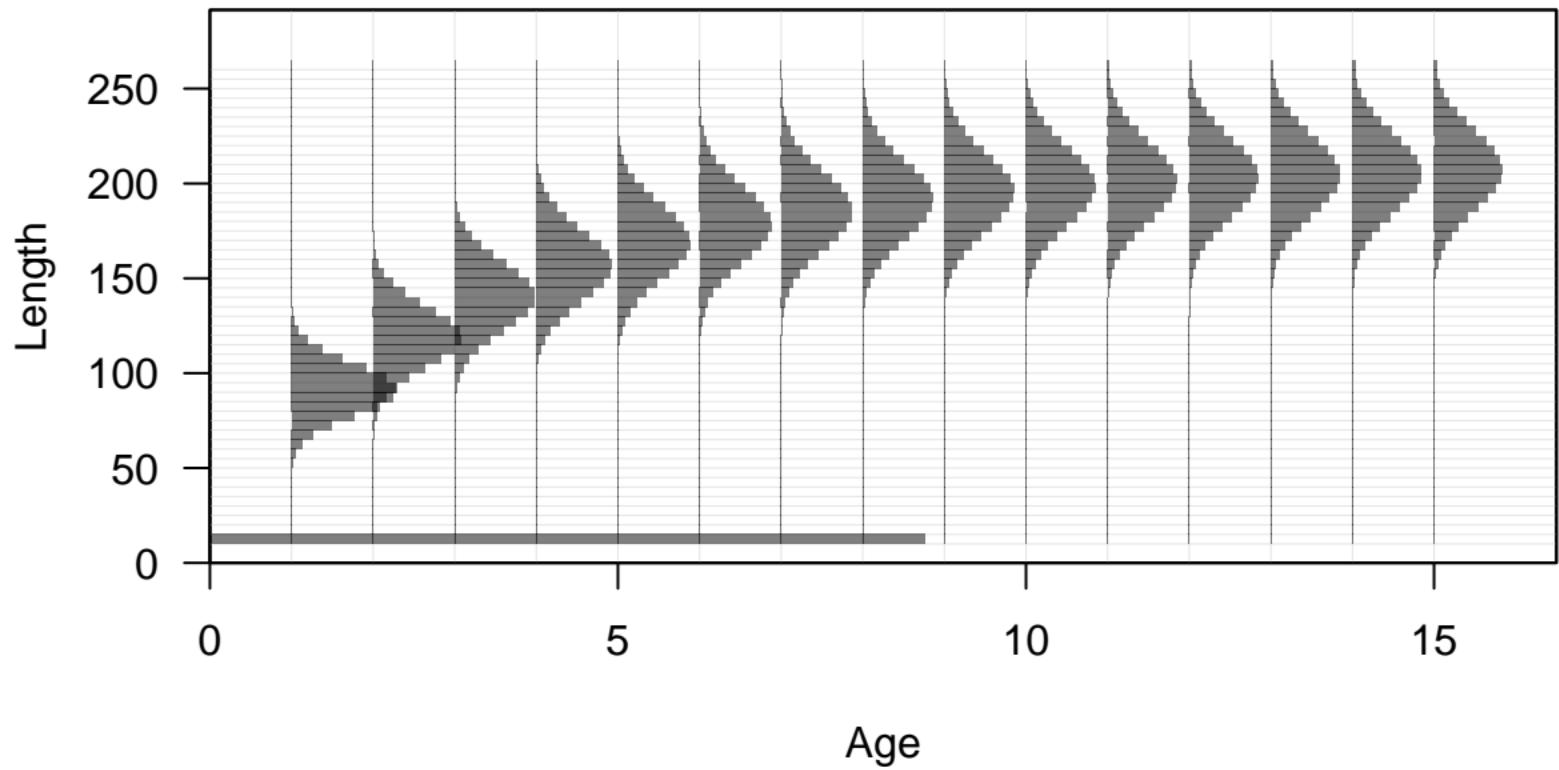


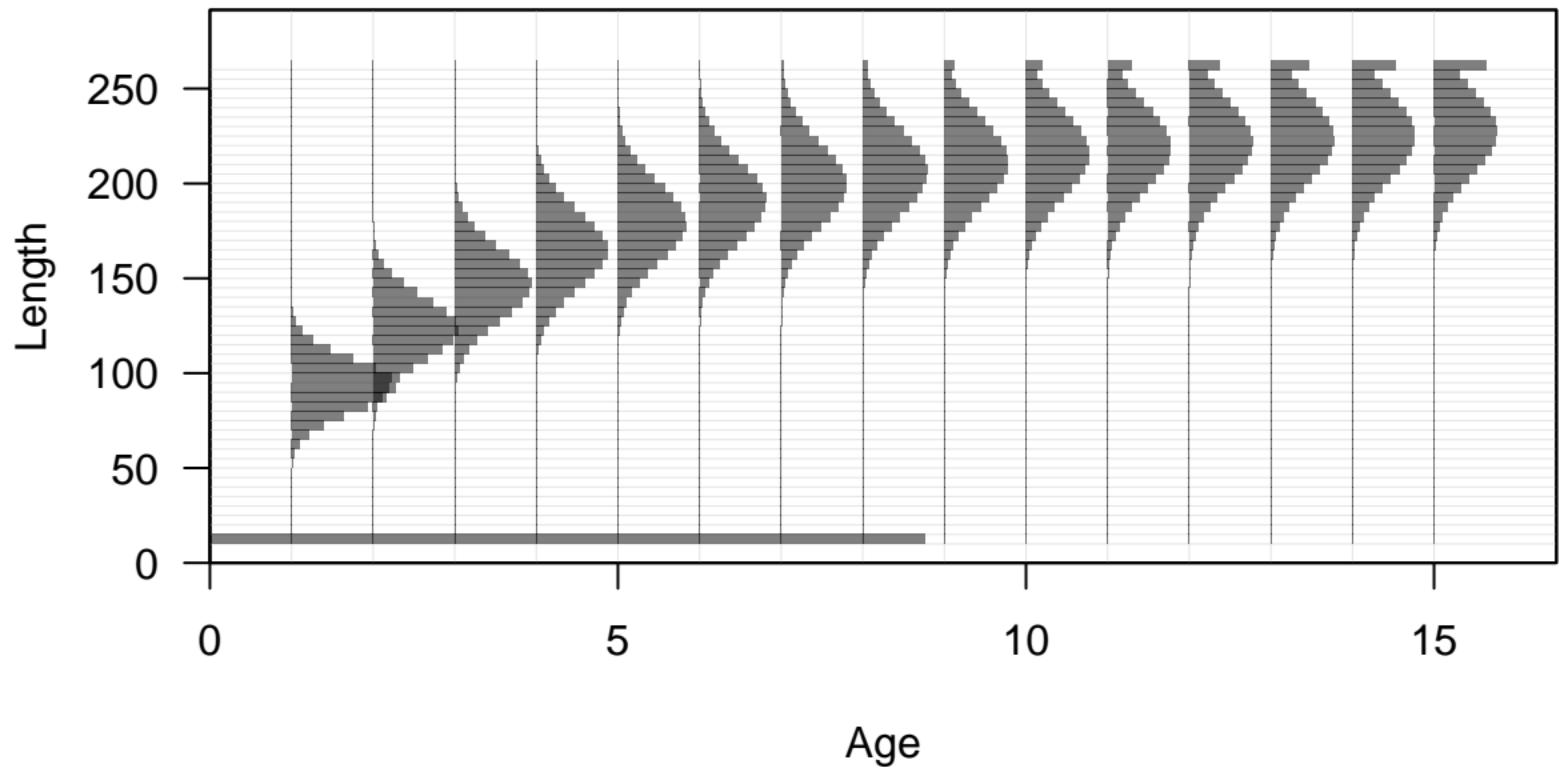


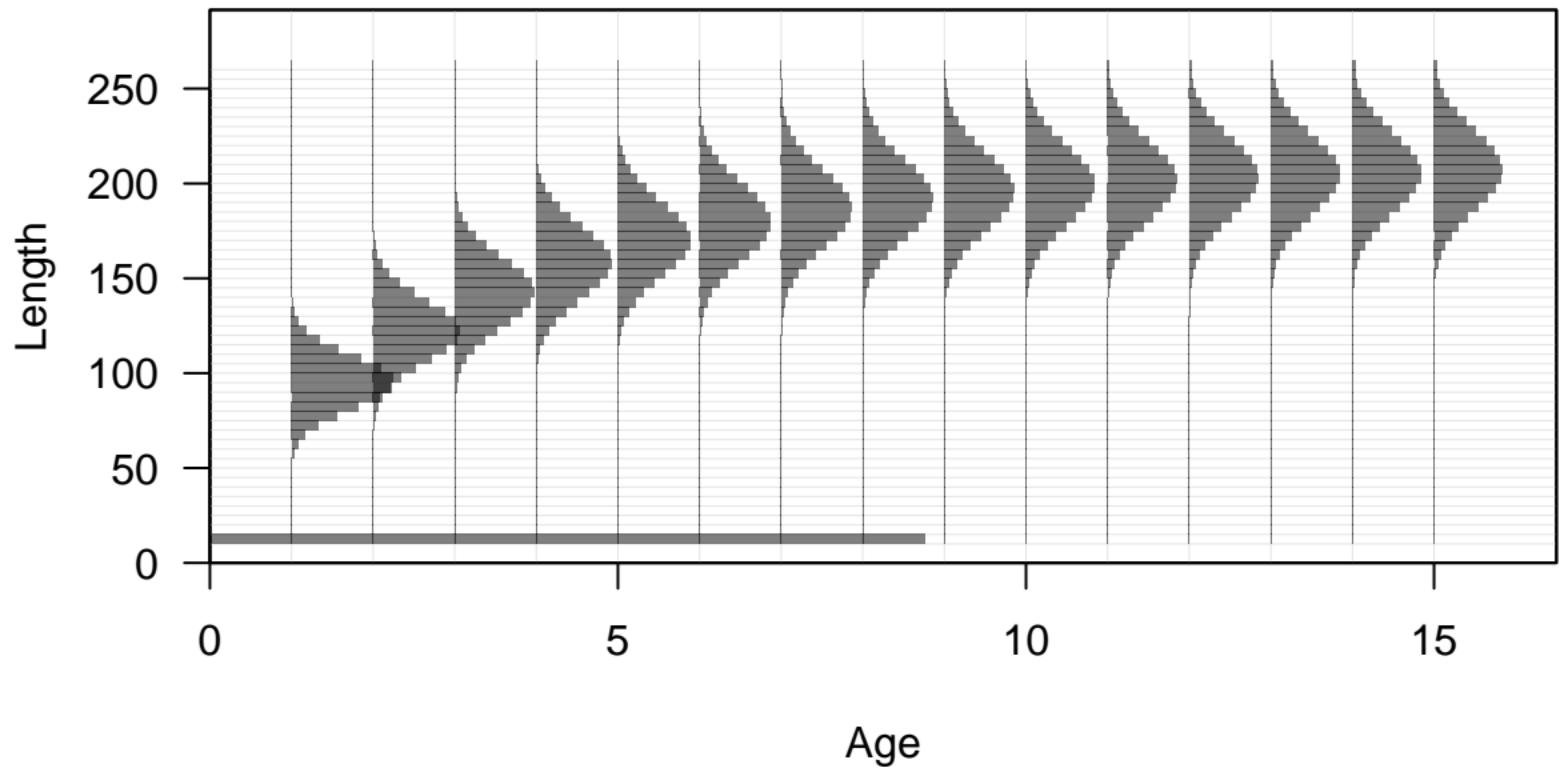


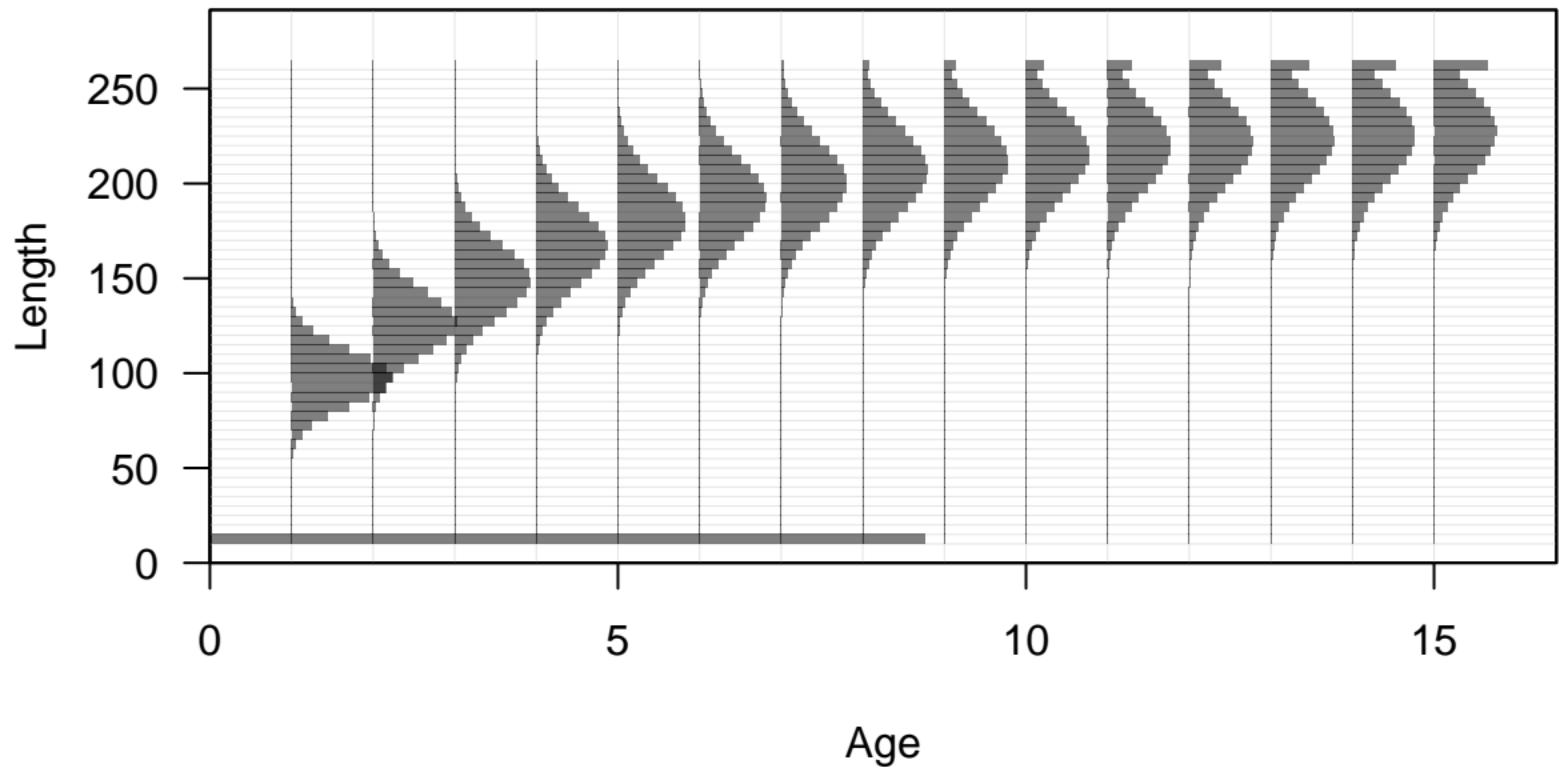


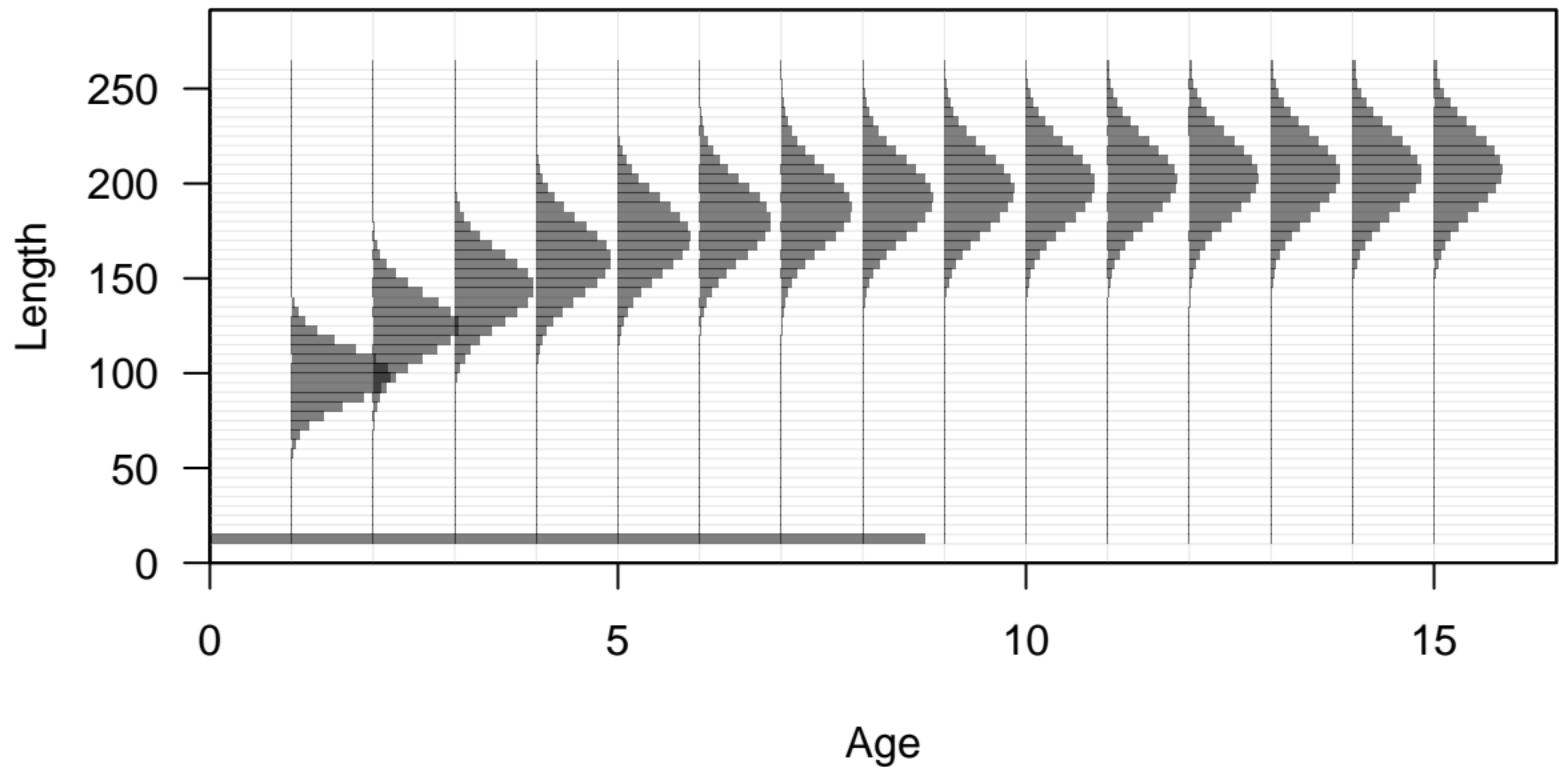


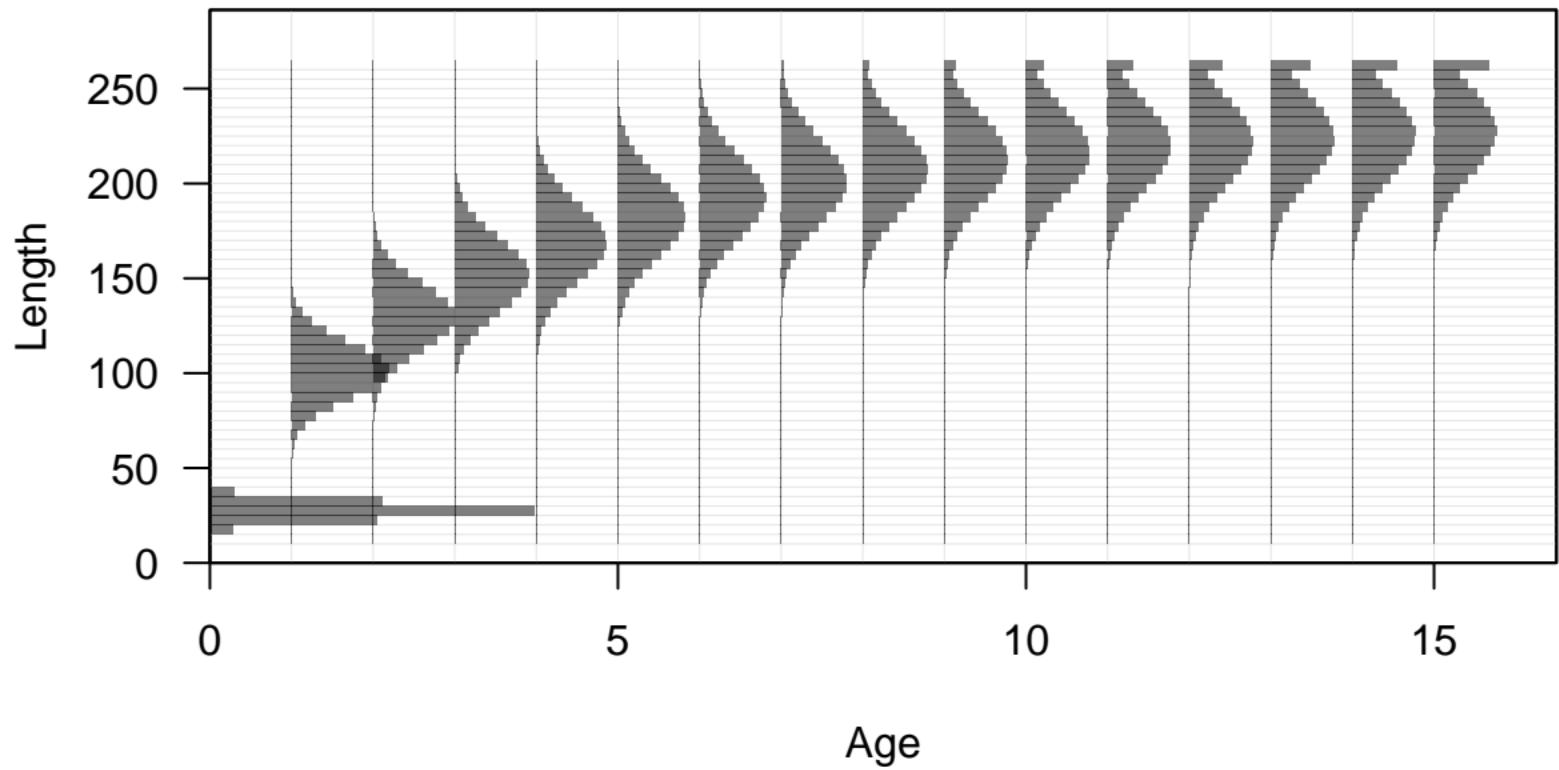


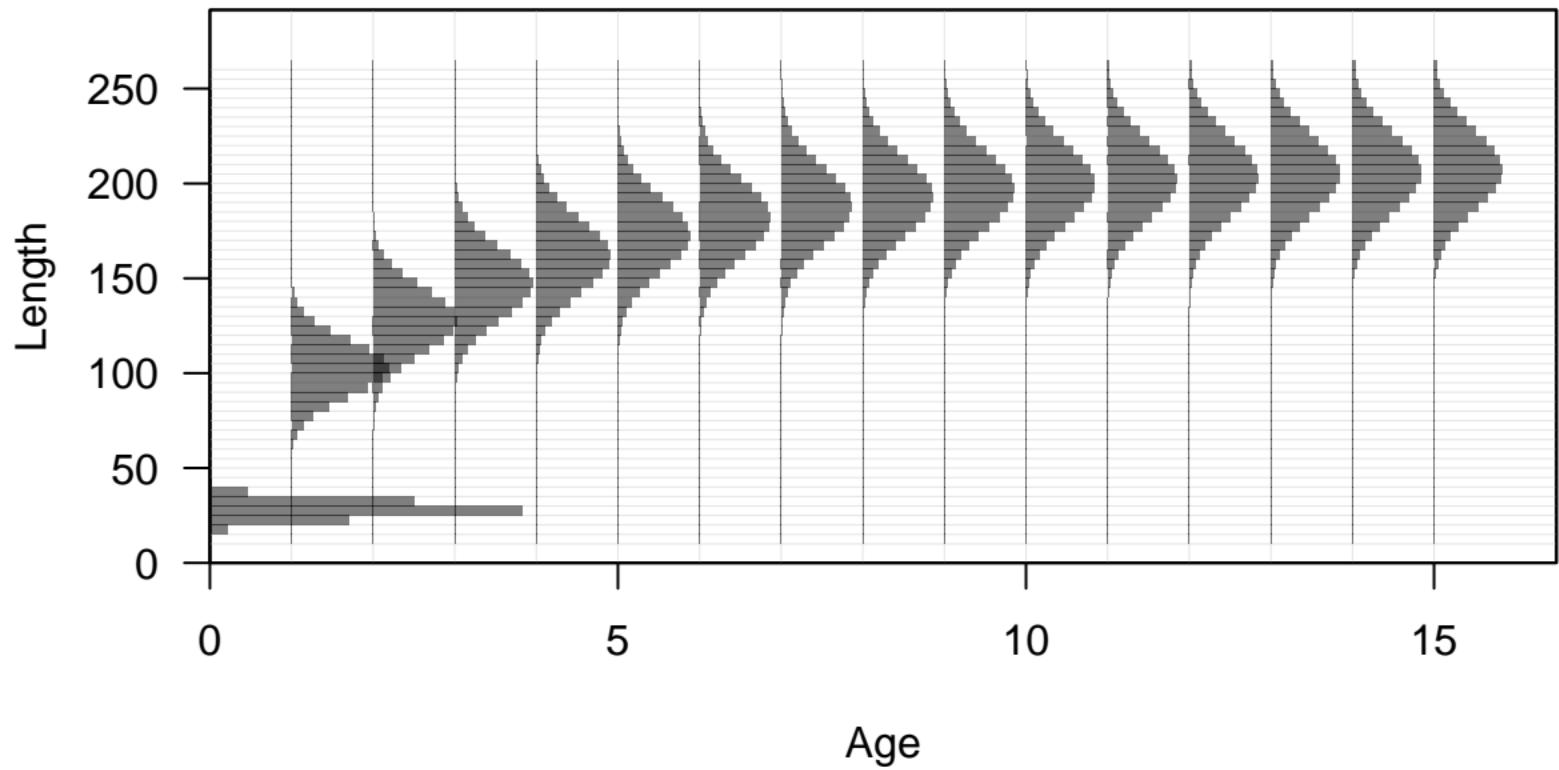


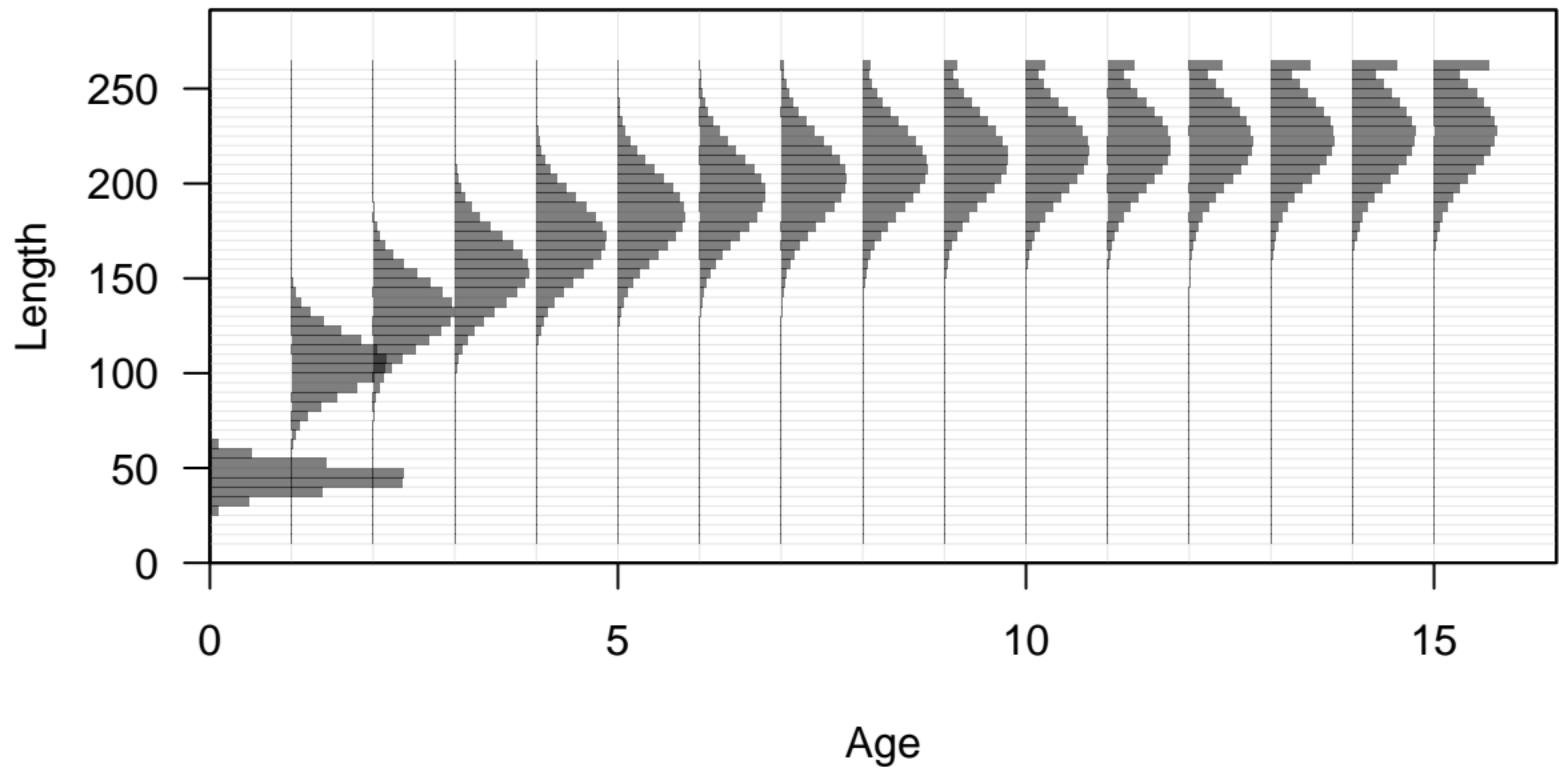


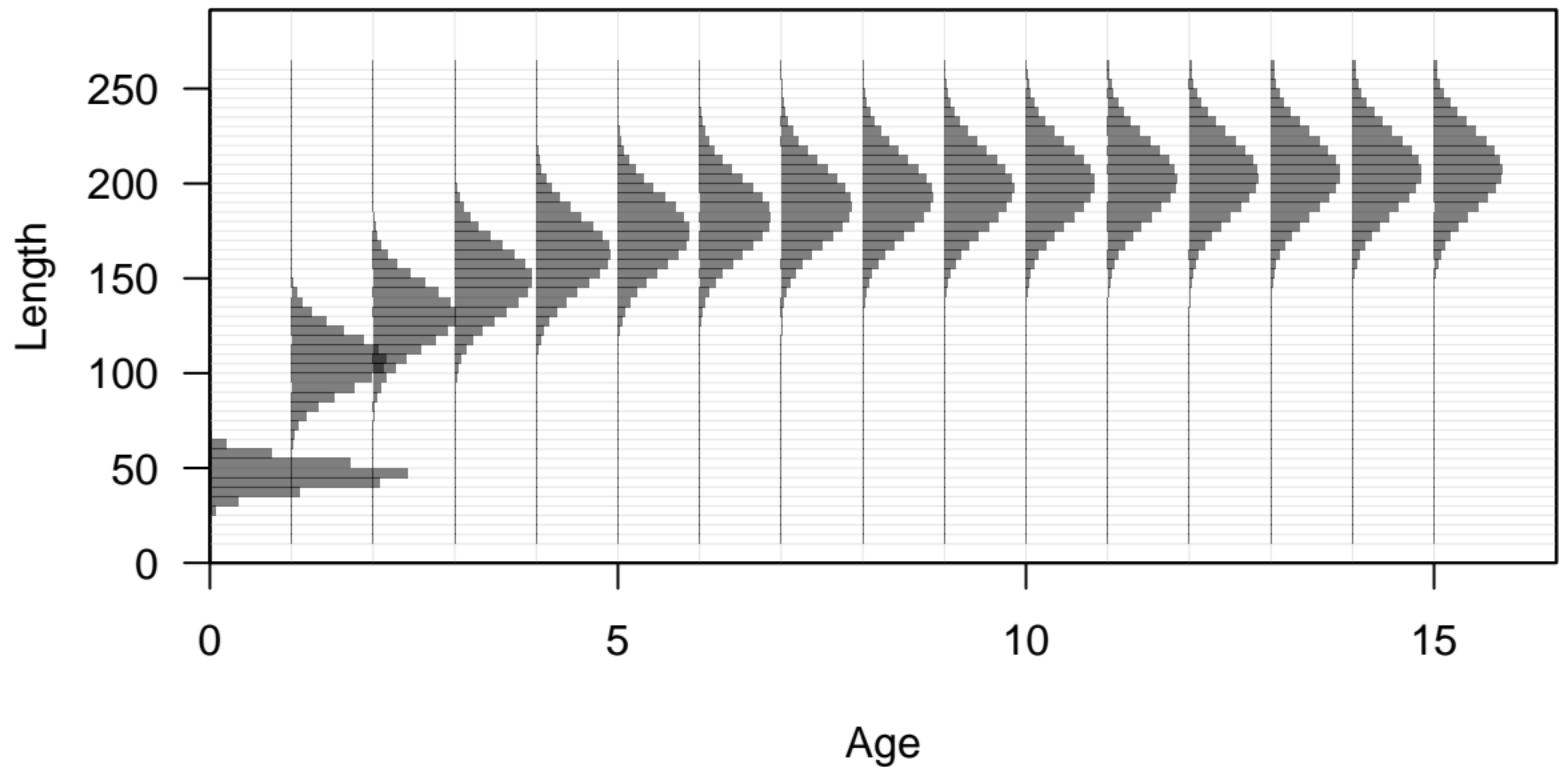


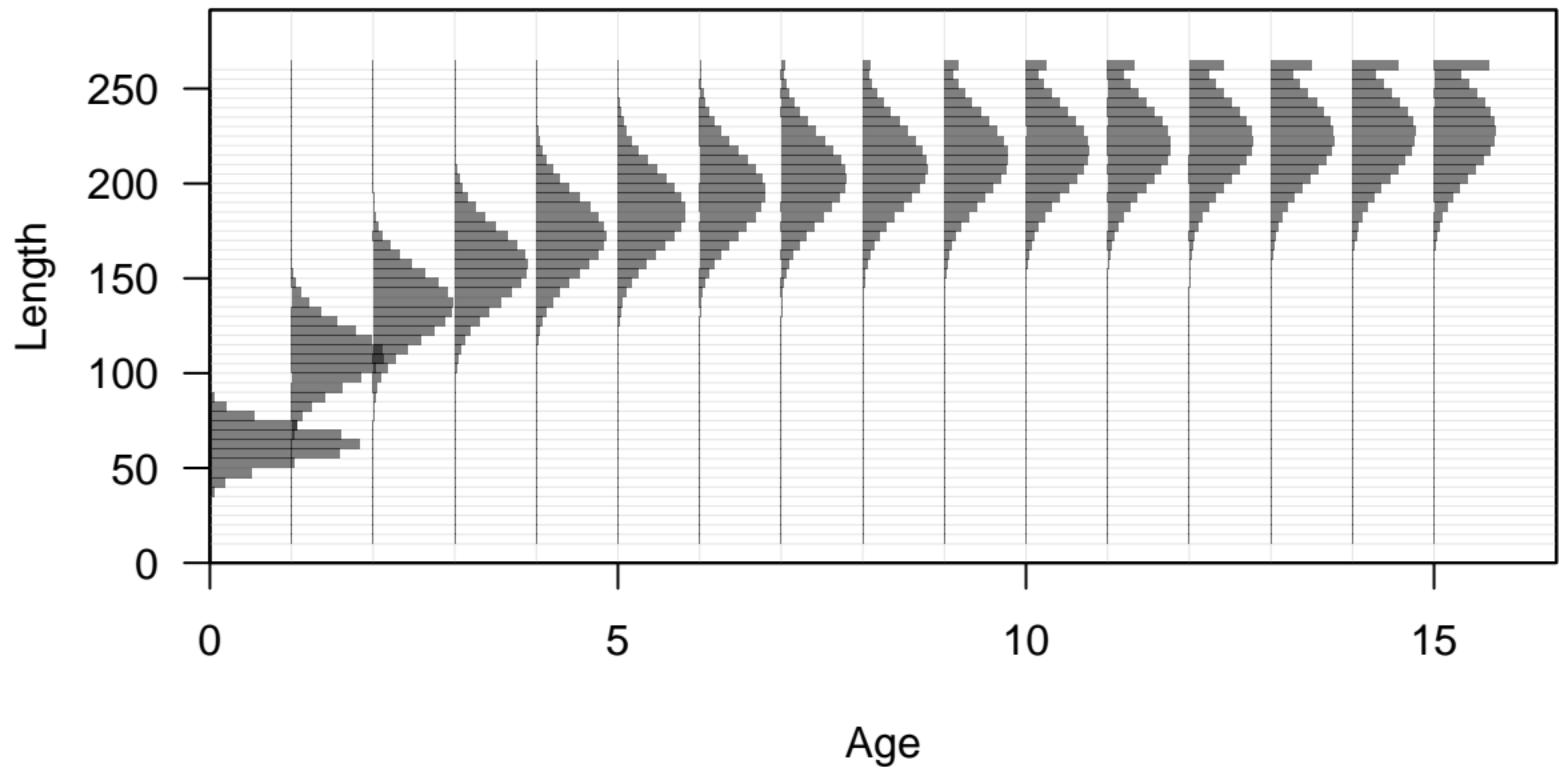


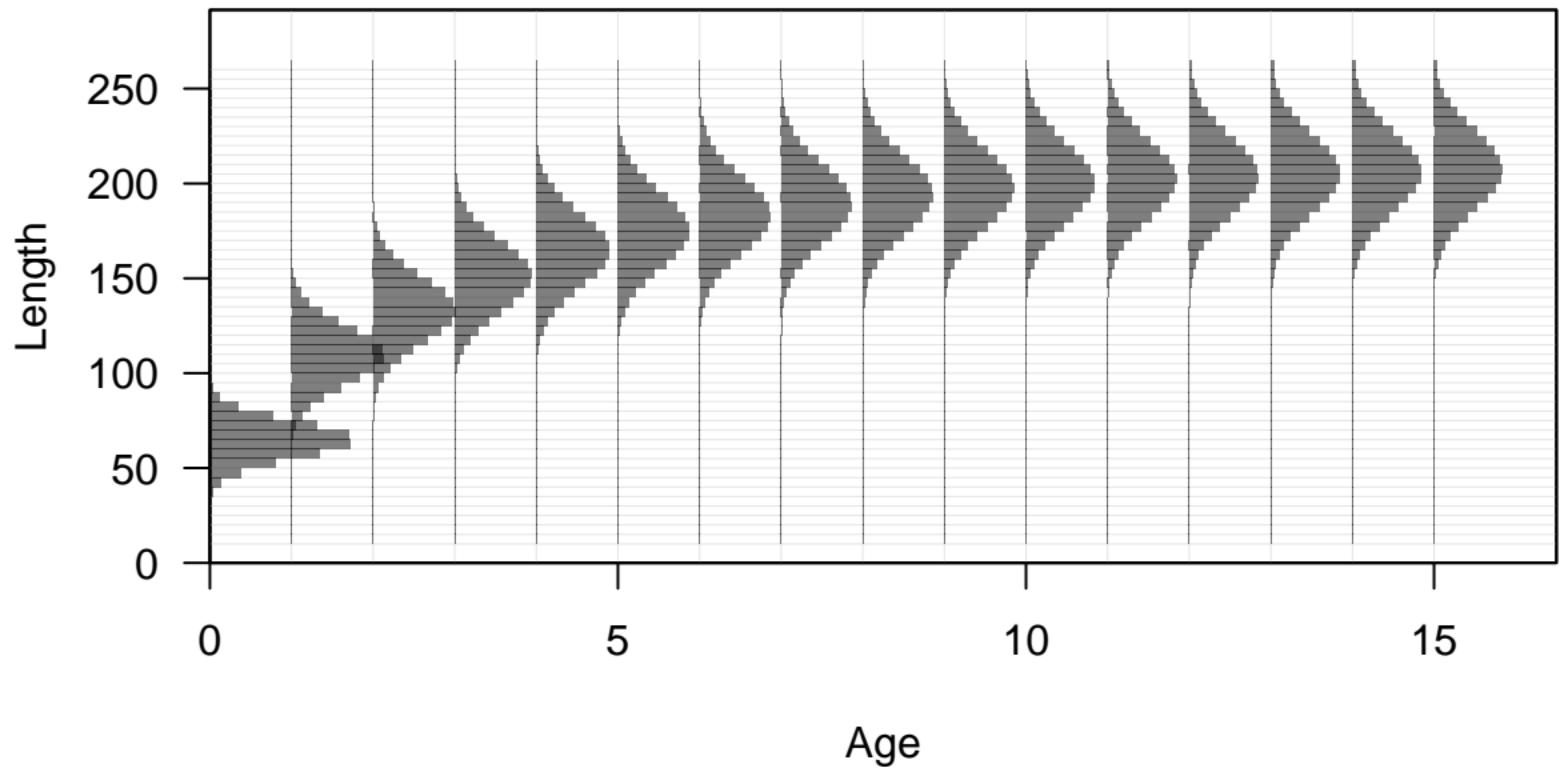


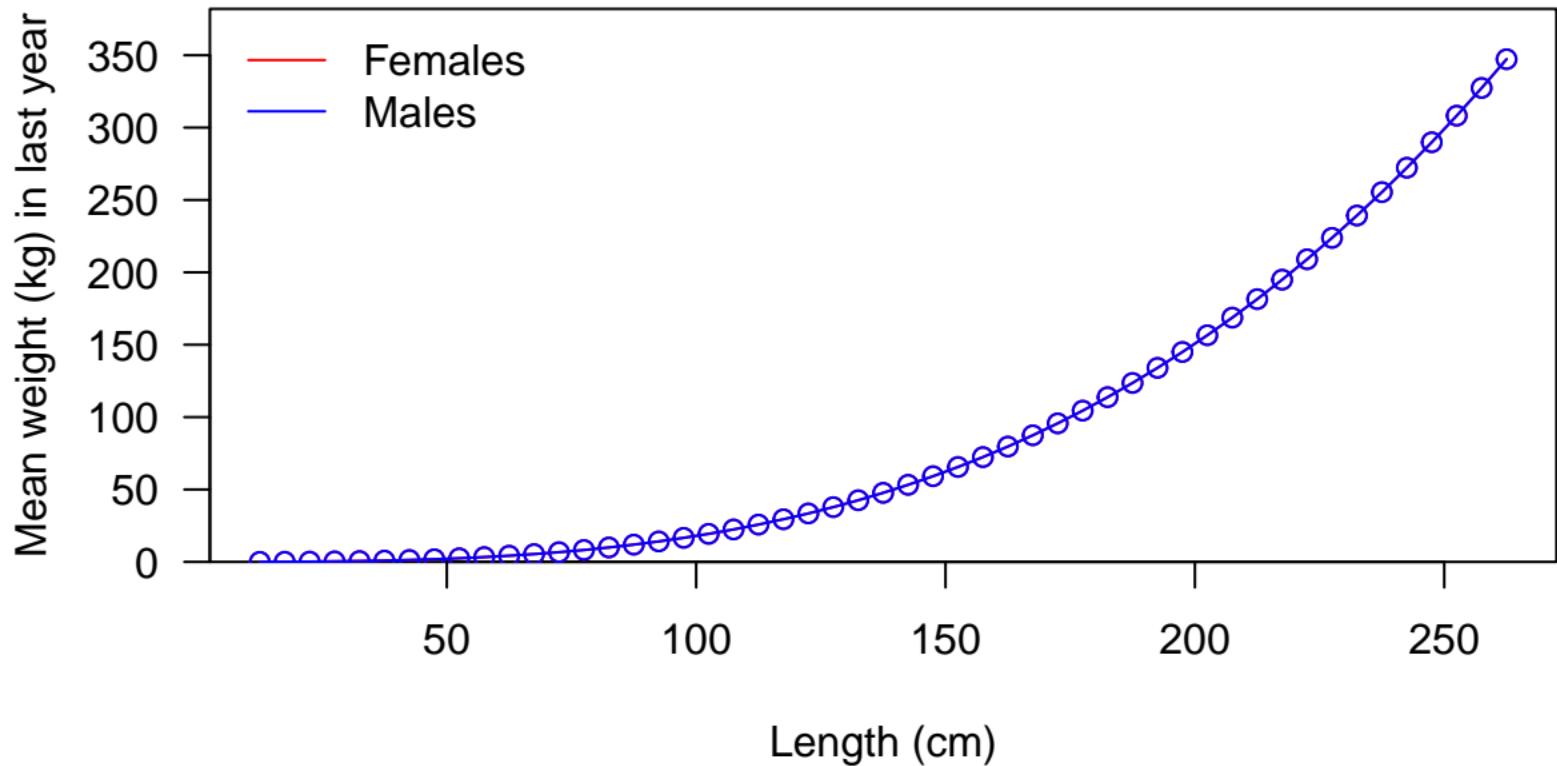


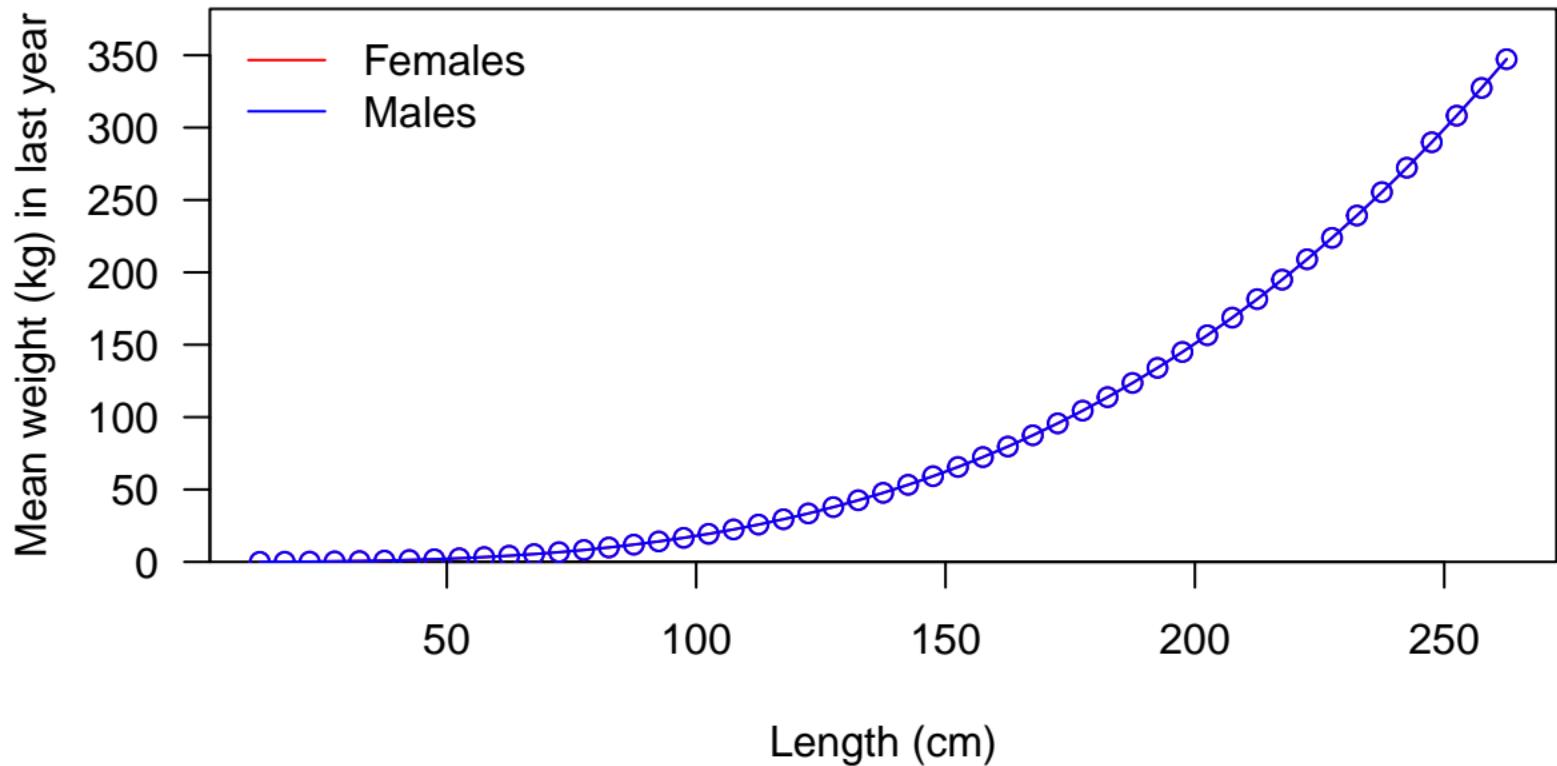


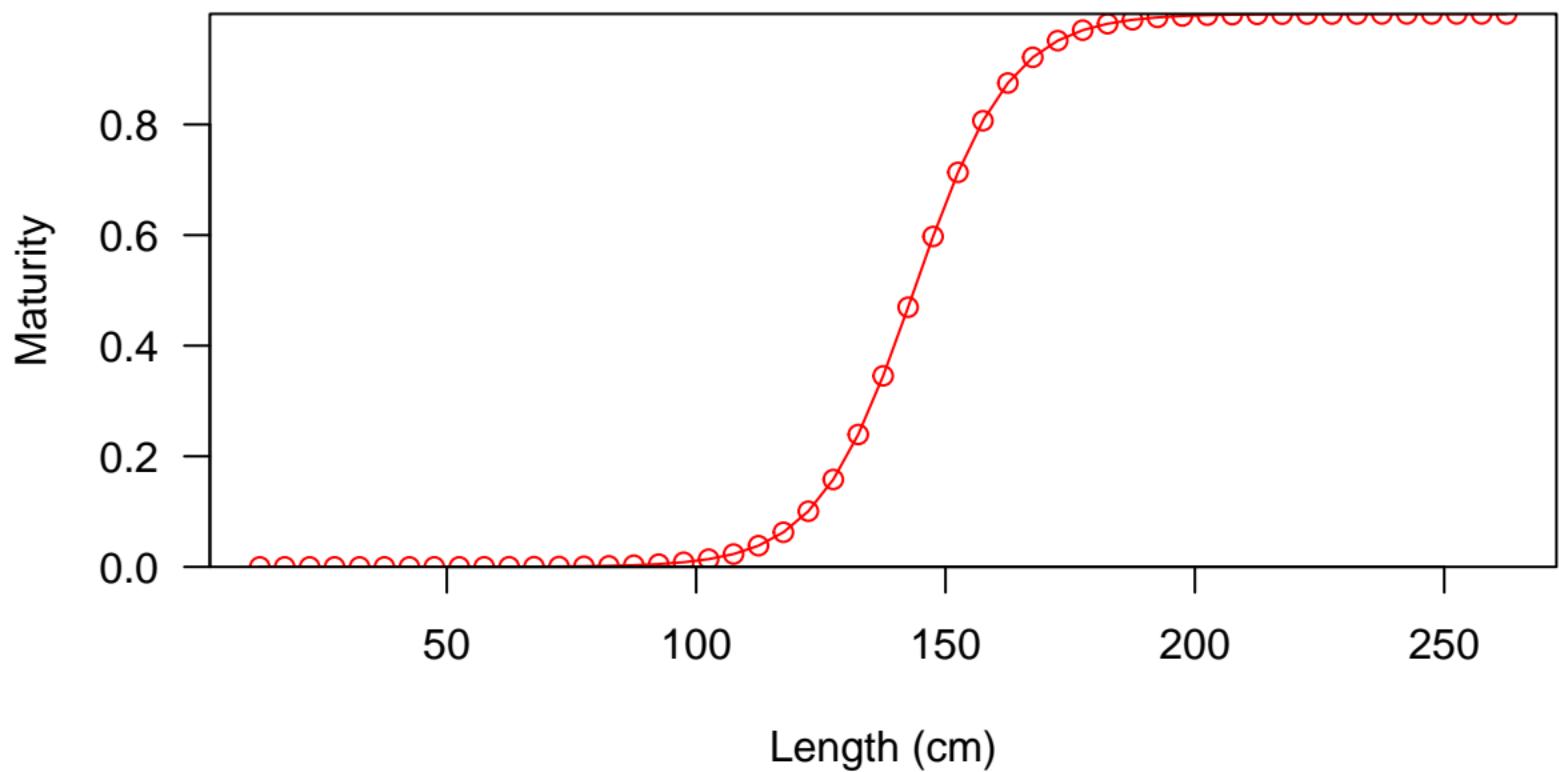


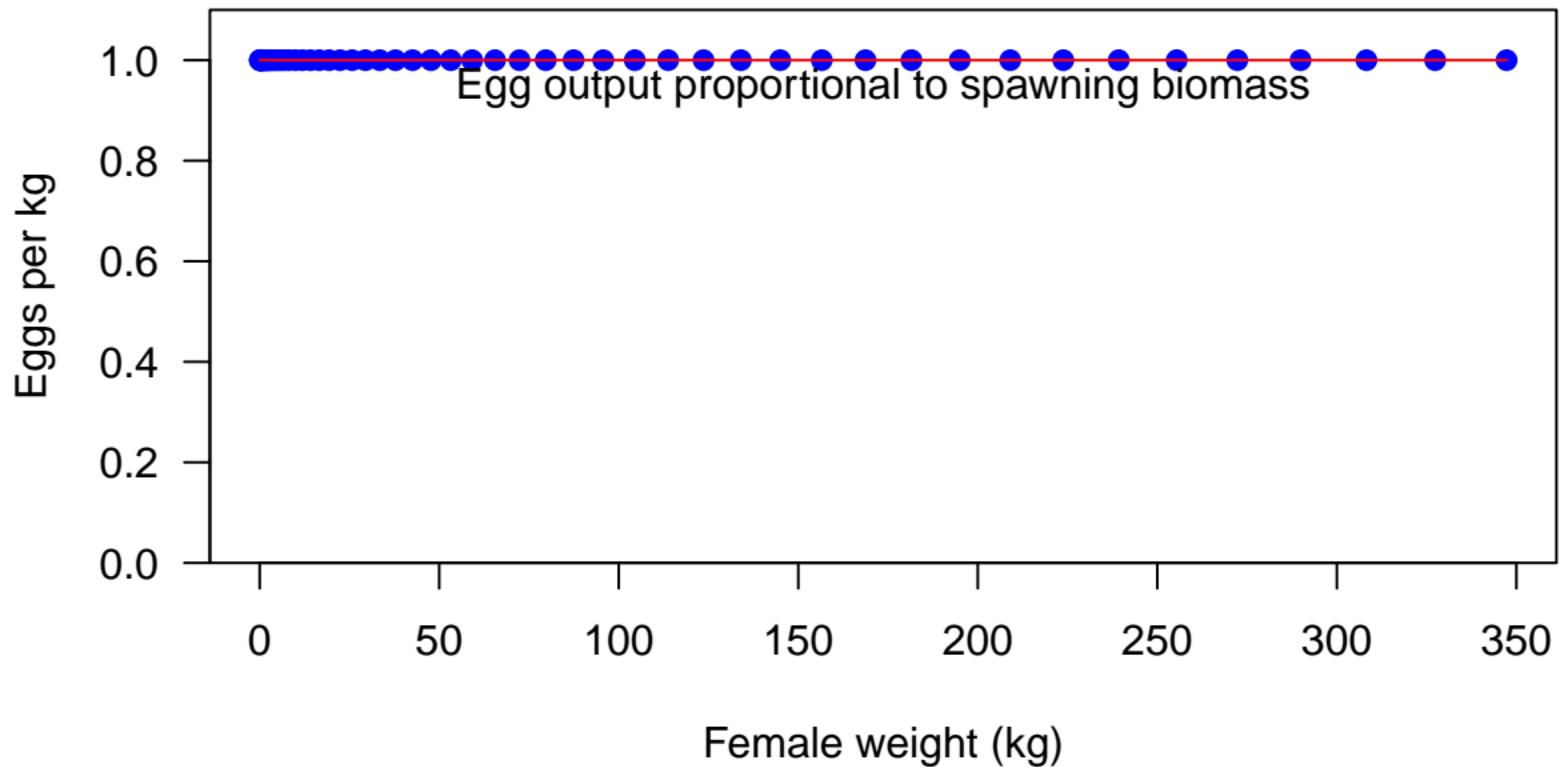


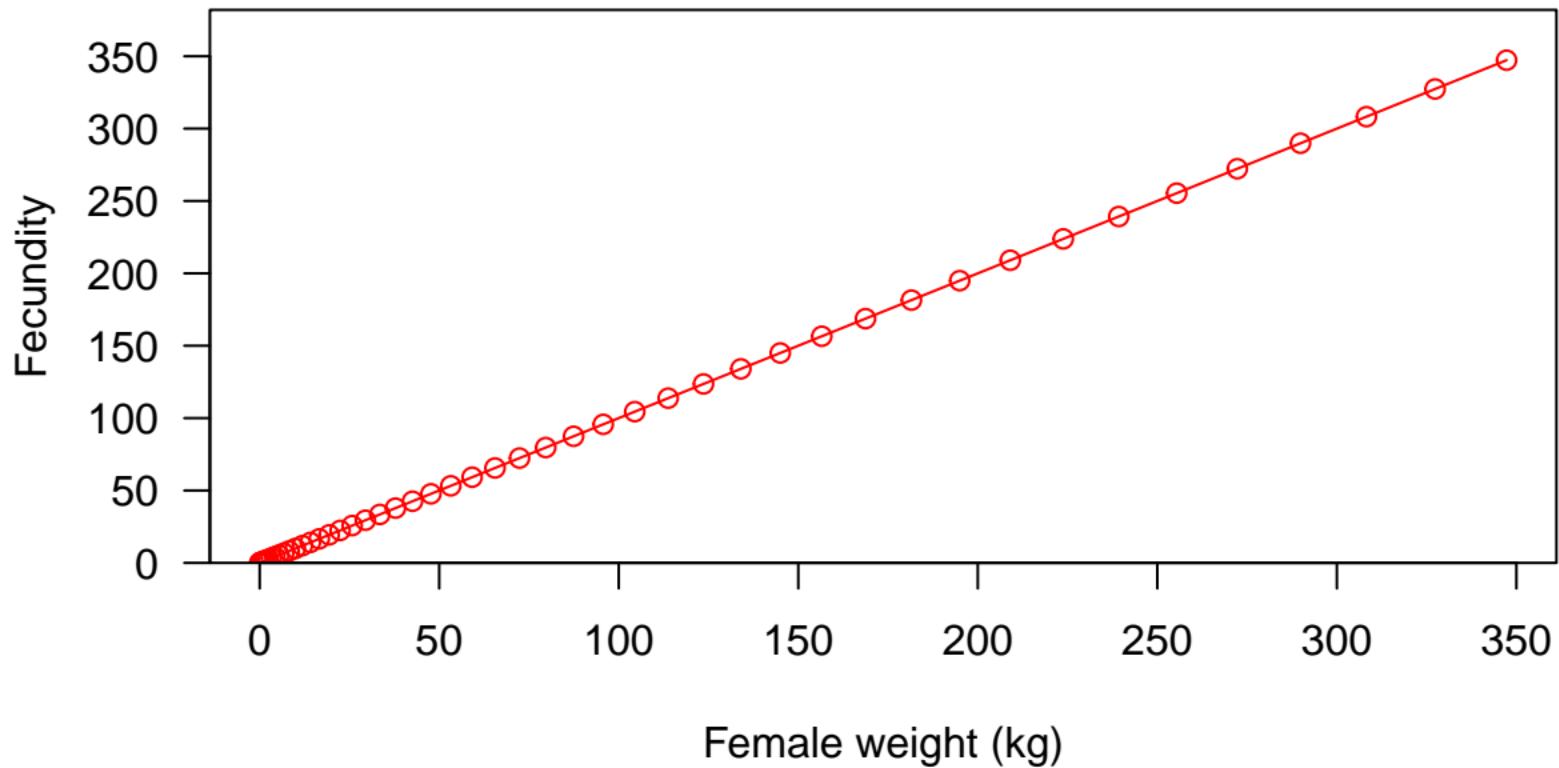


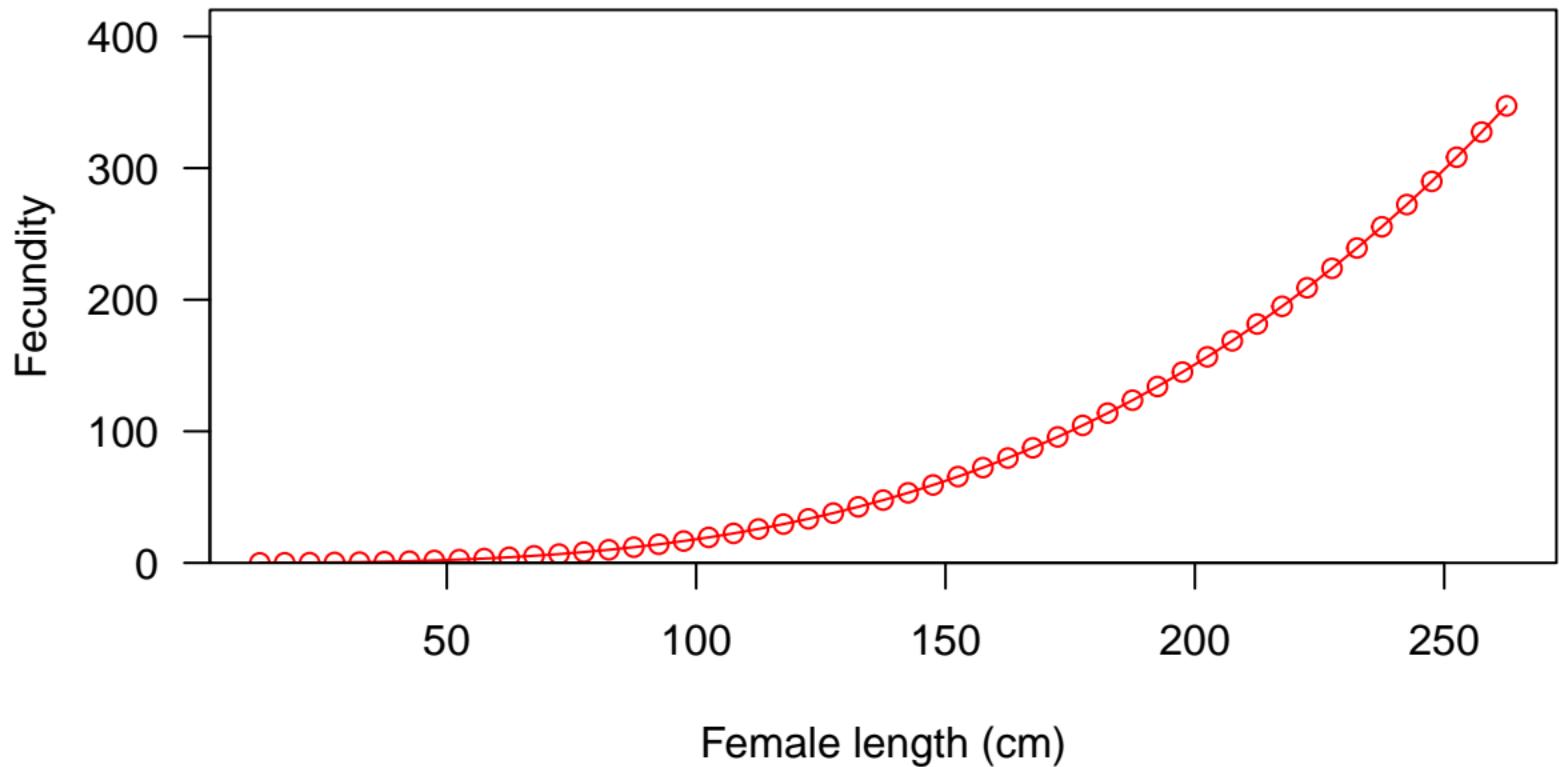


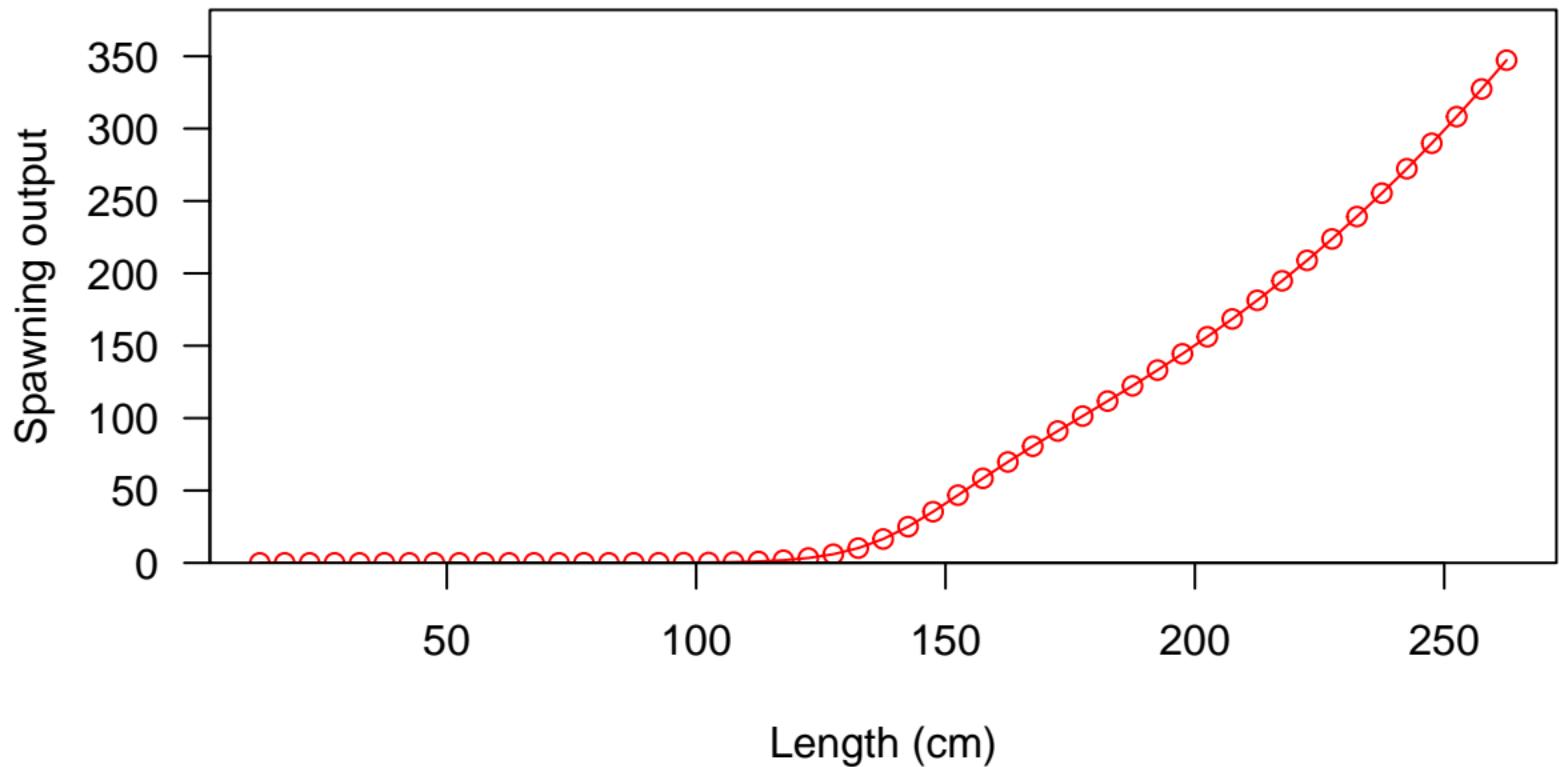


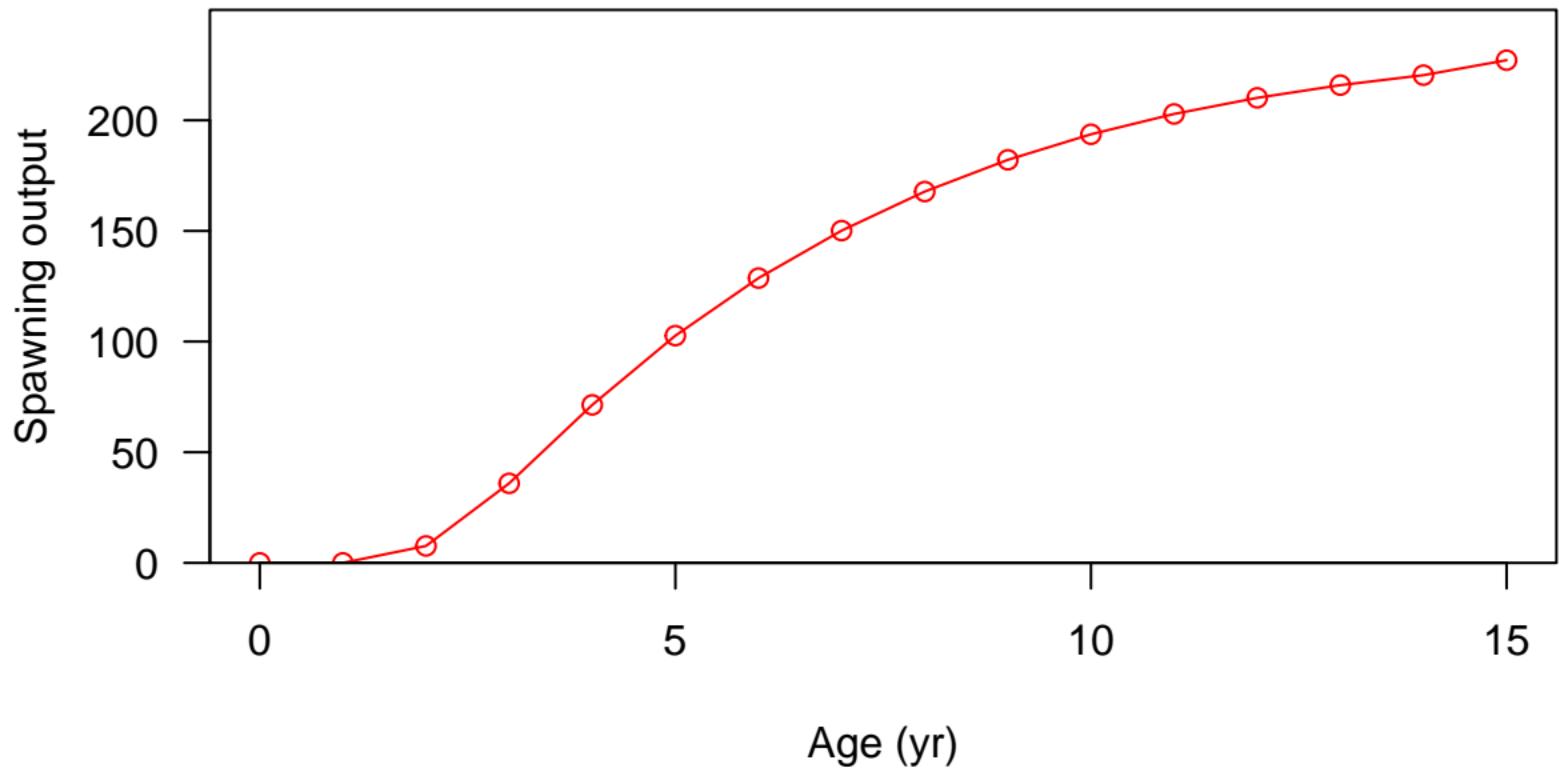


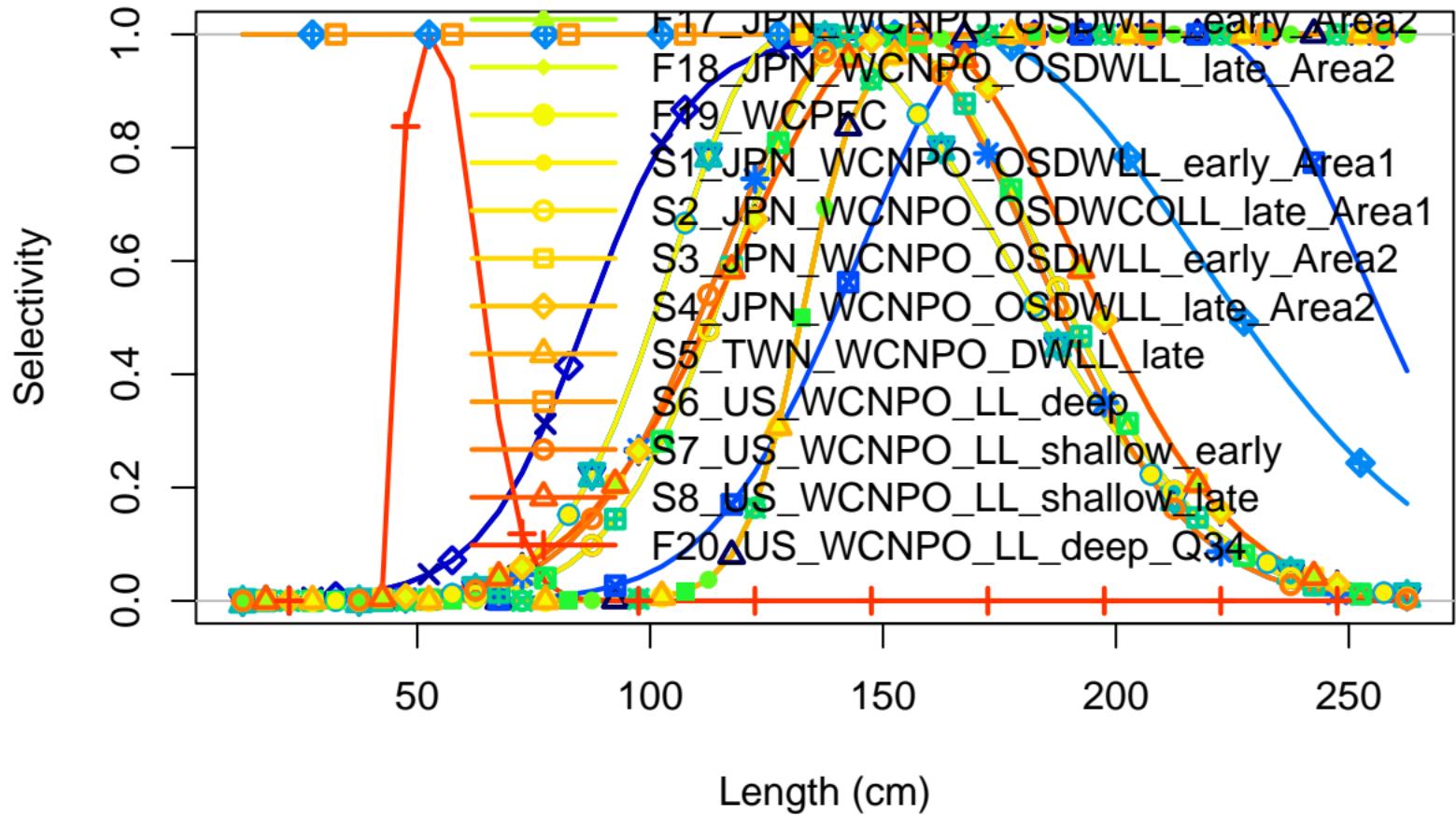


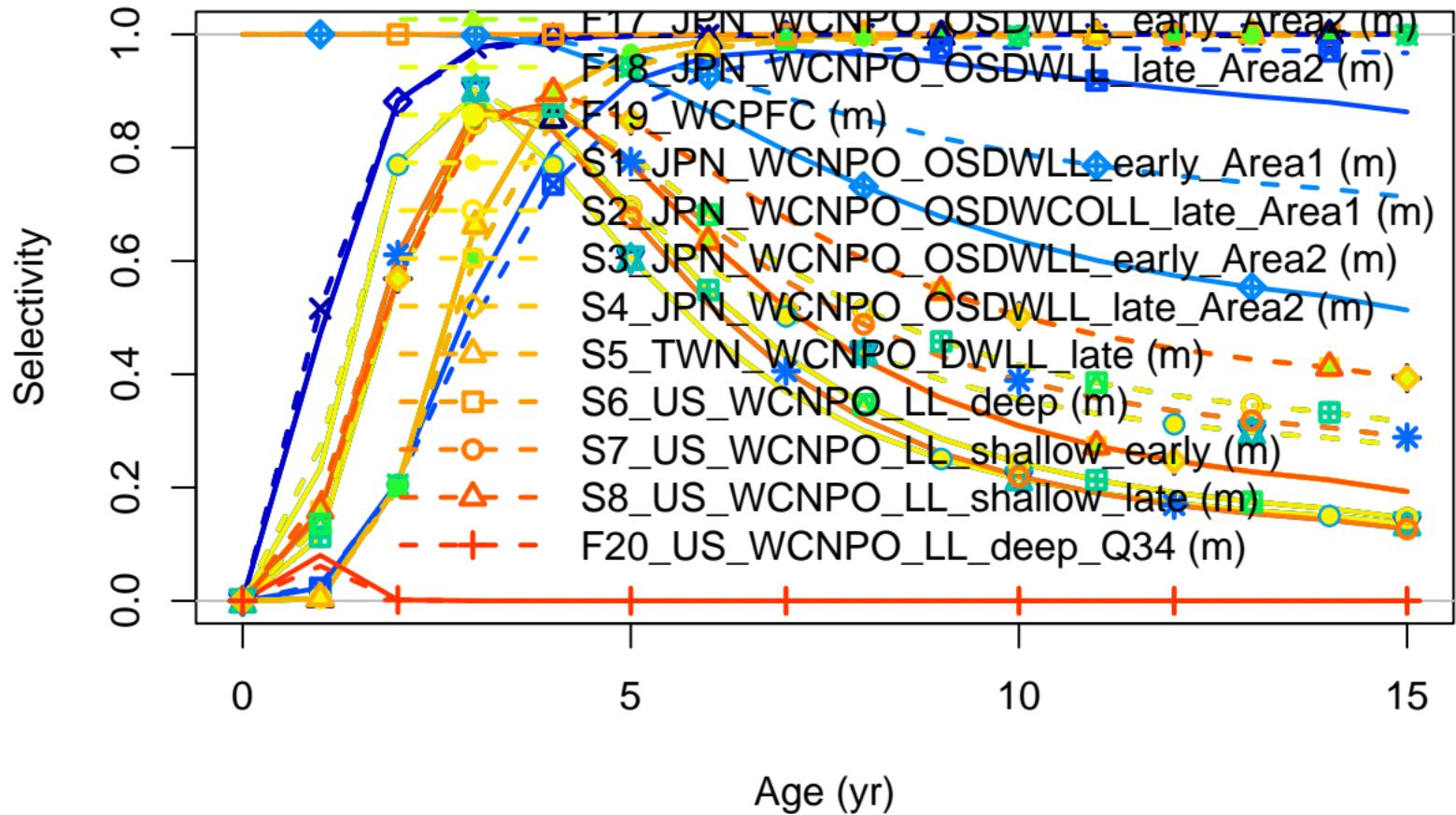


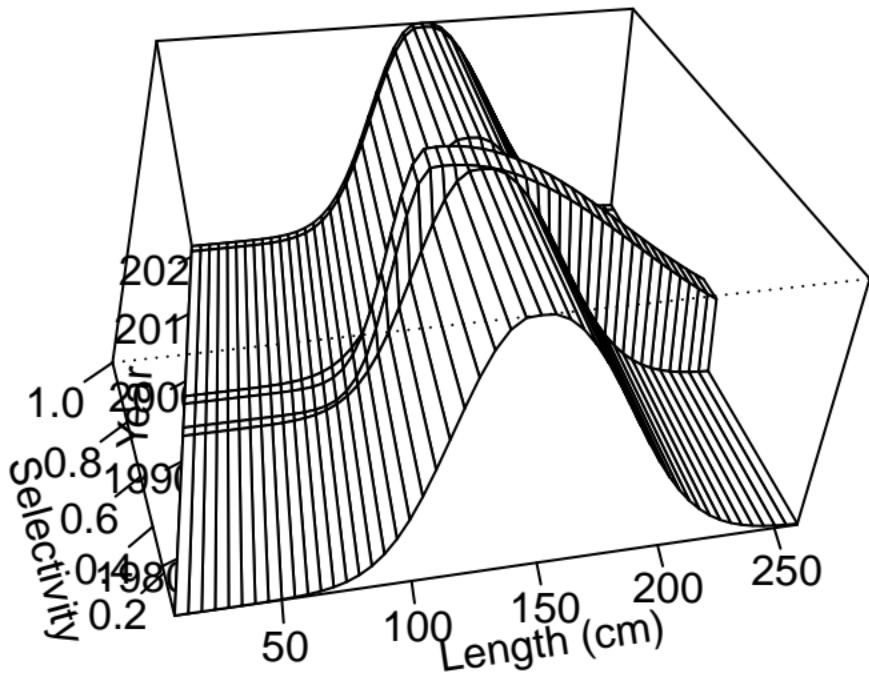


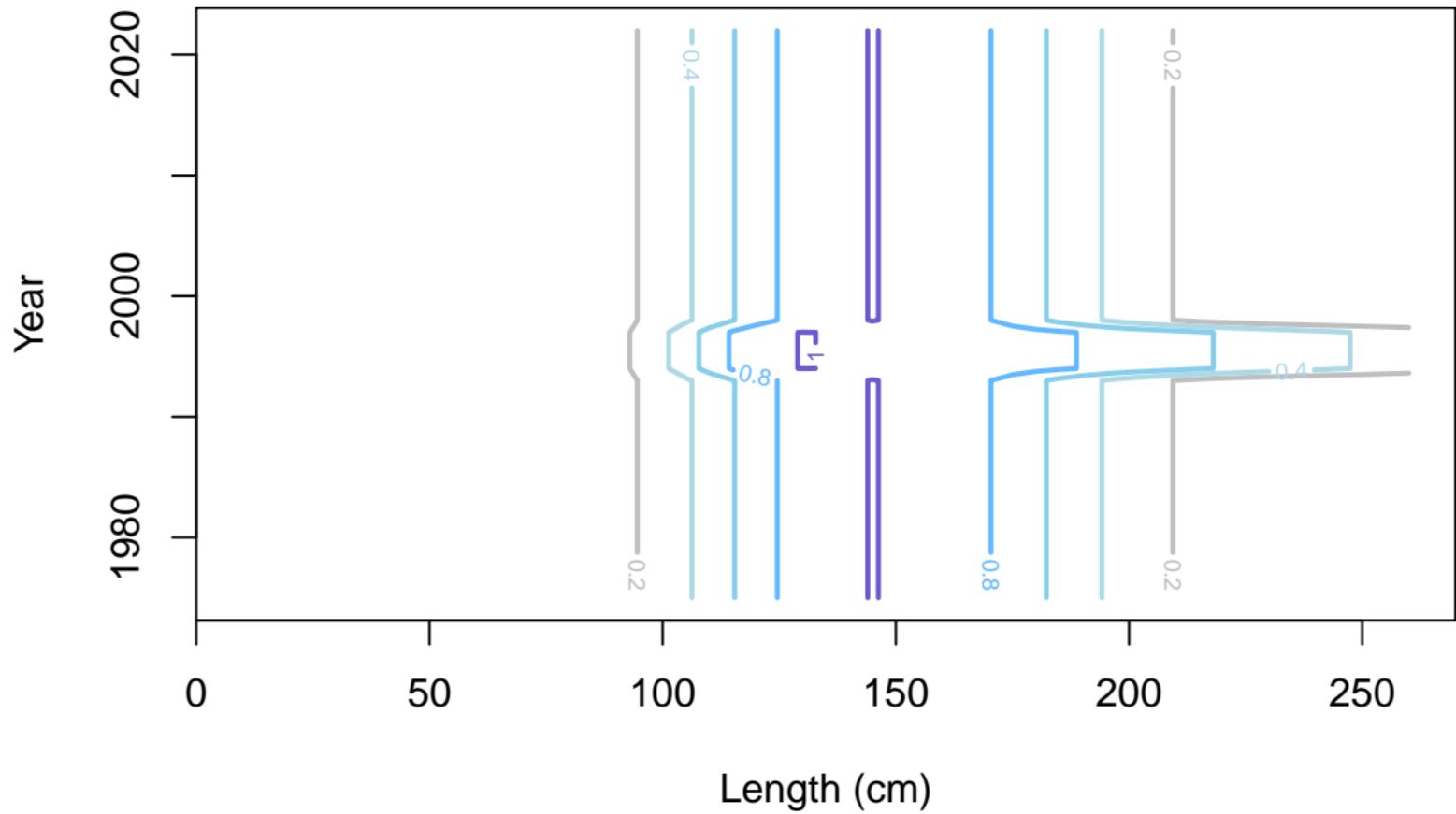


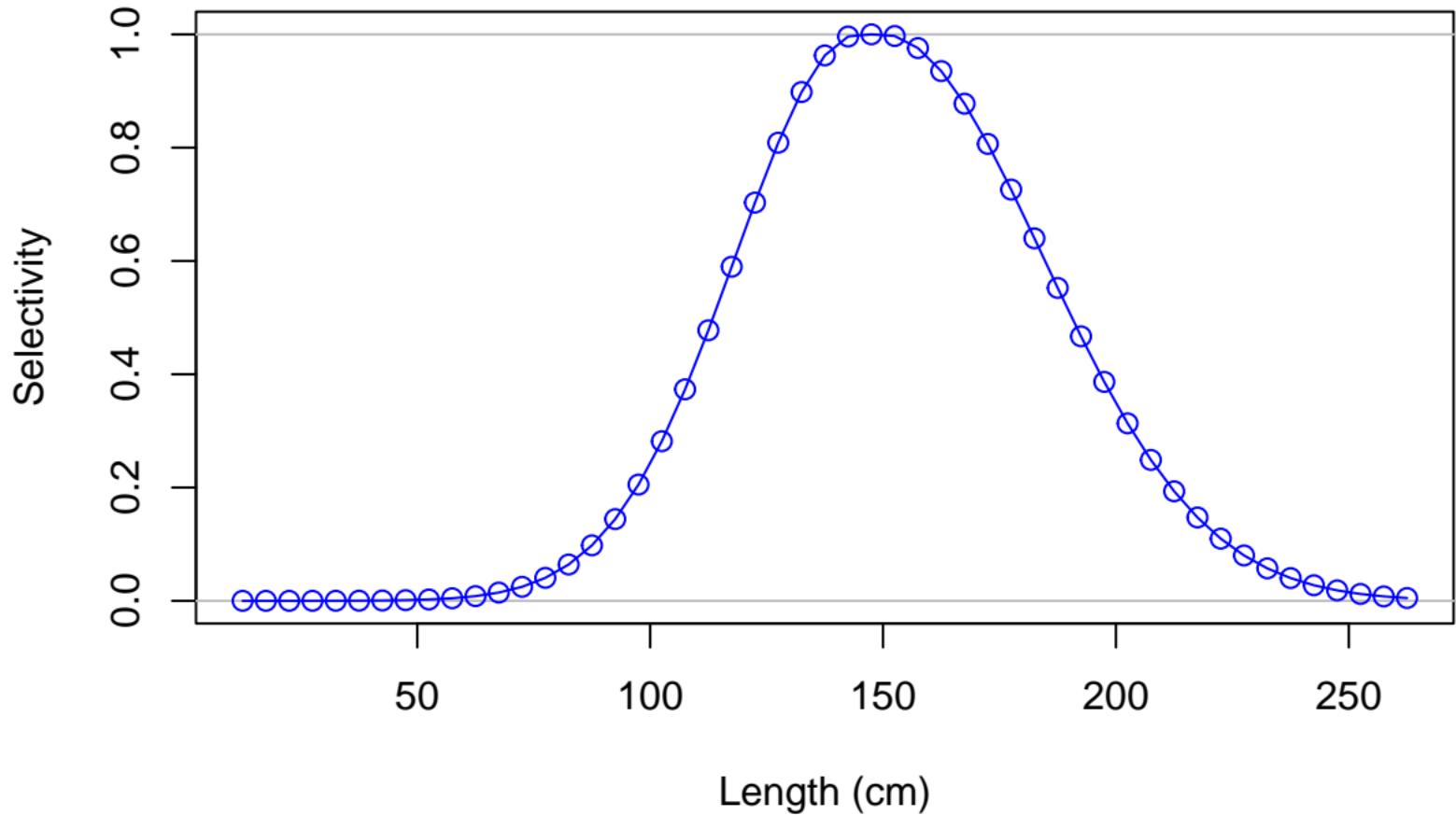


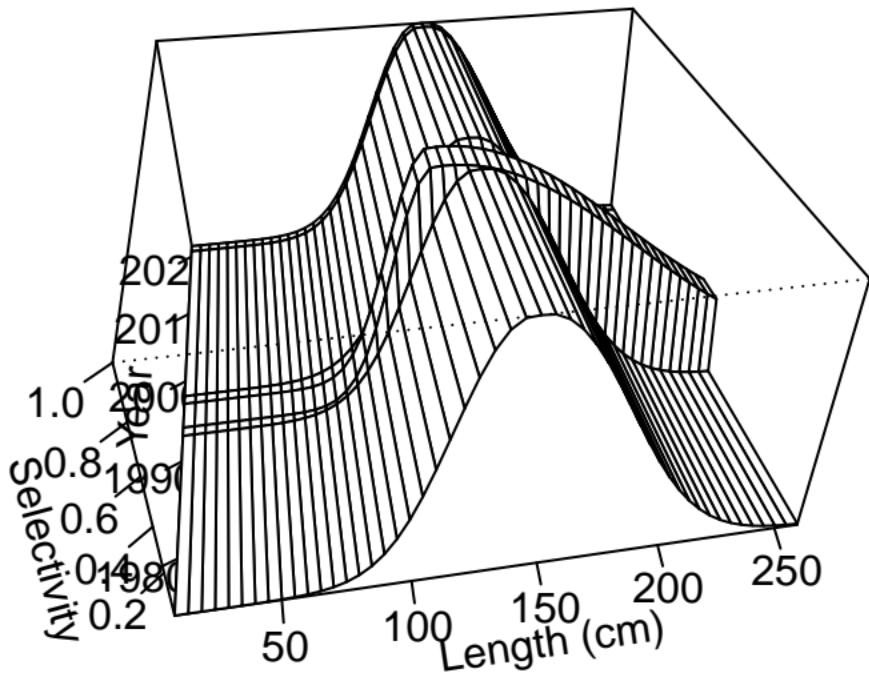


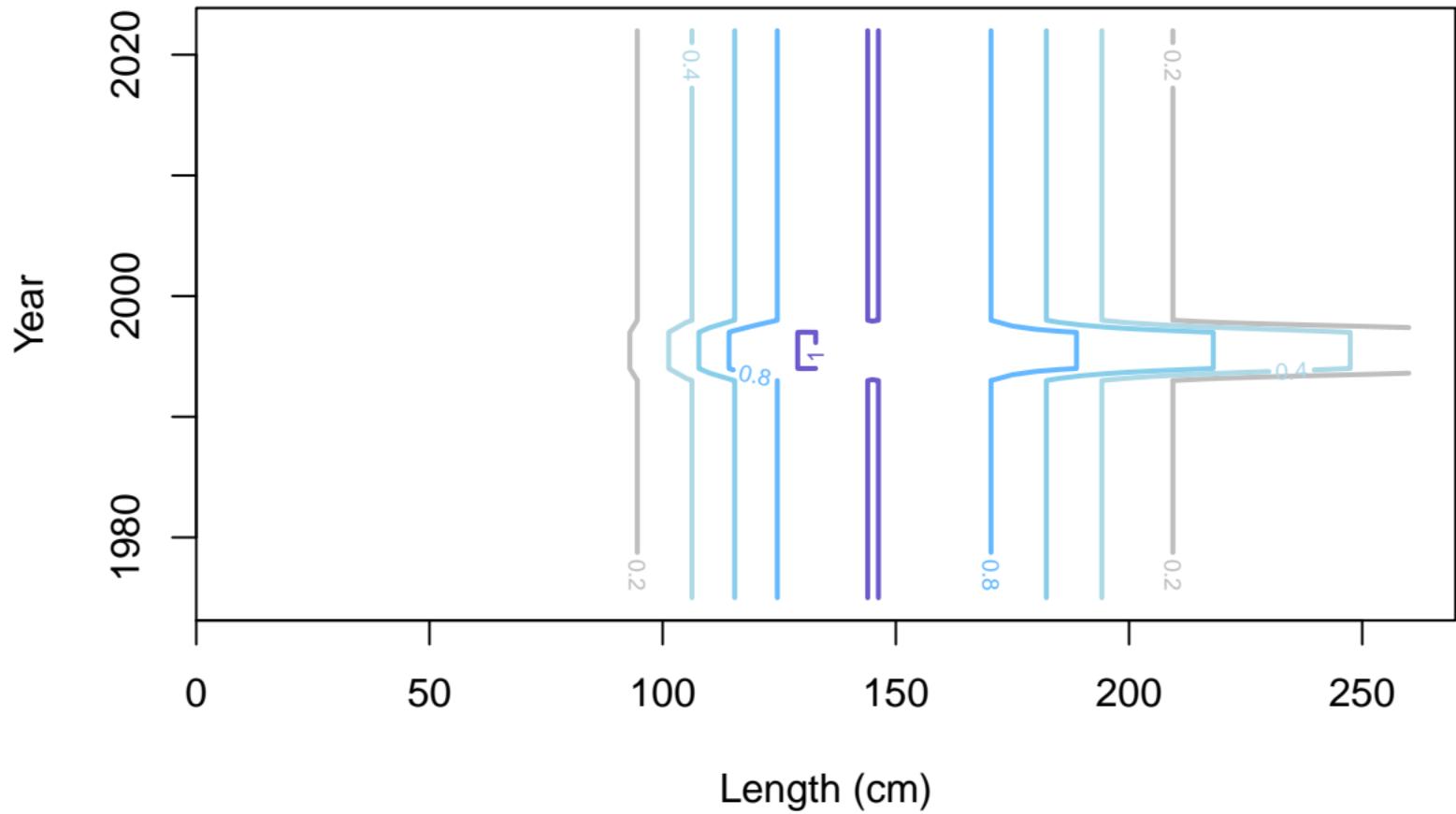


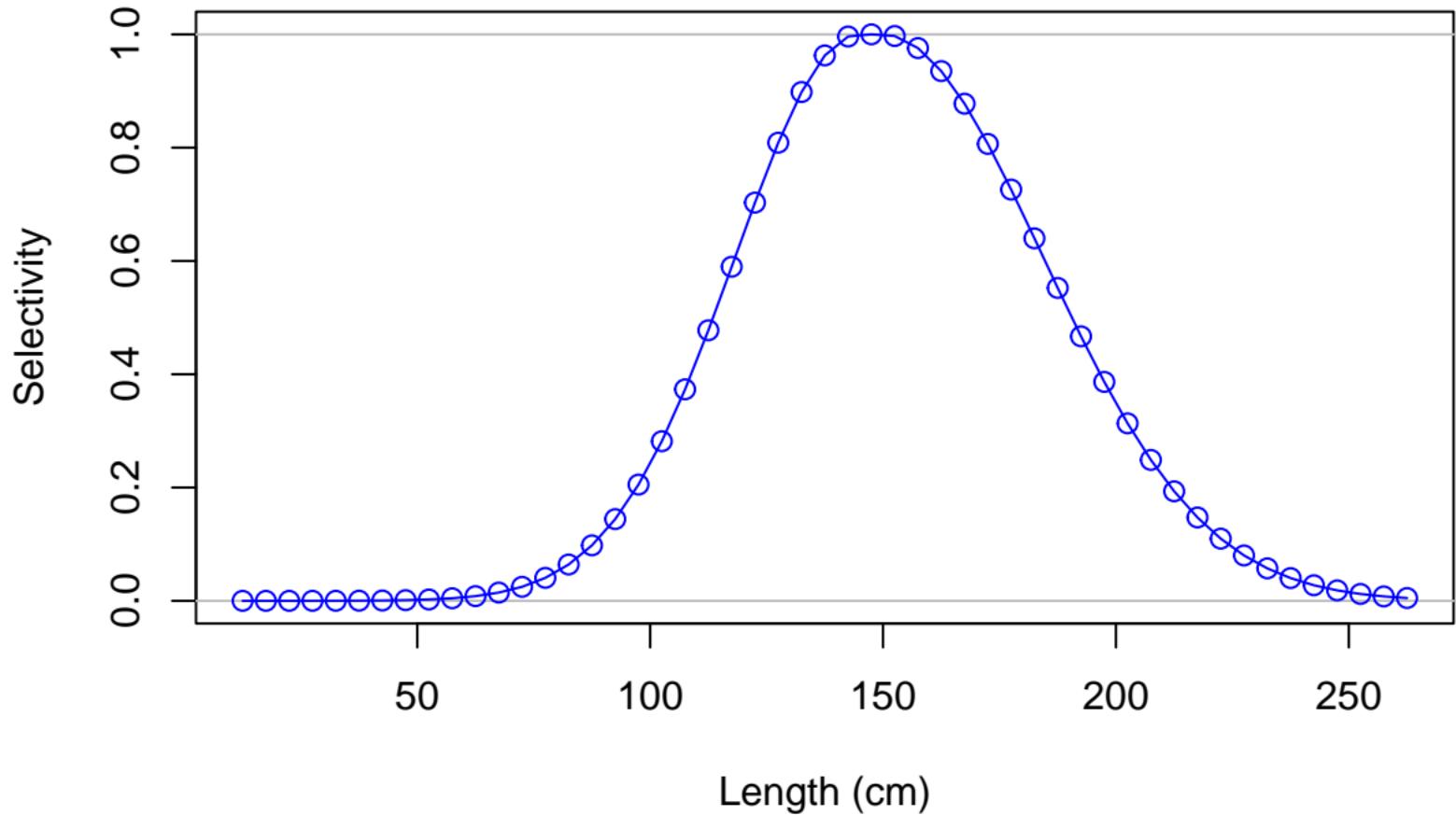


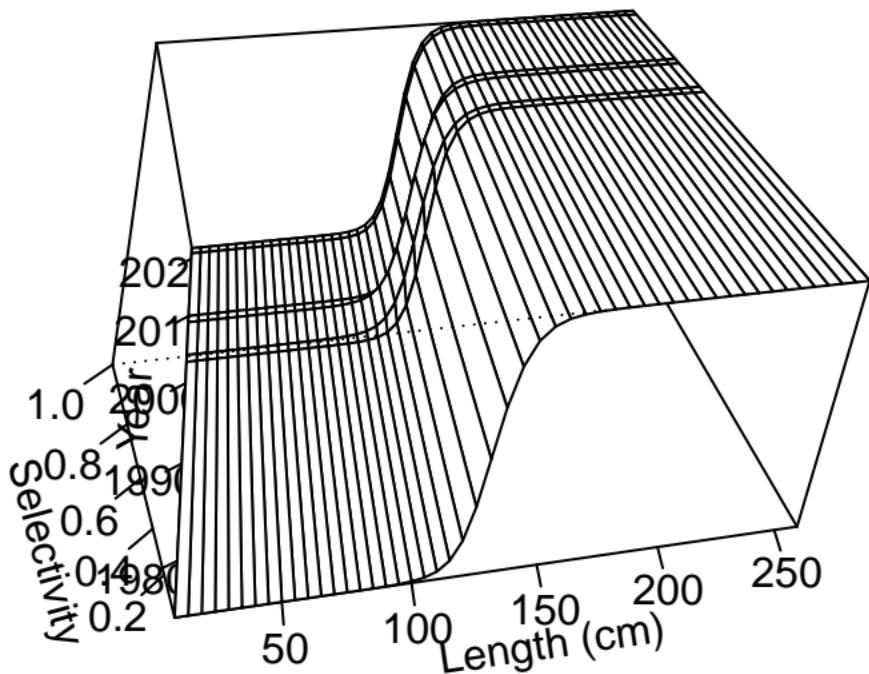


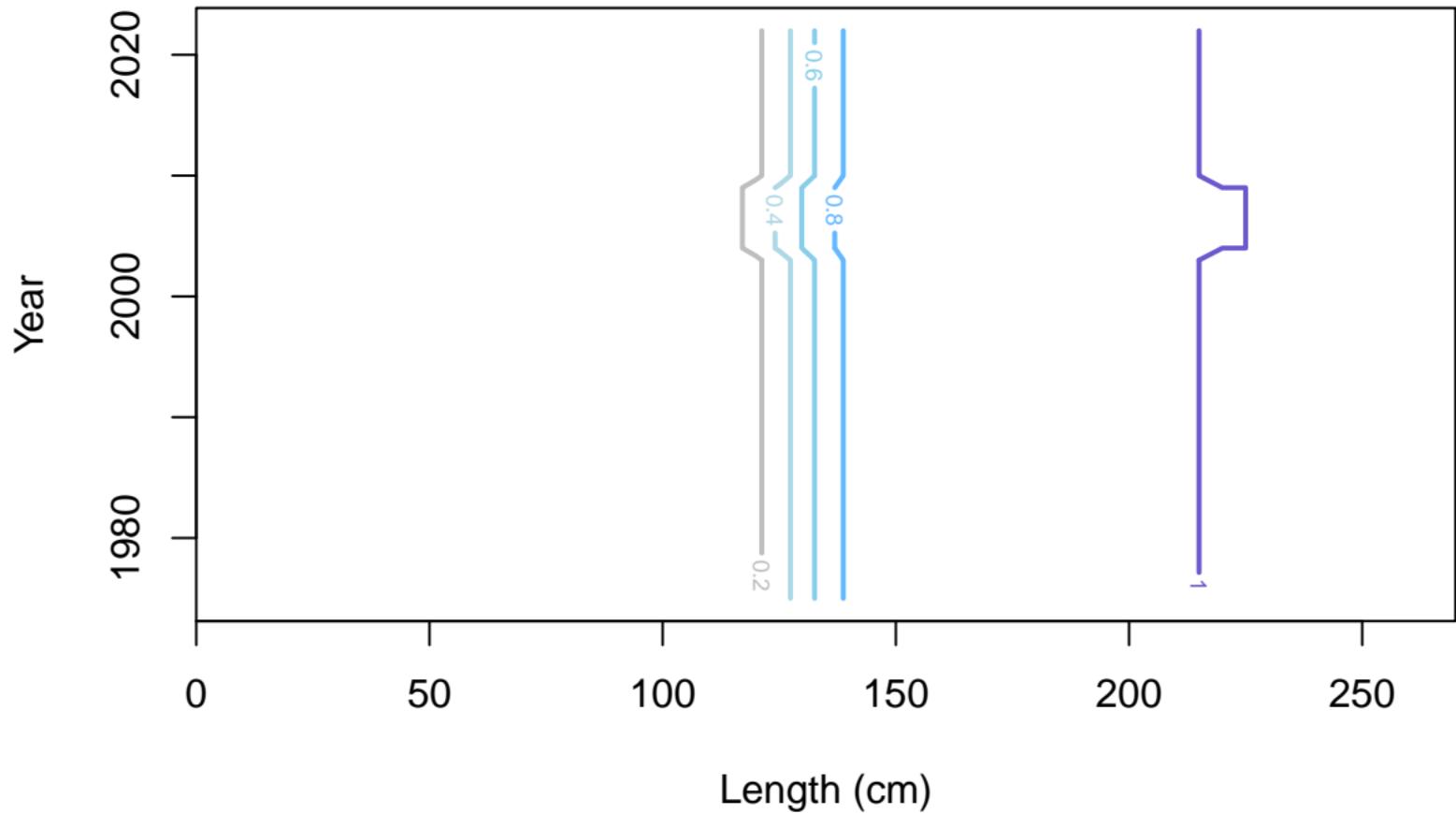


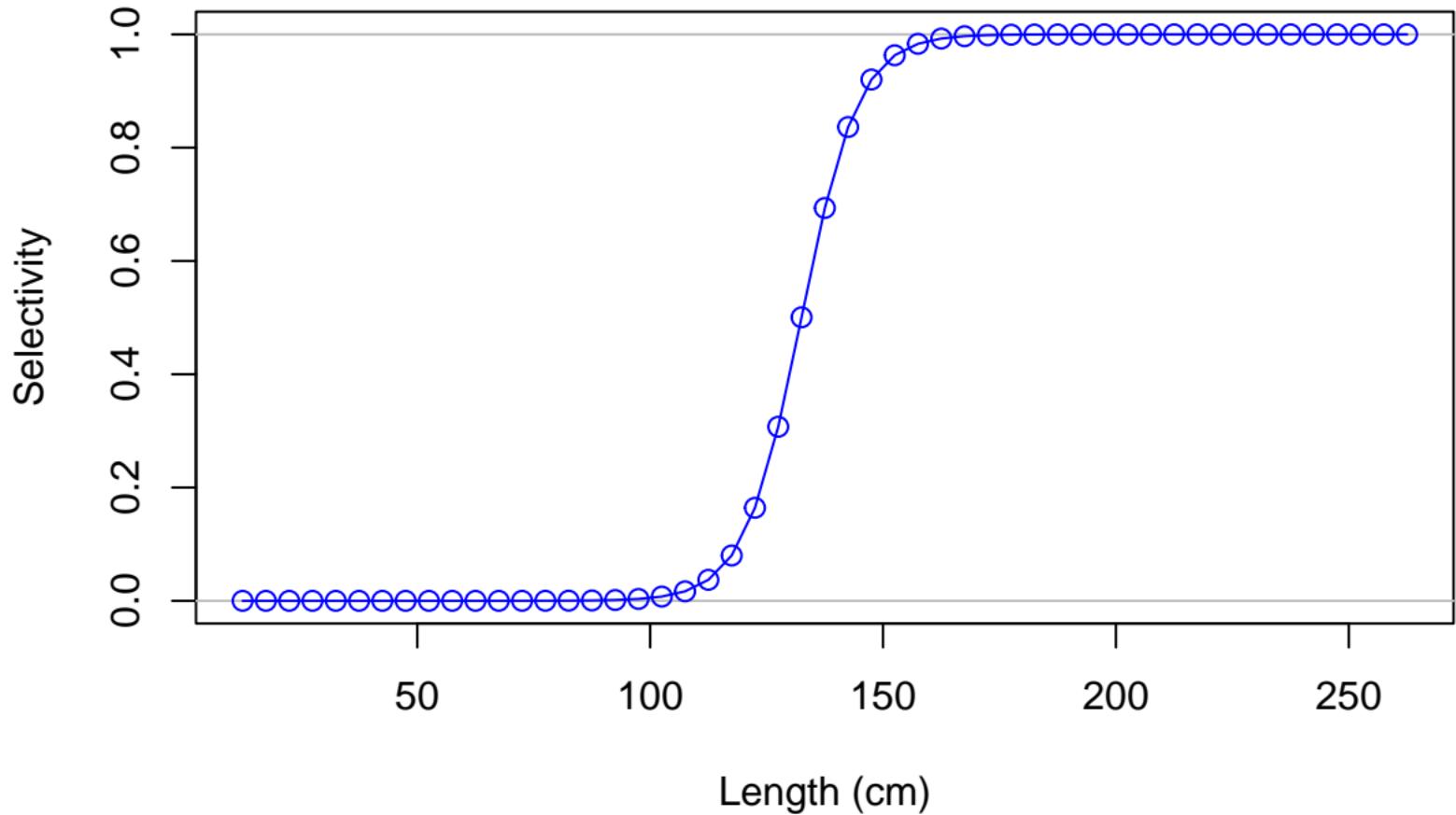


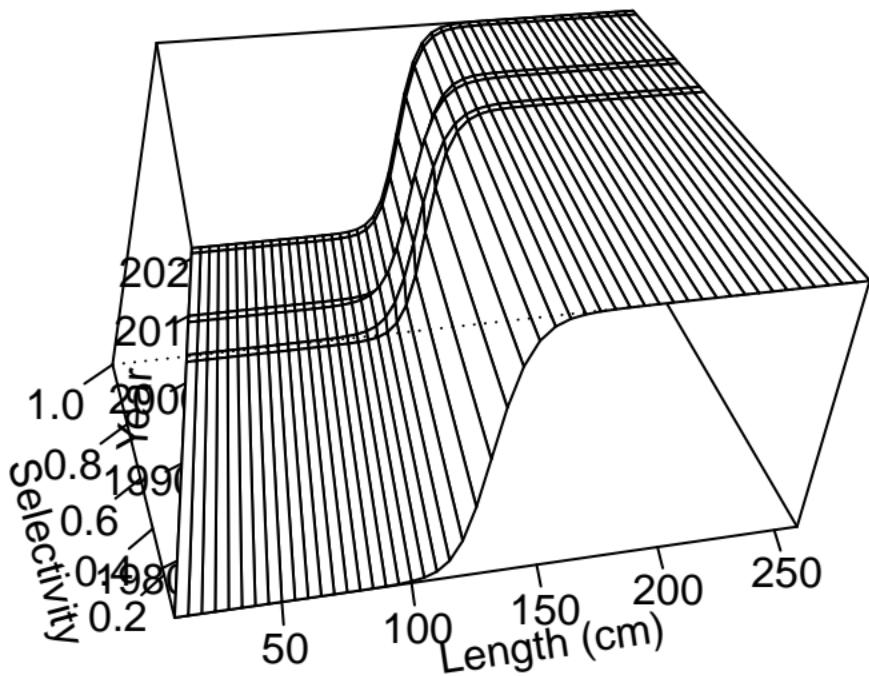


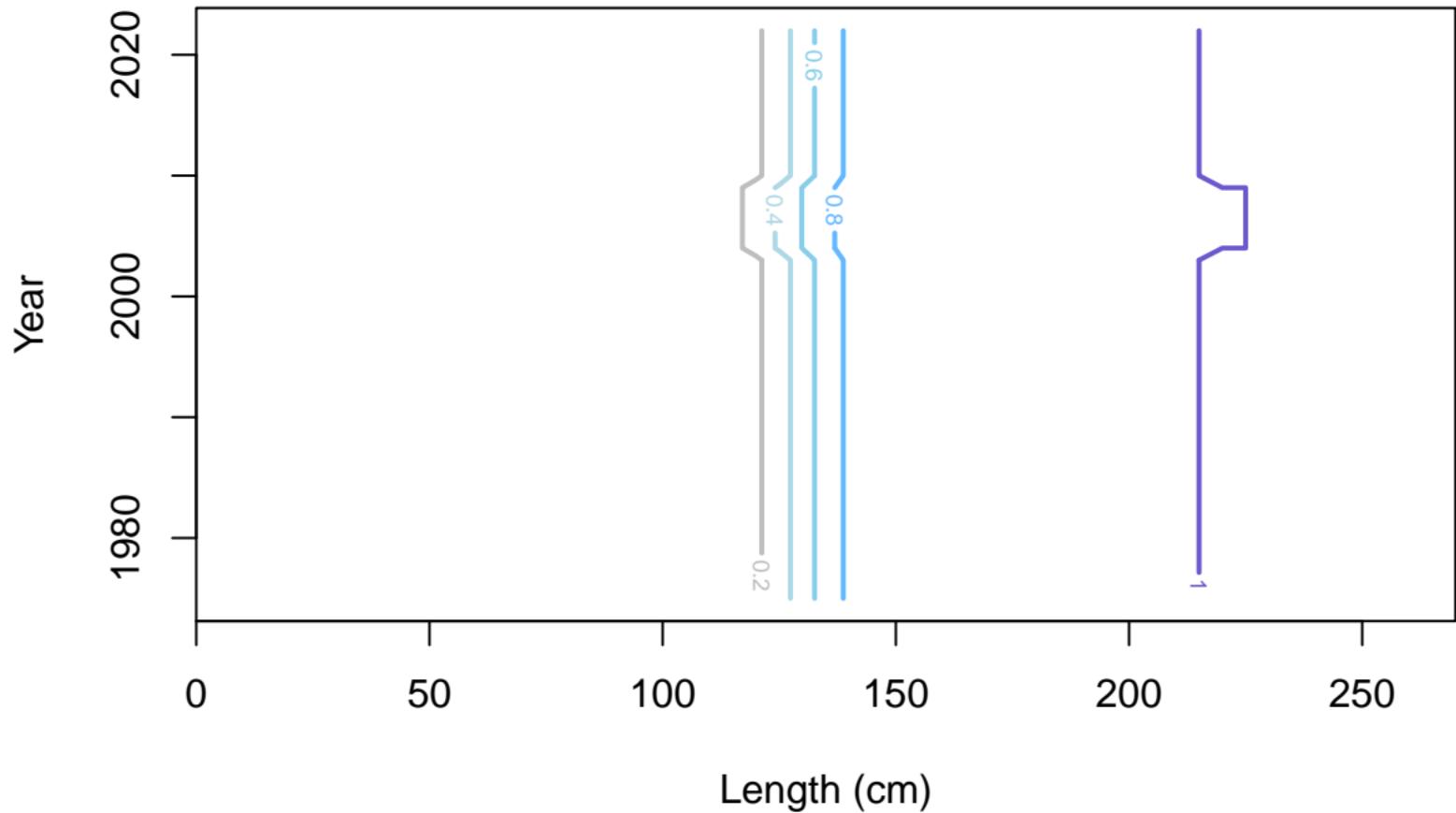


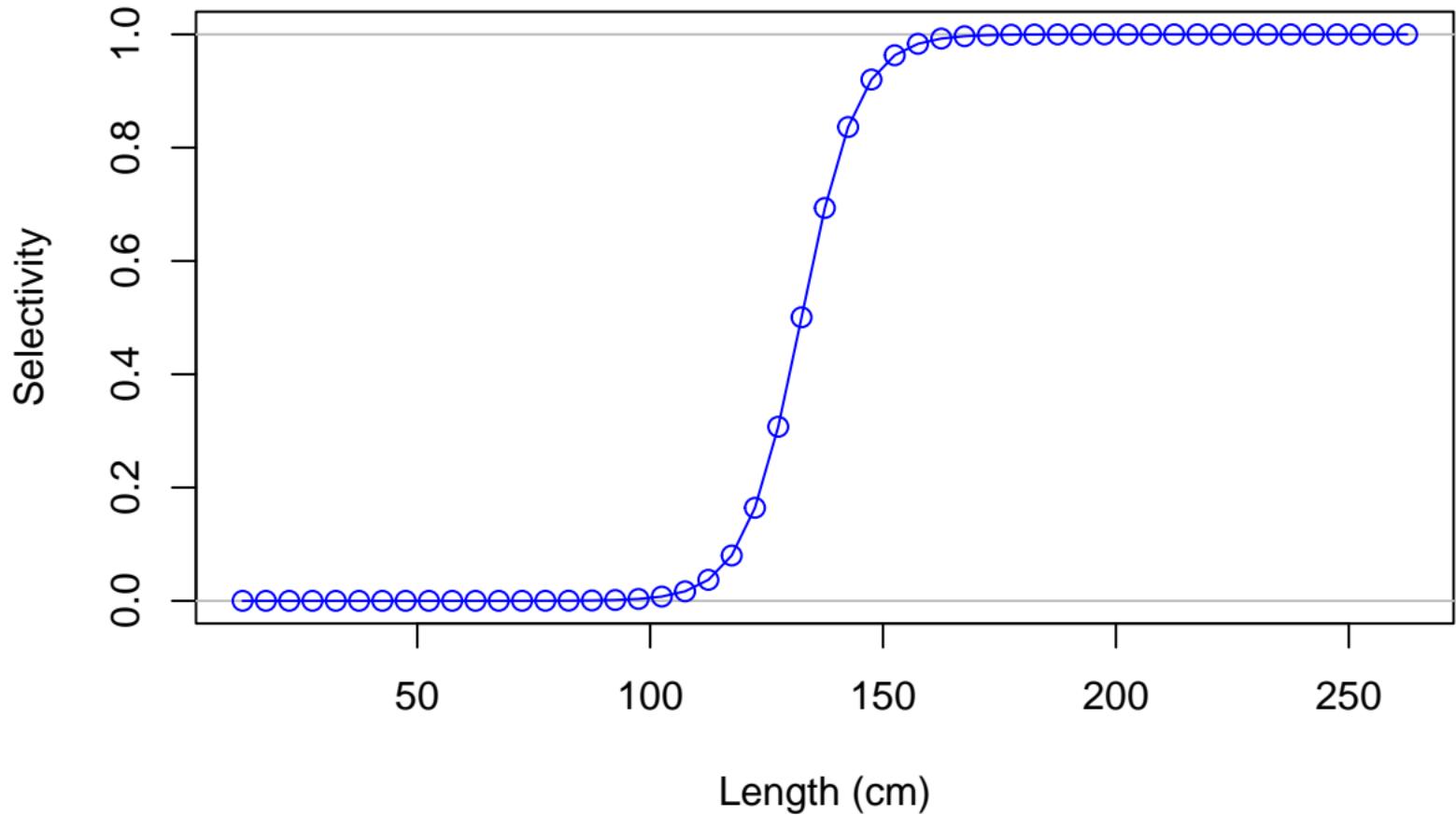


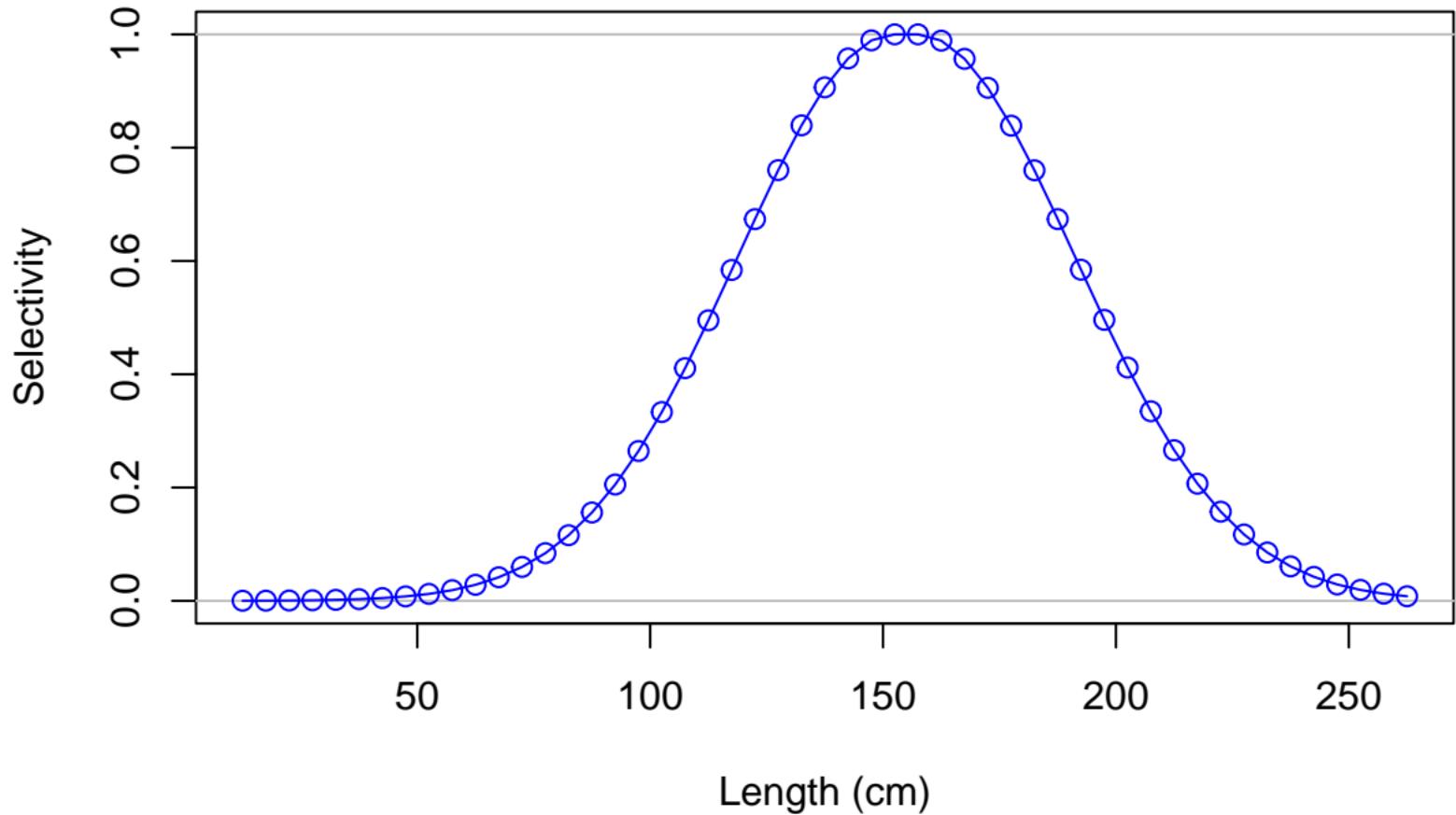


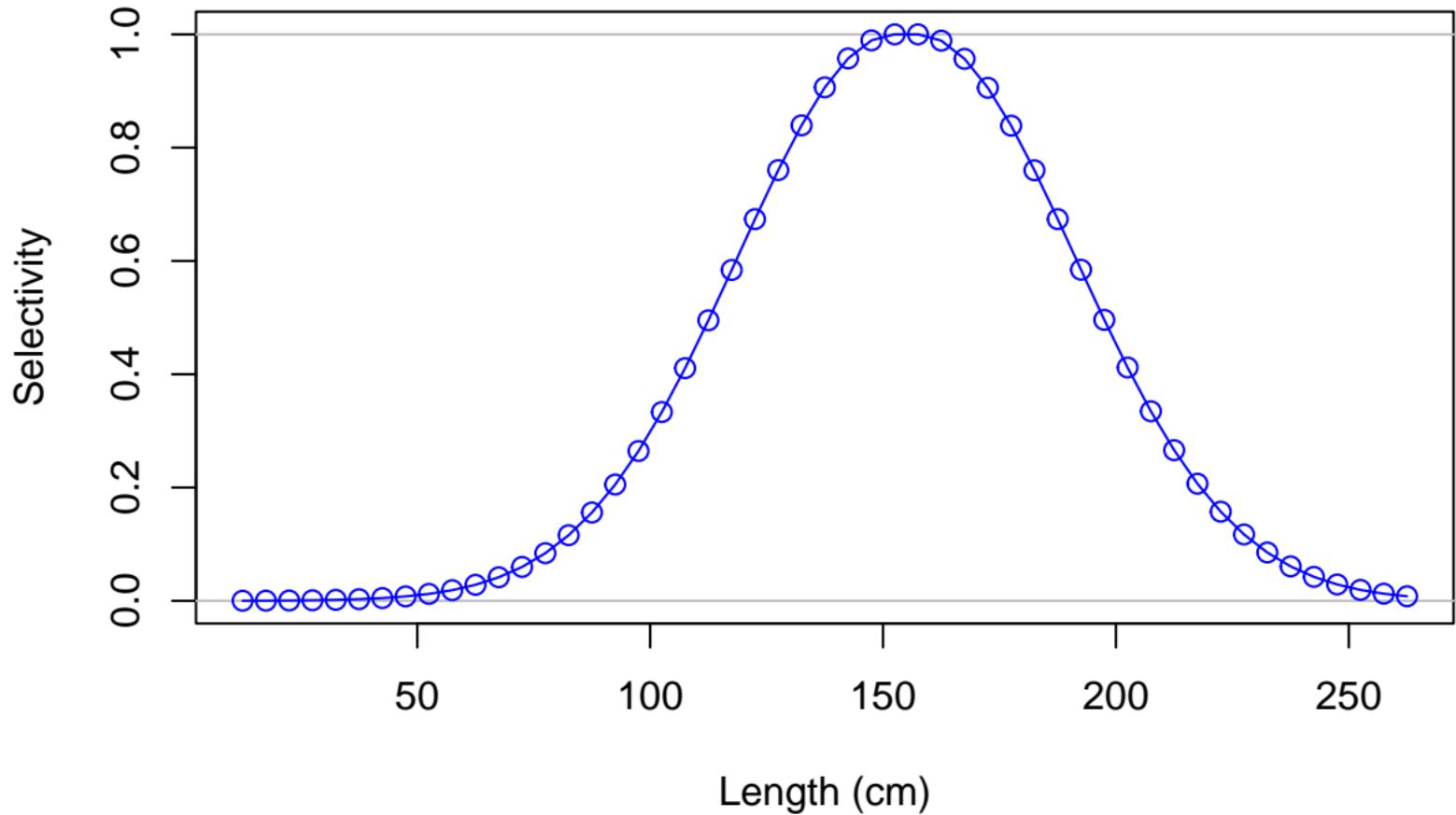


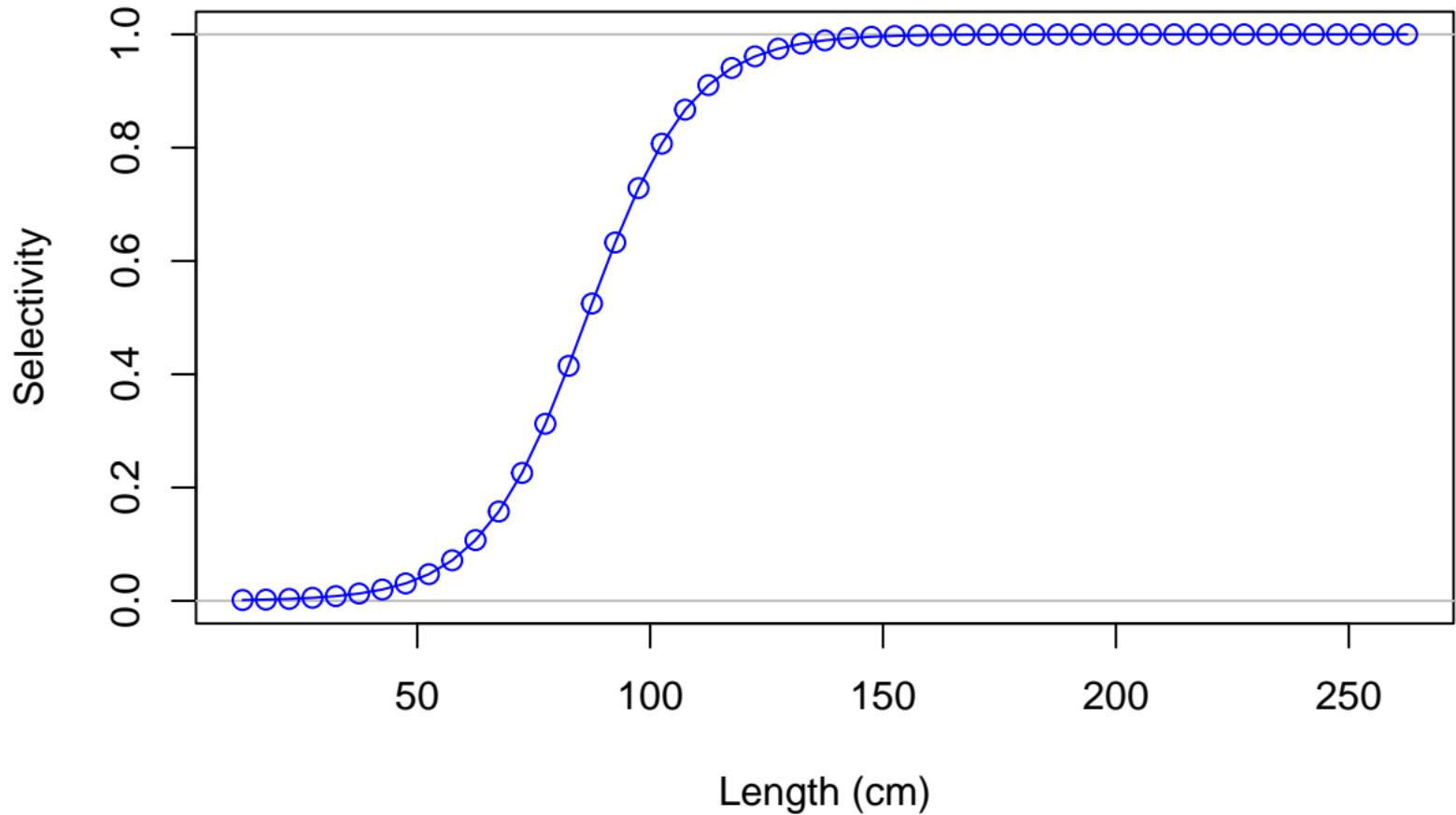


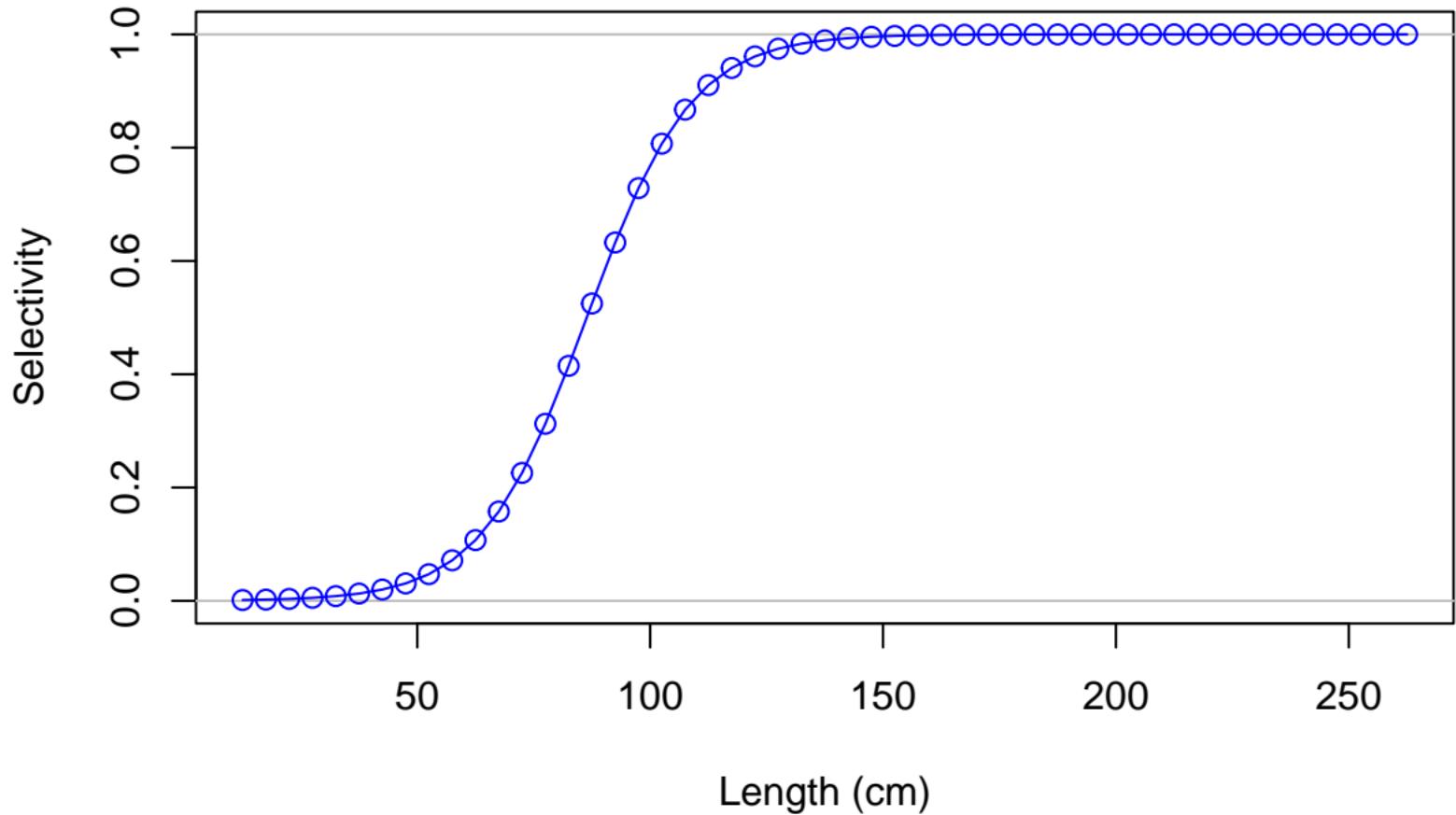


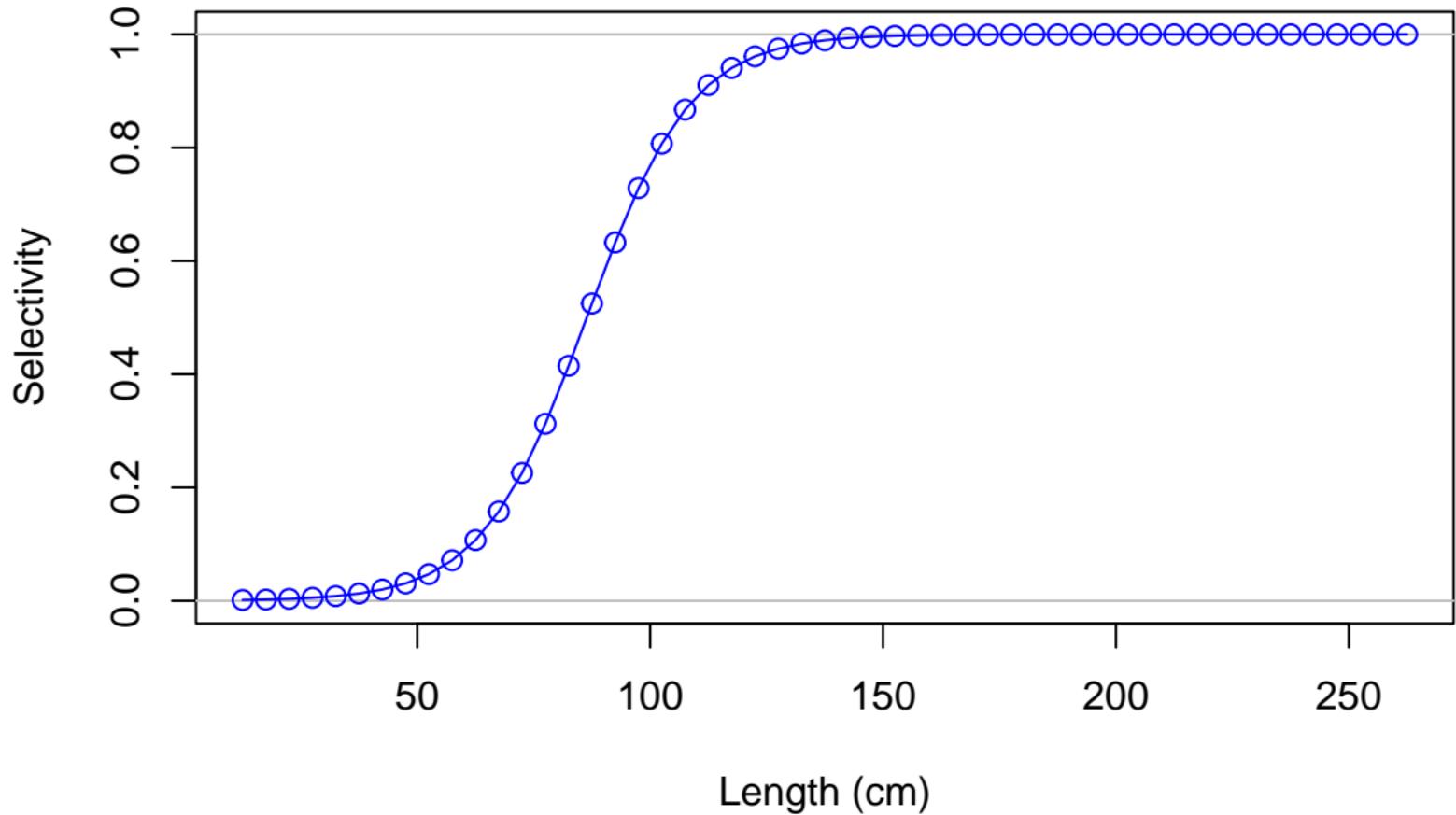


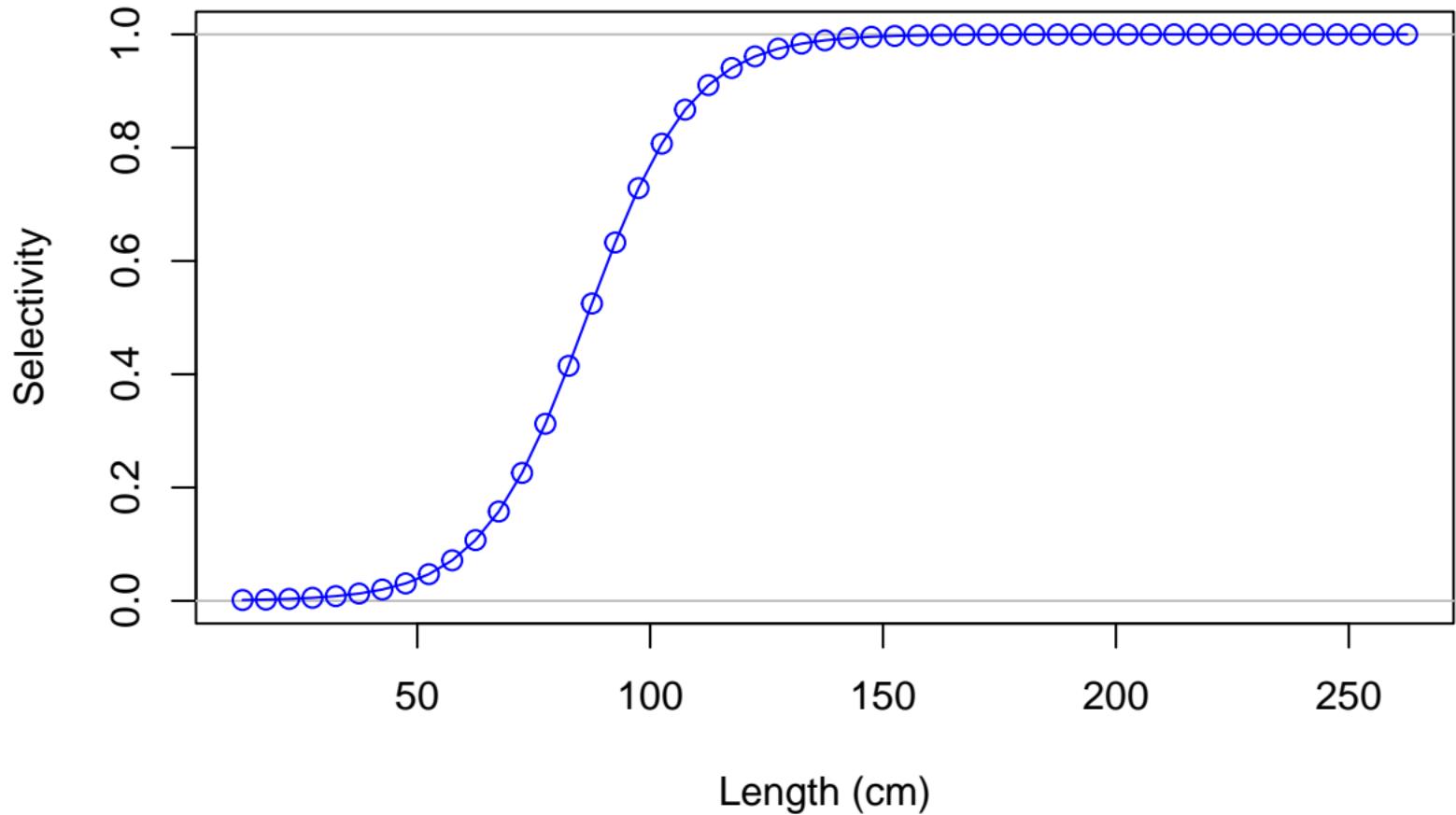


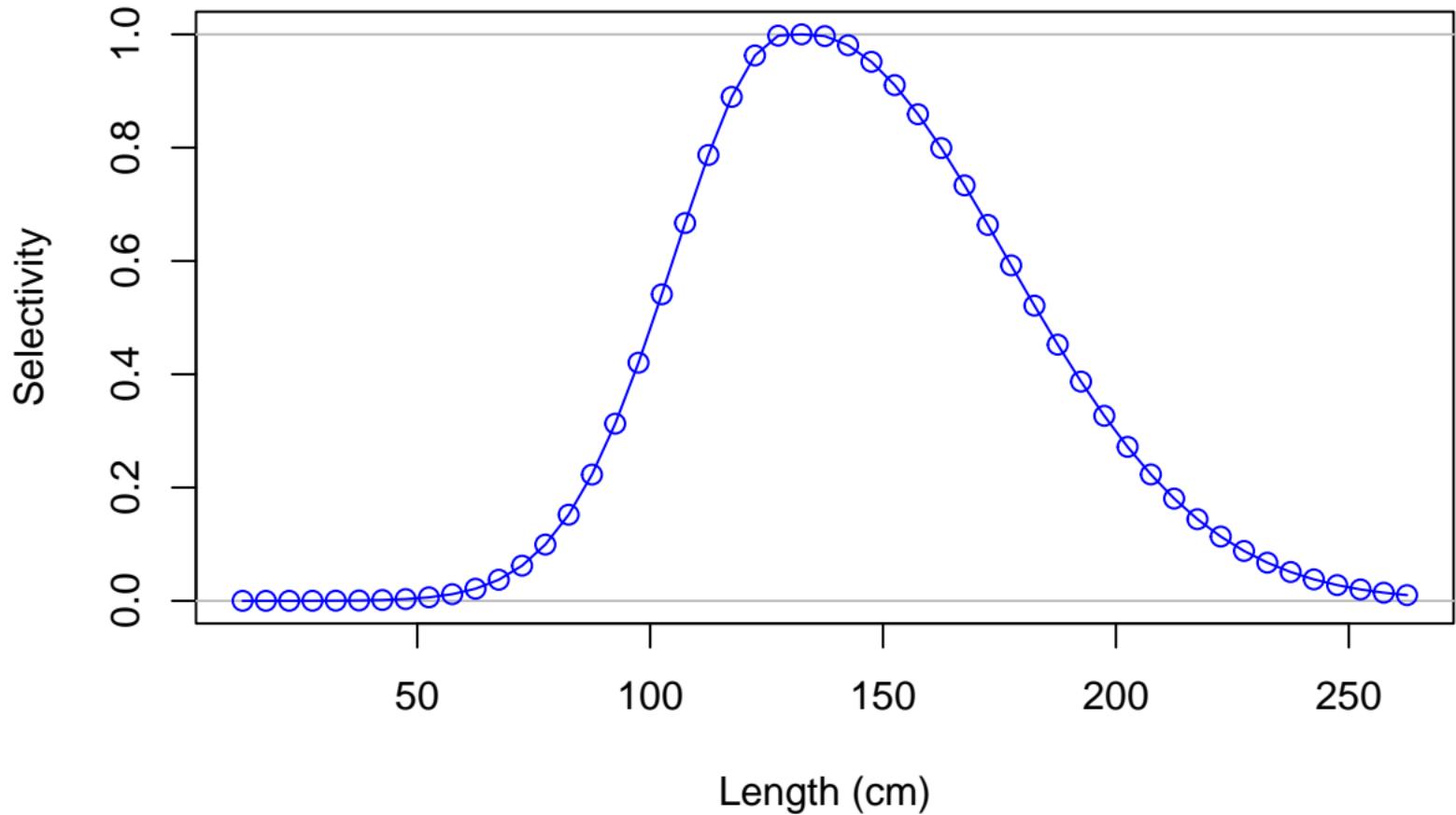


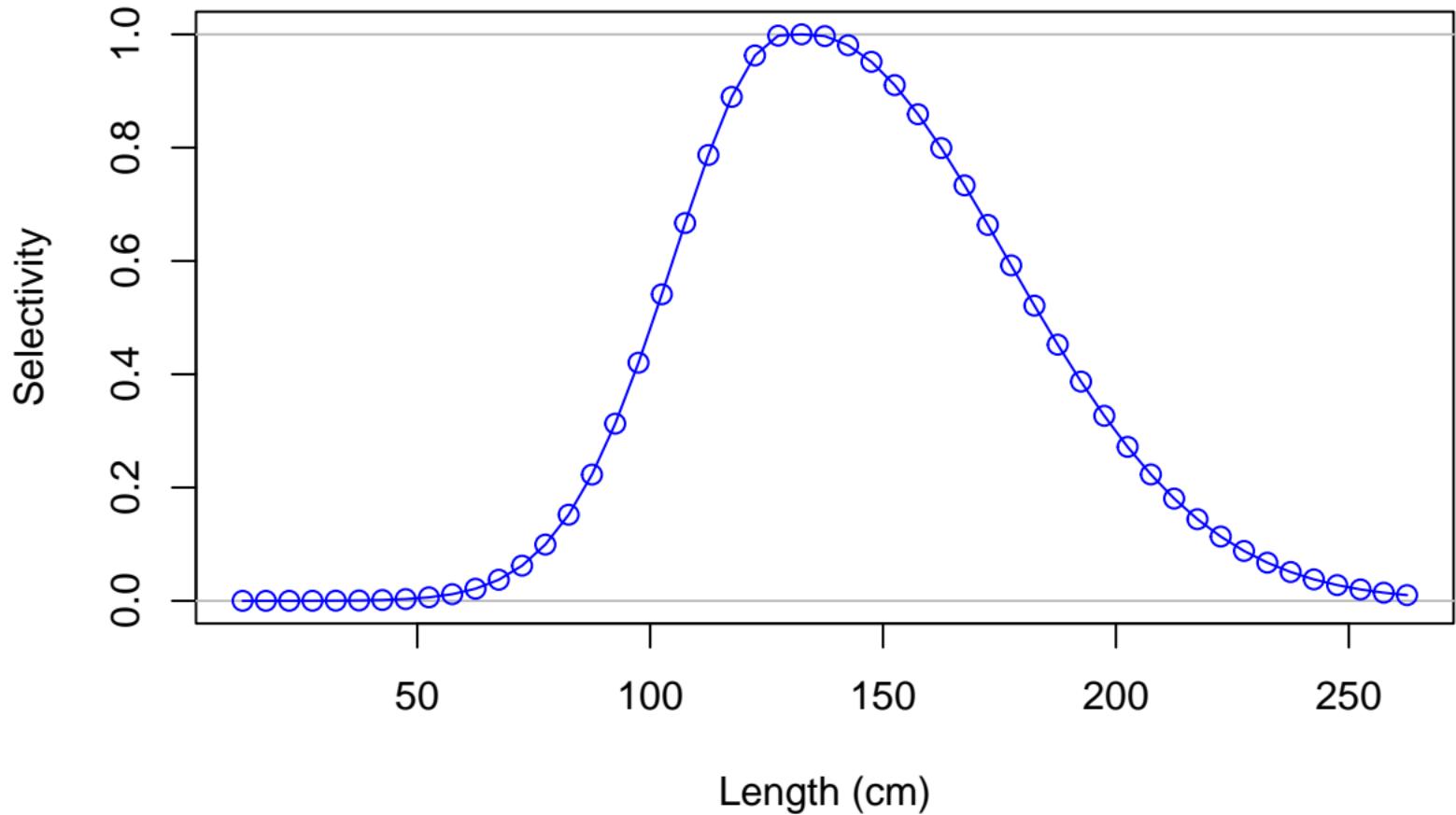


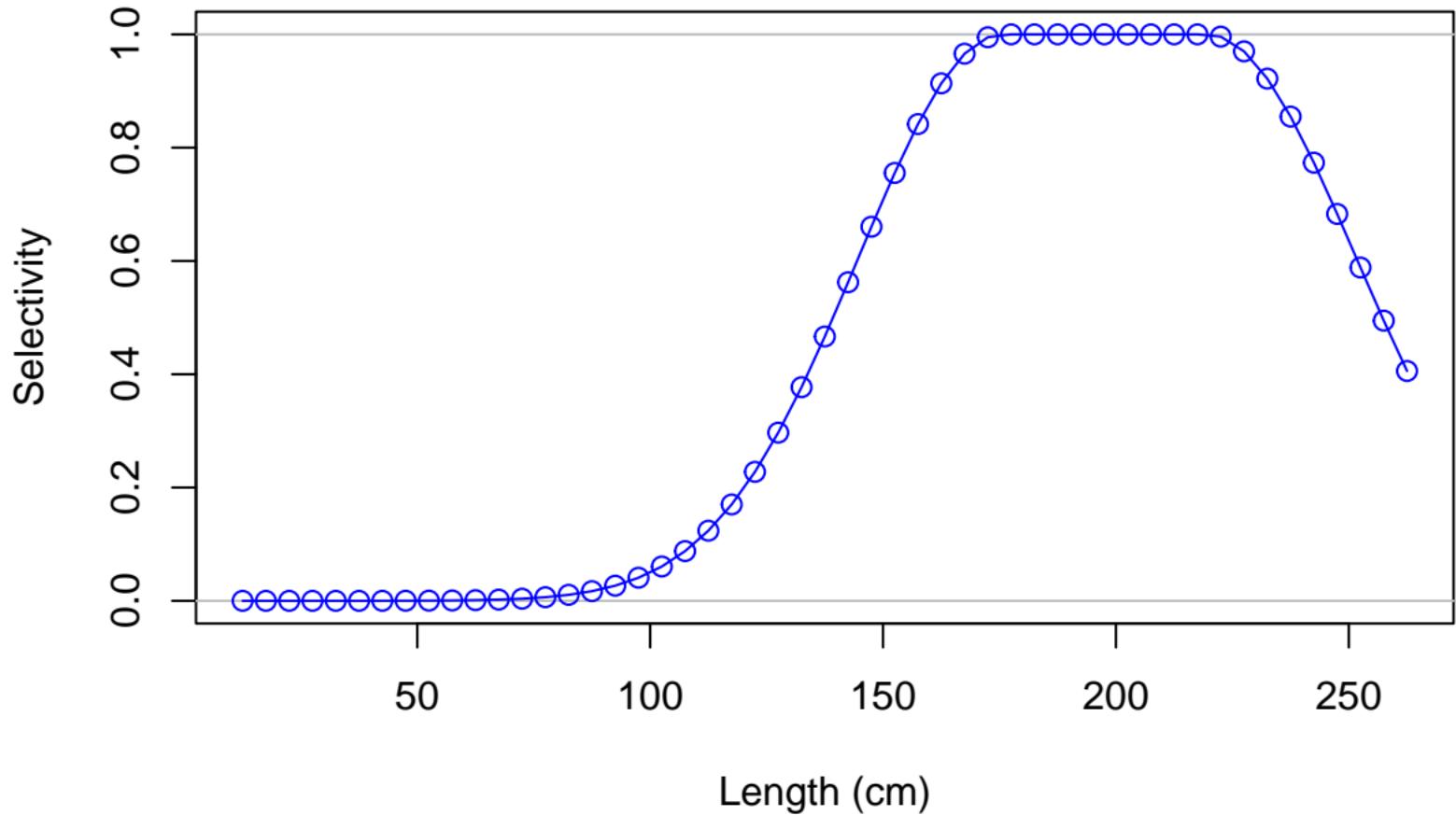


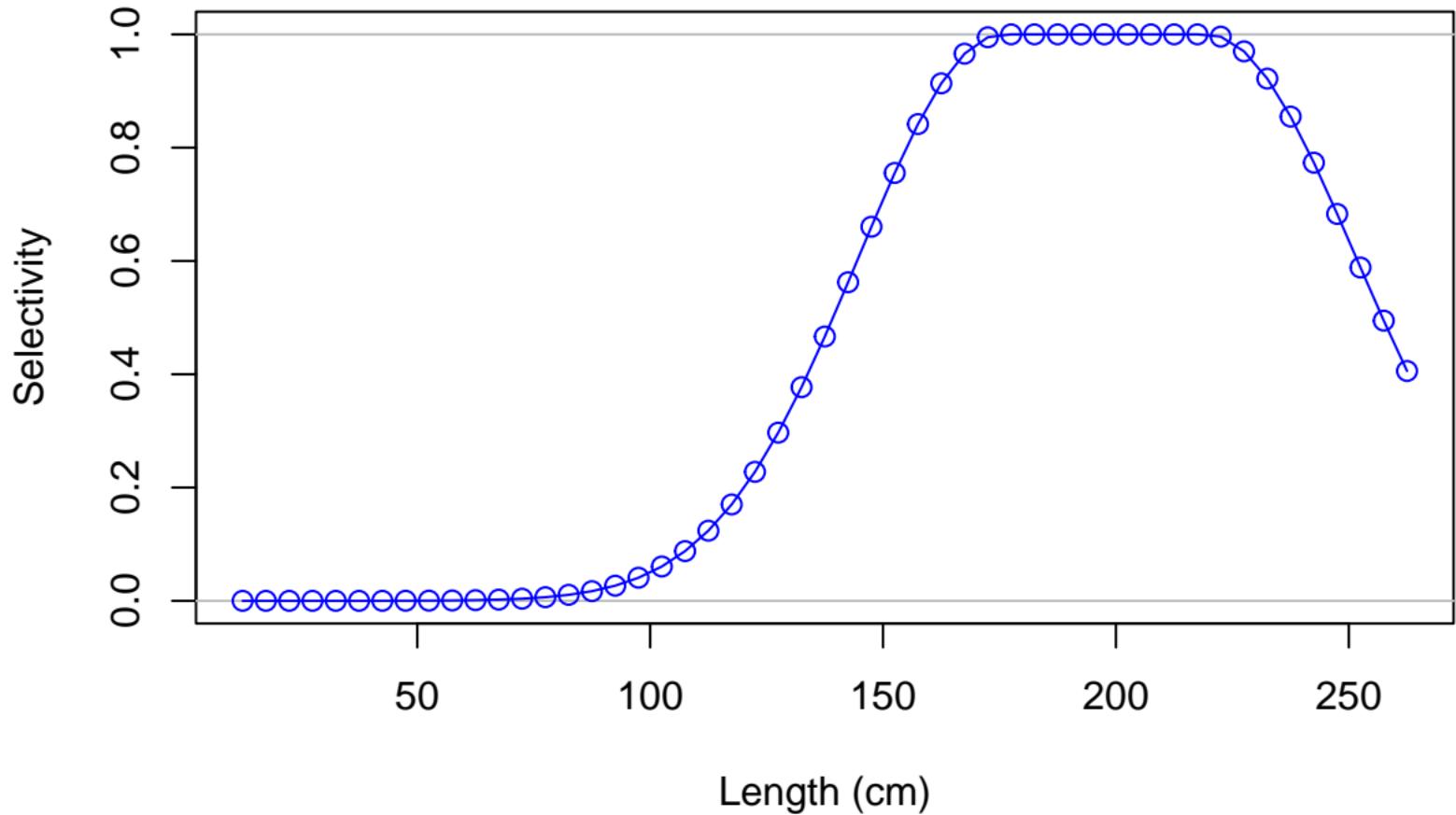


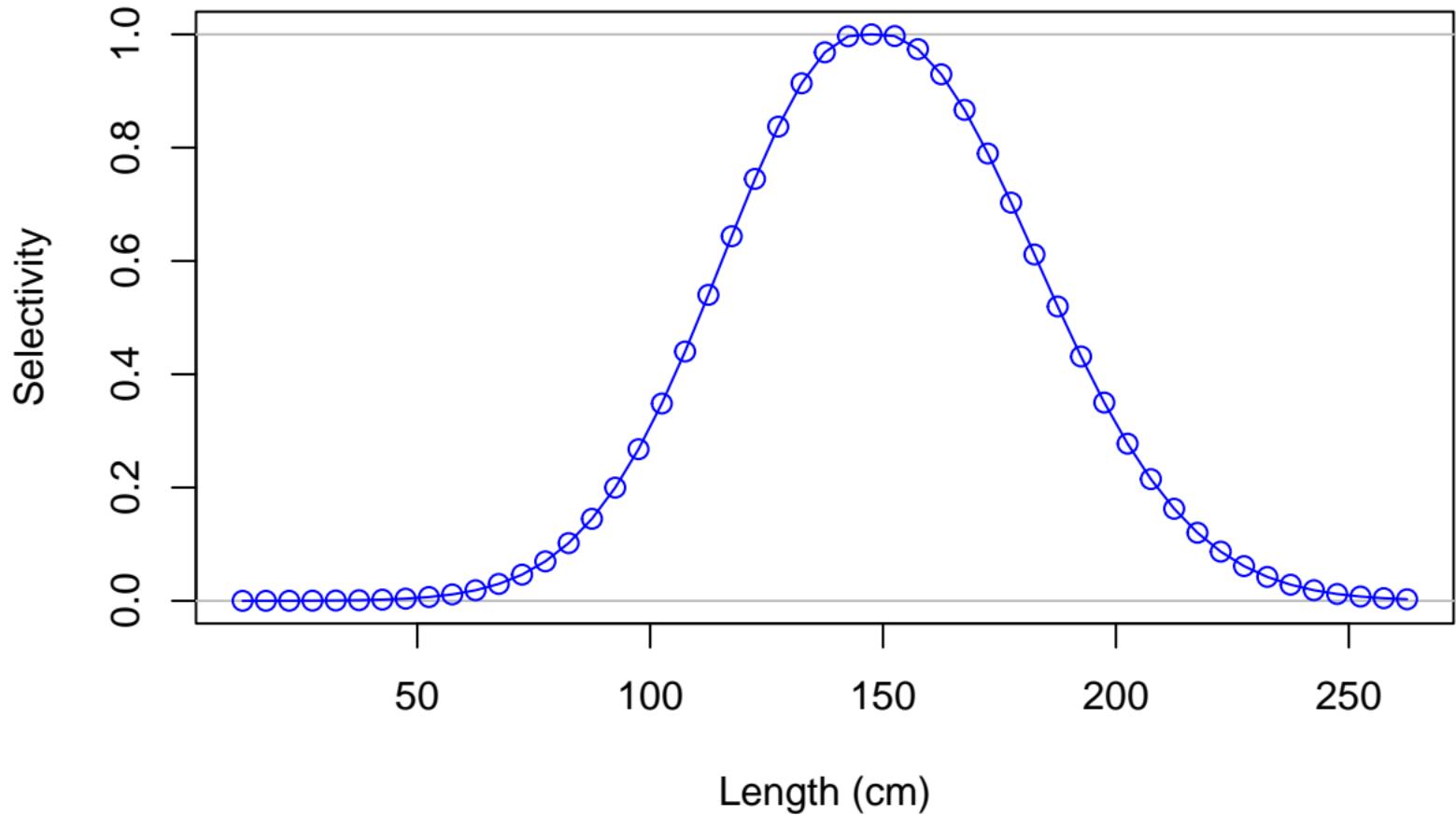


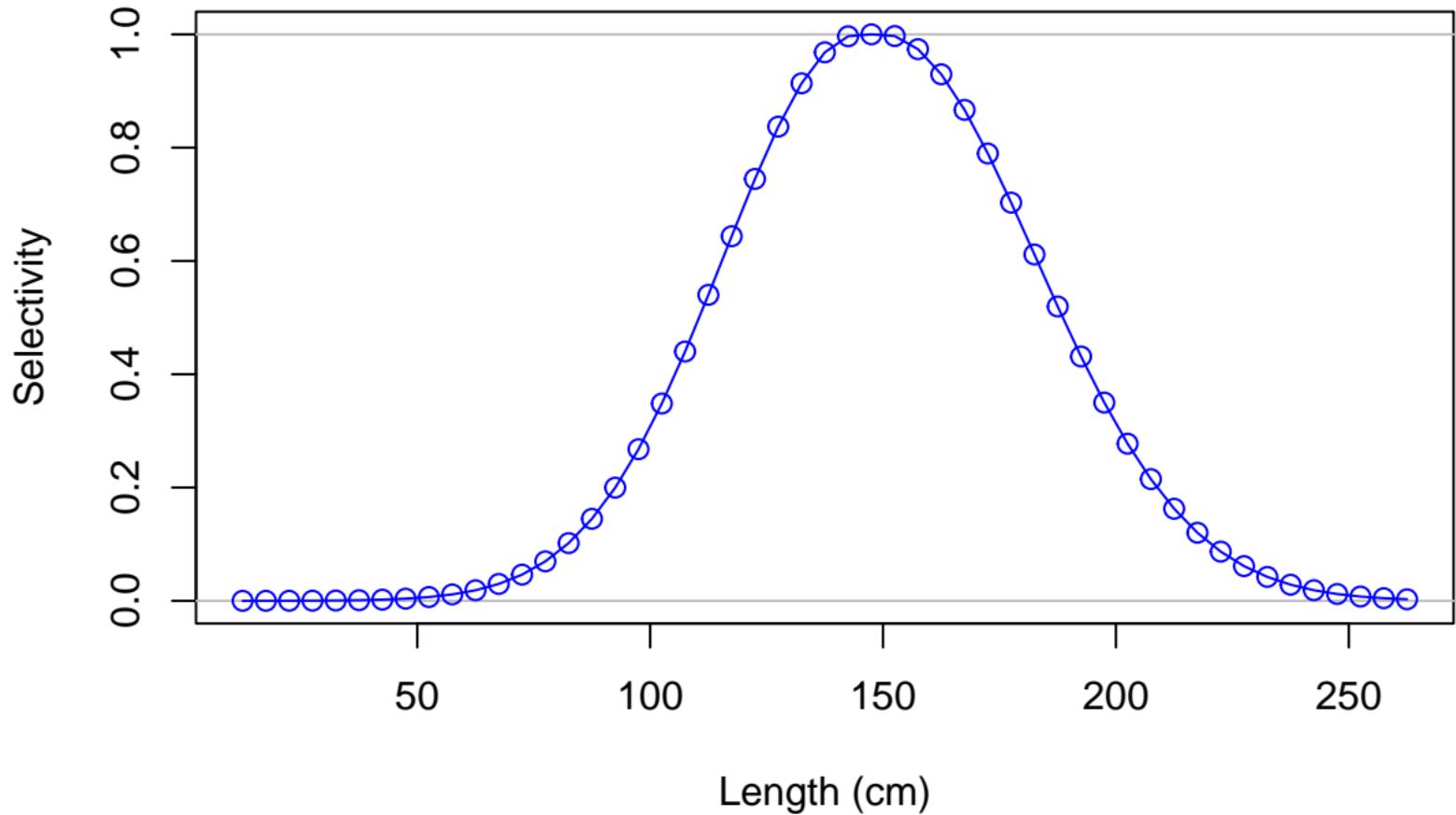


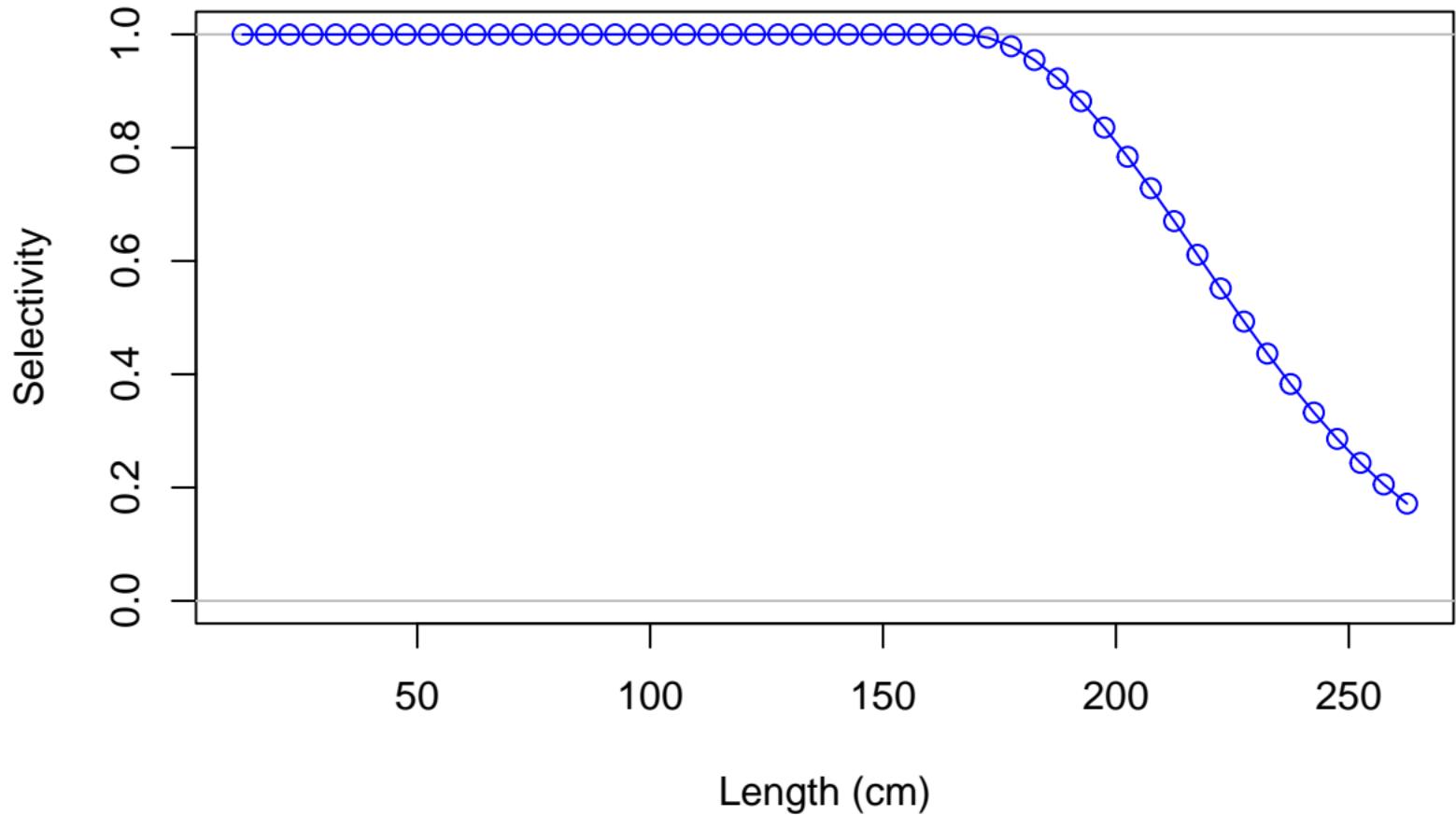


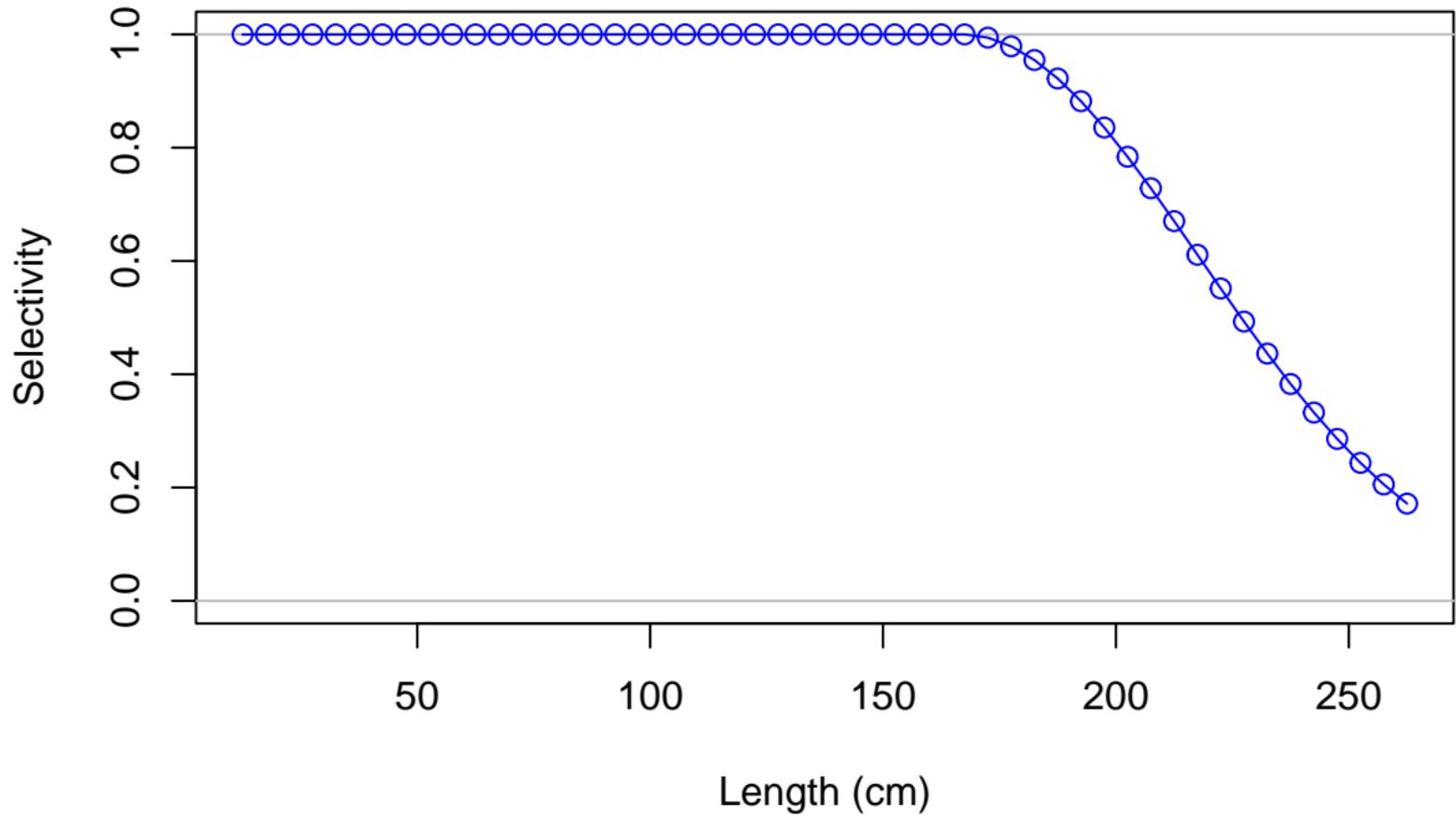


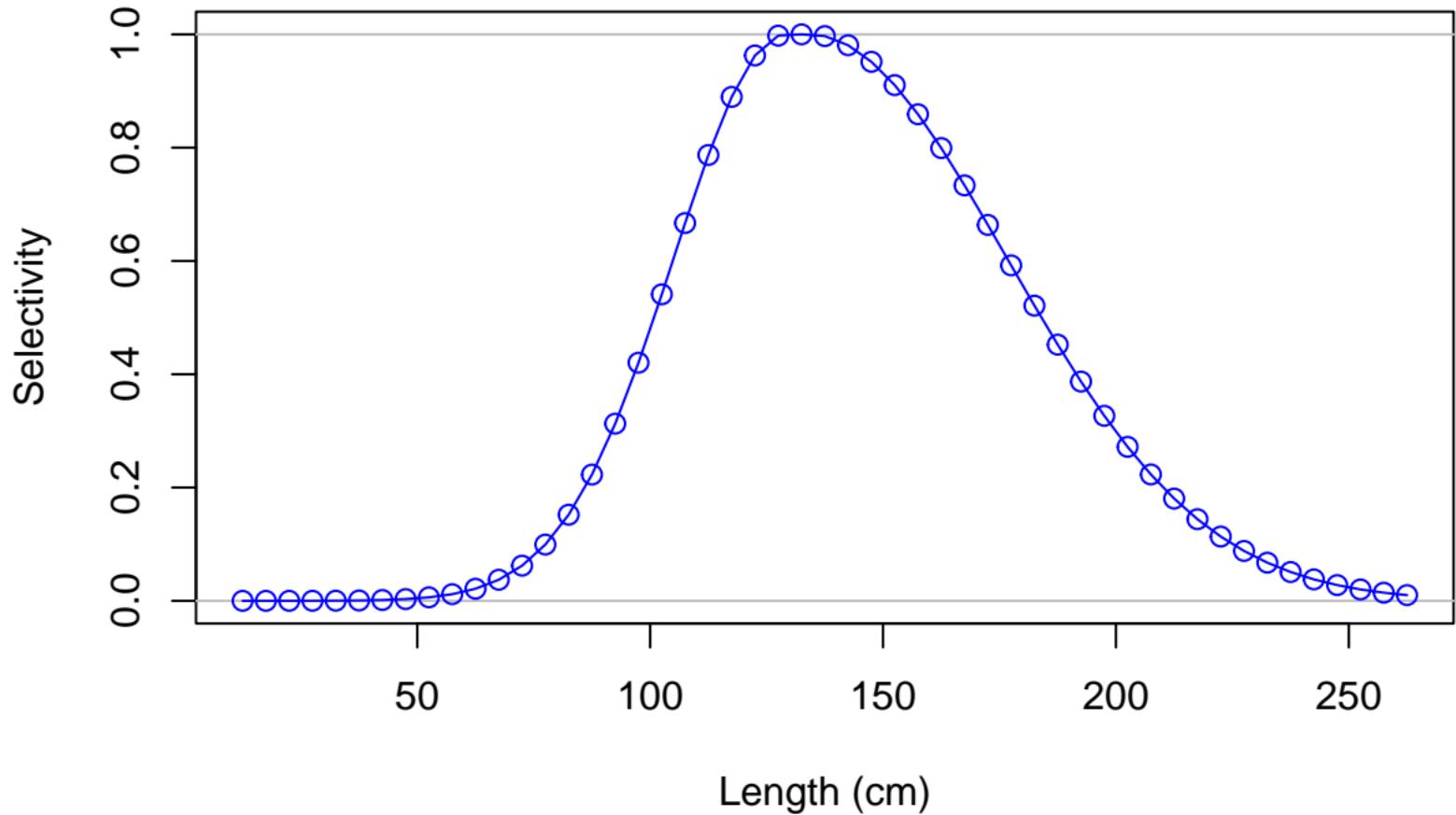


