

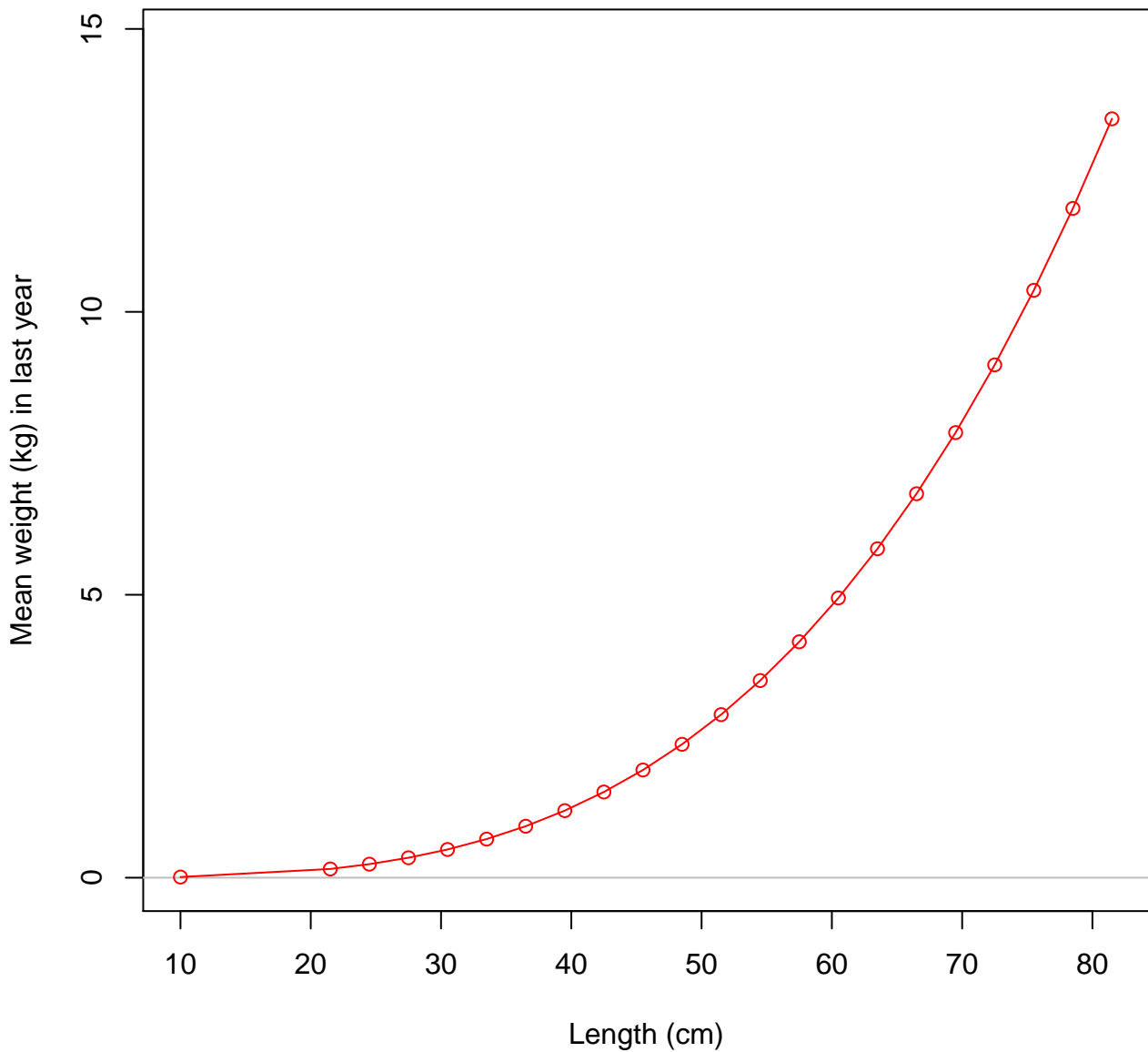
Plots created using the 'r4ss' package in R

