

Plots created using the 'r4ss' package in R

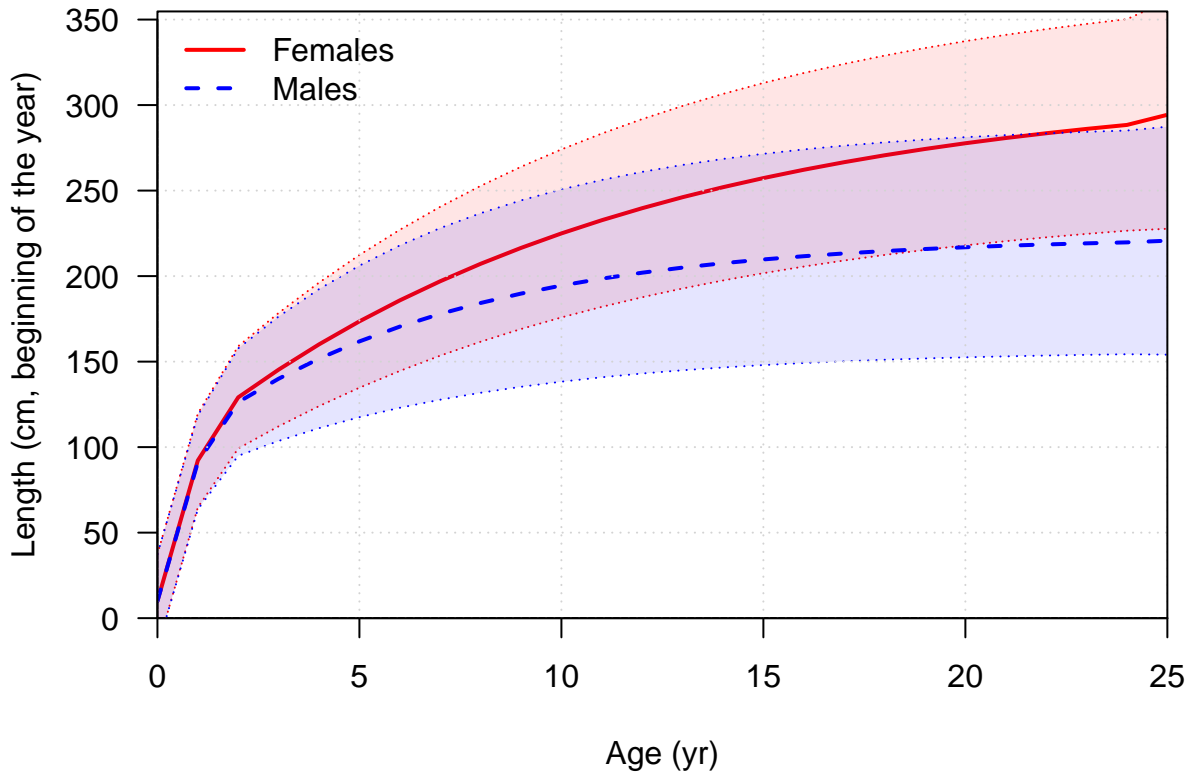
Stock Synthesis version: SS-V3.24A

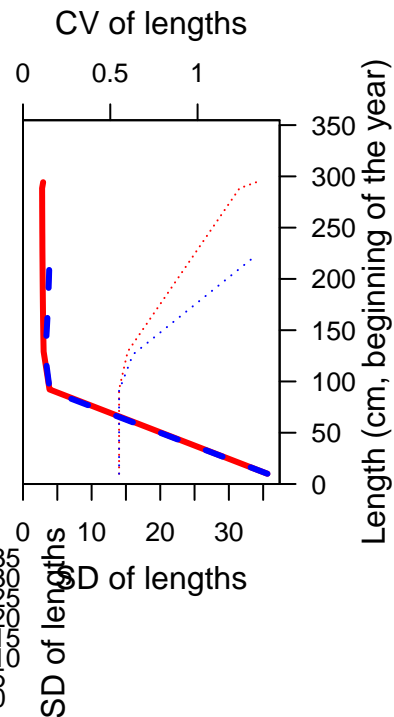
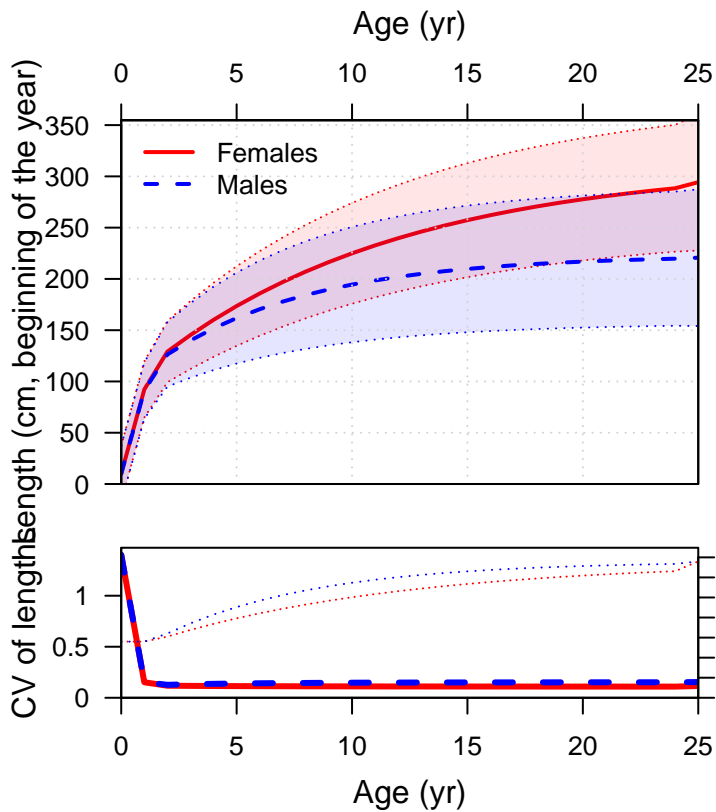
StartTime: Thu Jun 29 06:23:16 2017

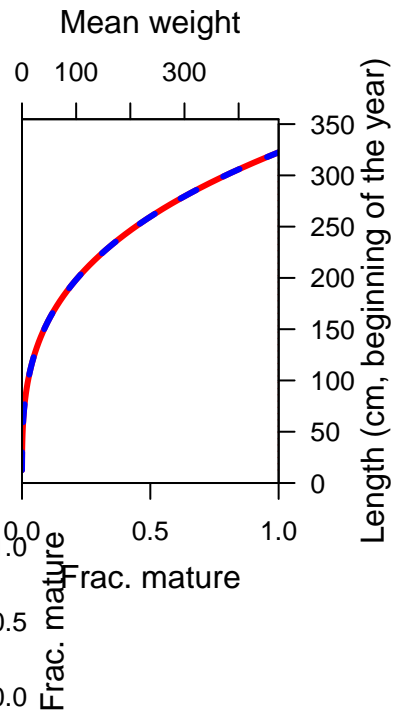
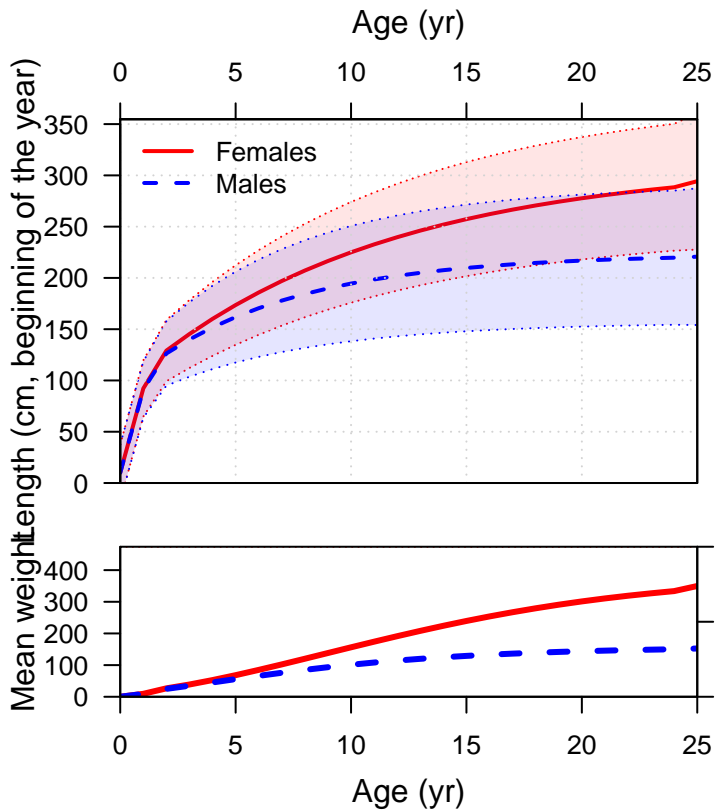
Data\_File: \_SWO\_DATA.dat

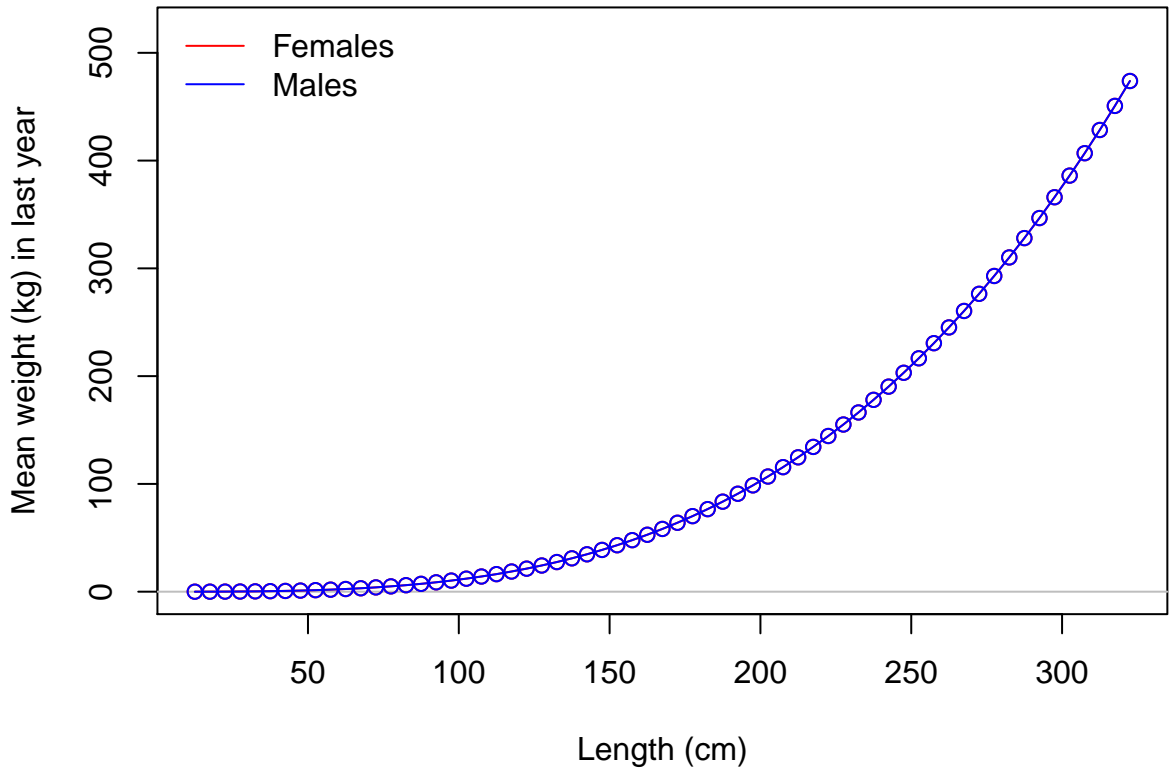
Control\_File: \_SWO\_AMO\_VR.ctf

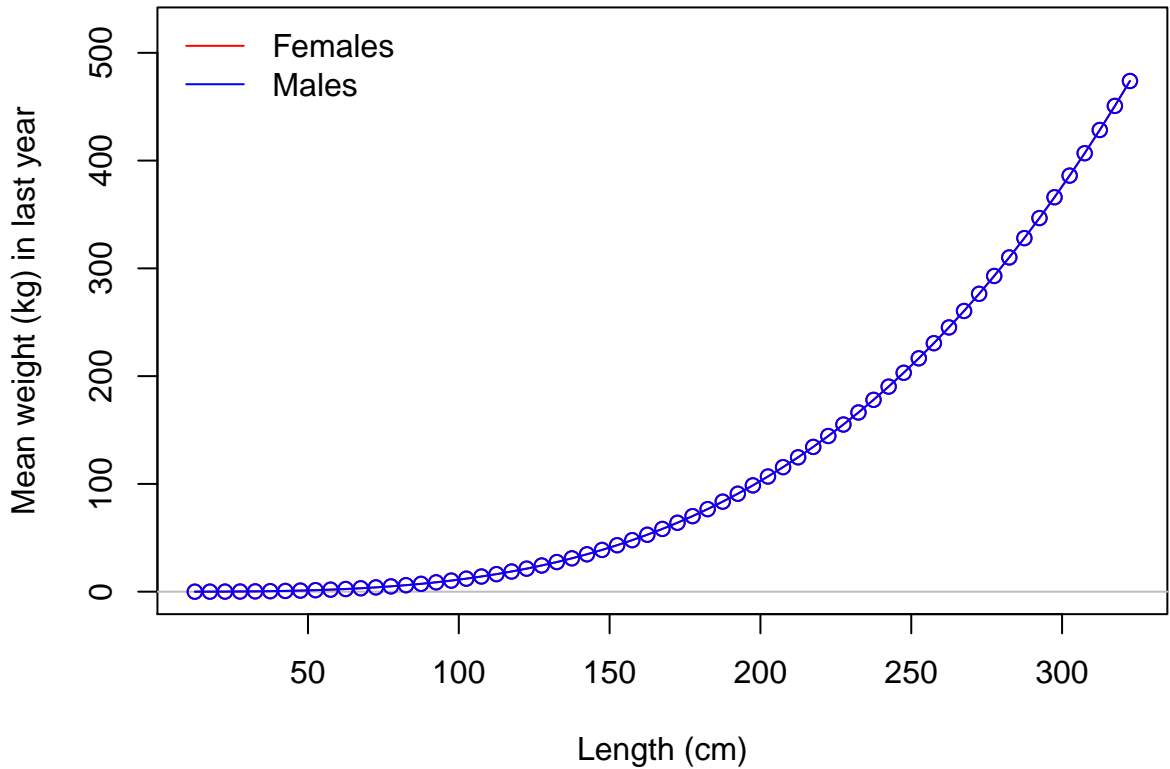
## Ending year expected growth (with 95% intervals)

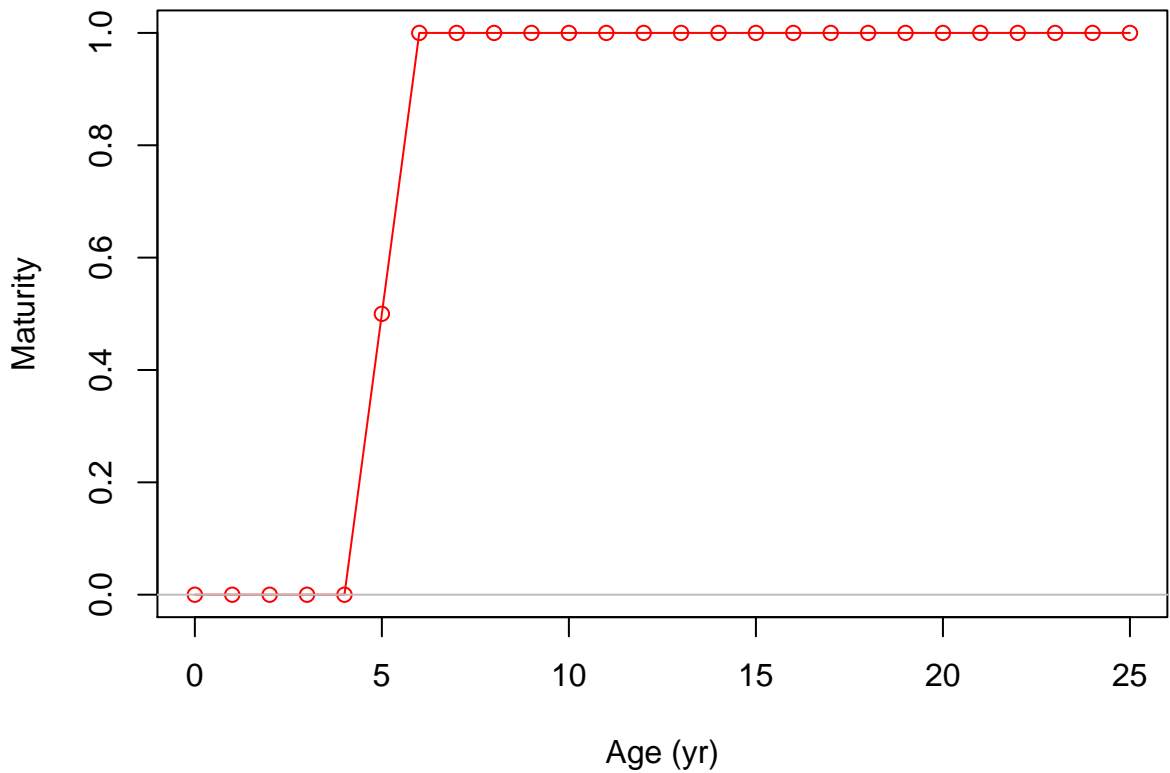


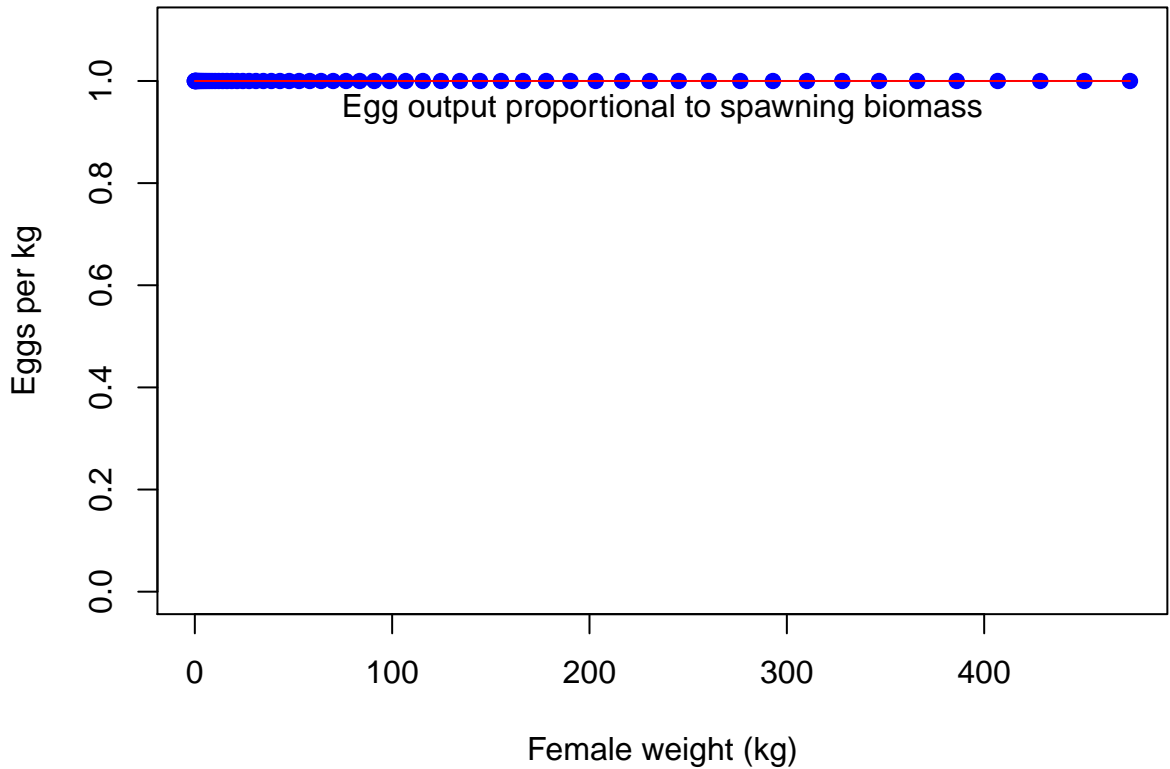




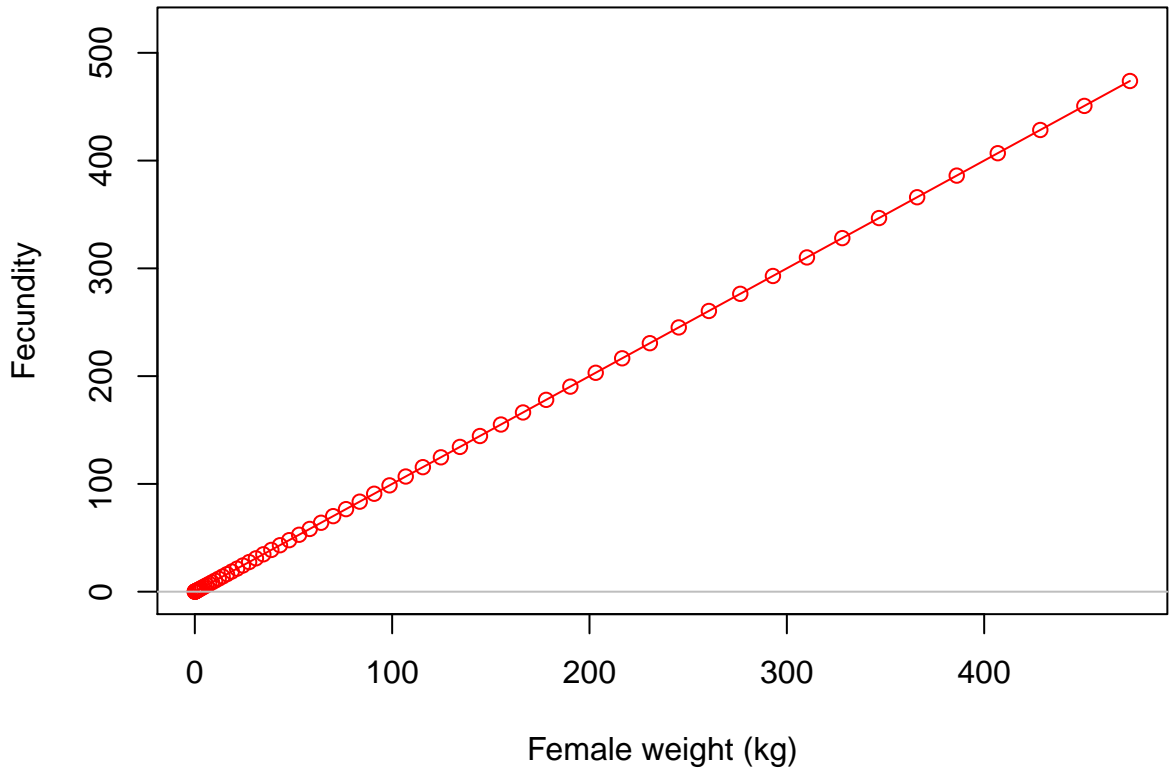


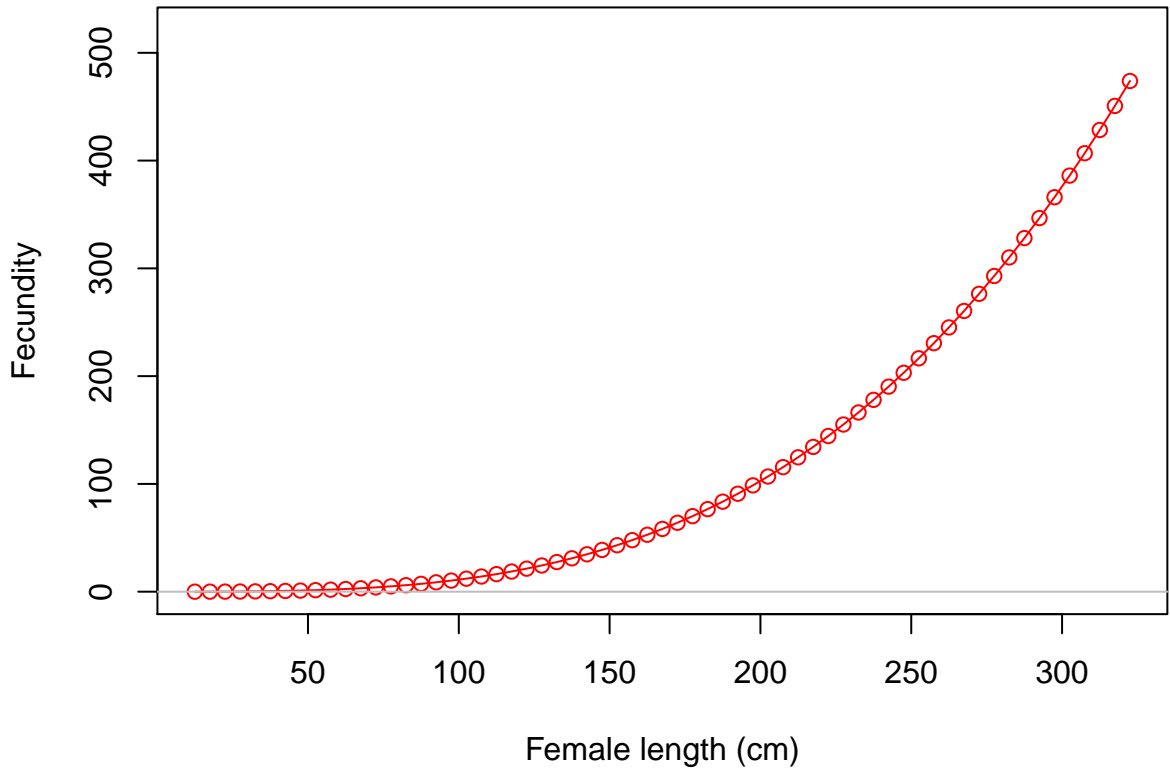


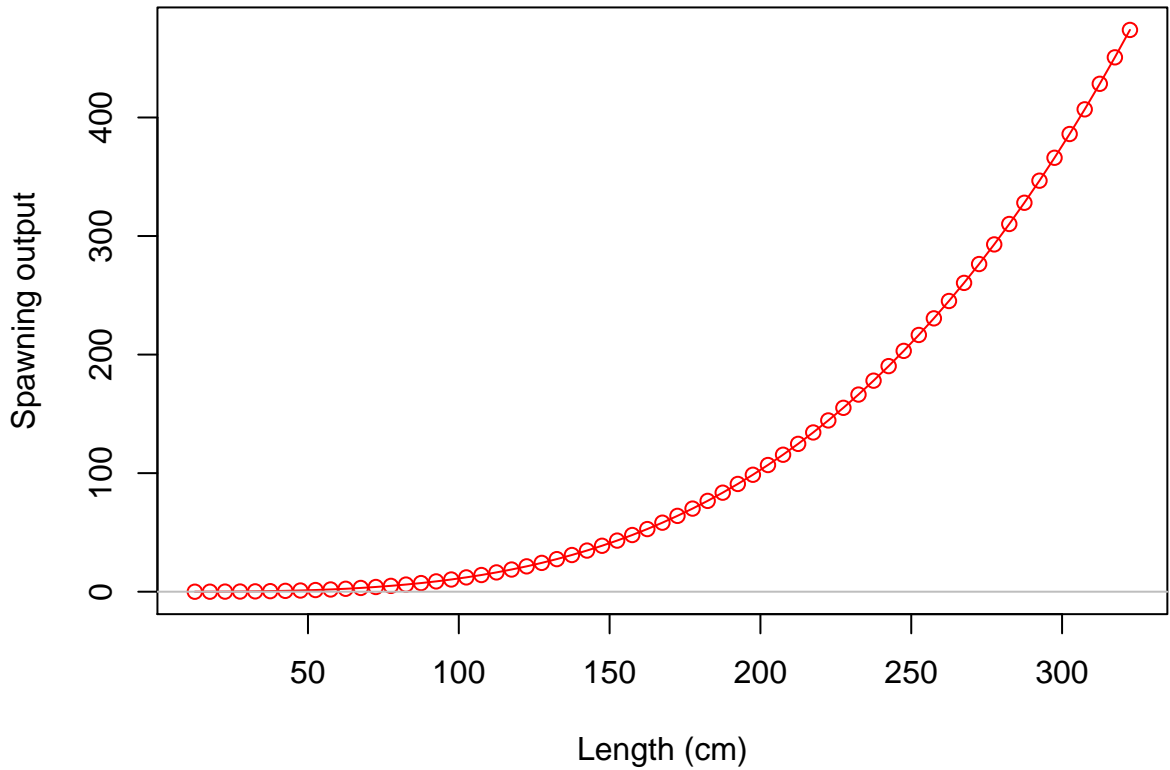




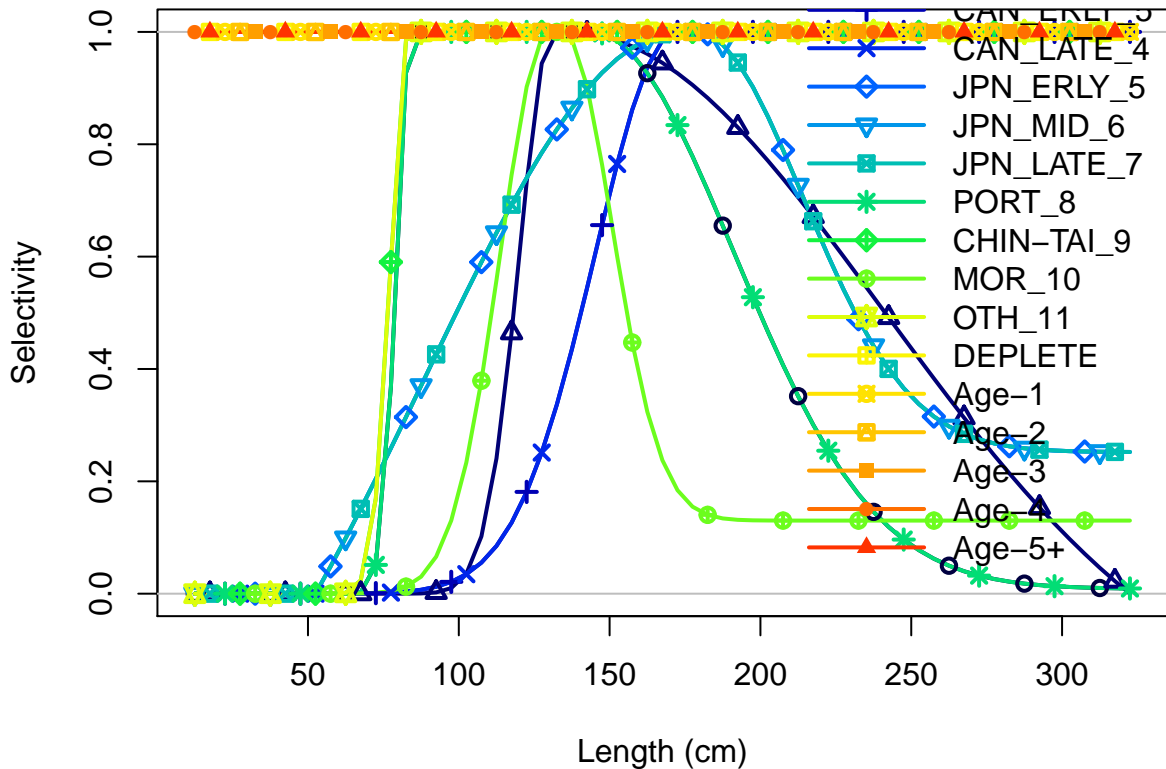






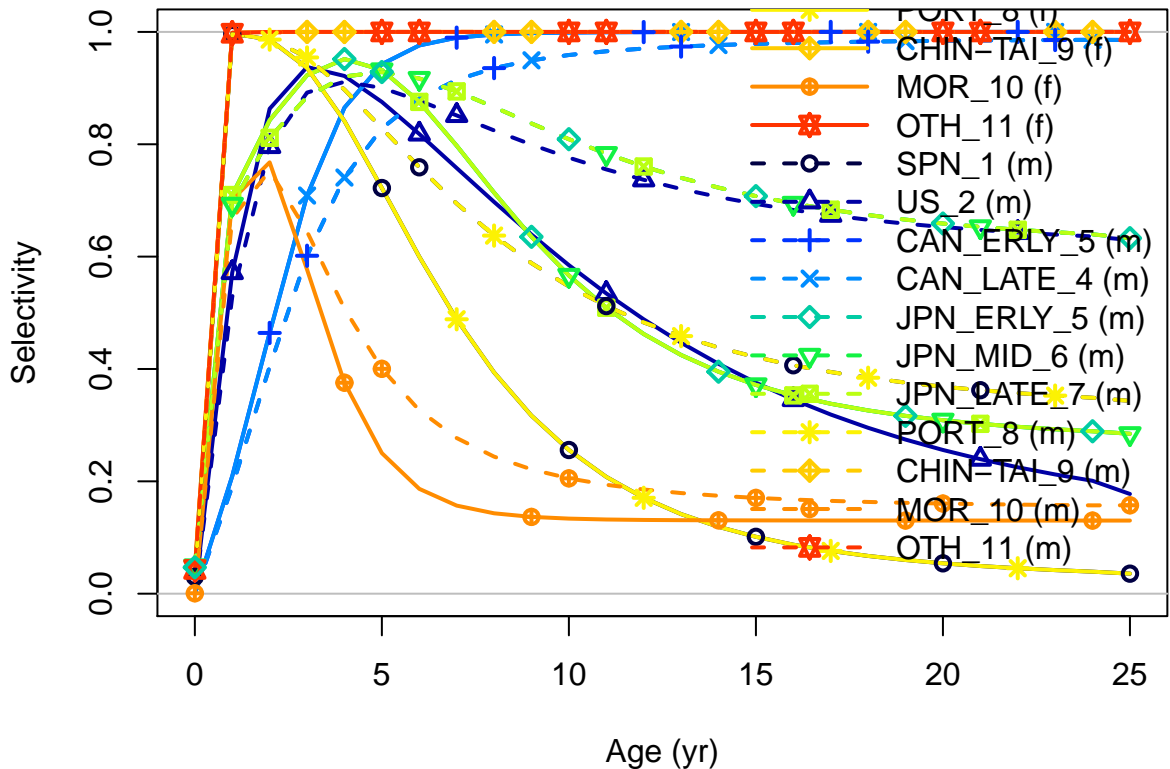


## Length-based selectivity by fleet in 2017

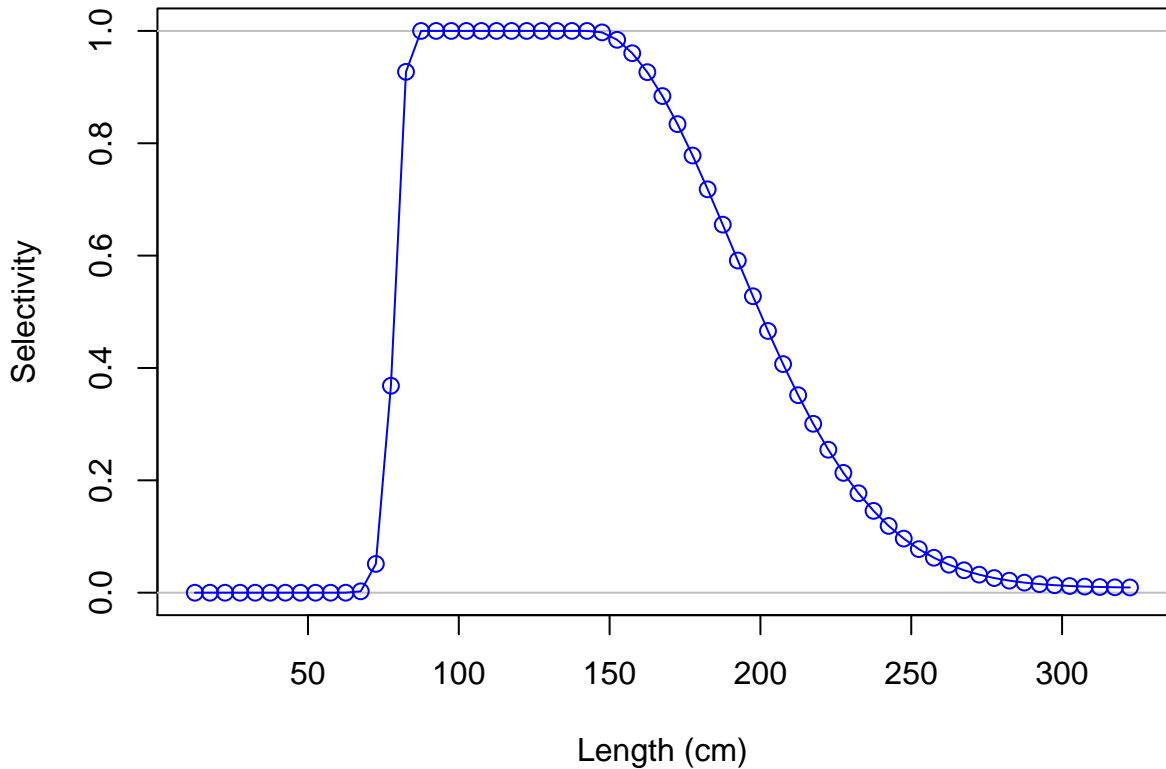




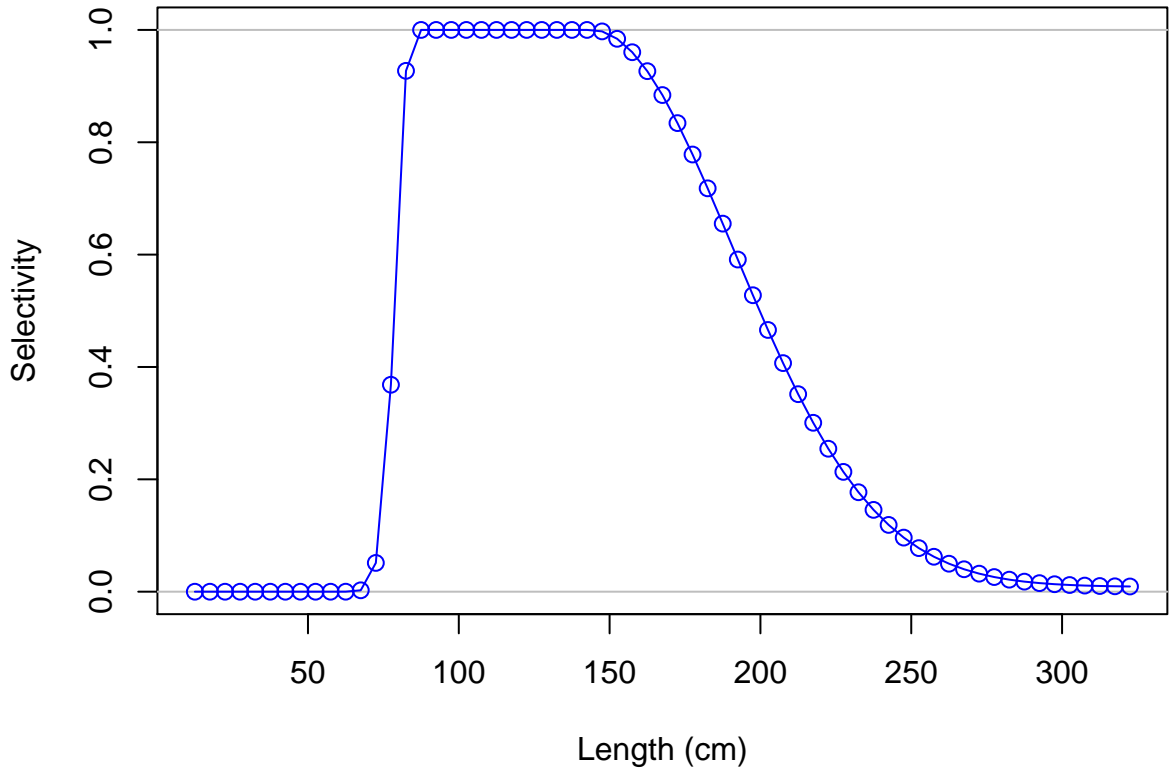
# Derived age-based from length-based selectivity by fleet in 2017



## Female ending year selectivity for SPN\_1

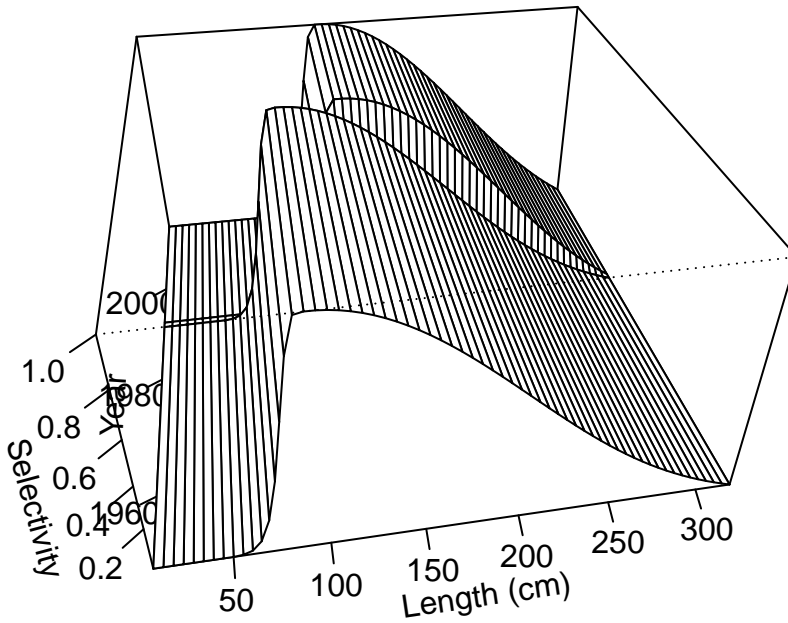


### Male ending year selectivity for SPN\_1

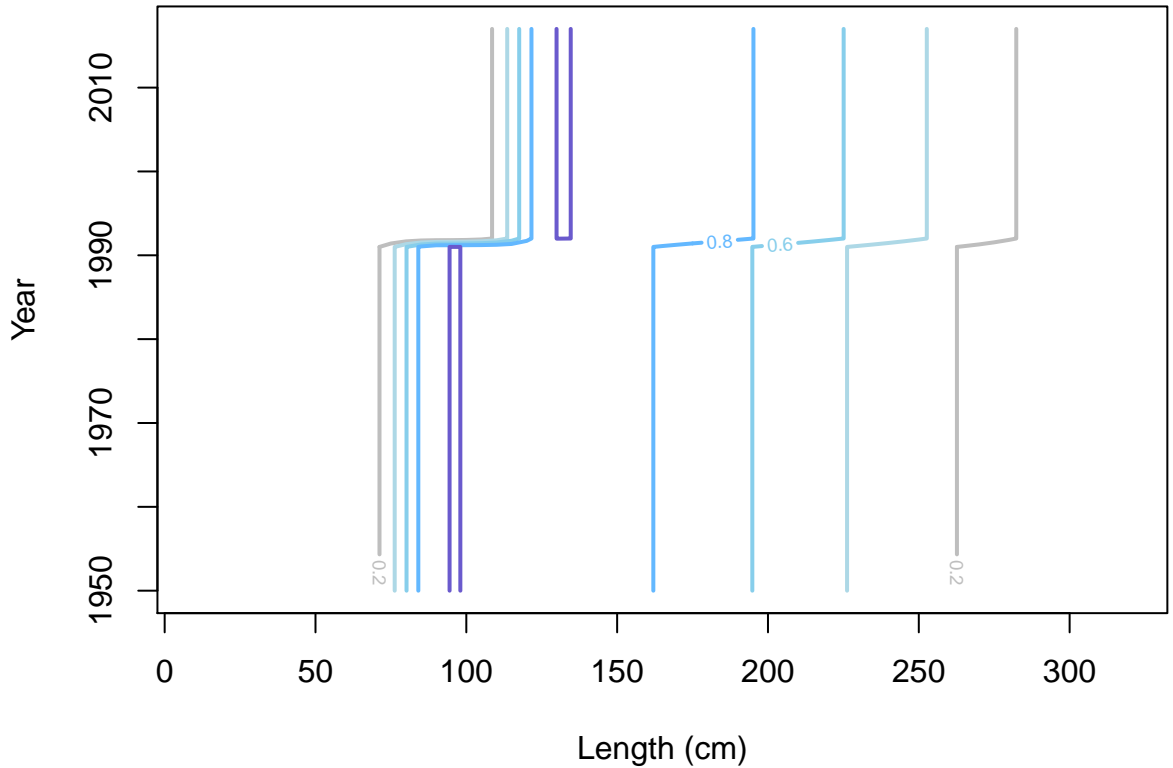




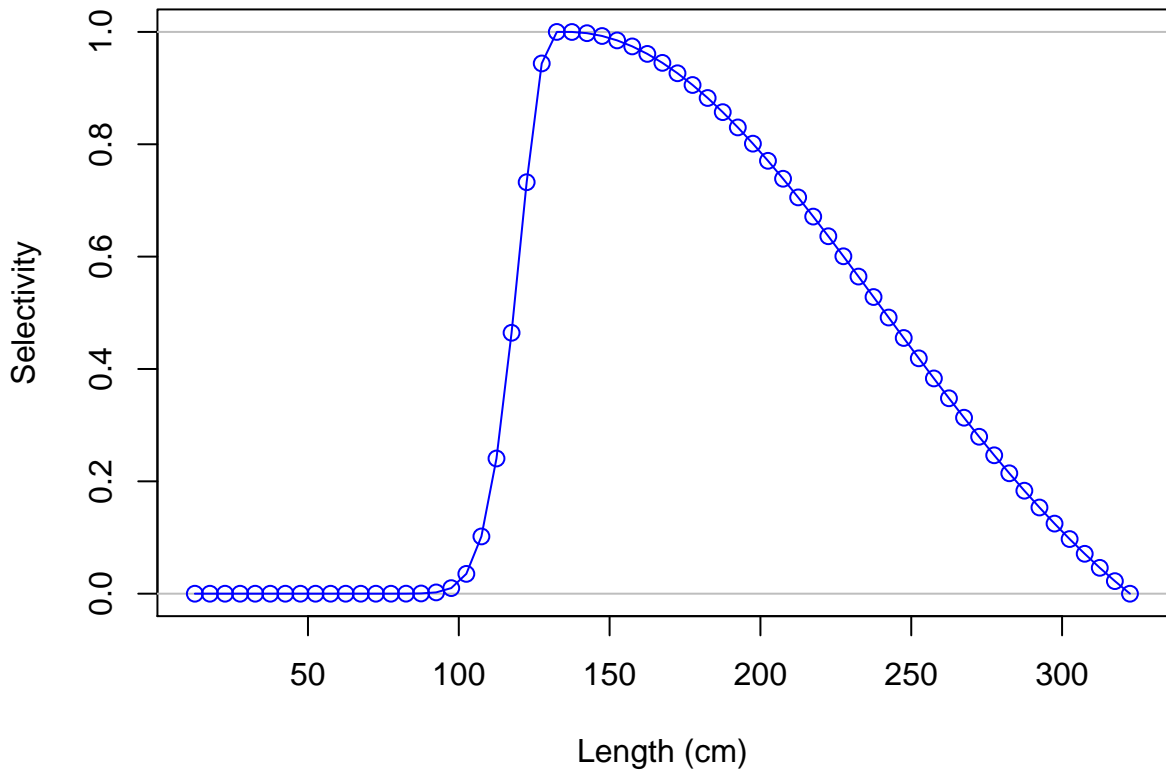
## Female time-varying selectivity for US\_2



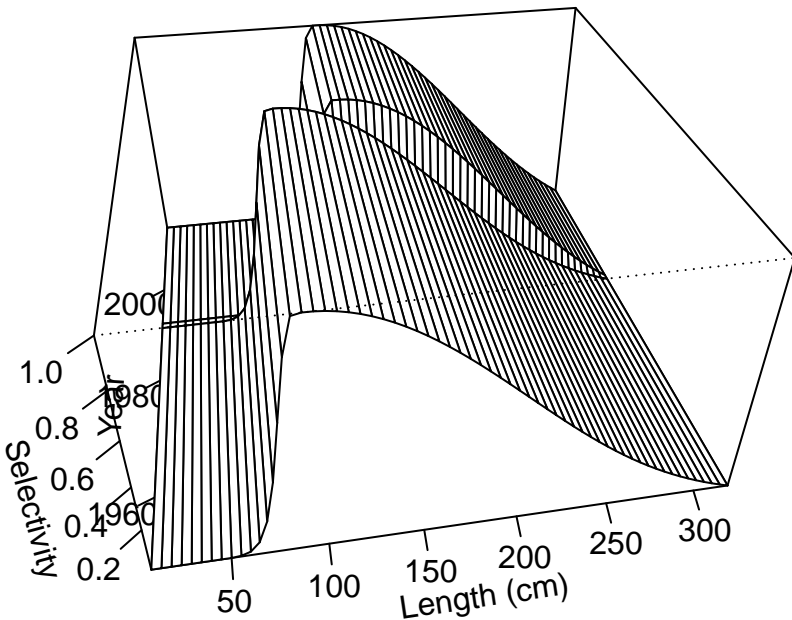
## Female time-varying selectivity for US\_2



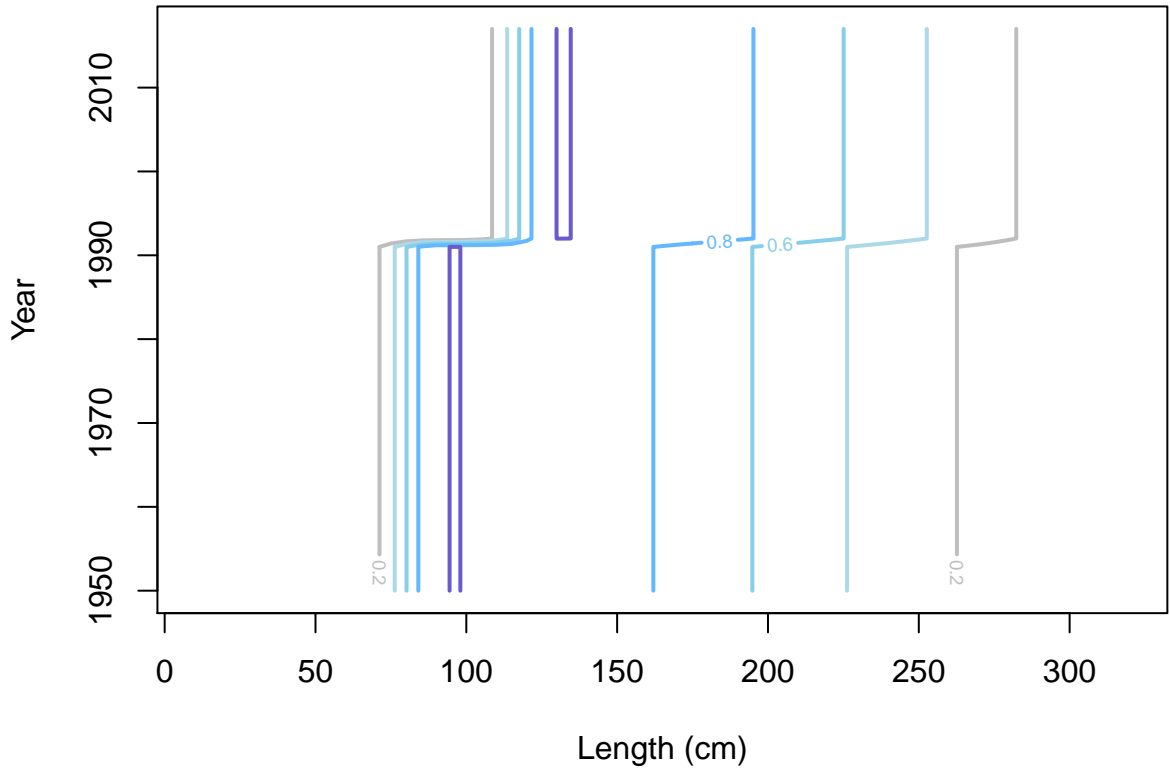
## Female ending year selectivity for US\_2



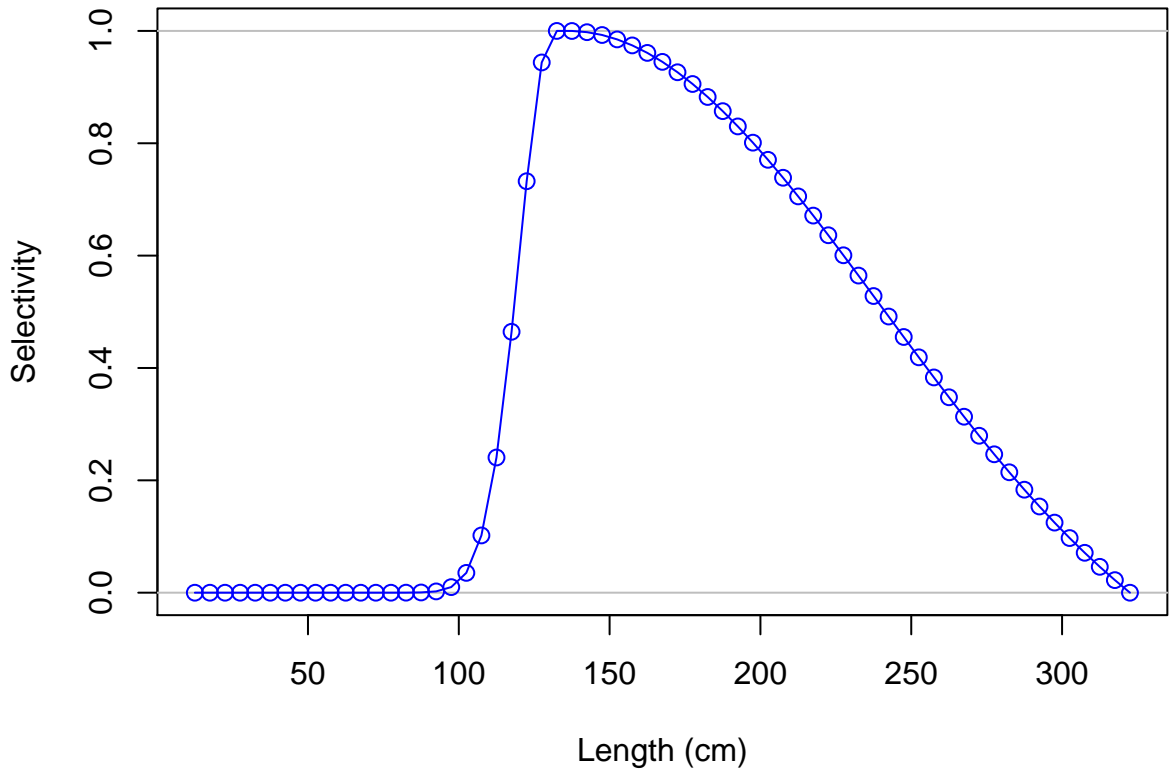
## Male time-varying selectivity for US\_2



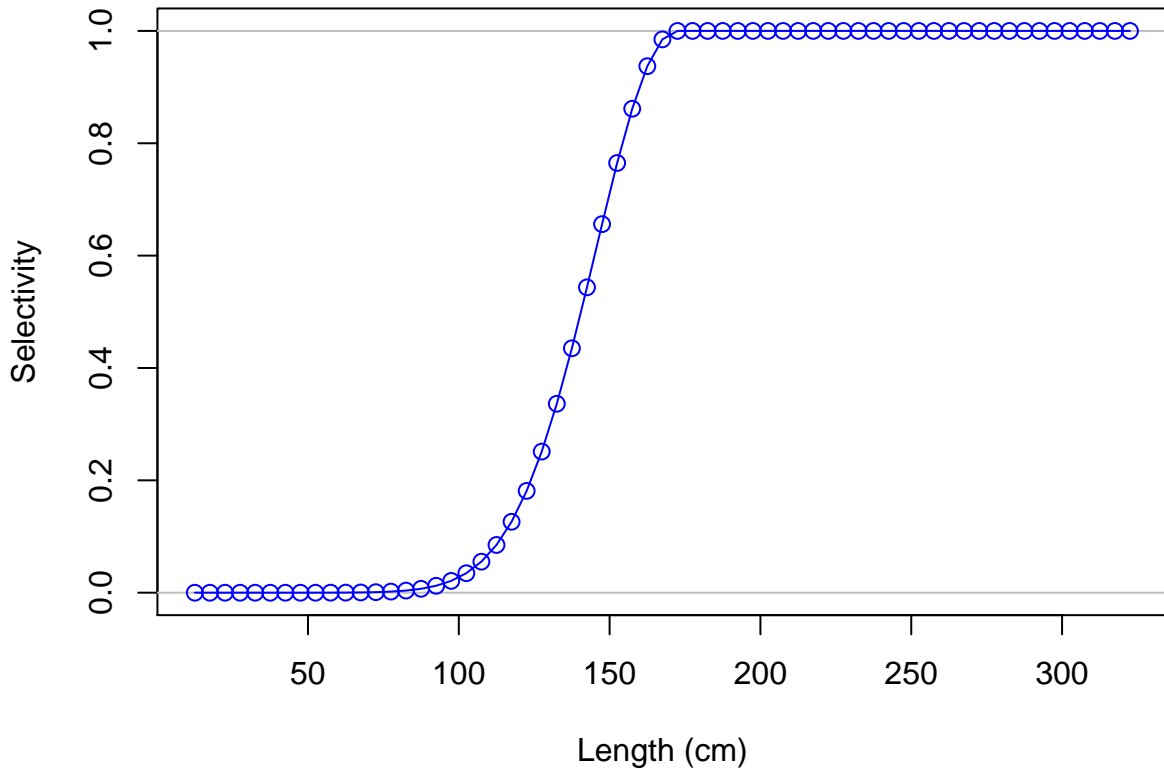
# Male time-varying selectivity for US\_2



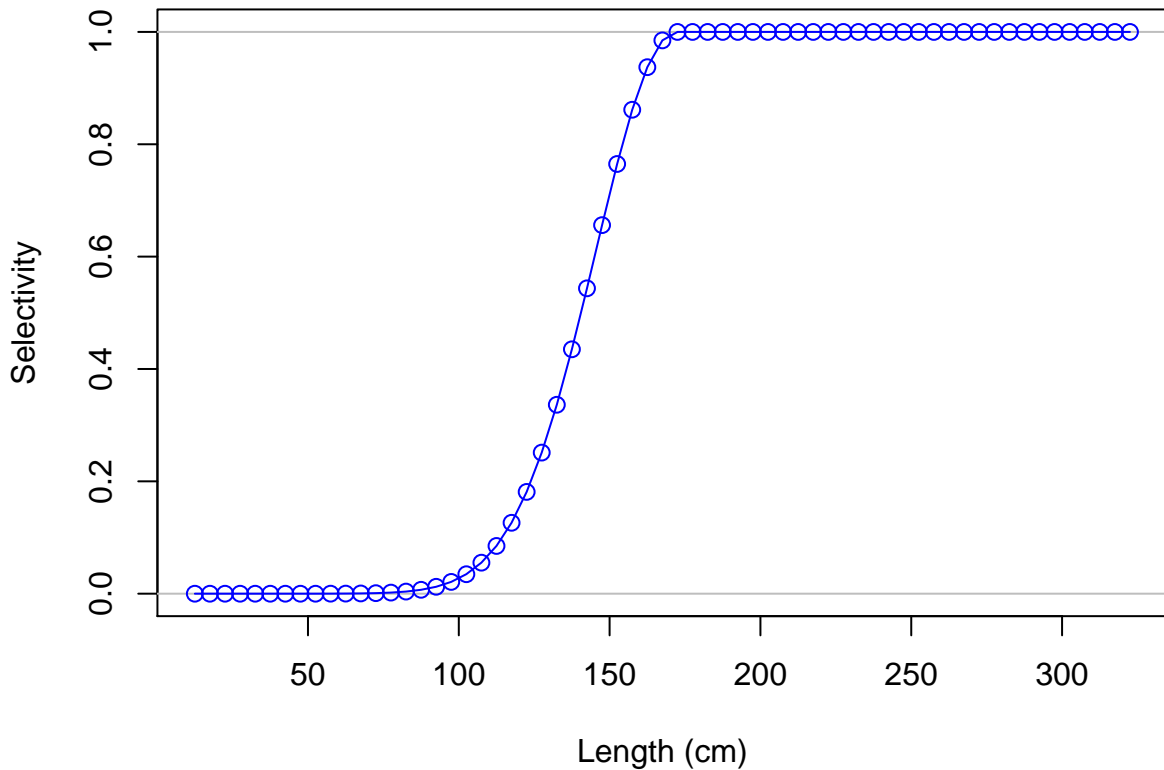
## Male ending year selectivity for US\_2



## Female ending year selectivity for CAN\_ERLY\_5

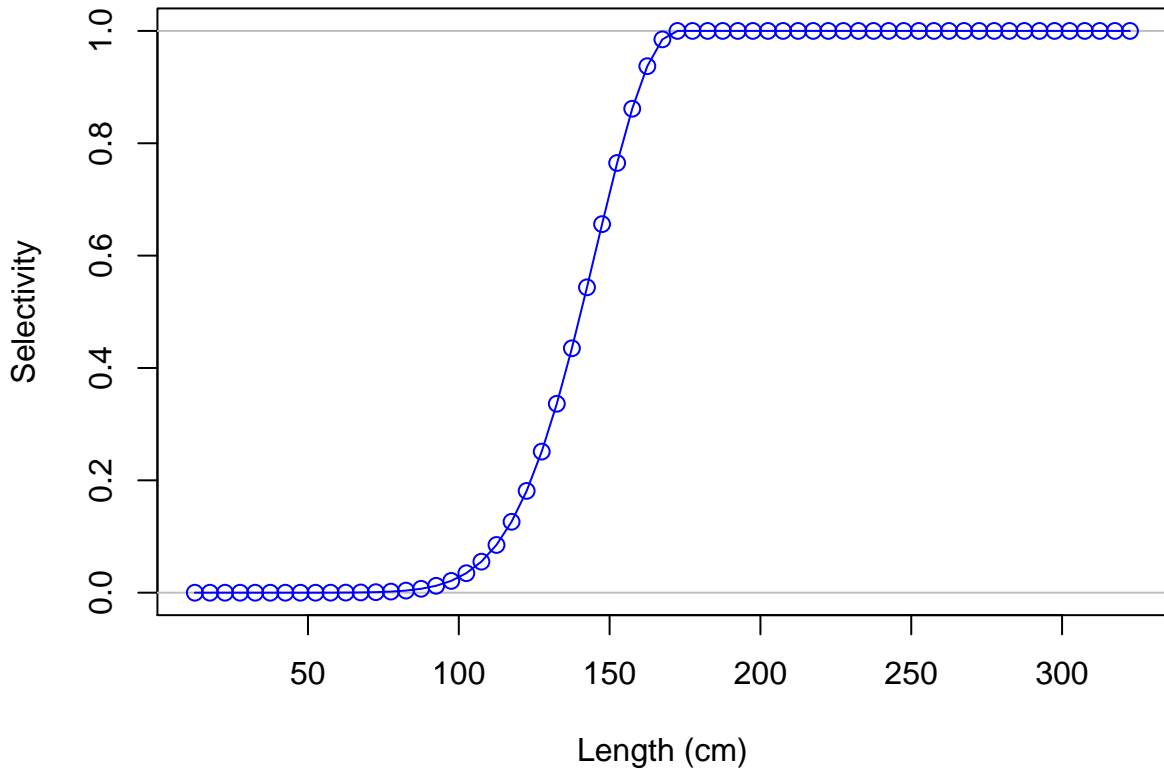


## Male ending year selectivity for CAN\_ERLY\_5

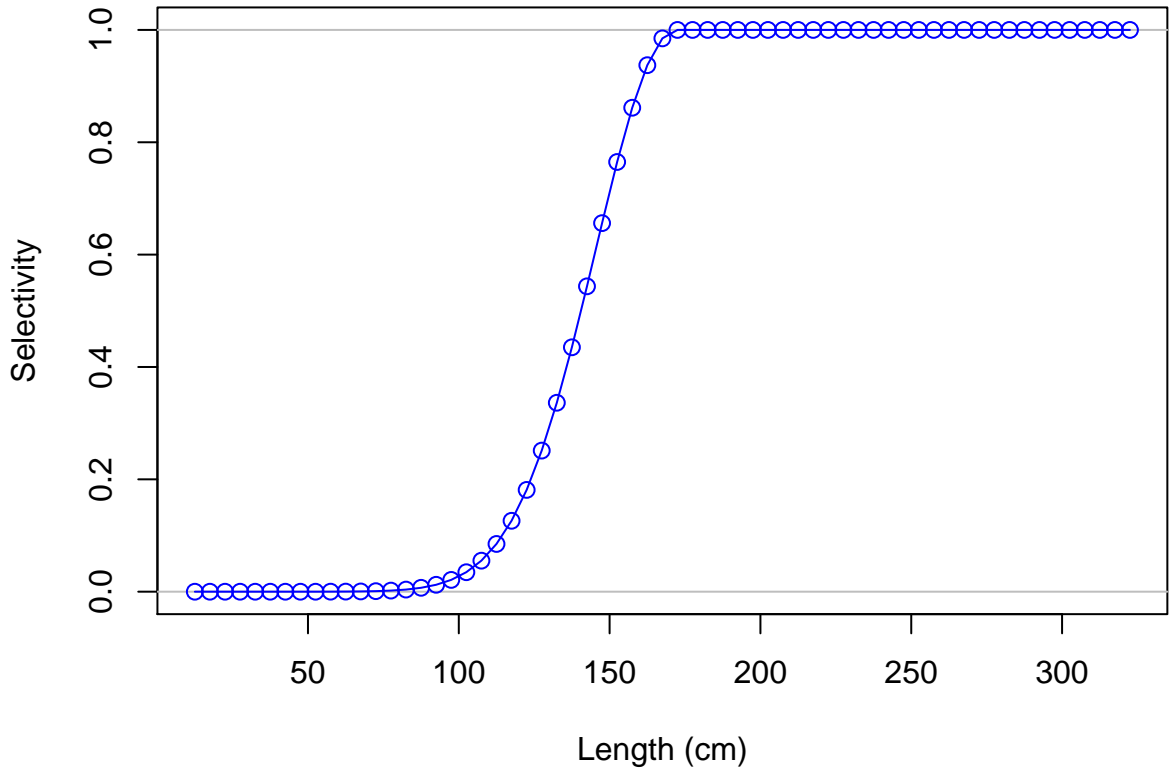




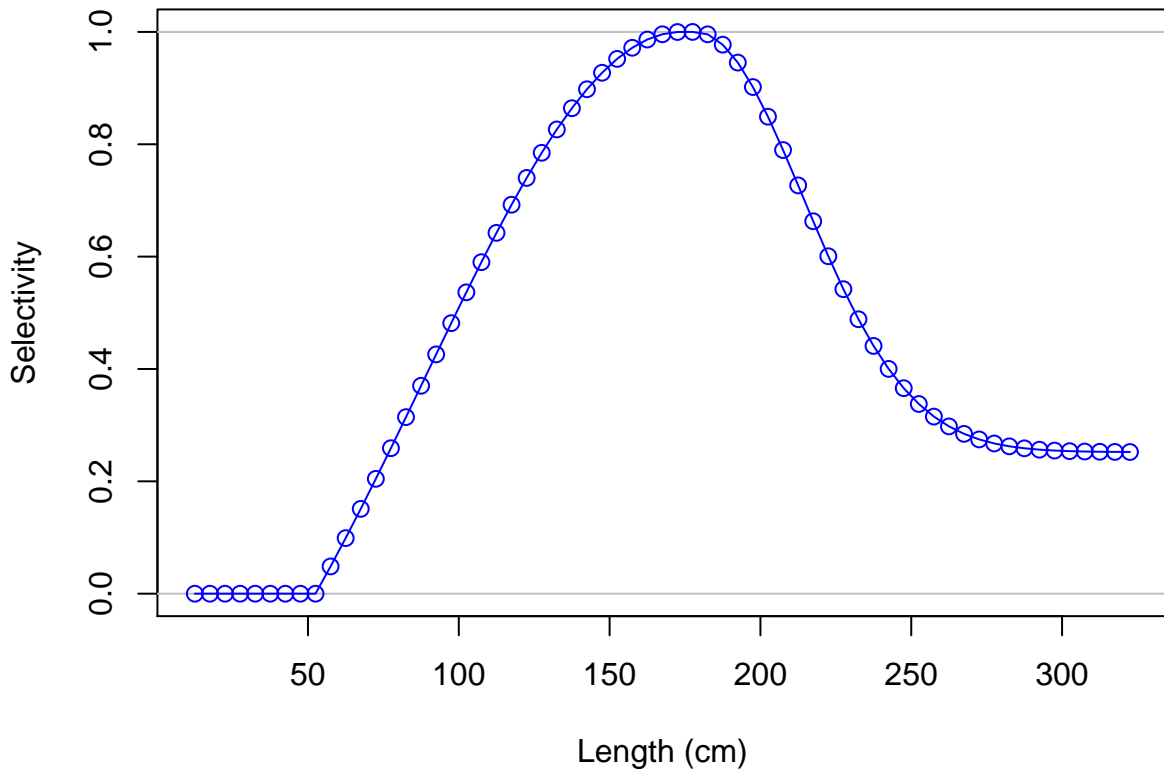
## Female ending year selectivity for CAN\_LATE\_4



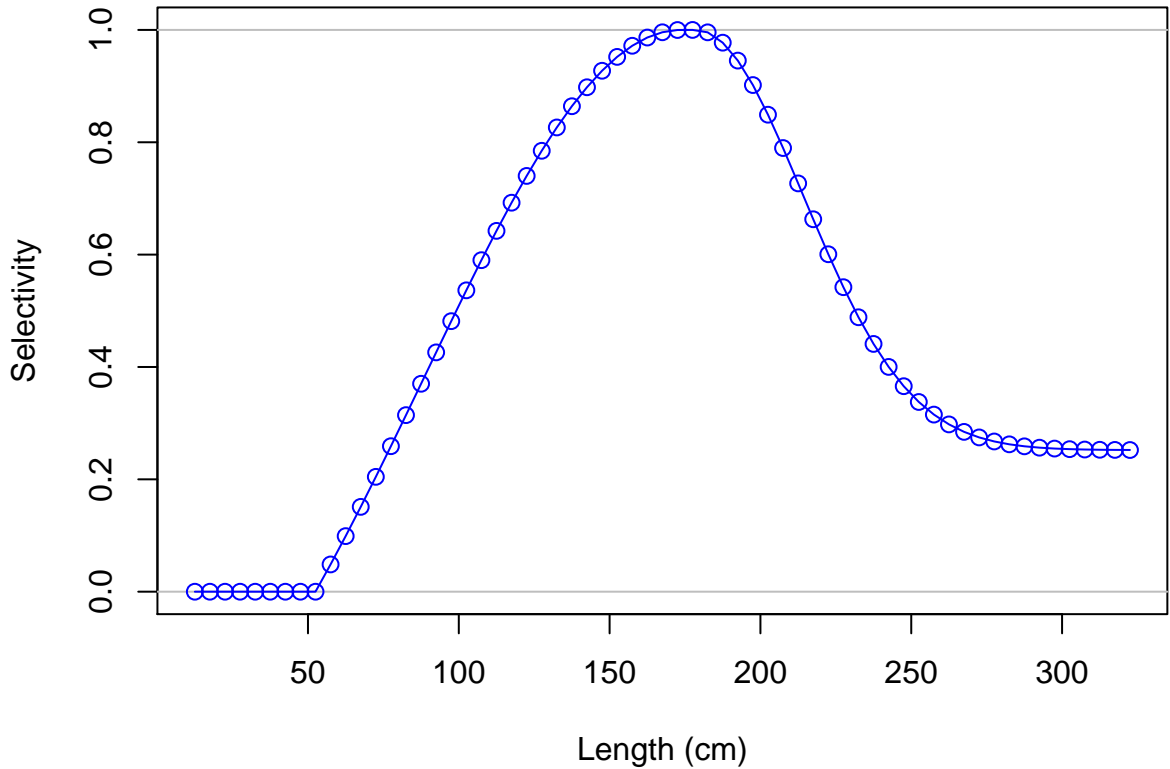
## Male ending year selectivity for CAN\_LATE\_4



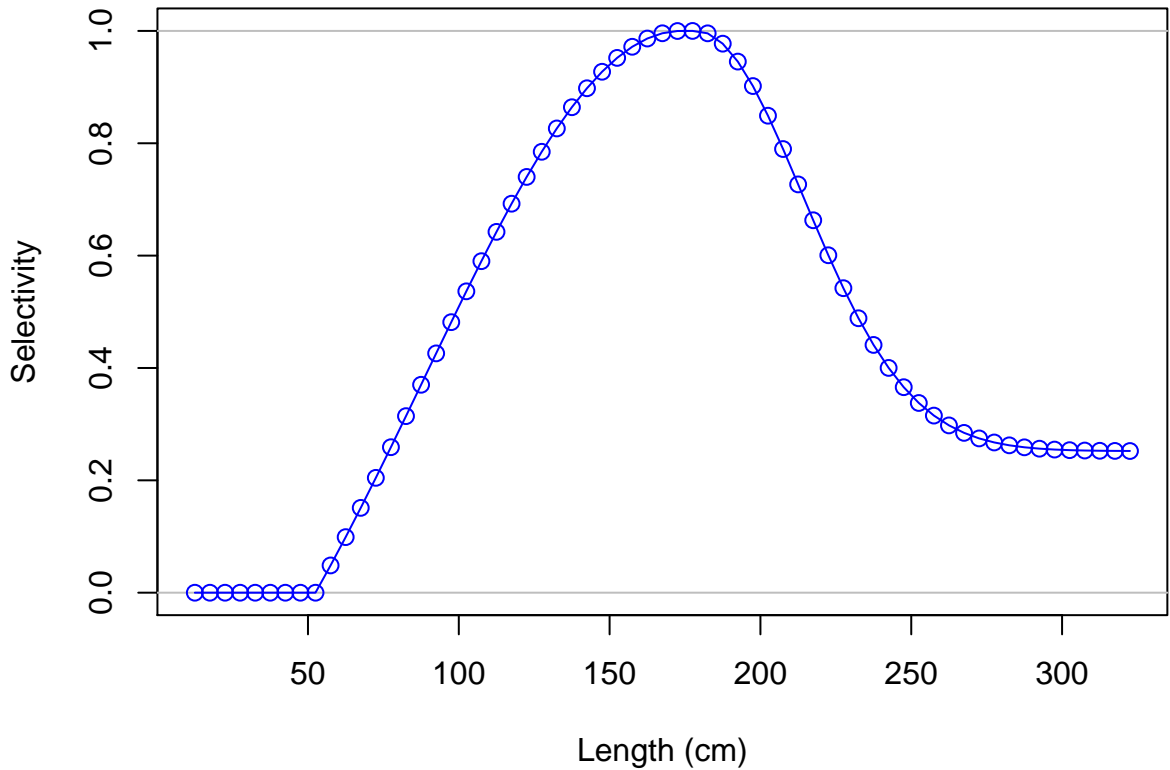
## Female ending year selectivity for JPN\_ERLY\_5



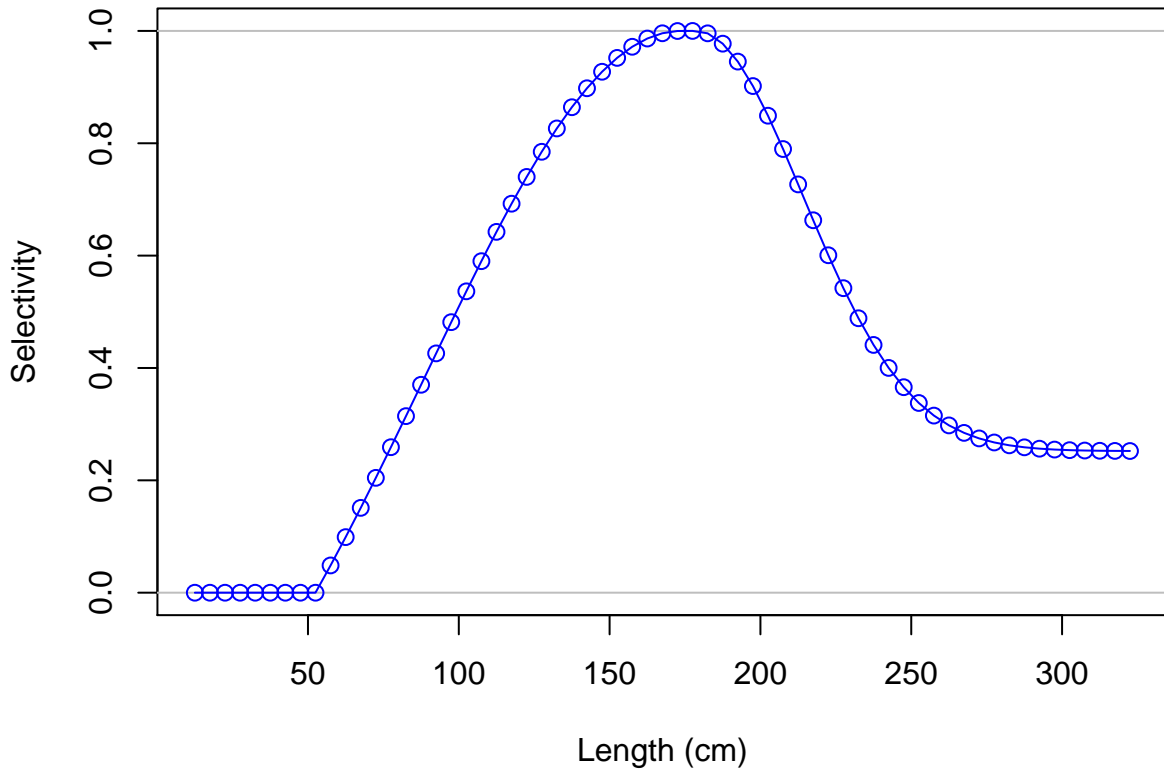
## Male ending year selectivity for JPN\_ERLY\_5