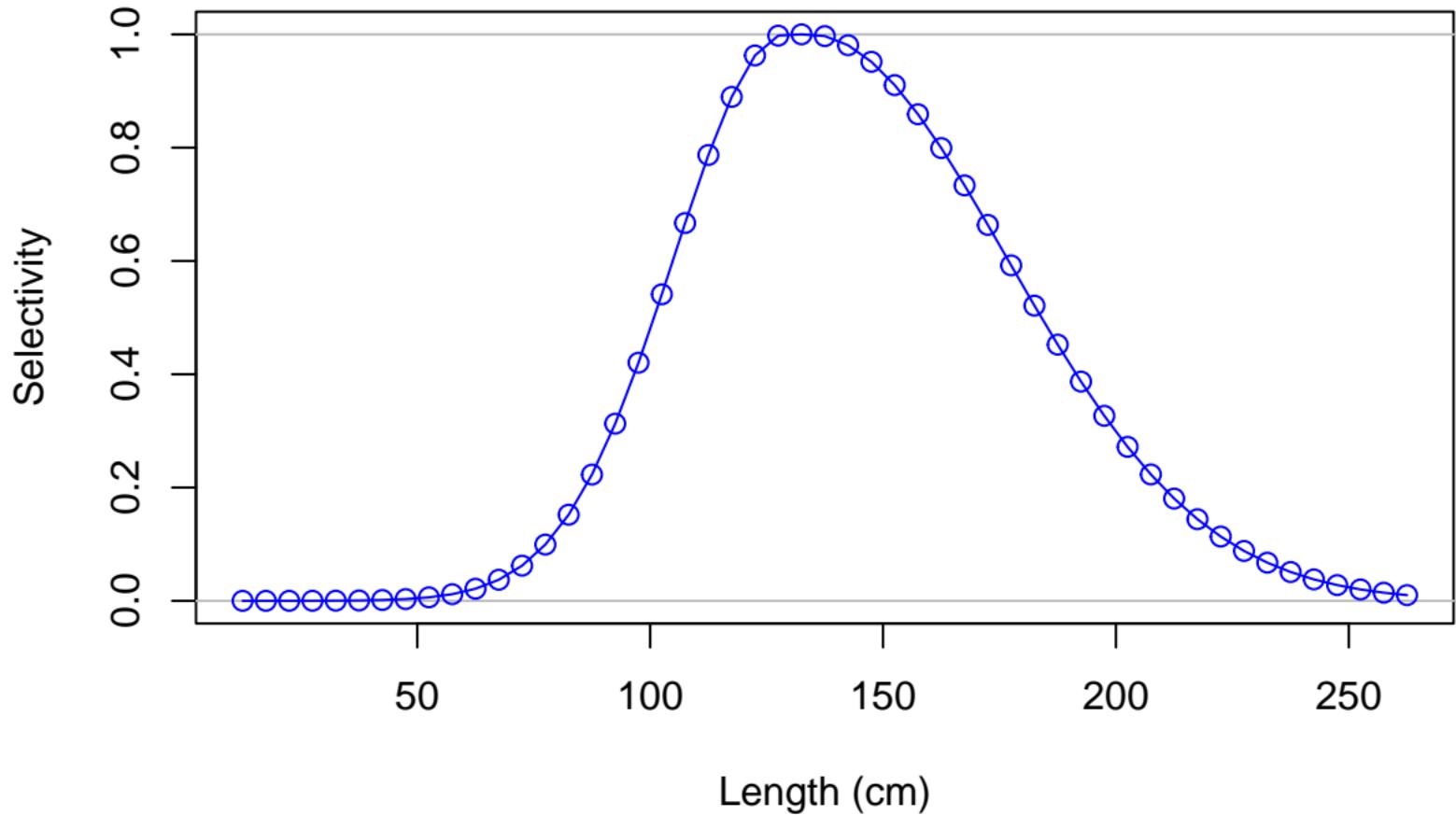


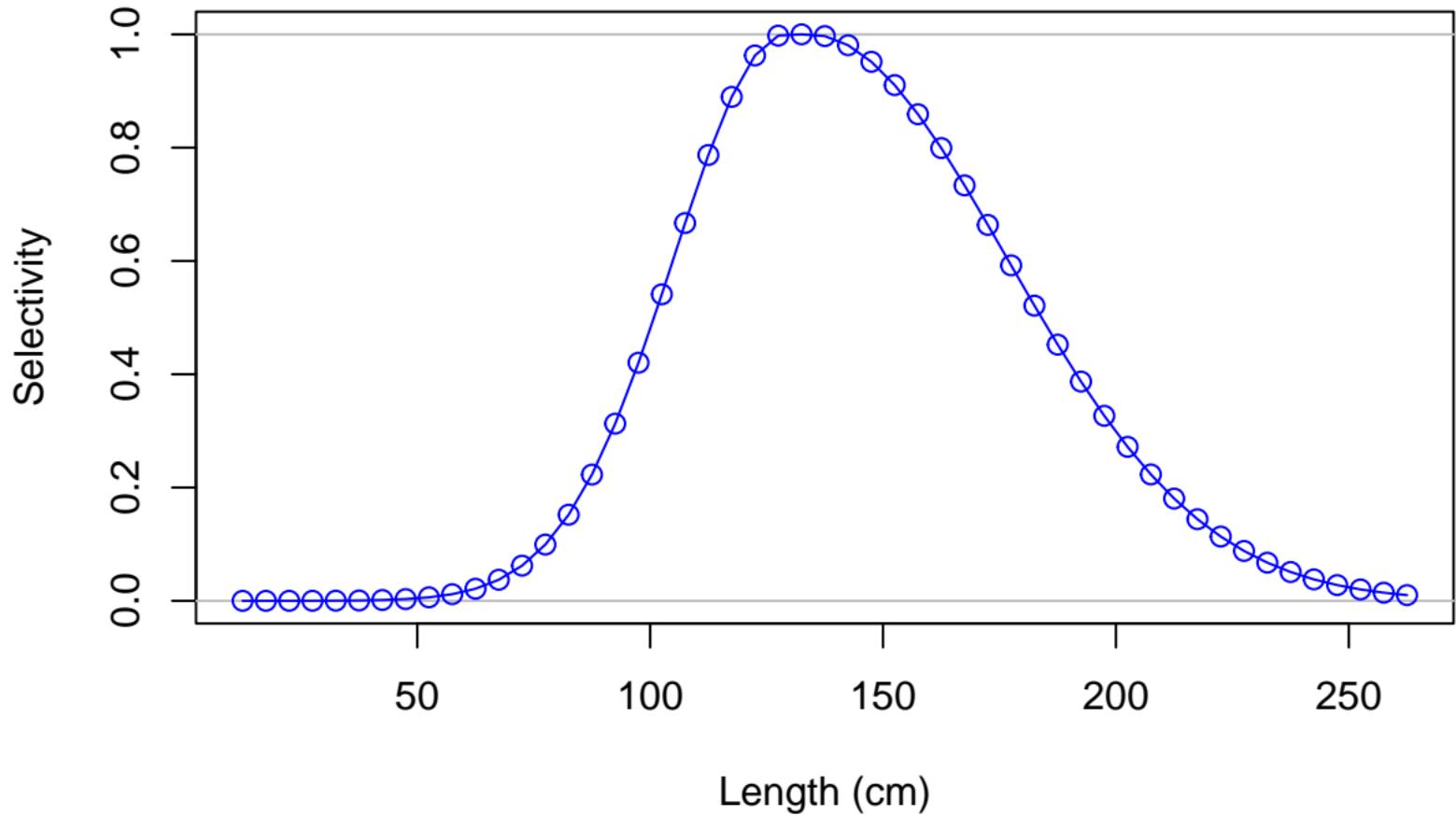


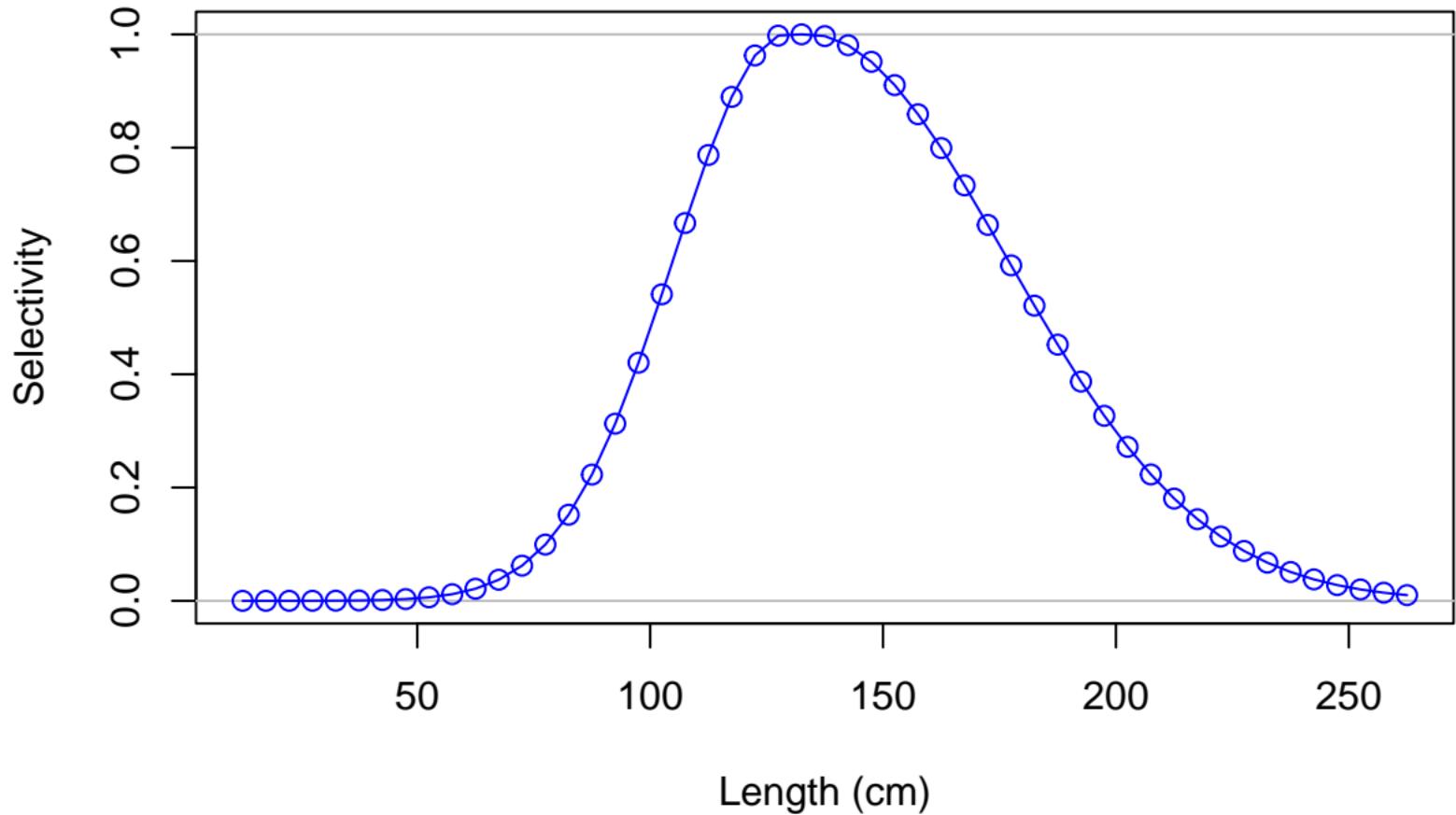


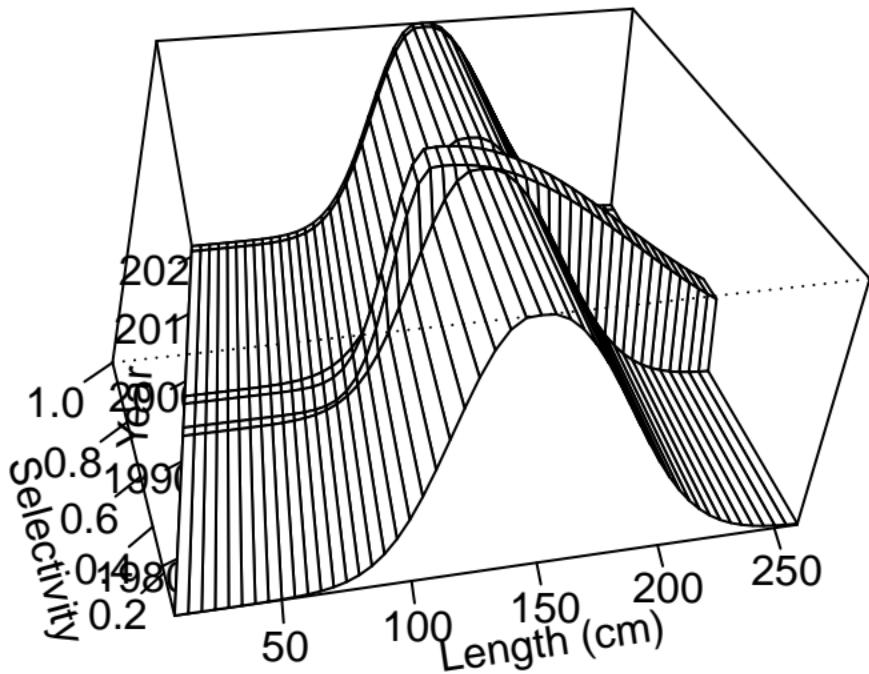


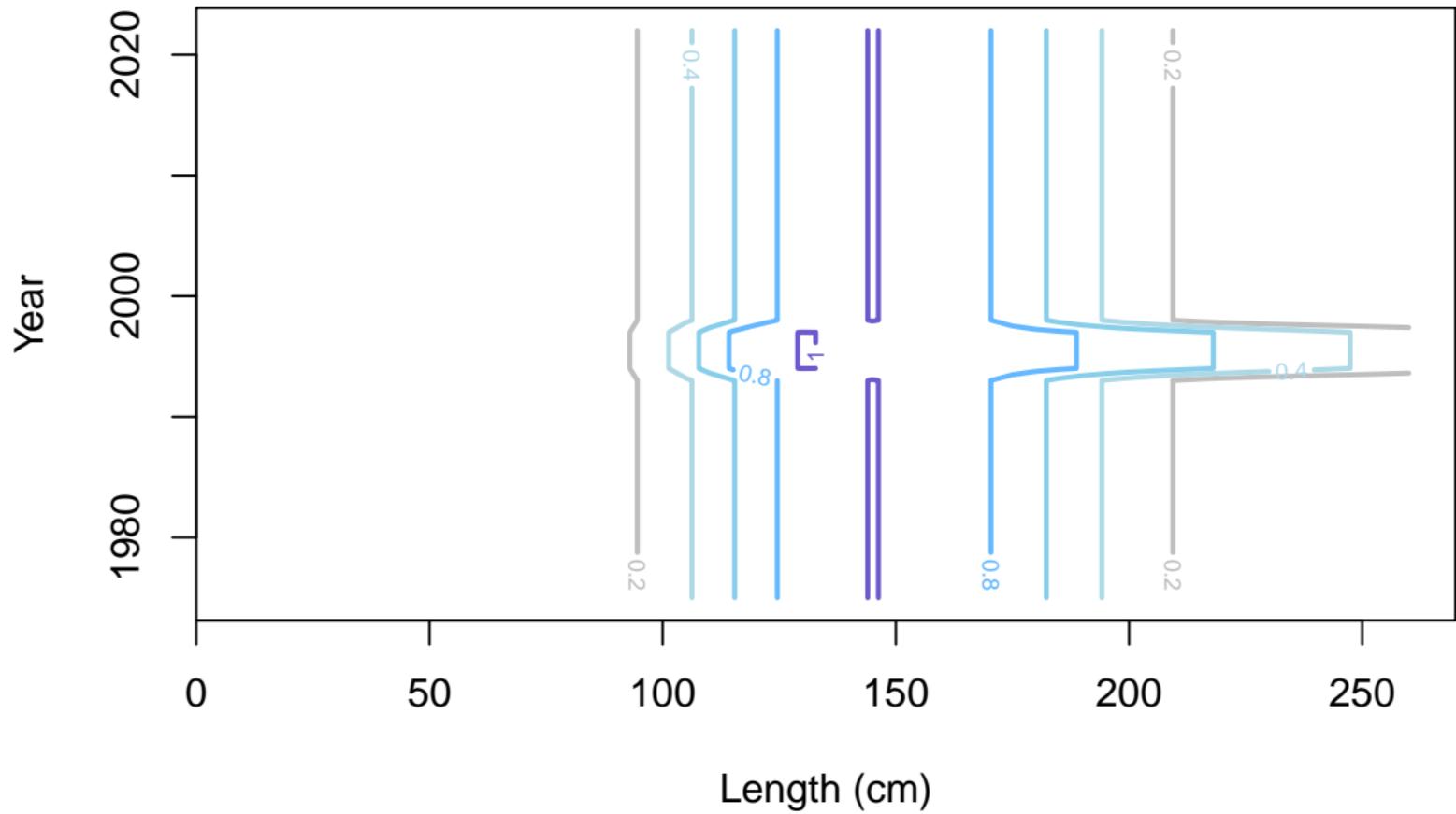


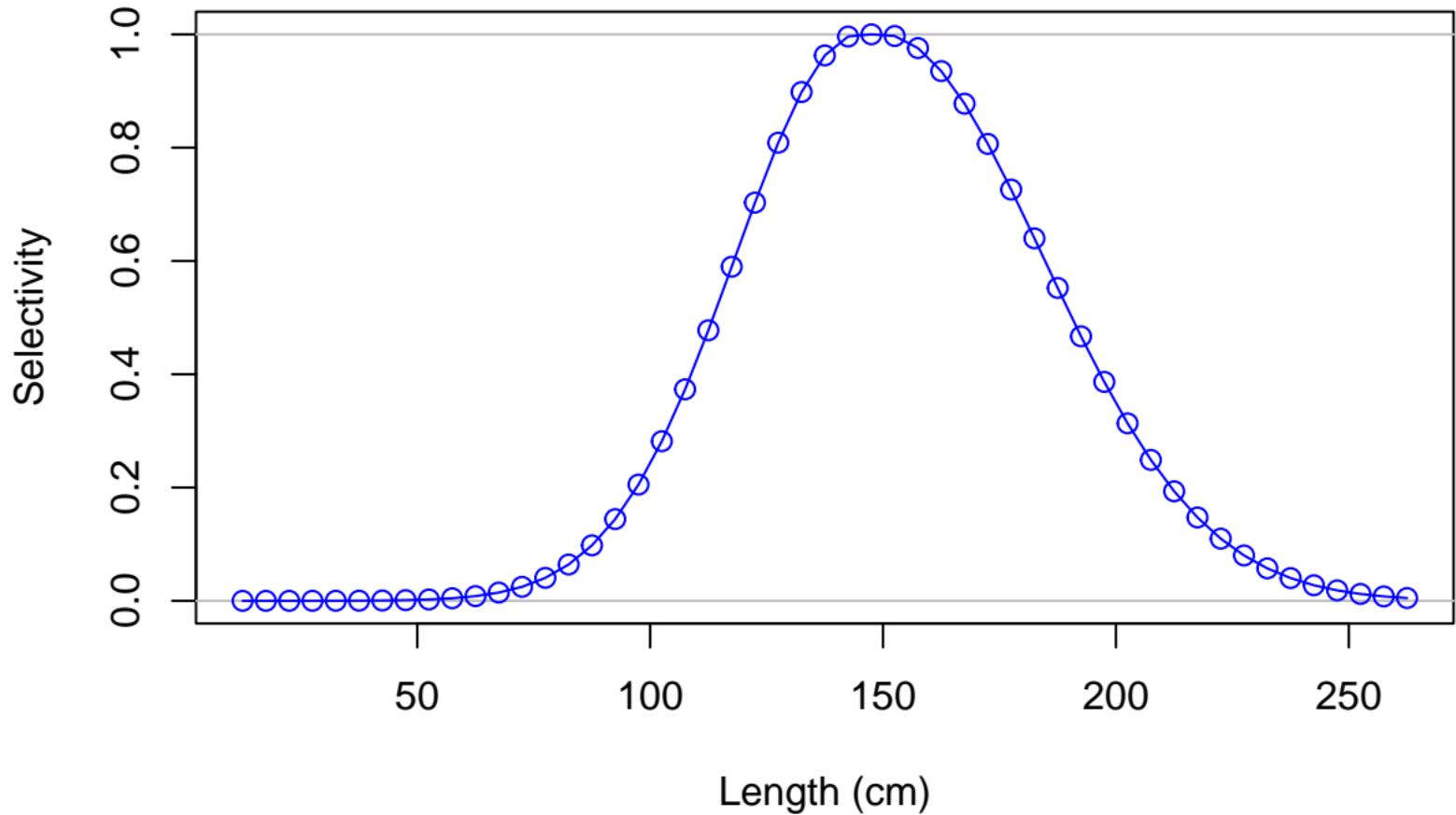


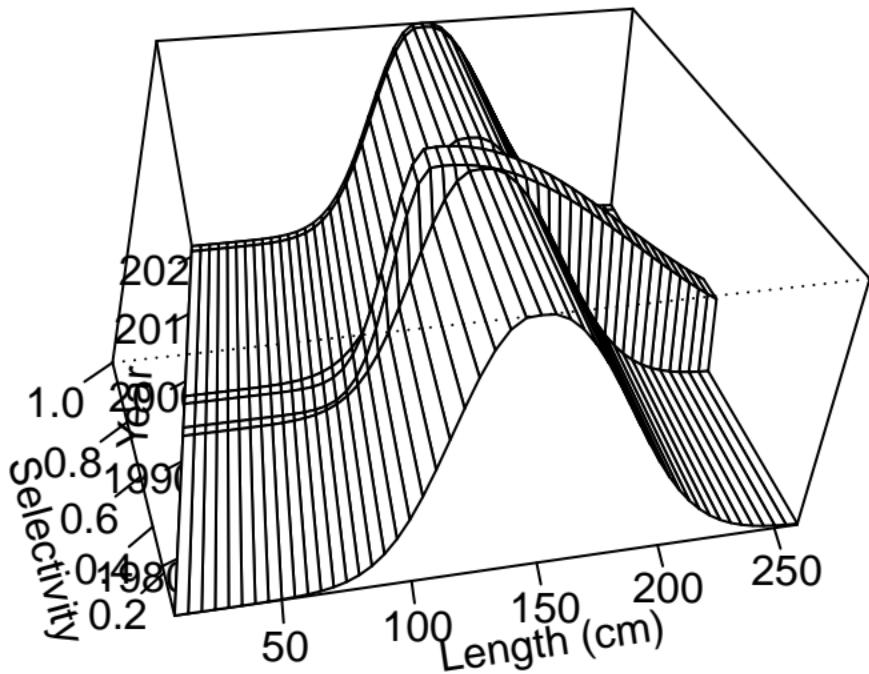


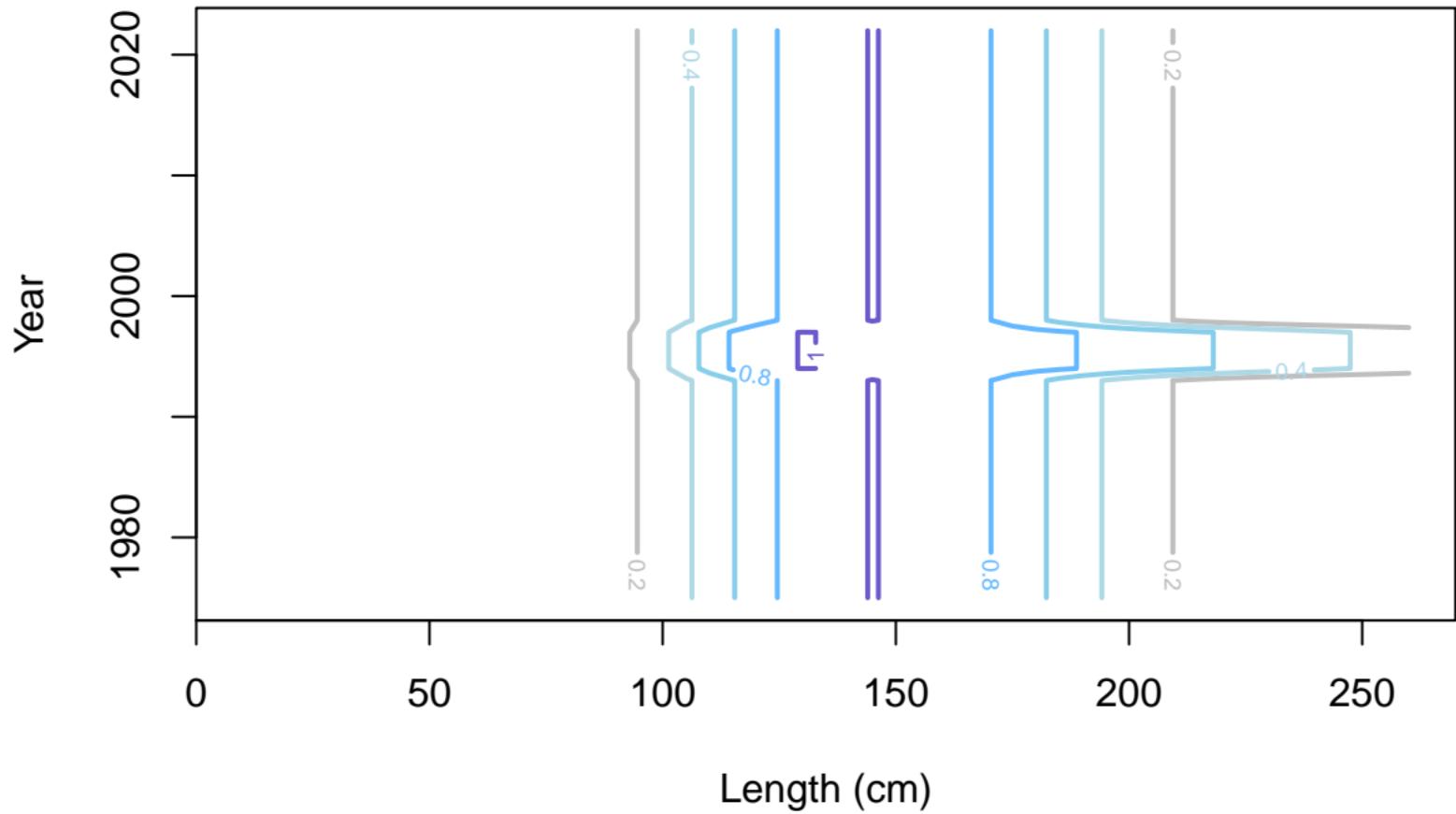


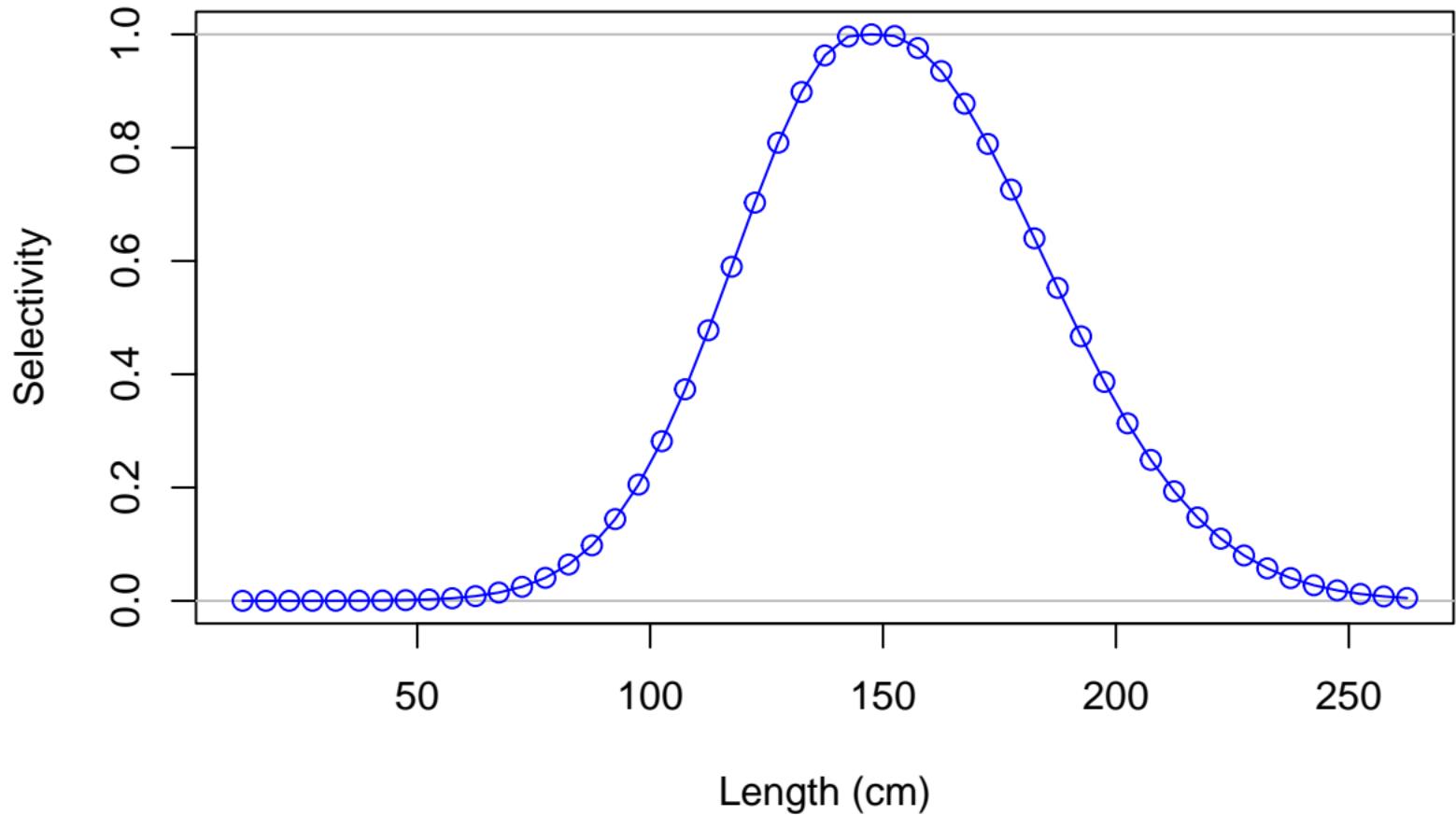


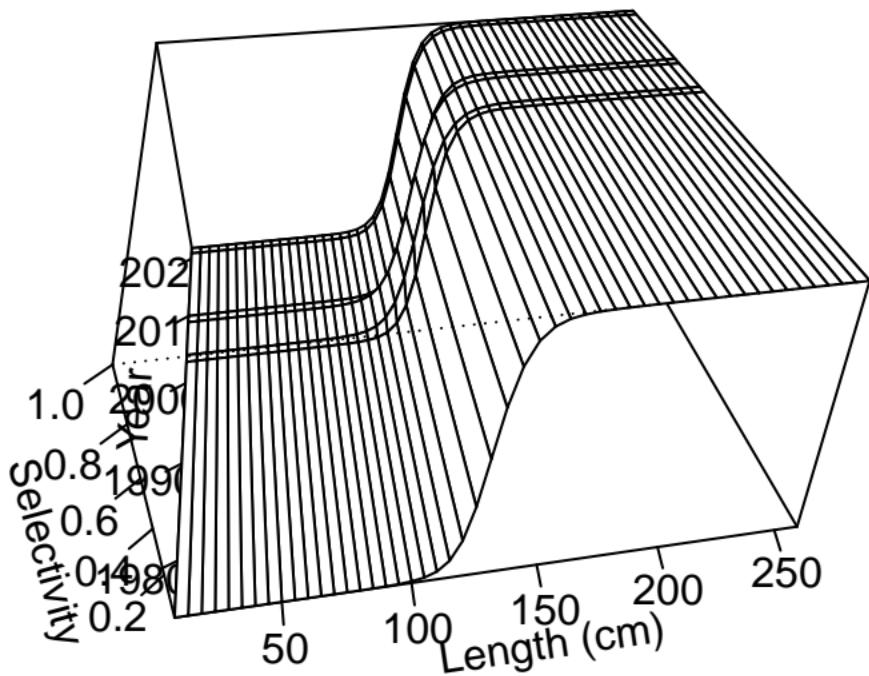


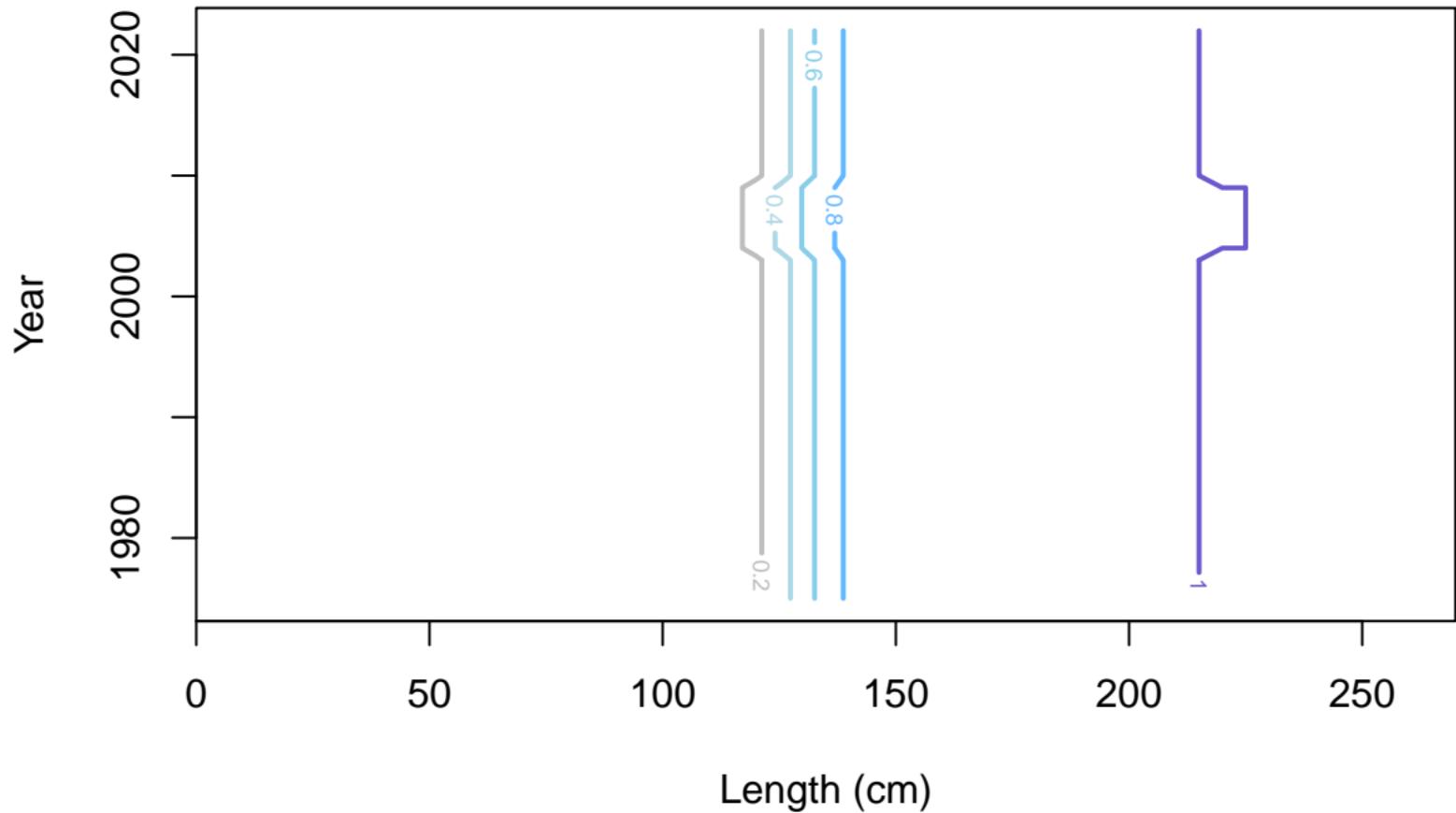


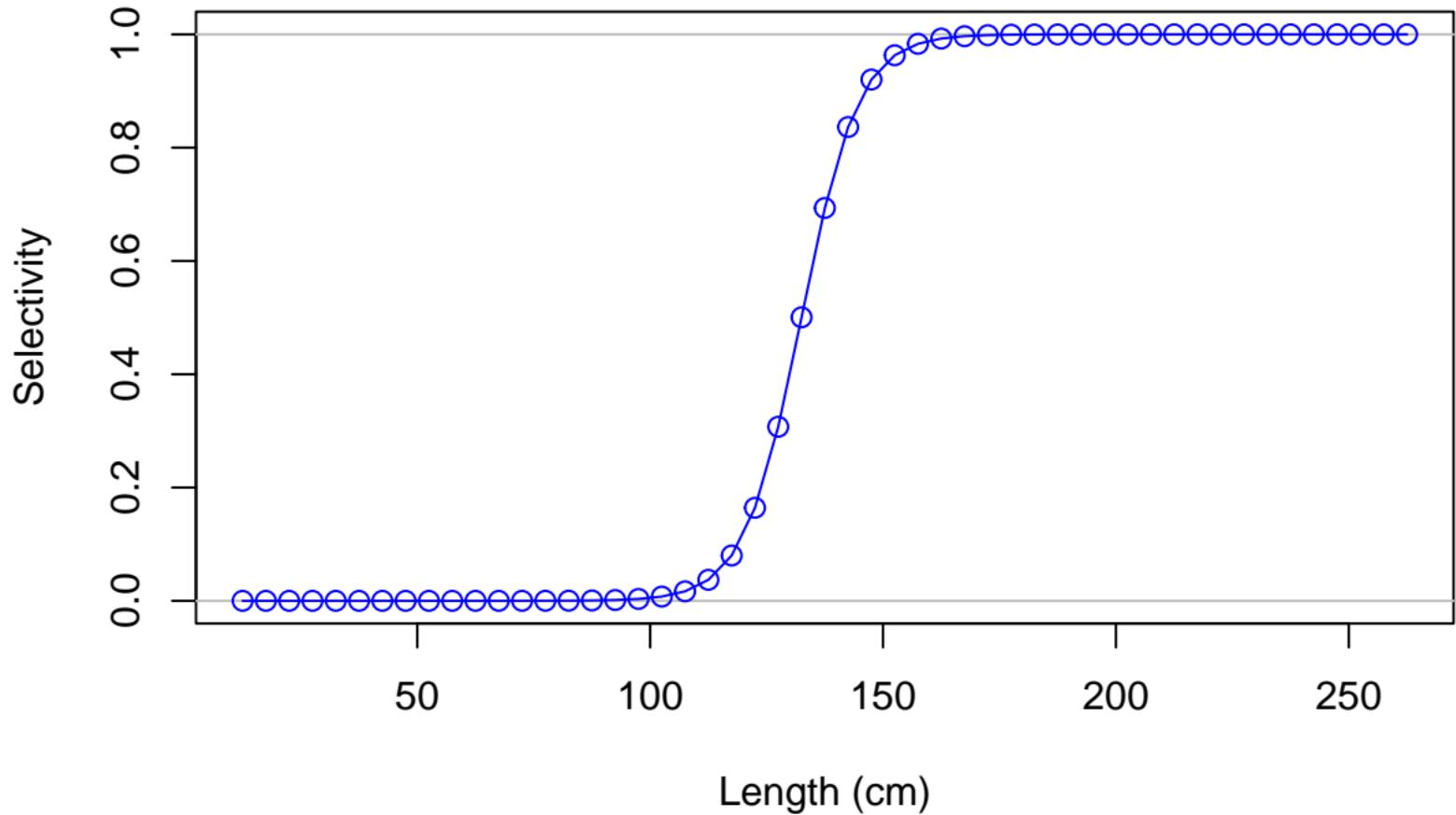


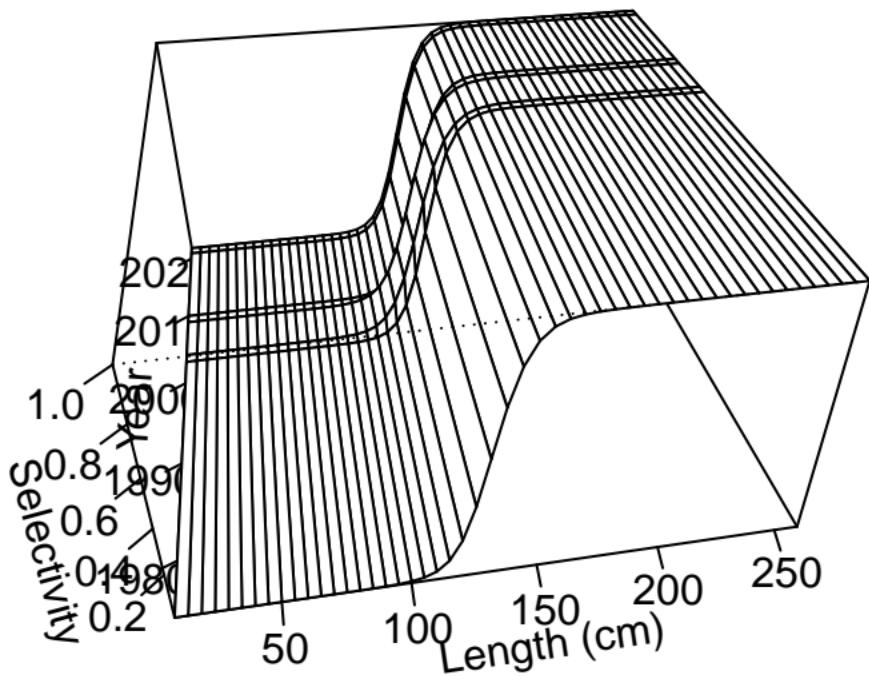


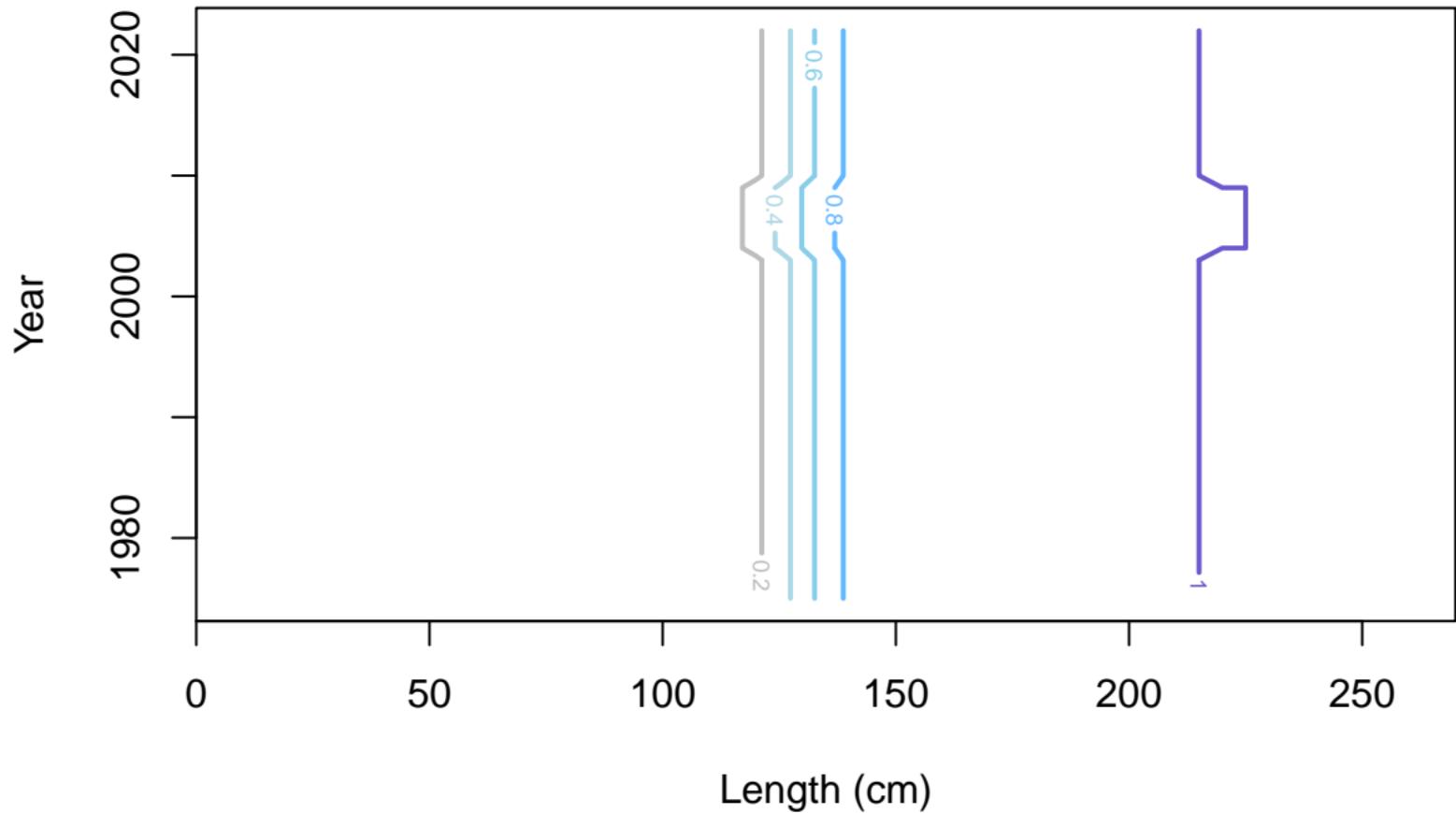


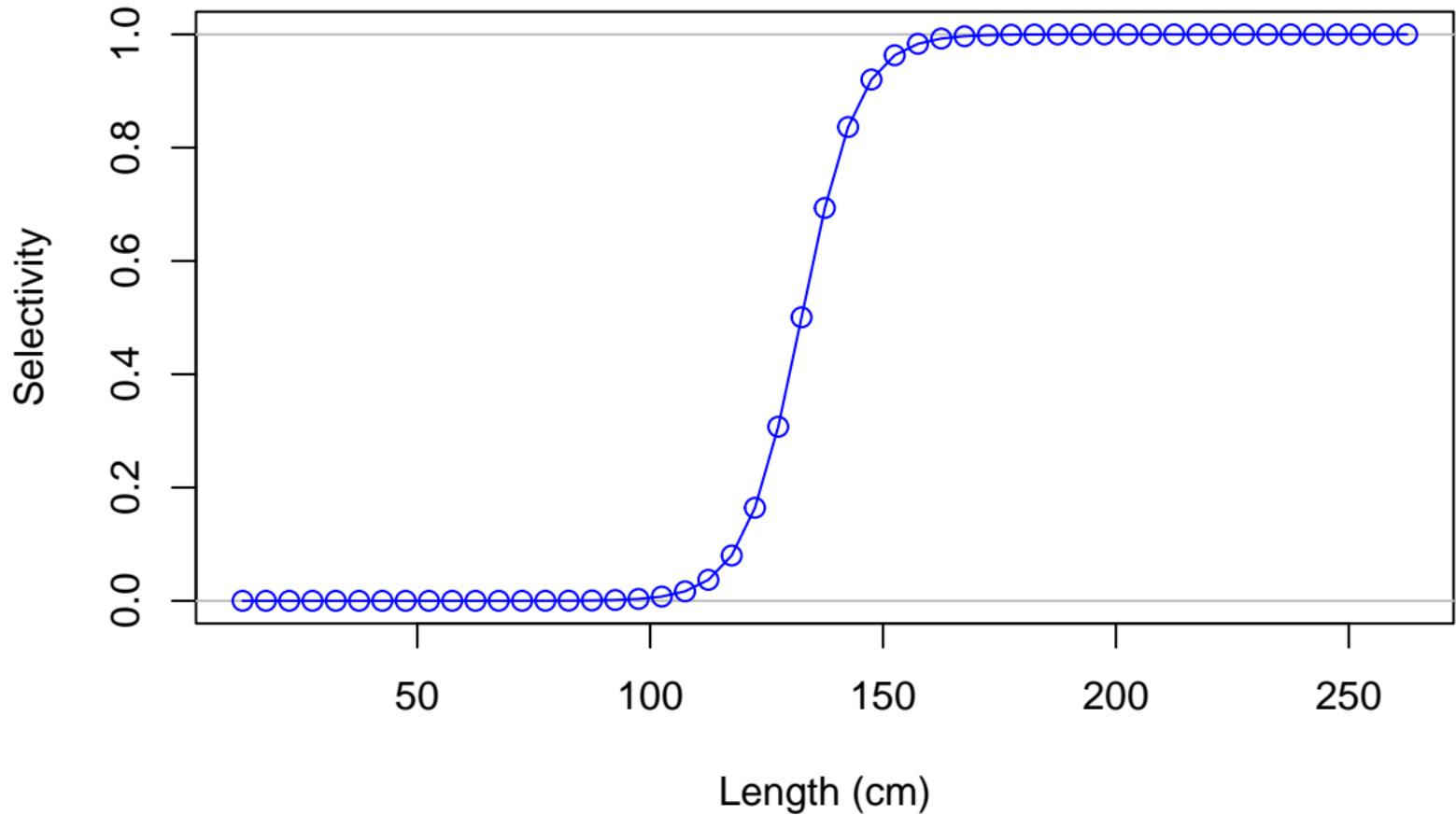


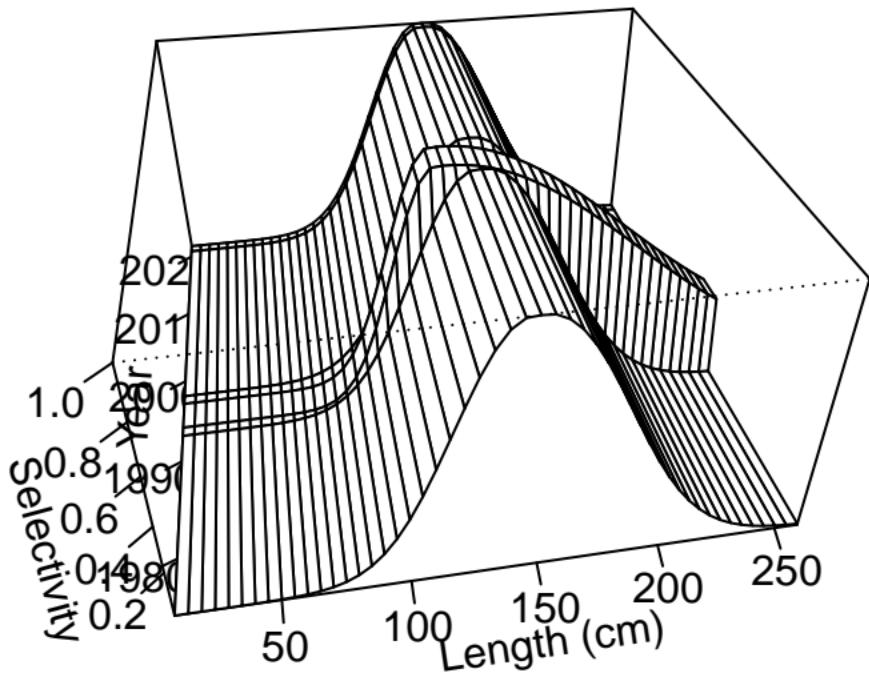


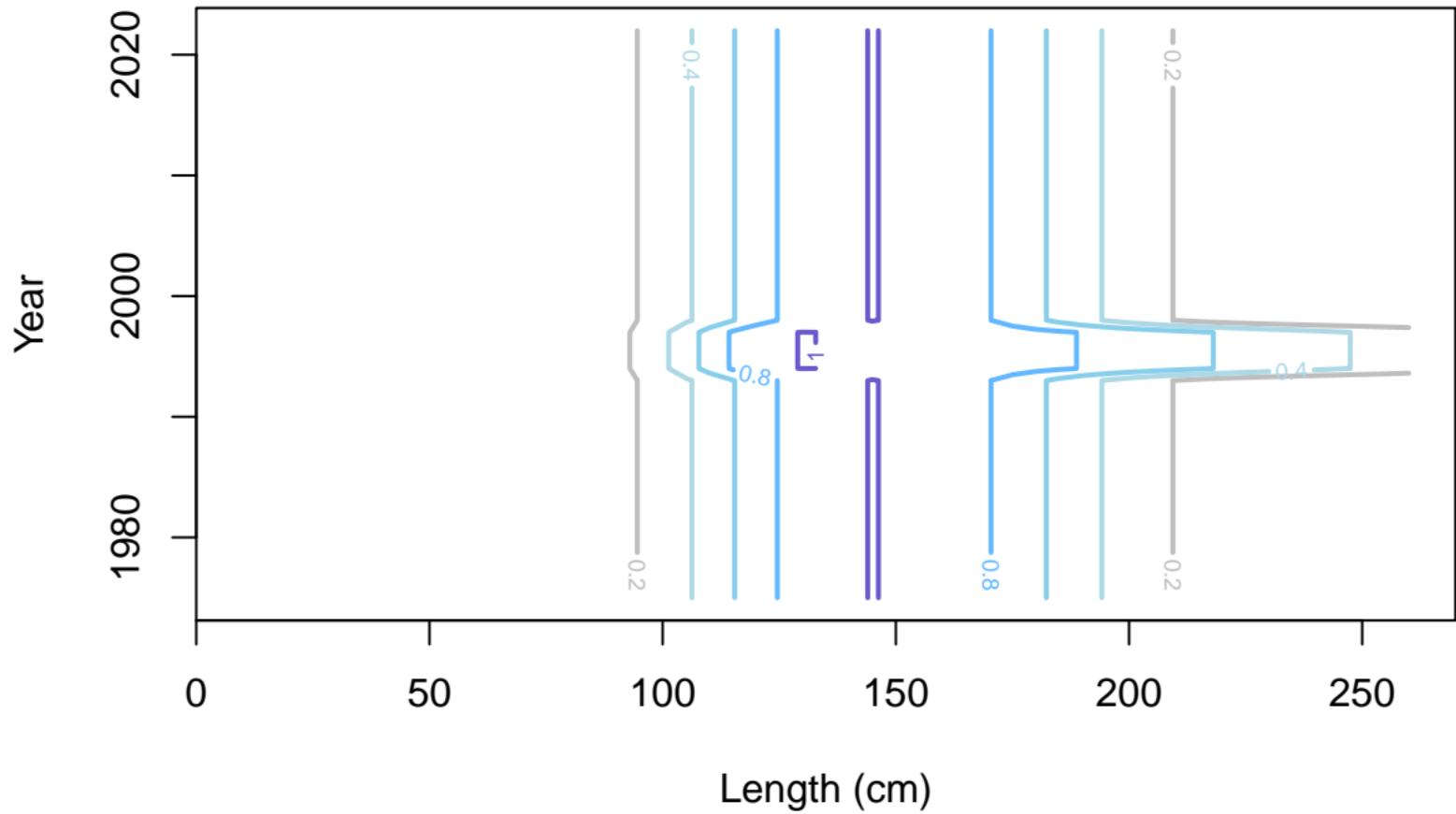


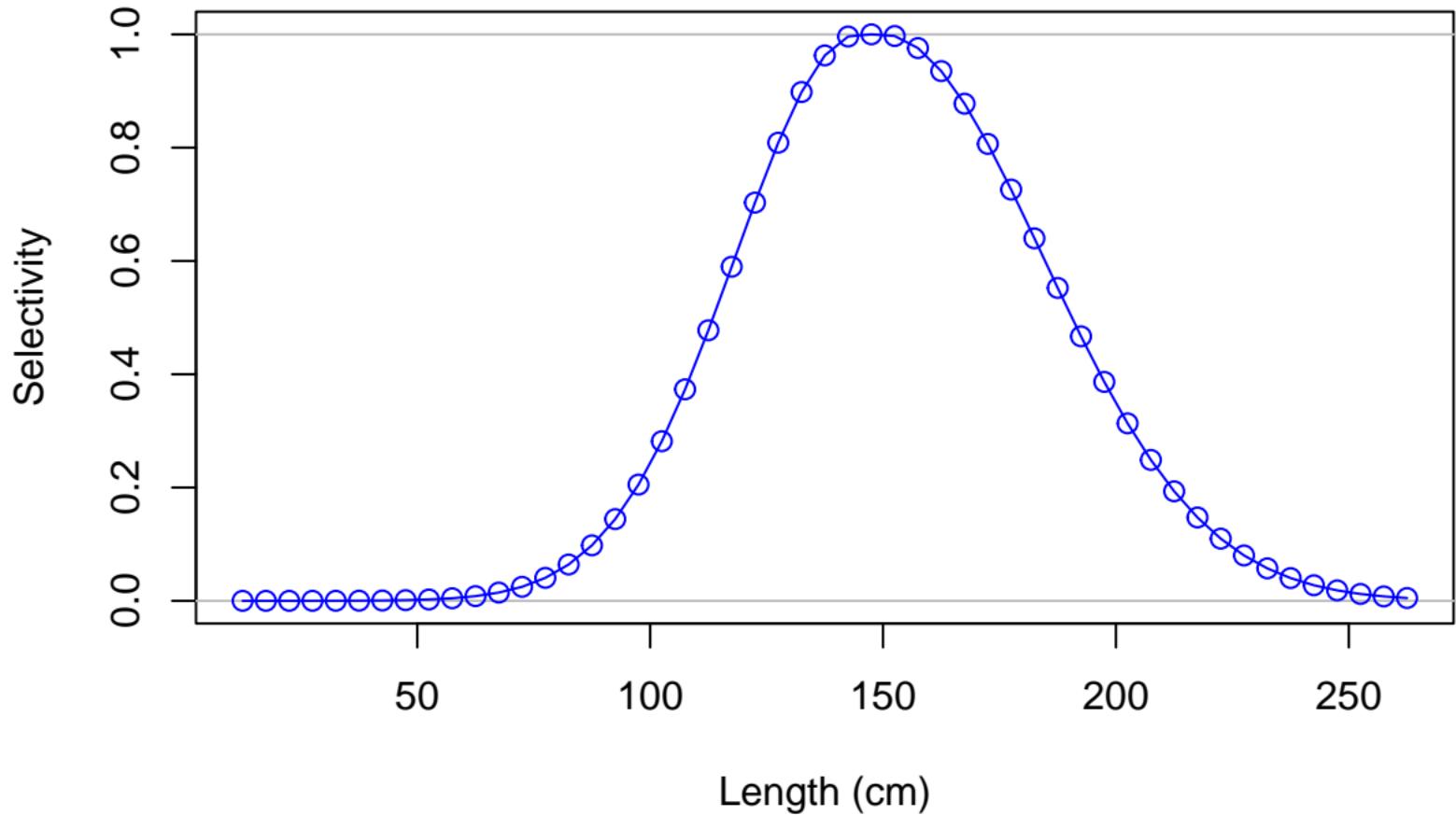


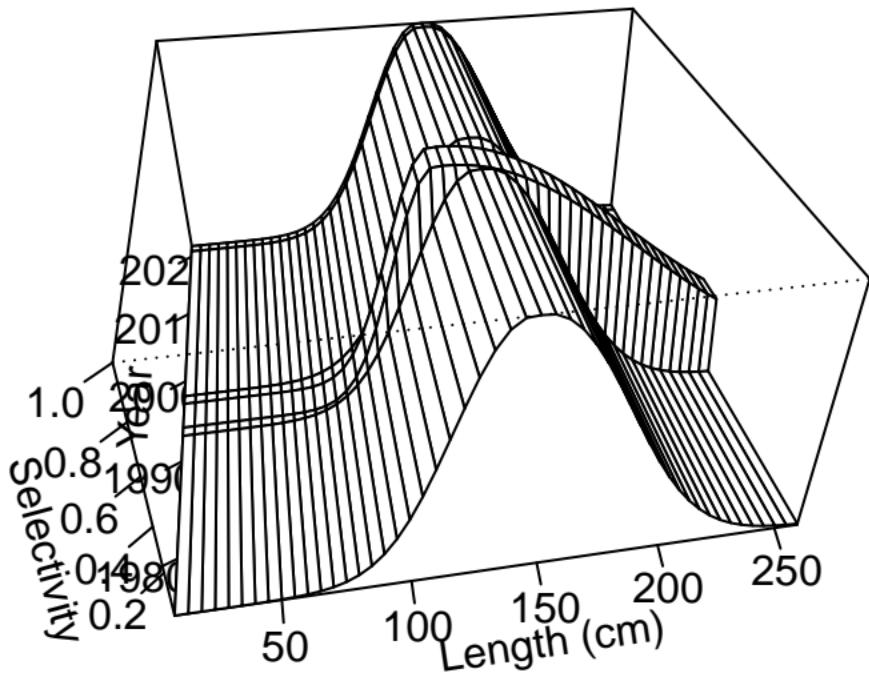


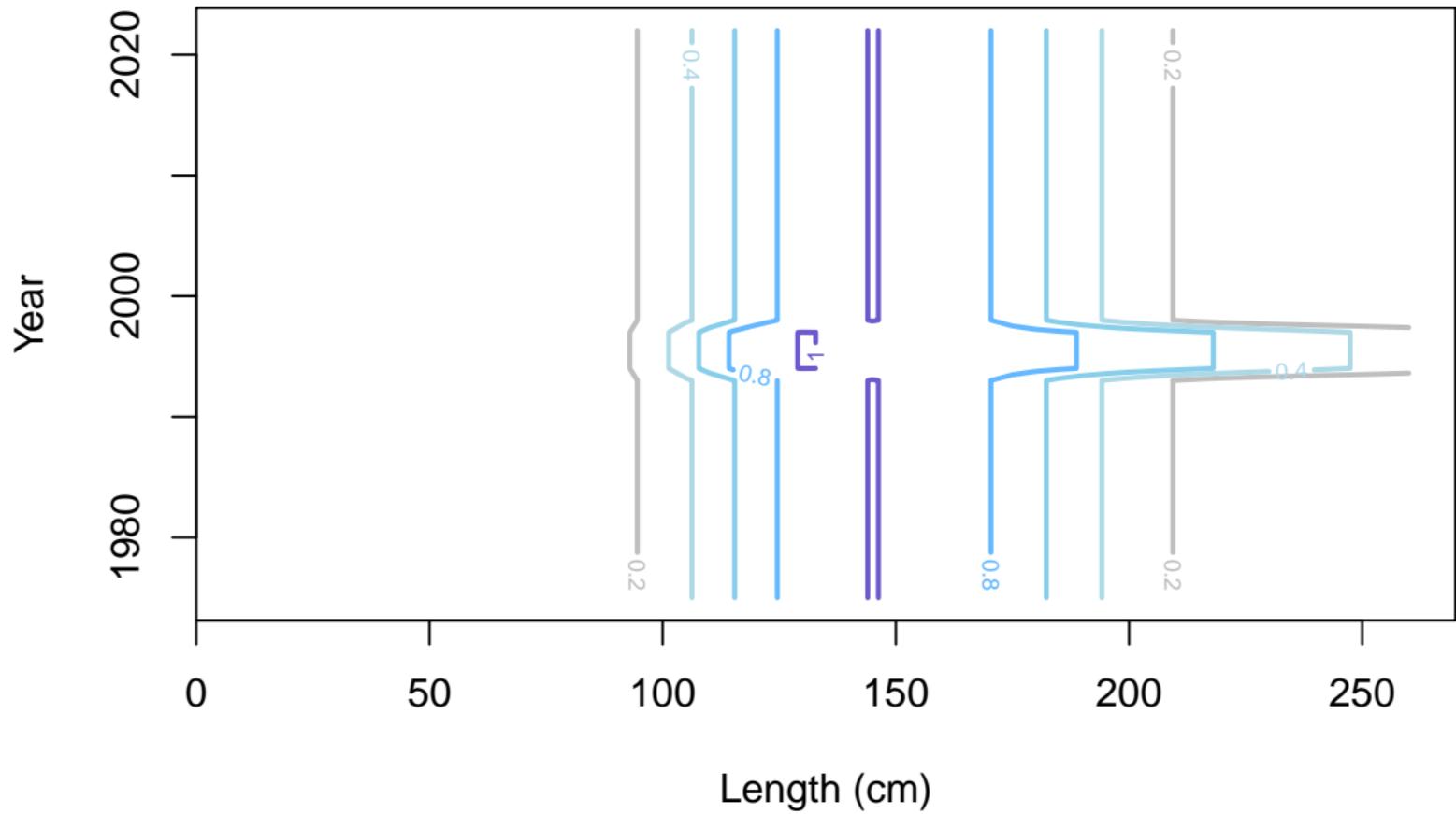


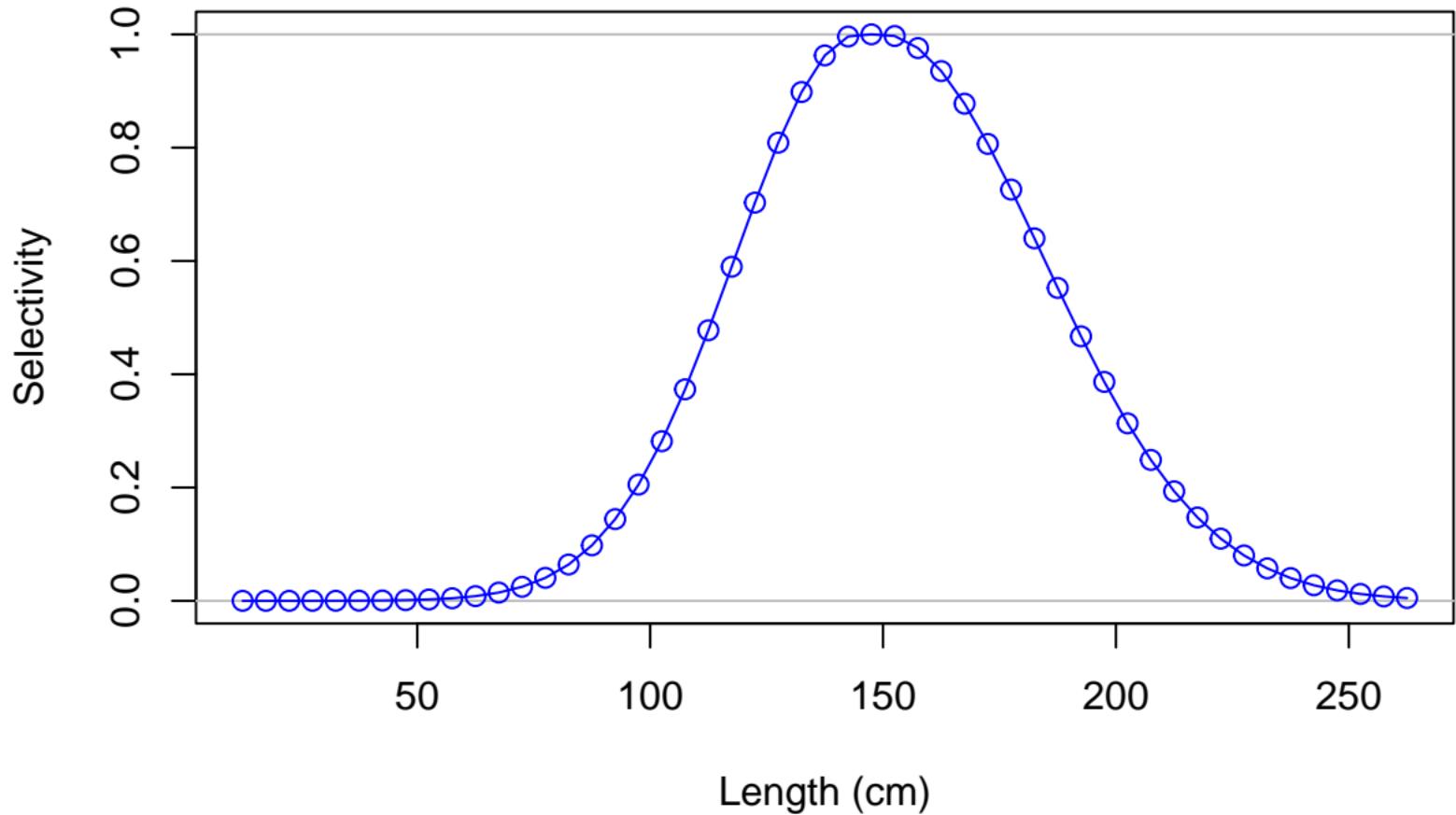


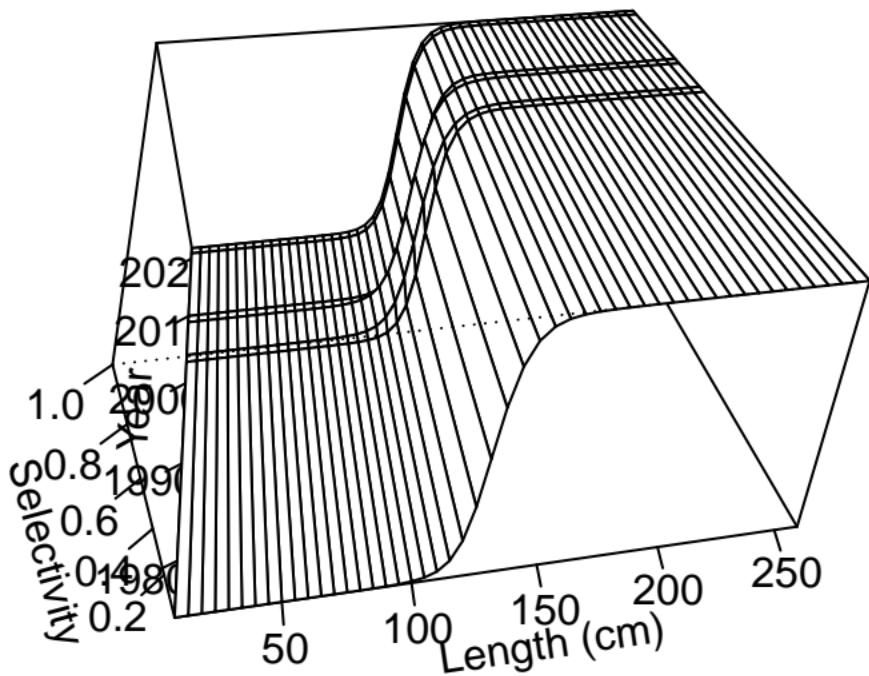


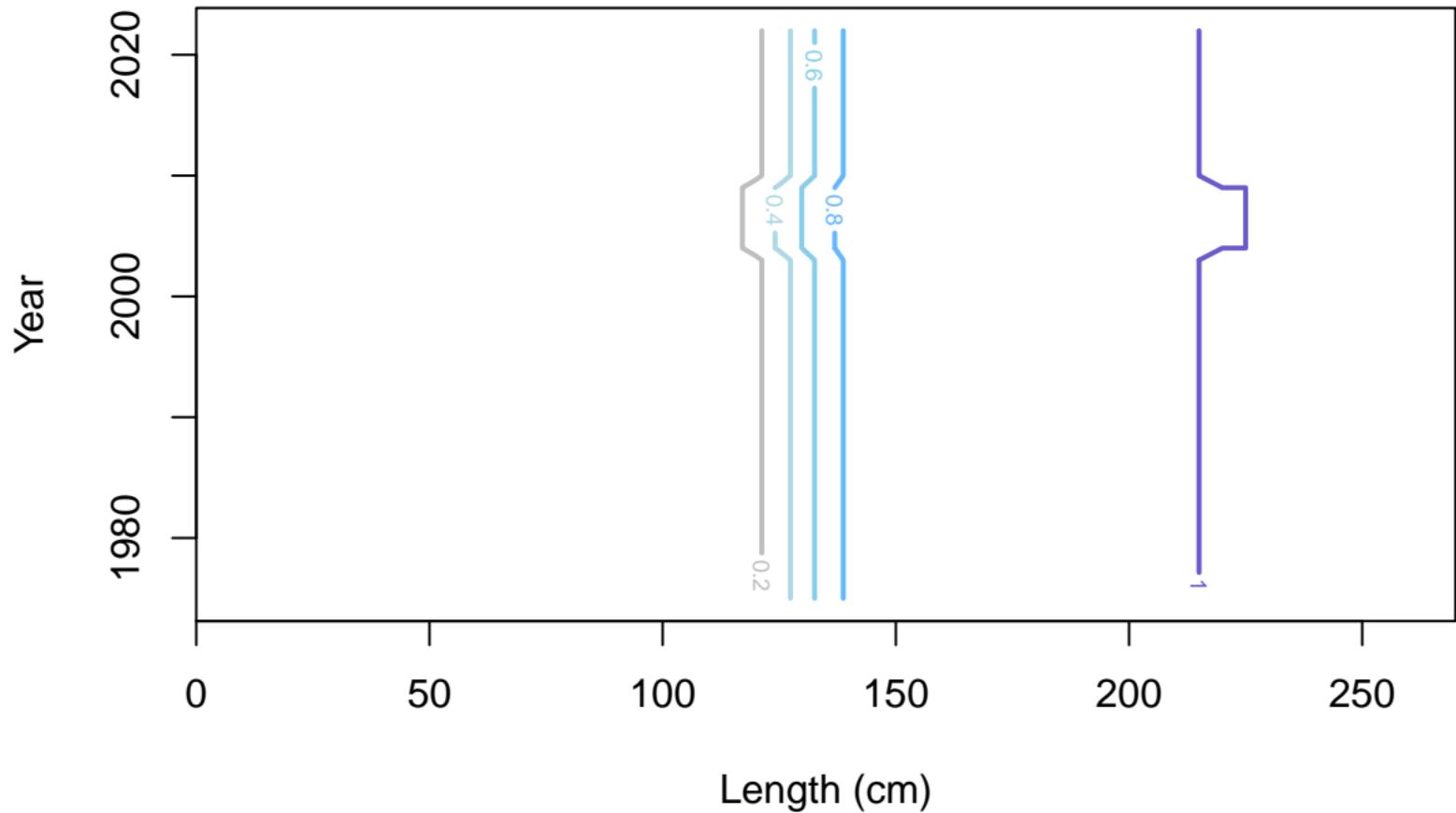


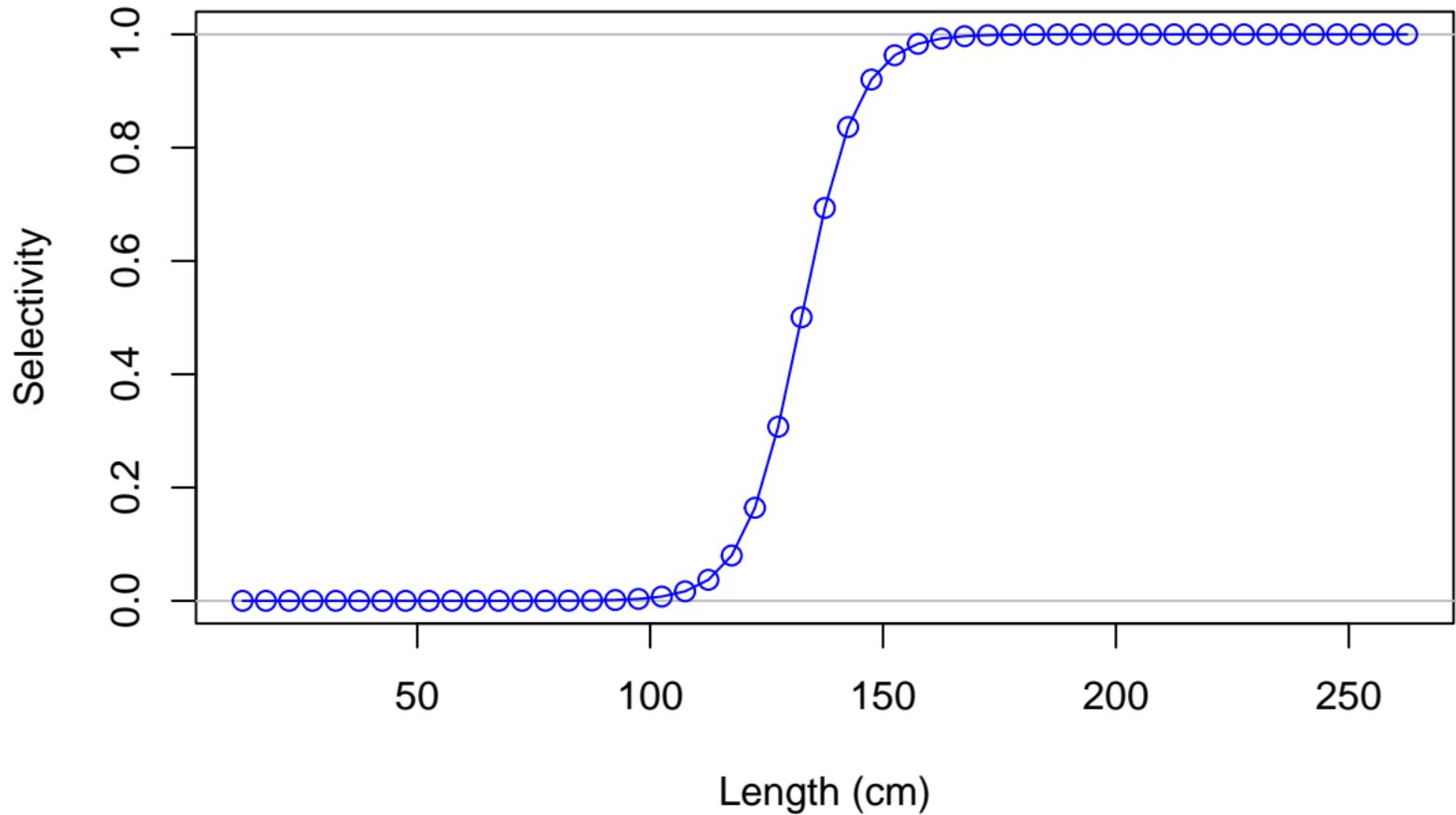


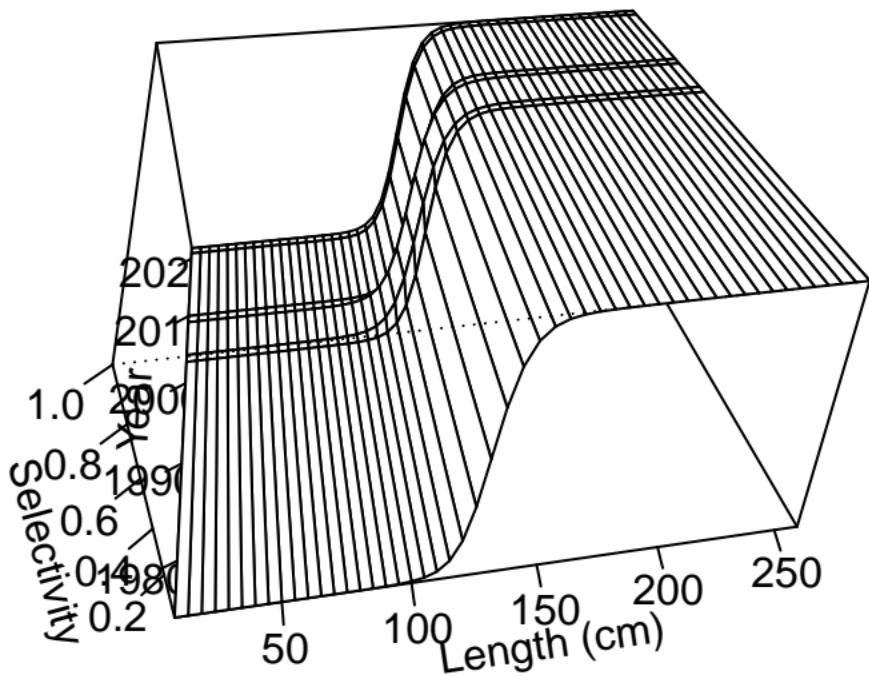


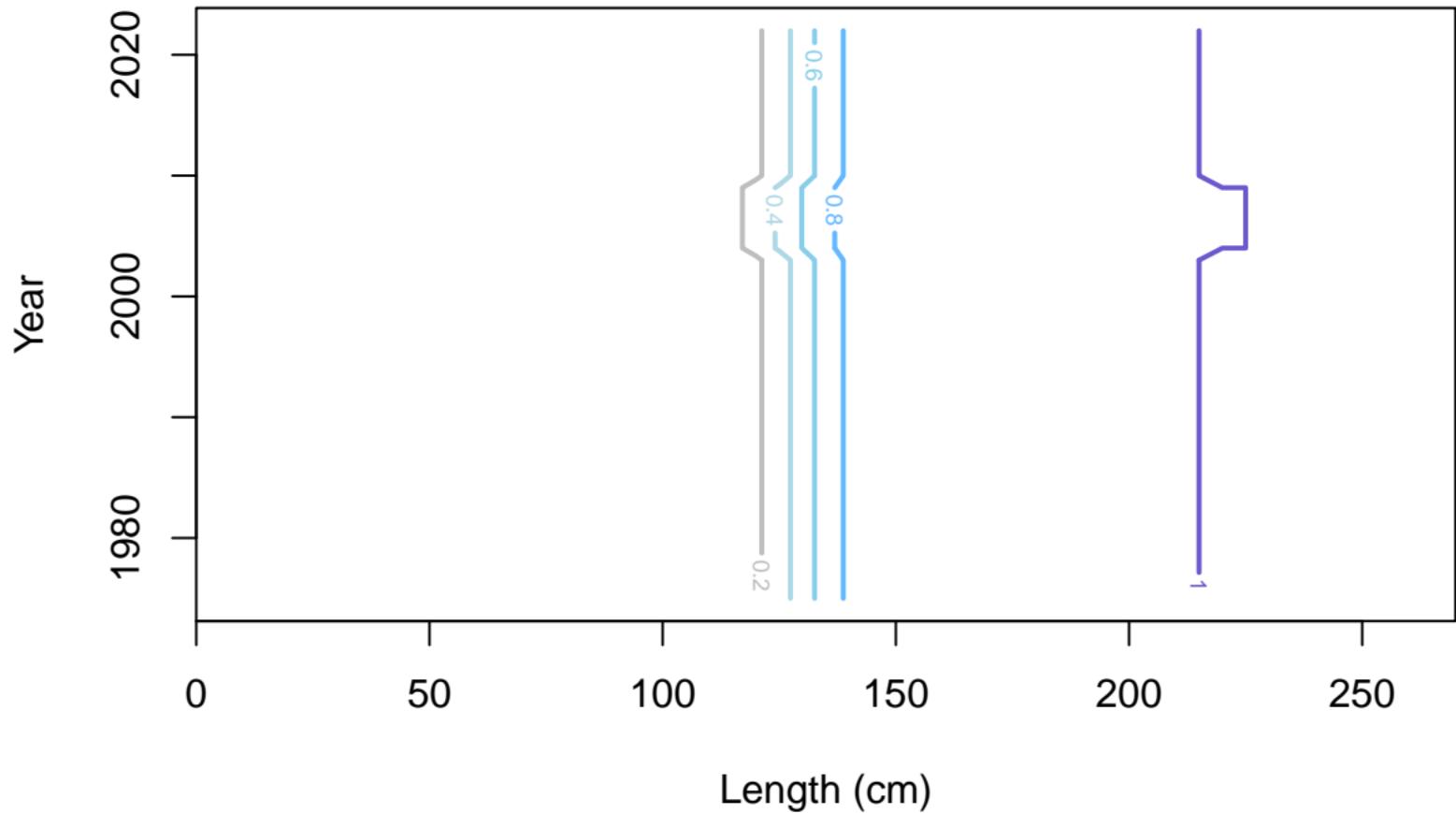


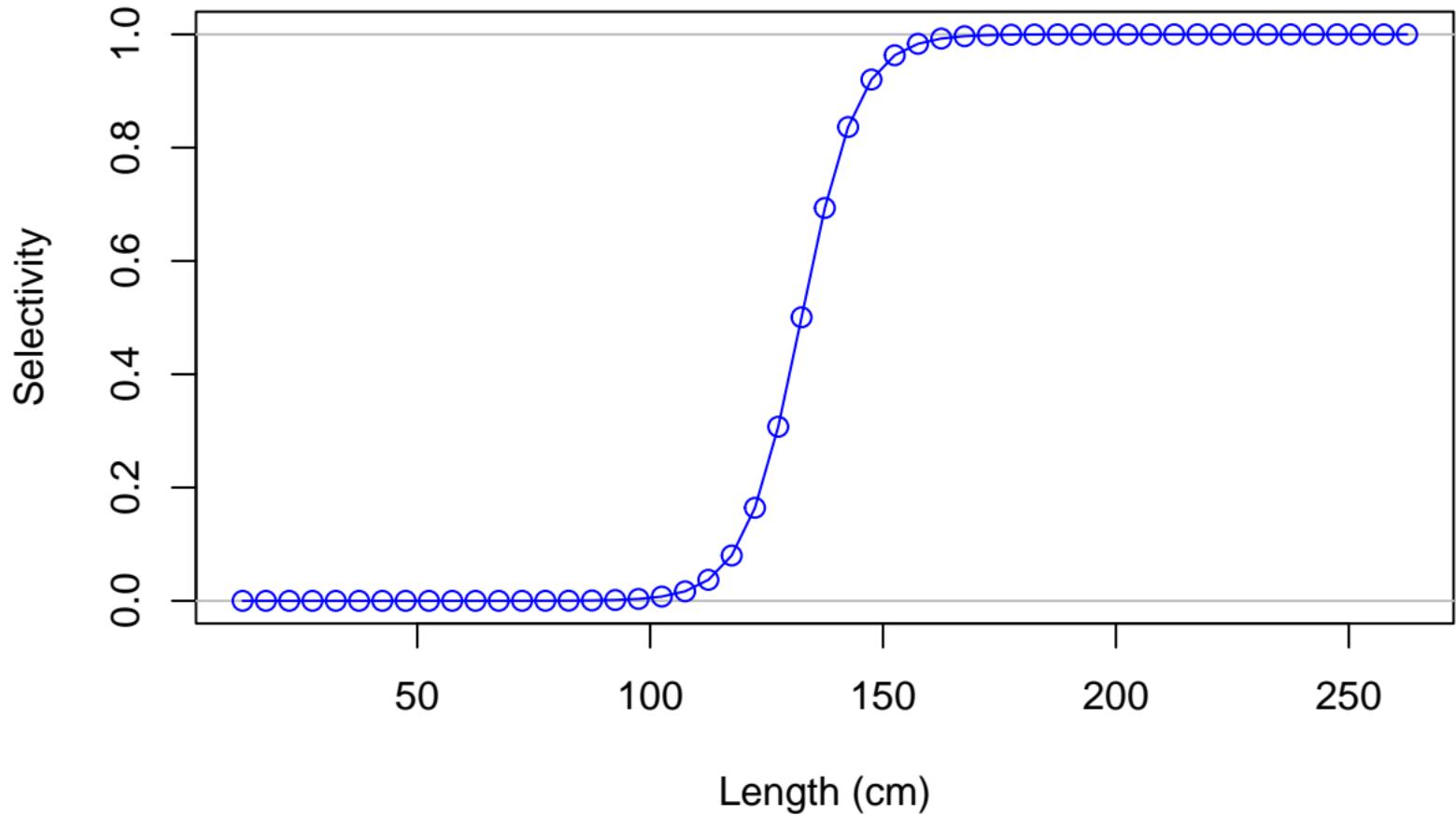


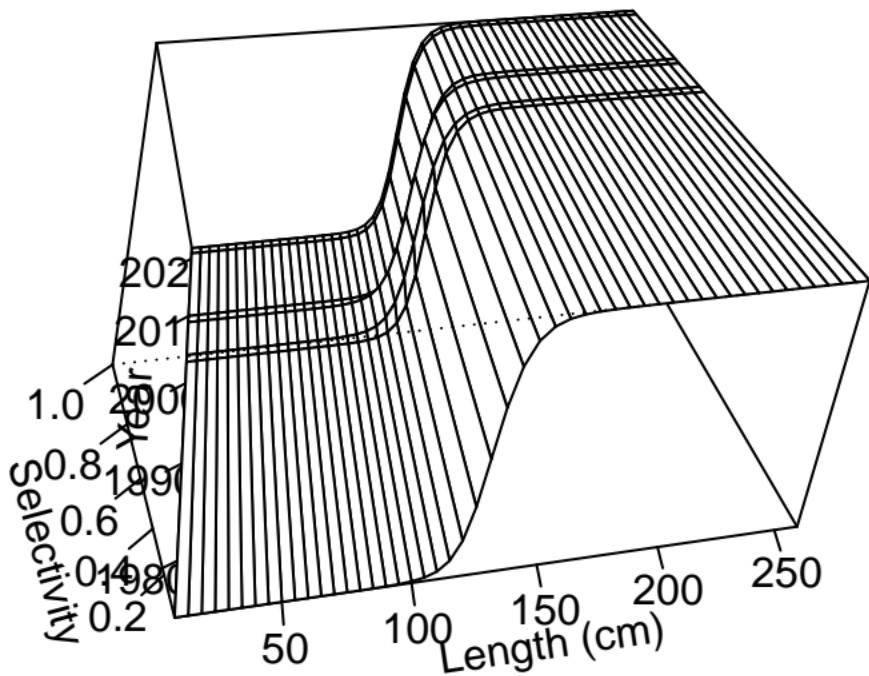


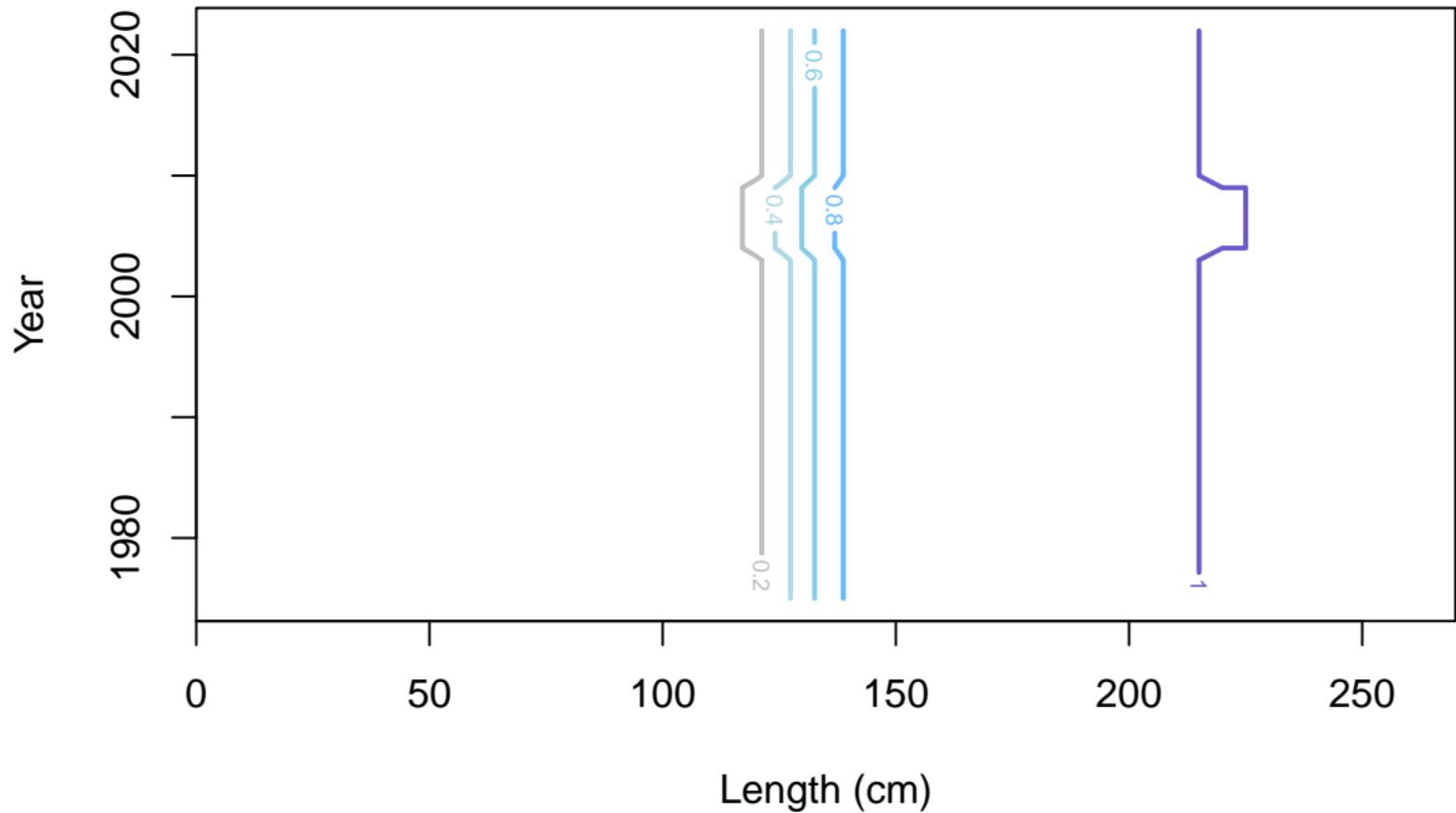


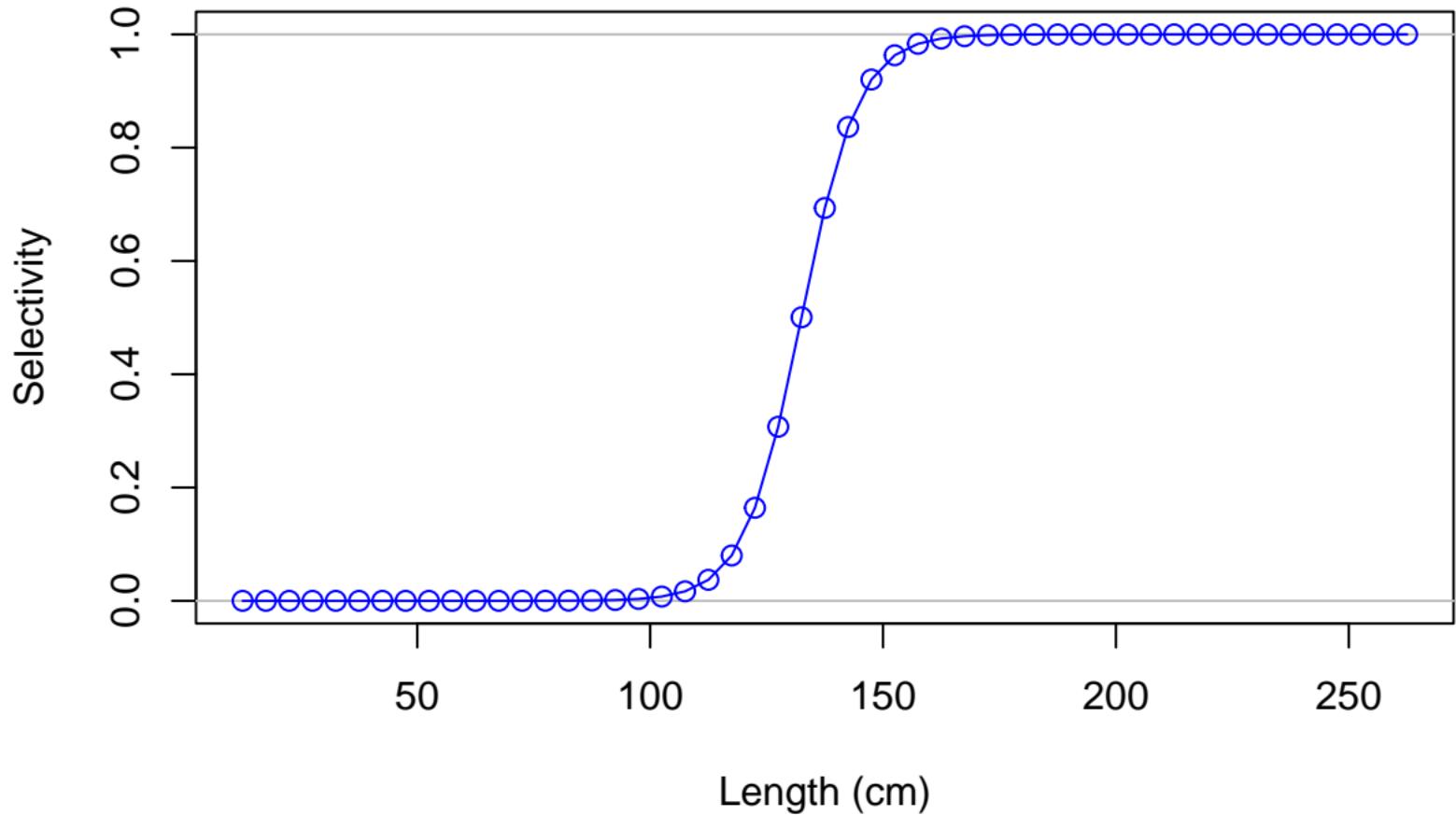


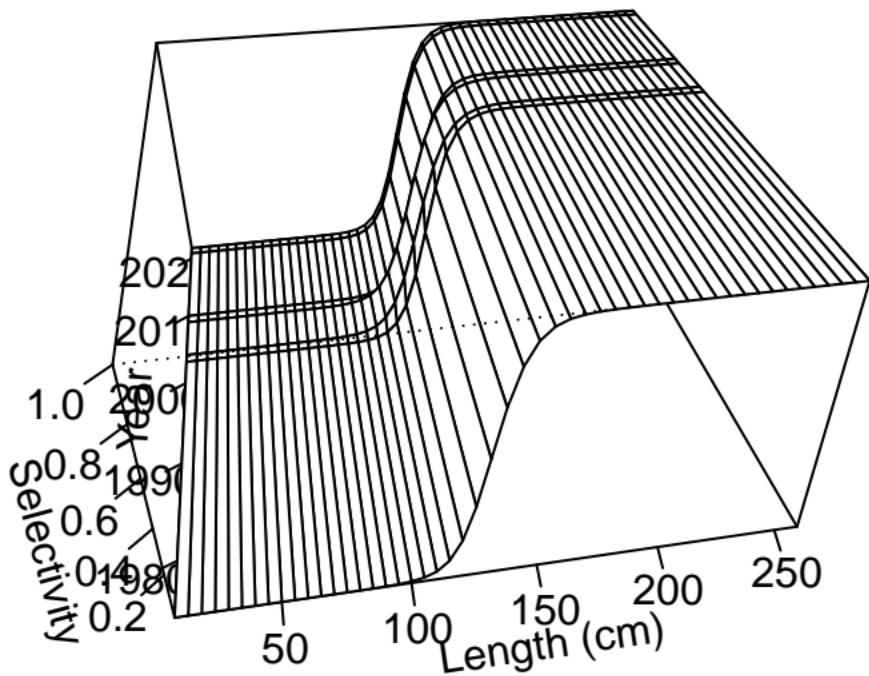


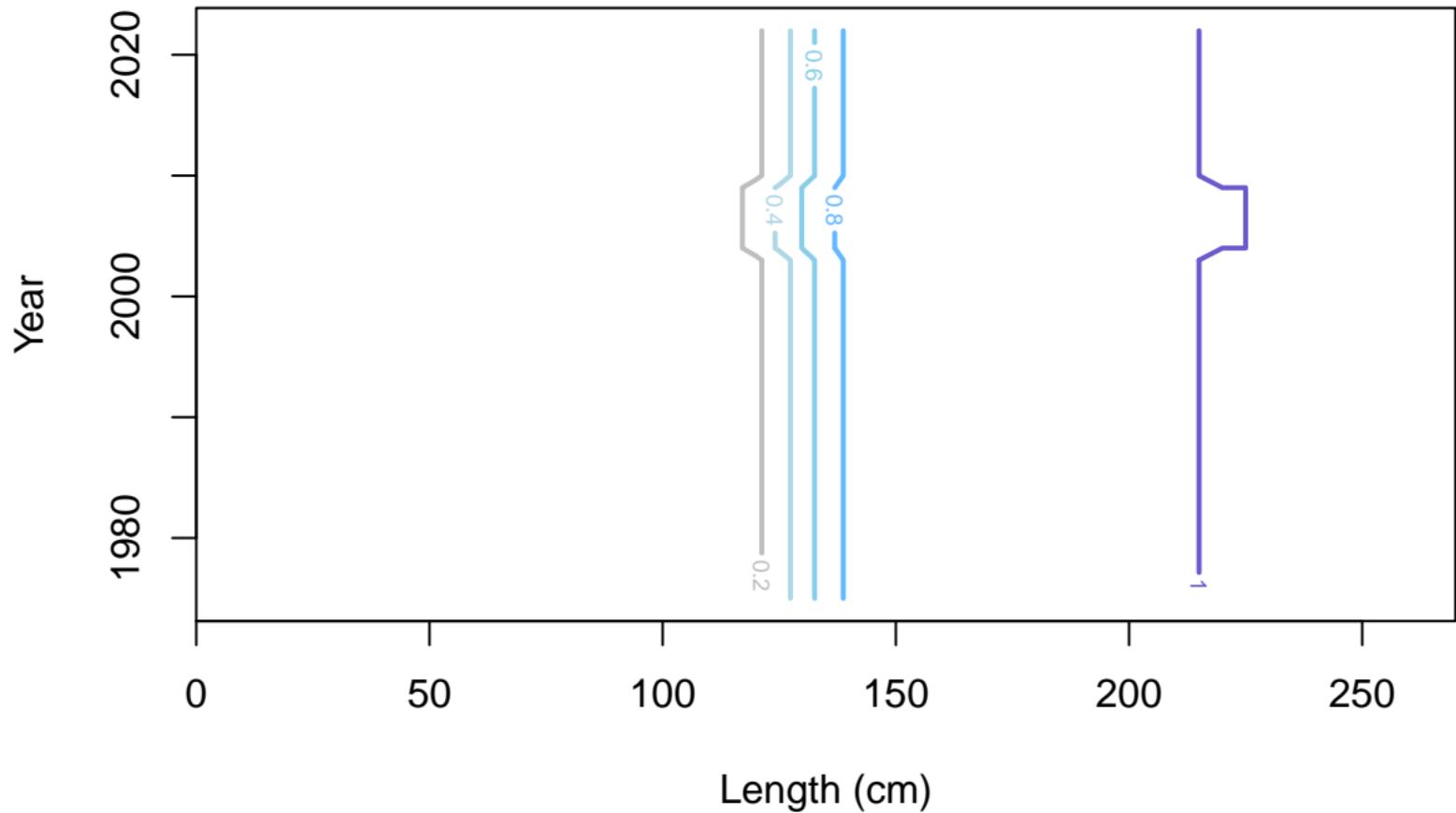


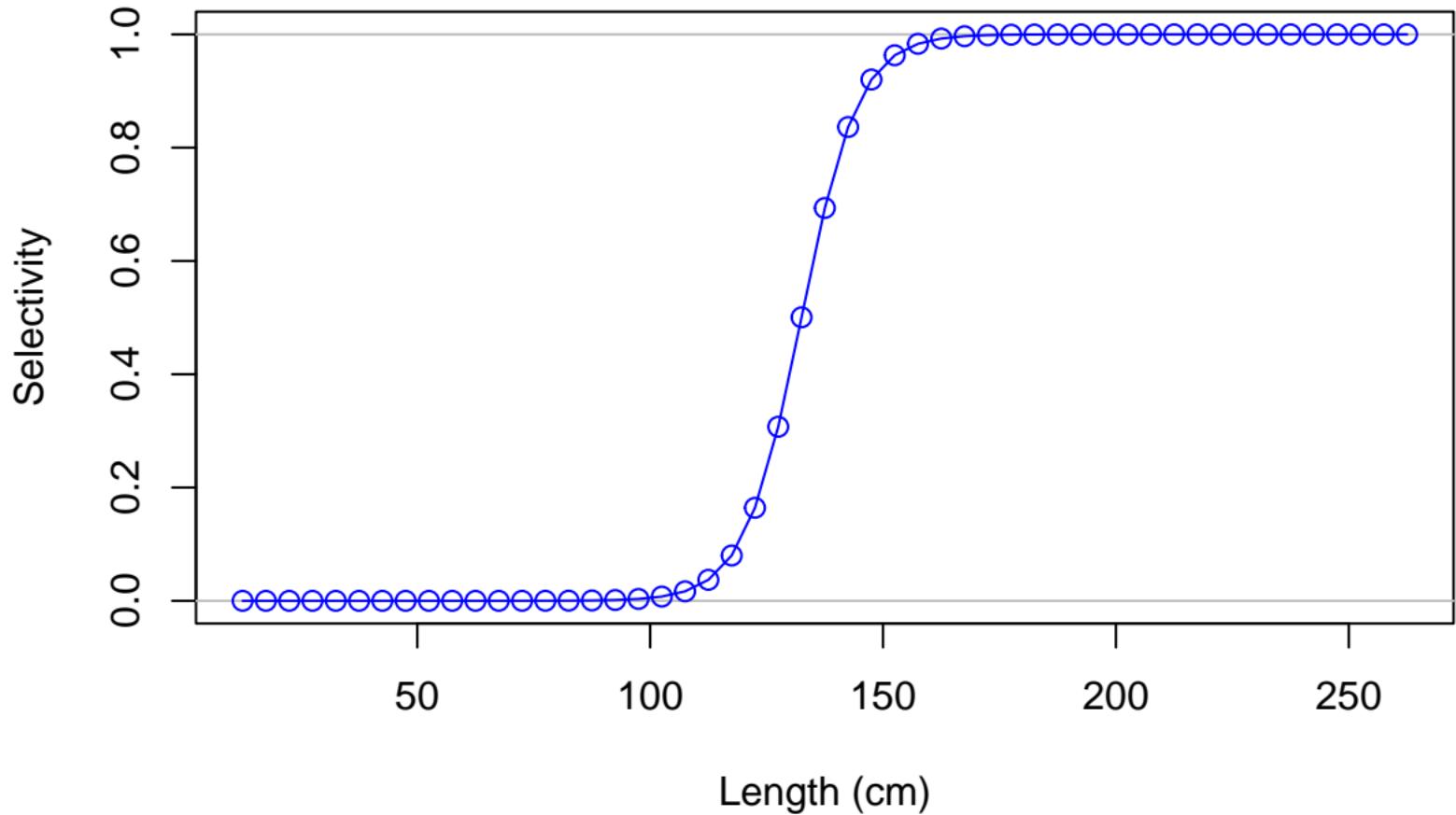


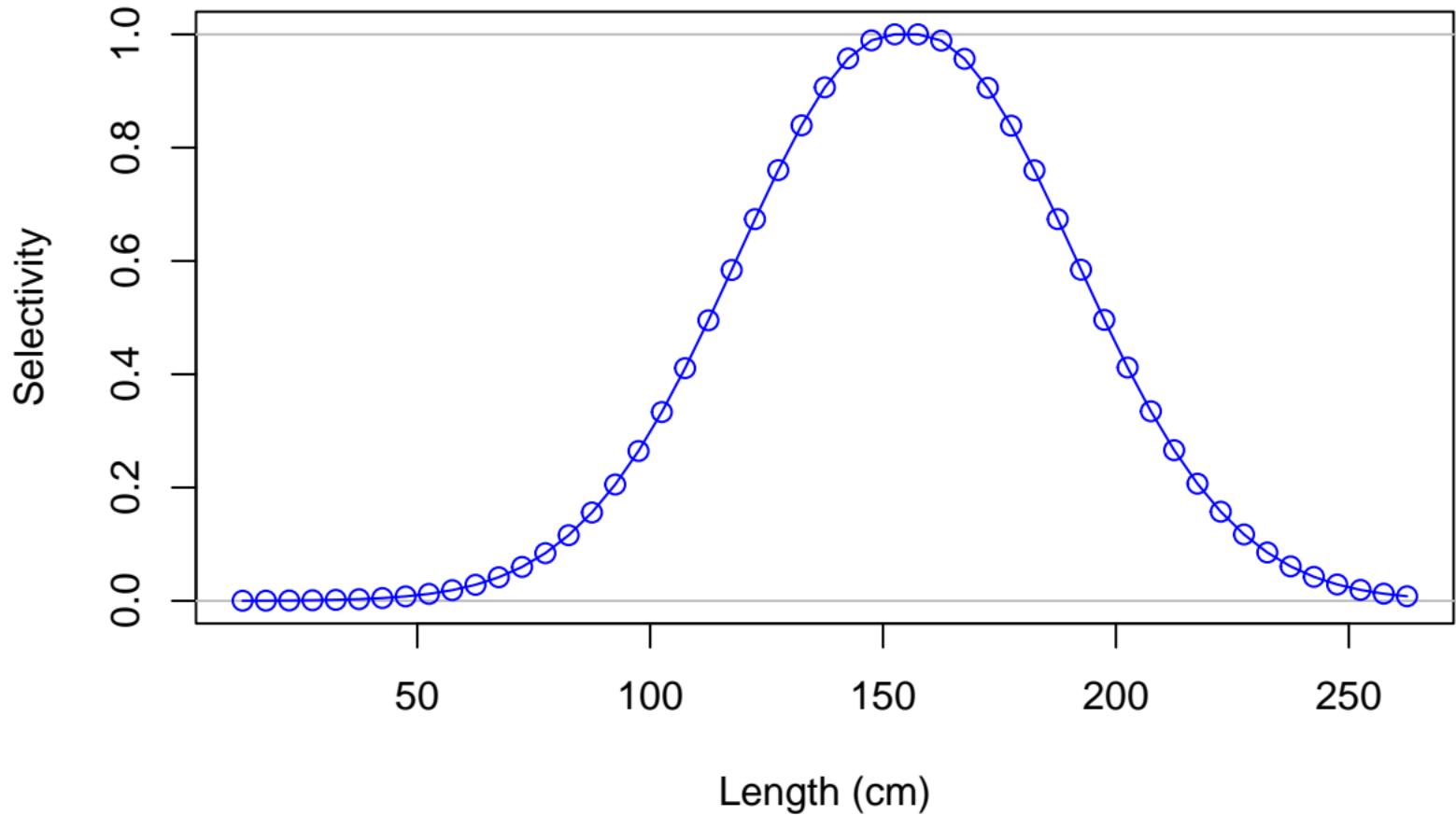


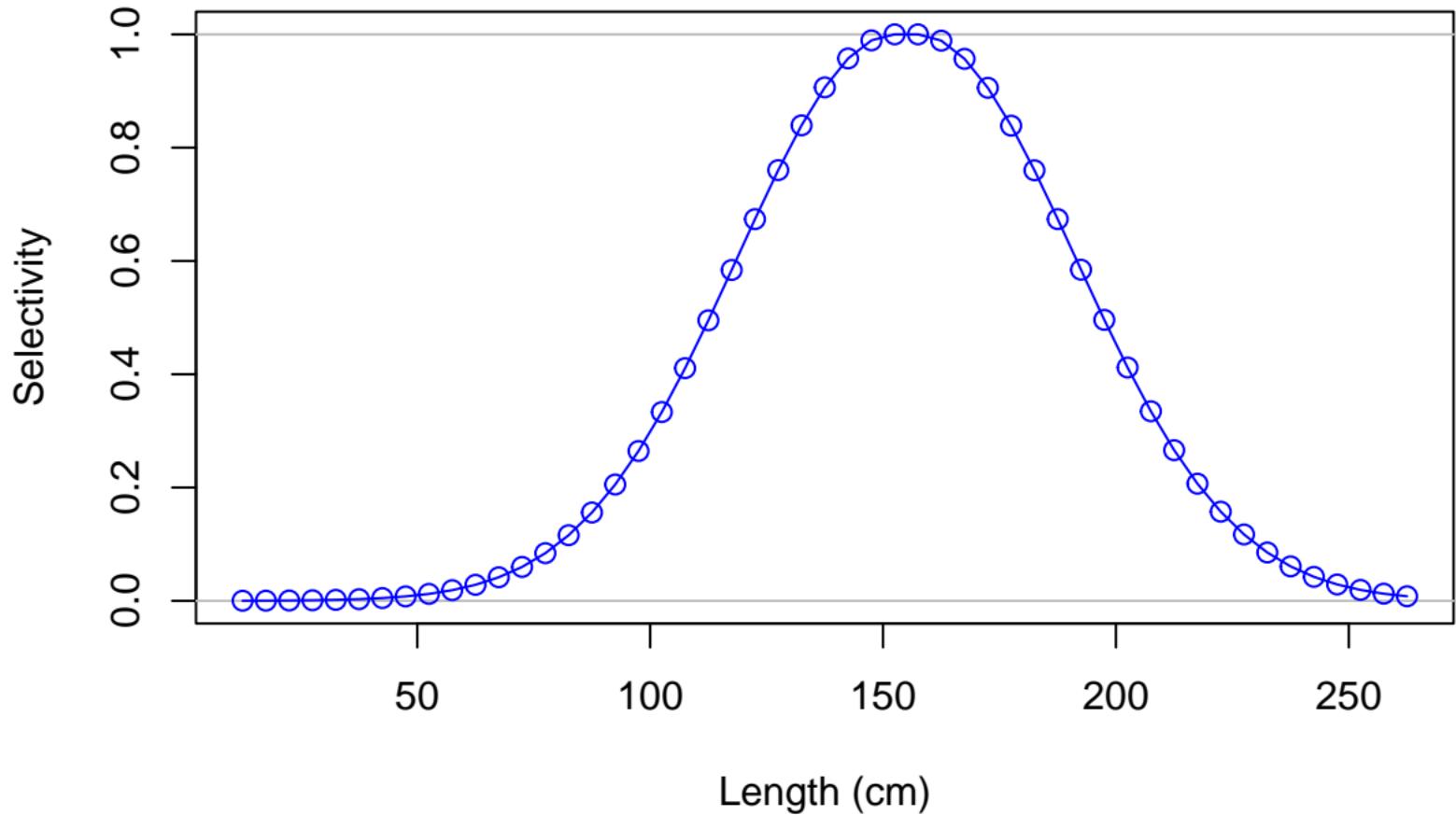


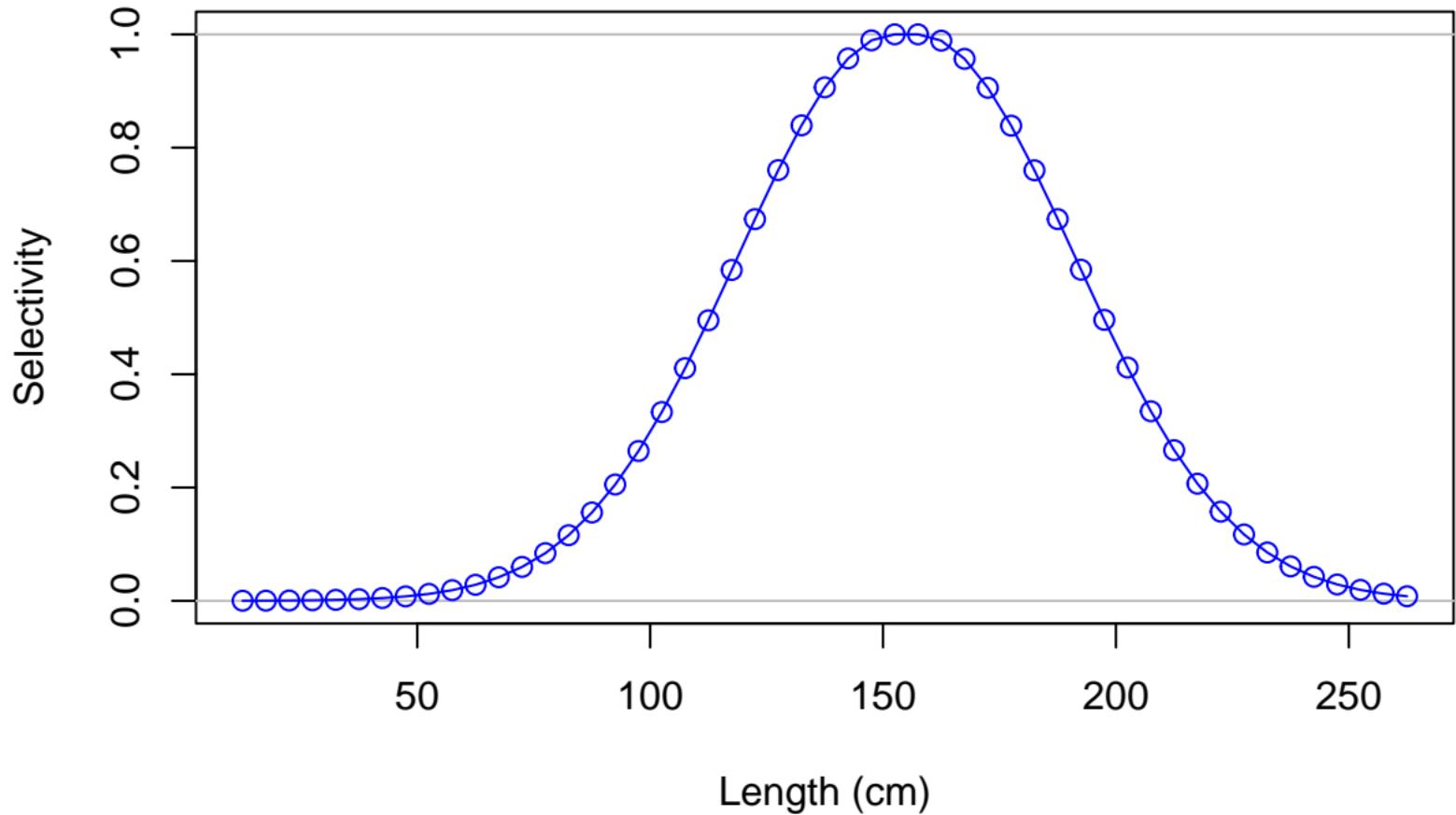


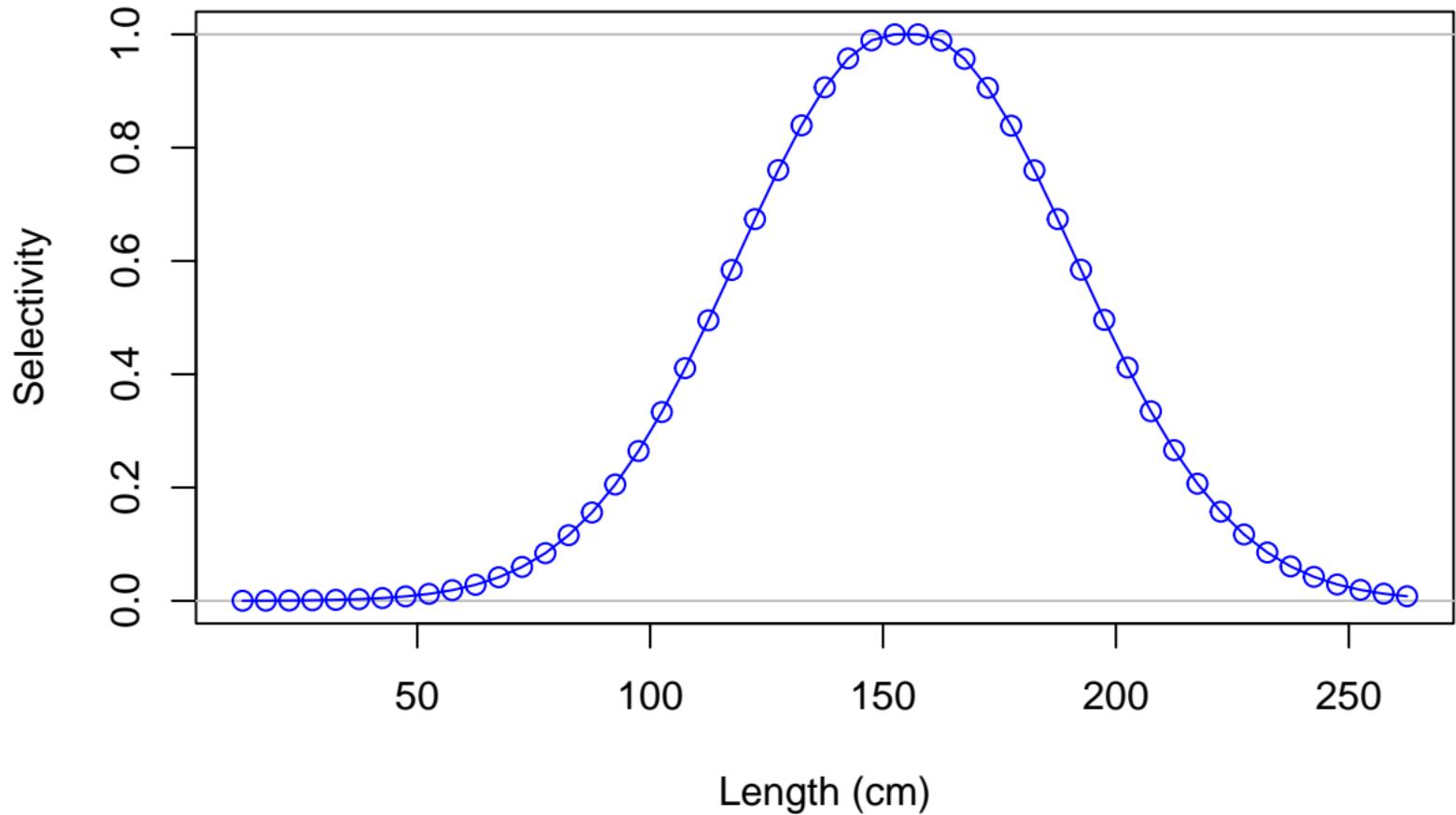


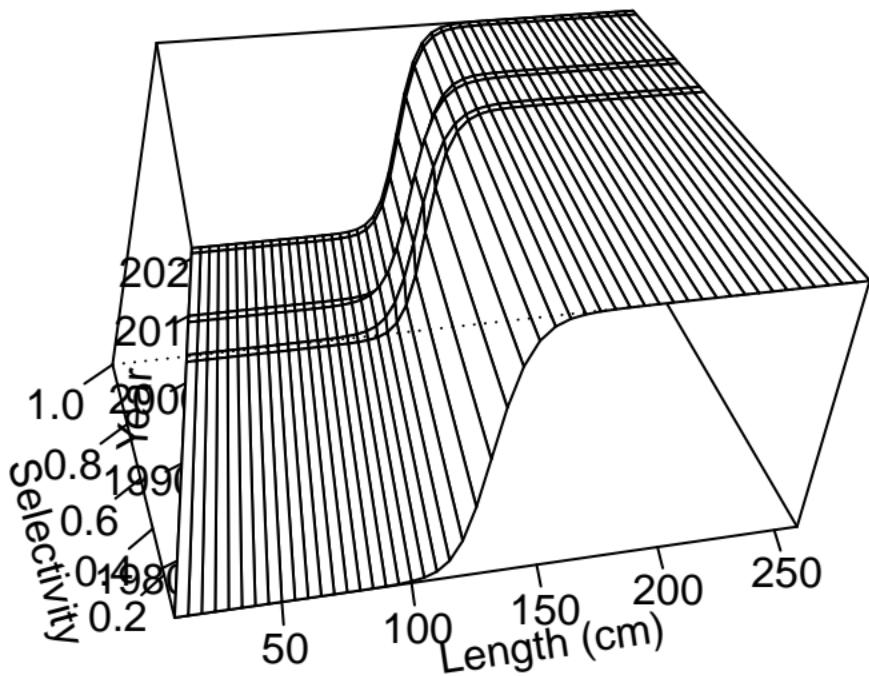


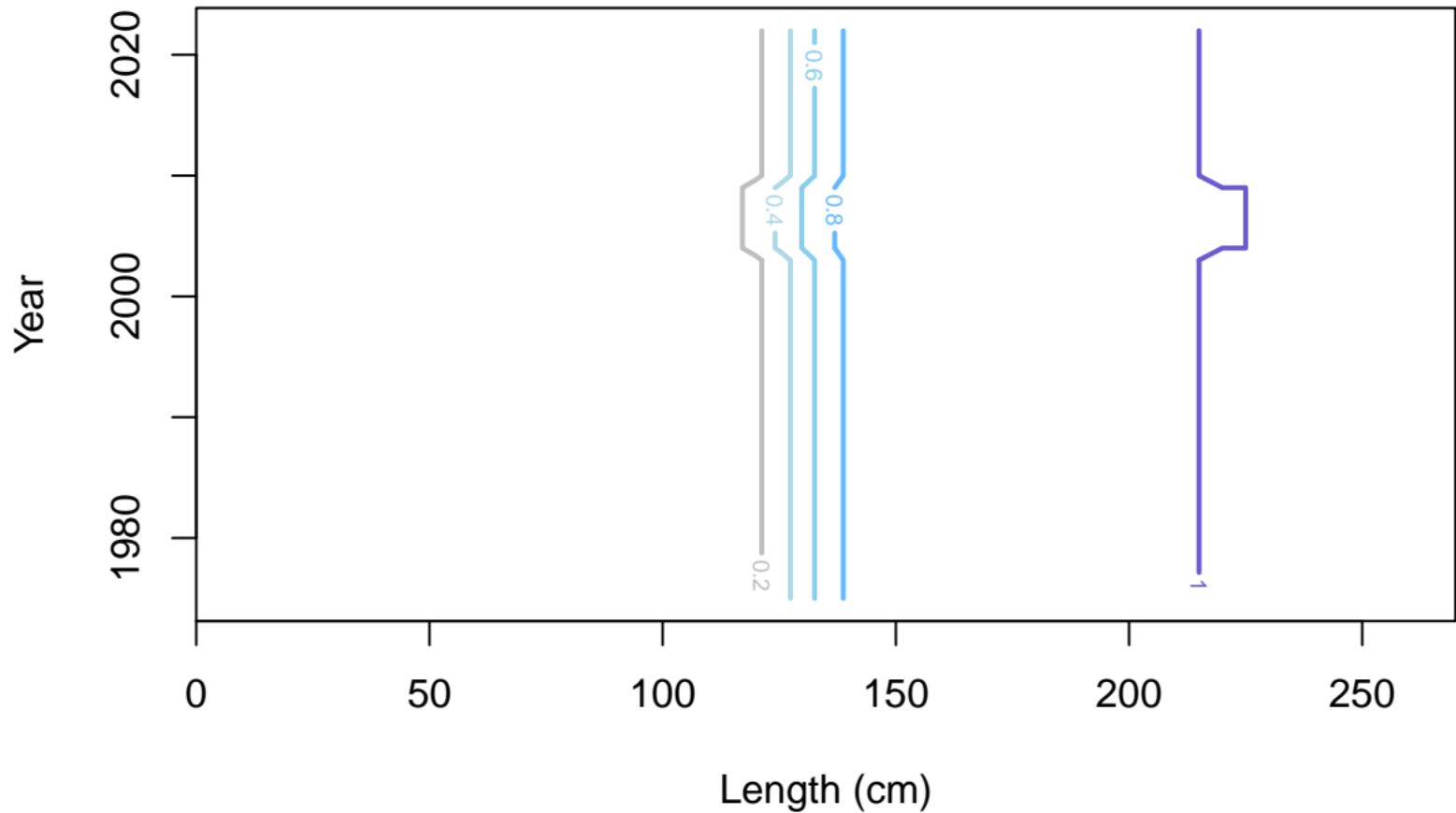


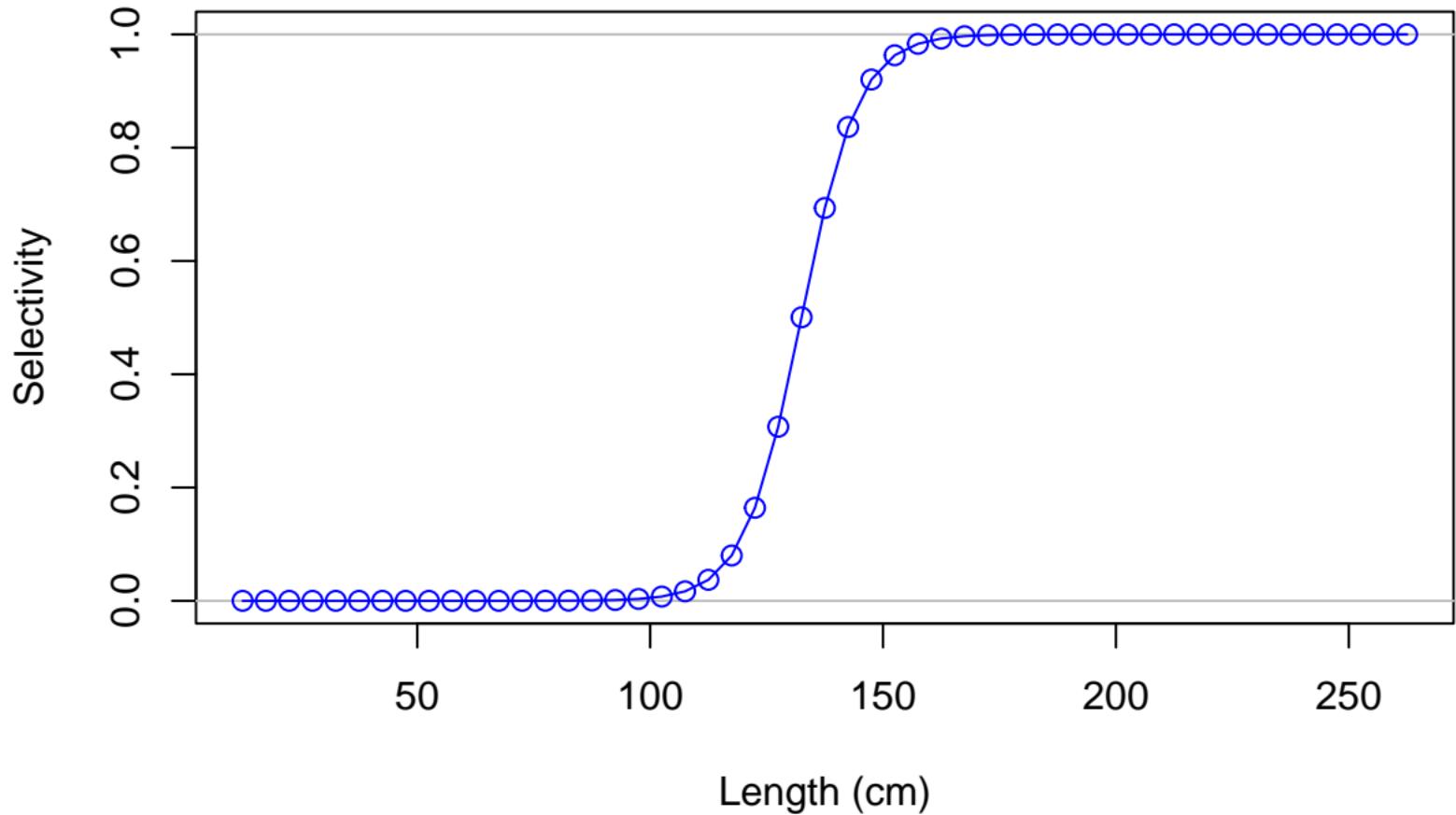


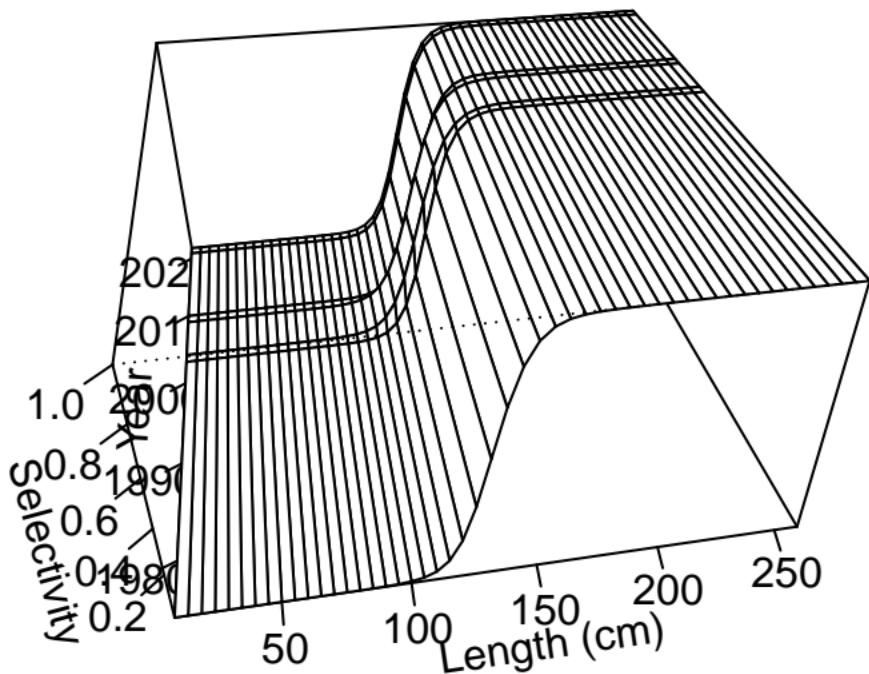


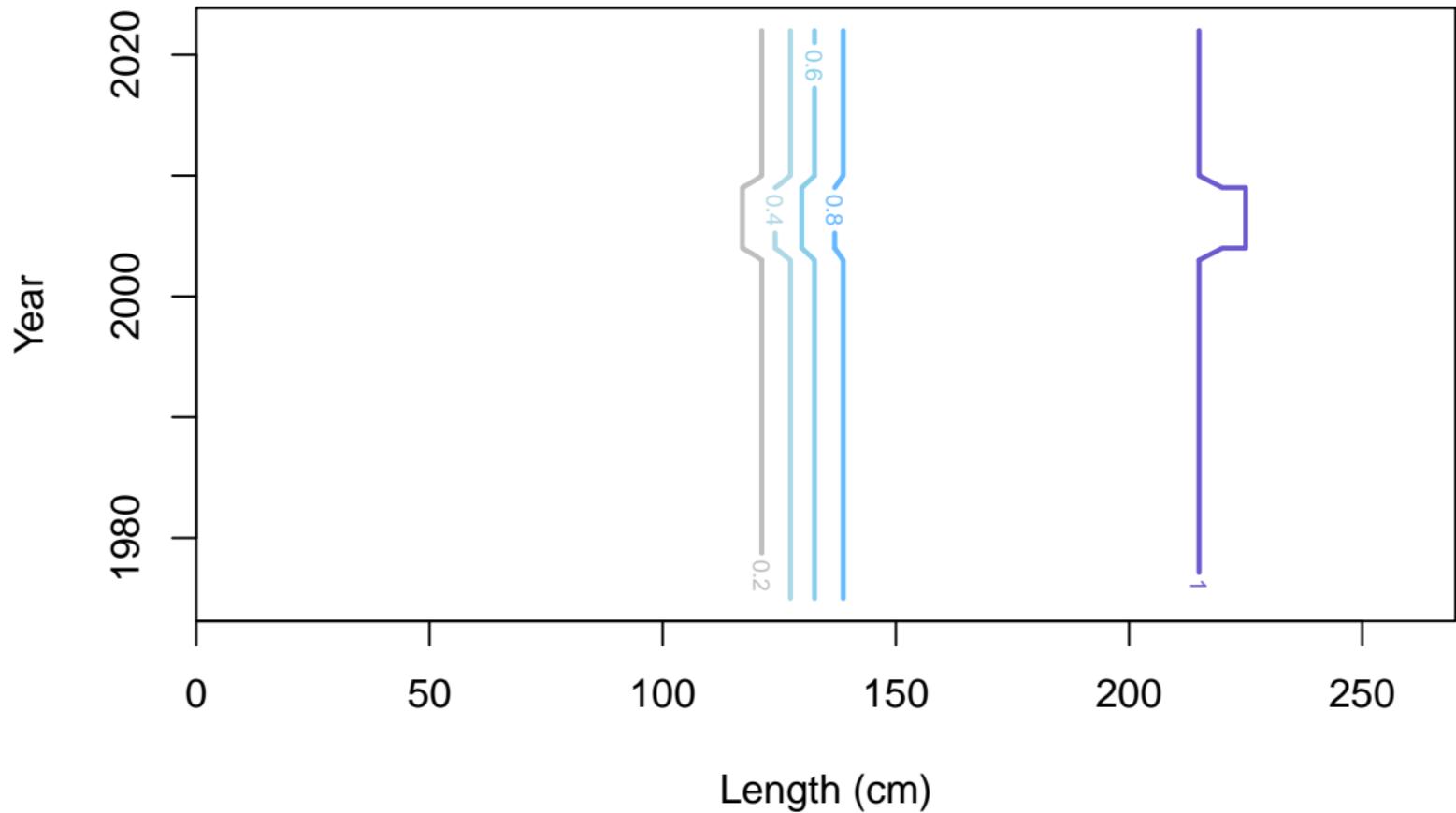


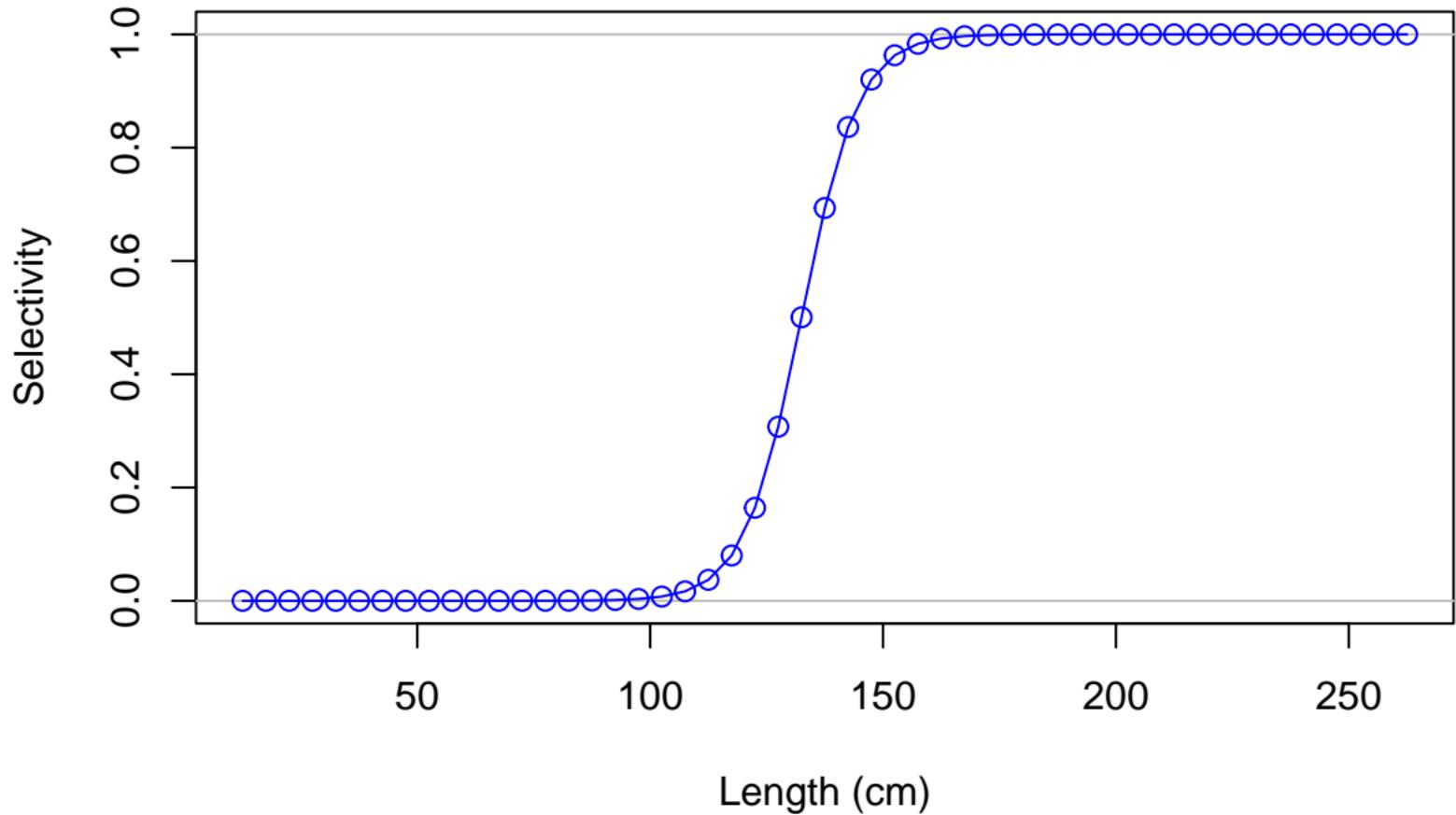


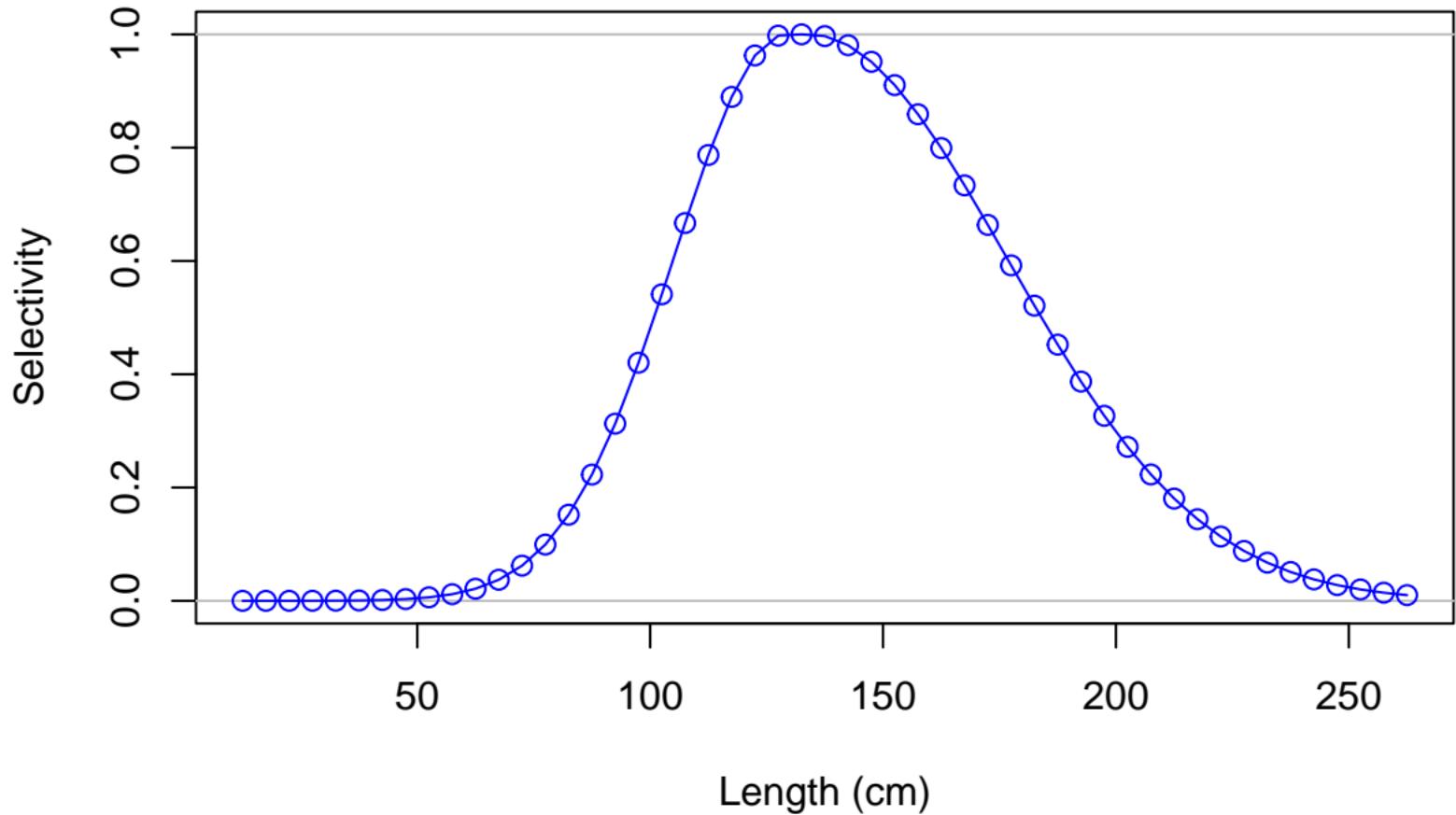


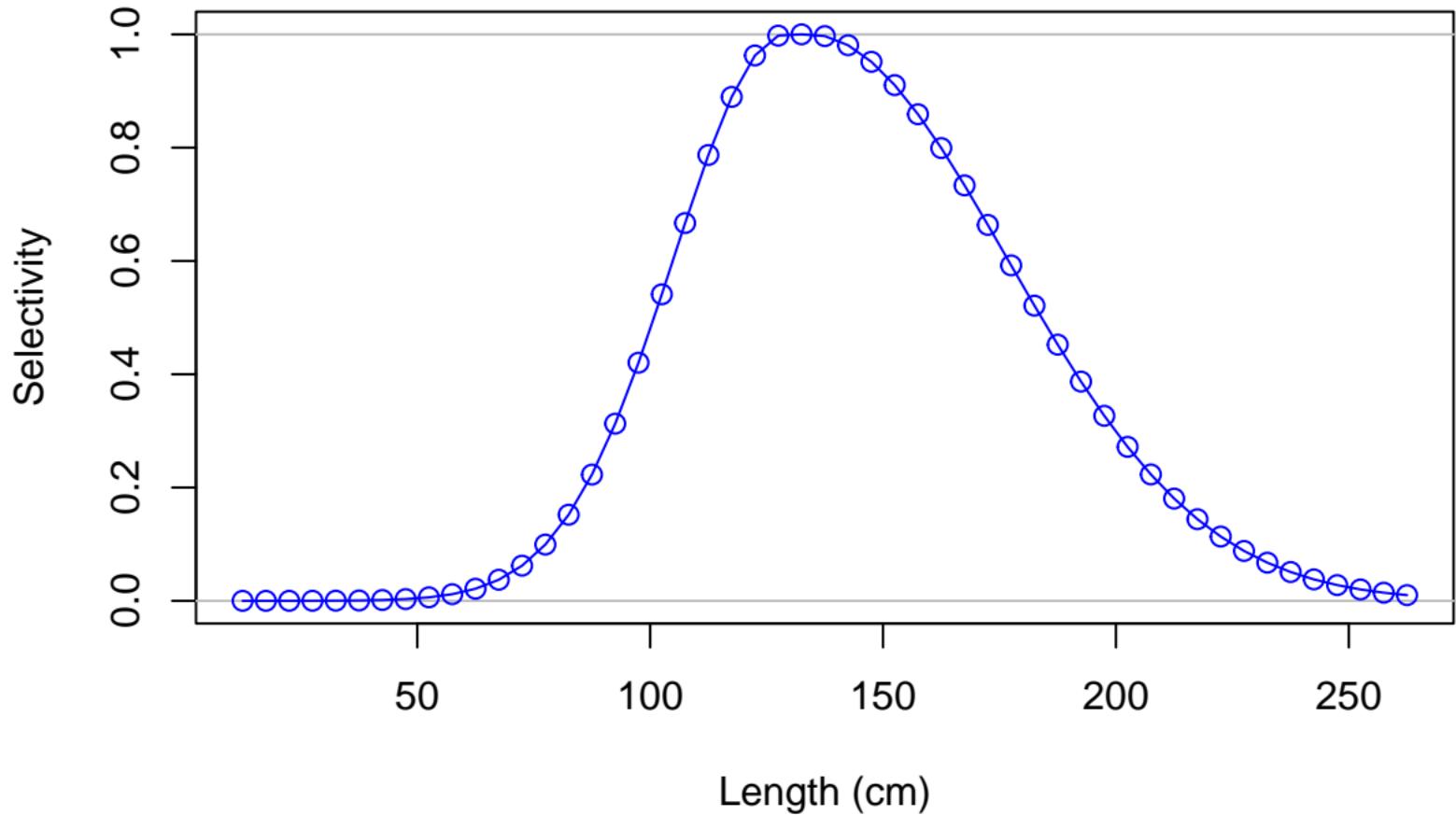


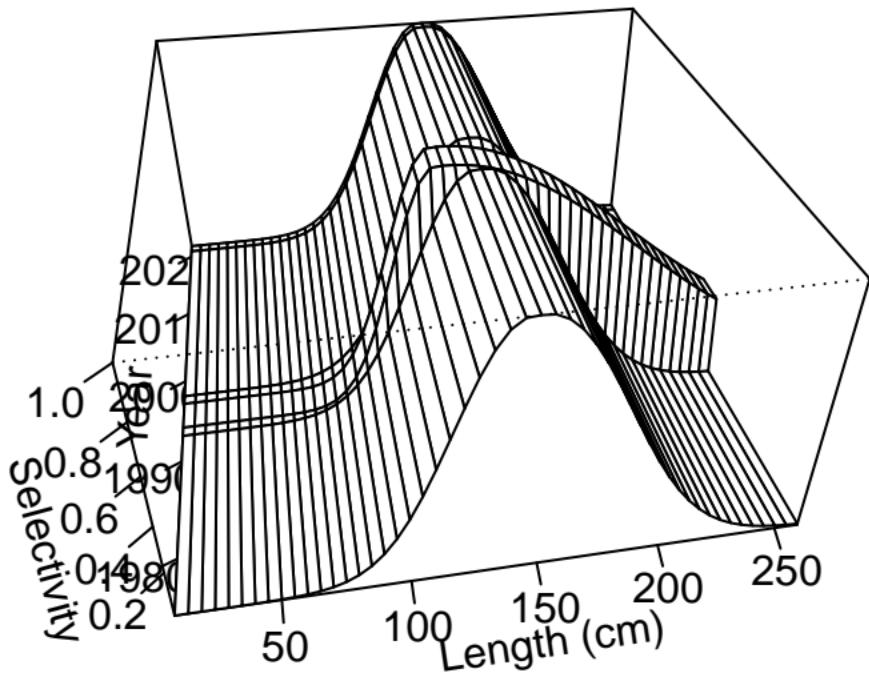


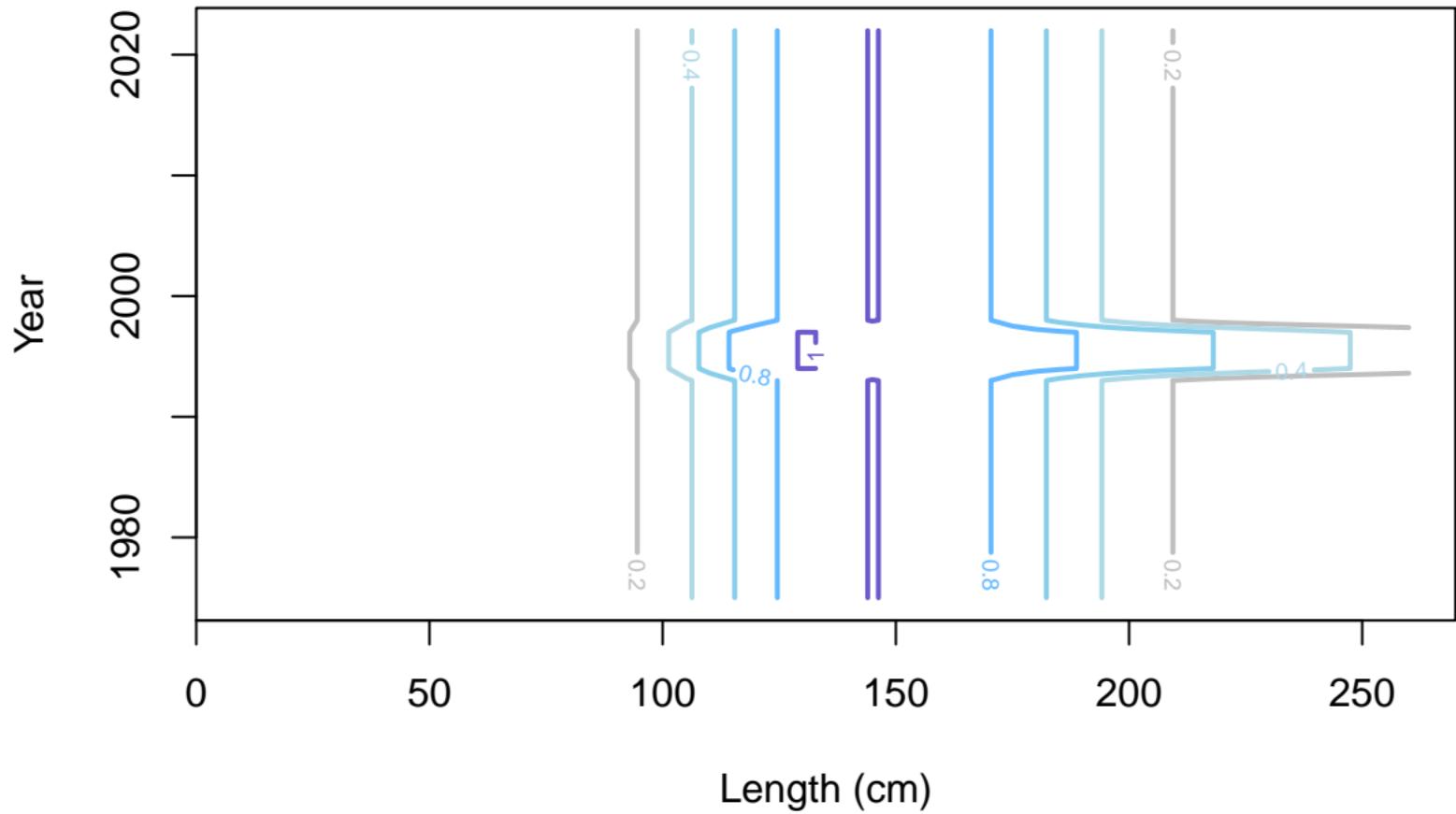


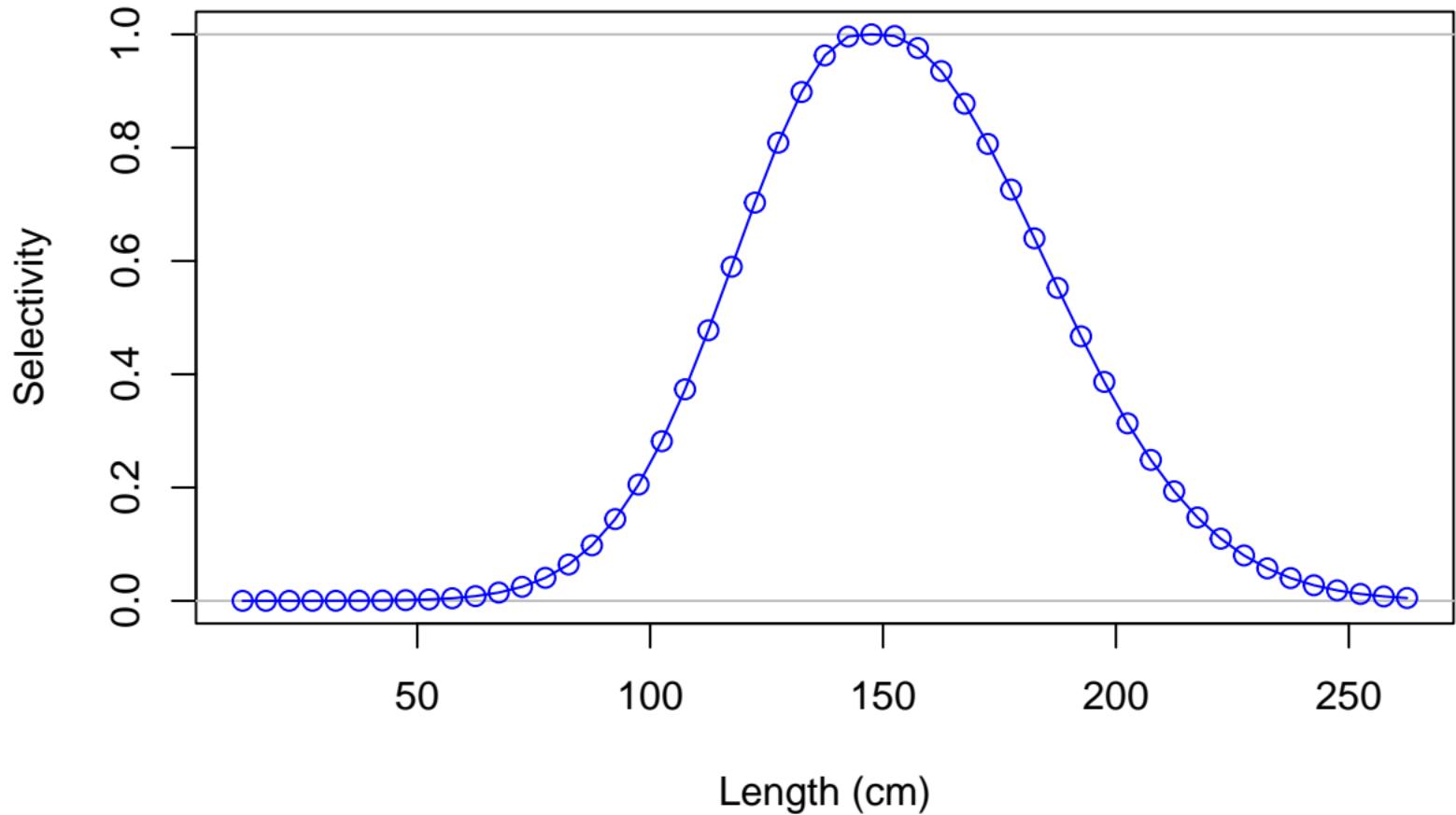


