

Plots created using the 'r4ss' package in R

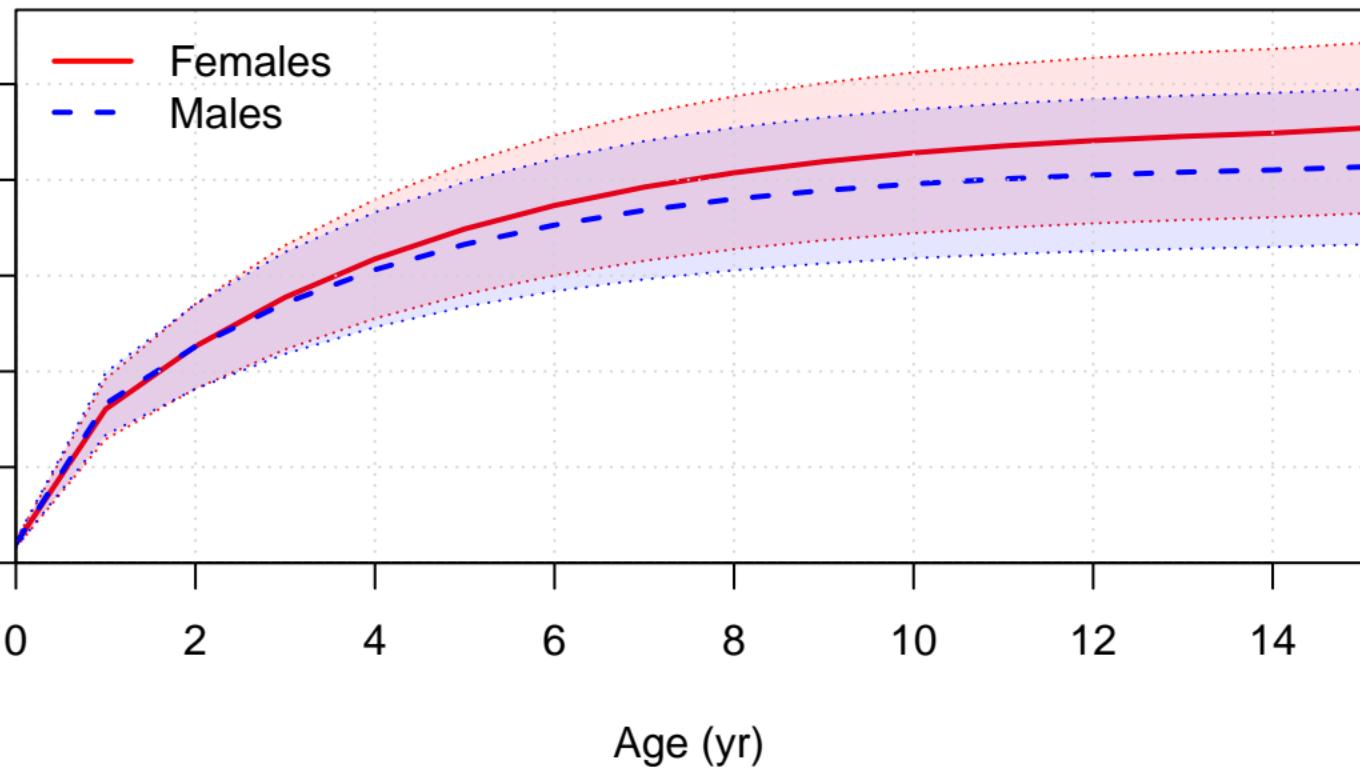
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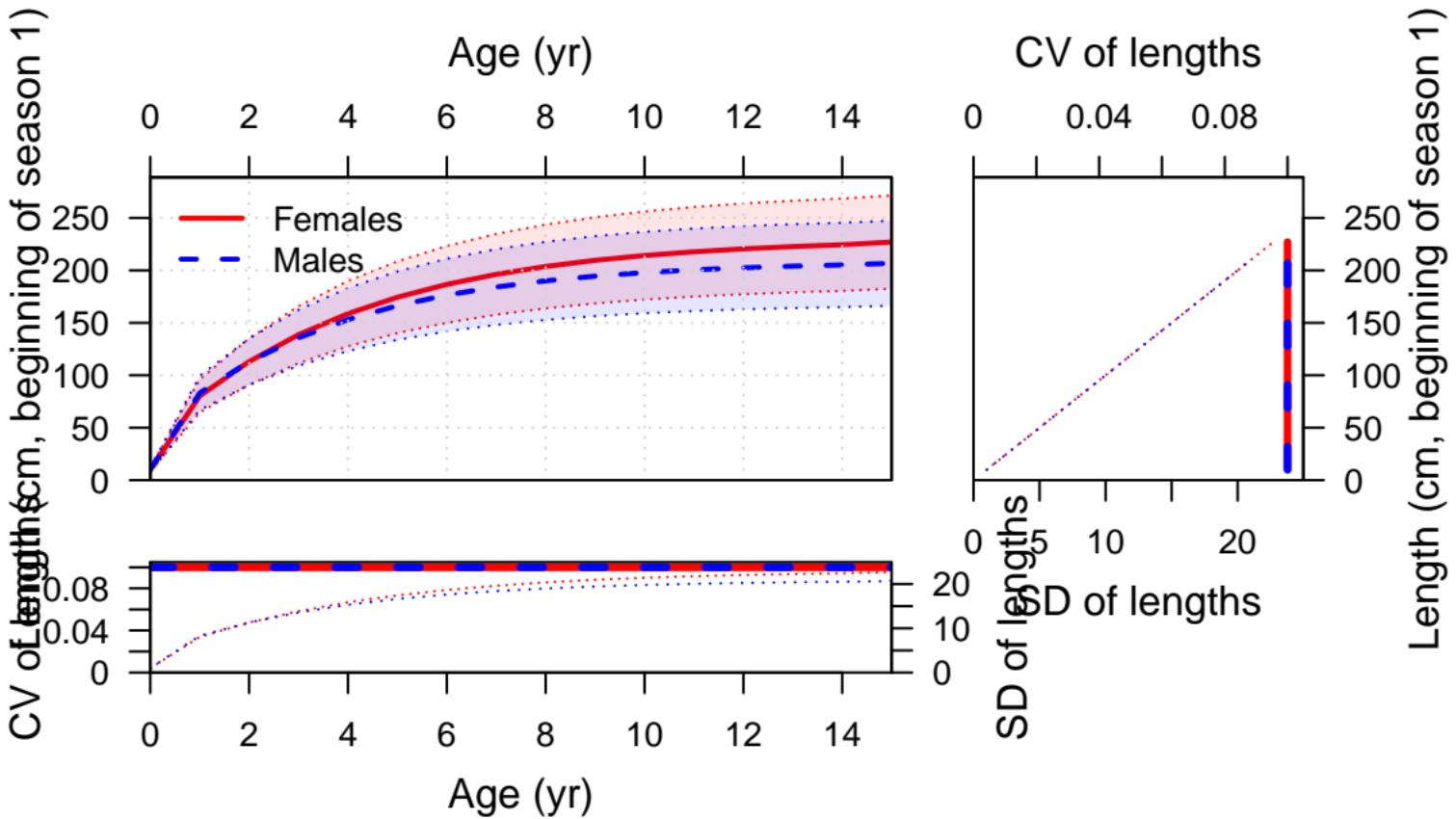
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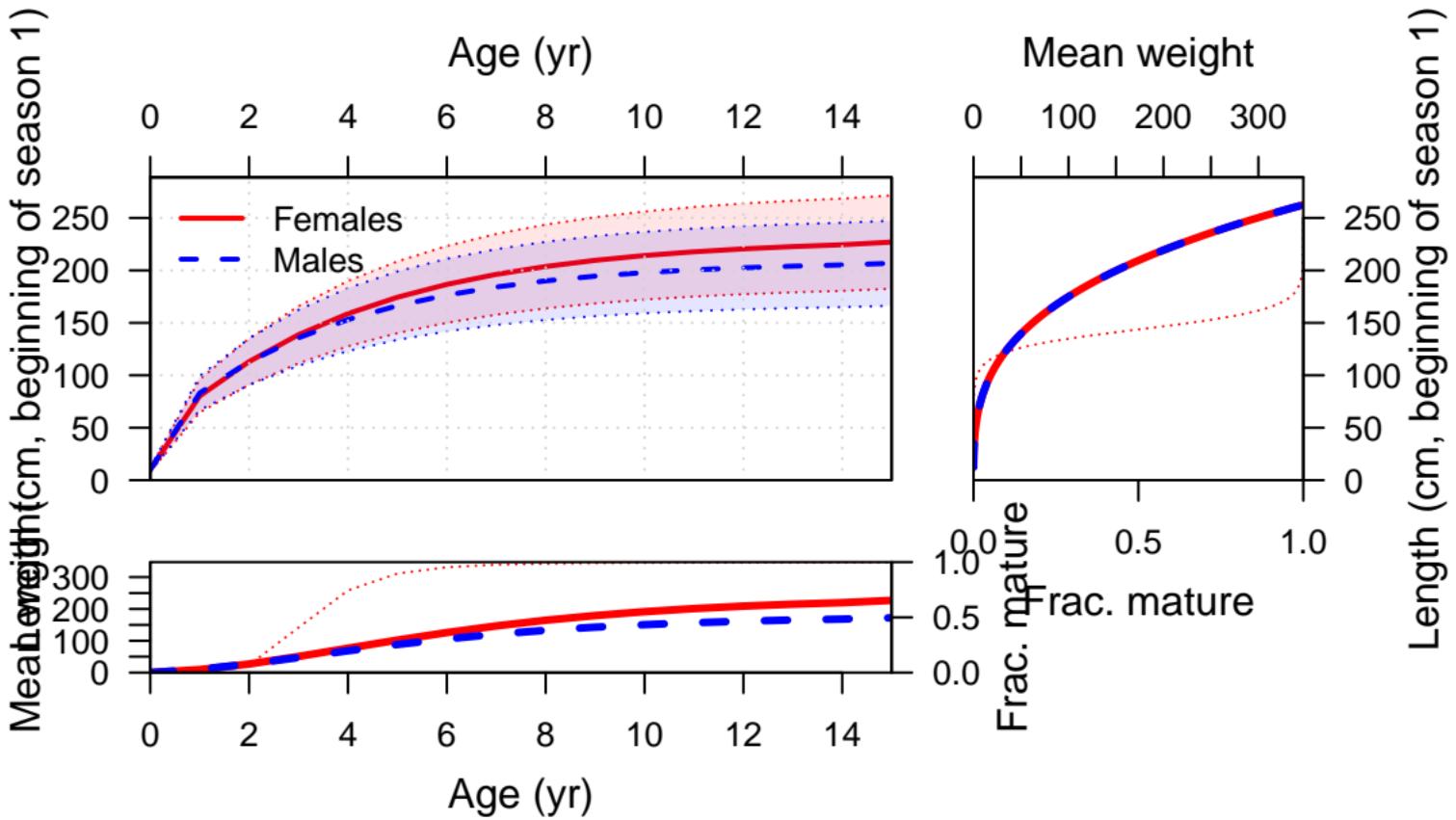
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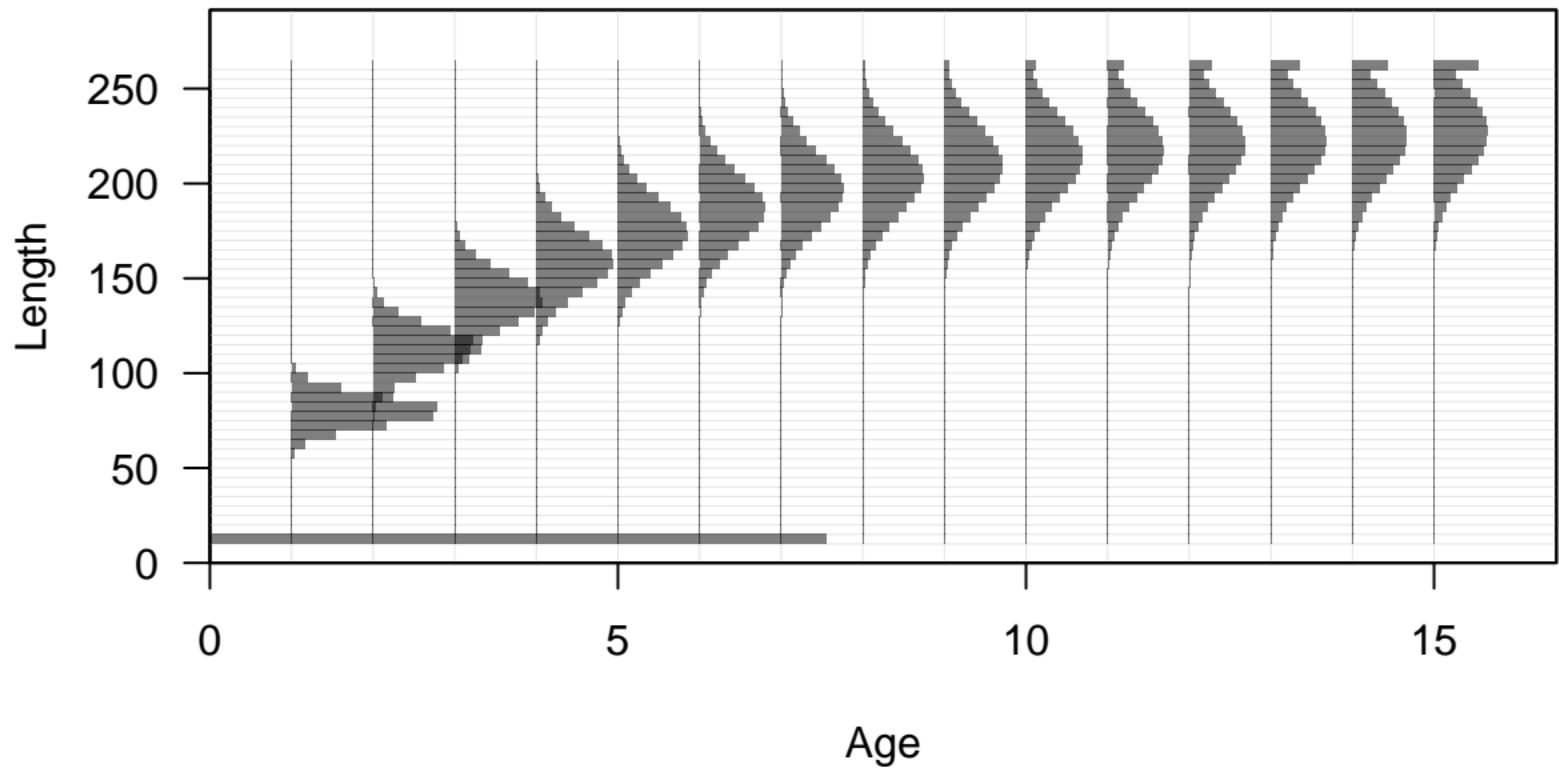
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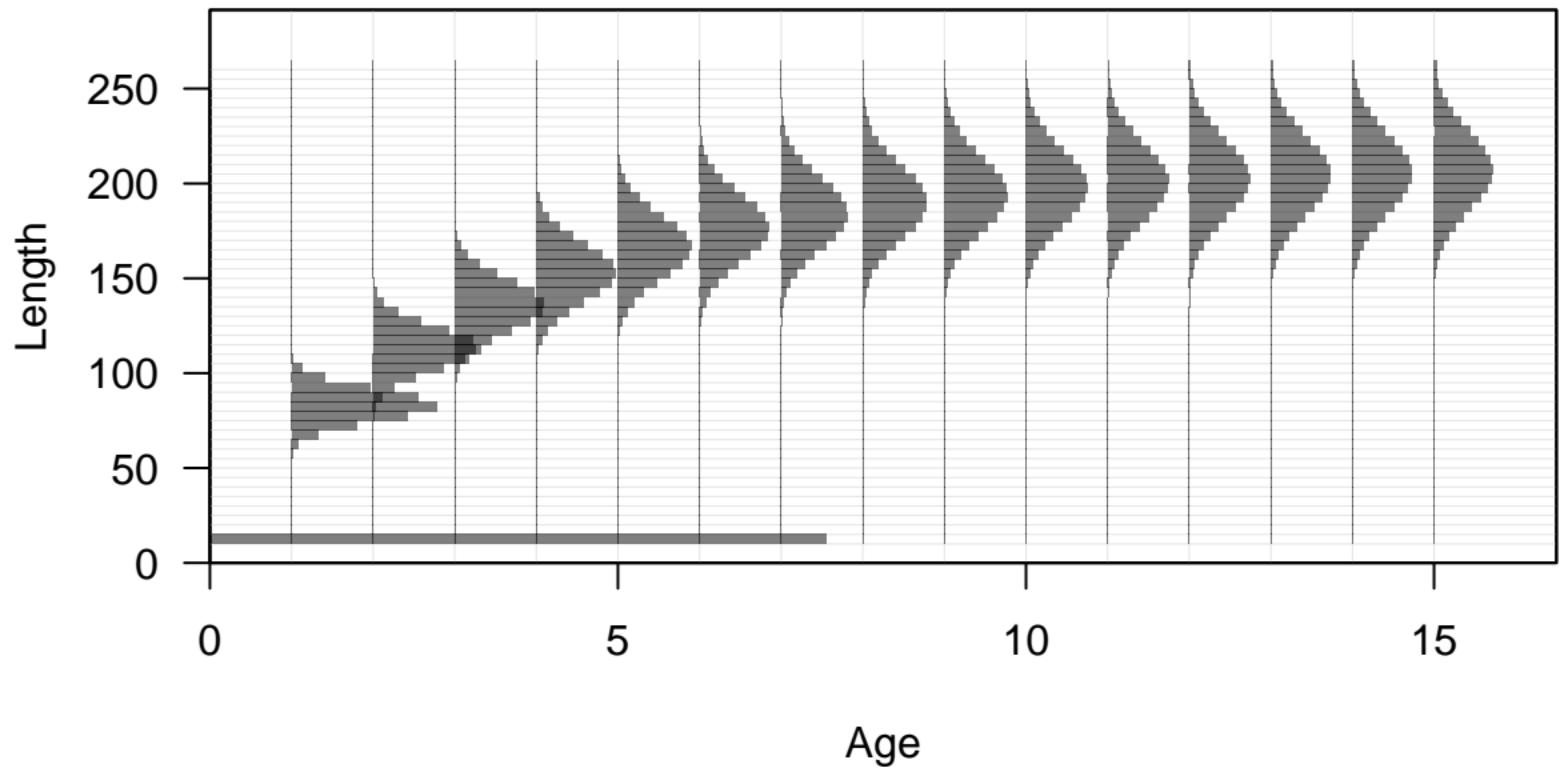
Length (cm, beginning of season 1)

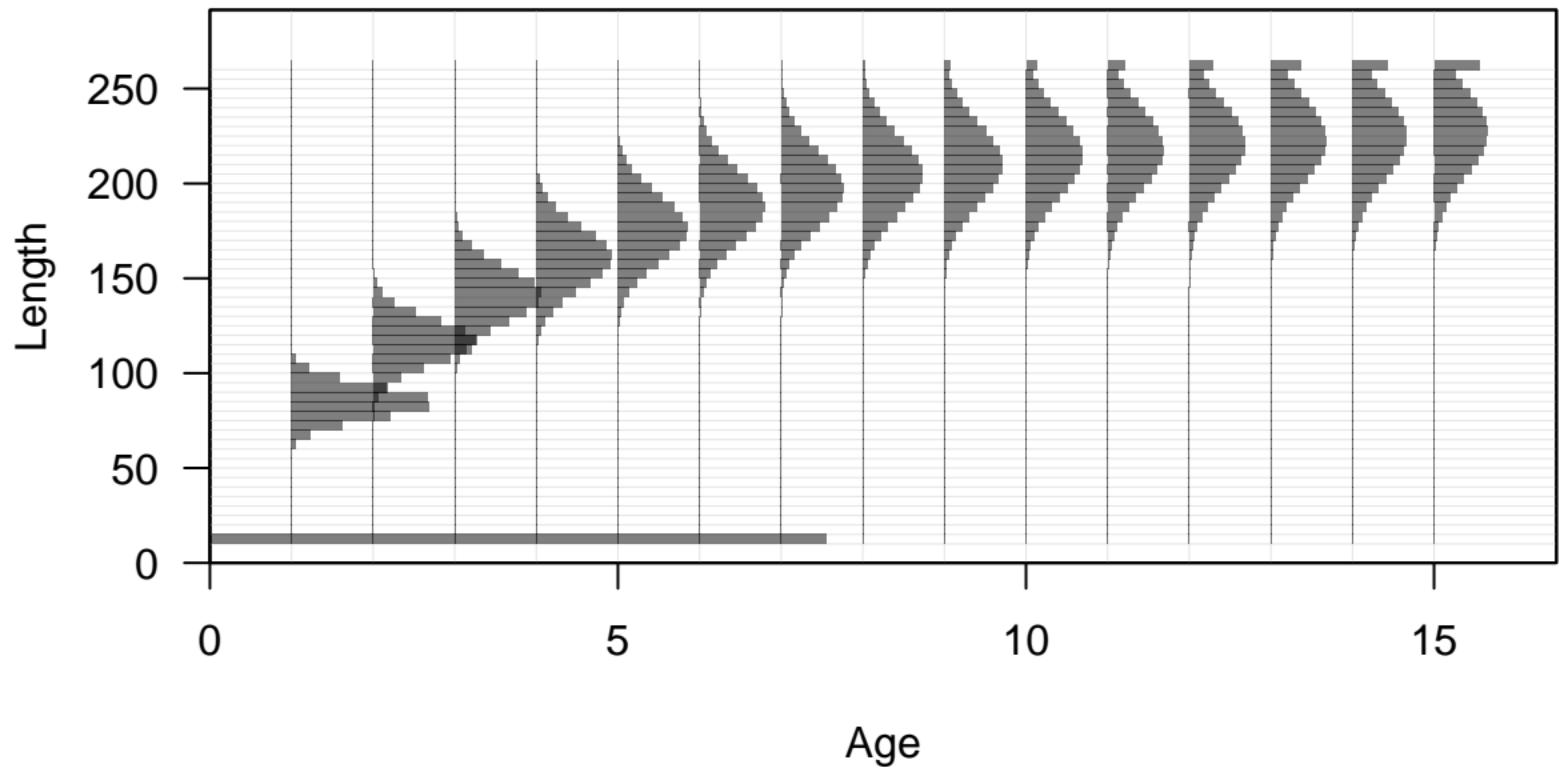


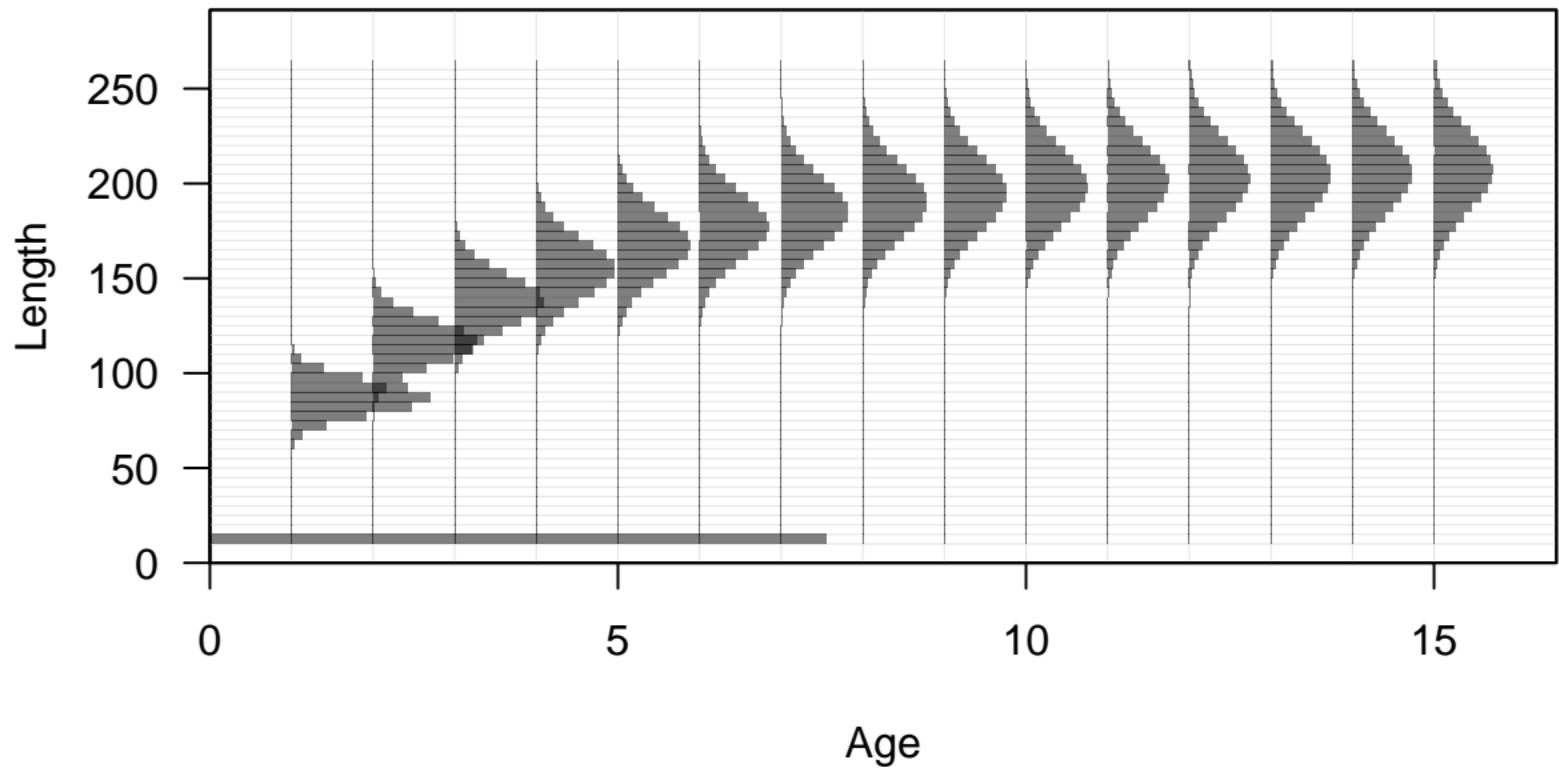


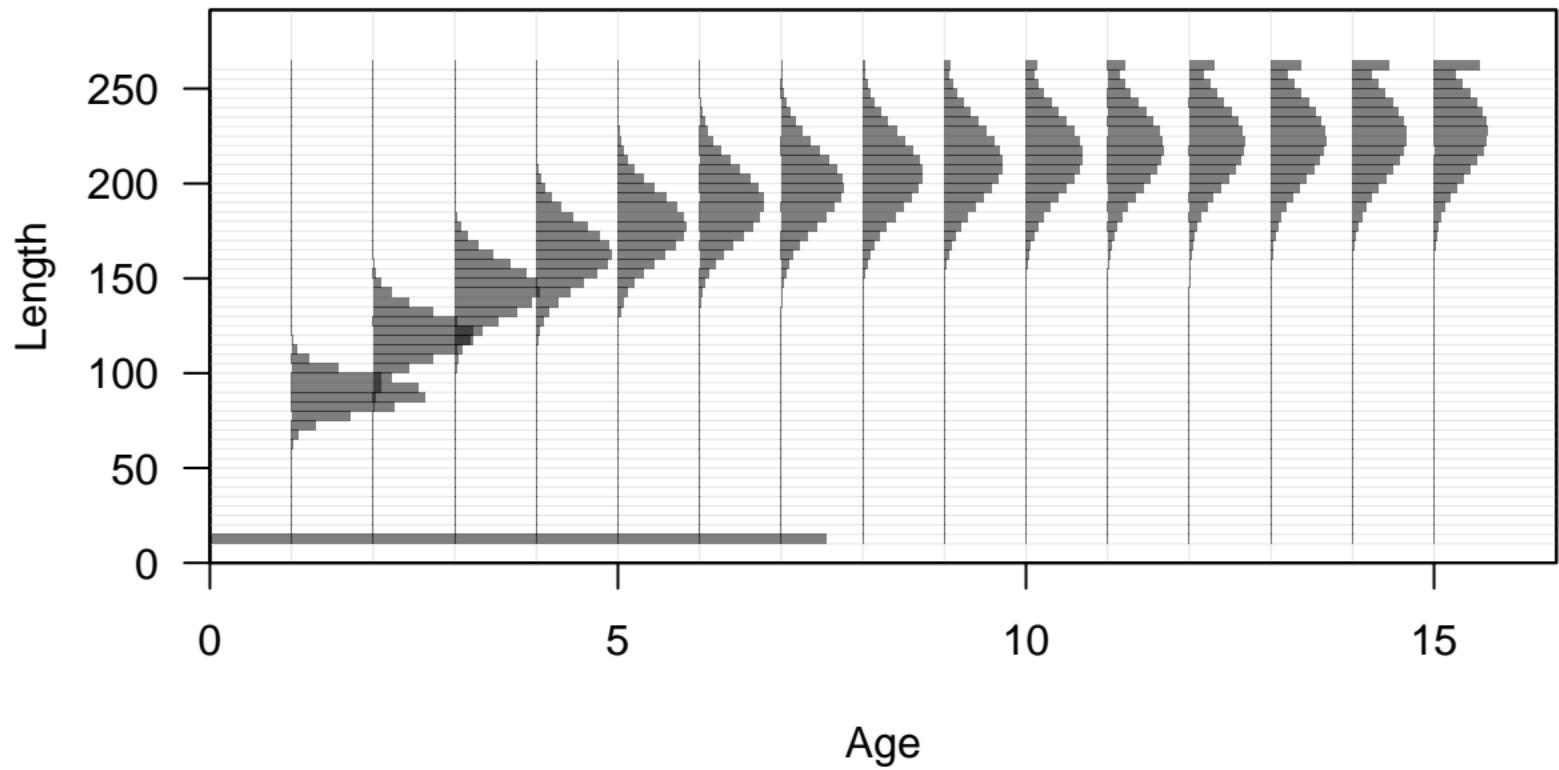


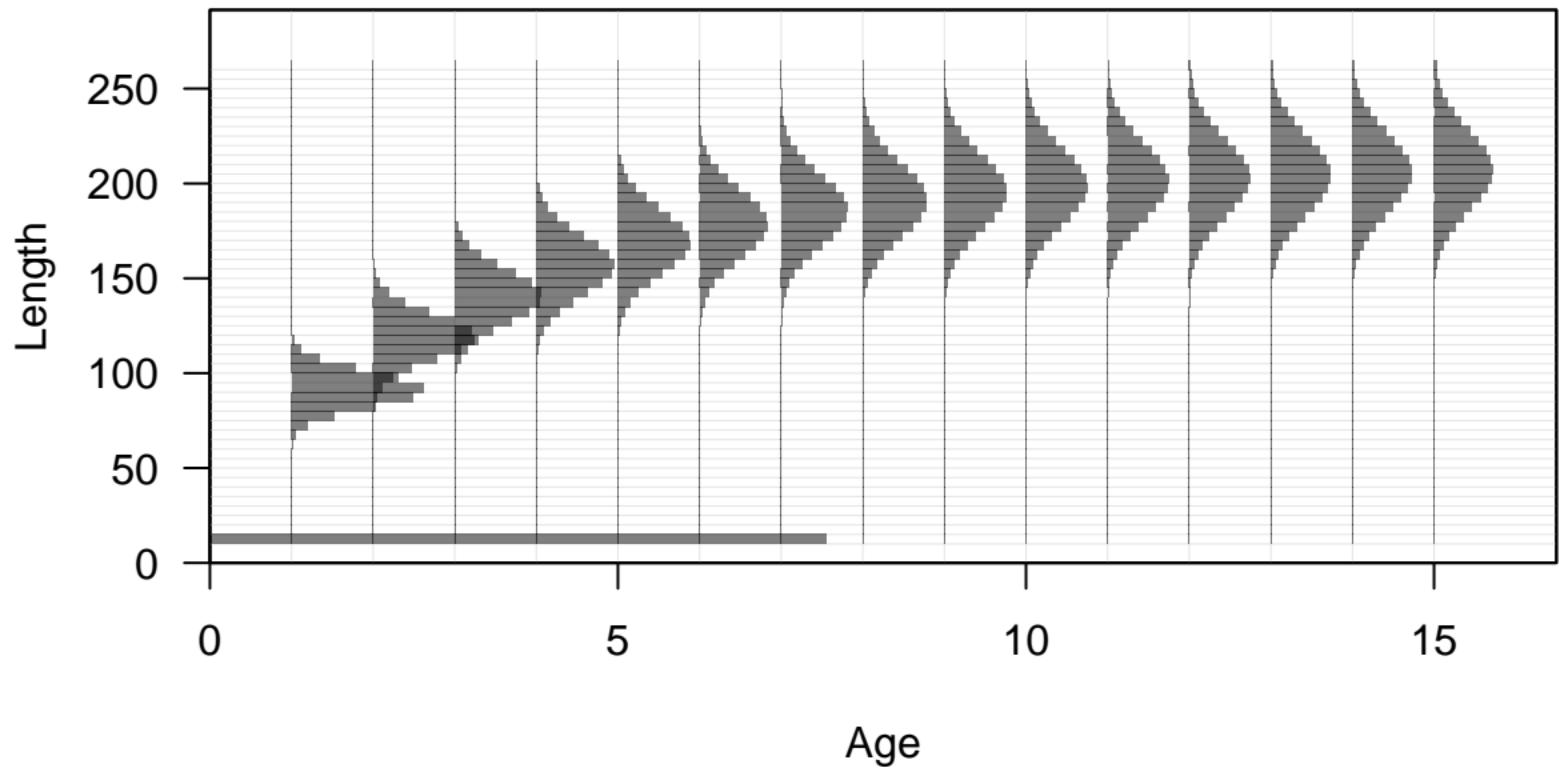


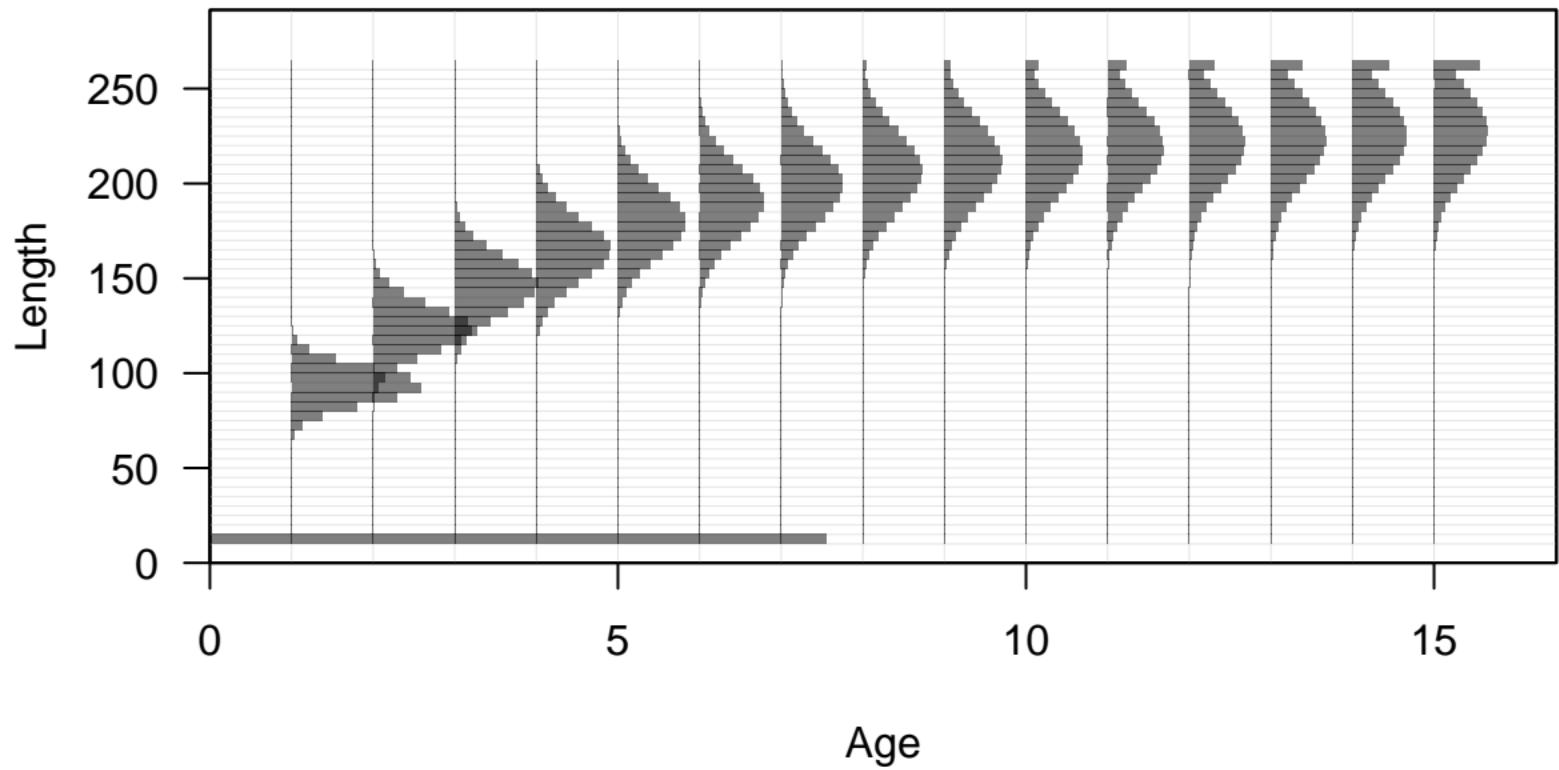


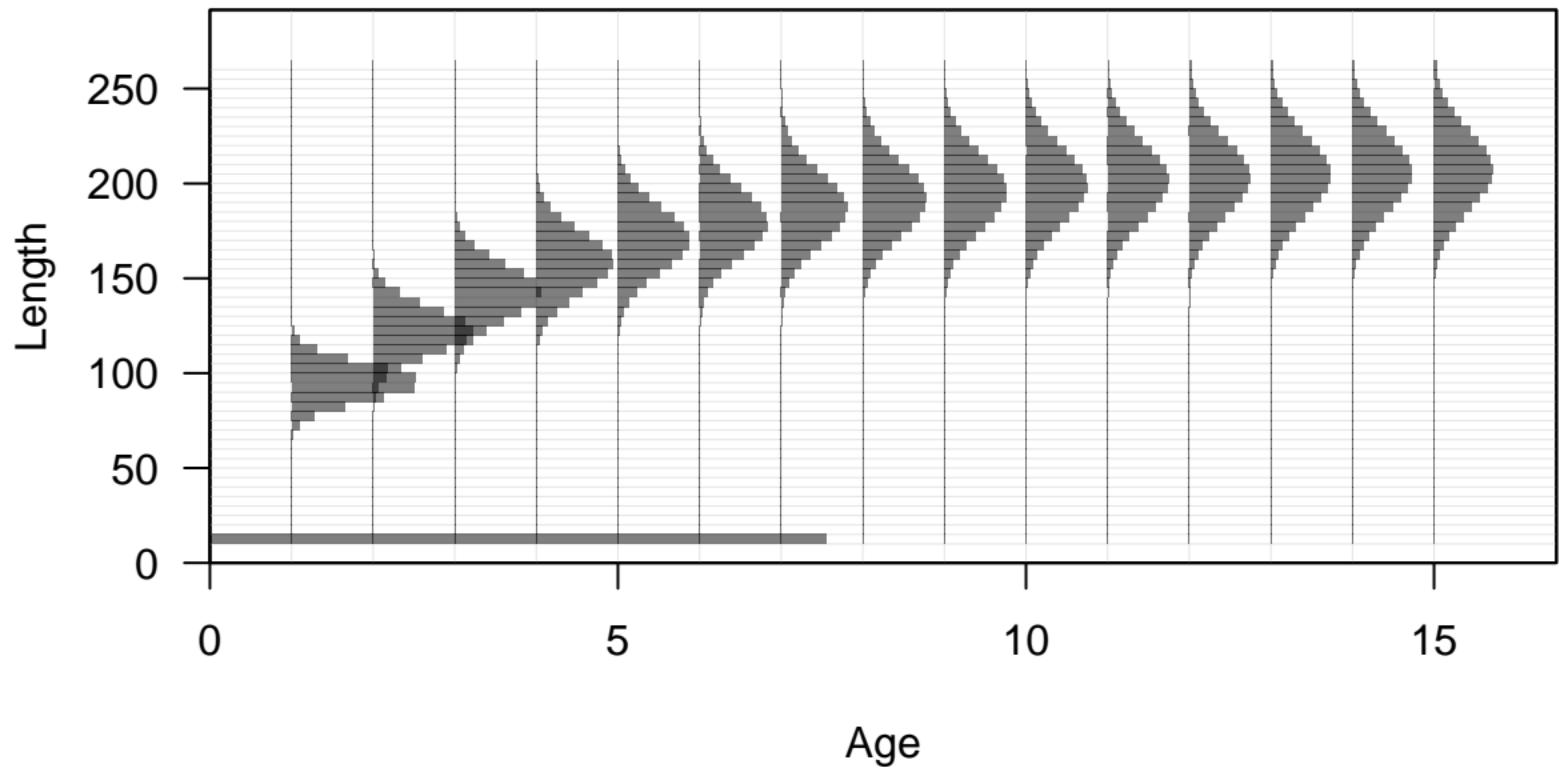


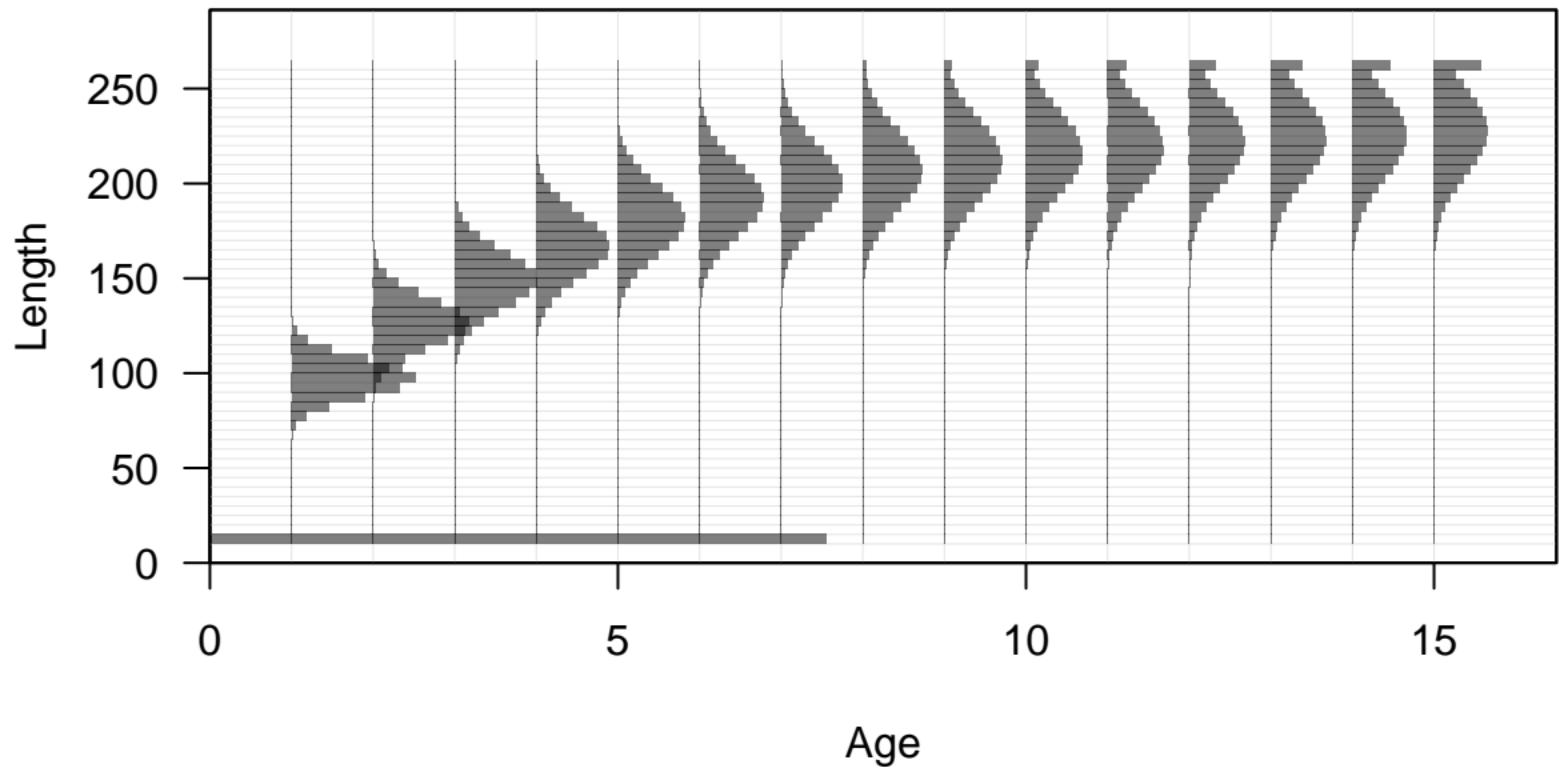


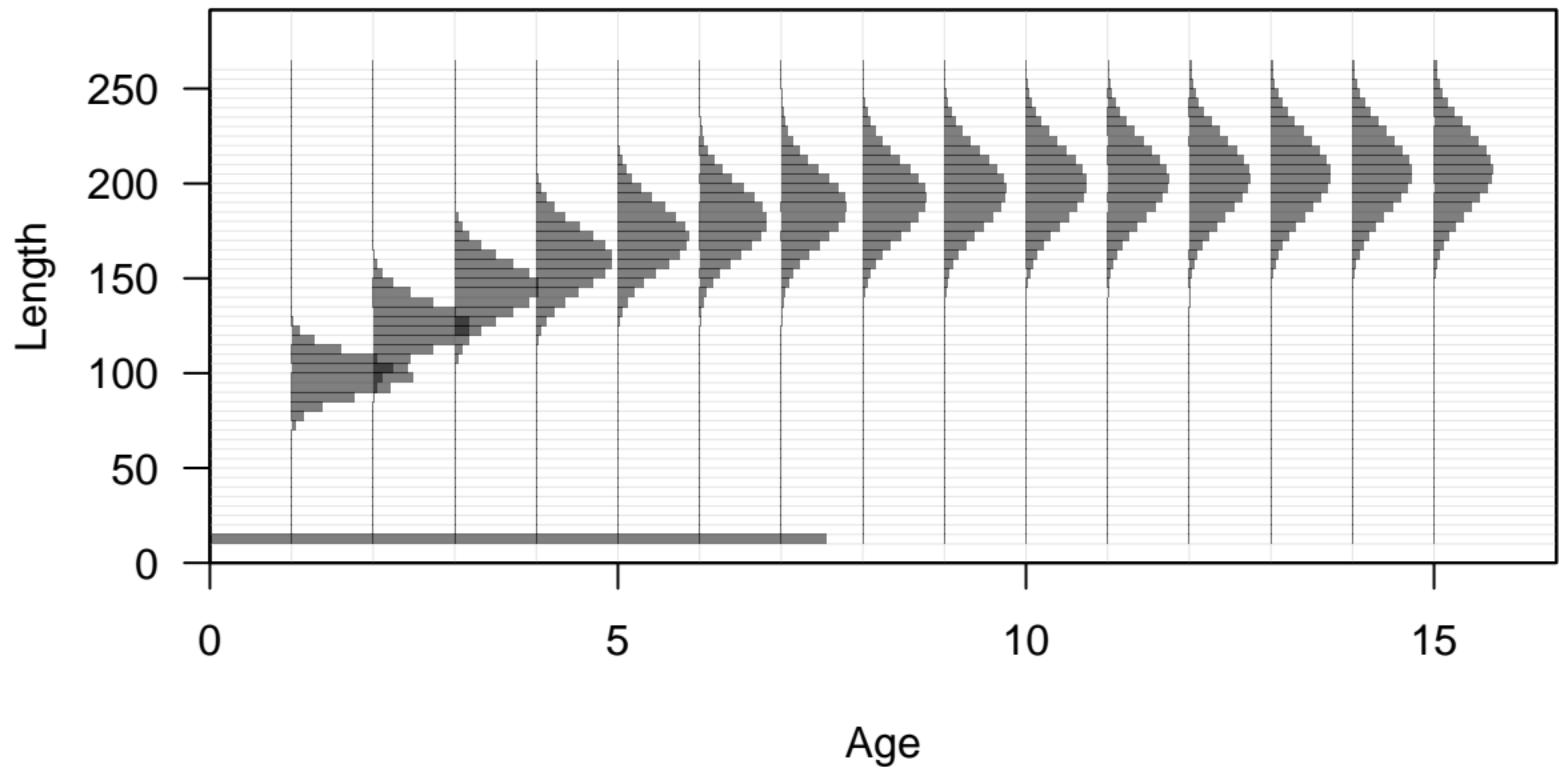


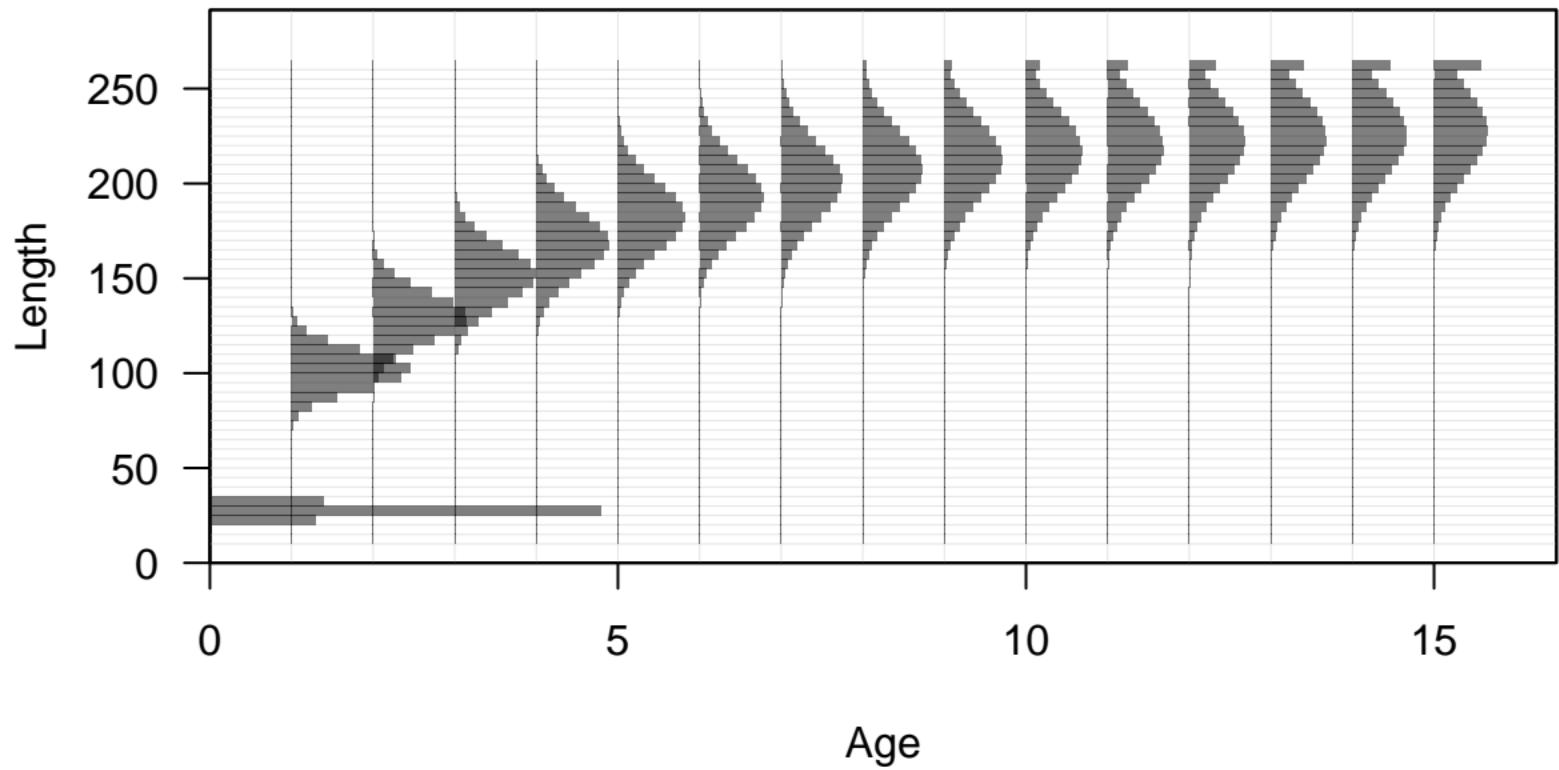


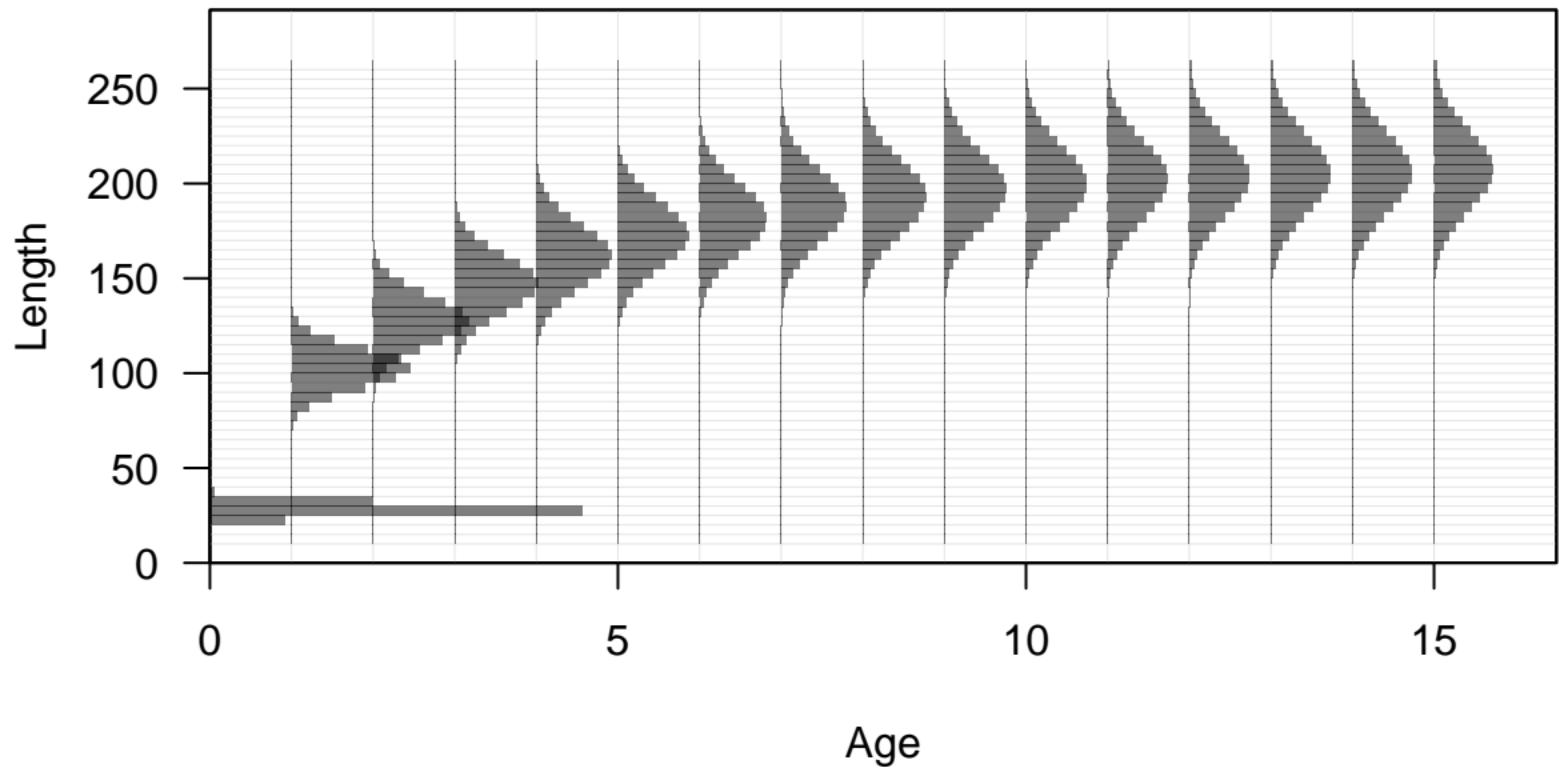


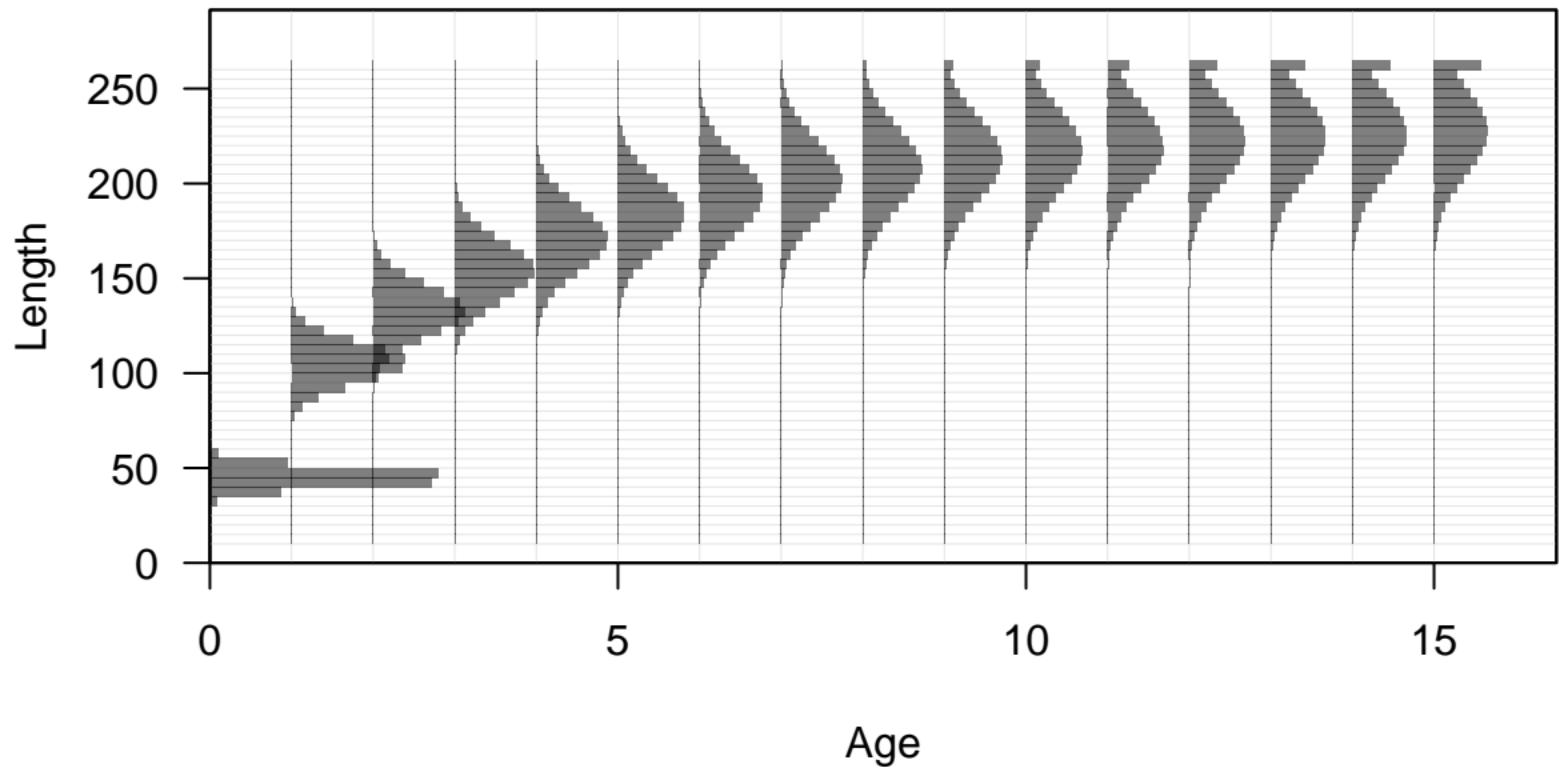


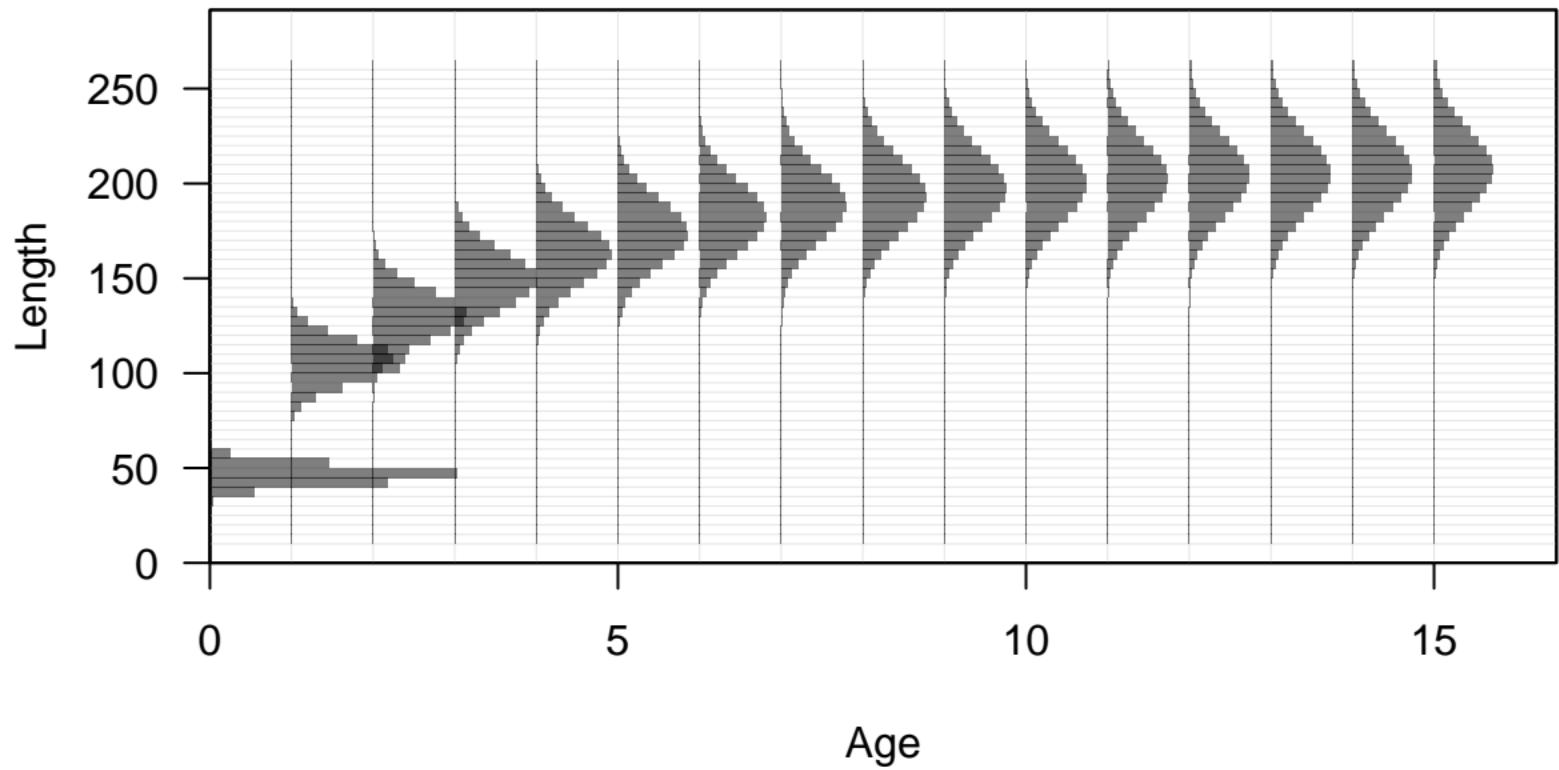


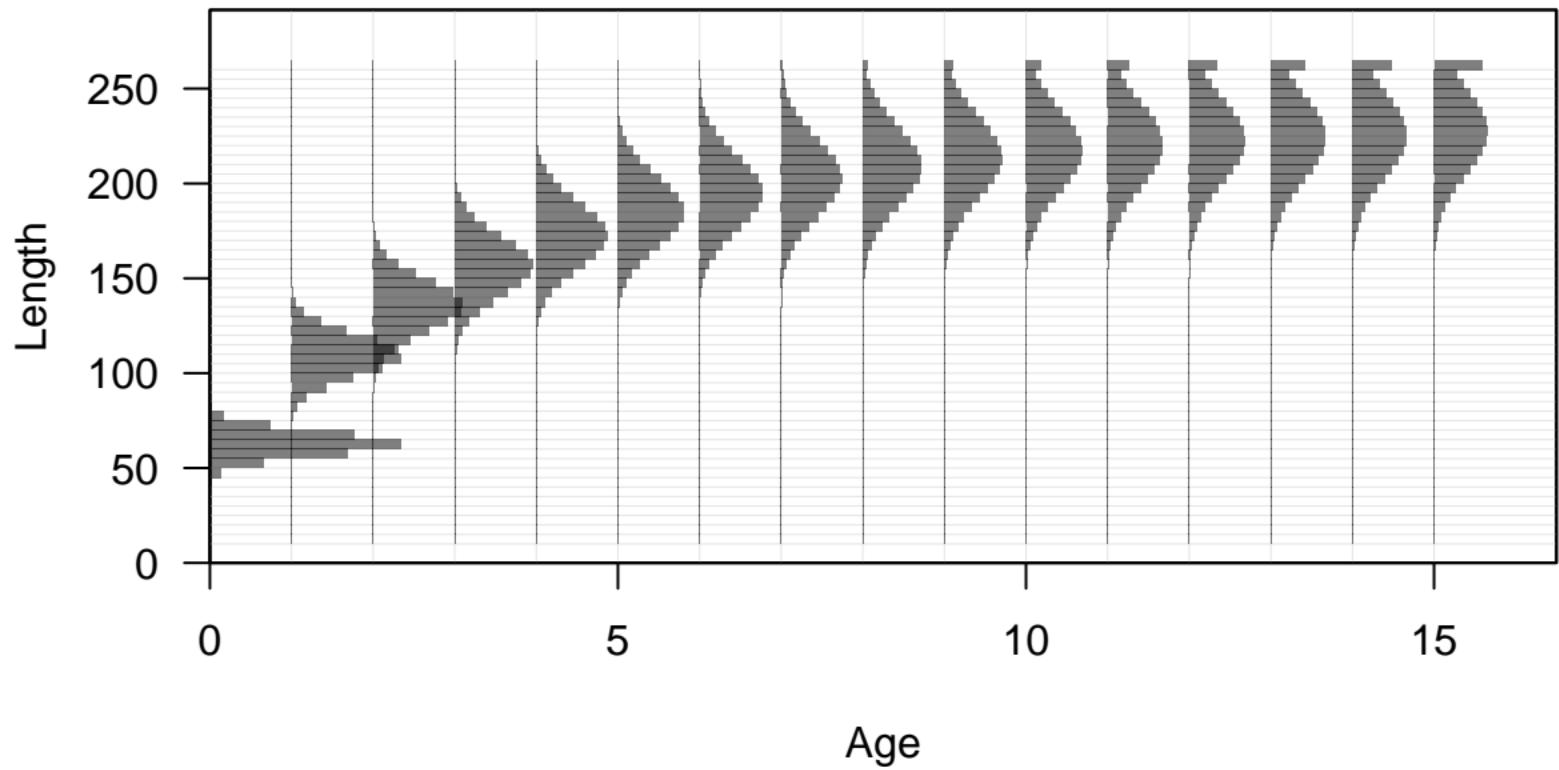


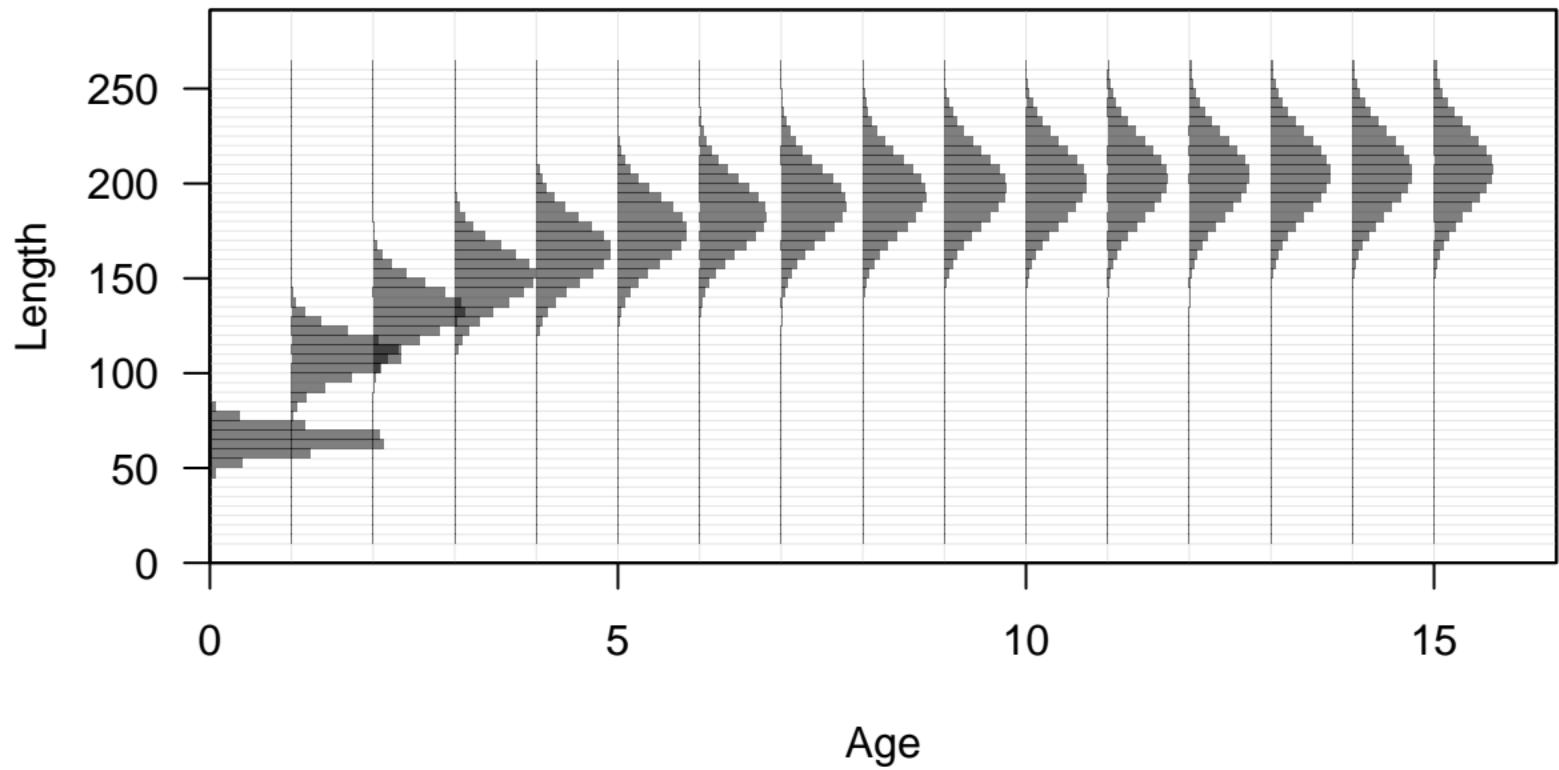


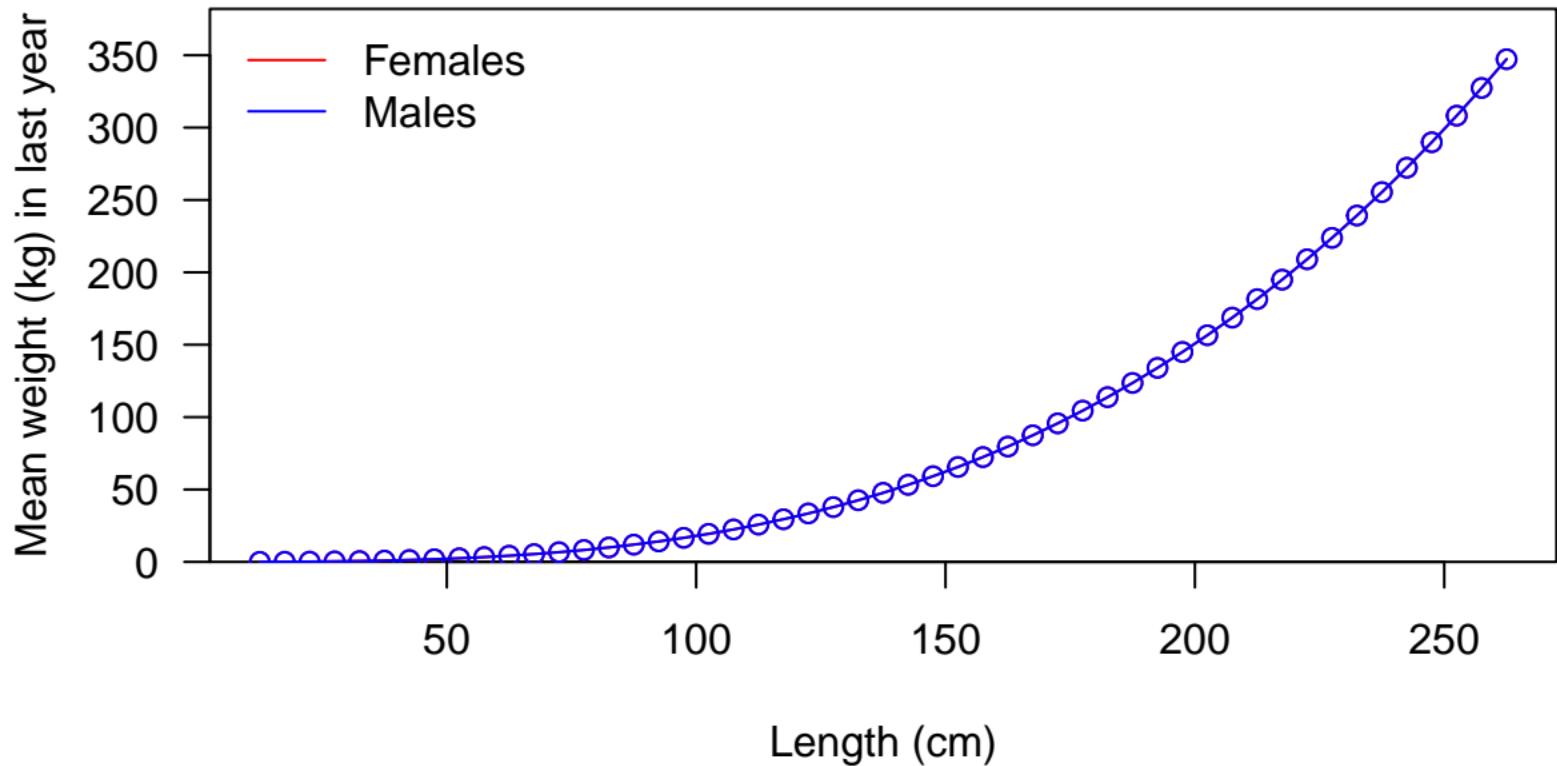


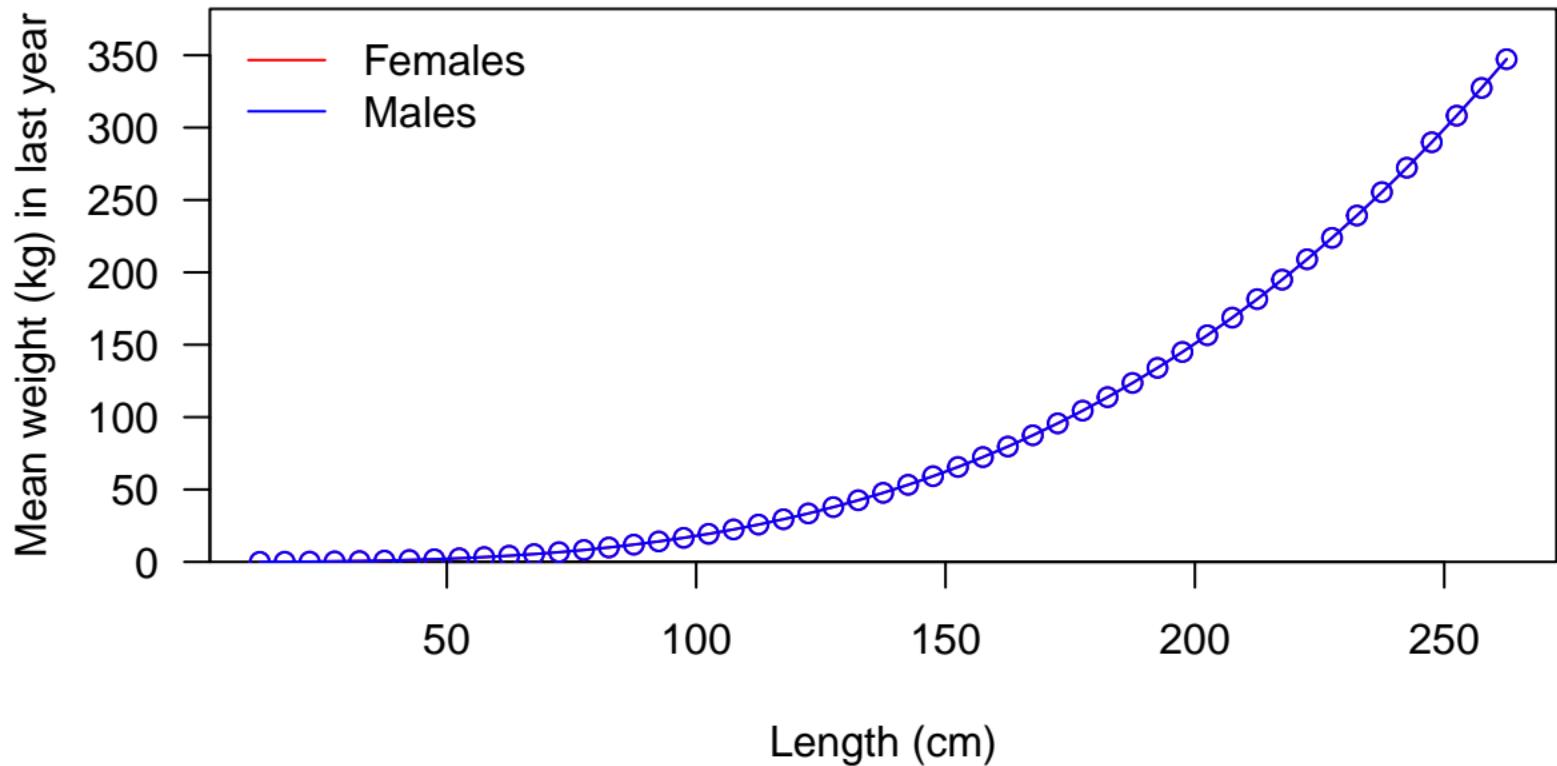


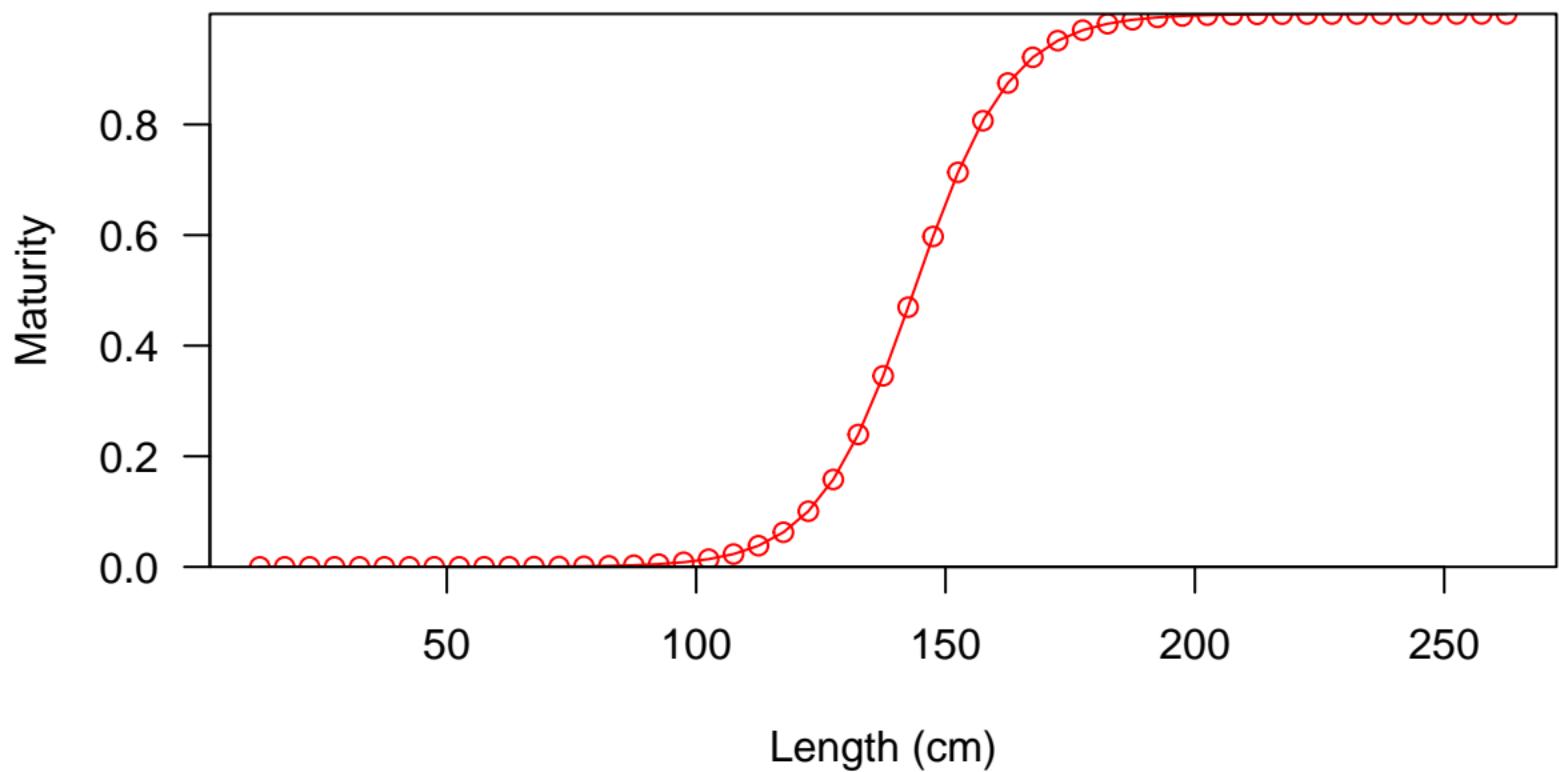


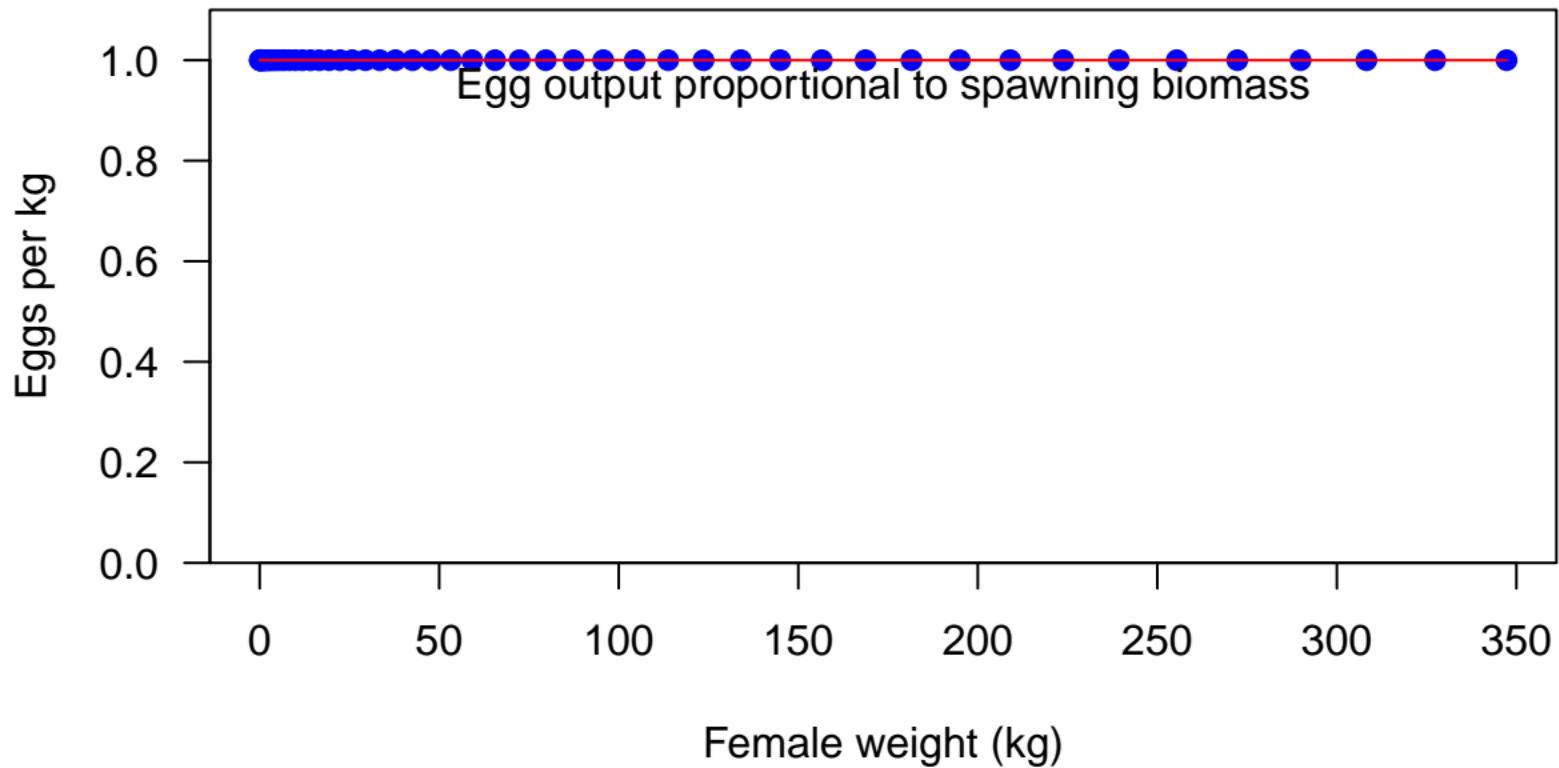


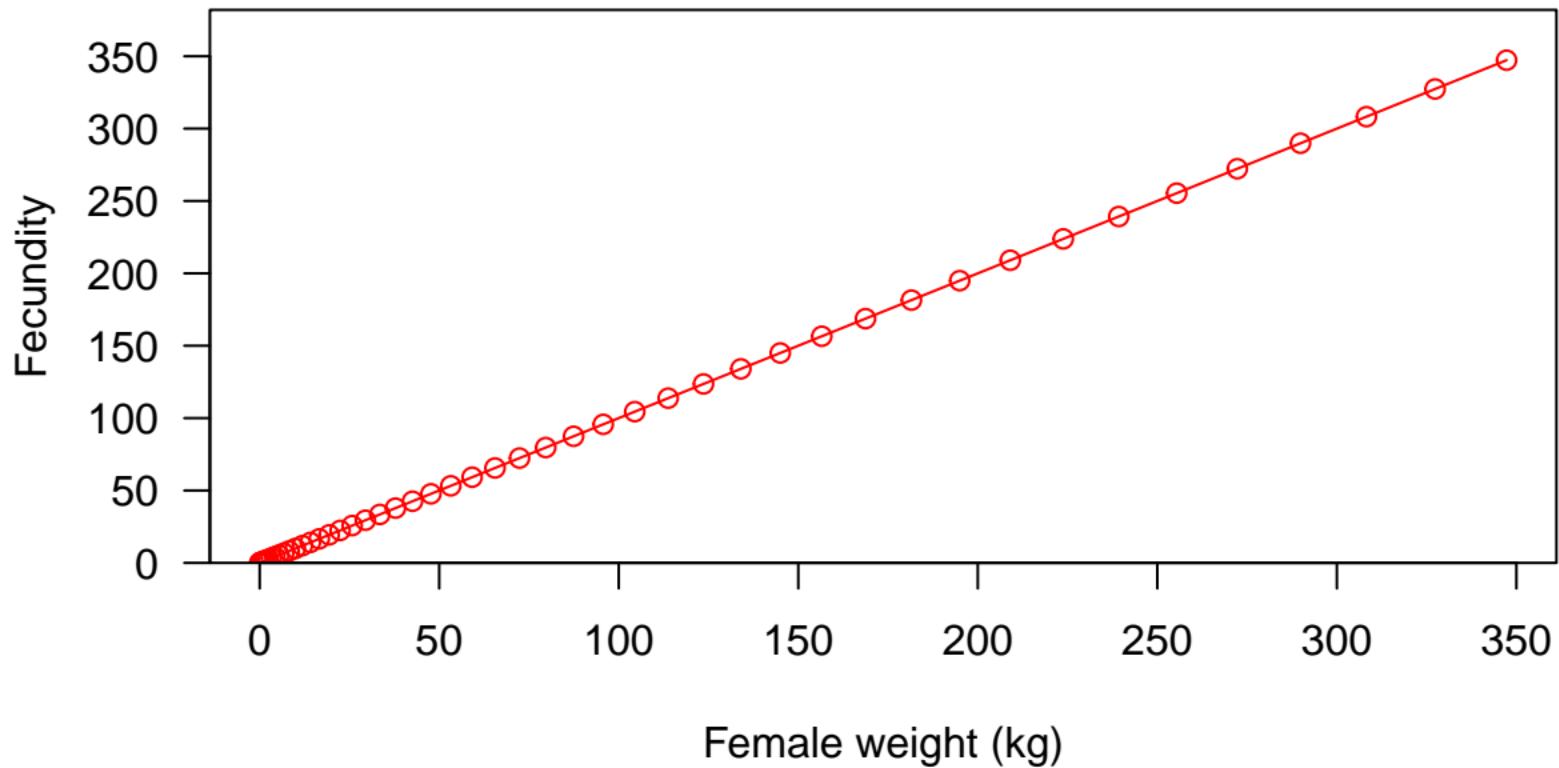


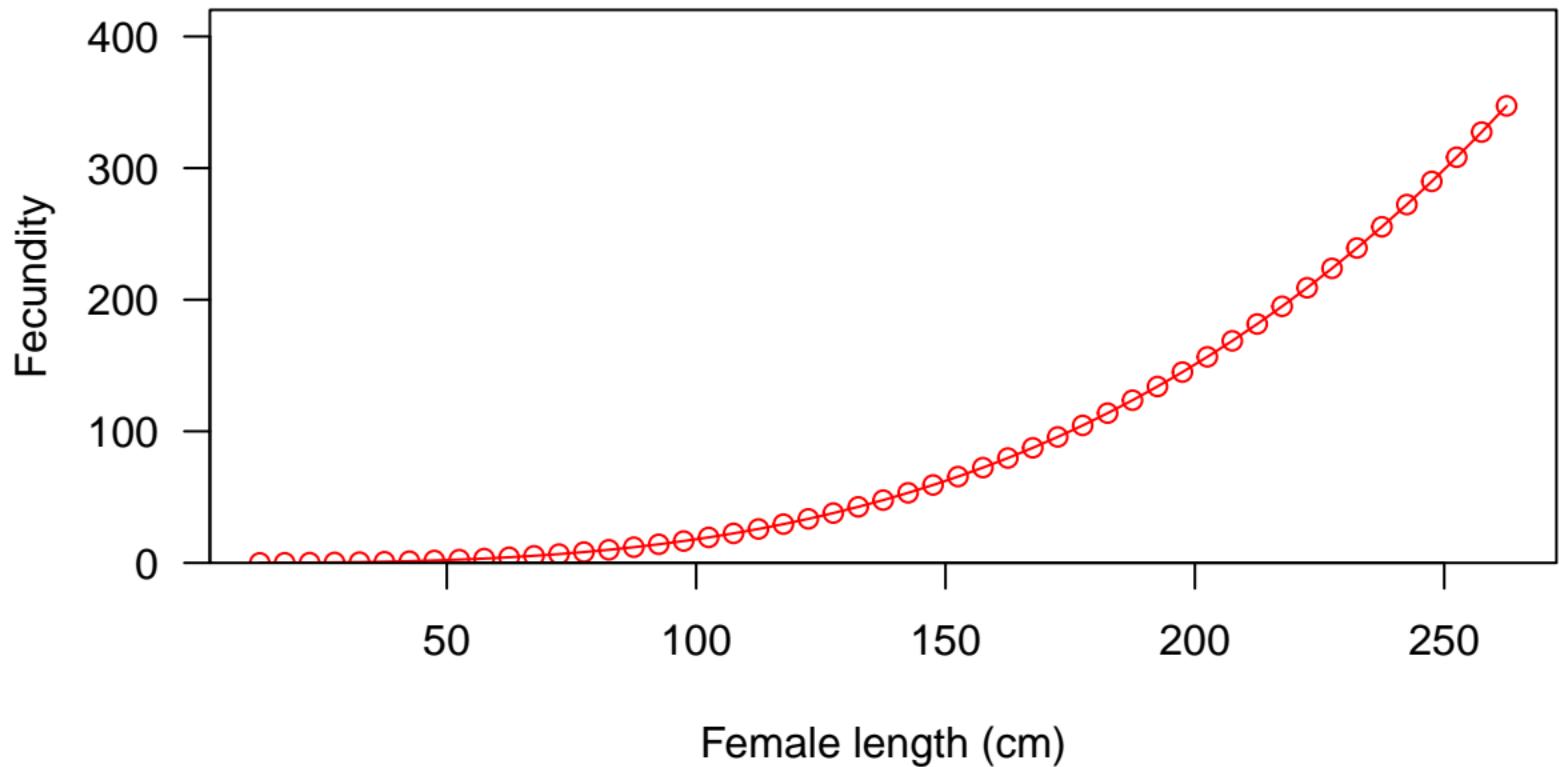


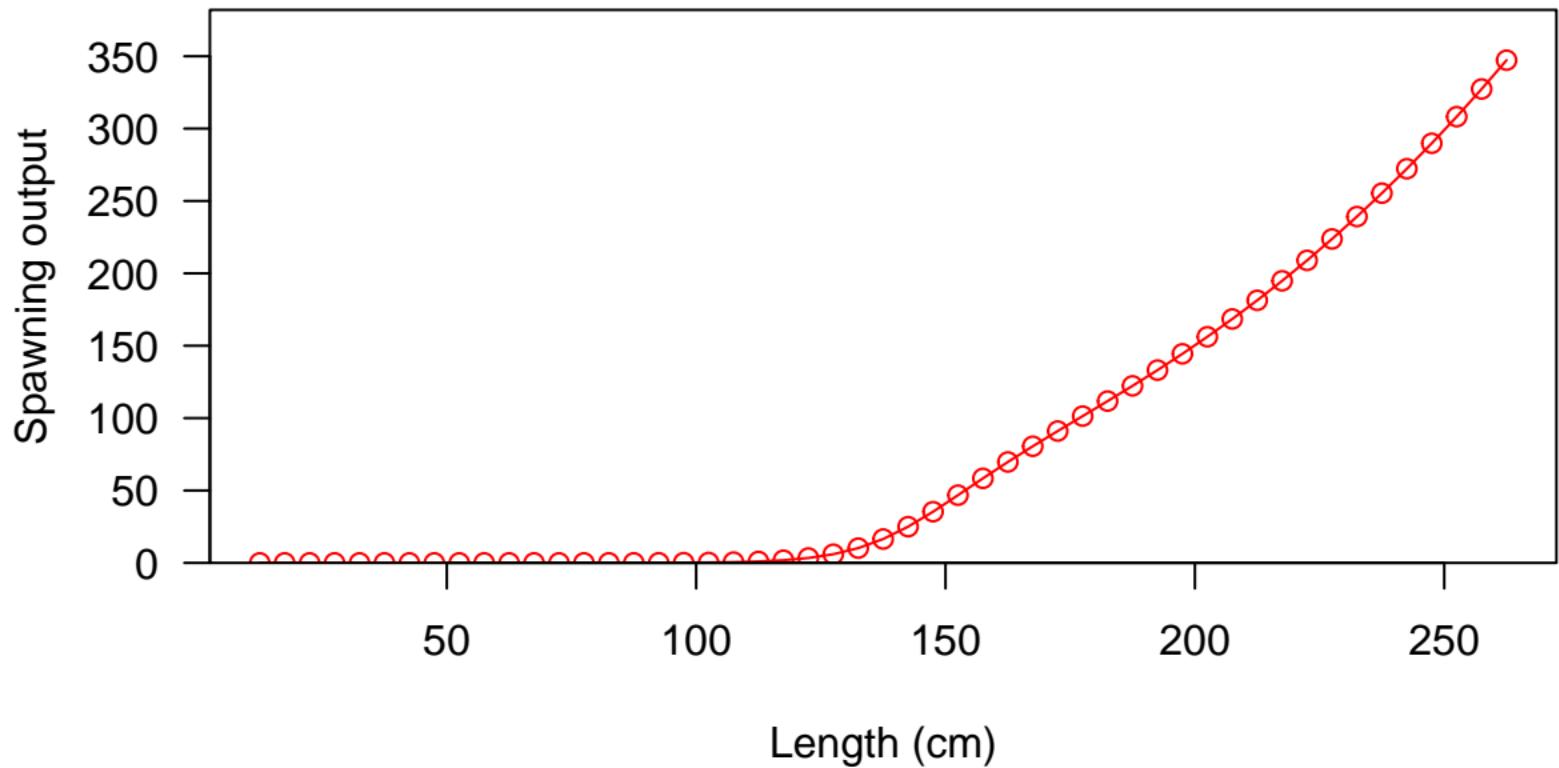


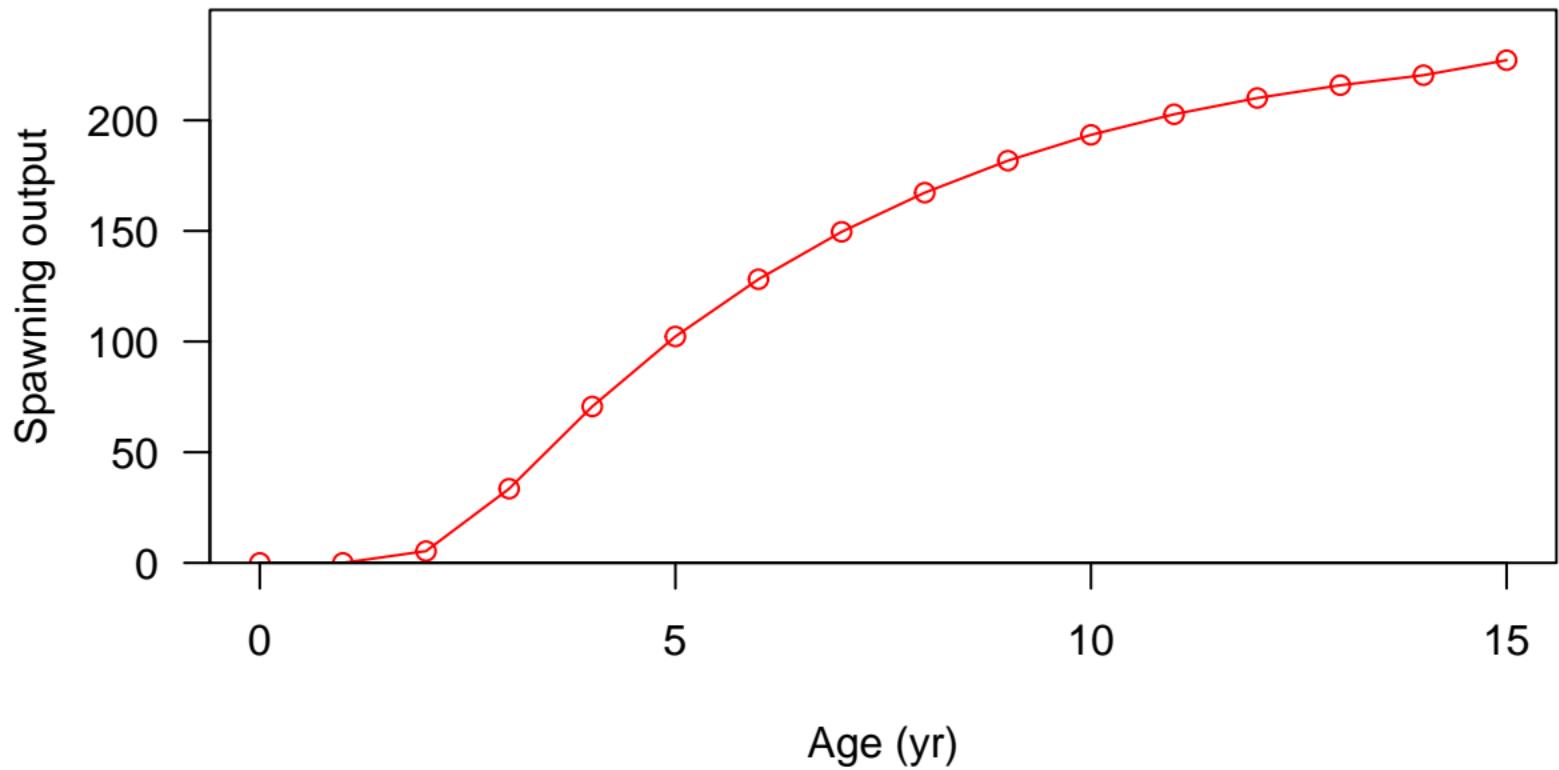


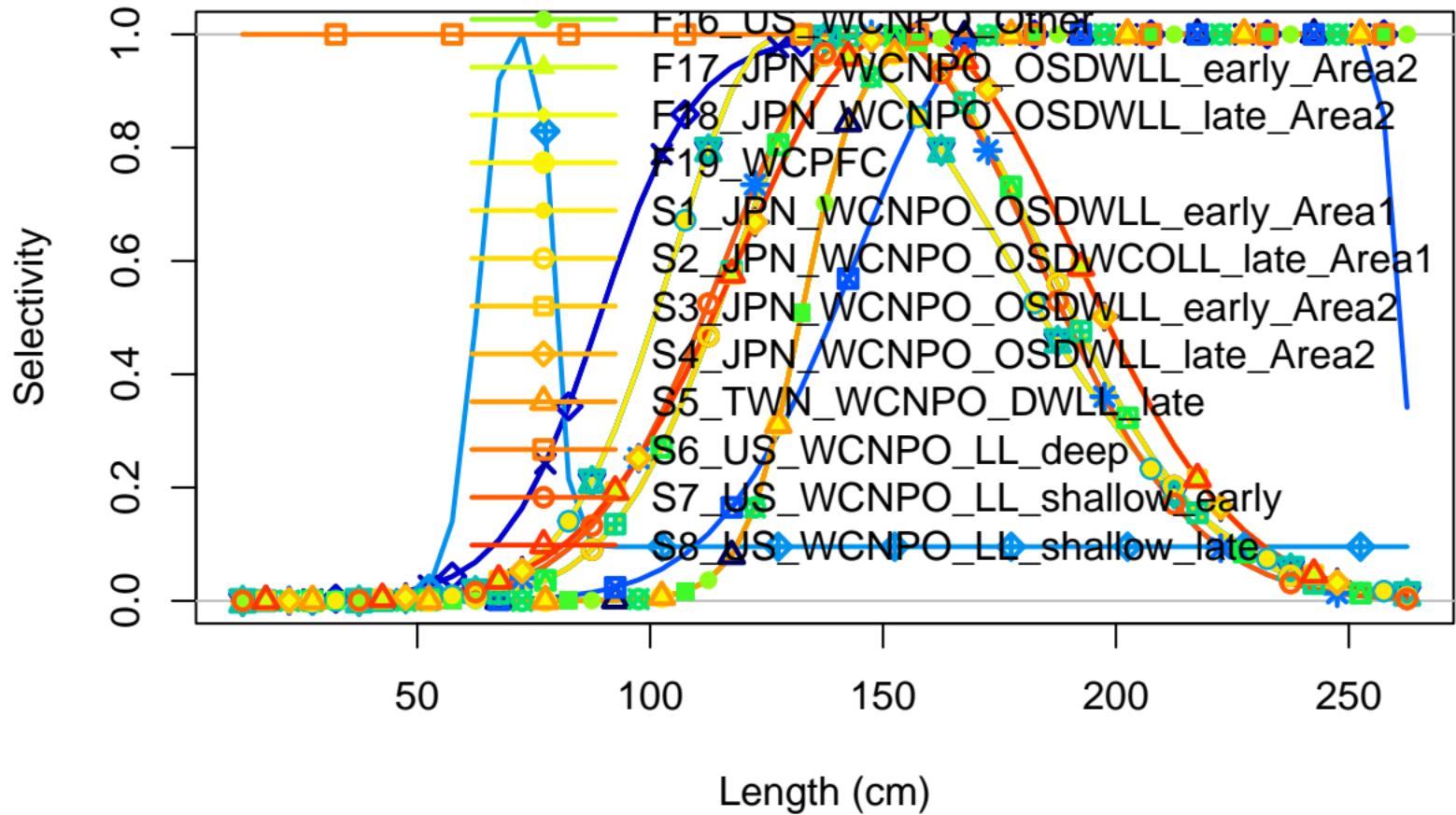


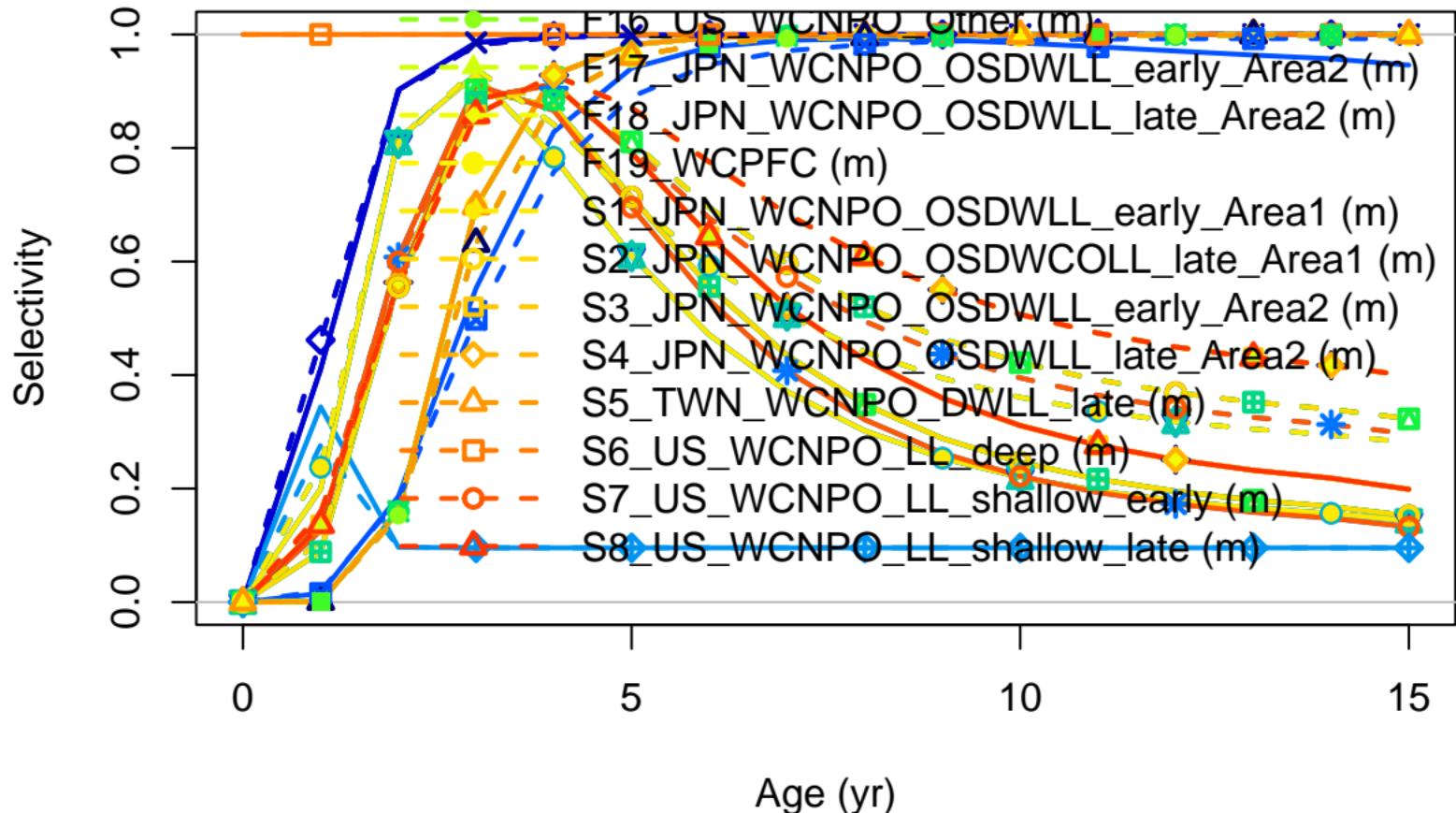


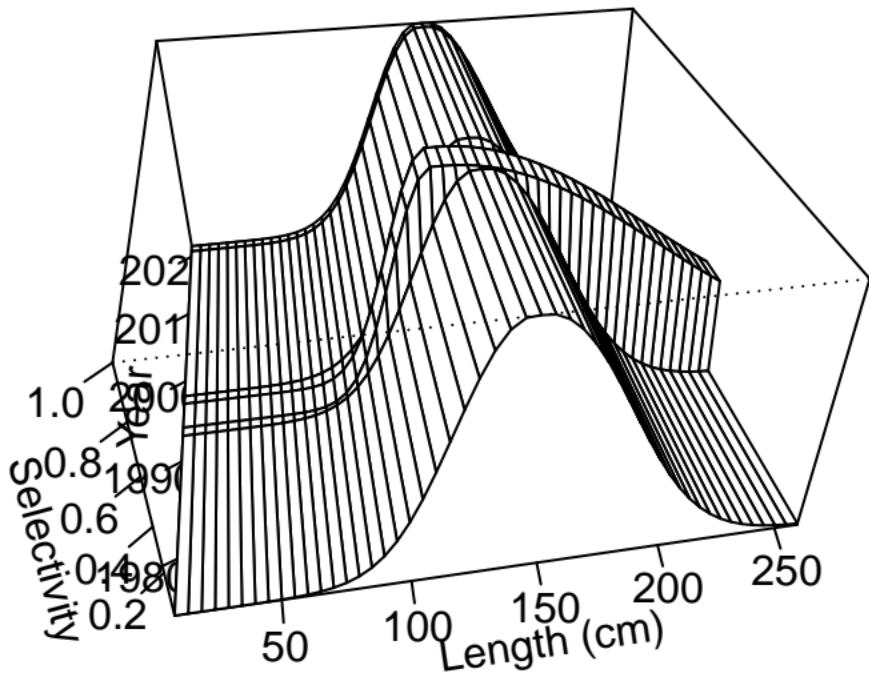




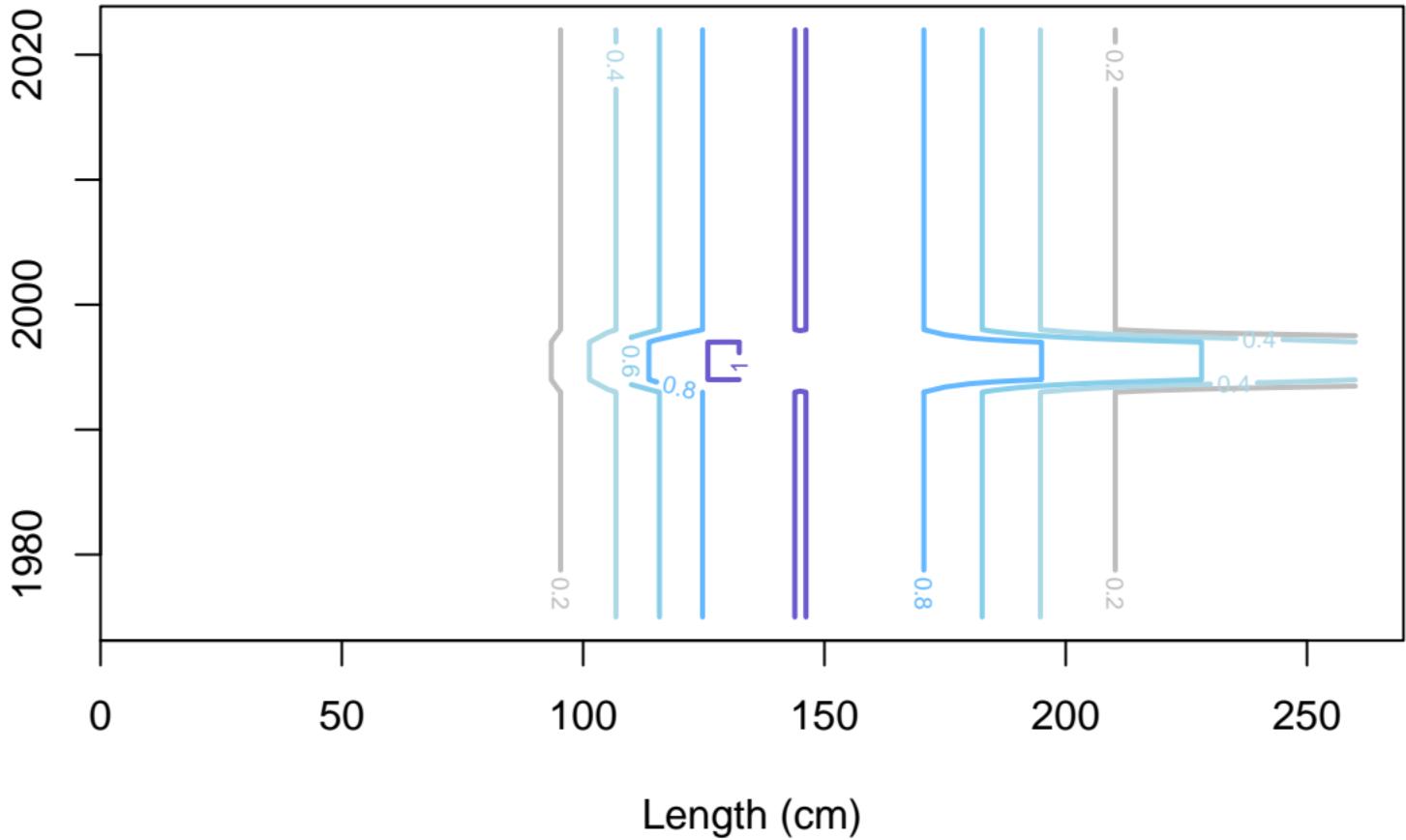


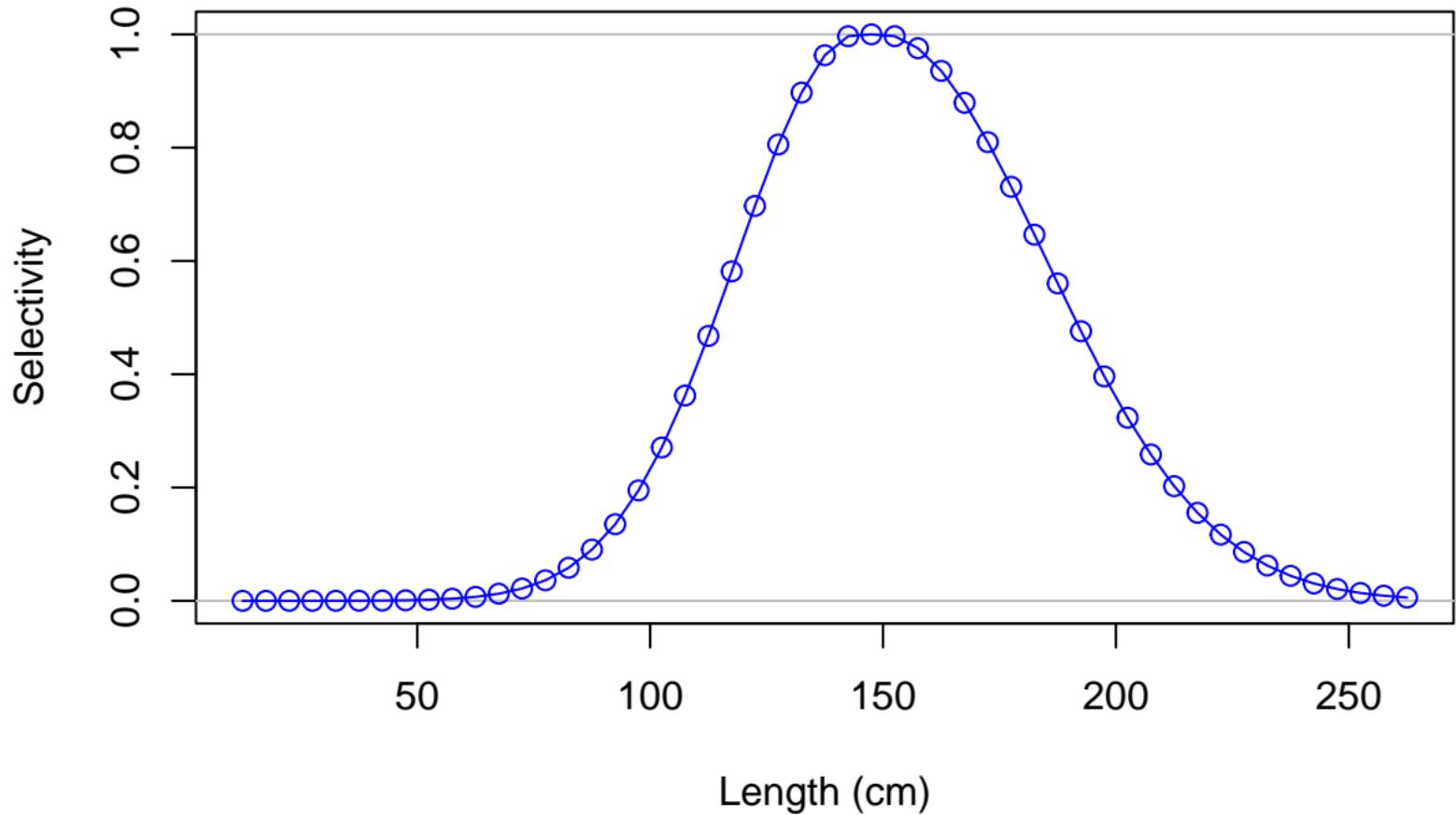


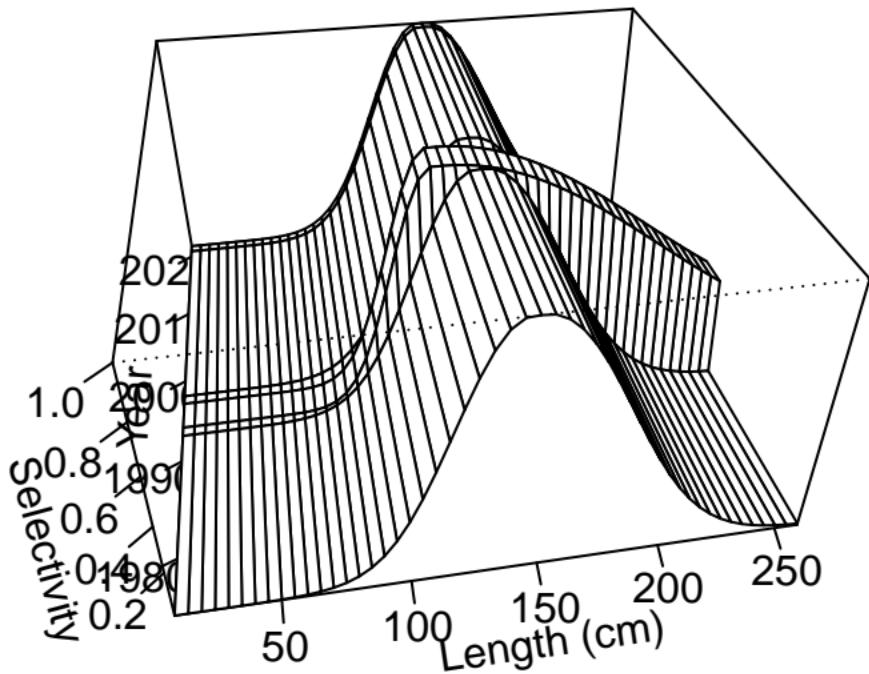




Year







Year

2020

2000

1980

0

50

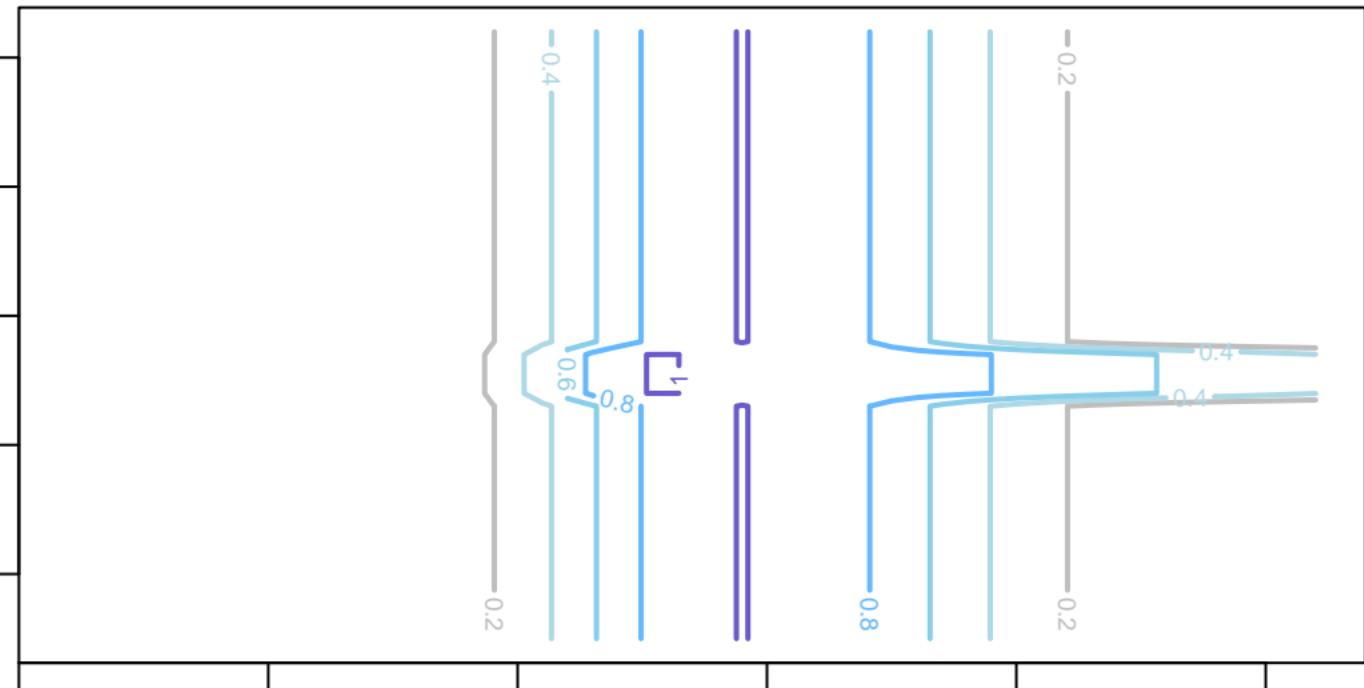
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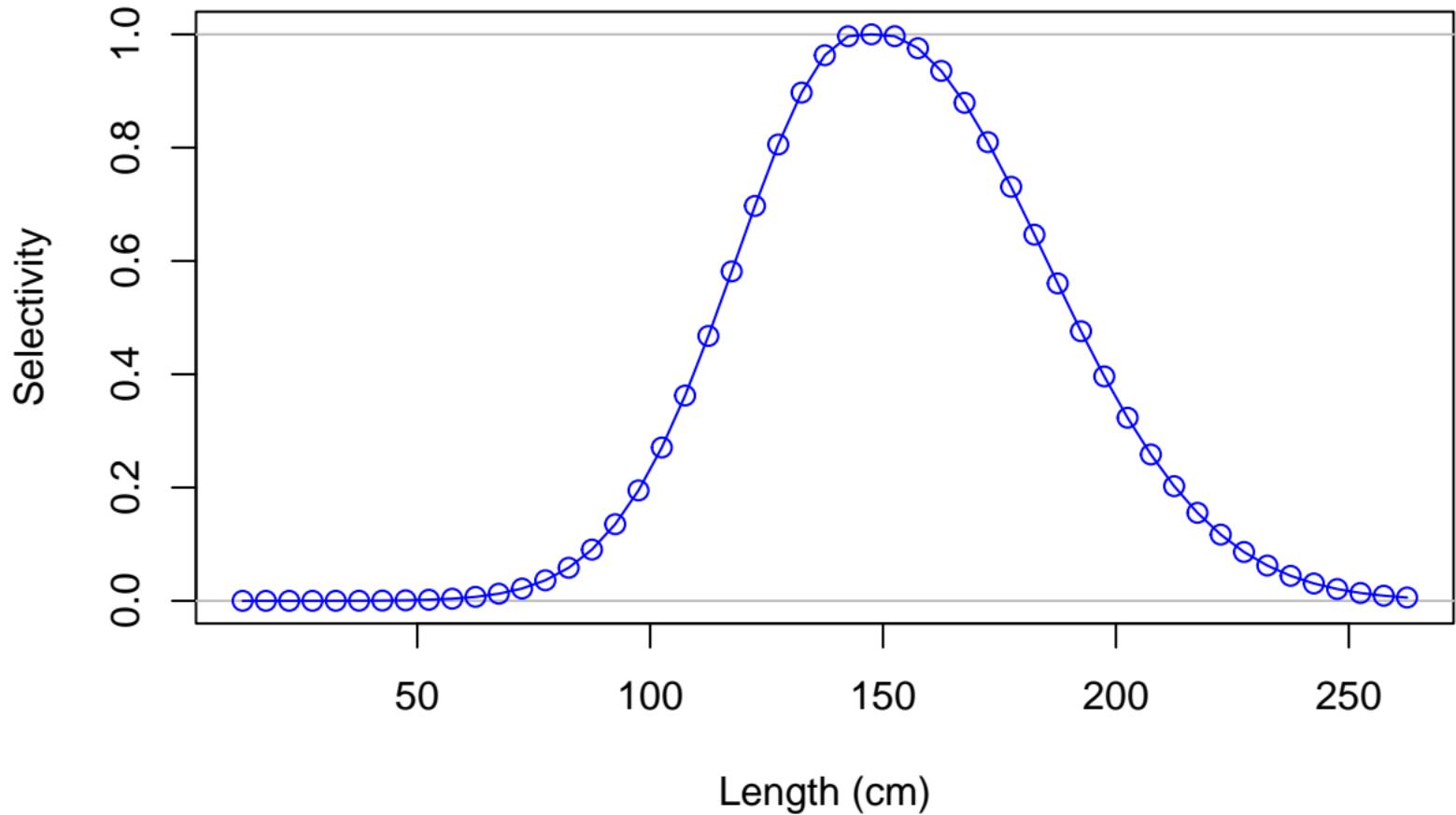
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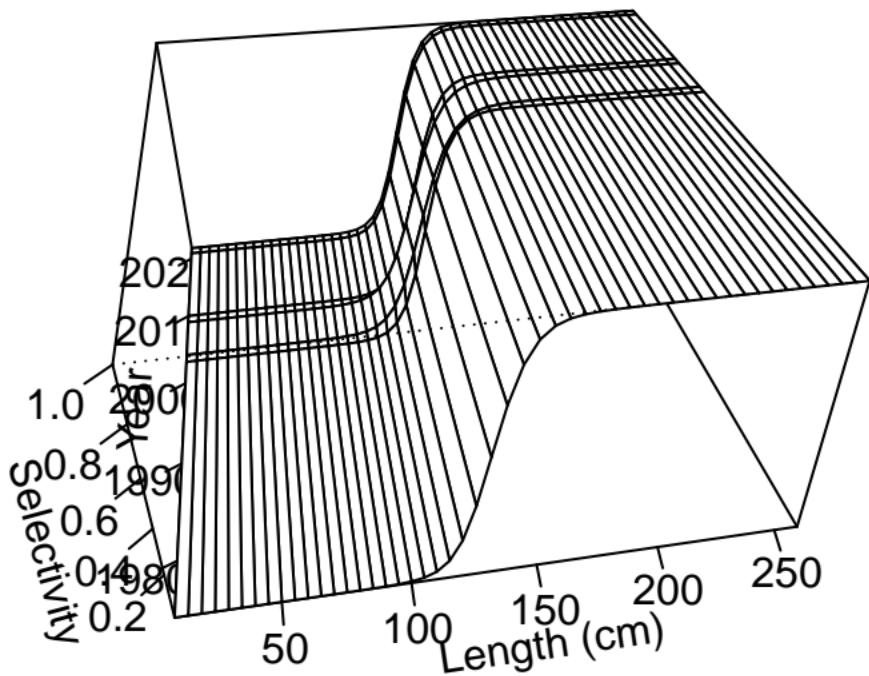
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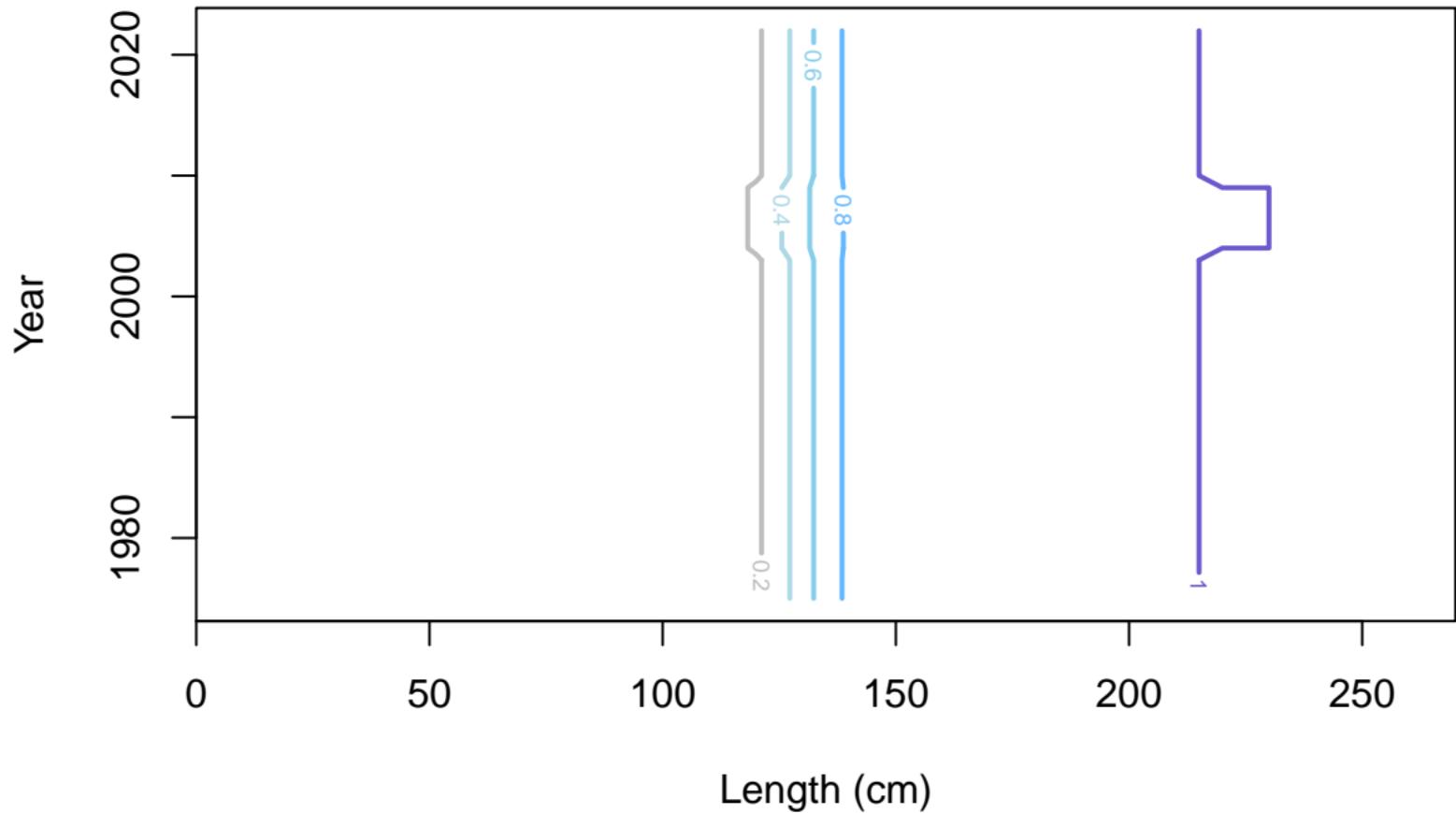
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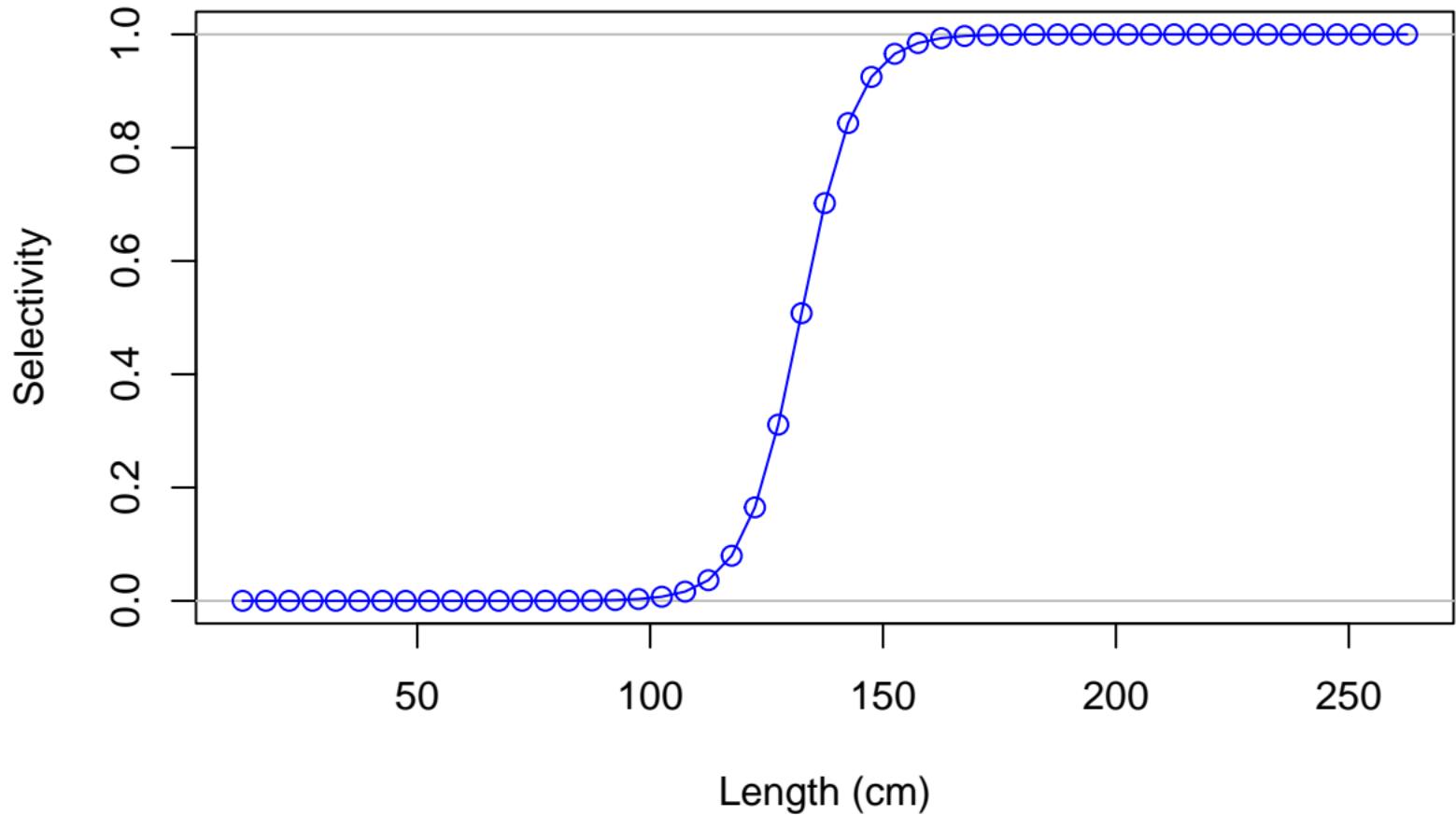
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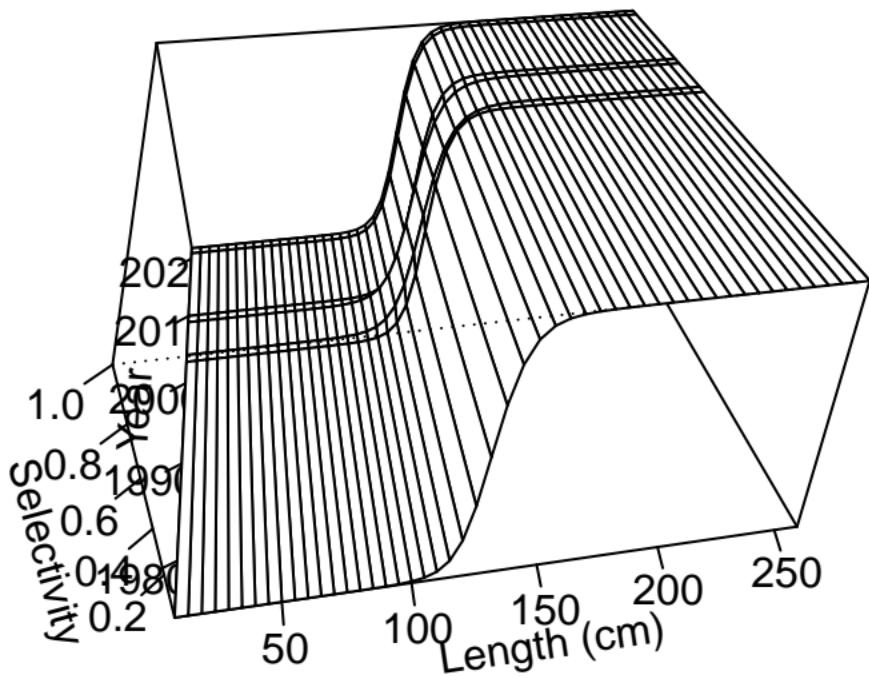