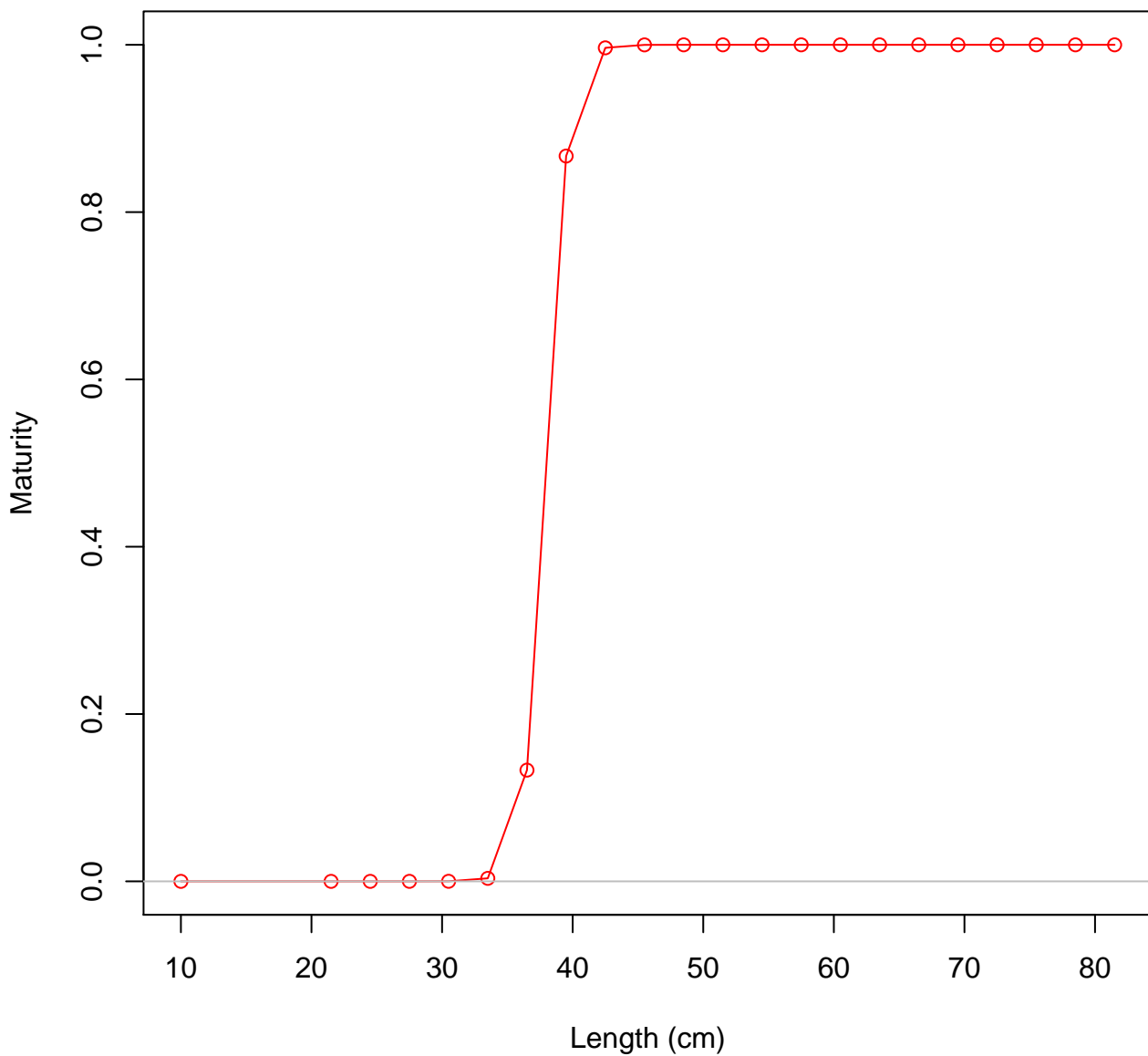
Stock Synthesis version: SS–V3.23b

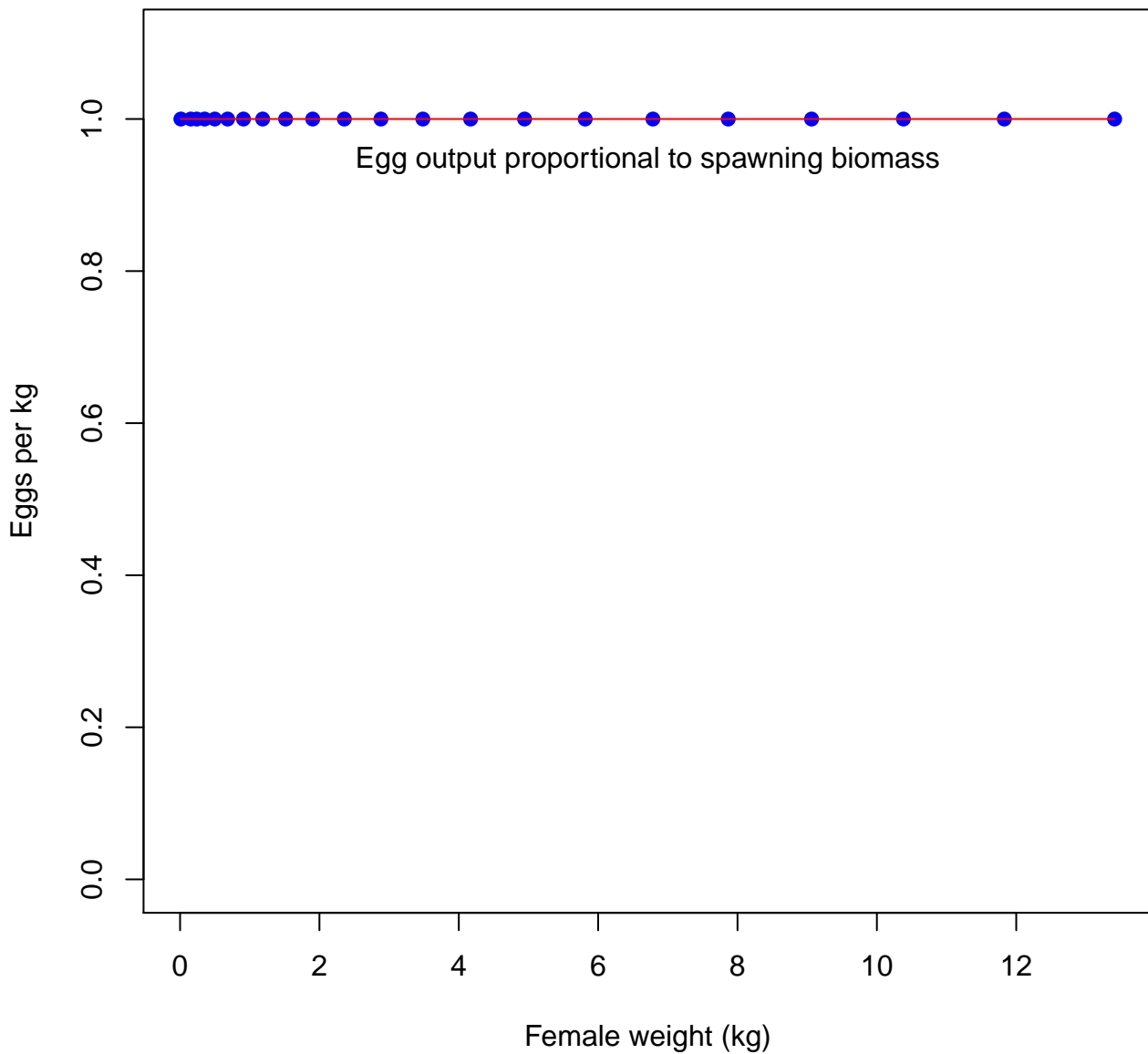
StartTime: Thu Oct 04 10:38:30 2012

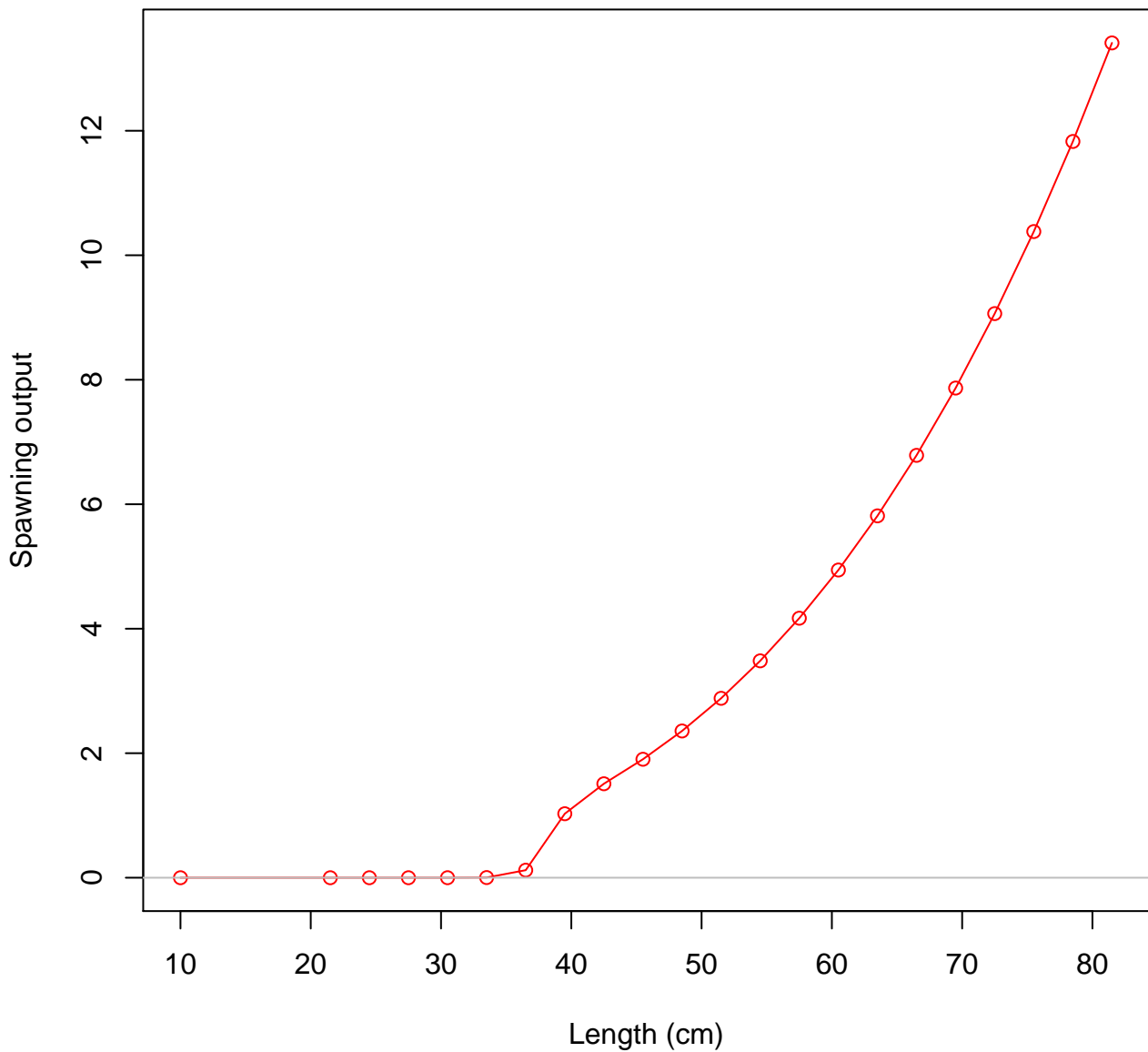
Data\_File: DATA.SS

Control\_File: CONTROL.SS

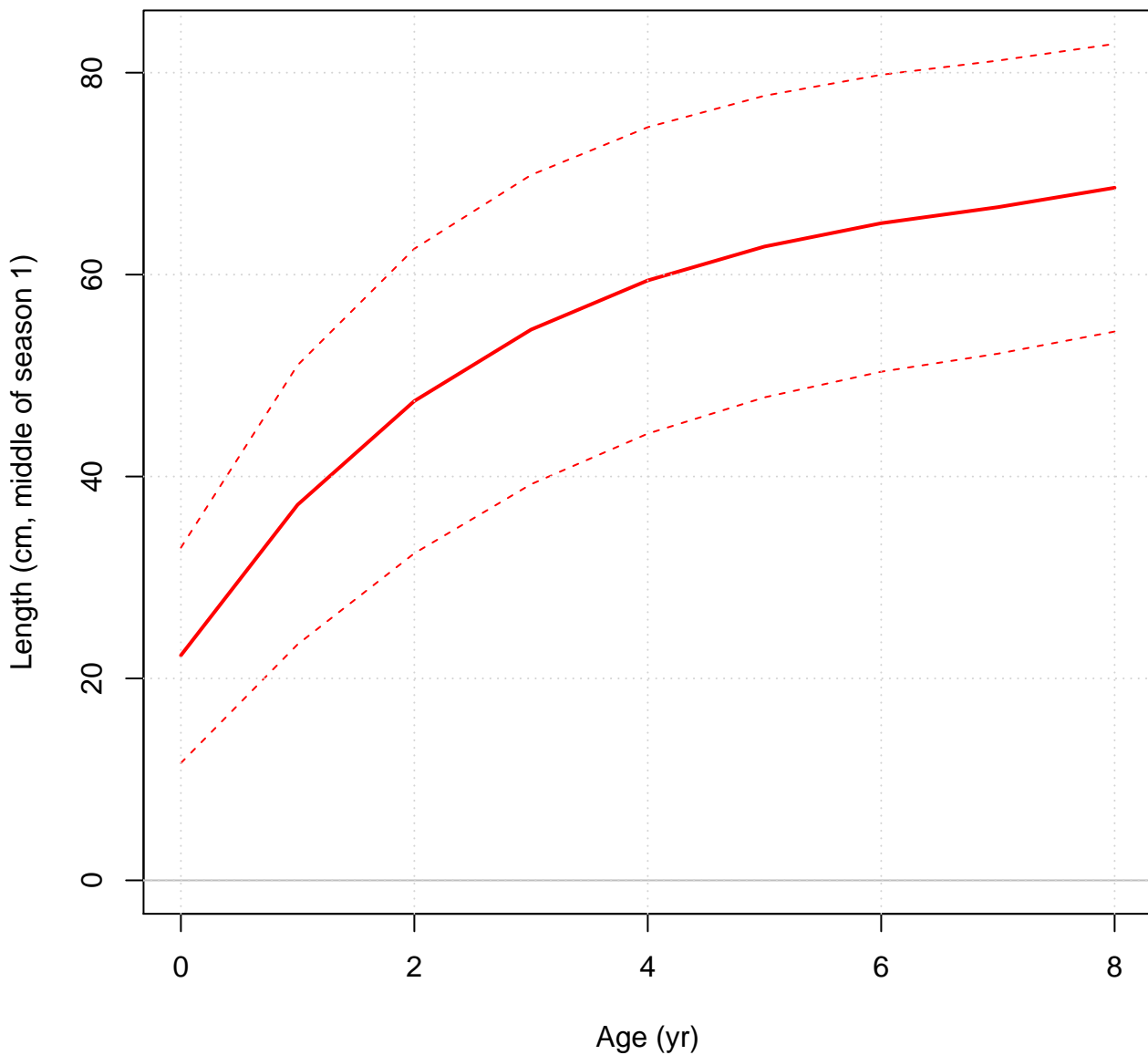


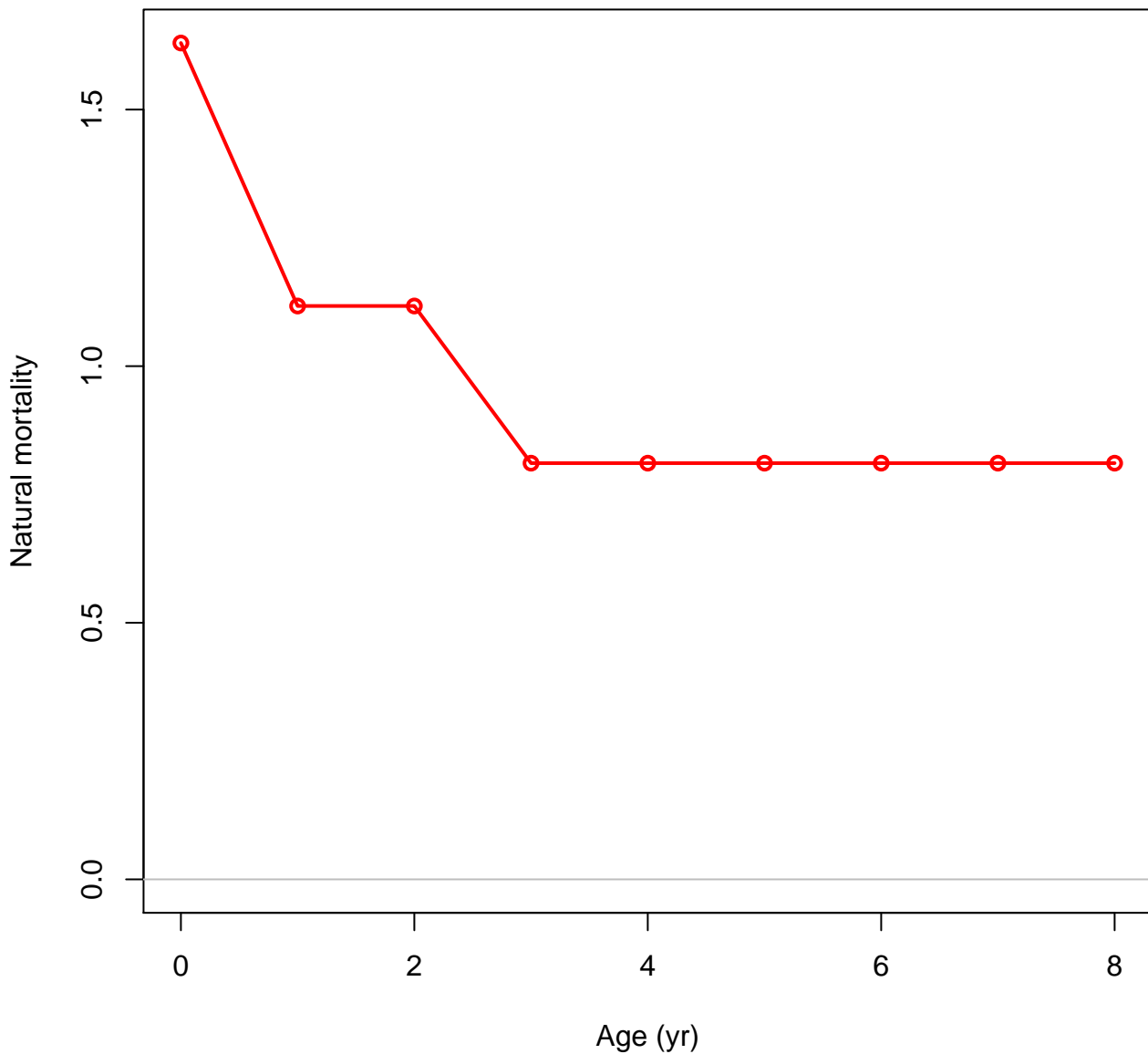




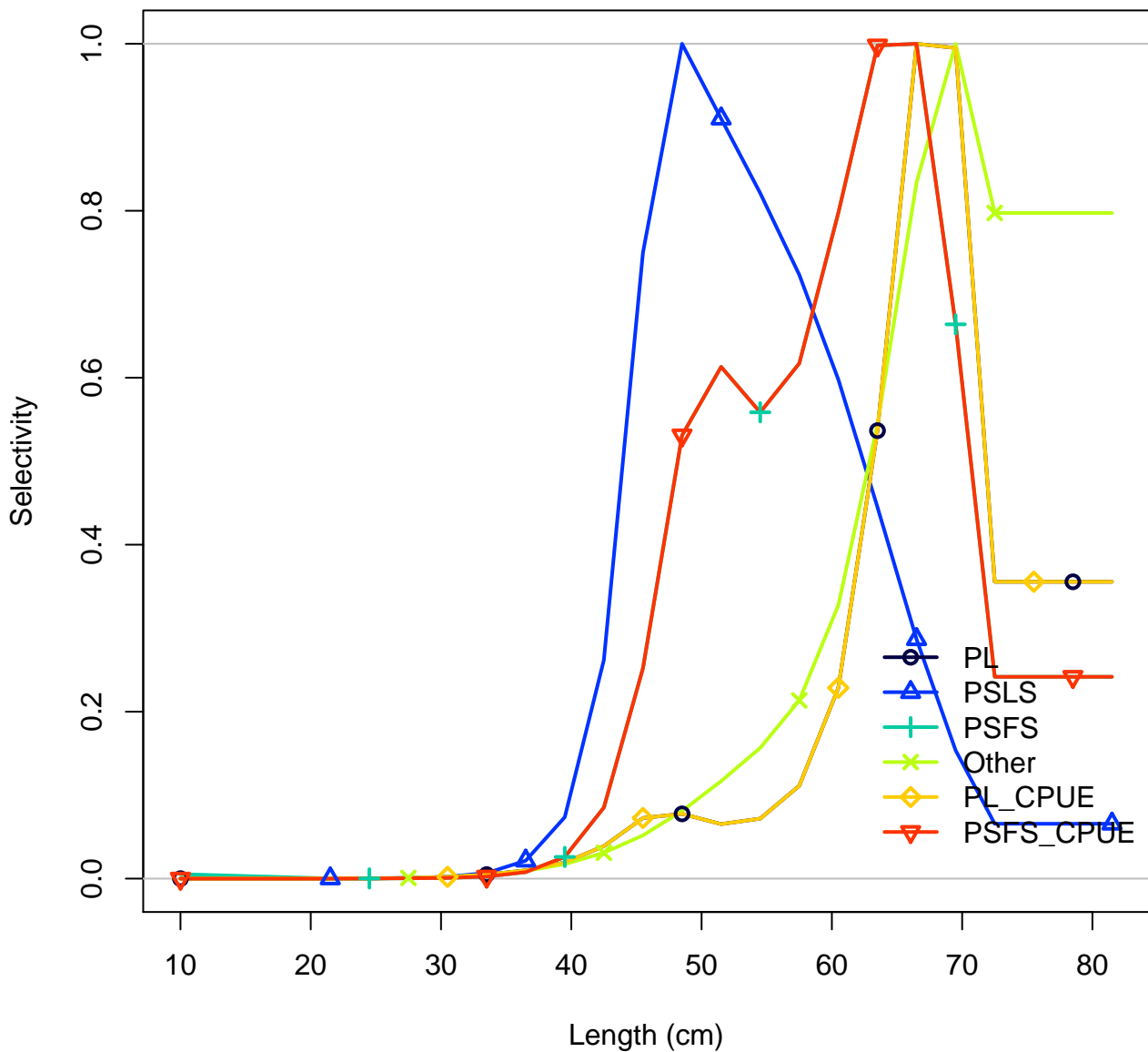


## Ending year expected growth



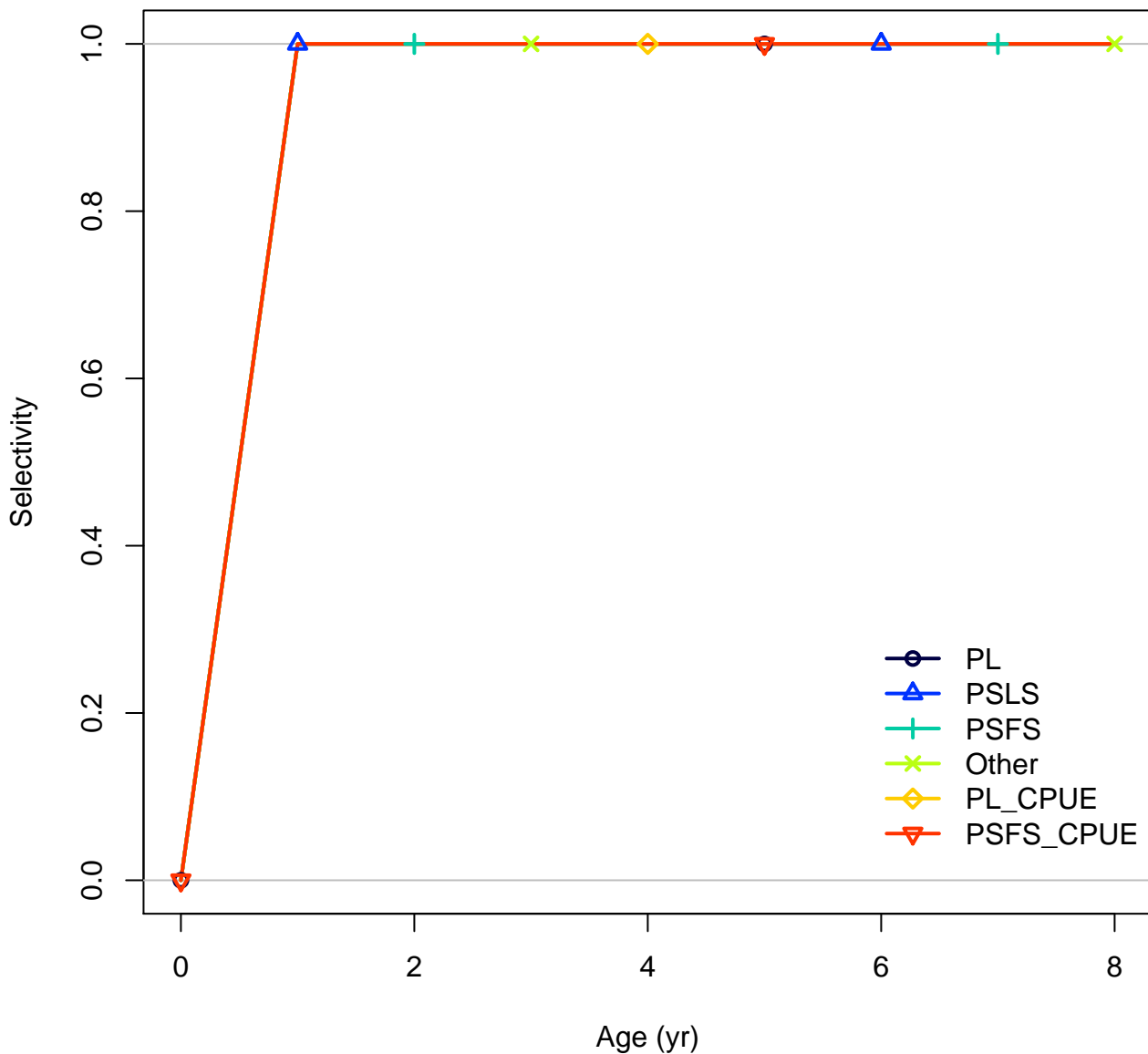


Length-based selectivity by fleet in 2011

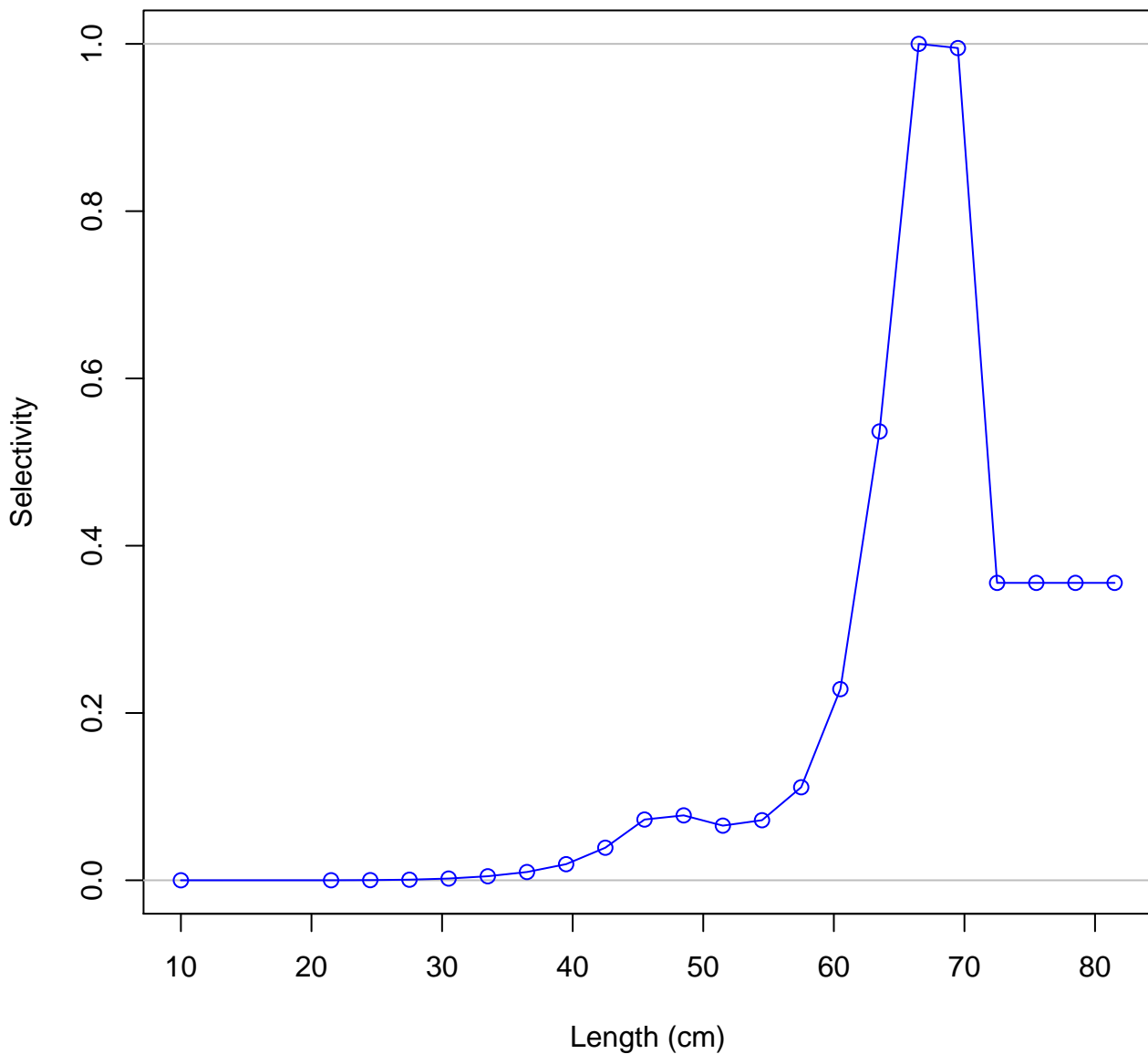




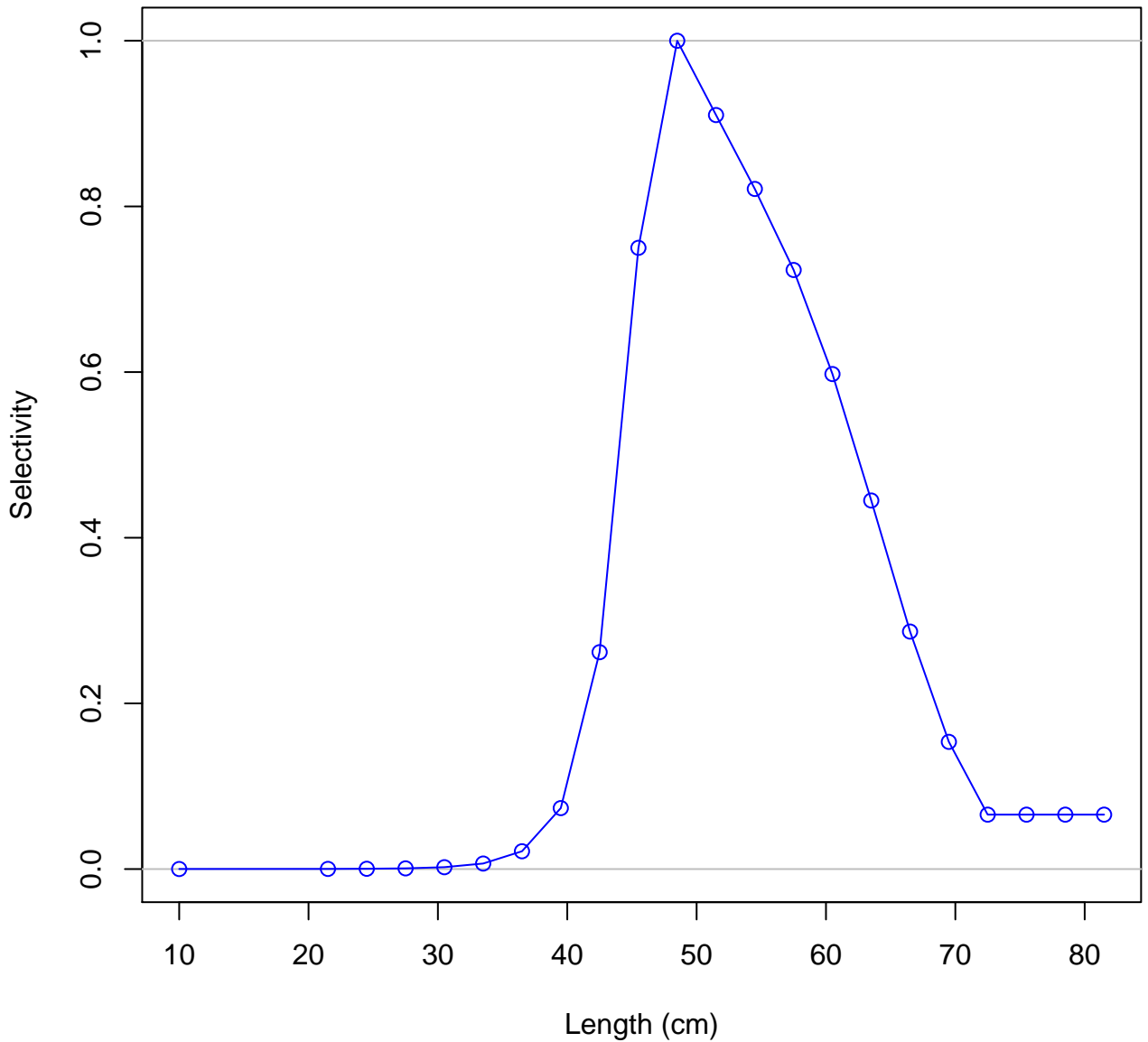
Age-based selectivity by fleet in 2011



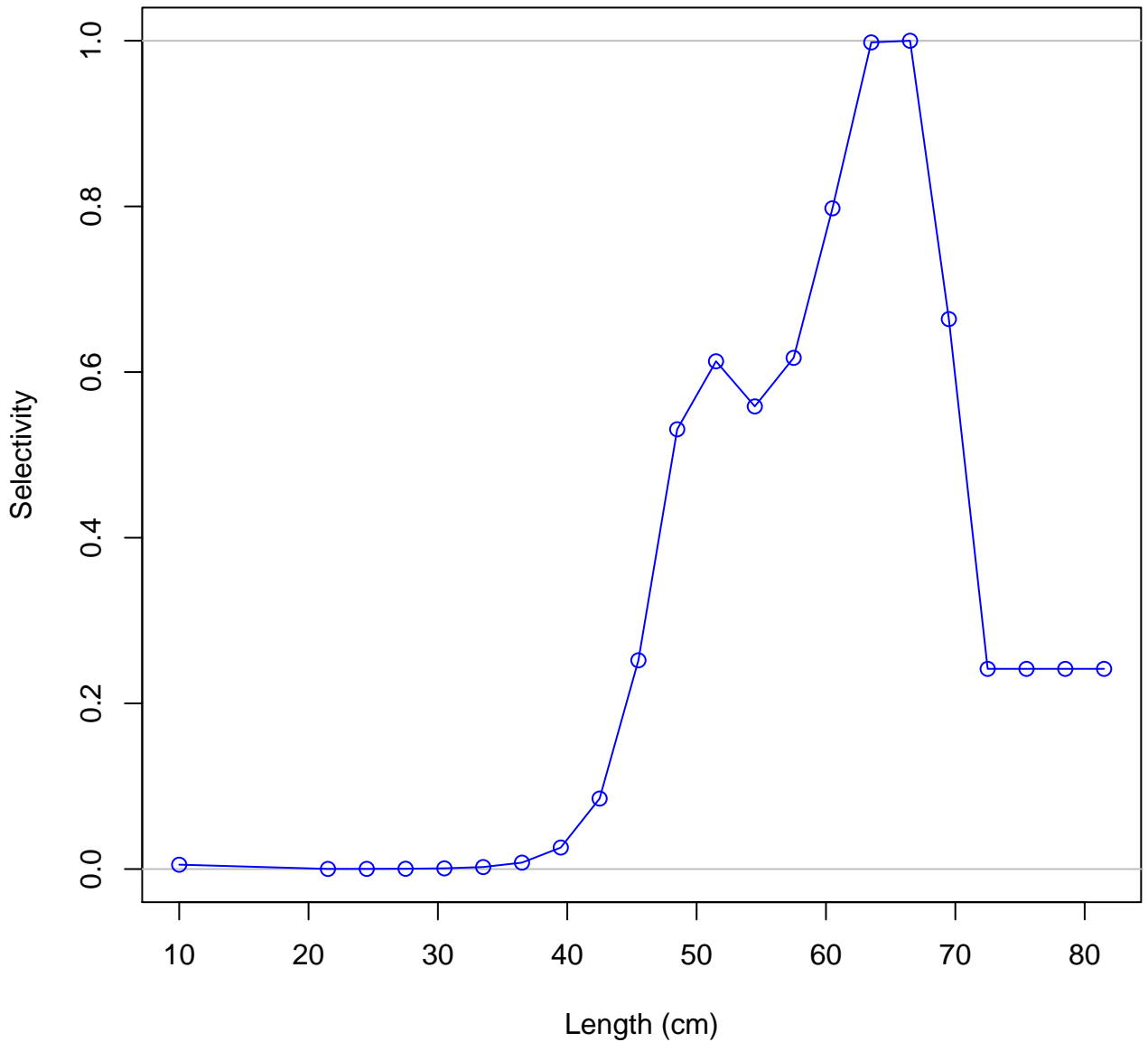
### Ending year selectivity for PL



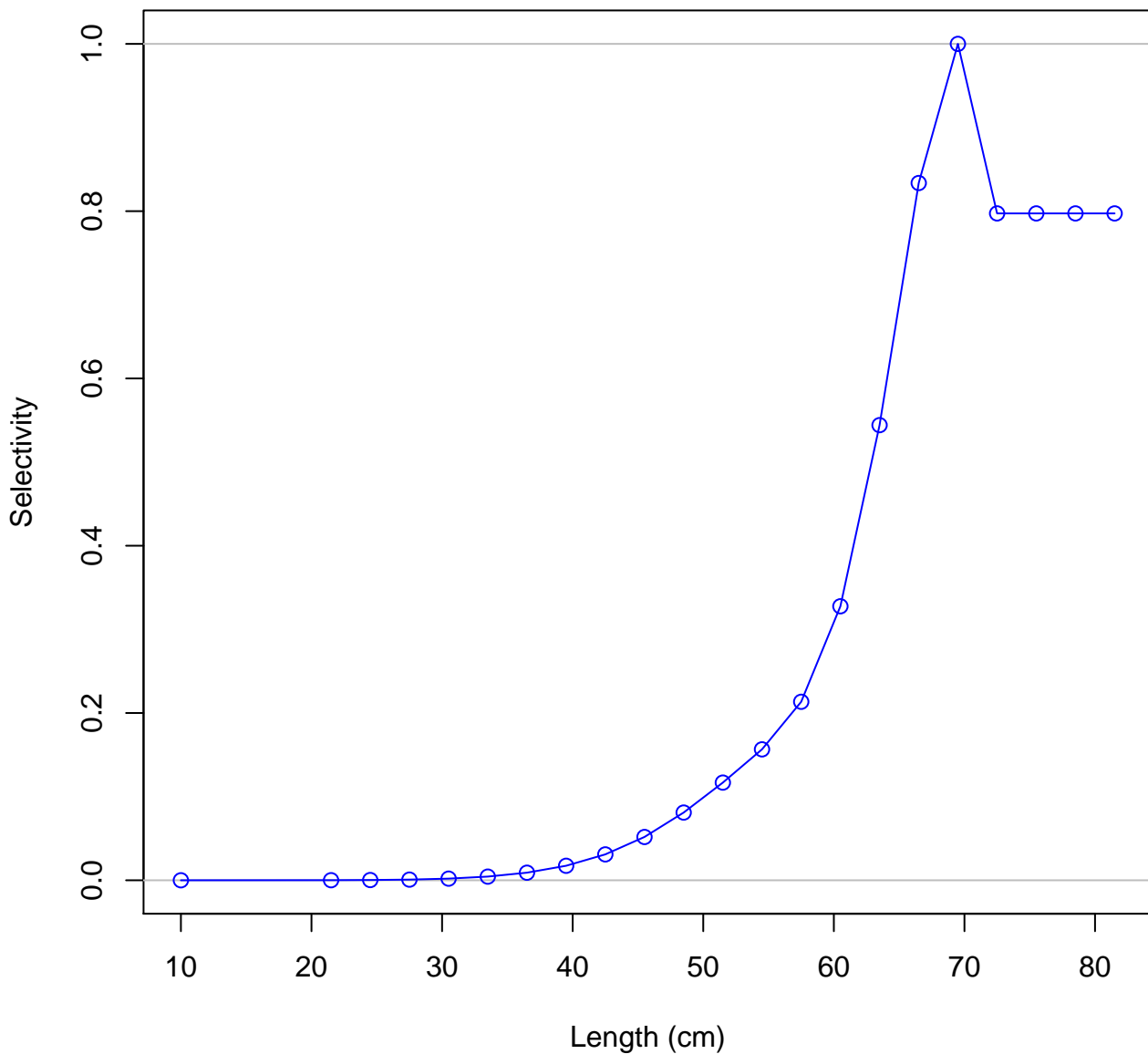
### Ending year selectivity for PSLS



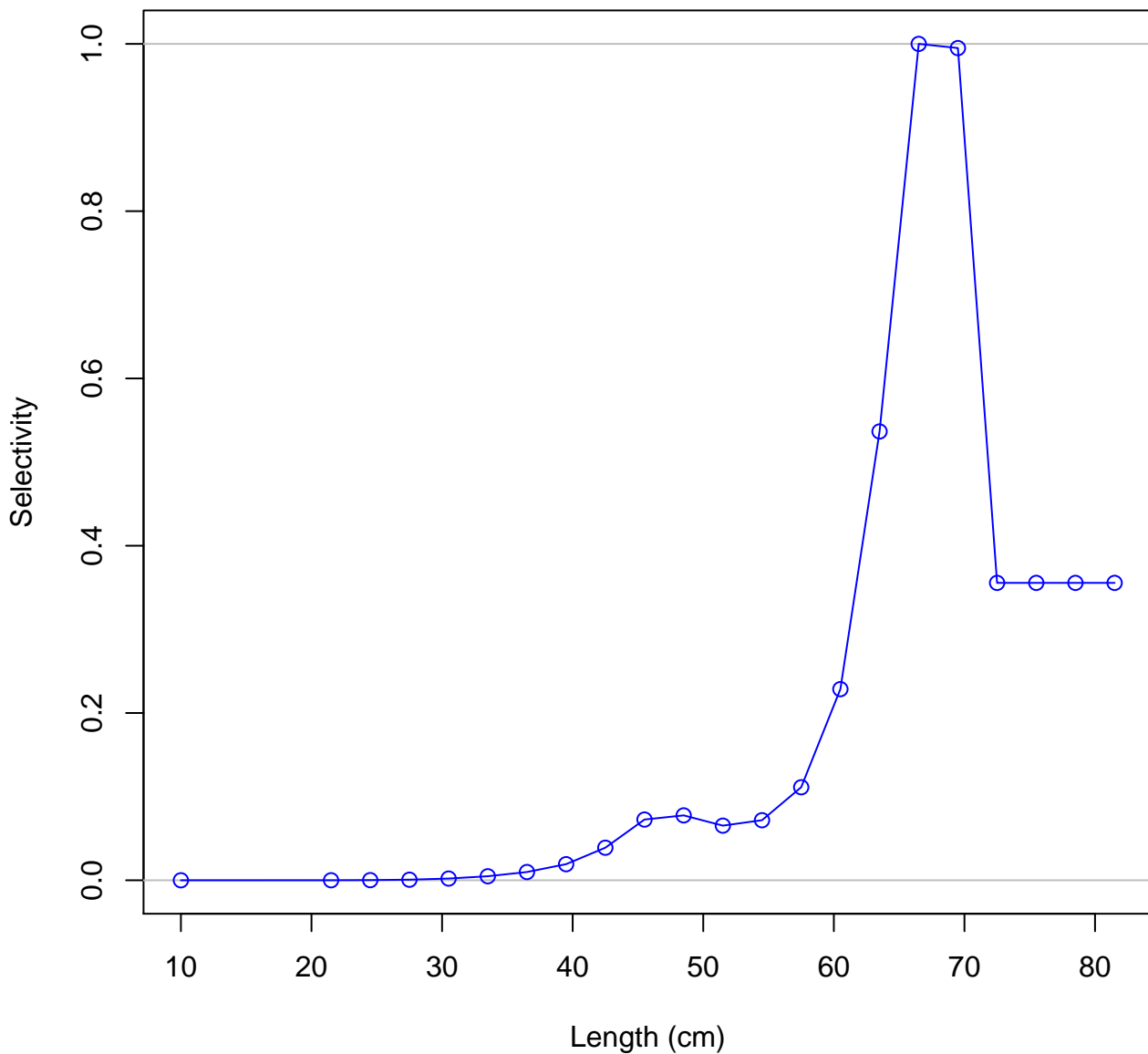