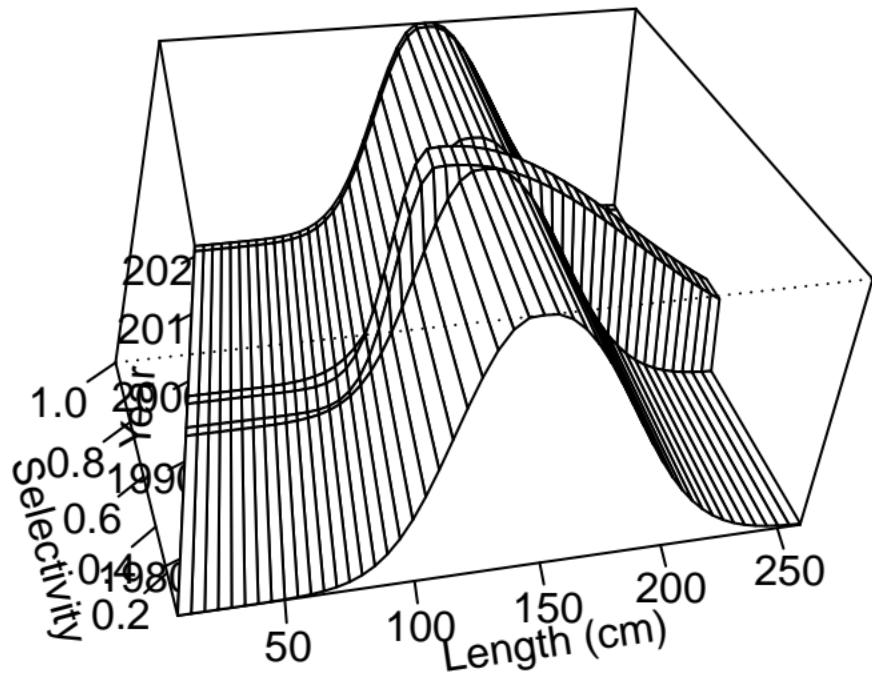


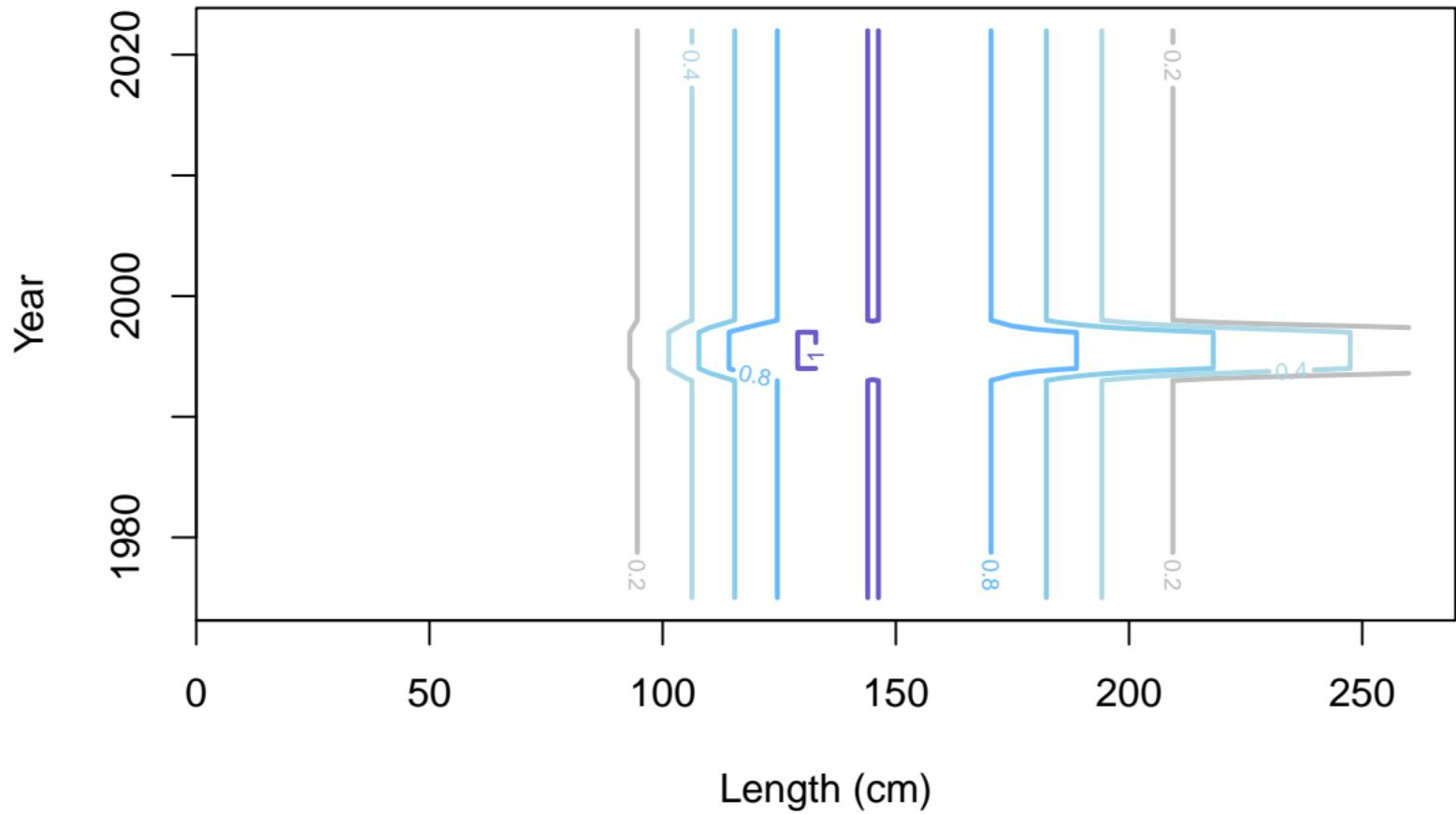


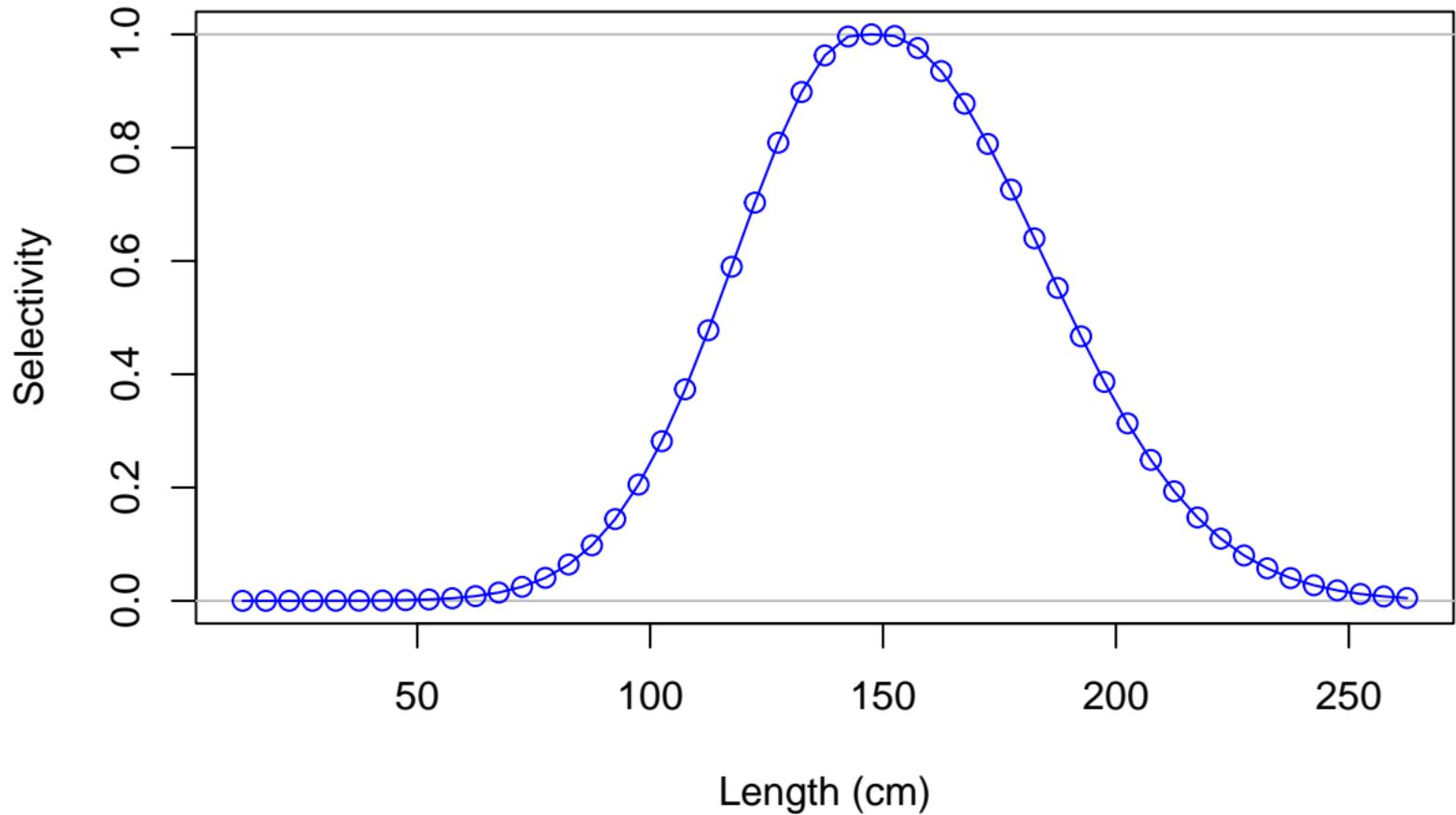


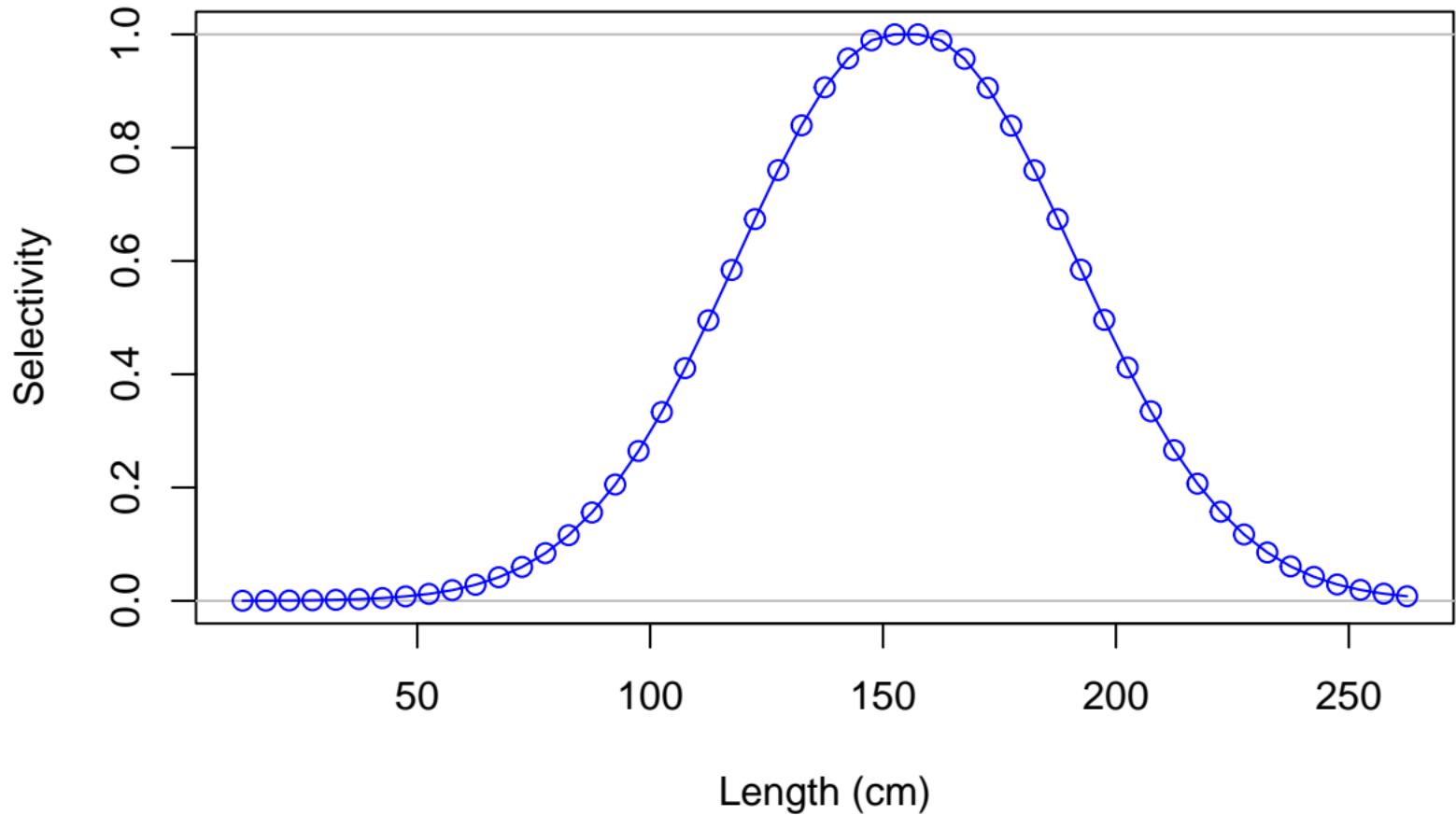


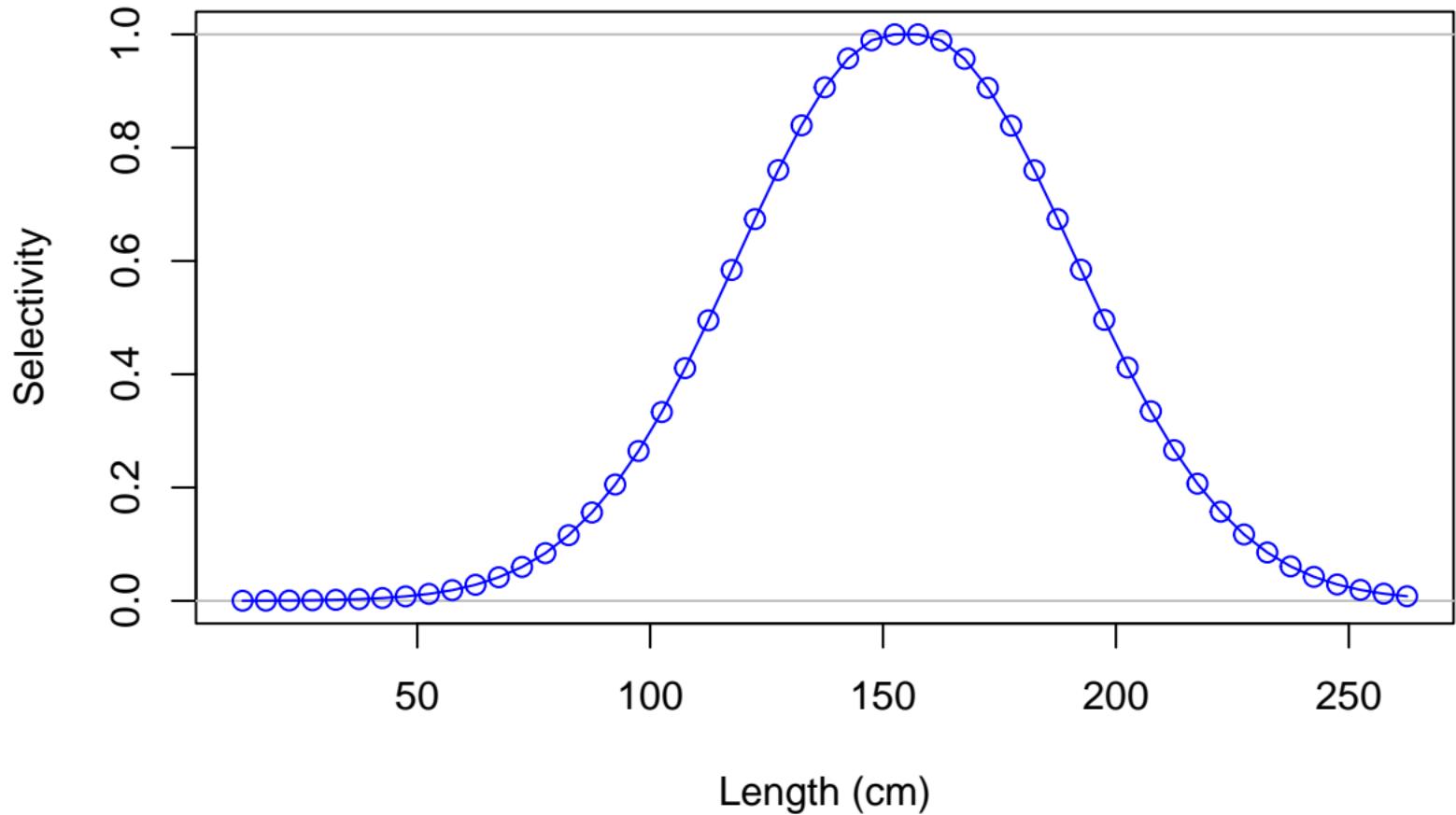


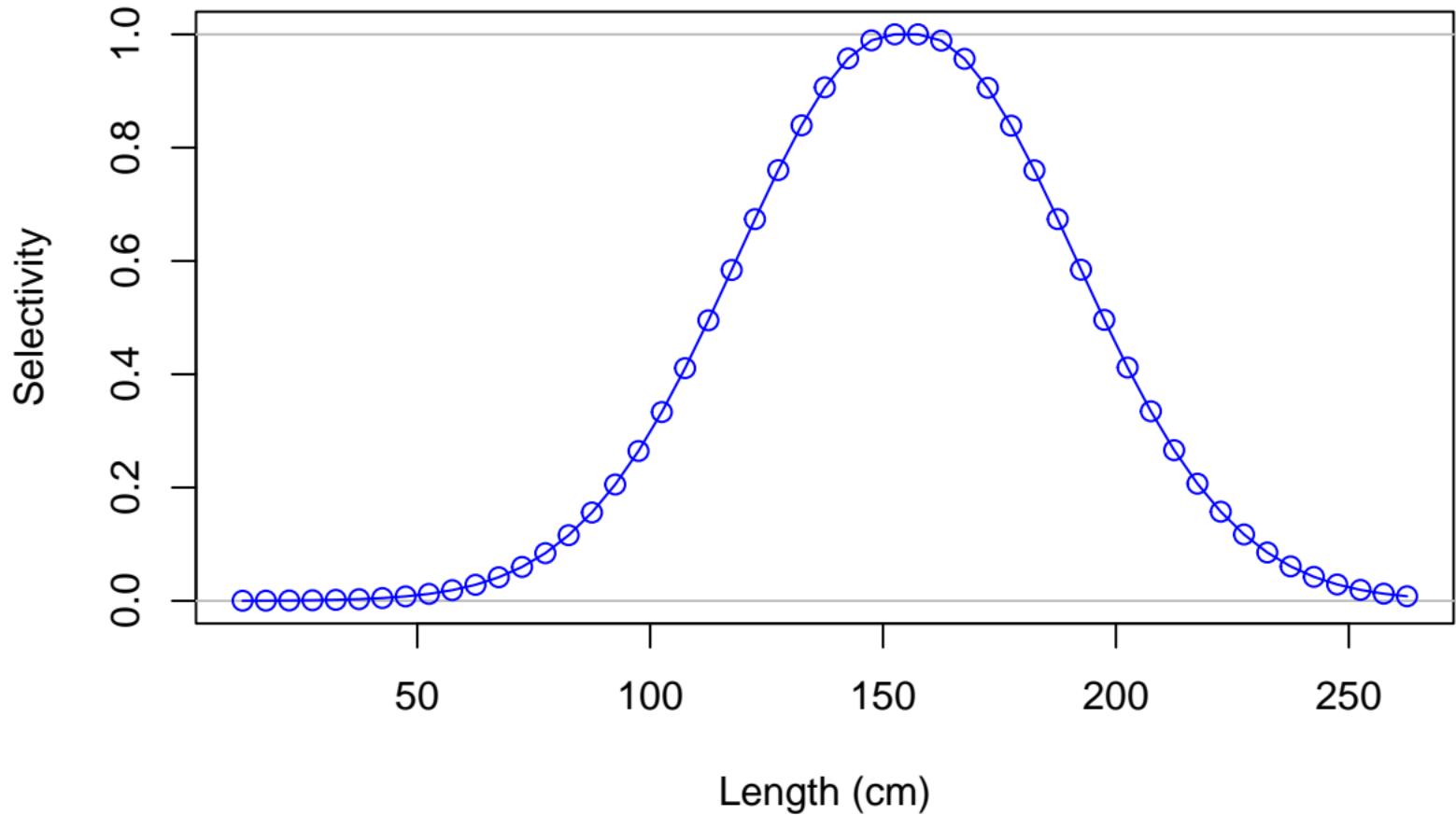


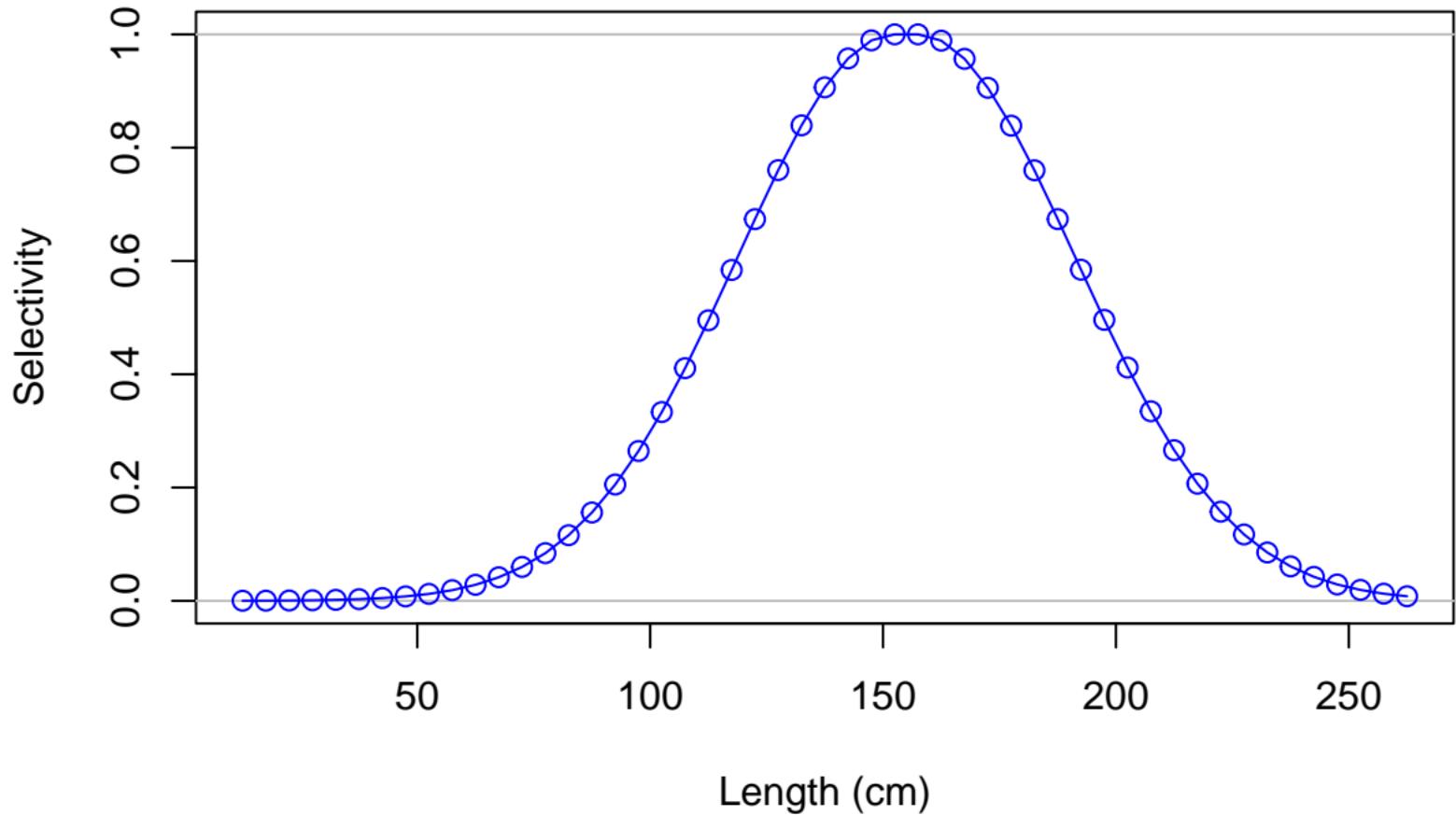


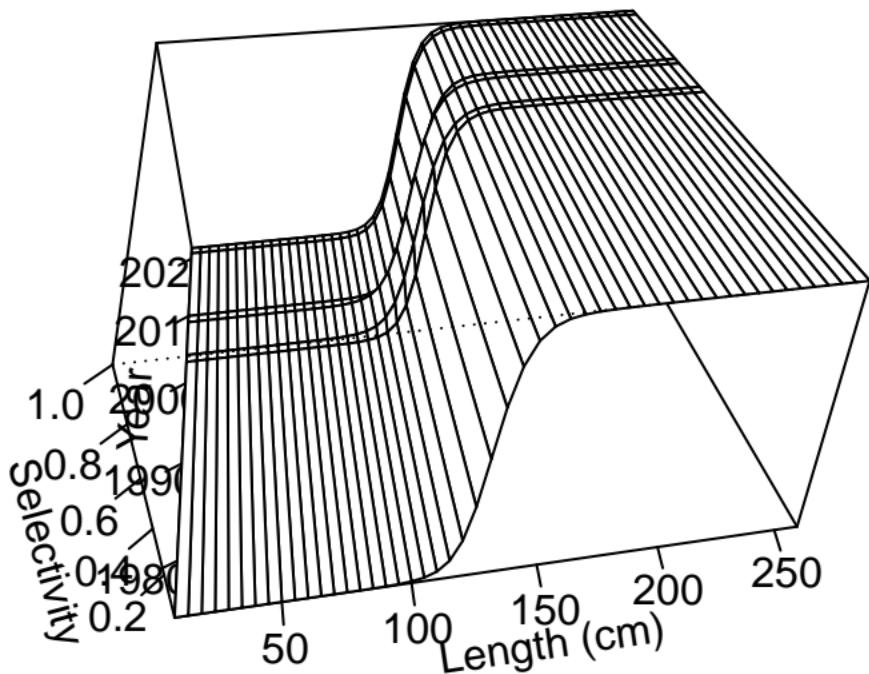


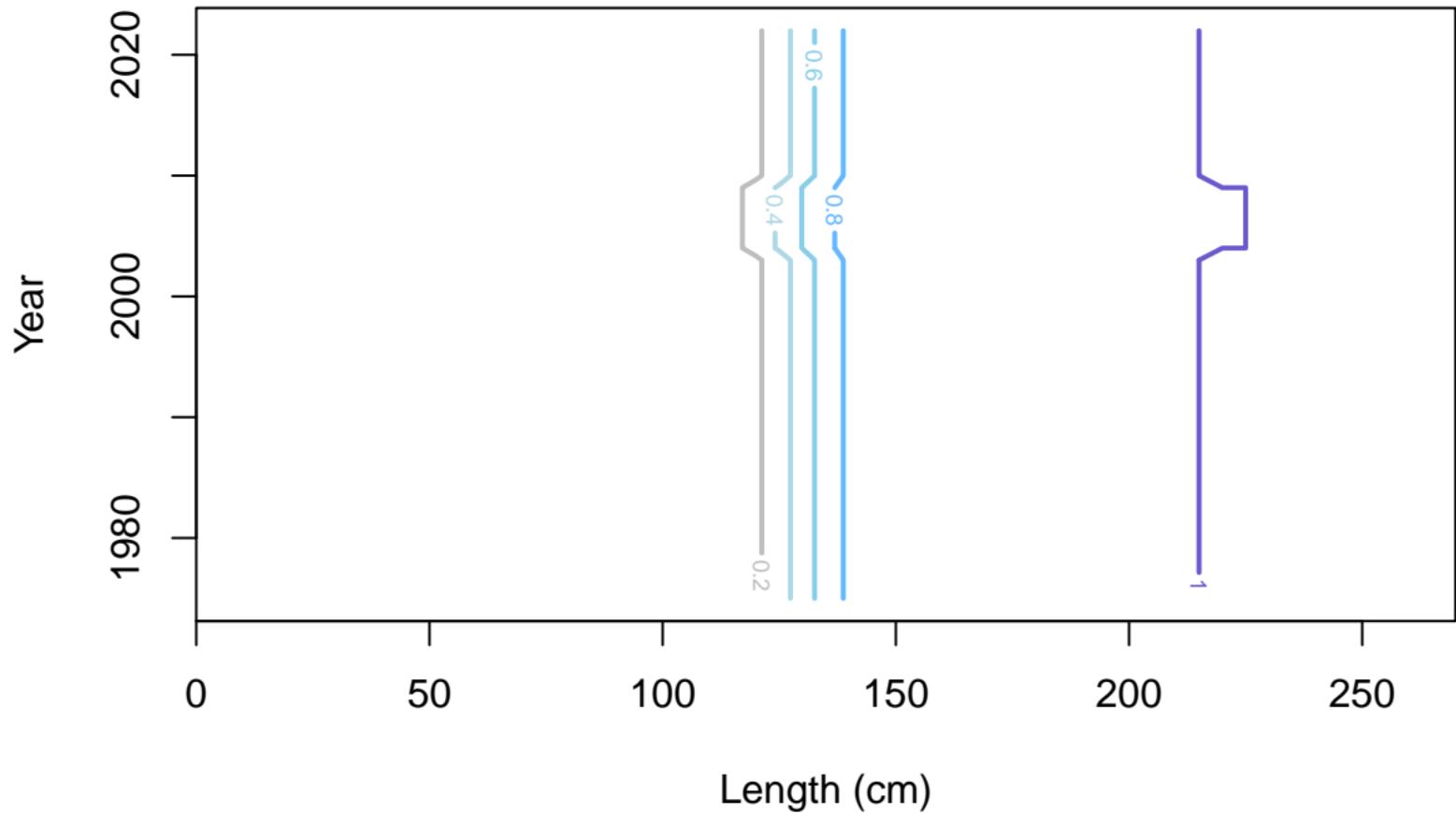


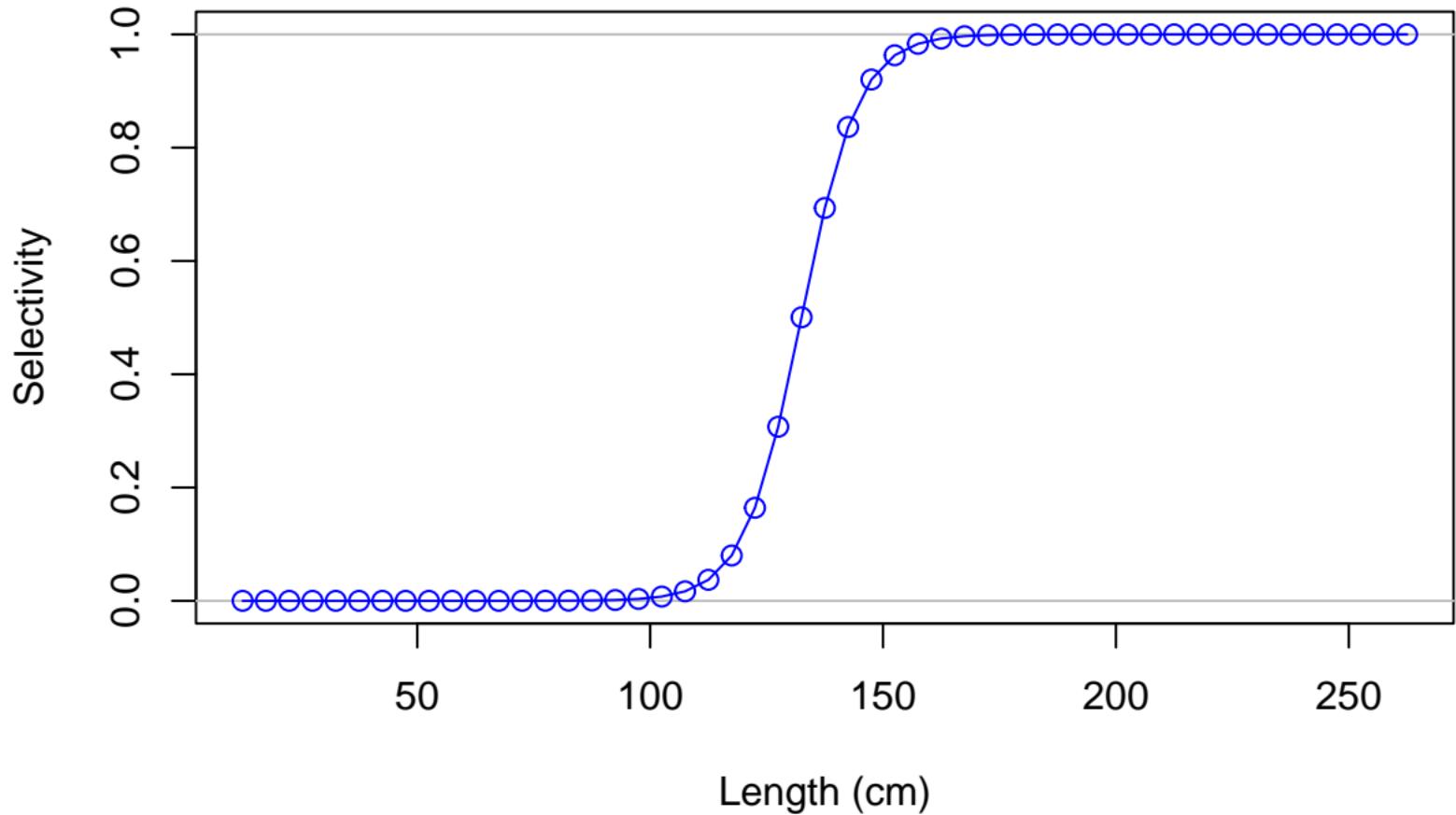


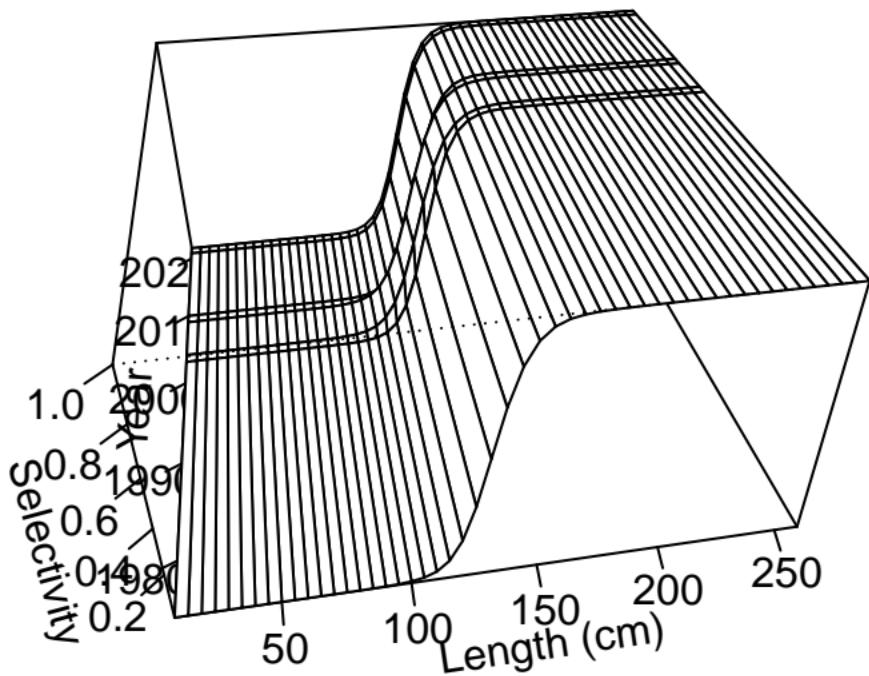


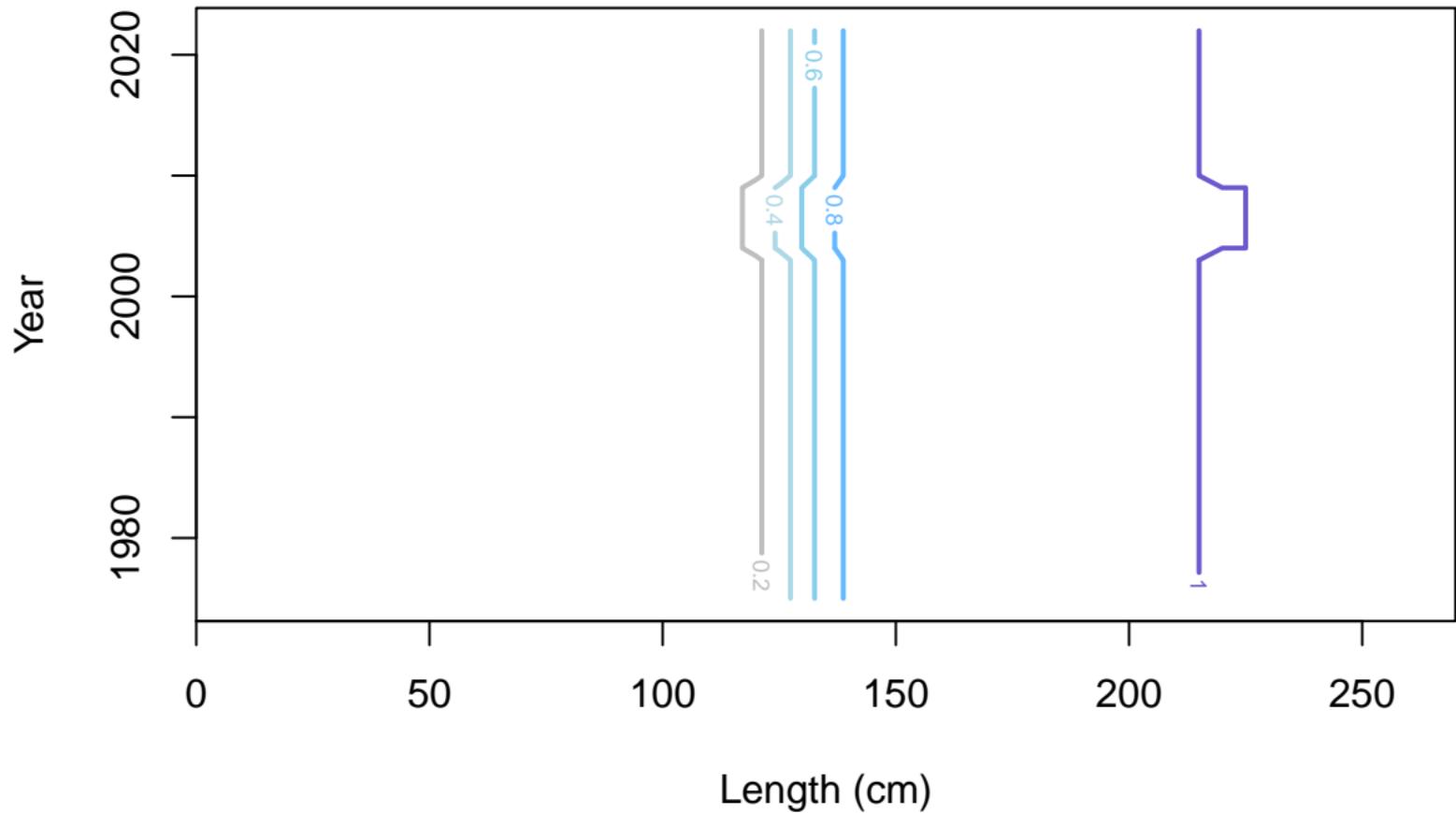


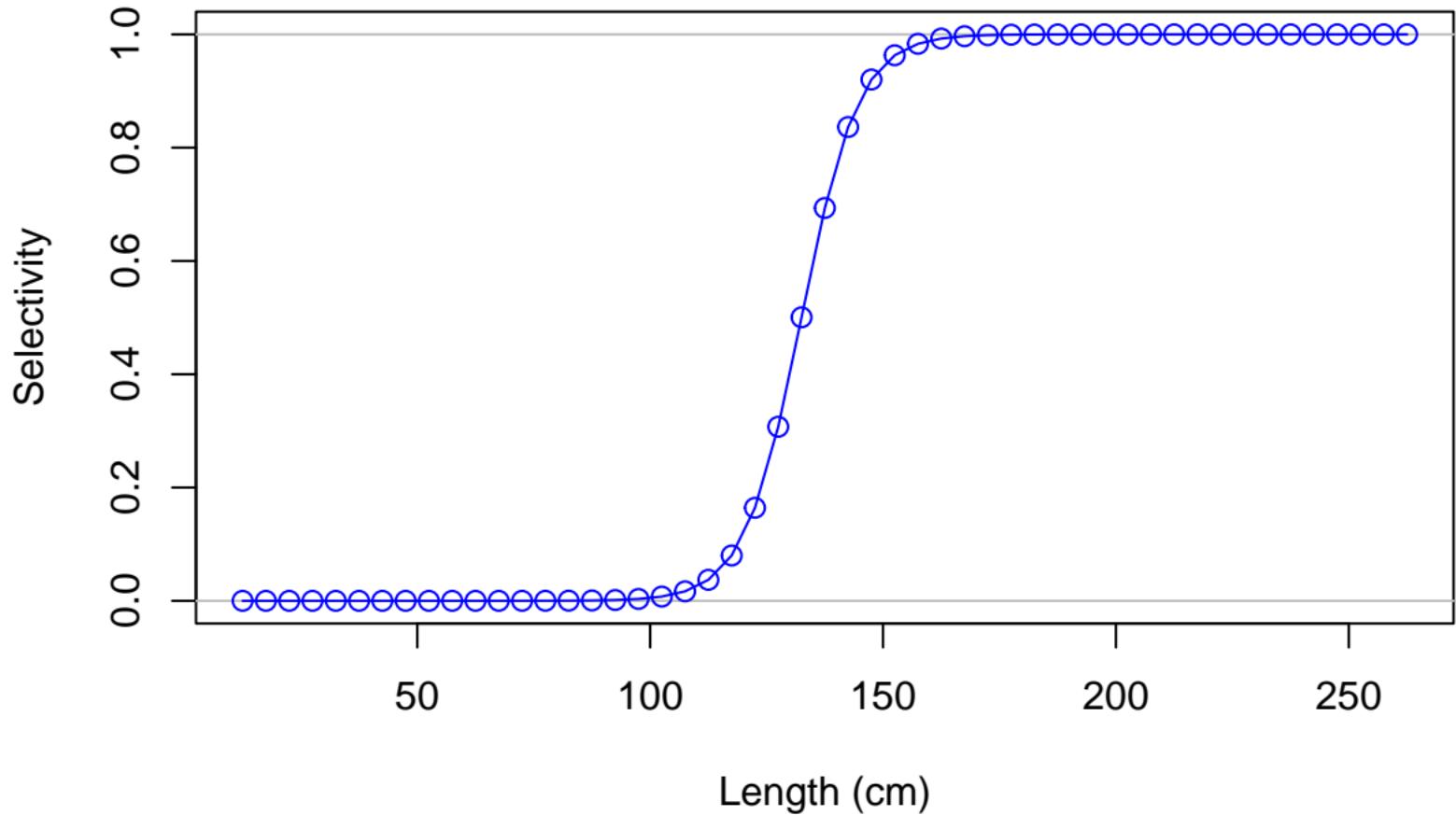


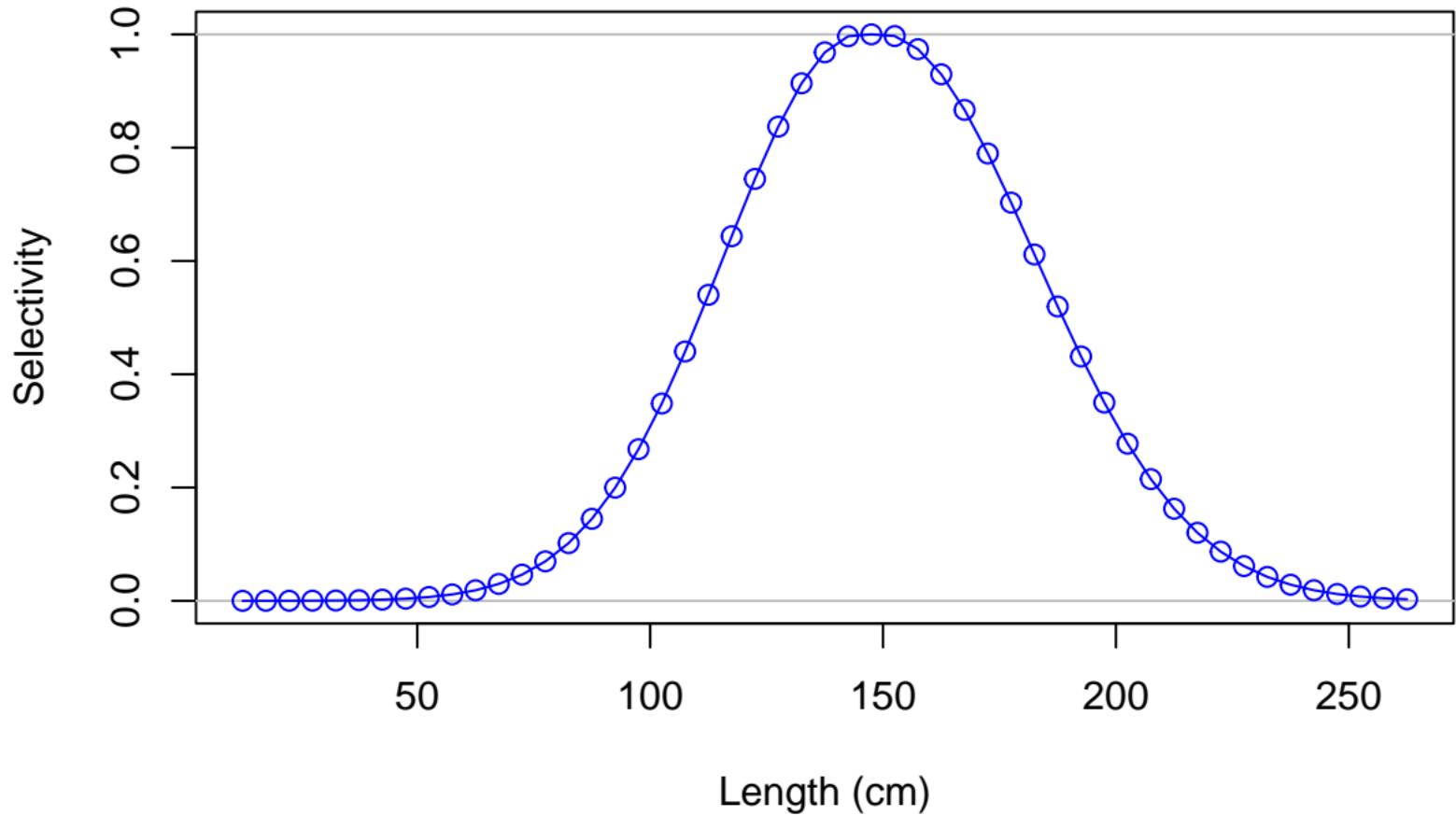


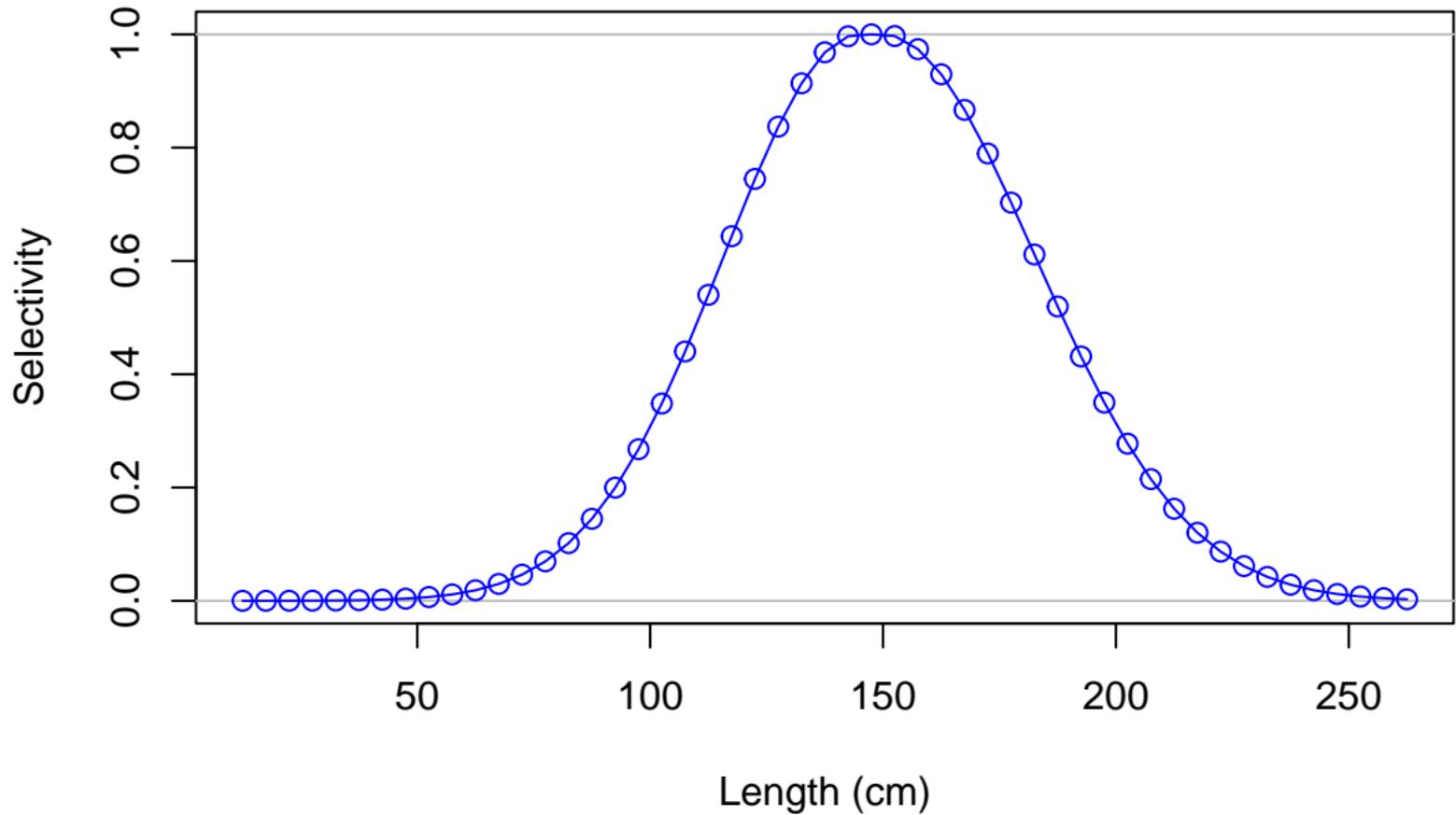


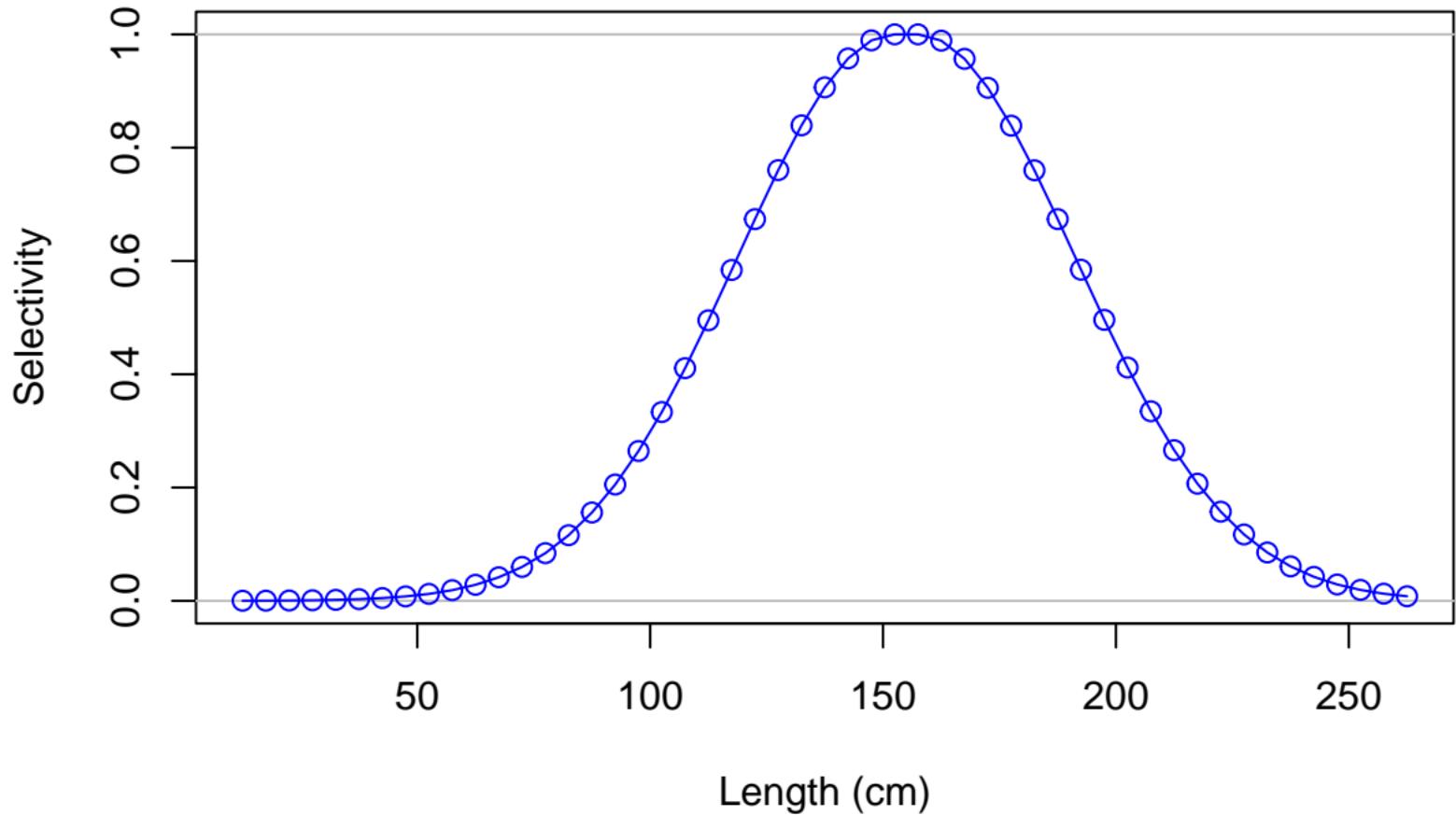


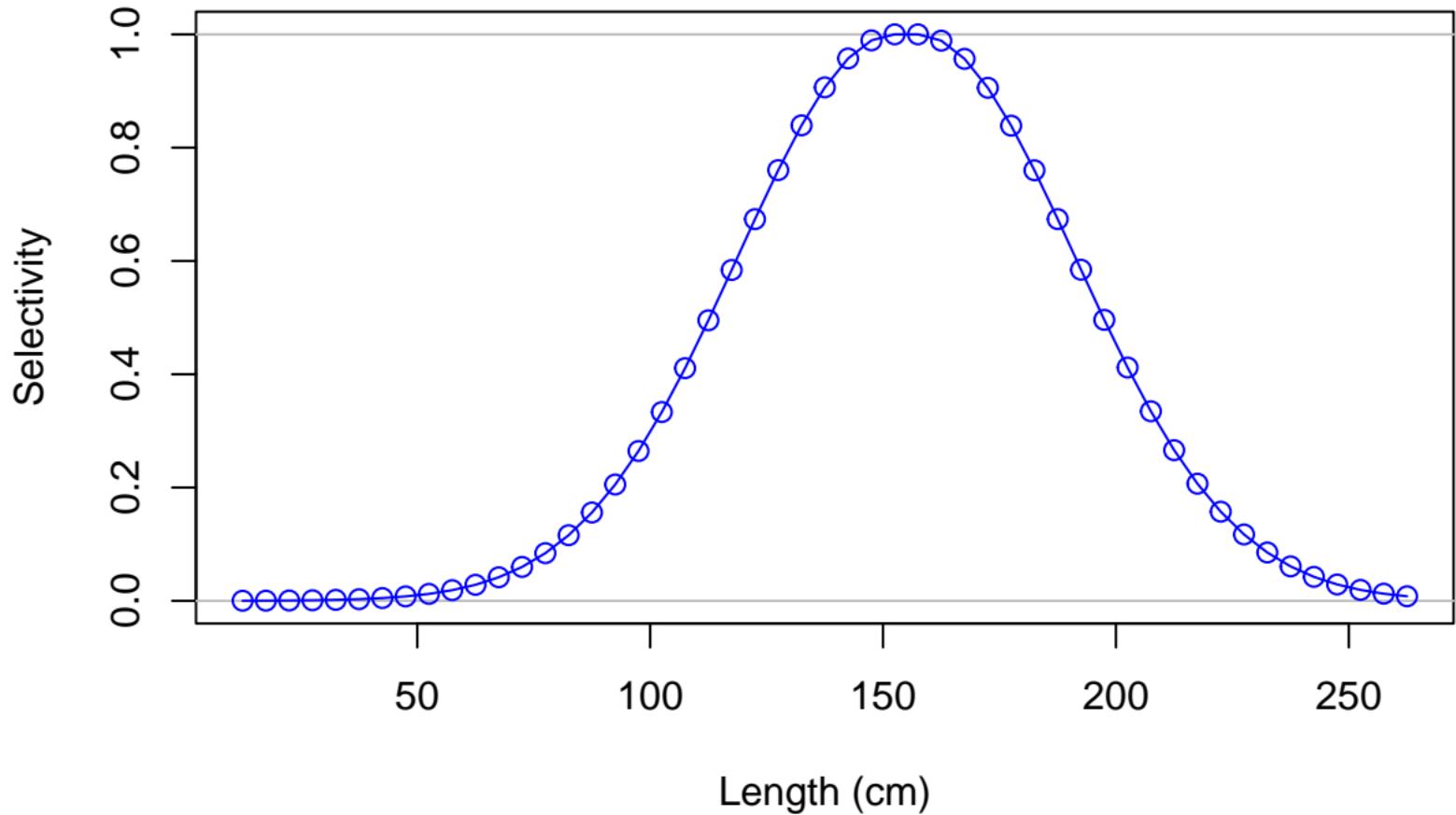


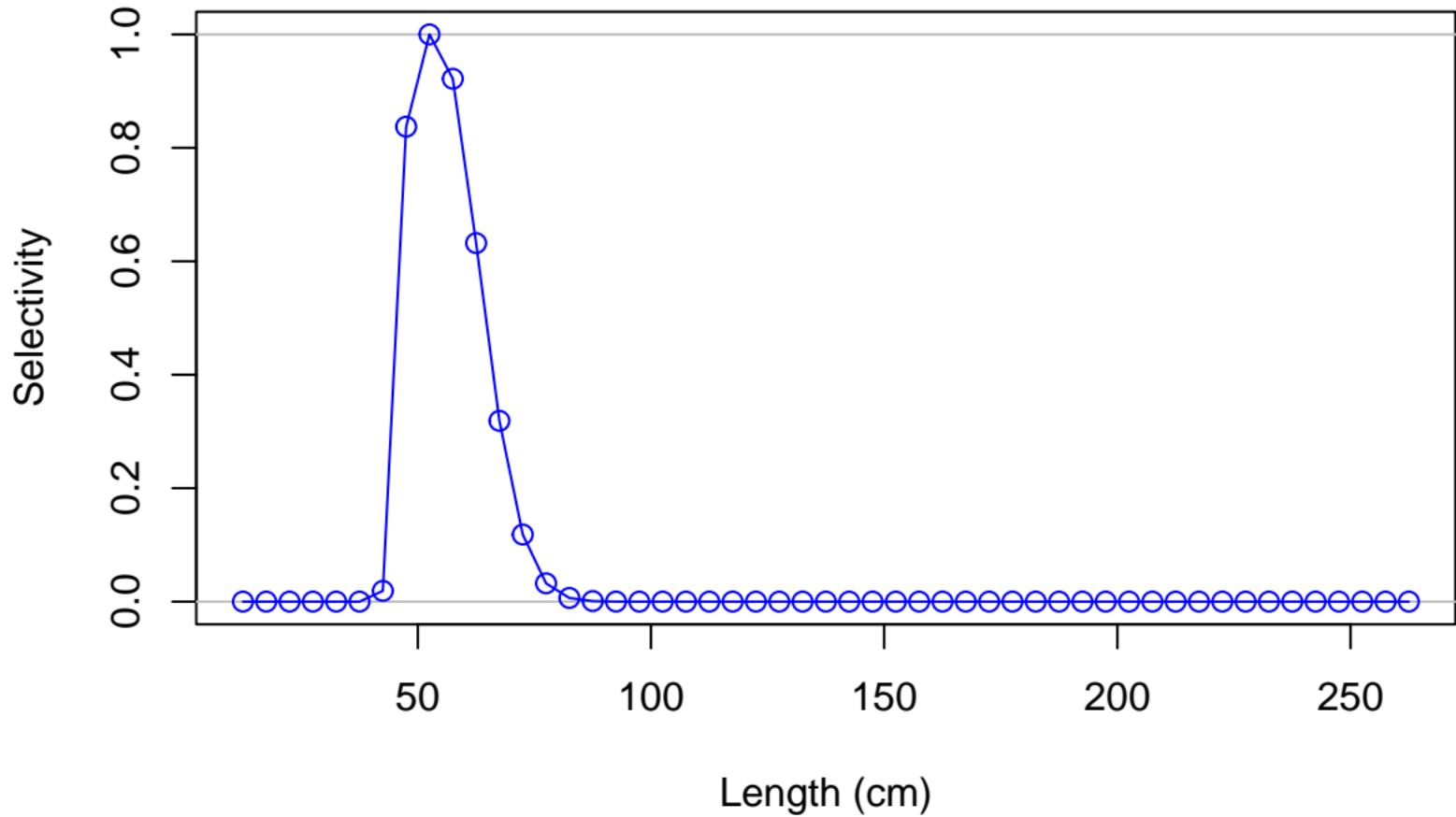


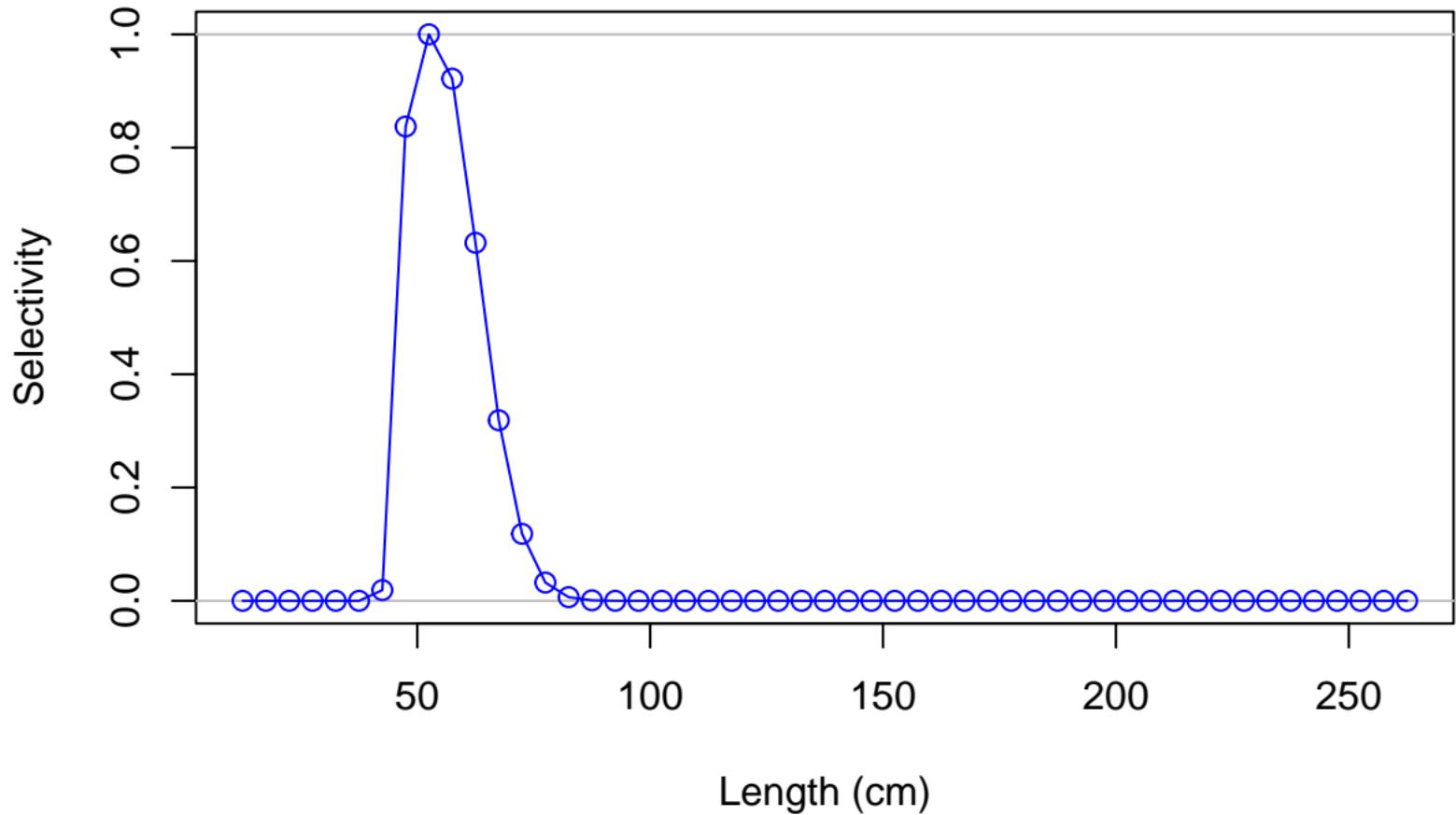


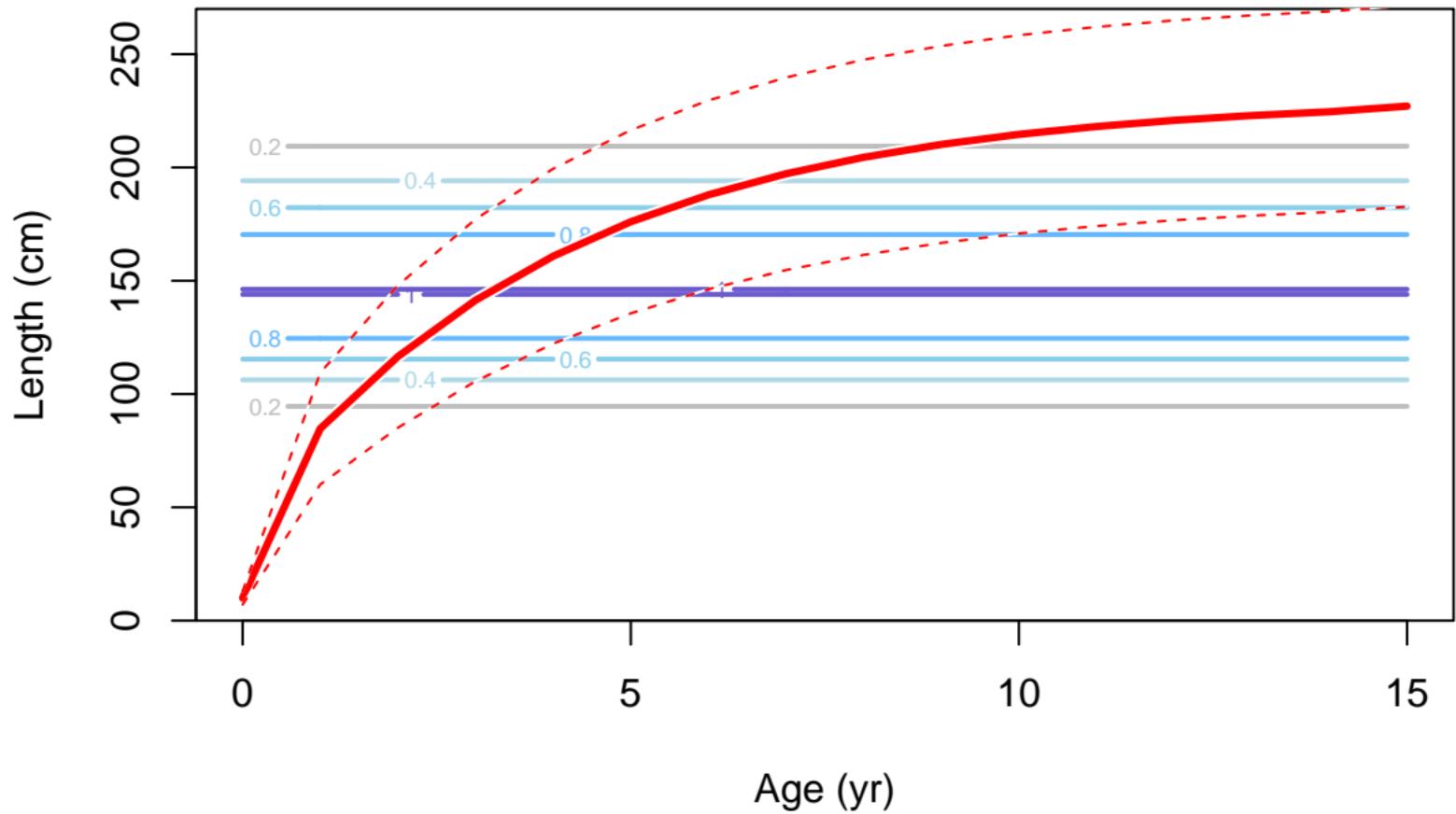


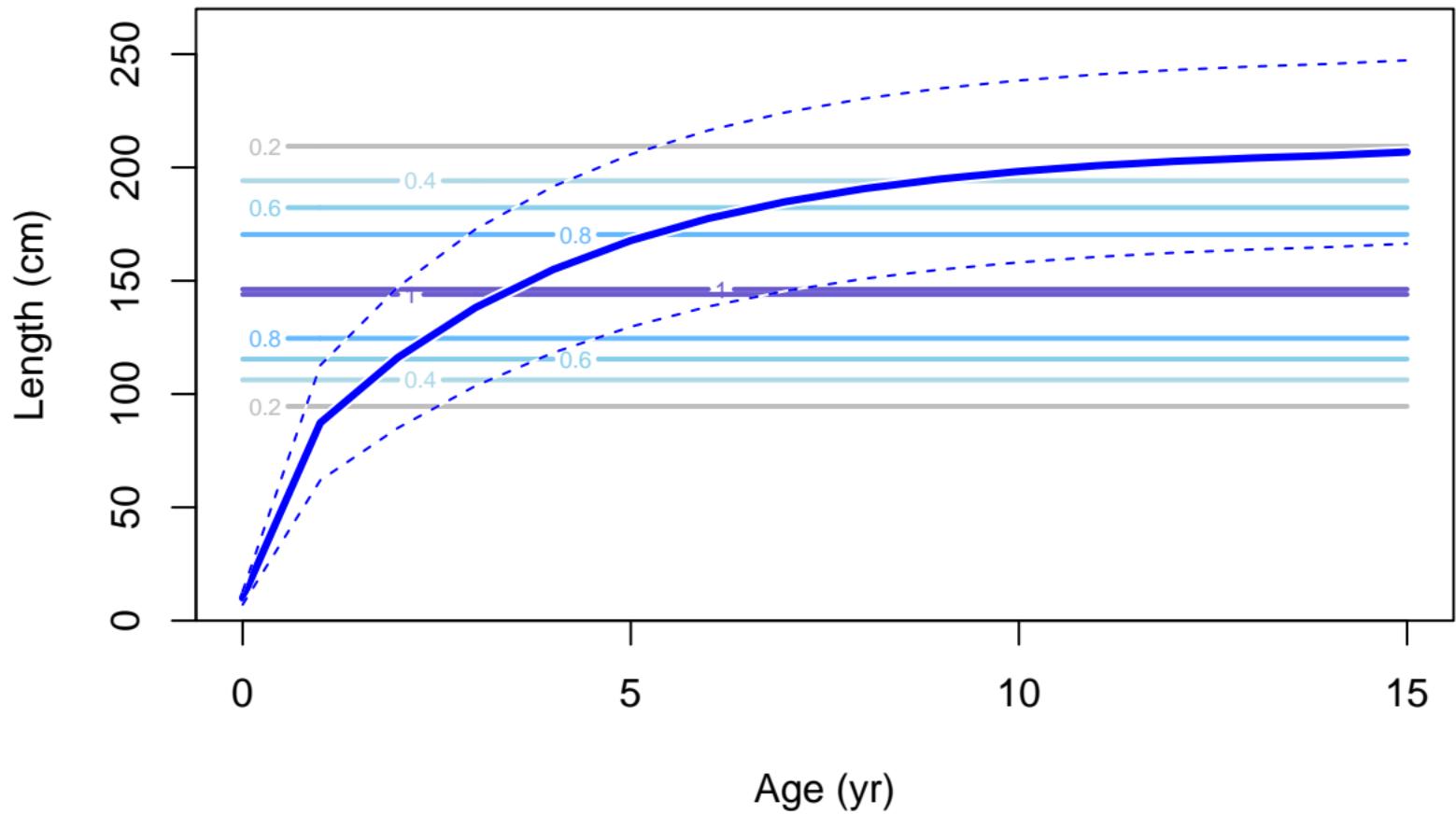


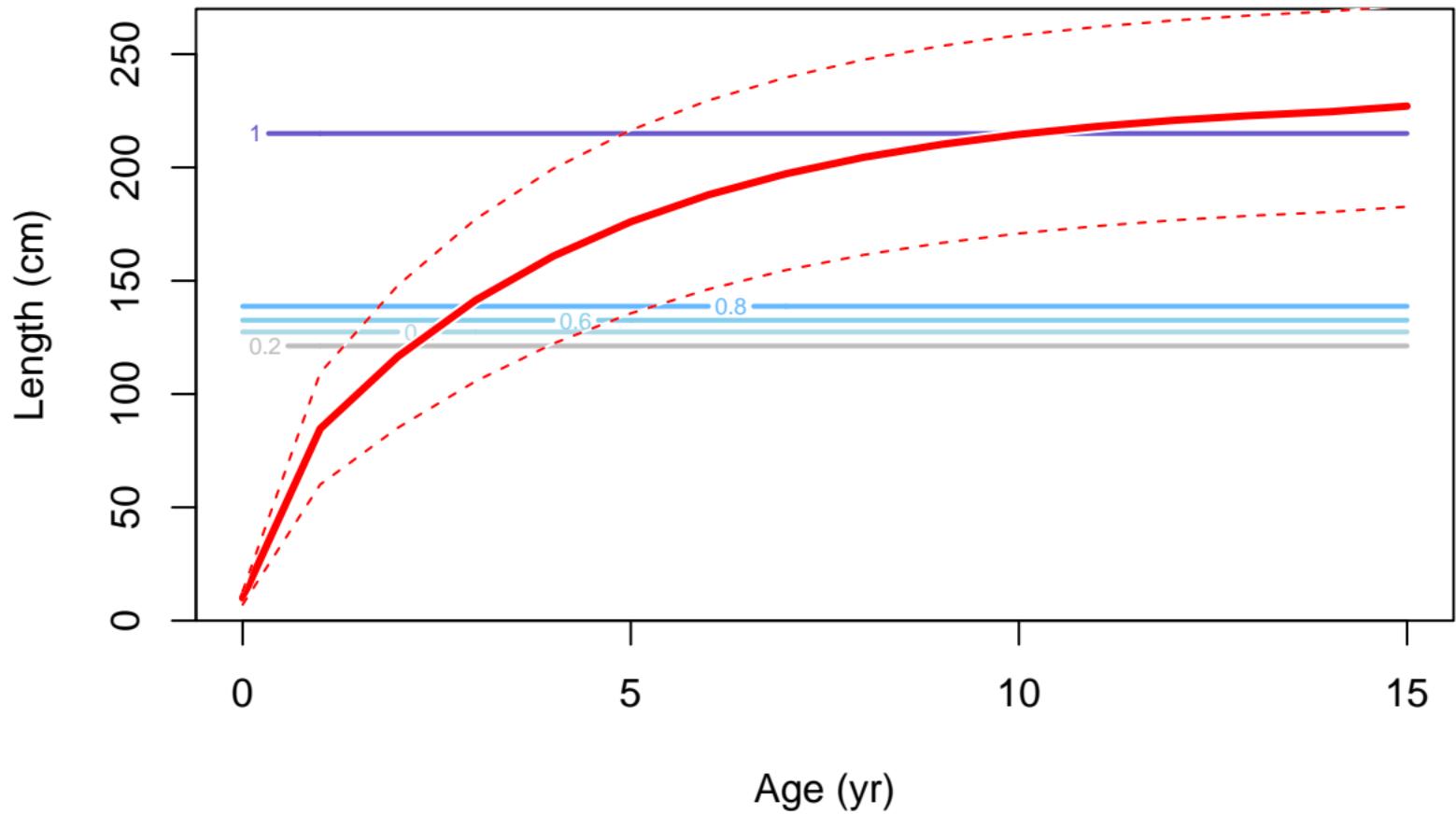


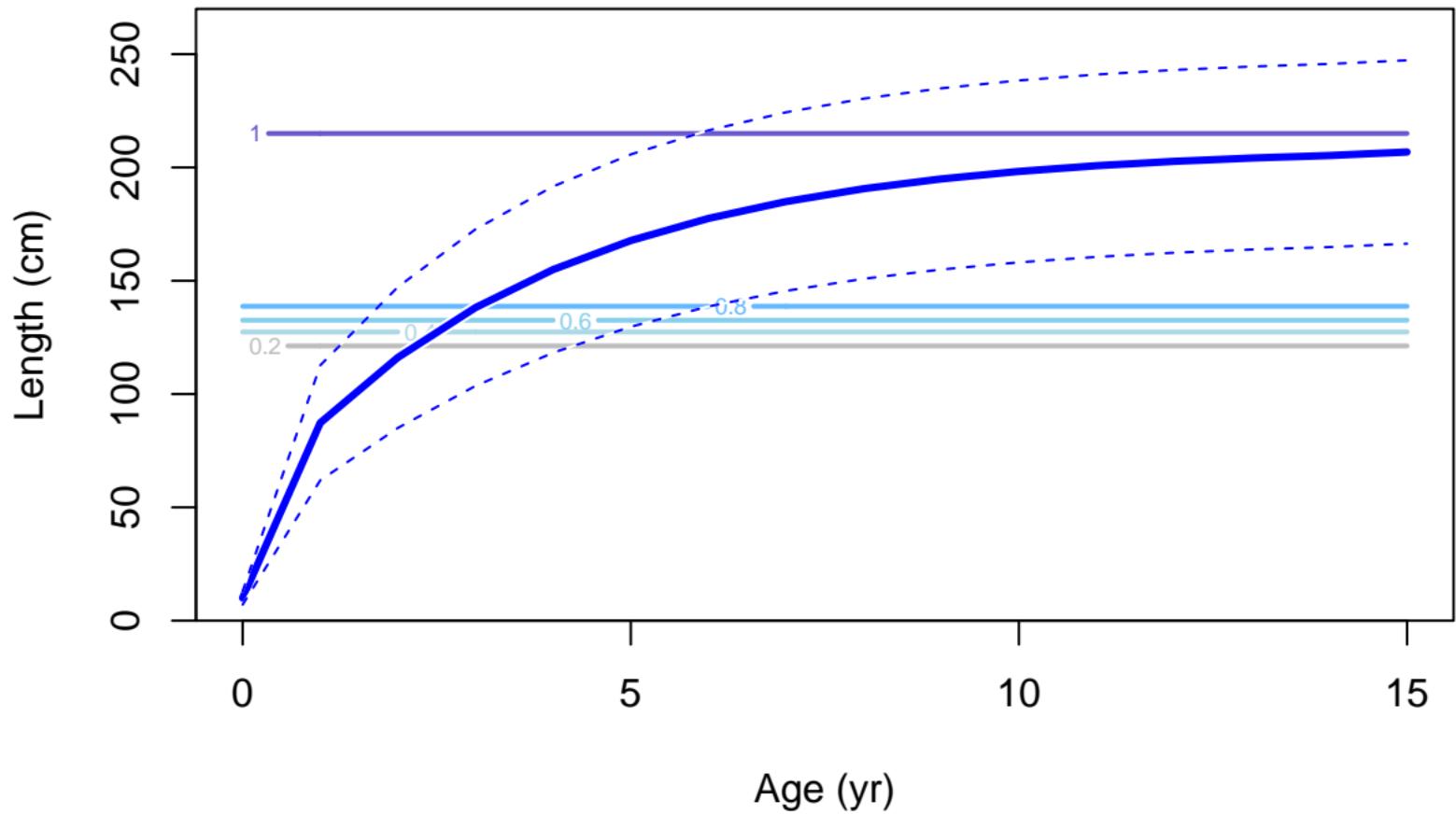


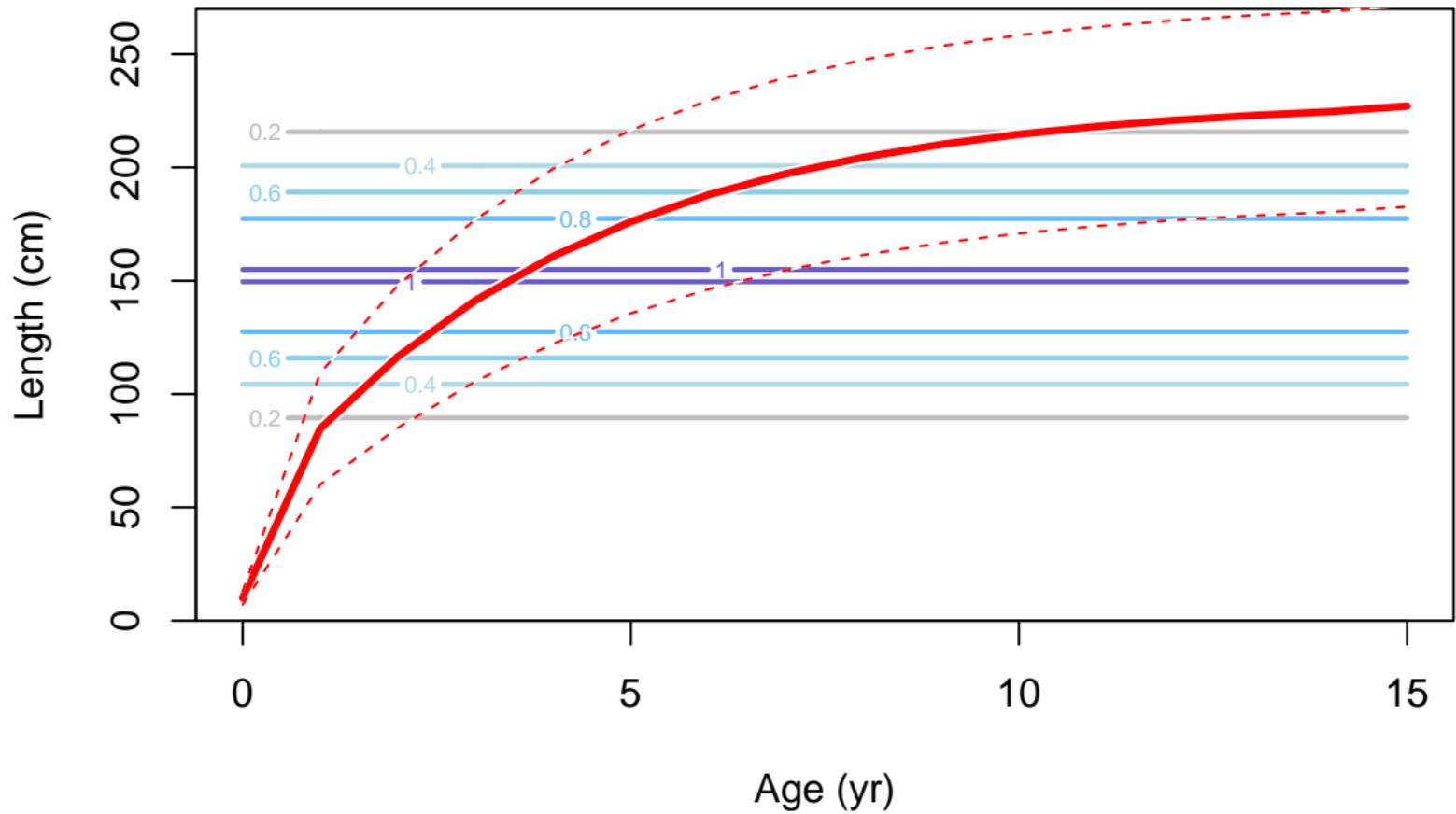


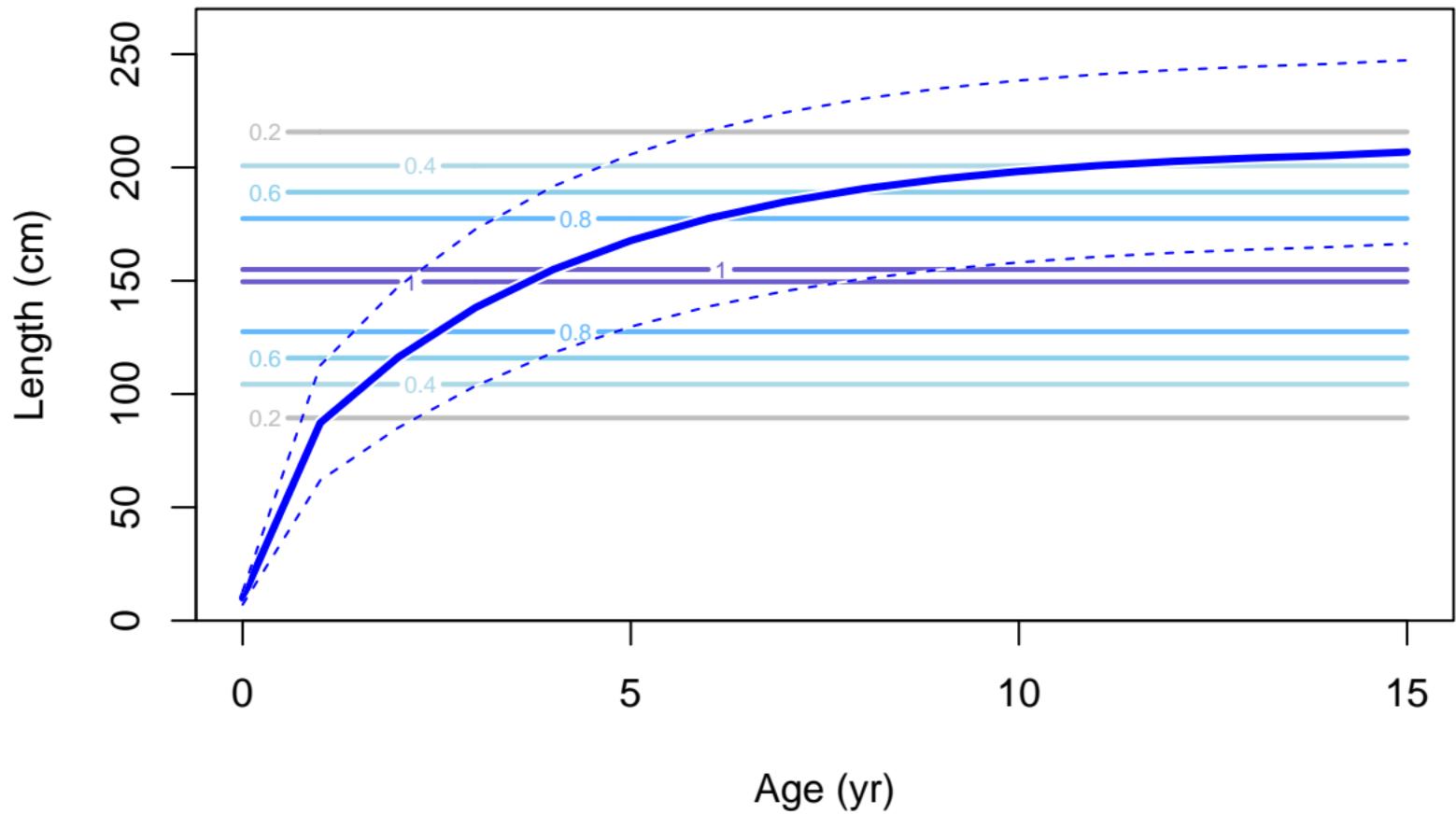


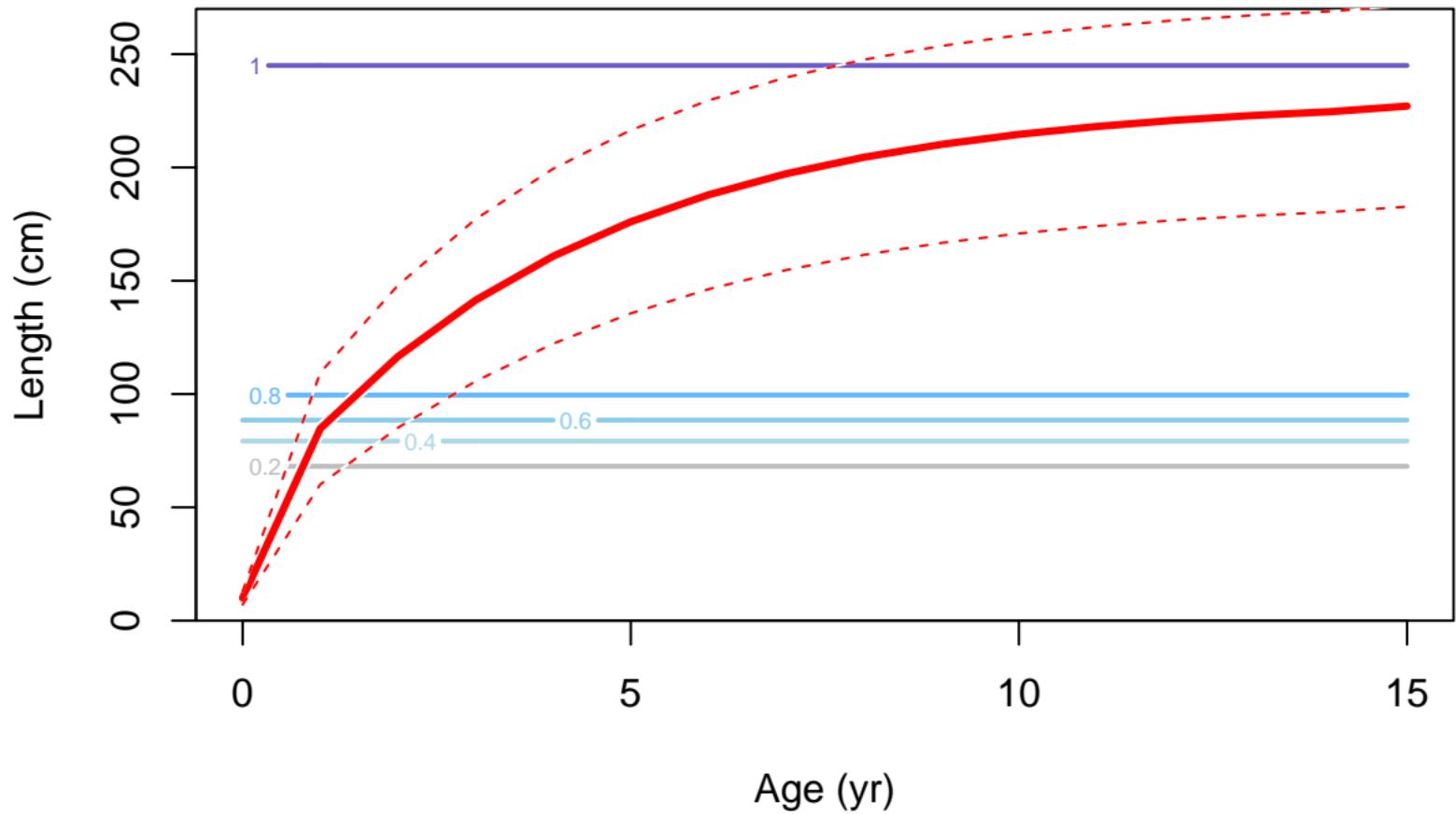


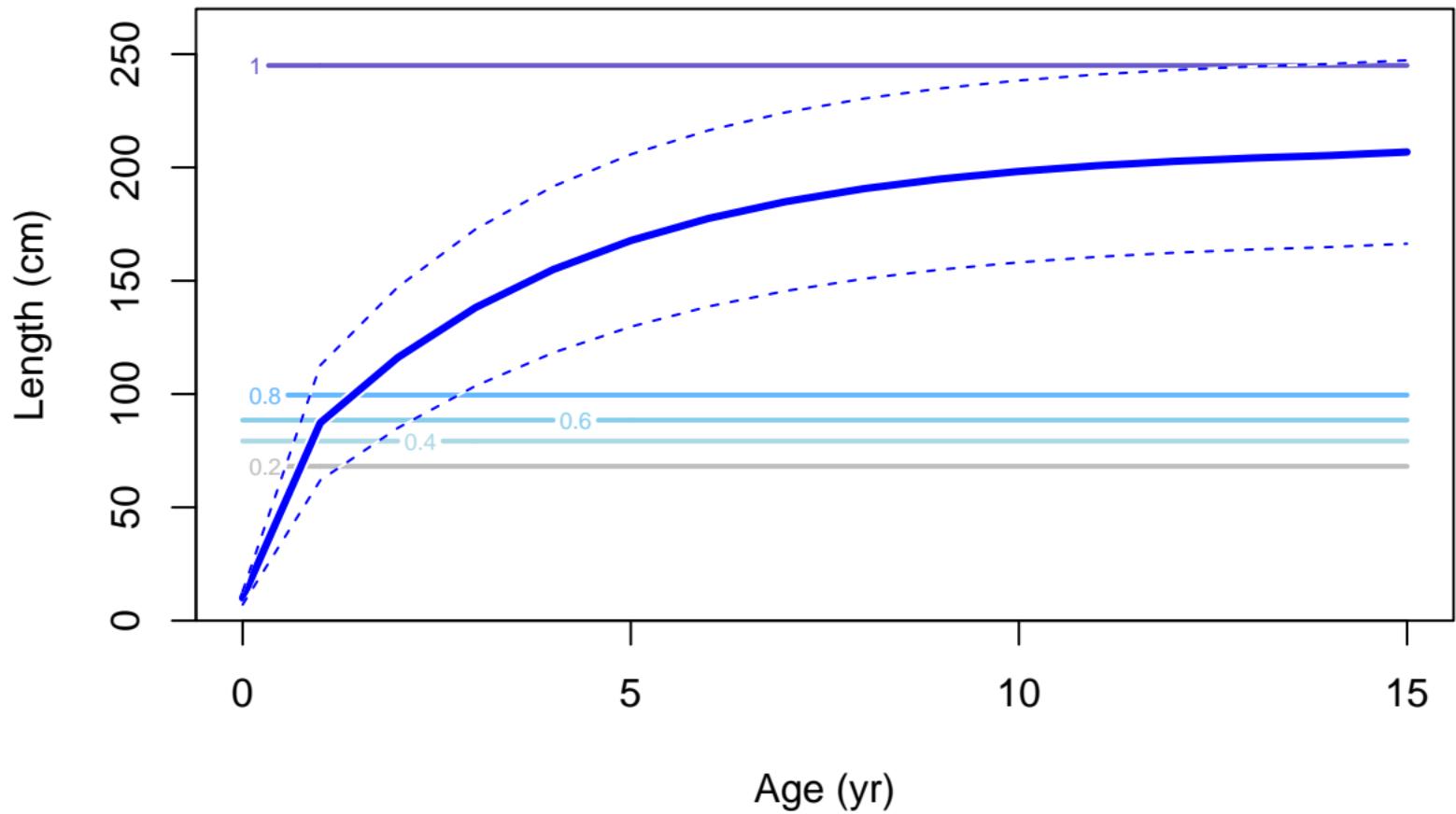


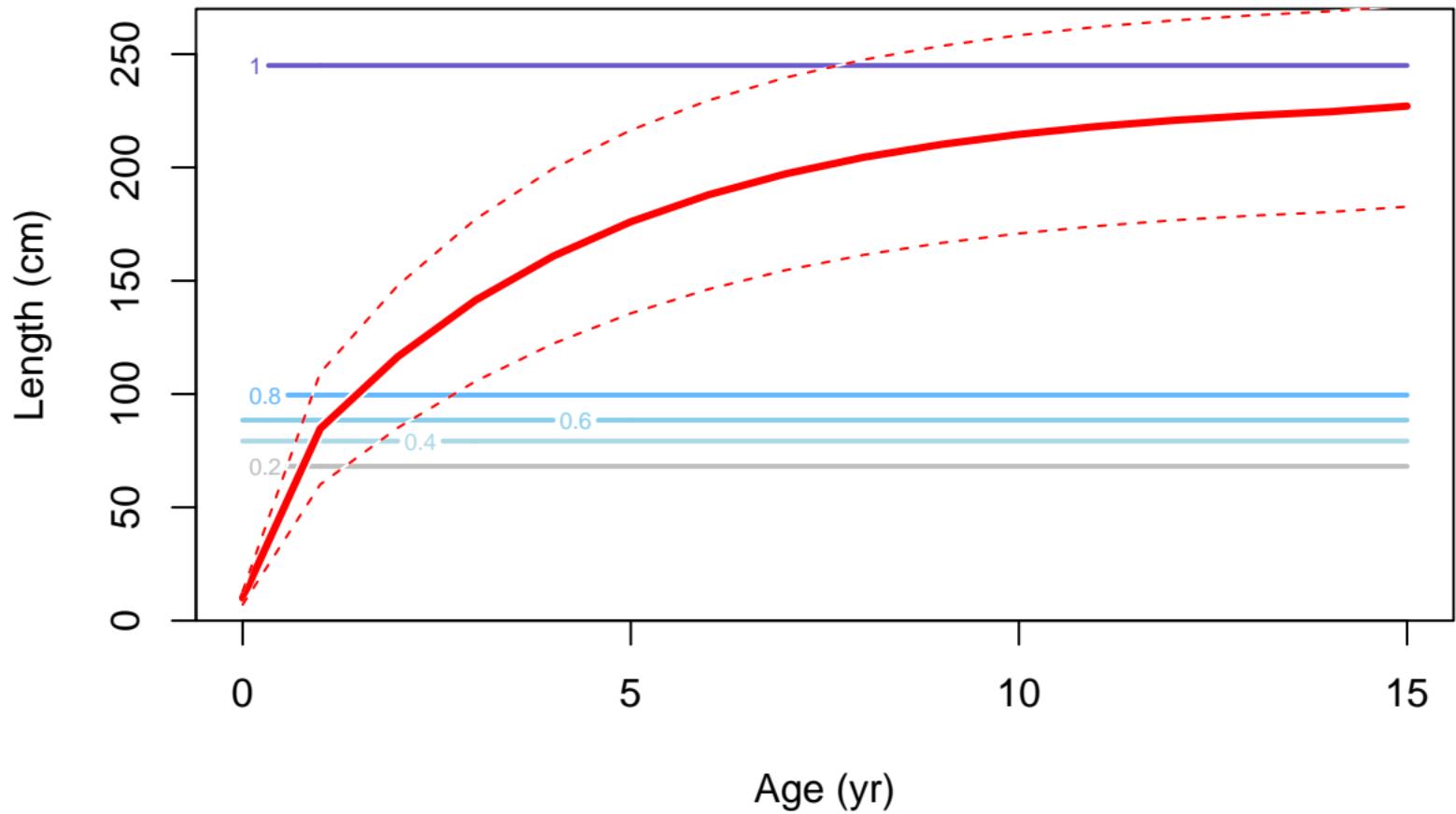


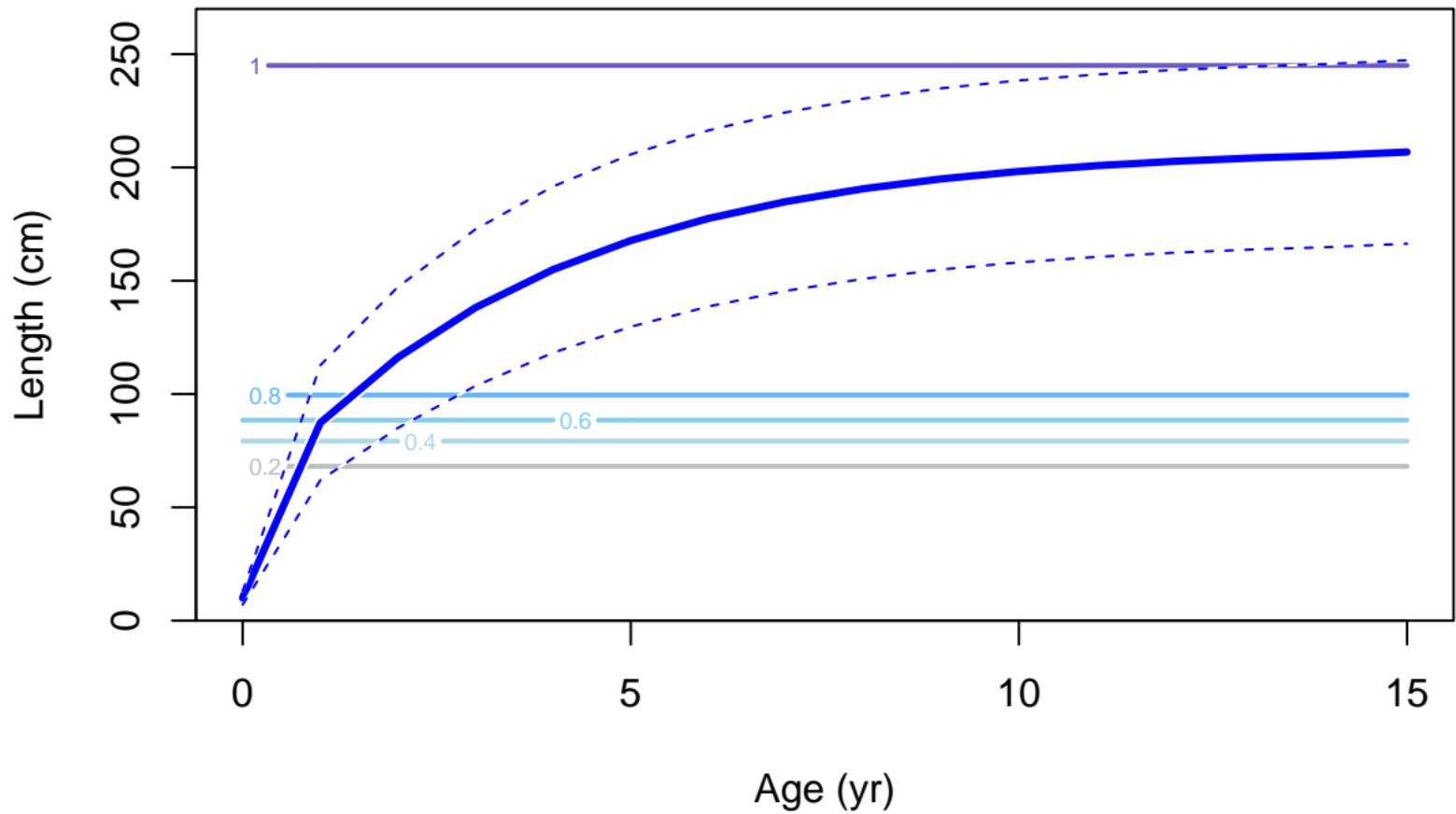


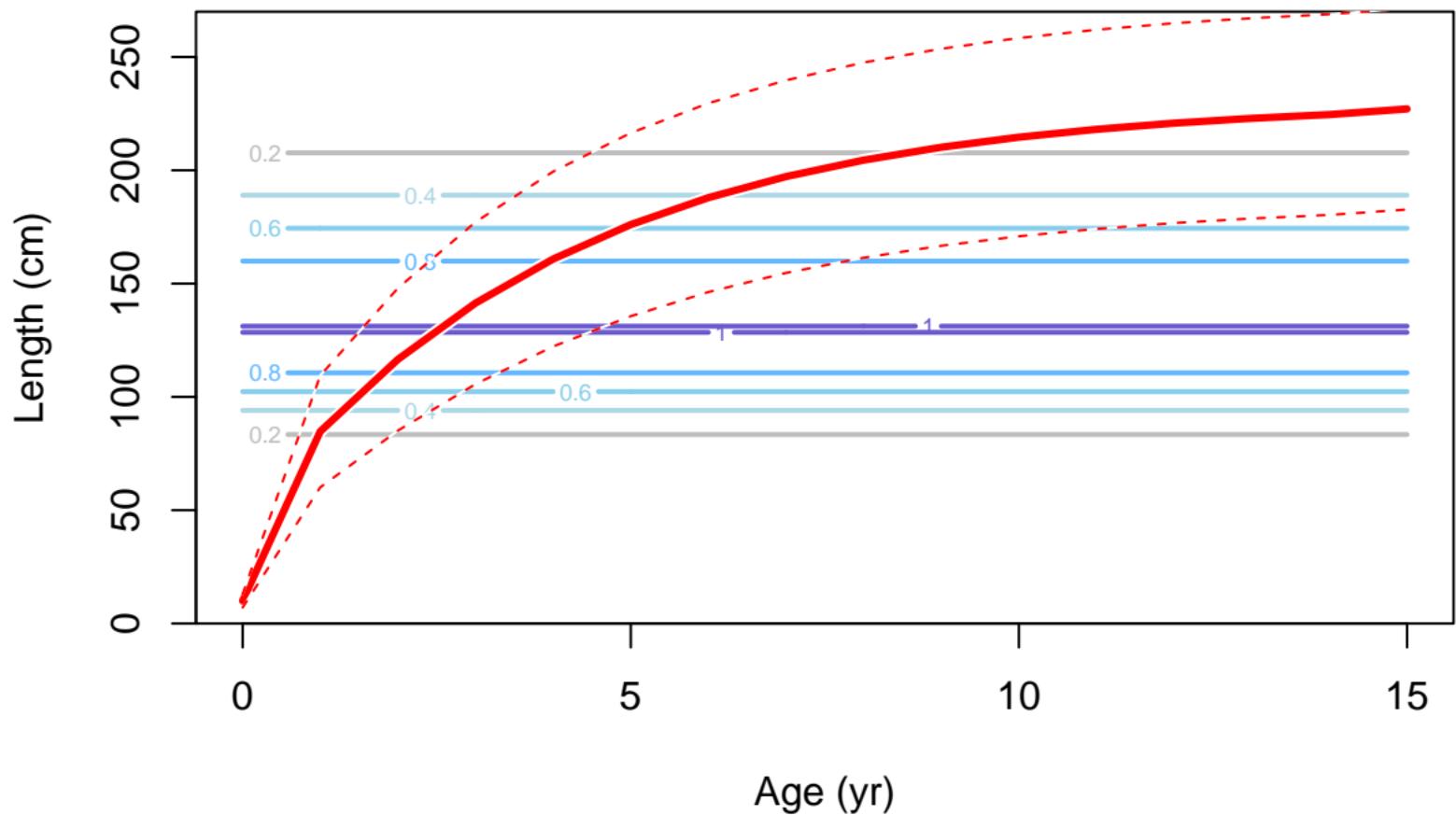


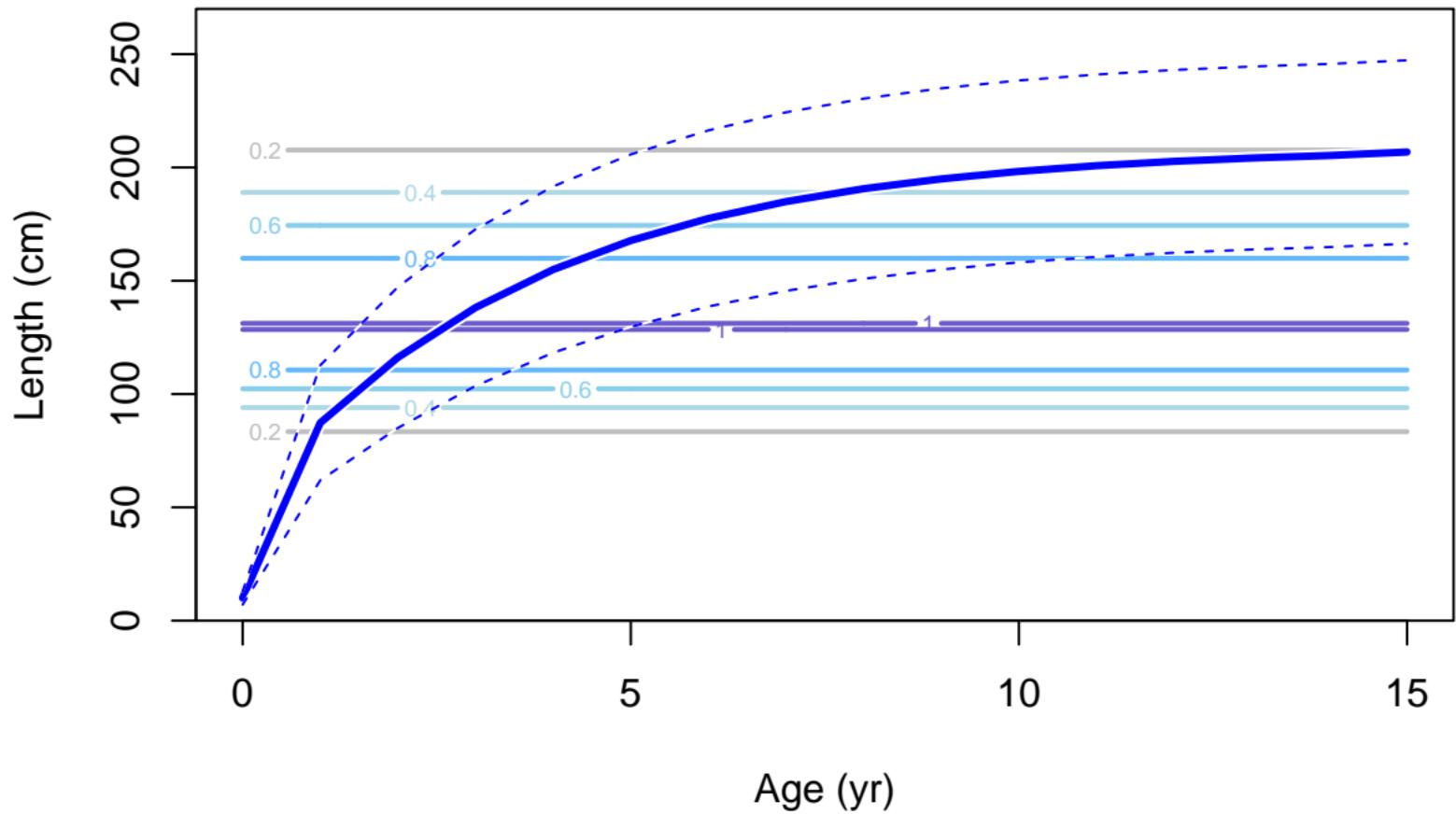


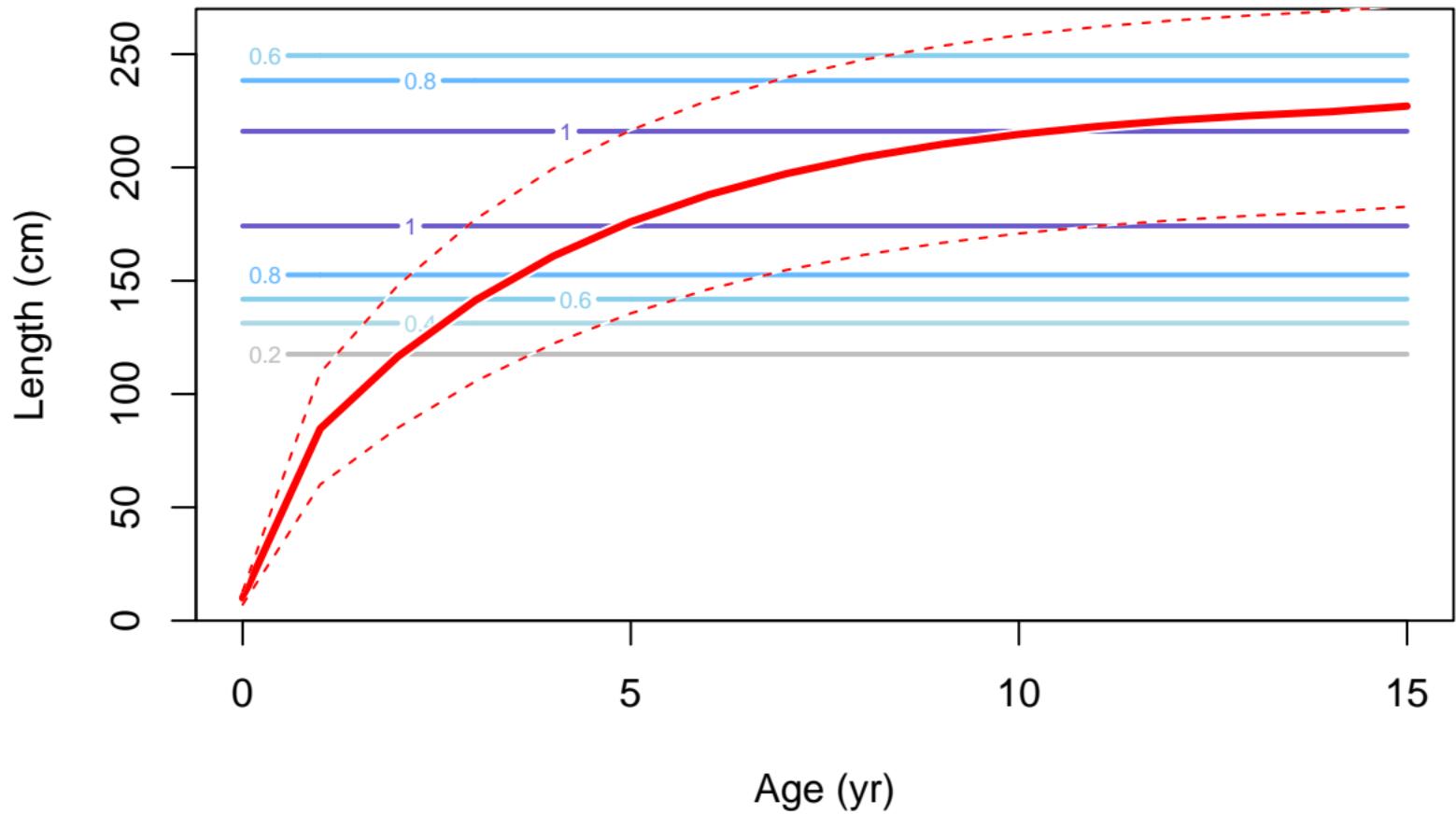


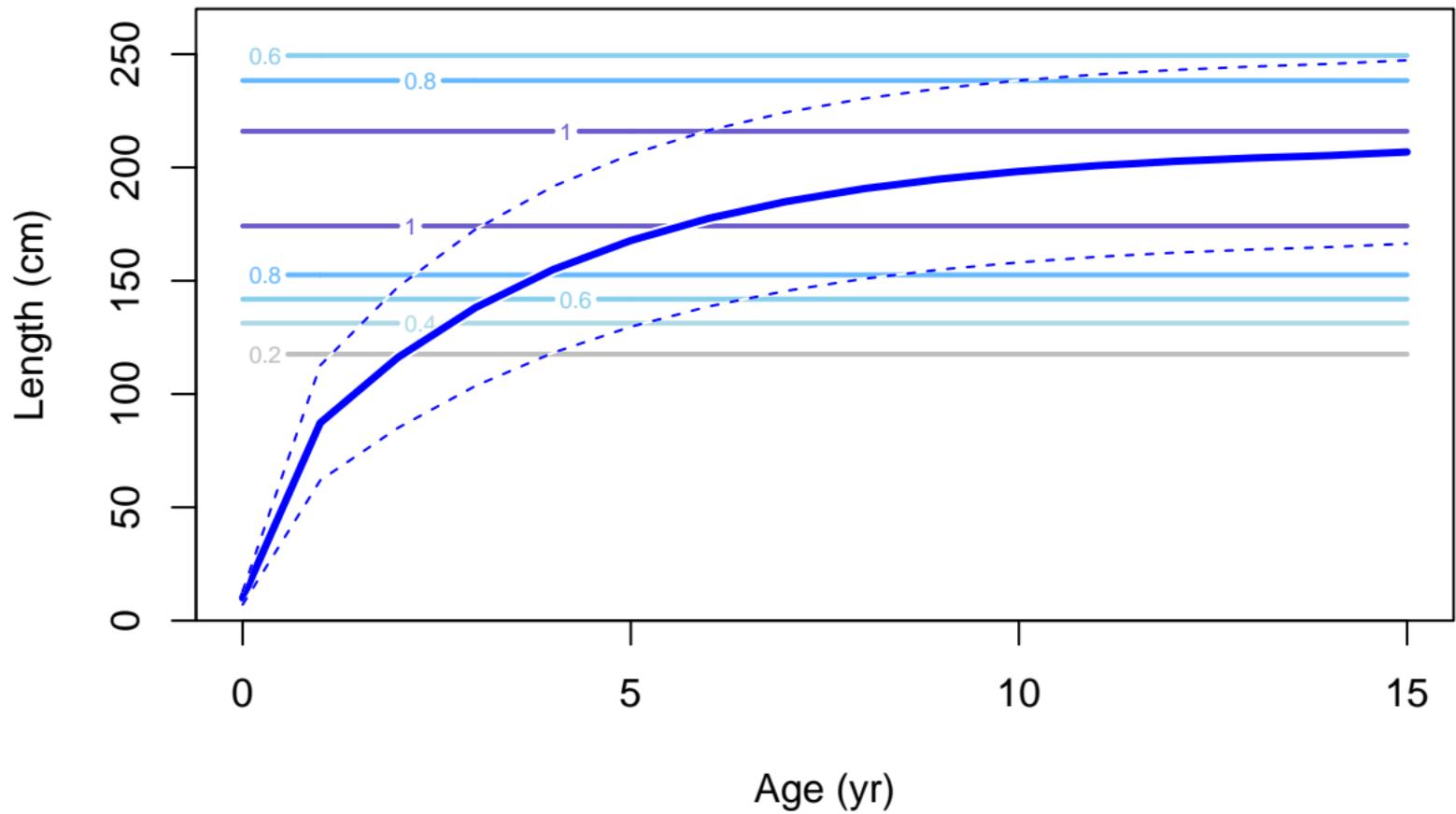


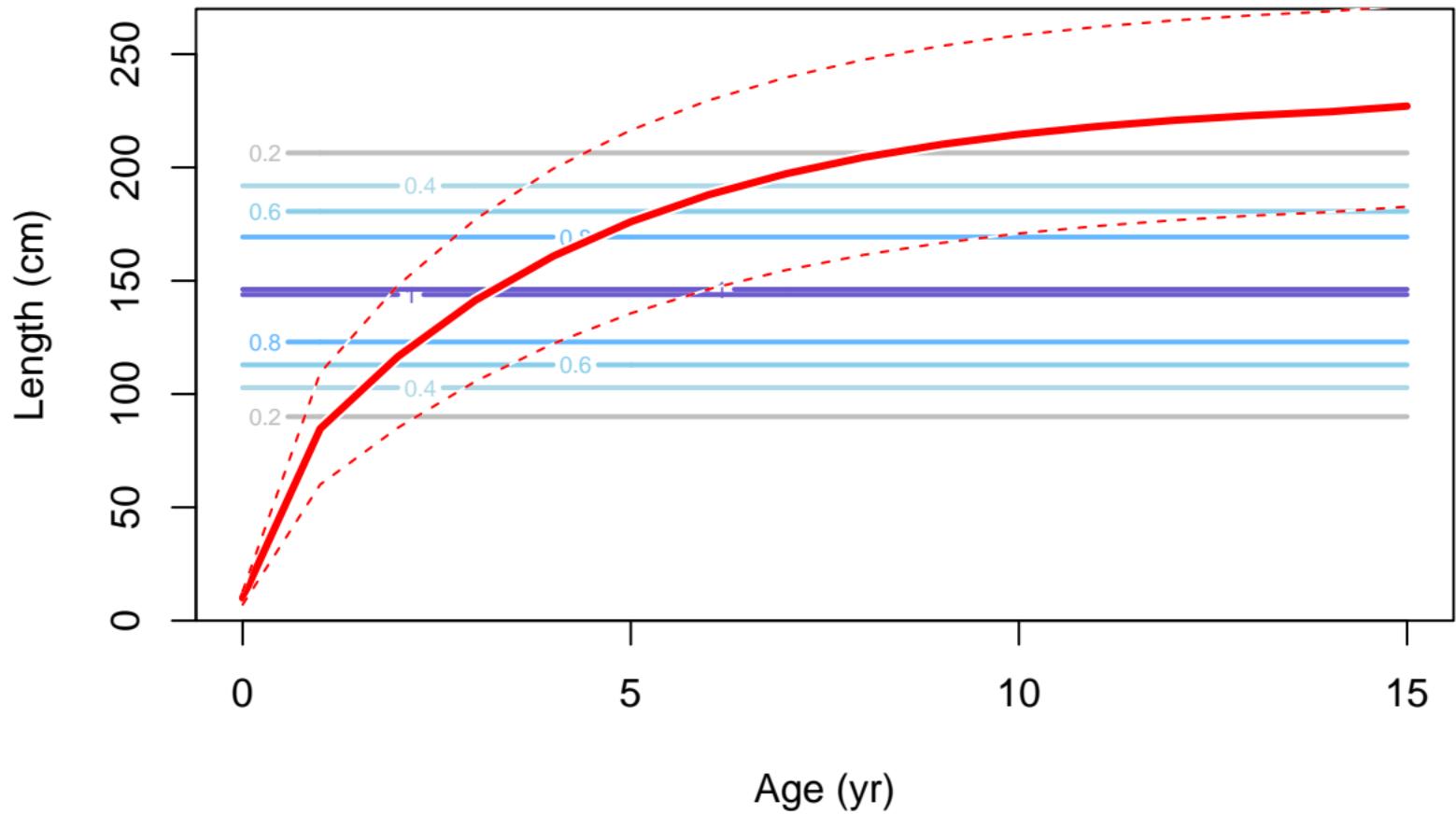


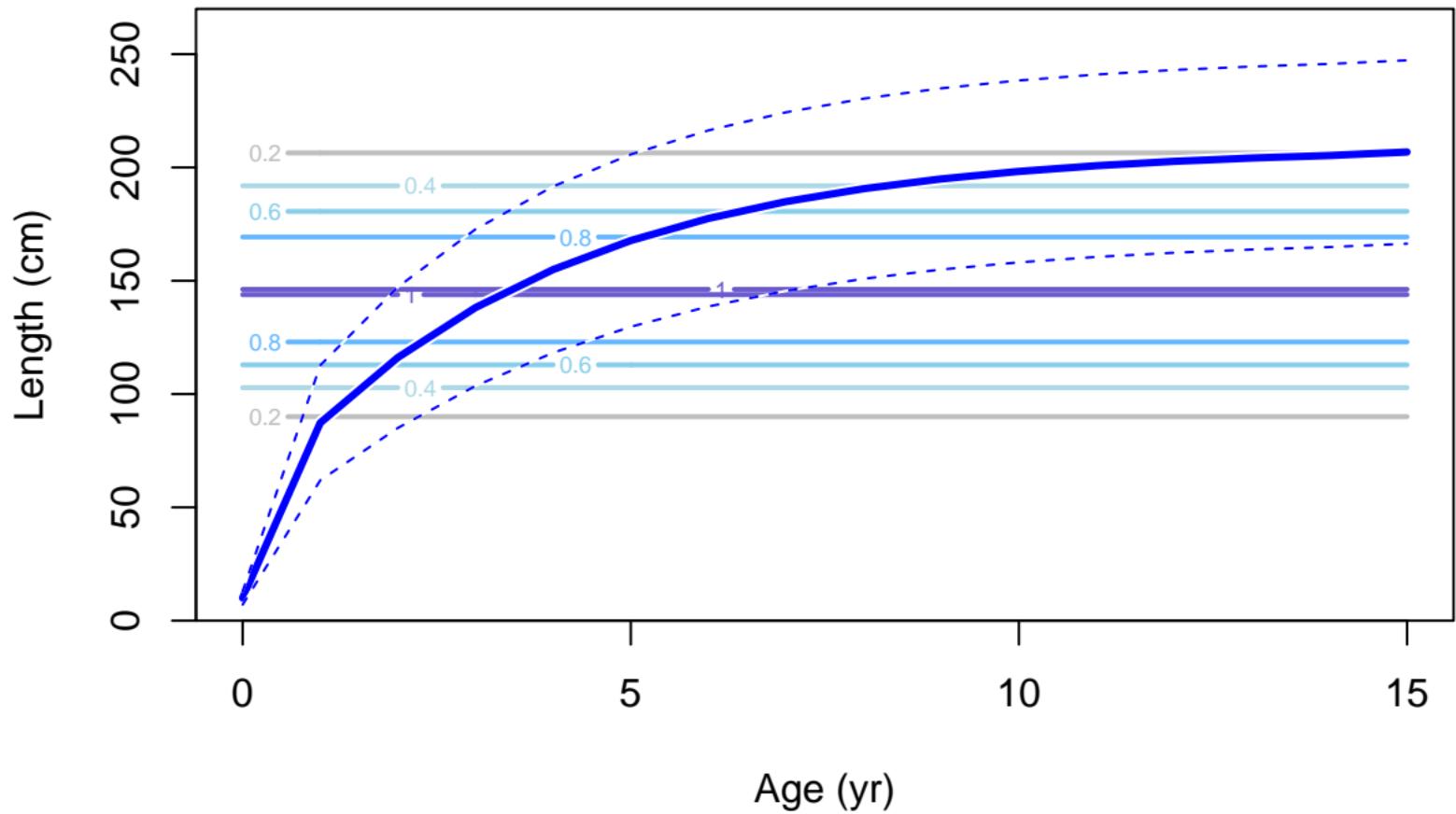


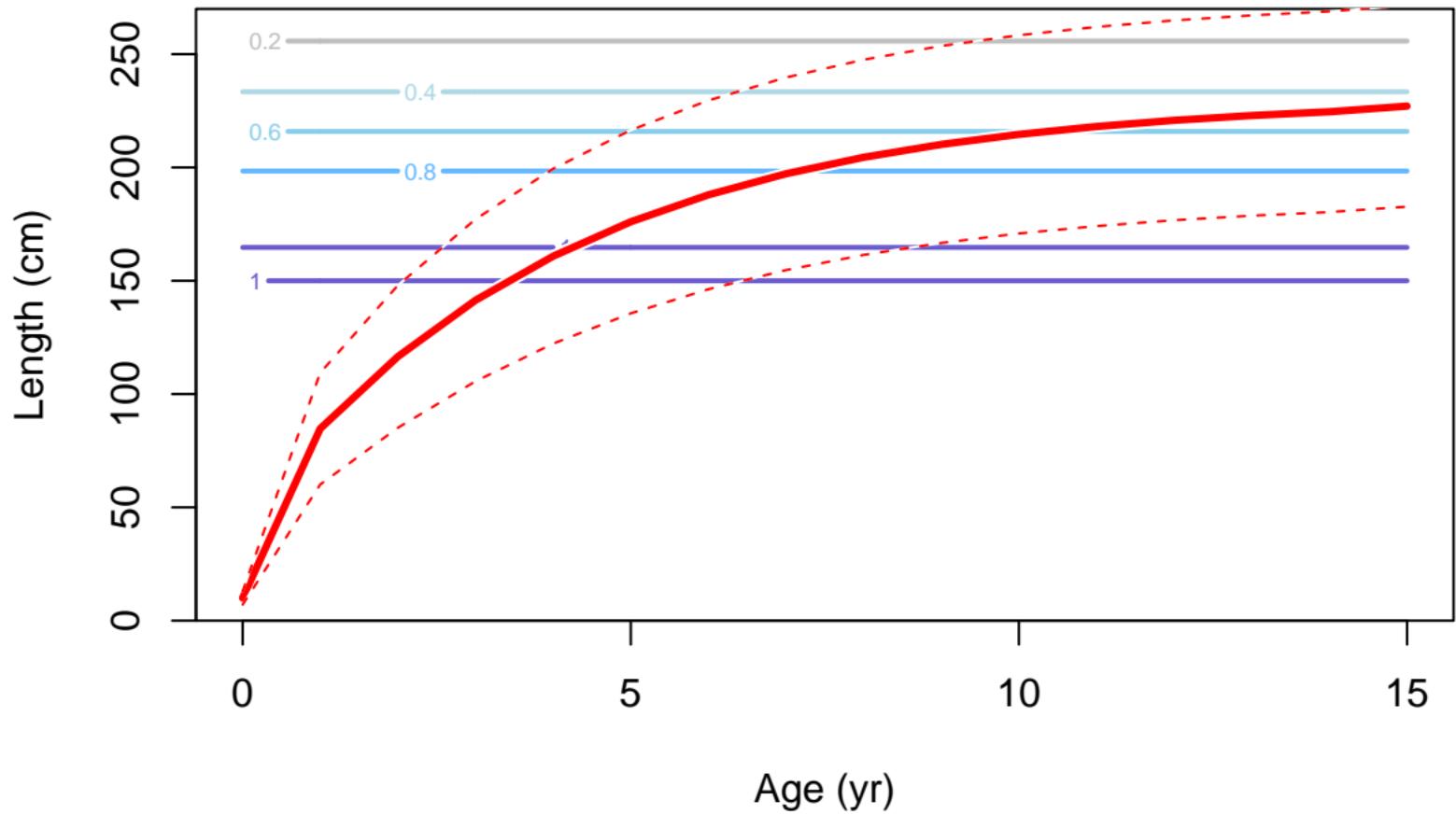


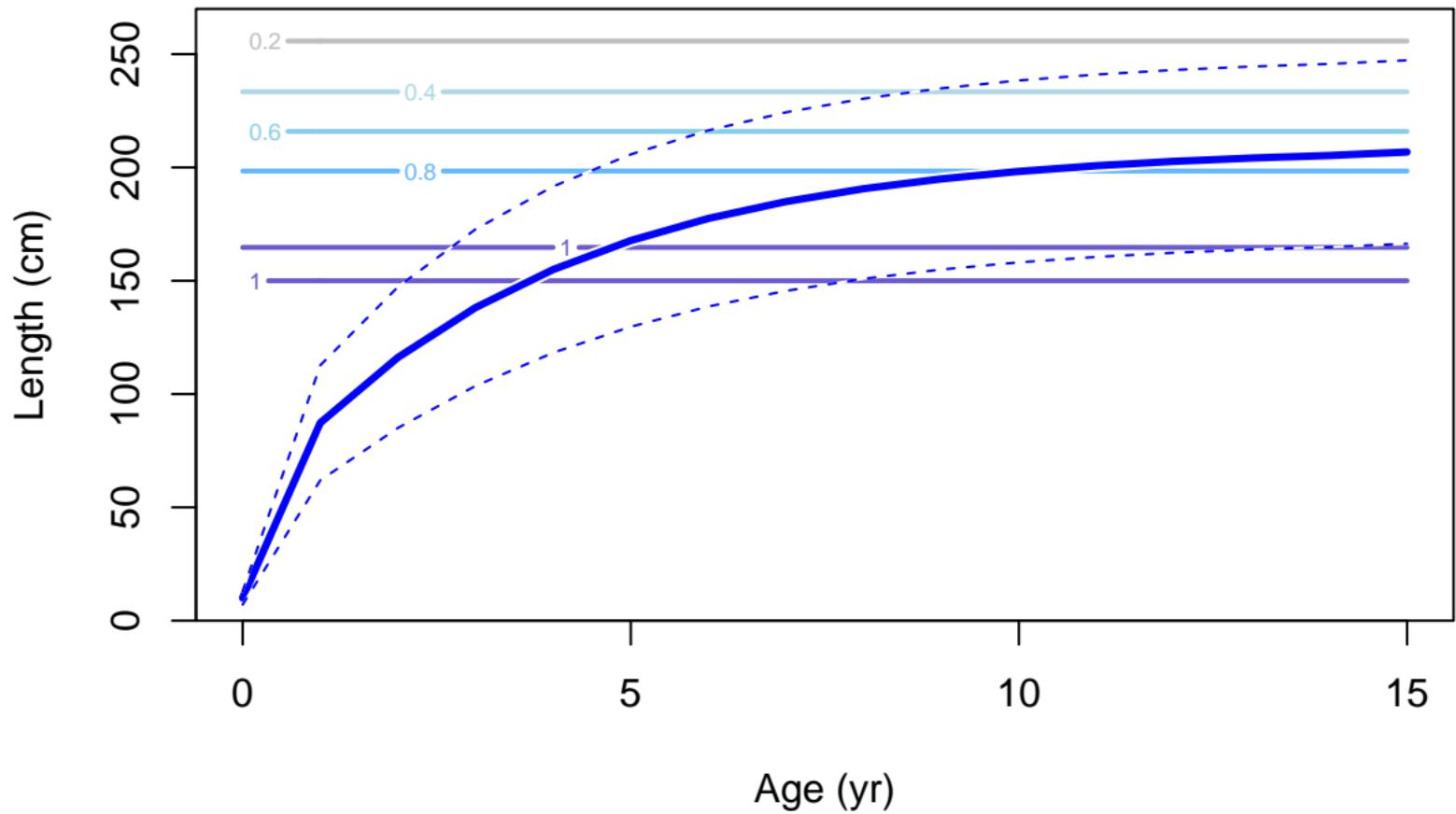


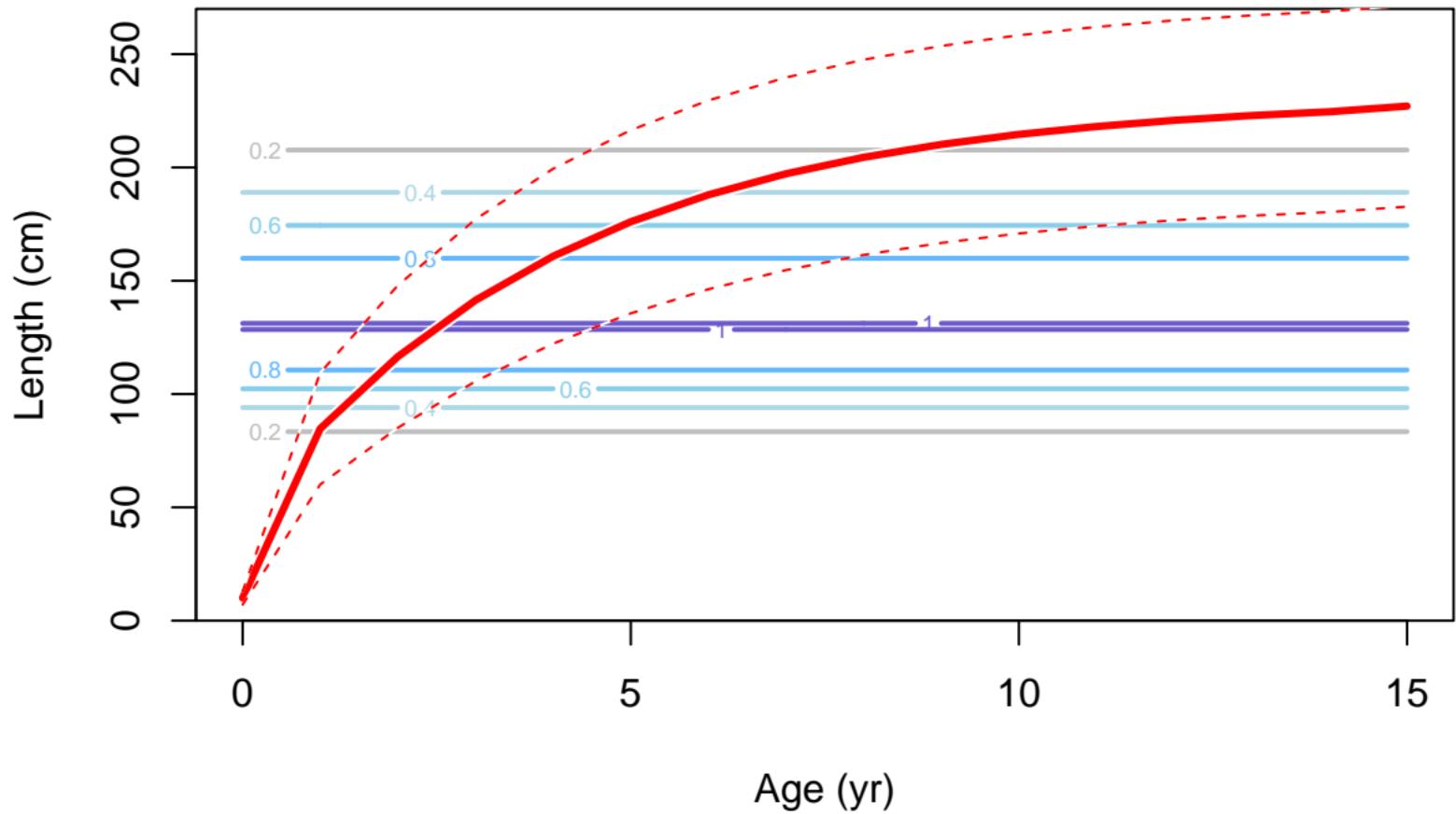


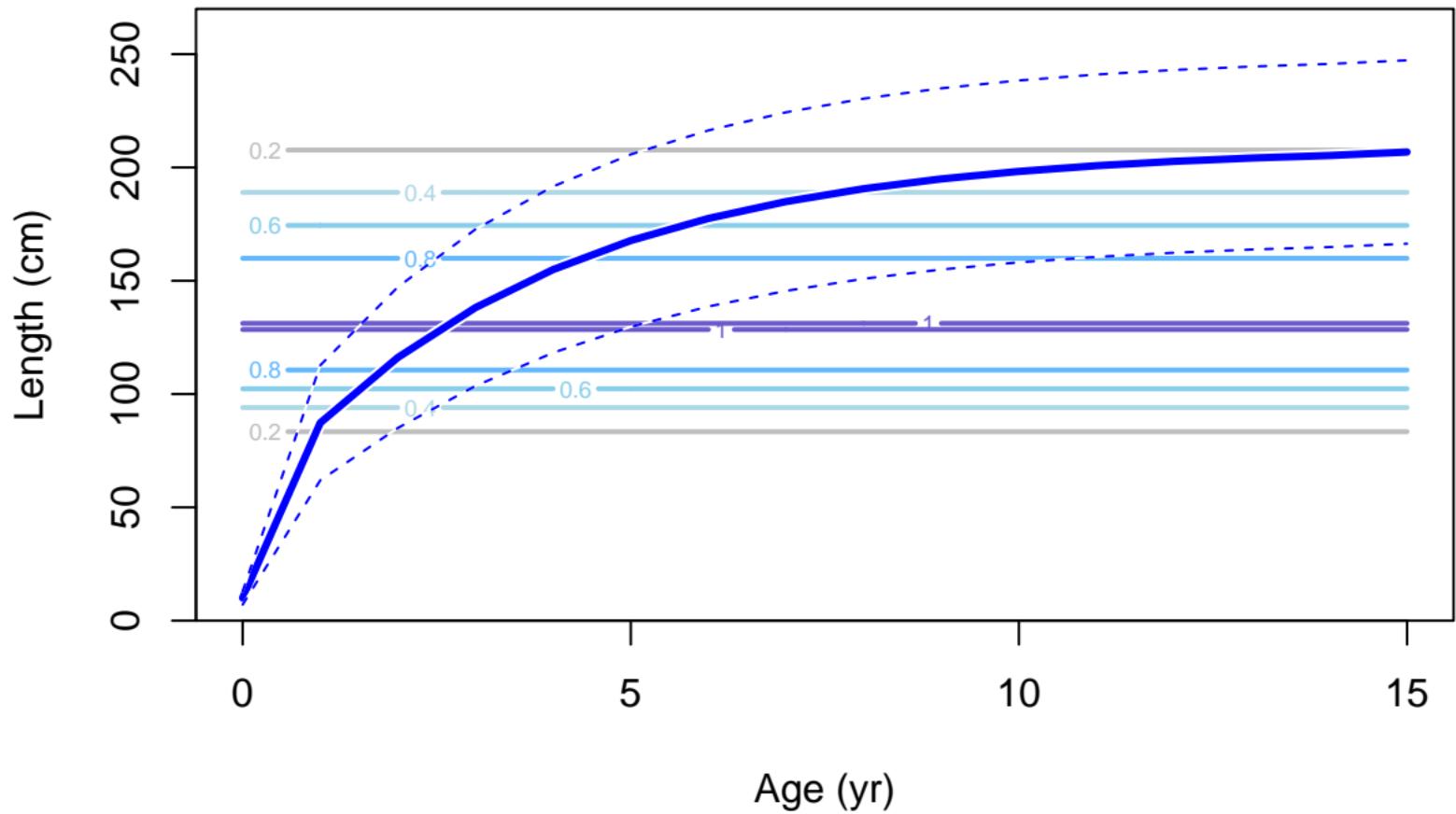


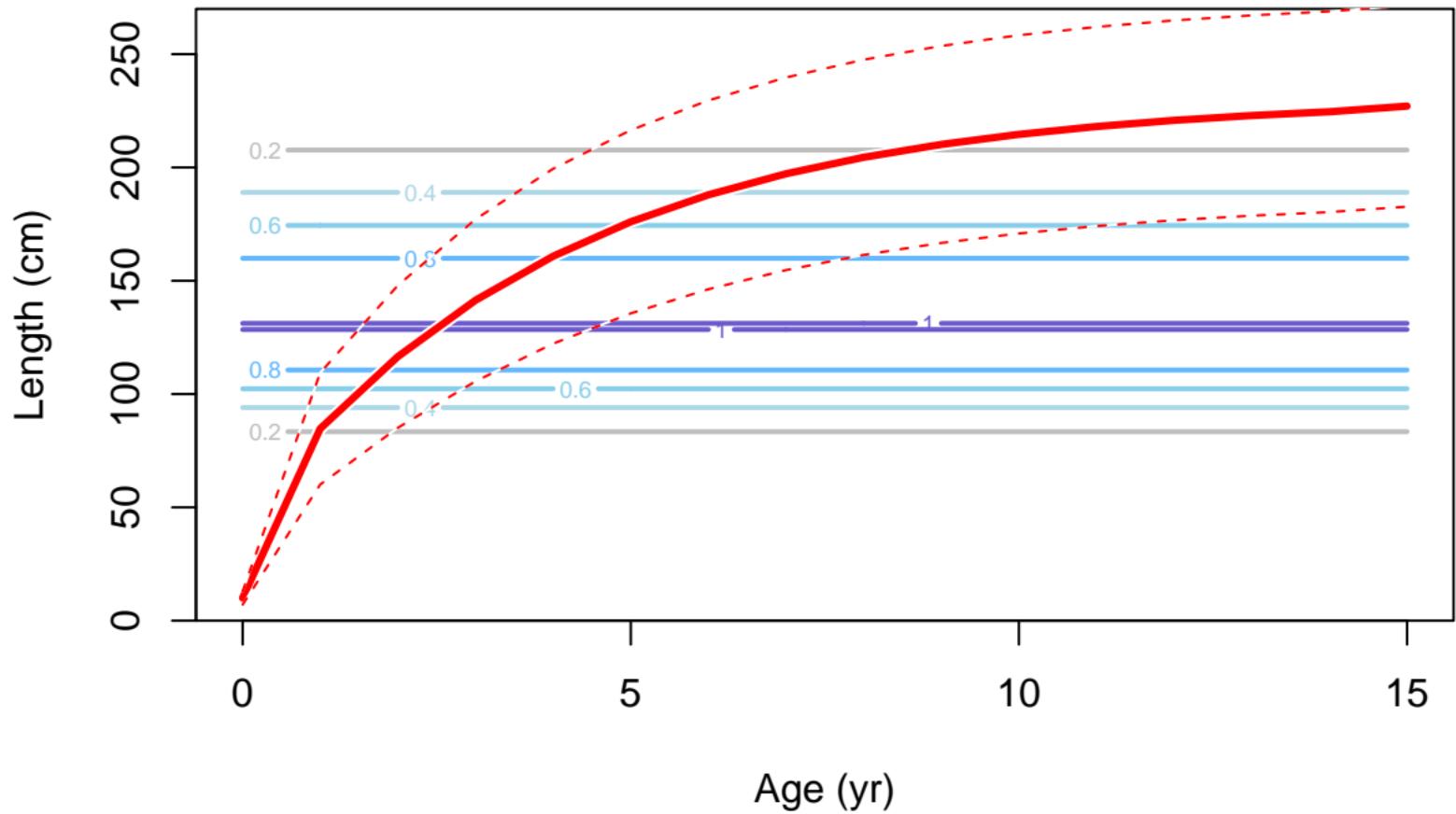


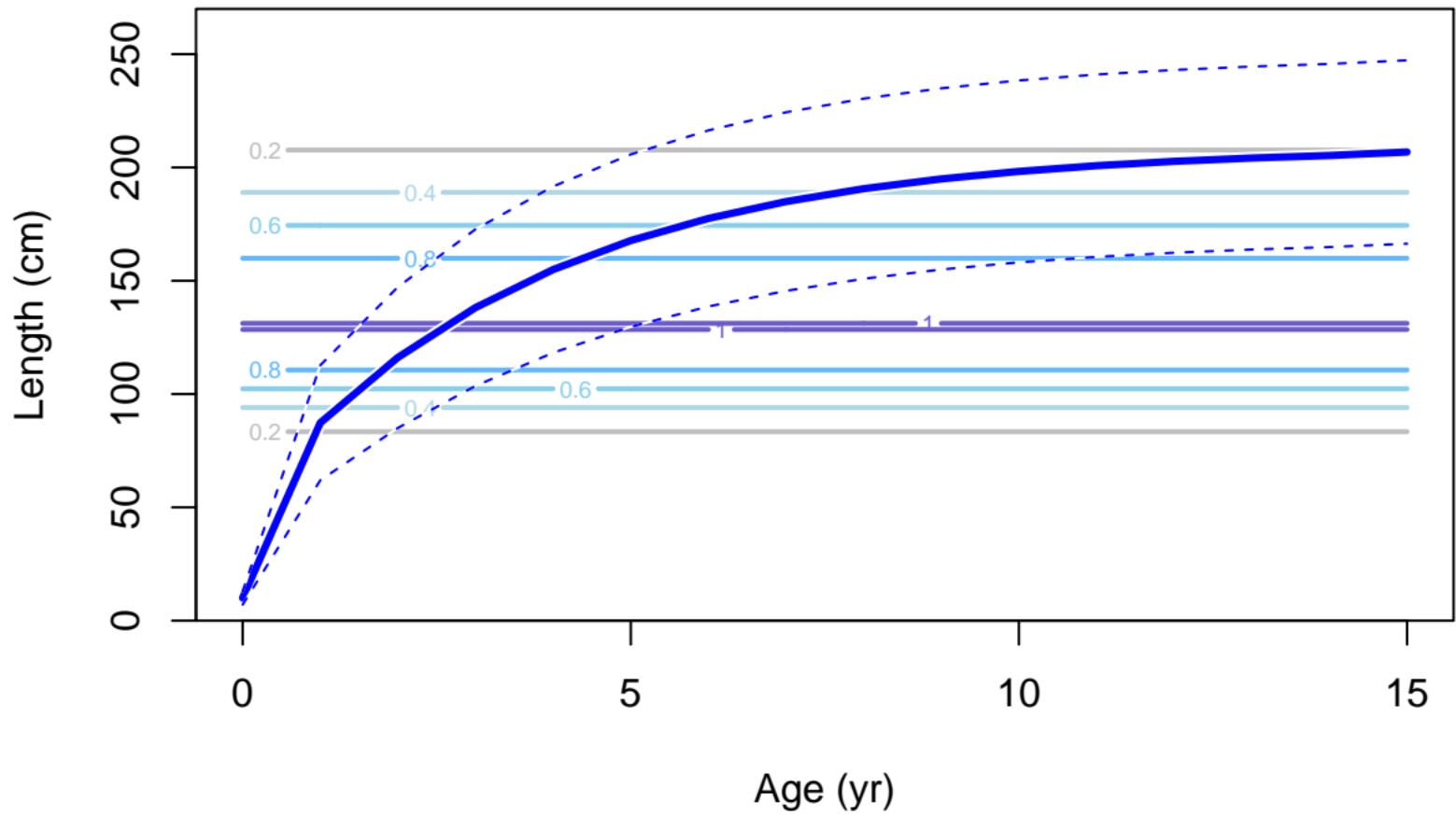


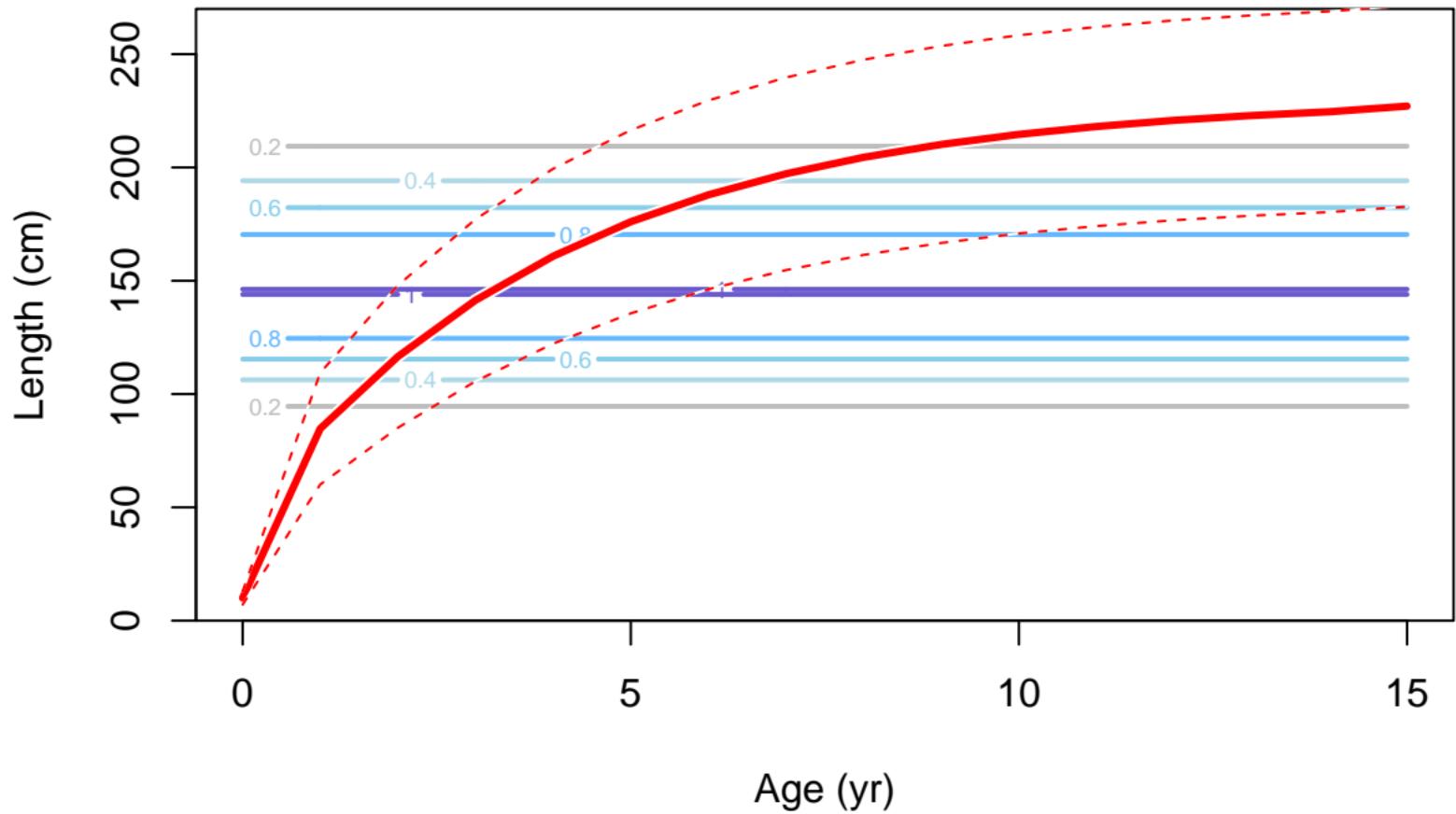


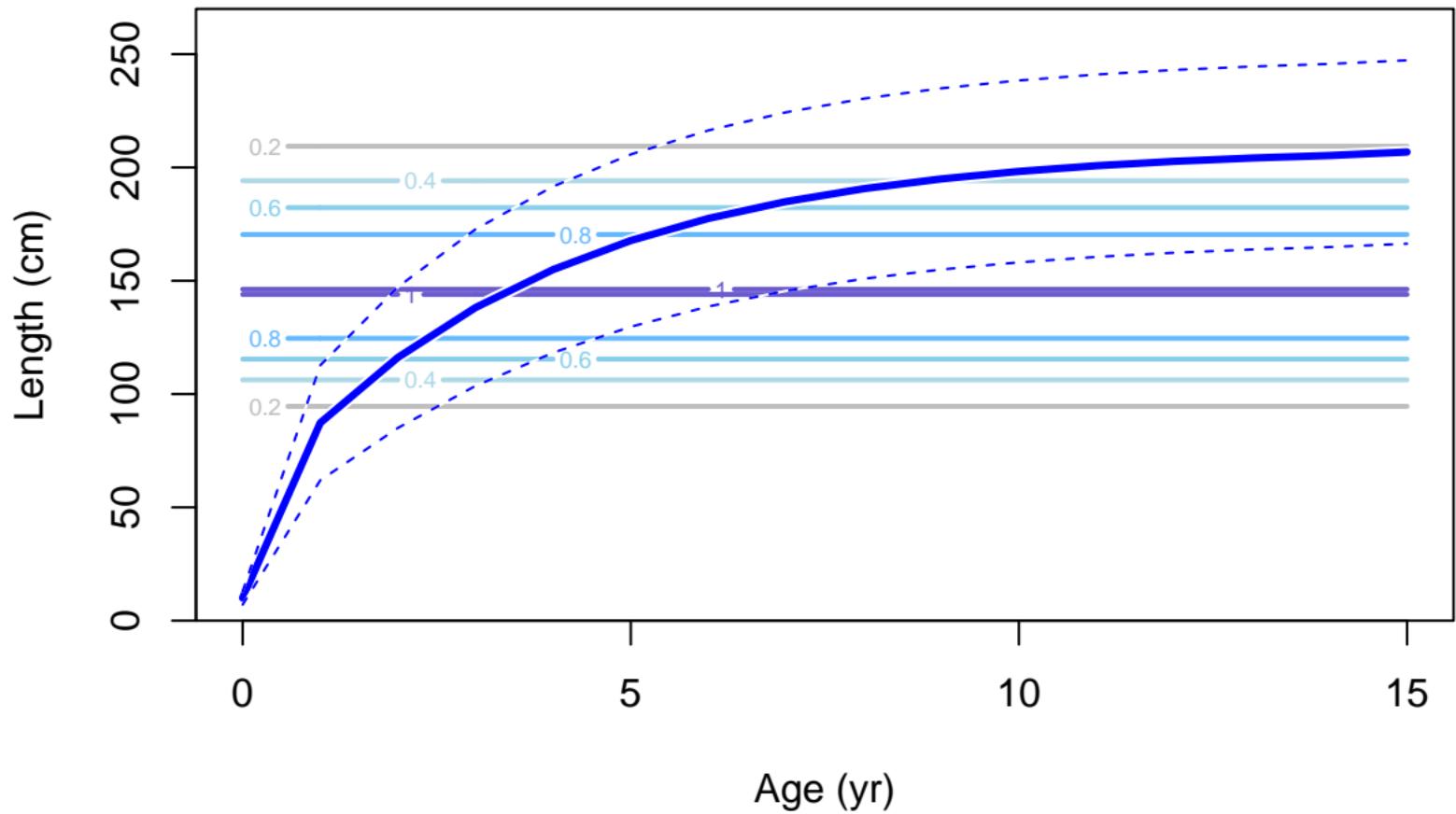


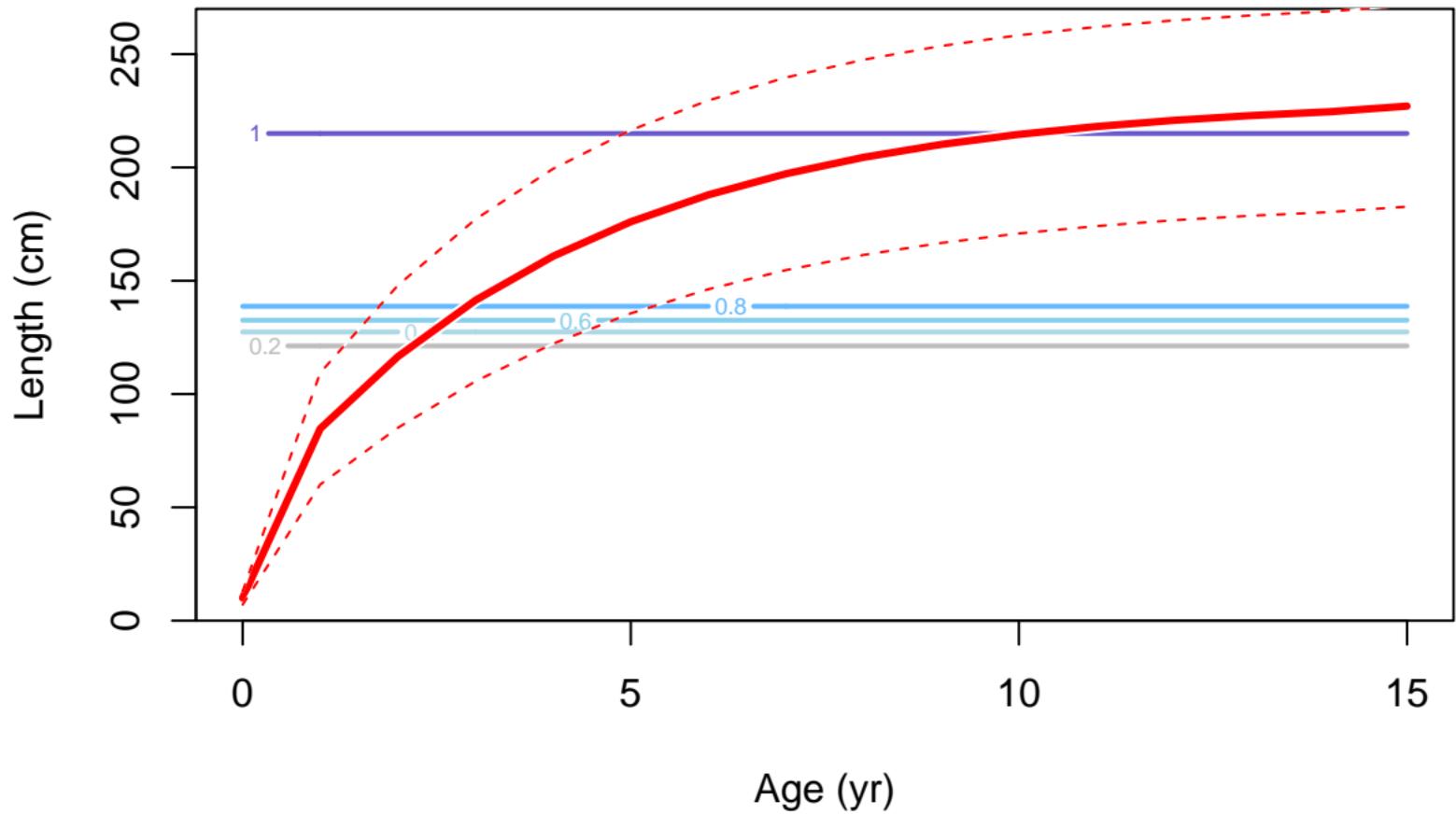


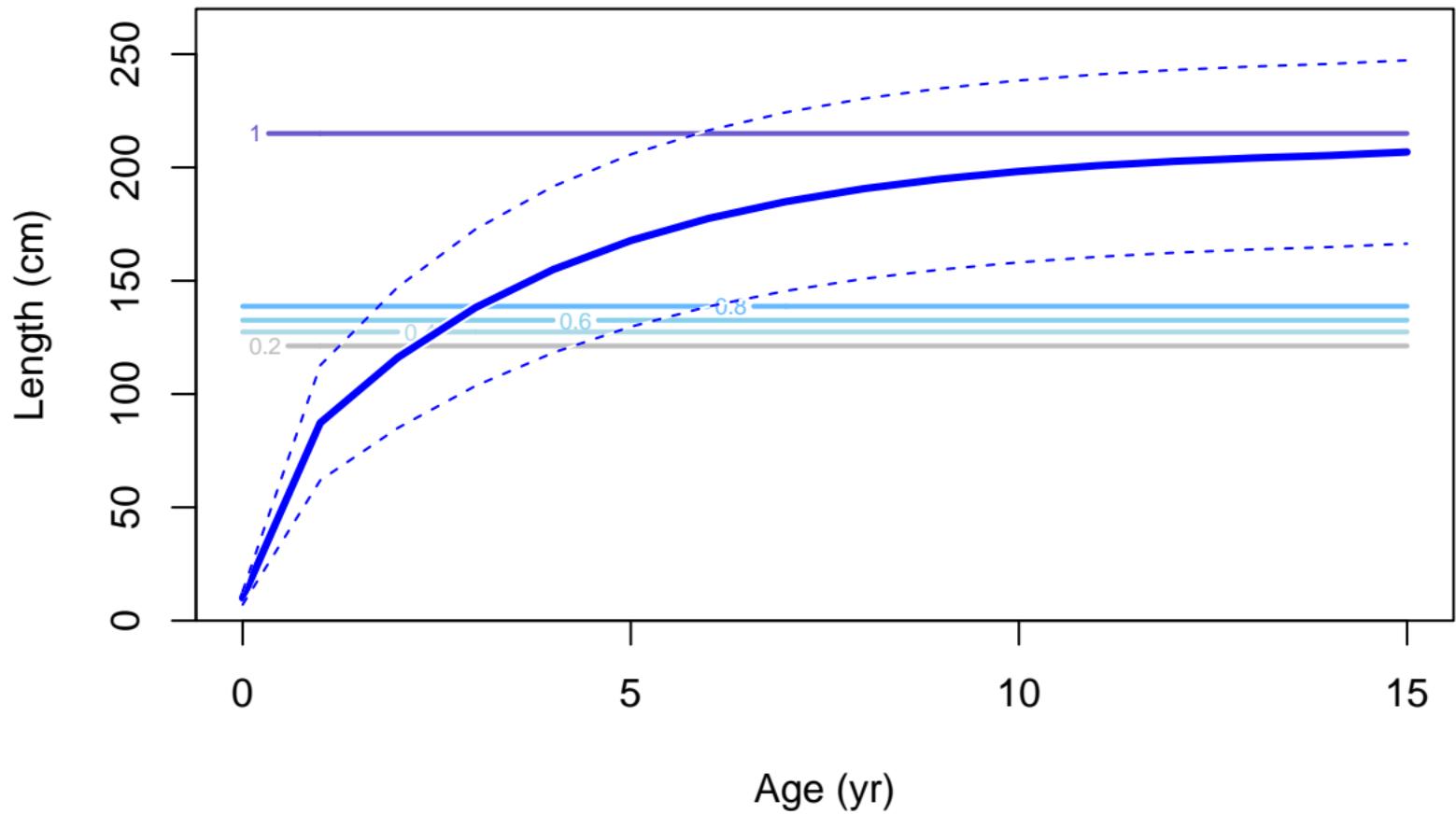


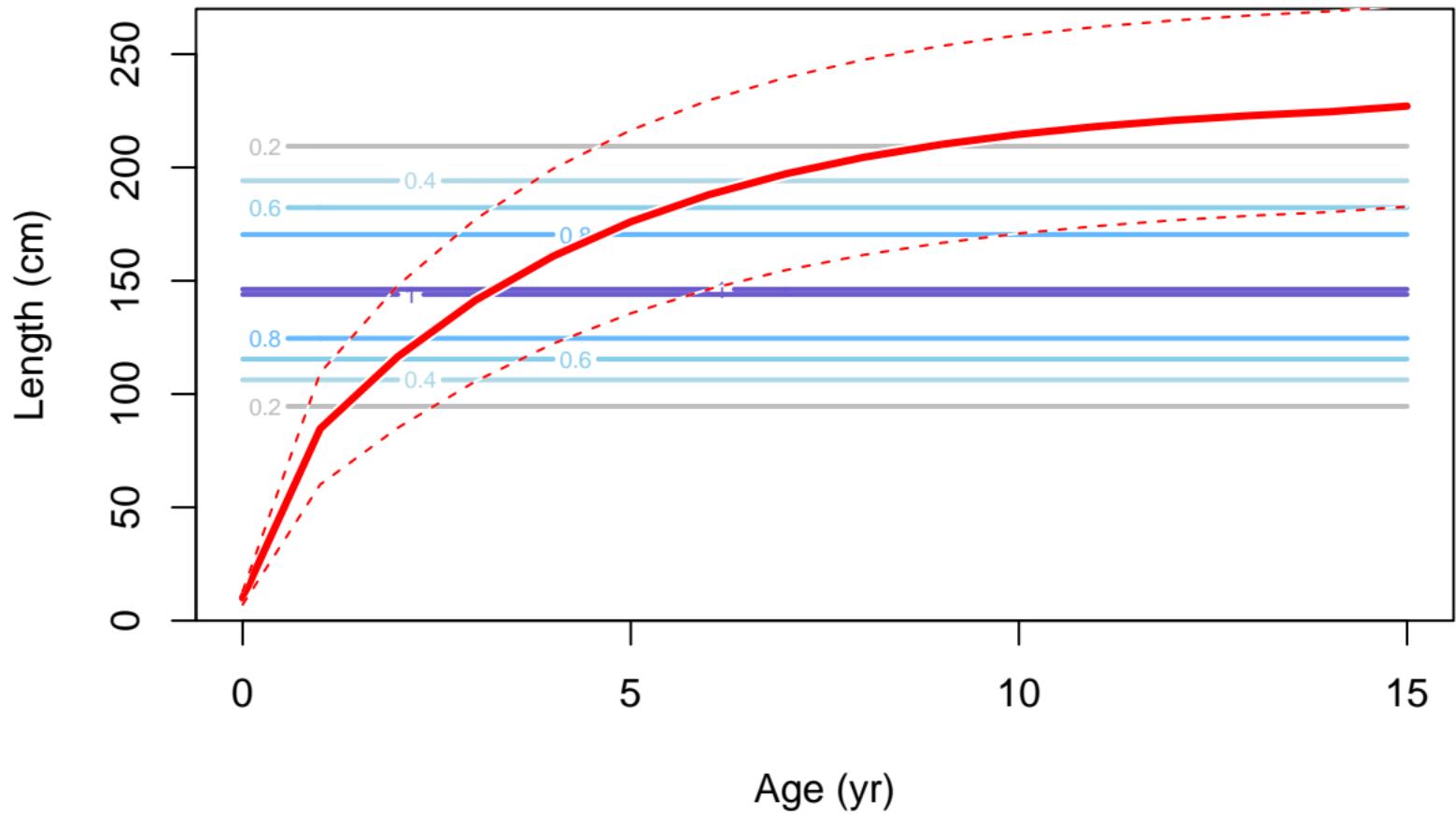


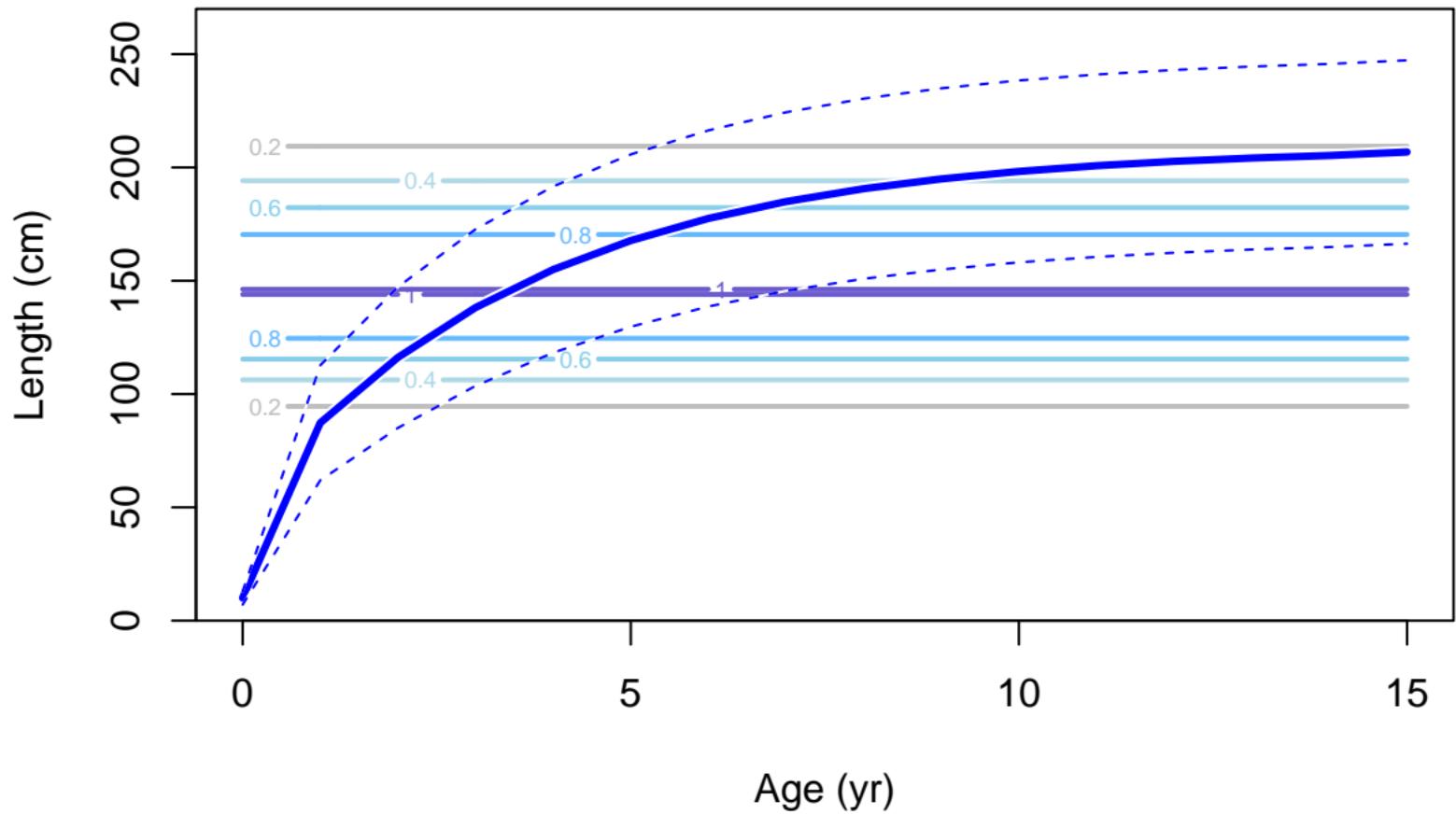


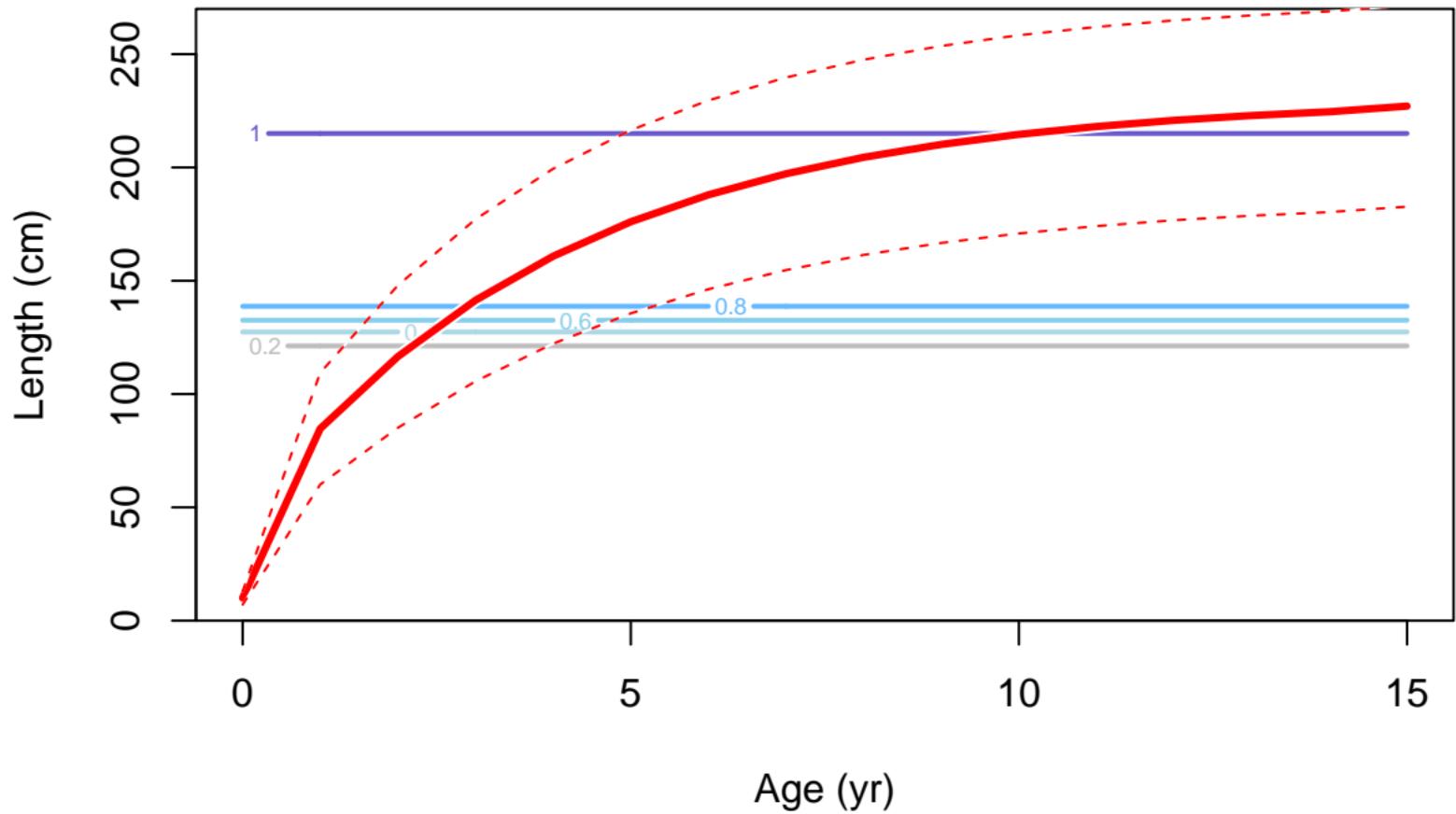