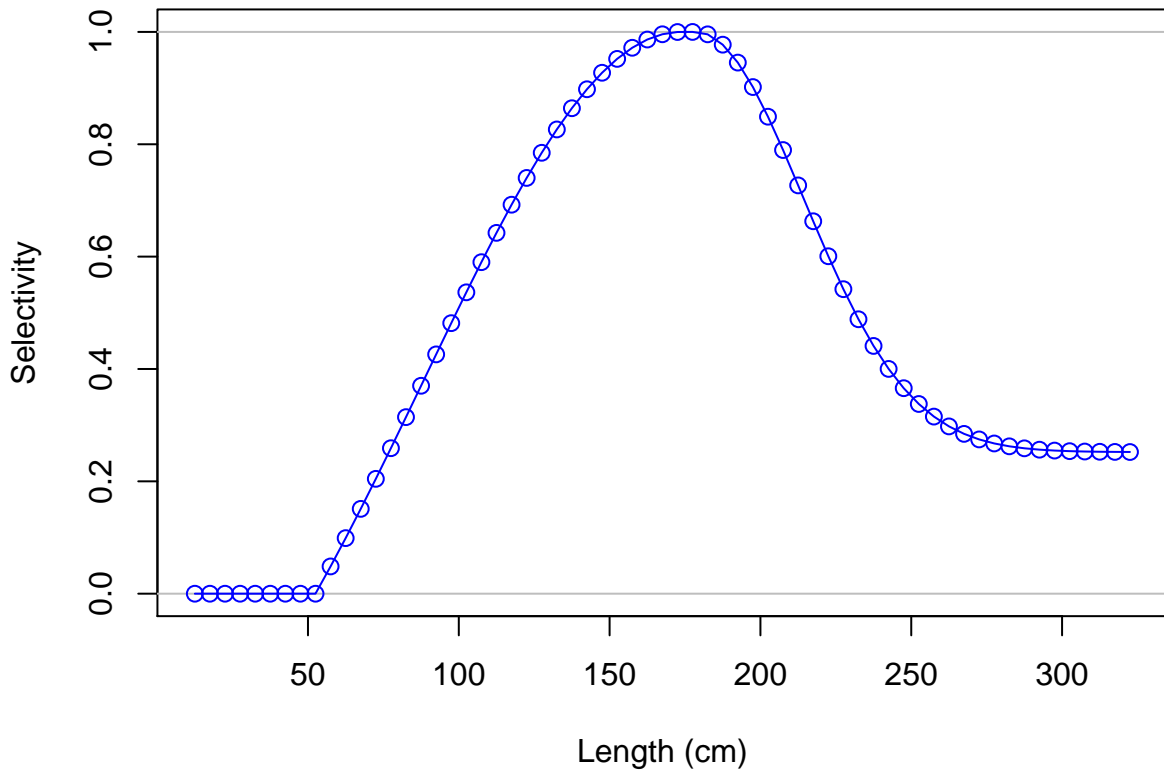
## Female ending year selectivity for JPN\_MID\_6



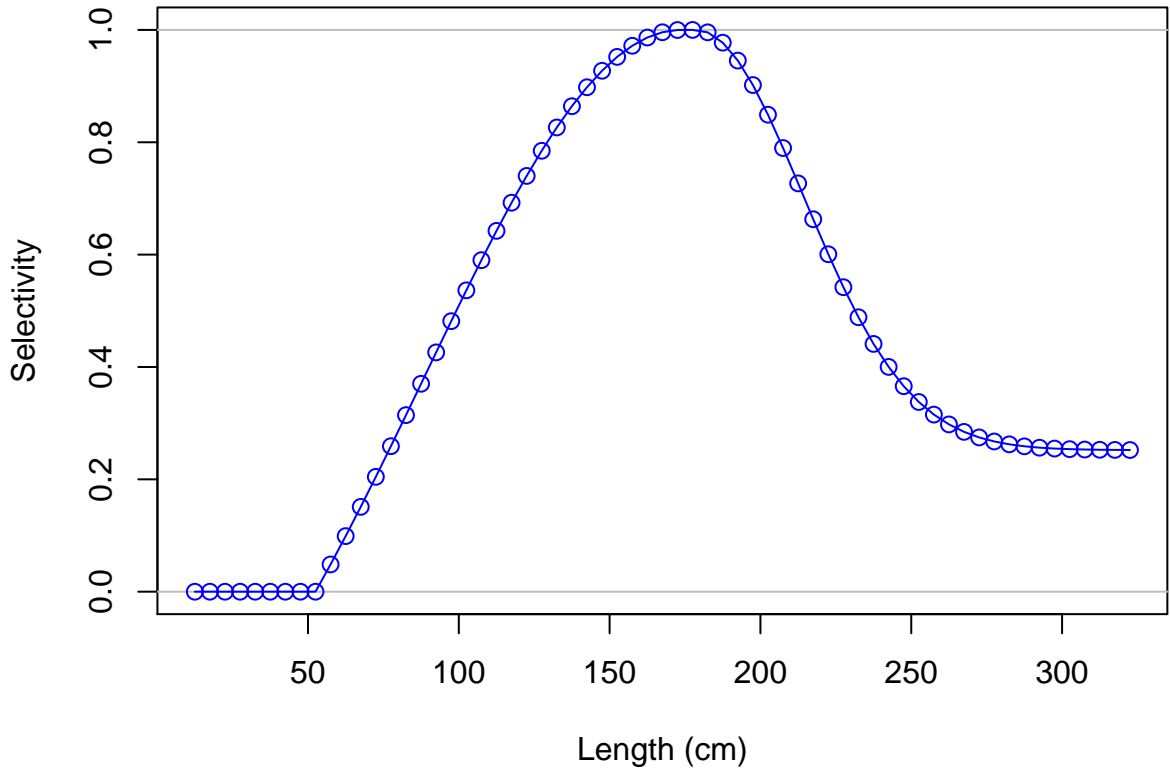
## Male ending year selectivity for JPN\_MID\_6



## Female ending year selectivity for JPN\_LATE\_7

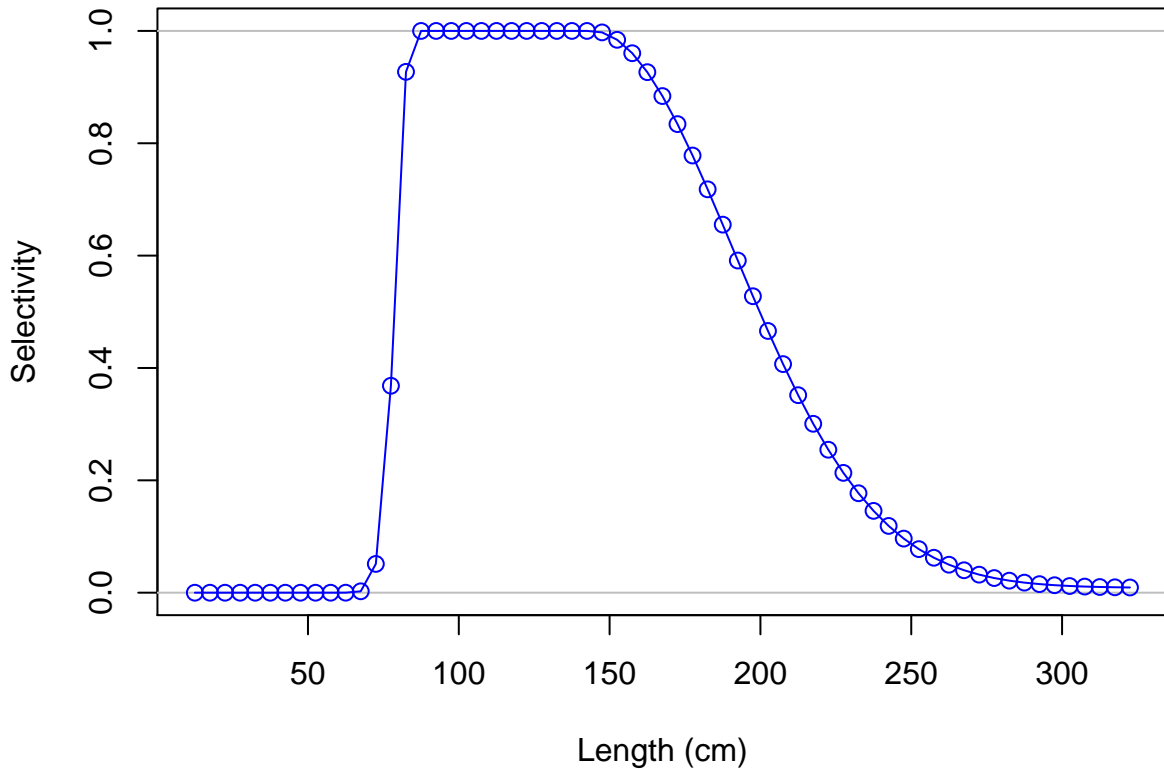


## Male ending year selectivity for JPN\_LATE\_7

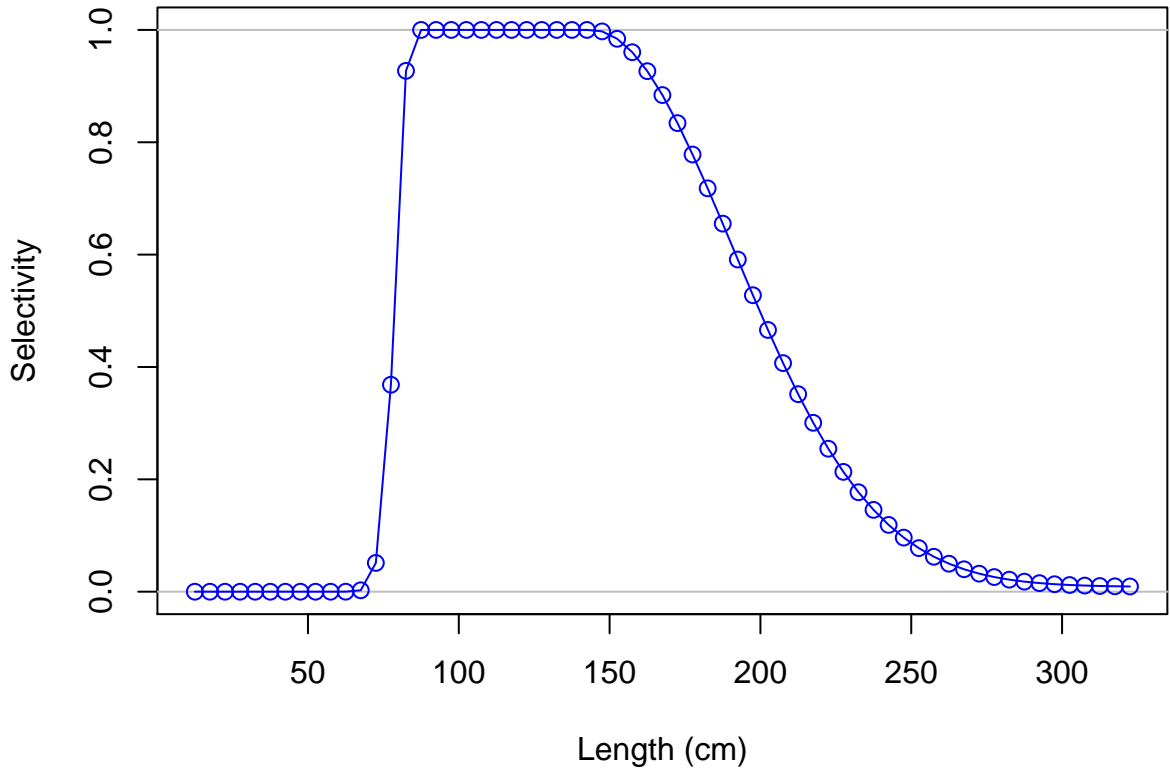




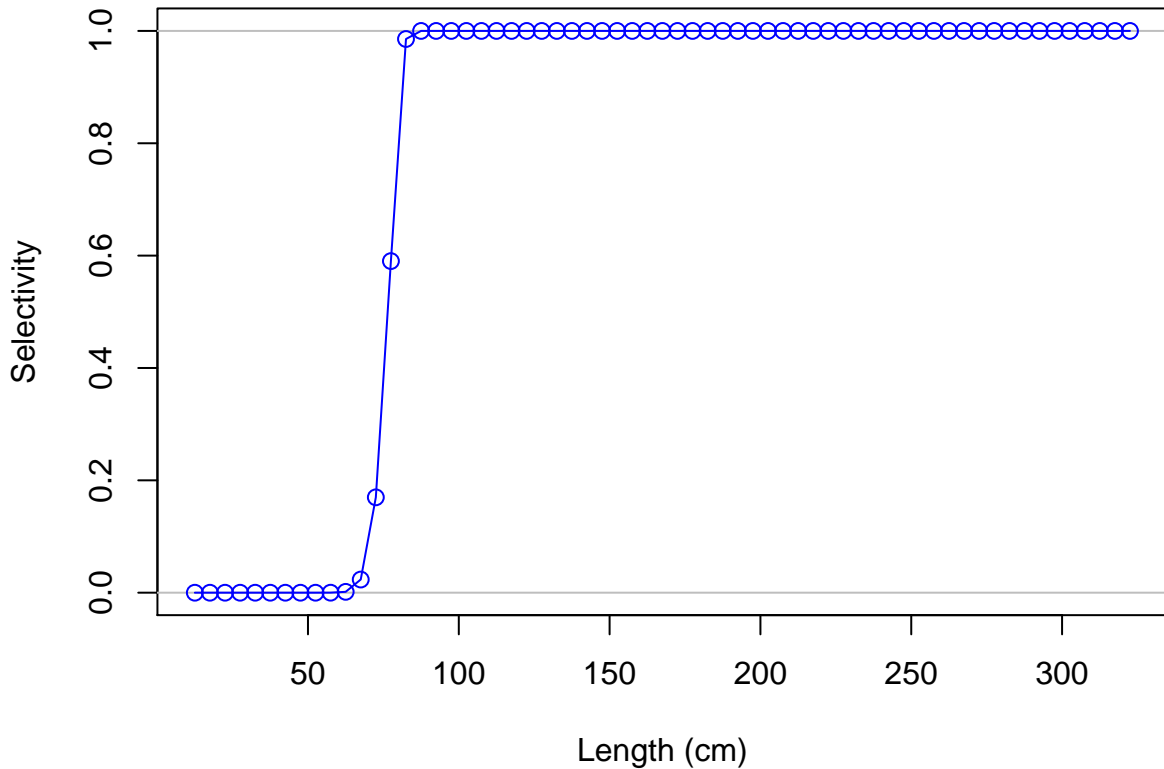
## Female ending year selectivity for PORT\_8



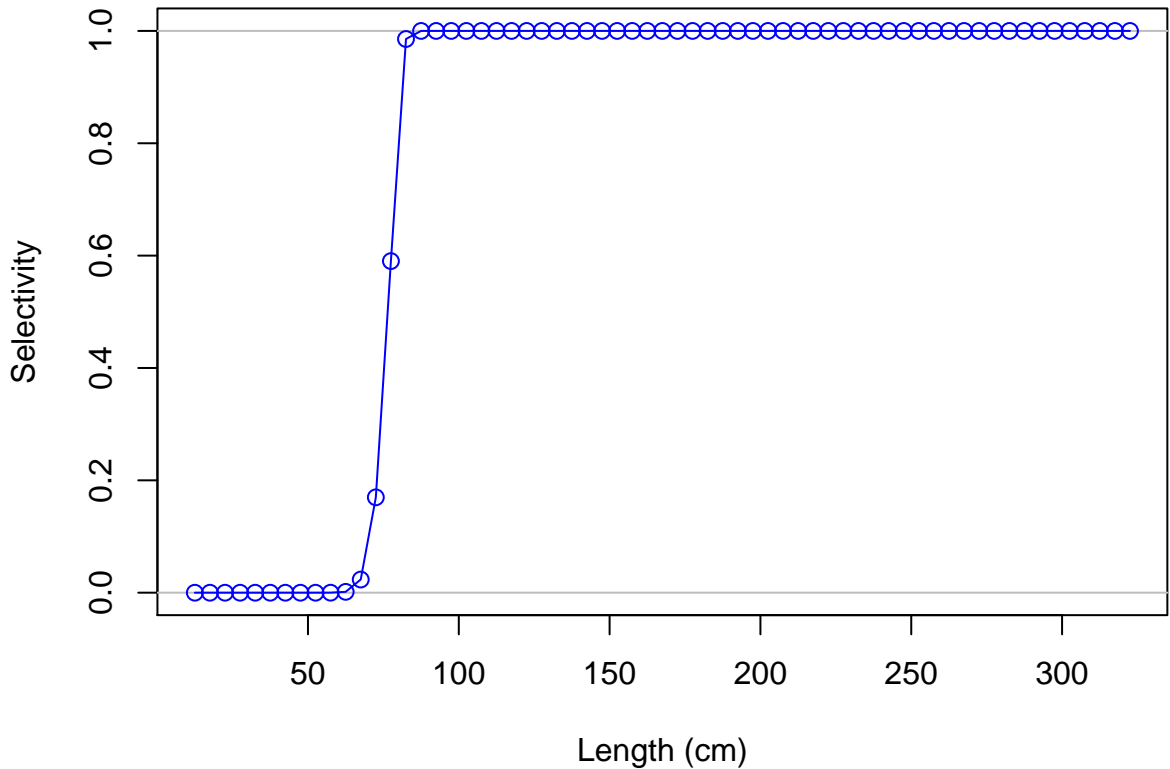
## Male ending year selectivity for PORT\_8



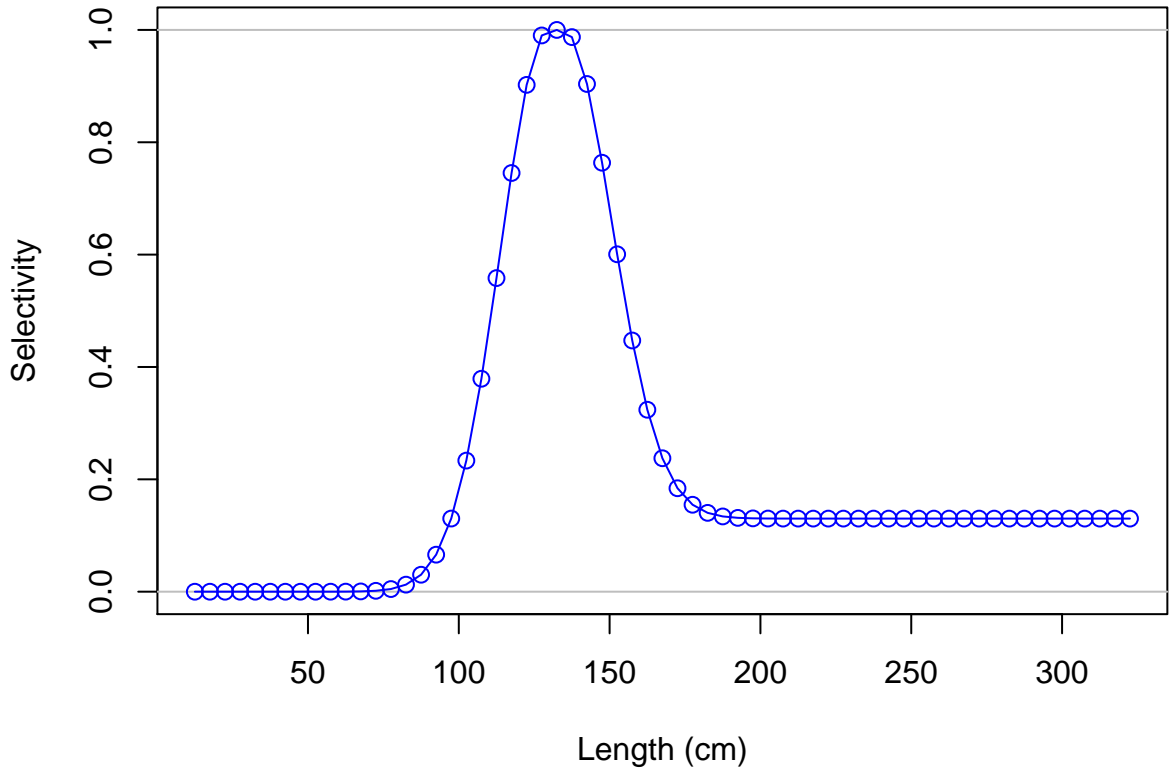
## Female ending year selectivity for CHIN-TAI\_9



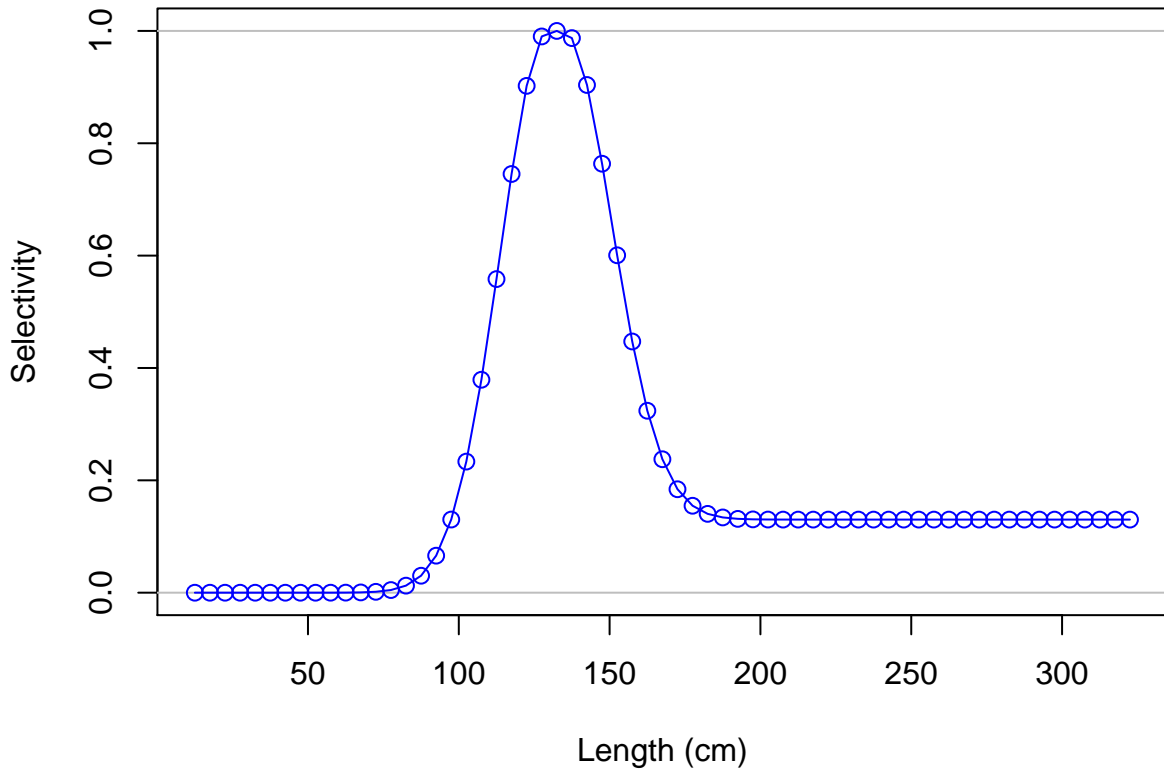
## Male ending year selectivity for CHIN-TAI\_9



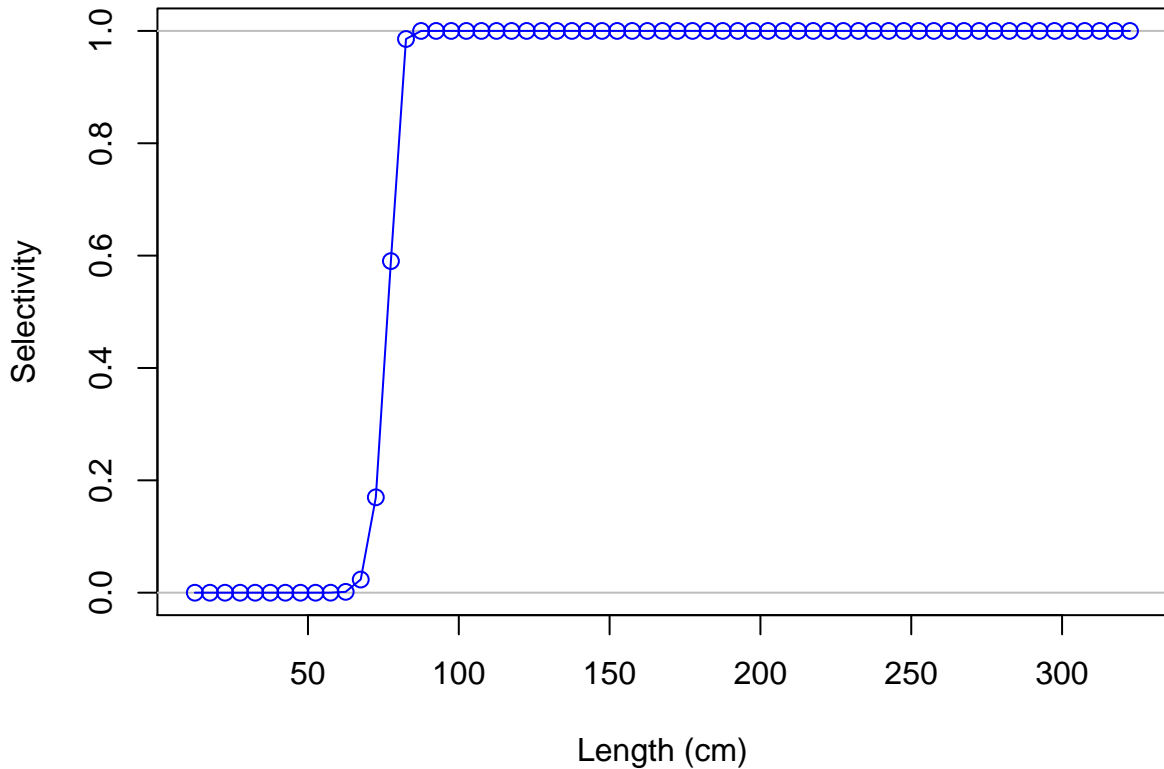
## Female ending year selectivity for MOR\_10



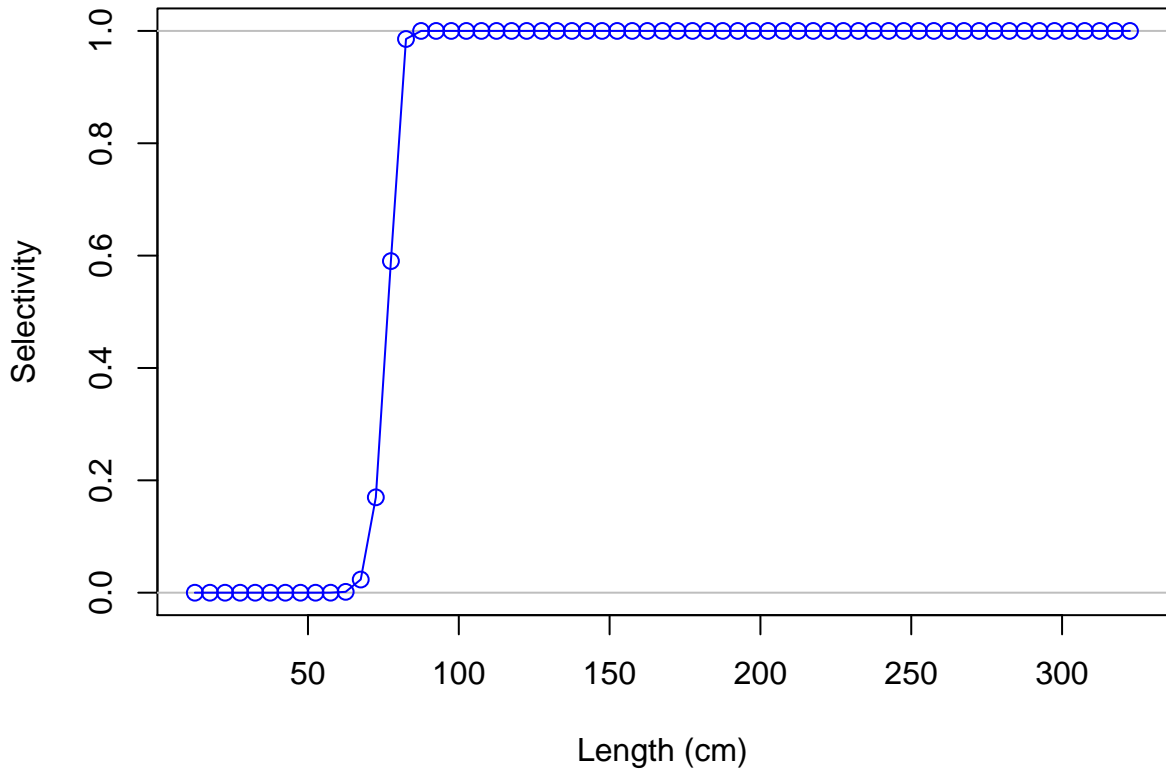
## Male ending year selectivity for MOR\_10



## Female ending year selectivity for OTH\_11

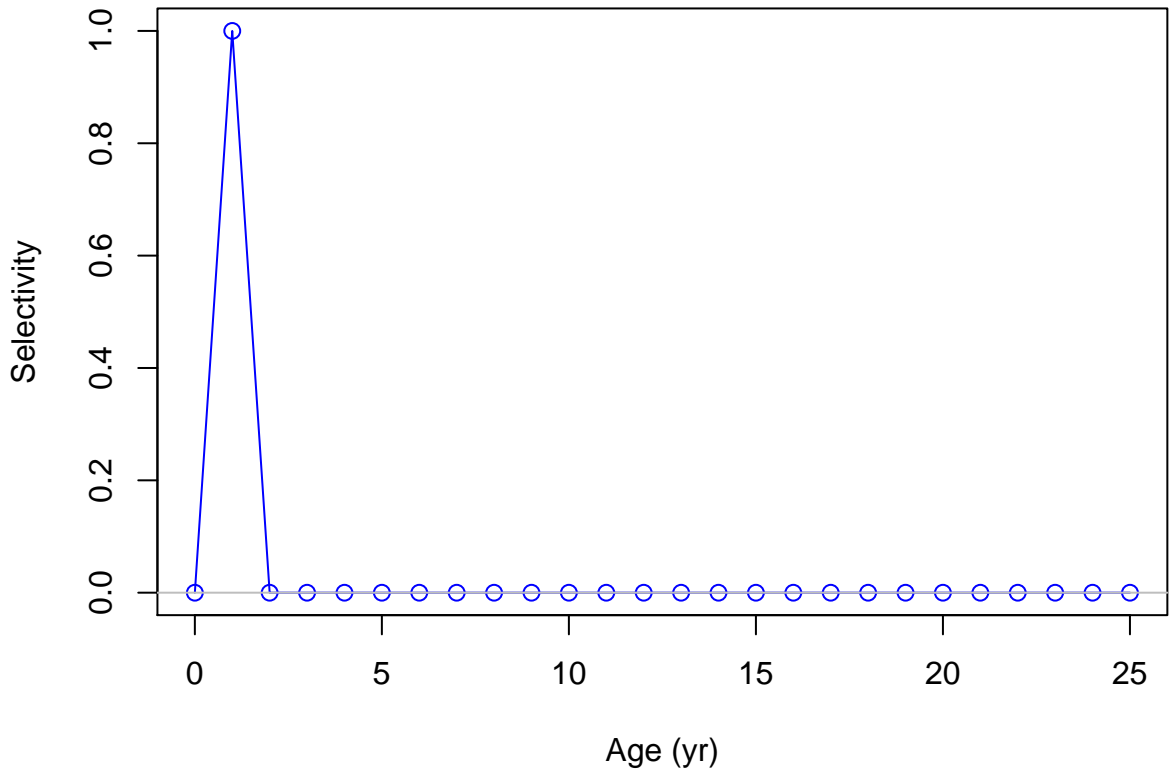


### Male ending year selectivity for OTH\_11

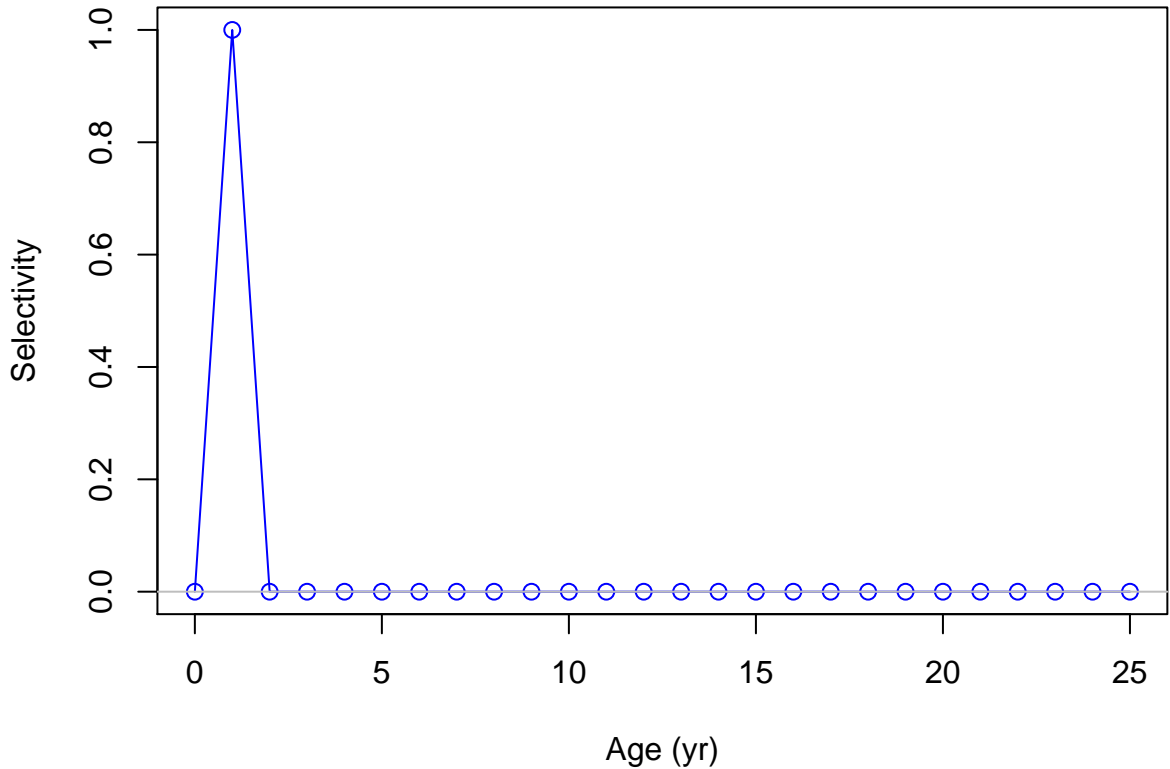




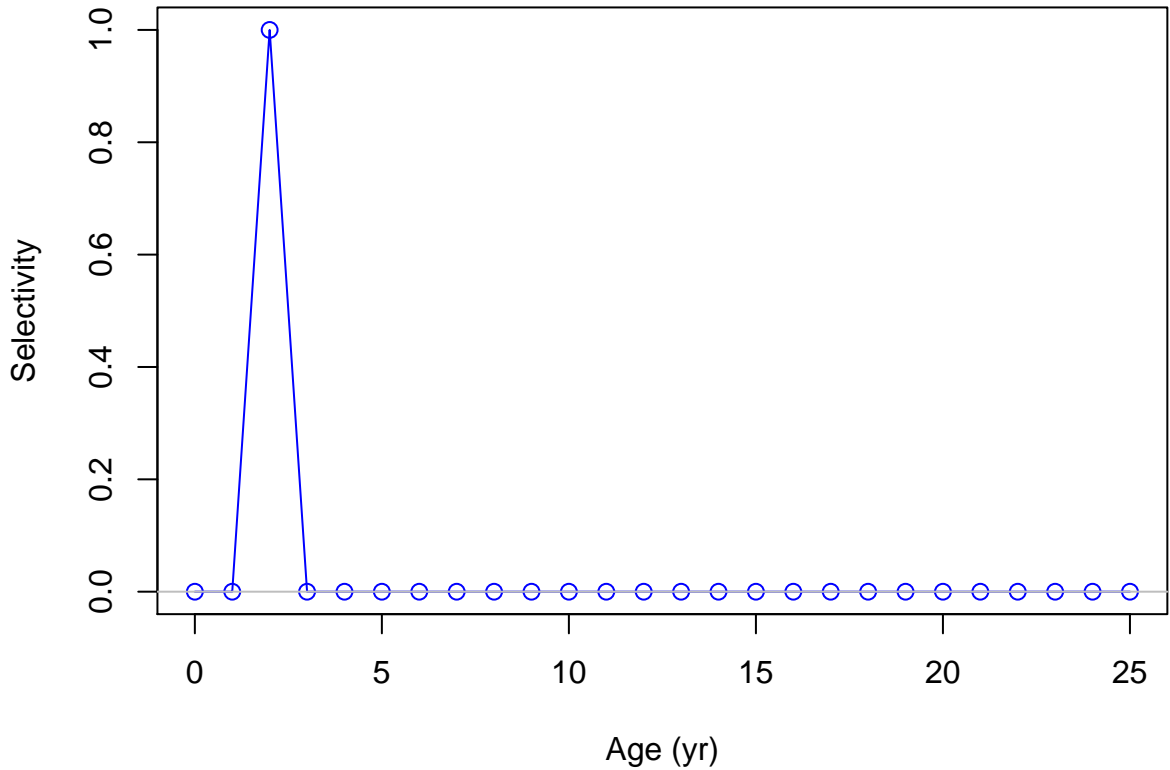
## Female ending year selectivity for Age-1



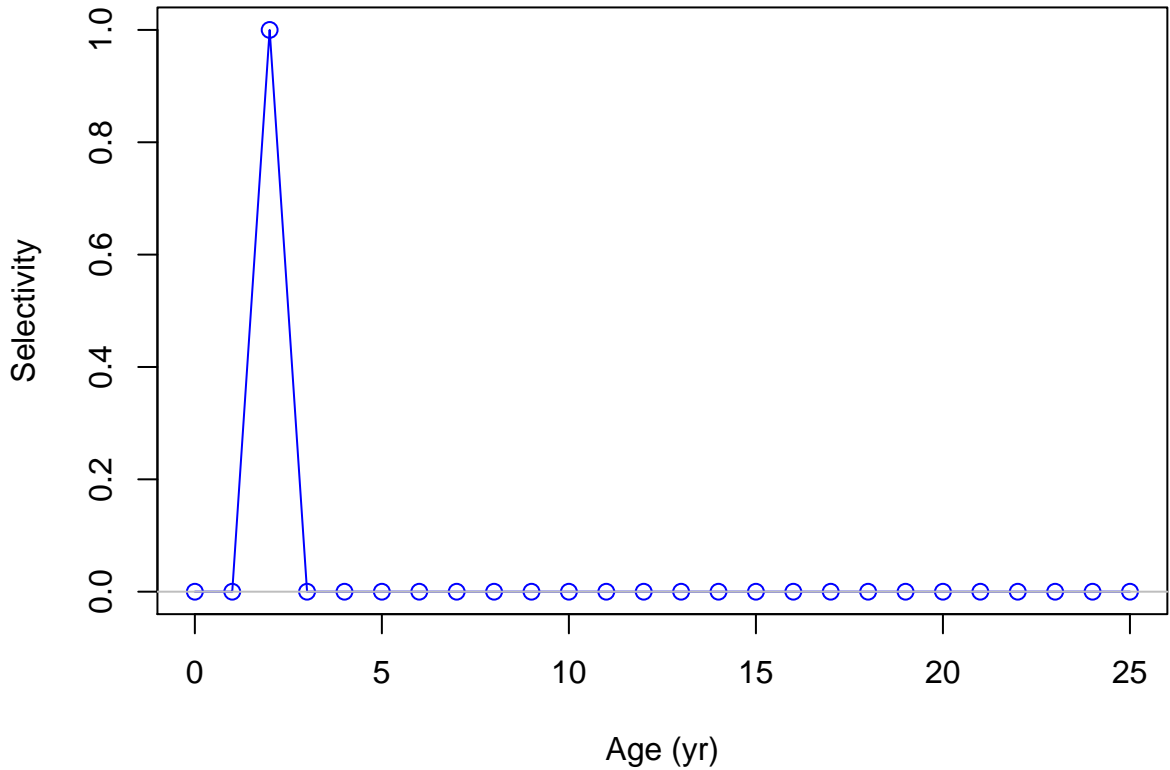
### Male ending year selectivity for Age-1



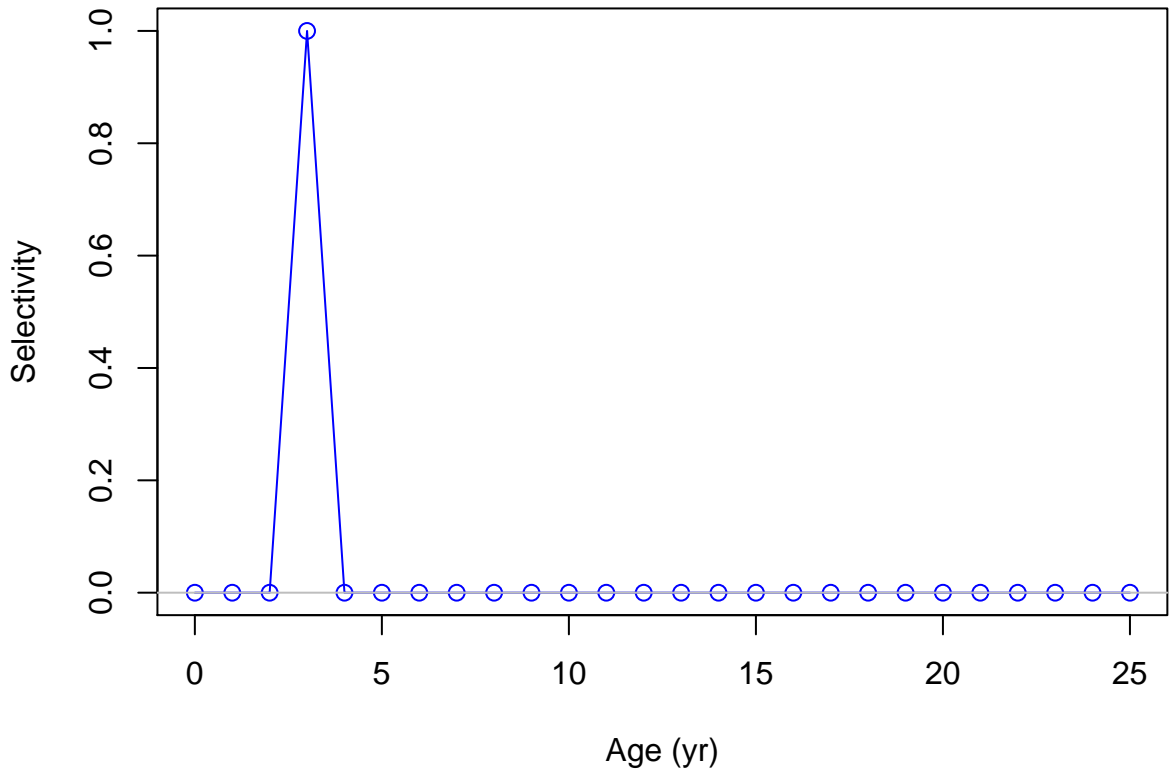
## Female ending year selectivity for Age-2



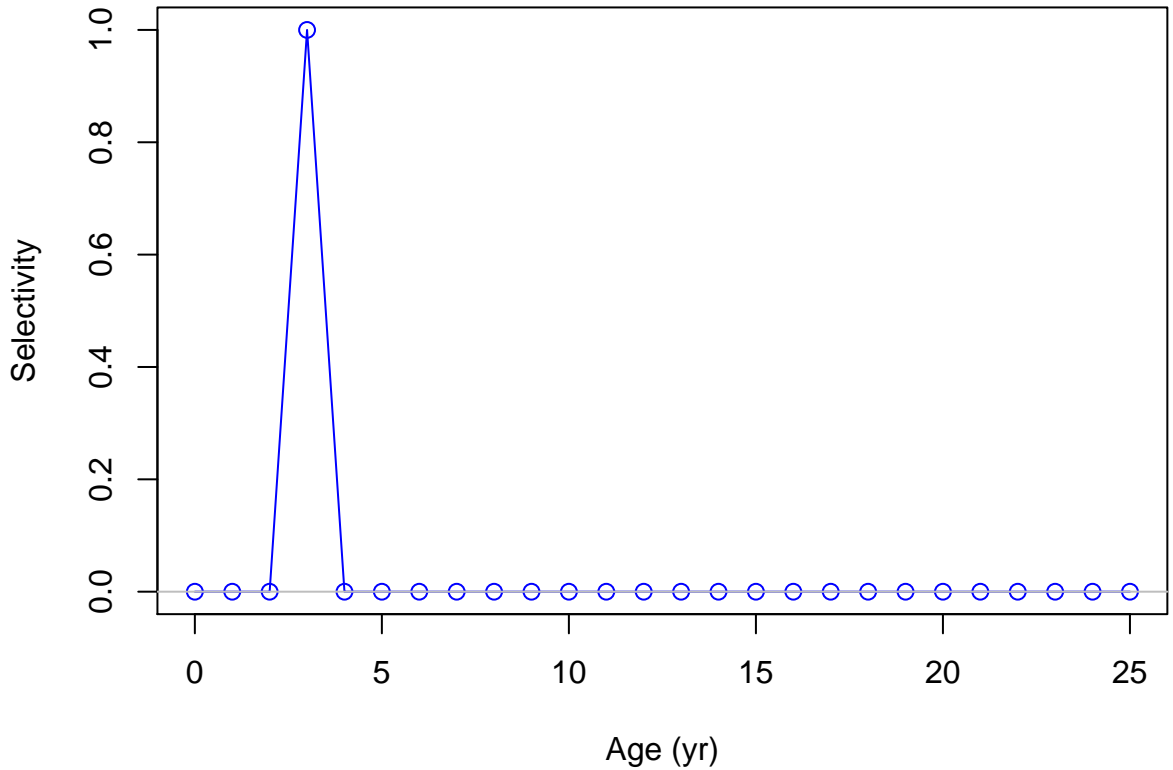
## Male ending year selectivity for Age-2



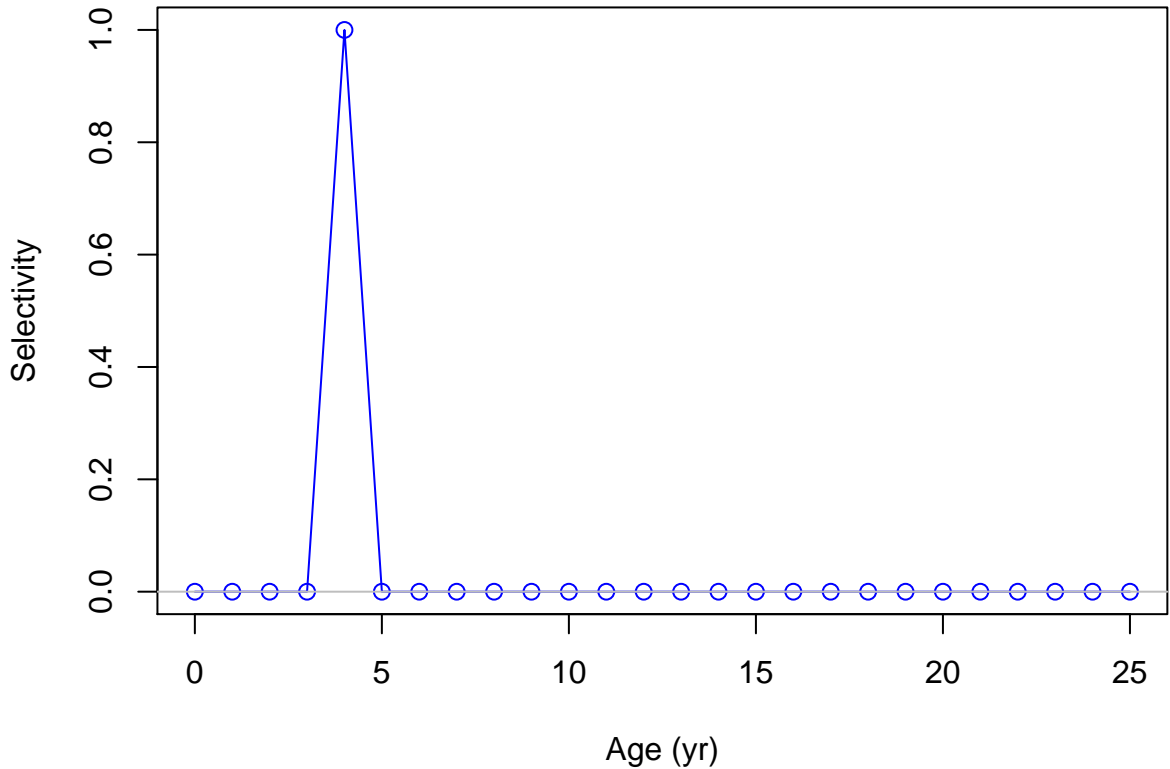
## Female ending year selectivity for Age-3



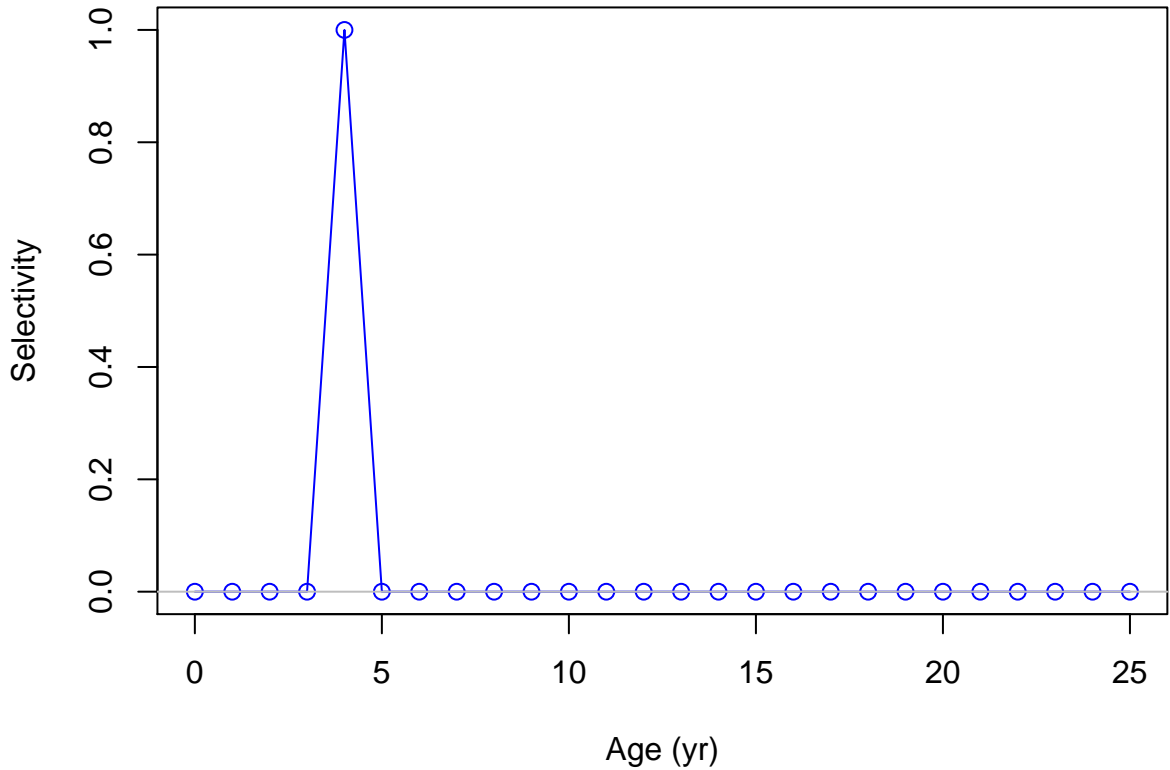
### Male ending year selectivity for Age-3



## Female ending year selectivity for Age-4

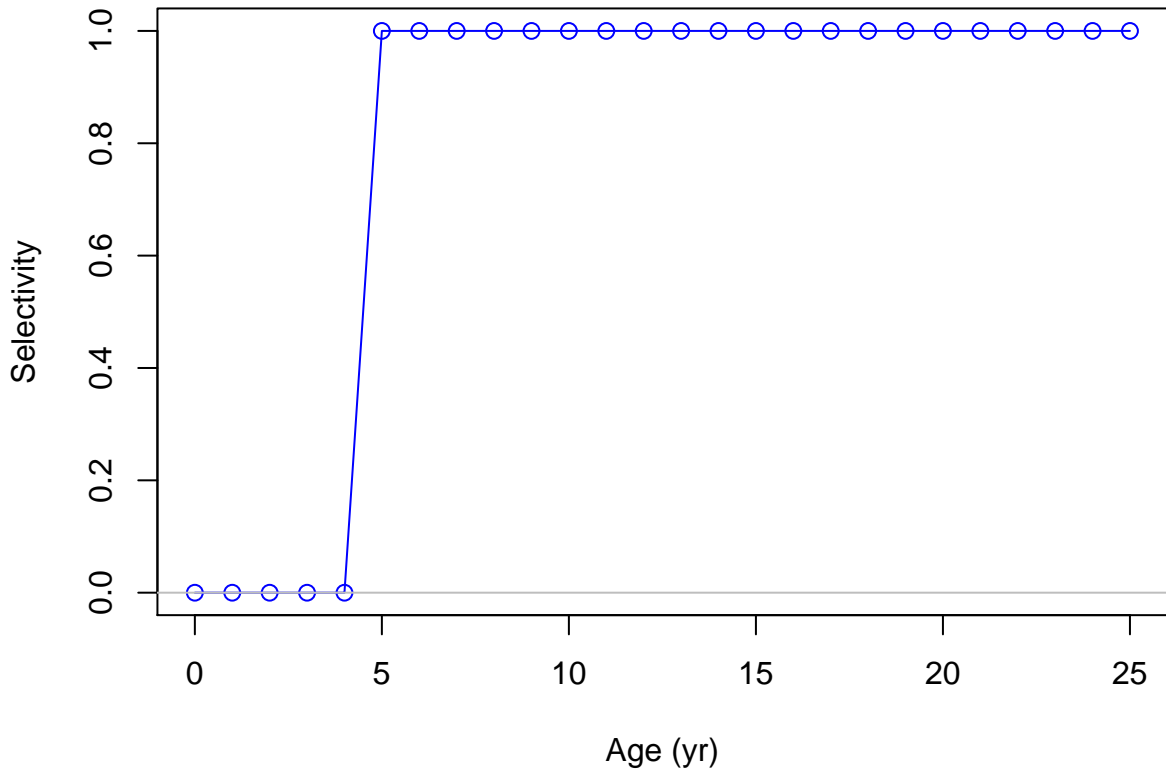


### Male ending year selectivity for Age-4

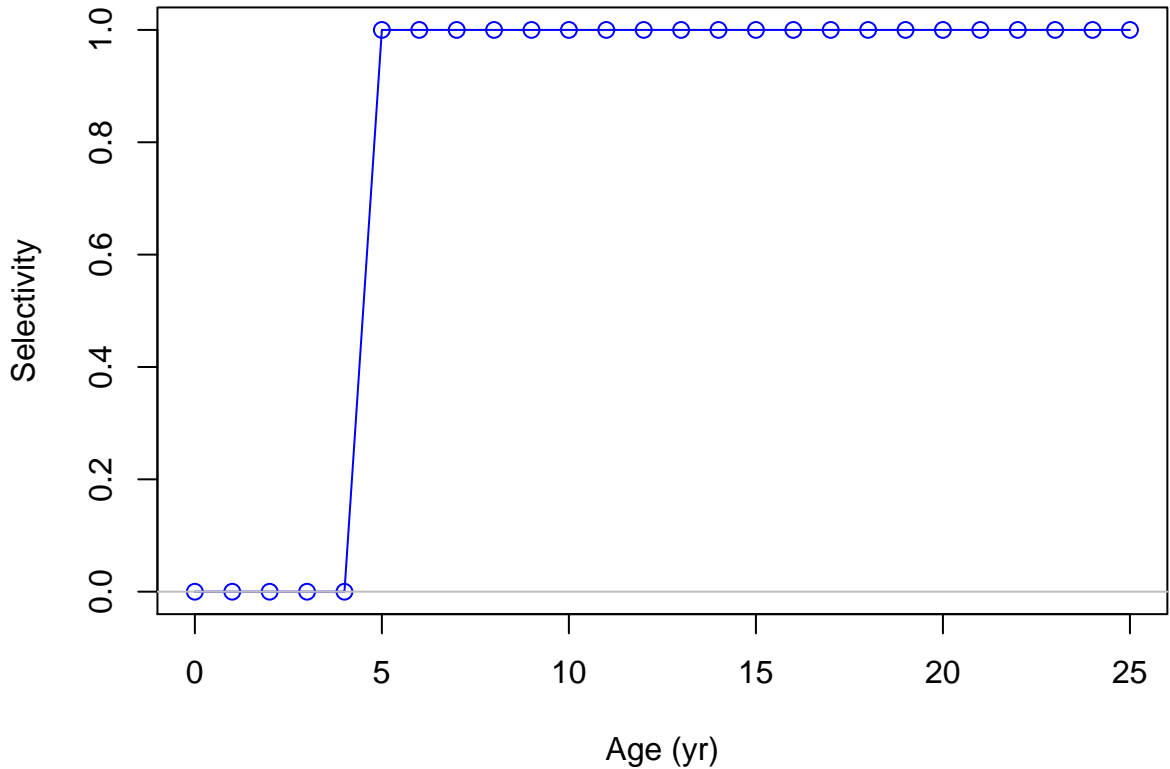




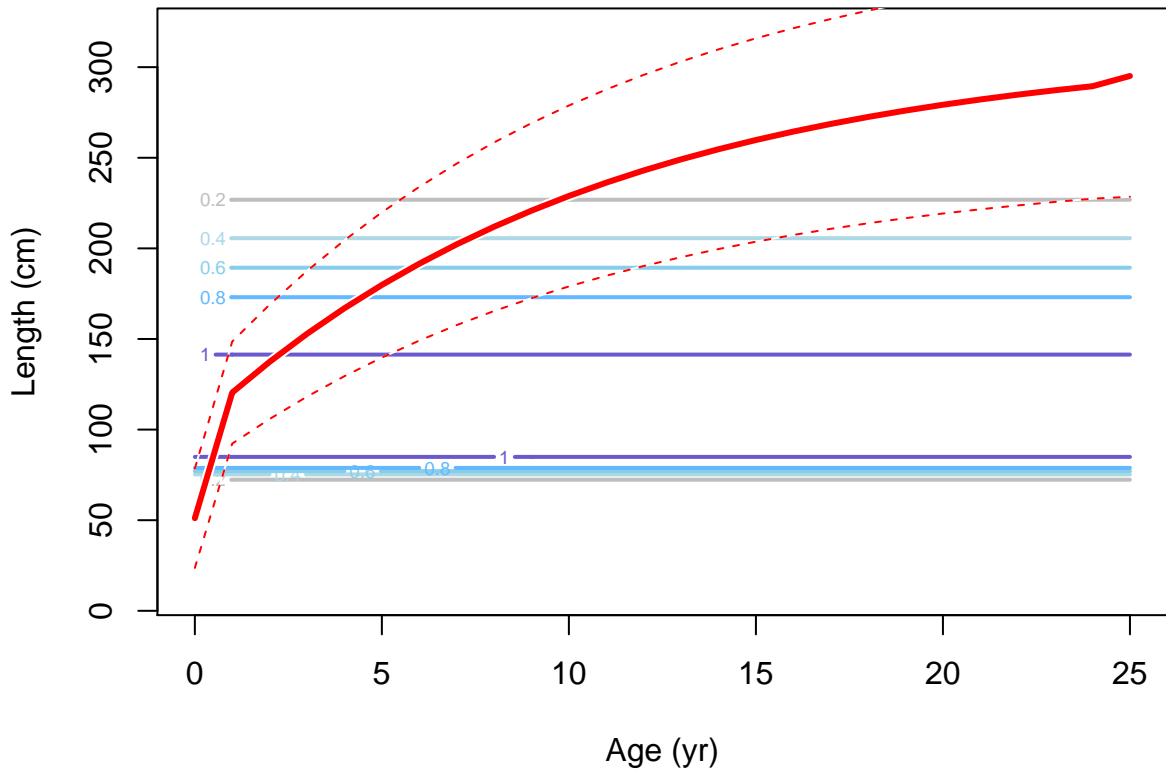
## Female ending year selectivity for Age-5+



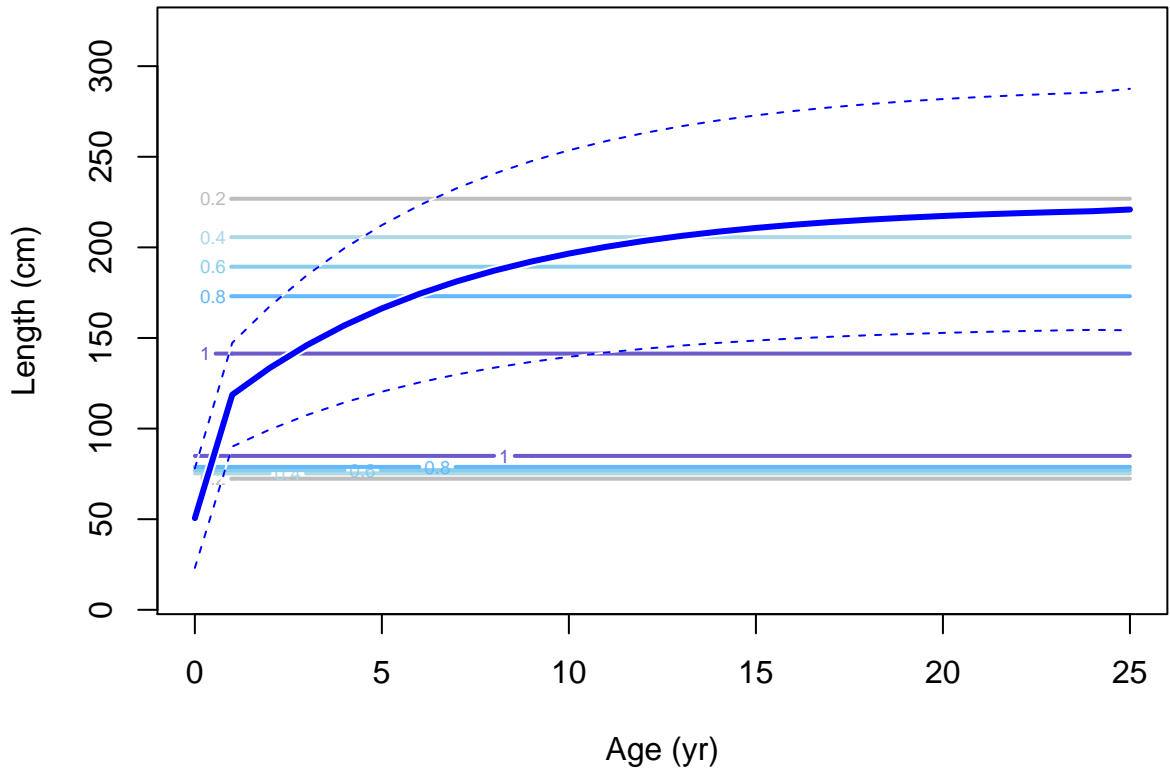
### Male ending year selectivity for Age-5+



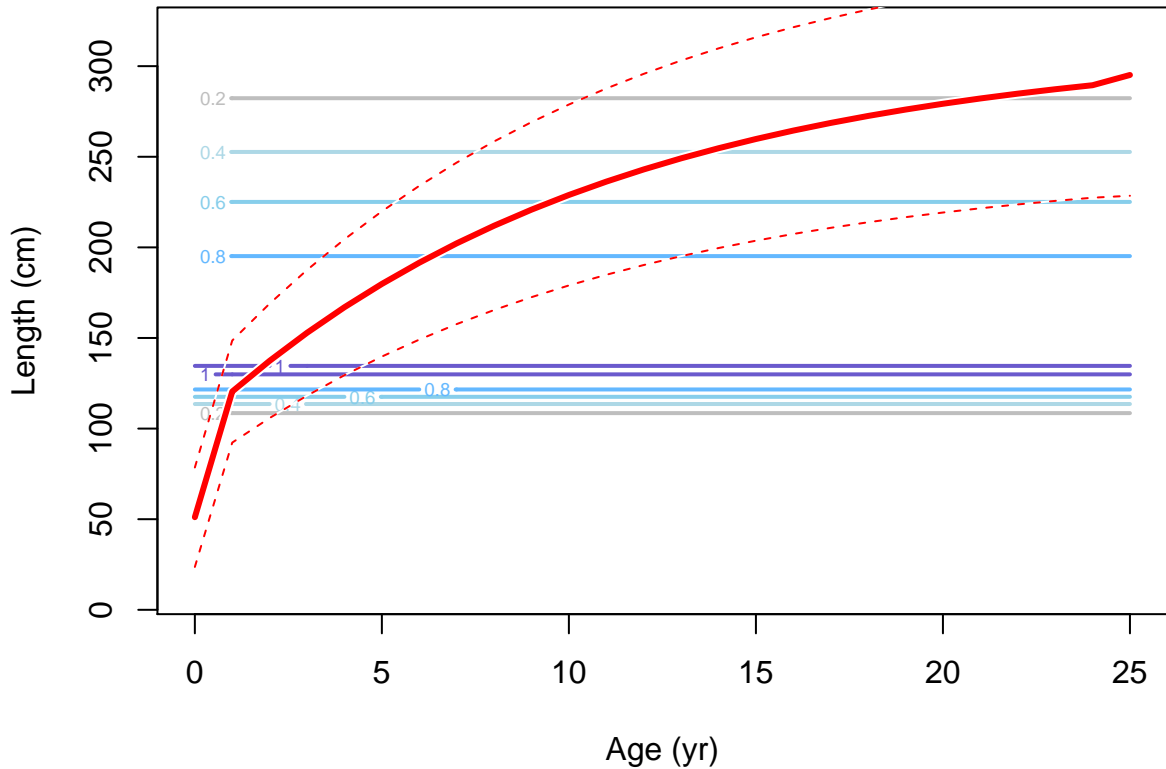
## Female ending year selectivity and growth for SPN\_1



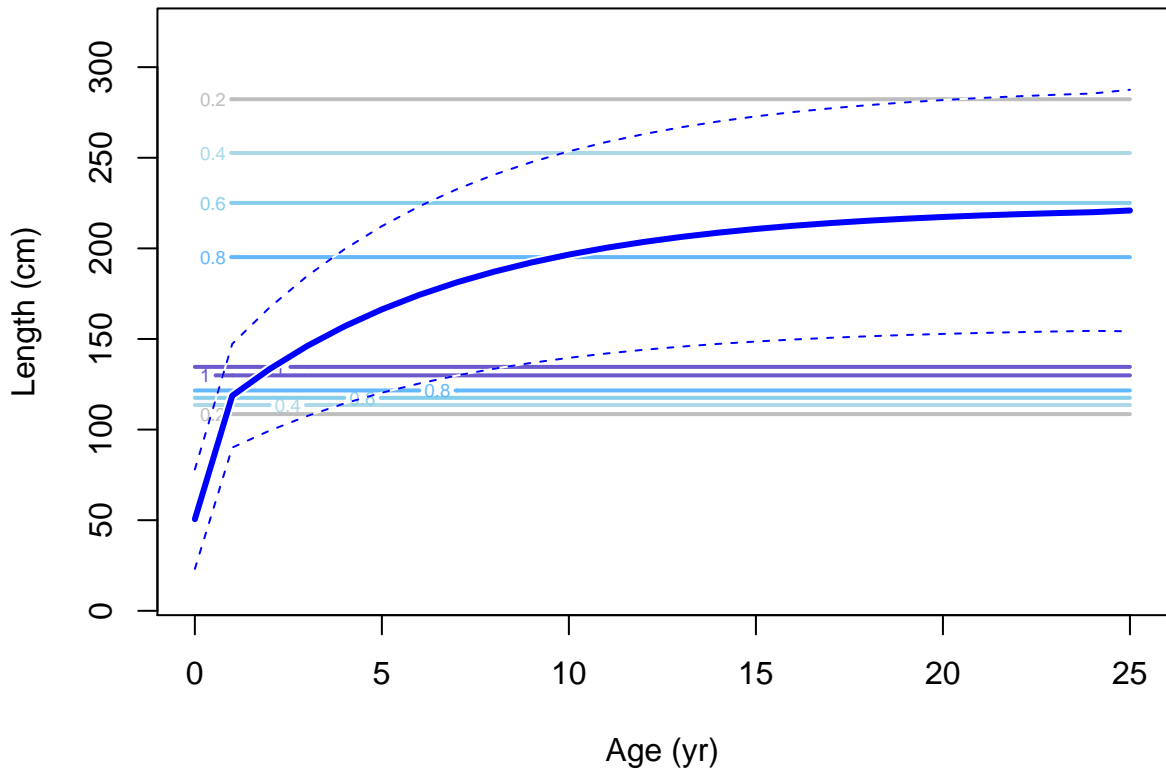
# Male ending year selectivity and growth for SPN\_1



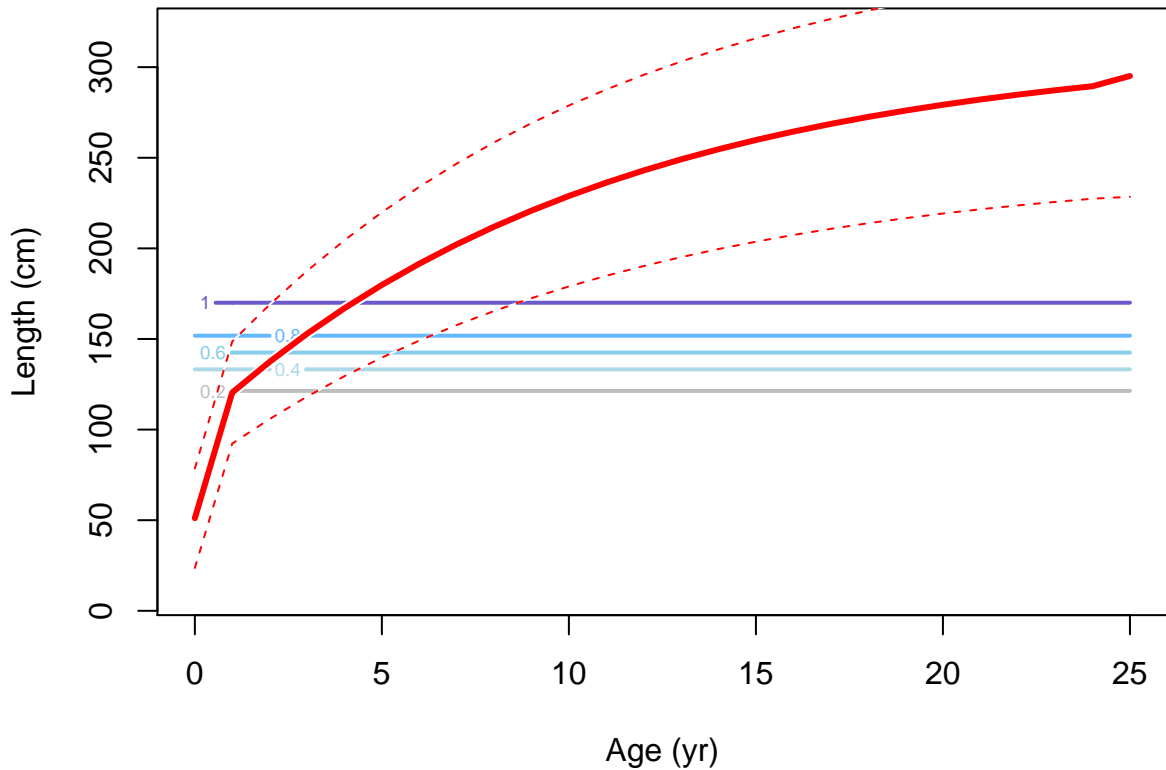
## Female ending year selectivity and growth for US\_2



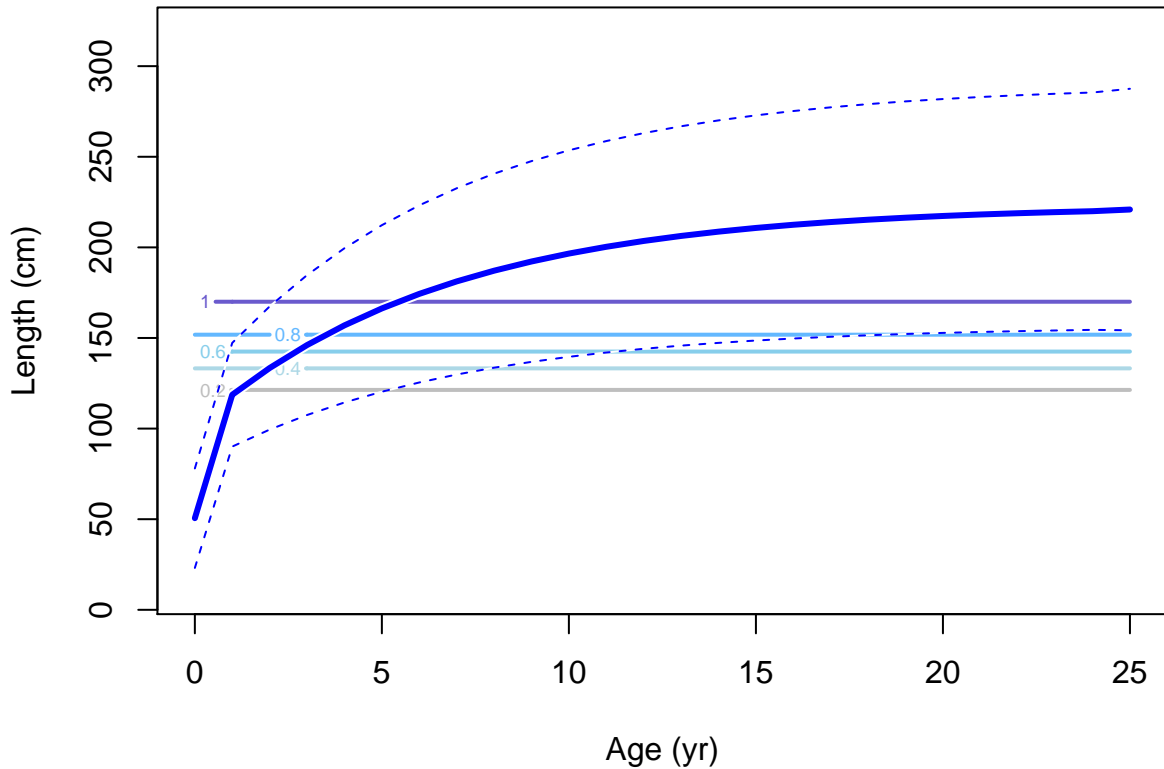
# Male ending year selectivity and growth for US\_2