# Ending year selectivity for PSFS



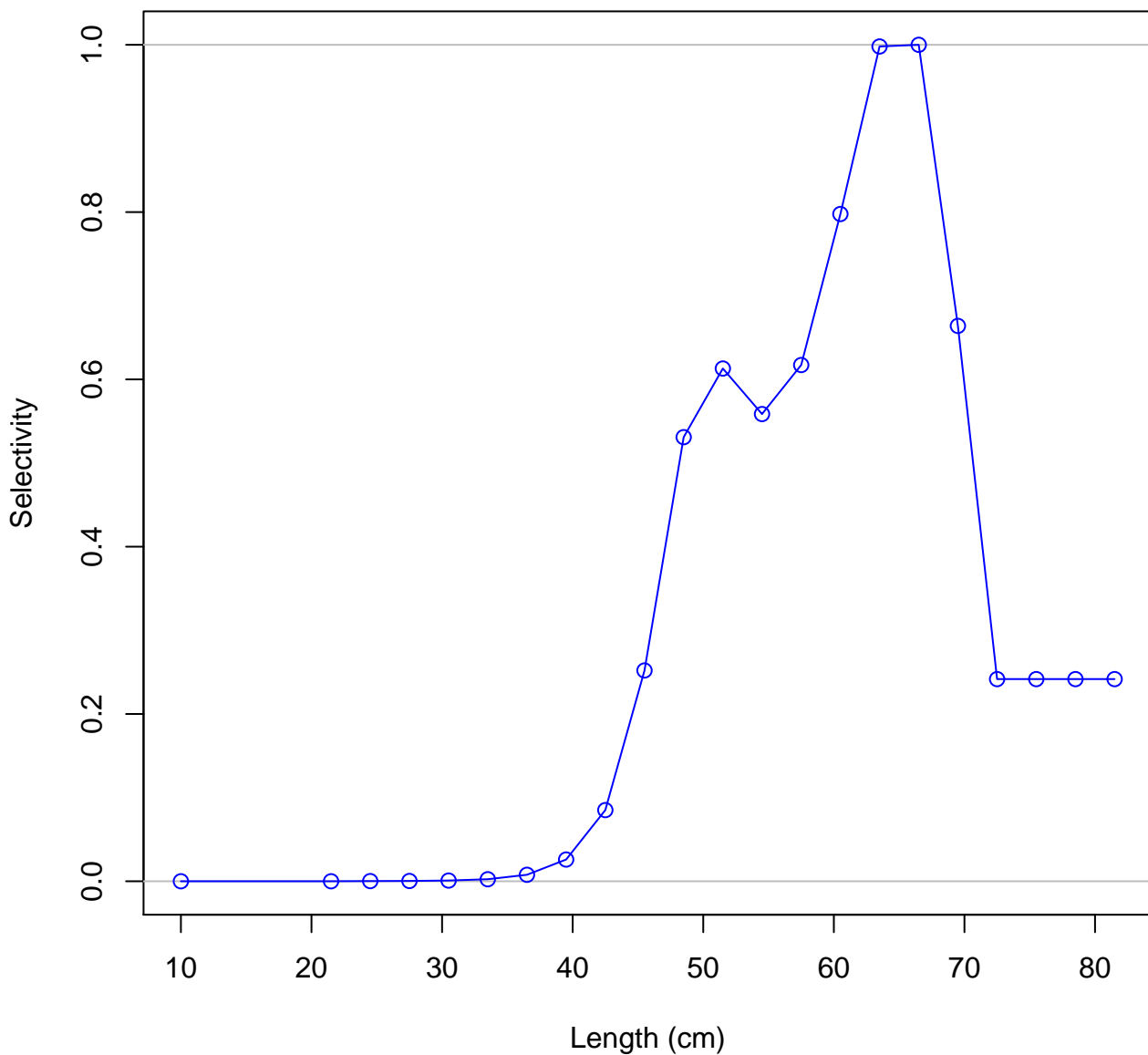
Ending year selectivity for Other



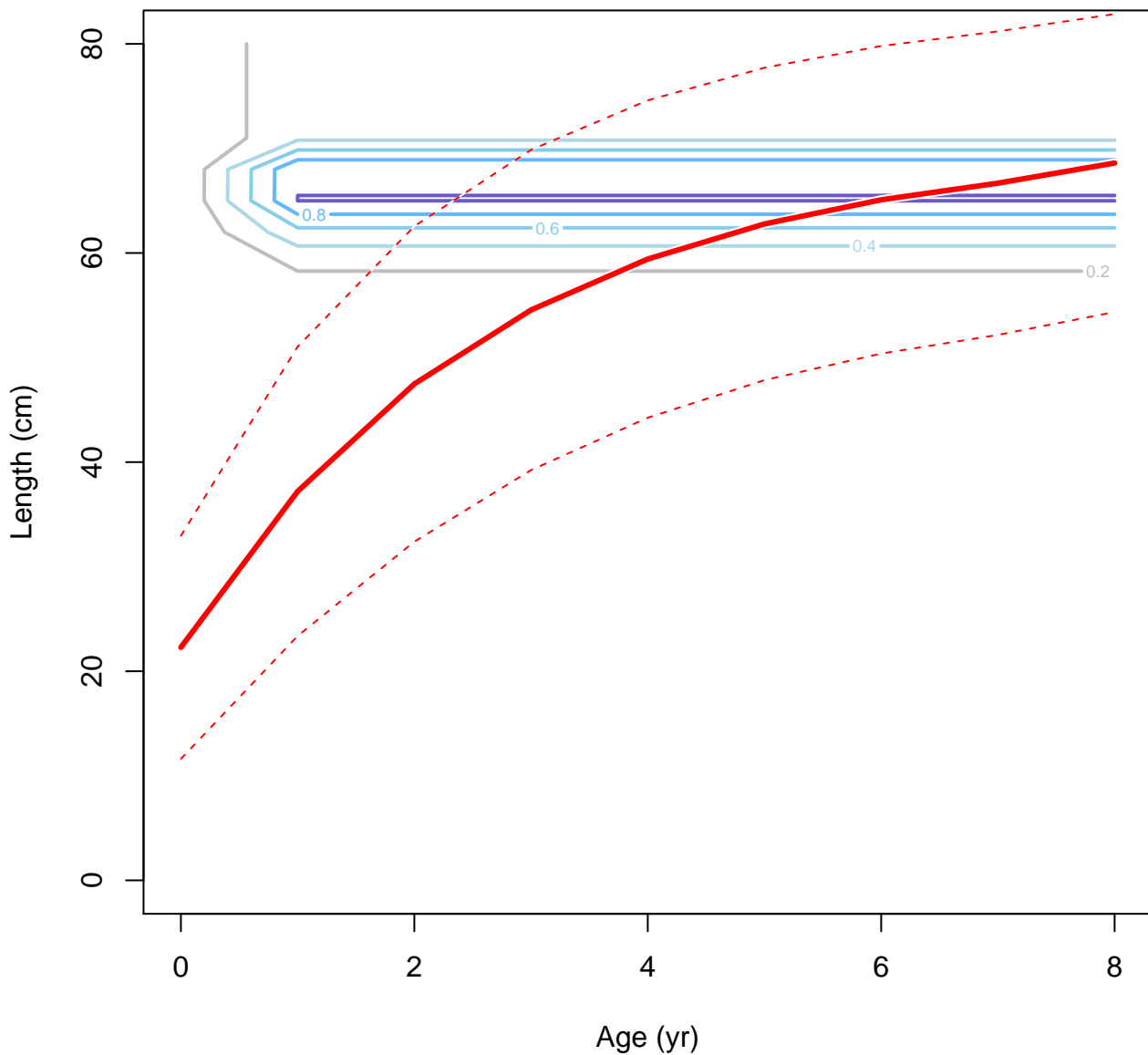
Ending year selectivity for PL\_CPUE



Ending year selectivity for PSFS\_CPUE

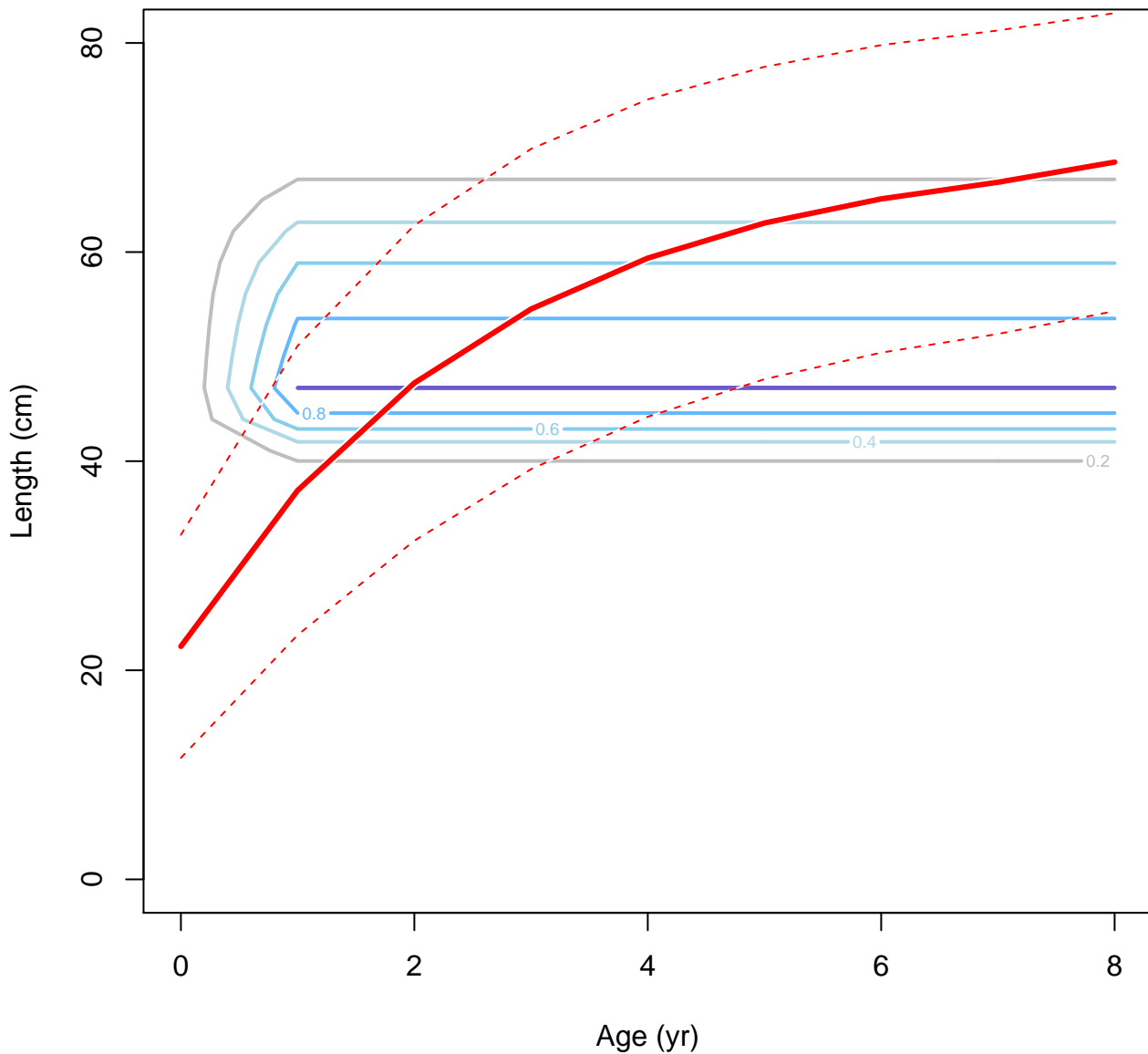


# Ending year selectivity and growth for PL

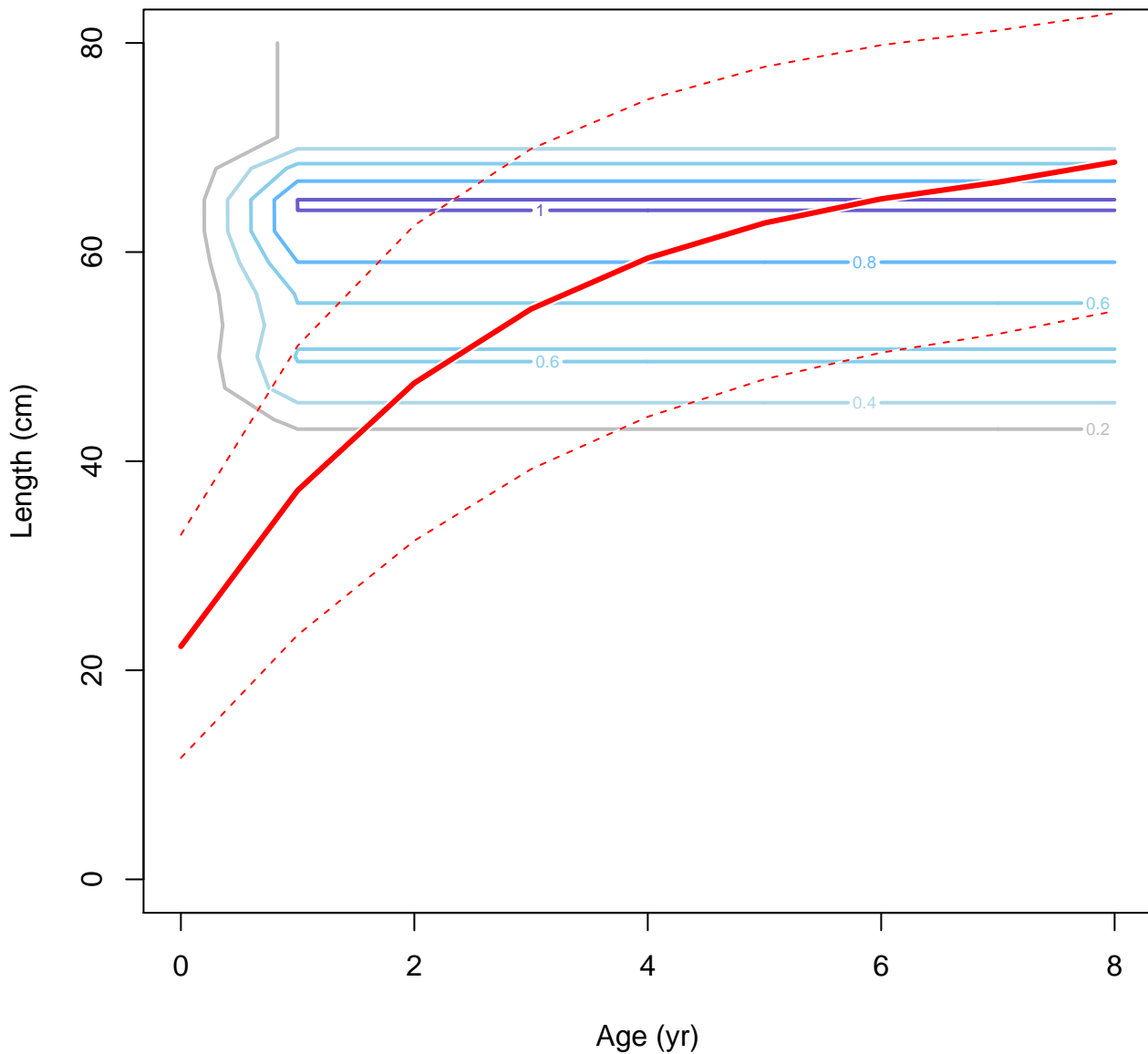




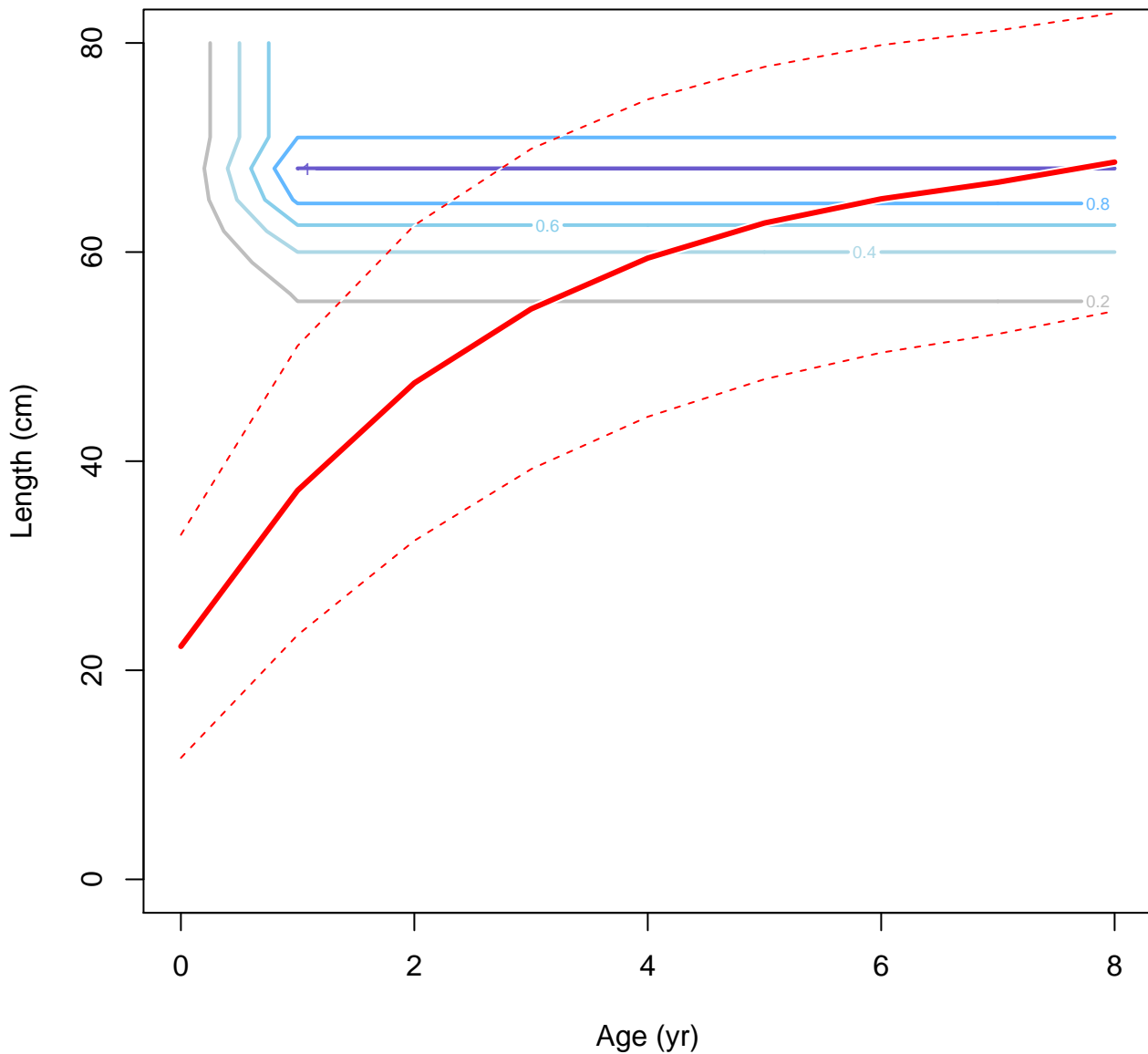
# Ending year selectivity and growth for PSLS



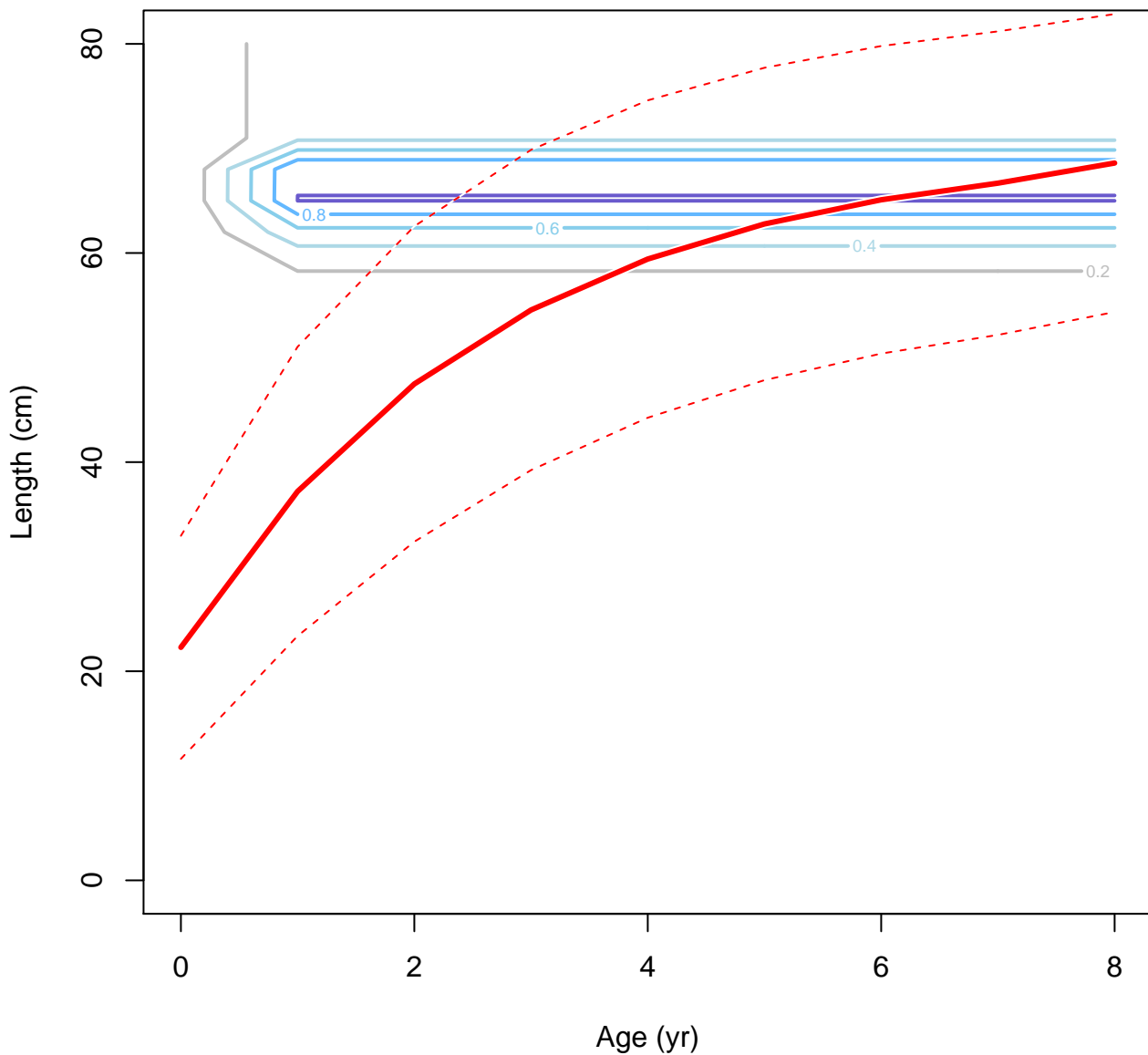
# Ending year selectivity and growth for PSFS



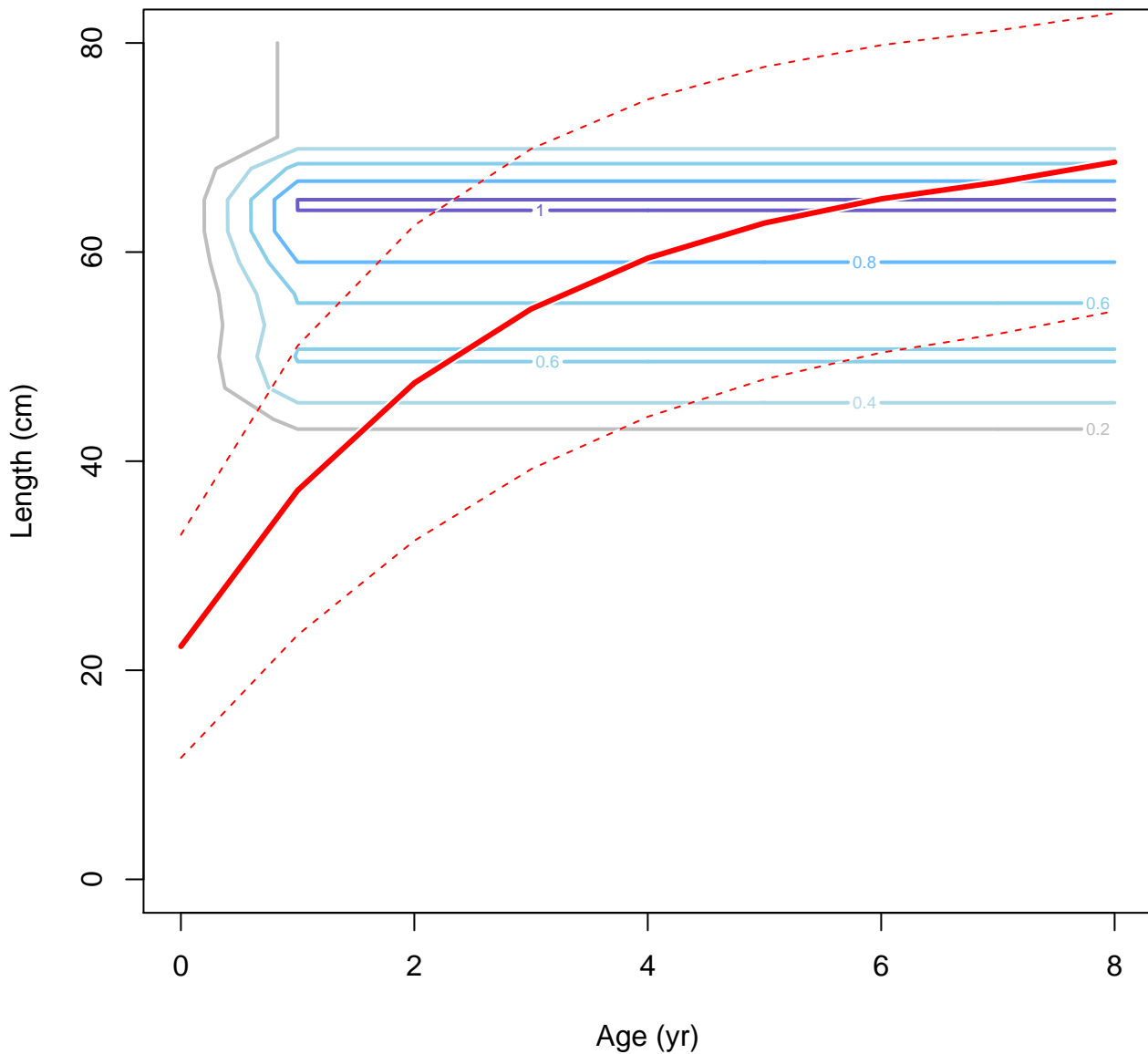
# Ending year selectivity and growth for Other



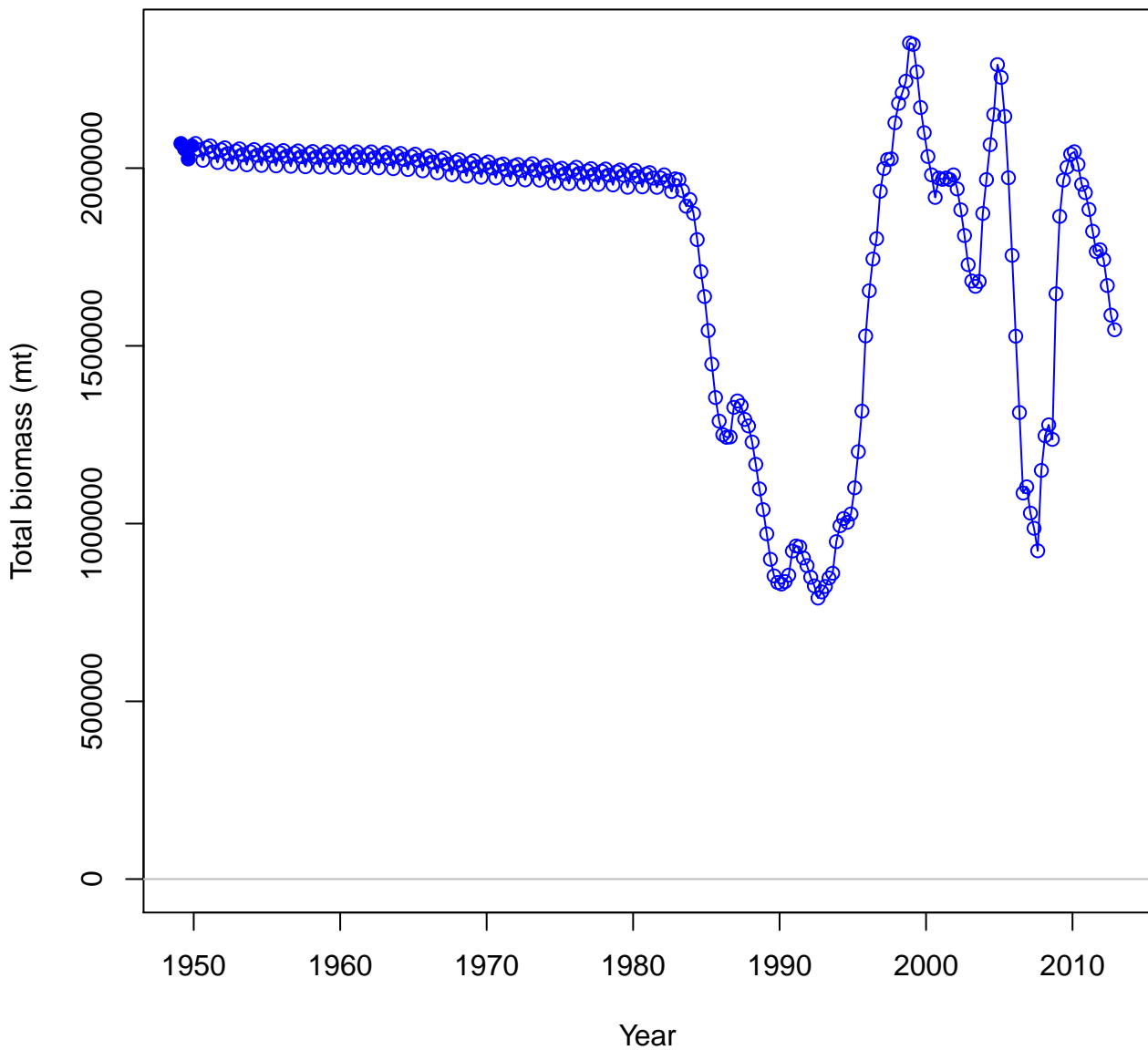
# Ending year selectivity and growth for PL\_CPUE



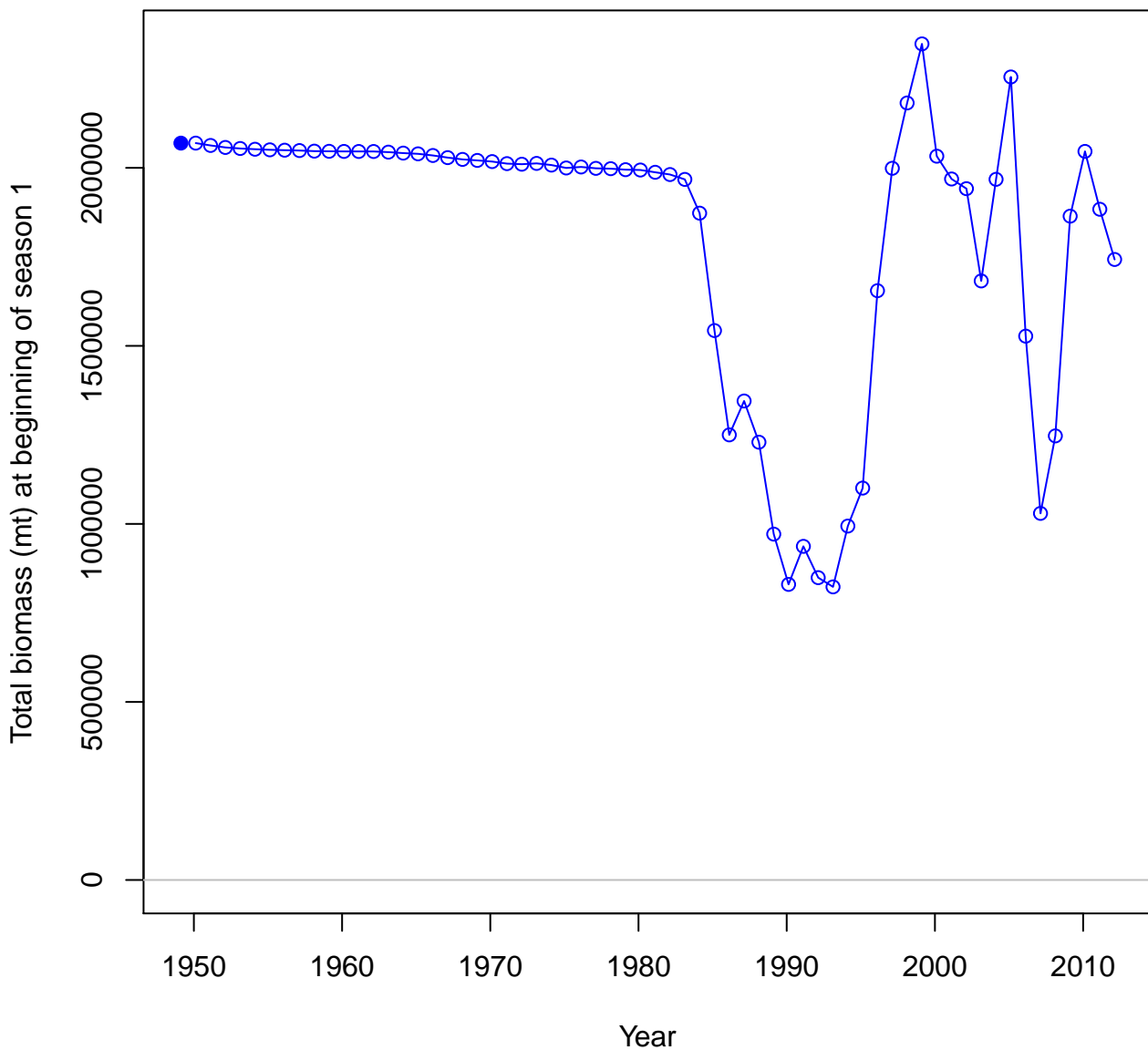
# Ending year selectivity and growth for PSFS\_CPUE



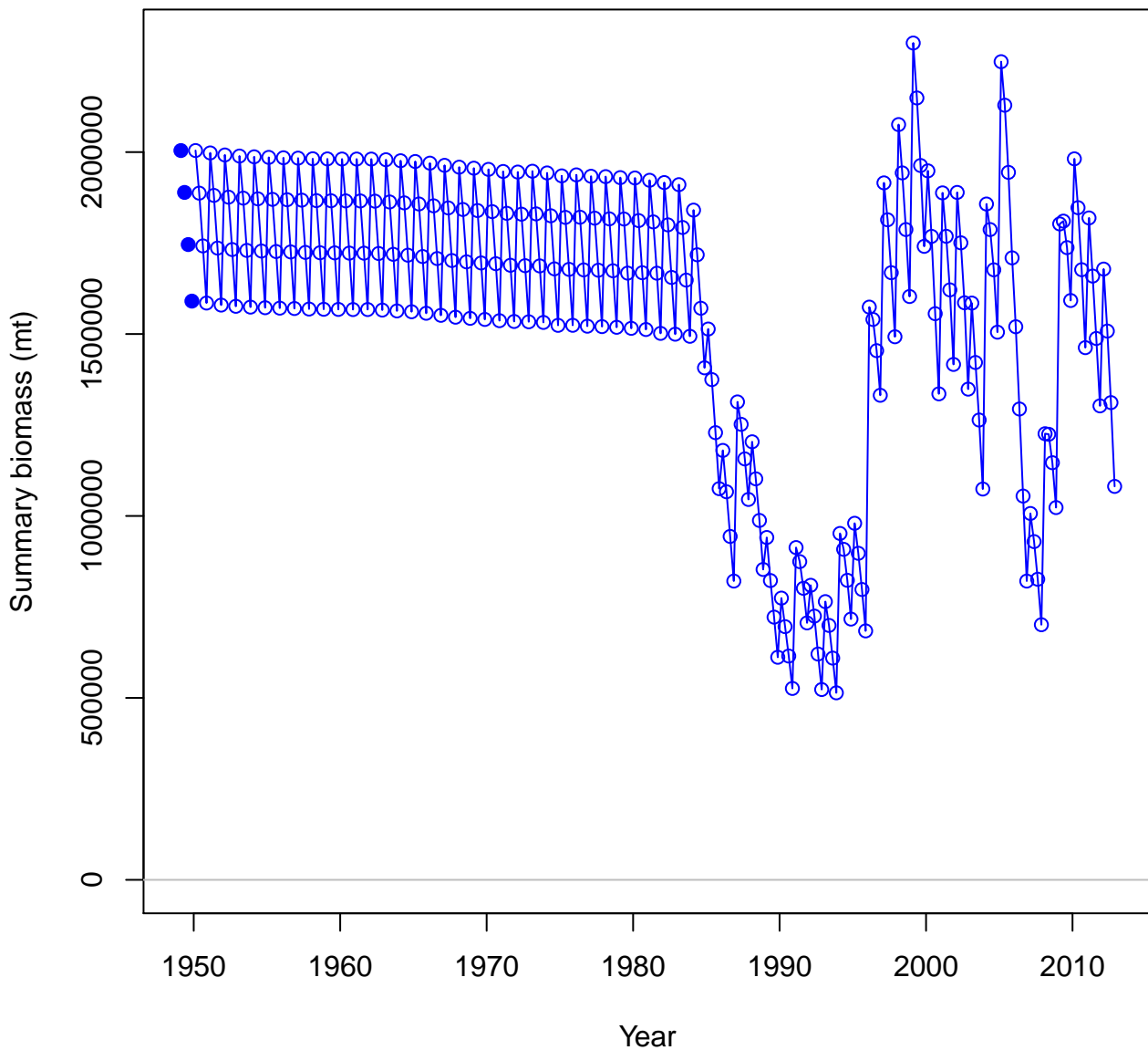
# Total biomass (mt)