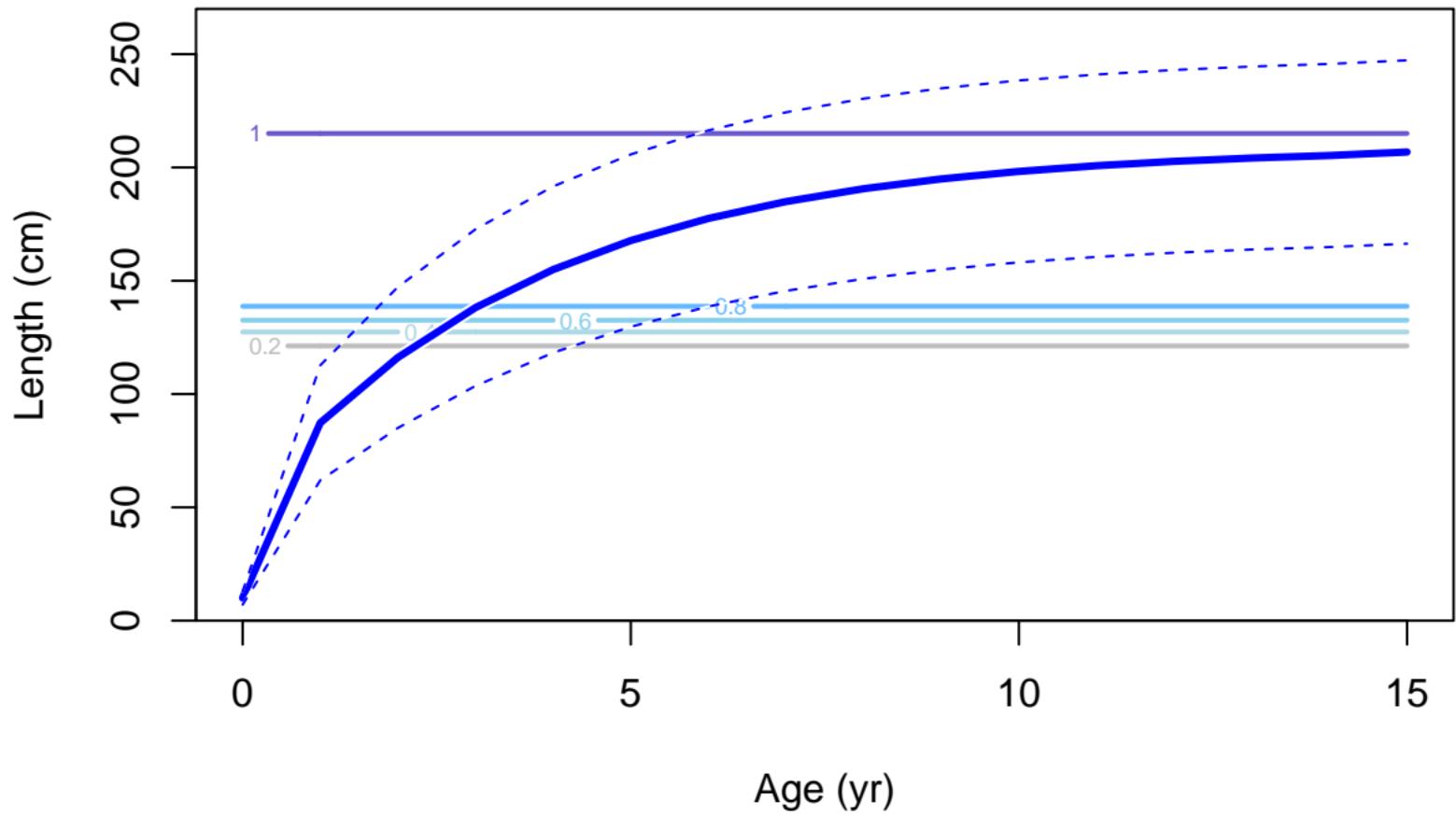


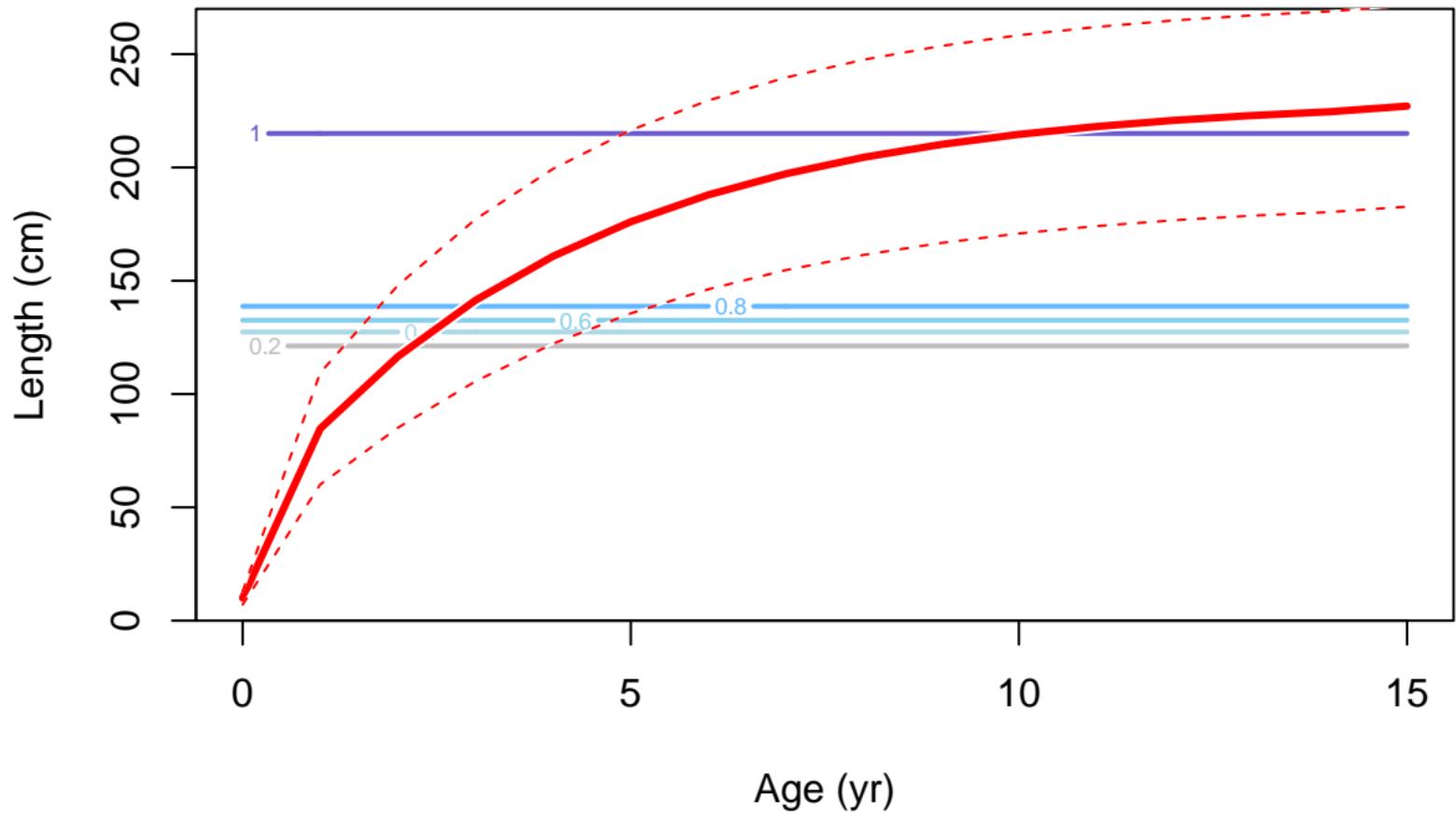


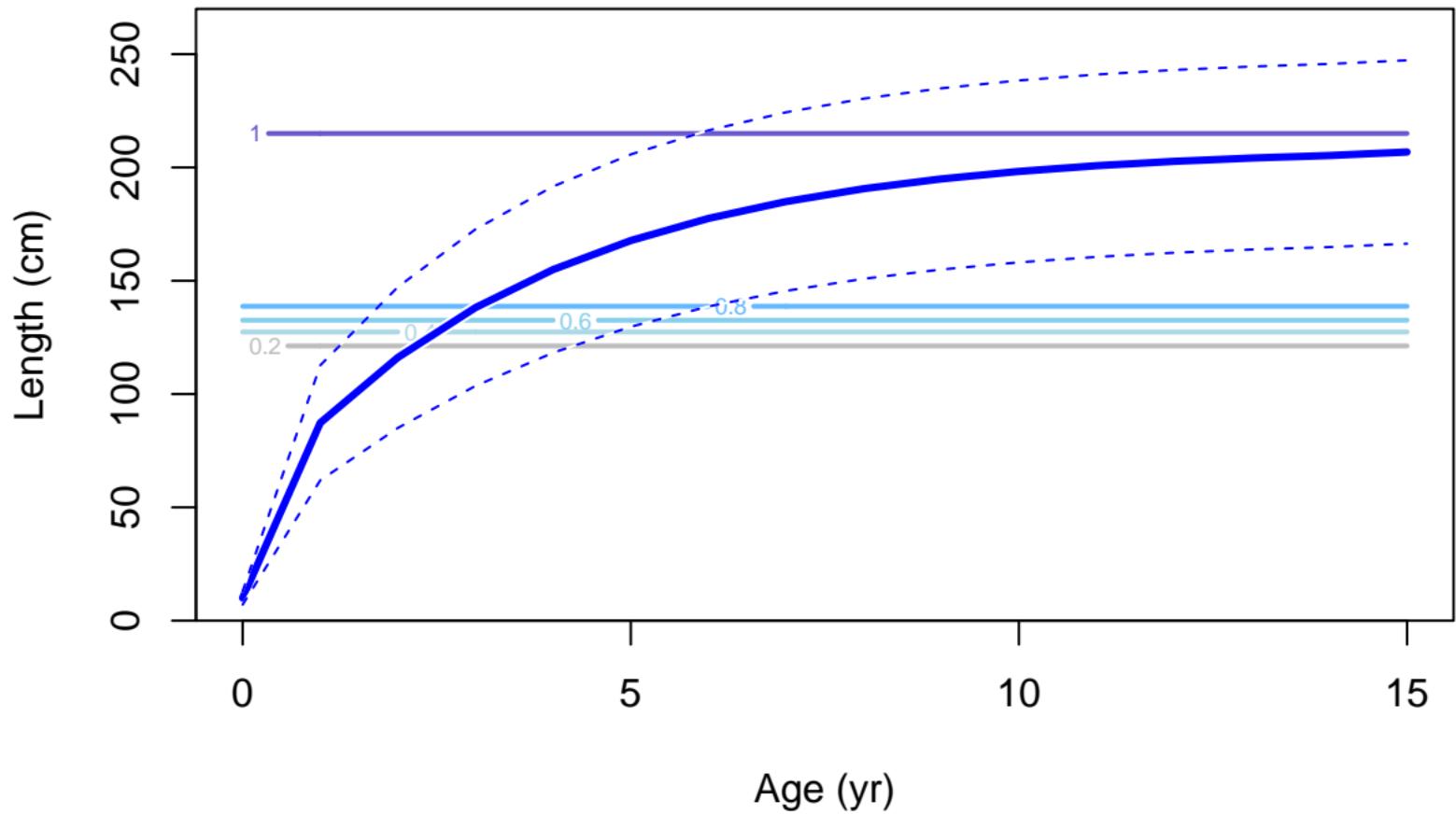


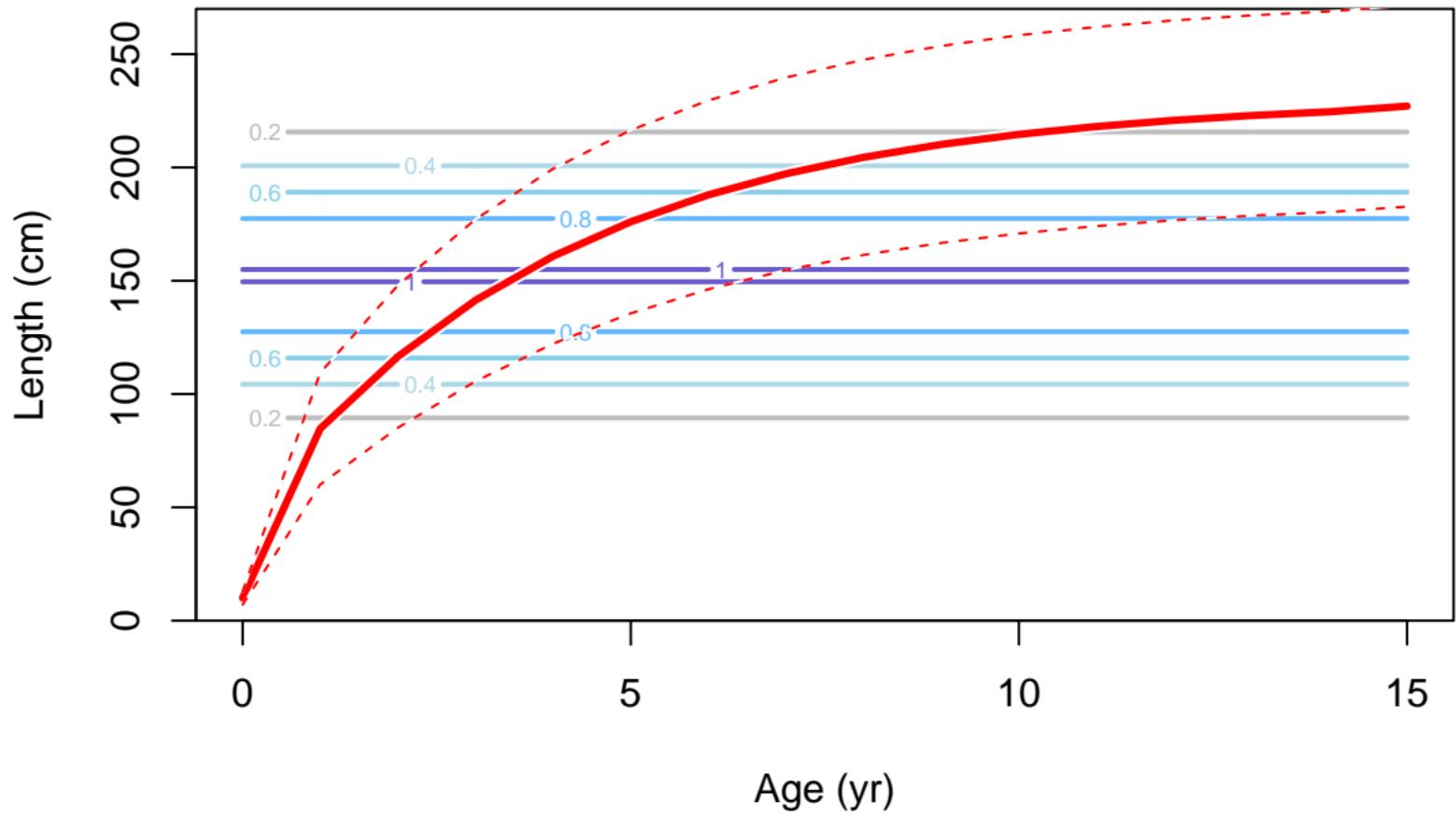


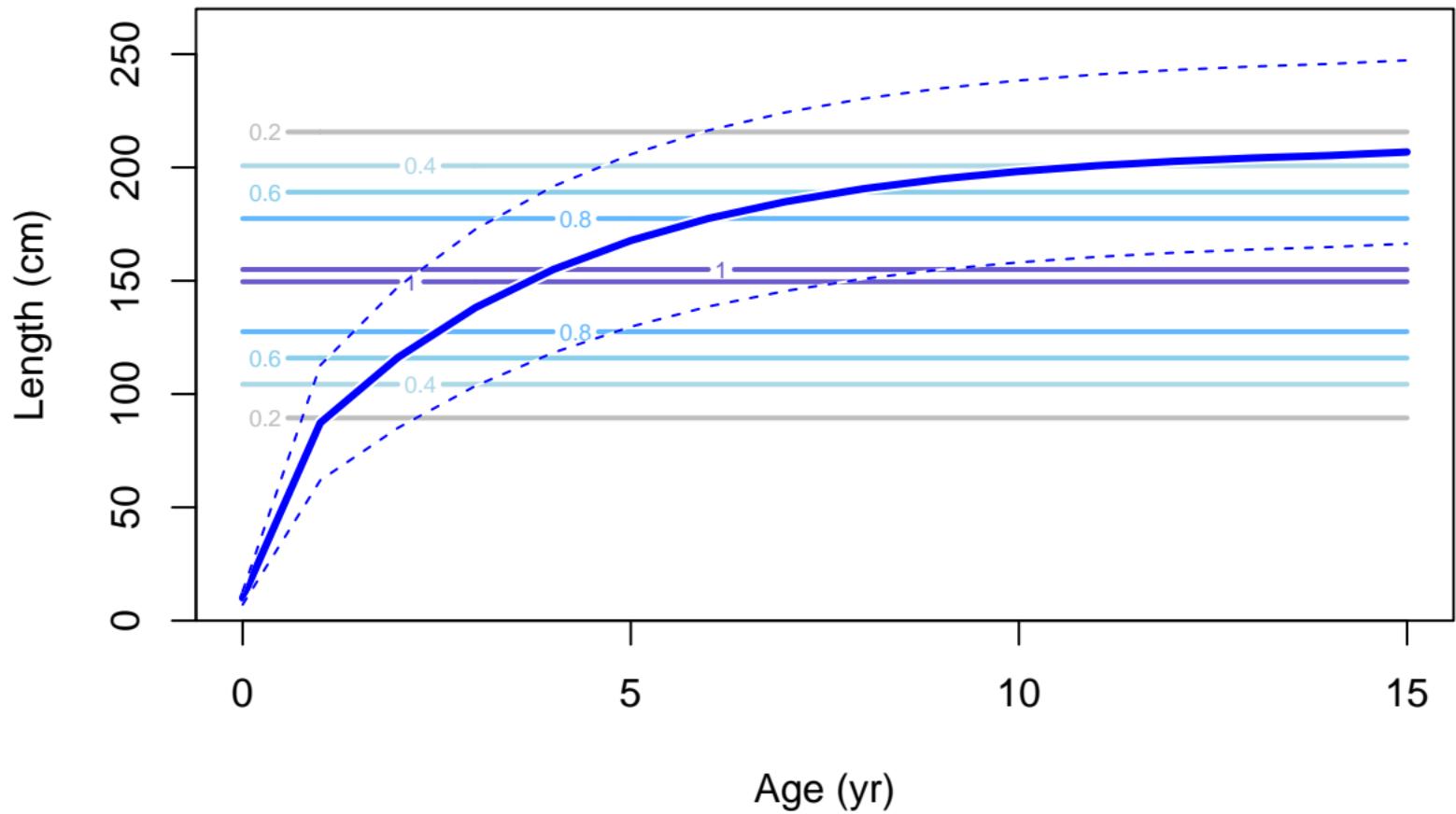


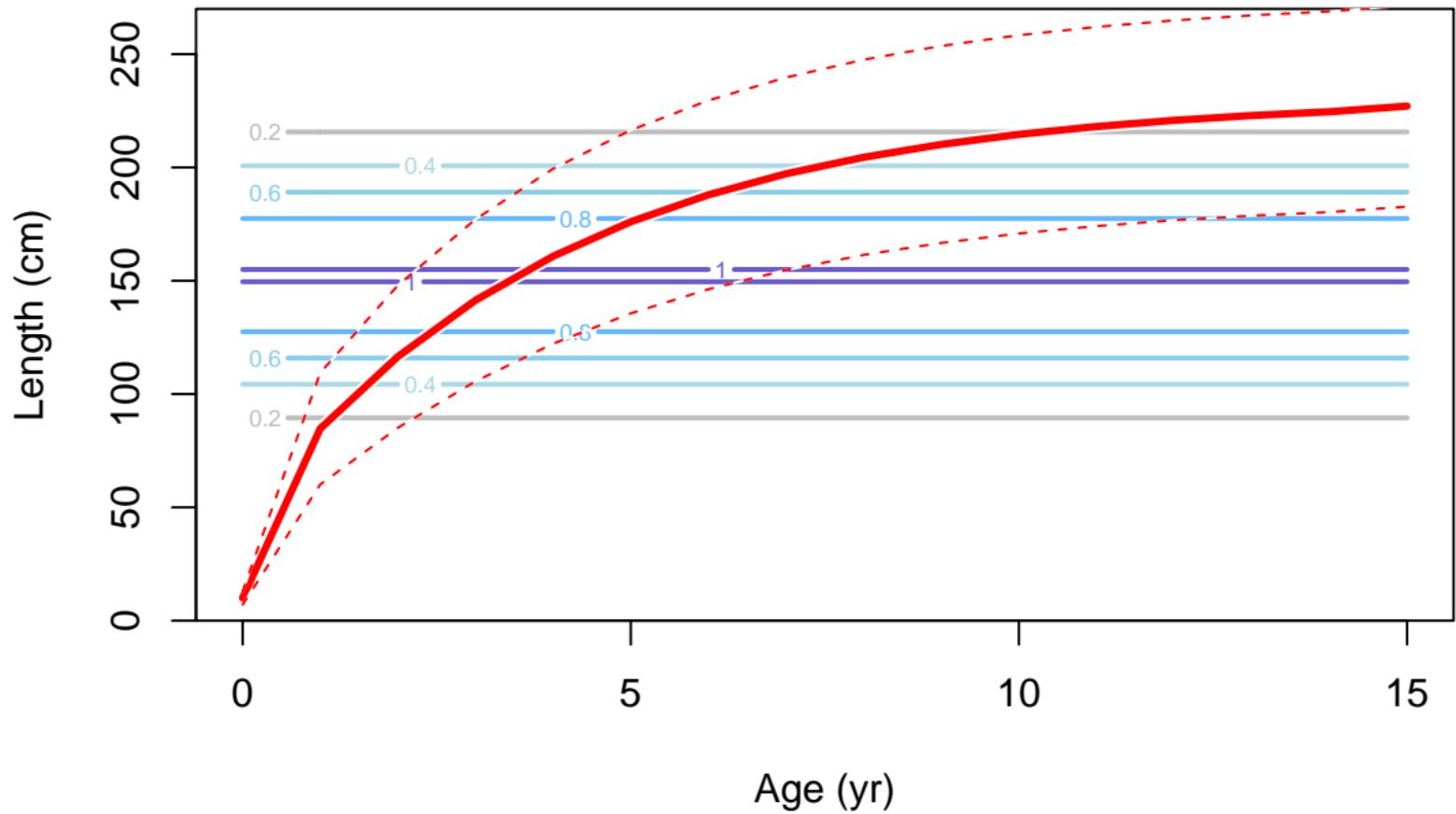


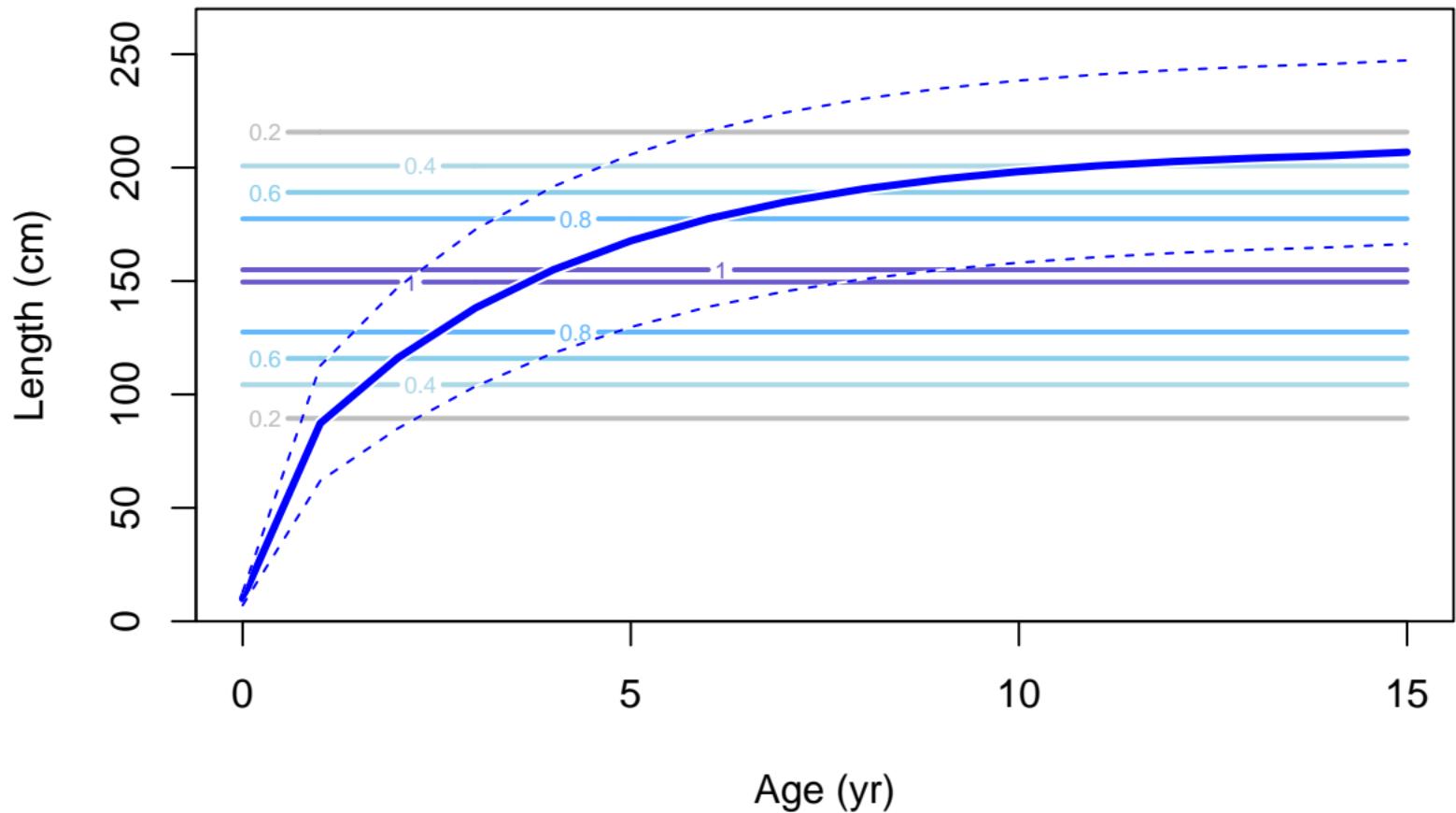


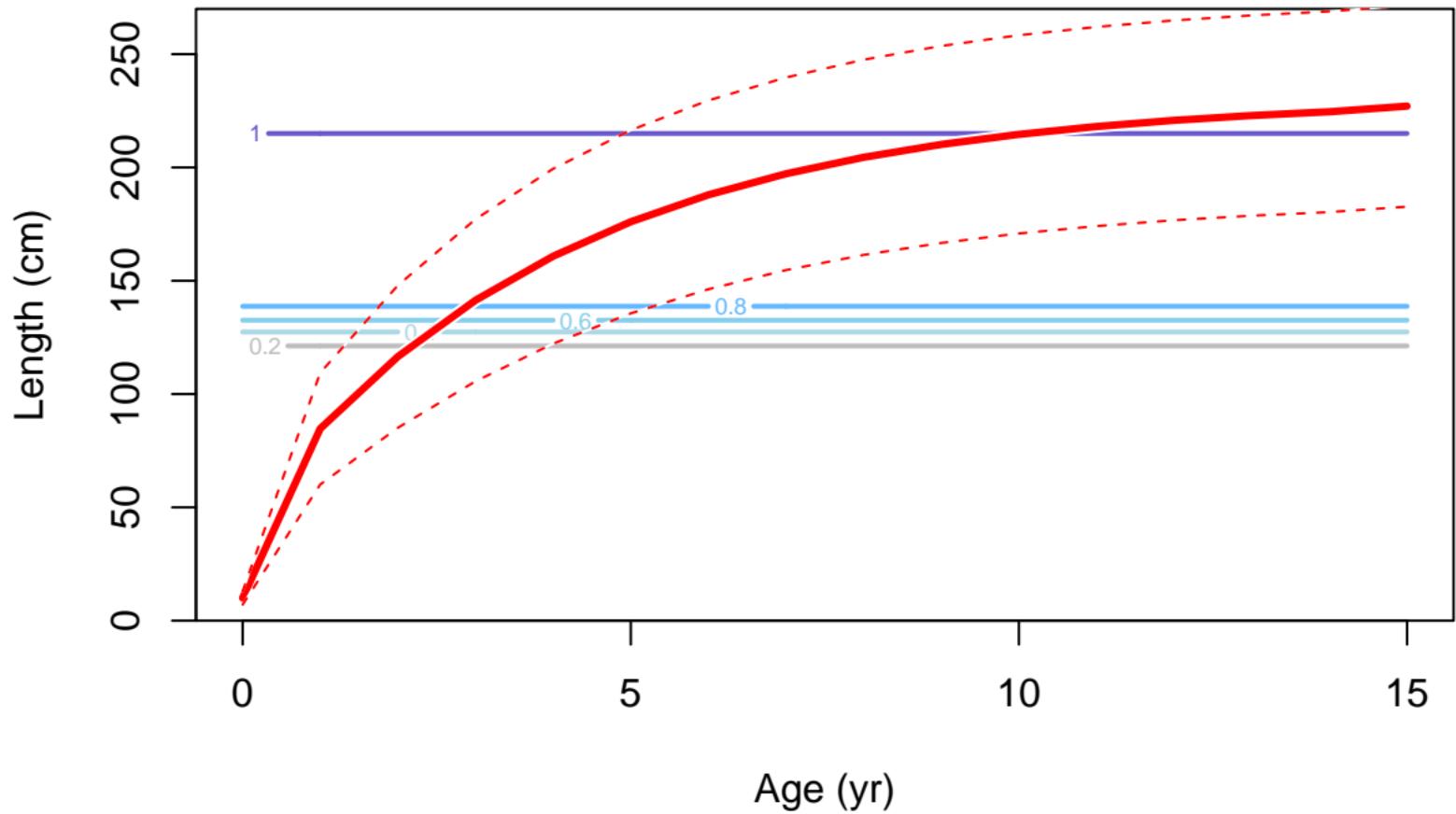


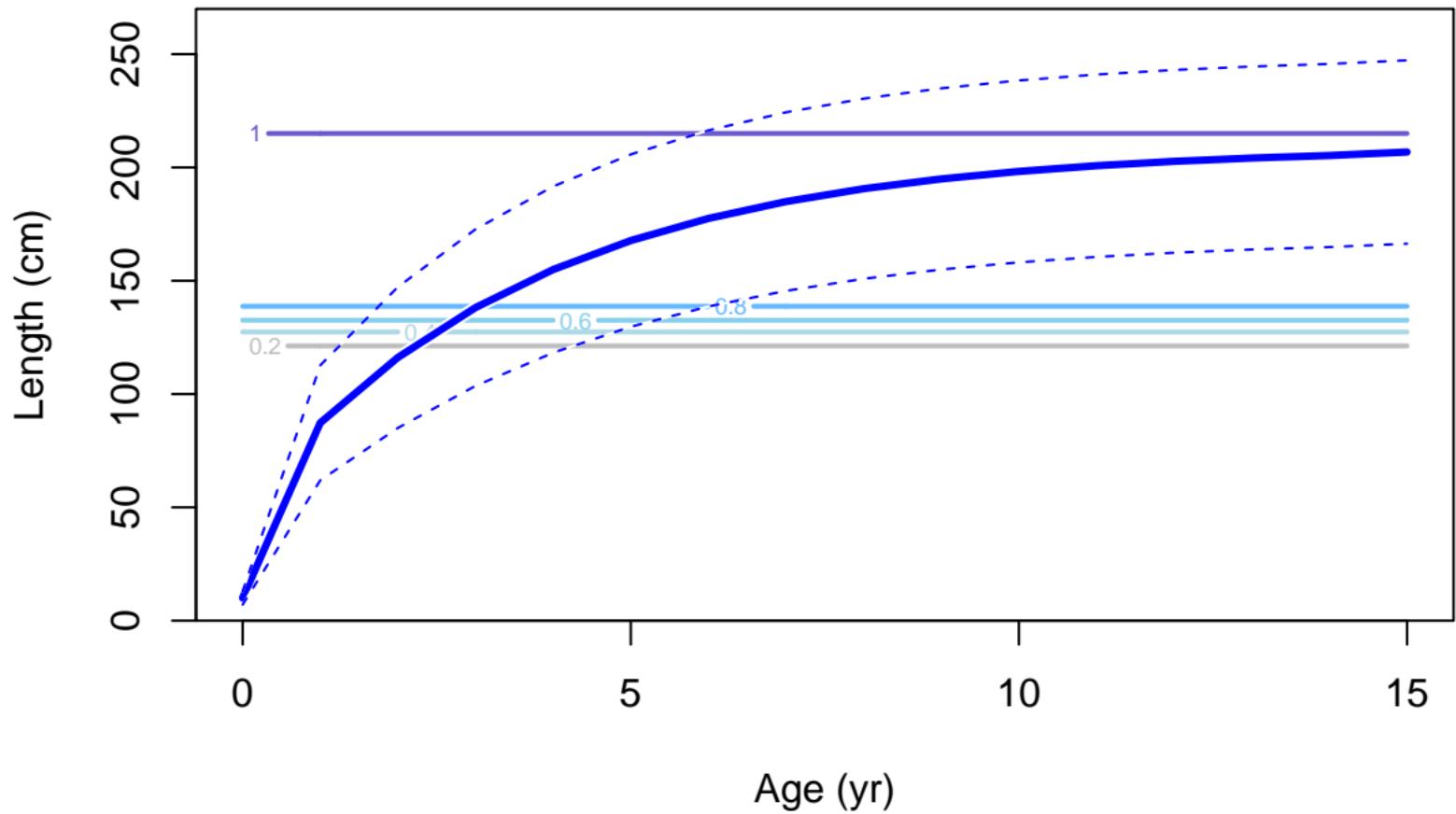


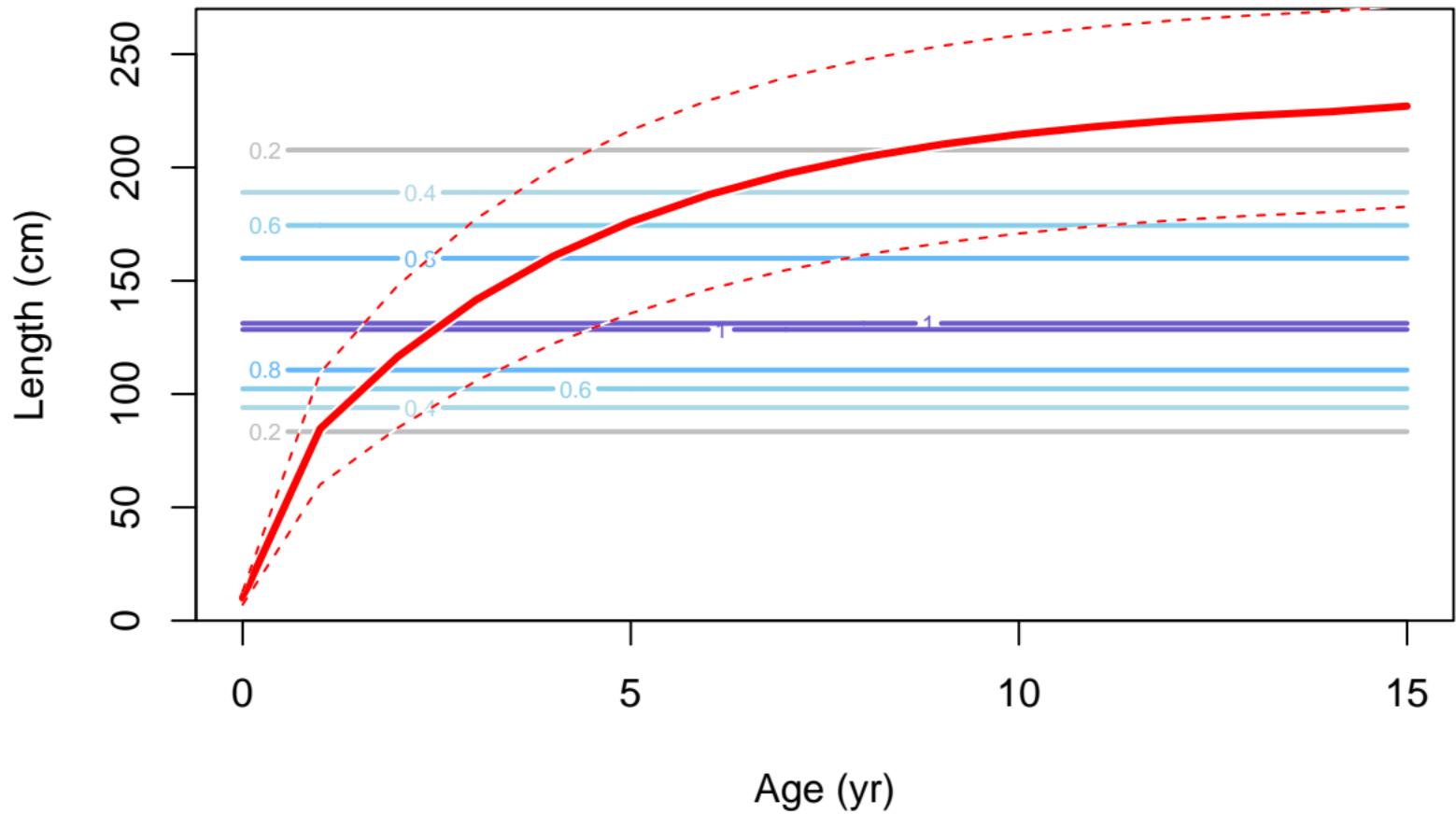


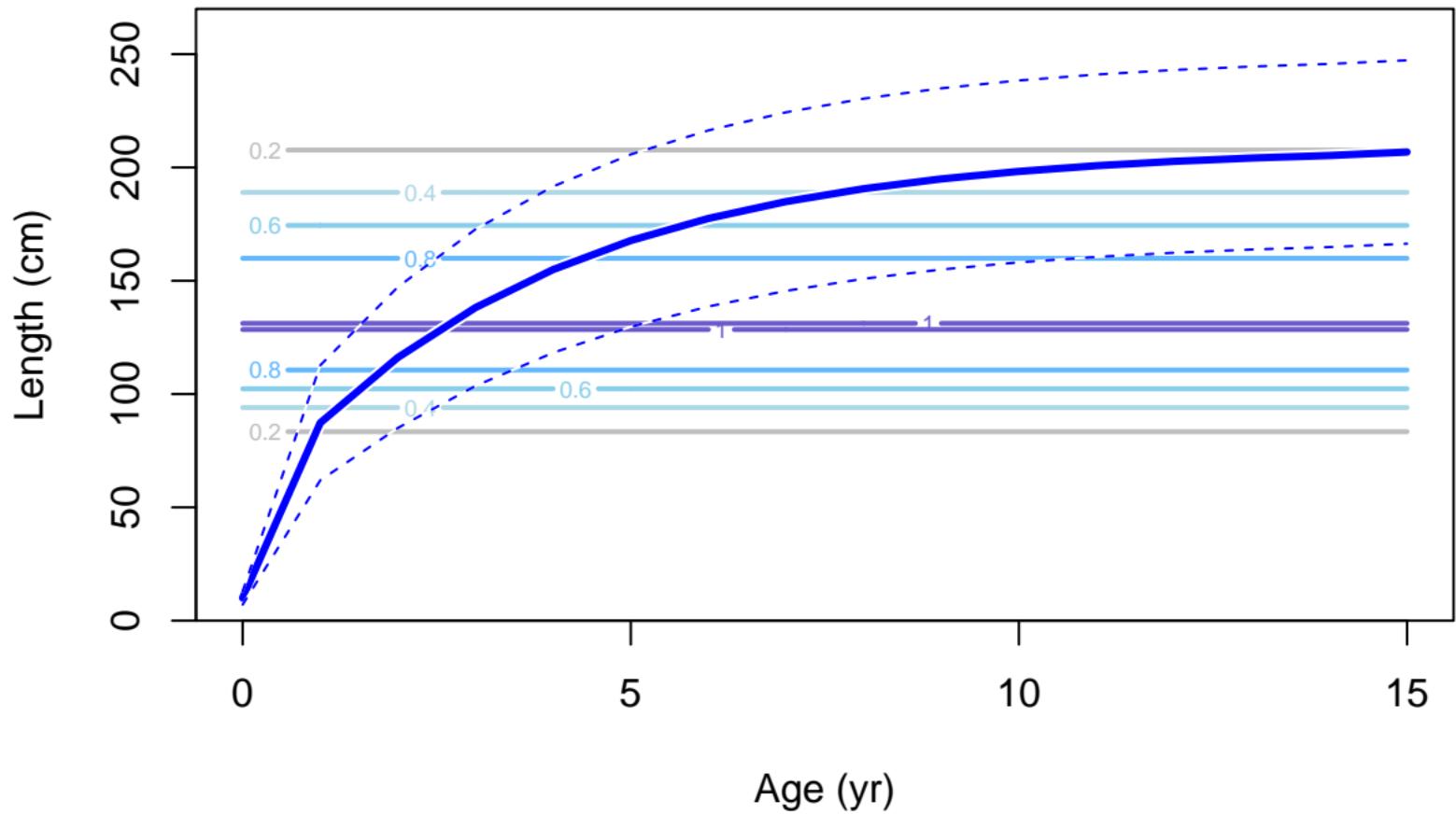


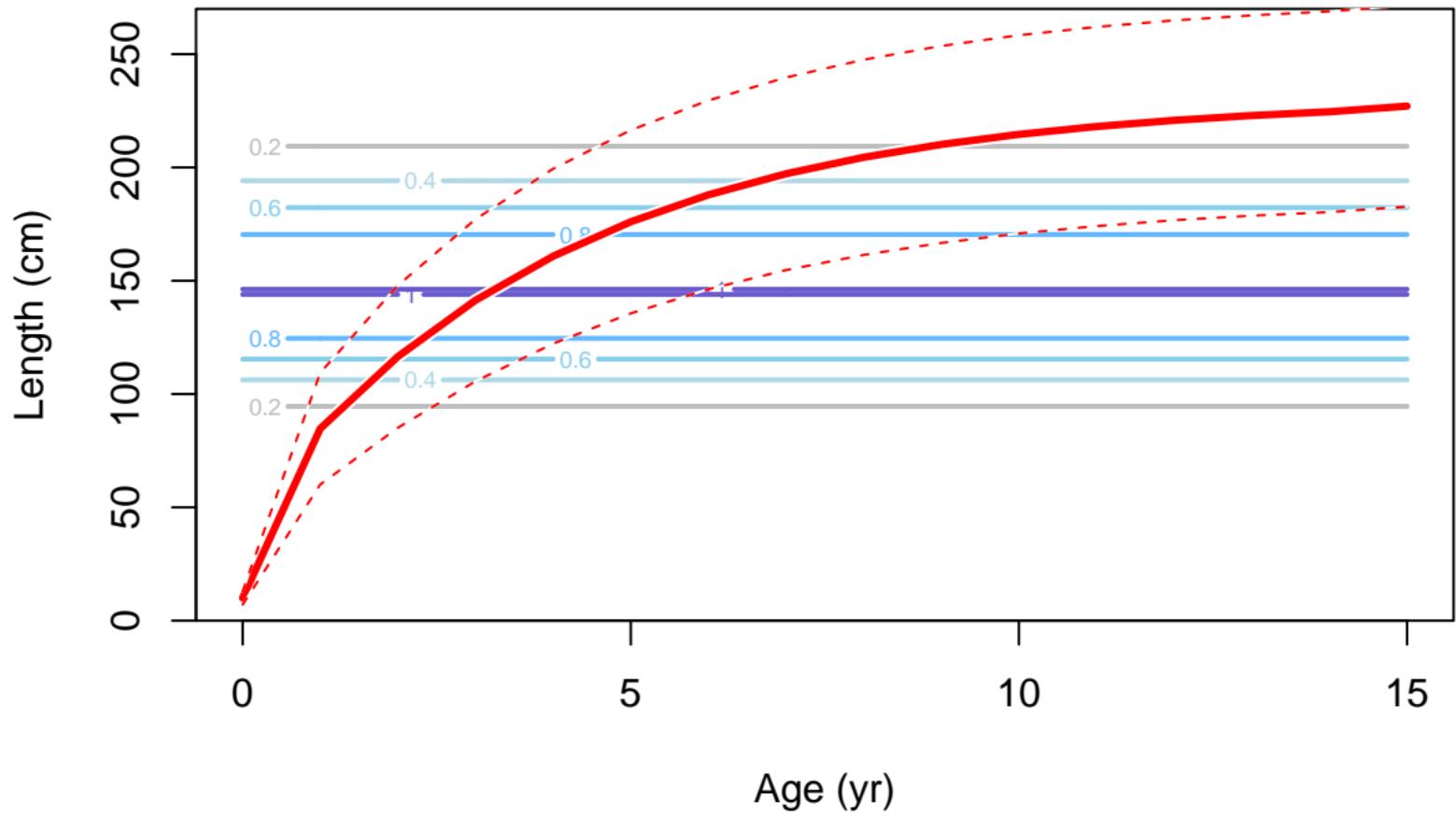


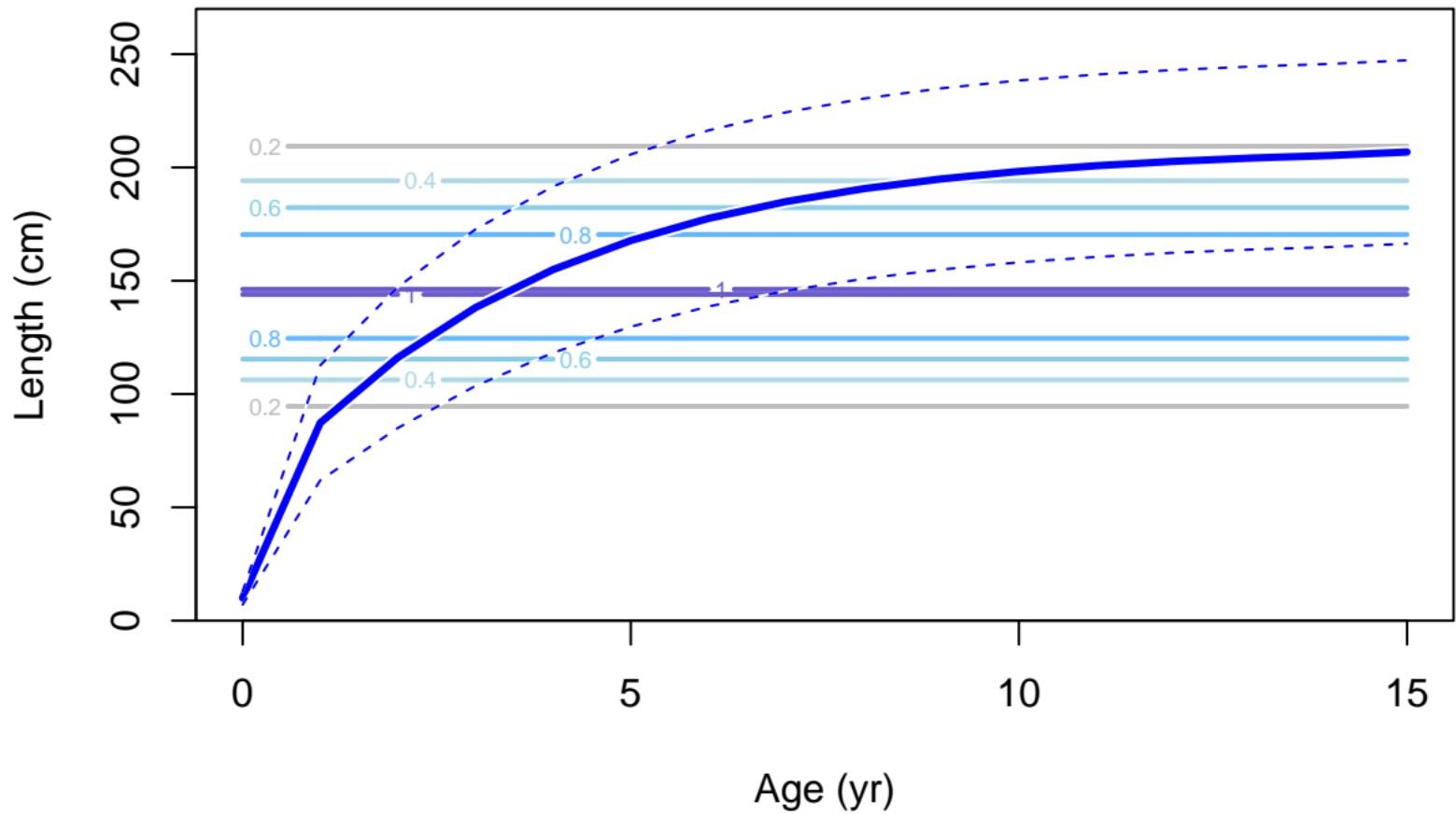


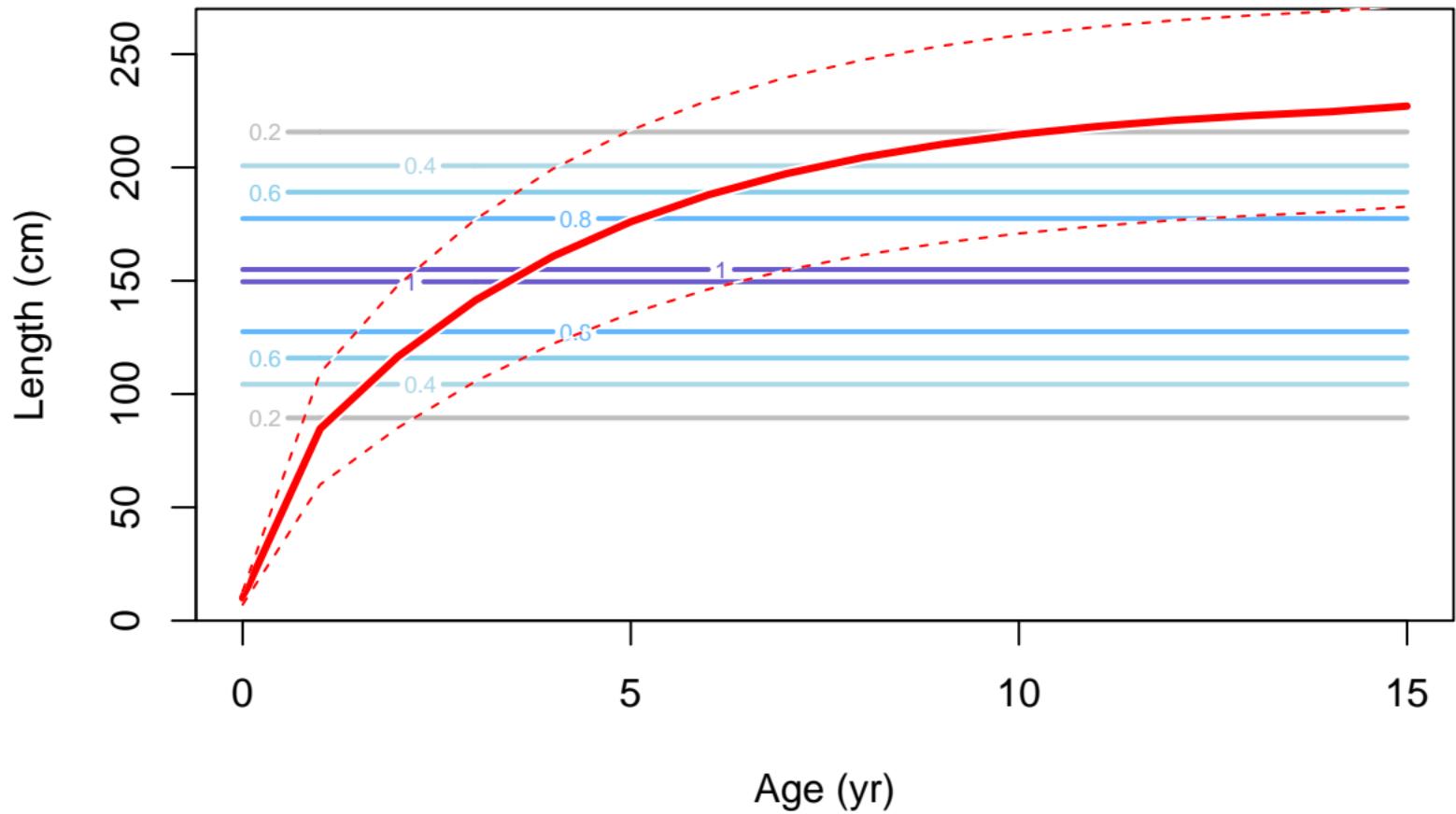


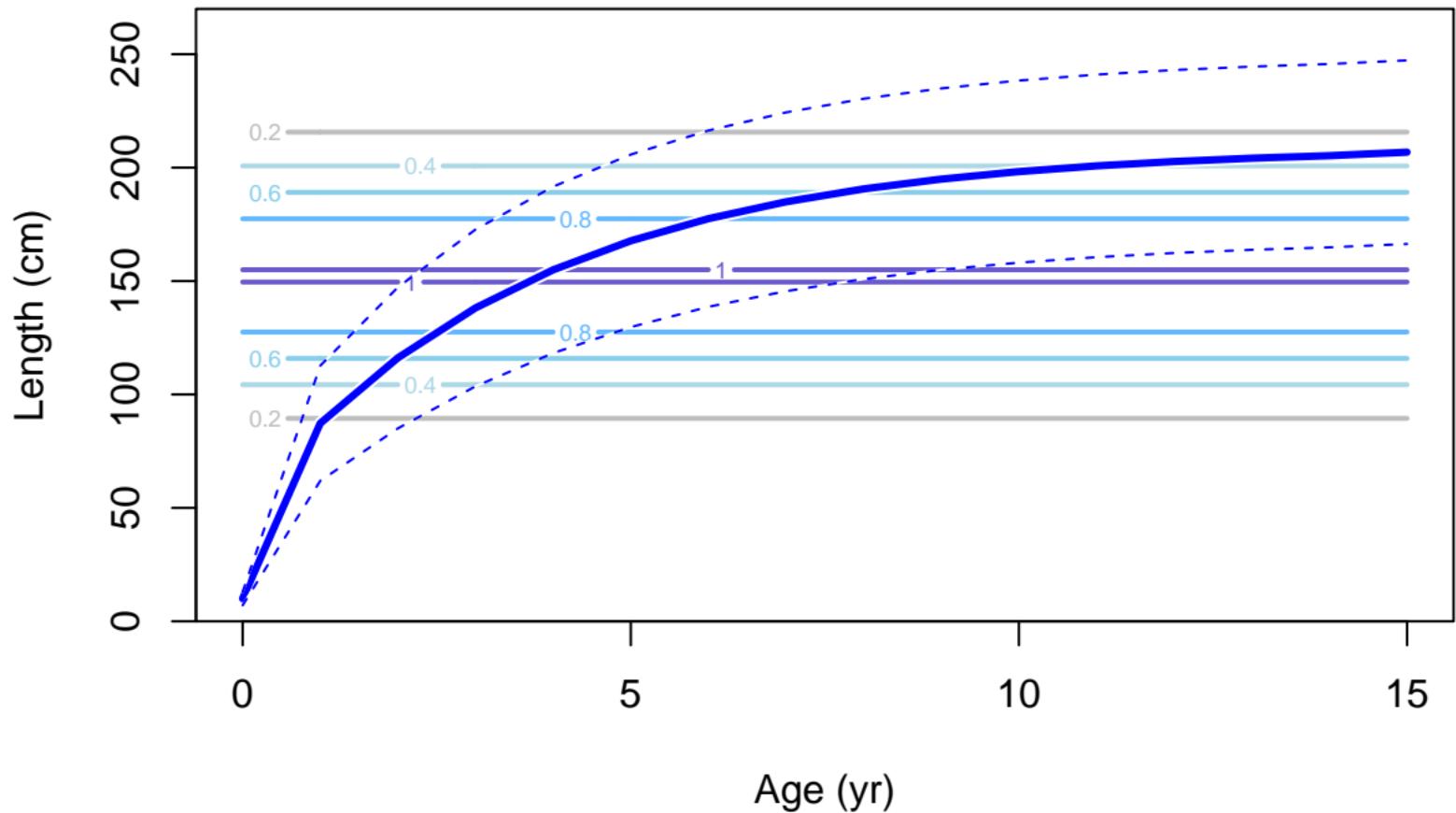


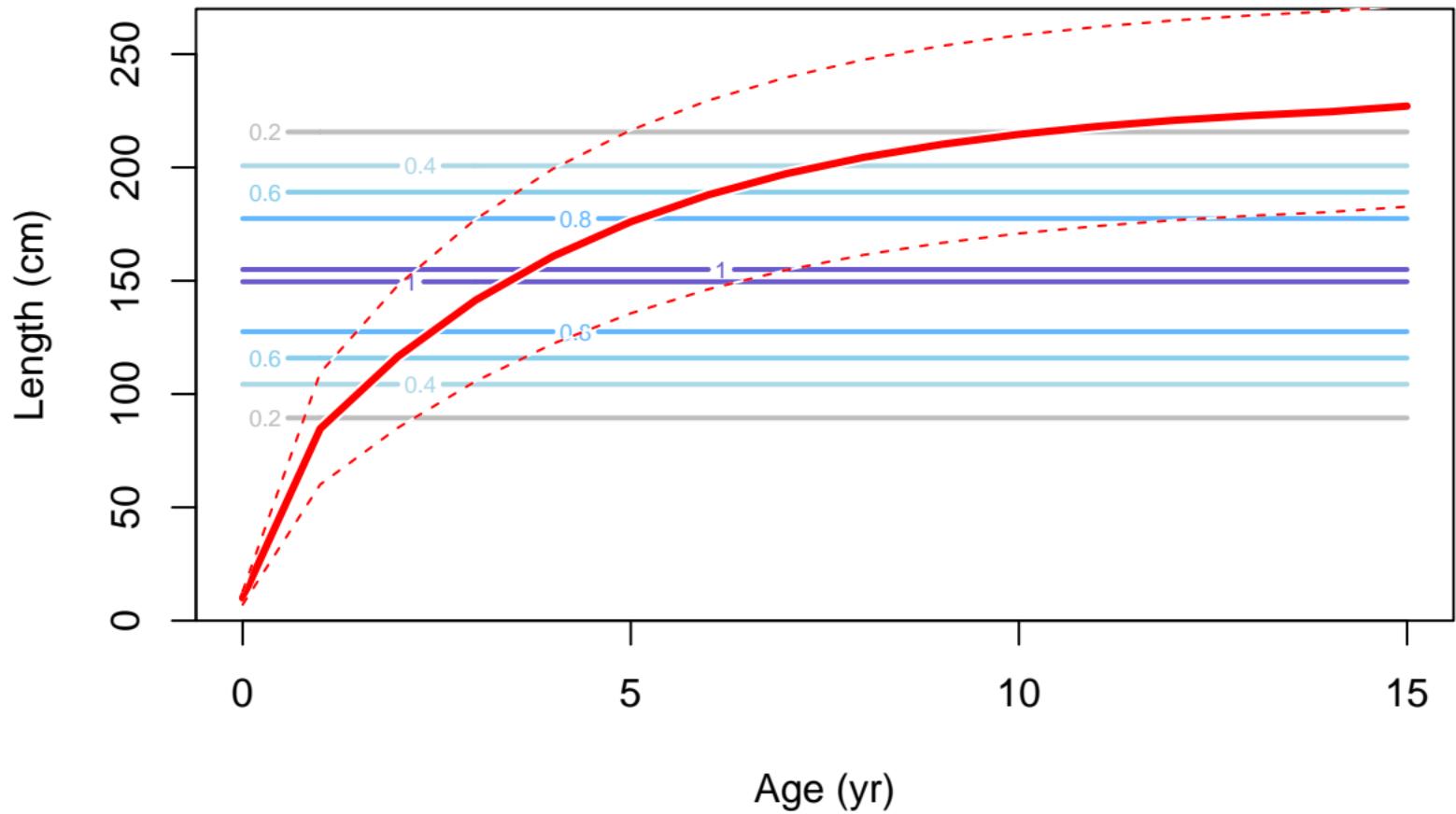


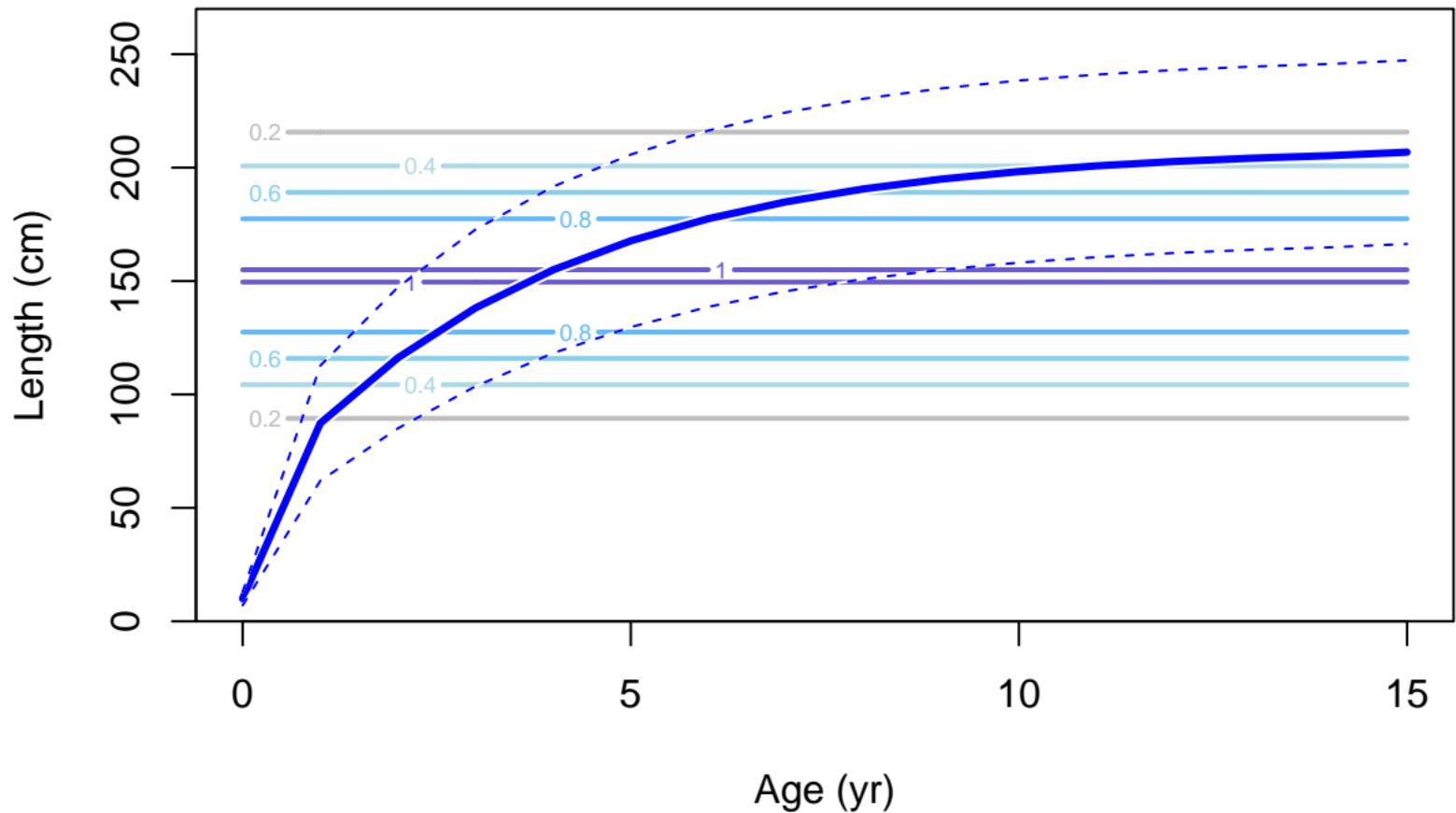


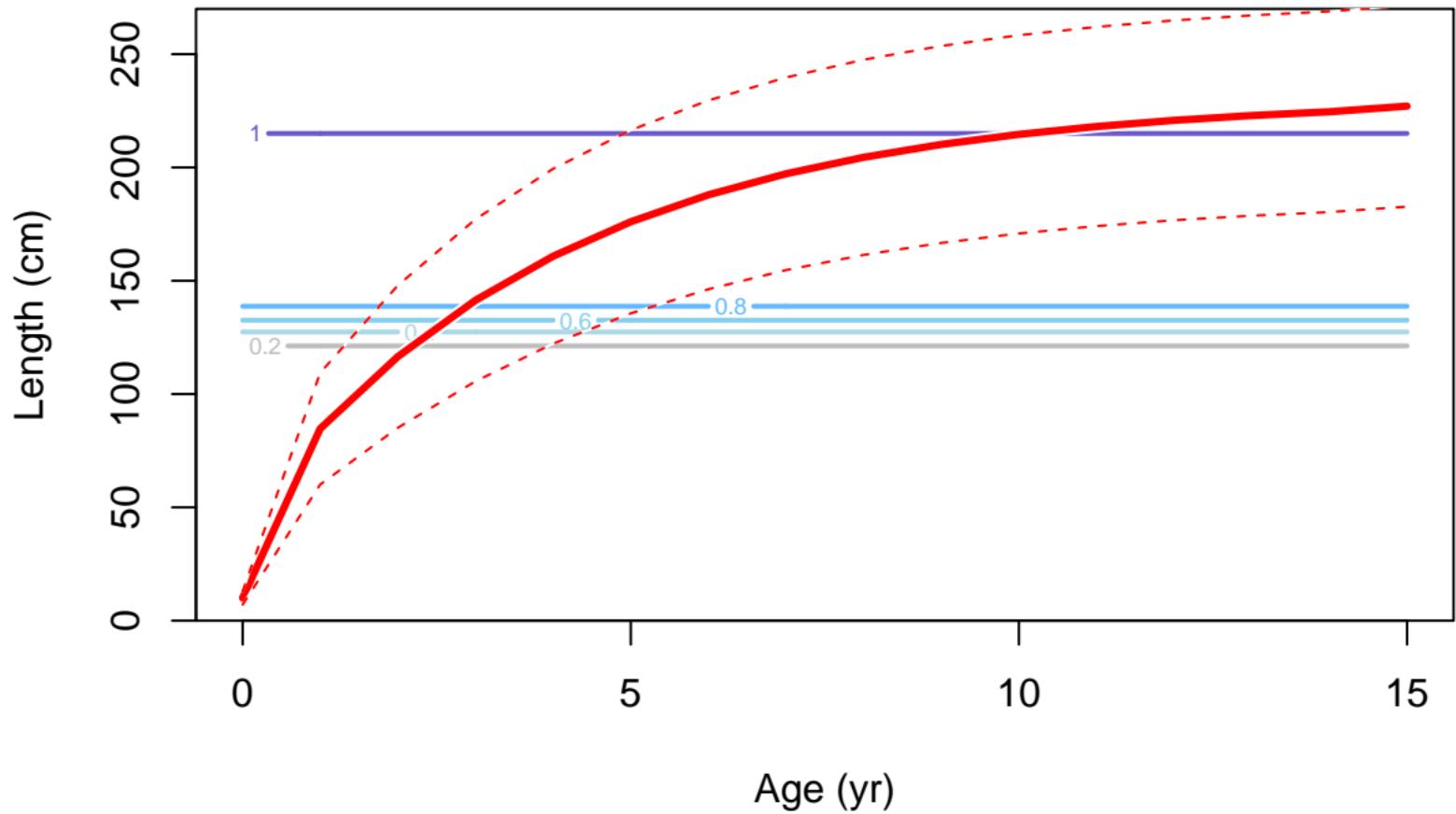


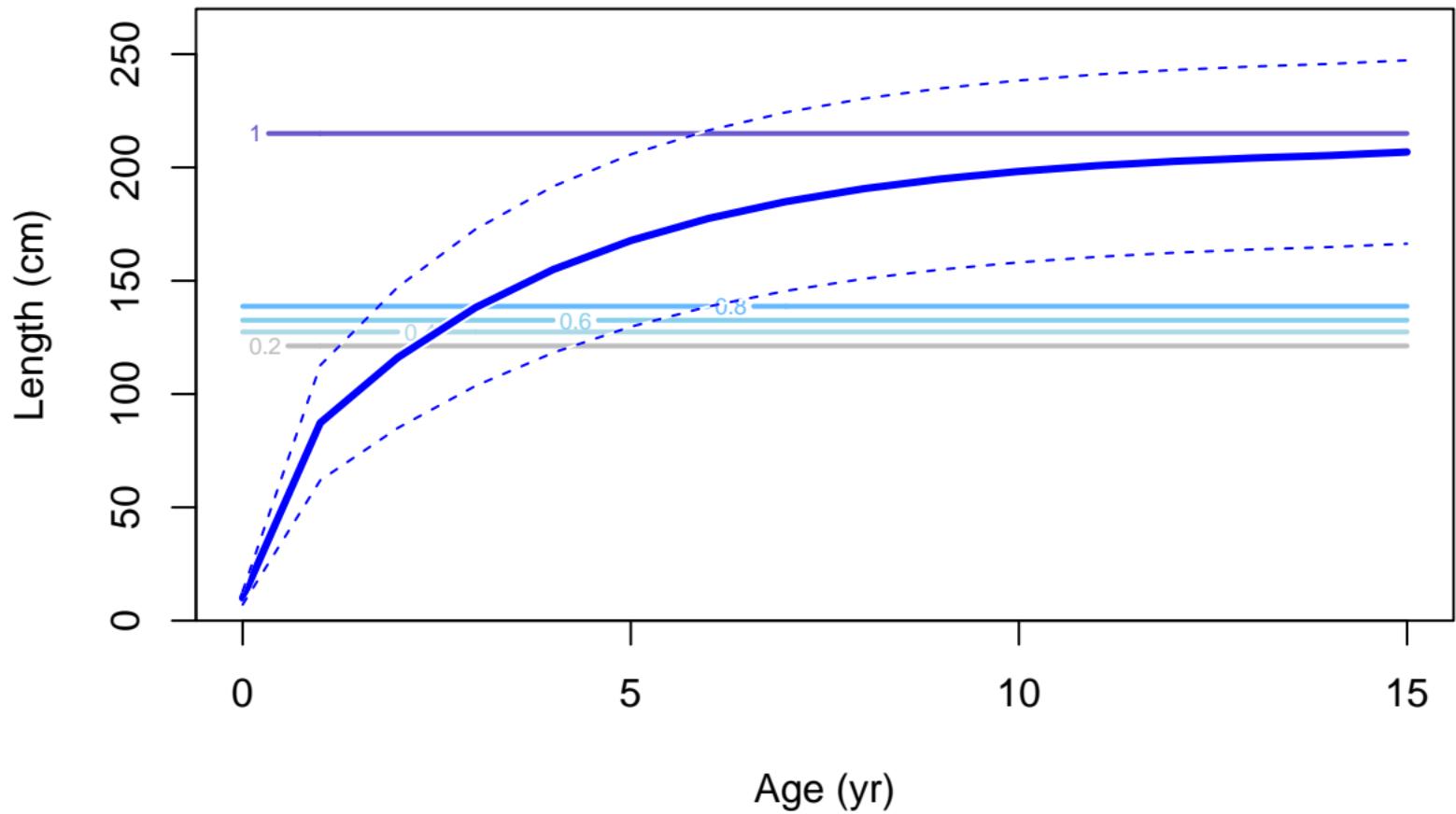


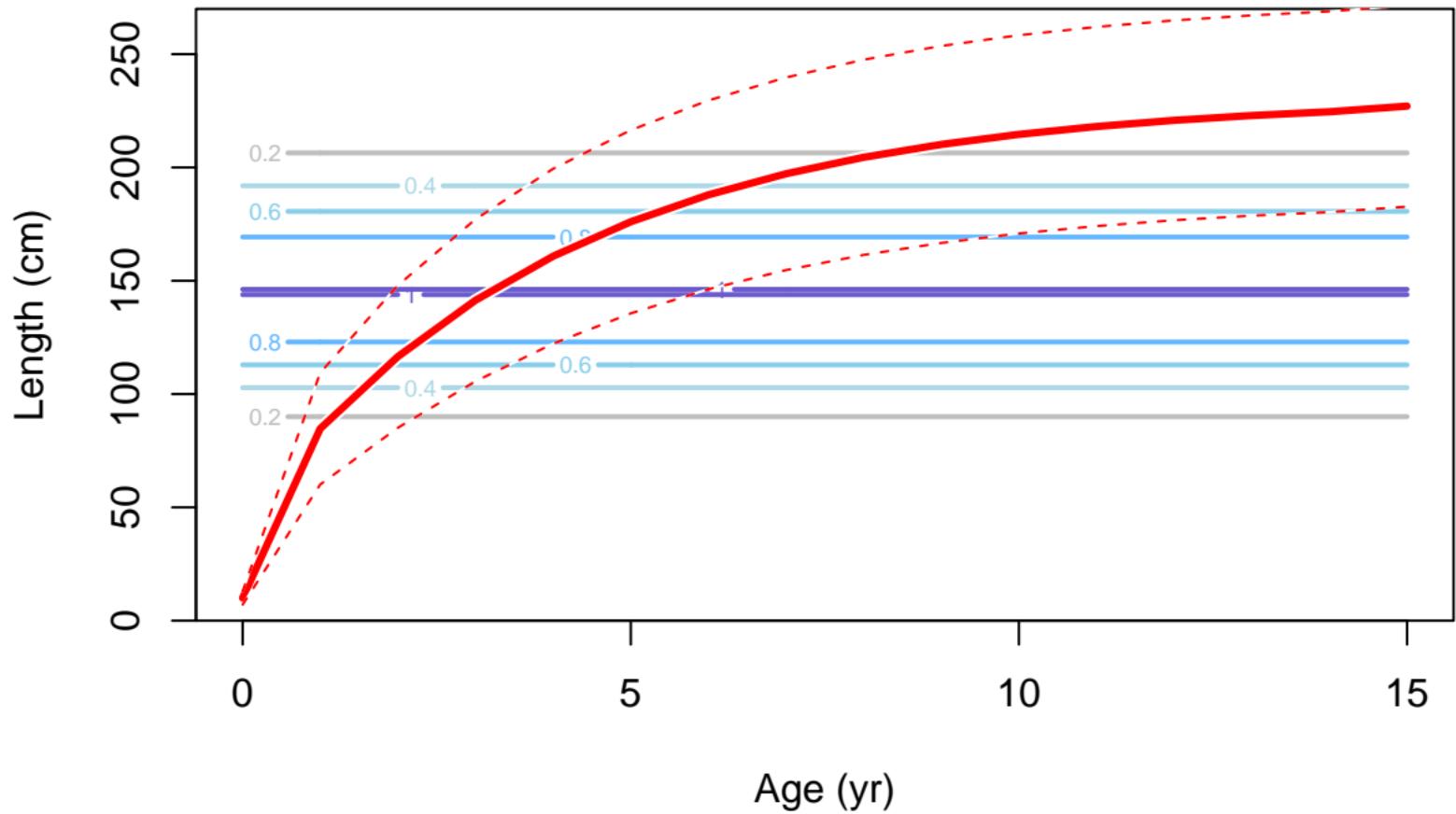


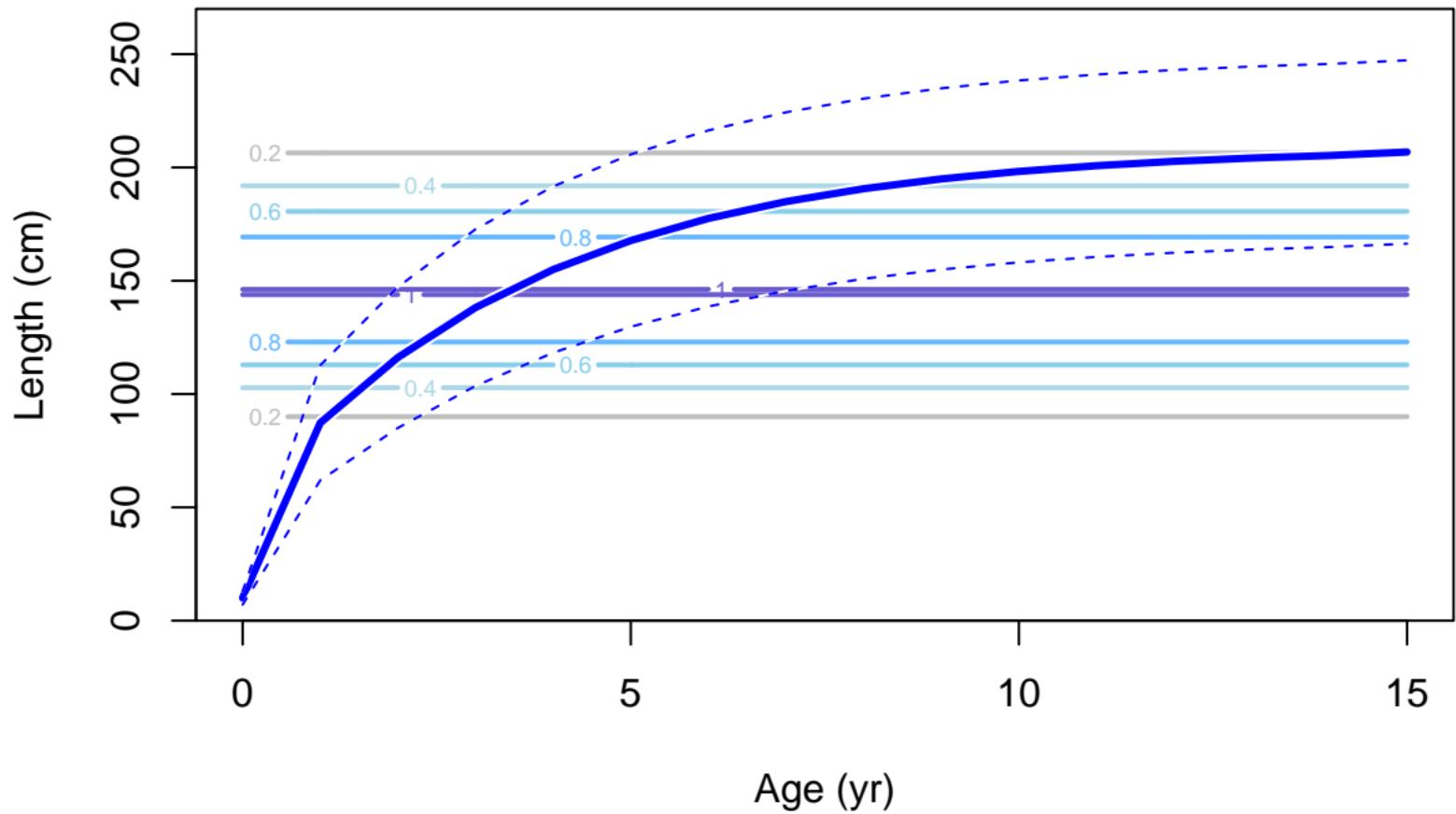


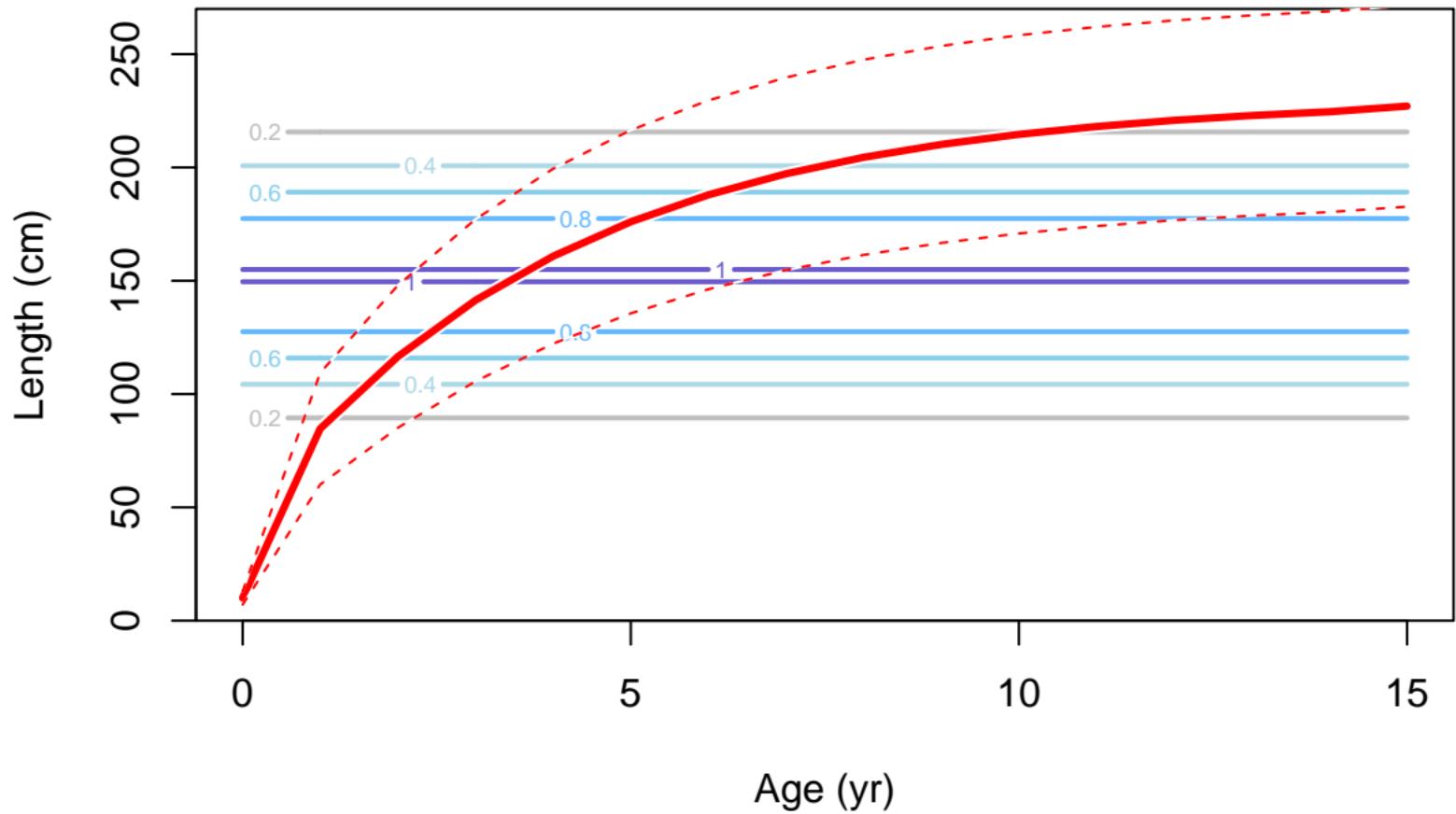


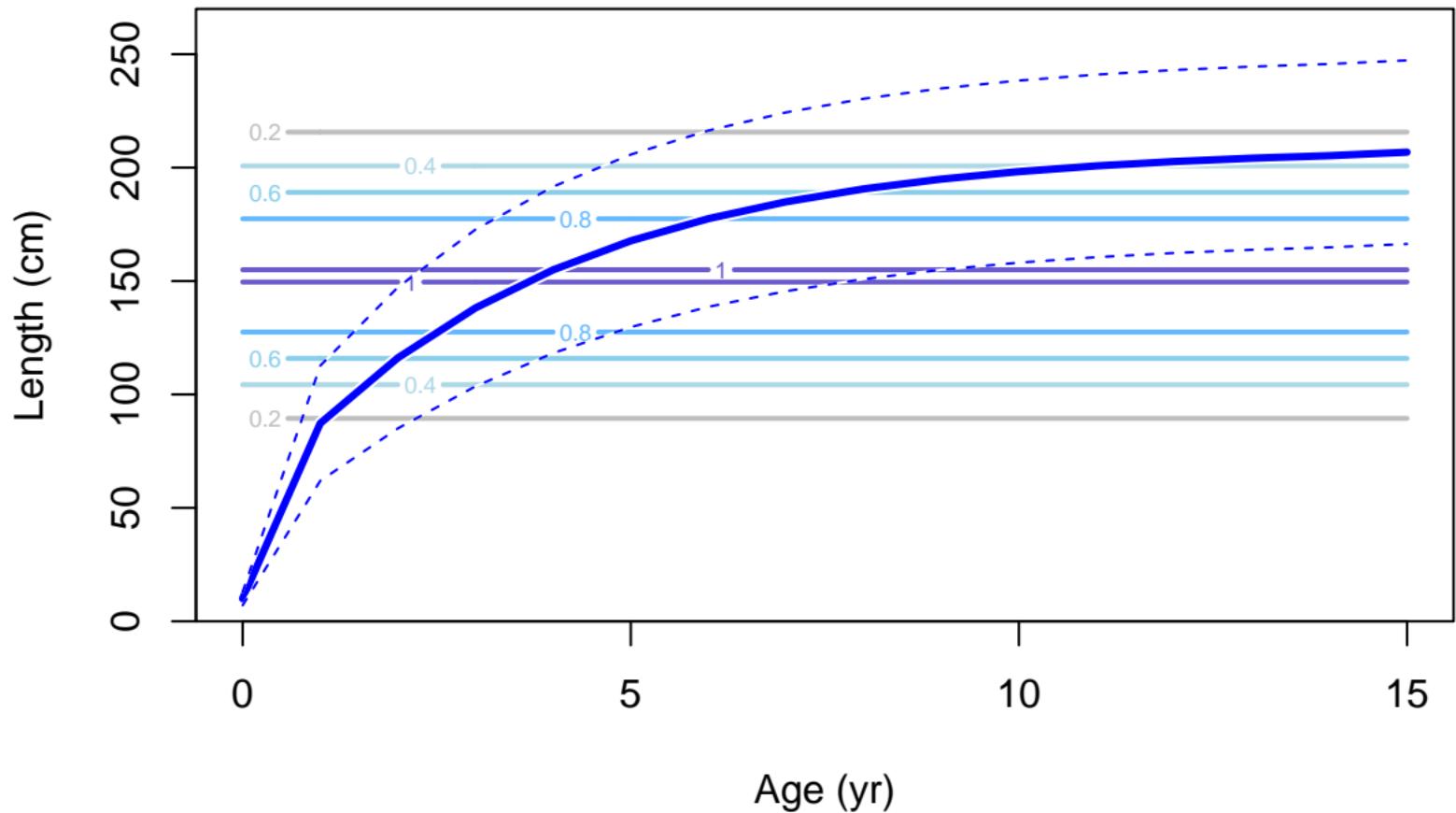


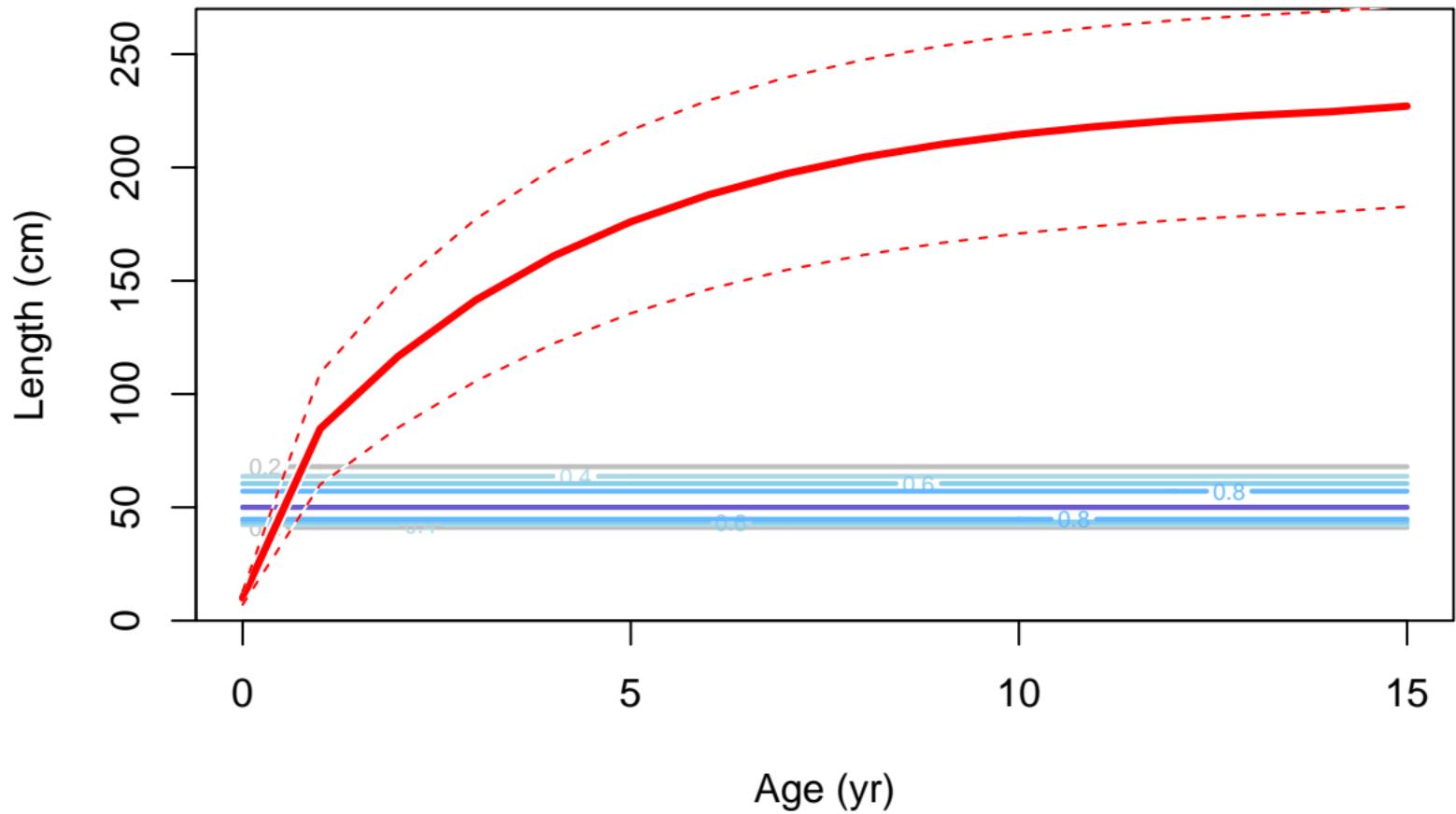


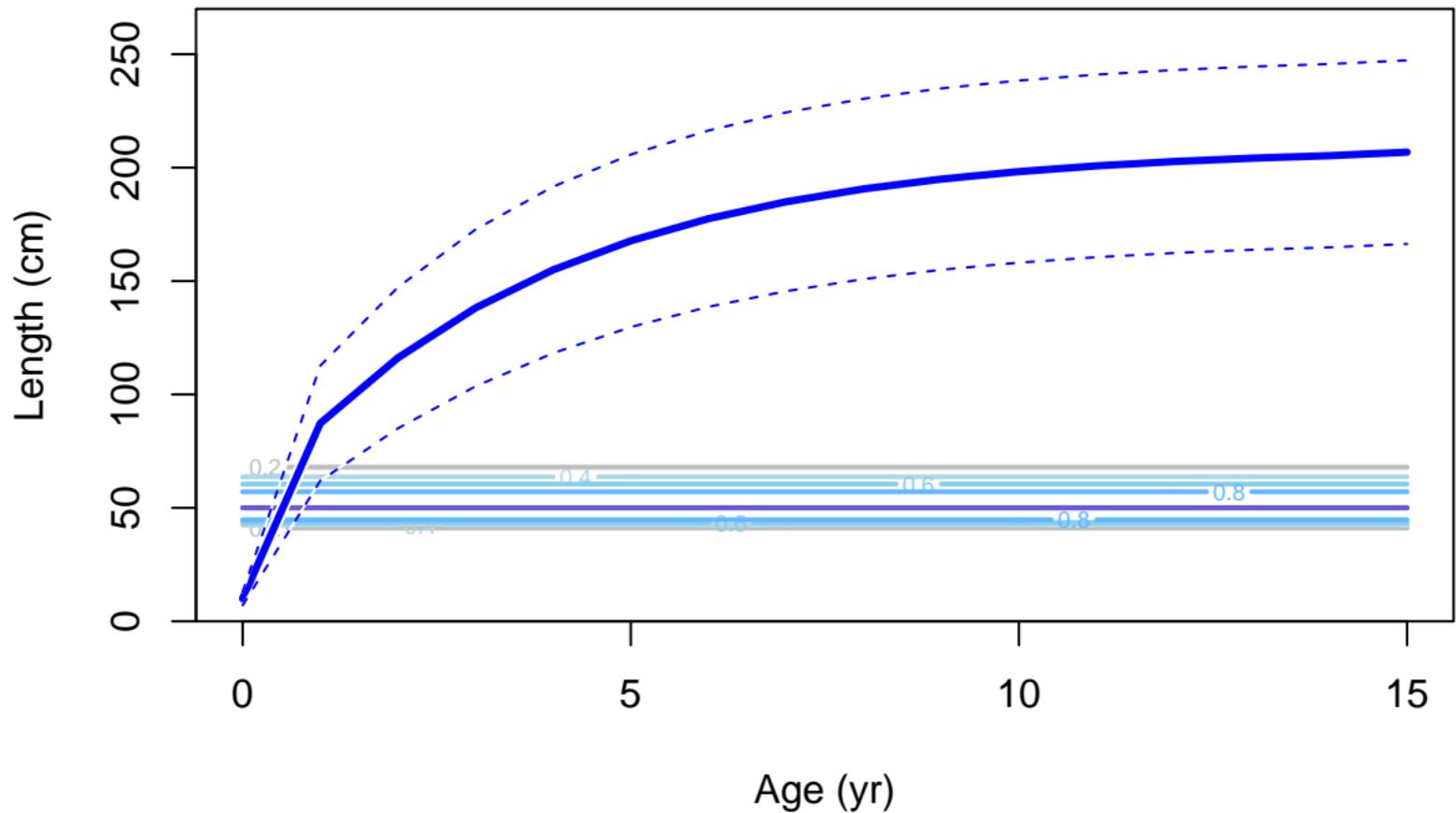


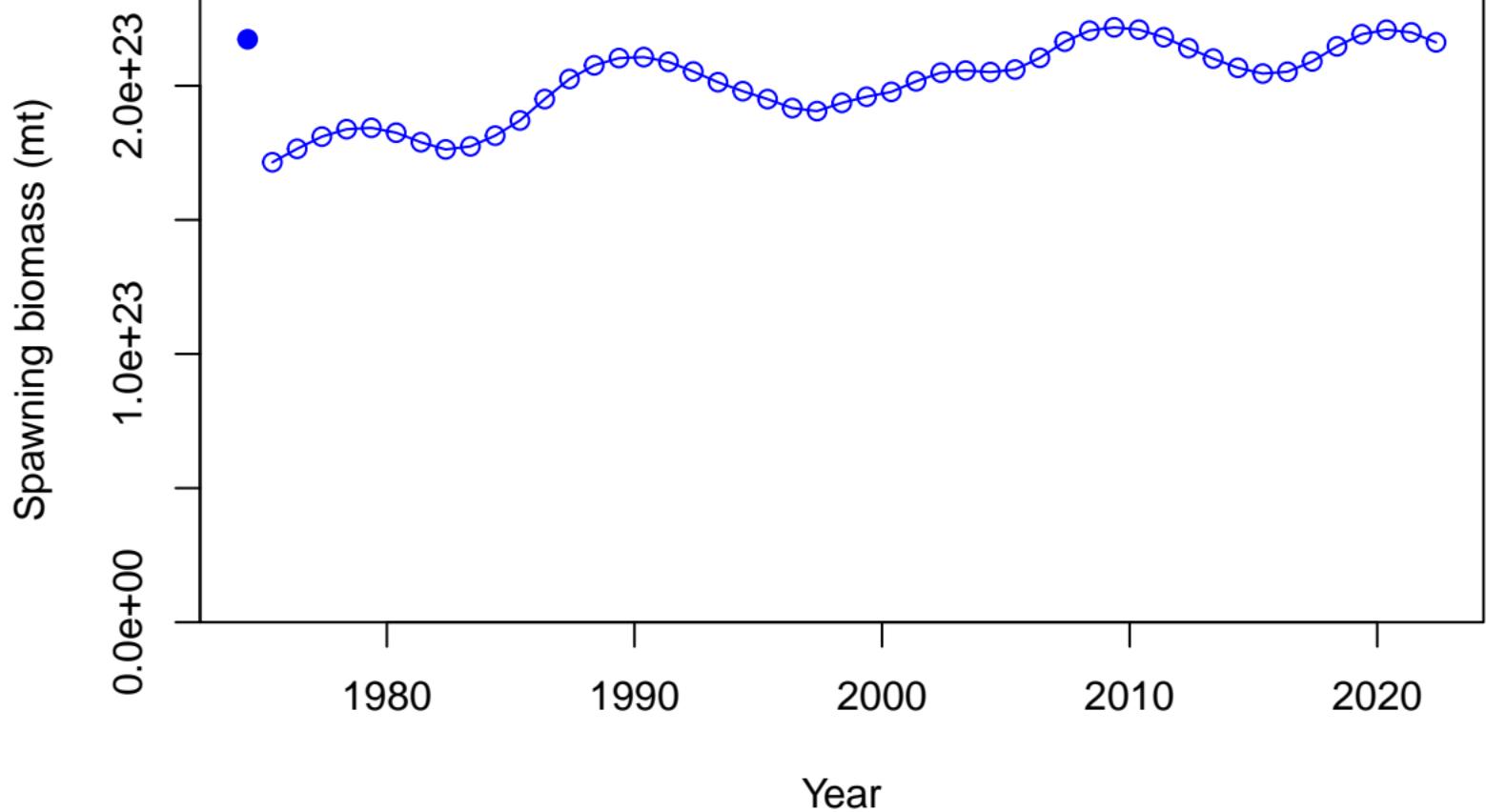




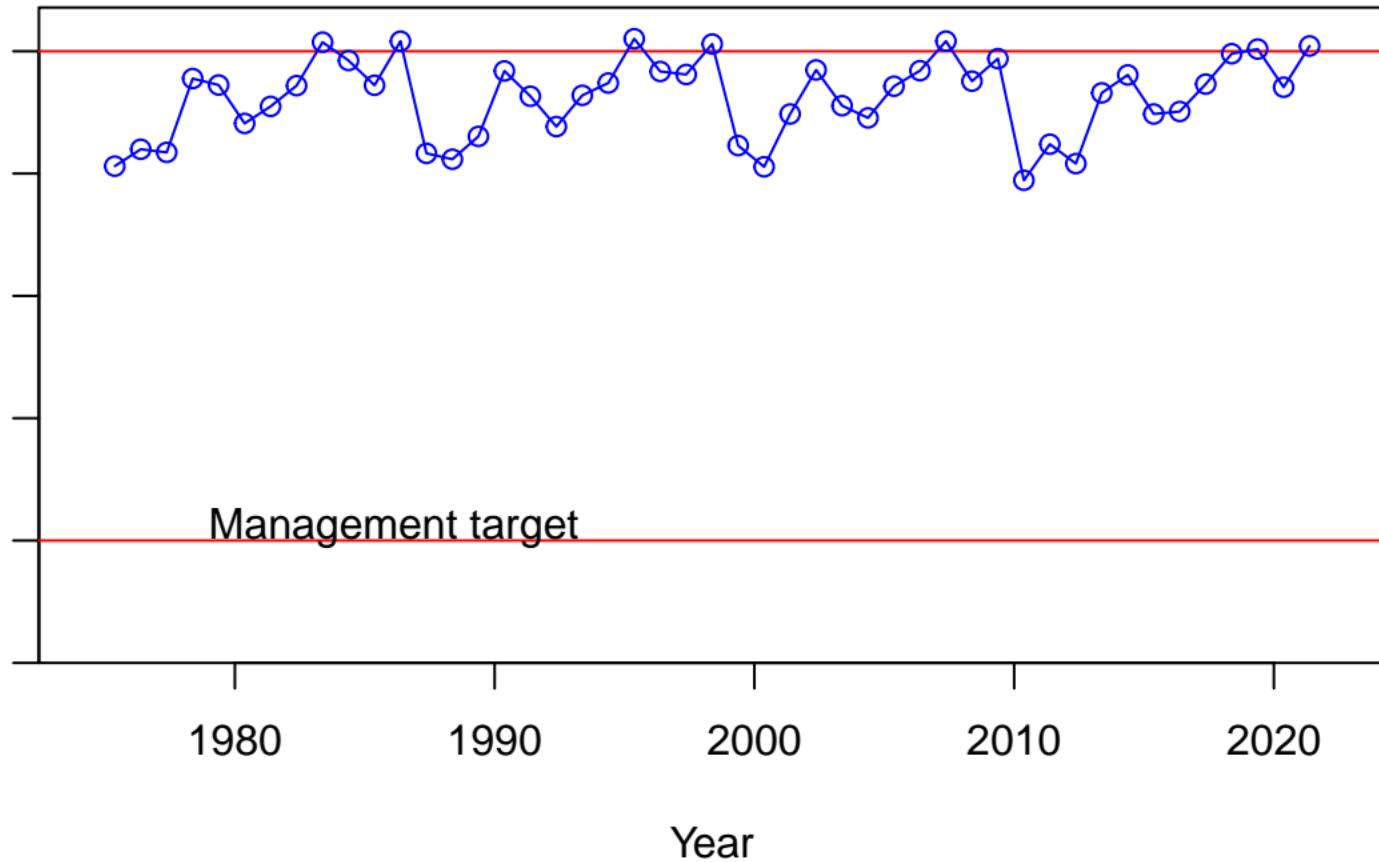


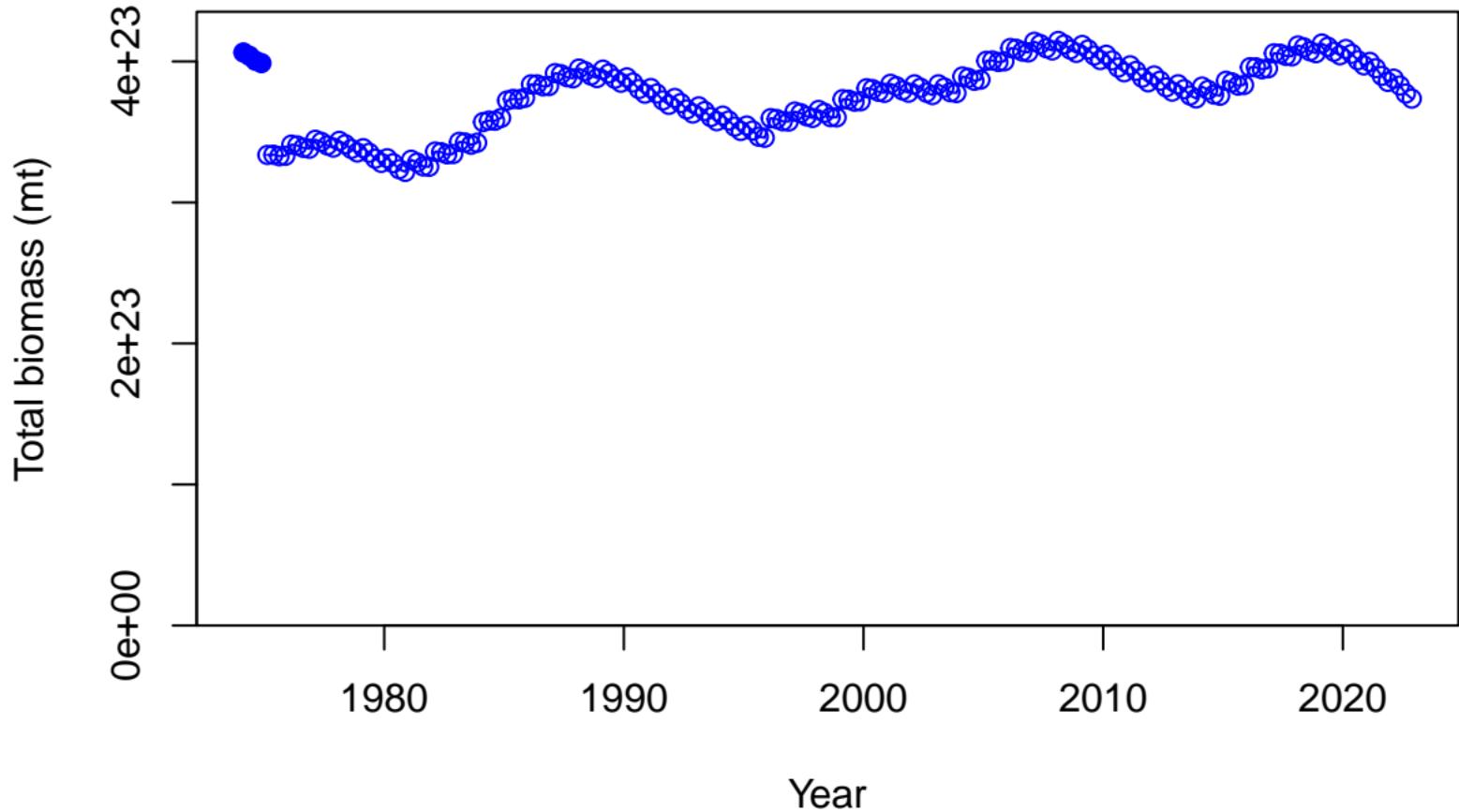


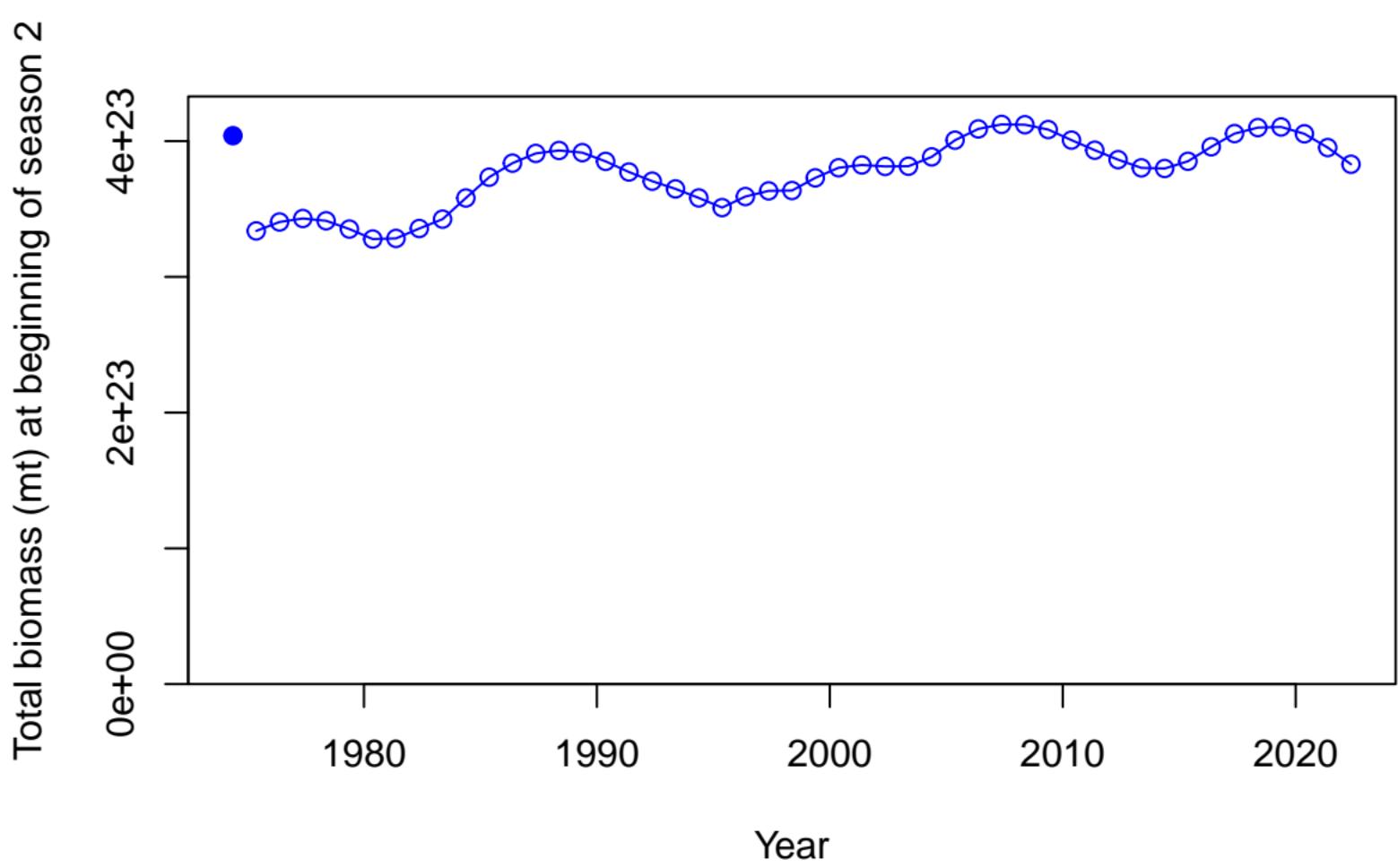


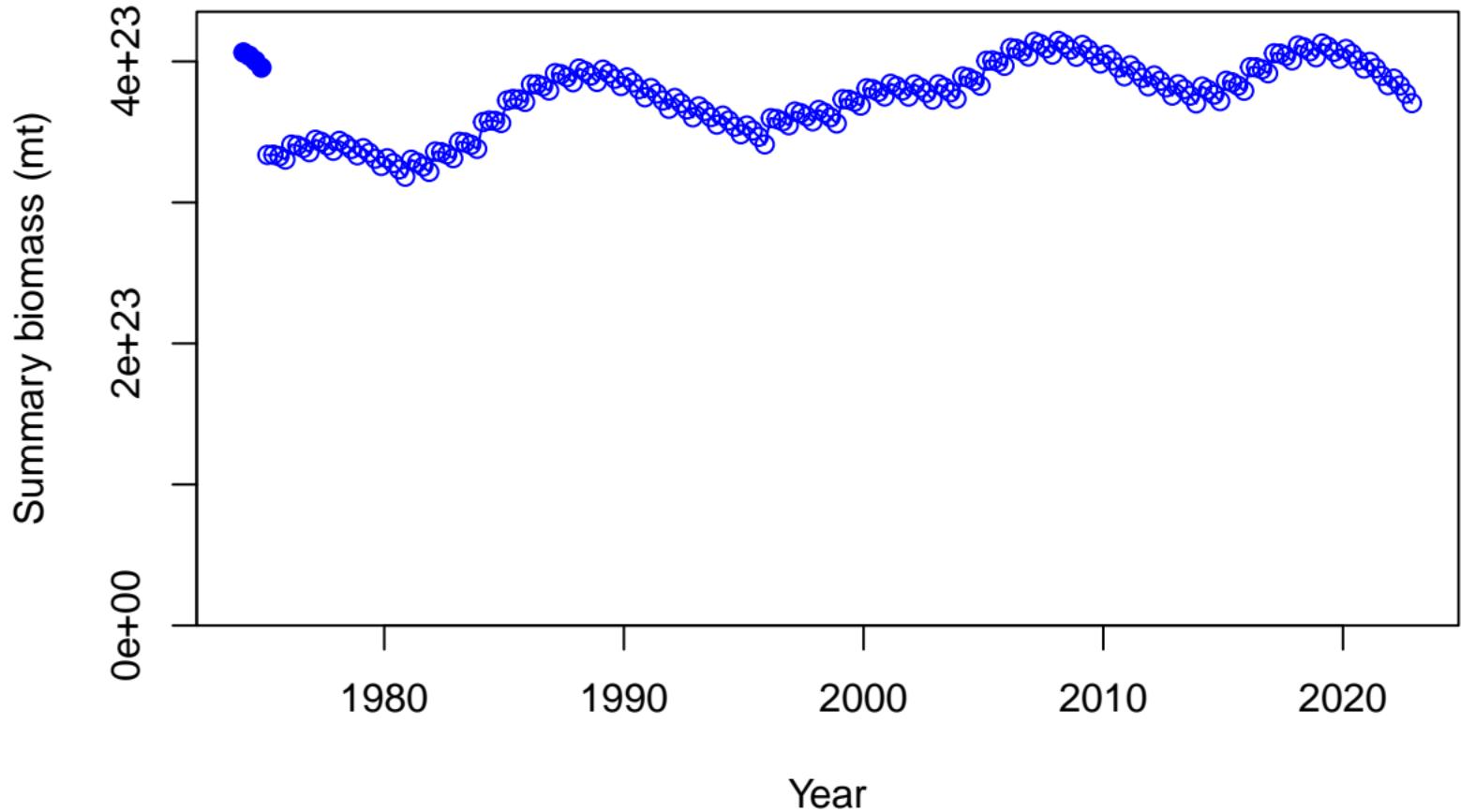


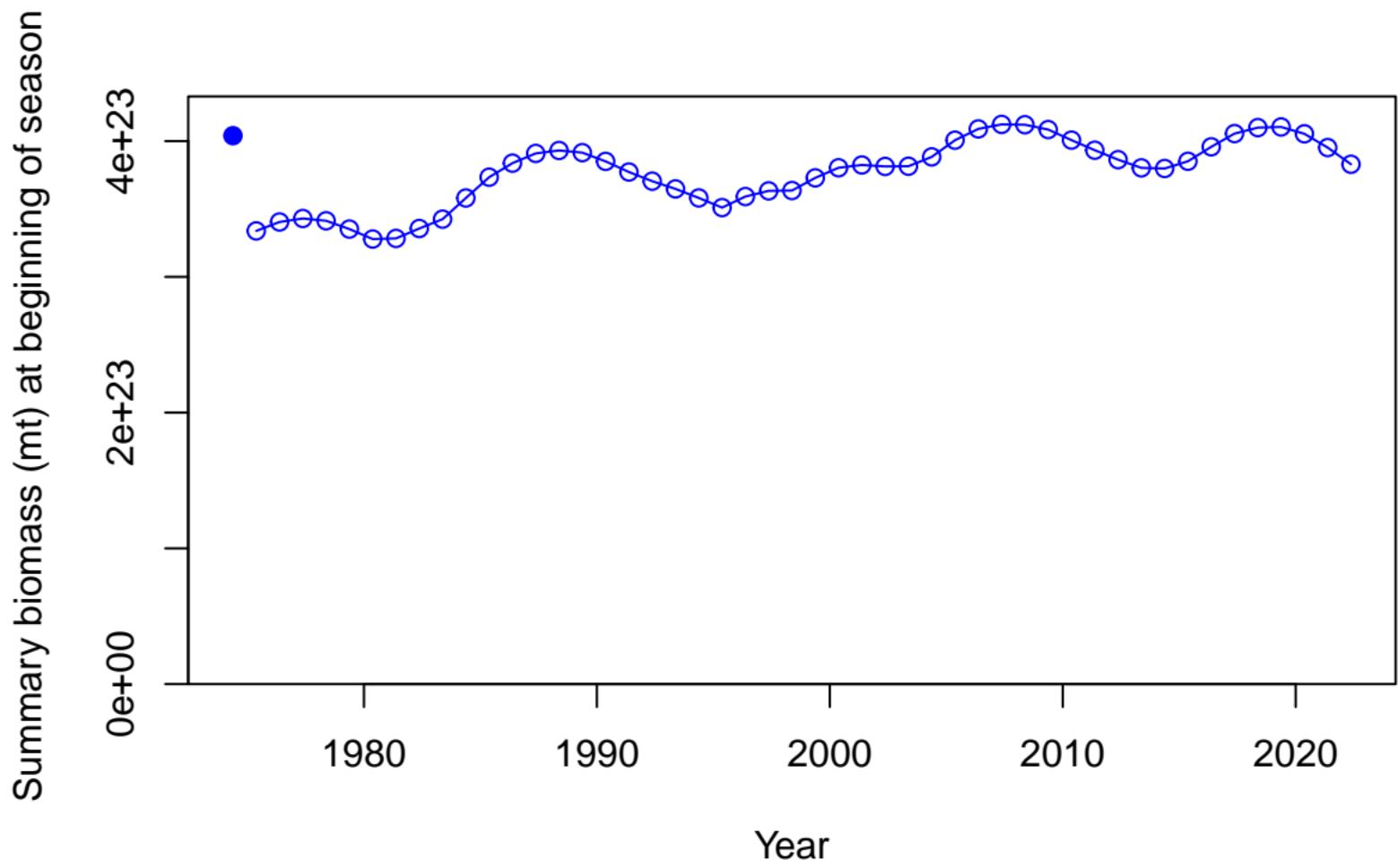
Relative spawning biomass:  $B/B_0$

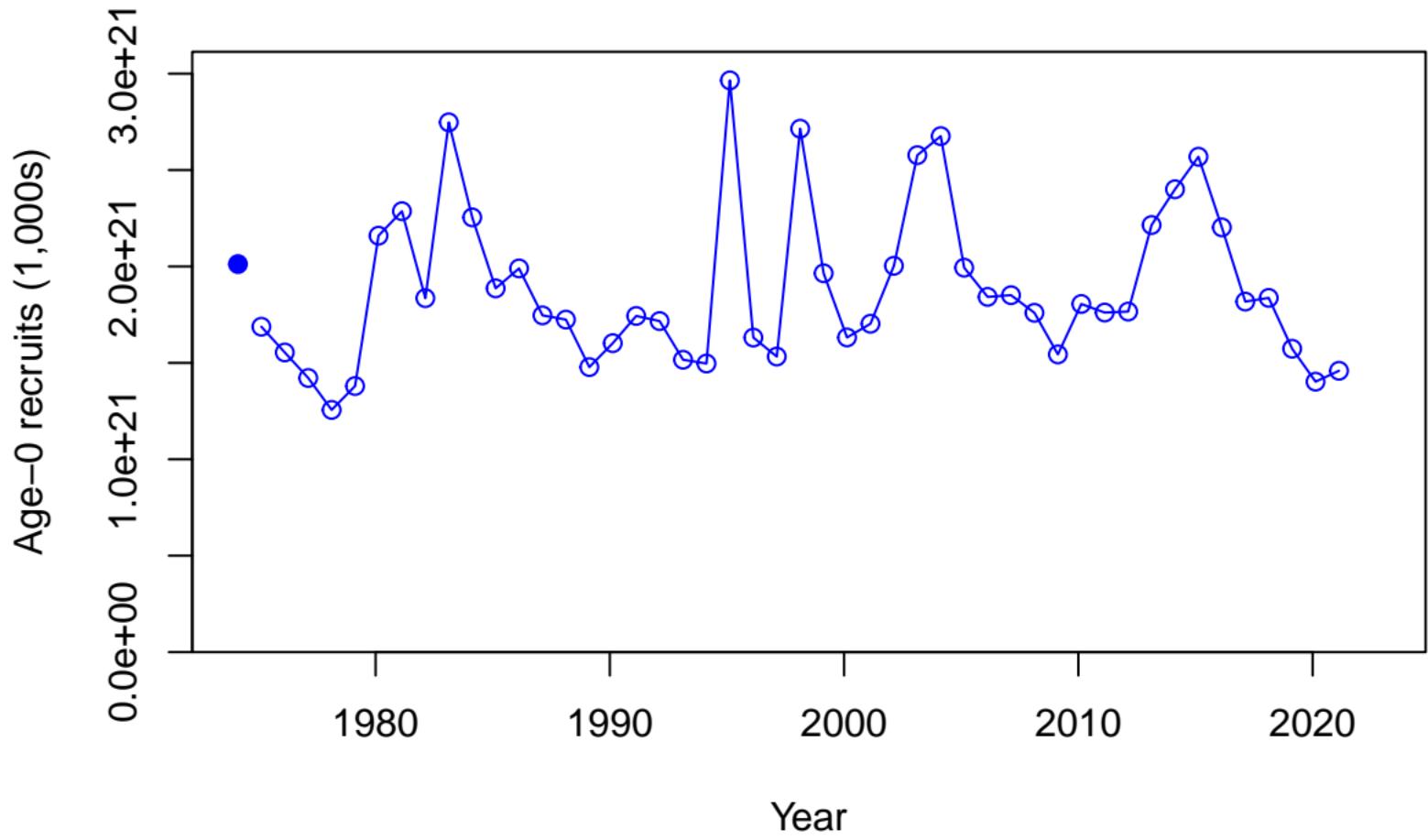


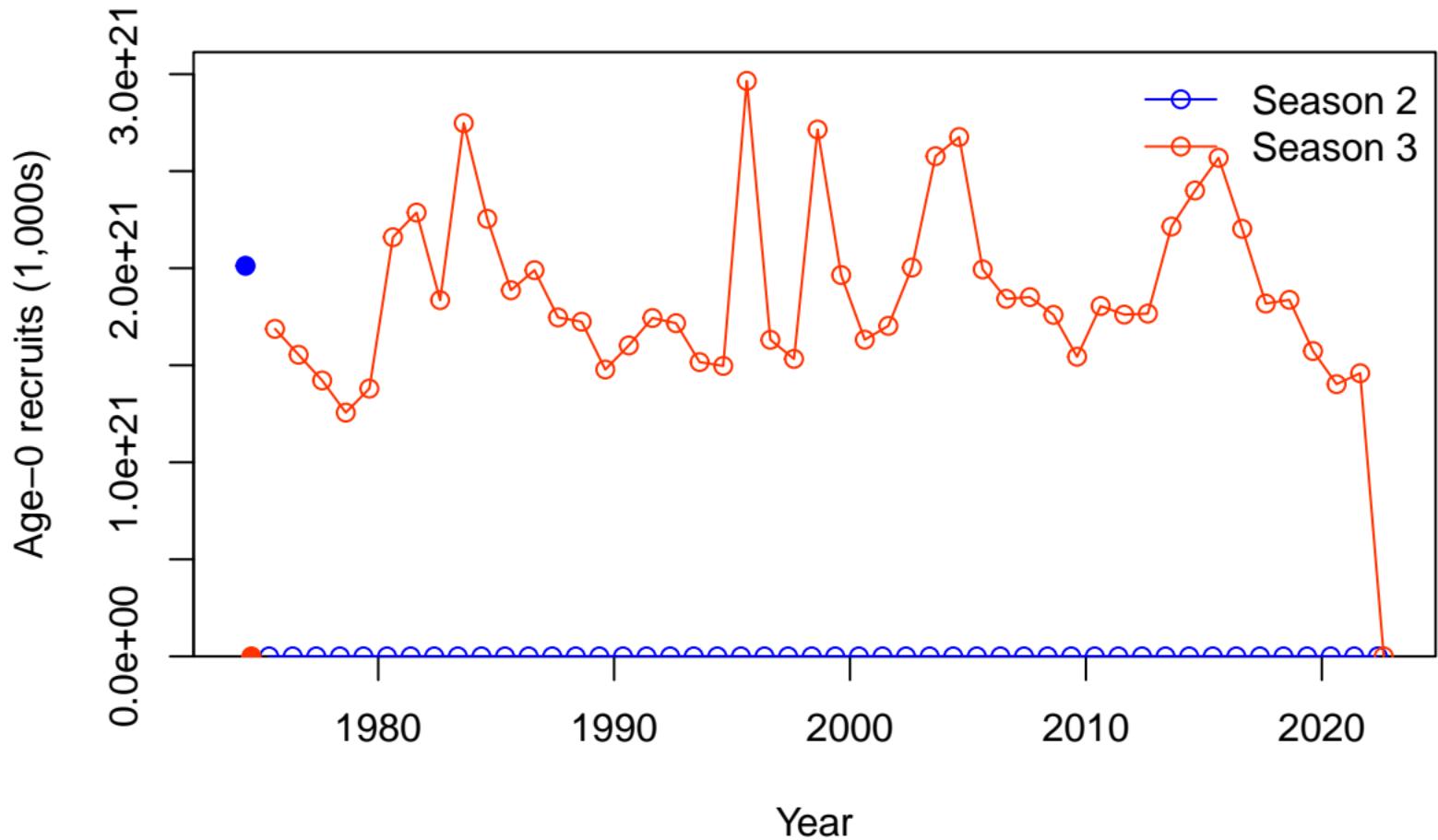




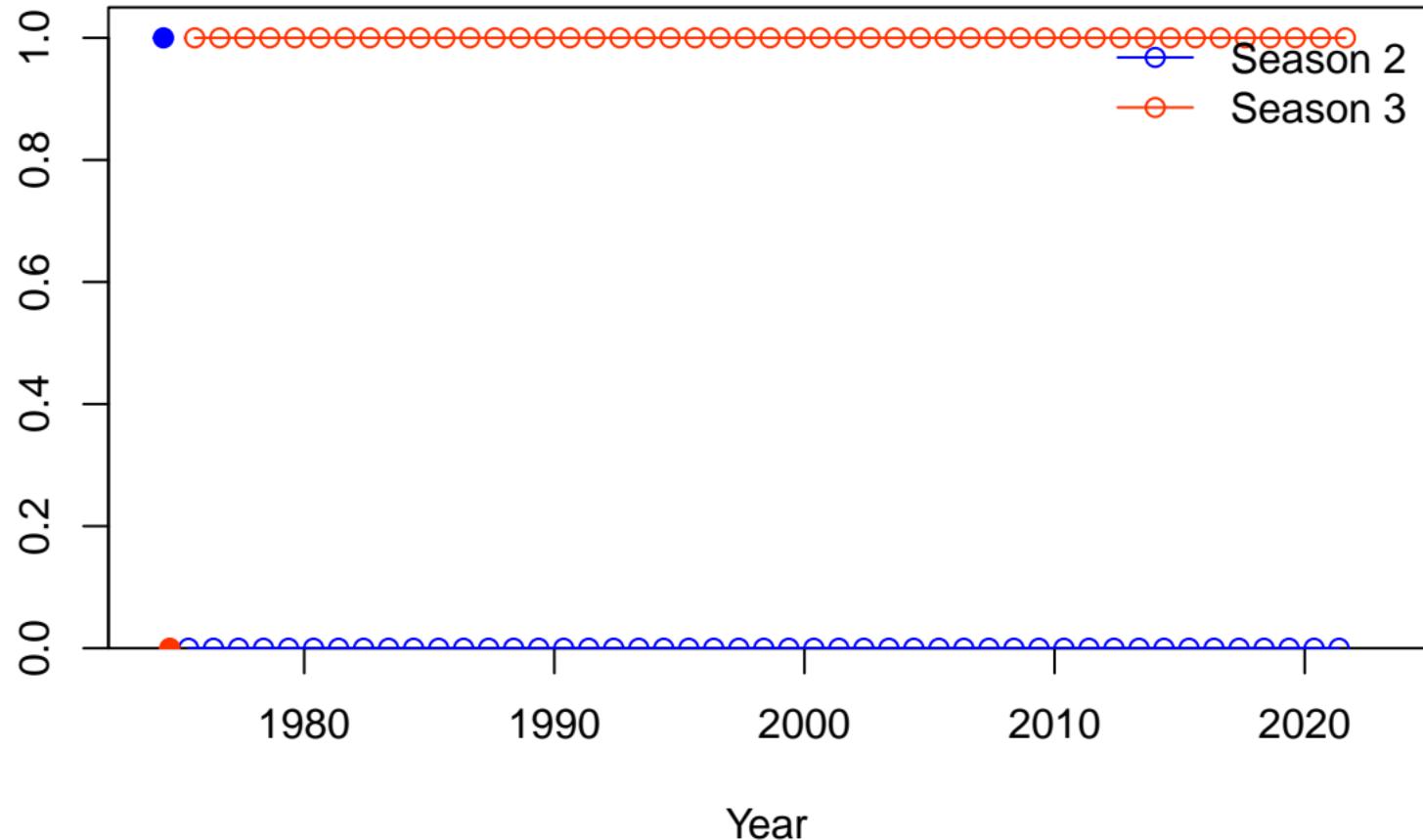




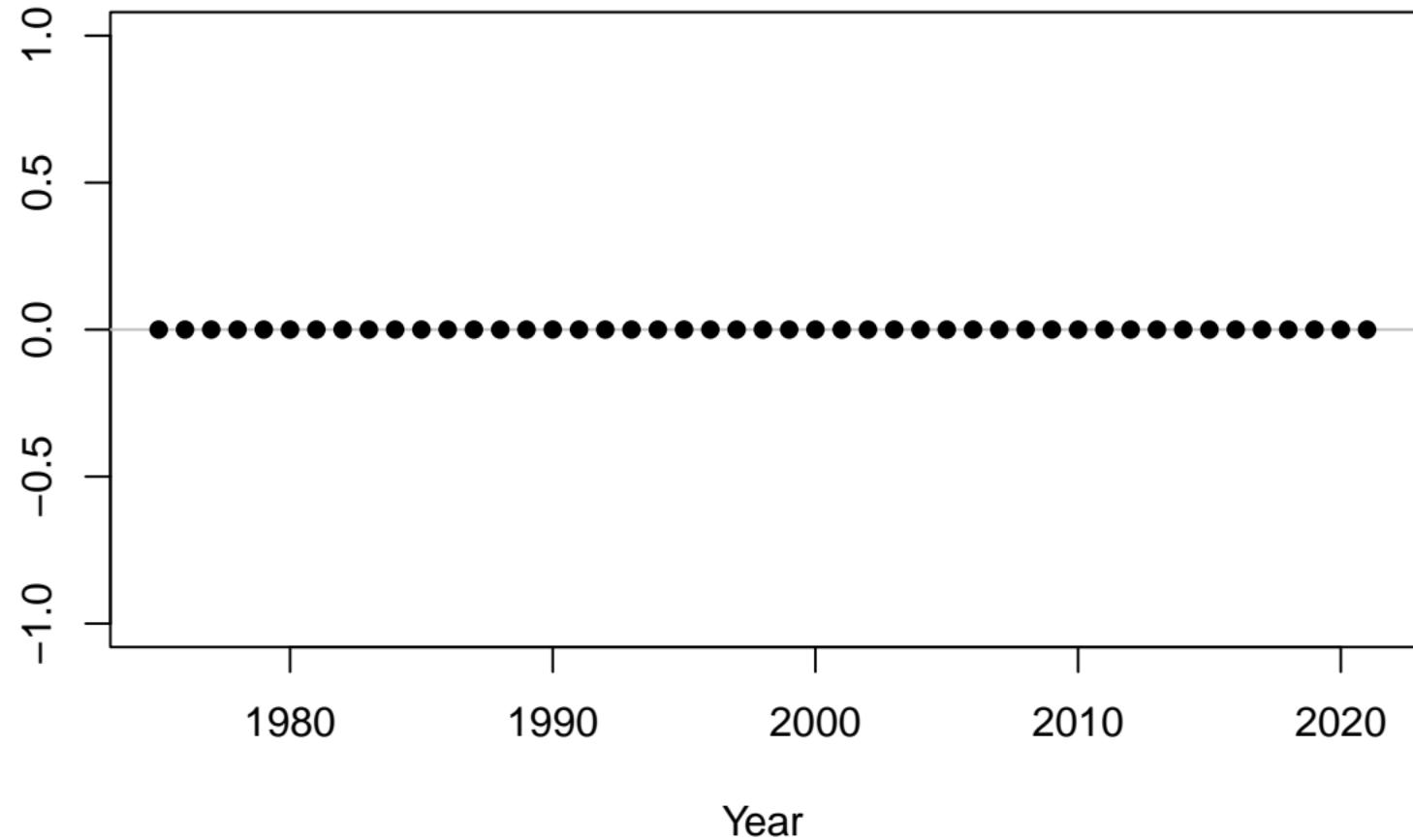


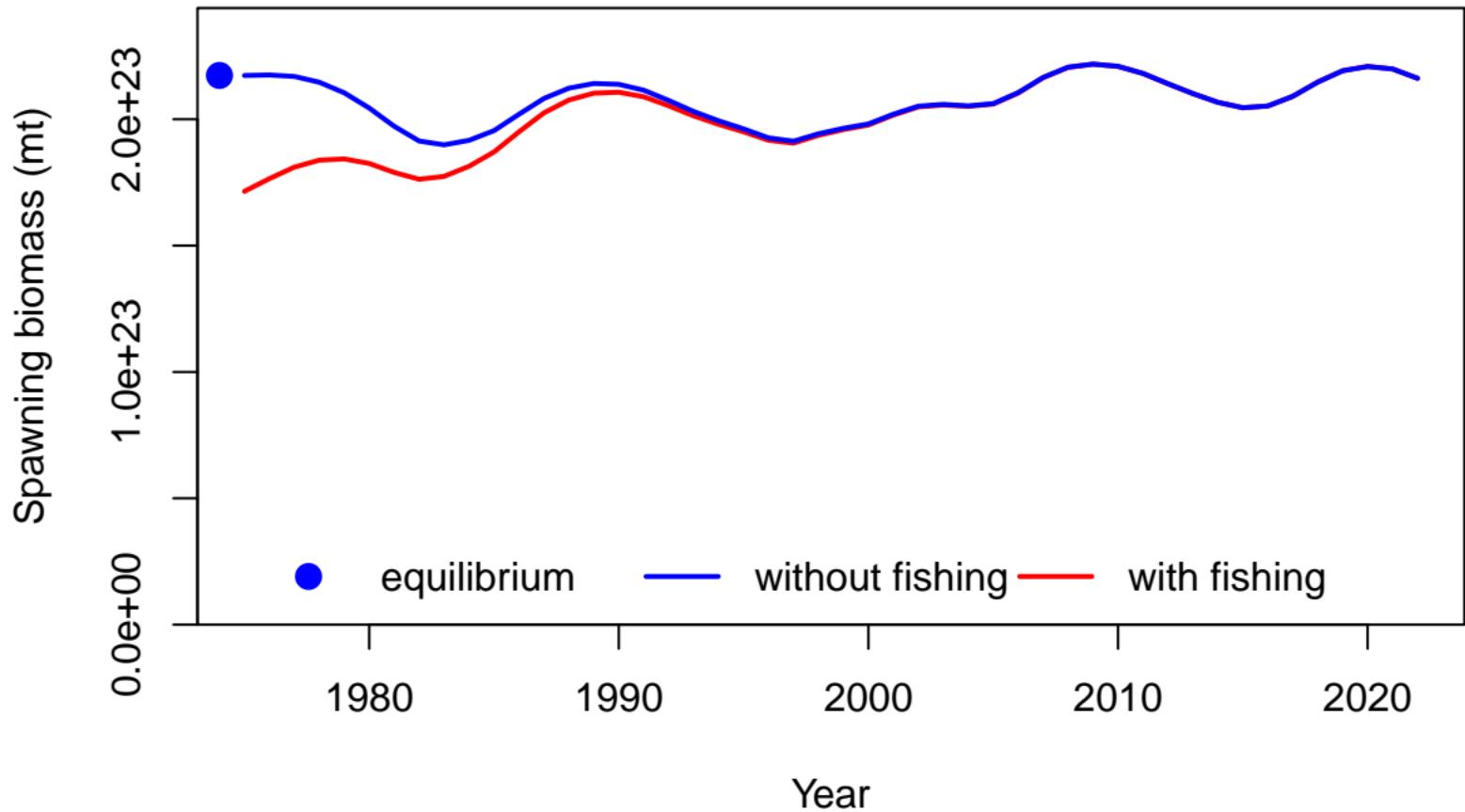


Fraction of total Age-0 recruits

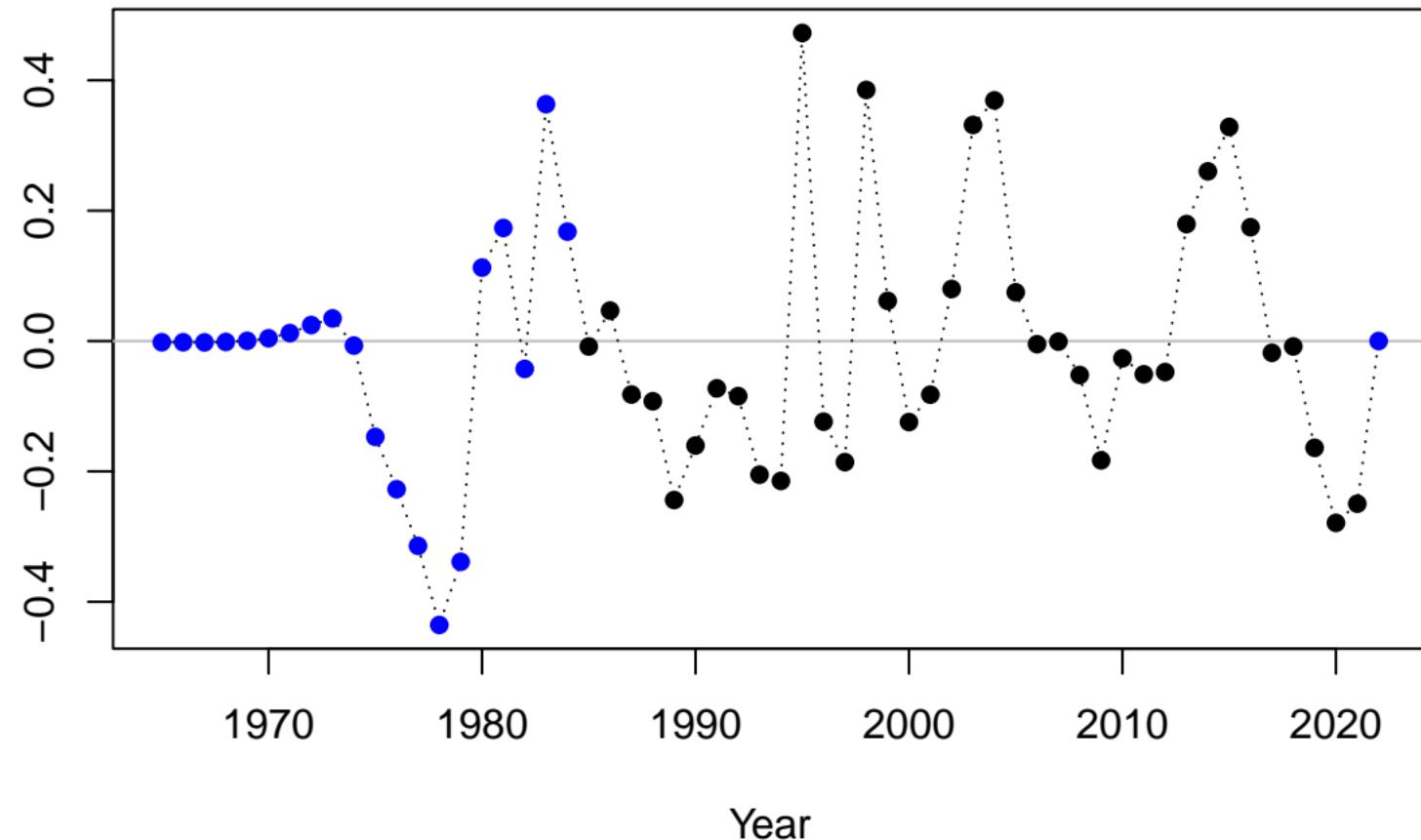


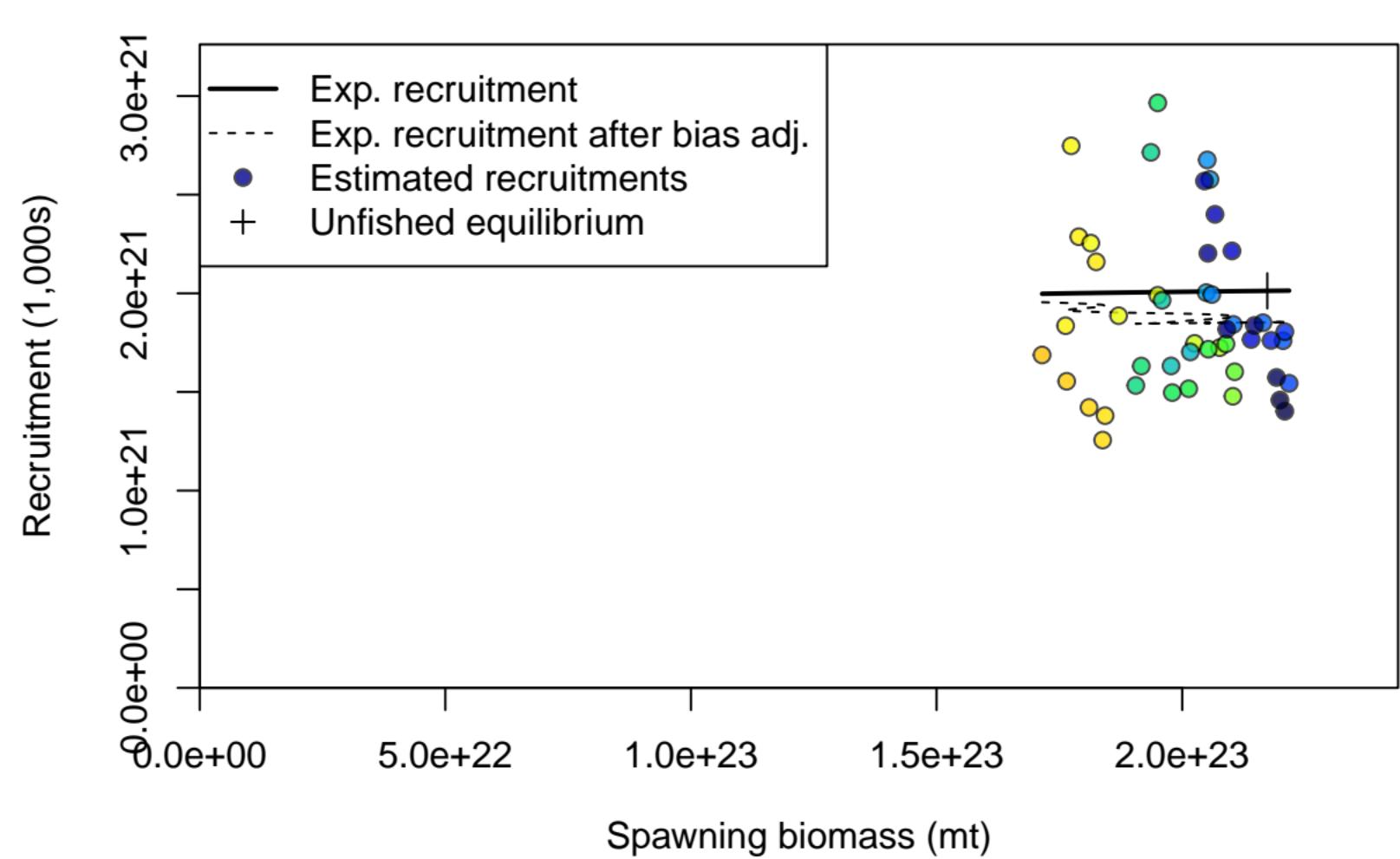
# Summary Fishing Mortality

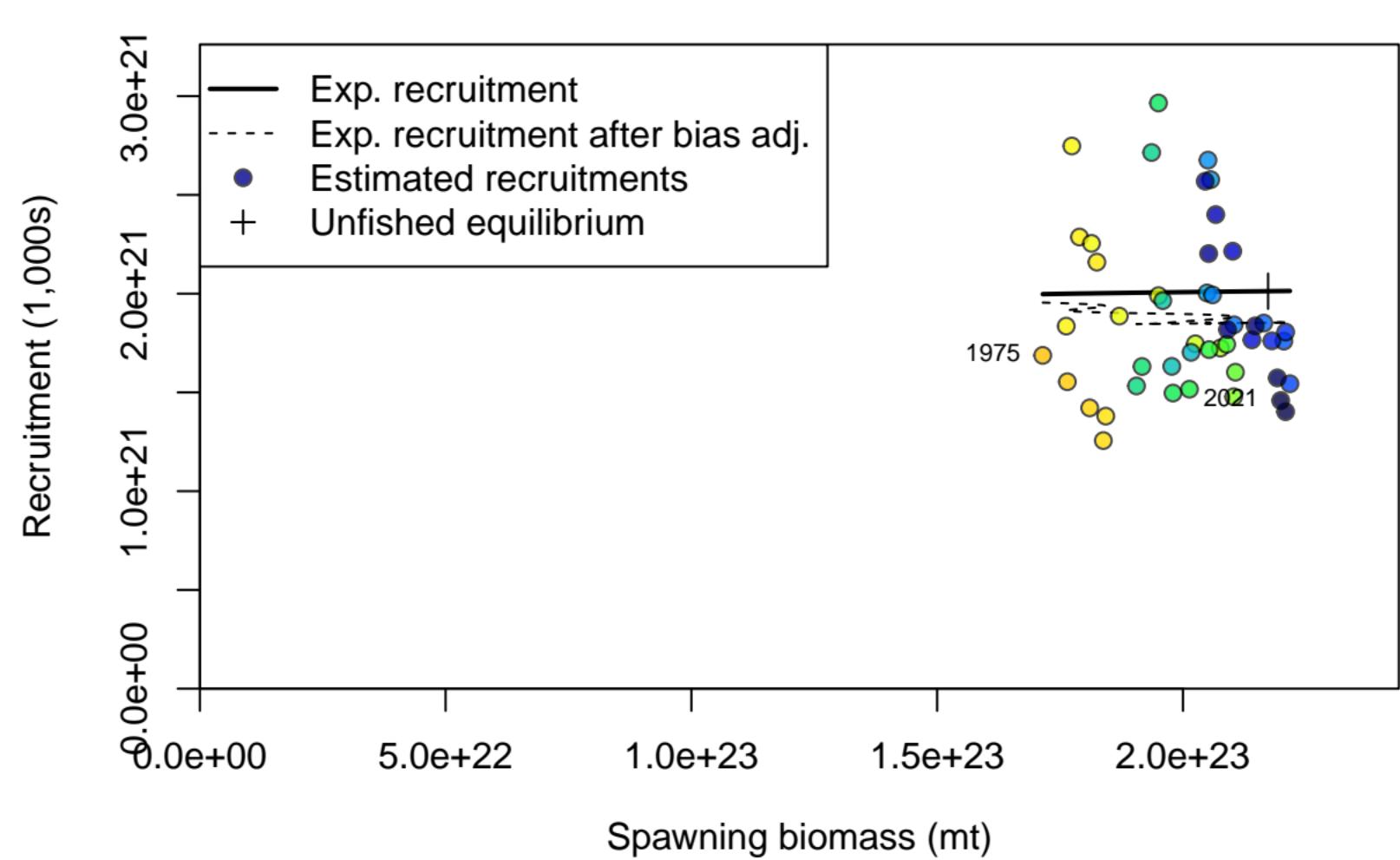


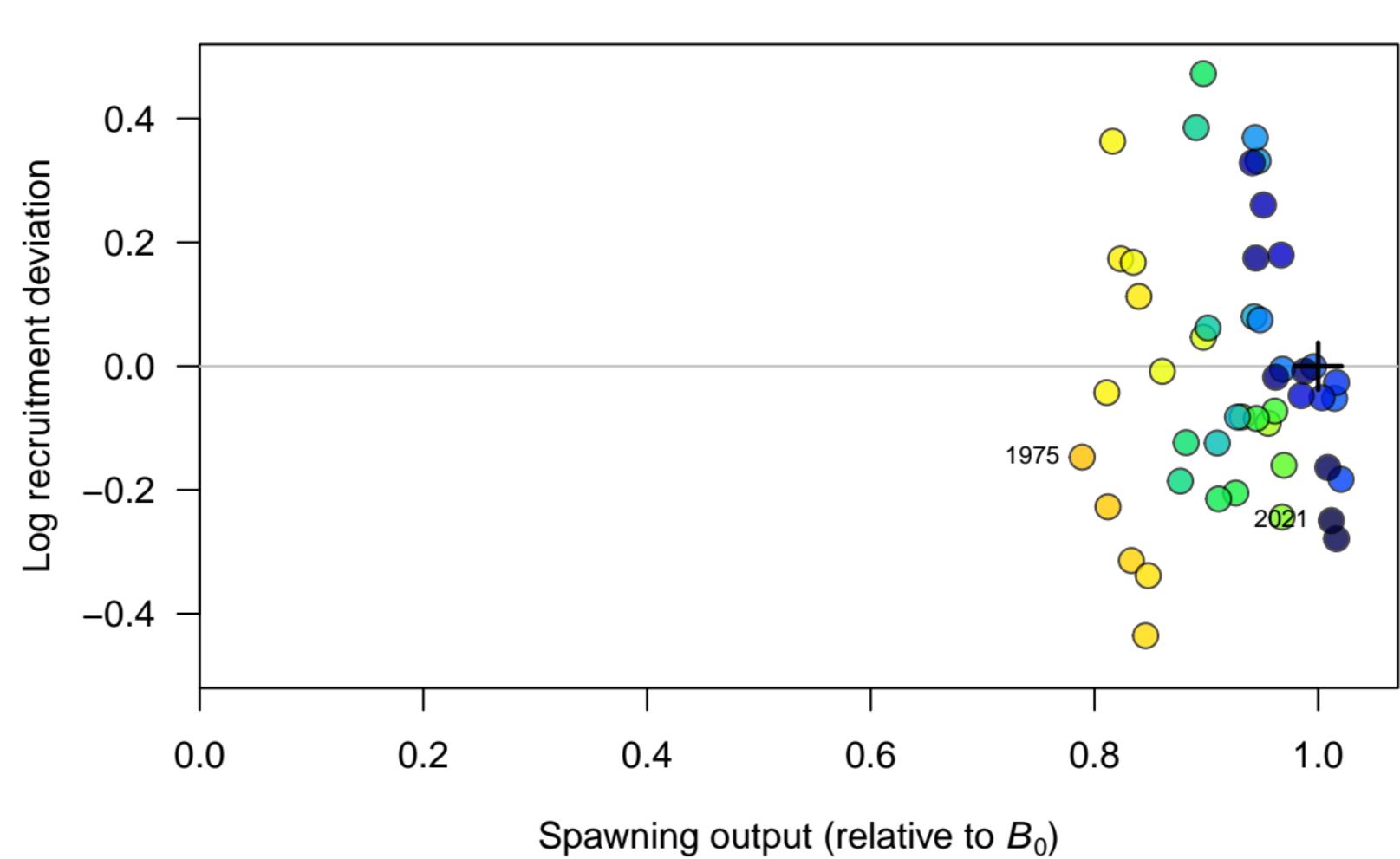


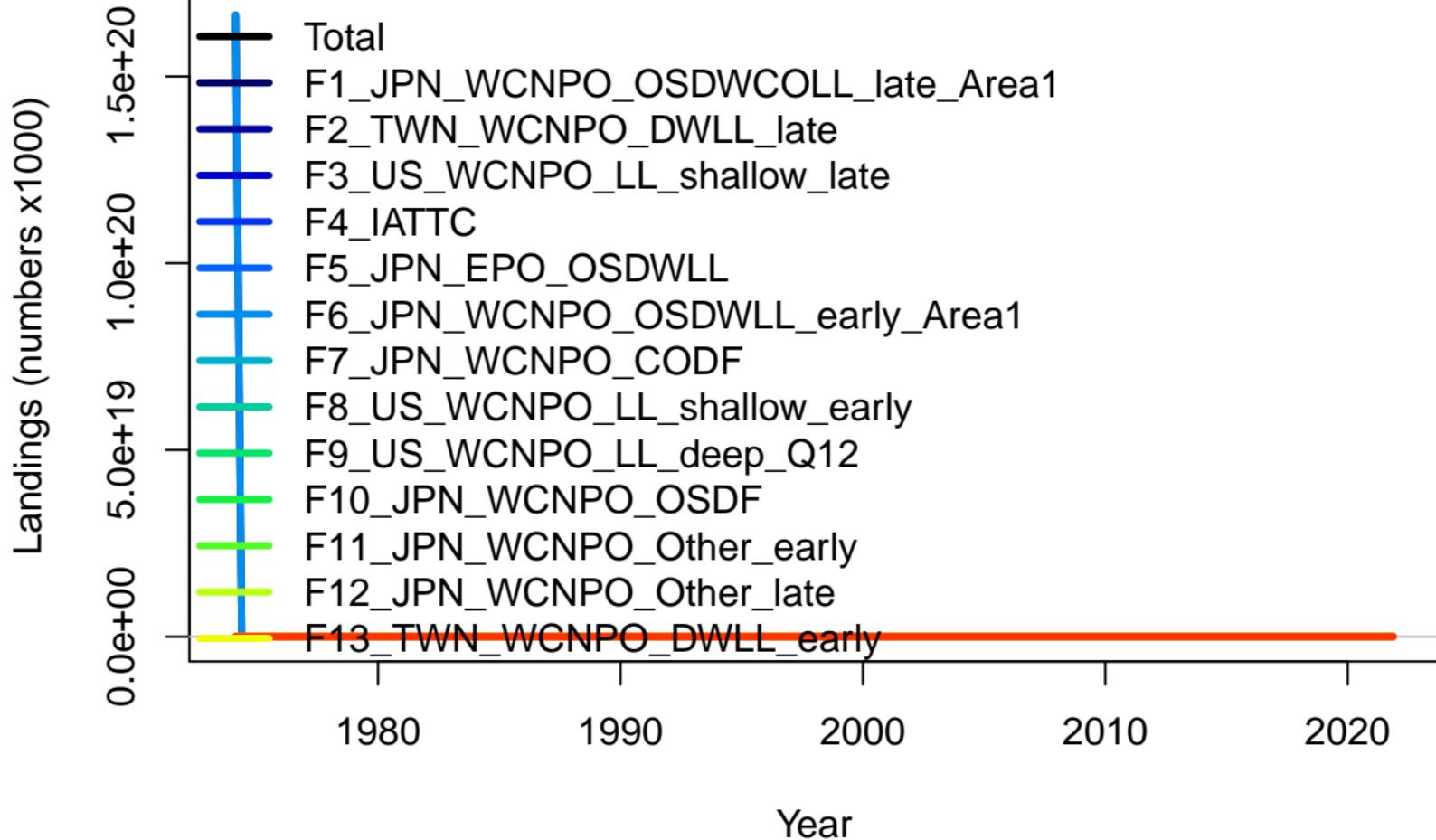
Log recruitment deviation



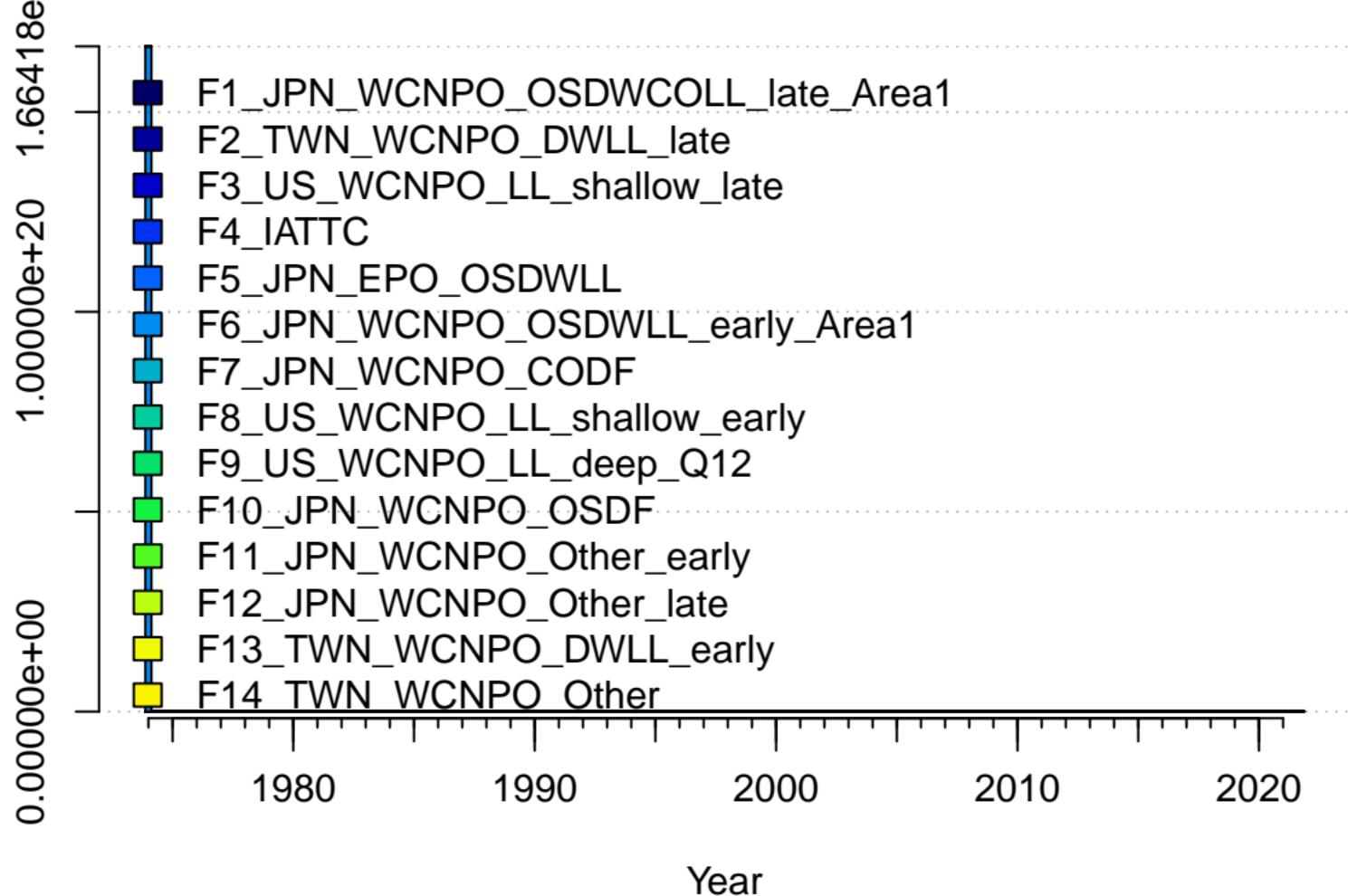


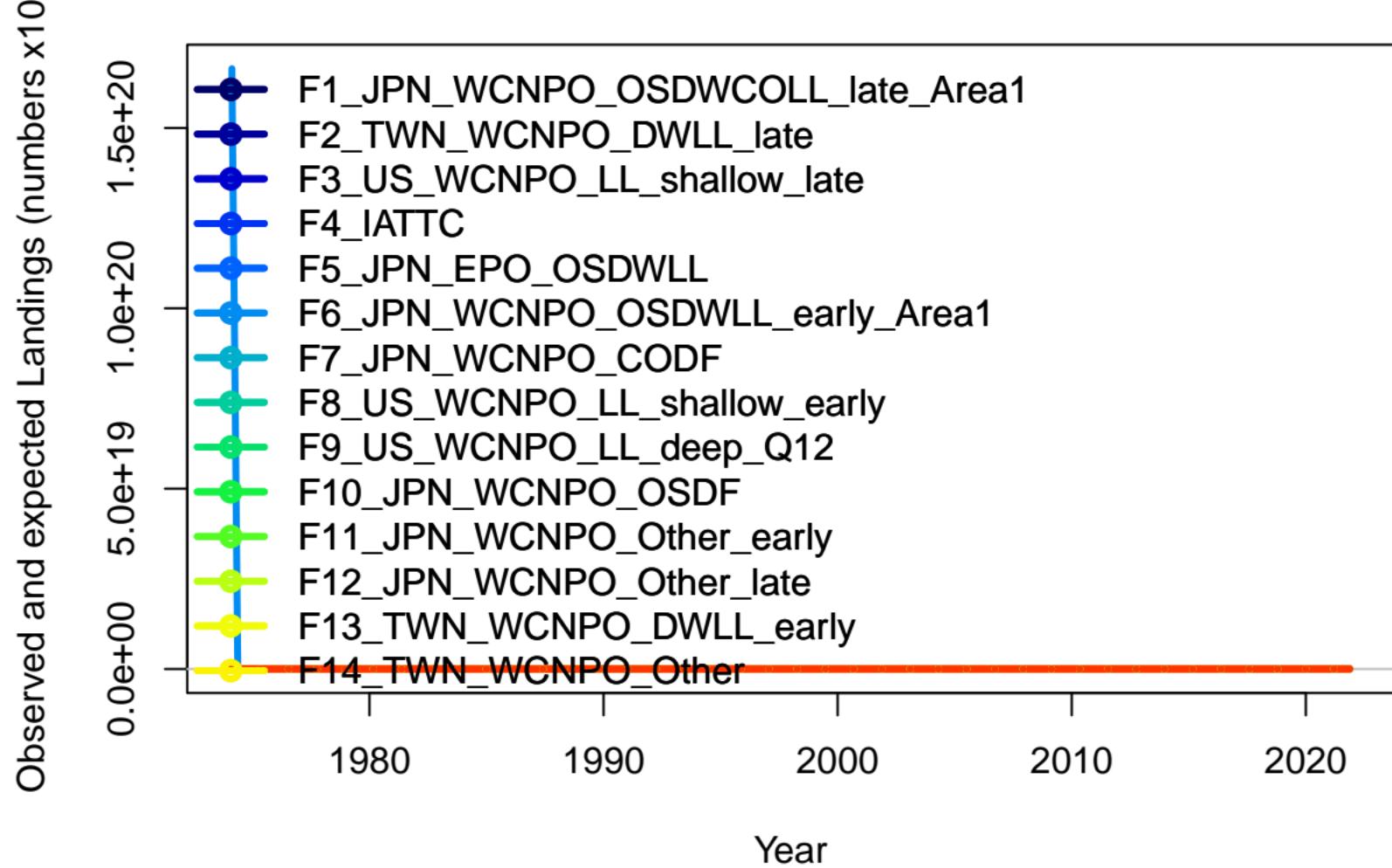






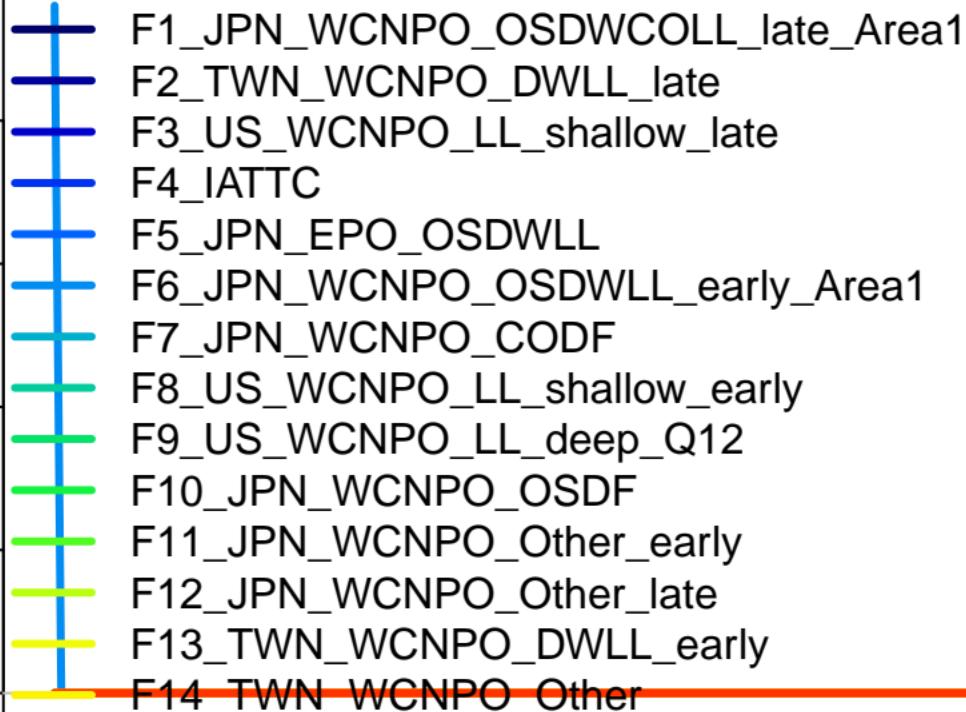
Landings (numbers x1000)