## Female ending year selectivity and growth for CAN\_ERLY\_5

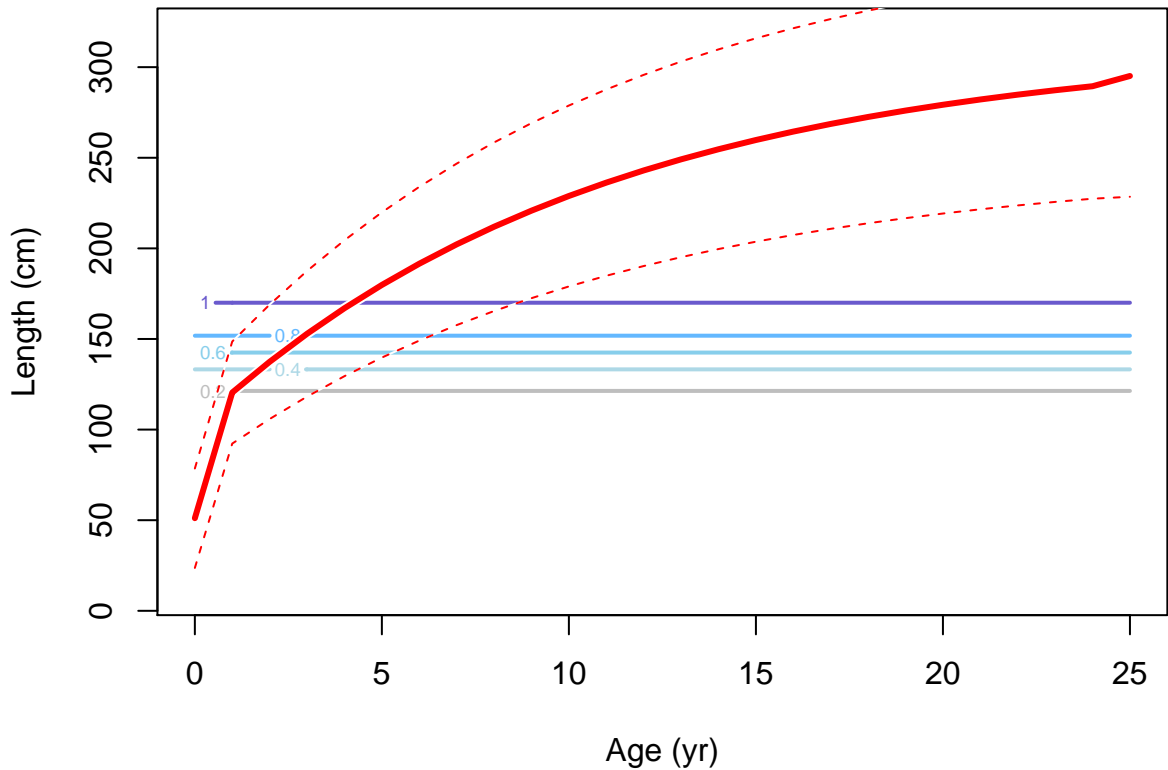


# Male ending year selectivity and growth for CAN\_ERLY\_5

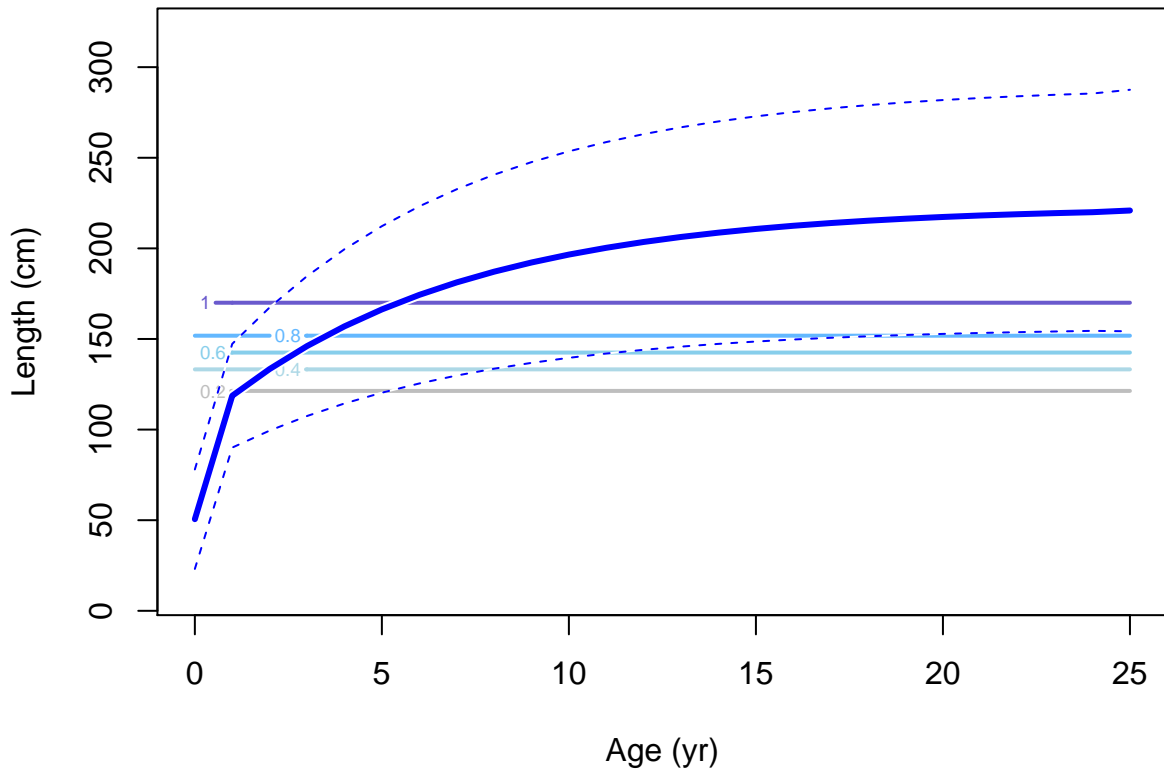




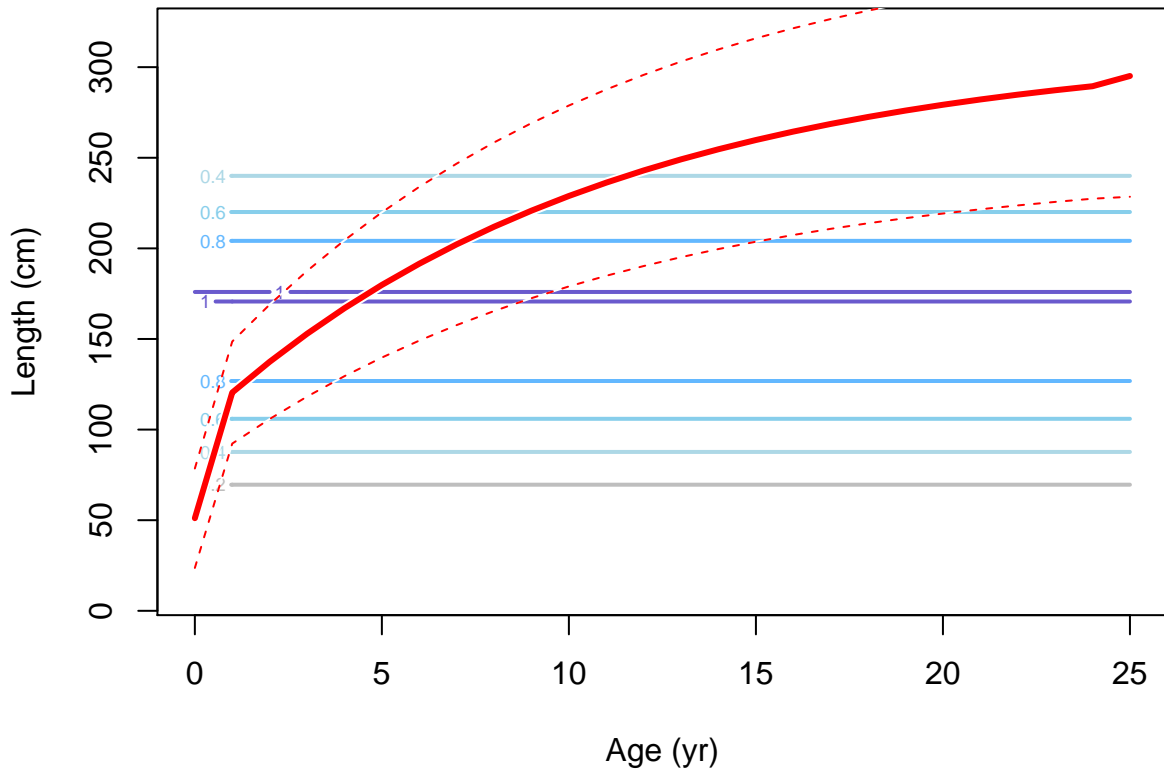
## Female ending year selectivity and growth for CAN\_LATE\_4



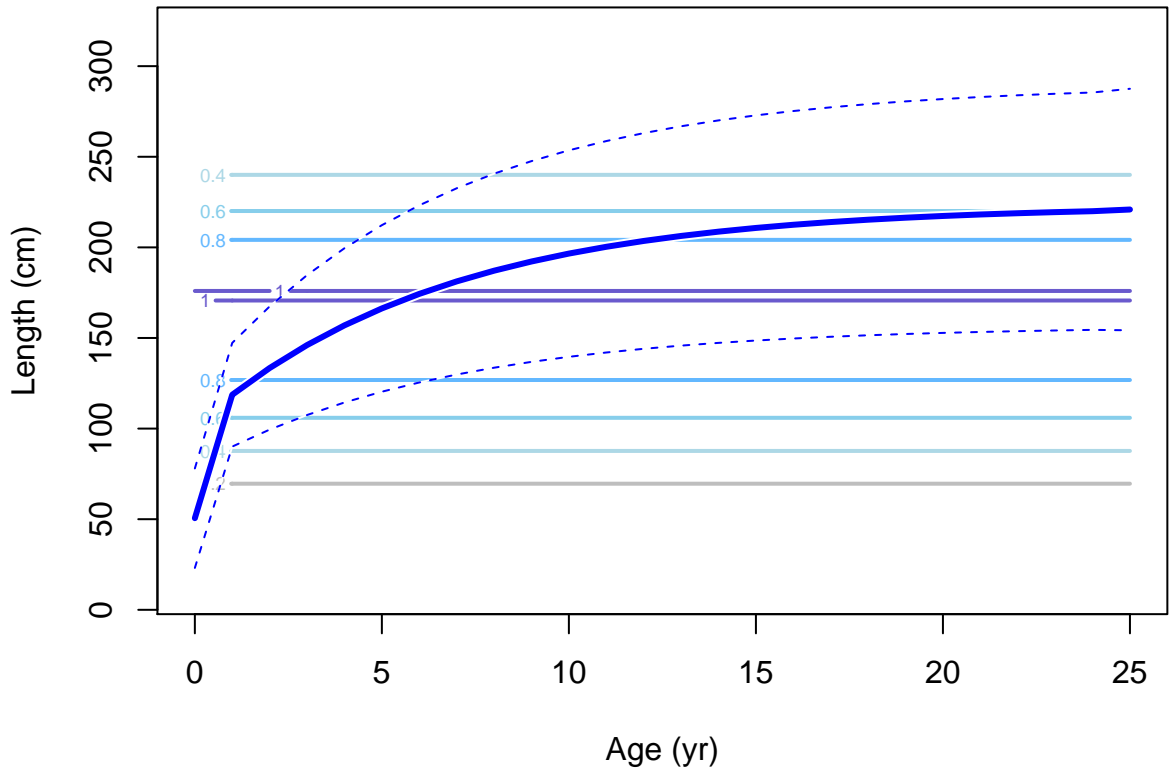
# Male ending year selectivity and growth for CAN\_LATE\_4



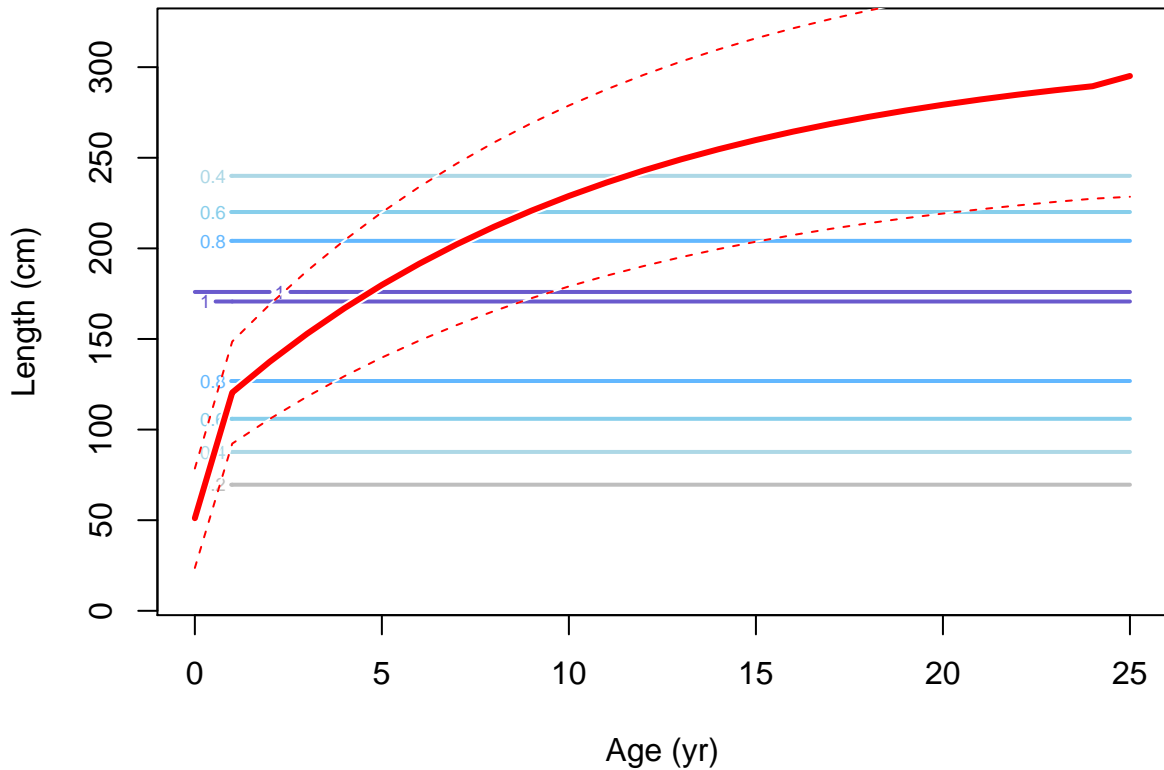
## Female ending year selectivity and growth for JPN\_ERLY\_5



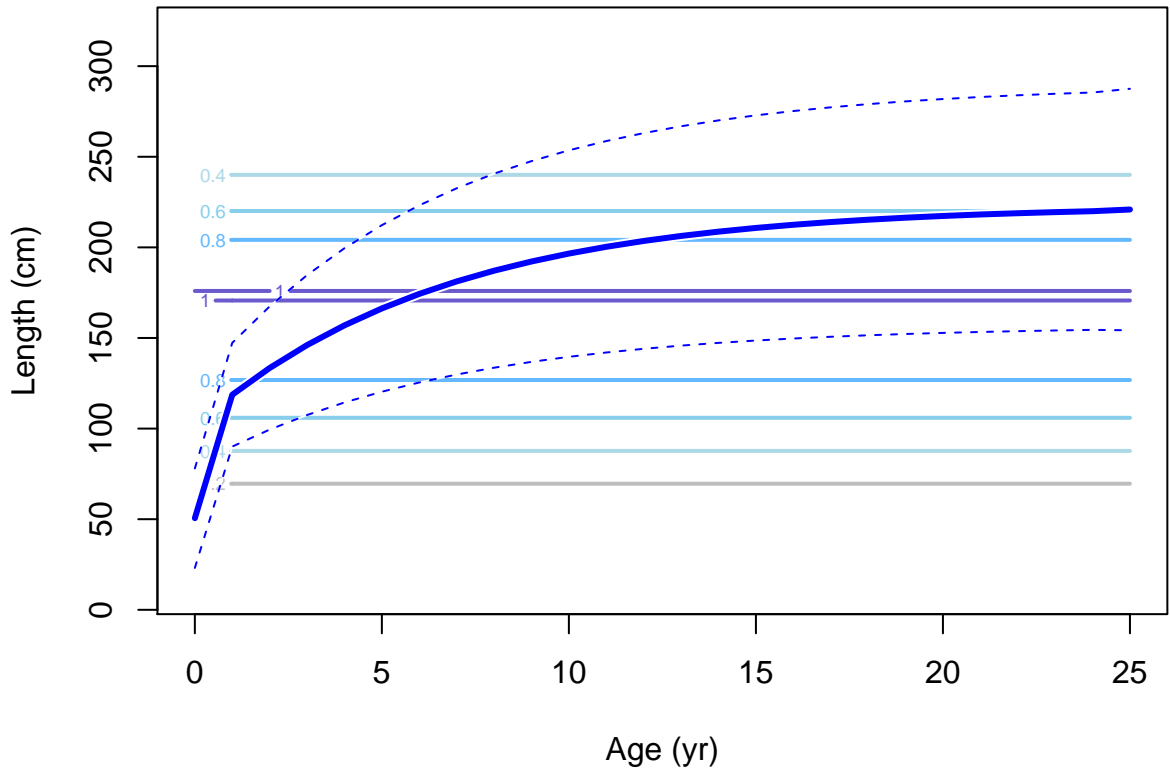
# Male ending year selectivity and growth for JPN\_ERLY\_5



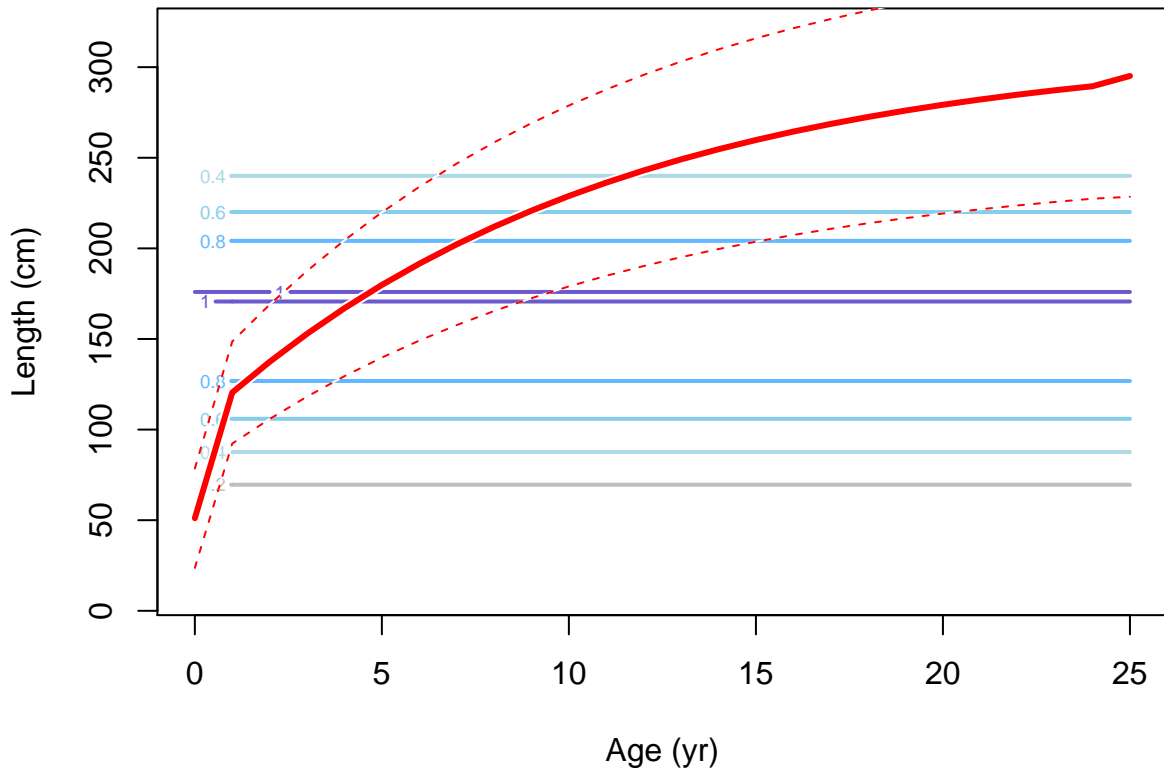
## Female ending year selectivity and growth for JPN\_MID\_6



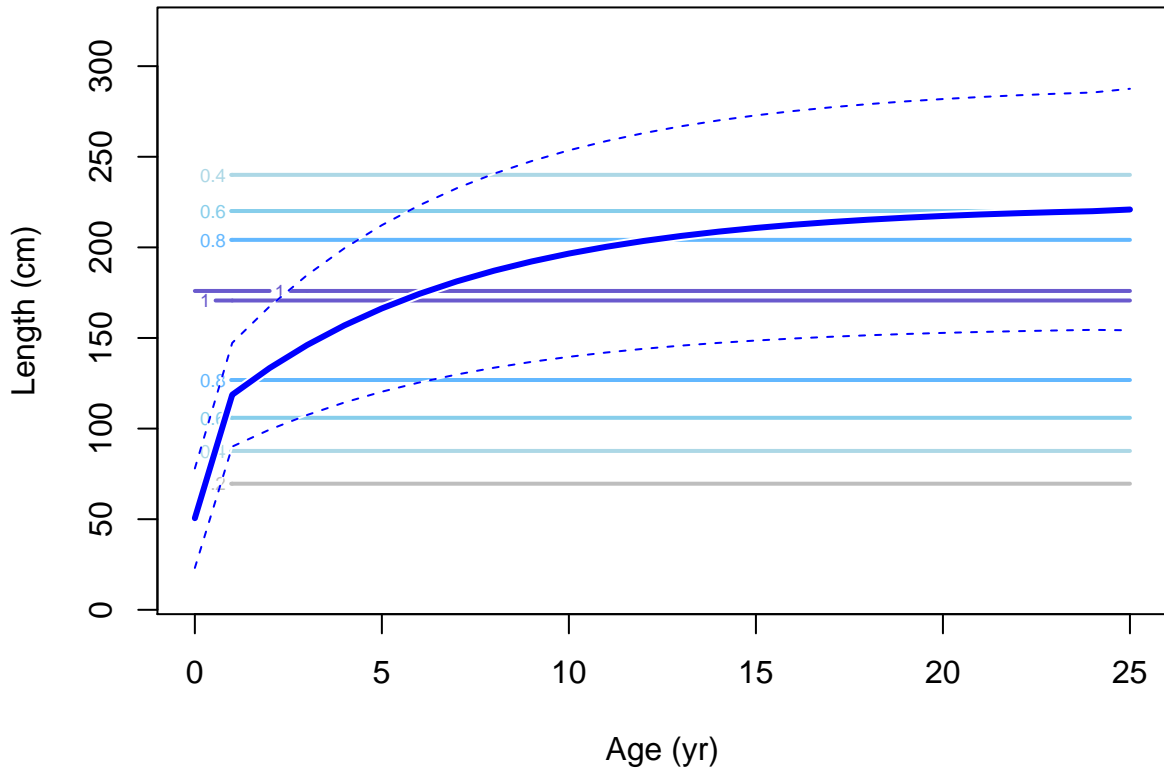
# Male ending year selectivity and growth for JPN\_MID\_6



## Female ending year selectivity and growth for JPN\_LATE\_7

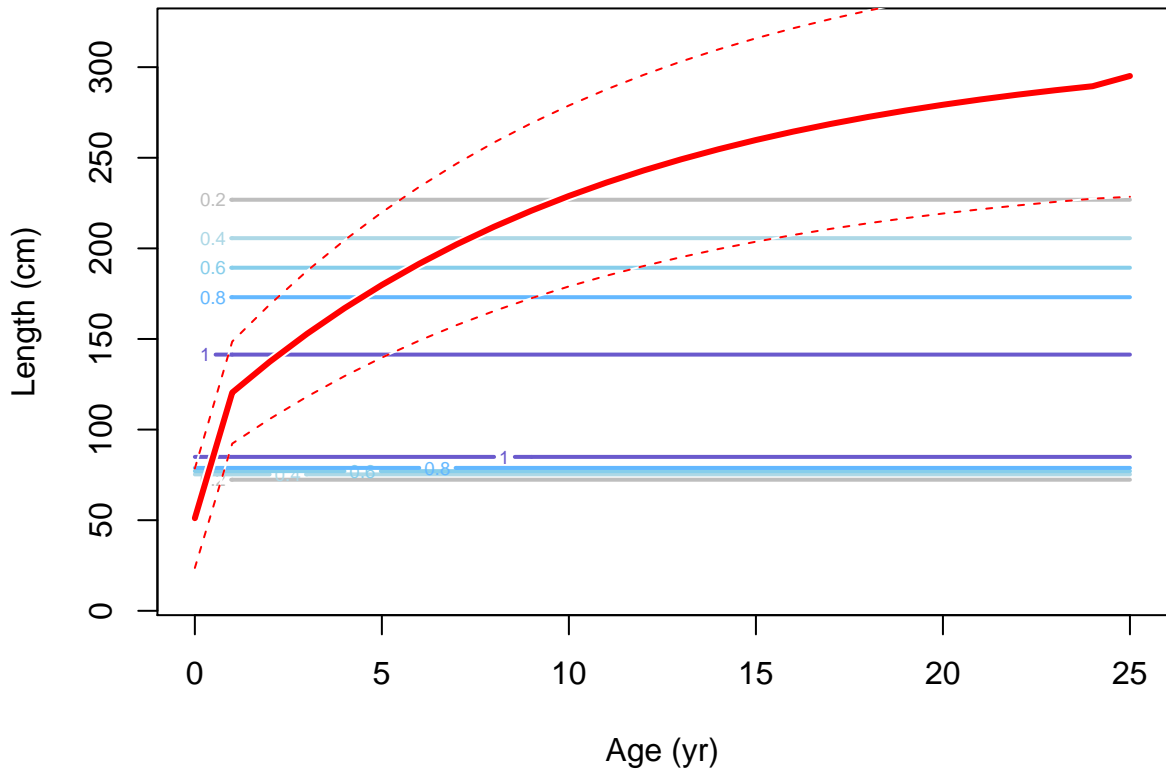


# Male ending year selectivity and growth for JPN\_LATE\_7

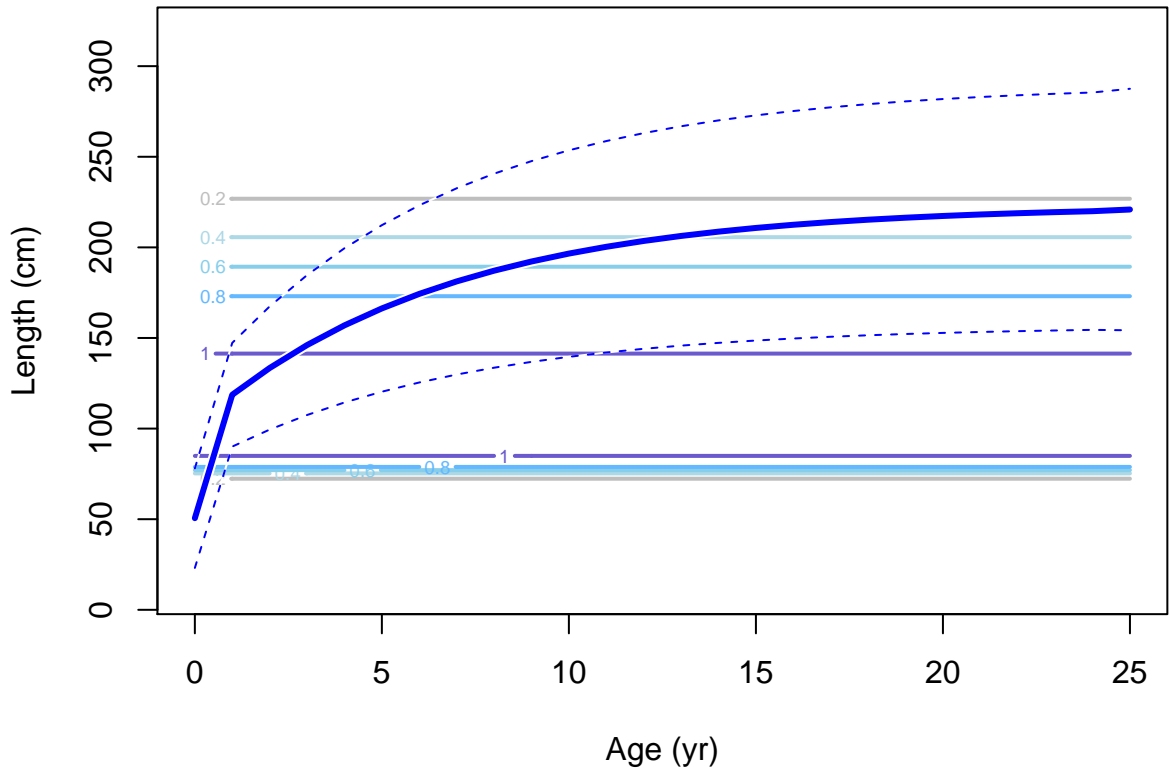




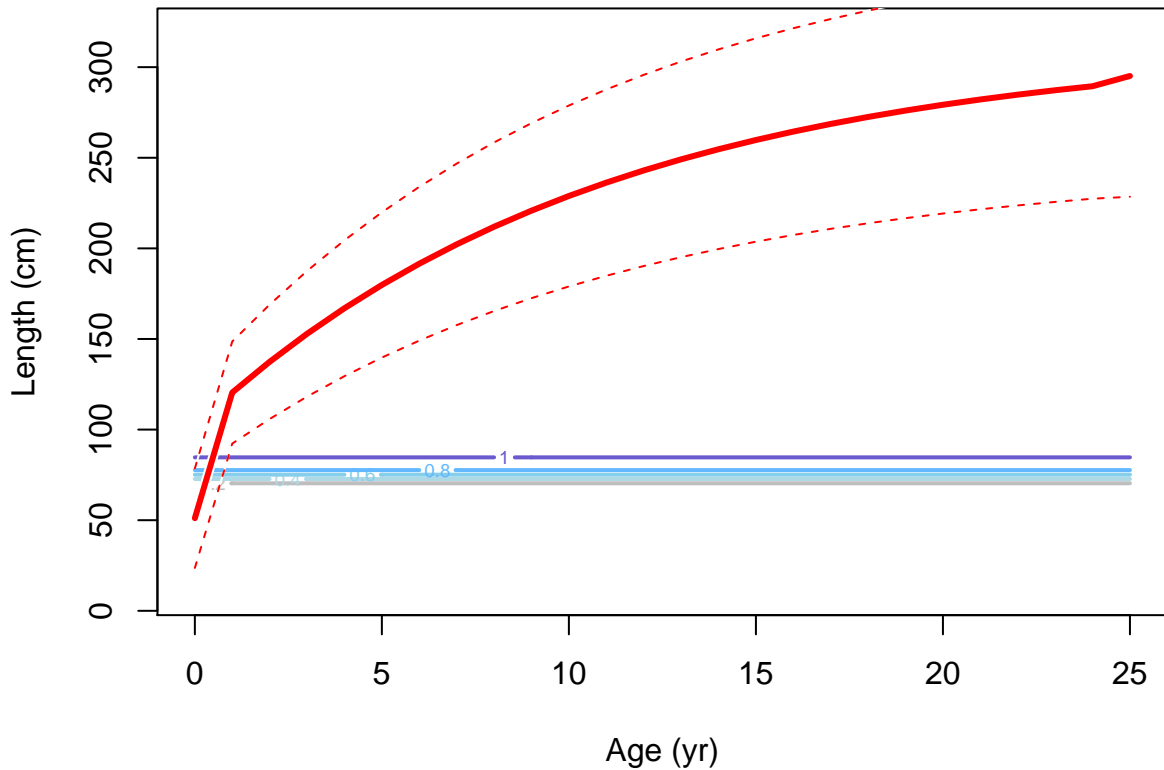
Female ending year selectivity and growth for PORT\_8



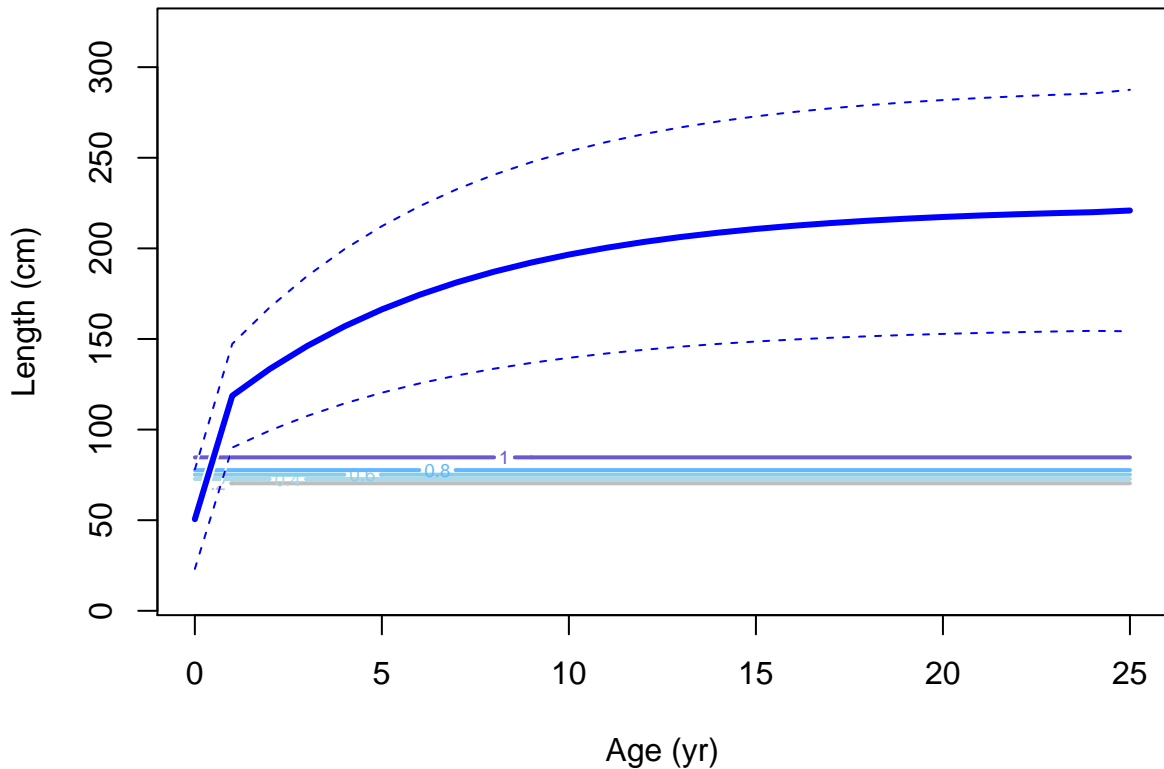
# Male ending year selectivity and growth for PORT\_8



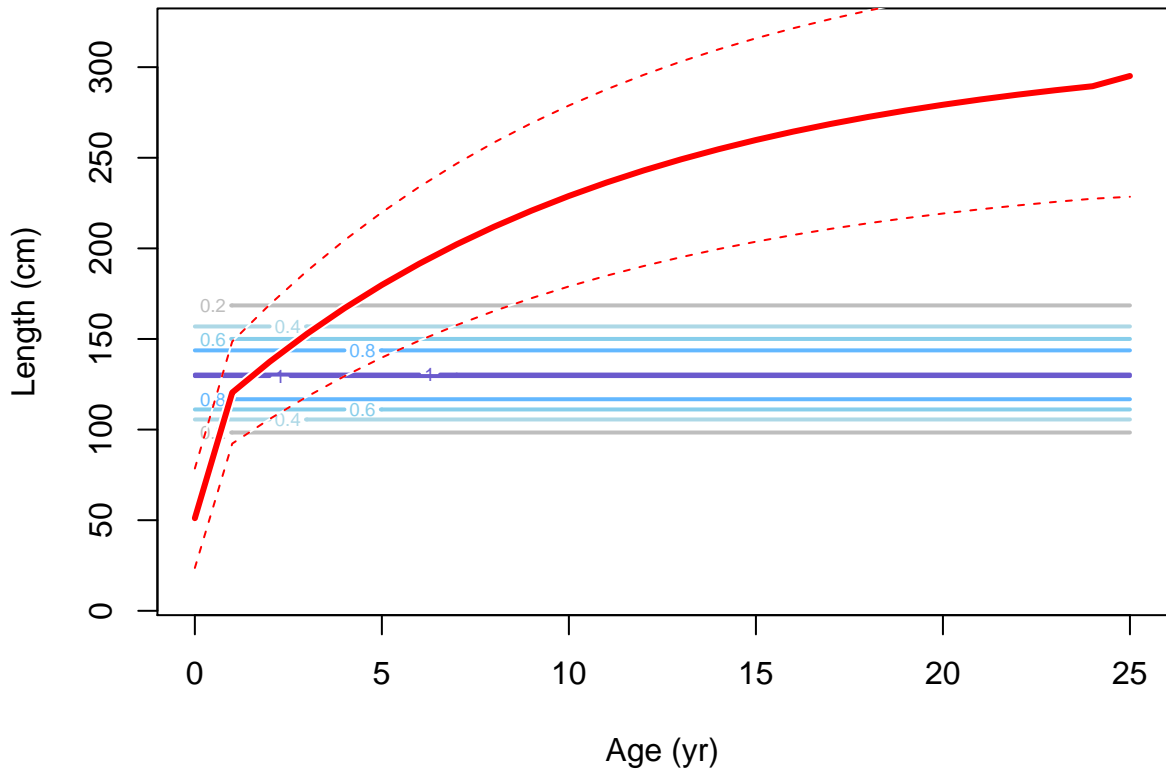
## Female ending year selectivity and growth for CHIN-TAI\_9



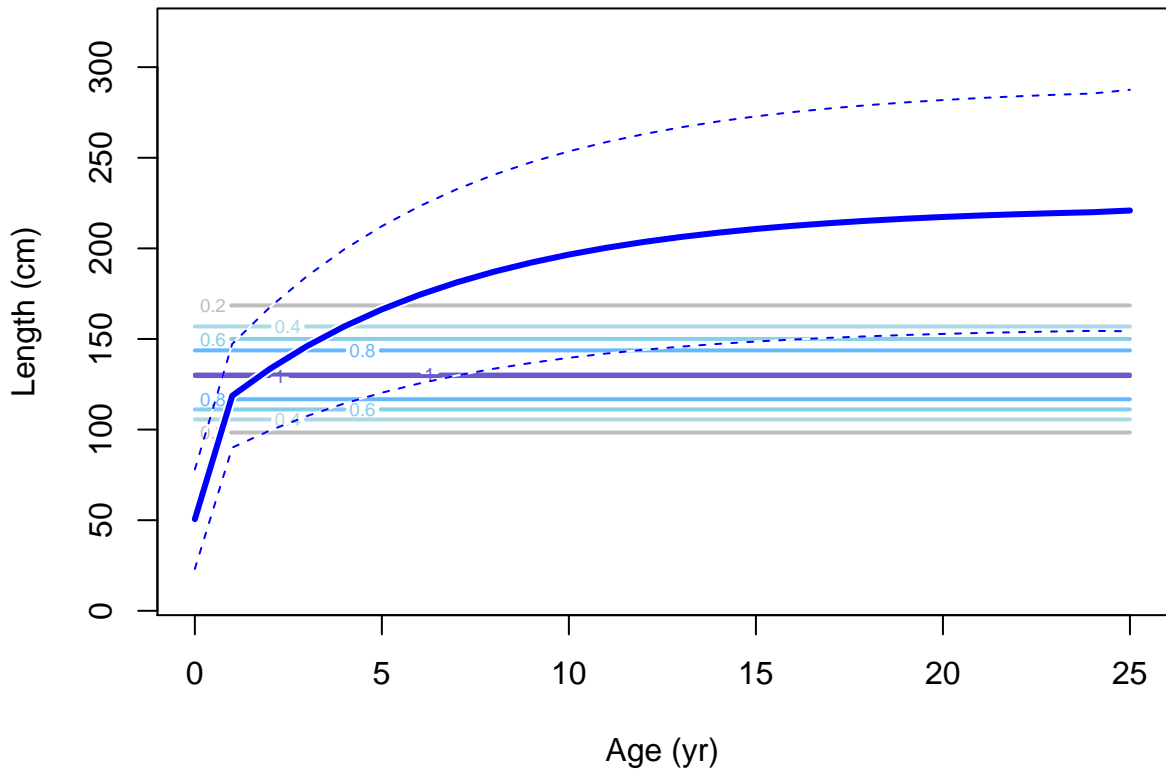
# Male ending year selectivity and growth for CHIN-TAI\_9



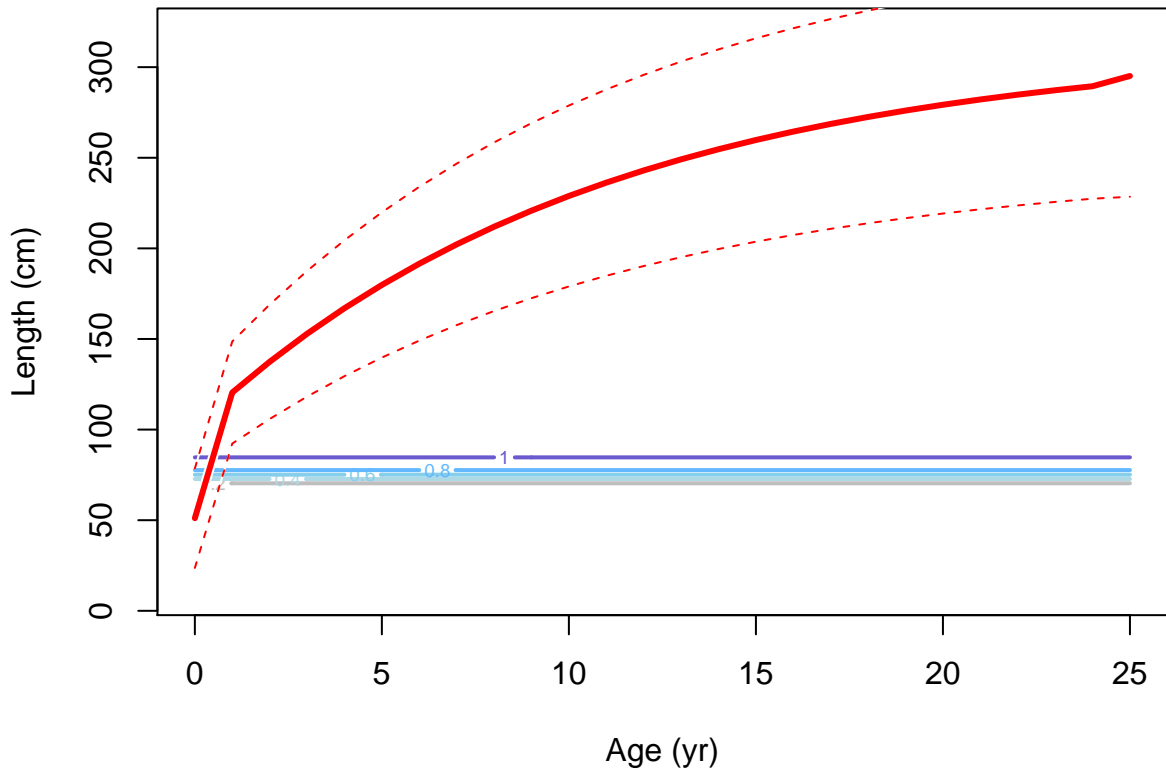
## Female ending year selectivity and growth for MOR\_10



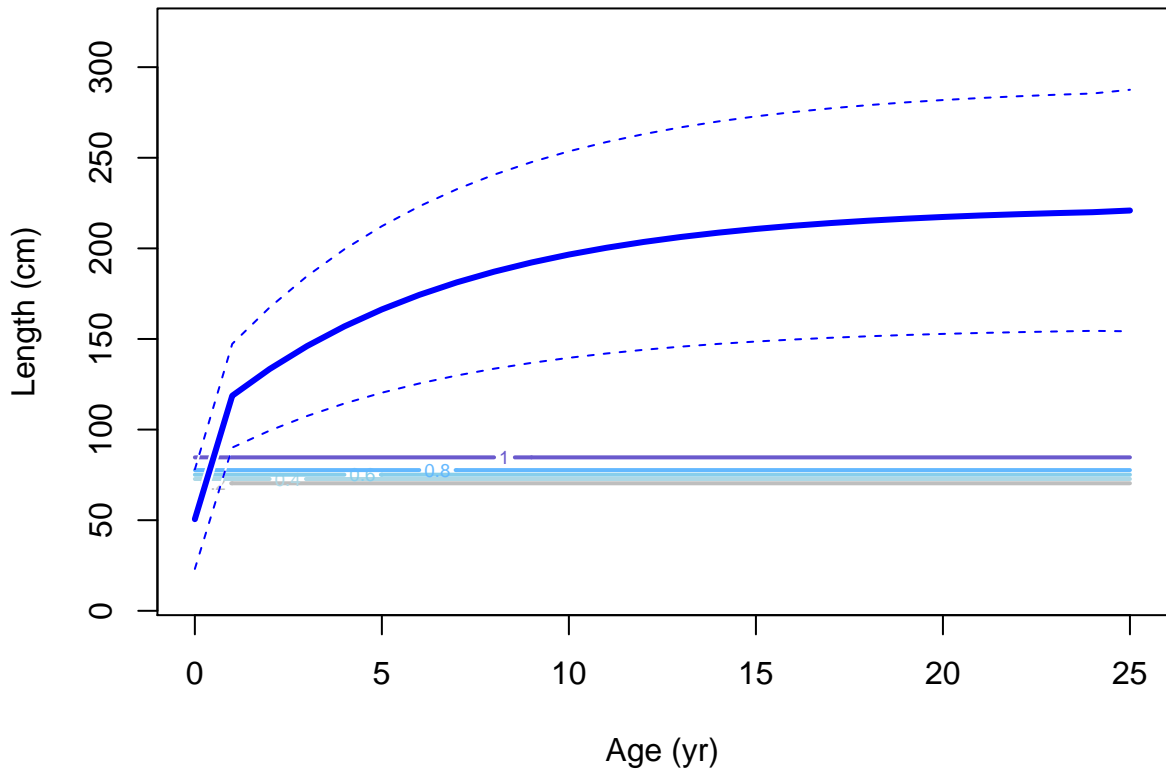
# Male ending year selectivity and growth for MOR\_10



## Female ending year selectivity and growth for OTH\_11

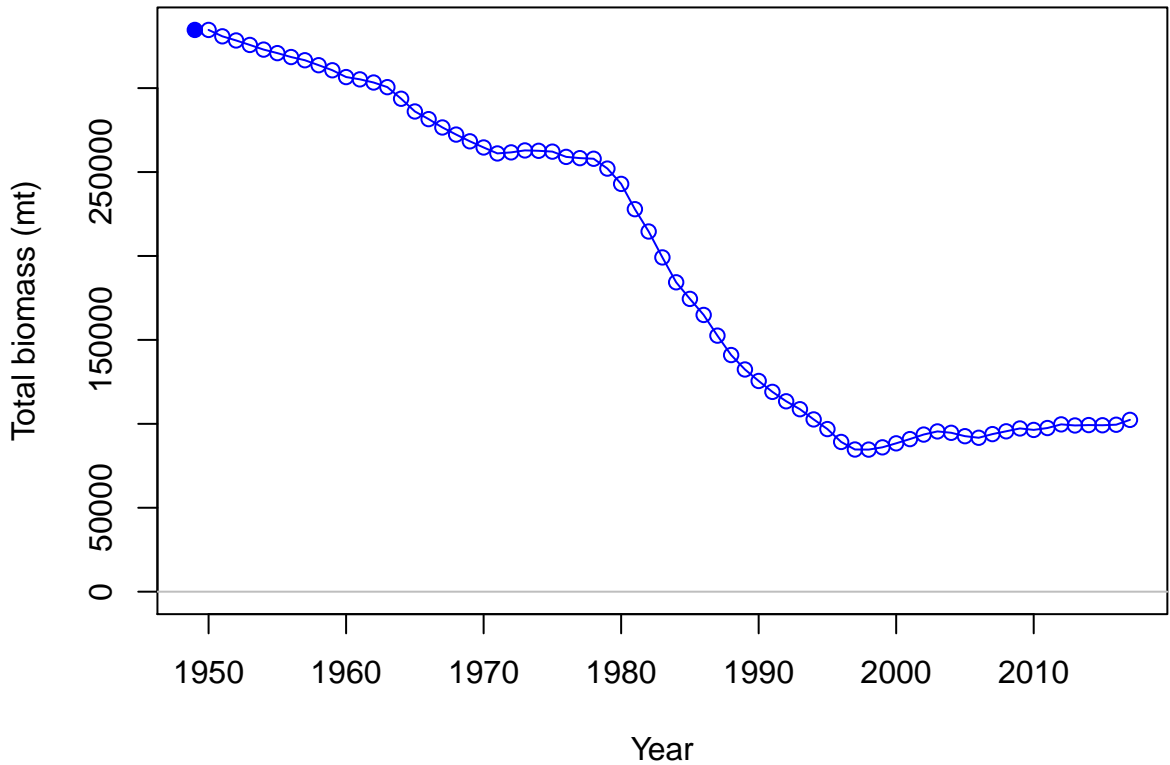


# Male ending year selectivity and growth for OTH\_11

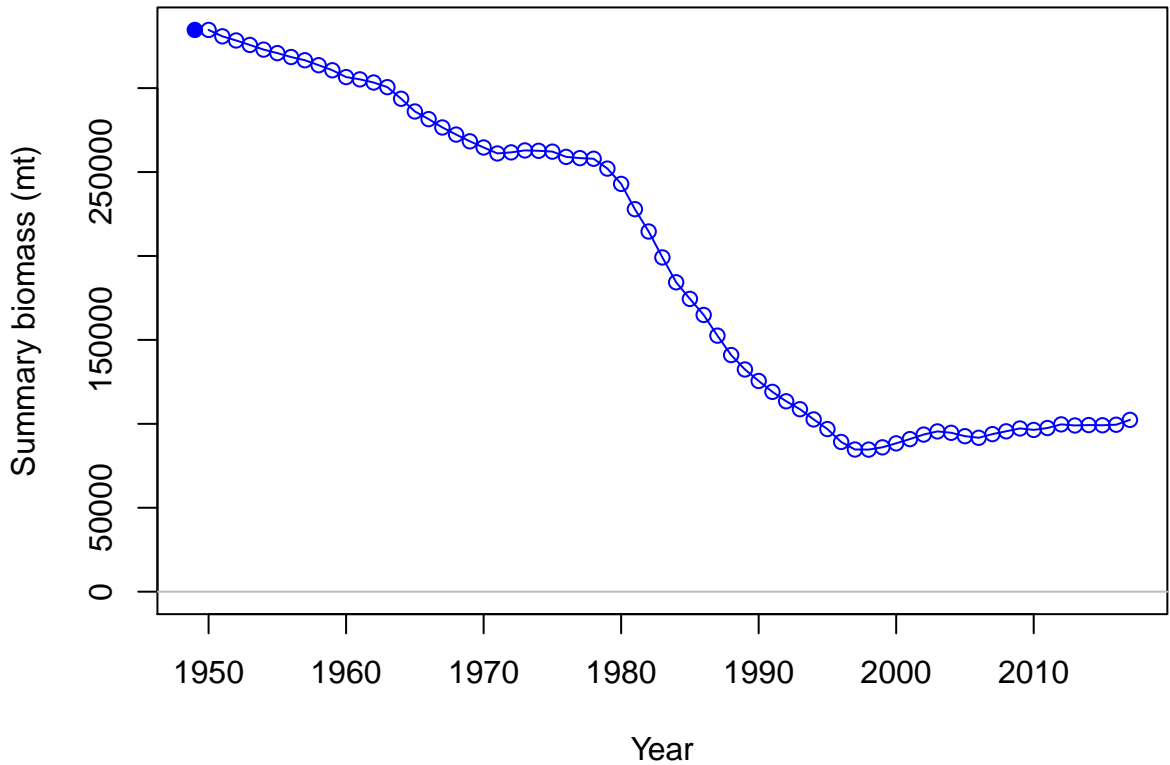




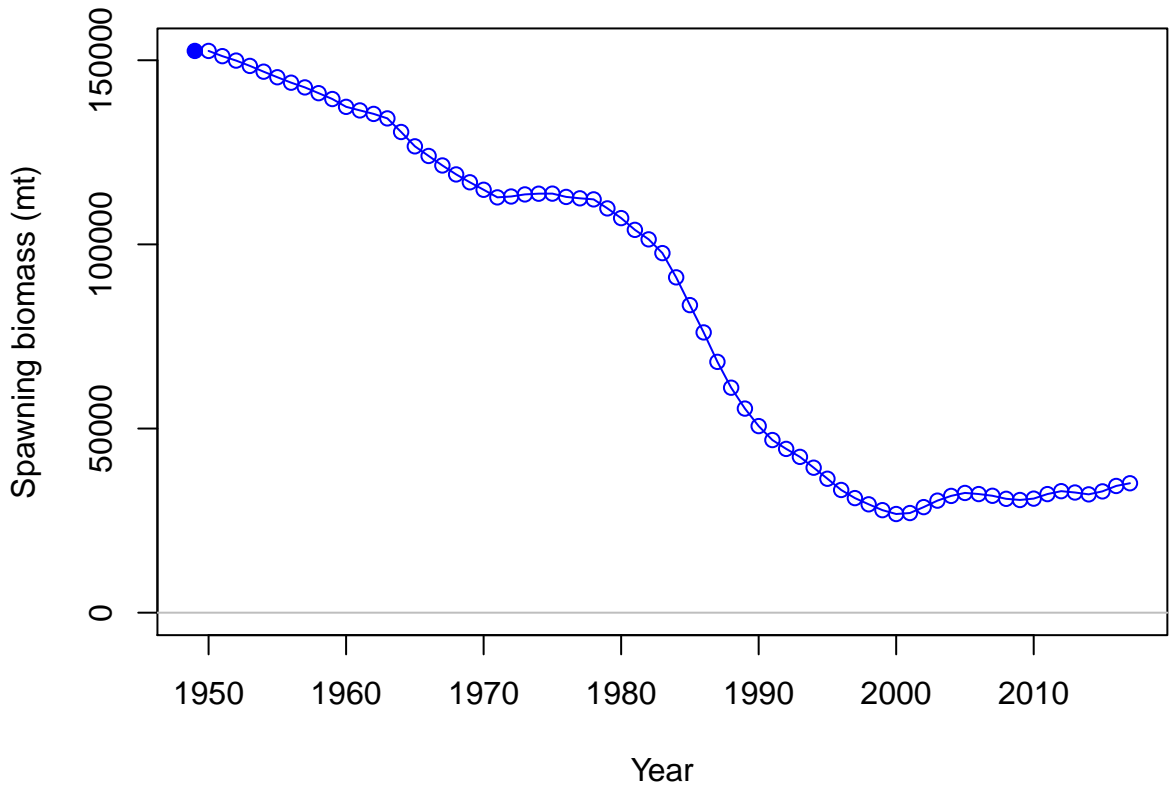
# Total biomass (mt)



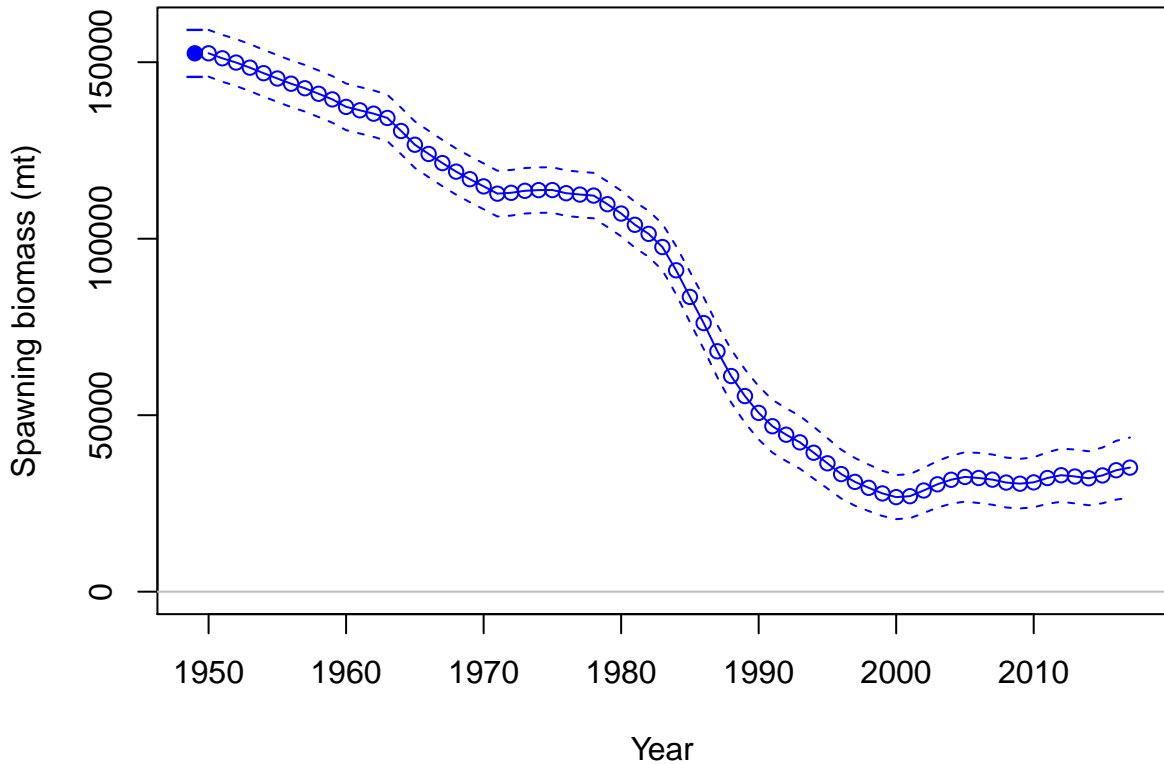
## Summary biomass (mt)



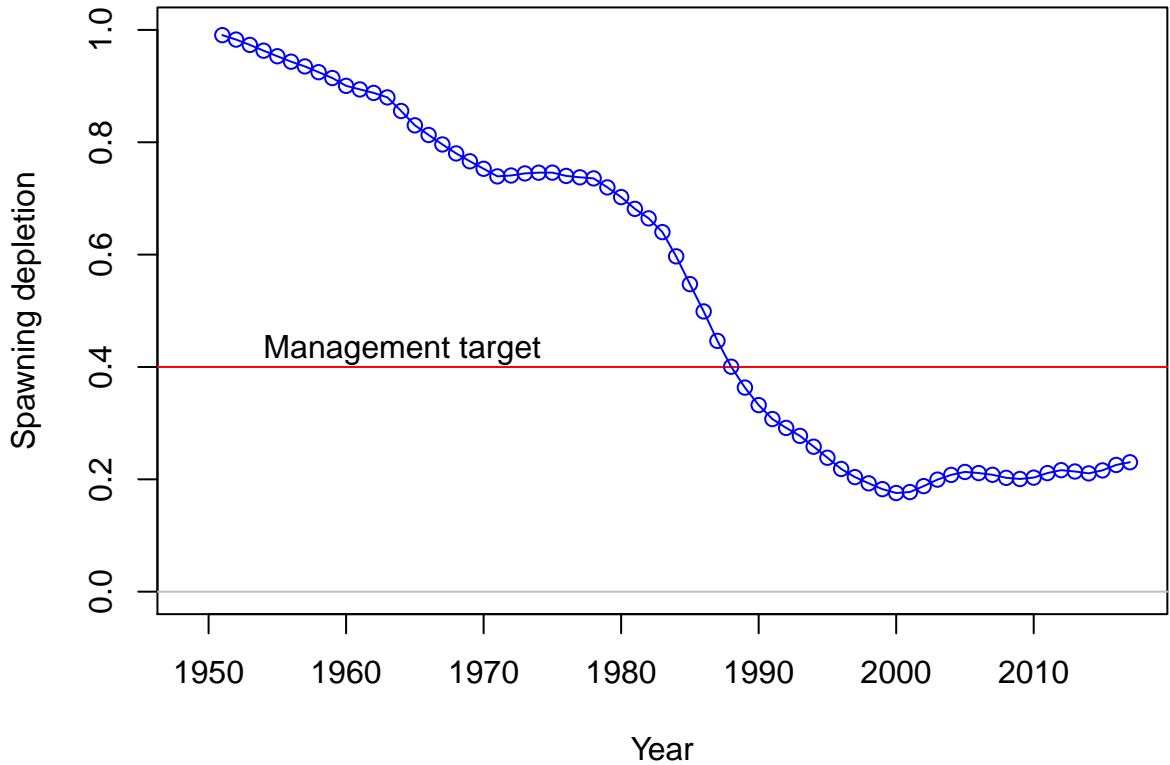
## Spawning biomass (mt)



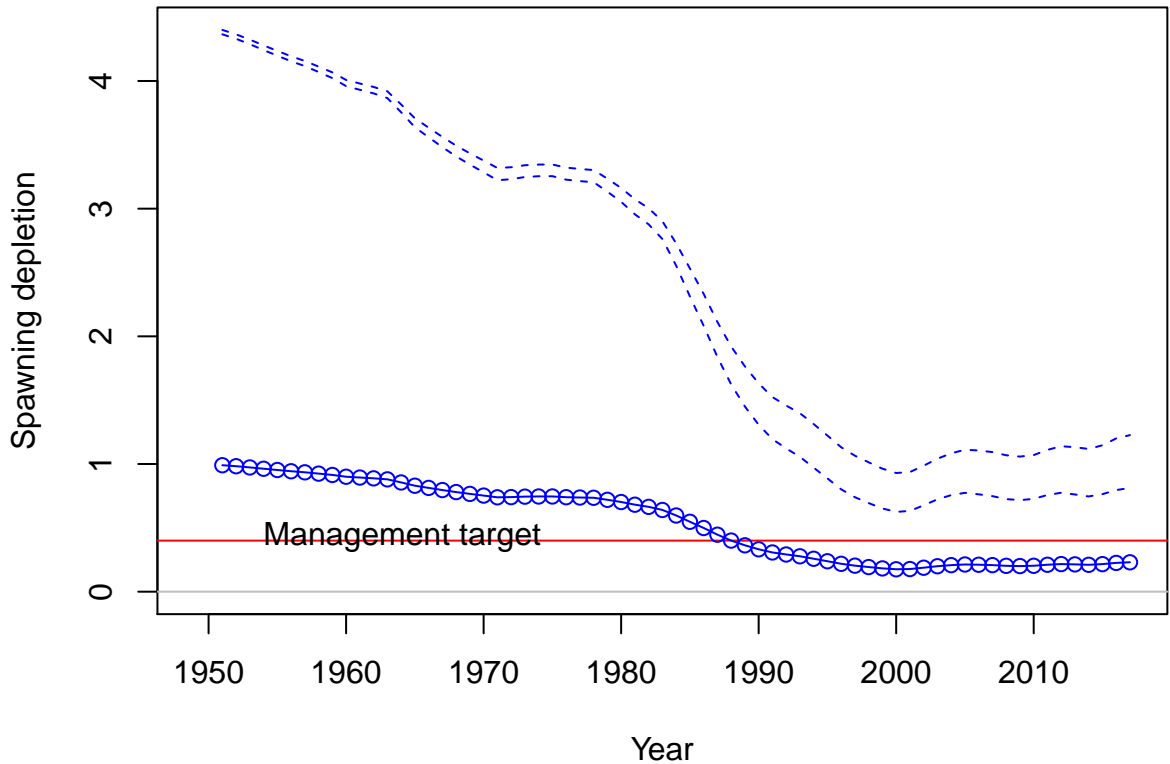
# Spawning biomass (mt) with ~95% asymptotic intervals



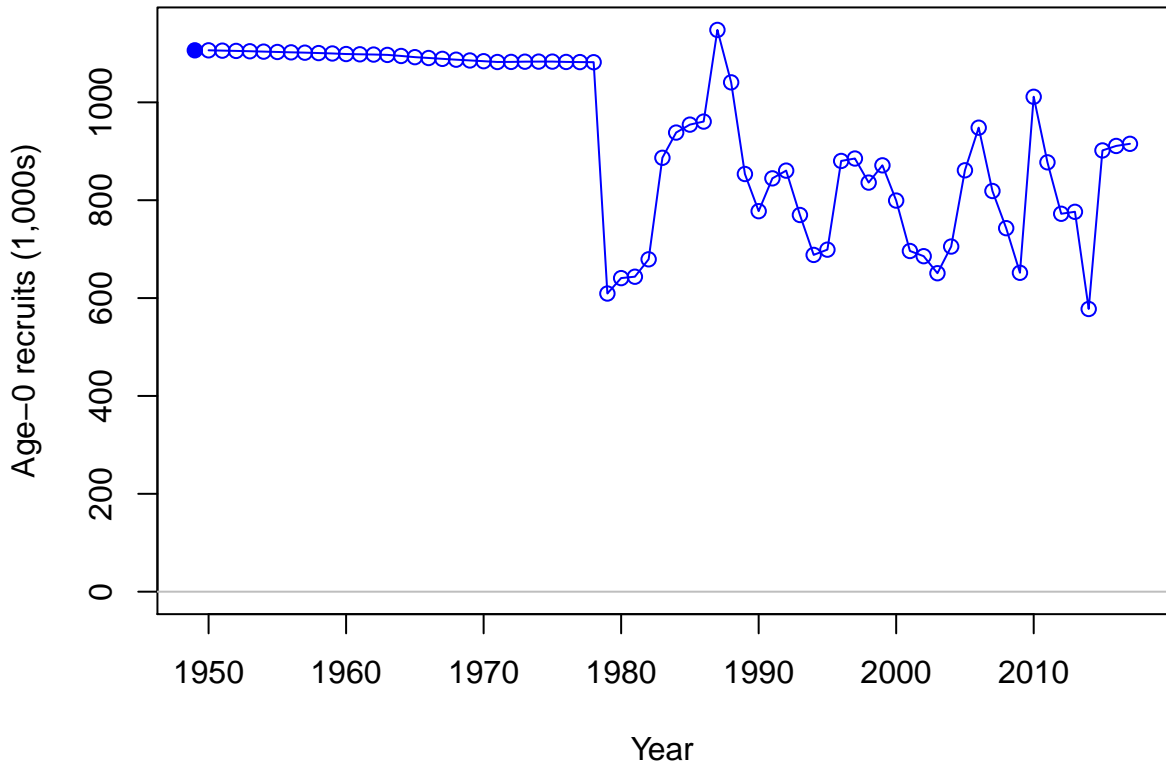
# Spawning depletion



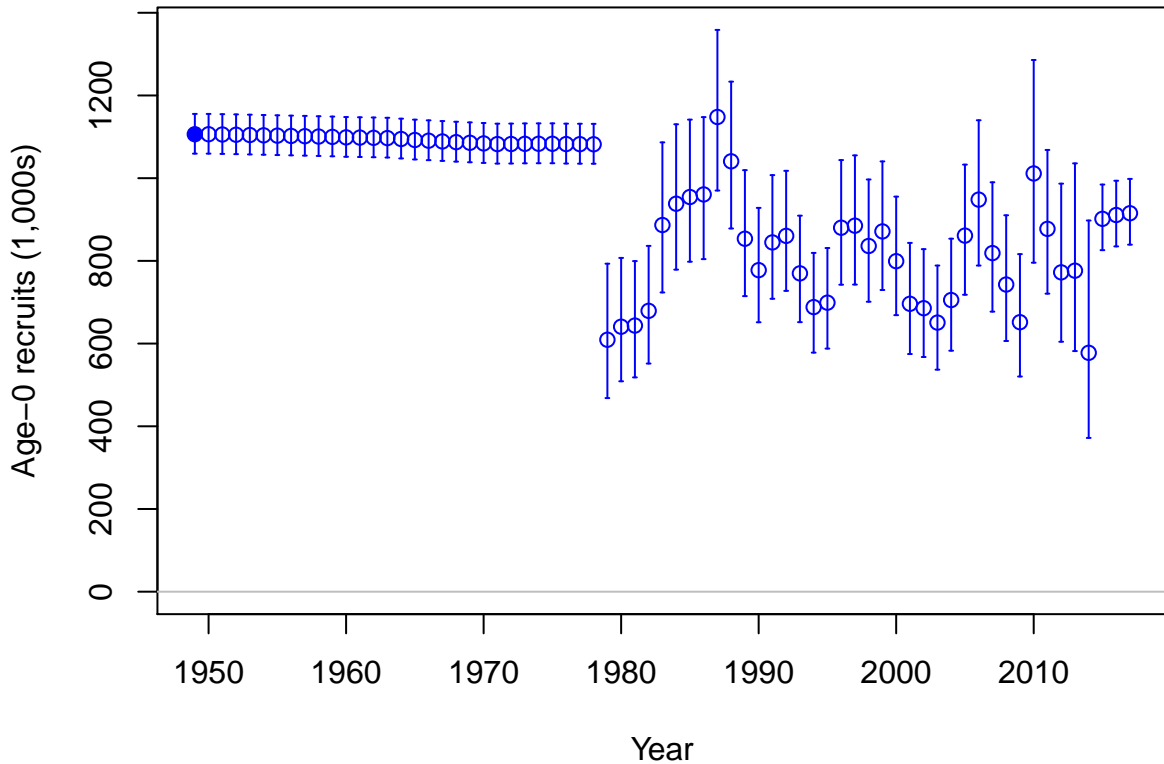
## Spawning depletion with ~95% asymptotic intervals



### Age-0 recruits (1,000s)

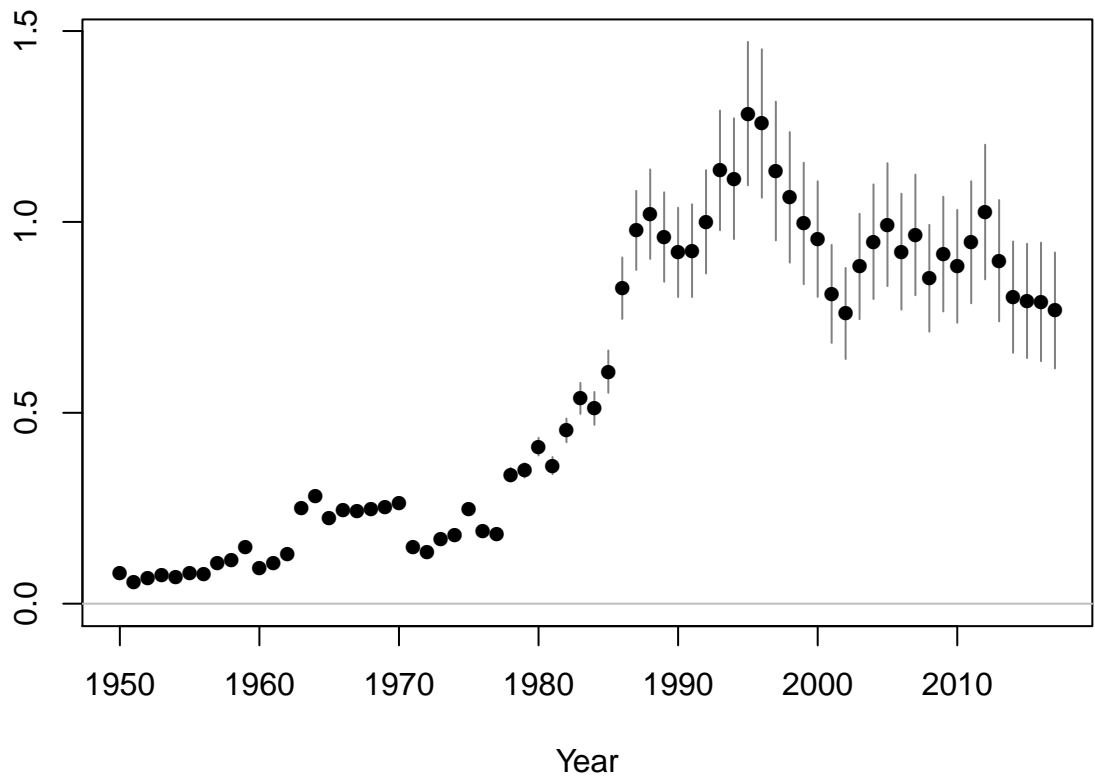


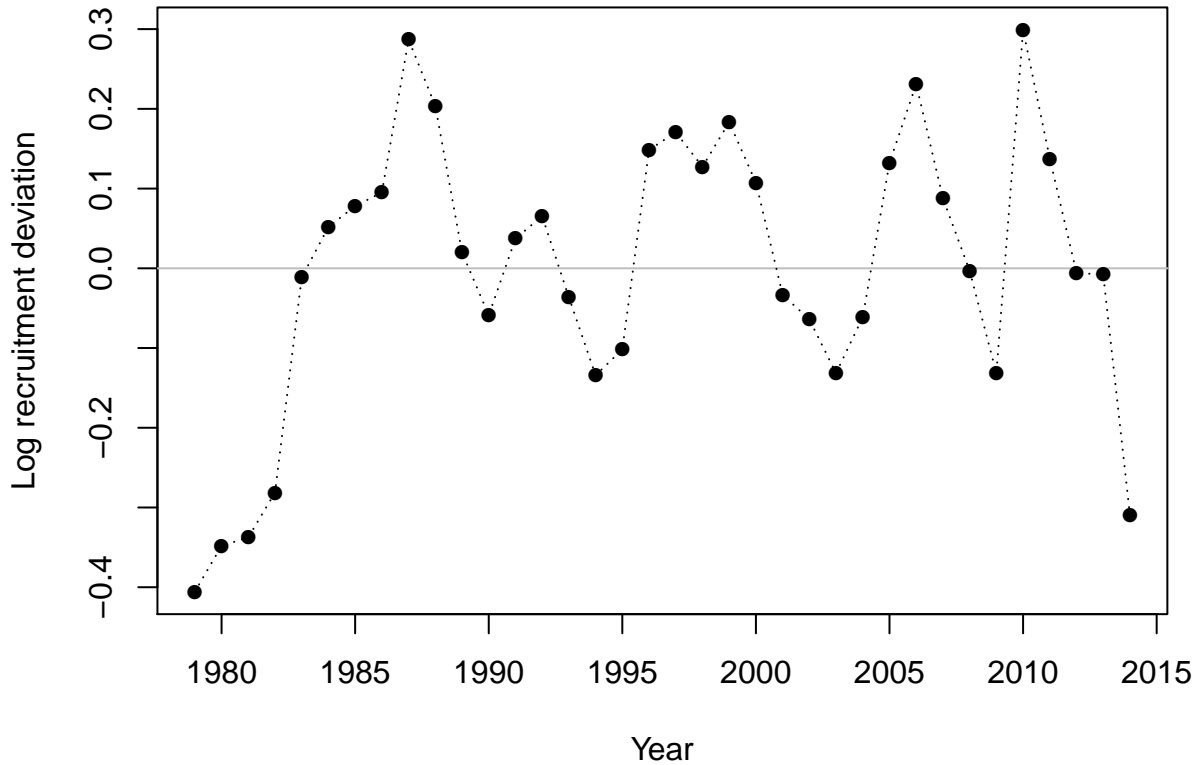
# Age-0 recruits (1,000s) with ~95% asymptotic intervals