**Total biomass (mt) at beginning of season 1**

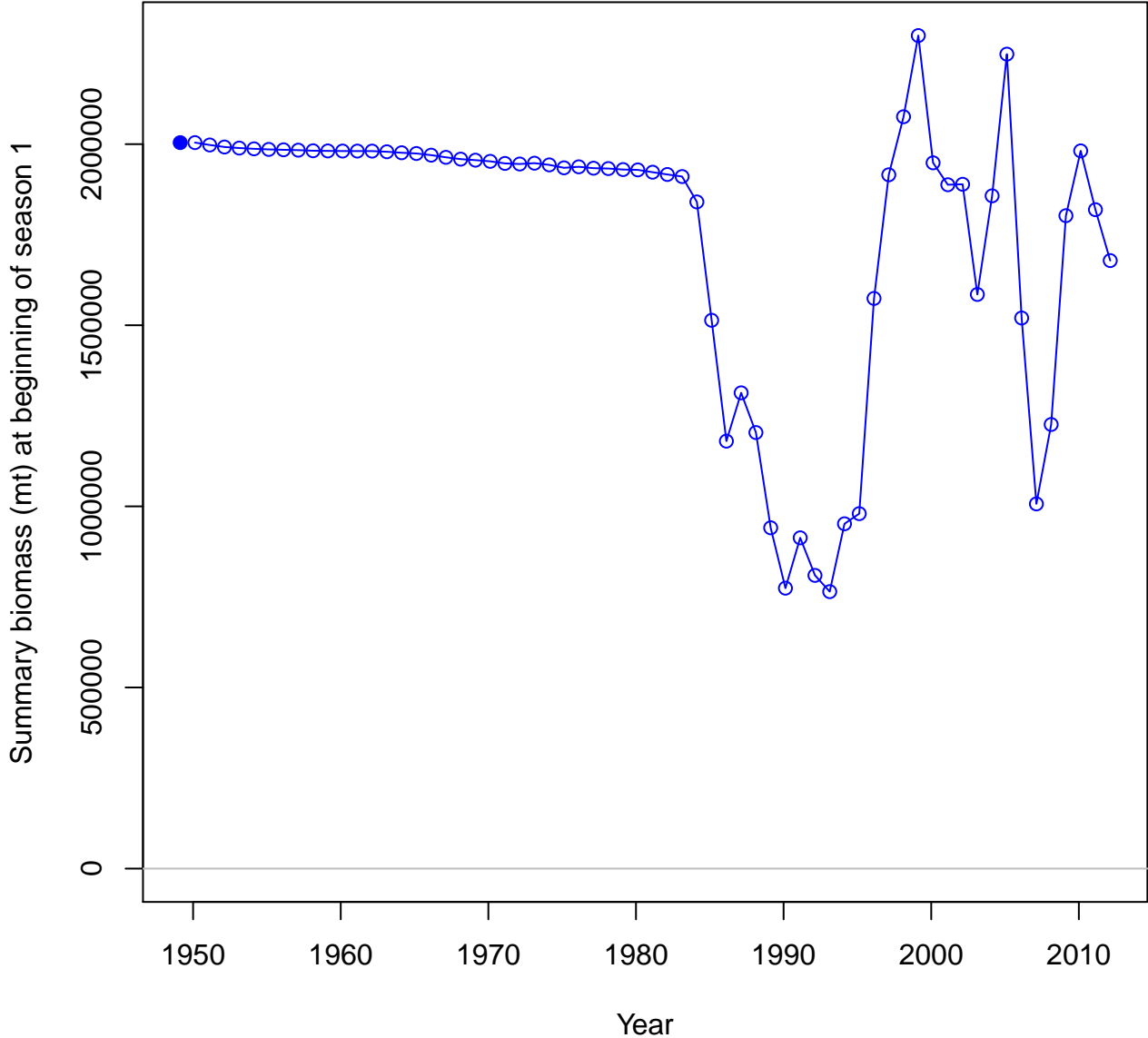


**Summary biomass (mt)**

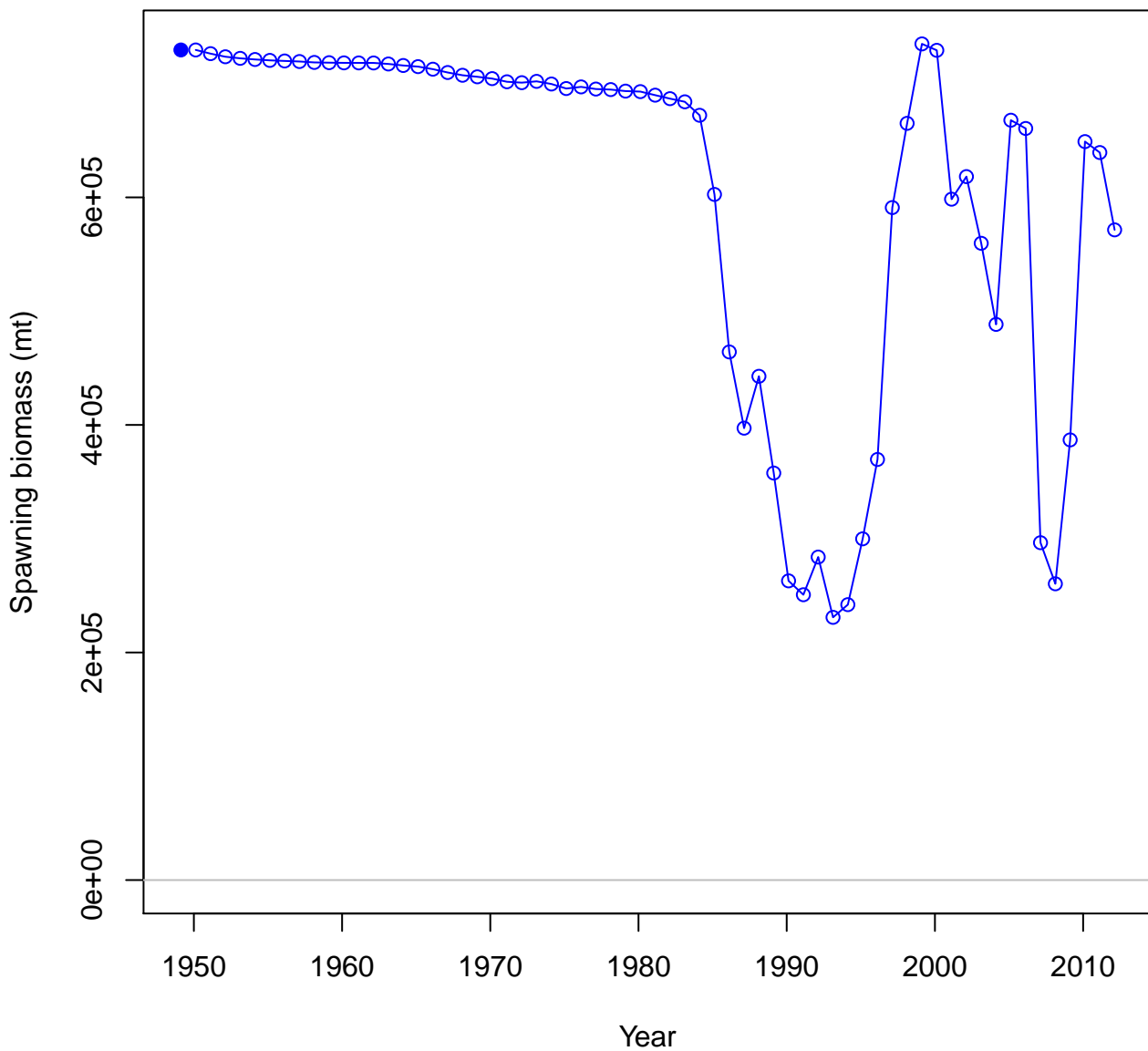




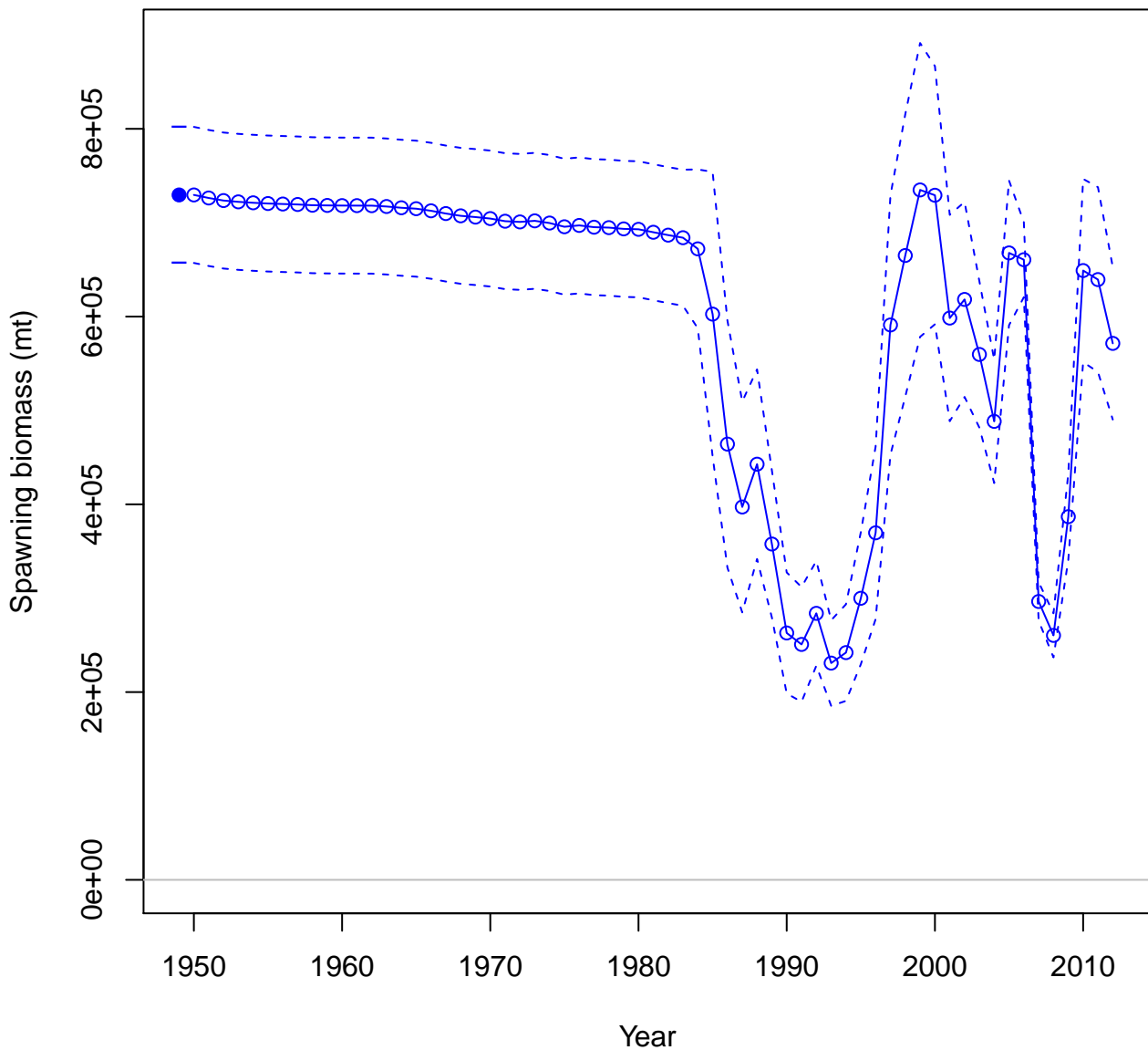
Summary biomass (mt) at beginning of season 1



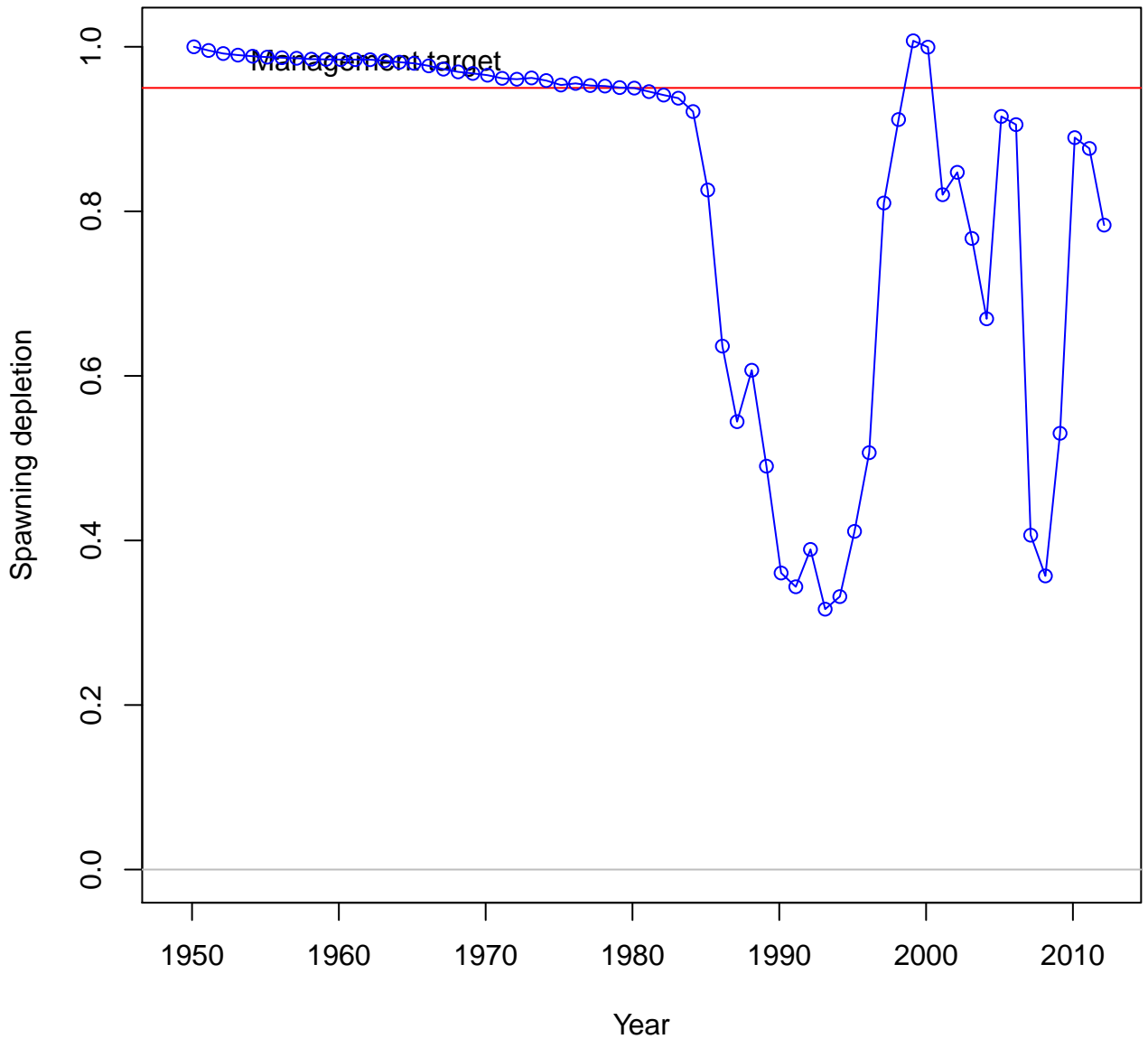
## Spawning biomass (mt)



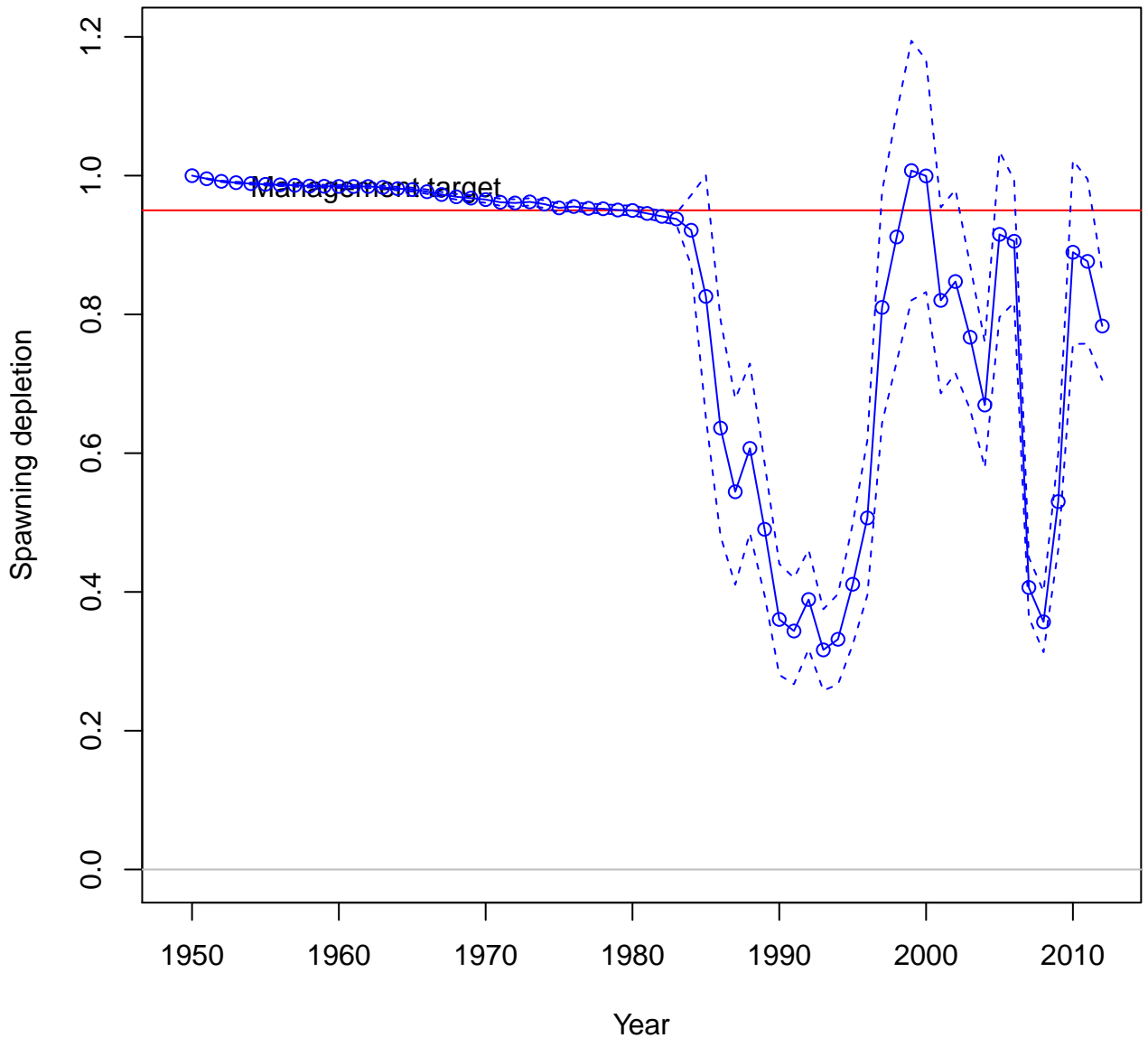
Spawning biomass (mt) with ~95% asymptotic intervals



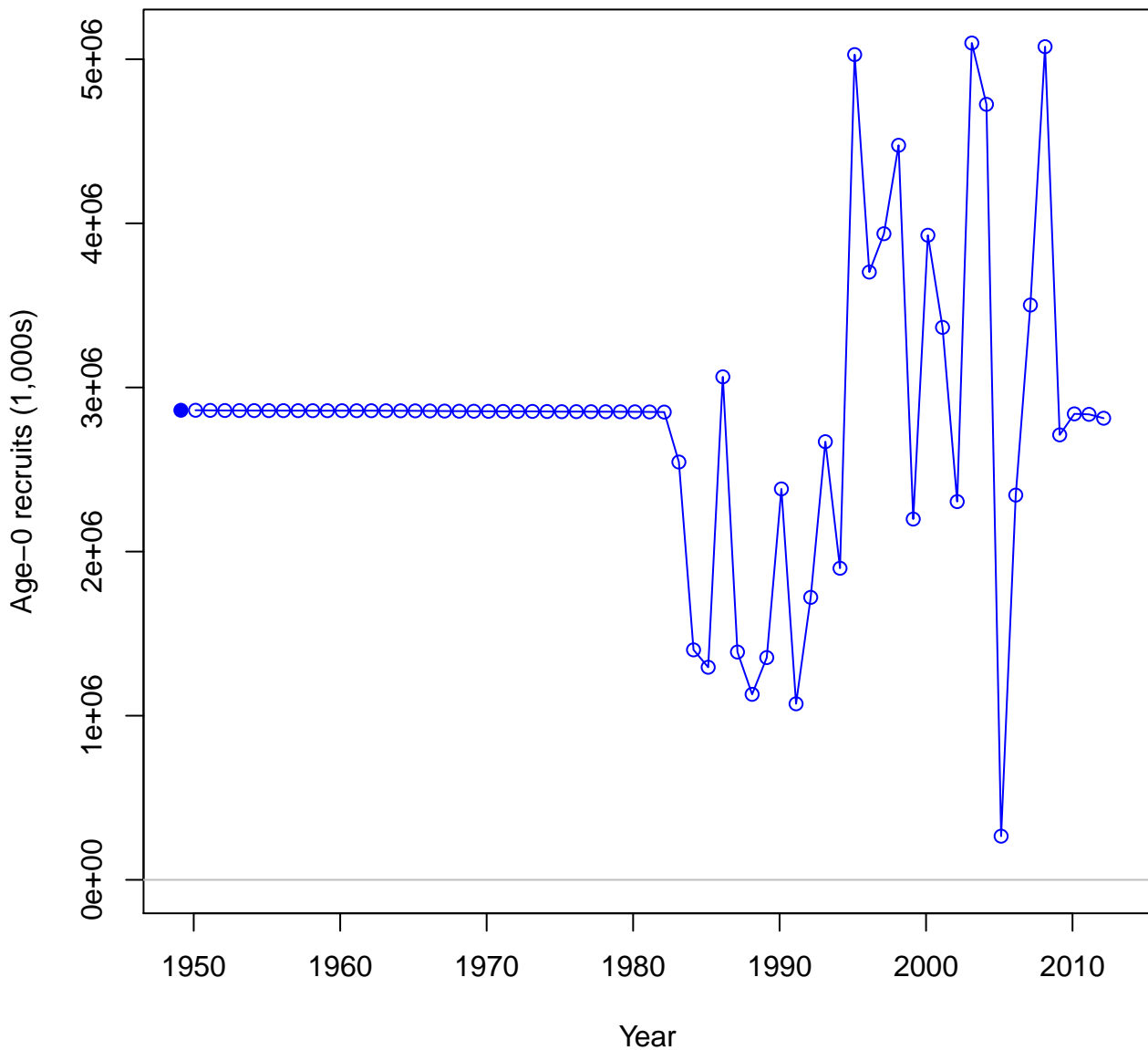
## Spawning depletion



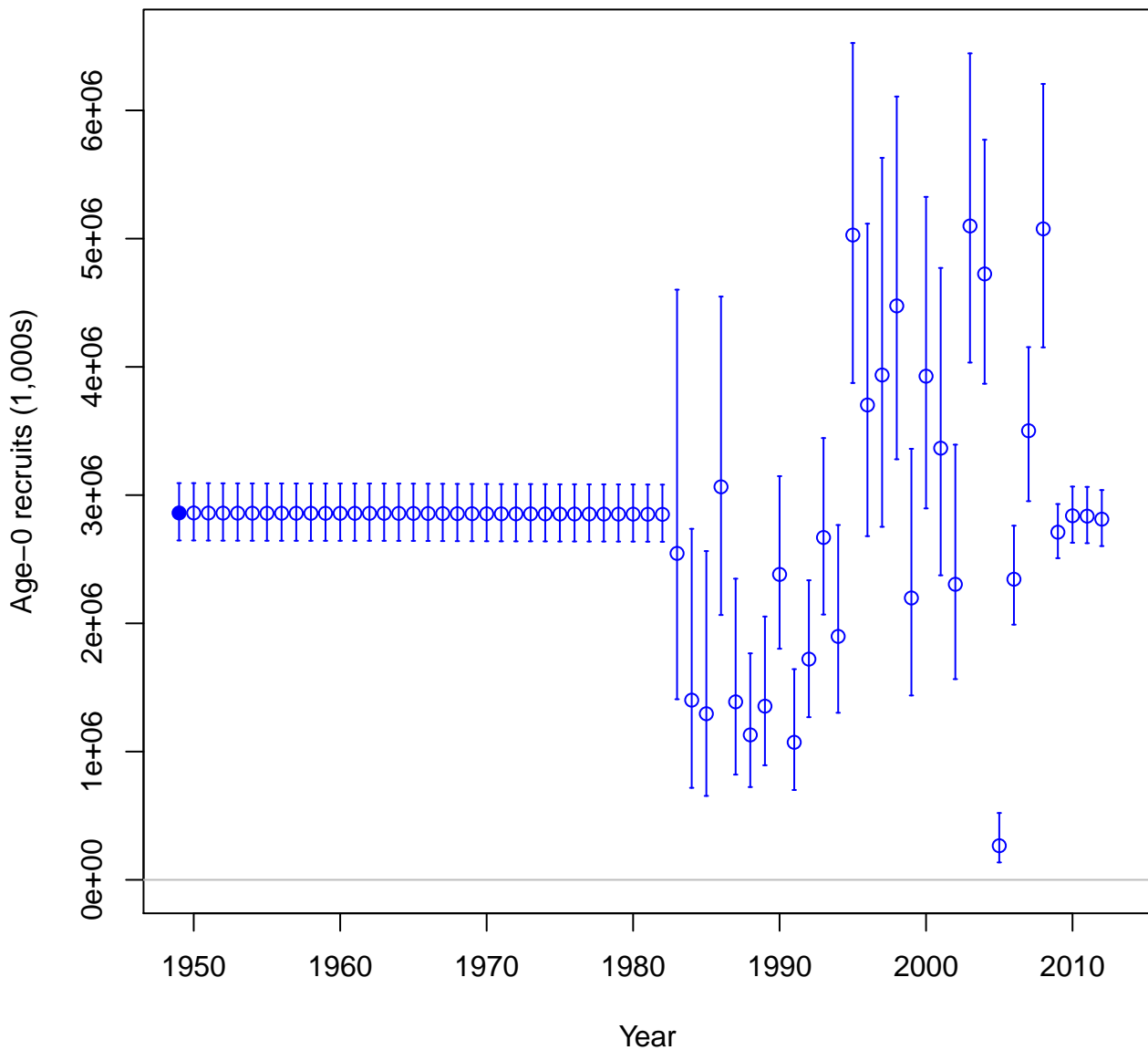
## Spawning depletion with ~95% asymptotic intervals



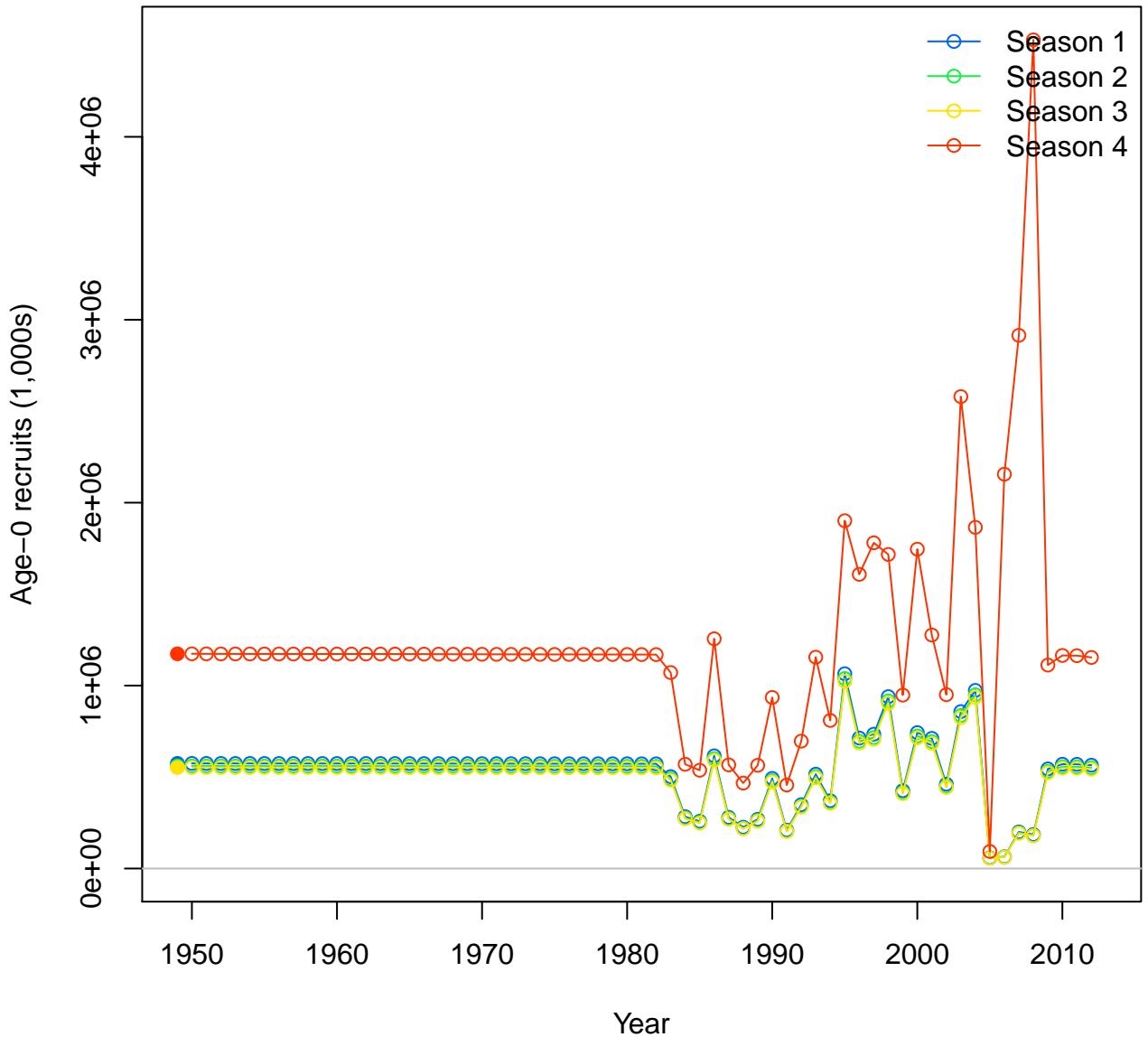
# Age-0 recruits (1,000s)