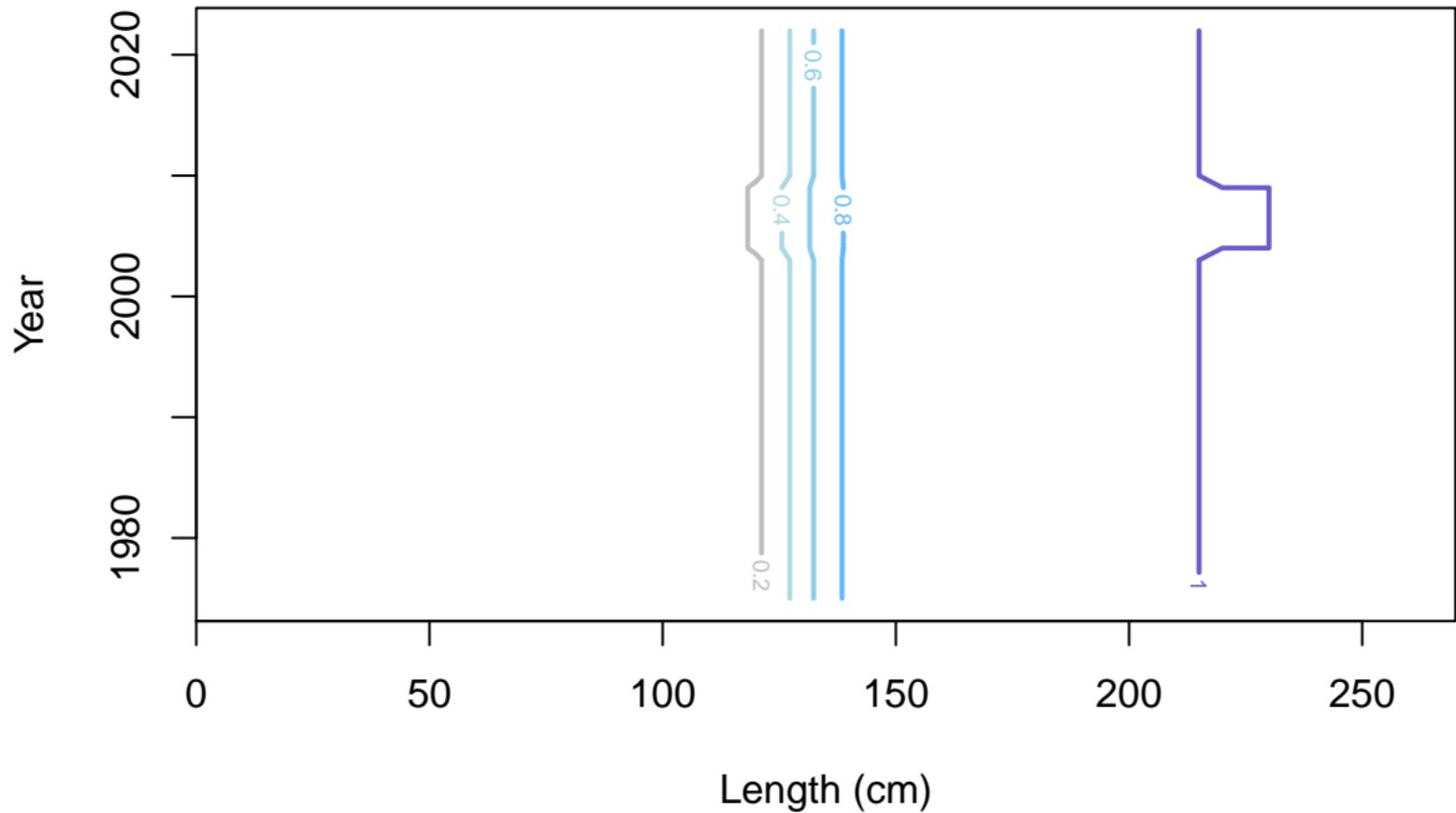


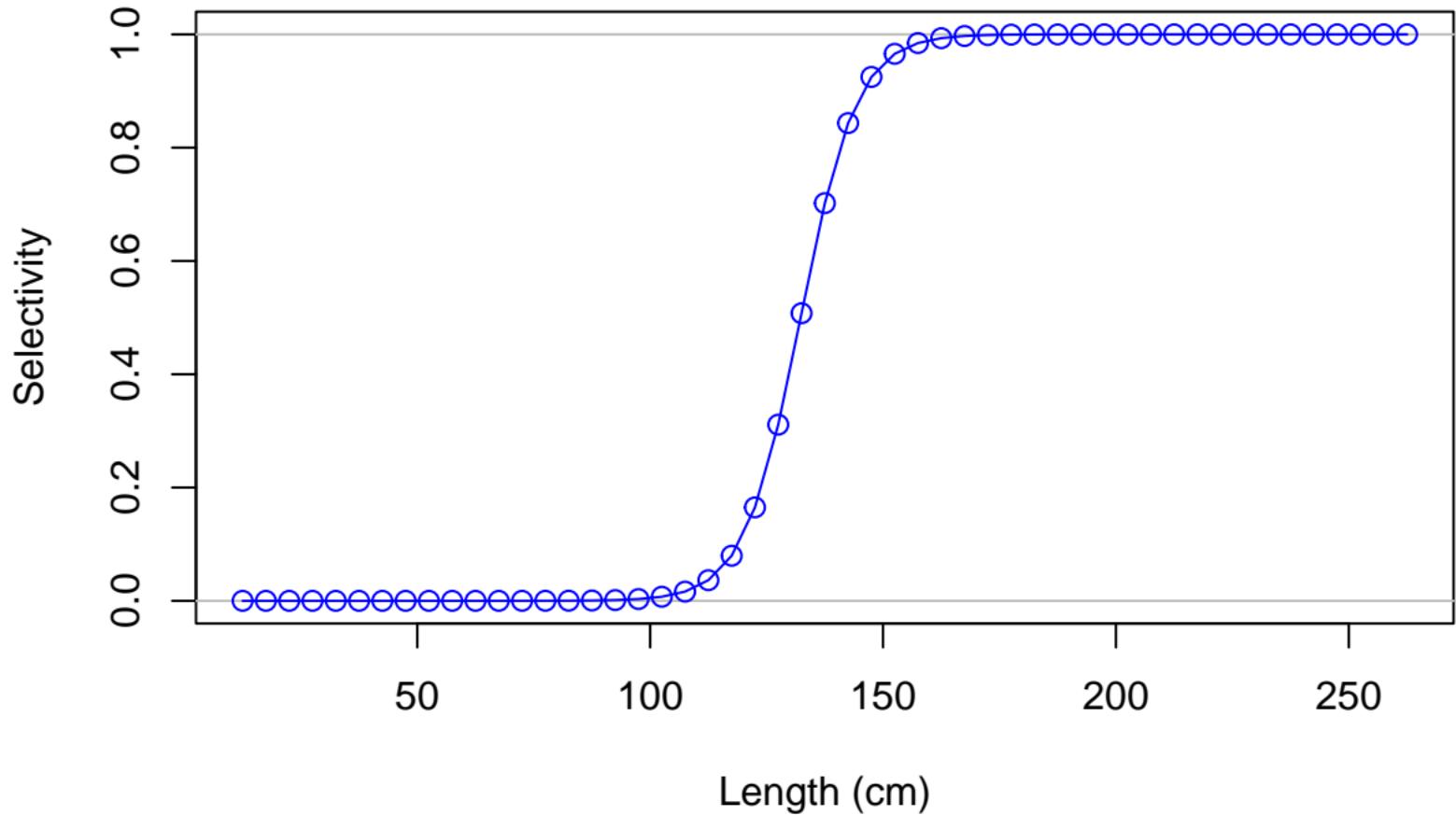


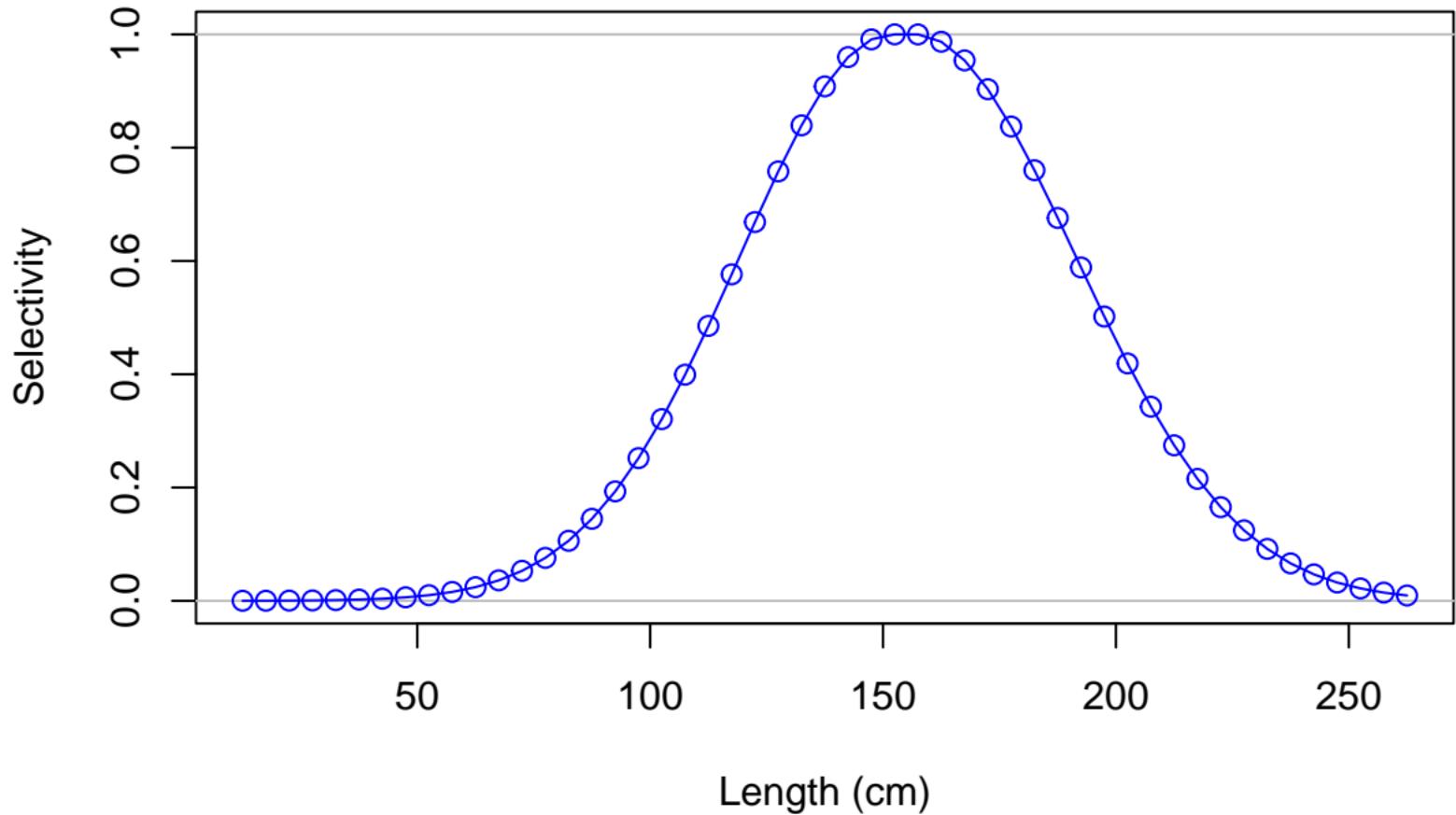


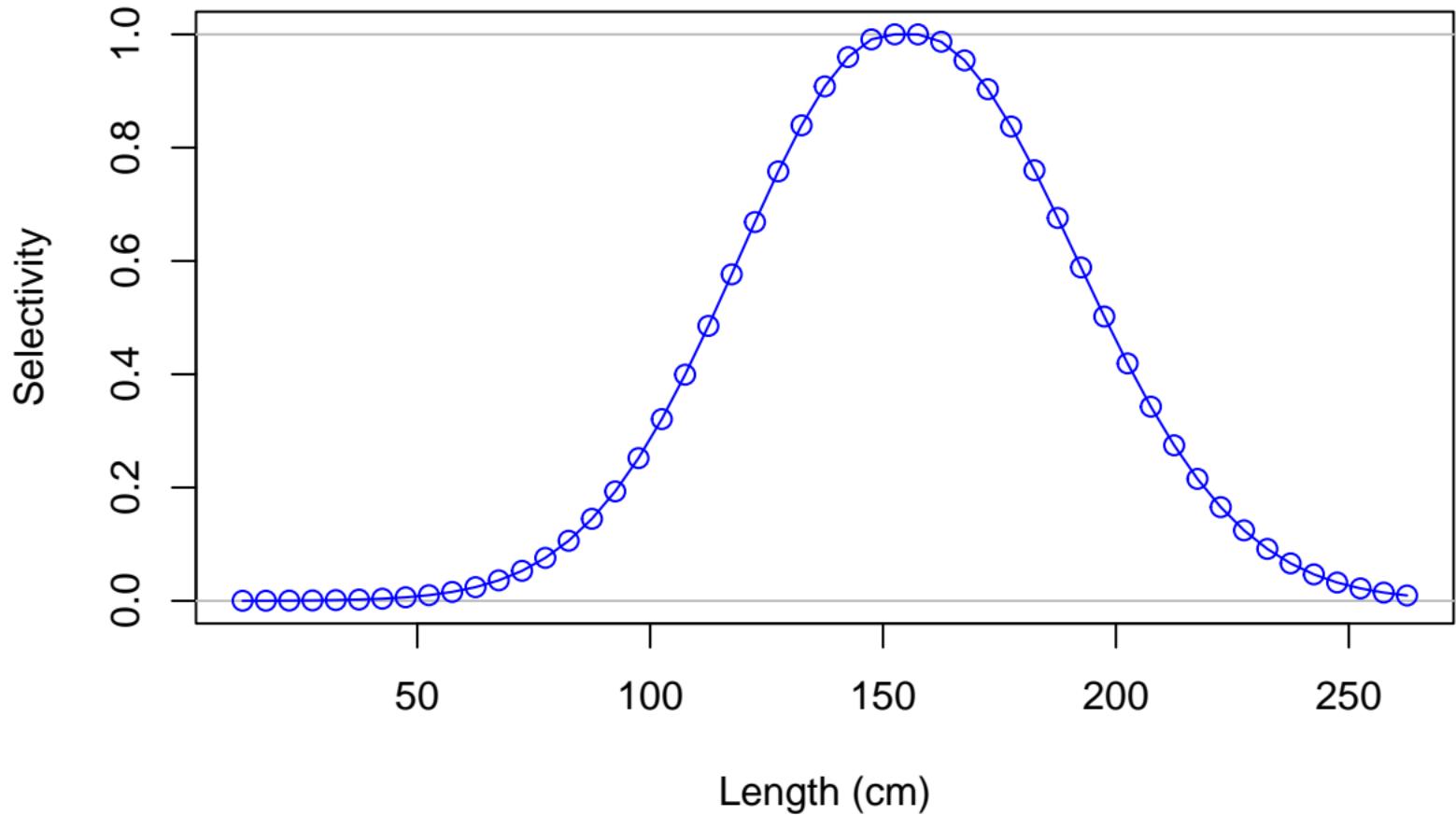


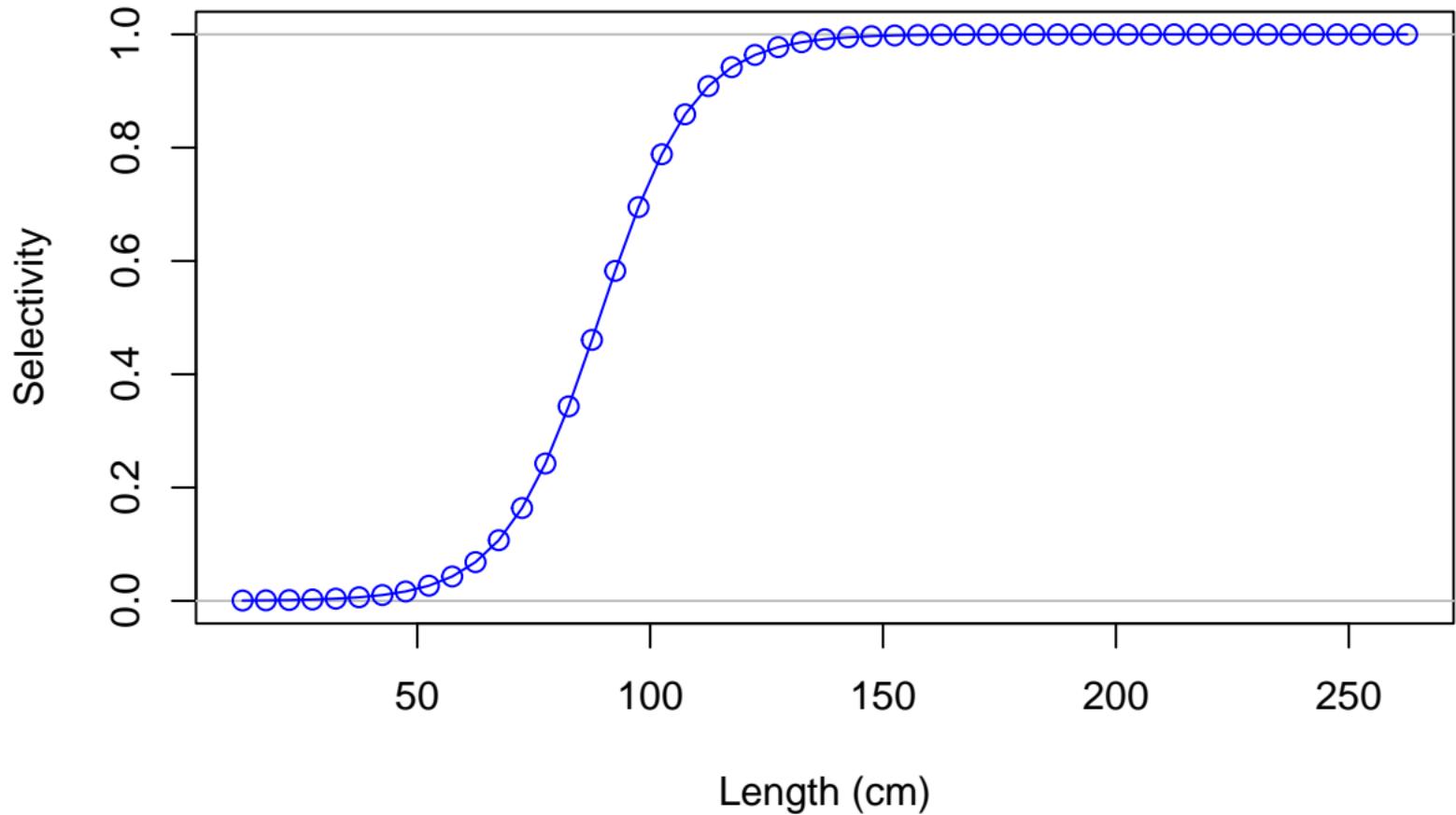


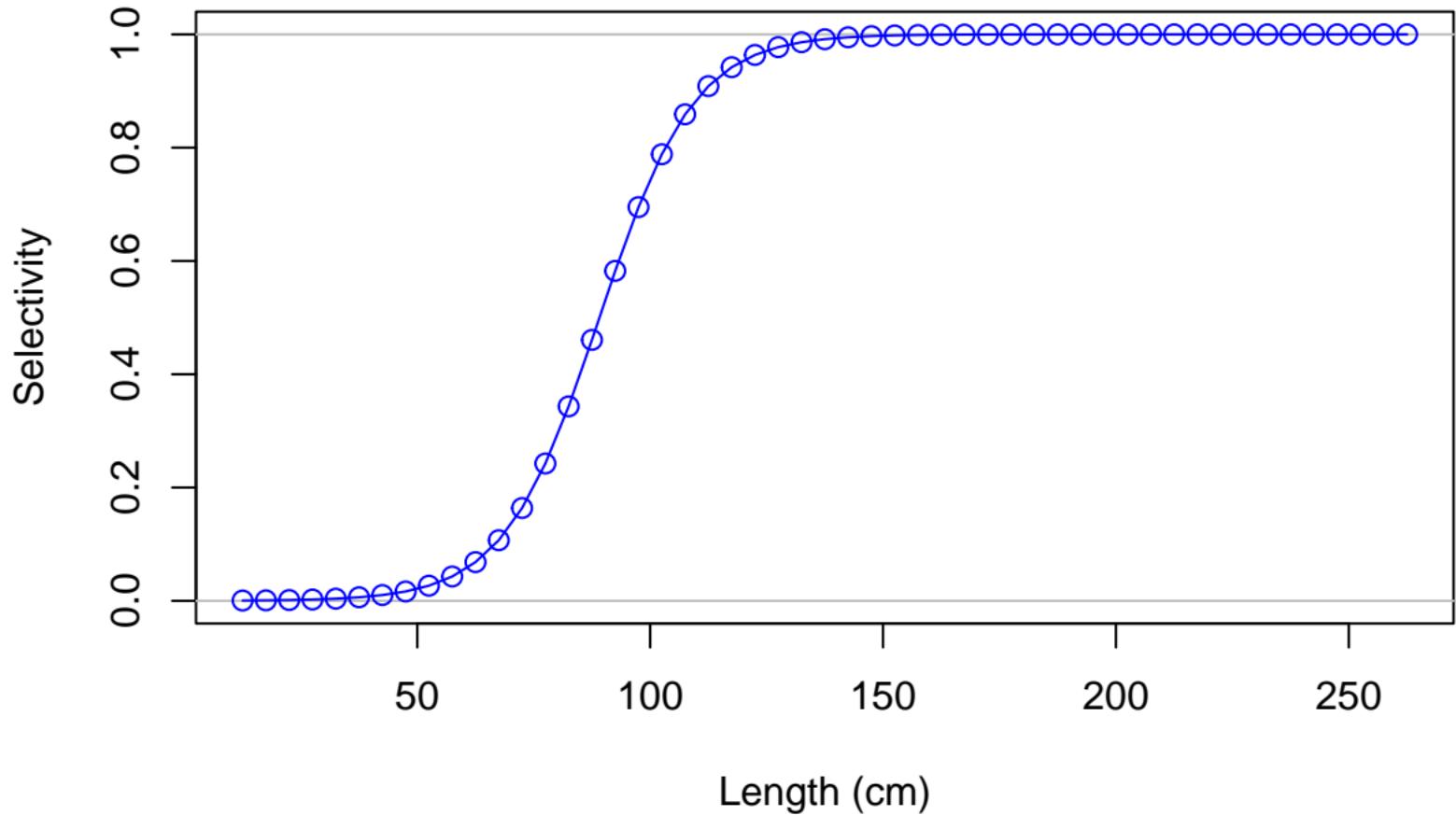


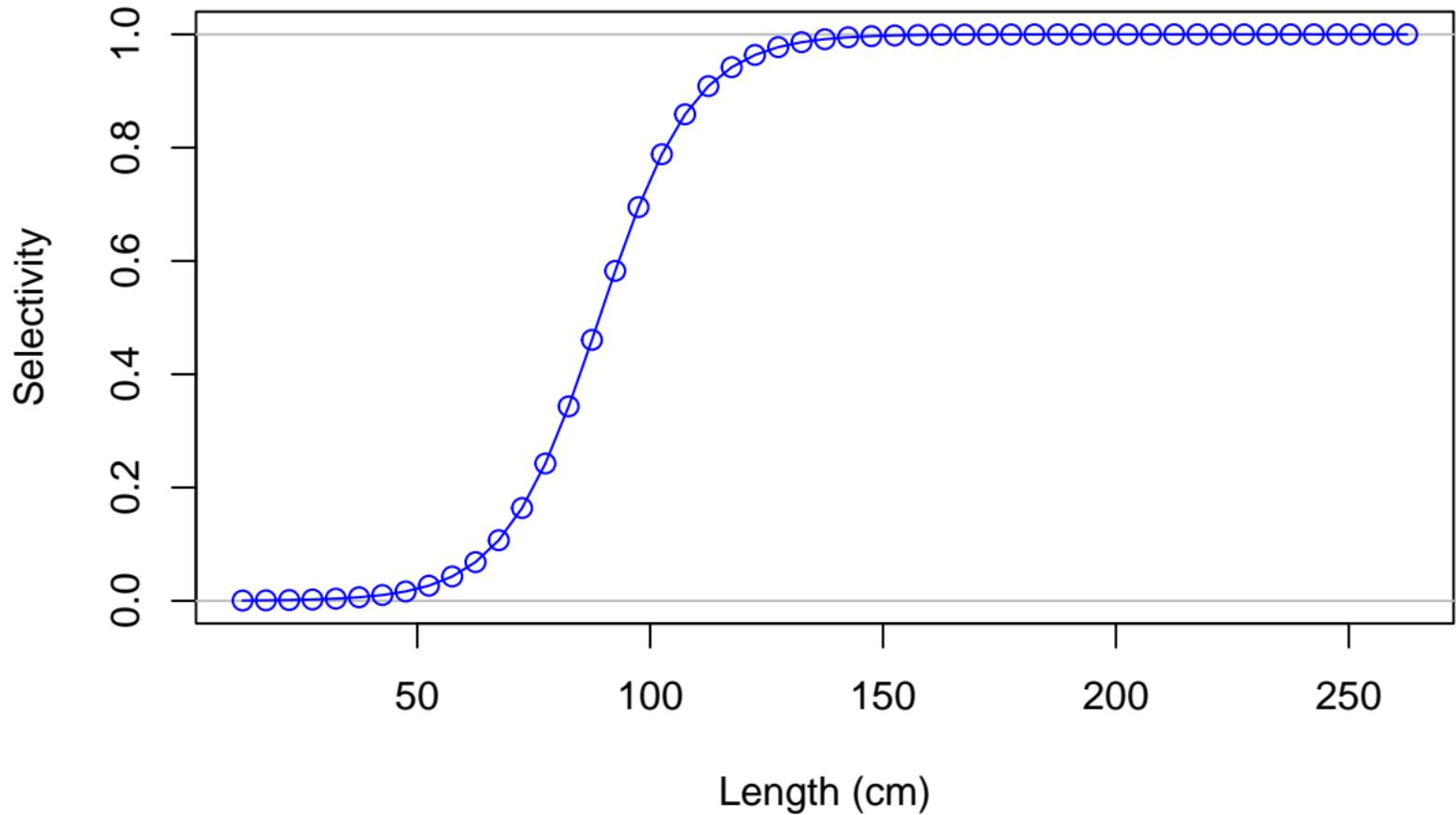


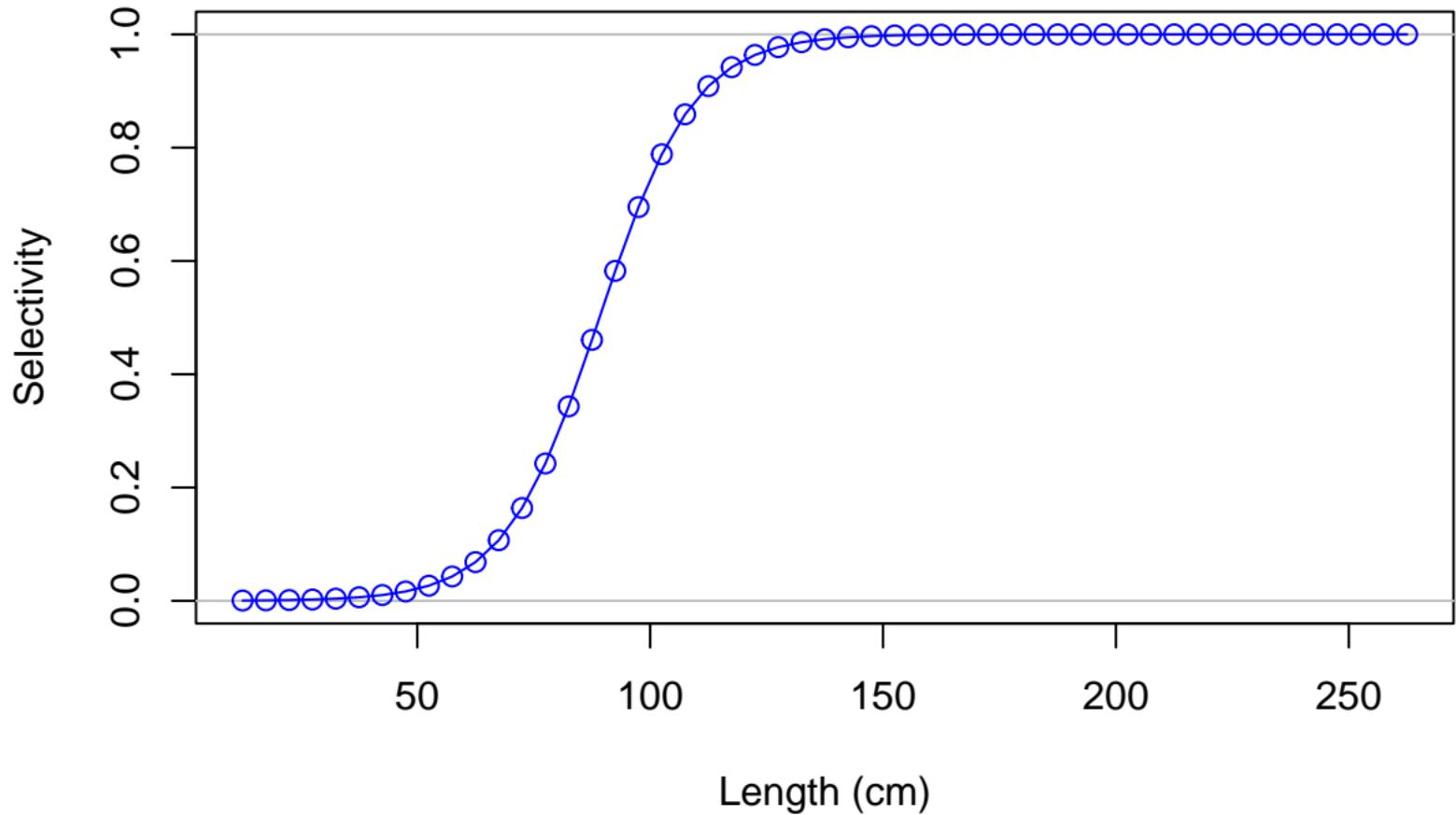


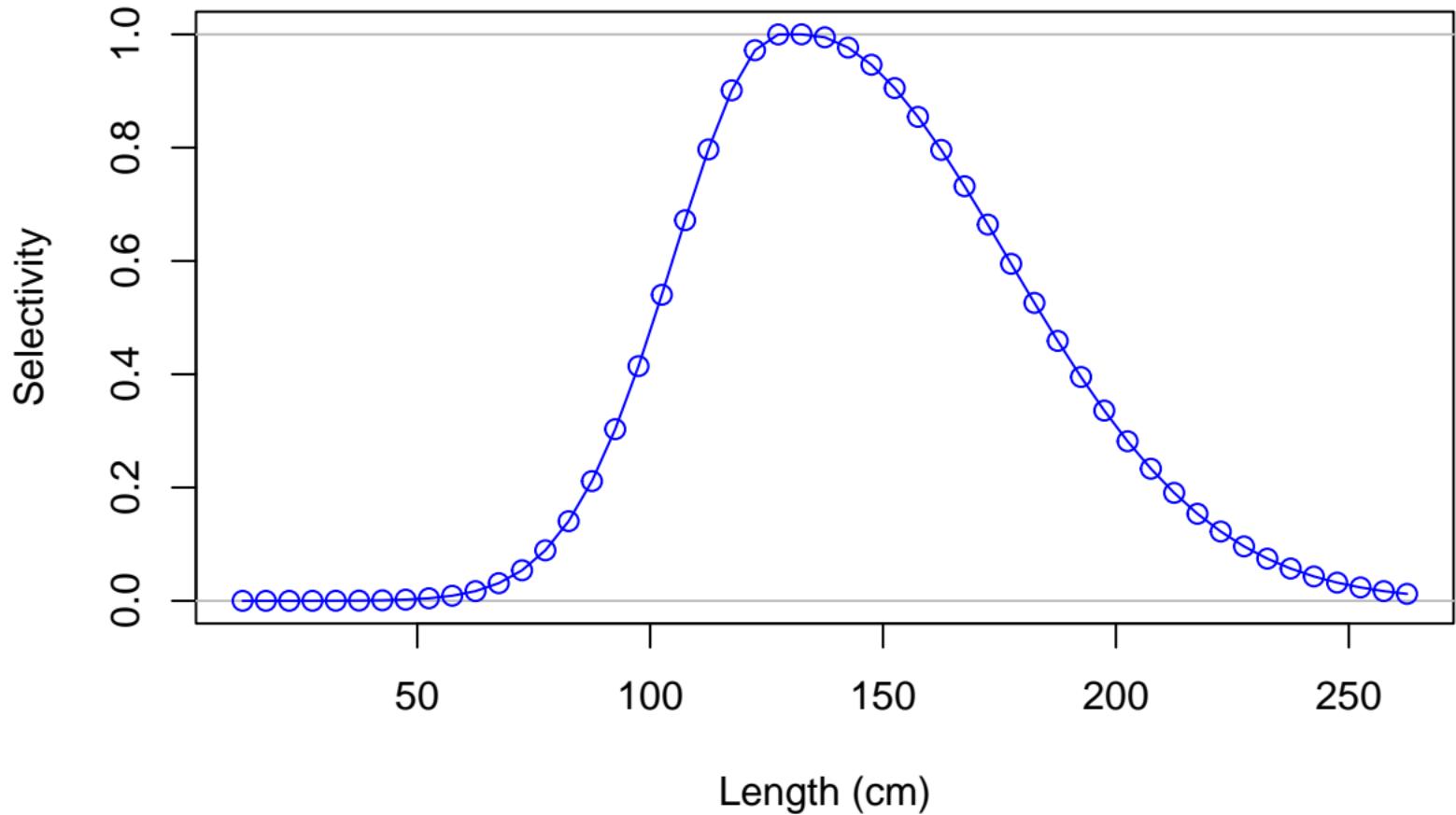


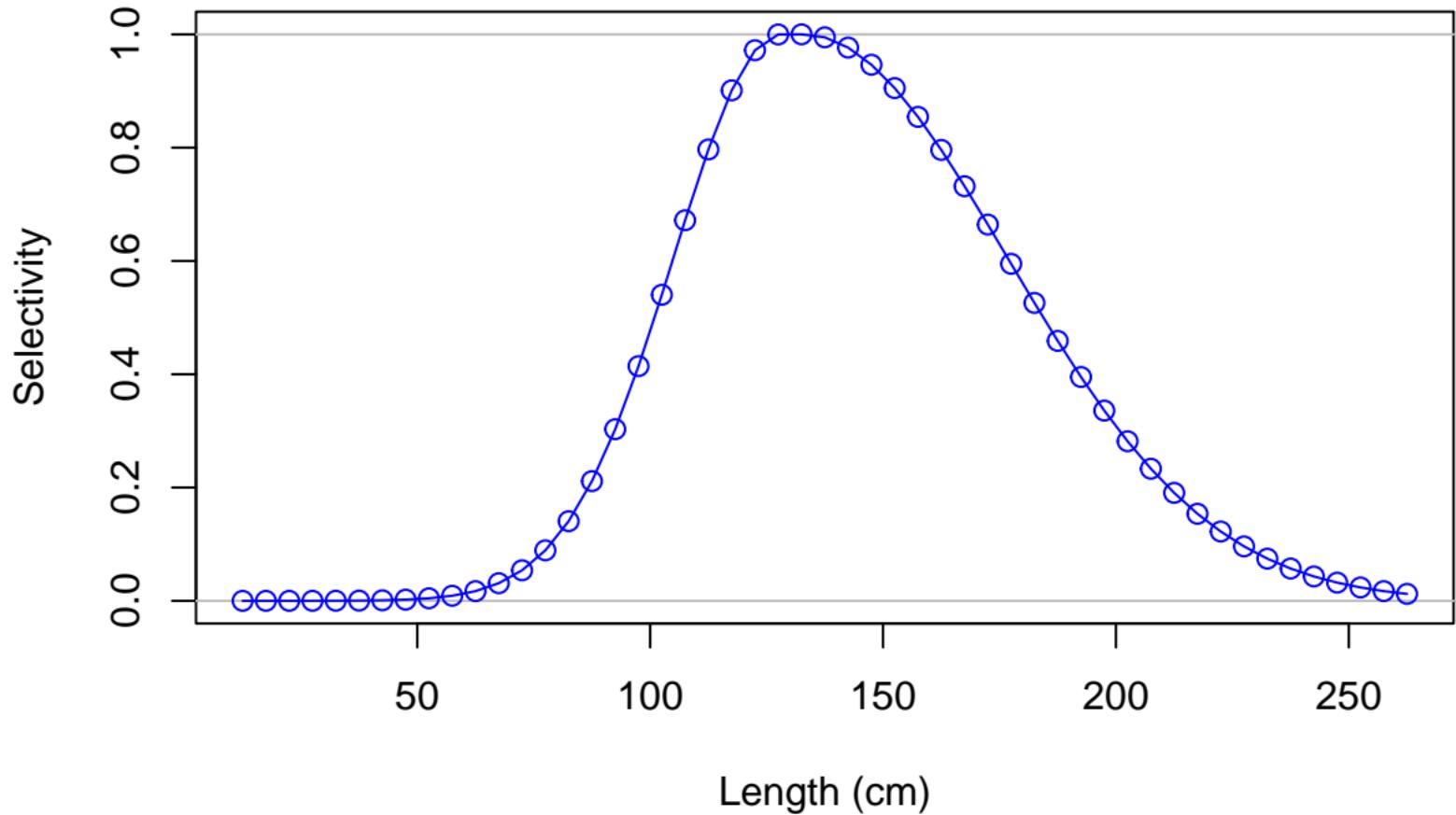


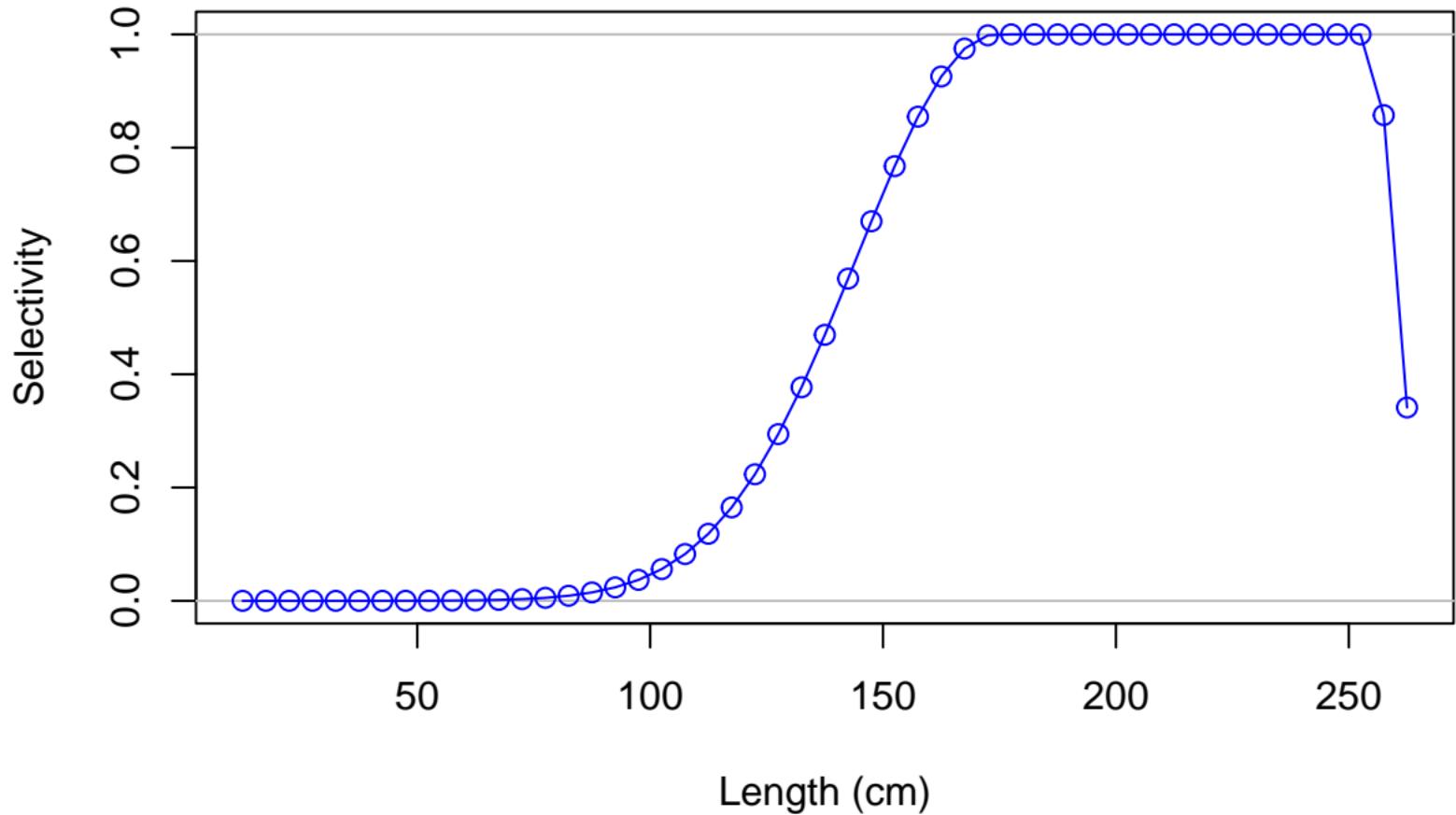


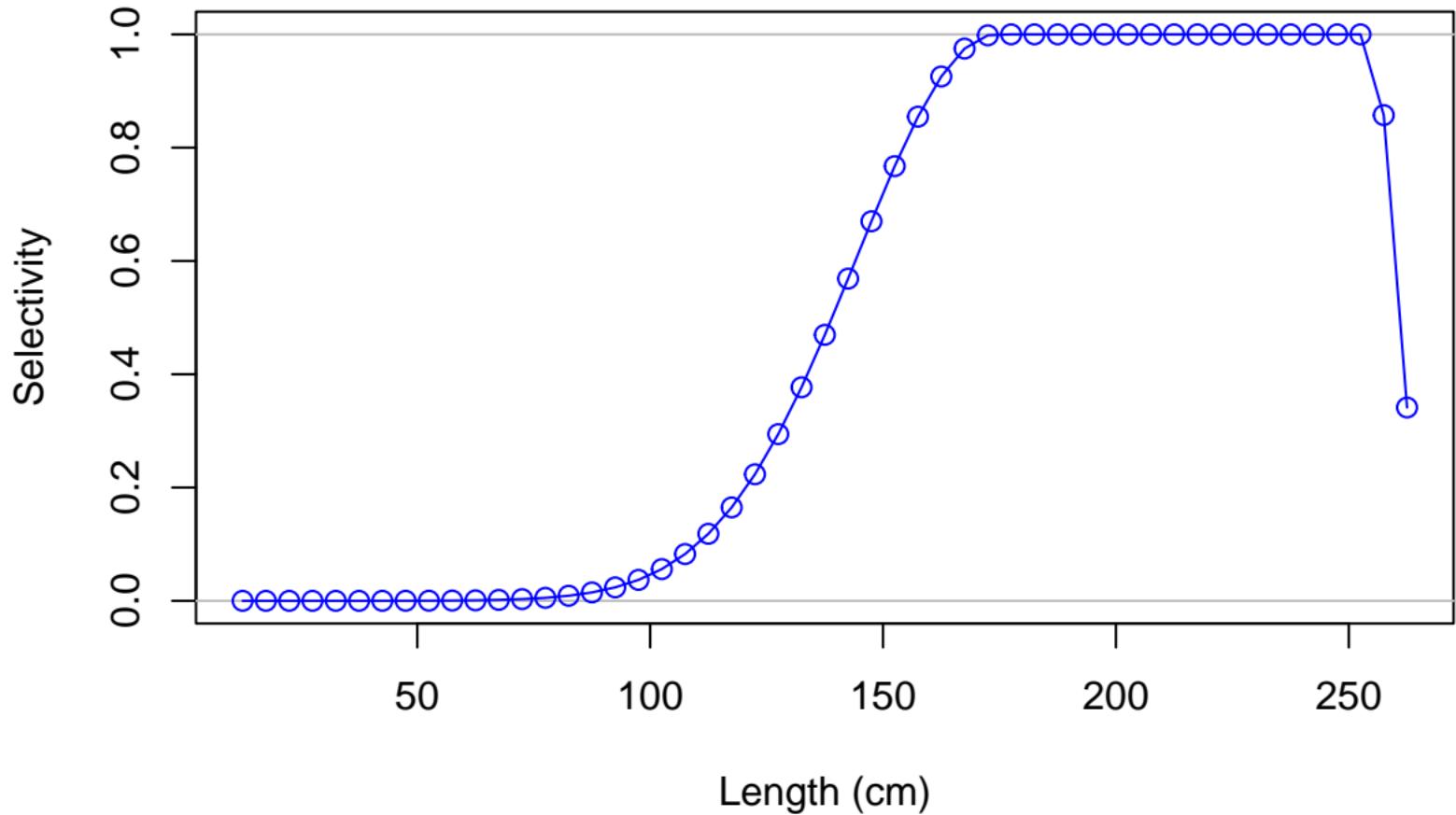


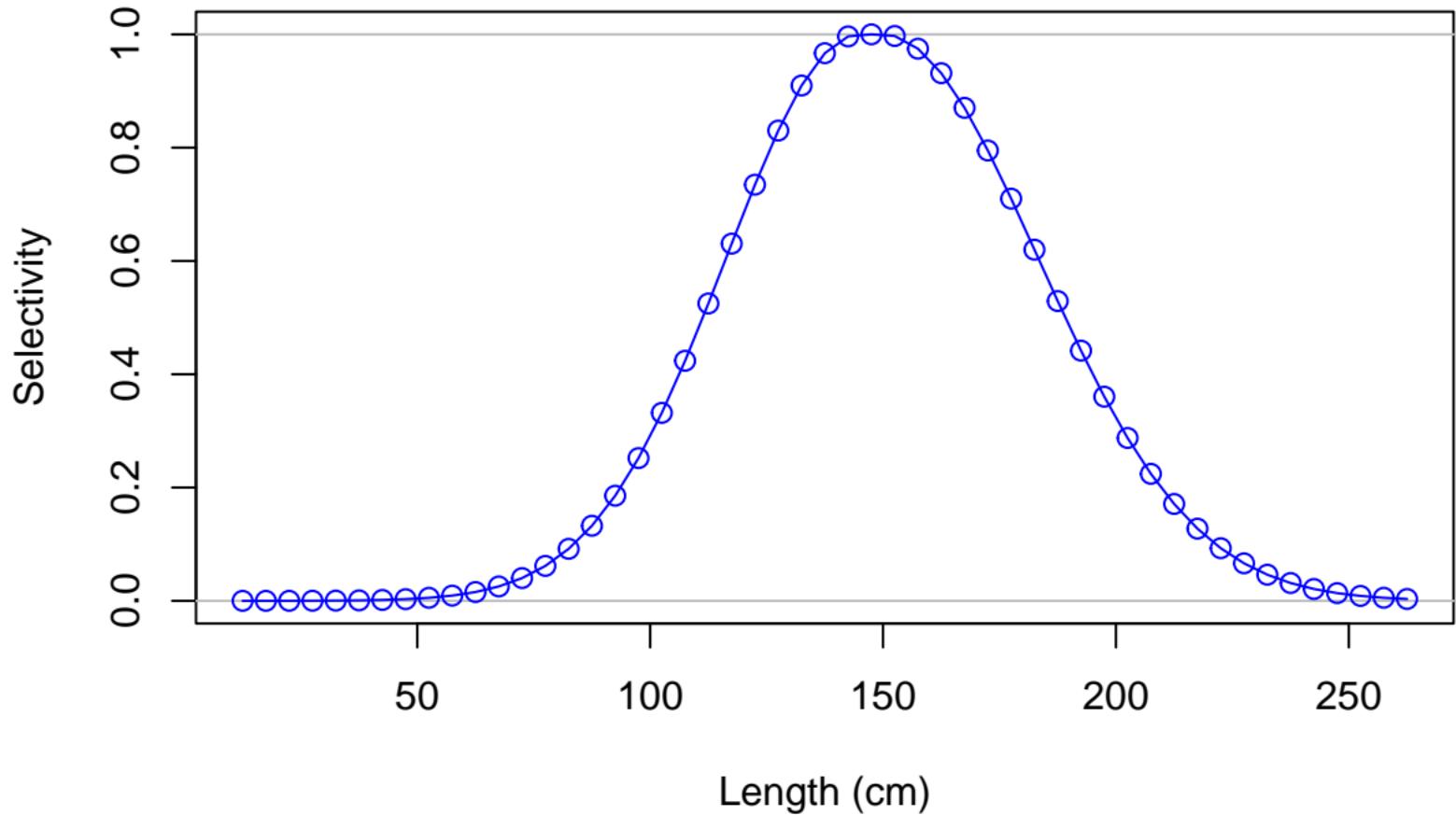


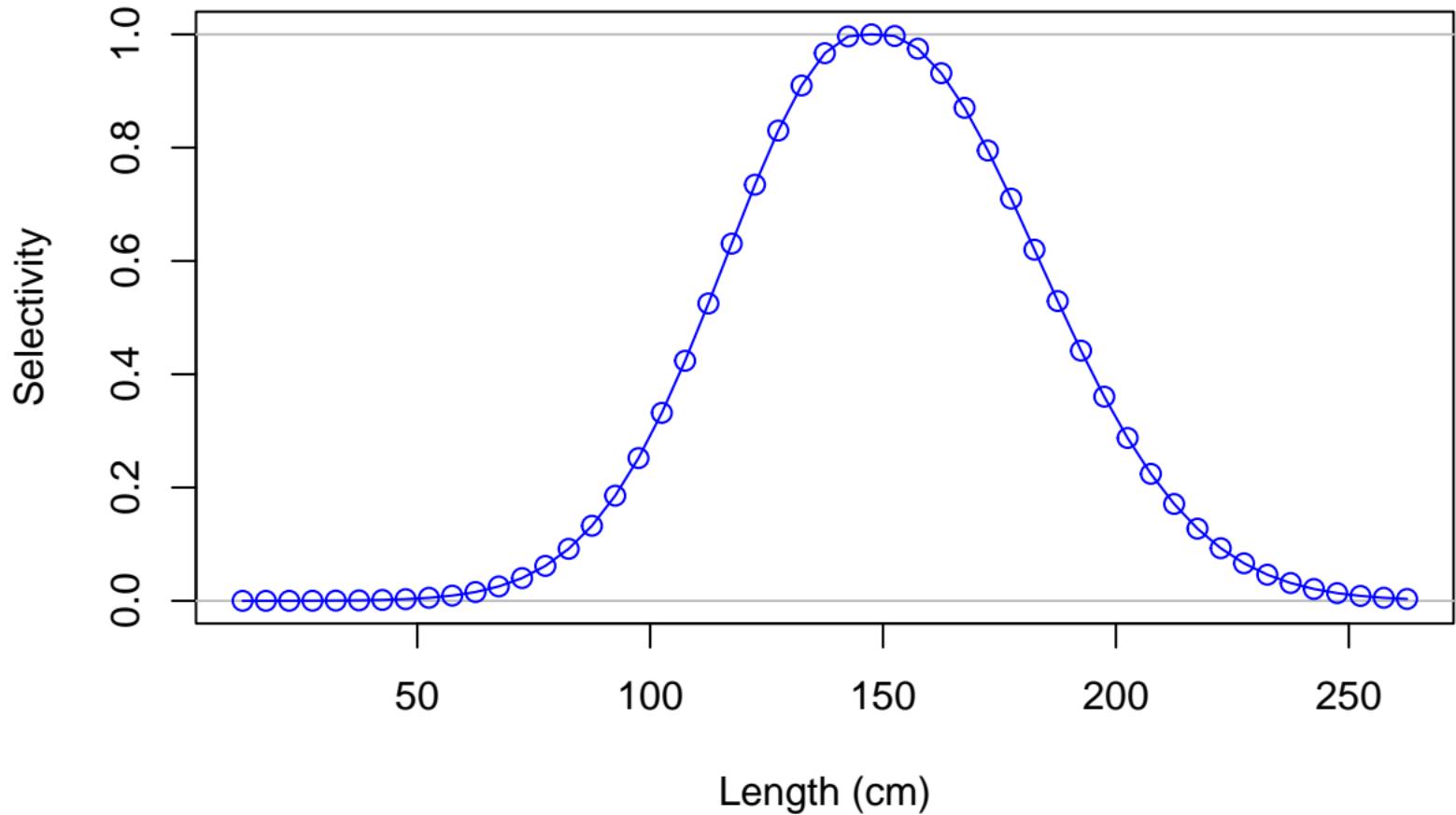


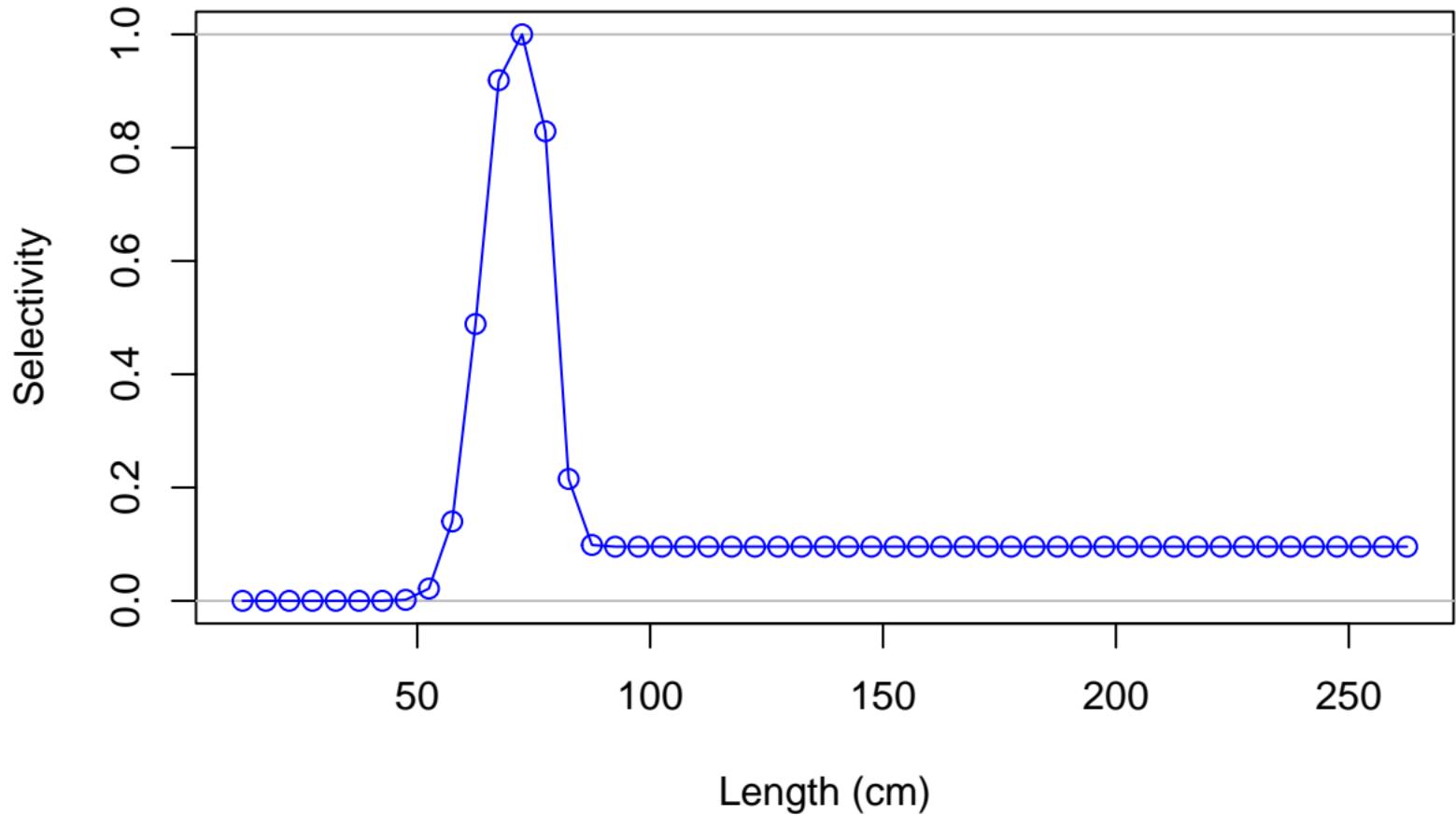


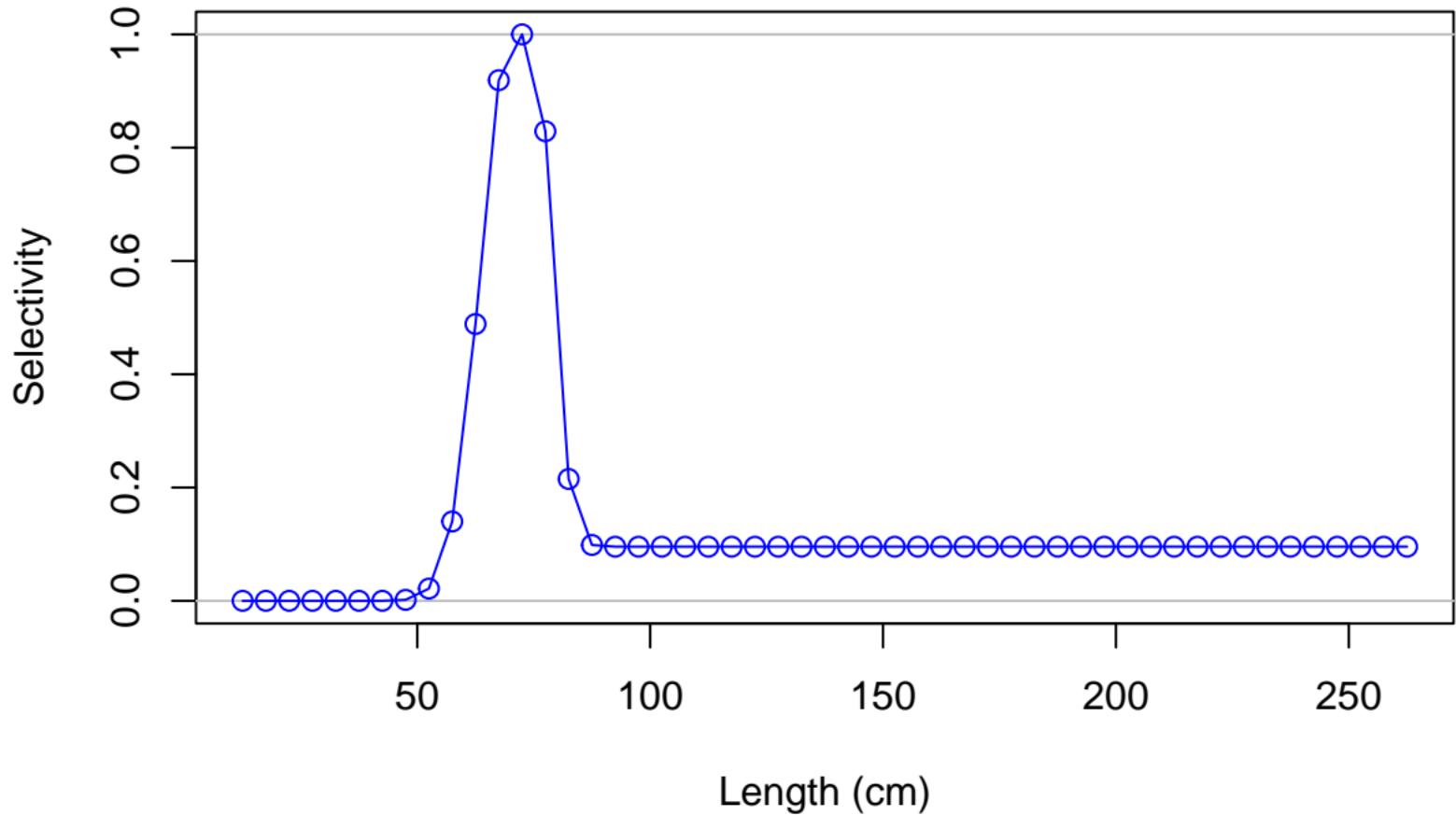


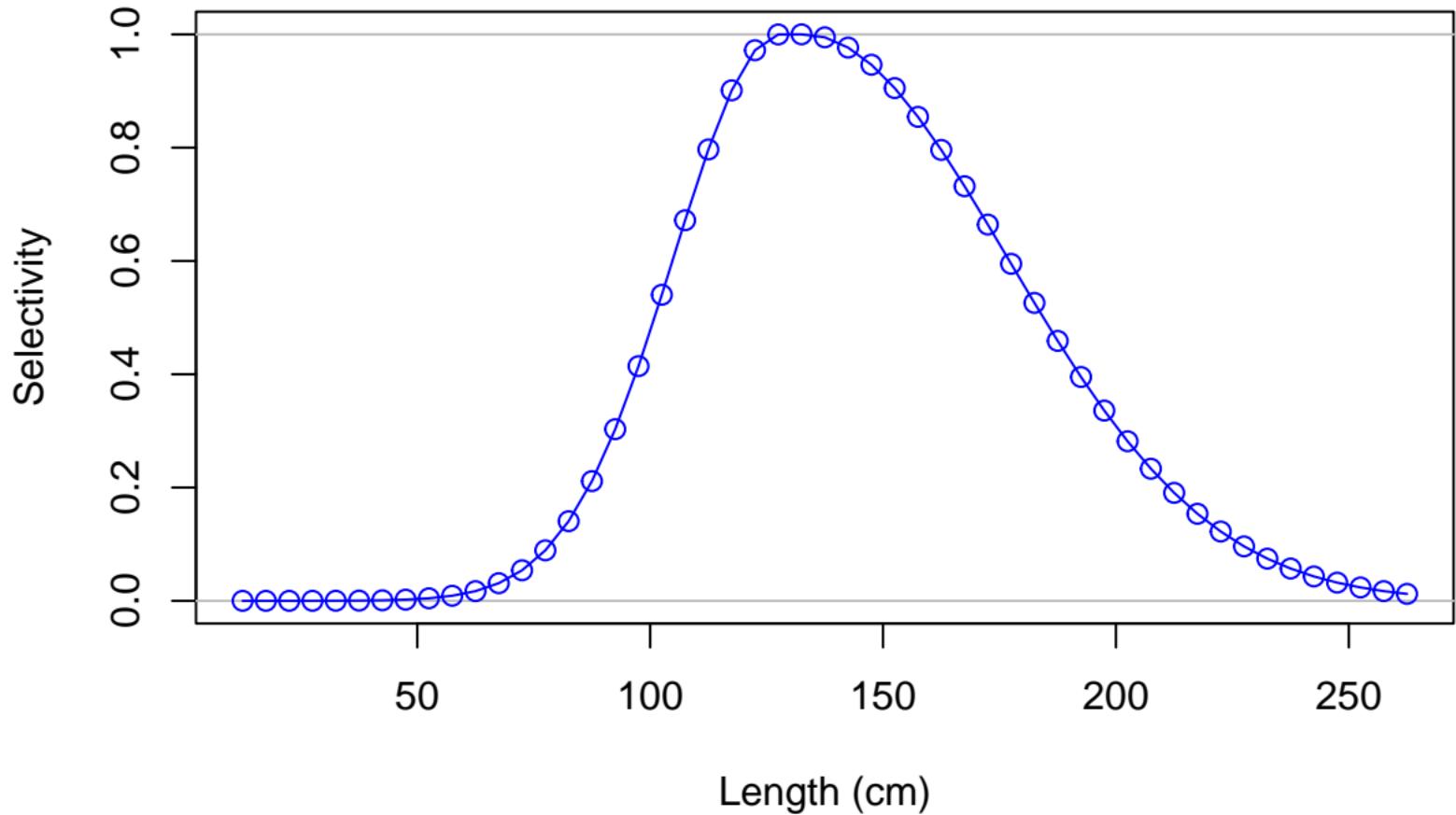


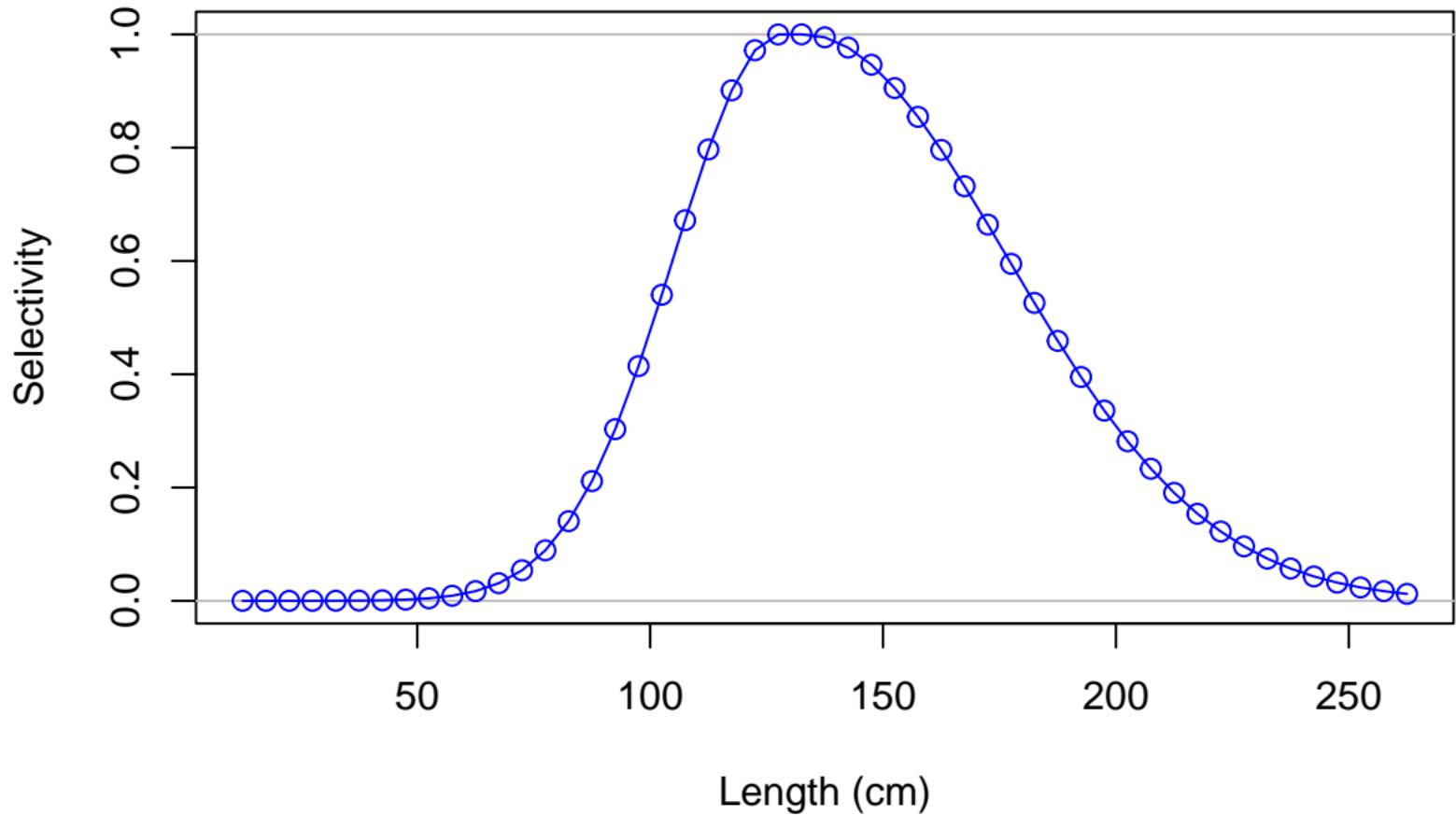


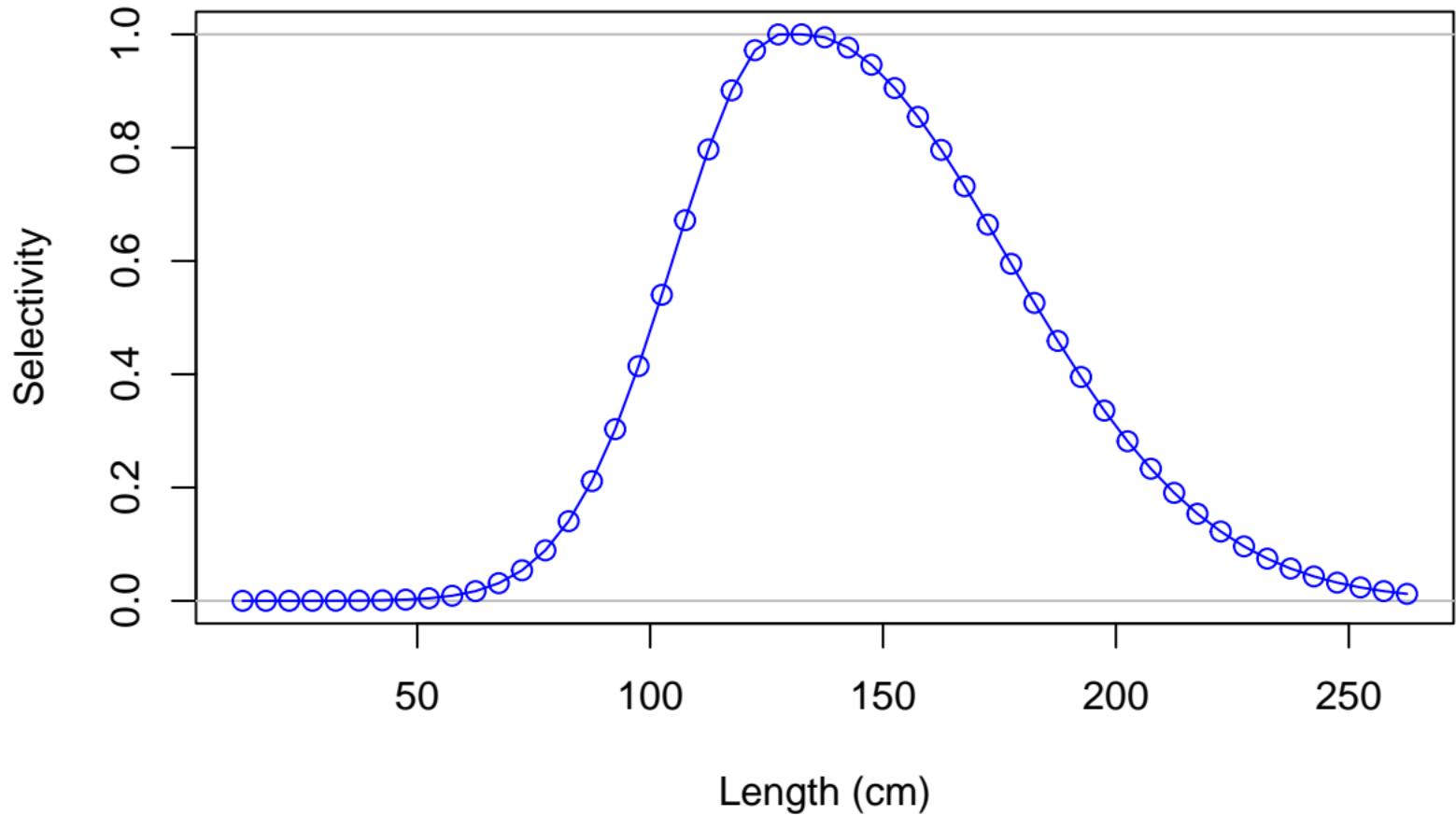


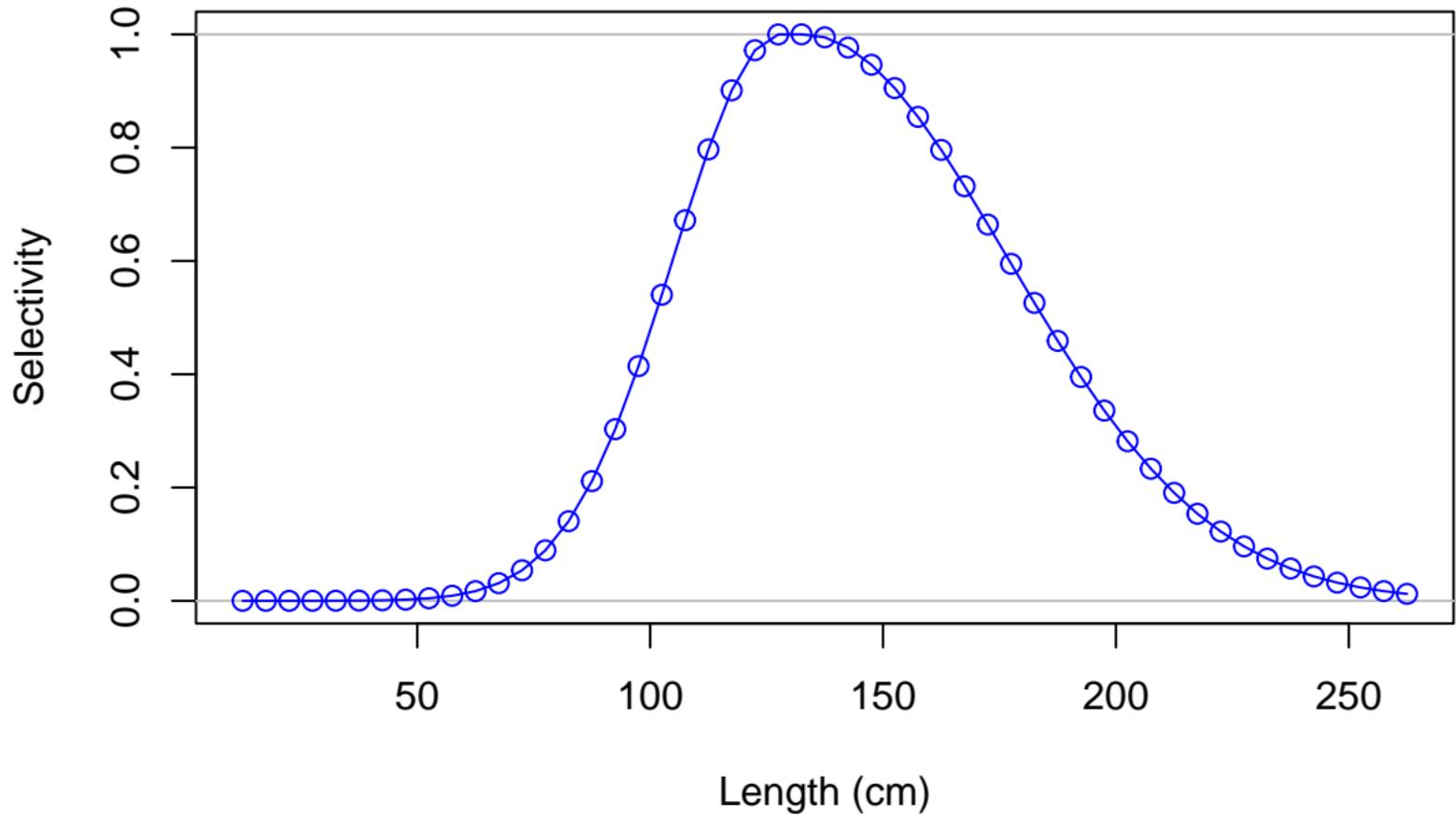


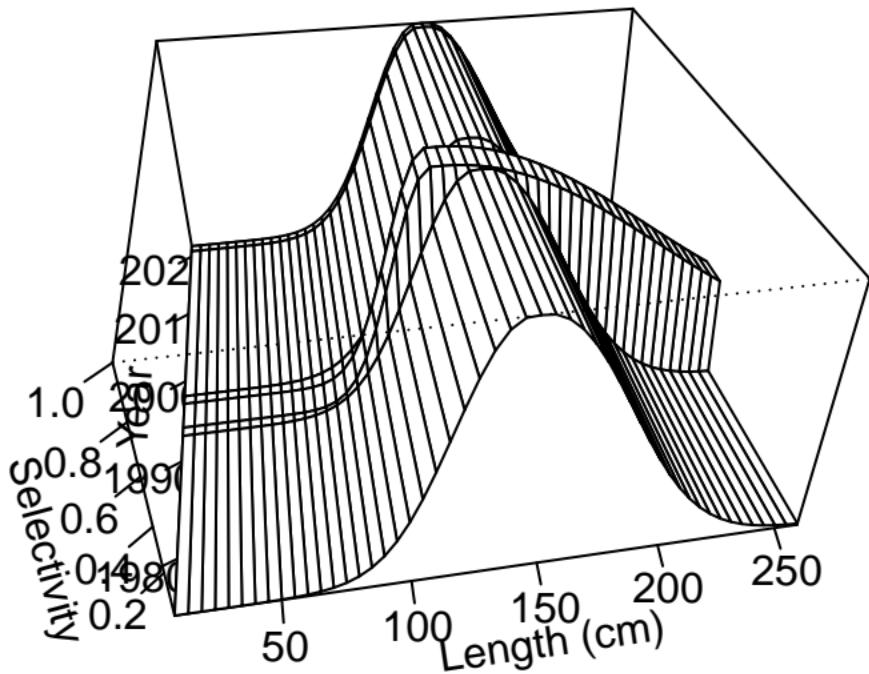












Year

2020

2000

1980

0

50

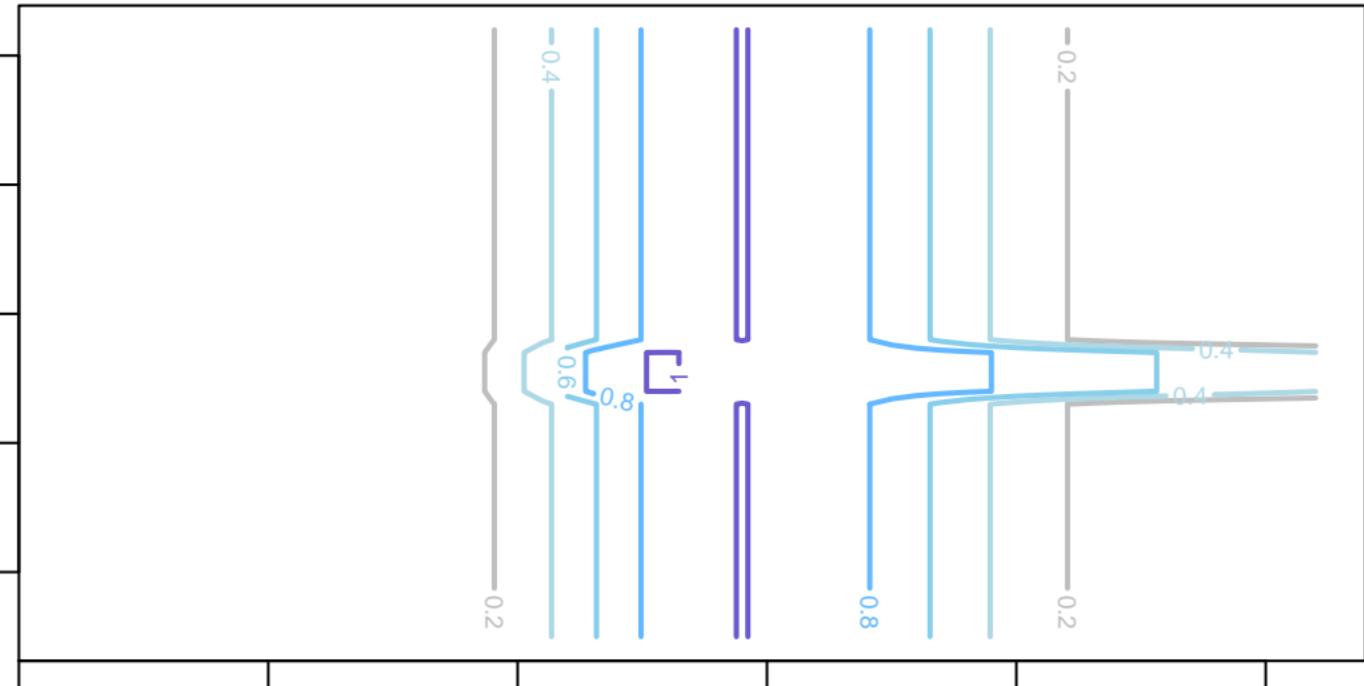
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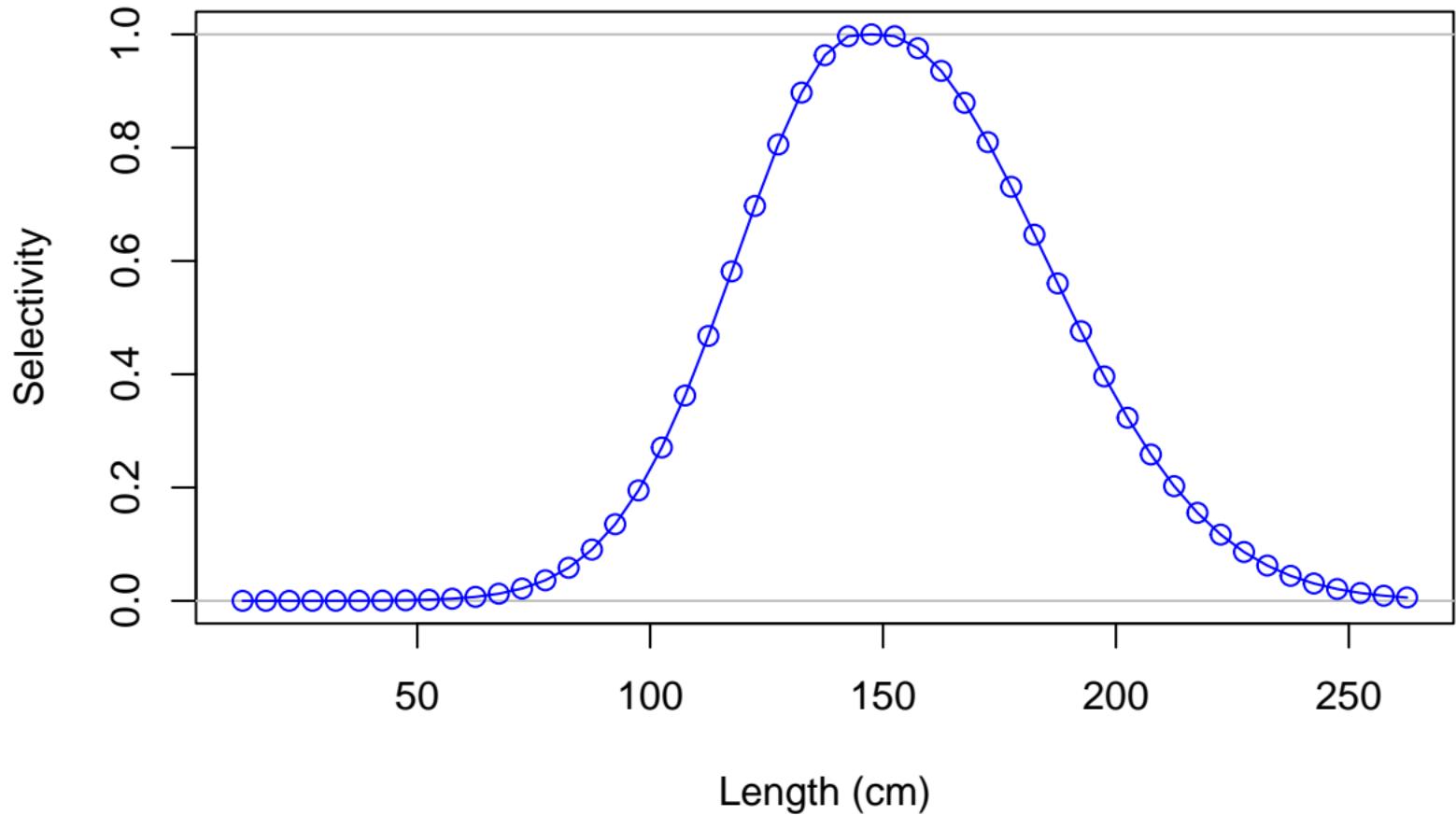
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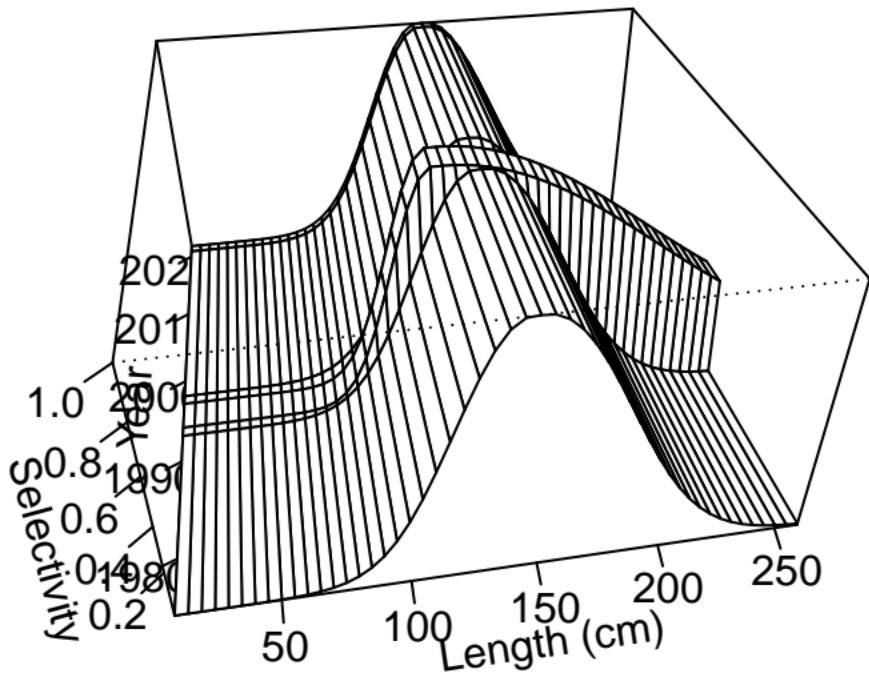
200

250

Length (cm)







Year

2020

2000

1980

0

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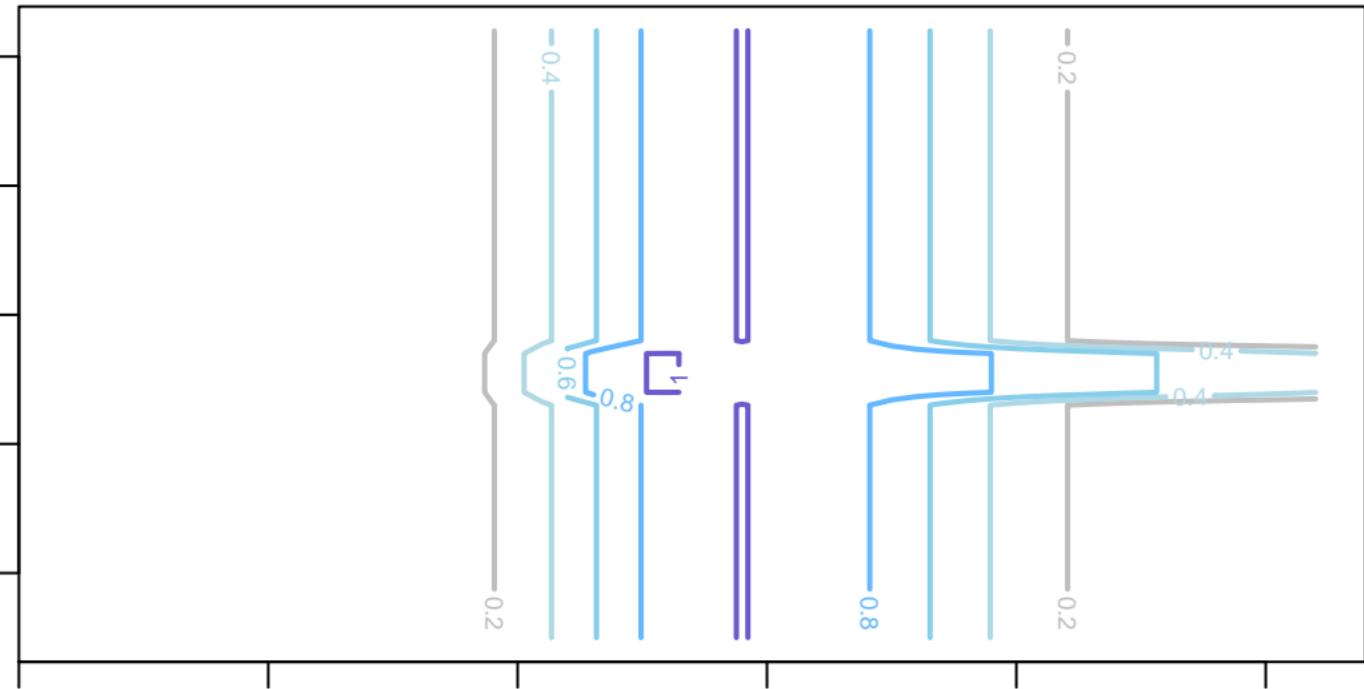
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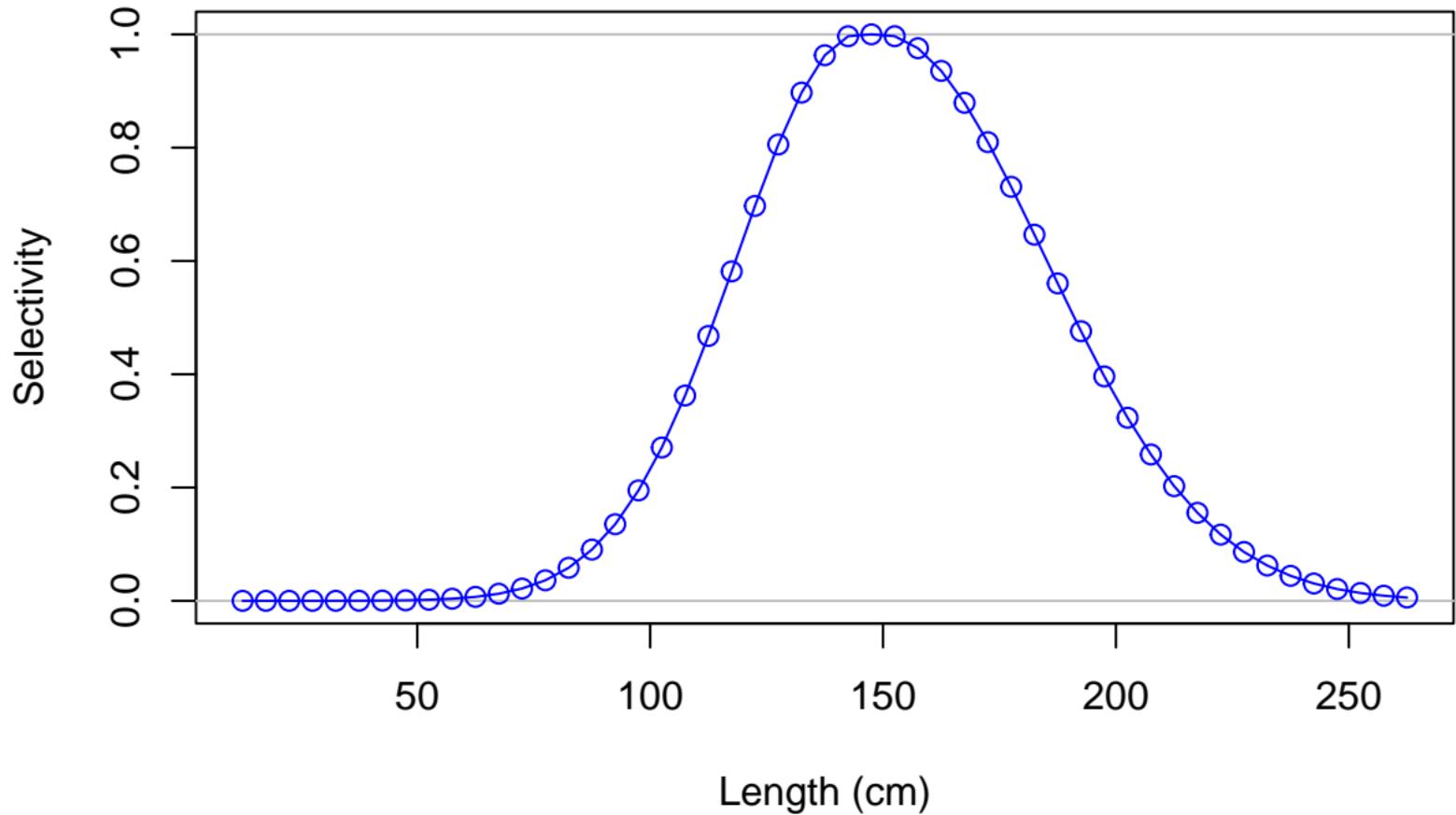
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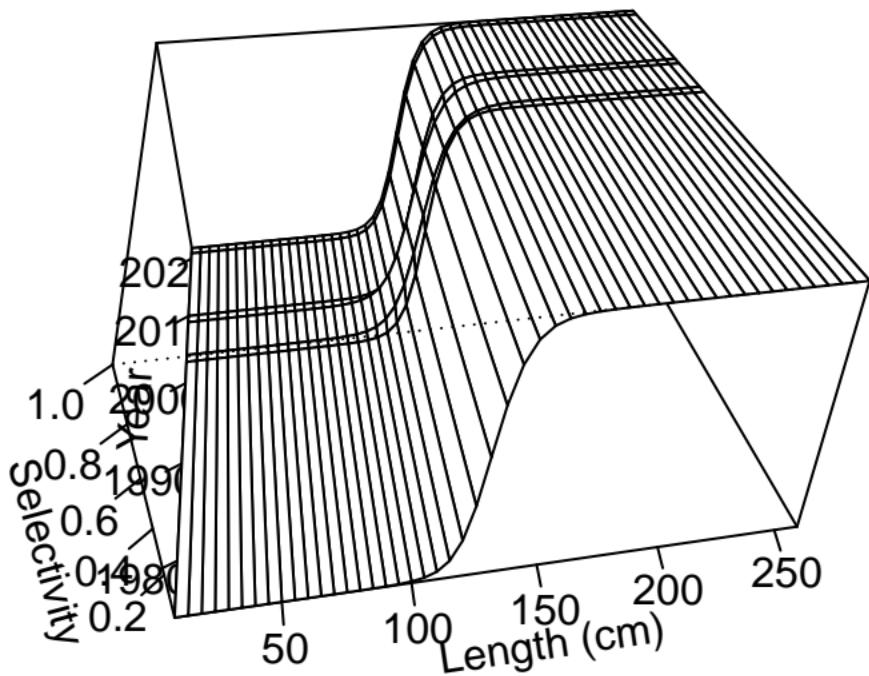
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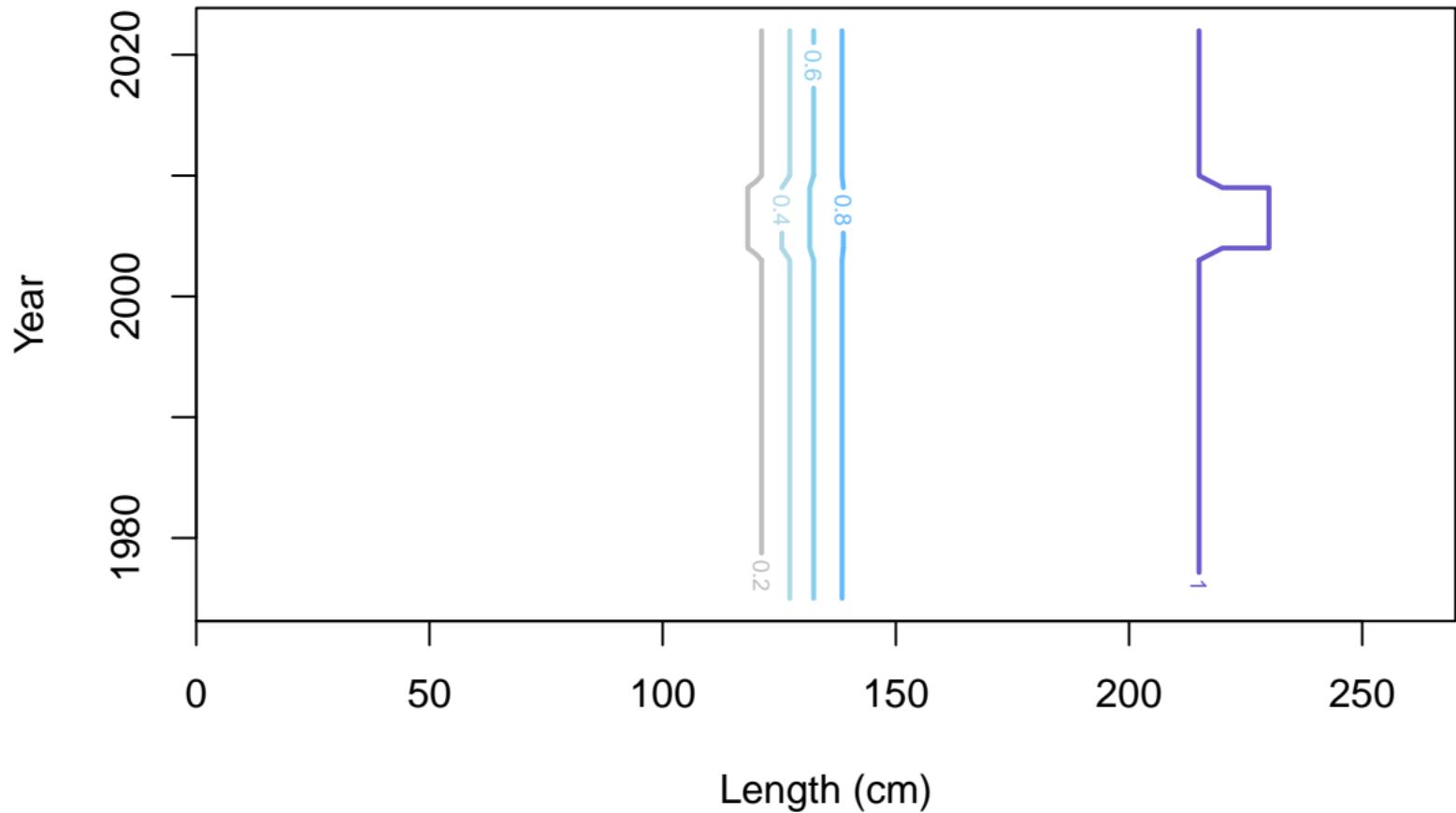
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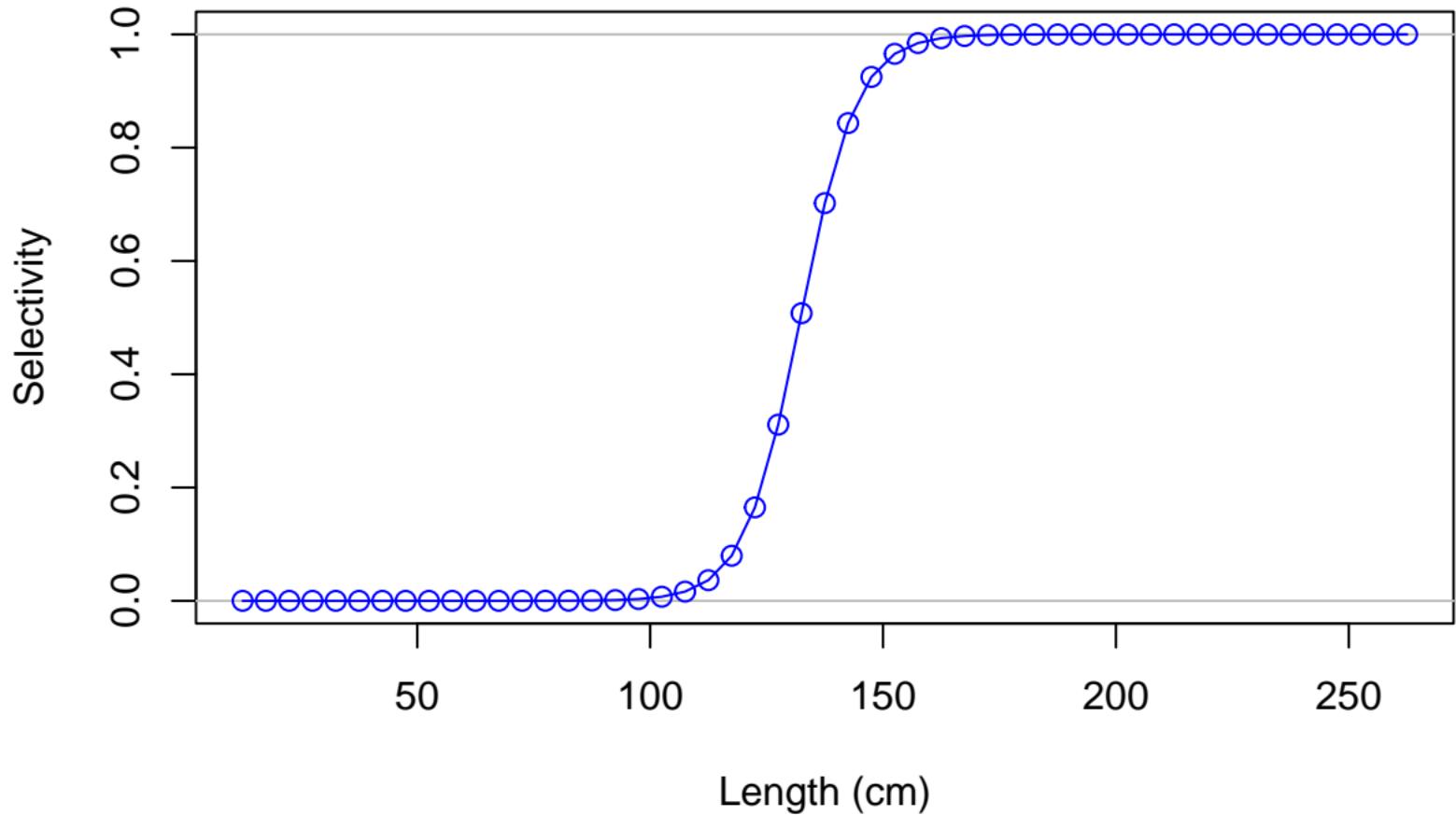
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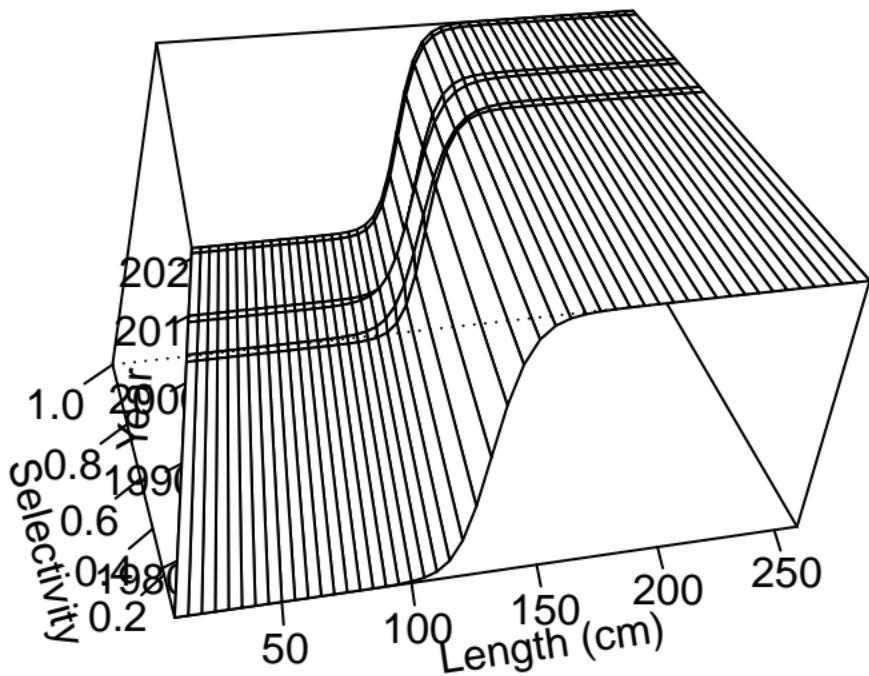


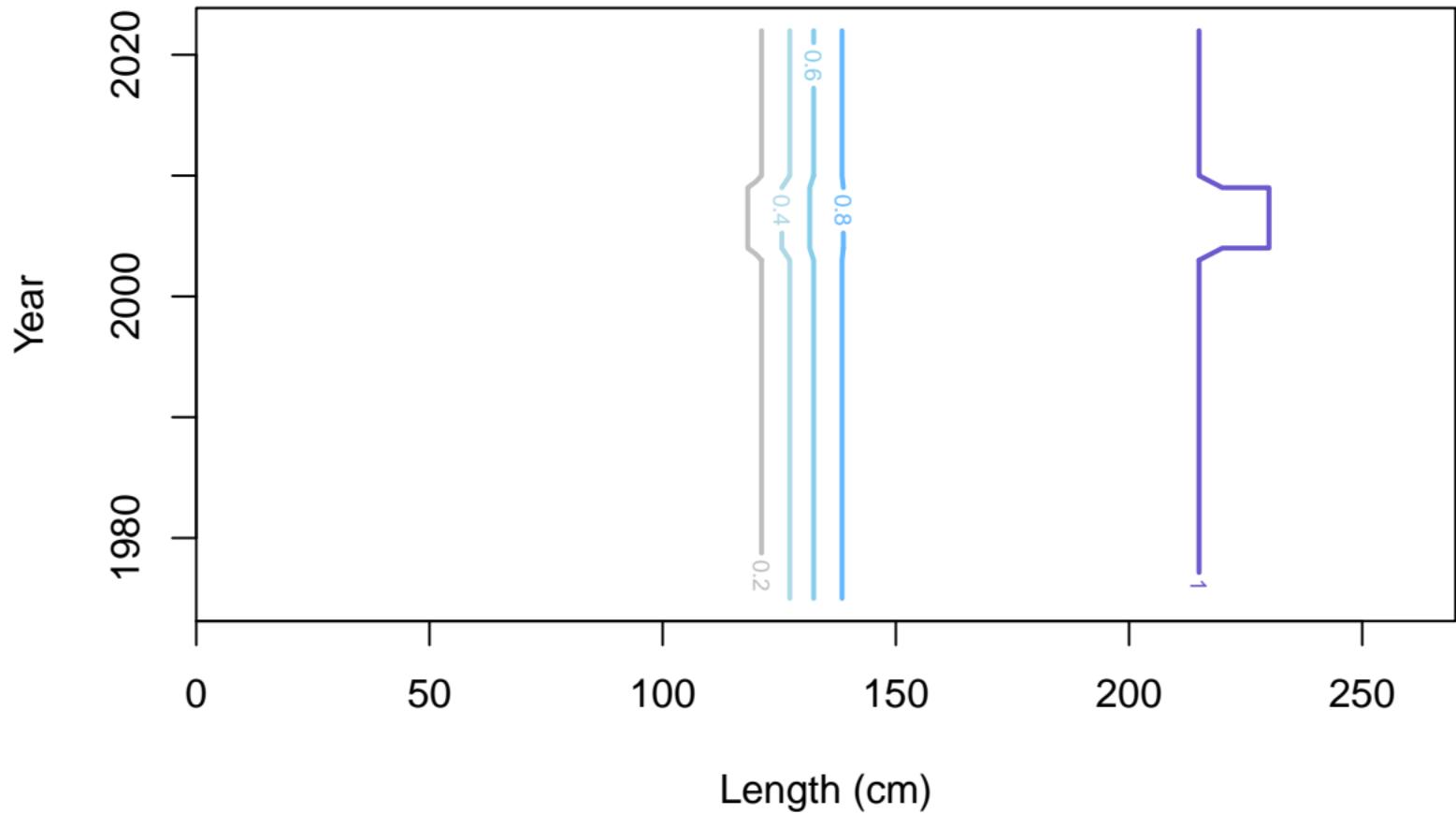


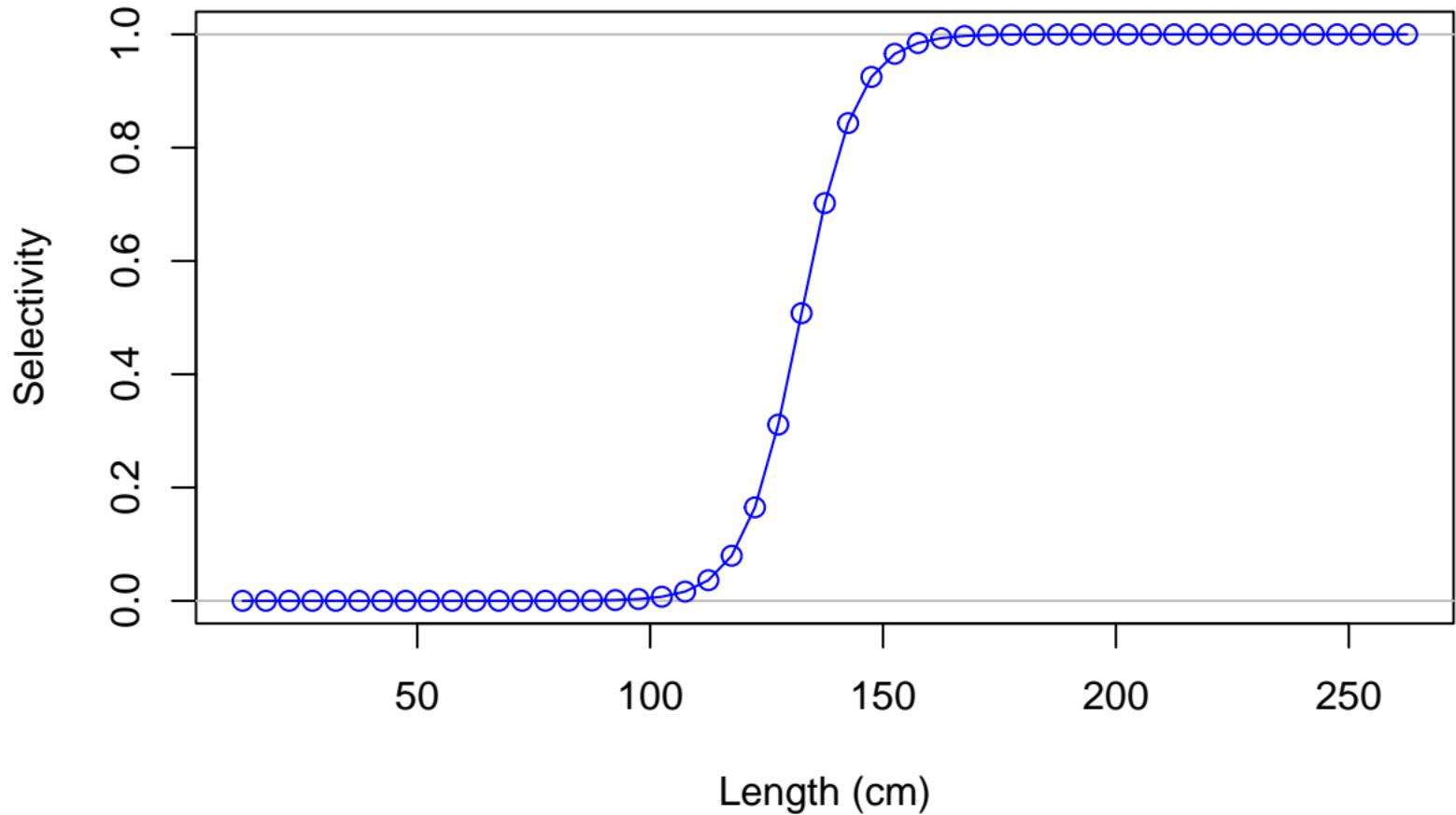


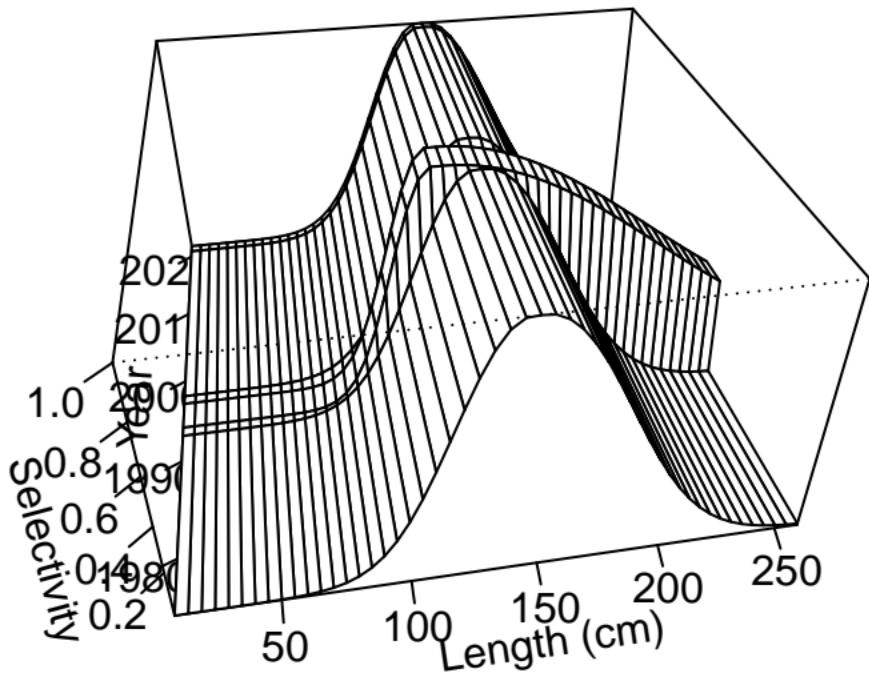












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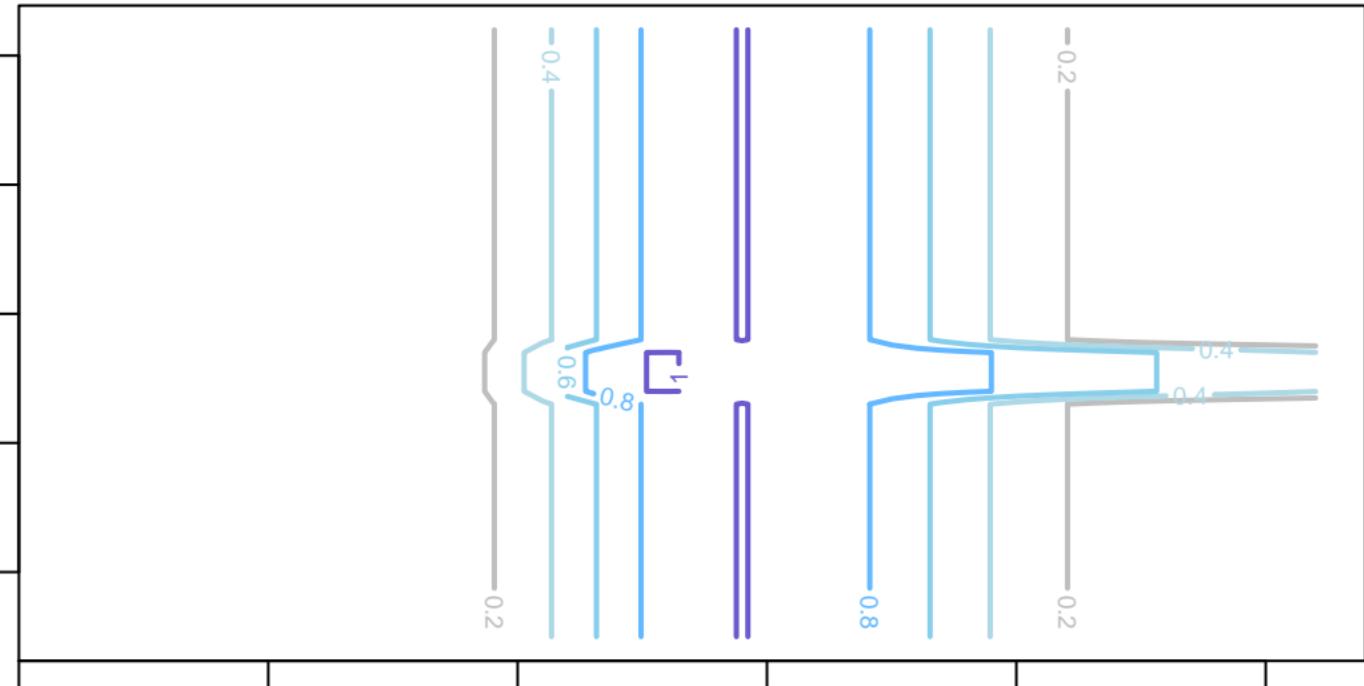
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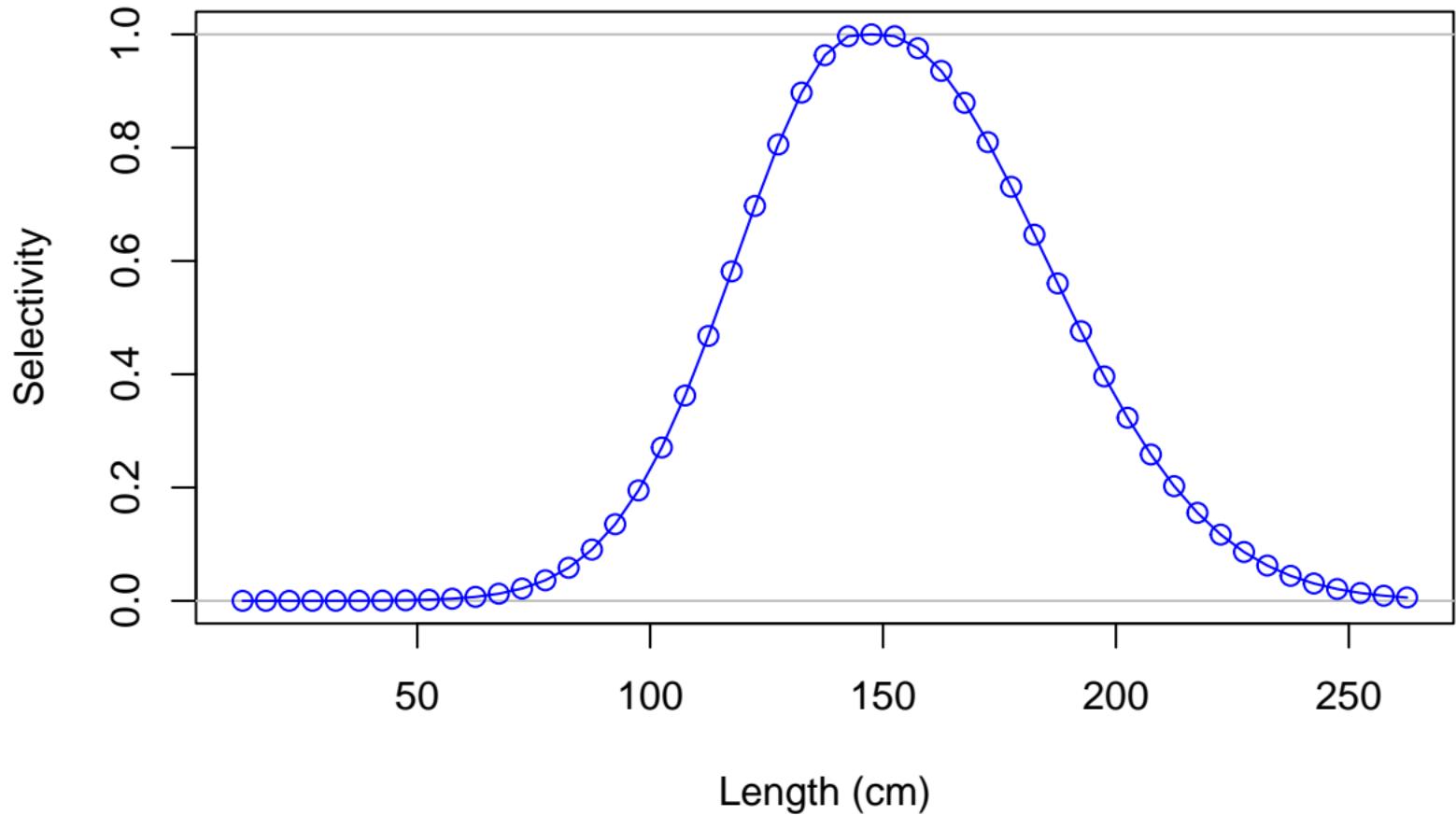
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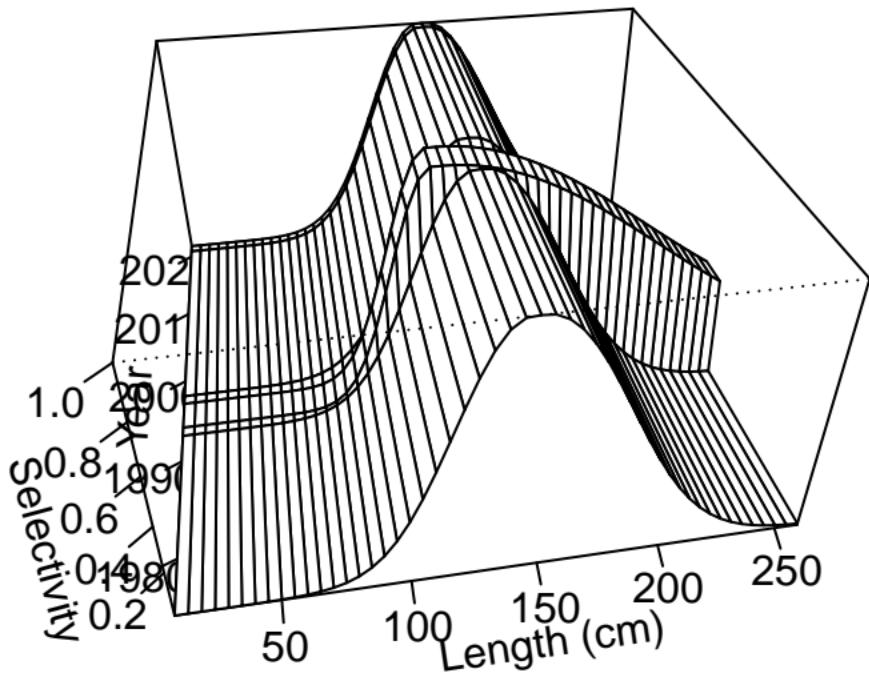
200

250

Length (cm)







Year

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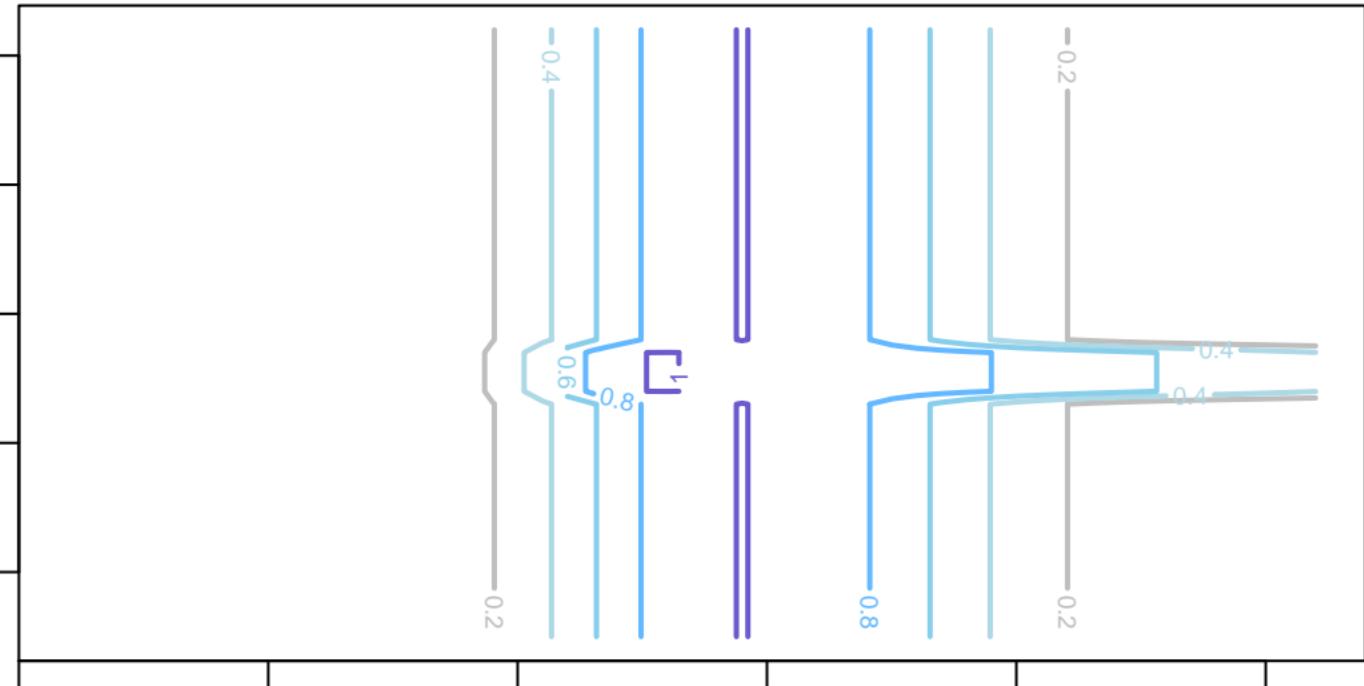
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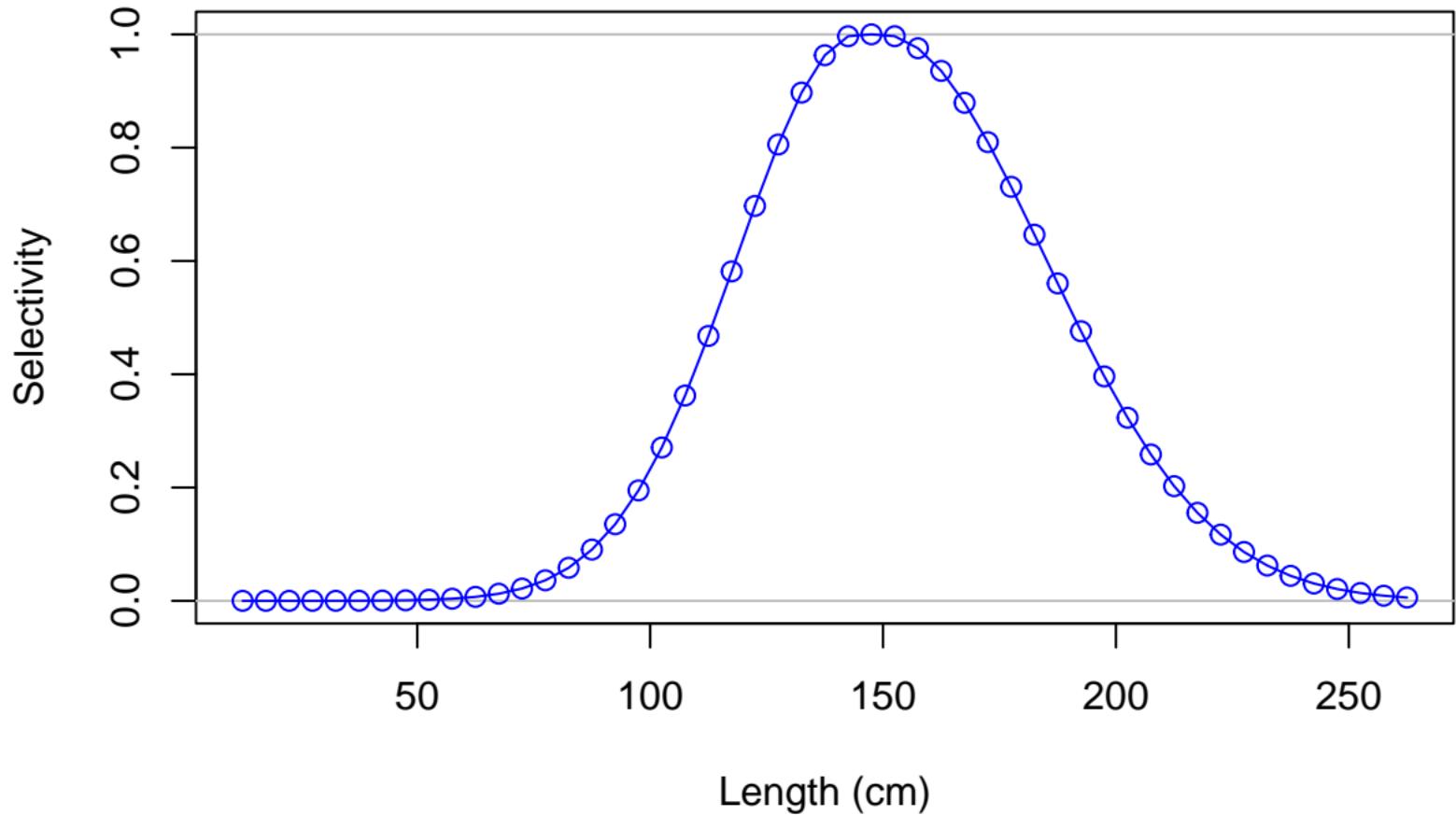
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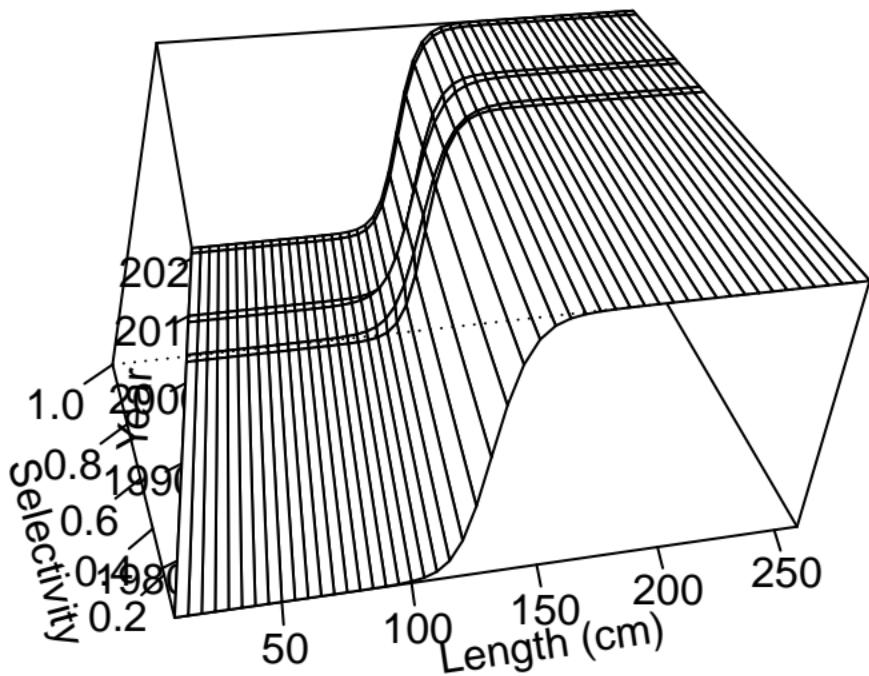
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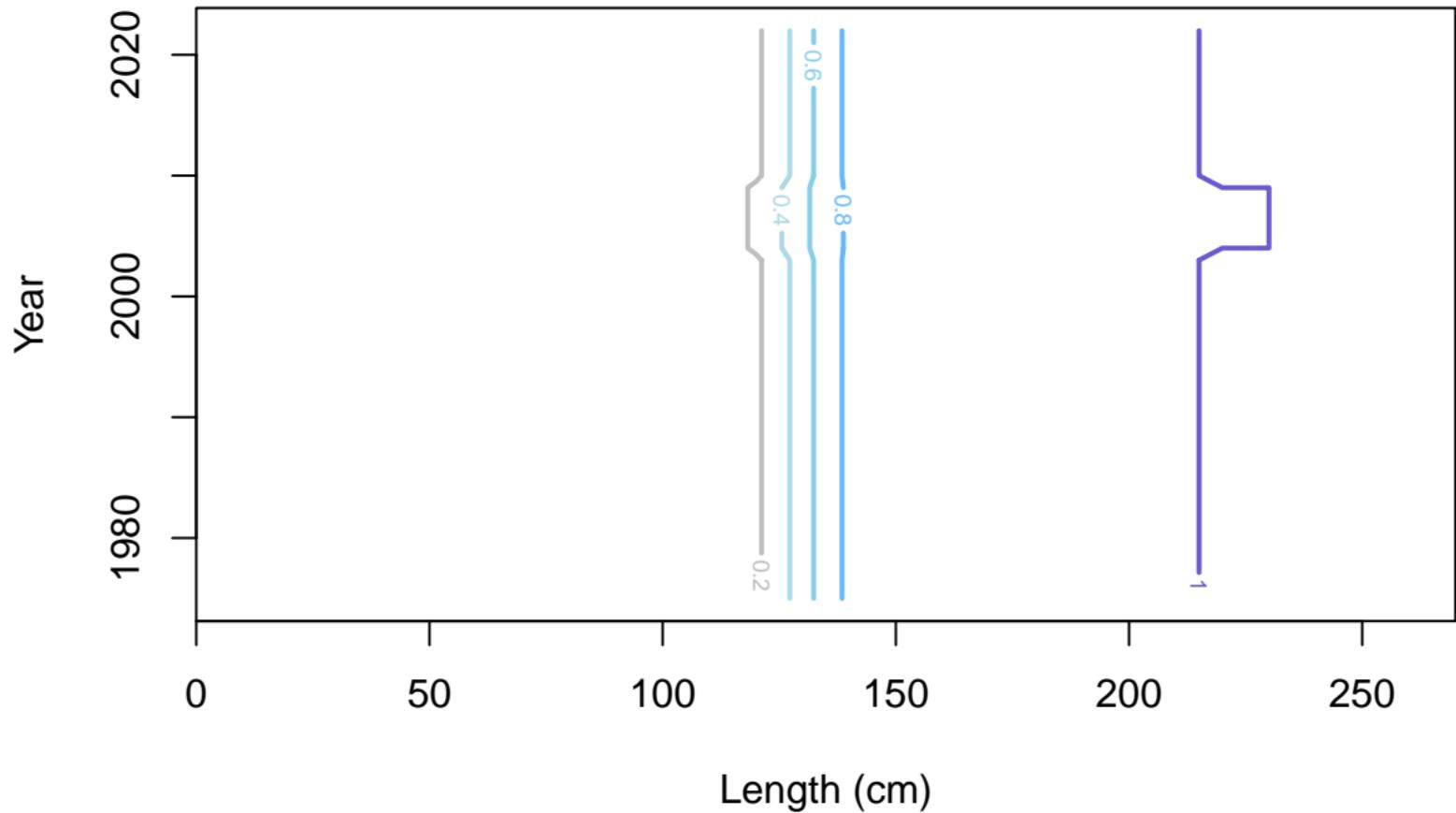
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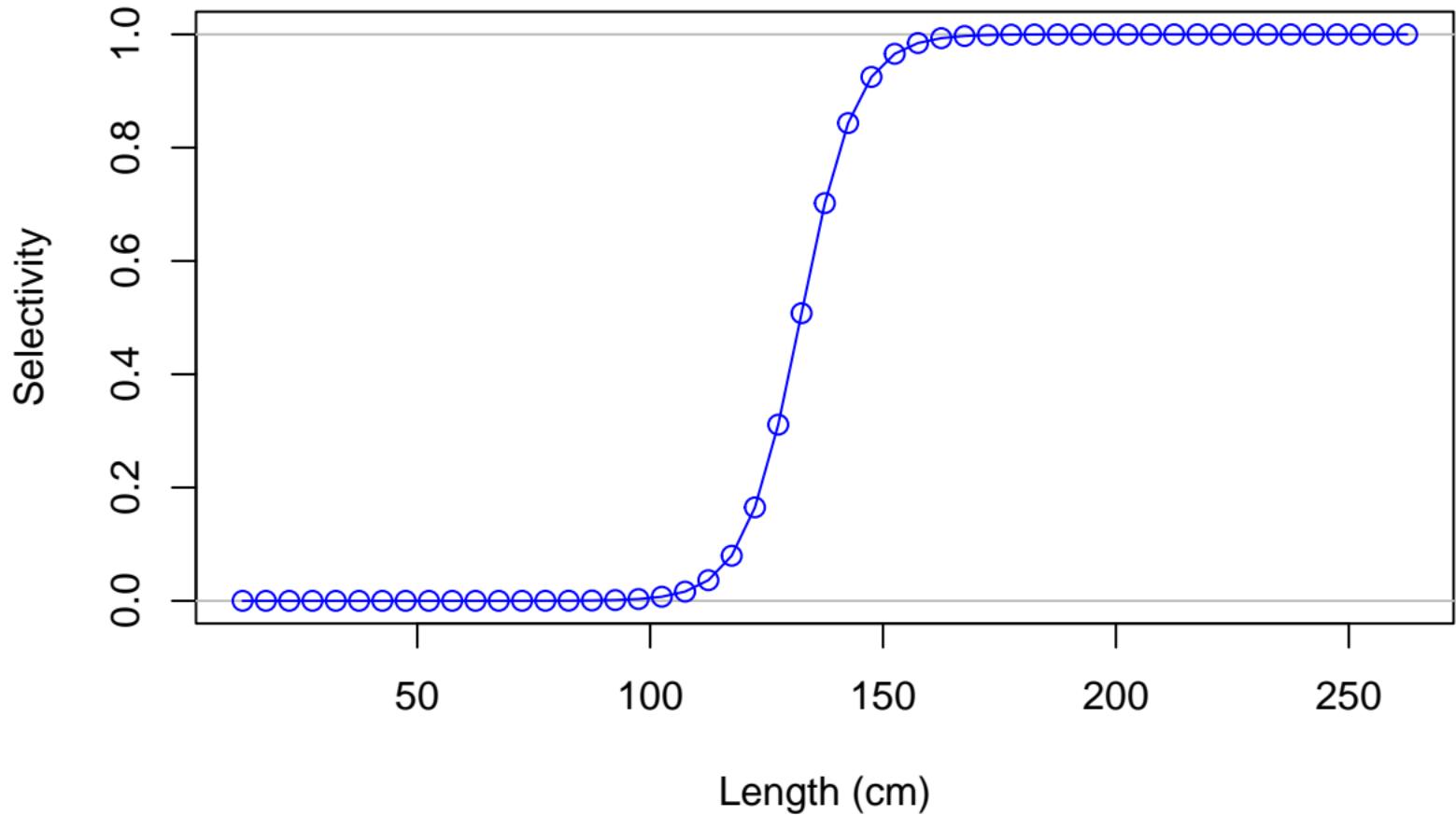
Length (cm)

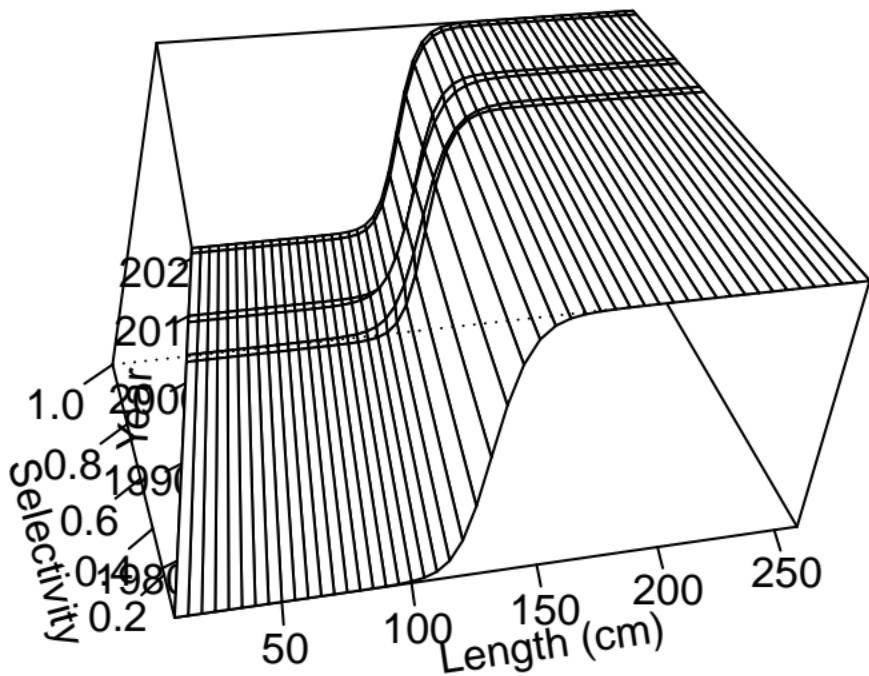


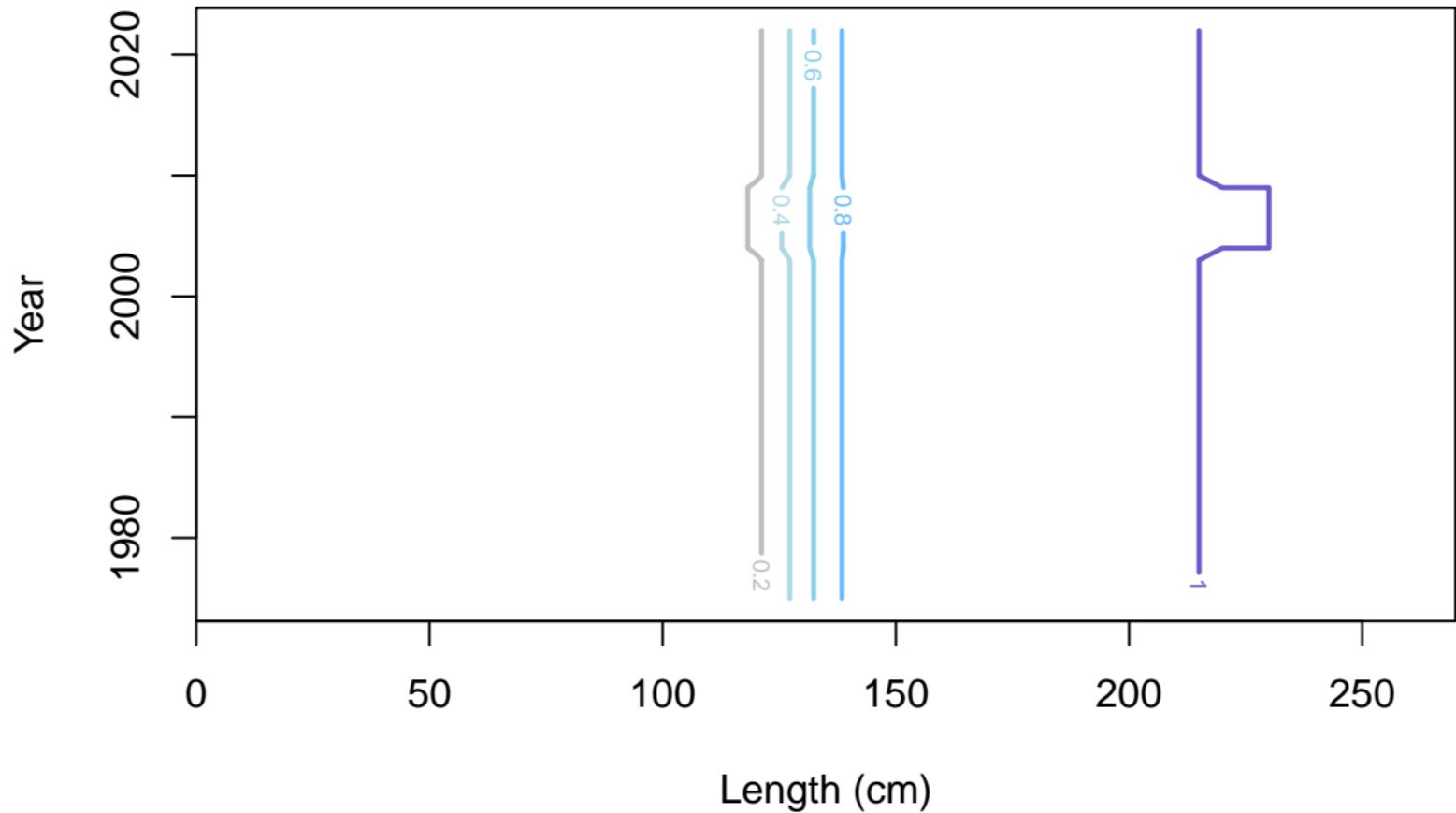


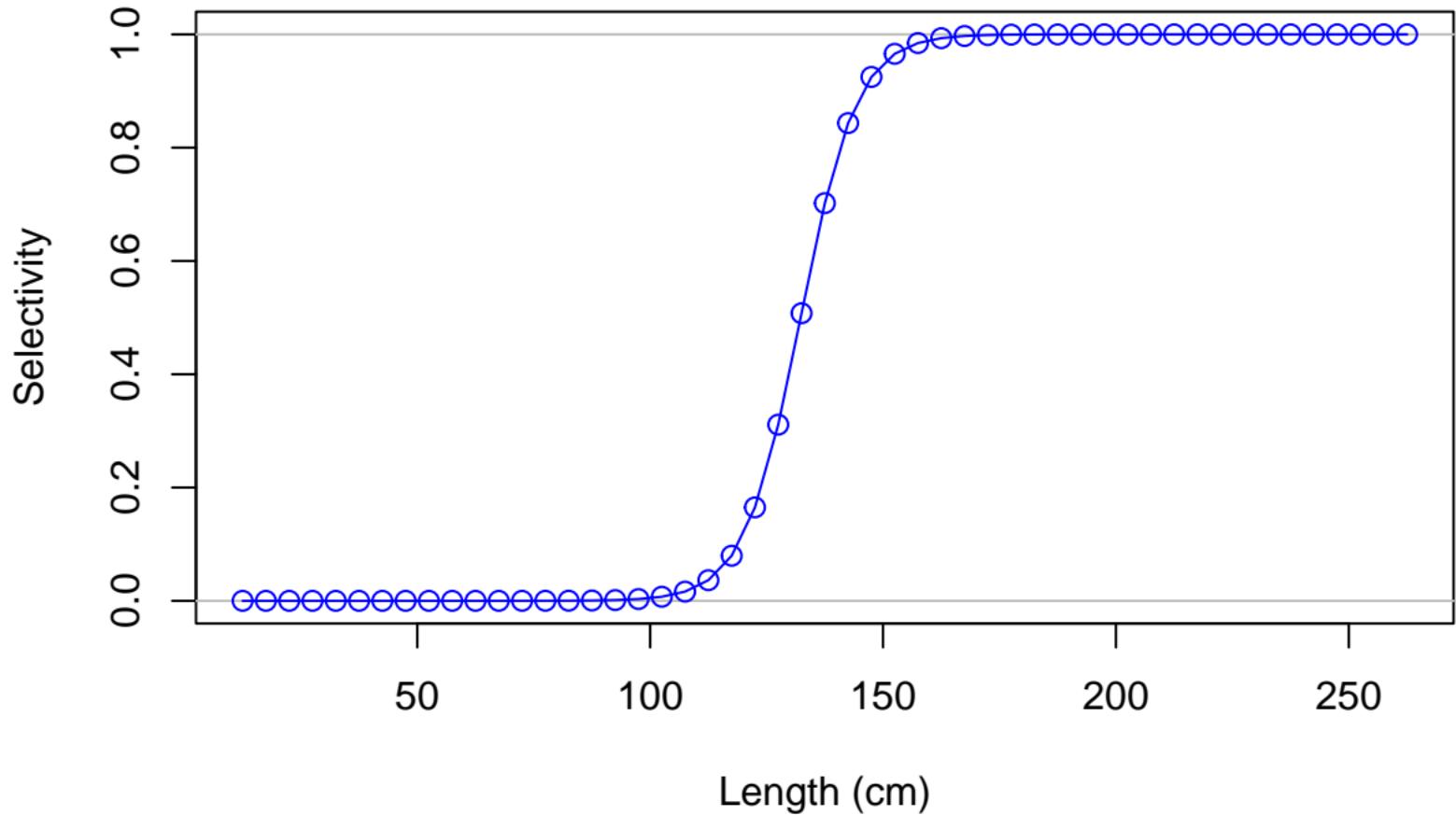


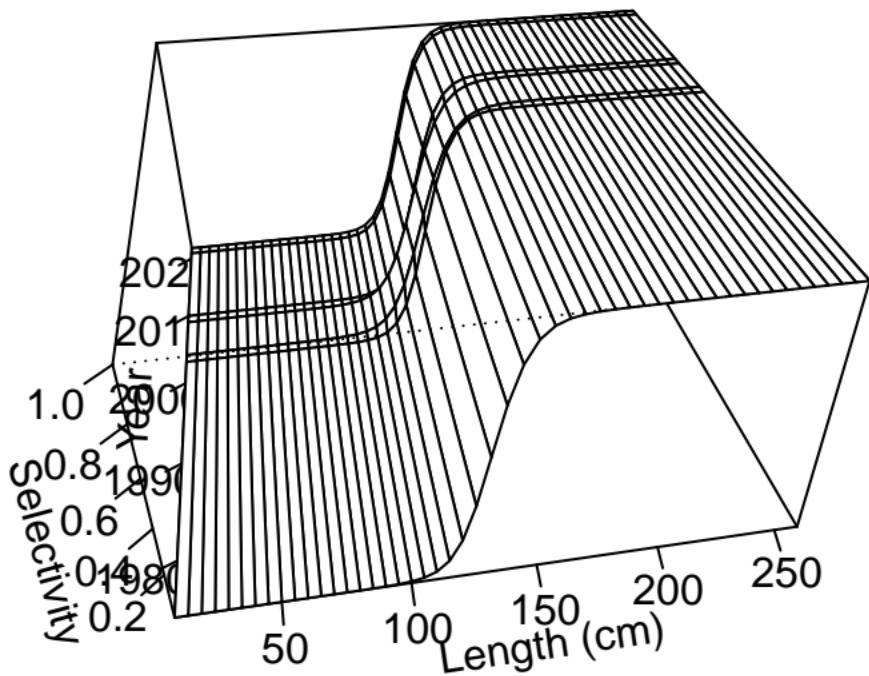


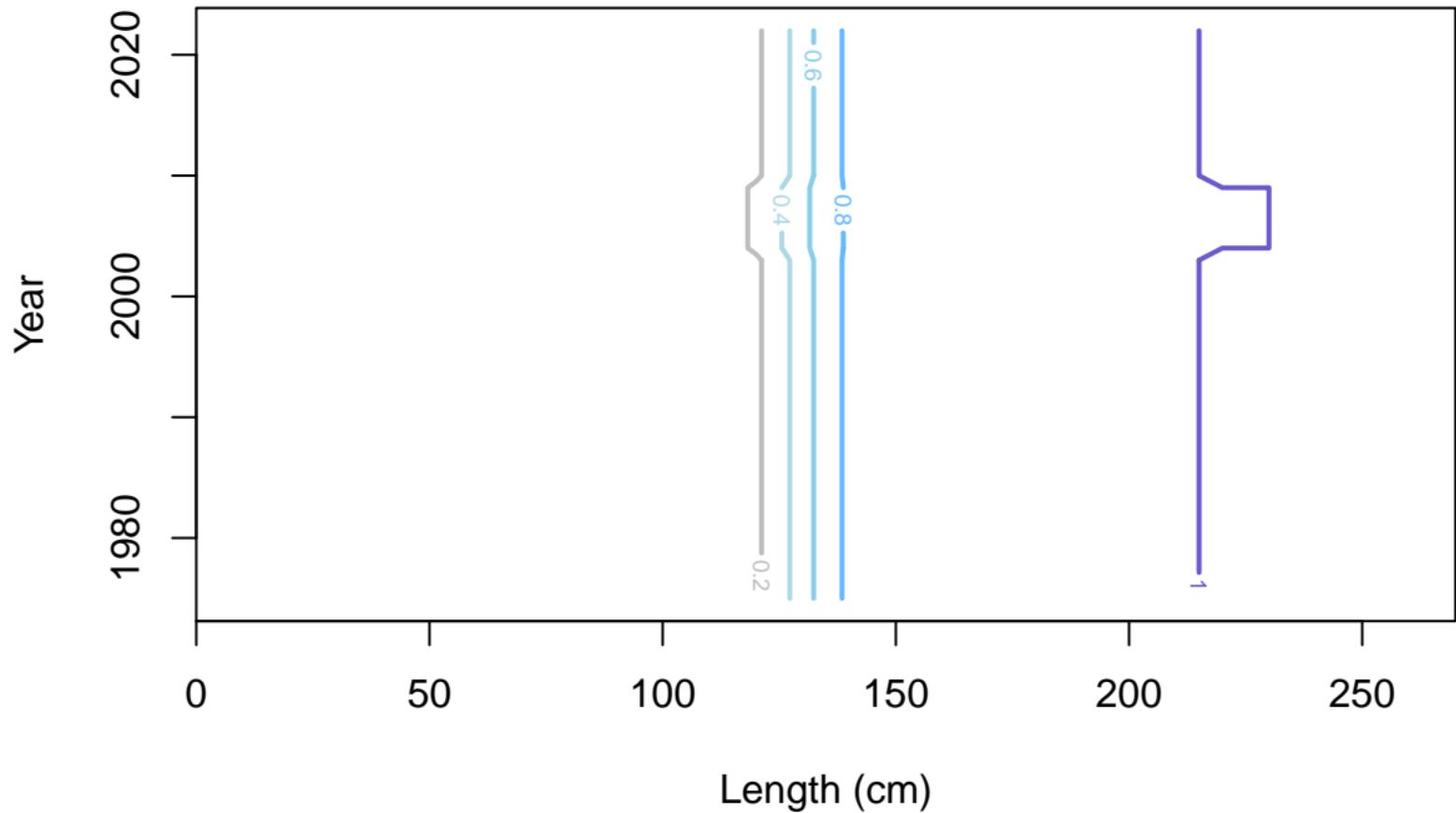


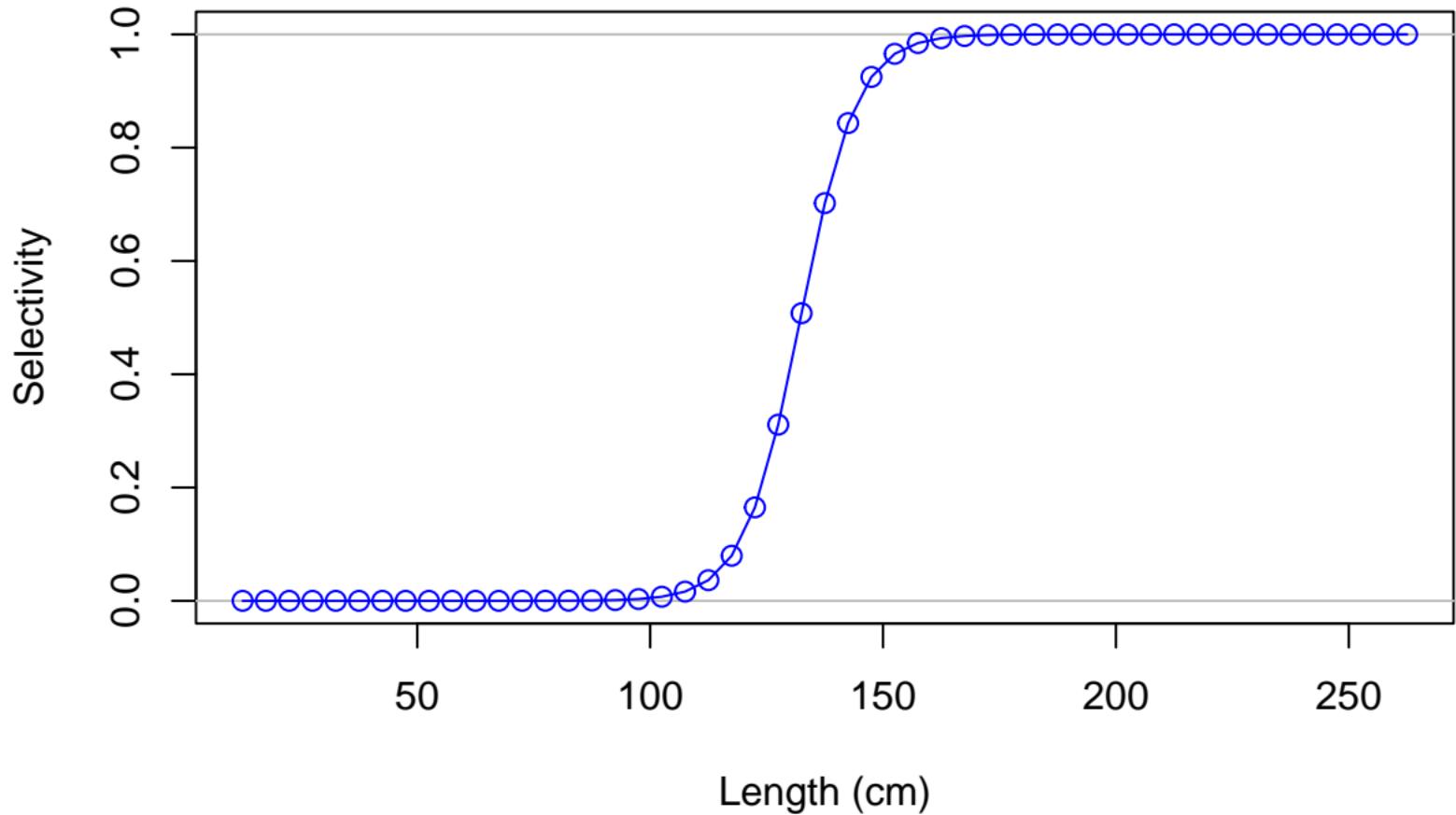


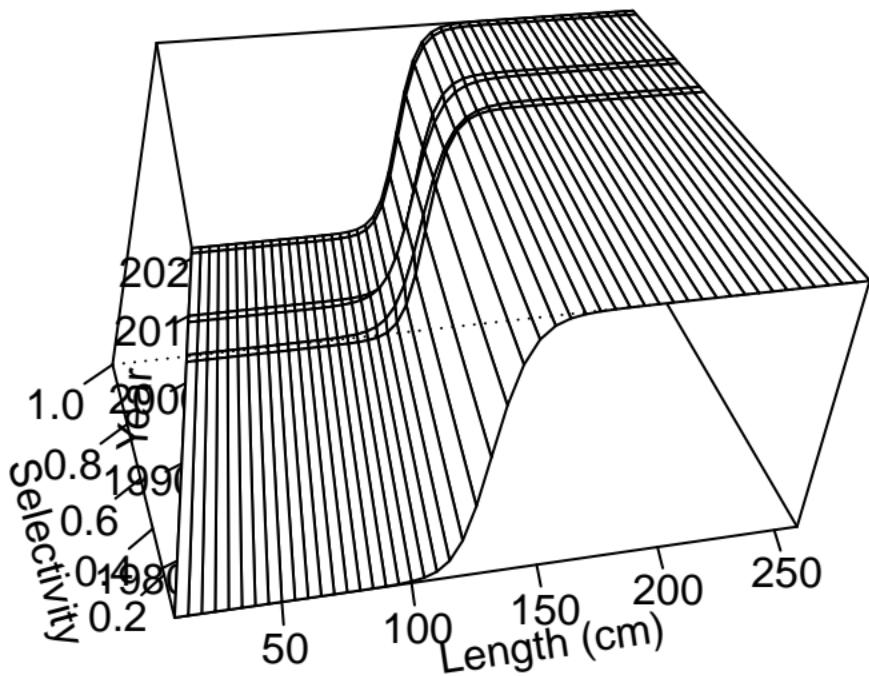


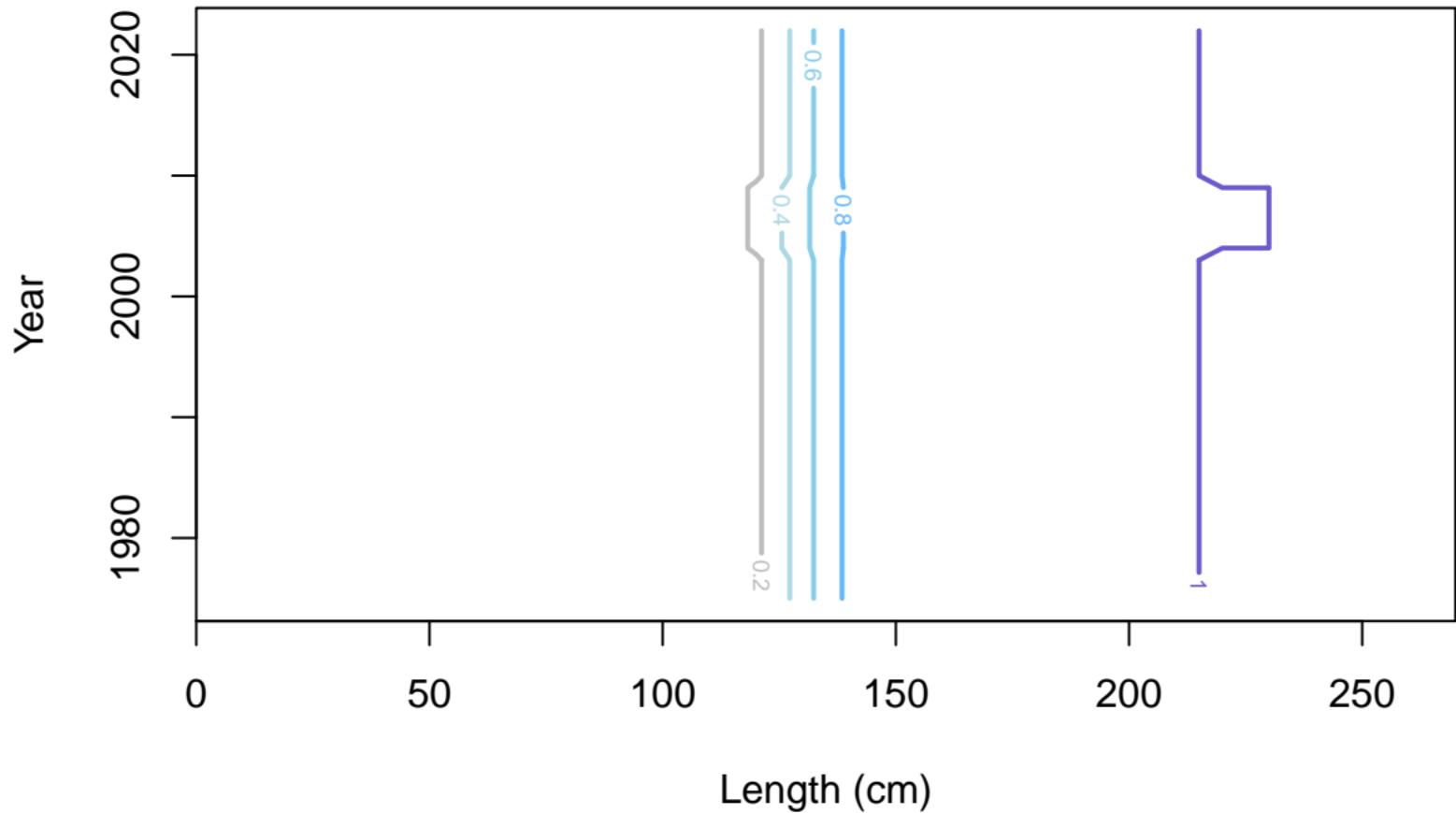


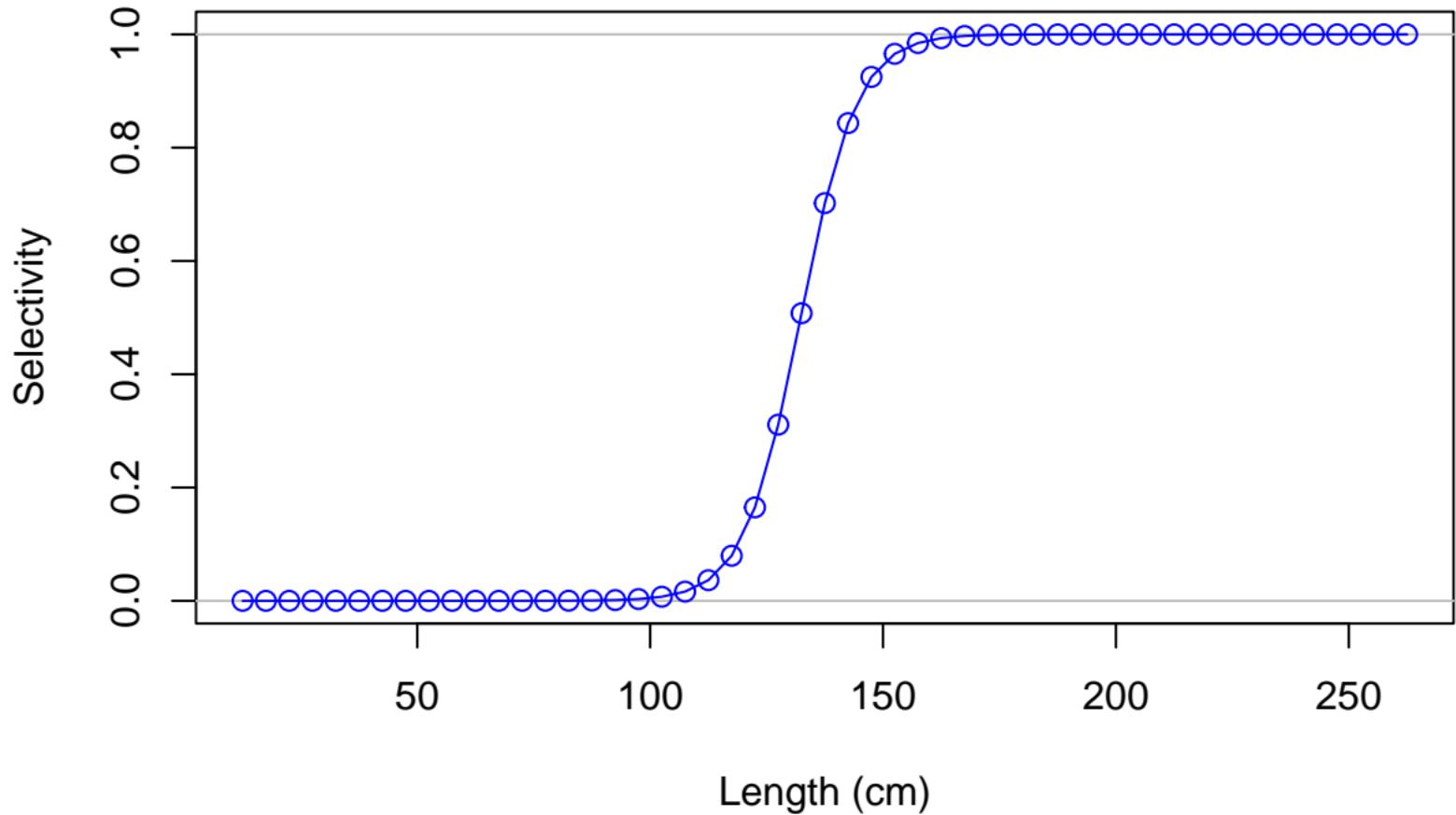


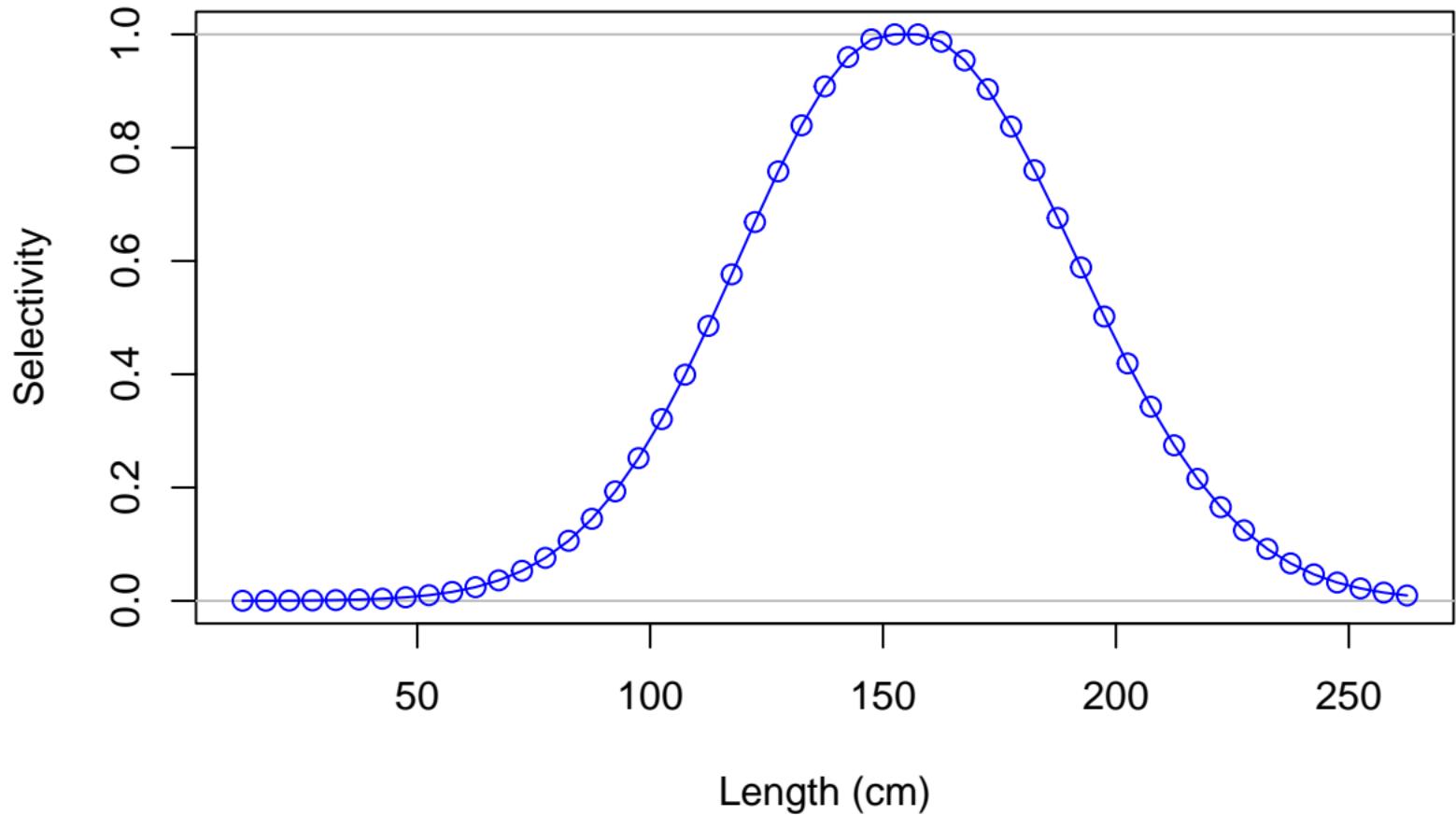


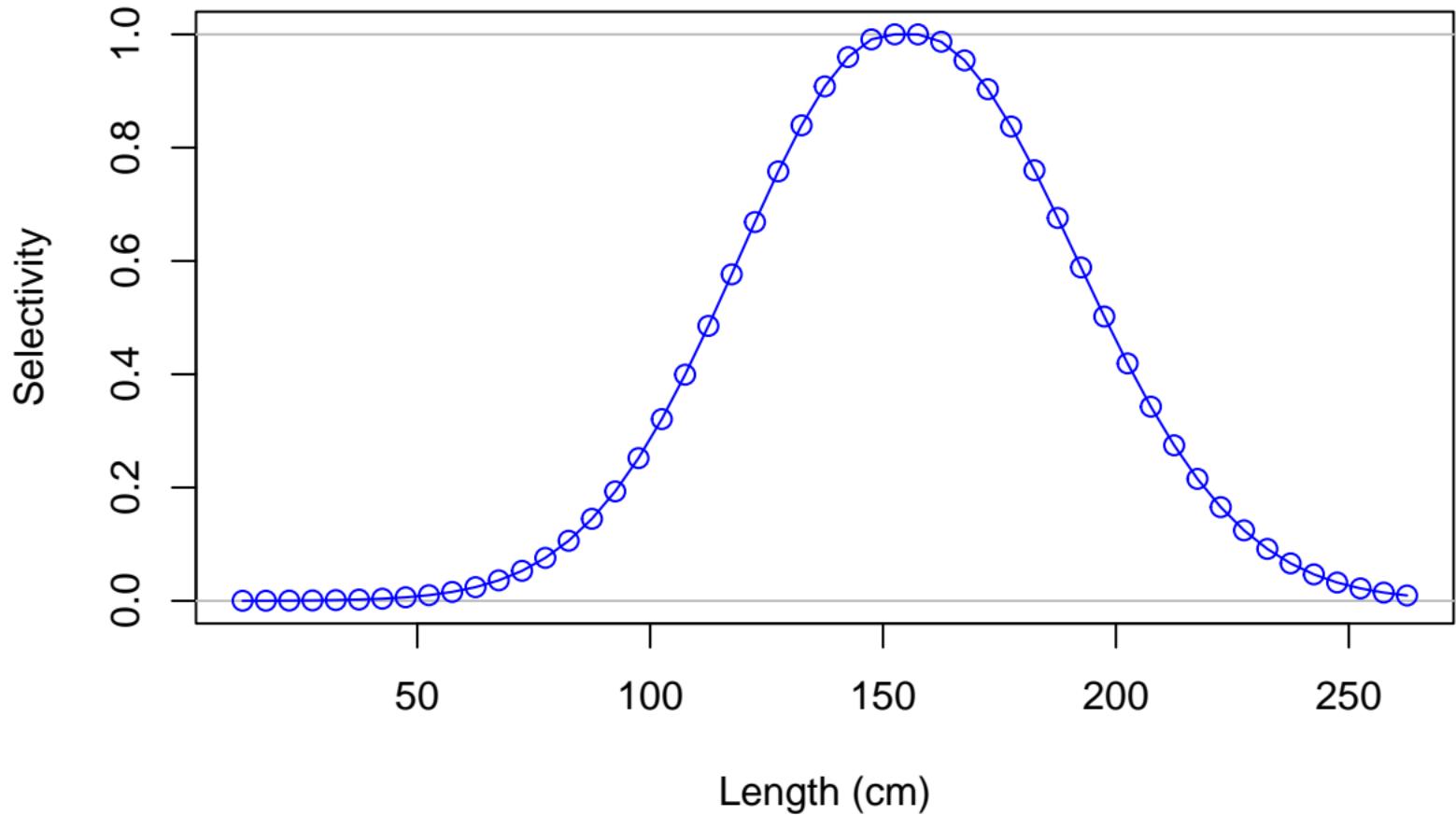


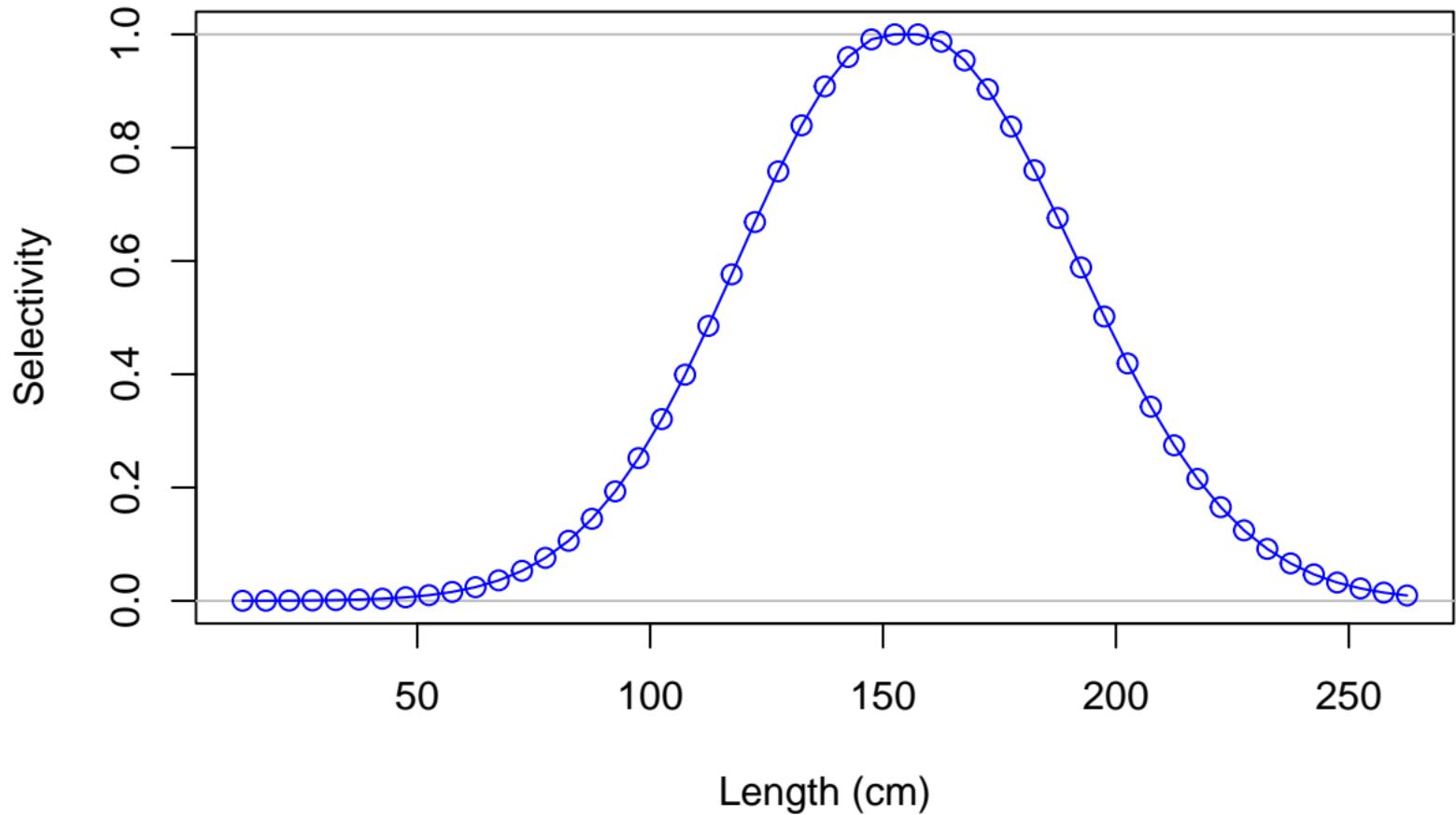


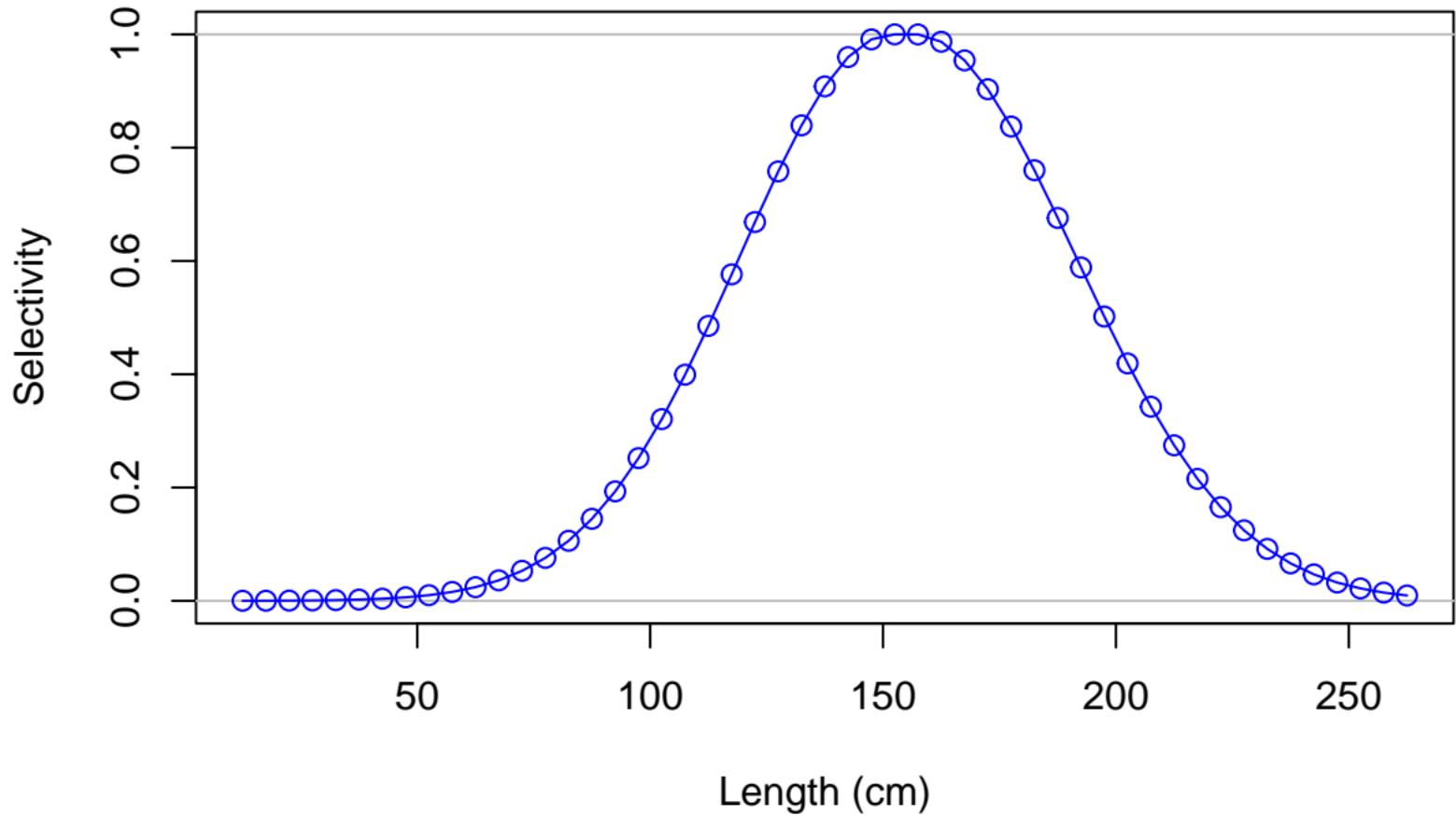


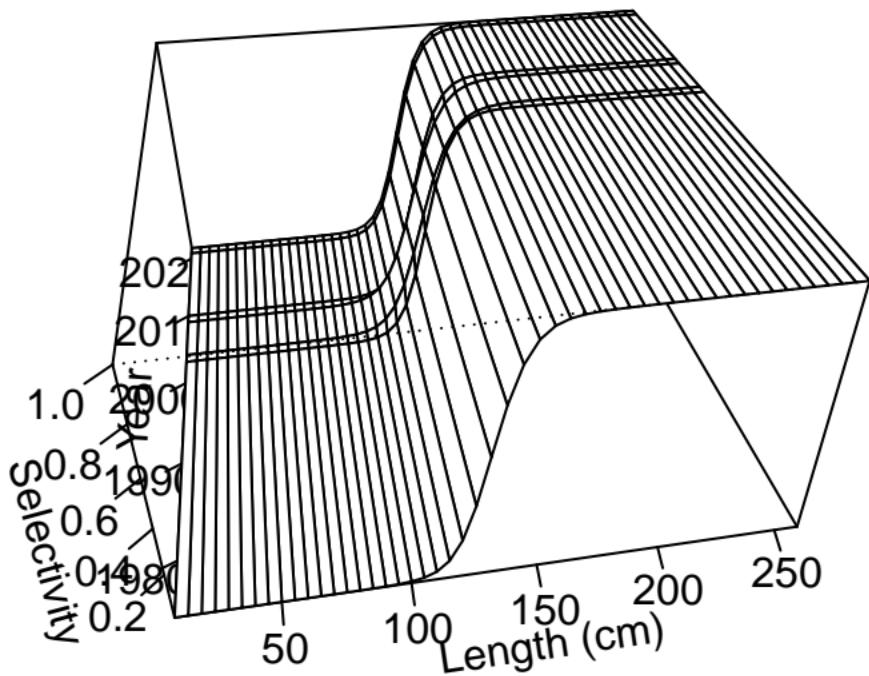


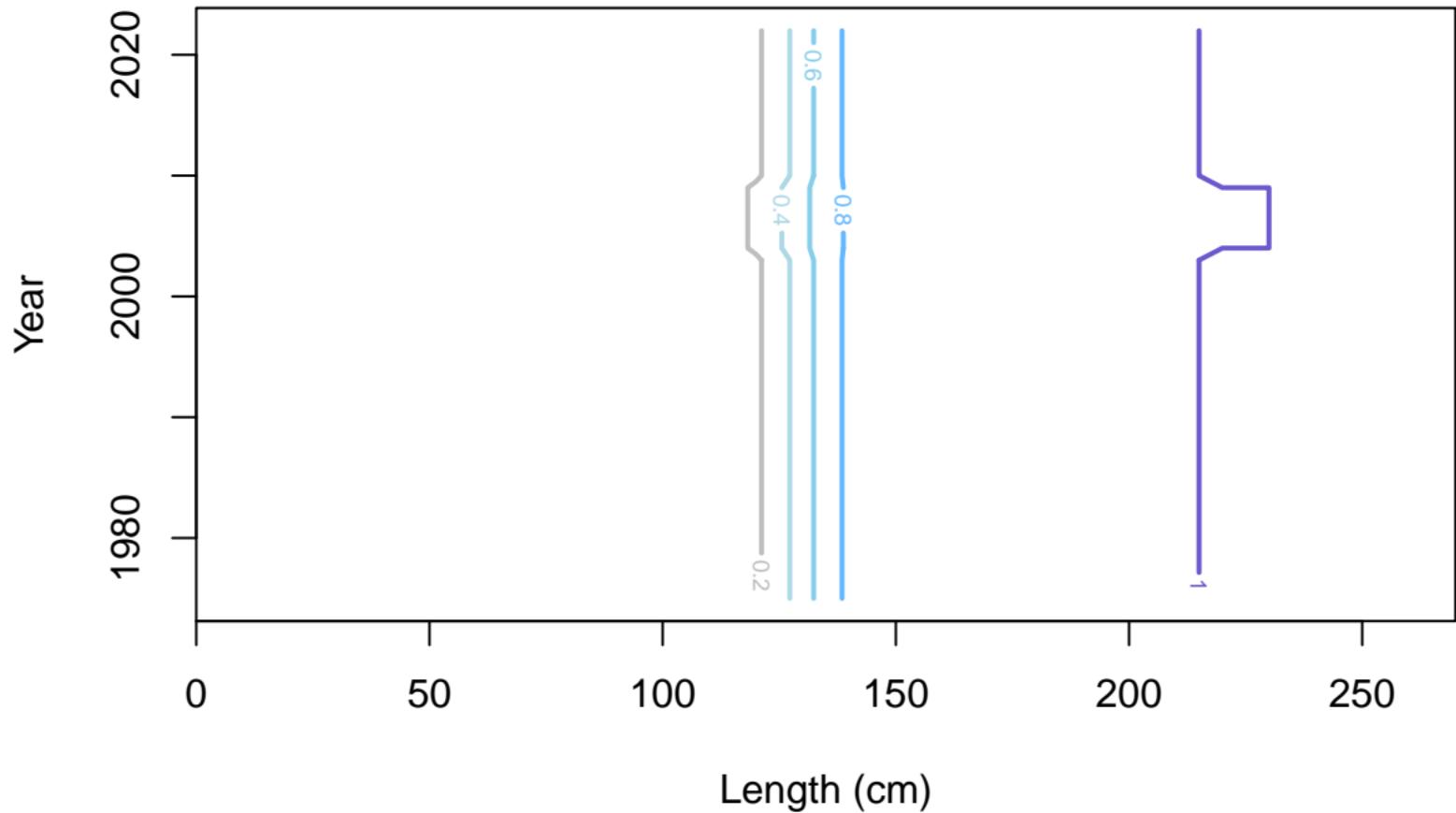


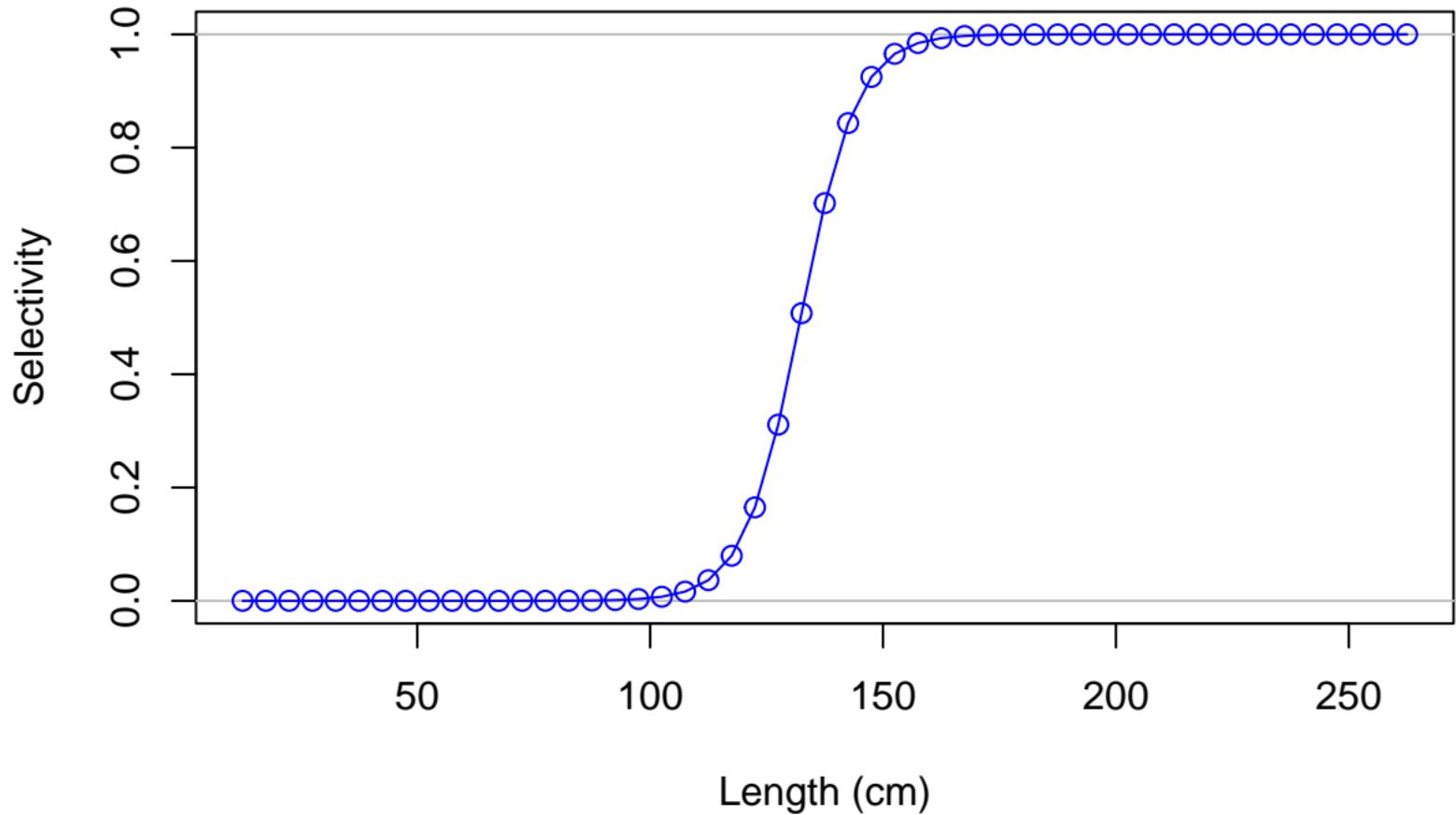


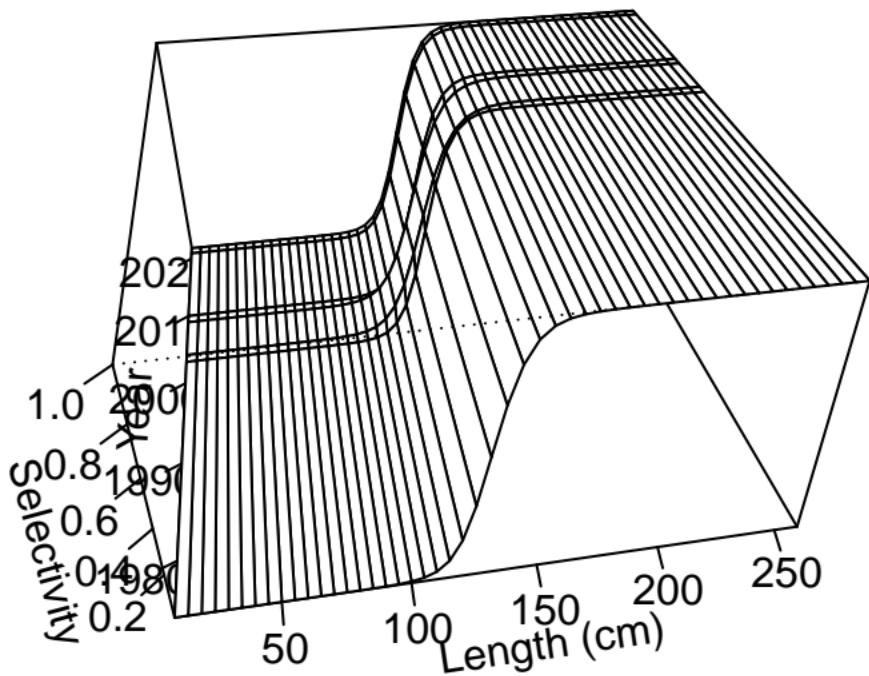


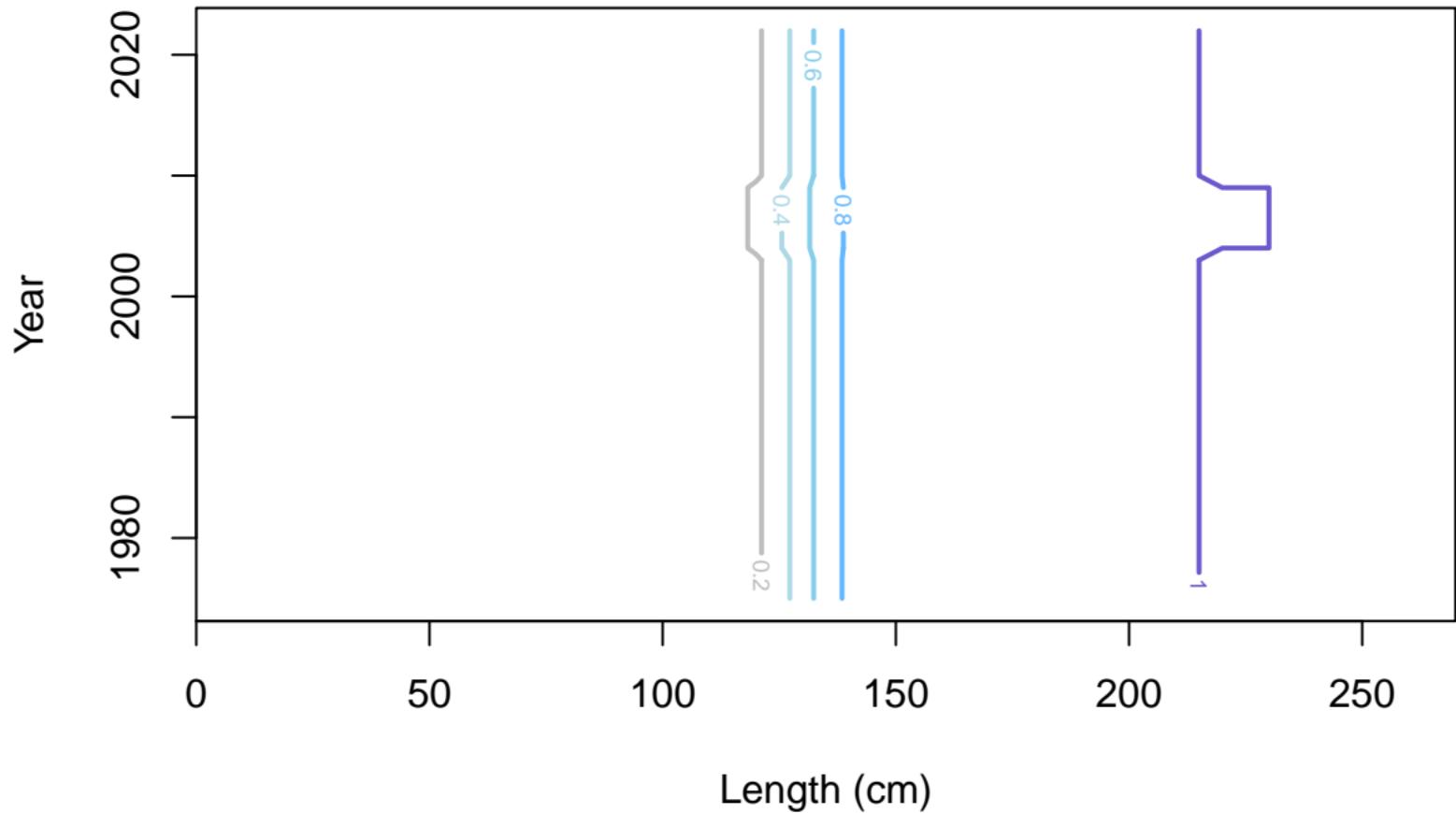


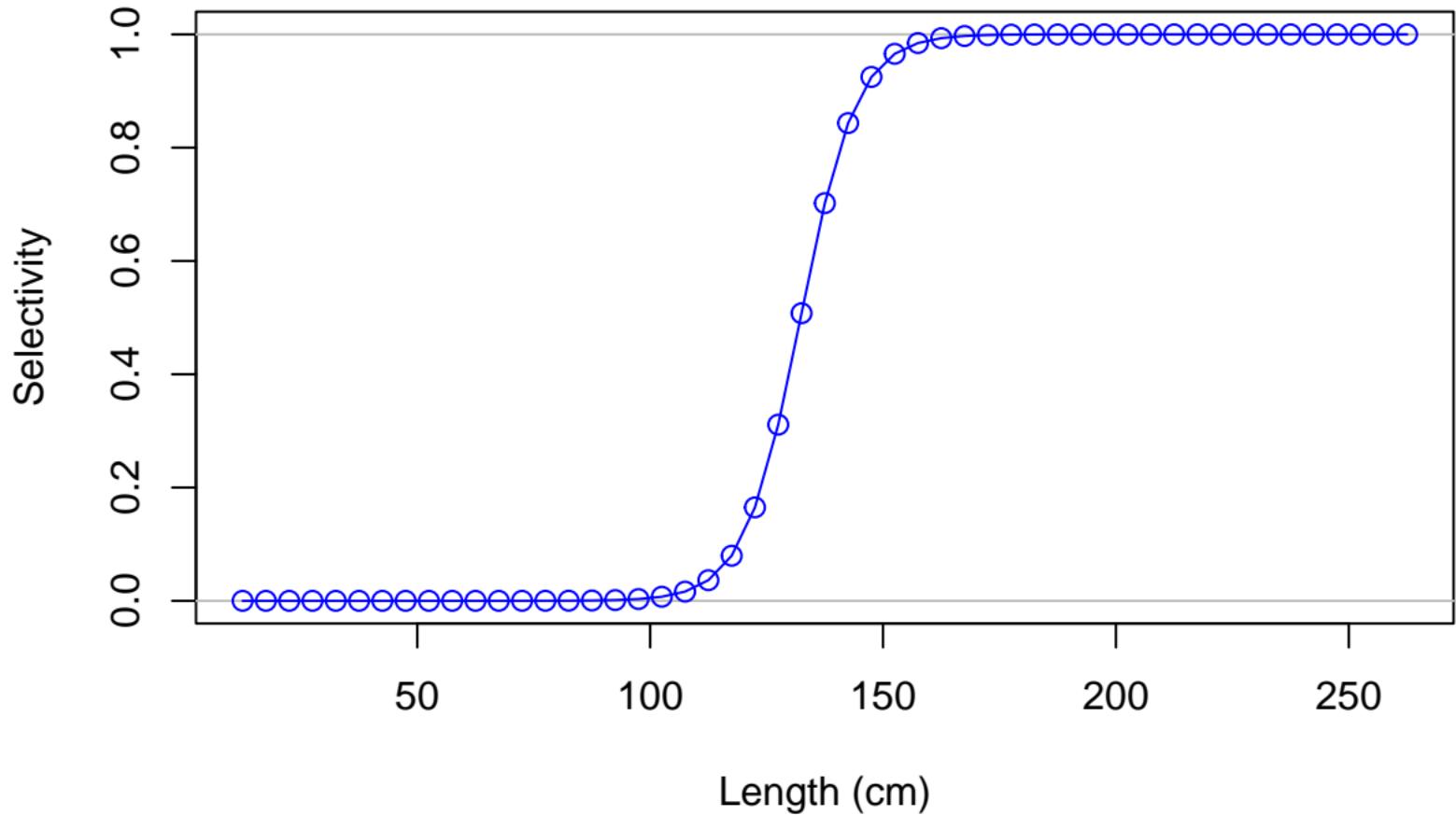


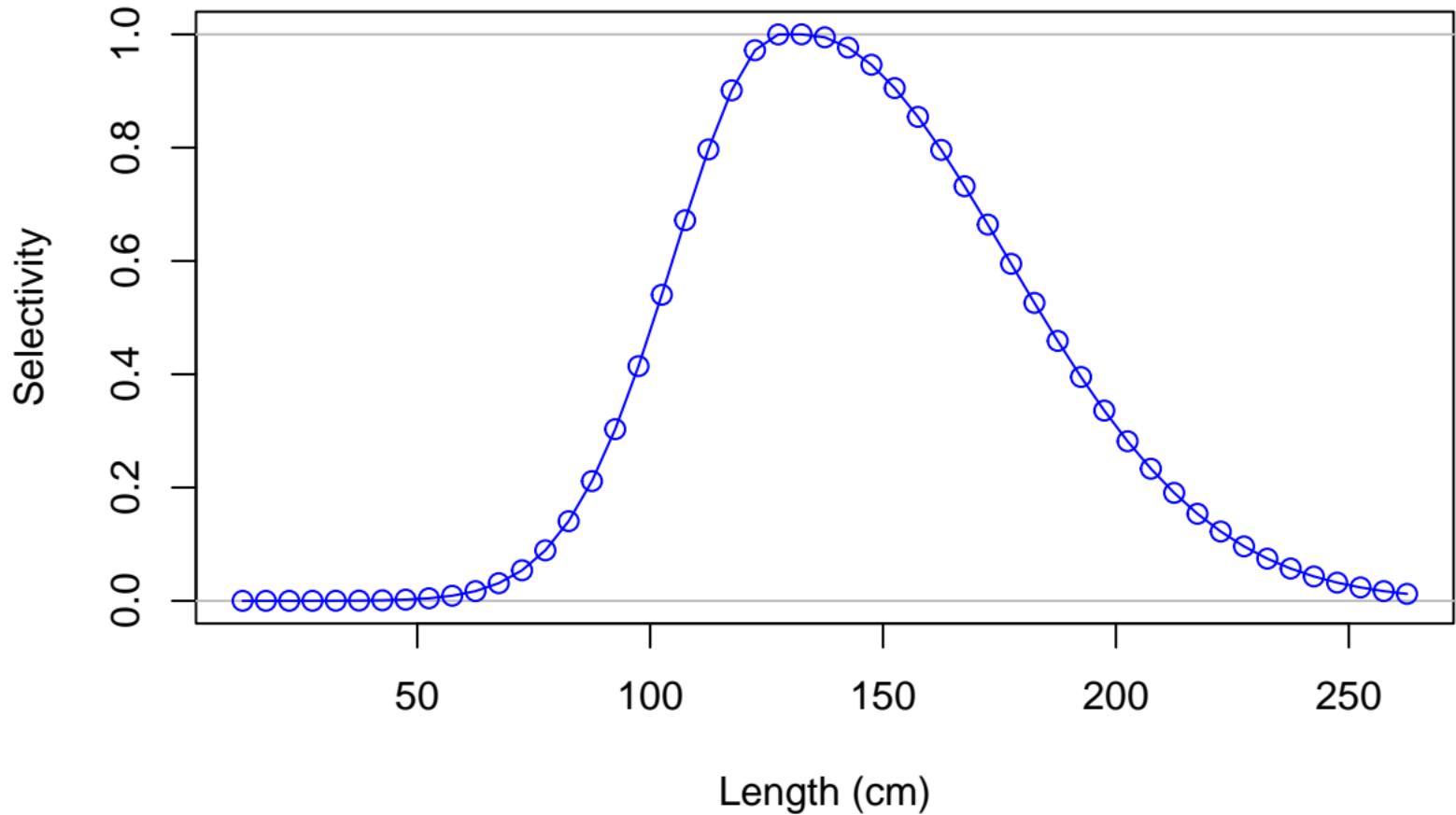


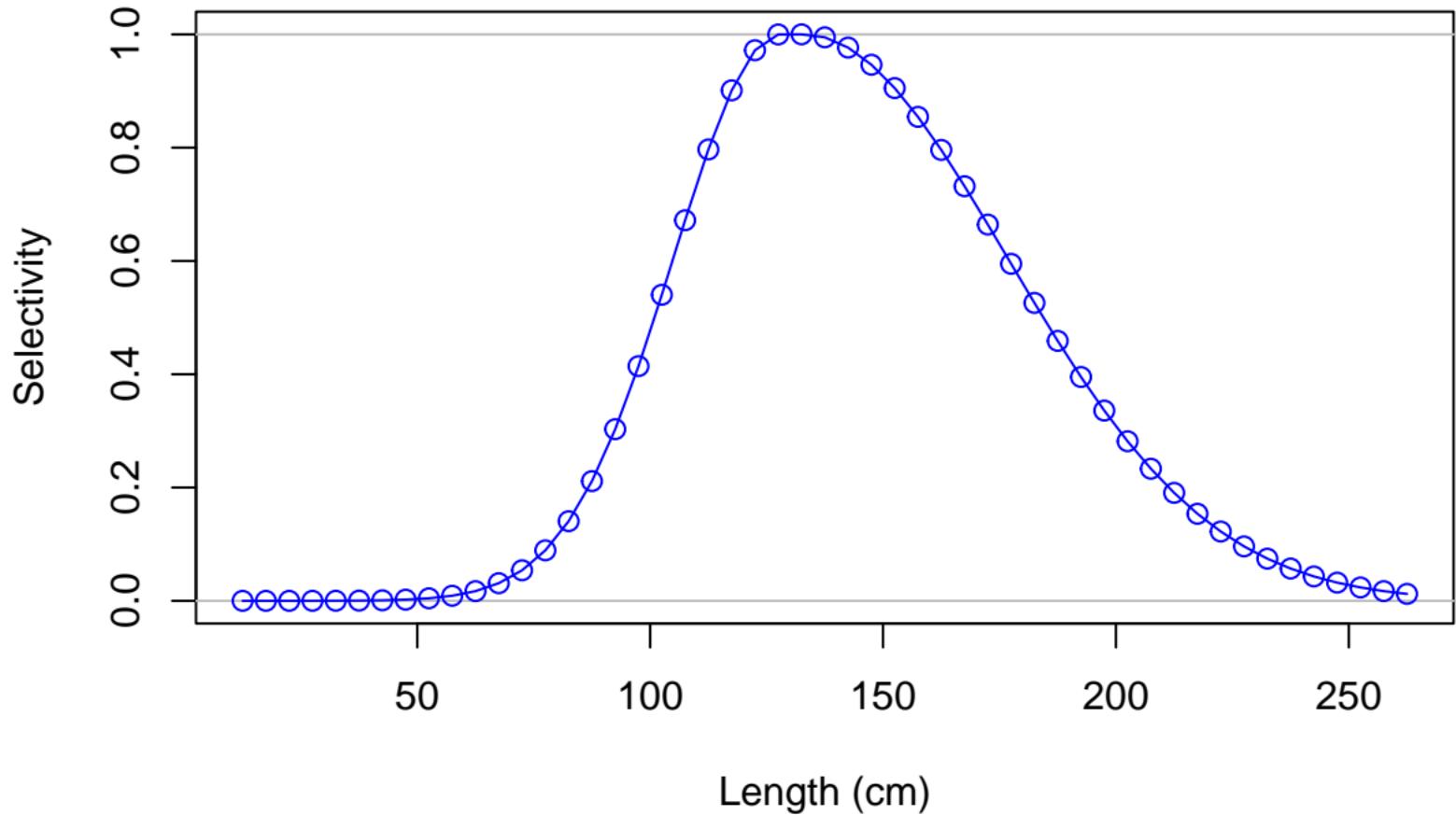


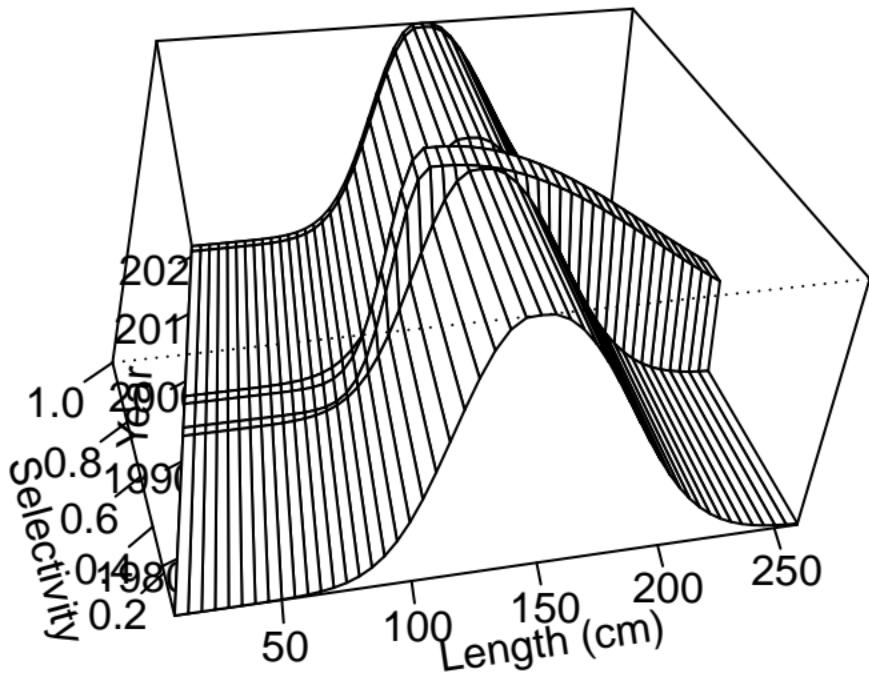












Year

2020

2000

1980

0

50

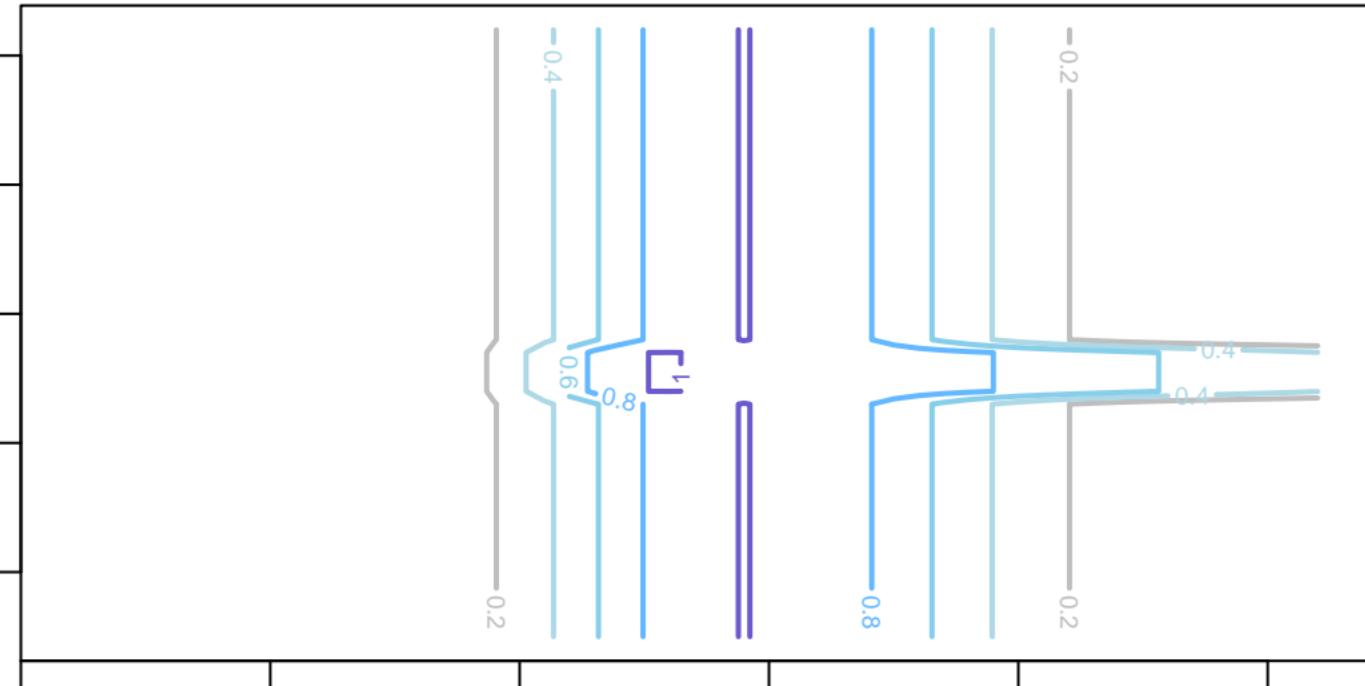
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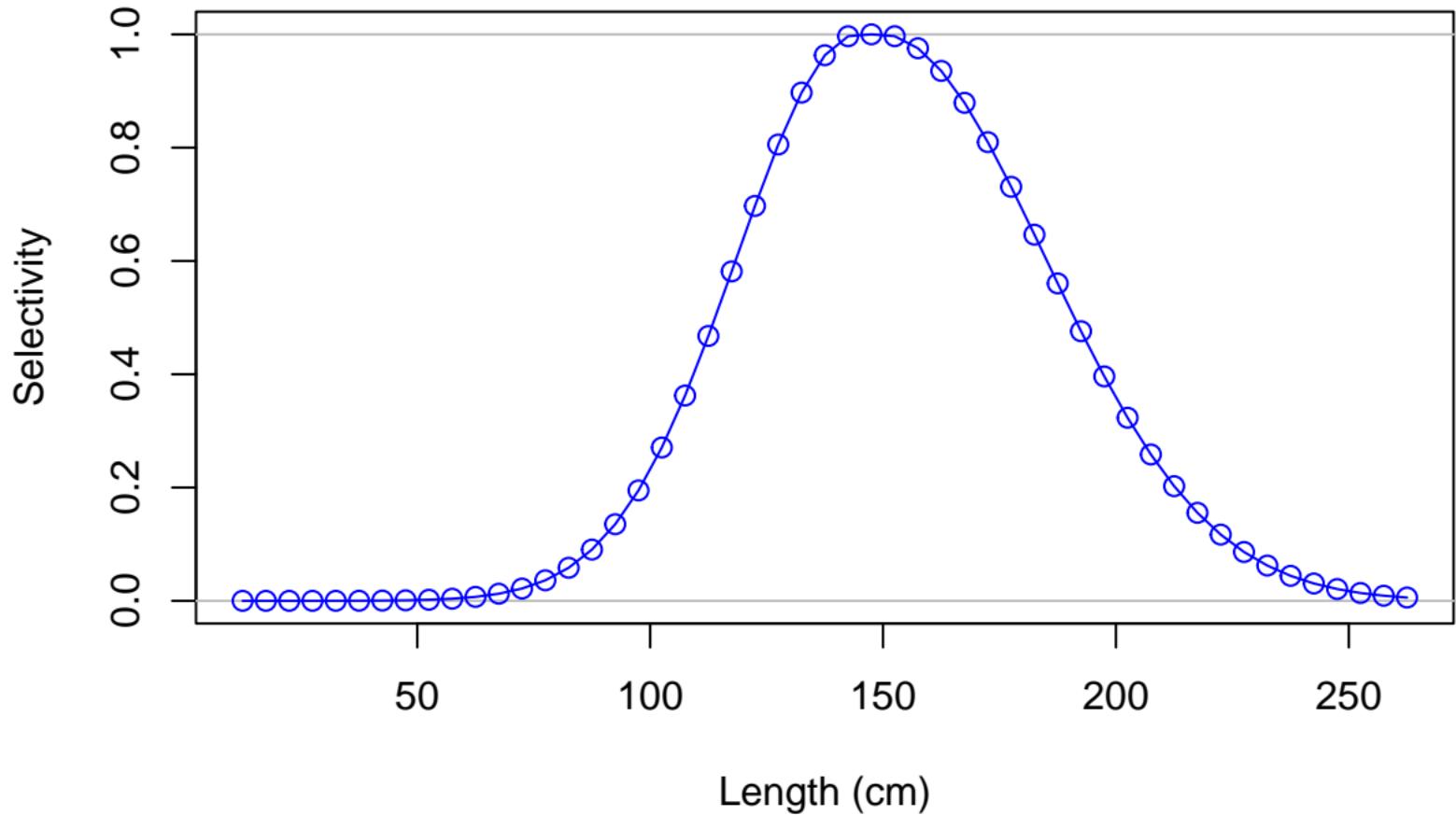
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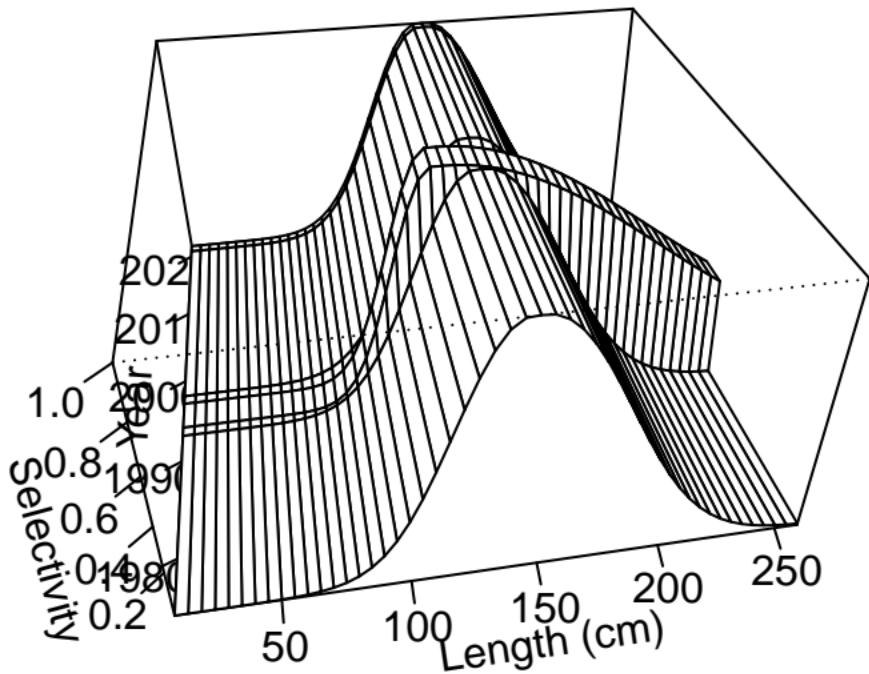
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Length (cm)