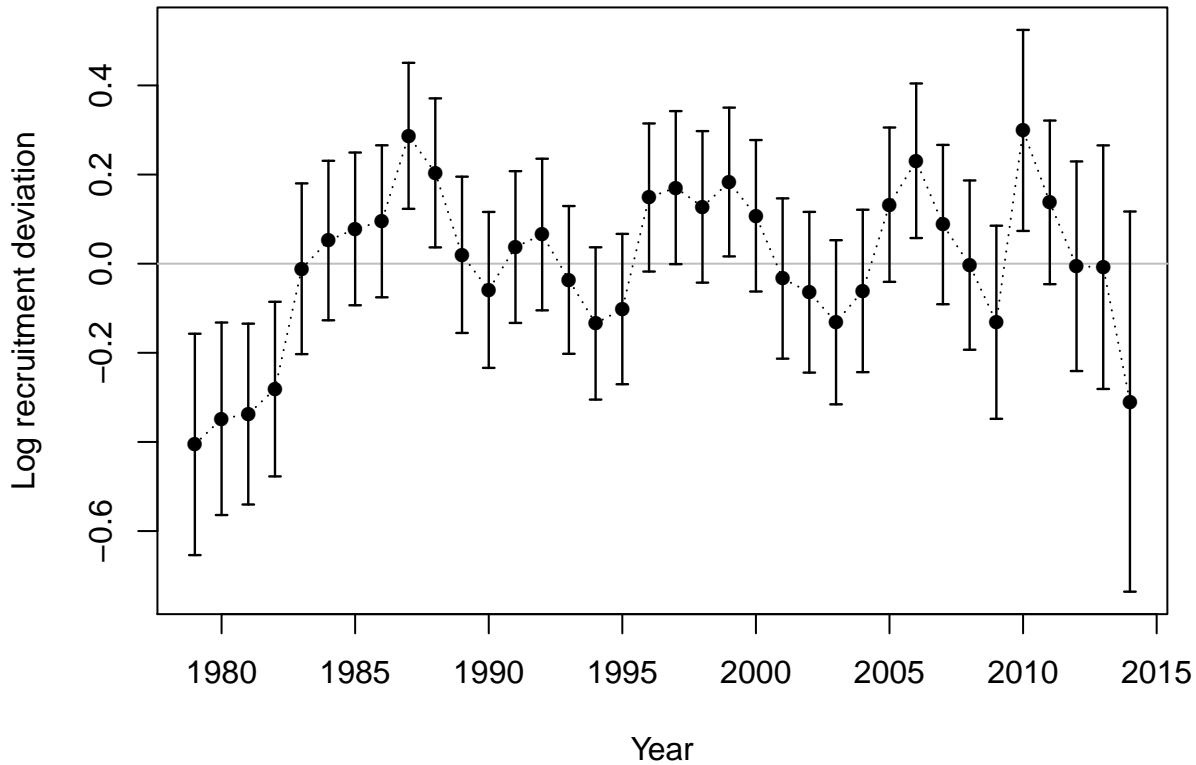




Summary Fishing Mortality

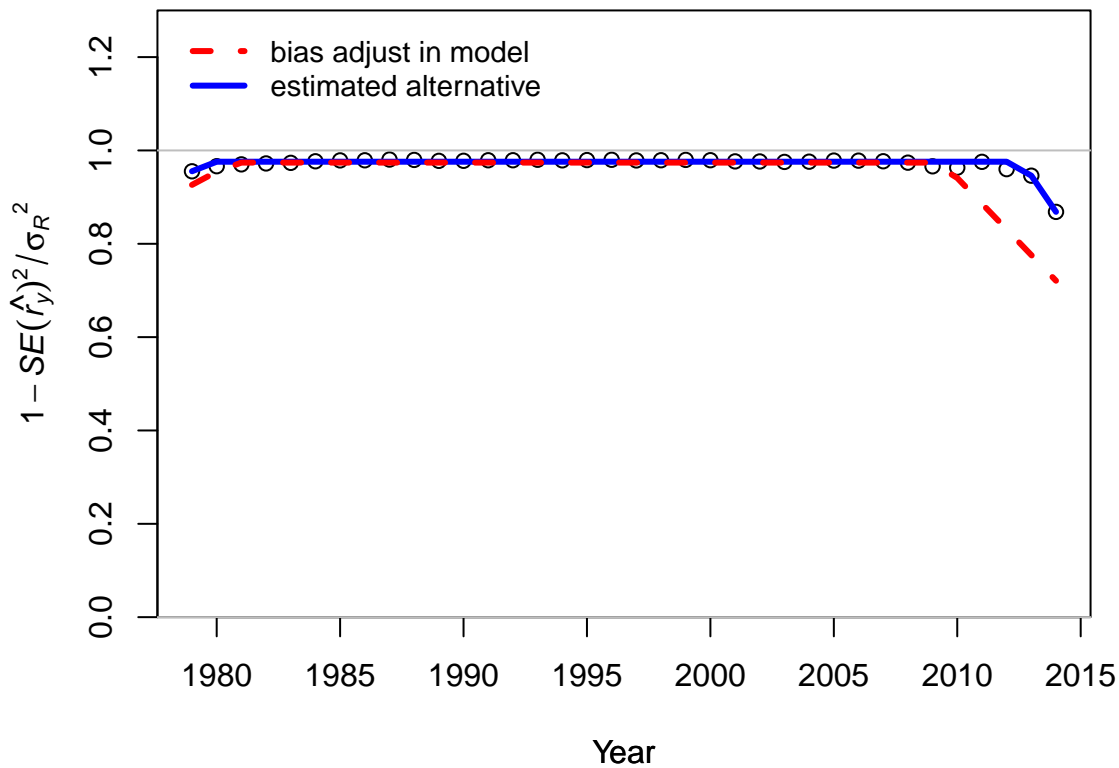


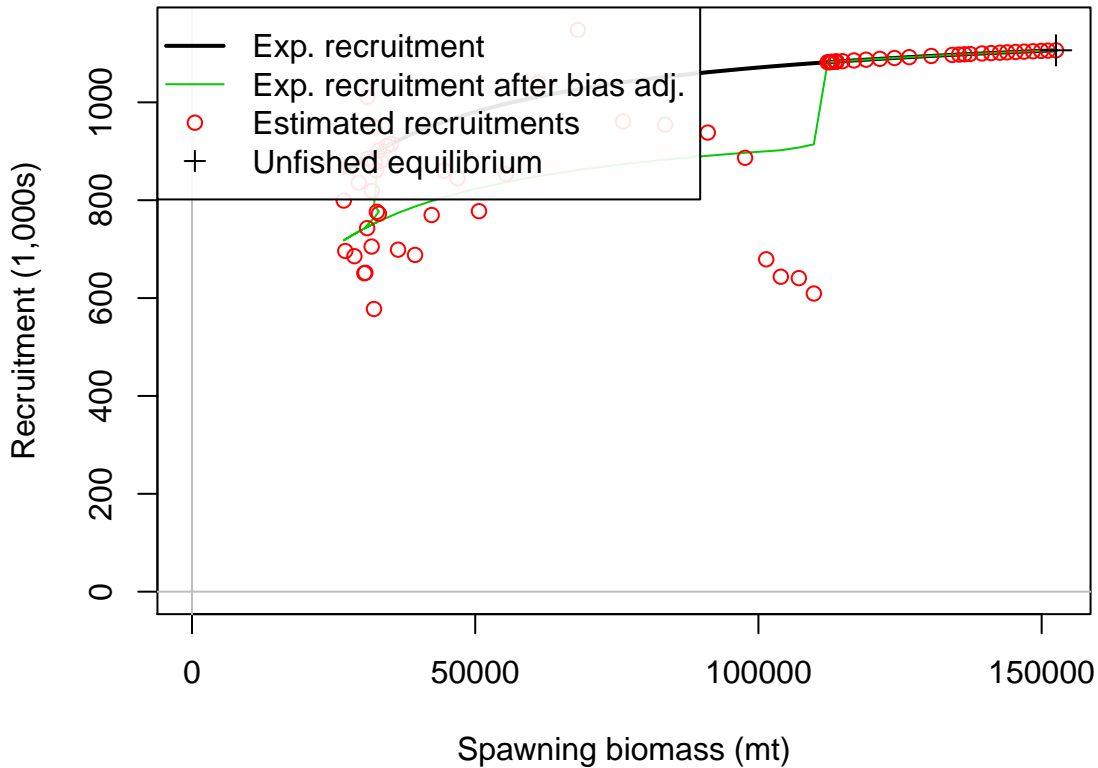


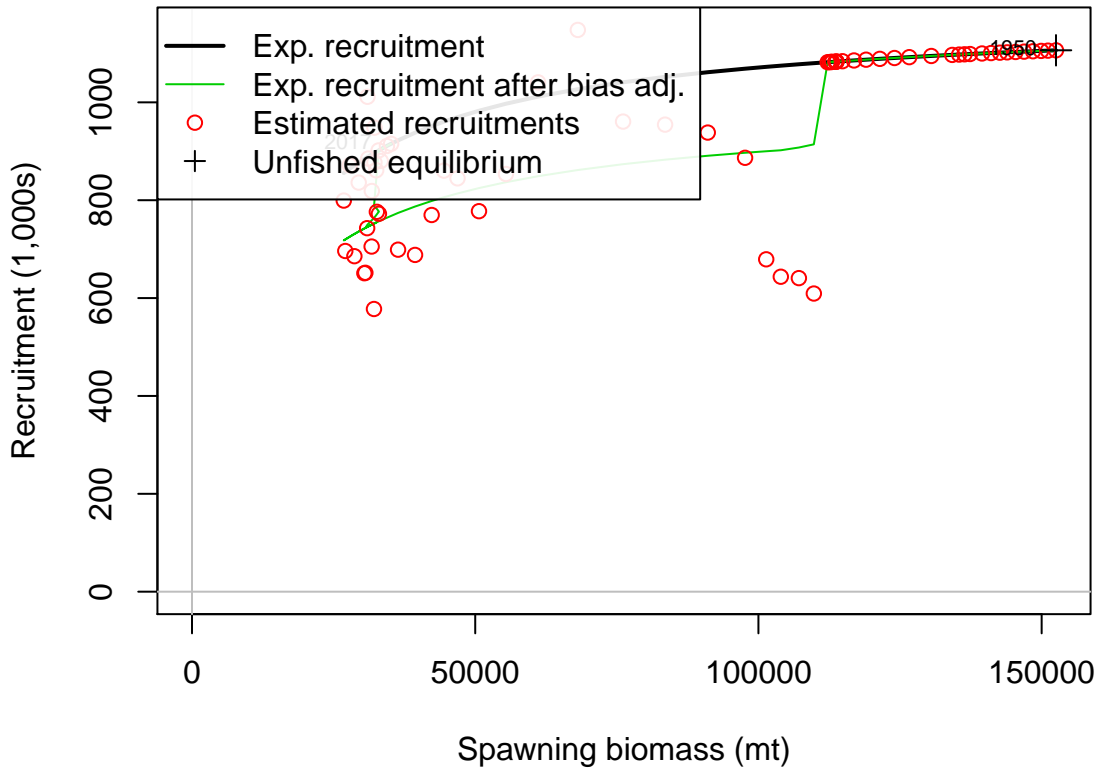


# Recruitment deviation variance





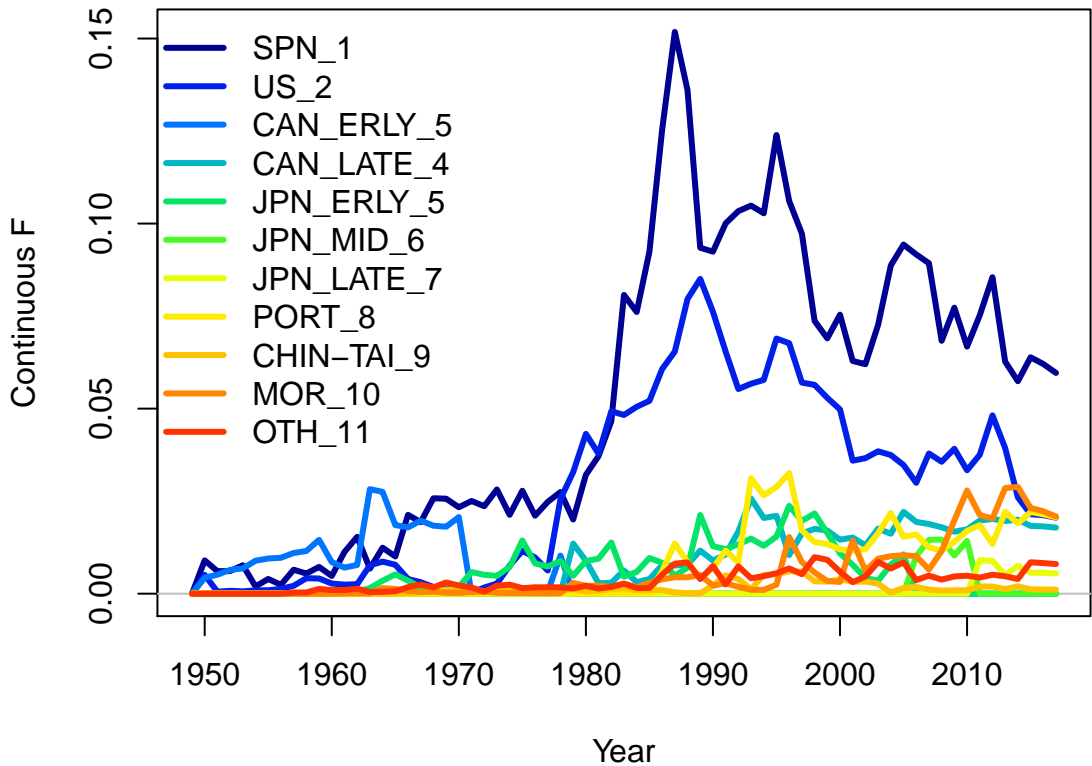


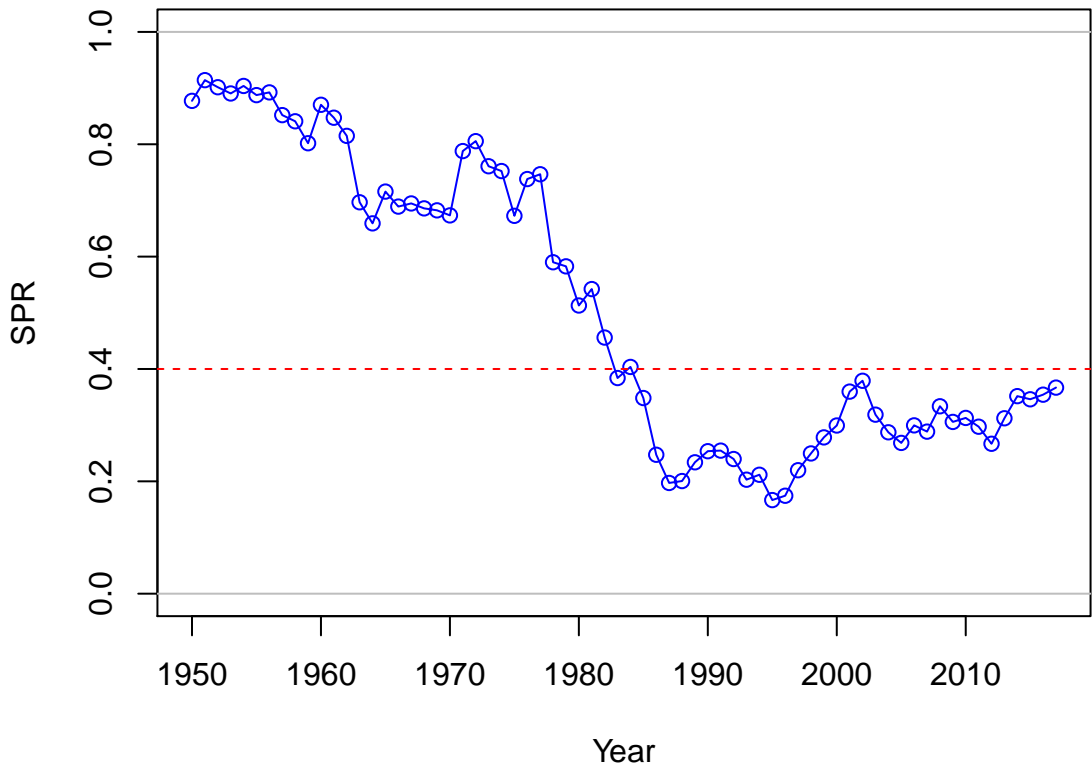


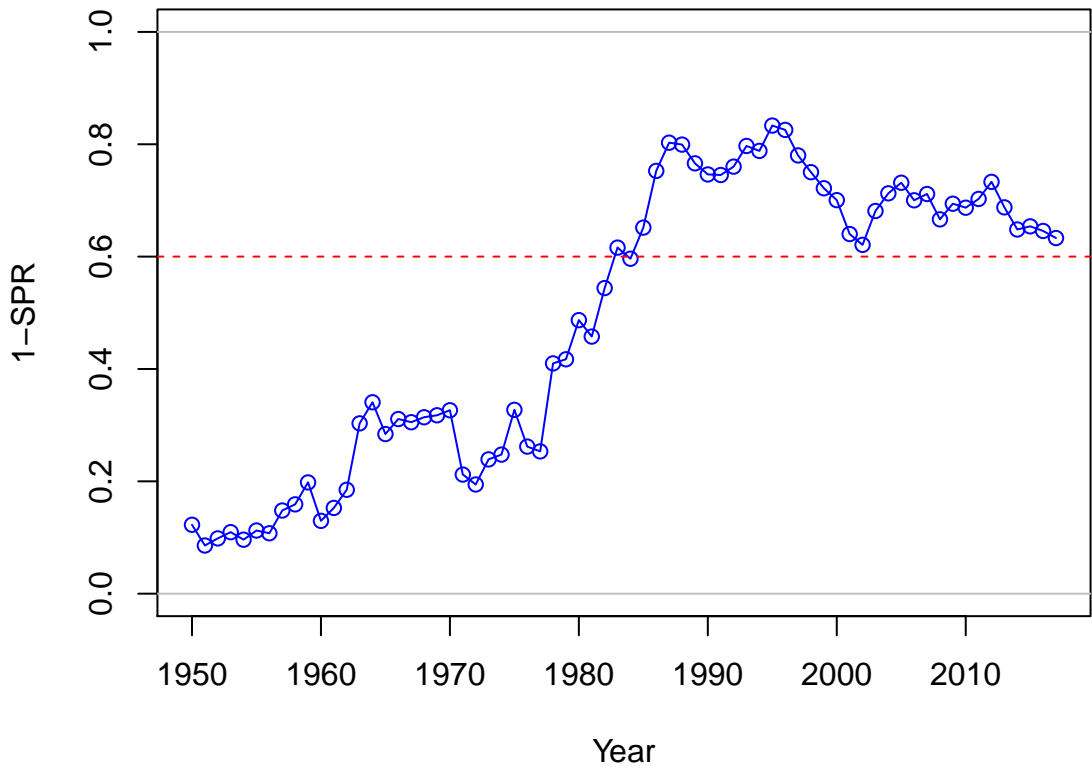


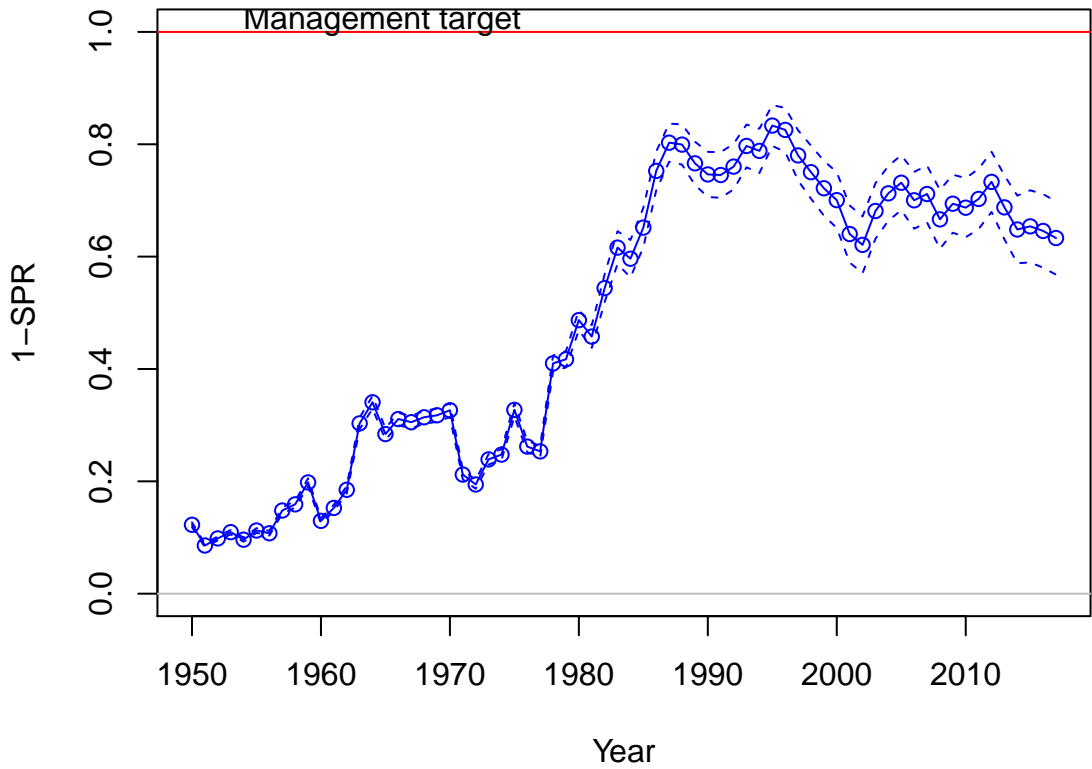


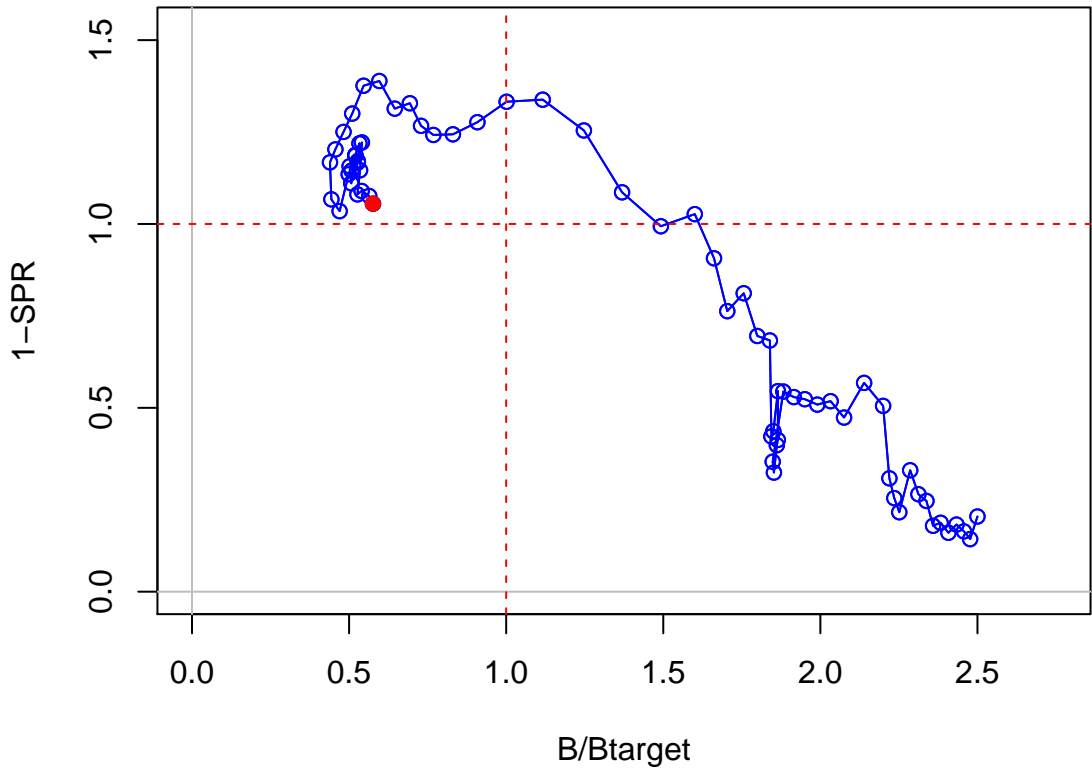




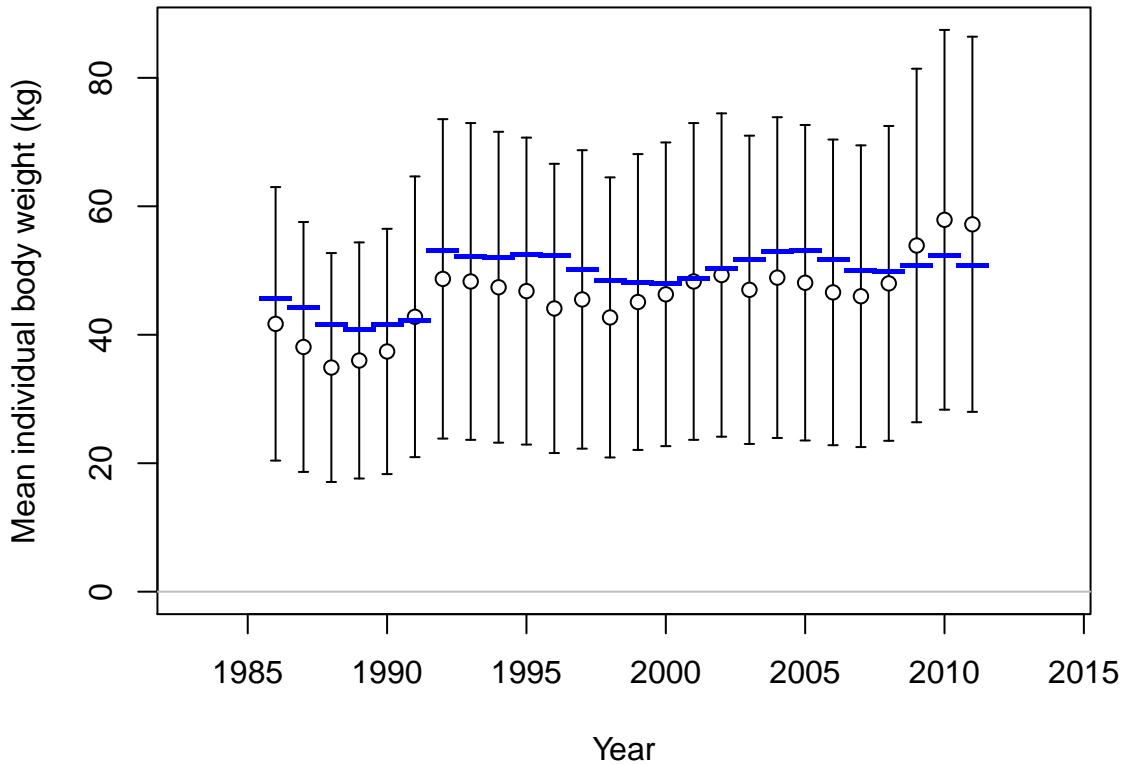




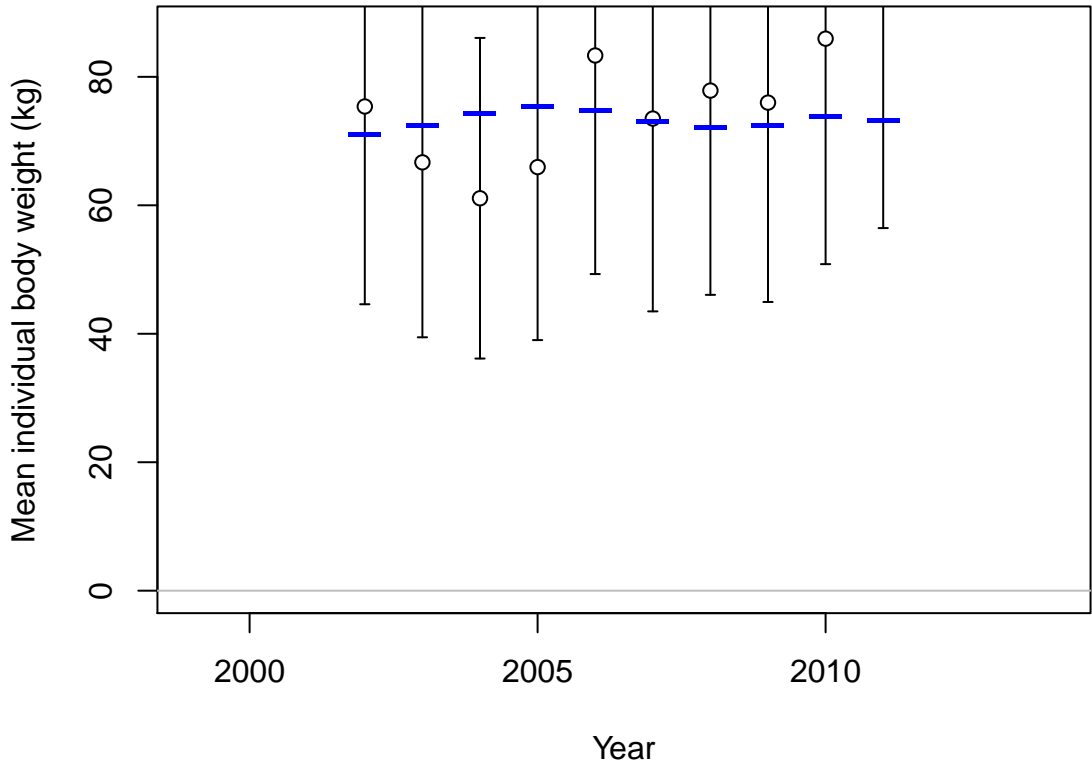




## Mean weight in retained catch for US\_2

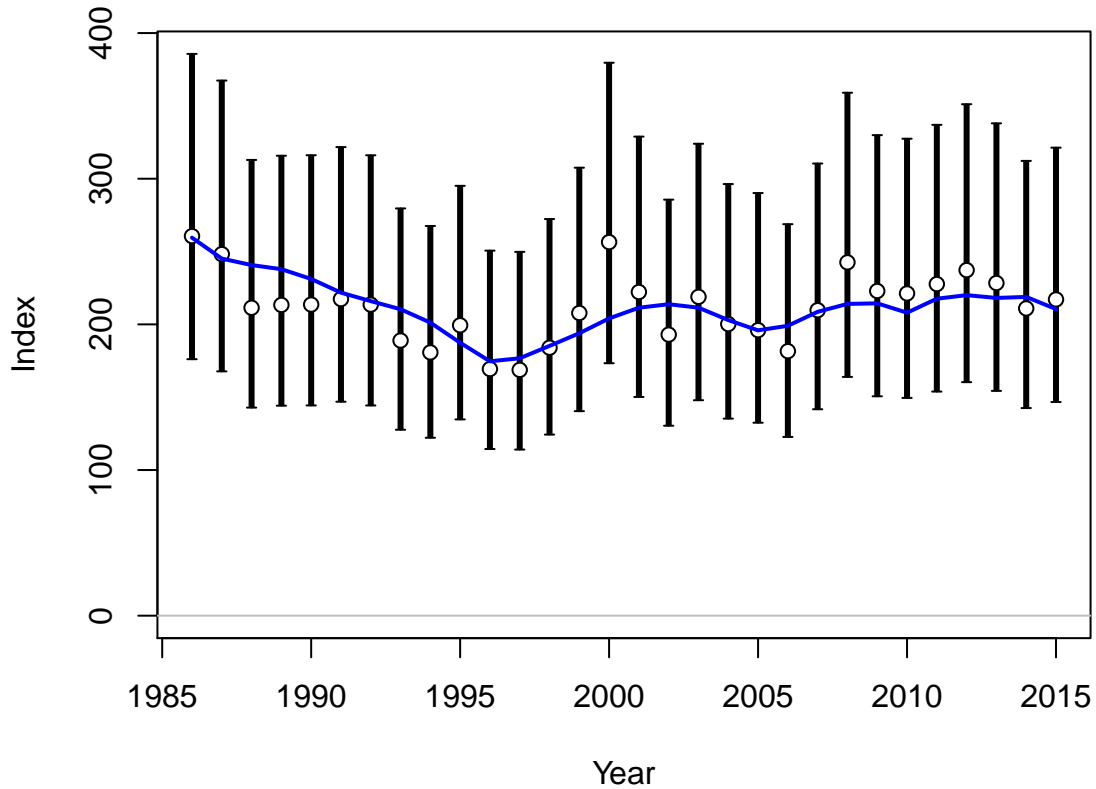


## Mean weight in retained catch for CAN\_LATE\_4

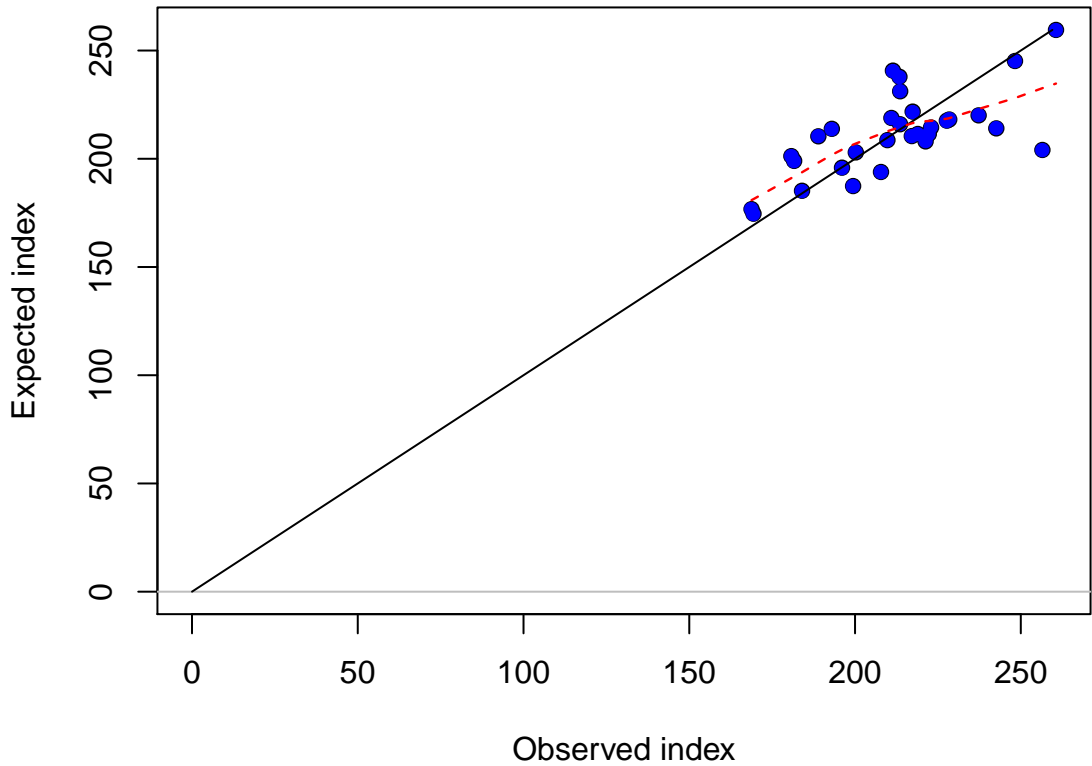




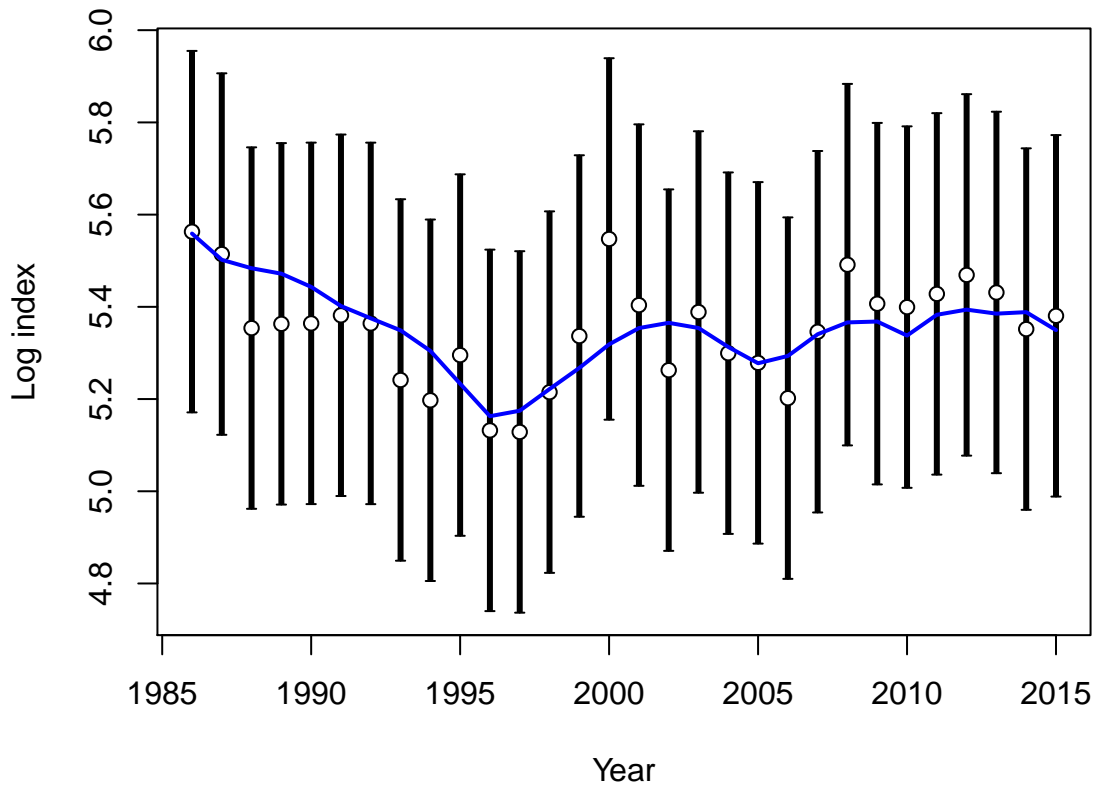
# Index SPN\_1



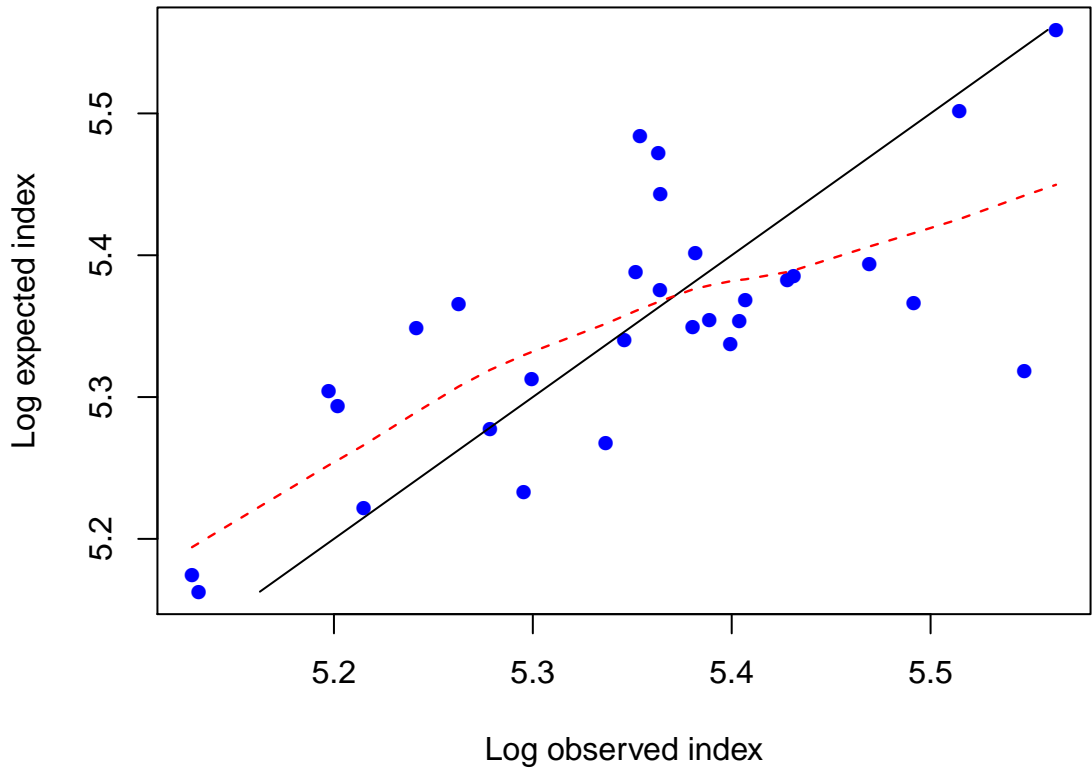
# Index SPN\_1



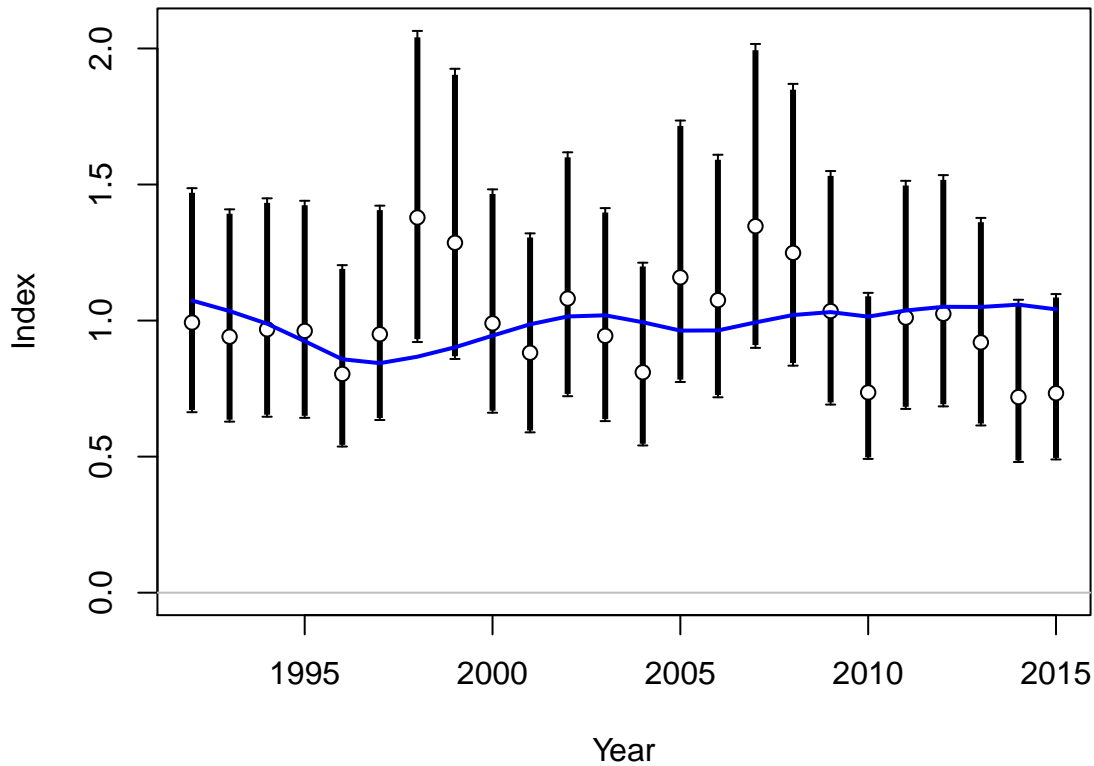
# Log index SPN\_1



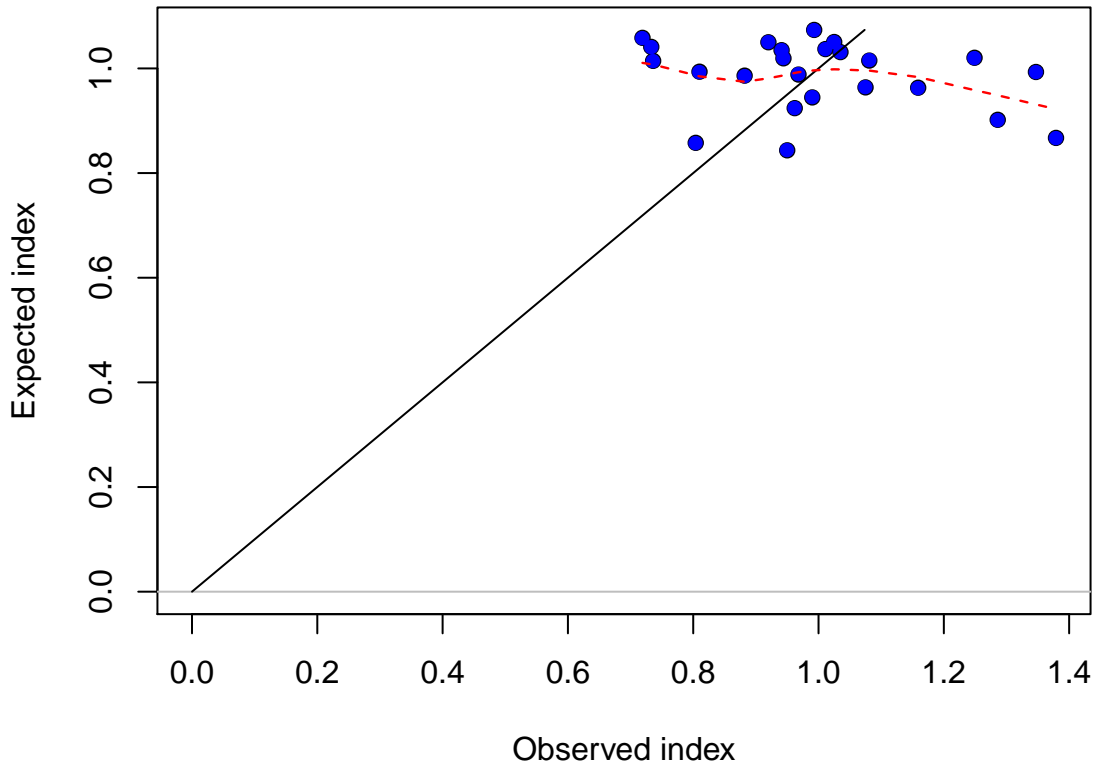
Log index SPN\_1



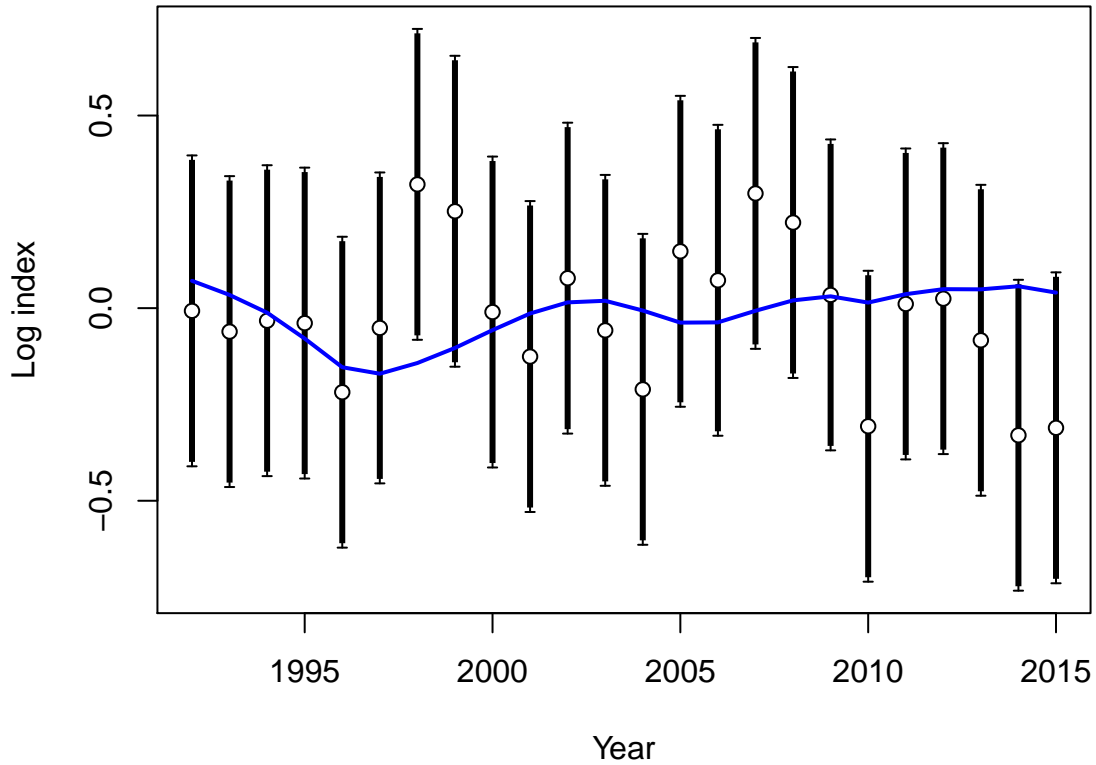
Index US\_2



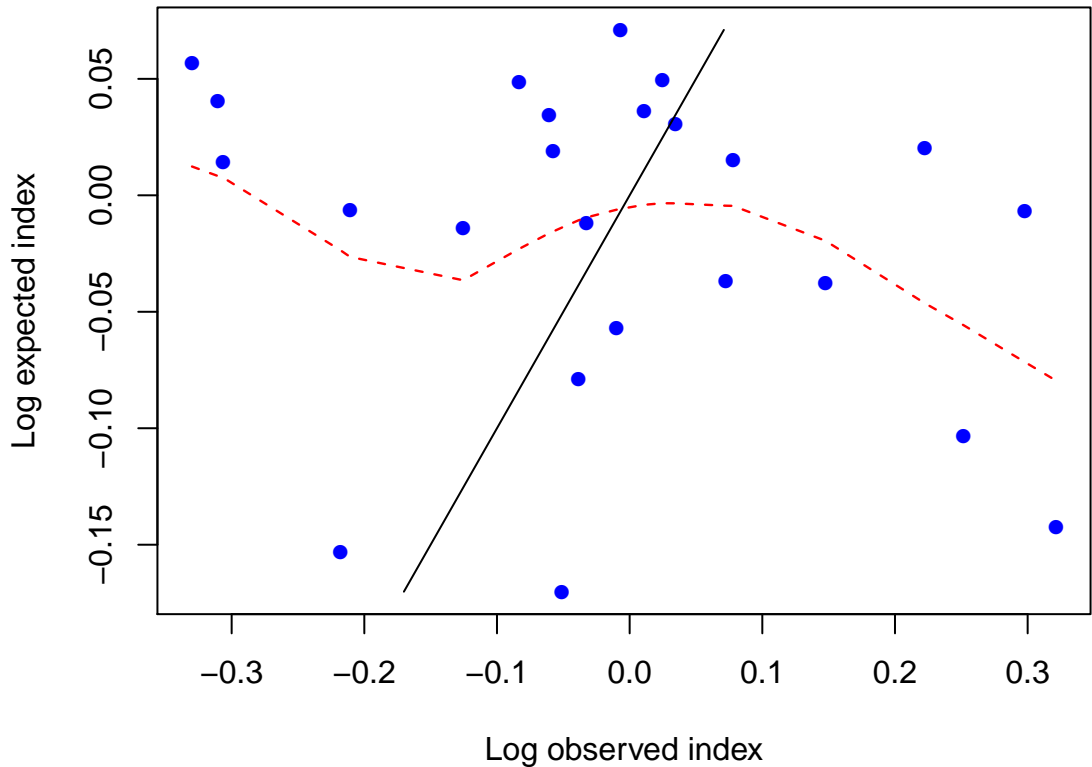
Index US\_2



# Log index US\_2

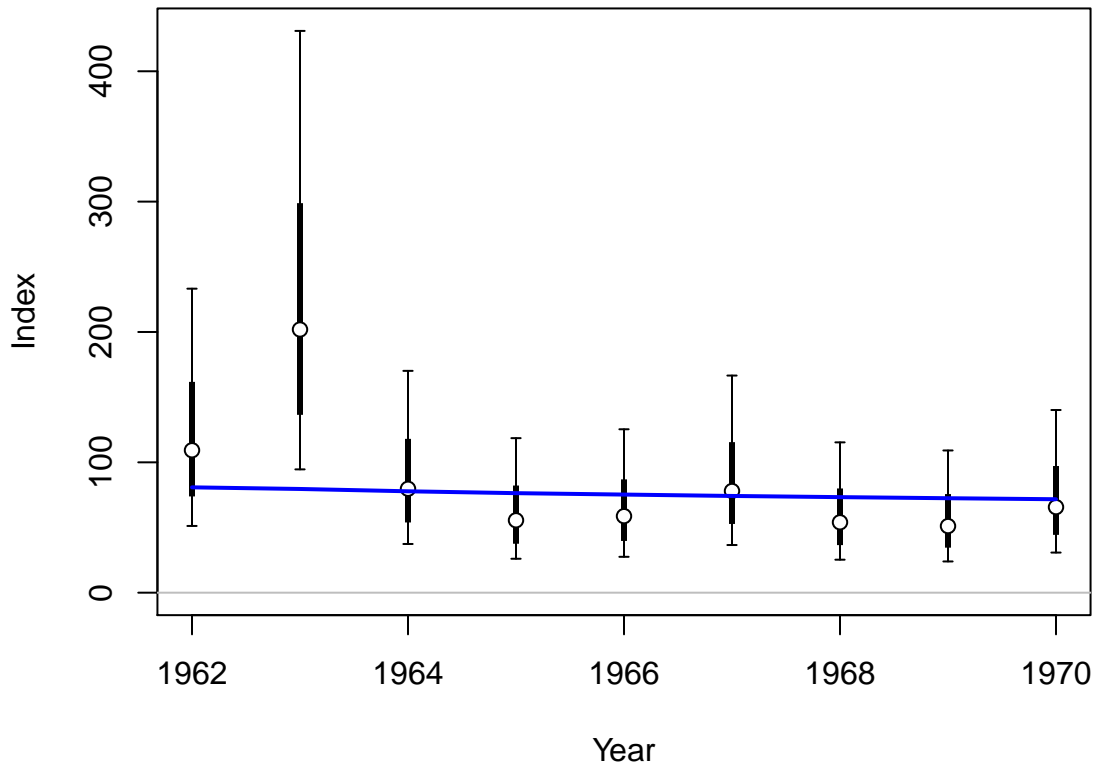


# Log index US\_2

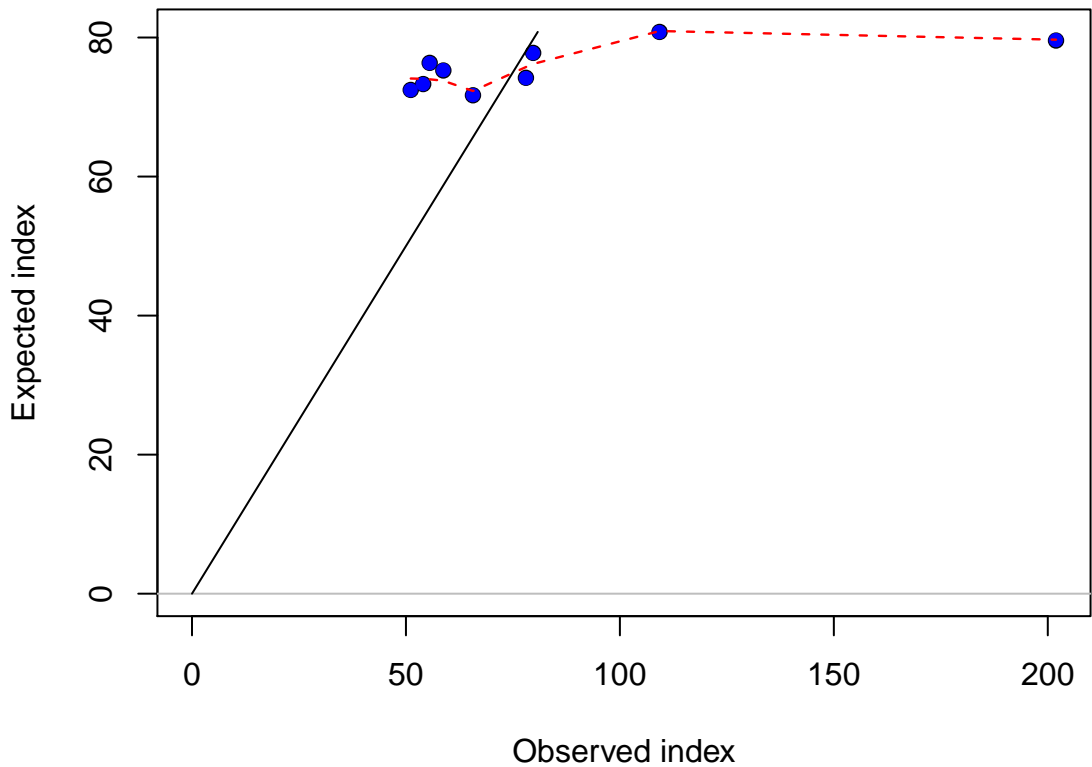




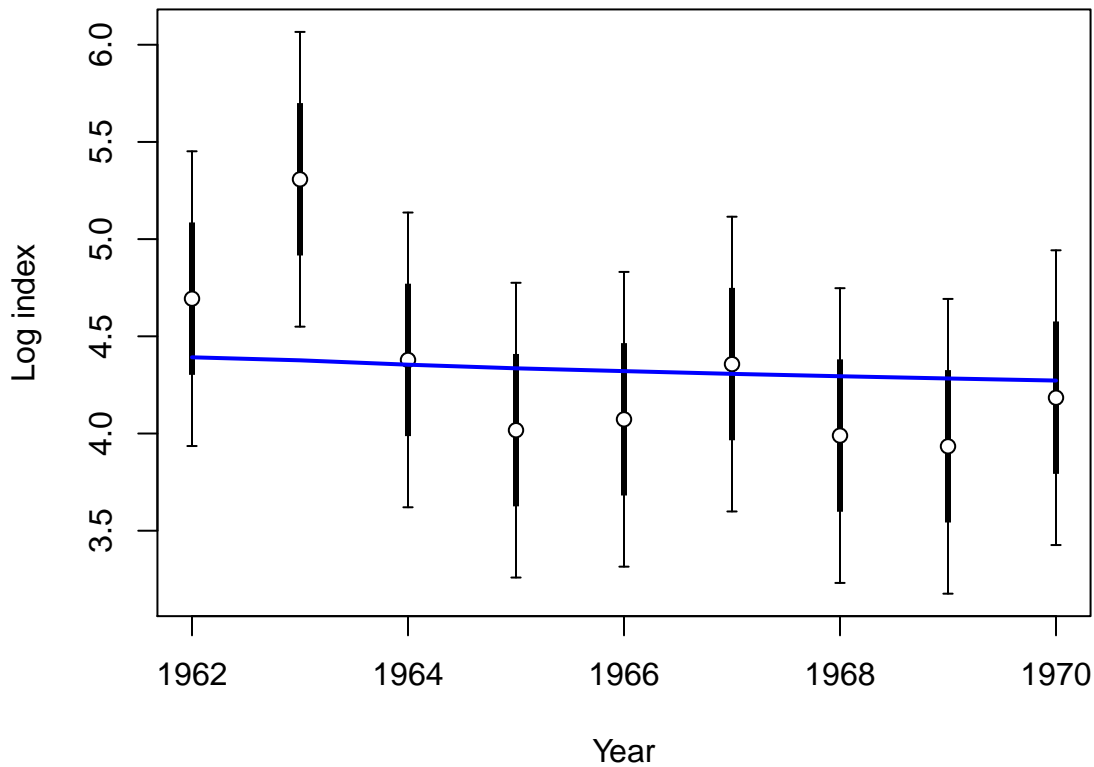
# Index CAN\_ERLY\_5



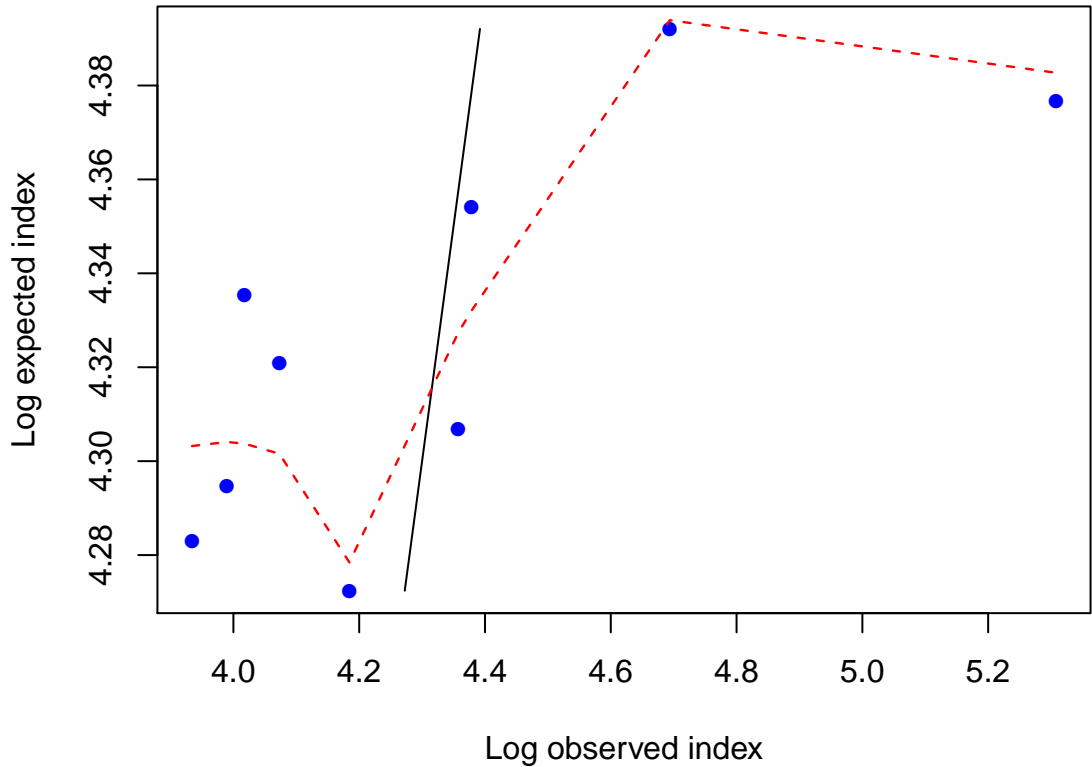
# Index CAN\_ERLY\_5



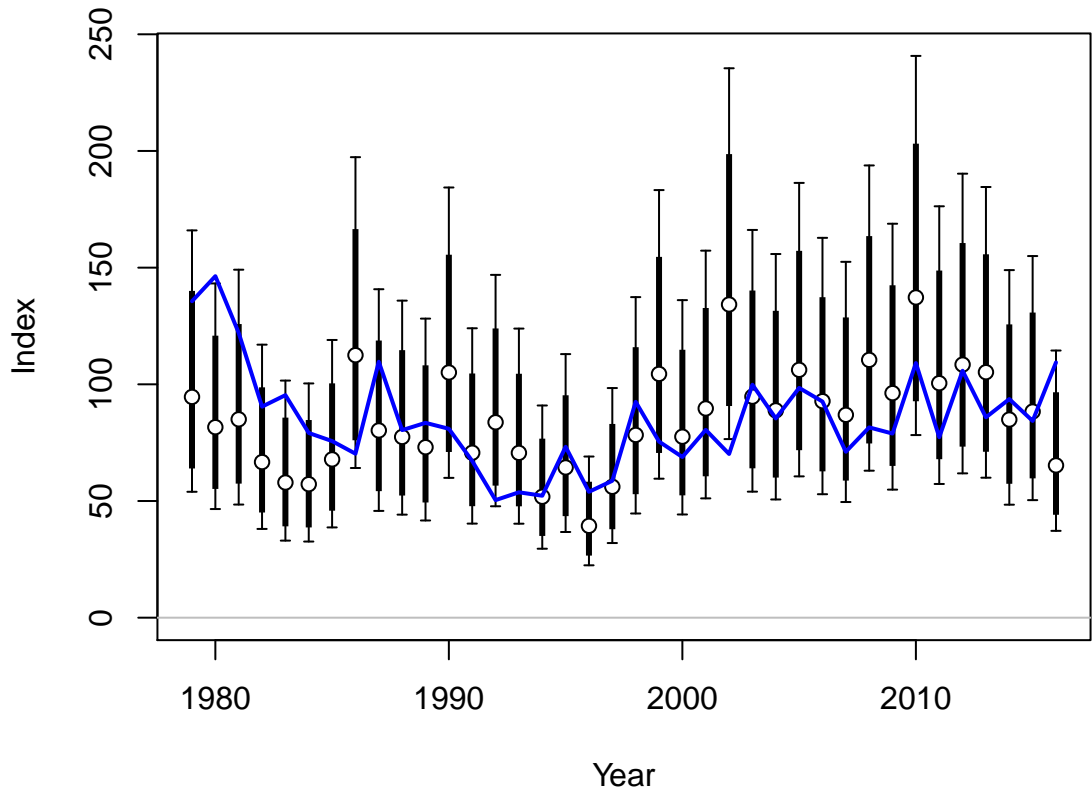
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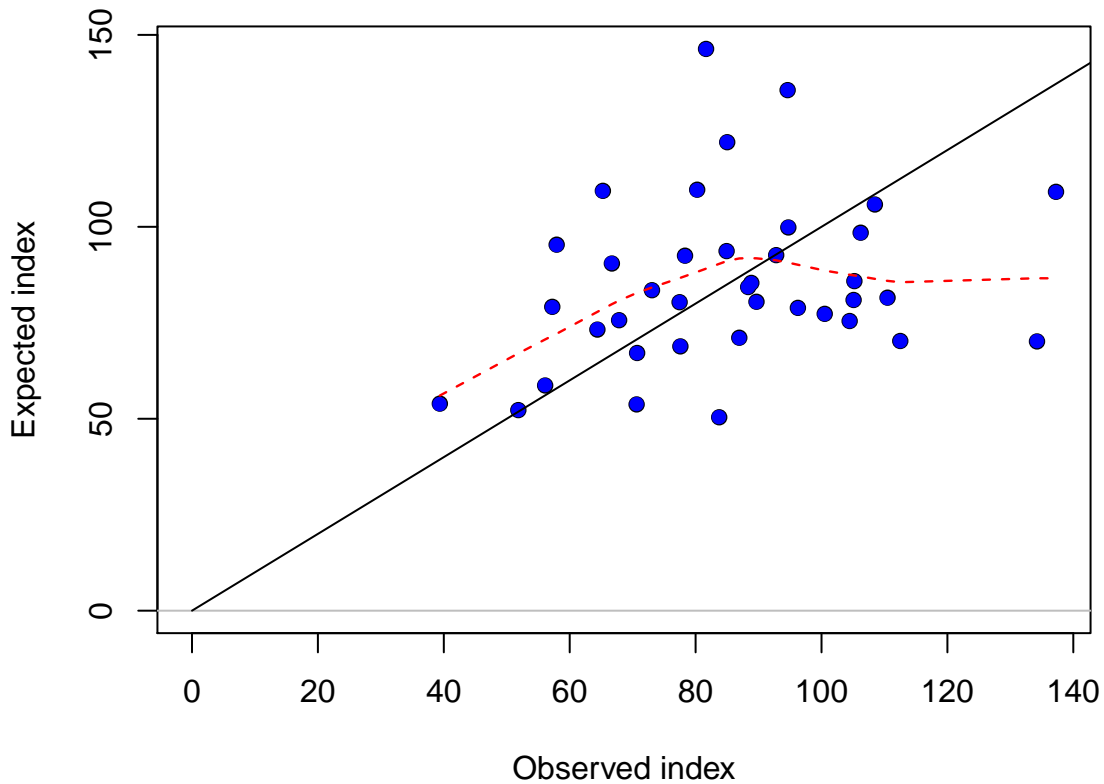
# Log index CAN\_ERLY\_5



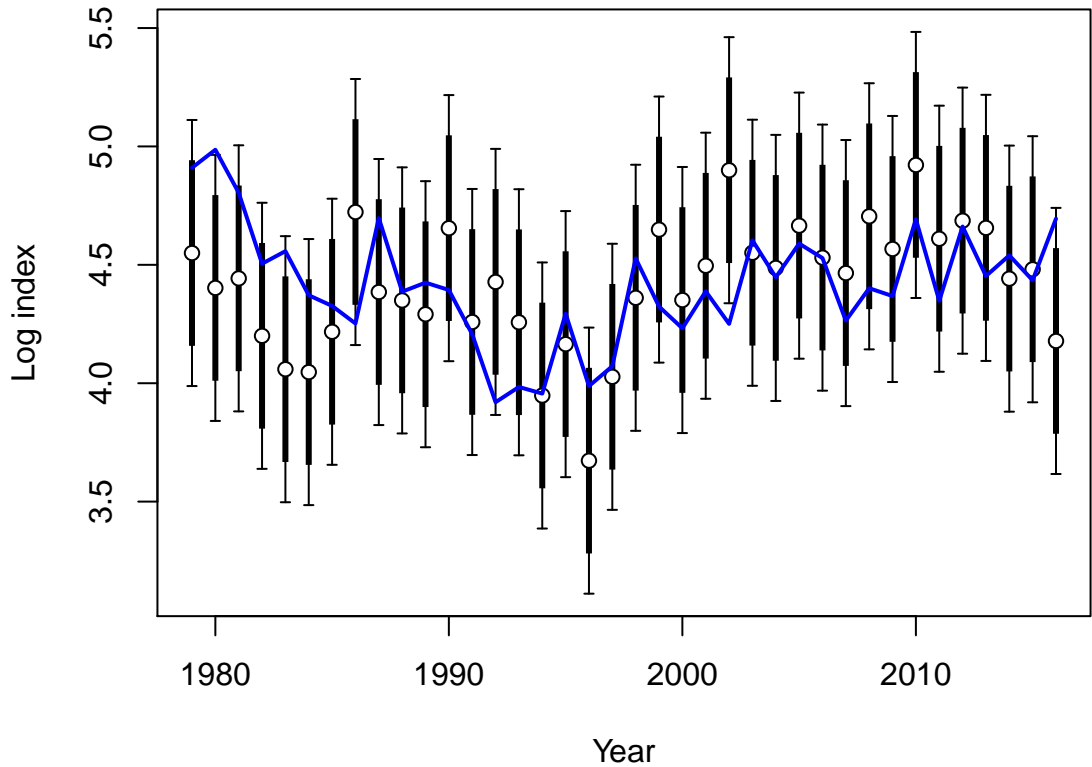
# Index CAN\_LATE\_4



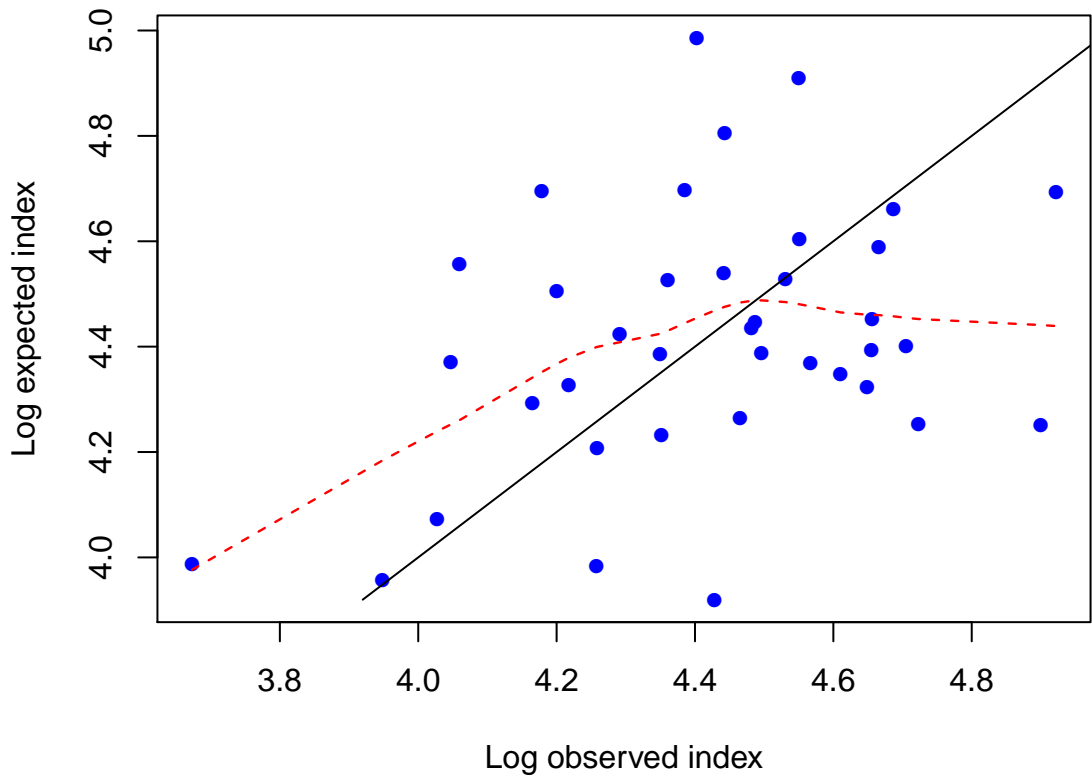
Index CAN\_LATE\_4



# Log index CAN\_LATE\_4

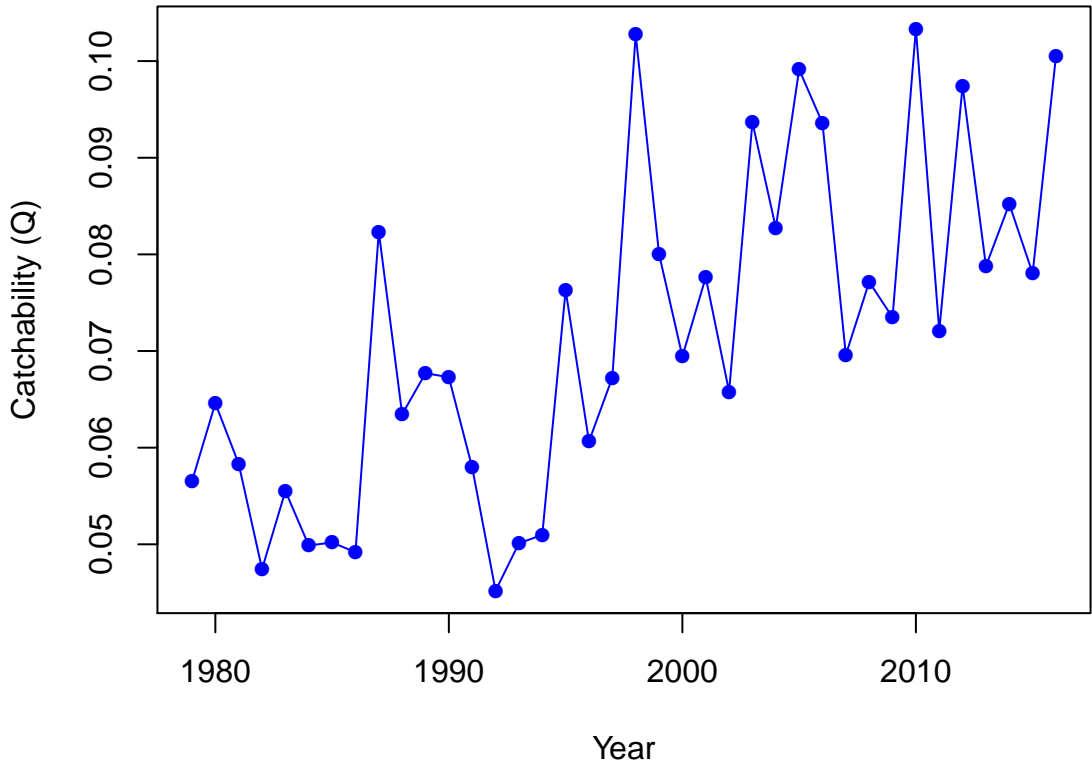


### Log index CAN\_LATE\_4

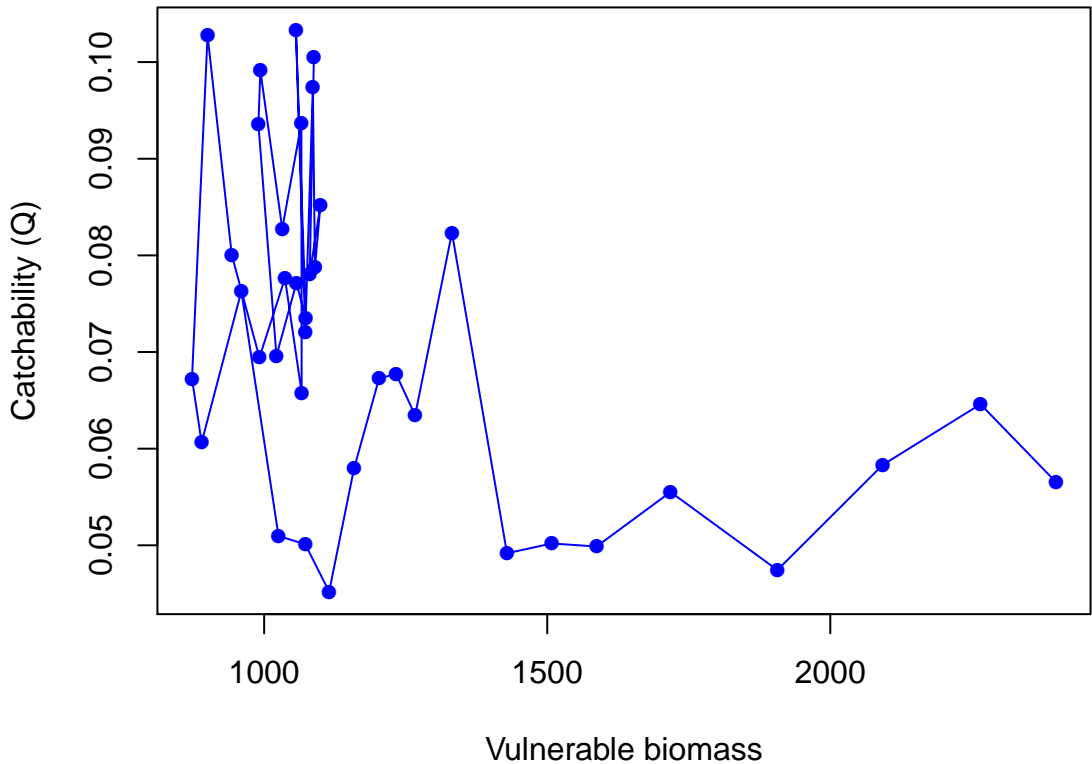




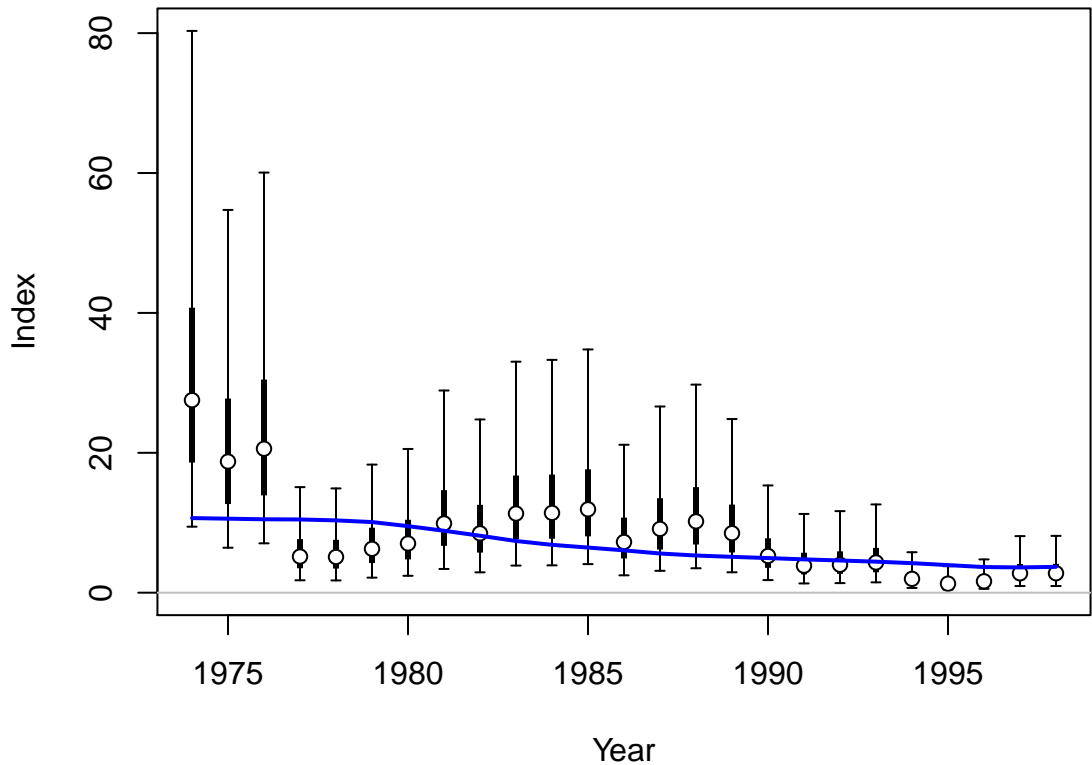
## Time-varying catchability CAN\_LATE\_4