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

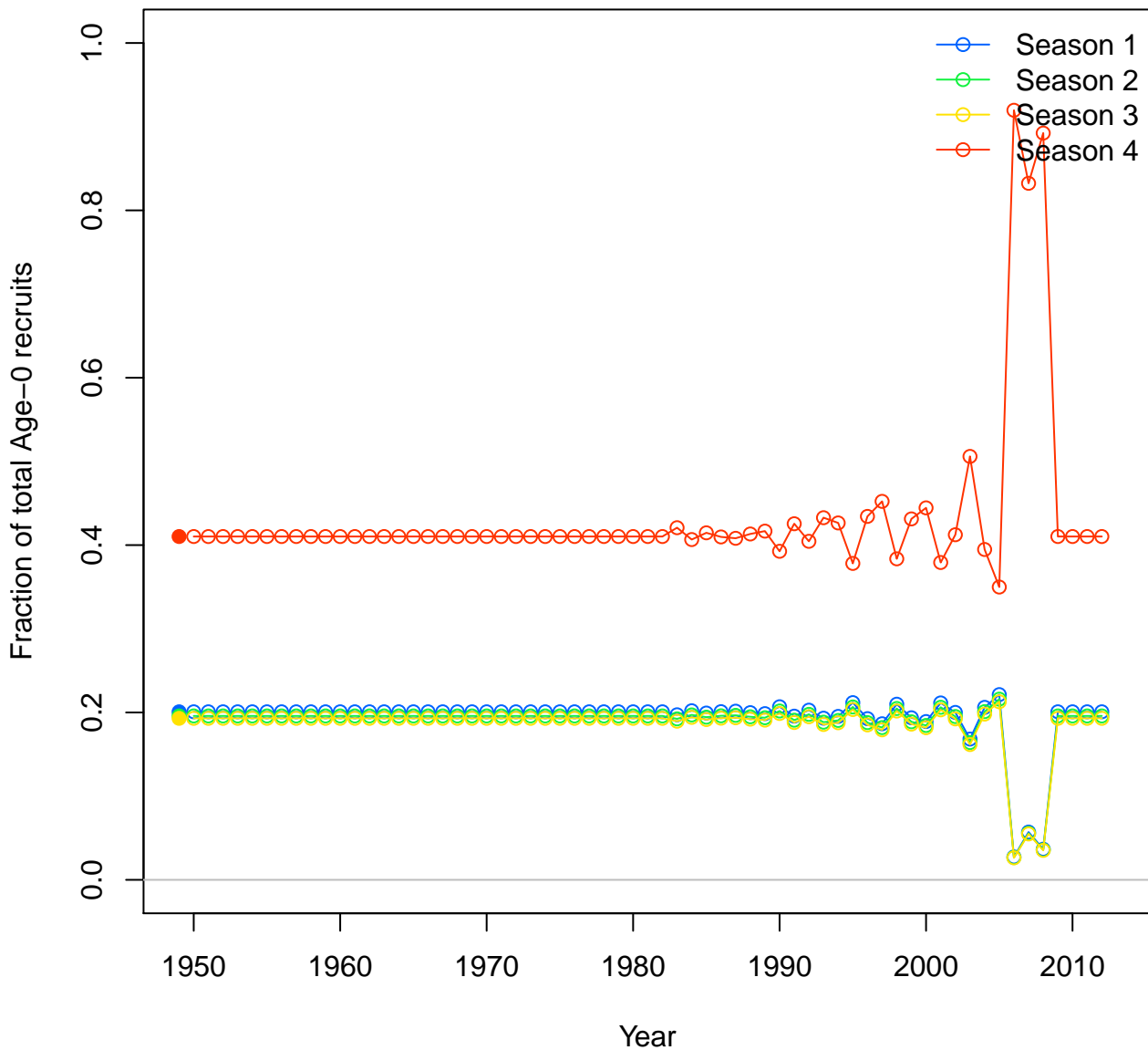


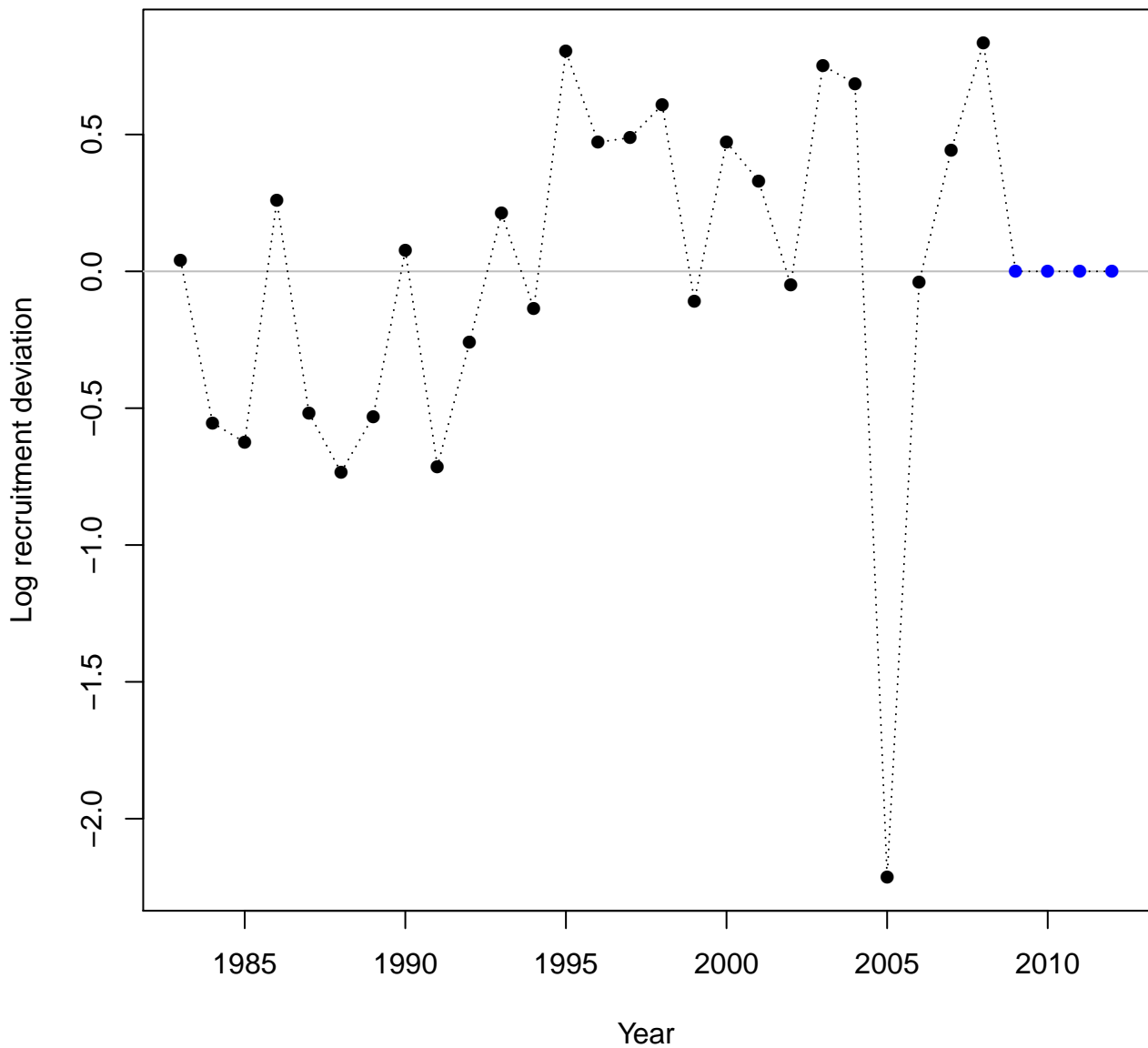
Age-0 recruits (1,000s) by birth season

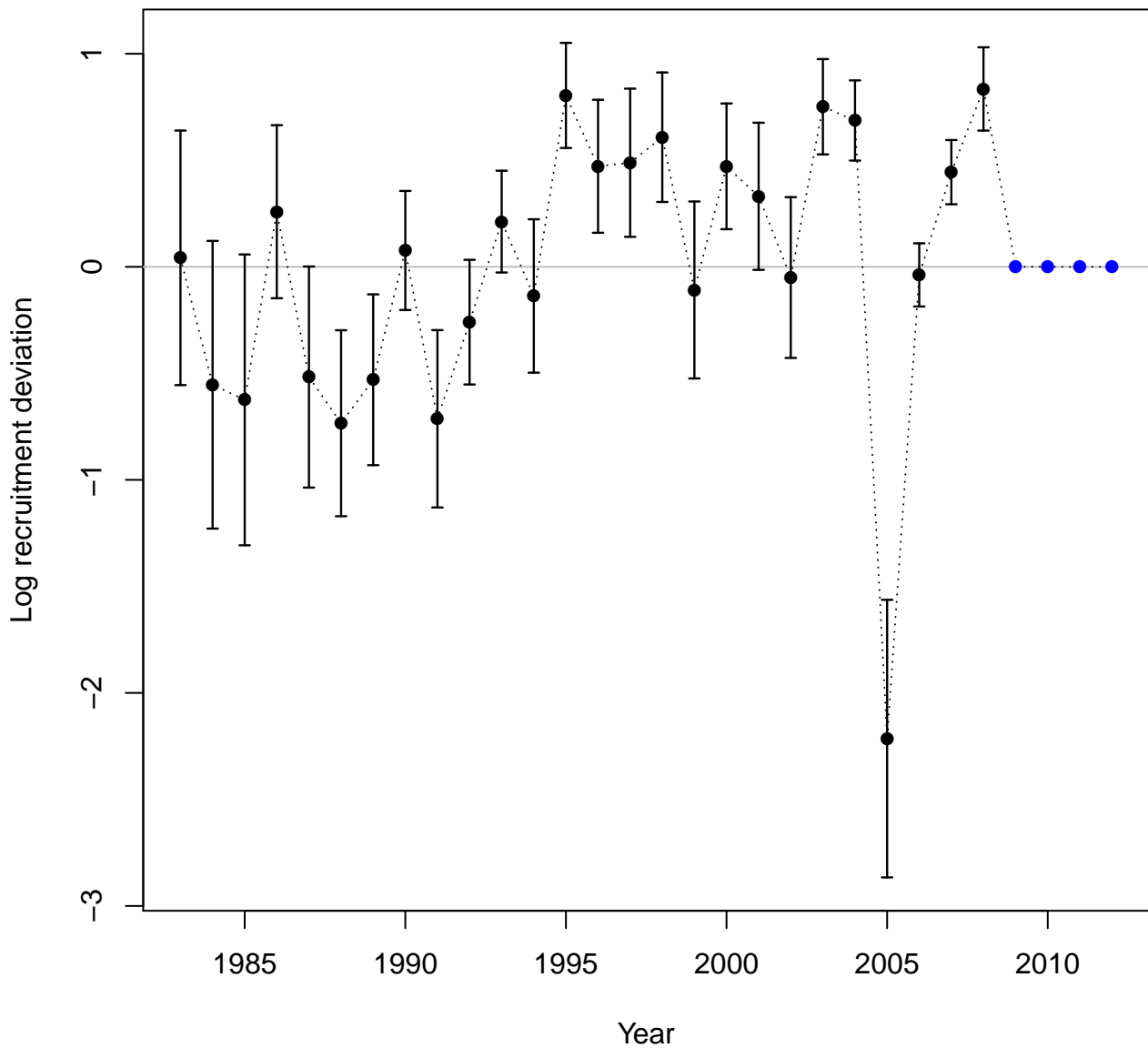




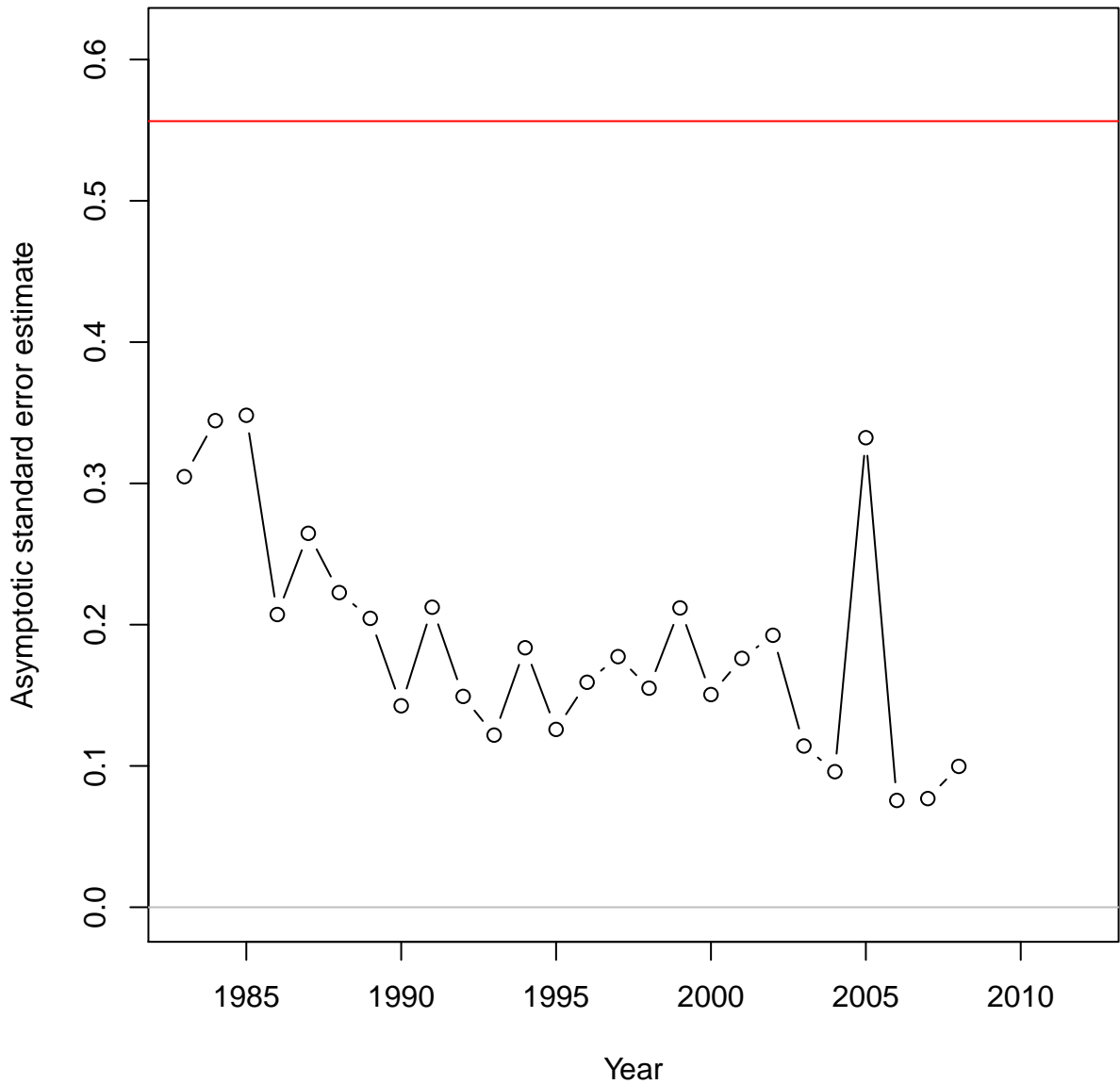
Fraction of total Age-0 recruits by birth season