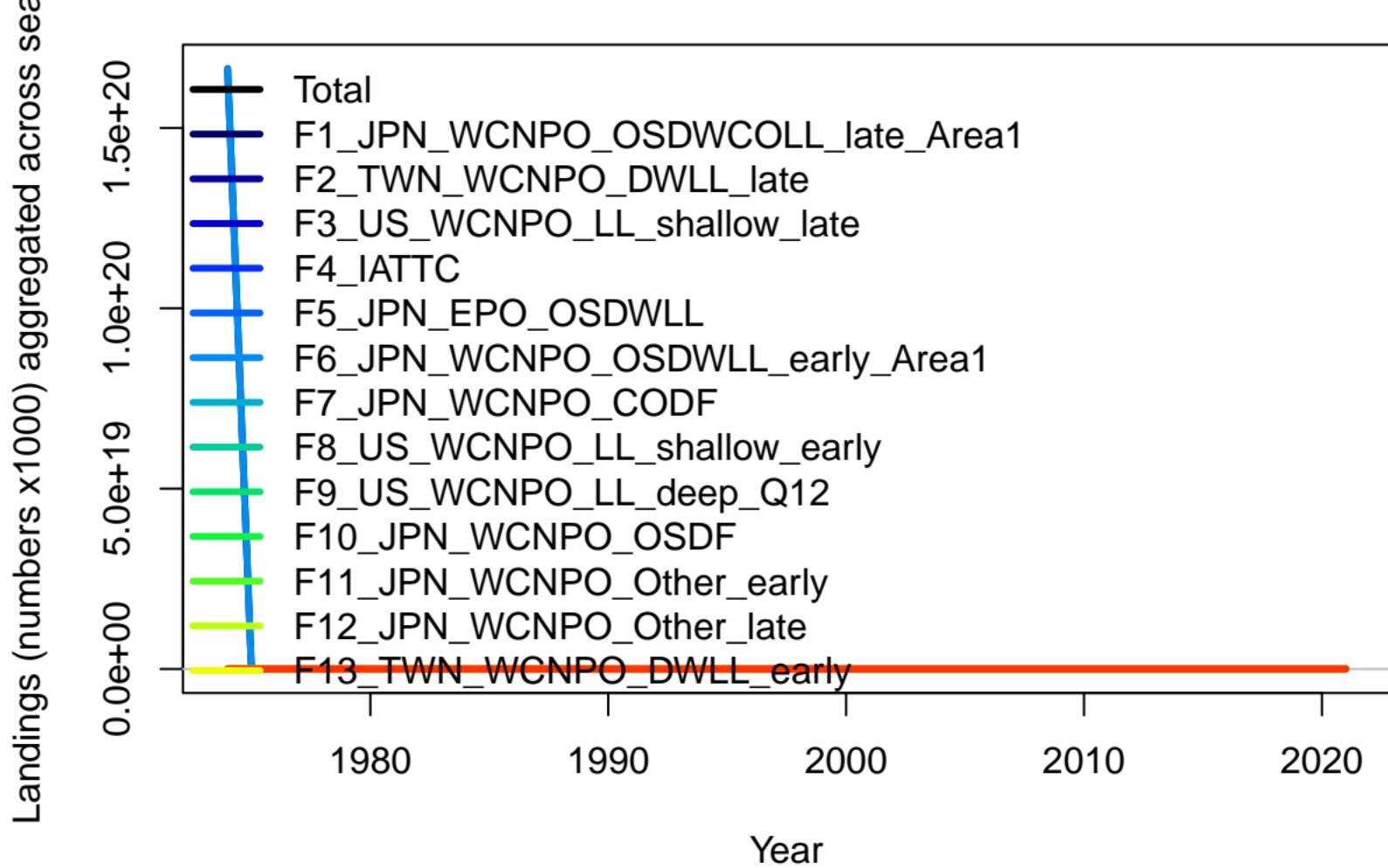
Continuous F

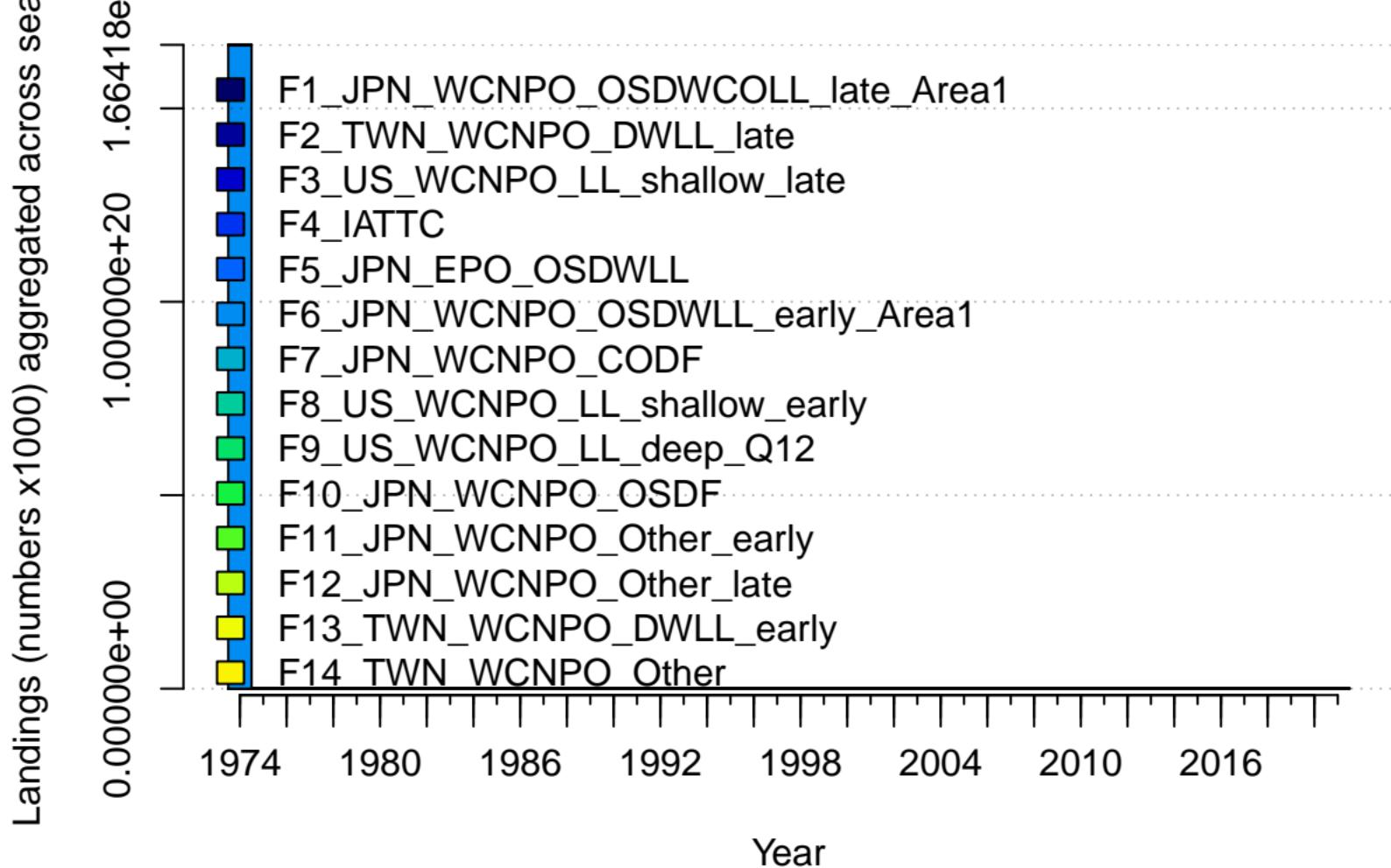
0.20  
0.15  
0.10  
0.05  
0.00

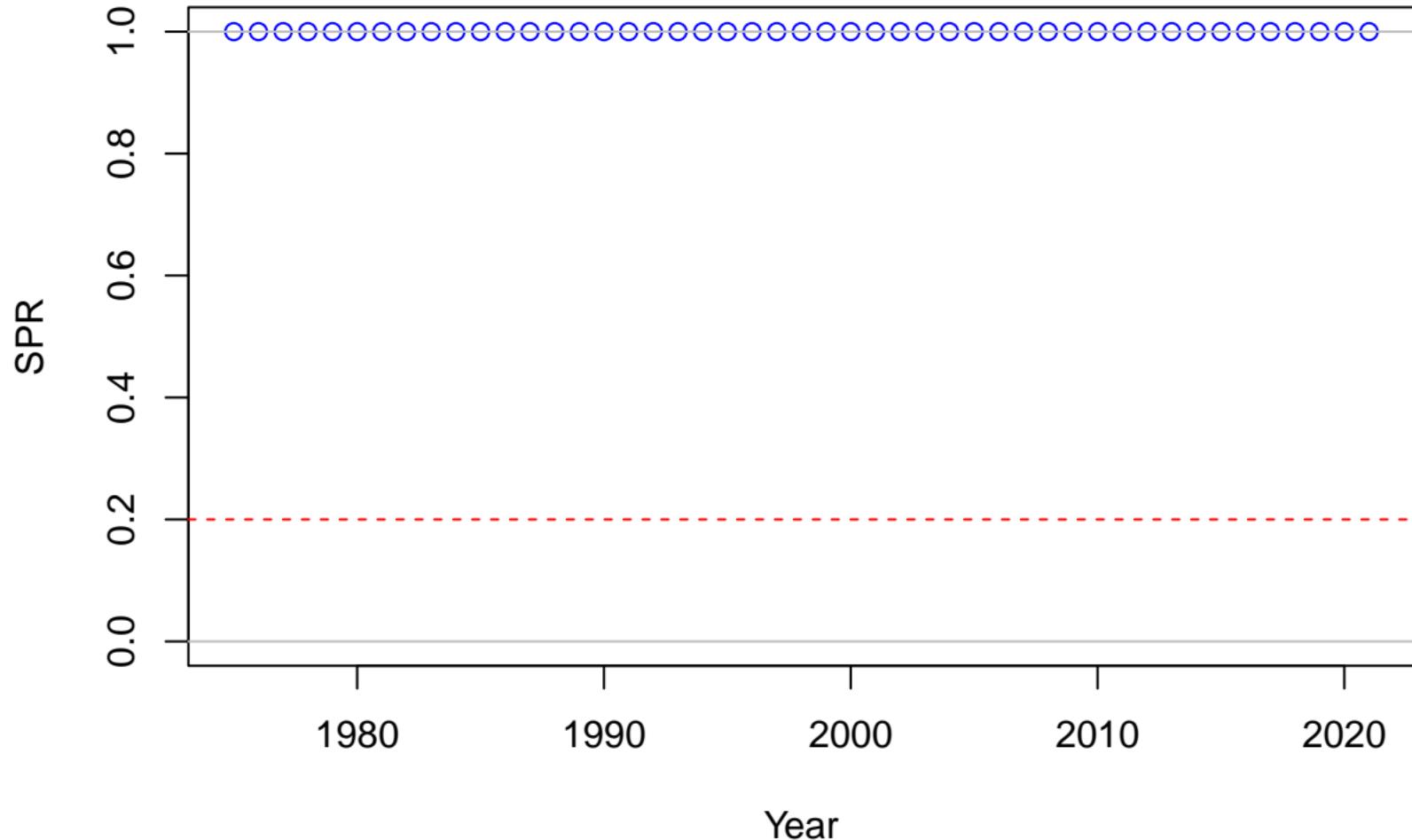


1980 1990 2000 2010 2020

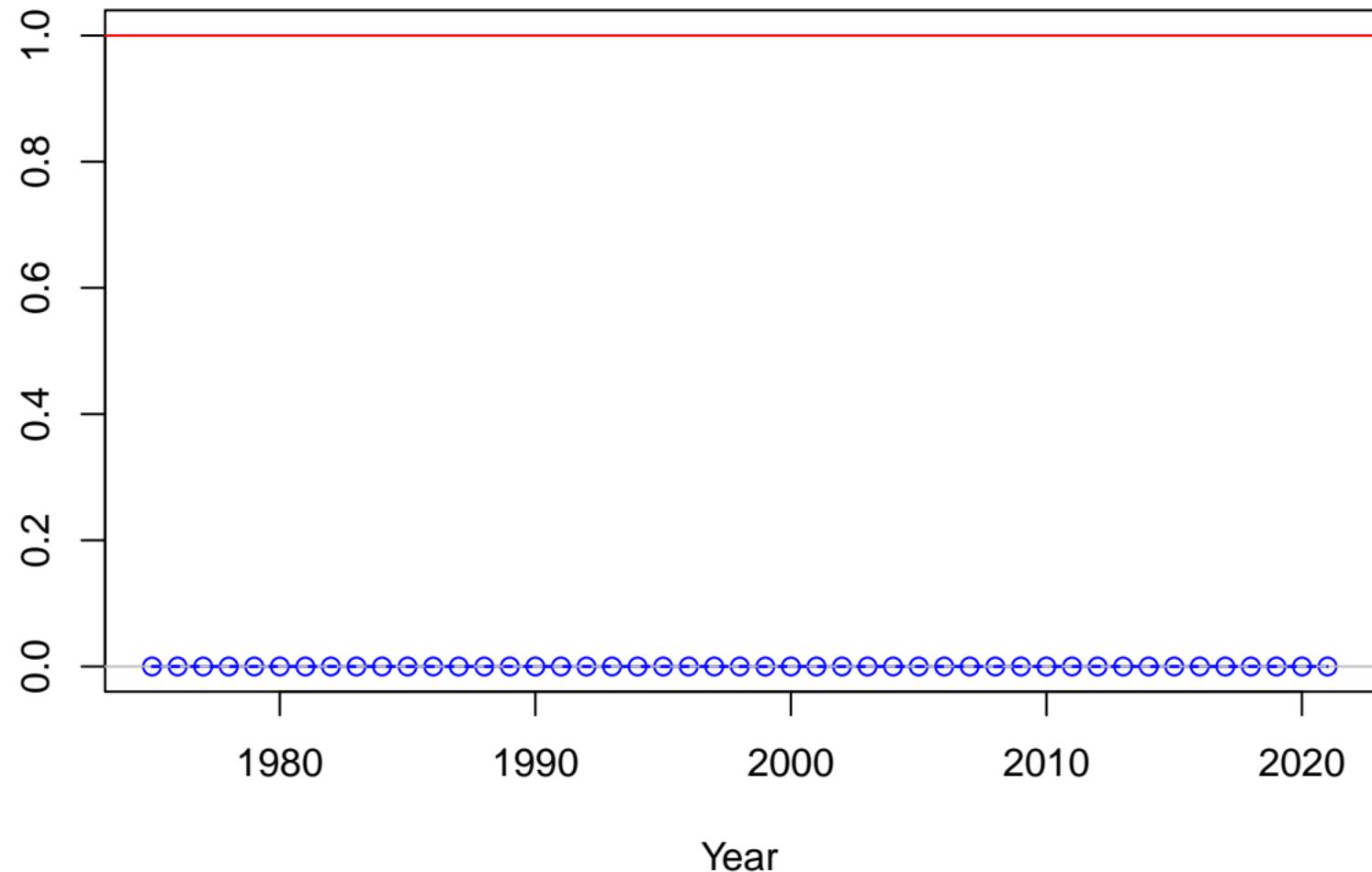
Year



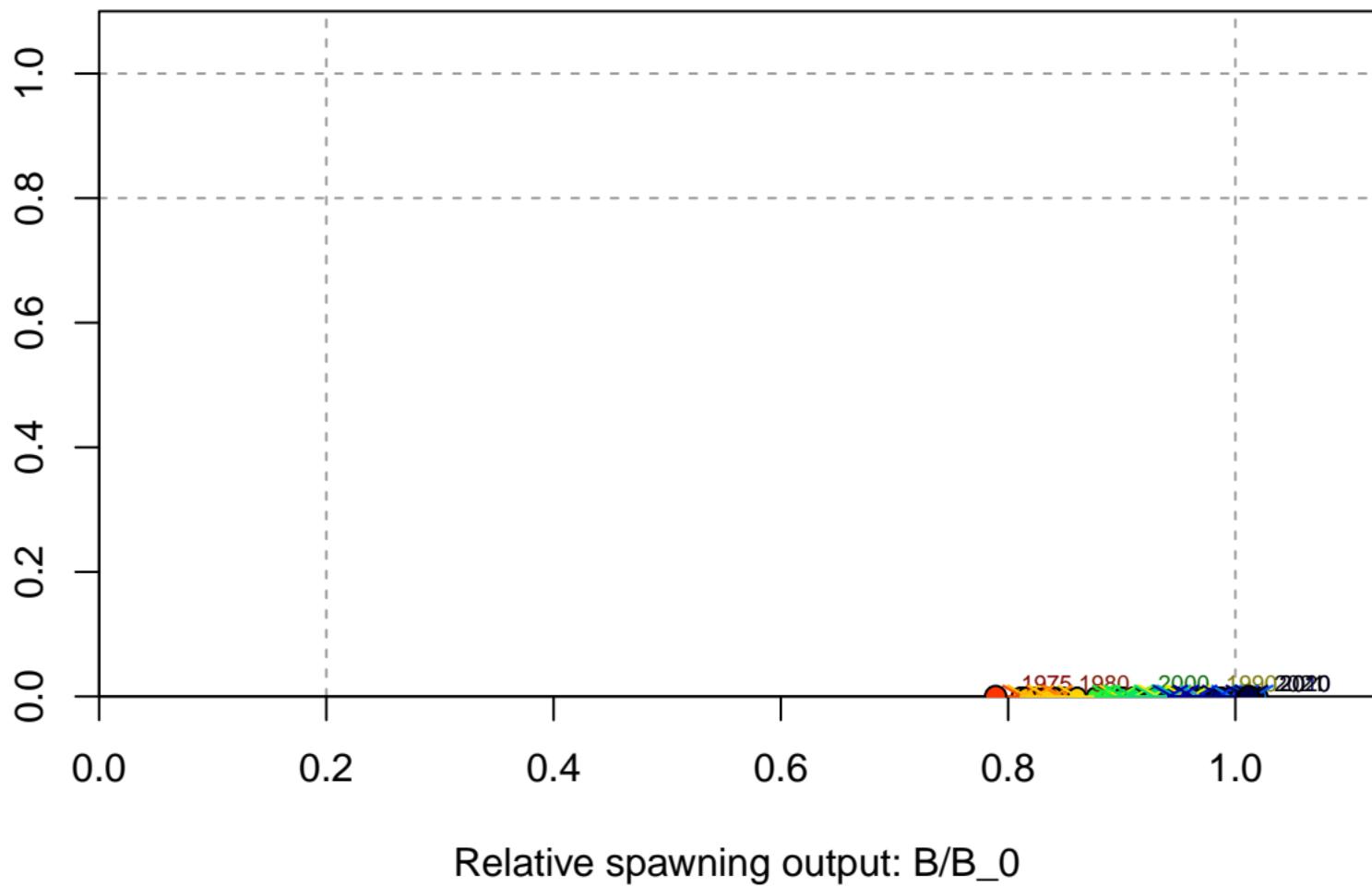


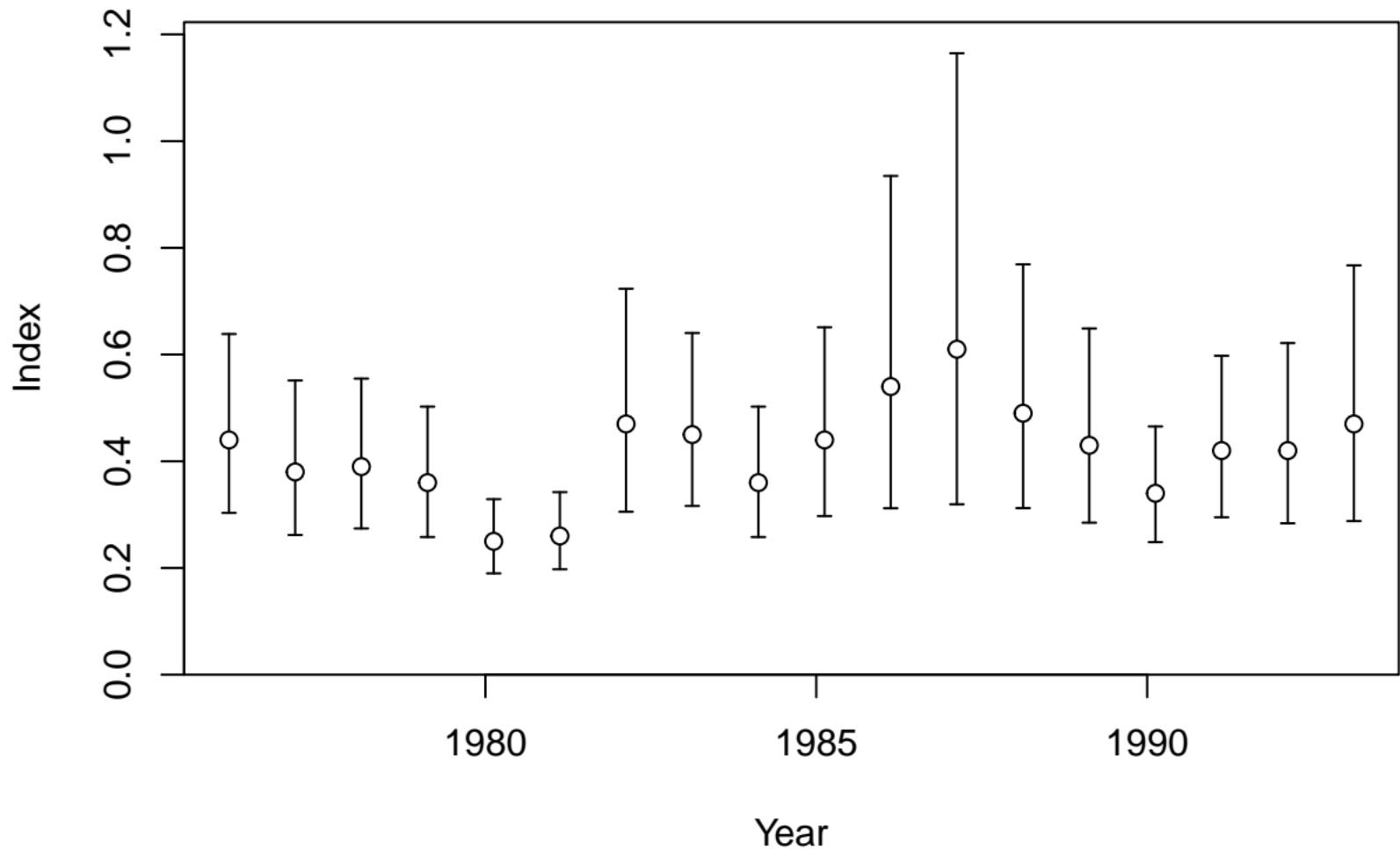


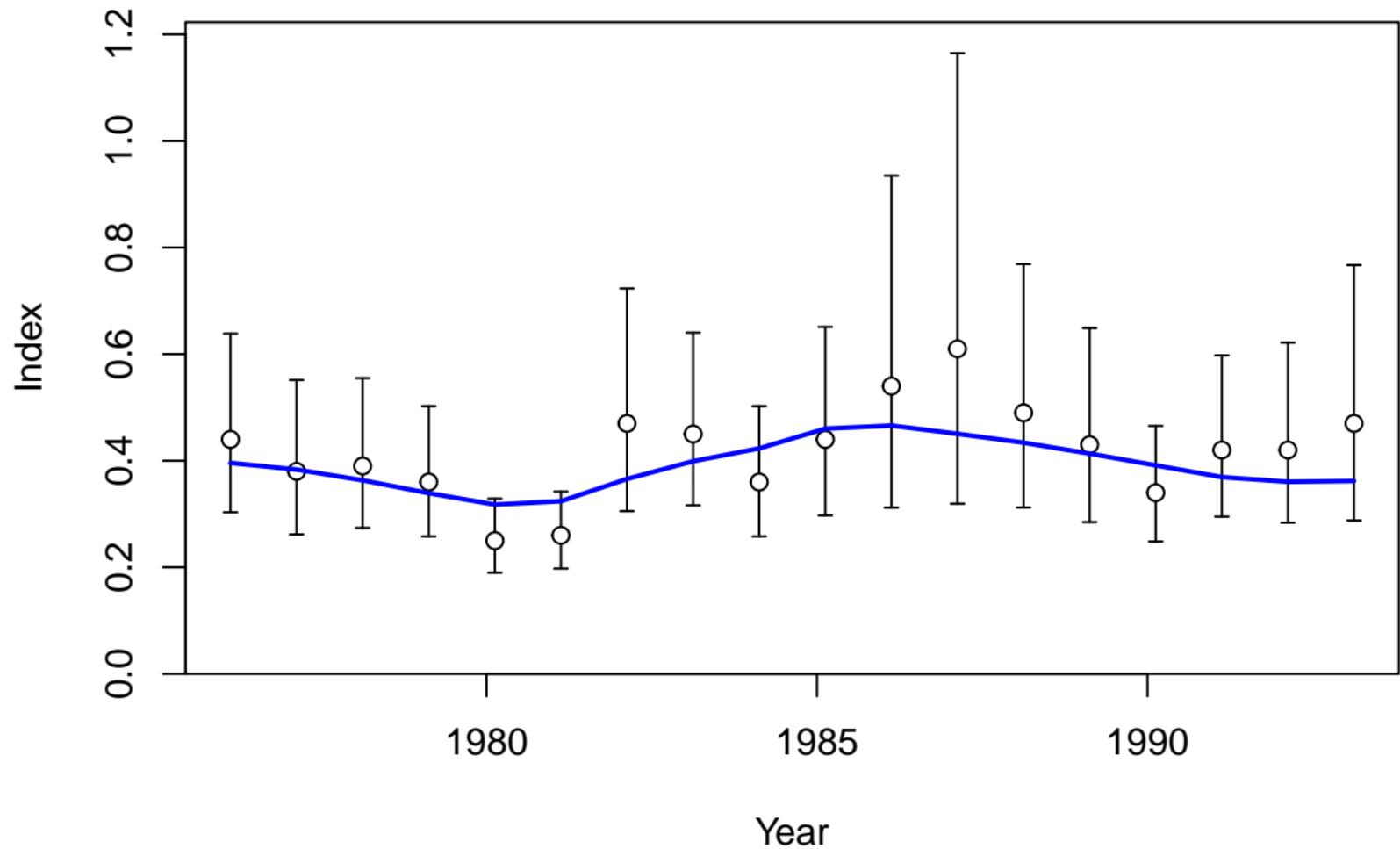
Fishing intensity: 1-SPR



Fishing intensity: 1-SPR





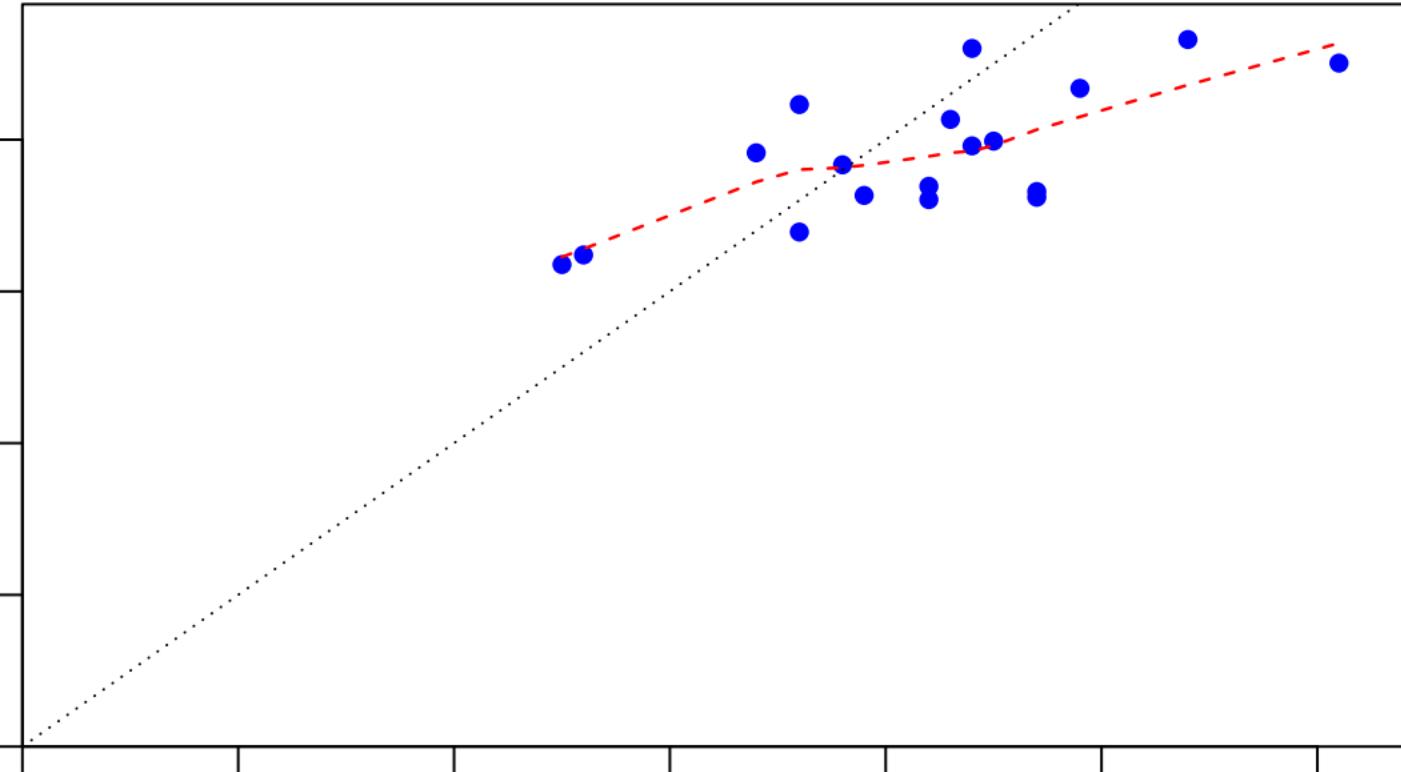


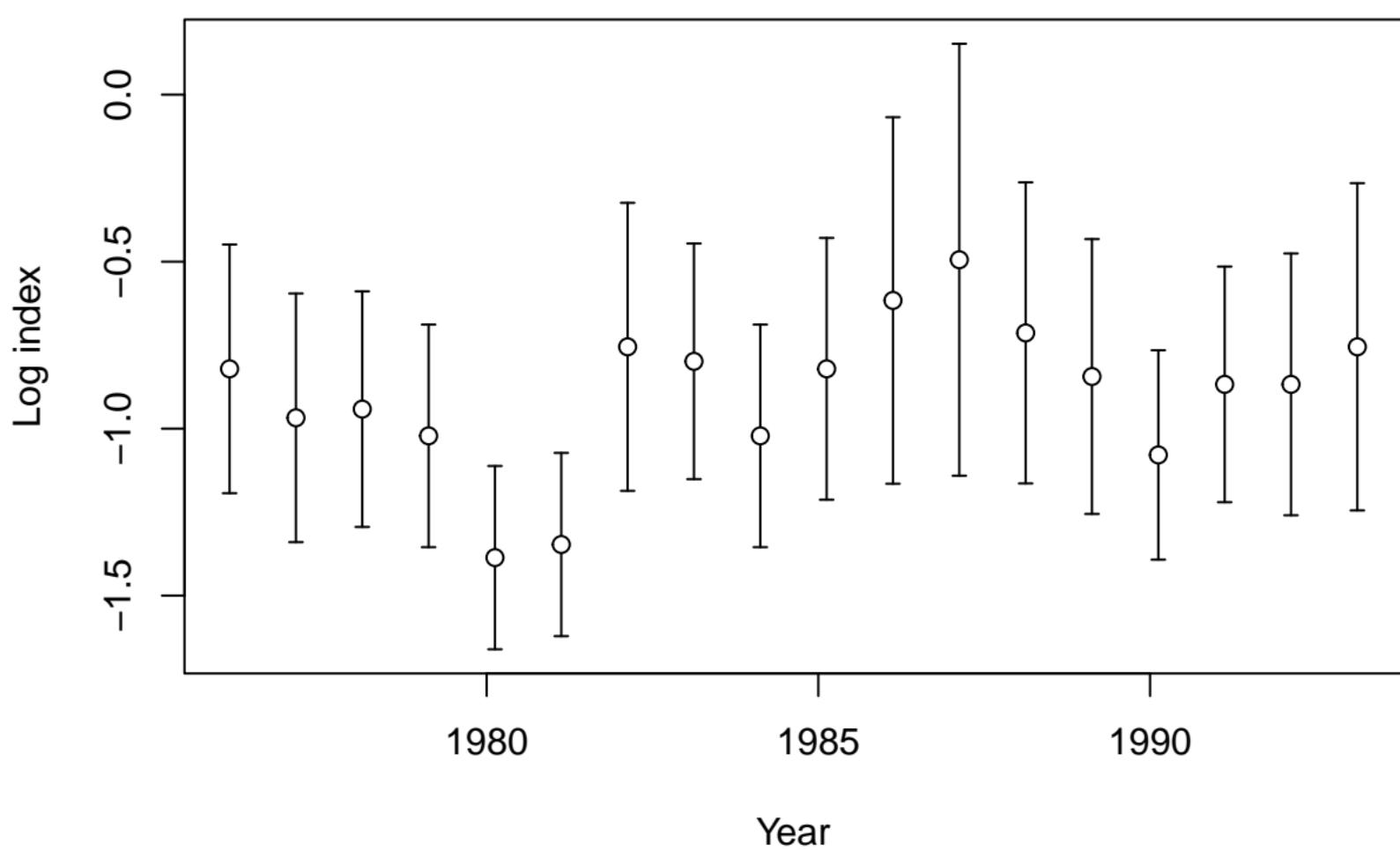
Expected index

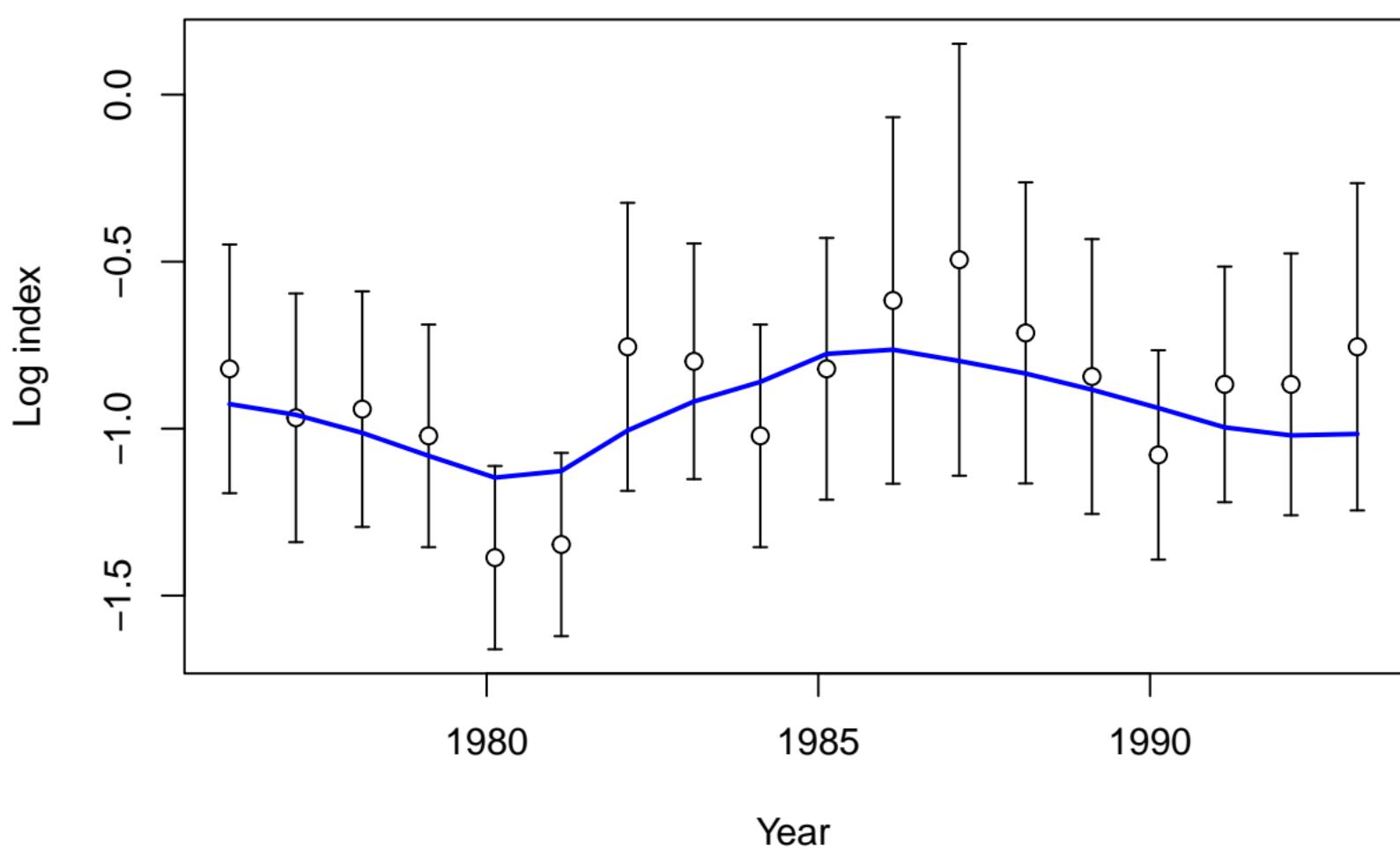
0.0 0.1 0.2 0.3 0.4

0.0 0.1 0.2 0.3 0.4 0.5 0.6

Observed index





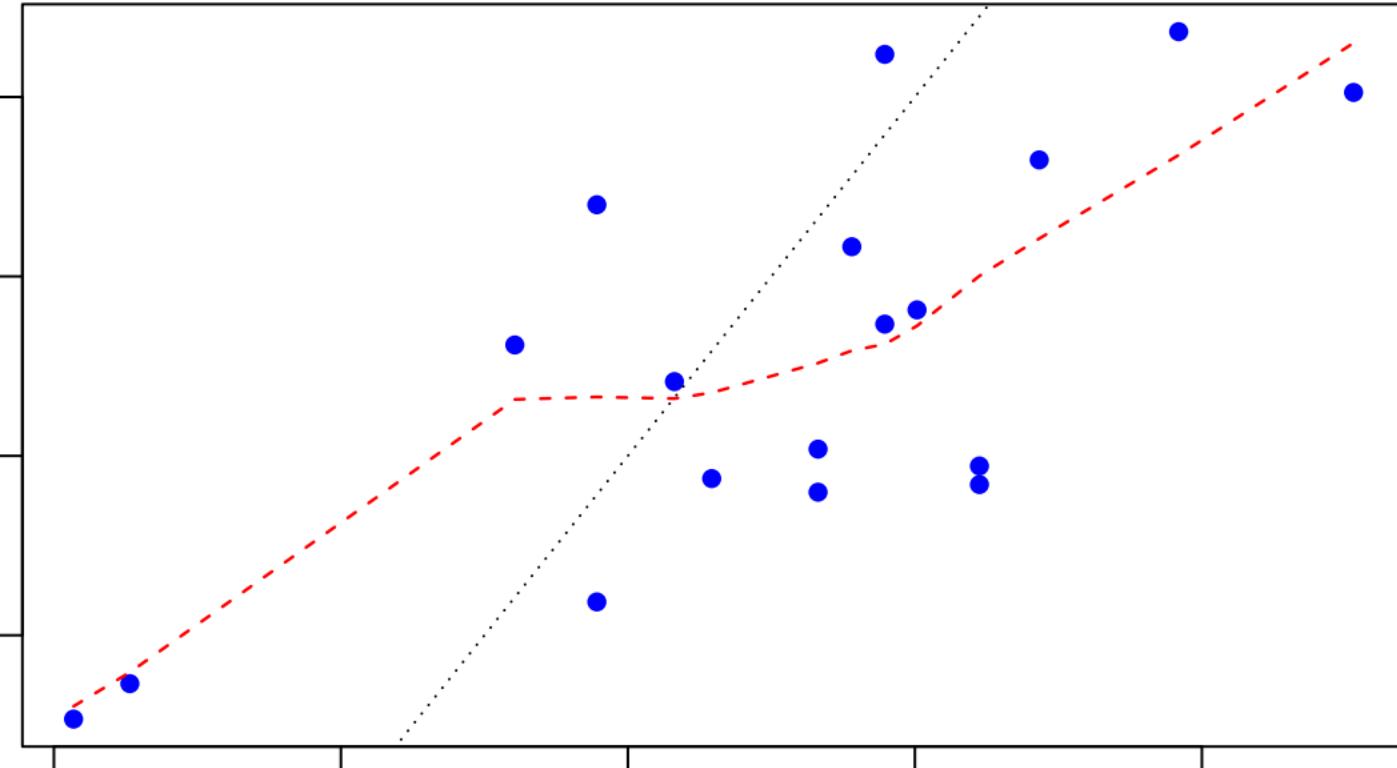


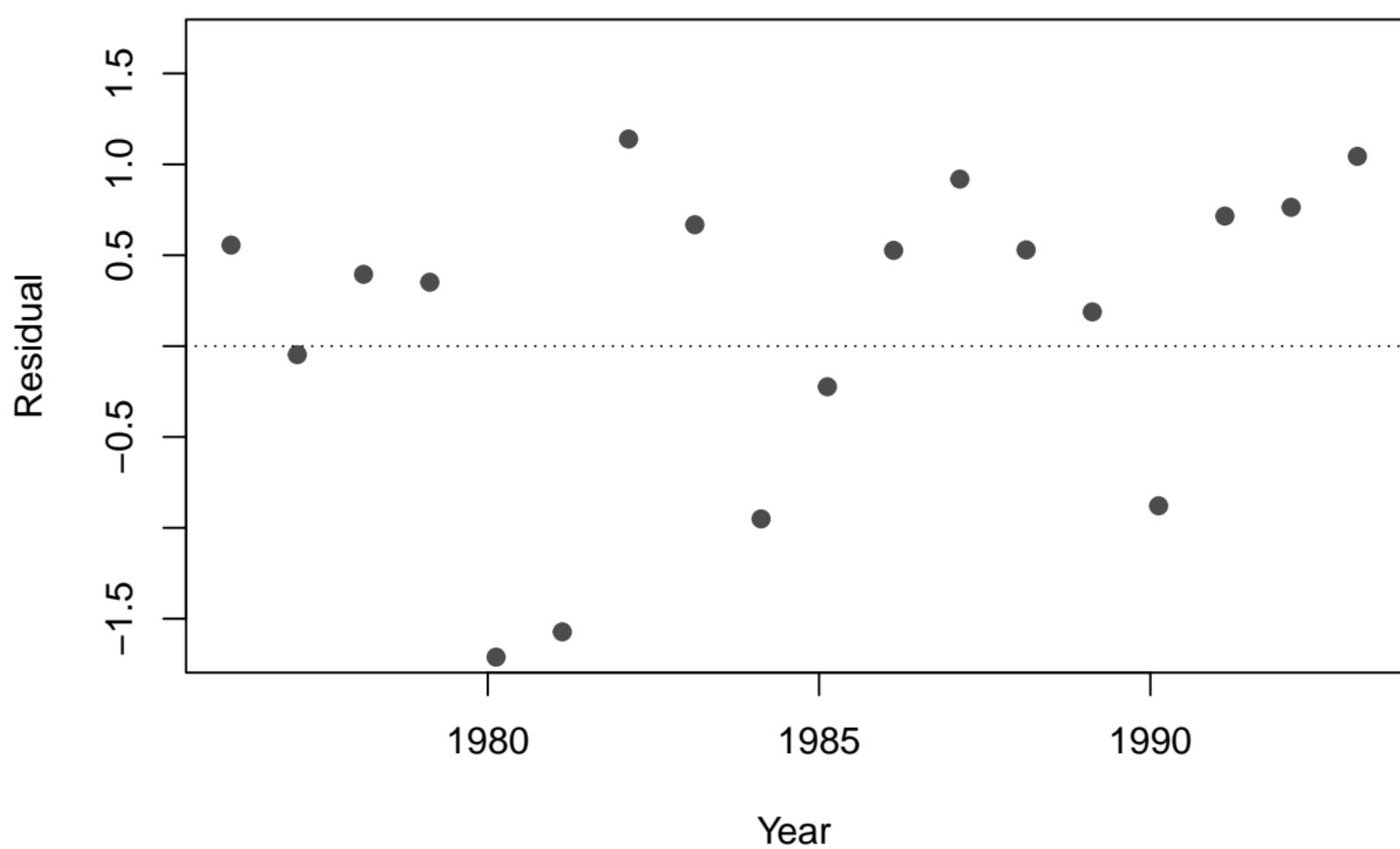
Log expected index

-0.8  
-0.9  
-1.0  
-1.1

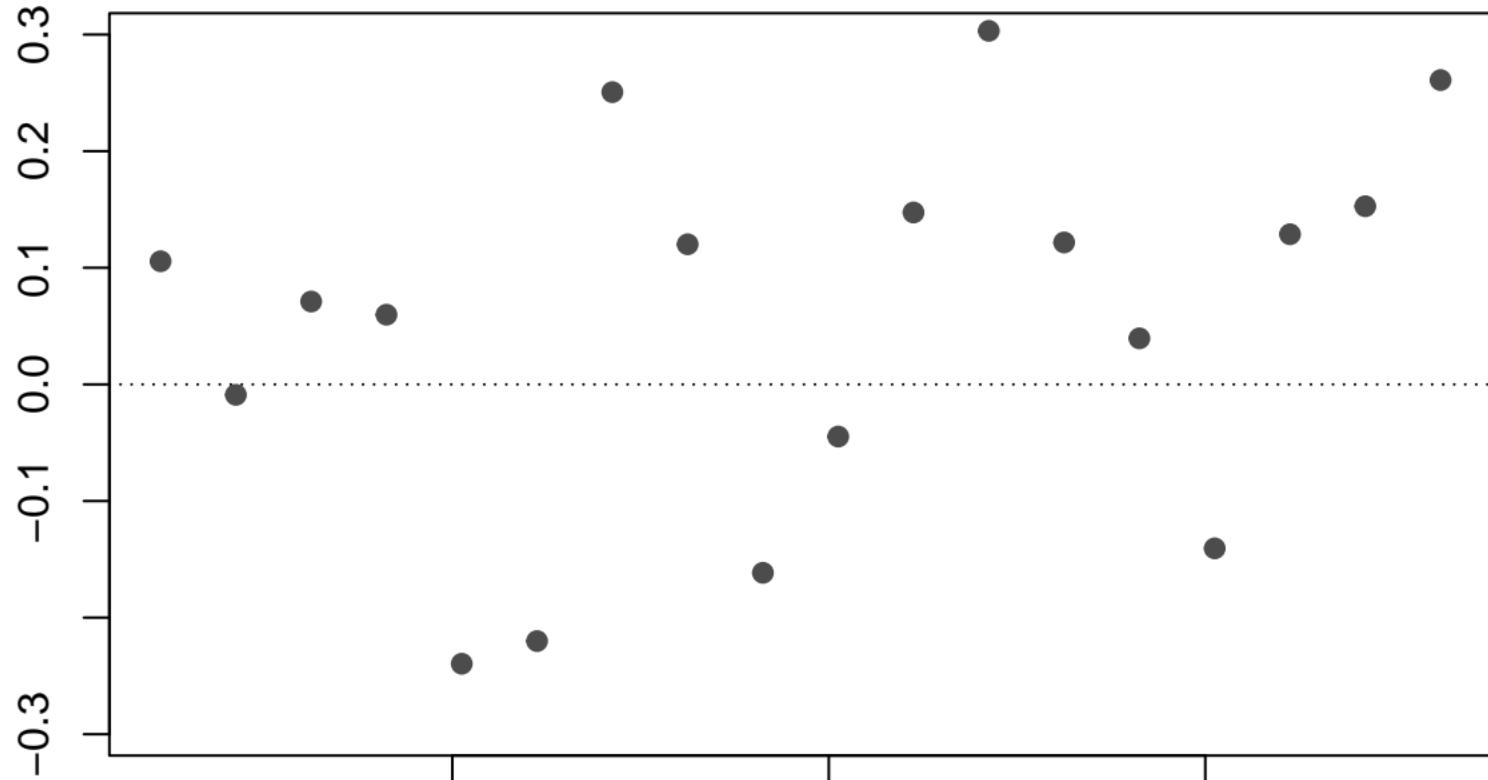
-1.4 -1.2 -1.0 -0.8 -0.6

Log observed index

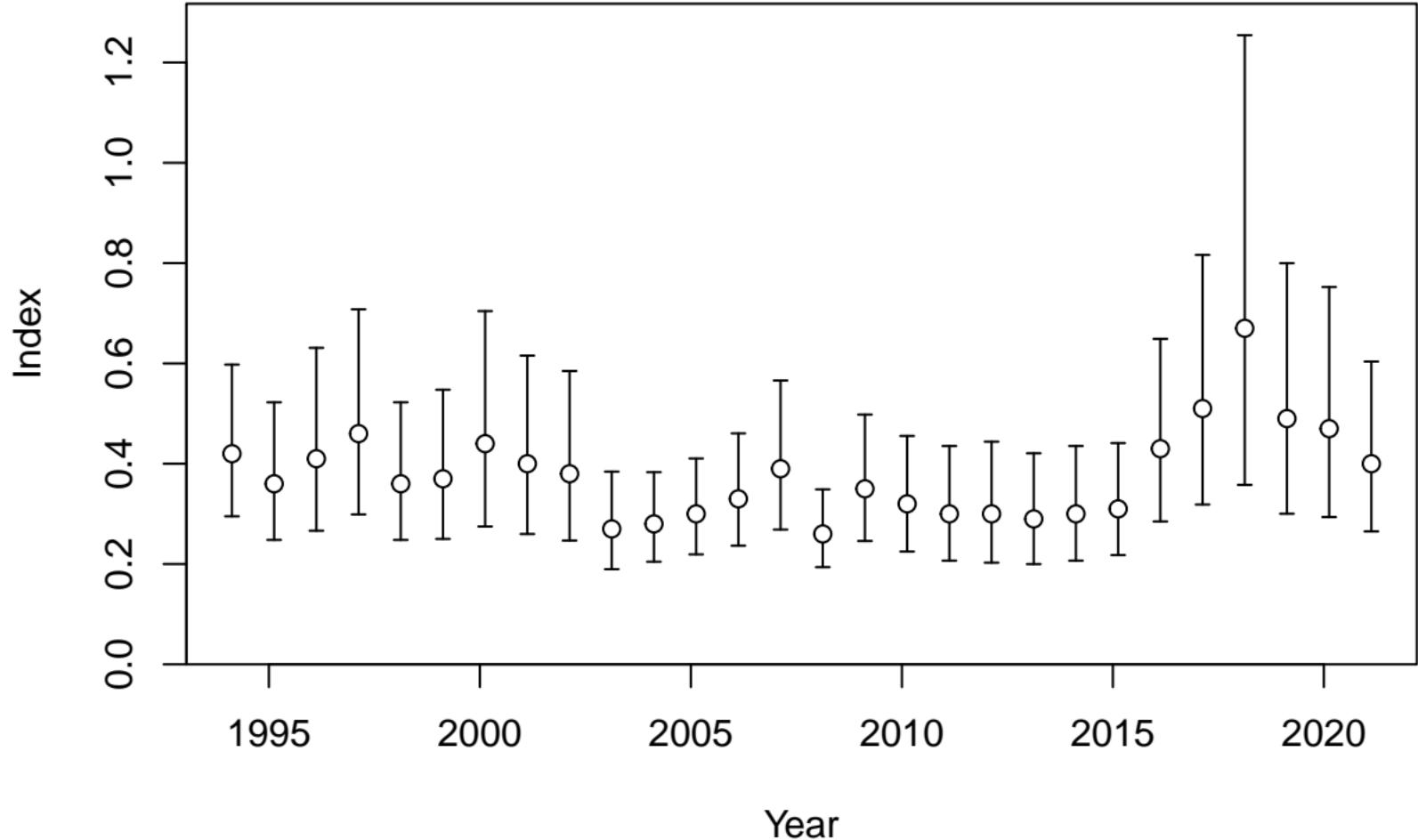


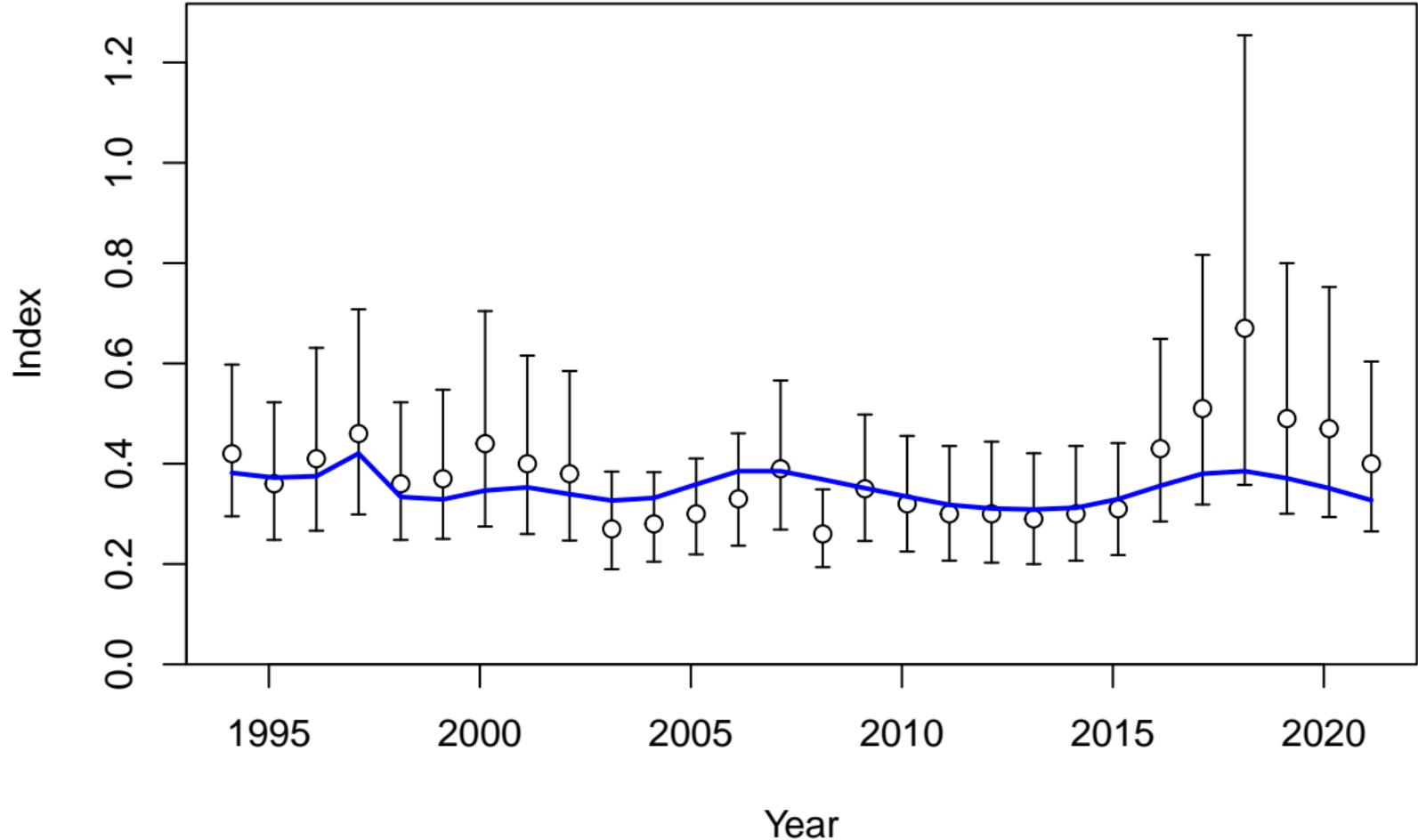


Deviation



Year



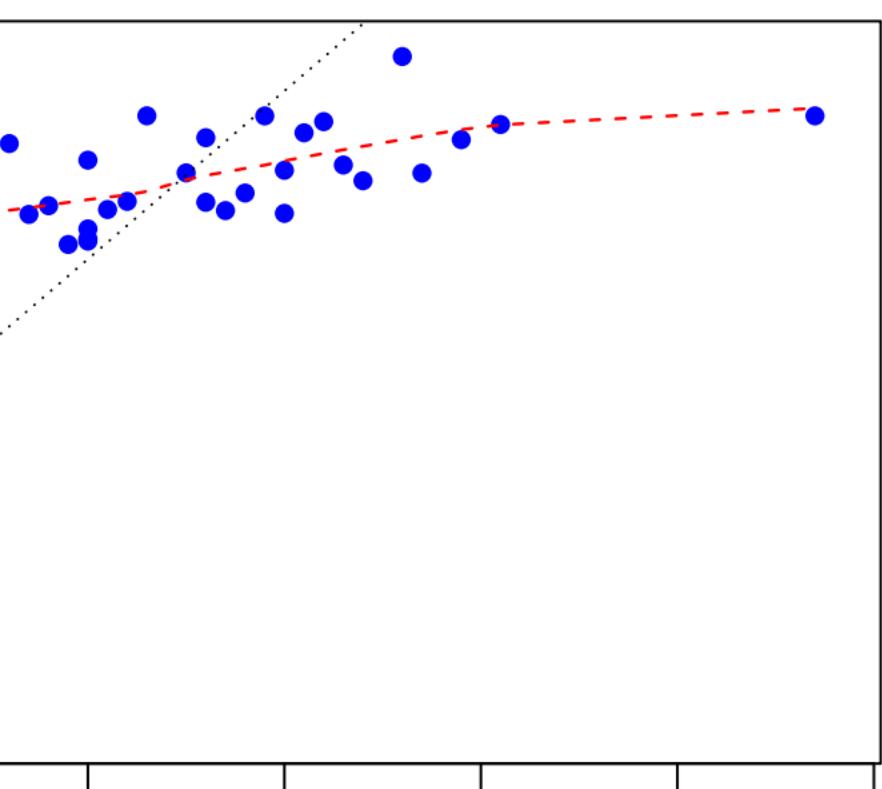


Expected index

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

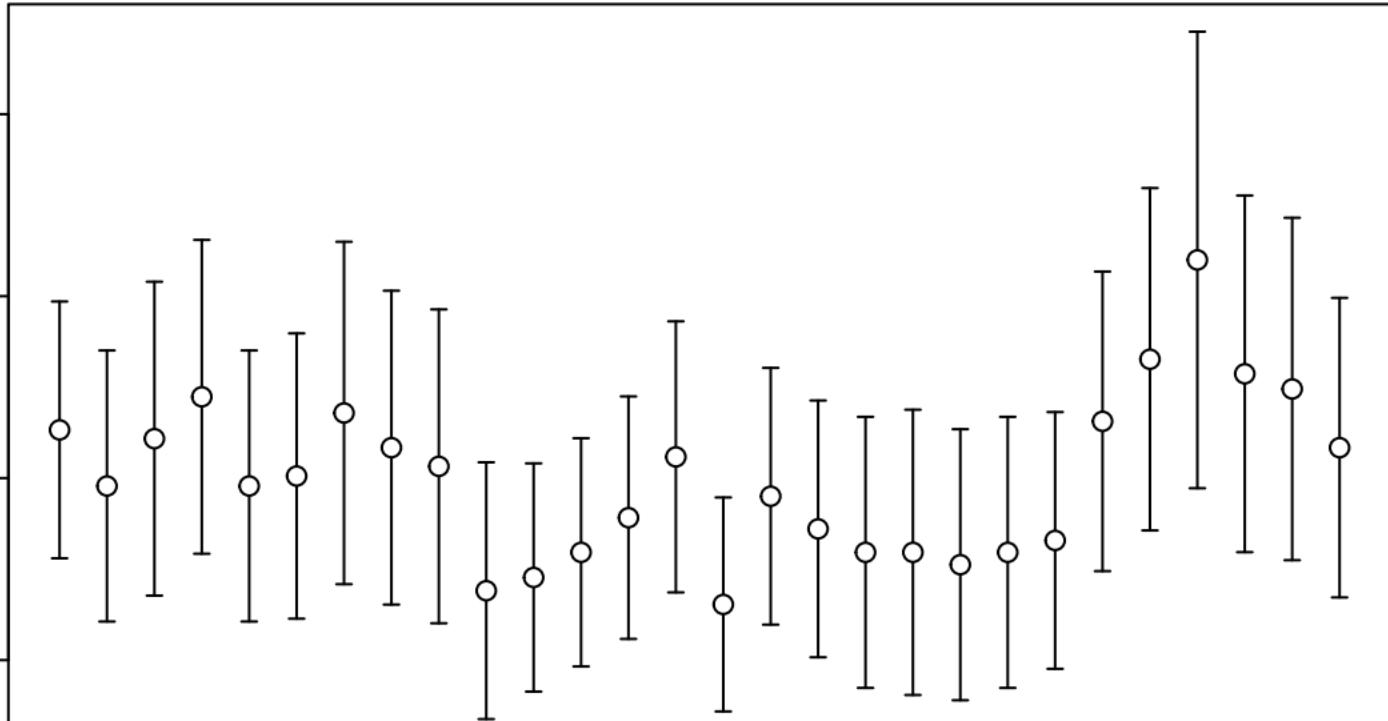


Log index

-1.5 -1.0 -0.5 0.0

1995 2000 2005 2010 2015 2020

Year

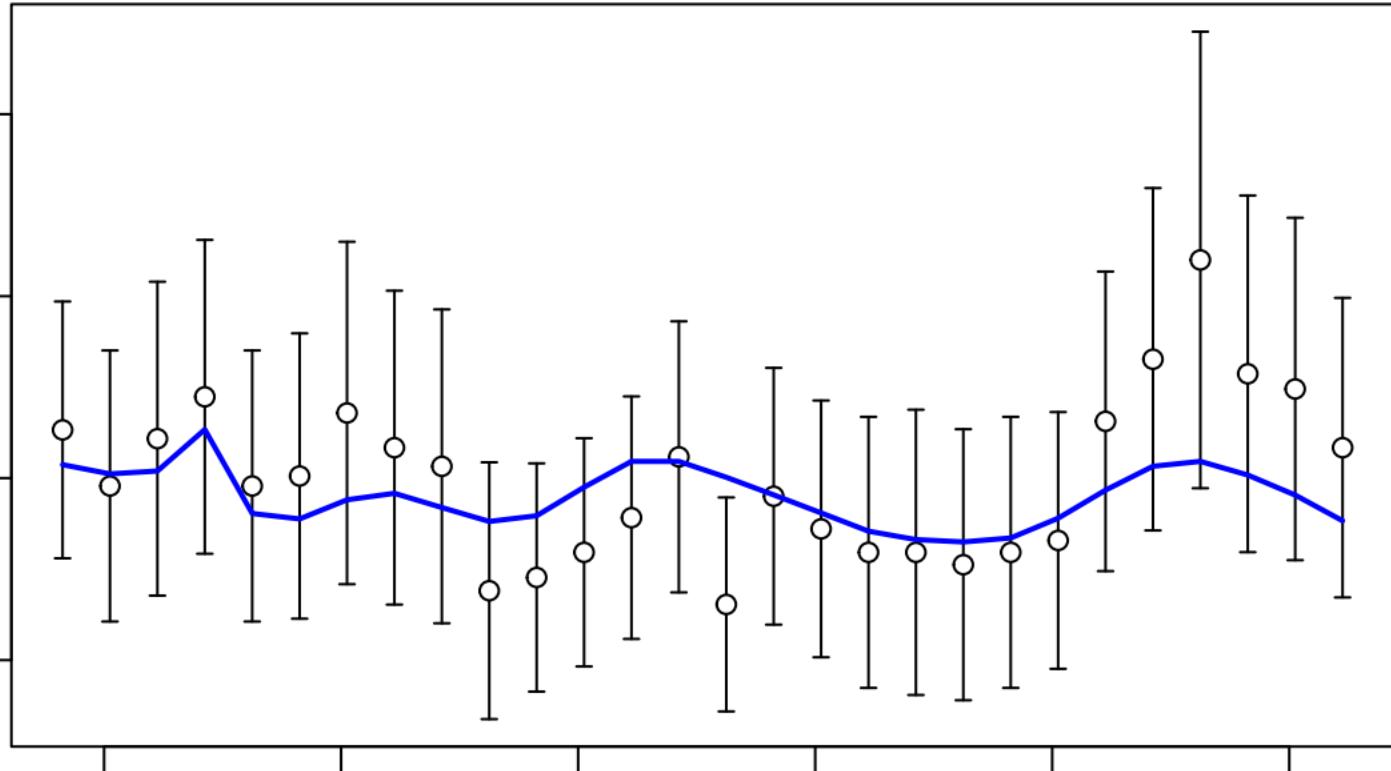


Log index

-1.5 -1.0 -0.5 0.0

1995 2000 2005 2010 2015 2020

Year

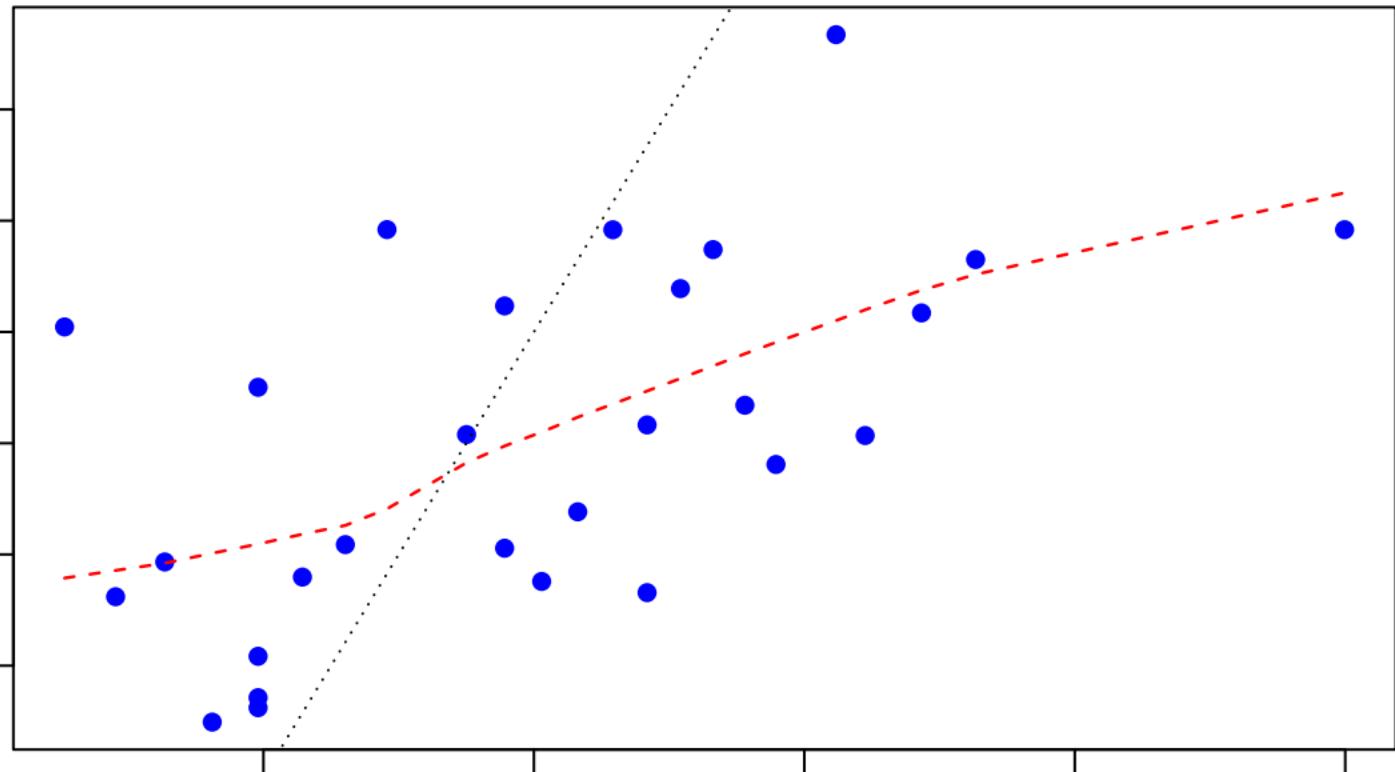


Log expected index

-1.15 -1.05 -0.95

-1.2 -1.0 -0.8 -0.6 -0.4

Log observed index

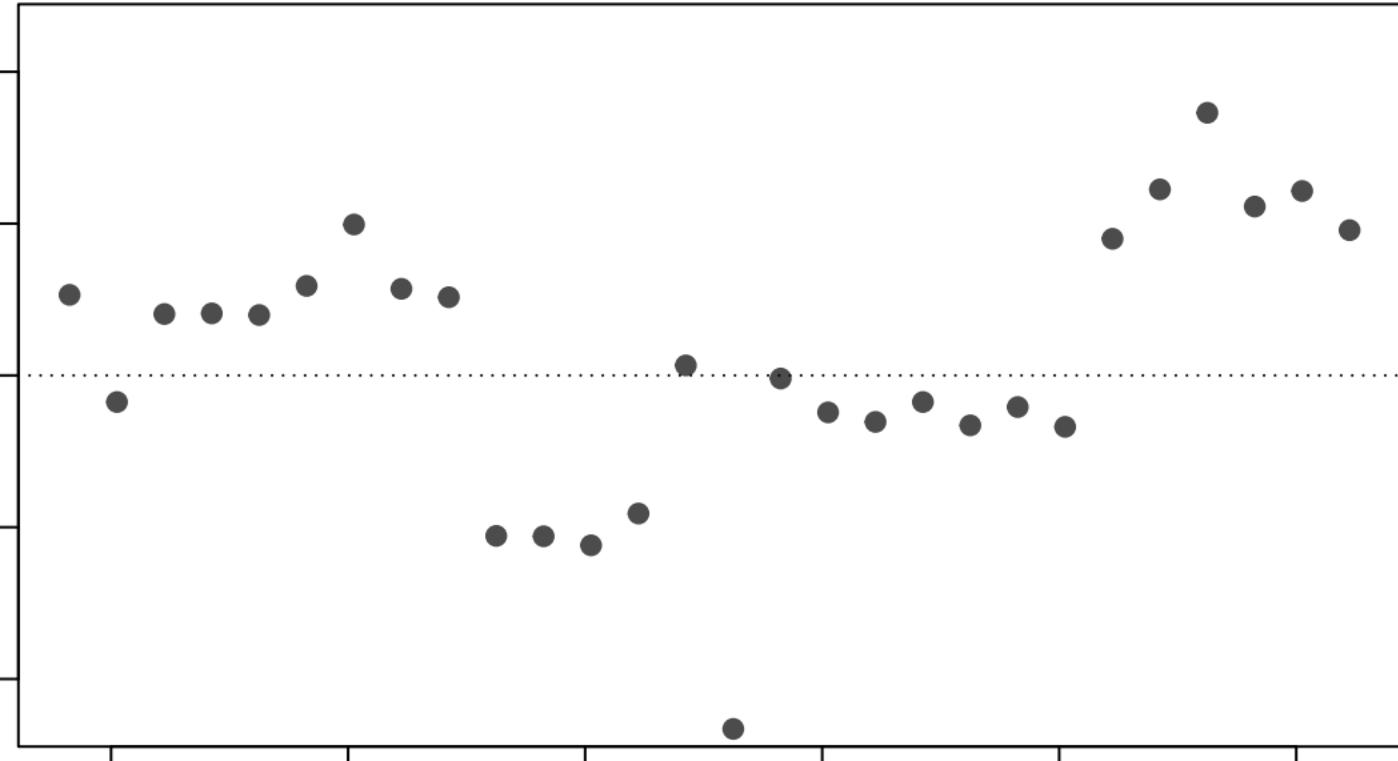


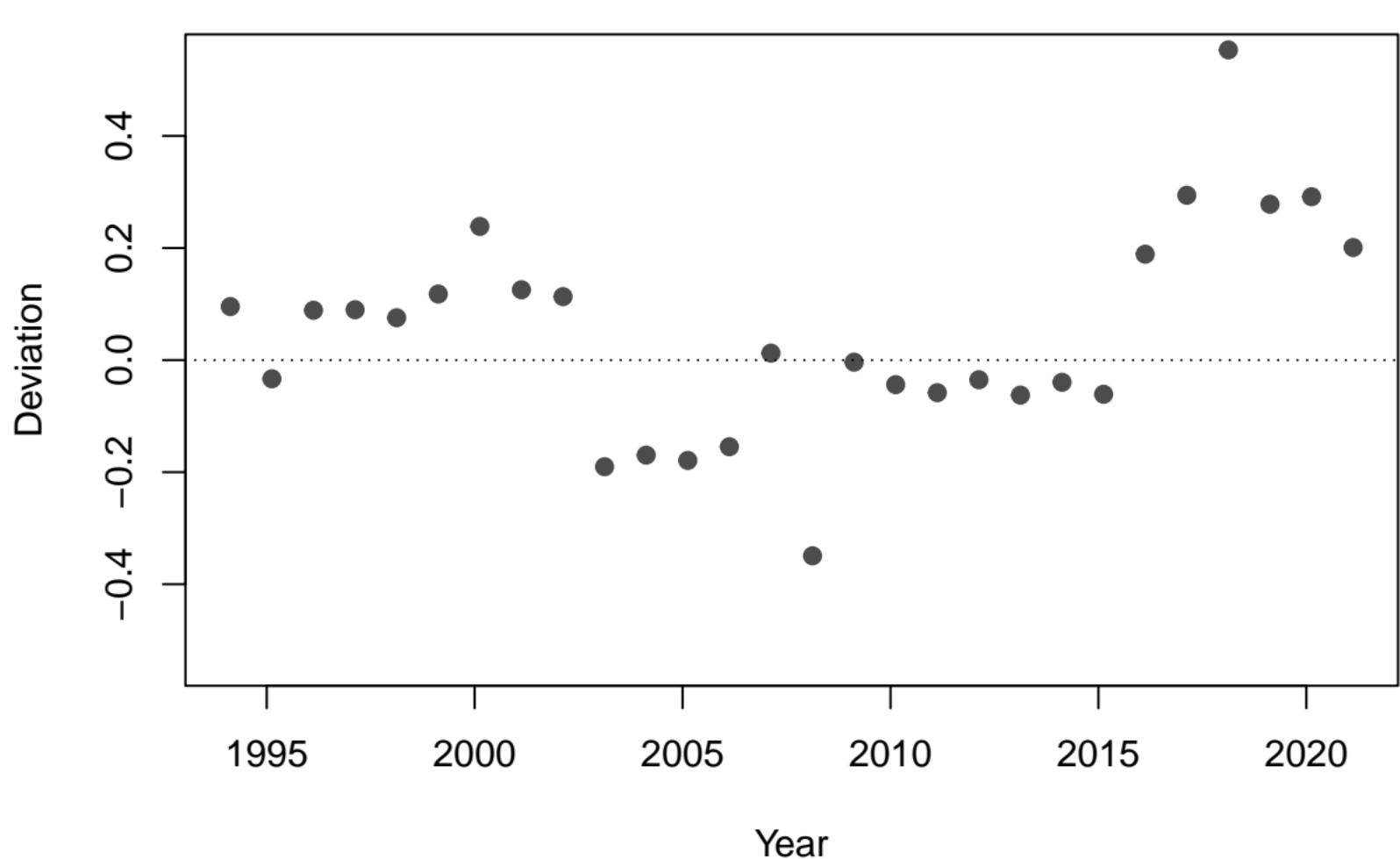
Residual

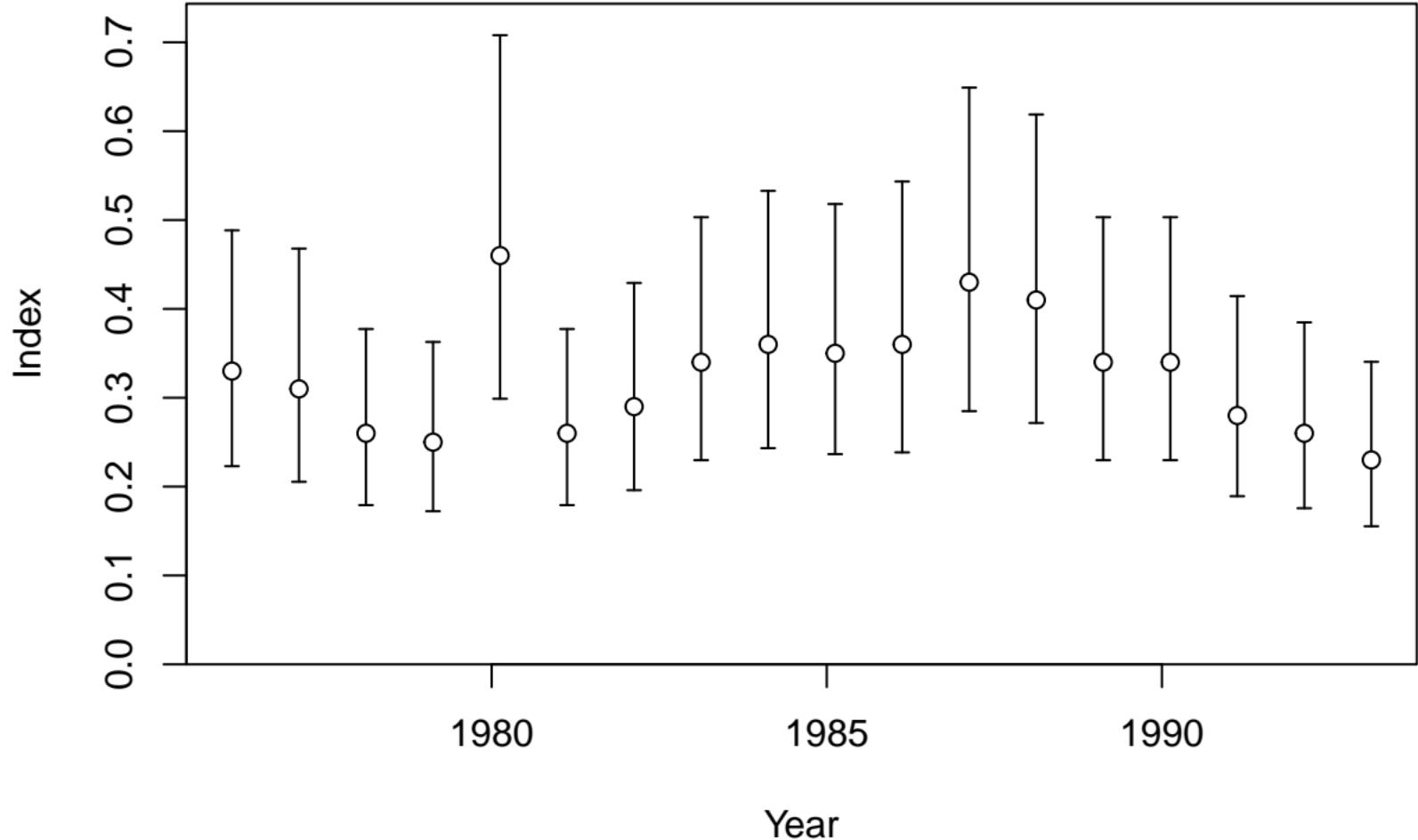
2  
1  
0  
-1  
-2

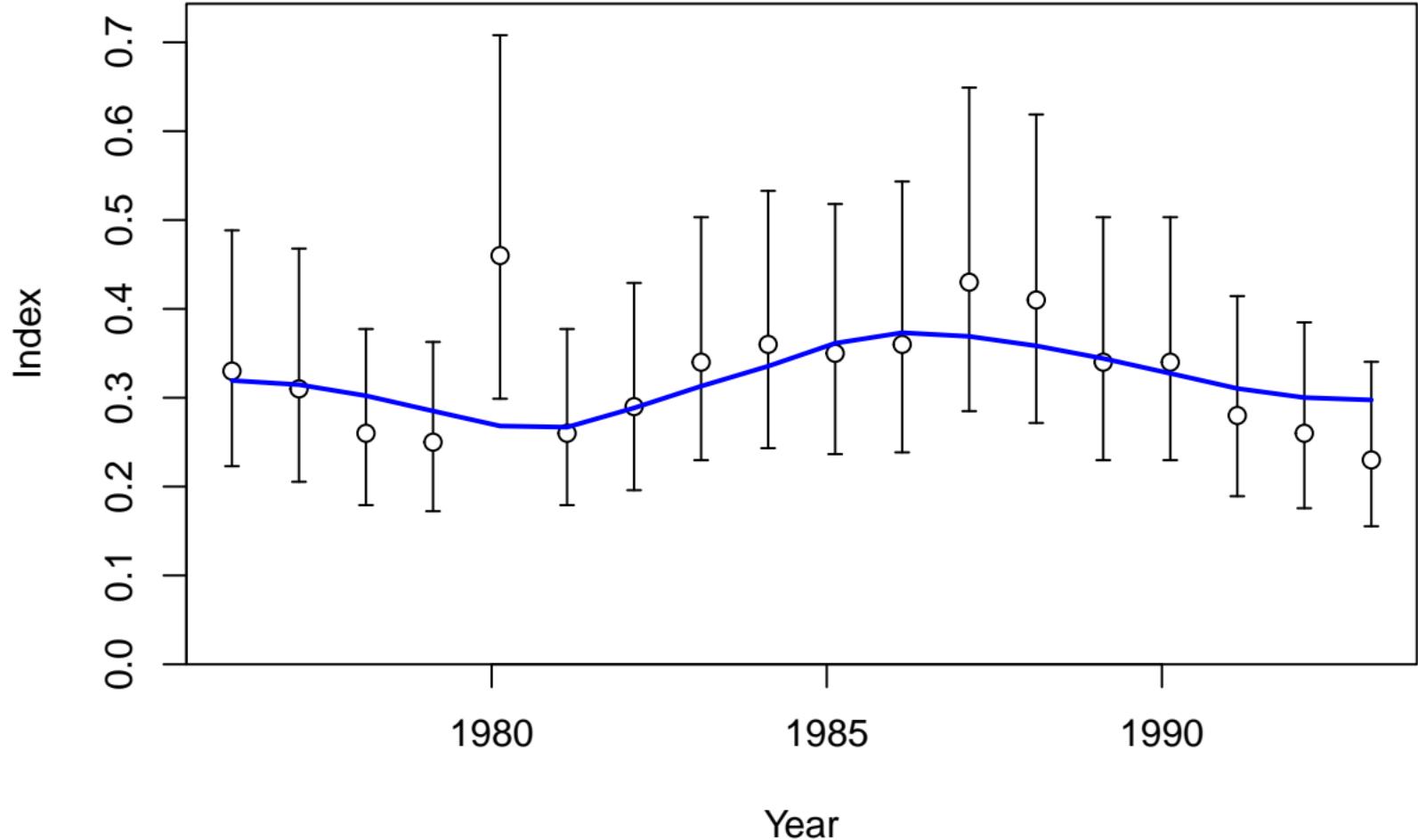
1995 2000 2005 2010 2015 2020

Year







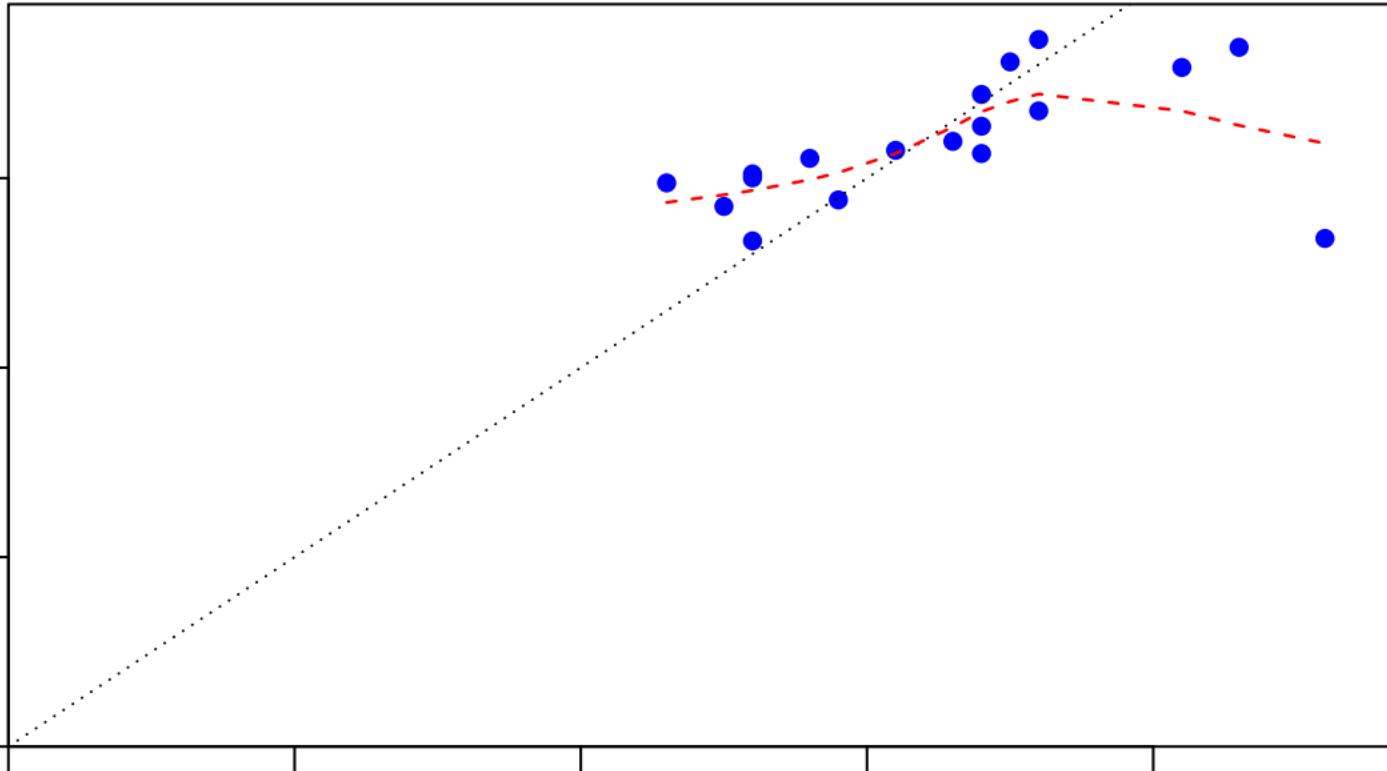


Expected index

0.0  
0.1  
0.2  
0.3

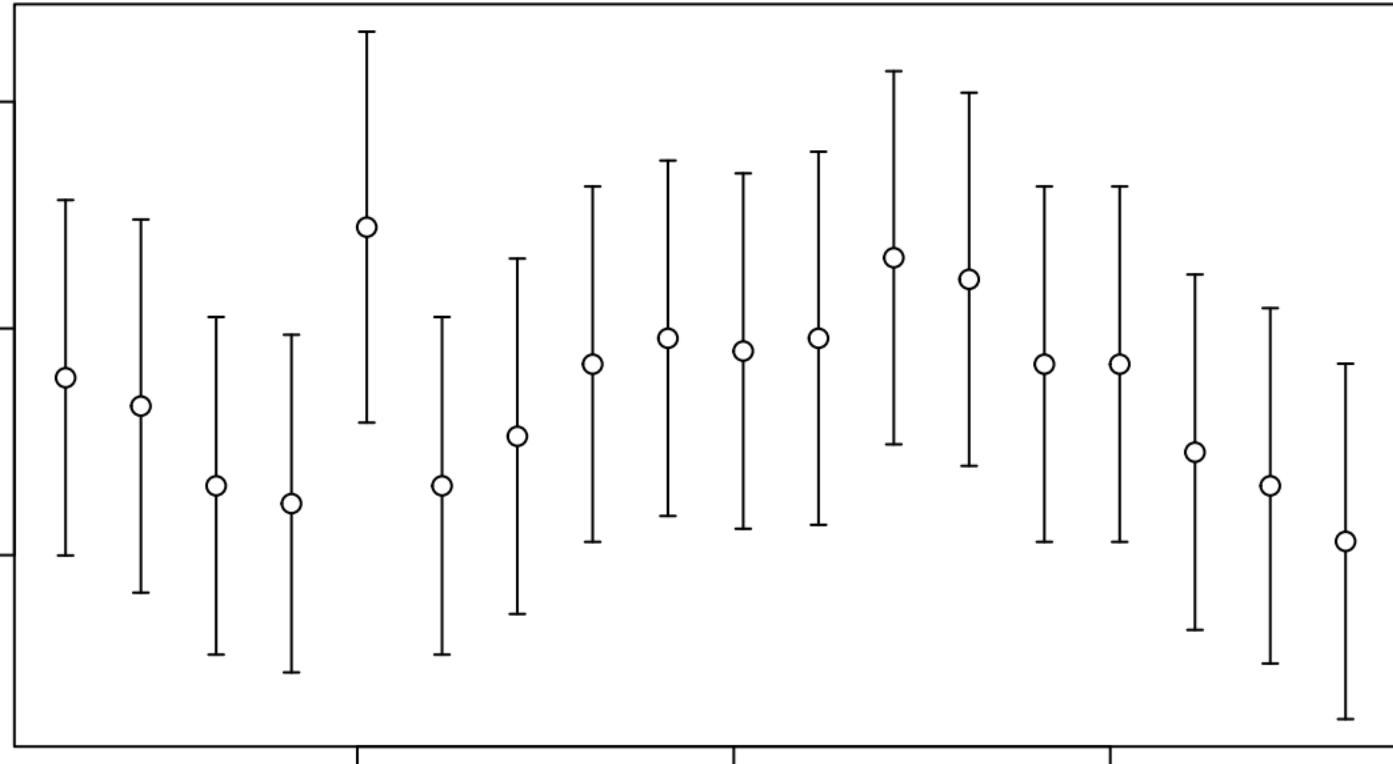
0.0 0.1 0.2 0.3 0.4

Observed index



Log index

-0.5  
-1.0  
-1.5



Year

Log index

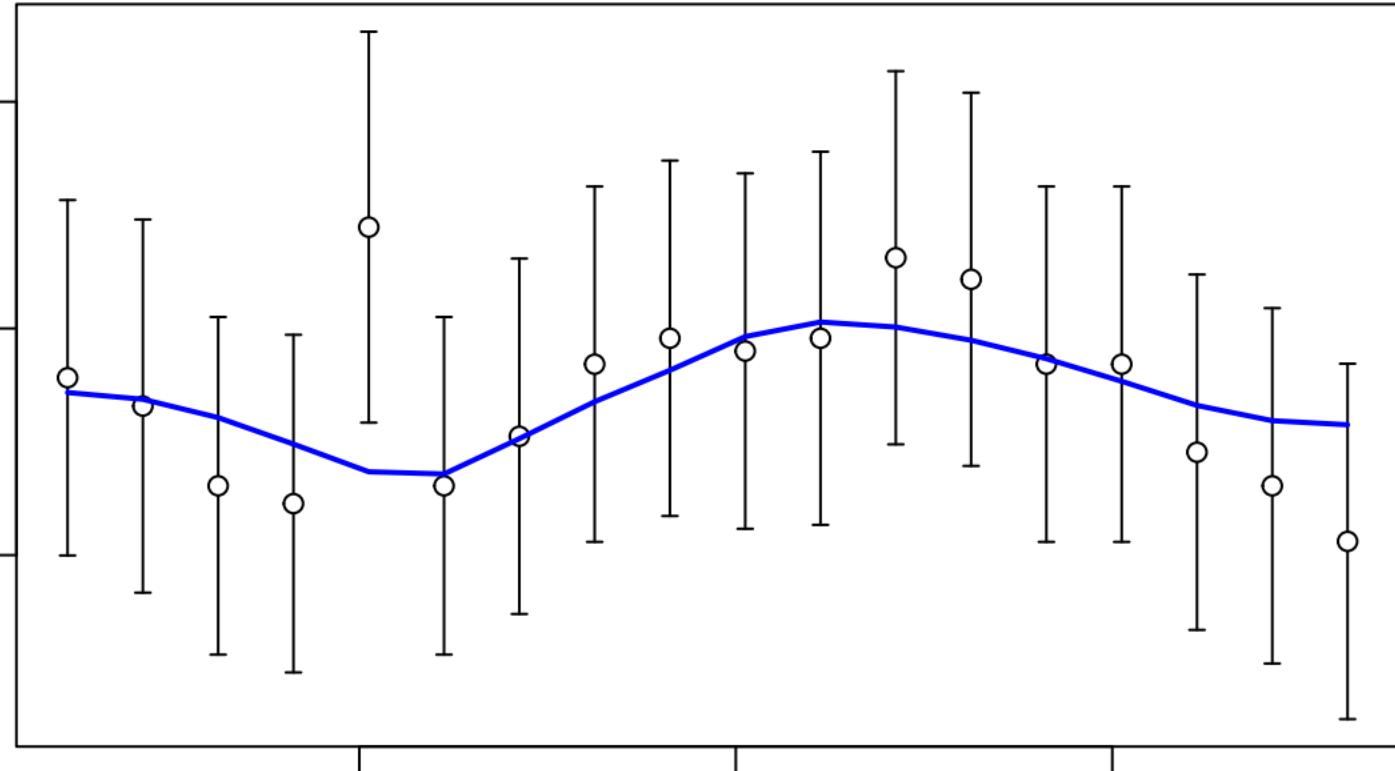
-0.5  
-1.0  
-1.5

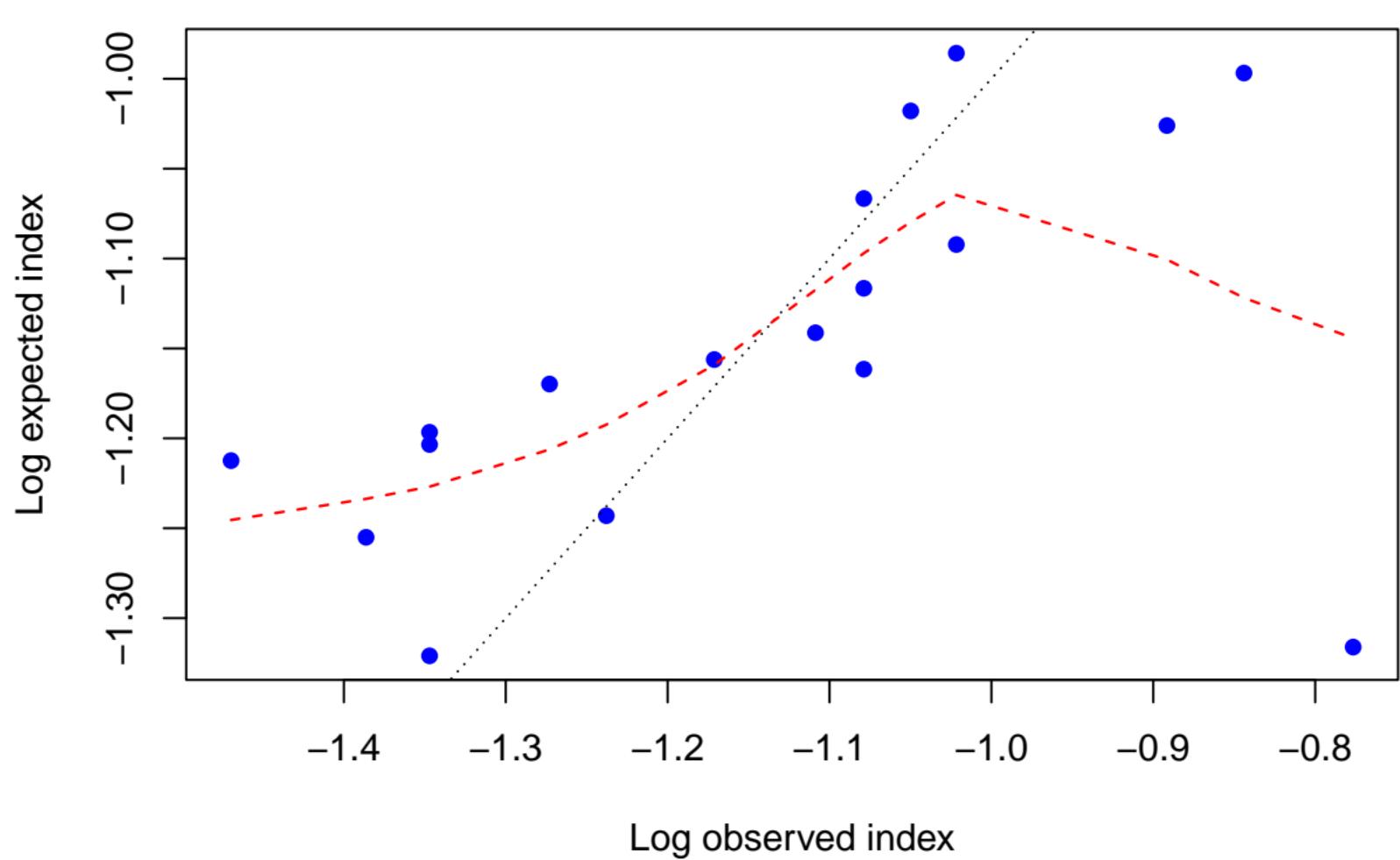
1980

Year

1985

1990





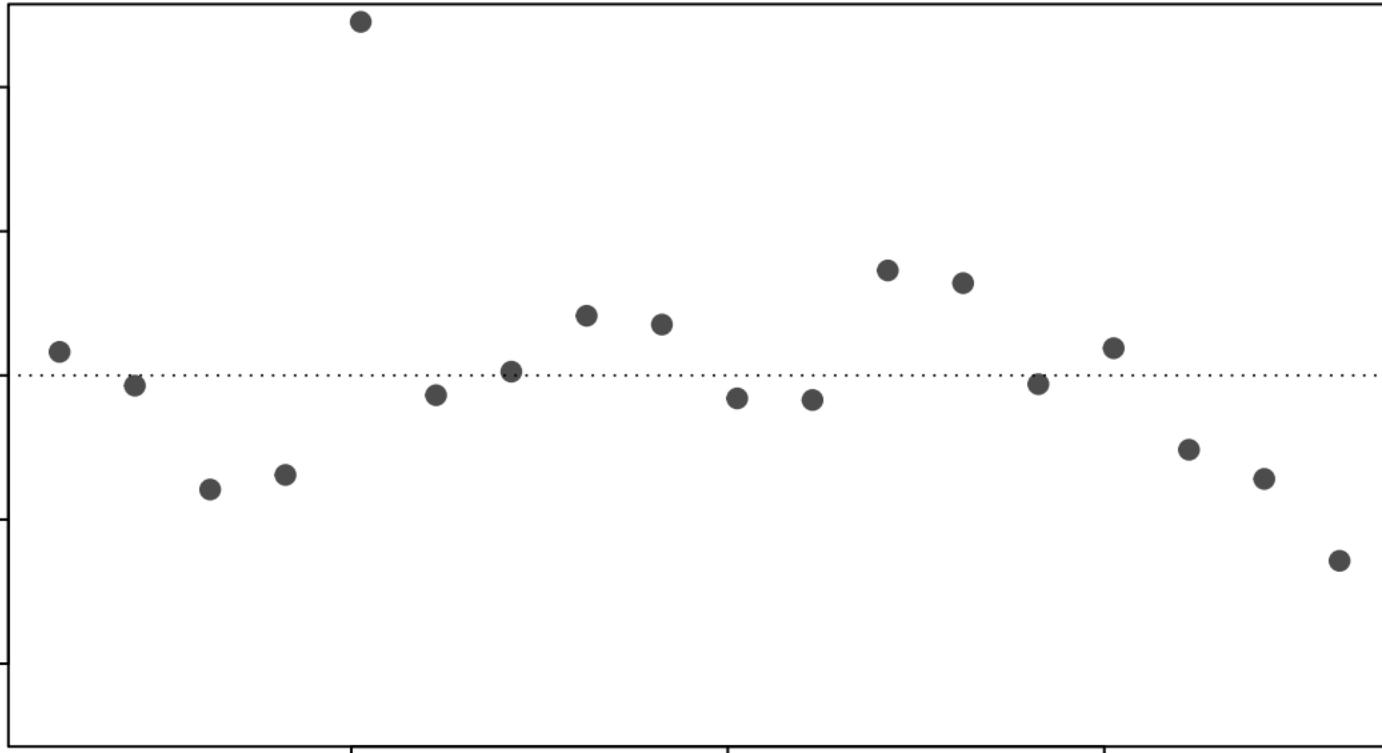
Residual

2  
1  
0  
-1  
-2

1980

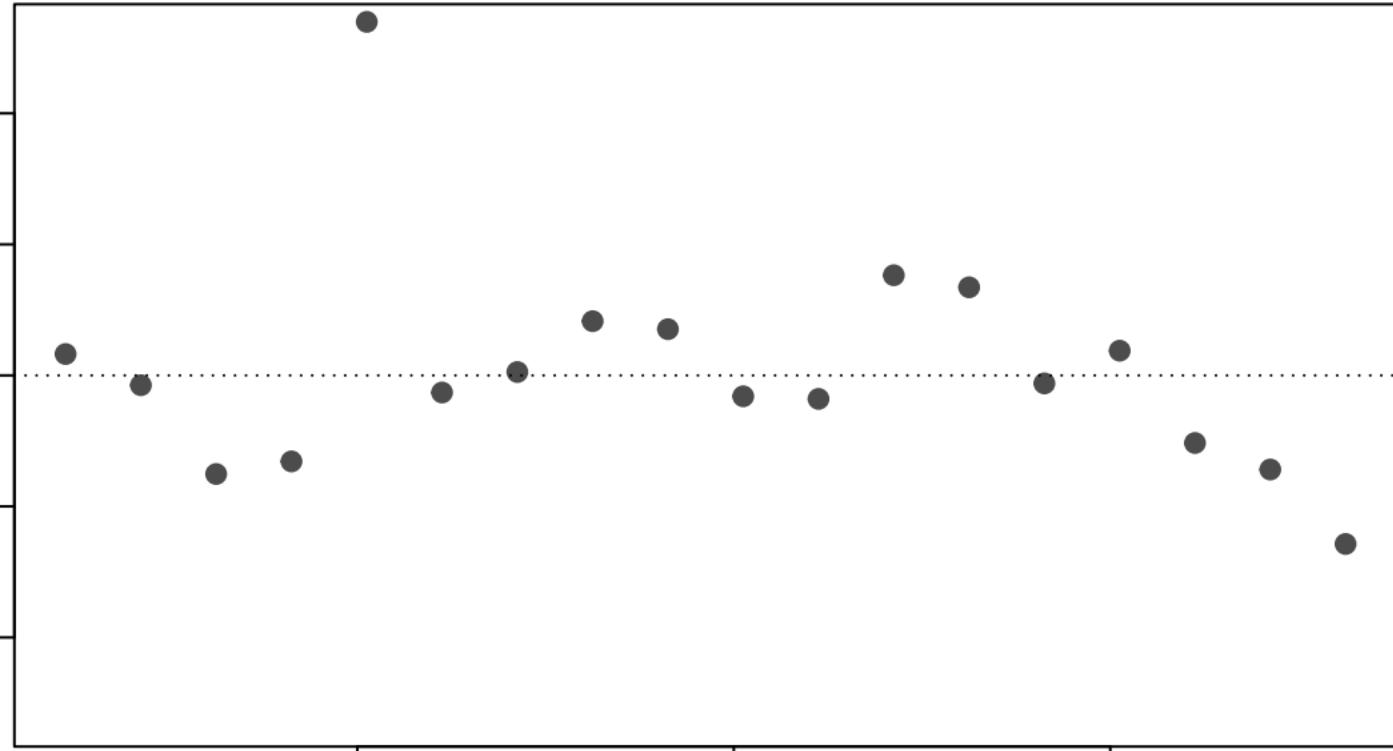
Year

1985 1990



Deviation

-0.4 -0.2 0.0 0.2 0.4

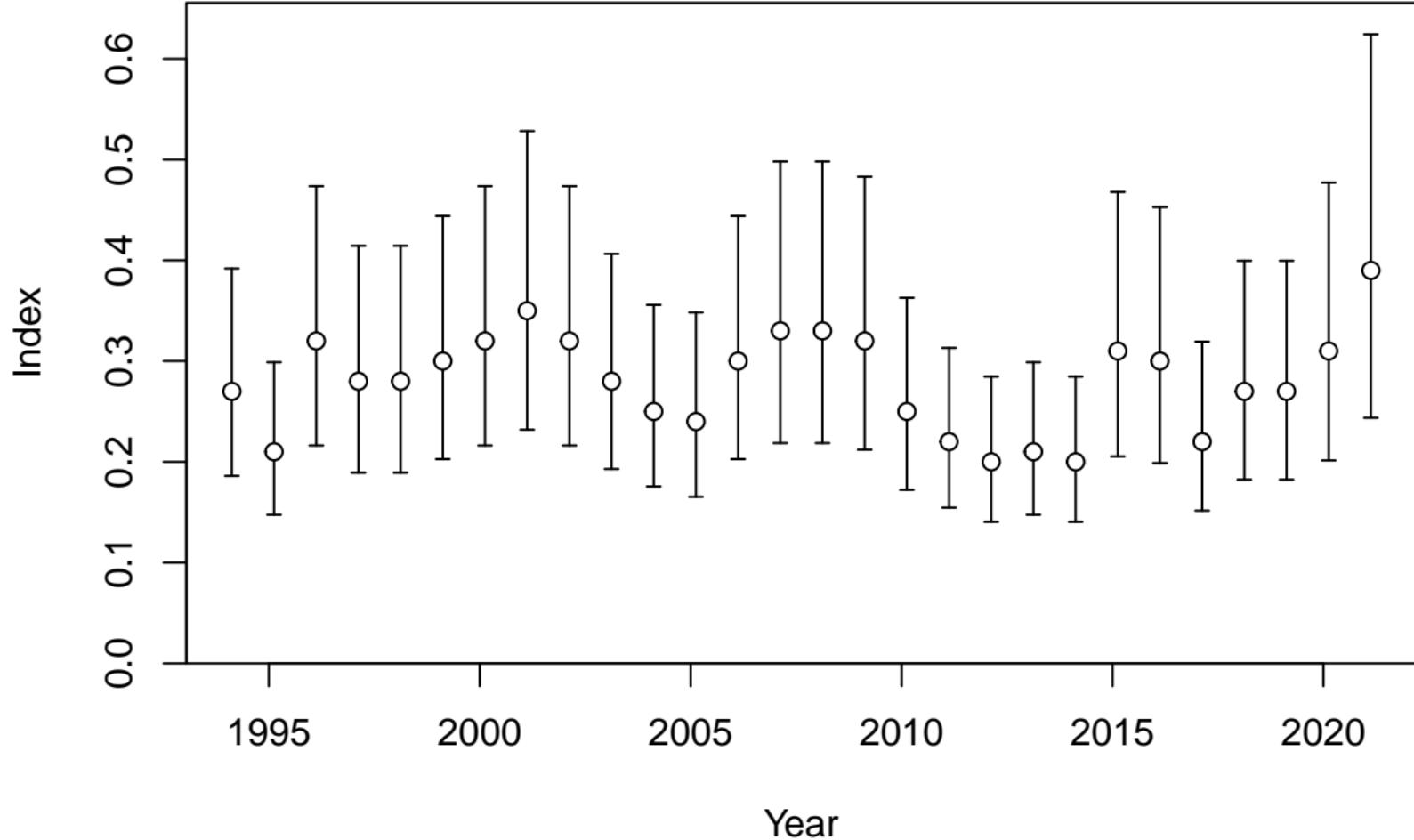


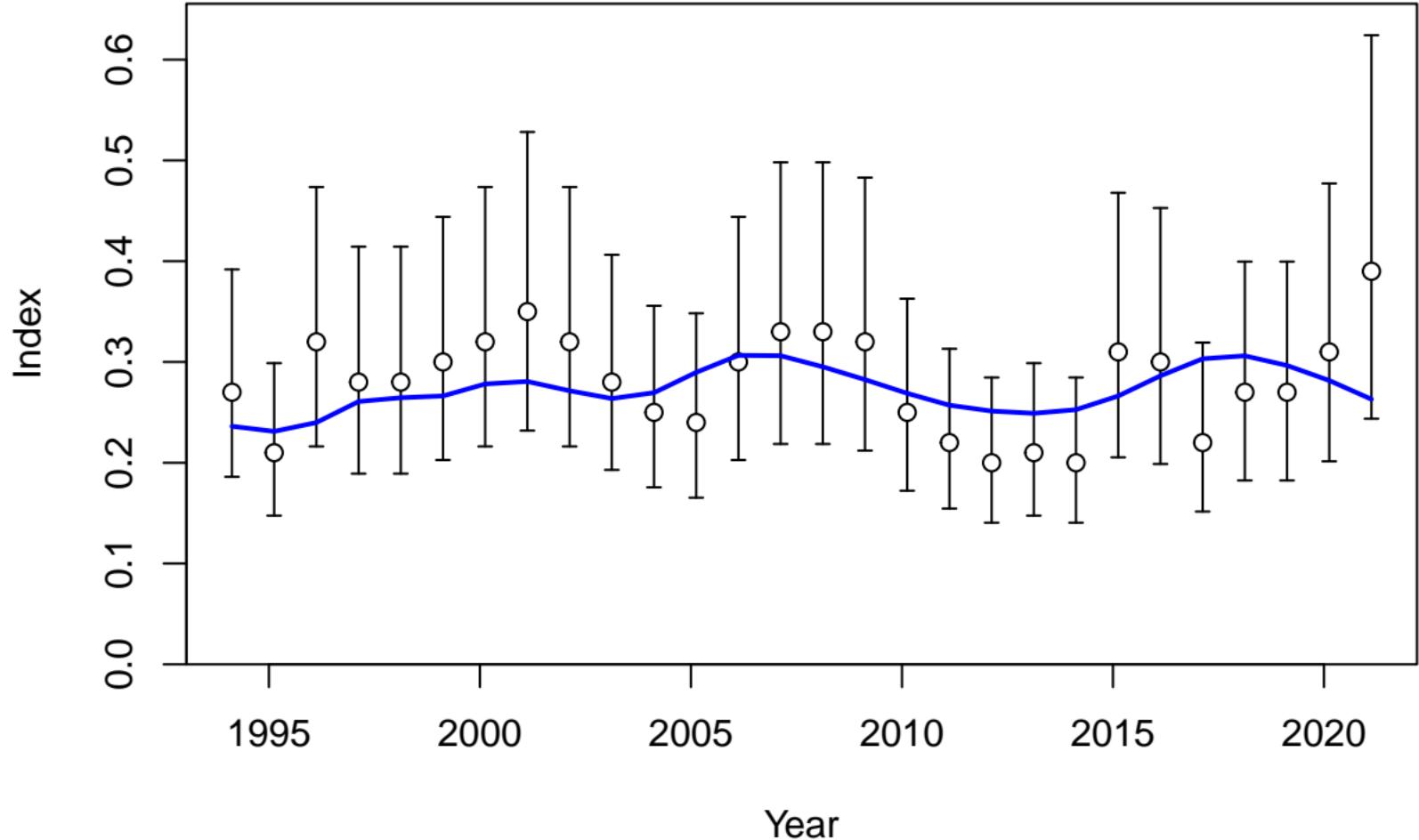
1980

1985

1990

Year





Expected index

0.30  
0.20  
0.10  
0.00

0.0

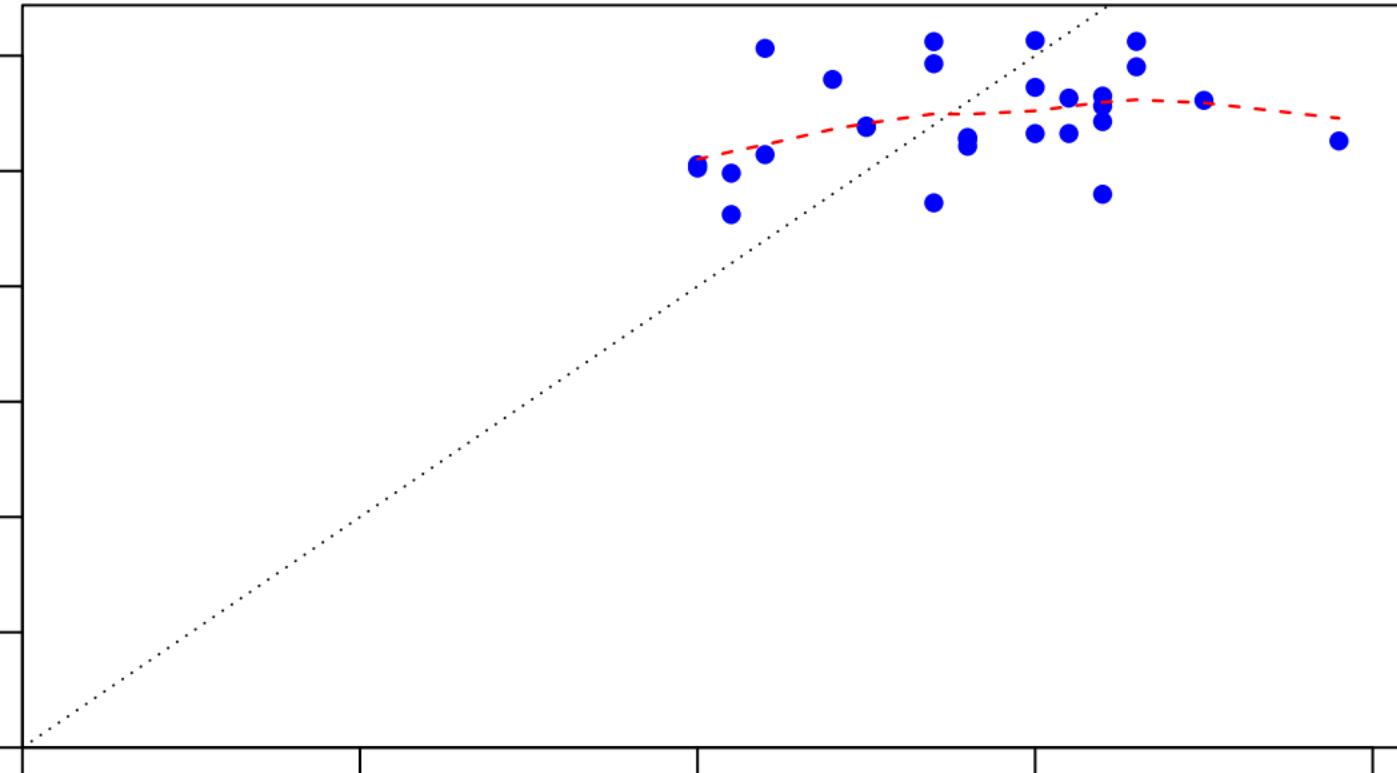
0.1

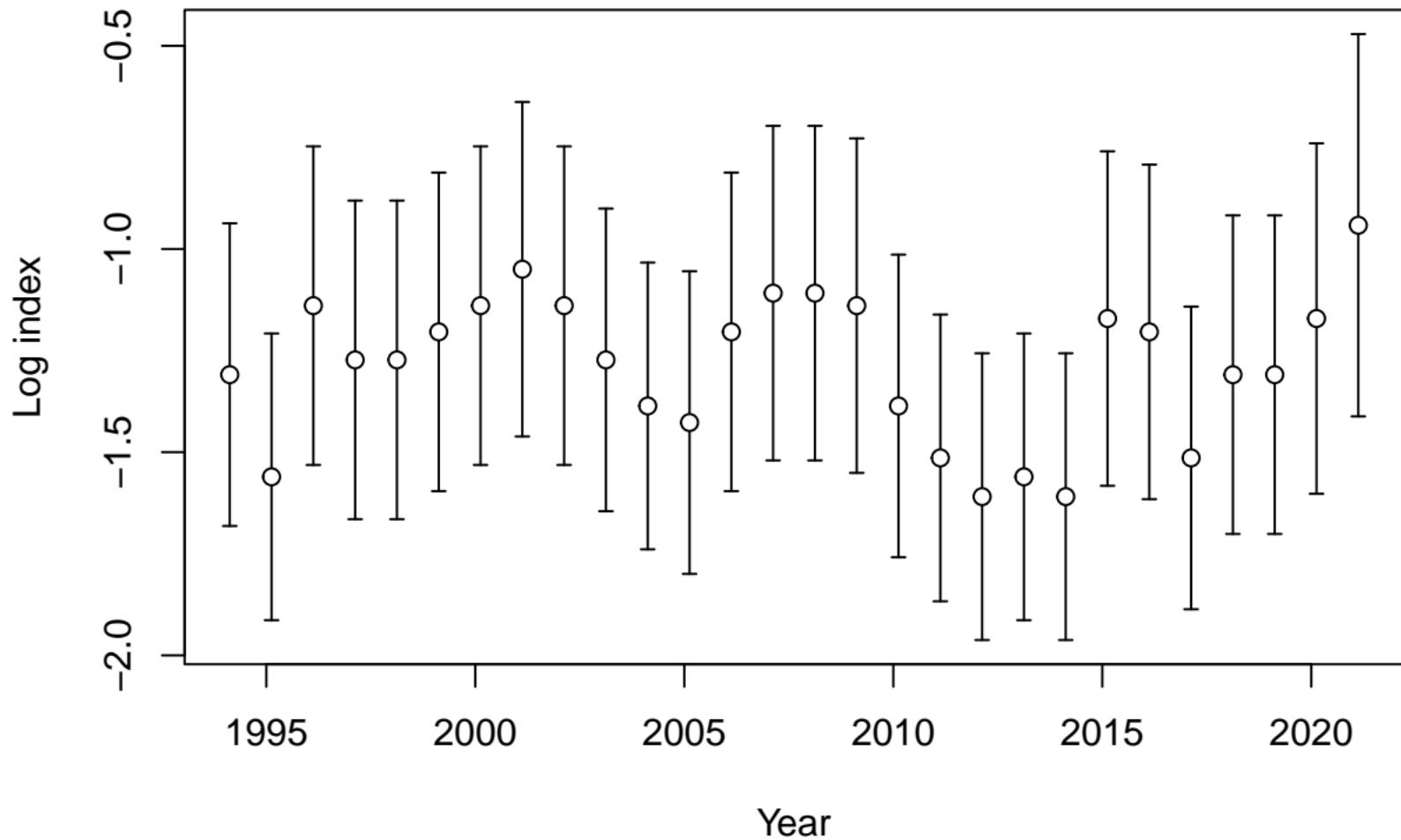
0.2

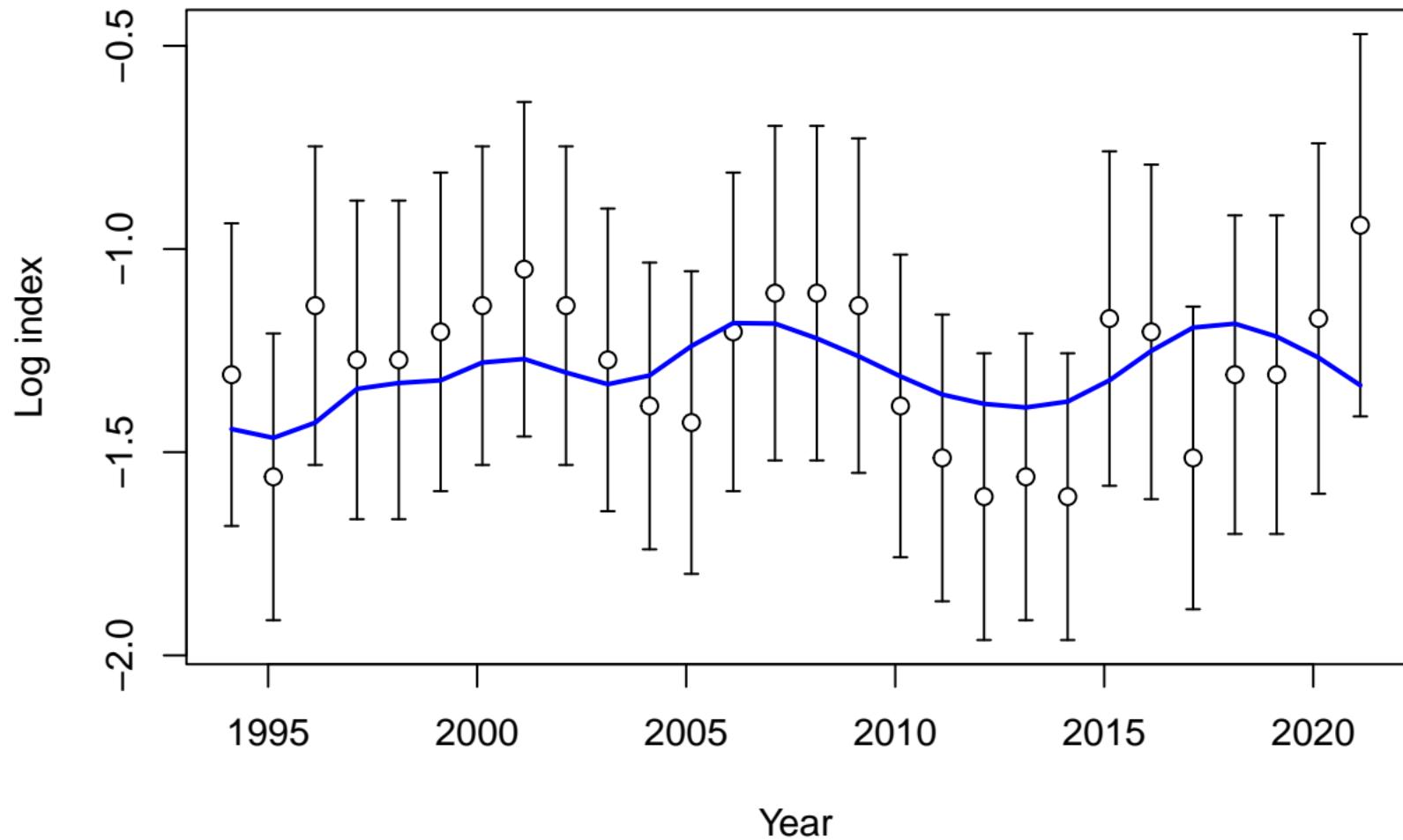
0.3

0.4

Observed index





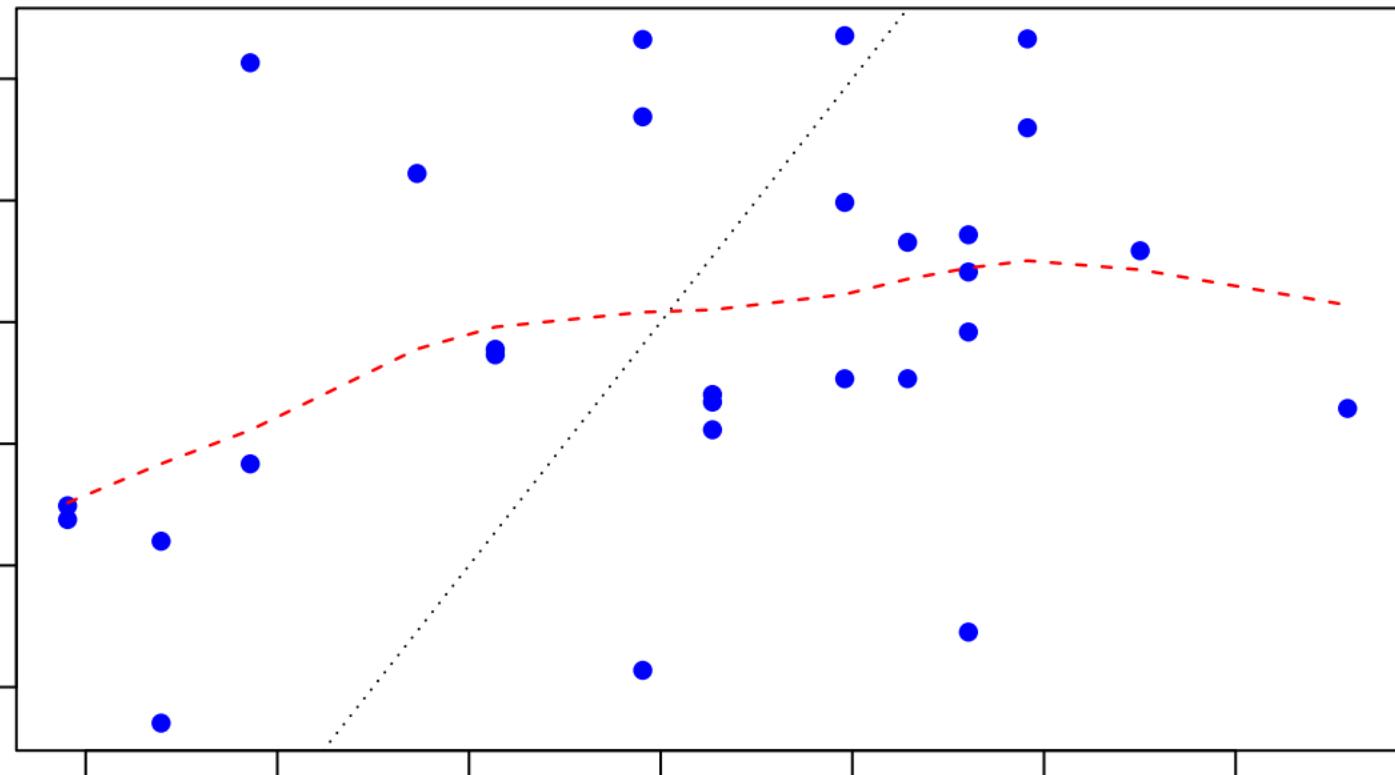


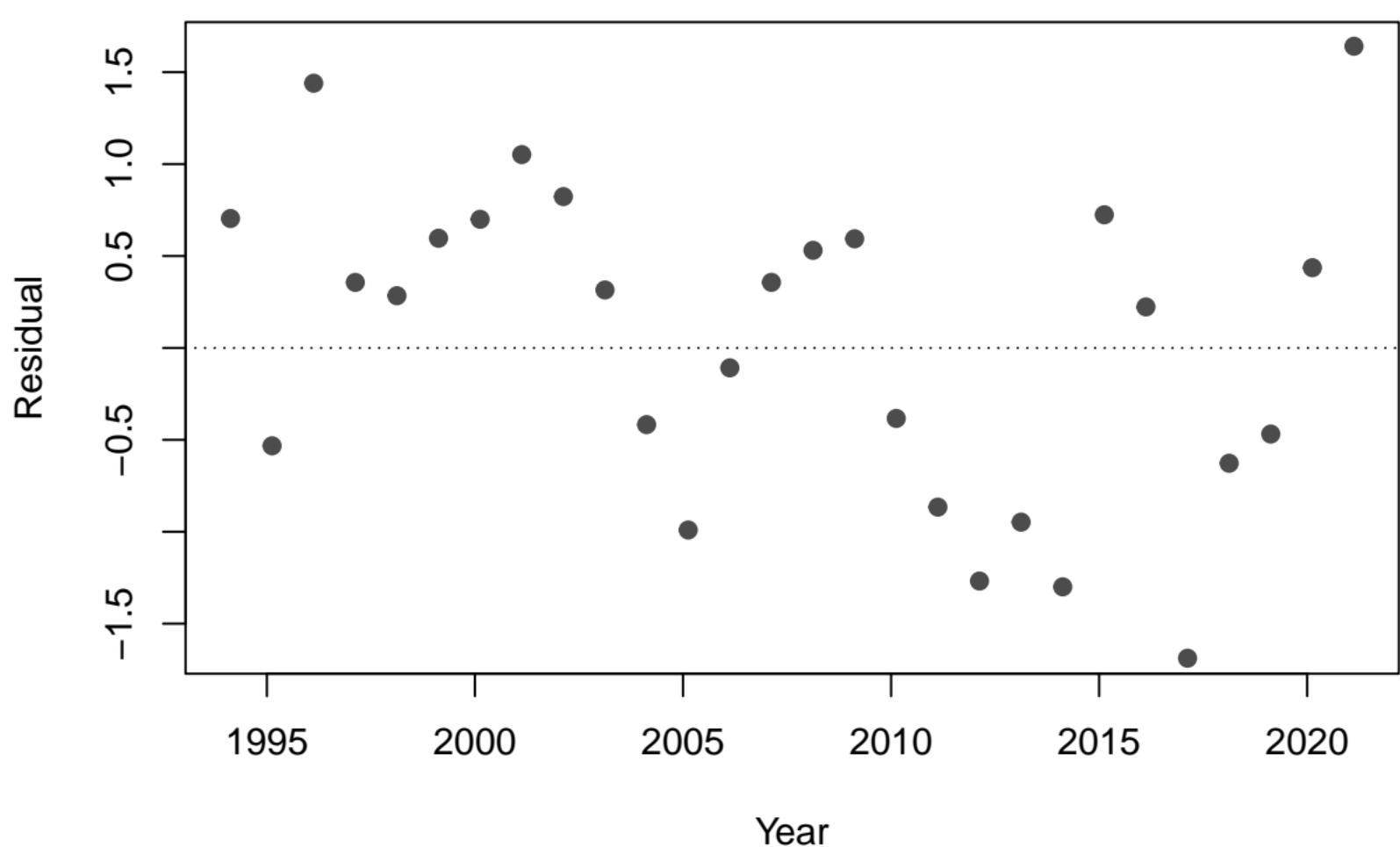
Log expected index

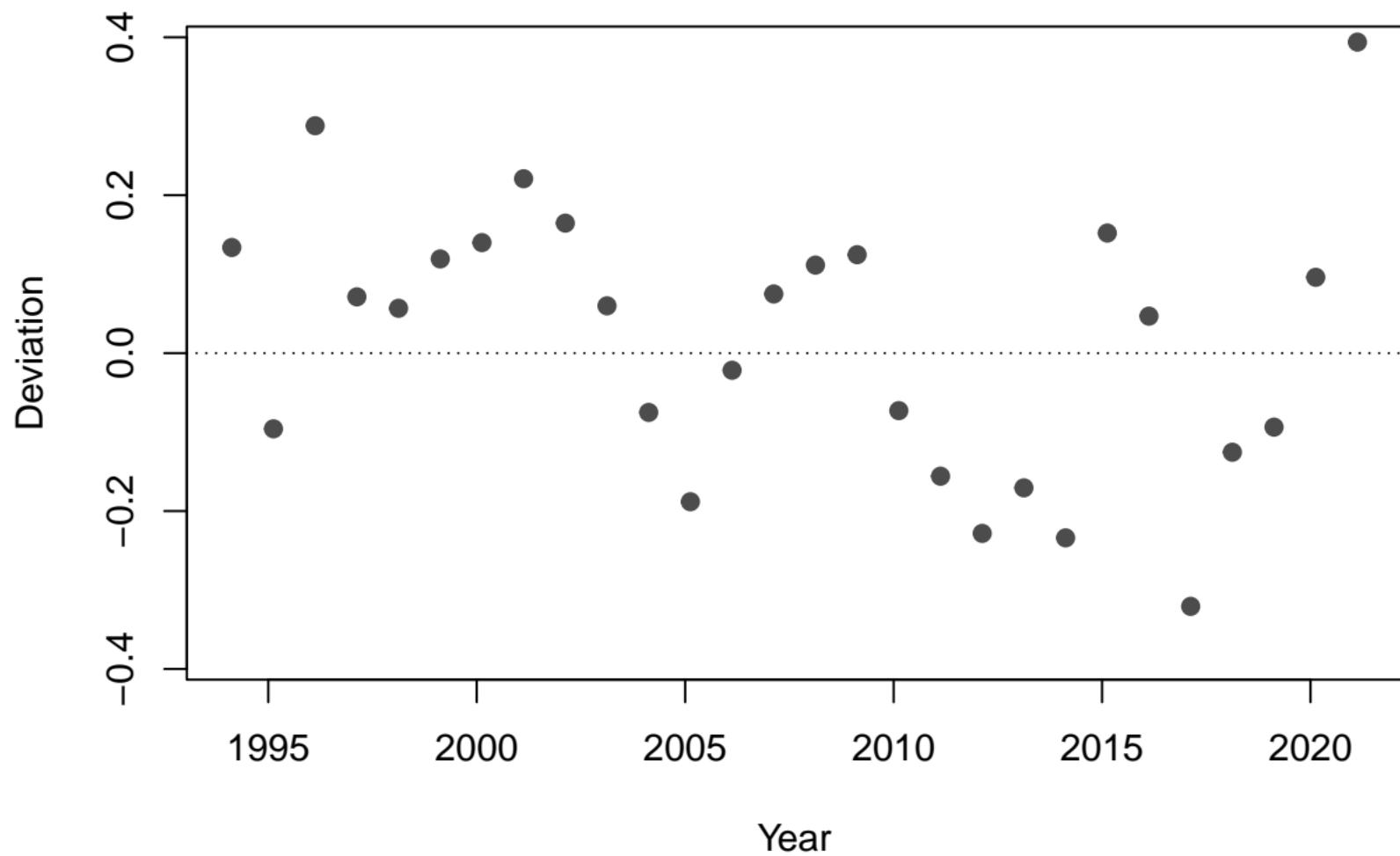
-1.25  
-1.35  
-1.45

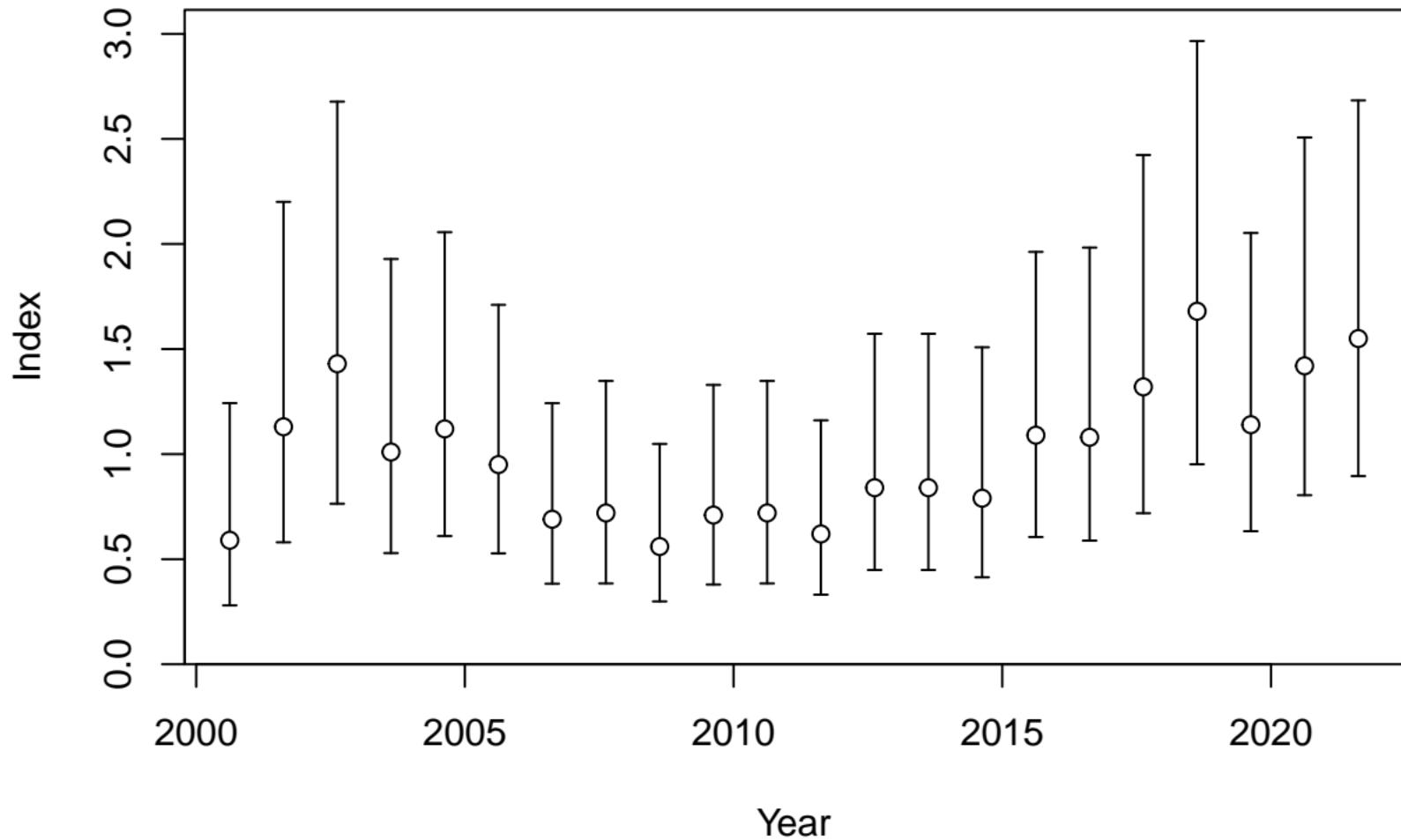
-1.6 -1.5 -1.4 -1.3 -1.2 -1.1 -1.0

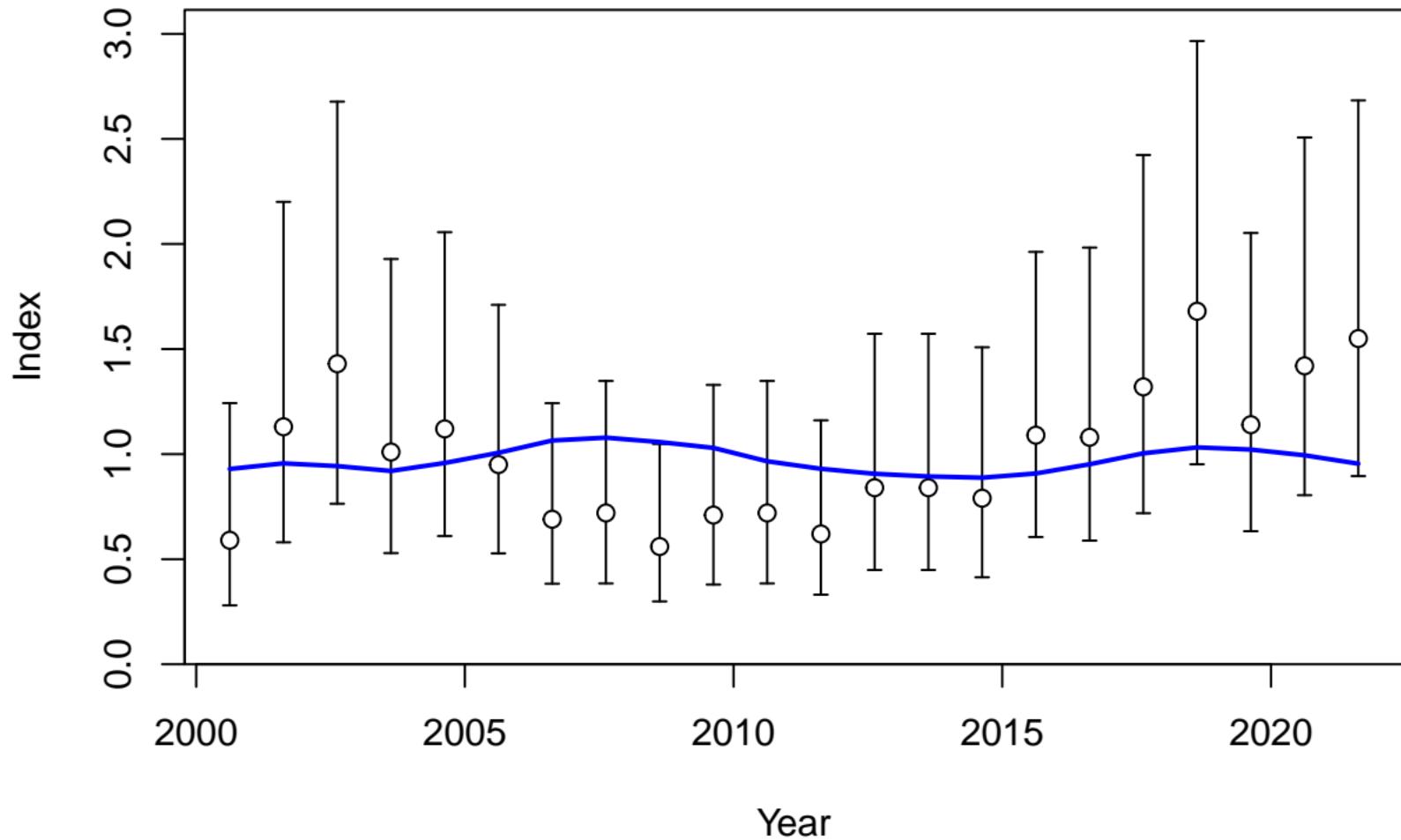
Log observed index











Expected index

1.0  
0.8  
0.6  
0.4  
0.2  
0.0

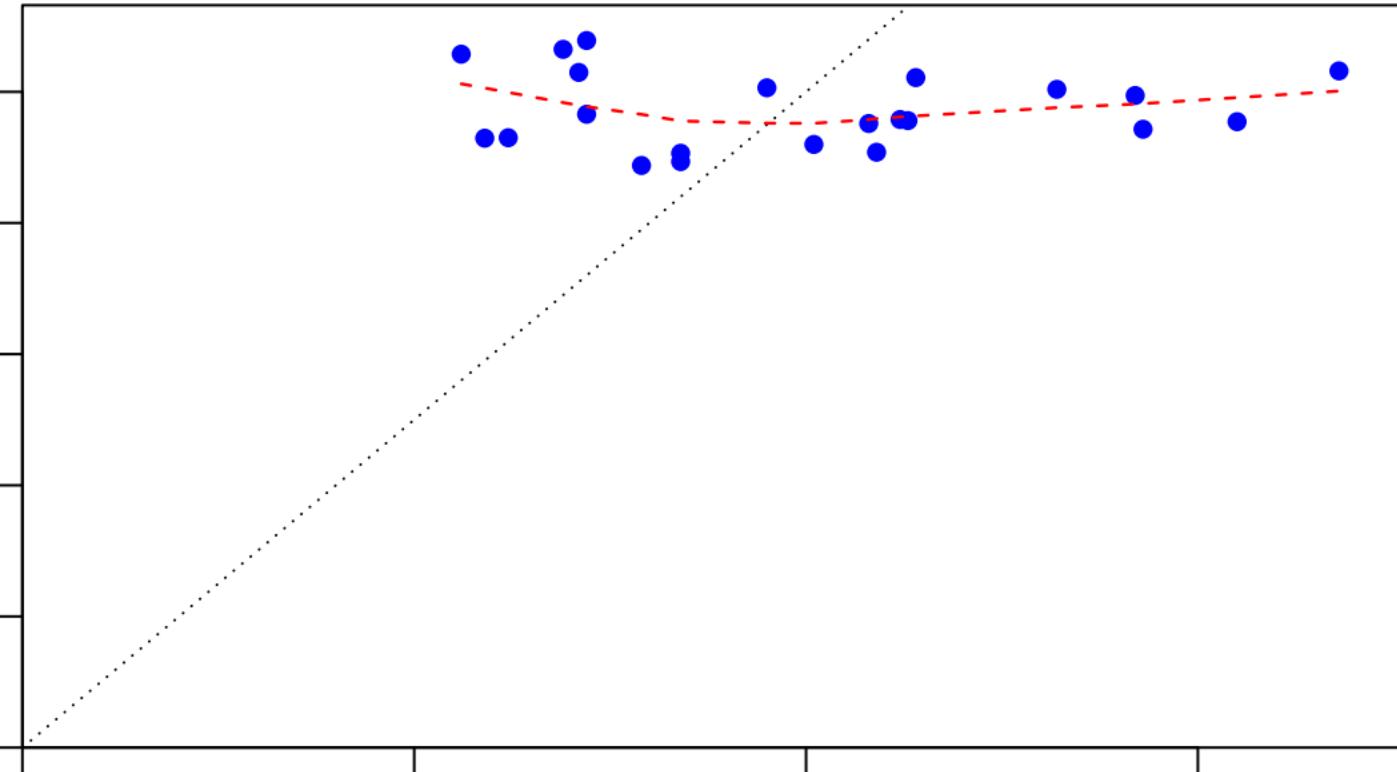
0.0

0.5

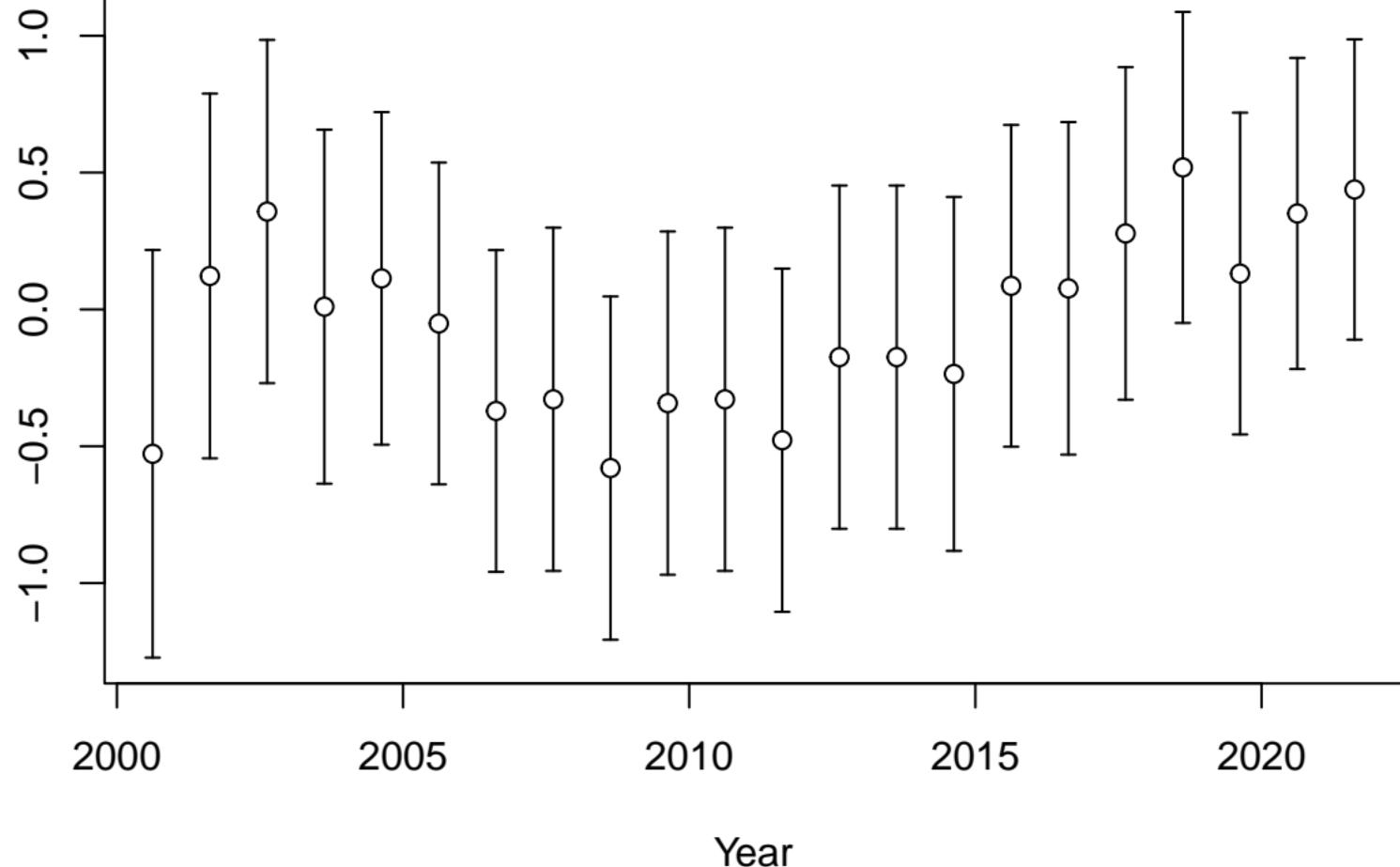
1.0

1.5

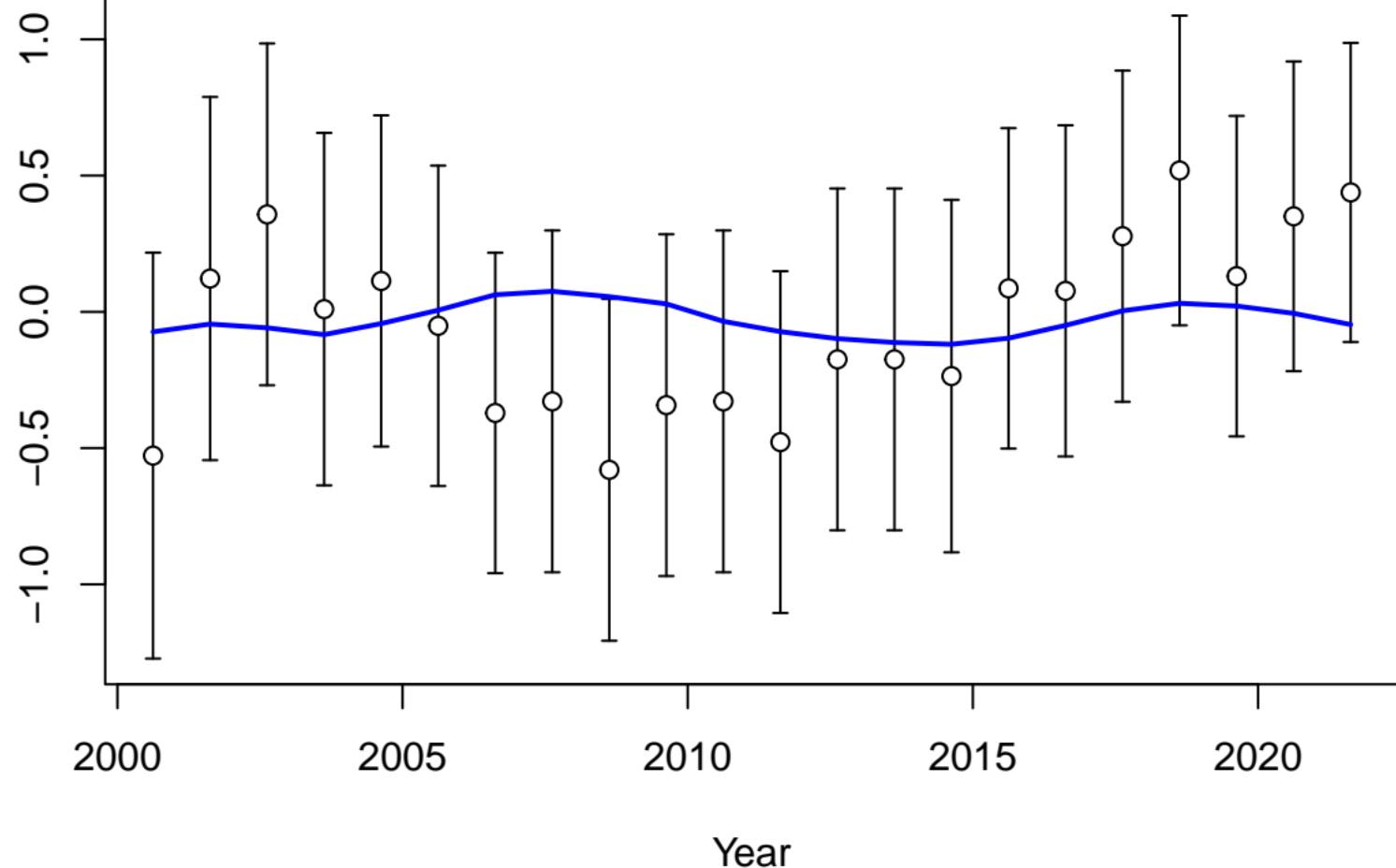
Observed index



Log index



Log index

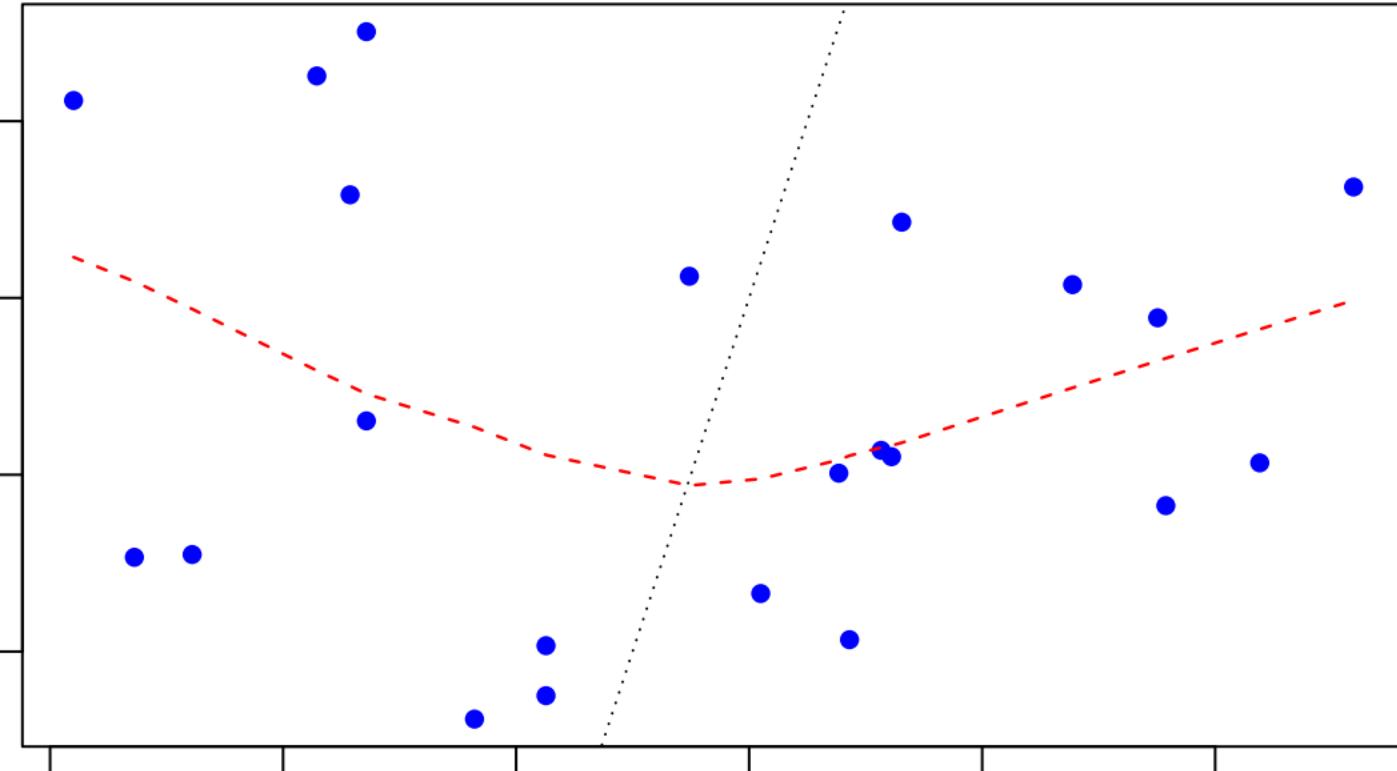


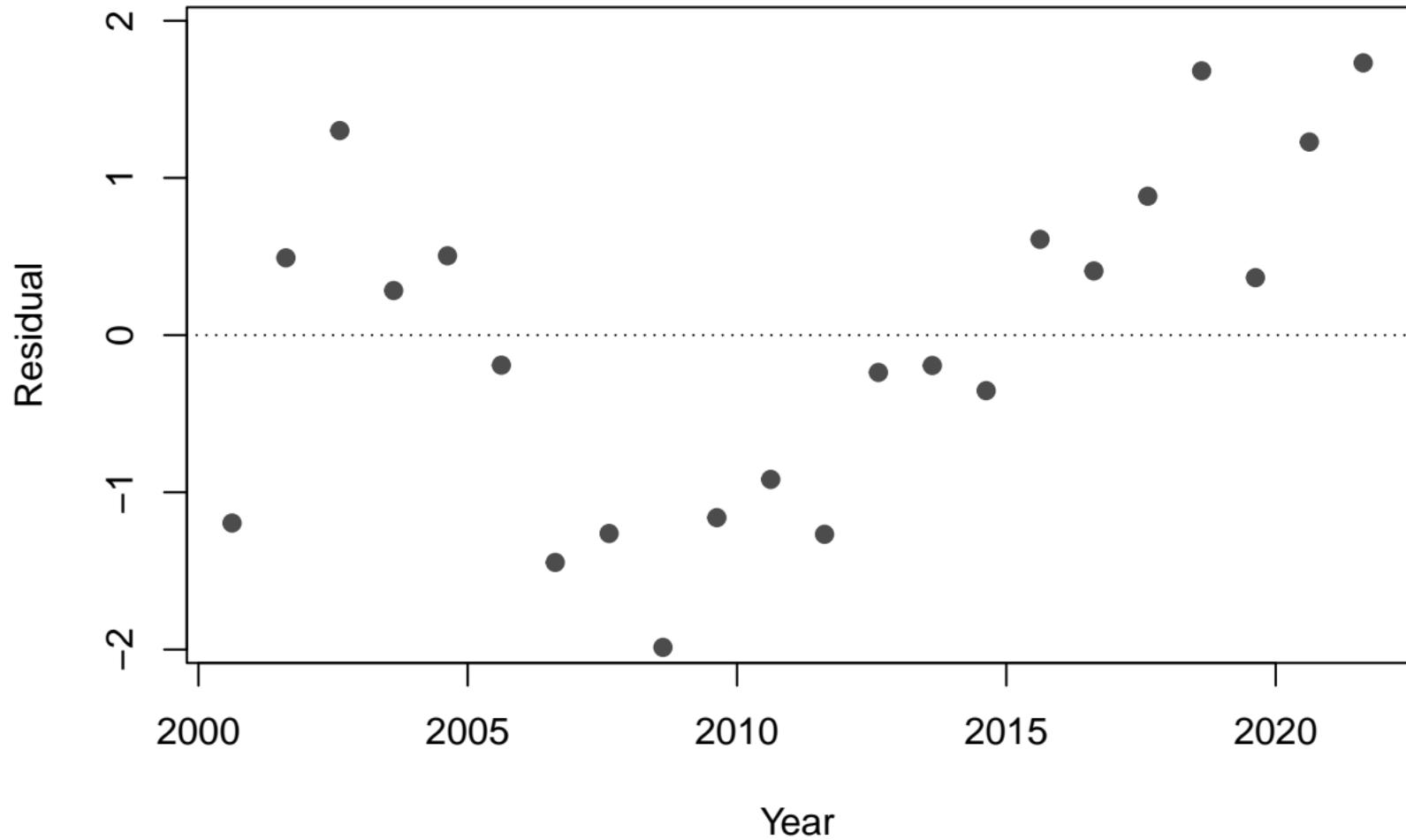
Log expected index

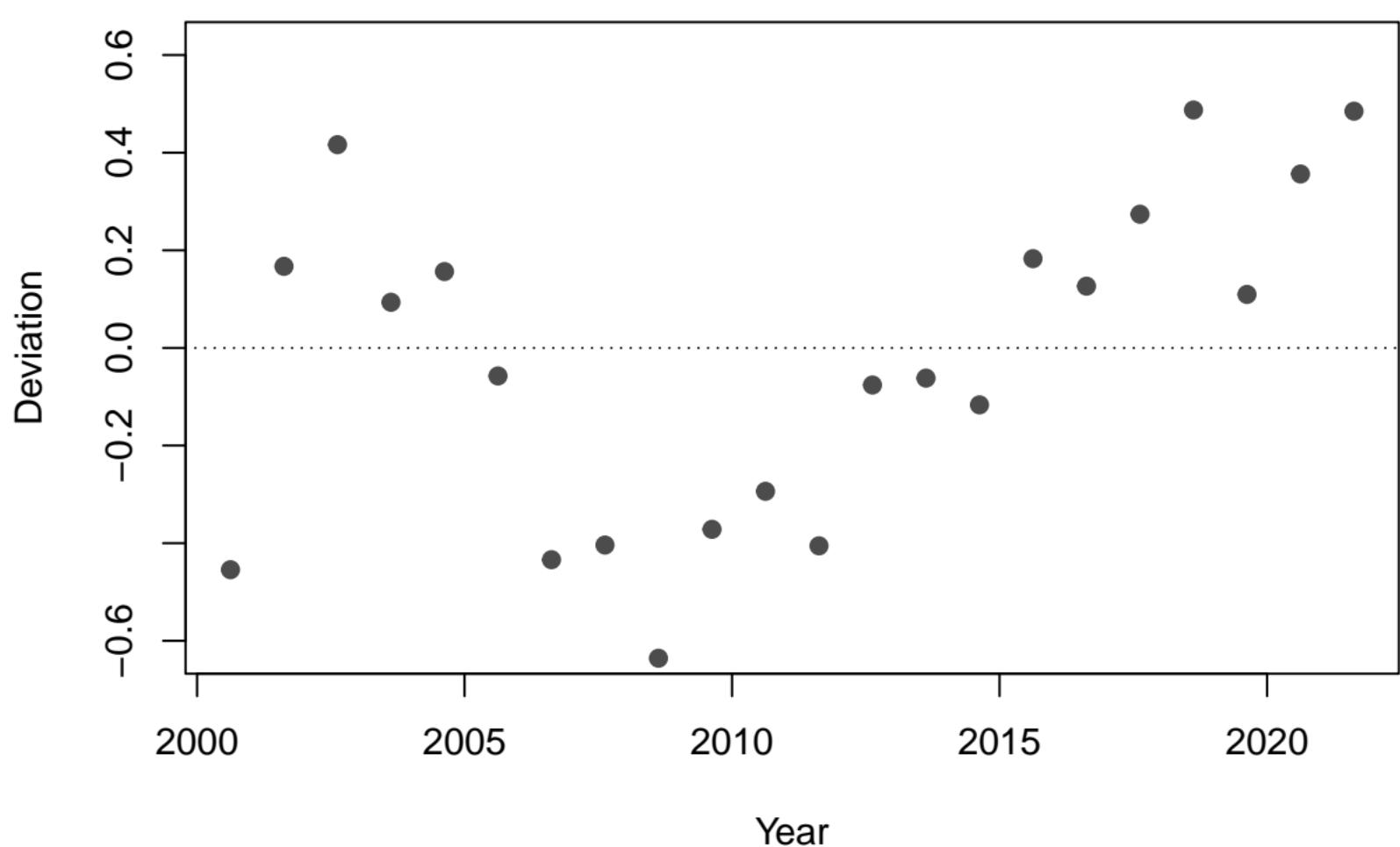