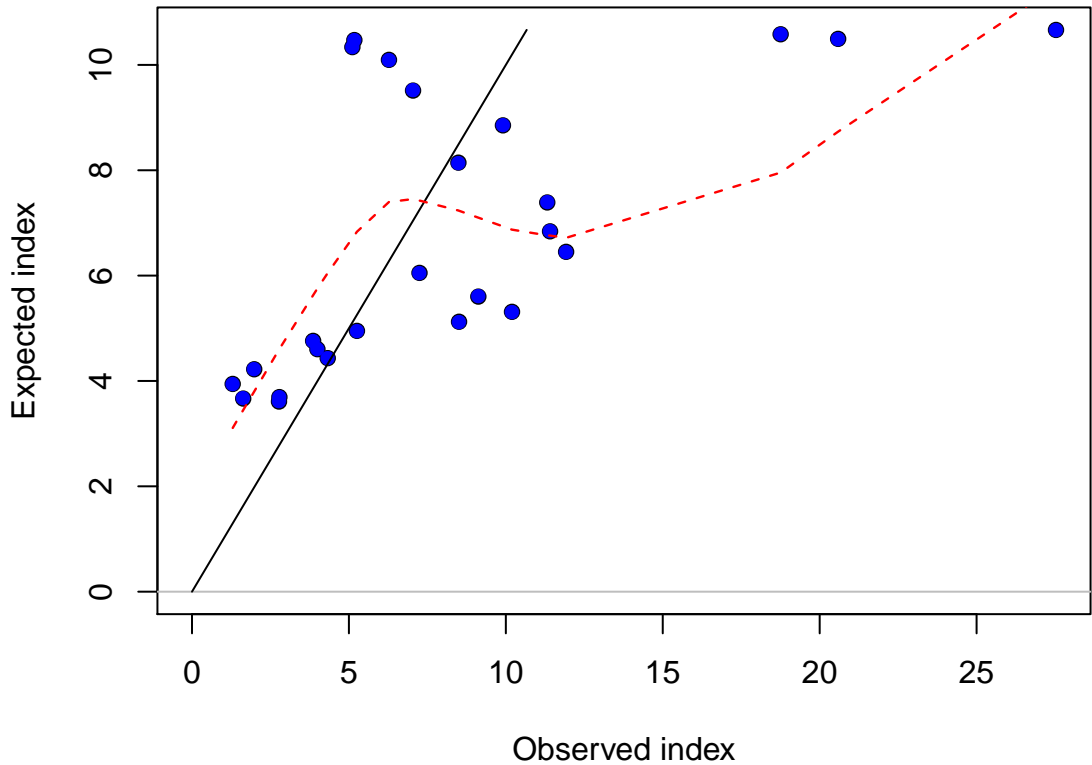
Catchability vs. vulnerable biomass CAN\_LATE\_4



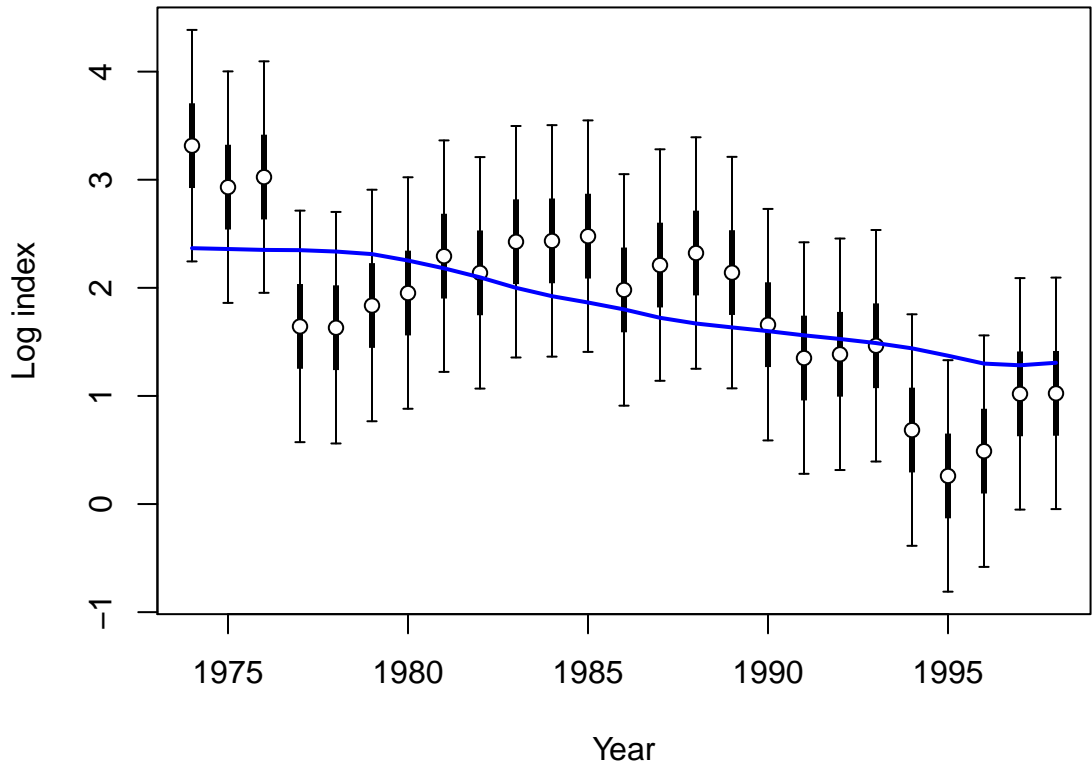
# Index JPN\_ERLY\_5



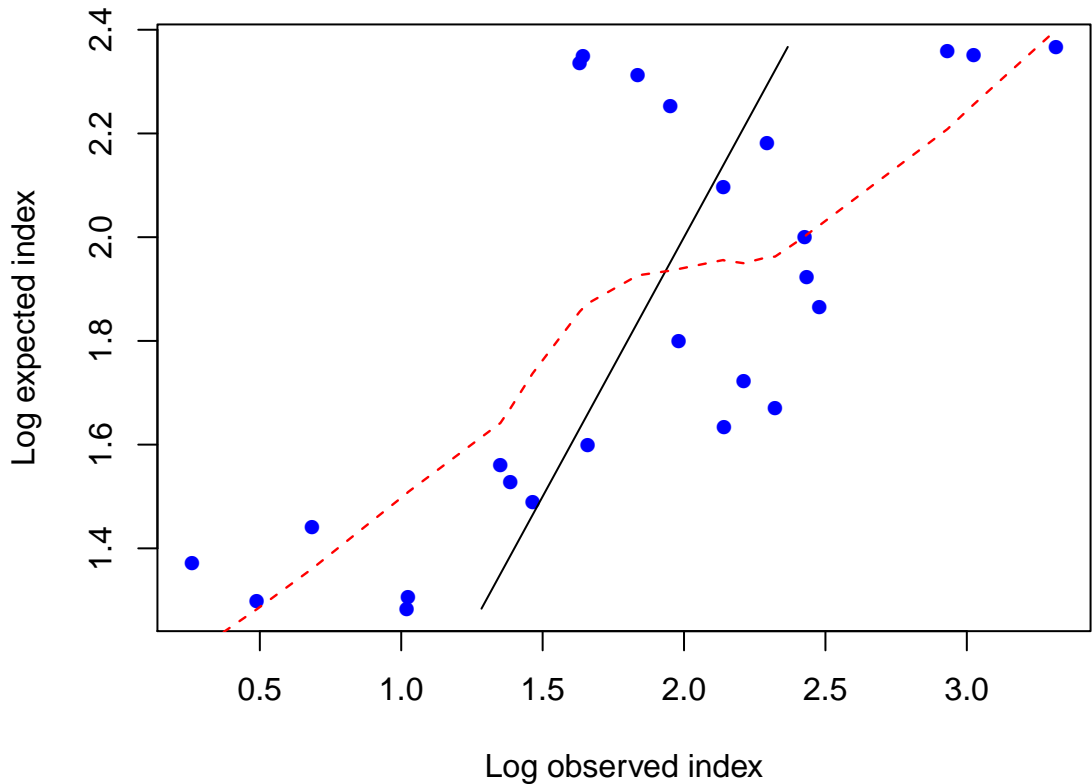
# Index JPN\_ERLY\_5



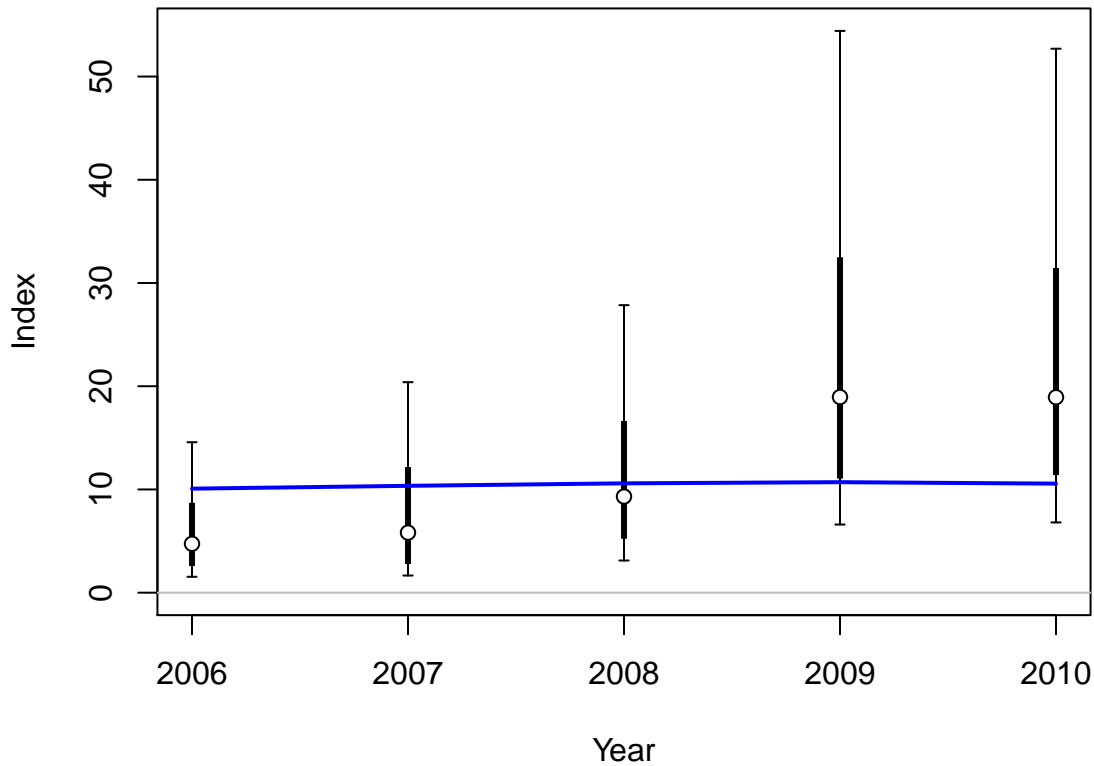
# Log index JPN\_ERLY\_5



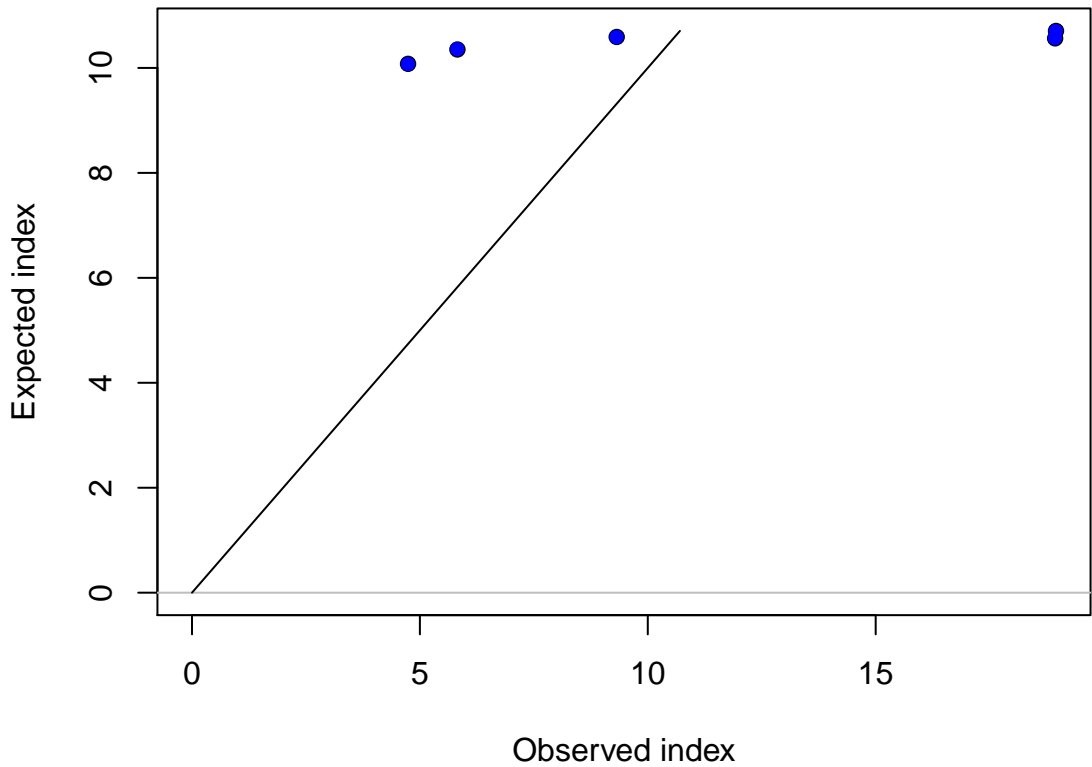
Log index JPN\_ERLY\_5



# Index JPN\_MID\_6

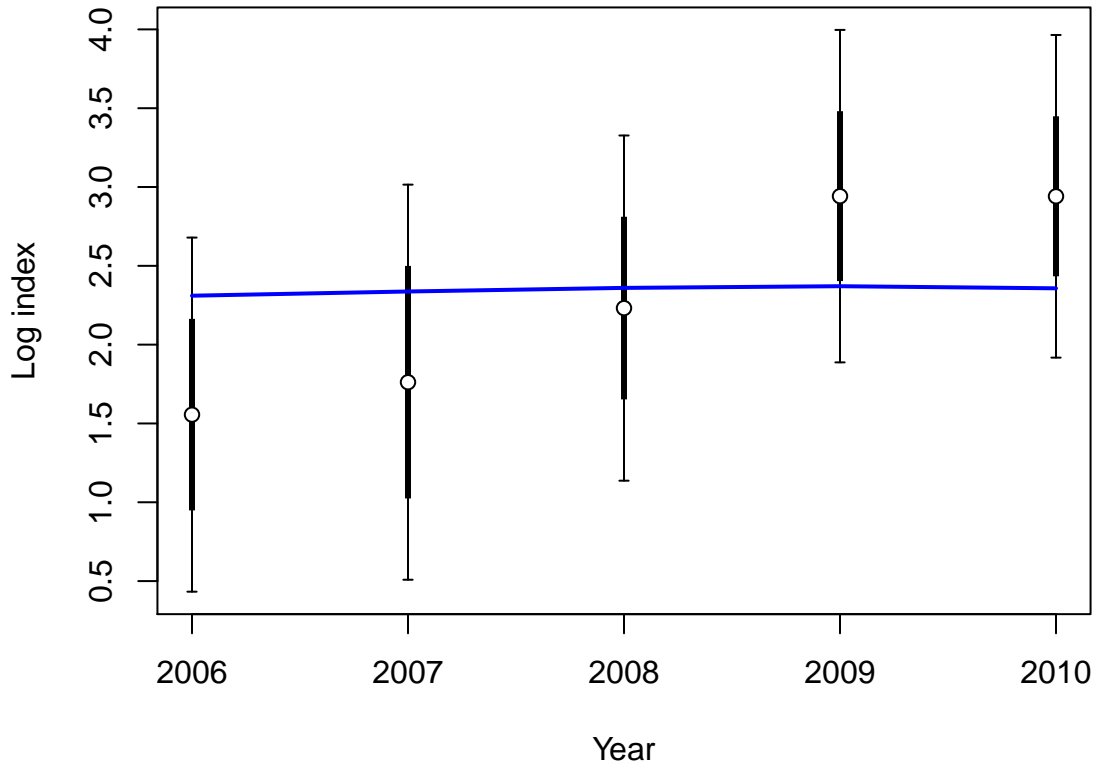


Index JPN\_MID\_6

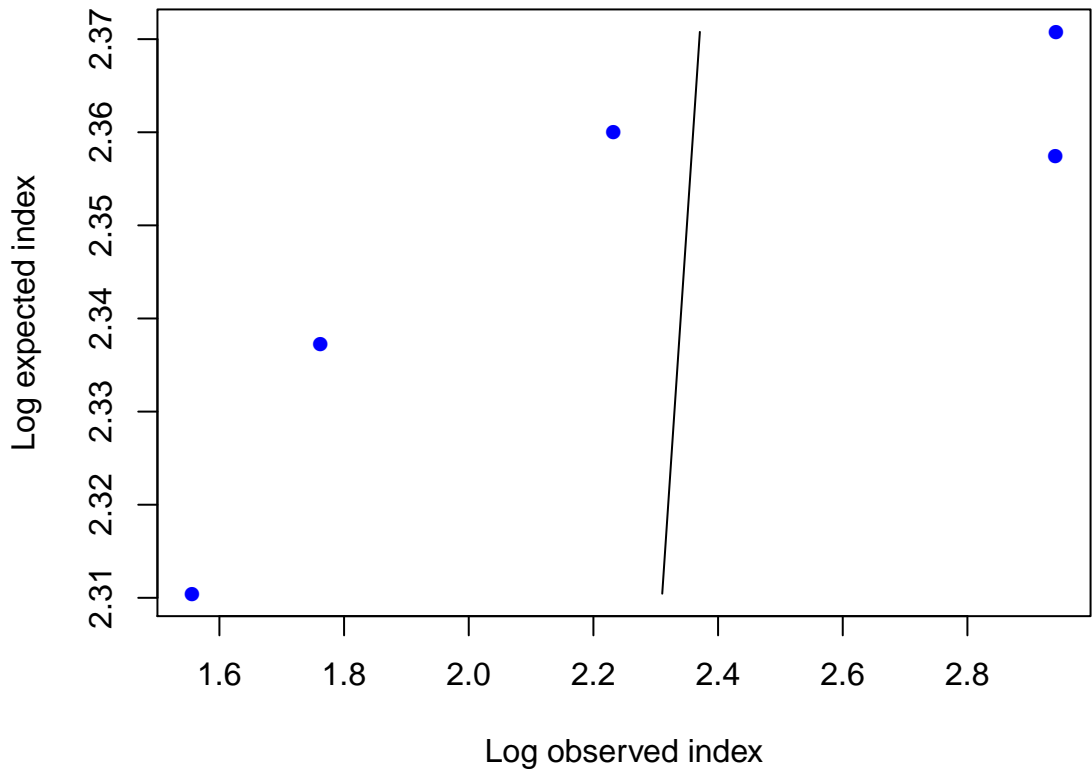




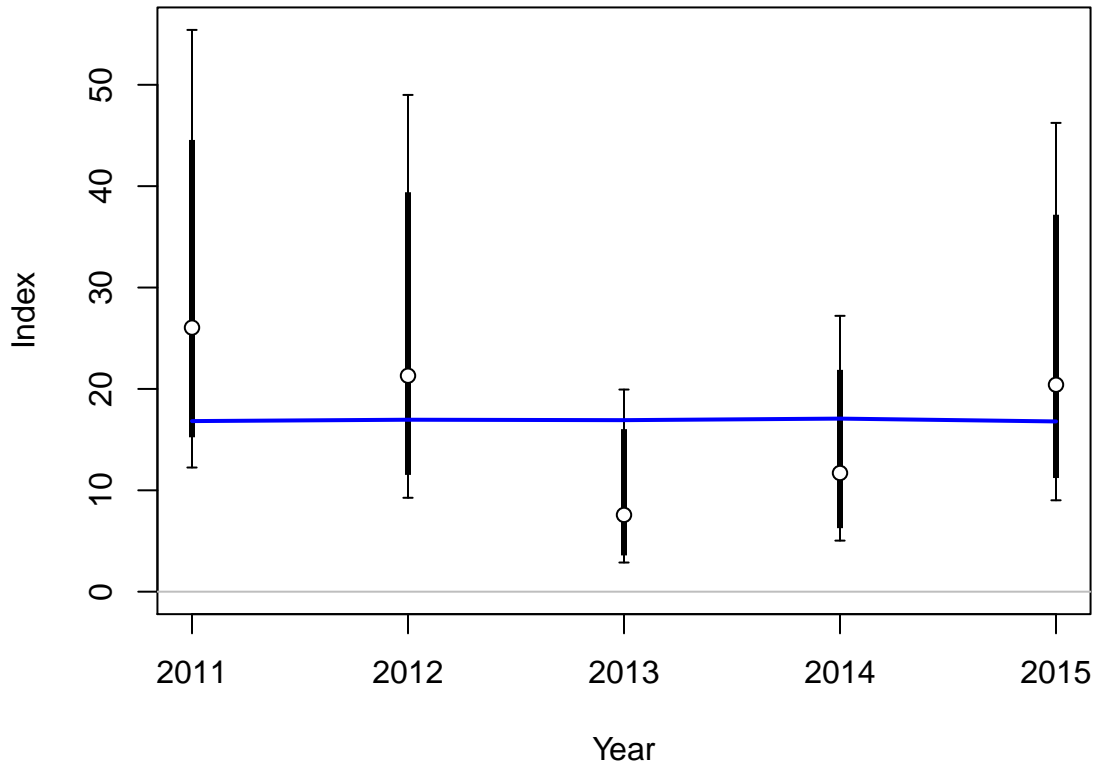
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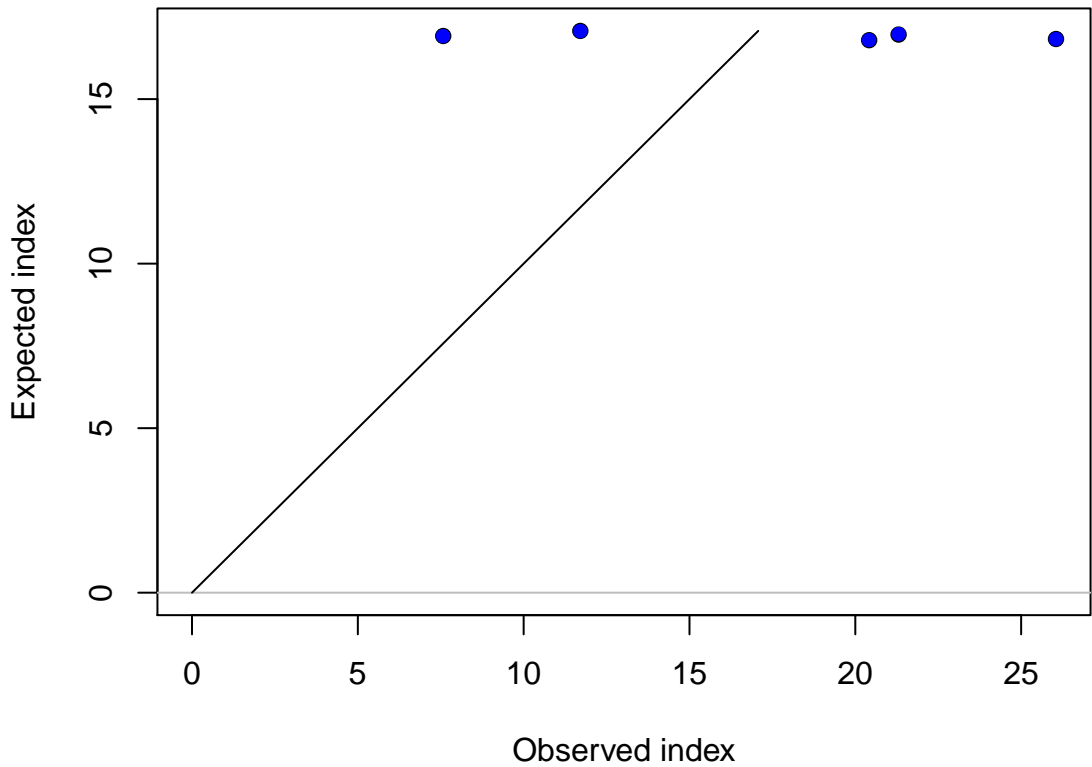
# Log index JPN\_MID\_6



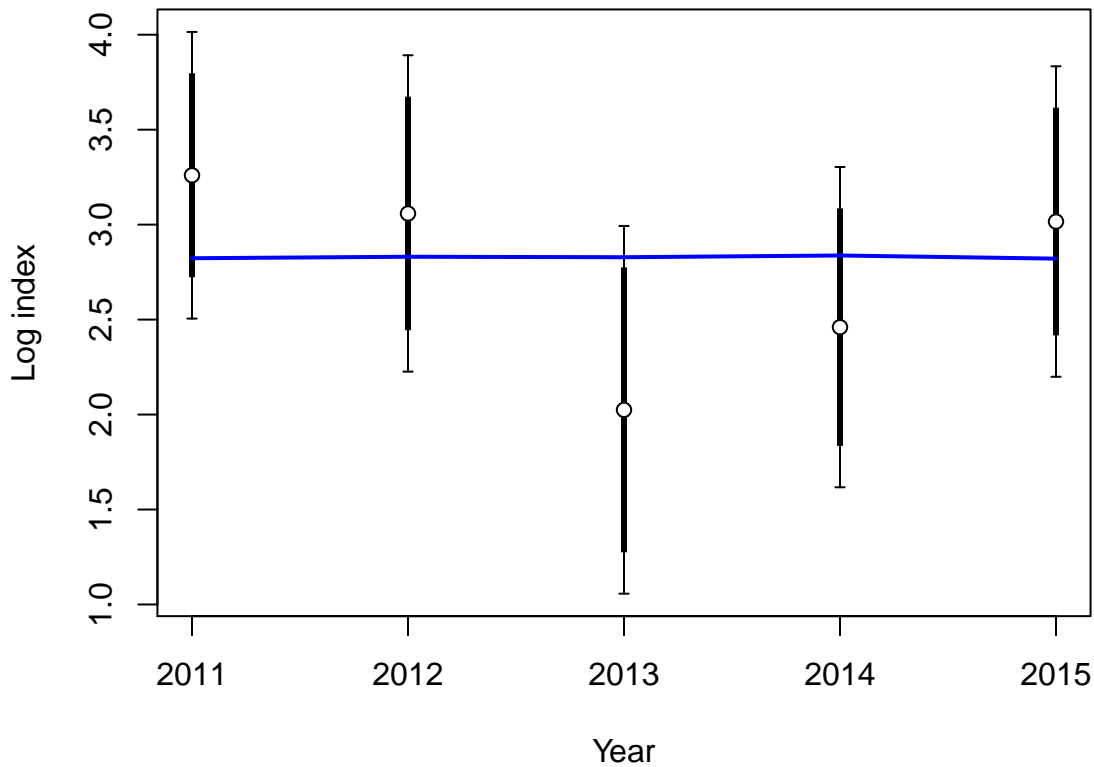
# Index JPN\_LATE\_7



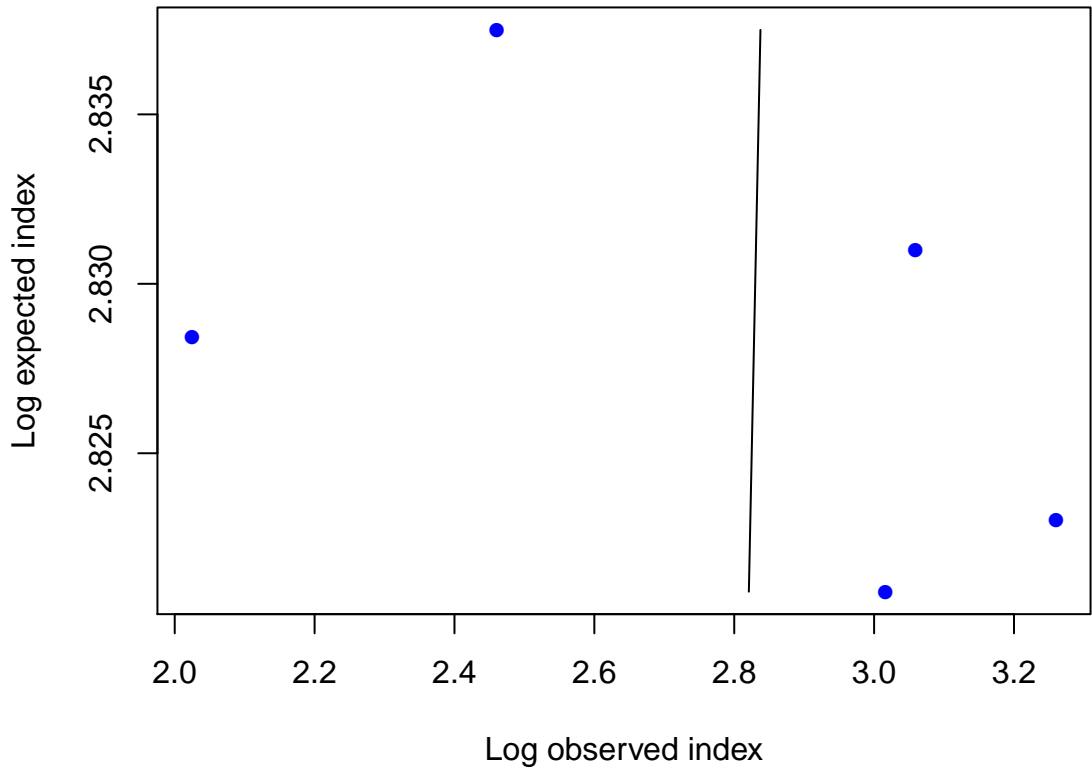
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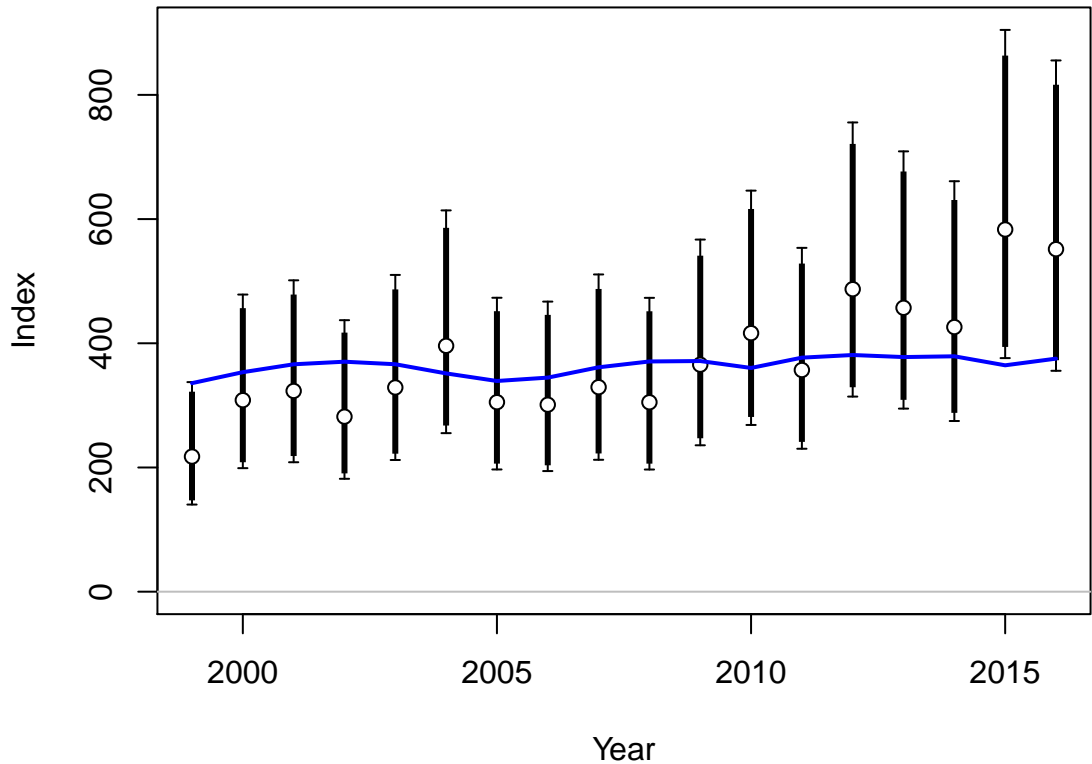
# Log index JPN\_LATE\_7



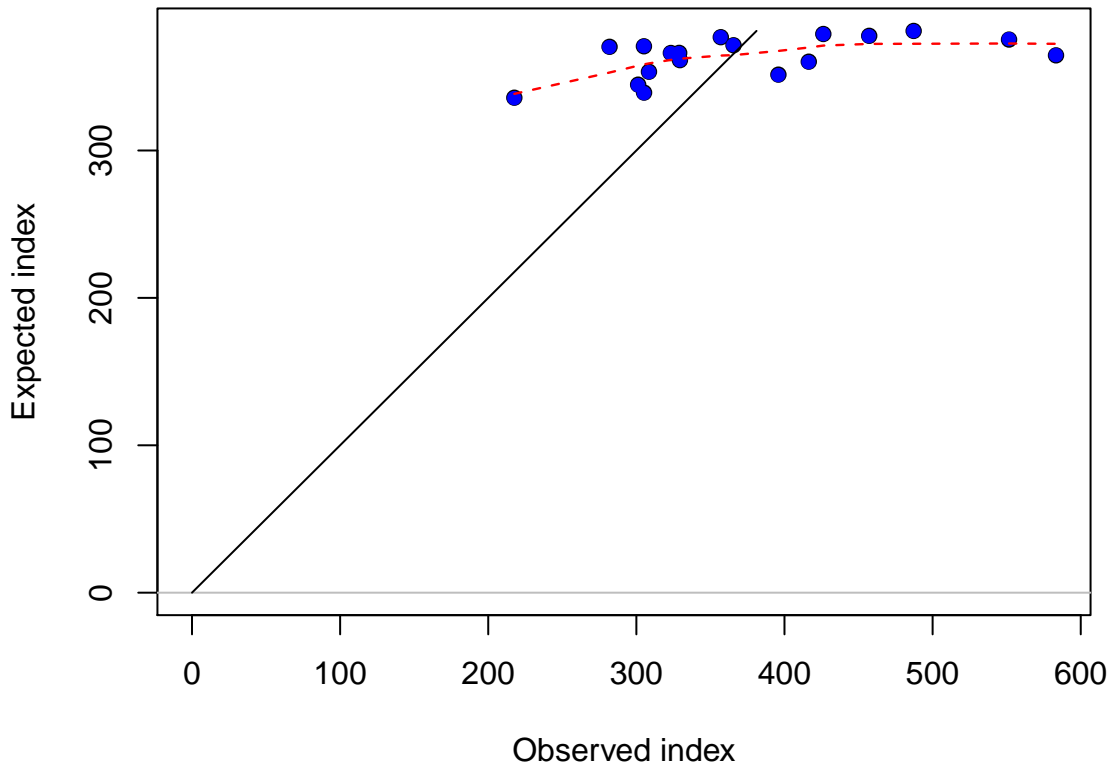
# Log index JPN\_LATE\_7



# Index PORT\_8

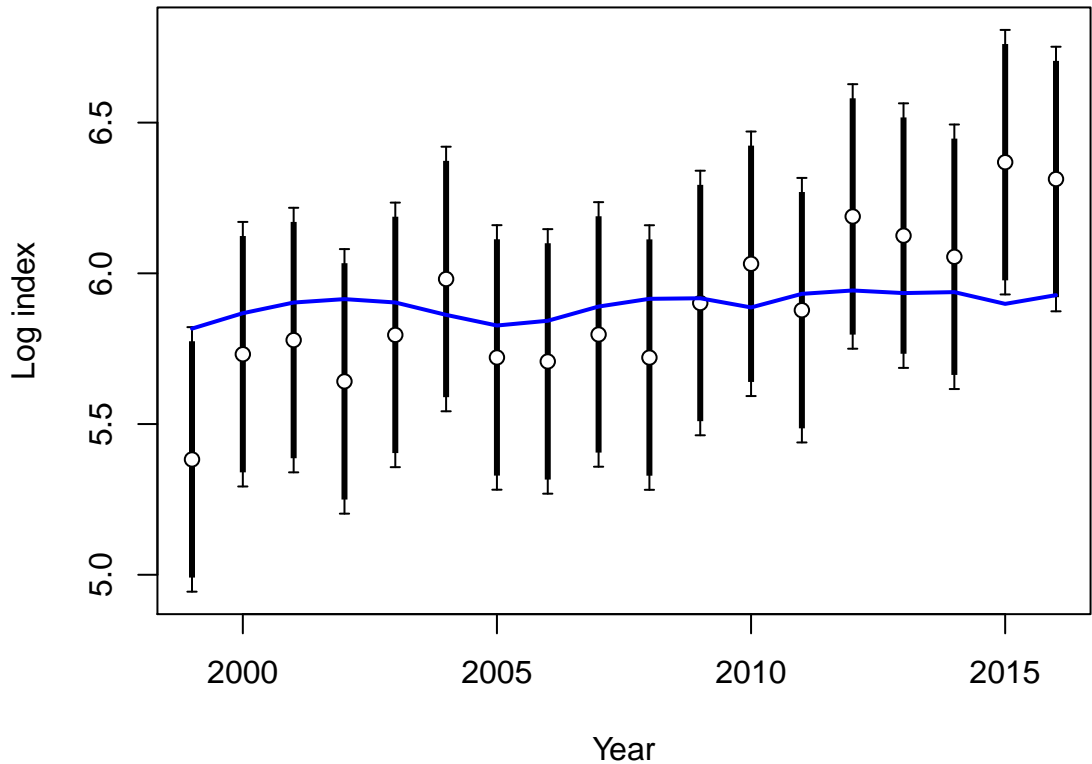


Index PORT\_8

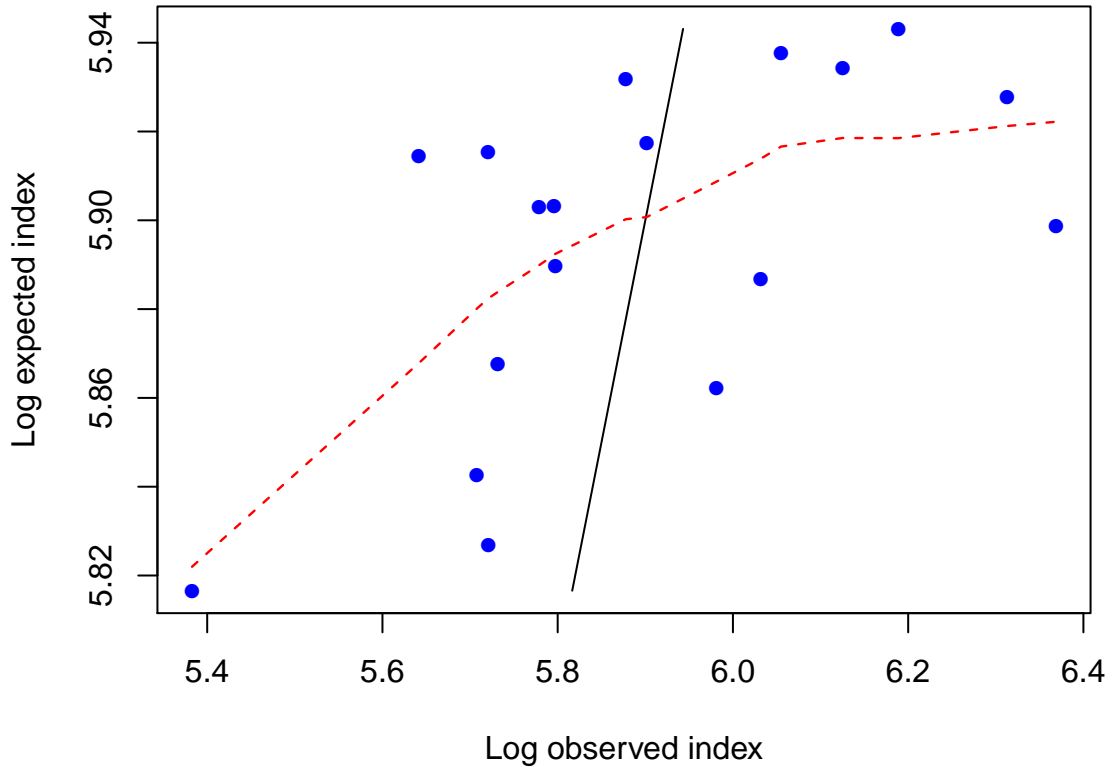




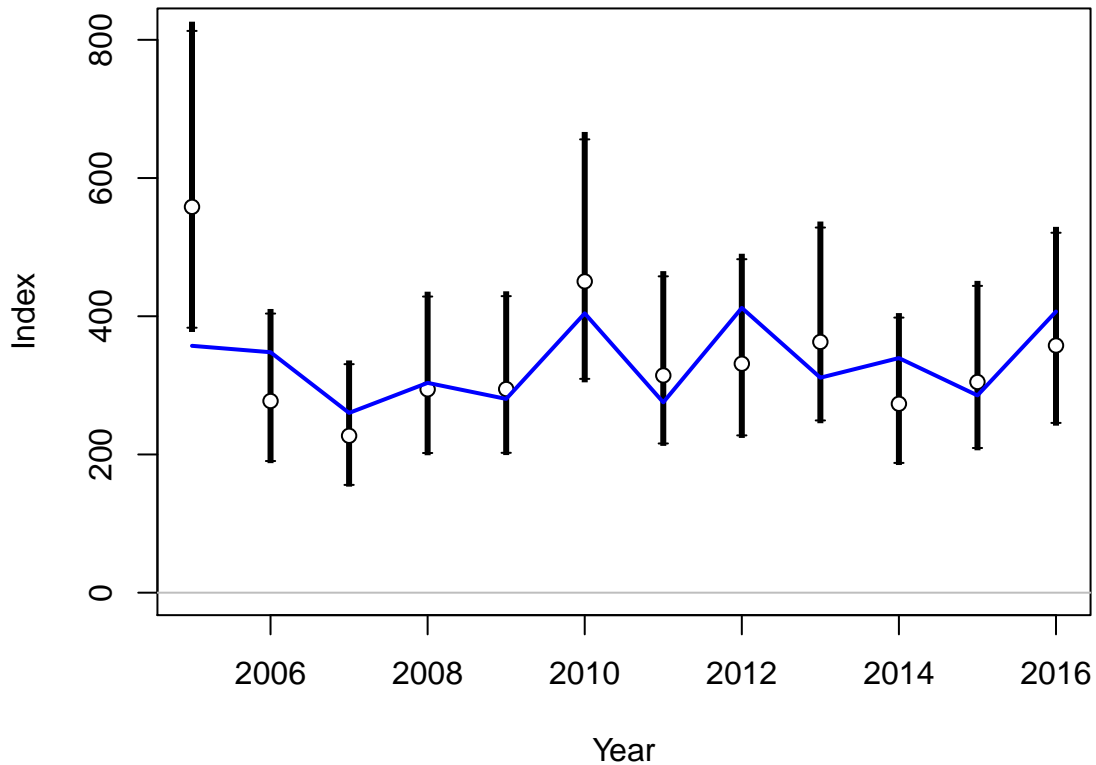
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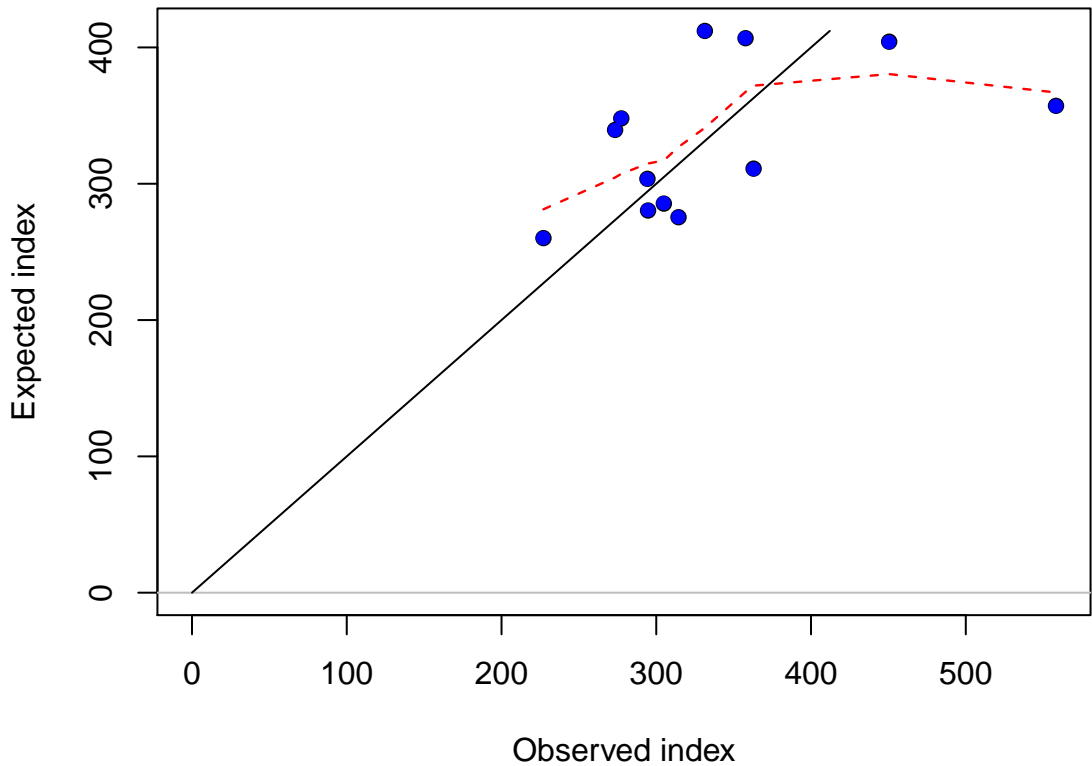
# Log index PORT\_8



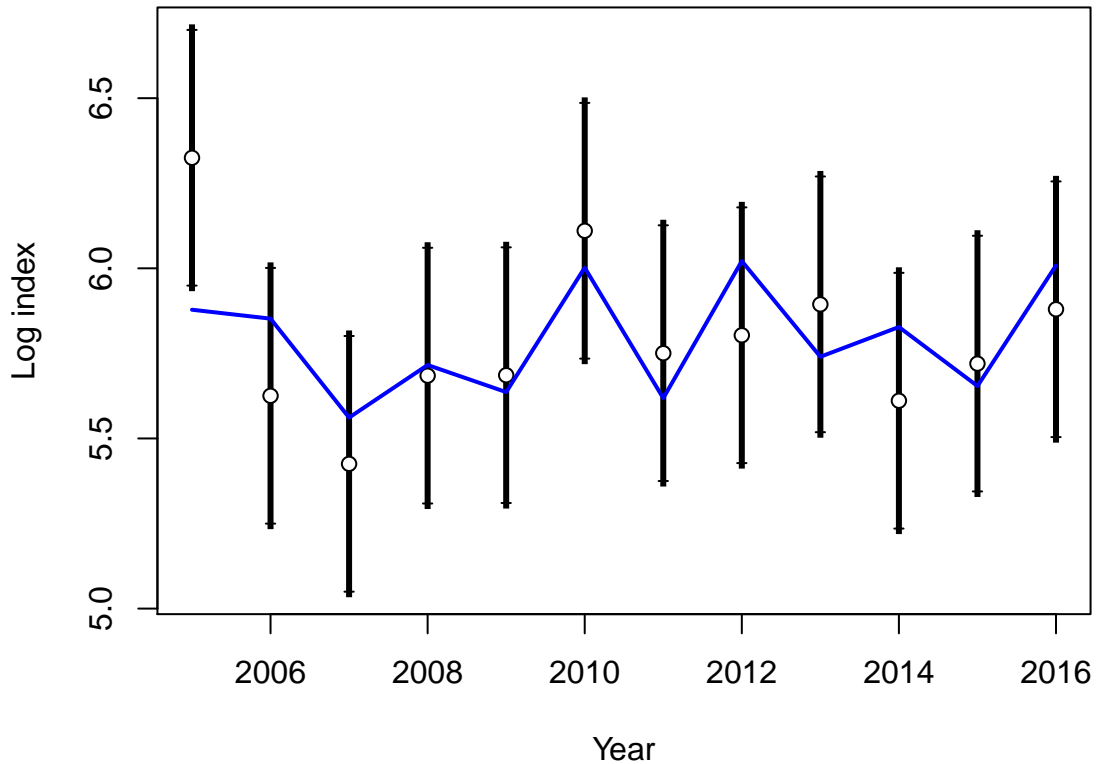
# Index MOR\_10



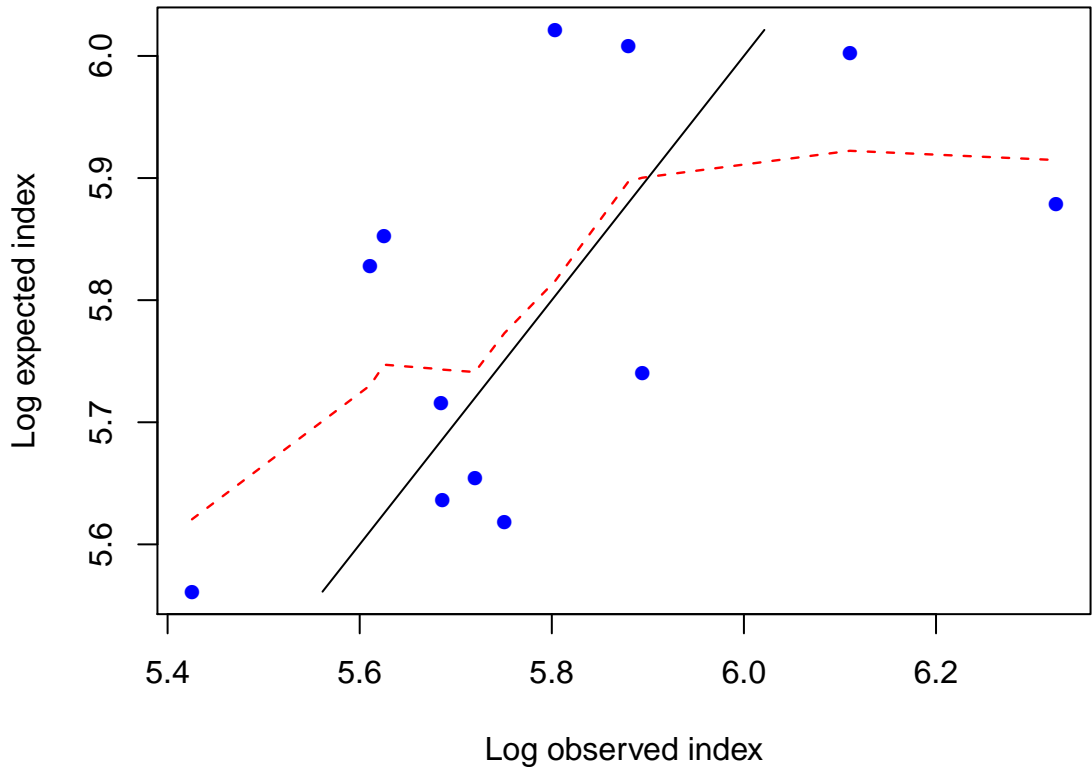
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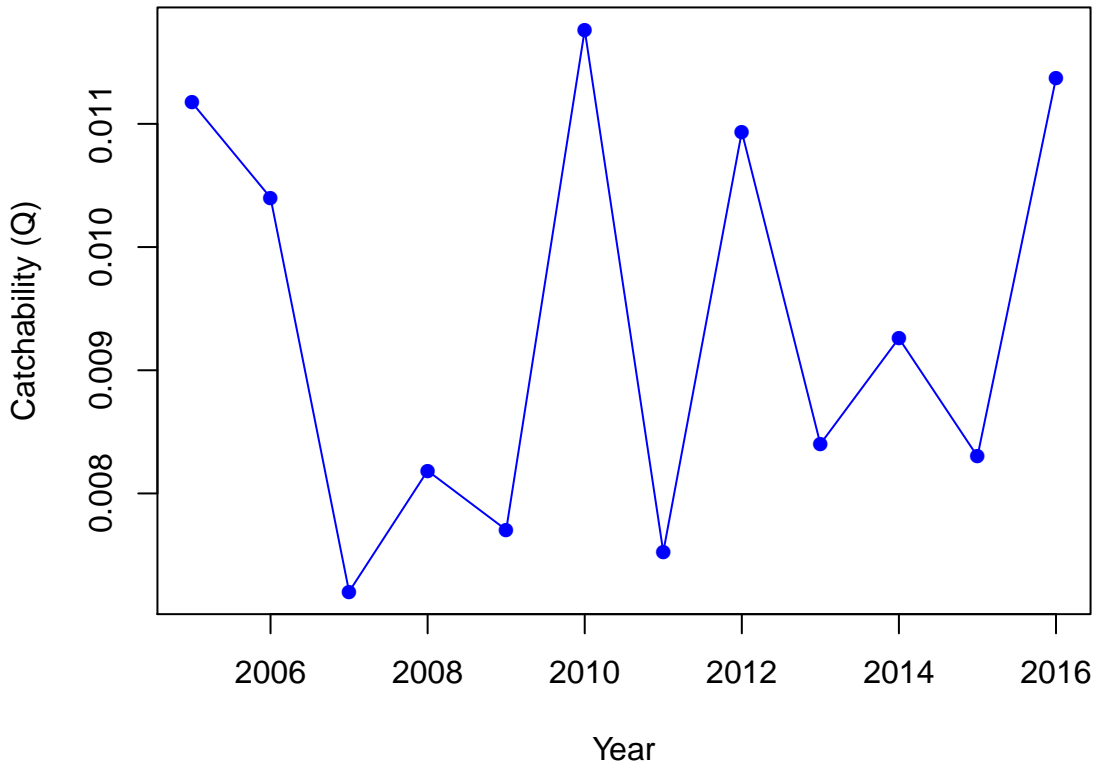
# Log index MOR\_10



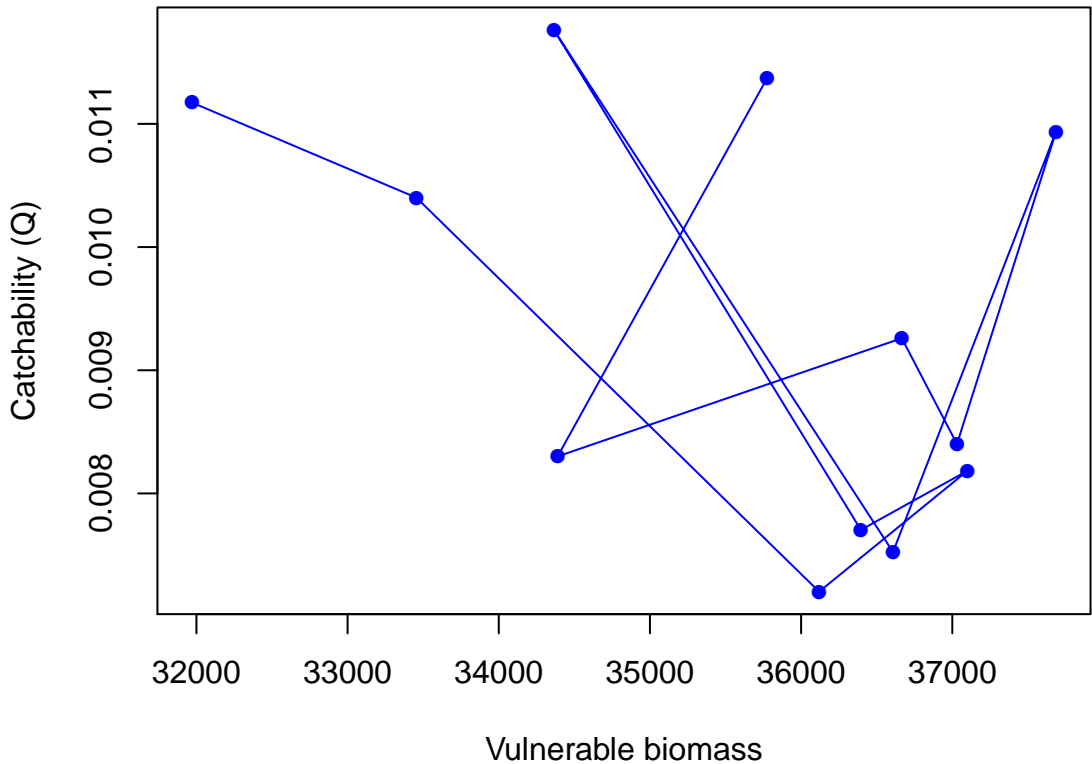
# Log index MOR\_10



## Time-varying catchability MOR\_10

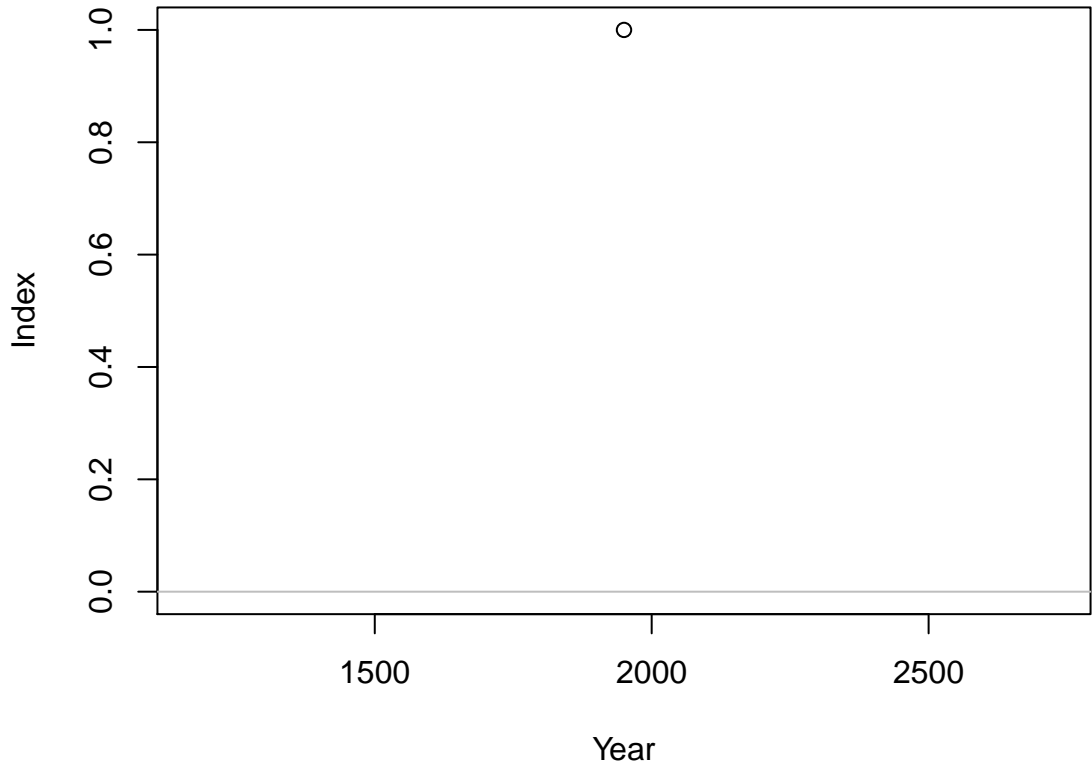


Catchability vs. vulnerable biomass MOR\_10

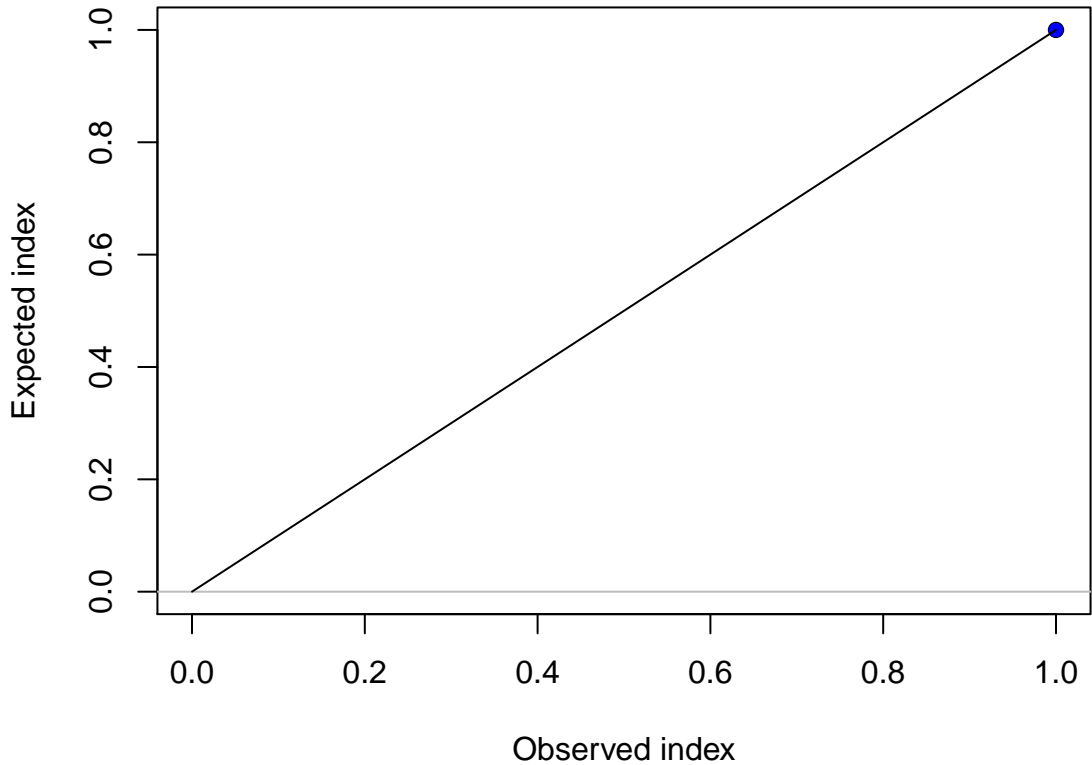




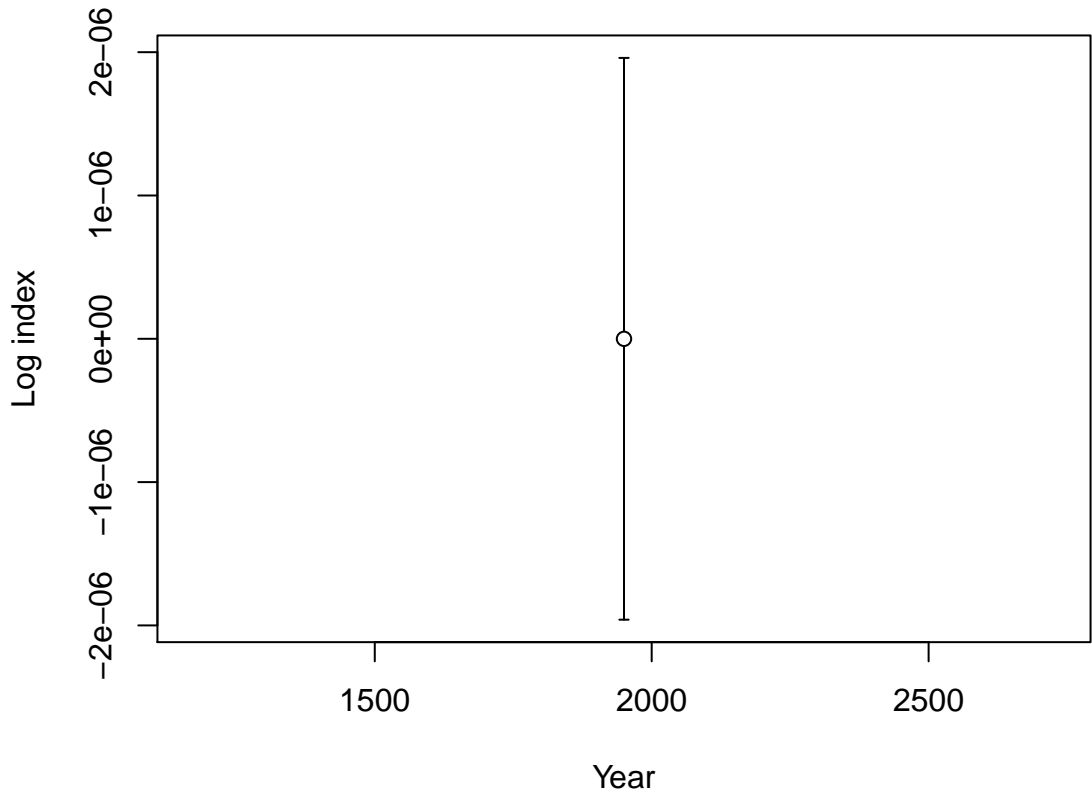
# Index DEplete



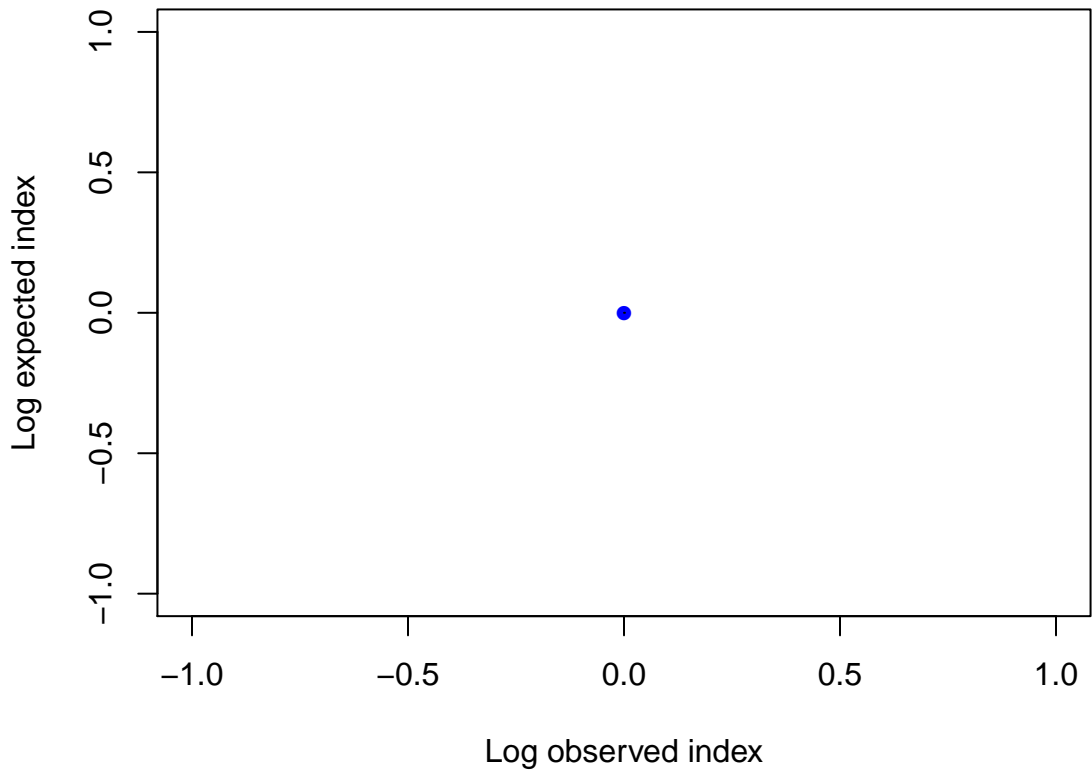
# Index DEplete



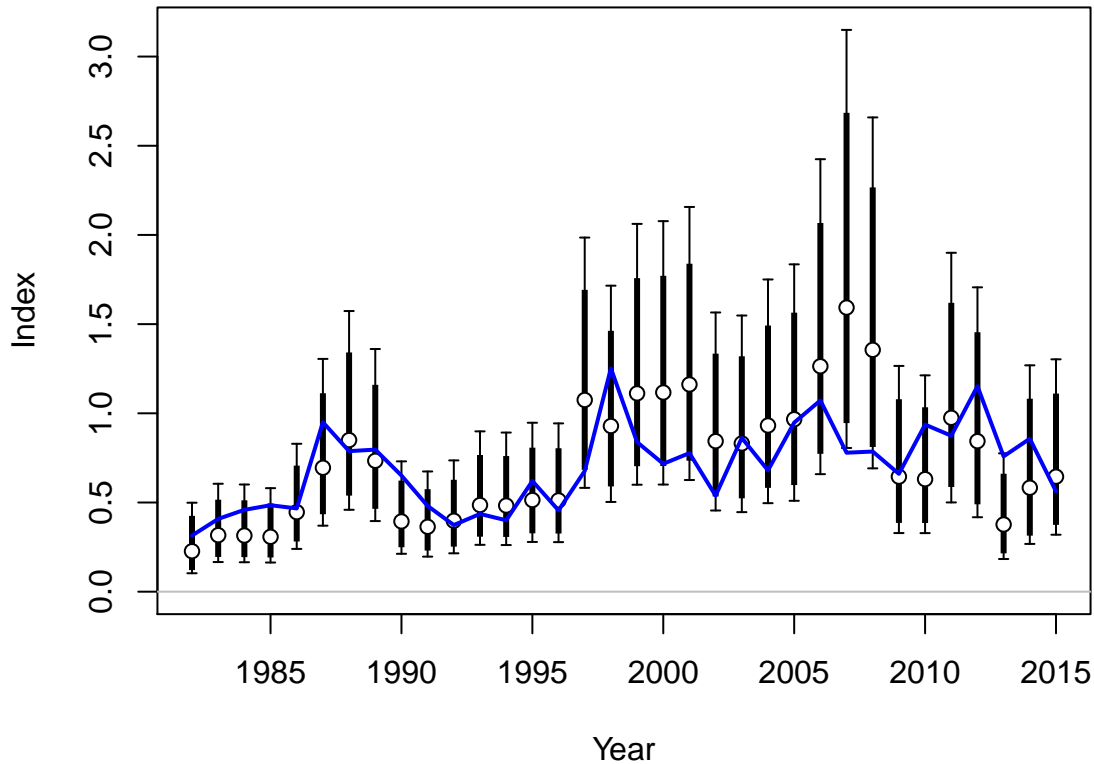
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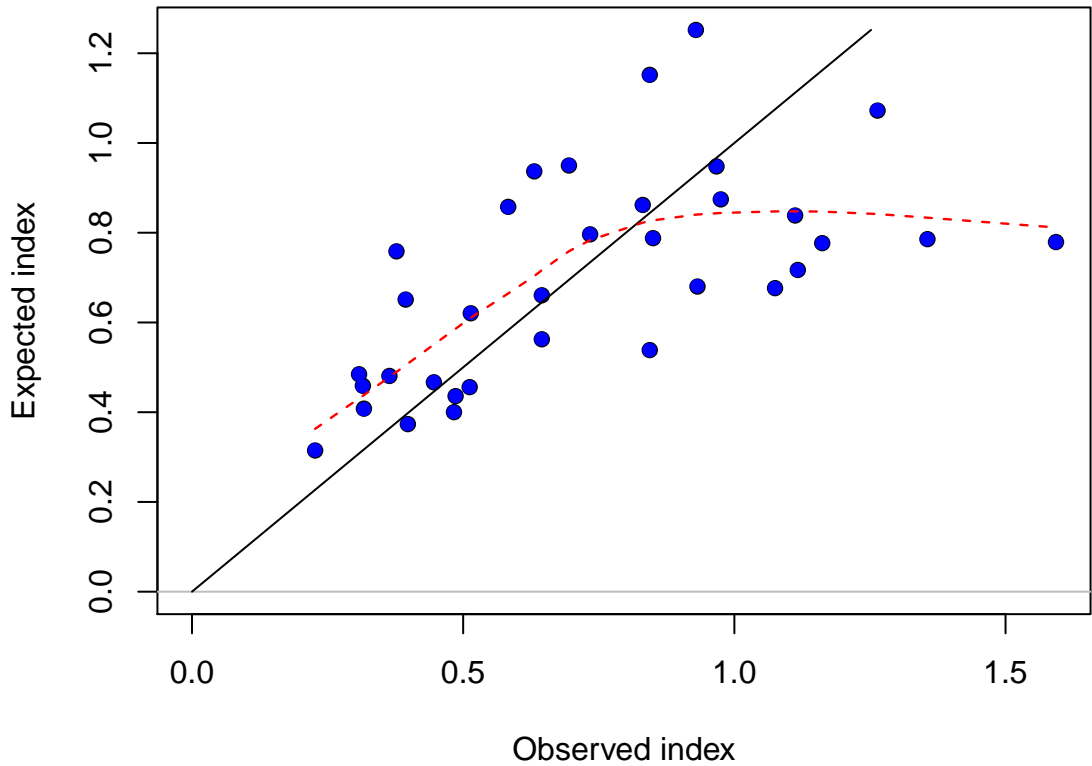
# Log index DEplete