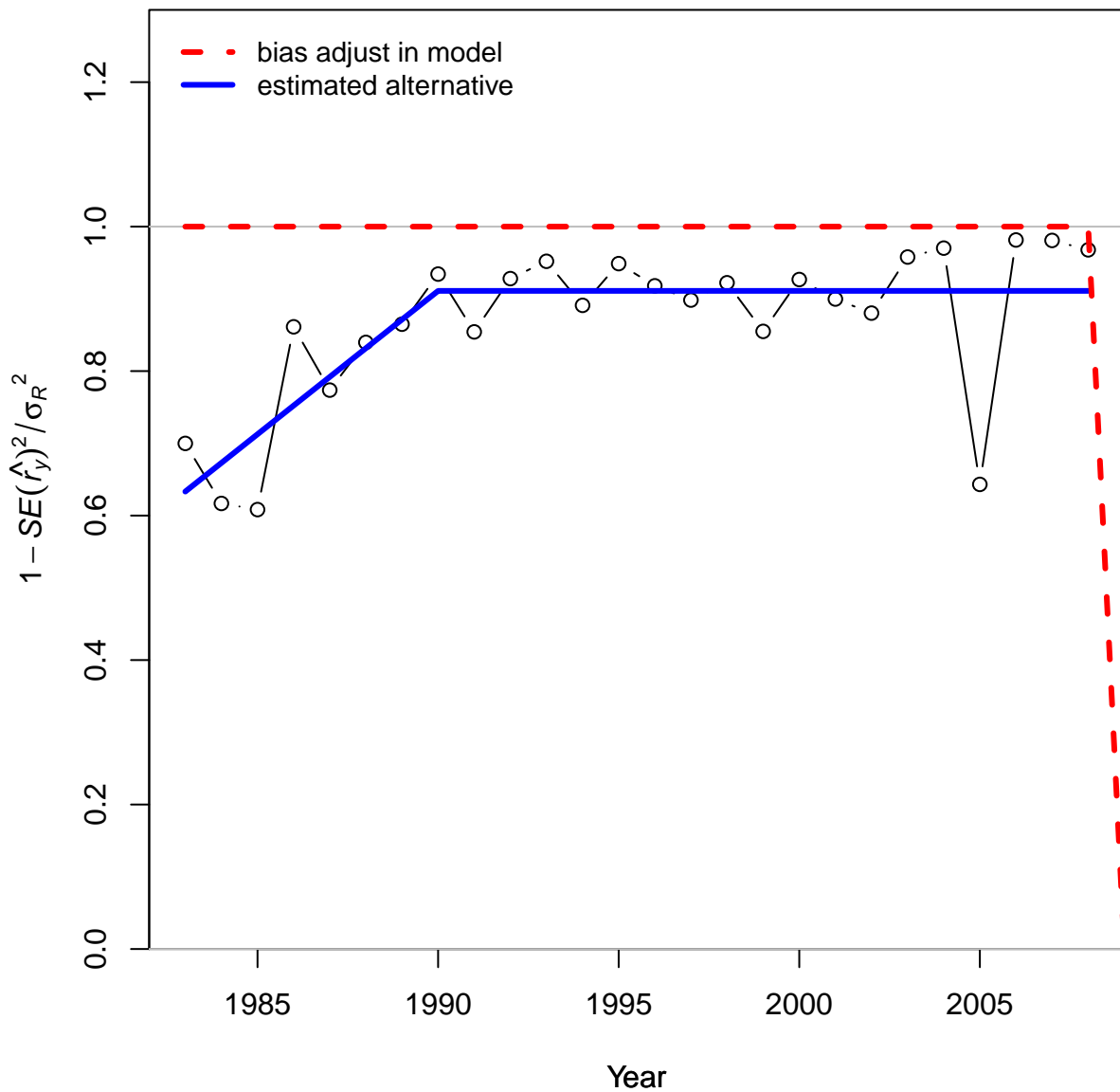


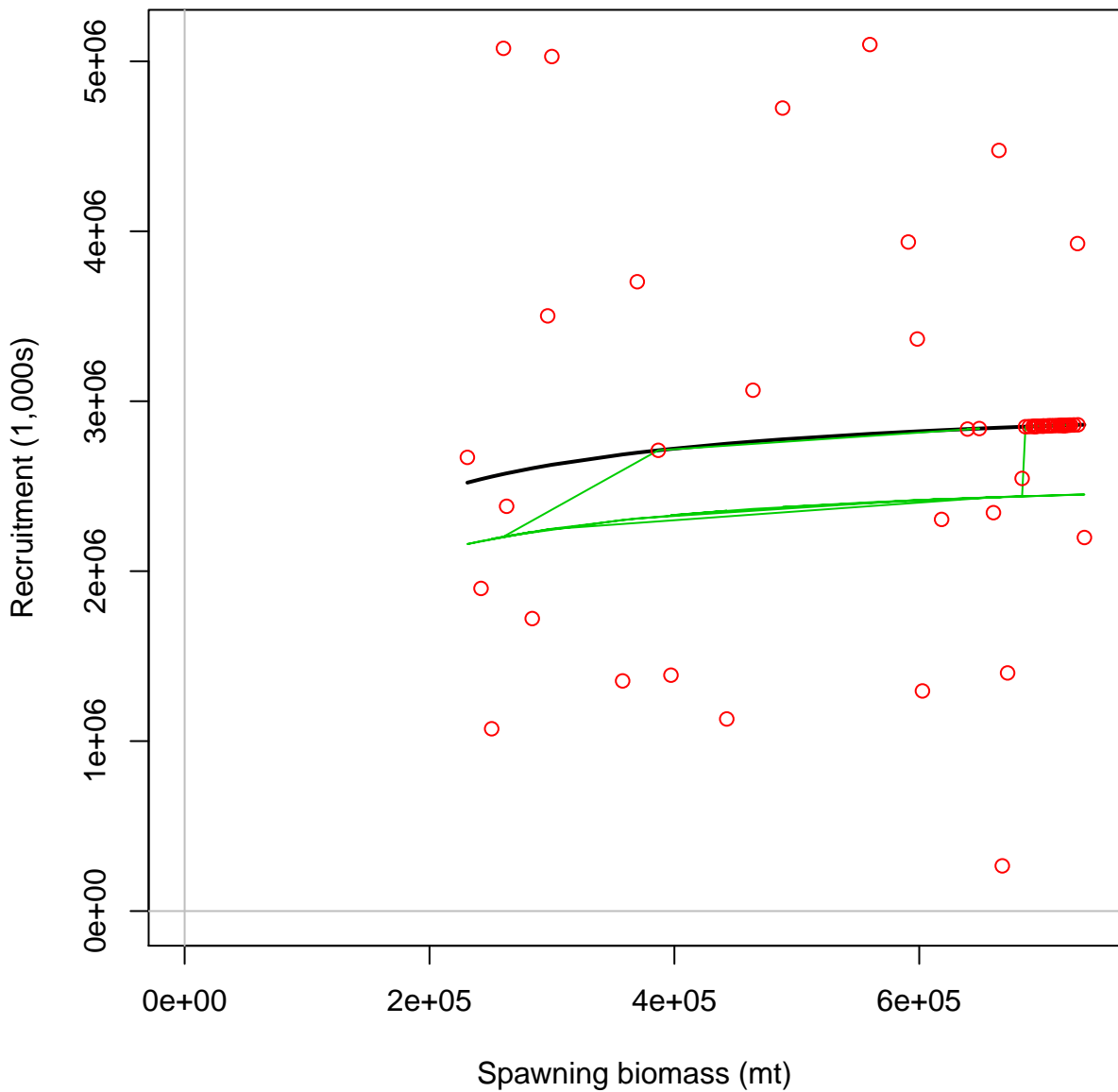


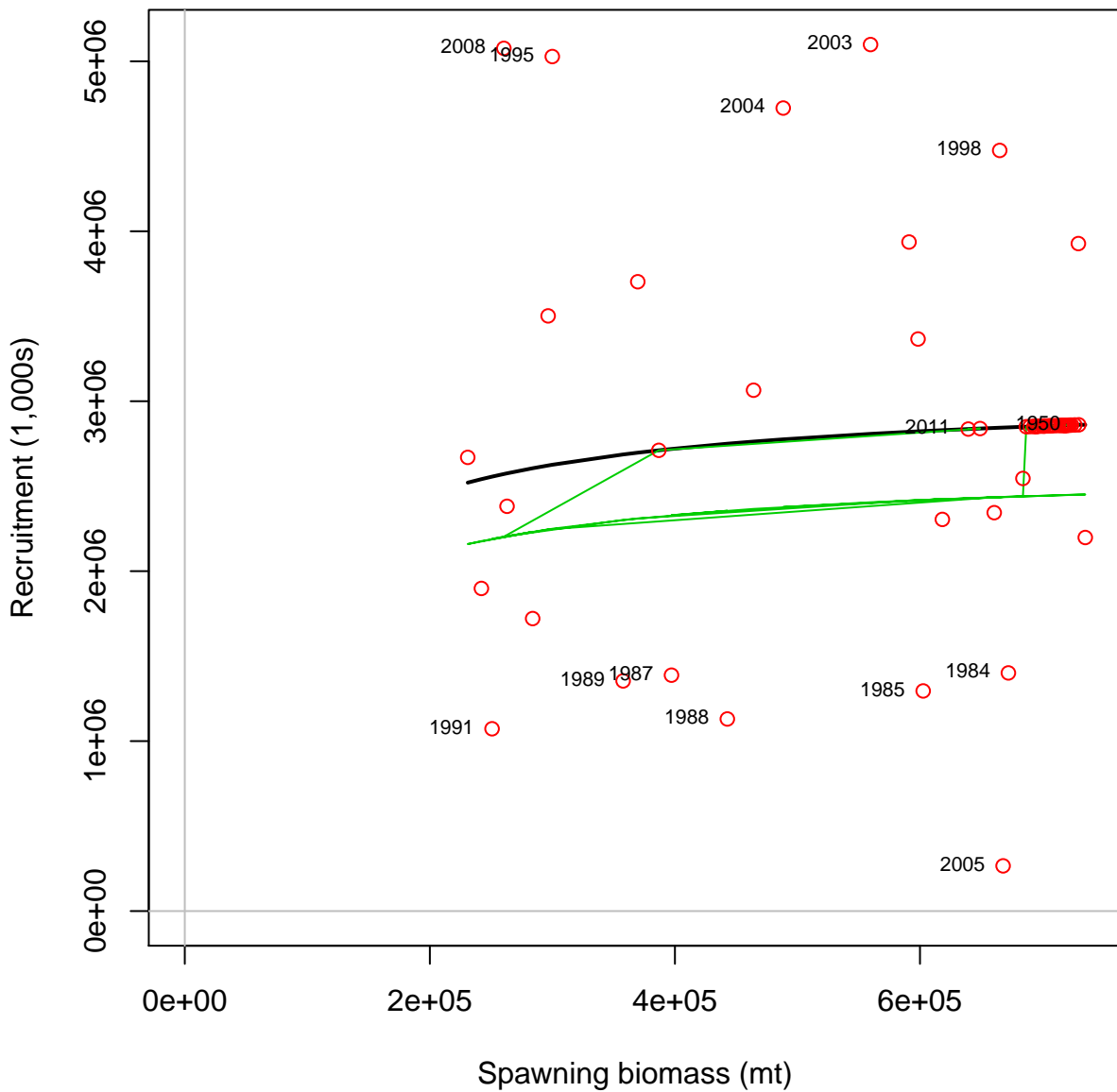


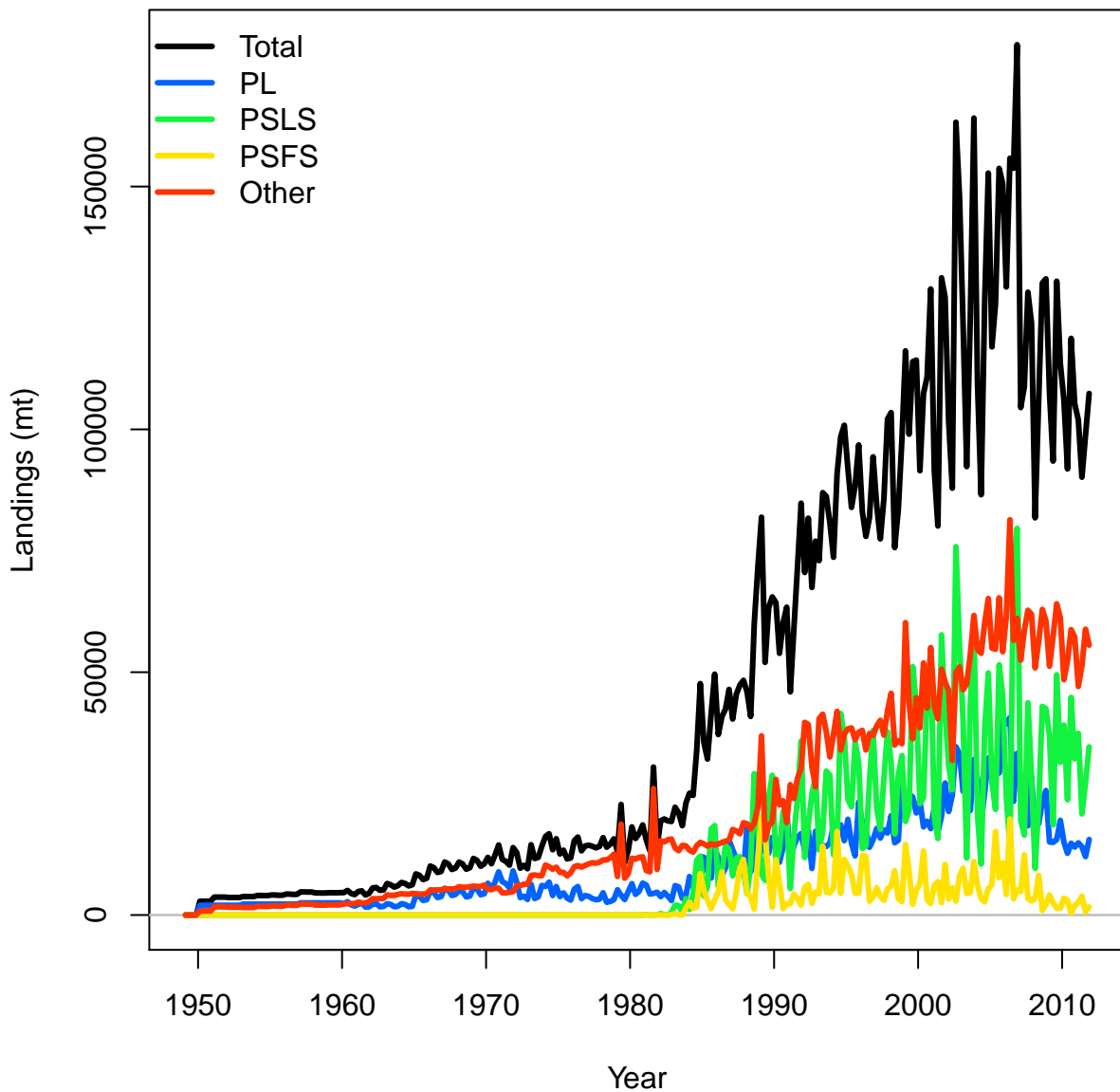
# Recruitment deviation variance check



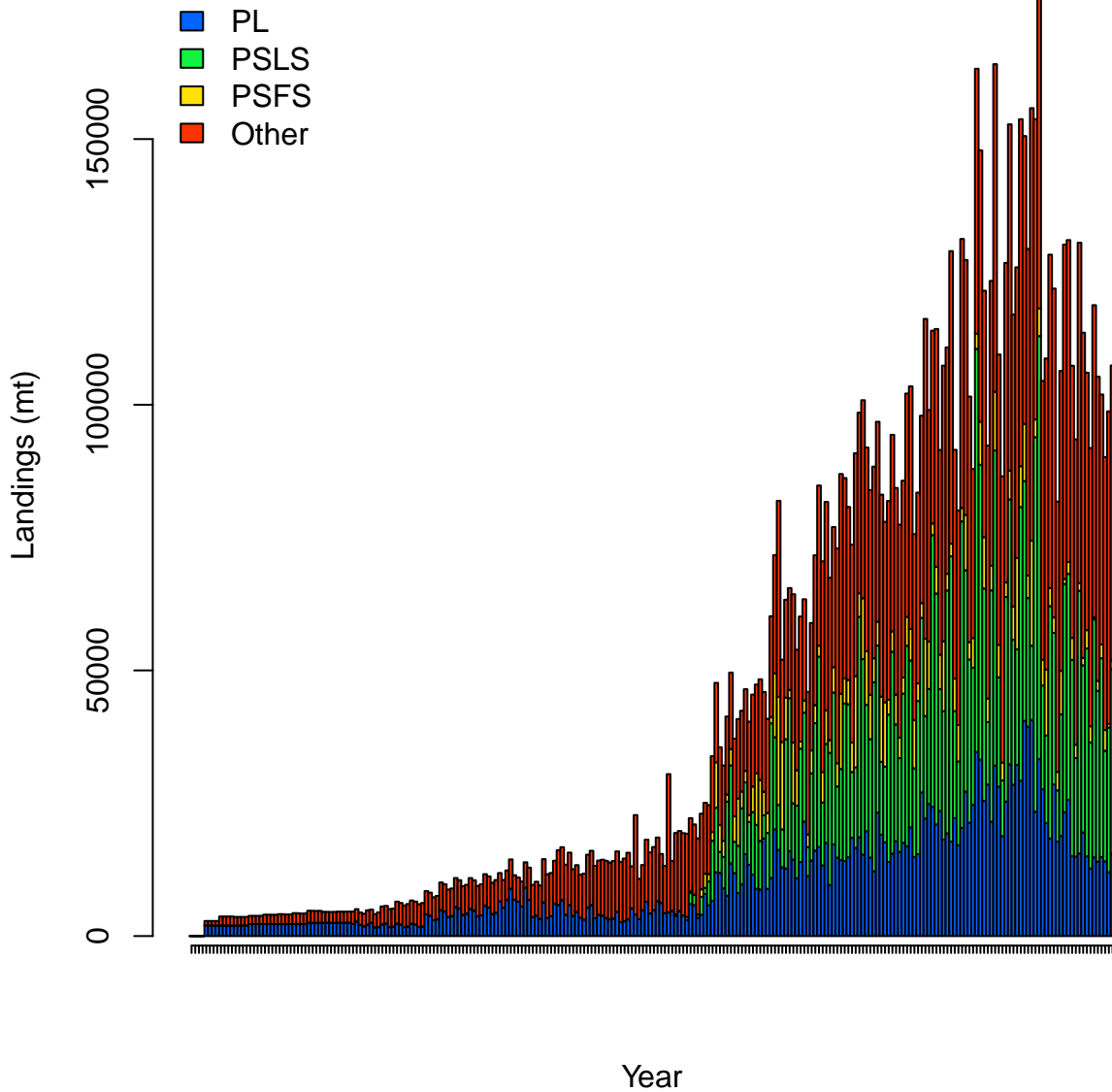


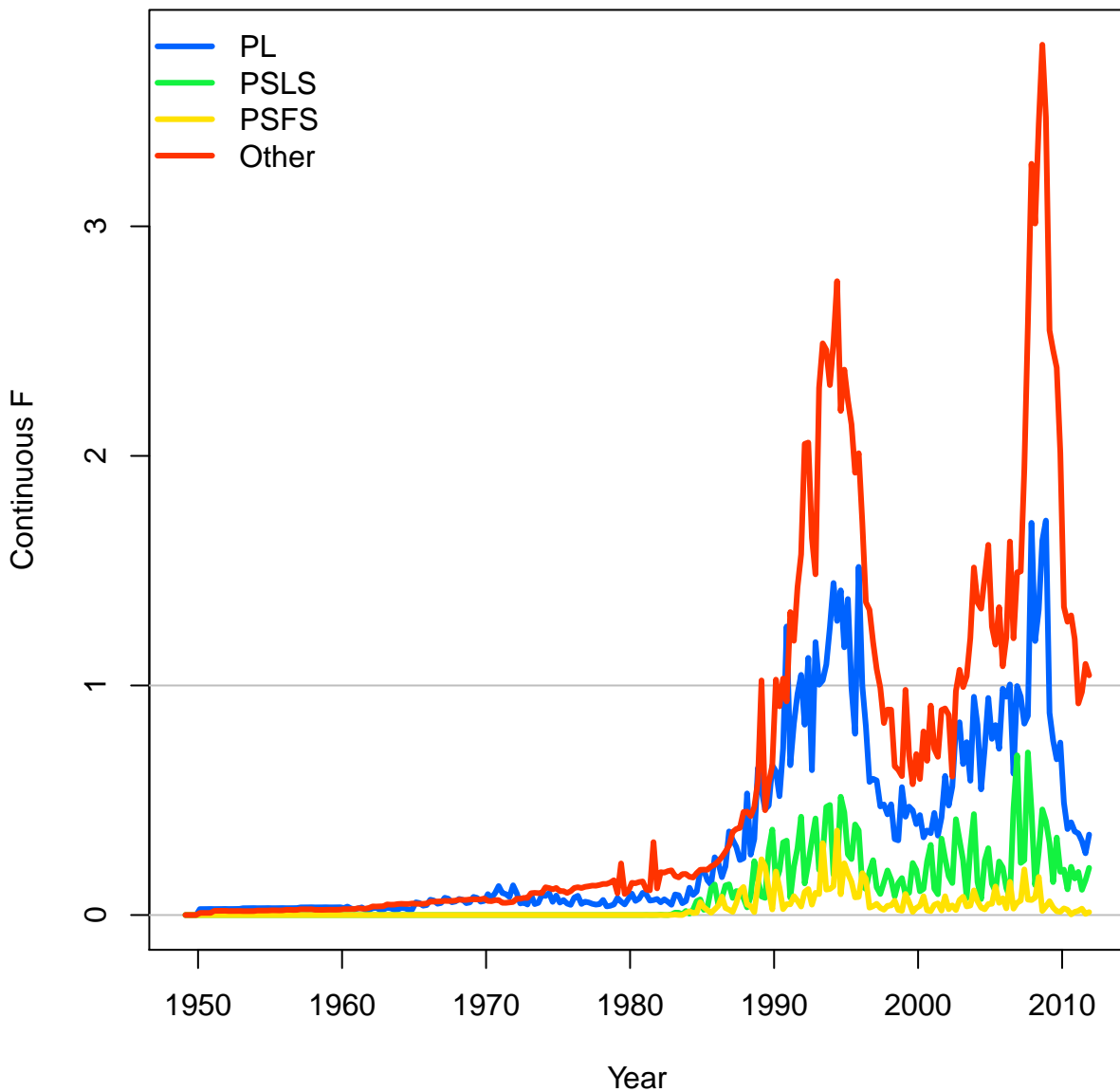


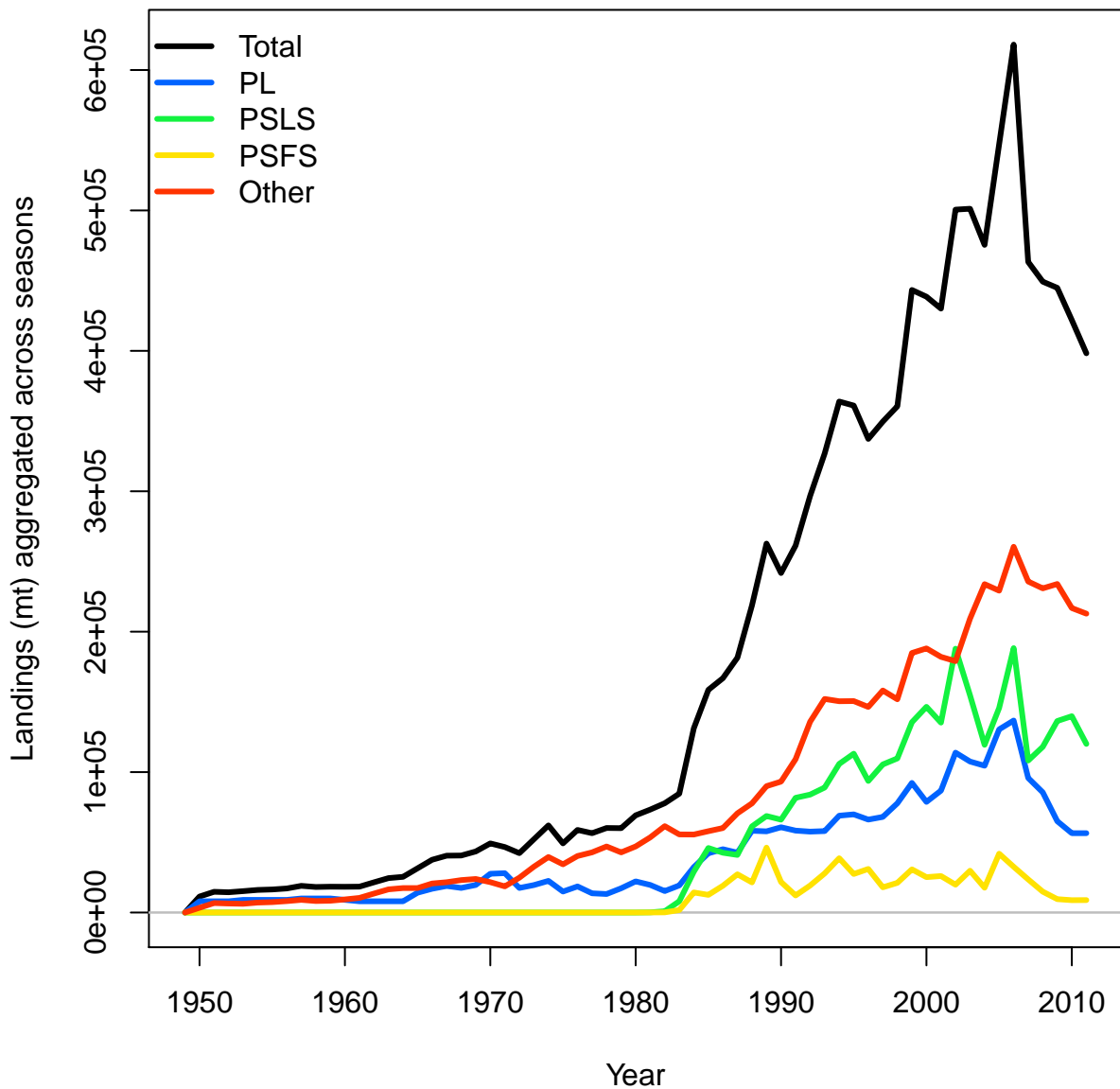


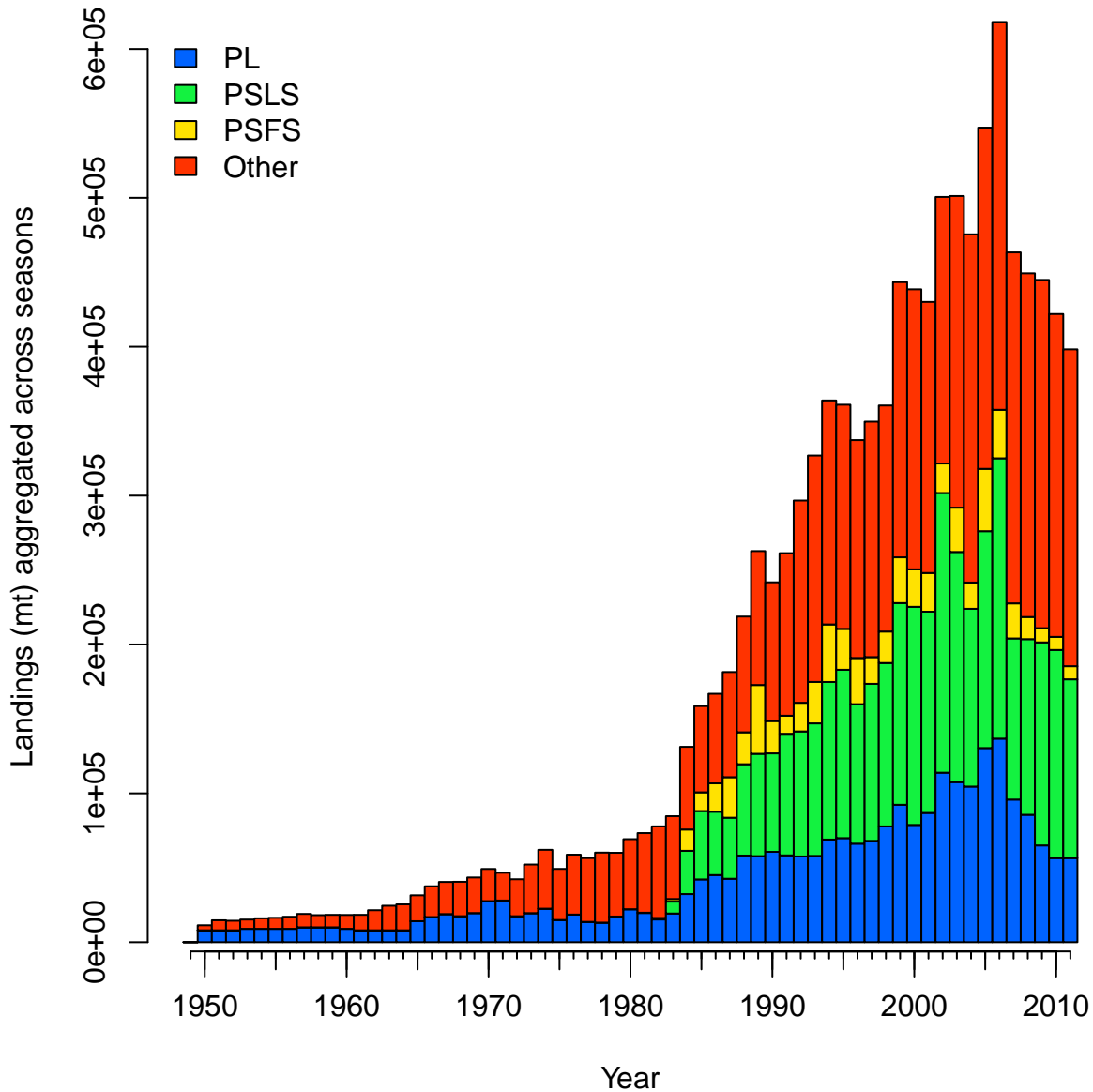


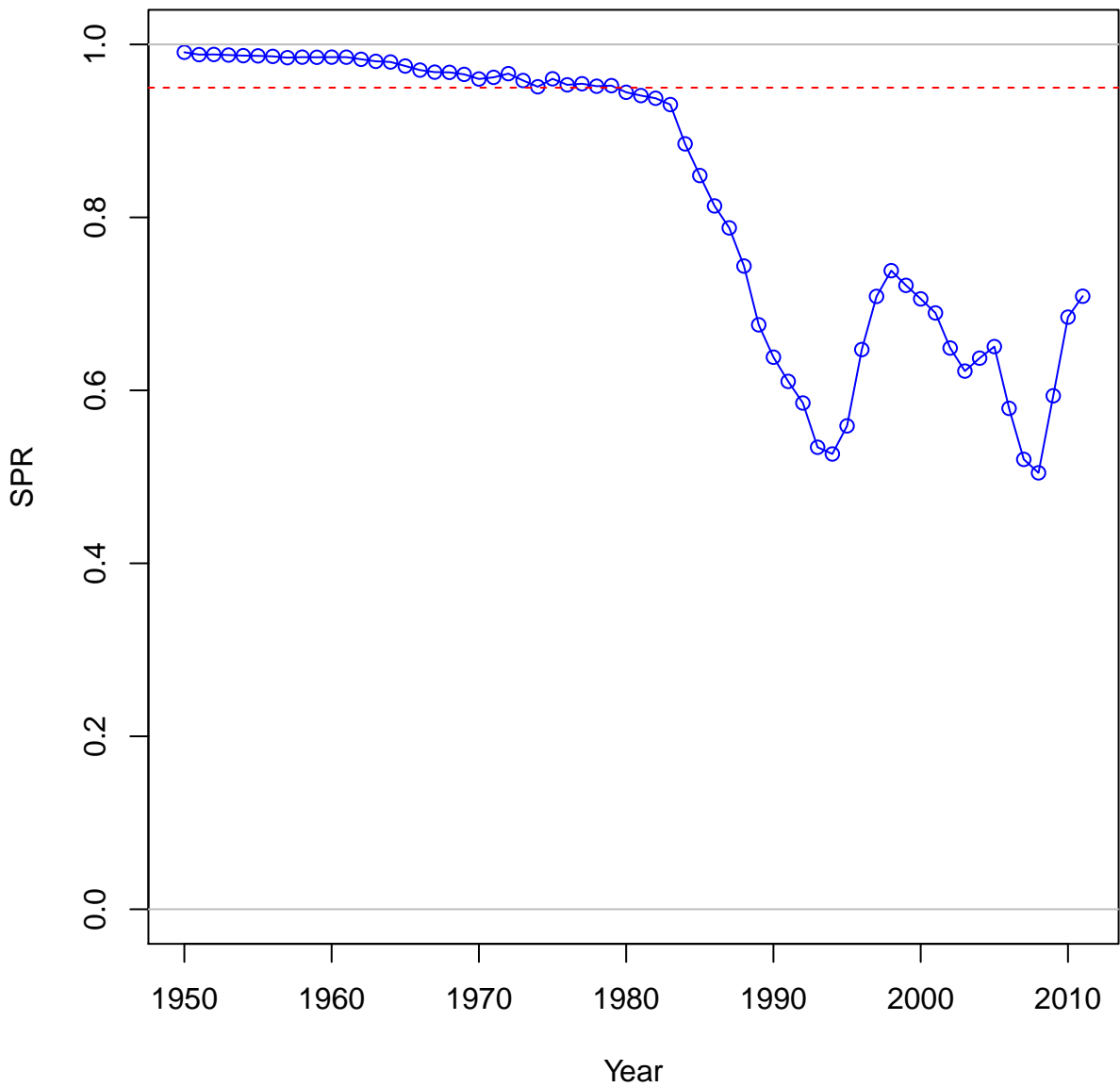




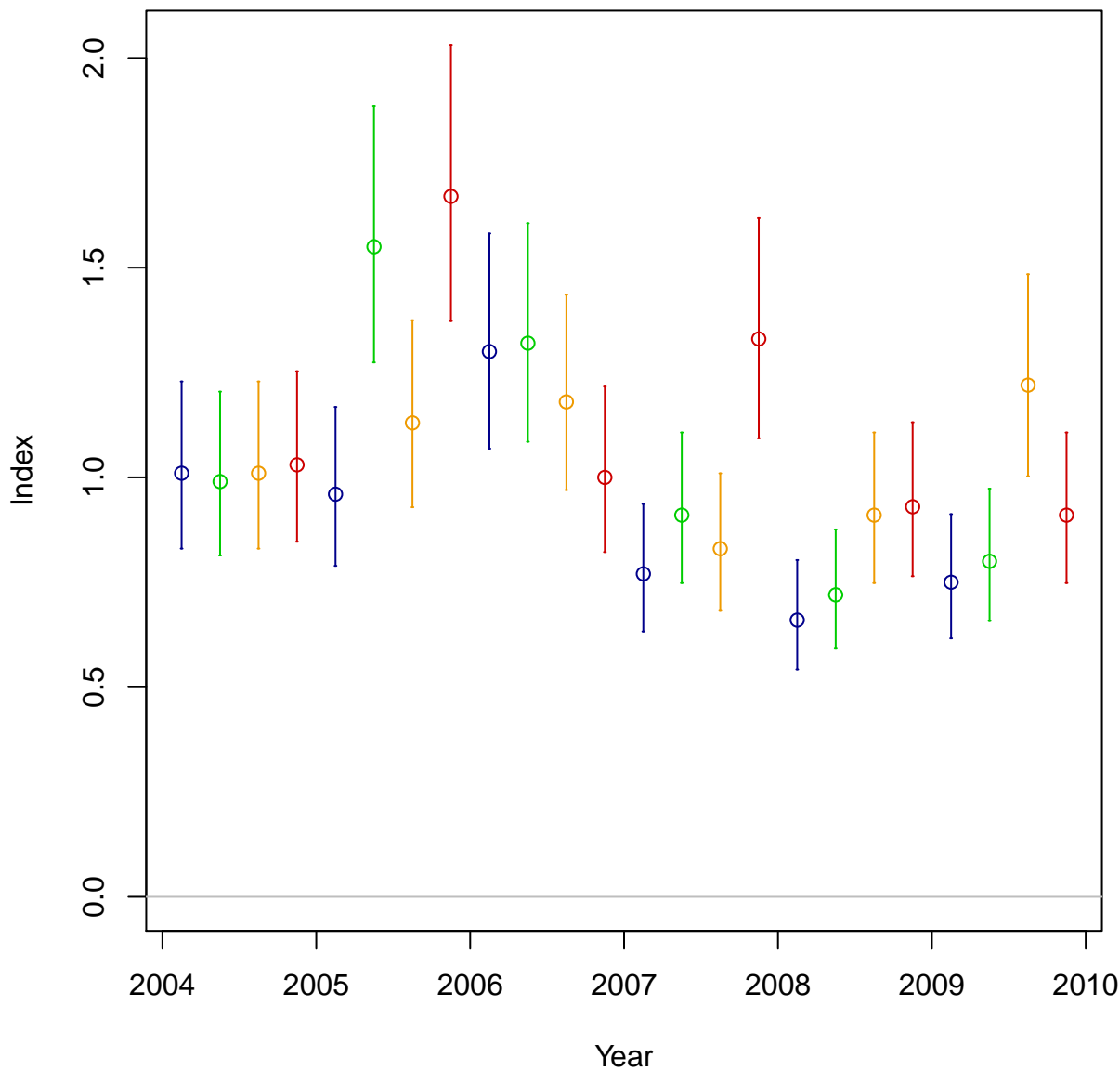




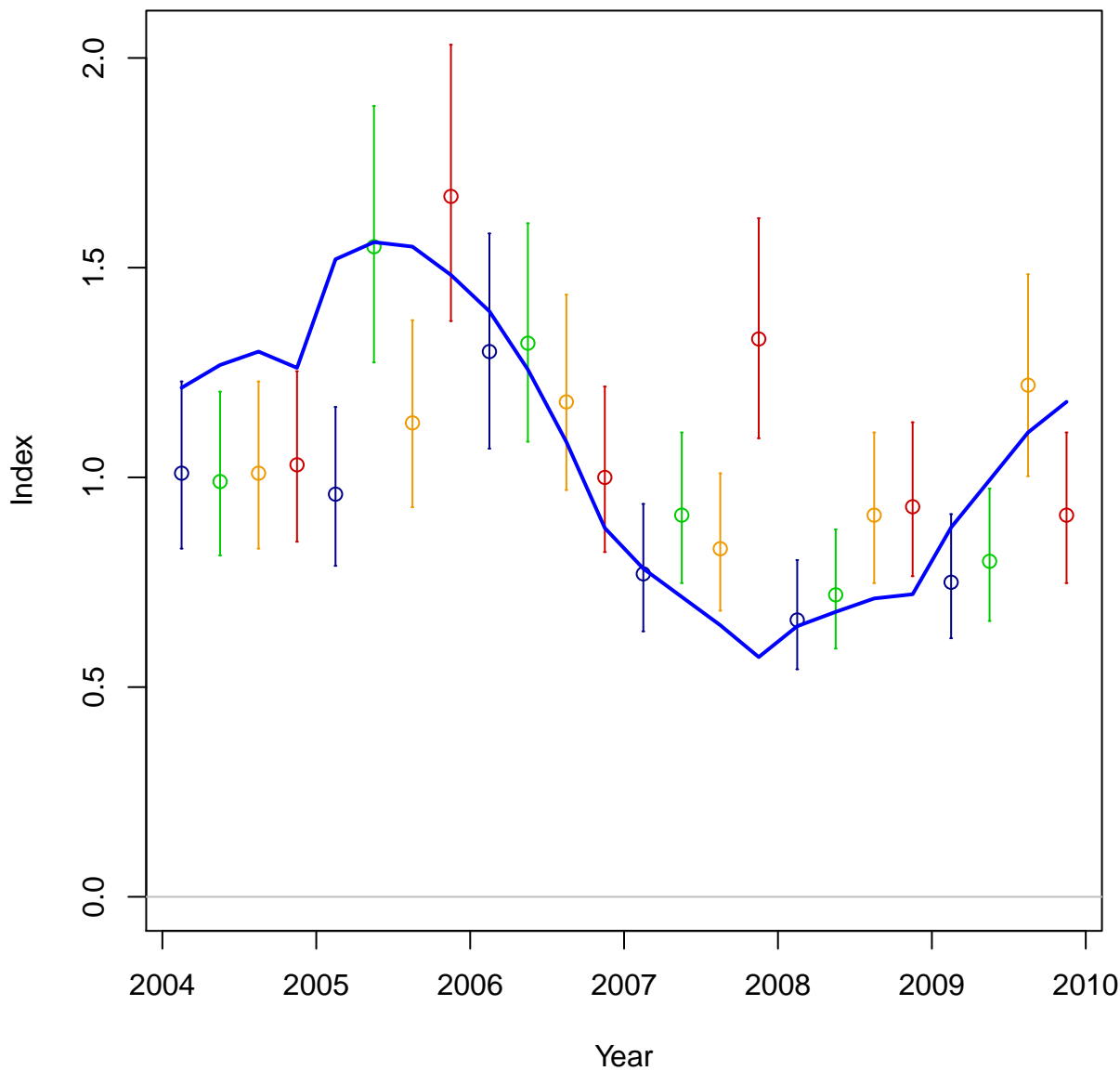




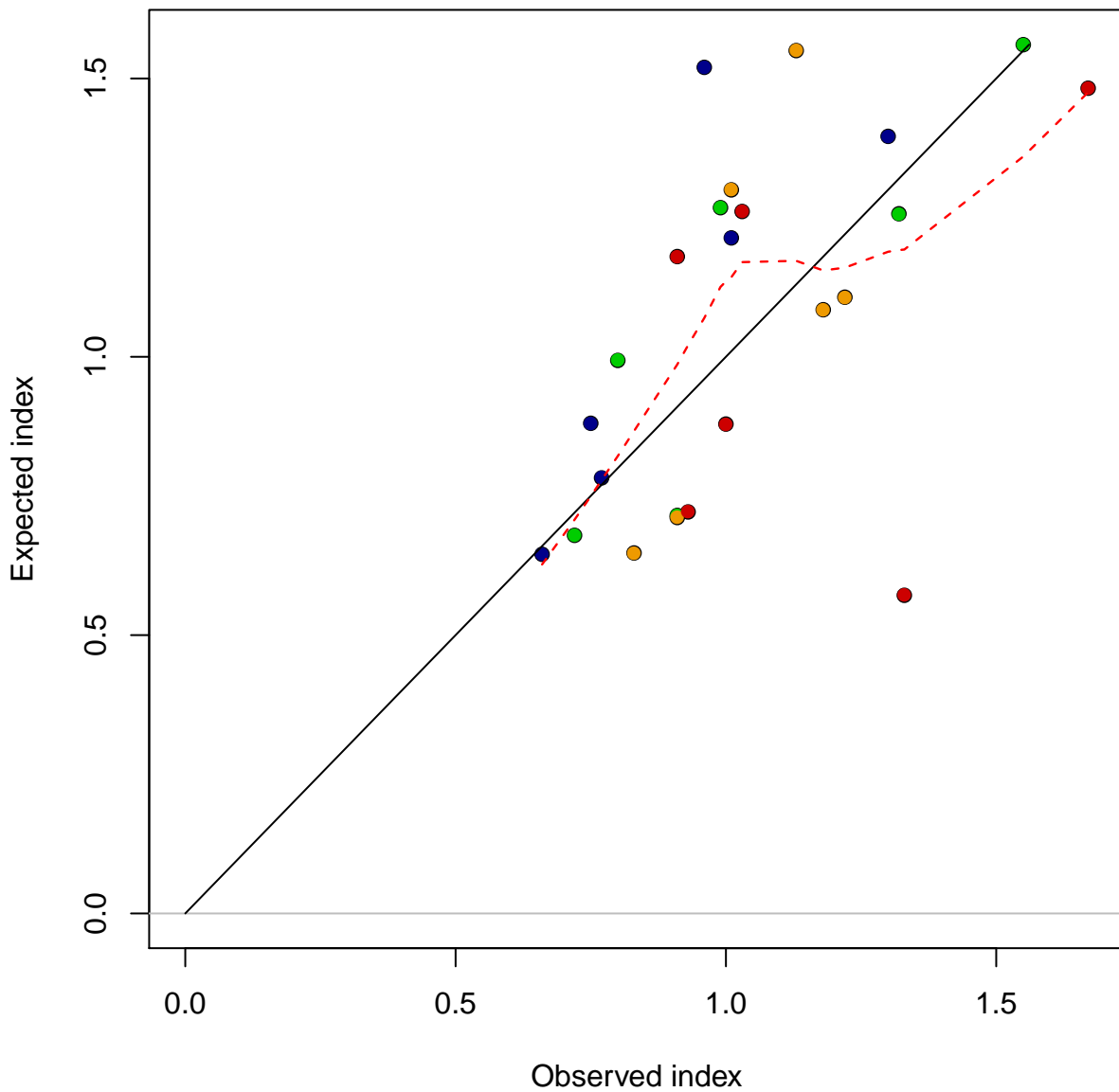
# Index PL\_CPUE



# Index PL\_CPUE

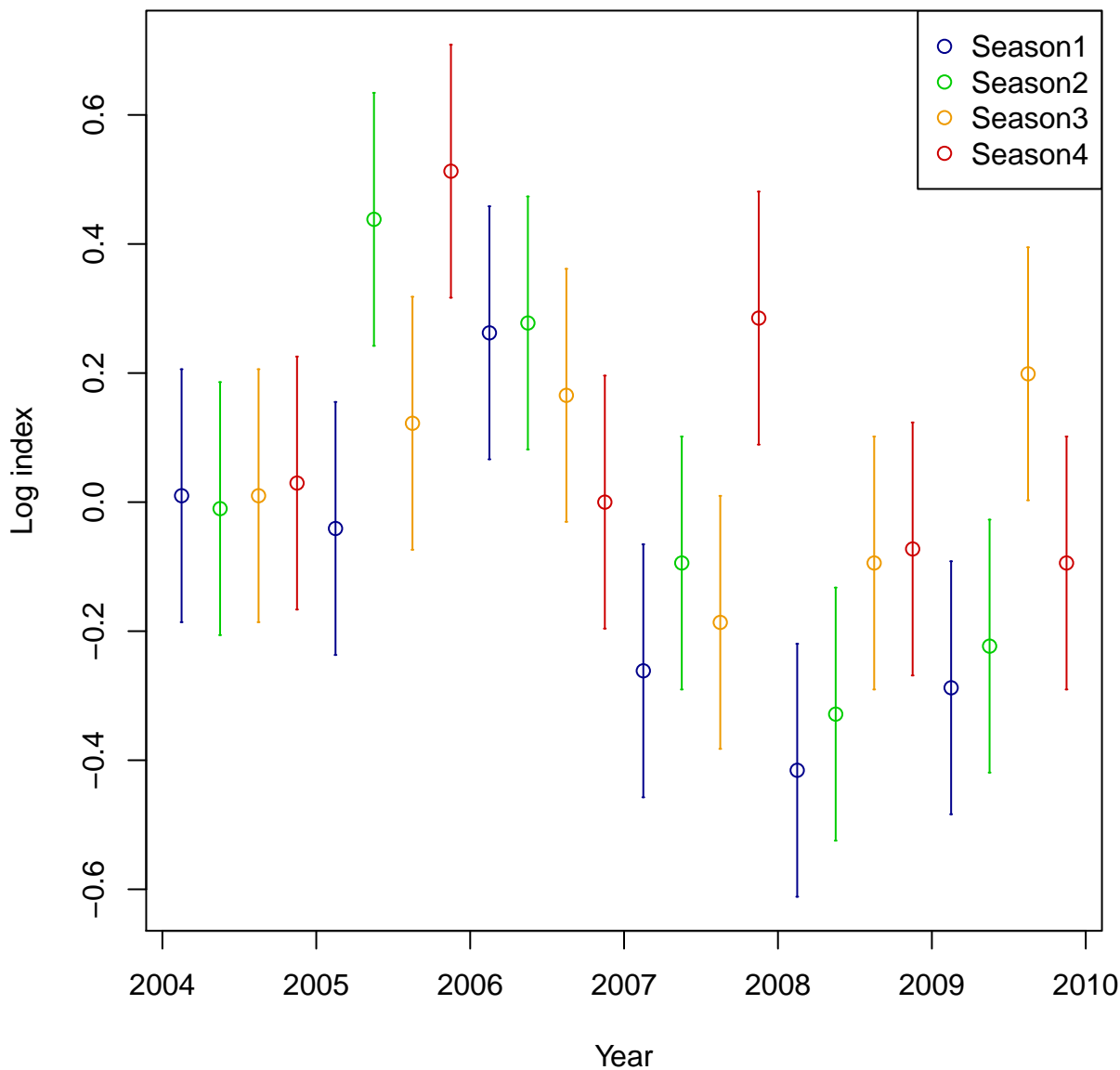