0.05  
0.00  
-0.05  
-0.10

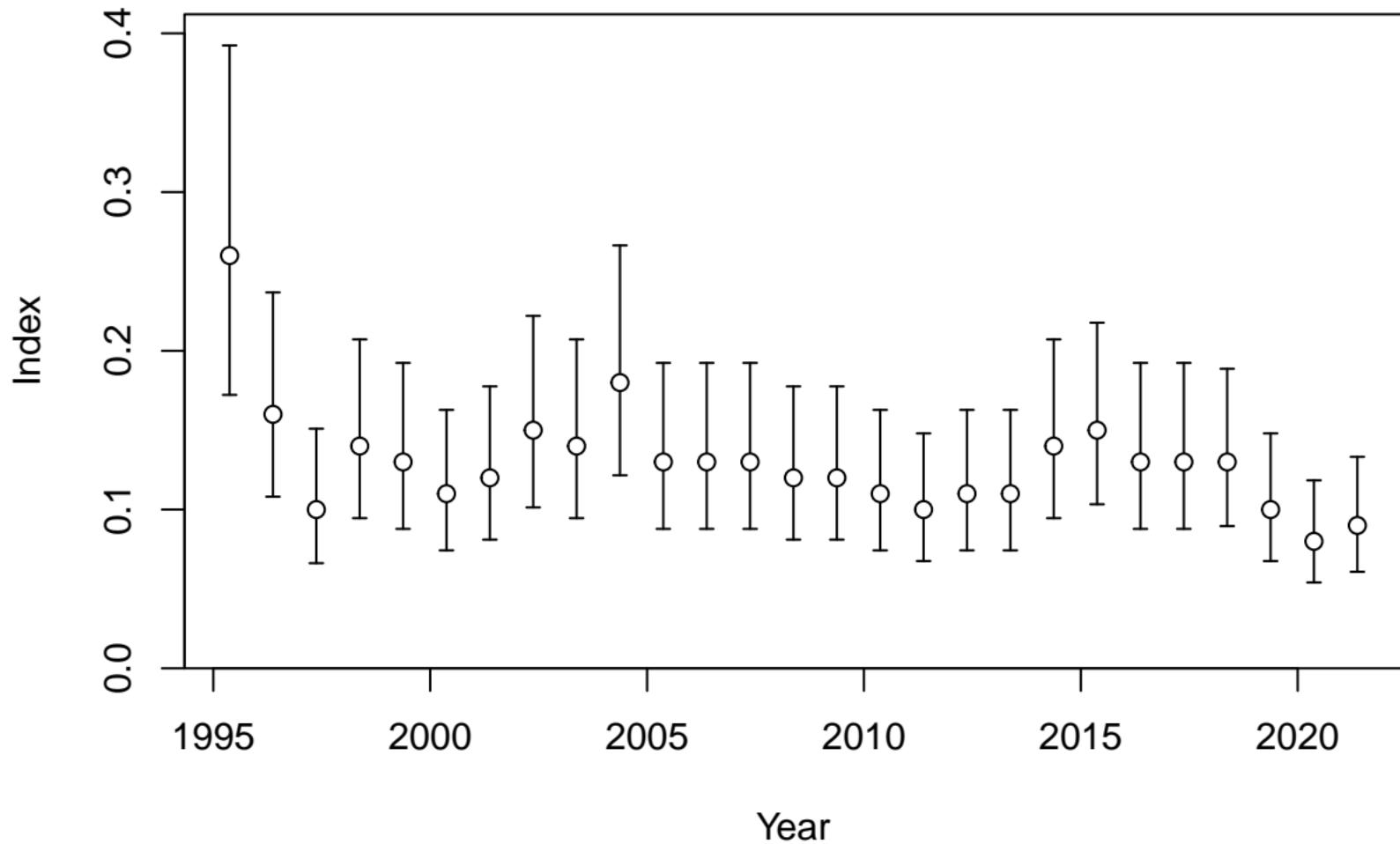
-0.6 -0.4 -0.2 0.0 0.2 0.4

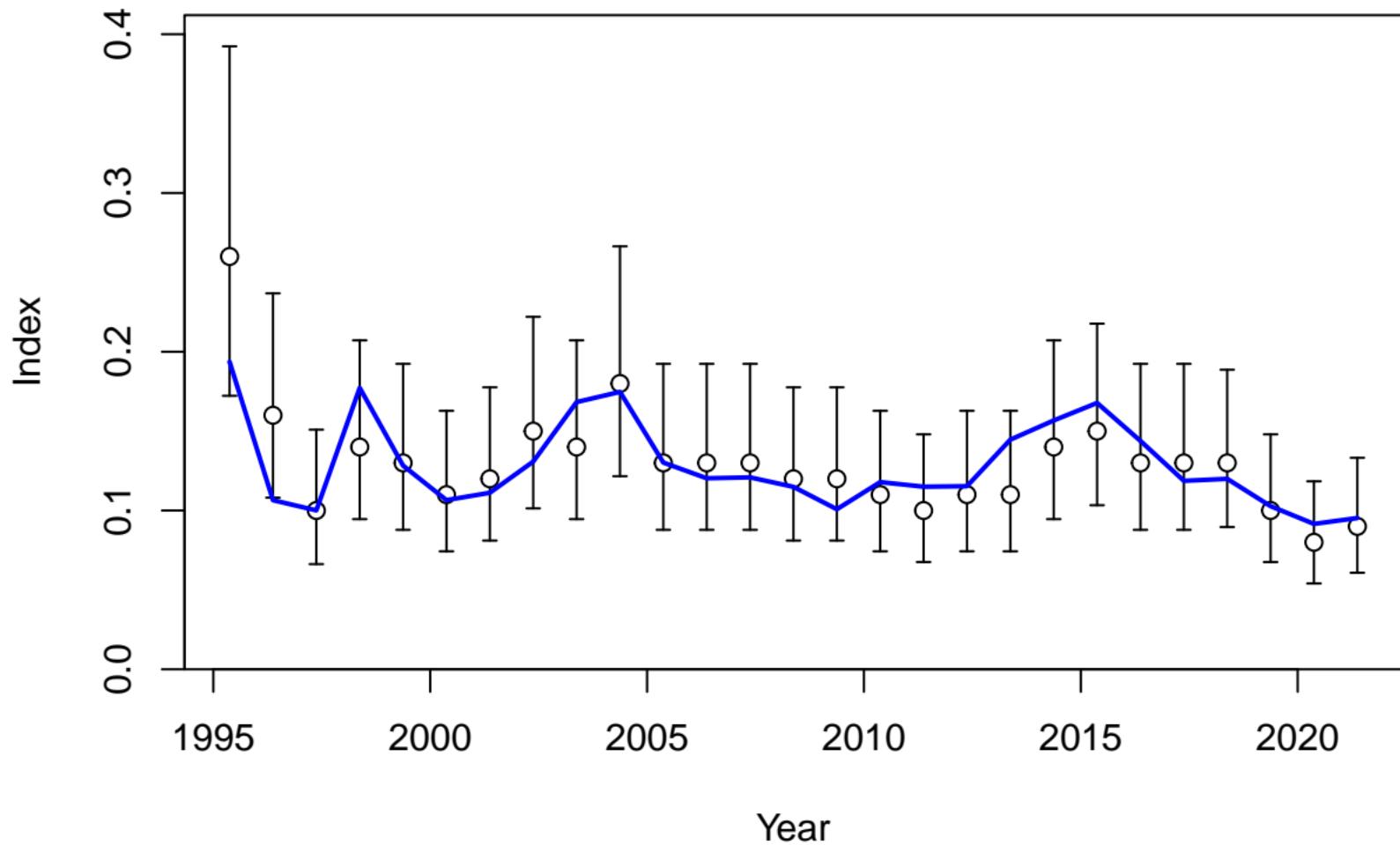
Log observed index

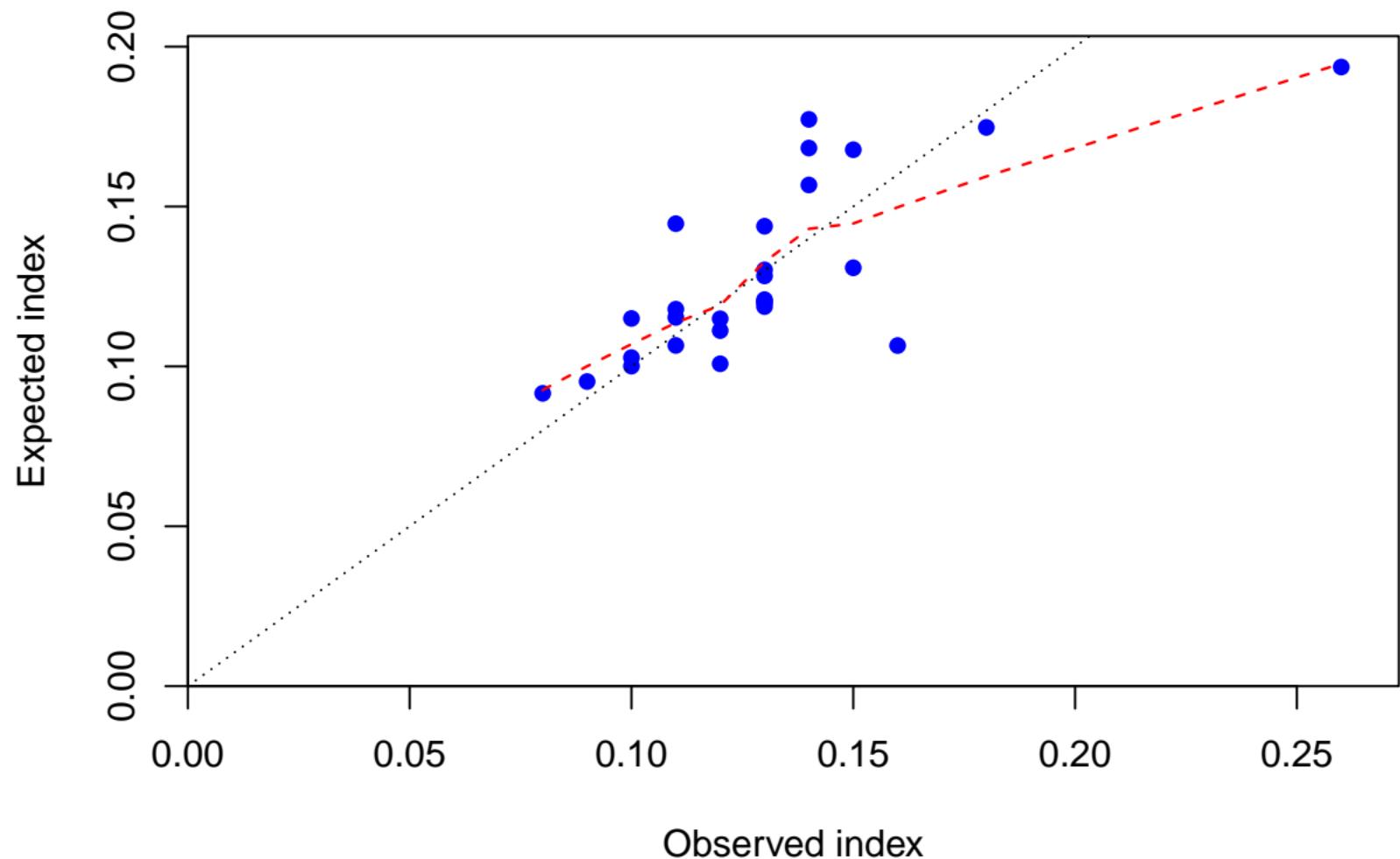




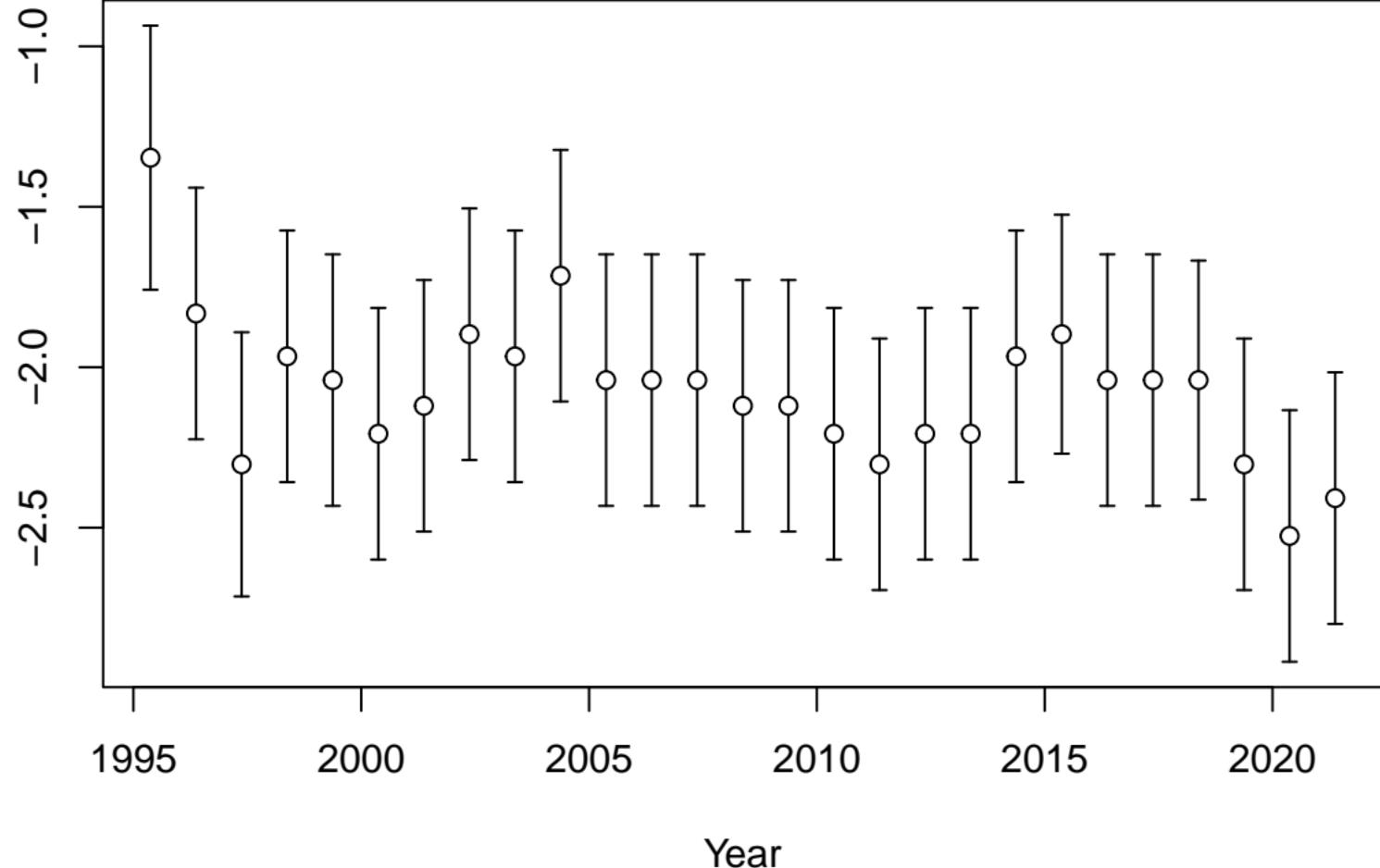




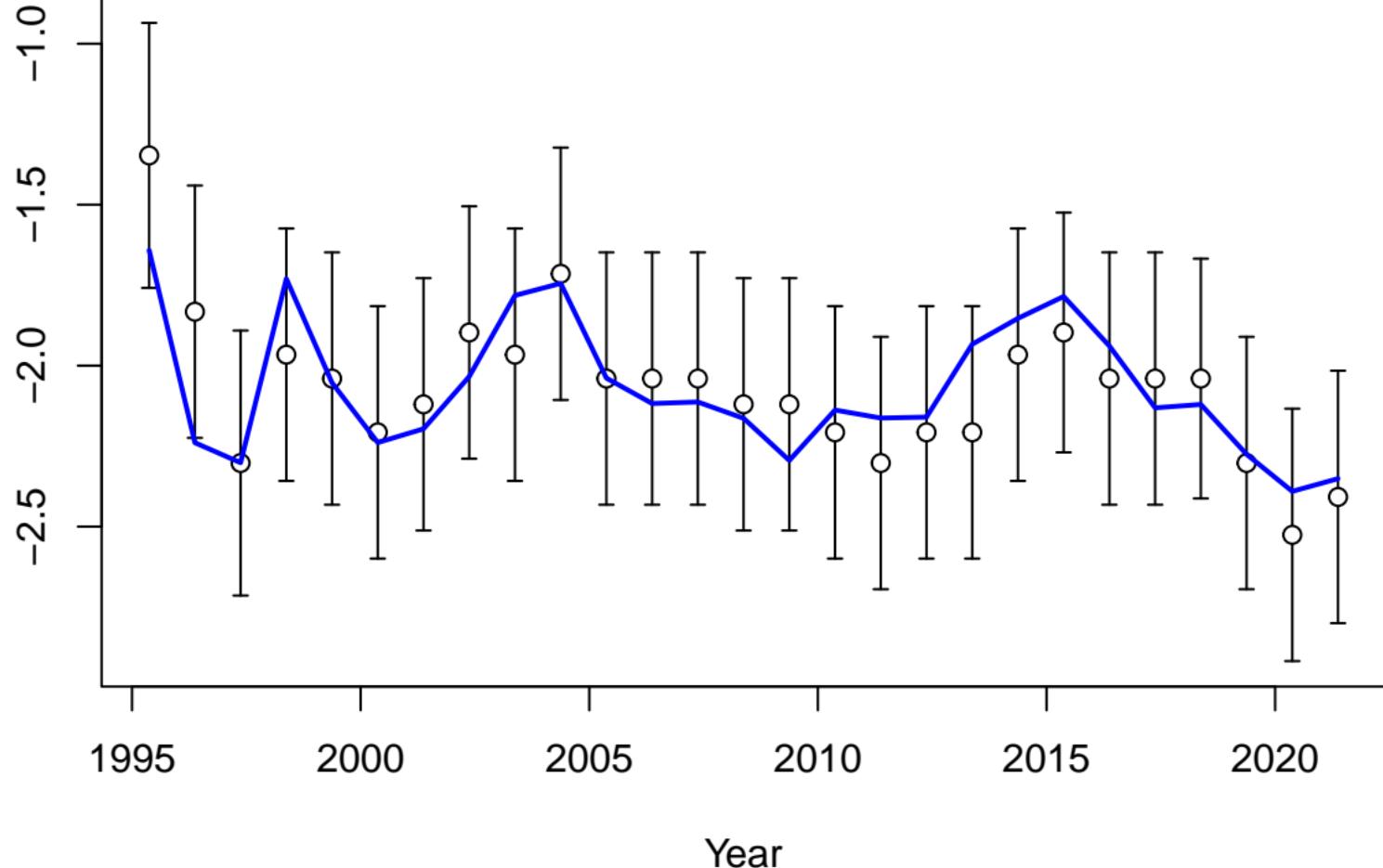


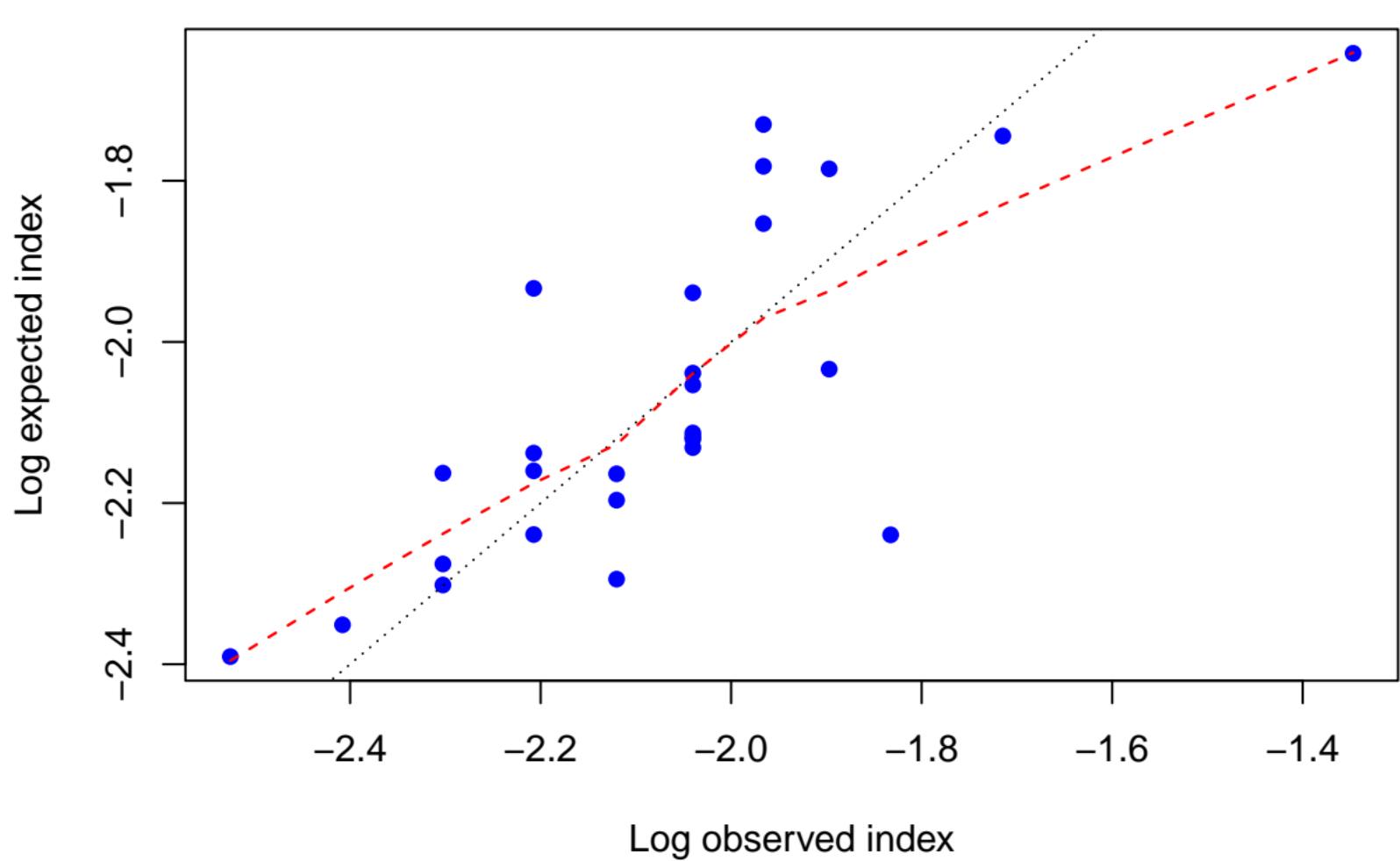


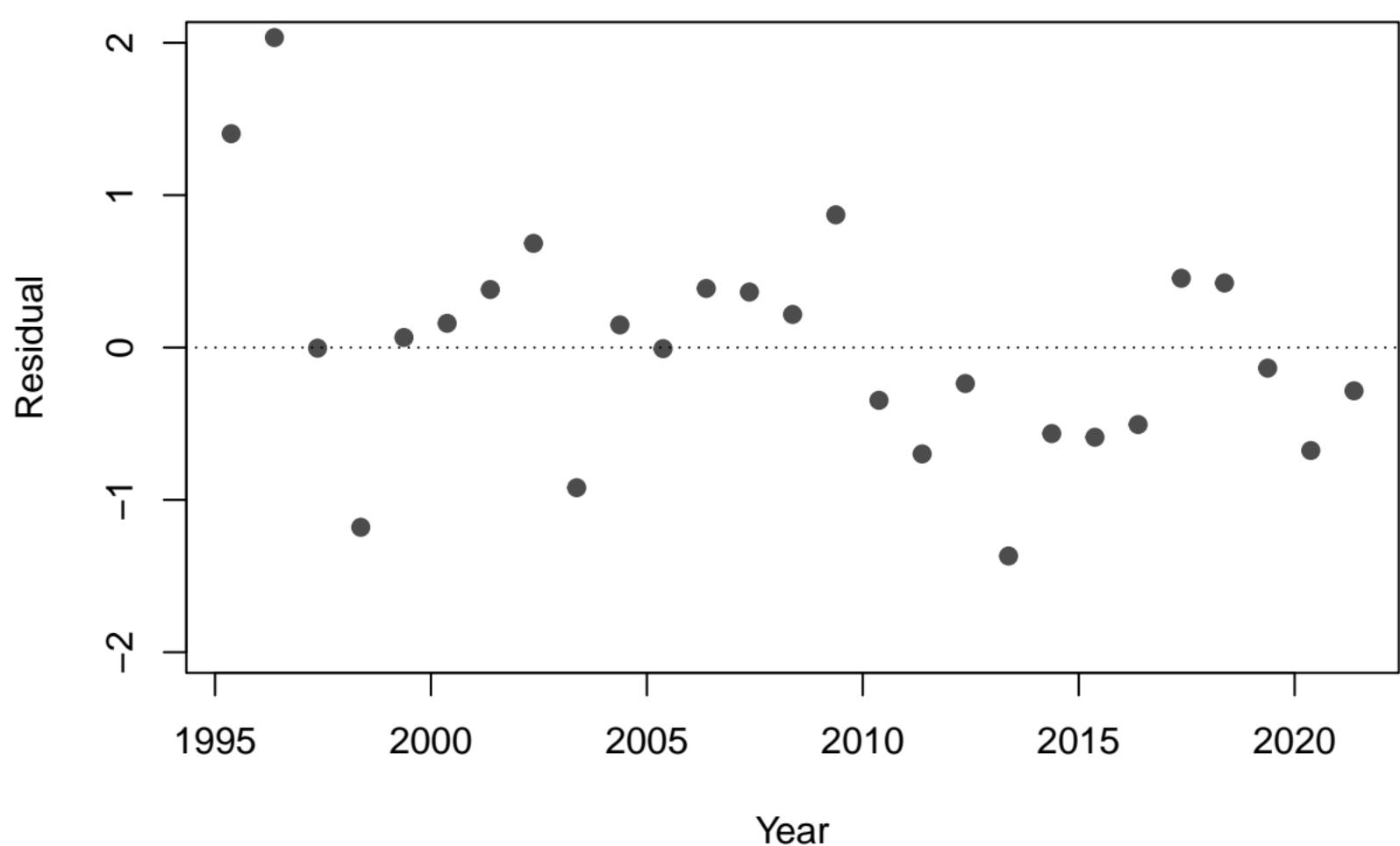
Log index



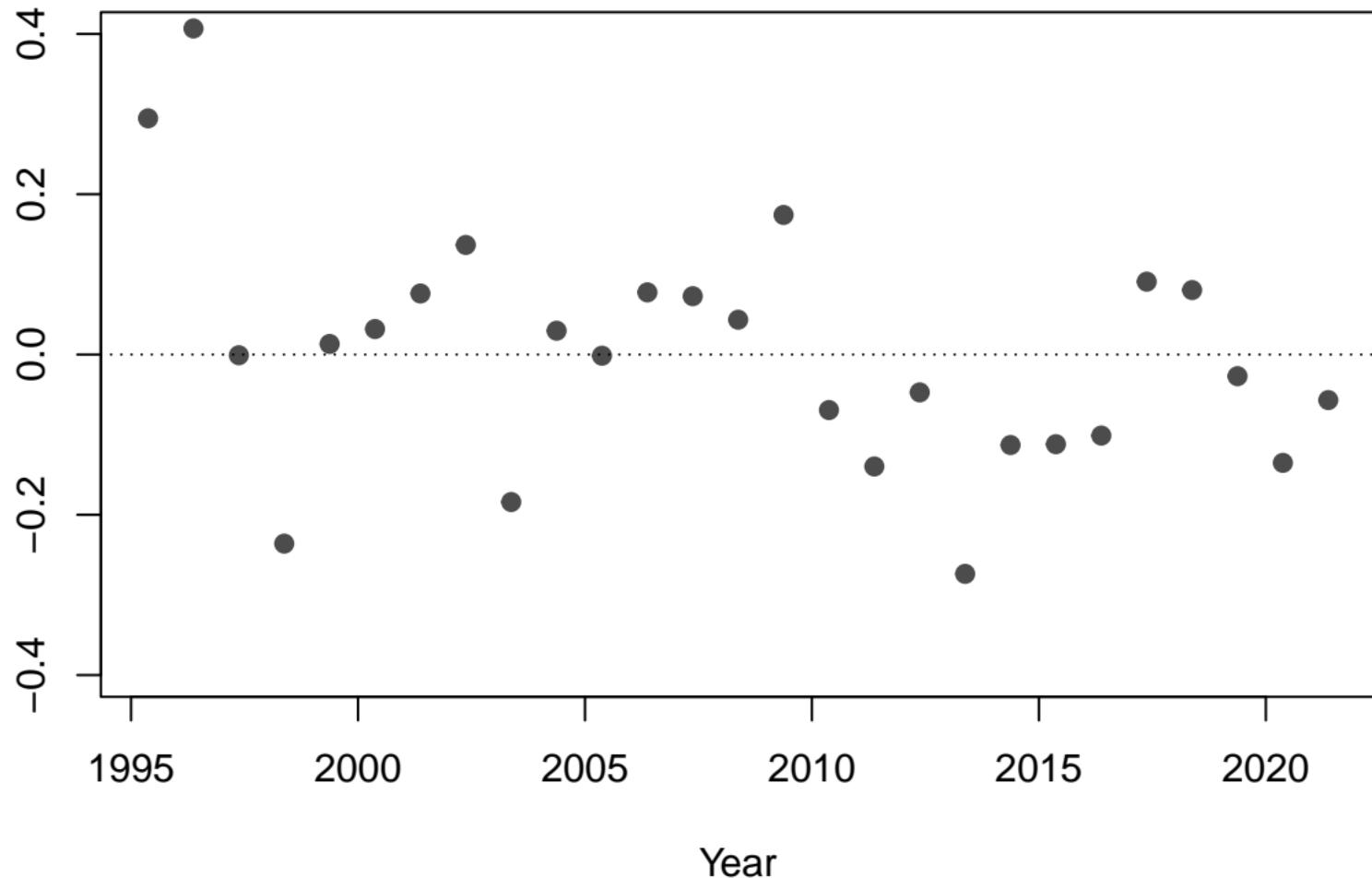
Log index

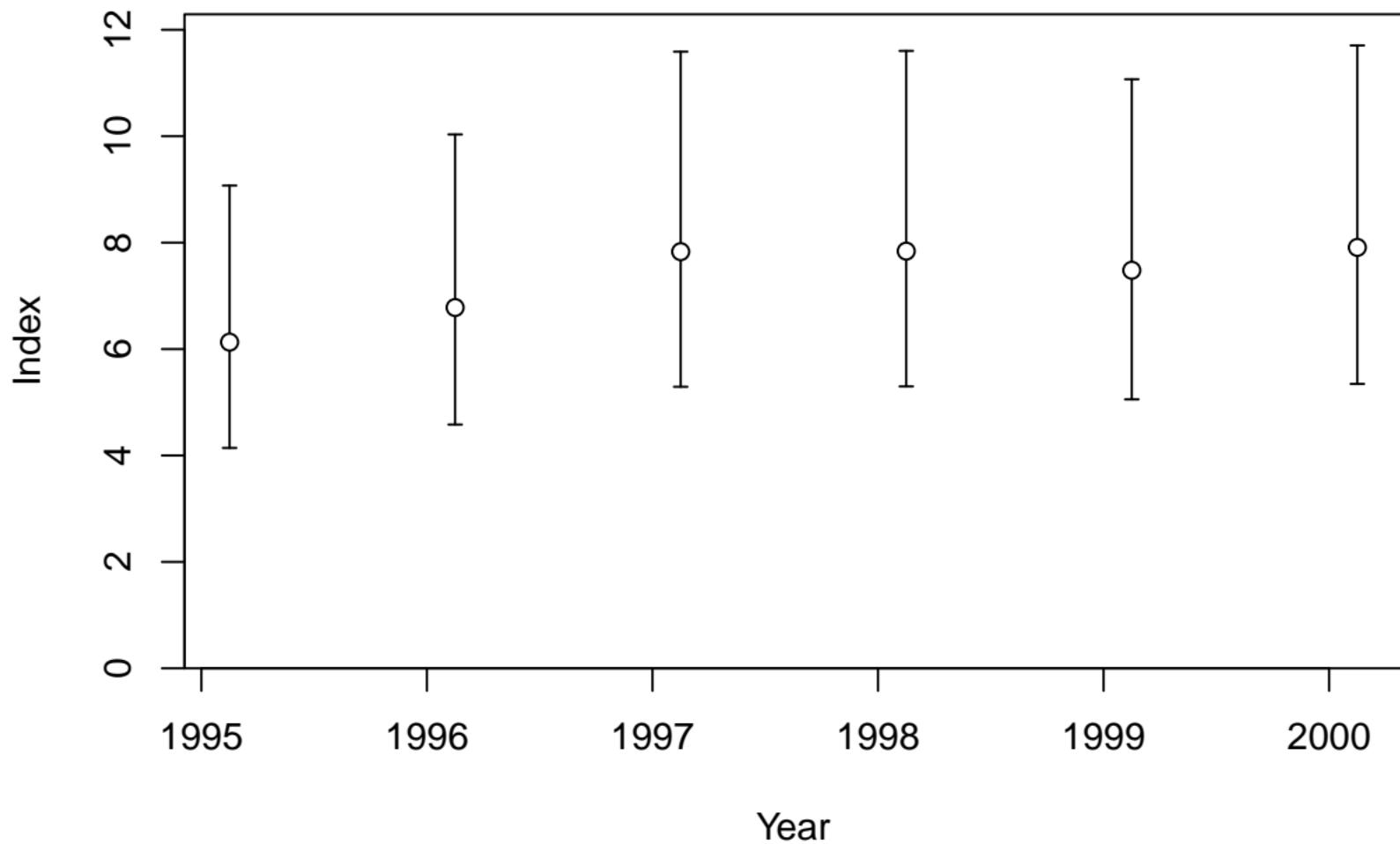


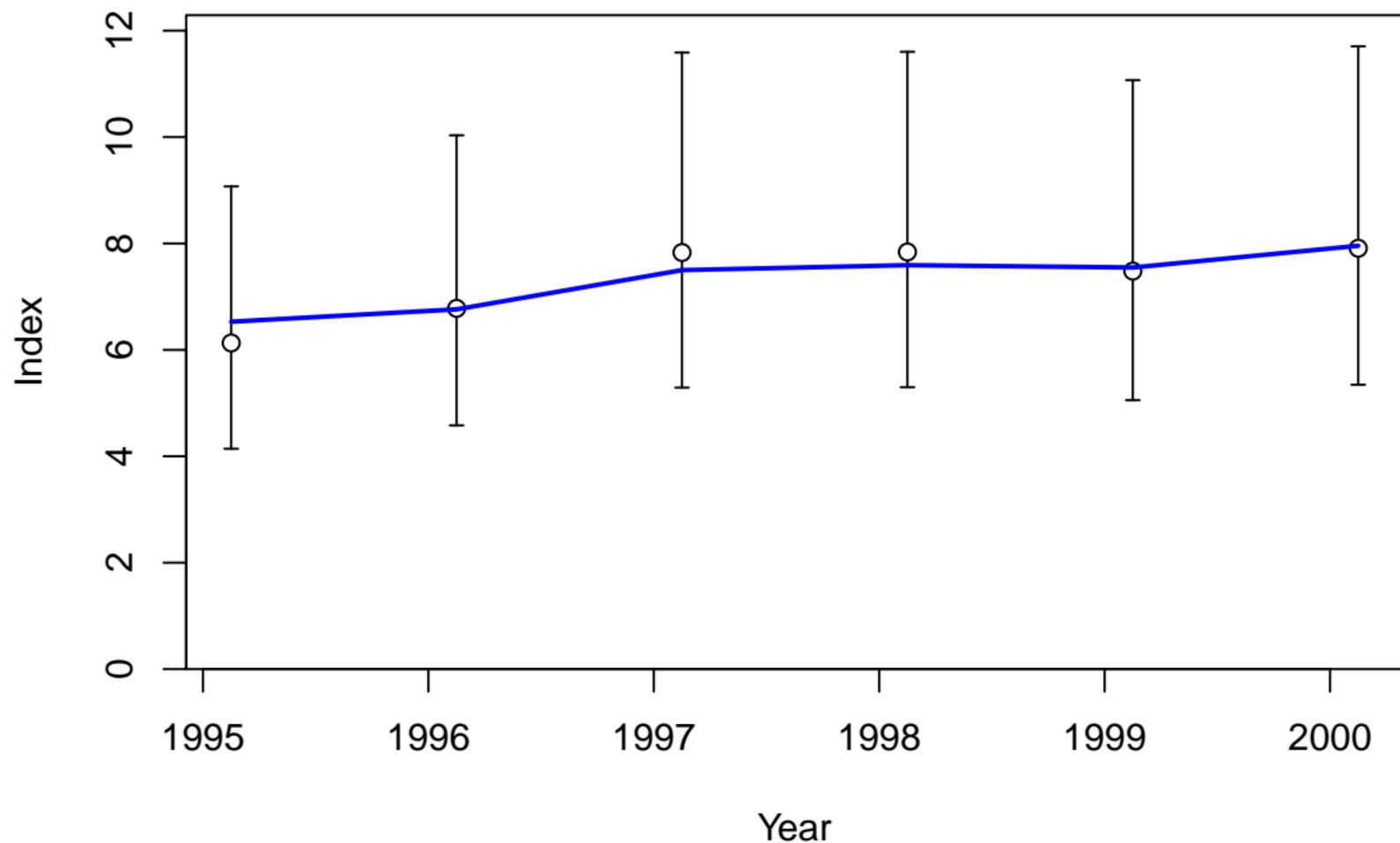




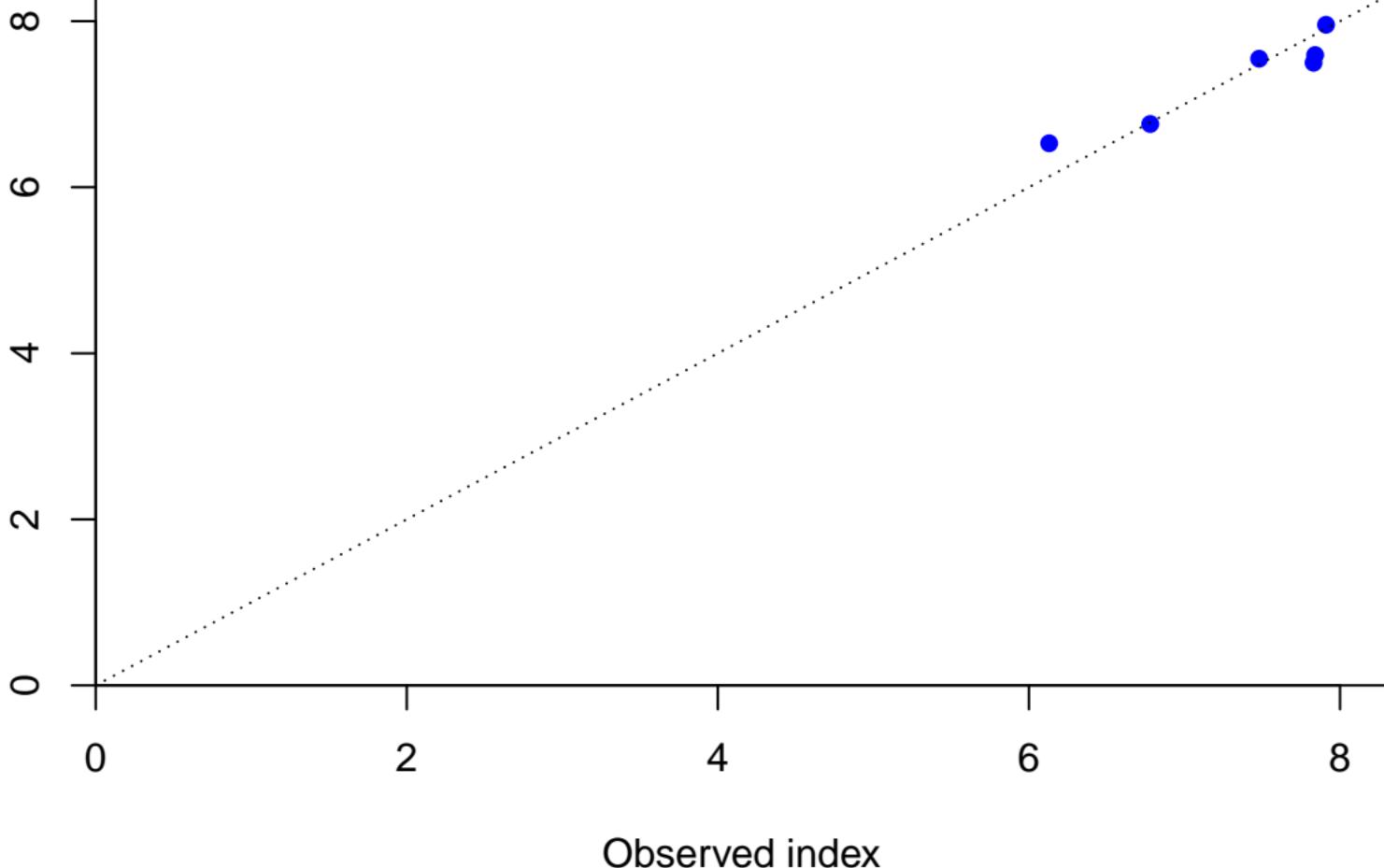
Deviation





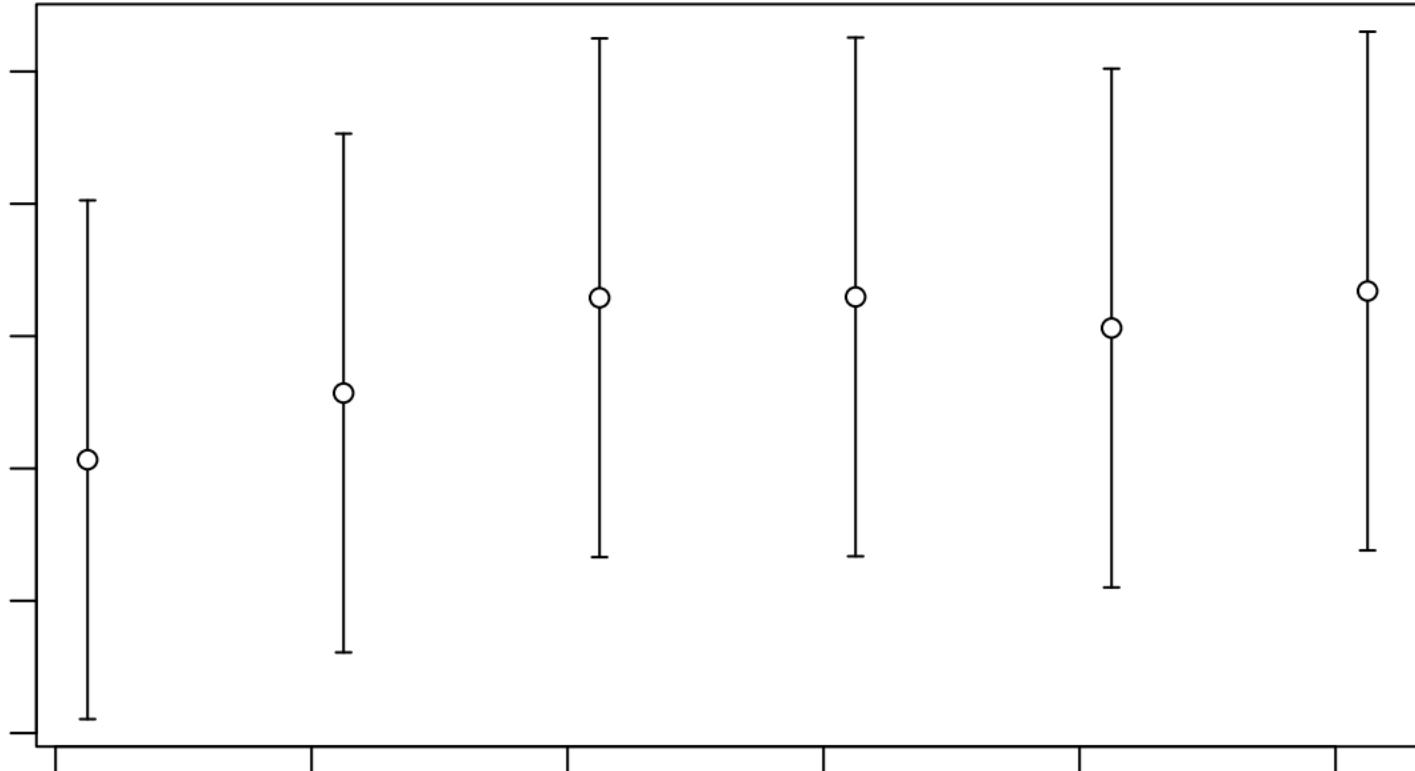


Expected index



Log index

1.4 1.6 1.8 2.0 2.2 2.4



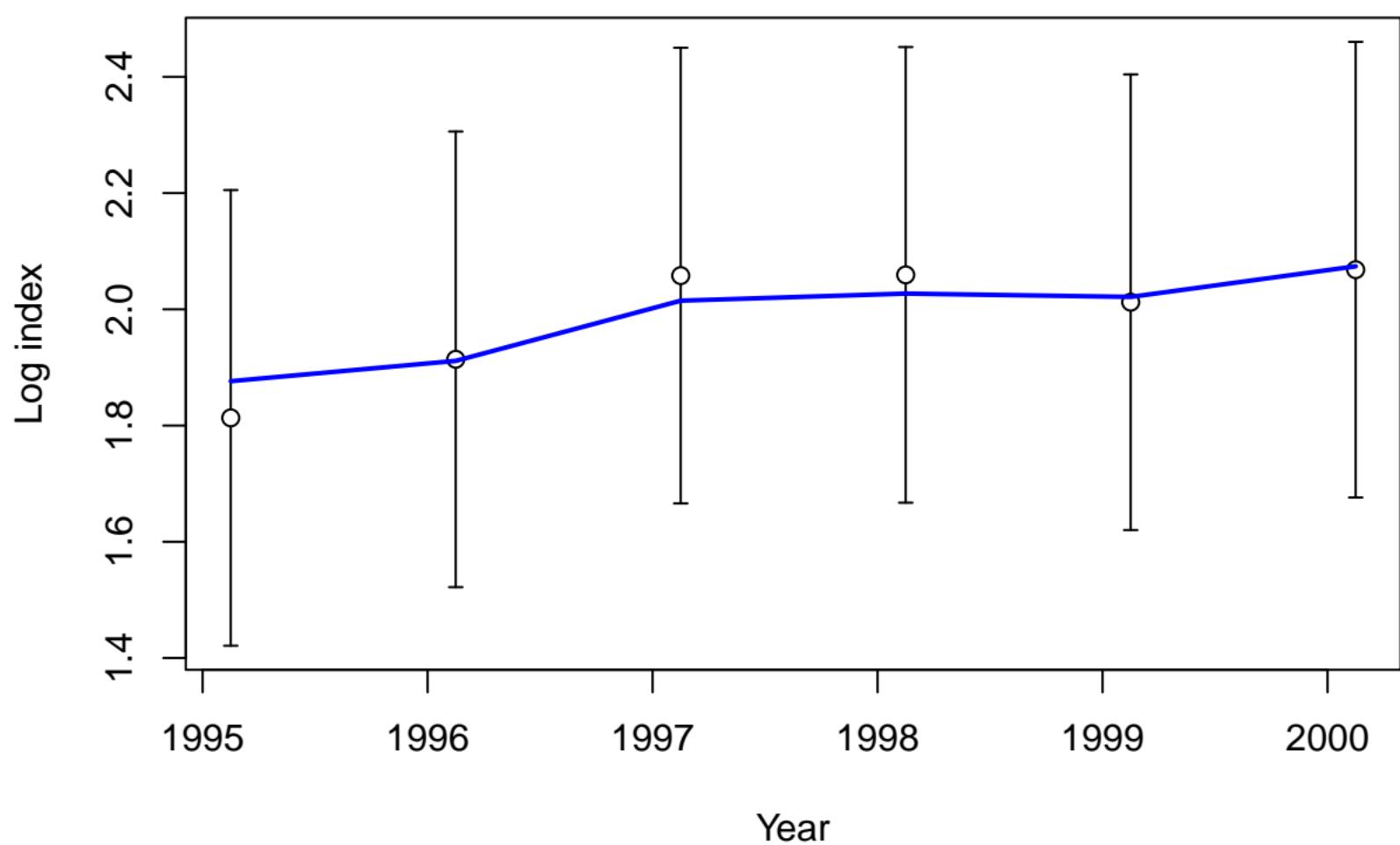
Year

Log index

2.4  
2.2  
2.0  
1.8  
1.6  
1.4

1995 1996 1997 1998 1999 2000

Year

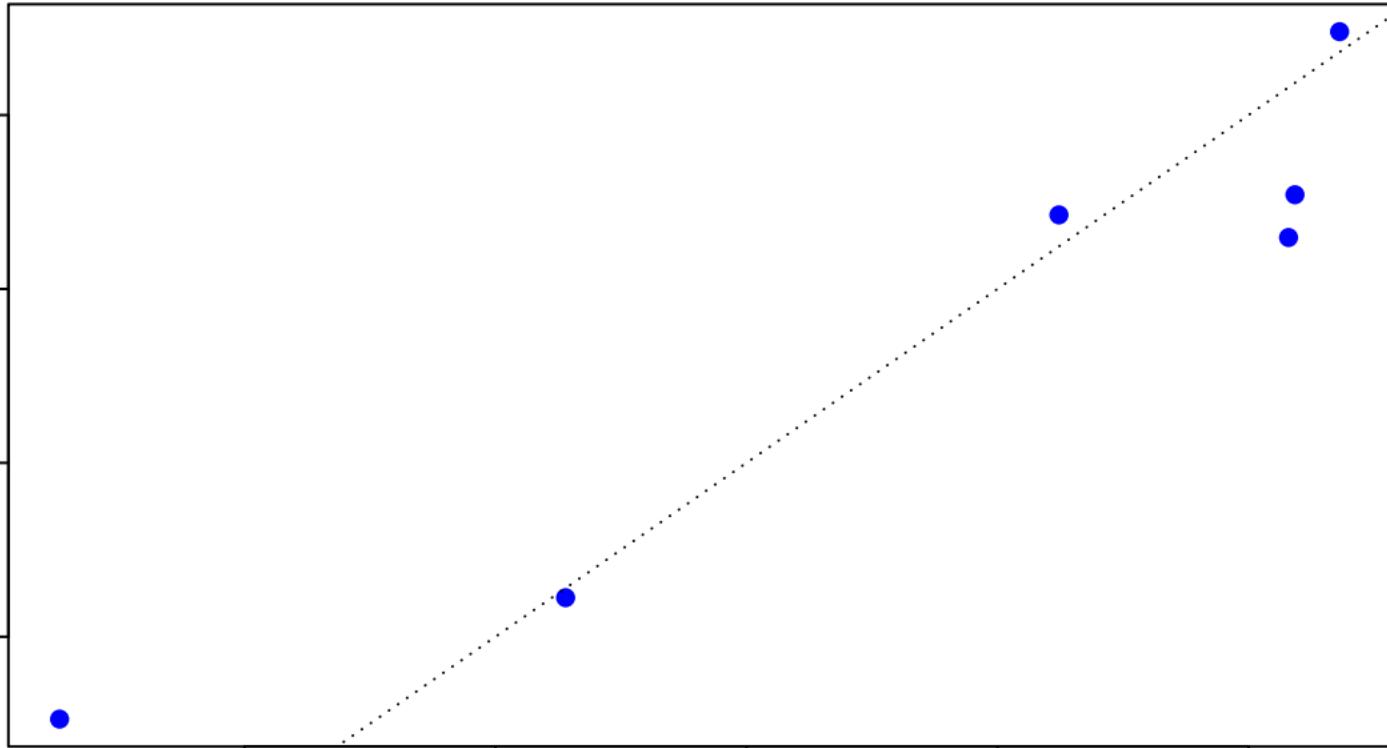


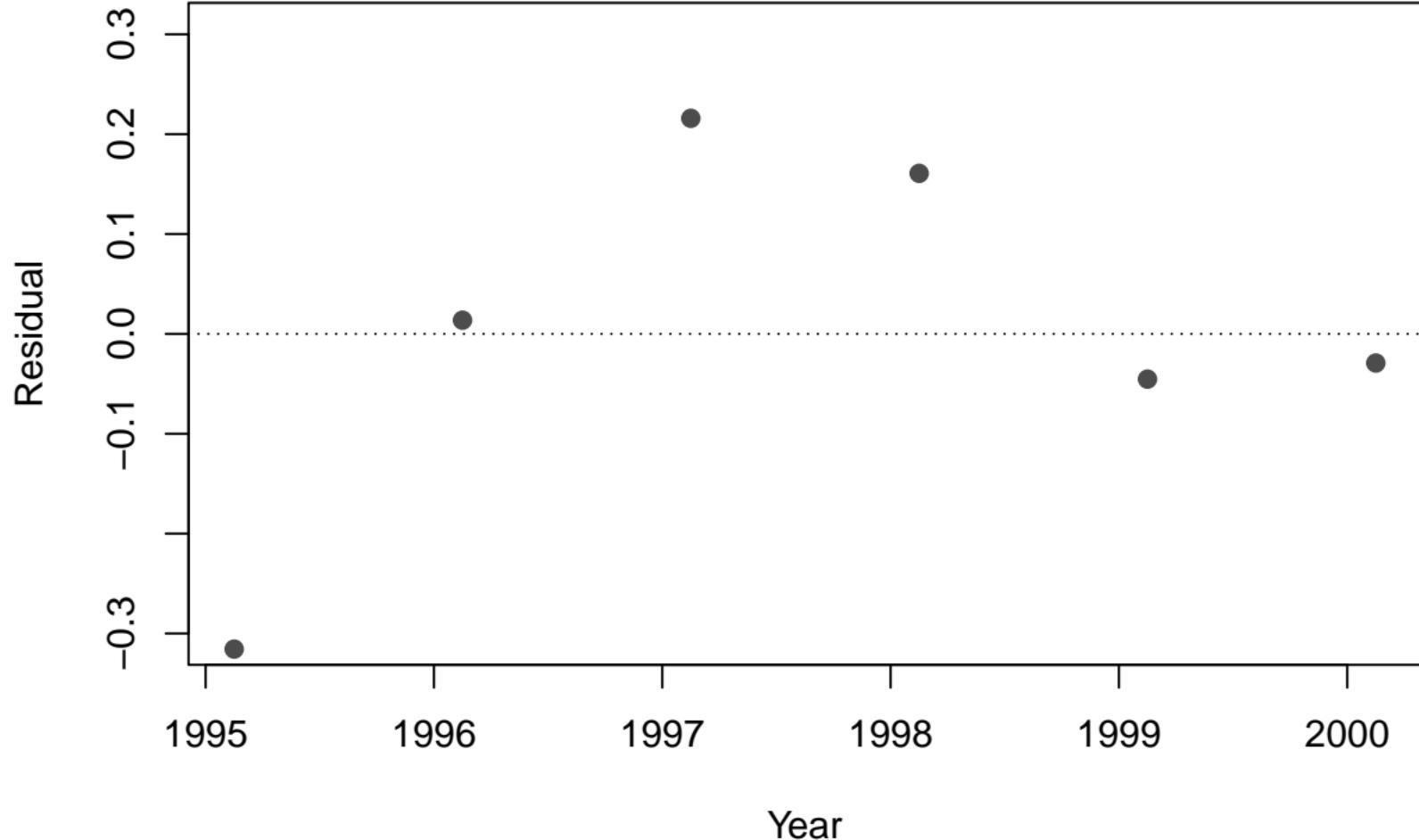
Log expected index

1.90 1.95 2.00 2.05

1.85 1.90 1.95 2.00 2.05

Log observed index





Deviation

0.06

0.02

-0.02

-0.06

1995

1996

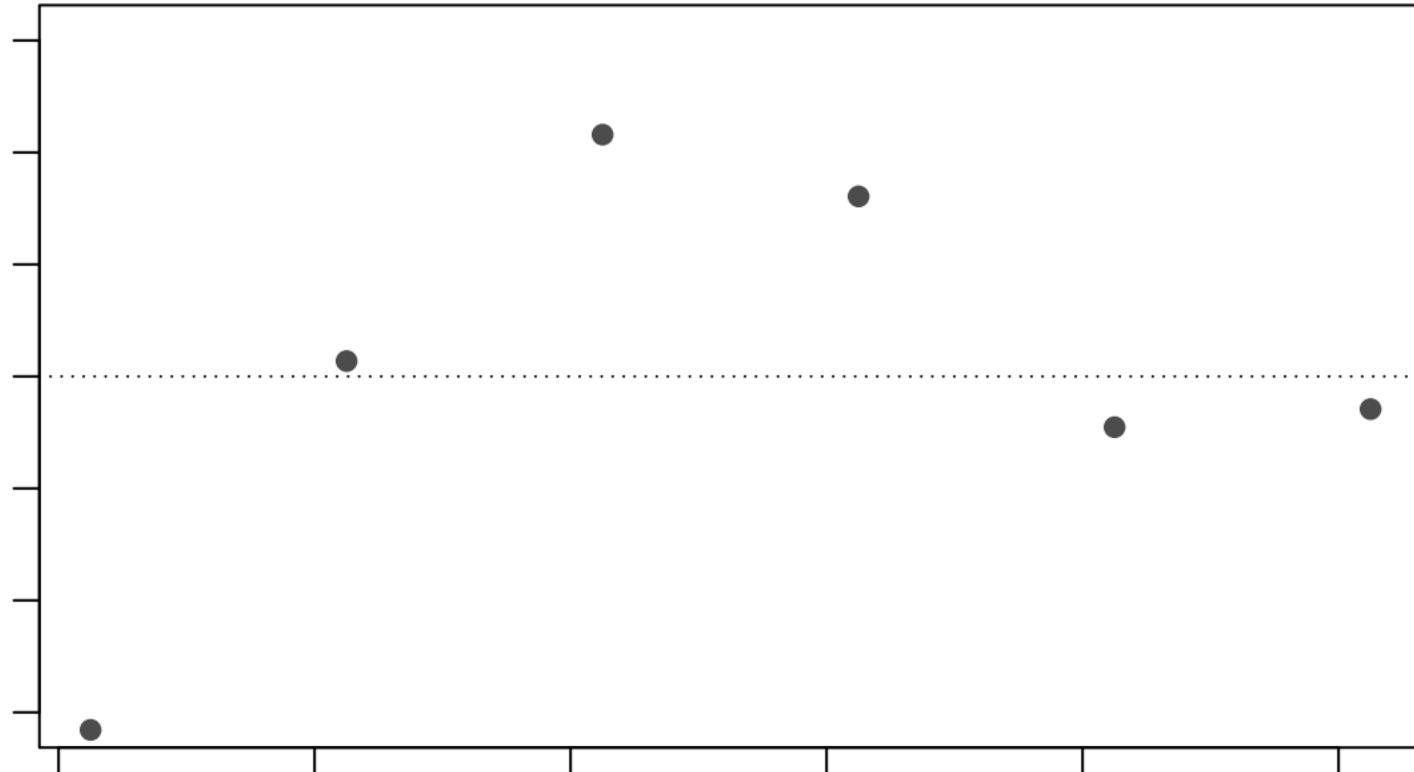
1997

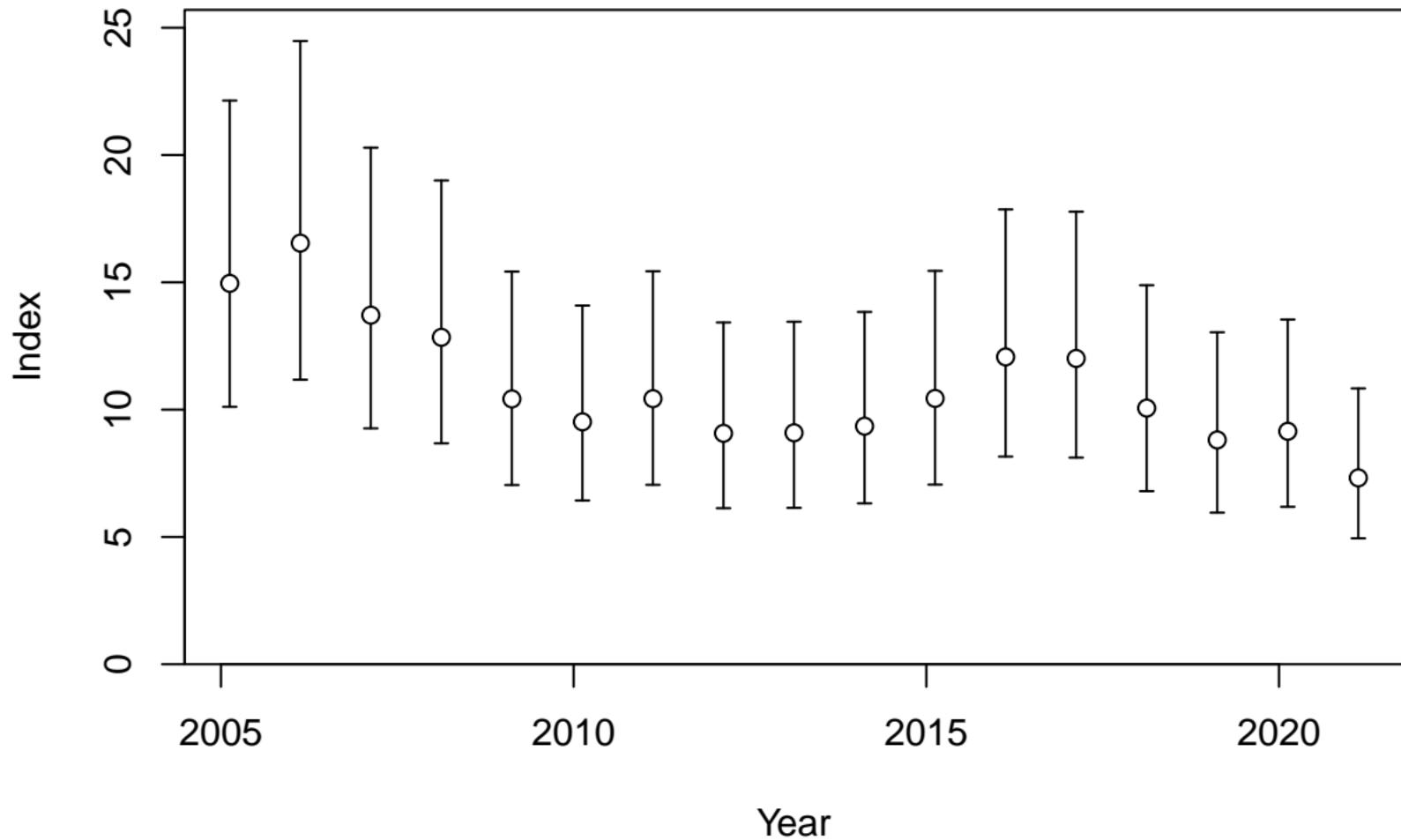
1998

1999

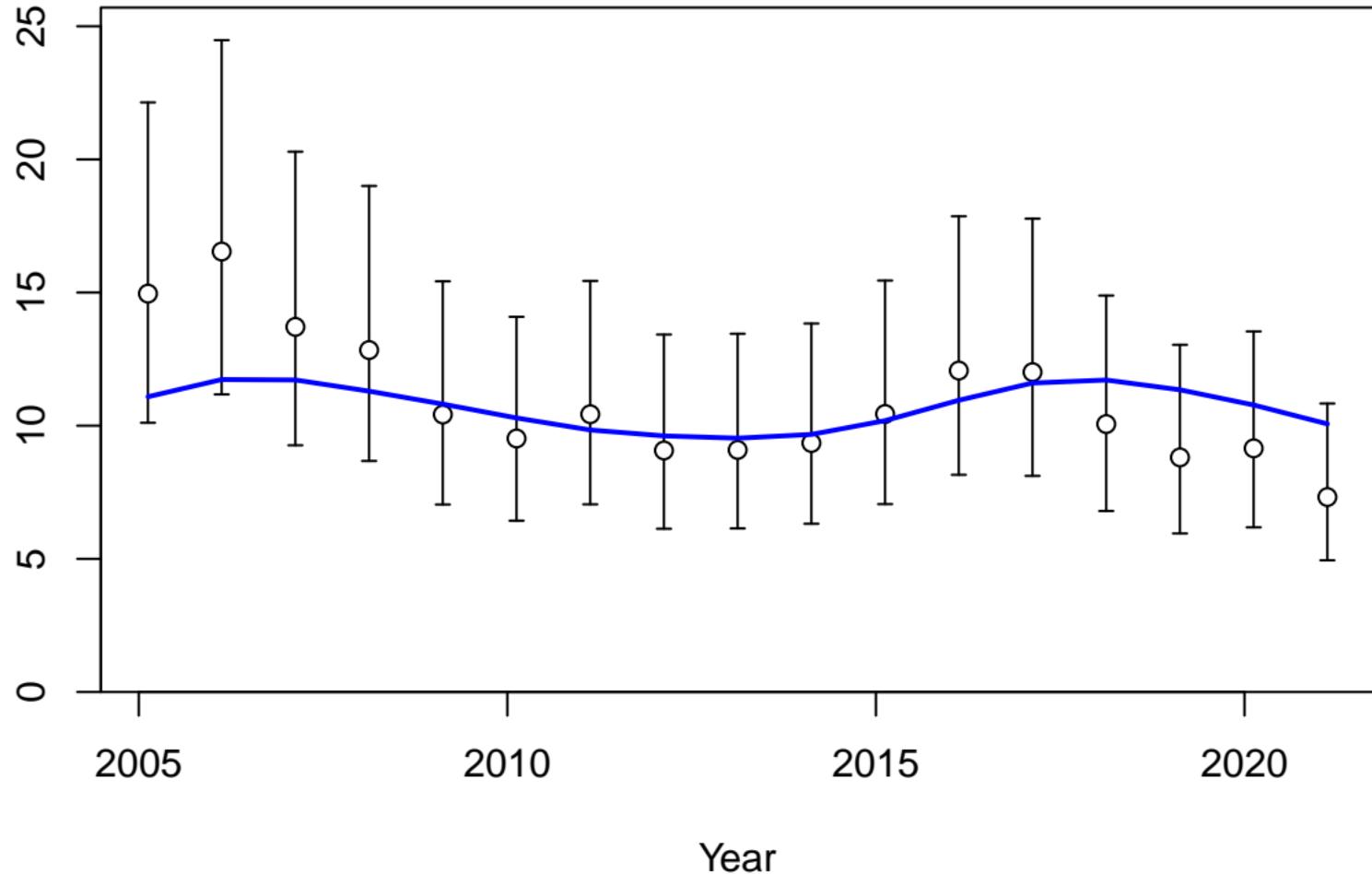
2000

Year

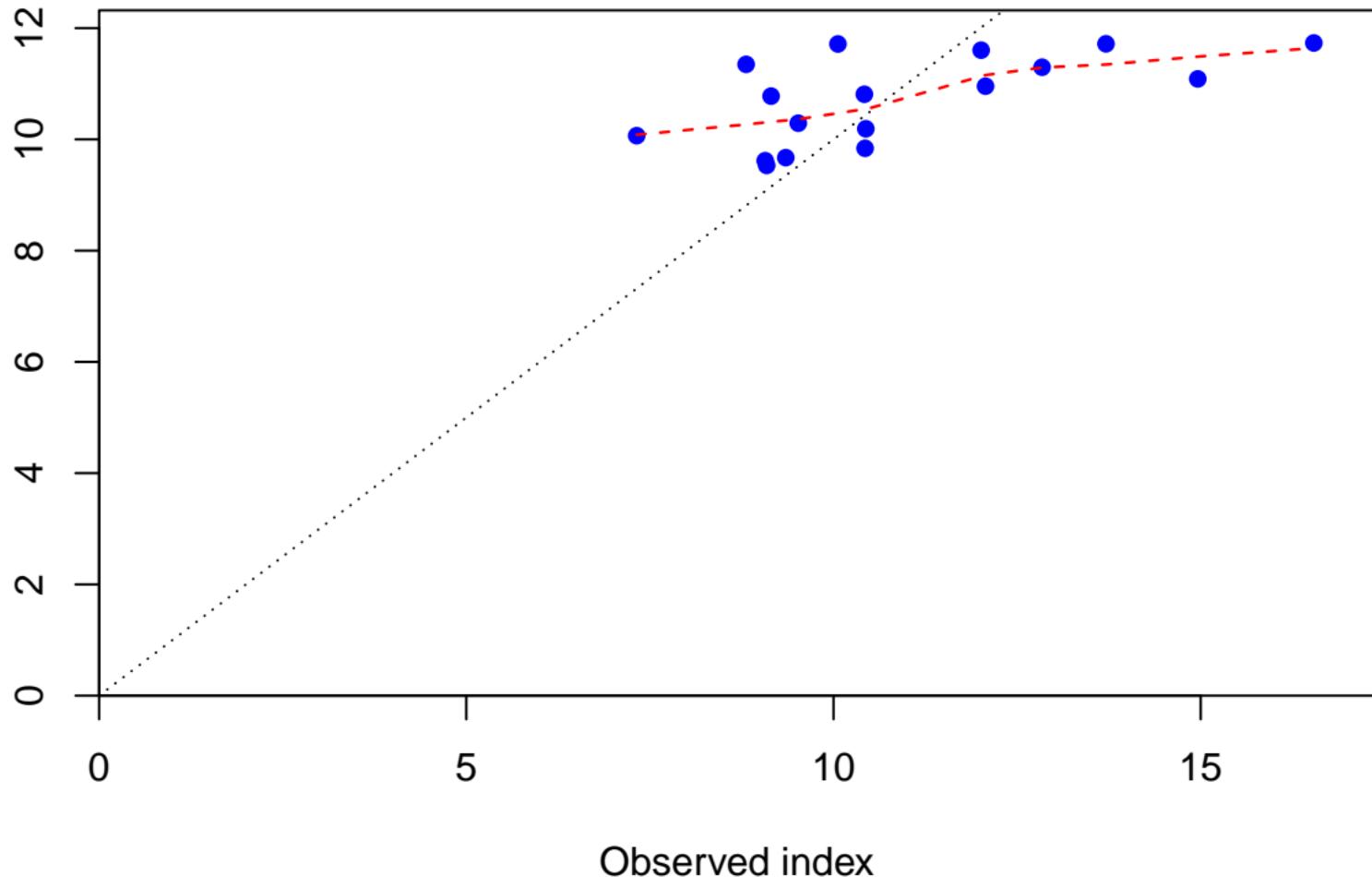




Index



Expected index



Log index

3.0  
2.5  
2.0

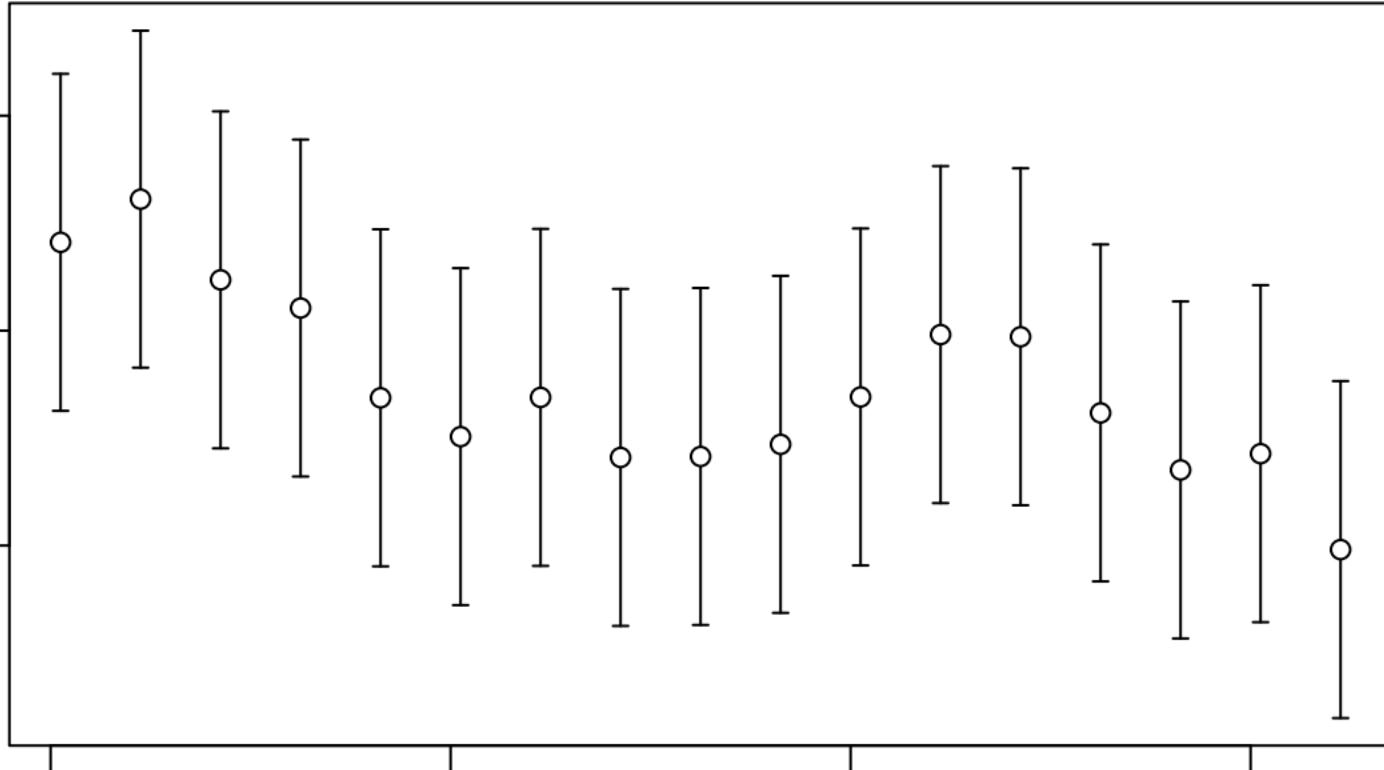
2005

2010

2015

2020

Year

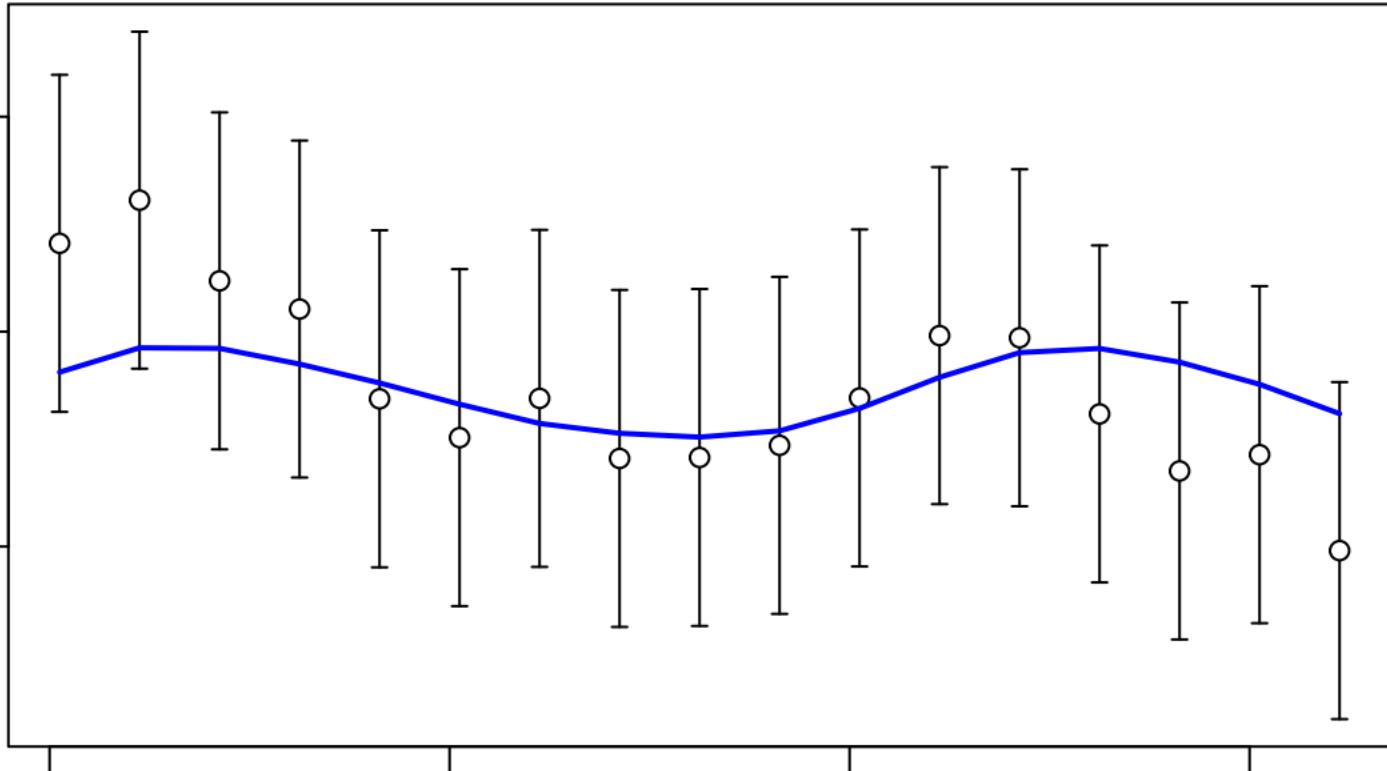


Log index

3.0  
2.5  
2.0

2005 2010 2015 2020

Year



Log expected index

2.25 2.30 2.35 2.40 2.45

2.0

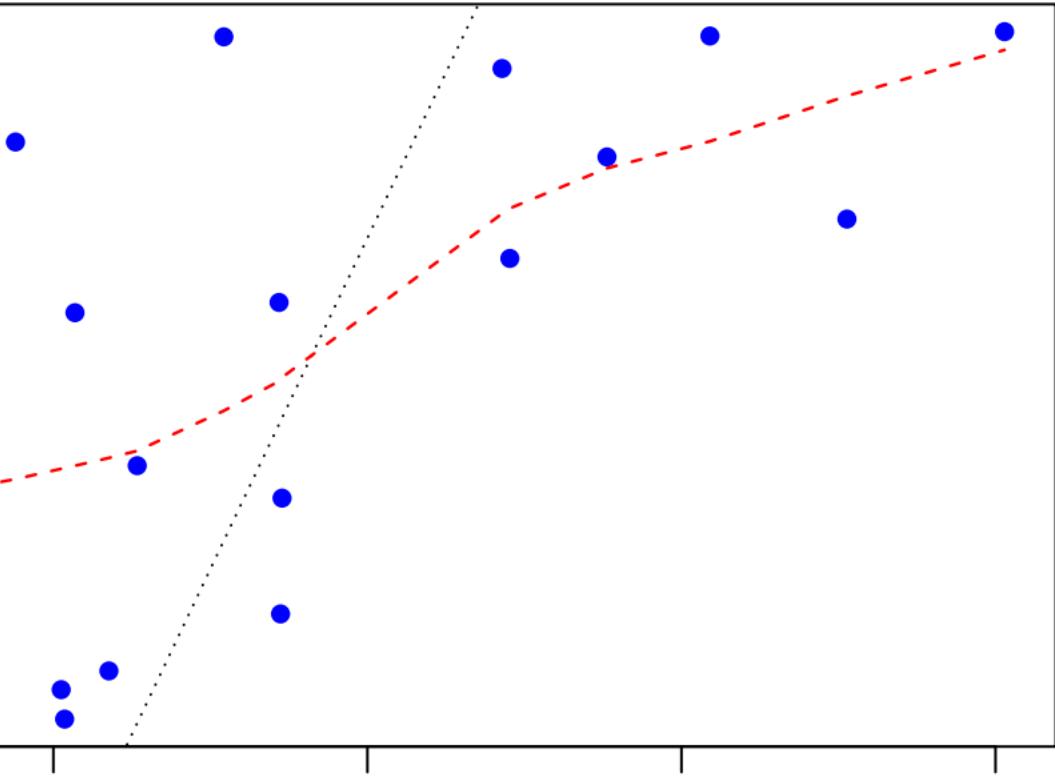
2.2

2.4

2.6

2.8

Log observed index

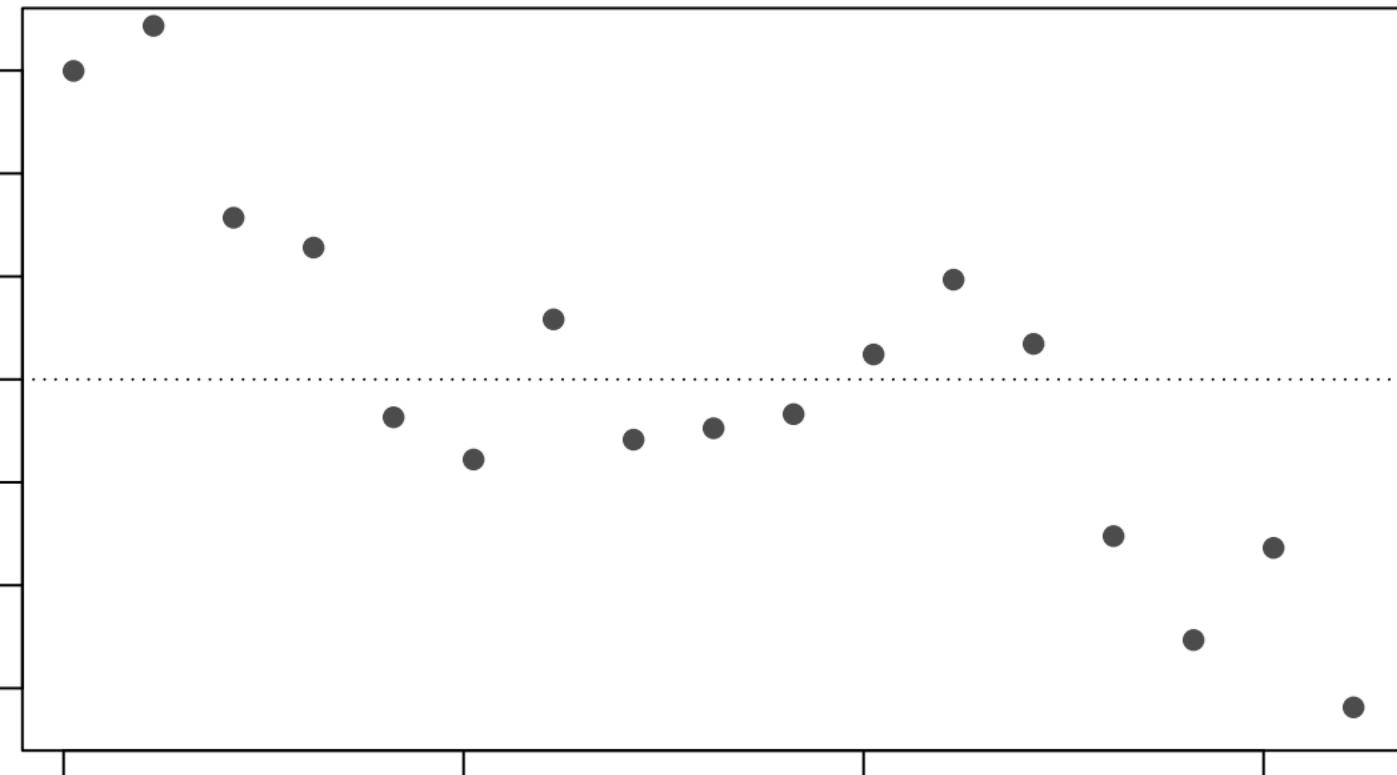


Residual

-1.5  
-0.5  
0.5  
1.0  
1.5

2005 2010 2015 2020

Year

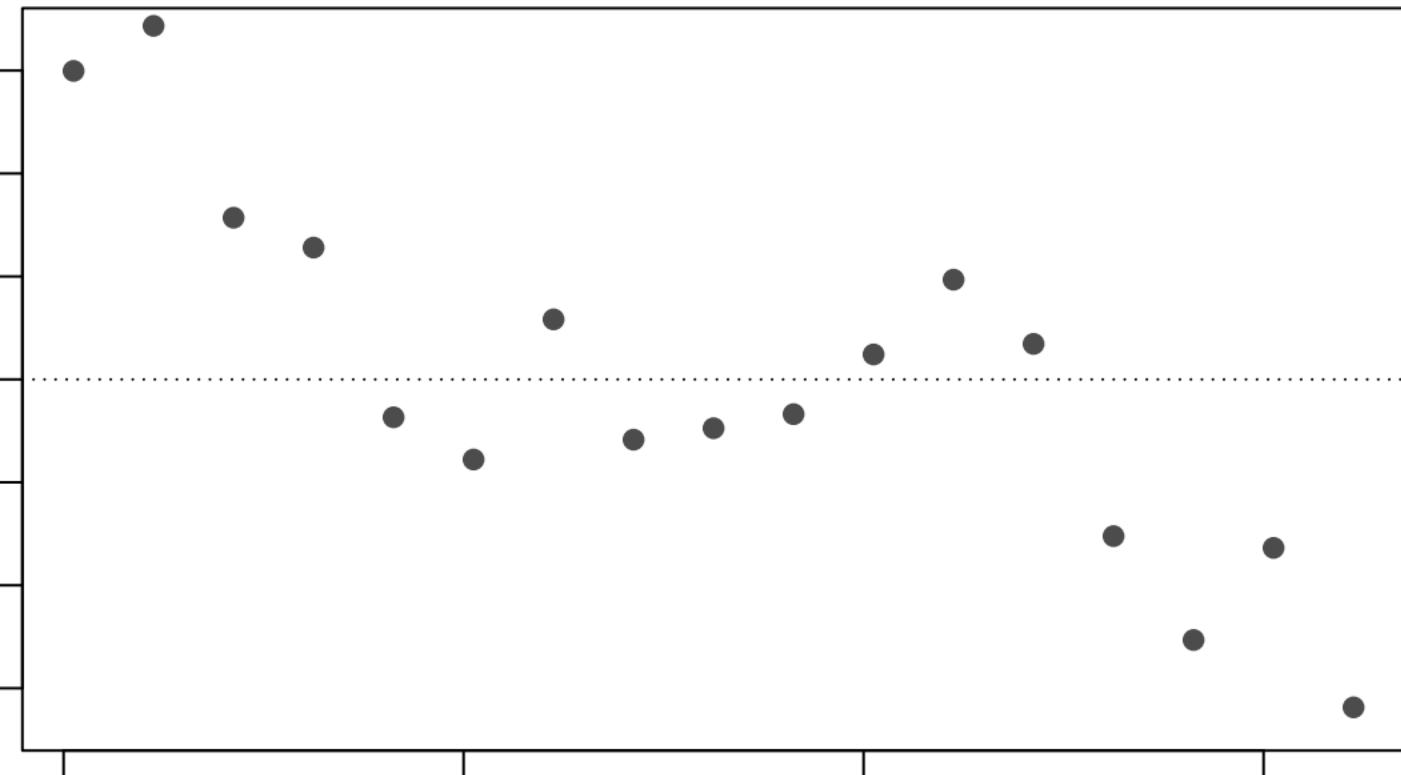


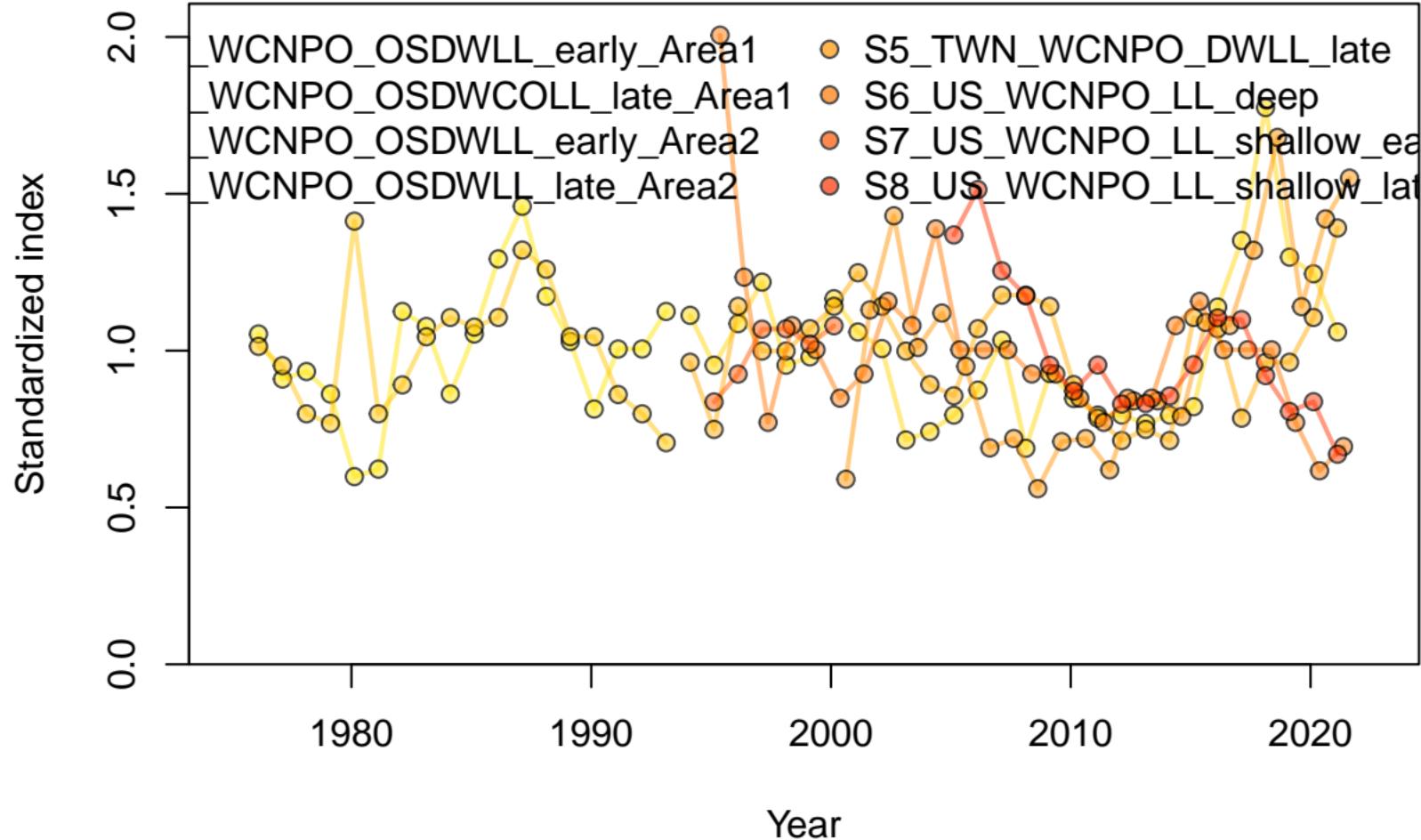
Deviation

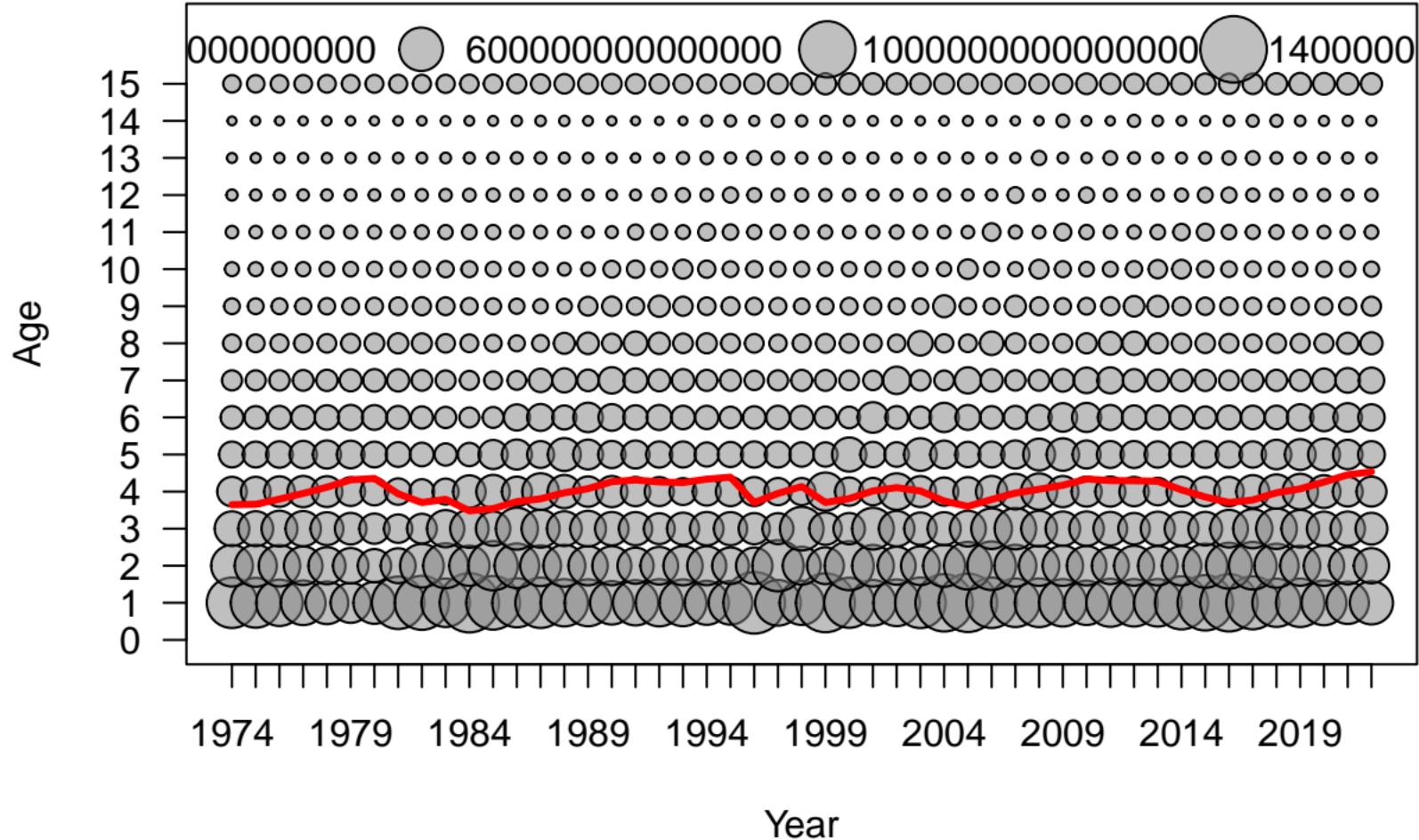
-0.3  
-0.1  
0.1  
0.2  
0.3

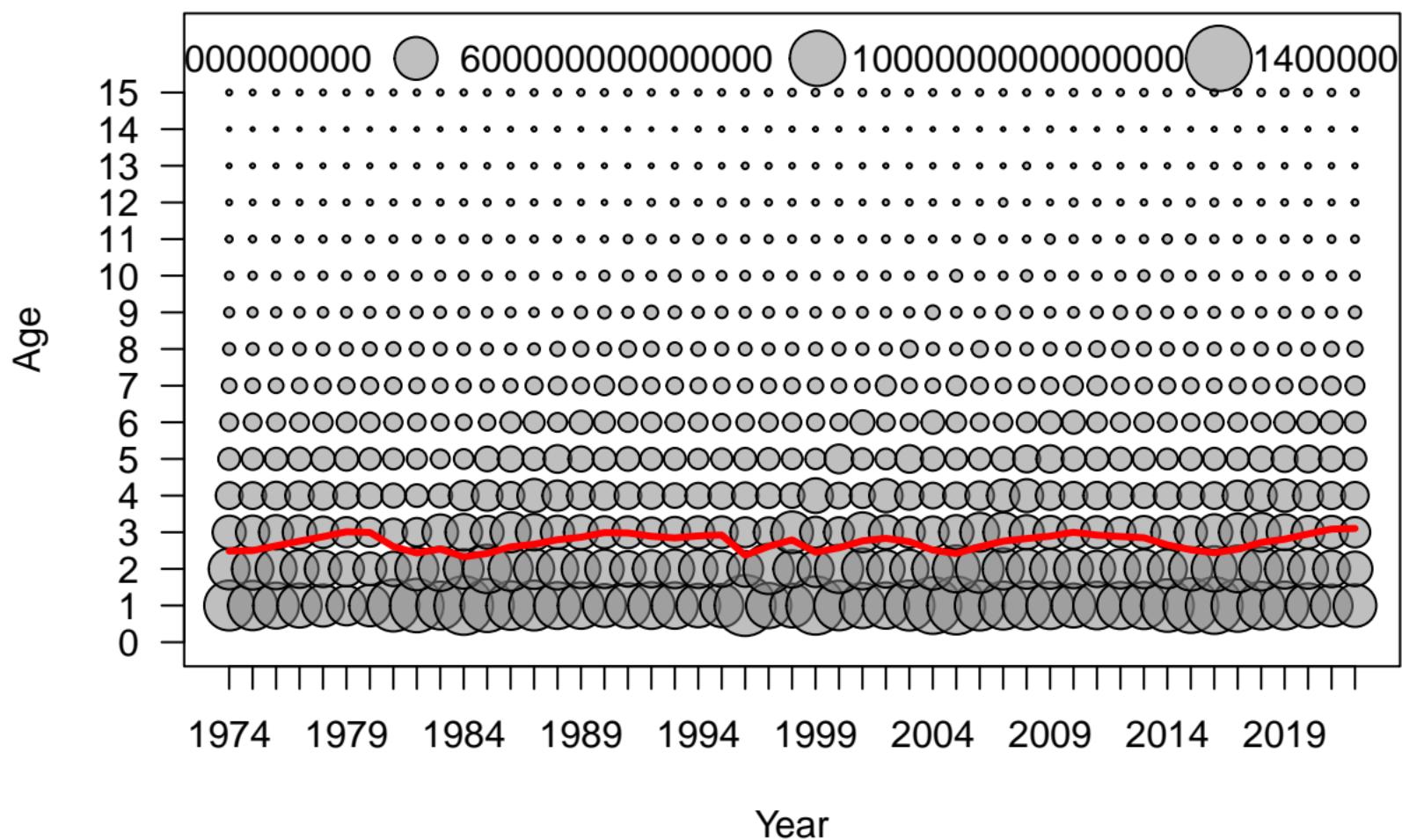
2005 2010 2015 2020

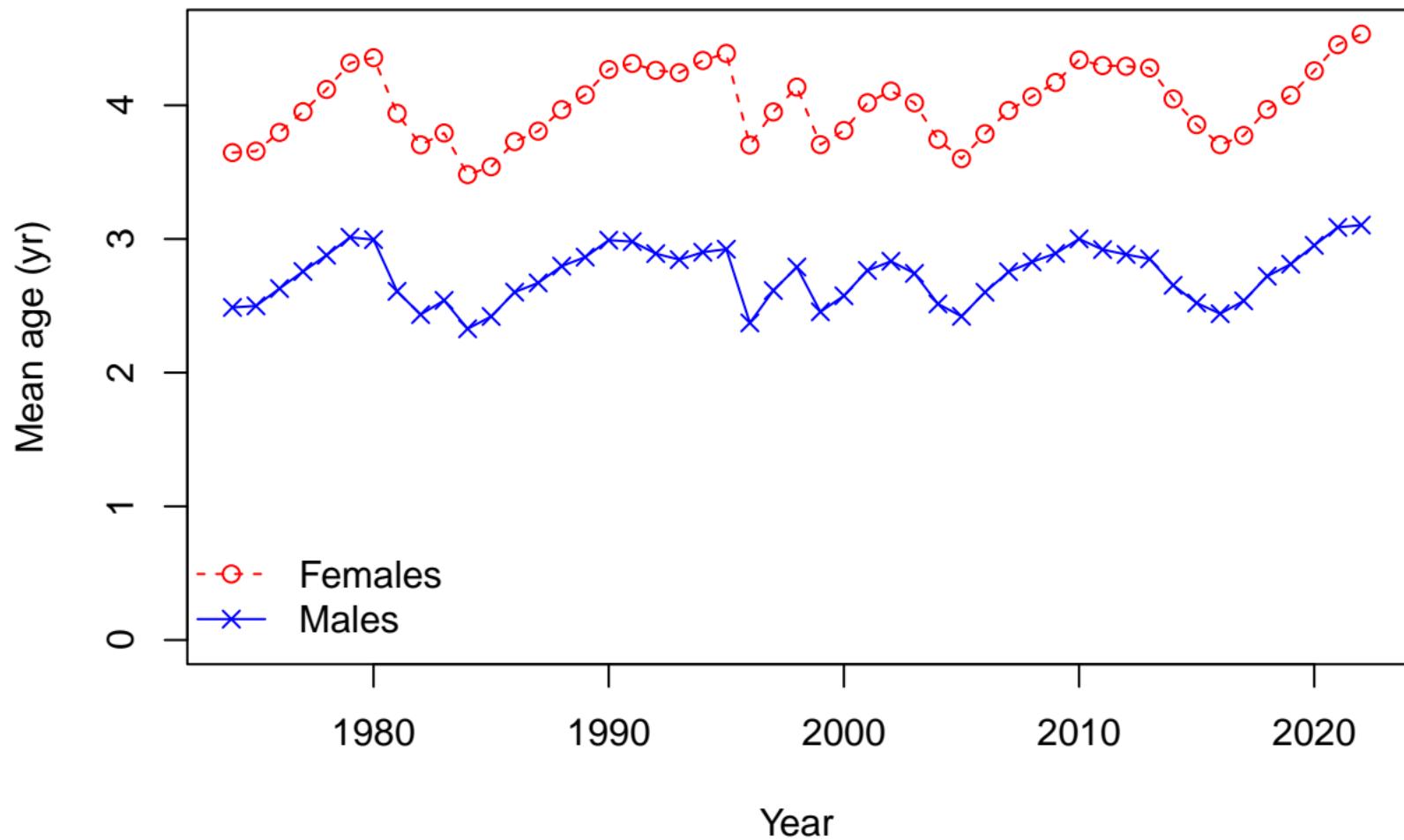
Year

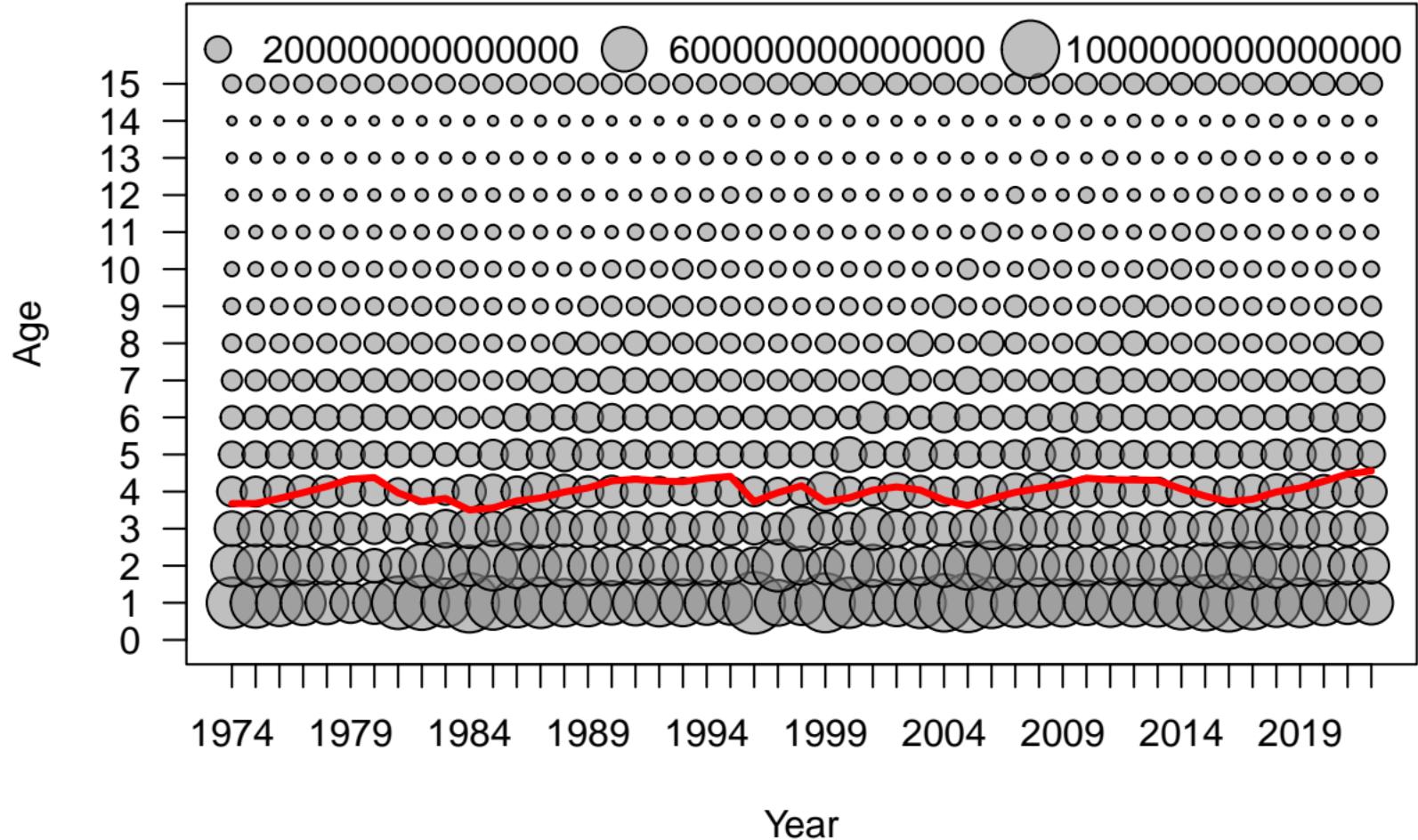


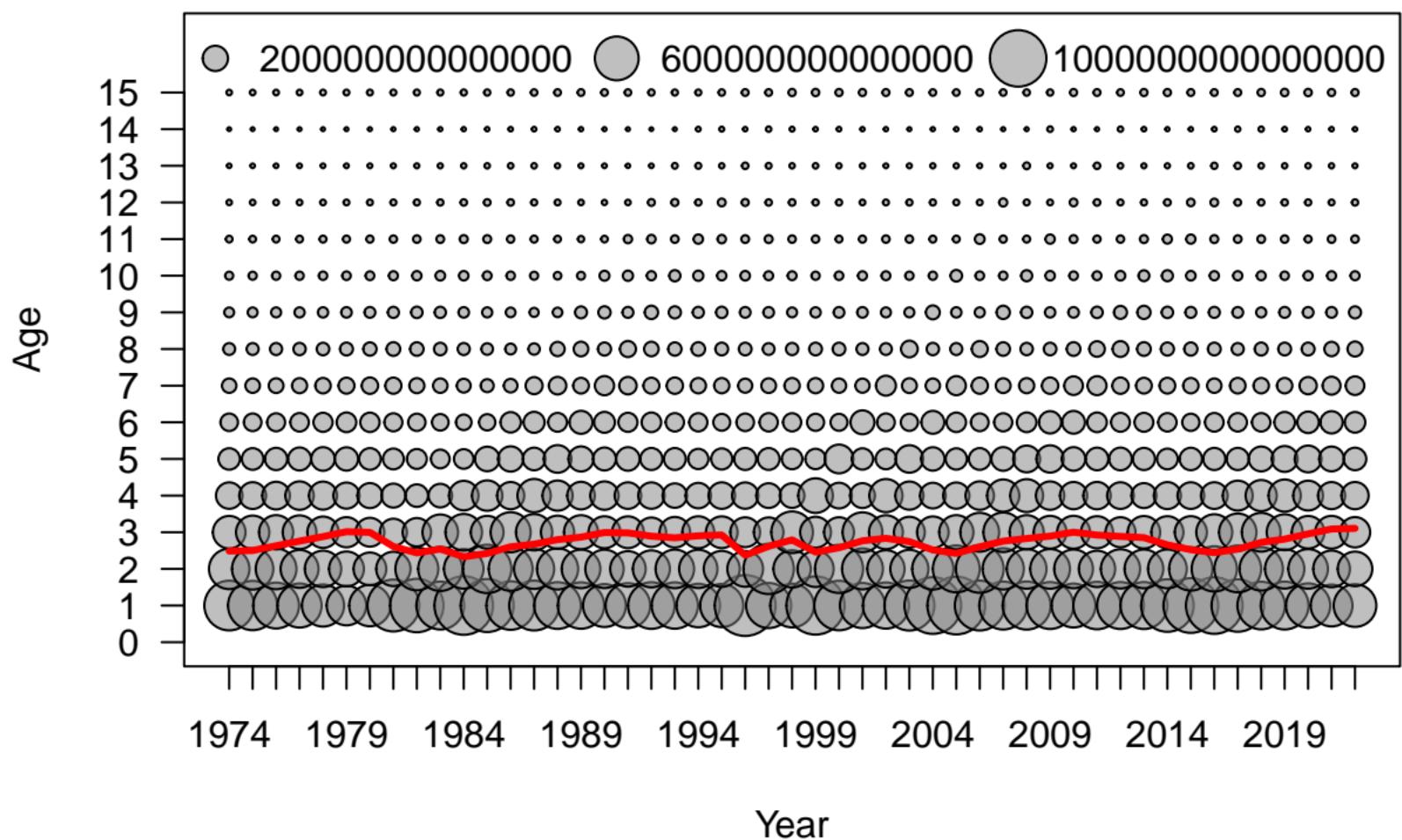


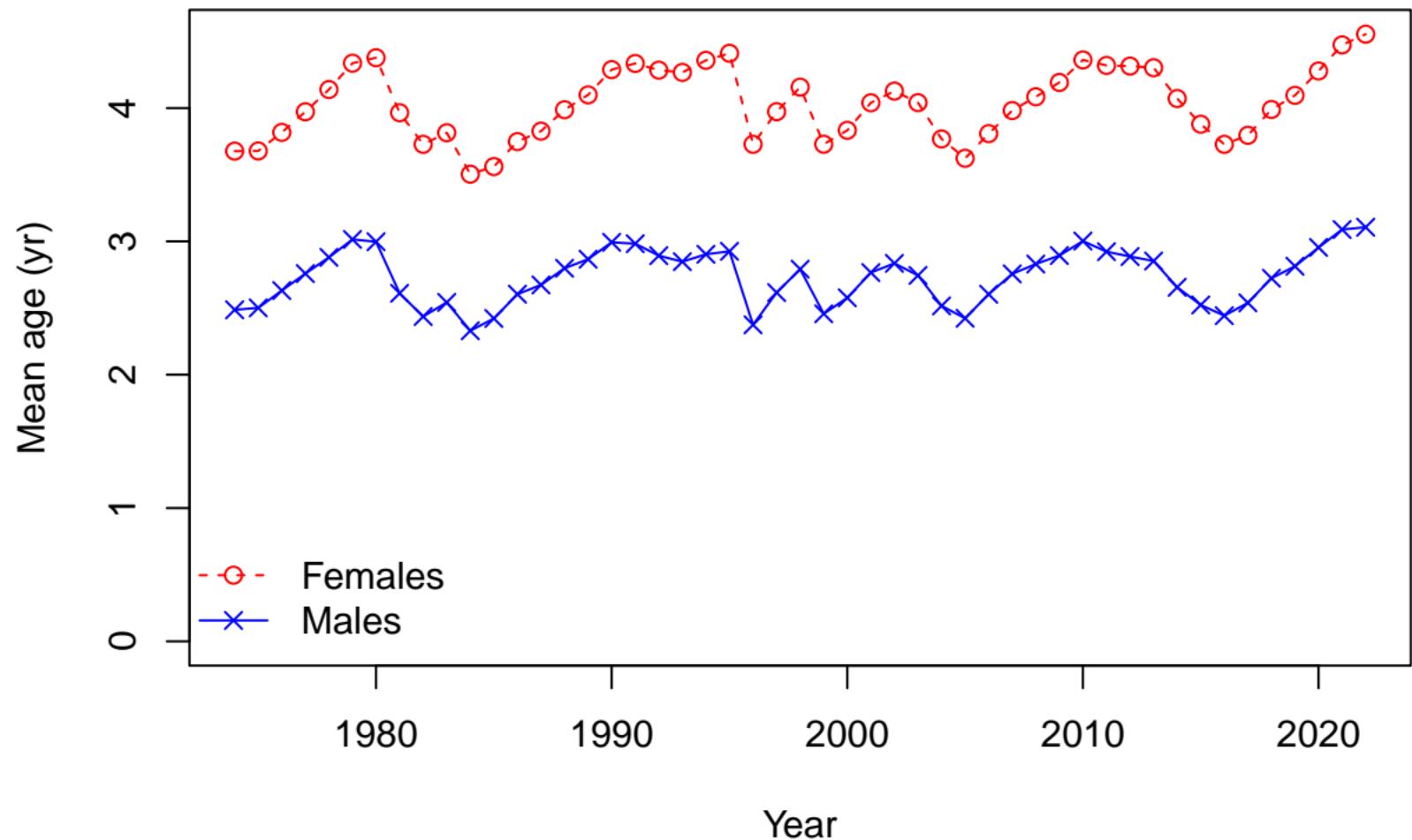


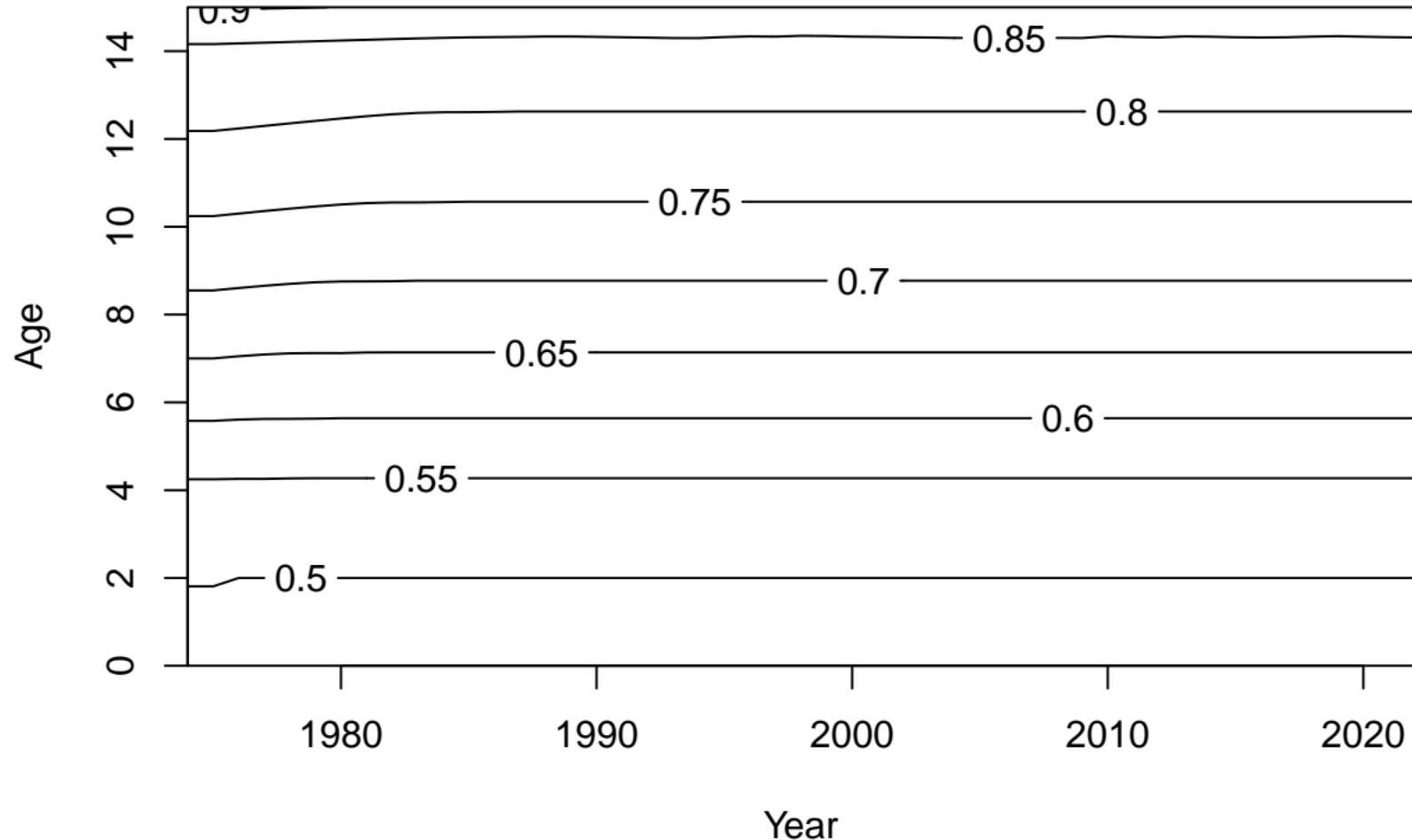


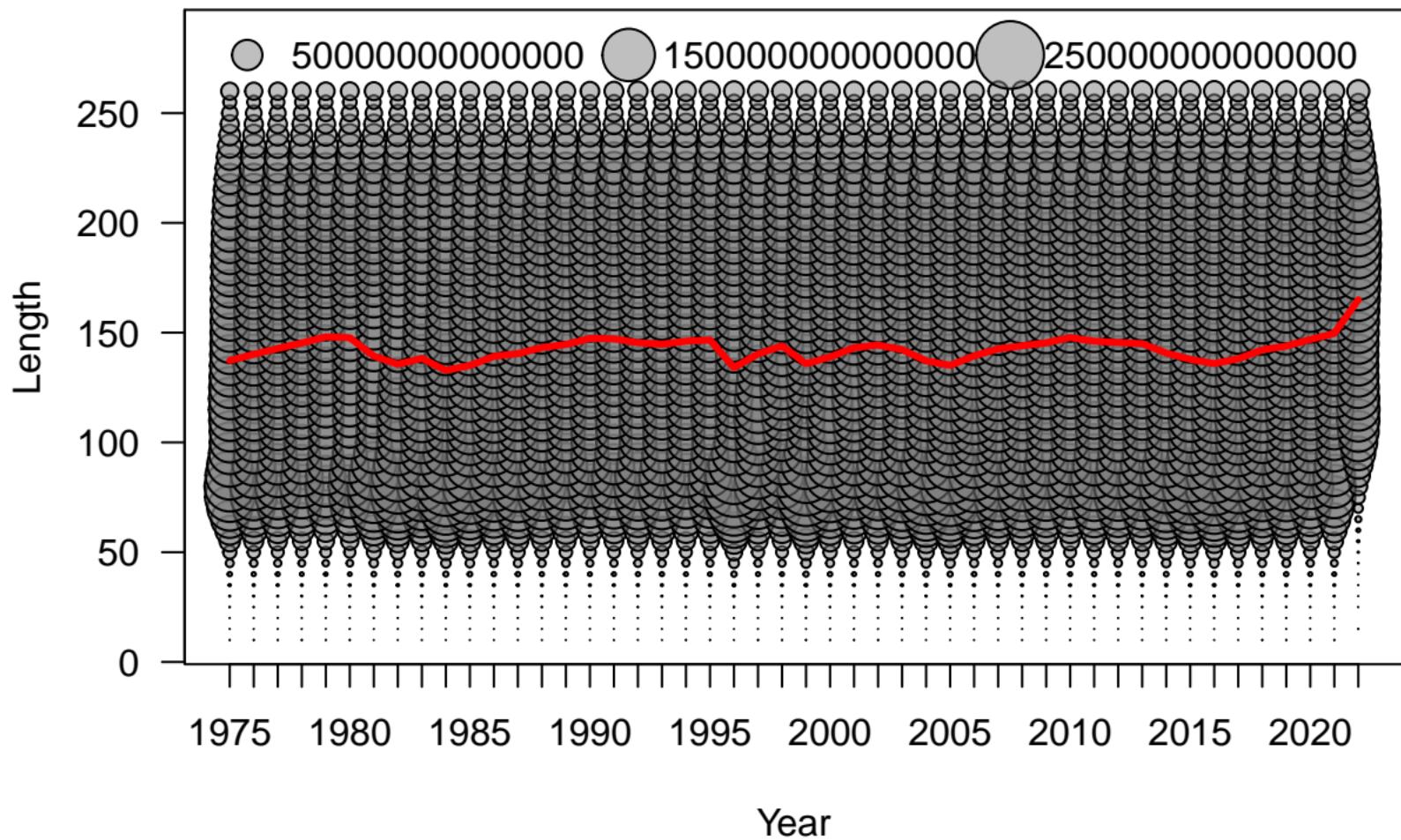


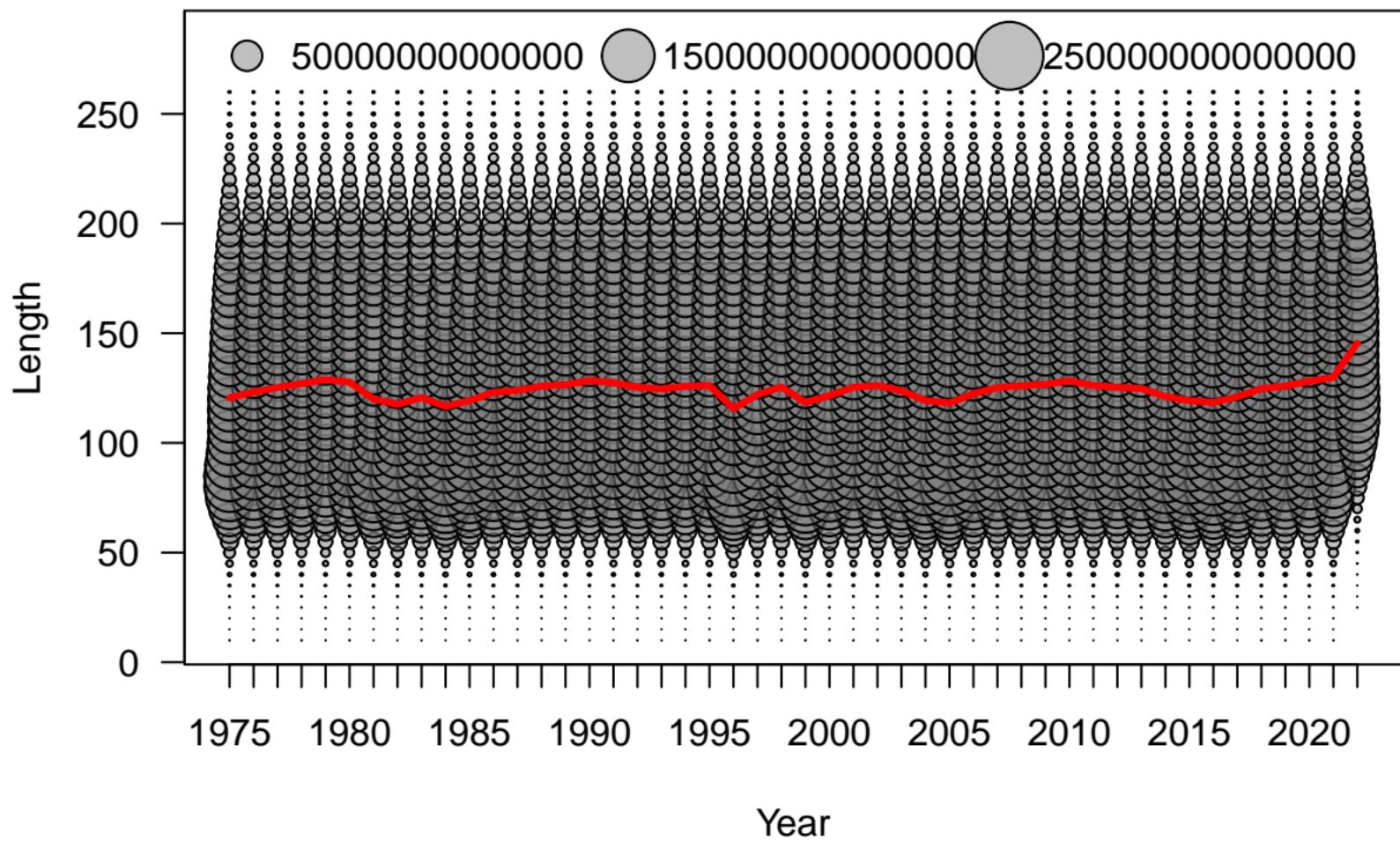


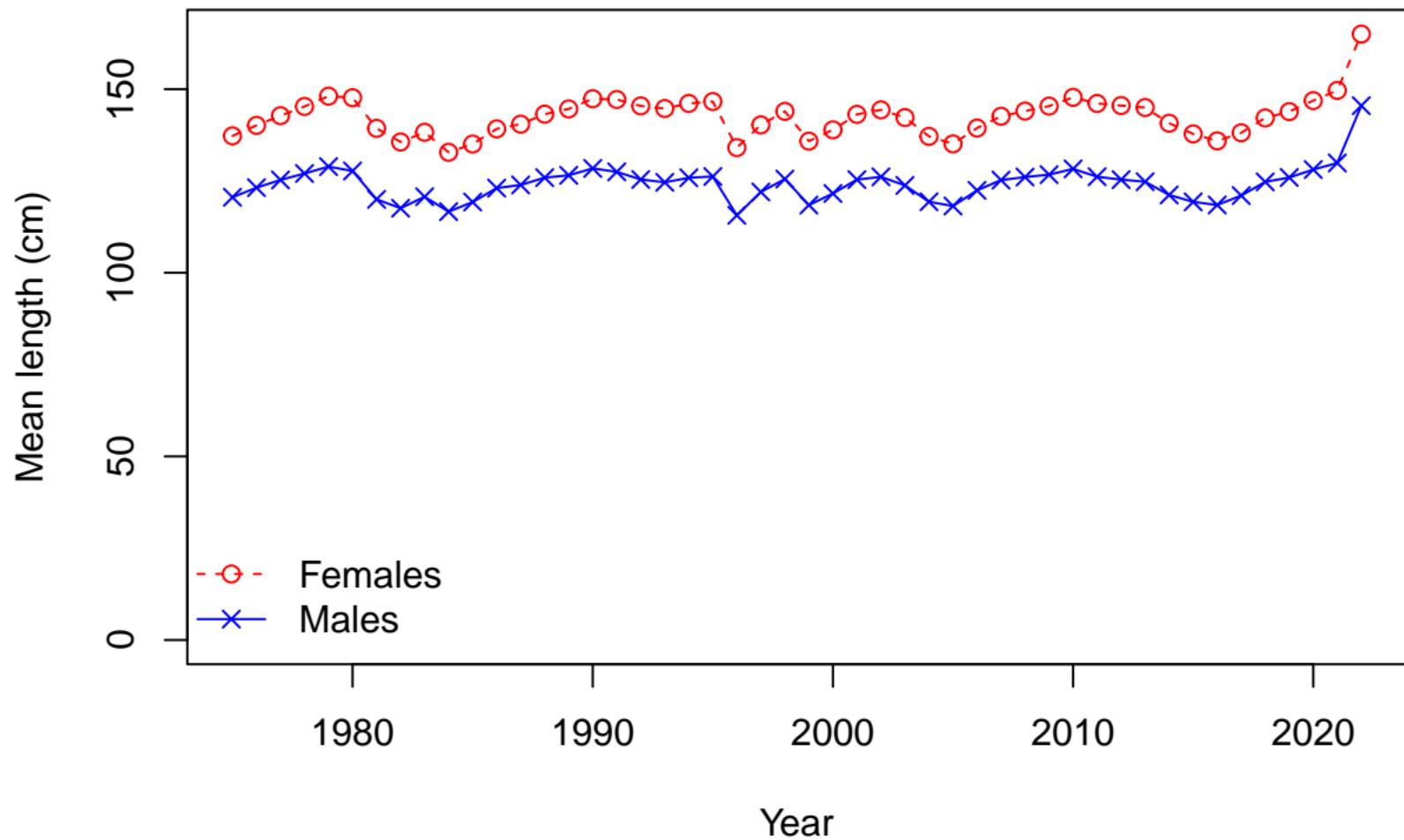


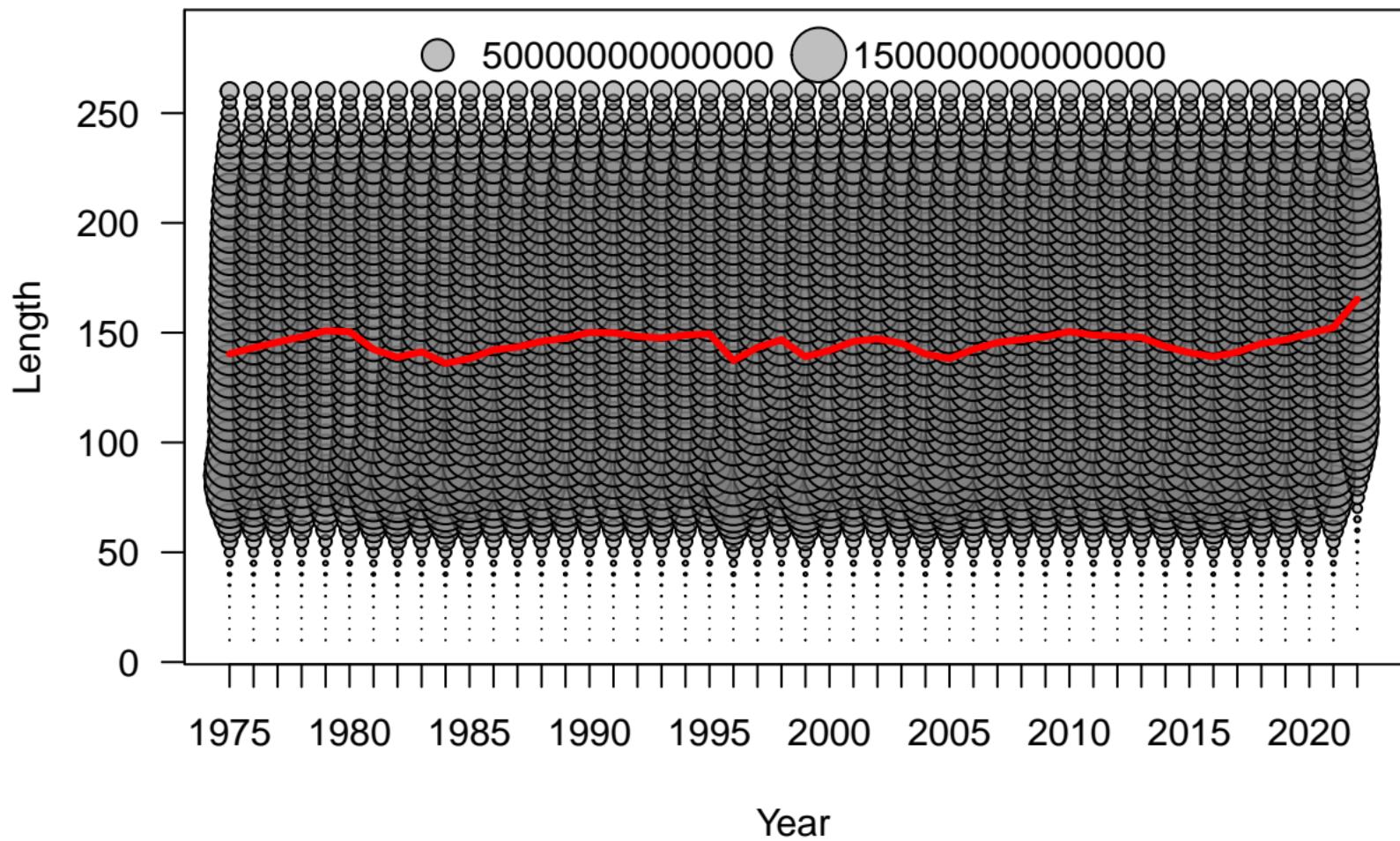


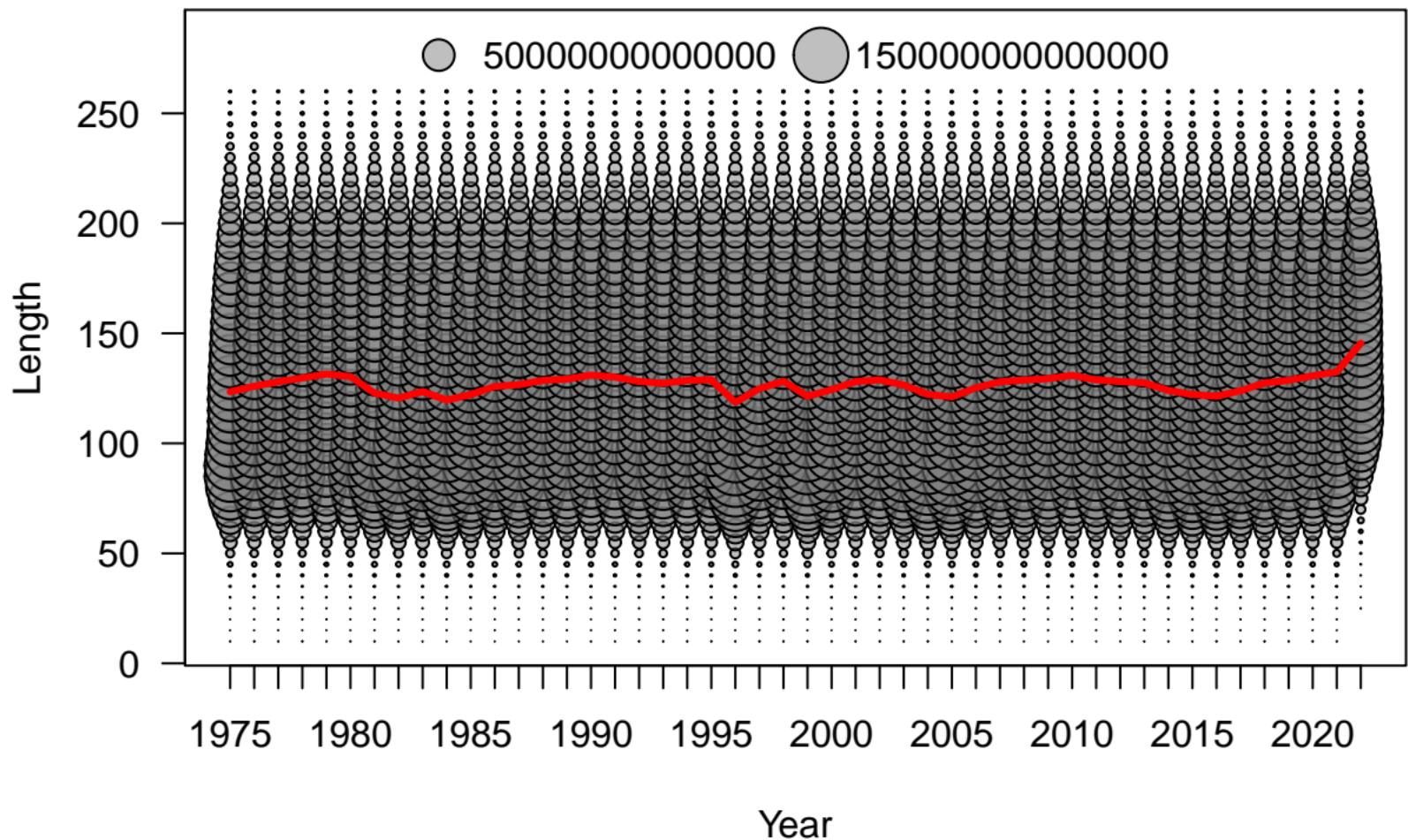


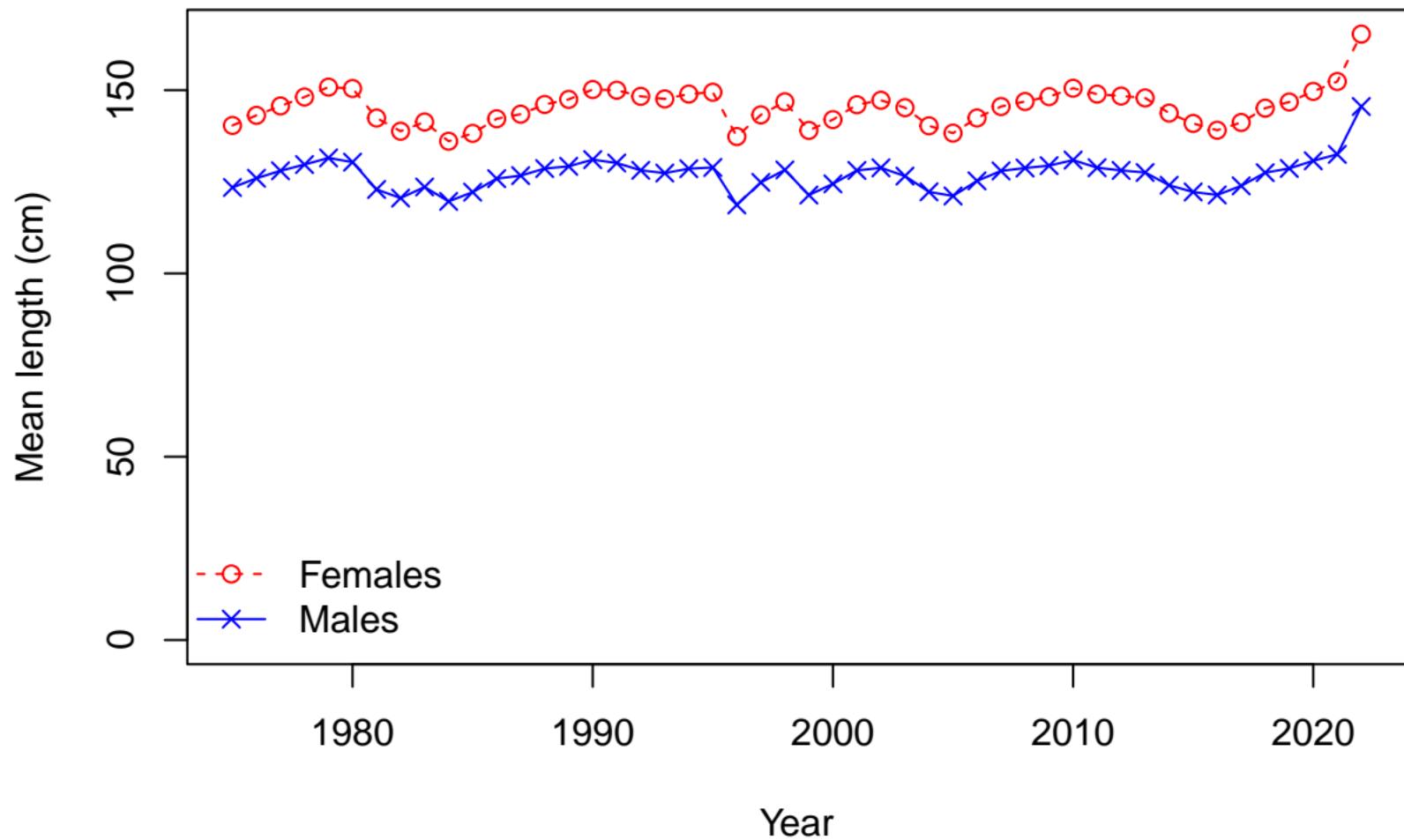


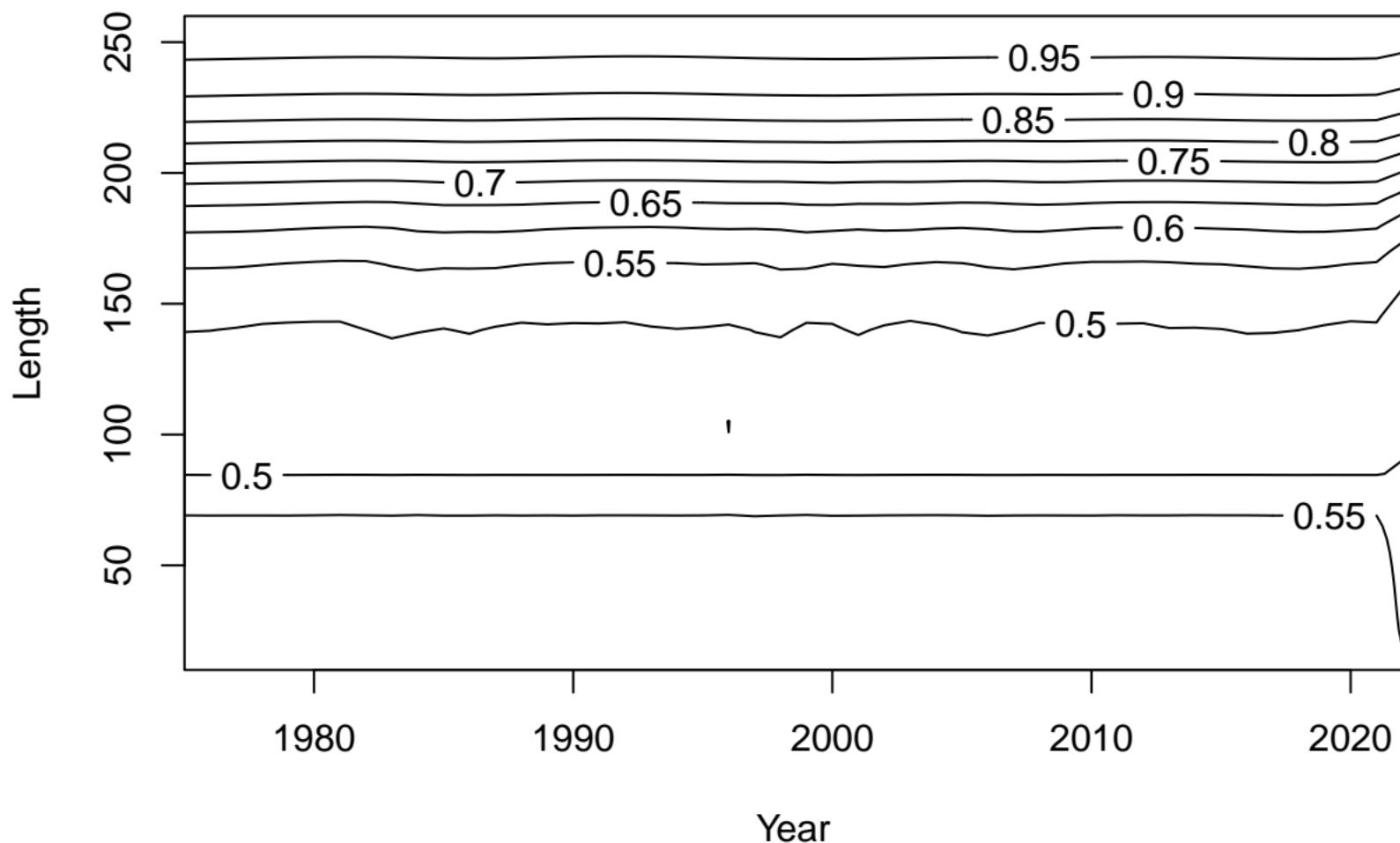




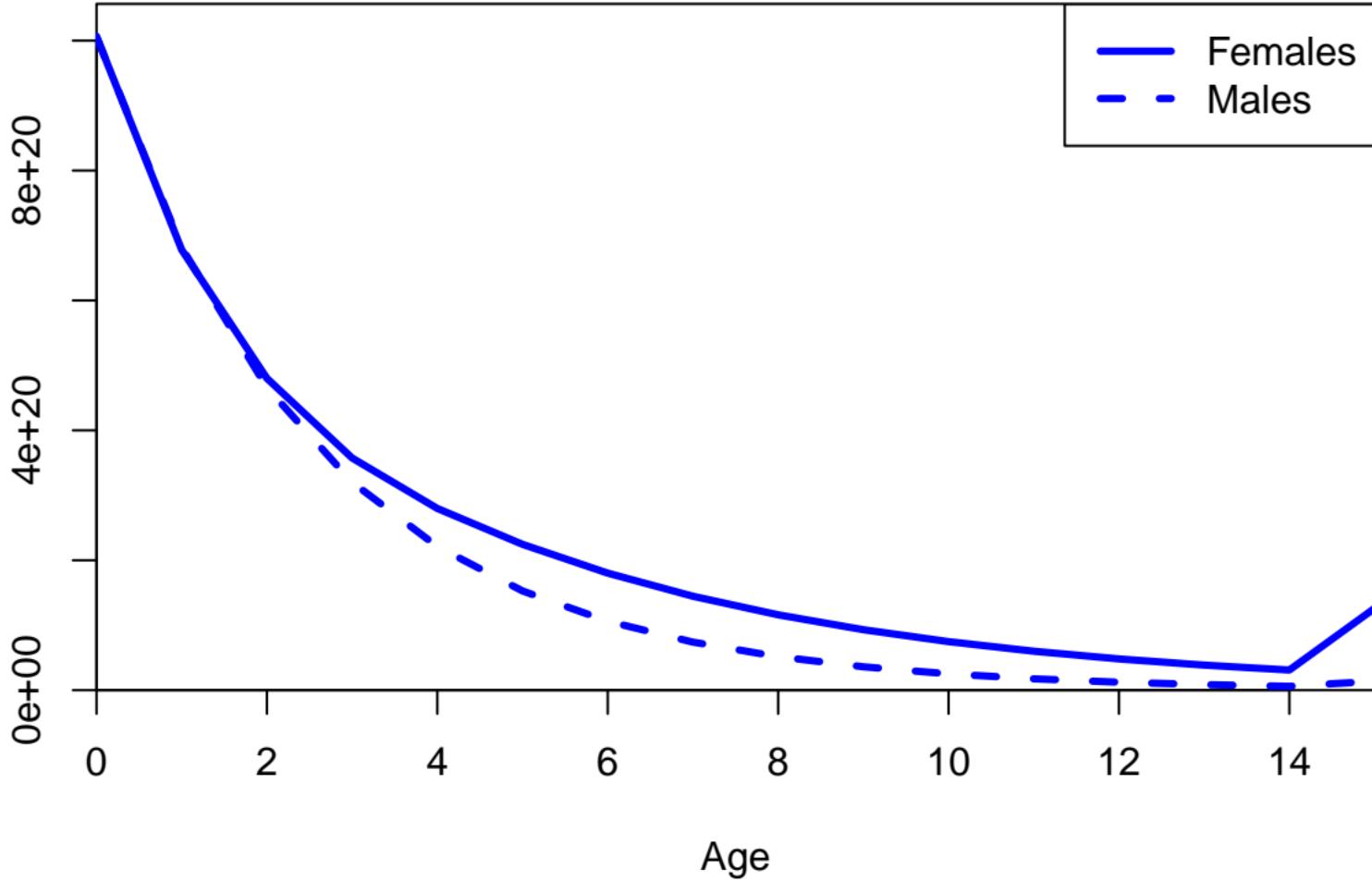




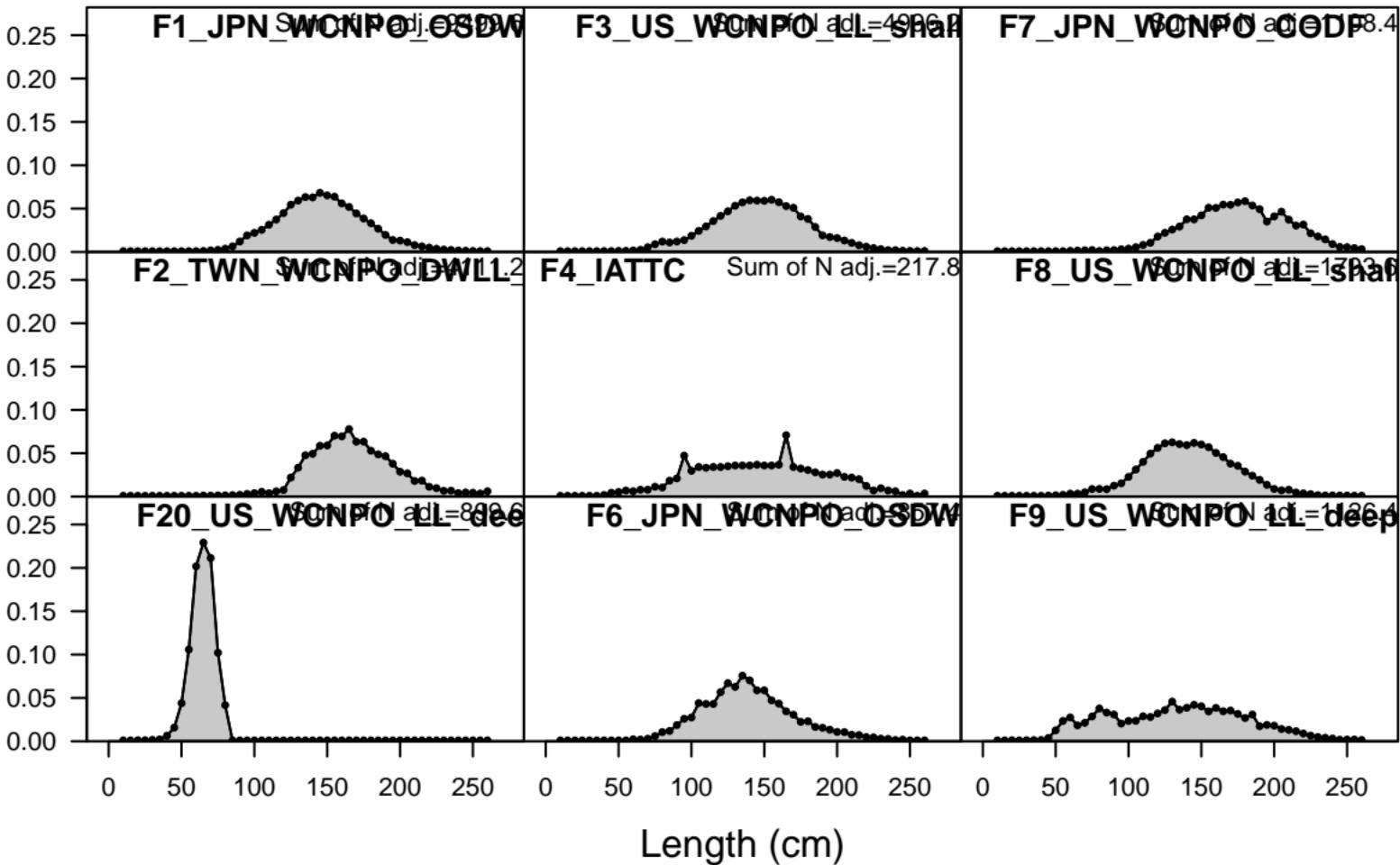


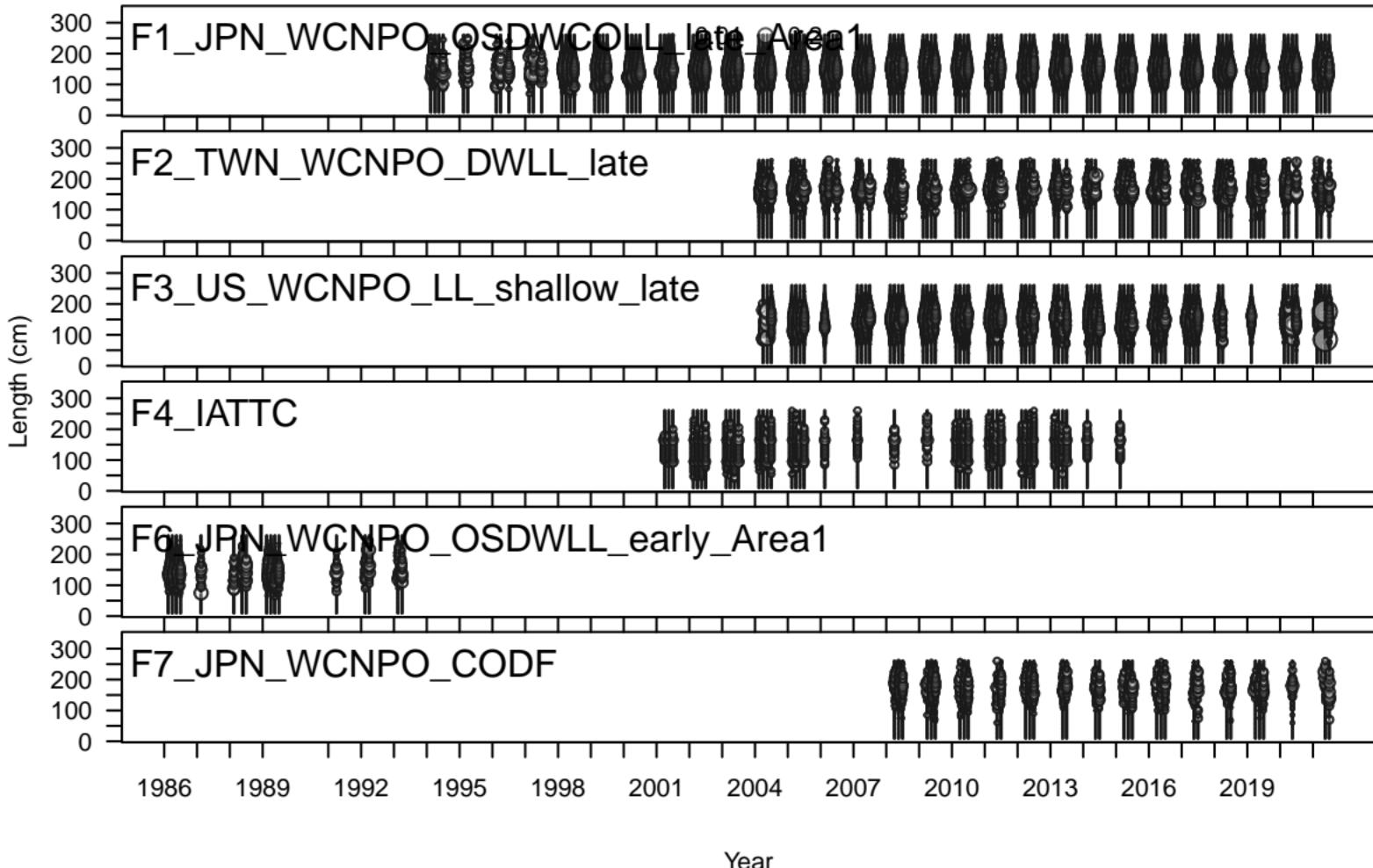


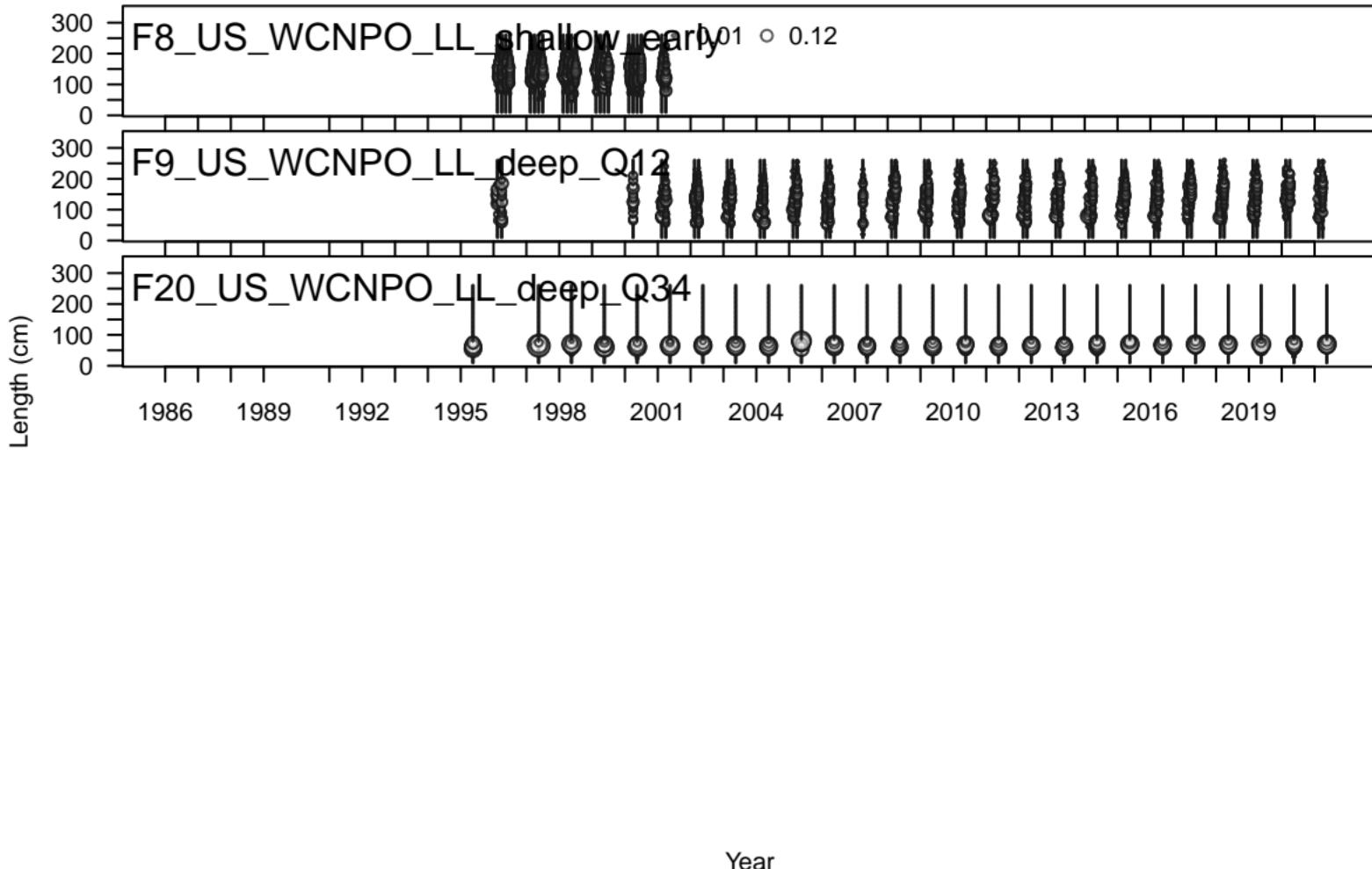
Numbers at age at equilibrium



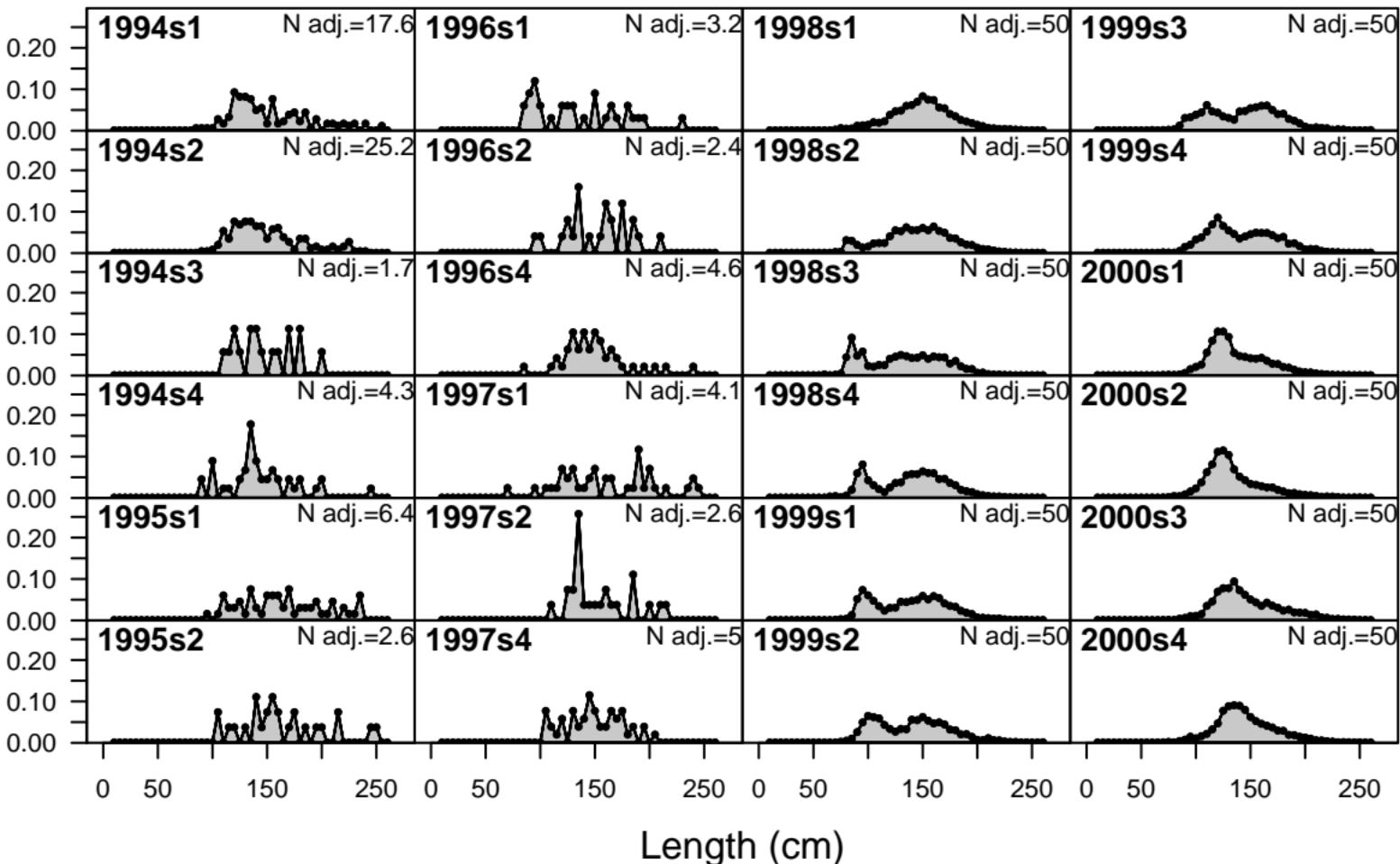
Proportion



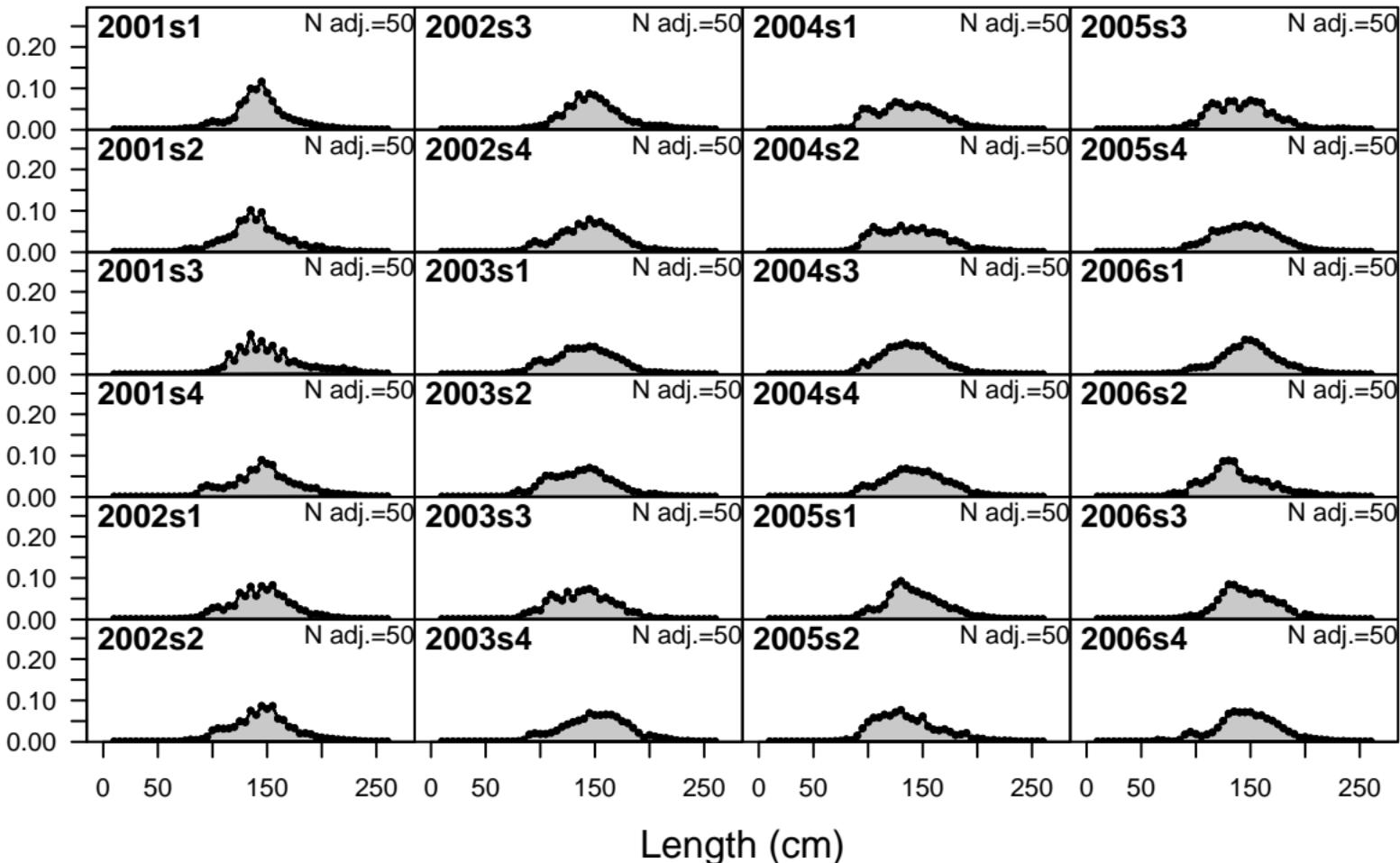




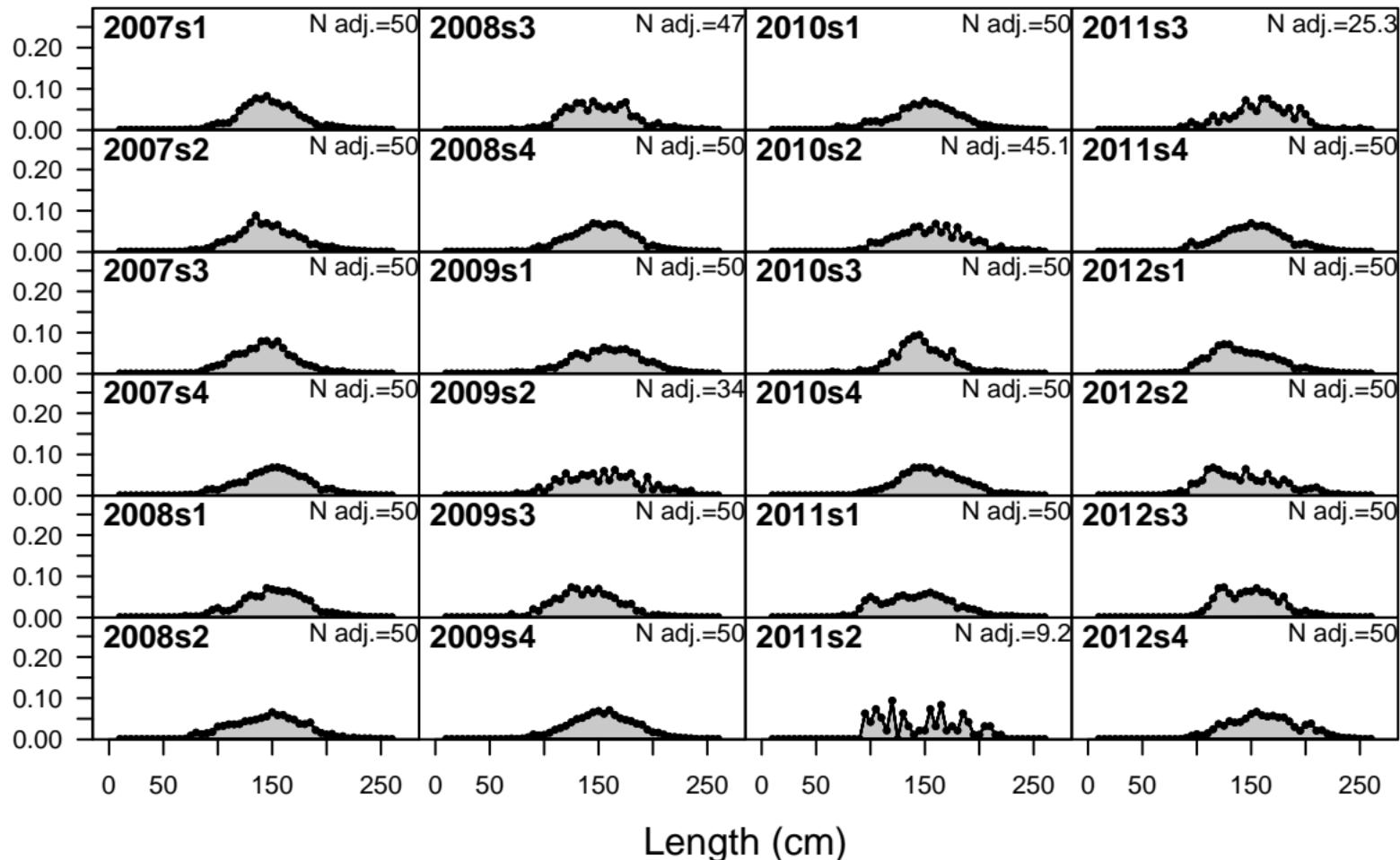
Proportion



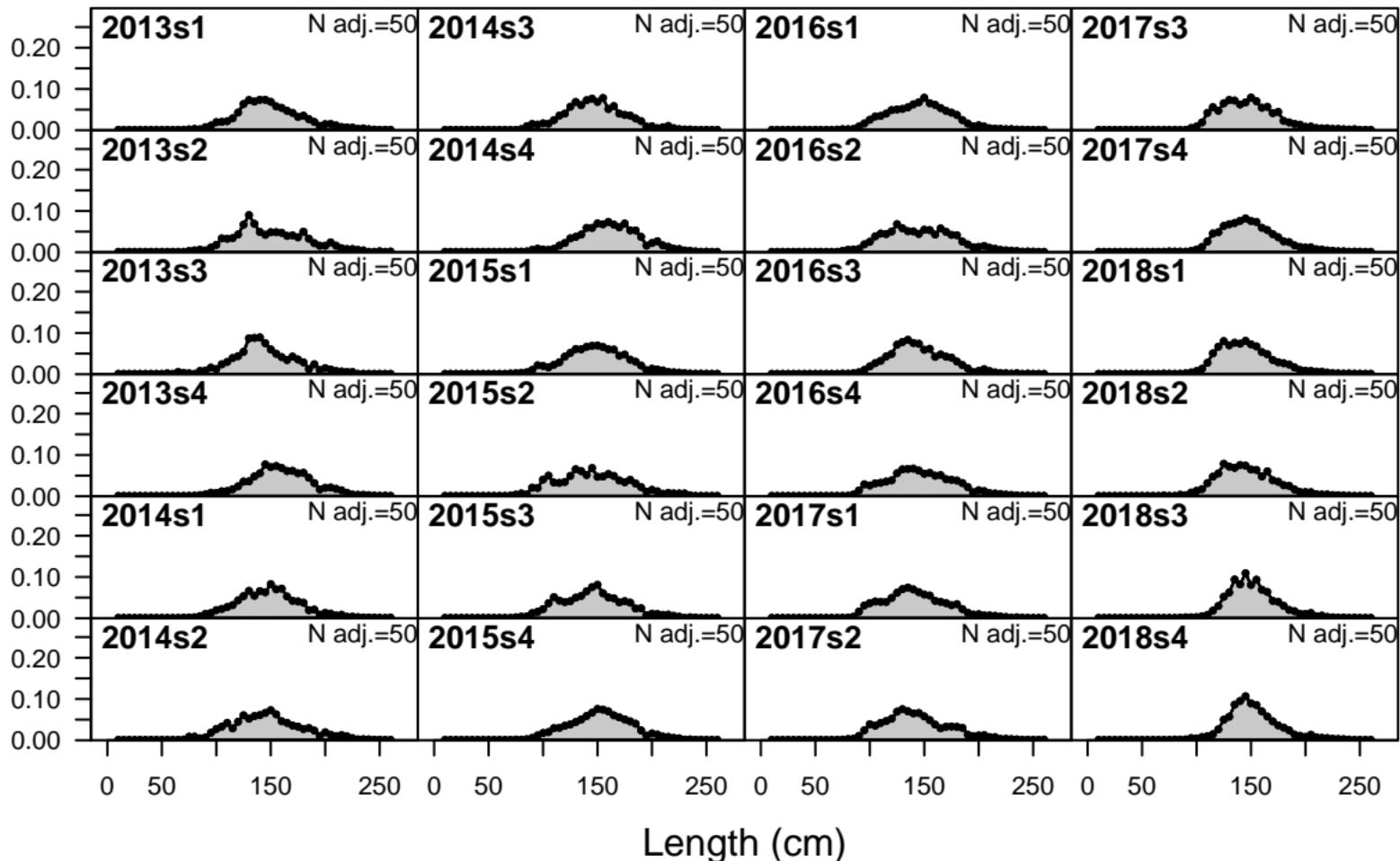
Proportion



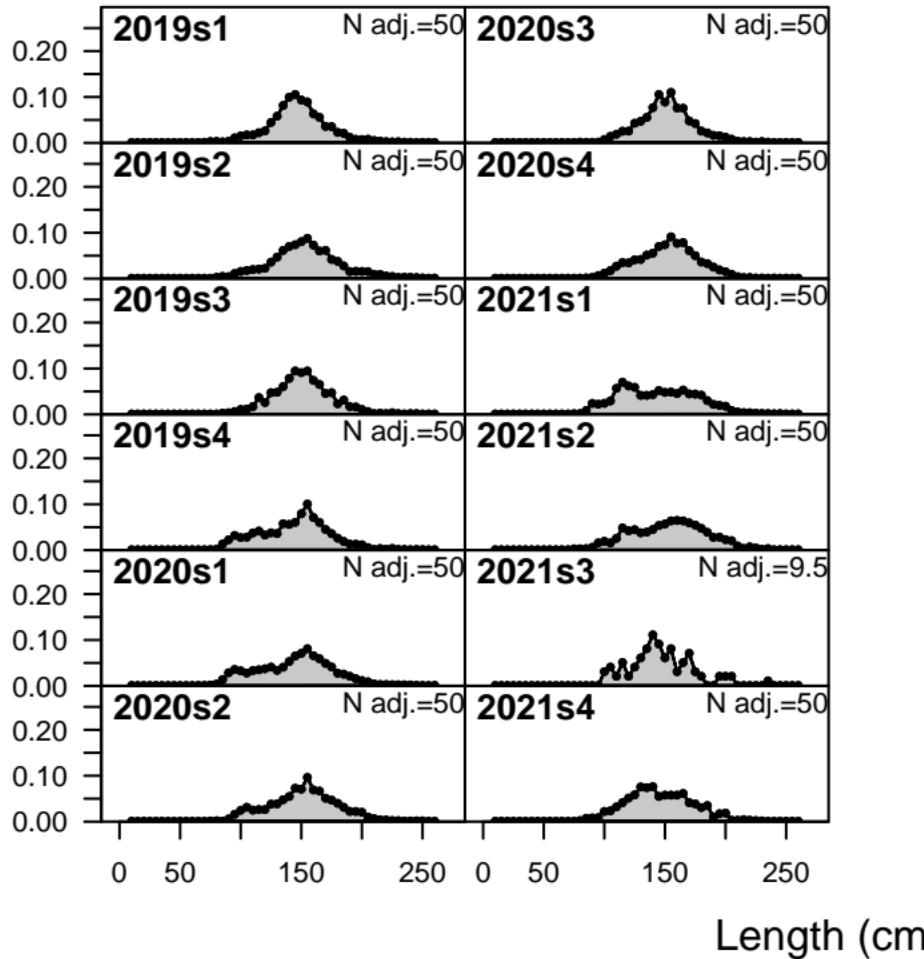
Proportion

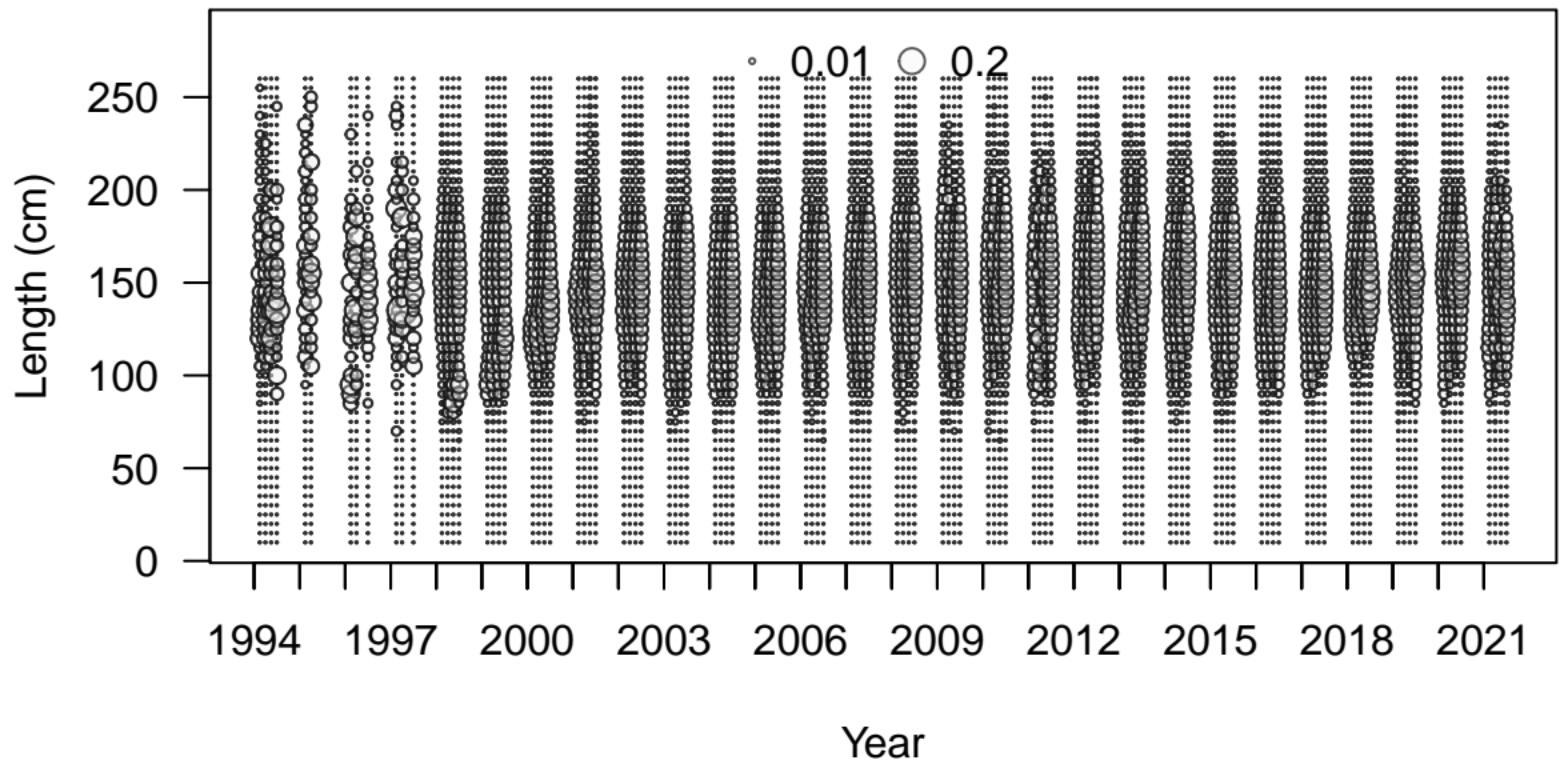


Proportion

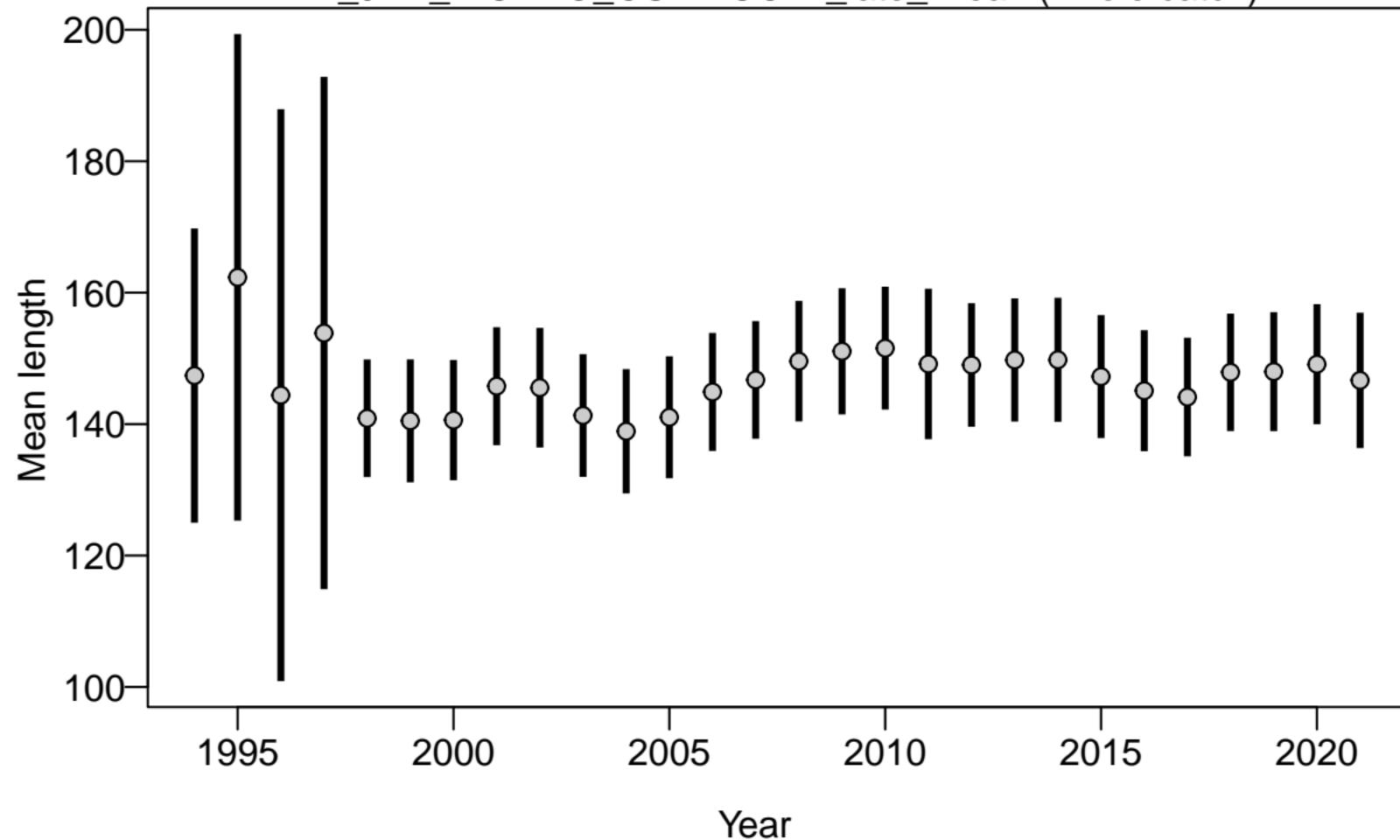


Proportion

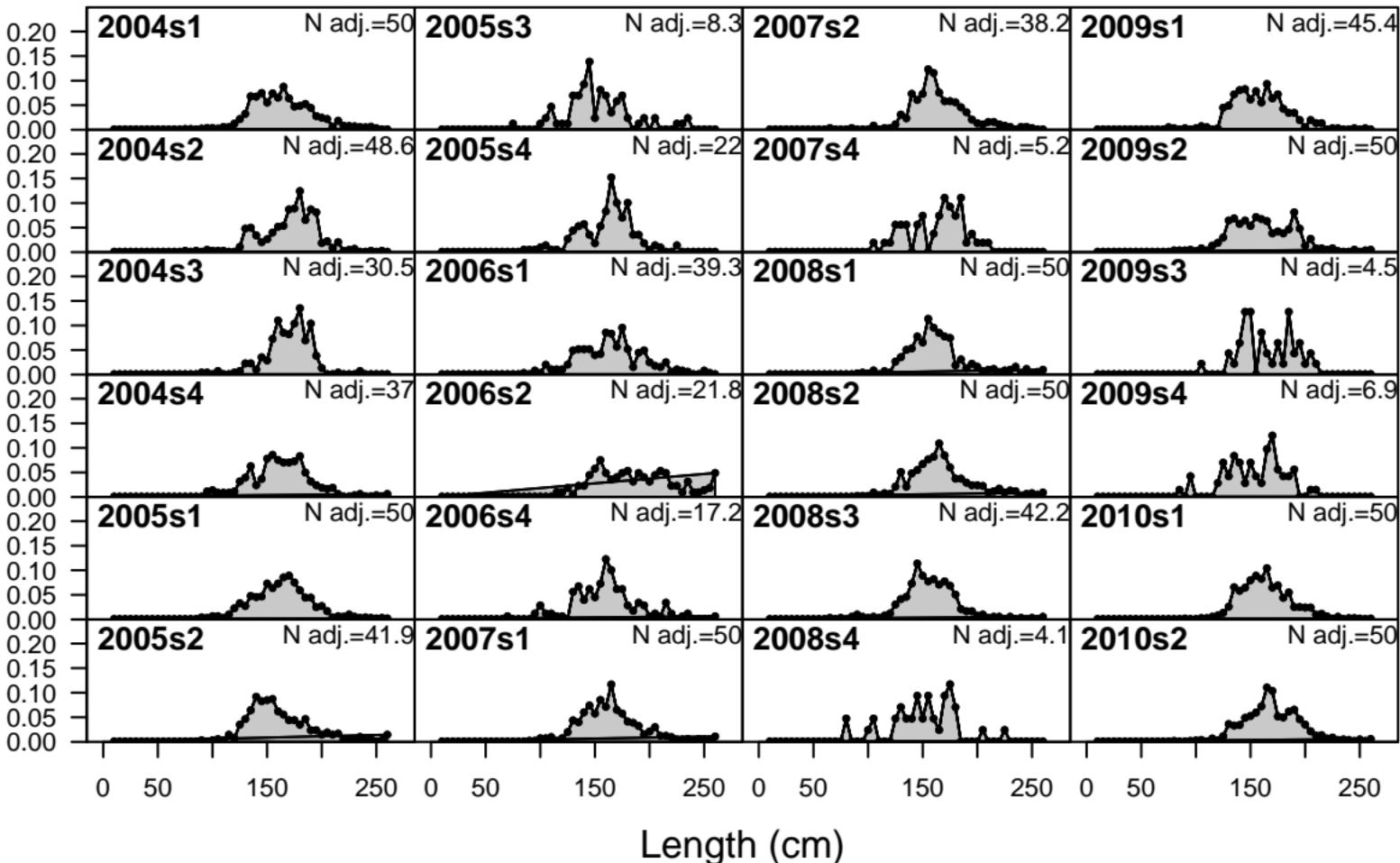




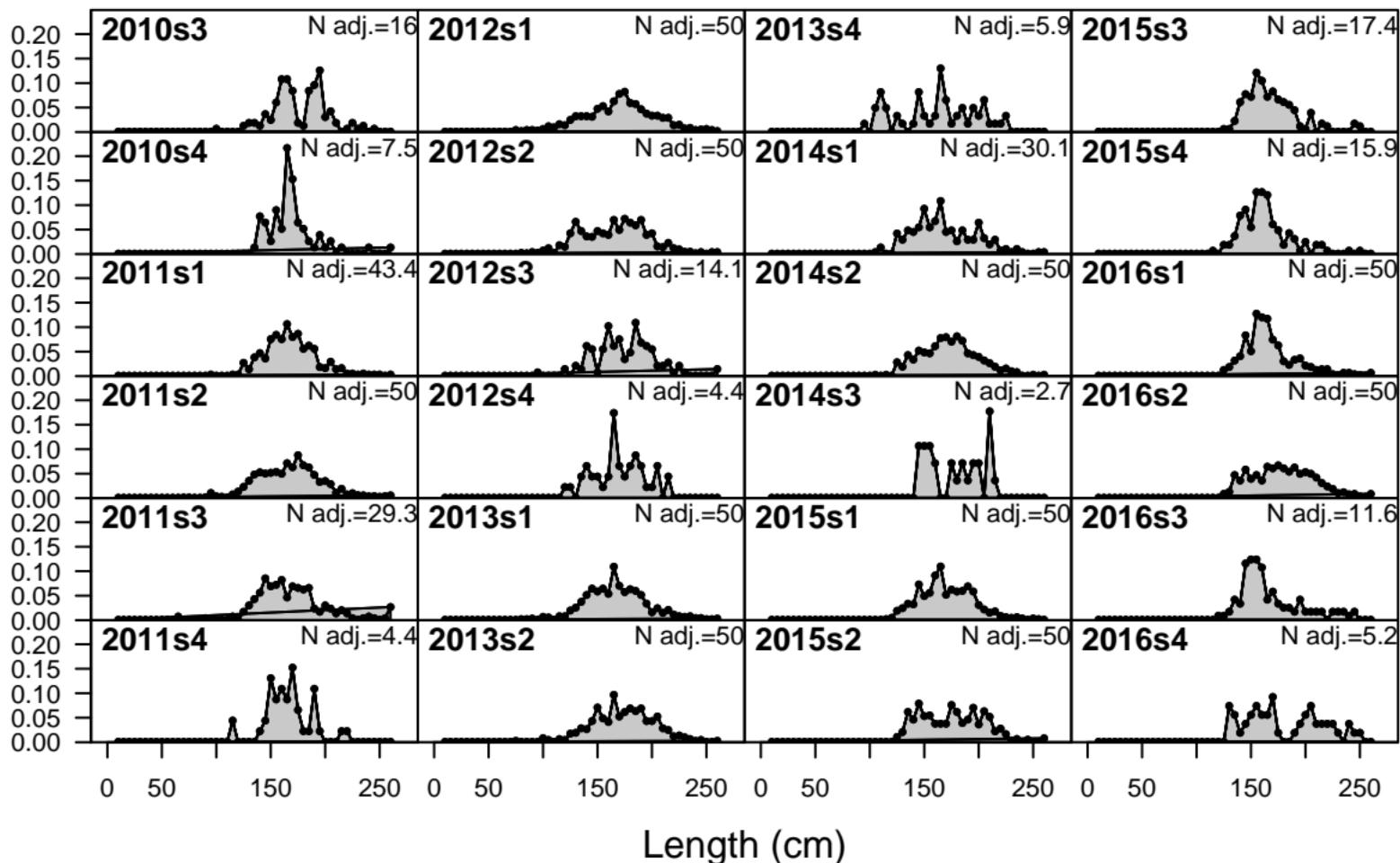
F1\_JPN\_WCNPO OSDWCOLL\_late\_Area1 (whole catch)