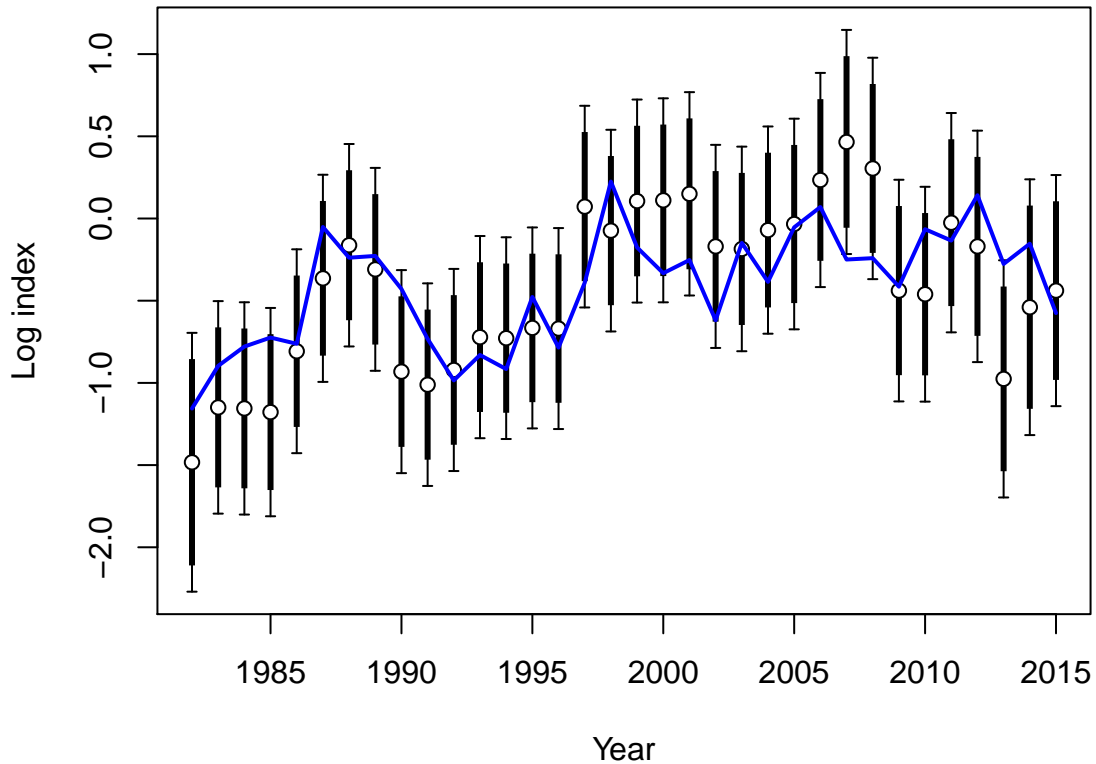
# Index Age-1



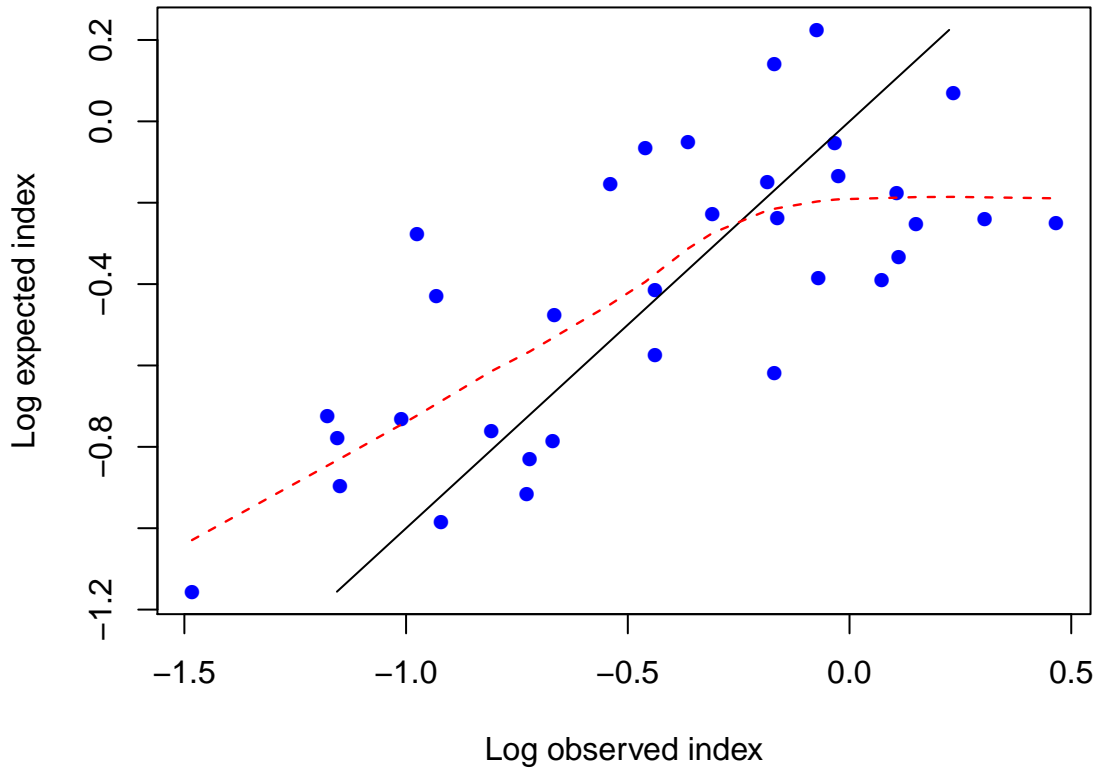
# Index Age-1



# Log index Age-1

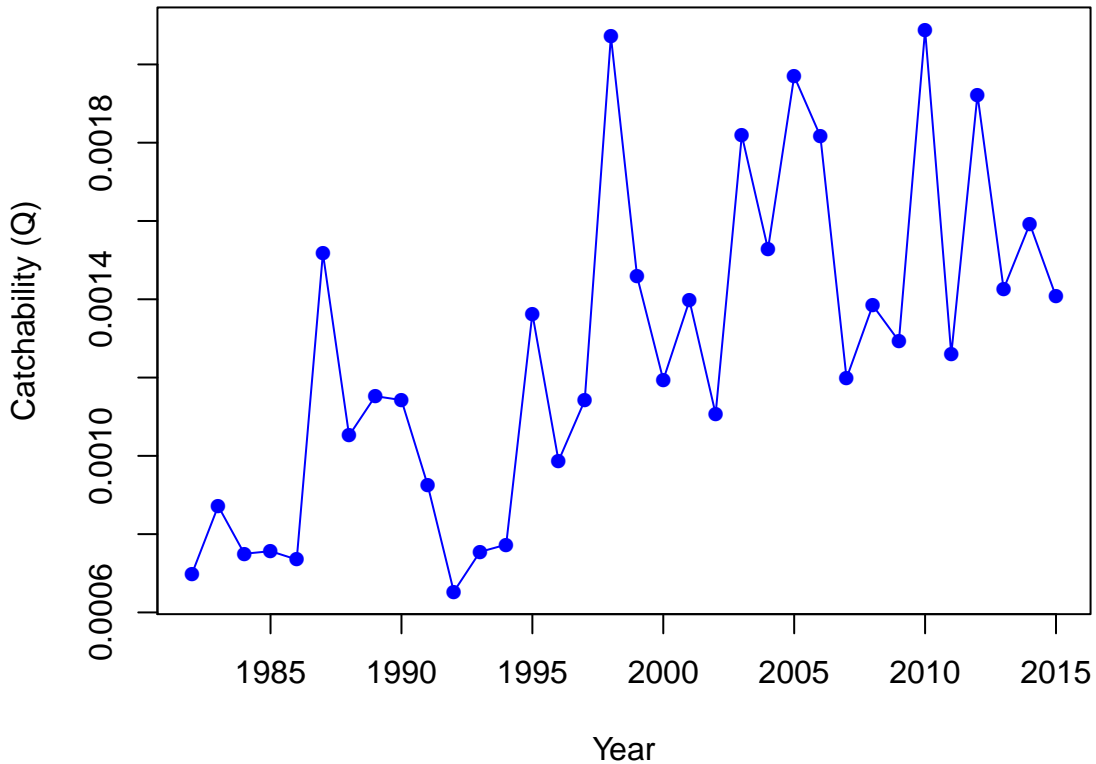


# Log index Age-1

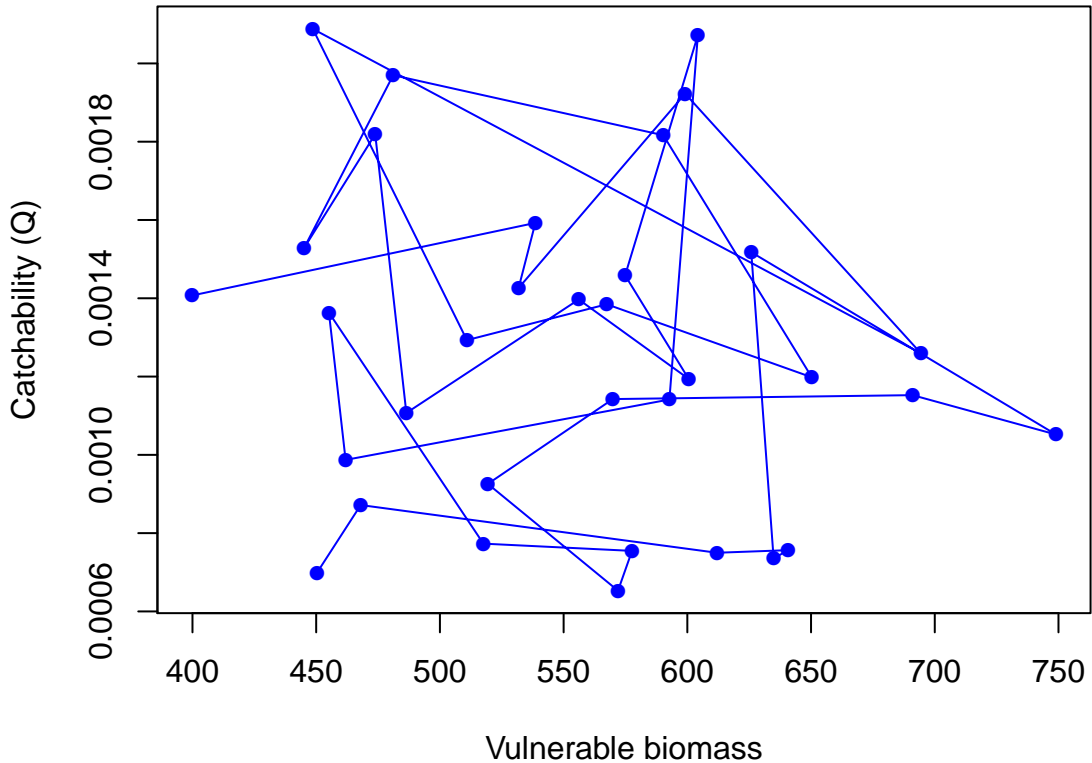




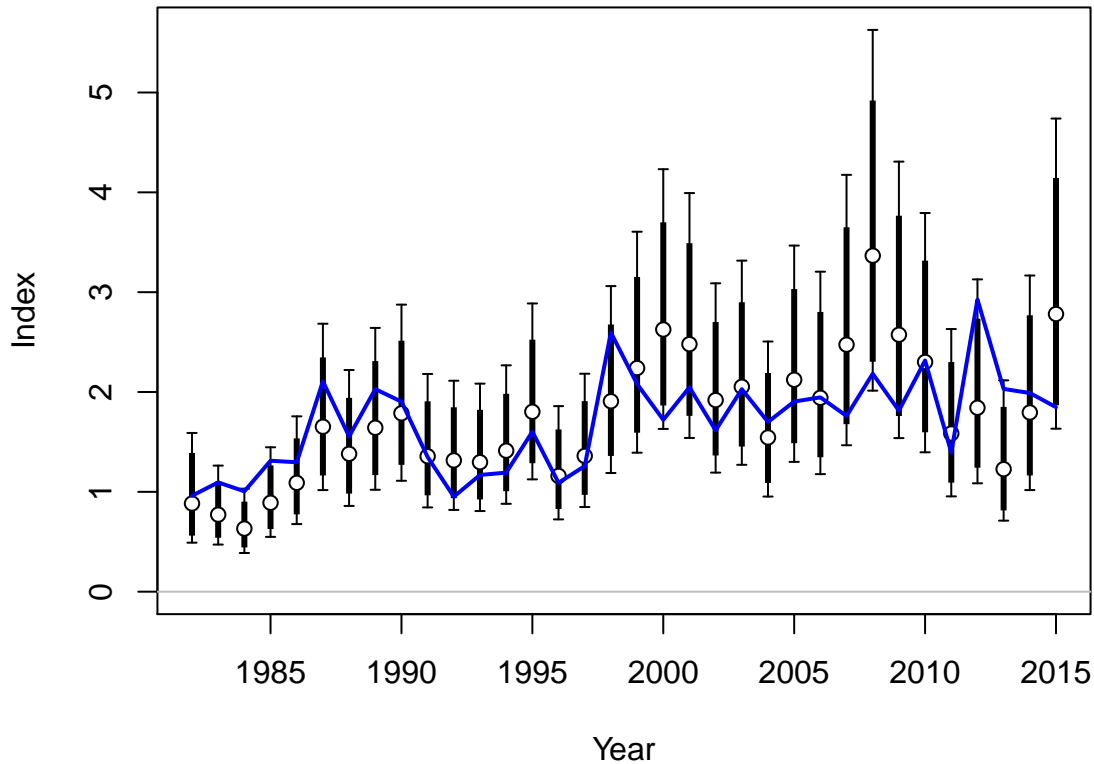
## Time-varying catchability Age-1



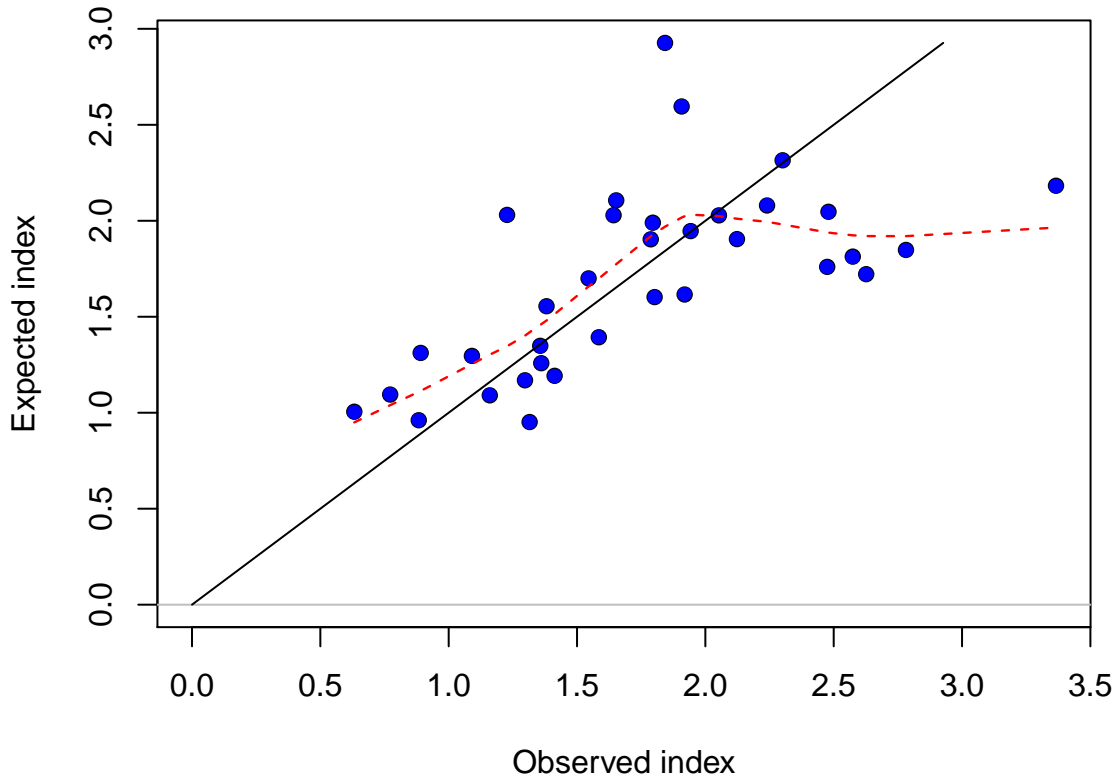
**Catchability vs. vulnerable biomass Age-1**



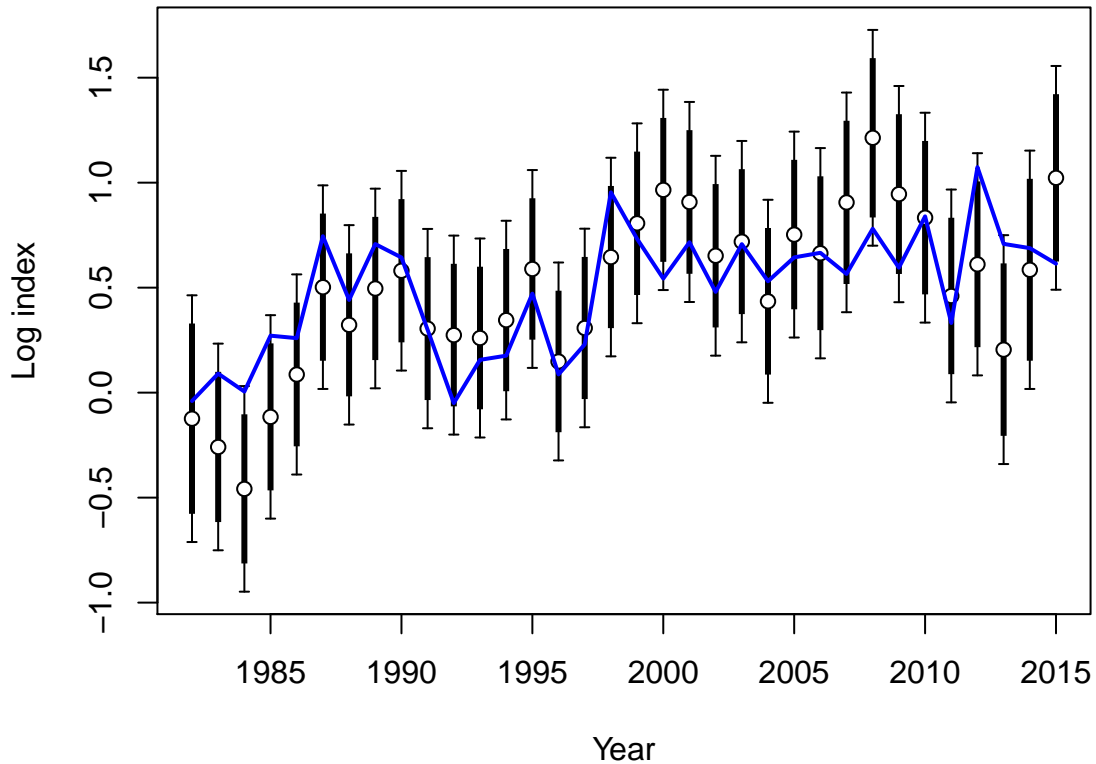
# Index Age-2



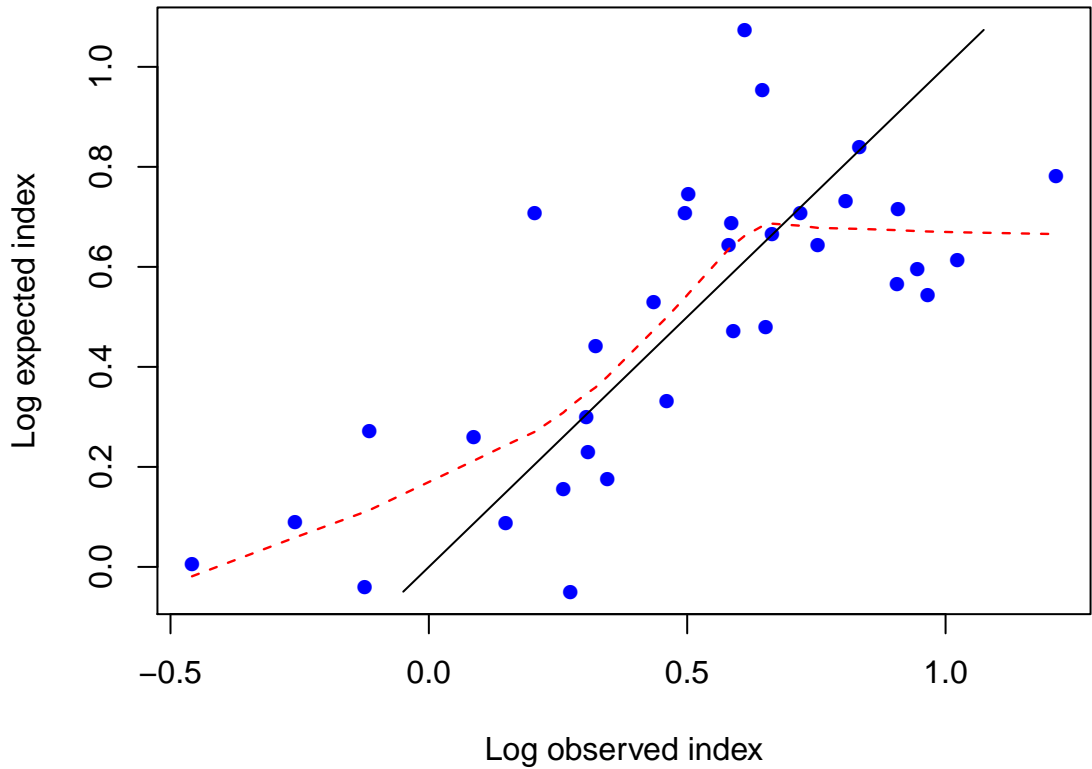
# Index Age-2



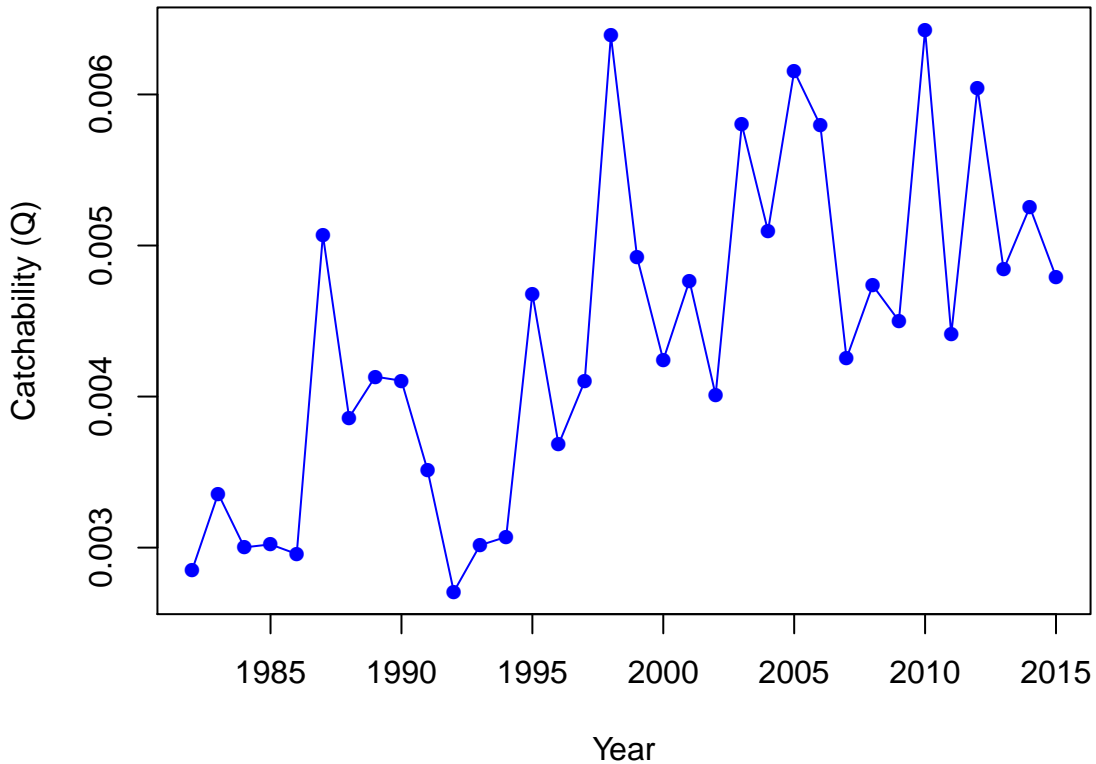
# Log index Age-2



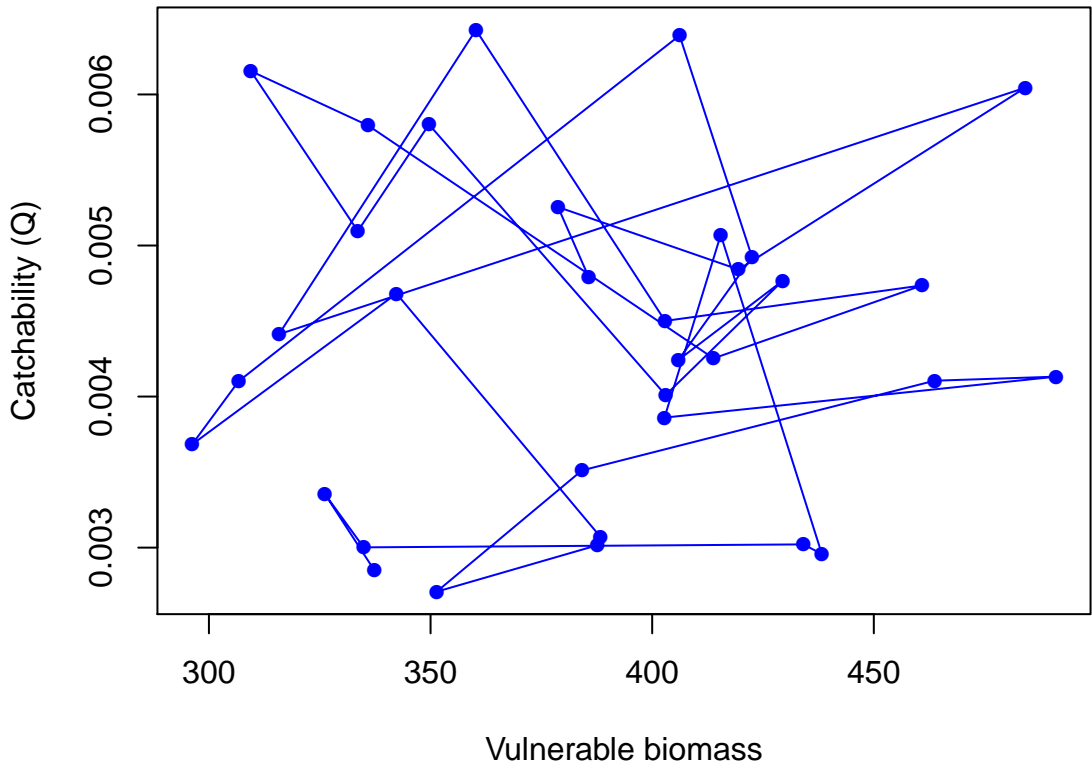
# Log index Age-2



## Time-varying catchability Age-2

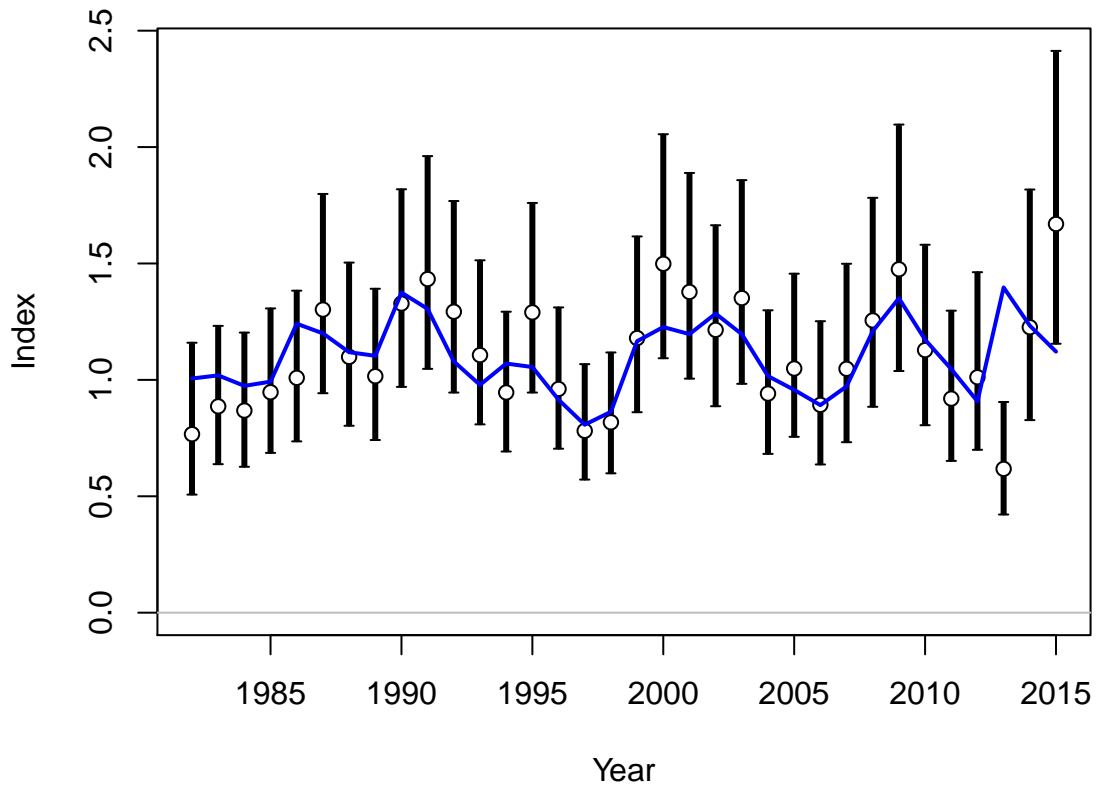


**Catchability vs. vulnerable biomass Age-2**

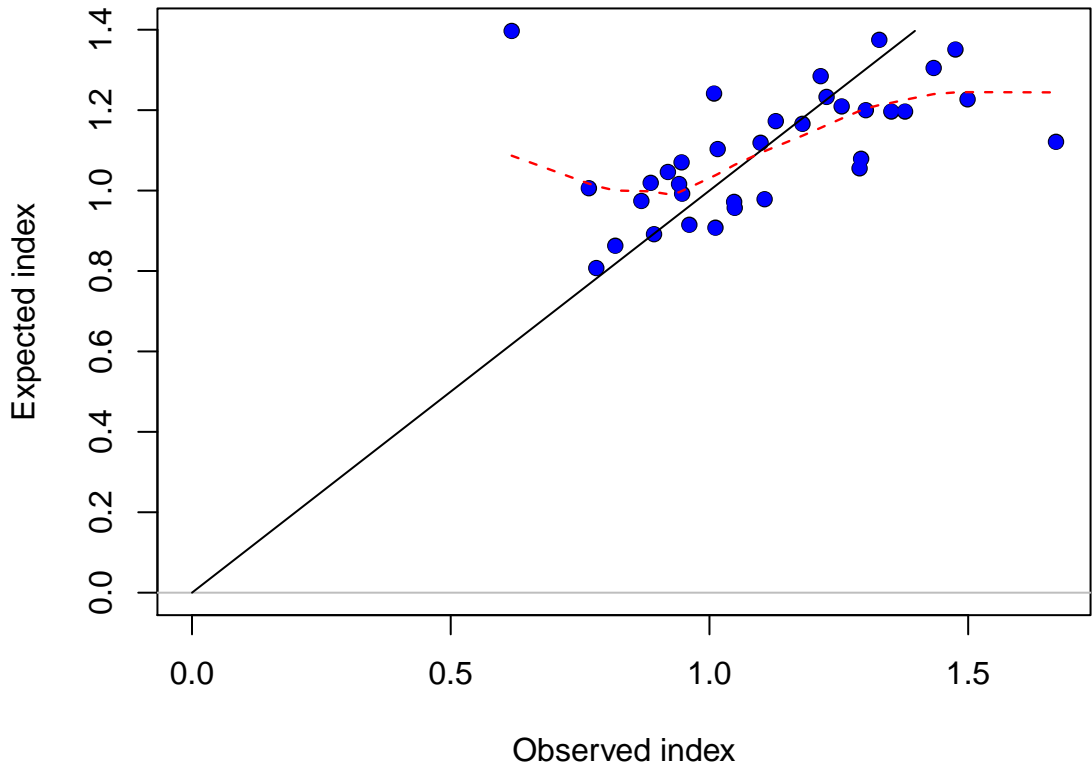




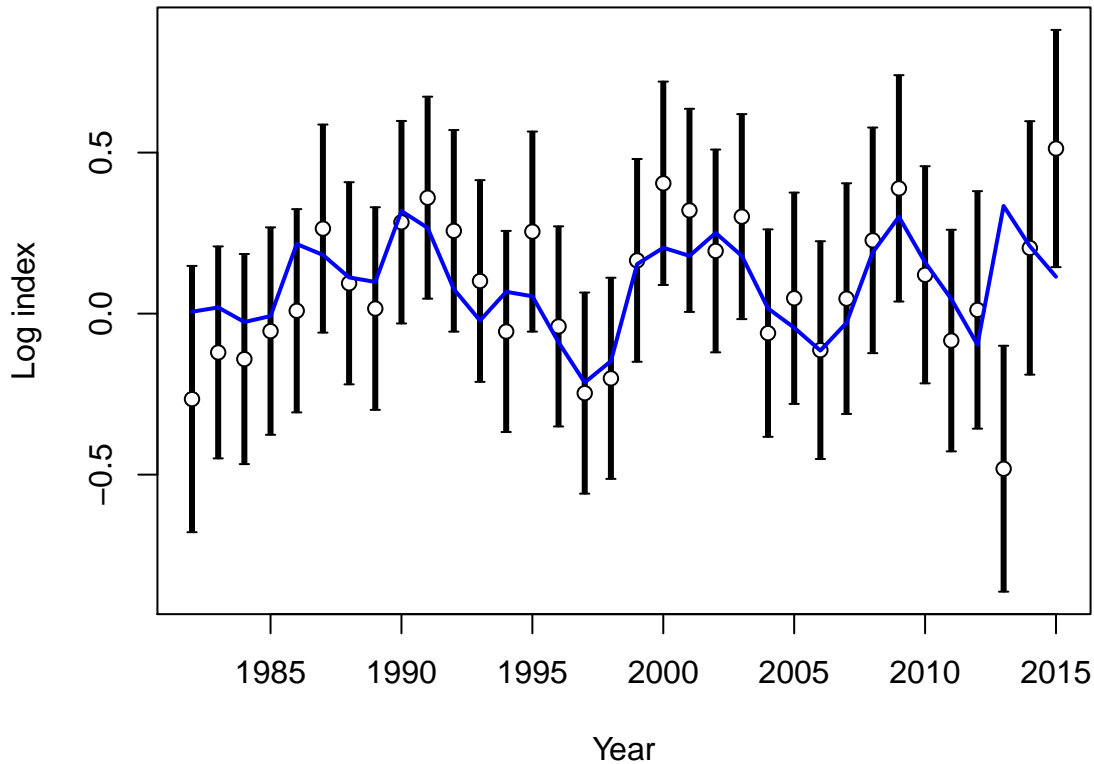
# Index Age-3



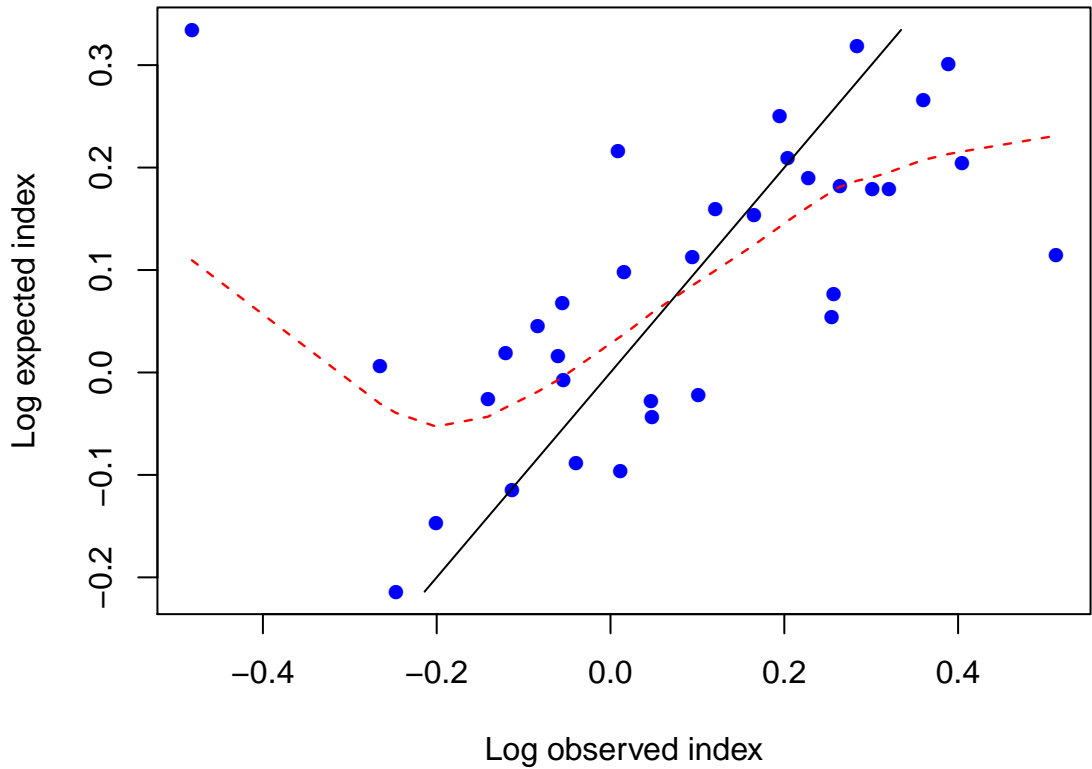
### Index Age-3



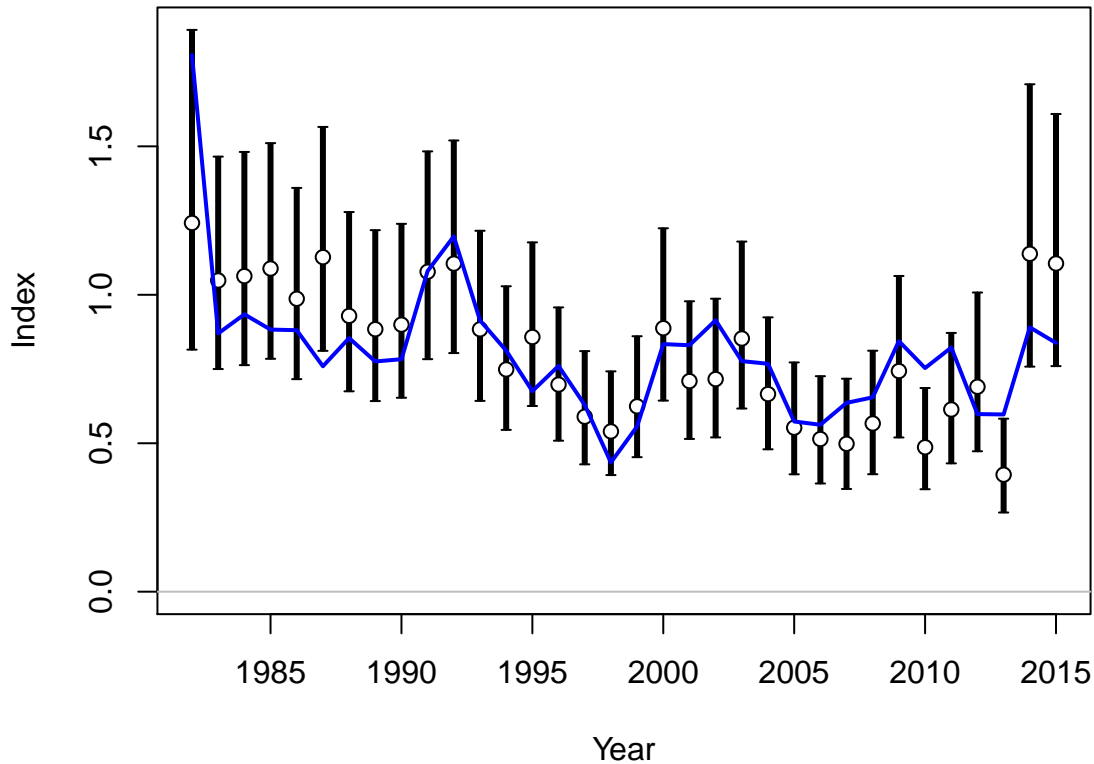
# Log index Age-3



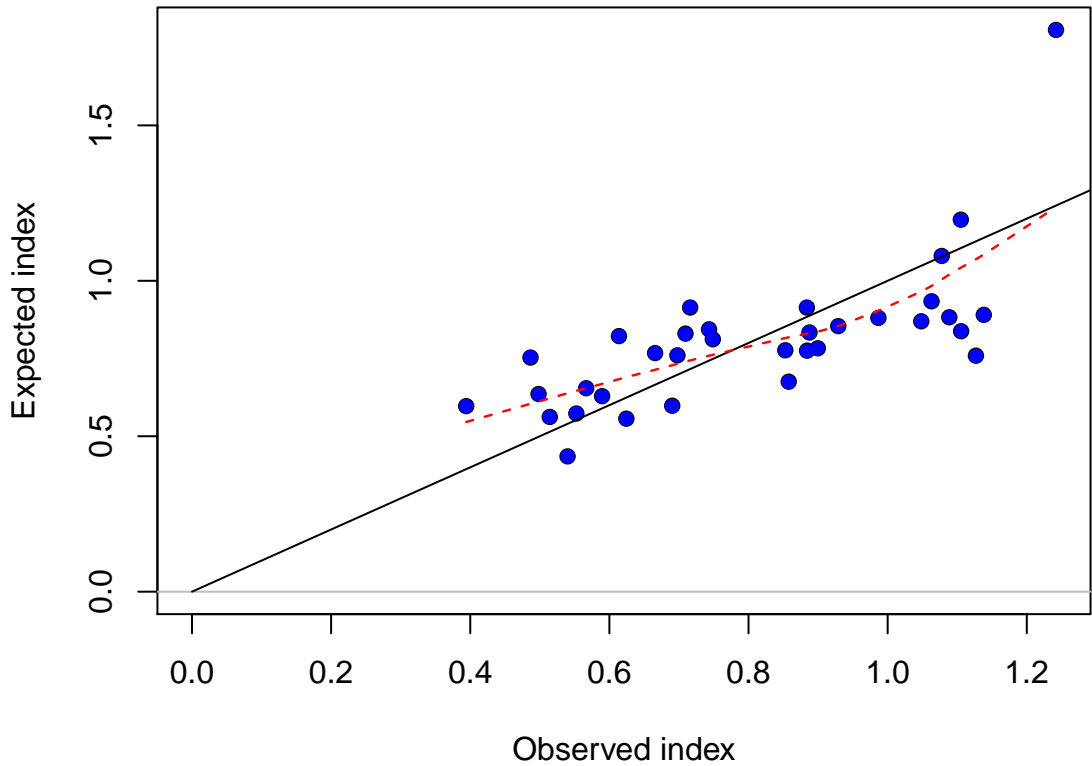
### Log index Age-3



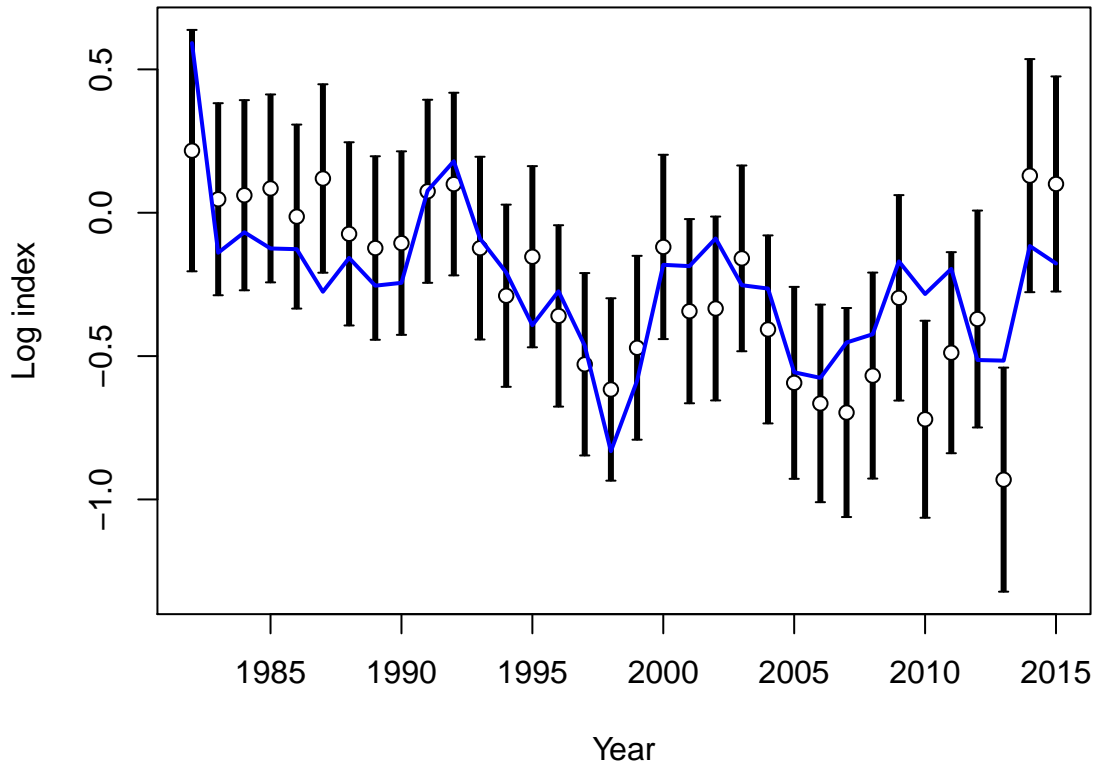
# Index Age-4



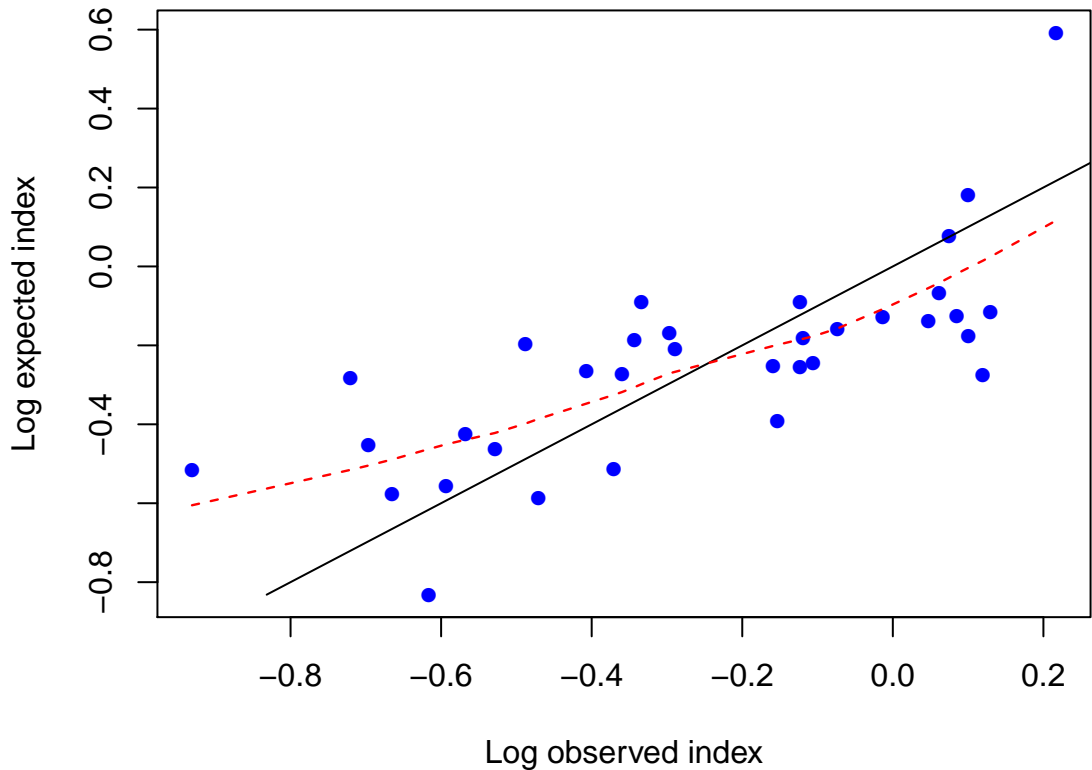
# Index Age-4



# Log index Age-4

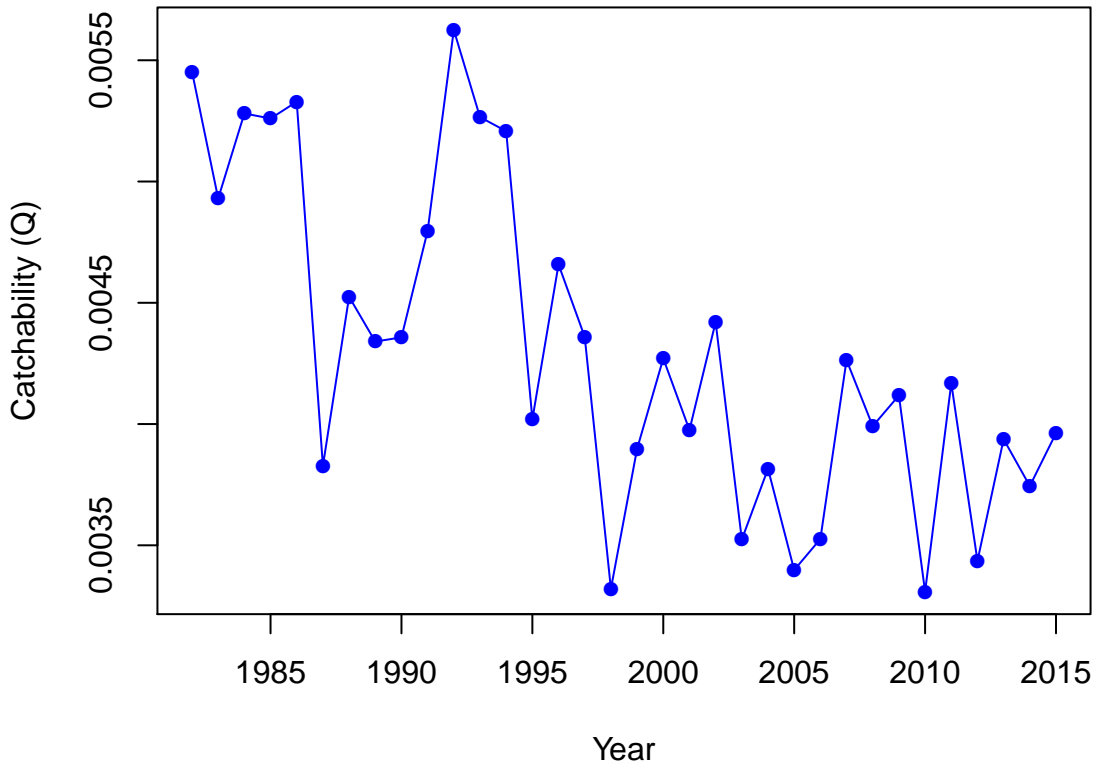


# Log index Age-4

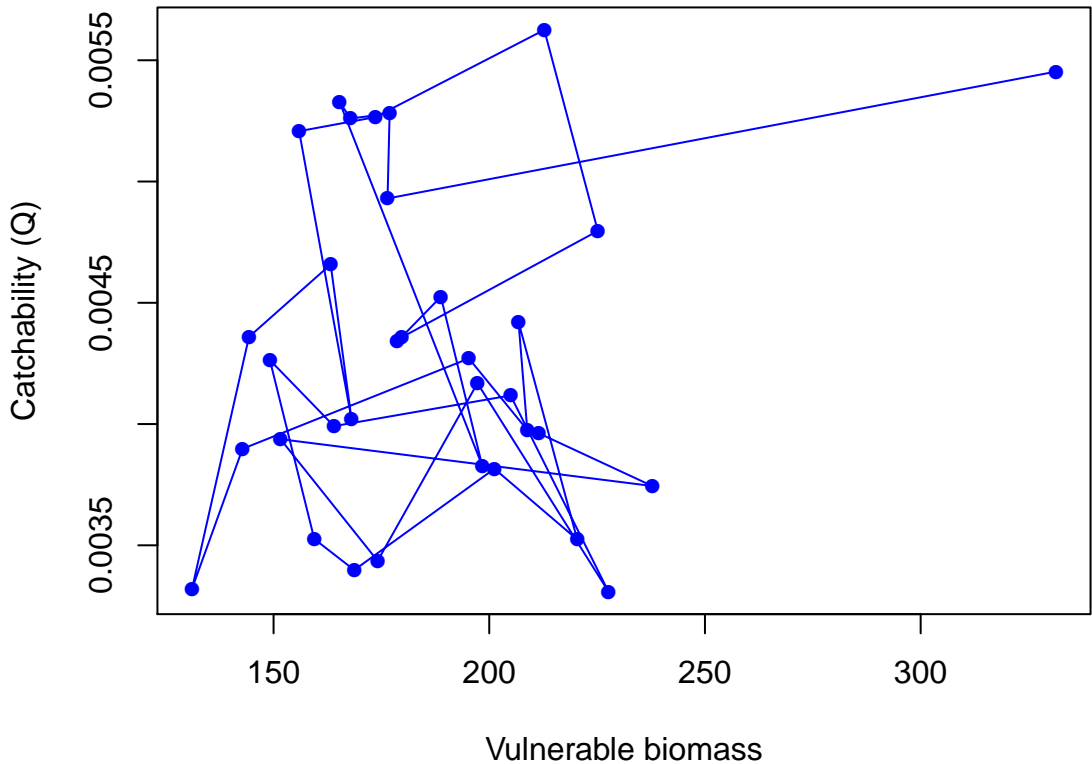




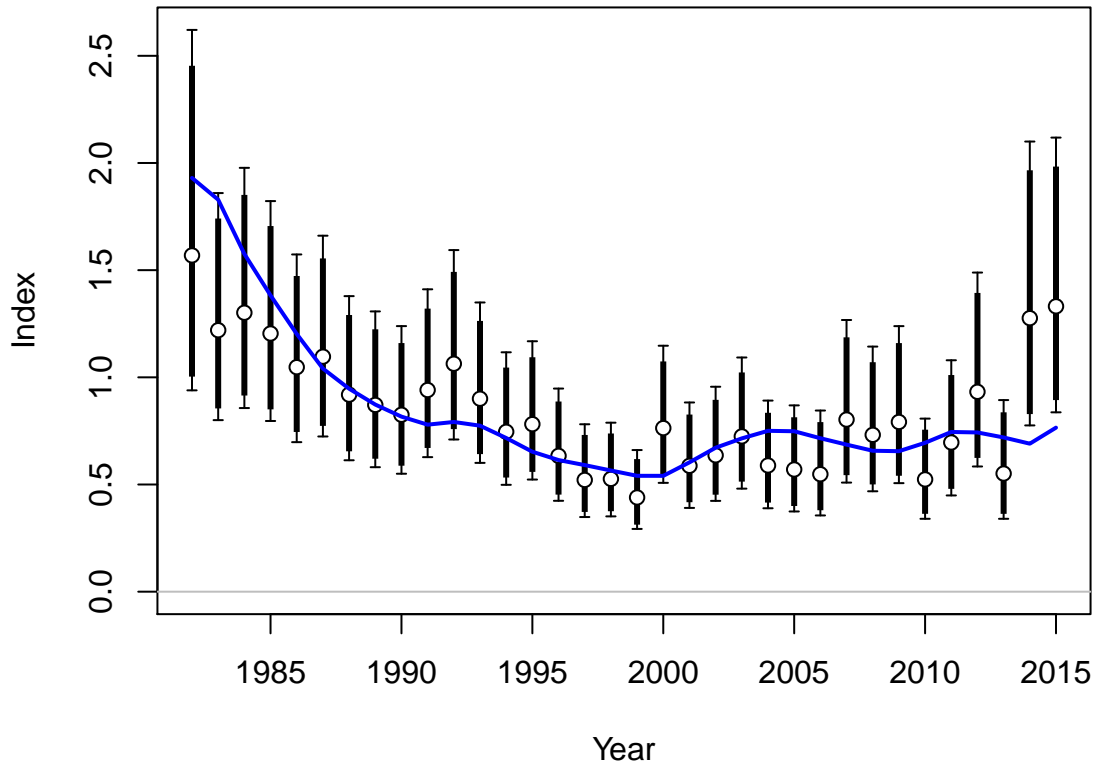
## Time-varying catchability Age-4



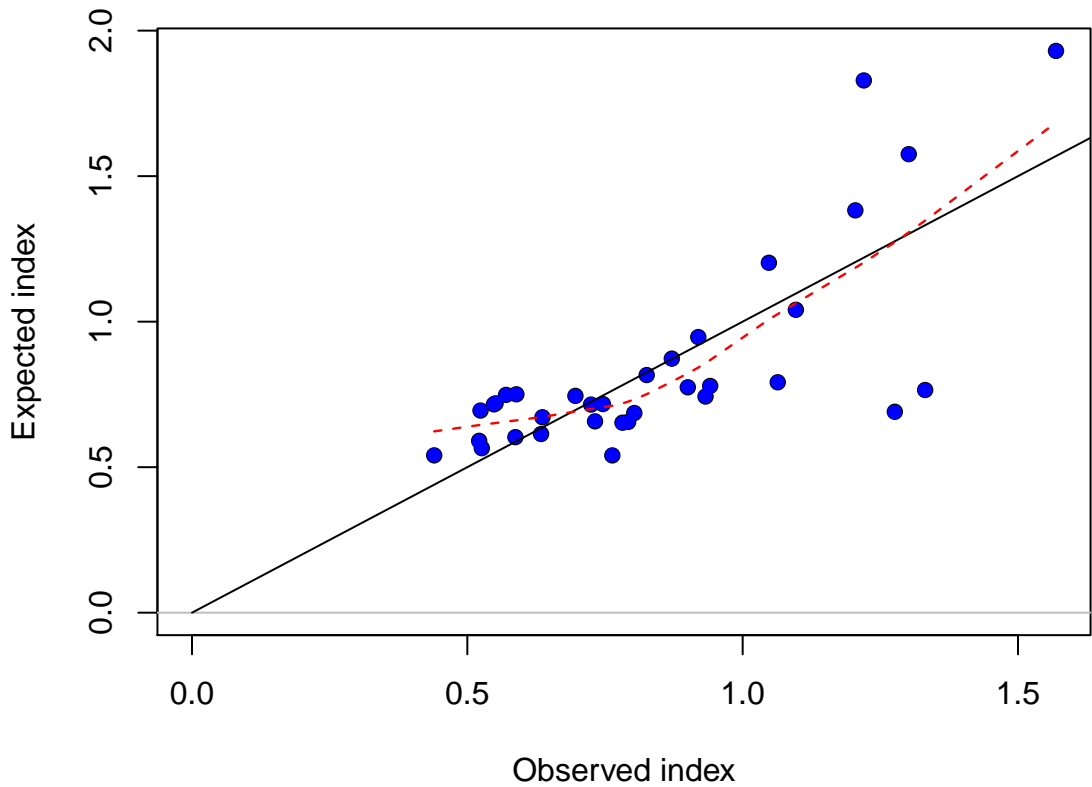
Catchability vs. vulnerable biomass Age-4



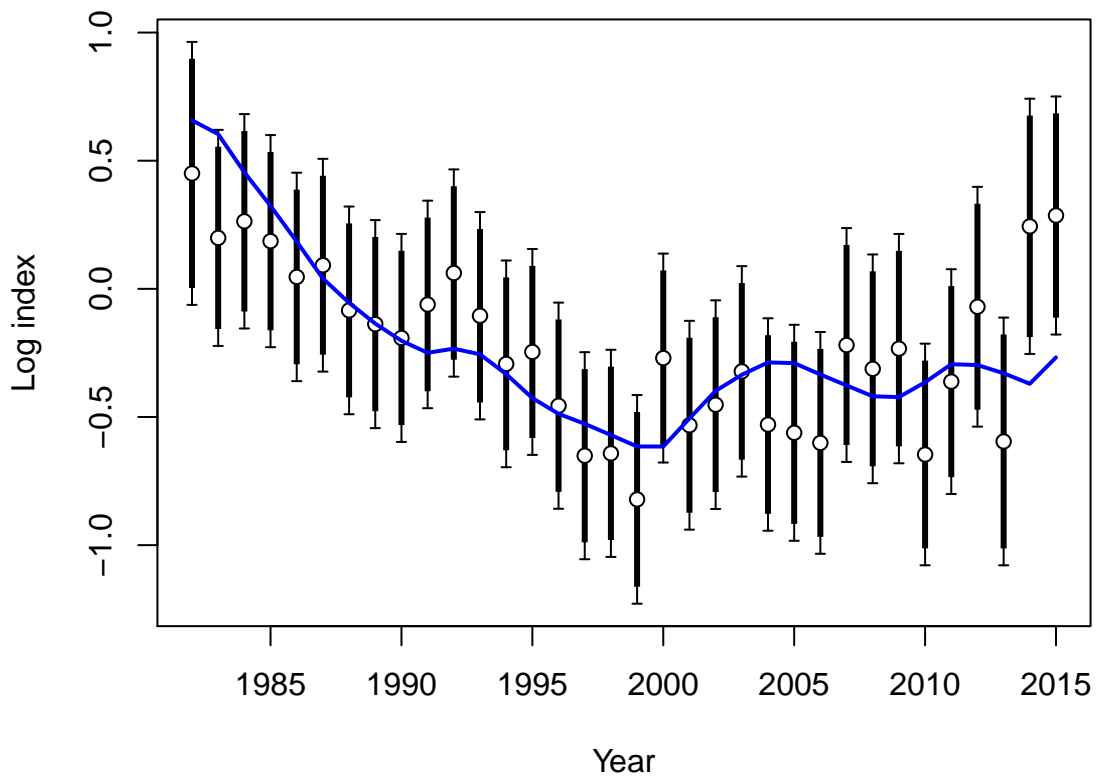
# Index Age-5+



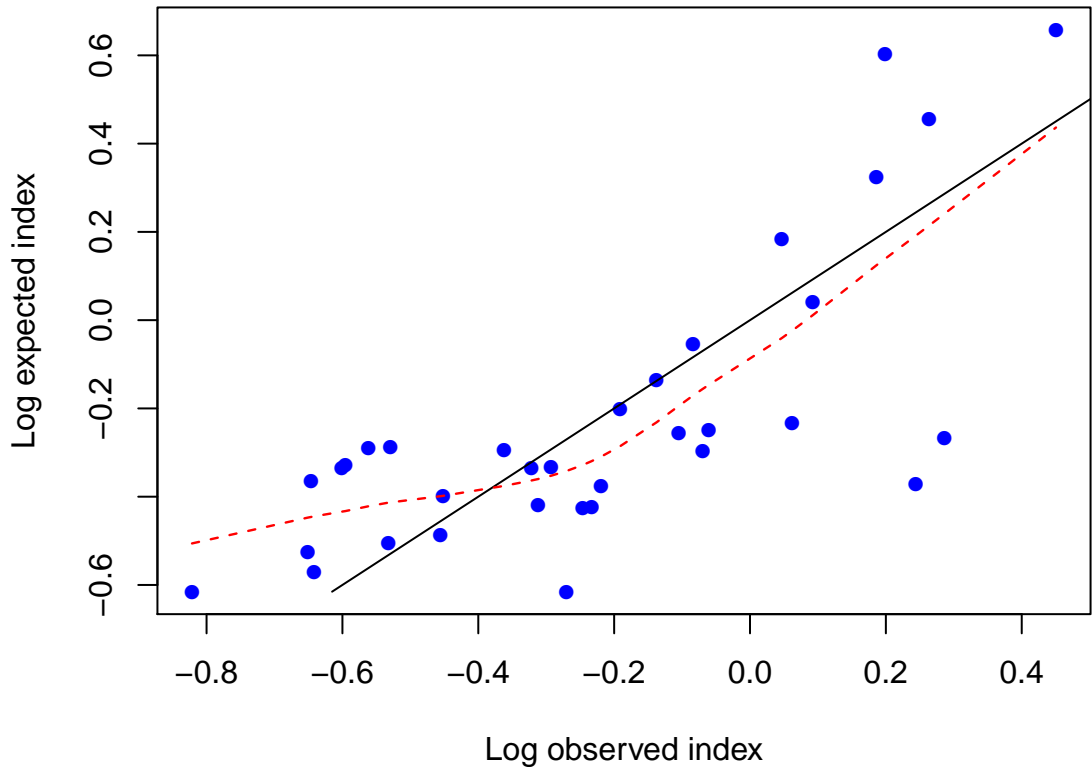
# Index Age-5+



# Log index Age-5+



# Log index Age-5+

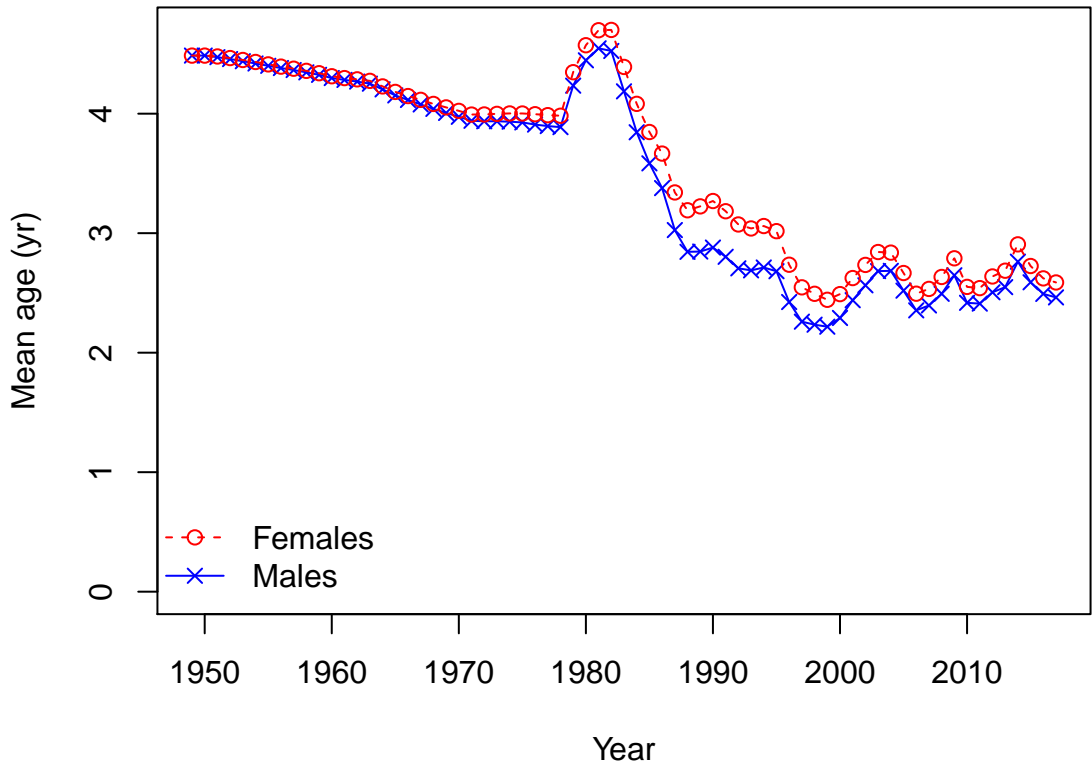






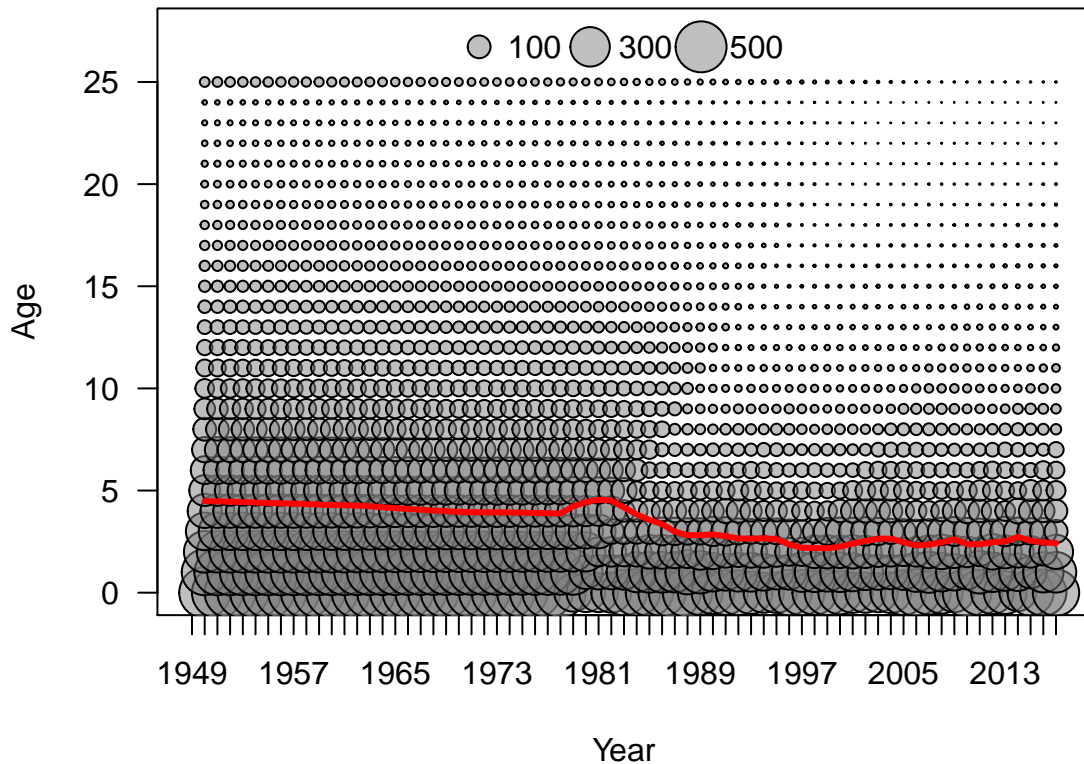


## Beginning of year mean age in the population

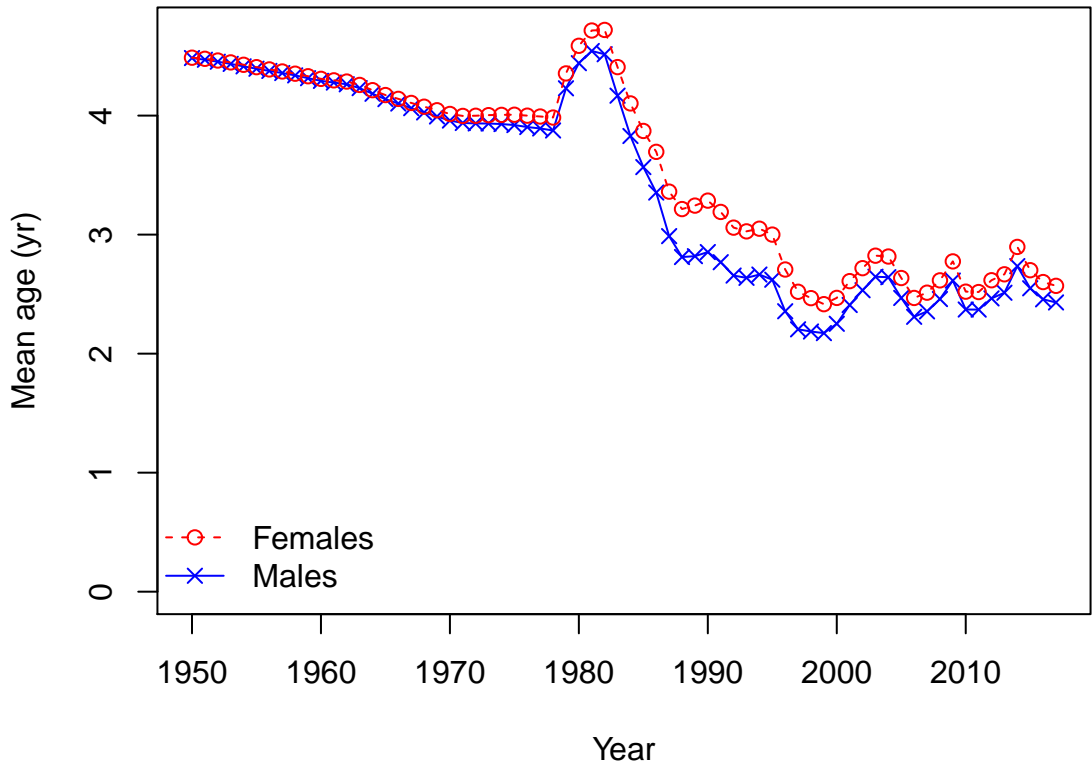




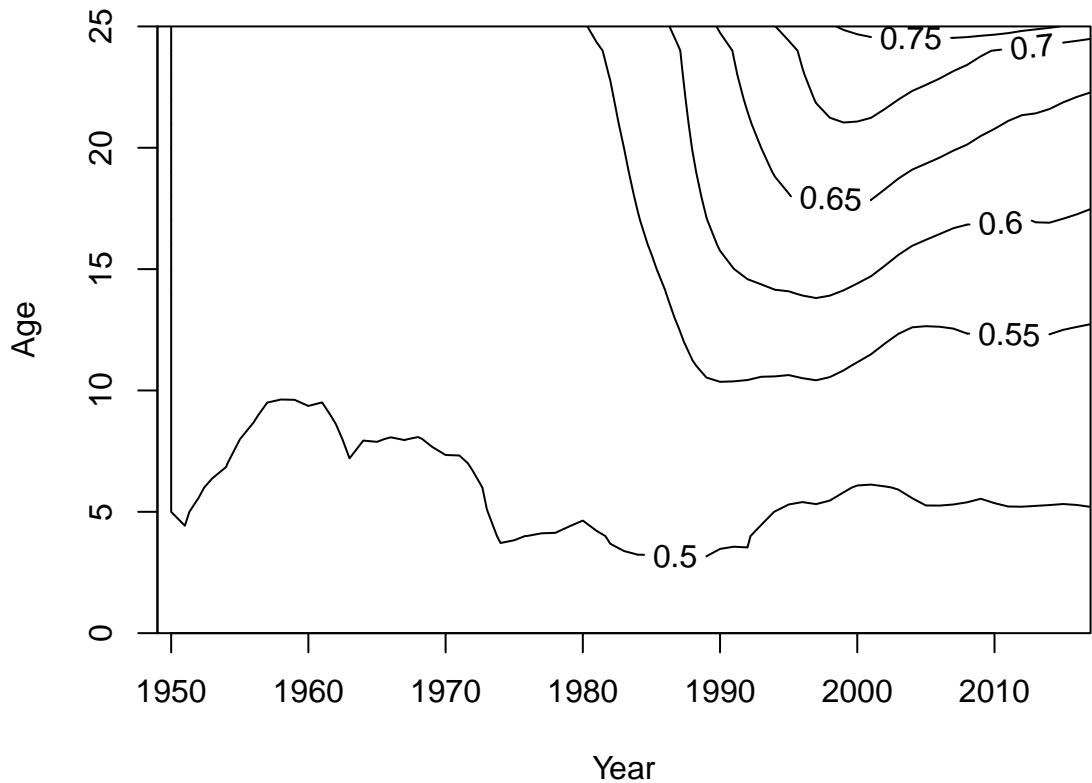
# Middle of year expected numbers at age of males in (max ~ 517.5 thousand)



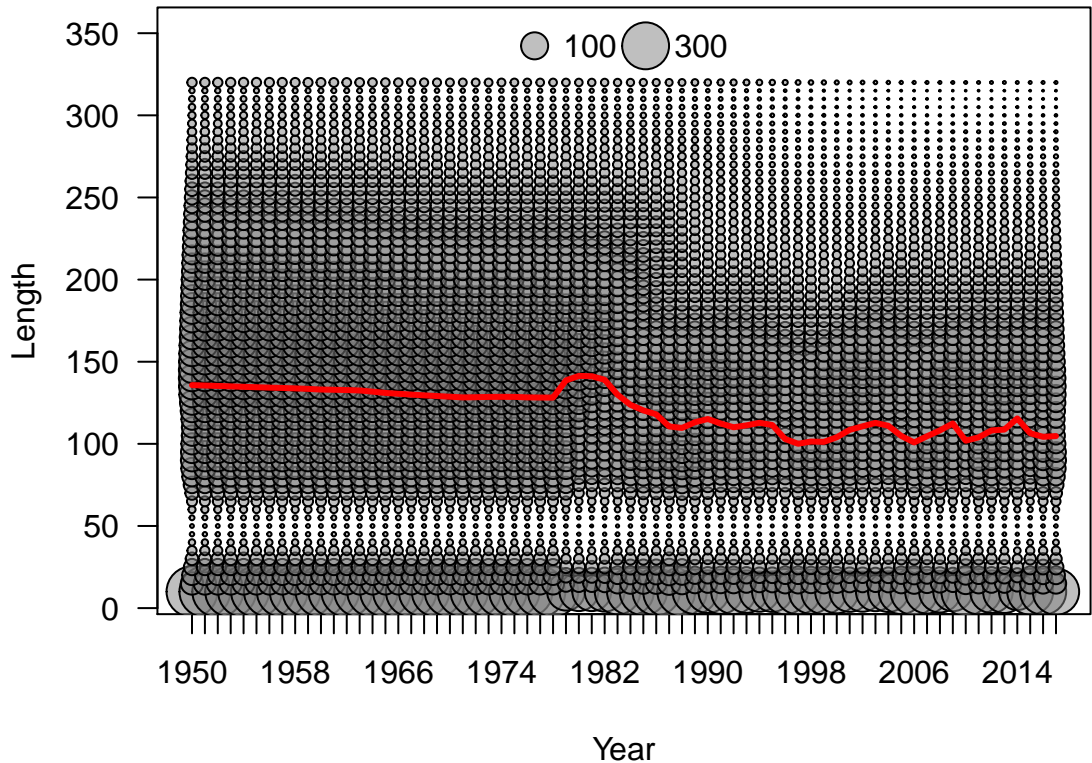
## Middle of year mean age in the population