Index PL\_CPUE

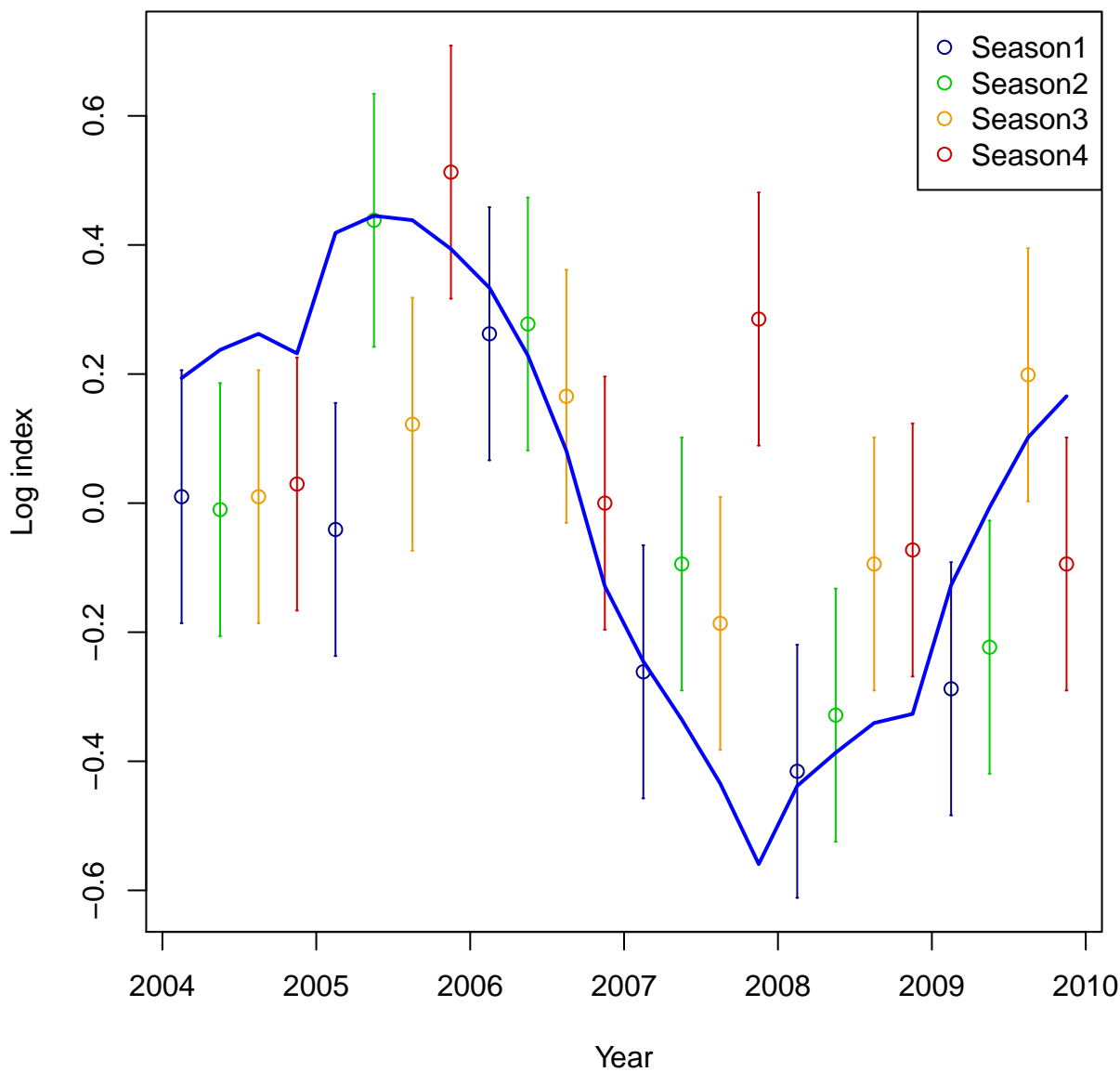




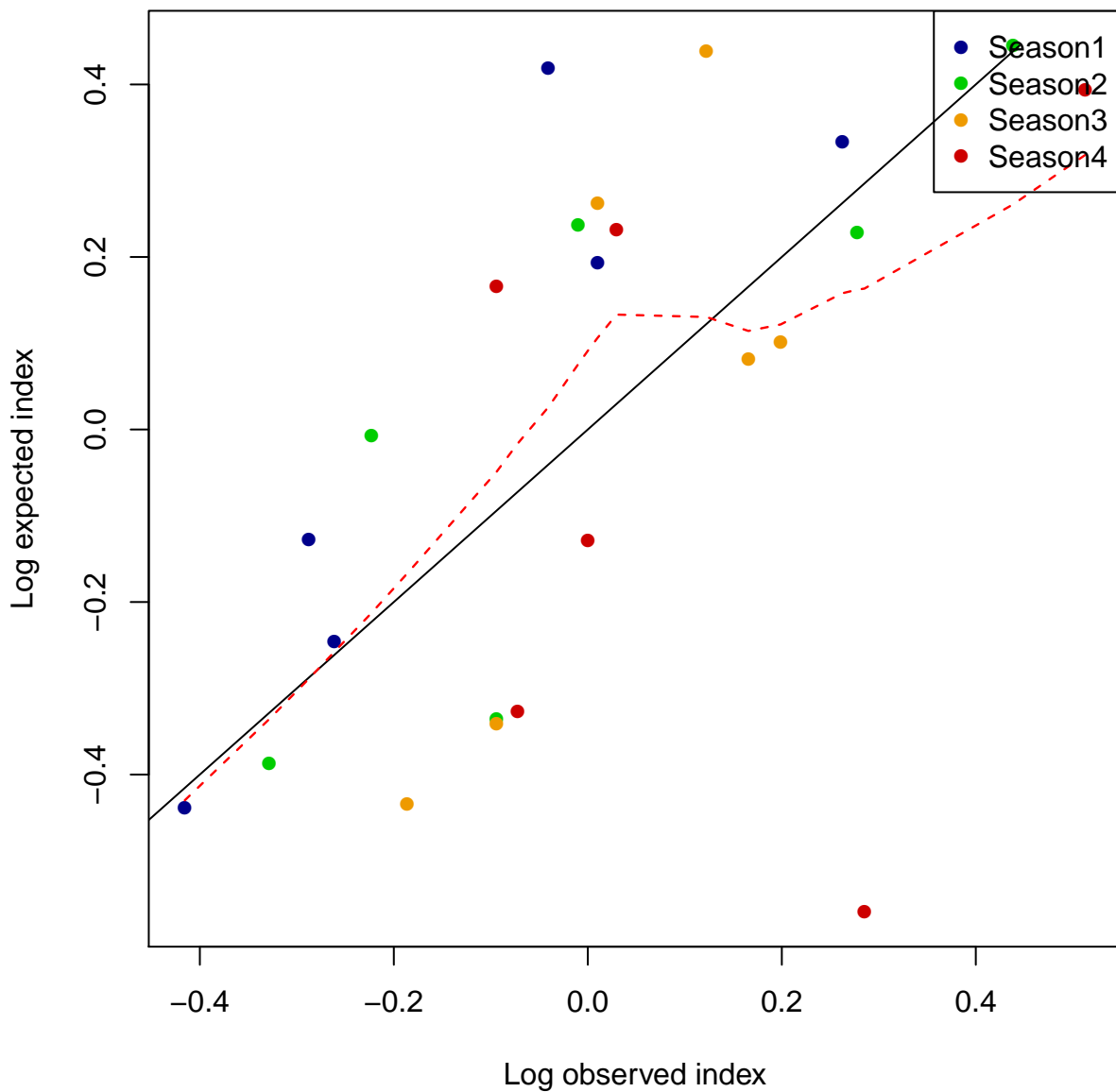
# Log index PL\_CPUE



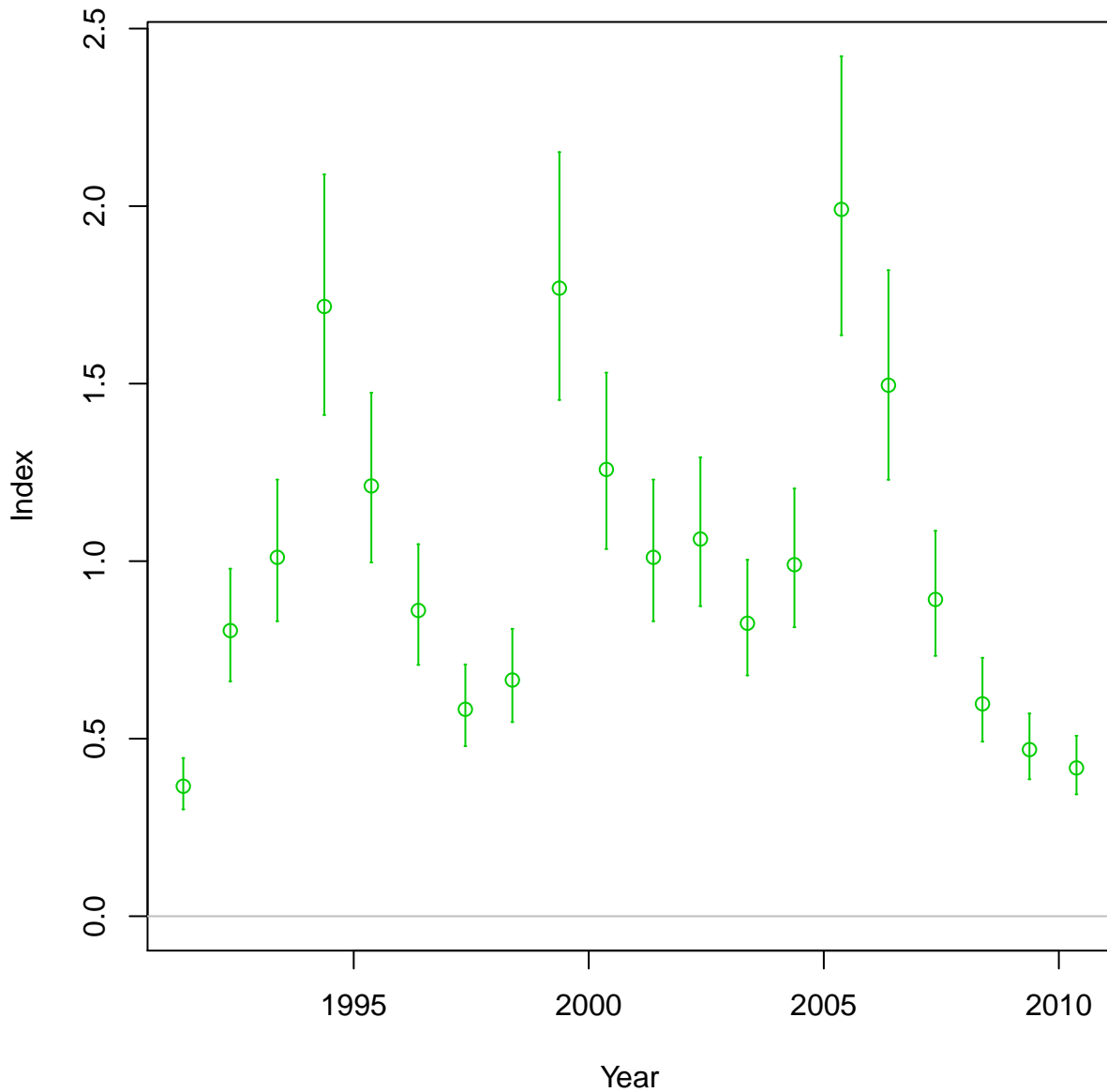
# Log index PL\_CPUE



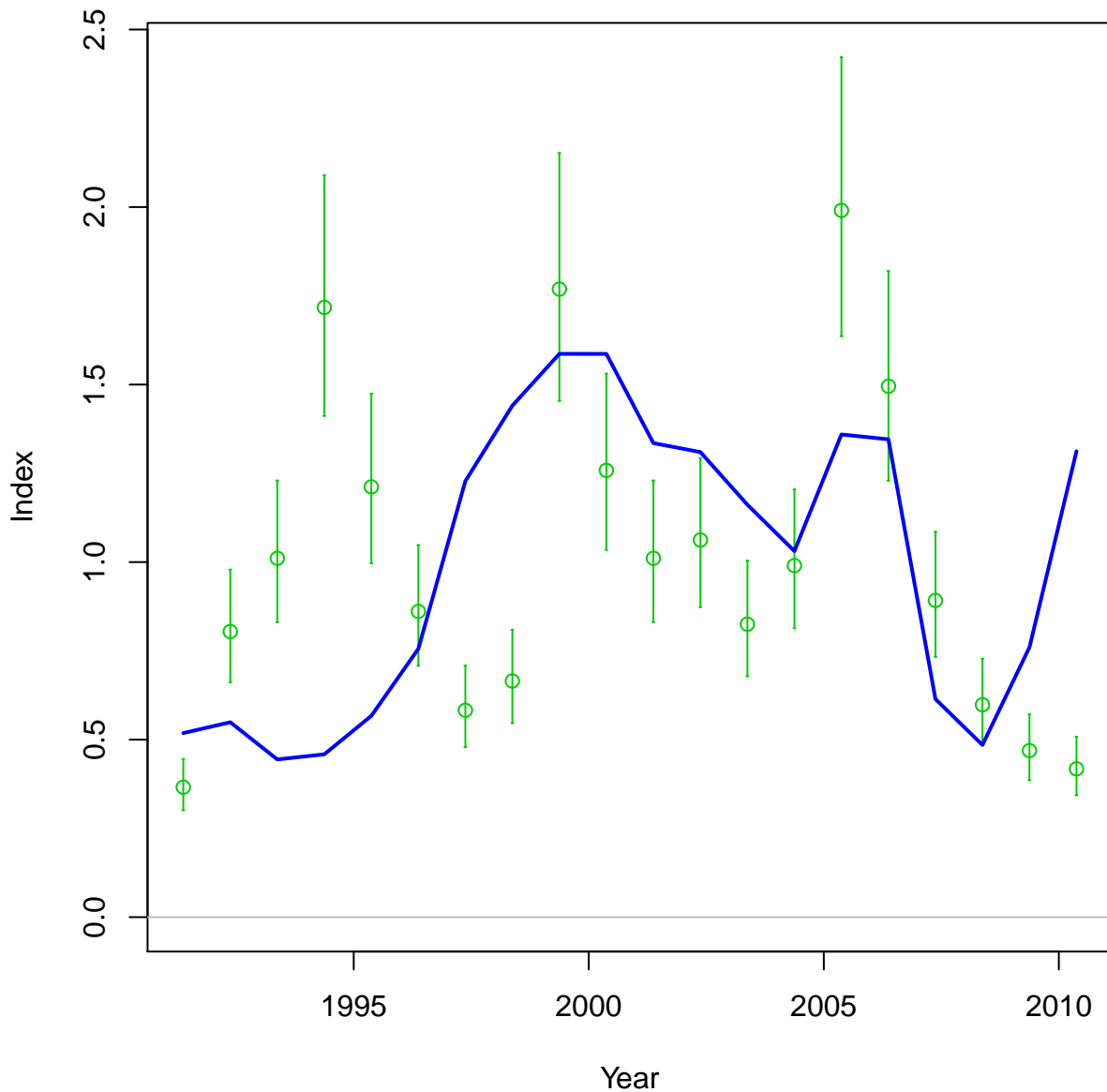
# Log index PL\_CPUE



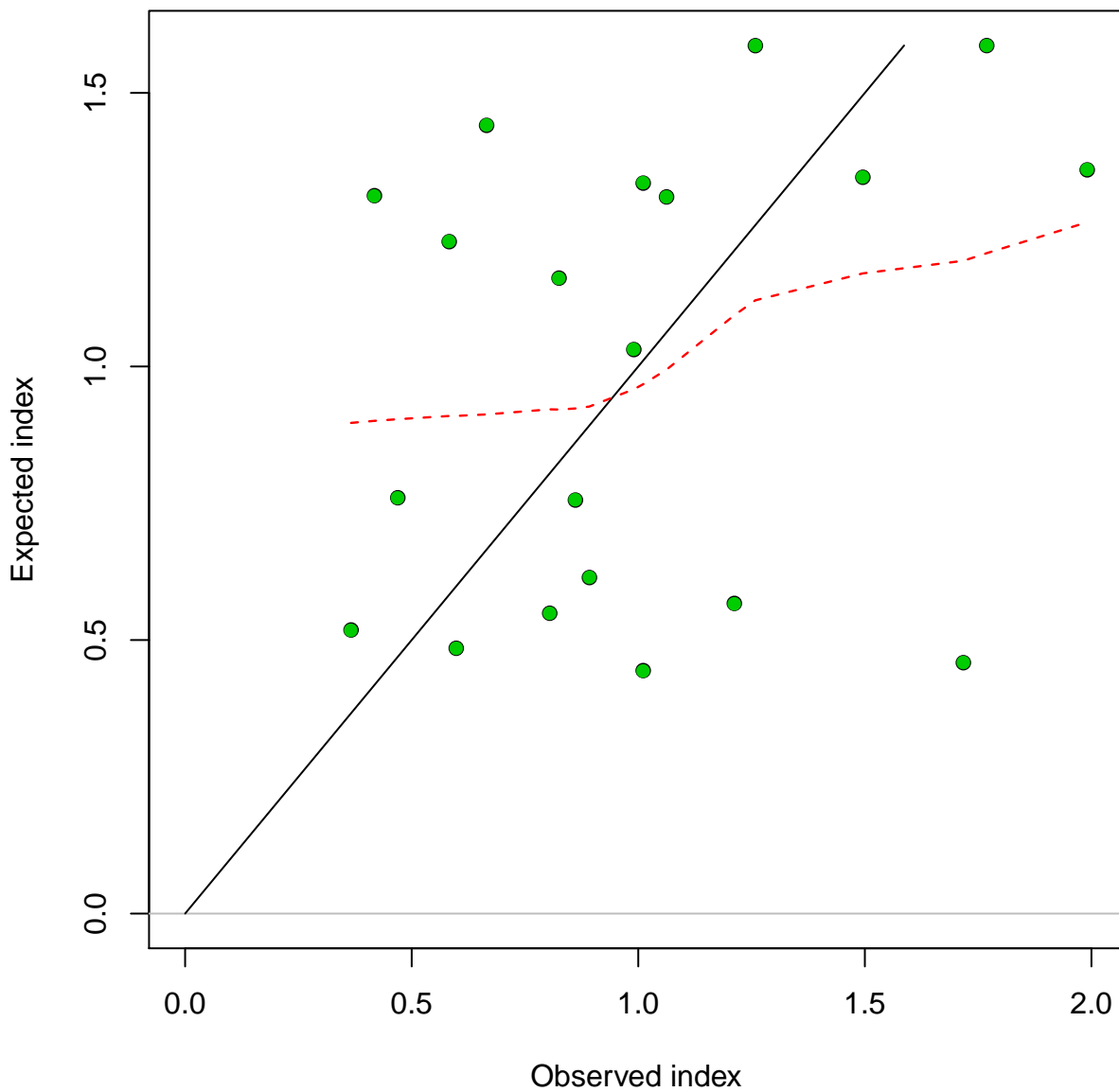
# Index PSFS\_CPUE



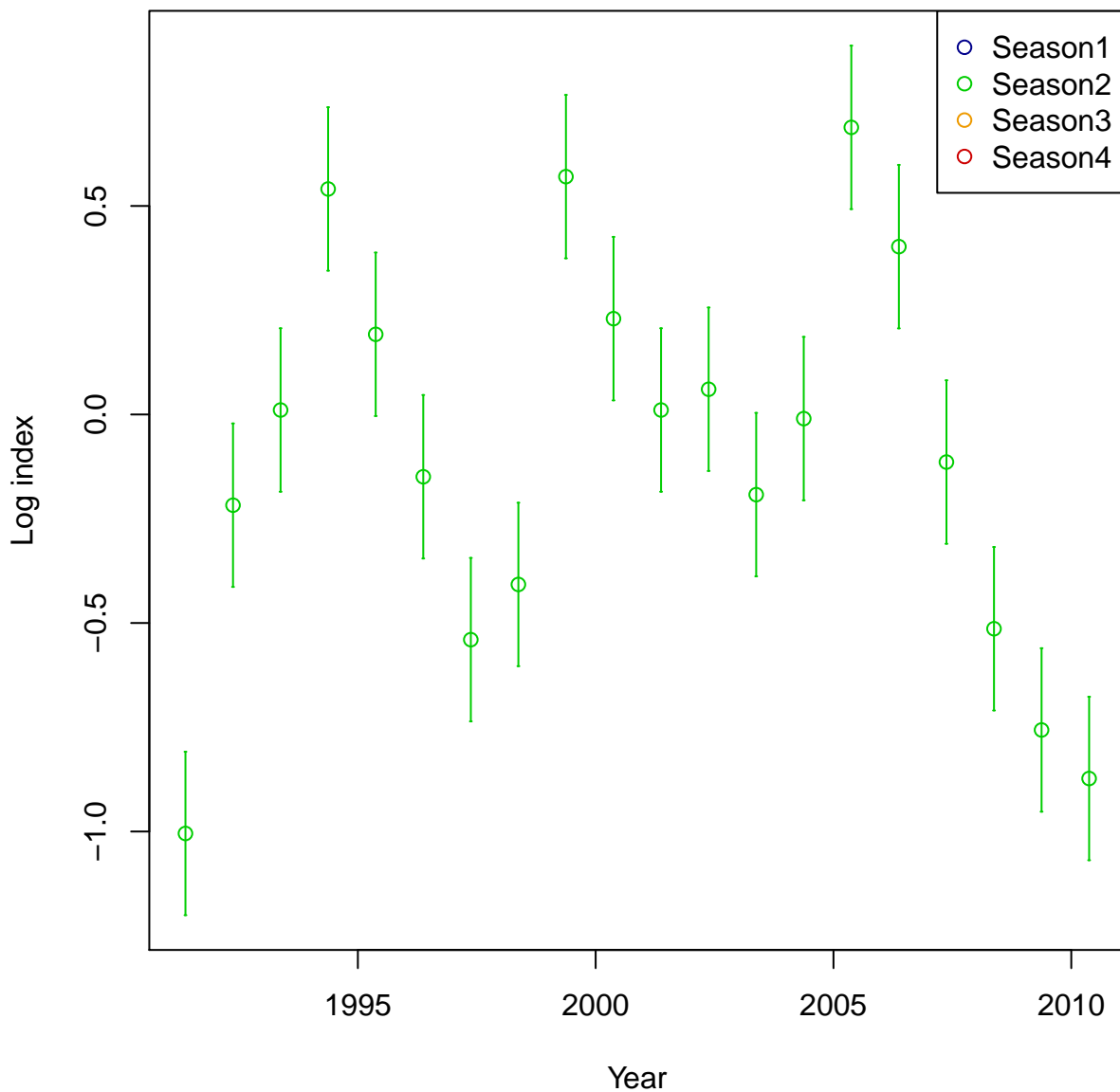
# Index PSFS\_CPUE



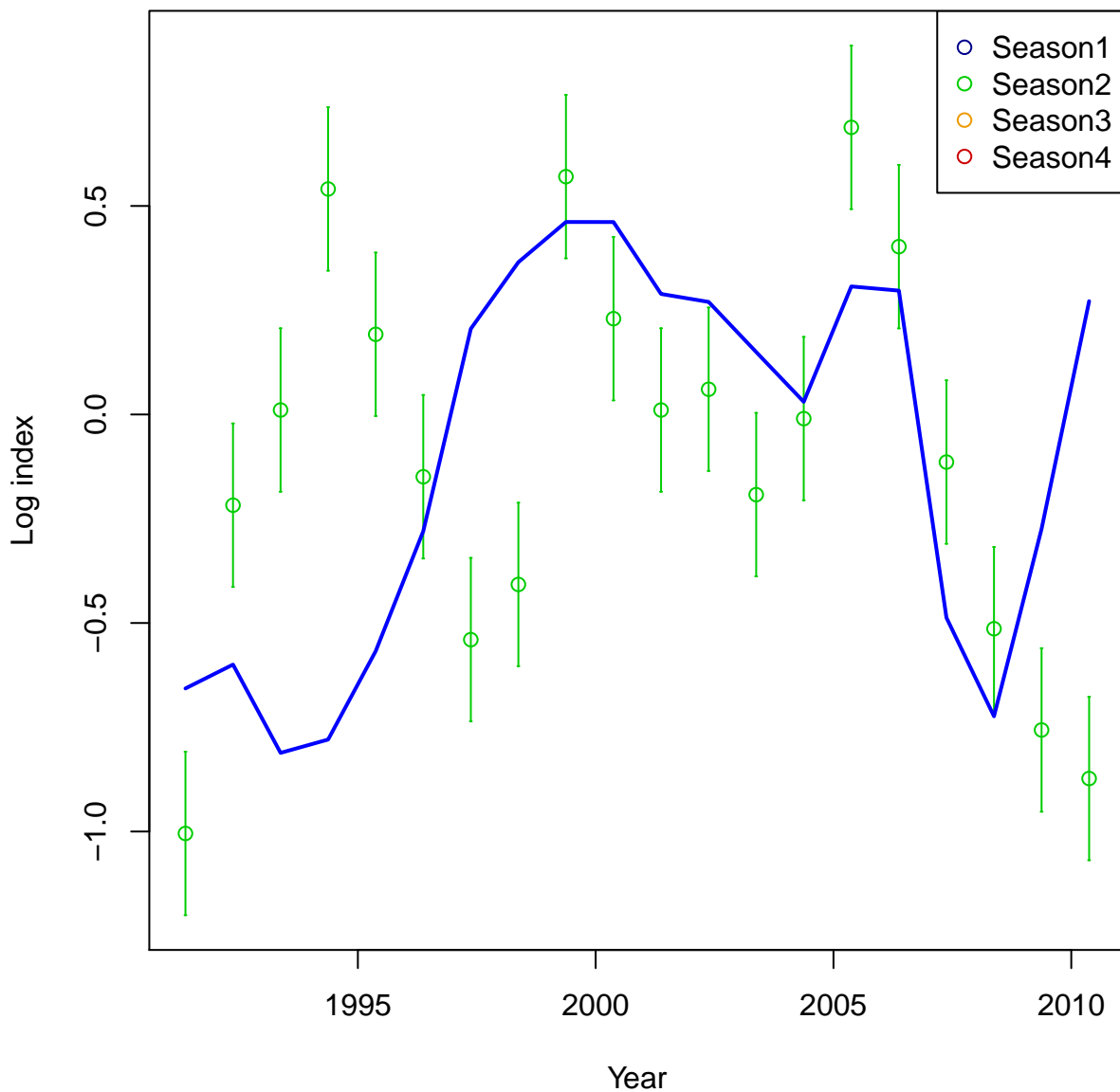
Index PSFS\_CPUE



# Log index PSFS\_CPUE

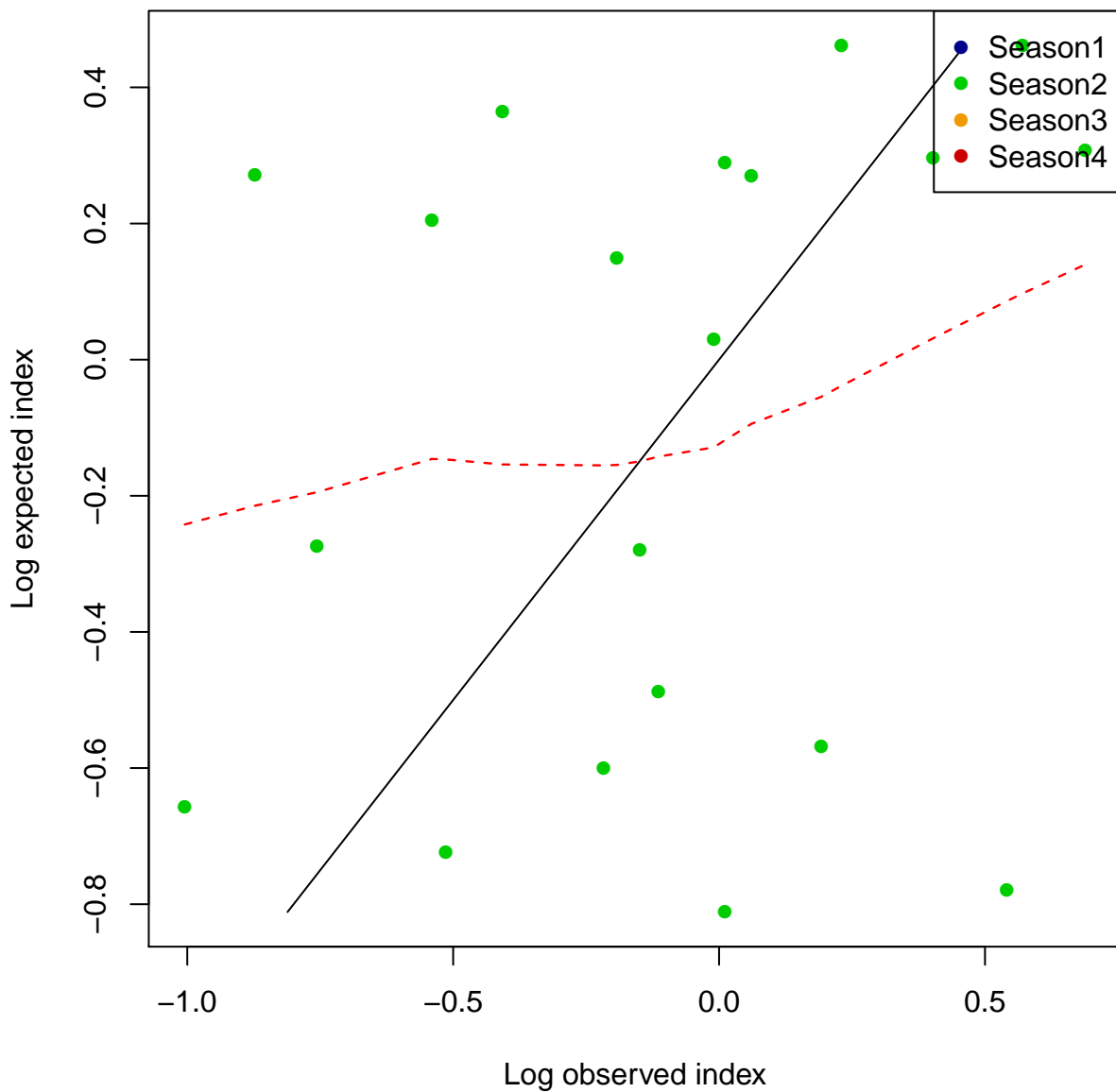


# Log index PSFS\_CPUE

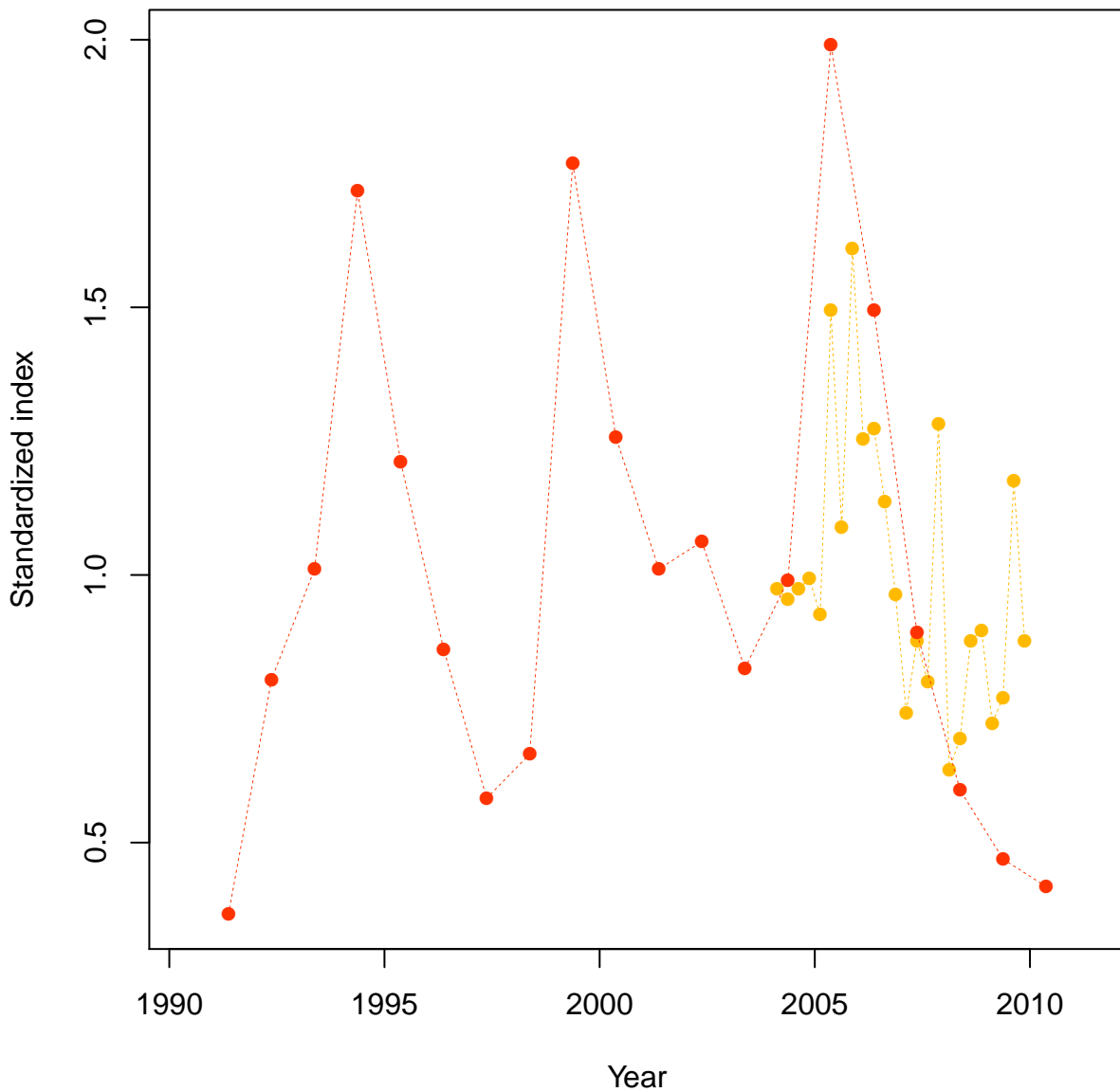




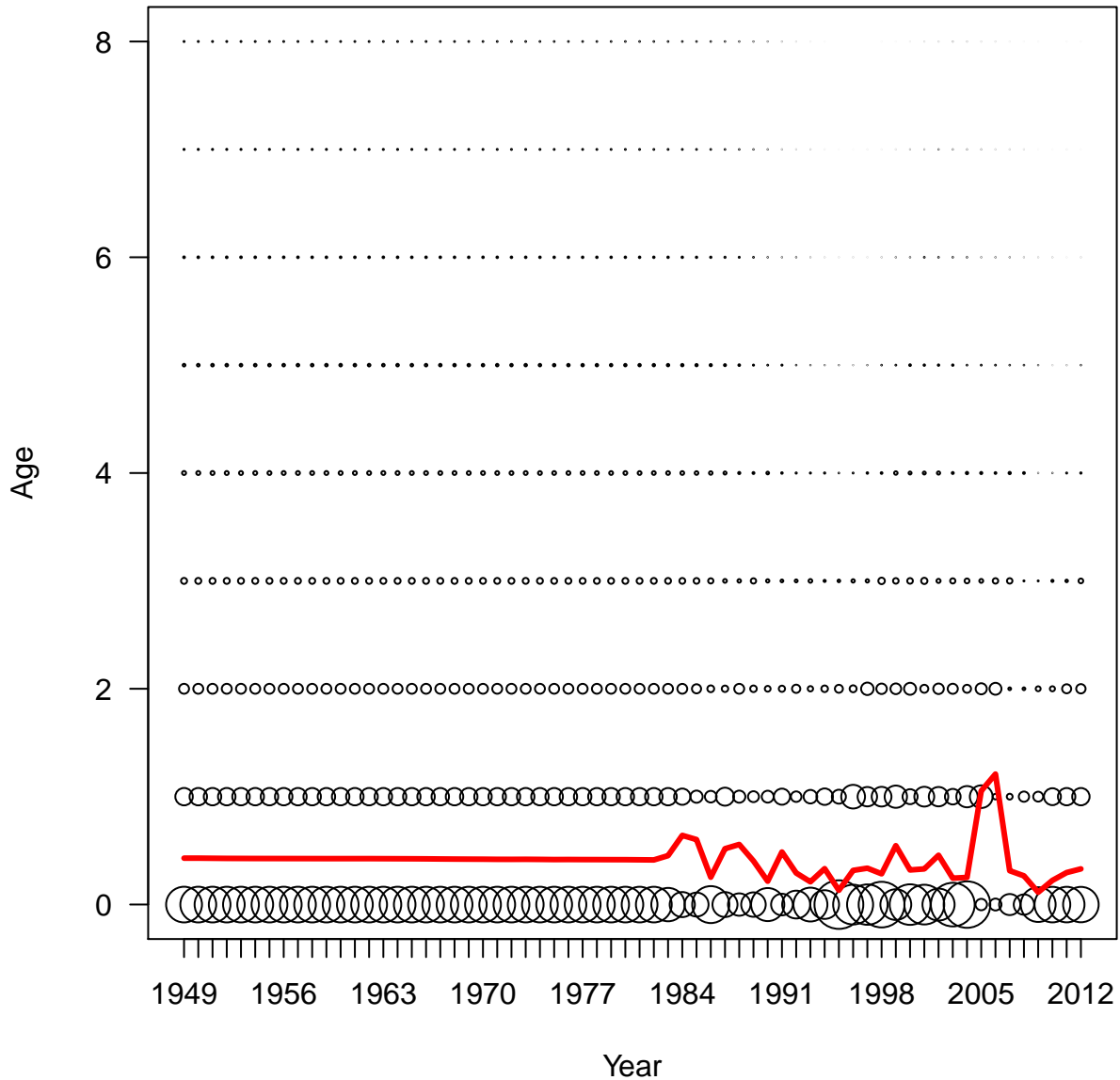