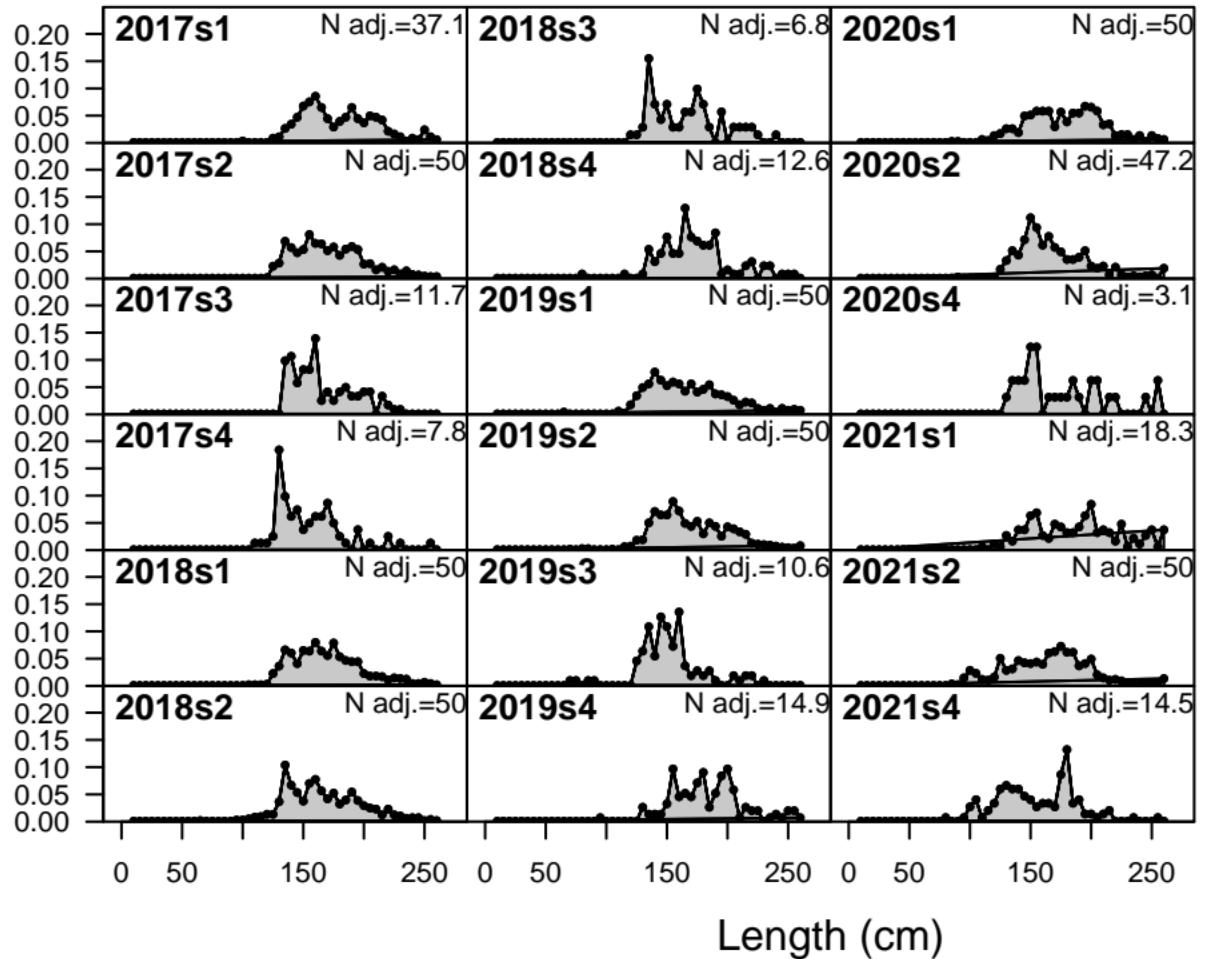
Proportion

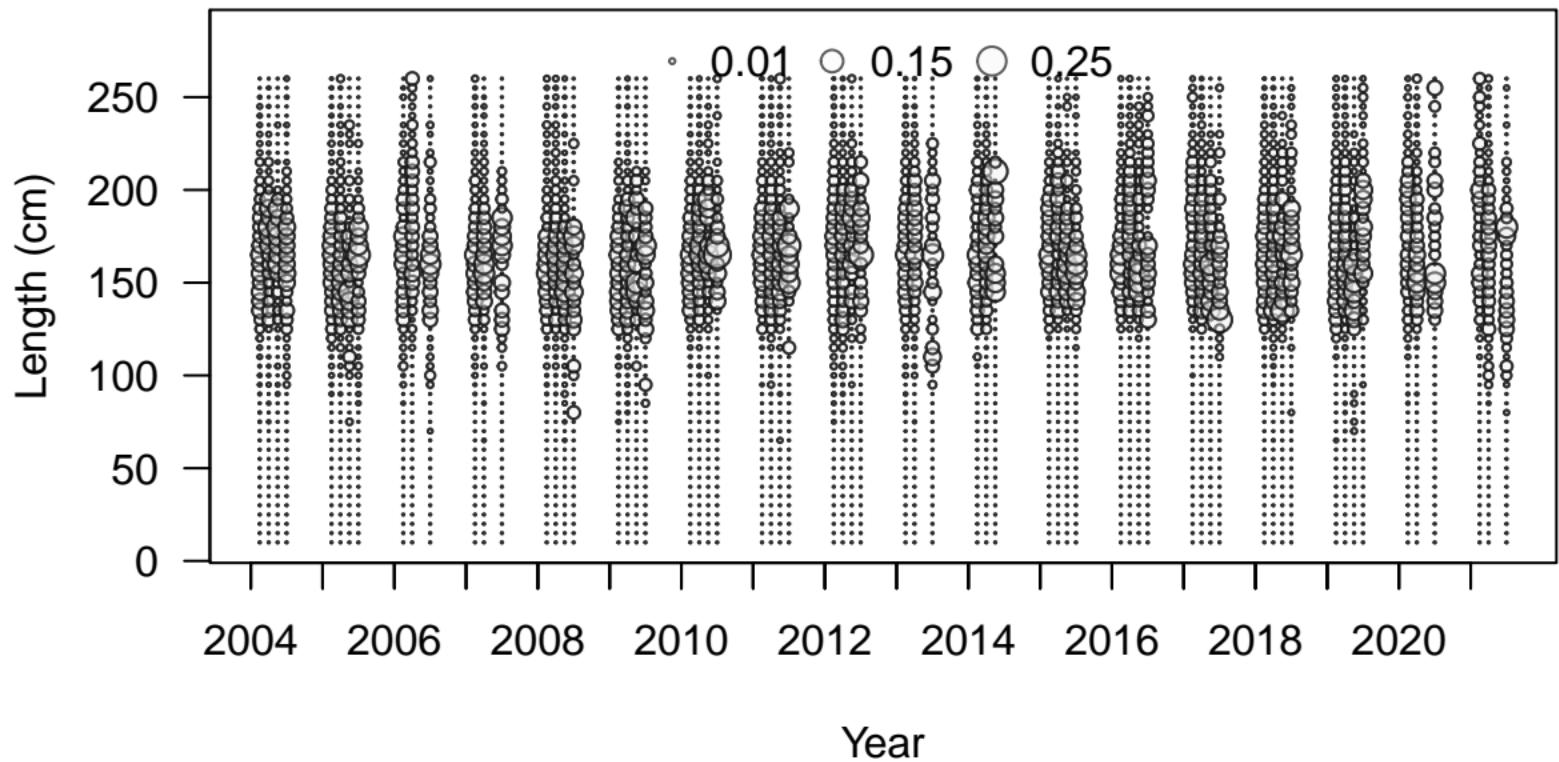


Proportion

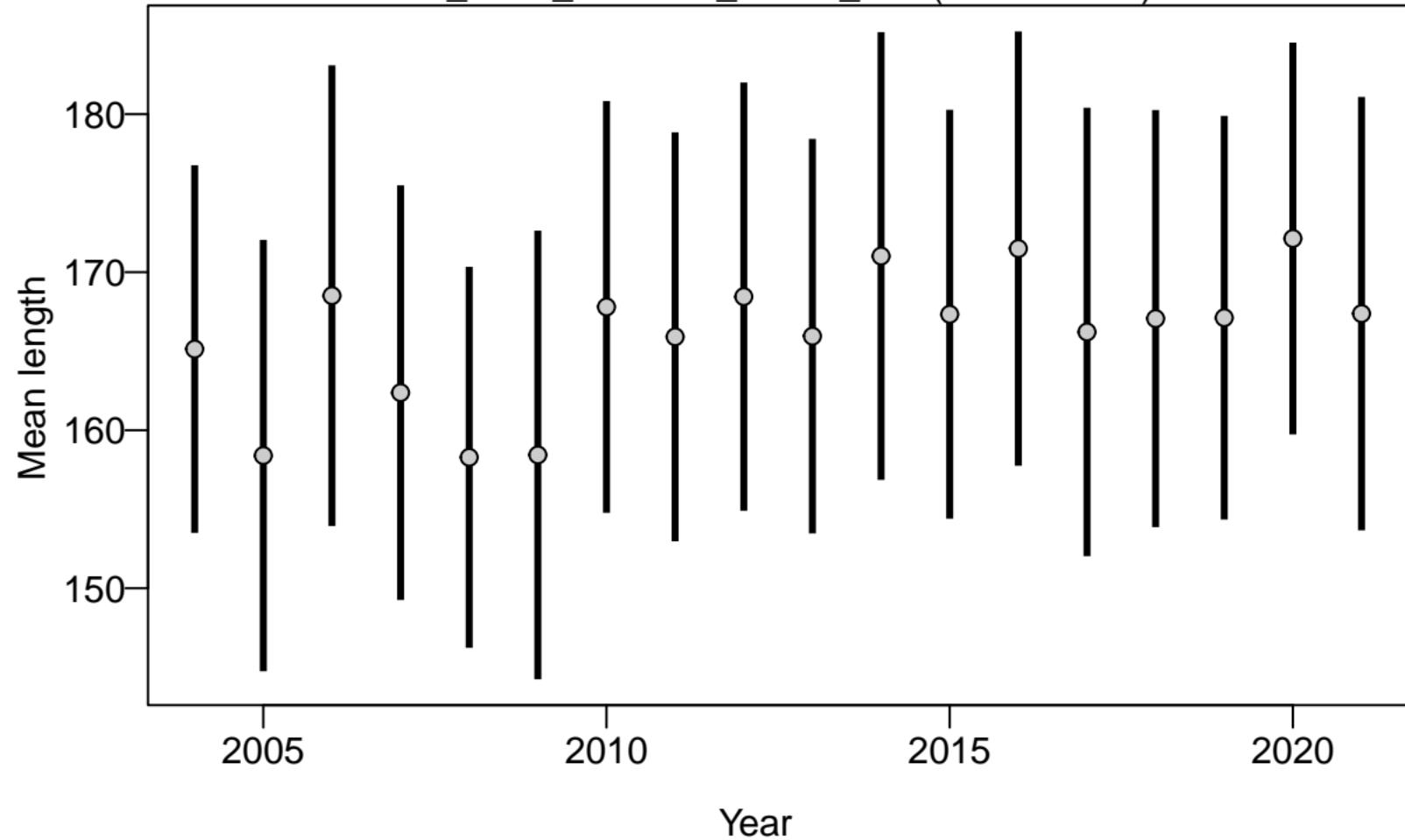


Proportion

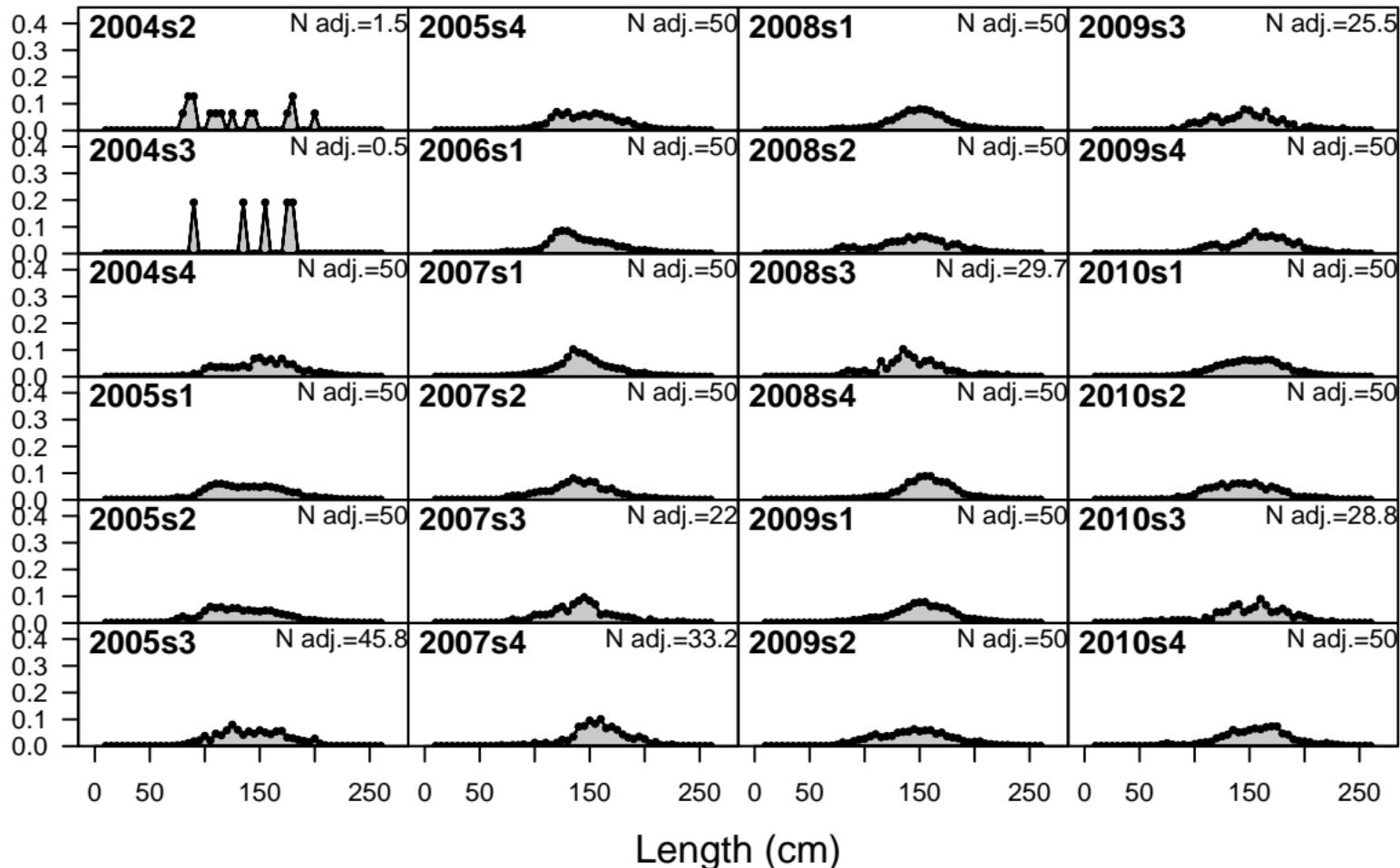




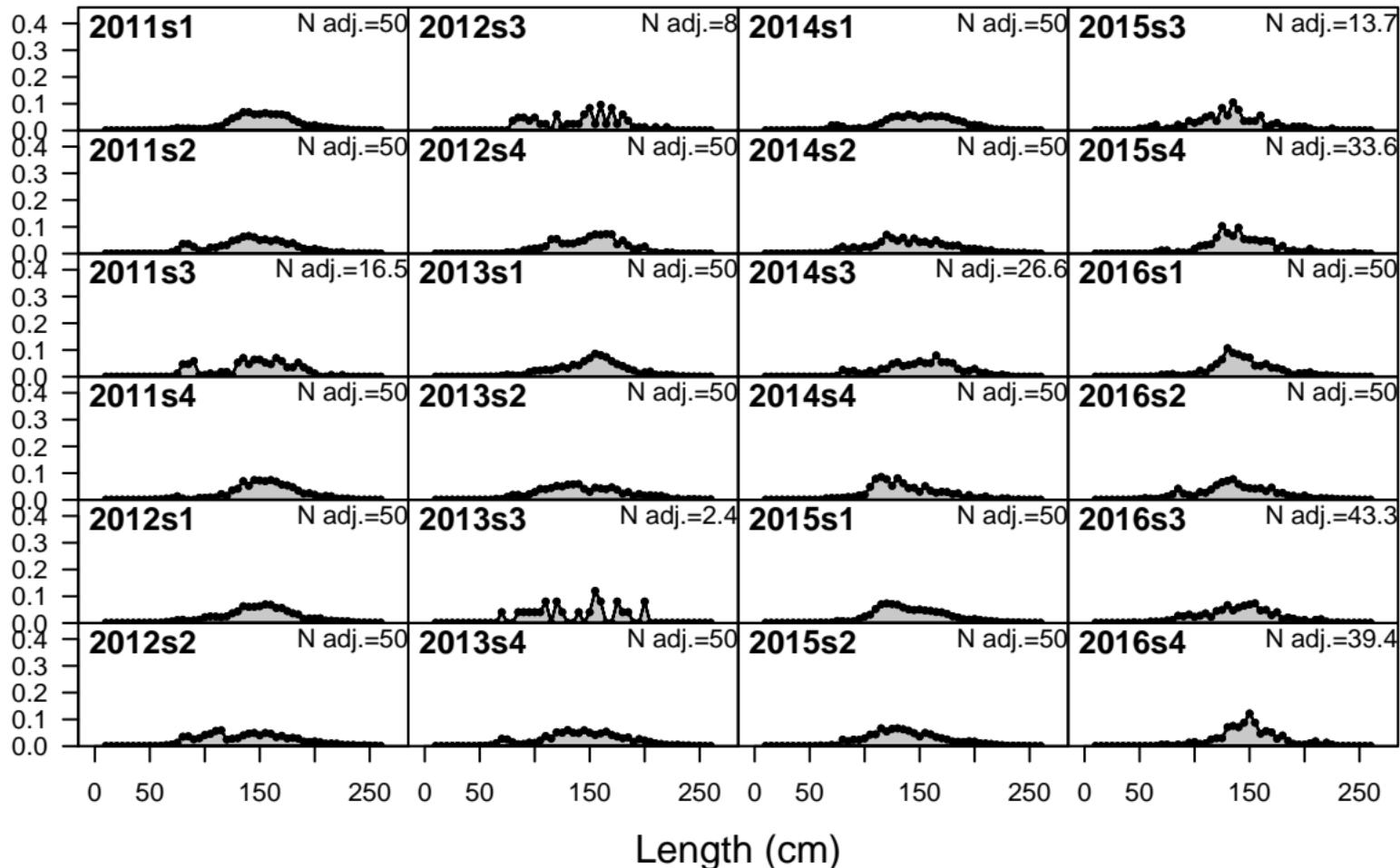
# F2\_TWN\_WCNPO\_DWLL\_late (whole catch)



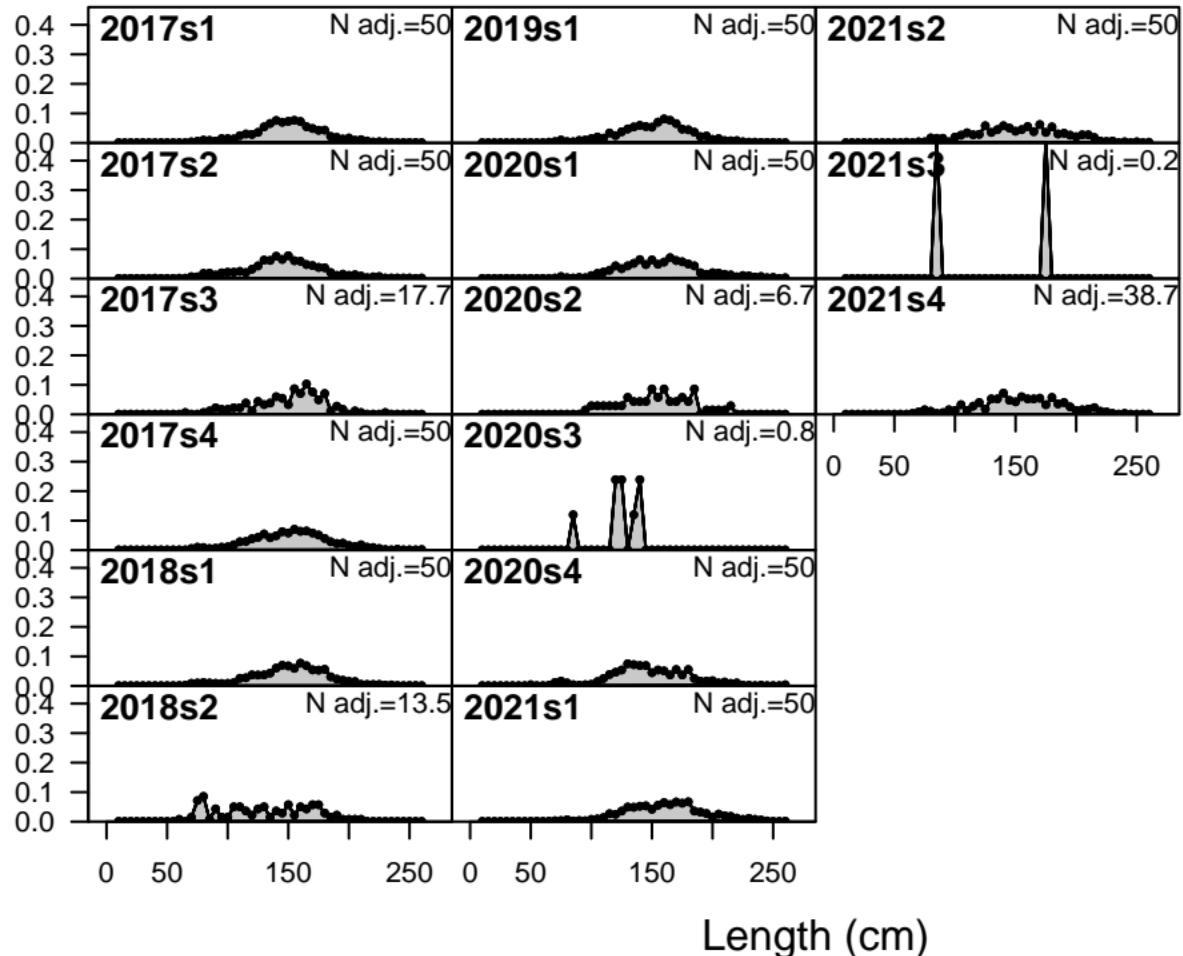
Proportion

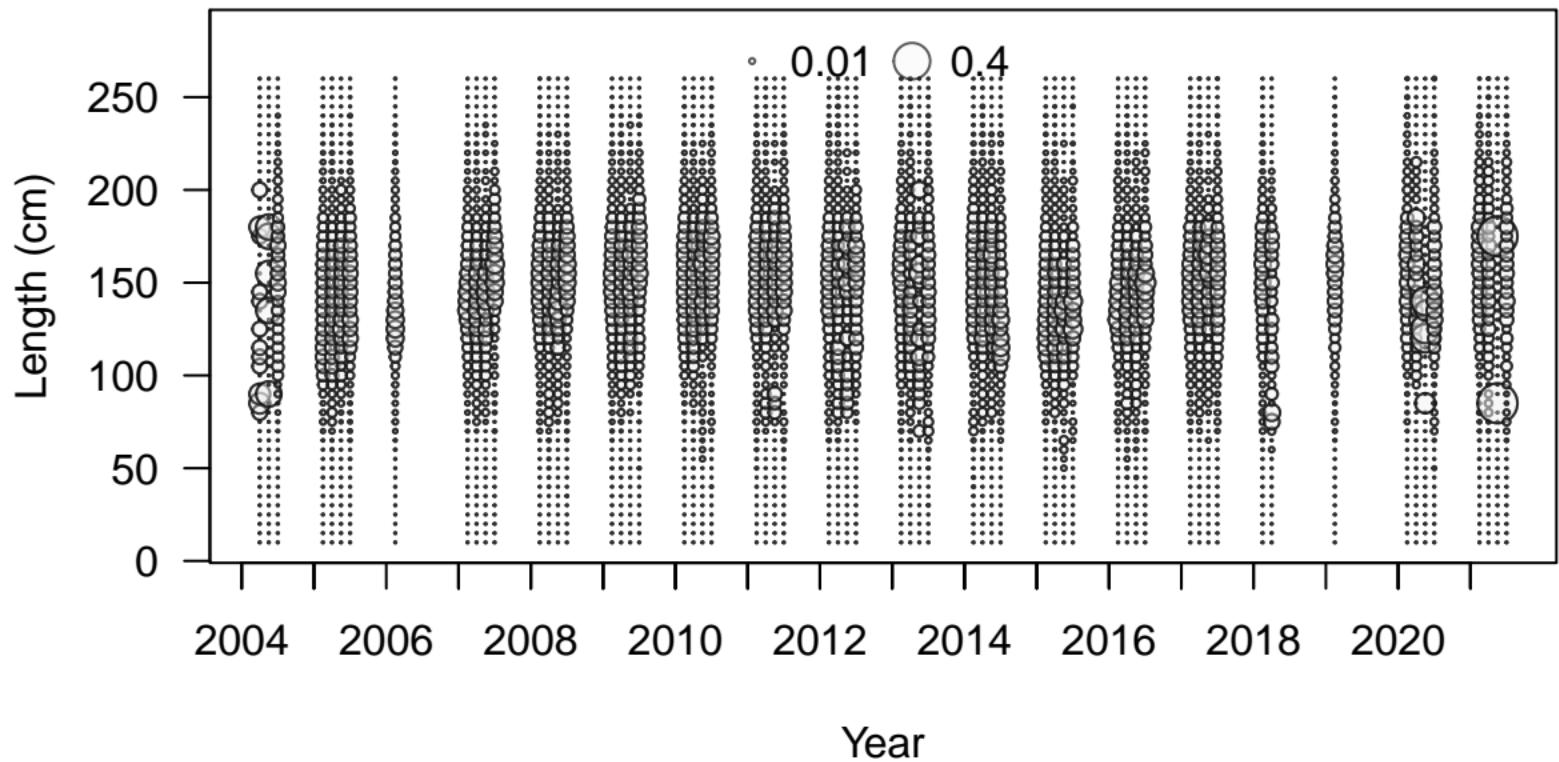


Proportion

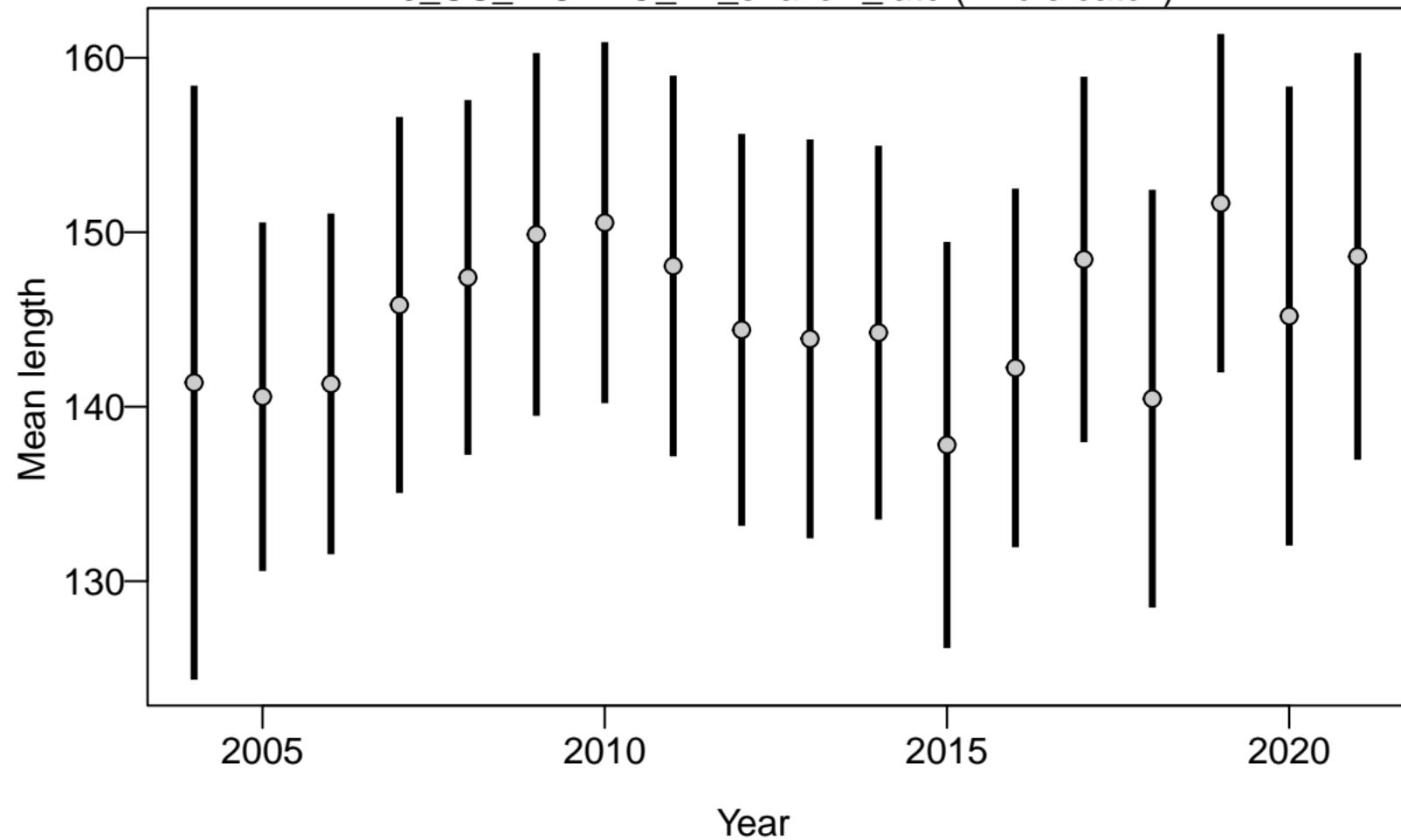


Proportion

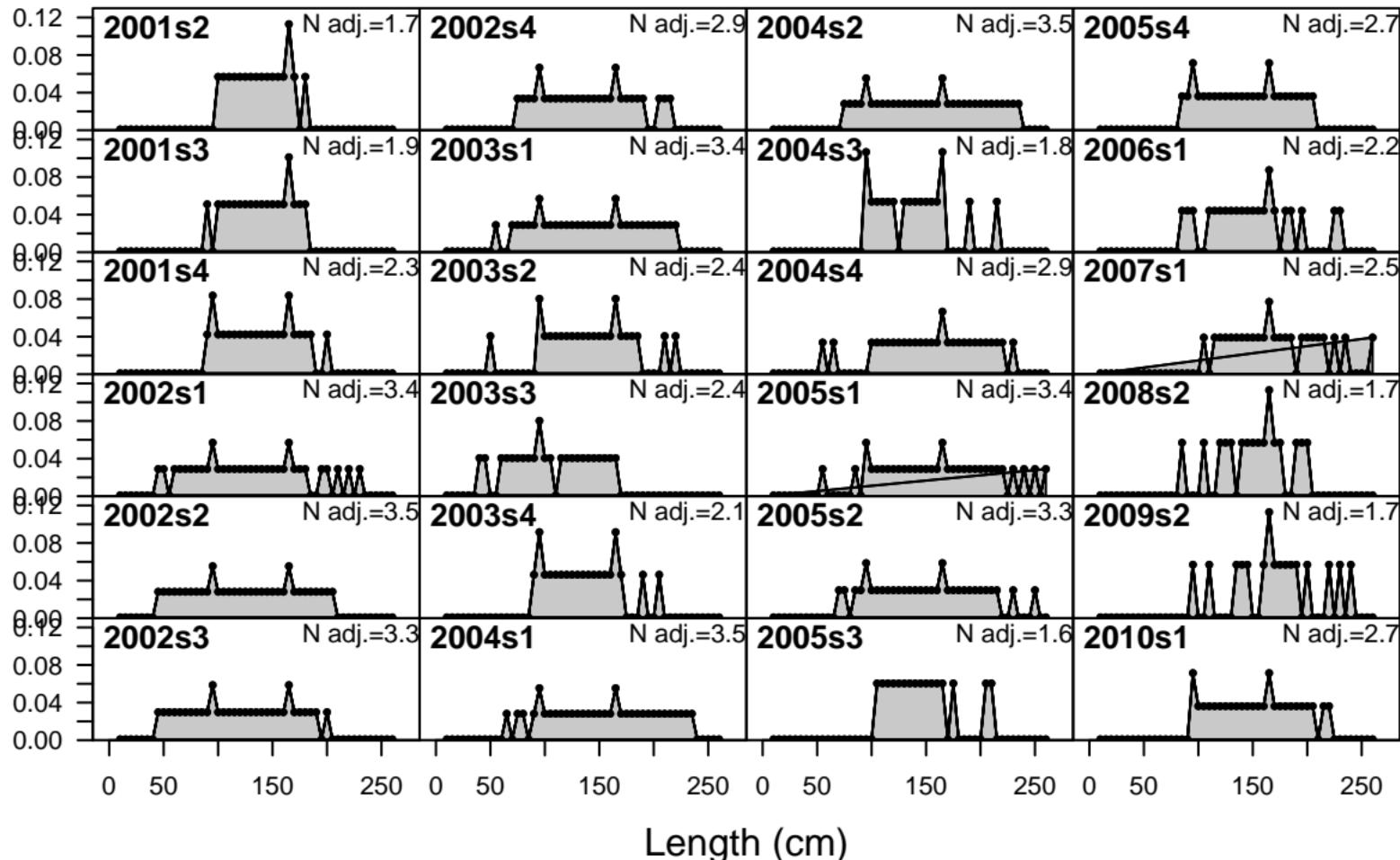




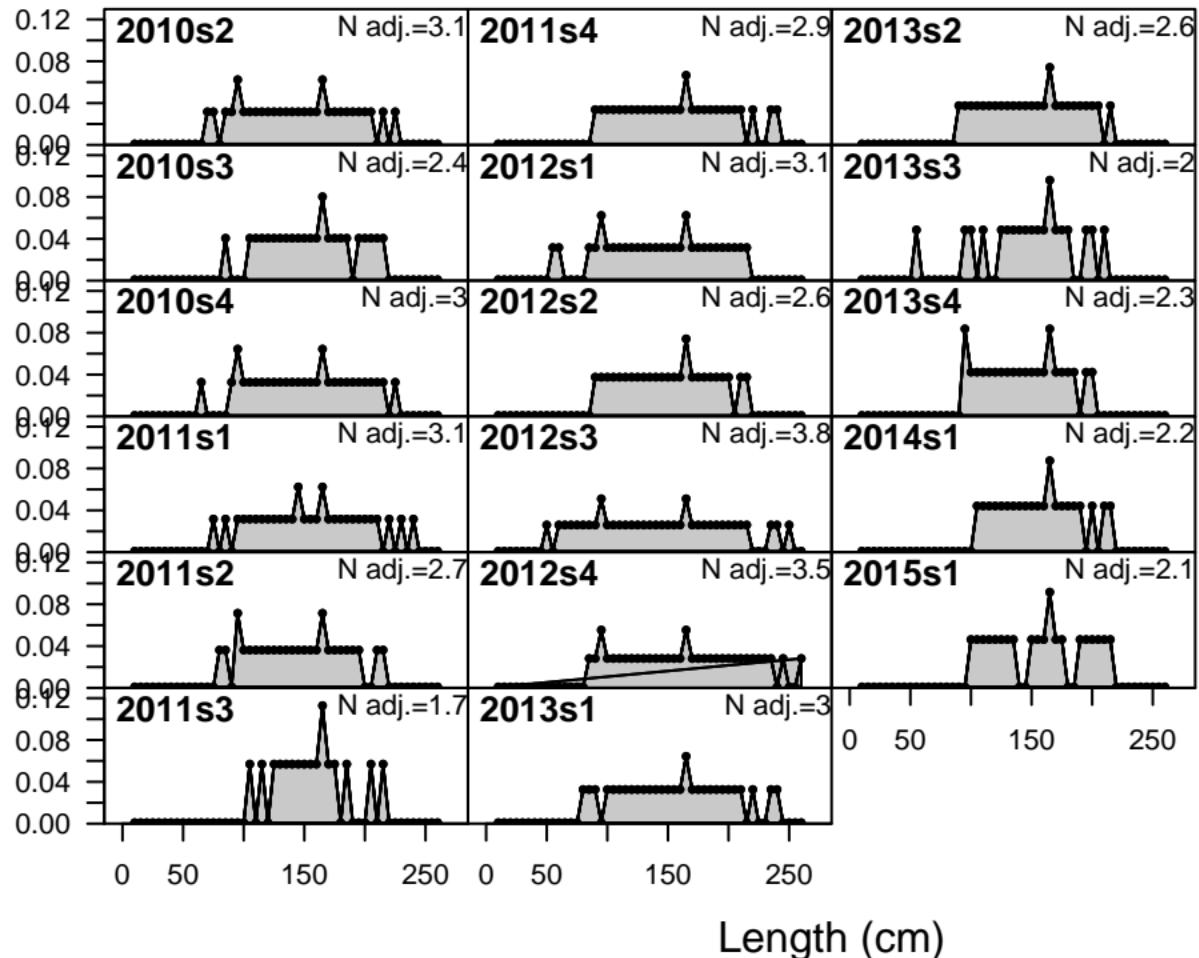
### F3\_US\_WCNPO\_LL\_shallow\_late (whole catch)

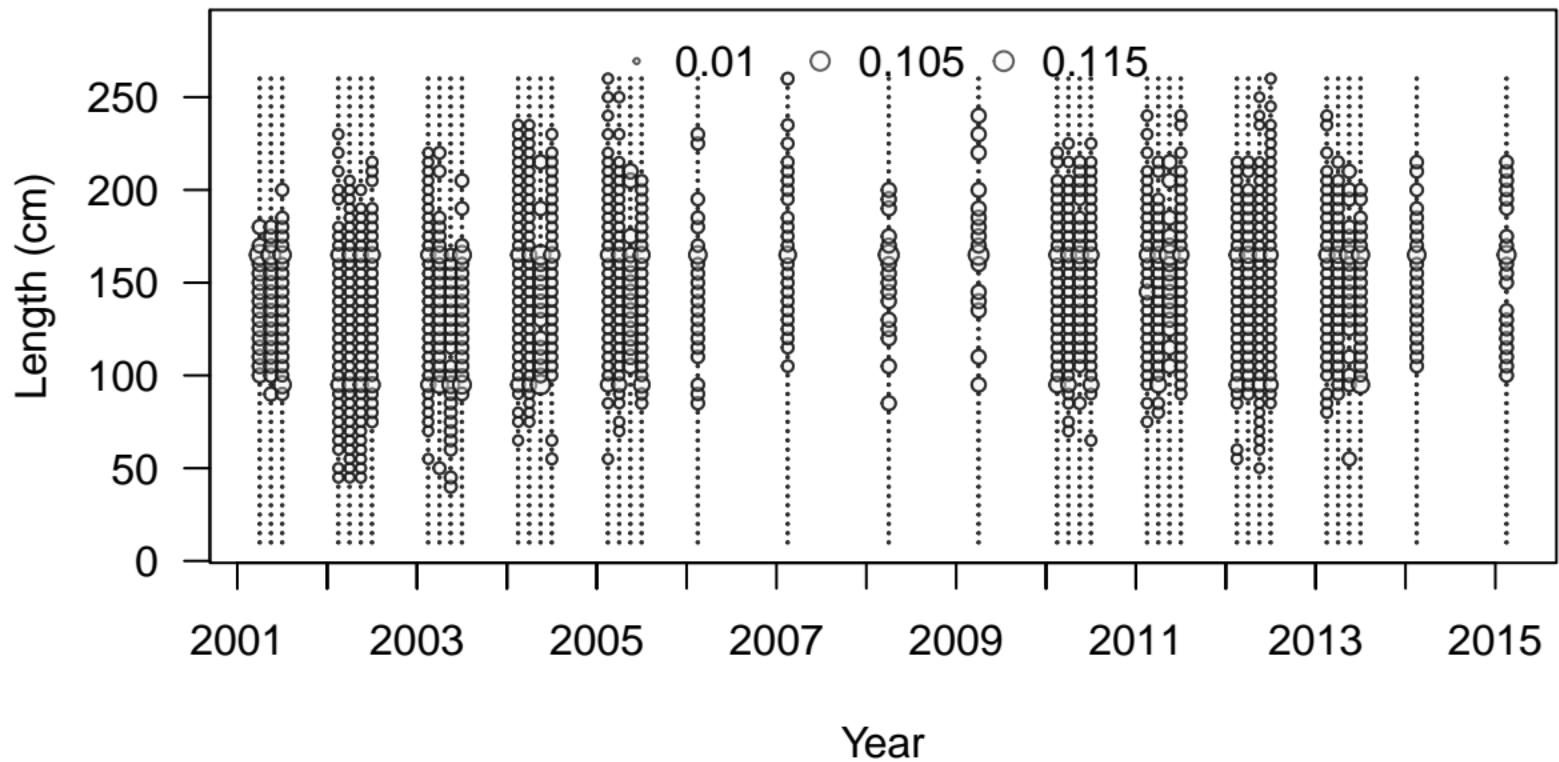


Proportion

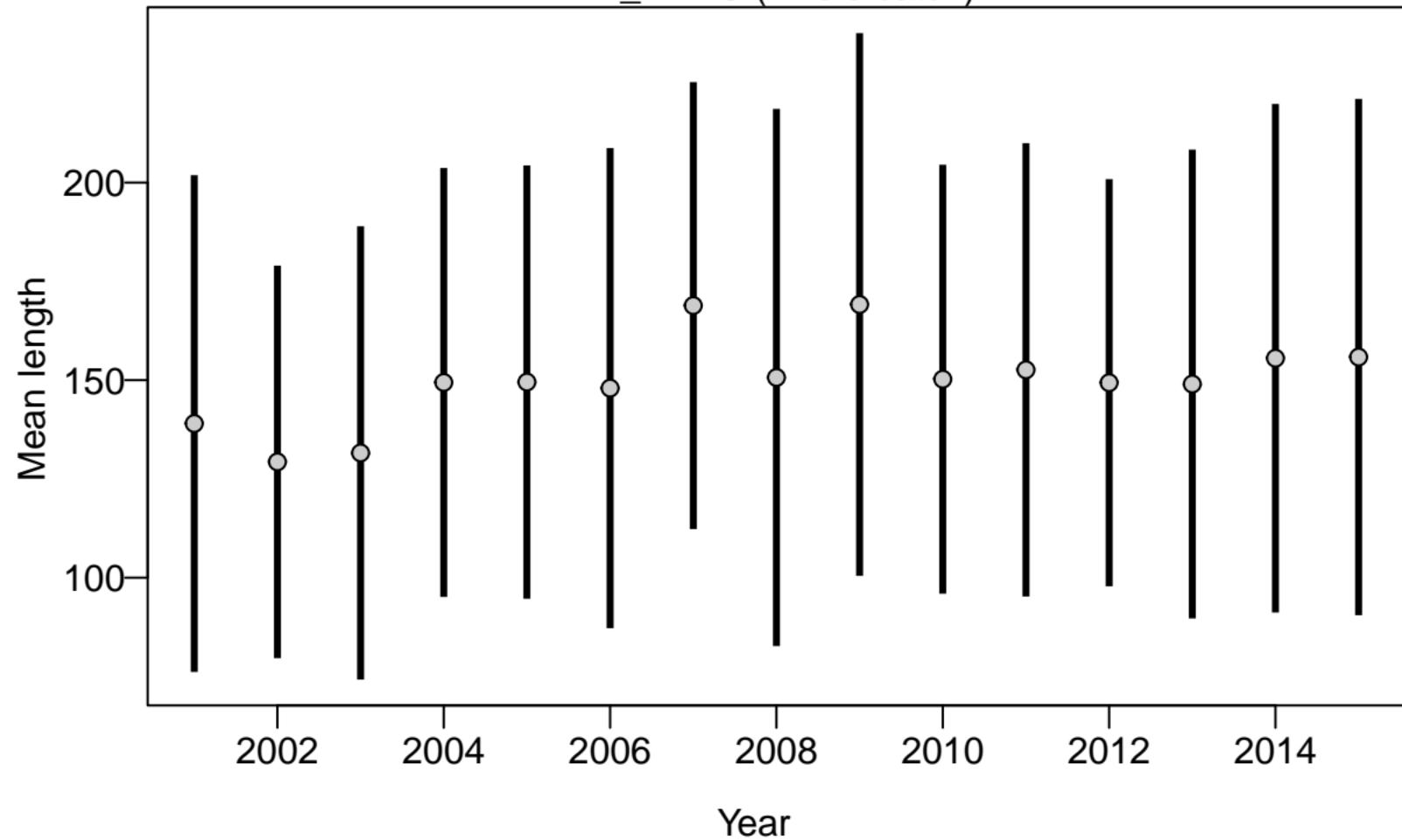


Proportion

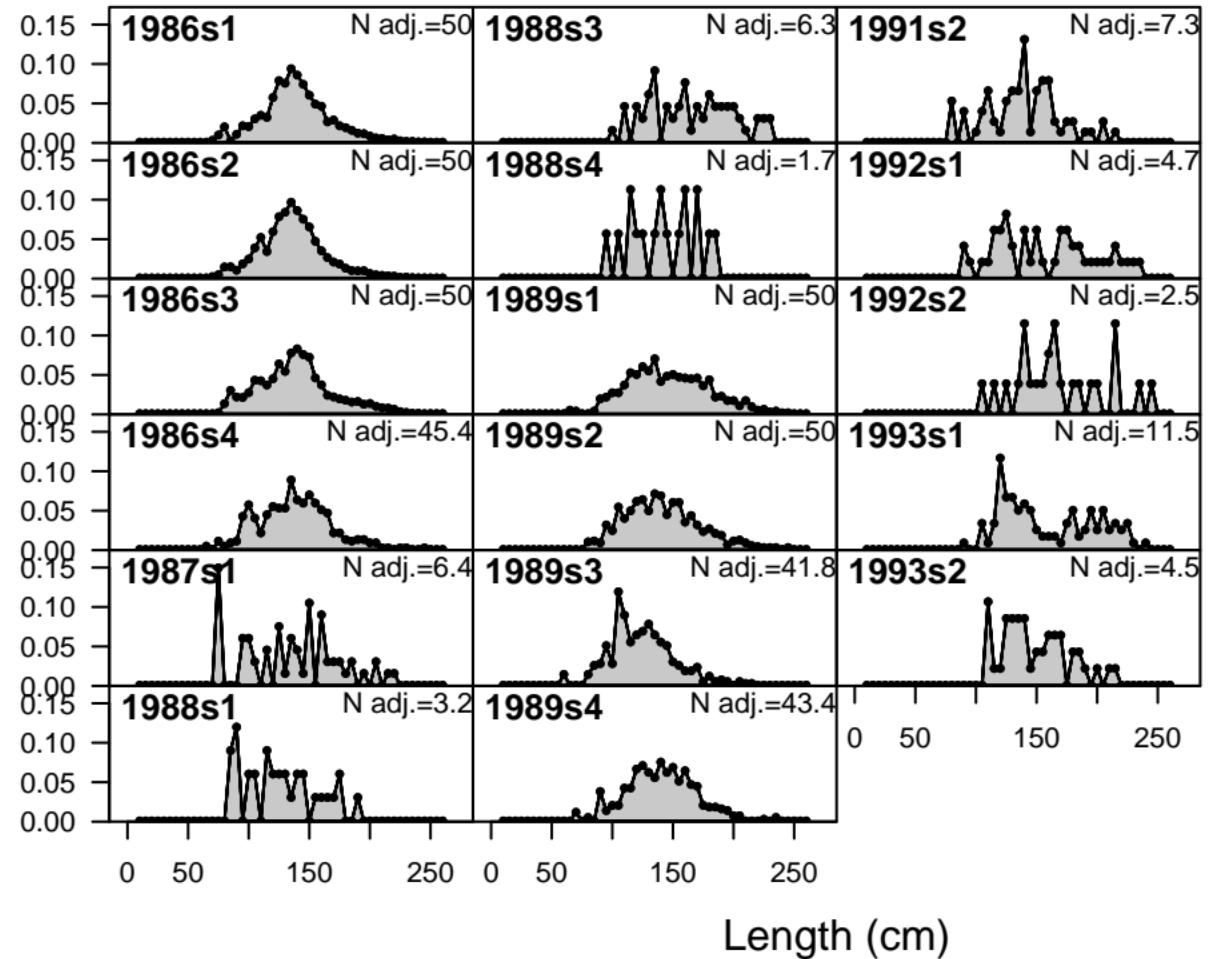


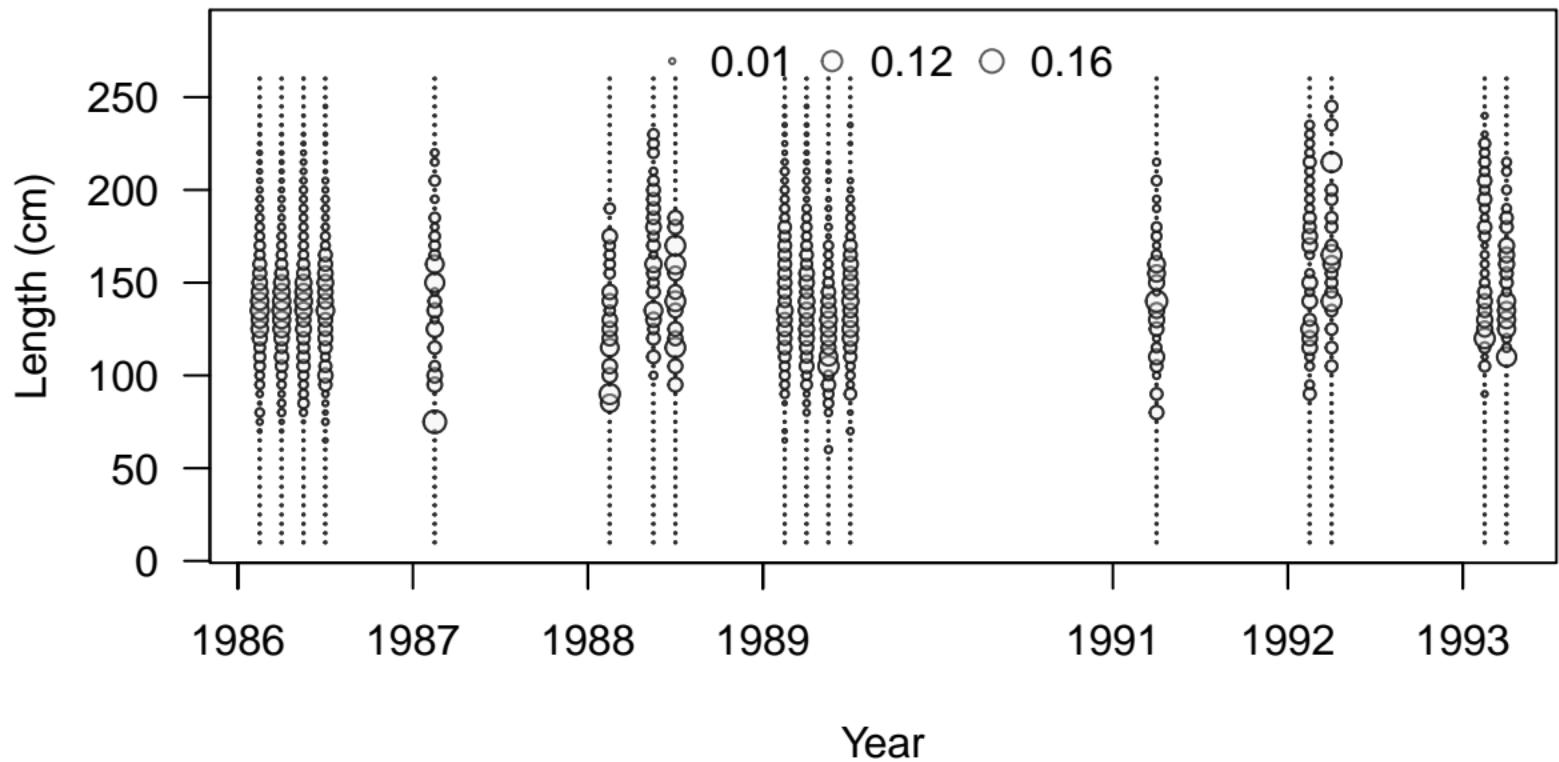


### F4\_IATTC (whole catch)

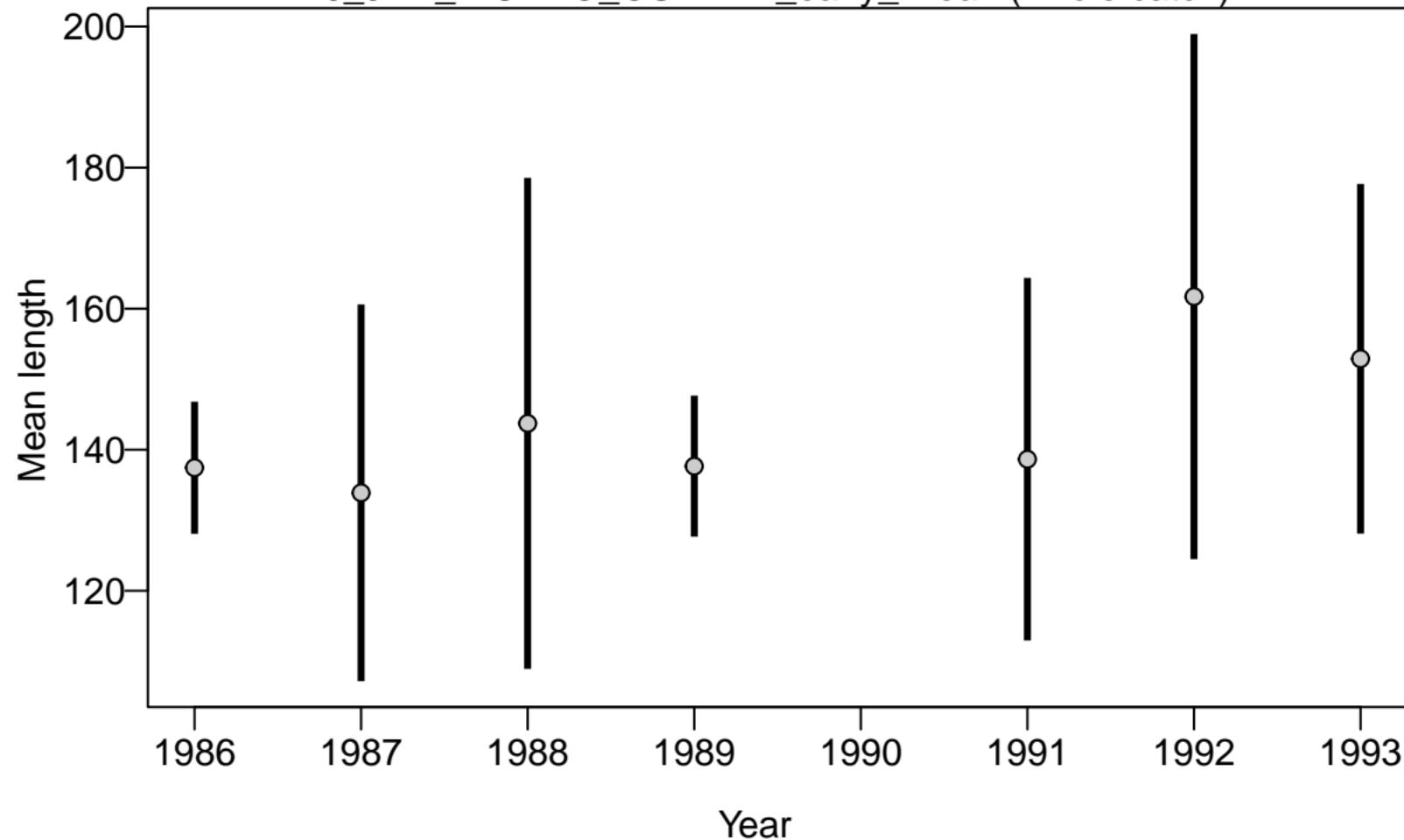


Proportion

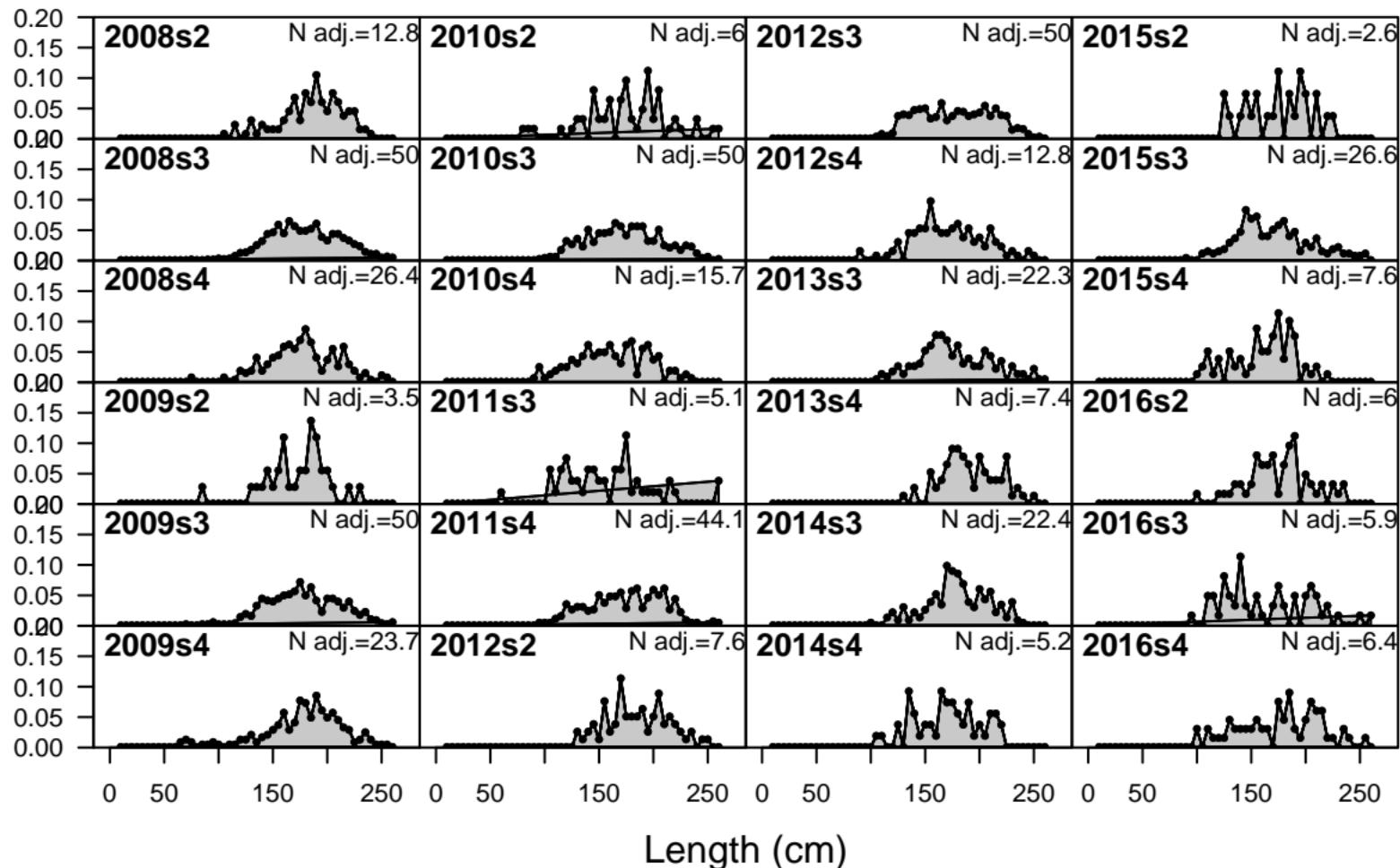




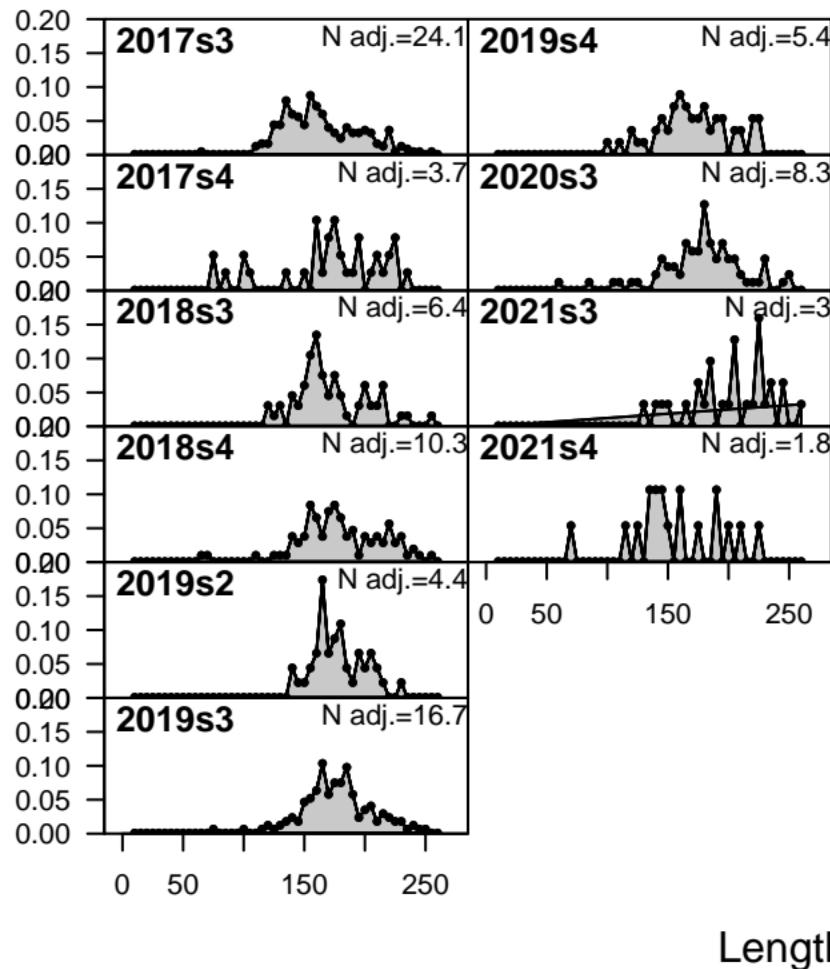
F6\_JPN\_WCNPO OSDWLL\_early\_Area1 (whole catch)

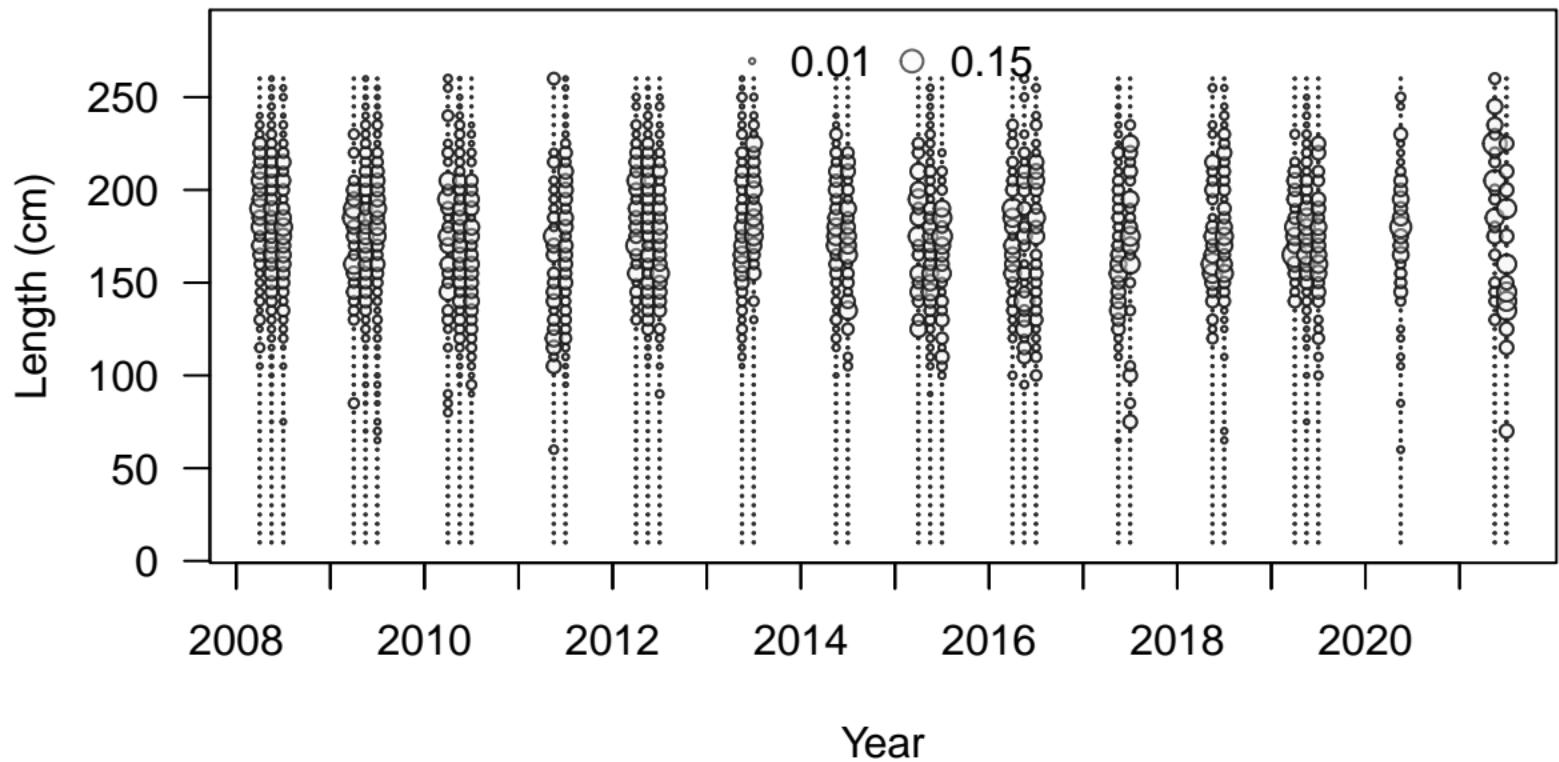


Proportion

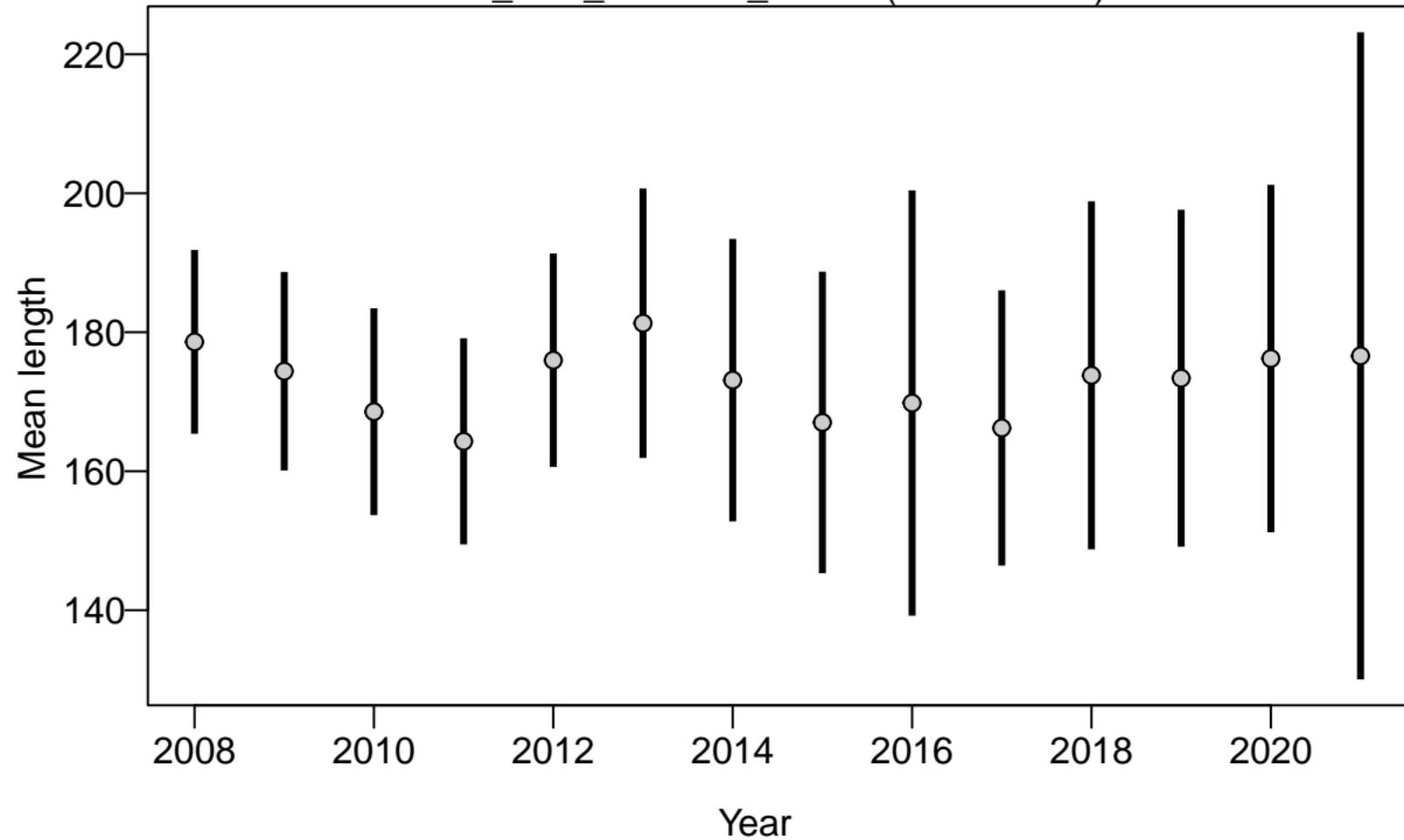


Proportion

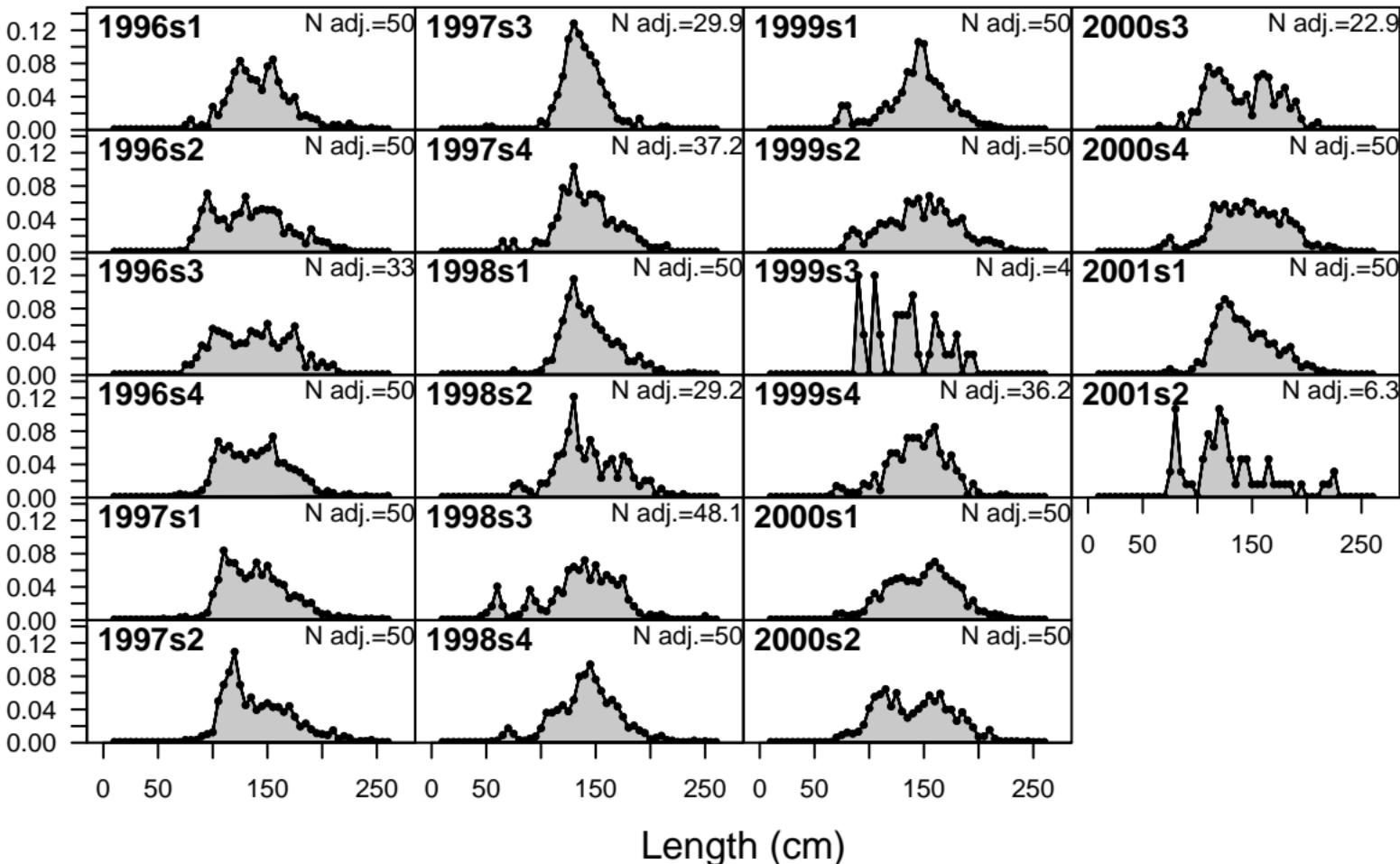


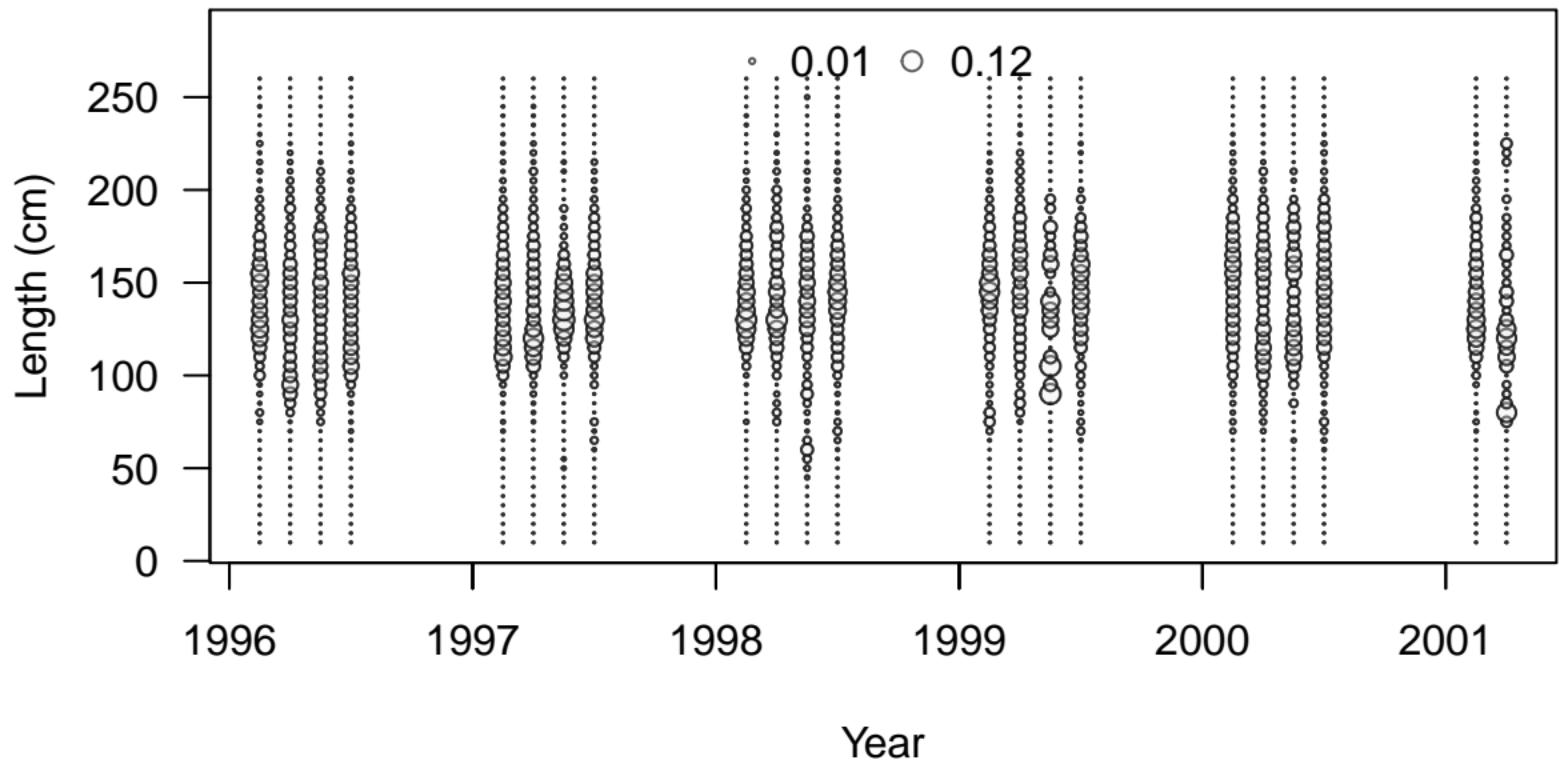


# F7\_JPN\_WCNPO\_CODF (whole catch)

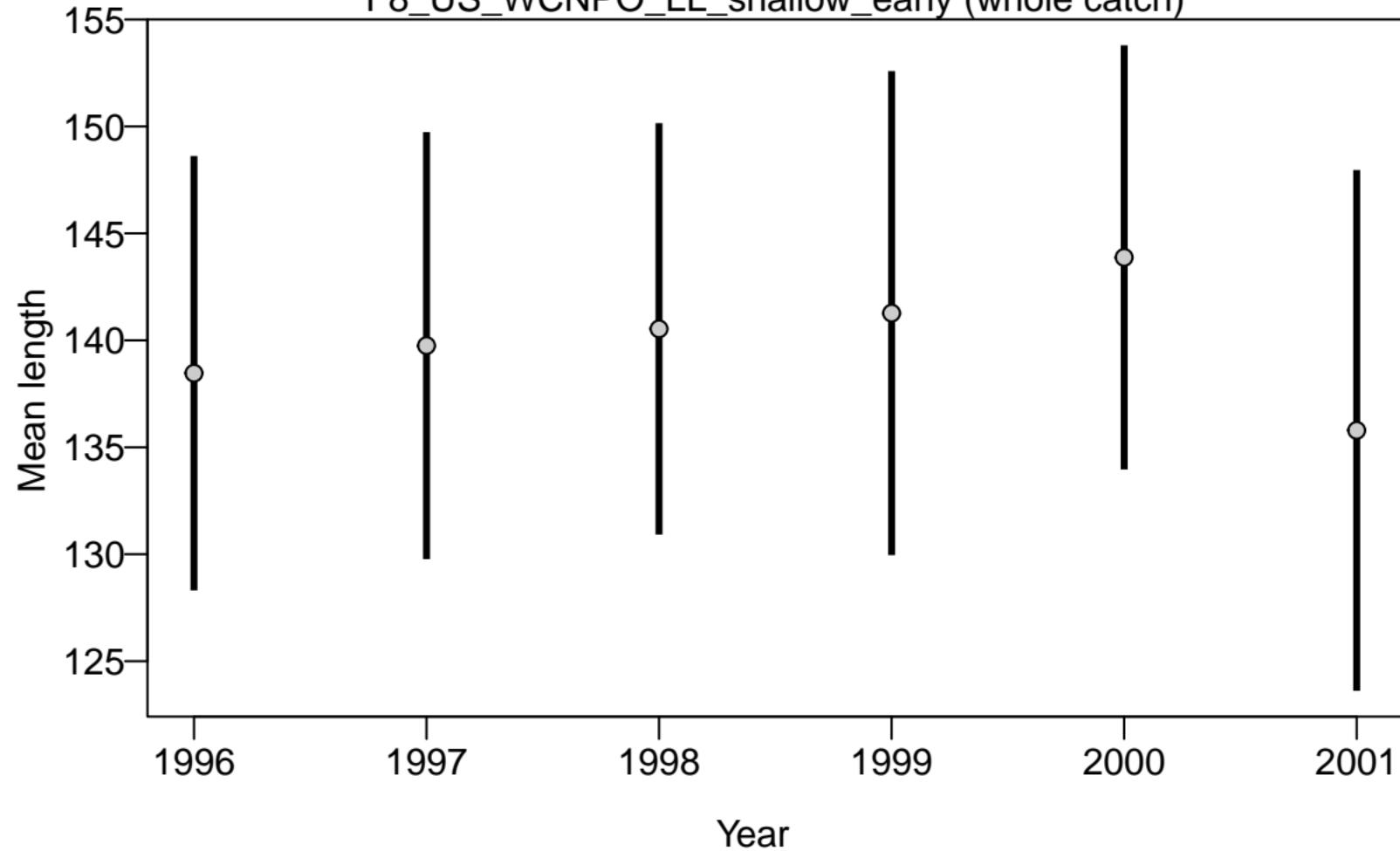


Proportion

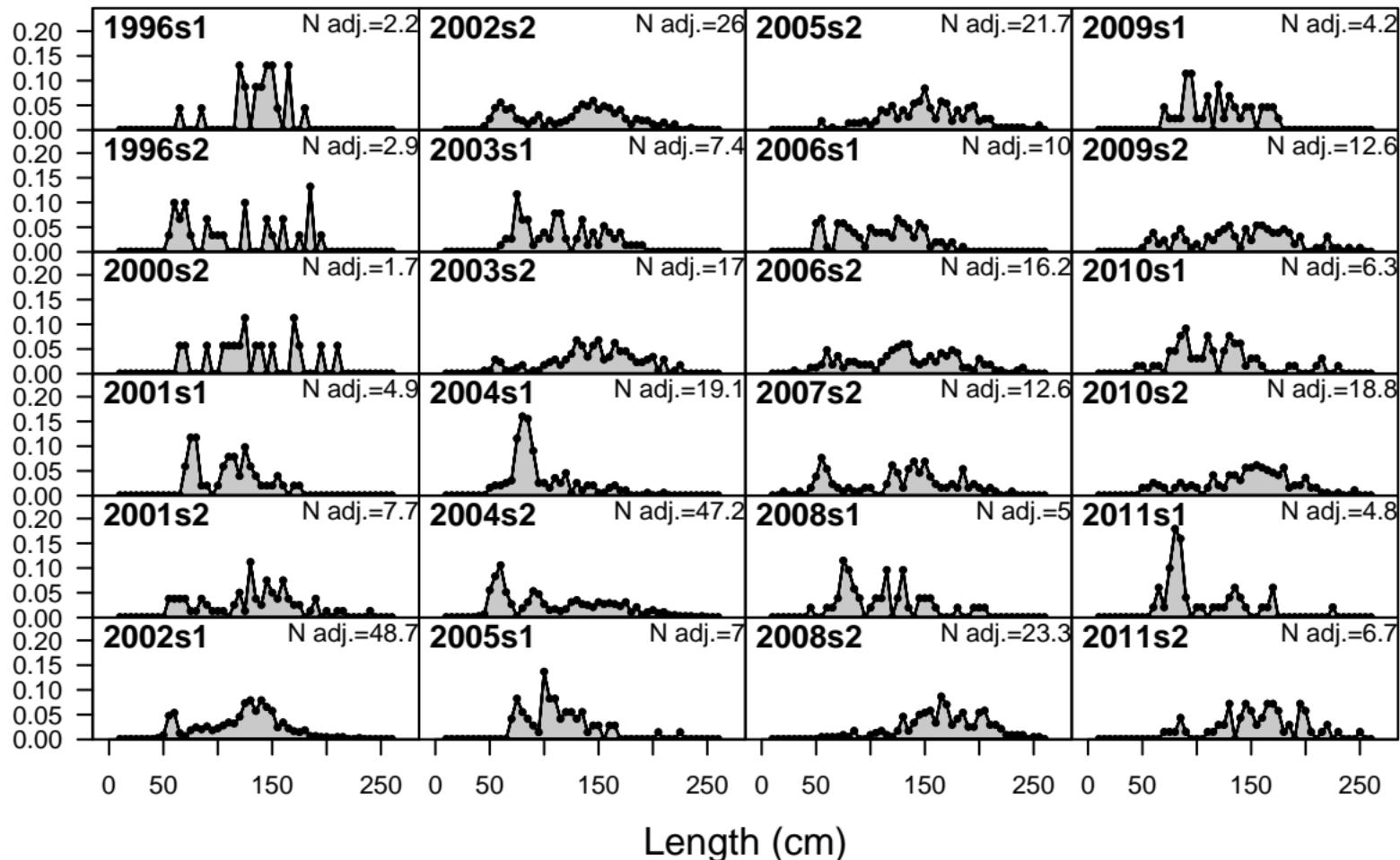




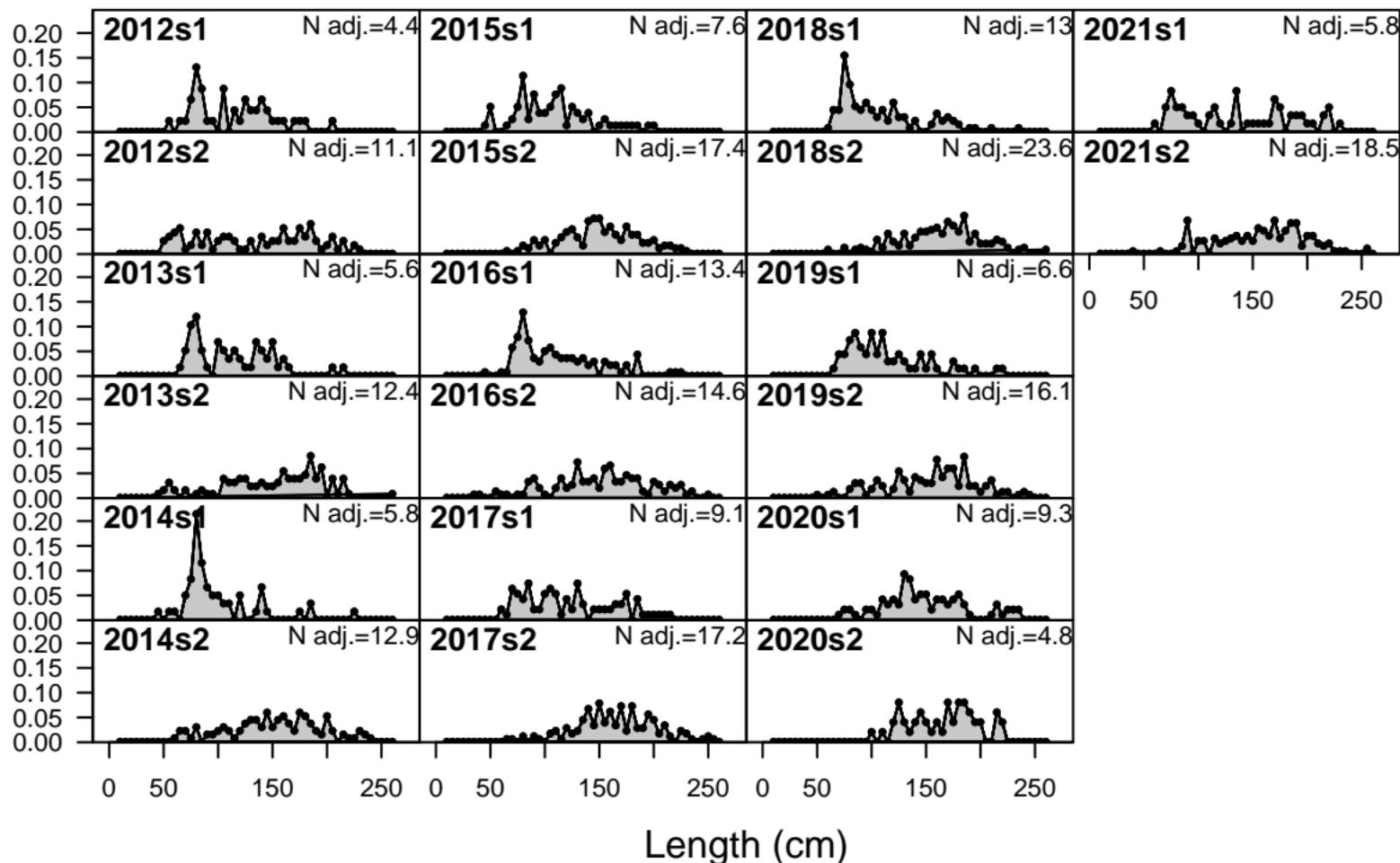
# F8\_US\_WCNPO\_LL\_shallow\_early (whole catch)

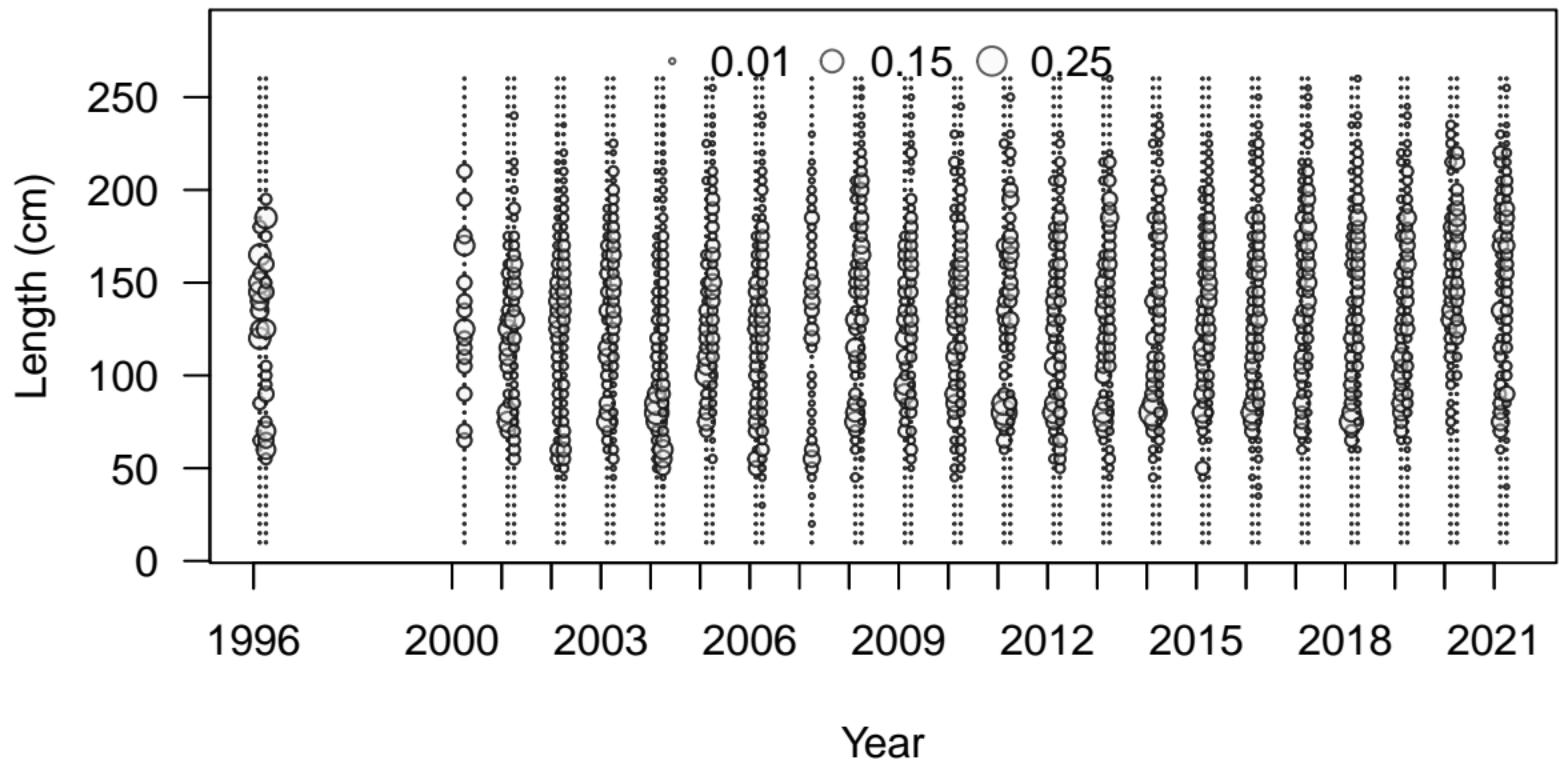


Proportion

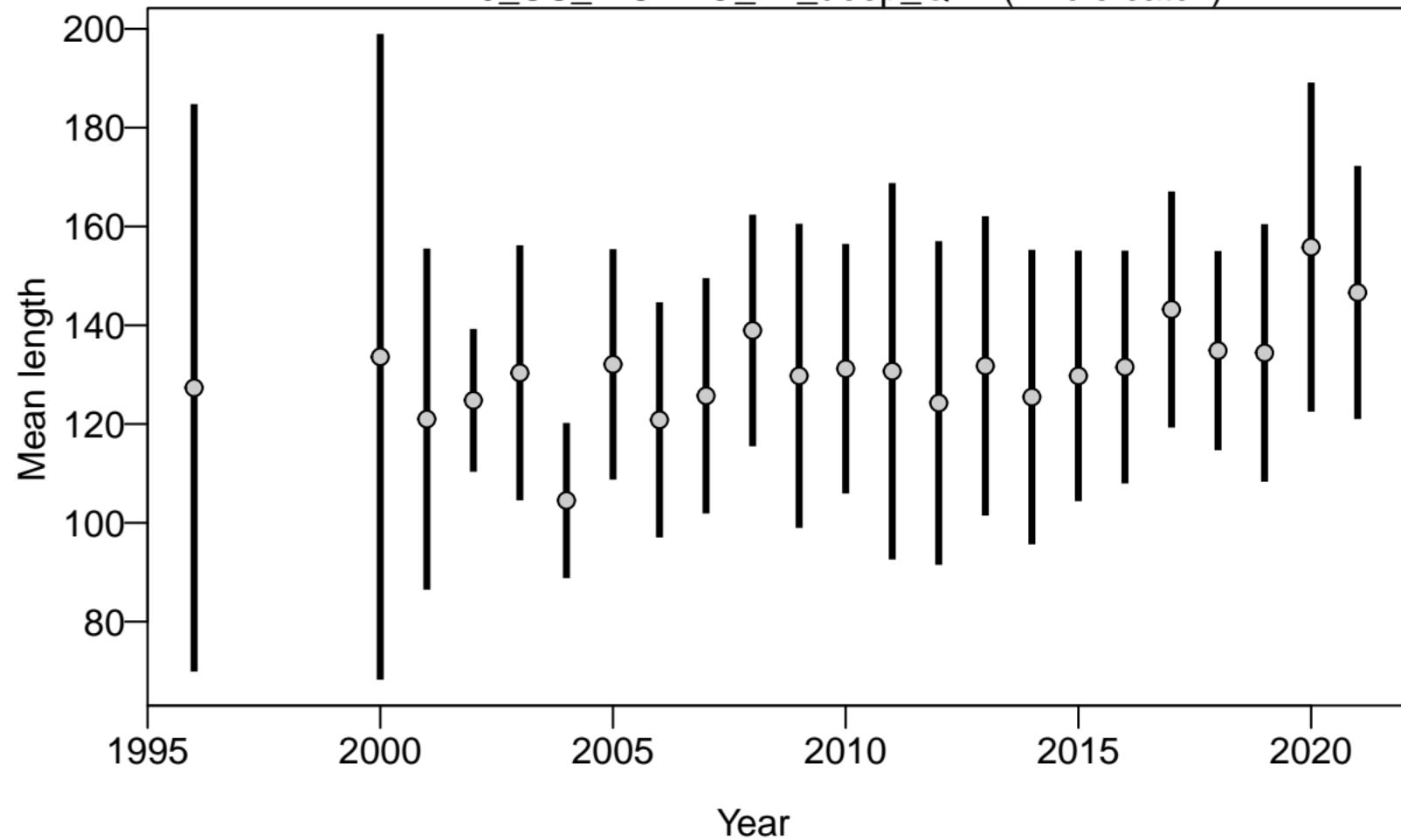


Proportion

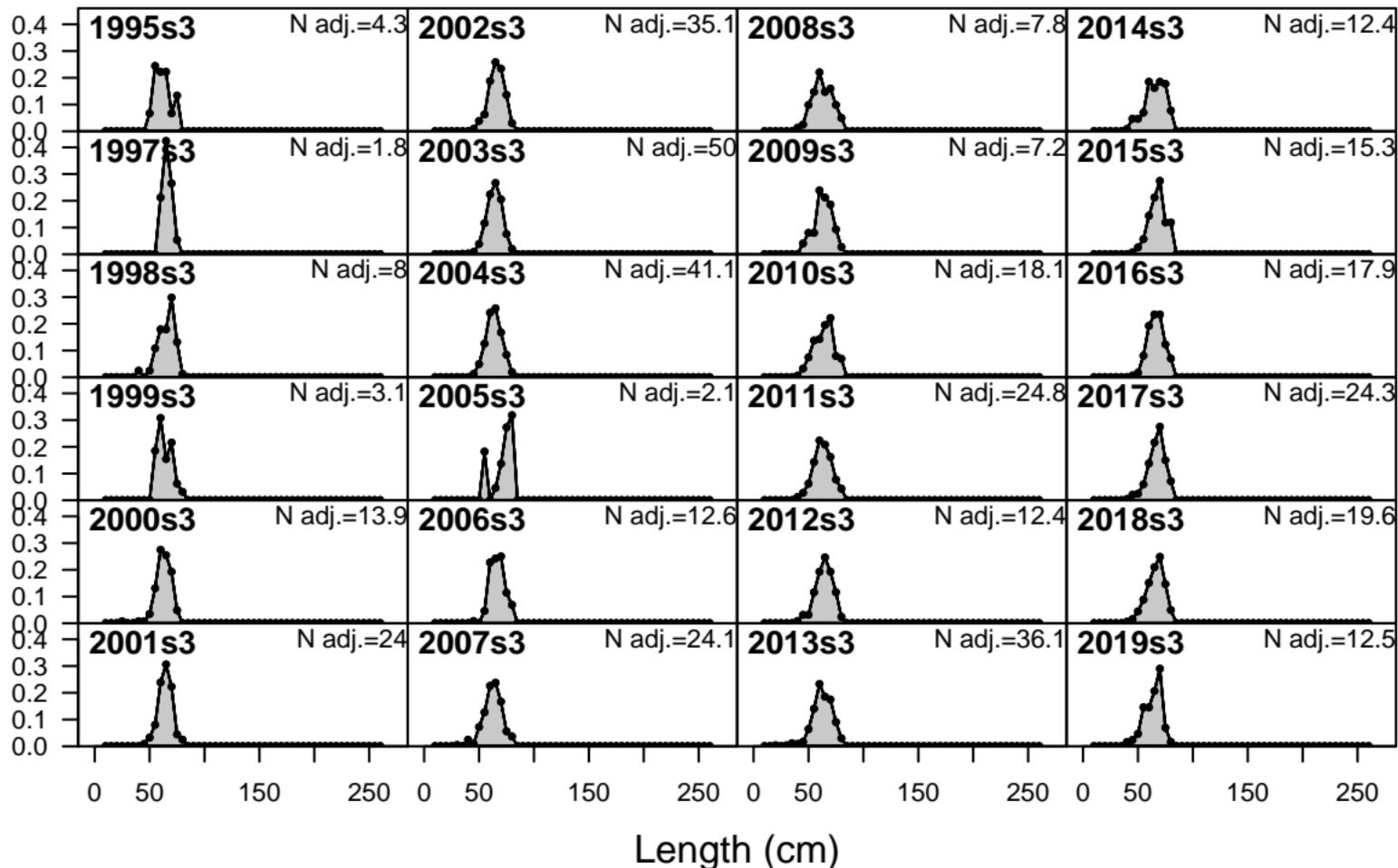




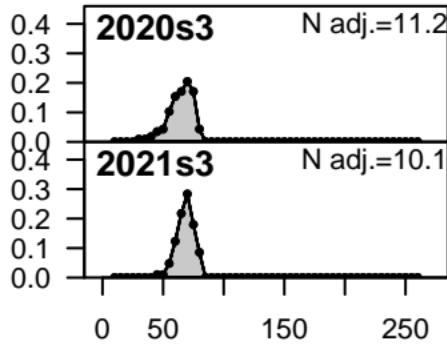
F9\_US\_WCNPO\_LL\_deep\_Q12 (whole catch)



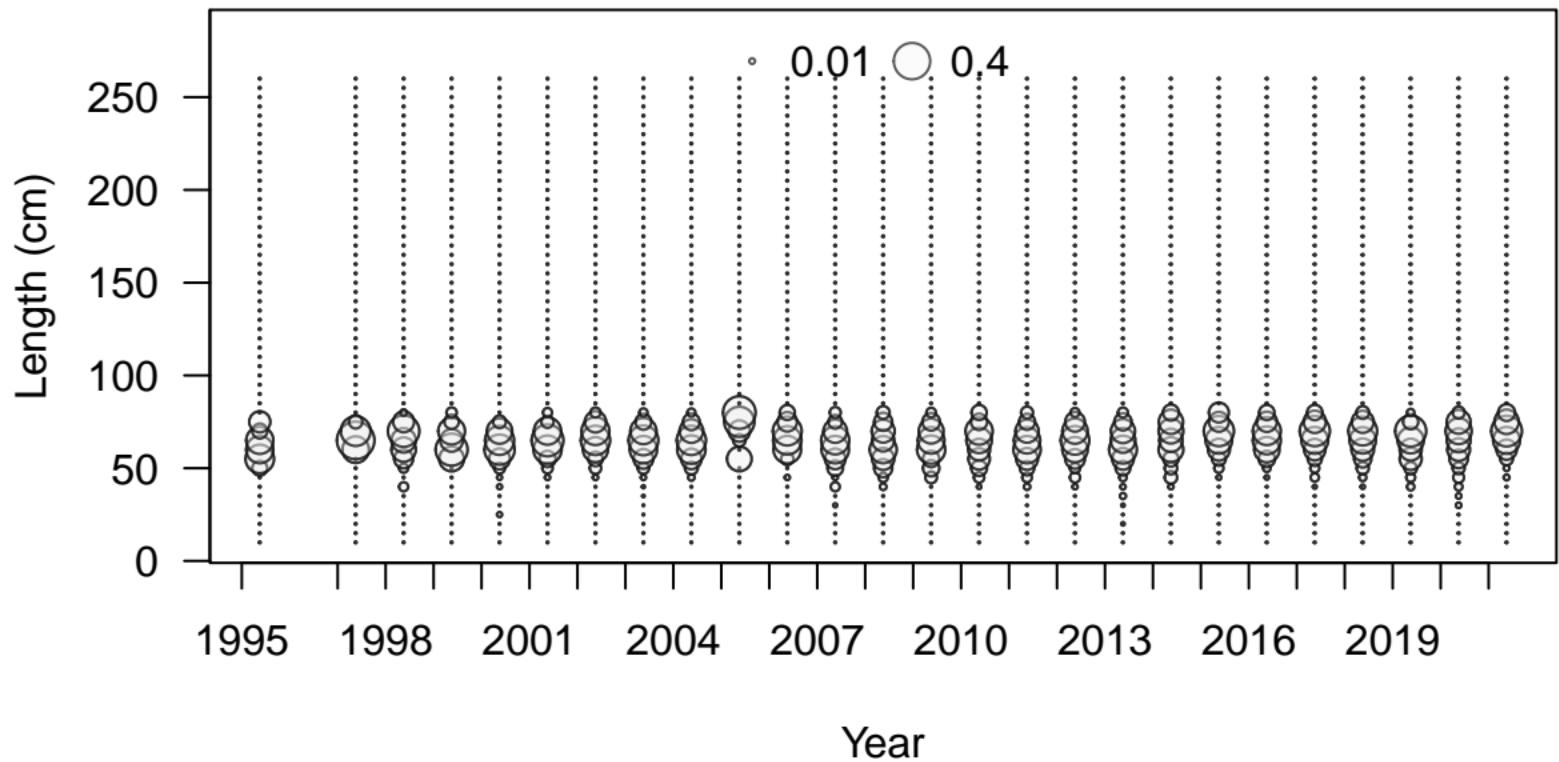
Proportion



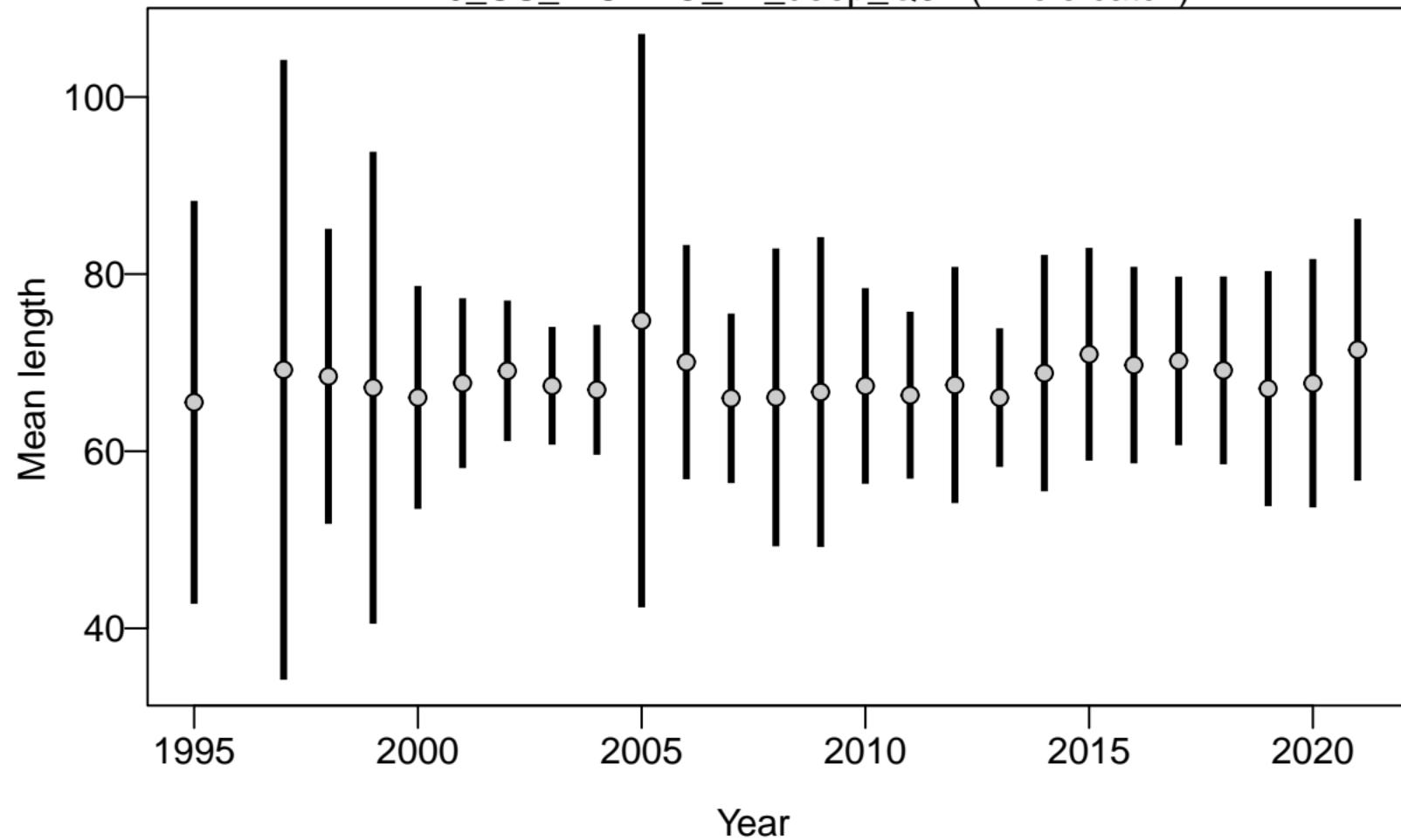
Proportion



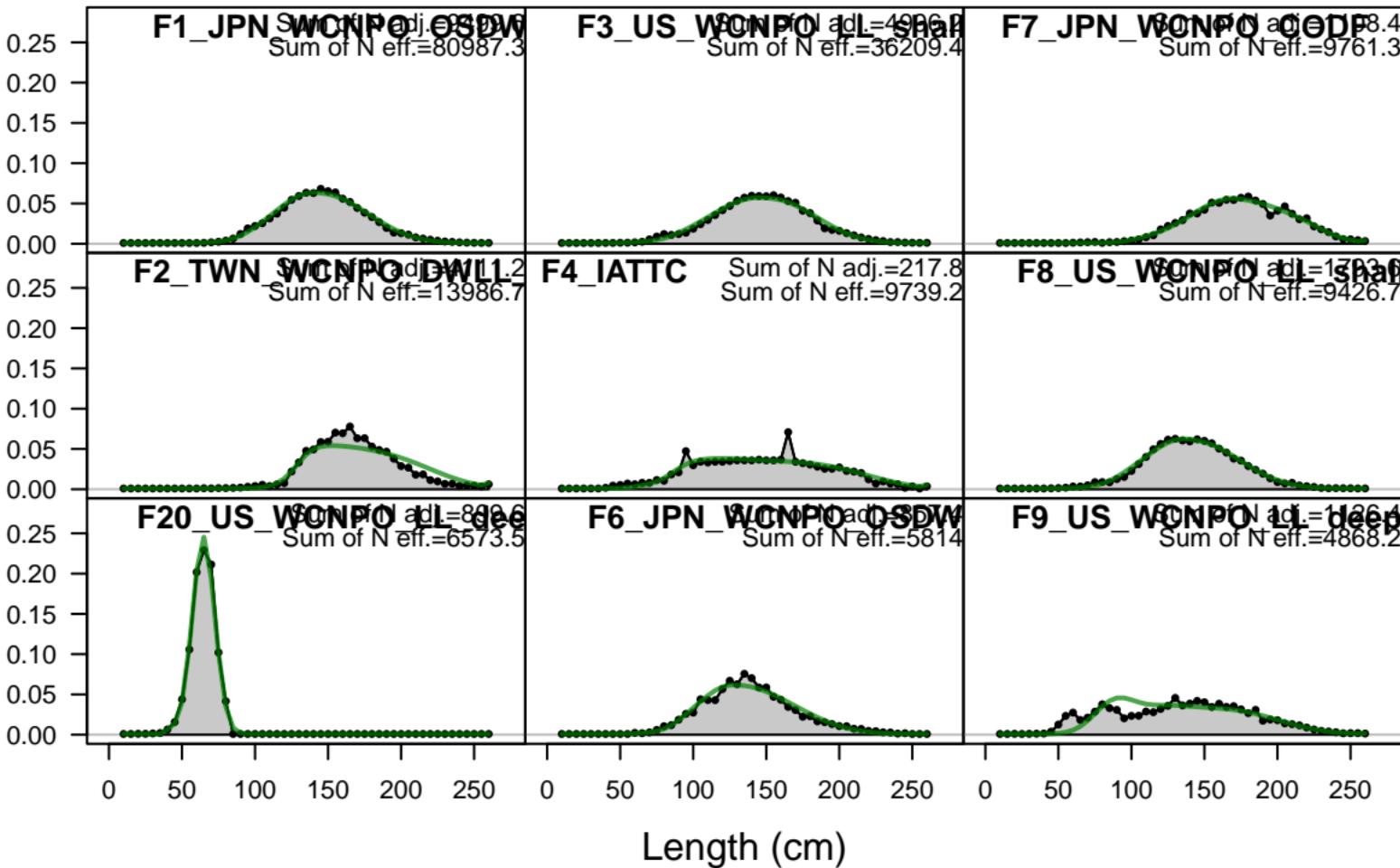
Length (cm)

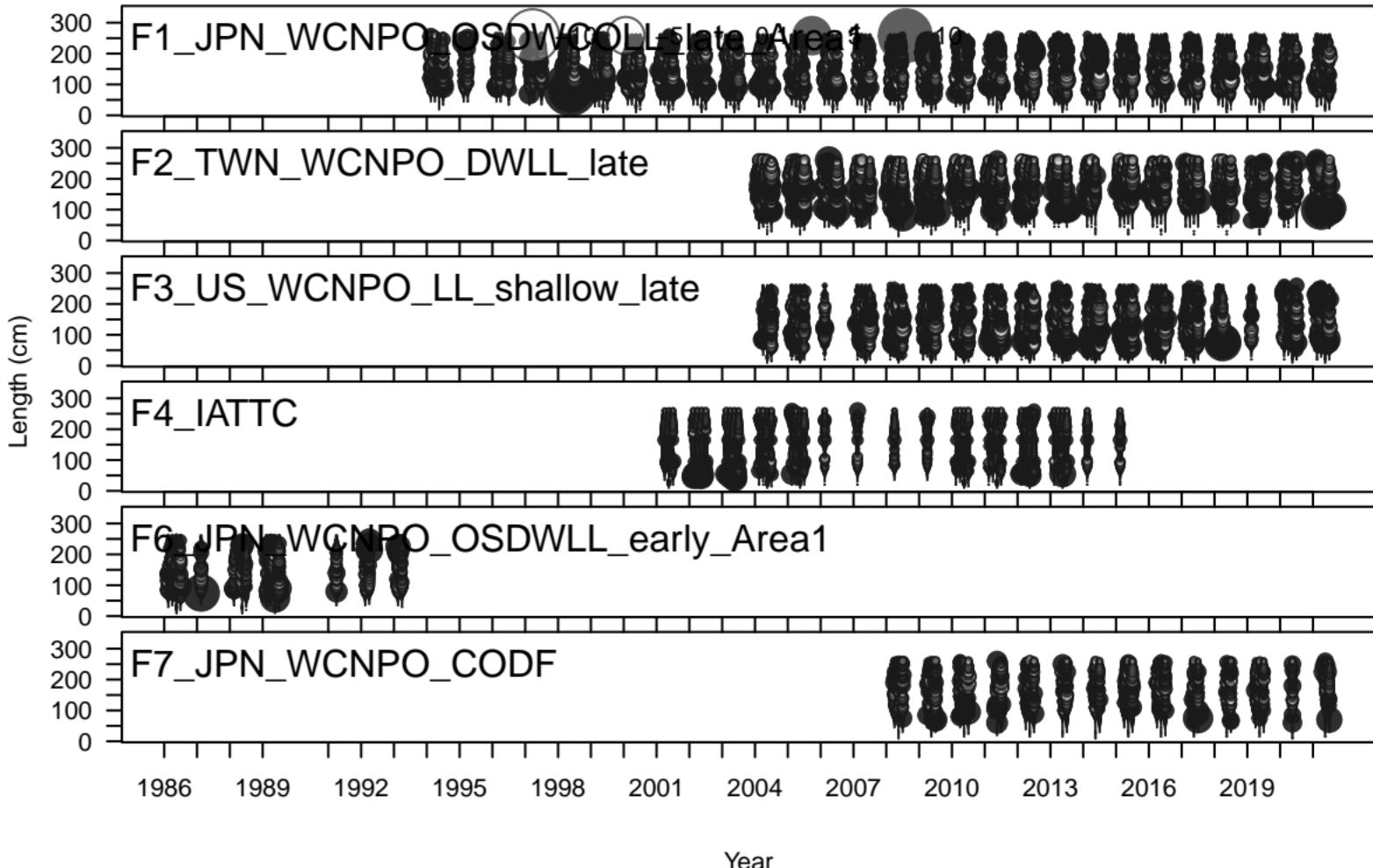


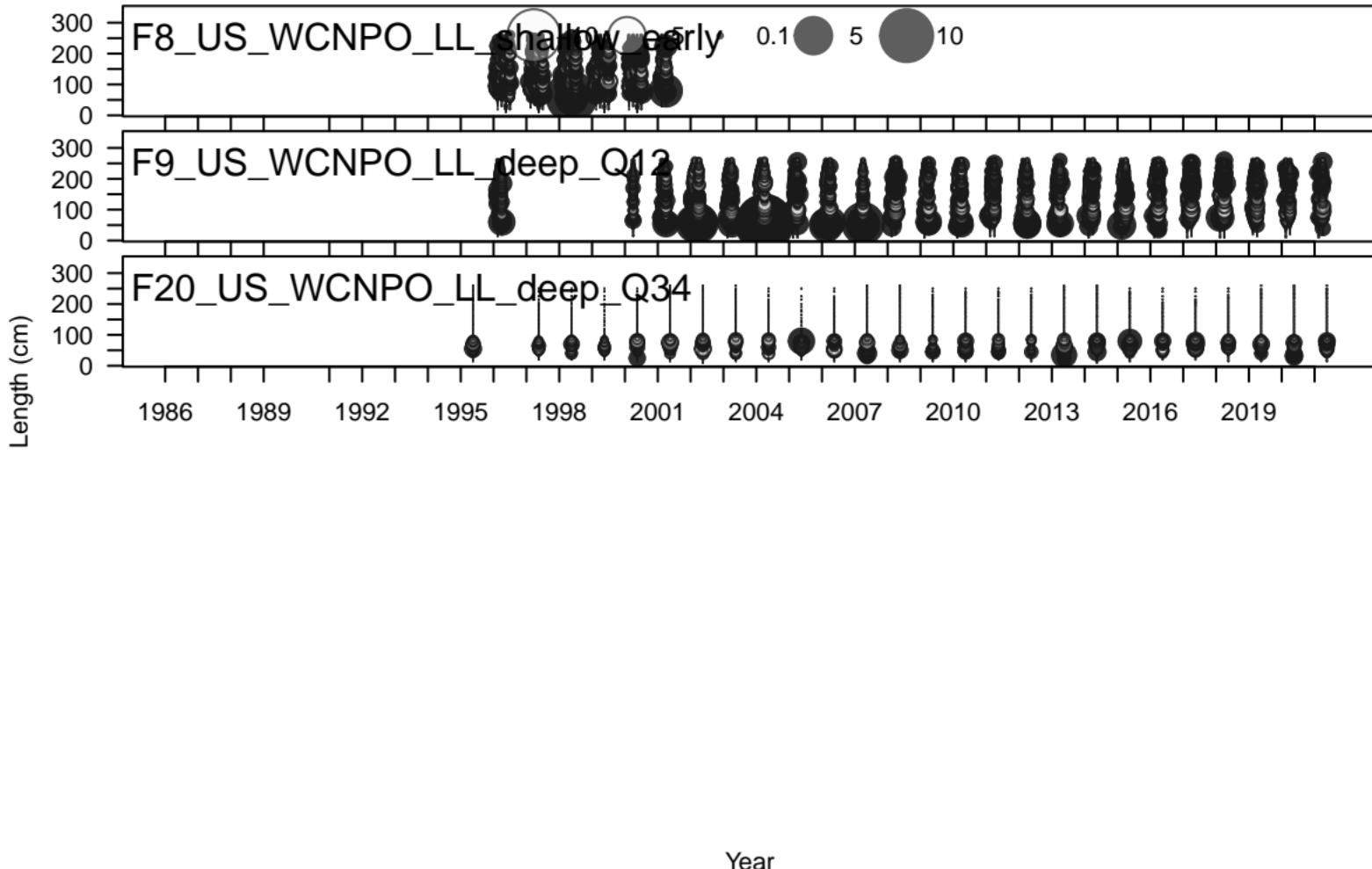
# F20\_US\_WCNPO\_LL\_deep\_Q34 (whole catch)



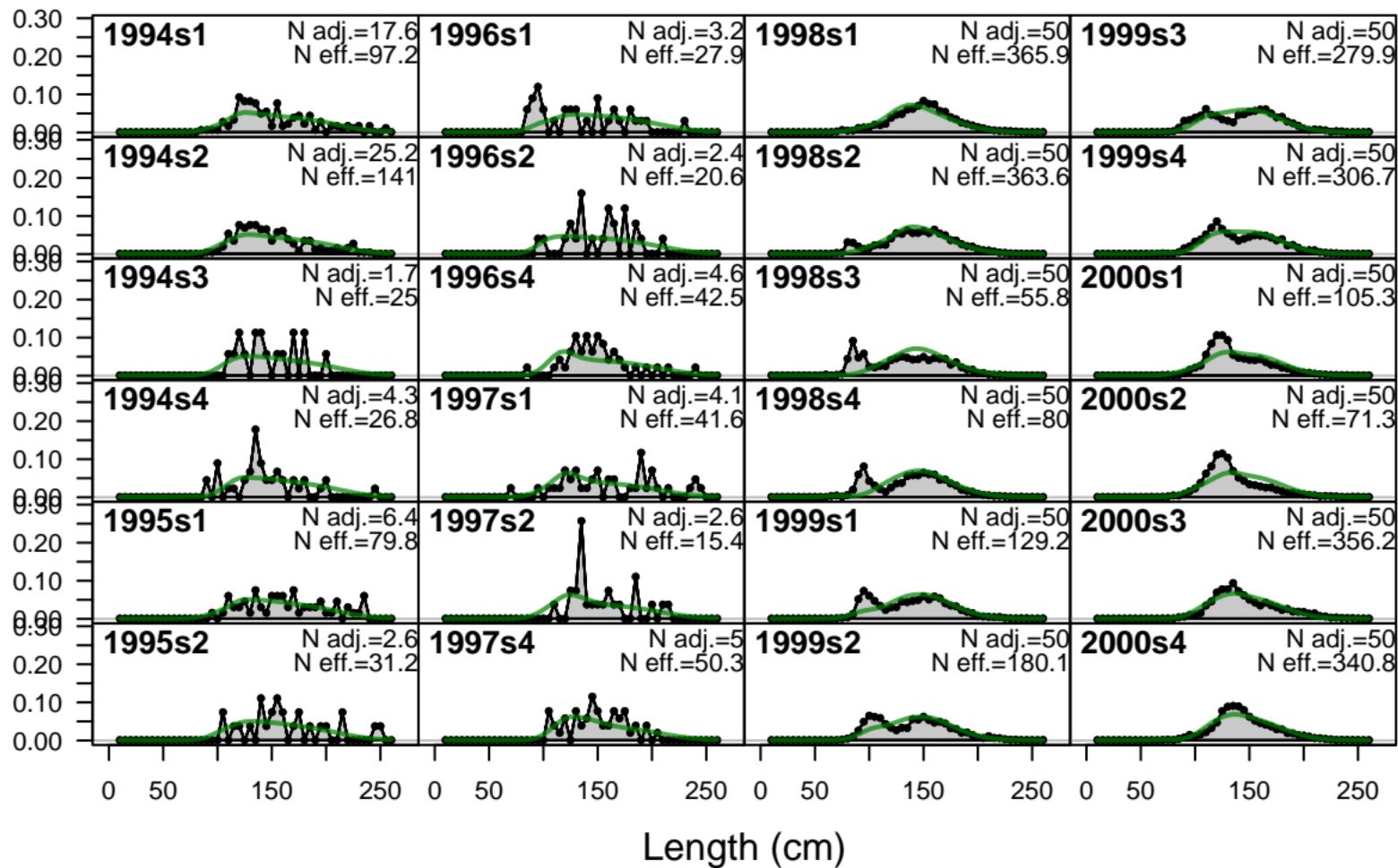
Proportion



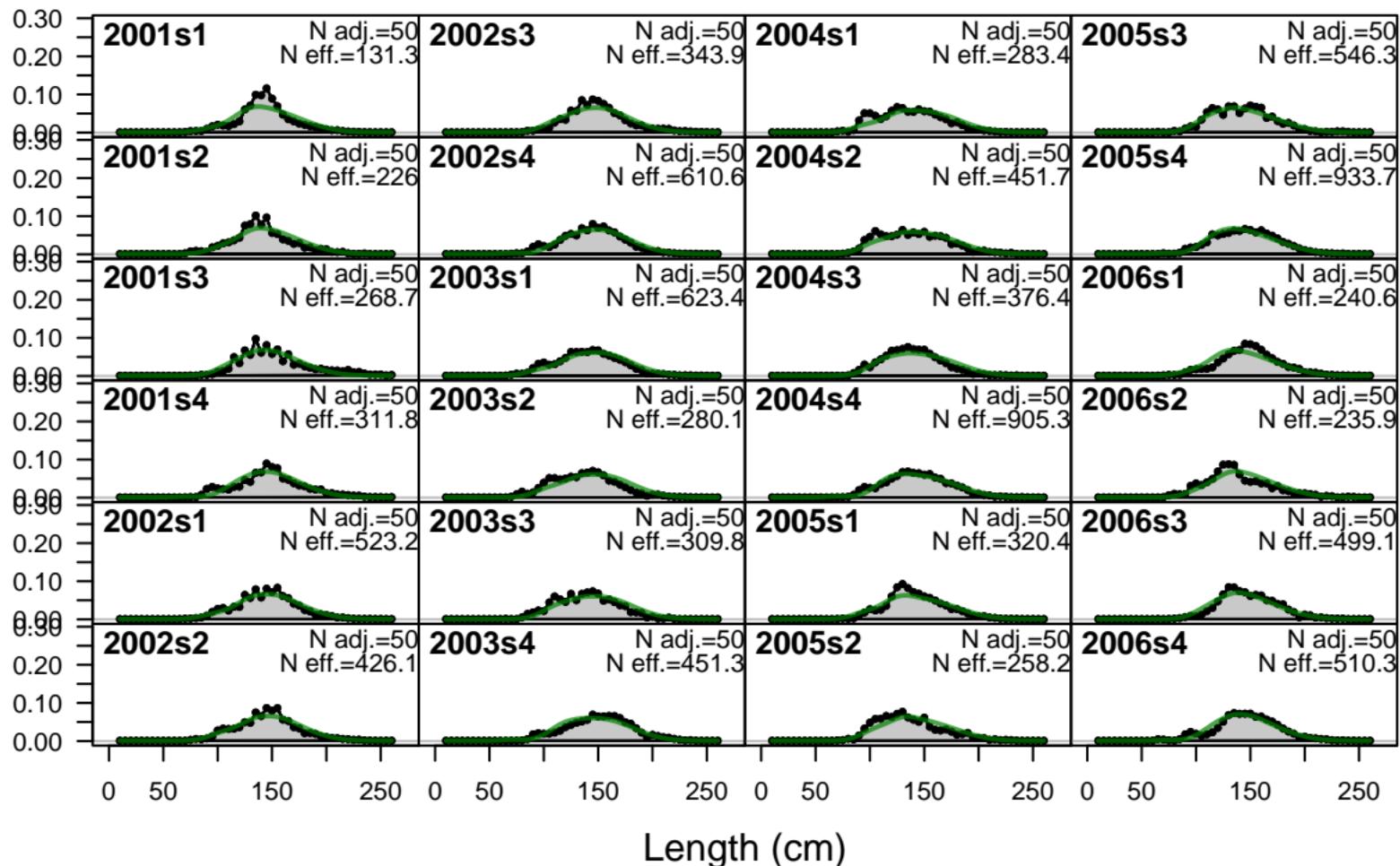




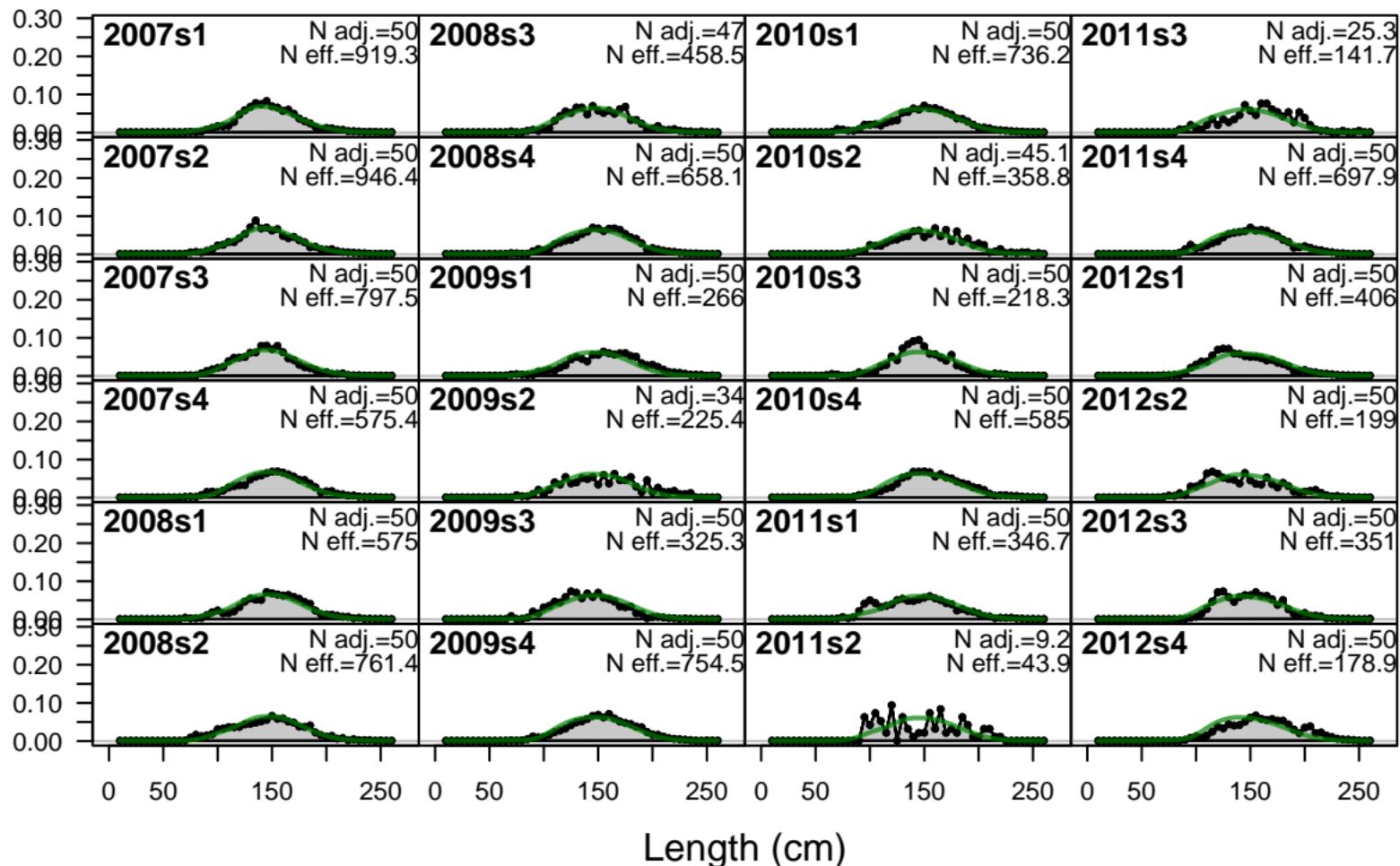
Proportion



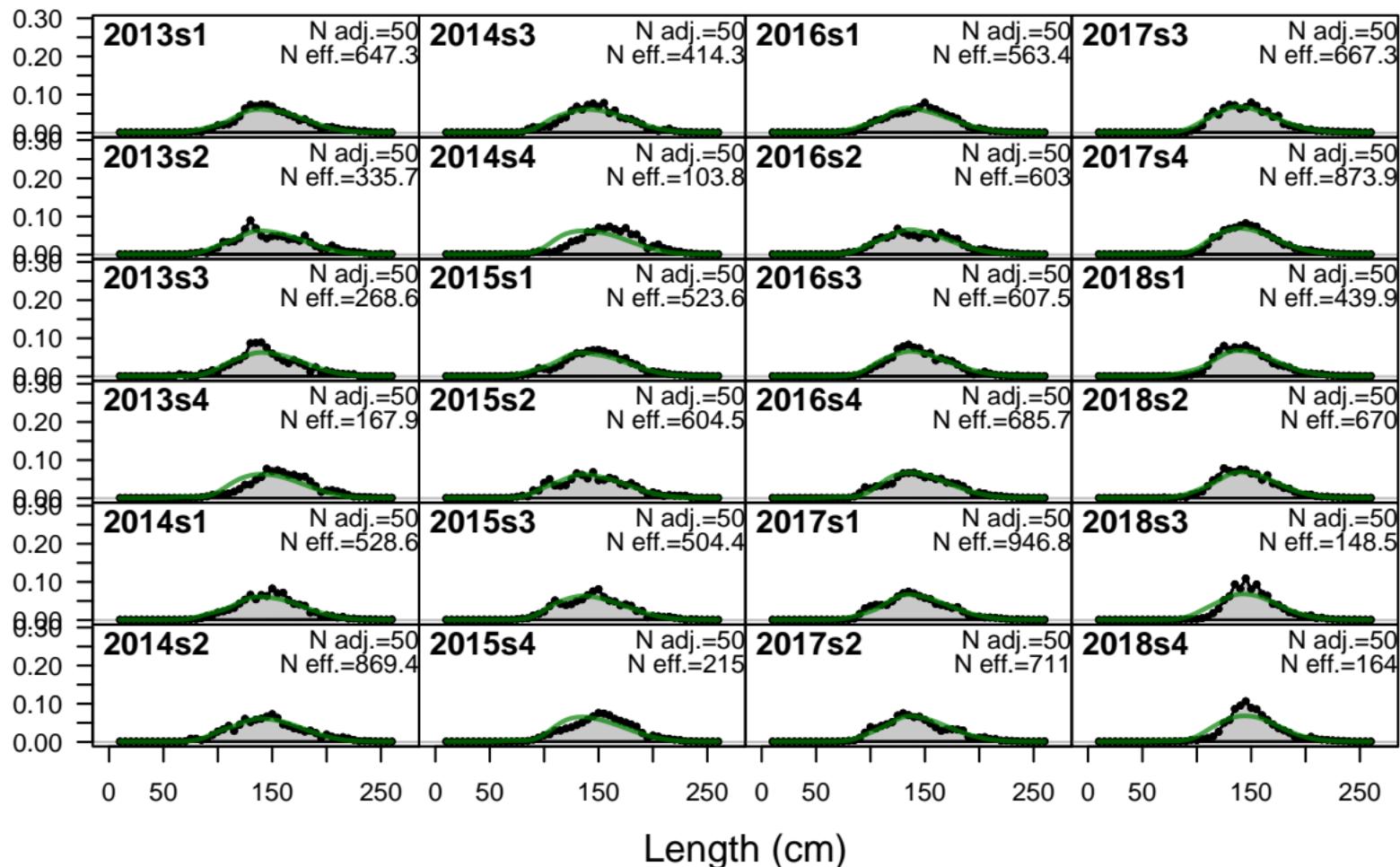
Proportion



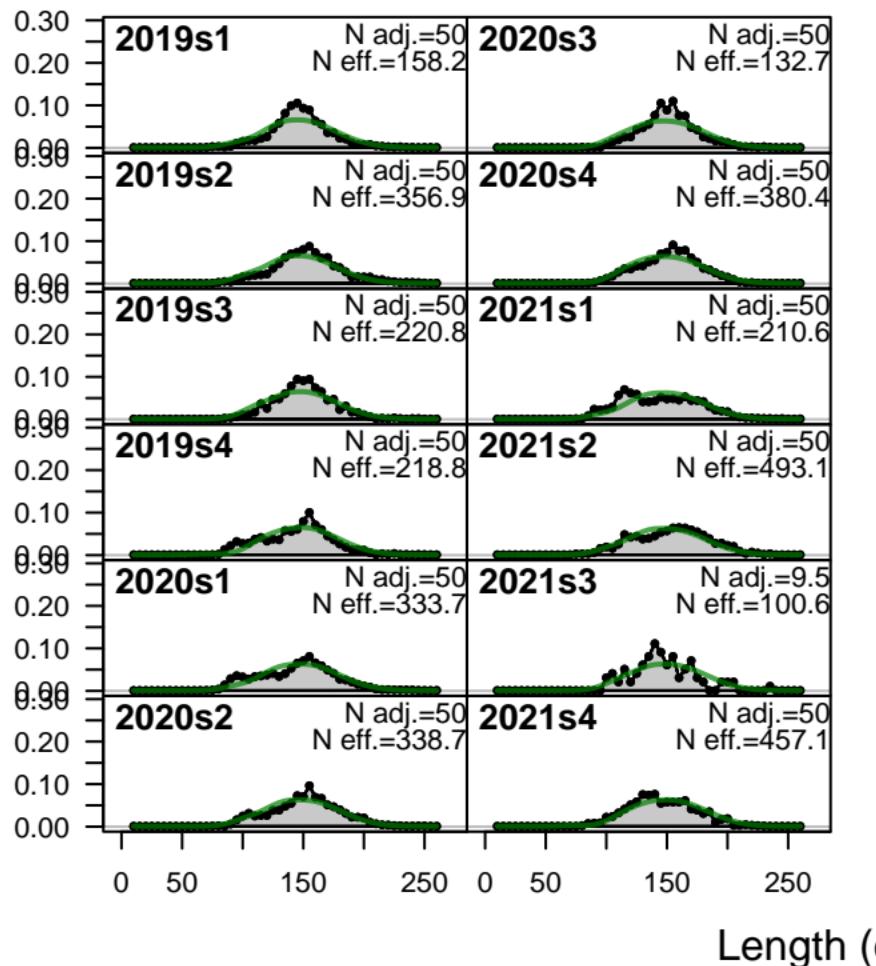
Proportion

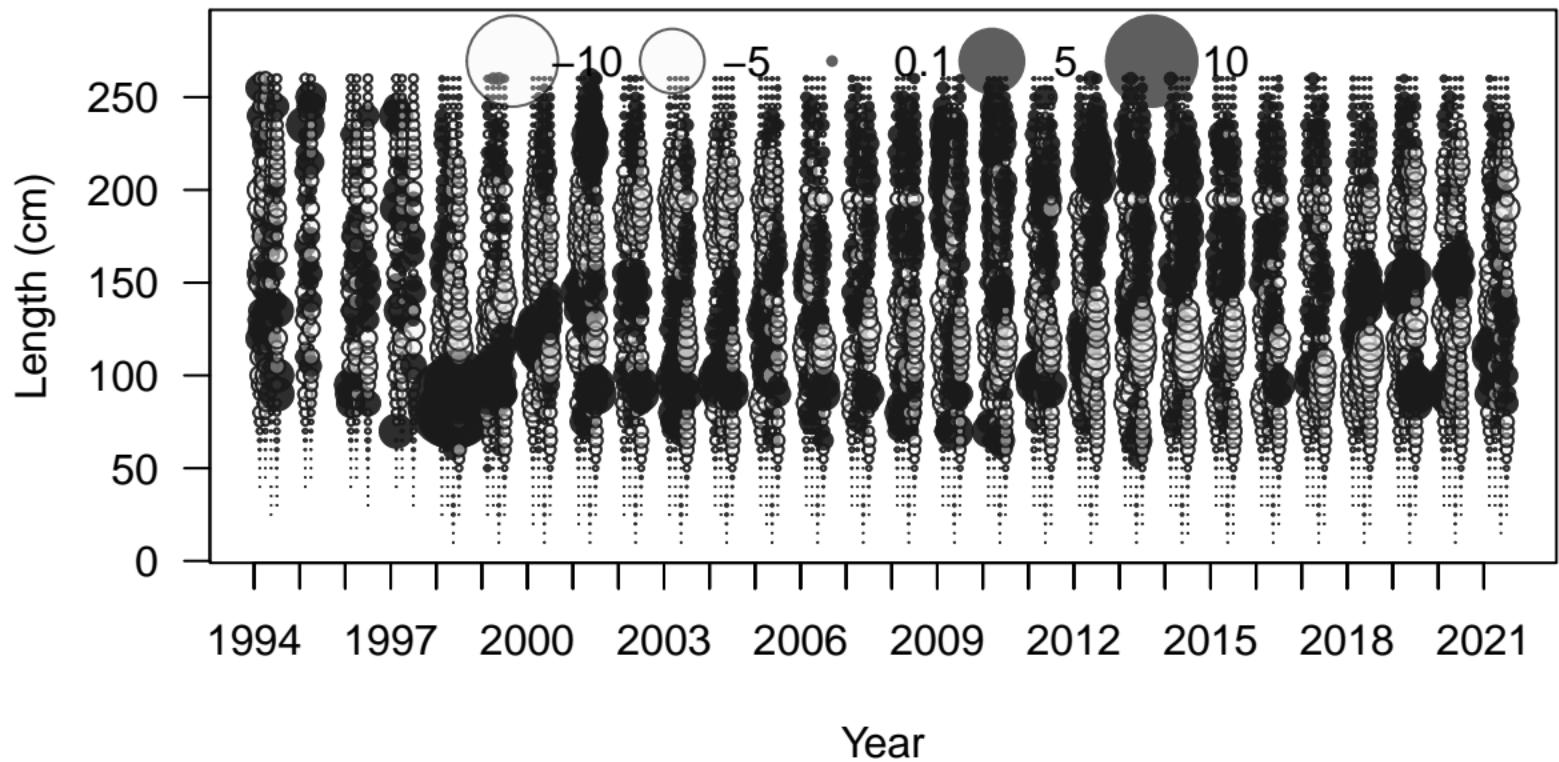


Proportion

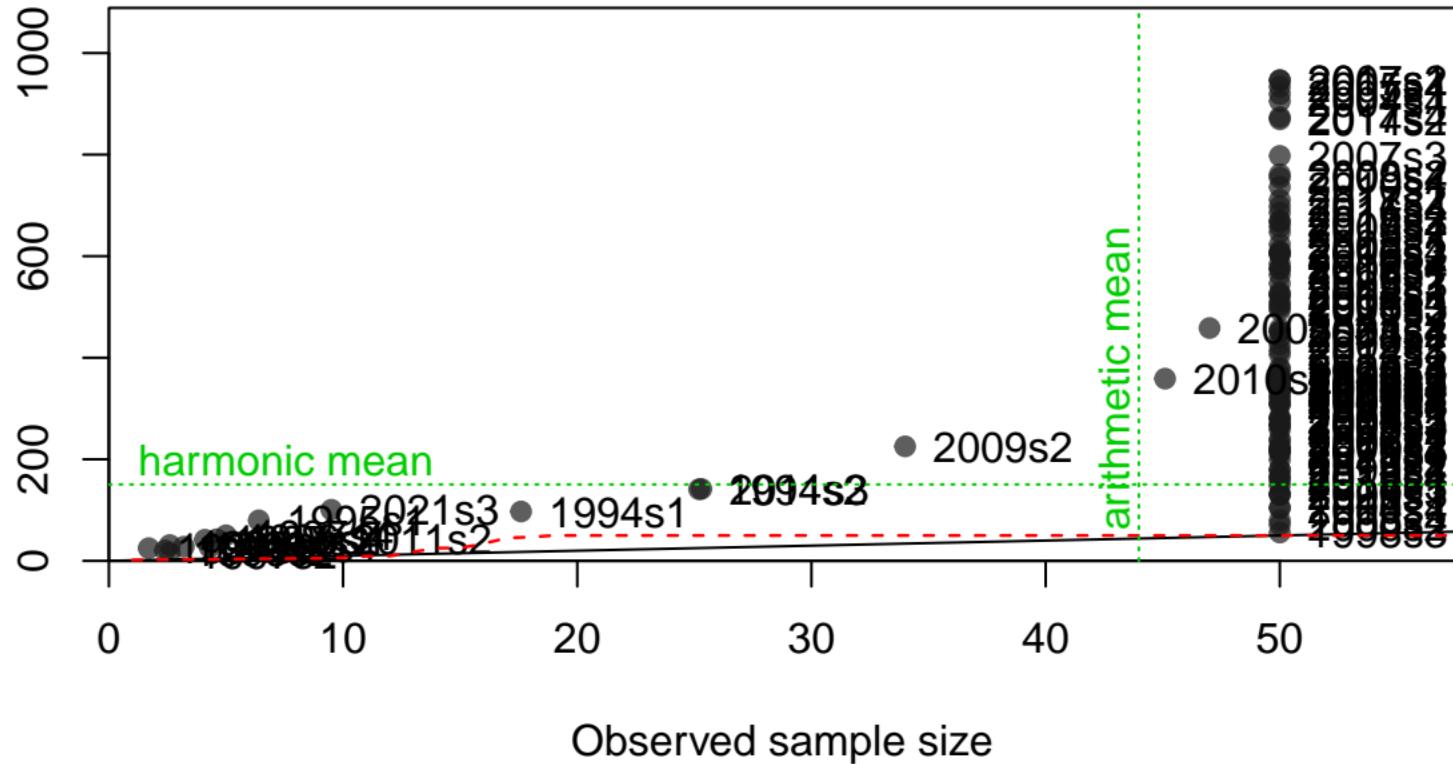


Proportion

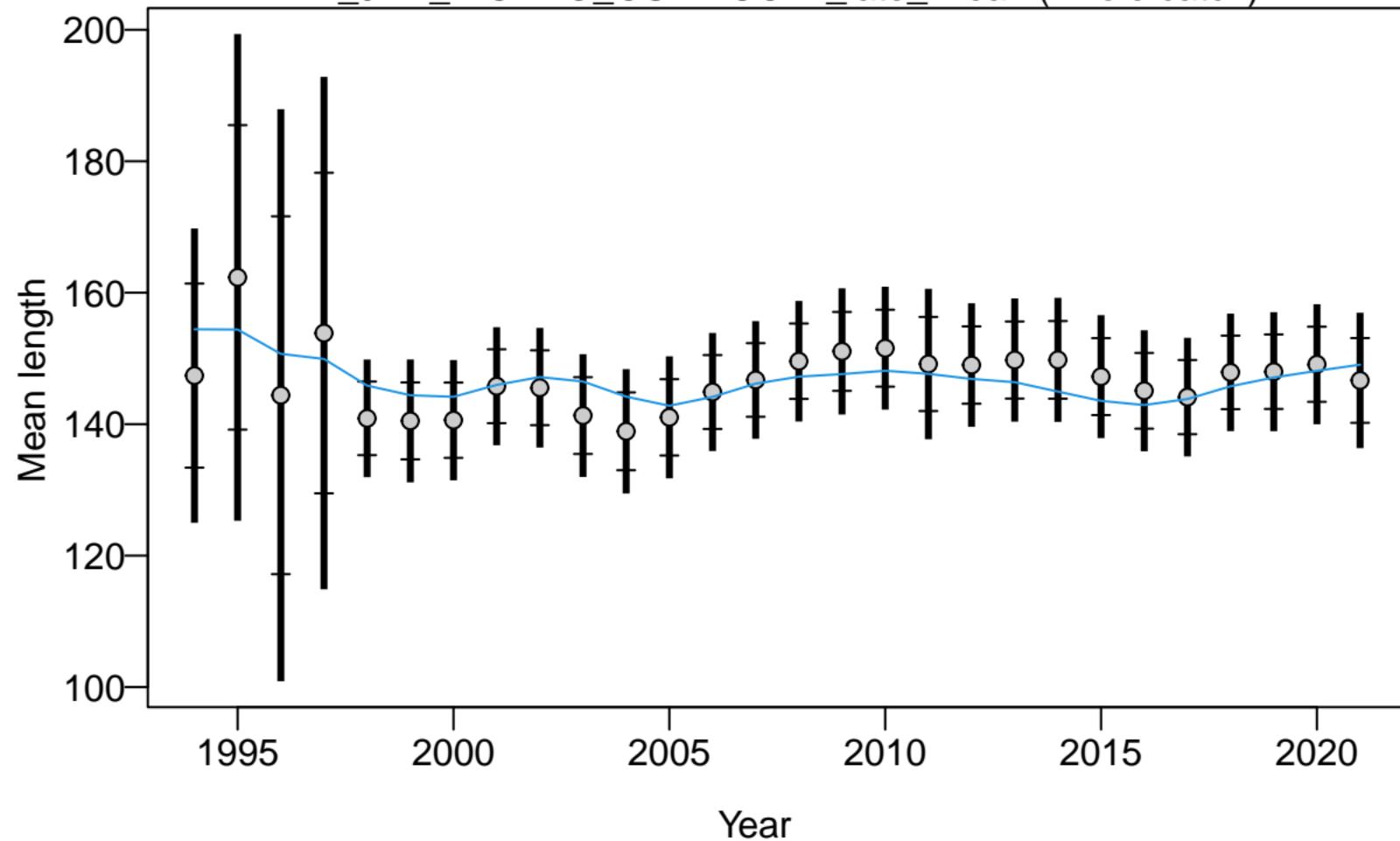




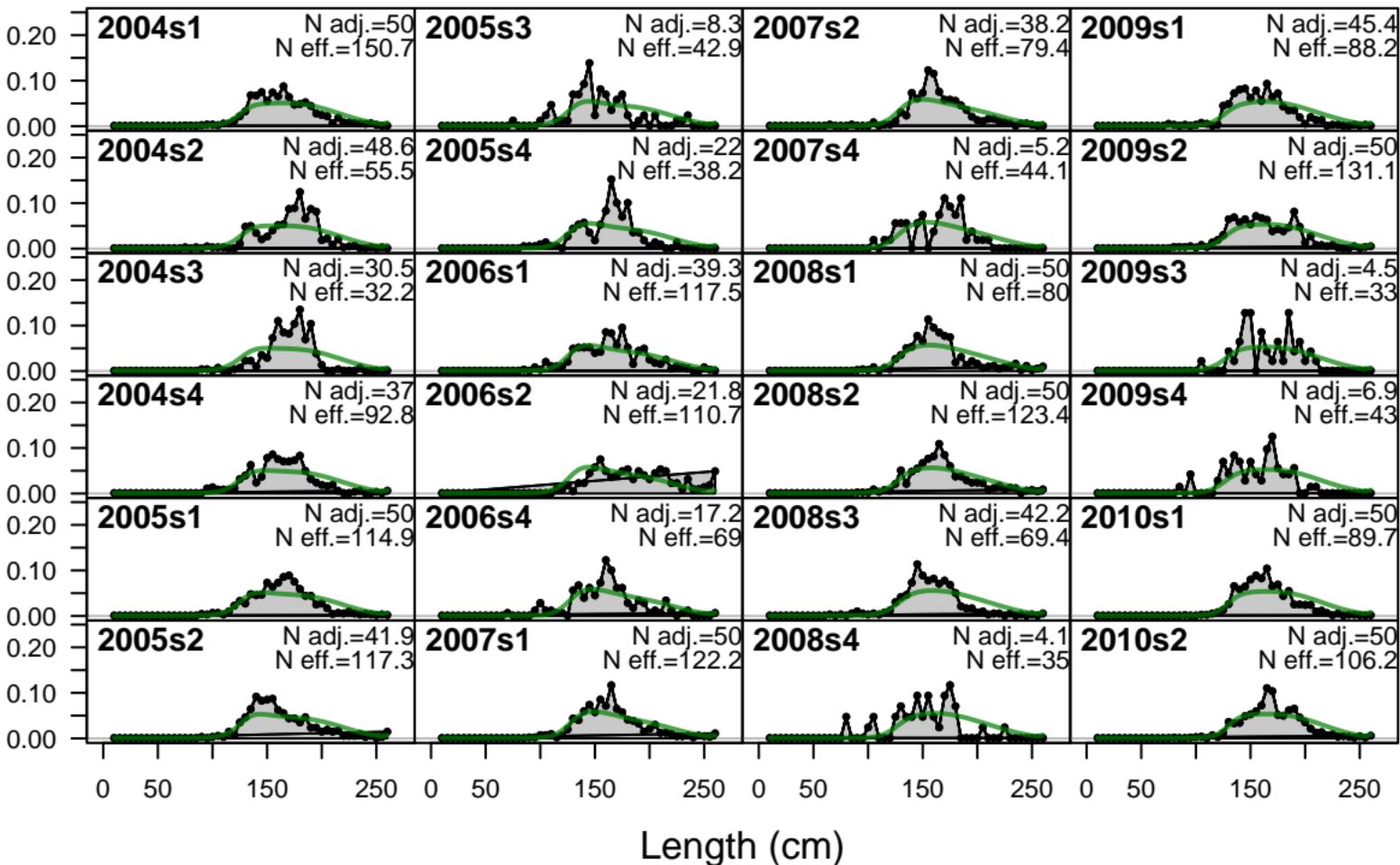
Effective sample size



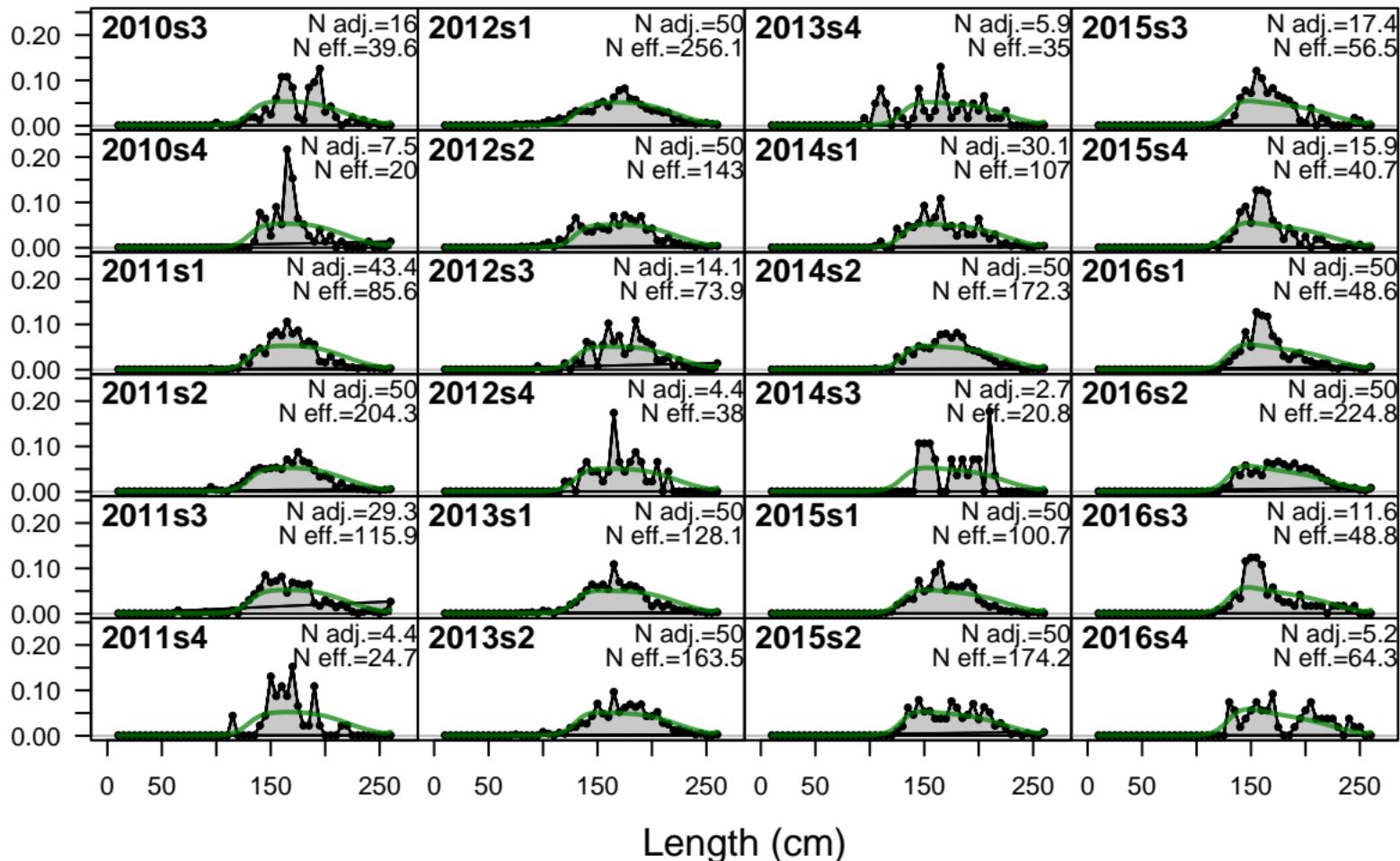
# F1\_JPN\_WCNPO OSDWCOLL late Area1 (whole catch)