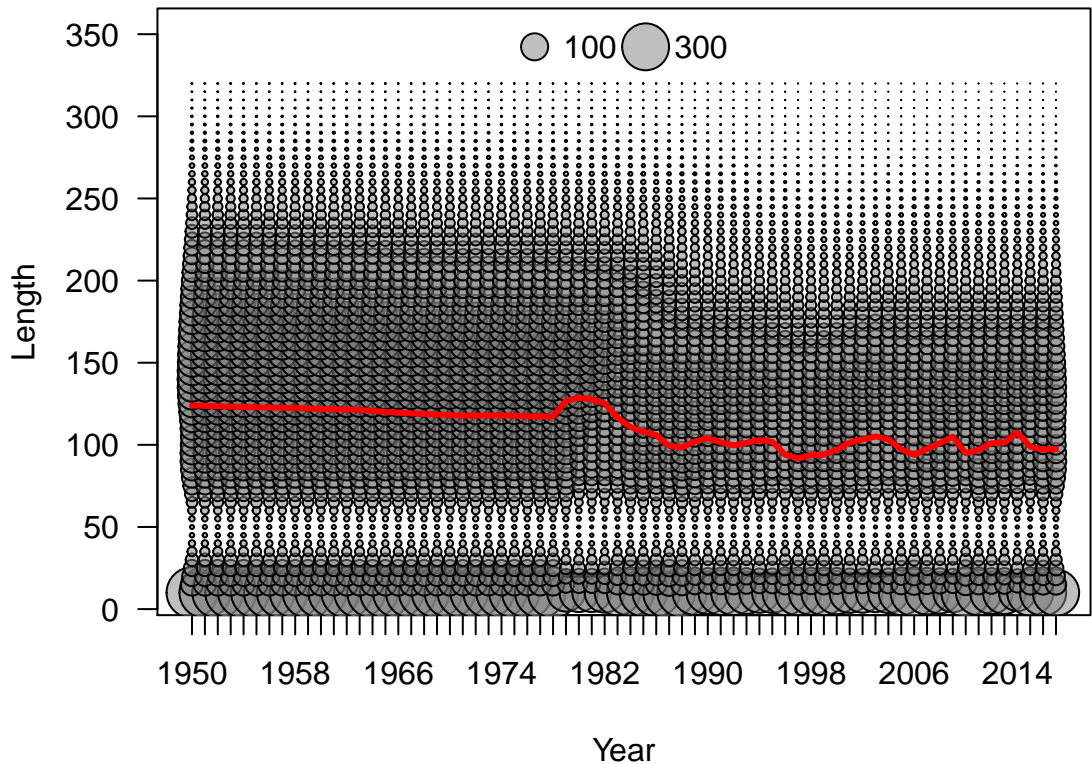
# Fraction female in numbers at age



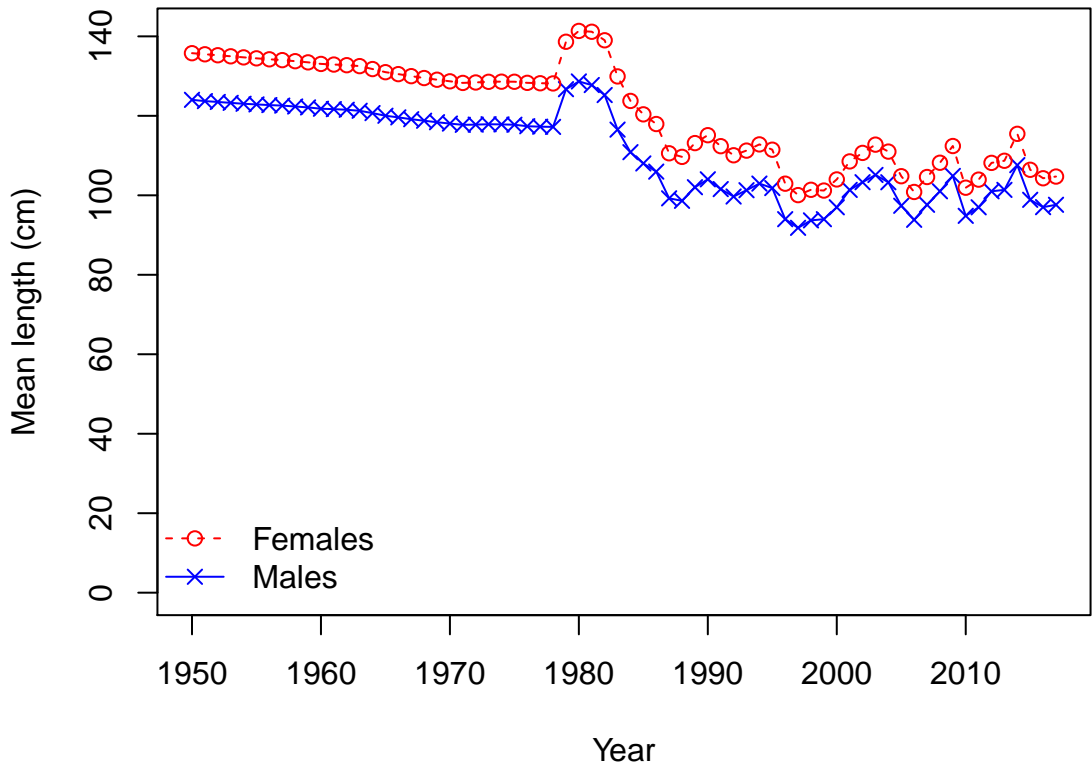
Beginning of year expected numbers at length of females in (max ~ 367.1 thousand



# Beginning of year expected numbers at length of males in (max ~ 367.1 thousand)

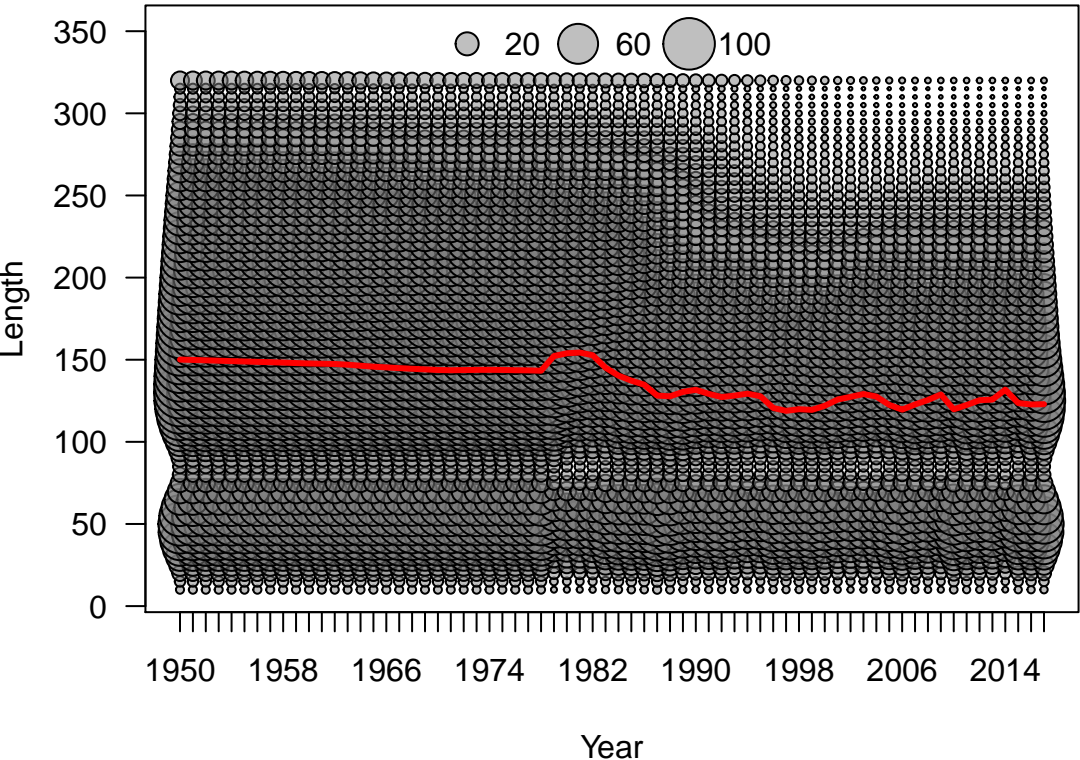


## Beginning of year mean length (cm) in the population

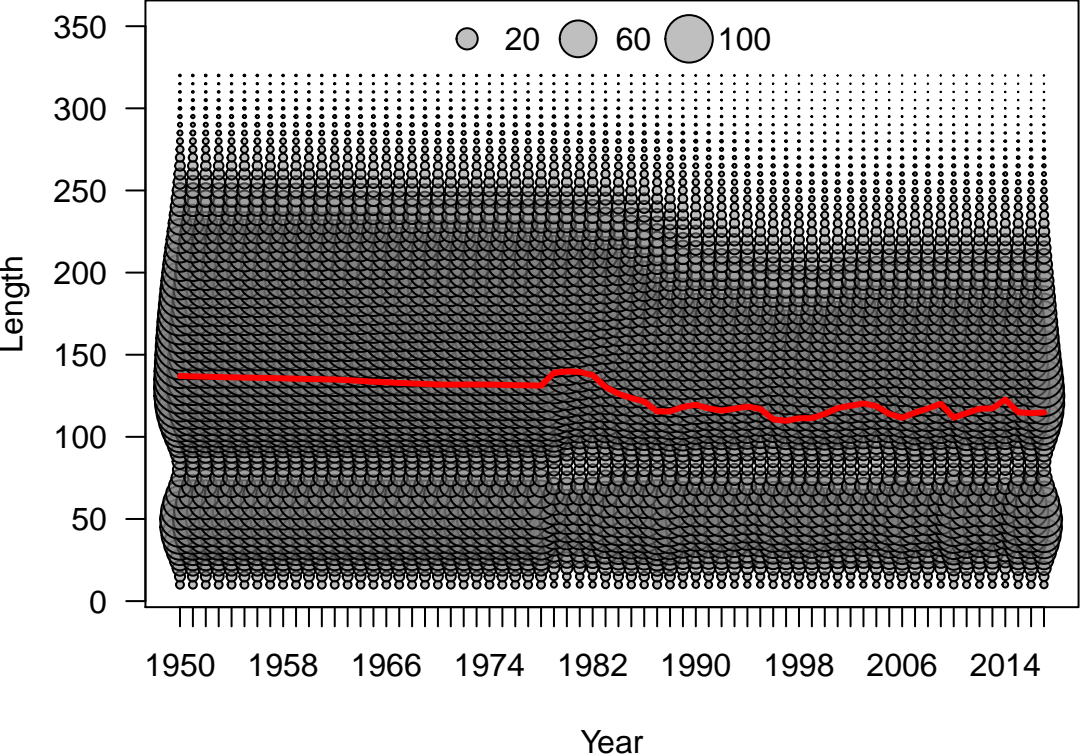




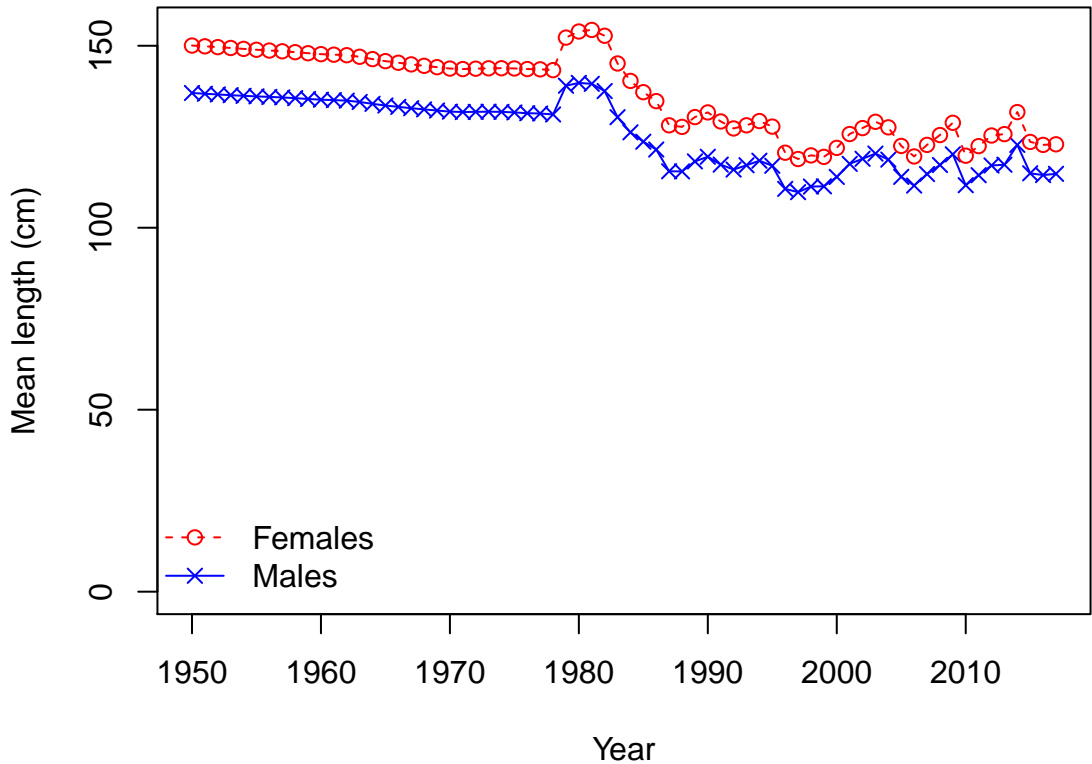
**Middle of year expected numbers at length of females in (max ~ 101.1 thousand)**



Middle of year expected numbers at length of males in (max ~ 119.4 thousand)

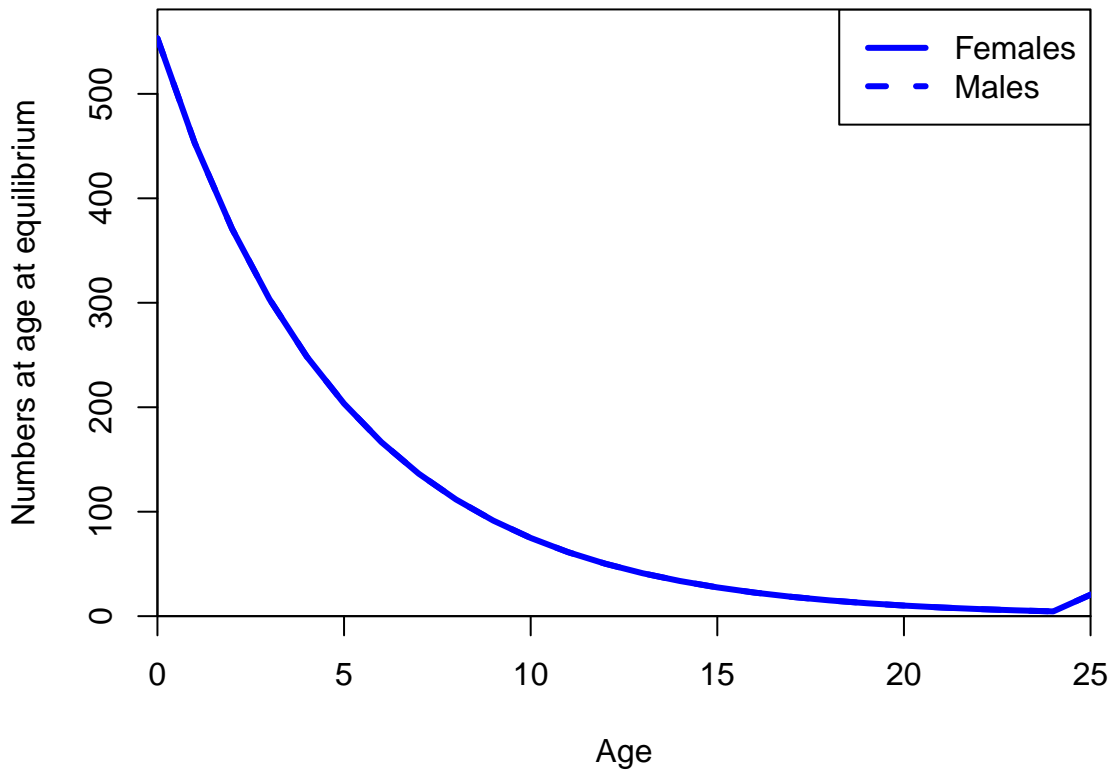


## Middle of year mean length (cm) in the population

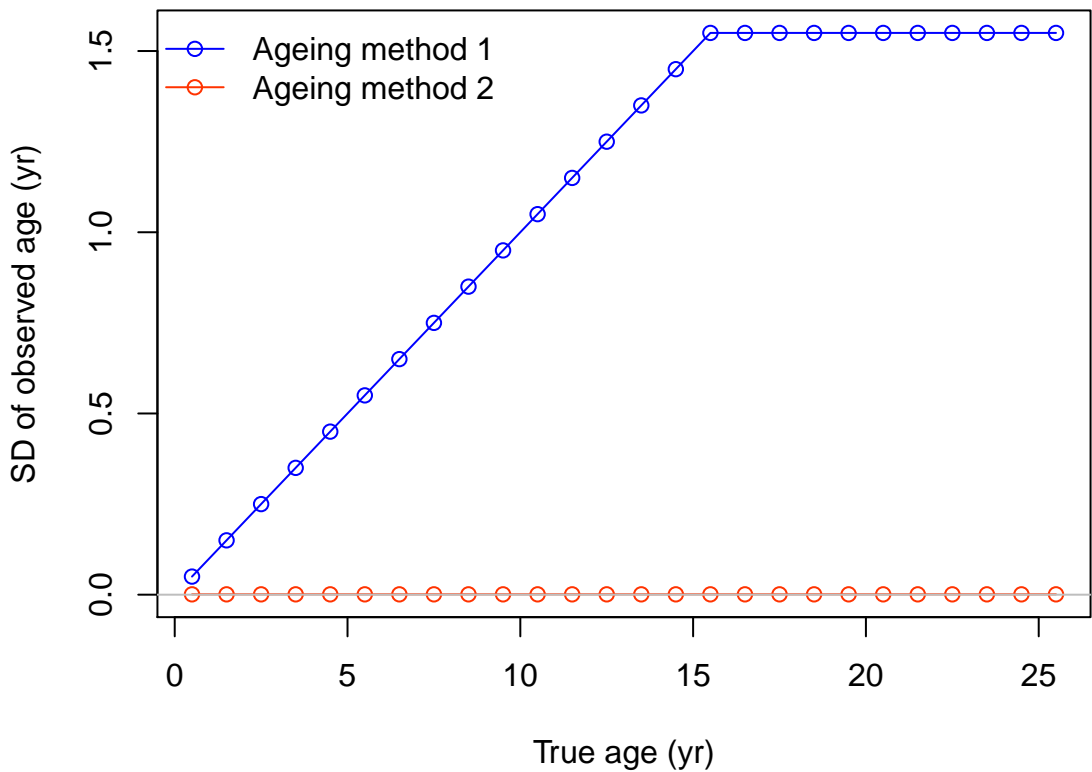




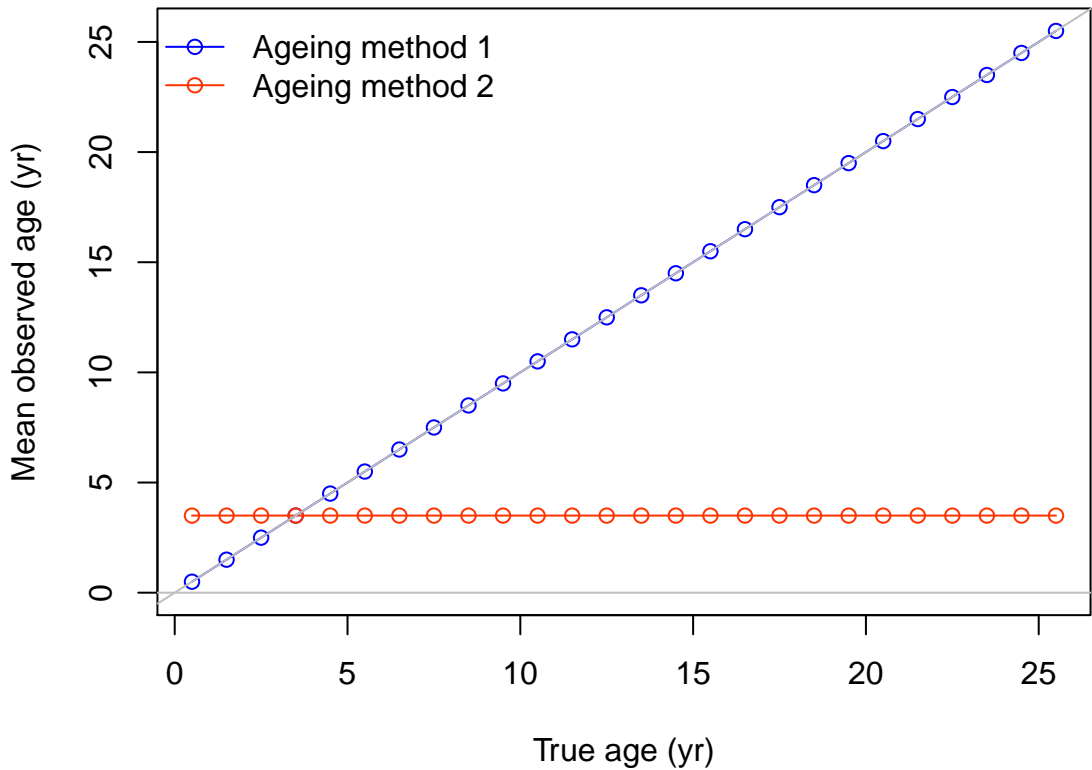
## Equilibrium age distribution



## Ageing imprecision



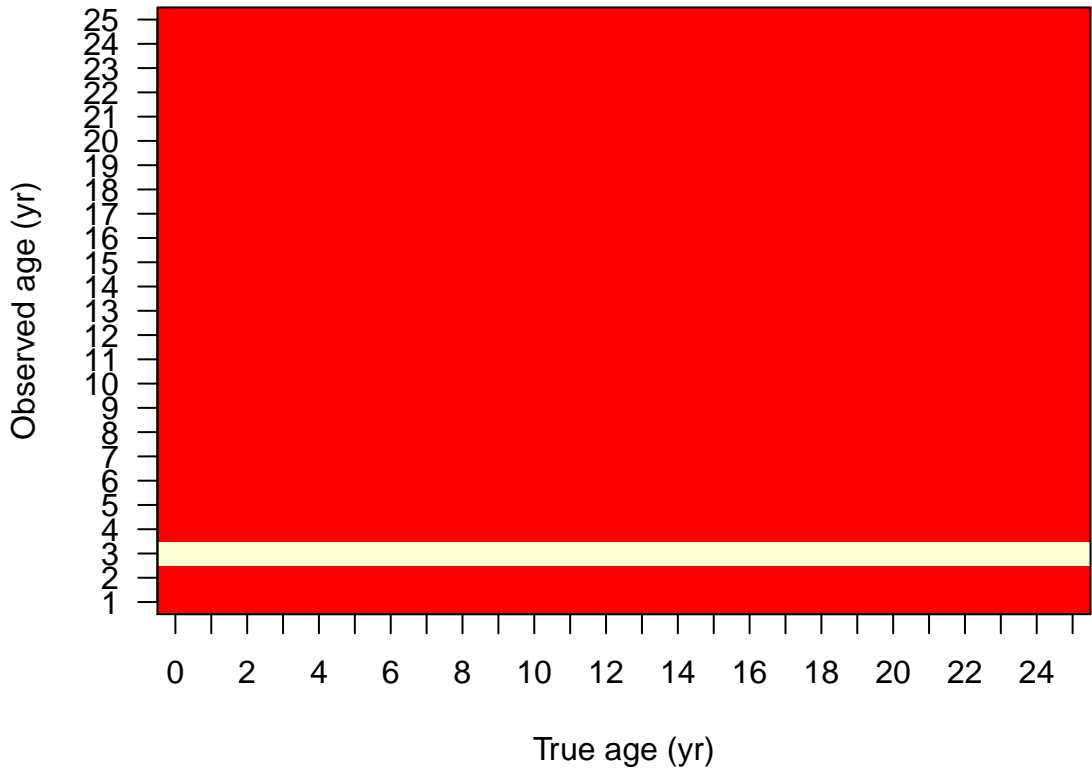
# Ageing imprecision



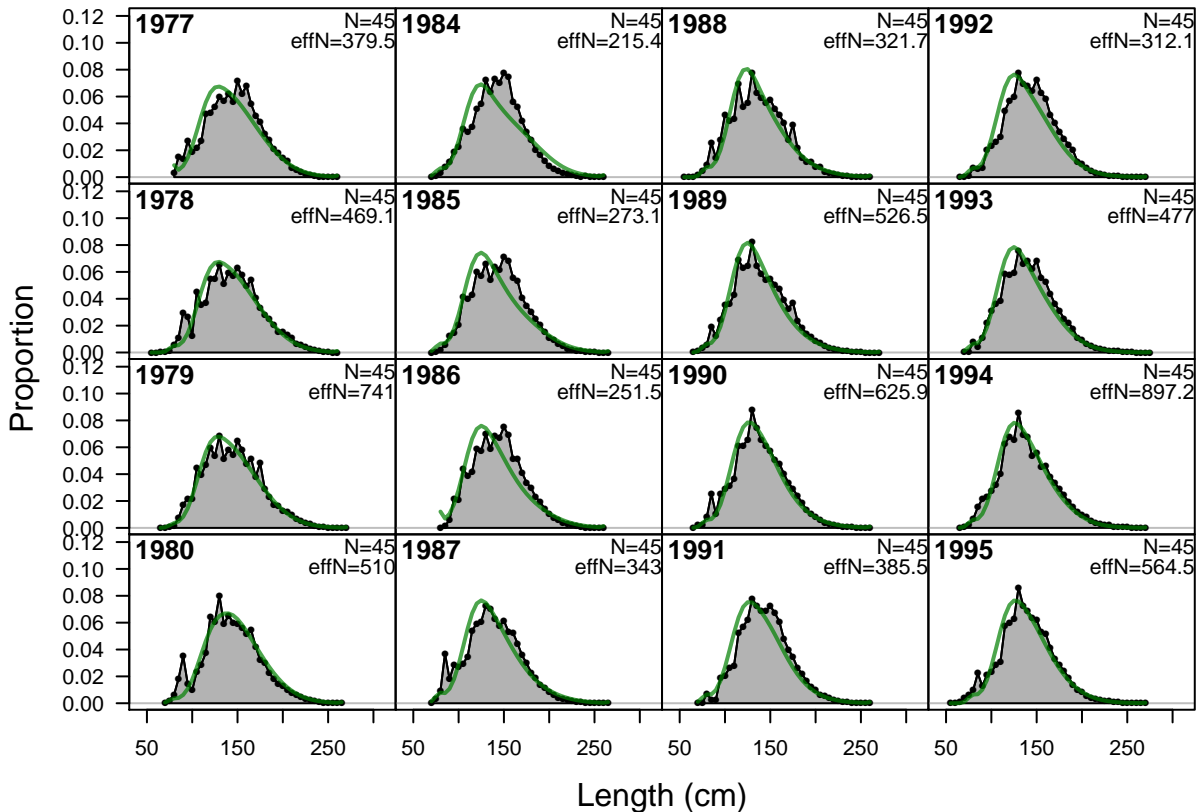




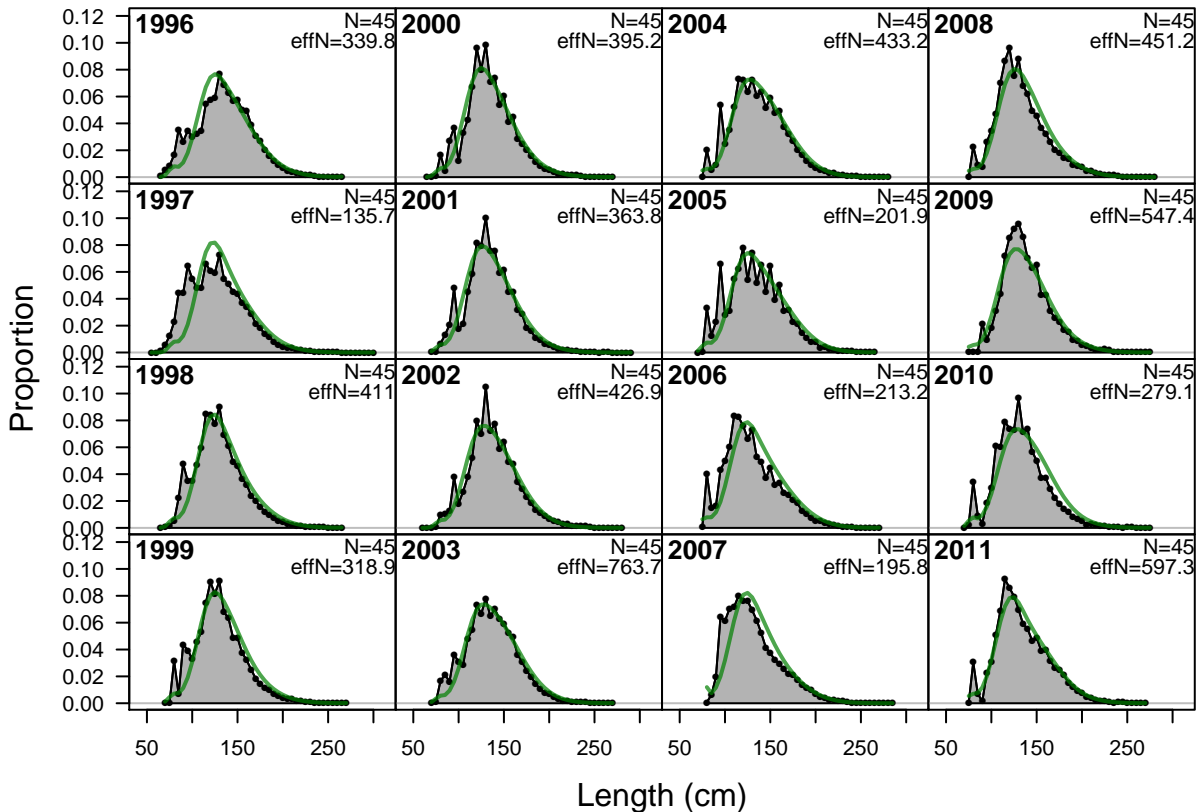
## Ageing imprecision: matrix for method 2



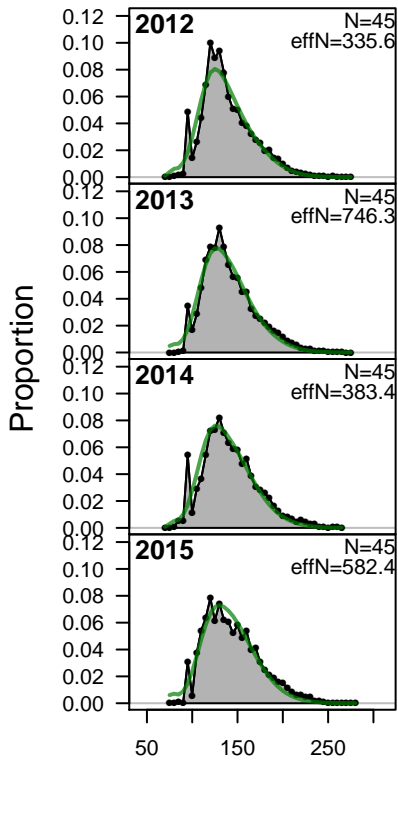
# Length comps, retained, SPN\_1



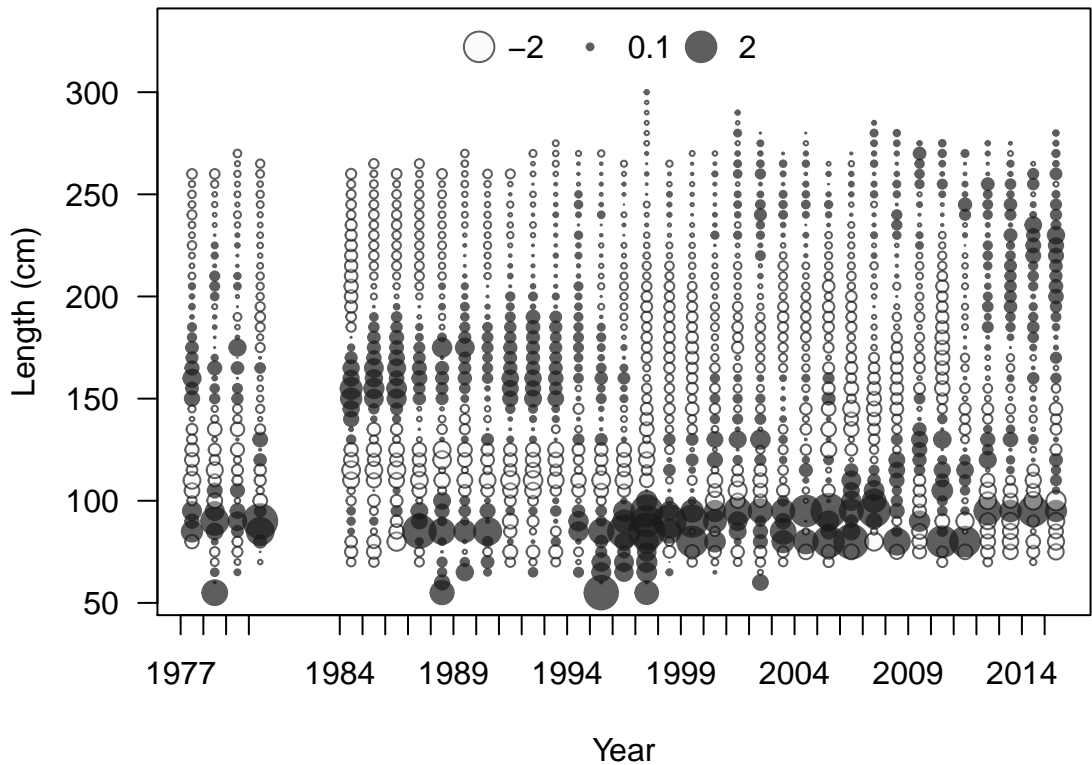
# Length comps, retained, SPN\_1



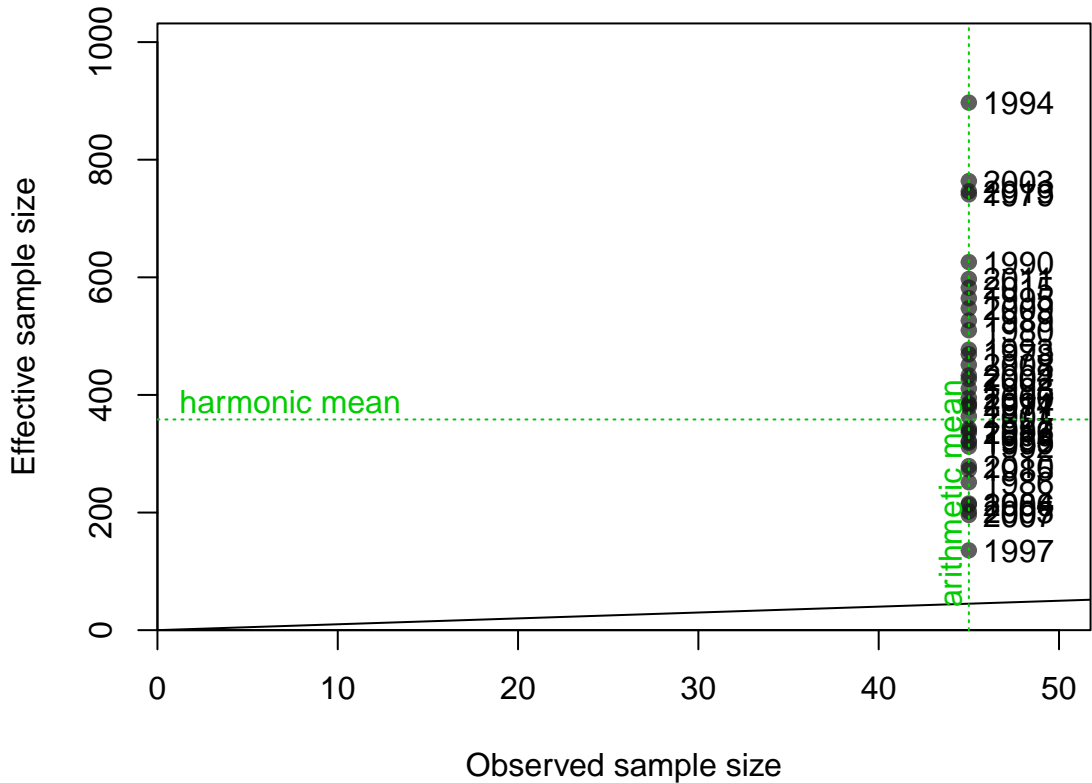
## Length comps, retained, SPN\_1



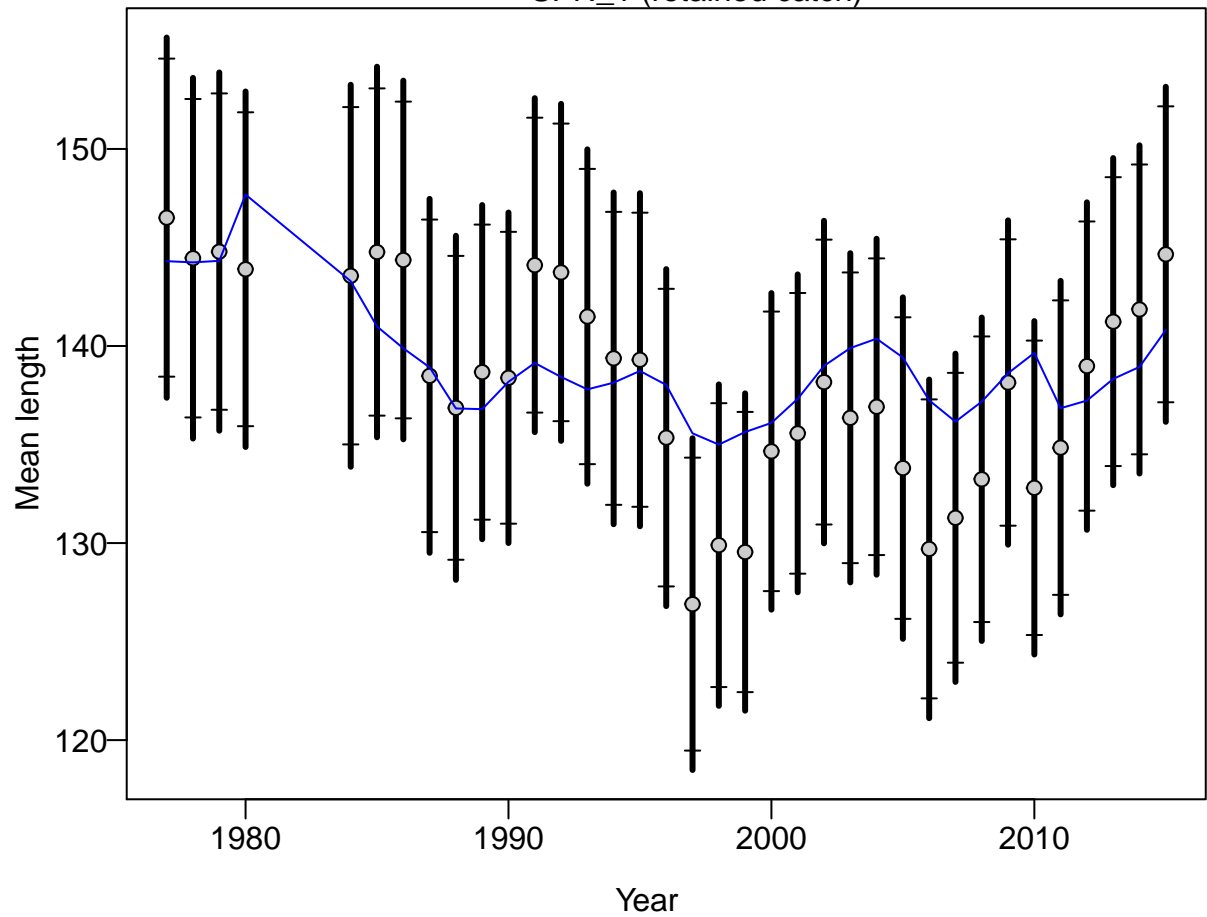
# Pearson residuals, retained, SPN\_1 (max=2.69)



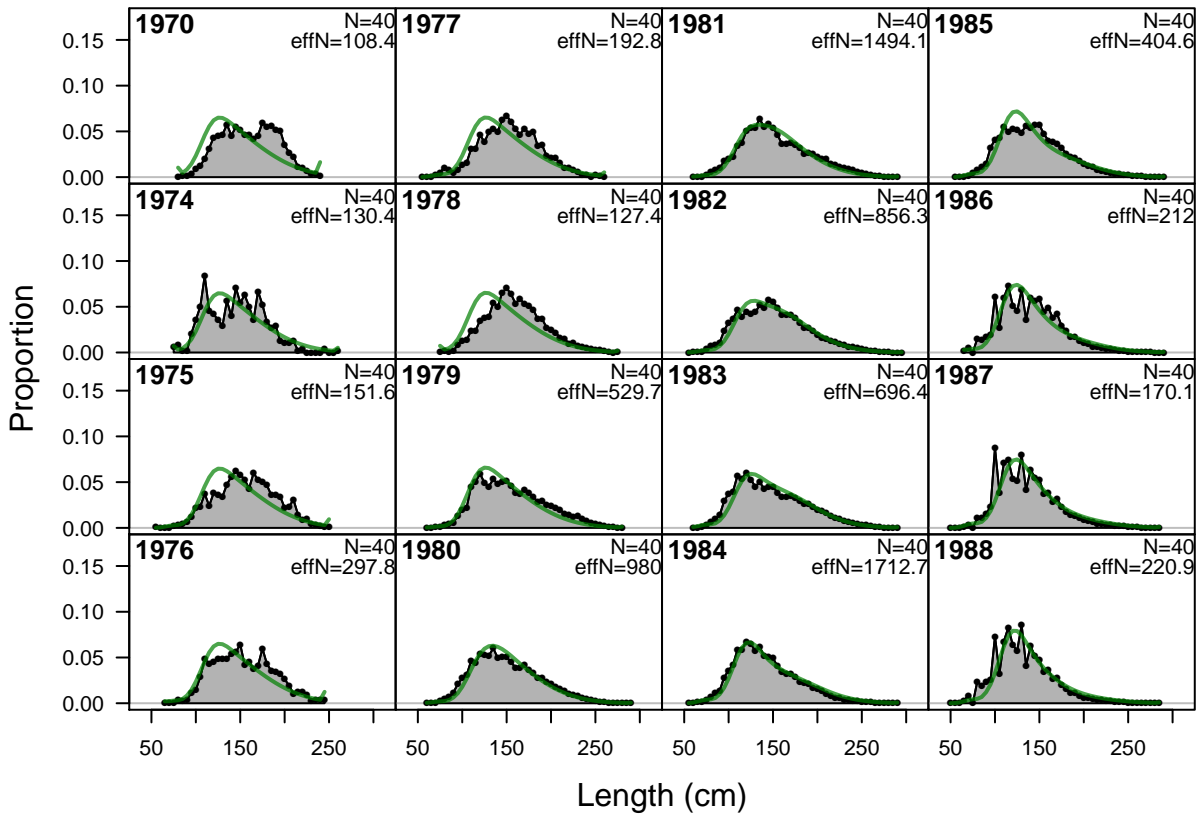
# N-EffN comparison, Length comps, retained, SPN\_1



## SPN\_1 (retained catch)

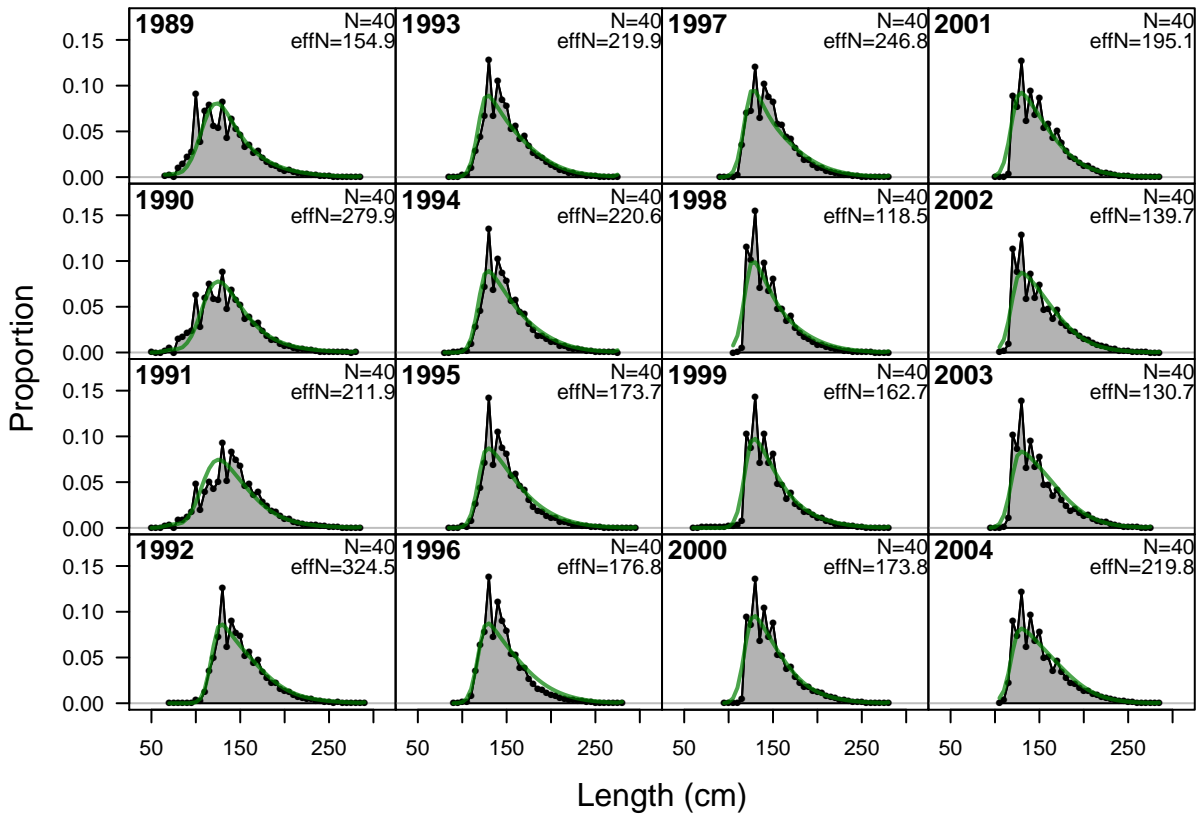


## Length comps, retained, US\_2

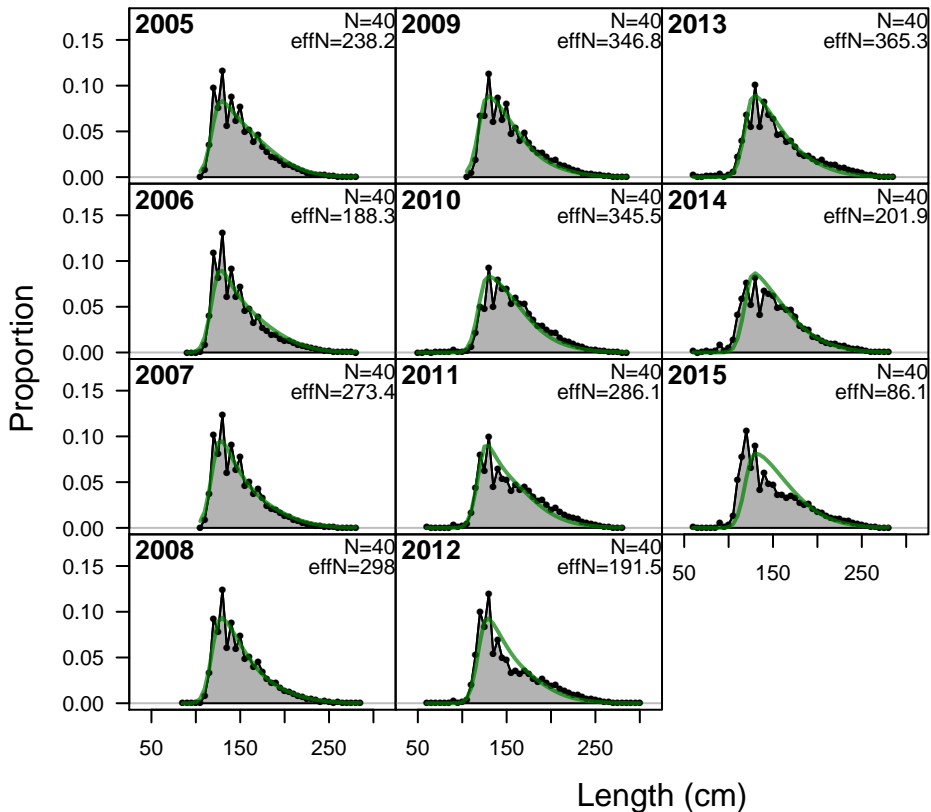




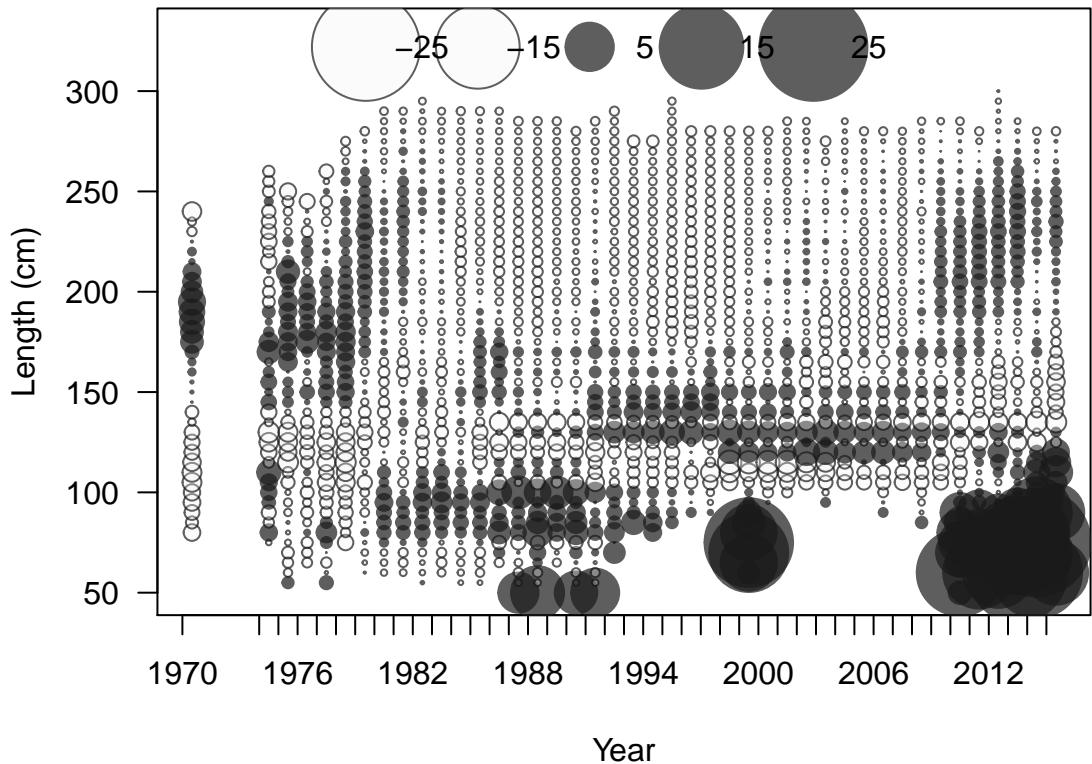
## Length comps, retained, US\_2



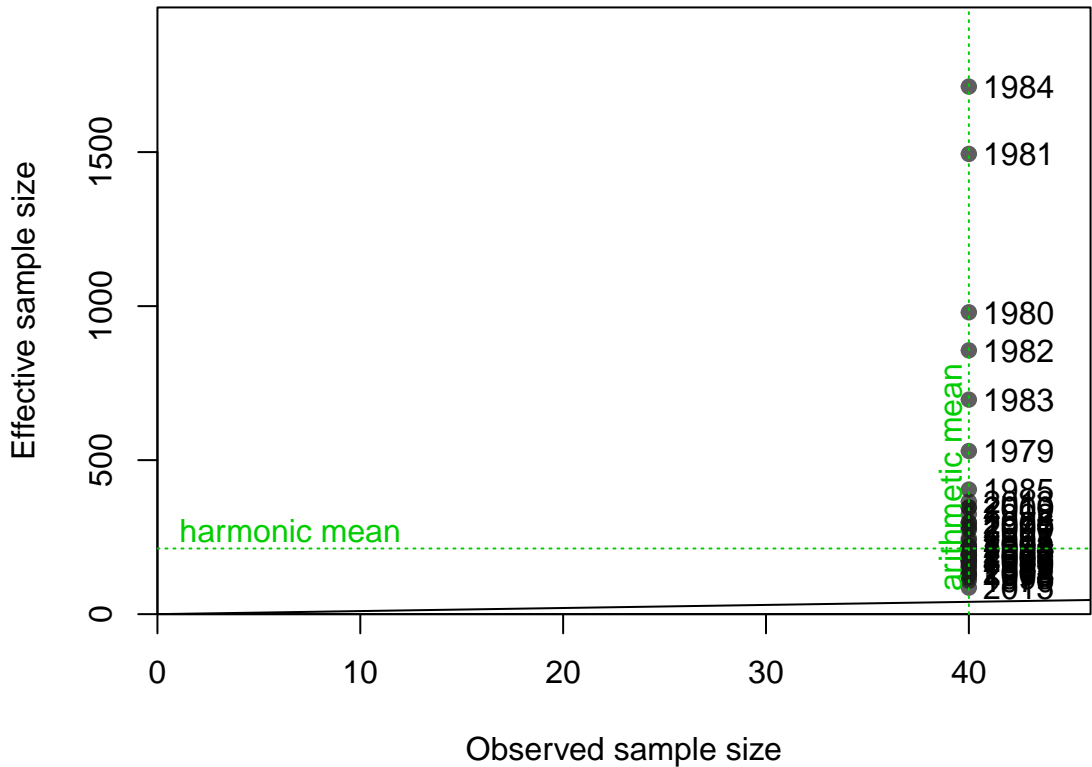
## Length comps, retained, US\_2



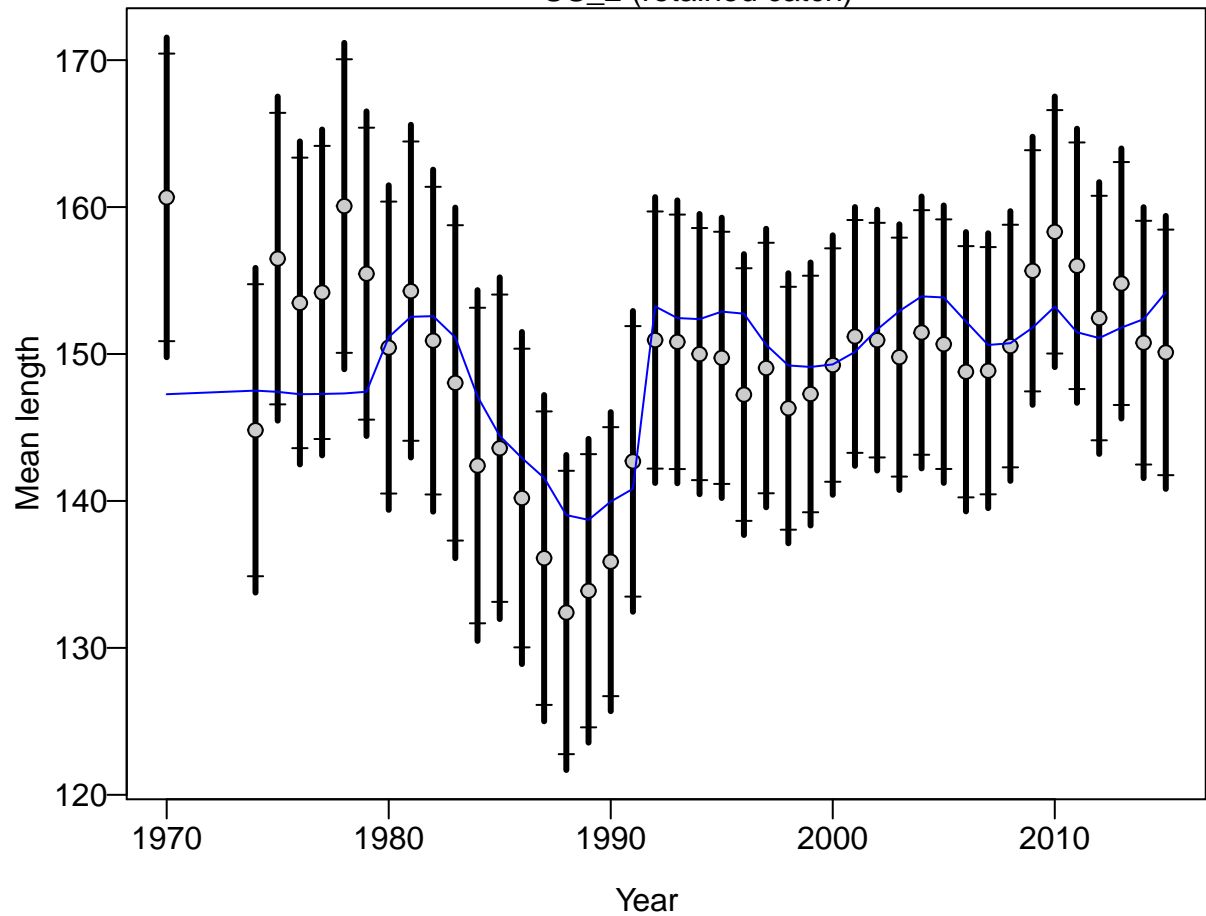
# Pearson residuals, retained, US\_2 (max=24.85)



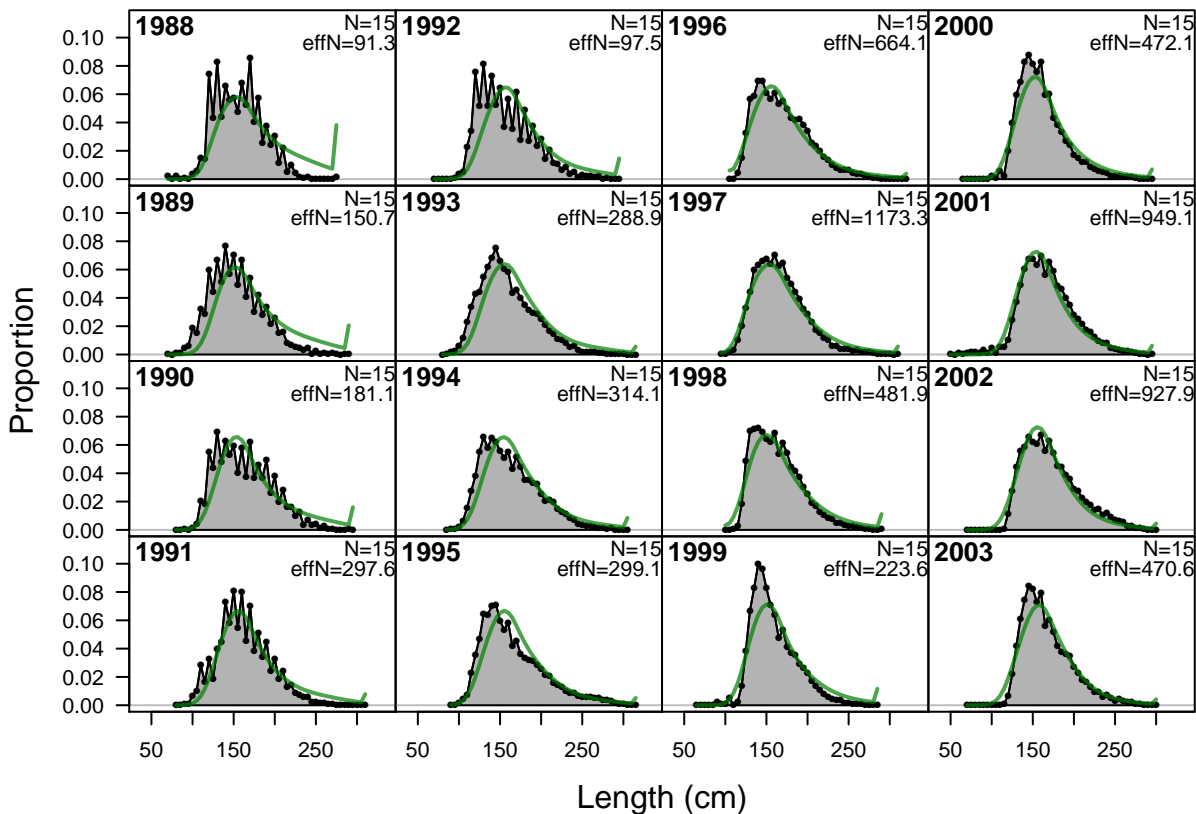
# N-EffN comparison, Length comps, retained, US\_2



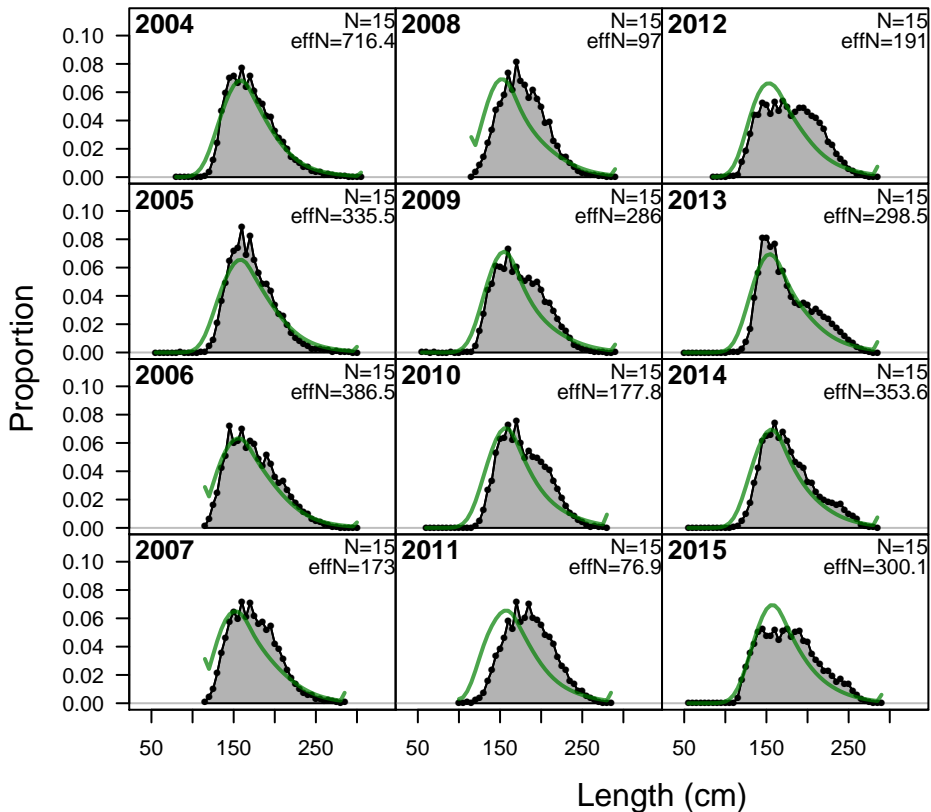
## US\_2 (retained catch)



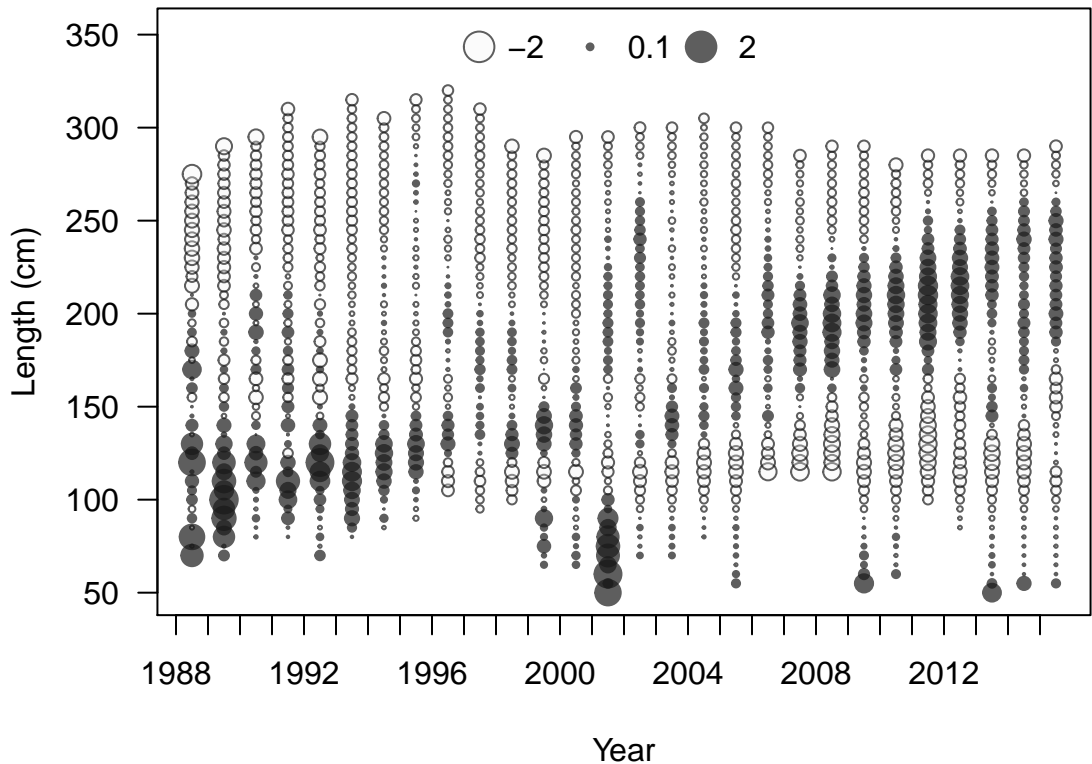
# Length comps, retained, CAN\_LATE\_4



## Length comps, retained, CAN\_LATE\_4

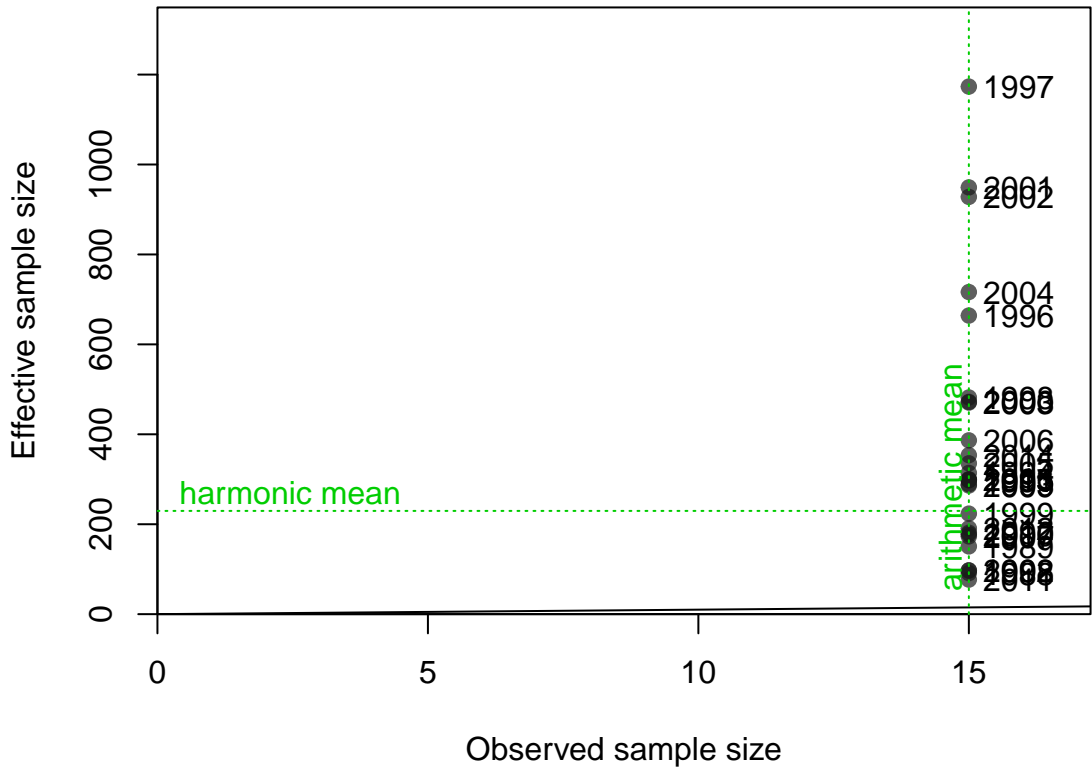


# Pearson residuals, retained, CAN\_LATE\_4 (max=1.62)

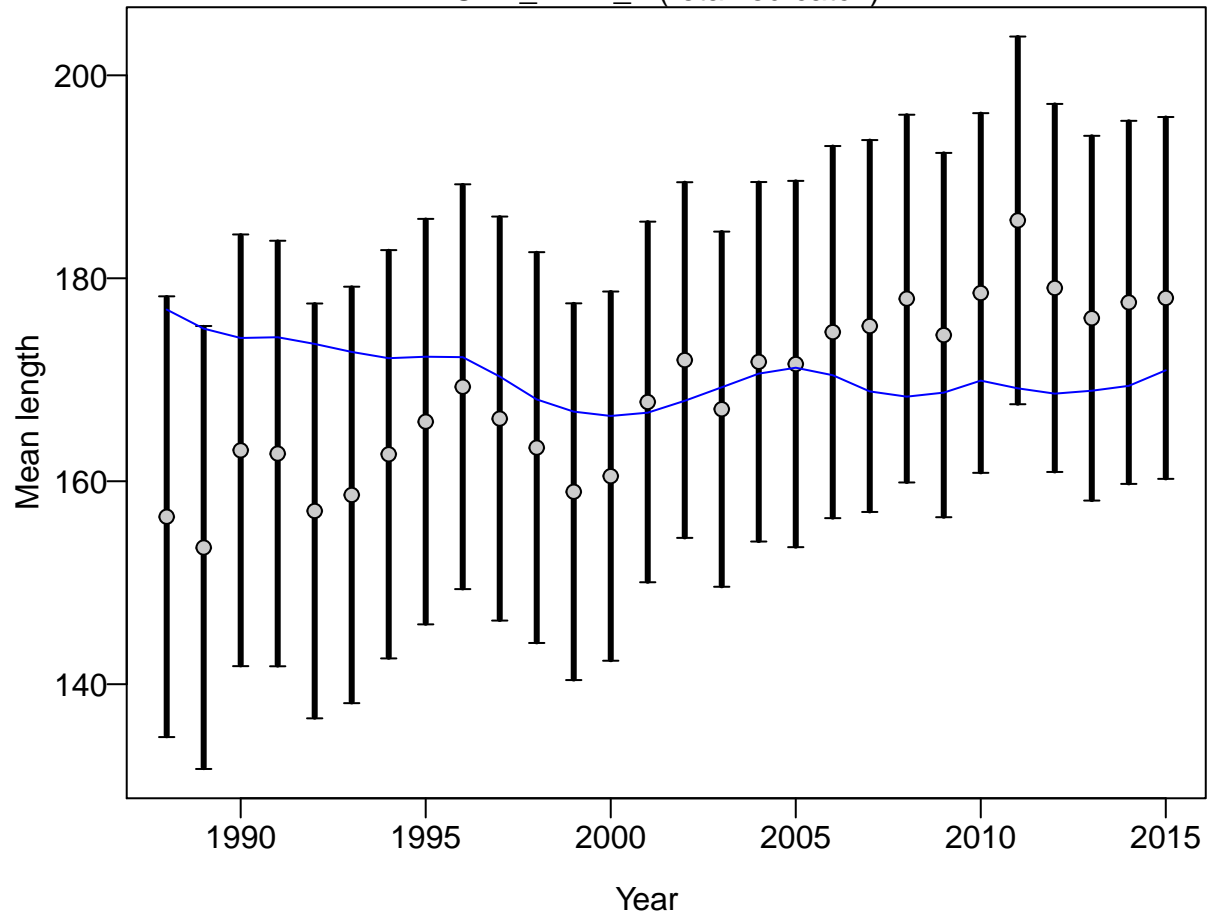




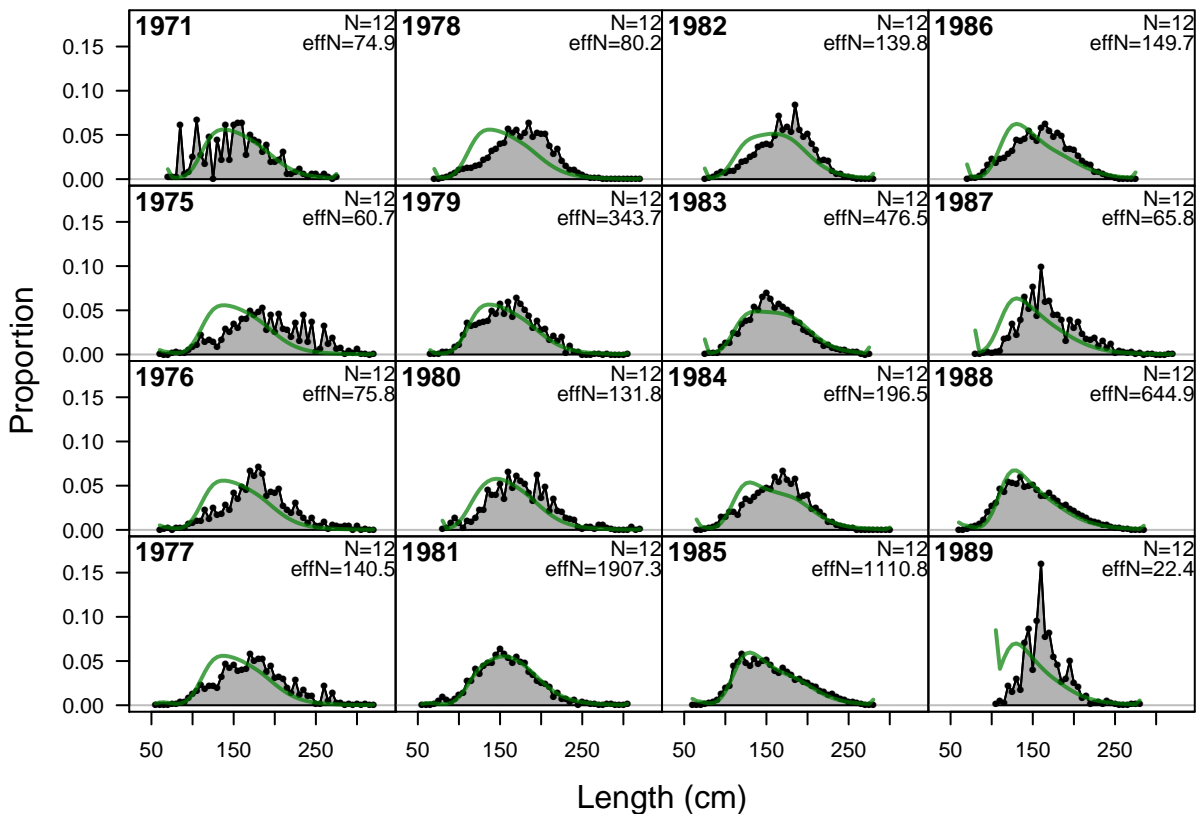
# N-EffN comparison, Length comps, retained, CAN\_LATE\_4



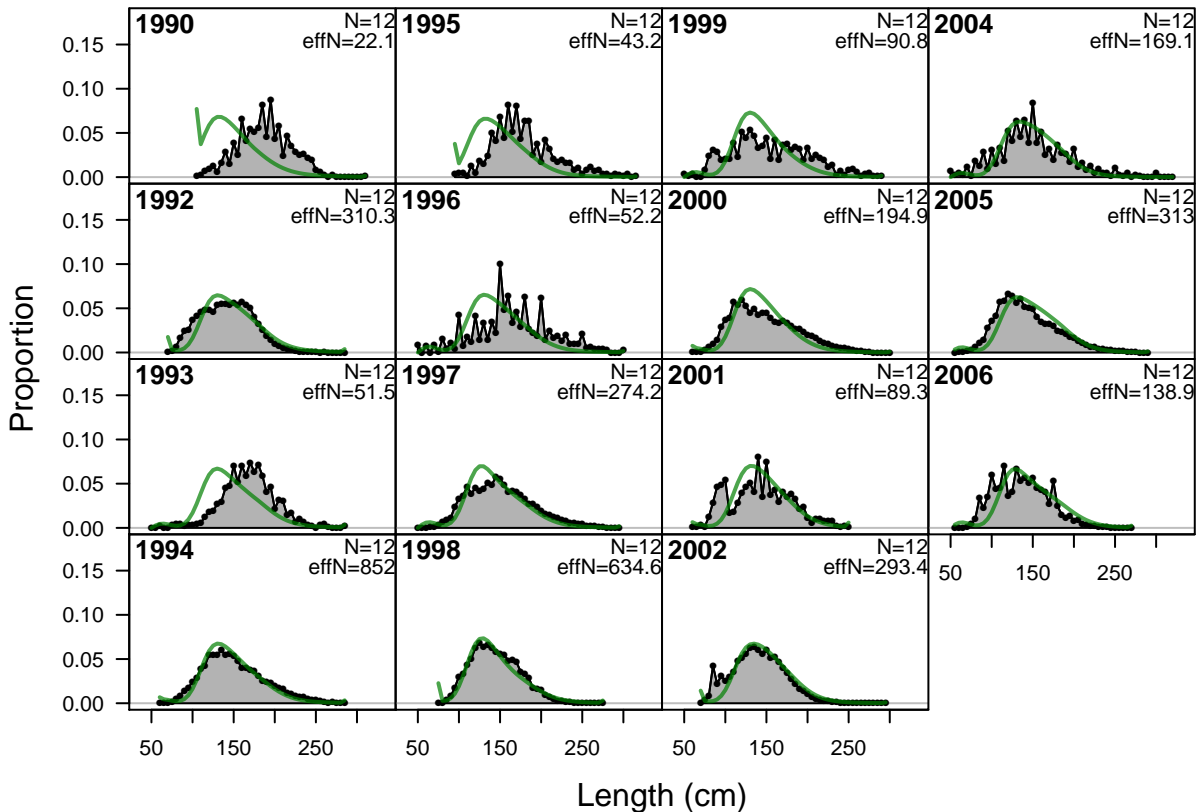
CAN\_LATE\_4 (retained catch)