Year

2020

2000

1980

0

50

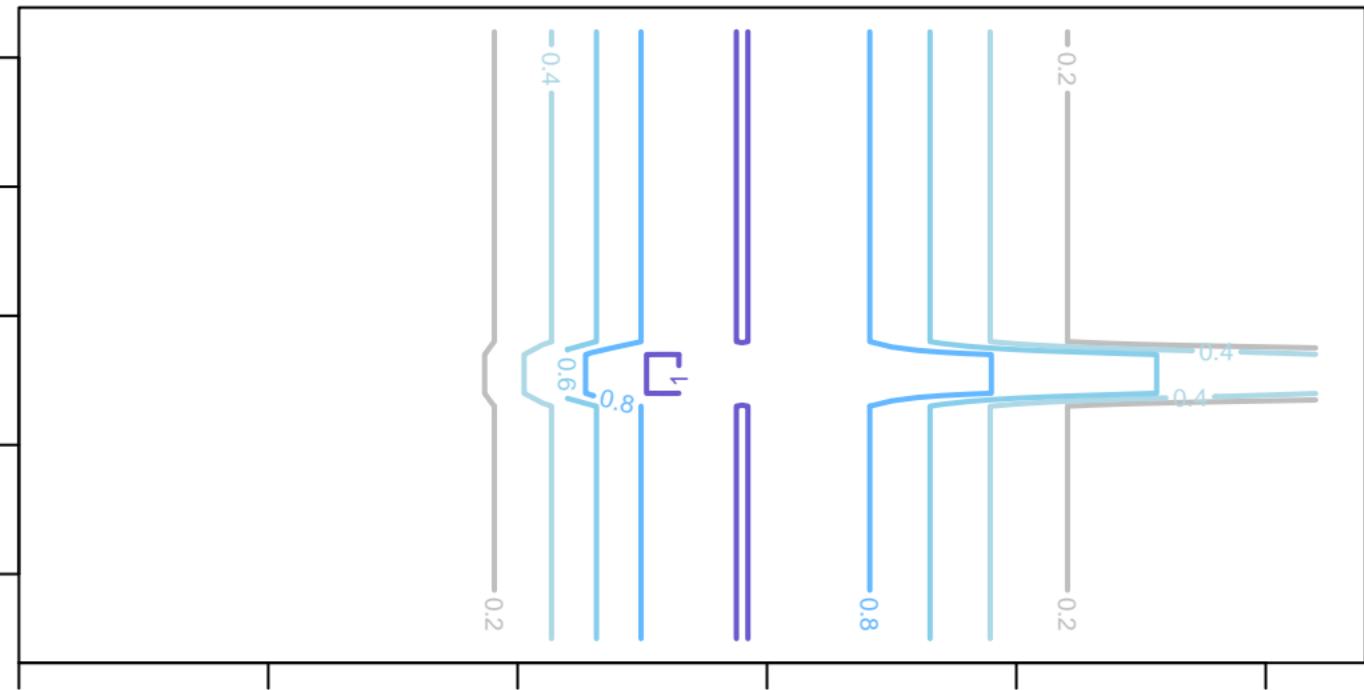
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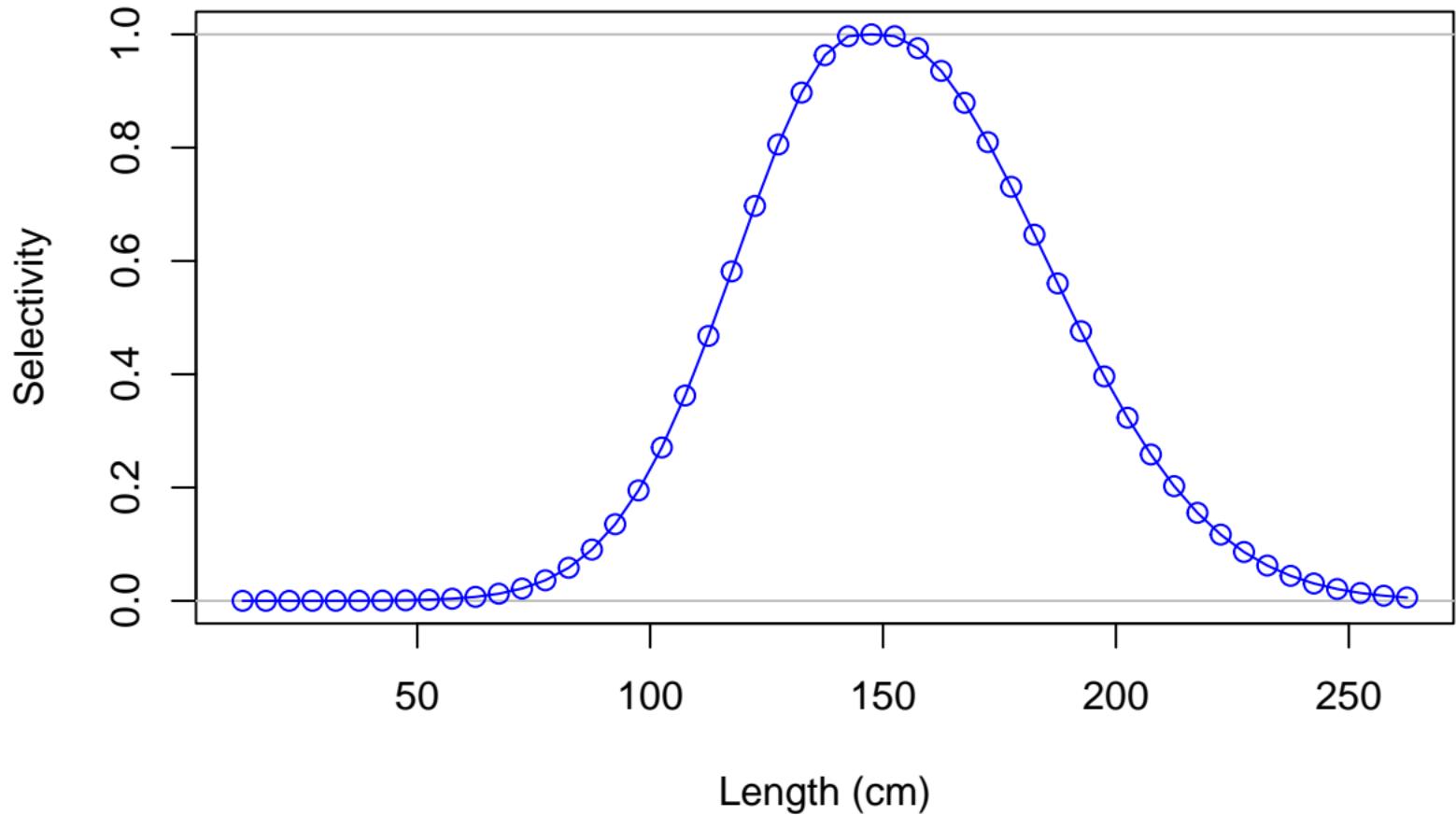
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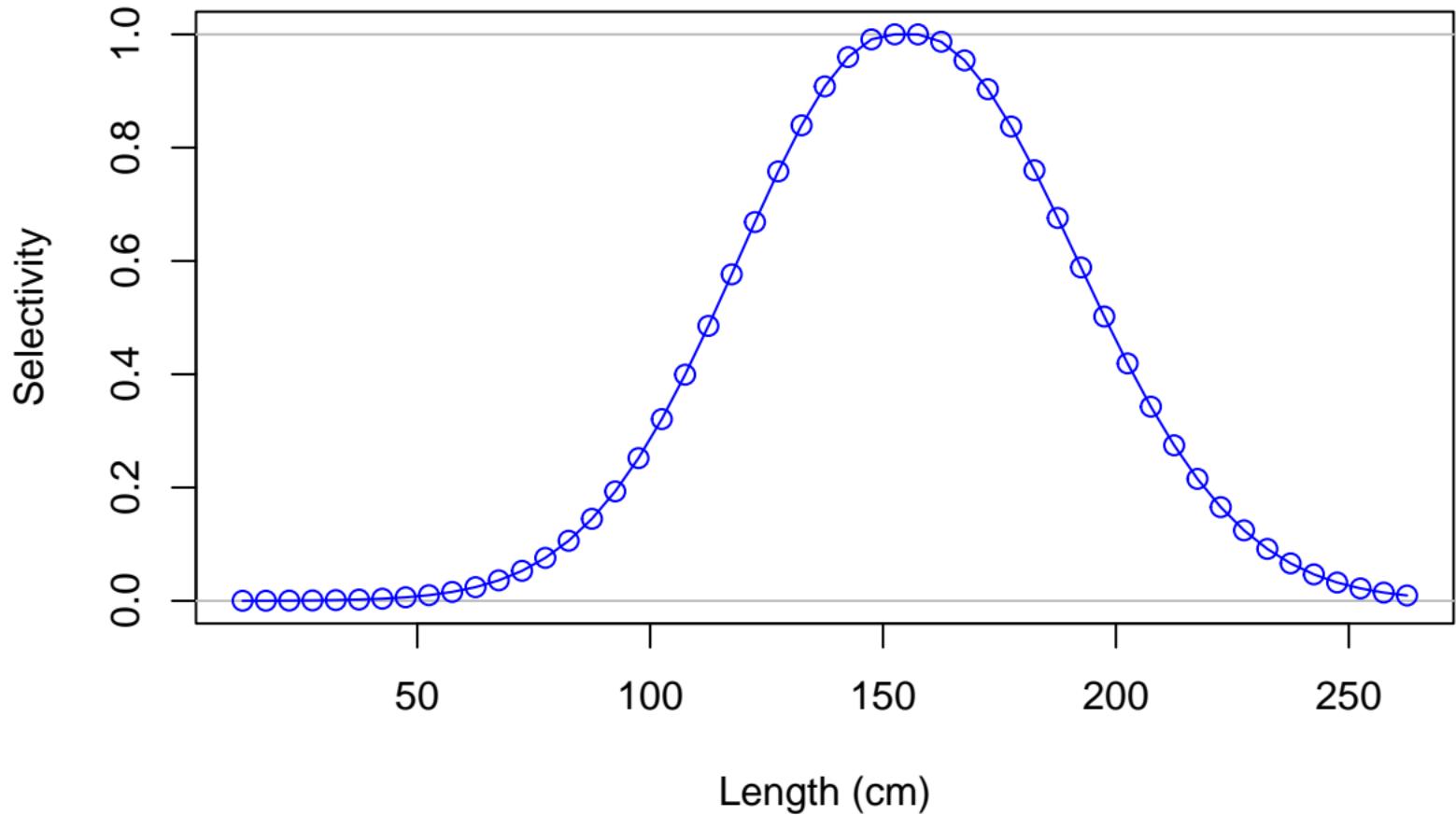
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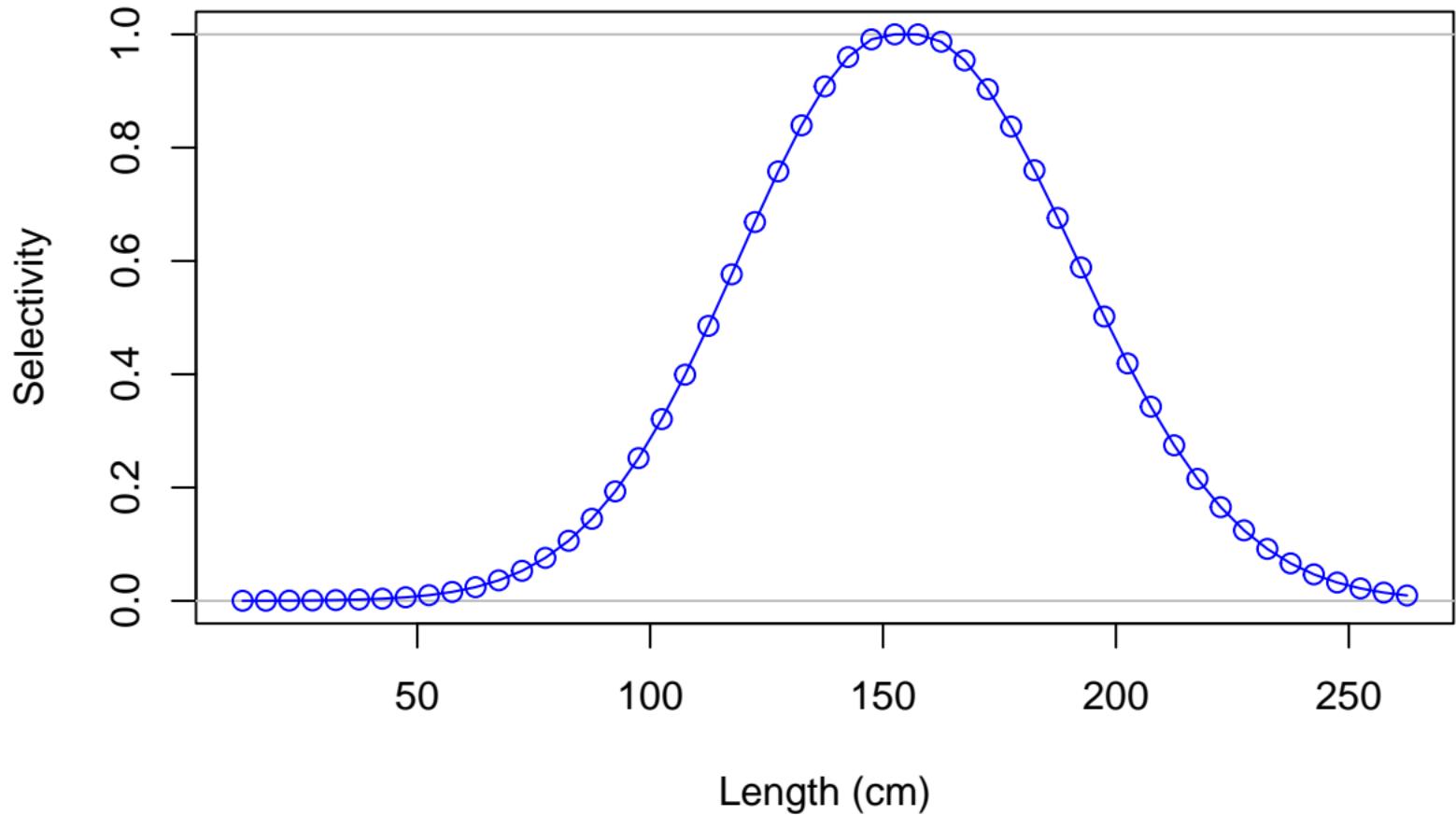
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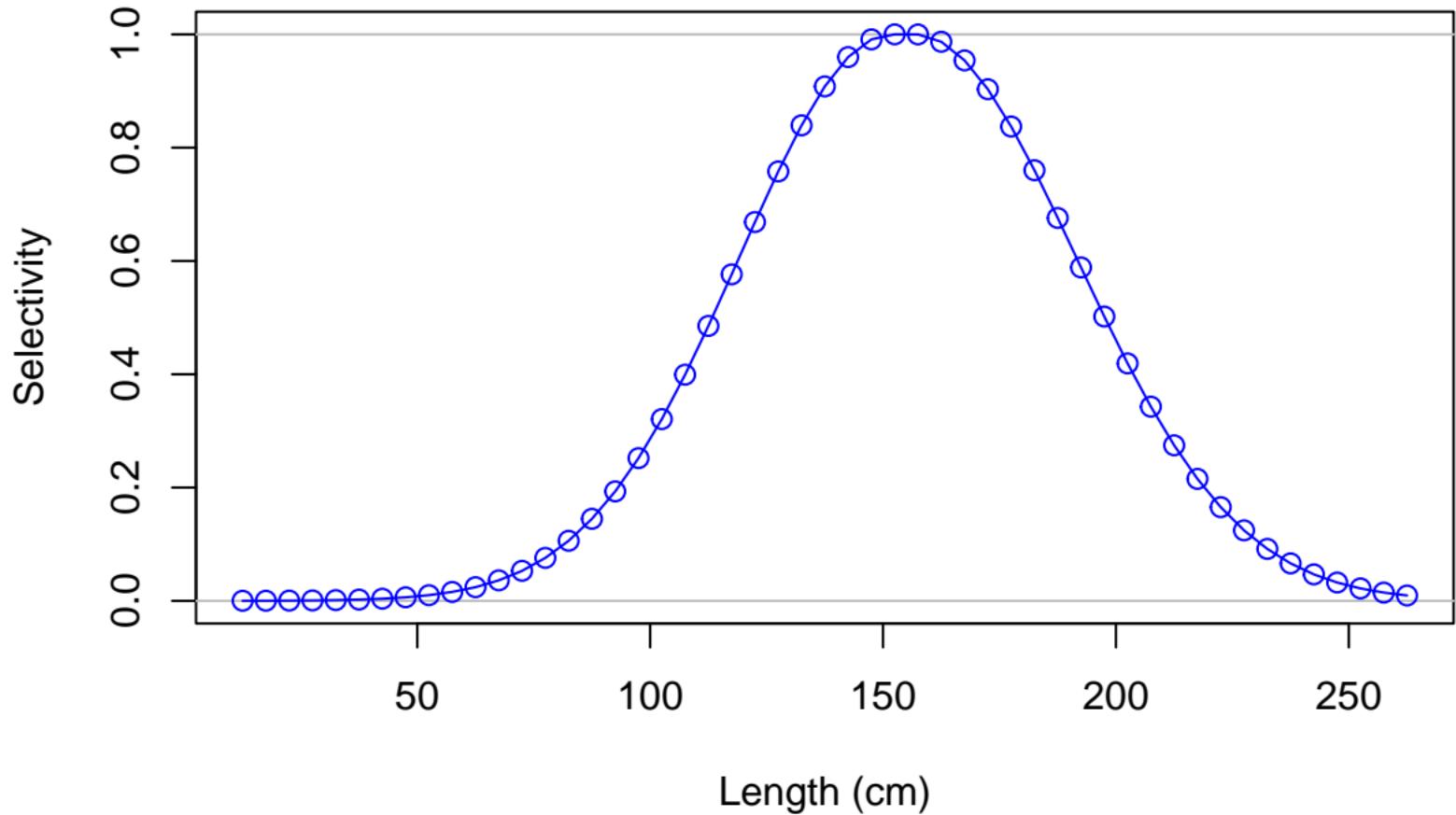
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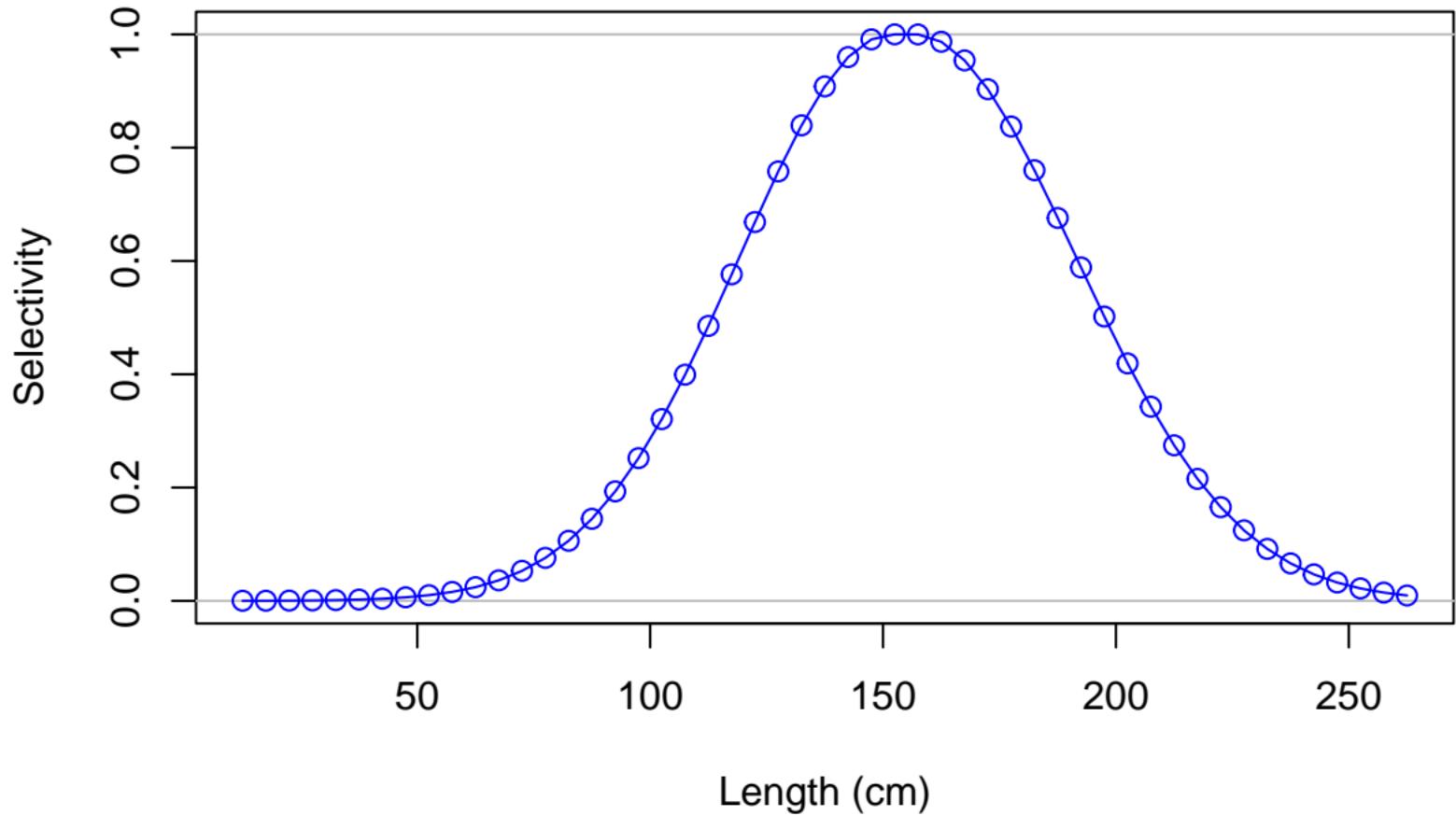