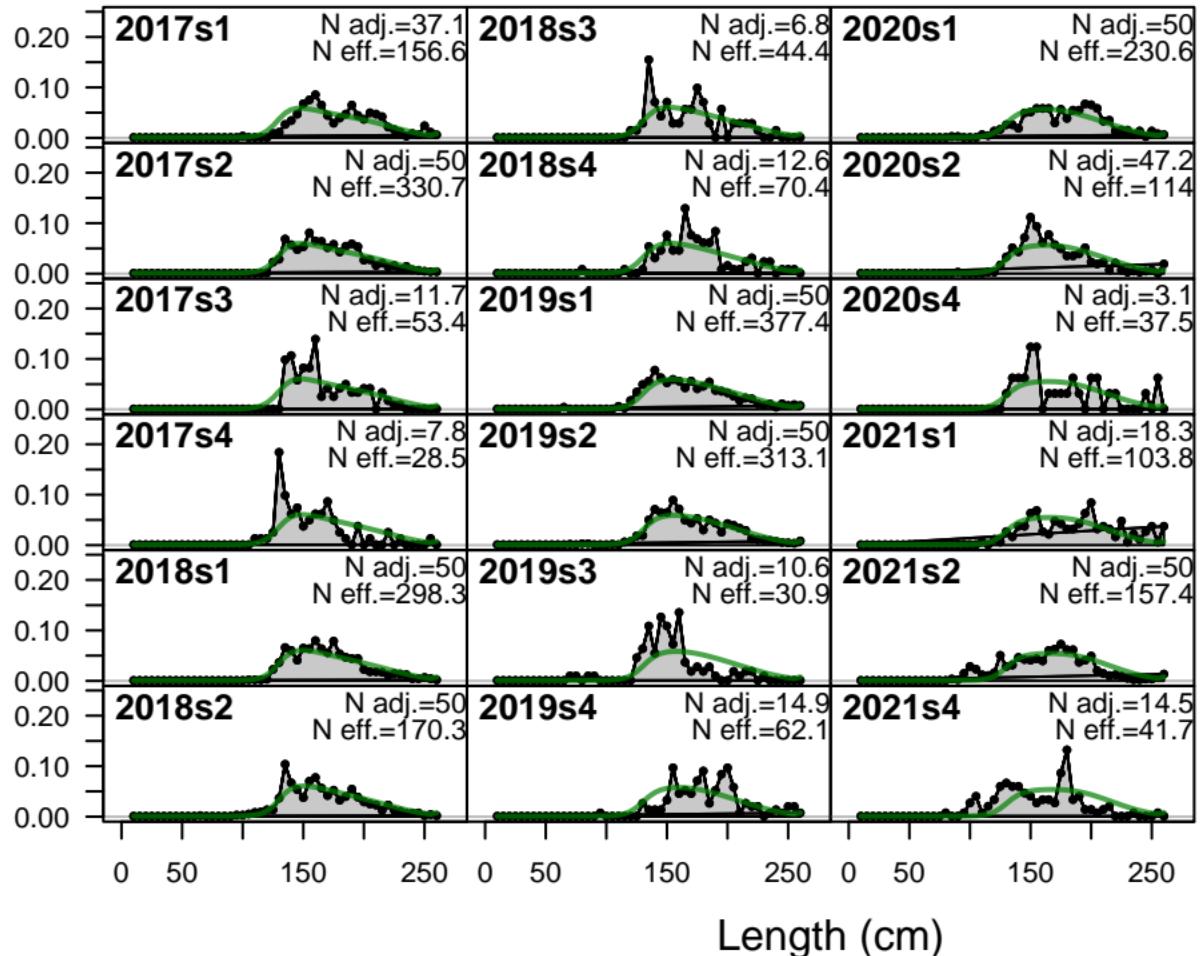
Proportion

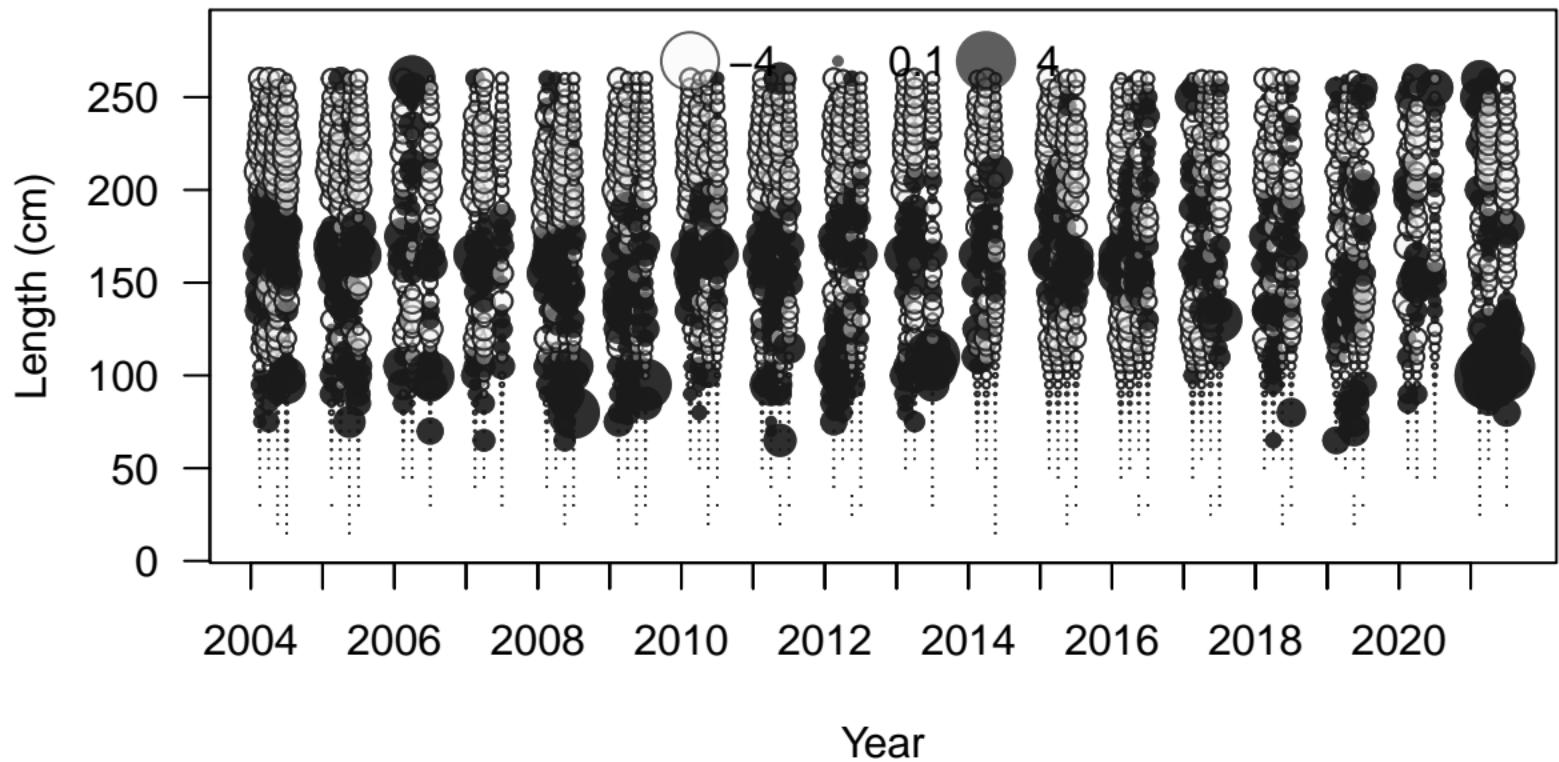


Proportion

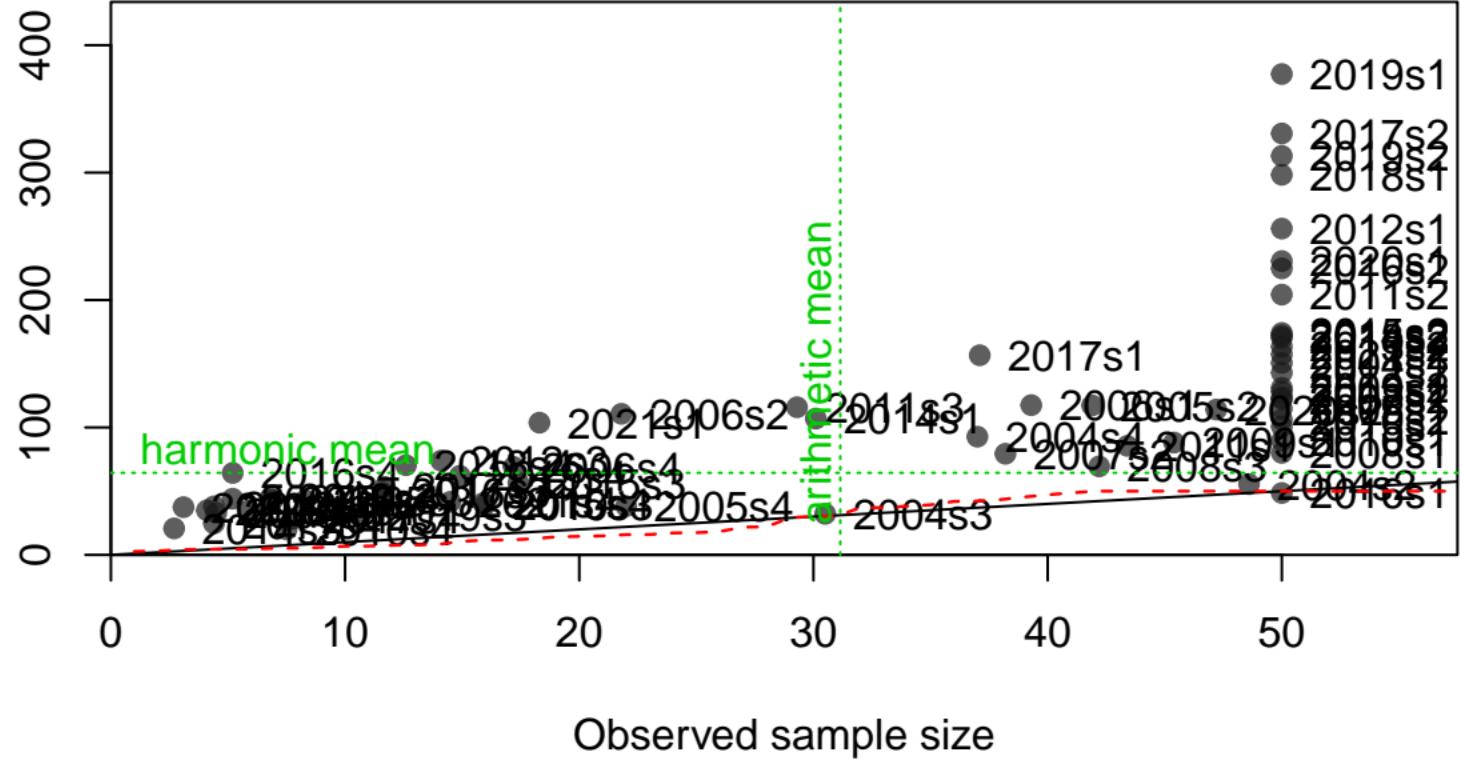


Proportion

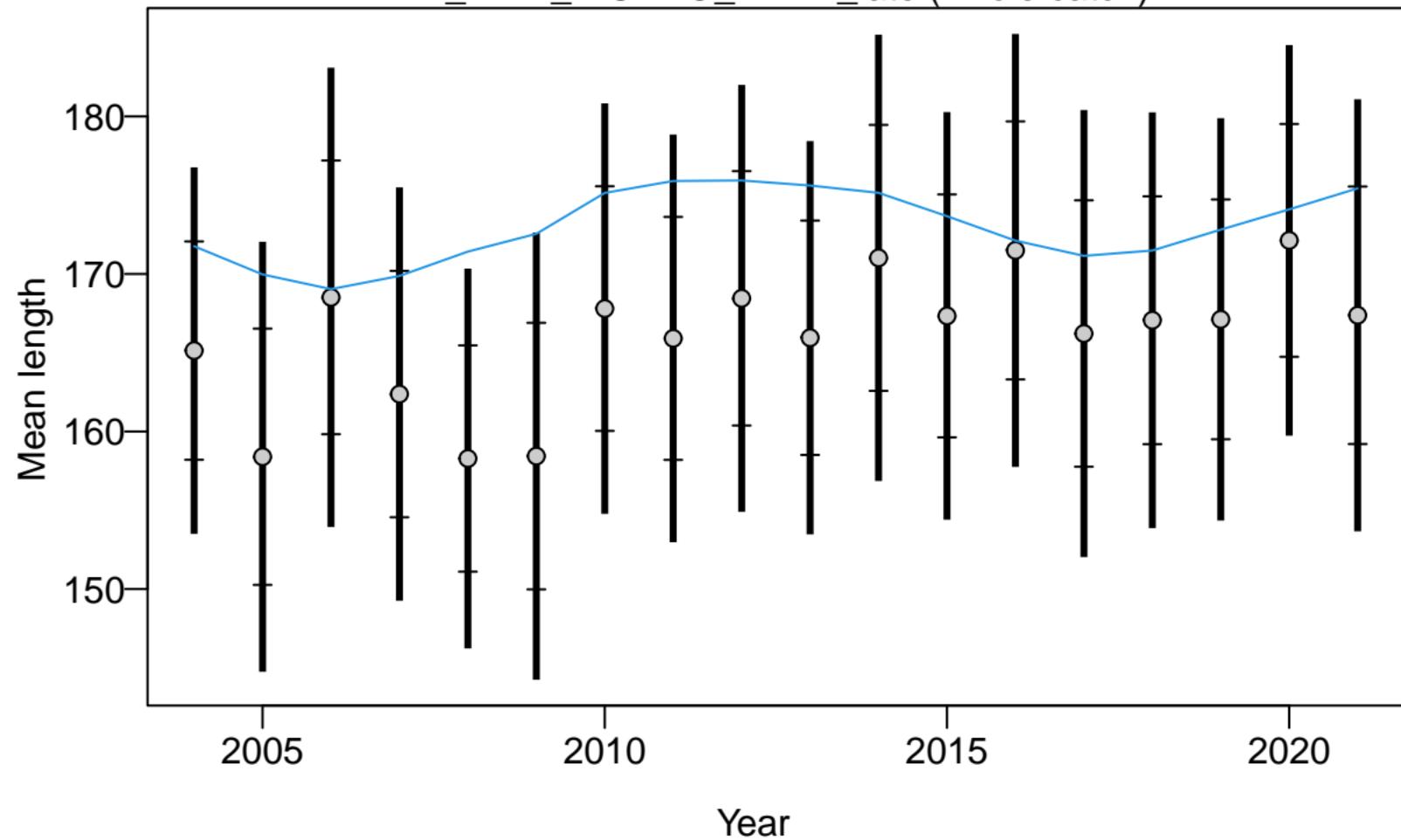




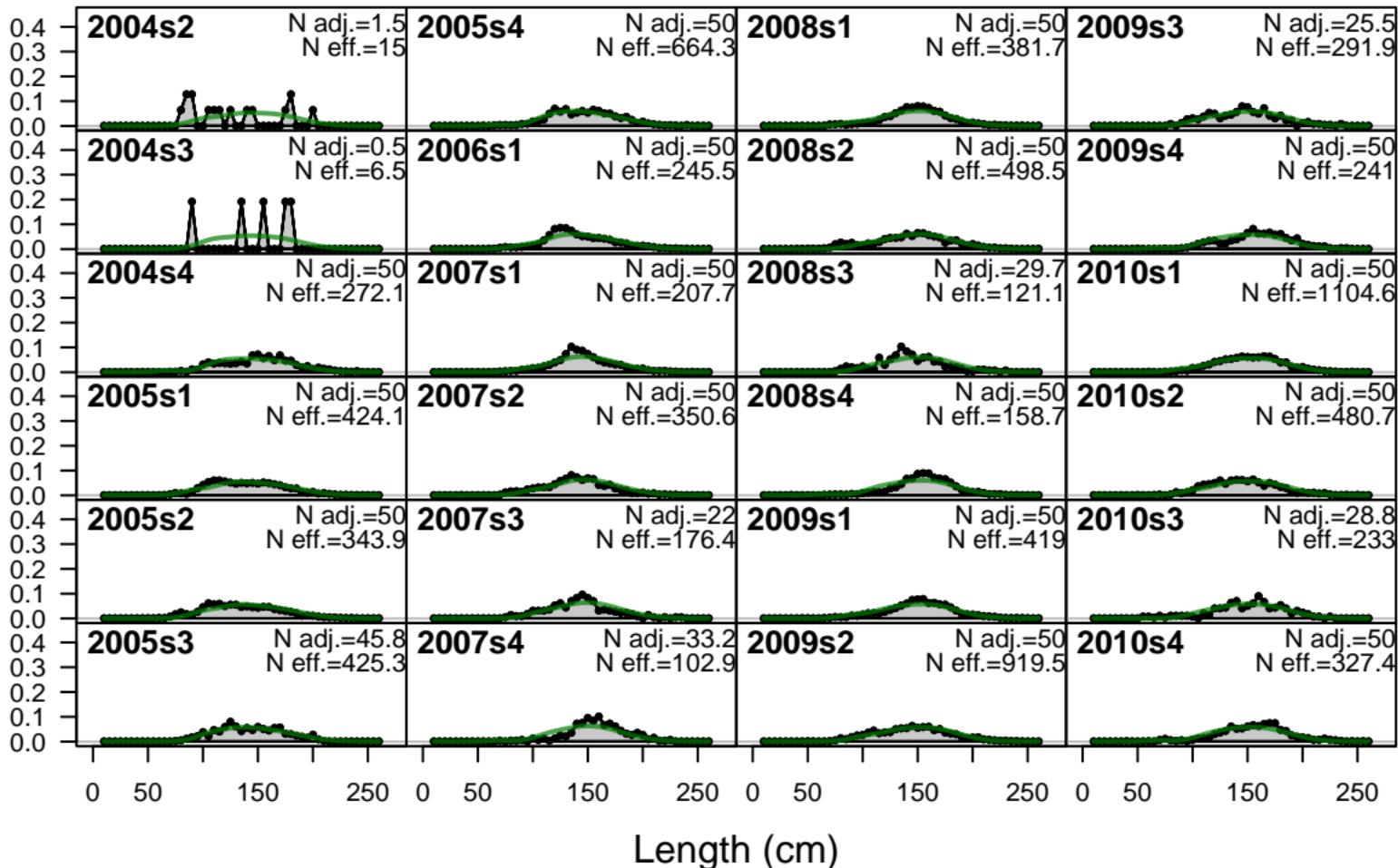
Effective sample size



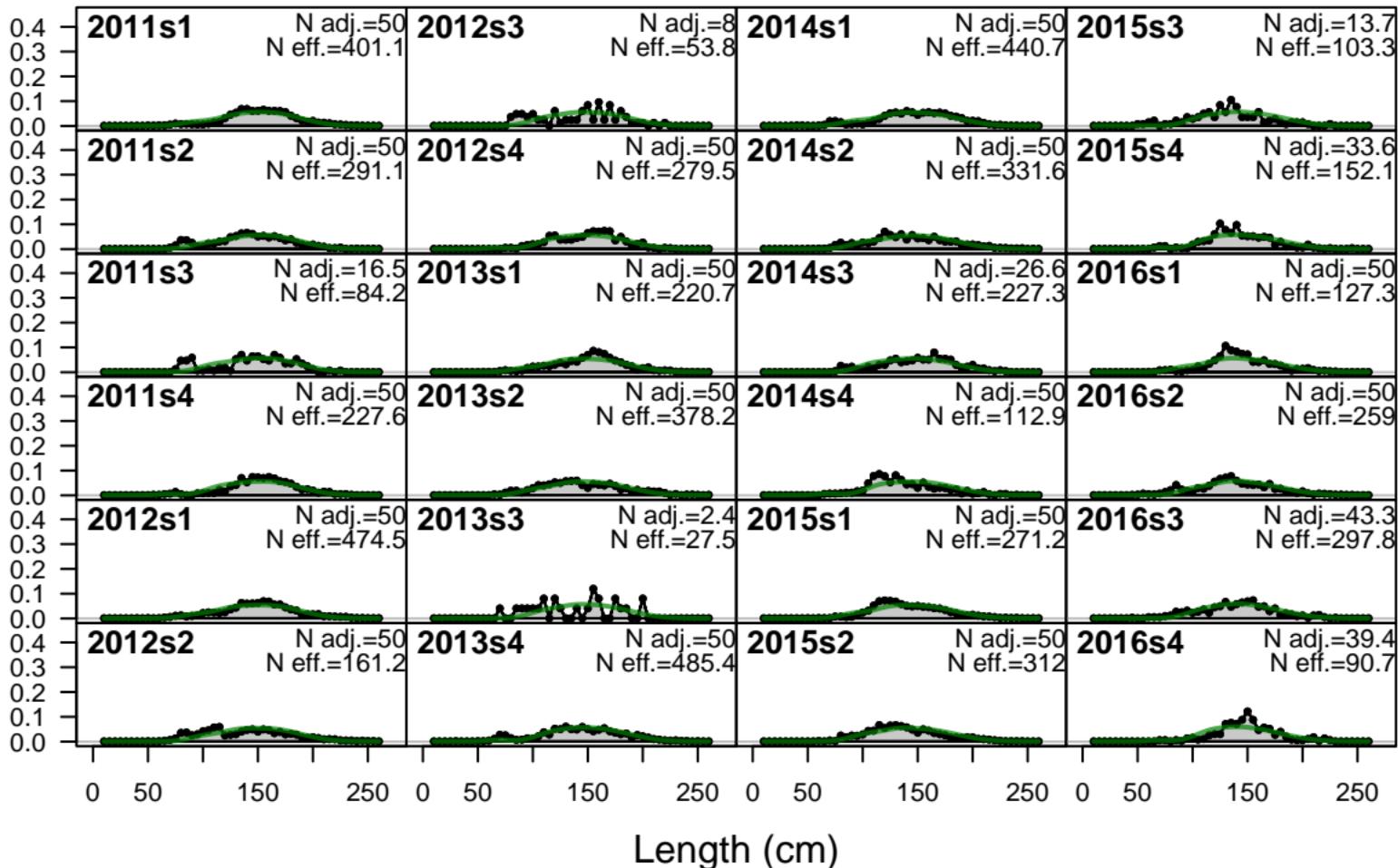
# F2\_TWN\_WCNPO\_DWLL\_late (whole catch)



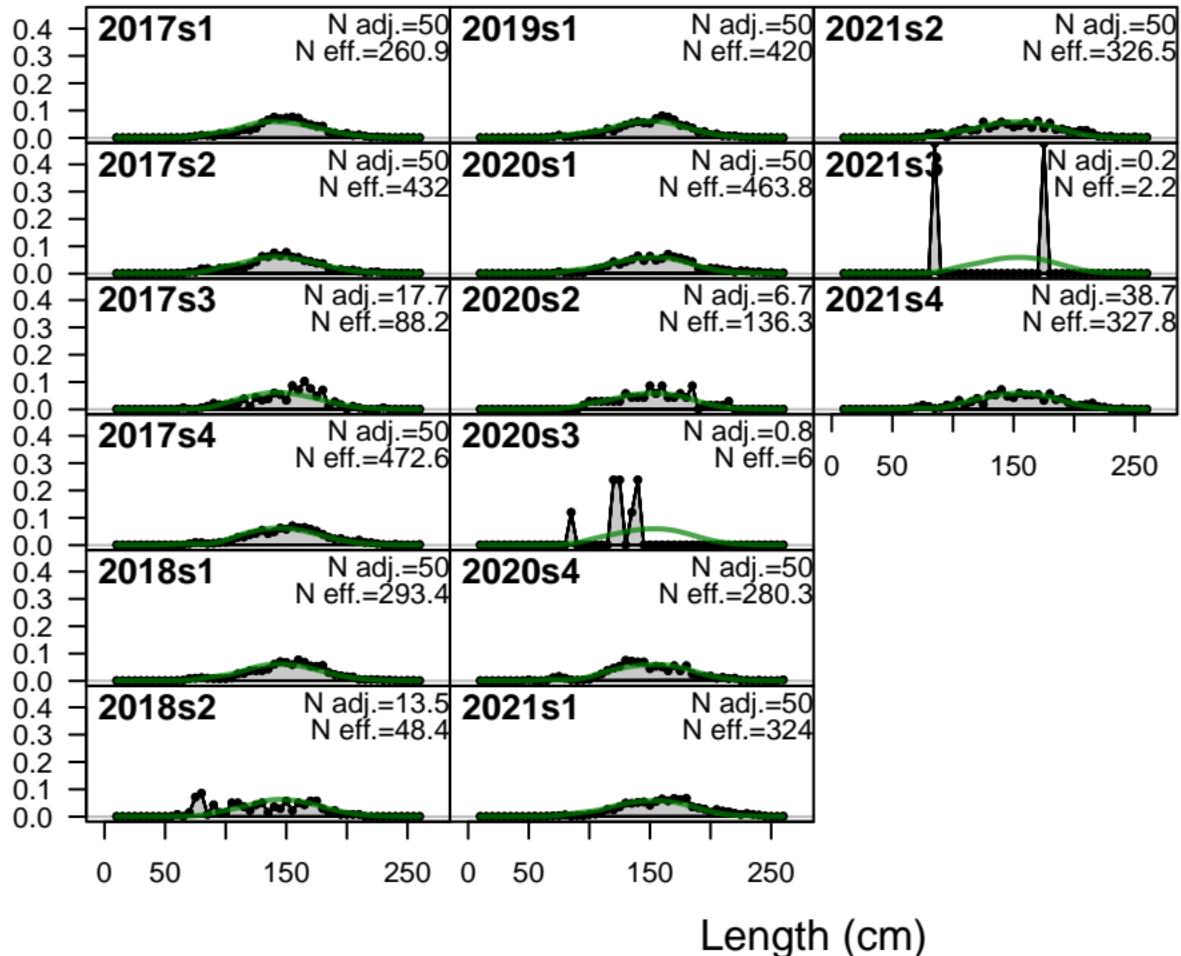
Proportion

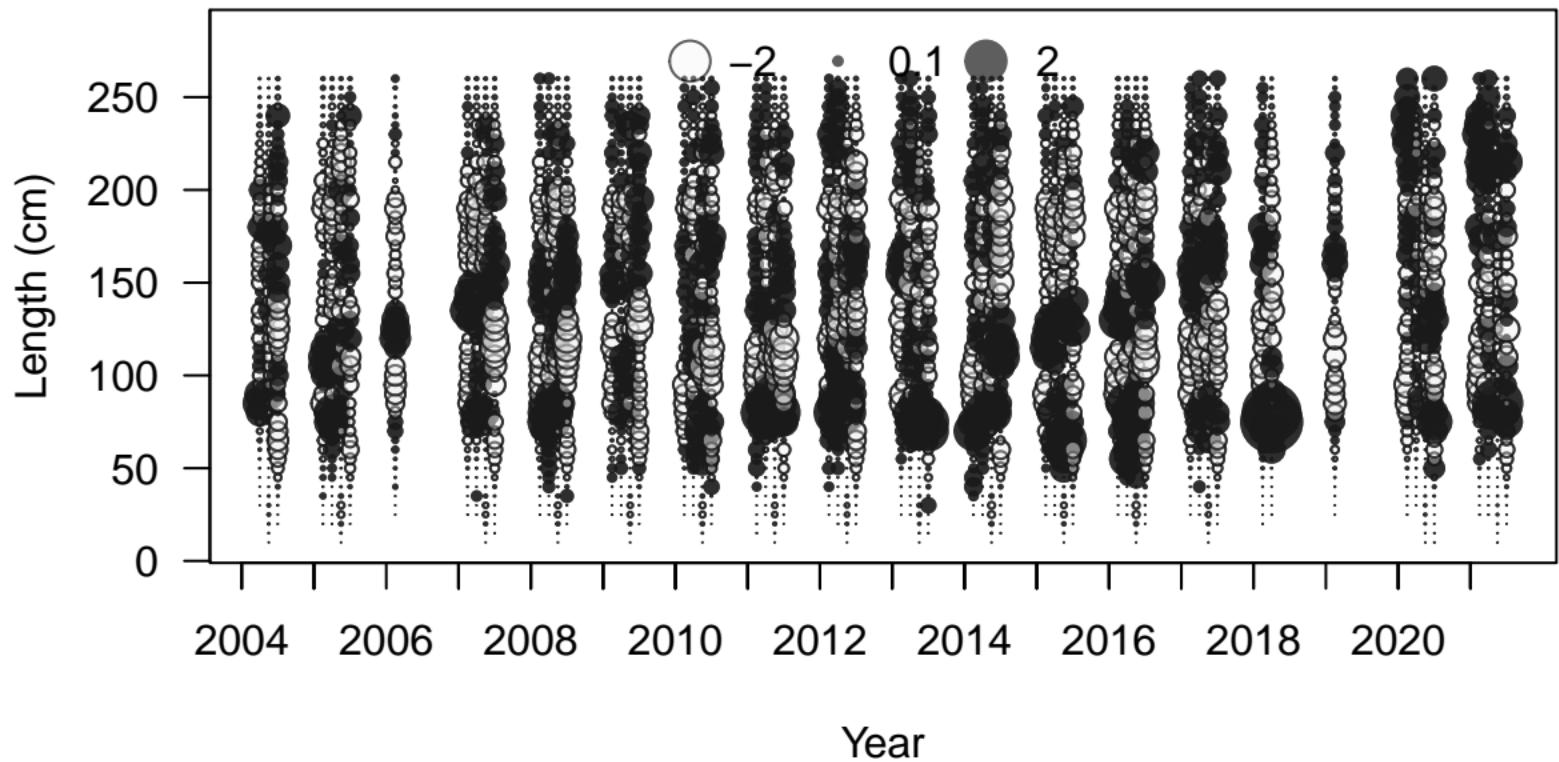


Proportion

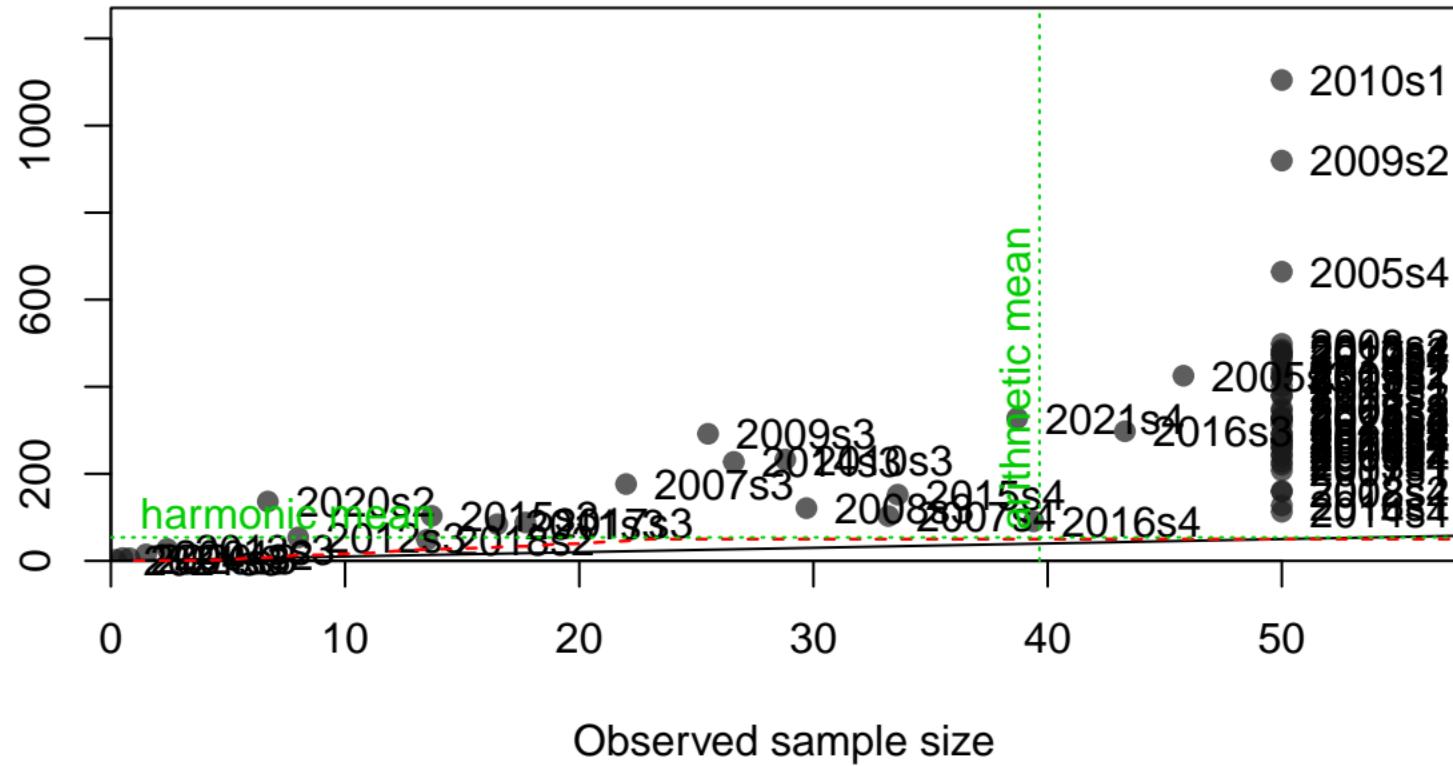


Proportion

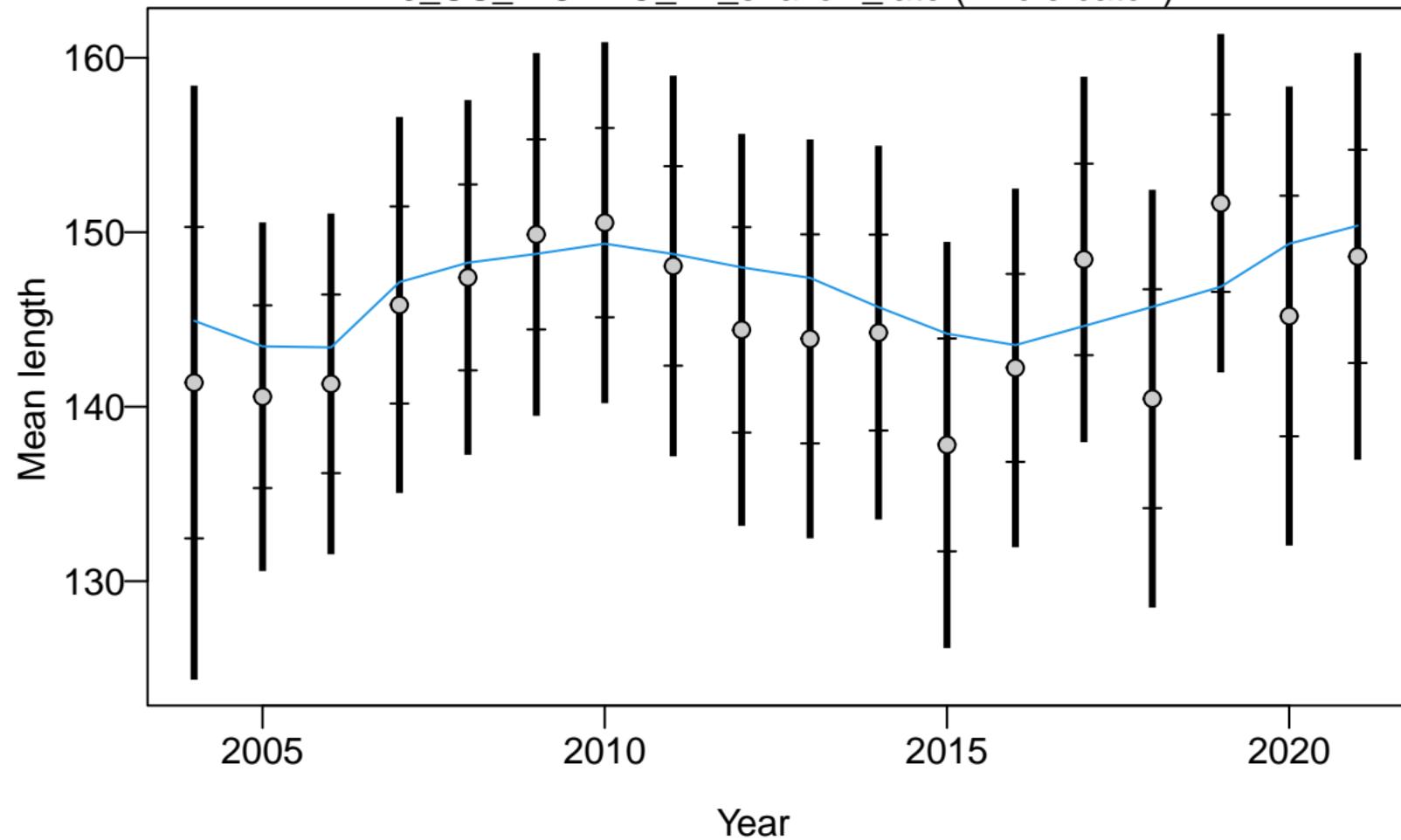




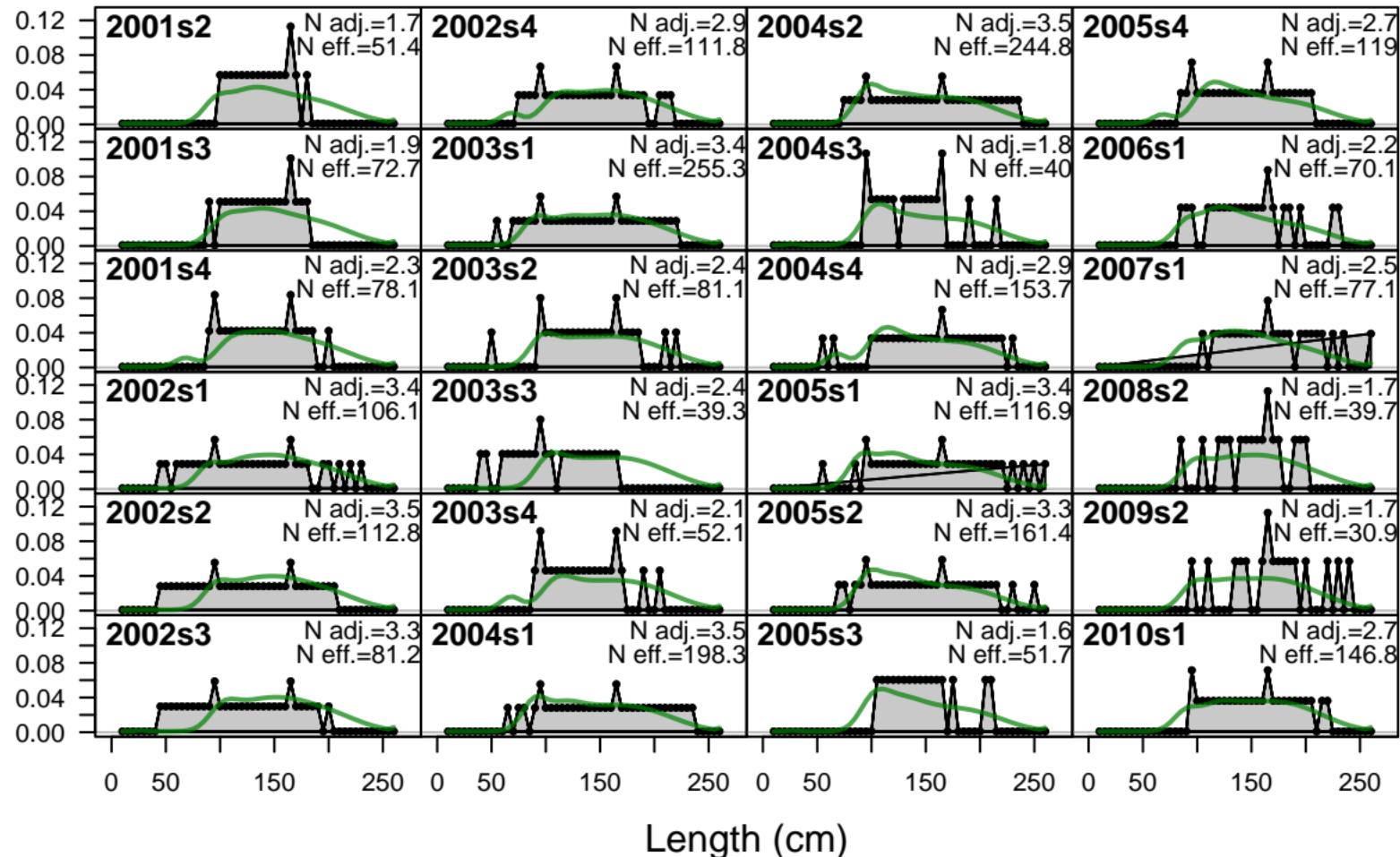
Effective sample size



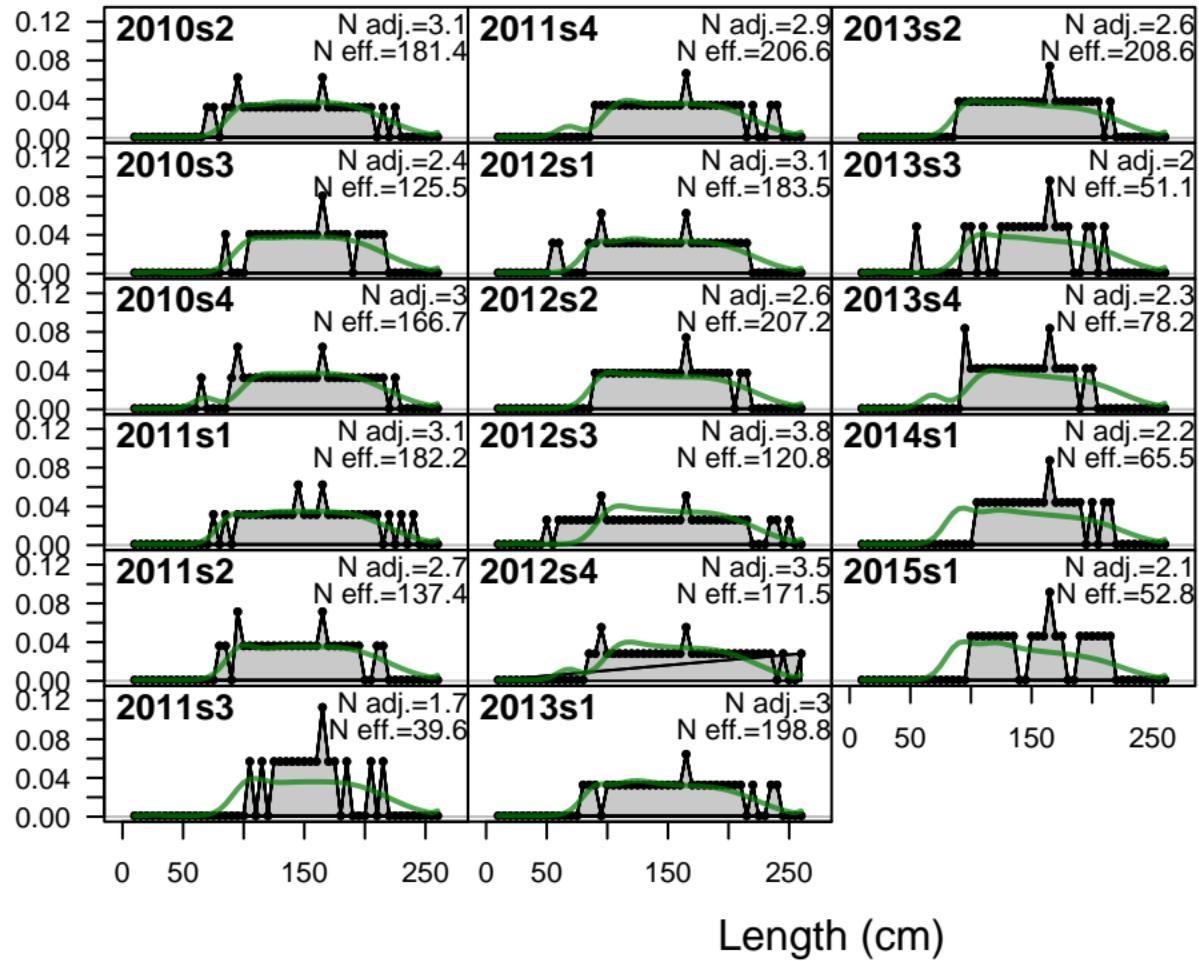
### F3\_US\_WCNPO\_LL\_shallow\_late (whole catch)

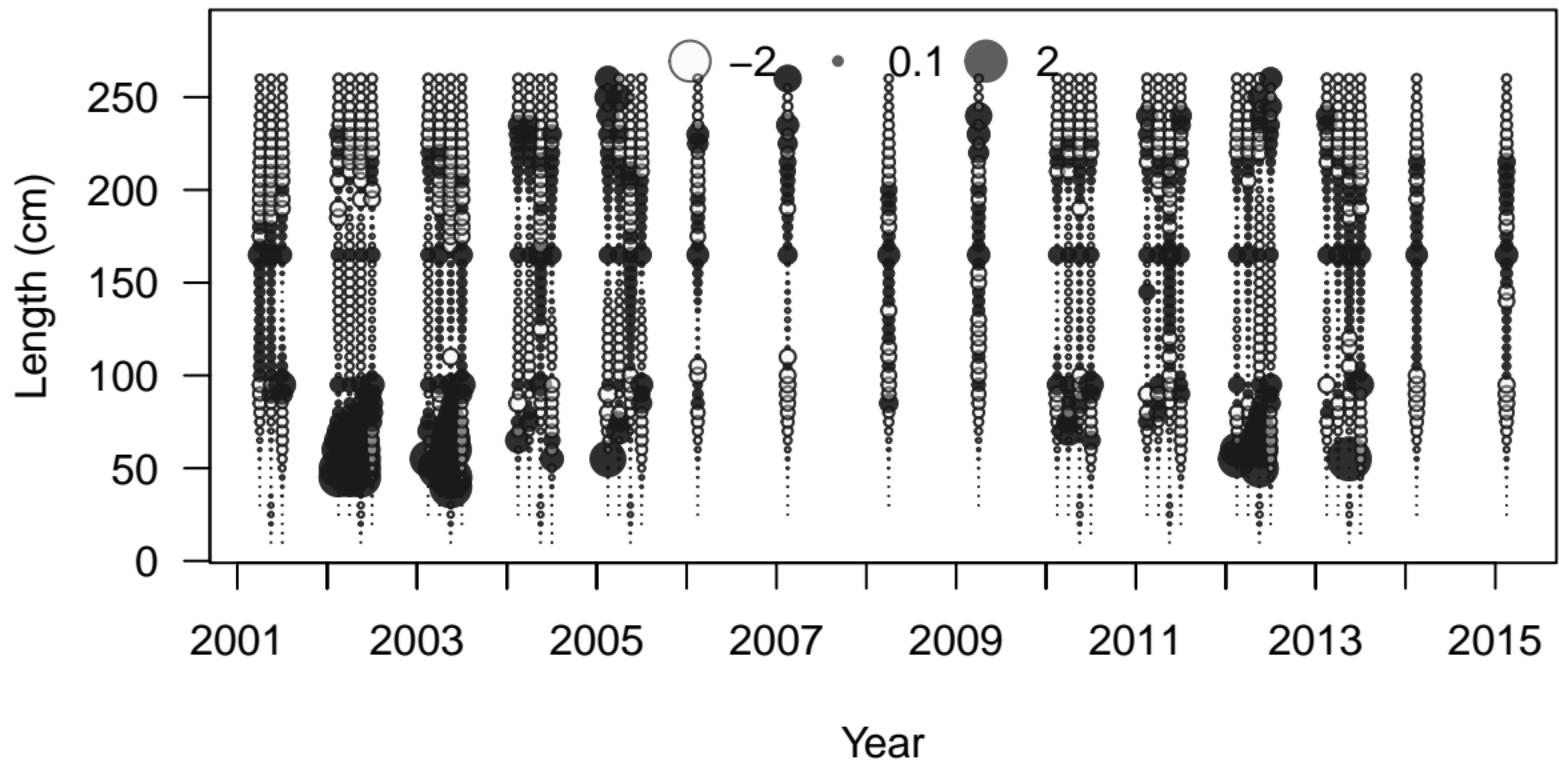


Proportion



Proportion





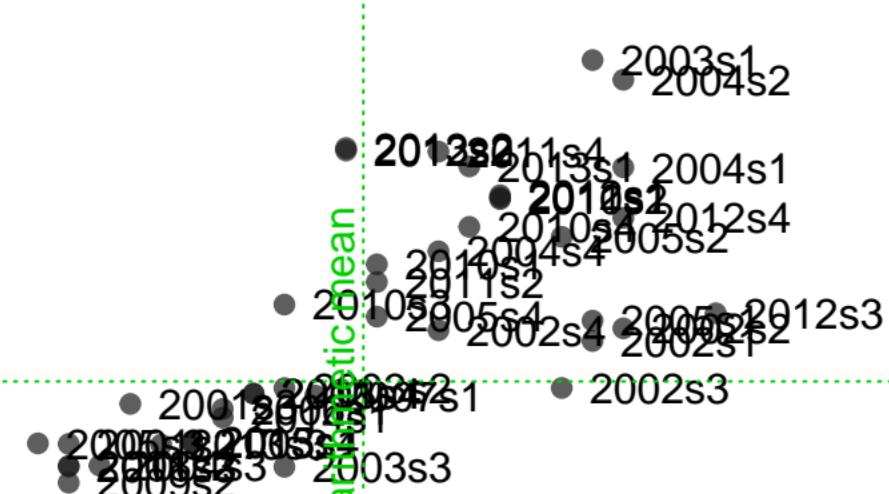
Effective sample size

250  
150  
50  
0

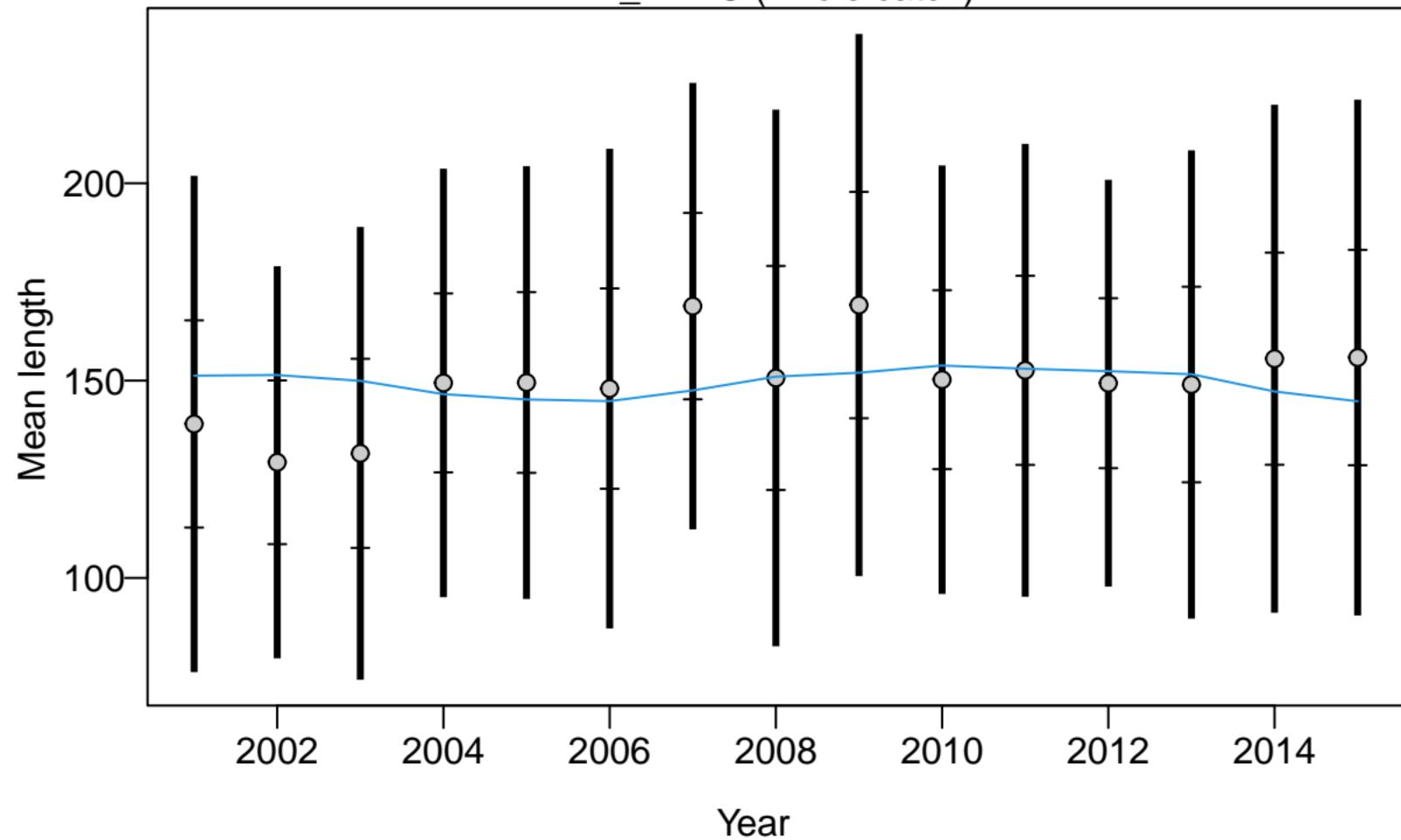
harmonic mean

0 1 2 3 4

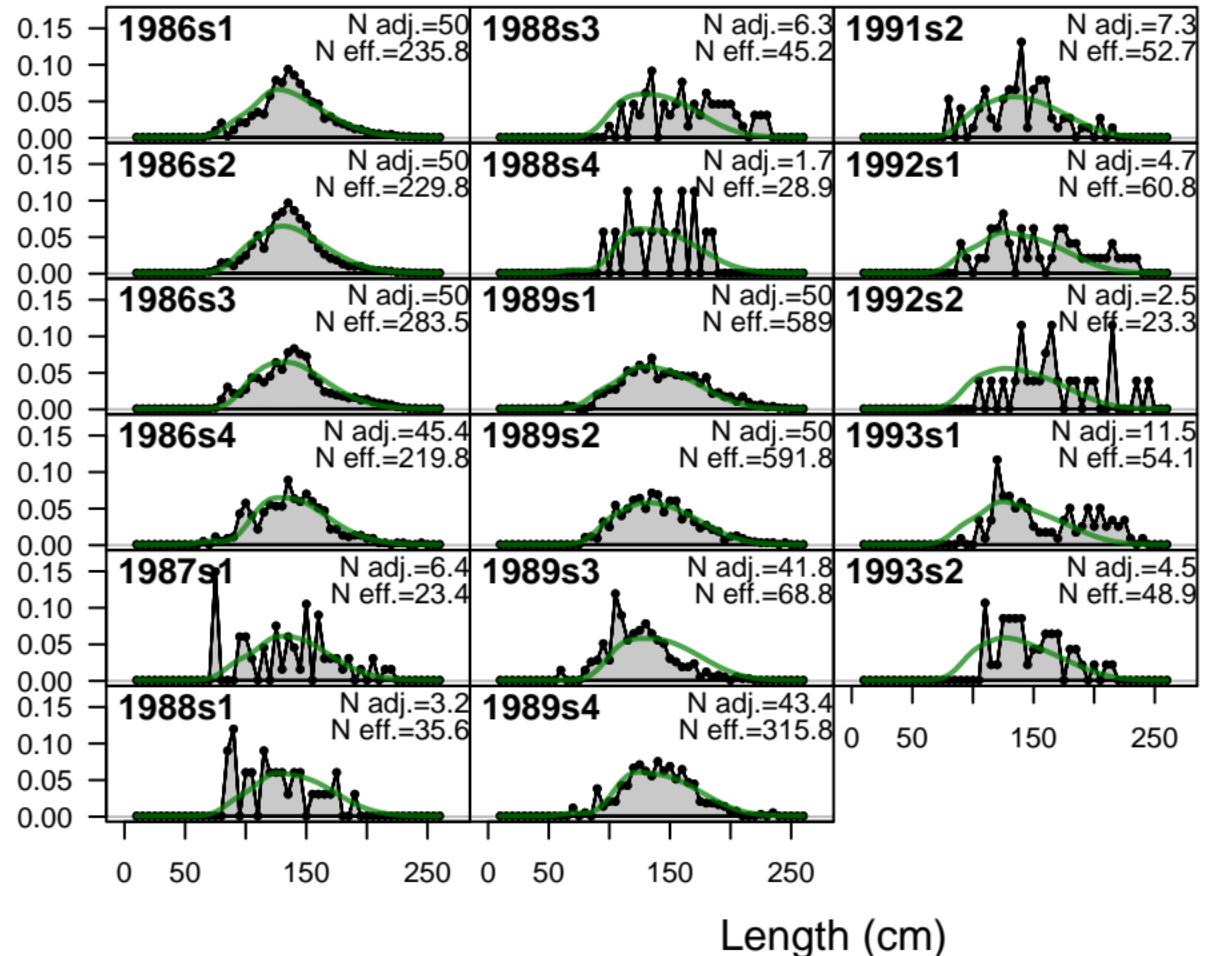
Observed sample size

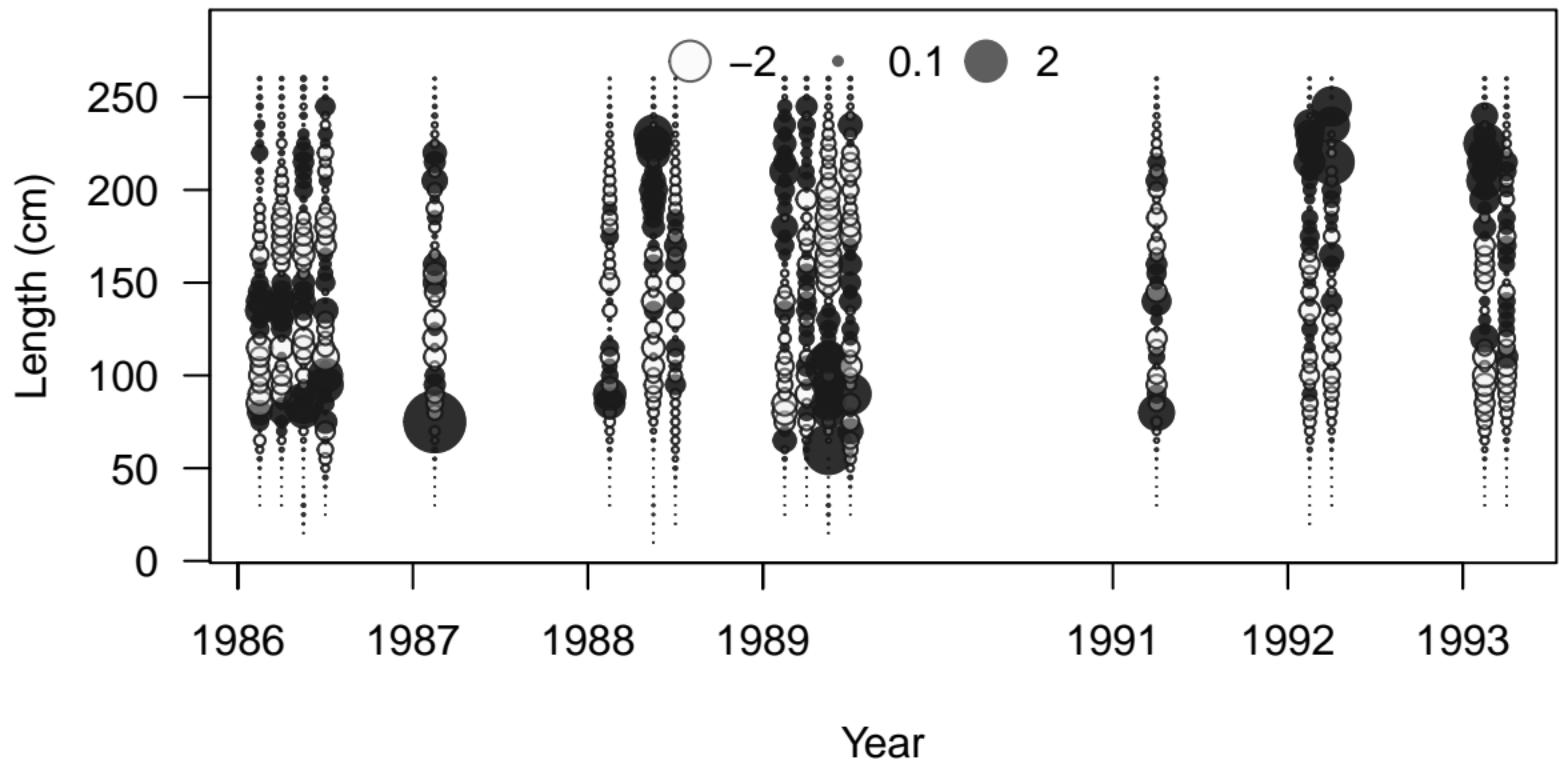


### F4\_IATTC (whole catch)

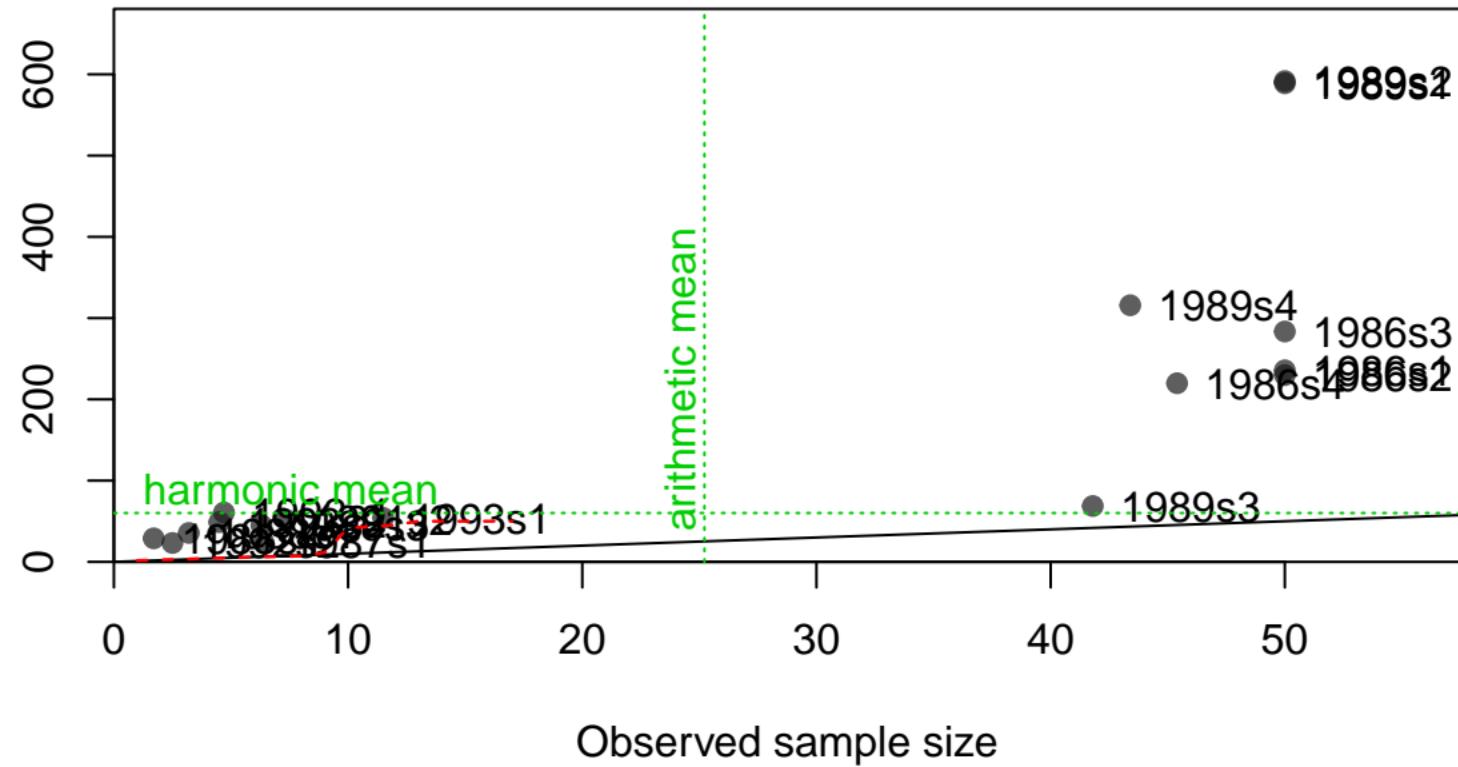


Proportion

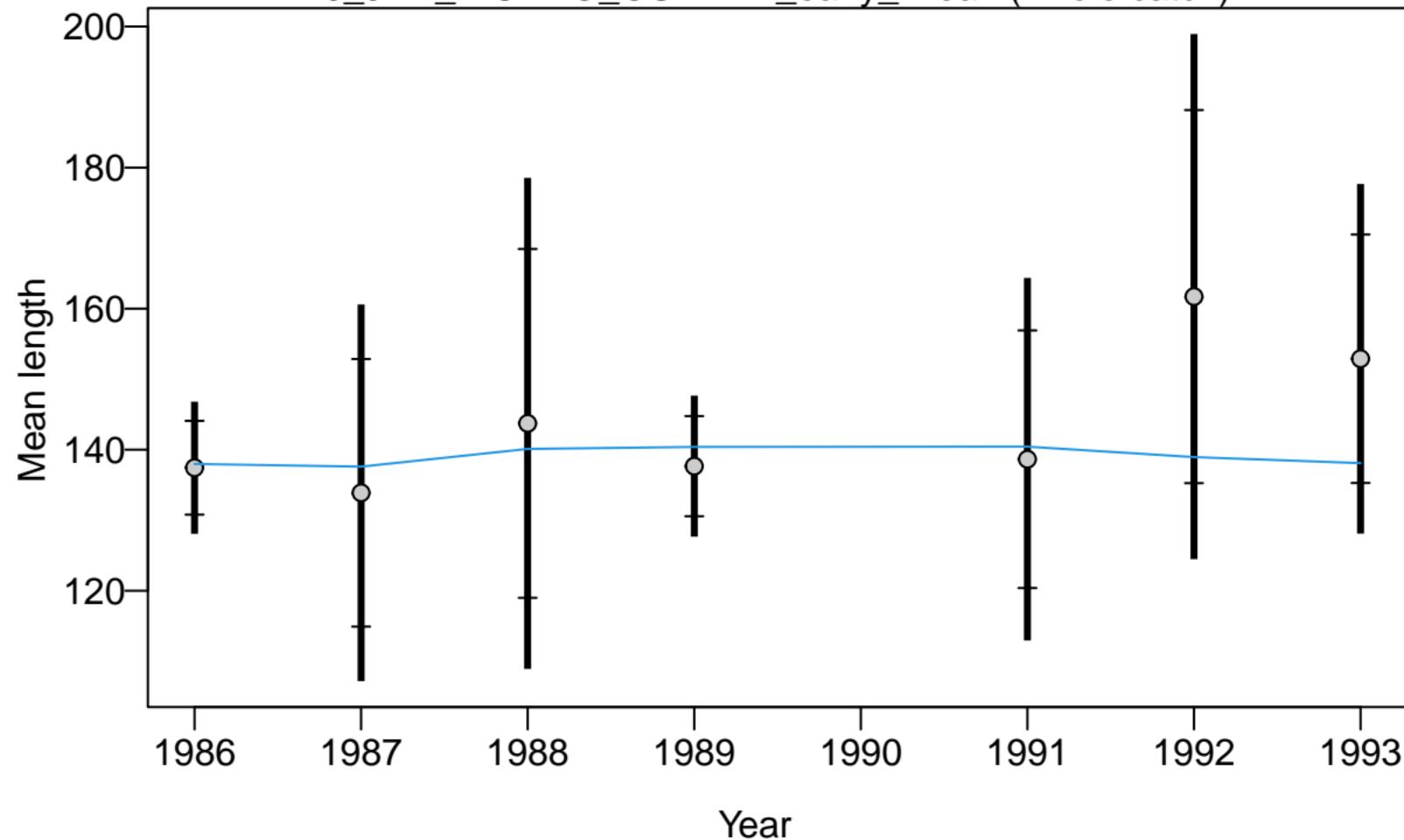




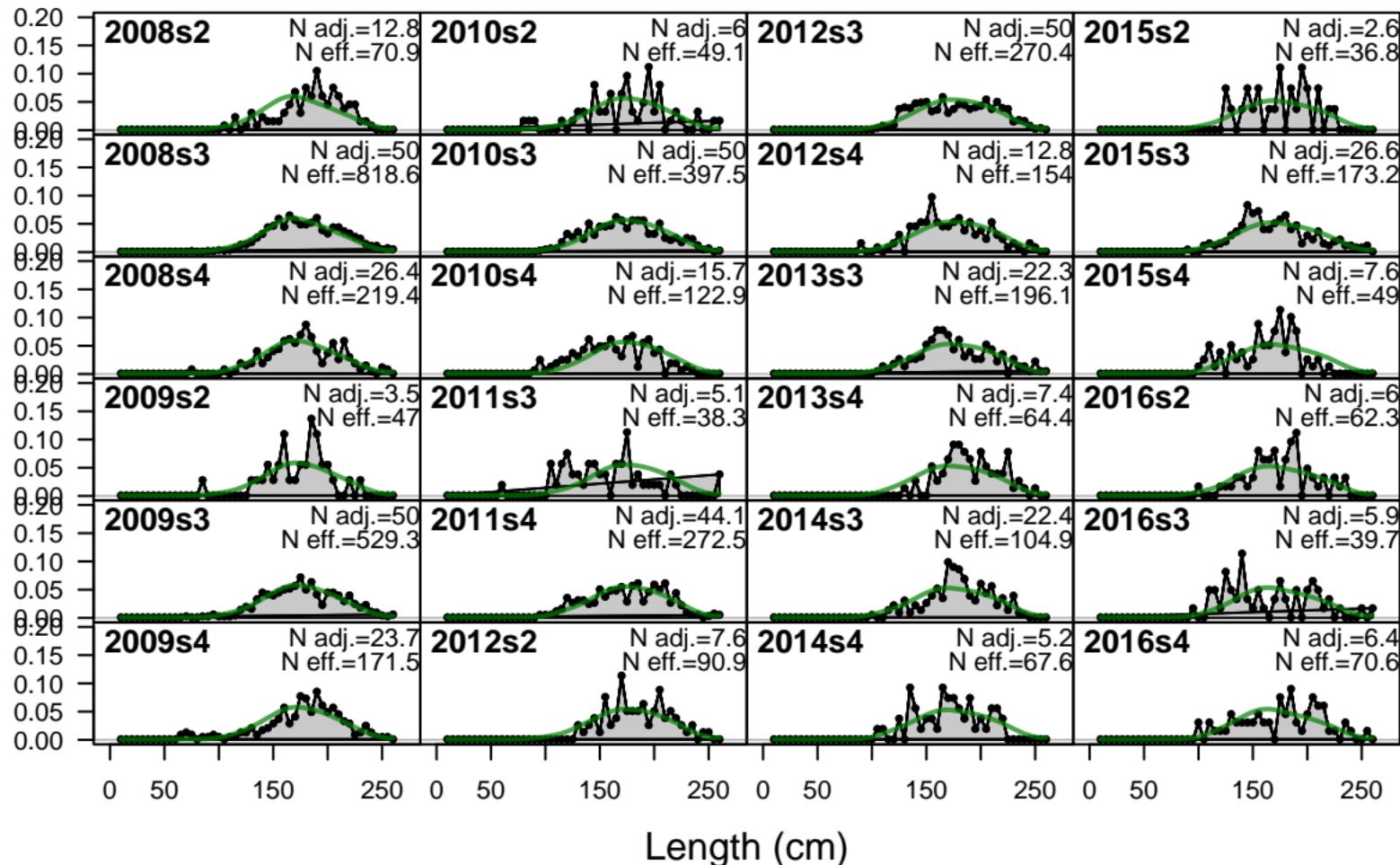
Effective sample size



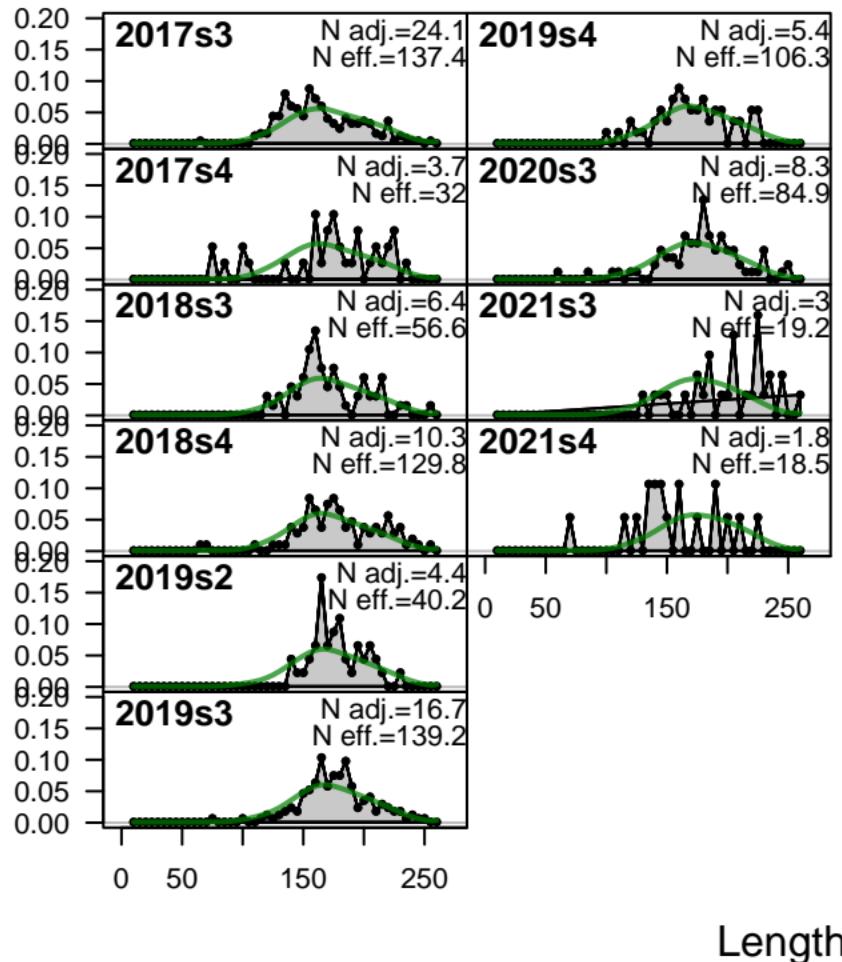
F6\_JPN\_WCNPO OSDWLL\_early\_Area1 (whole catch)

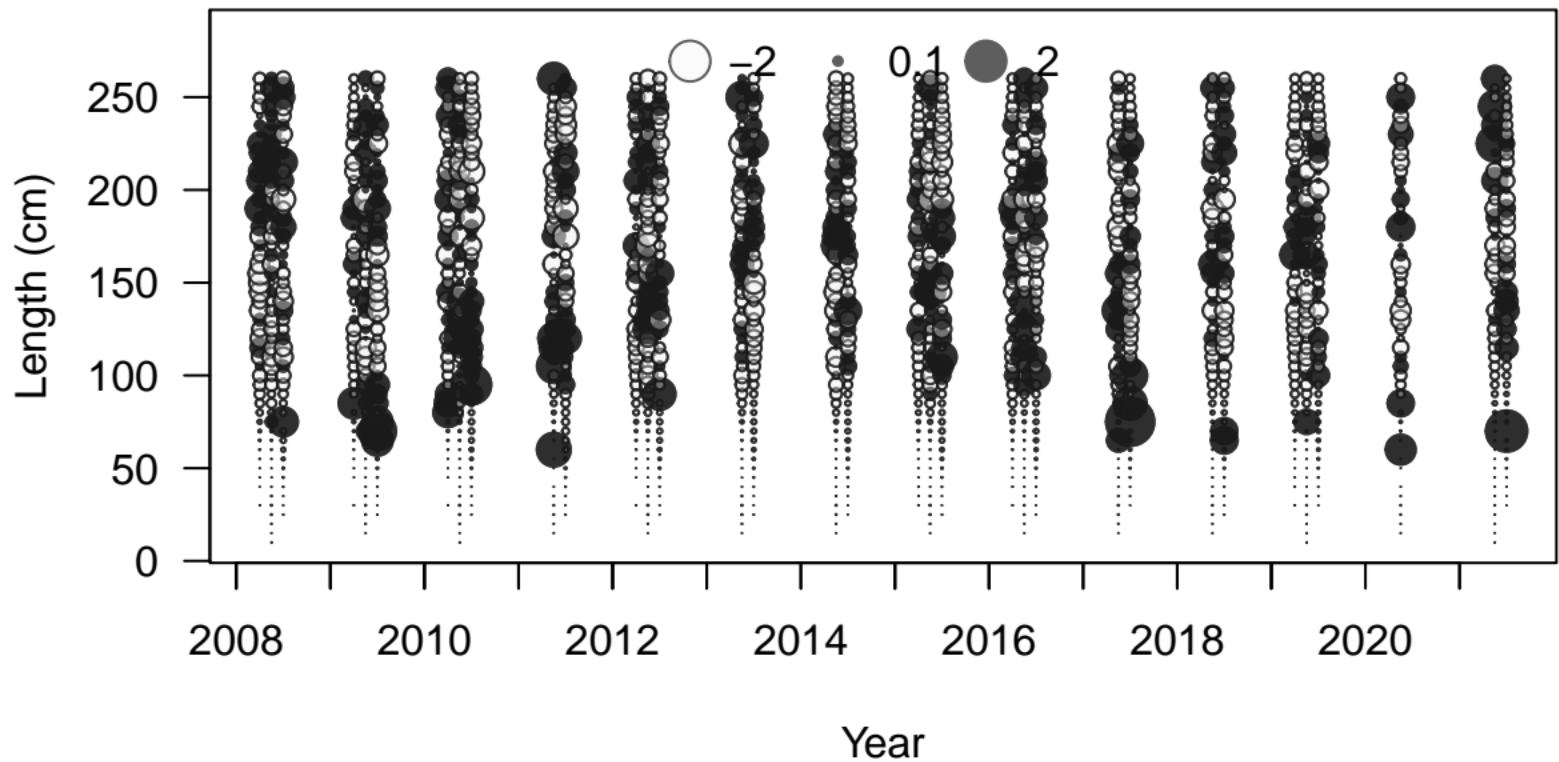


Proportion



Proportion





Effective sample size

800  
600  
400  
200  
0

0 10 20 30 40 50

Observed sample size

harmonic mean  
biometric mean

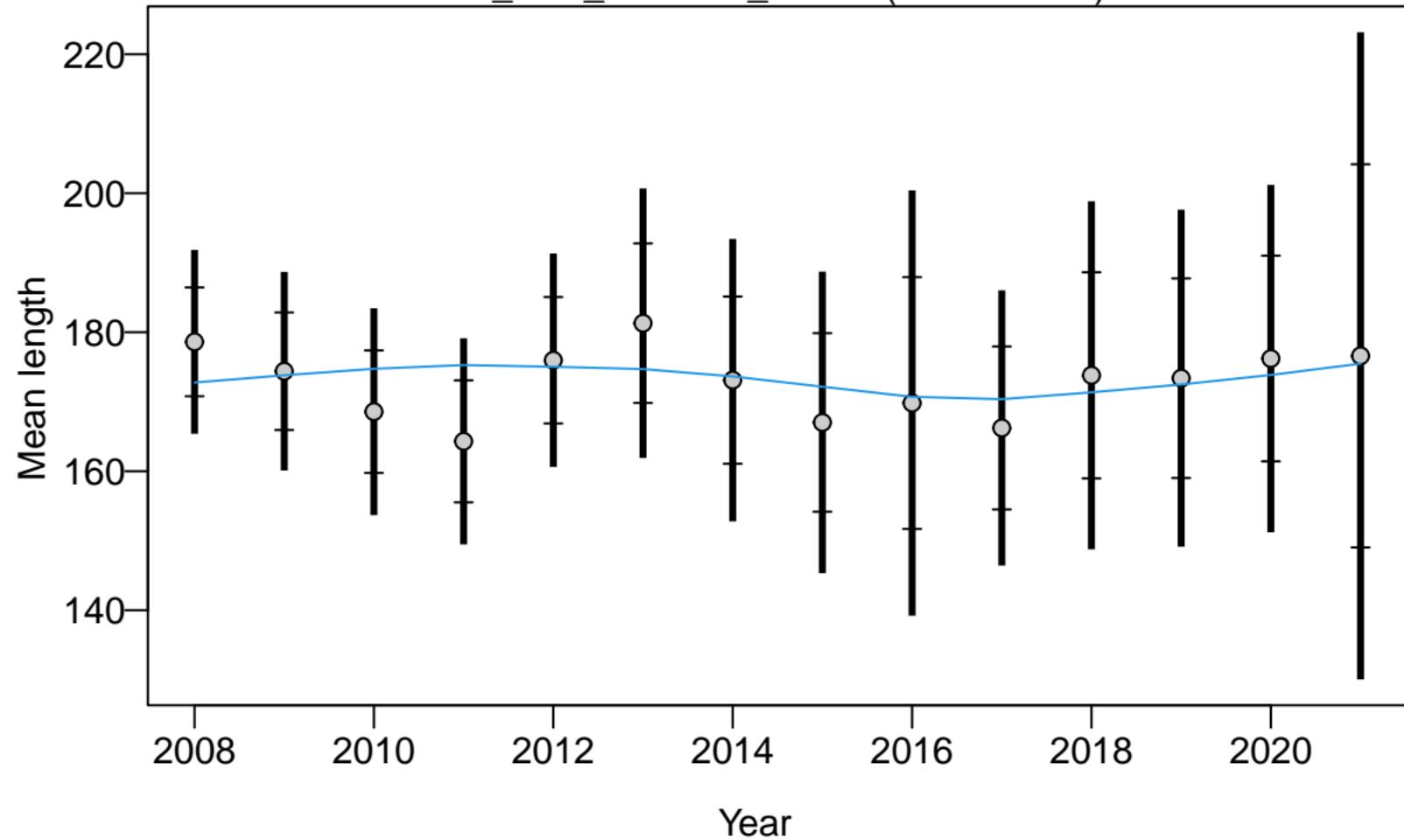
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

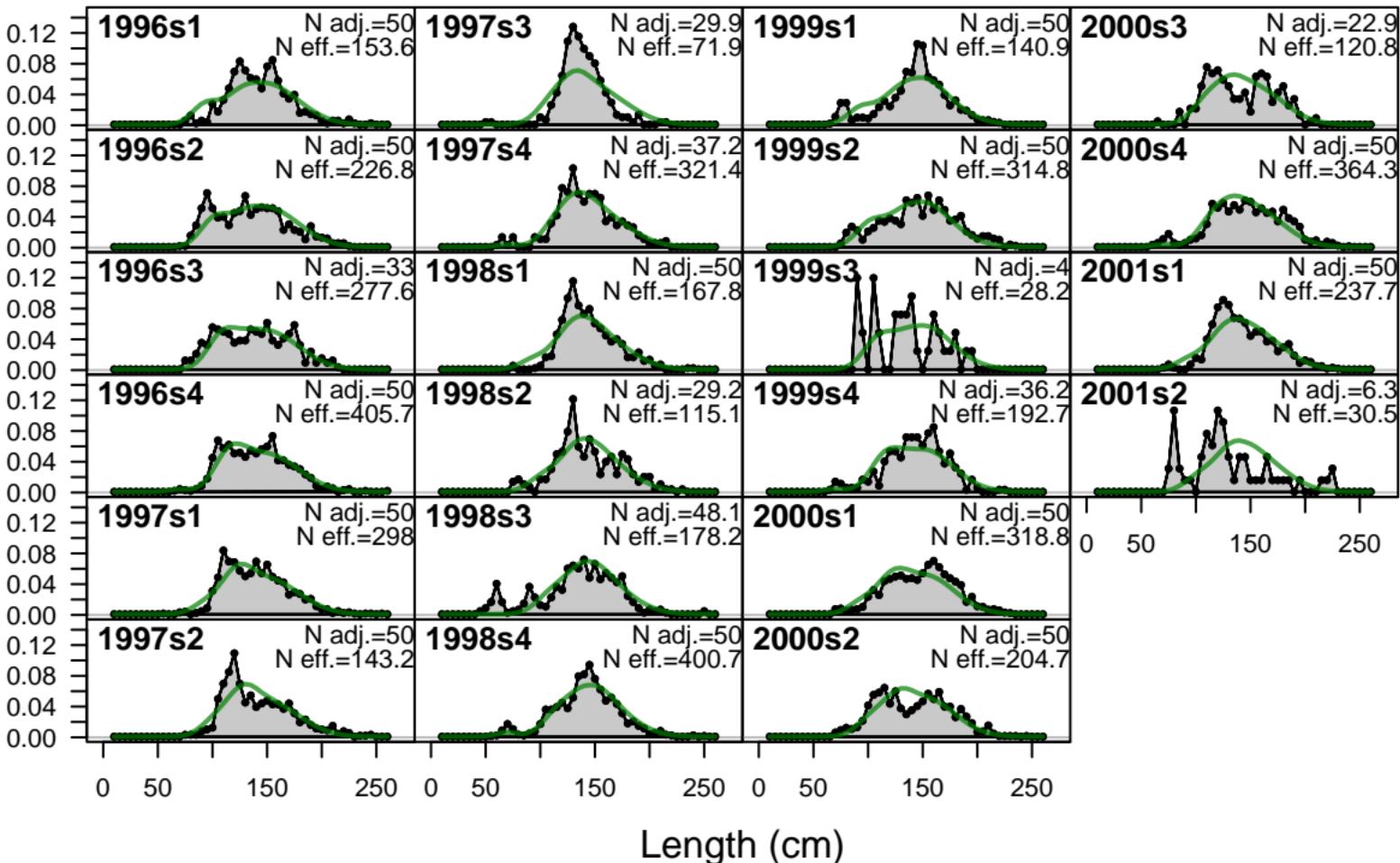
2008s2 2008s3 2008s4 2008s5 2008s6 2008s7 2008s8 2008s9 2008s10 2008s11 2008s12 2008s13 2008s14 2008s15 2008s16 2008s17 2008s18 2008s19 2008s20 2008s21 2008s22 2008s23 2008s24 2008s25 2008s26 2008s27 2008s28 2008s29 2008s30 2008s31 2008s32 2008s33 2008s34 2008s35 2008s36 2008s37 2008s38 2008s39 2008s40 2008s41 2008s42 2008s43 2008s44 2008s45 2008s46 2008s47 2008s48 2008s49 2008s50

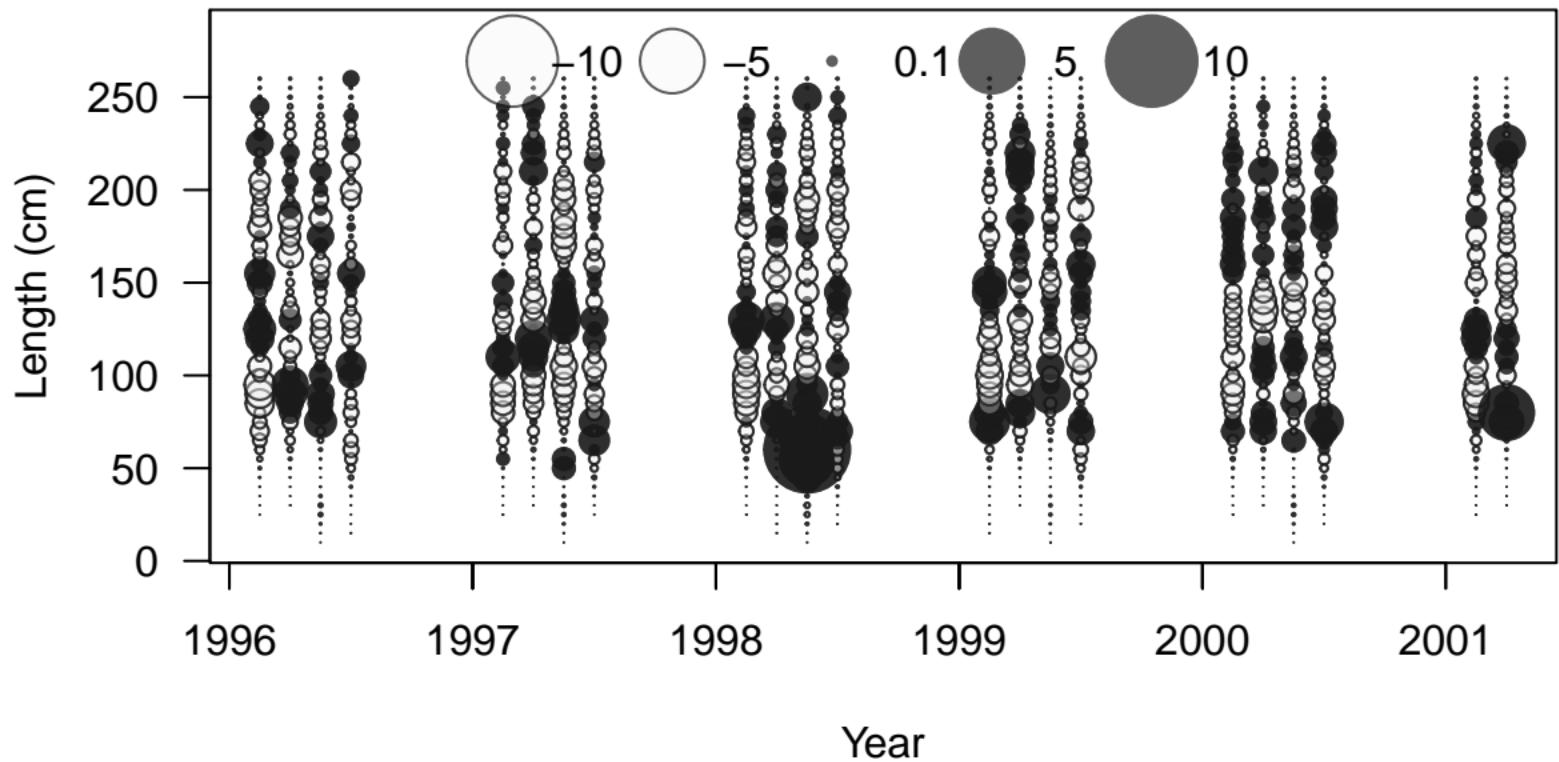
2008s3  
2009s3  
2010s3  
2011s4  
2012s3

# F7\_JPN\_WCNPO\_CODF (whole catch)

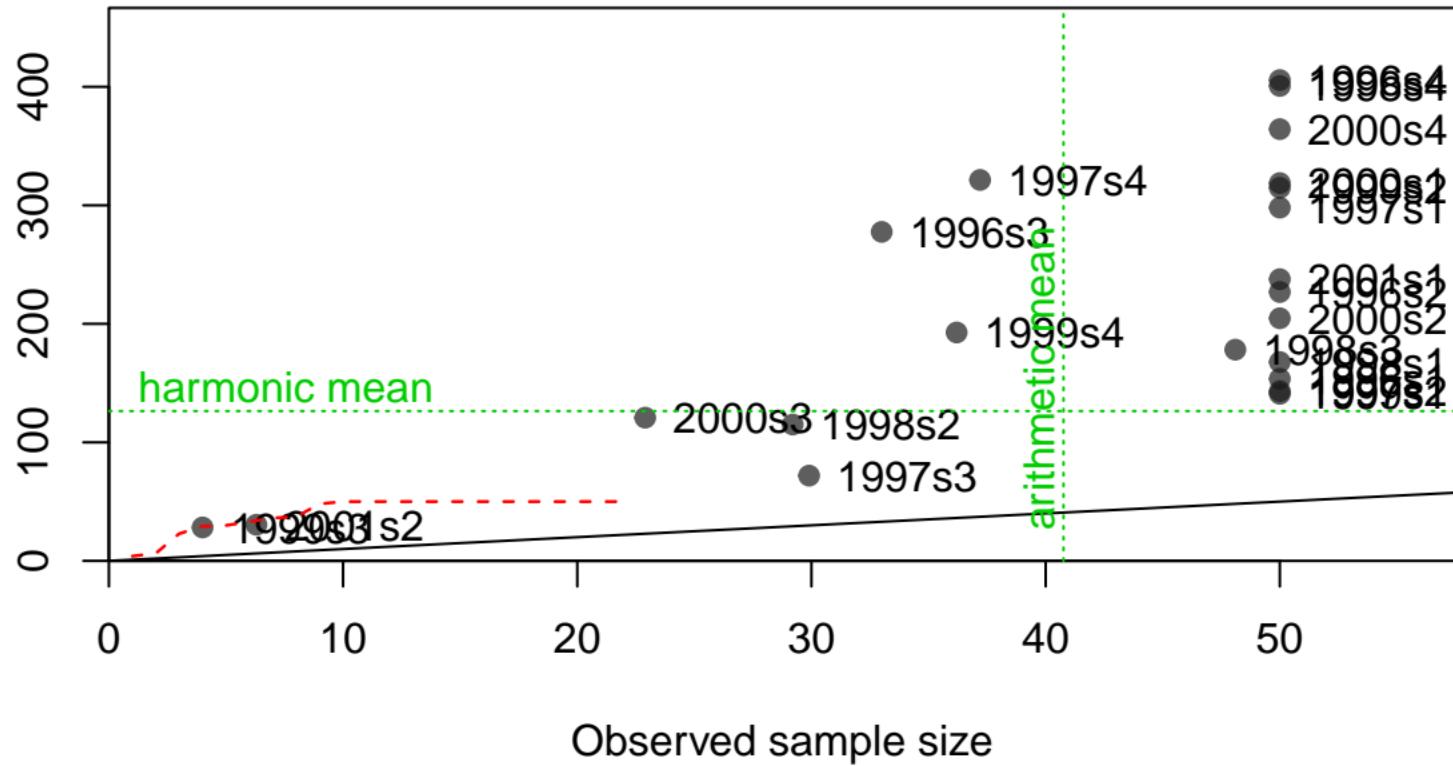


Proportion

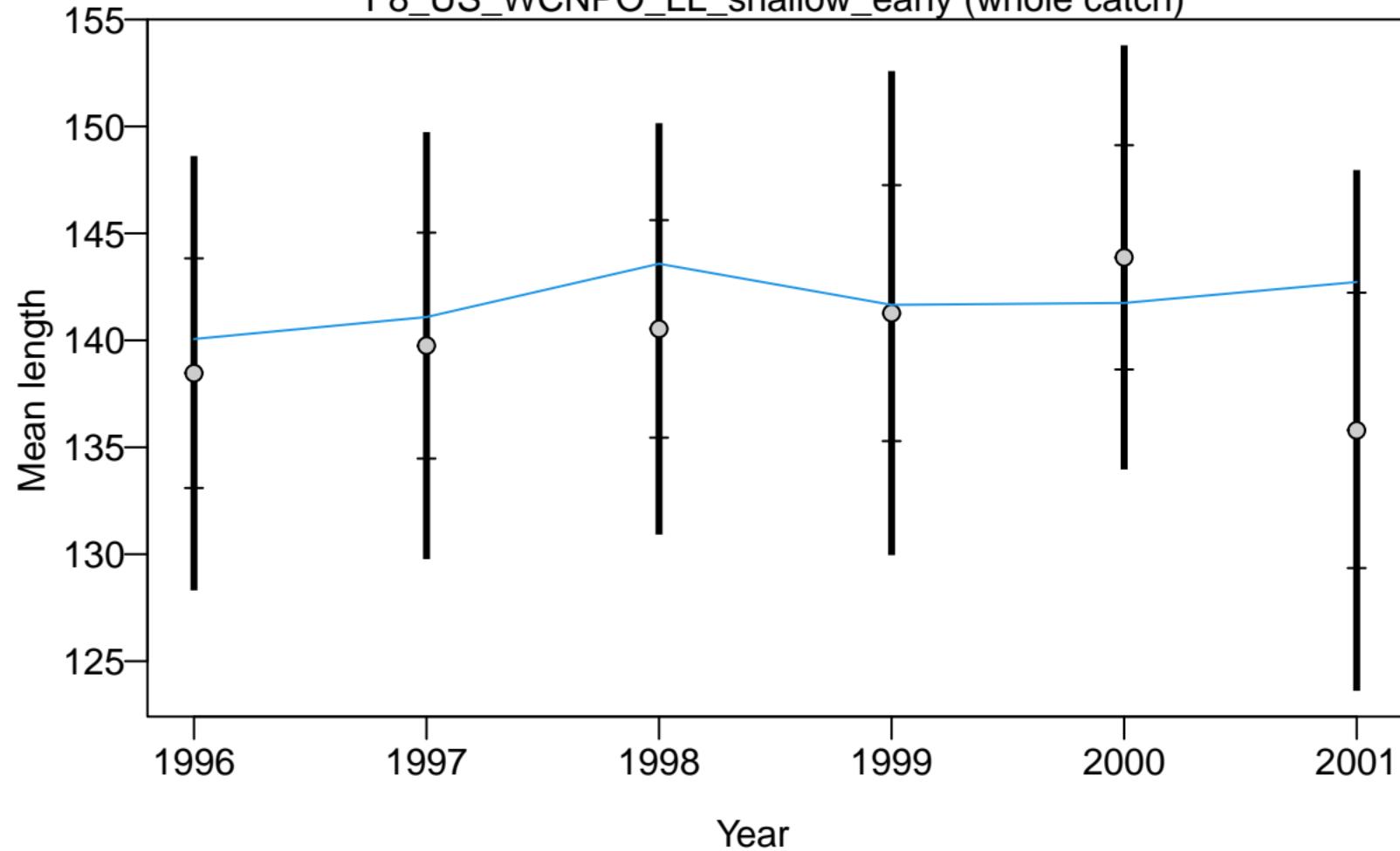




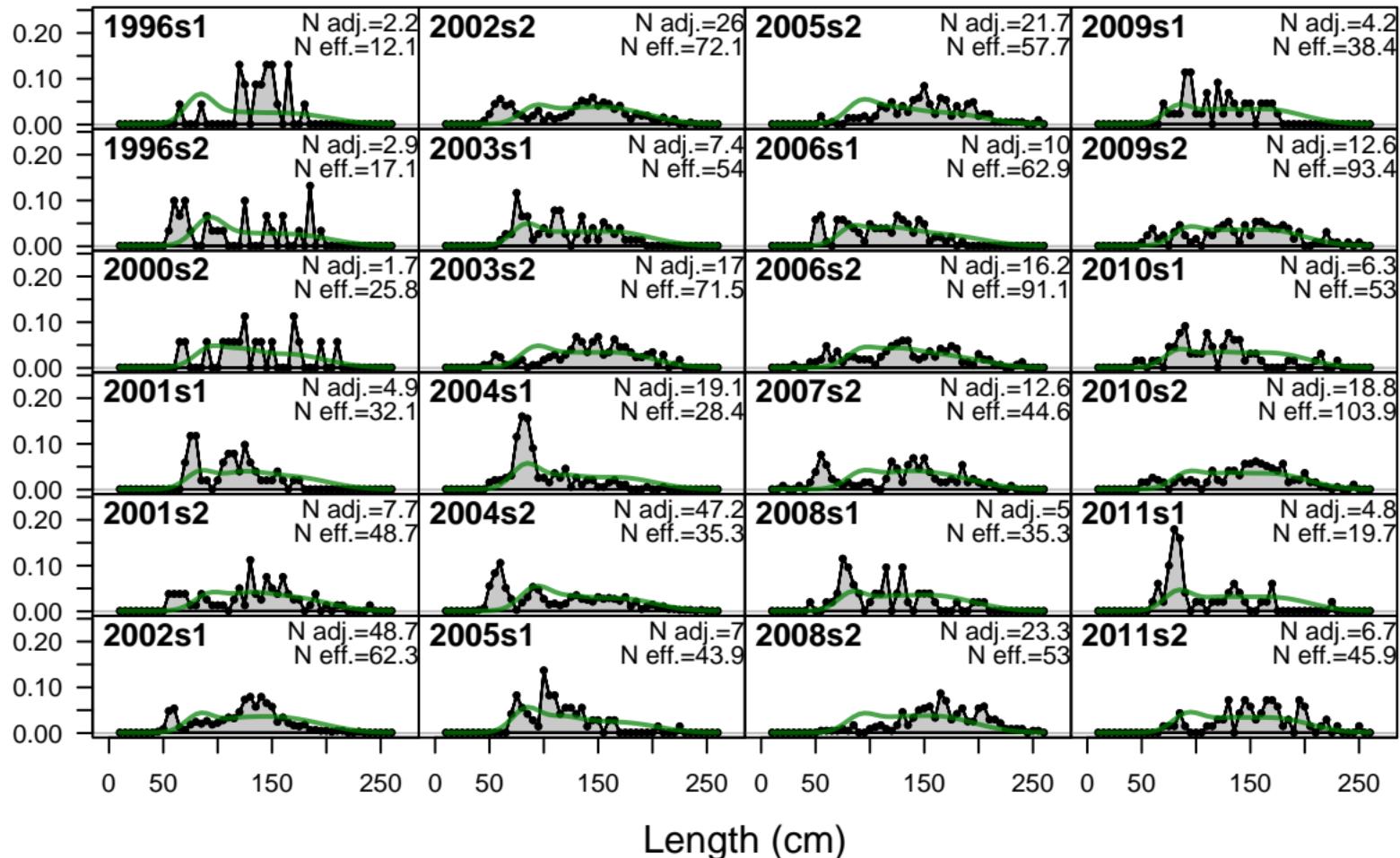
Effective sample size



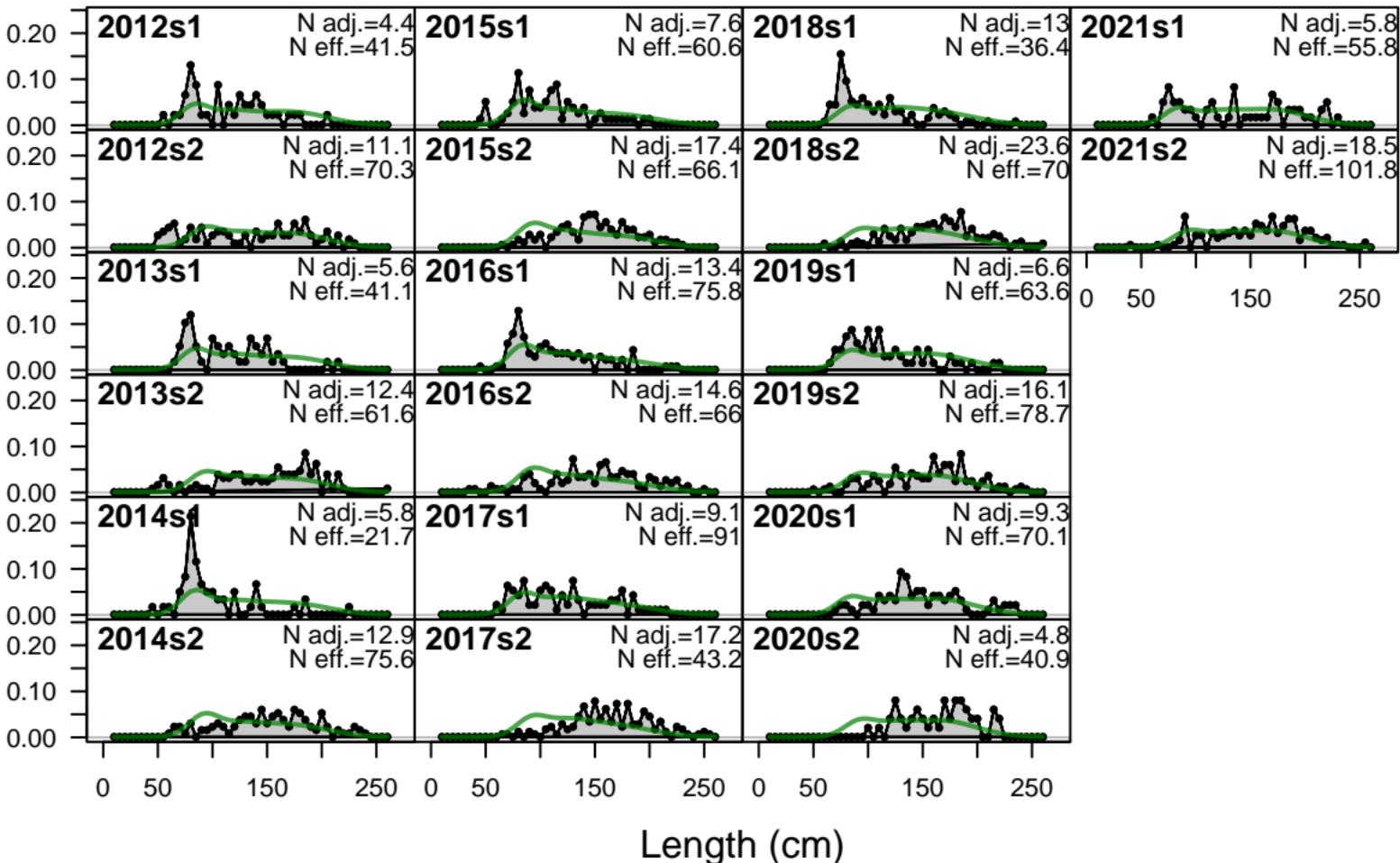
F8\_US\_WCNPO\_LL\_shallow\_early (whole catch)

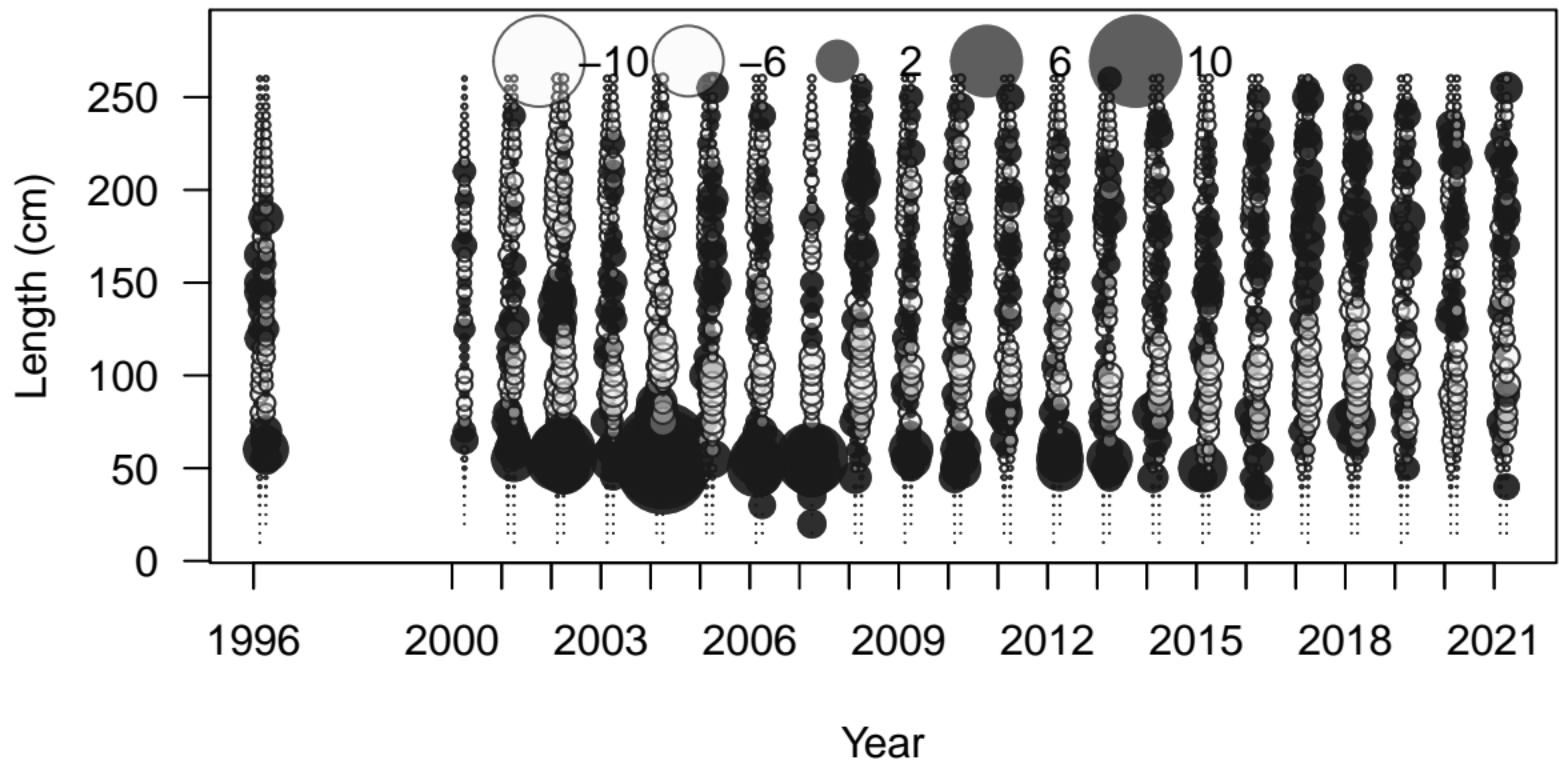


Proportion

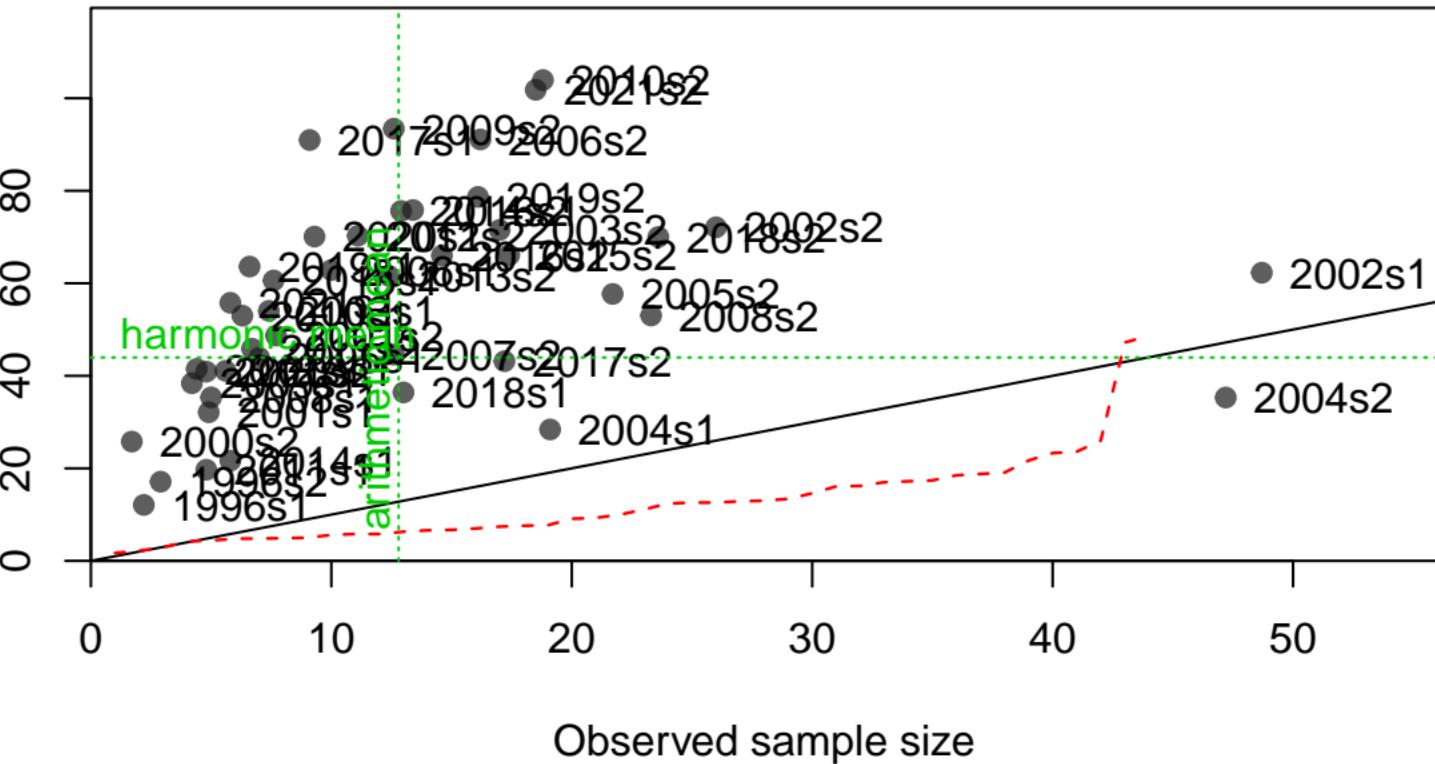


Proportion

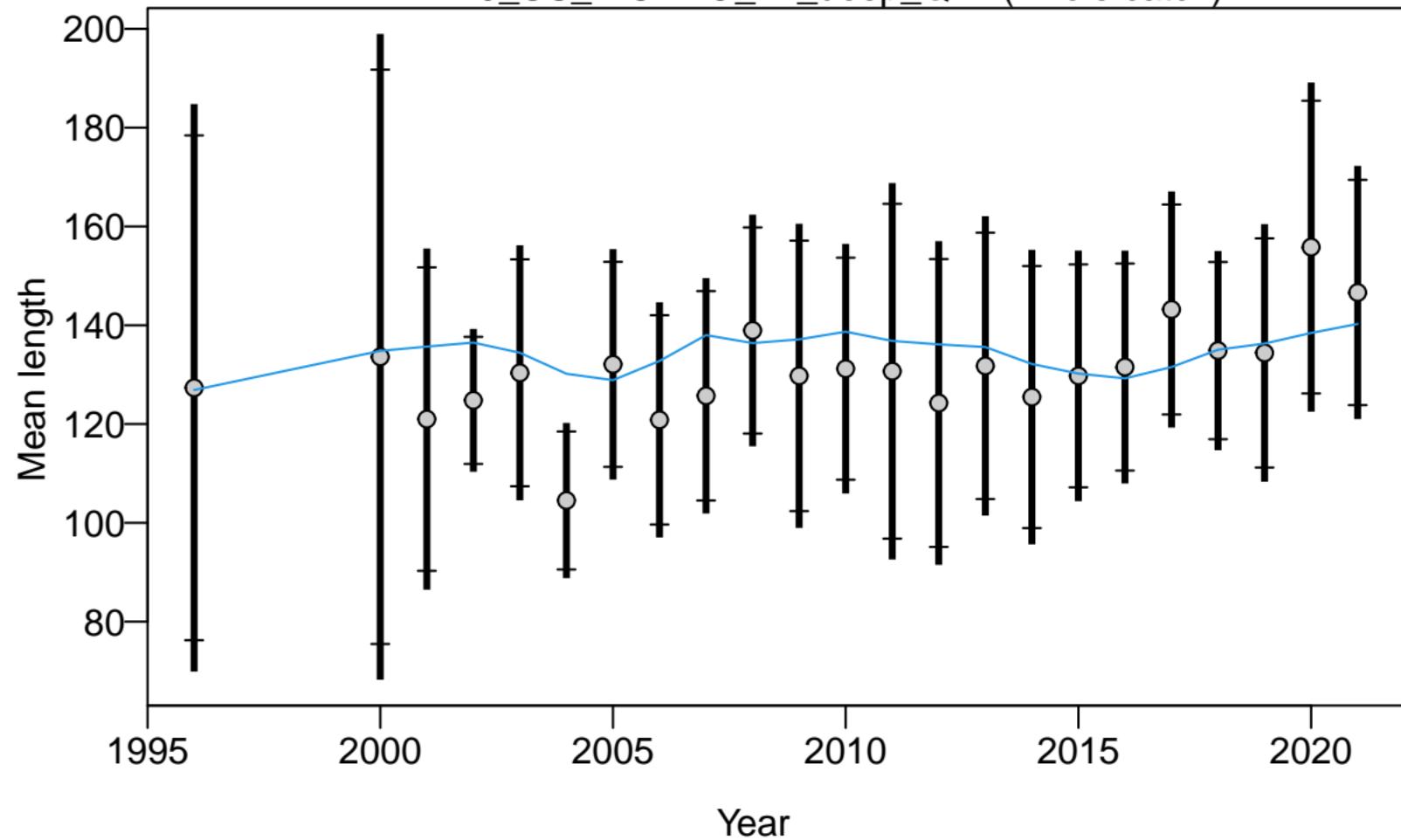




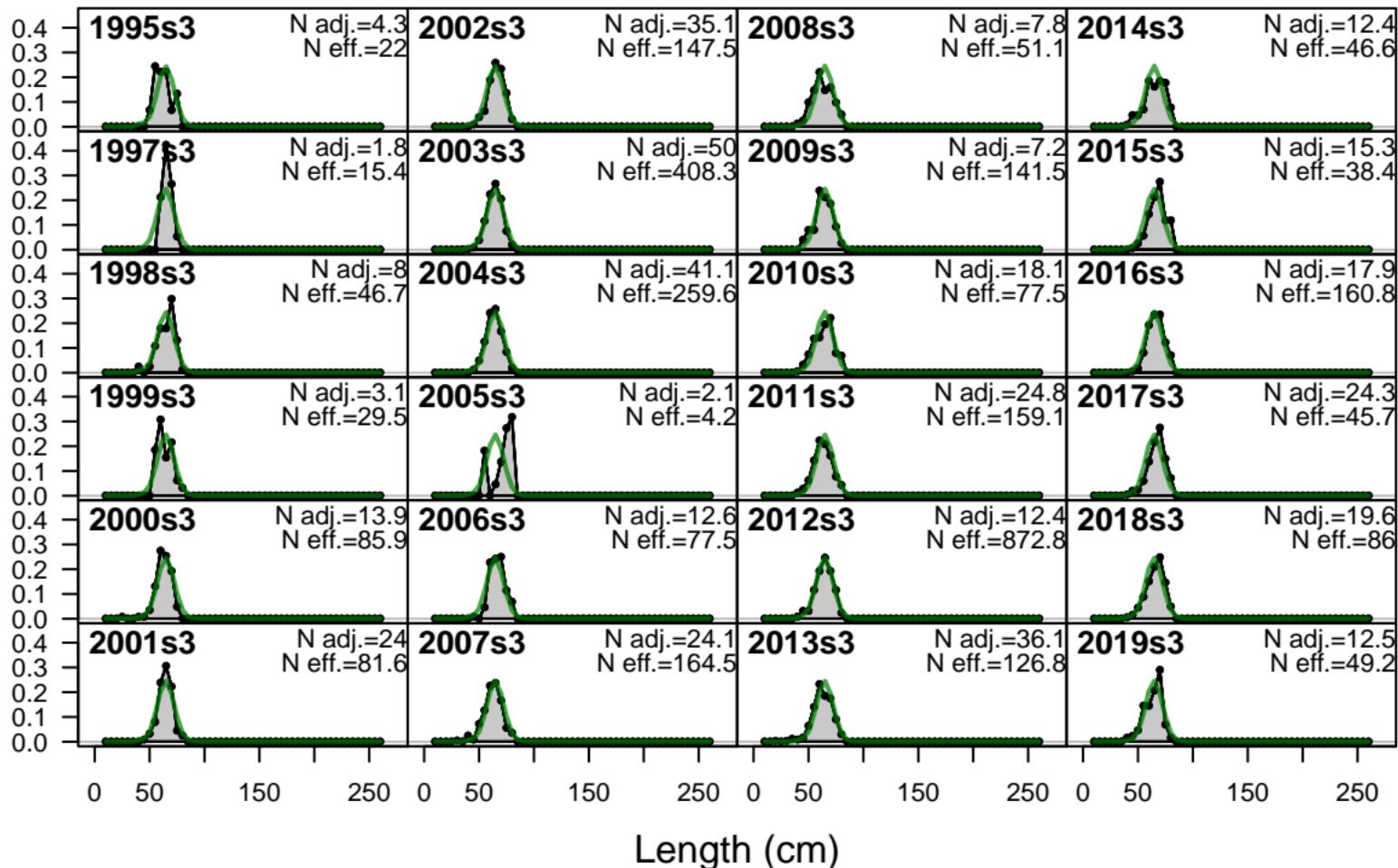
Effective sample size



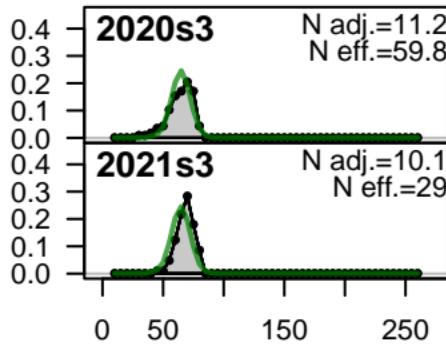
F9\_US\_WCNPO\_LL\_deep\_Q12 (whole catch)

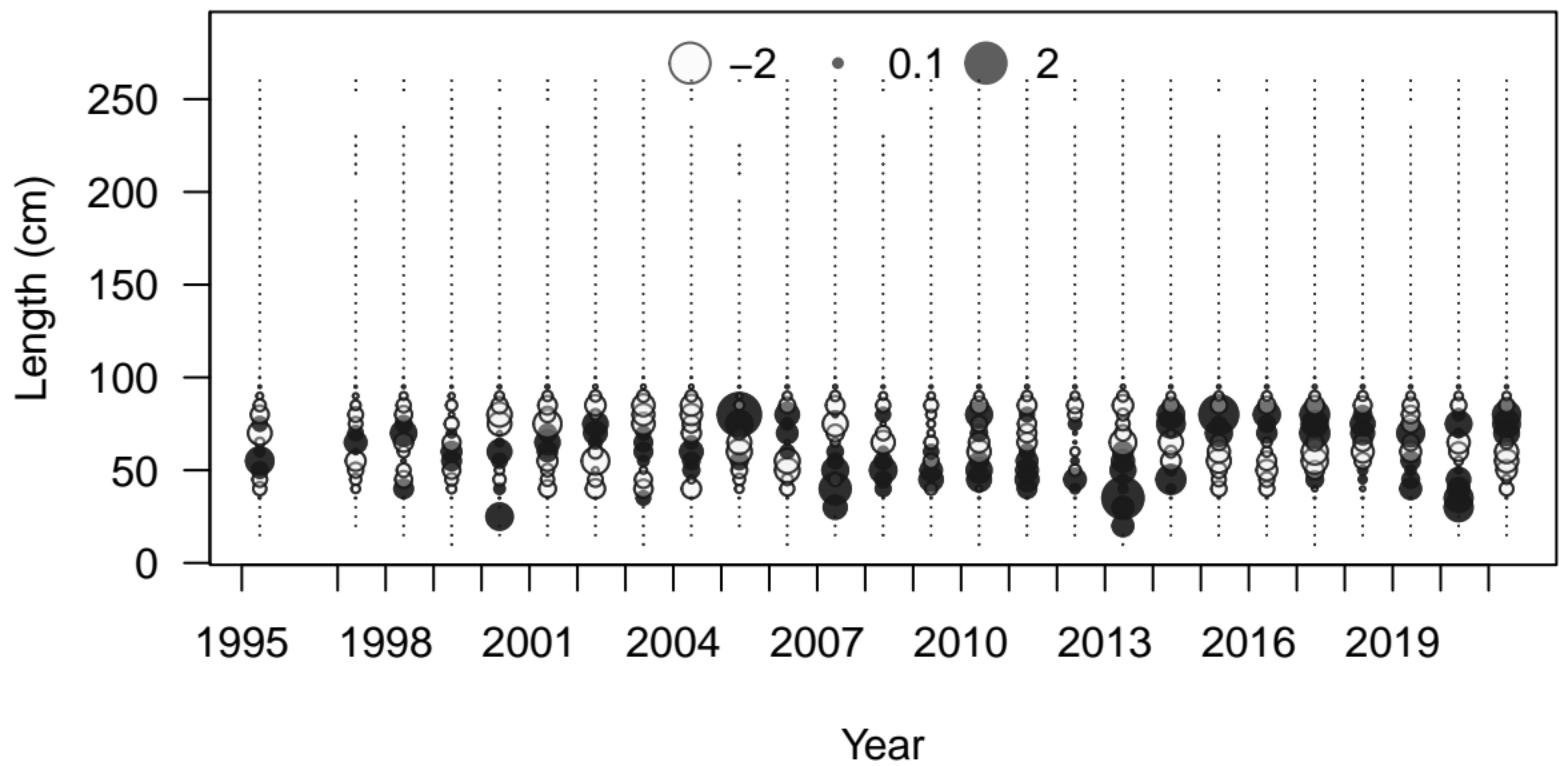


Proportion

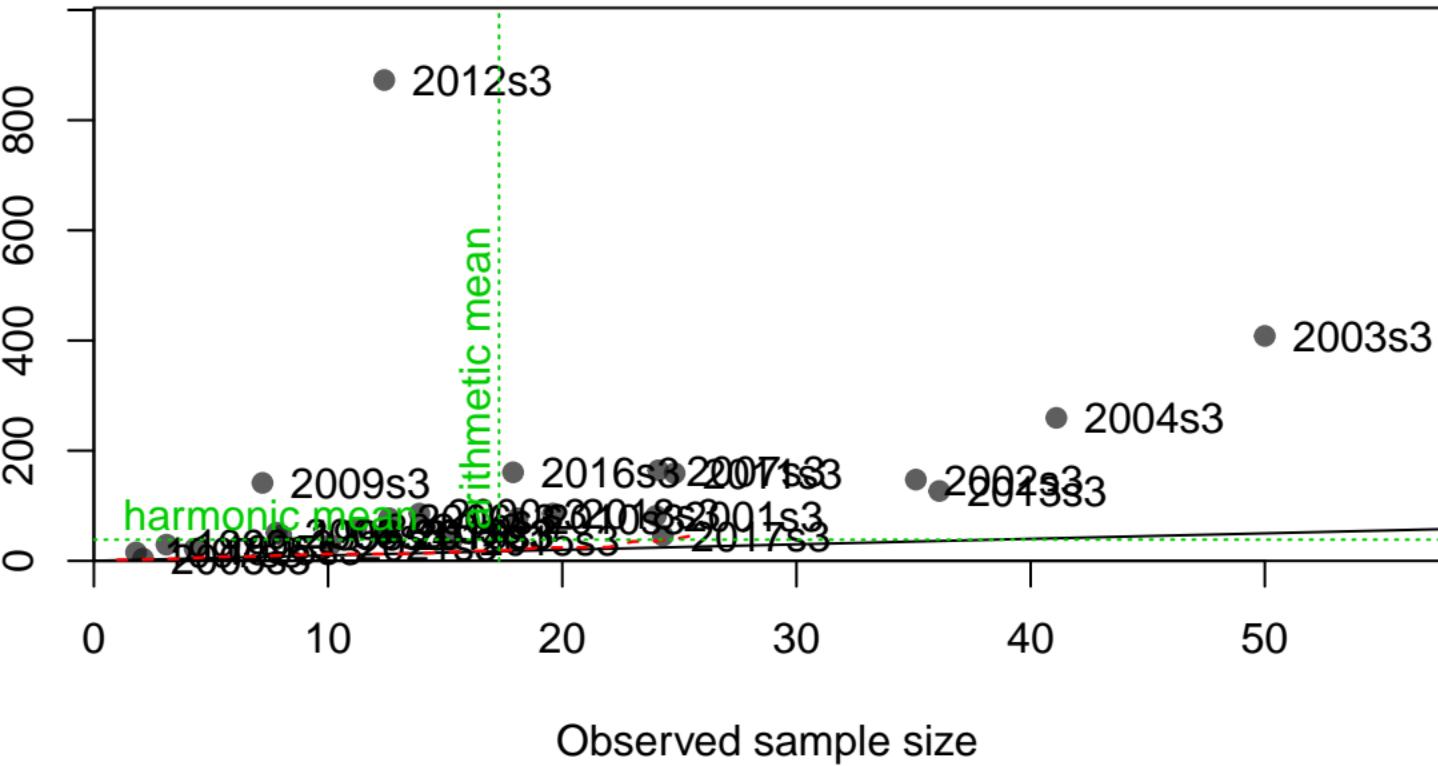


Proportion

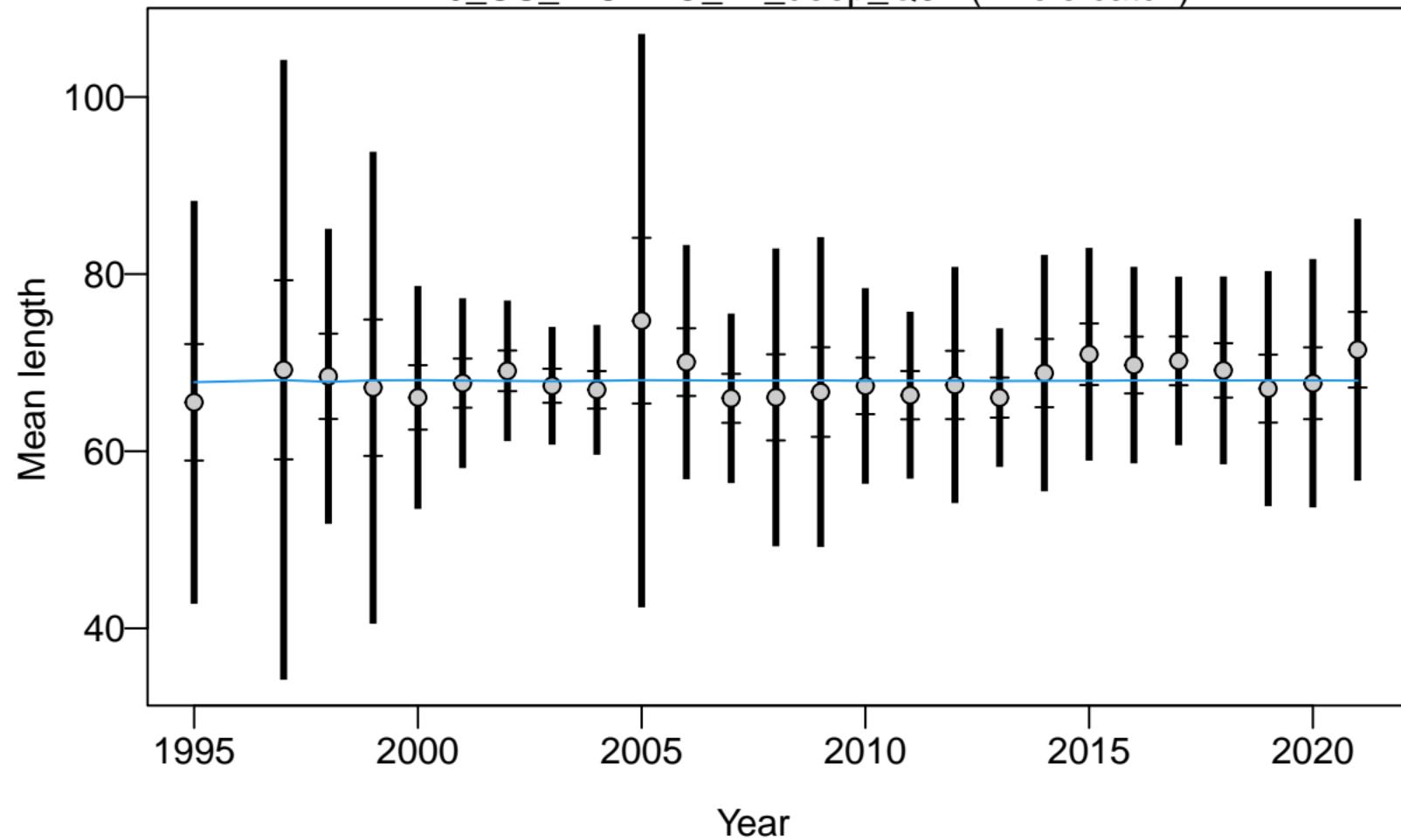




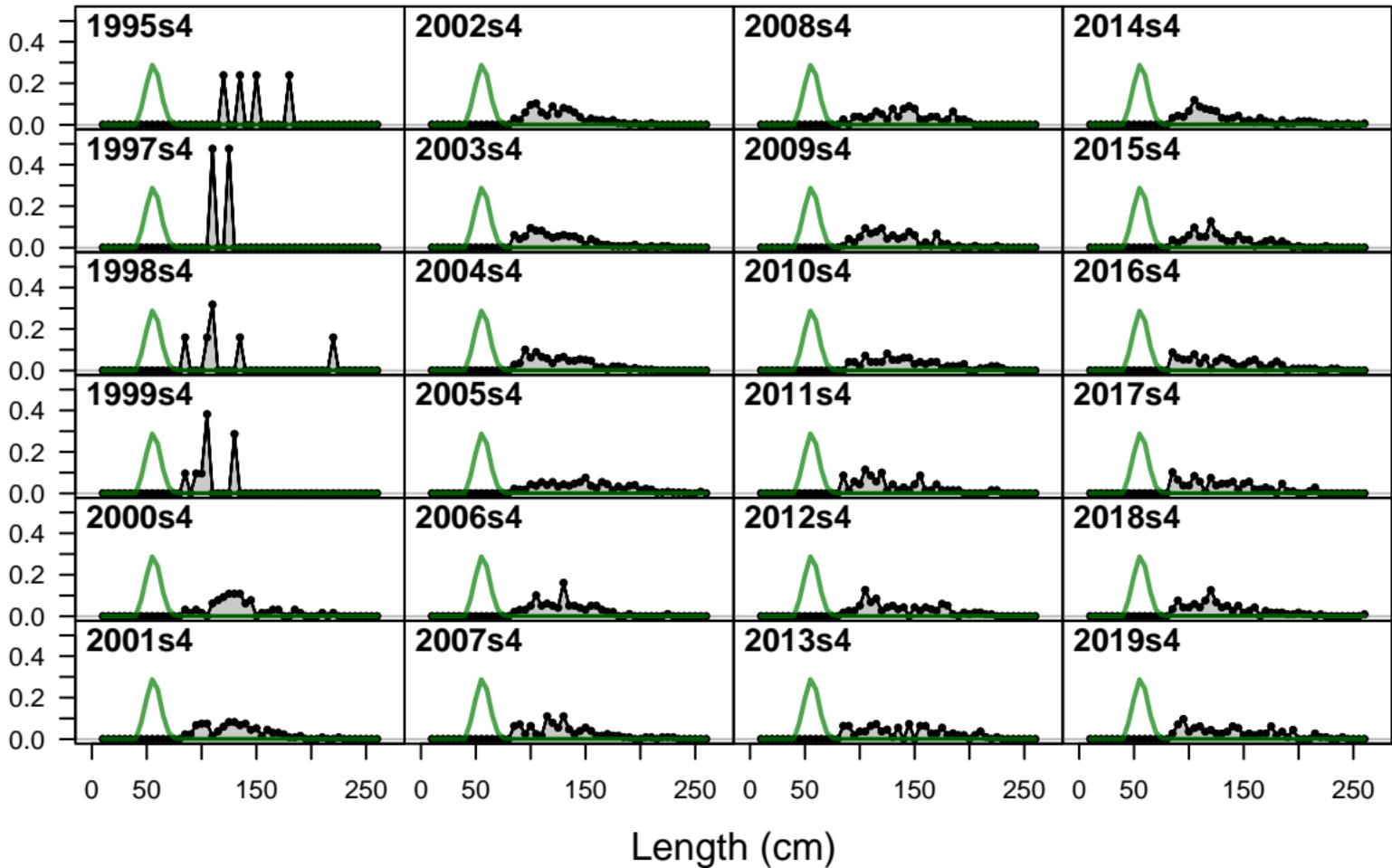
Effective sample size



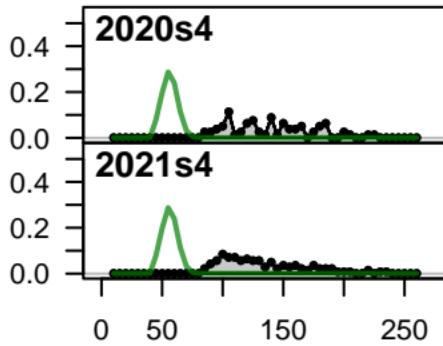
# F20\_US\_WCNPO\_LL\_deep\_Q34 (whole catch)



Proportion



Proportion



Length (cm)

Equilibrium yield (mt)

1.0e+22

0.0e+00

0.0

0.2

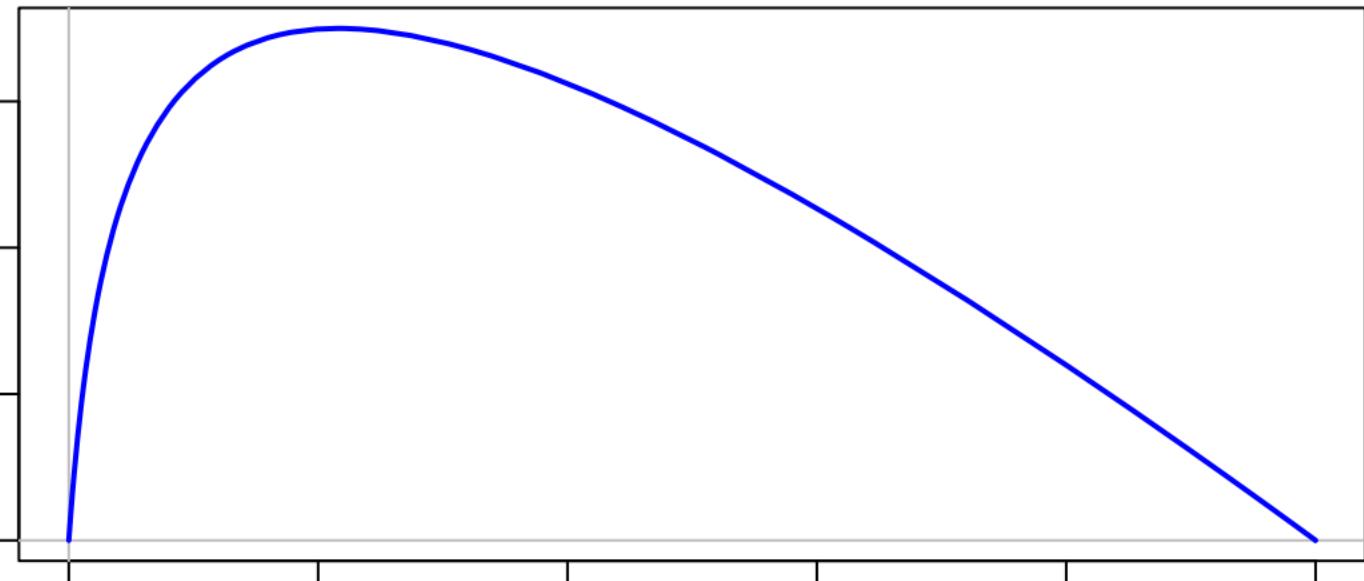
0.4

0.6

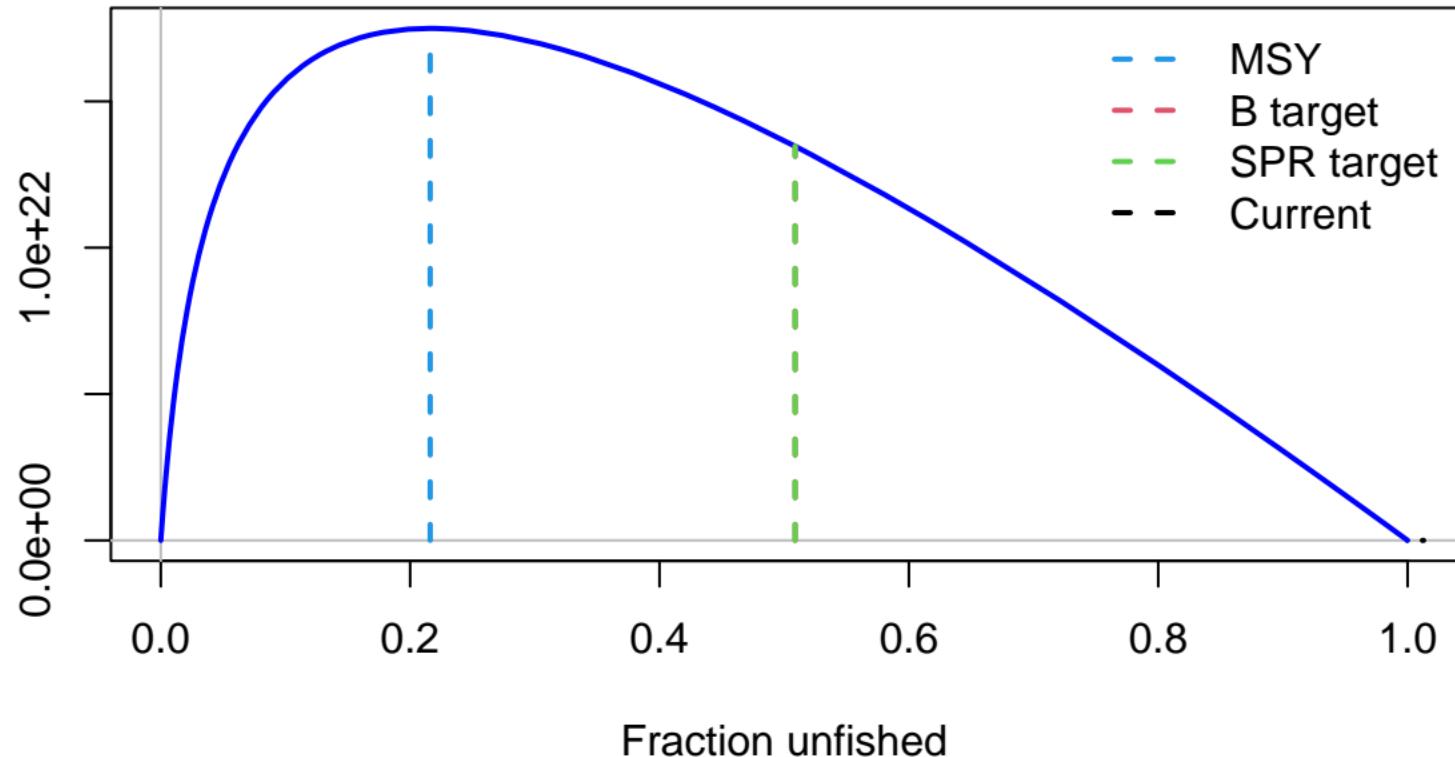
0.8

1.0

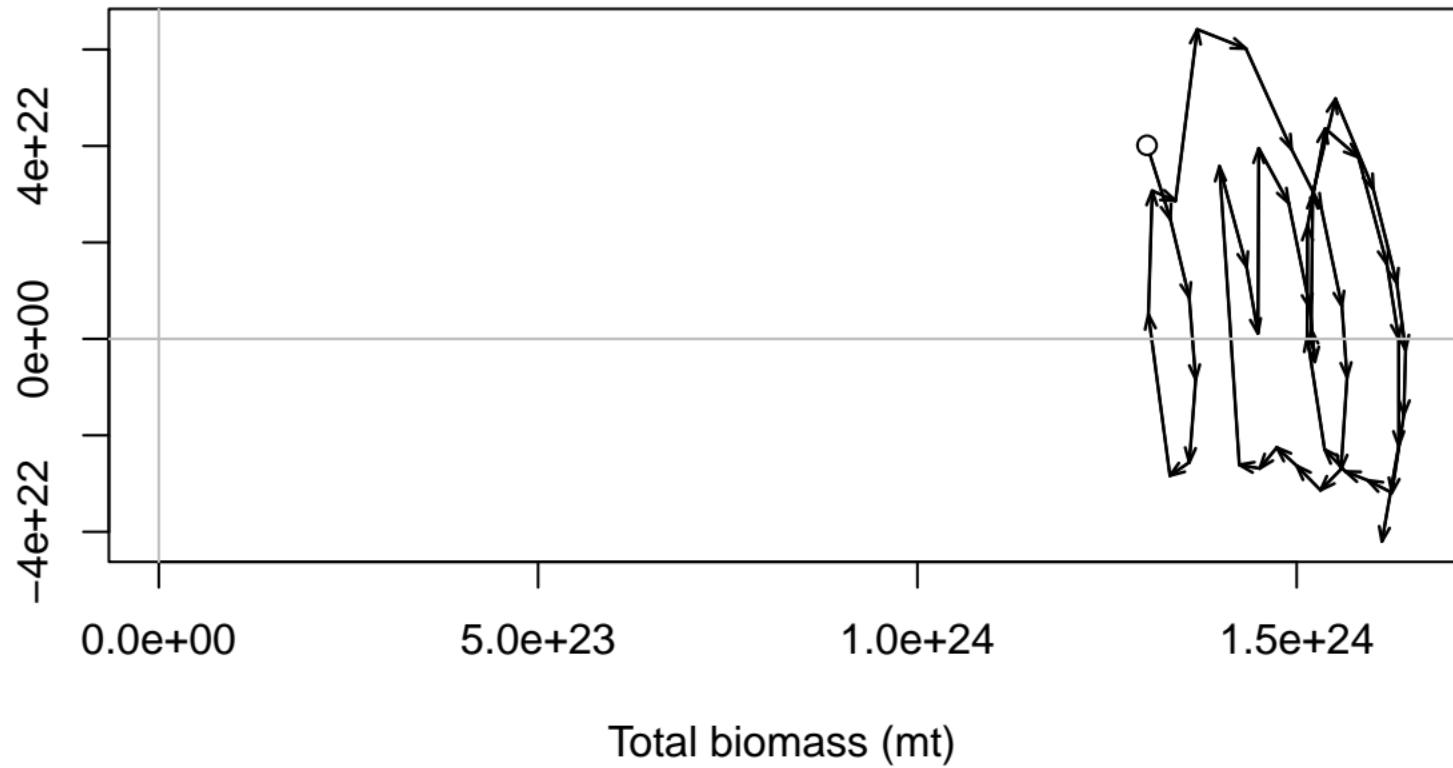
Fraction unfished



Equilibrium yield (mt)

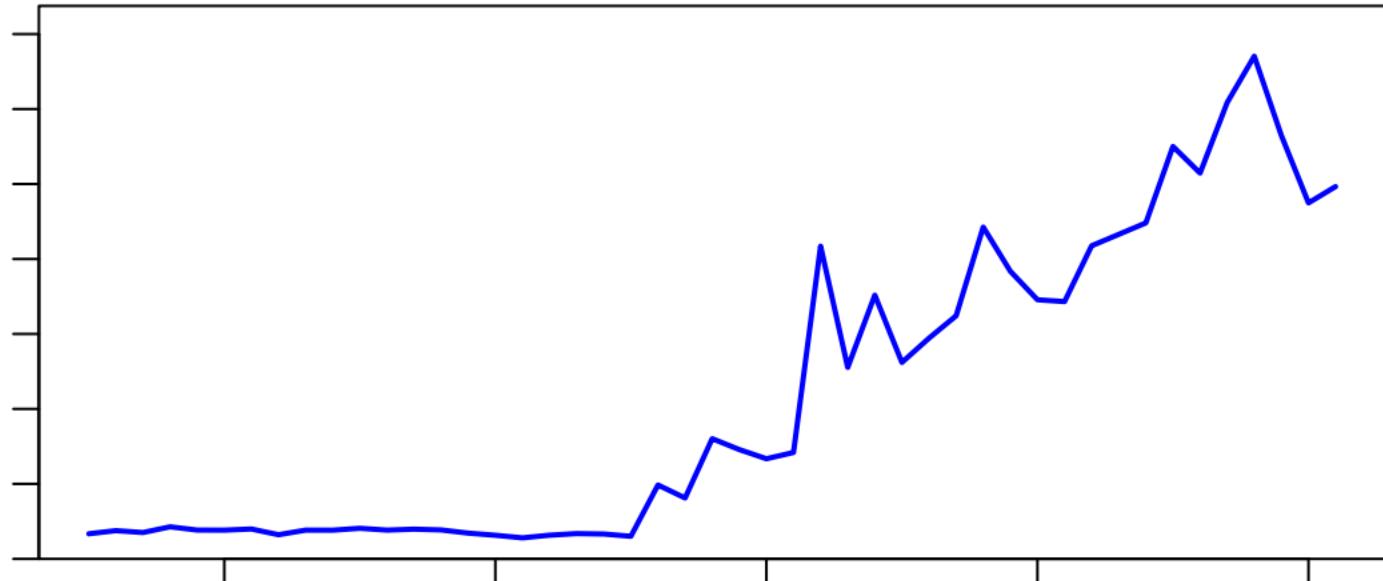


Surplus production (mt)

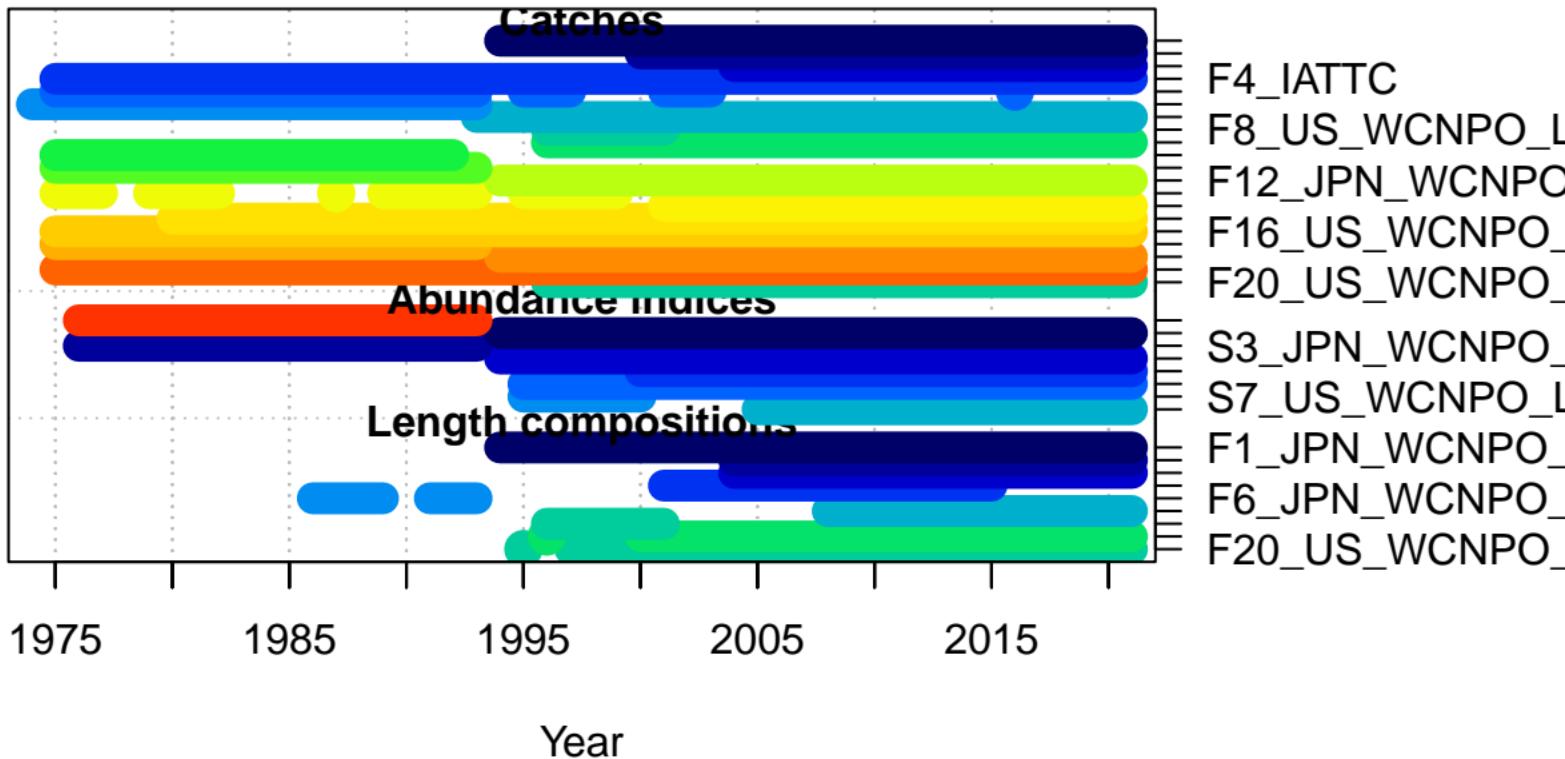


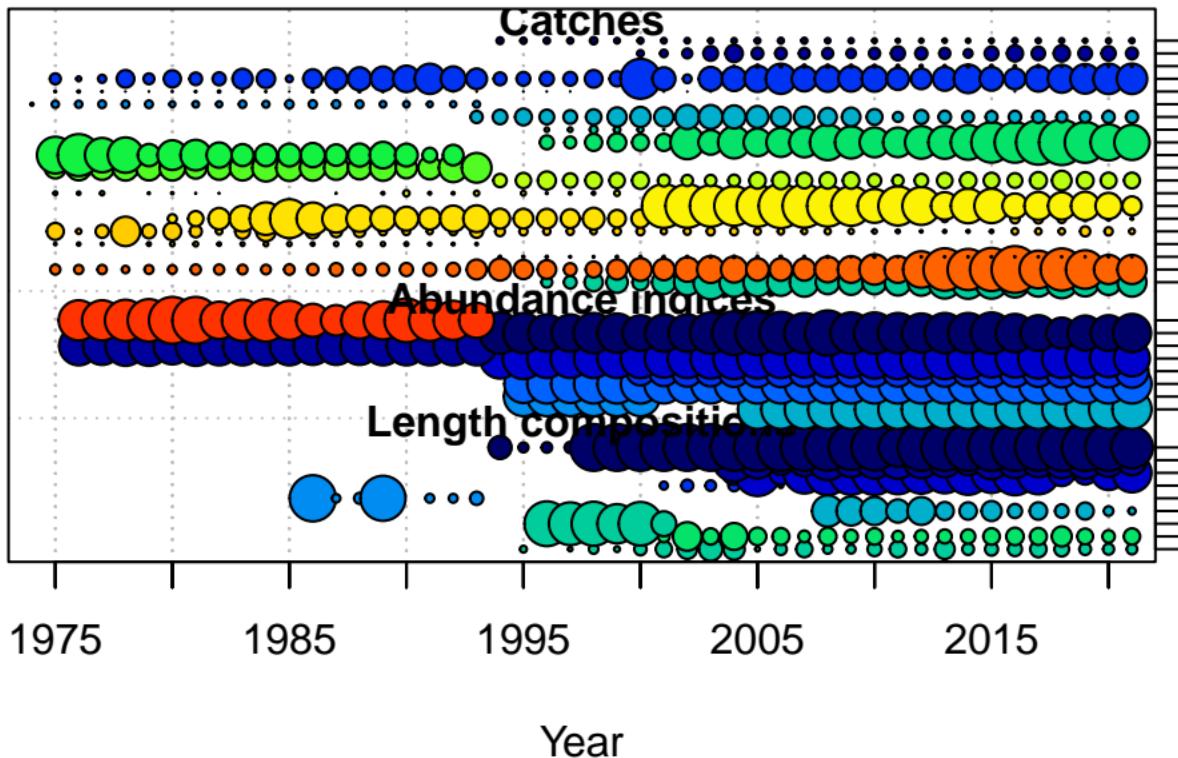
Yield per recruit (kg)

0.0e+00 6.0e-17 1.2e-16



Year

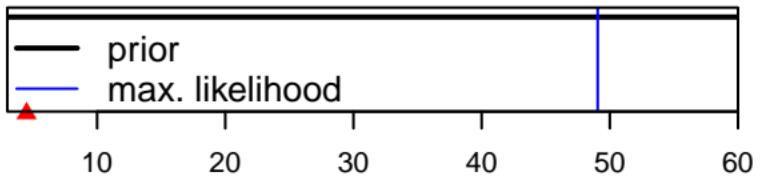




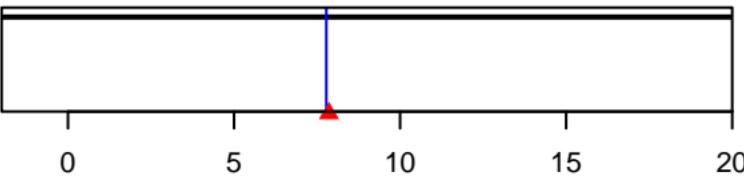
F4\_IATTC  
F8\_US\_WCNPO\_L  
F12\_JPN\_WCNPO\_L  
F16\_US\_WCNPO\_L  
F20\_US\_WCNPO\_L  
S3\_JPN\_WCNPO\_L  
S7\_US\_WCNPO\_L  
F1\_JPN\_WCNPO\_L  
F6\_JPN\_WCNPO\_L  
F20\_US\_WCNPO\_L

Density

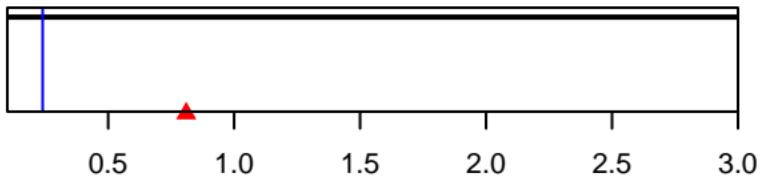
SR\_LN(R0)



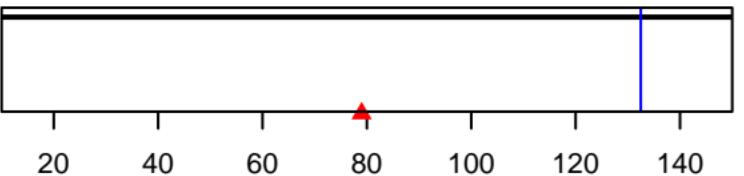
DbIN\_descend\_se\_F1\_JPN\_WCNPO OSDWCOLL\_late\_Are



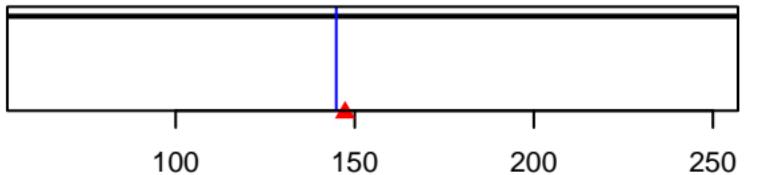
InitF\_seas\_1\_flt\_6F6\_JPN\_WCNPO\_OSDWLL\_early\_Area1



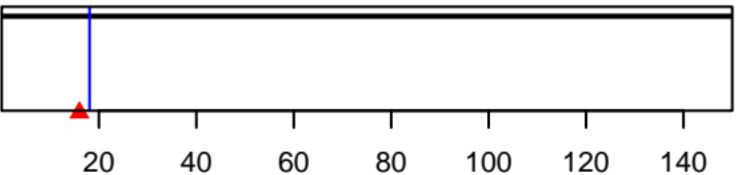
Size\_inflection\_F2\_TWN\_WCNPO\_DWLL\_late(2)



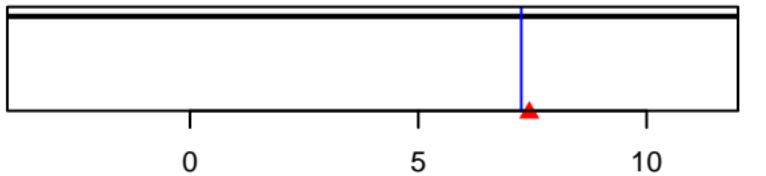
Size\_DbIN\_peak\_F1\_JPN\_WCNPO OSDWCOLL\_late\_Area1'



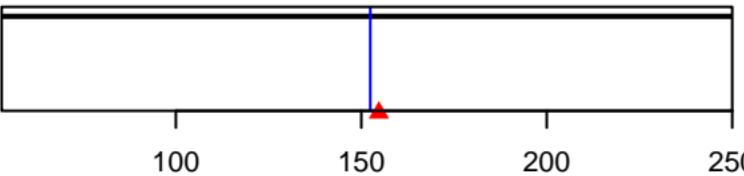
Size\_95%width\_F2\_TWN\_WCNPO\_DWLL\_late(2)



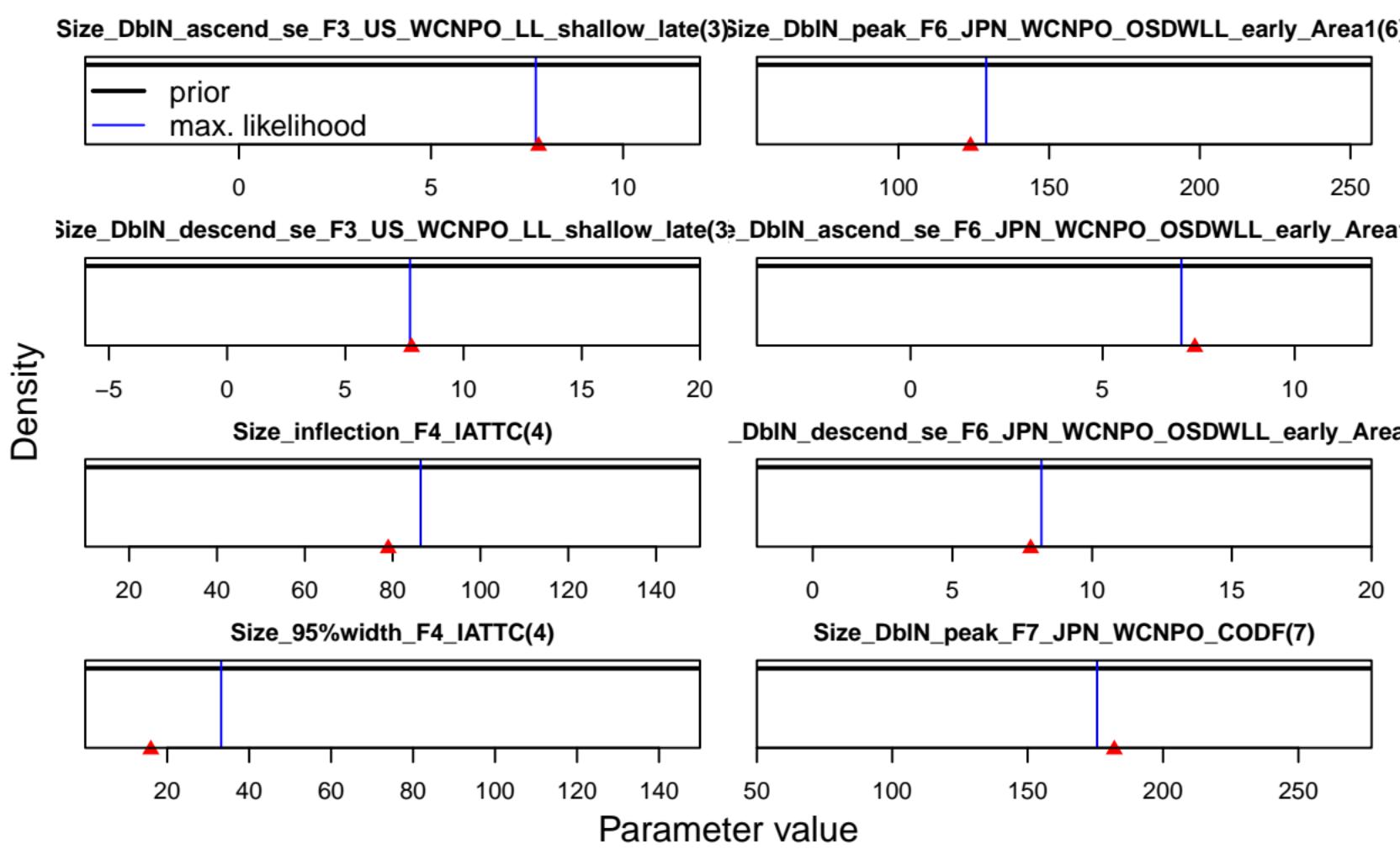
\_DbIN\_ascend\_se\_F1\_JPN\_WCNPO OSDWCOLL\_late\_Are



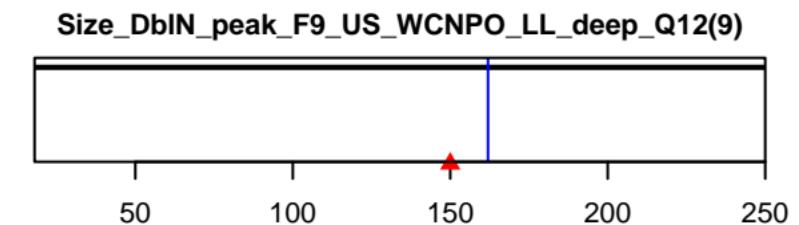
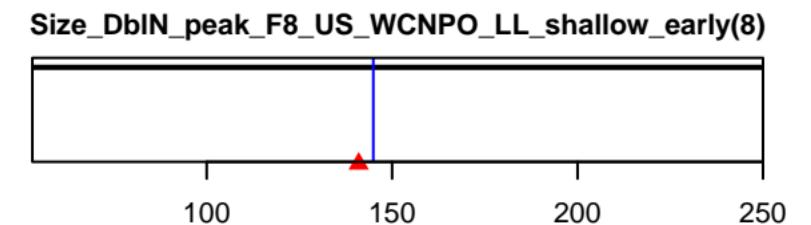
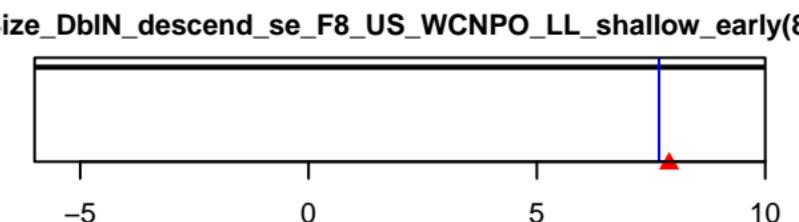
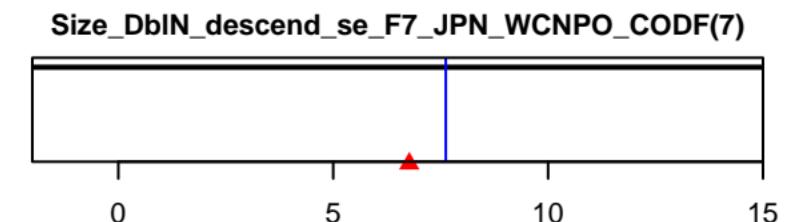
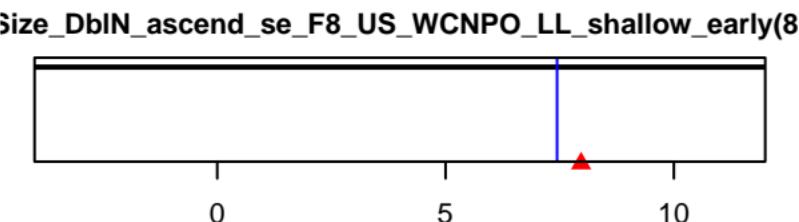
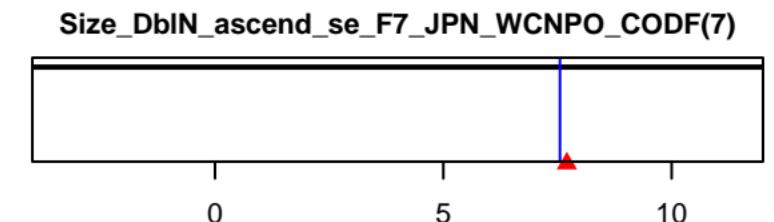
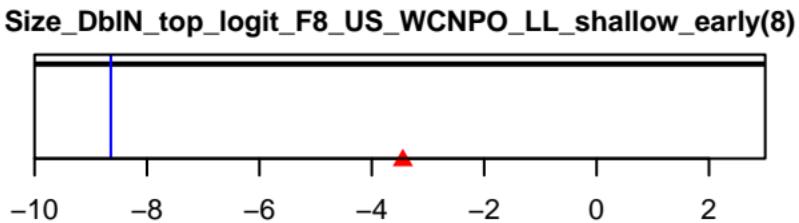
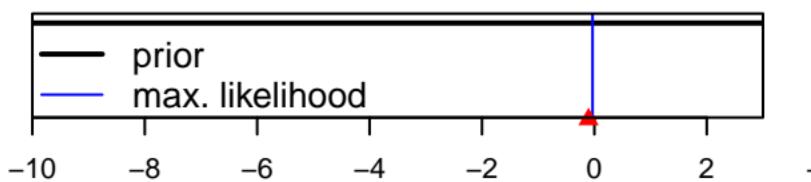
Size\_DbIN\_peak\_F3\_US\_WCNPO\_LL\_shallow\_late(3)



Parameter value

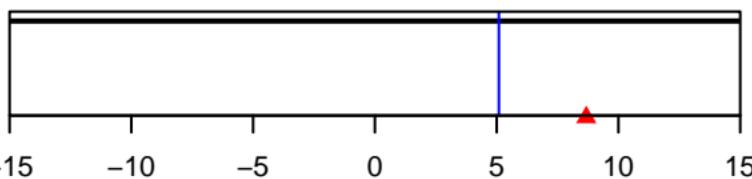
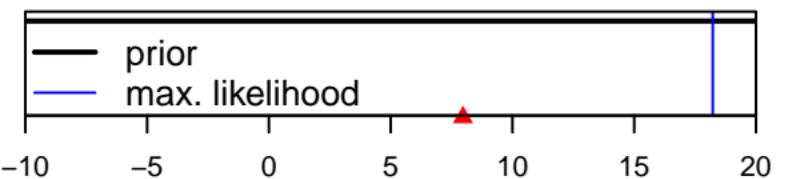


Density

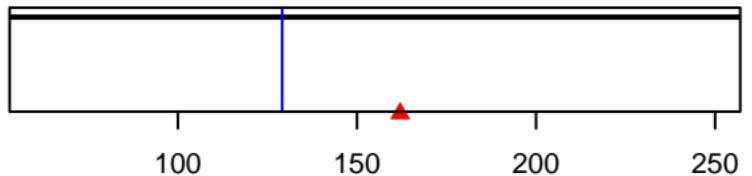
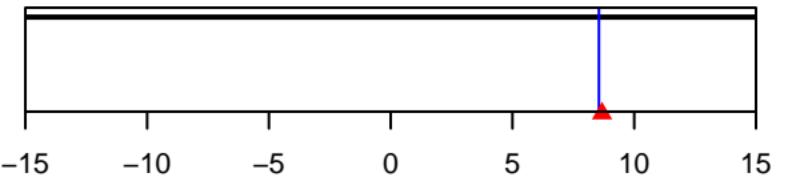


Parameter value

Size\_DbIN\_ascend\_se\_F9\_US\_WCNPO\_LL\_deep\_Q12(9) Size\_DbIN\_descend\_se\_F20\_US\_WCNPO\_LL\_deep\_Q34(28)

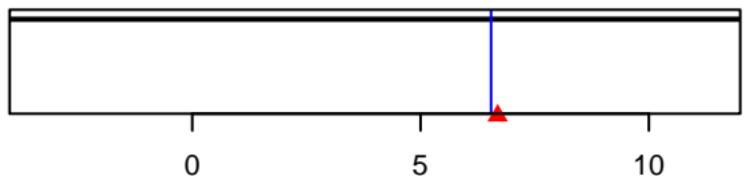
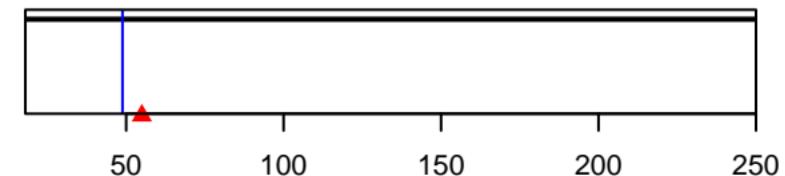


Size\_DbIN\_descend\_se\_F9\_US\_WCNPO\_LL\_deep\_Q12(9) l\_peak\_F1\_JPN\_WCNPO OSDWCOLL\_late\_Area1(1)\_BLK2

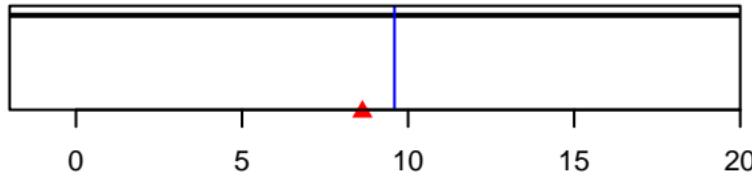
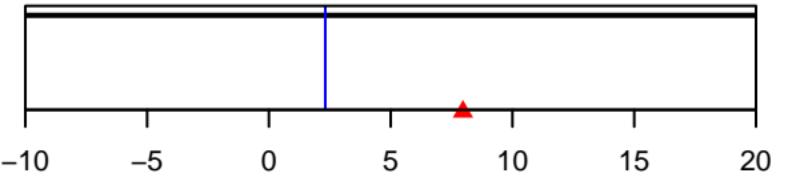


Size\_DbIN\_peak\_F20\_US\_WCNPO\_LL\_deep\_Q34(28)

scend\_se\_F1\_JPN\_WCNPO OSDWCOLL\_late\_Area1(1)\_BL



Size\_DbIN\_ascend\_se\_F20\_US\_WCNPO\_LL\_deep\_Q34(28) scend\_se\_F1\_JPN\_WCNPO OSDWCOLL\_late\_Area1(1)\_BL

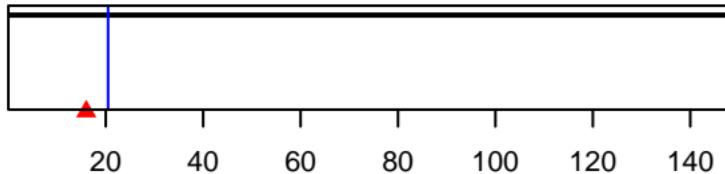


Parameter value

:e\_inflection\_F2\_TWN\_WCNPO\_DWLL\_late(2)\_BLK1repl\_20



:e\_95%width\_F2\_TWN\_WCNPO\_DWLL\_late(2)\_BLK1repl\_20



Density

Parameter value