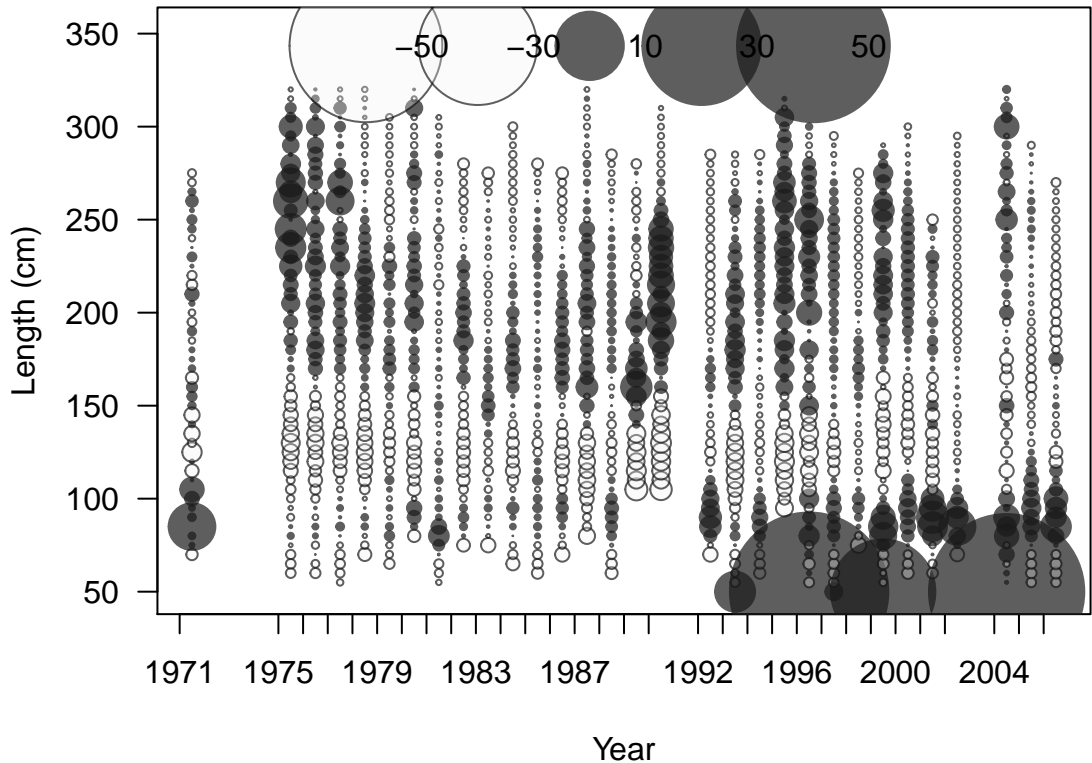
## Length comps, retained, JPN\_ERLY\_5



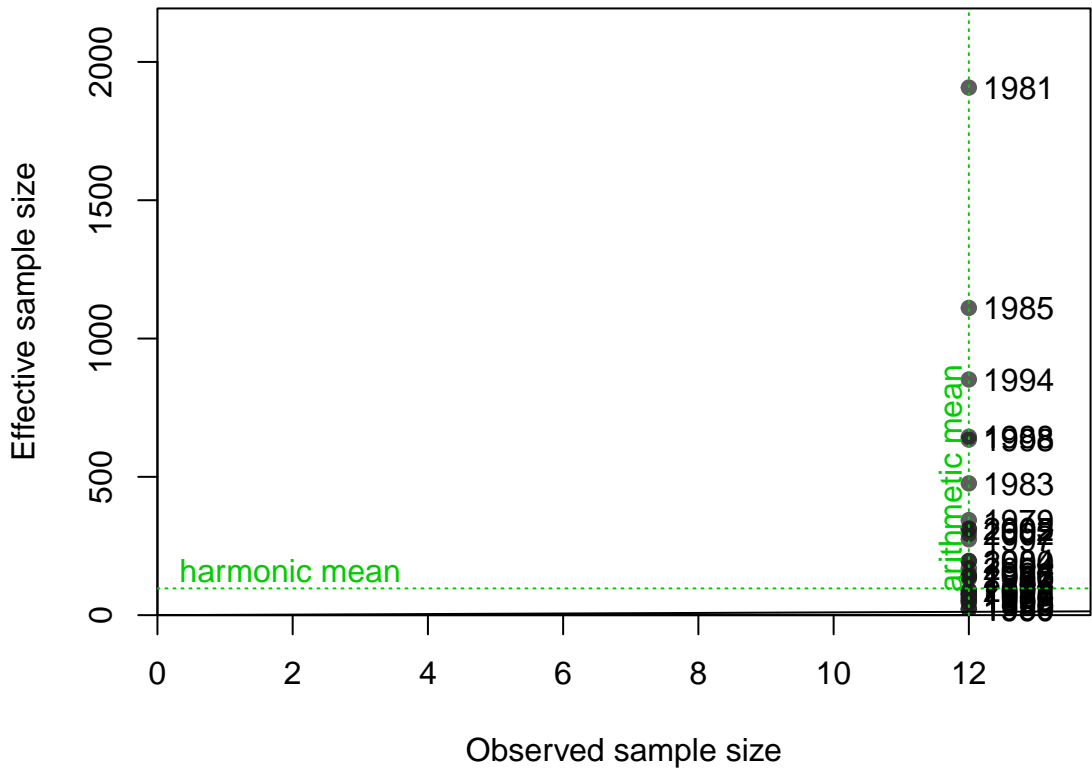
# Length comps, retained, JPN\_ERLY\_5



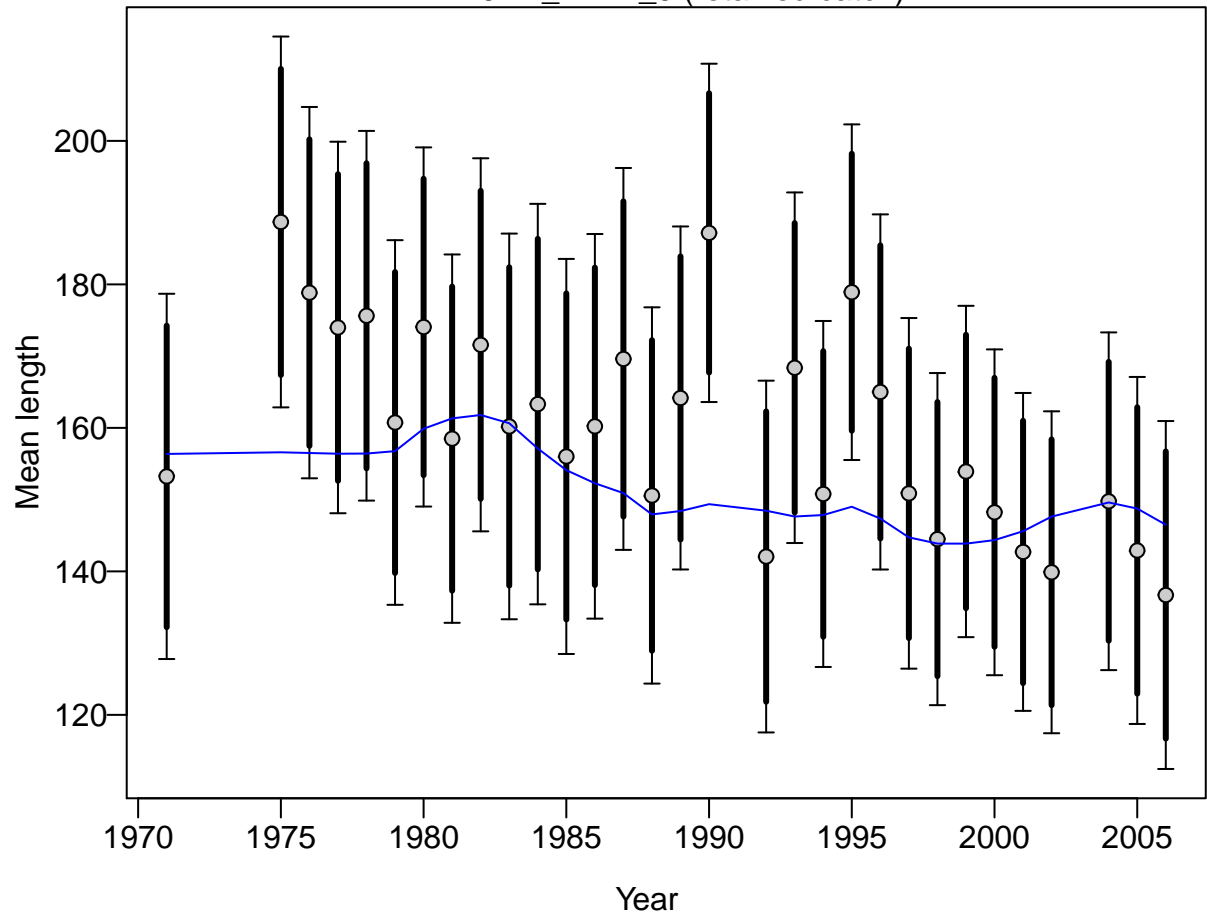
# Pearson residuals, retained, JPN\_ERLY\_5 (max=53.76)



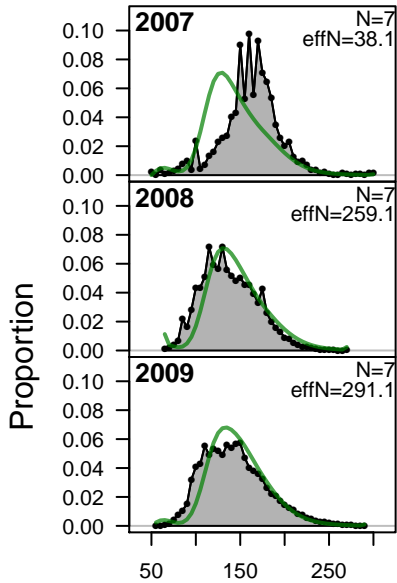
# N-EffN comparison, Length comps, retained, JPN\_ERLY\_5



JPN\_ERLY\_5 (retained catch)



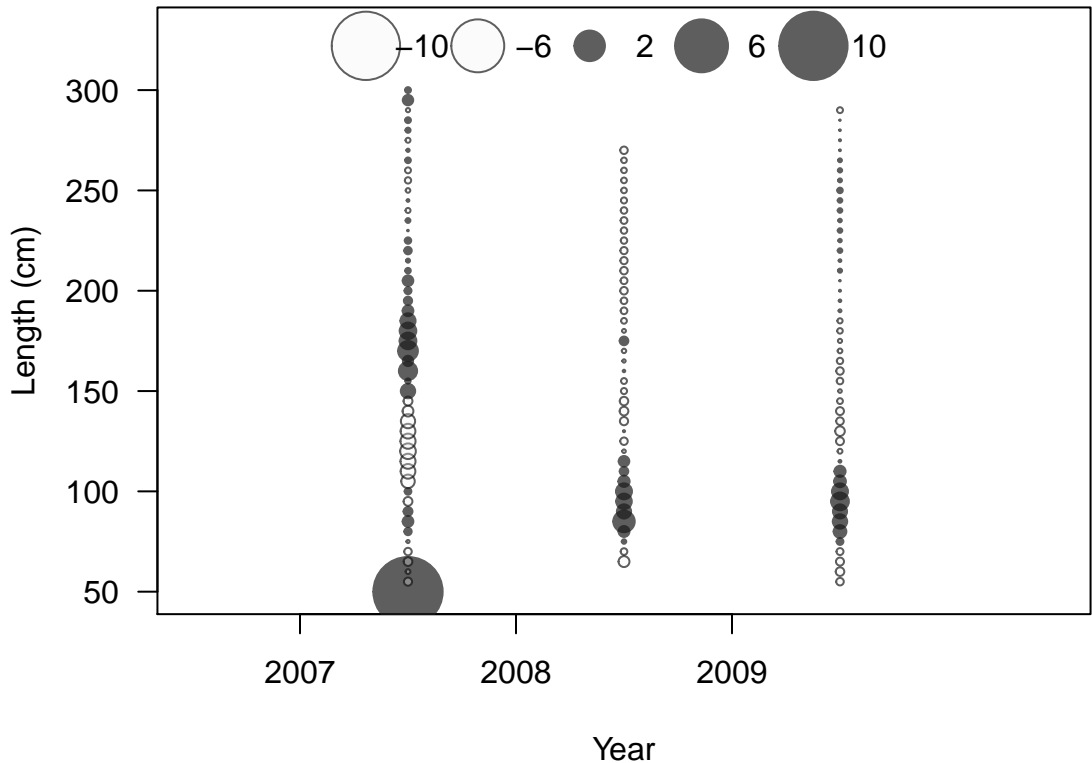
# Length comps, retained, JPN\_MID\_6



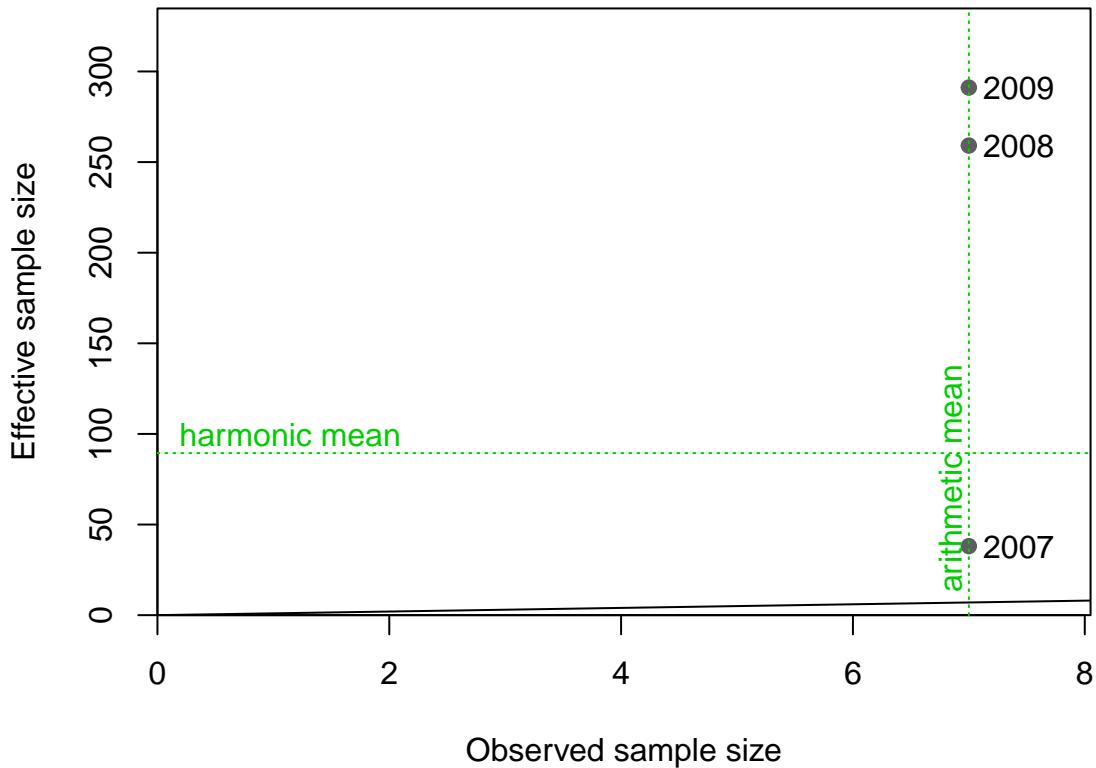
Length (cm)



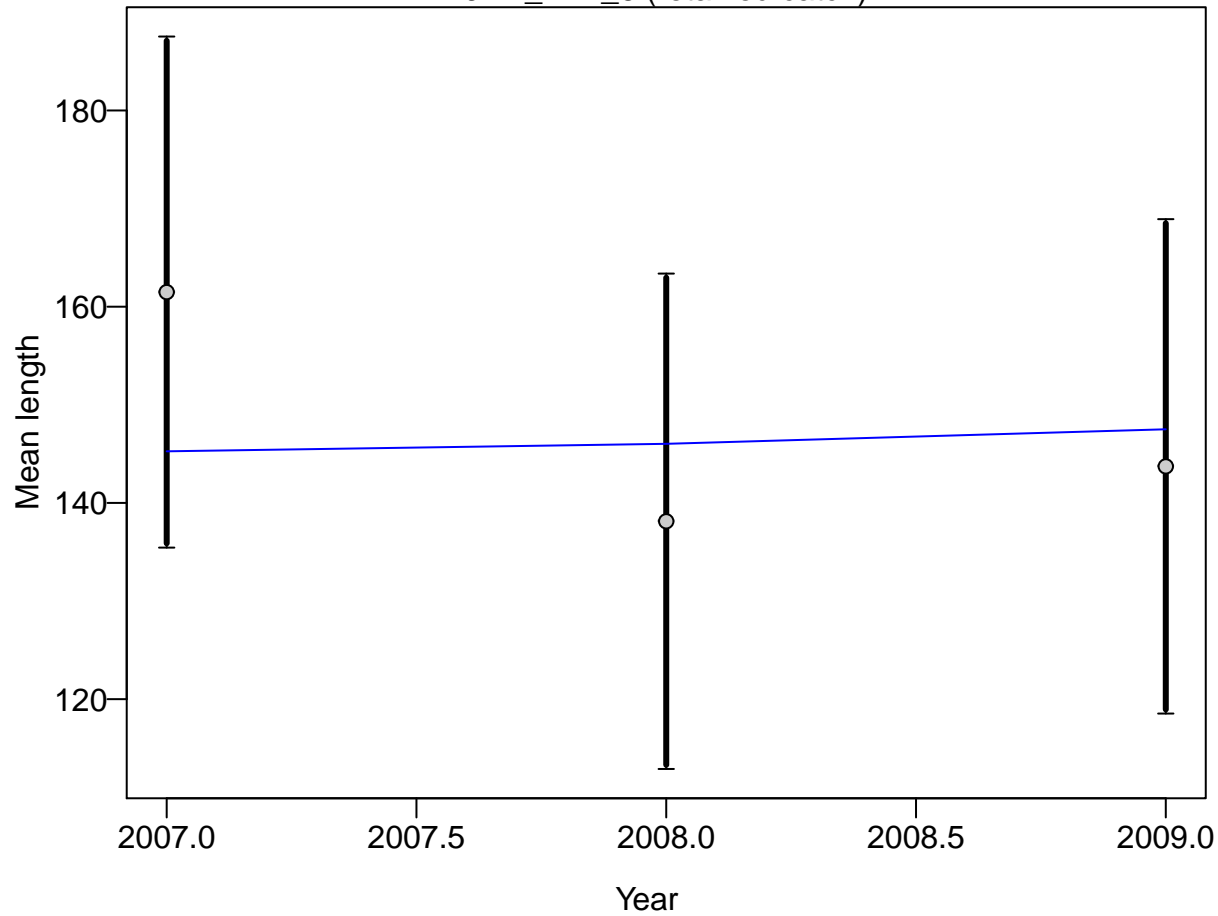
# Pearson residuals, retained, JPN\_MID\_6 (max=10.29)



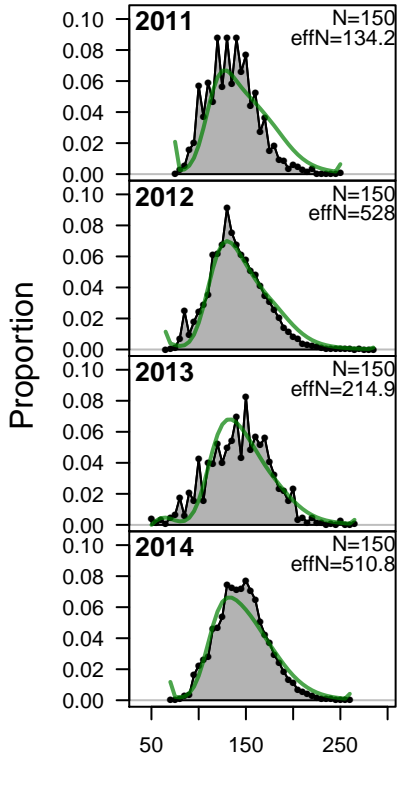
# N-EffN comparison, Length comps, retained, JPN\_MID\_6



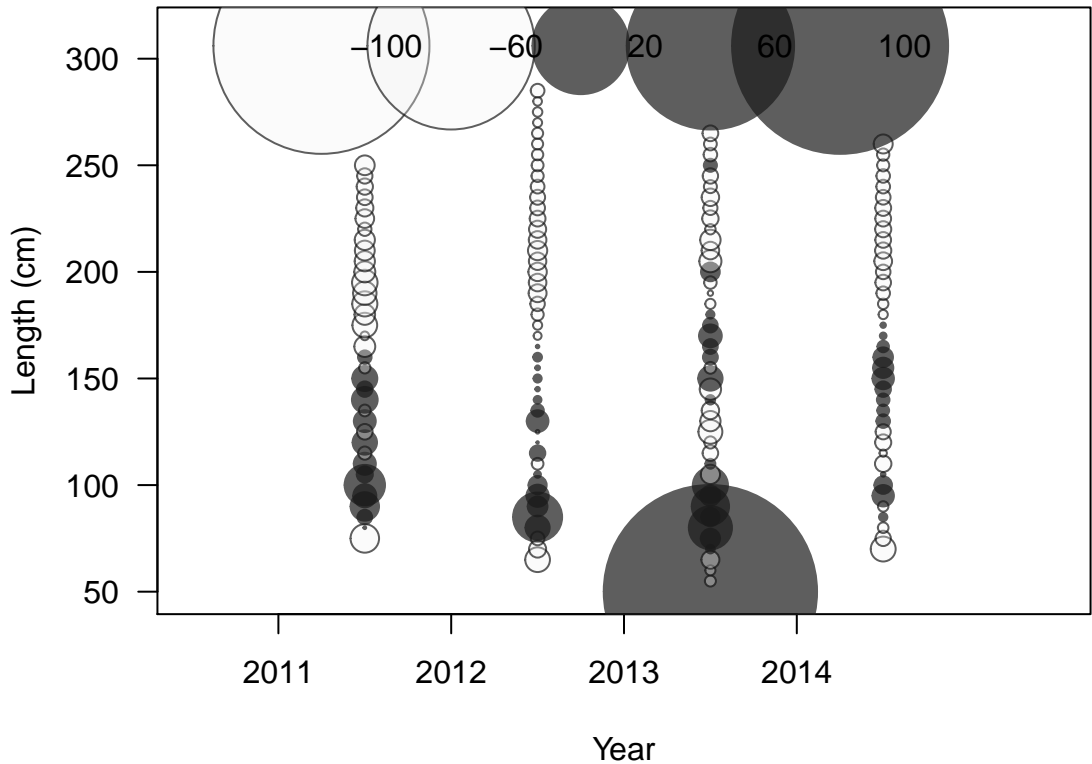
JPN\_MID\_6 (retained catch)



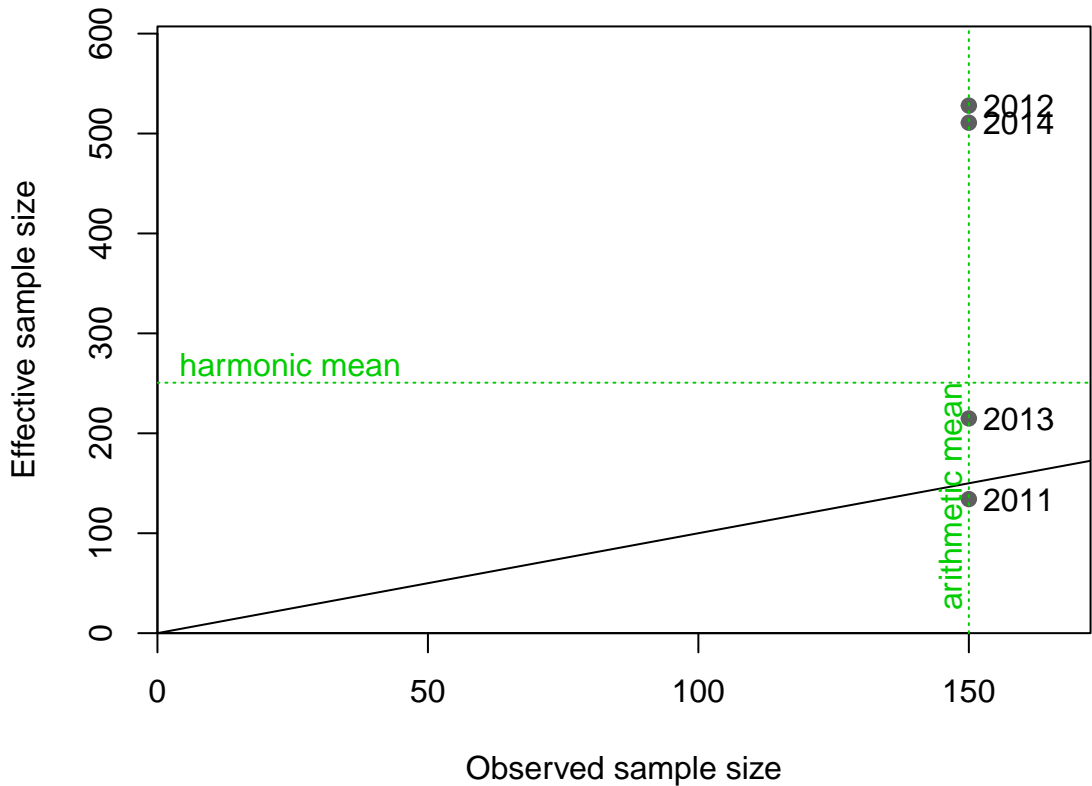
# Length comps, retained, JPN\_LATE\_7



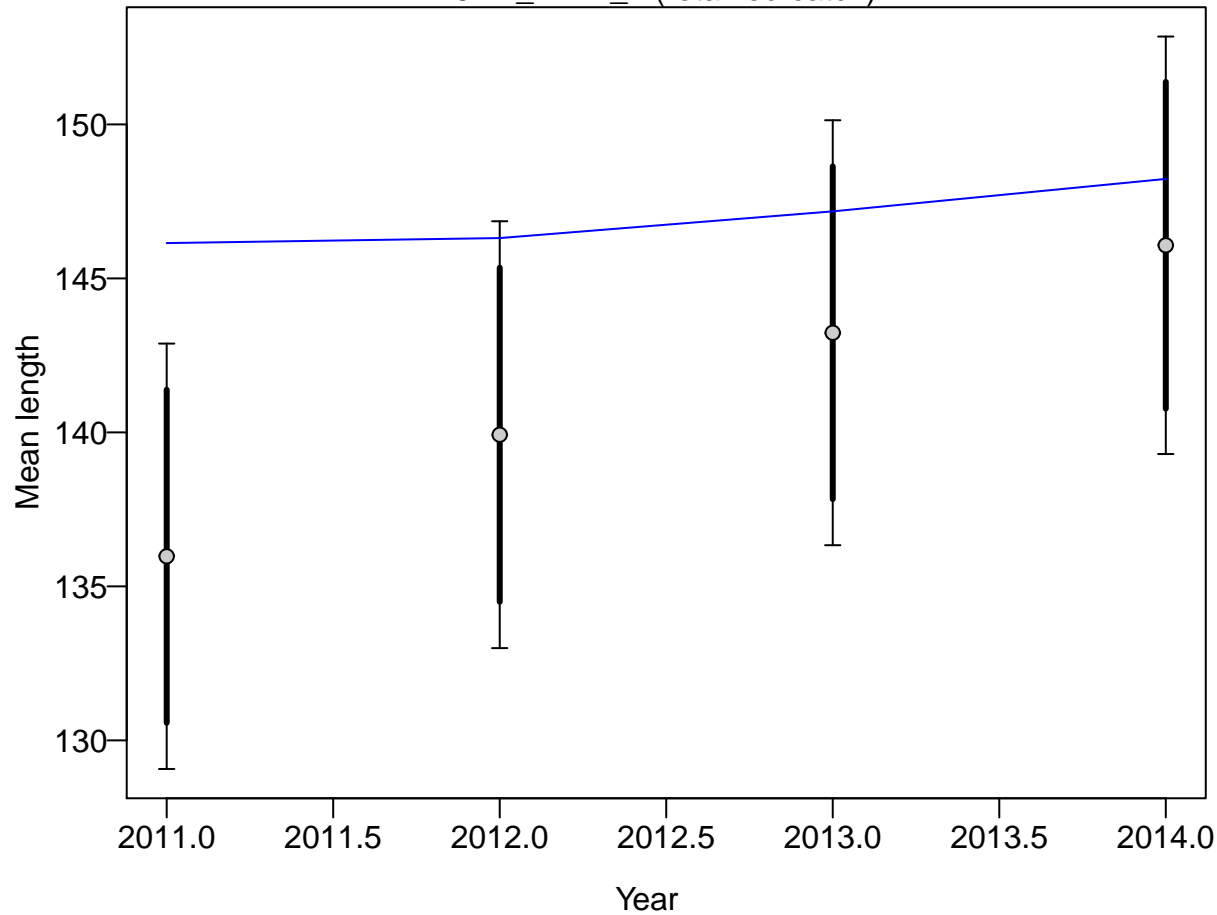
# Pearson residuals, retained, JPN\_LATE\_7 (max=97.5)



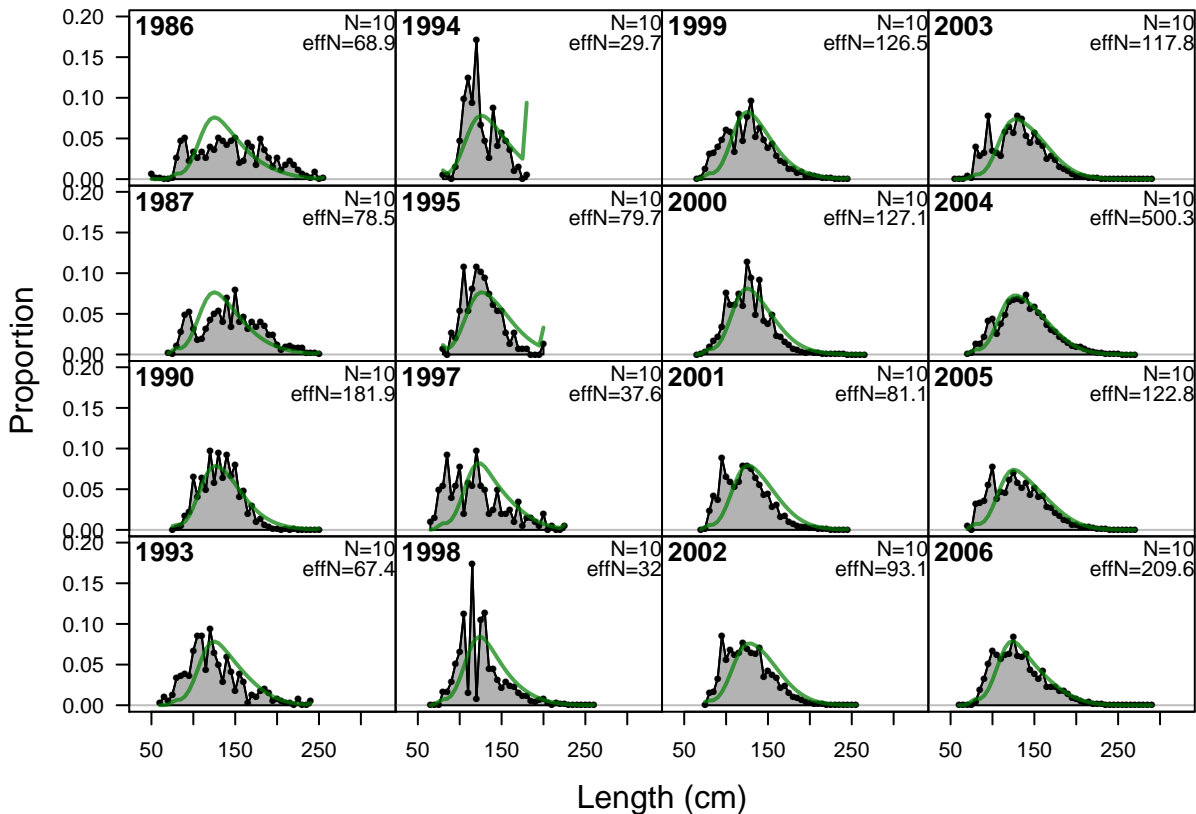
# N-EffN comparison, Length comps, retained, JPN\_LATE\_7



JPN\_LATE\_7 (retained catch)

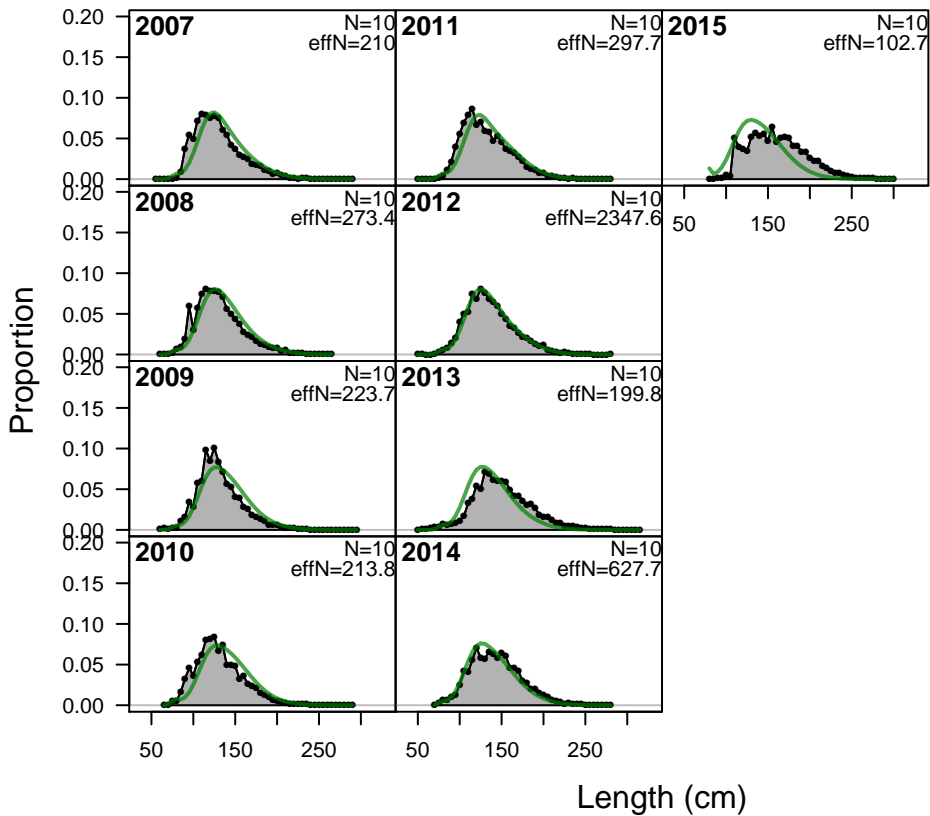


# Length comps, retained, PORT\_8

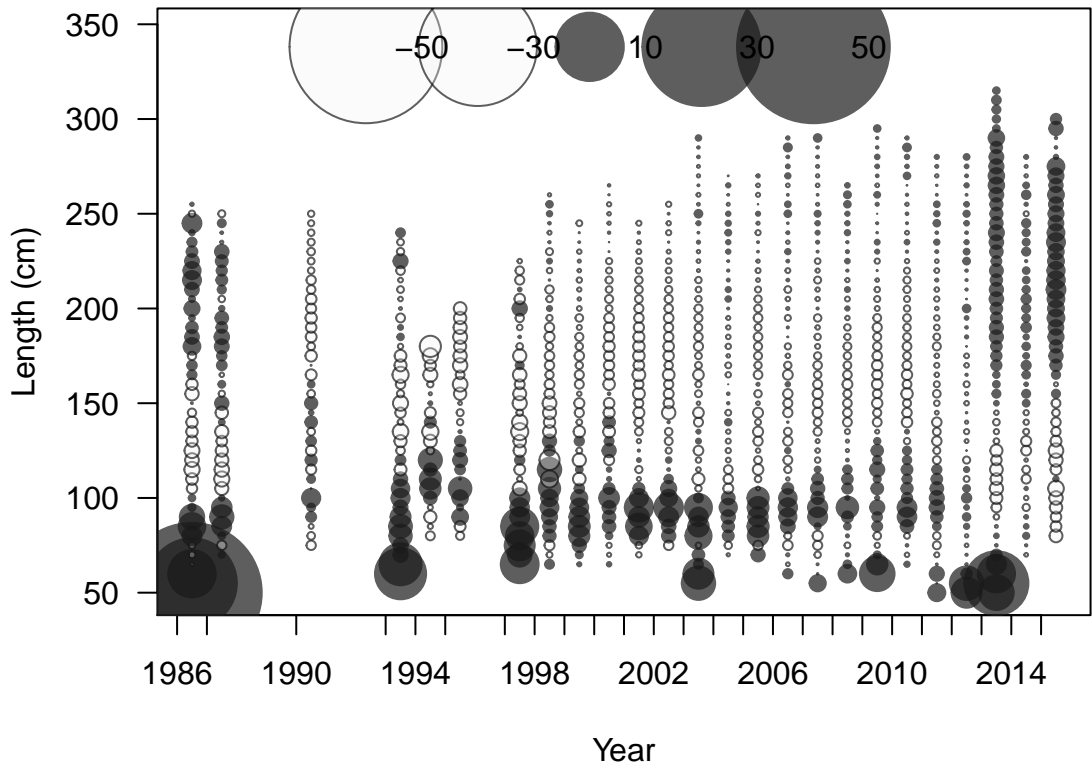




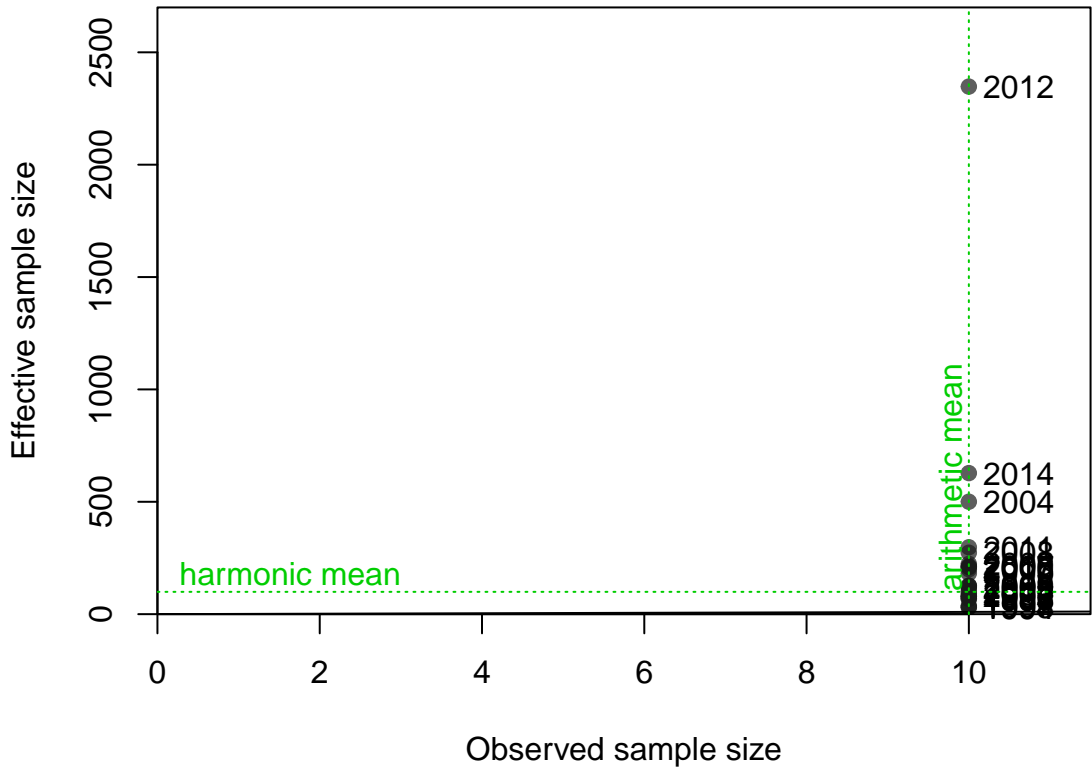
## Length comps, retained, PORT\_8



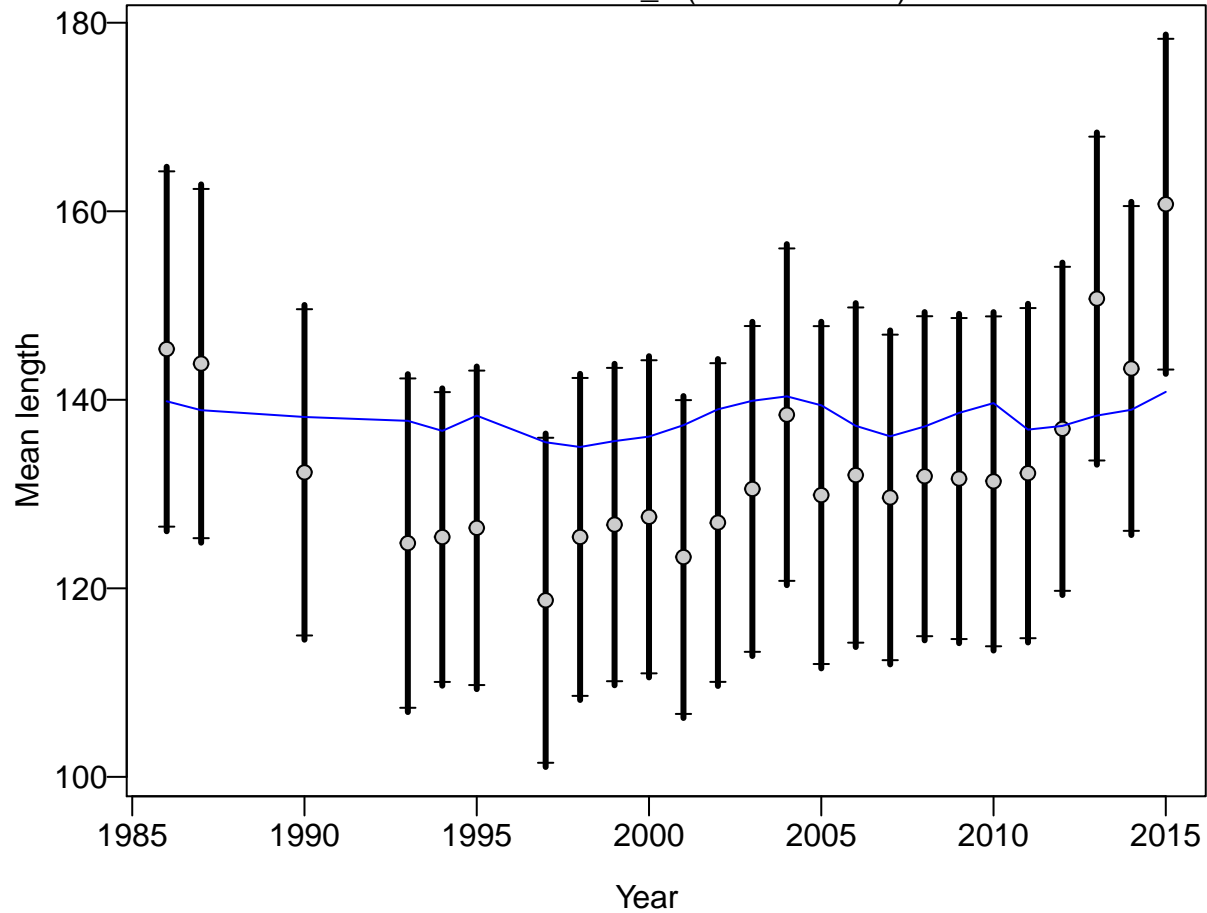
# Pearson residuals, retained, PORT\_8 (max=41.67)



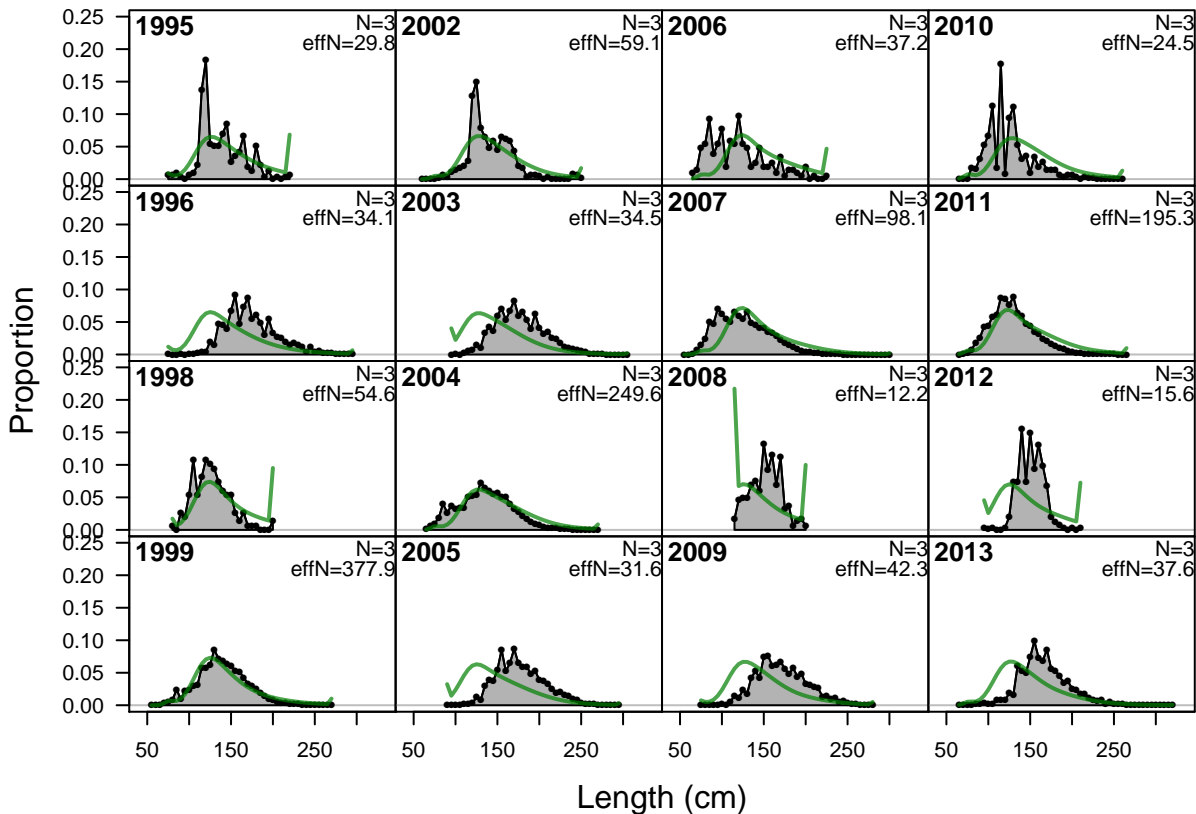
# N-EffN comparison, Length comps, retained, PORT\_8



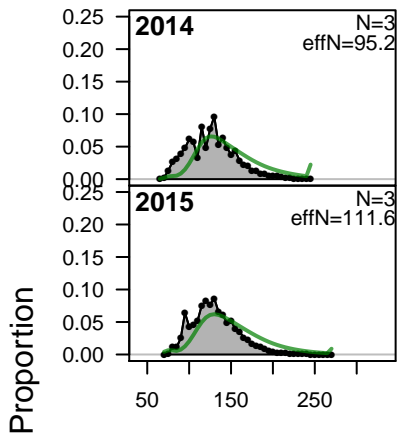
PORT\_8 (retained catch)



## Length comps, retained, CHIN-TAI\_9

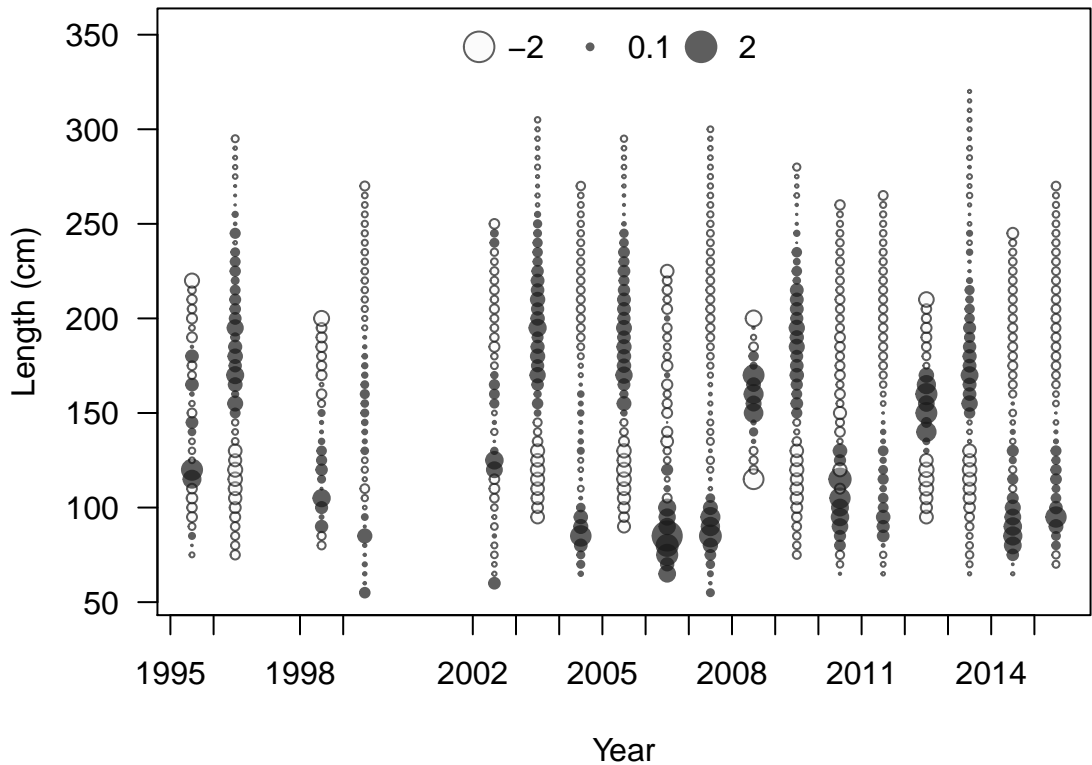


## Length comps, retained, CHIN-TAI\_9

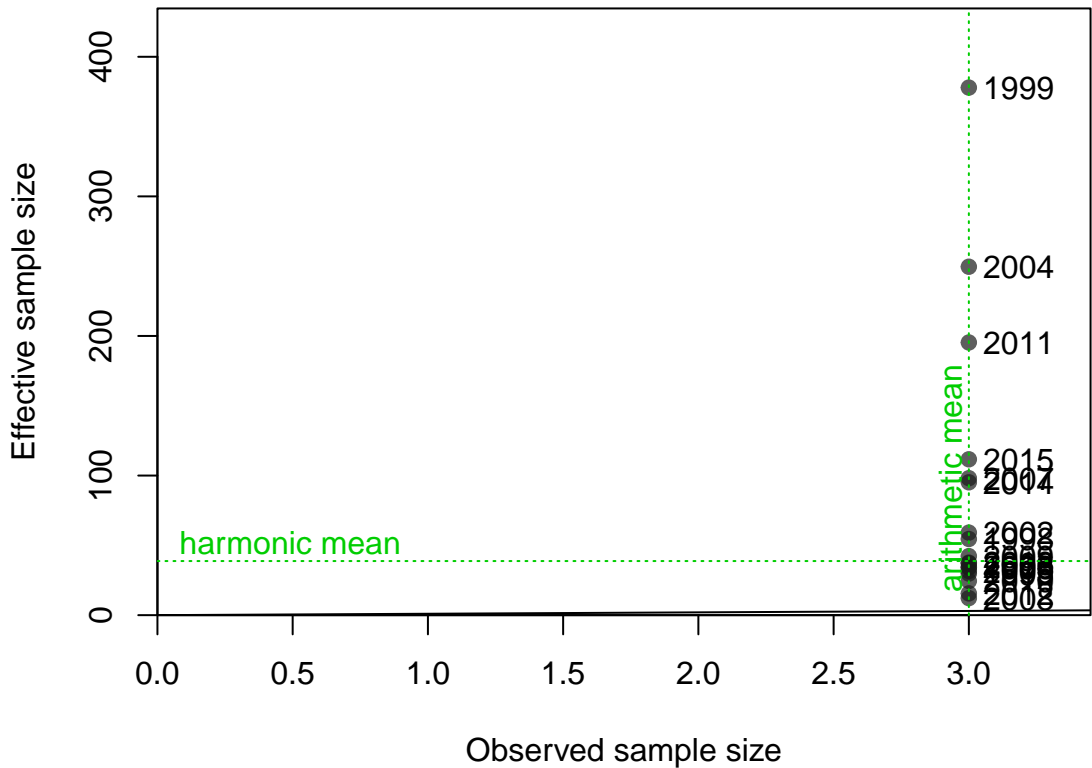


Length (cm)

# Pearson residuals, retained, CHIN-TAI\_9 (max=1.82)

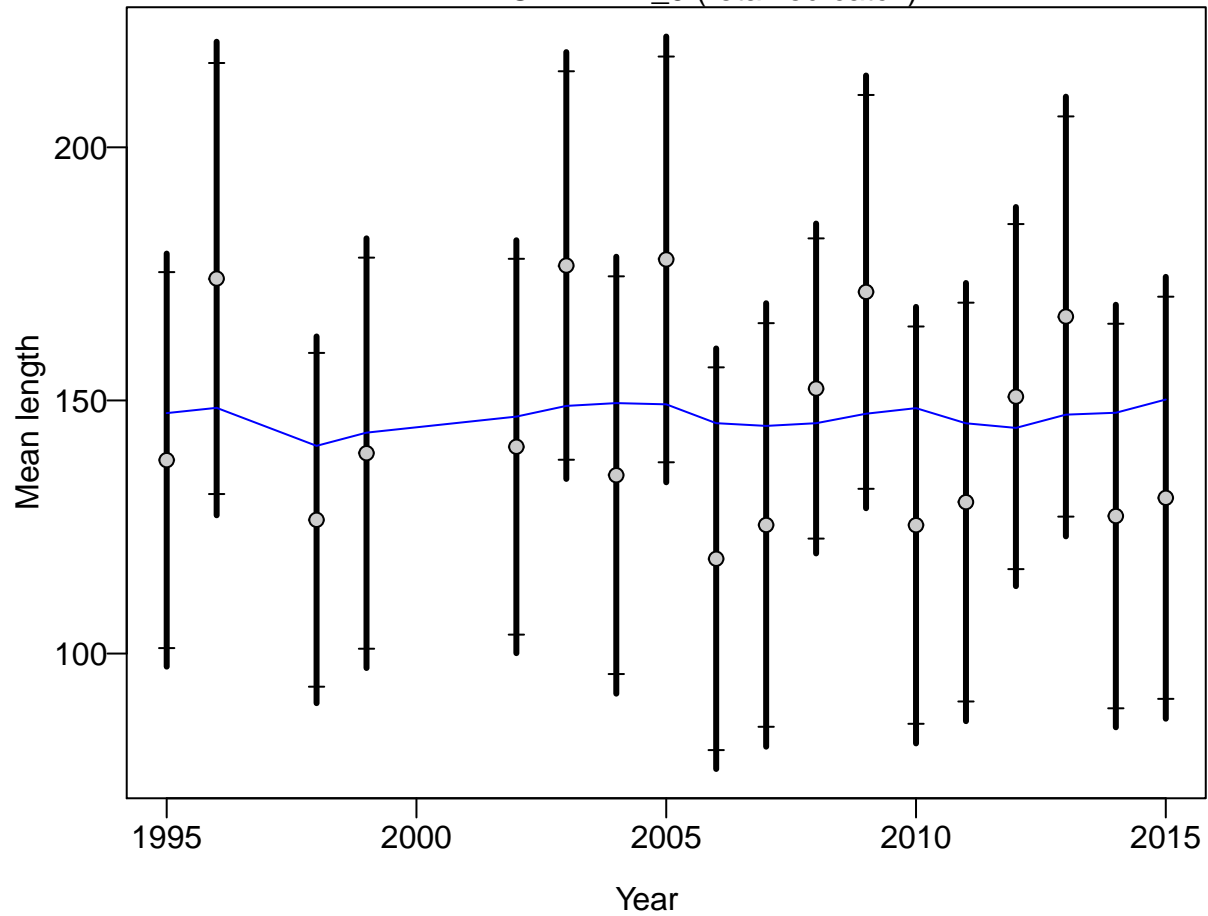


# N-EffN comparison, Length comps, retained, CHIN-TAI\_9

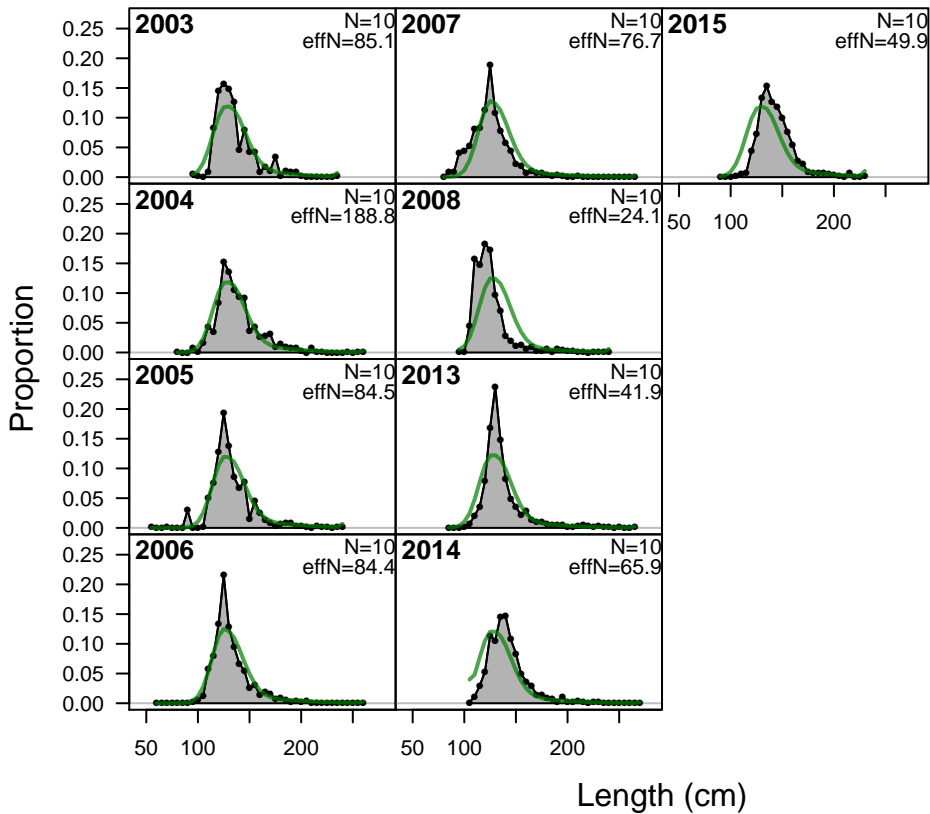




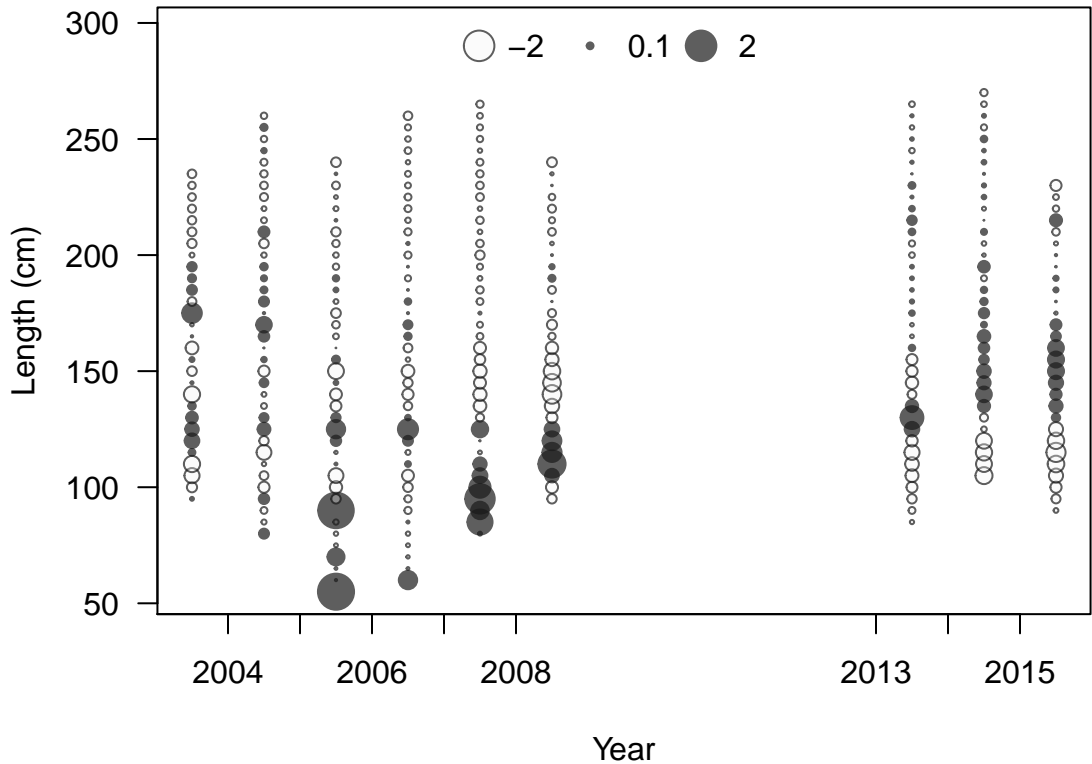
CHIN-TAI\_9 (retained catch)



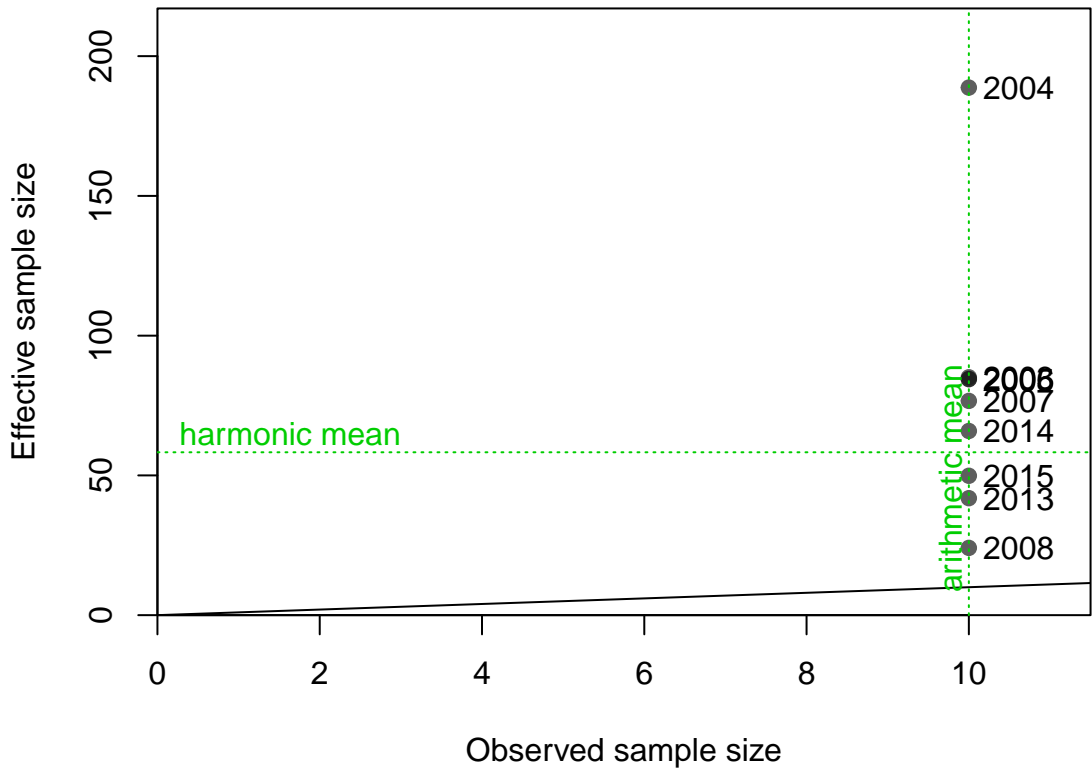
## Length comps, retained, MOR\_10



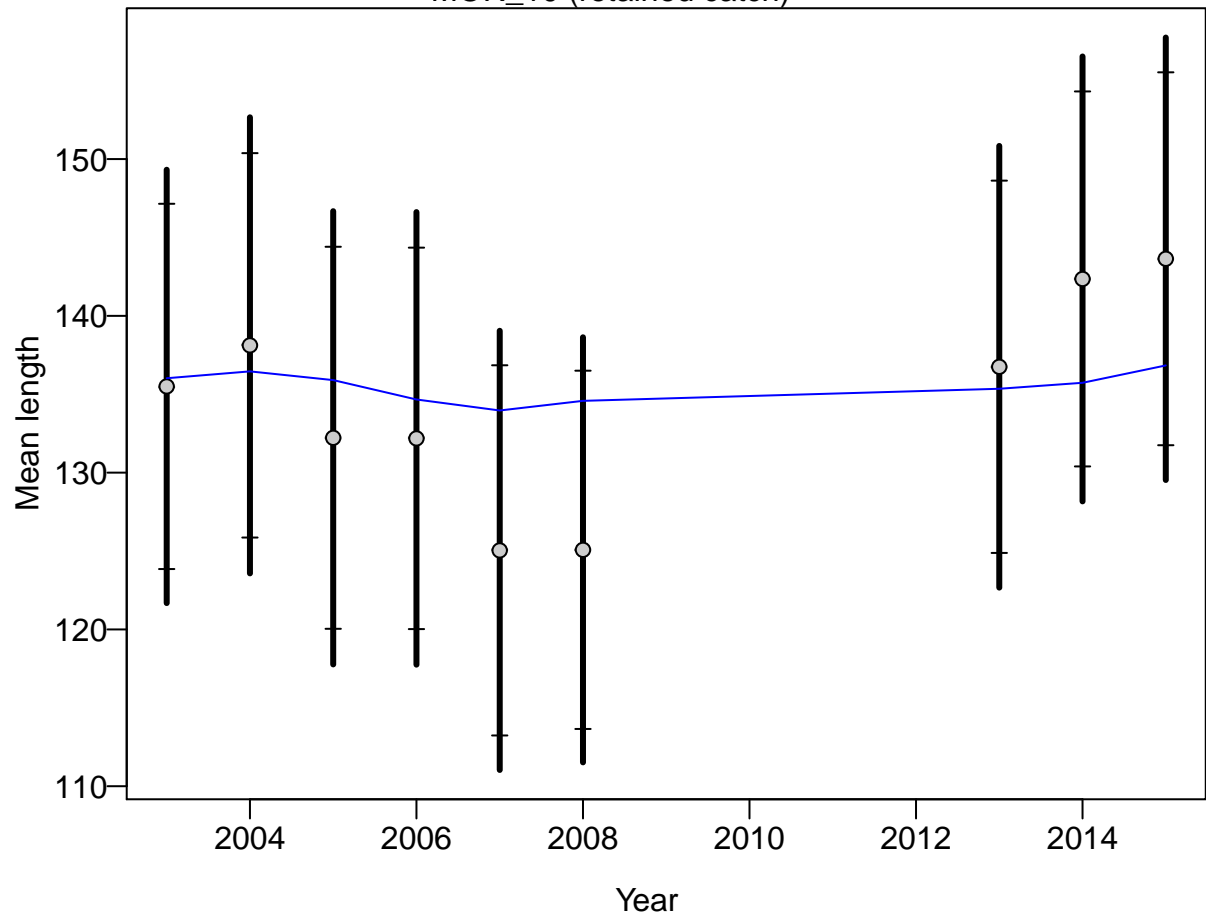
# Pearson residuals, retained, MOR\_10 (max=2.79)



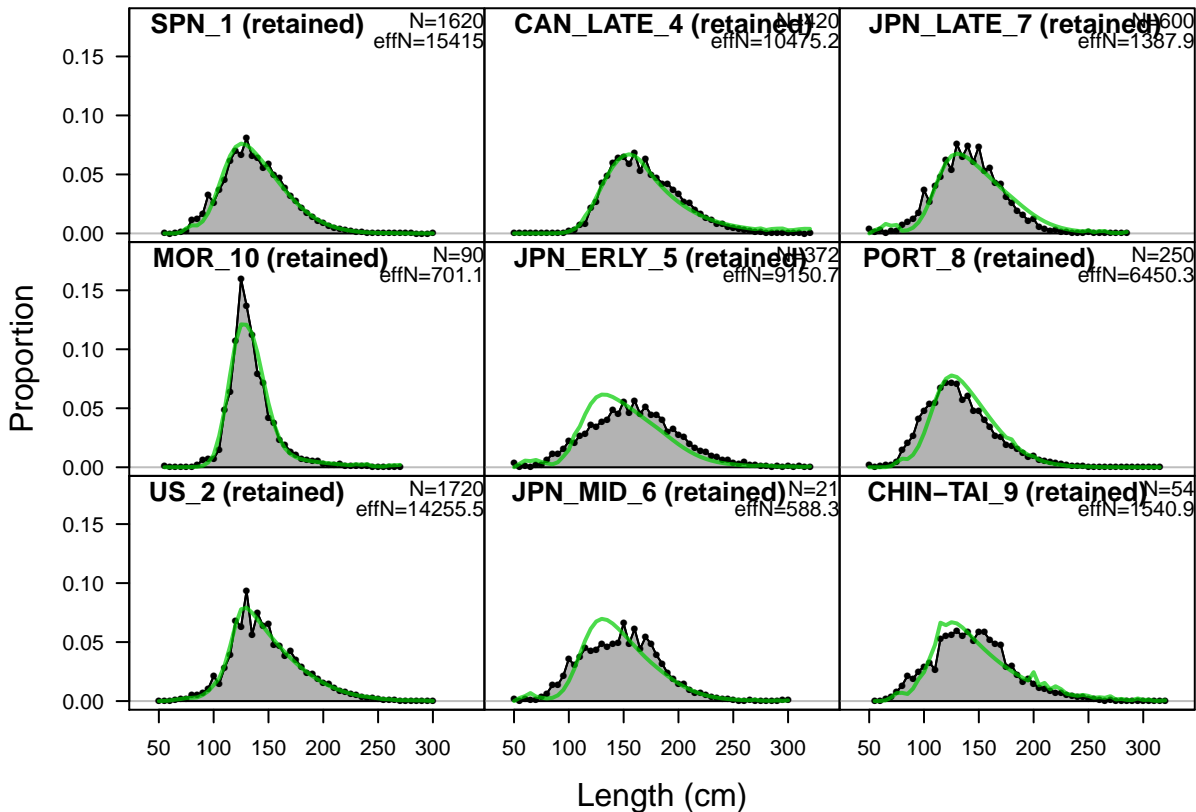
# N-EffN comparison, Length comps, retained, MOR\_10

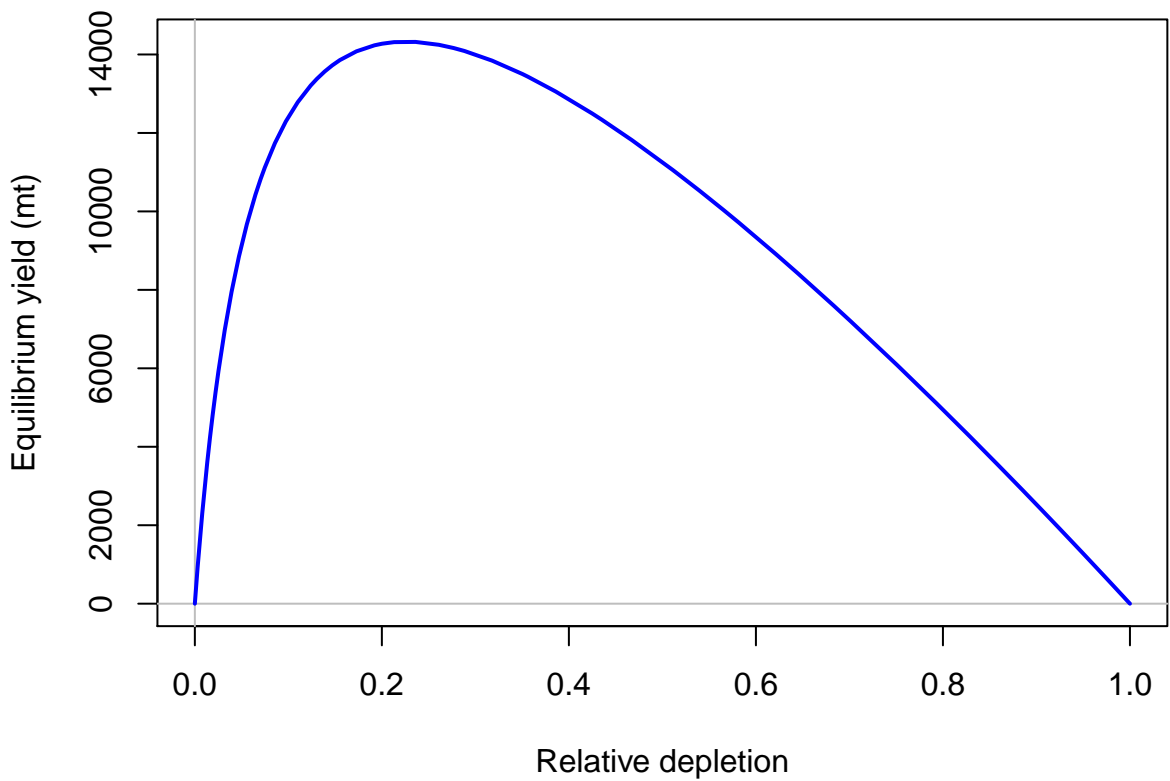


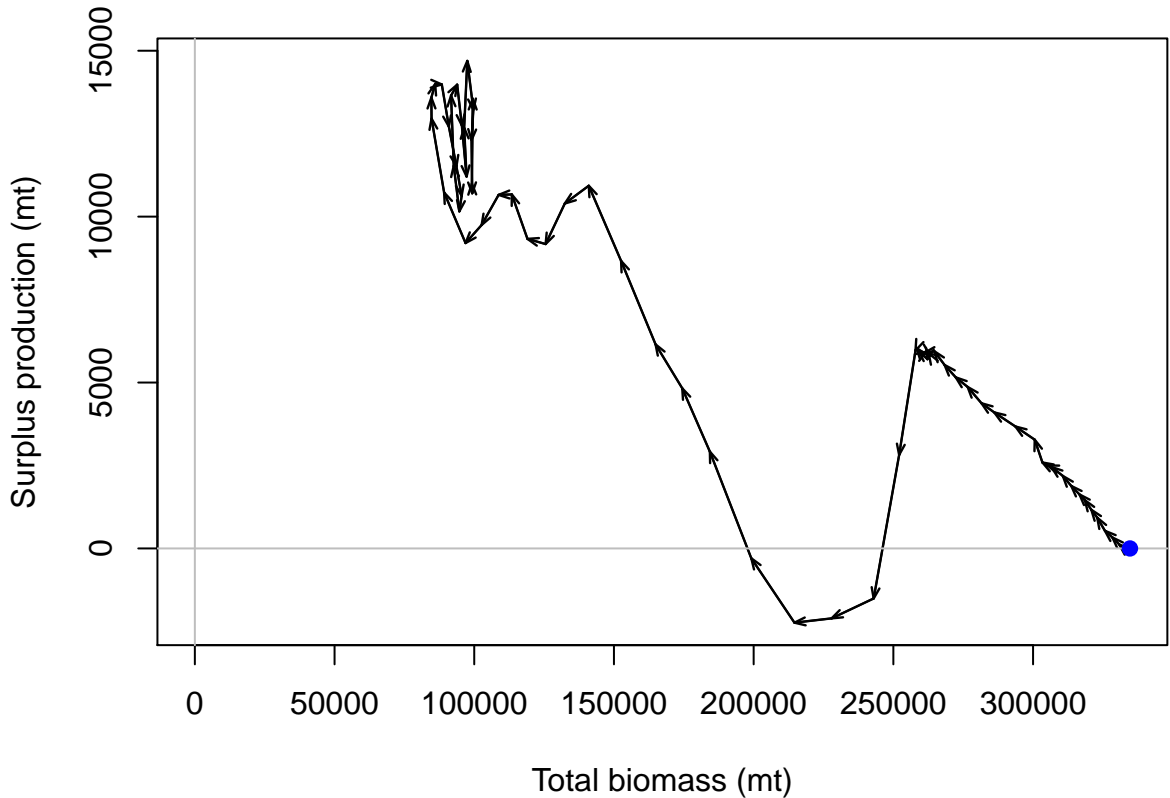
MOR\_10 (retained catch)



## Length comps, aggregated across time by fleet











ta by type and year, circle area is relative to precision within data type