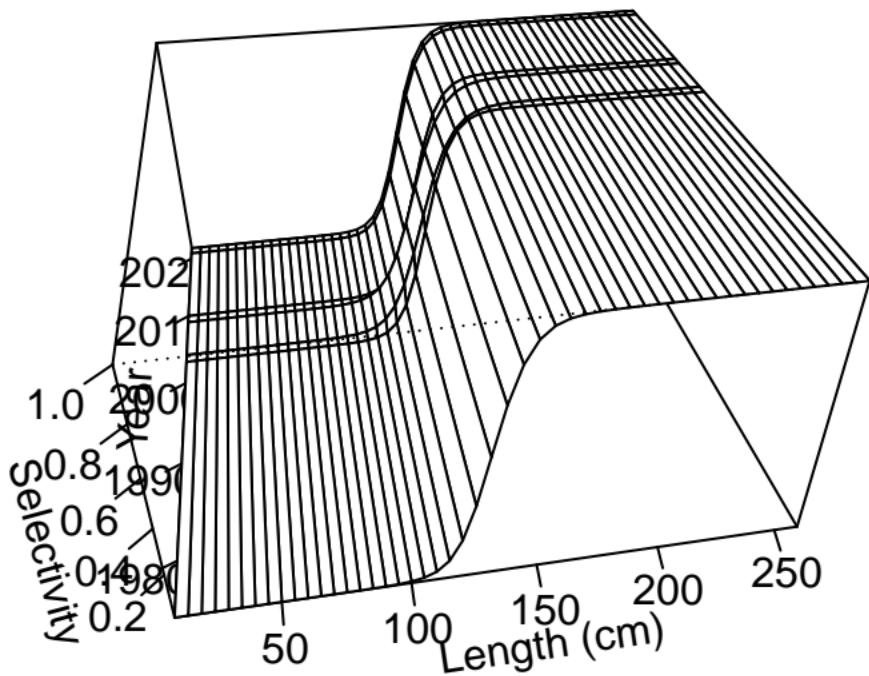


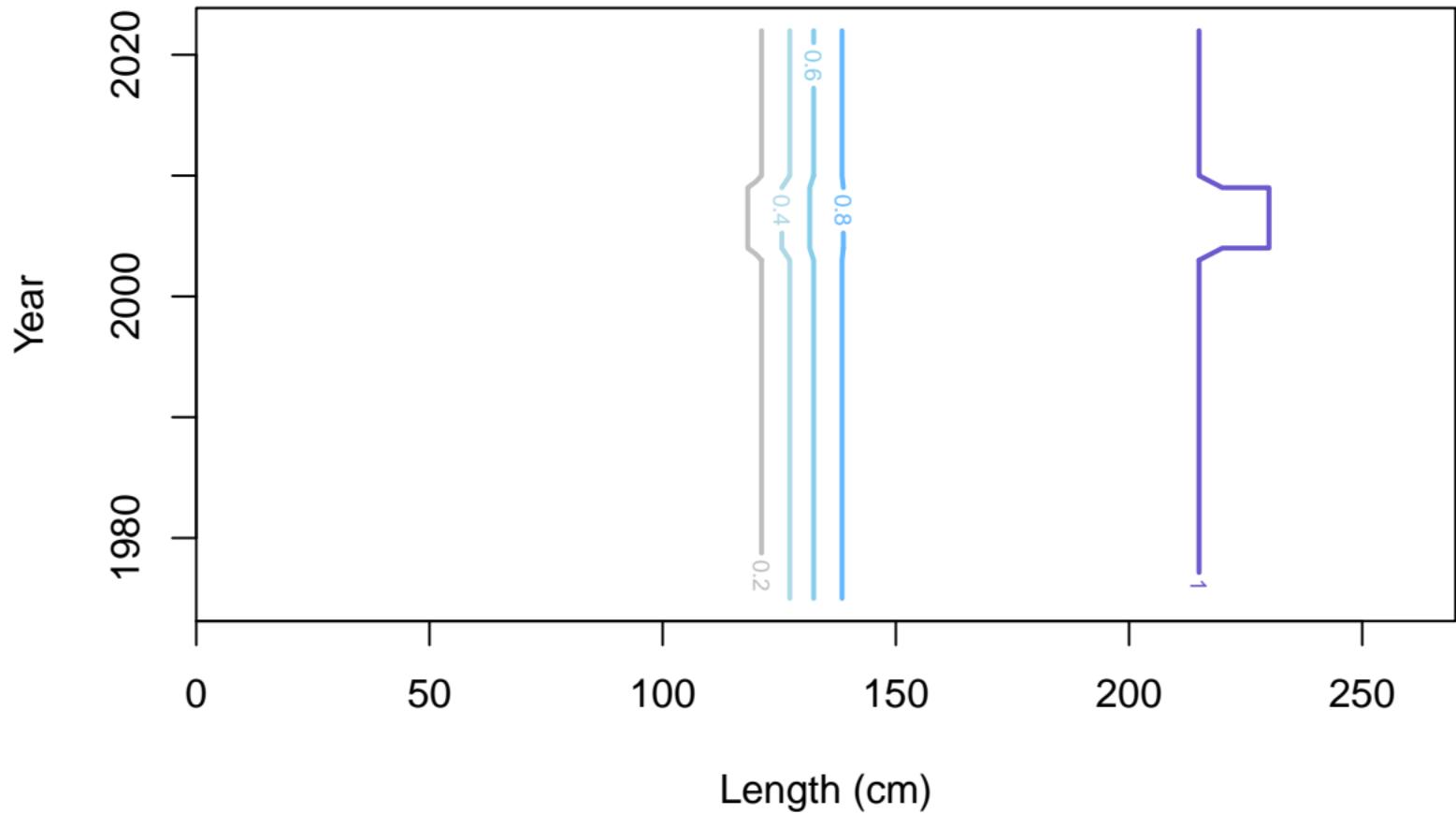


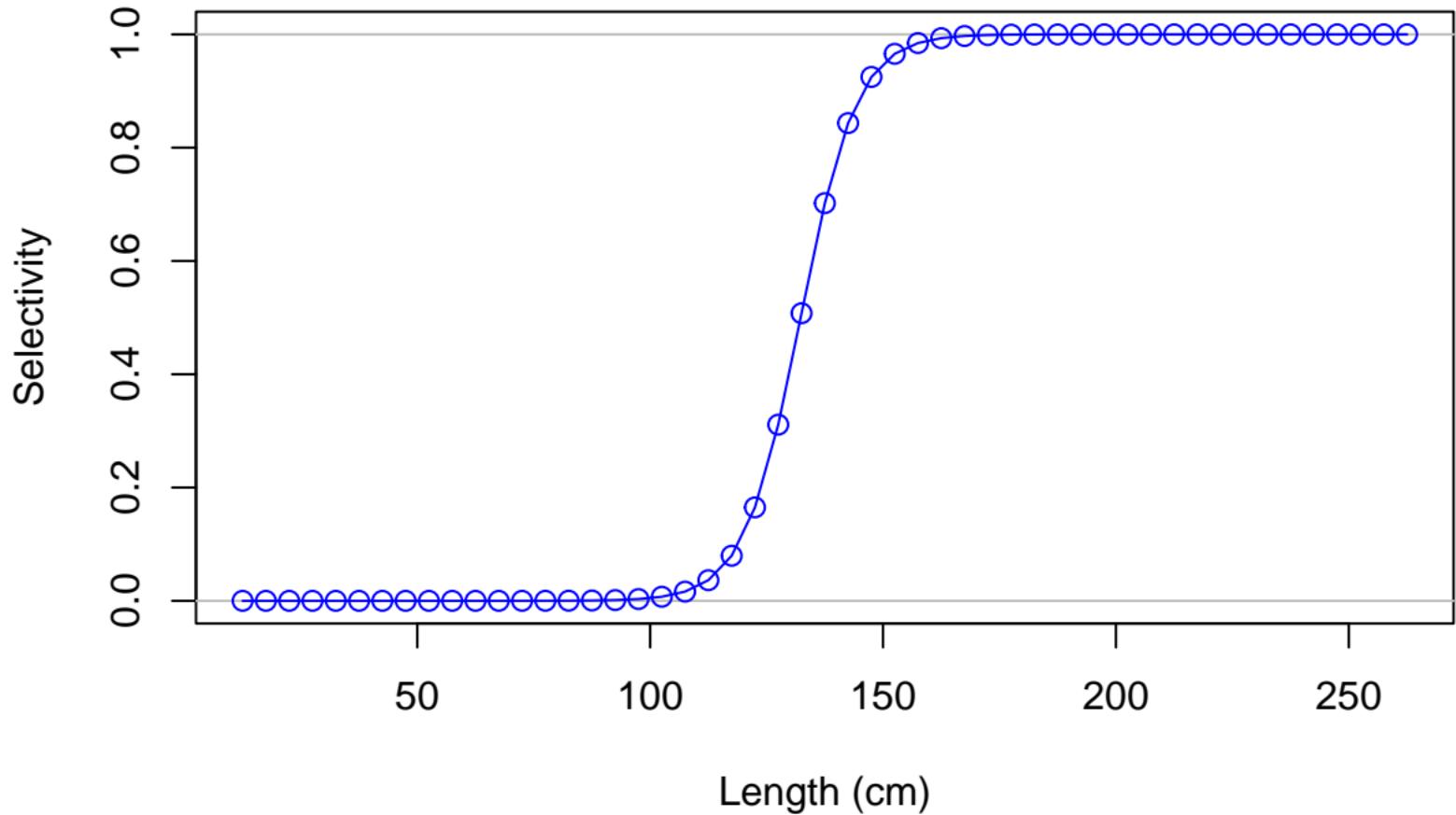


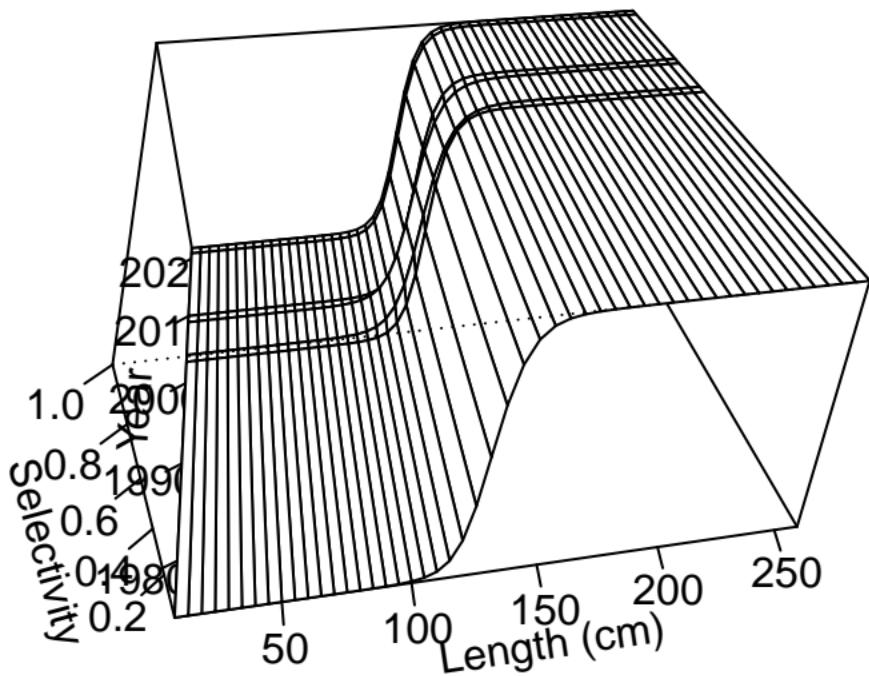


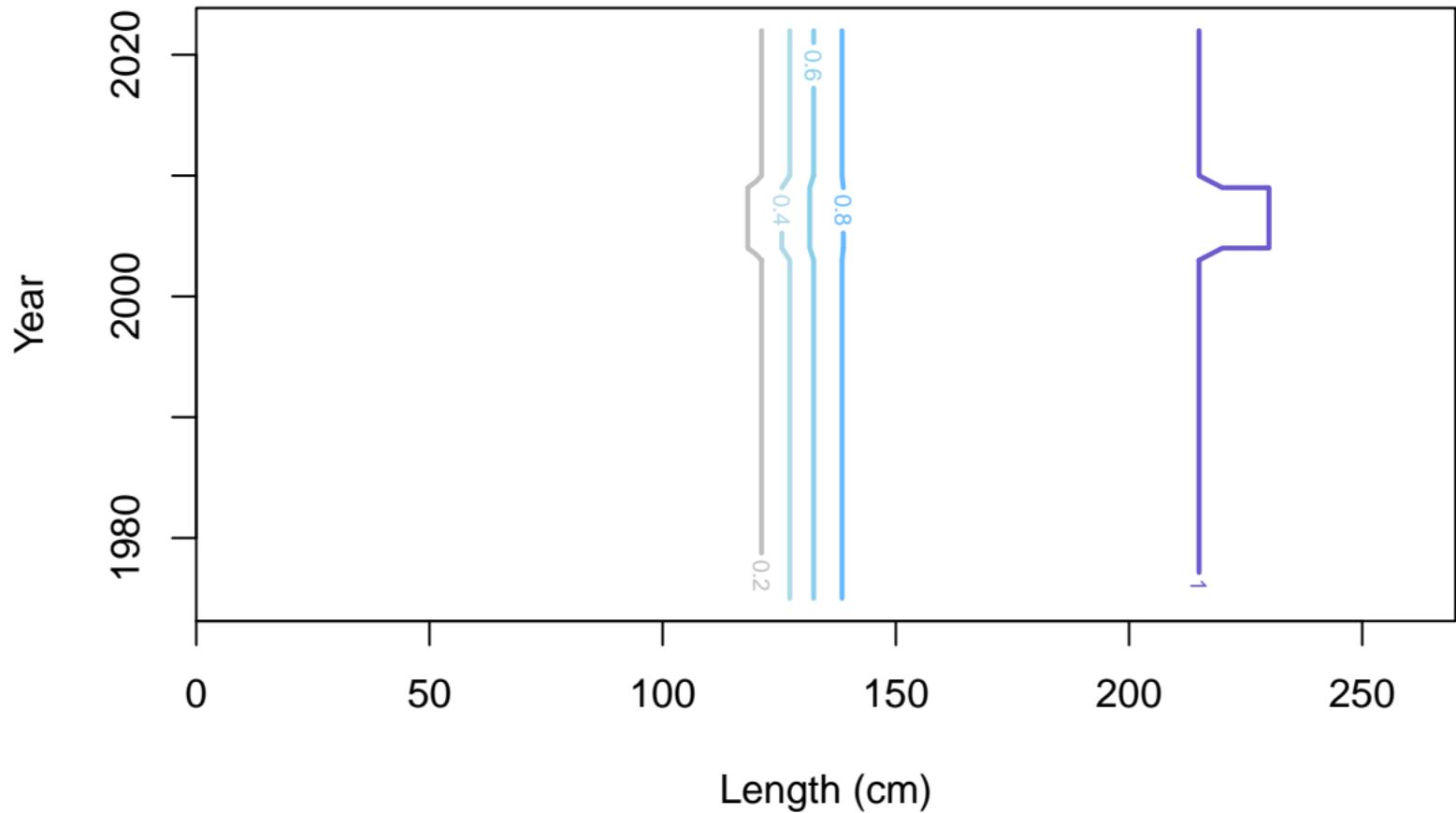


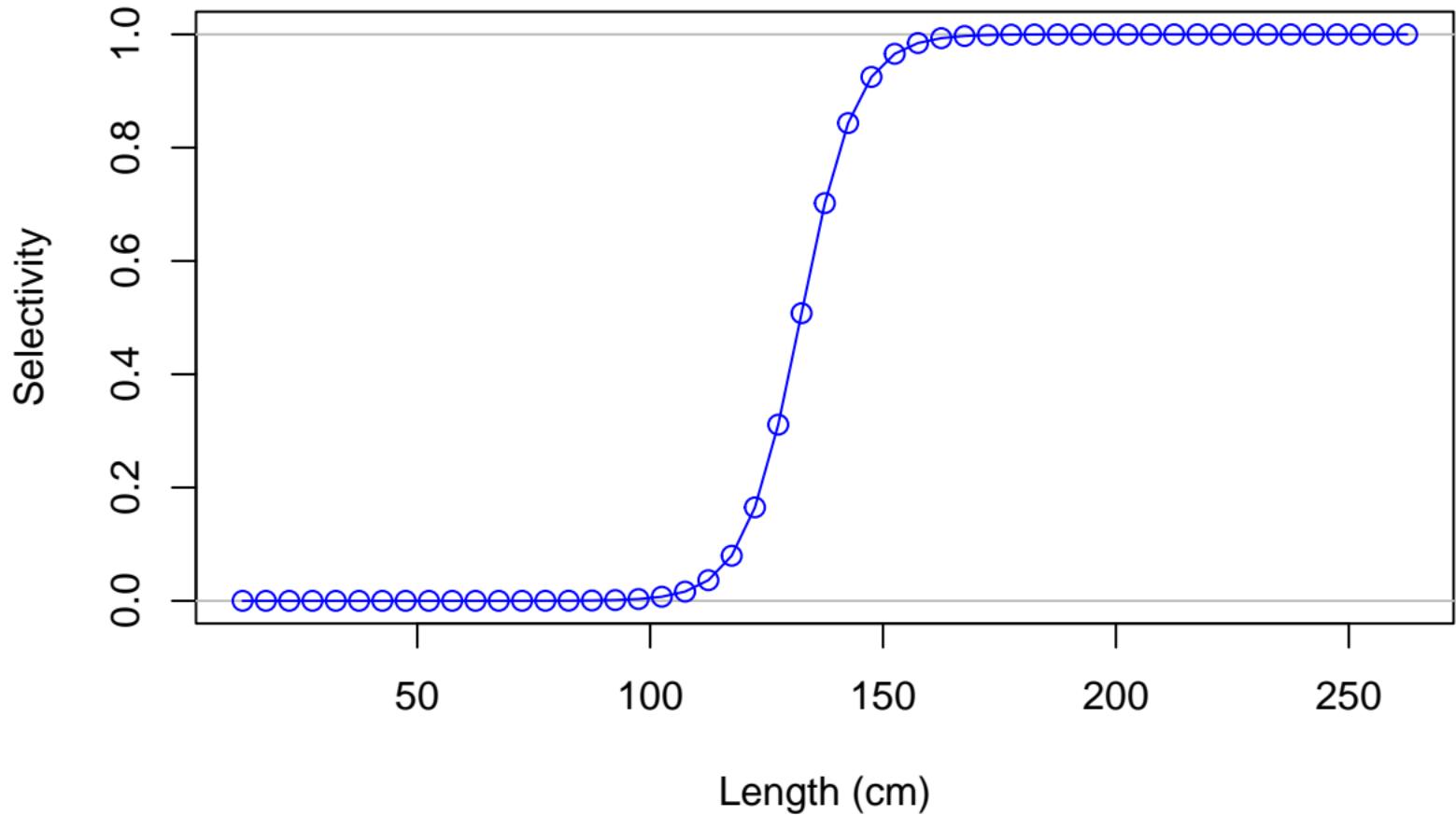


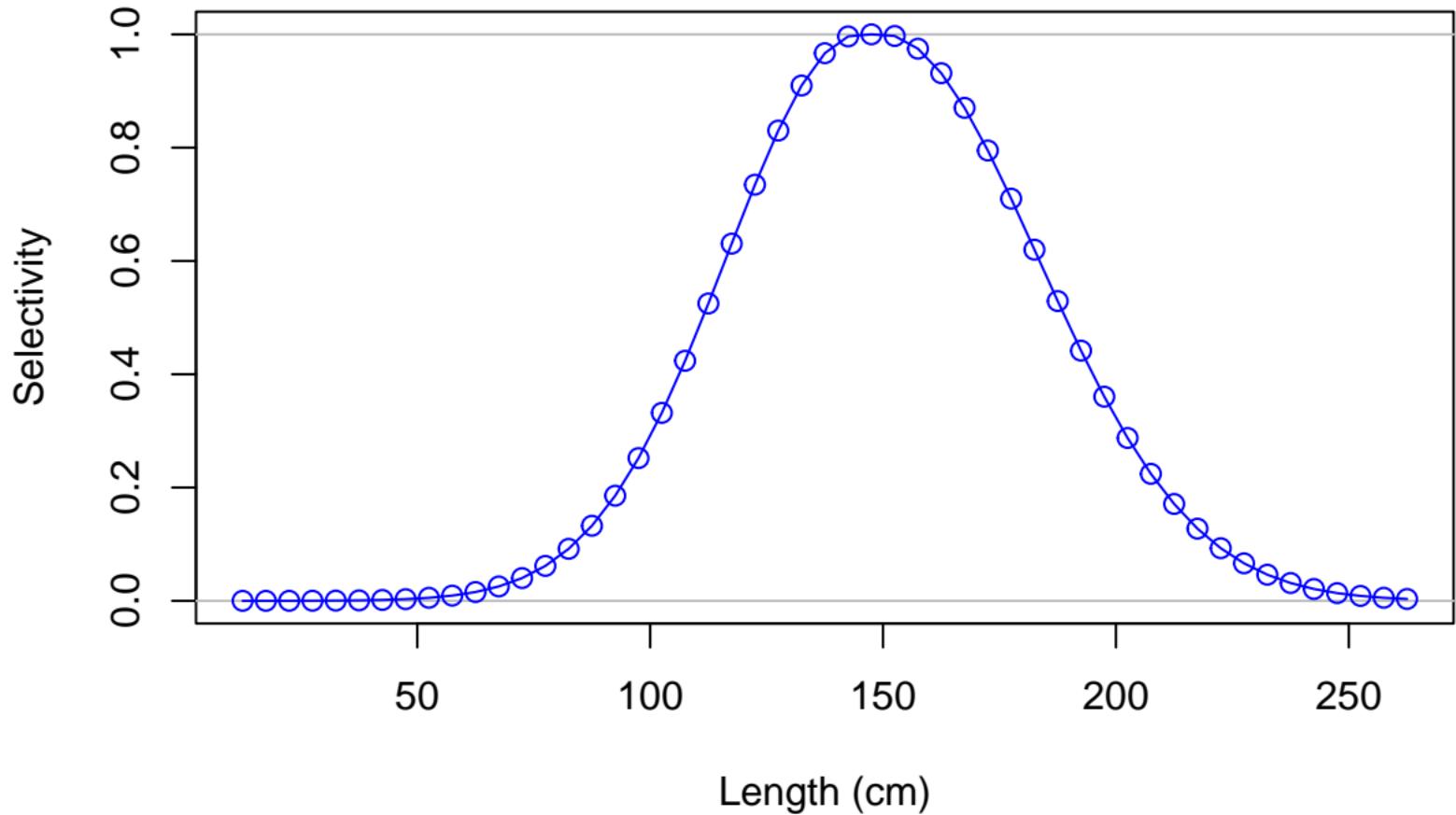


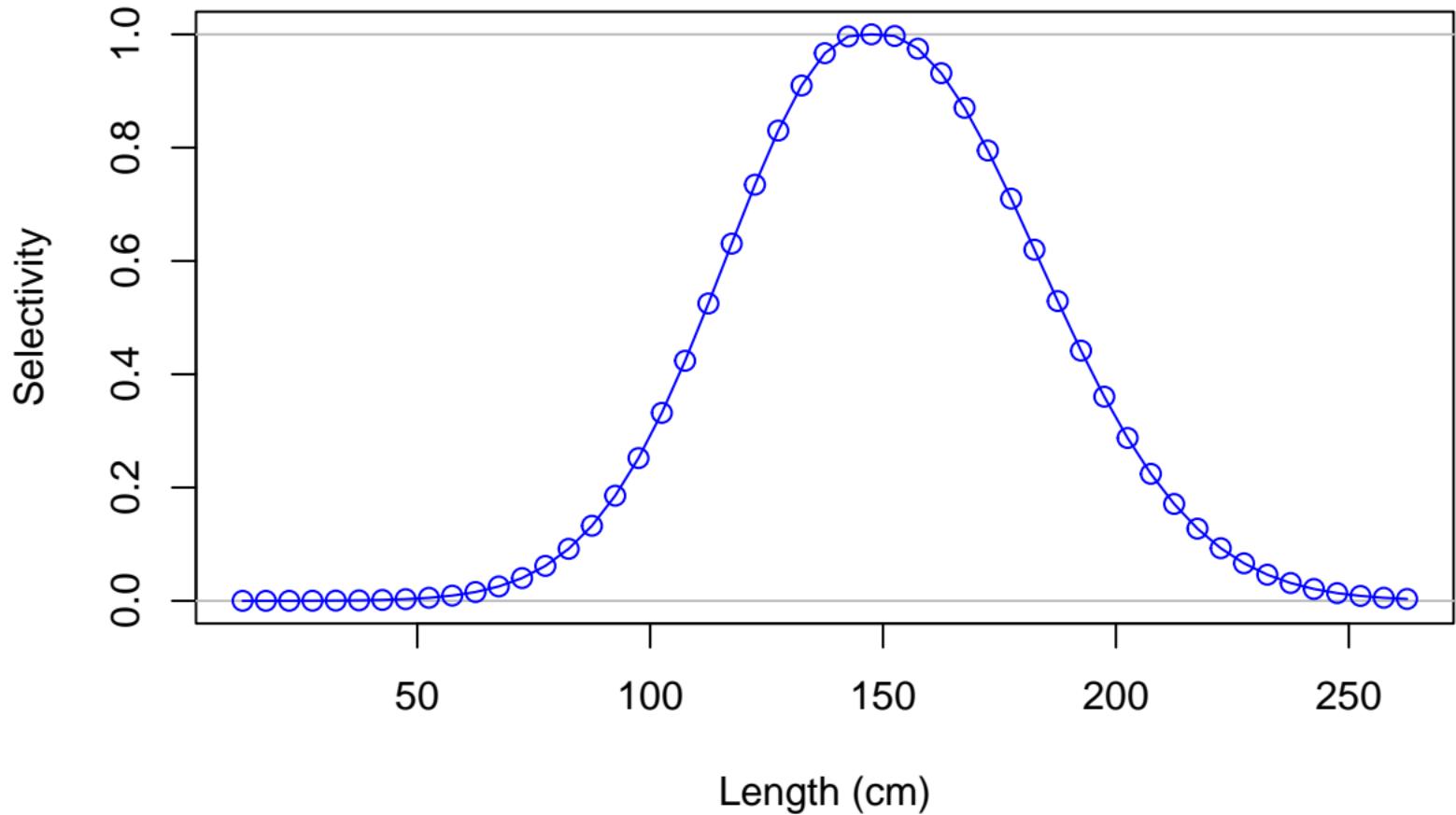


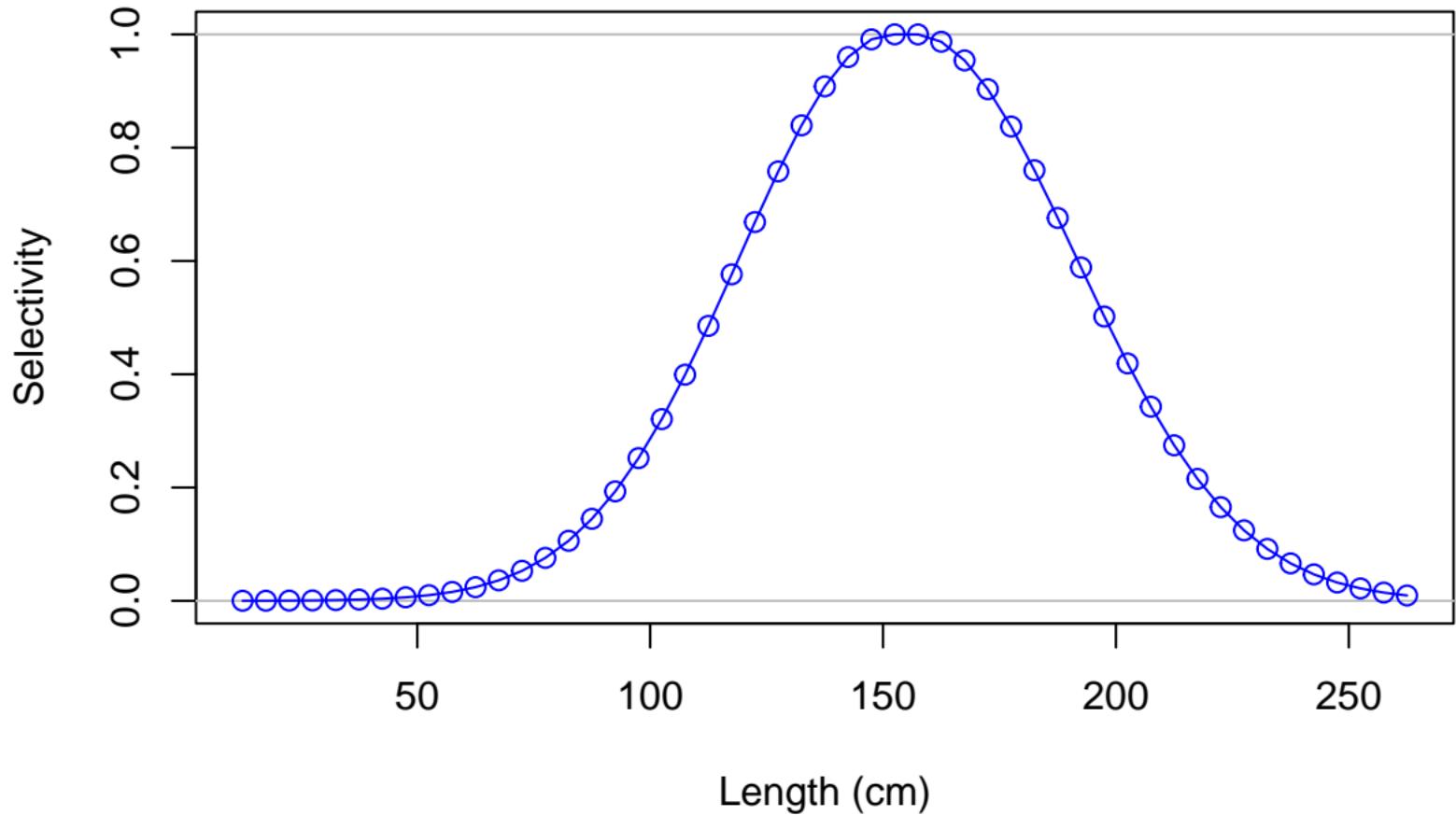


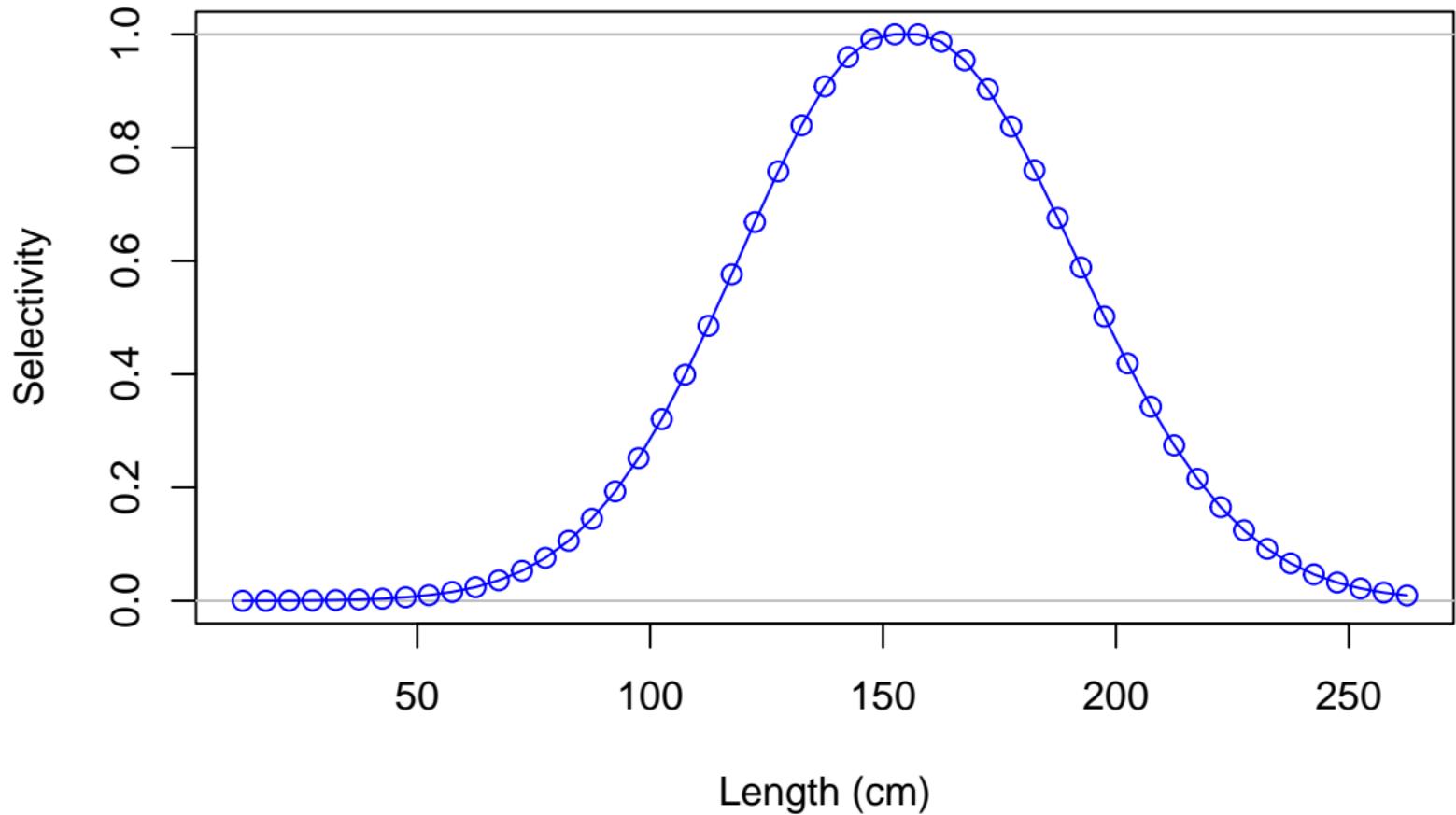


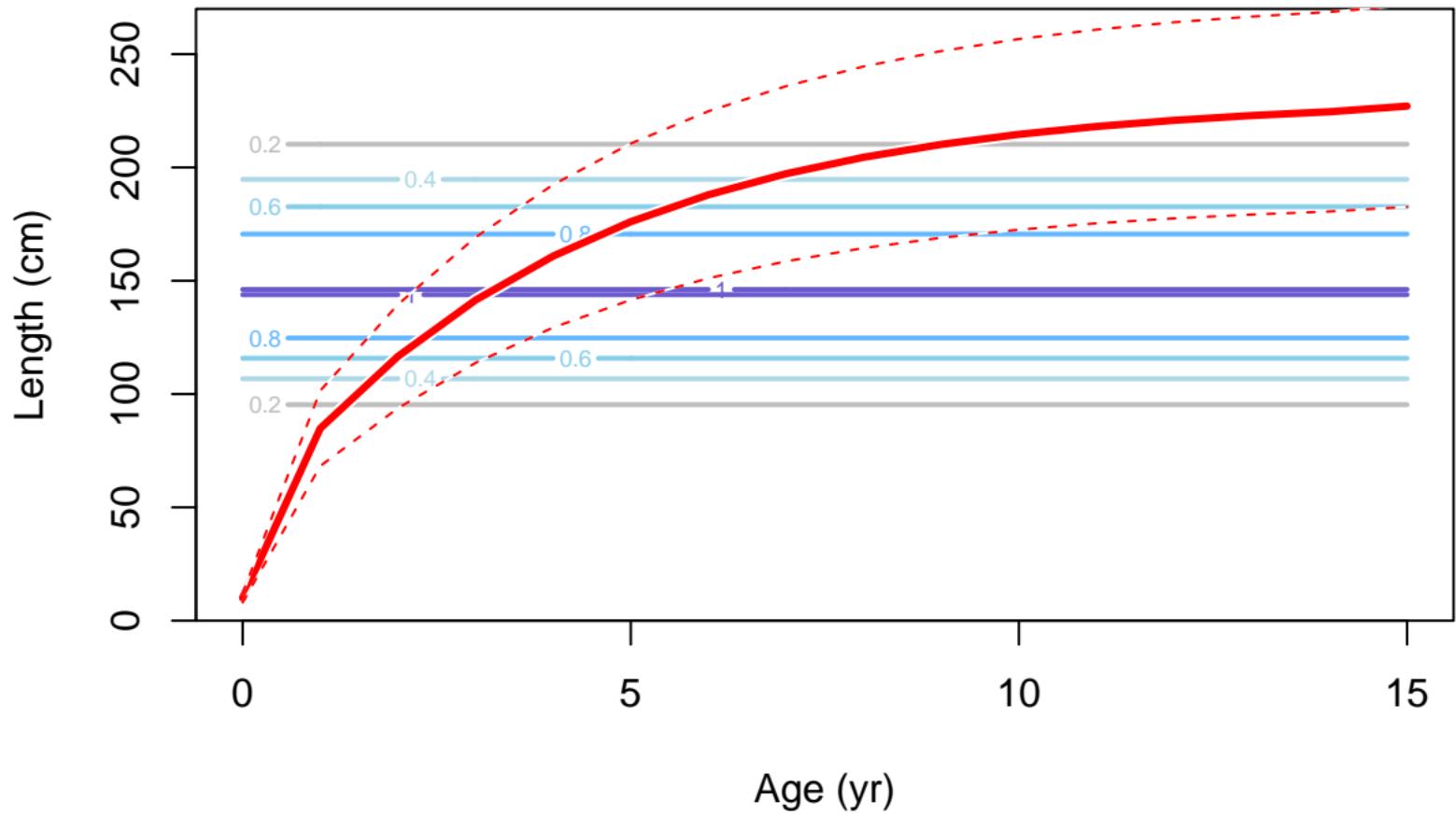


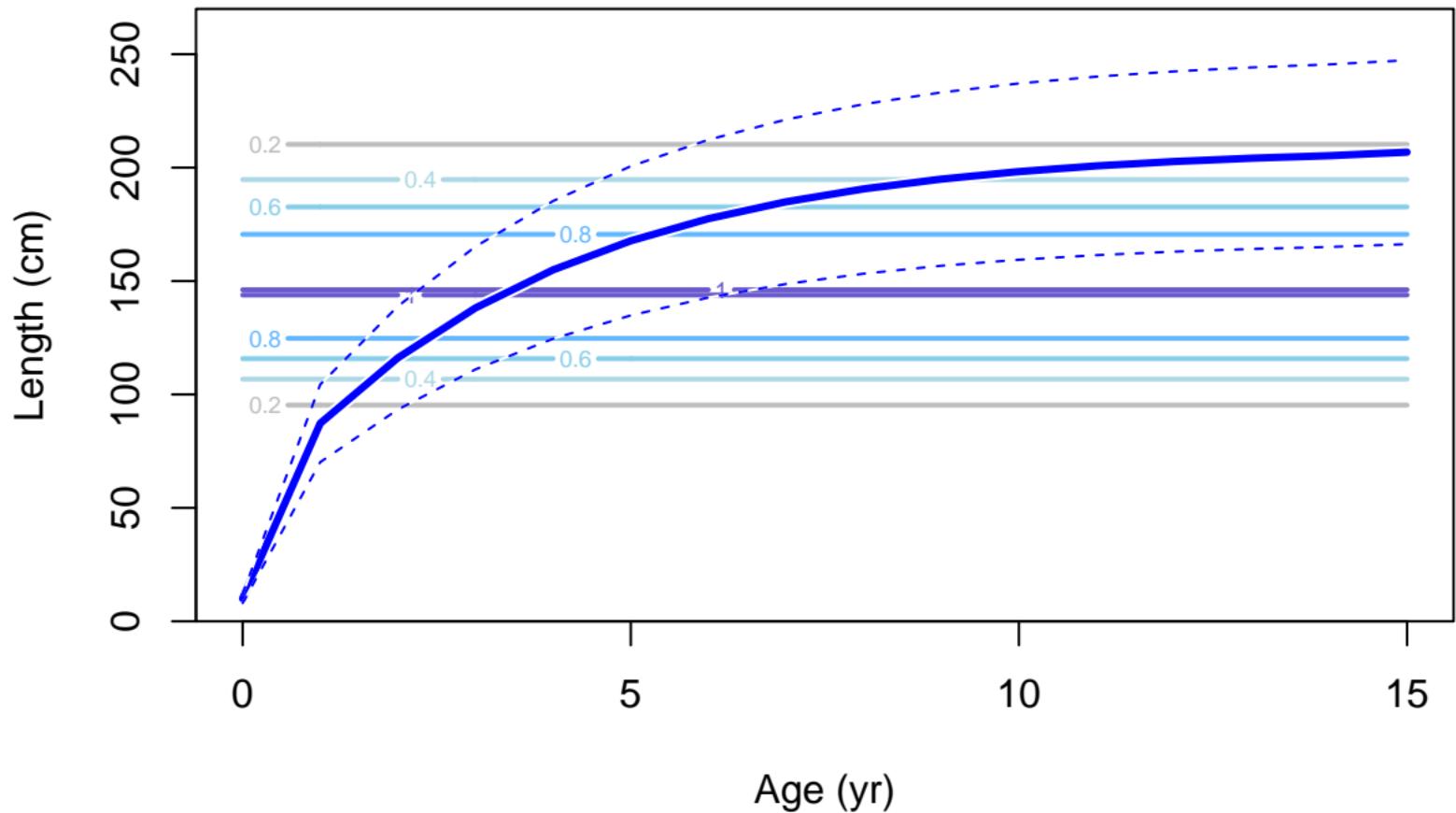


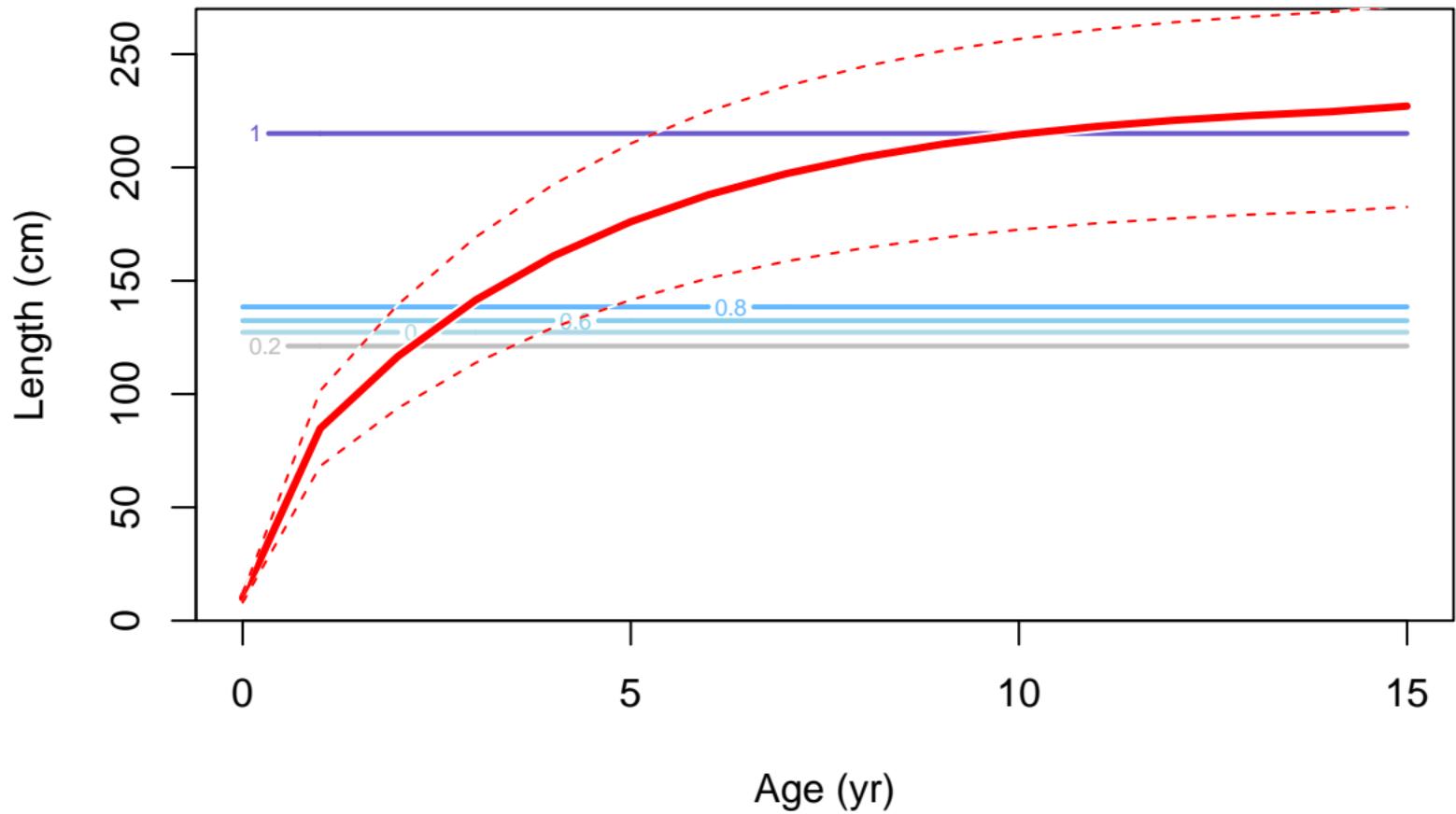


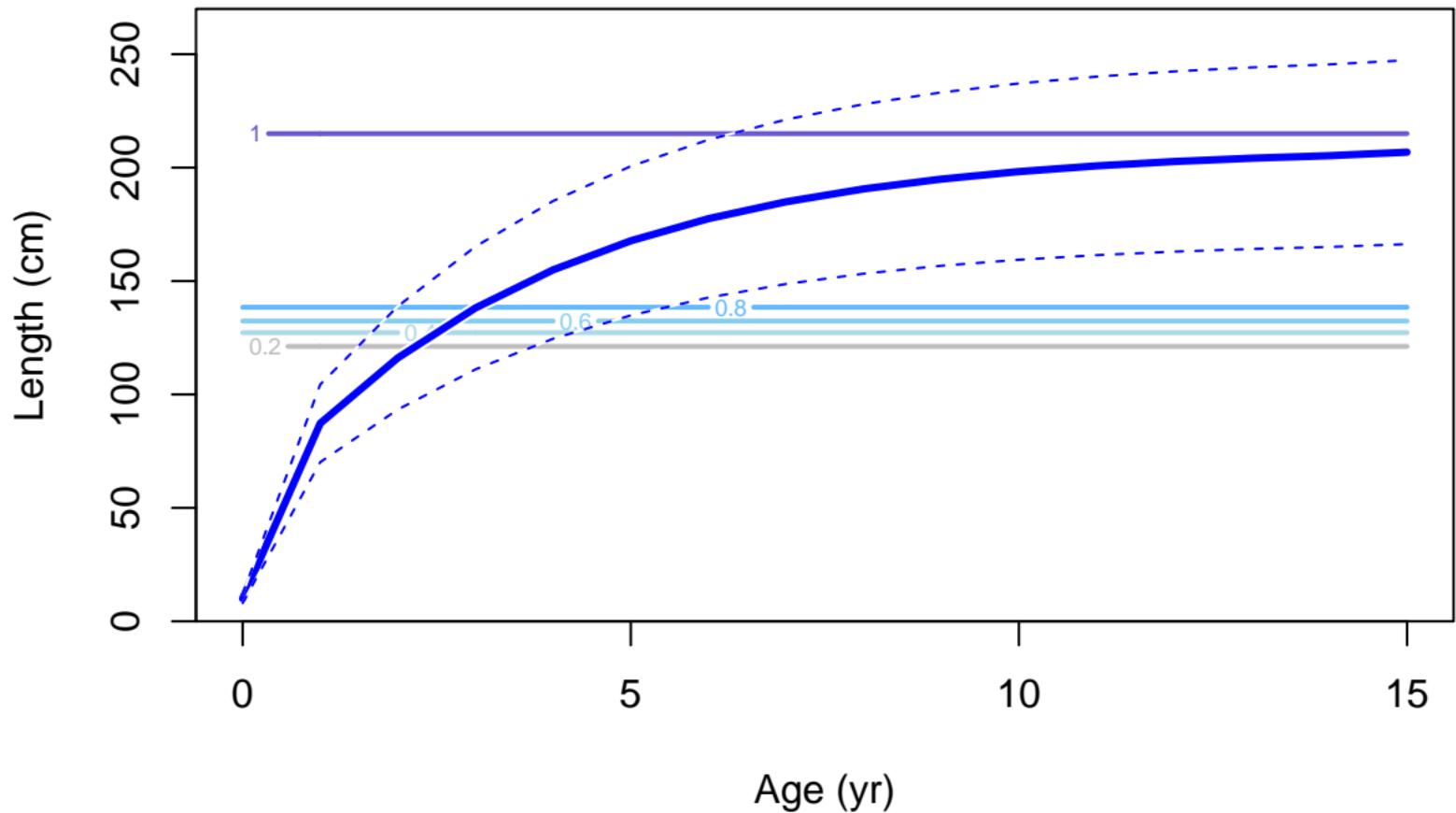


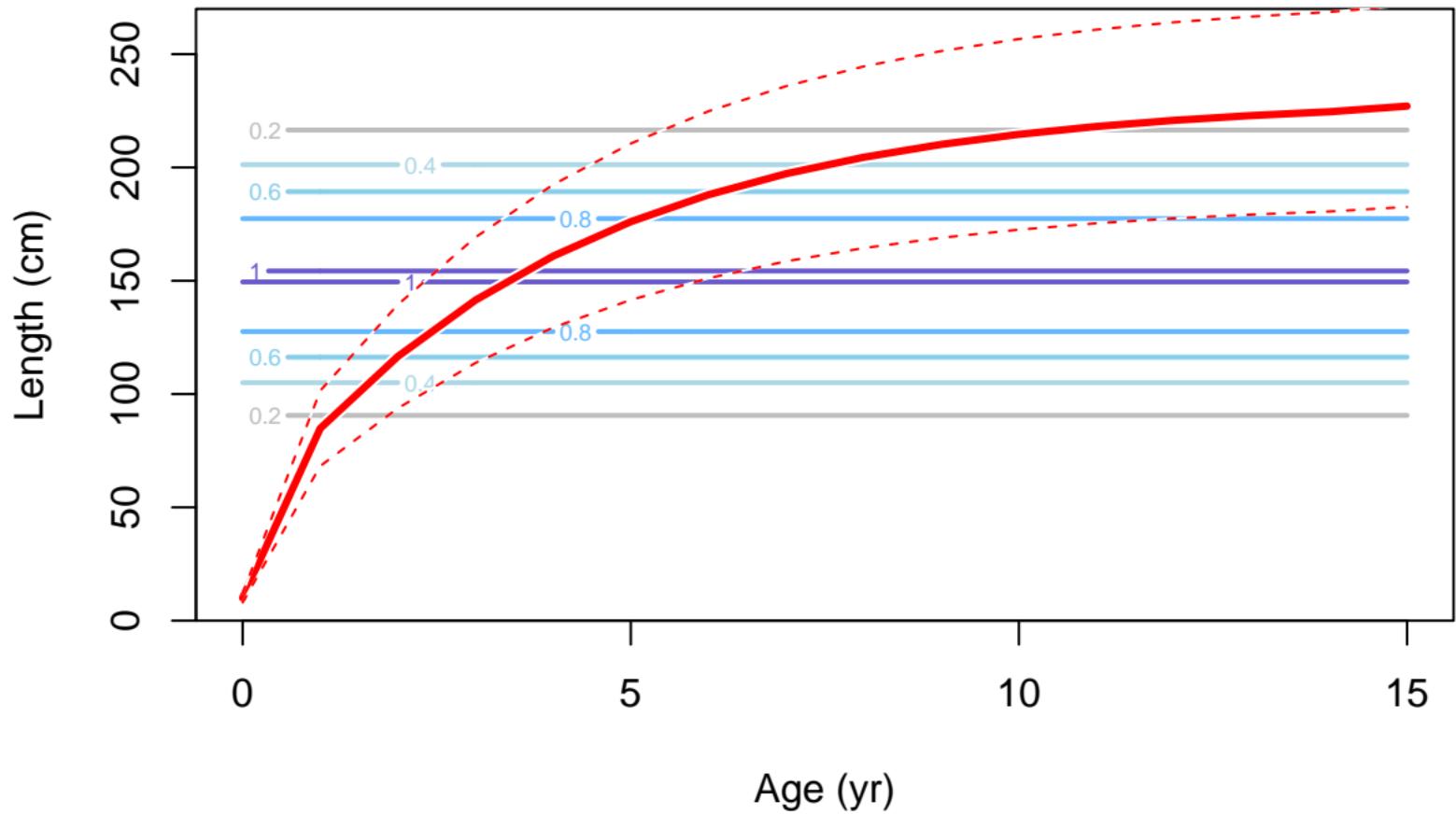


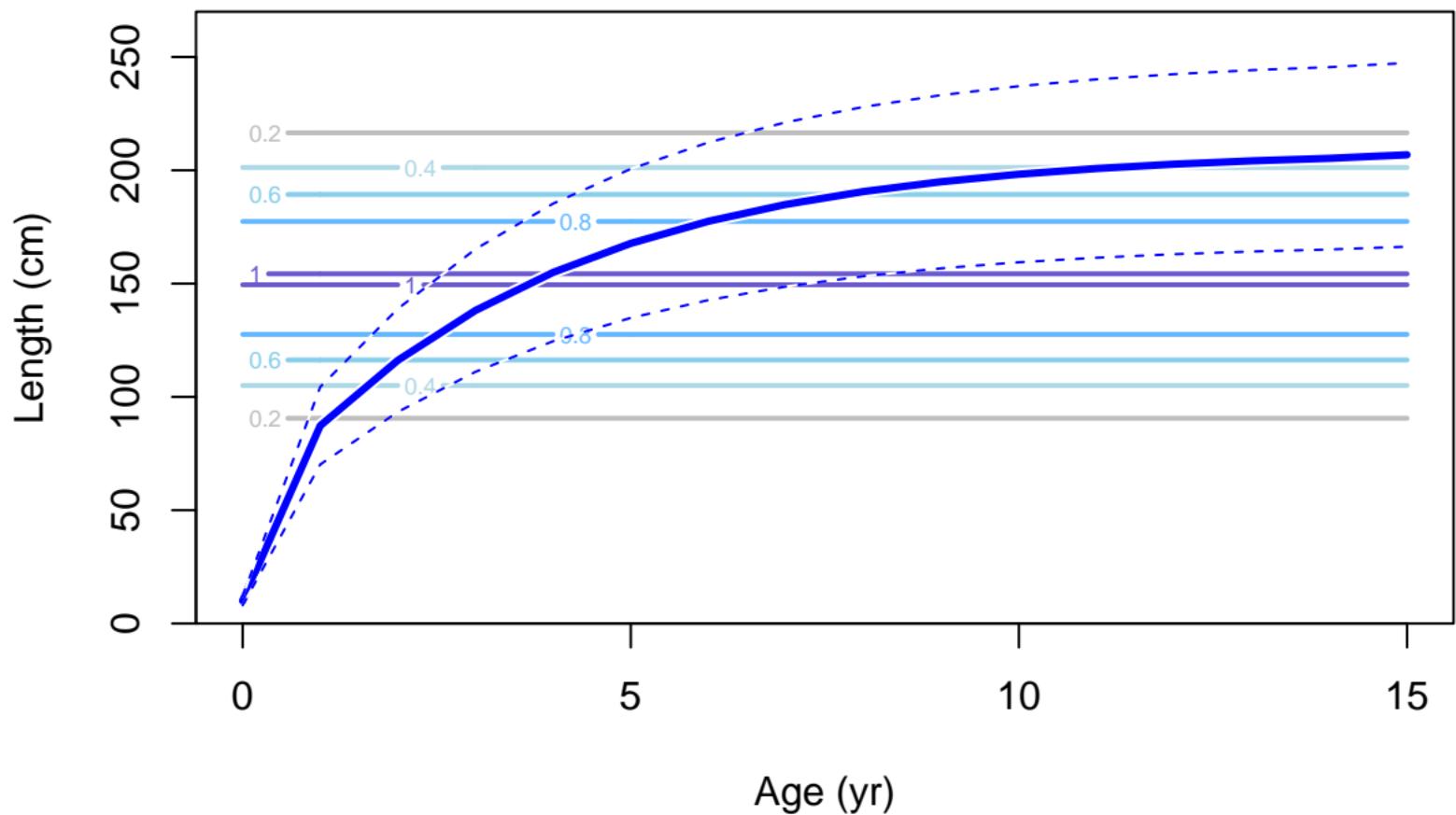


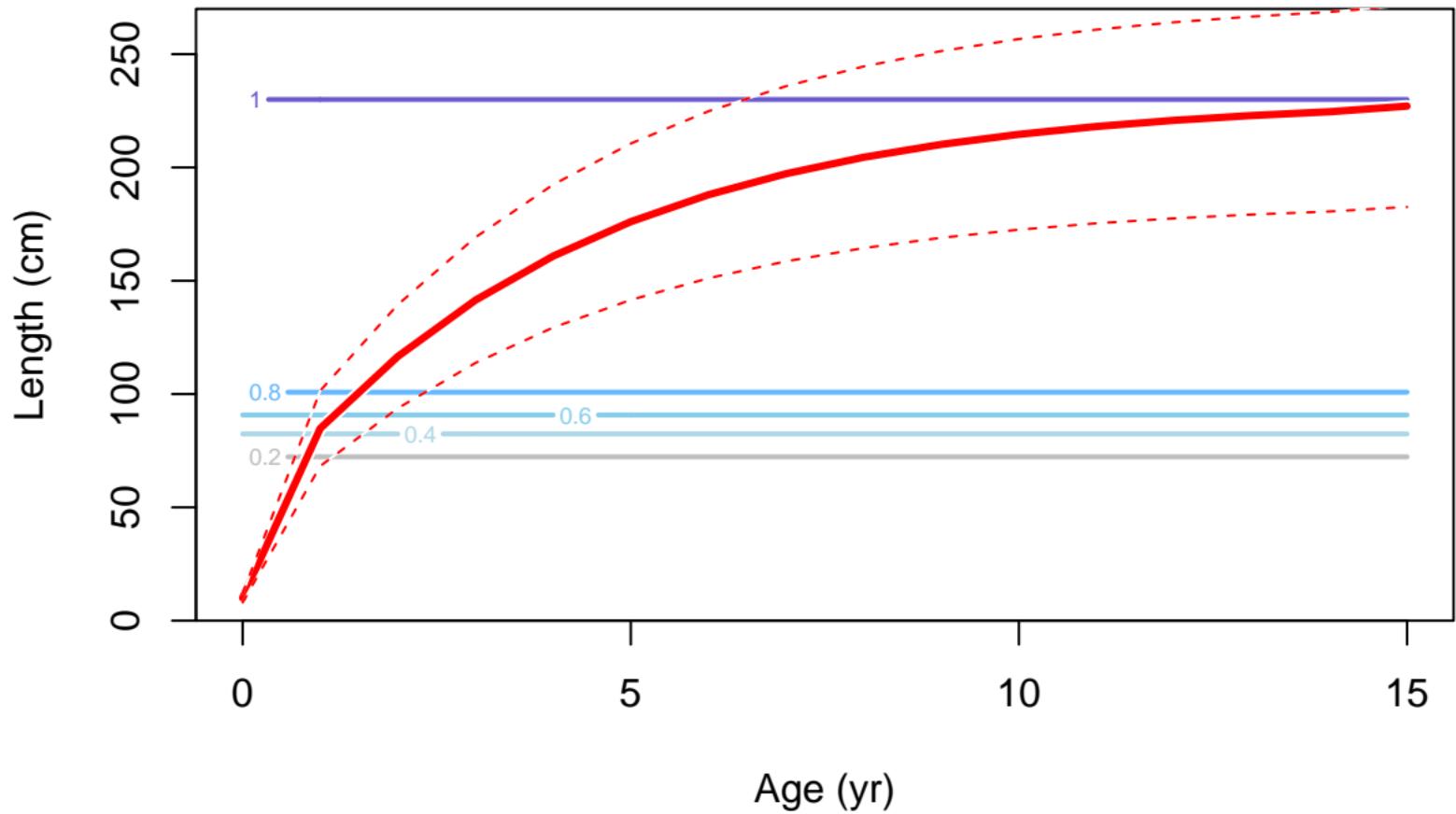


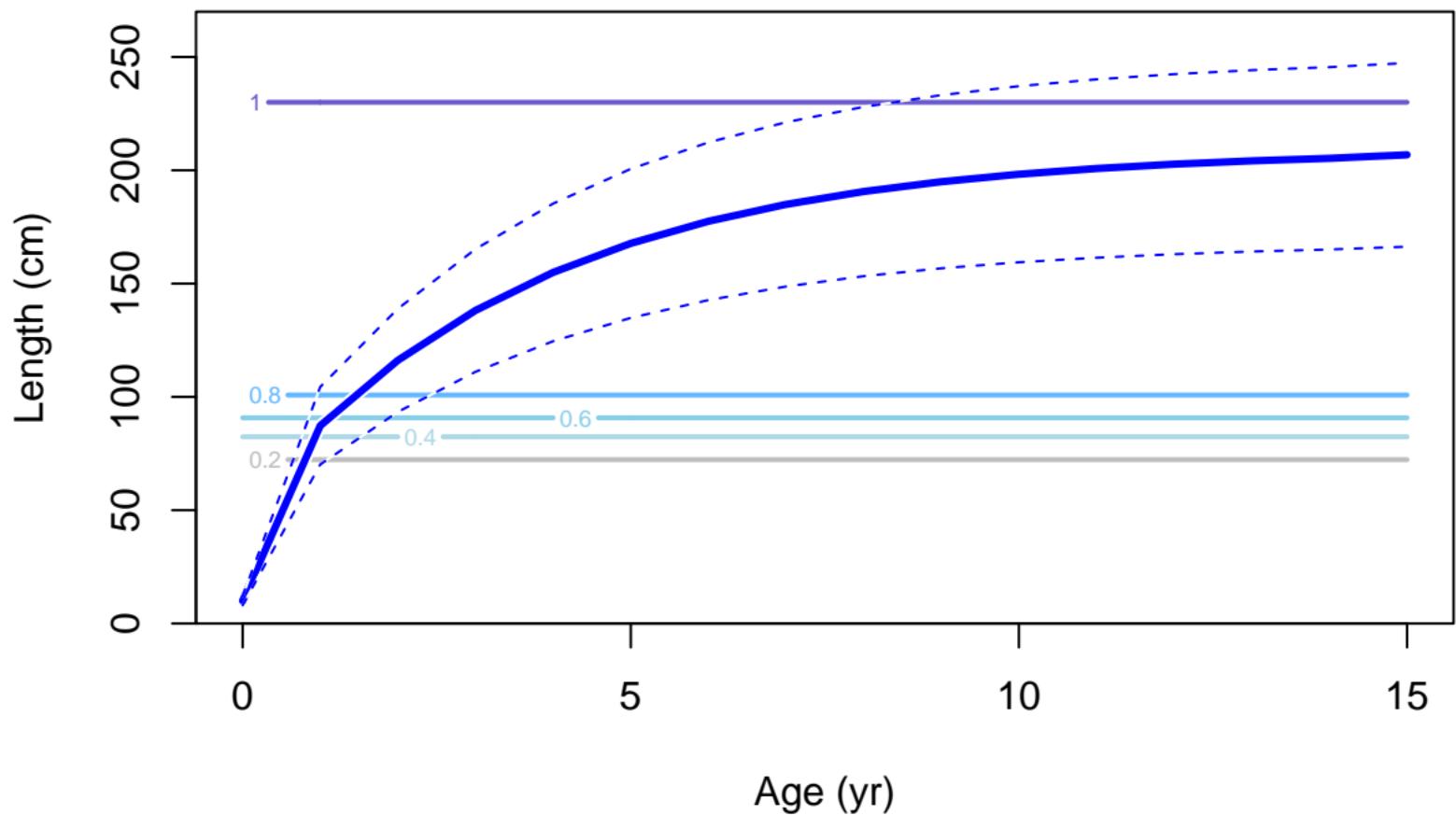


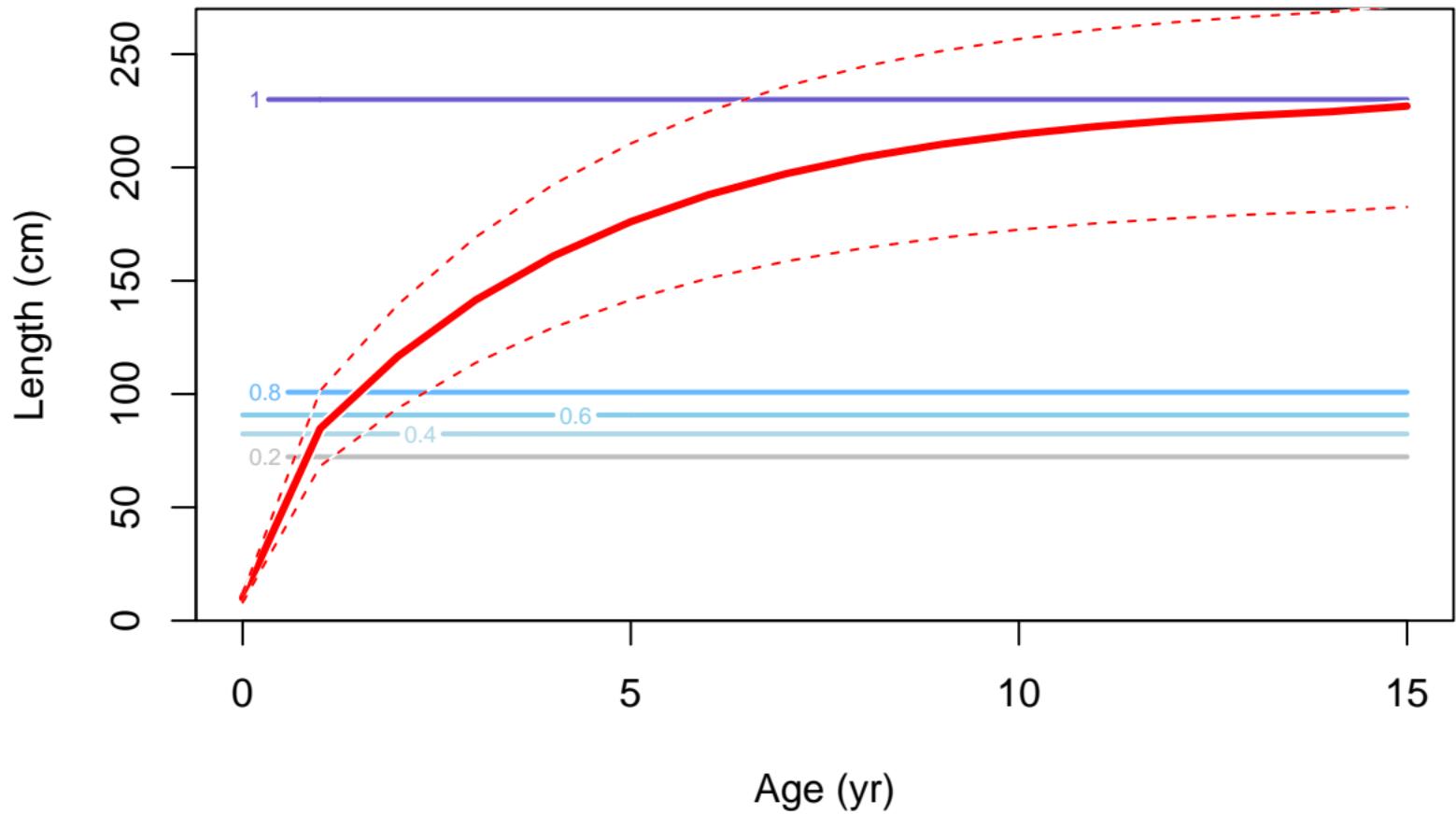


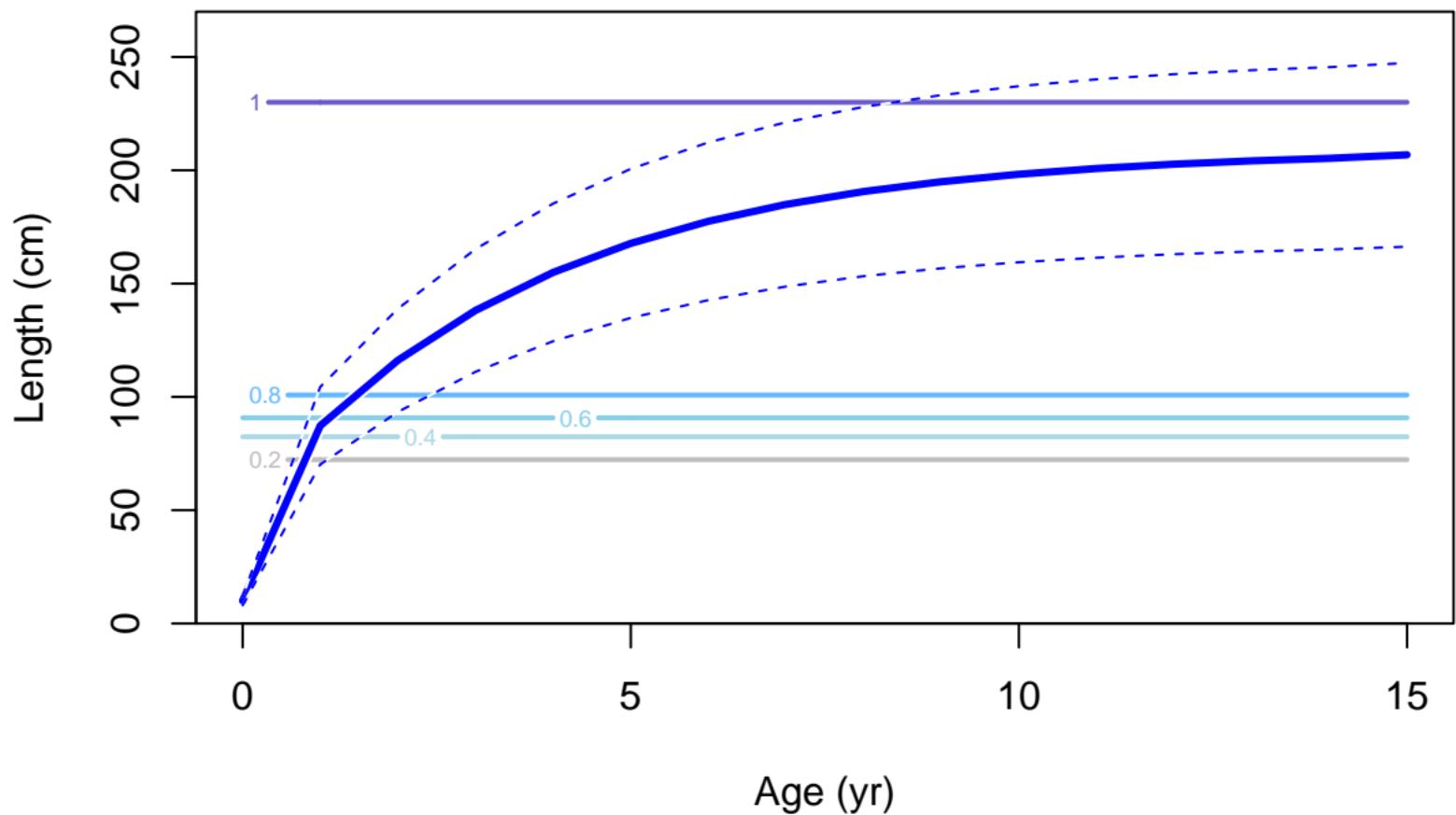


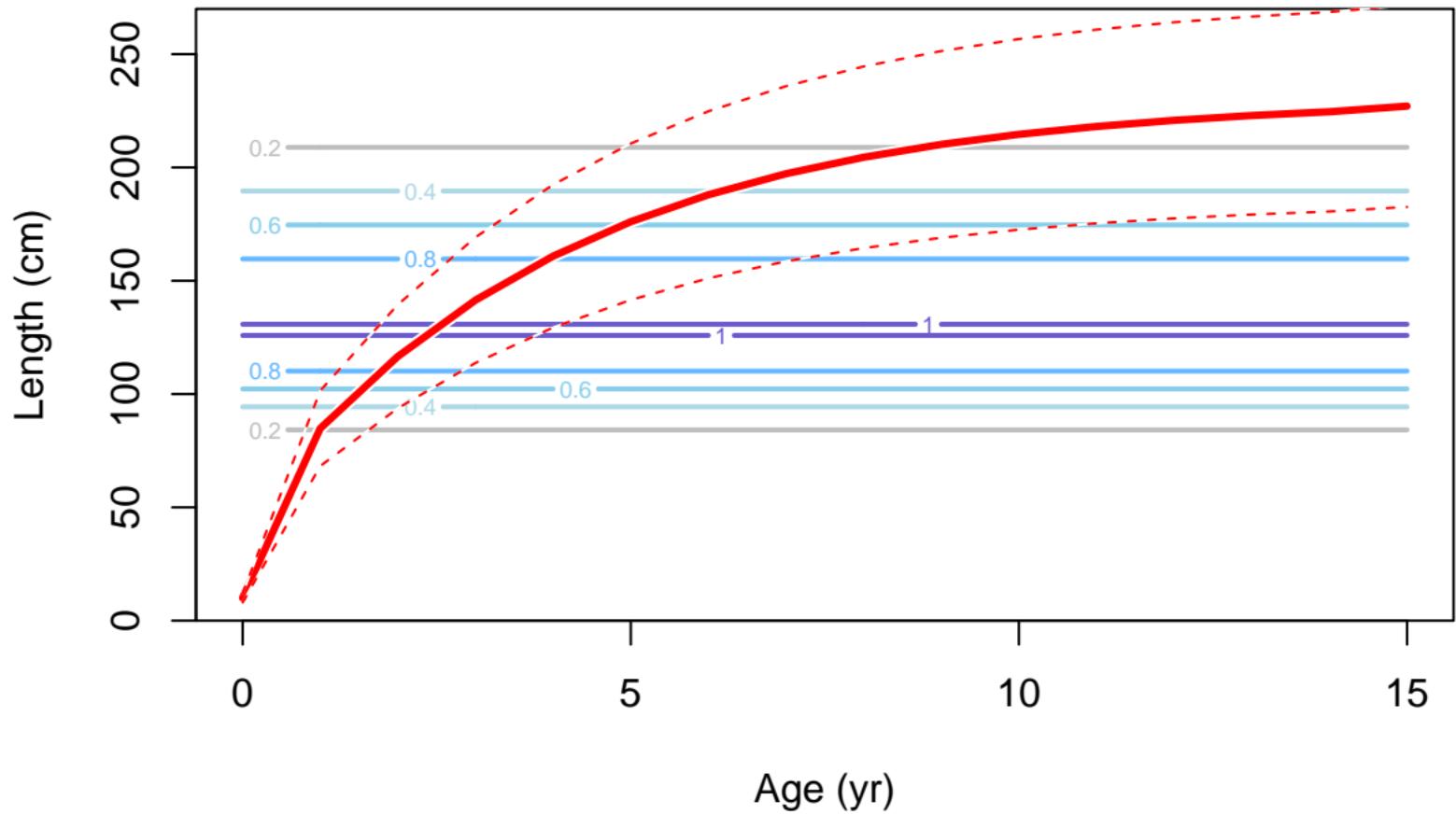


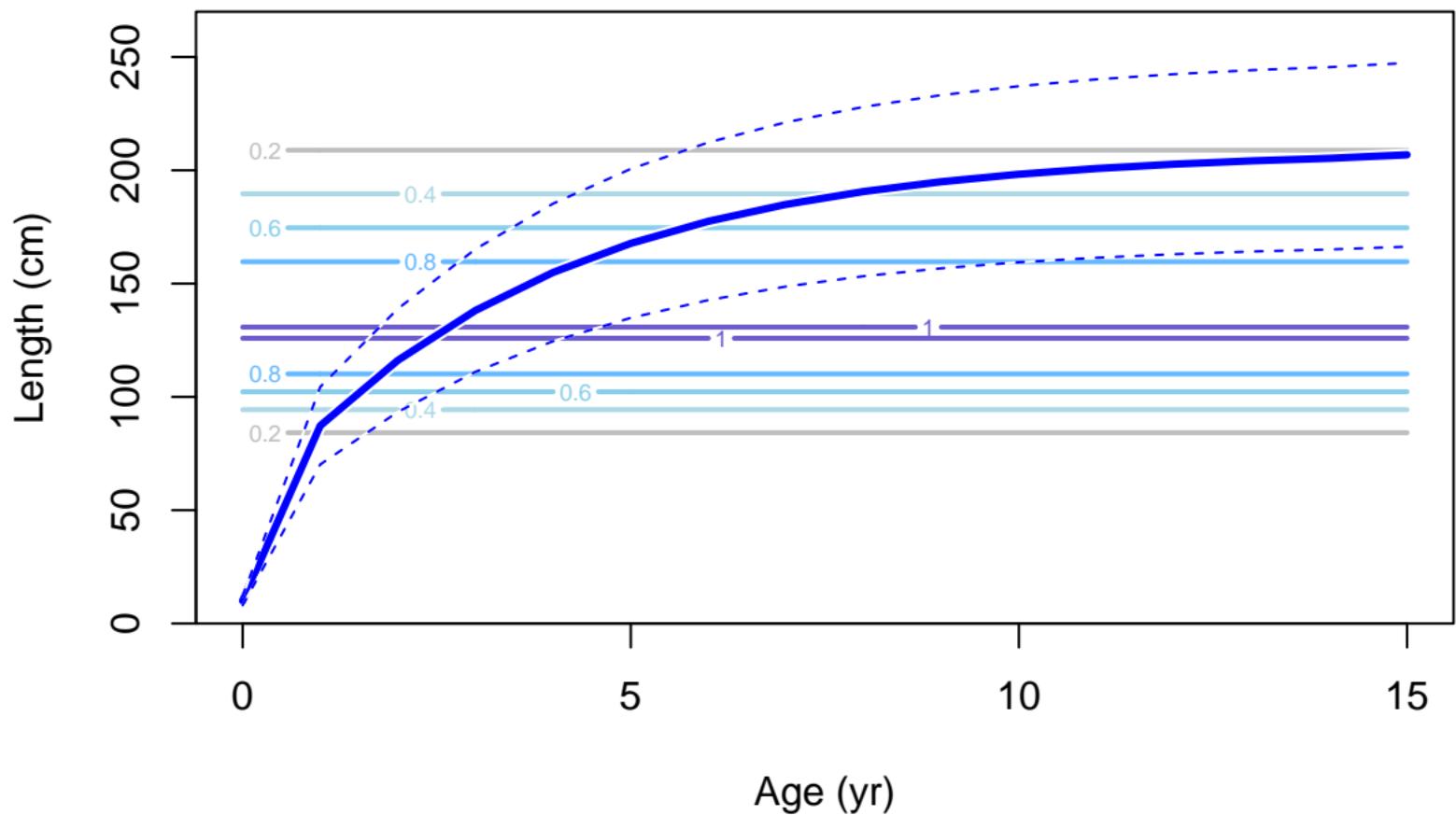


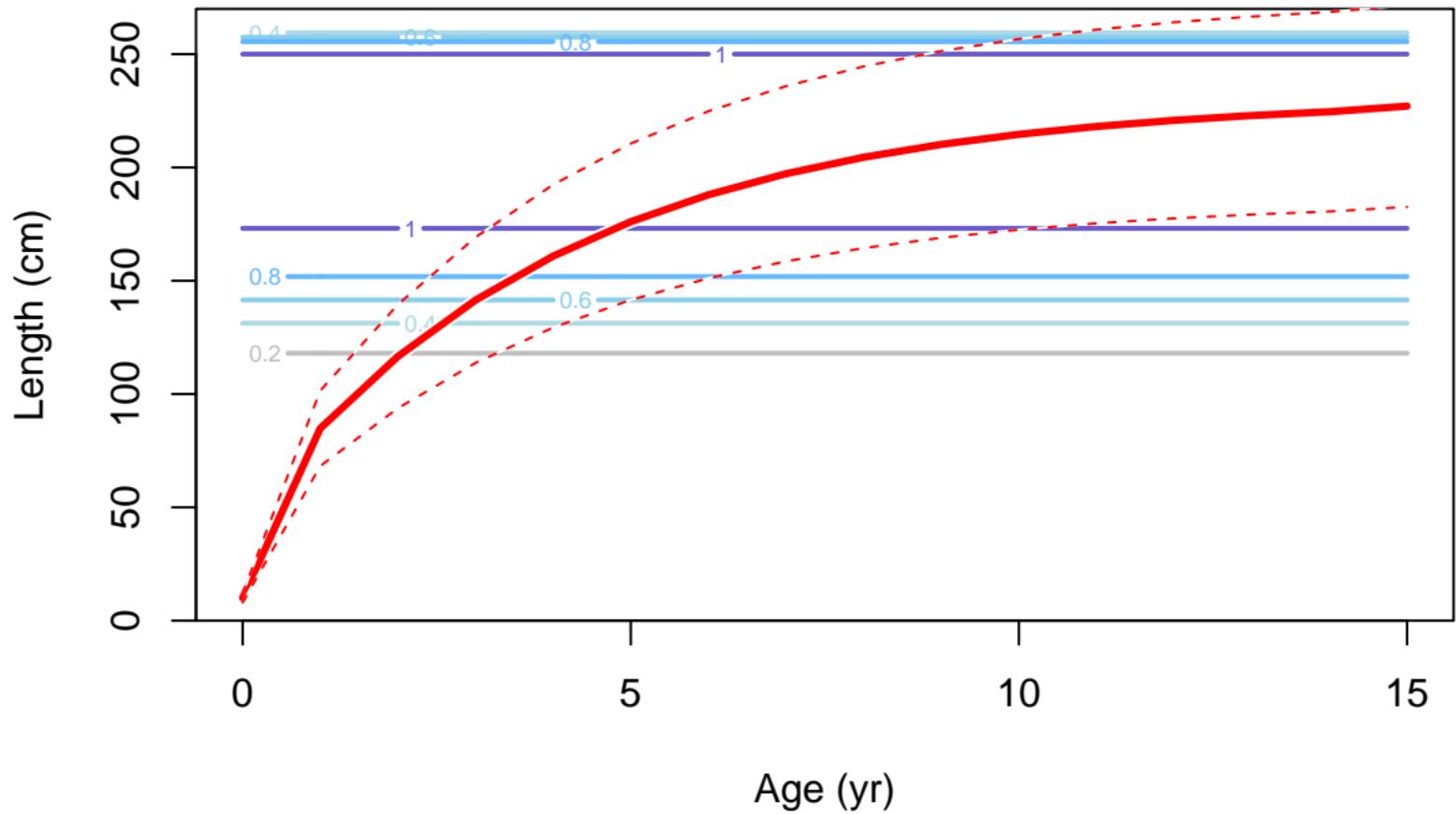


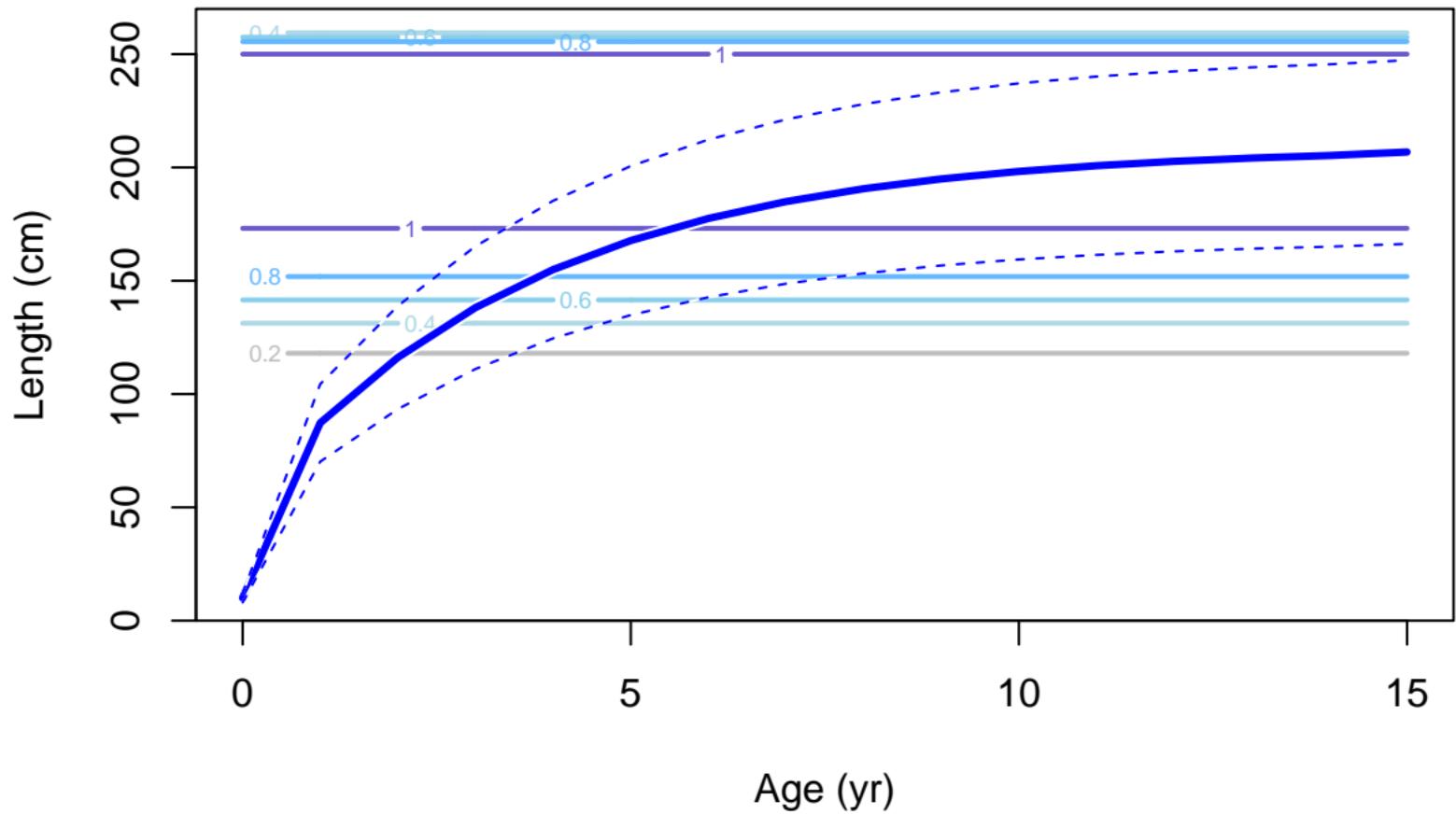


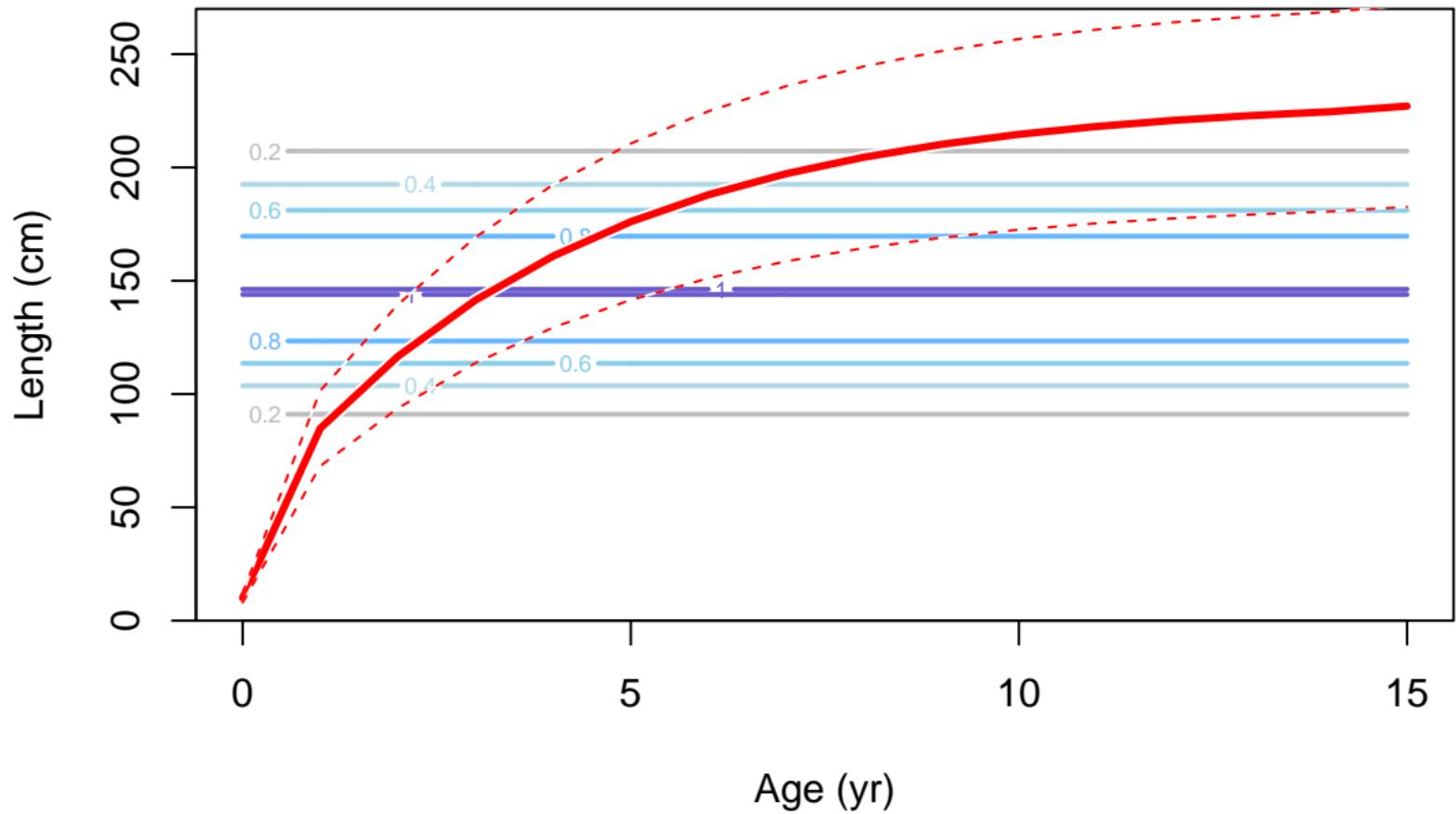


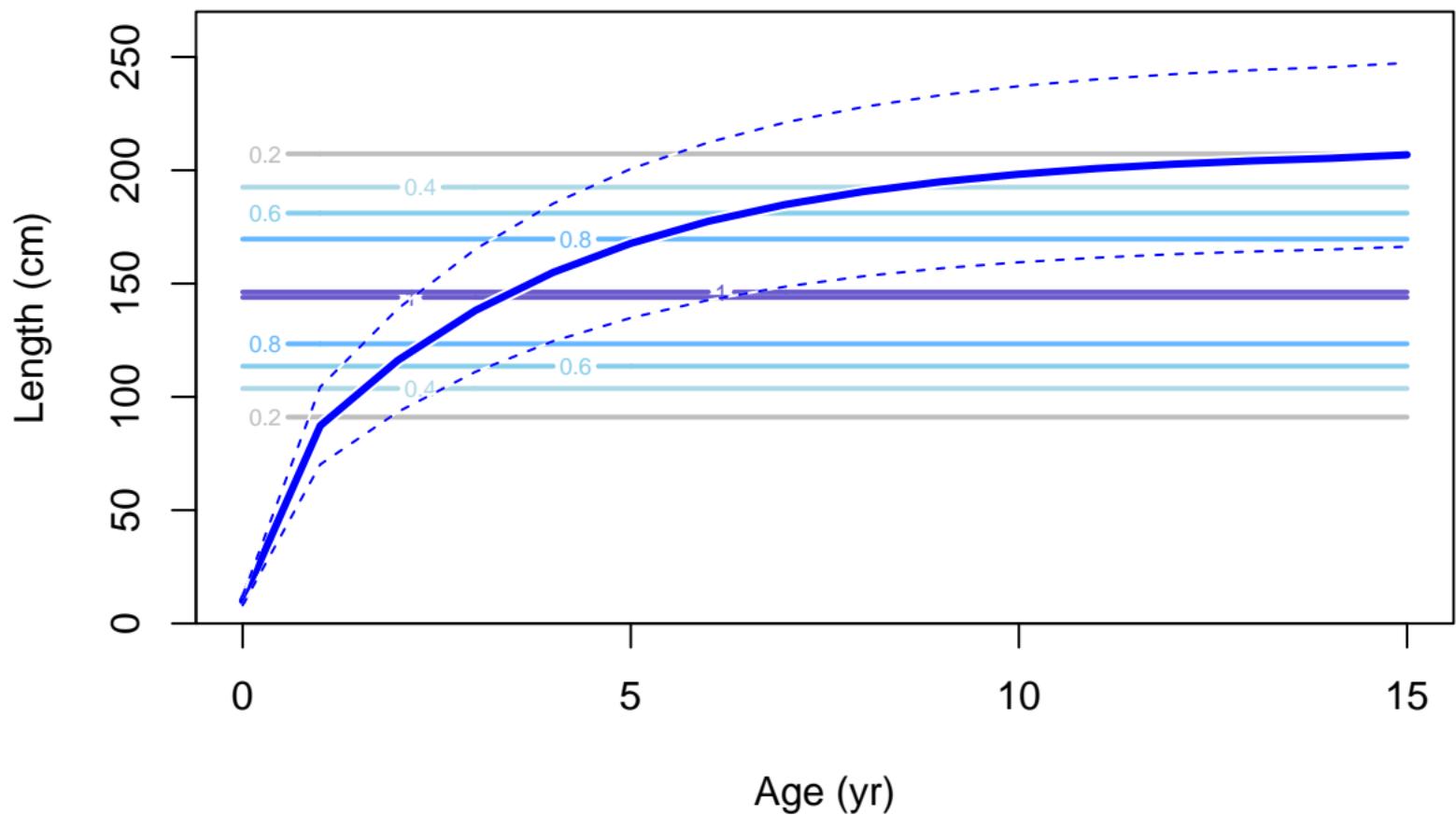


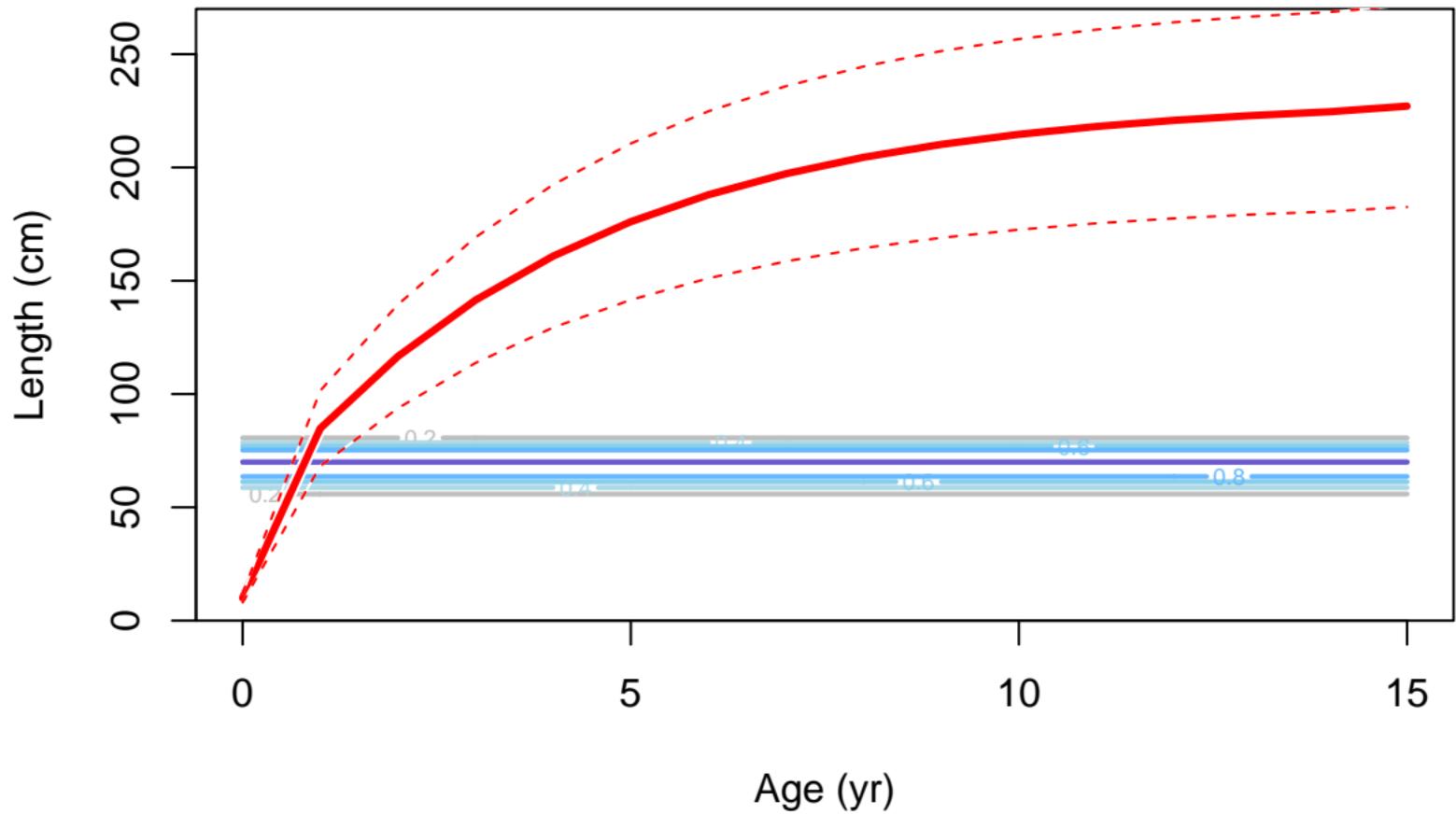


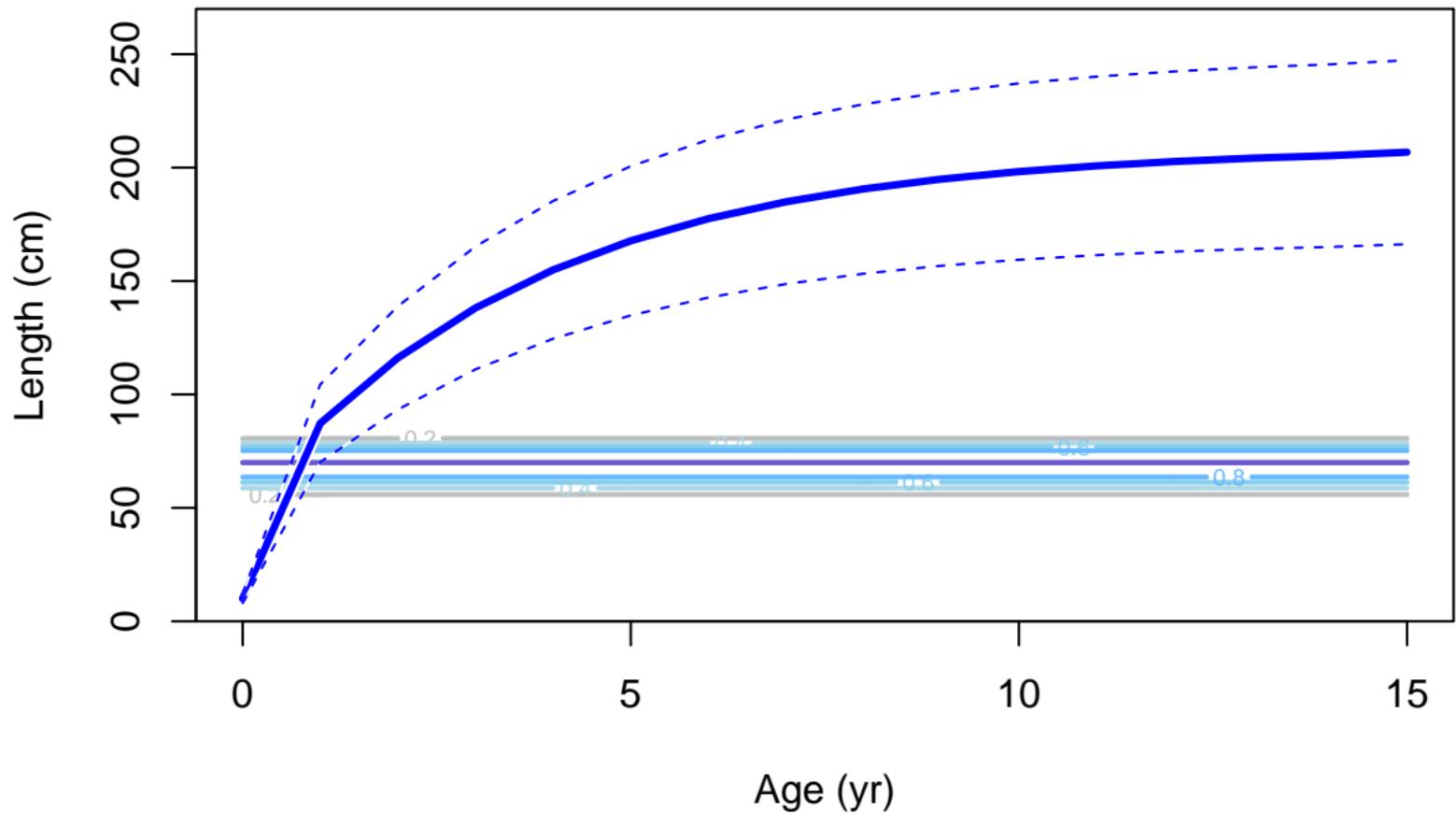


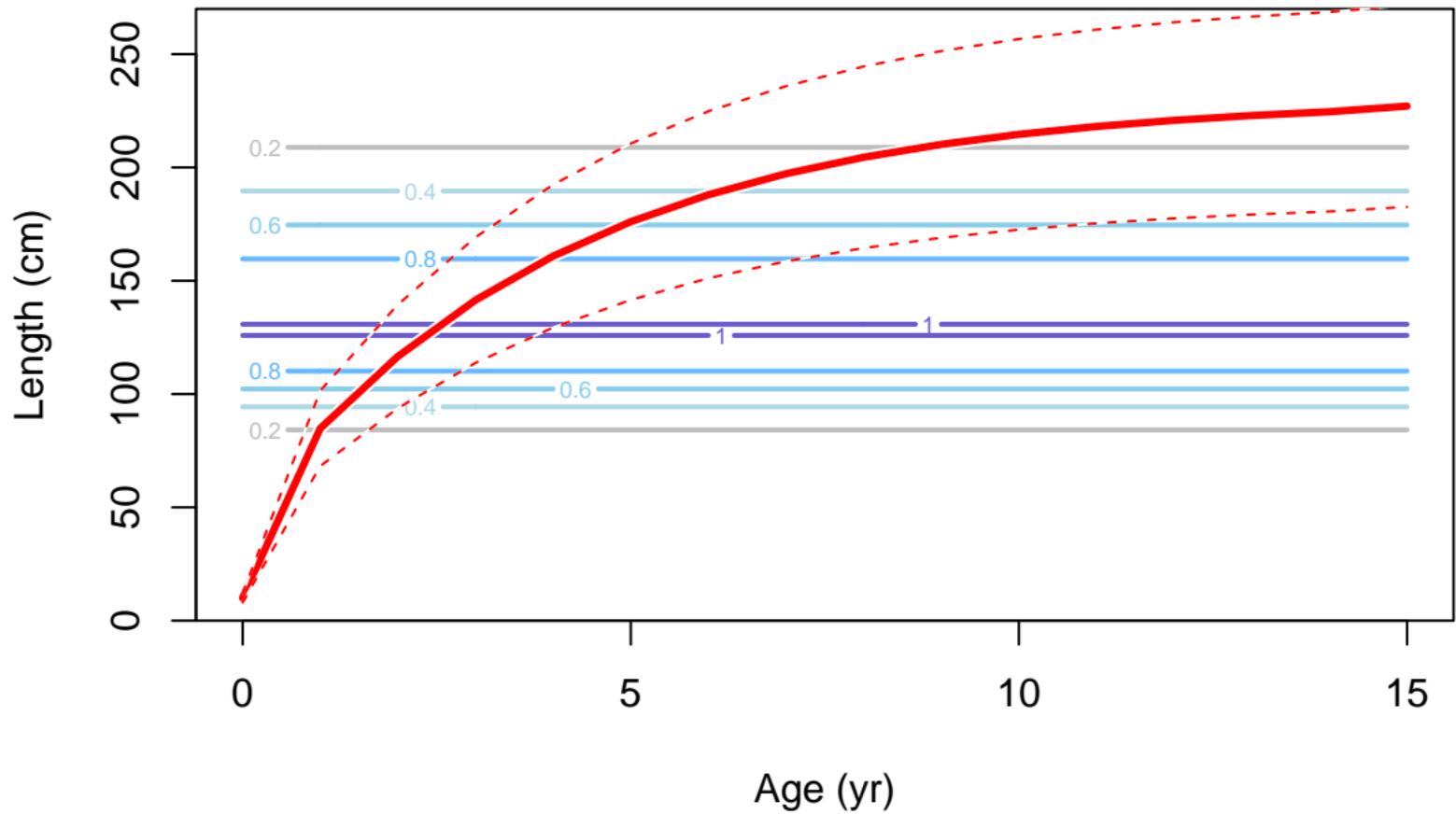


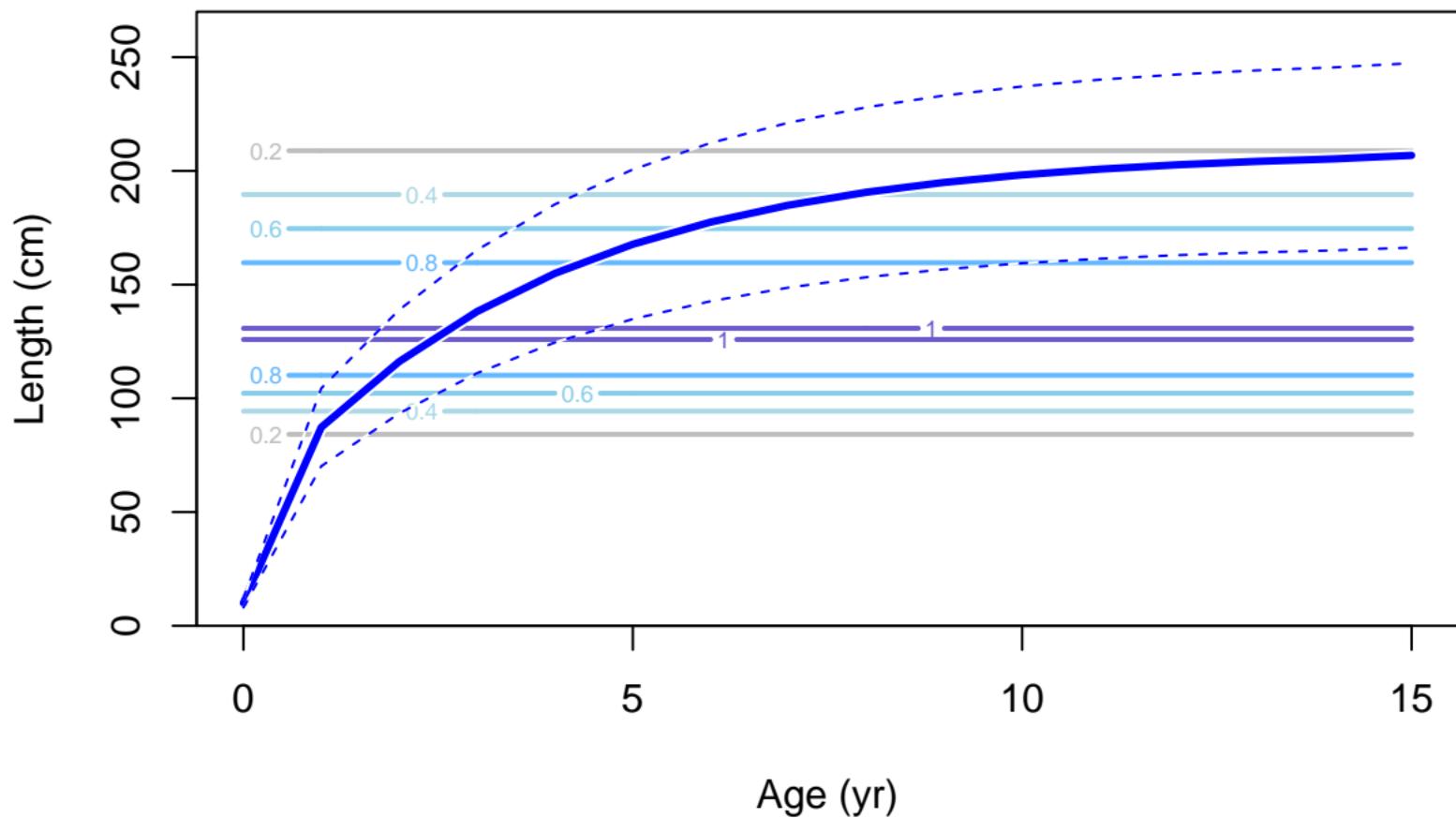


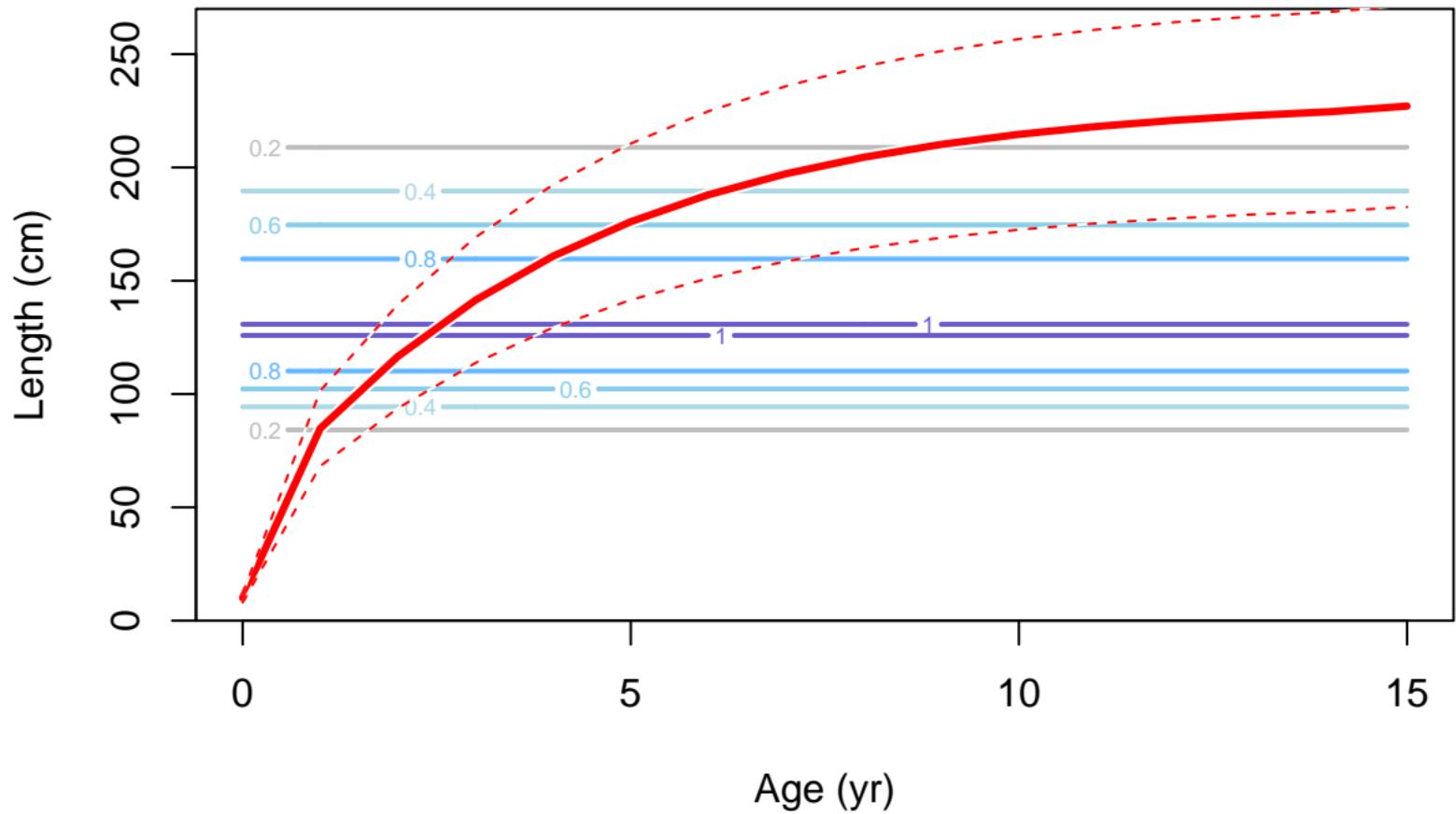


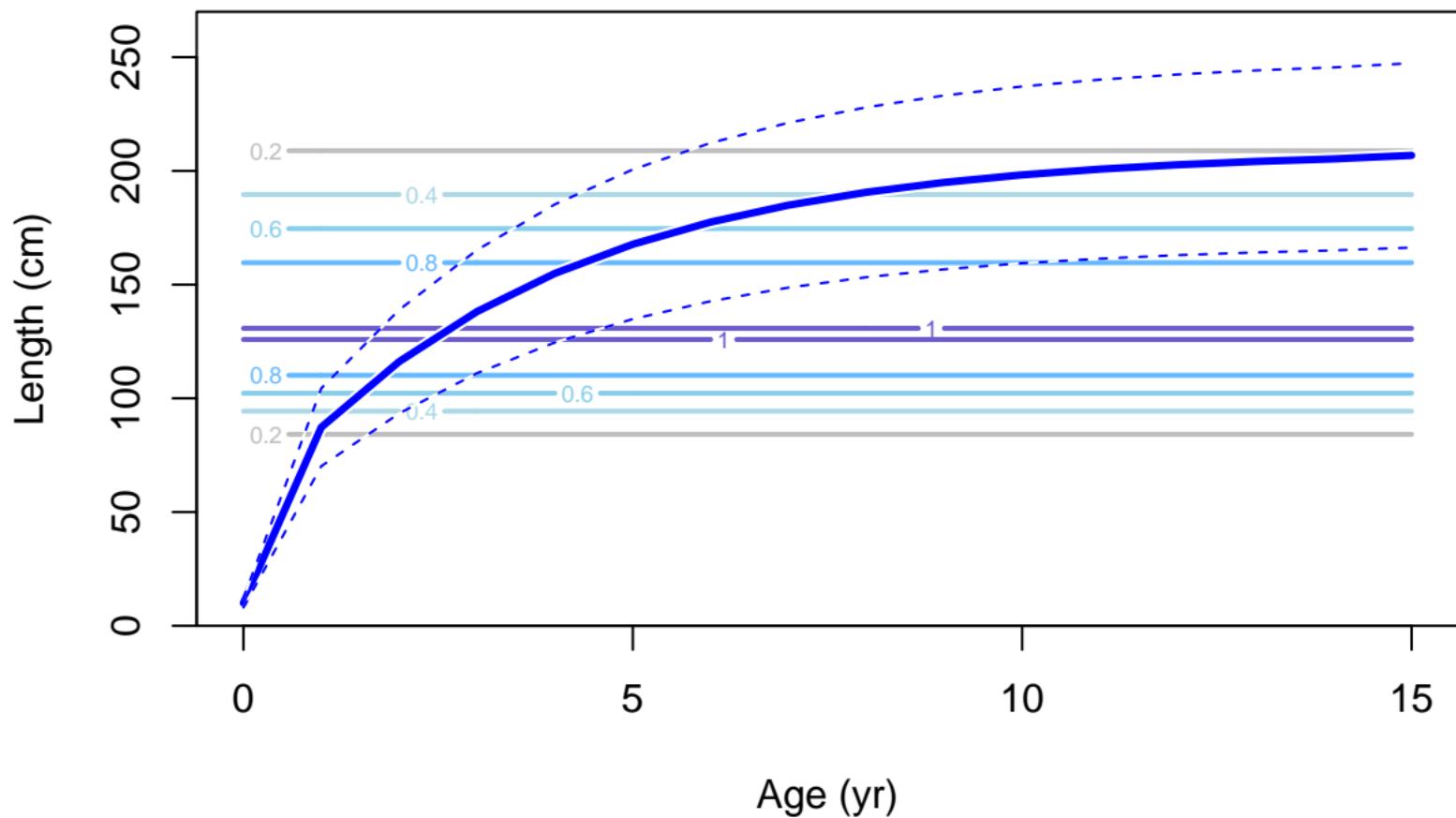


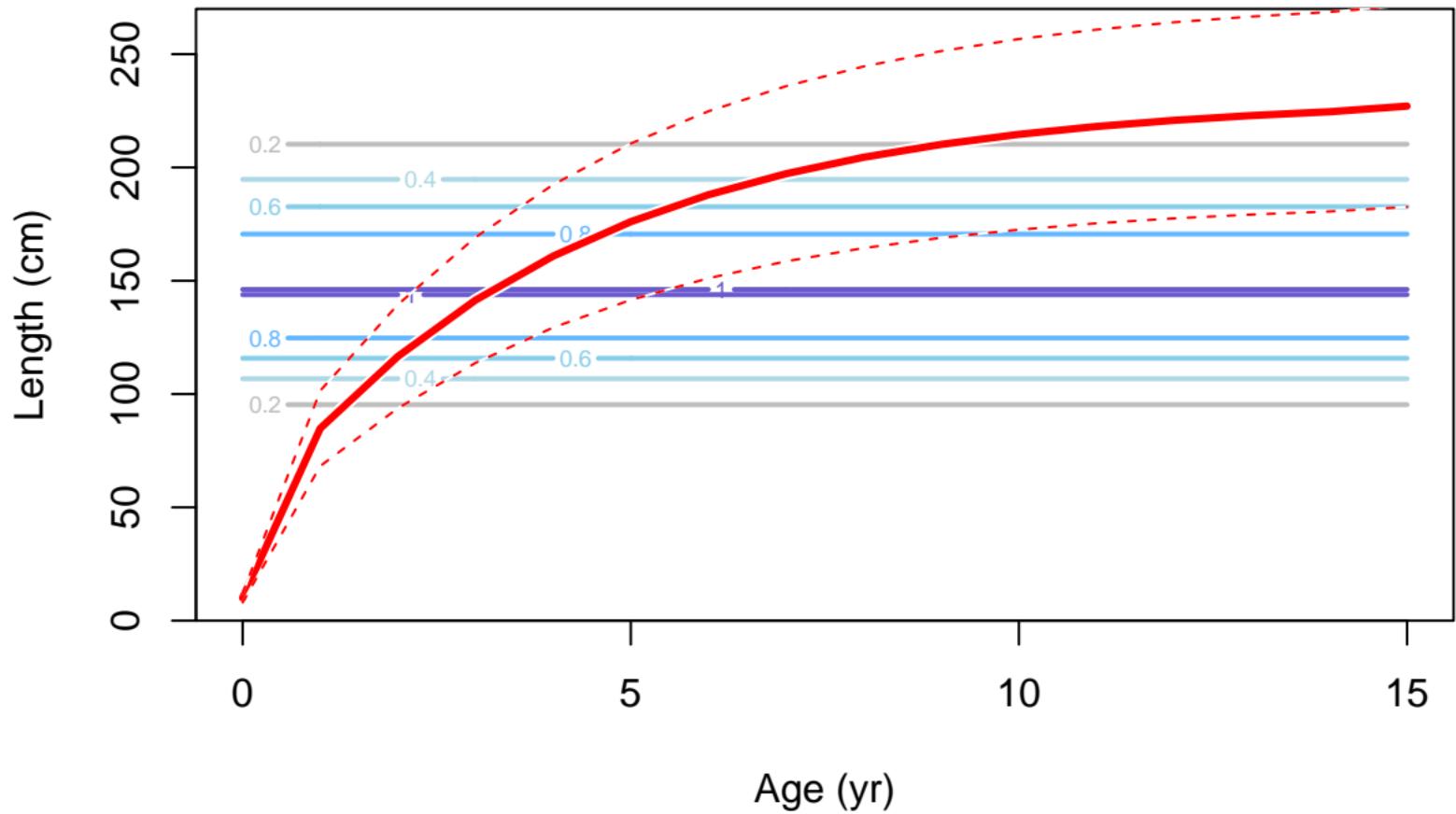


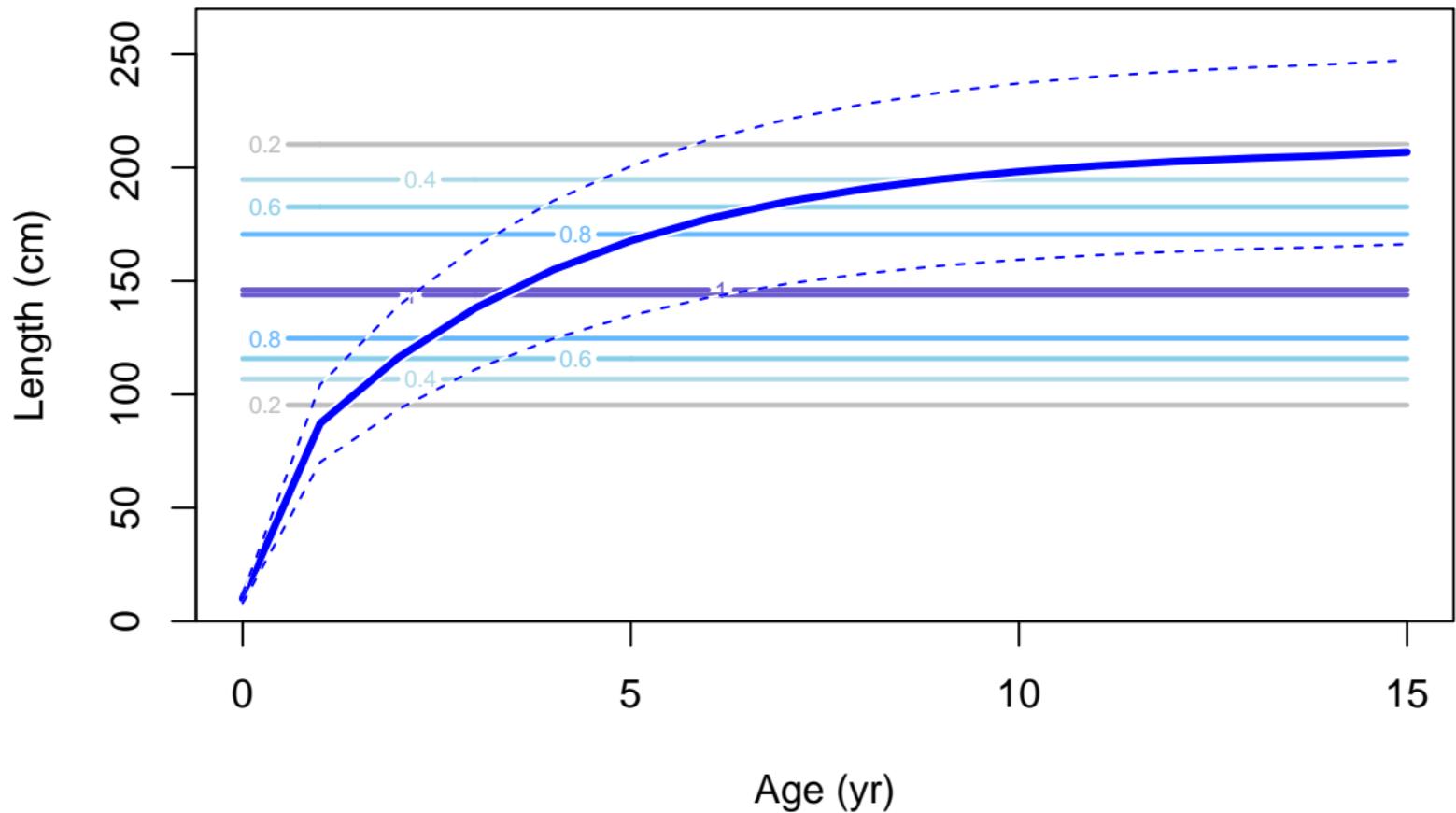


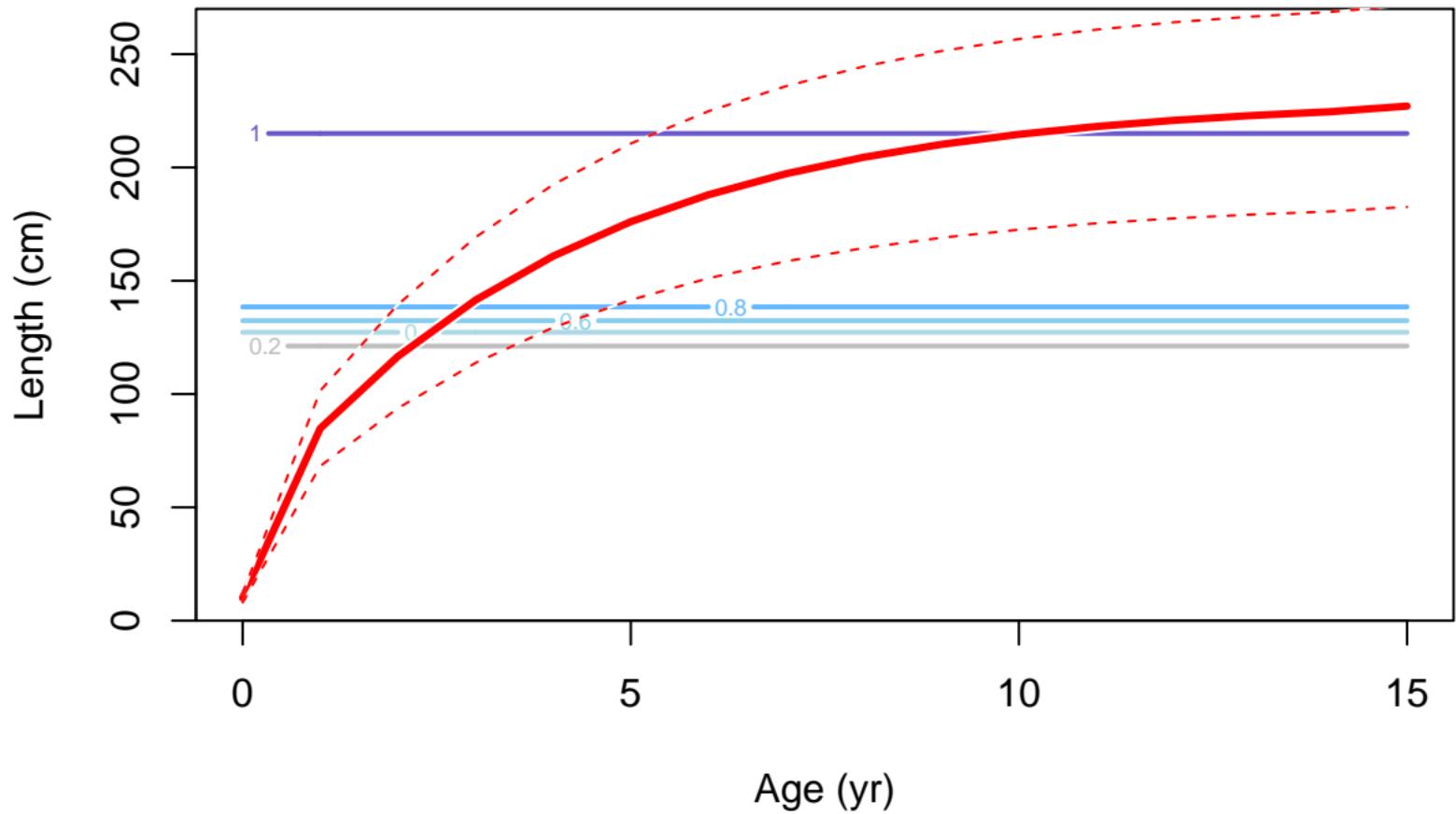


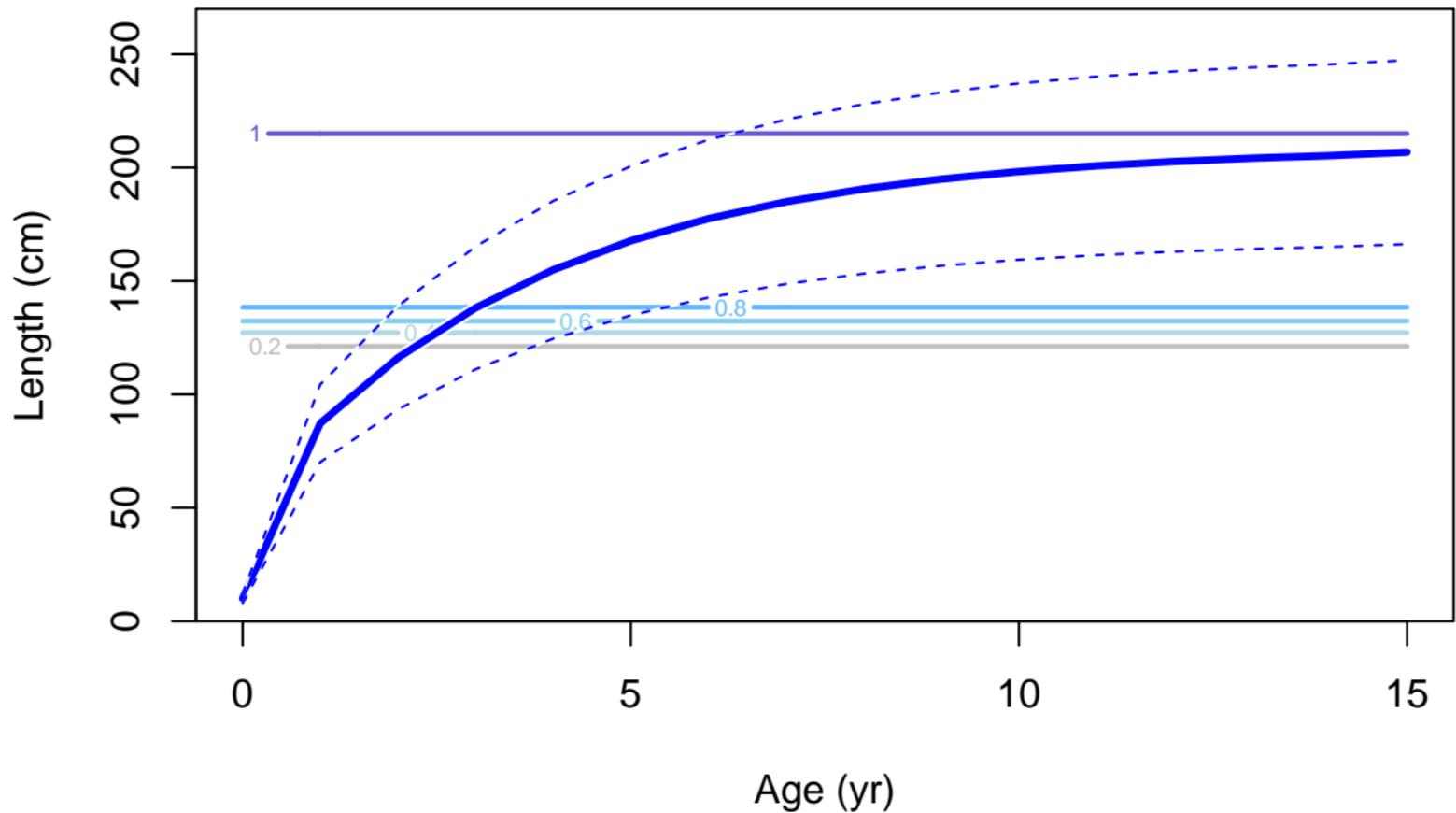


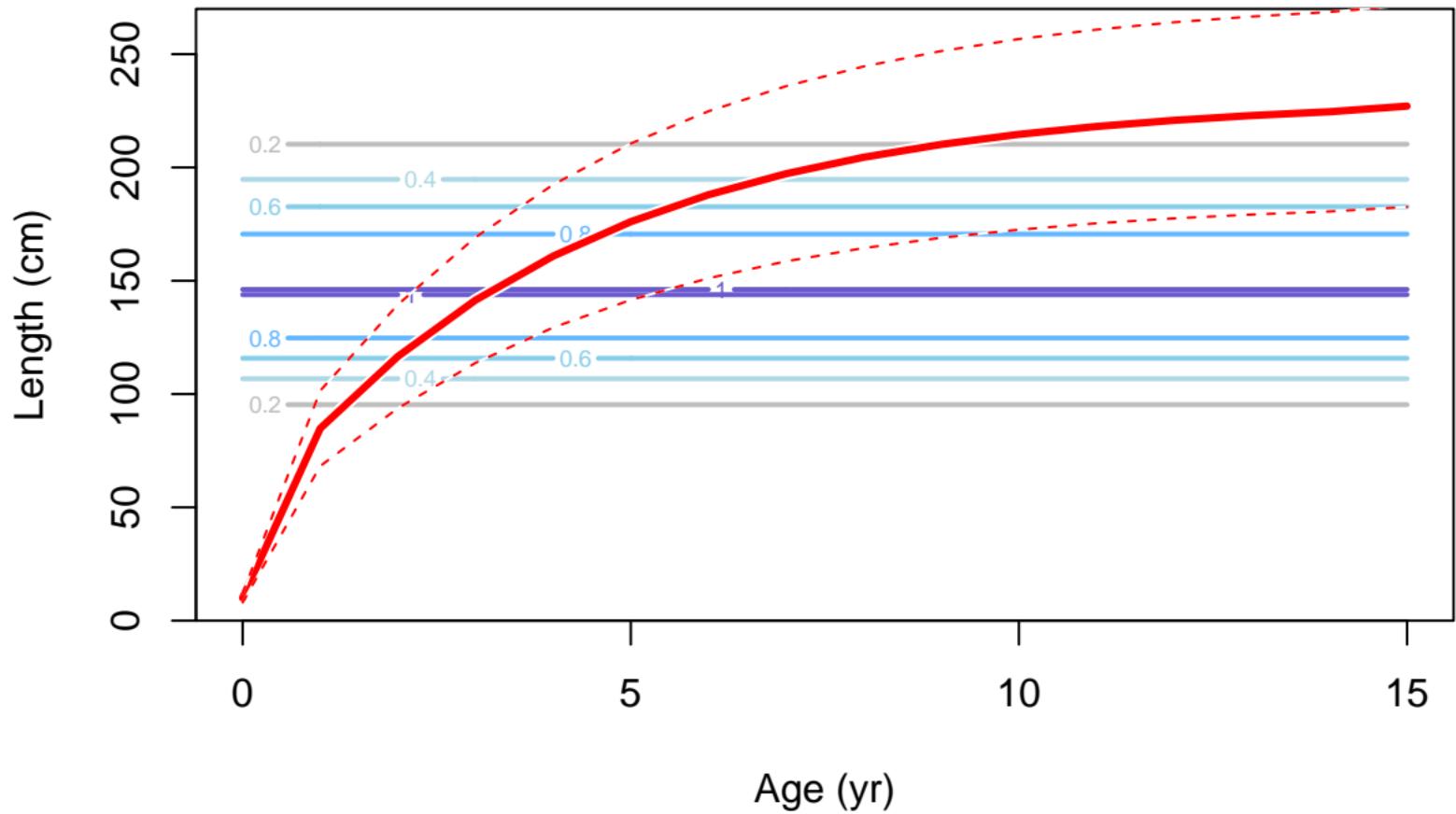


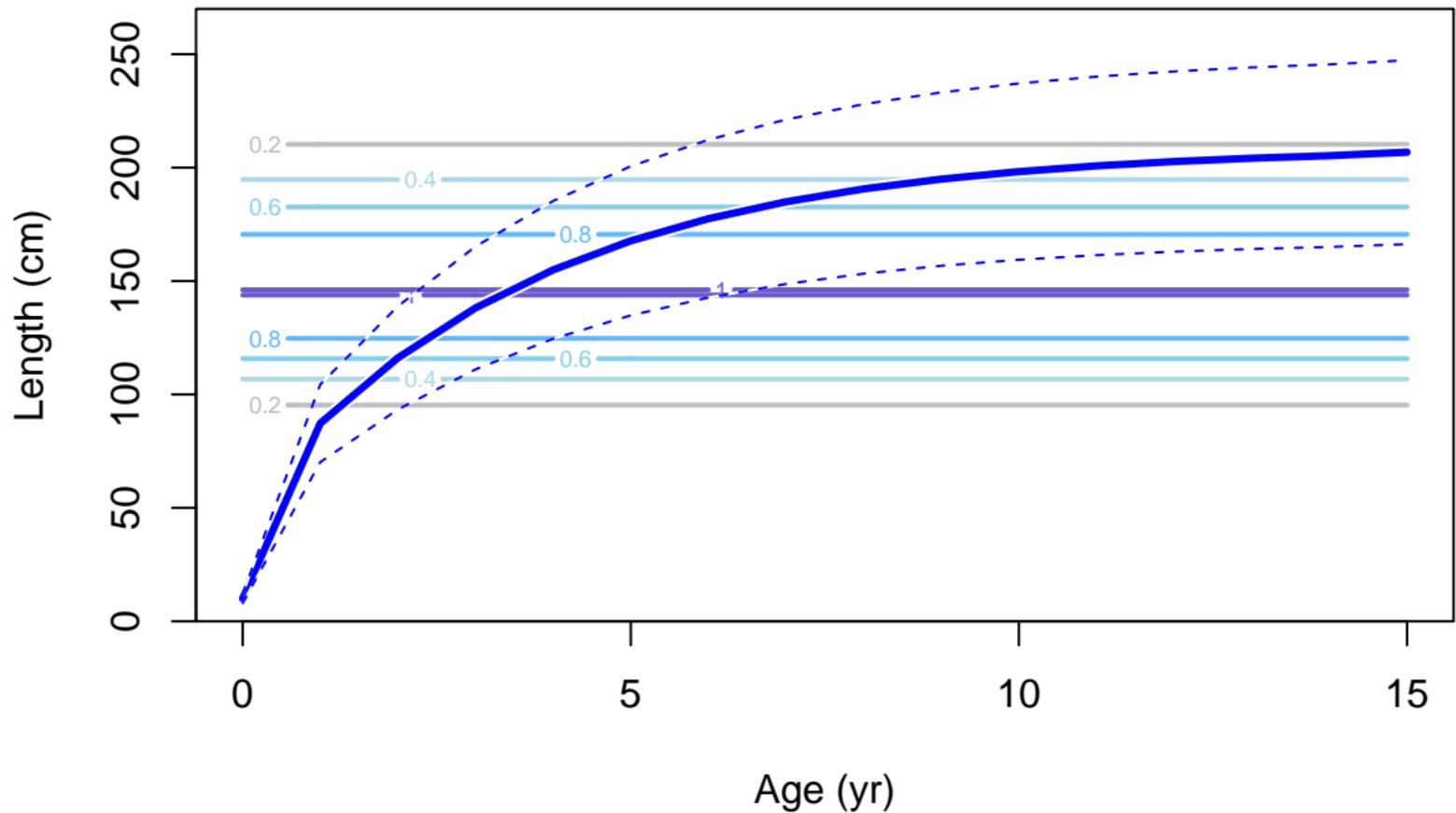


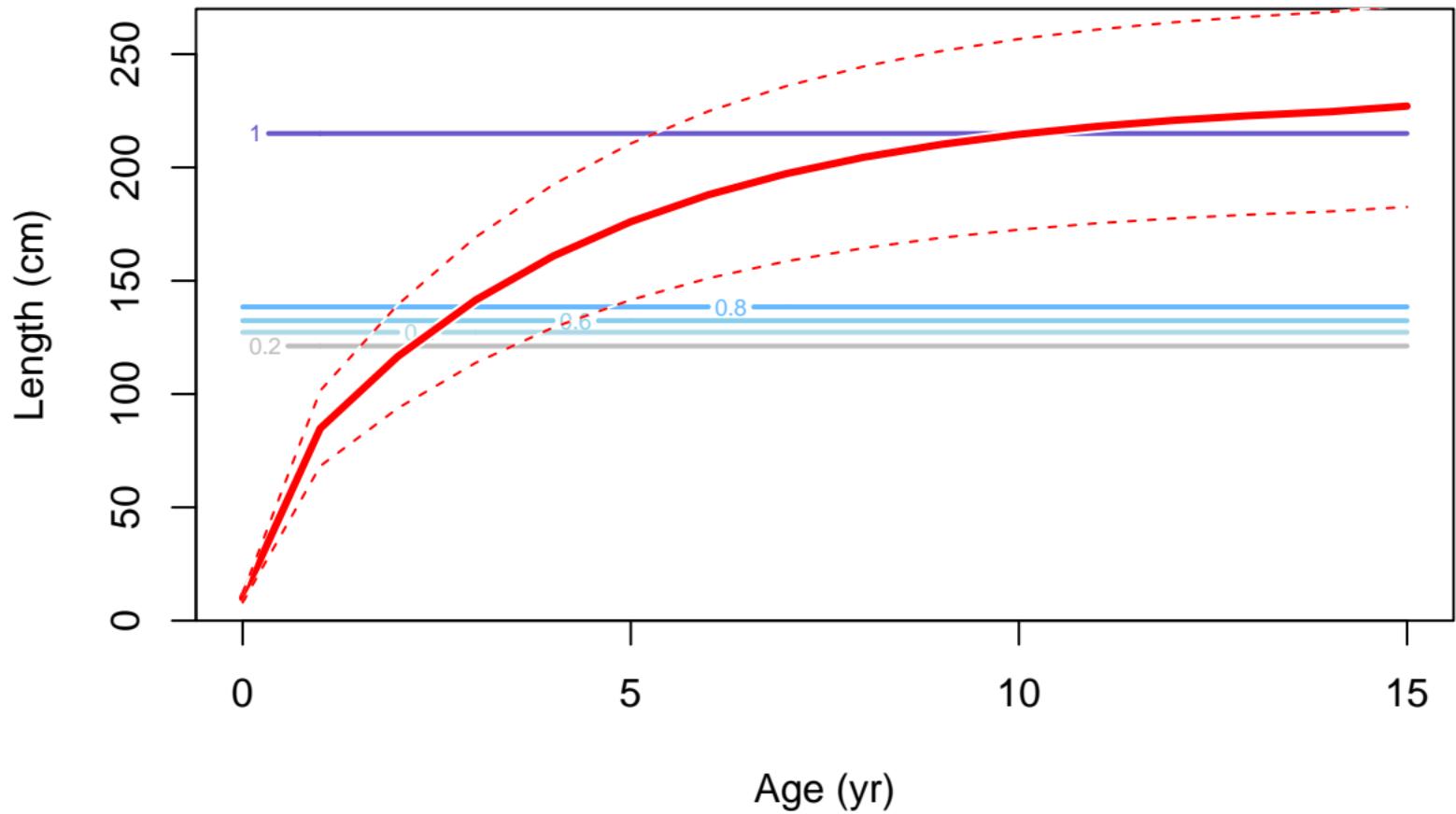


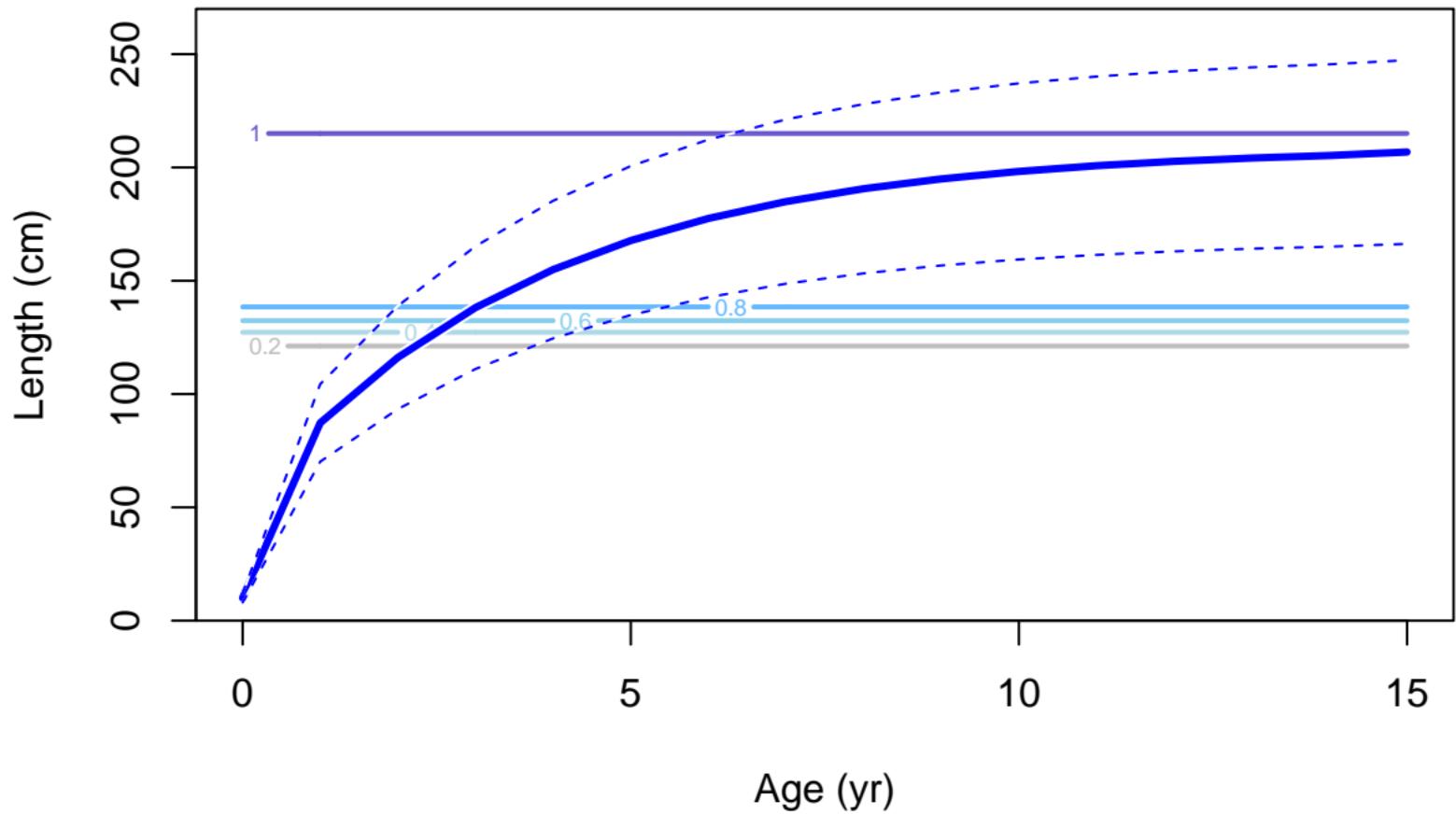


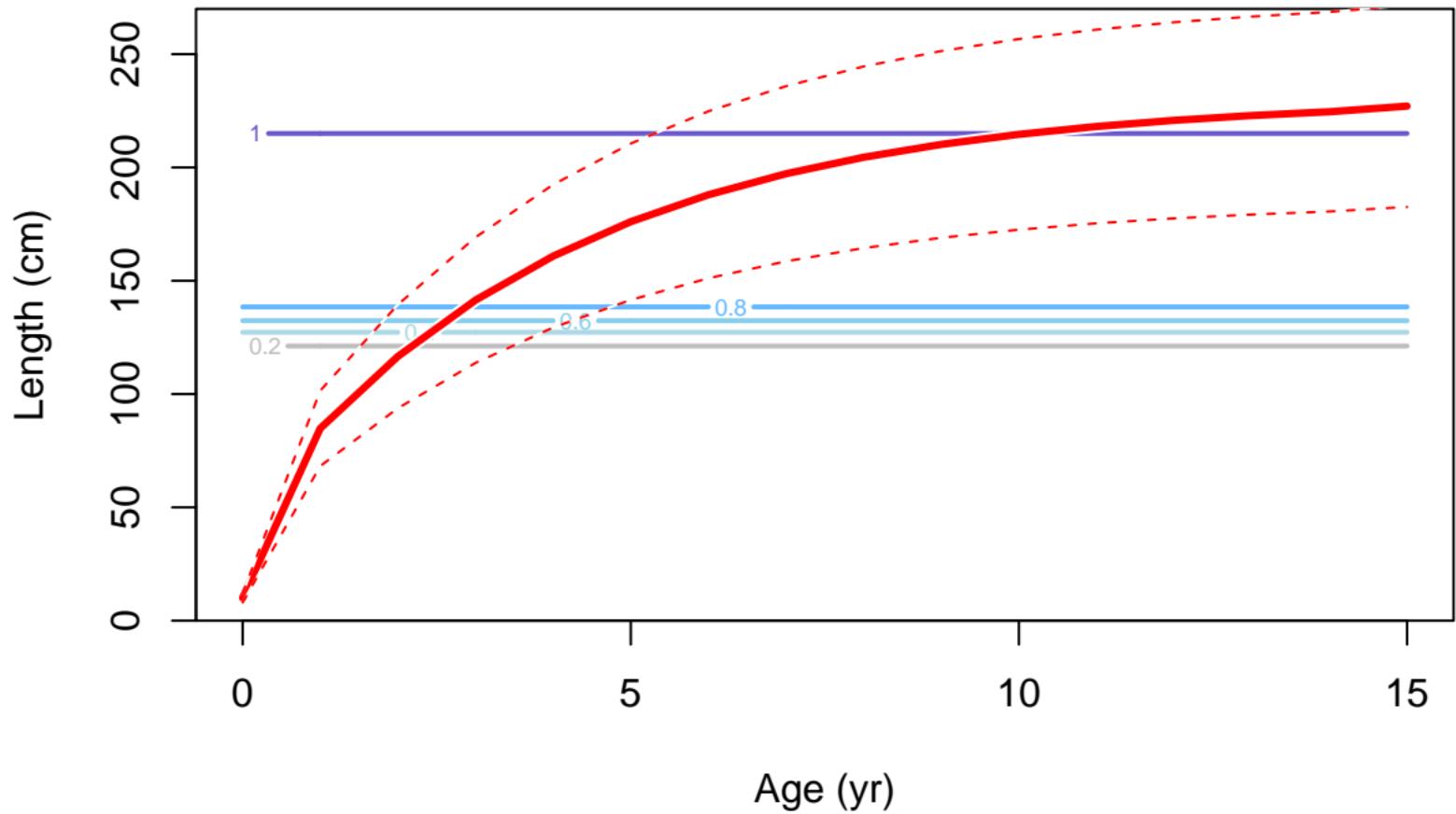


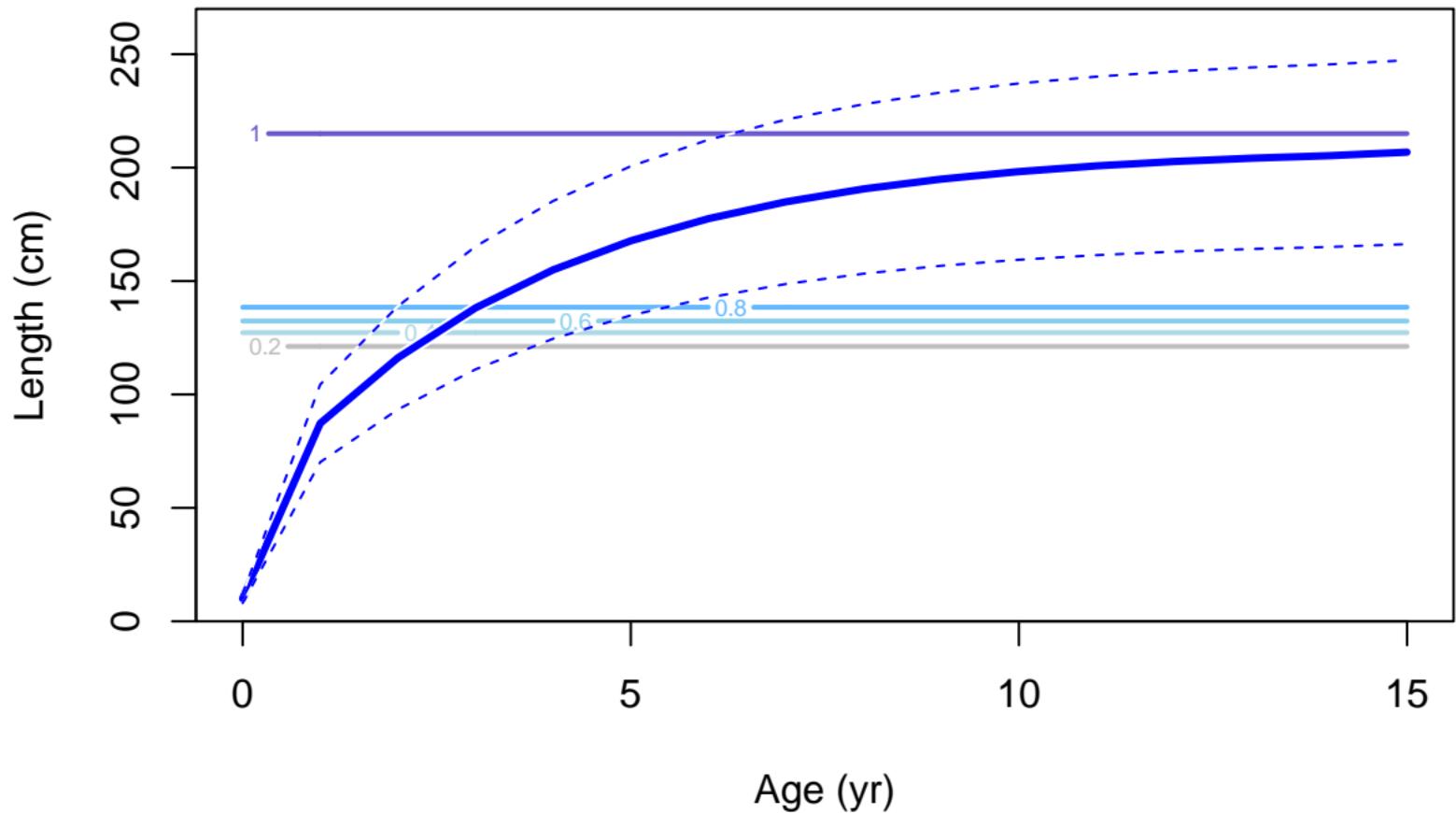


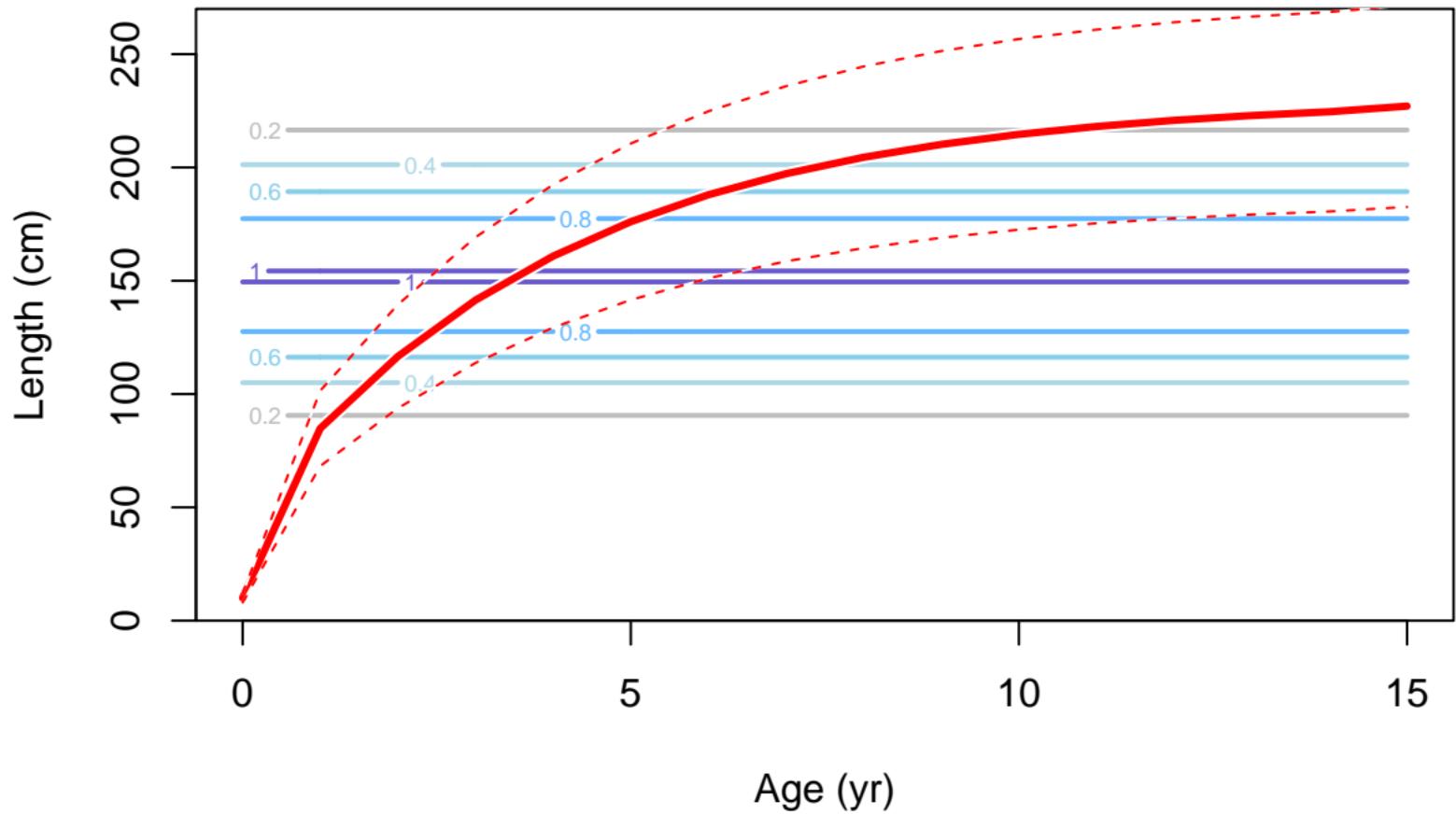


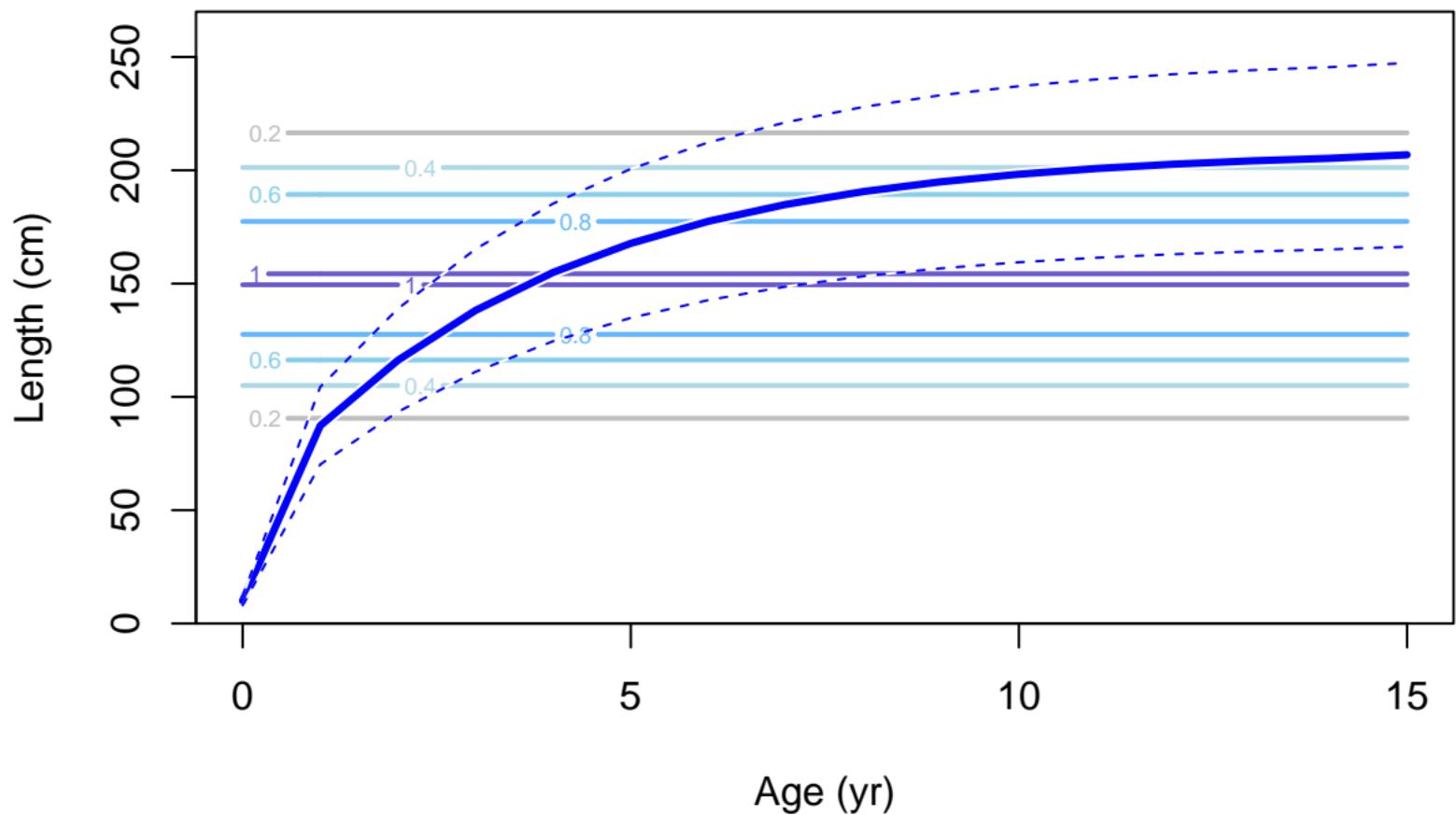


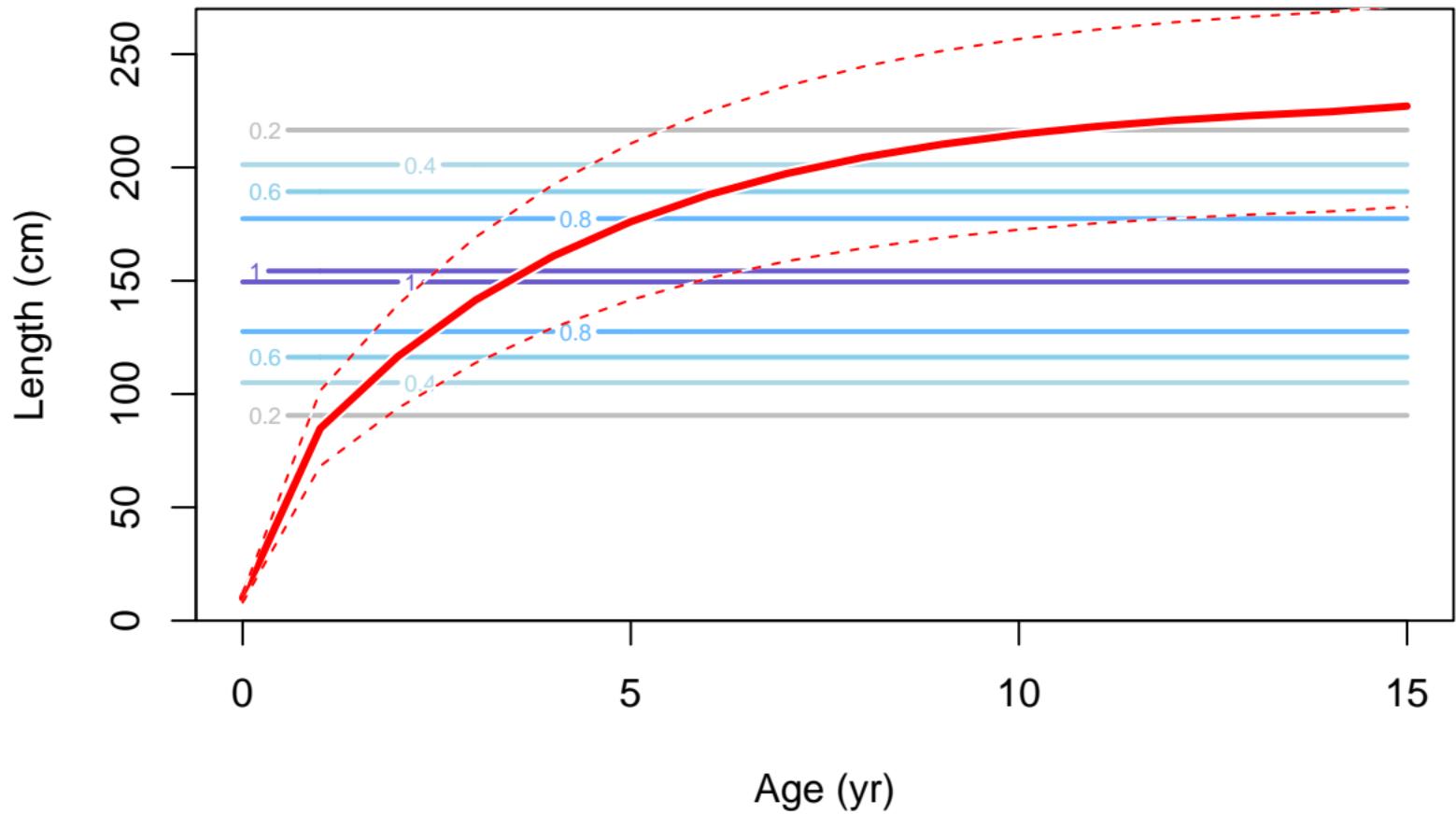


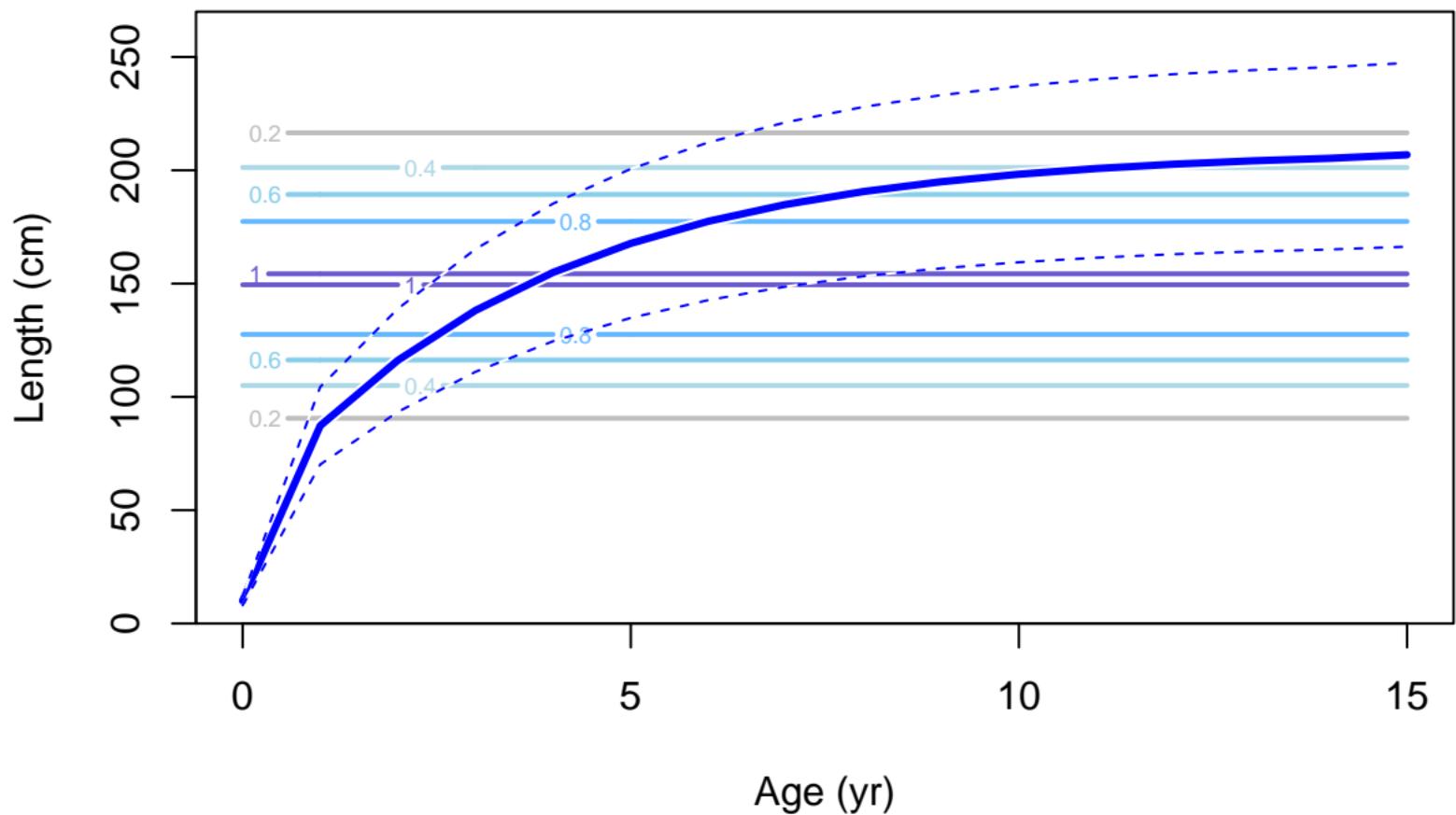


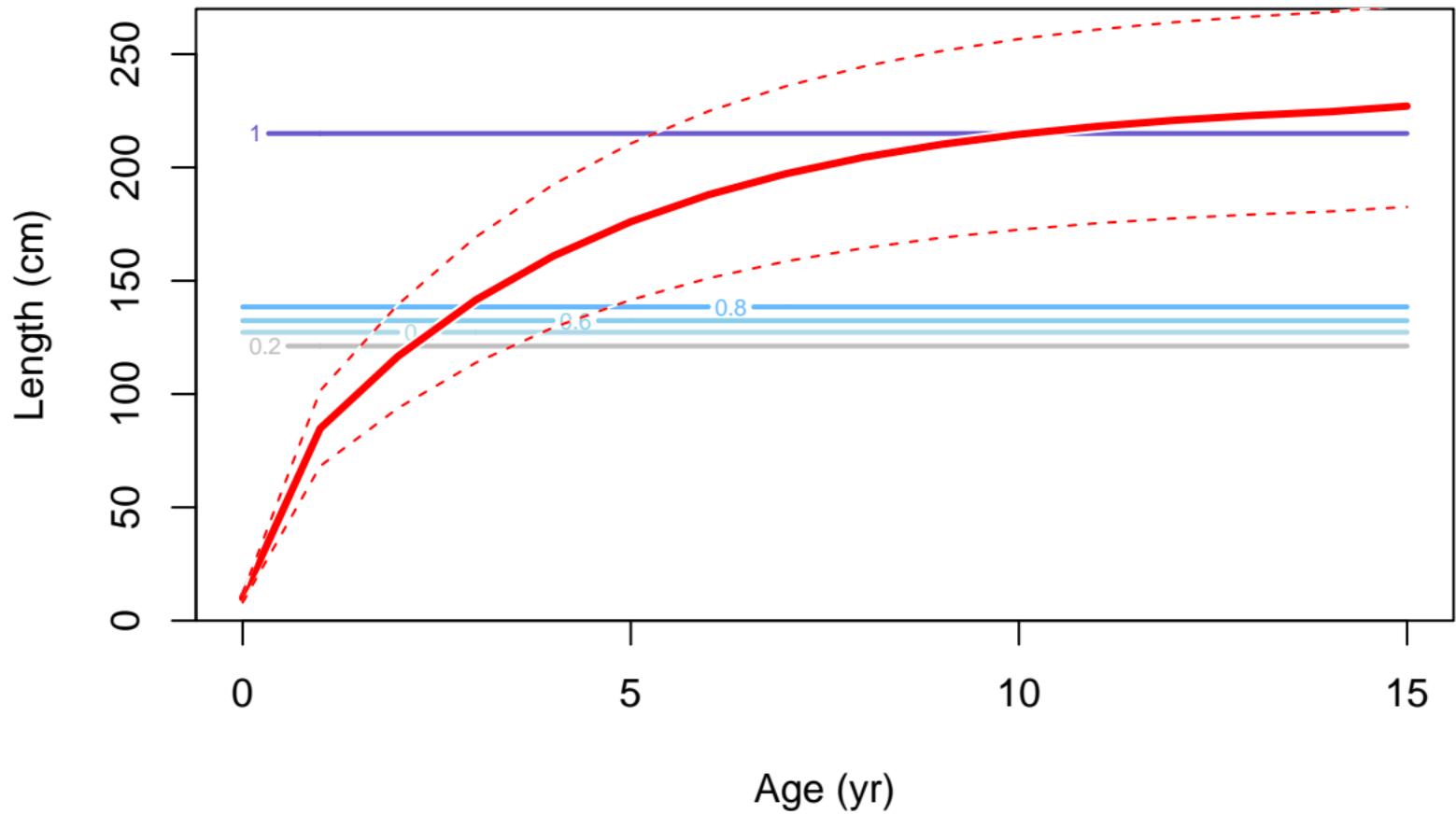


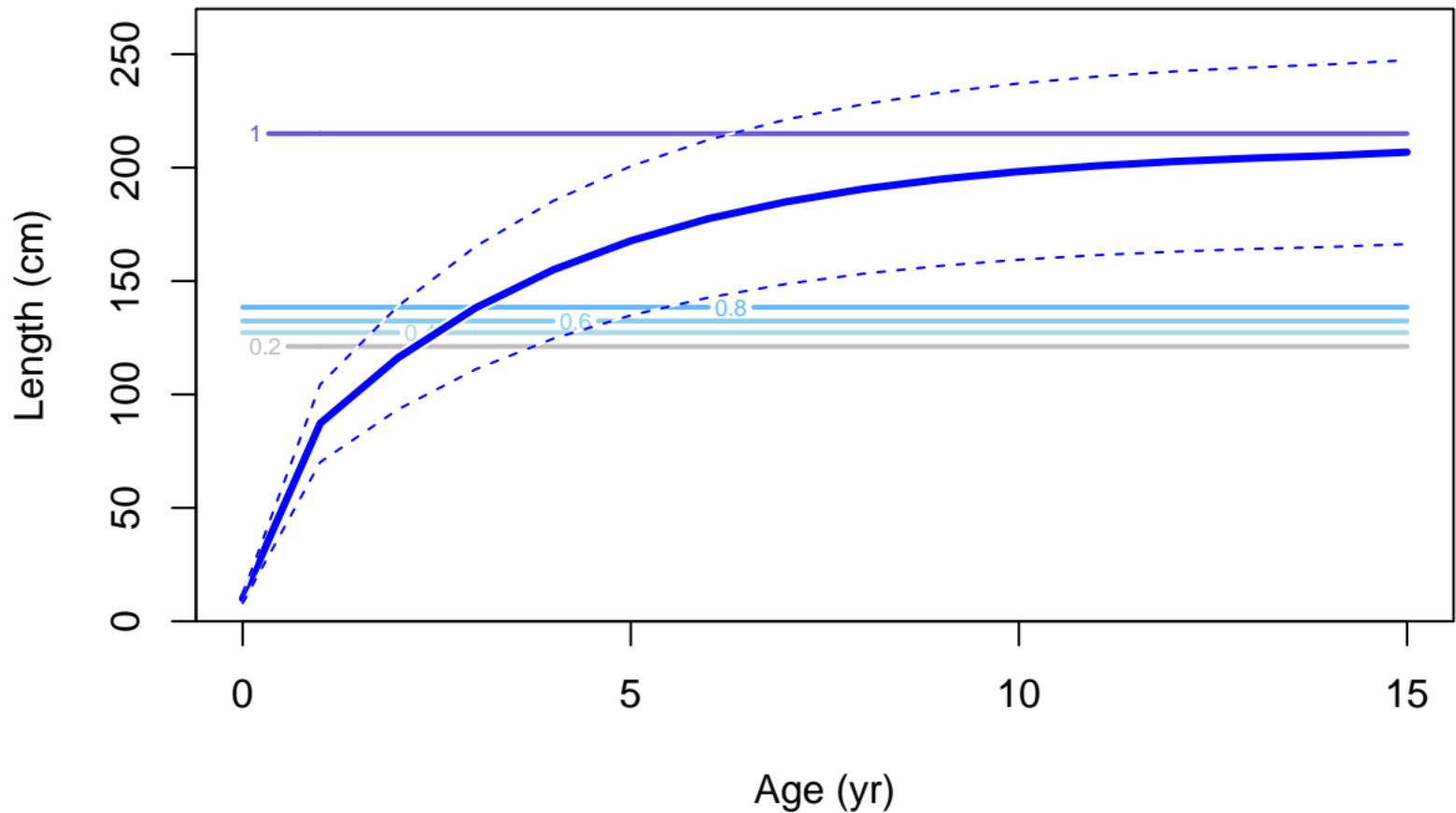


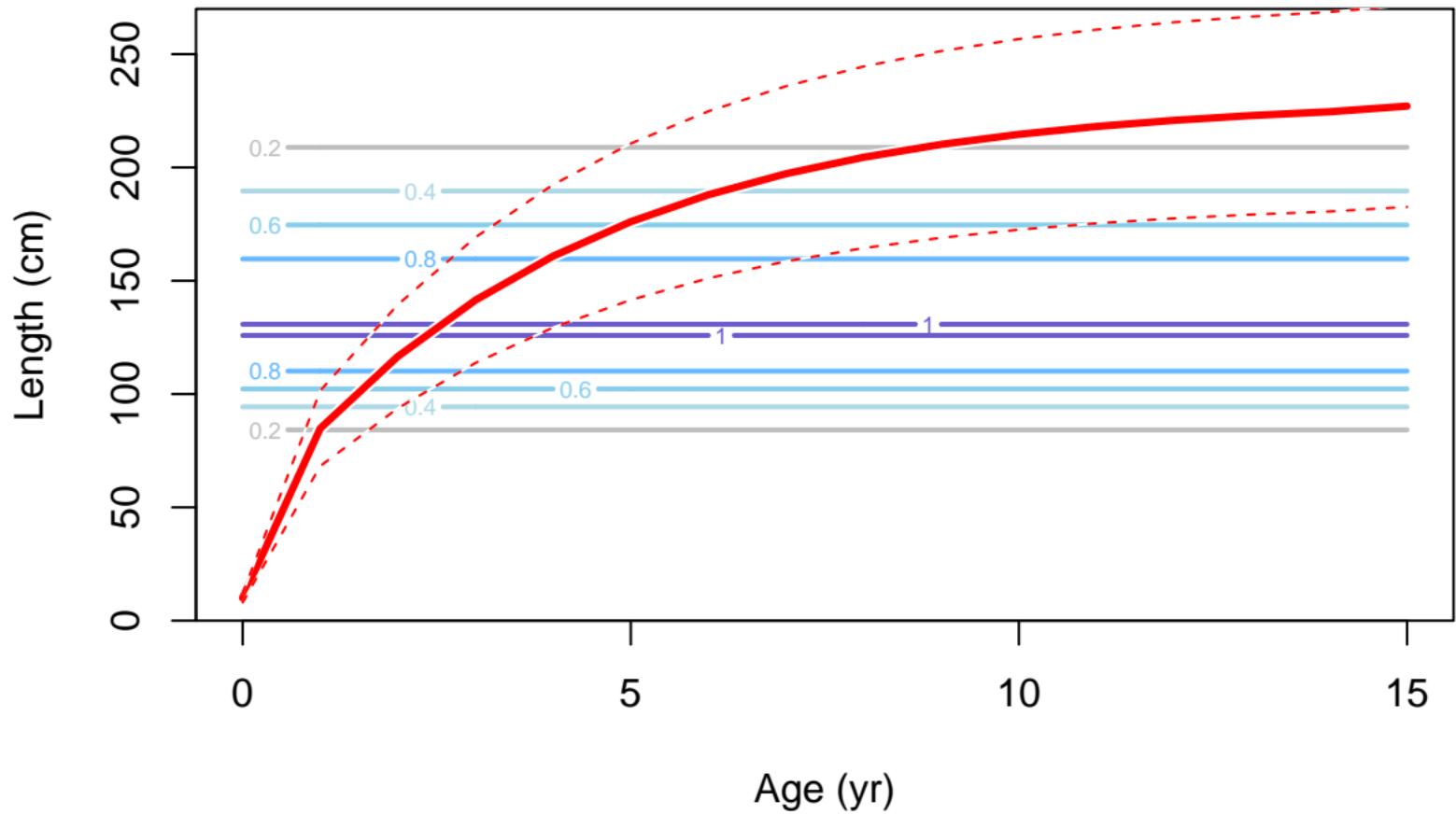


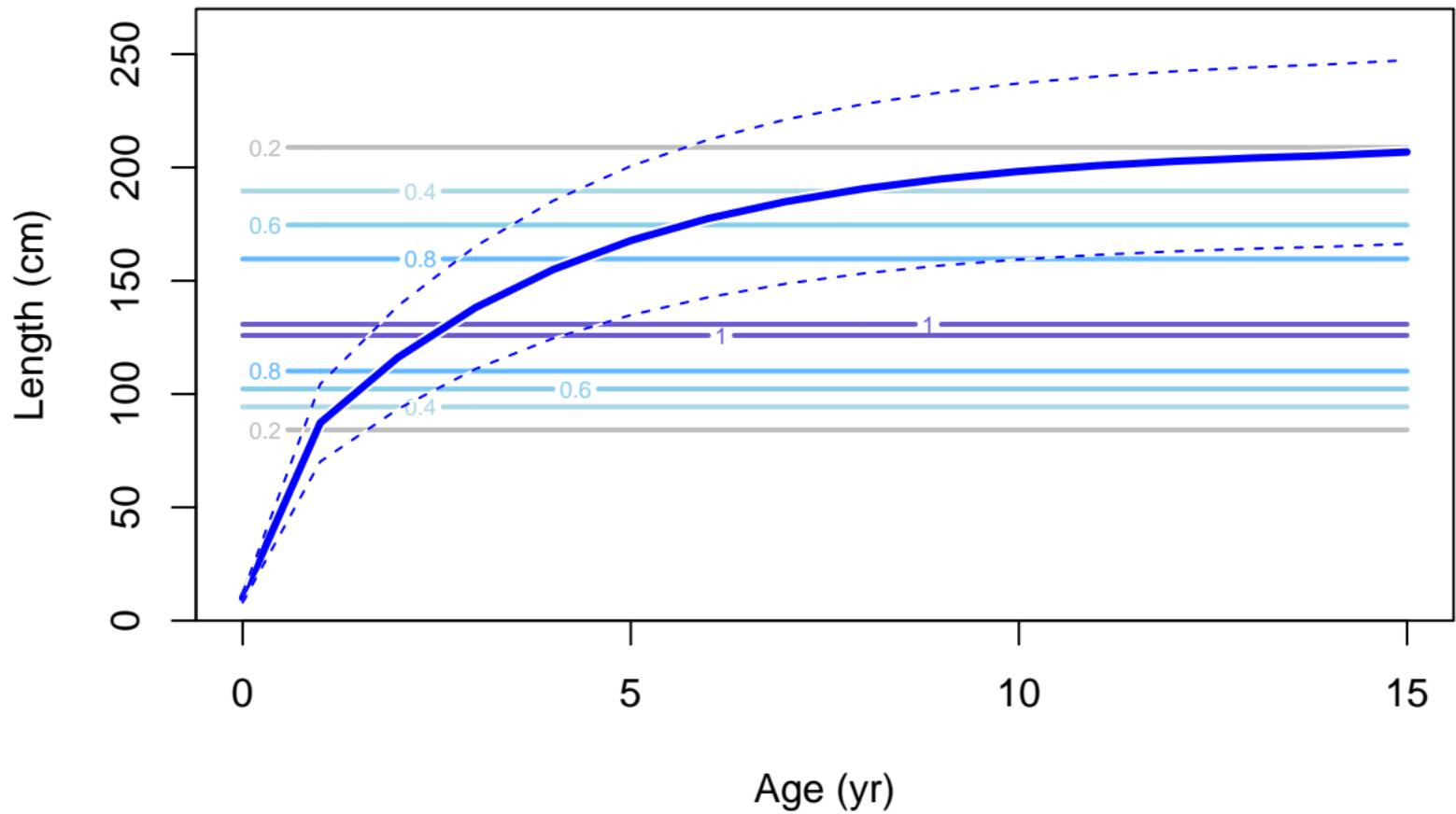


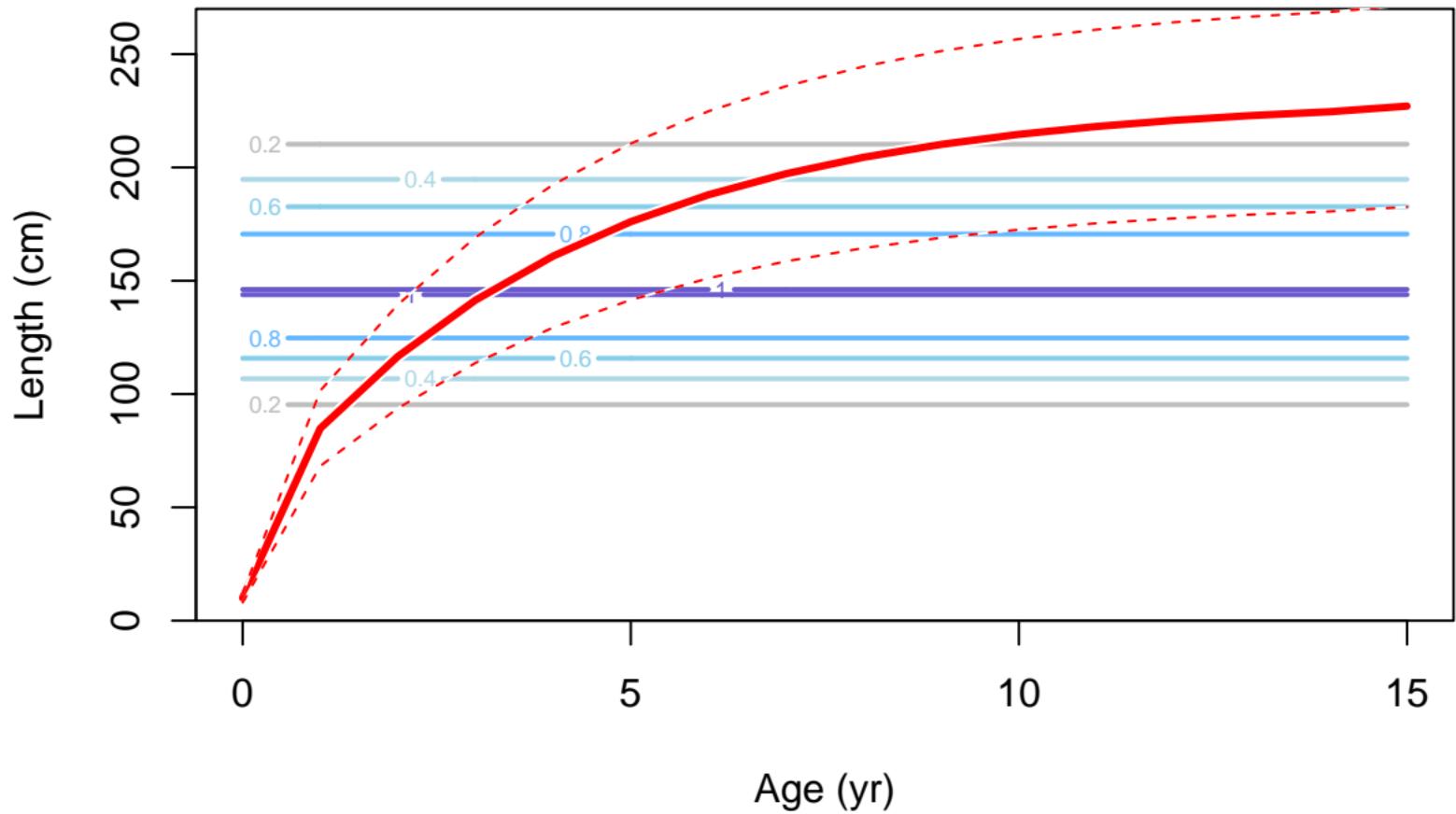


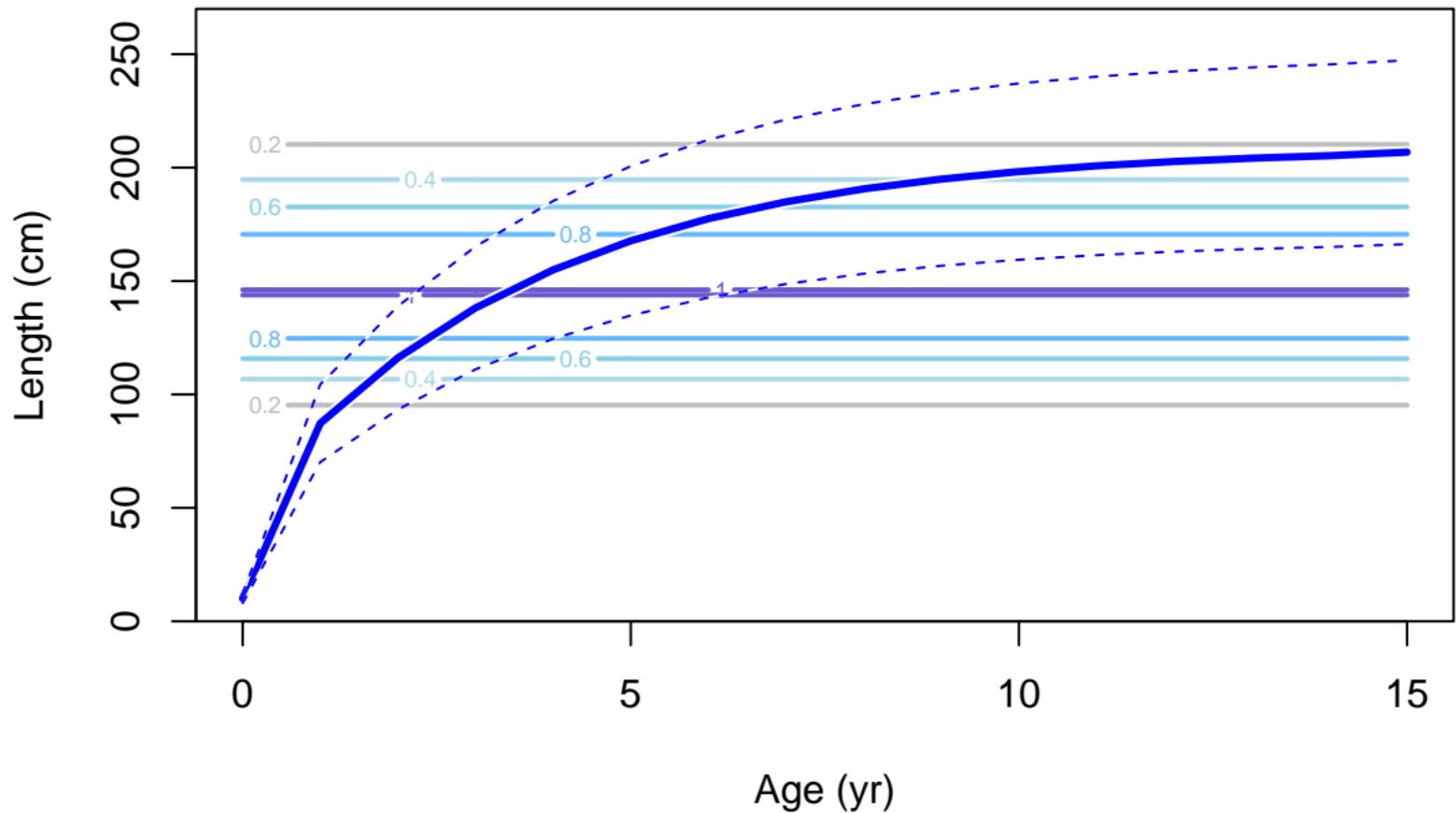


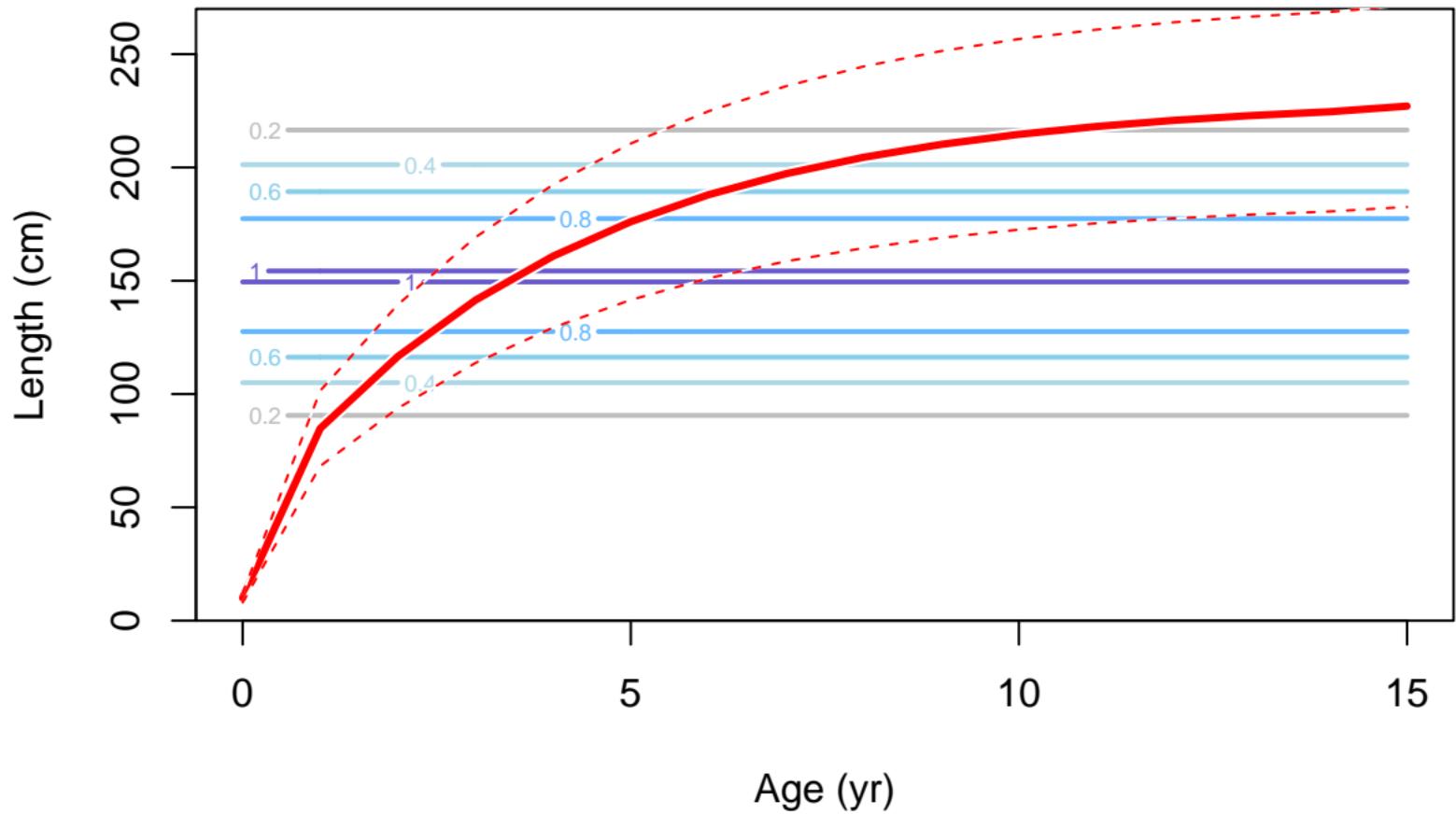


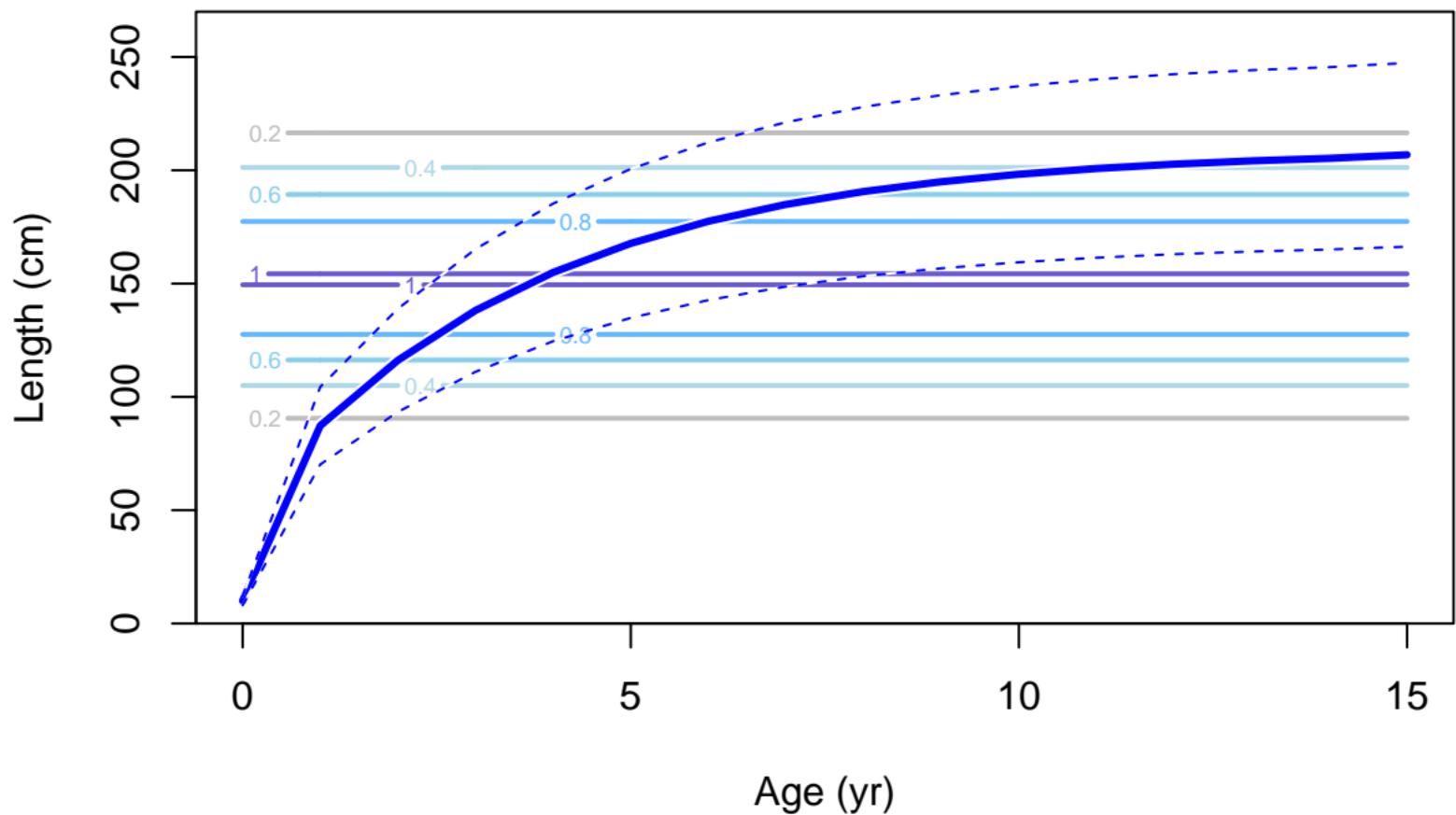


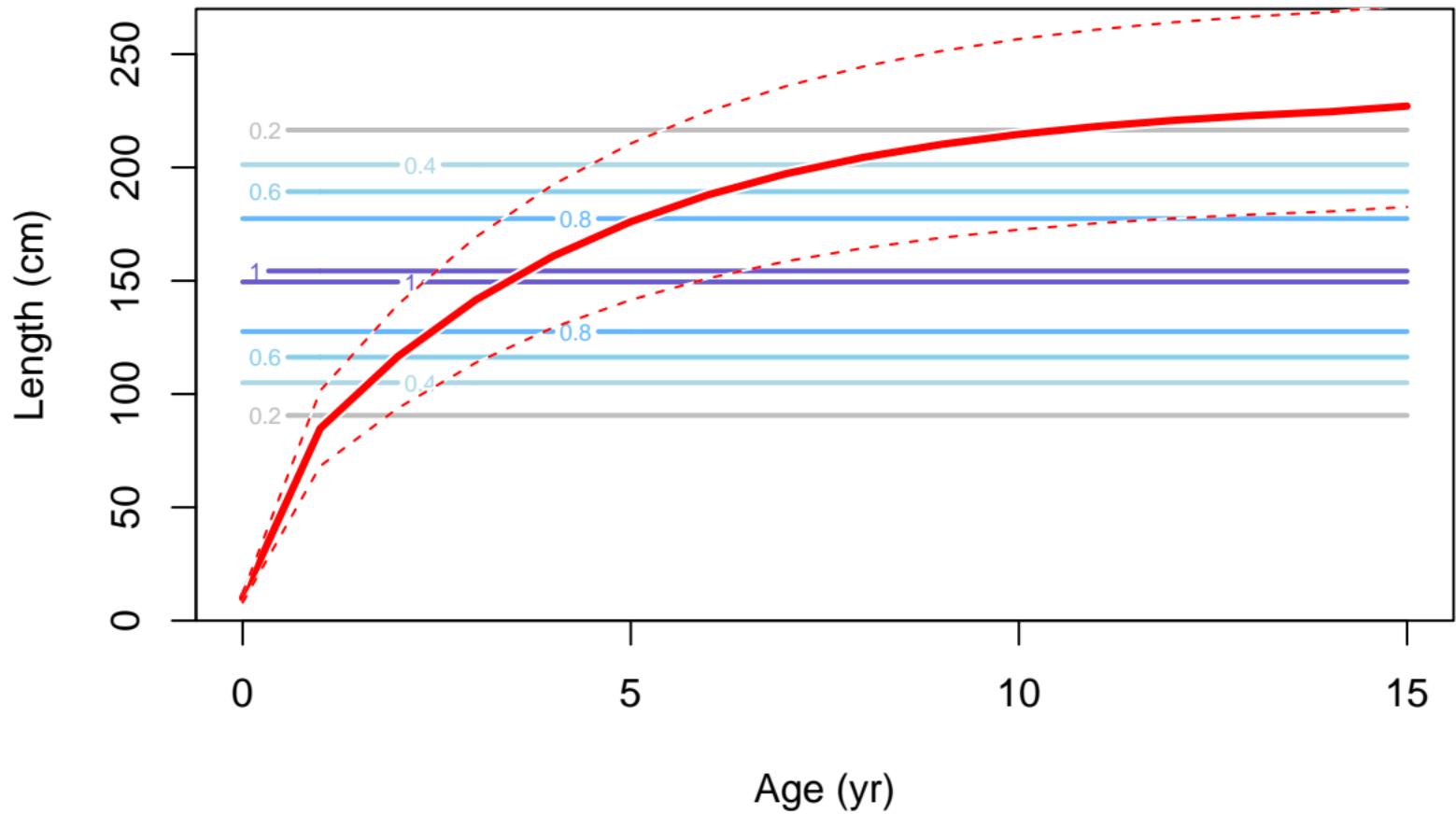


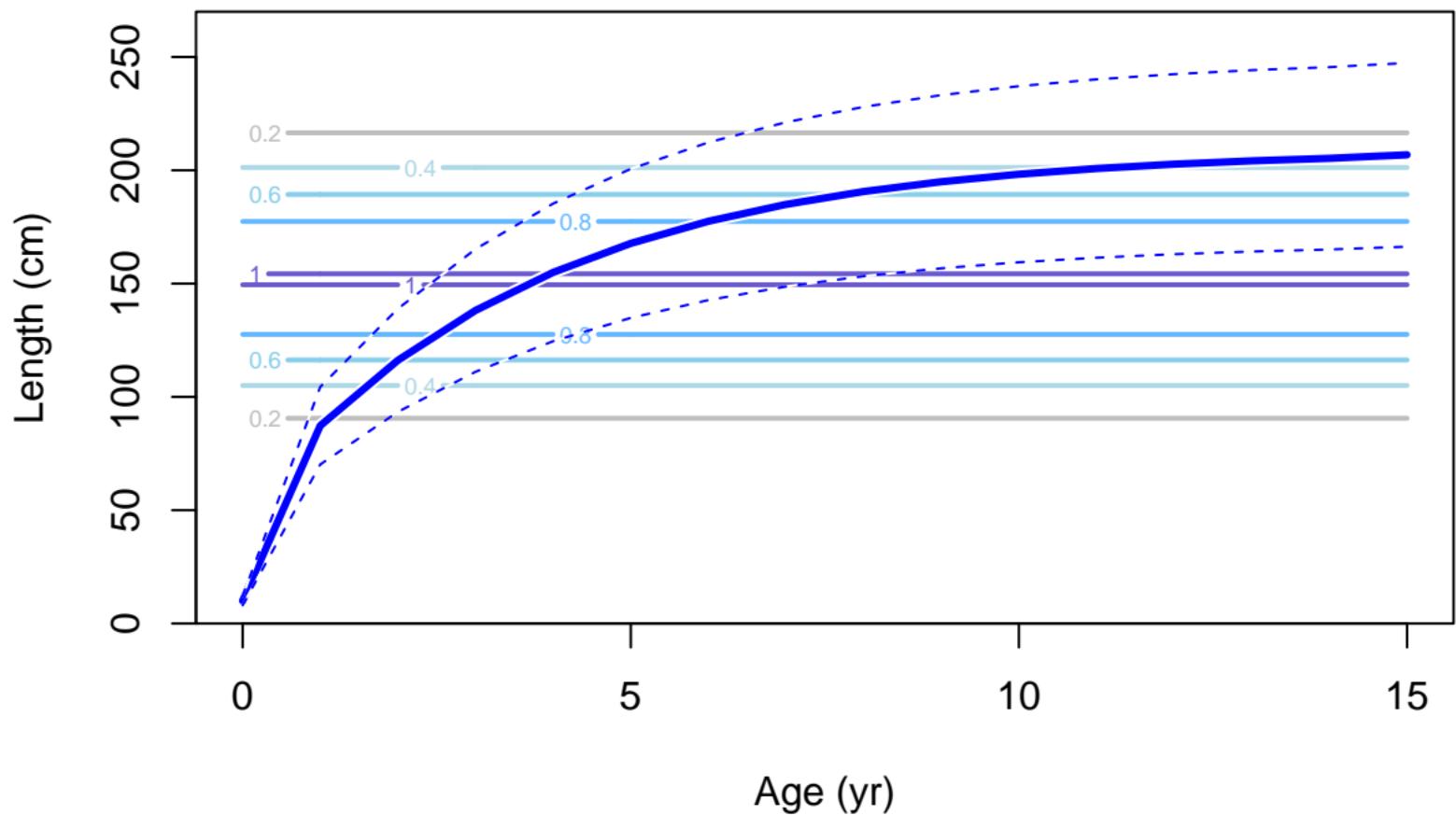


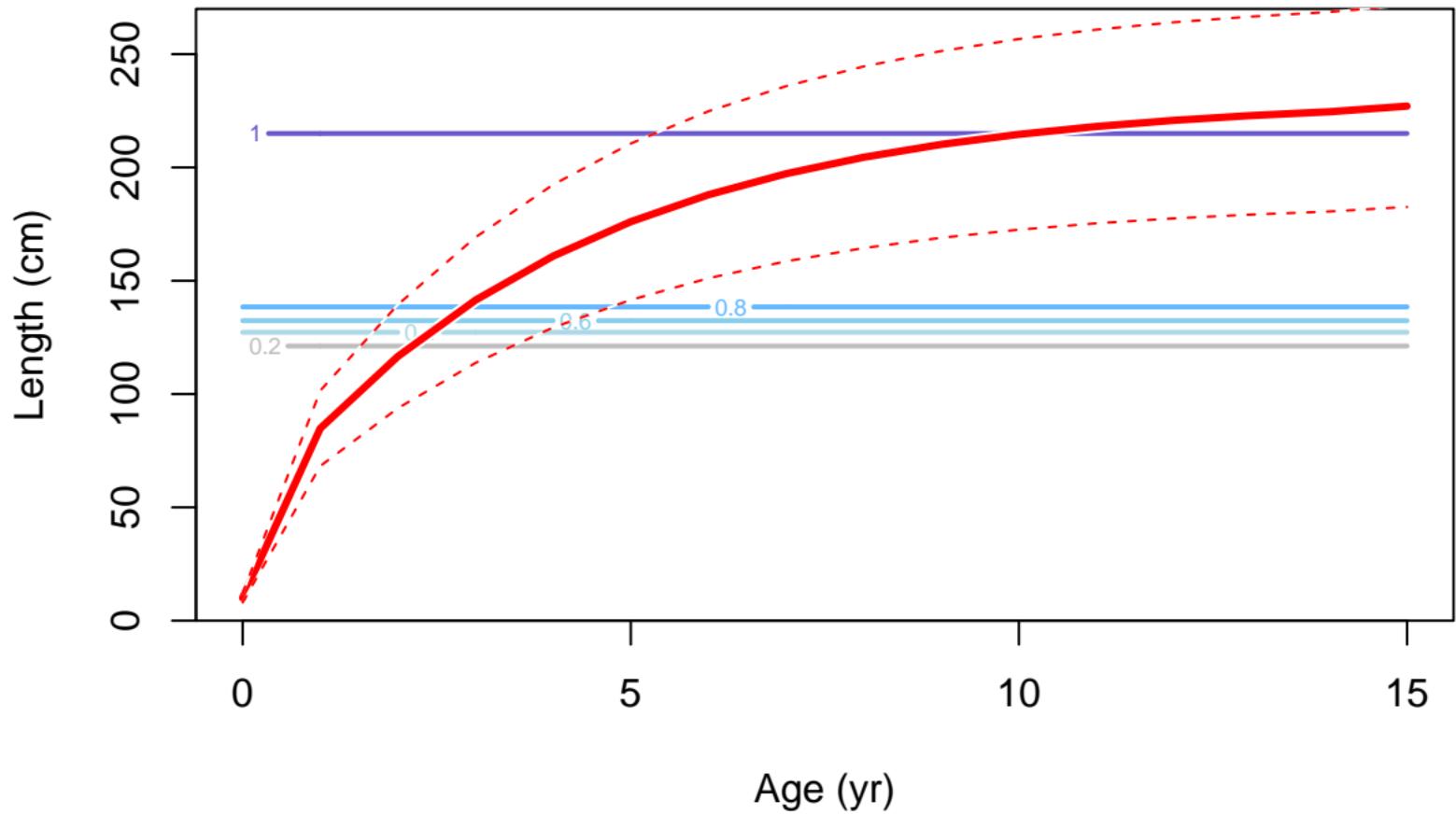


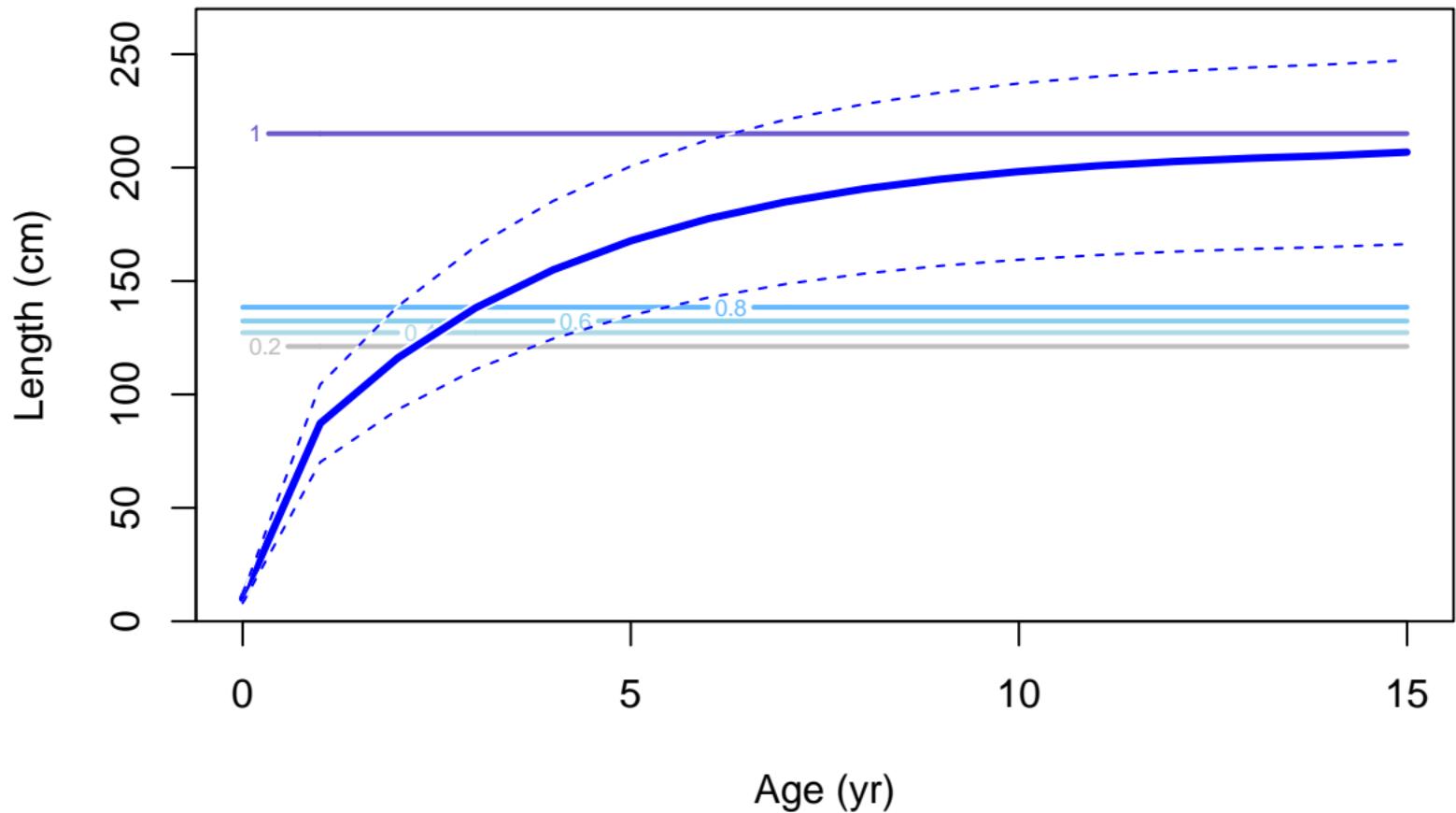


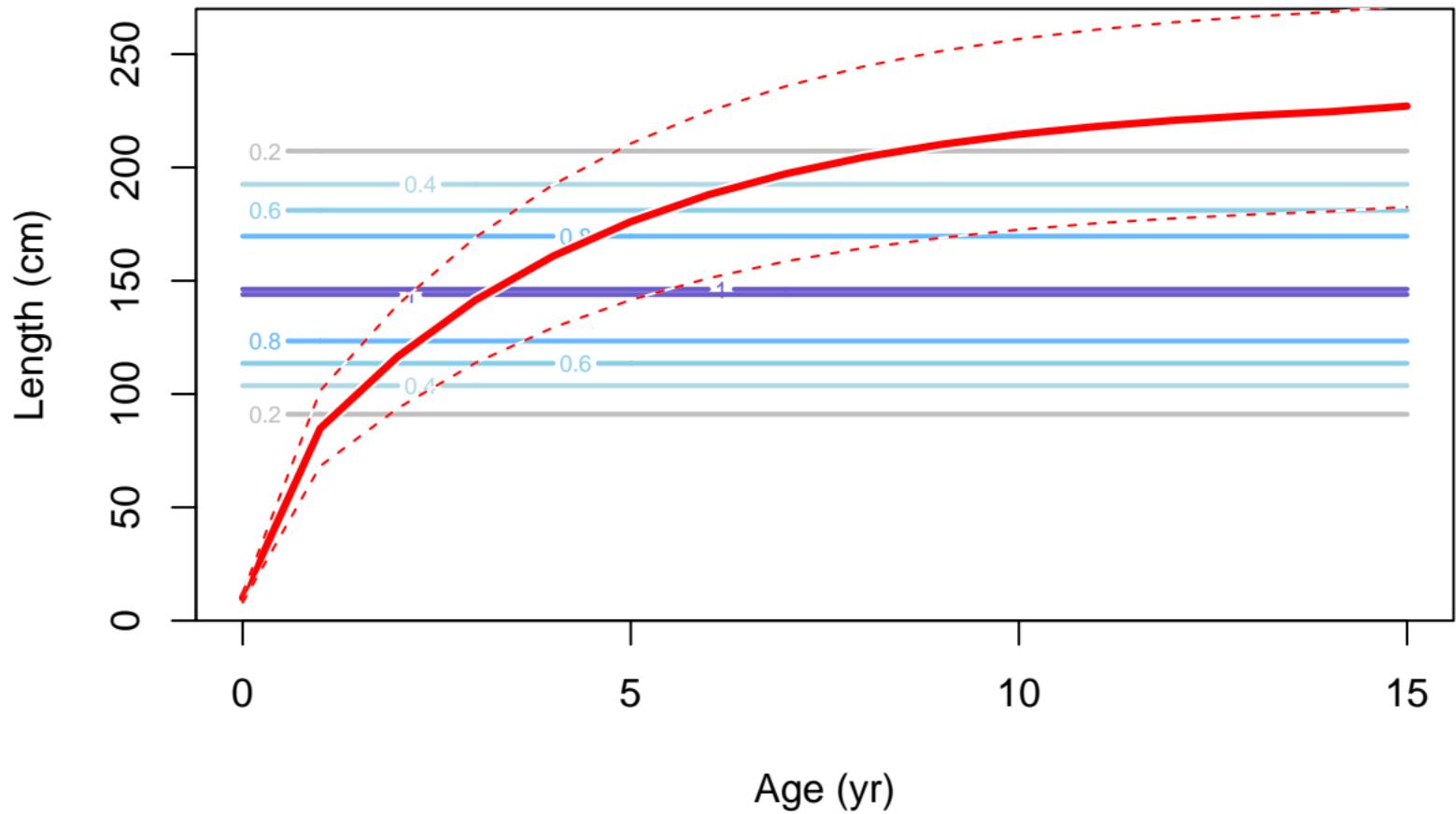


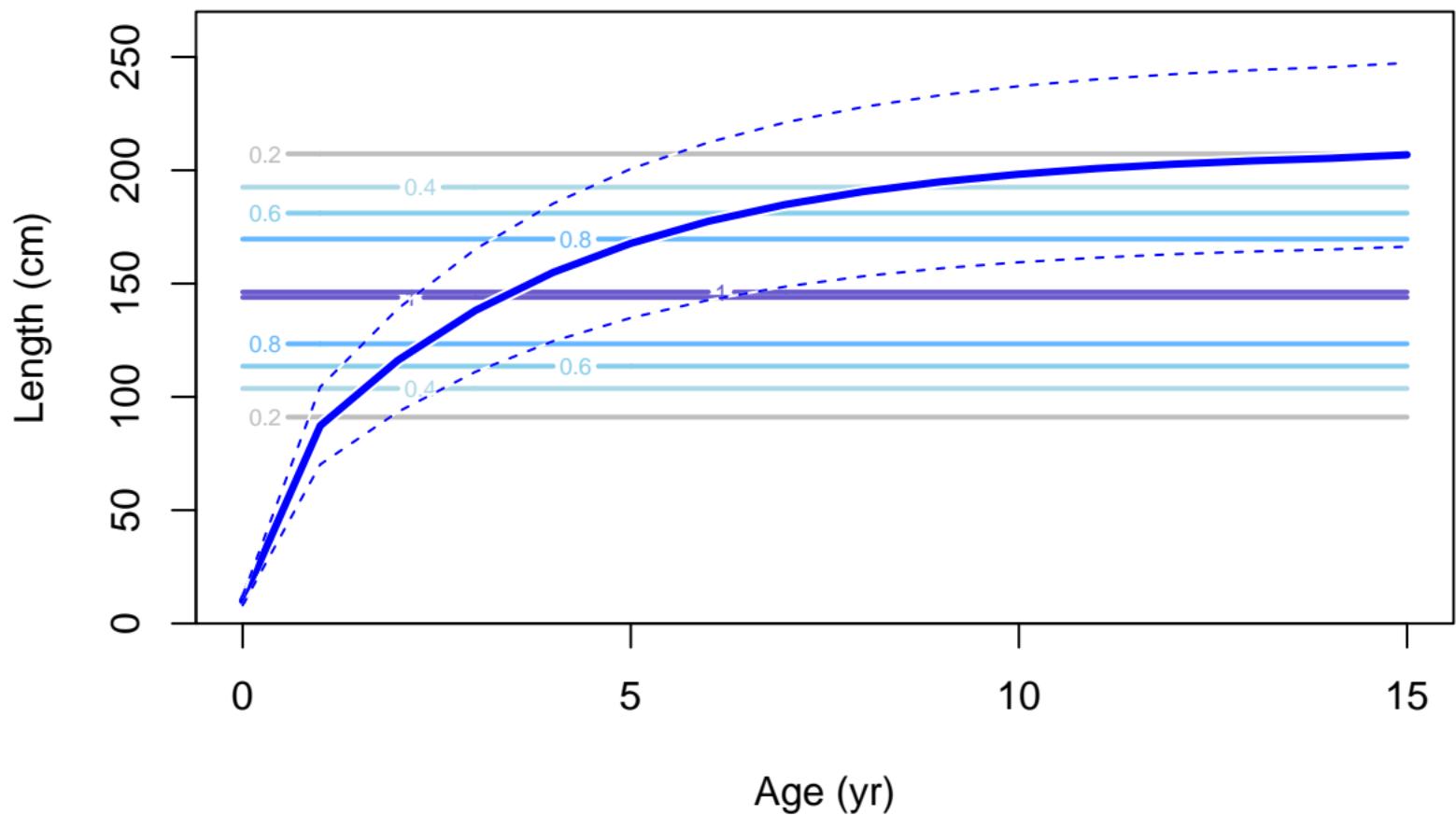


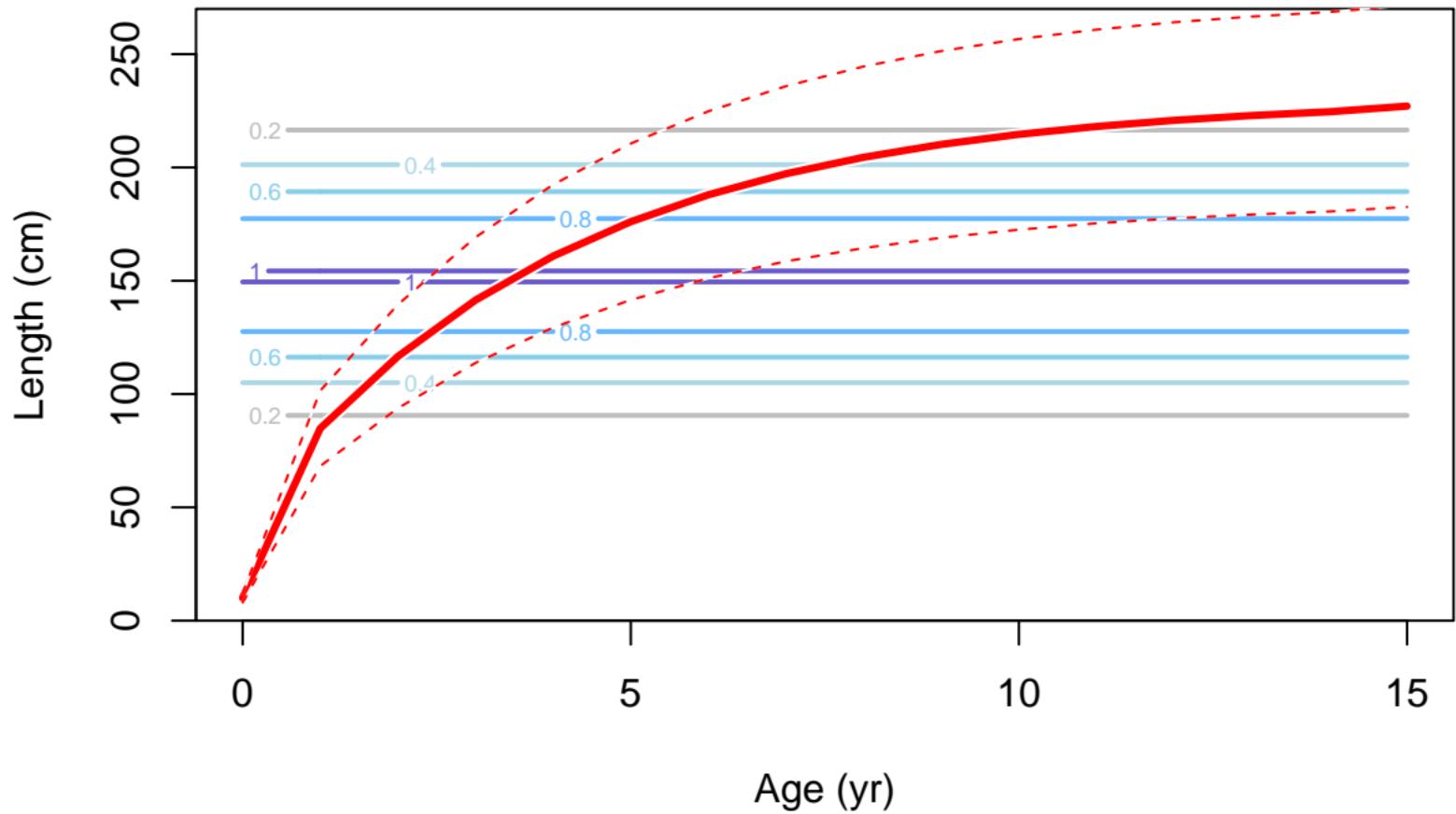


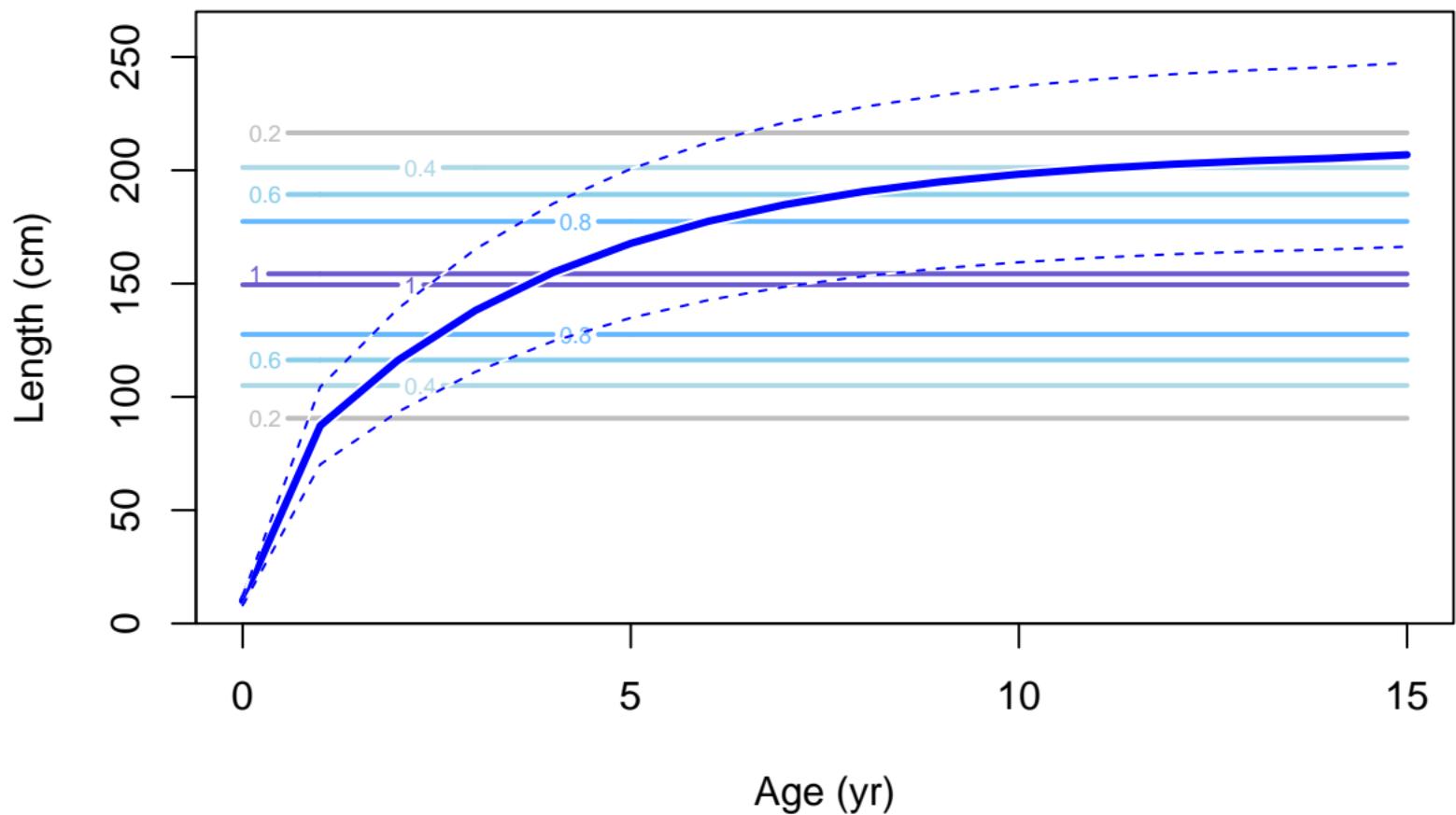


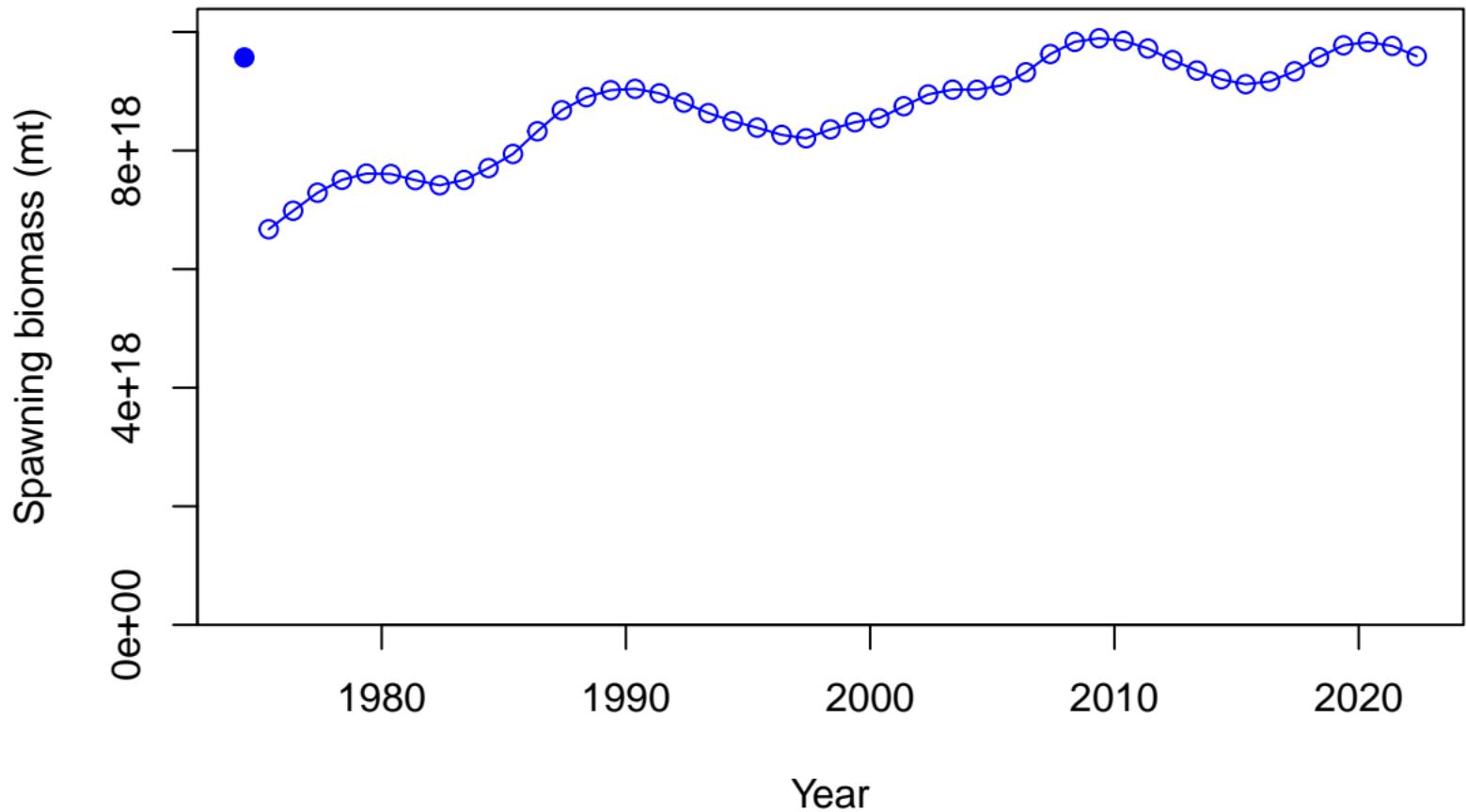


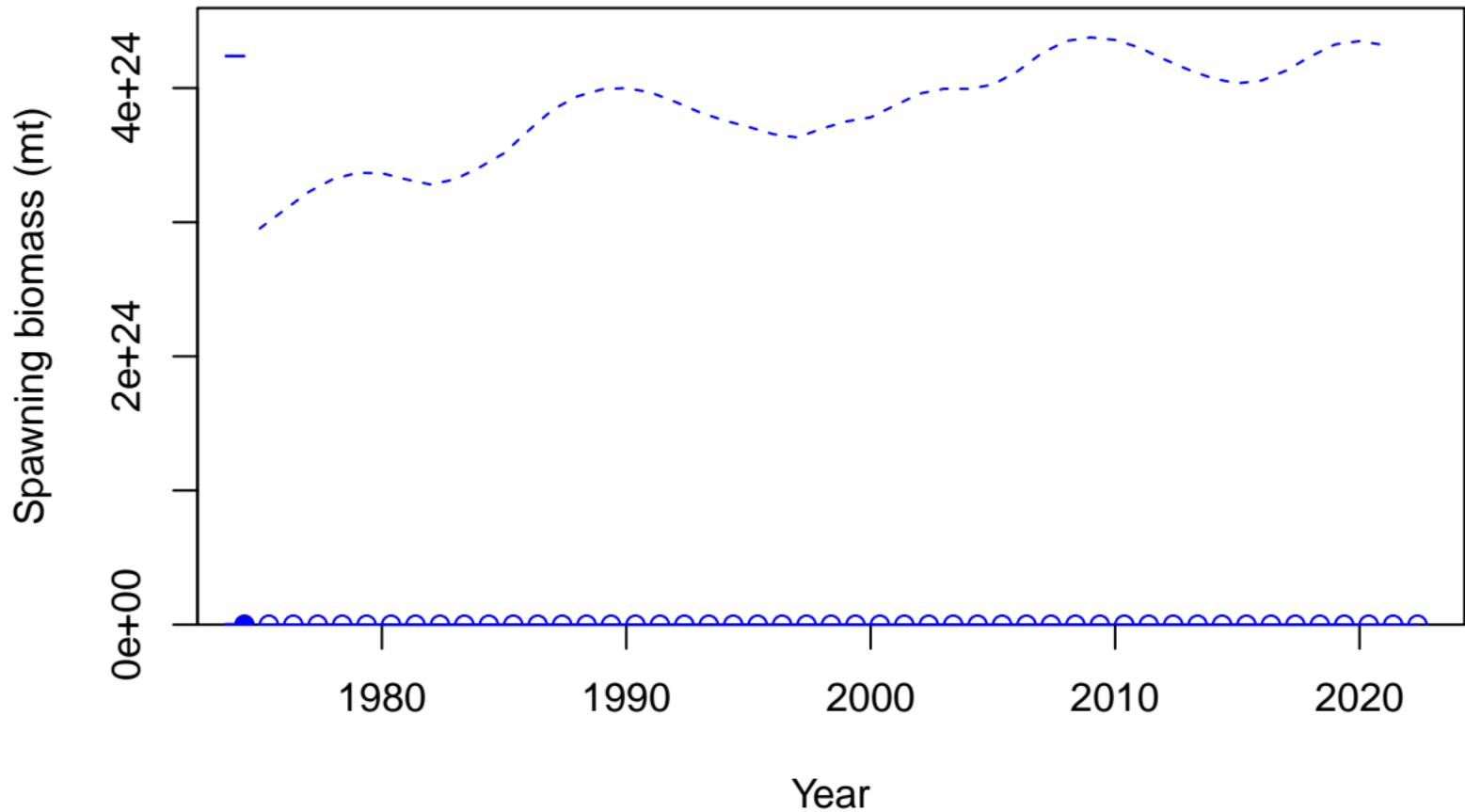




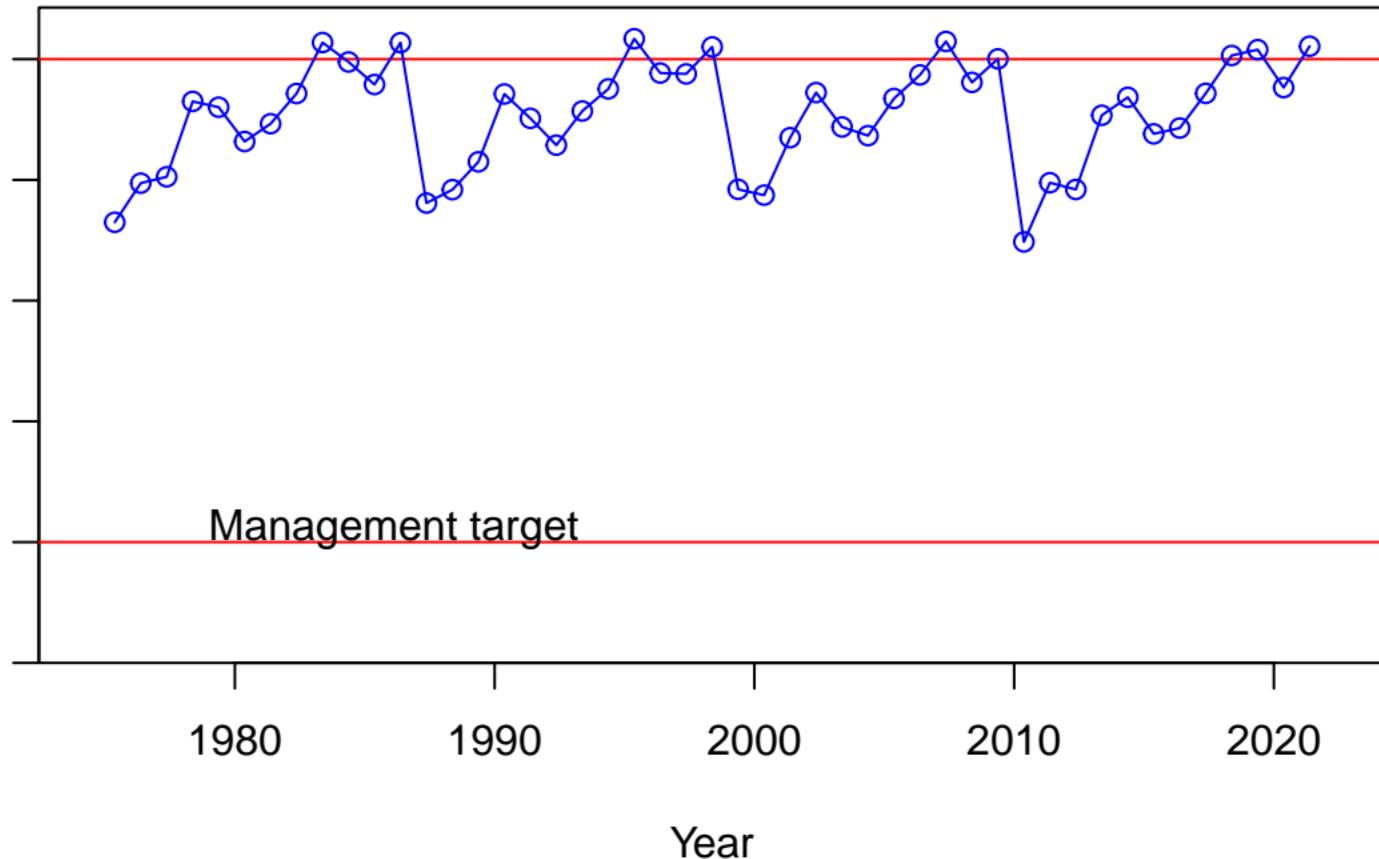




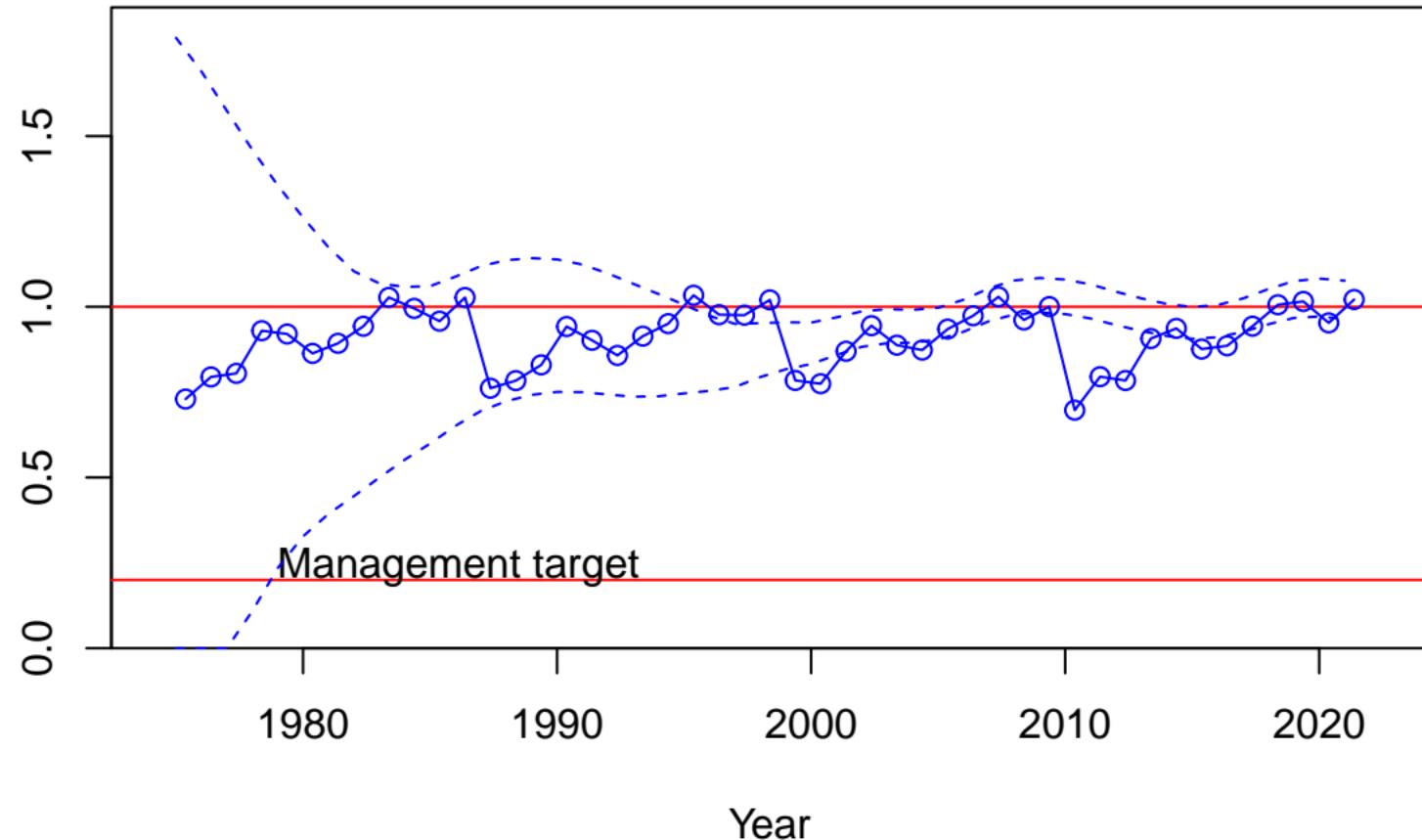


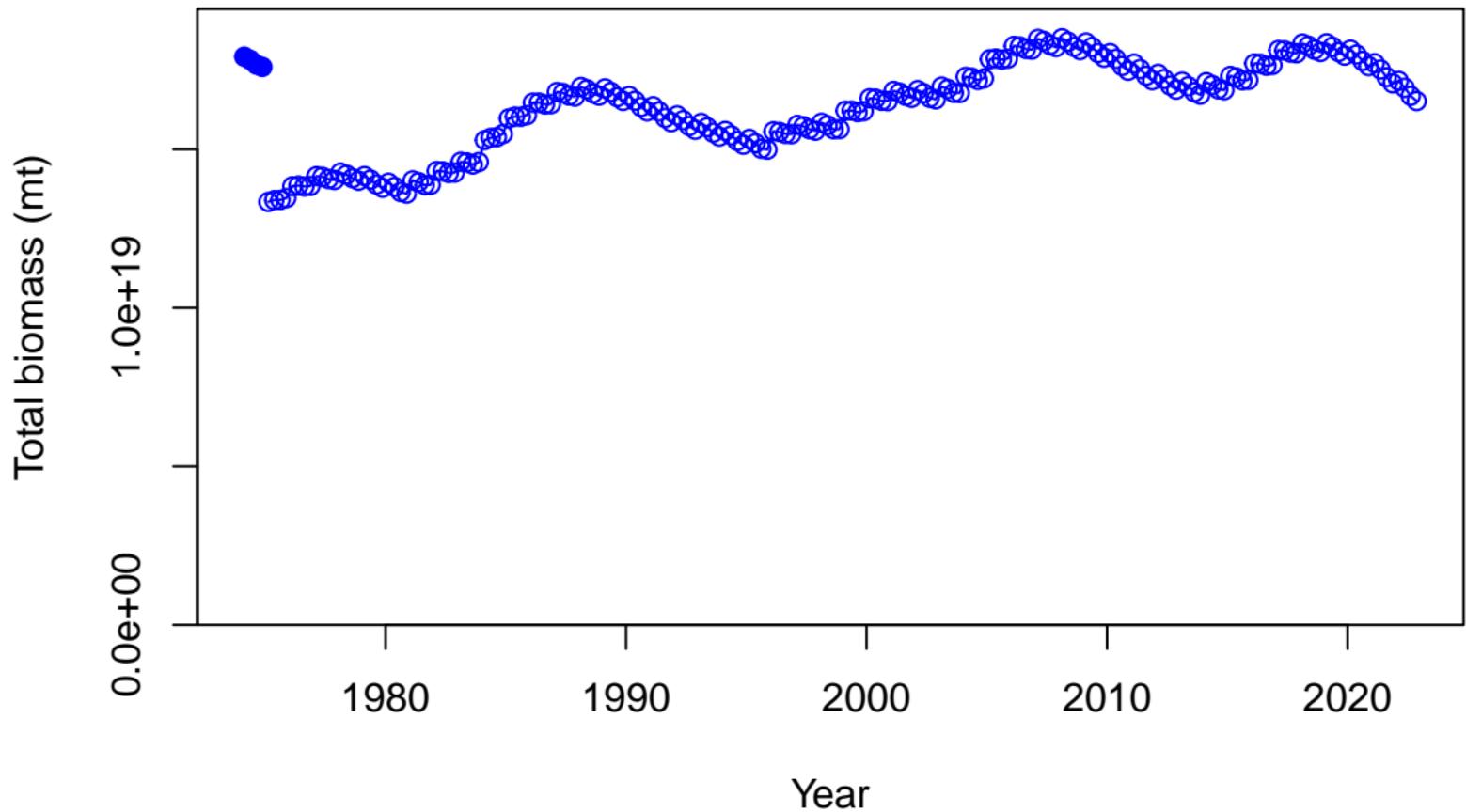


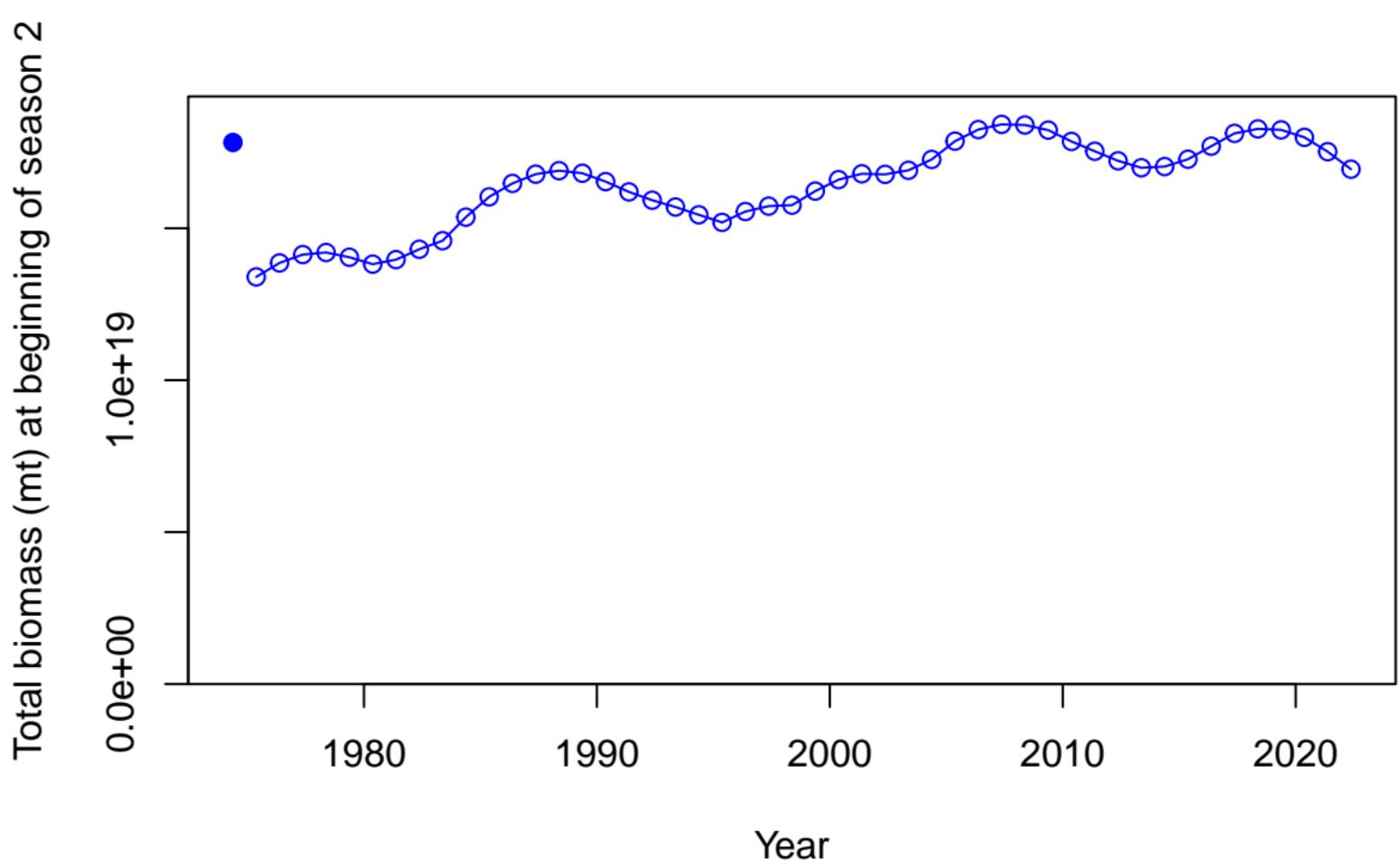
Relative spawning biomass: B/B_0



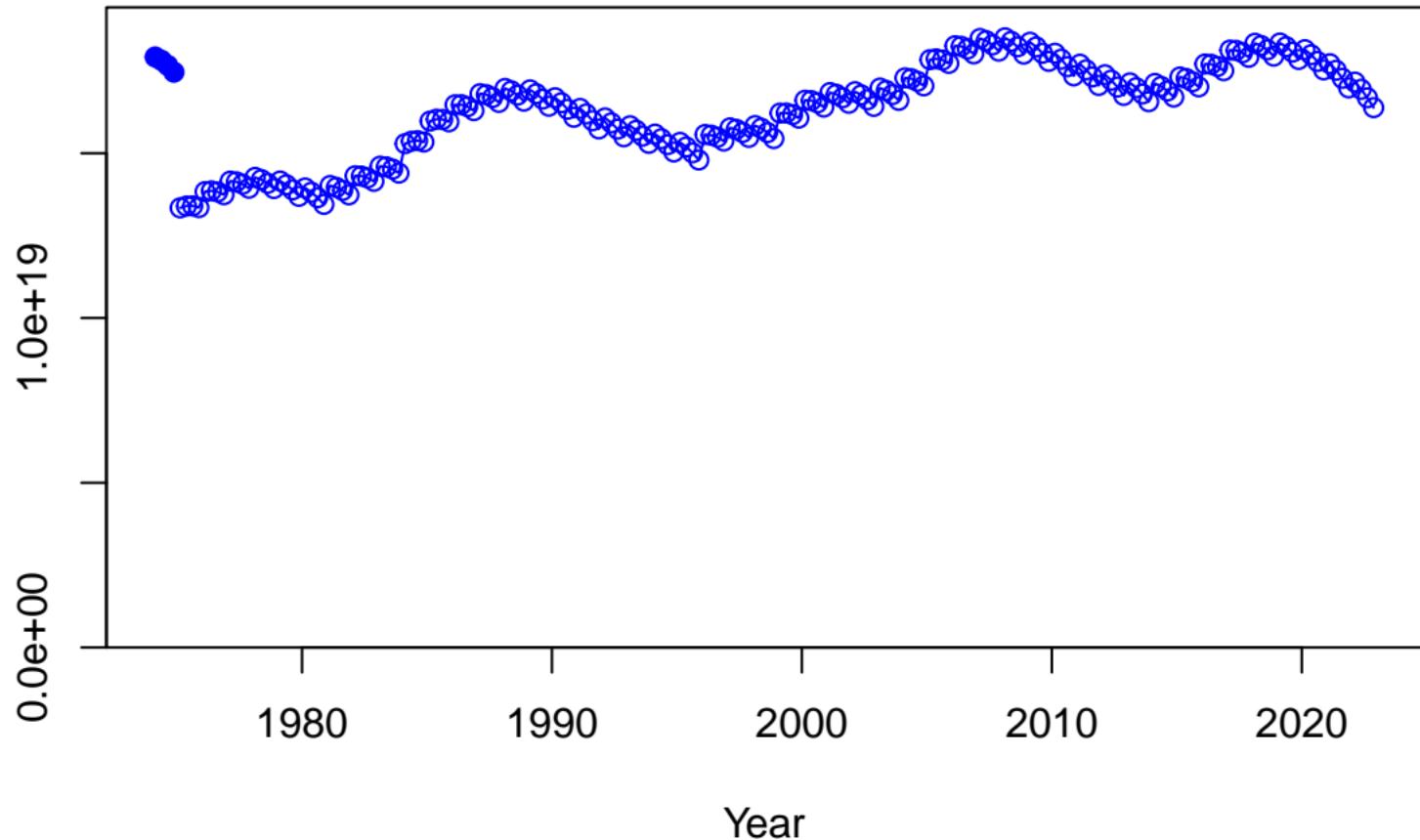
Relative spawning biomass: B/B_0

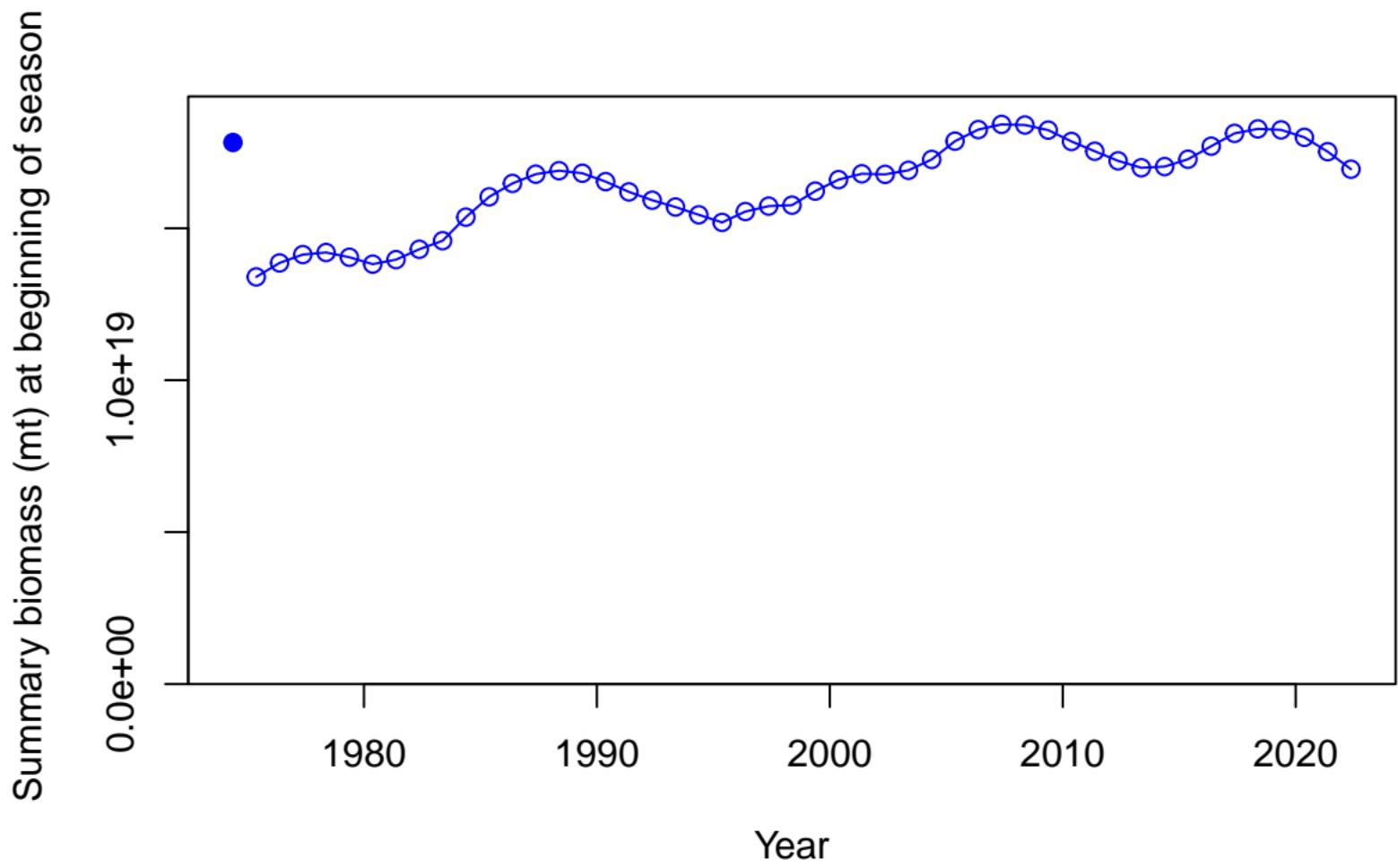


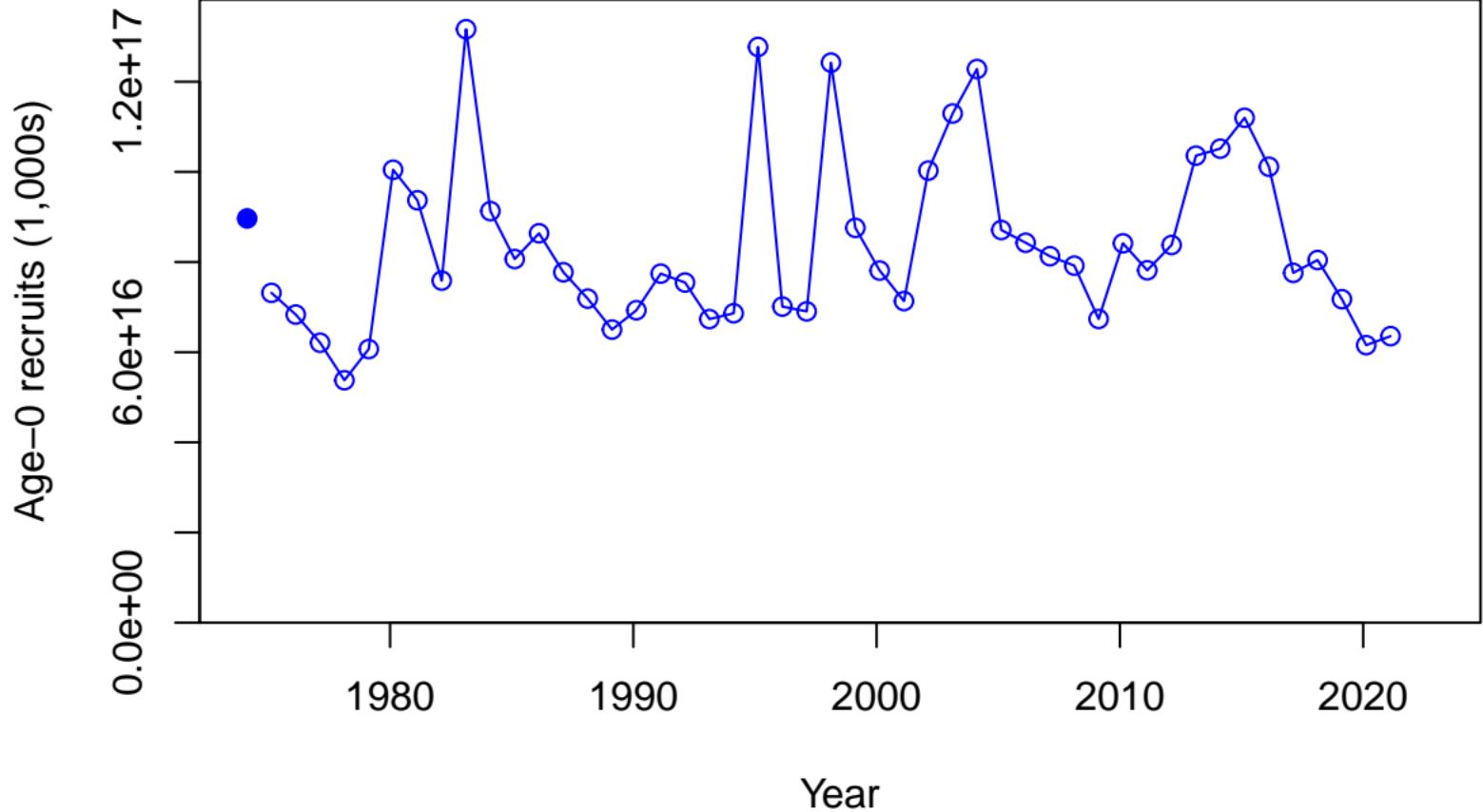


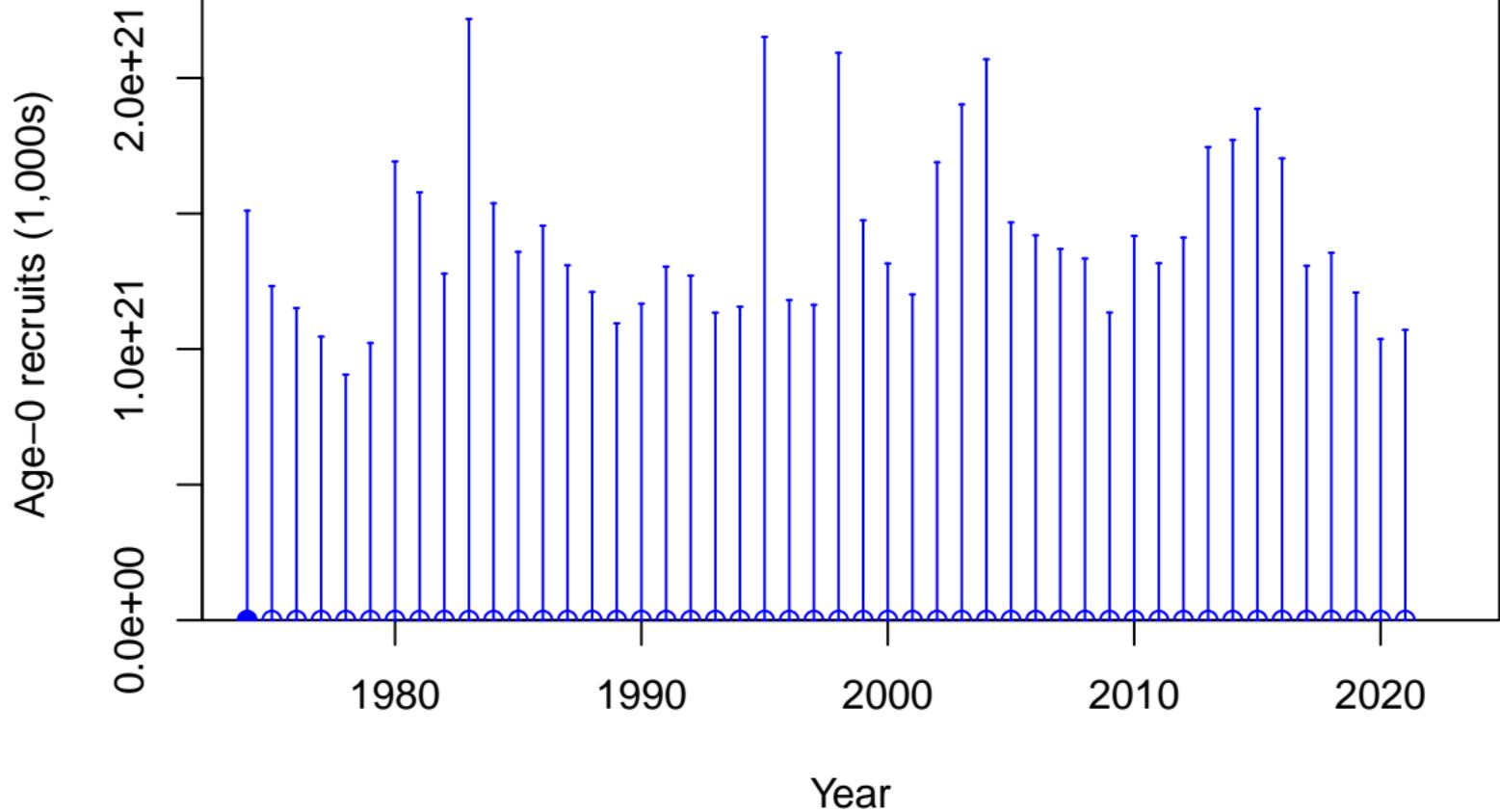


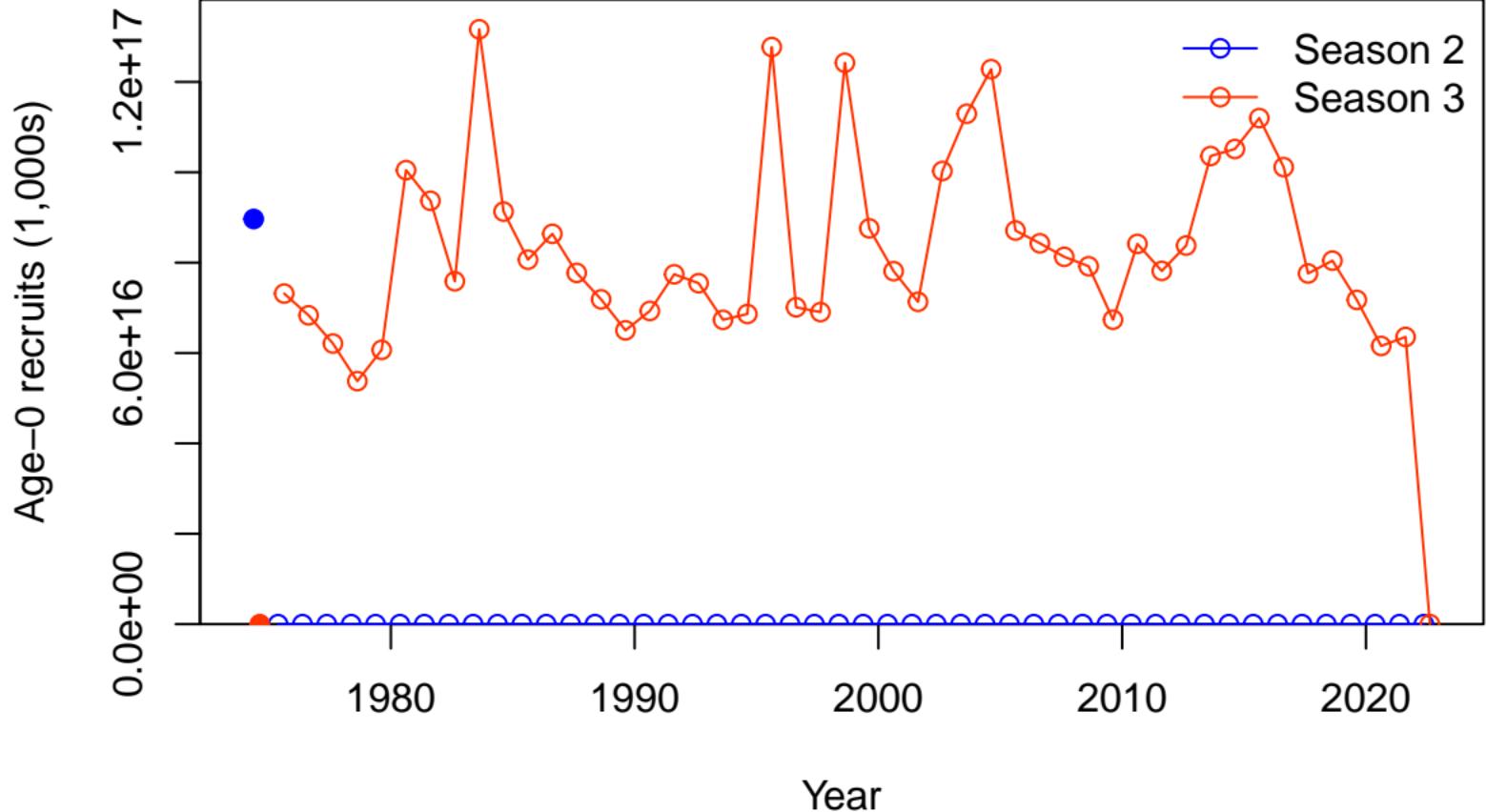
Summary biomass (mt)



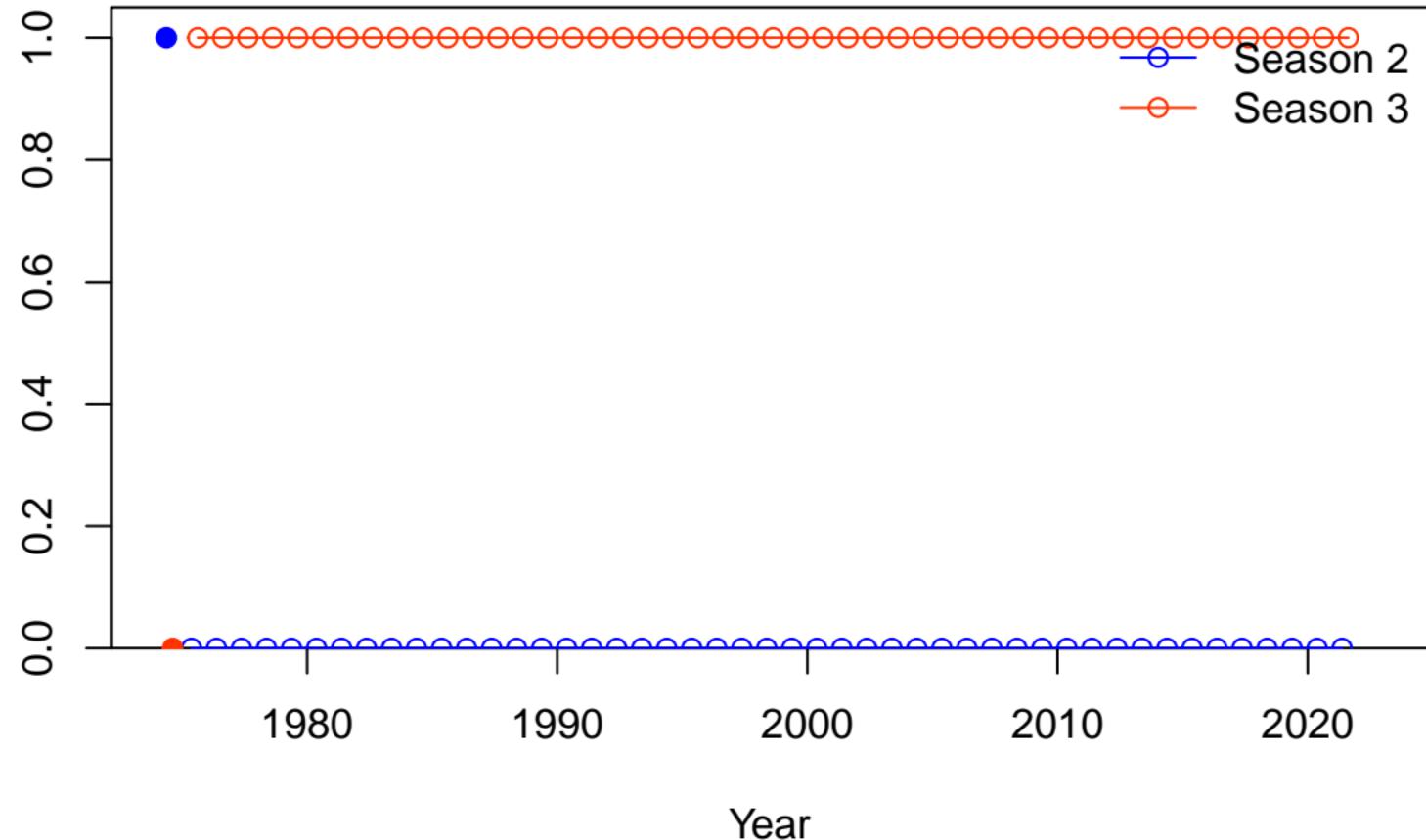




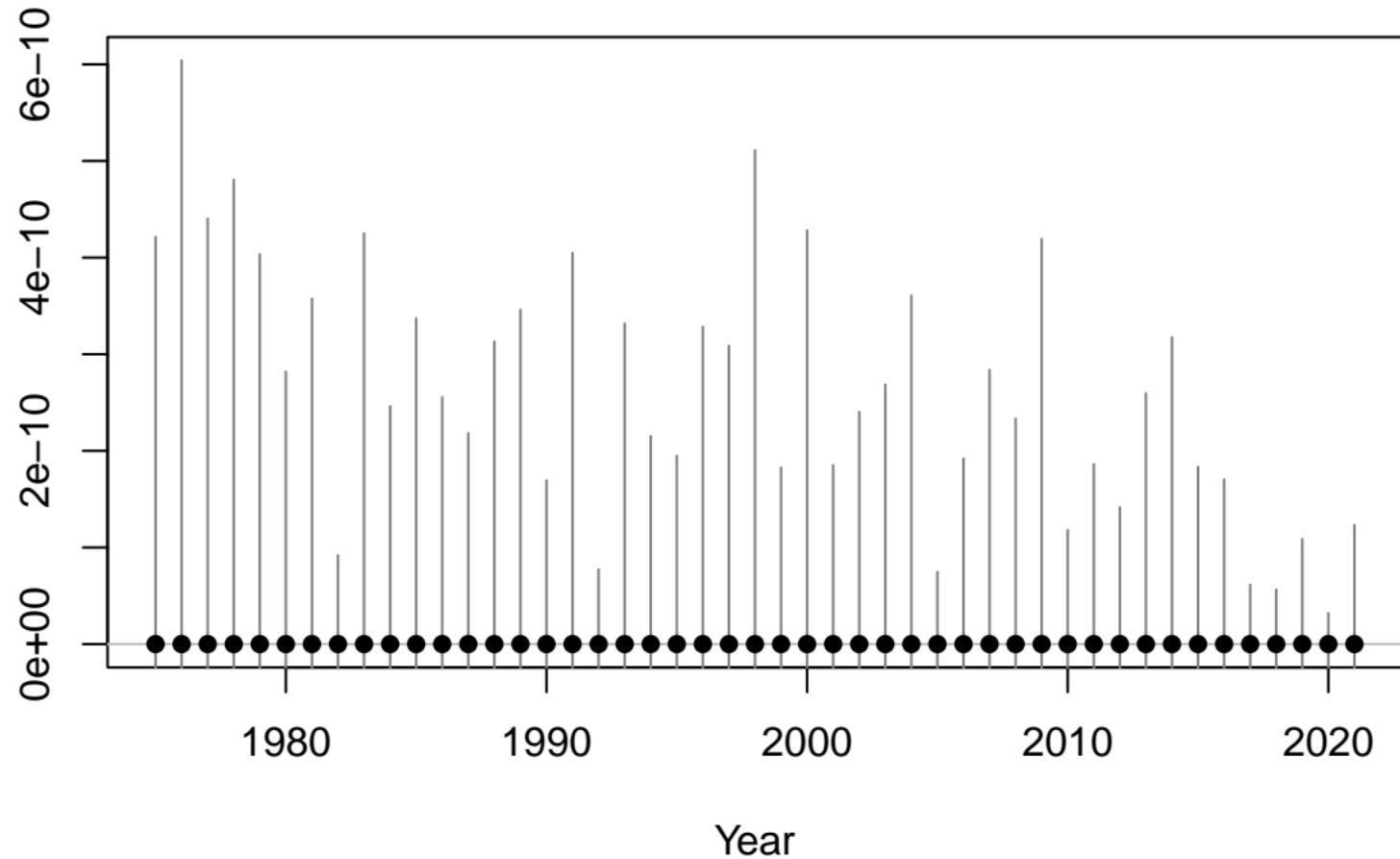


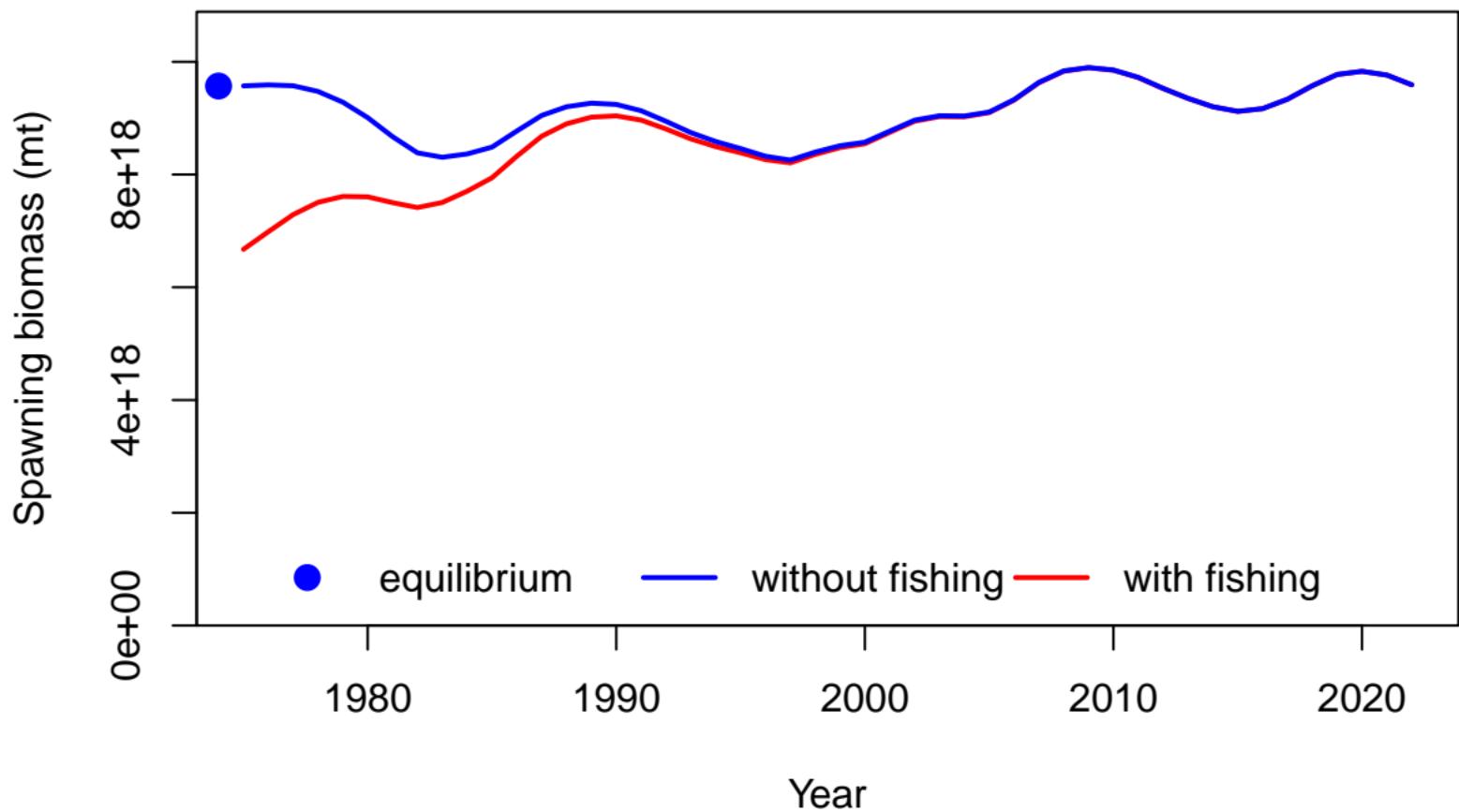


Fraction of total Age-0 recruits

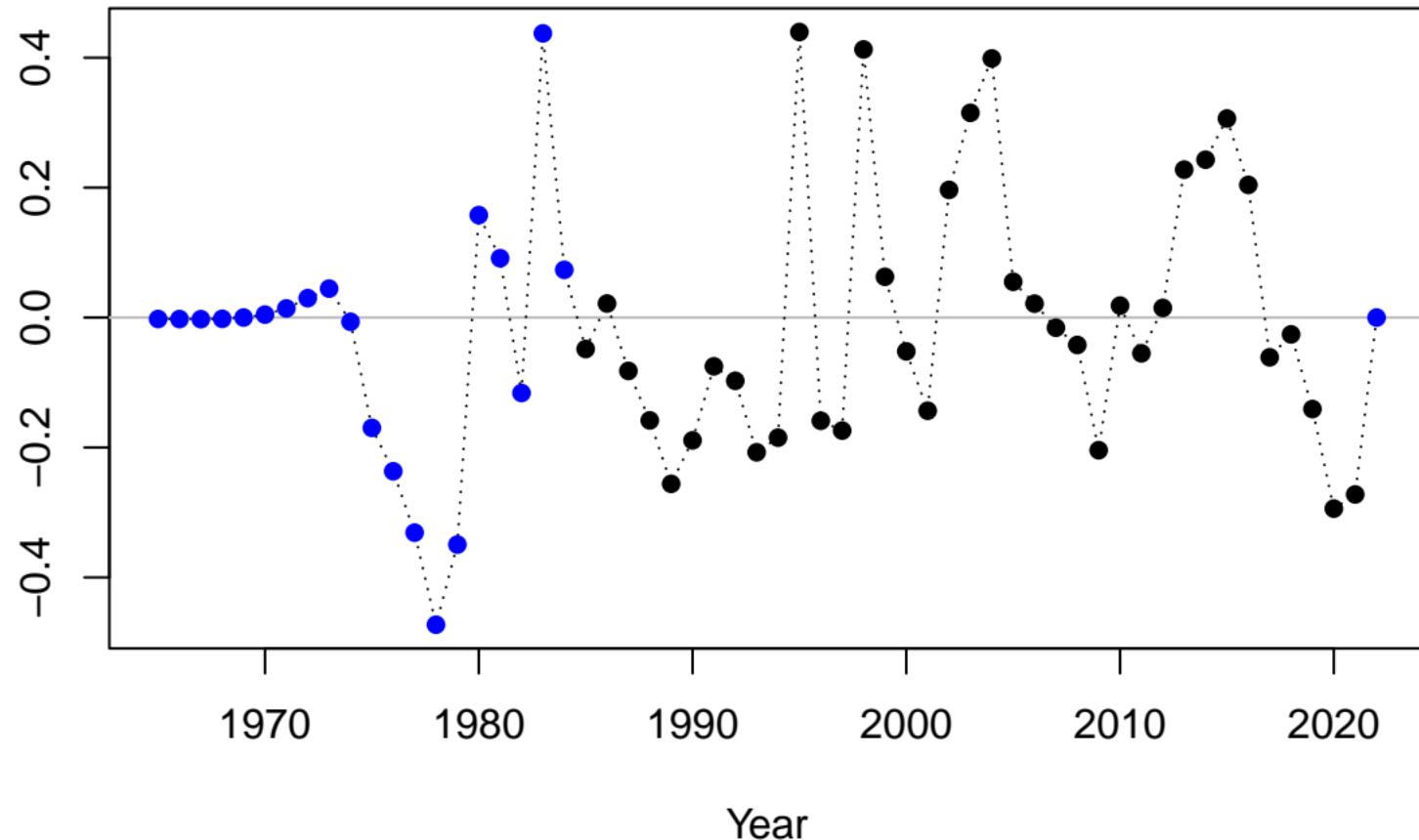


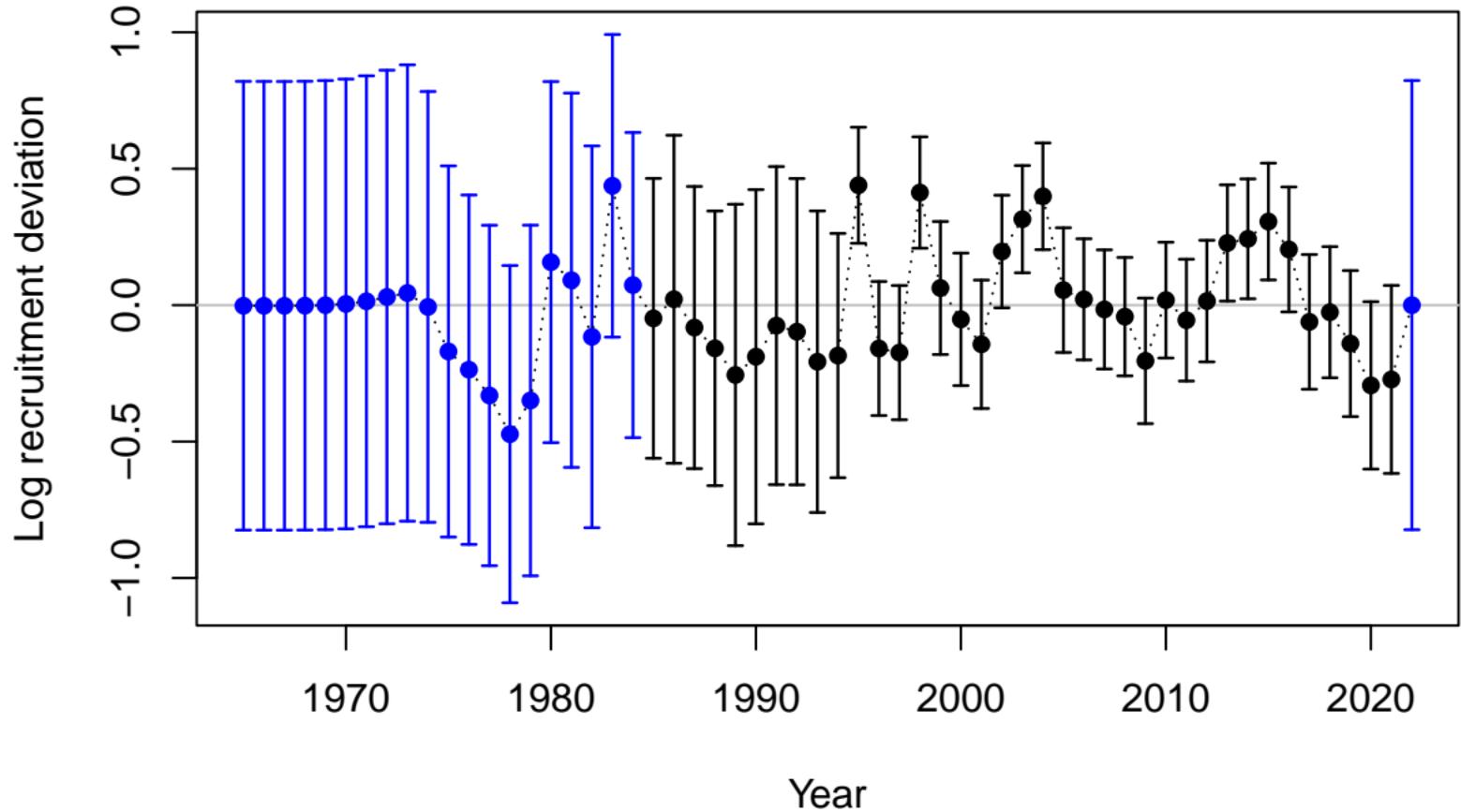
Summary Fishing Mortality



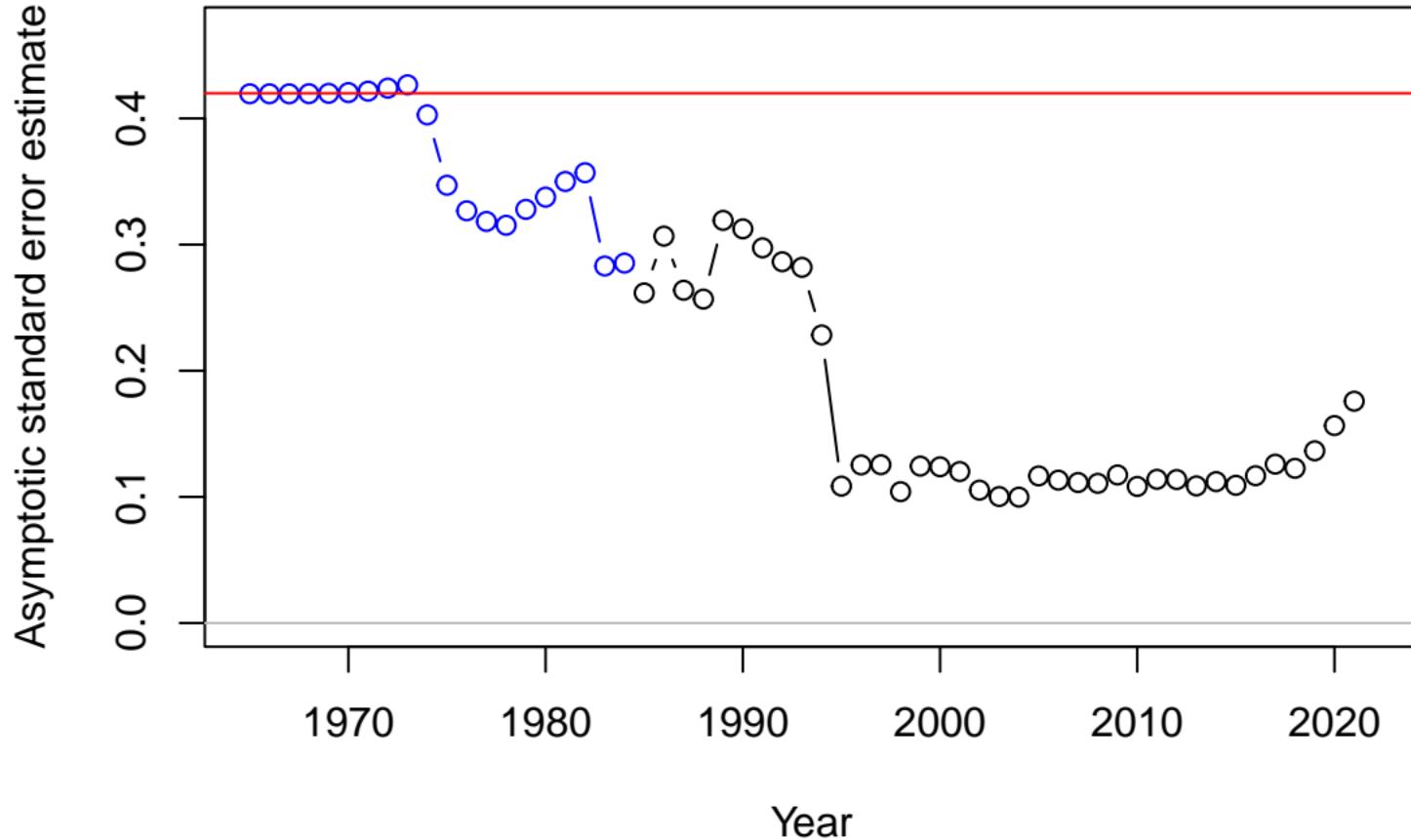


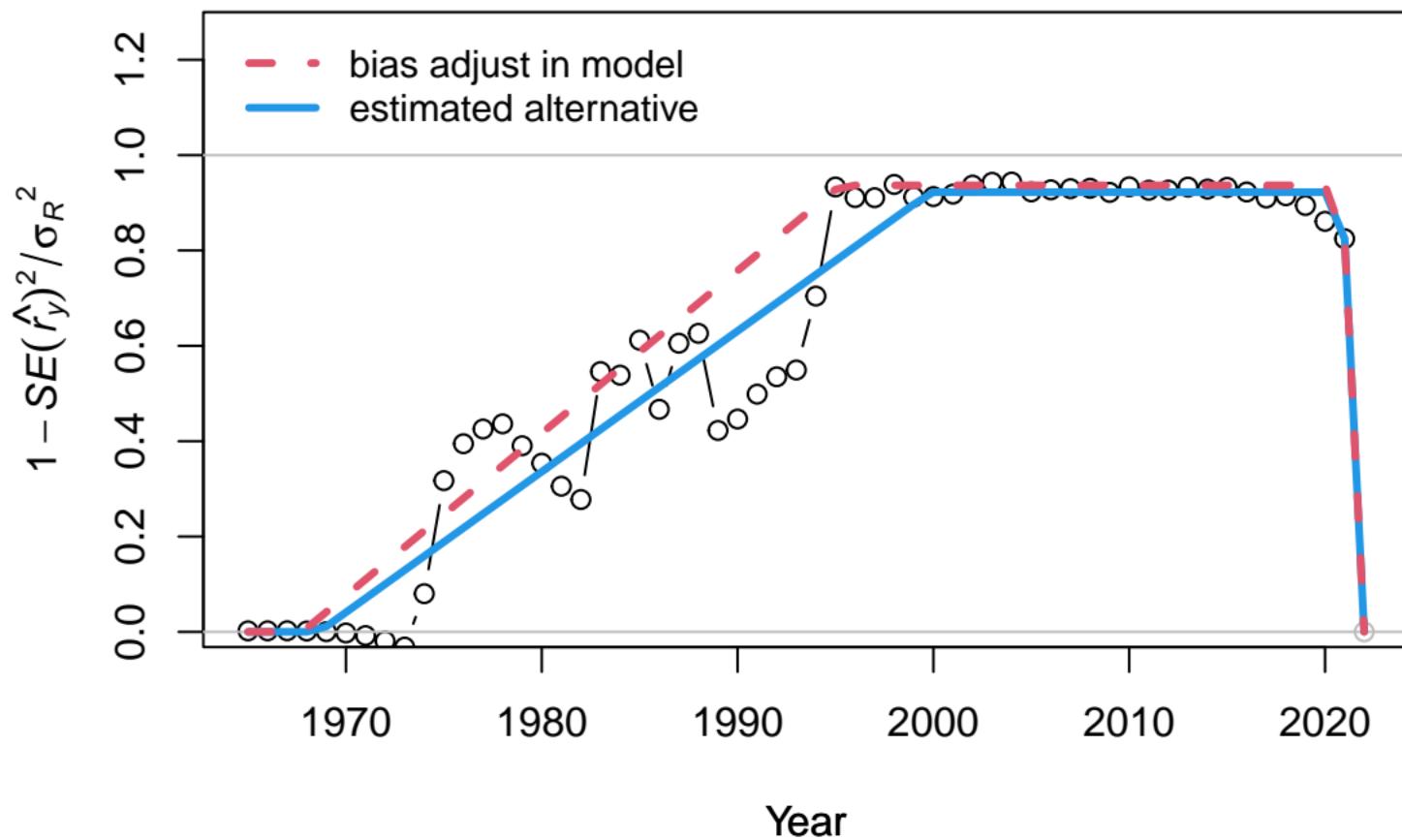
Log recruitment deviation

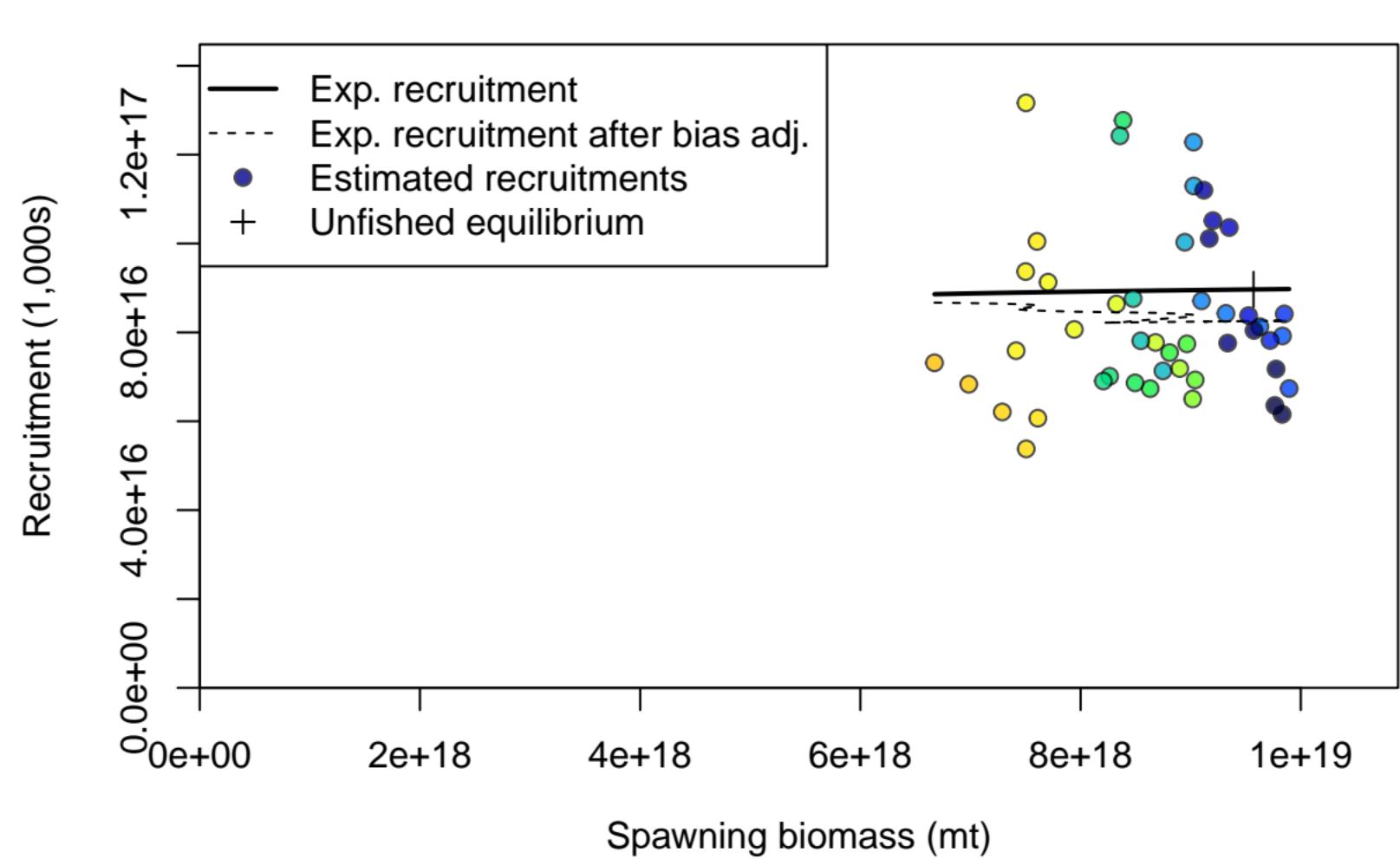


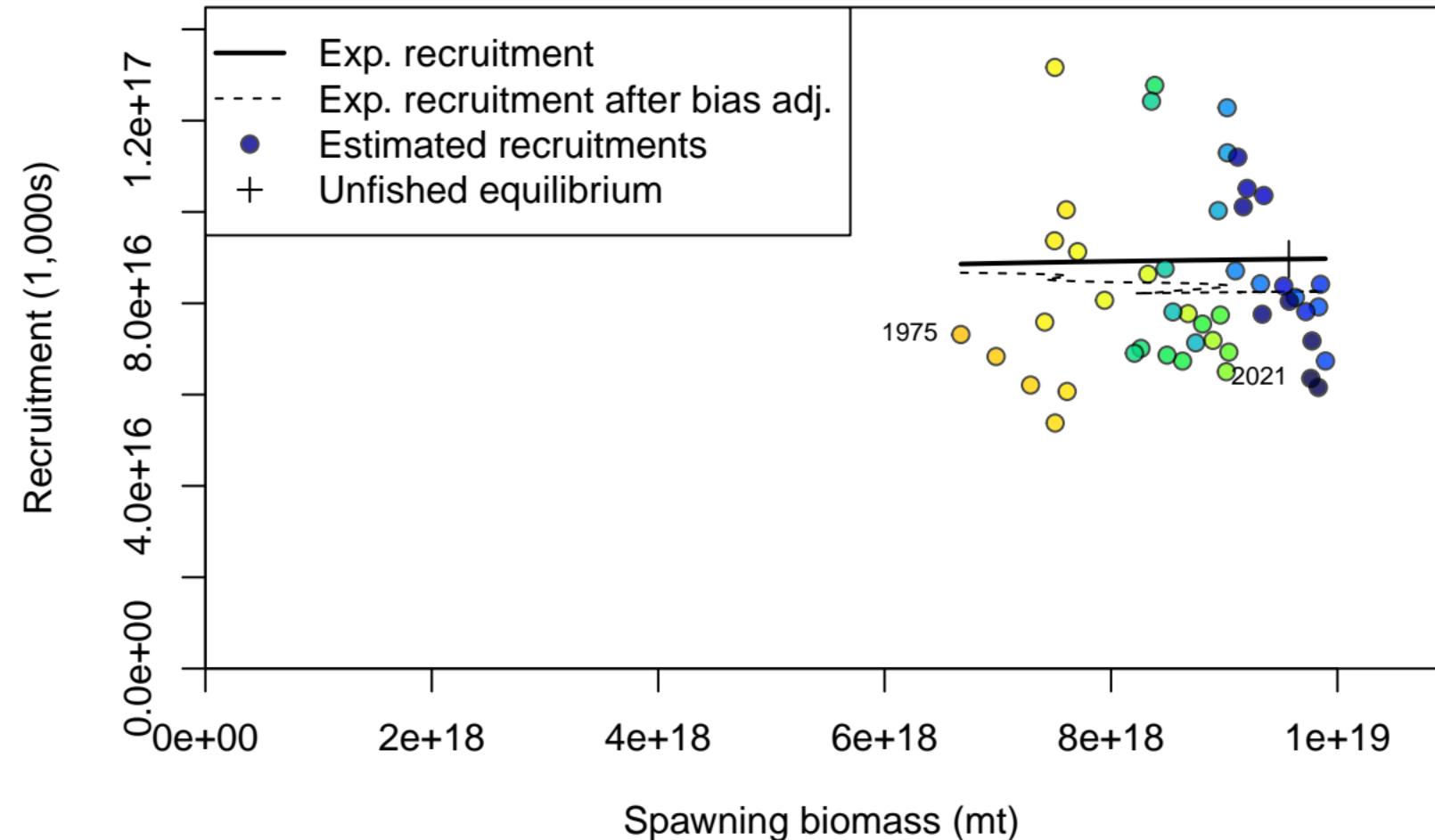


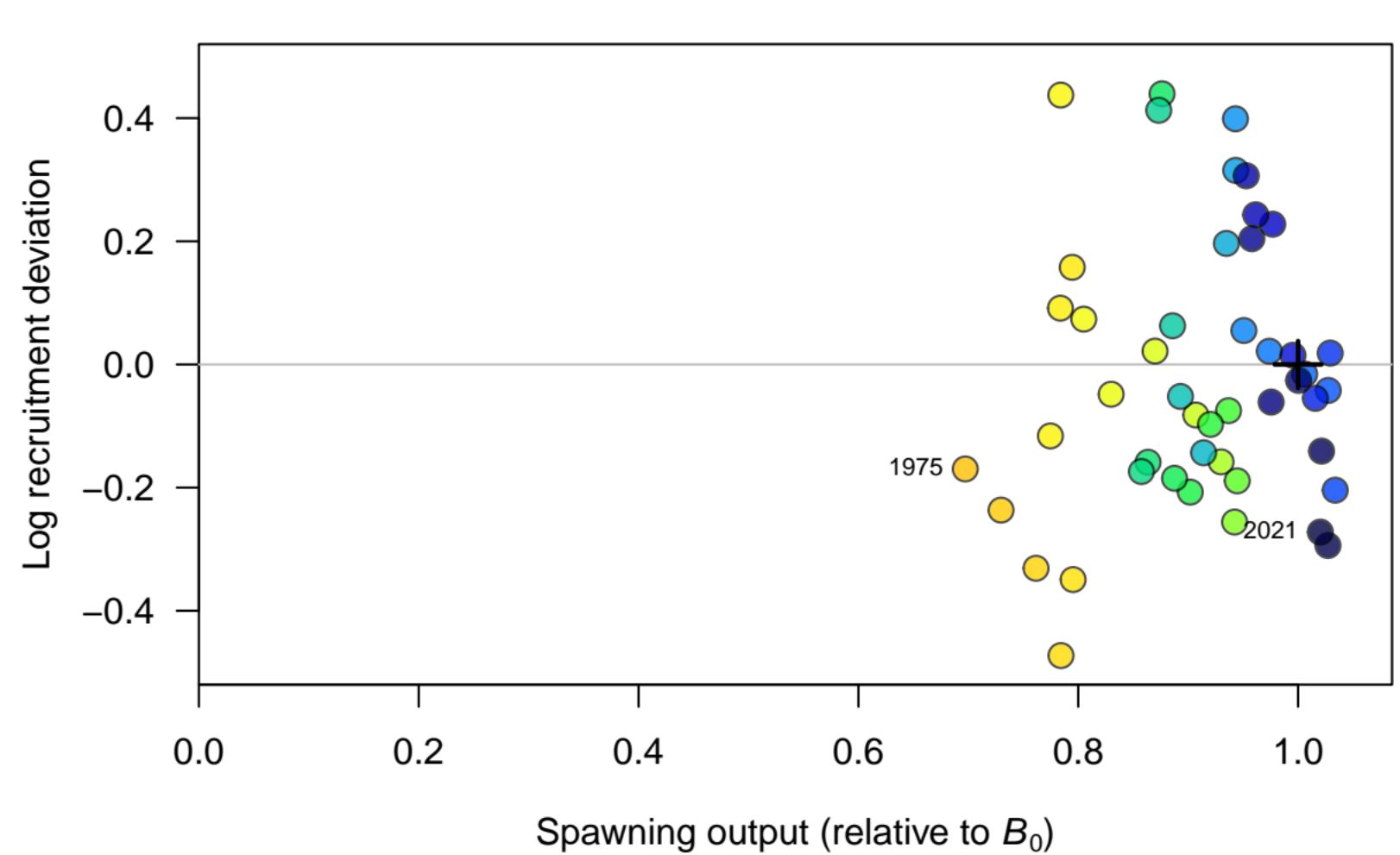
Recruitment deviation variance

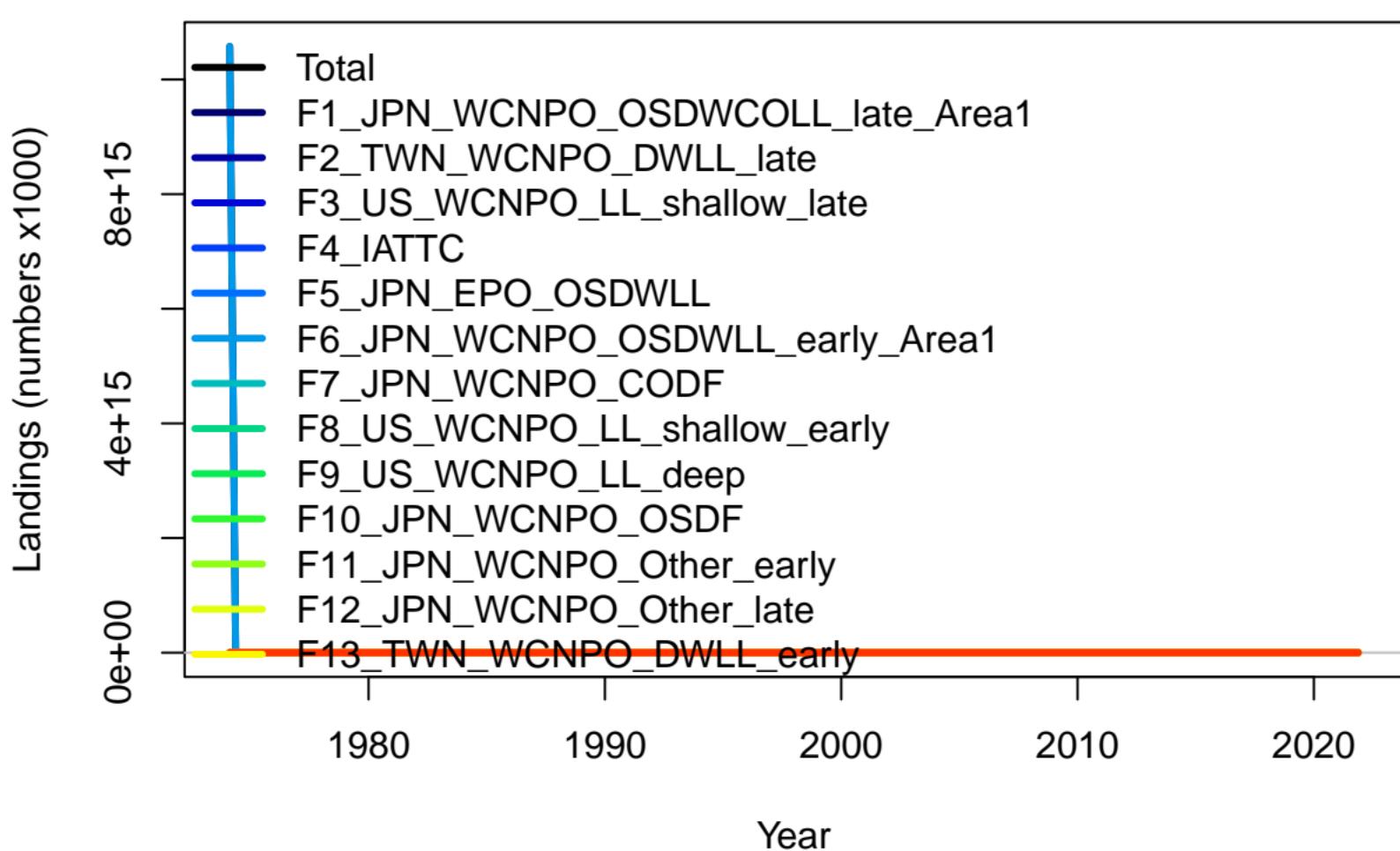




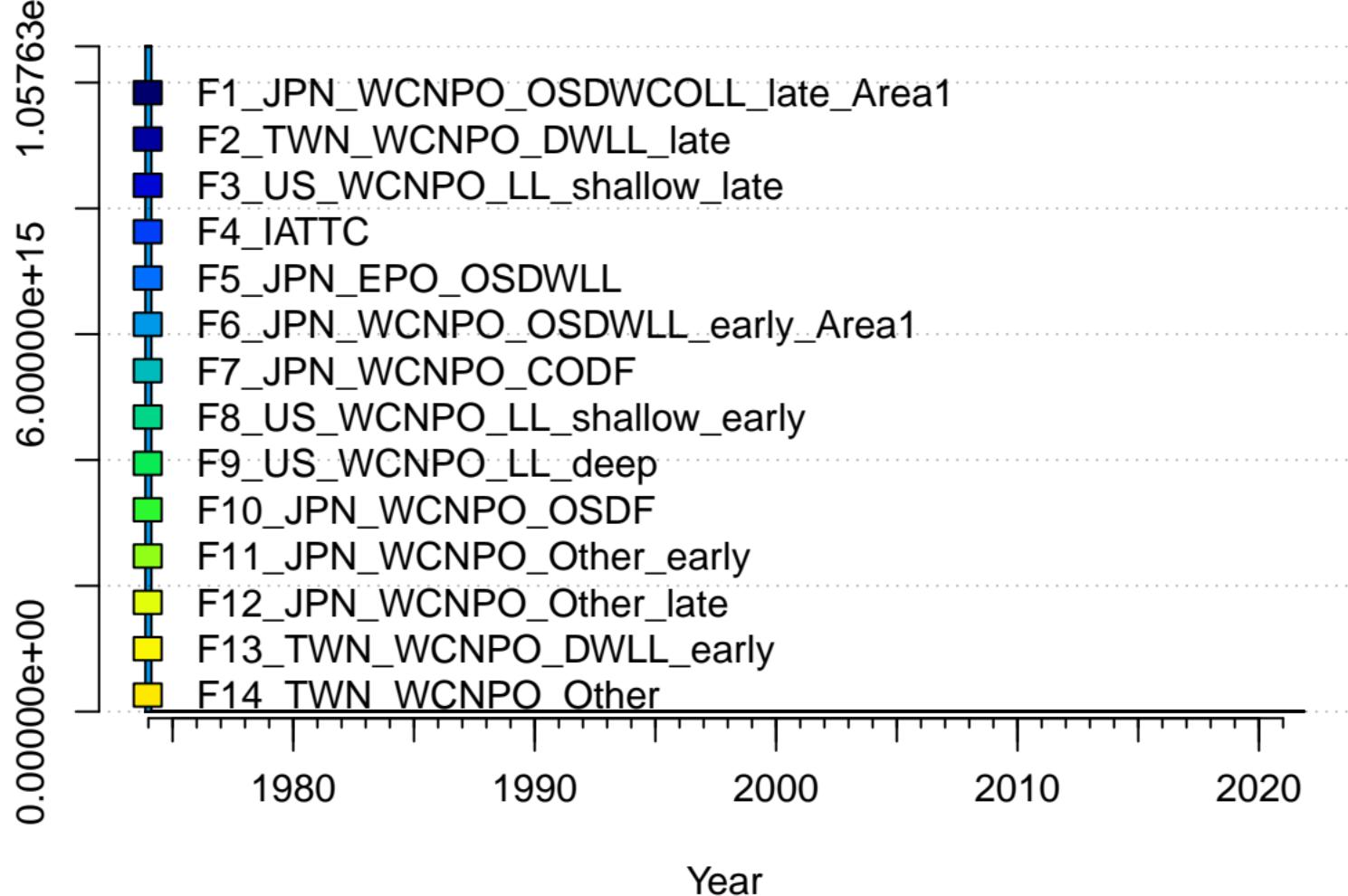


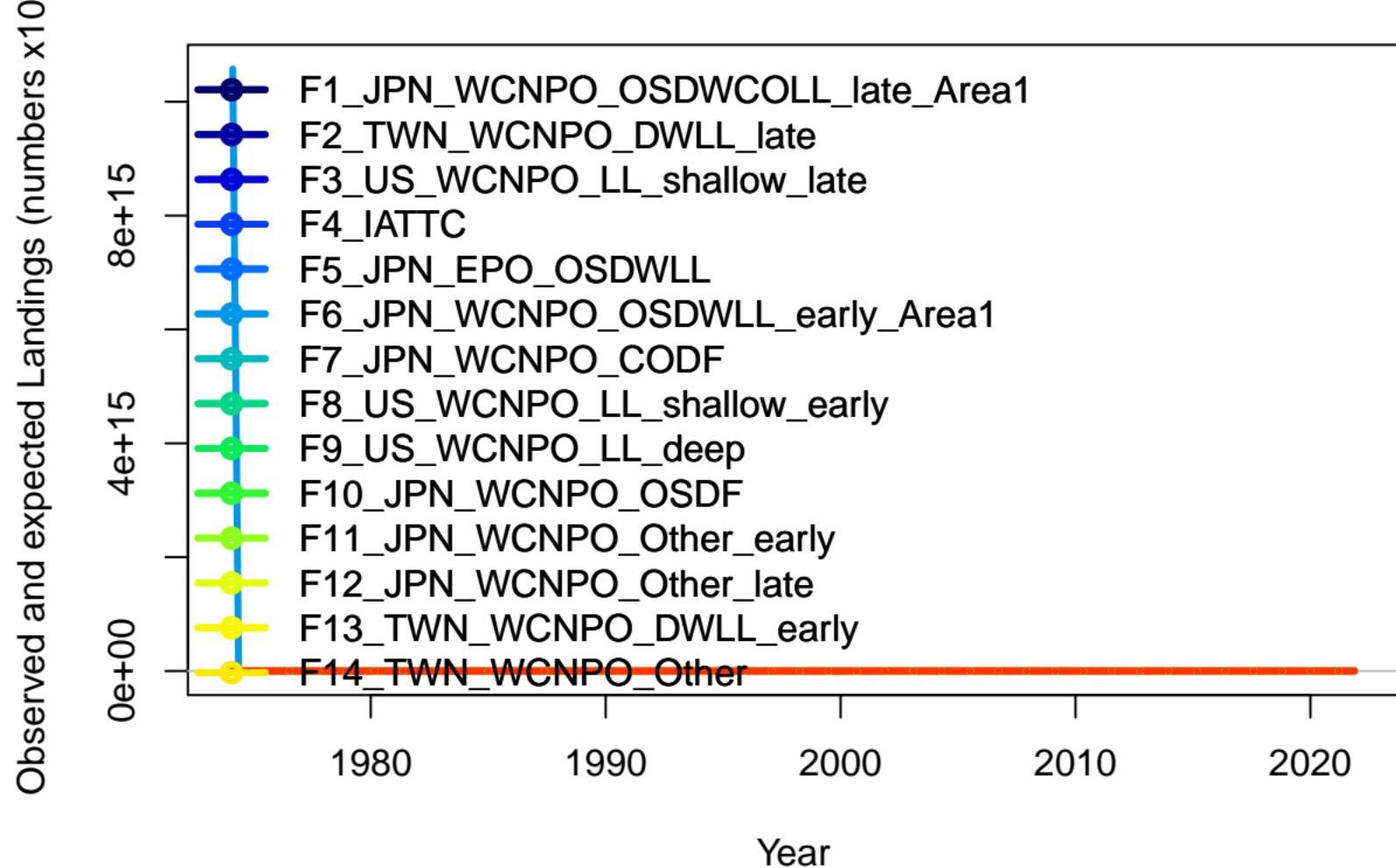






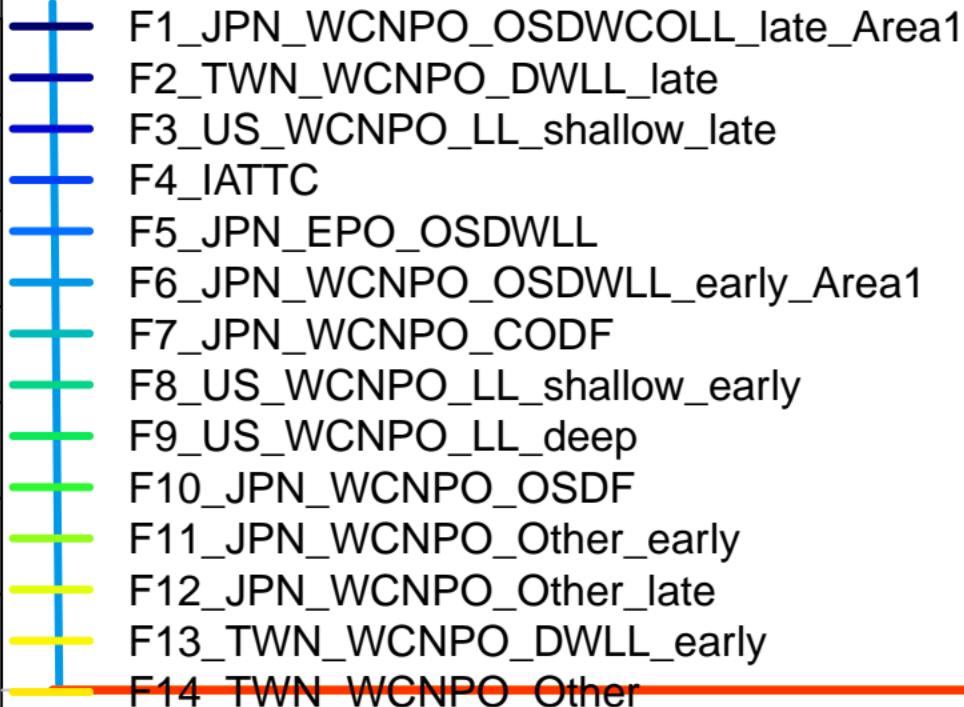
Landings (numbers x1000)





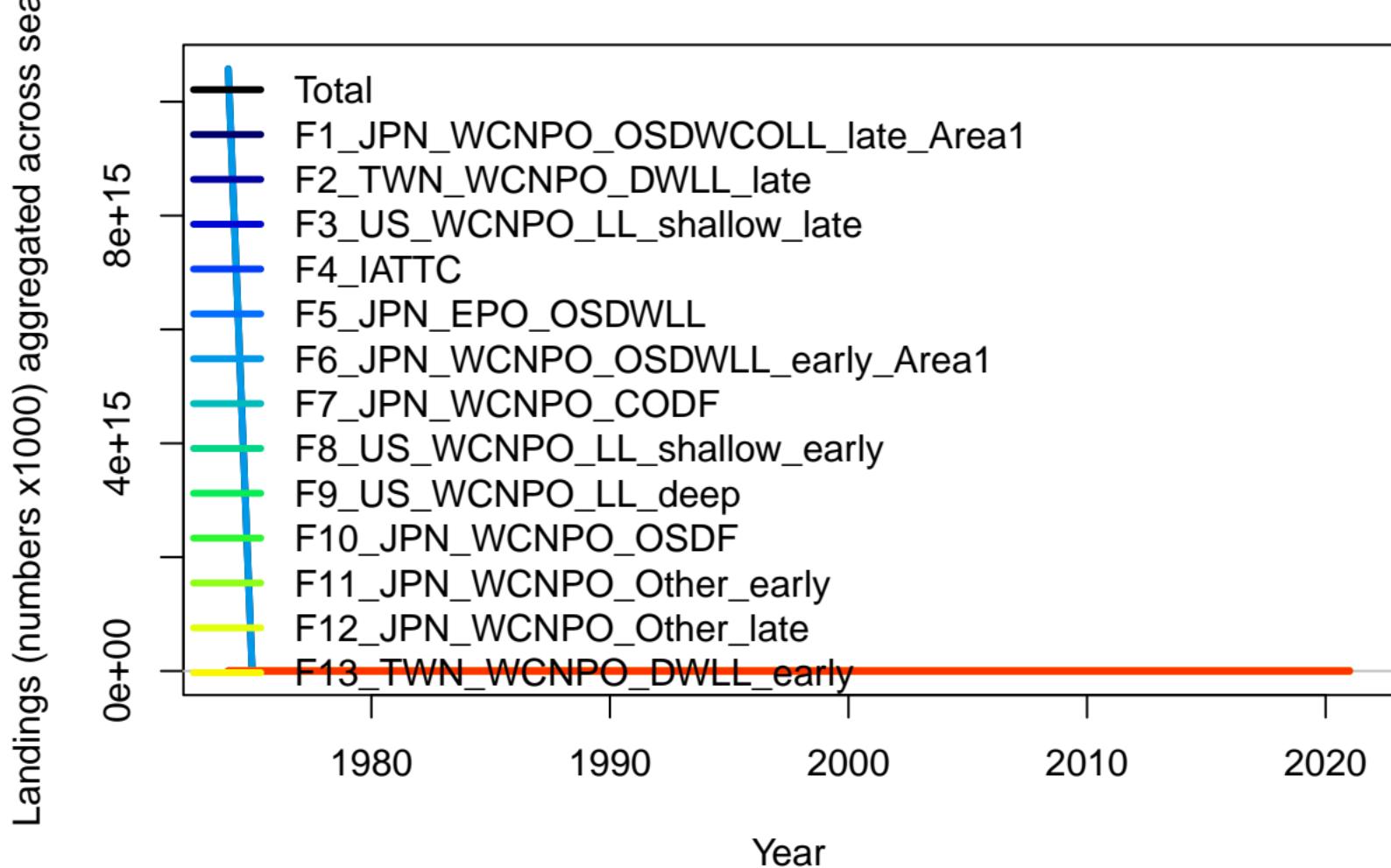
Continuous F

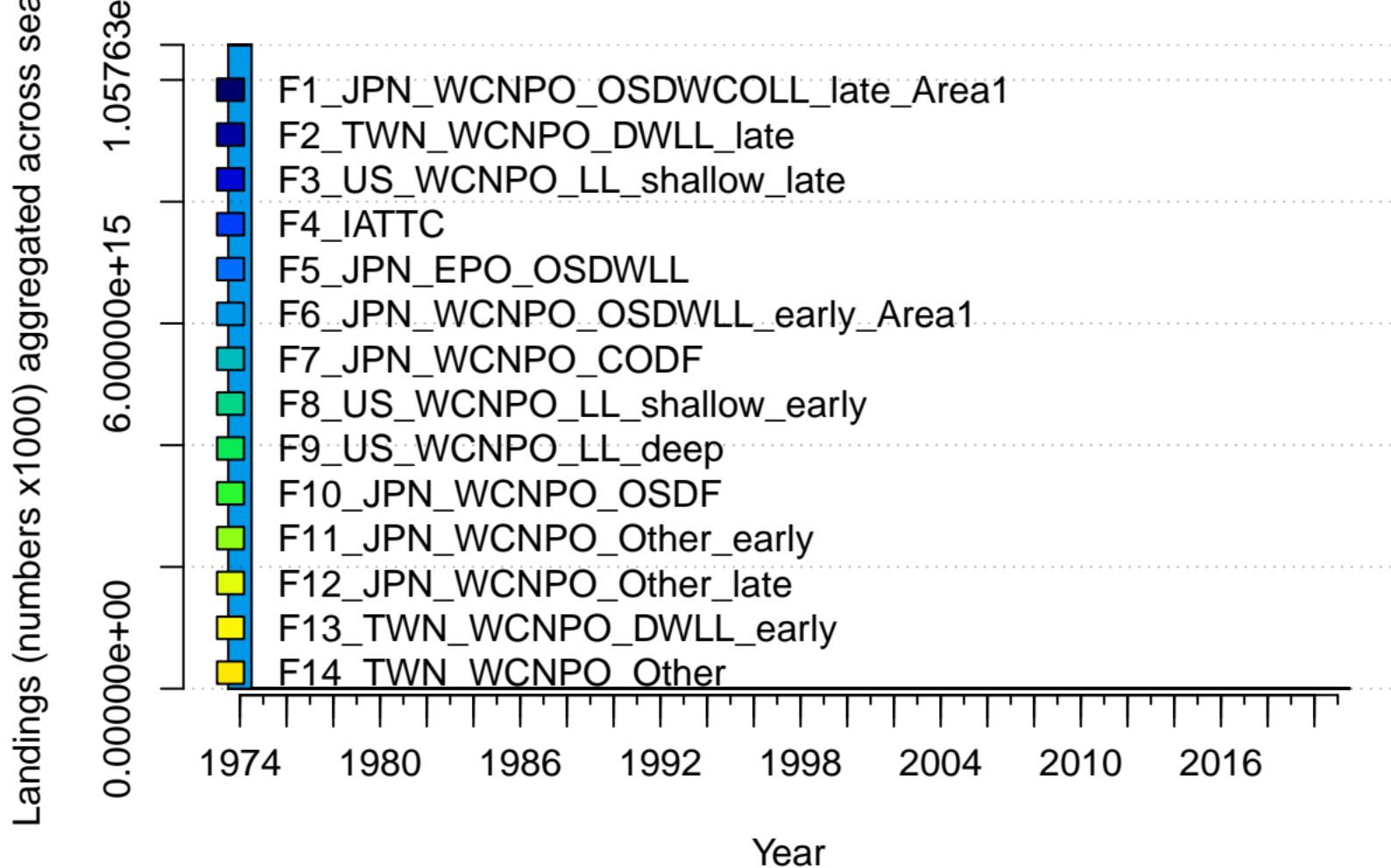
0.30
0.20
0.10
0.00

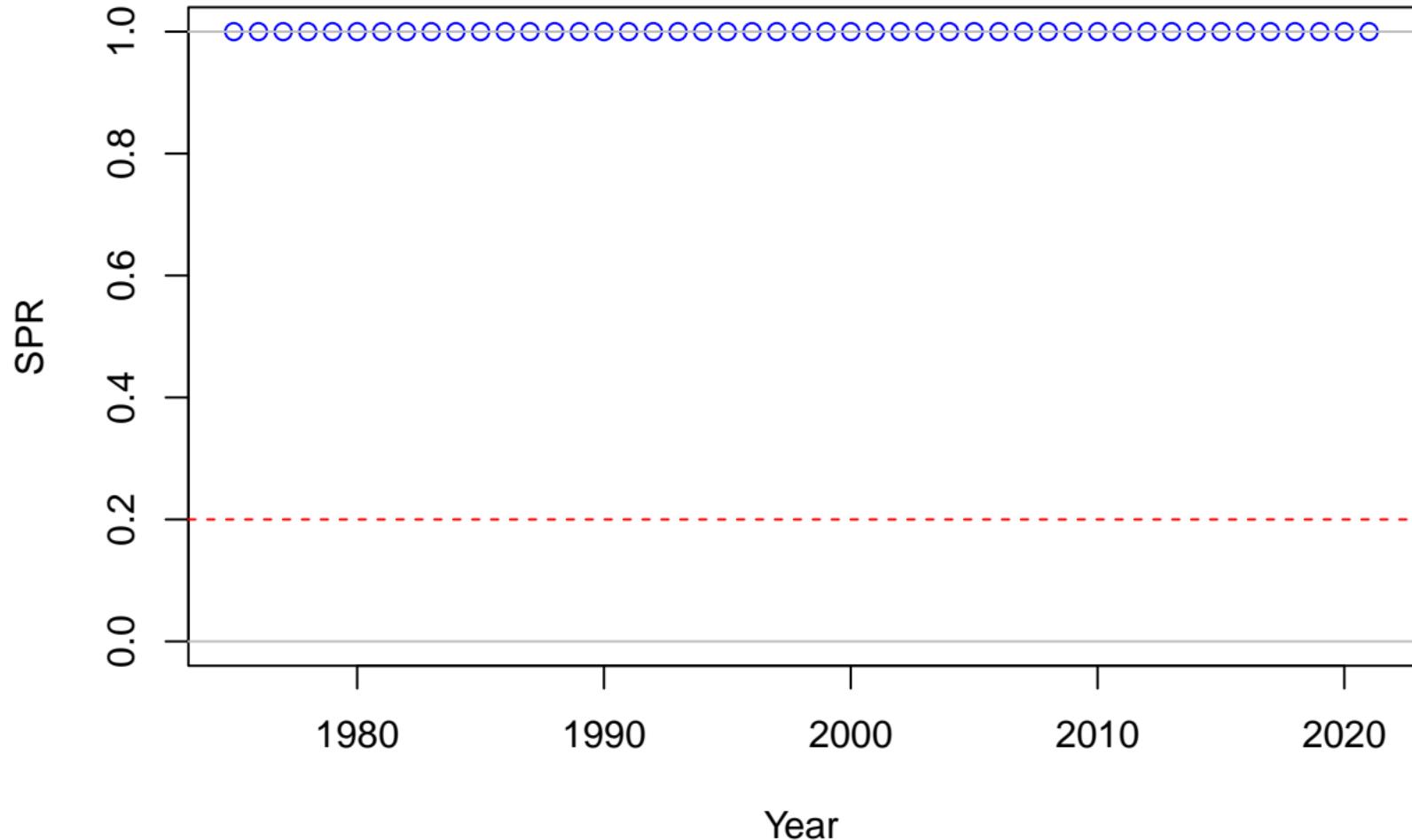


1980 1990 2000 2010 2020

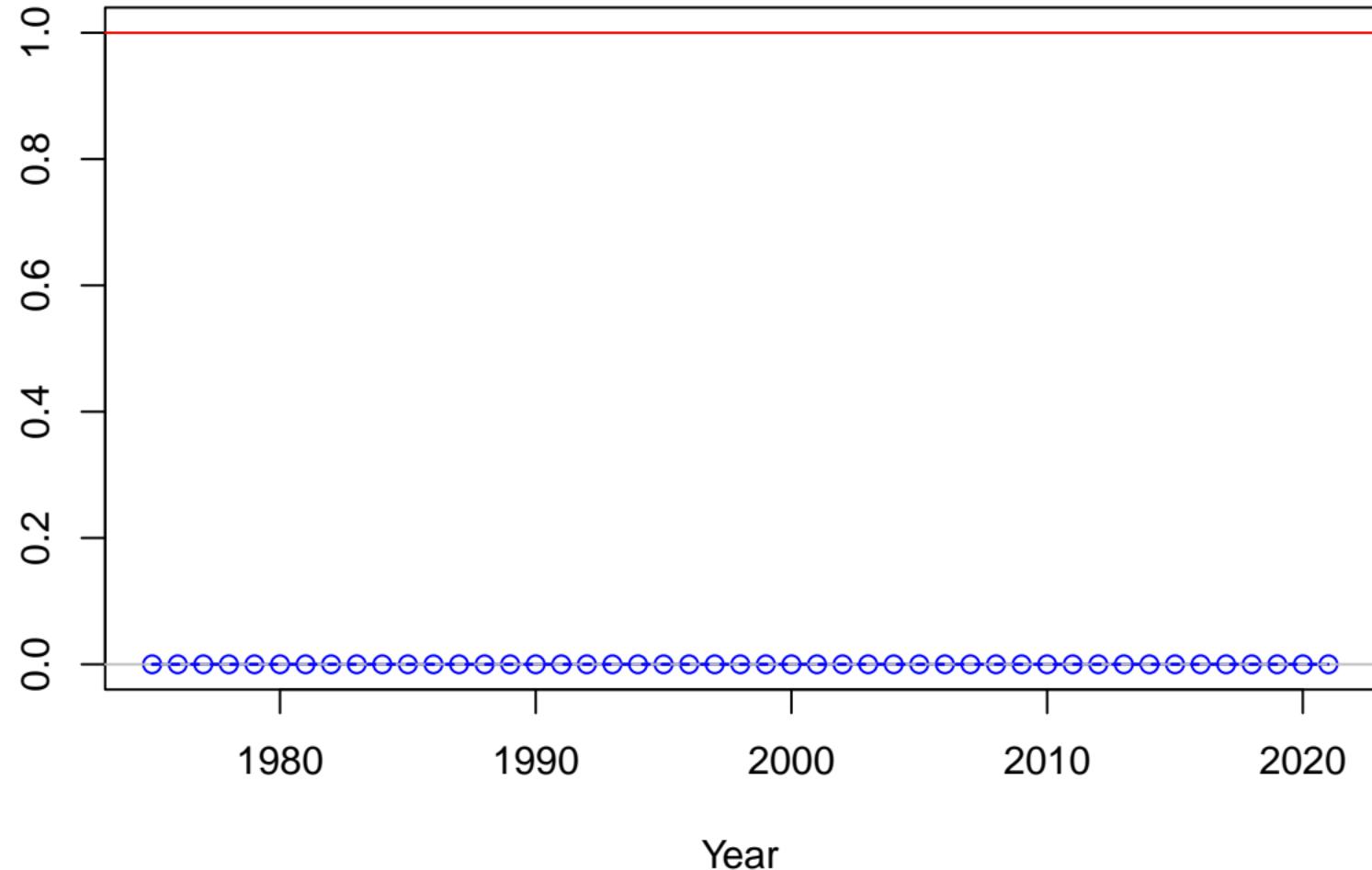
Year



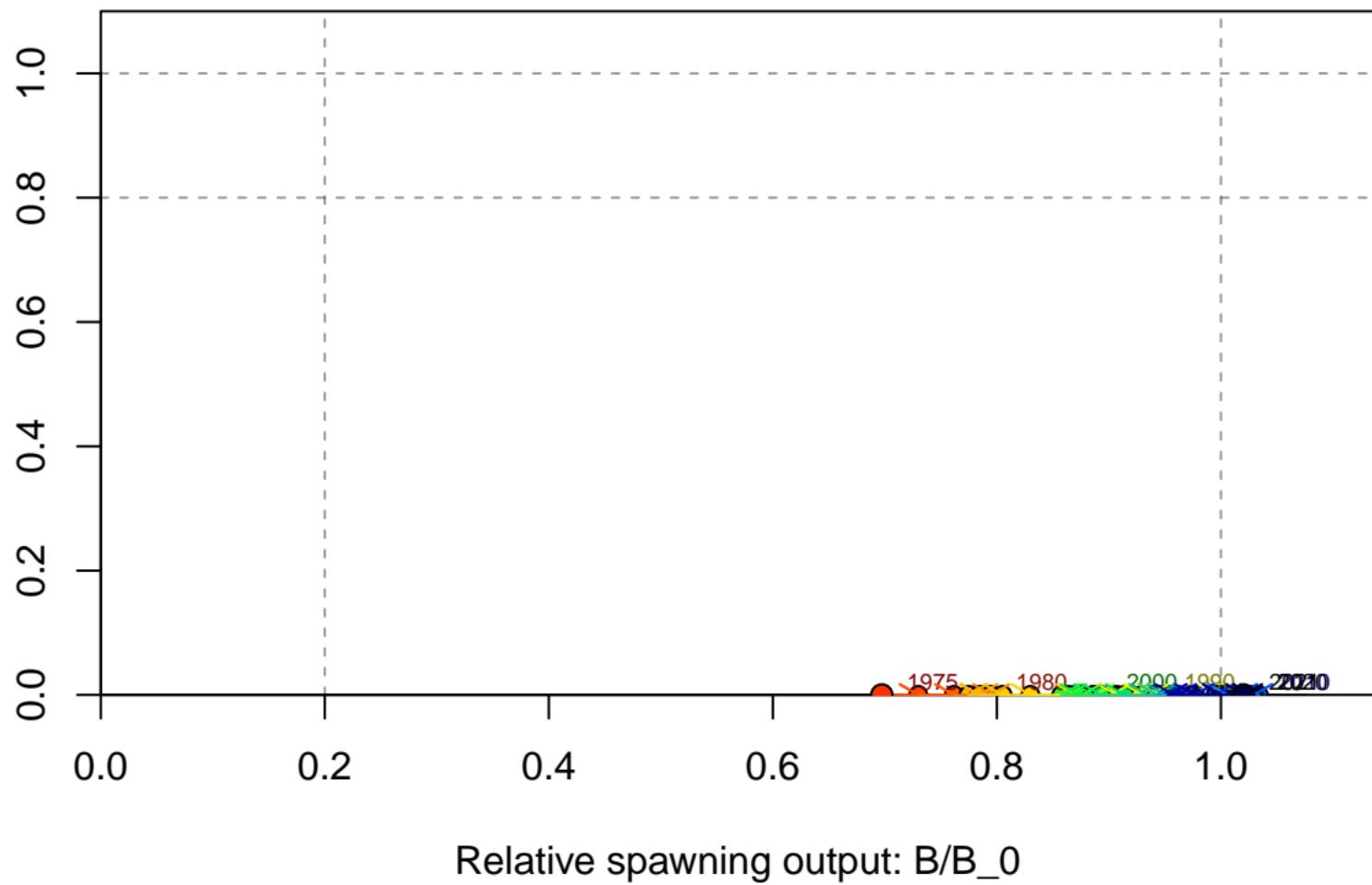


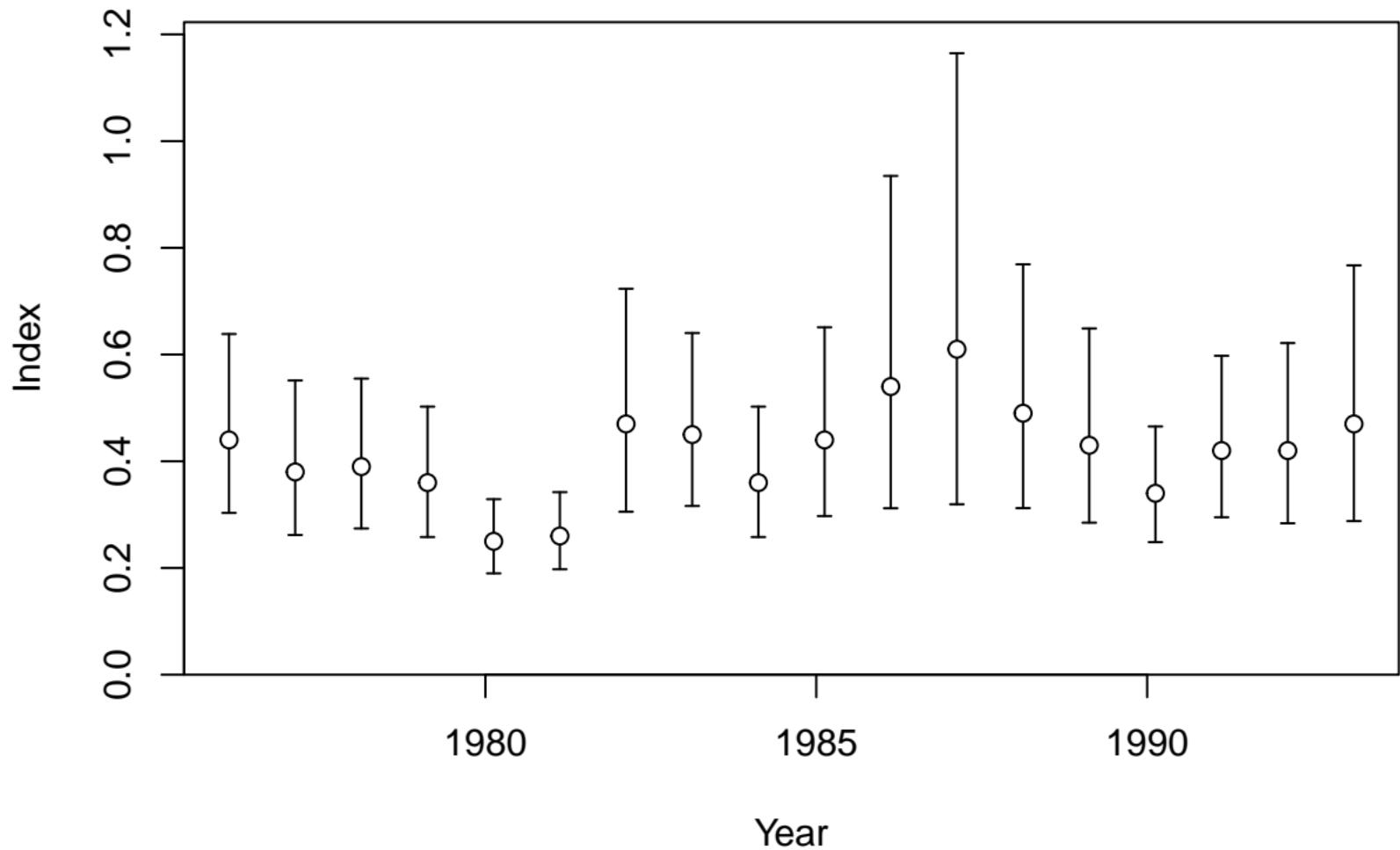


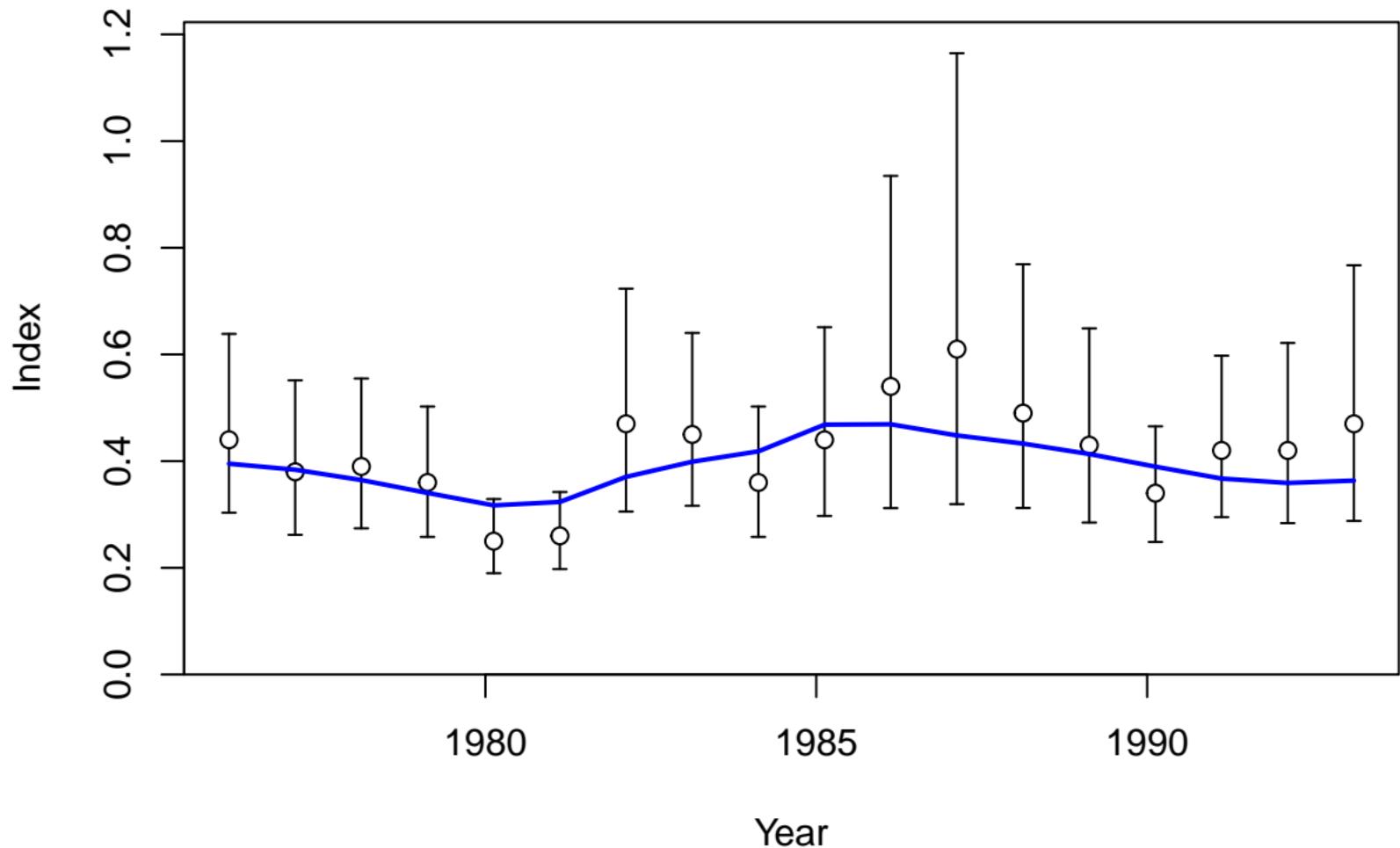
Fishing intensity: 1-SPR



Fishing intensity: 1-SPR





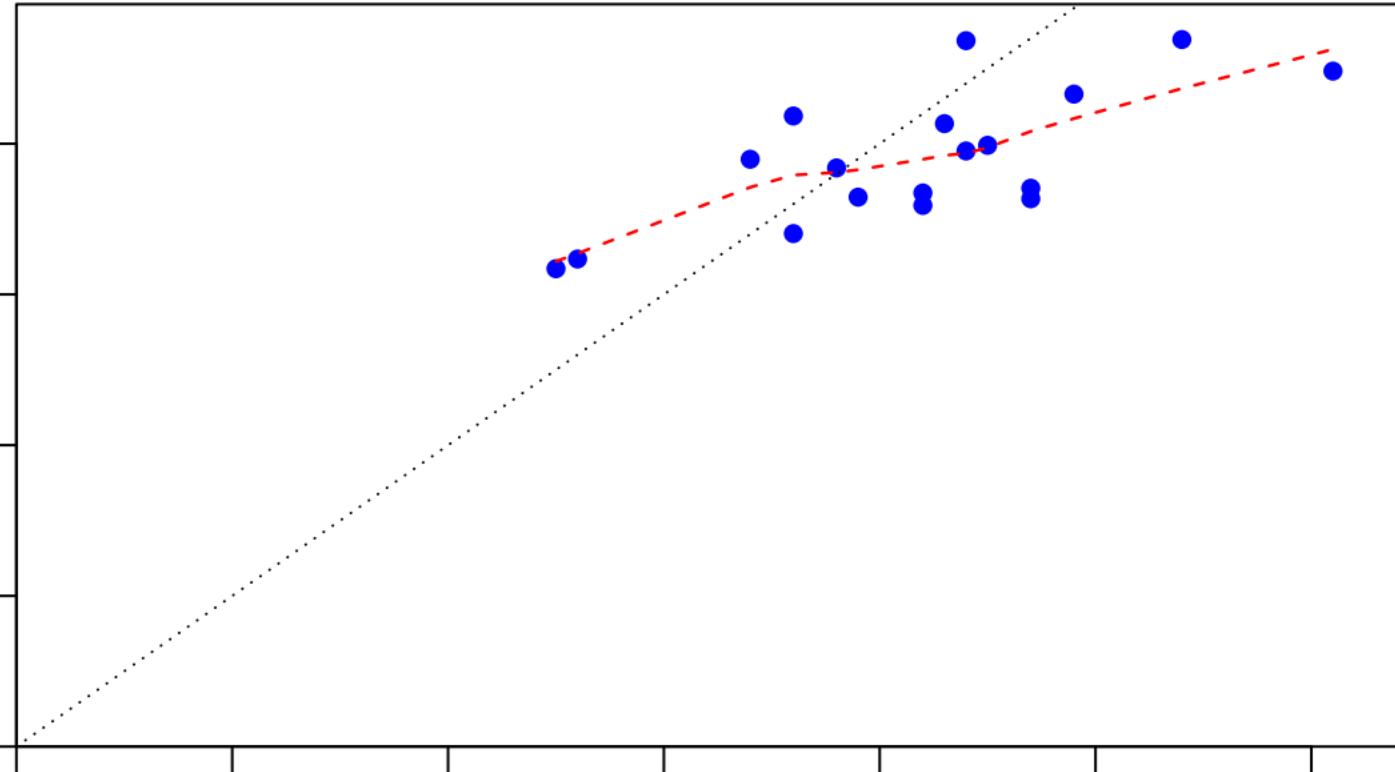


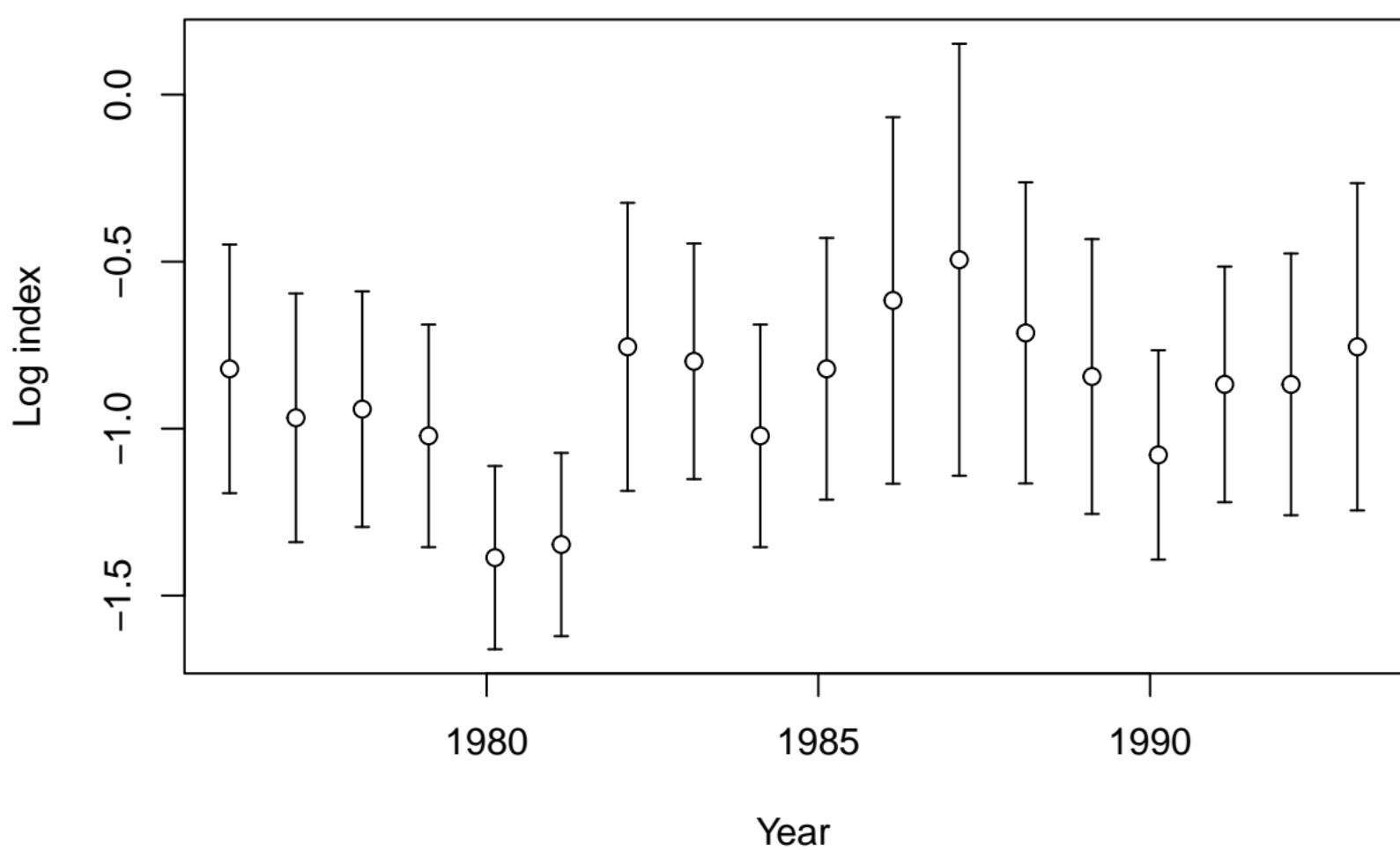
Expected index

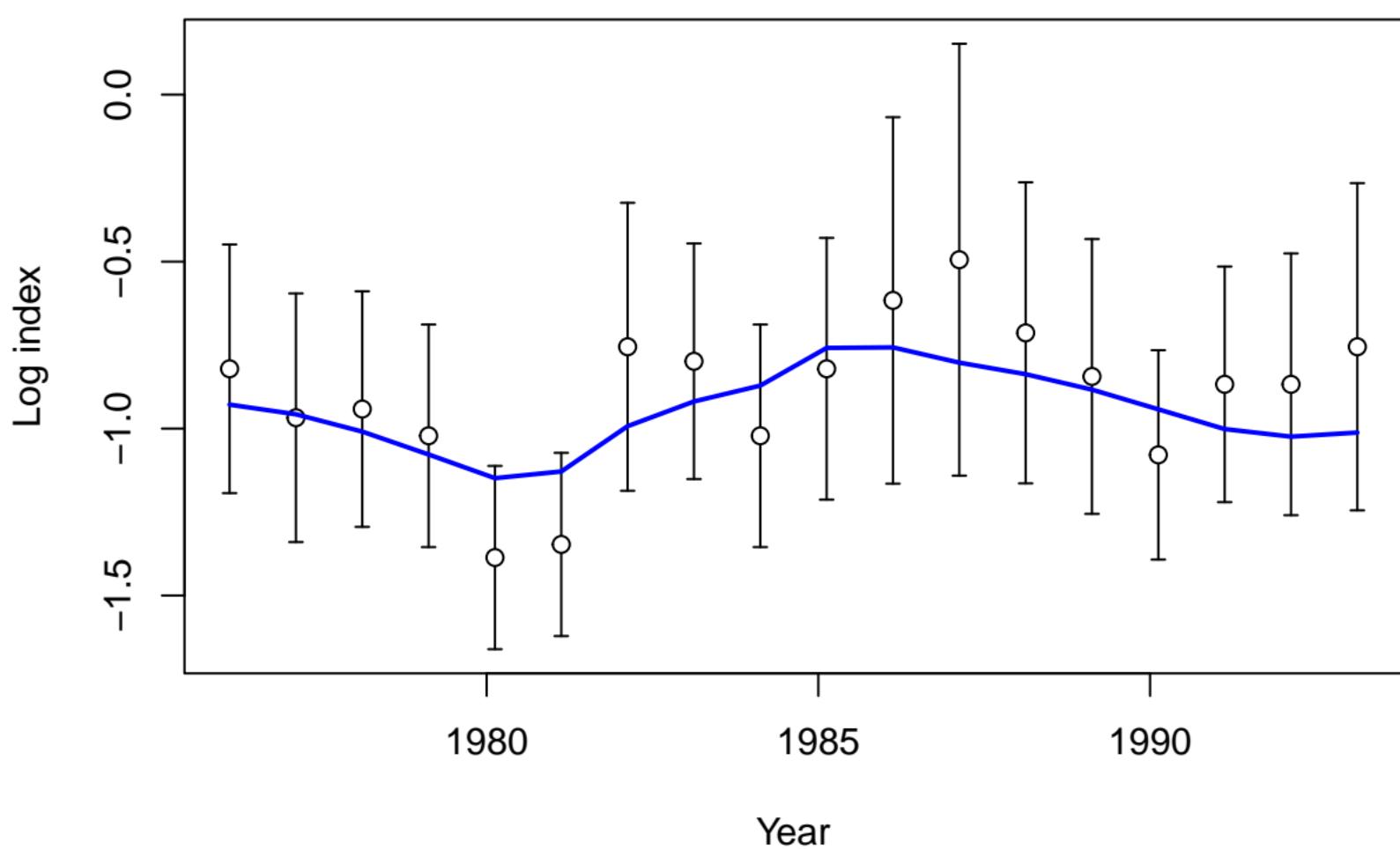
0.0 0.1 0.2 0.3 0.4

0.0 0.1 0.2 0.3 0.4 0.5 0.6

Observed index







Log expected index

-1.1
-1.0
-0.9
-0.8

-1.4

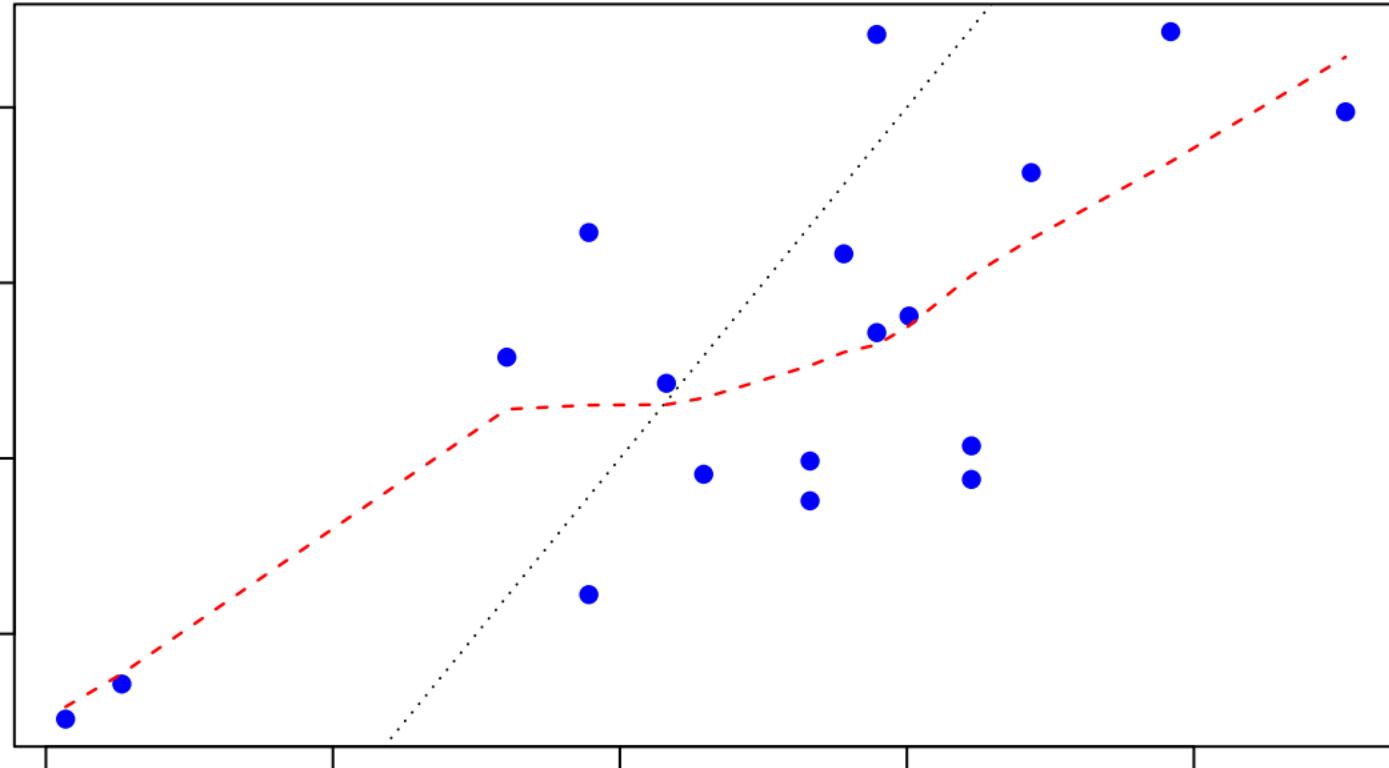
-1.2

Log observed index

-1.0

-0.8

-0.6

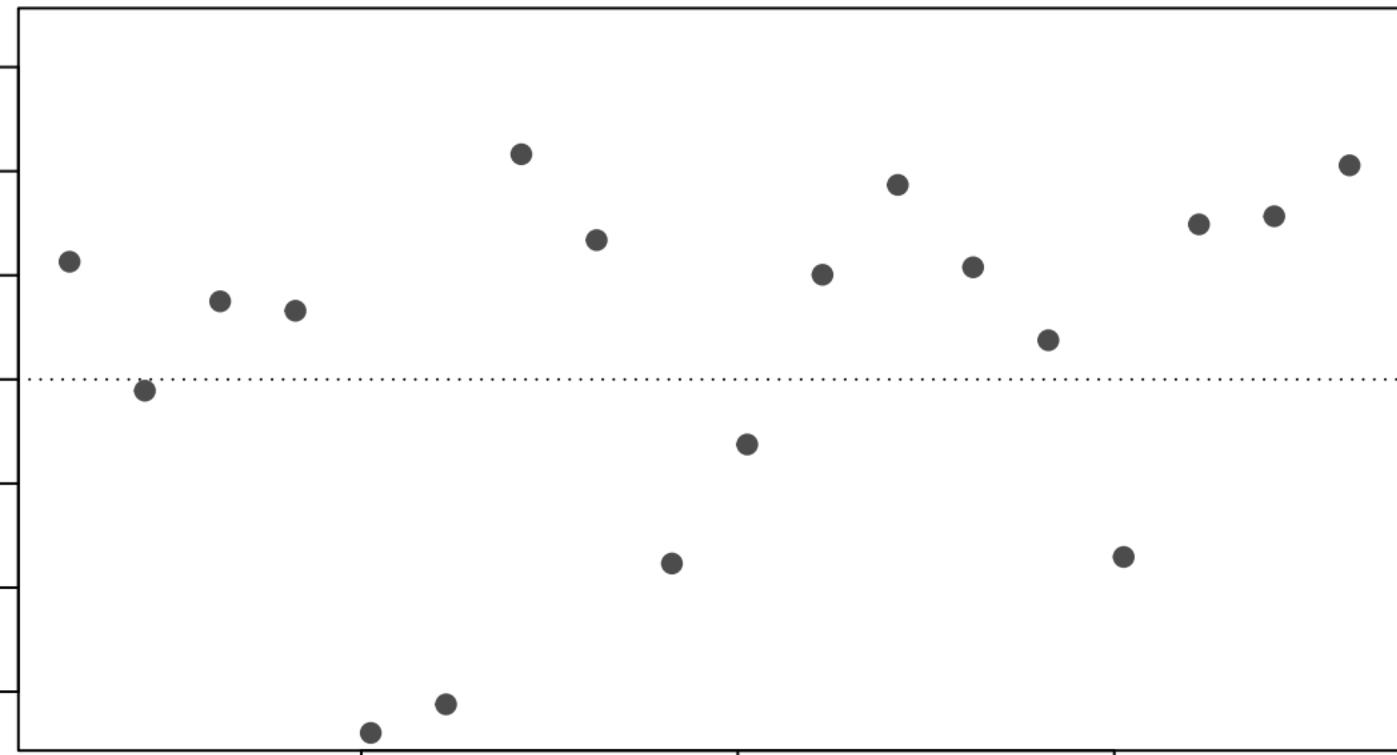


Residual

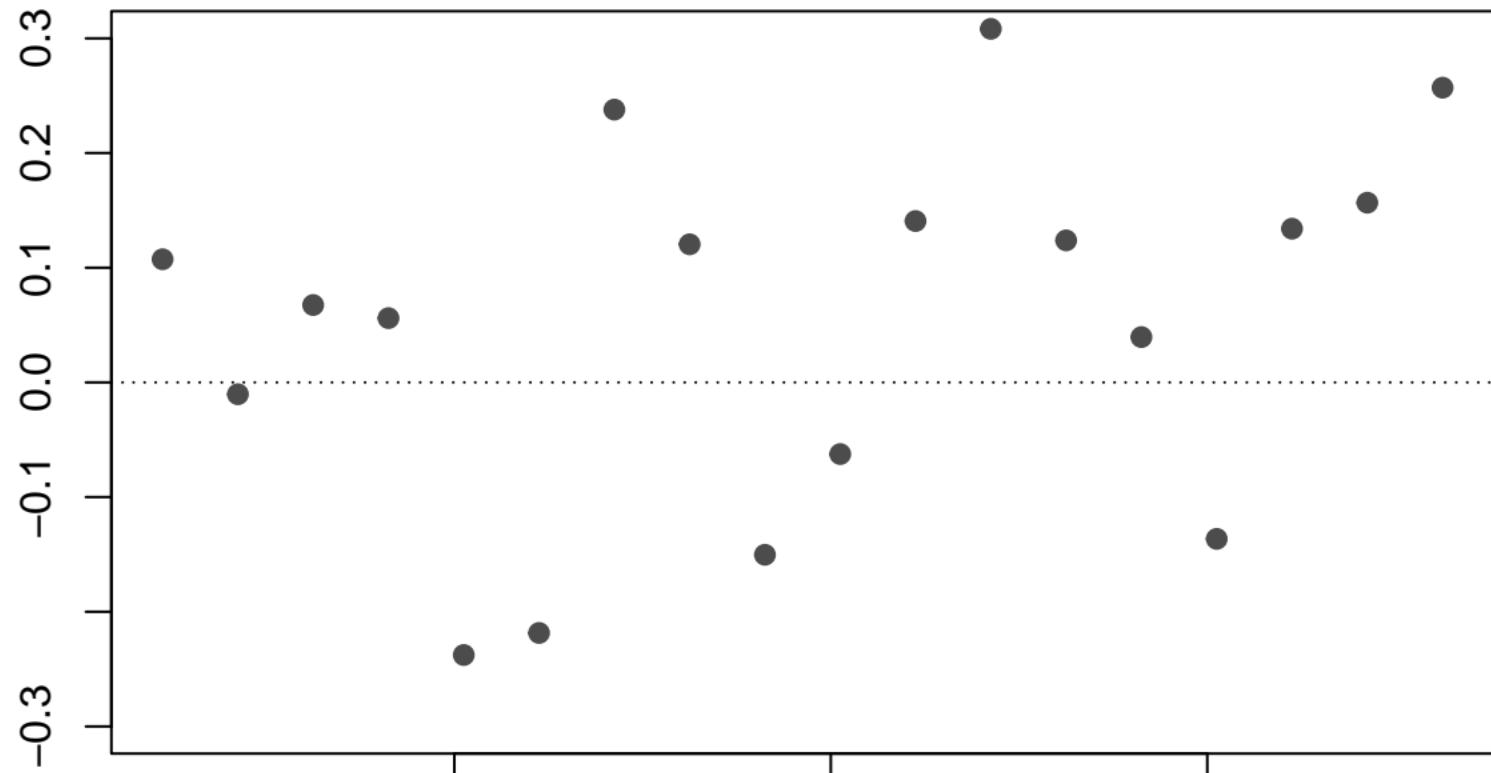
-1.5
-0.5
0.5
1.0
1.5

1980 1985 1990

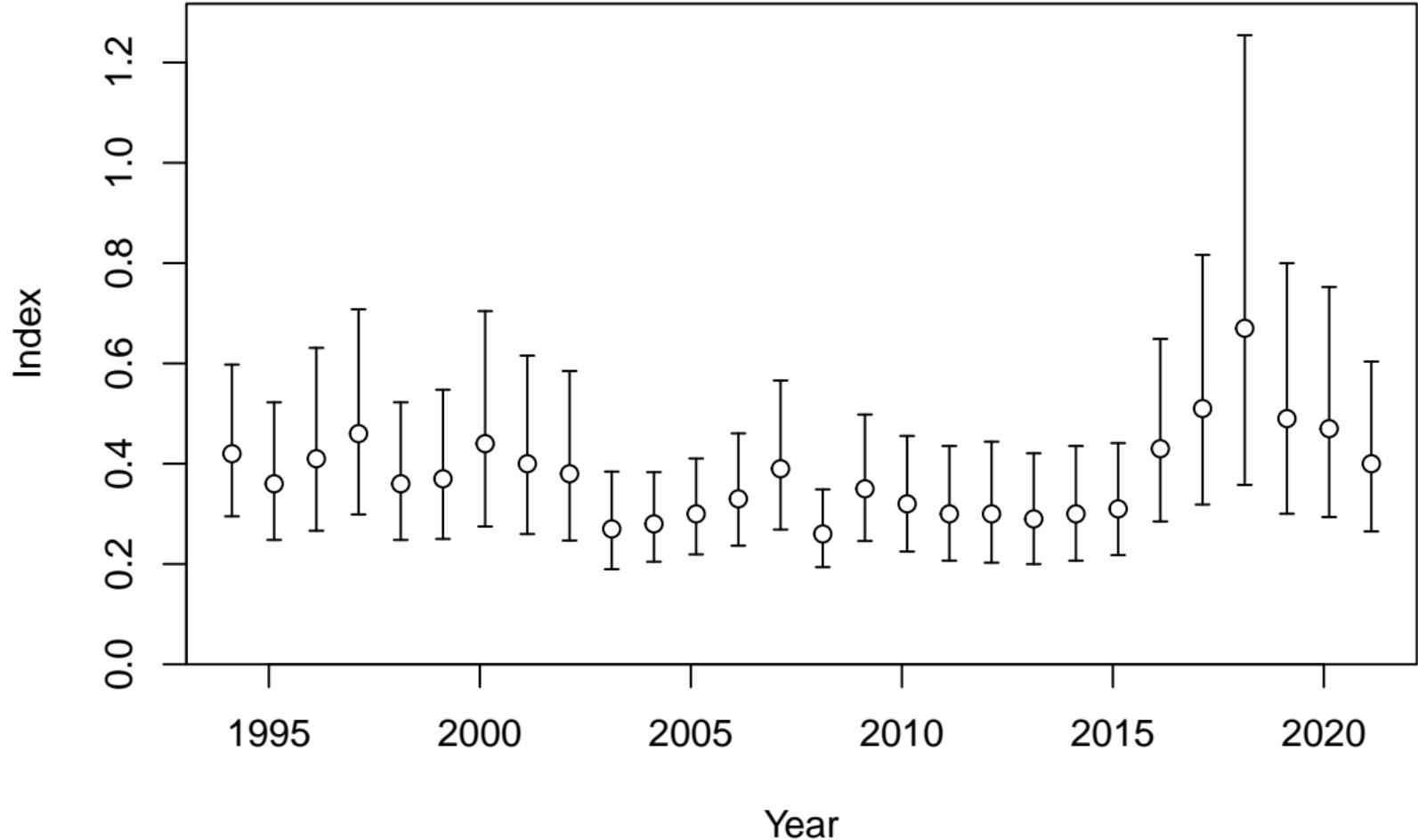
Year

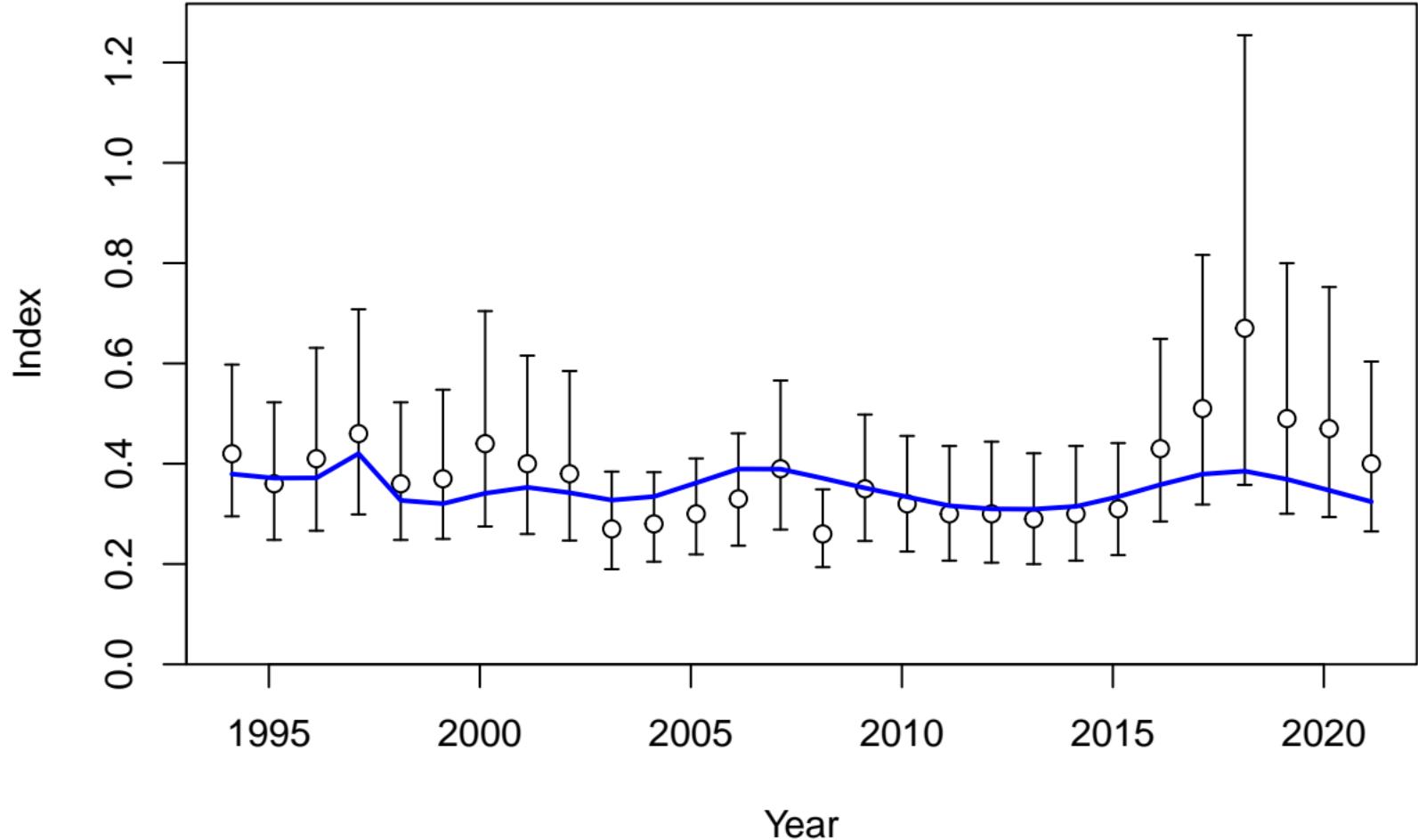


Deviation



Year



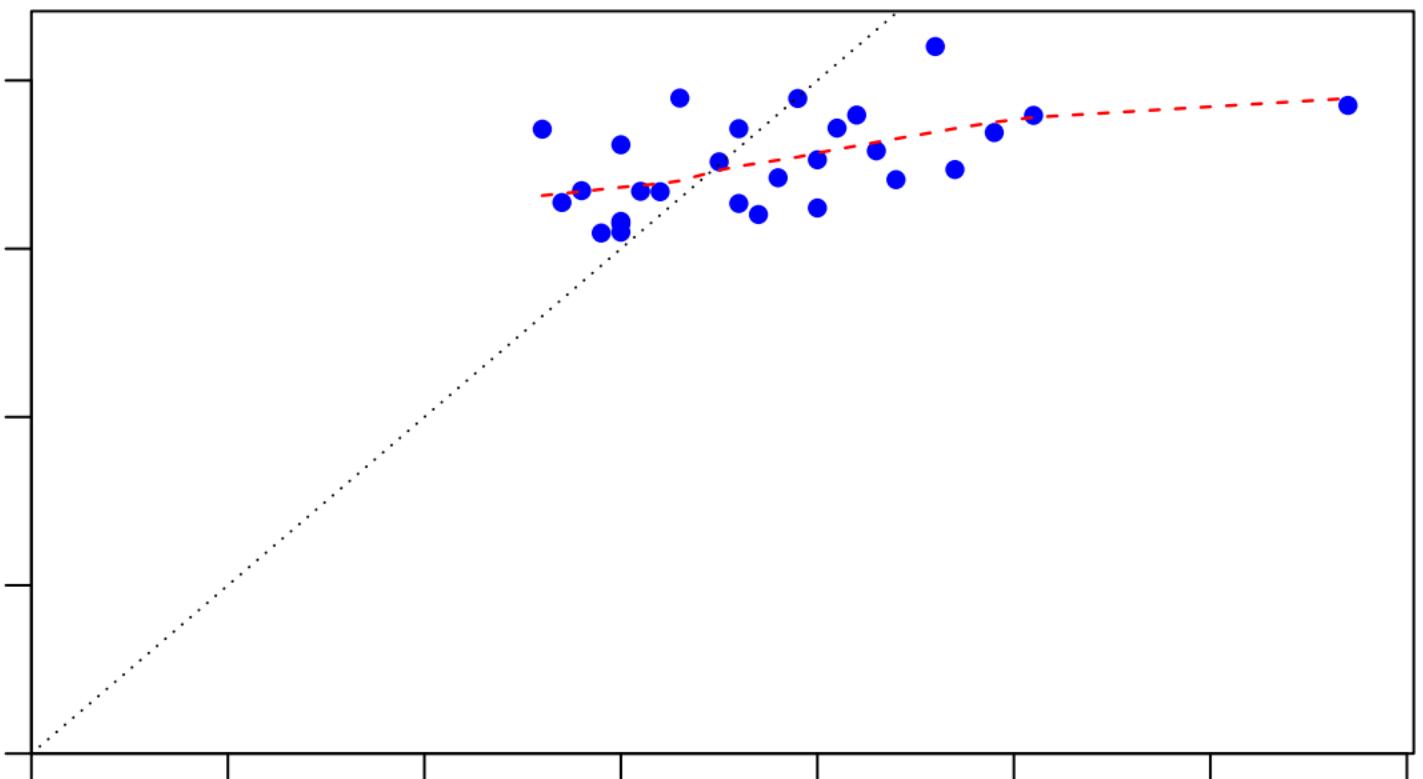


Expected index

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

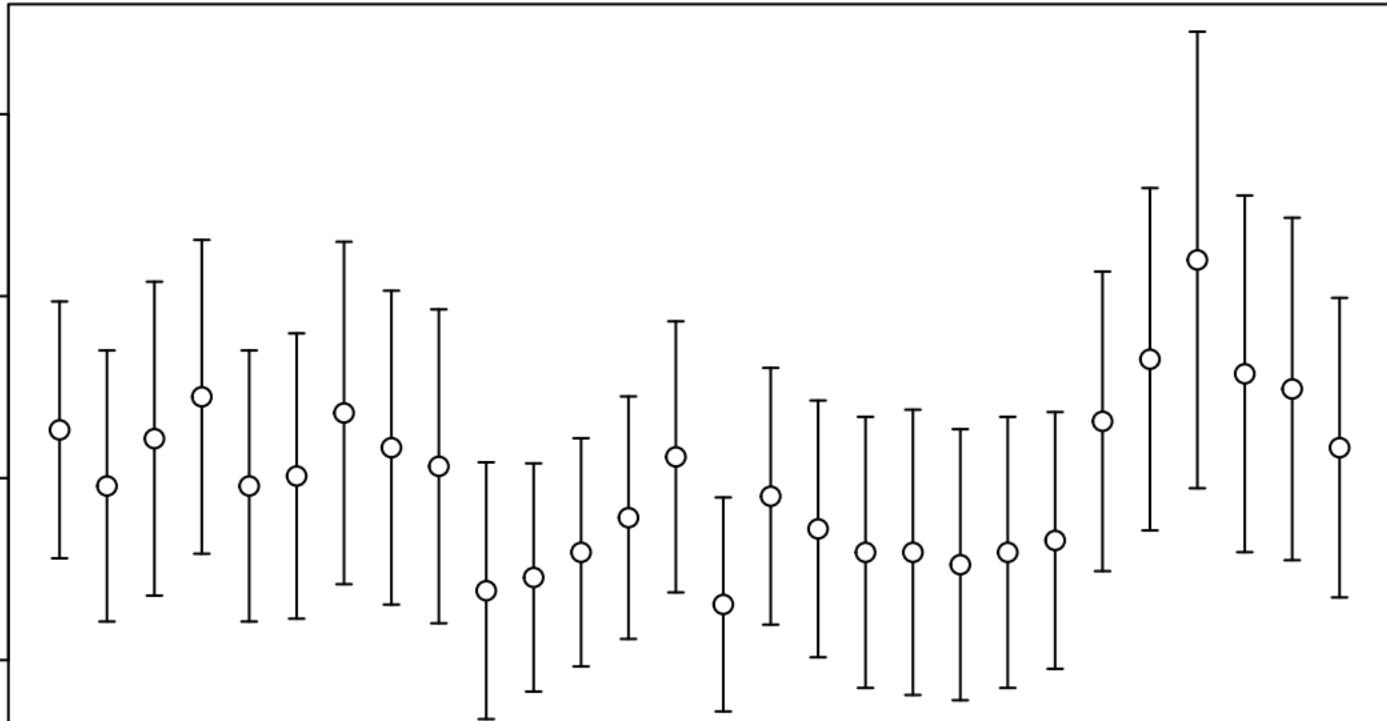


Log index

-1.5 -1.0 -0.5 0.0

1995 2000 2005 2010 2015 2020

Year

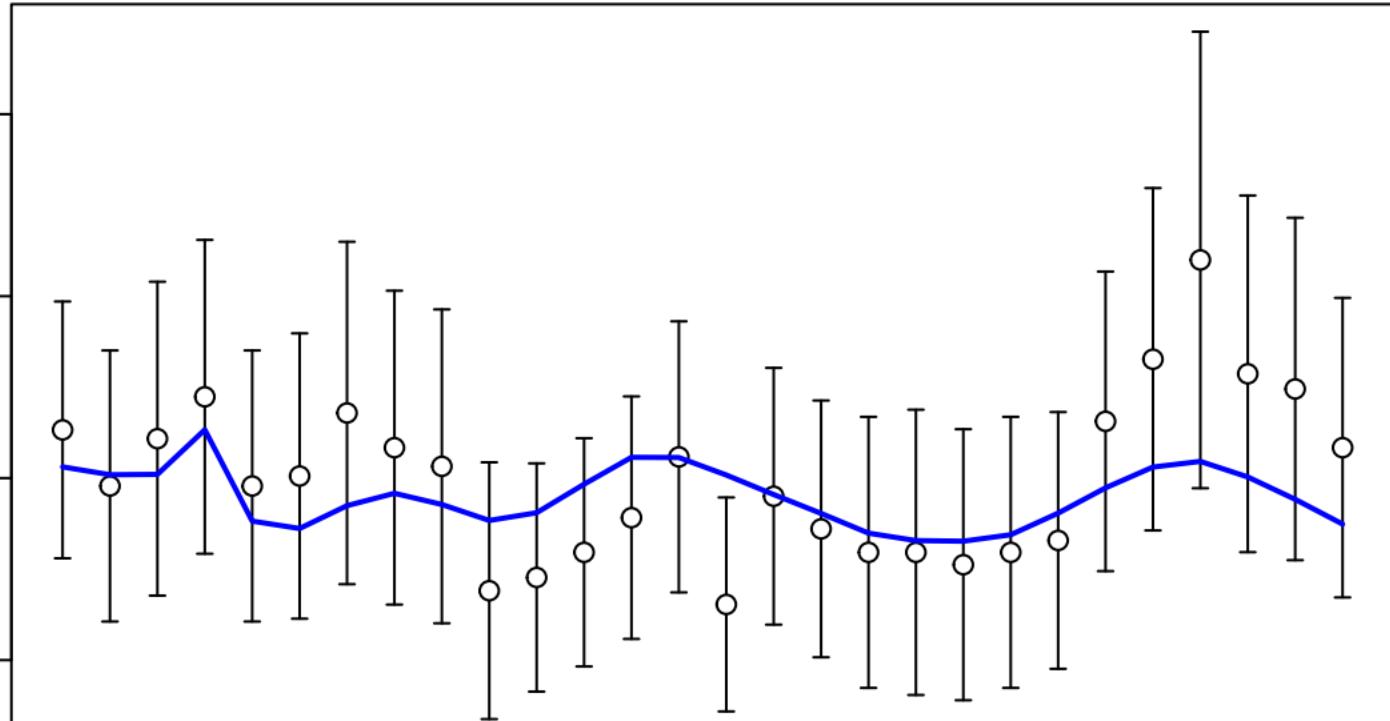


Log index

-1.5 -1.0 -0.5 0.0

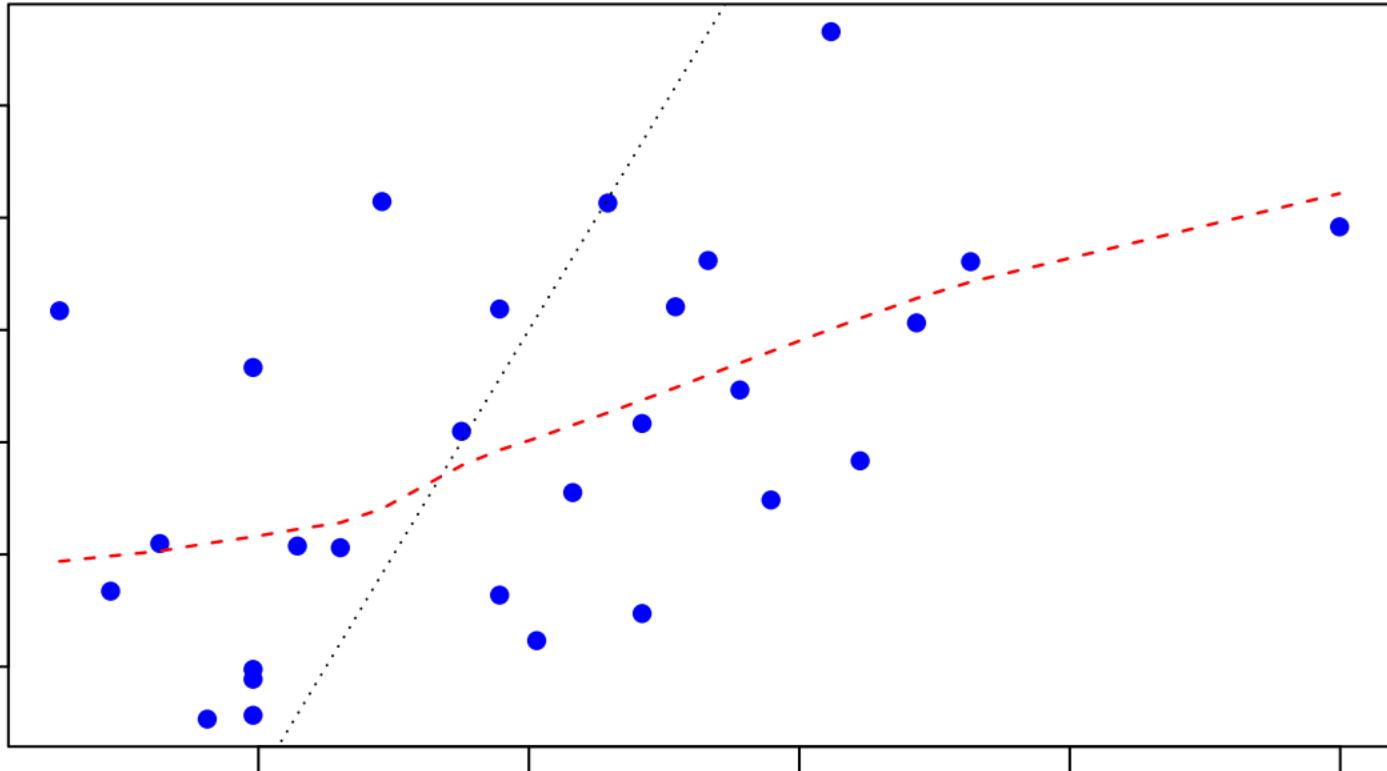
1995 2000 2005 2010 2015 2020

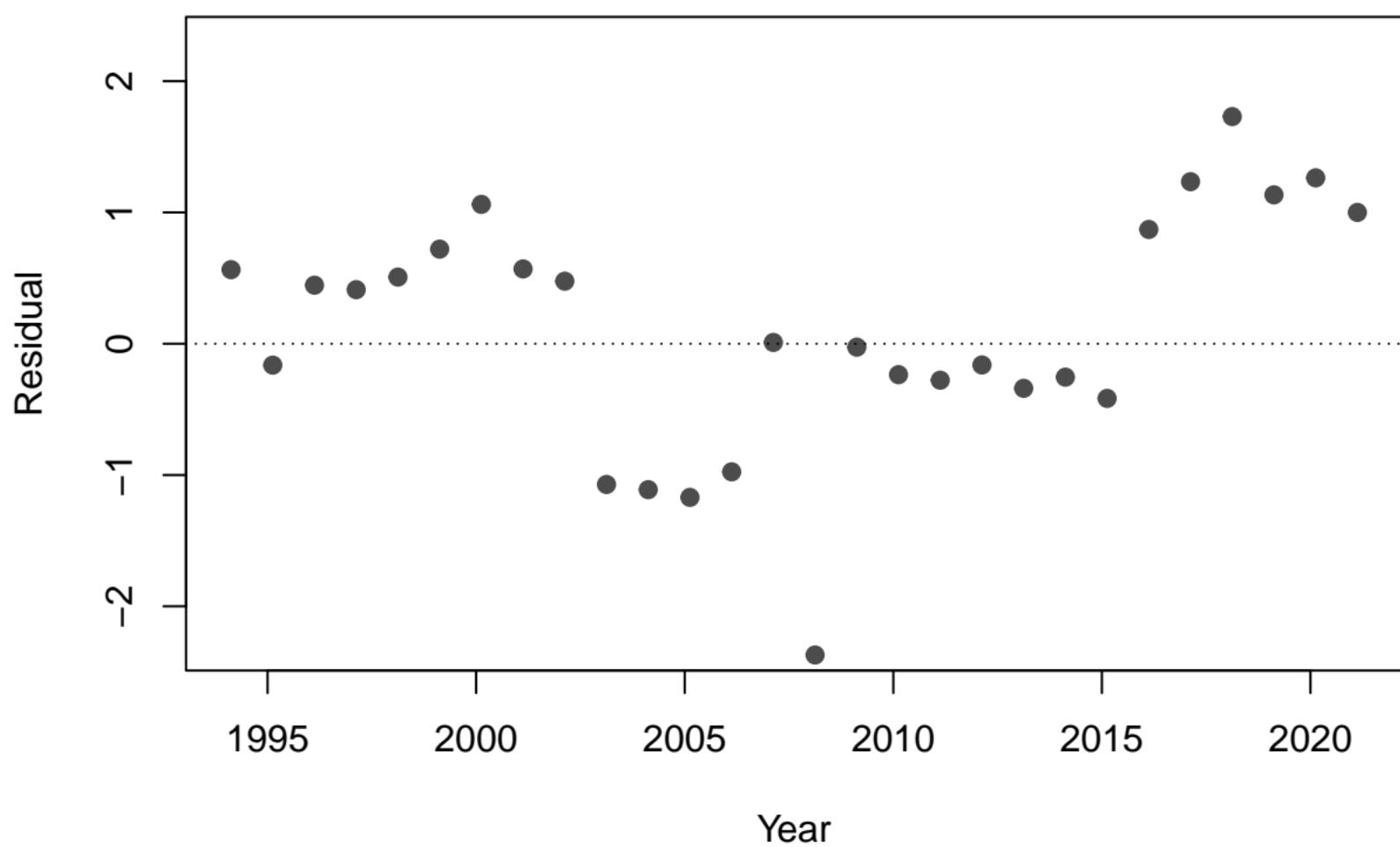
Year

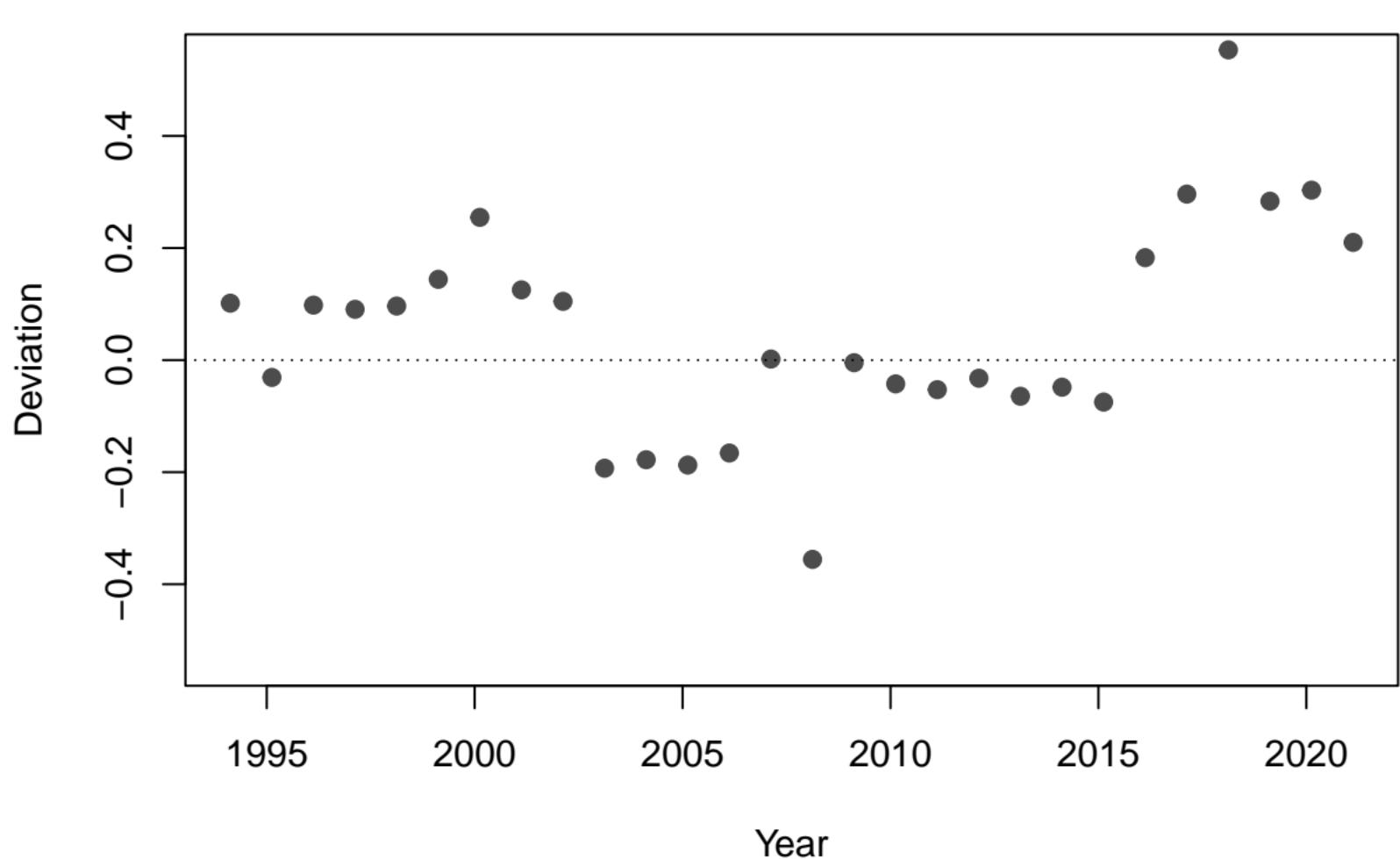


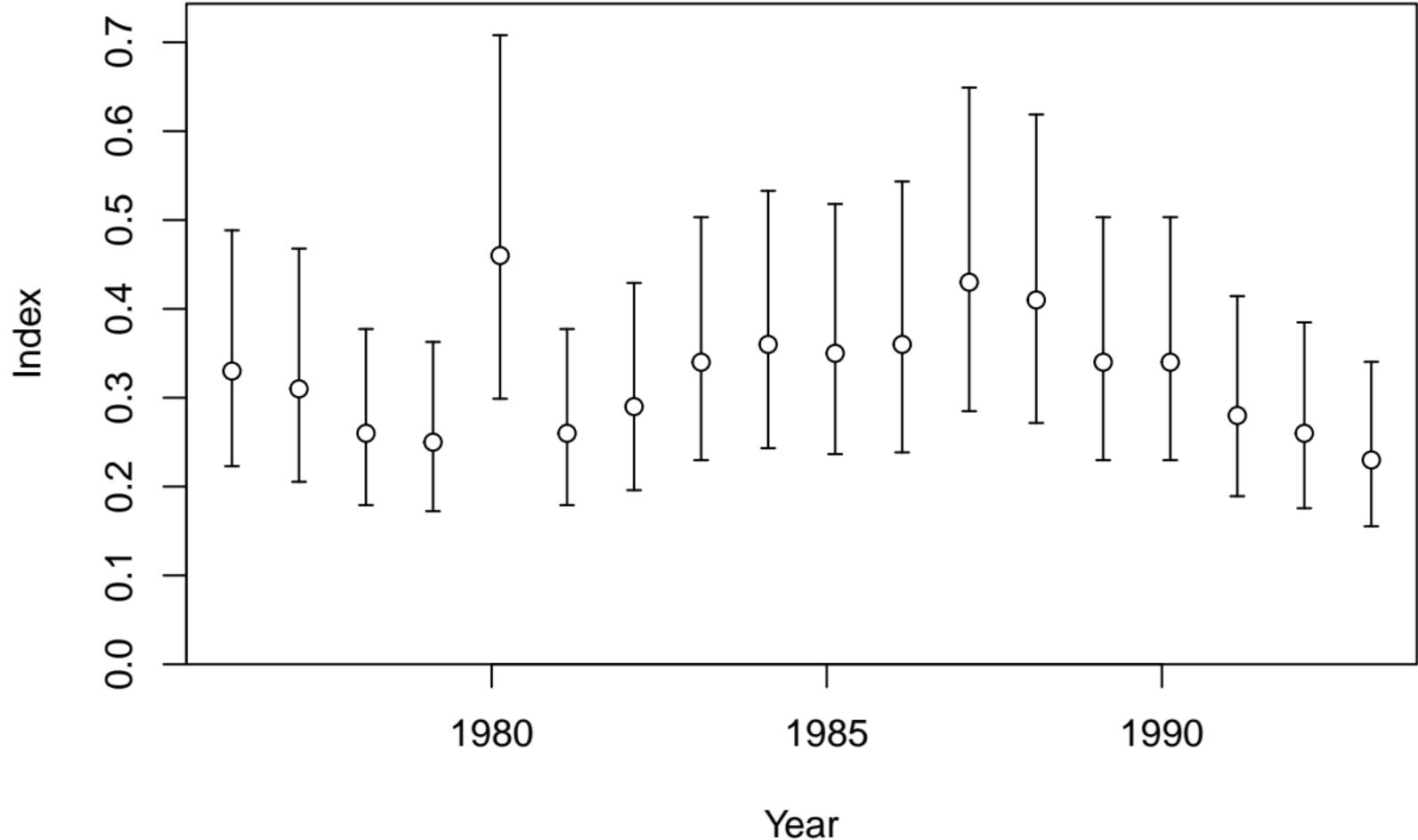
Log expected index

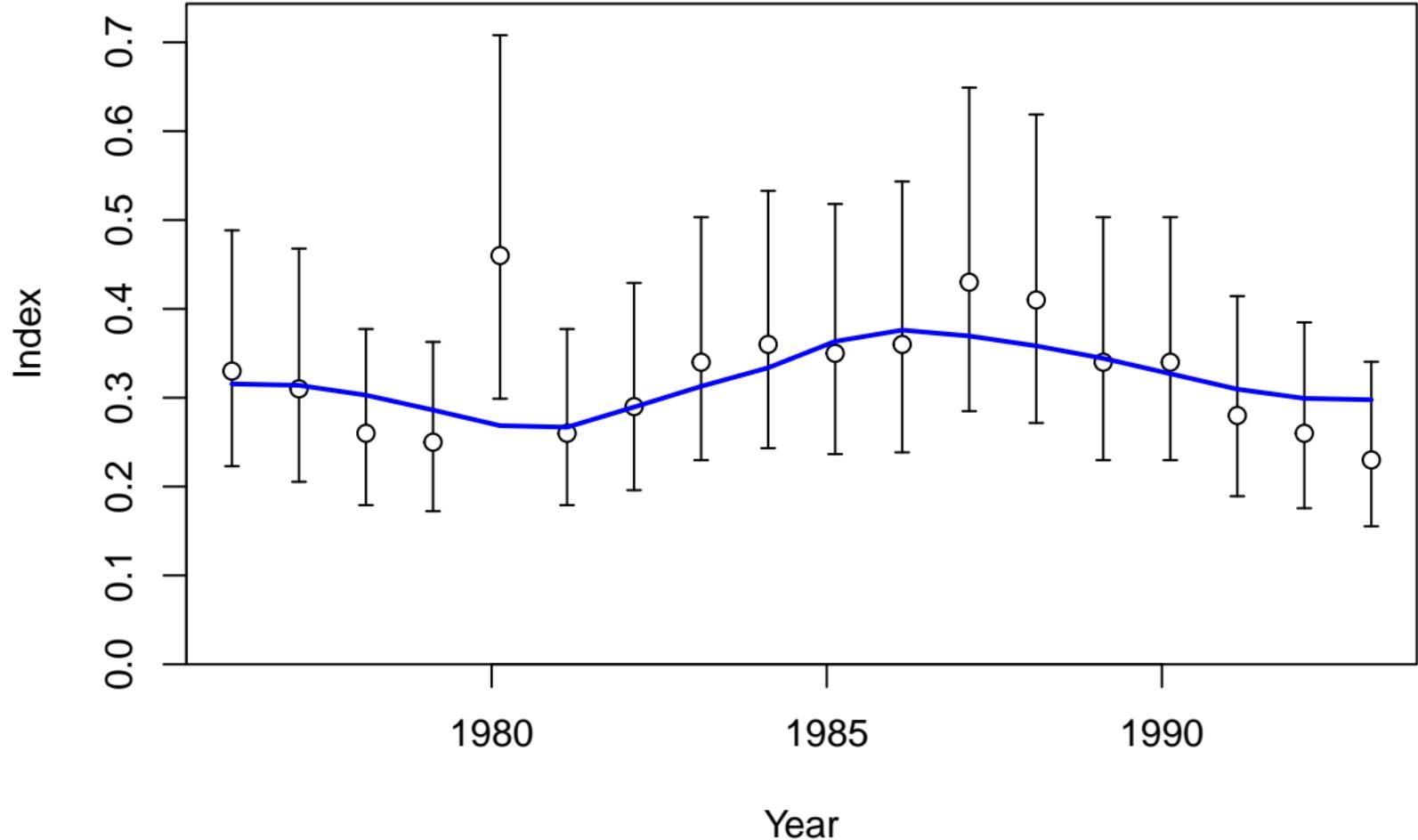
-1.05
-1.15









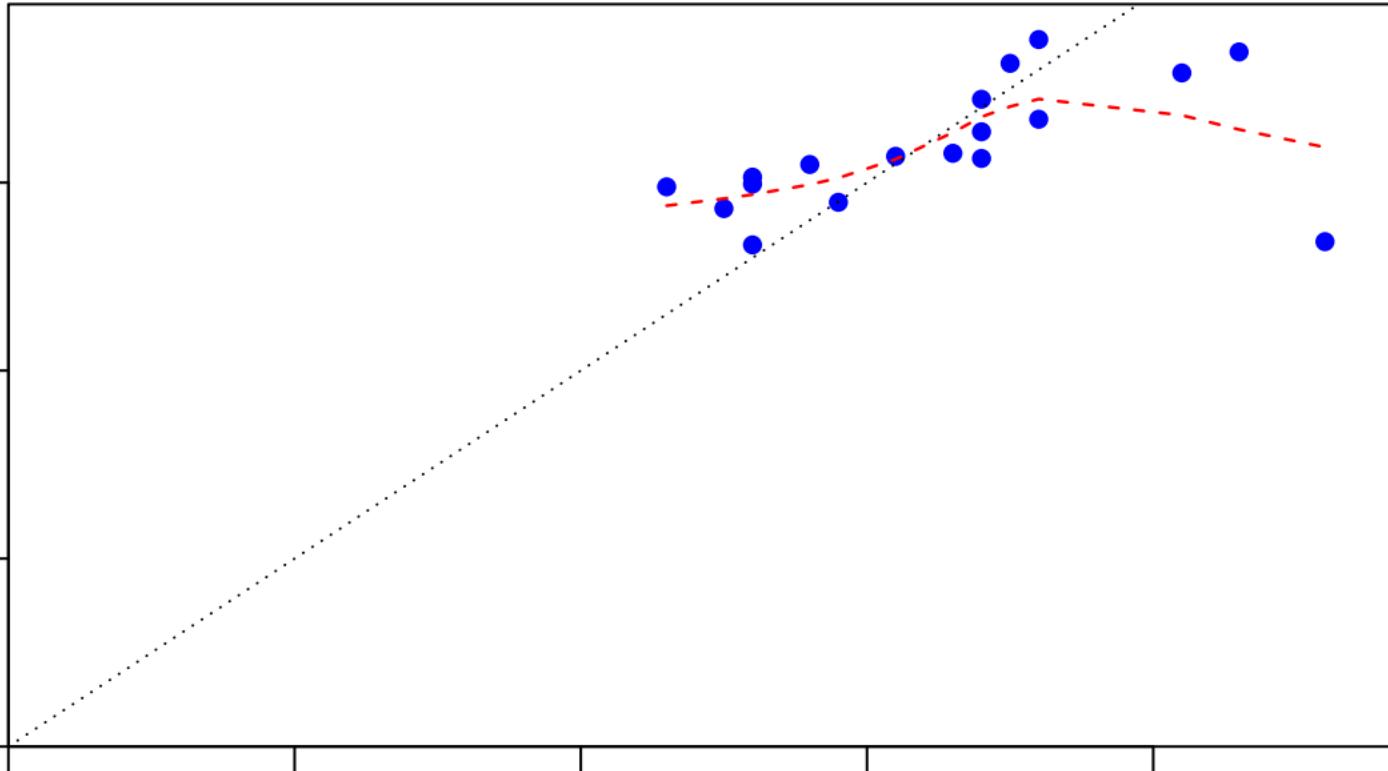


Expected index

0.0
0.1
0.2
0.3

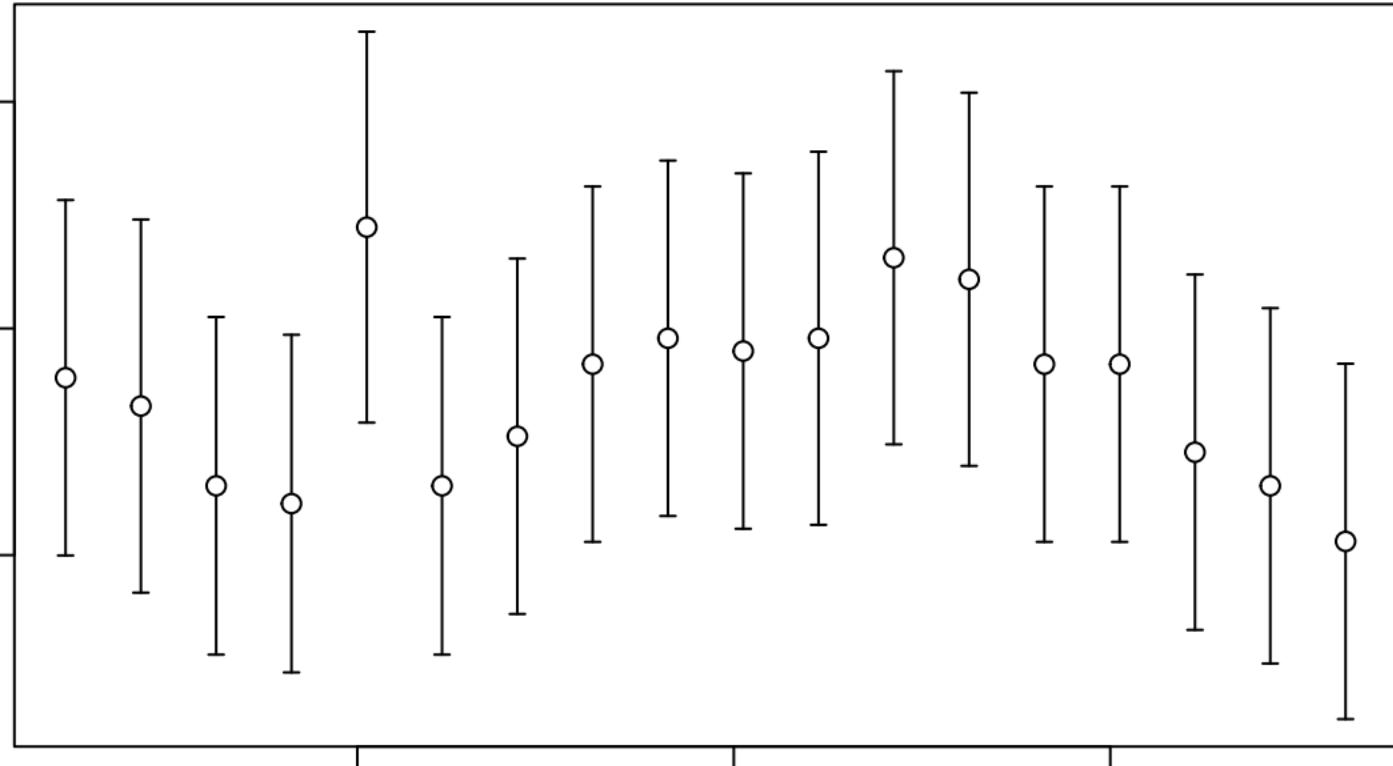
0.0 0.1 0.2 0.3 0.4

Observed index



Log index

-0.5
-1.0
-1.5



1980

1985

1990

Year

Log index

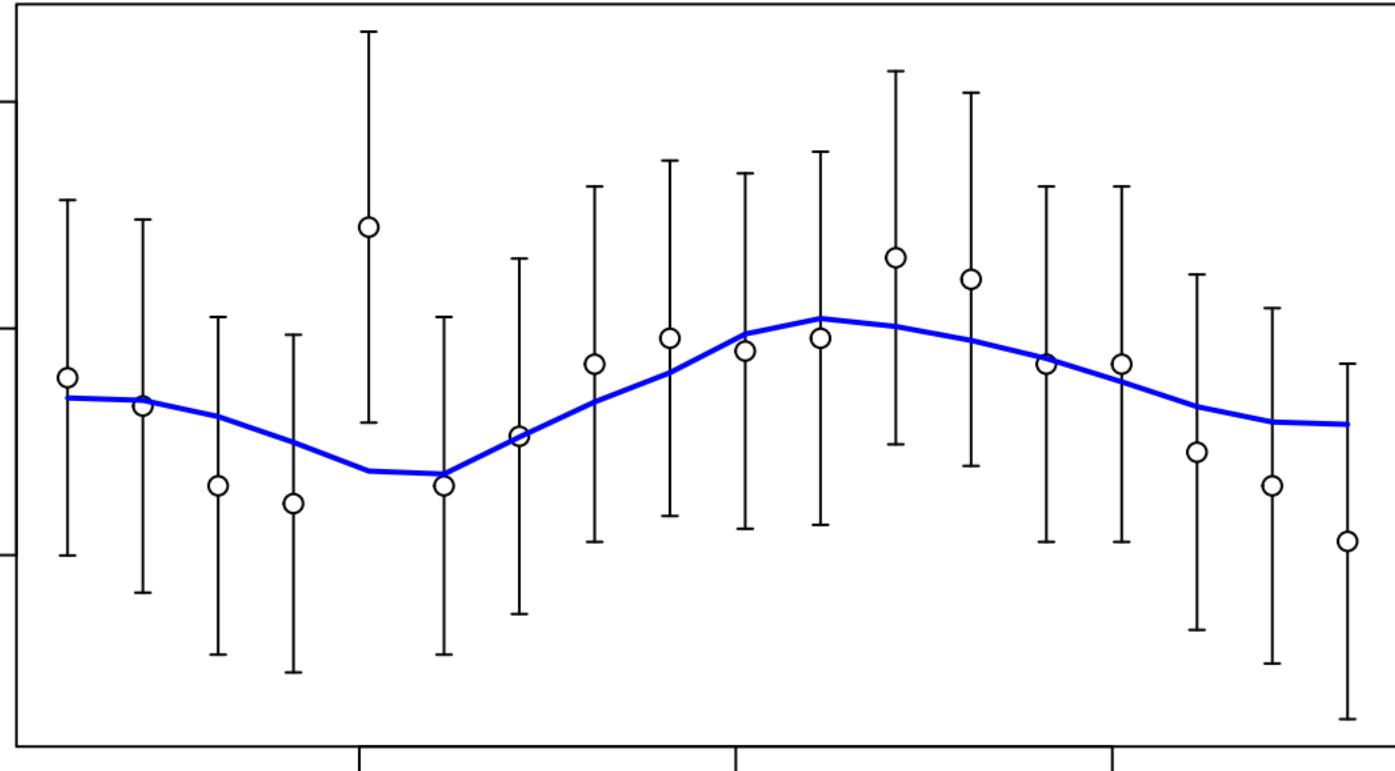
-0.5
-1.0
-1.5

1980

Year

1985

1990

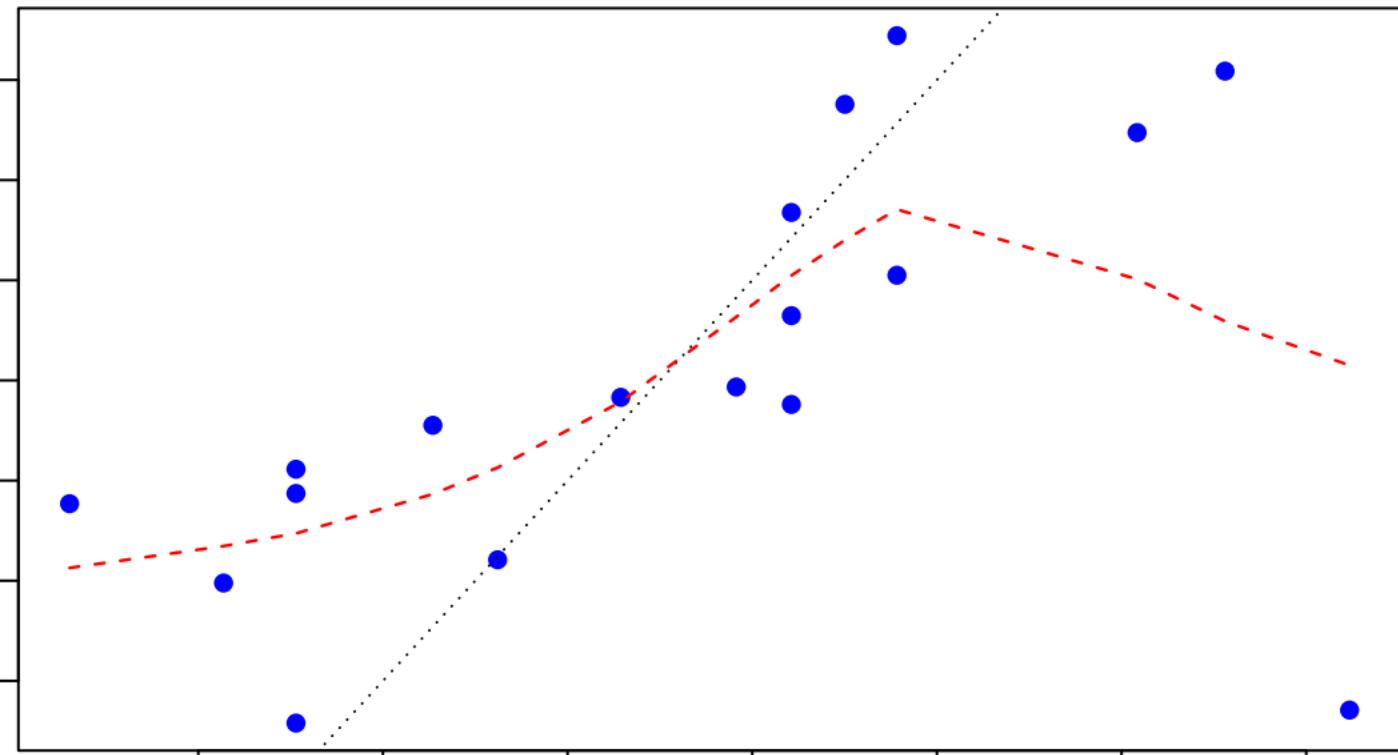


Log expected index

-1.30 -1.20 -1.10 -1.00

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

Log observed index



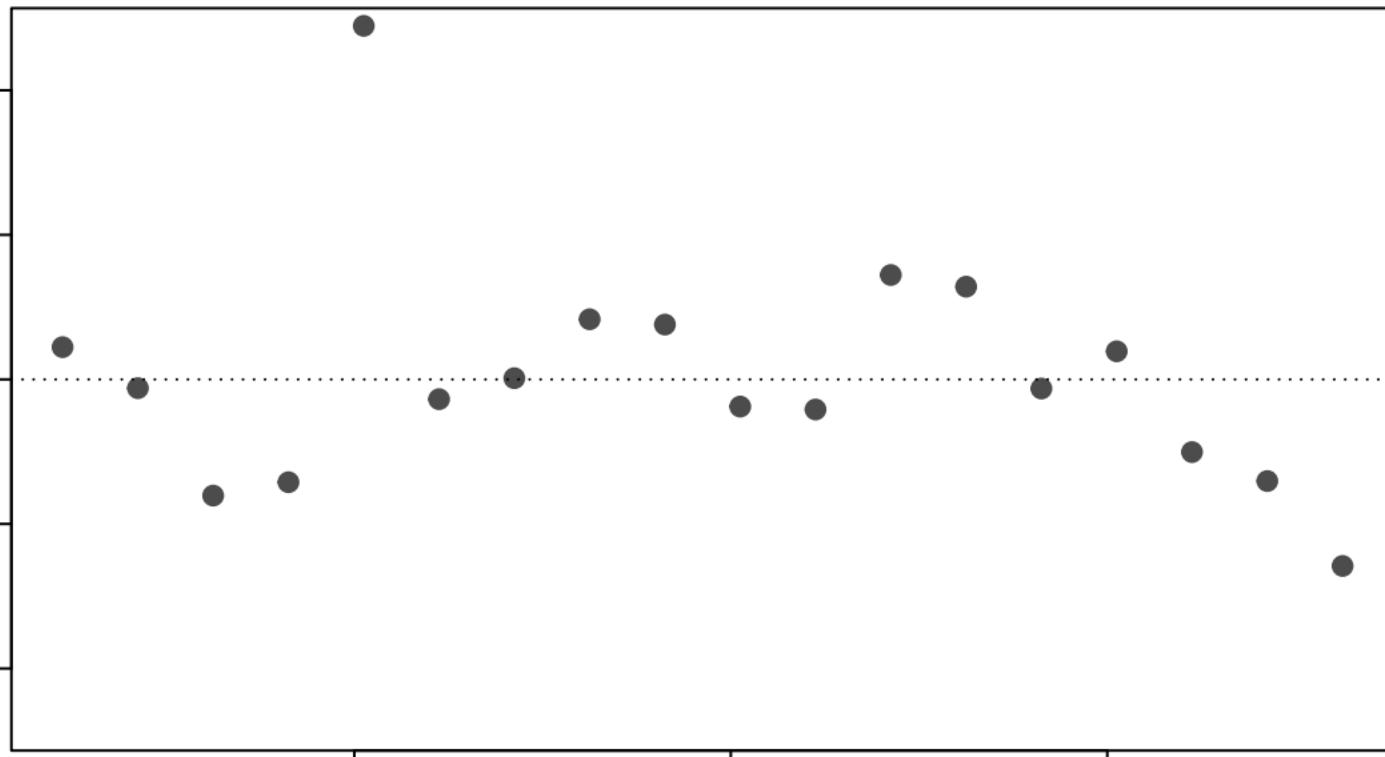
Residual

2
1
0
-1
-2

1980

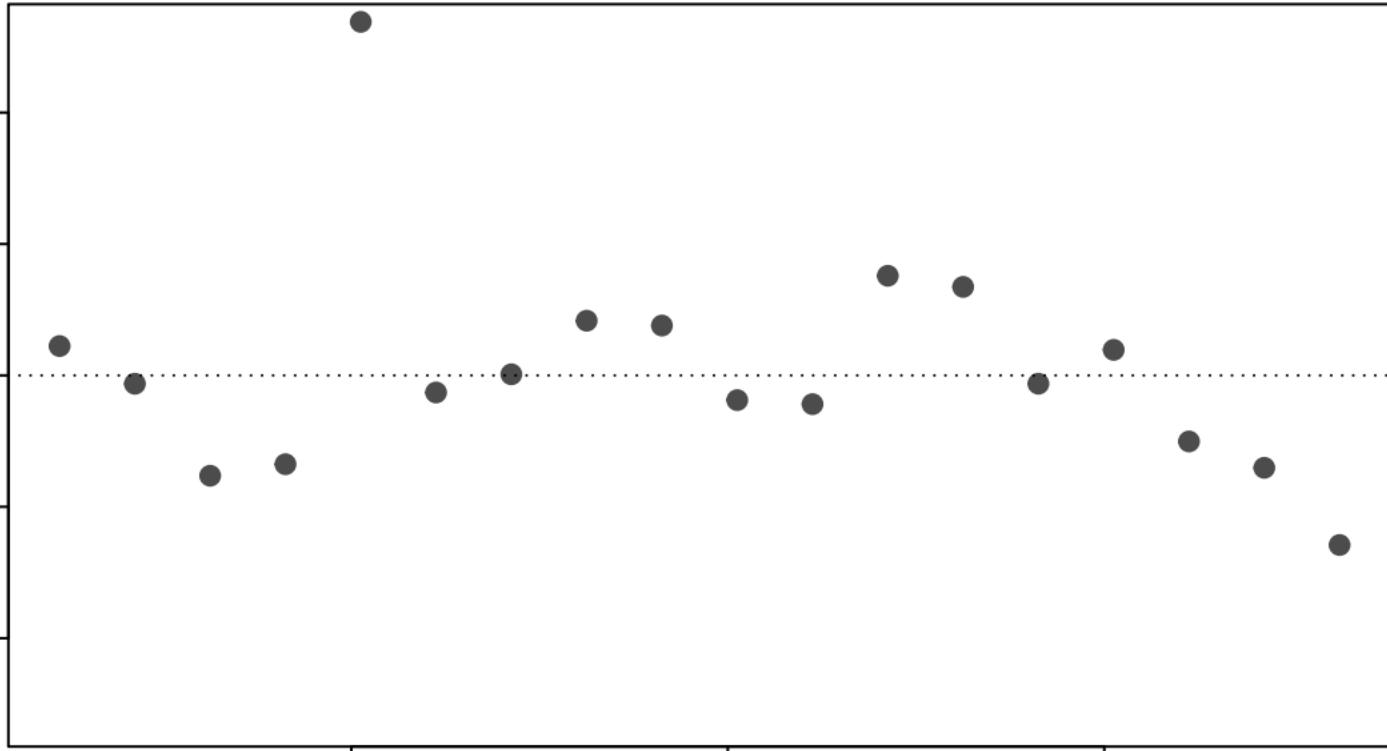
Year

1985 1990



Deviation

-0.4 -0.2 0.0 0.2 0.4

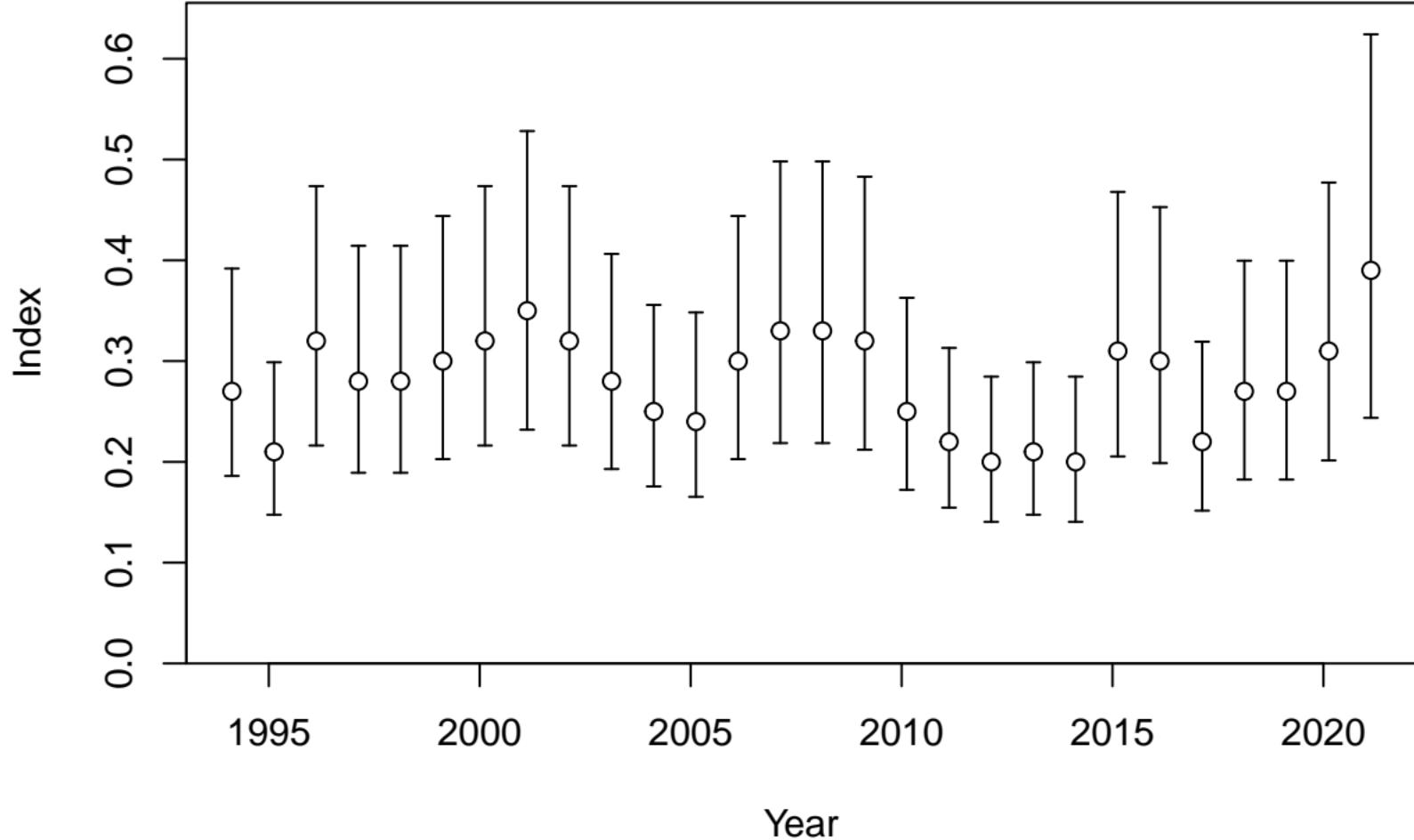


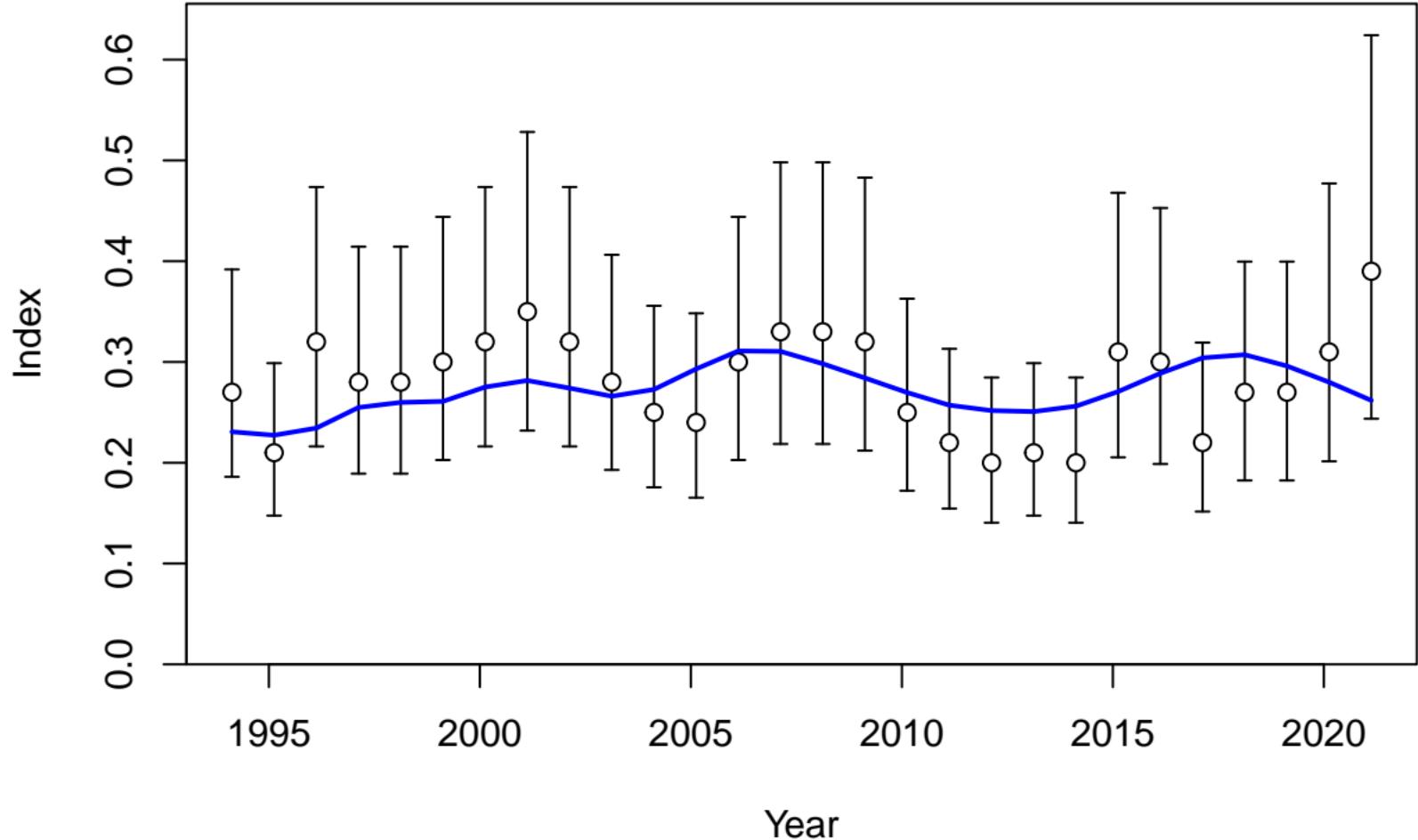
1980

1985

1990

Year



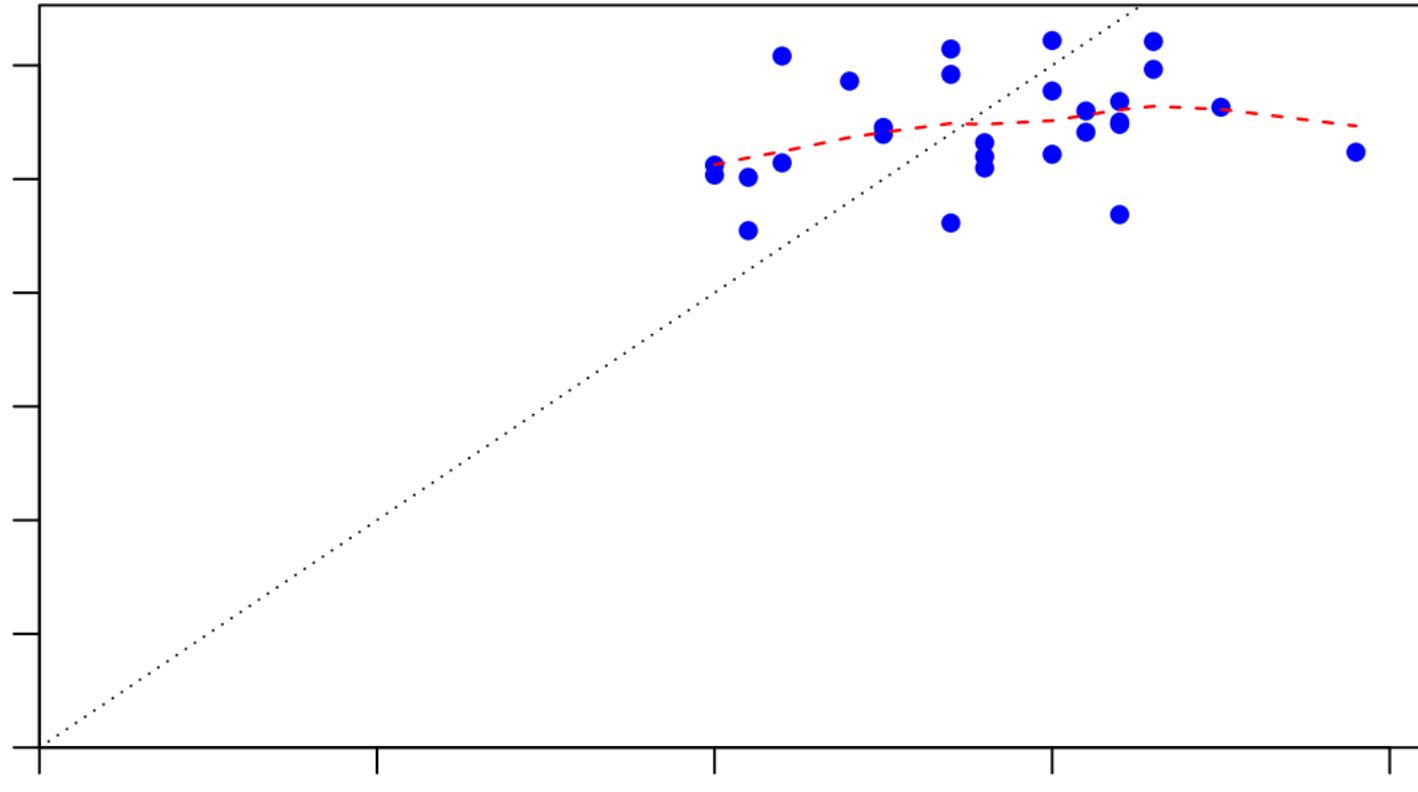


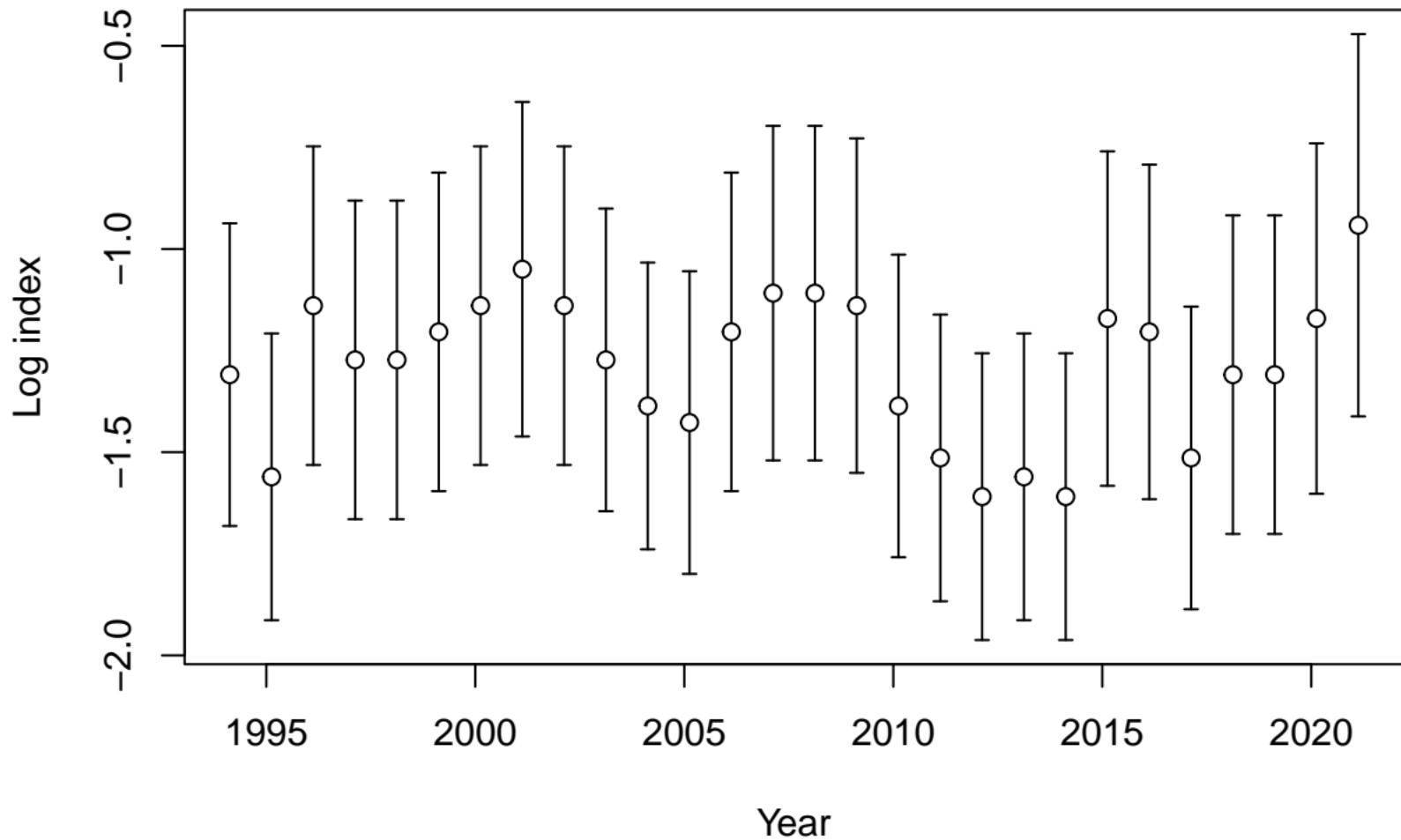
Expected index

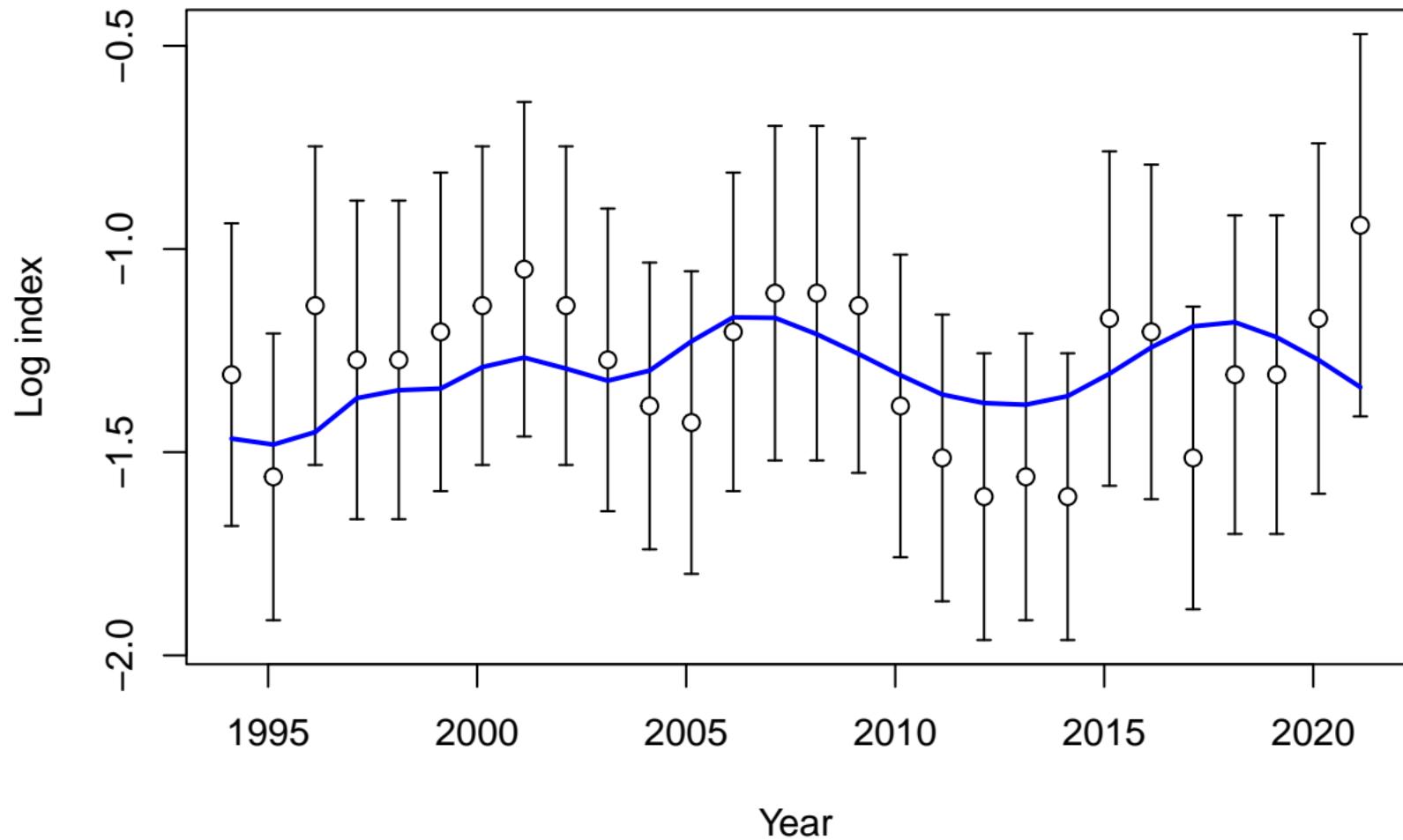
0.30
0.20
0.10
0.00

0.0 0.1 0.2 0.3 0.4

Observed index





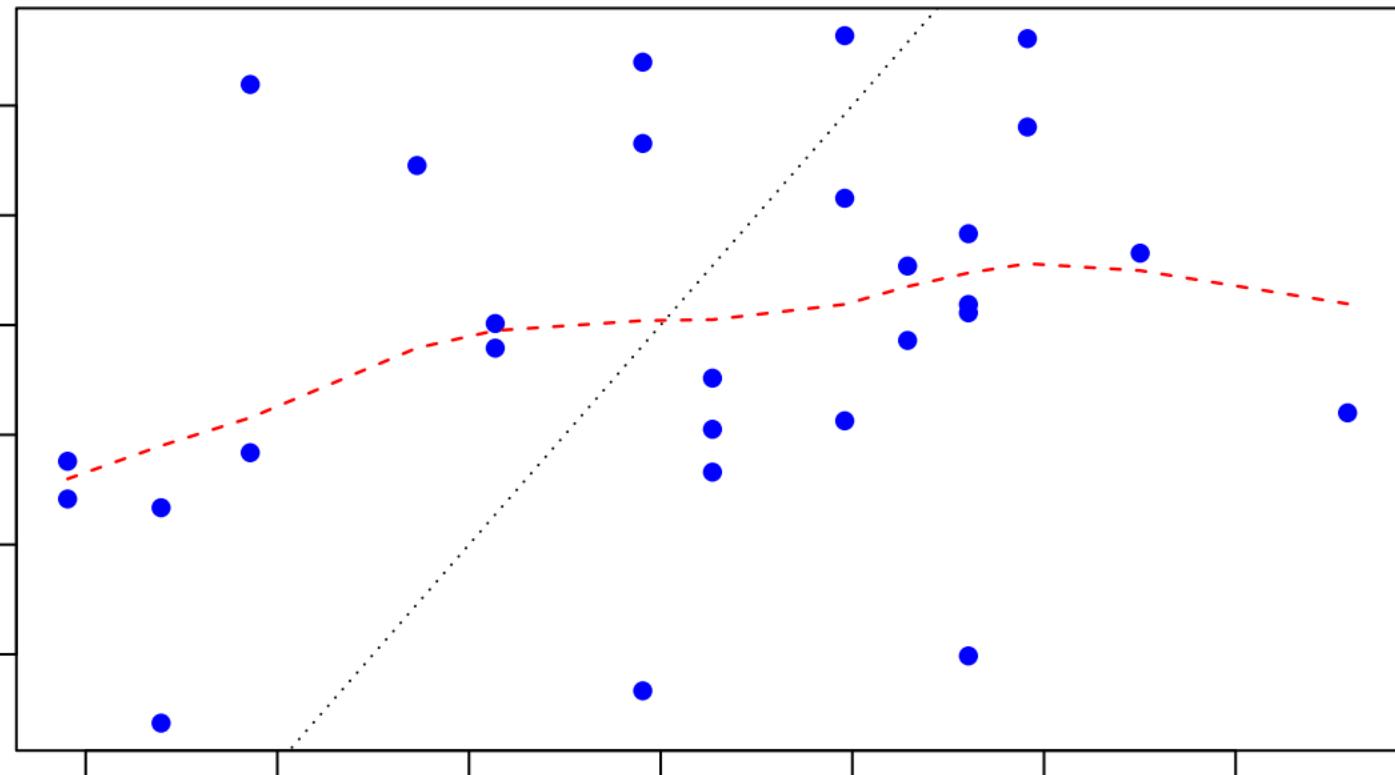


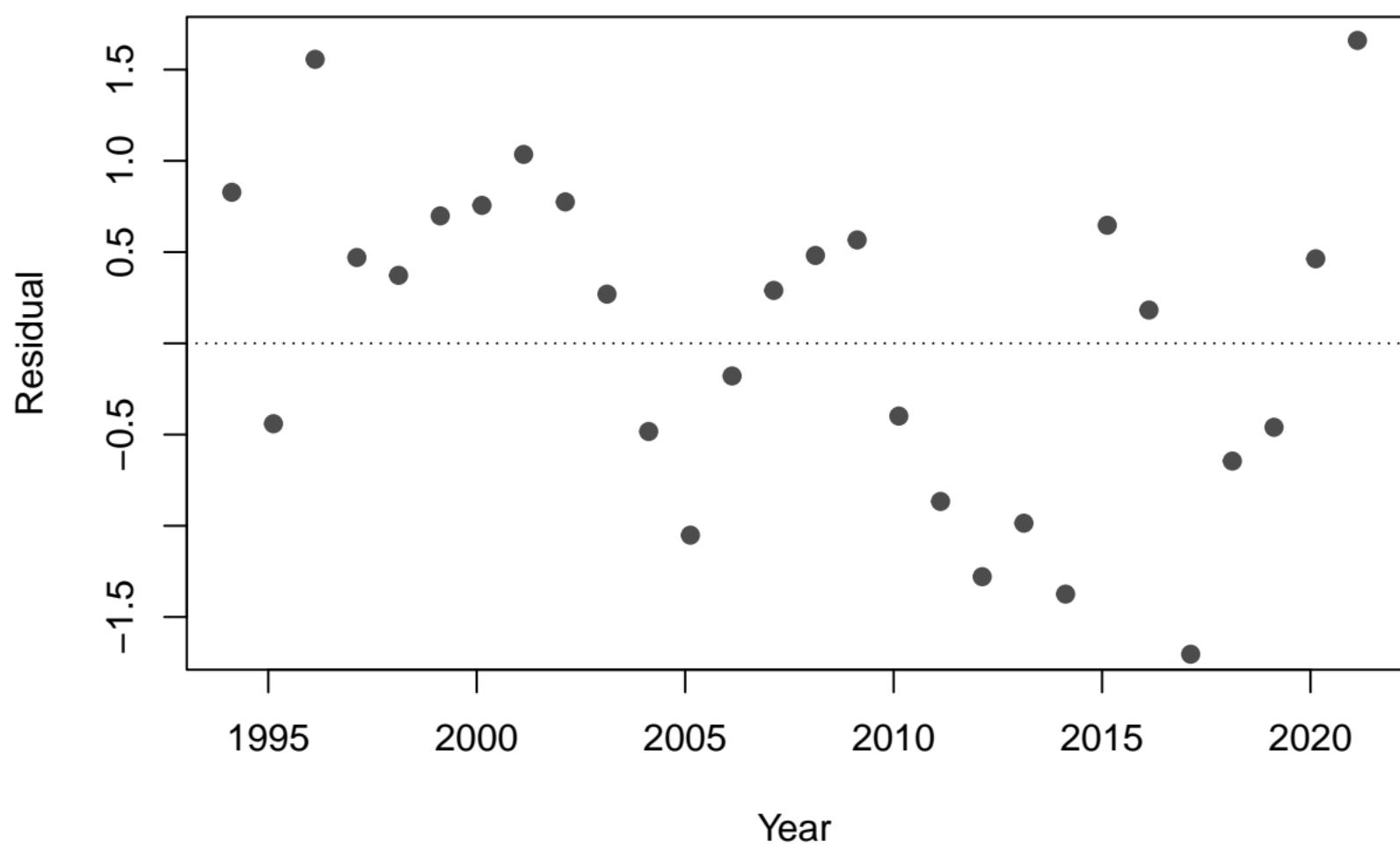
Log expected index

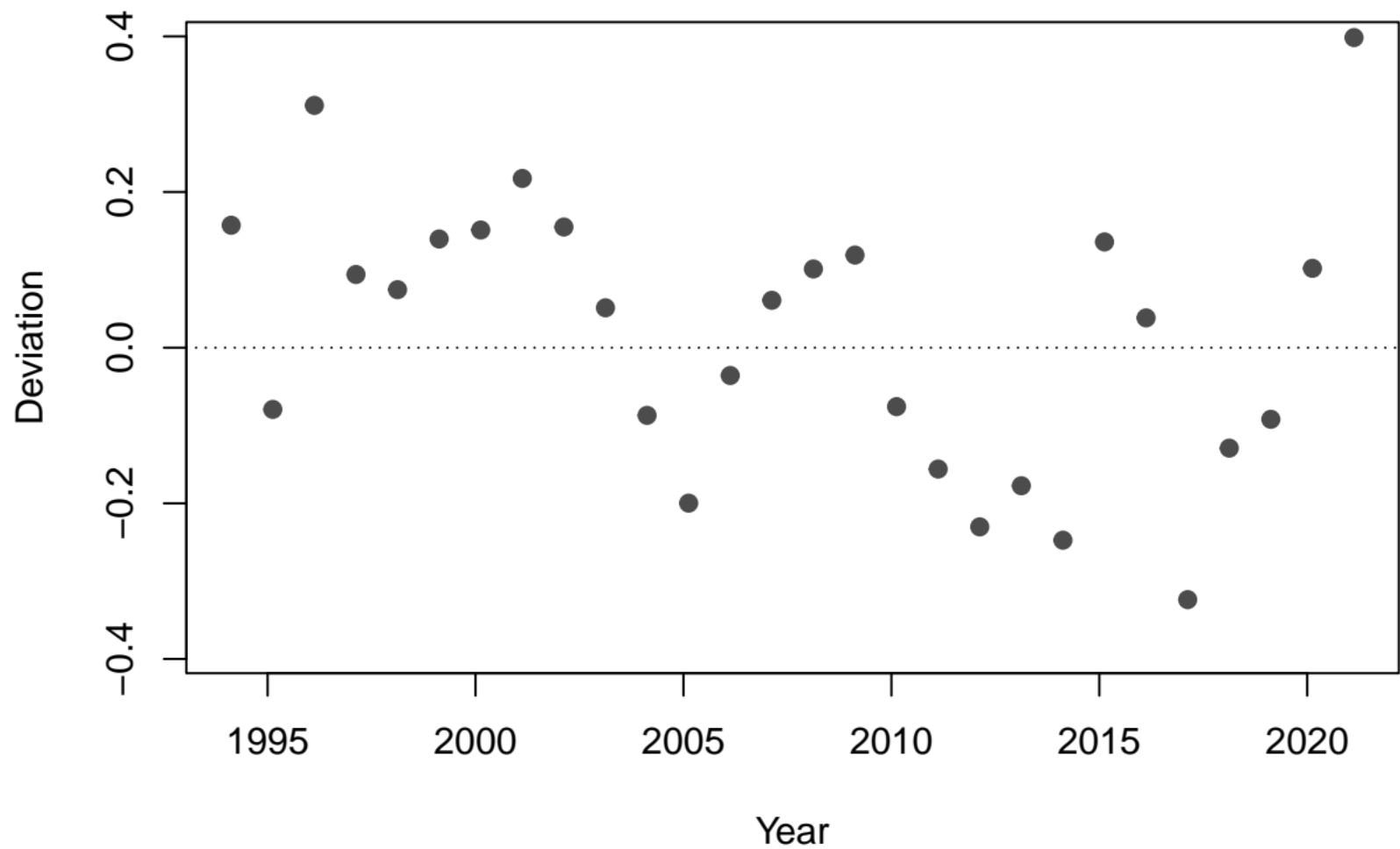
-1.45 -1.35 -1.25

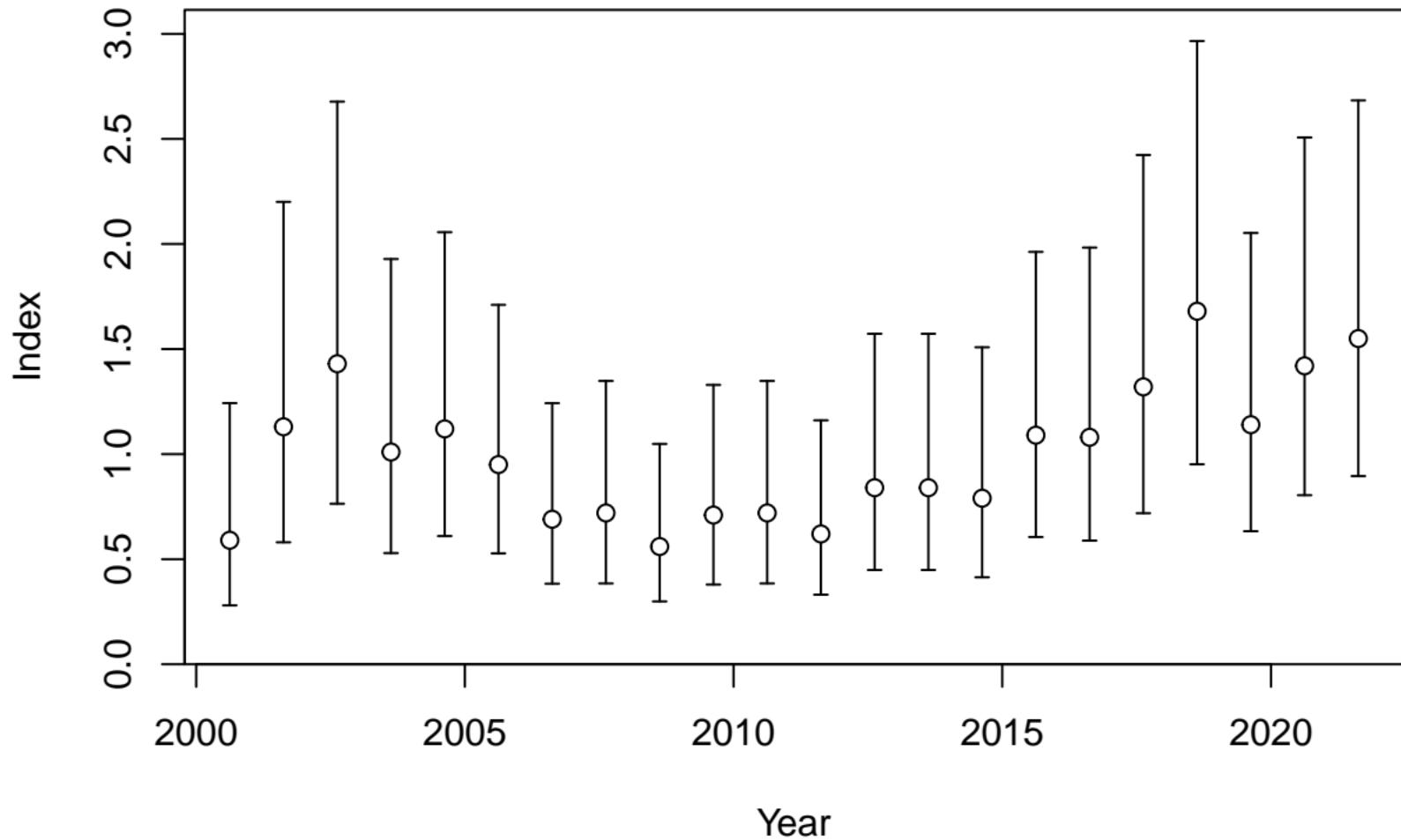
-1.6 -1.5 -1.4 -1.3 -1.2 -1.1 -1.0

Log observed index

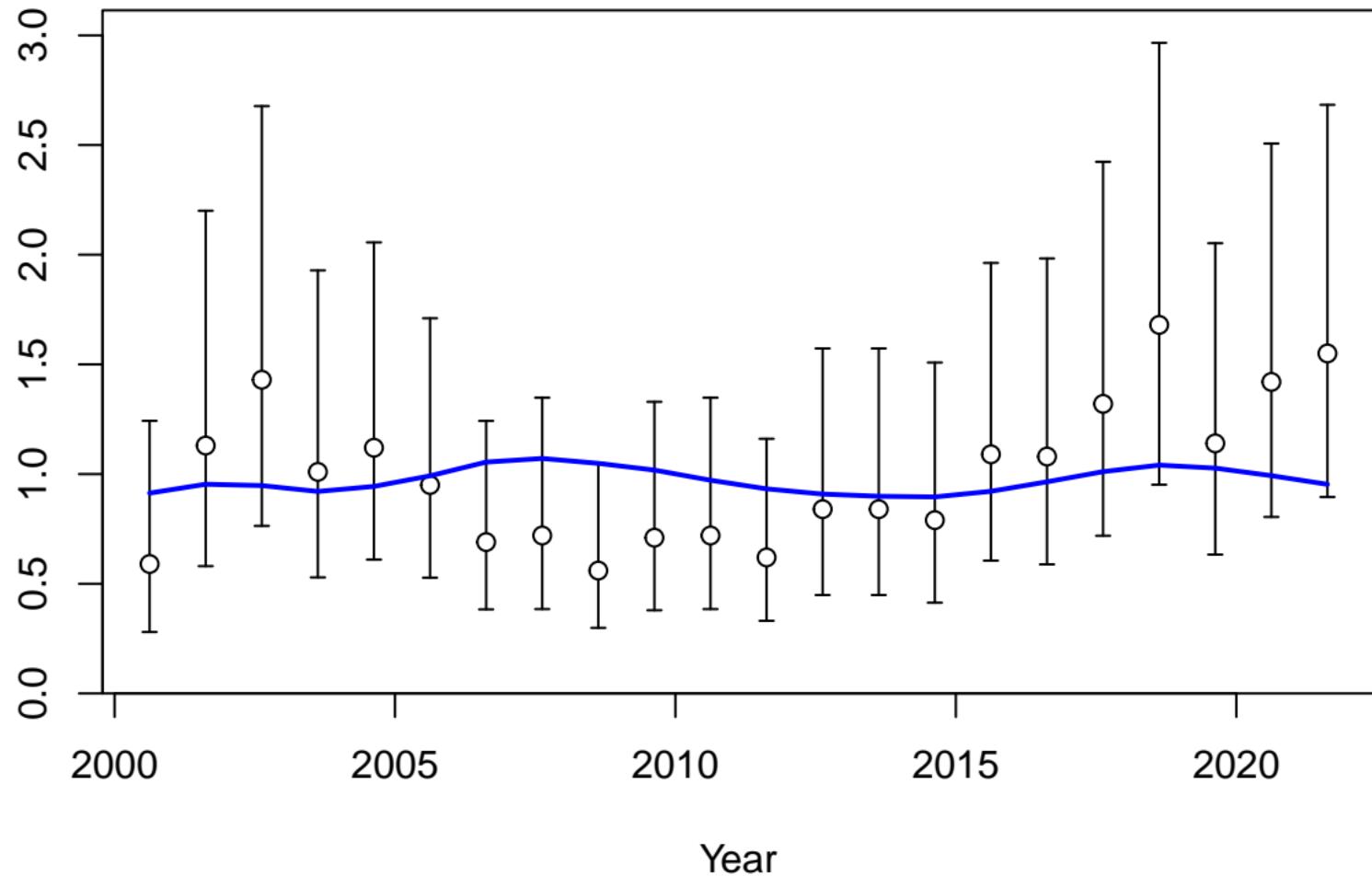








Index



Expected index

1.0
0.8
0.6
0.4
0.2
0.0

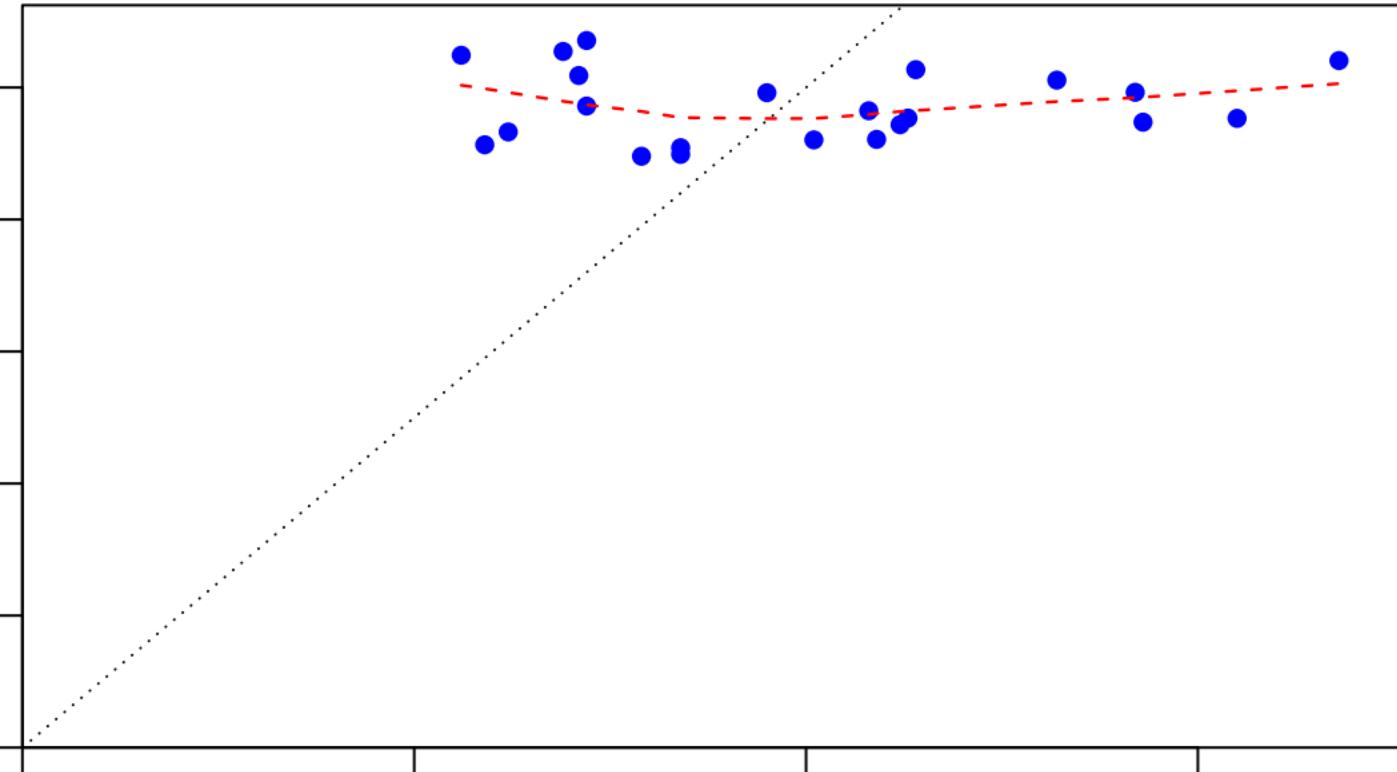
0.0

0.5

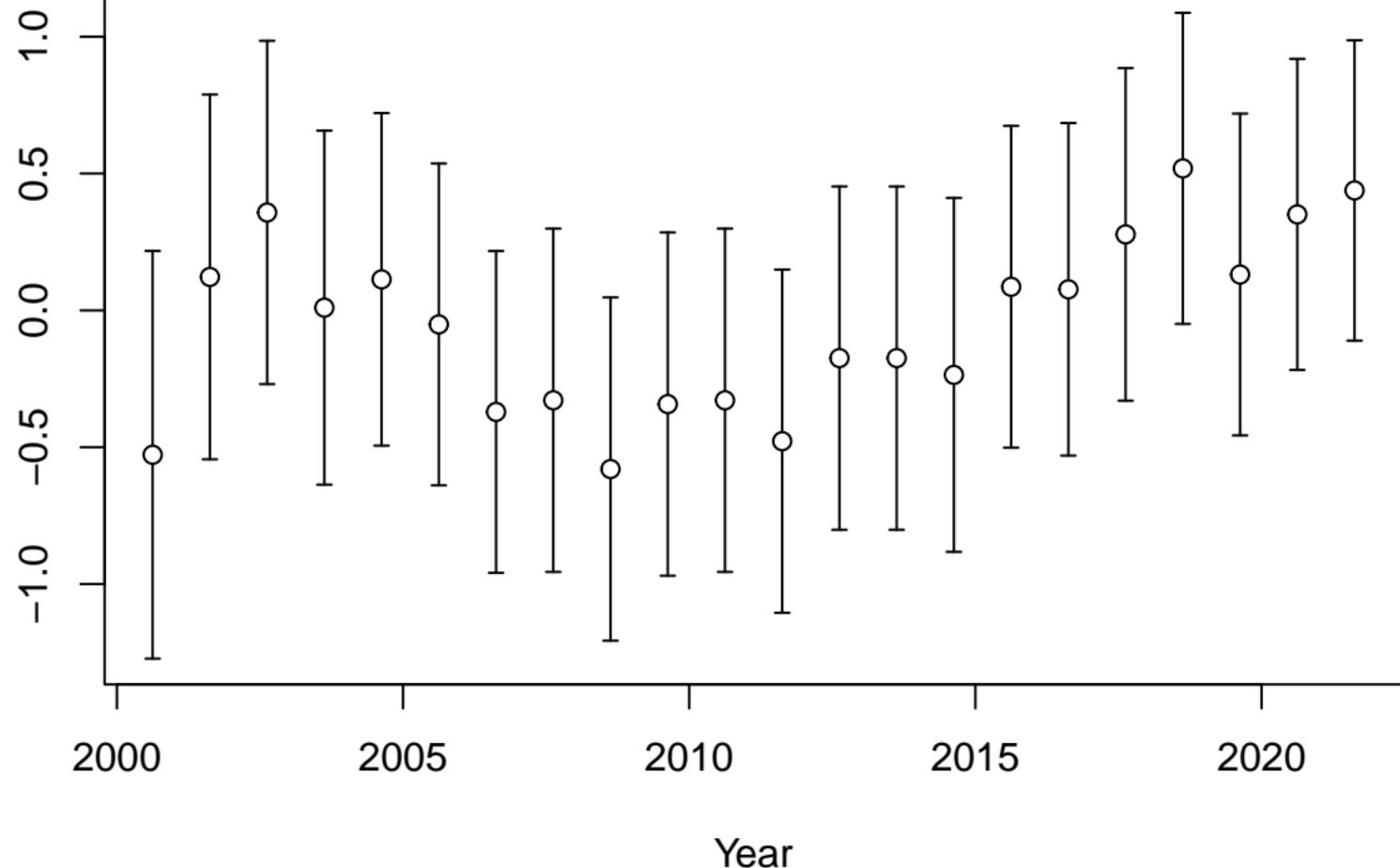
1.0

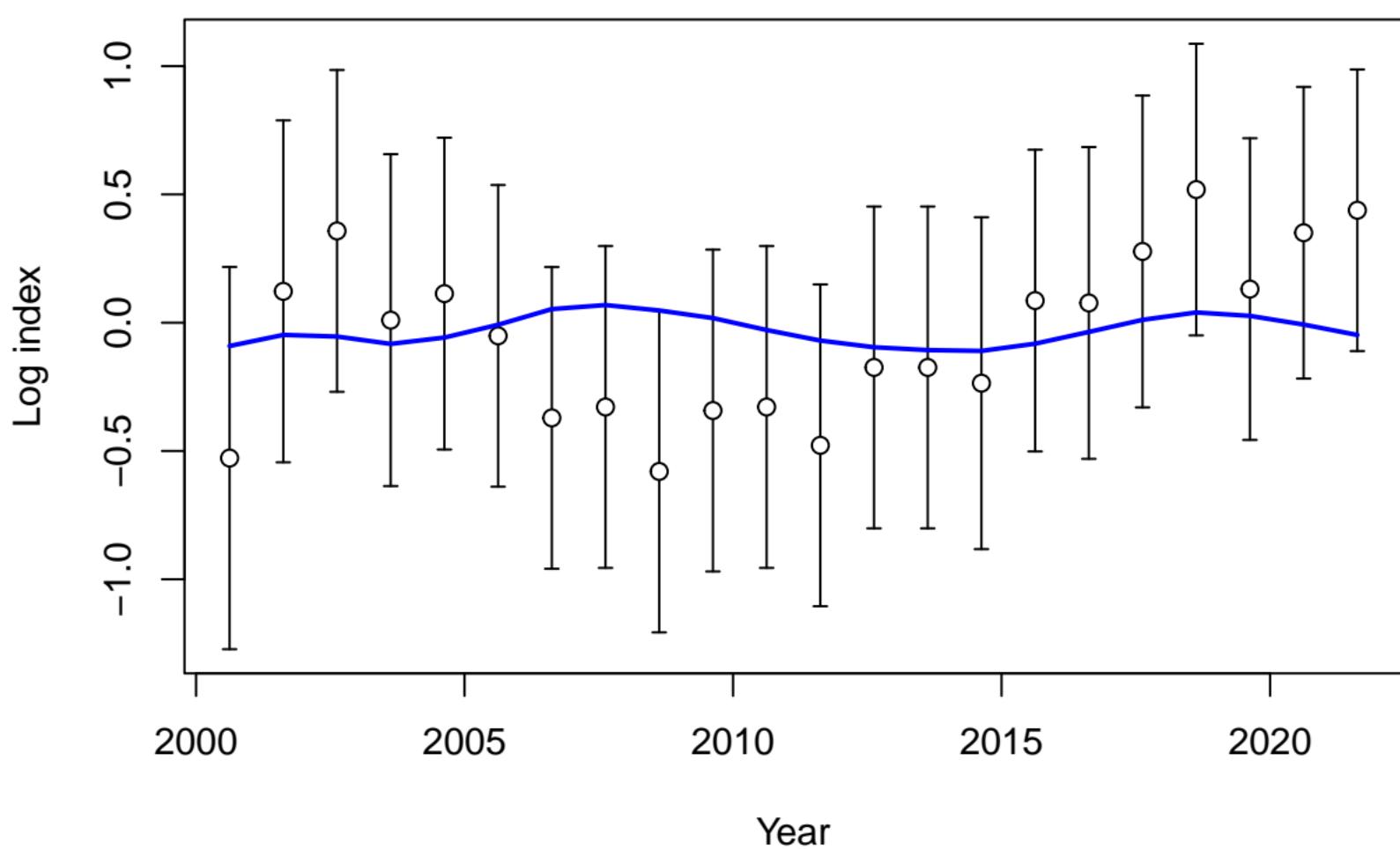
1.5

Observed index



Log index



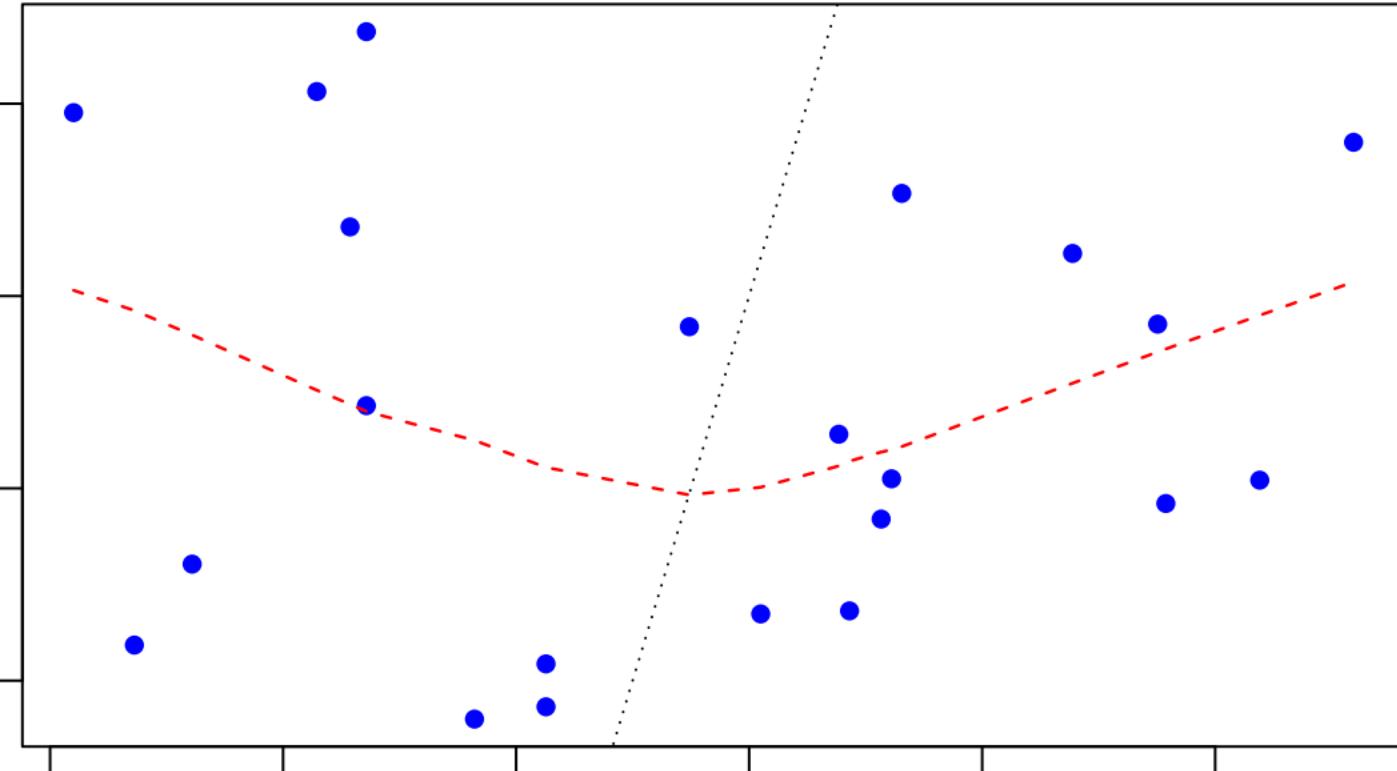


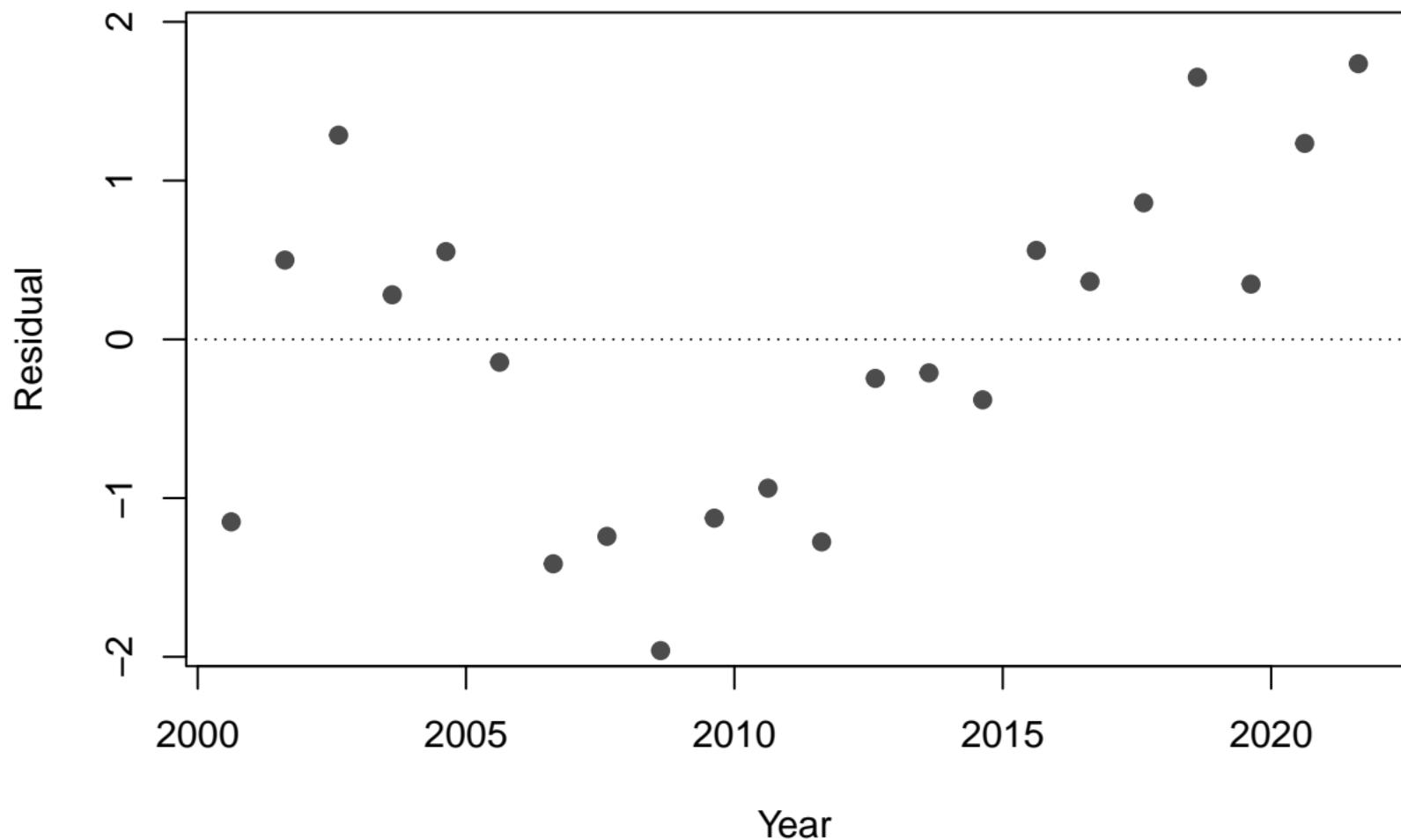
Log expected index

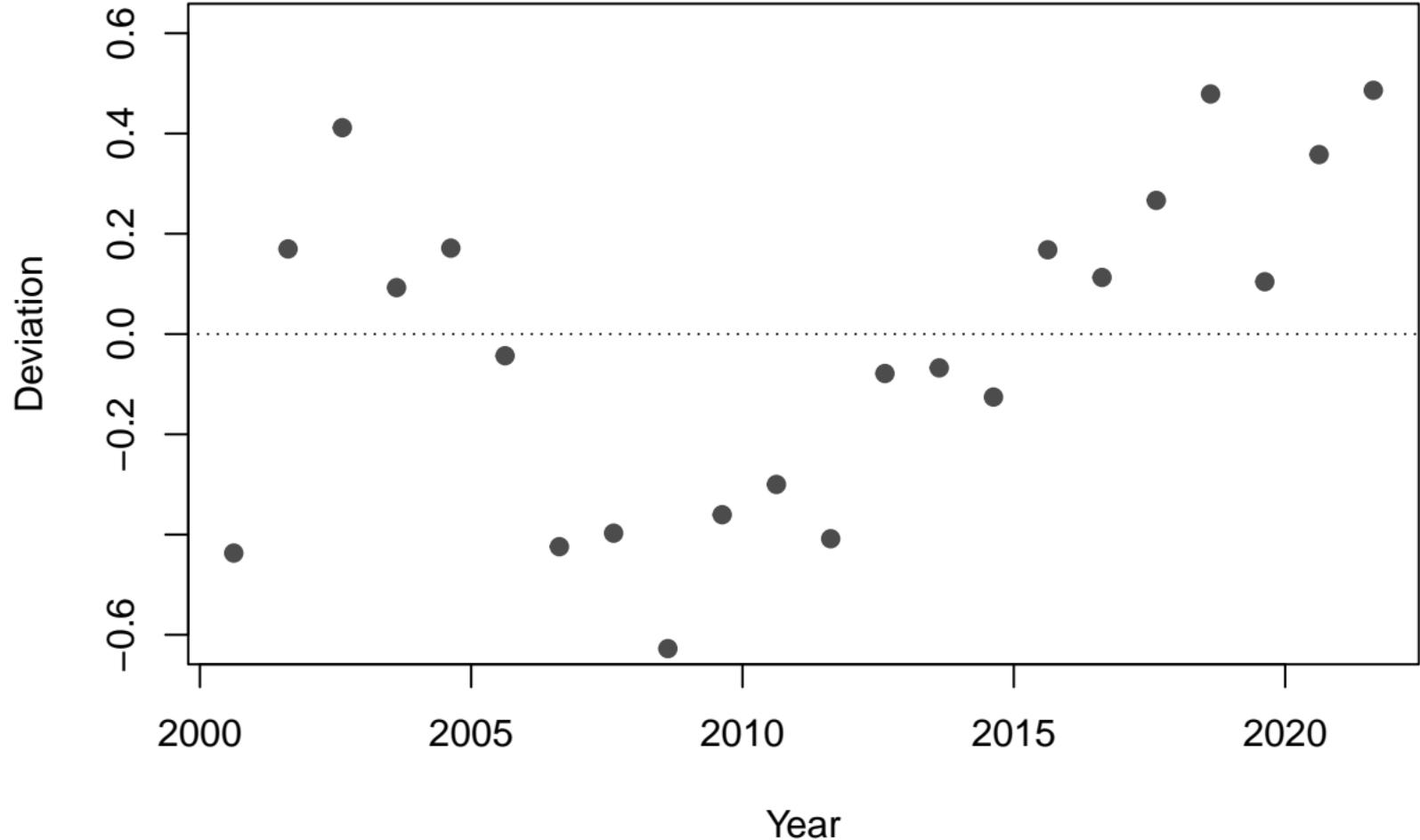
-0.10
-0.05
0.00
0.05

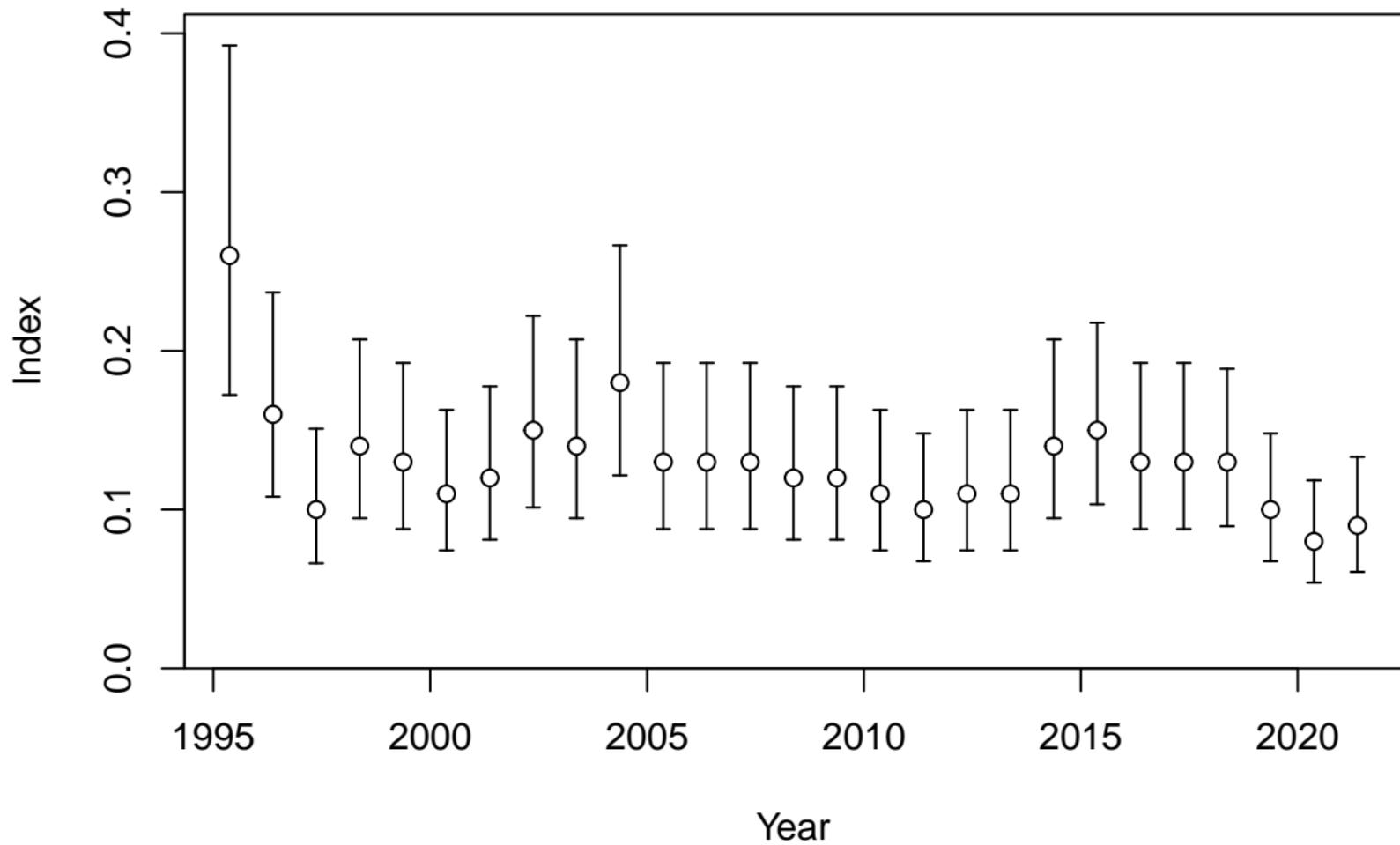
-0.6 -0.4 -0.2 0.0 0.2 0.4

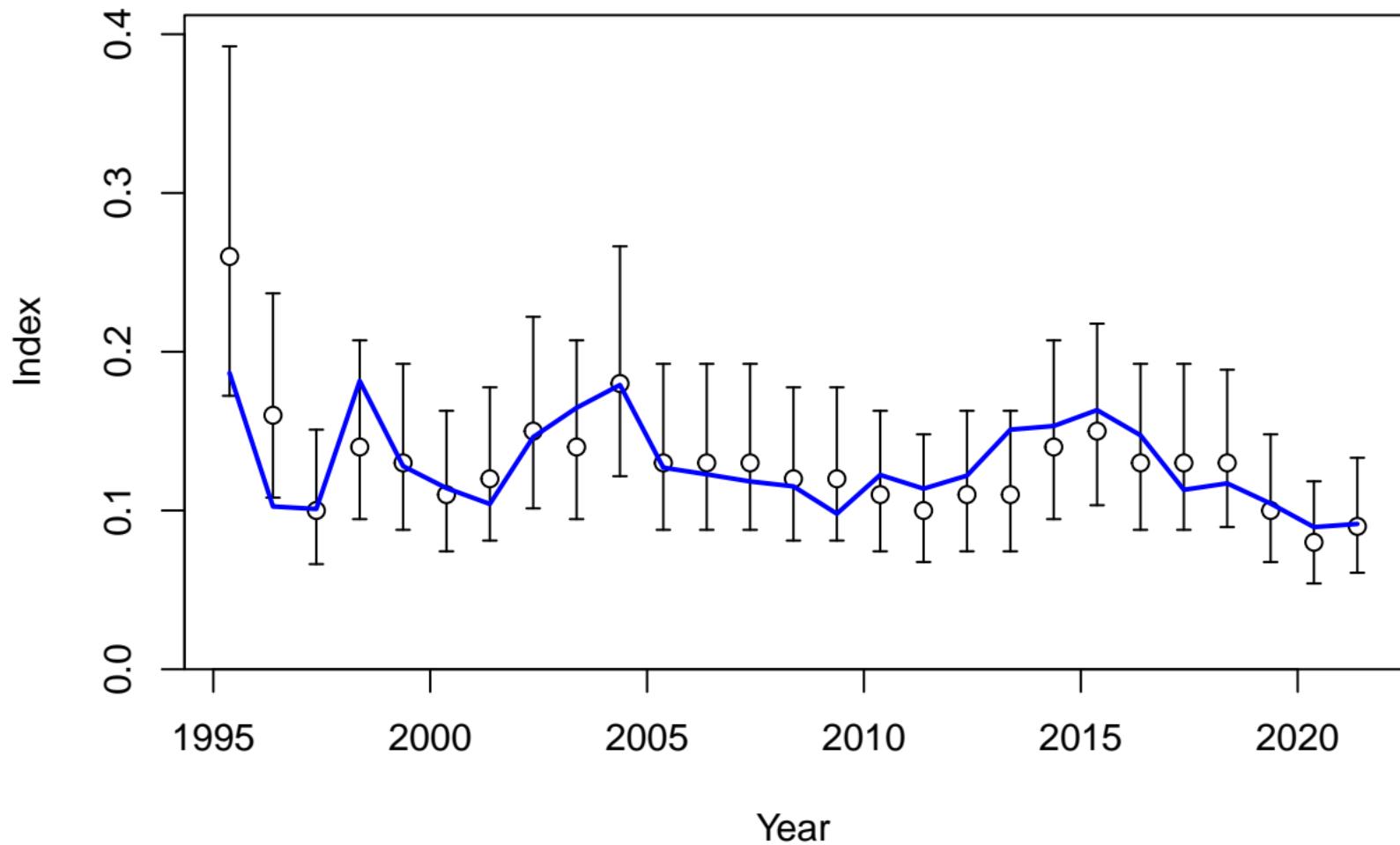
Log observed index









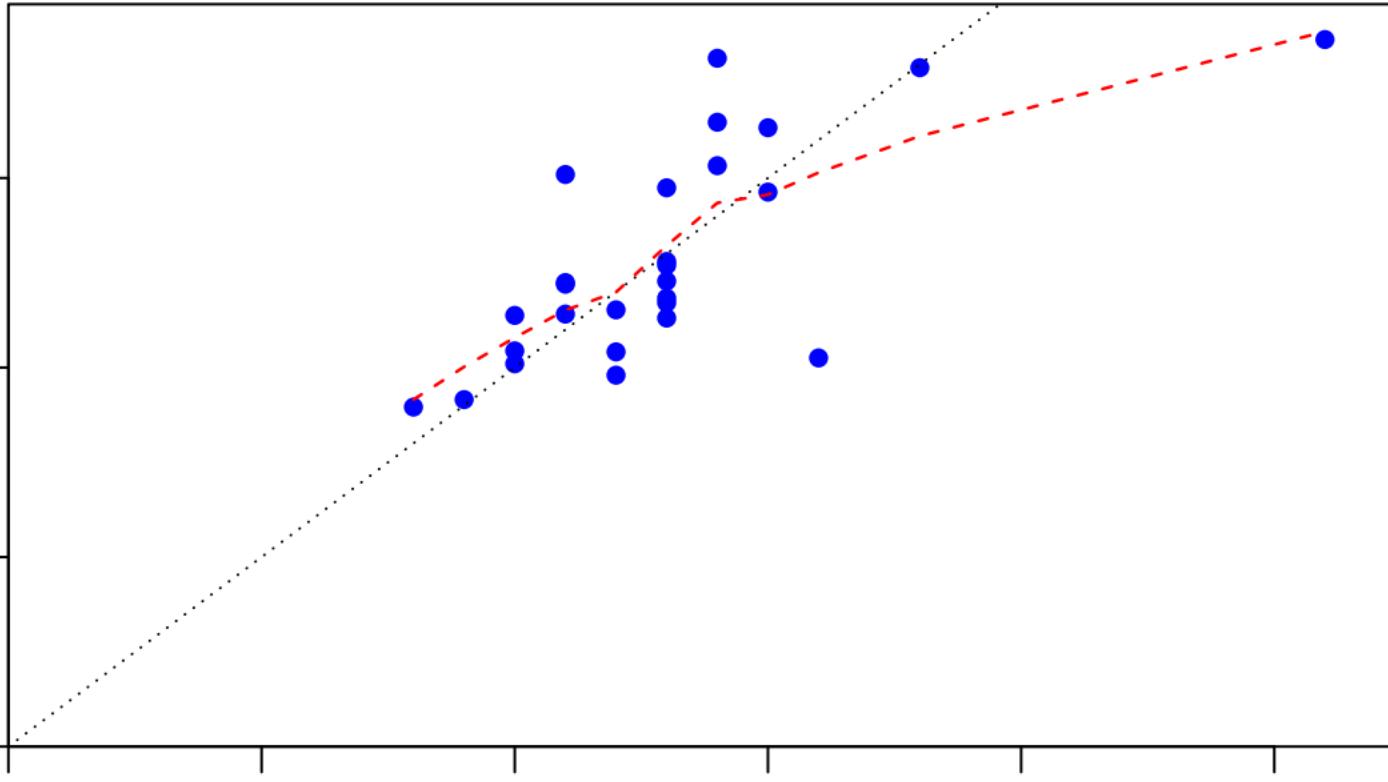


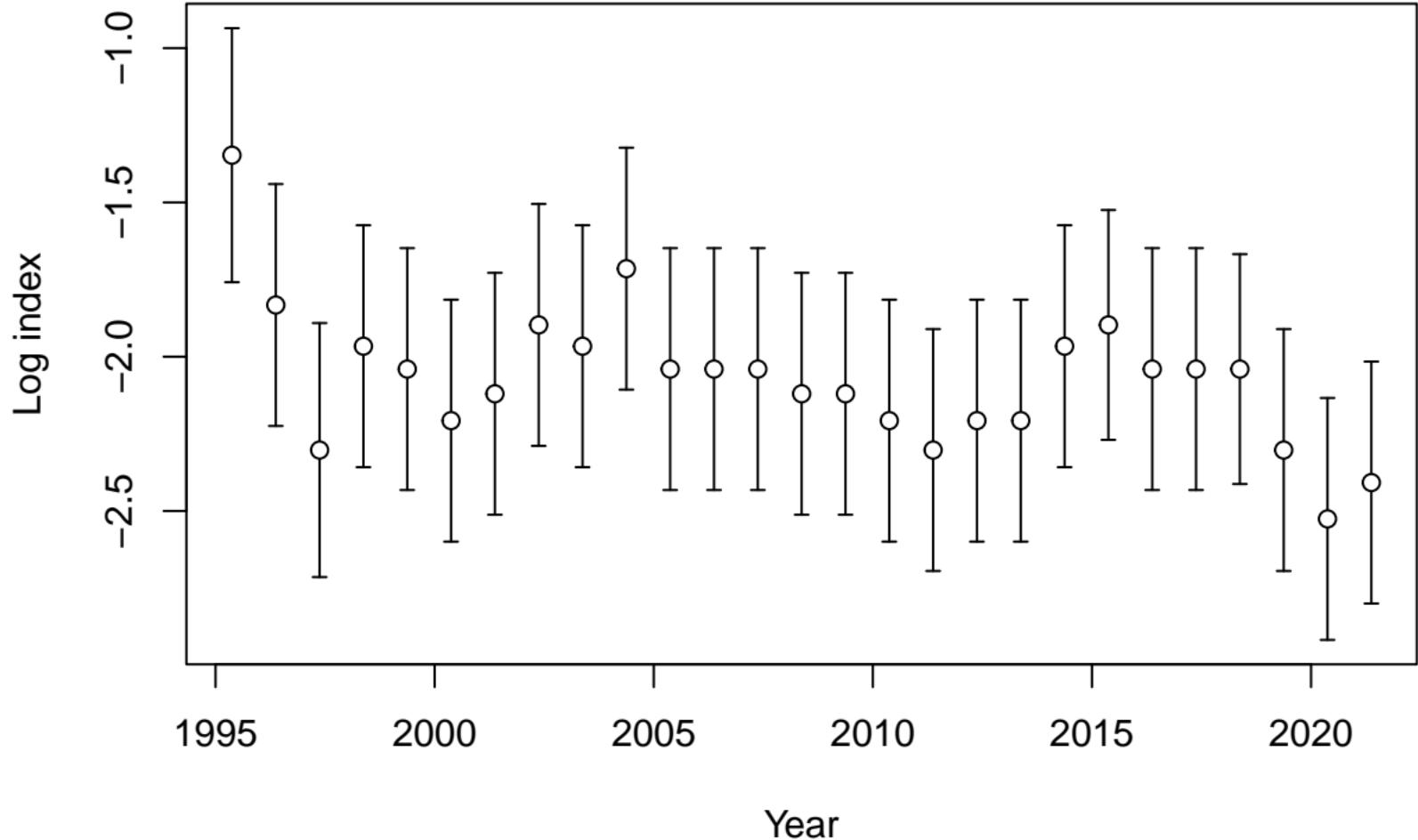
Expected index

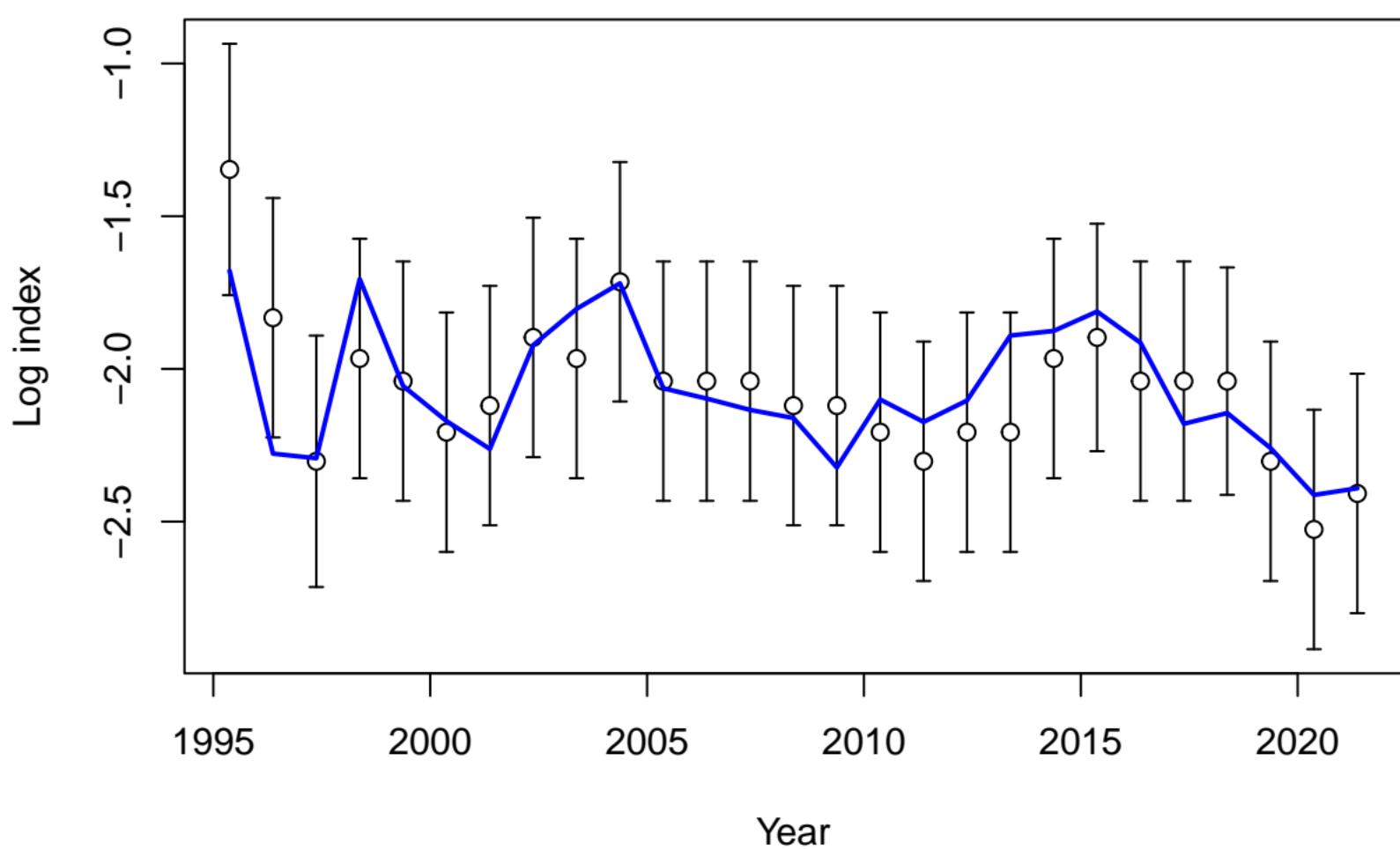
0.00 0.05 0.10 0.15

0.00 0.05 0.10 0.15 0.20 0.25

Observed index





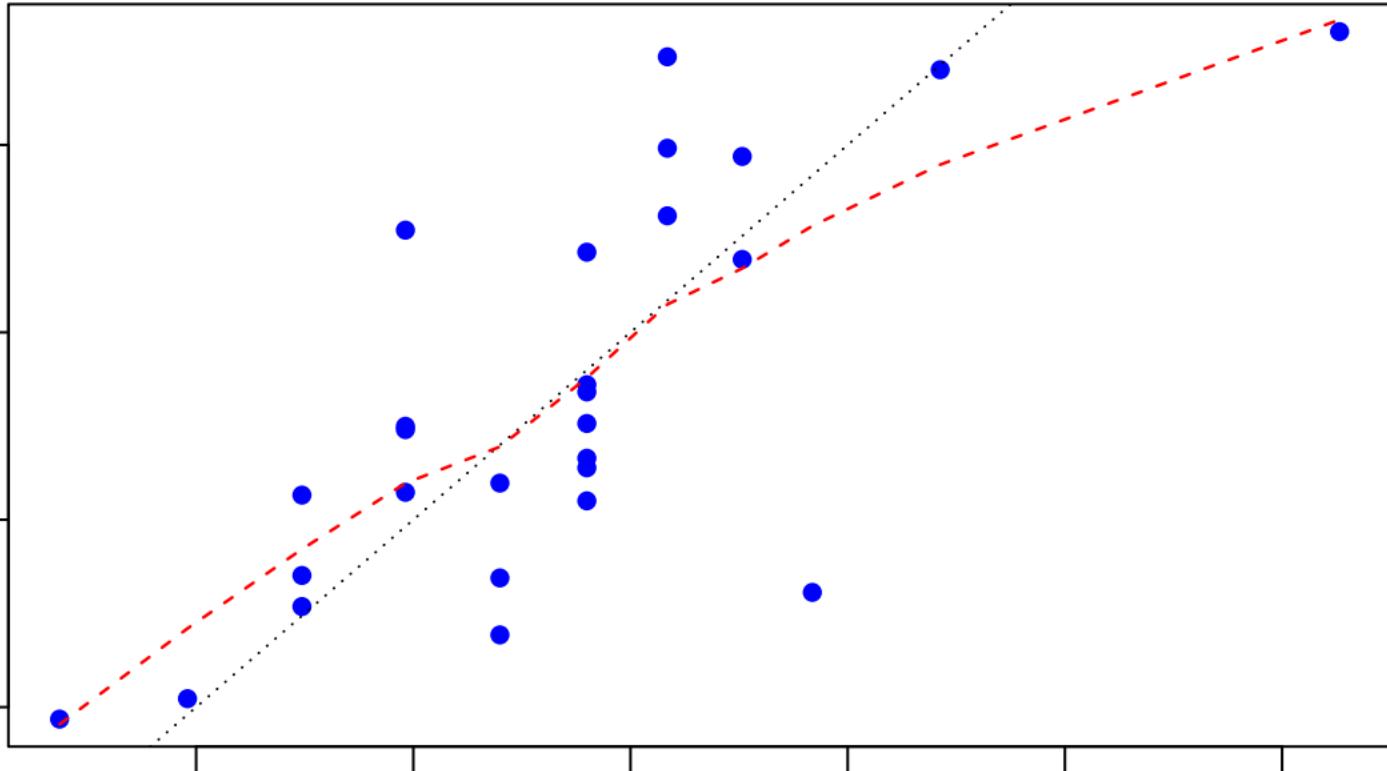


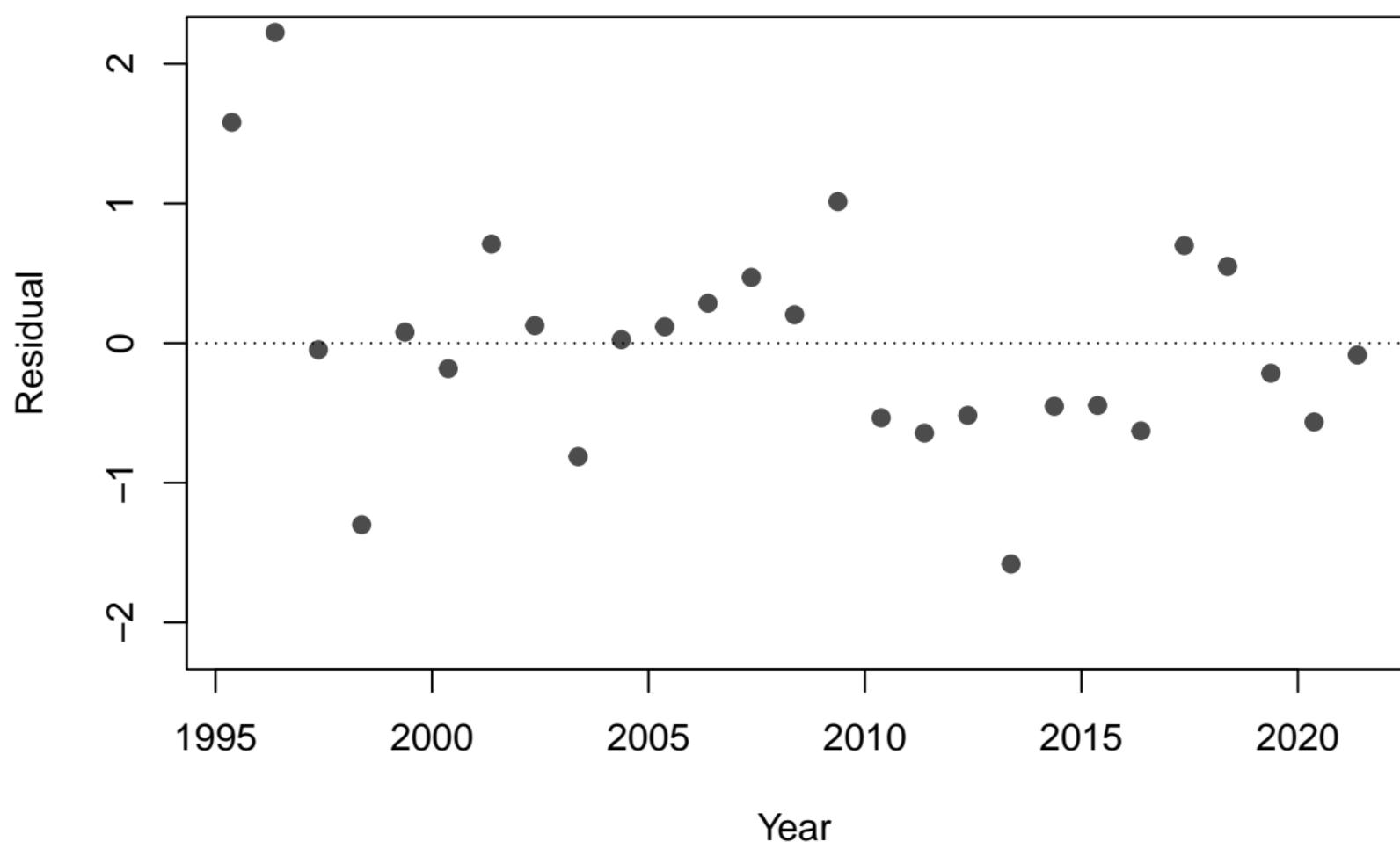
Log expected index

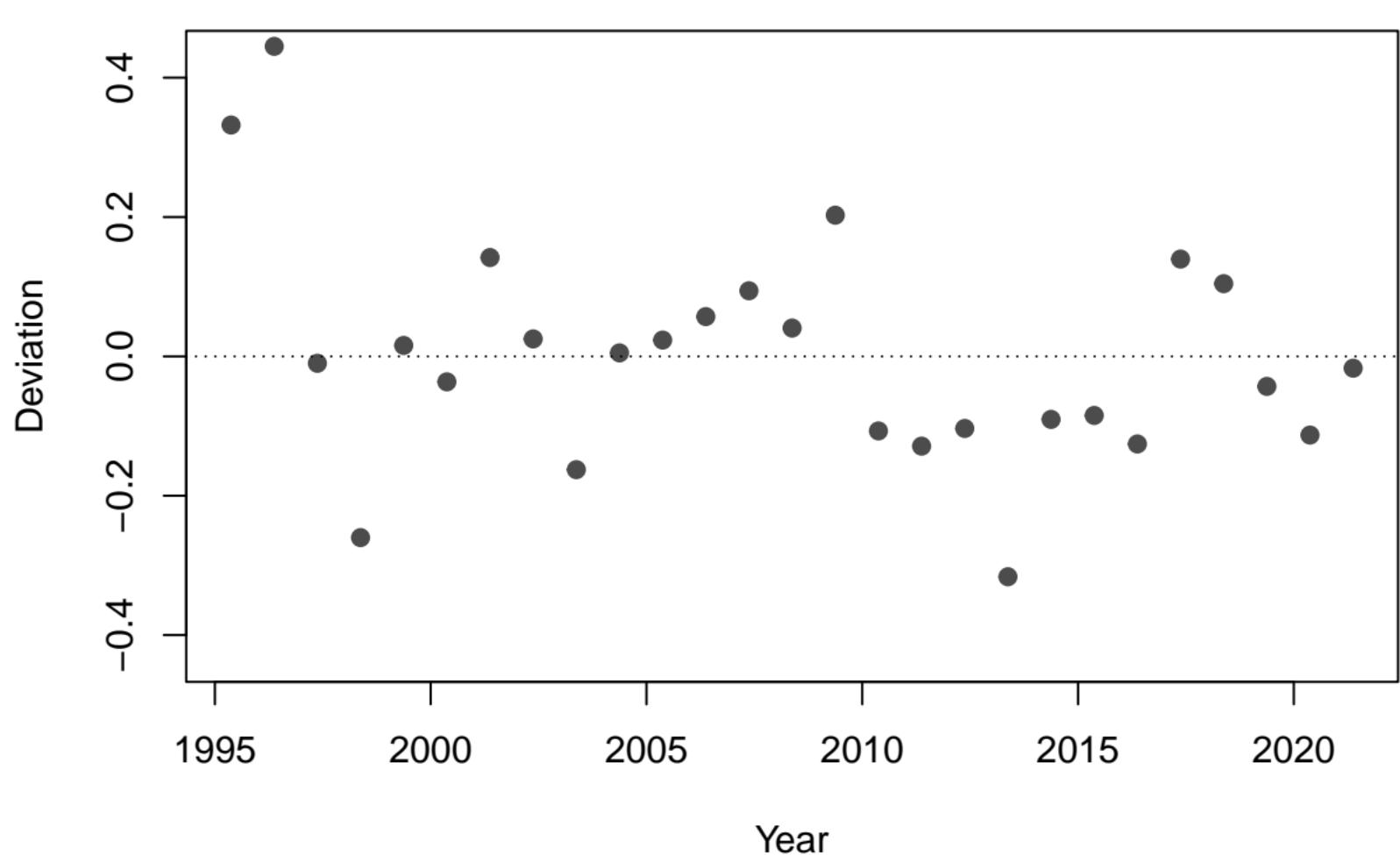
-2.4
-2.2
-2.0
-1.8

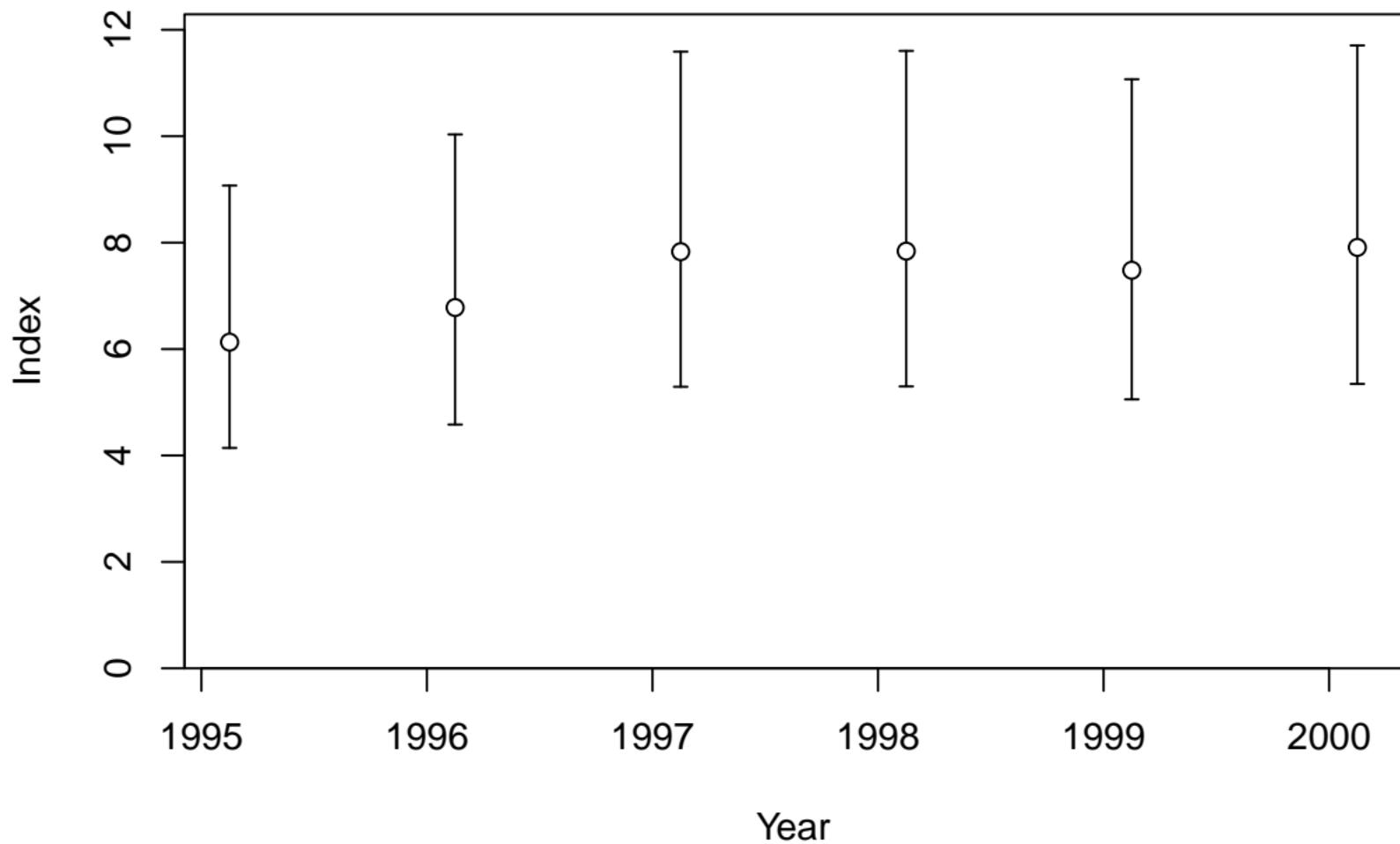
-2.4 -2.2 -2.0 -1.8 -1.6 -1.4

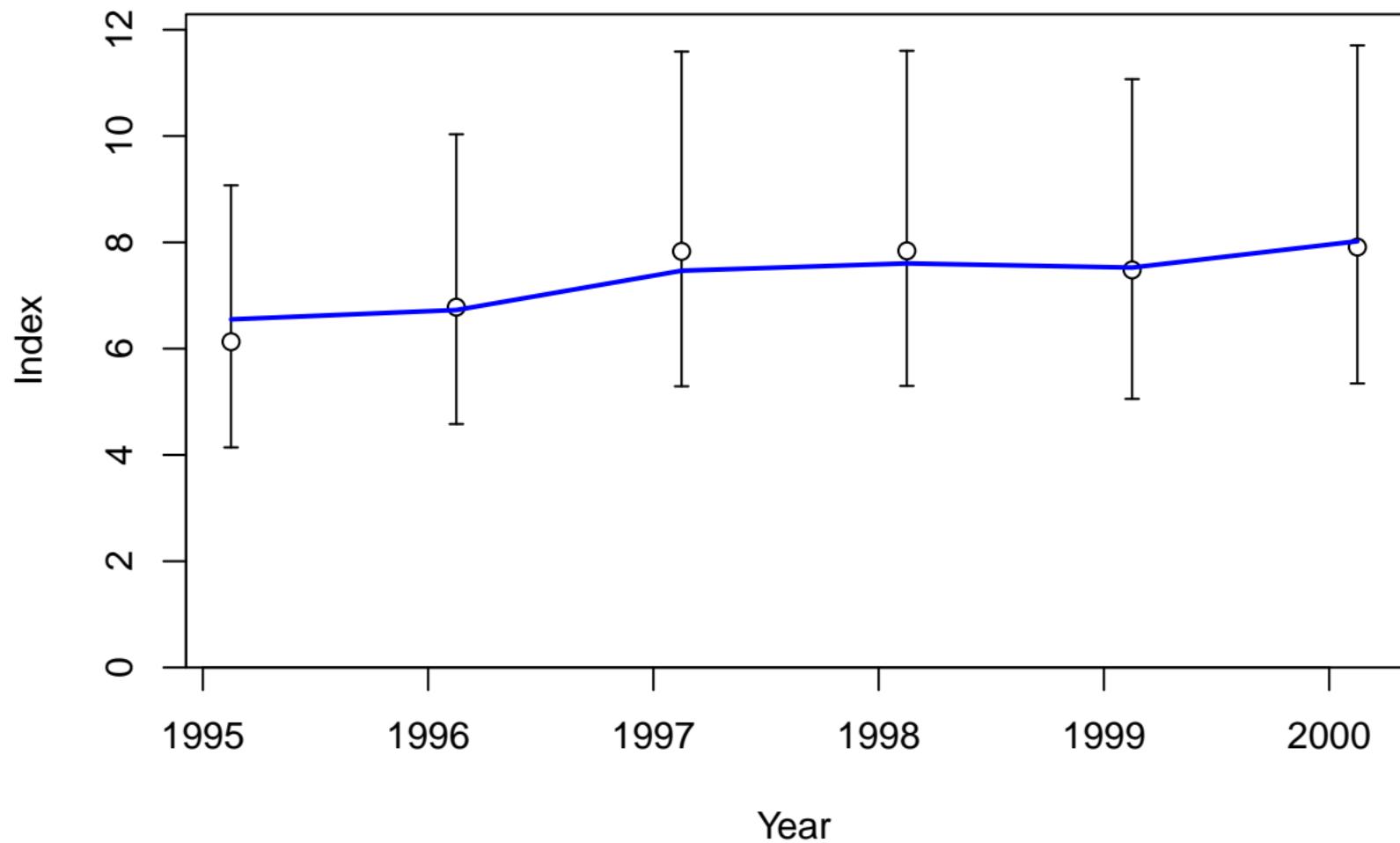
Log observed index



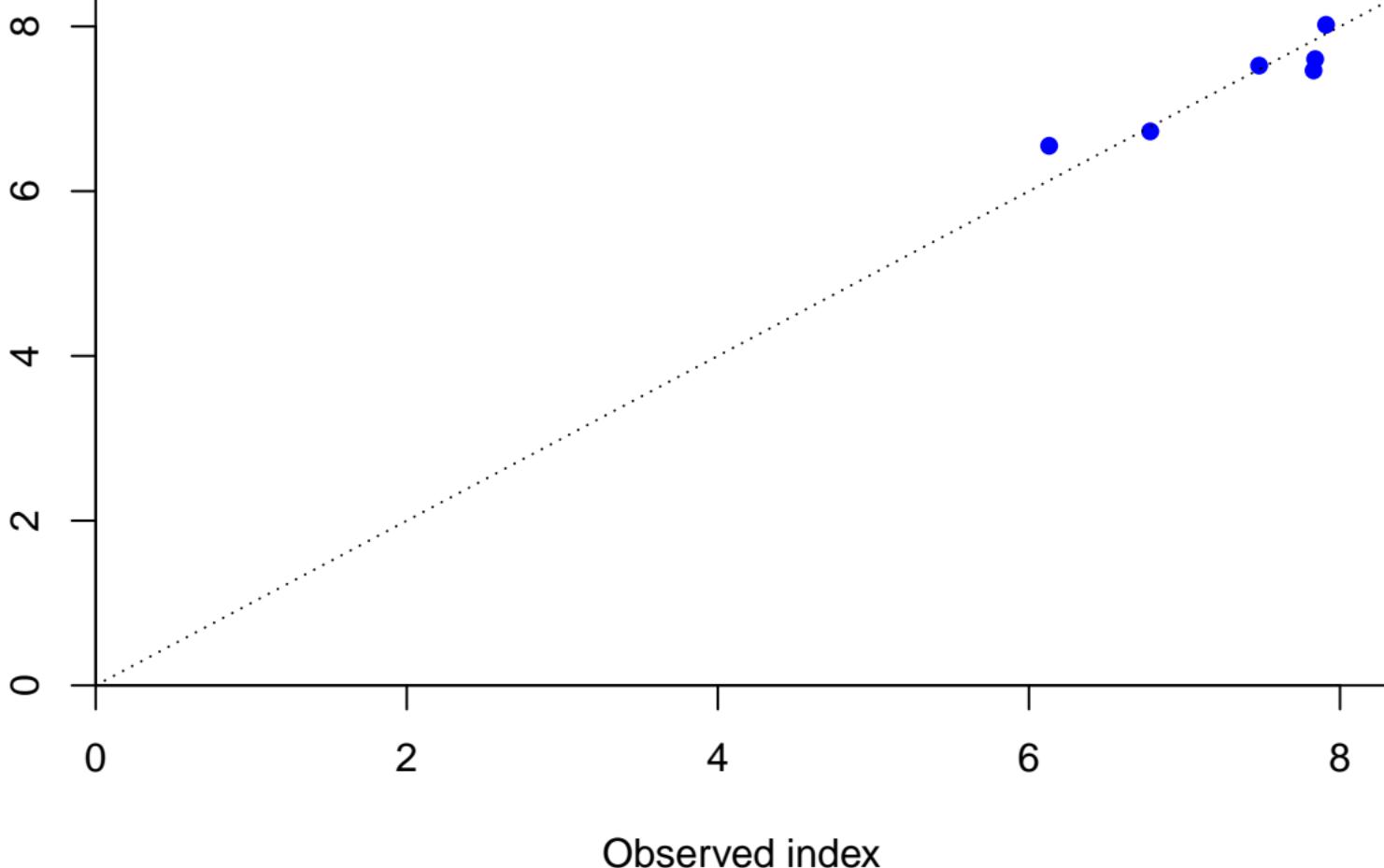






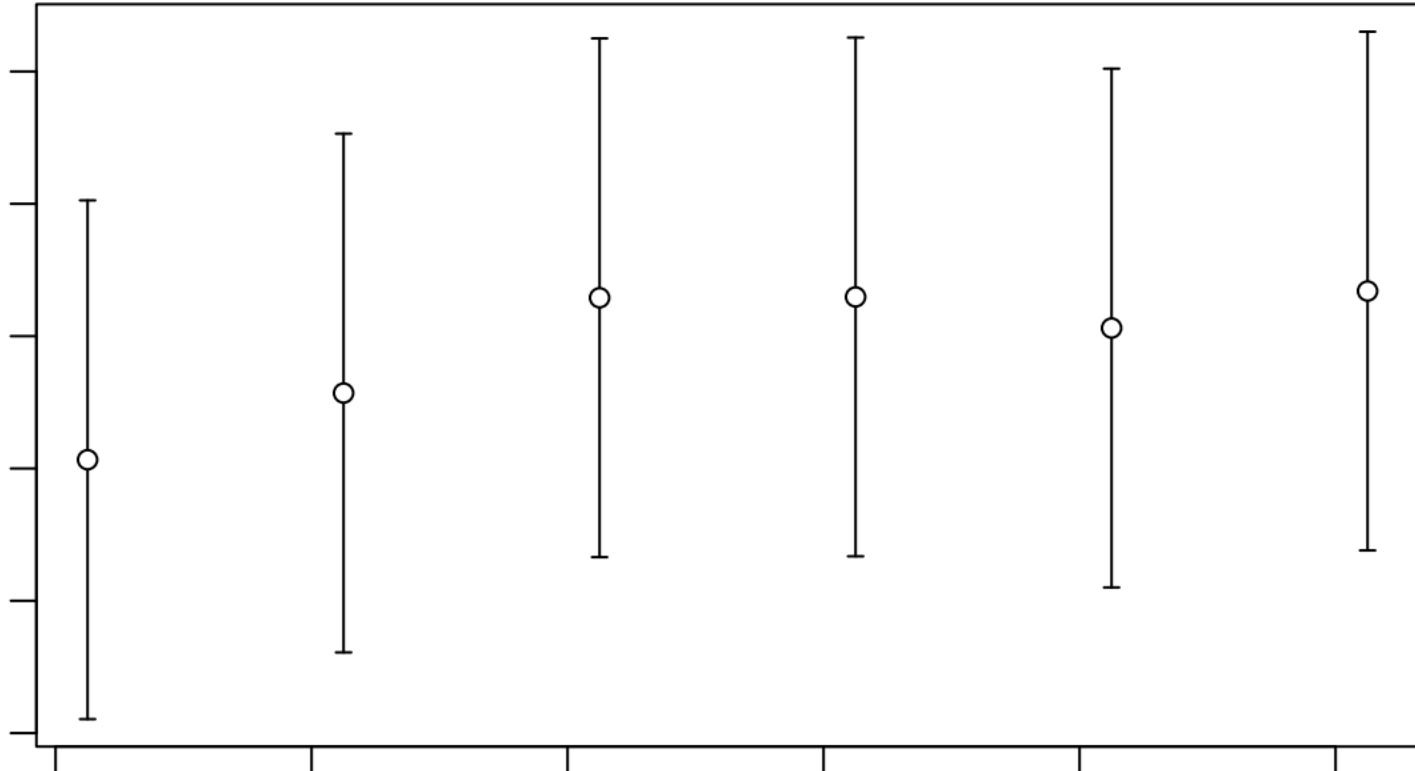


Expected index



Log index

1.4 1.6 1.8 2.0 2.2 2.4



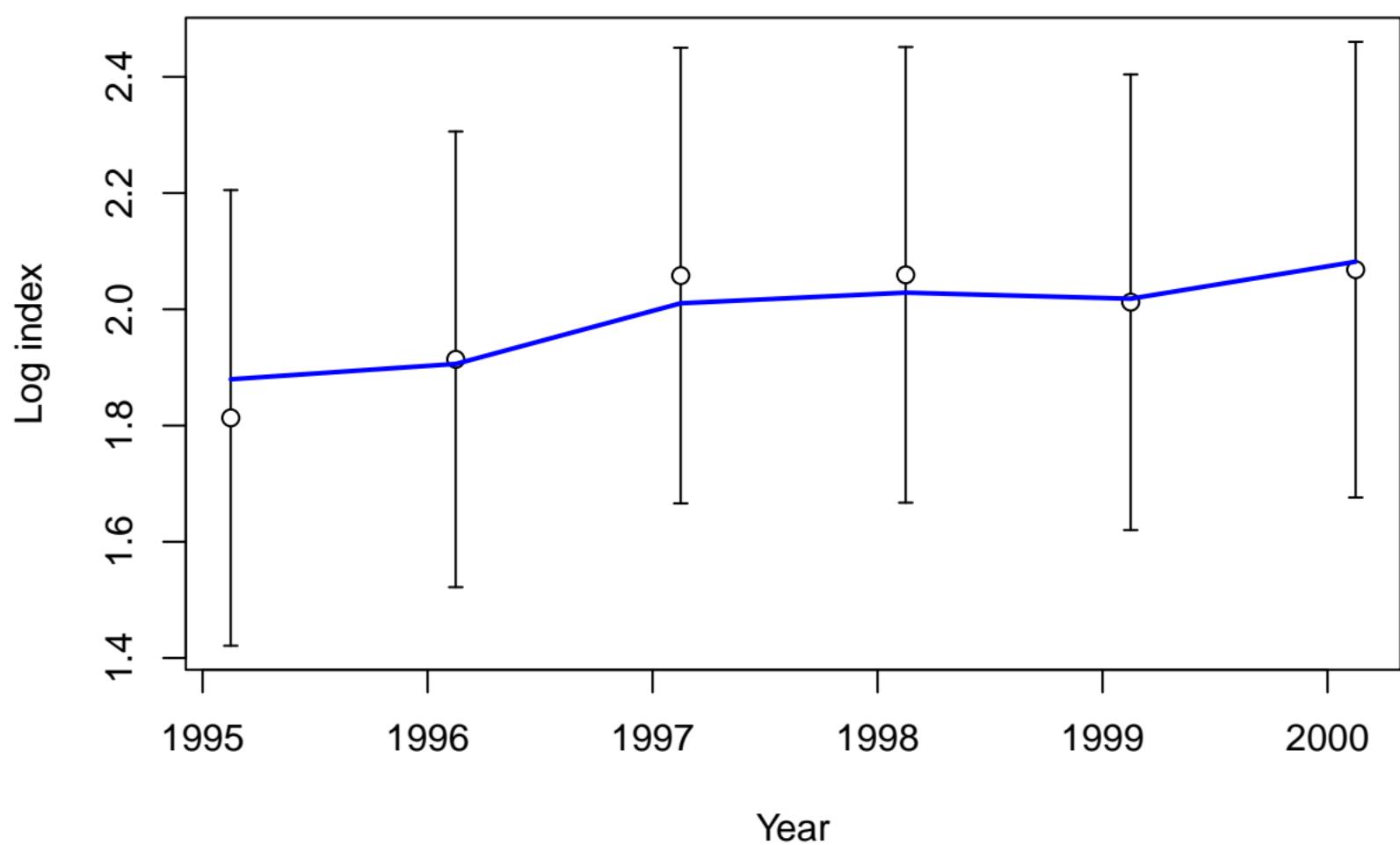
Year

Log index

2.4
2.2
2.0
1.8
1.6
1.4

1995 1996 1997 1998 1999 2000

Year



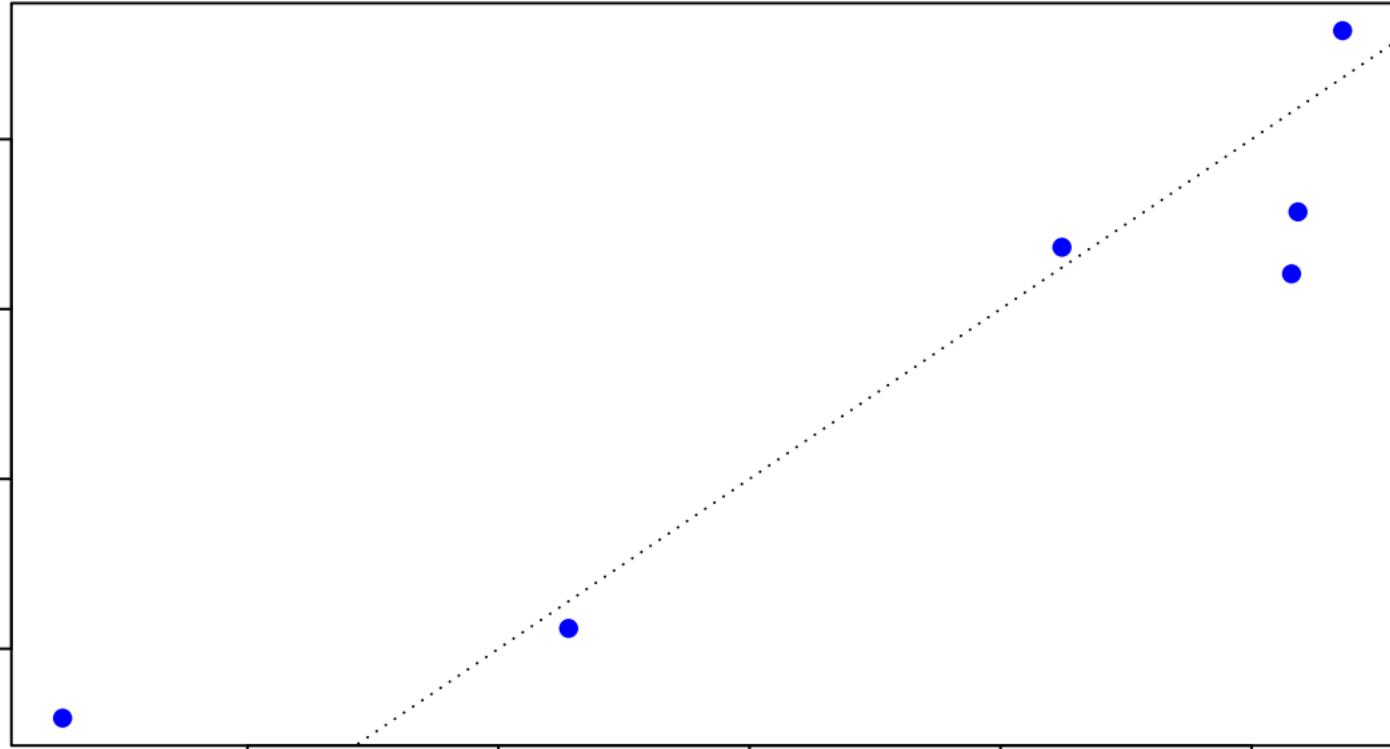
Log expected index

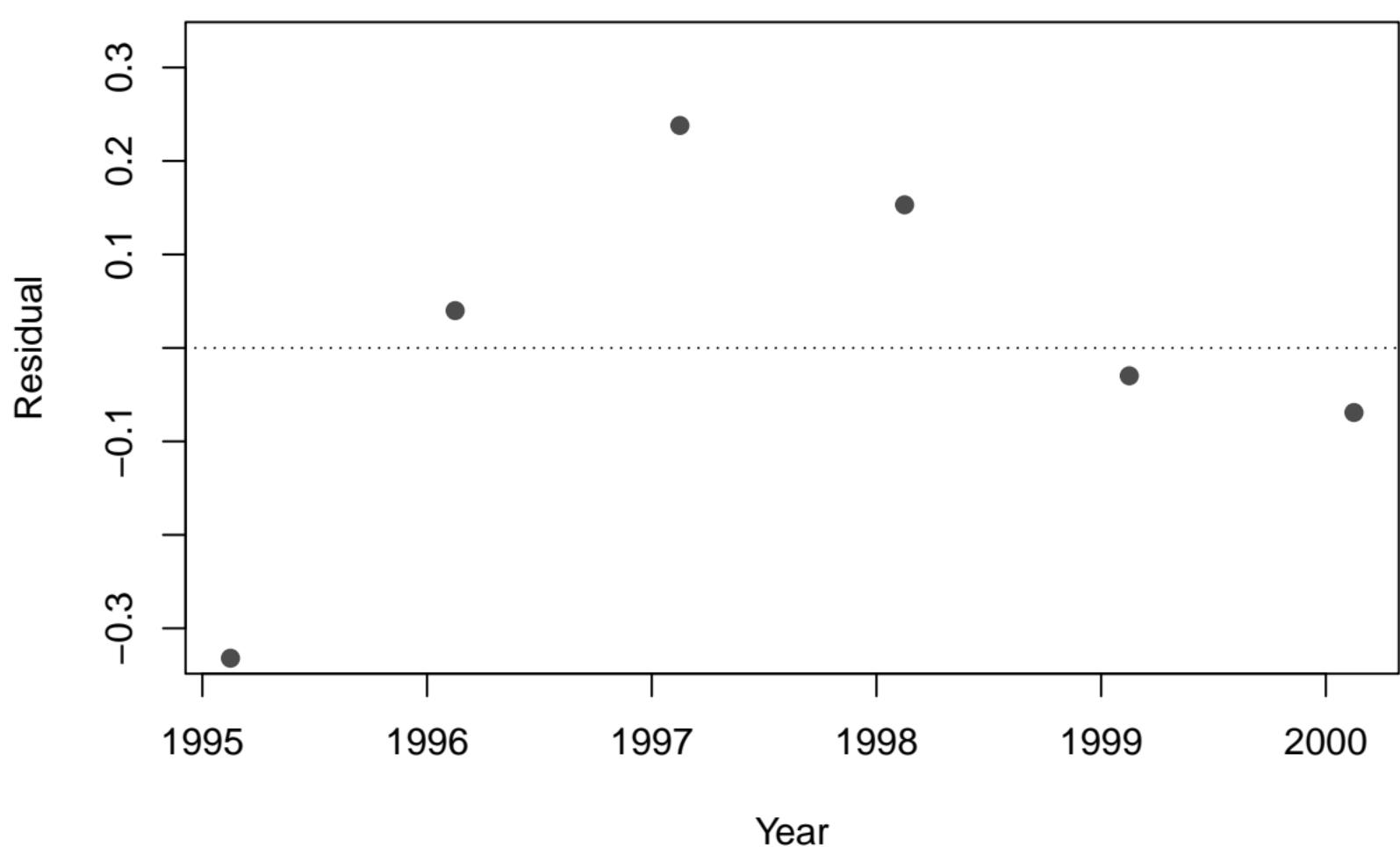
2.05
2.00
1.95

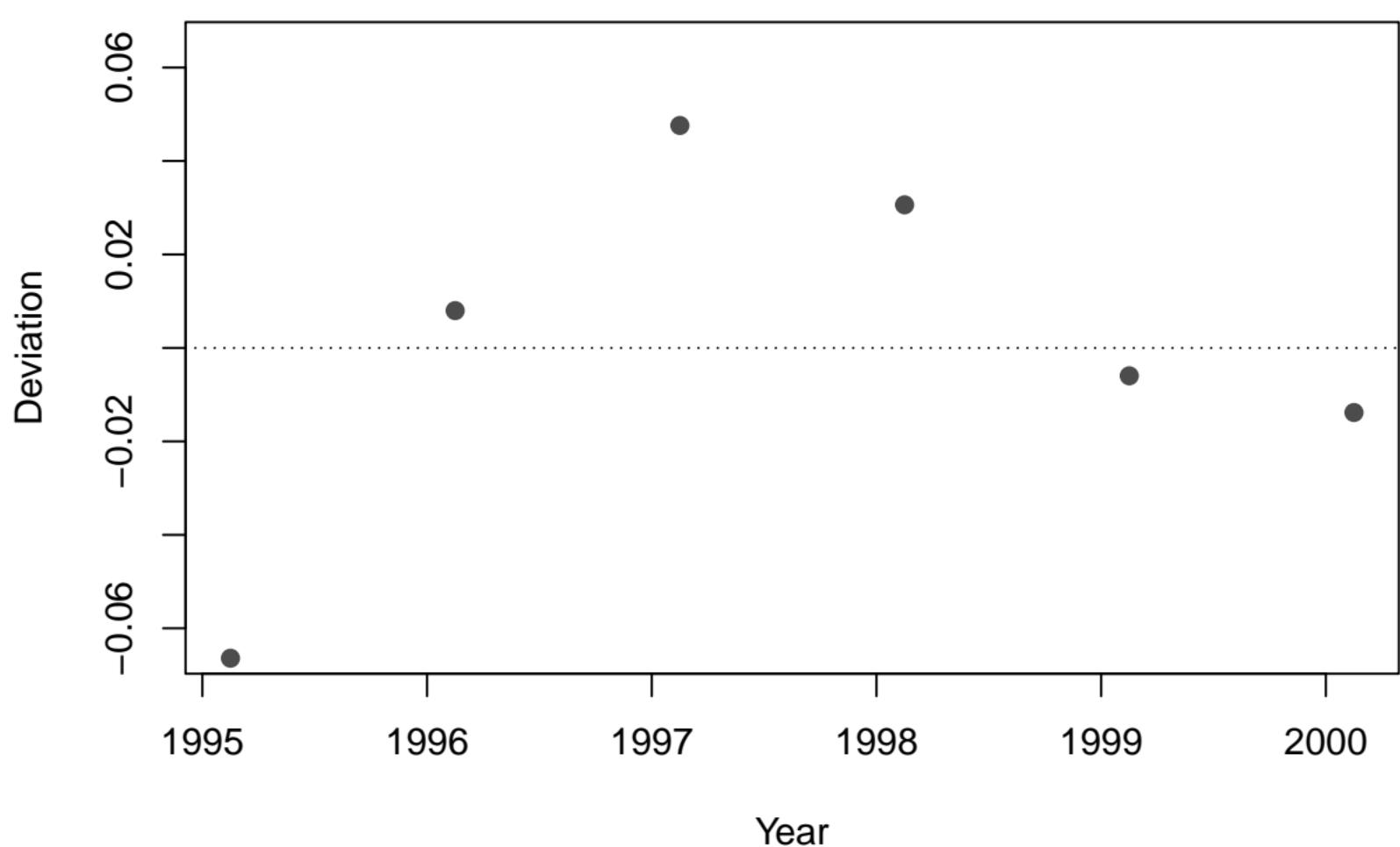
1.90

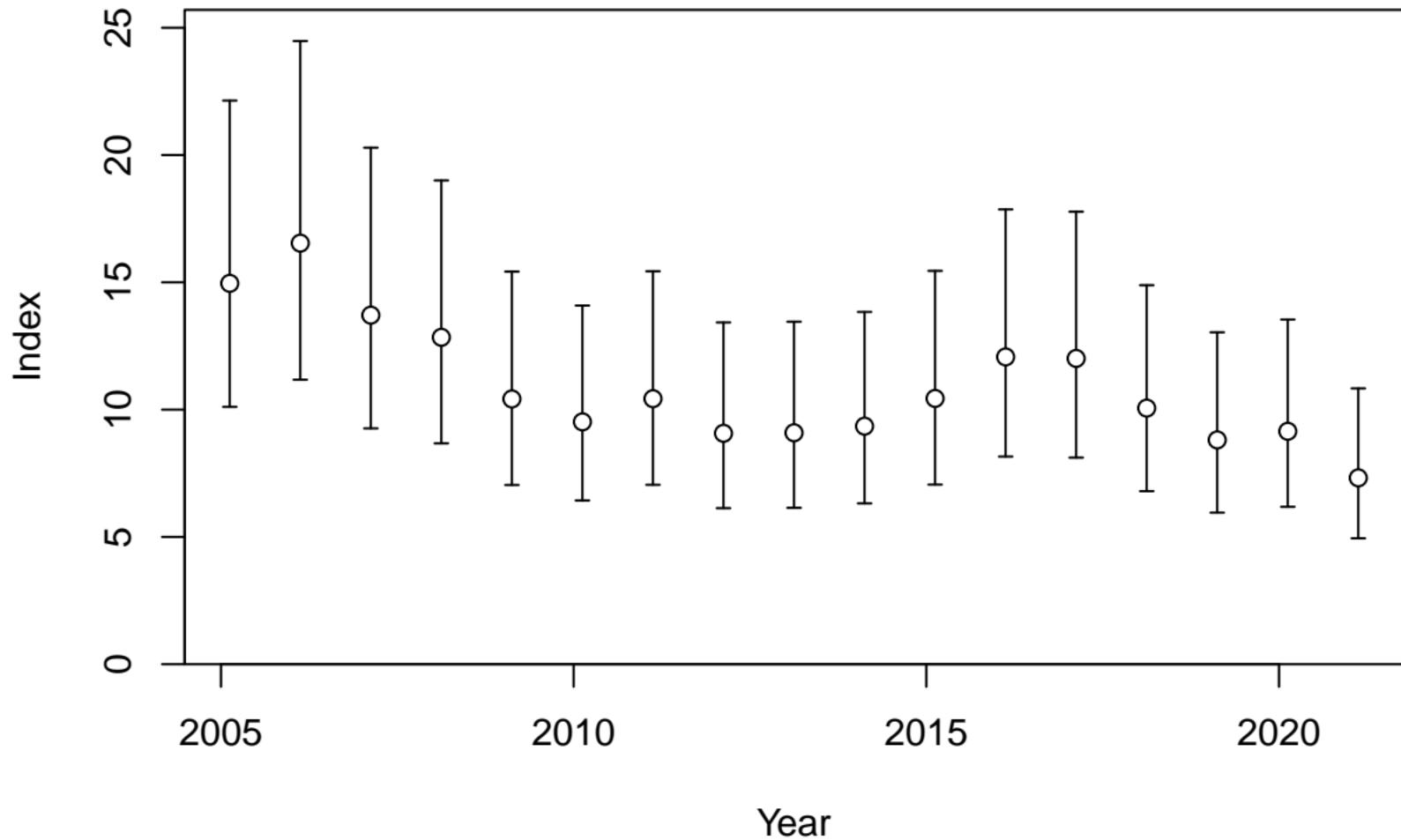
1.85 1.90 1.95 2.00 2.05

Log observed index

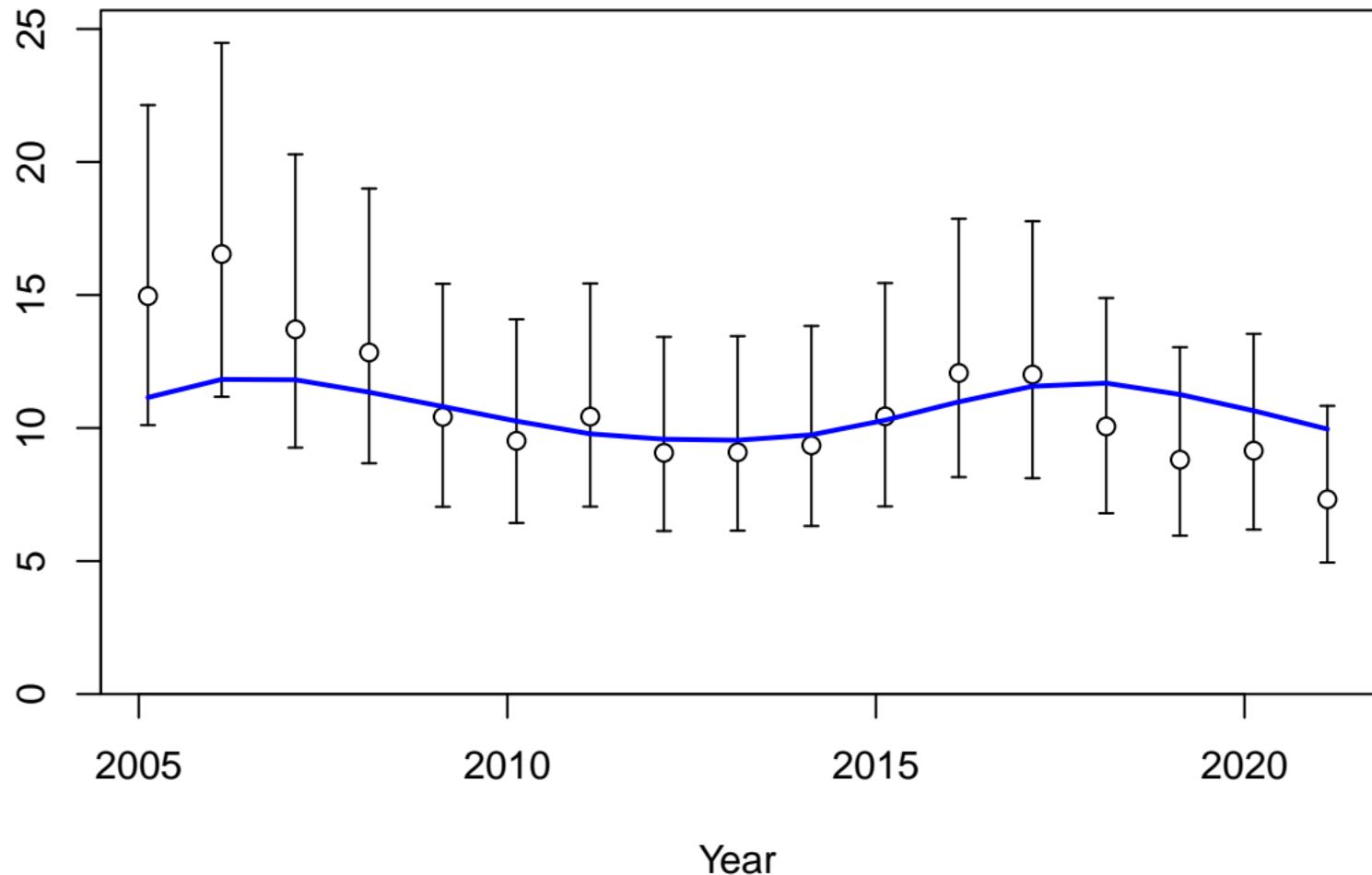




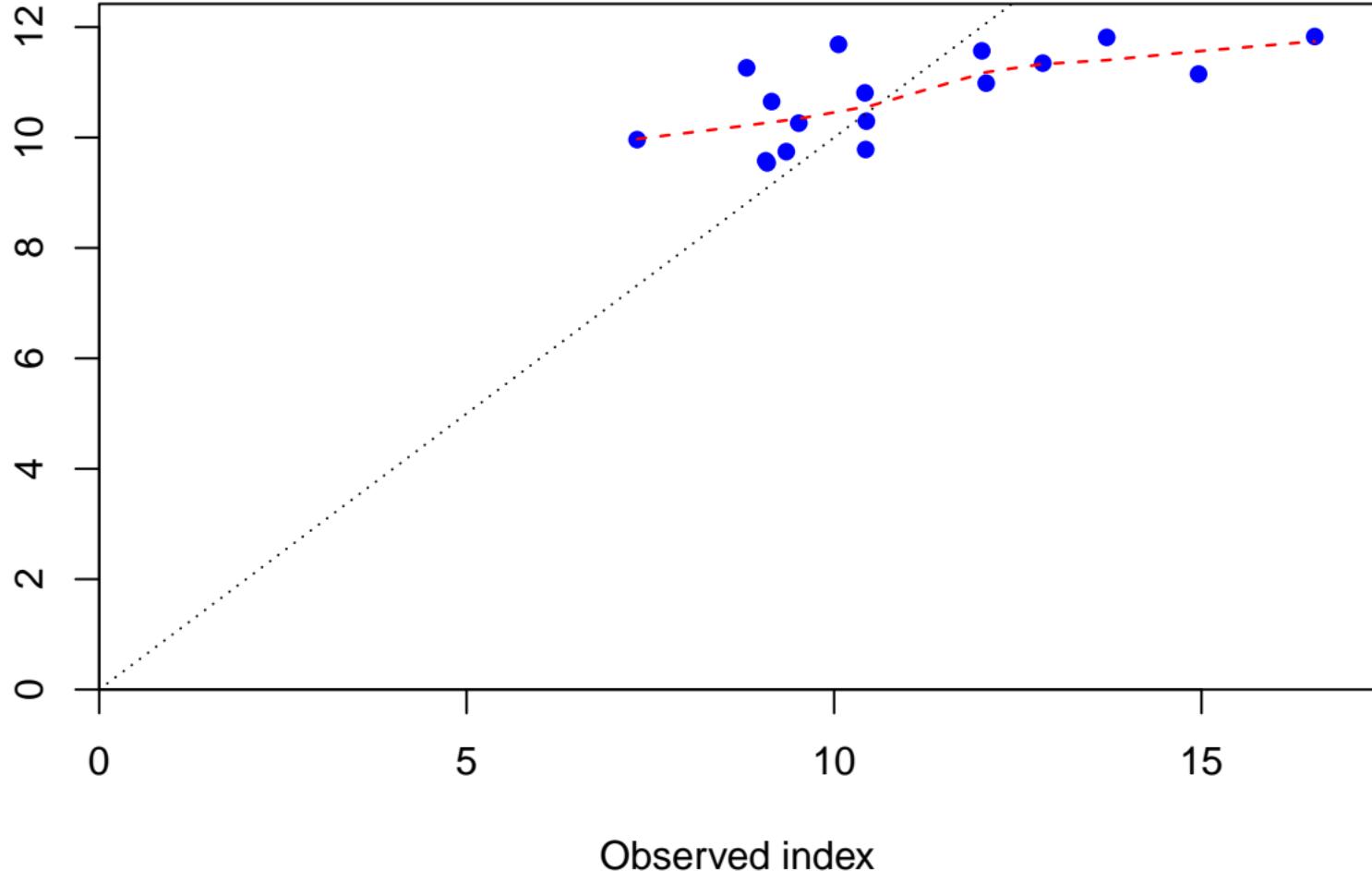




Index



Expected index



Log index

3.0
2.5
2.0

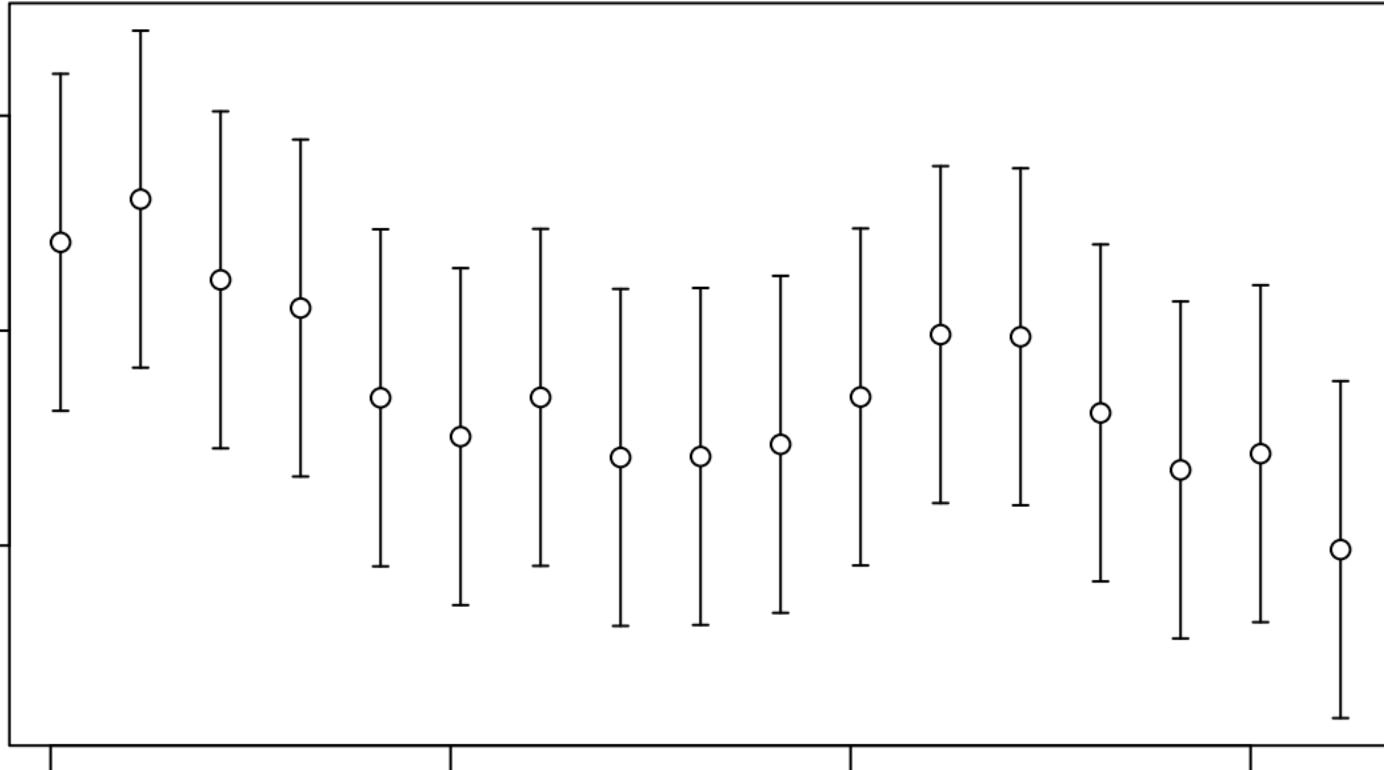
2005

2010

2015

2020

Year

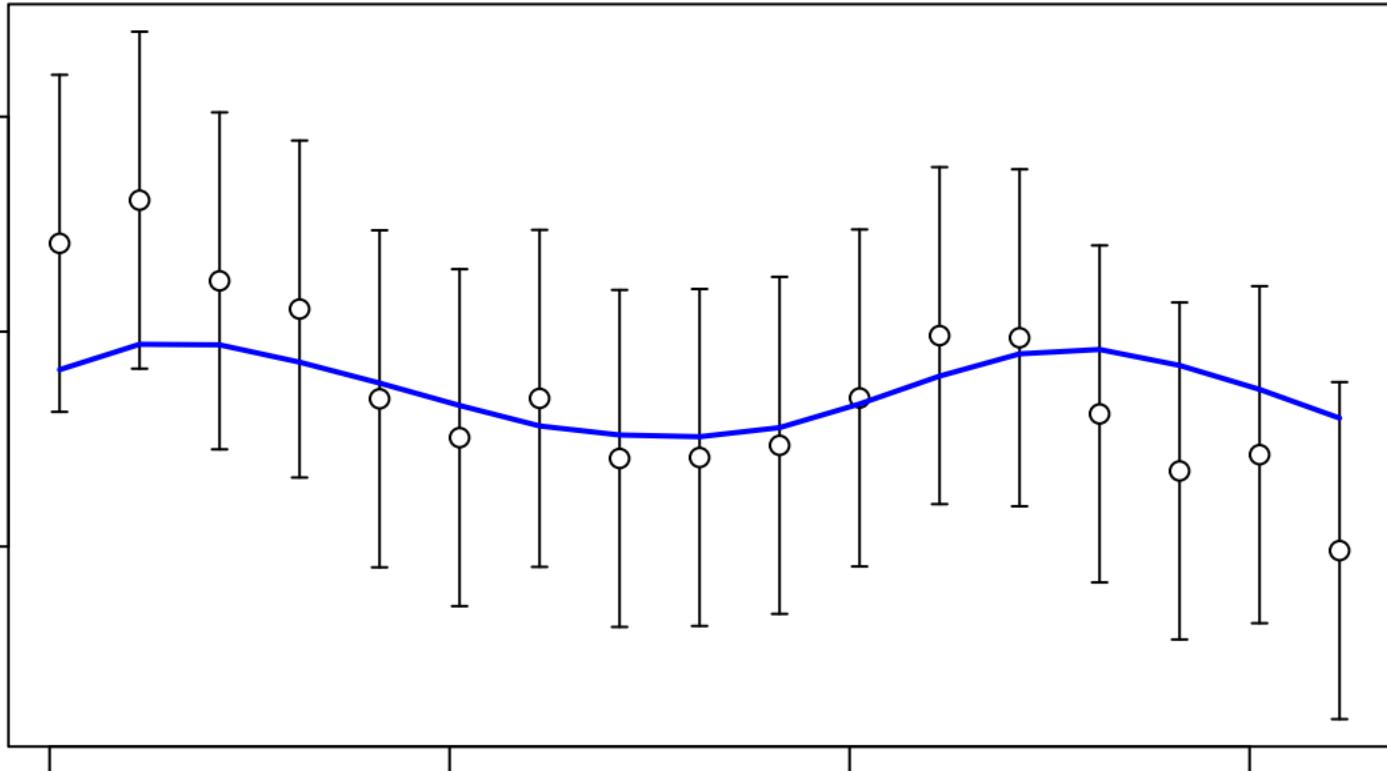


Log index

3.0
2.5
2.0

2005 2010 2015 2020

Year

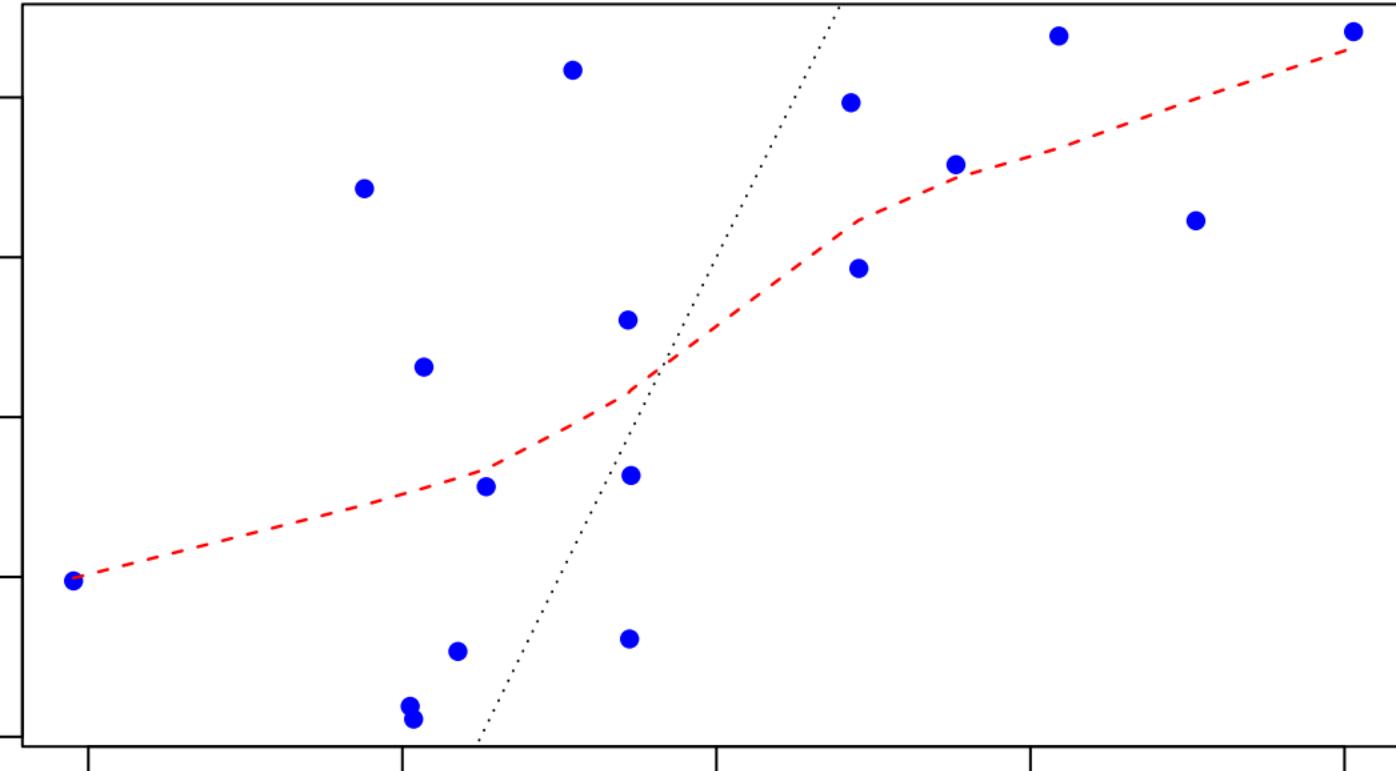


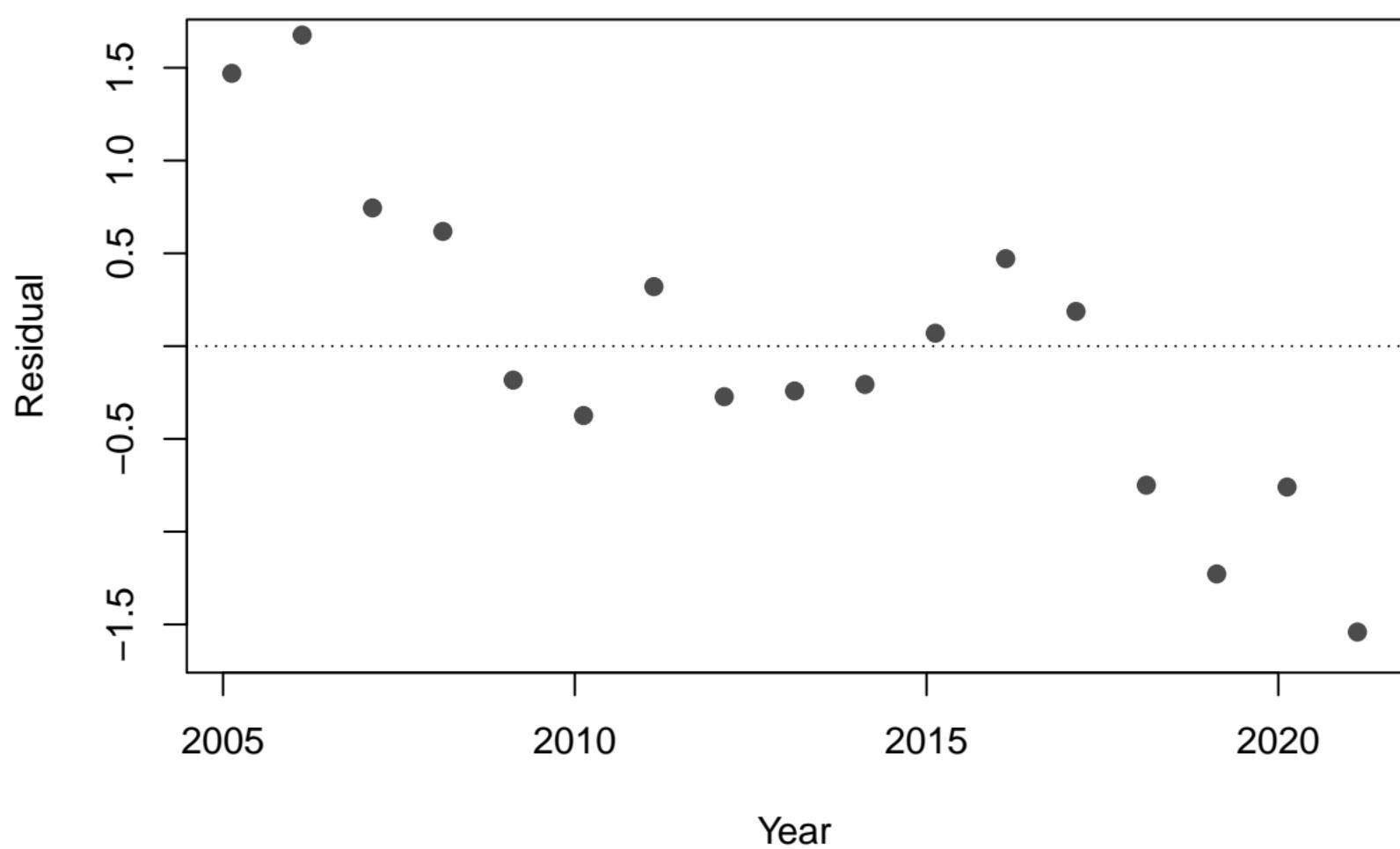
Log expected index

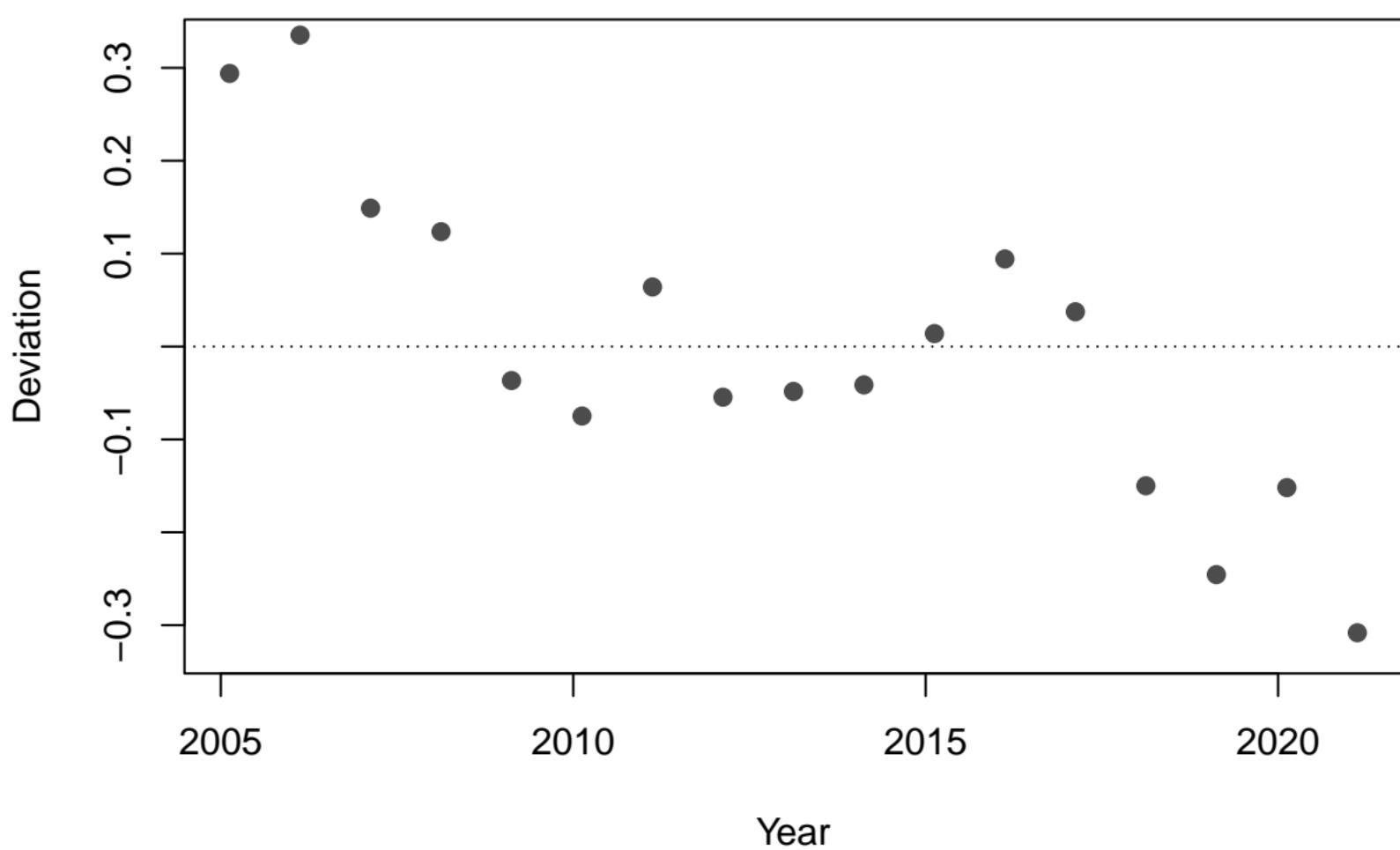
2.45
2.40
2.35
2.30
2.25

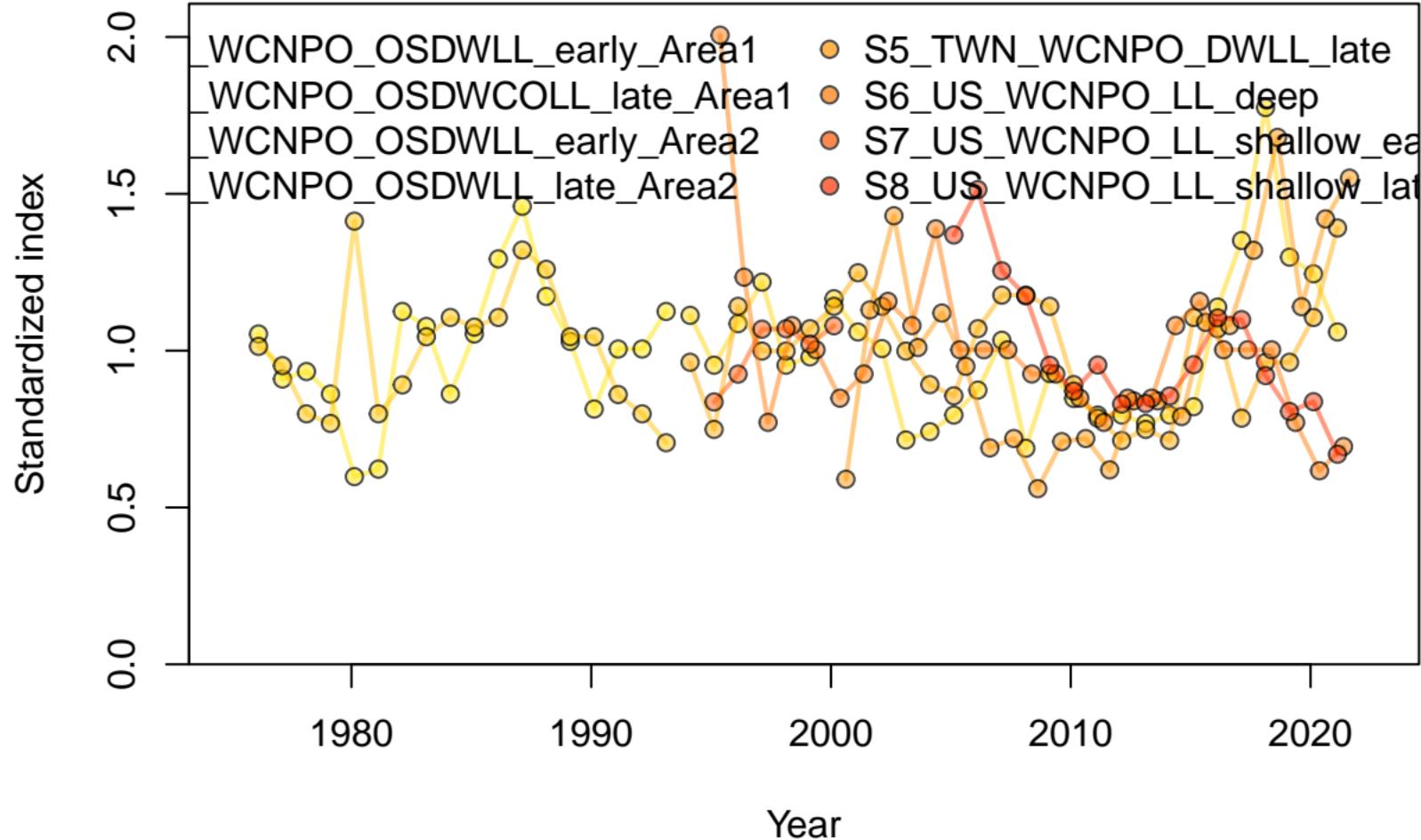
2.0 2.2 2.4 2.6 2.8

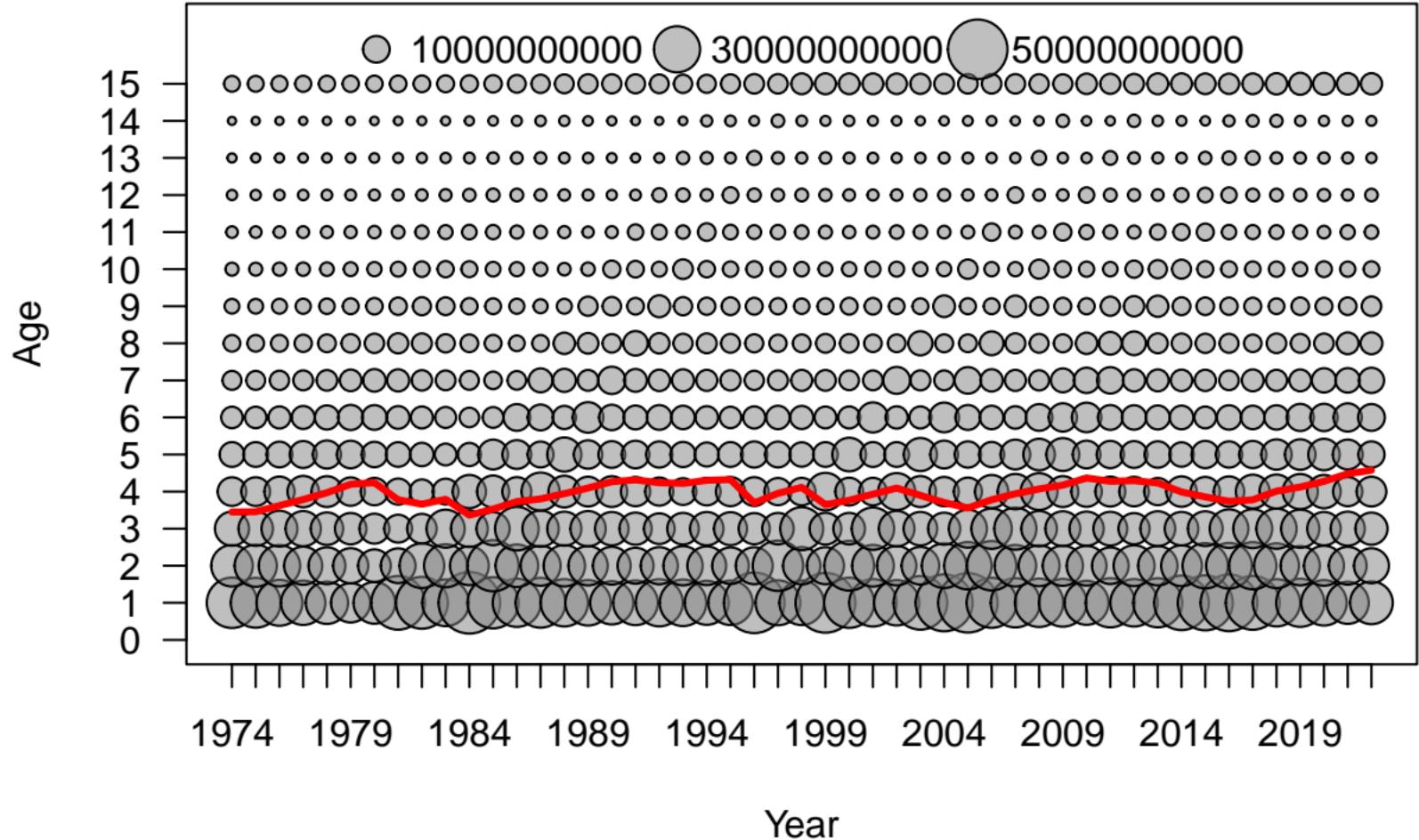
Log observed index

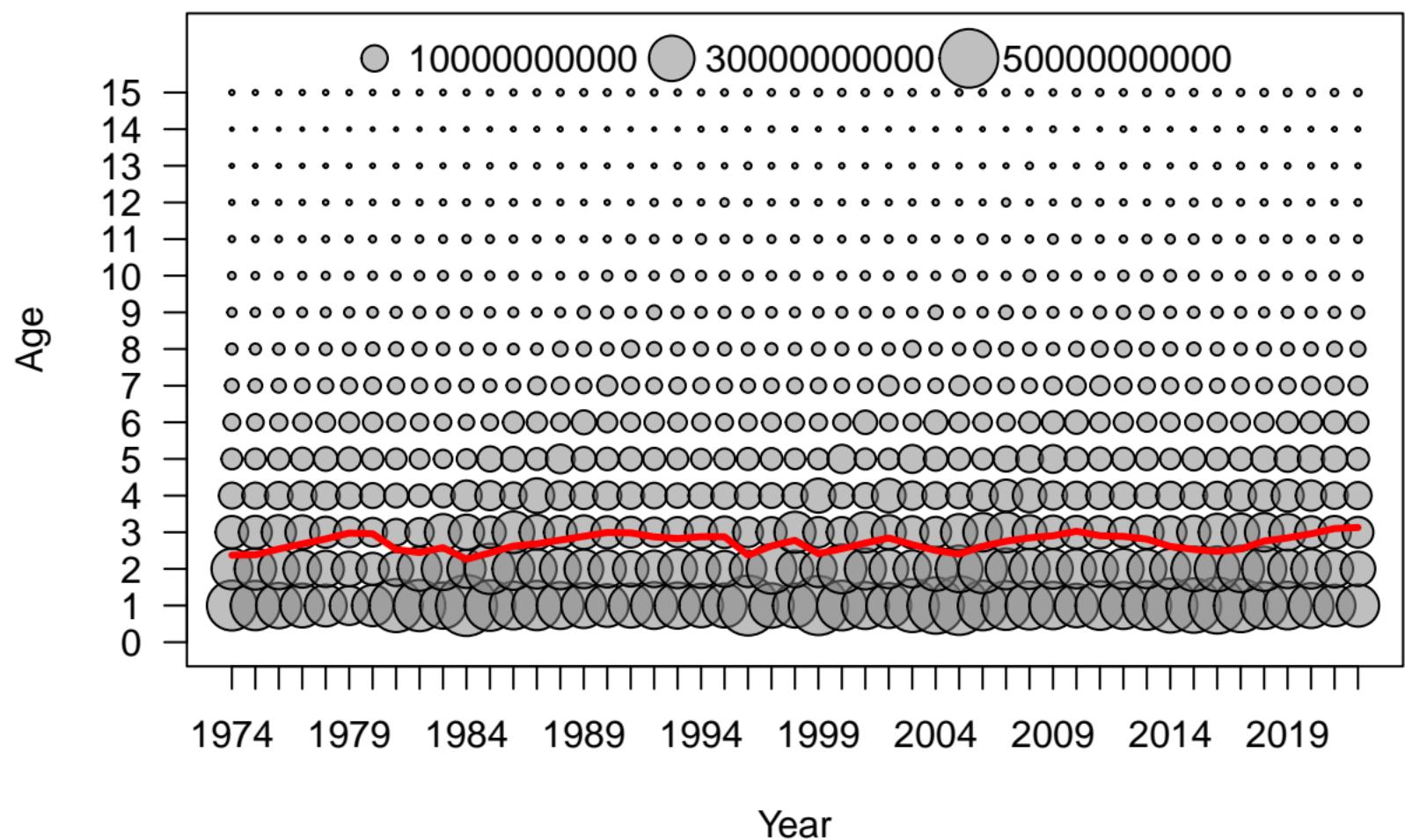


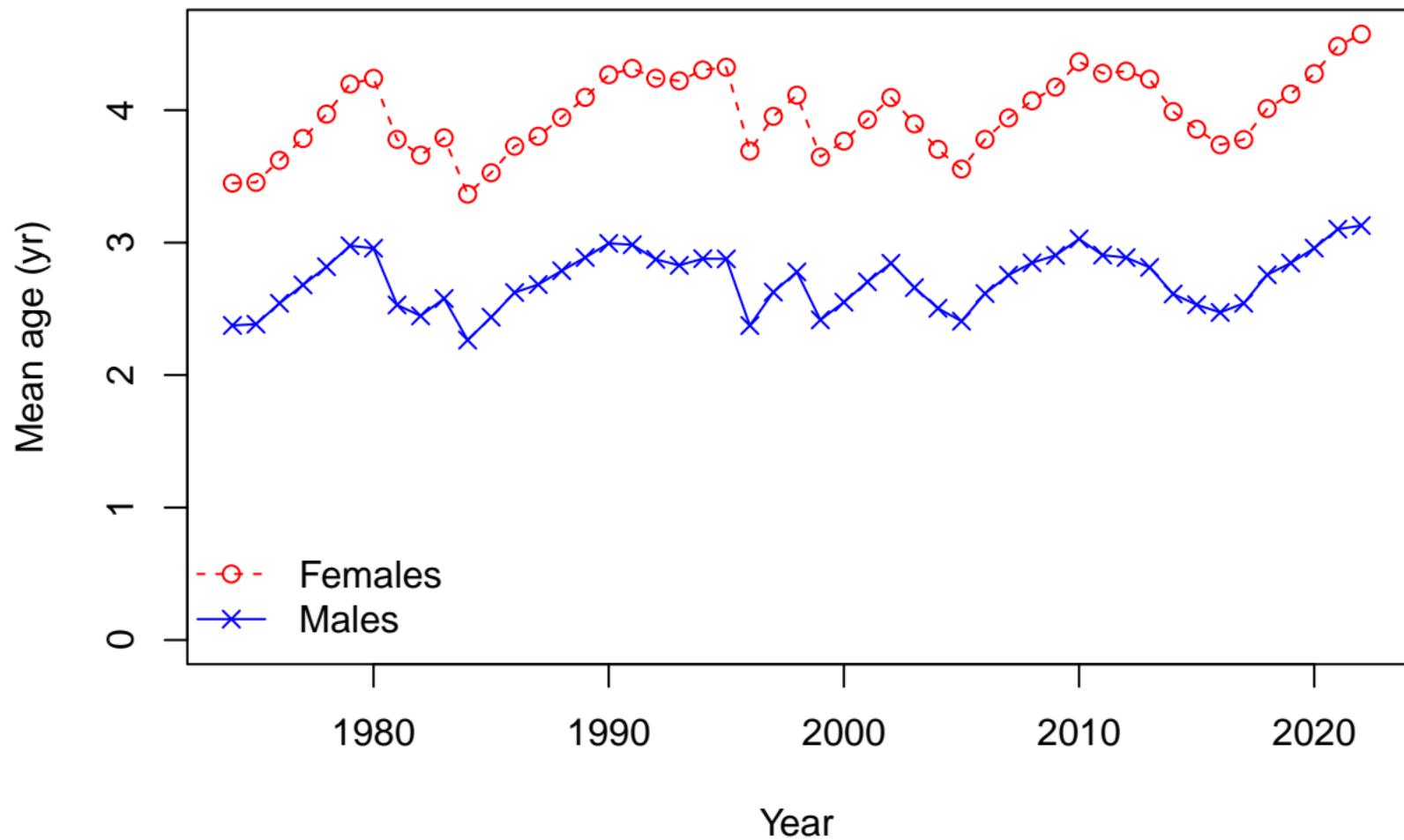


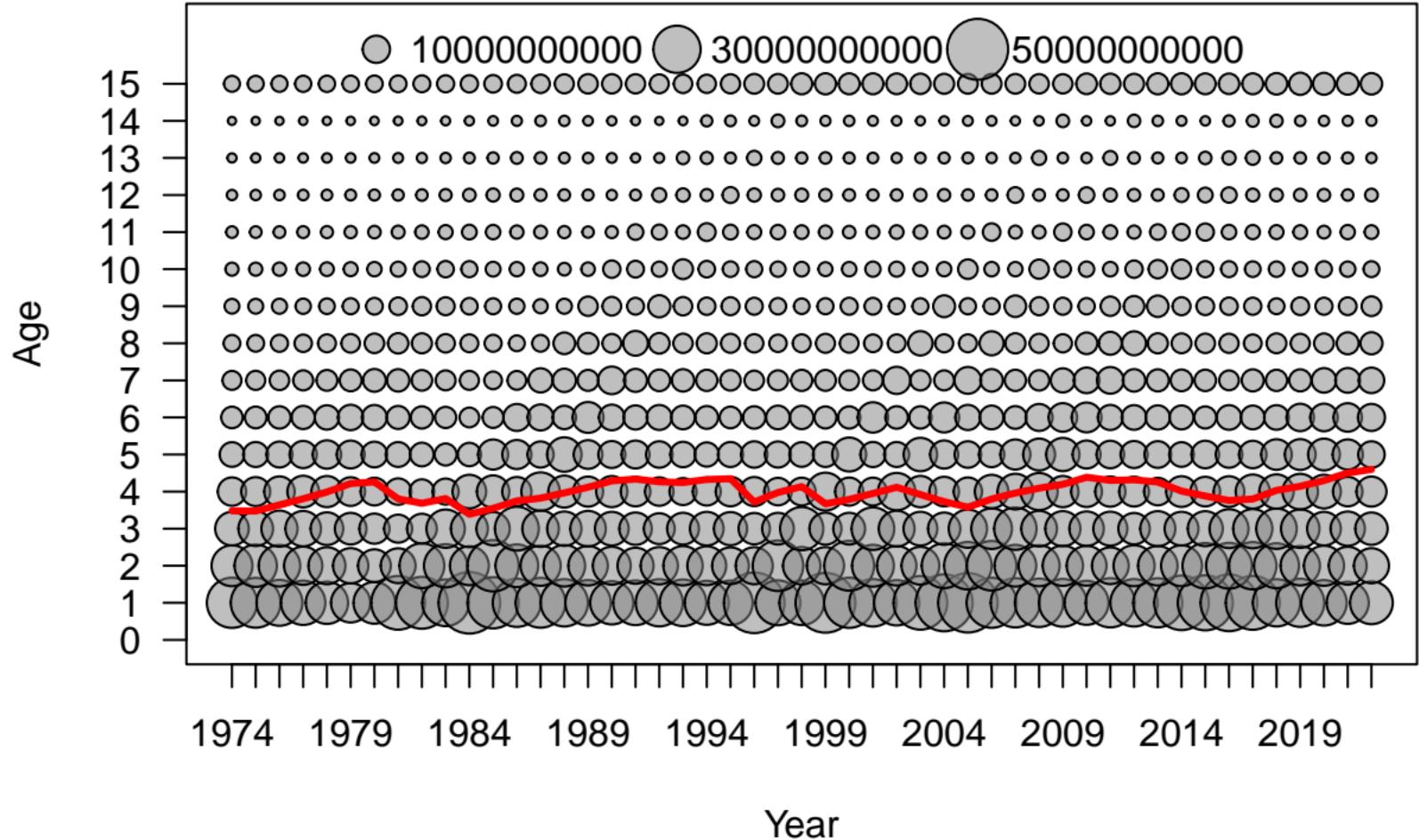


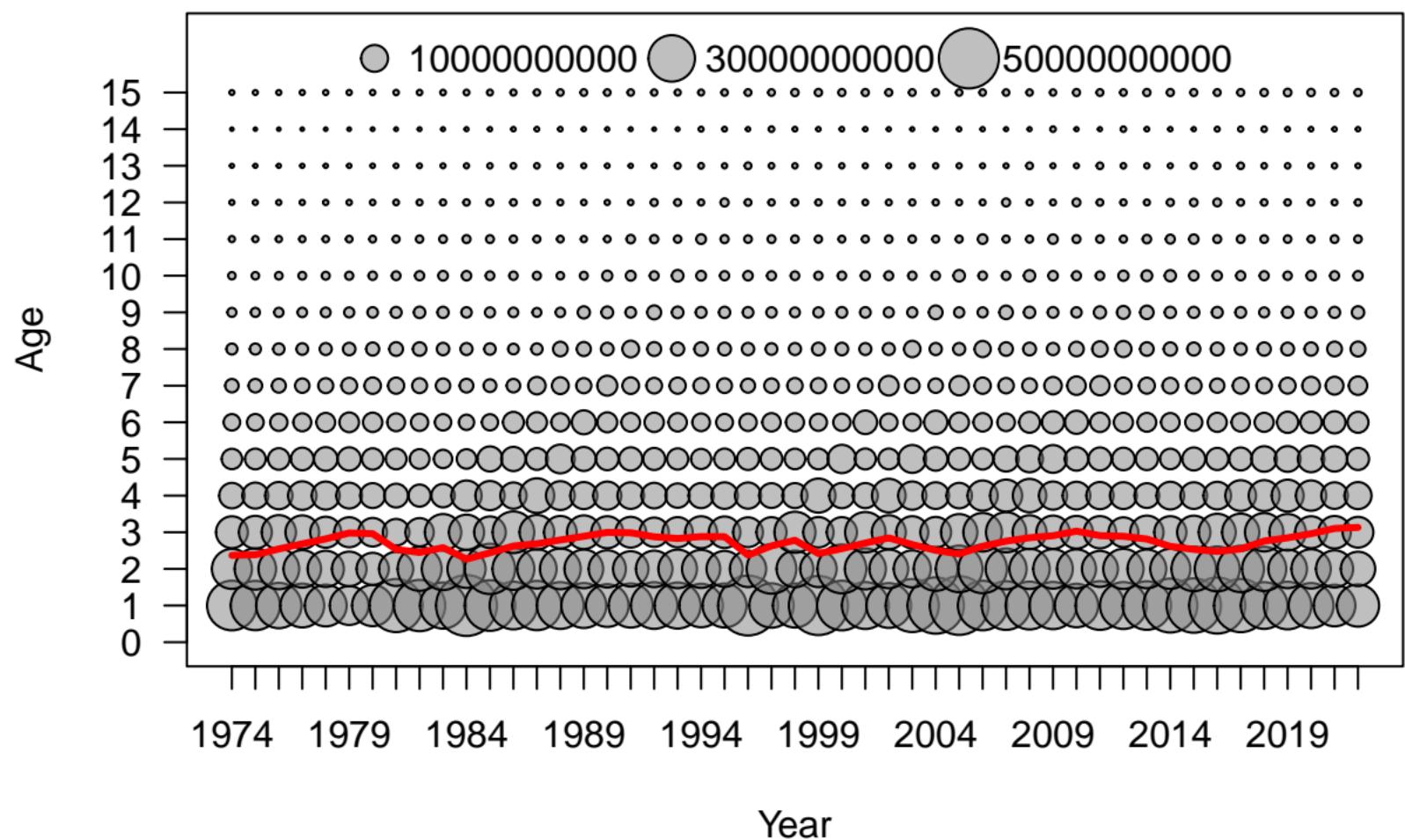


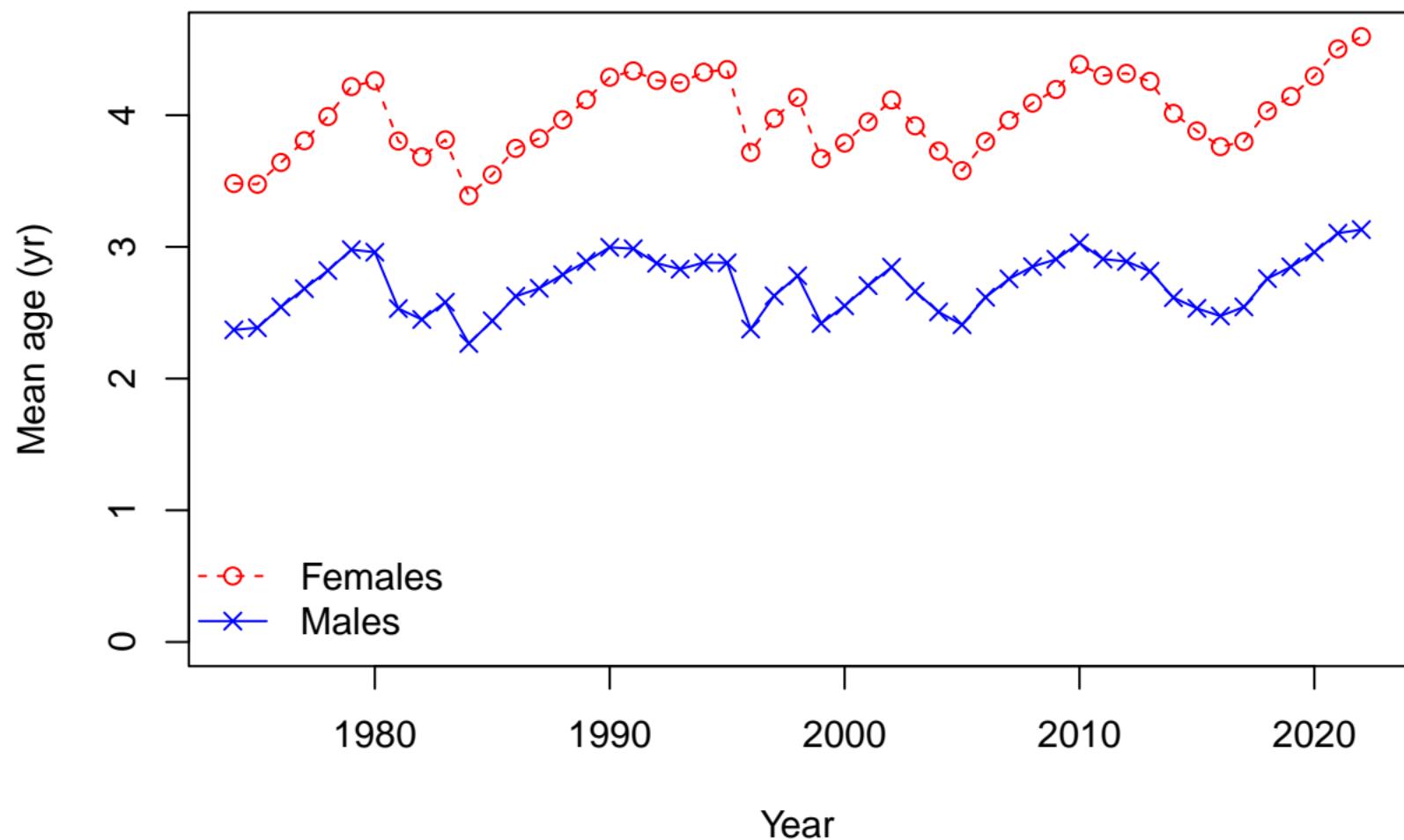


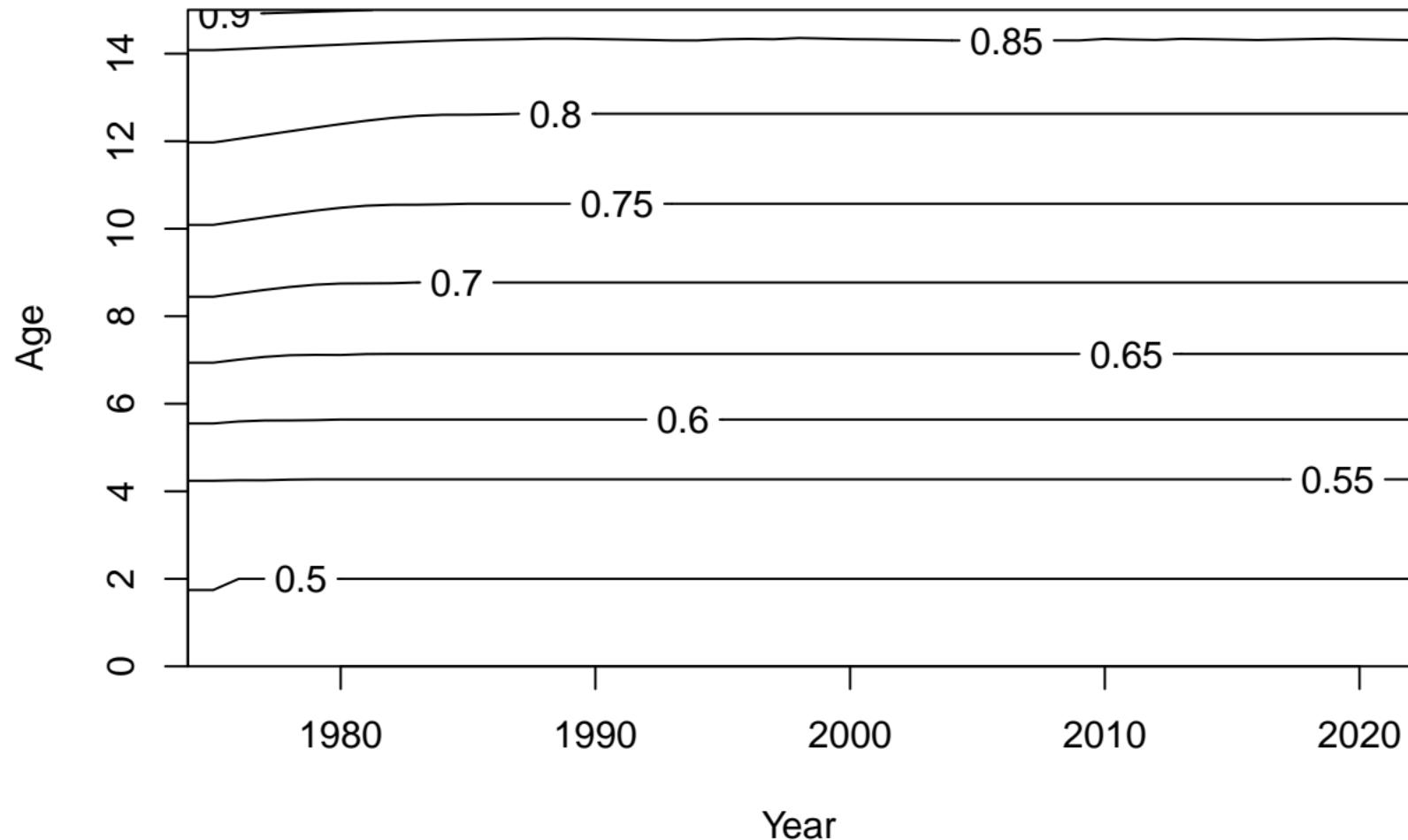


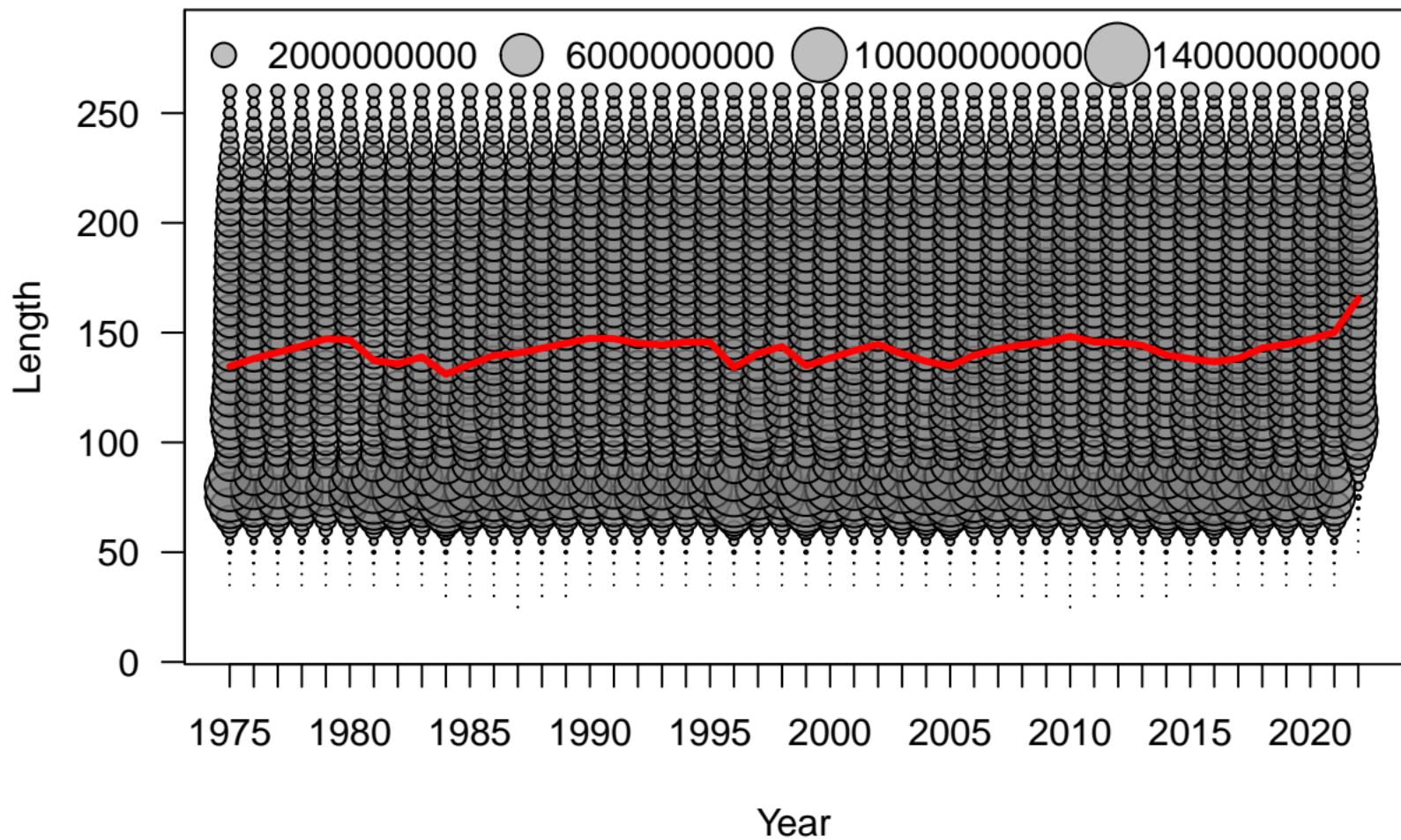


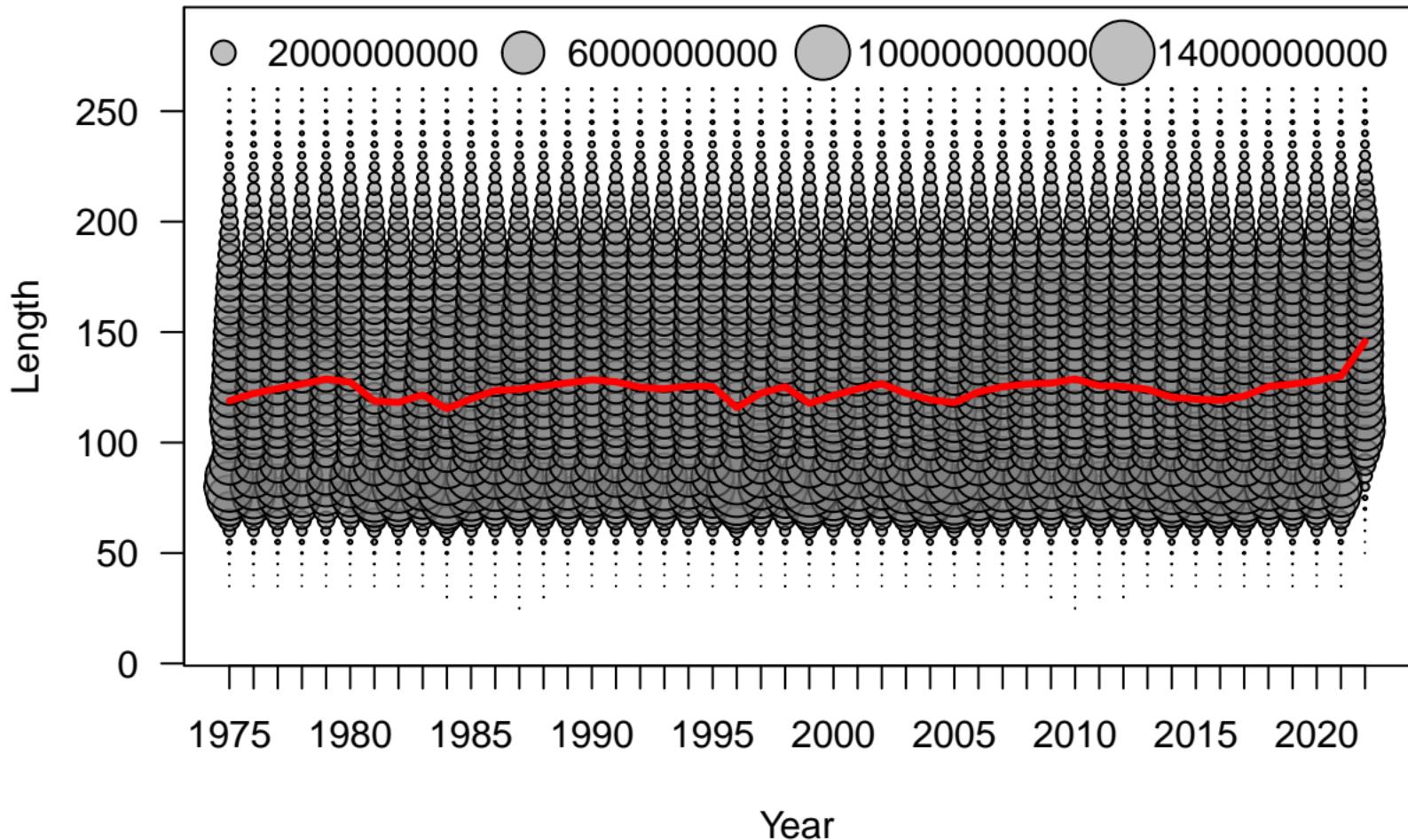


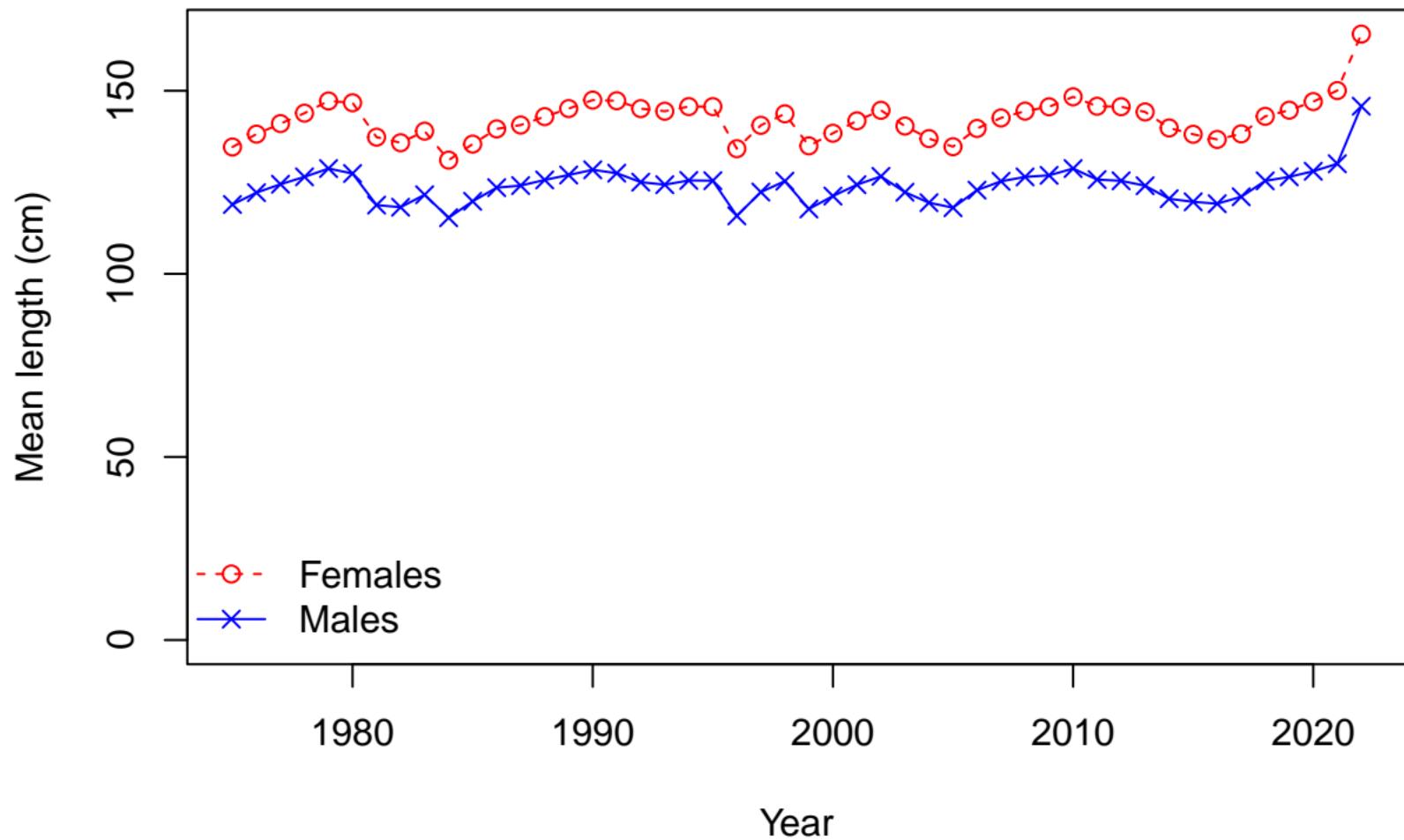


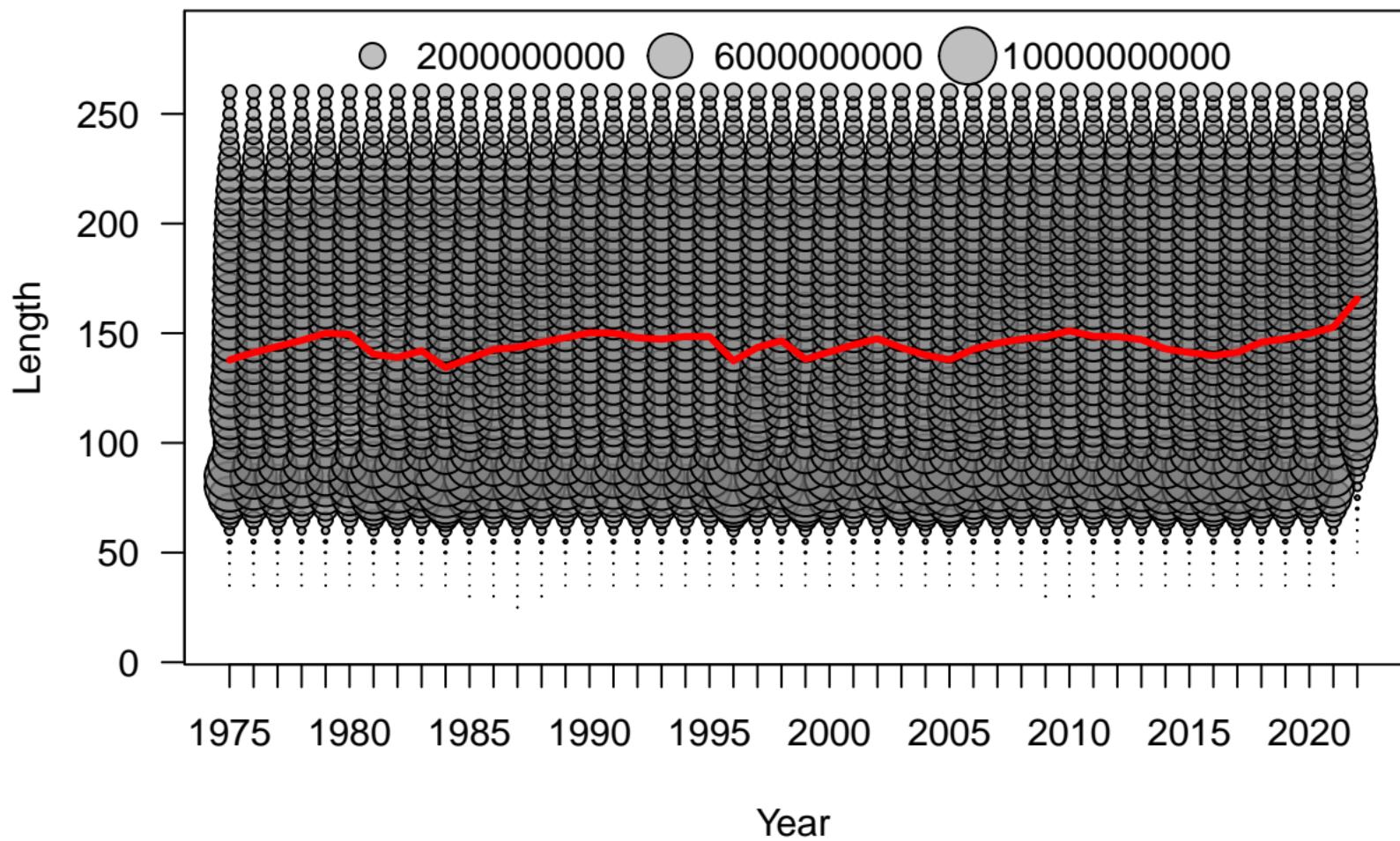


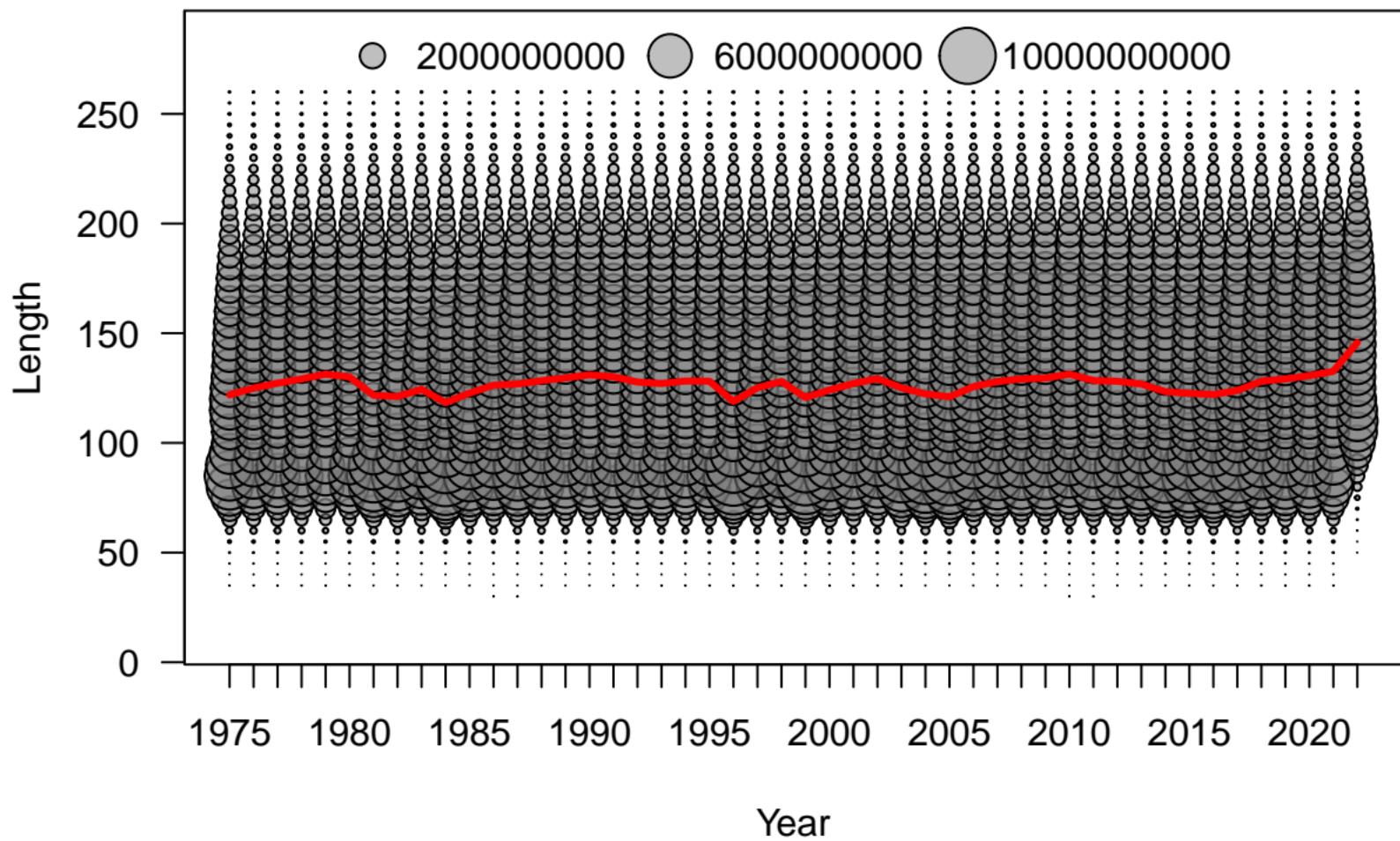


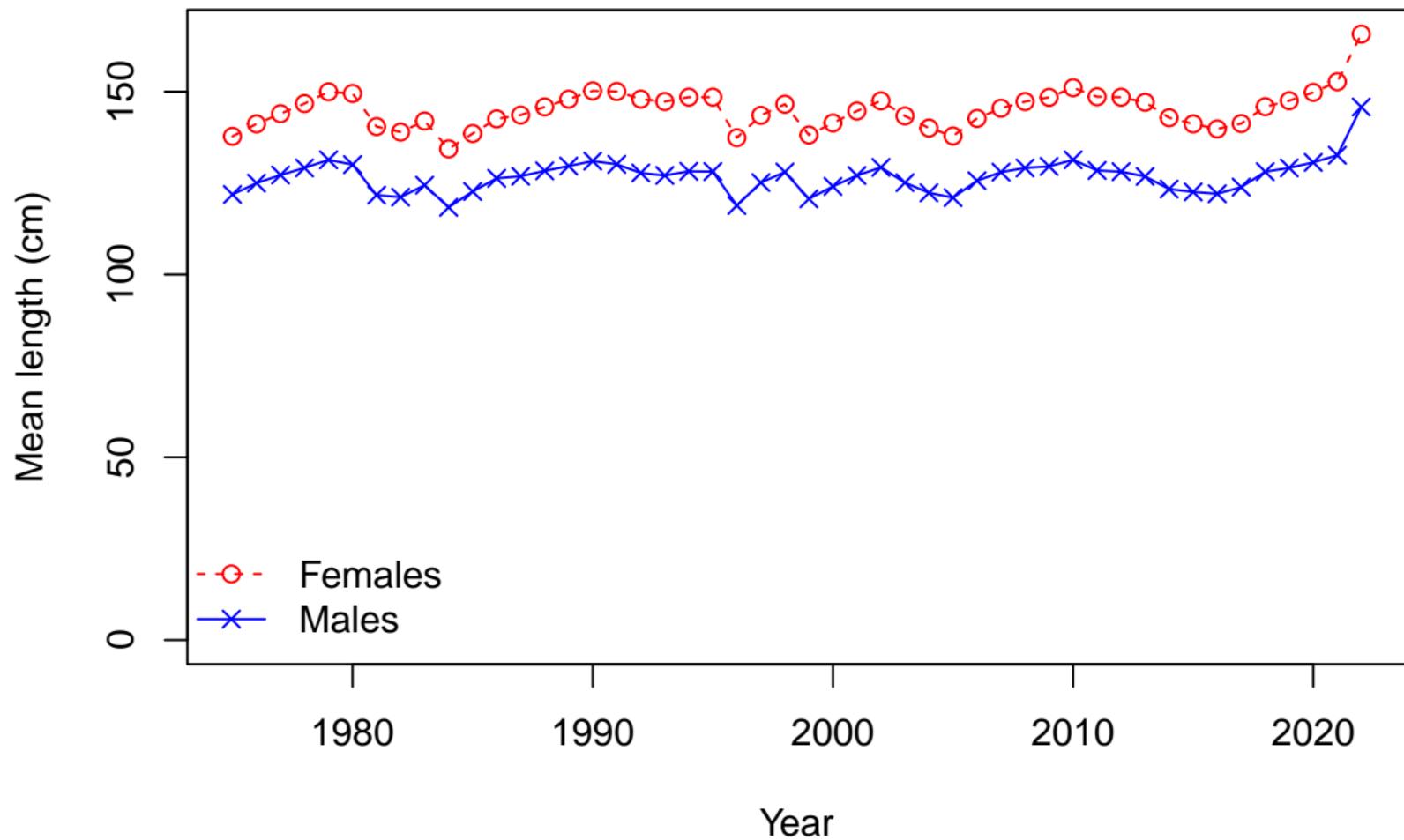


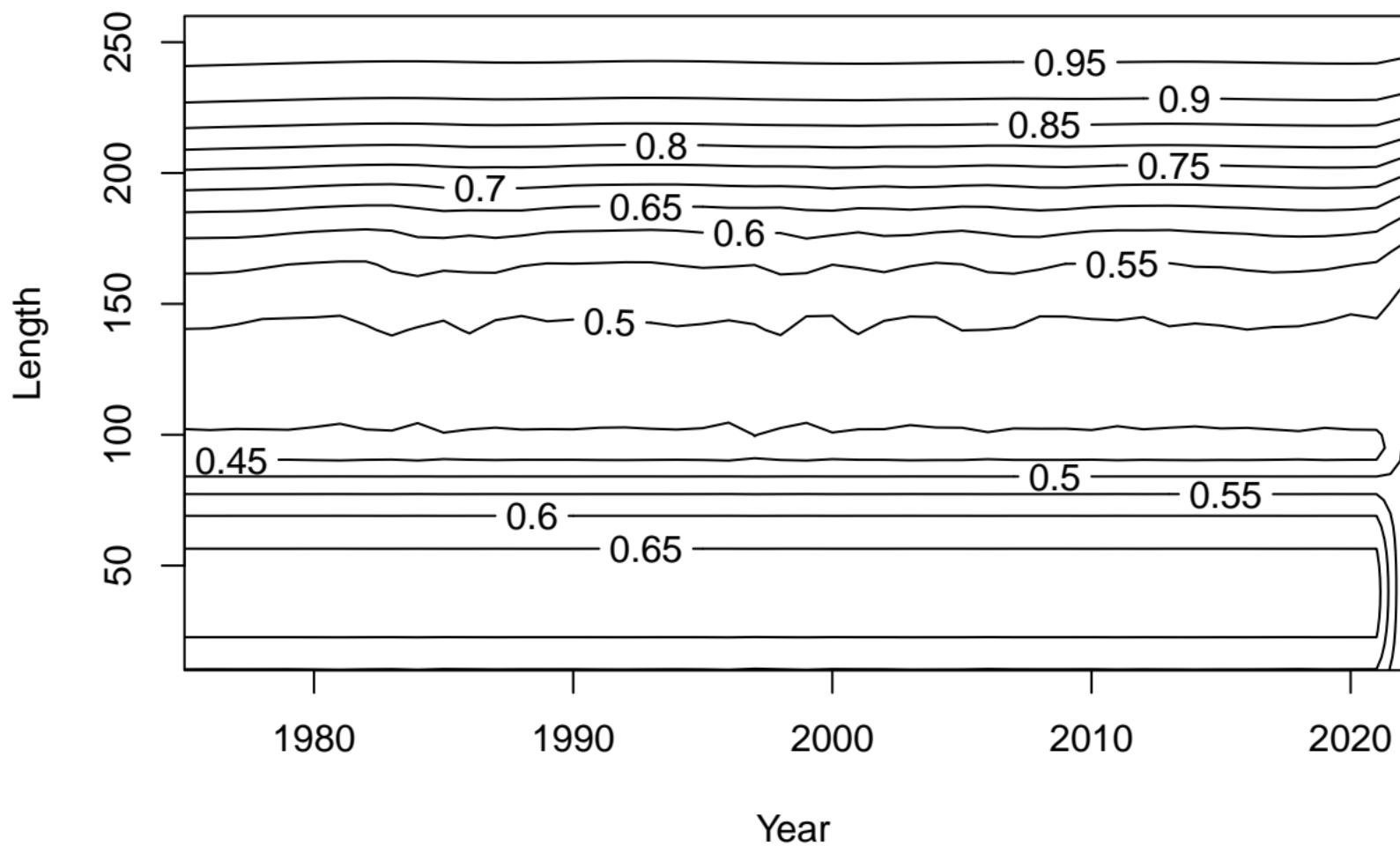




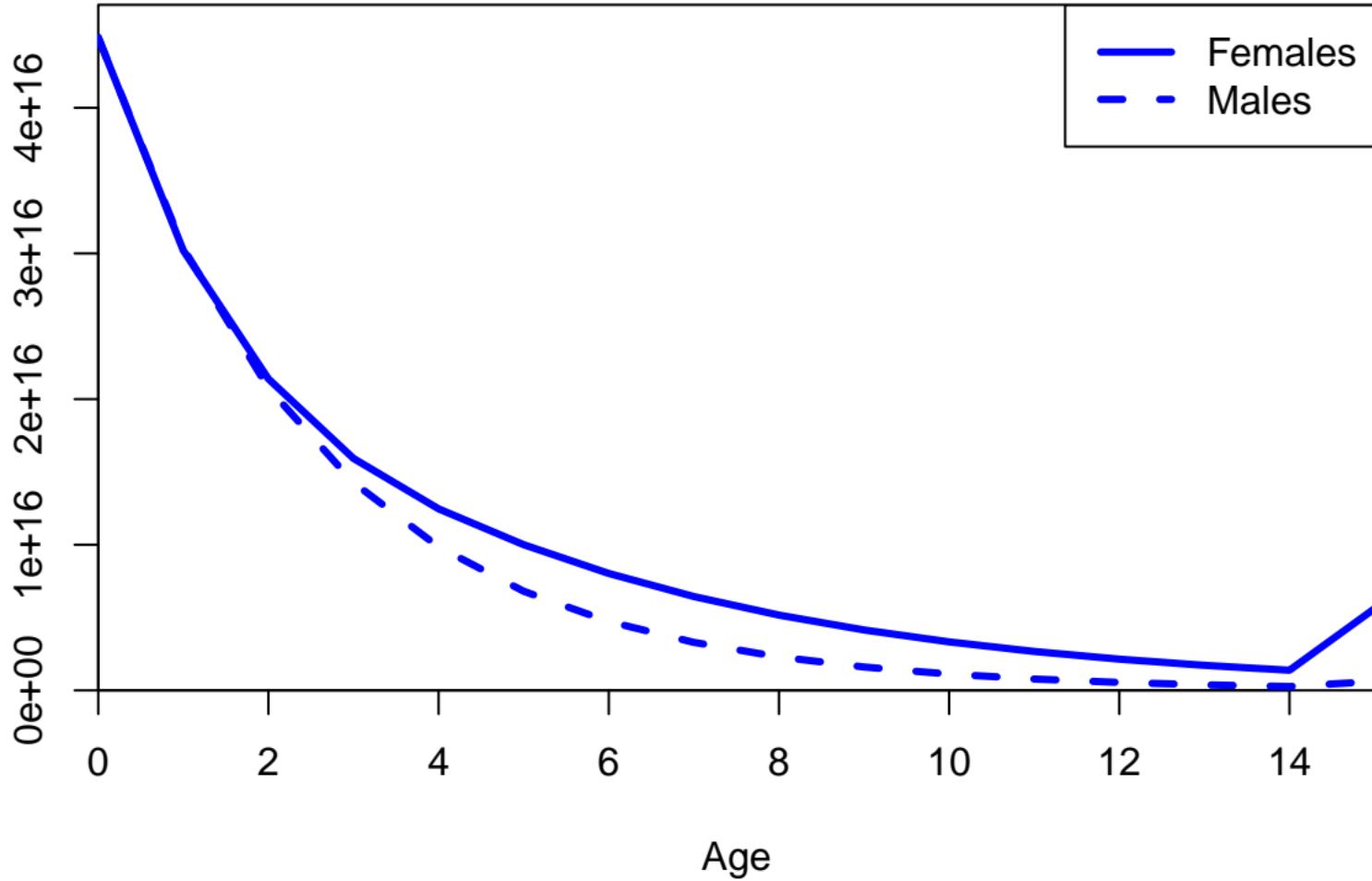




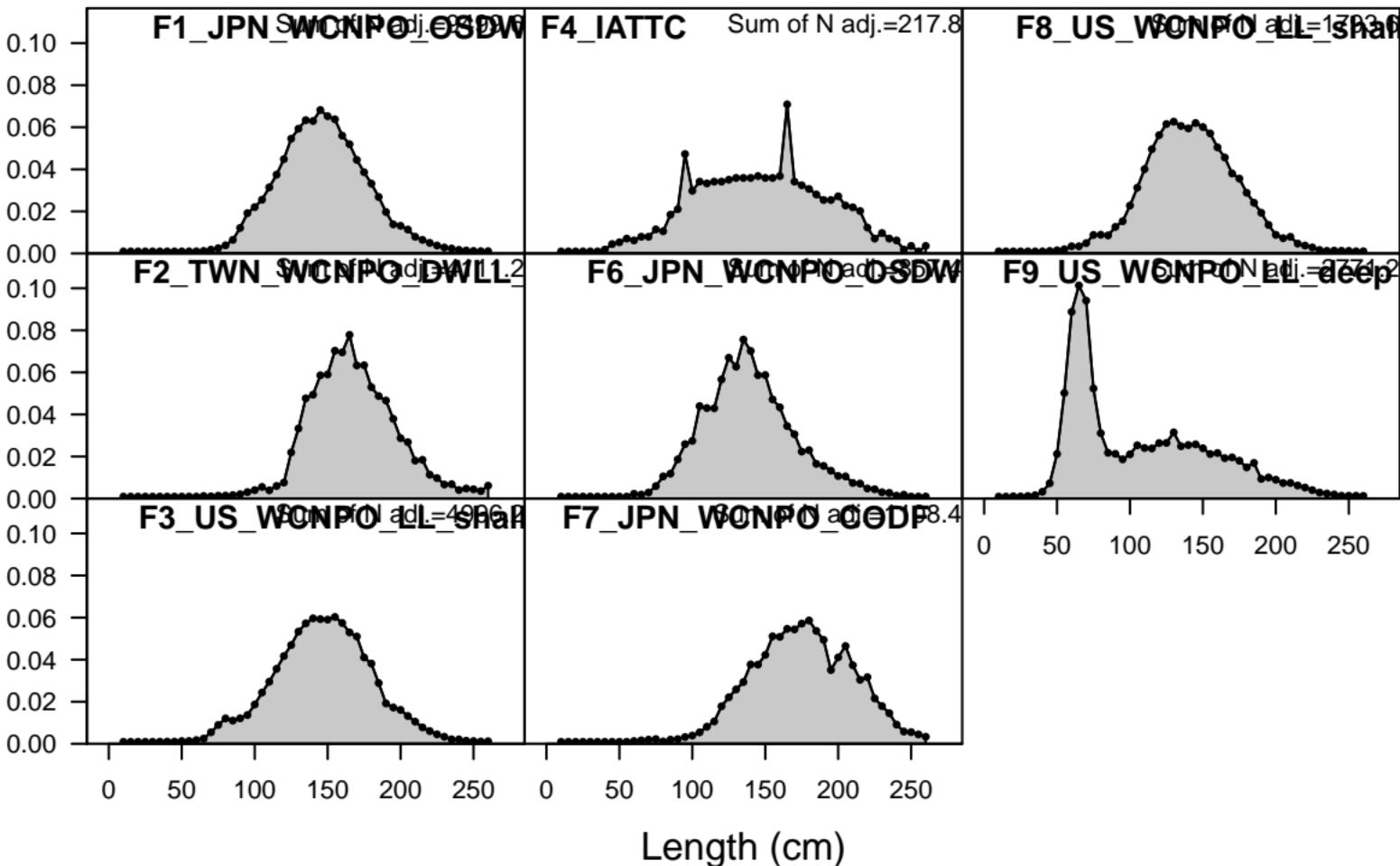


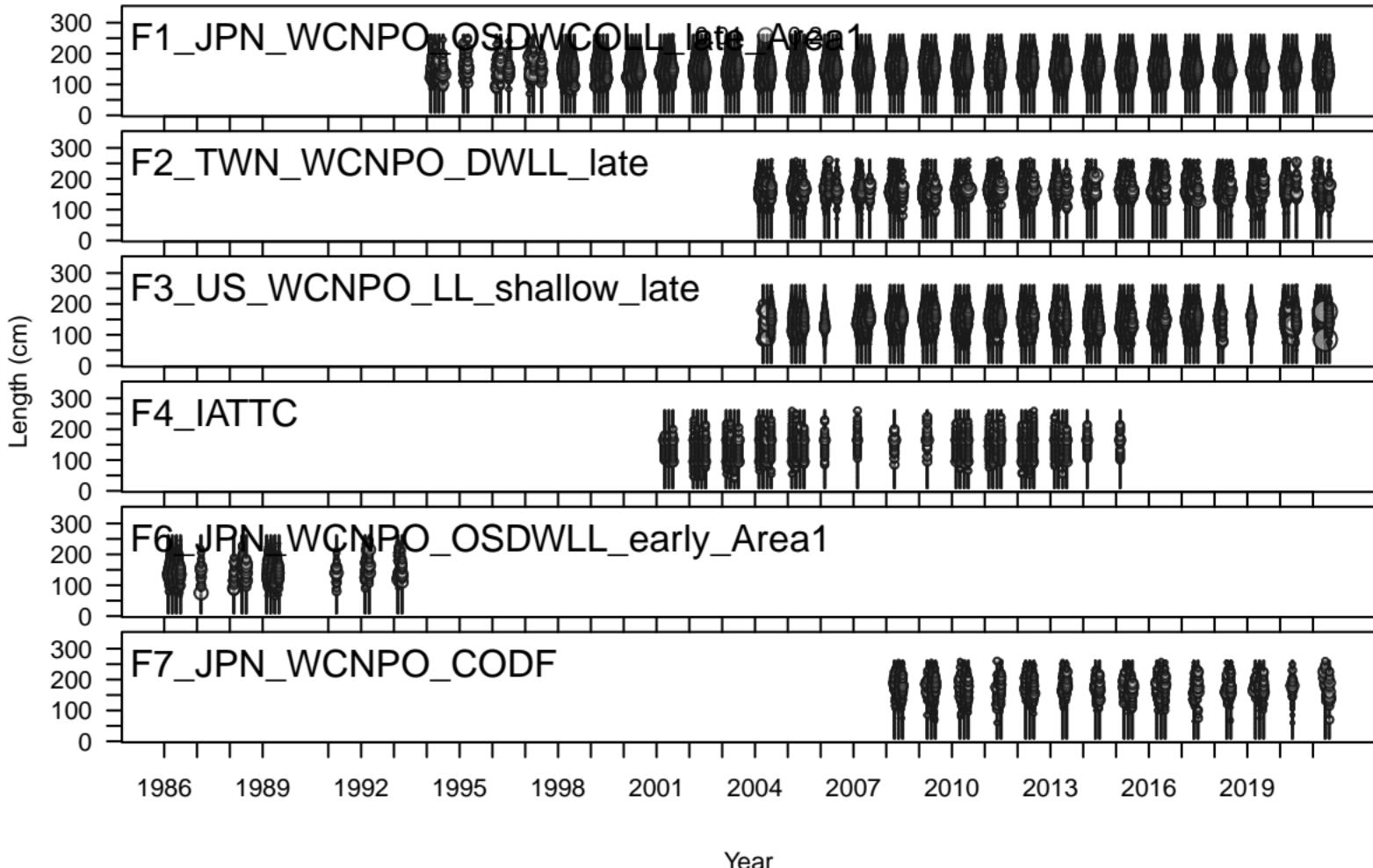


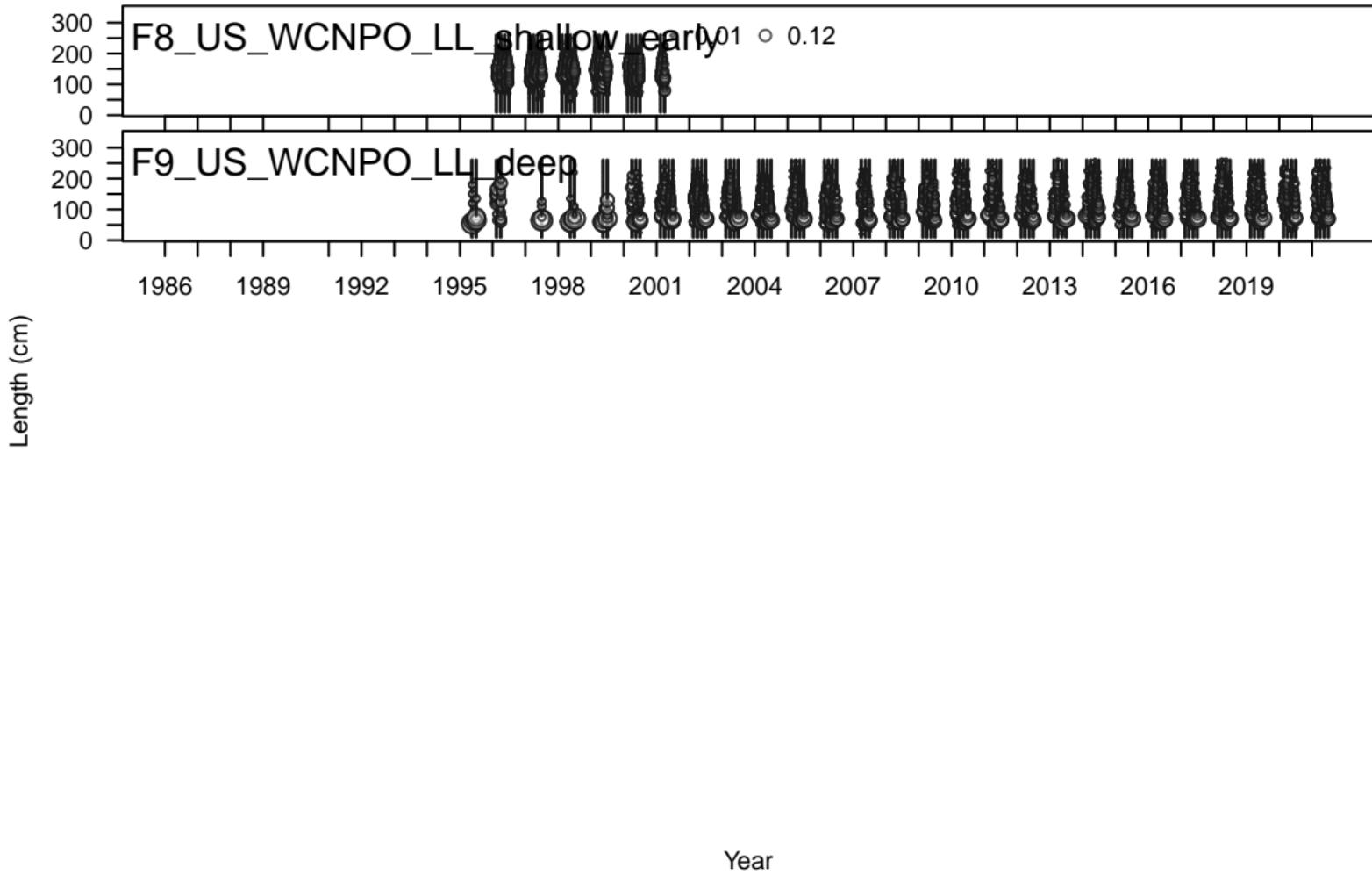
Numbers at age at equilibrium



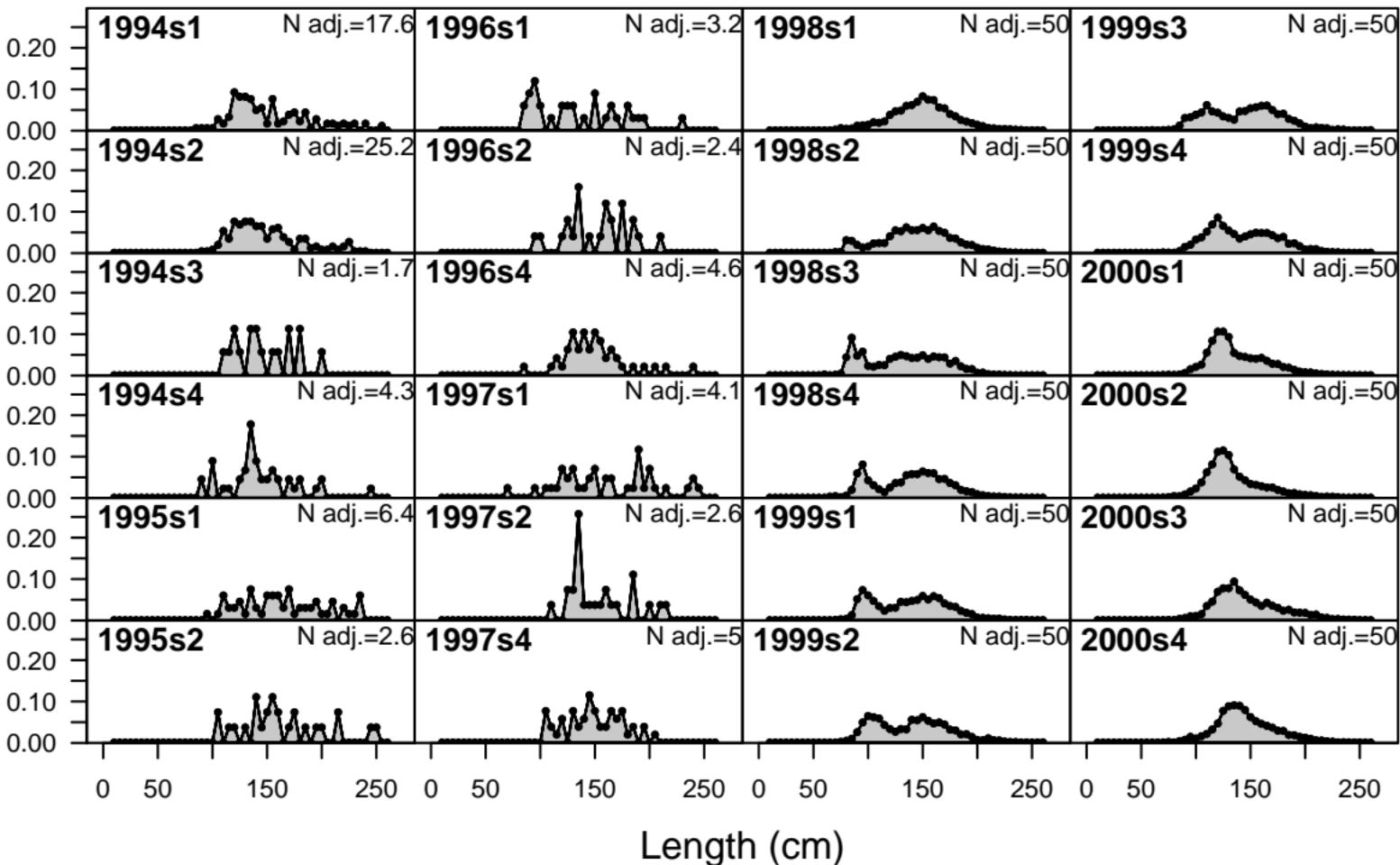
Proportion



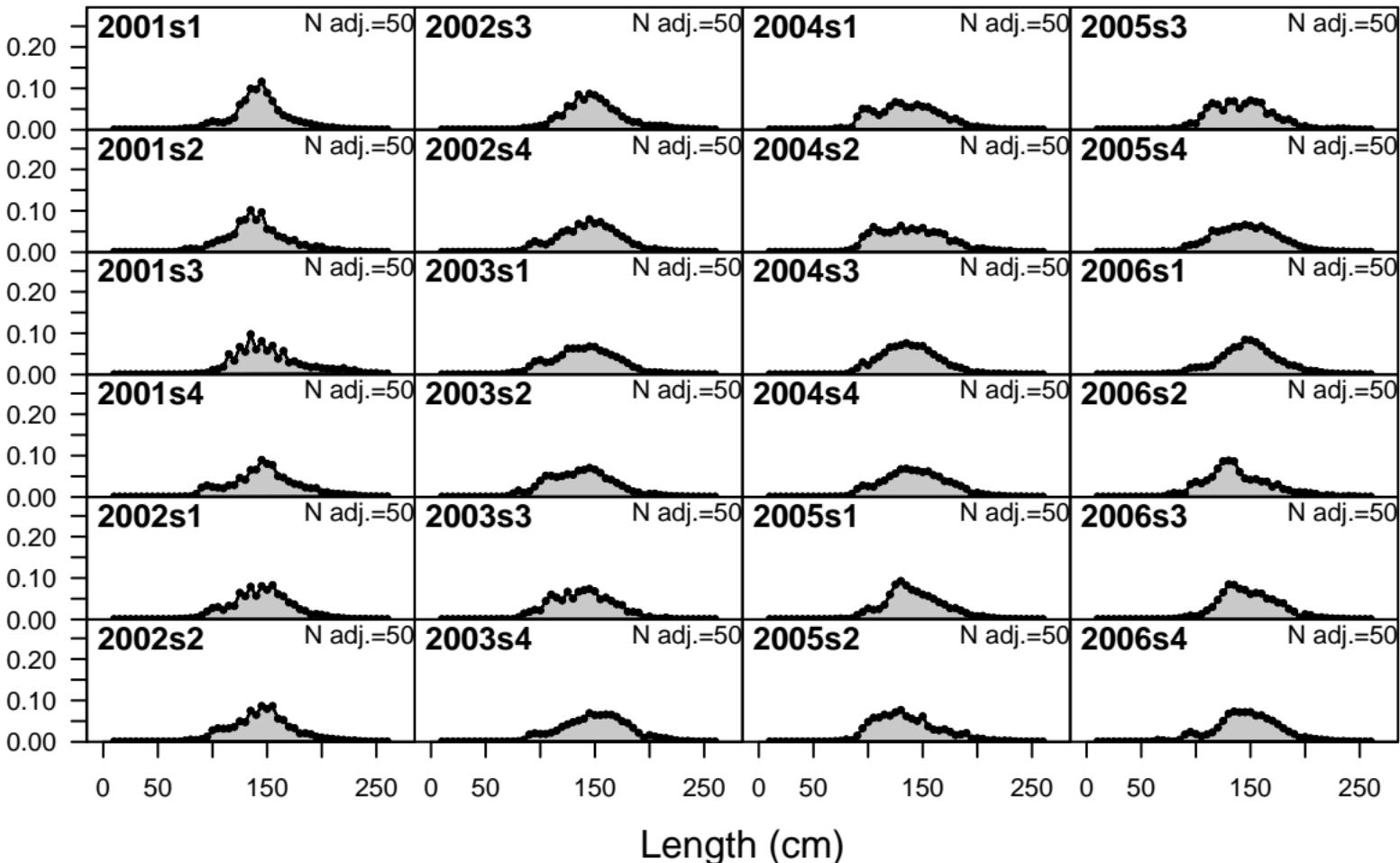




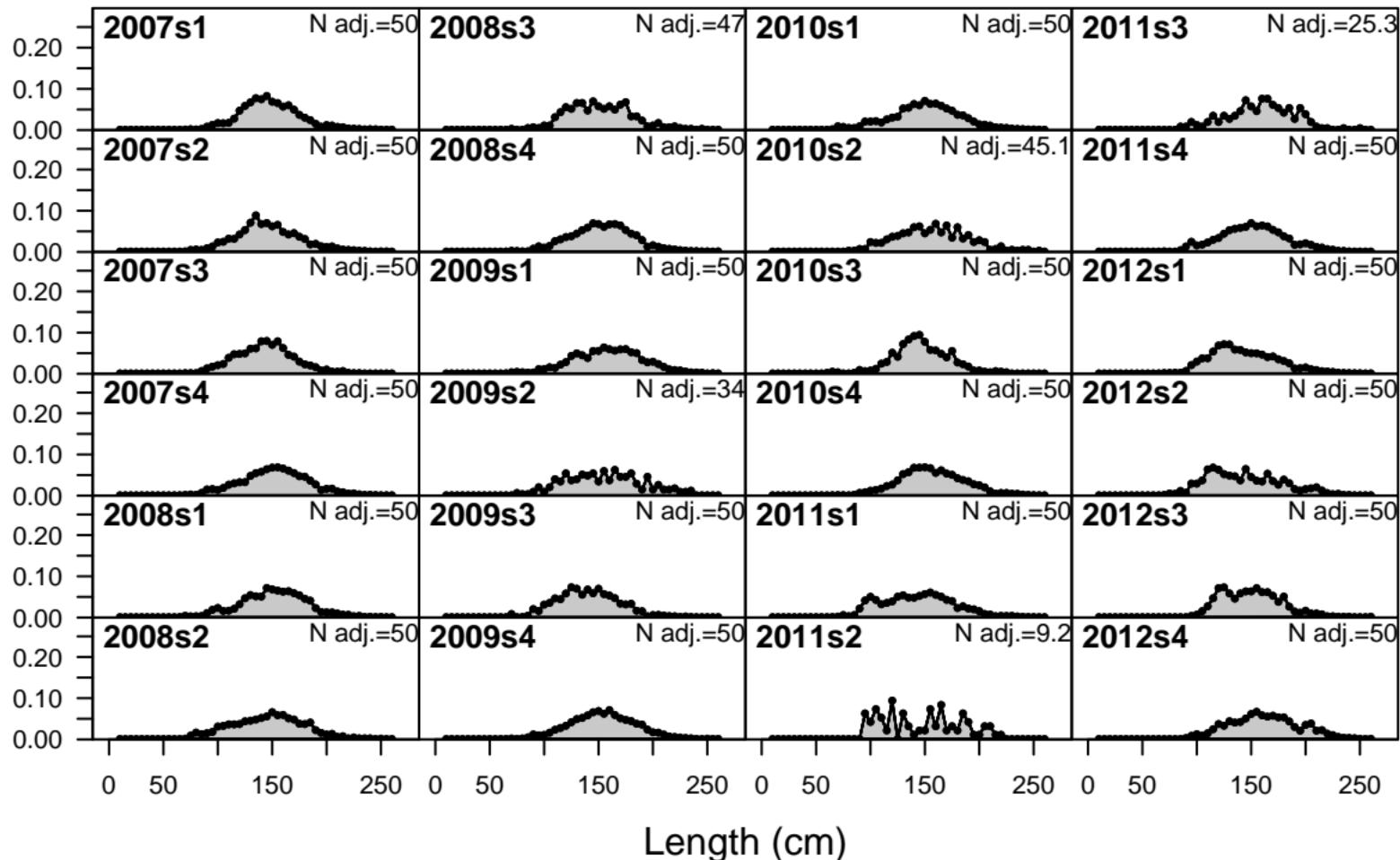
Proportion



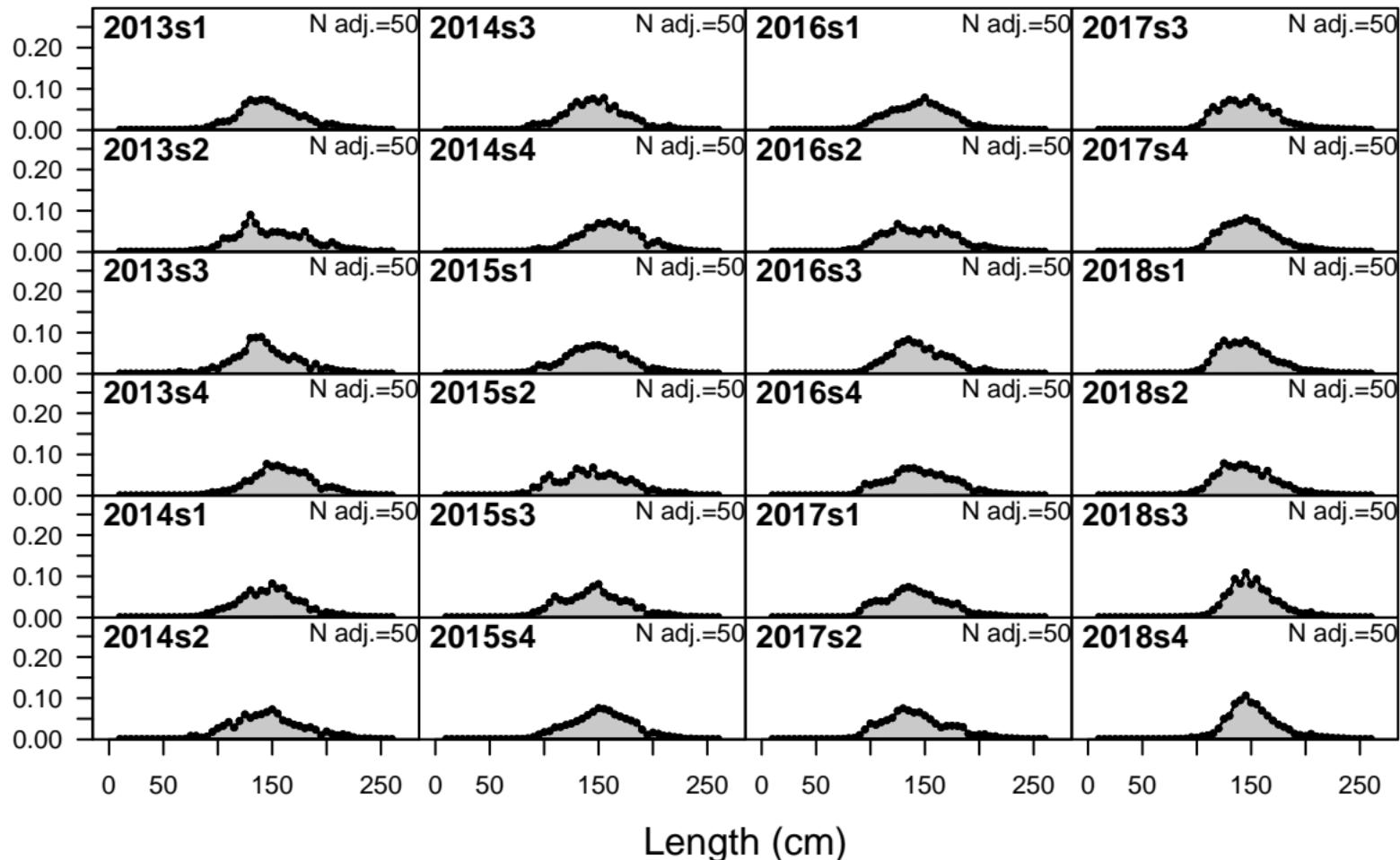
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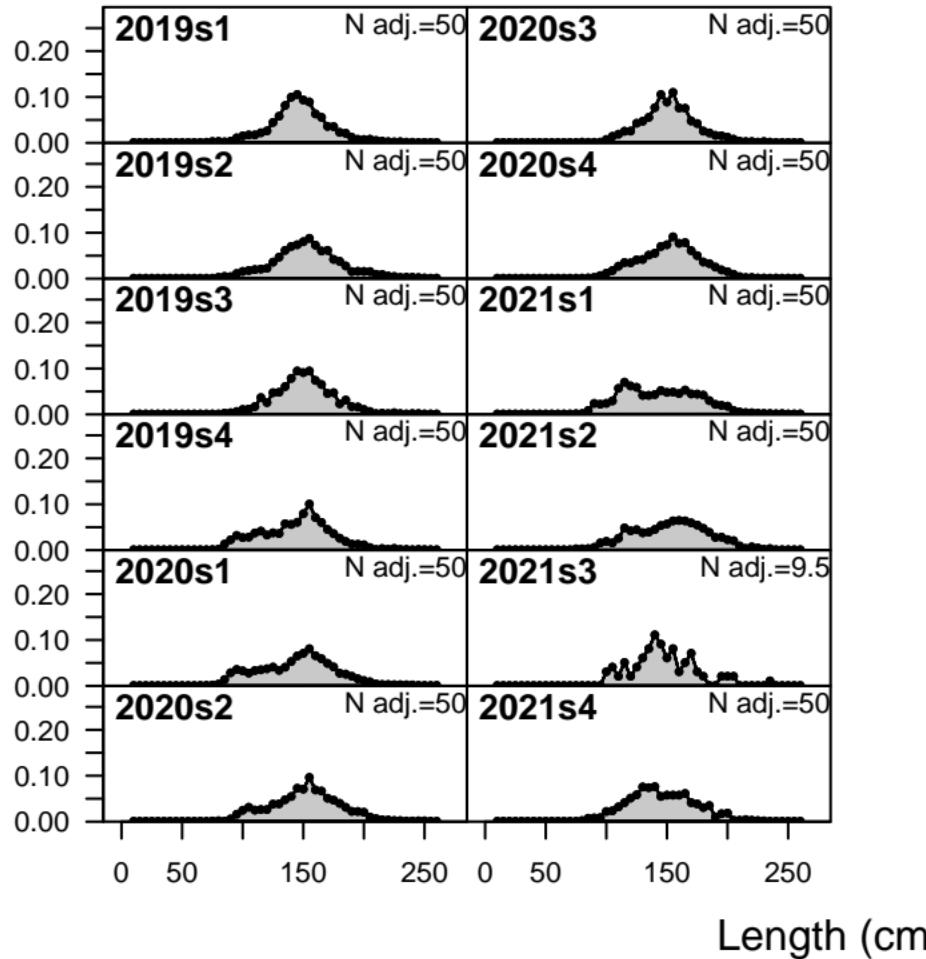
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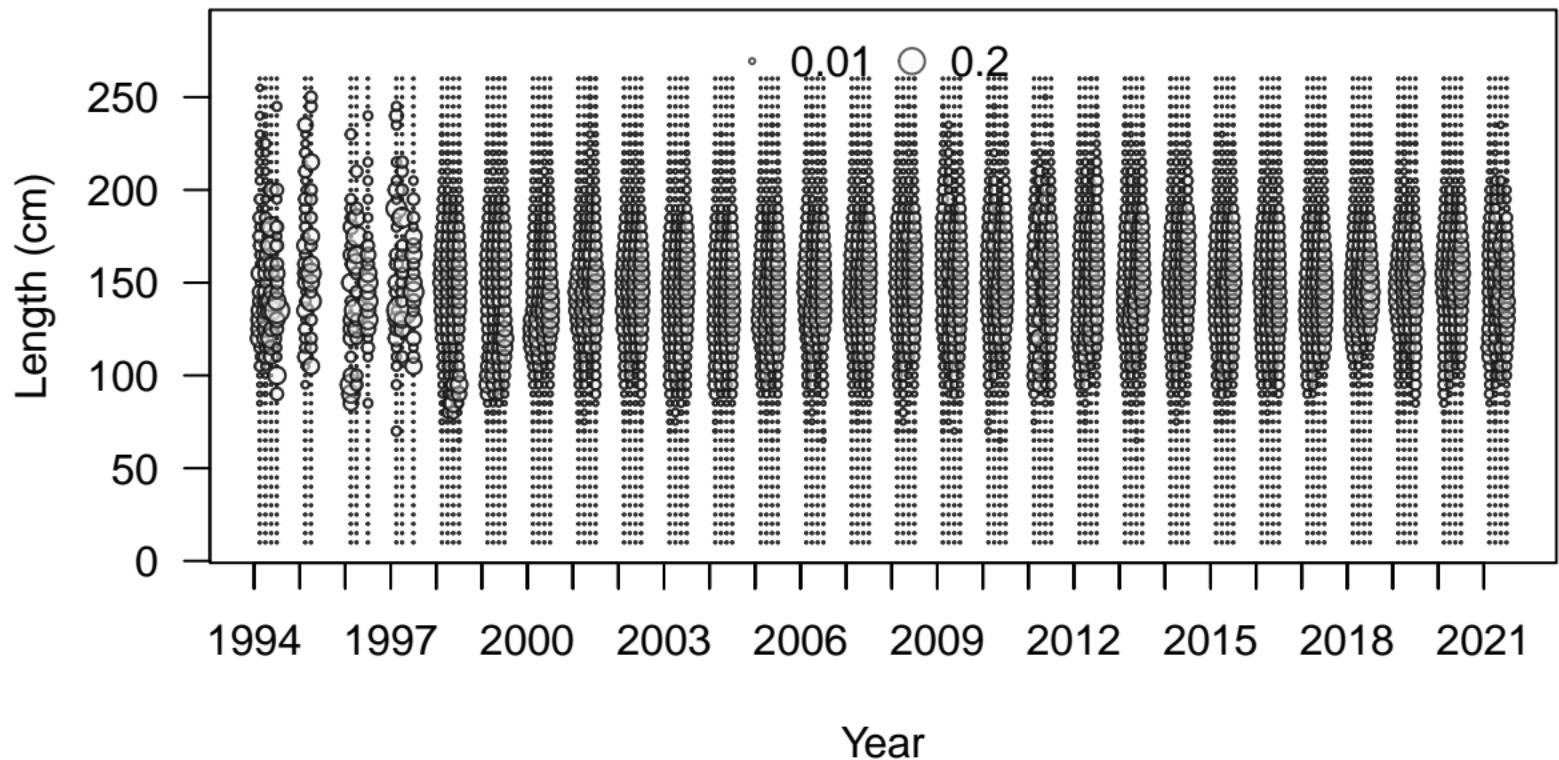


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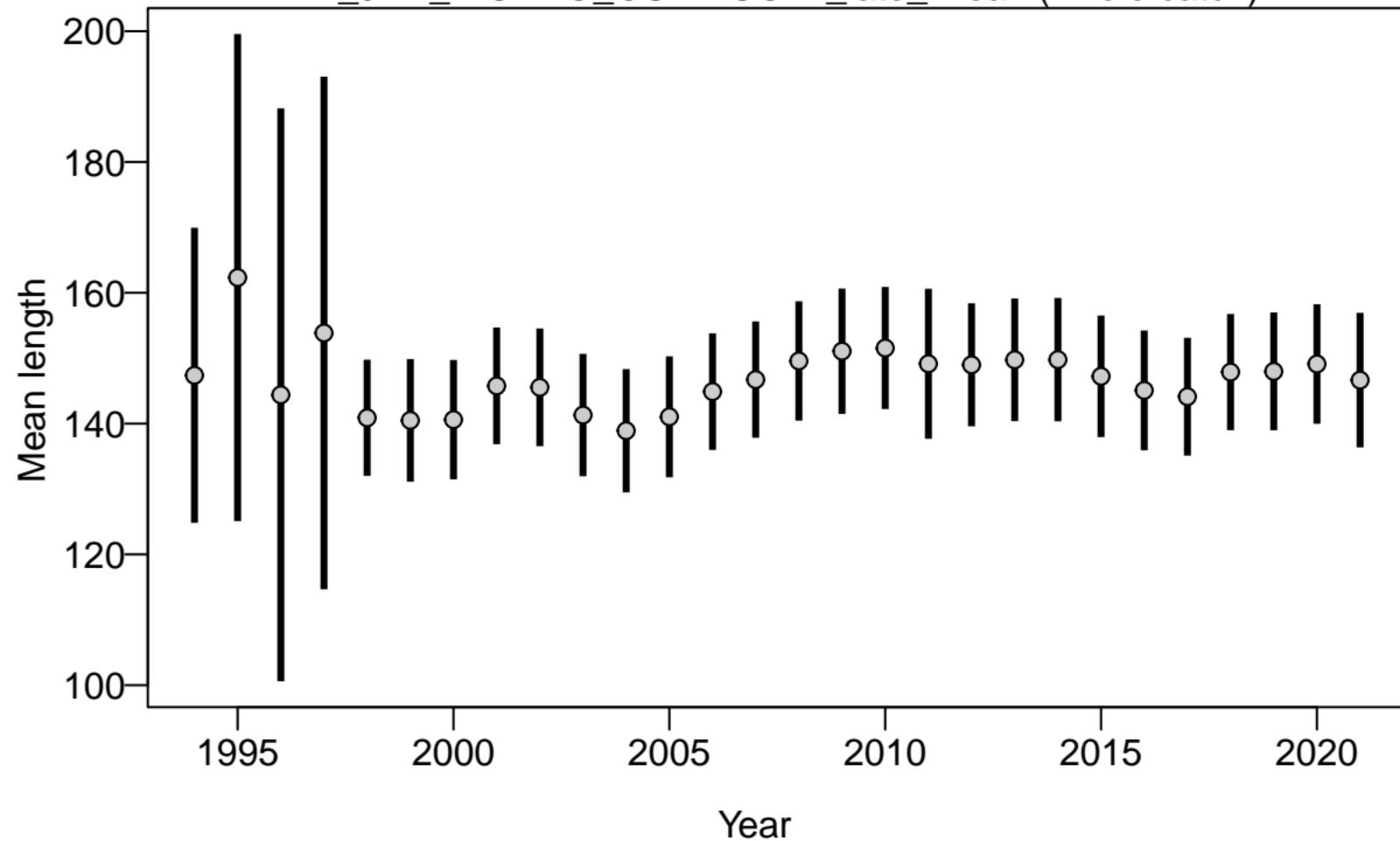


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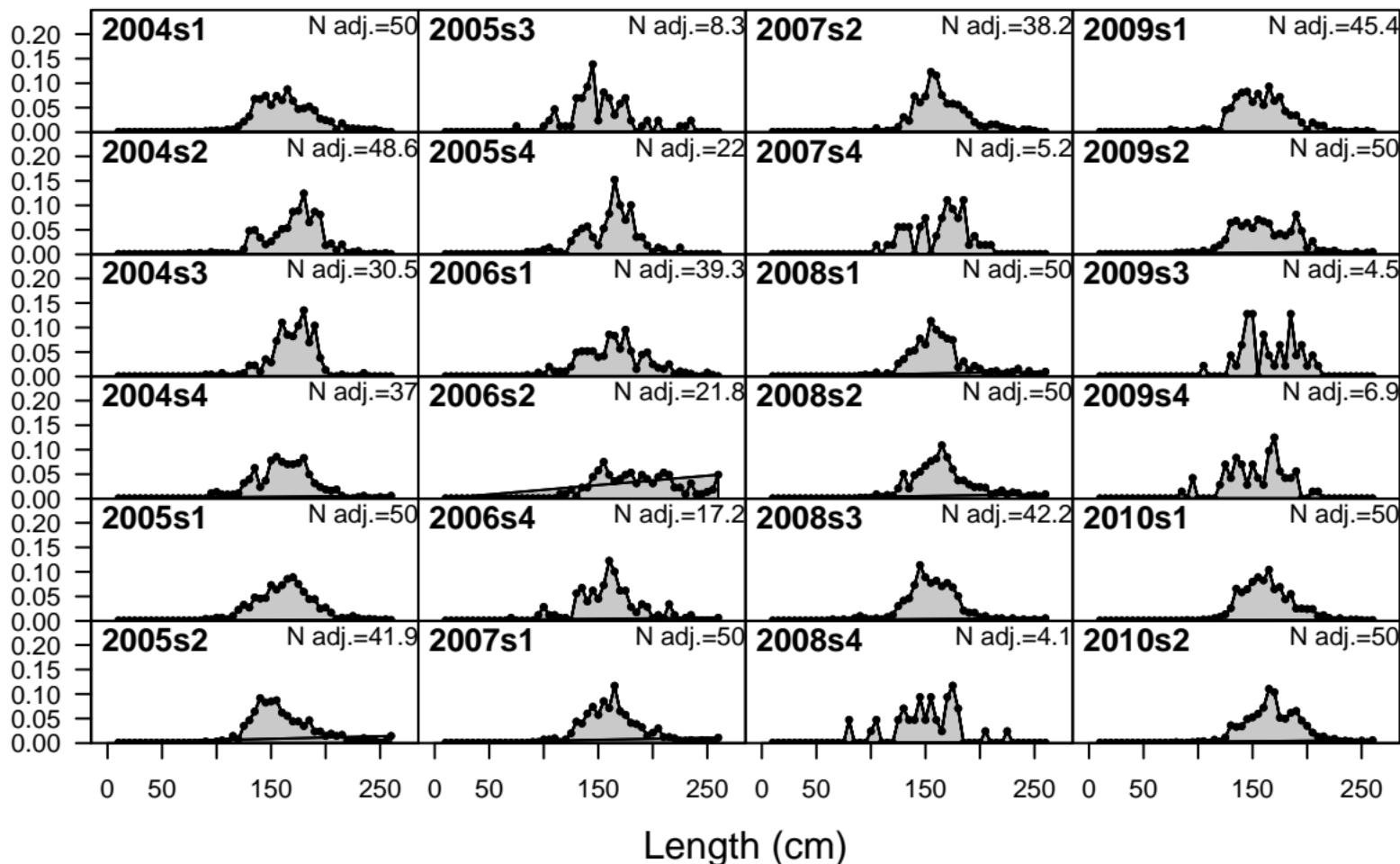




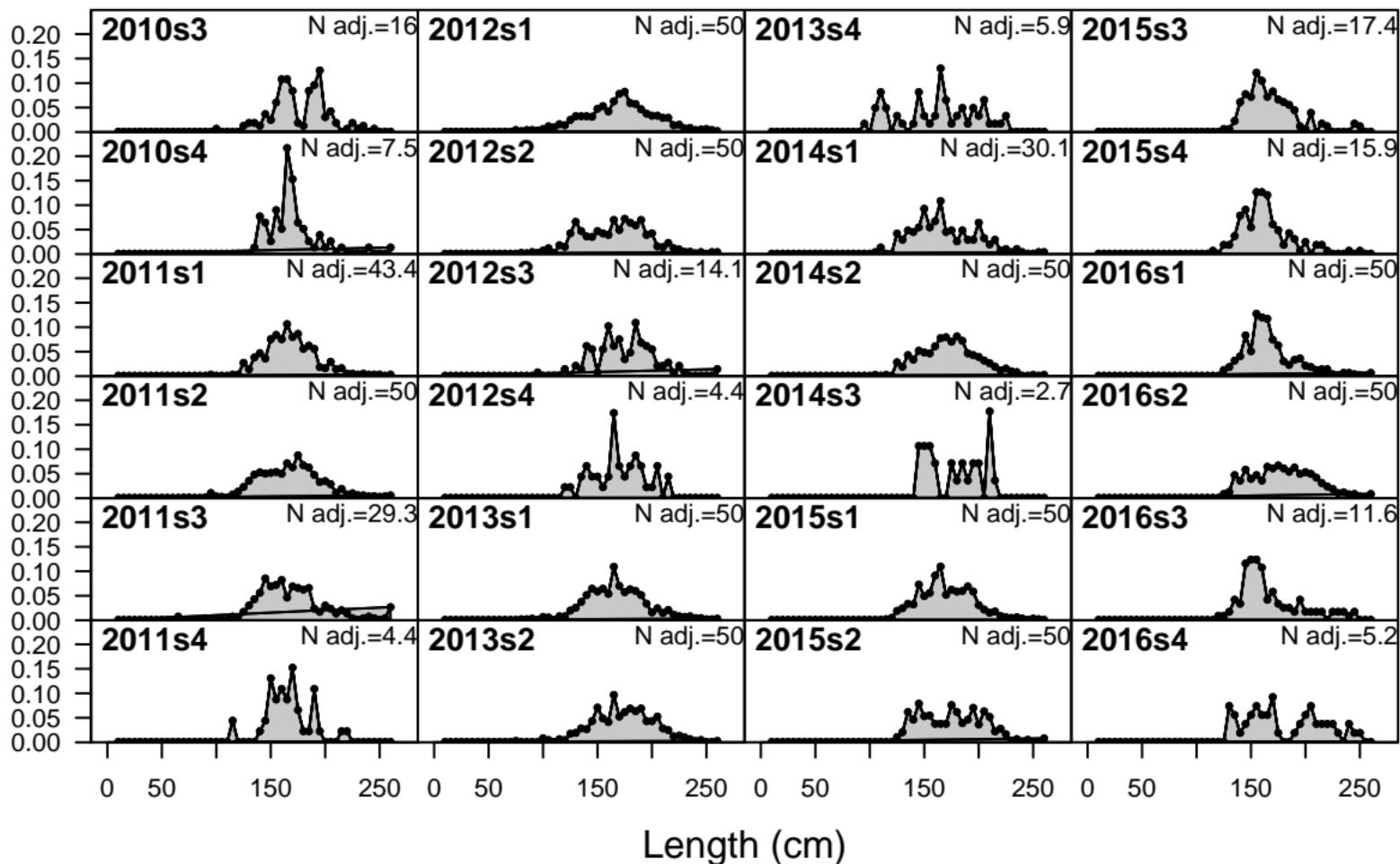
F1_JPN_WCNPO OSDWCOLL late Area1 (whole catch)



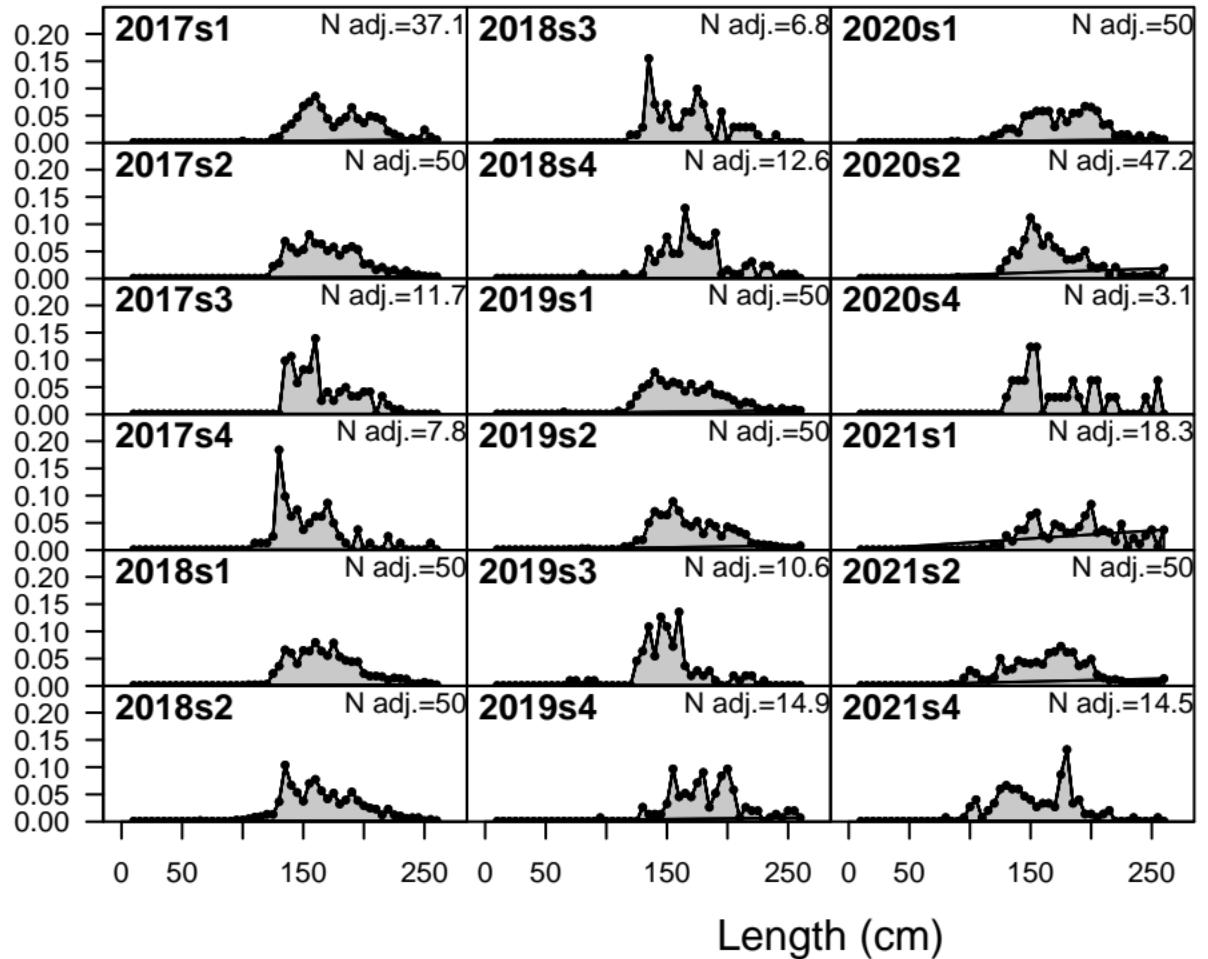
Proportion

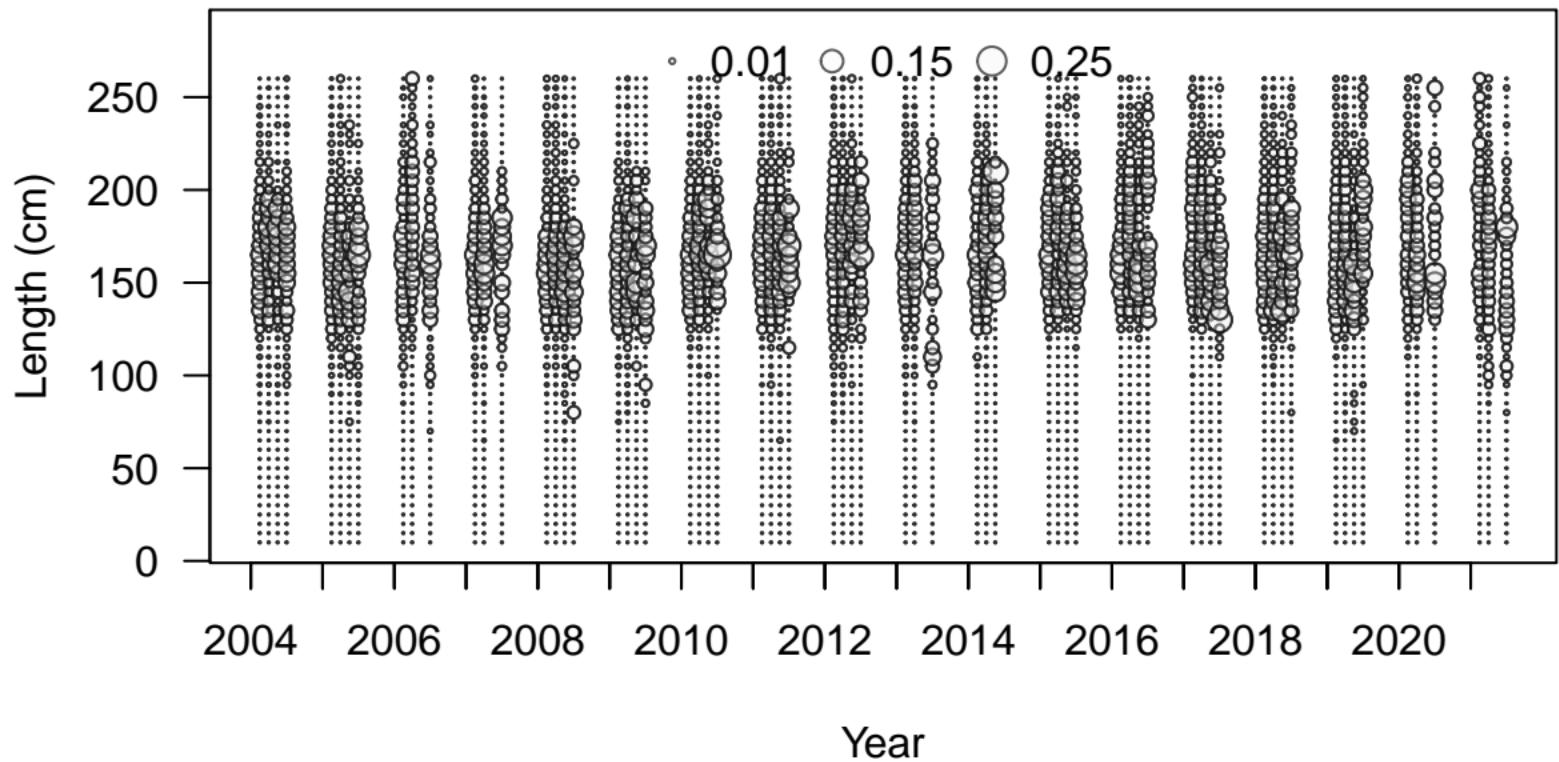


Proportion

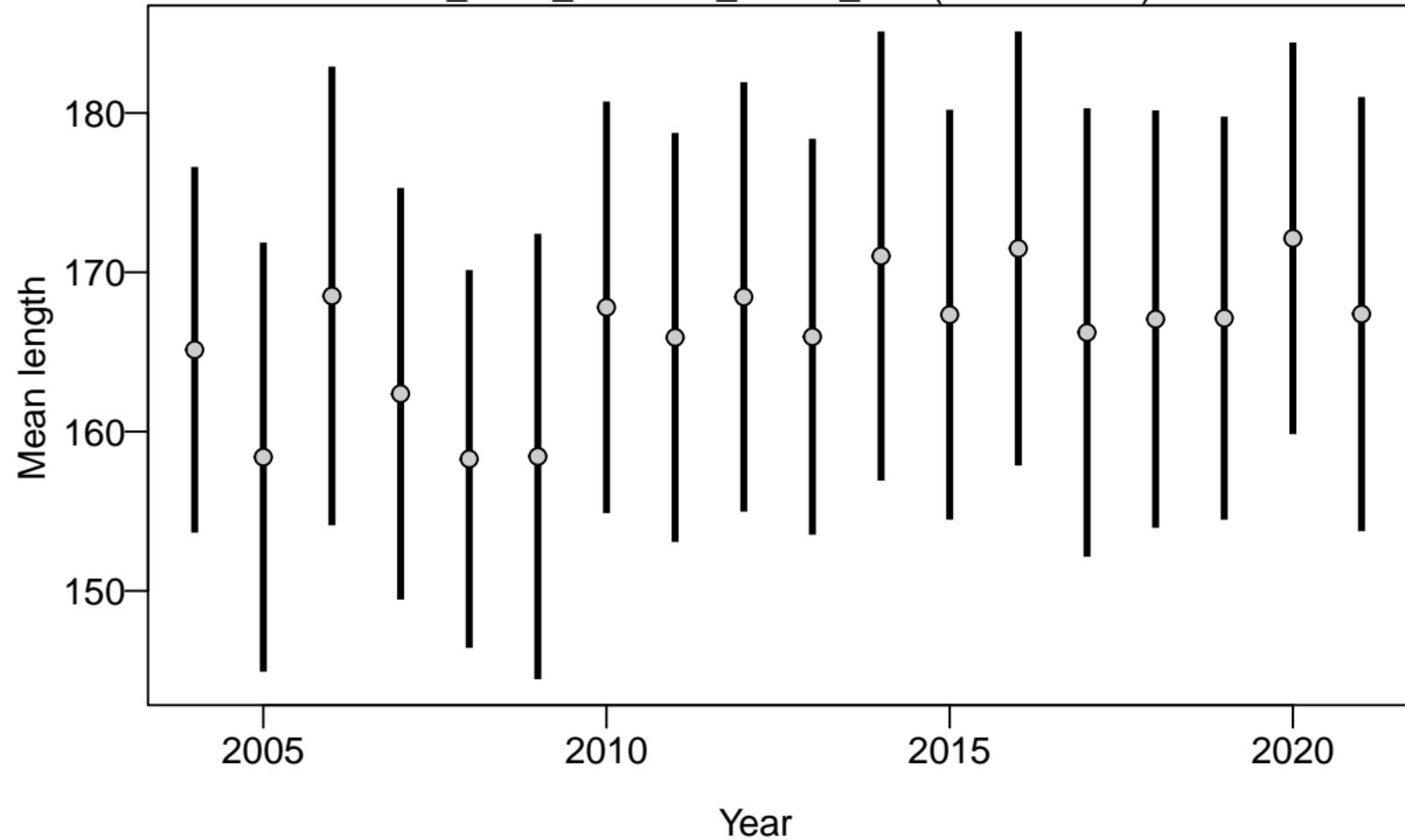


Proportion

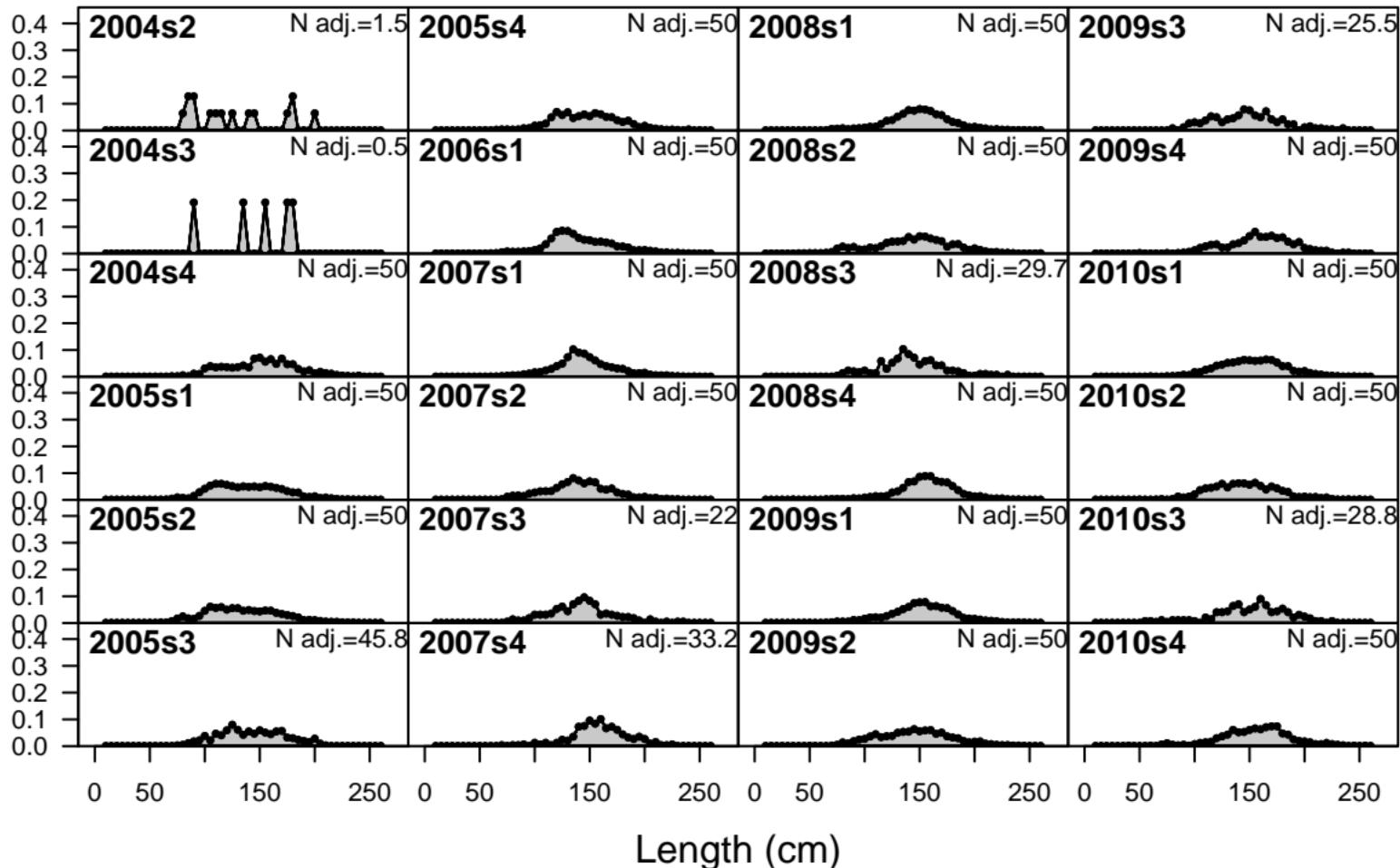




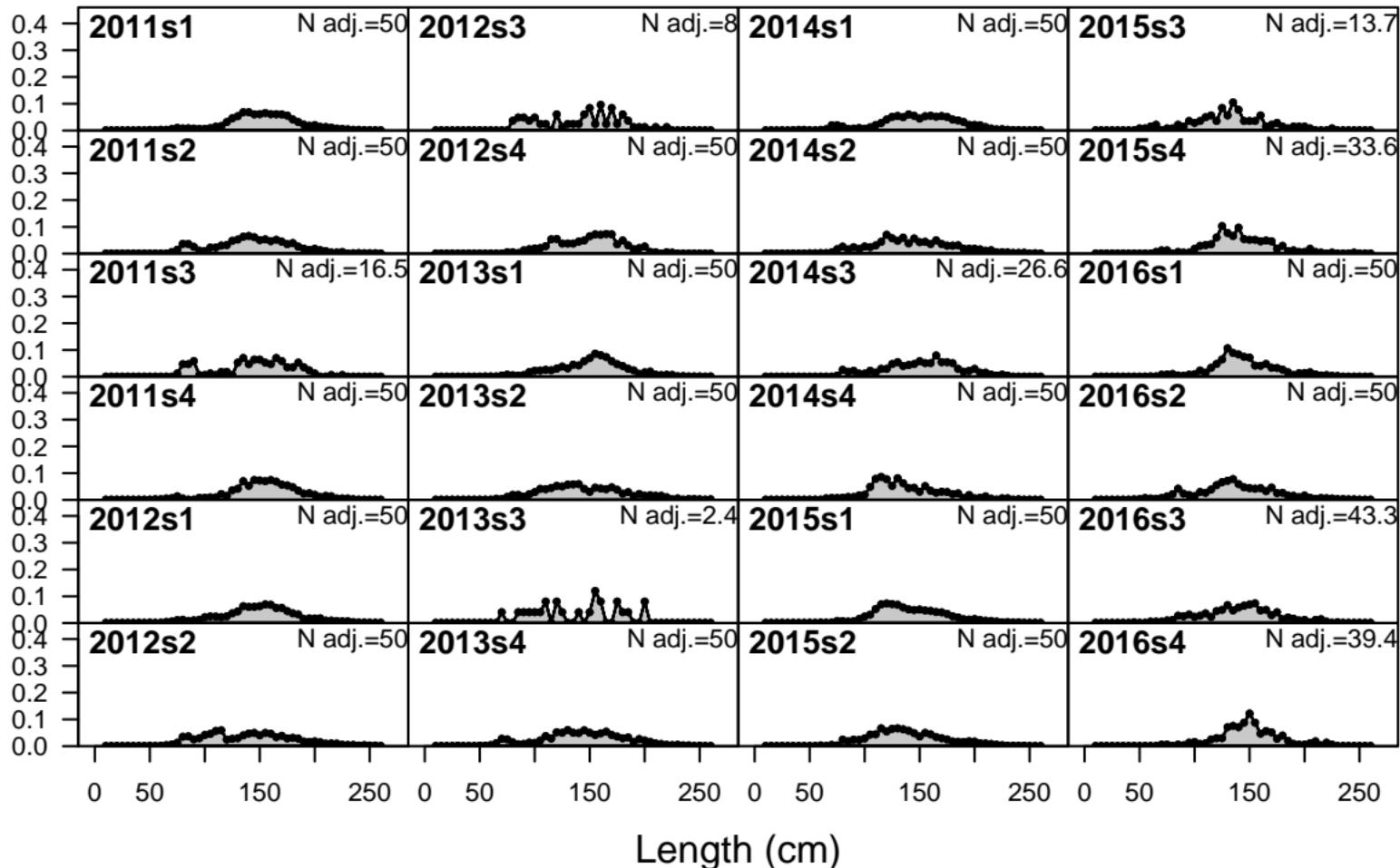
F2_TWN_WCNPO_DWLL_late (whole catch)



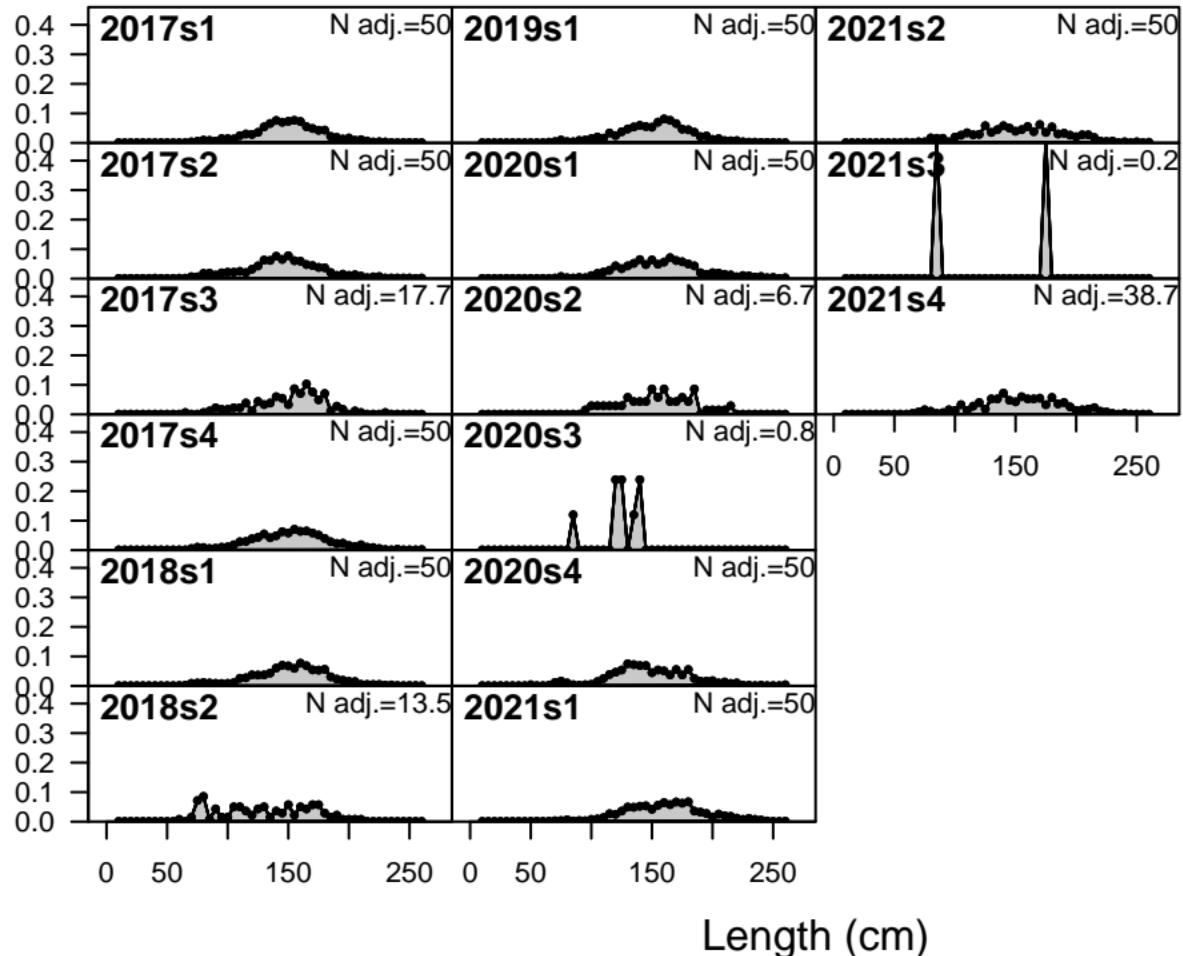
Proportion

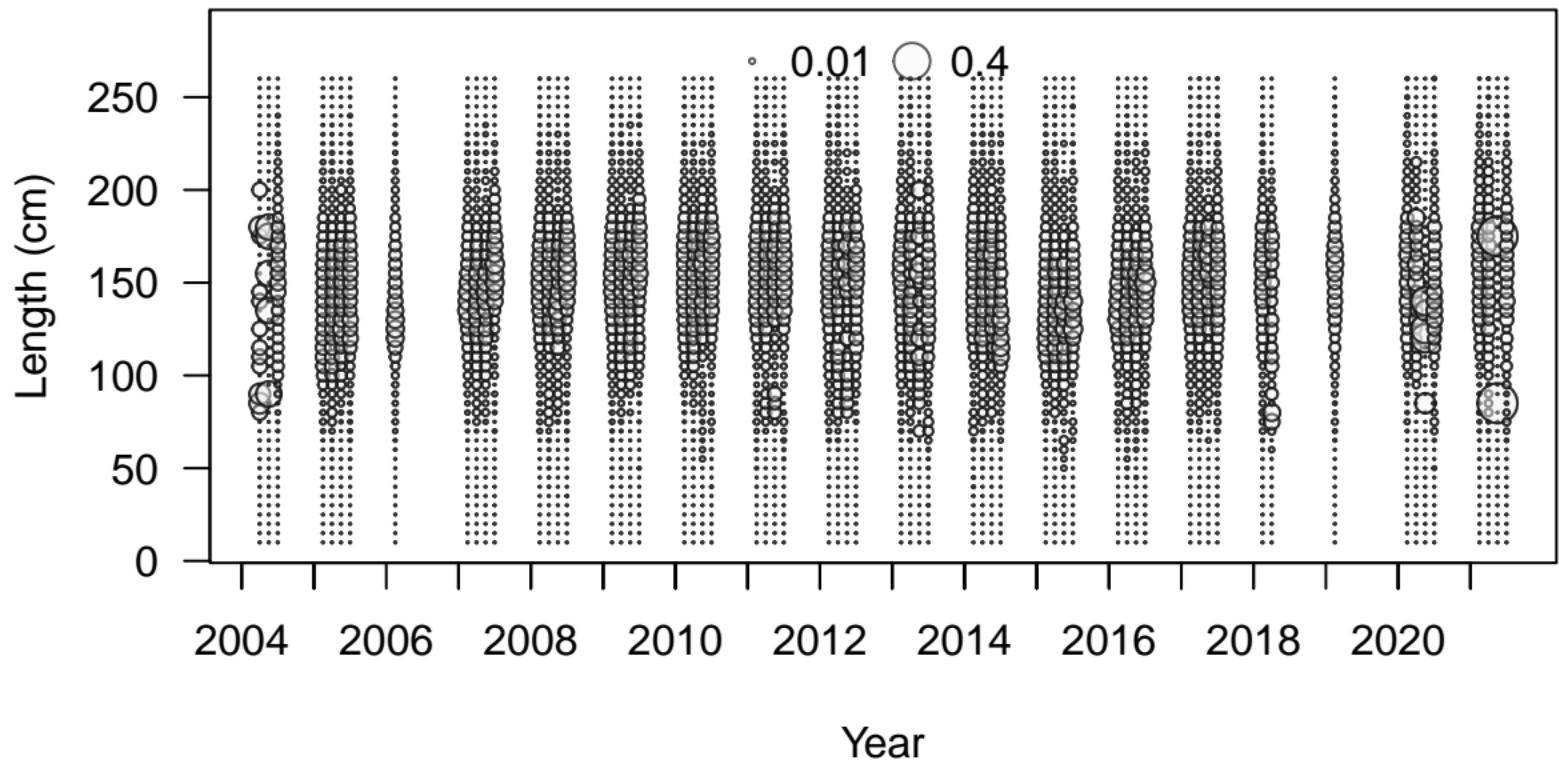


Proportion

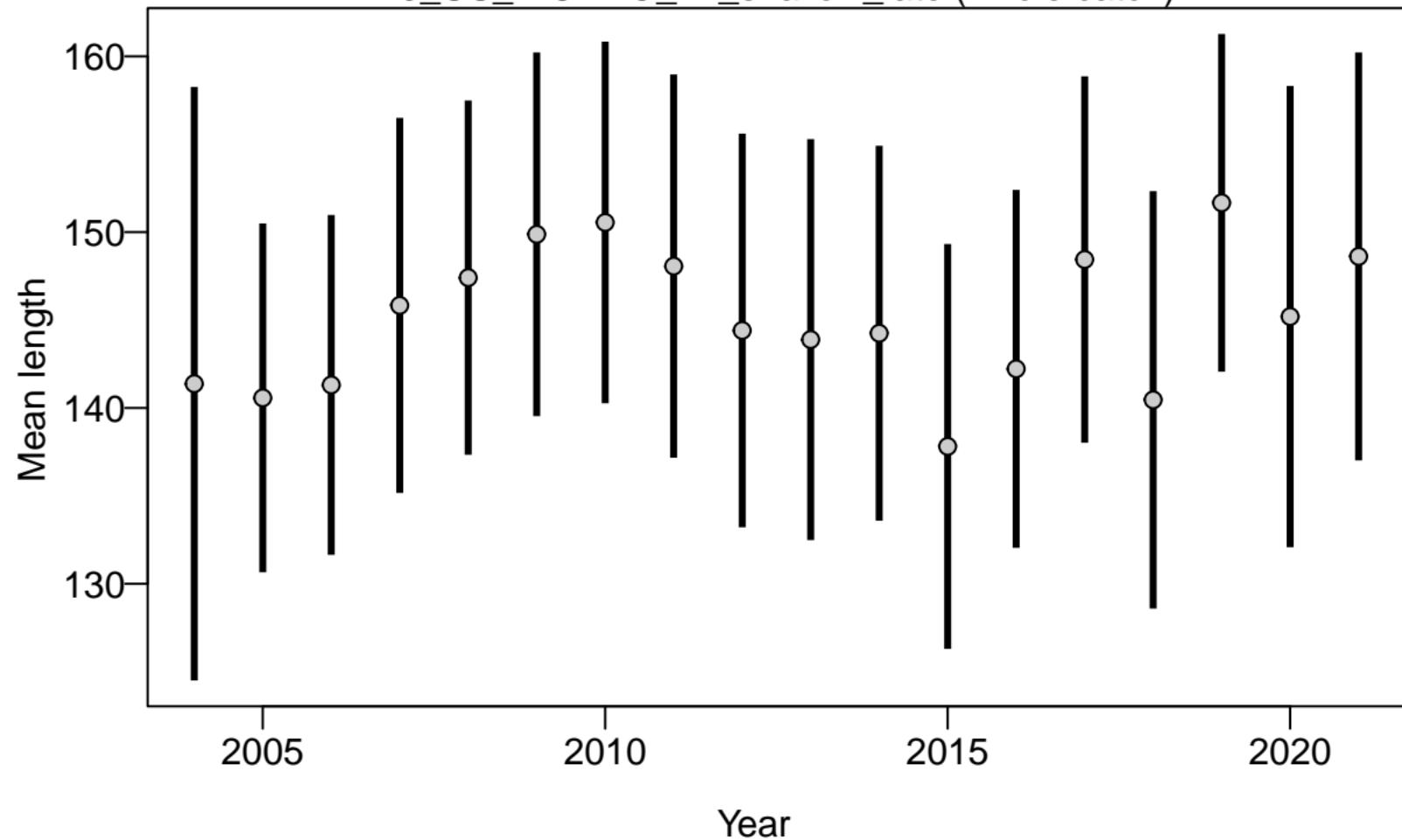


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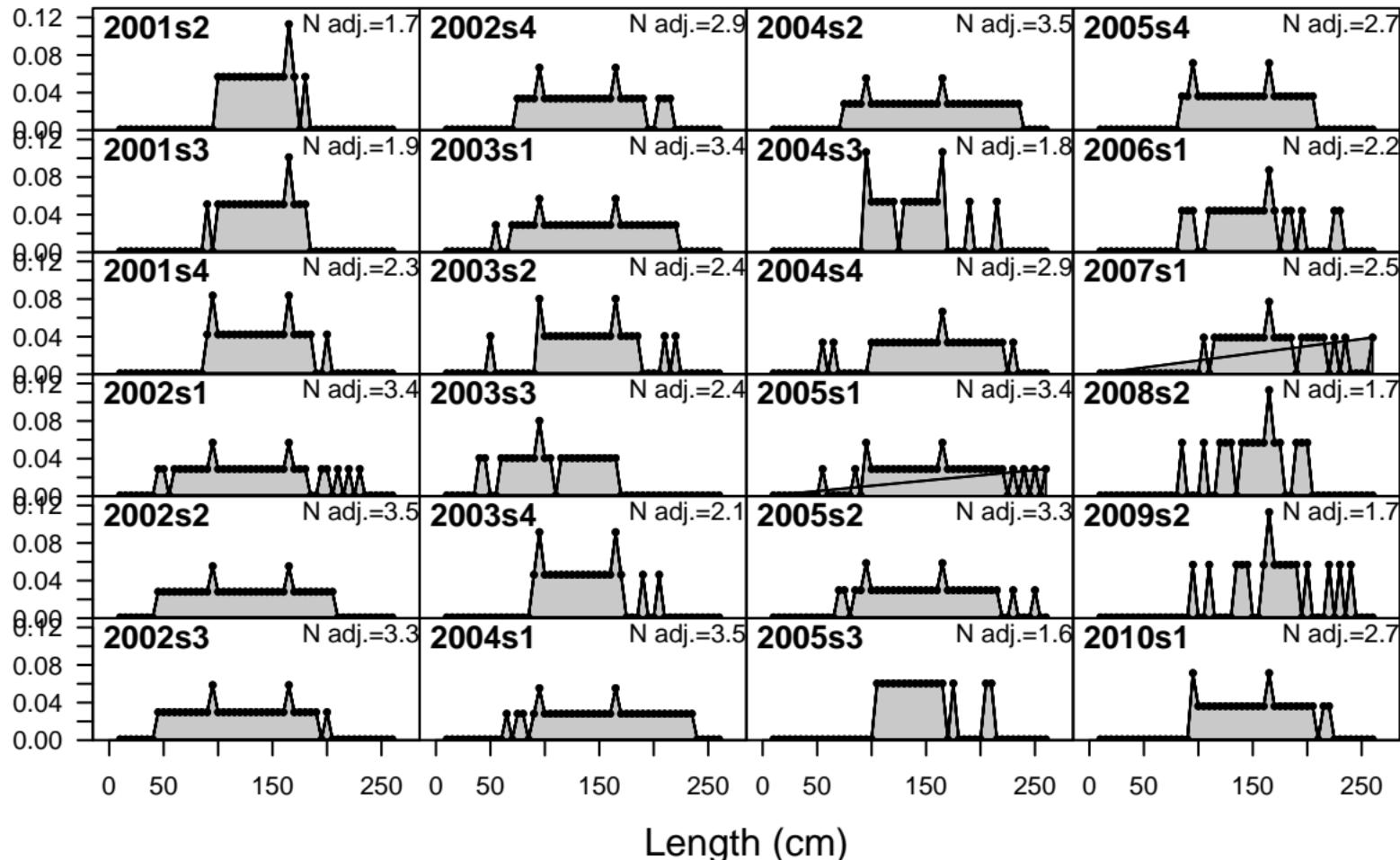




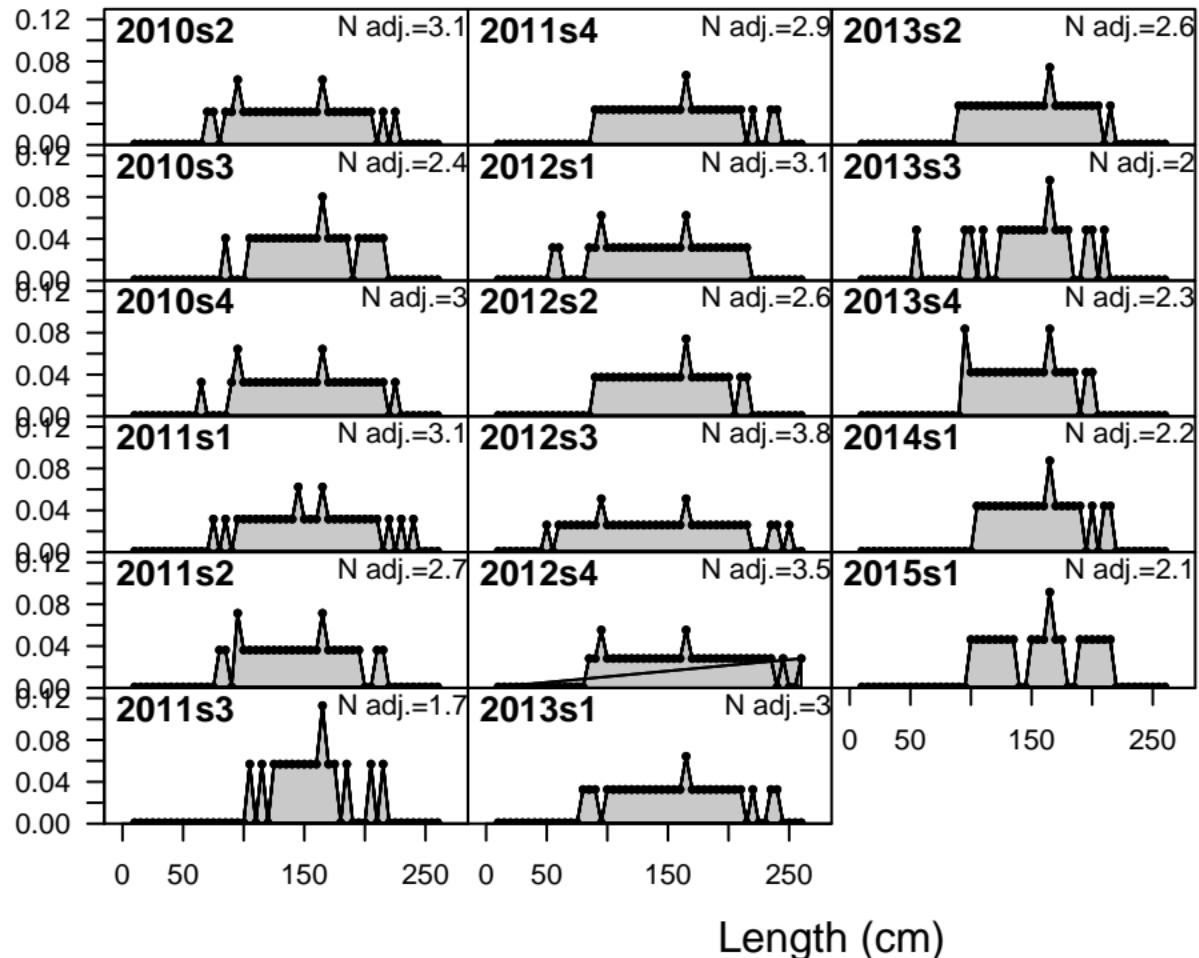
F3_US_WCNPO_LL_shallow_late (whole catch)

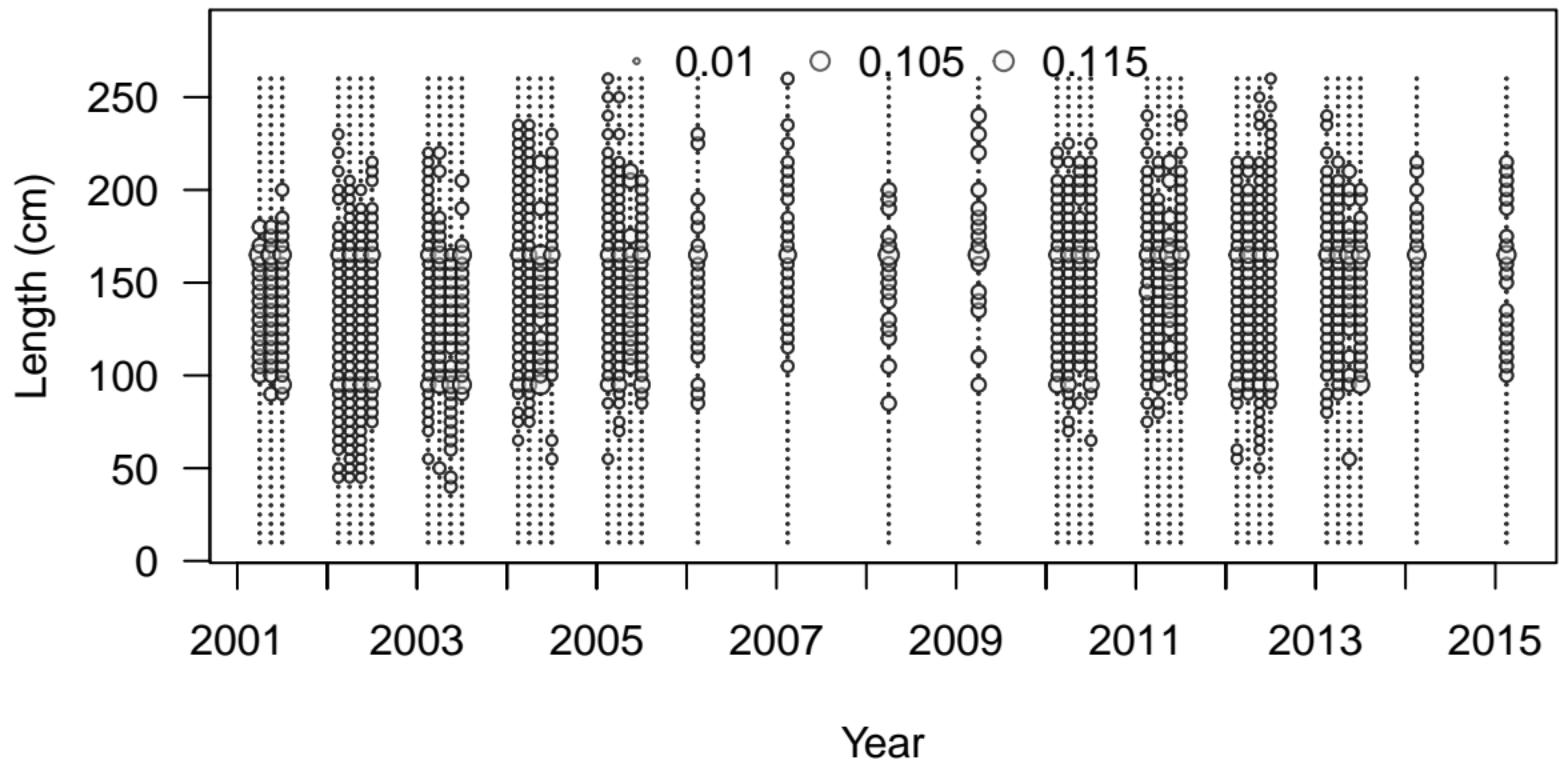


Proportion

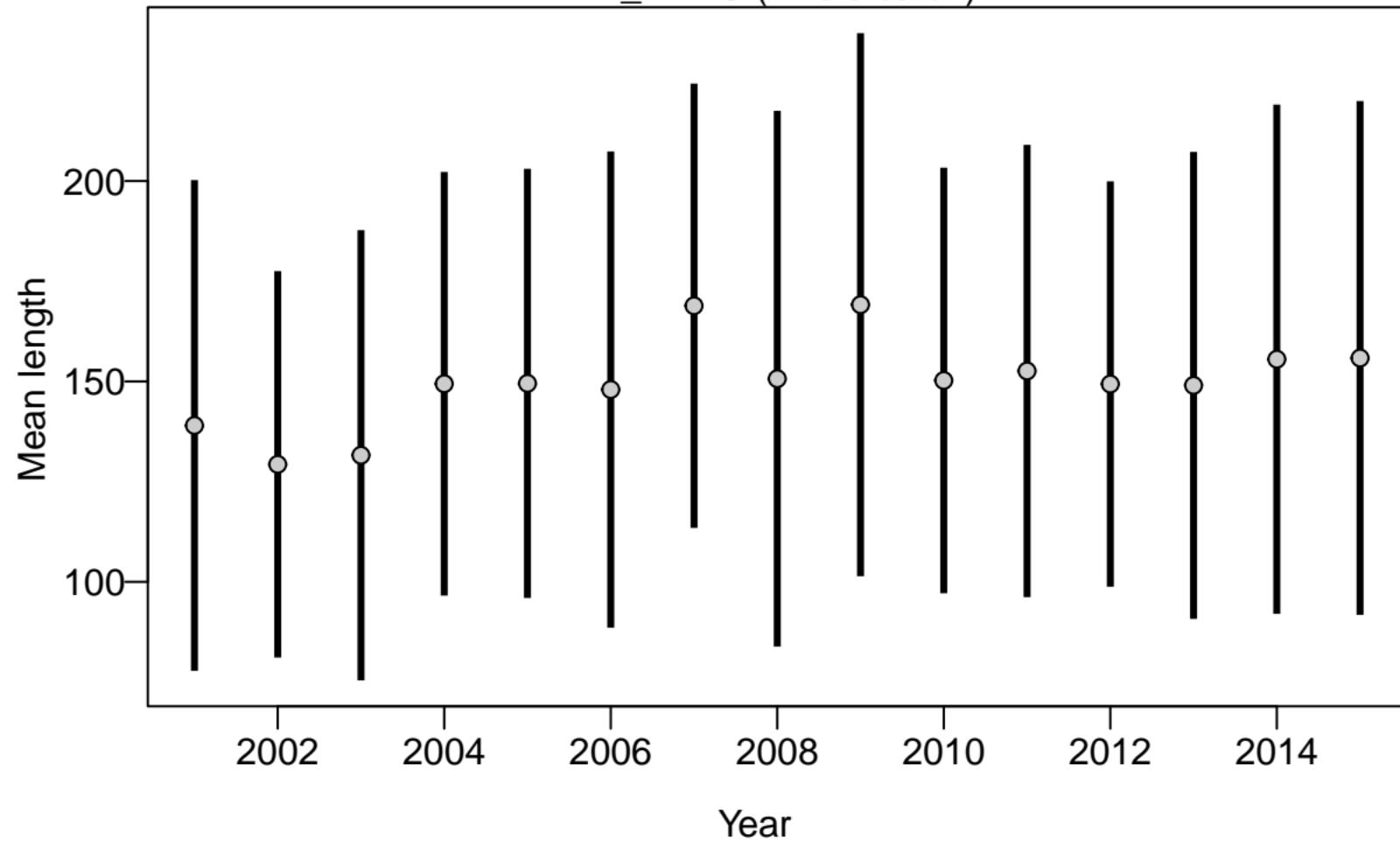


Proportion

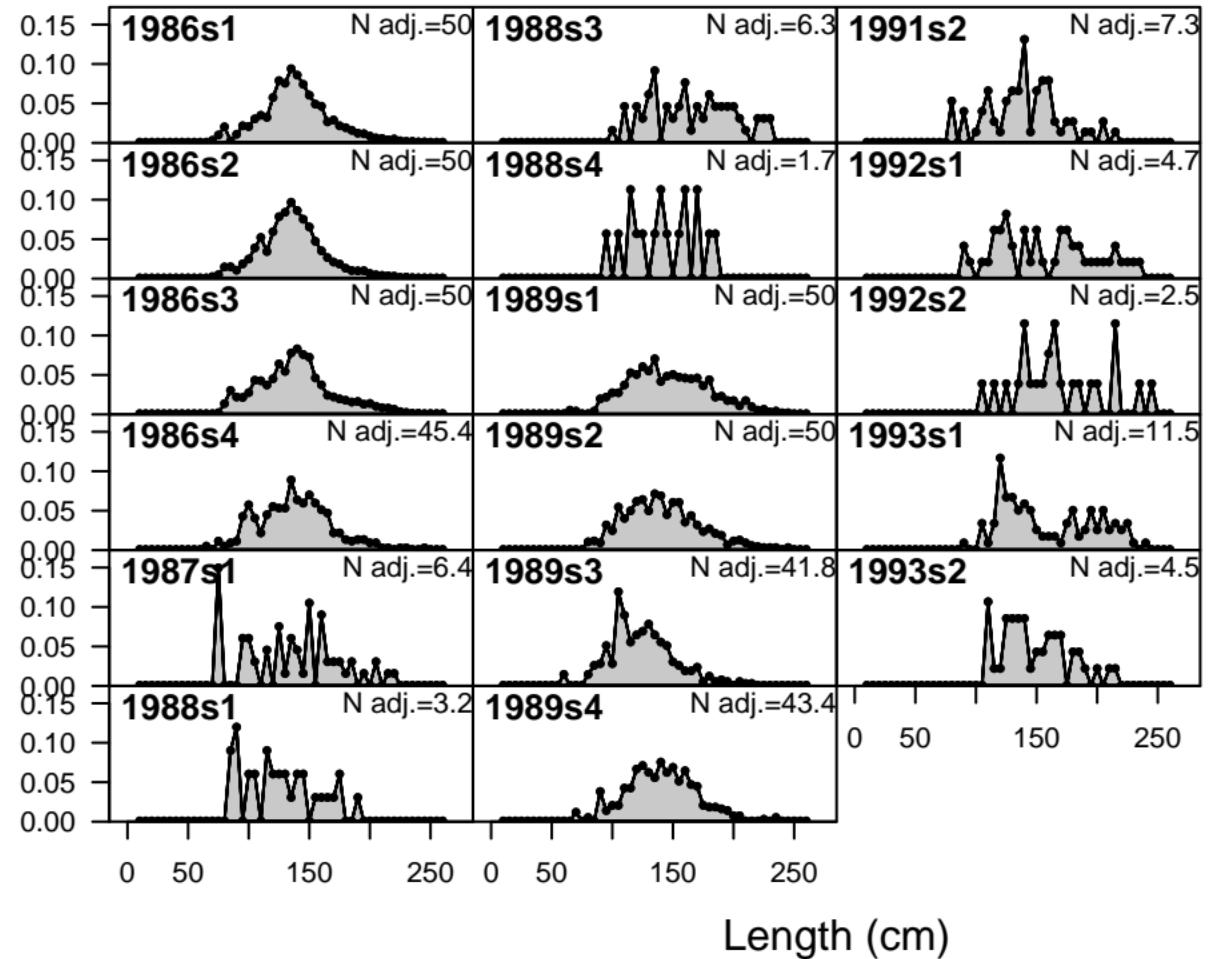


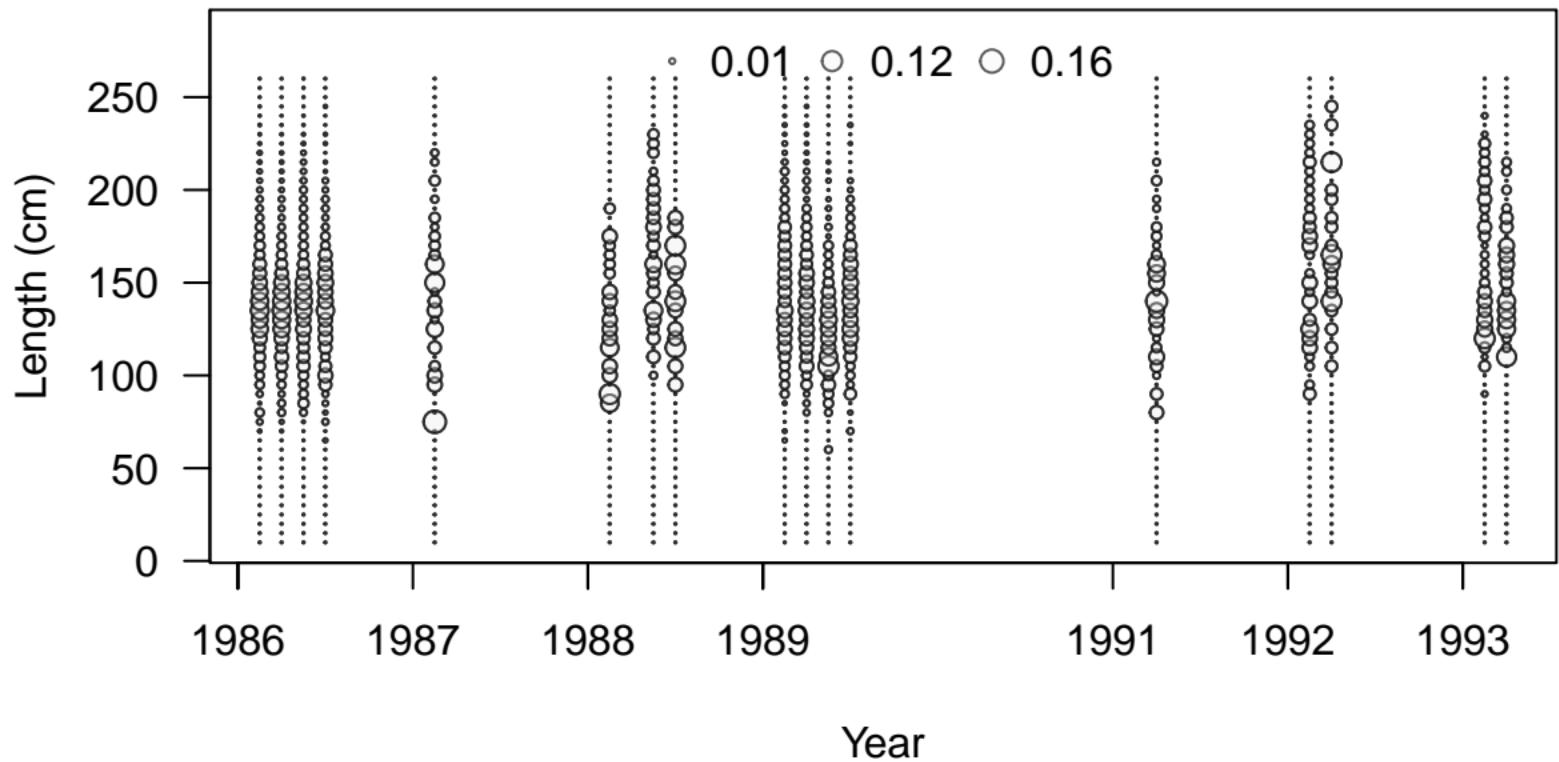


F4_IATTC (whole catch)

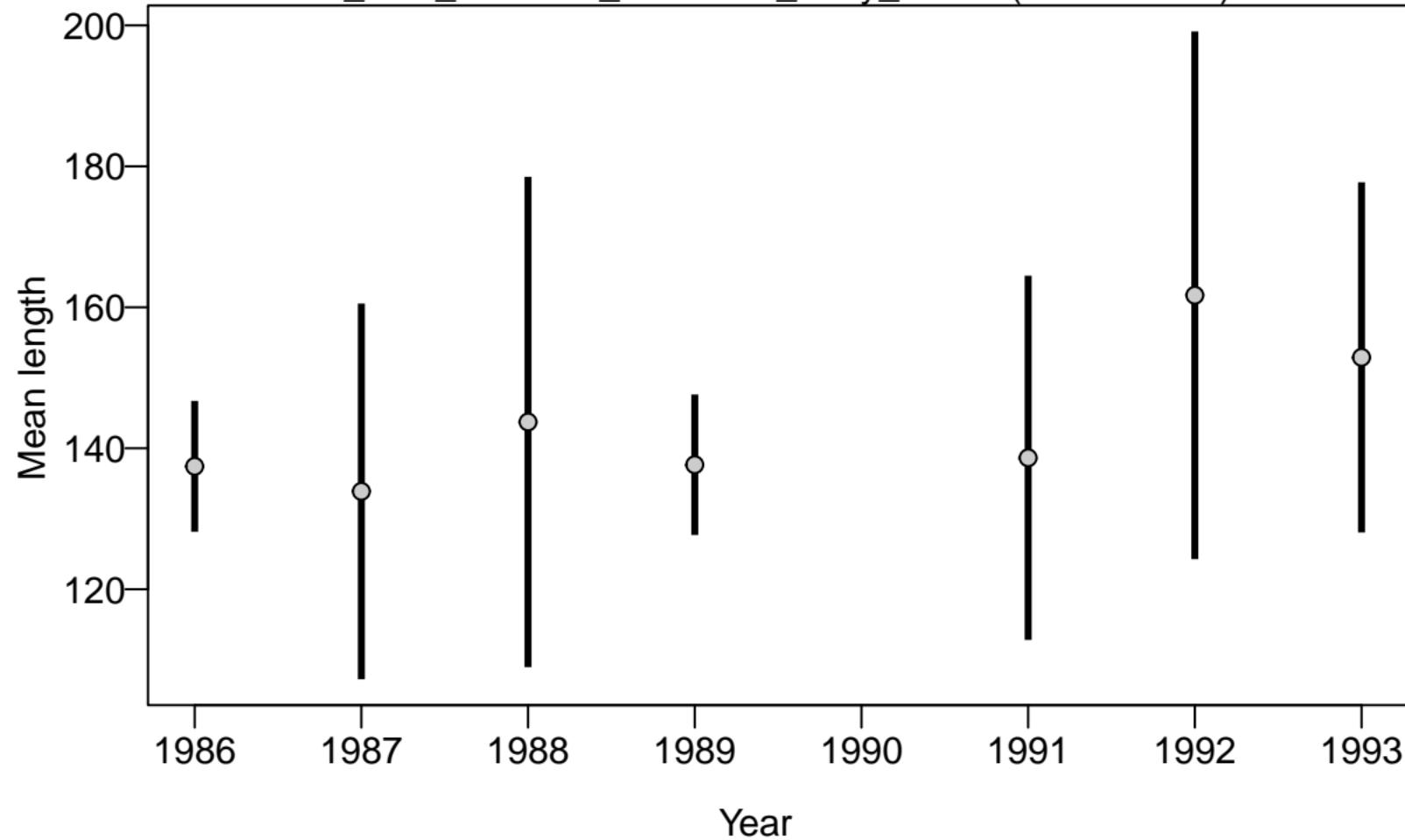


Proportion

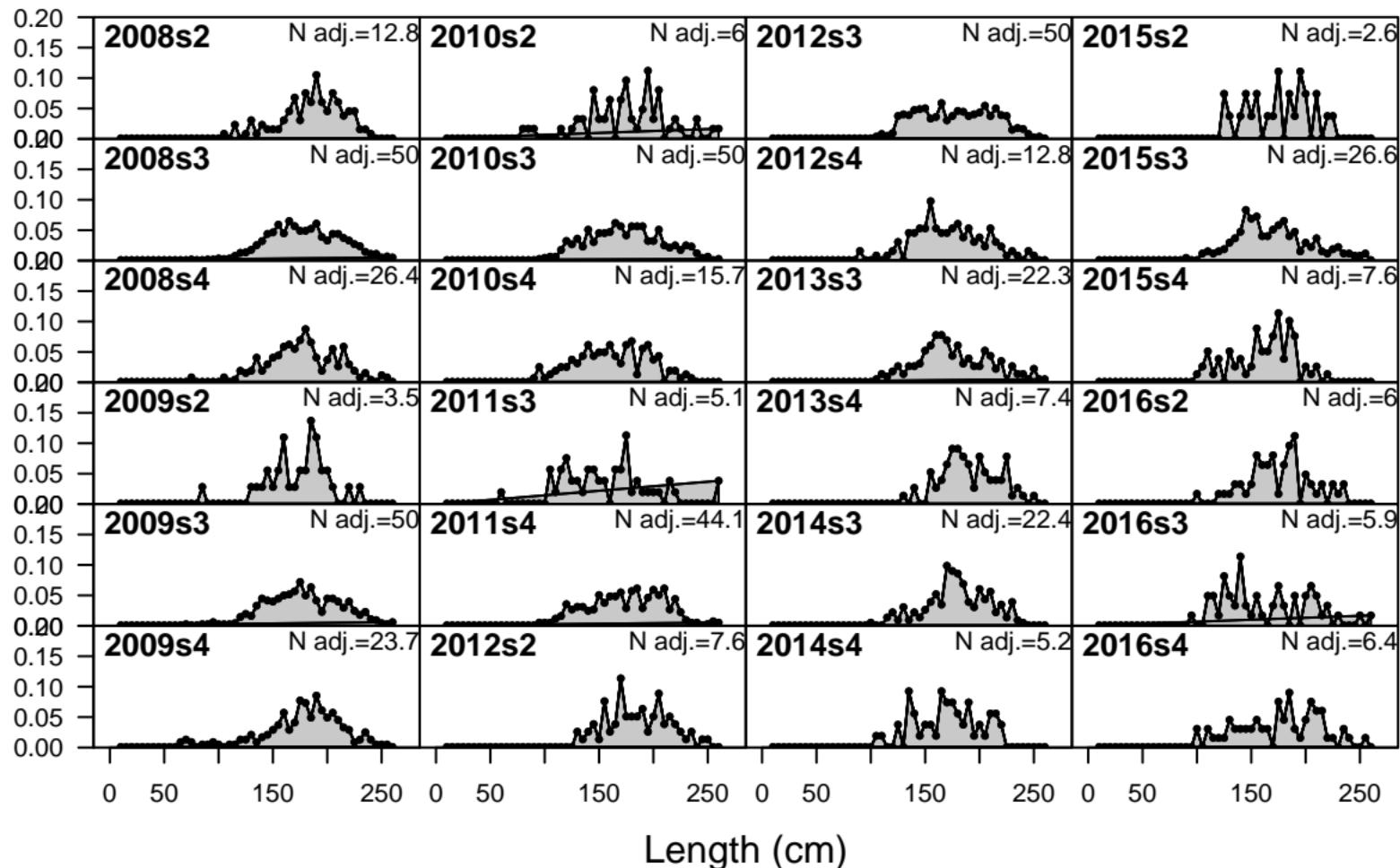




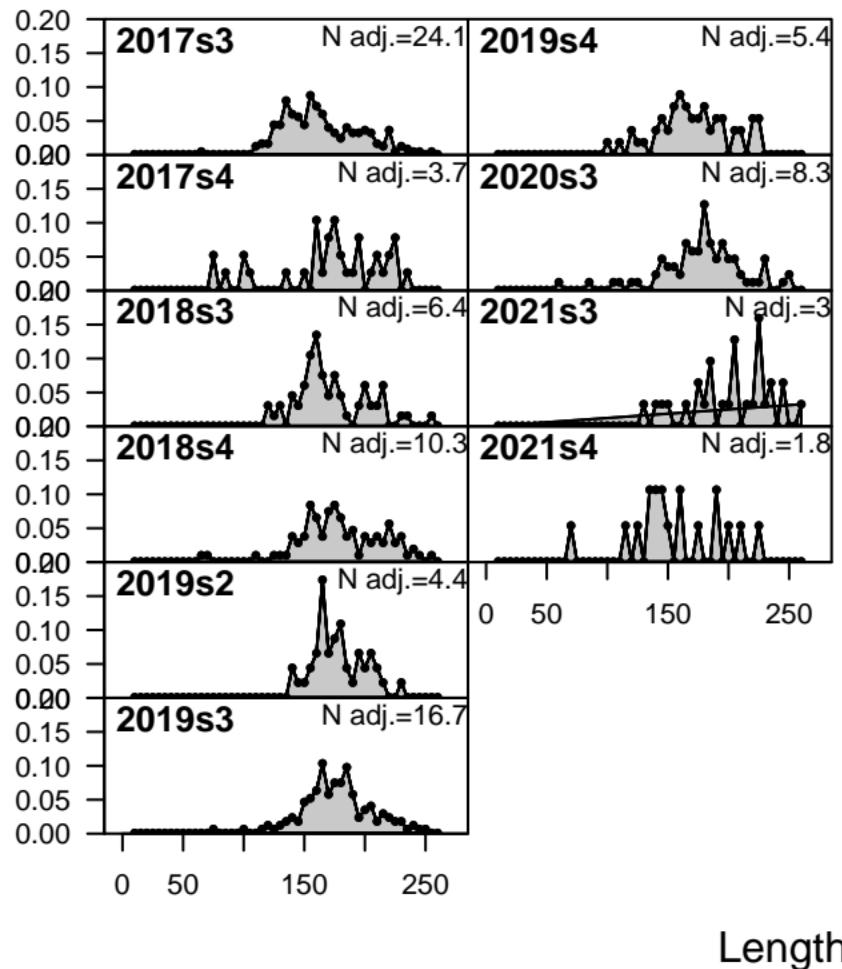
F6_JPN_WCNPO OSDWLL_early_Area1 (whole catch)

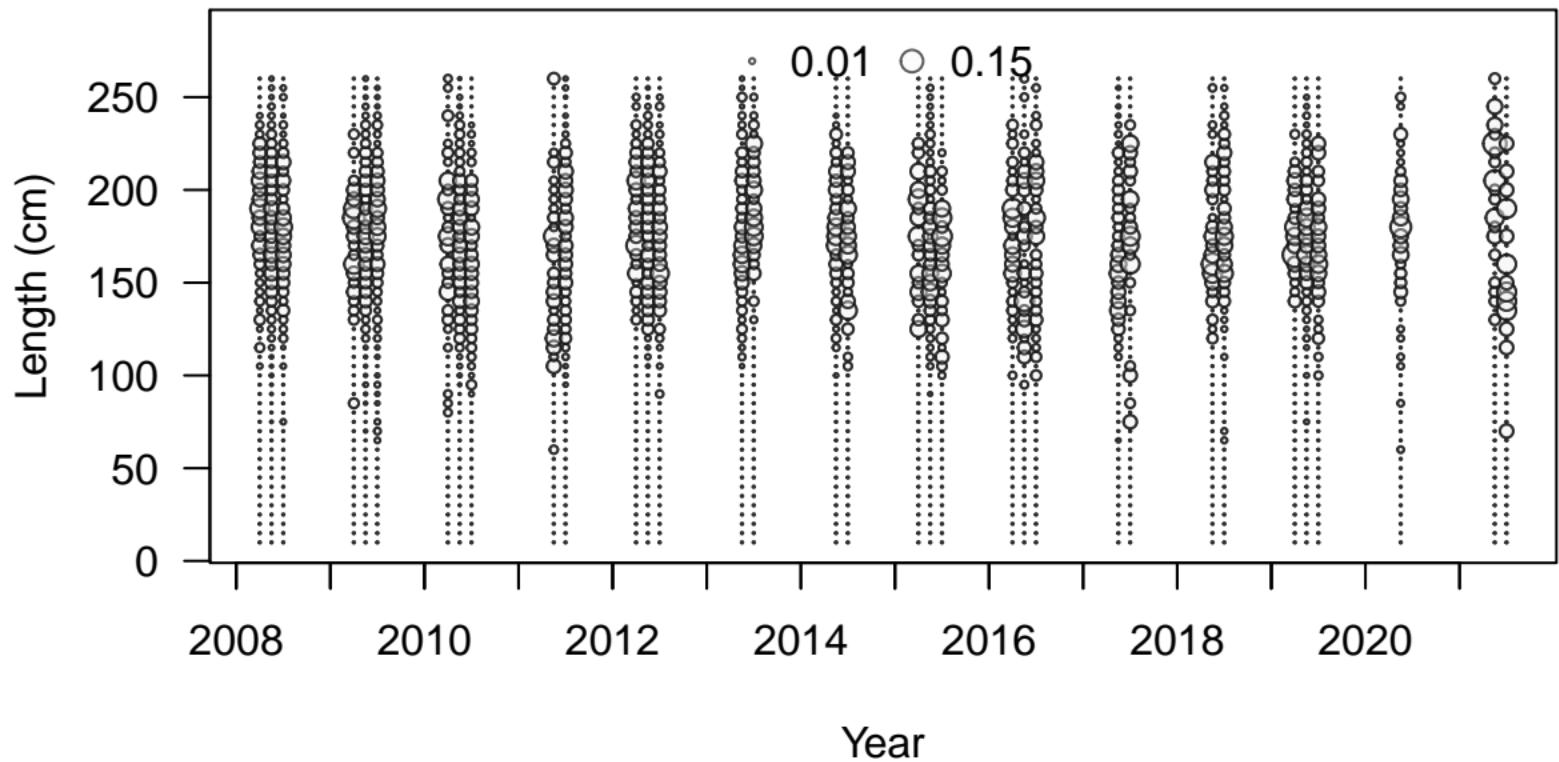


Proportion

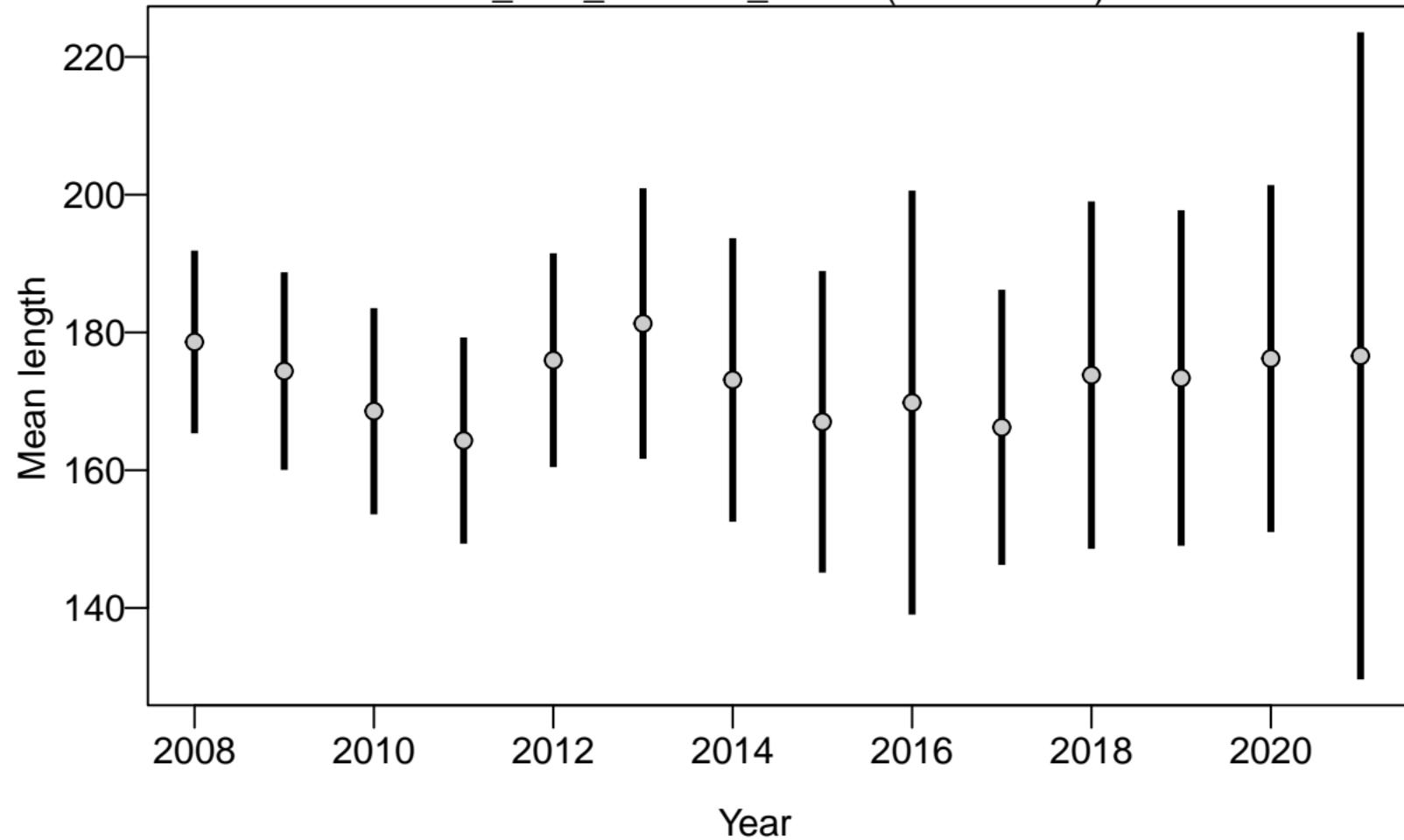


Proportion

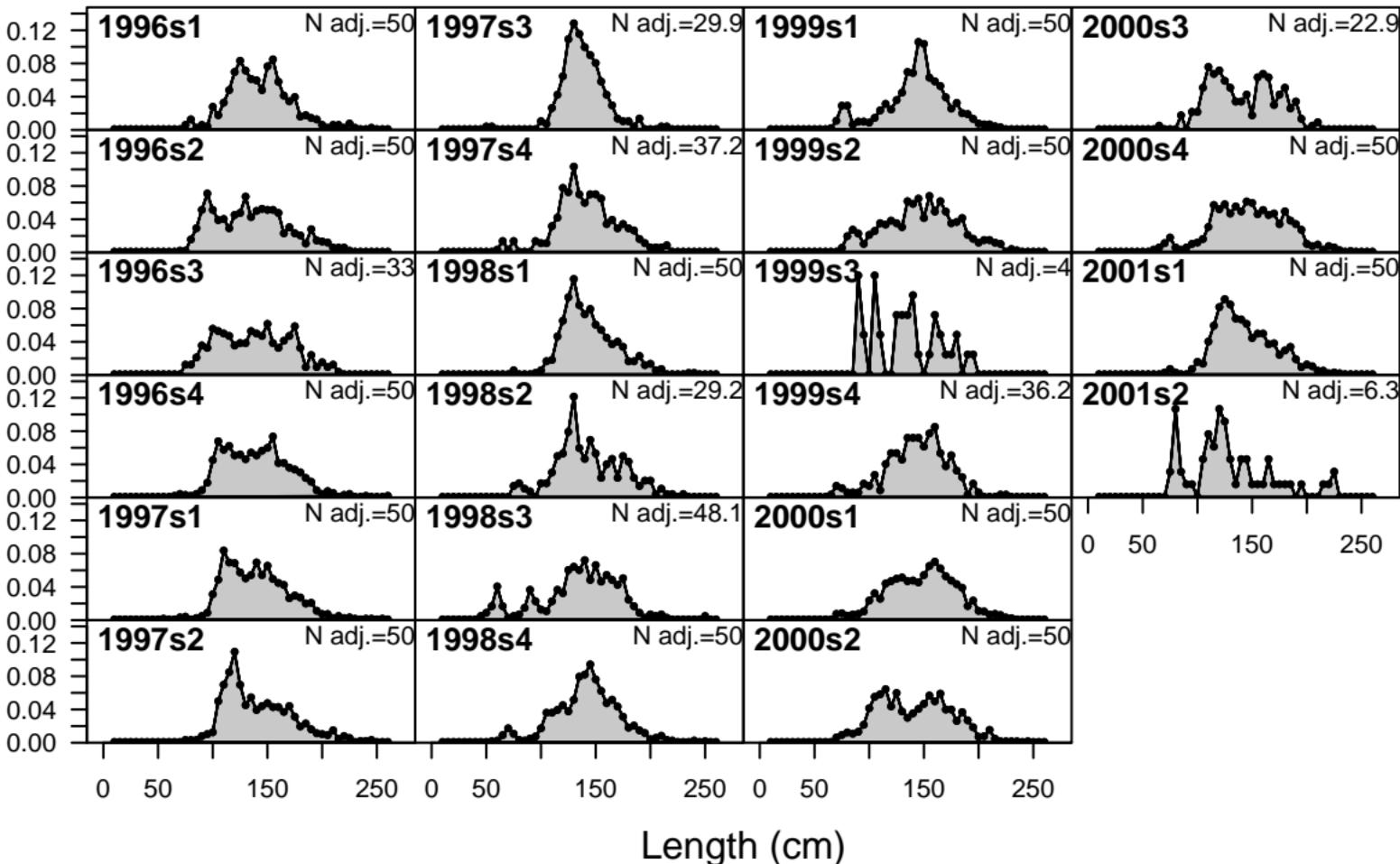


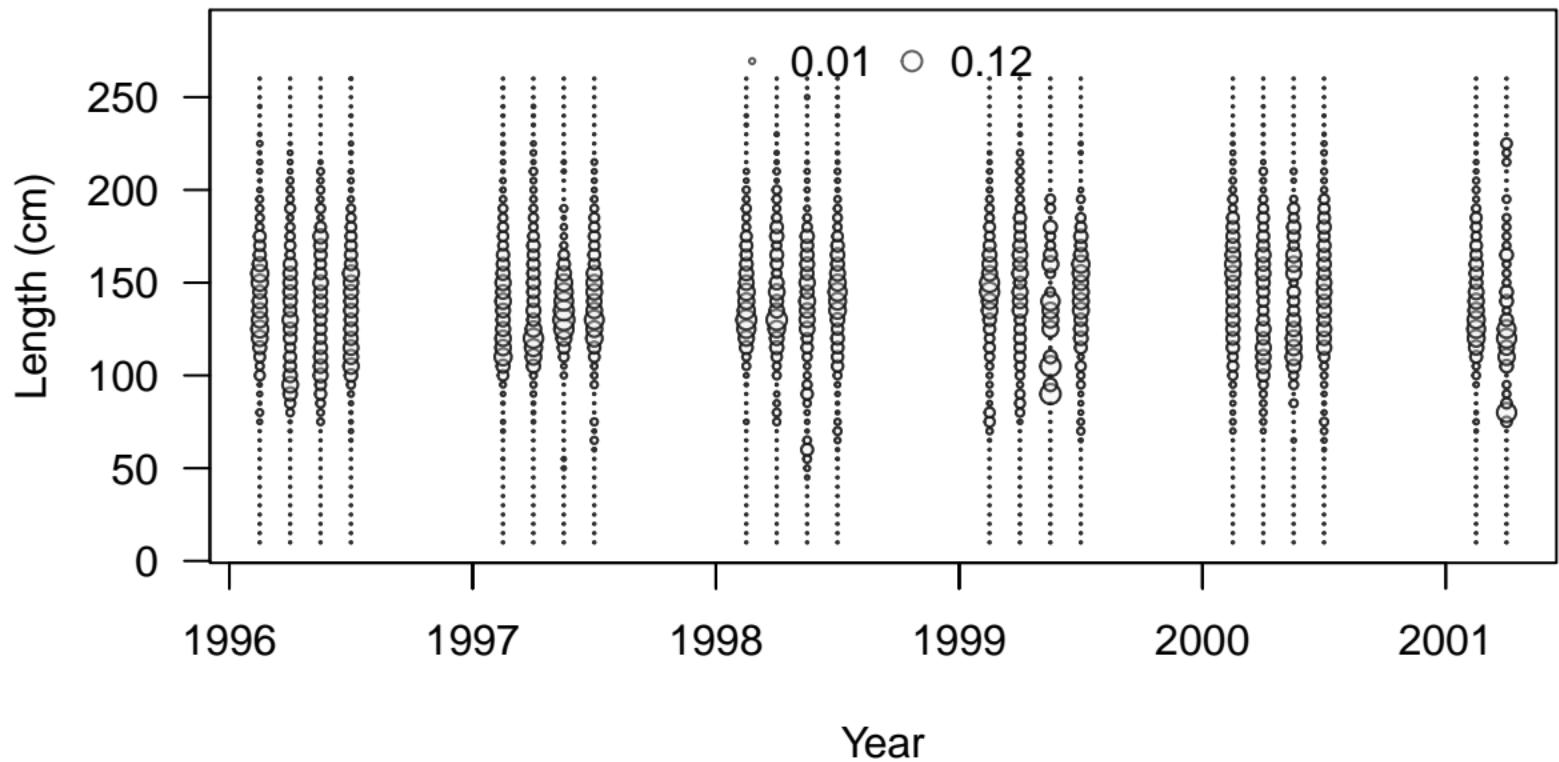


F7_JPN_WCNPO_CODF (whole catch)

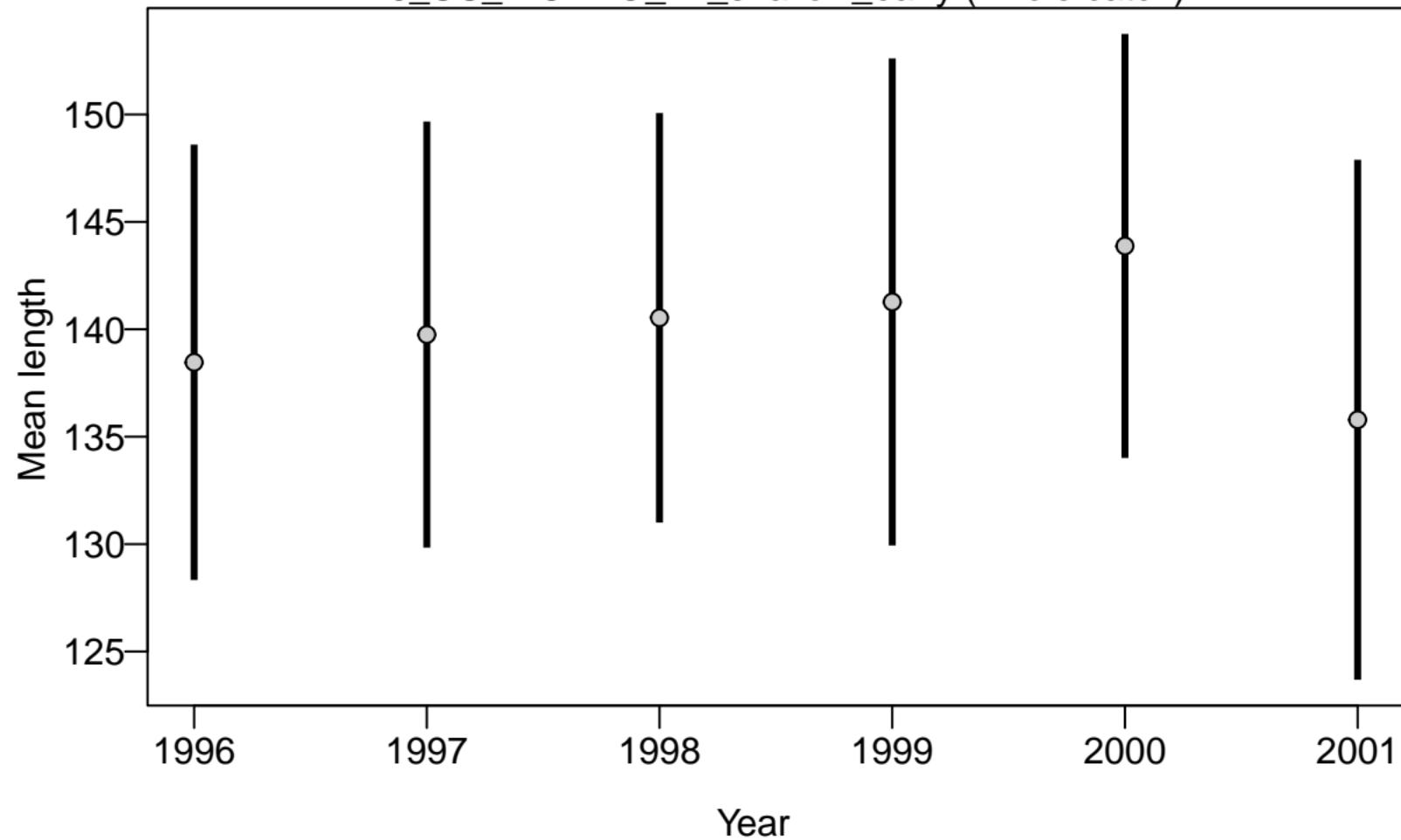


Proportion

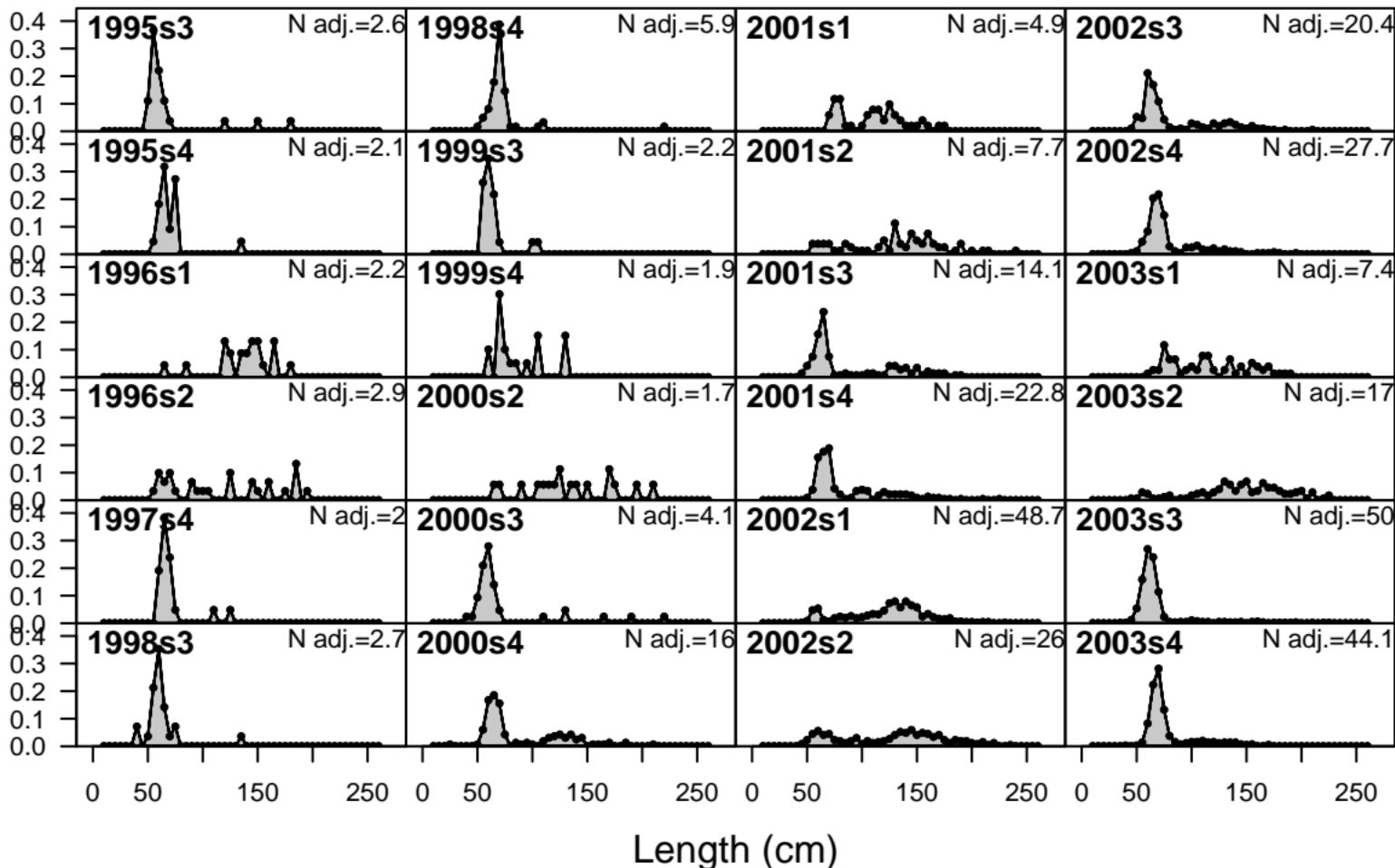




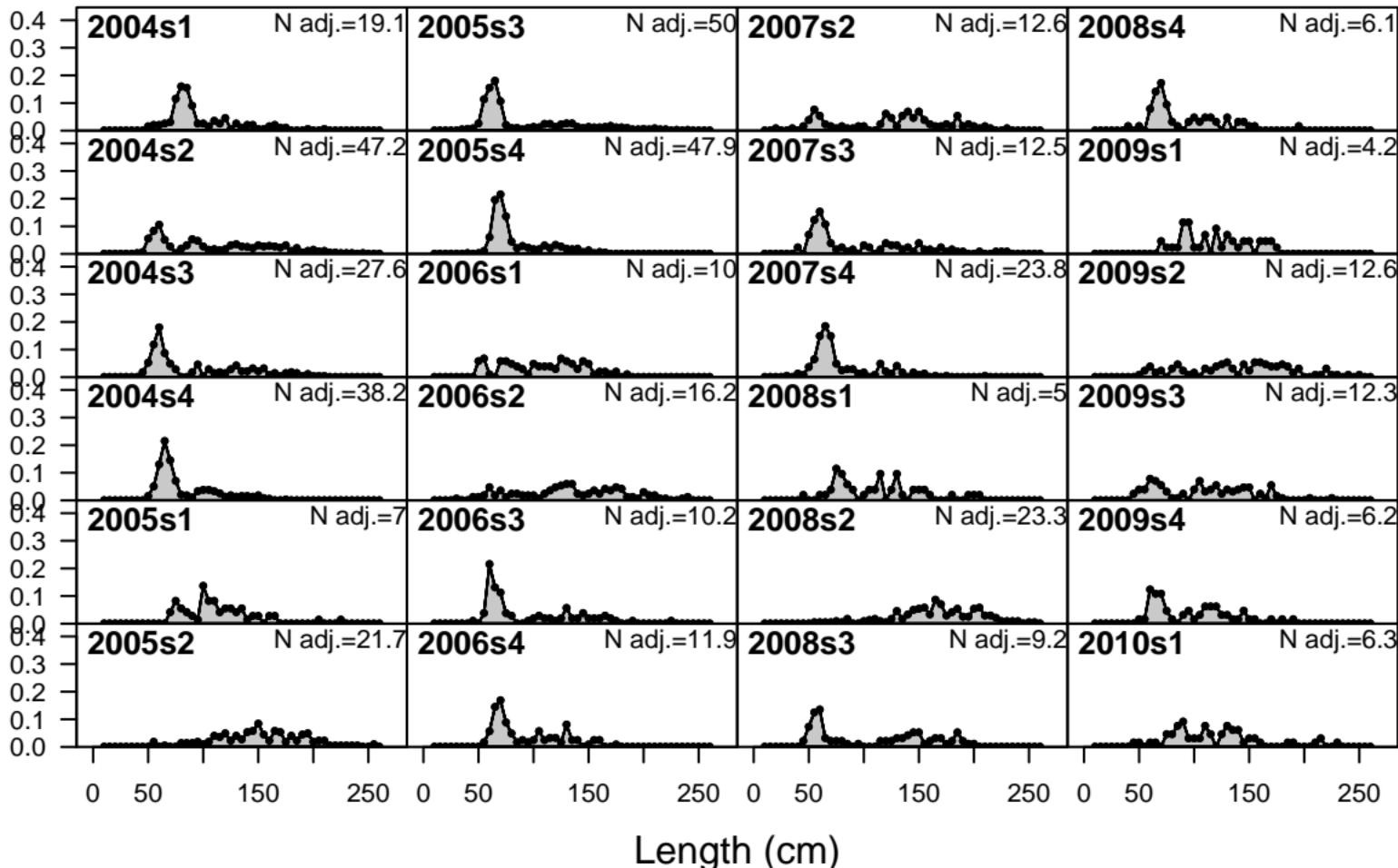
F8_US_WCNPO_LL_shallow_early (whole catch)



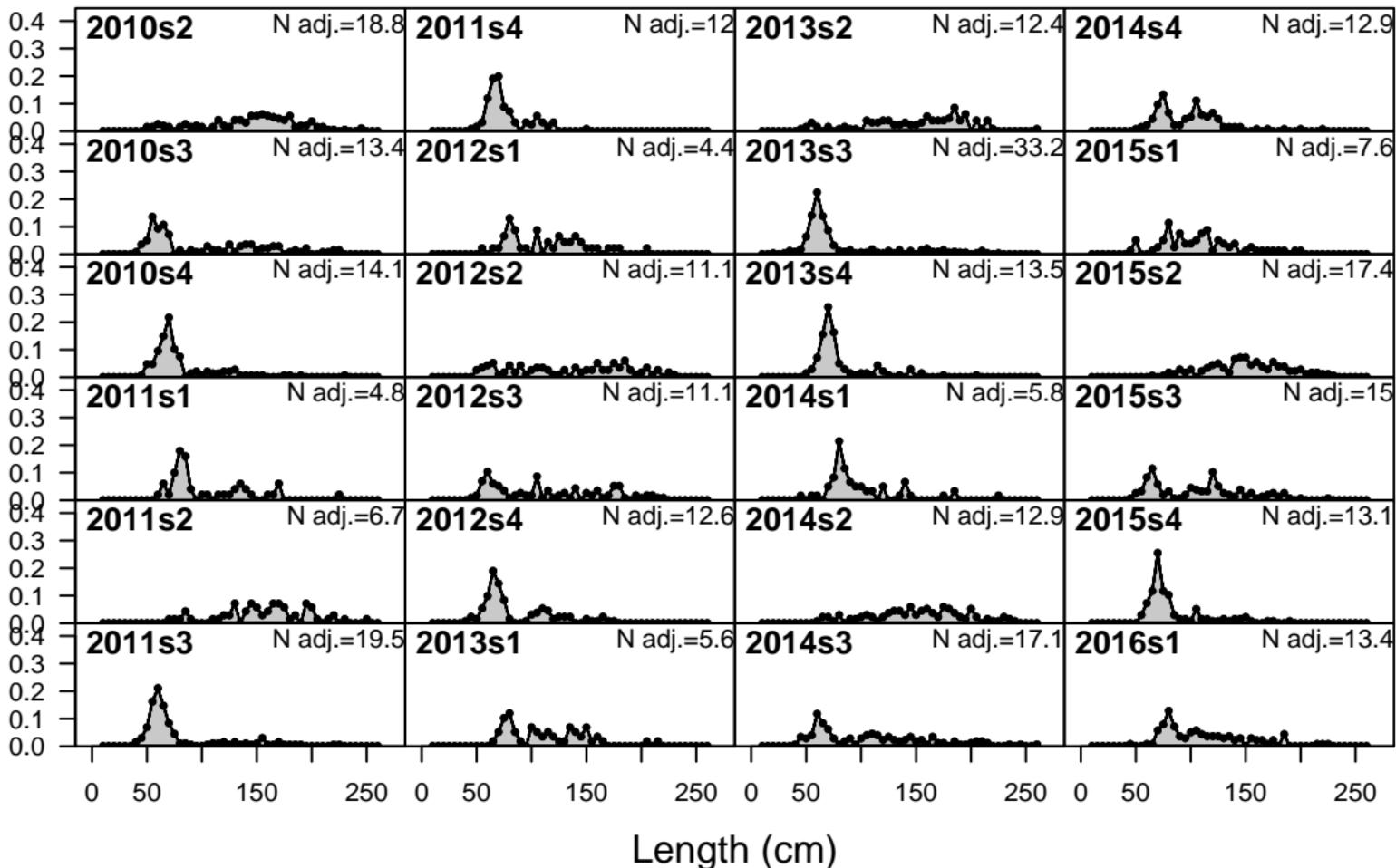
Proportion



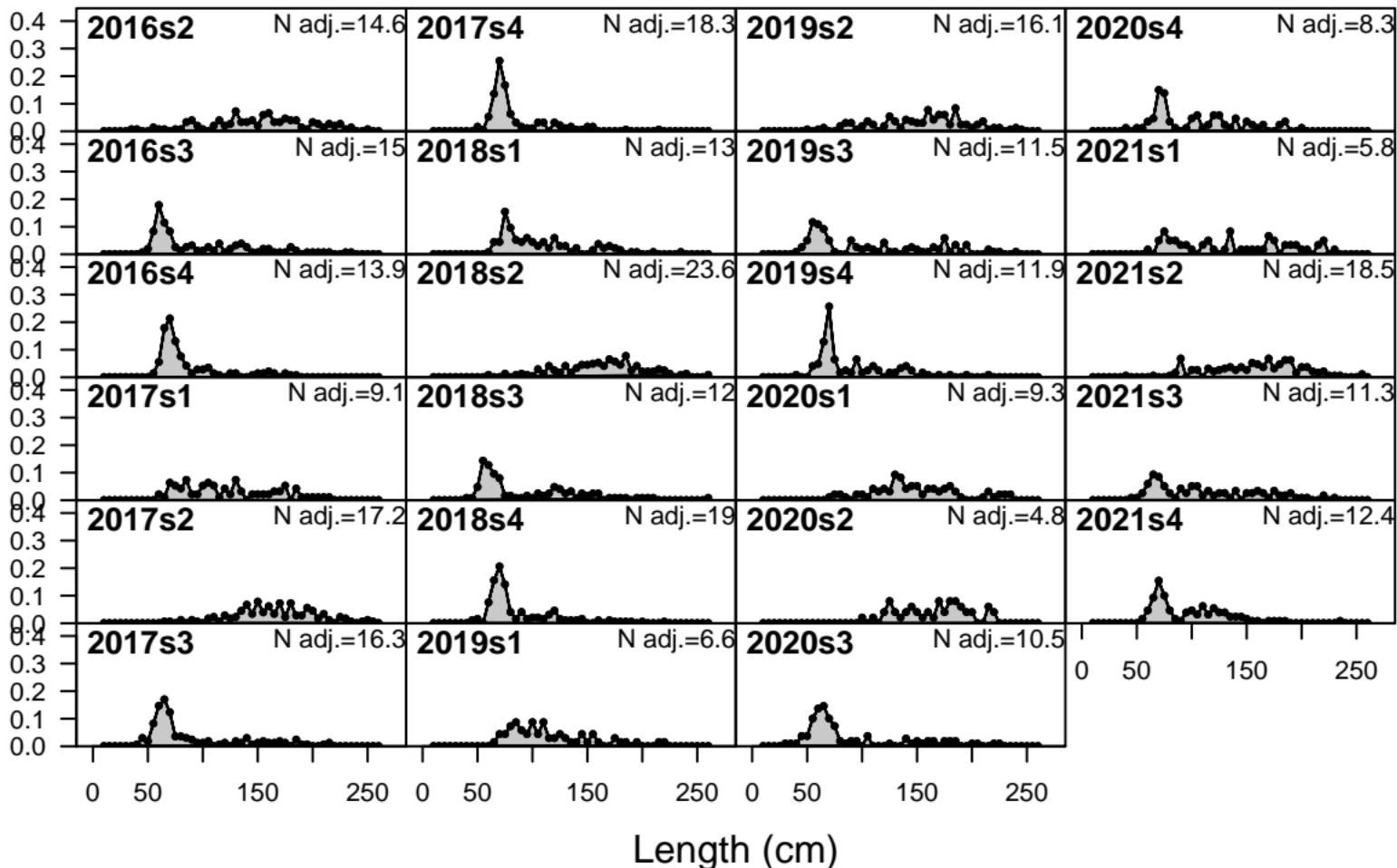
Proportion

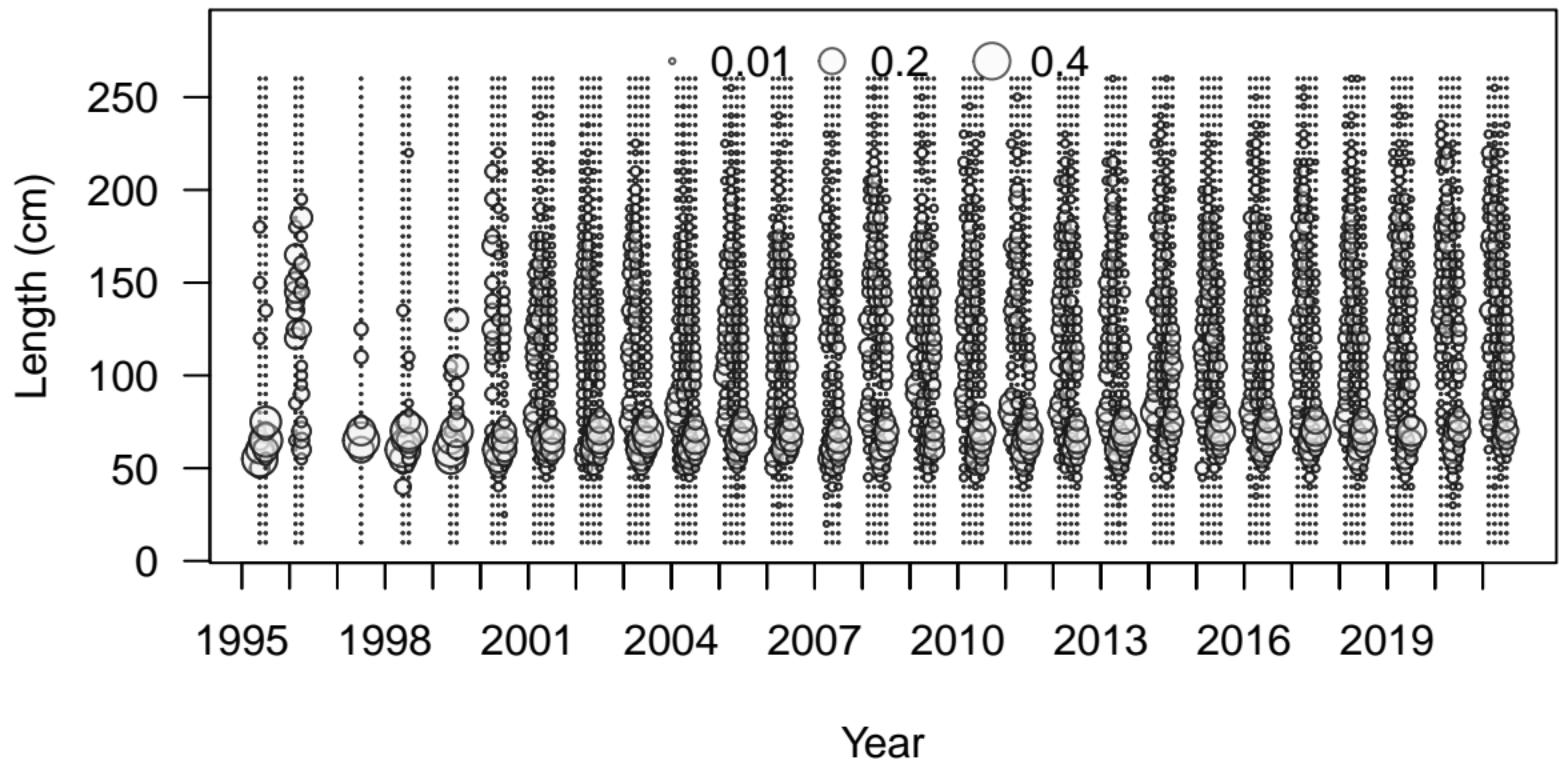


Proportion

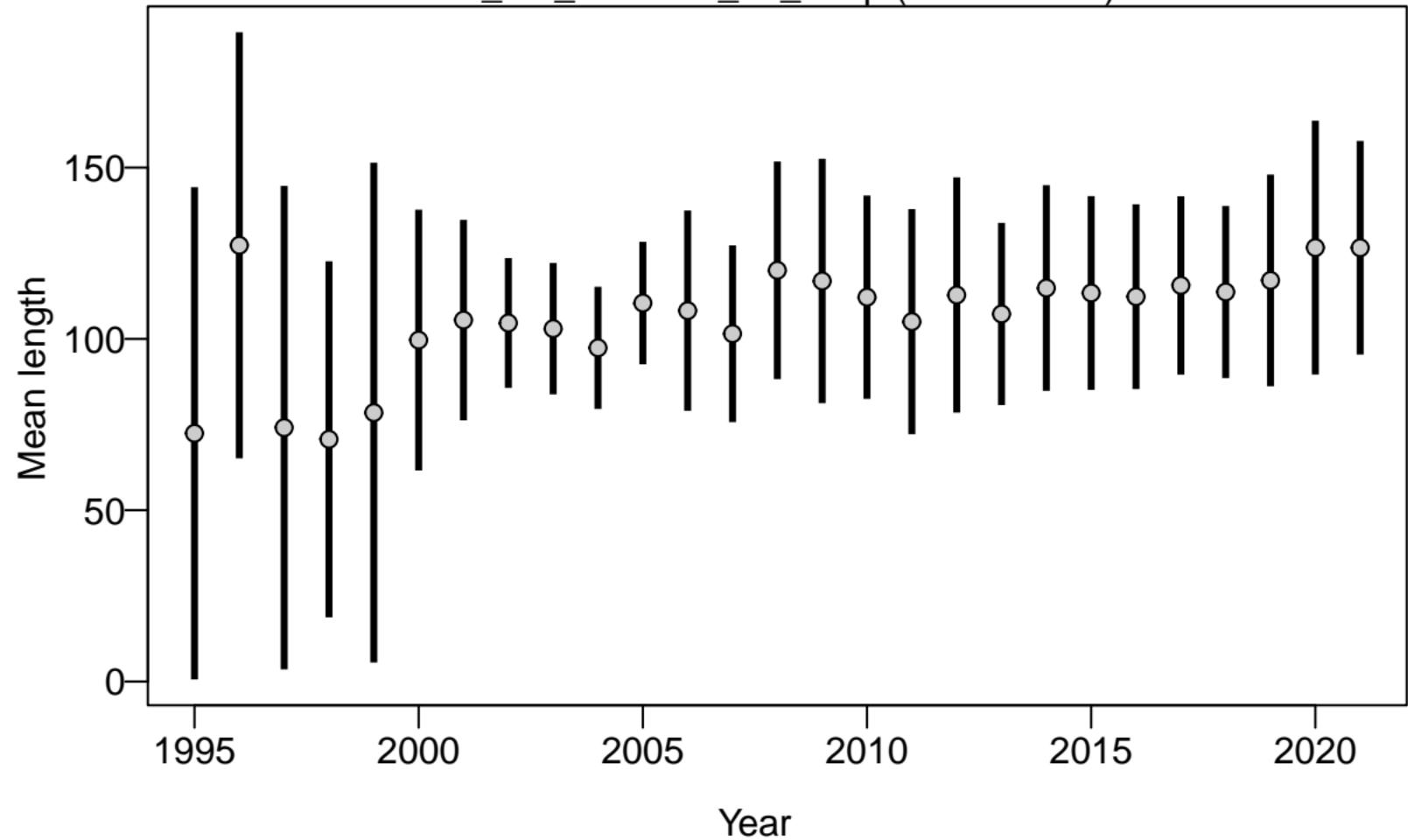


Proportion

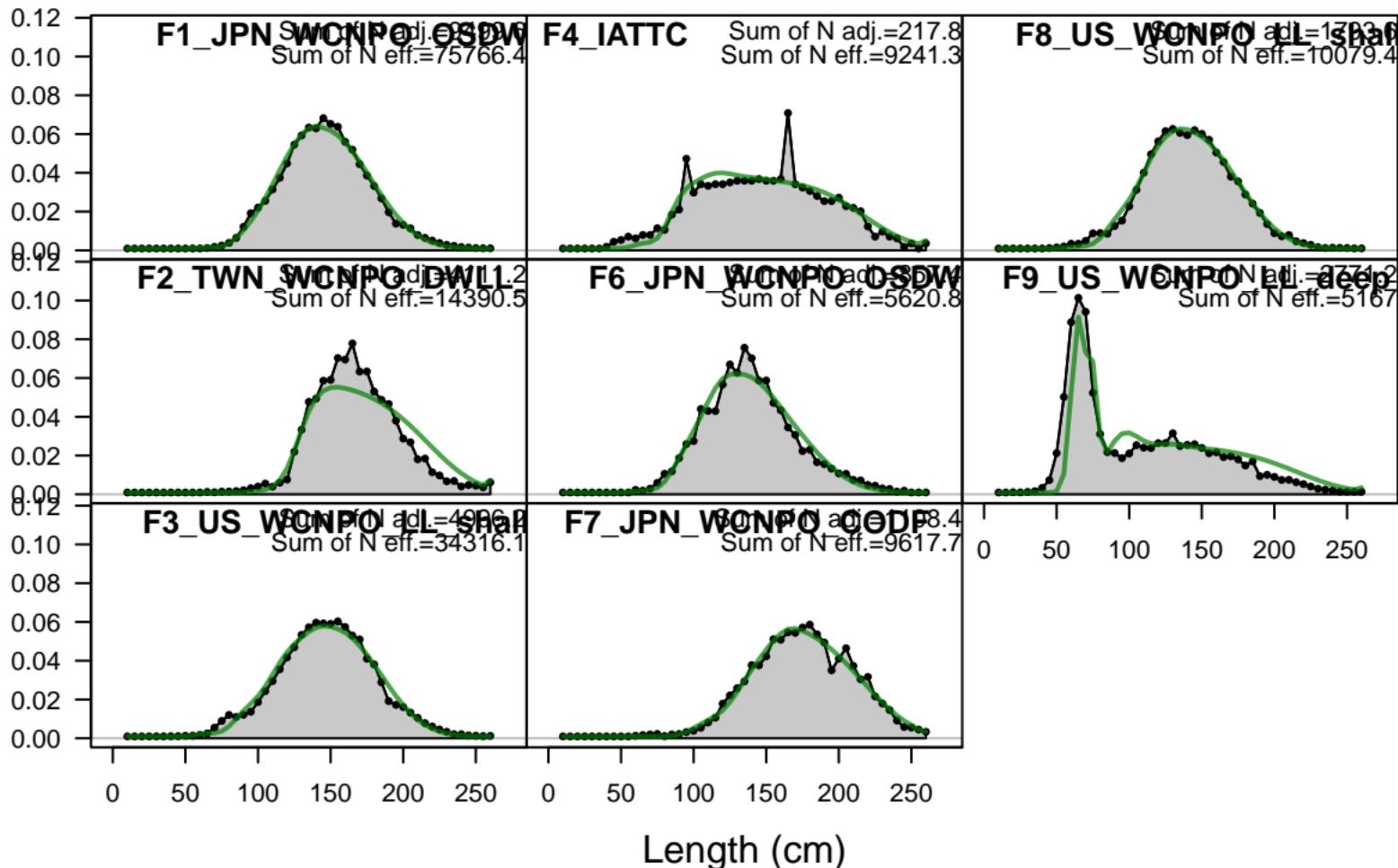


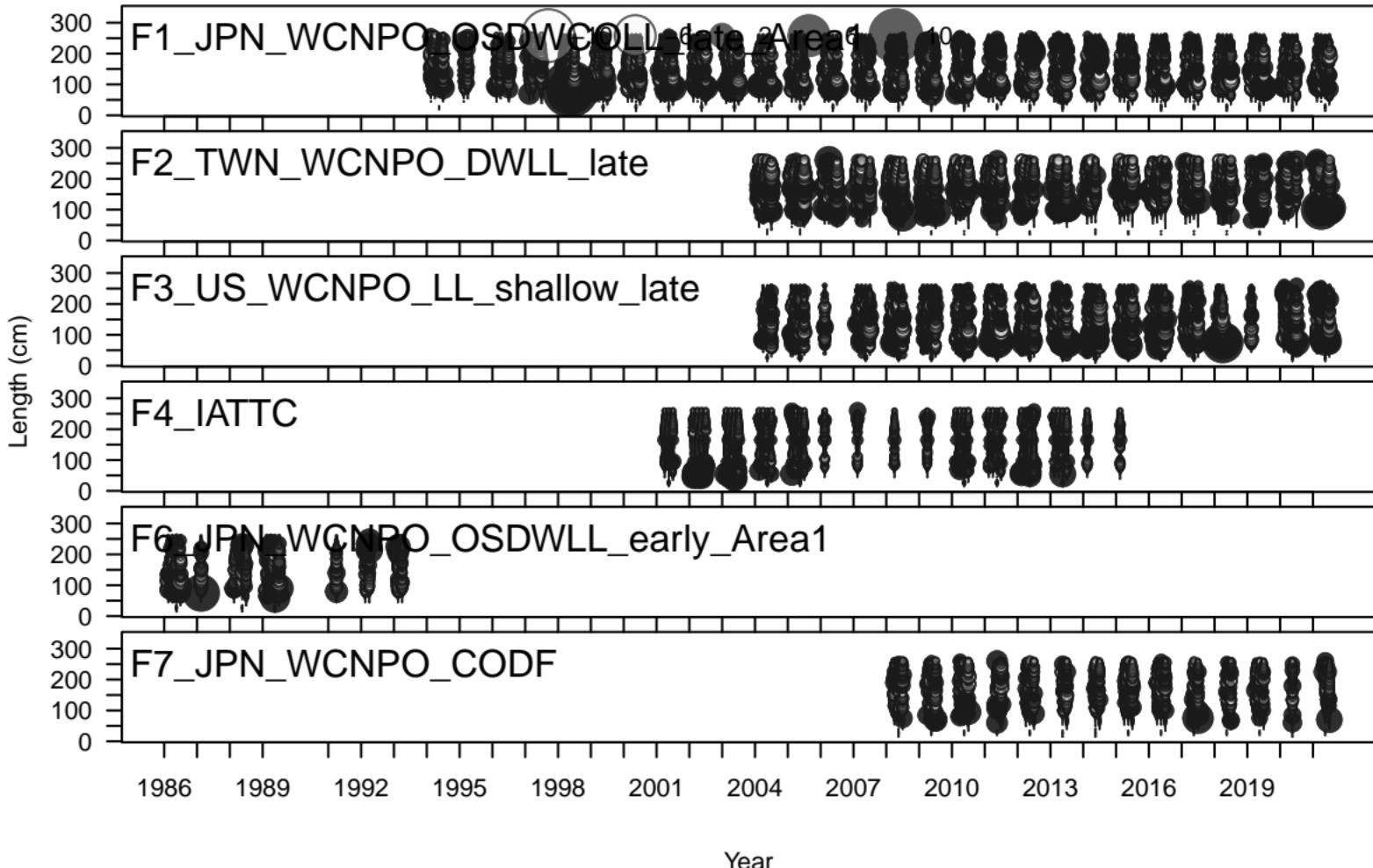


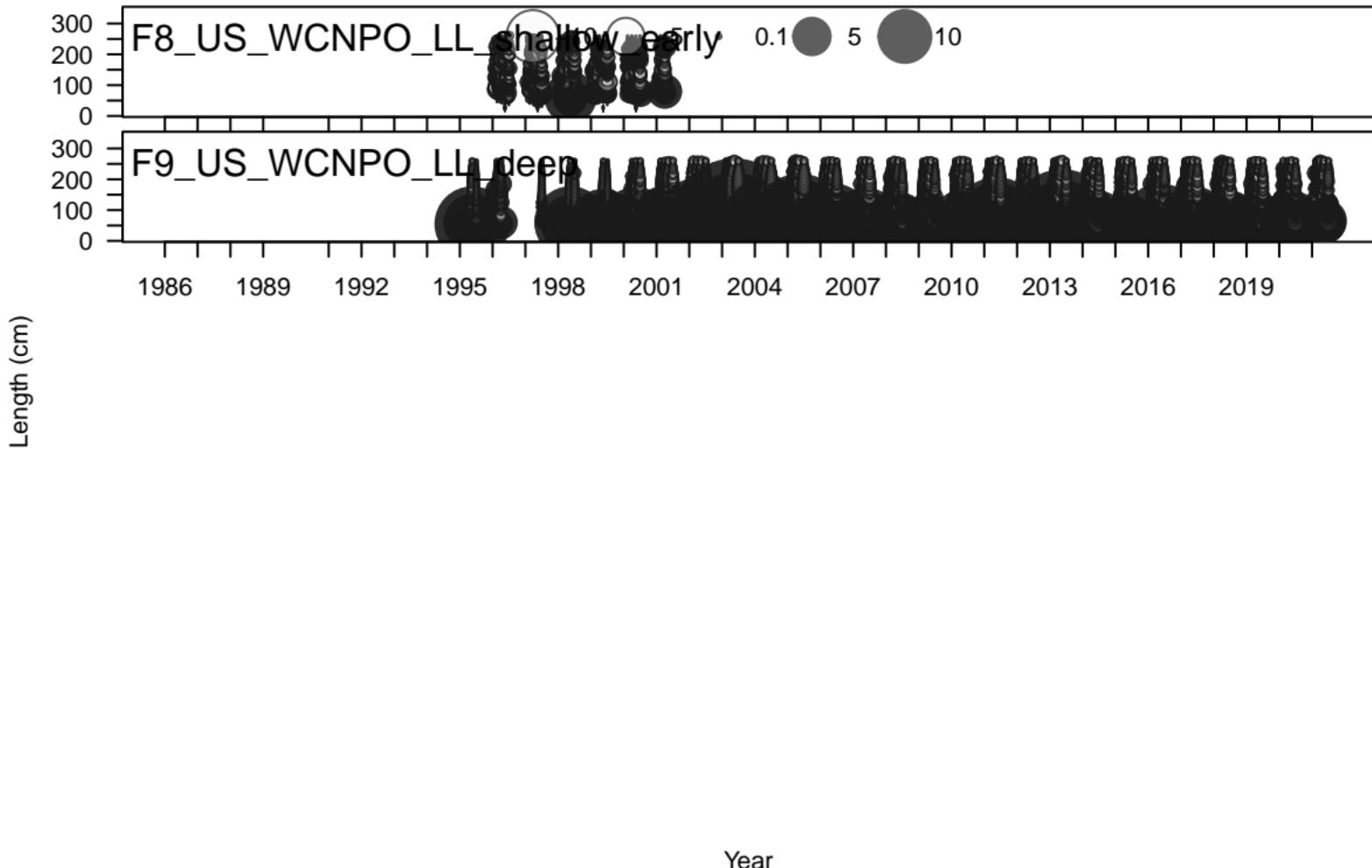
F9_US_WCNPO_LL_deep (whole catch)



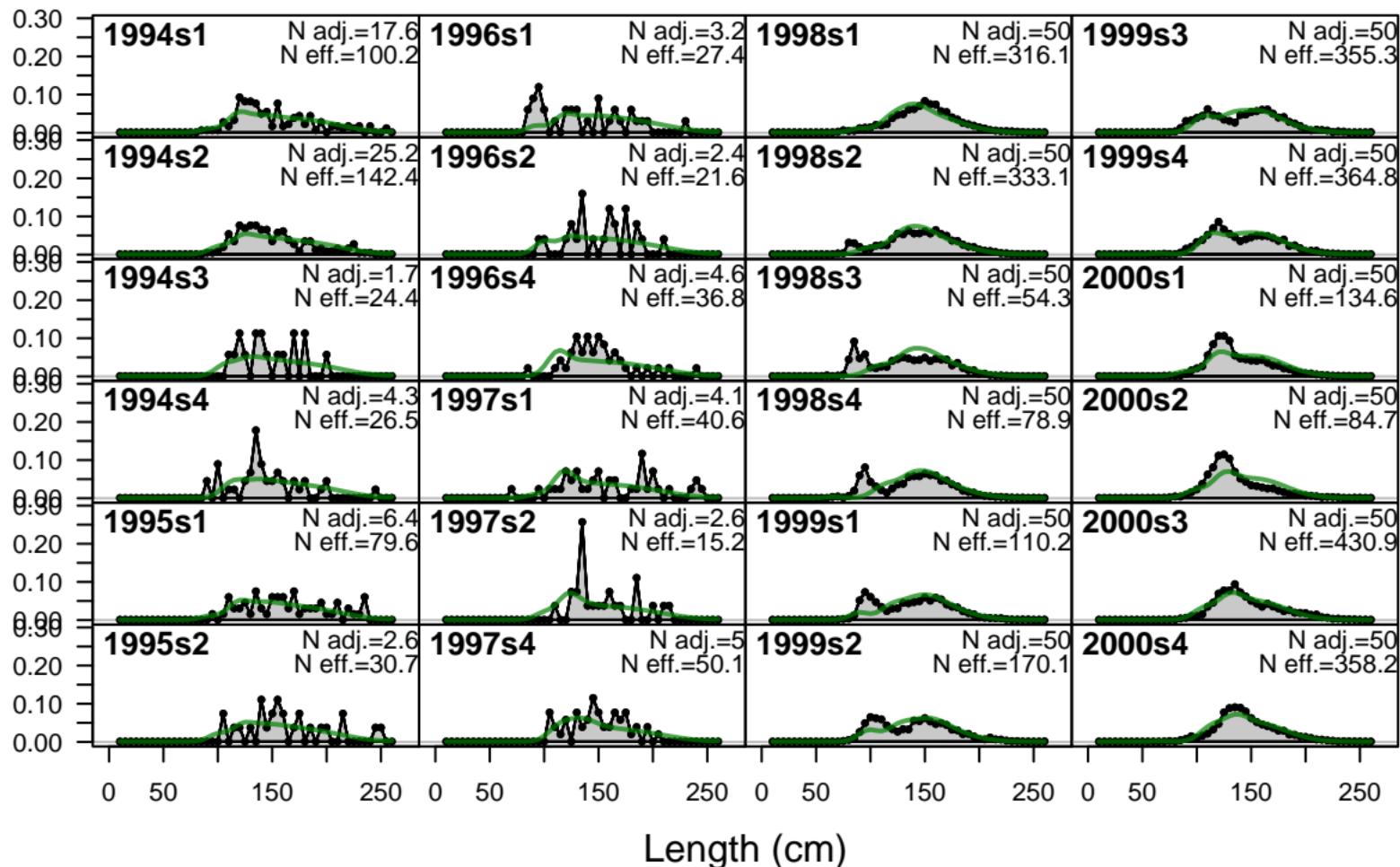
Proportion



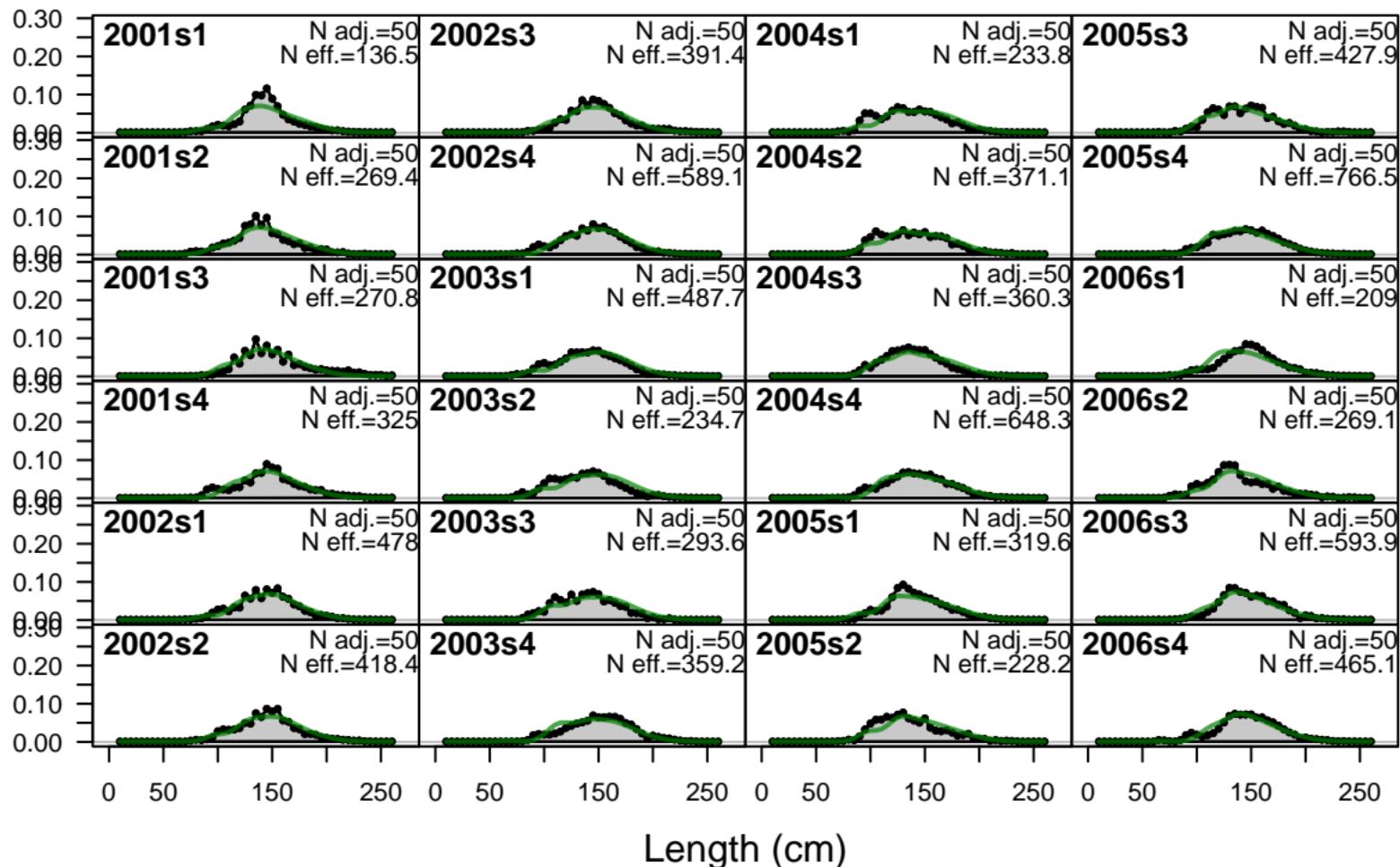




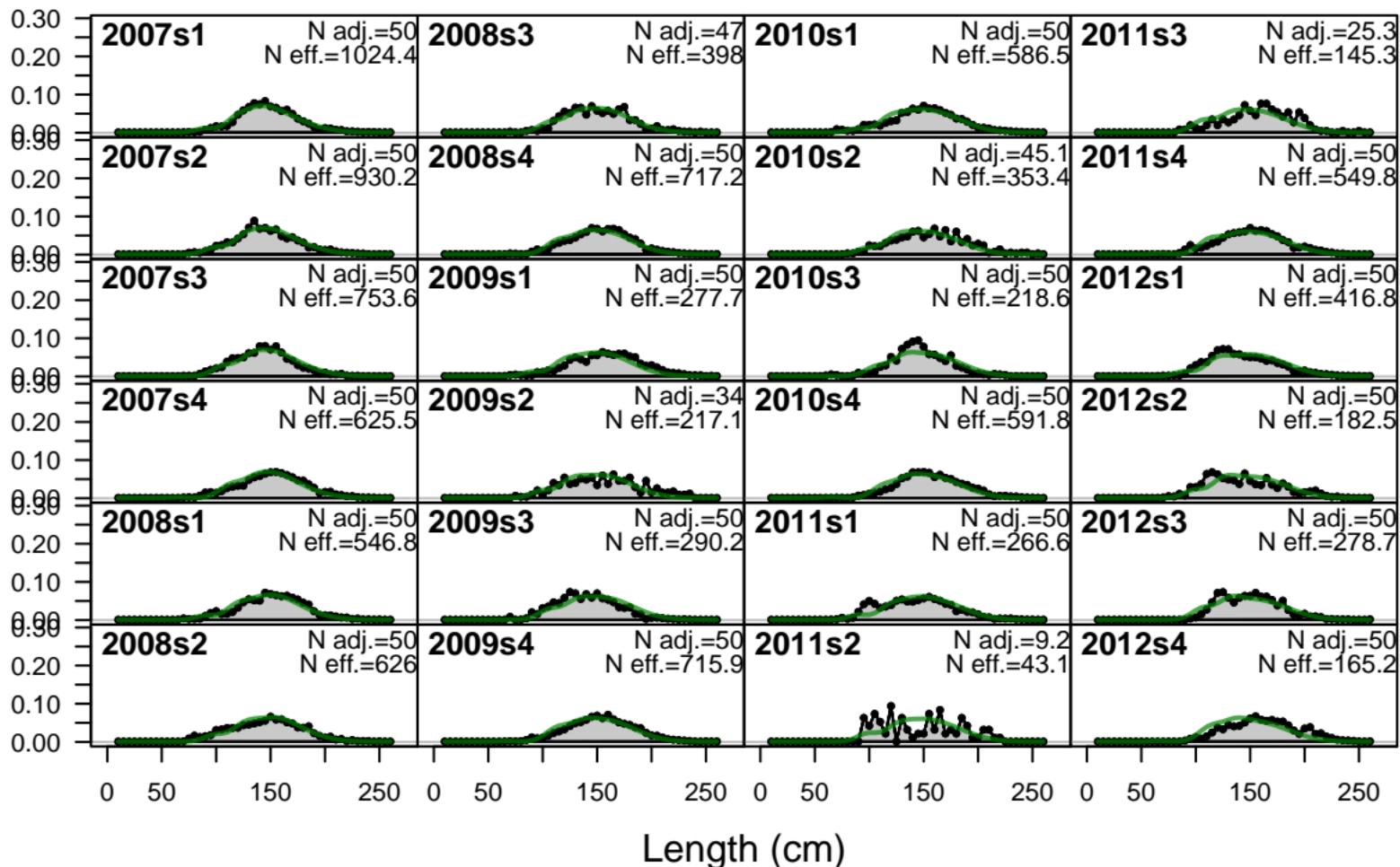
Proportion



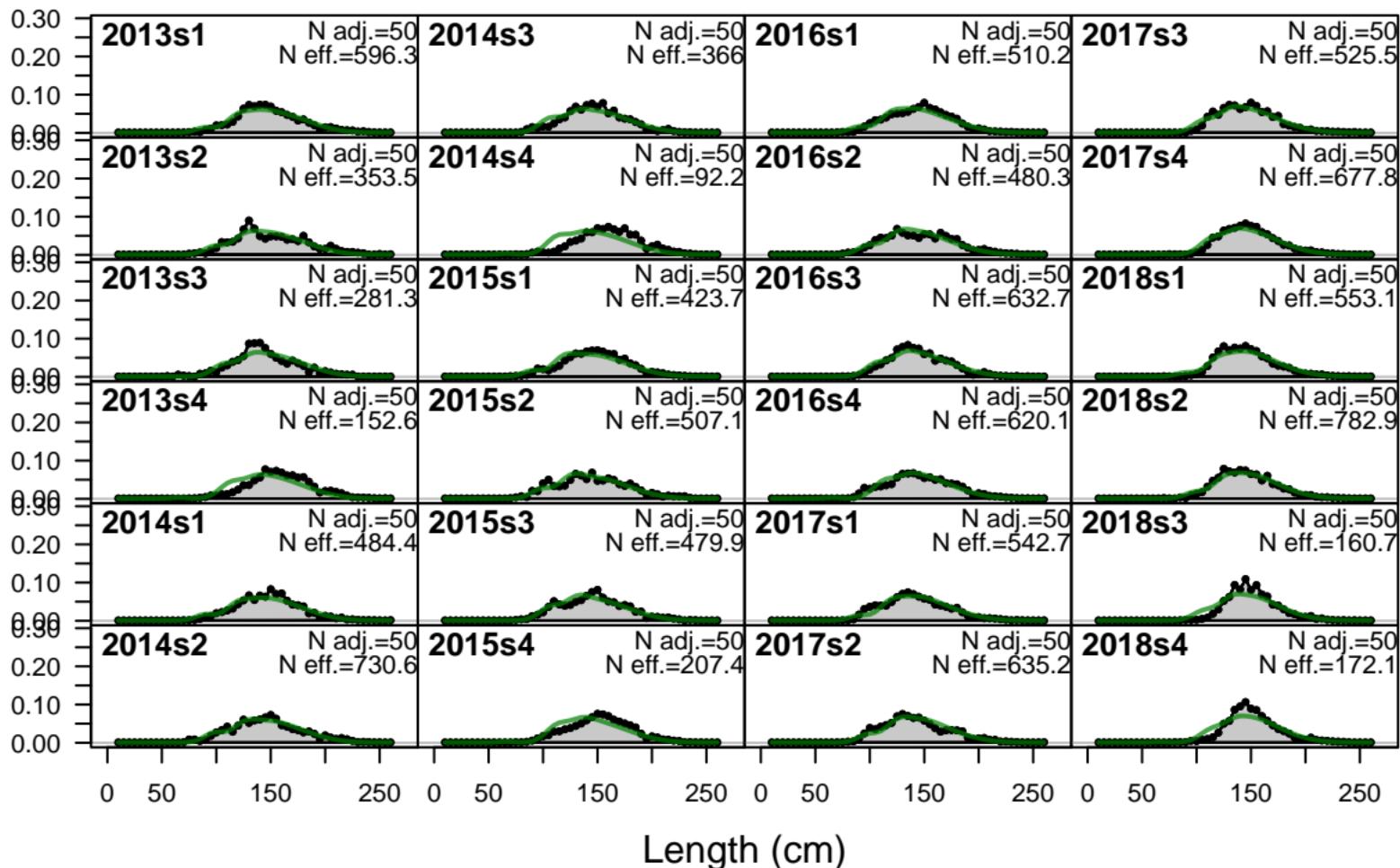
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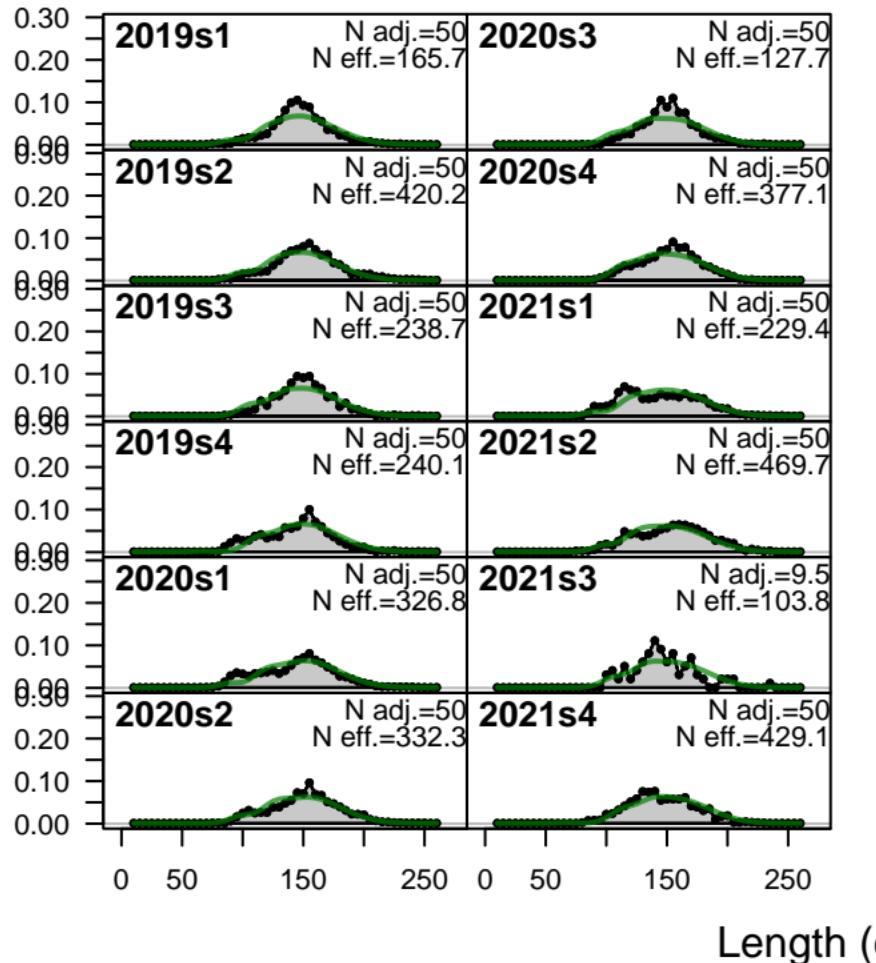
Proportion

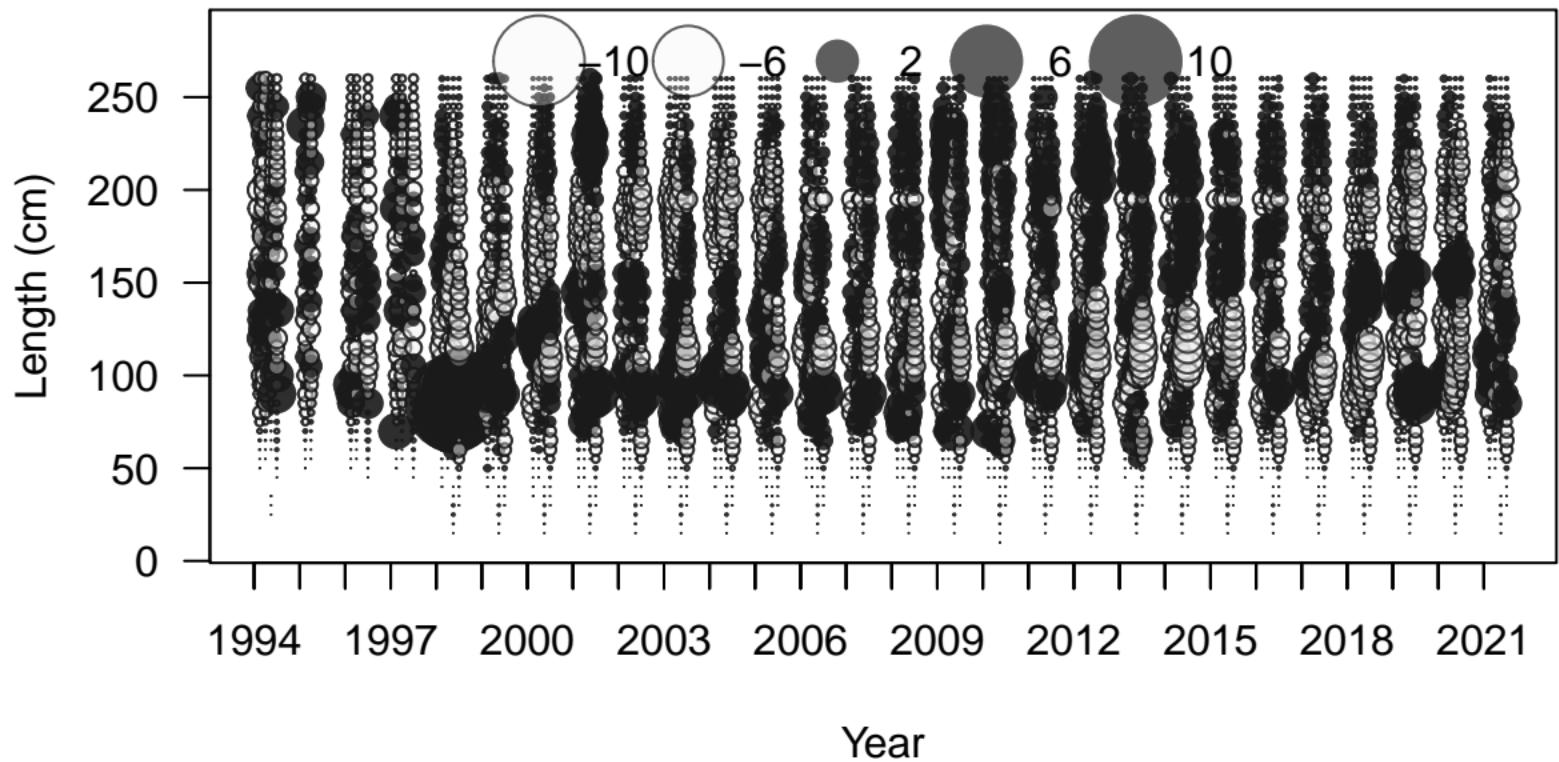


Proportion



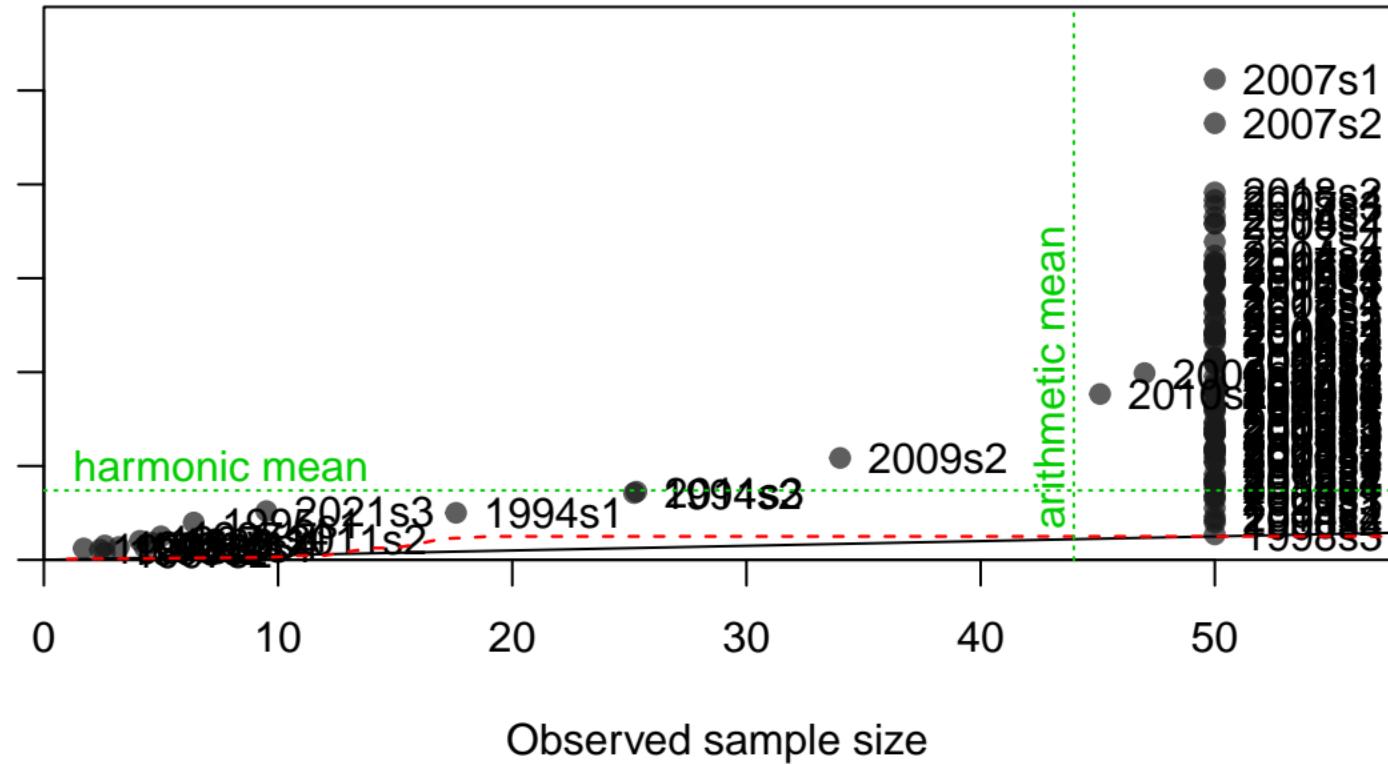
Proportion



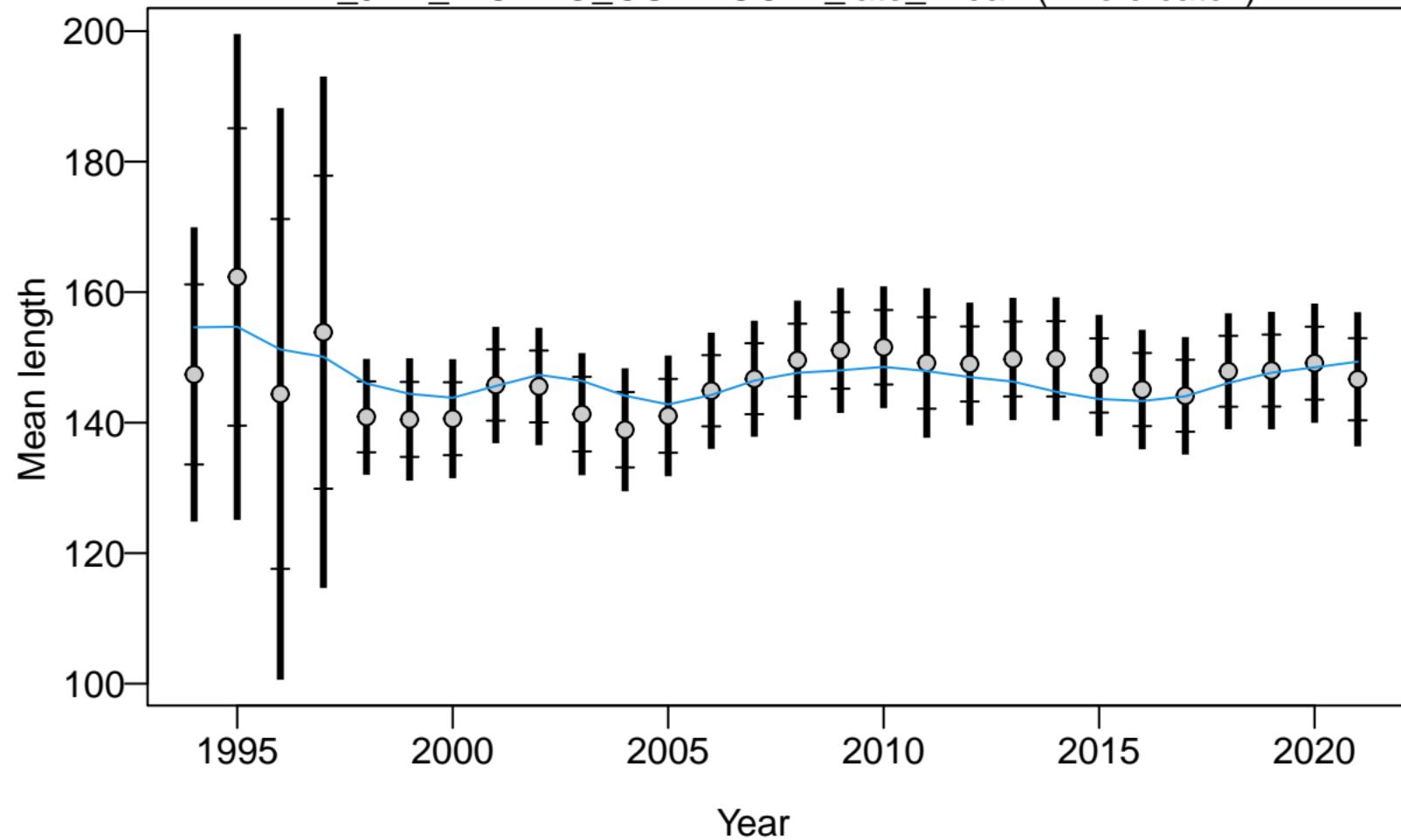


Effective sample size

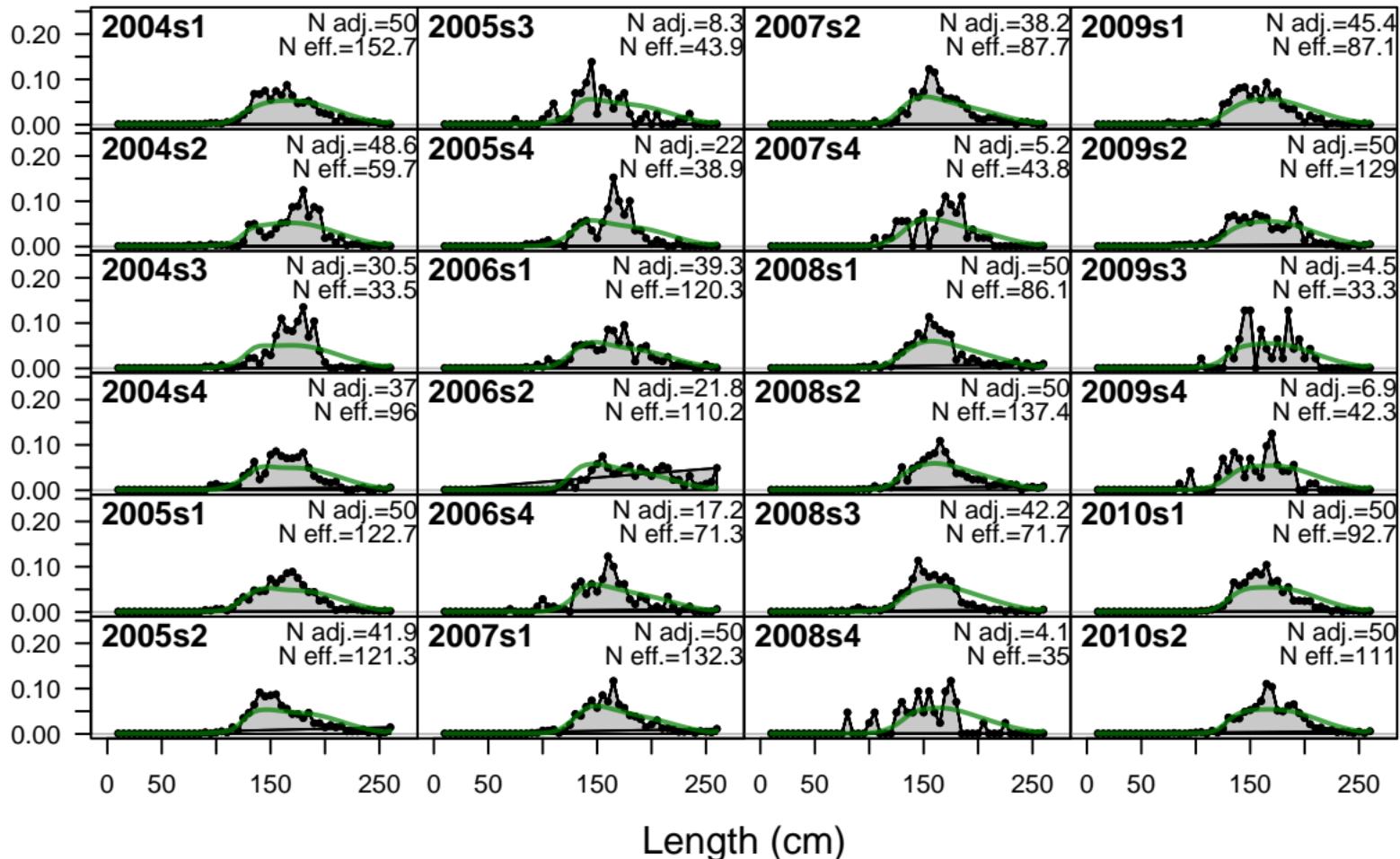
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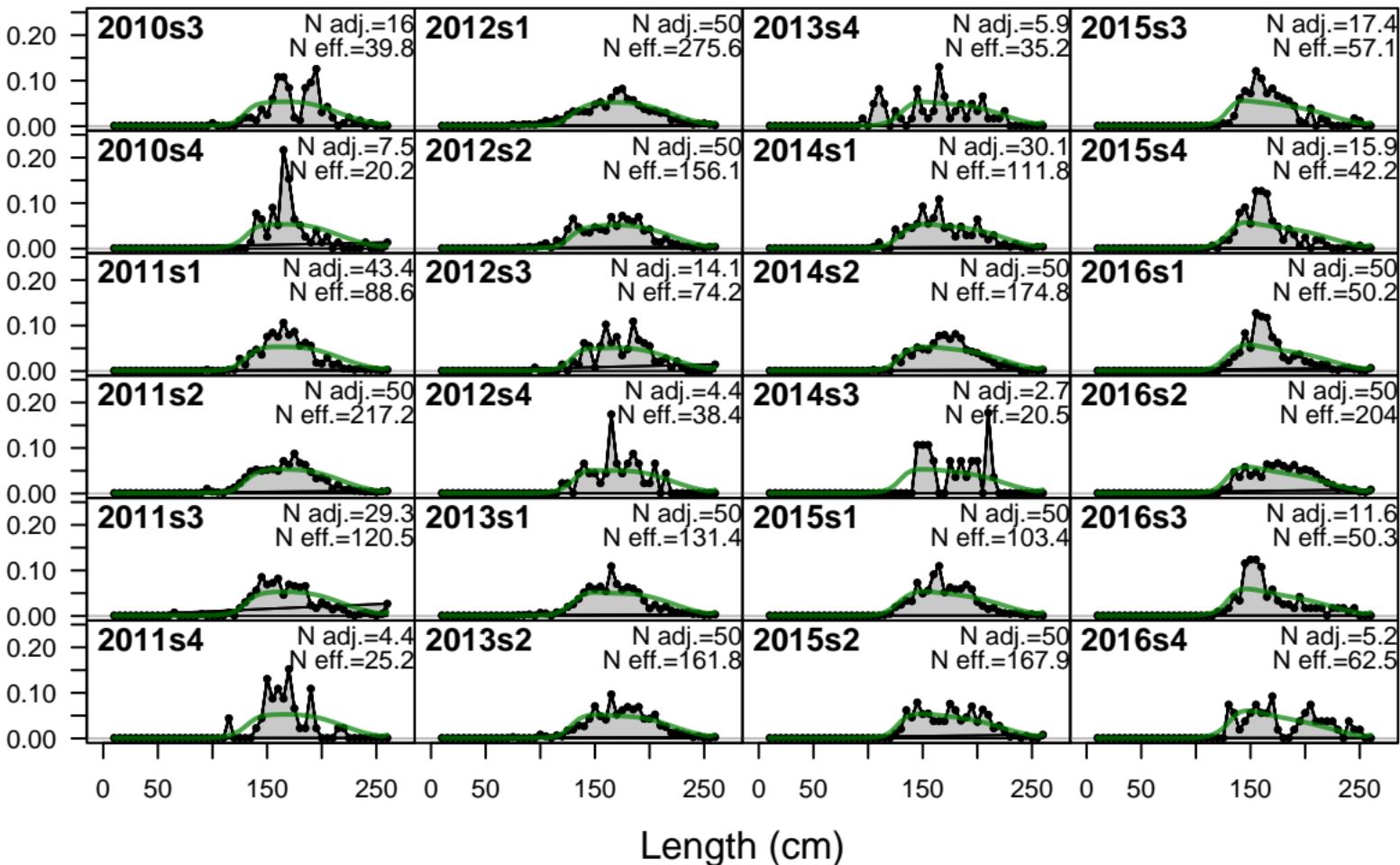
F1_JPN_WCNPO OSDWCOLL late Area1 (whole catch)



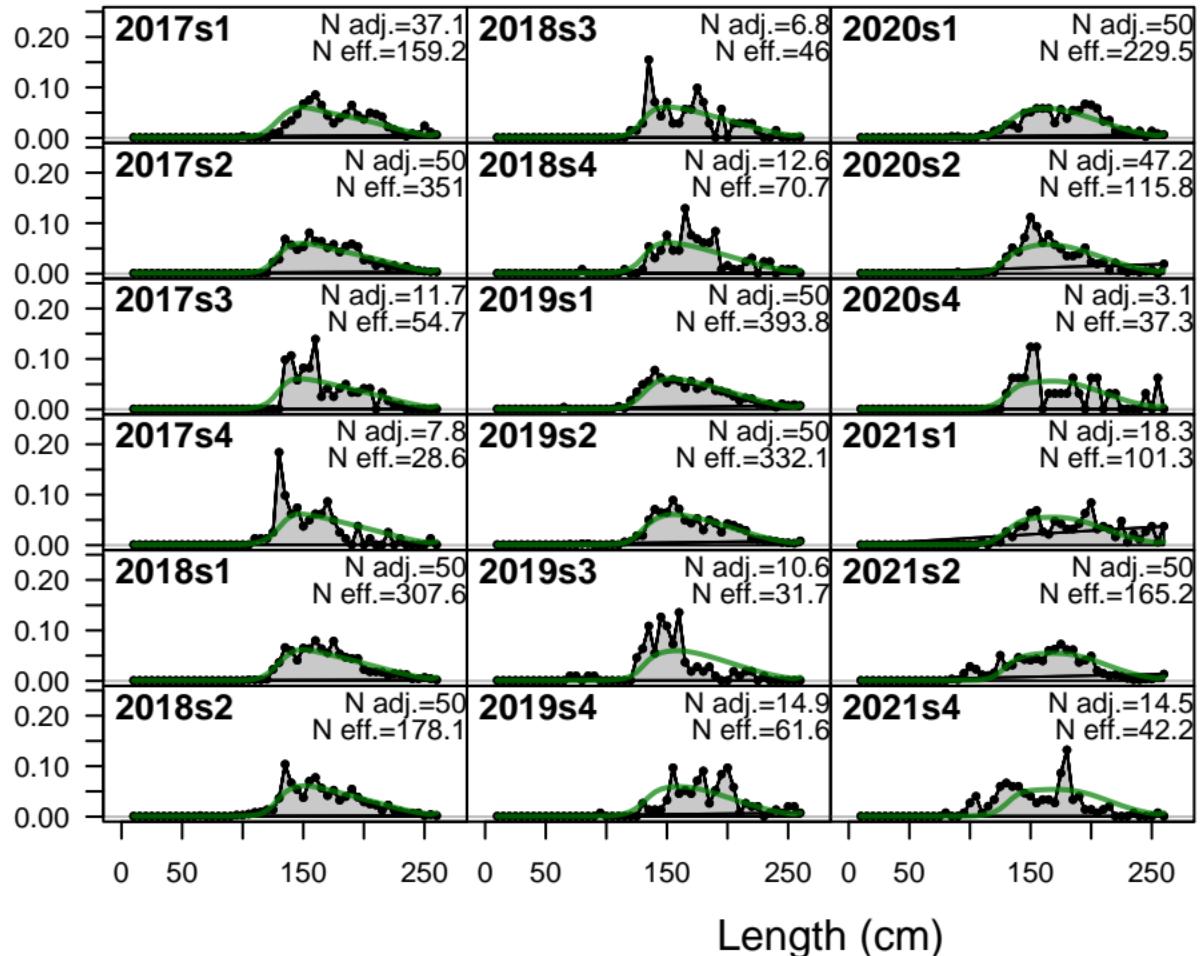
Proportion

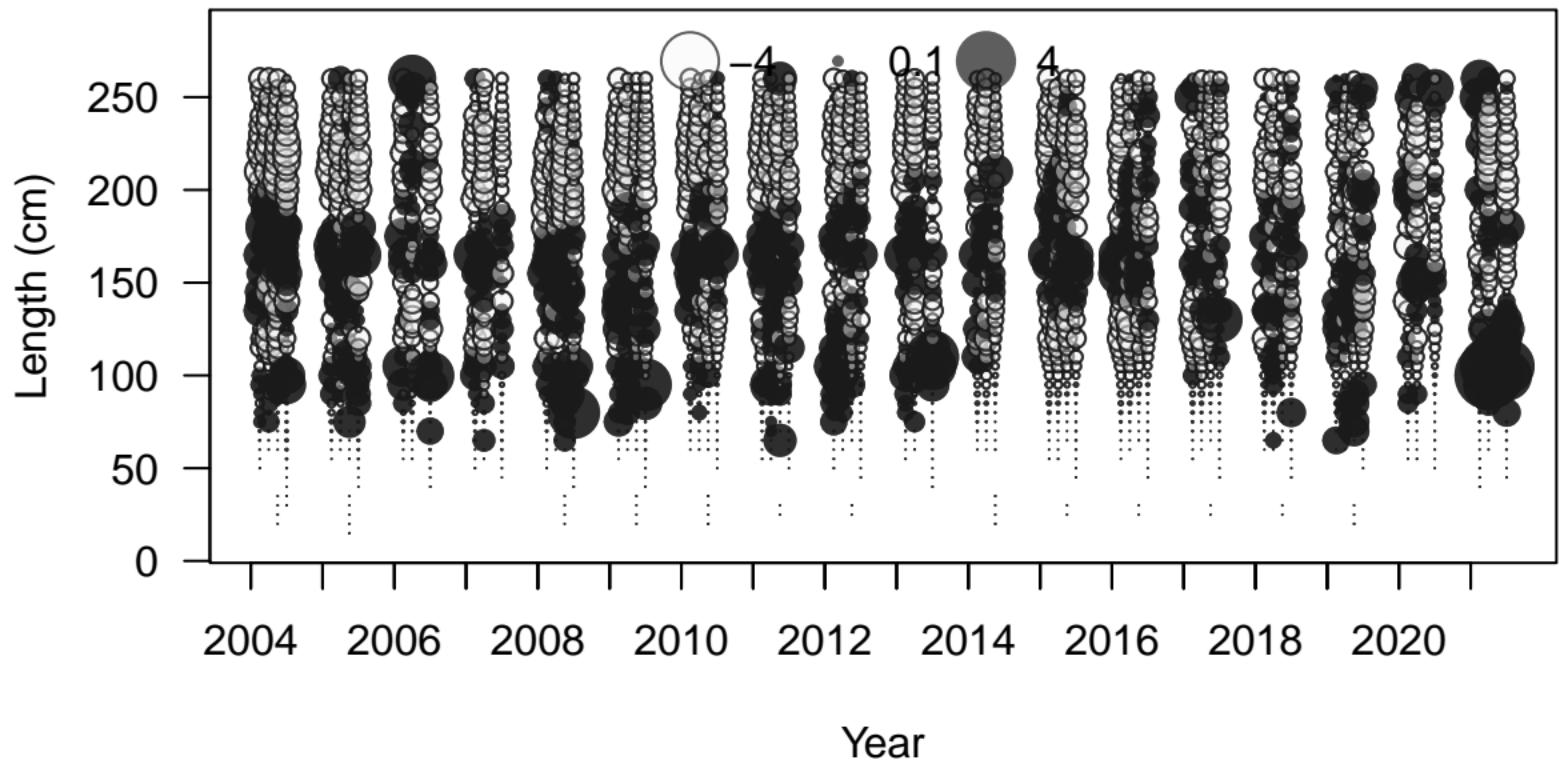


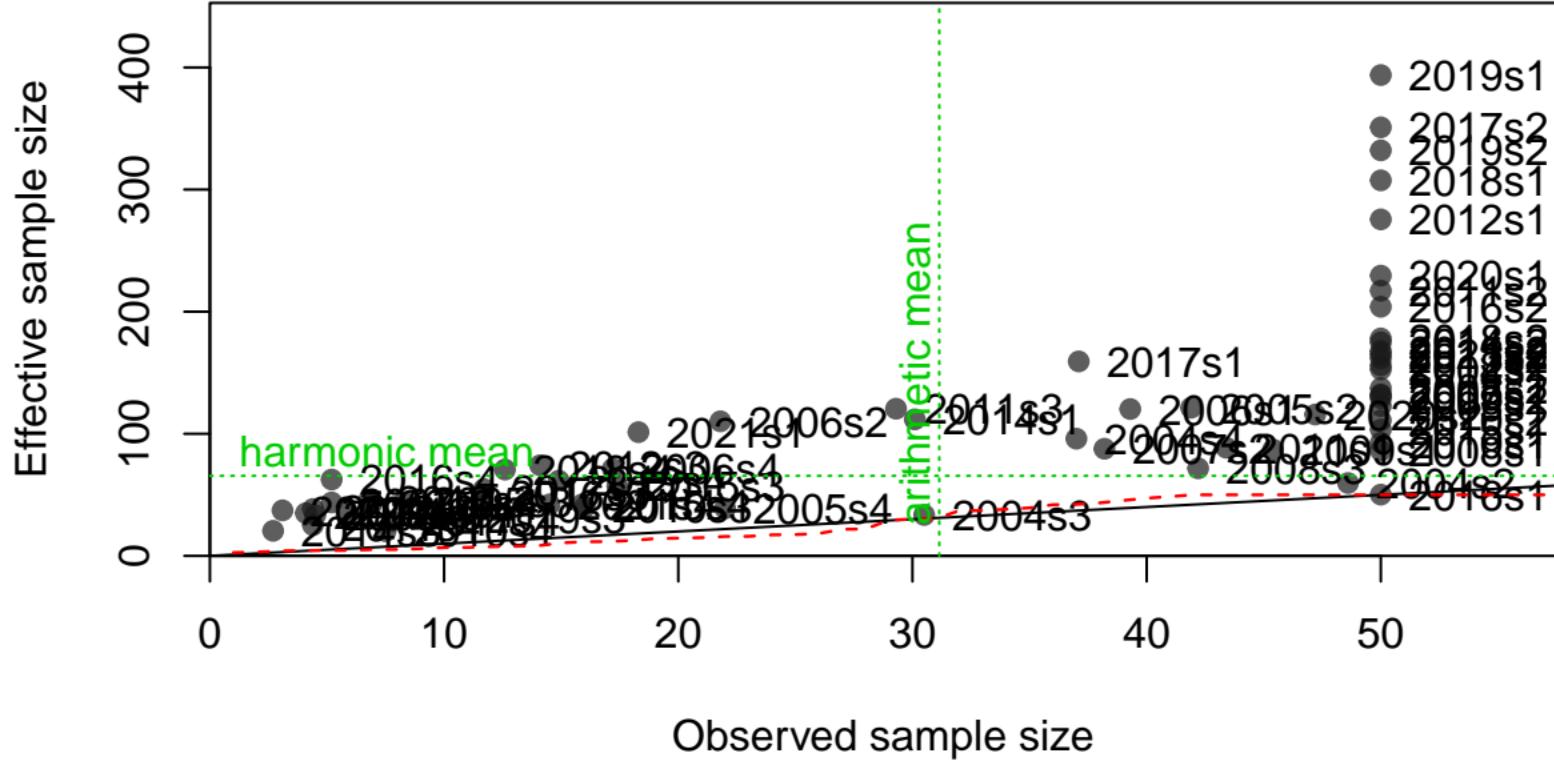
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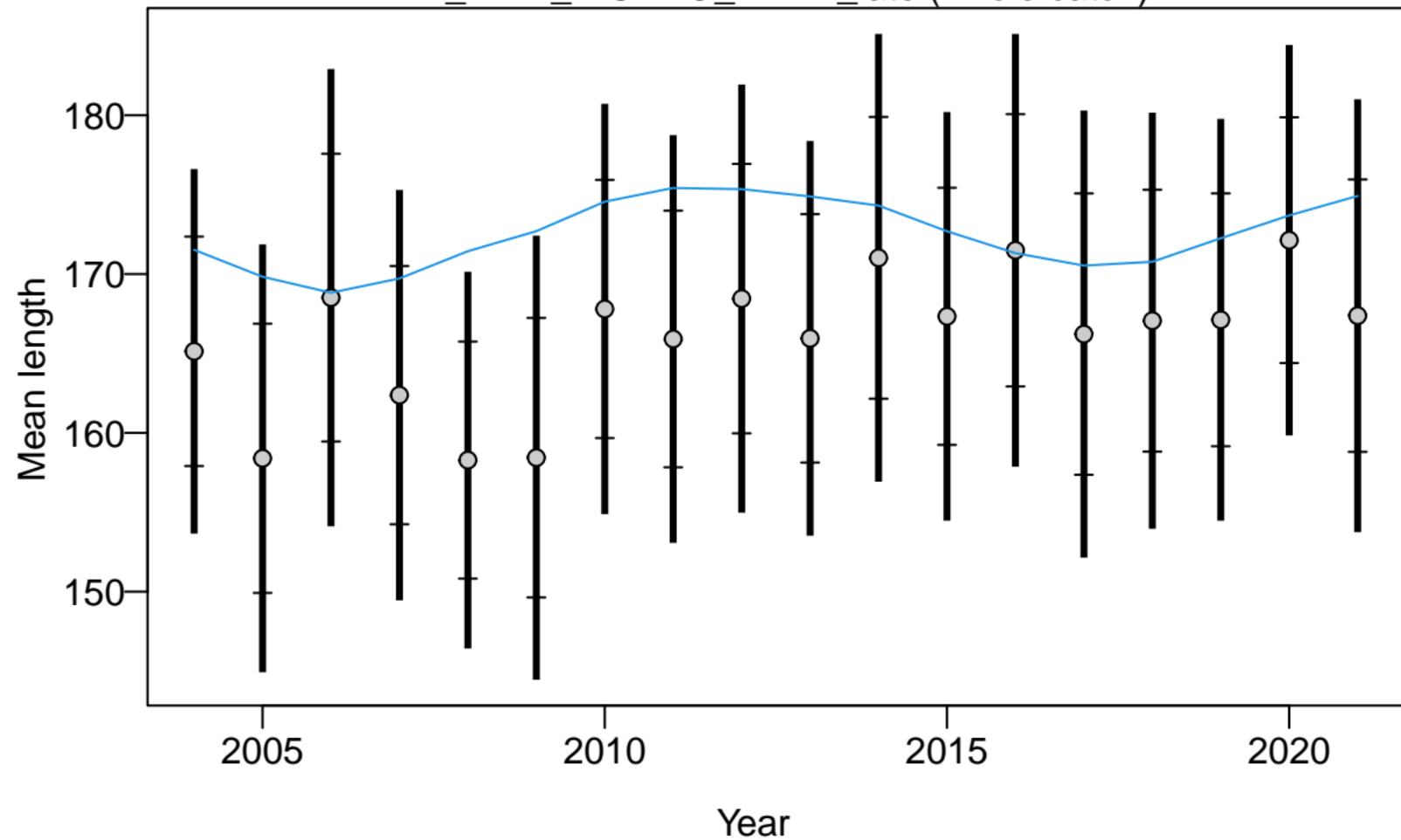
Proportion



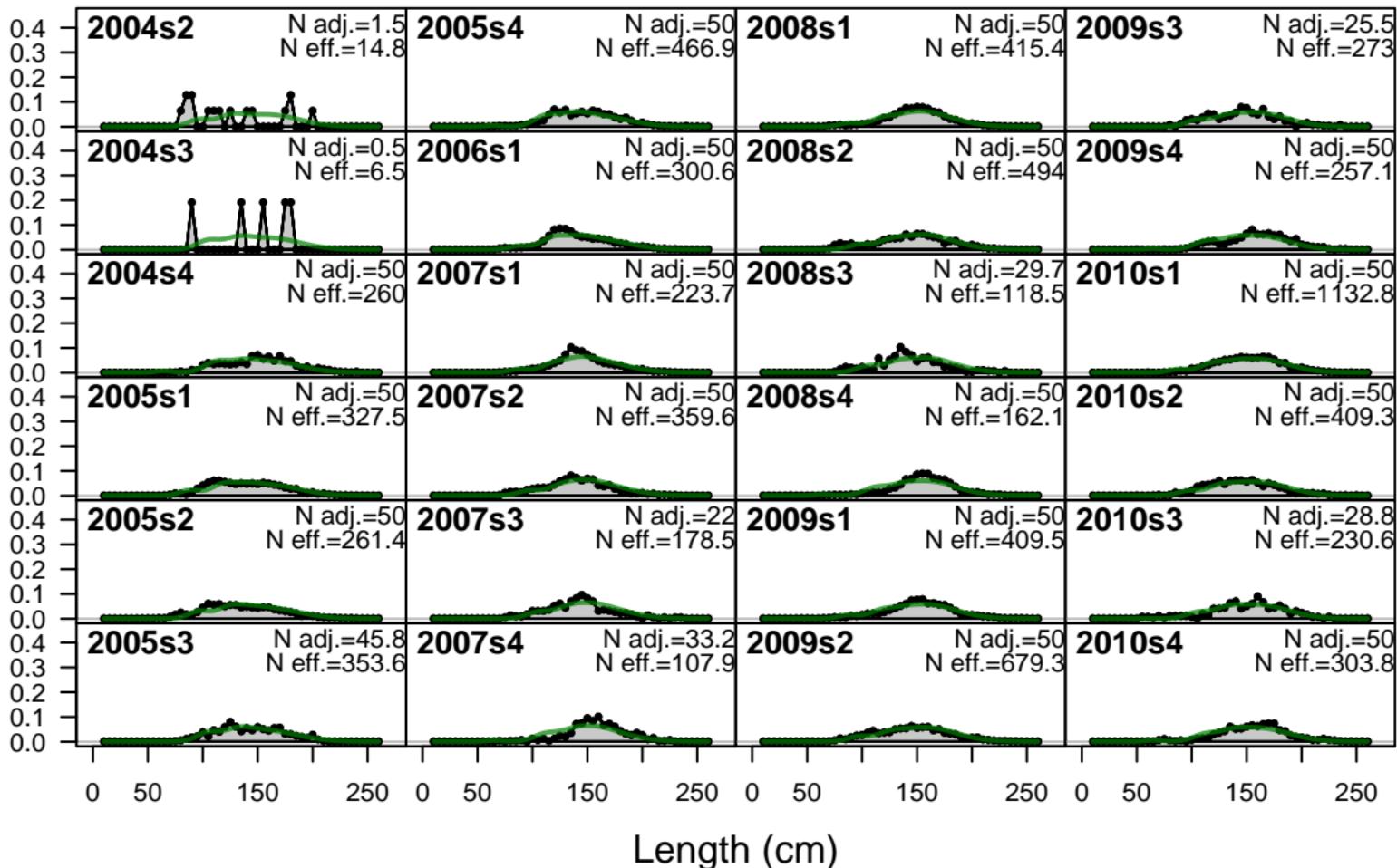




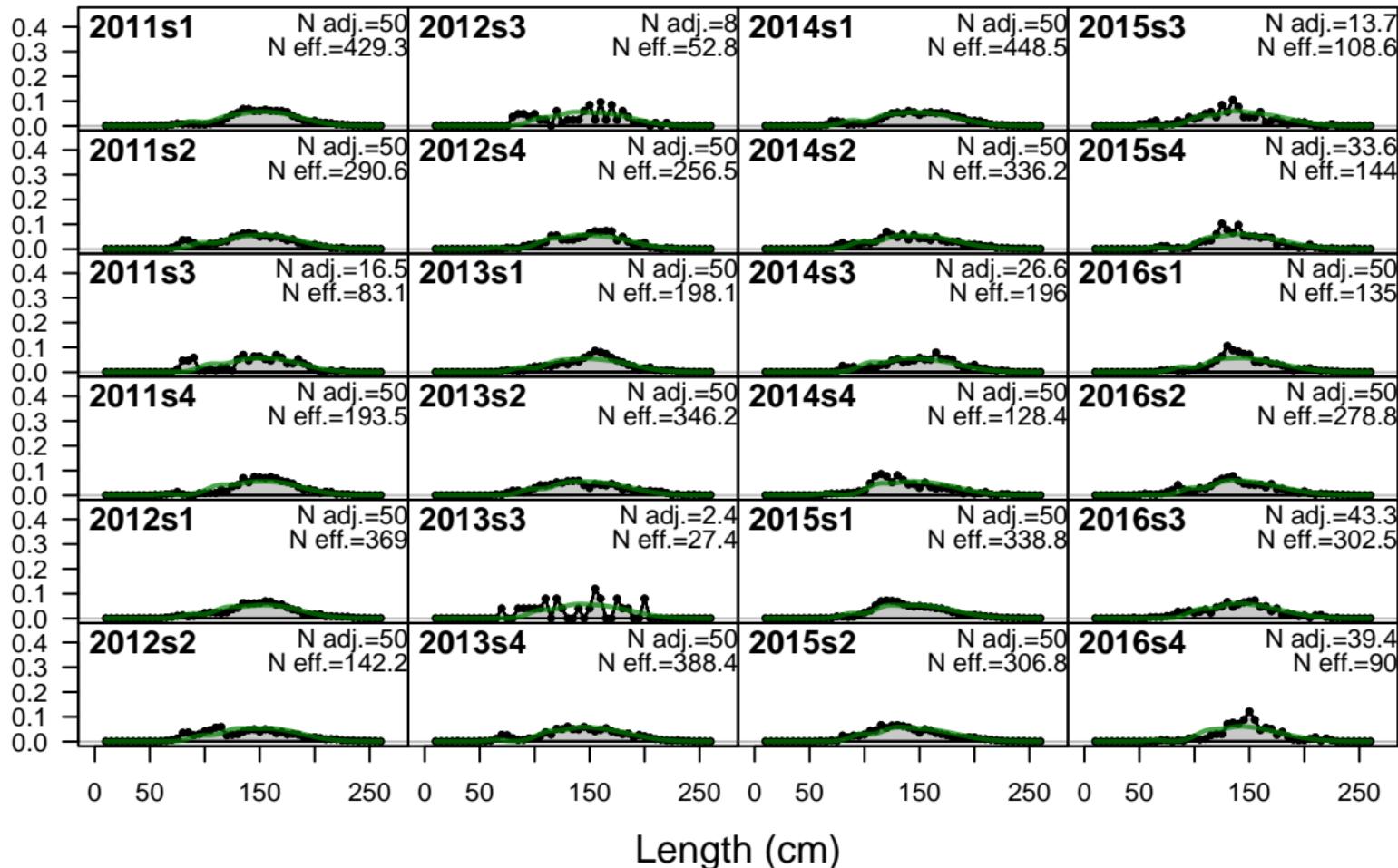
F2_TWN_WCNPO_DWLL_late (whole catch)



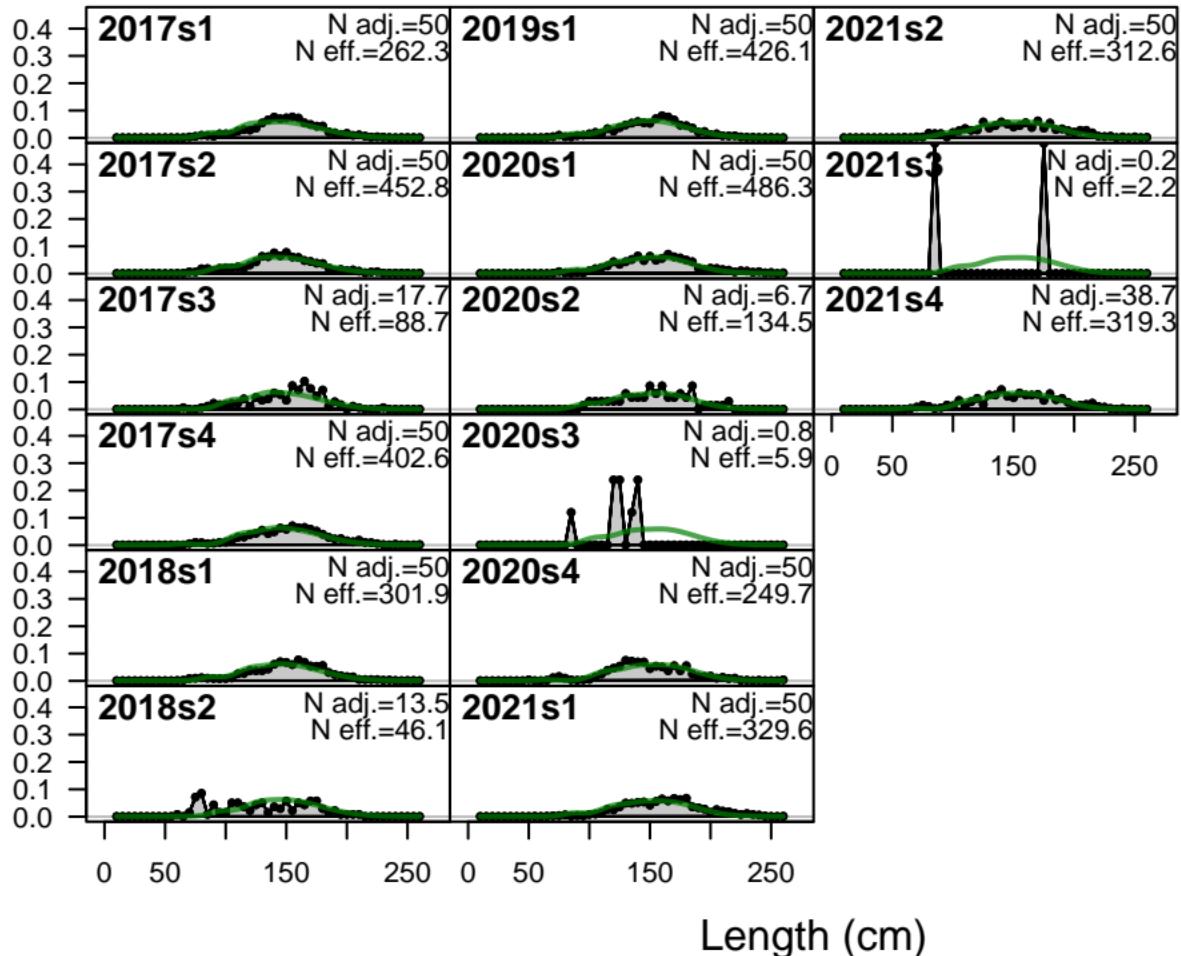
Proportion

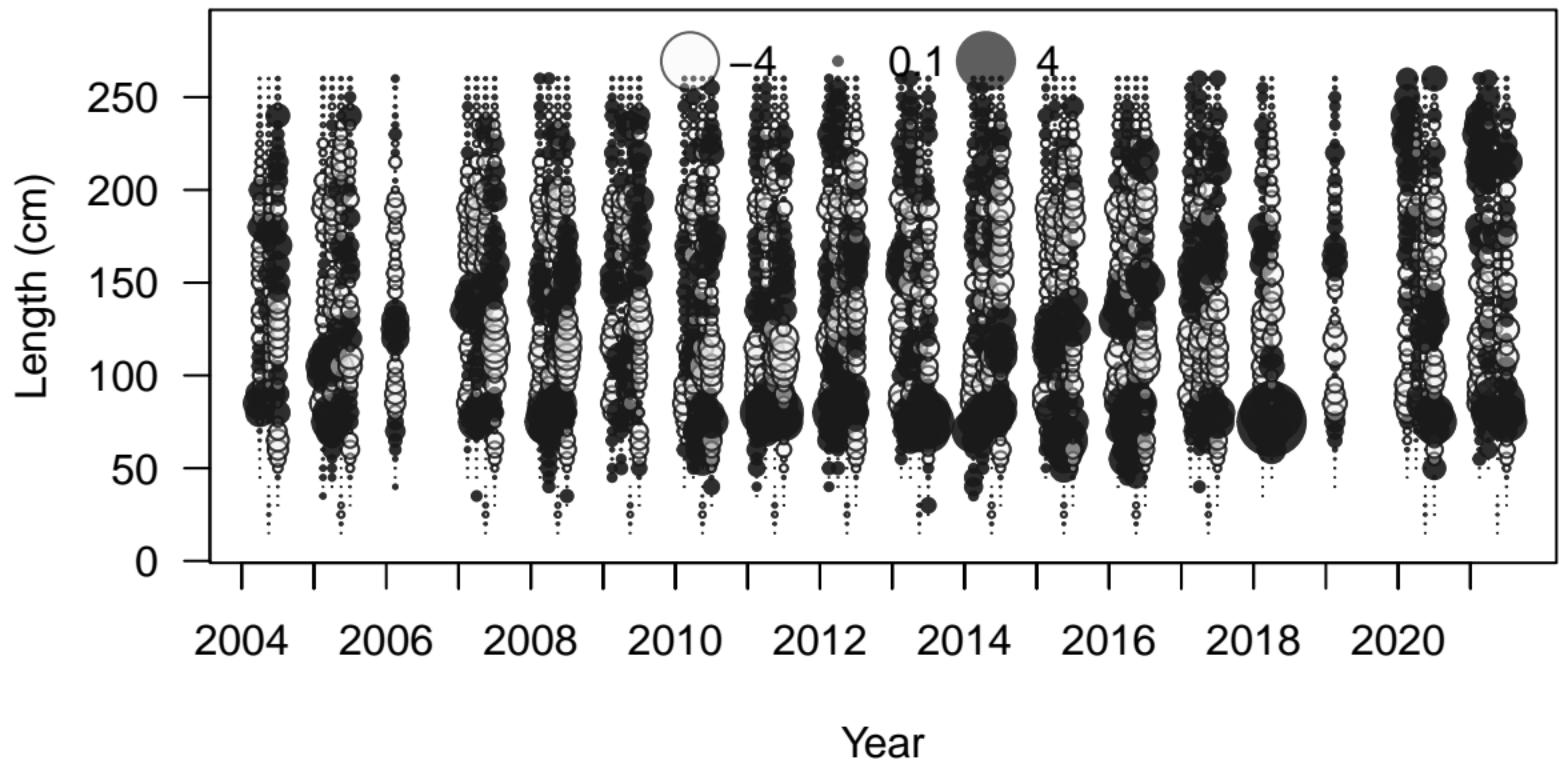


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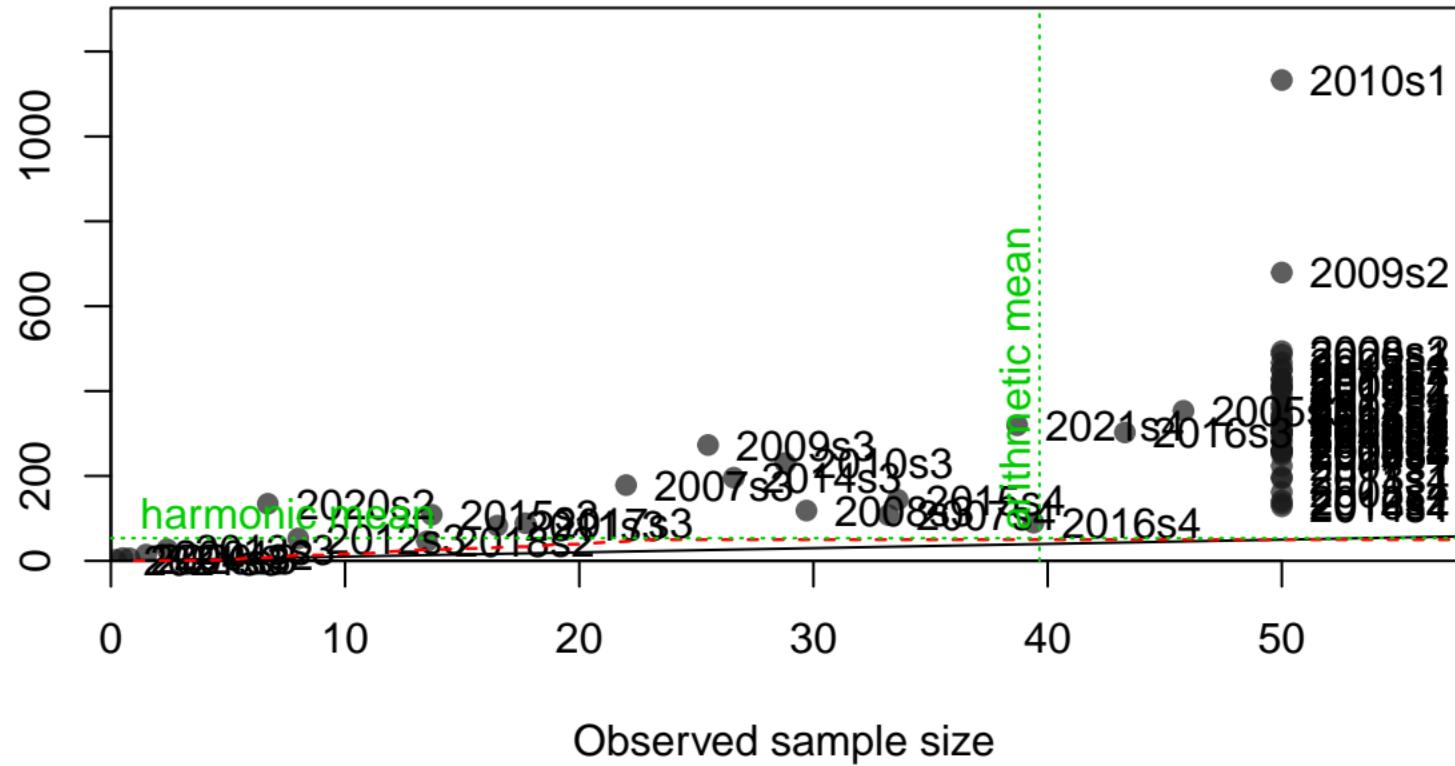


Proportion

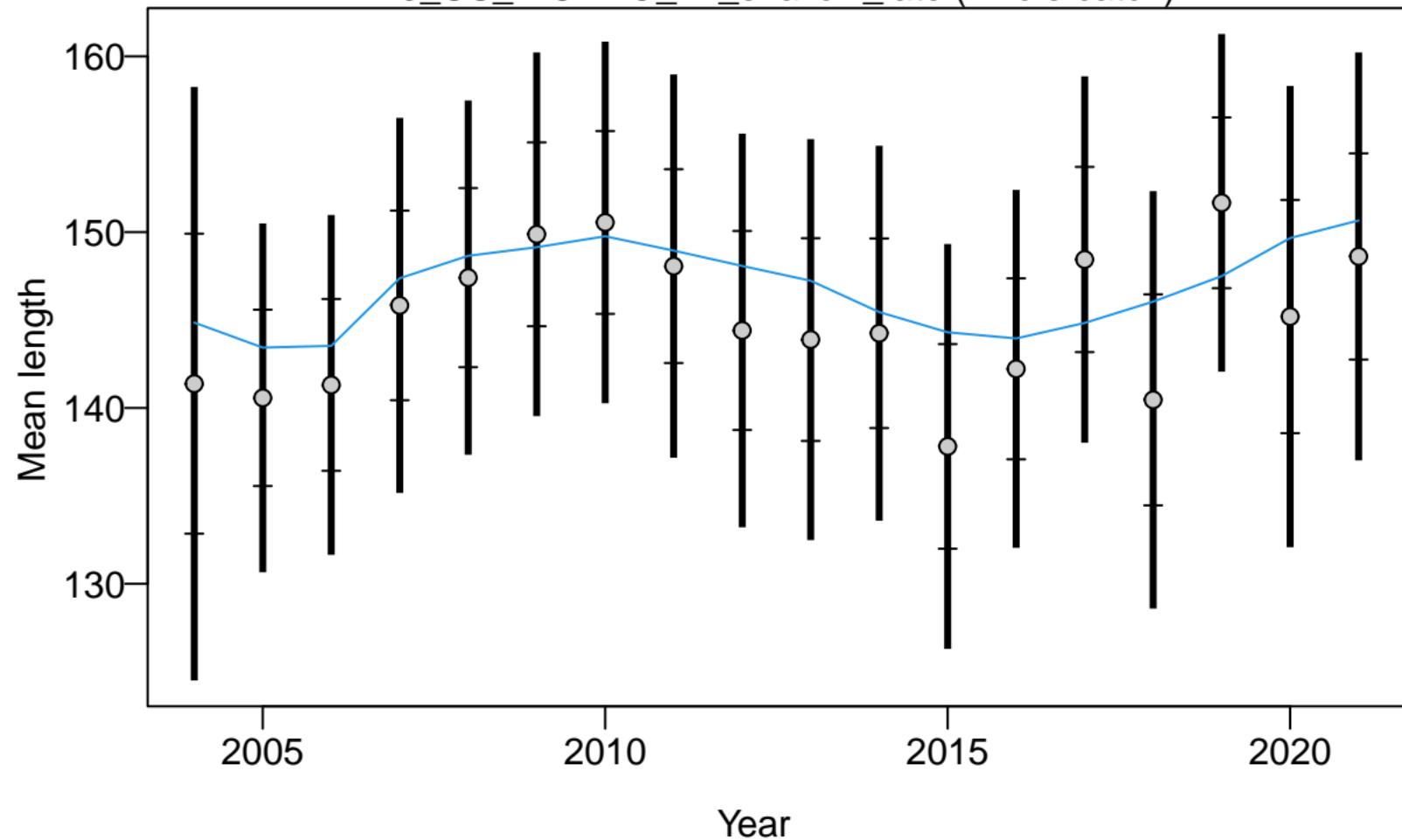




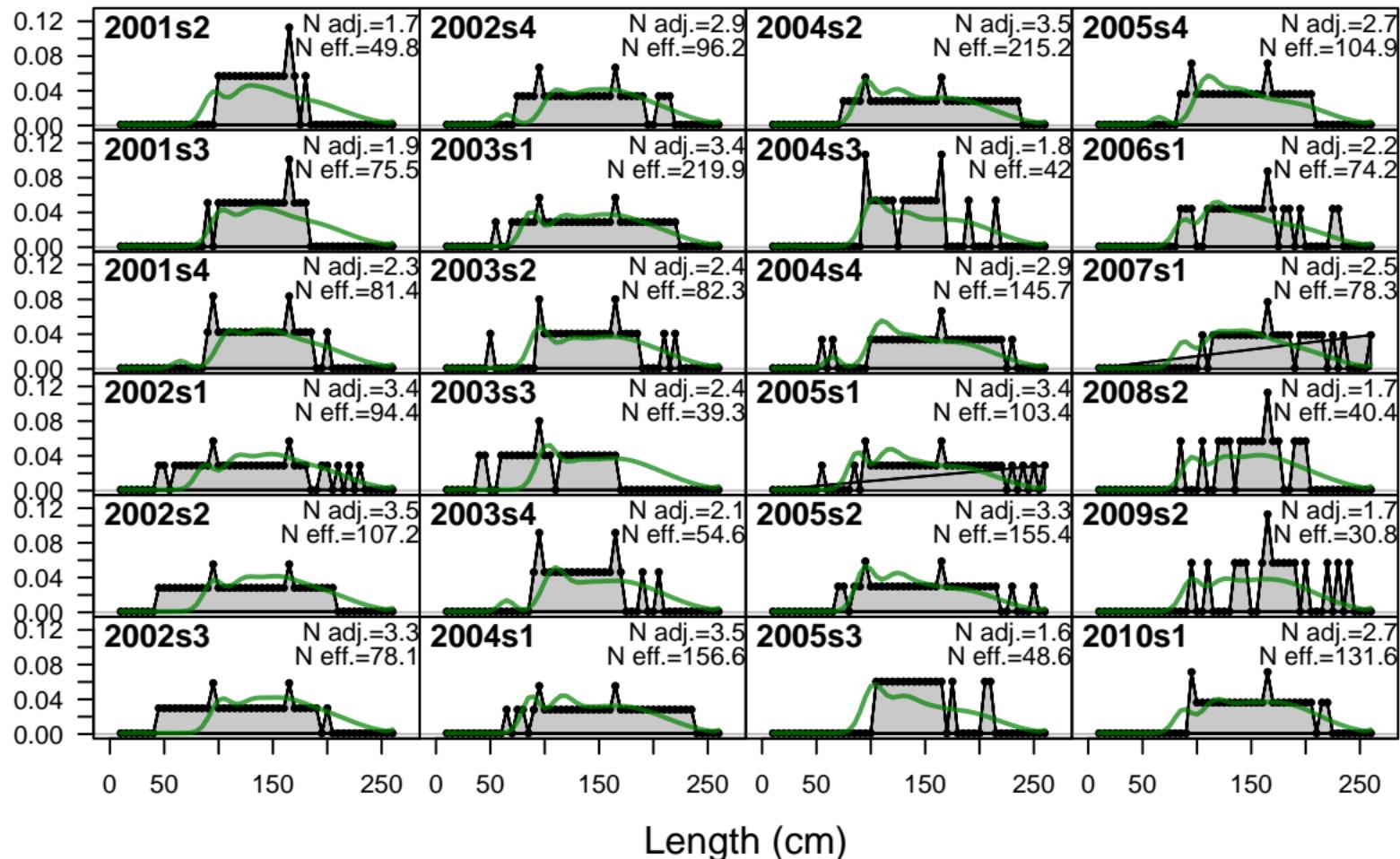
Effective sample size



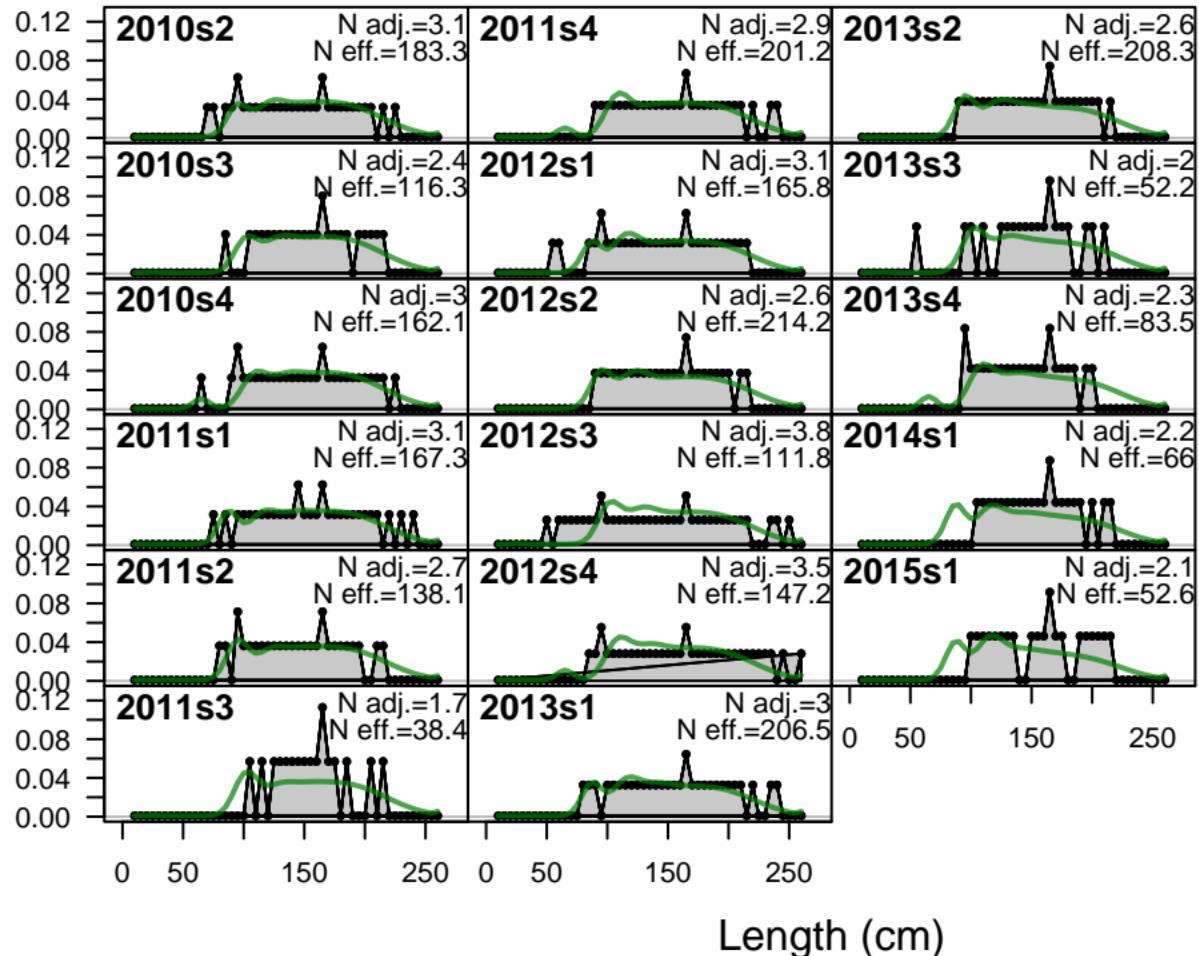
F3_US_WCNPO_LL_shallow_late (whole catch)

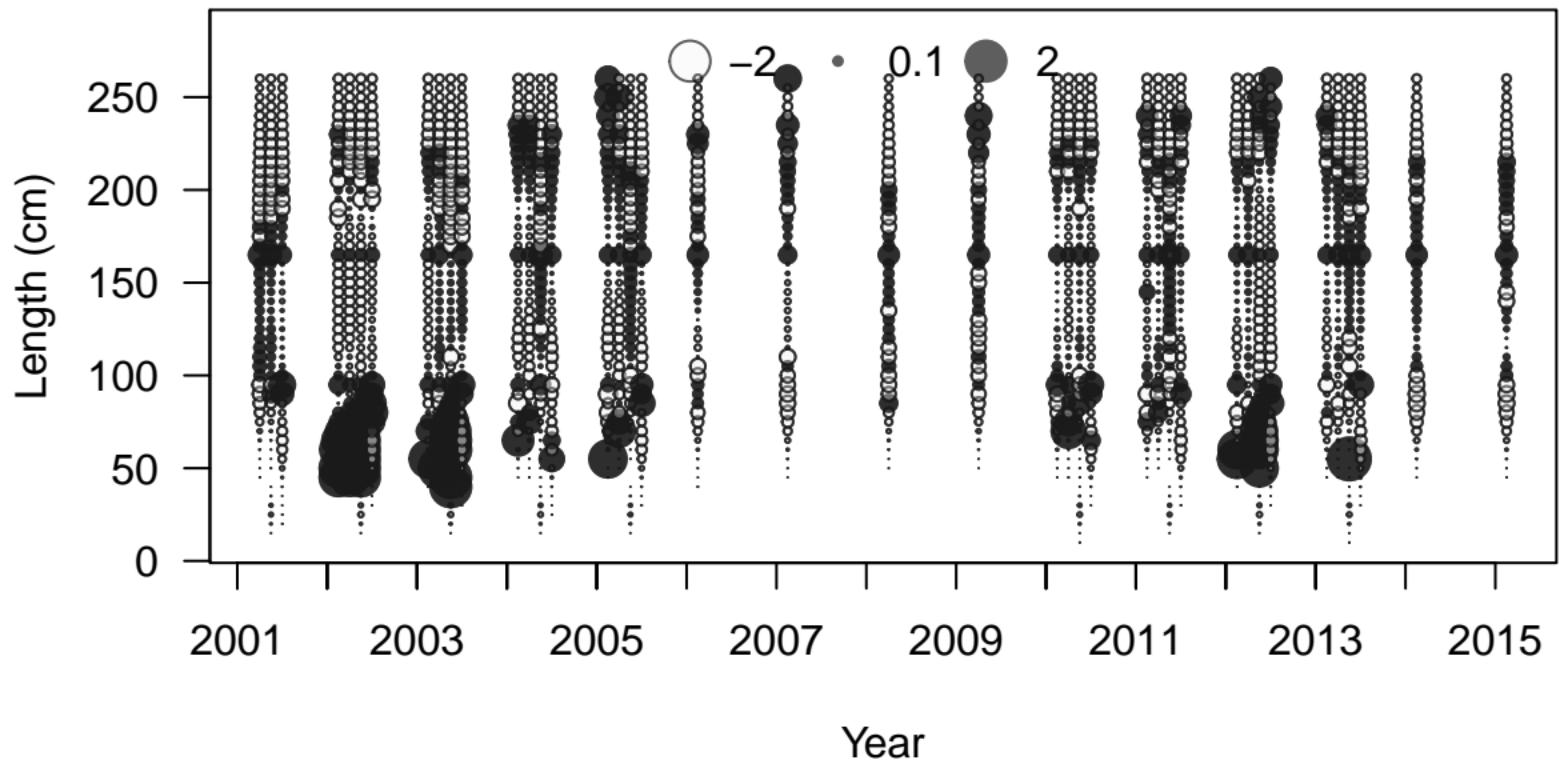


Proportion

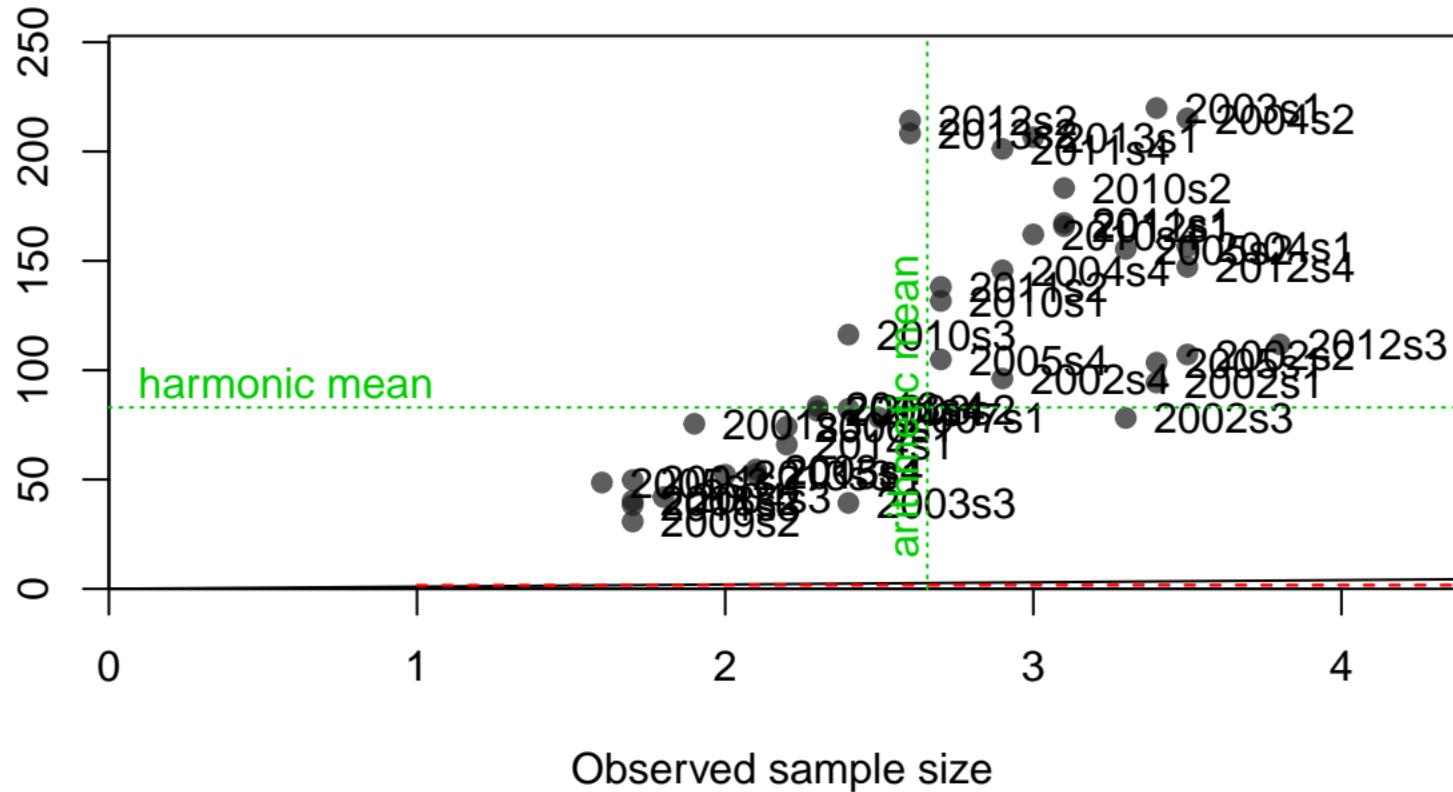


Proportion

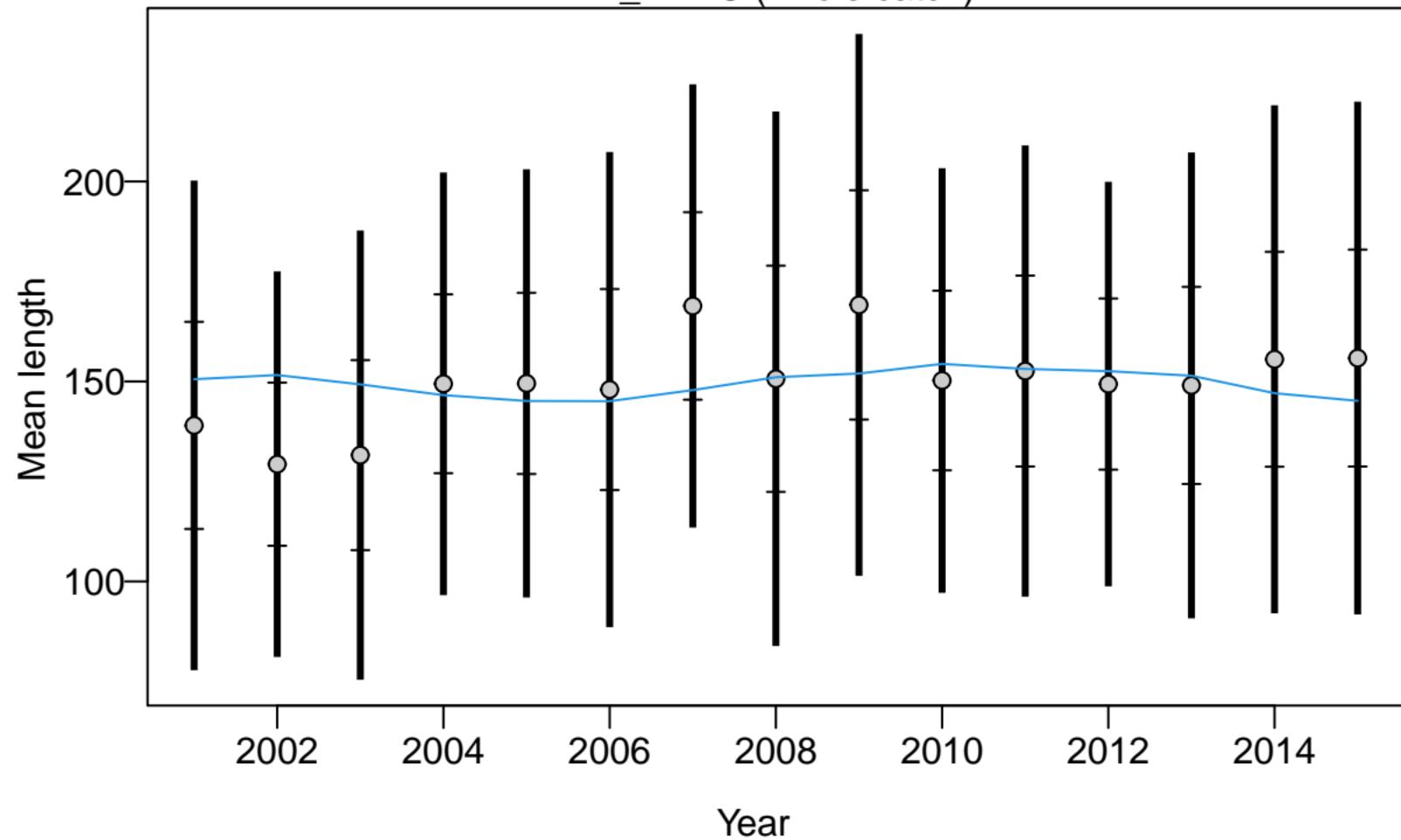




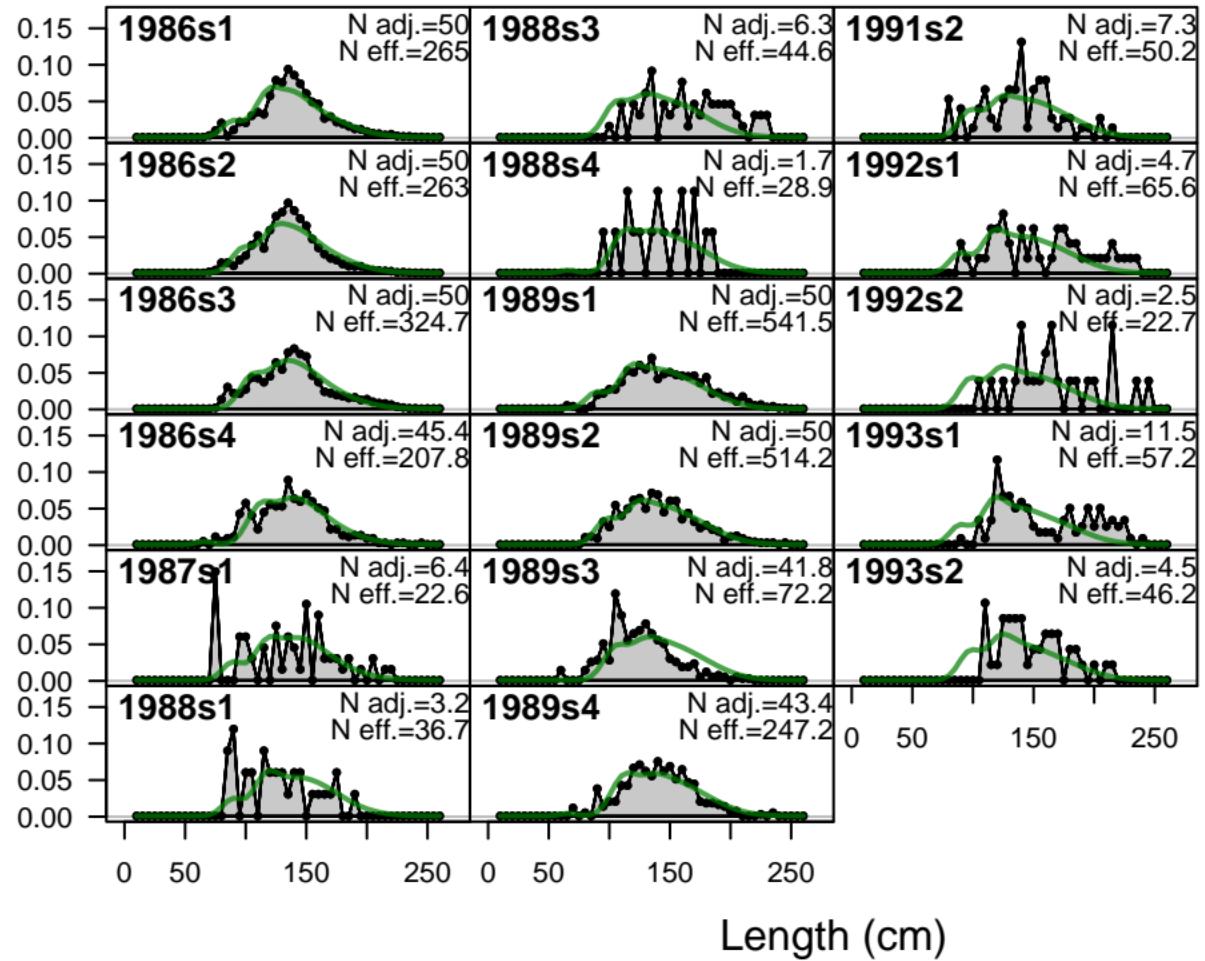
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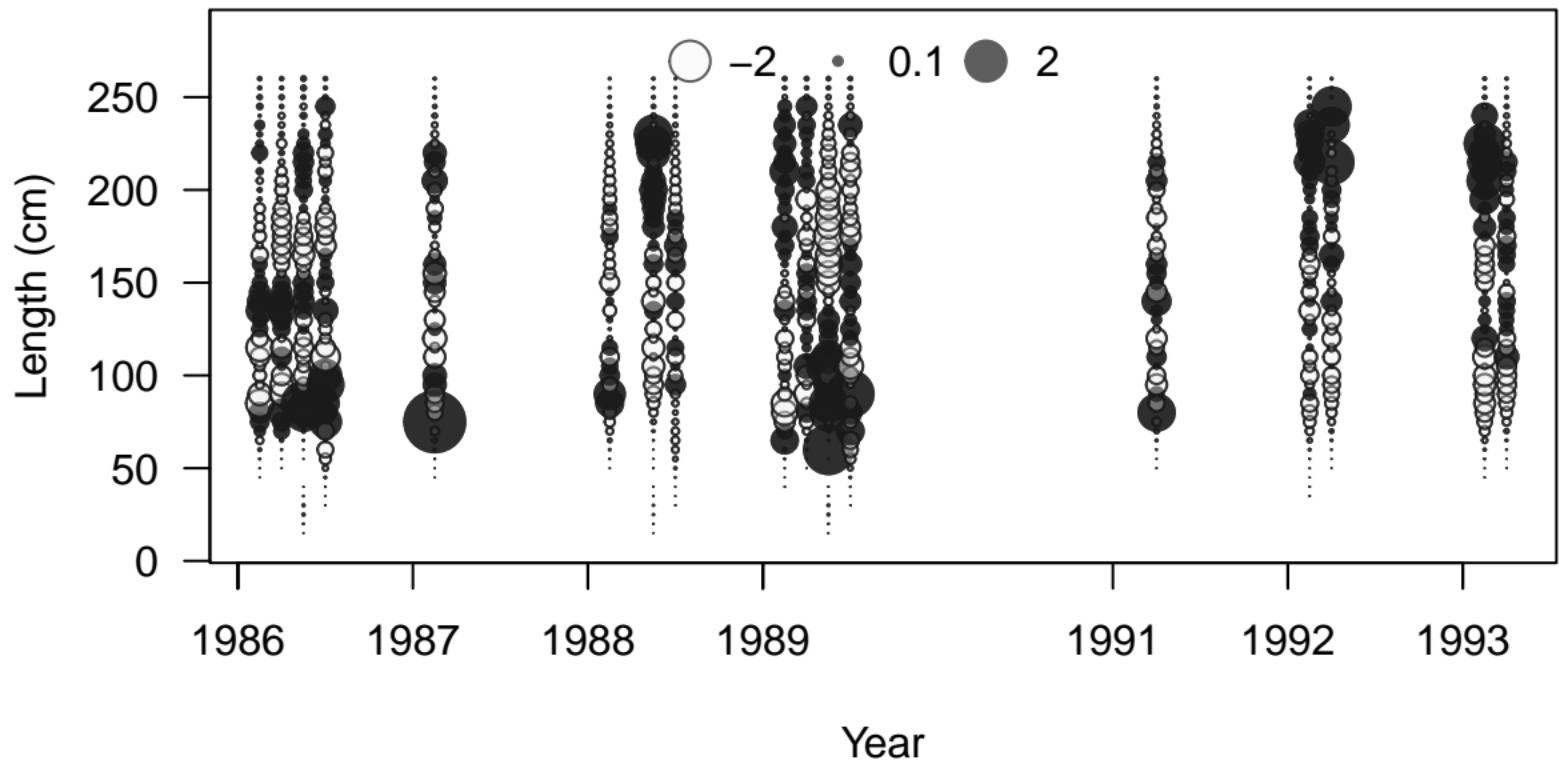


F4_IATTC (whole catch)

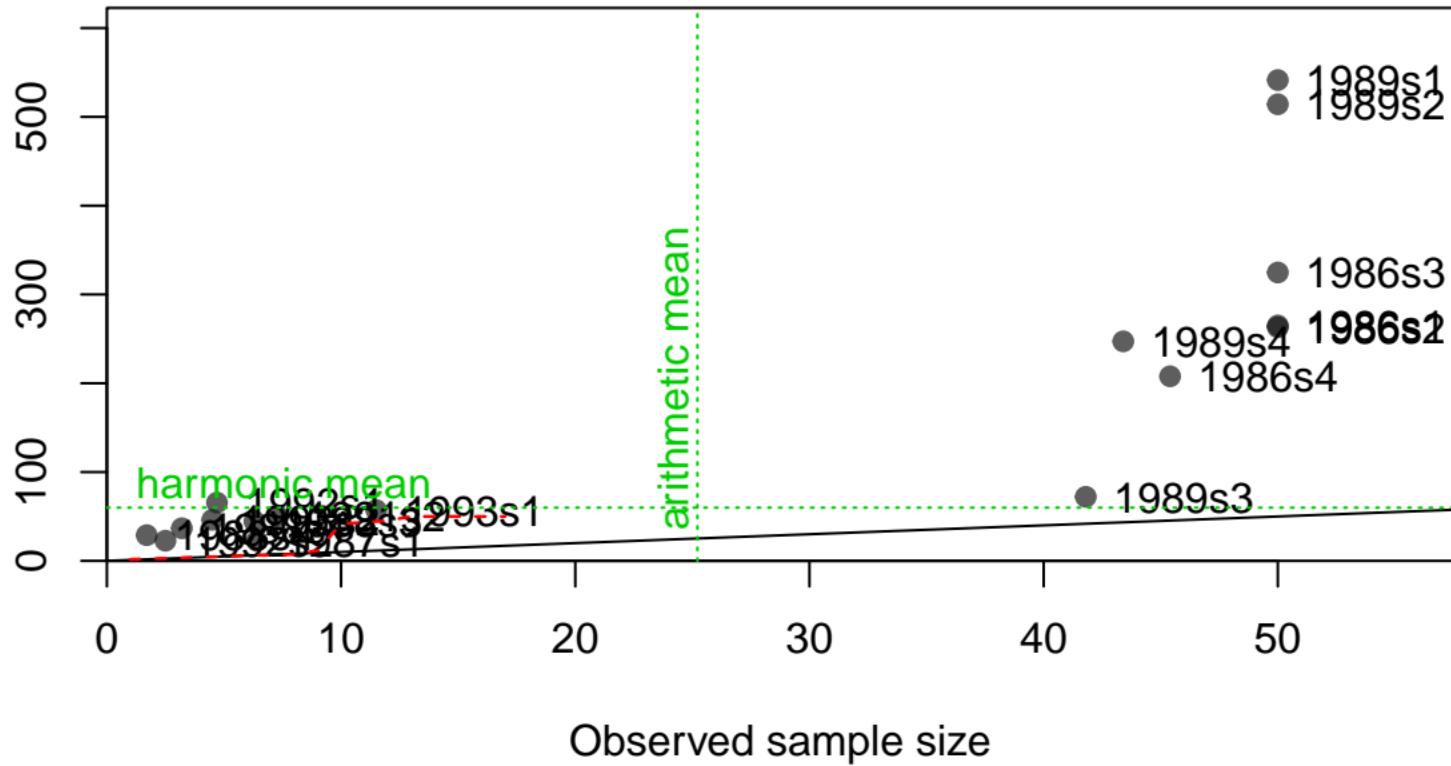


Proportion

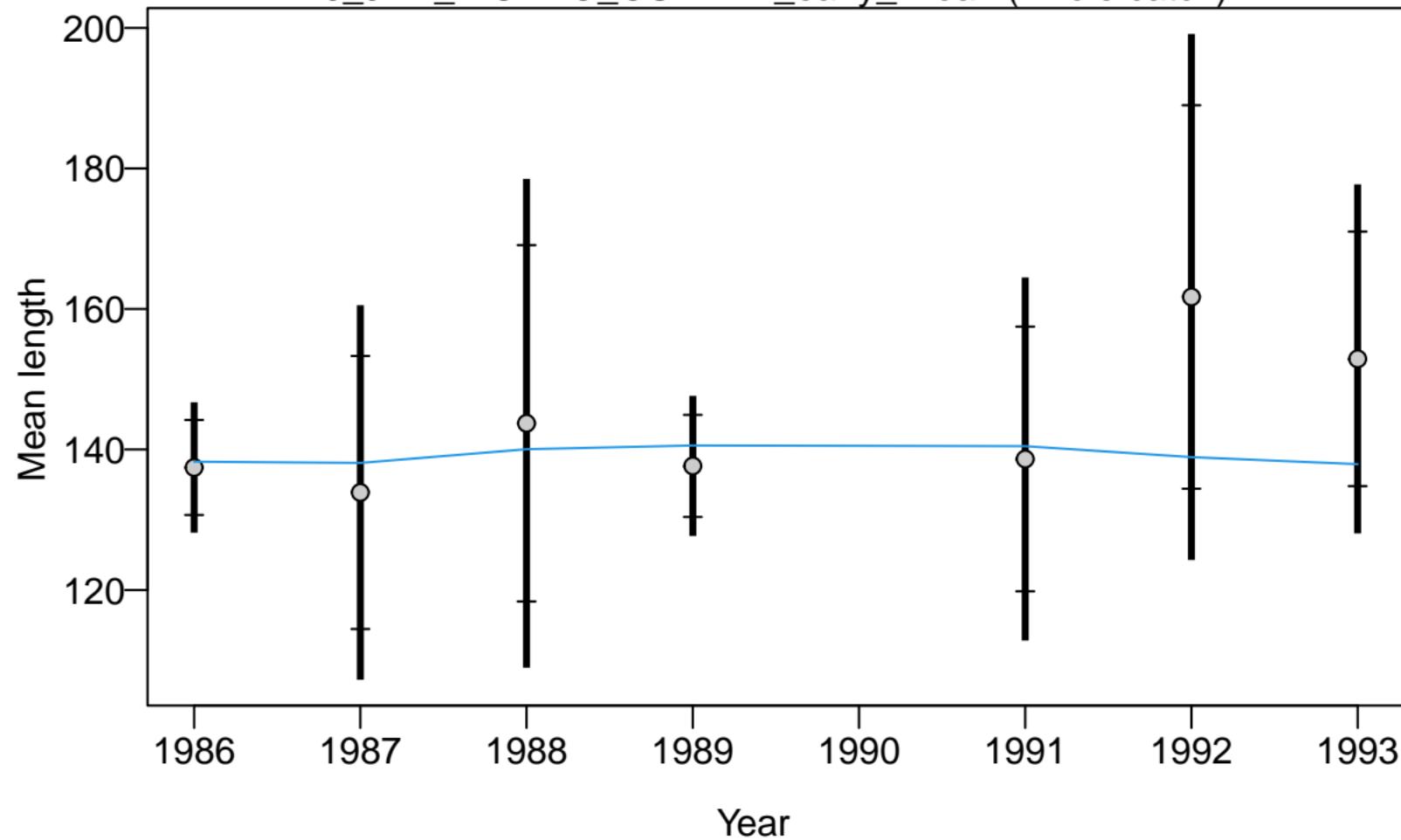




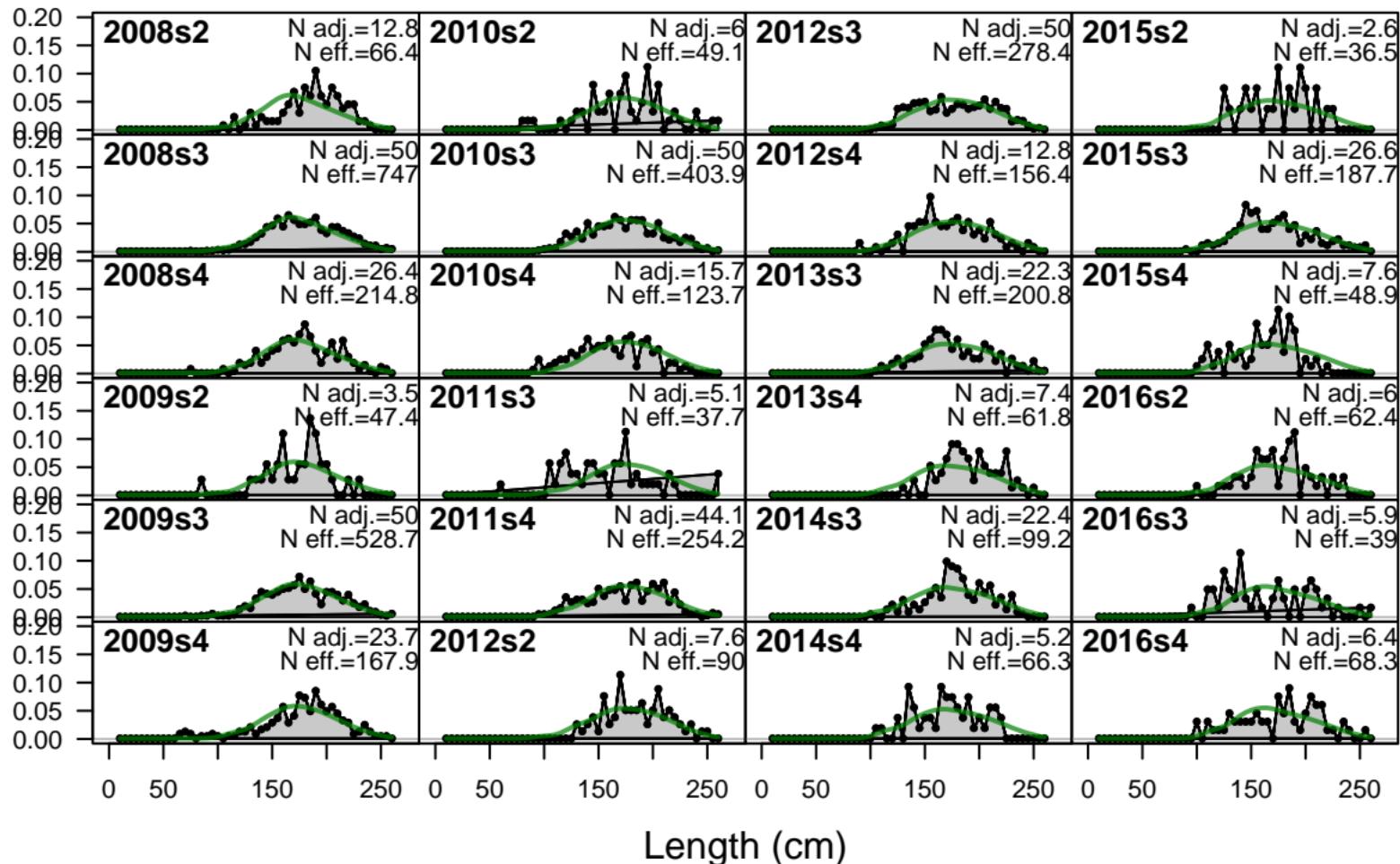
Effective sample size



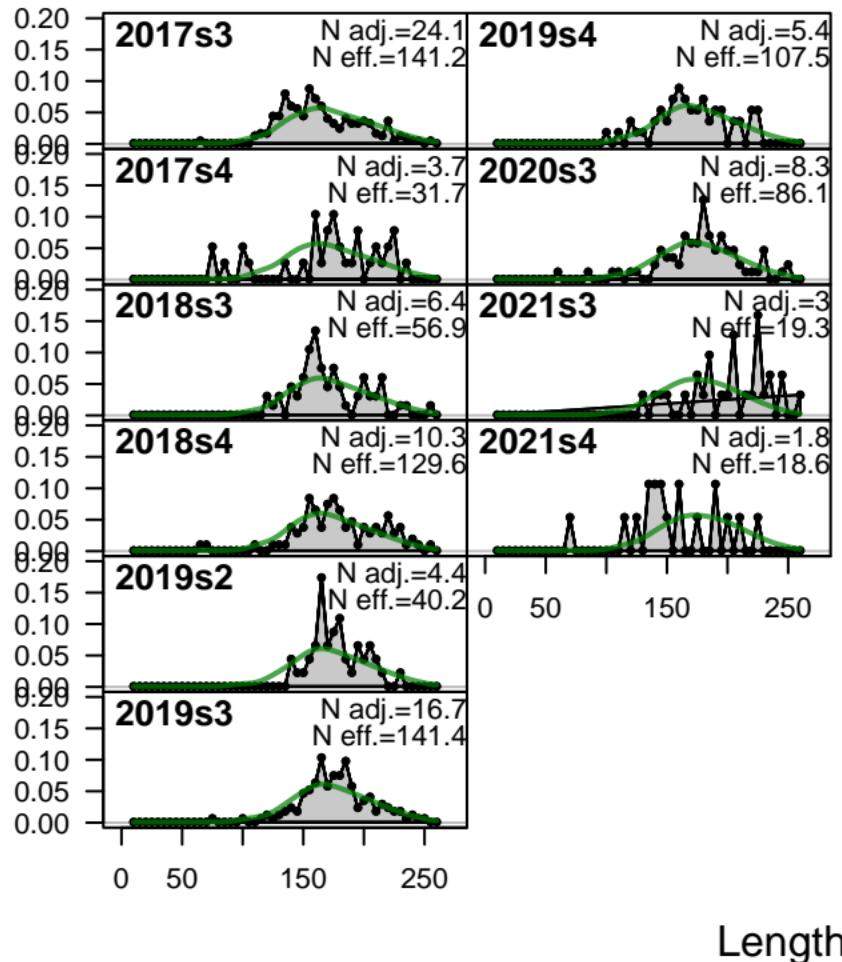
F6_JPN_WCNPO OSDWLL_early_Area1 (whole catch)

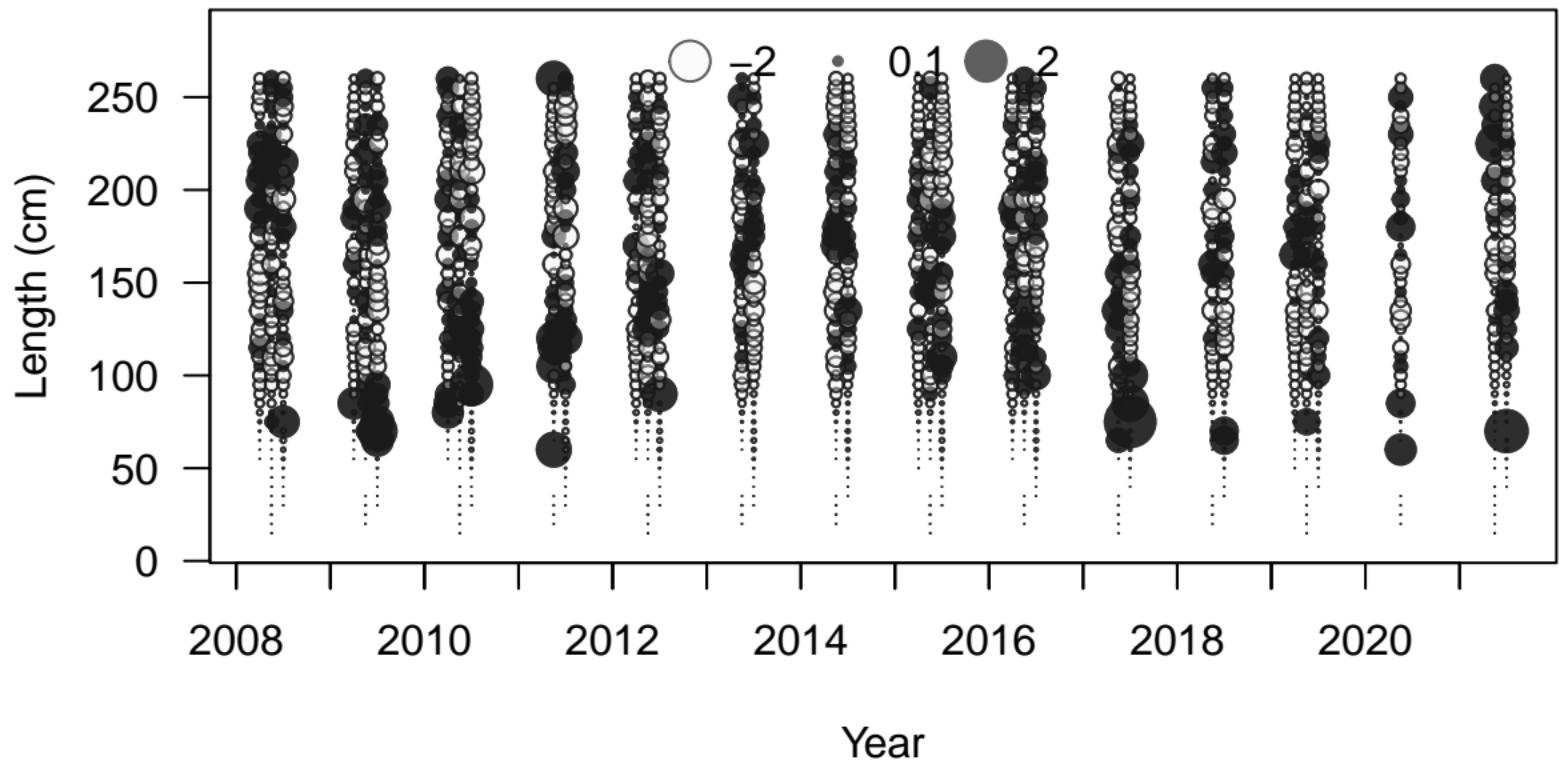


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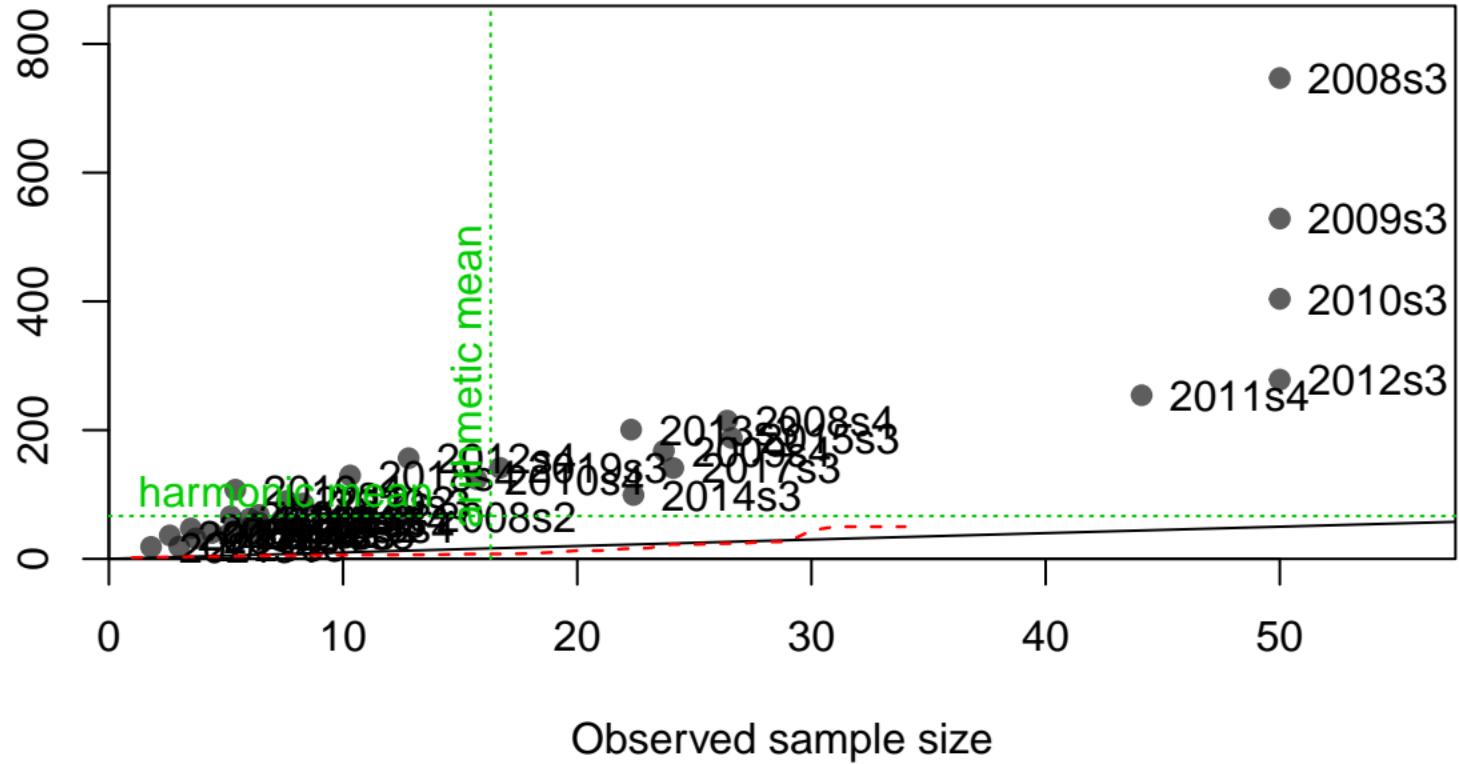


Proportion

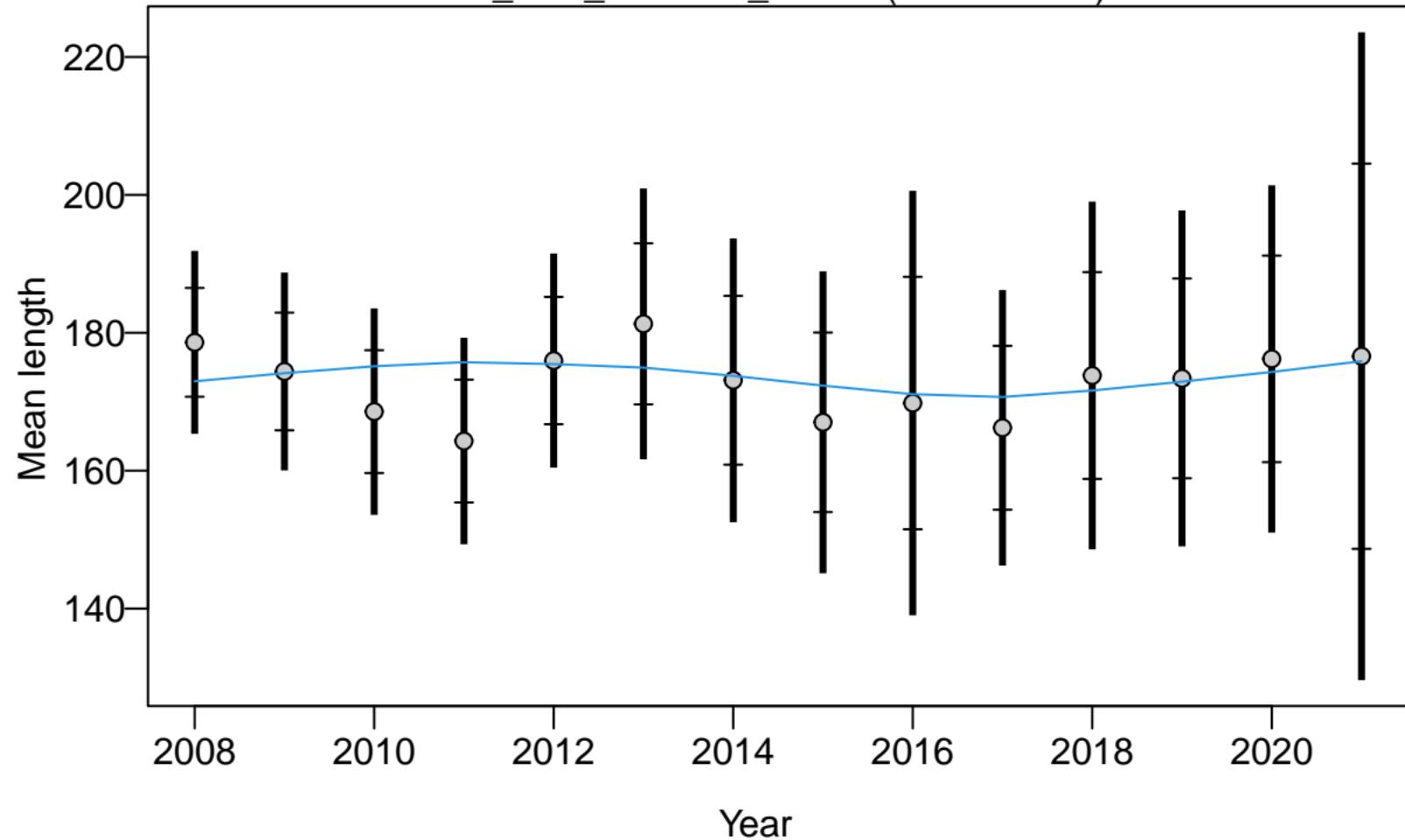




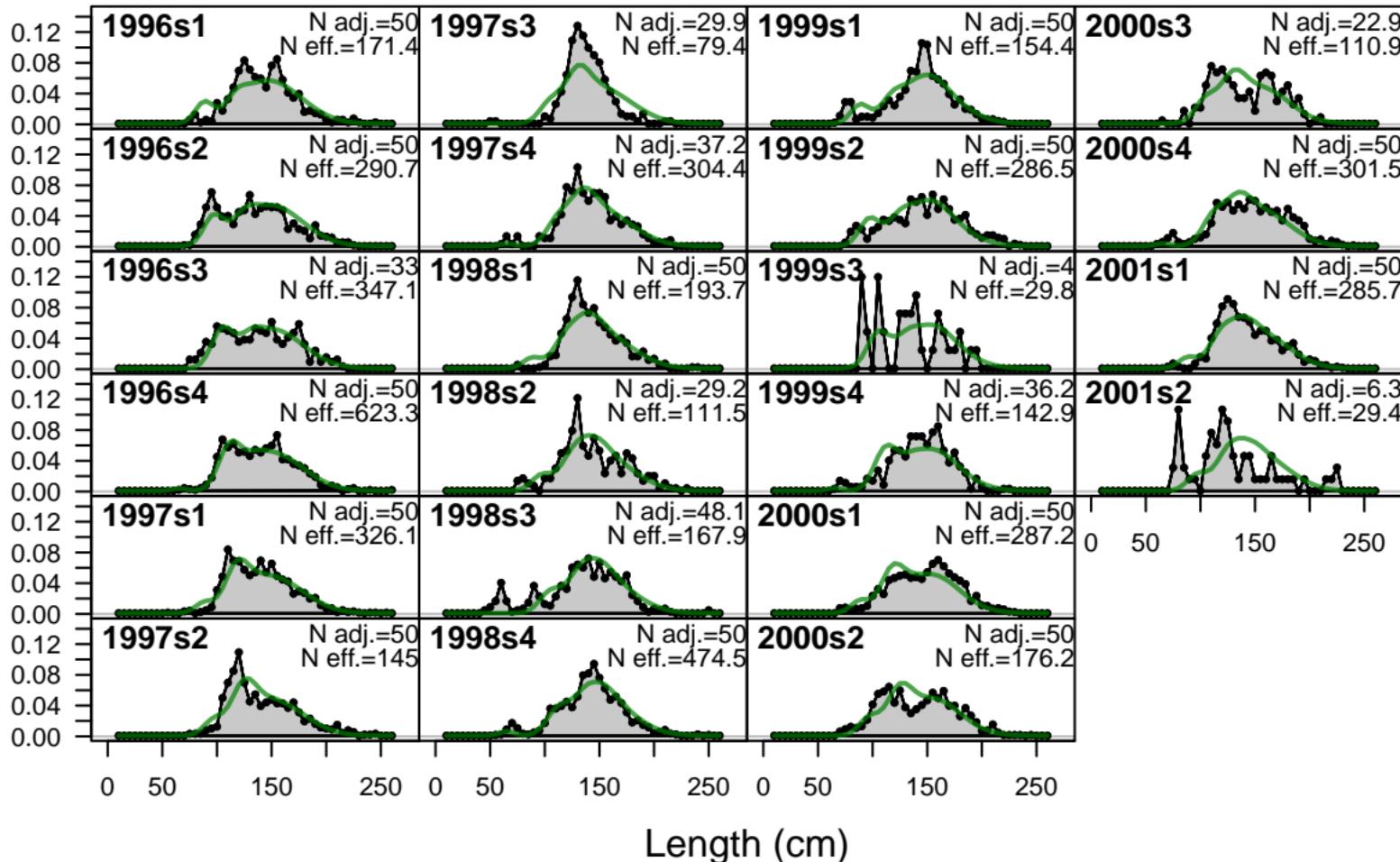
Effective sample size

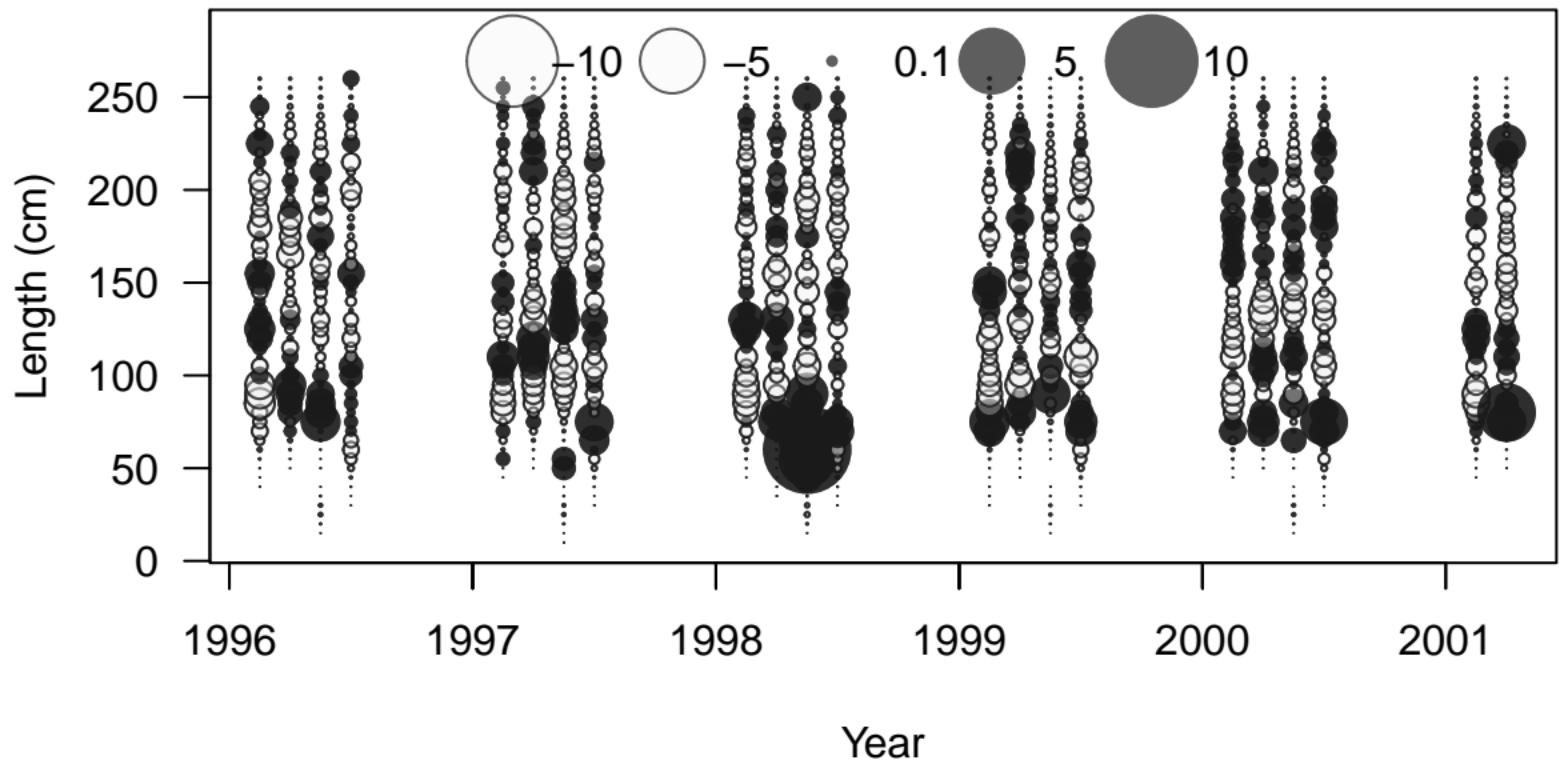


F7_JPN_WCNPO_CODF (whole catch)

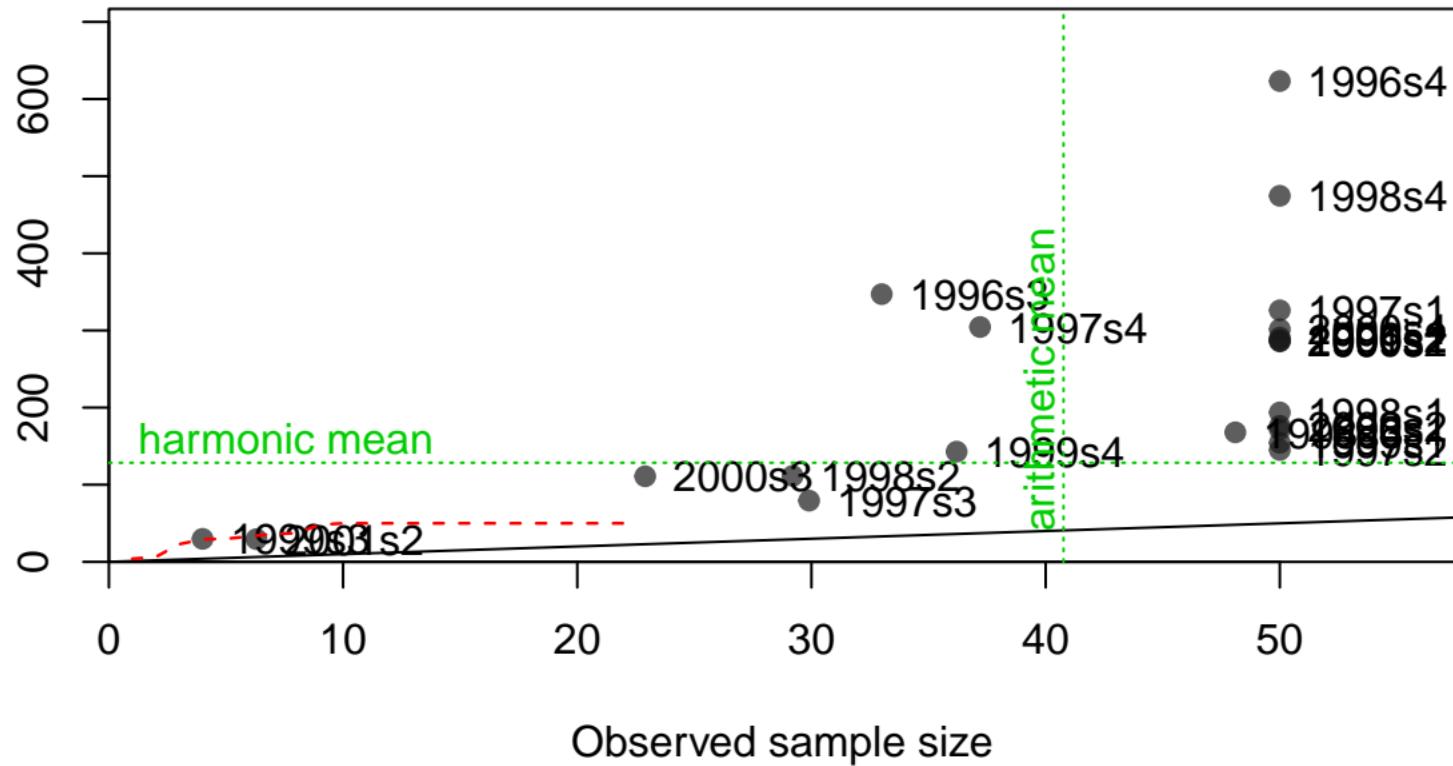


Proportion

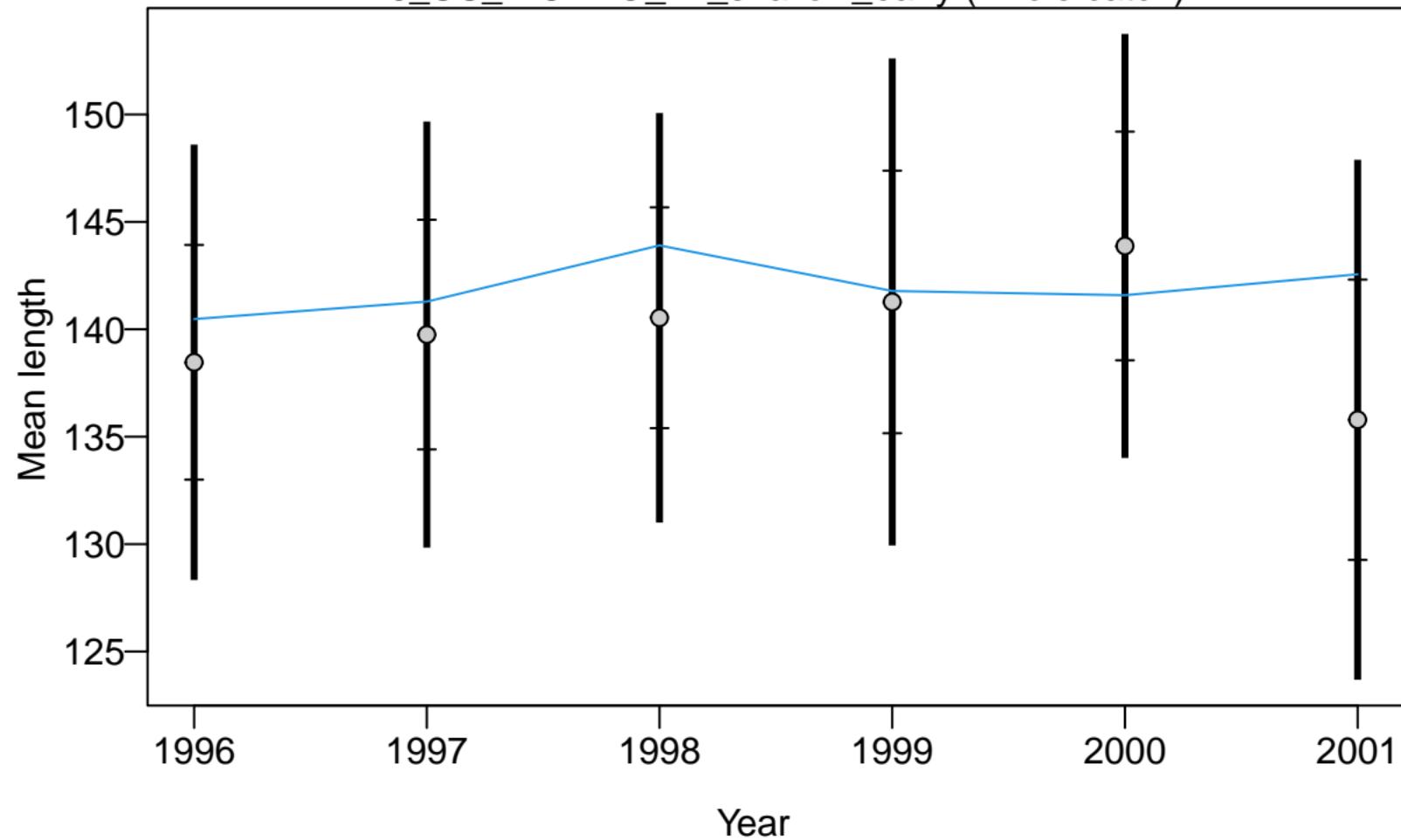




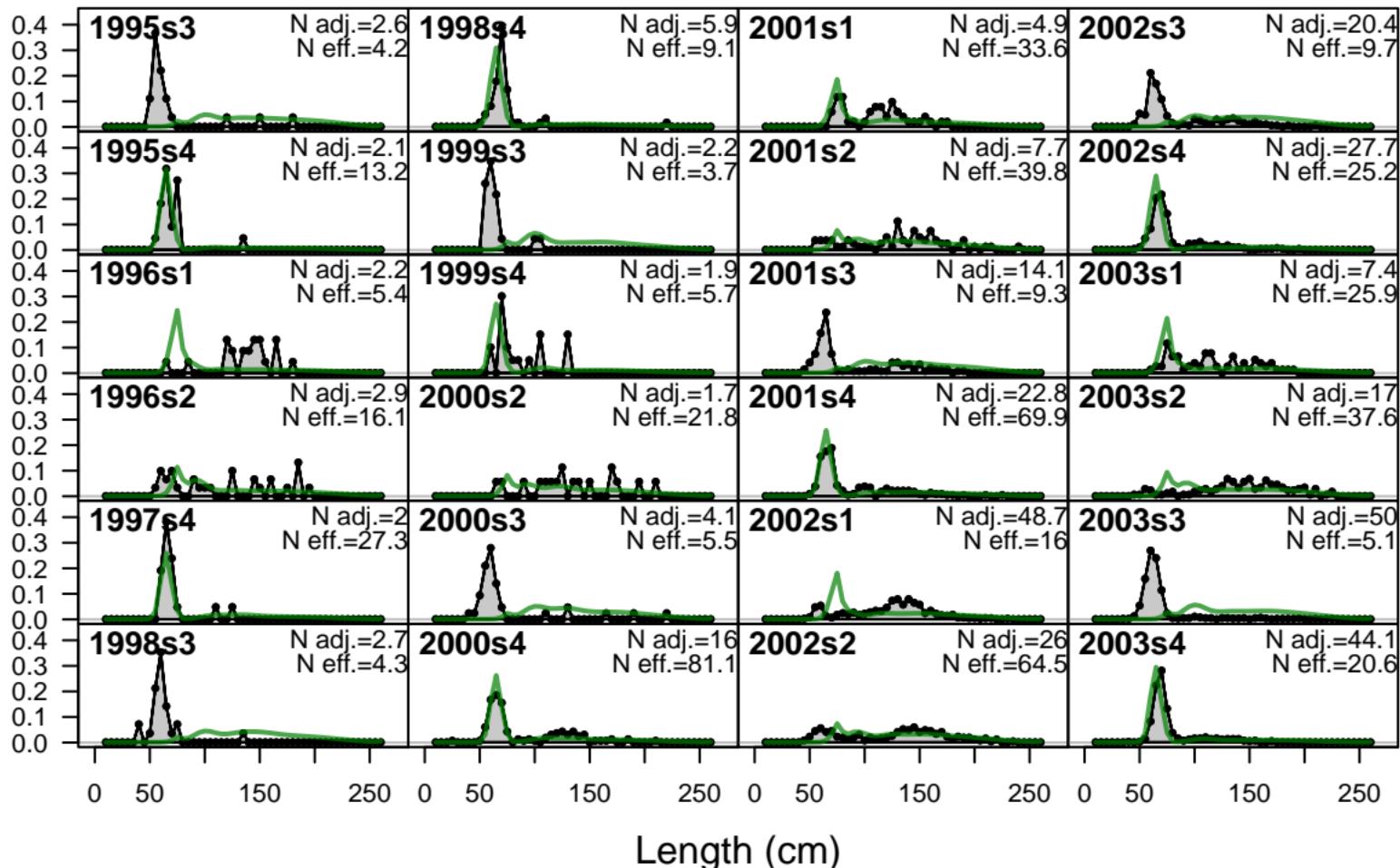
Effective sample size



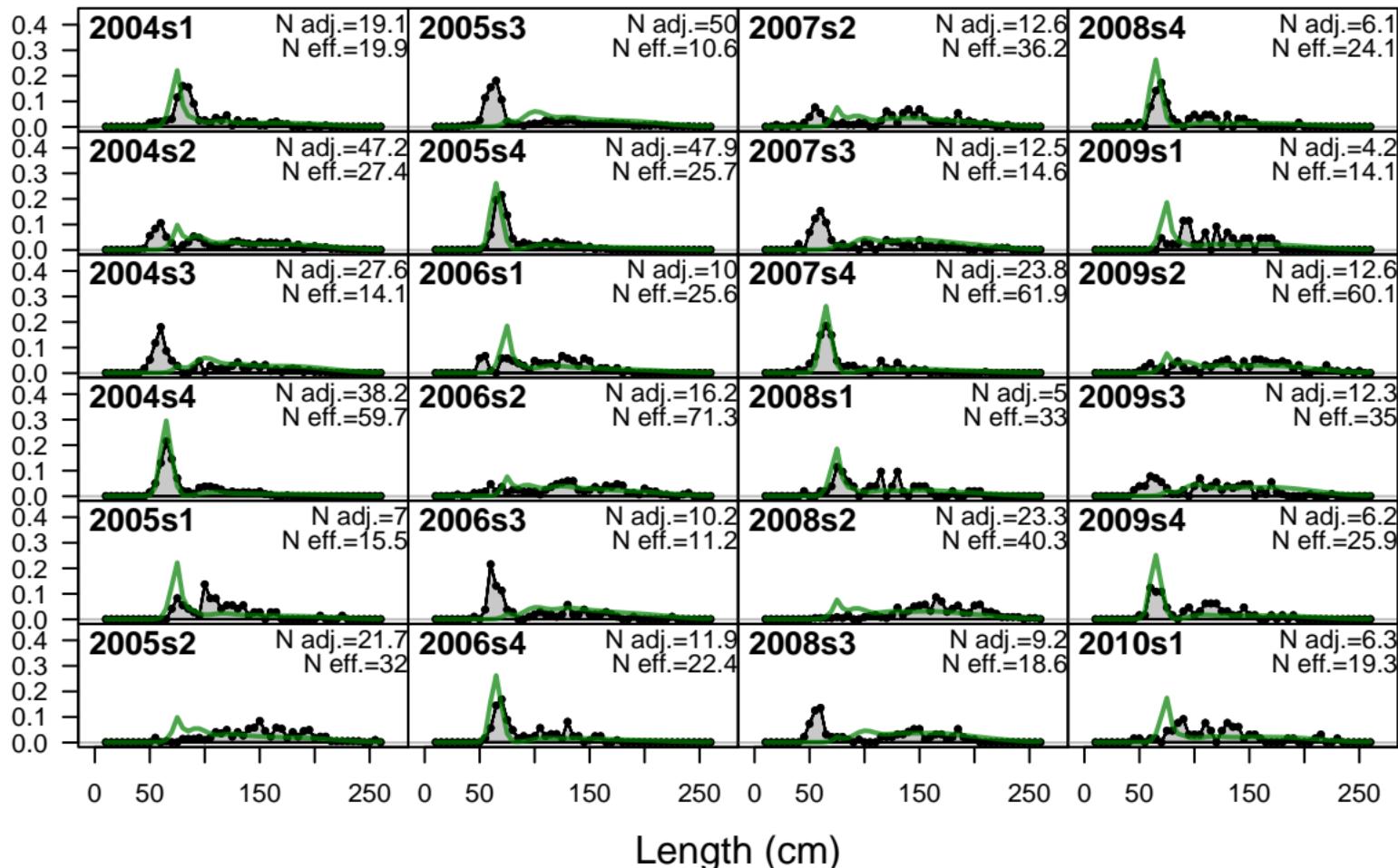
F8_US_WCNPO_LL_shallow_early (whole catch)



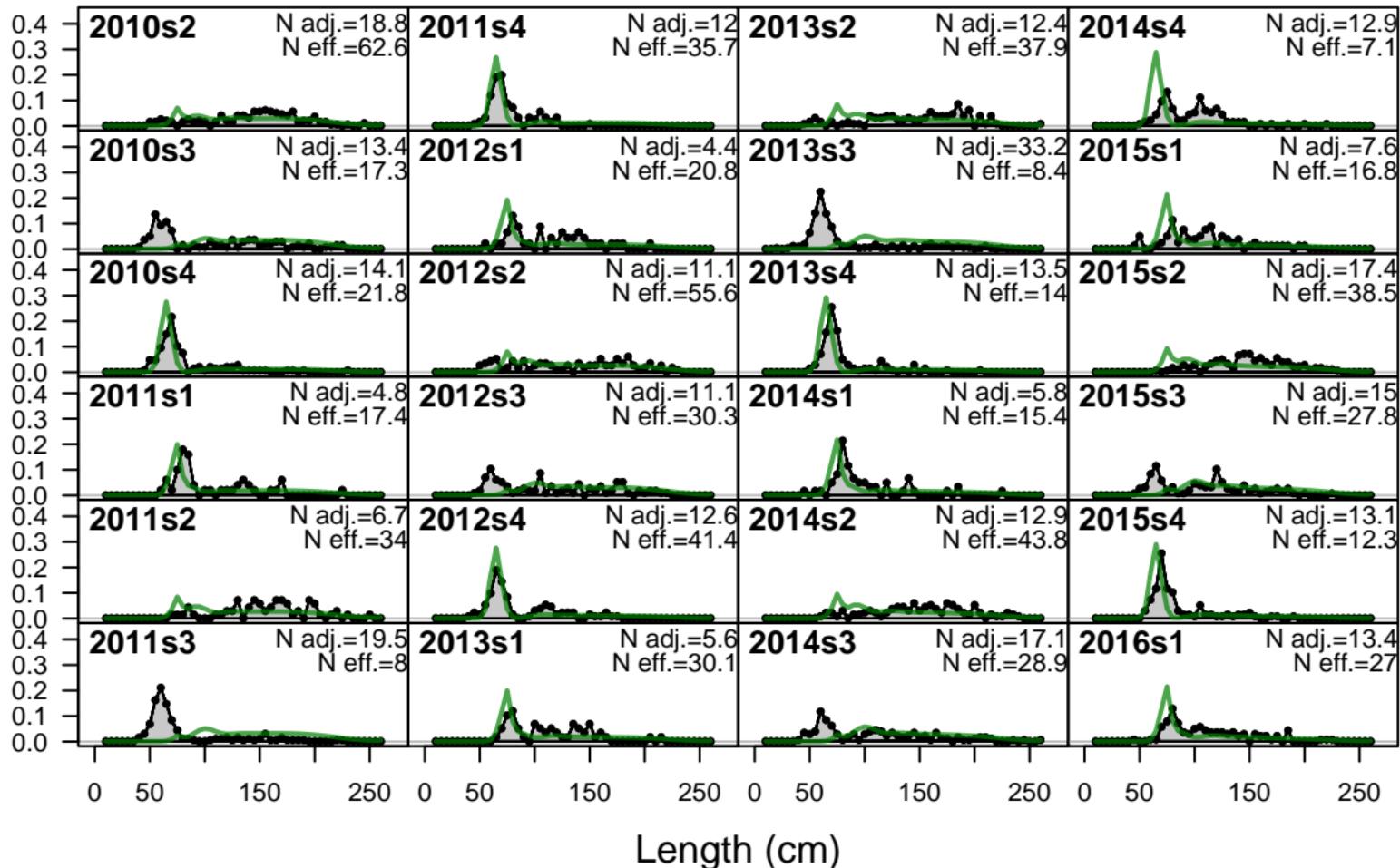
Proportion



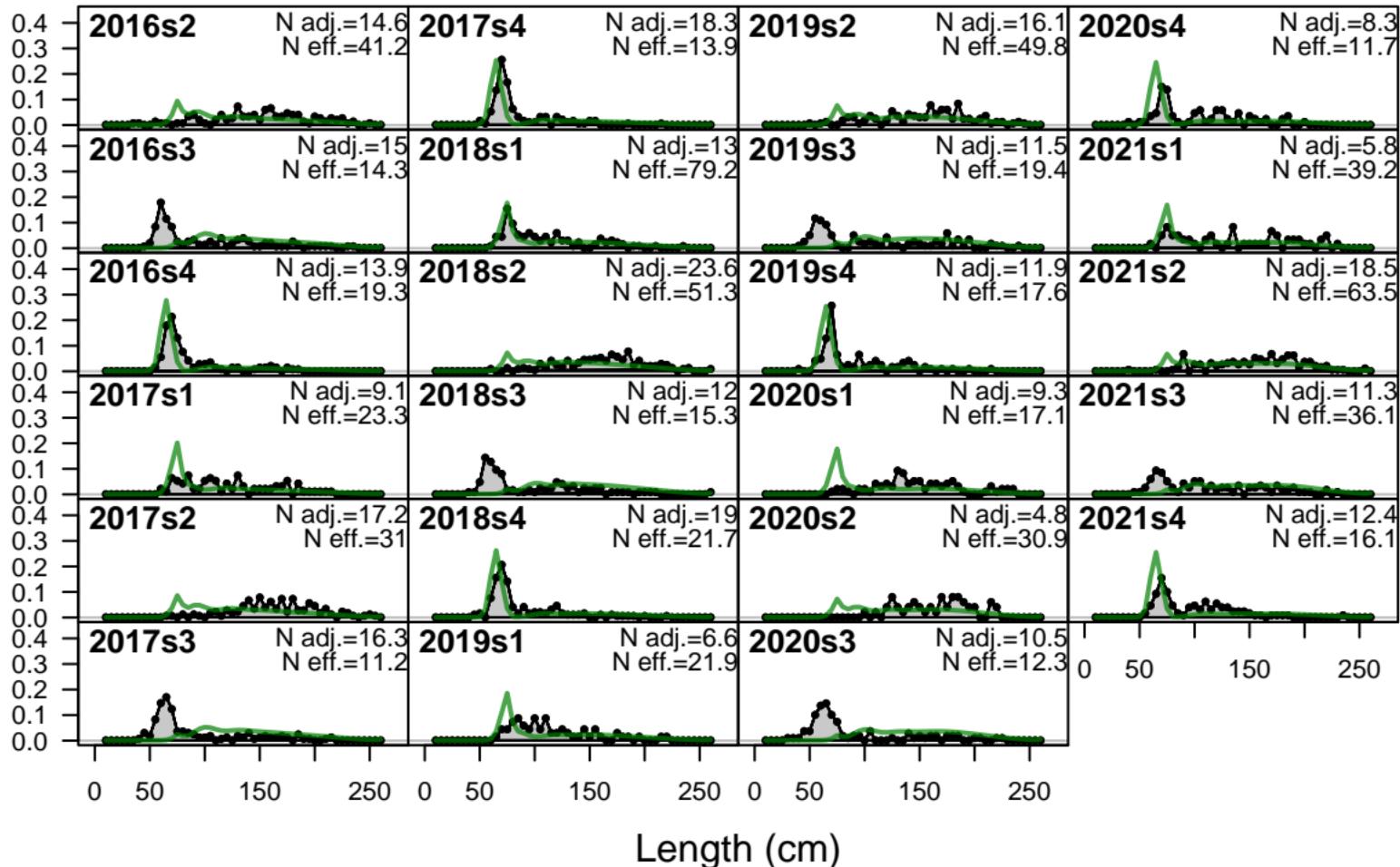
Proportion

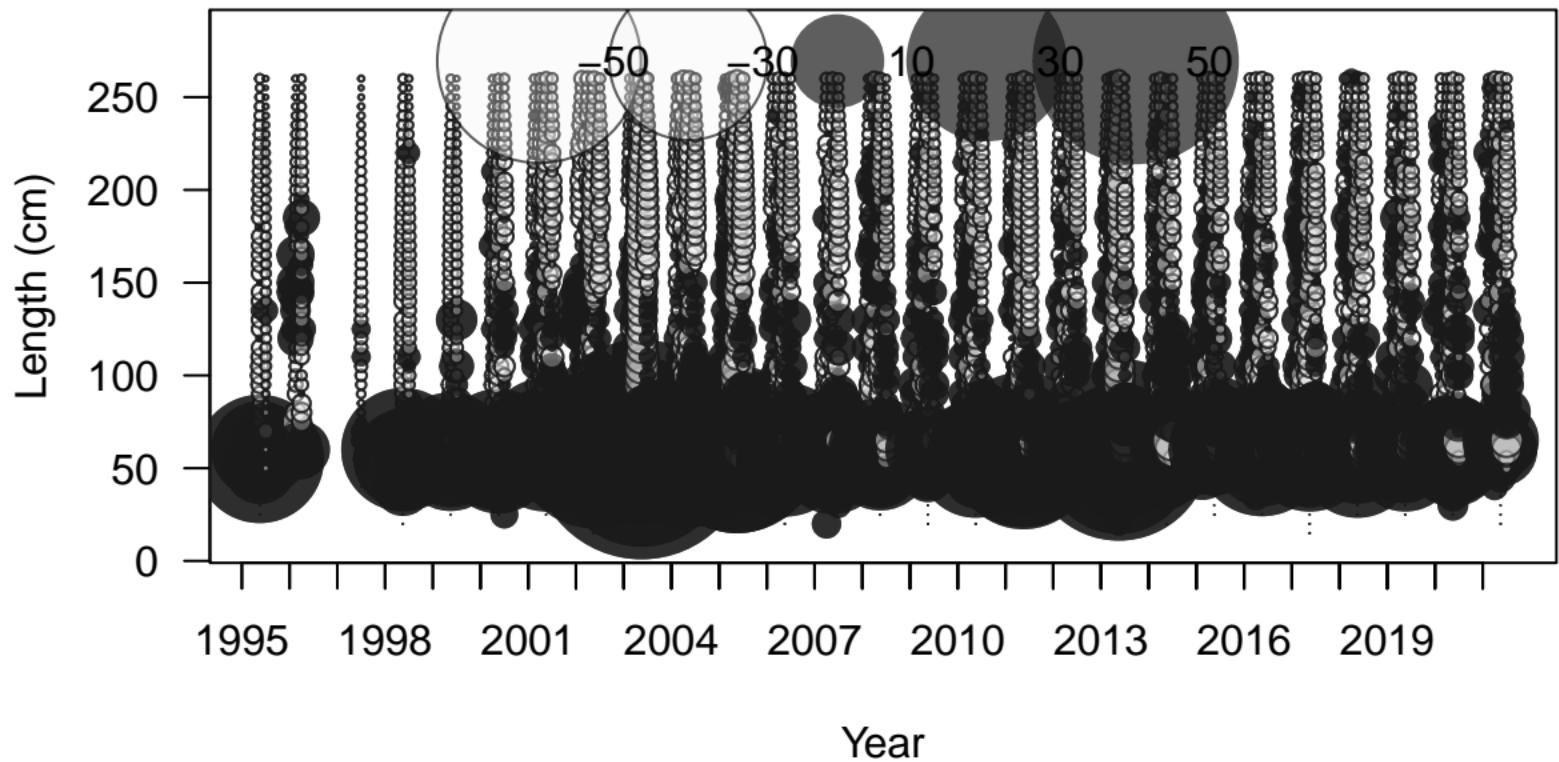


Proportion

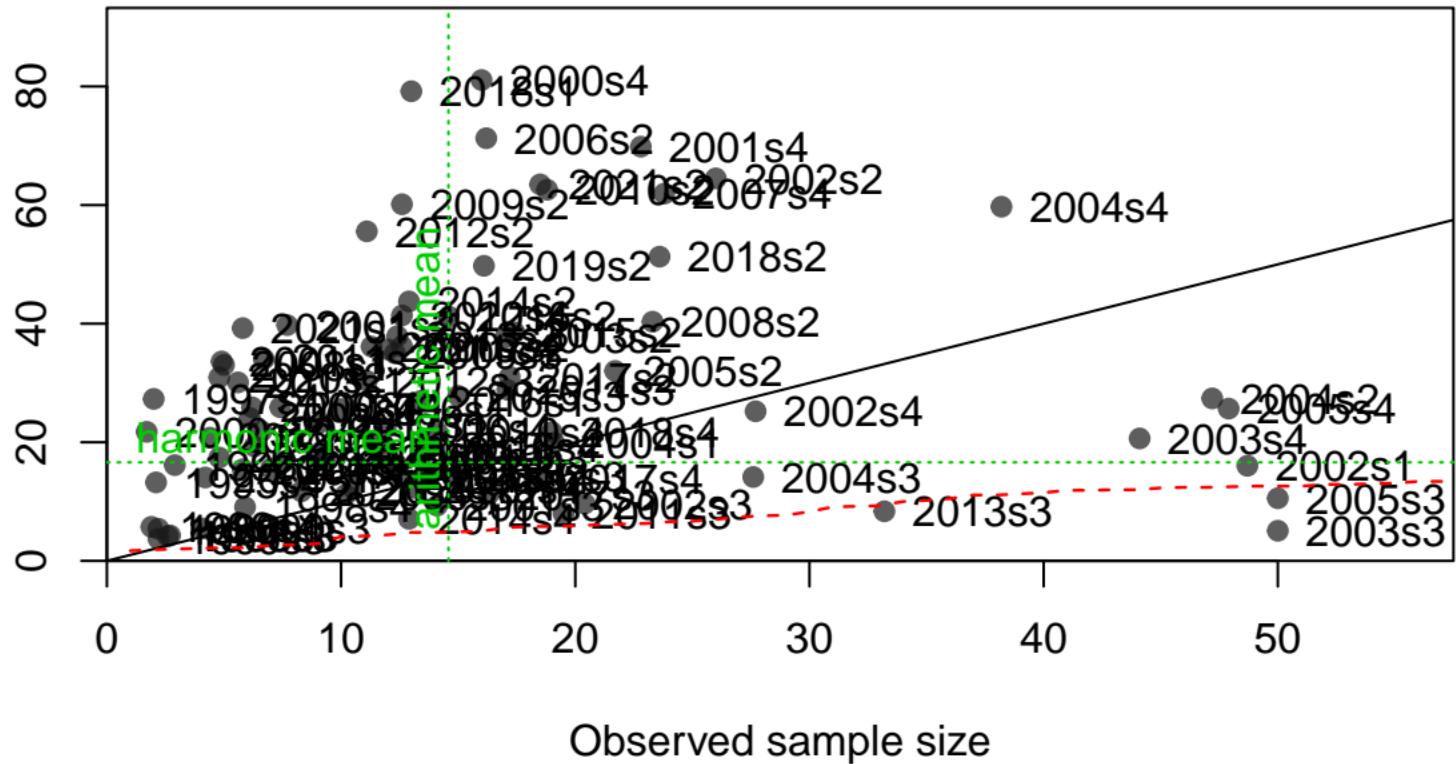


Proportion

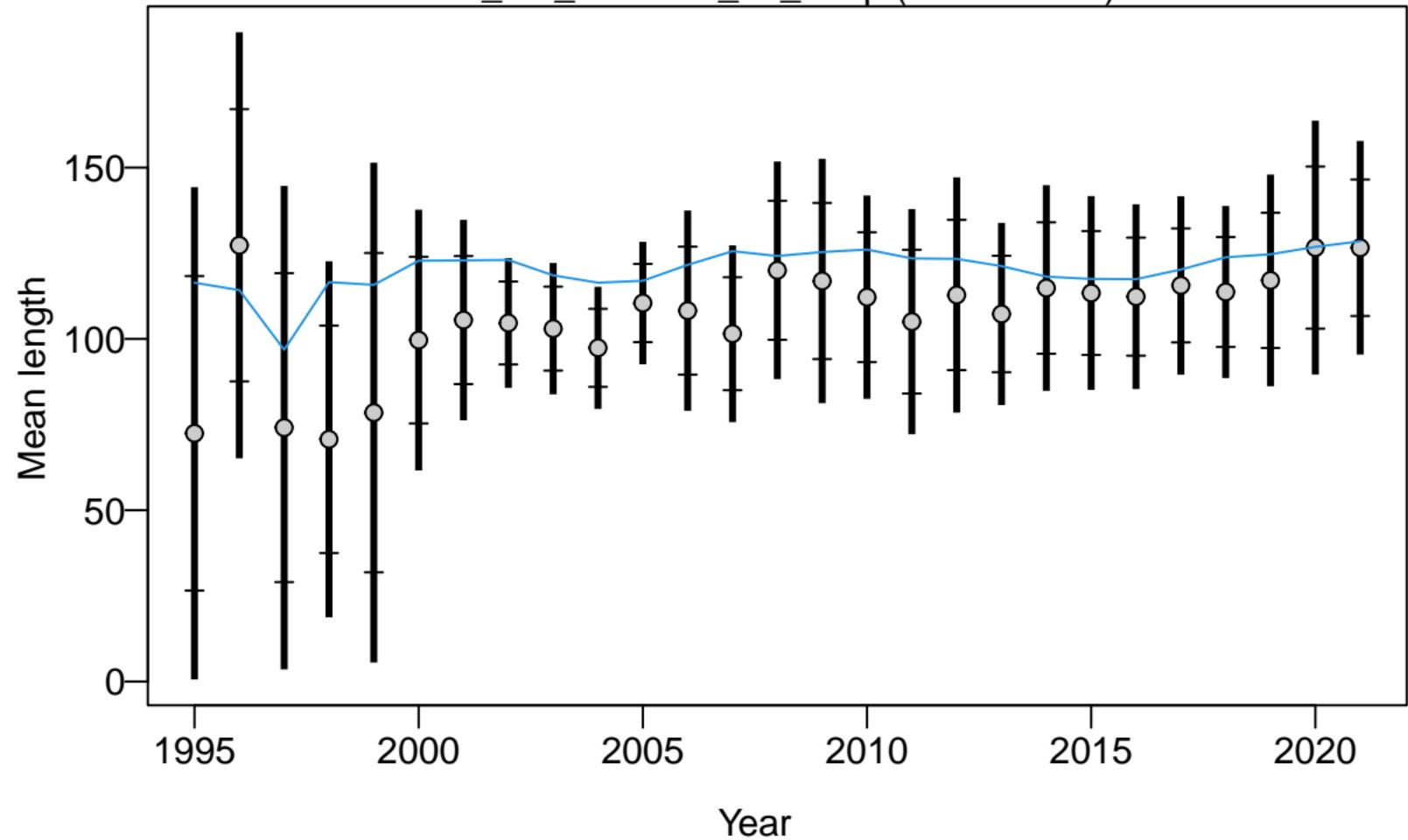


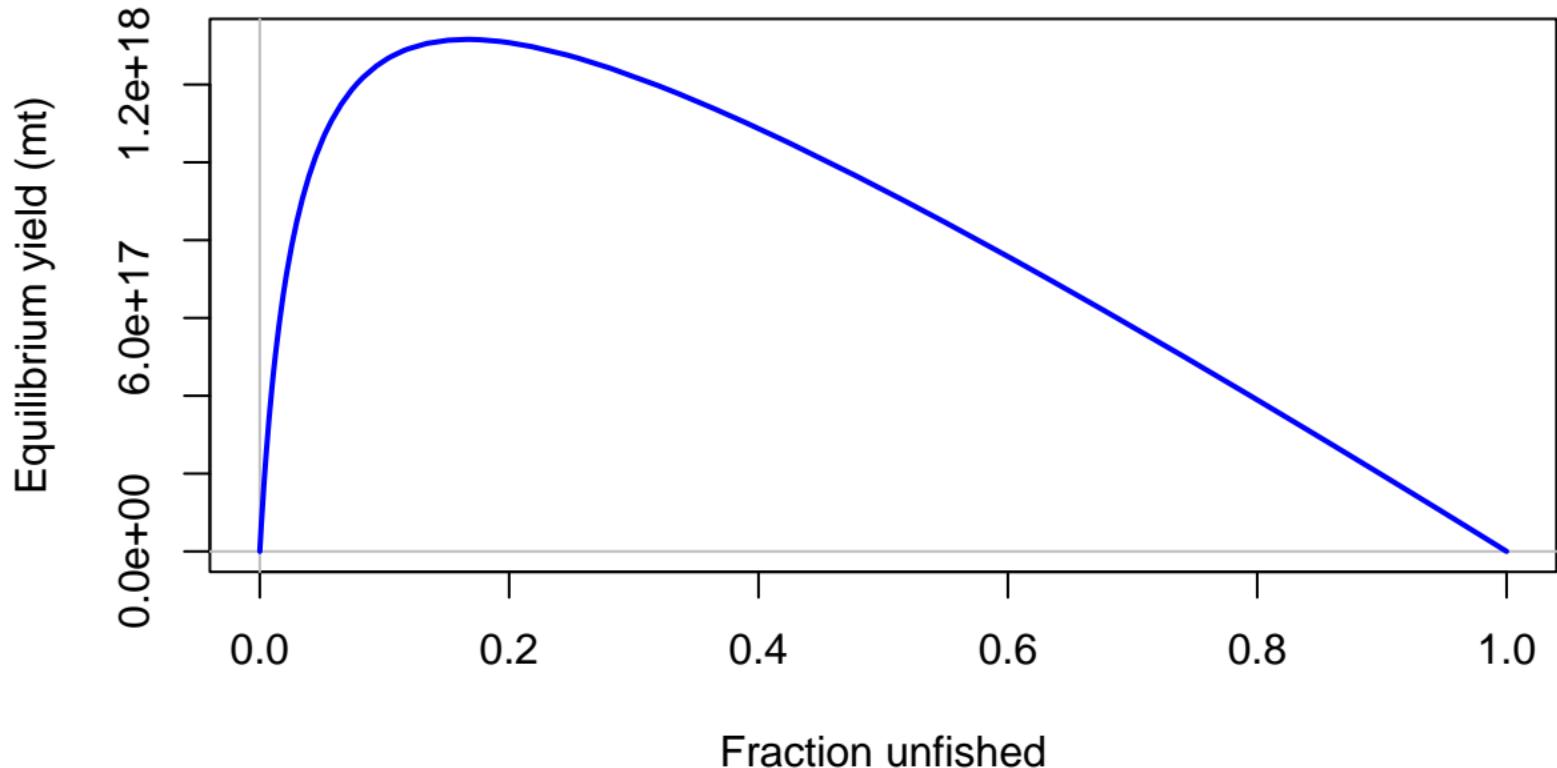


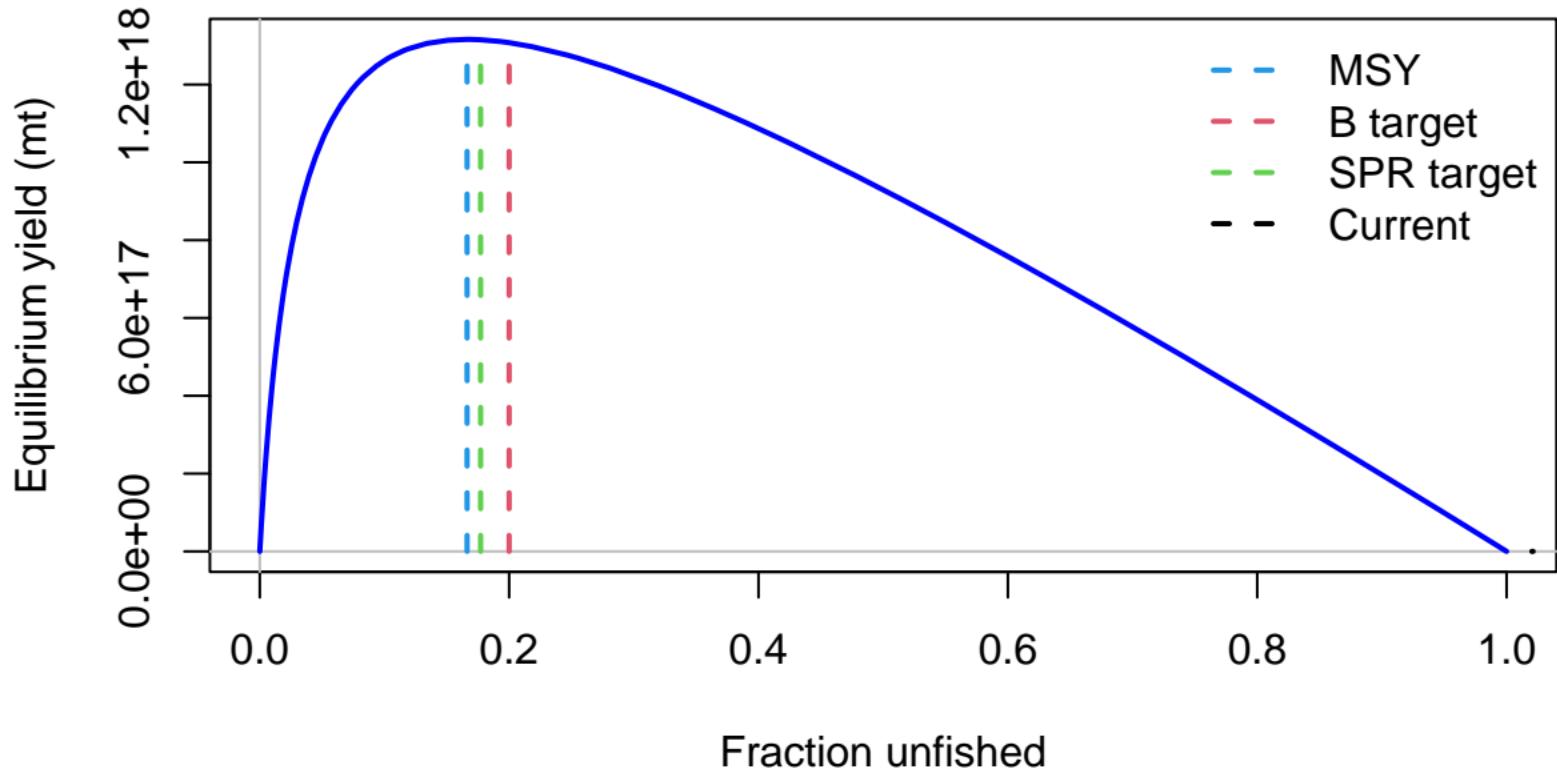
Effective sample size



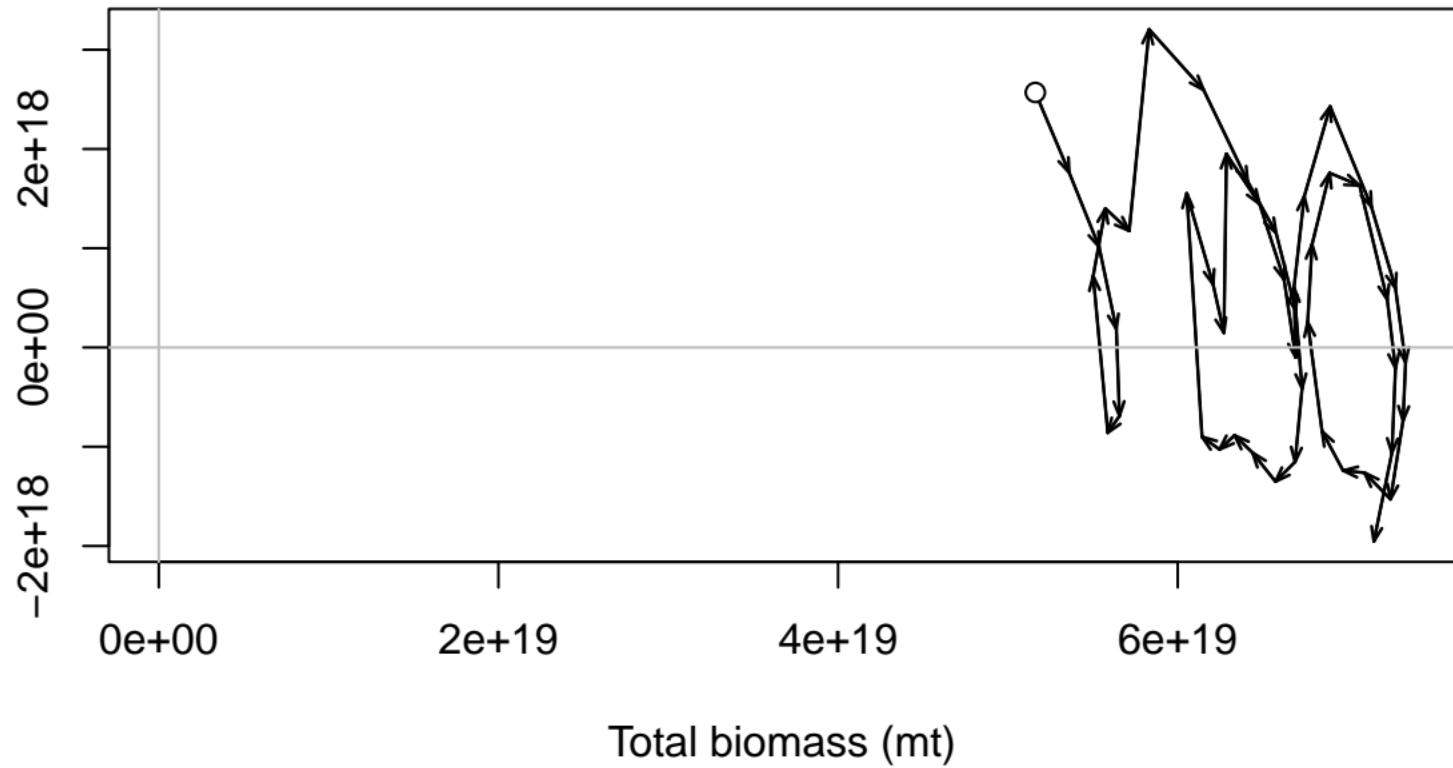
F9_US_WCNPO_LL_deep (whole catch)





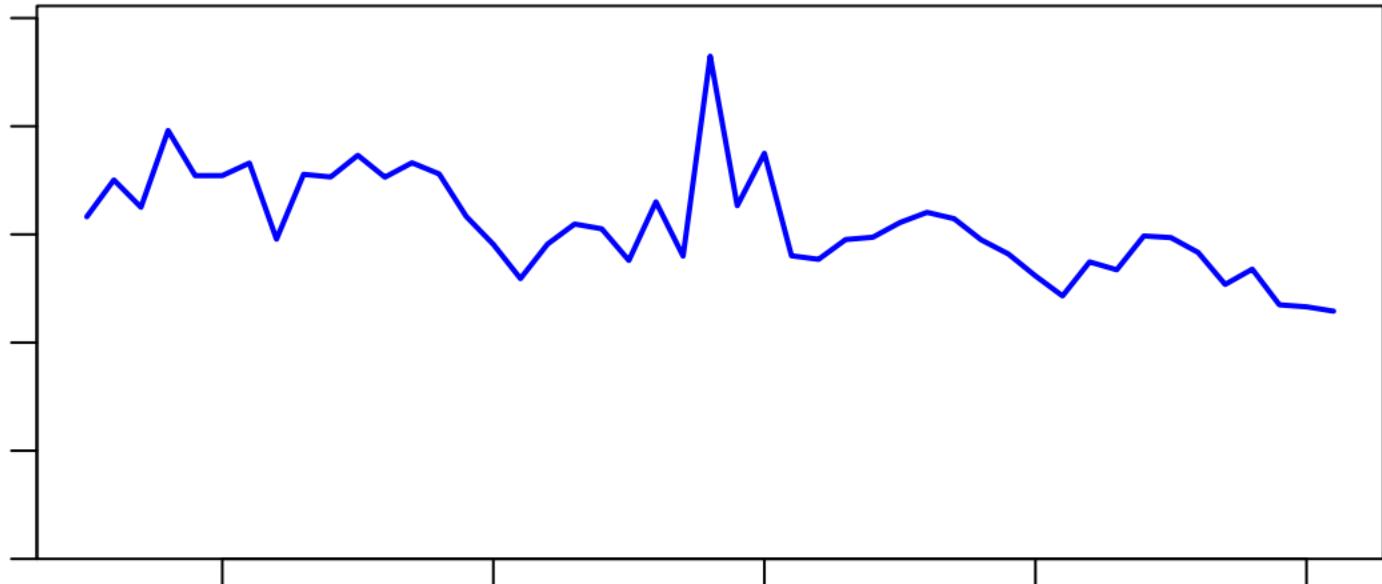


Surplus production (mt)

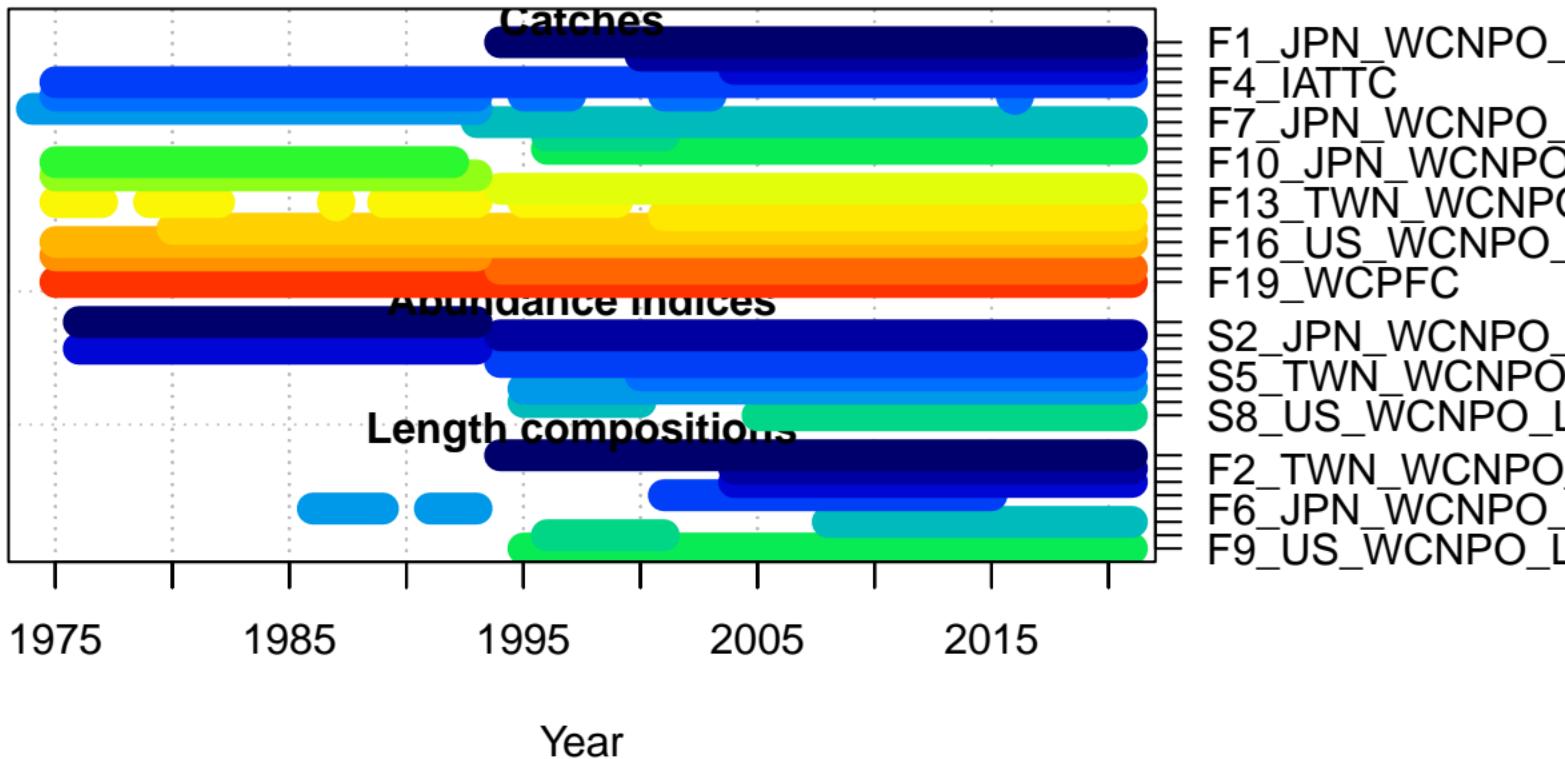


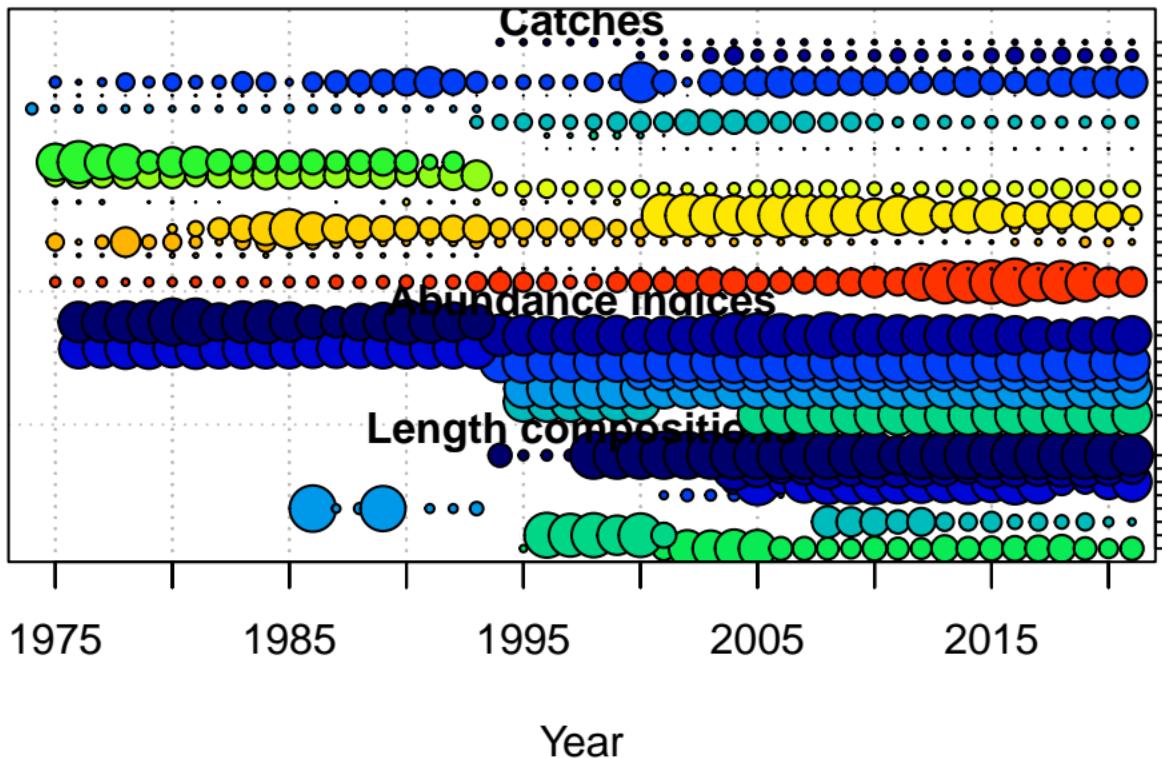
Yield per recruit (kg)

0.0e+00 1.0e-13 2.0e-13

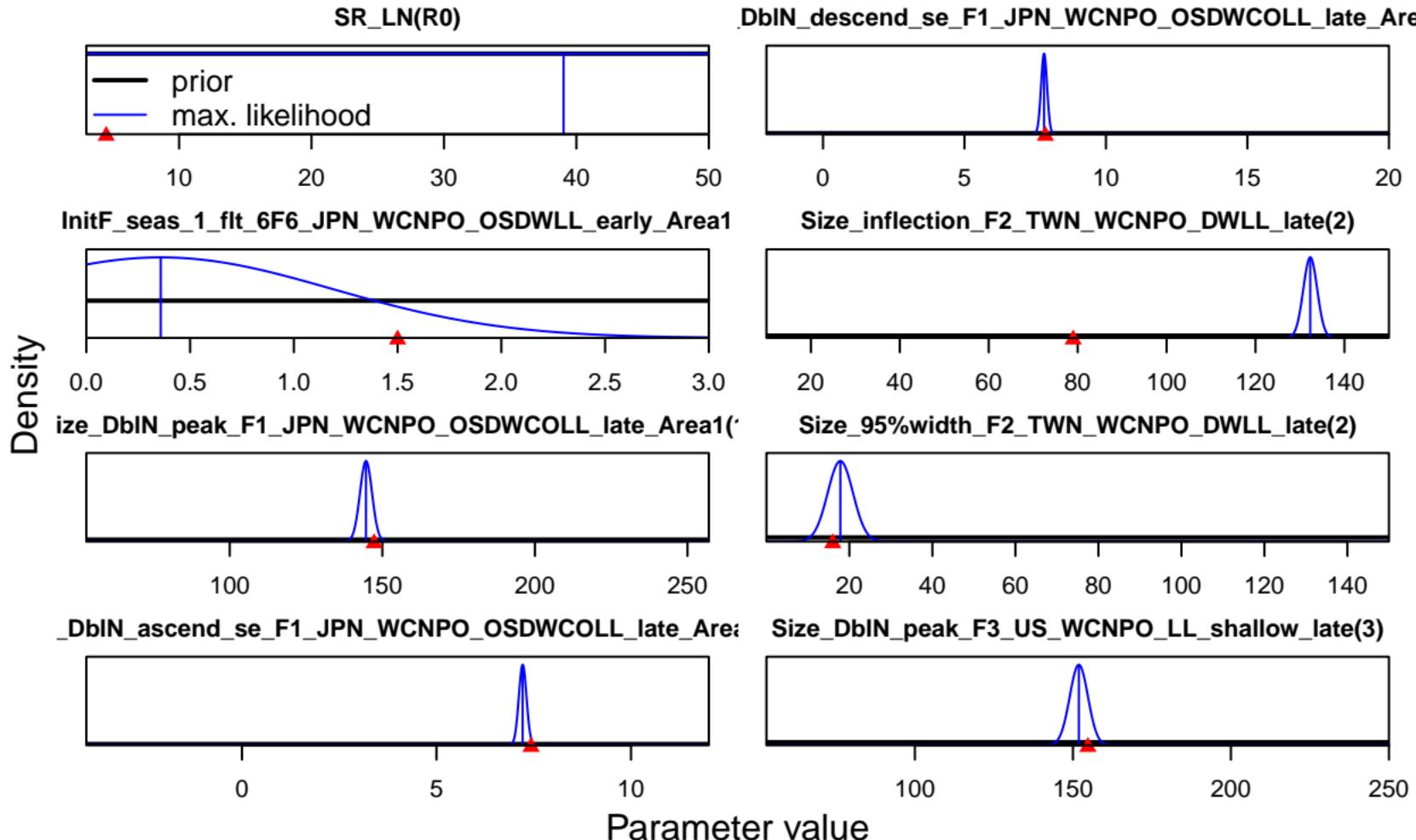


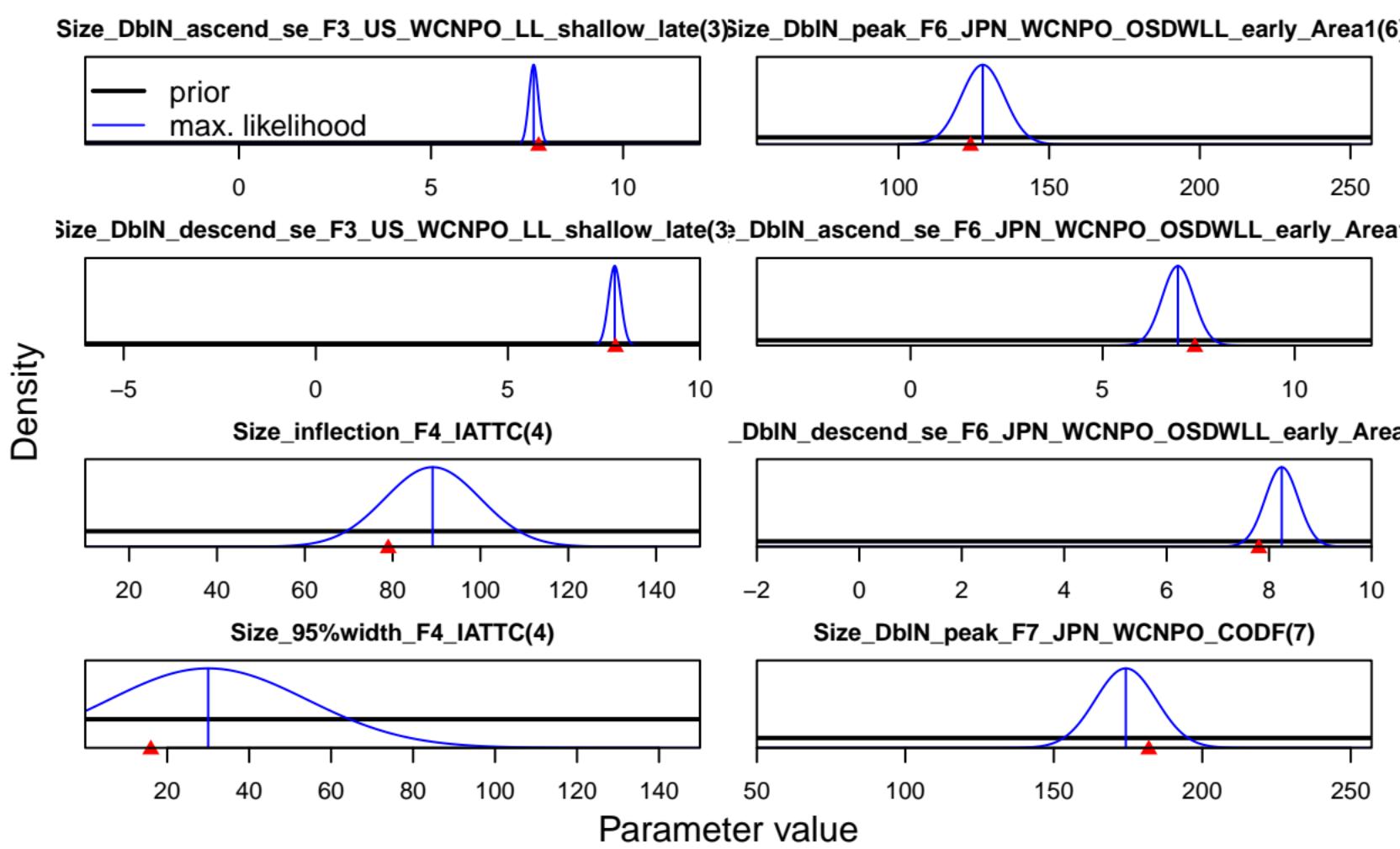
Year



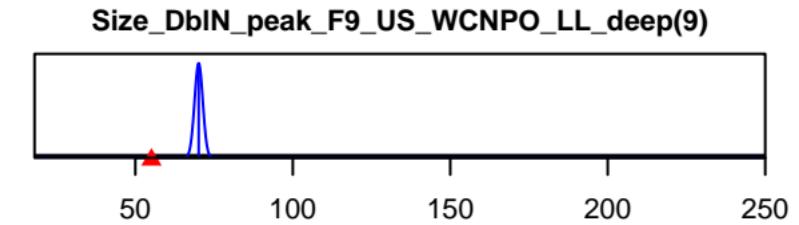
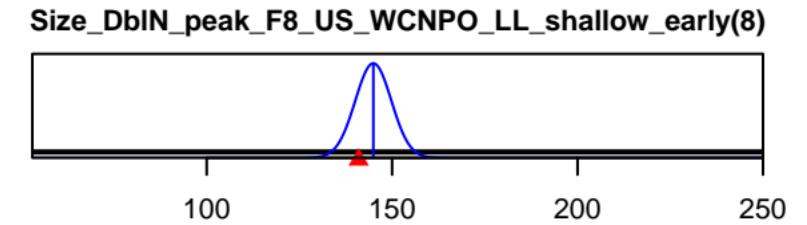
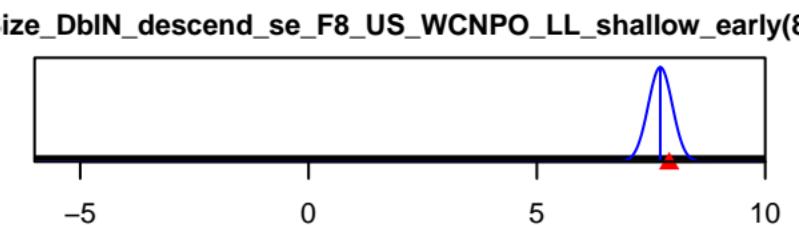
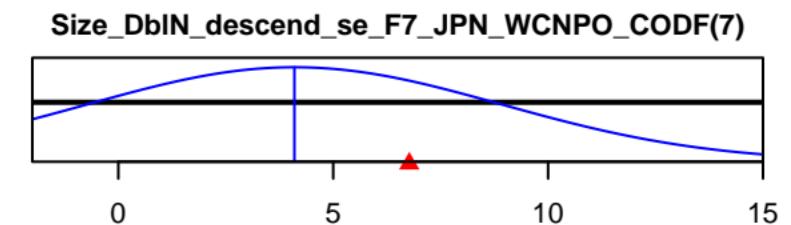
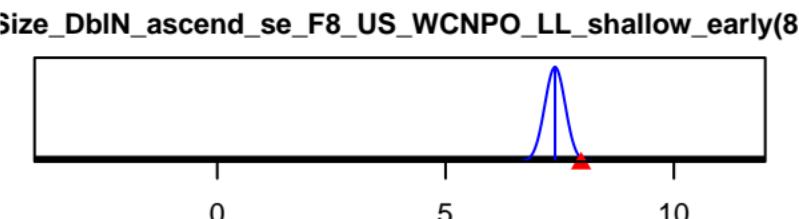
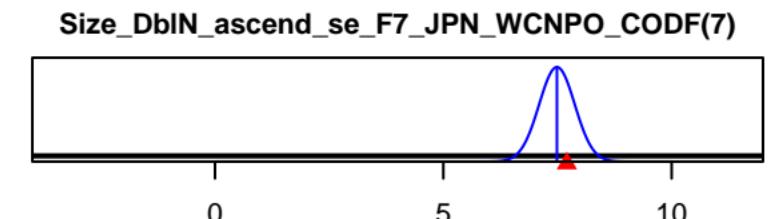
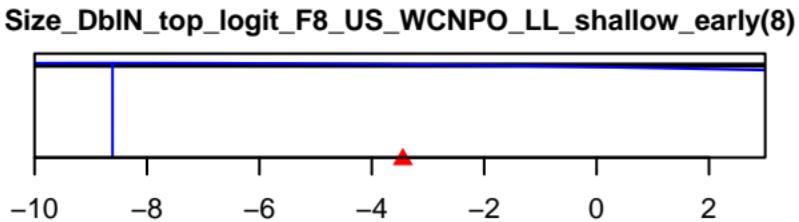
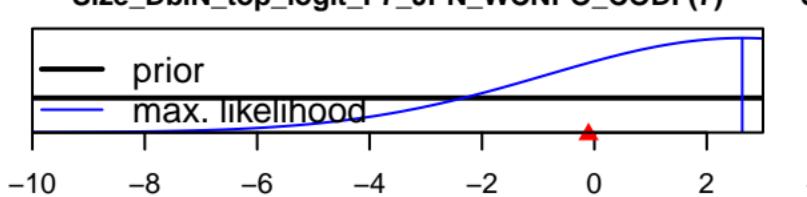


F1_JPN_WCNPO
F4_IATTC
F7_JPN_WCNPO
F10_JPN_WCNPO
F13_TWN_WCNPO
F16_US_WCNPO
F19_WCPFC
S2_JPN_WCNPO
S5_TWN_WCNPO
S8_US_WCNPO_L
F2_TWN_WCNPO
F6_JPN_WCNPO
F9_US_WCNPO_L





Density



Parameter value

Density