# Log index PSFS\_CPUE



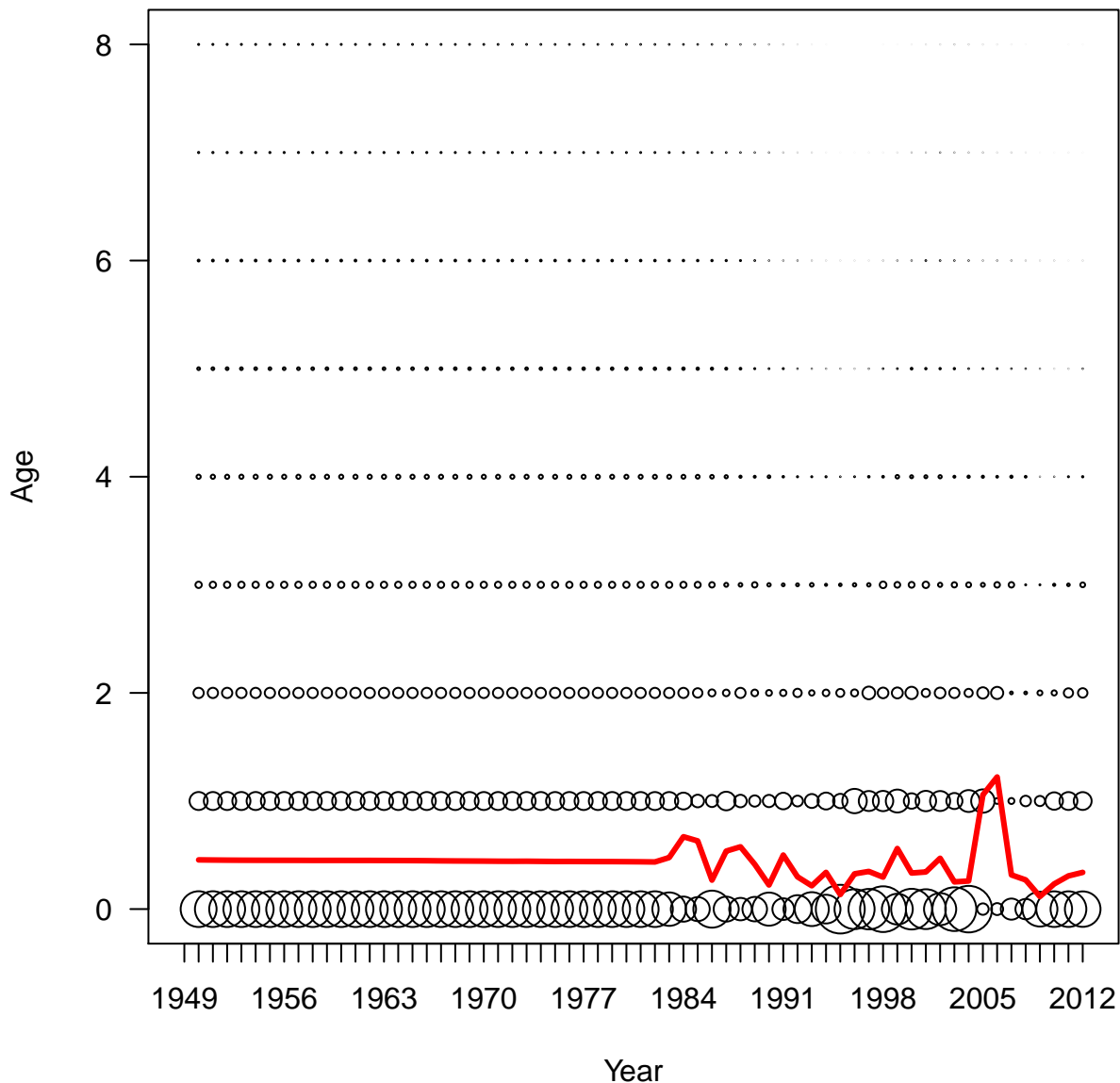
All cpue plot



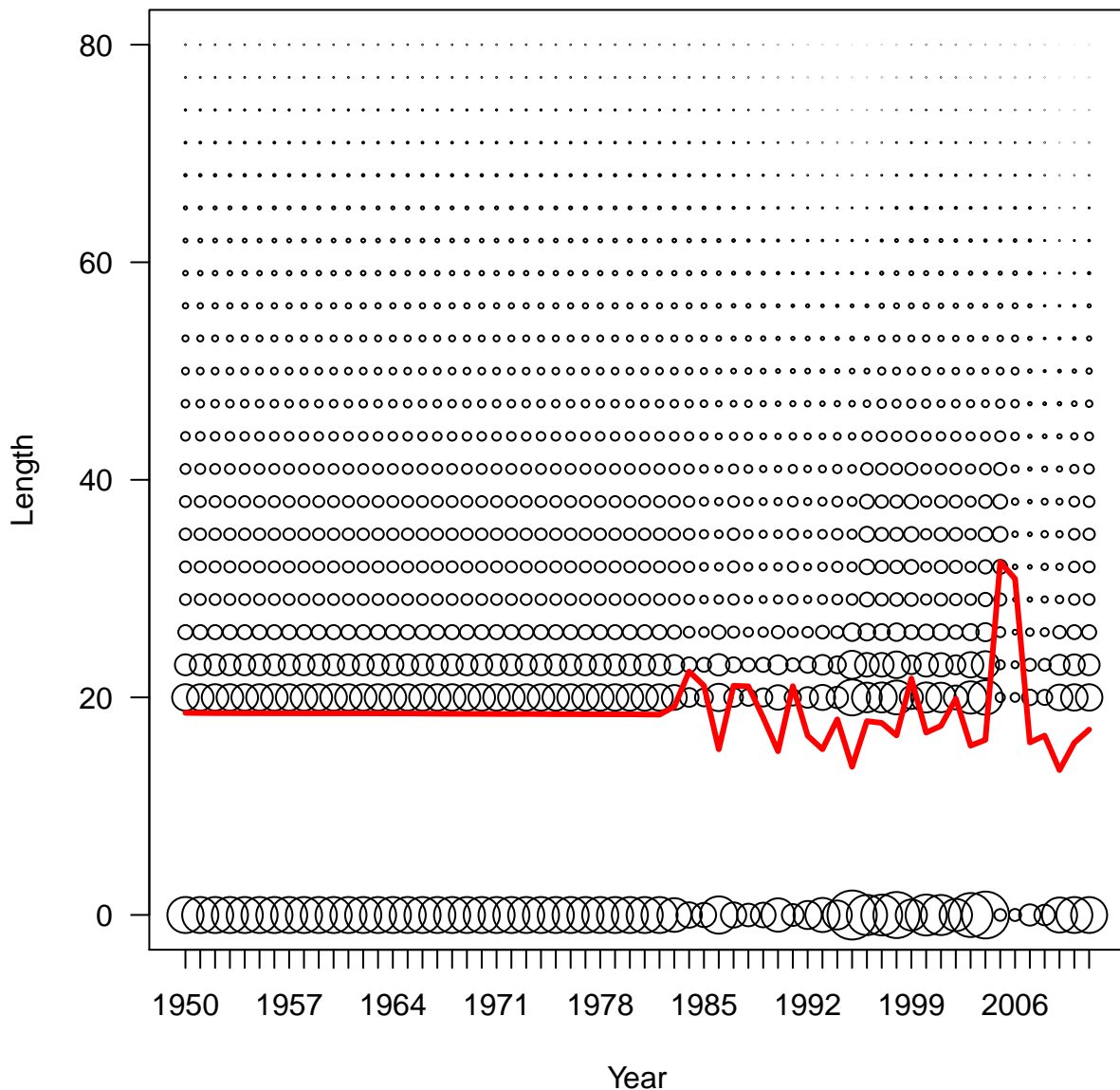
**Beginning of year expected numbers at age in thousands (max=1064840)**



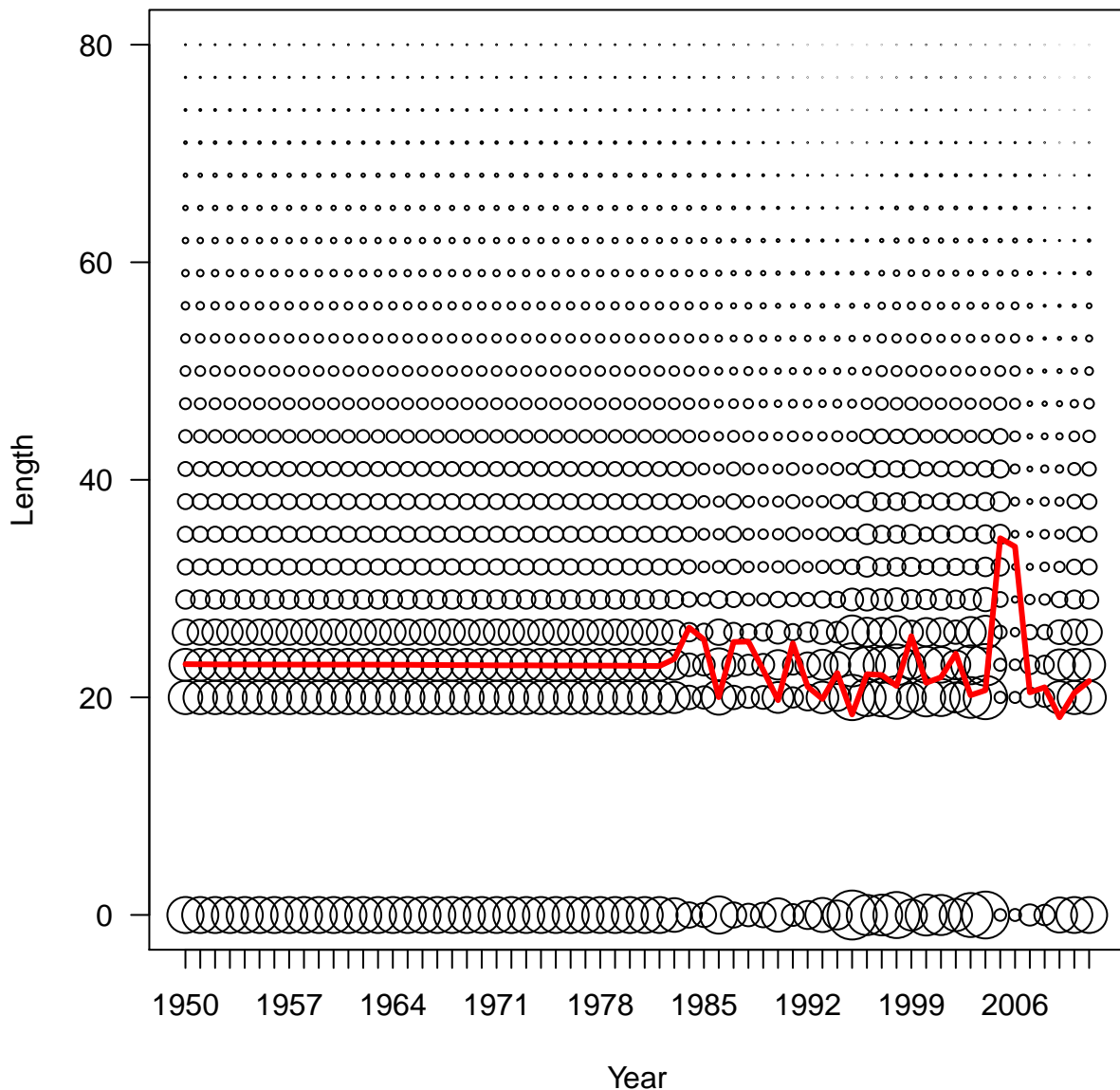
Middle of year expected numbers at age in thousands (max=868581)



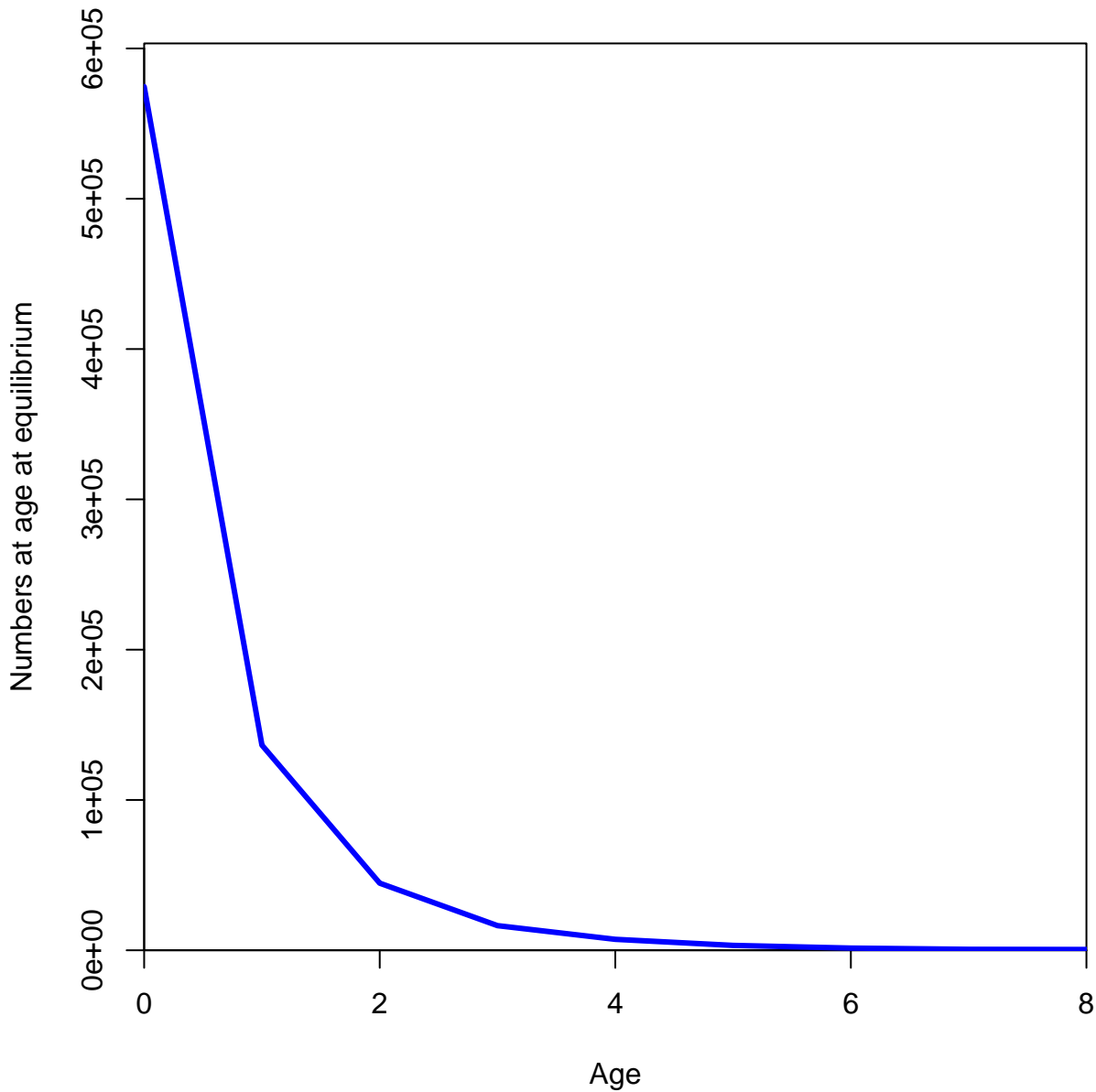
# Beginning of year expected numbers at length in thousands (max=532891)



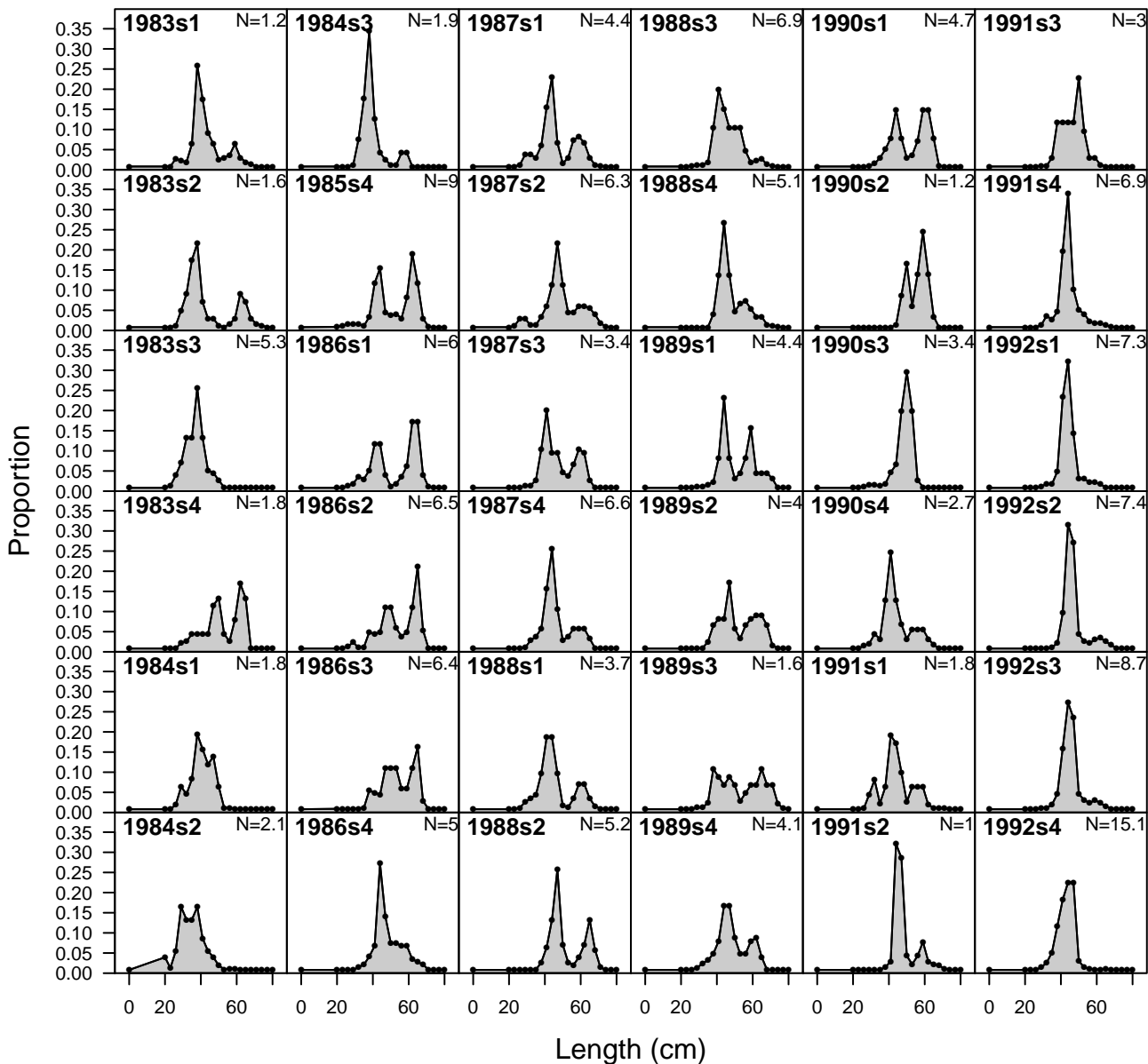
# Middle of year expected numbers at length in thousands (max=264200)



Equilibrium age distribution

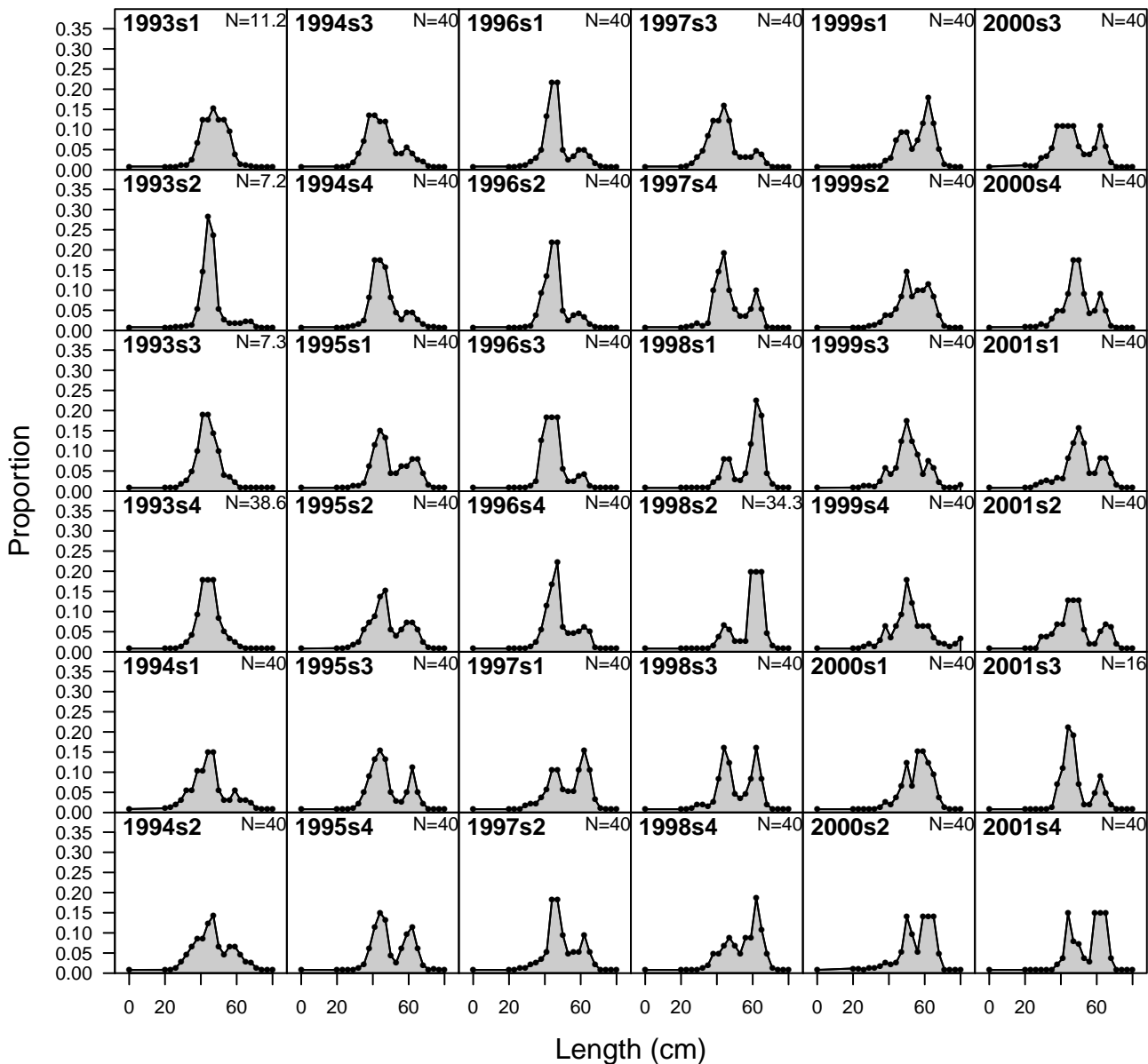


# length comp data, sexes combined, whole catch, PL

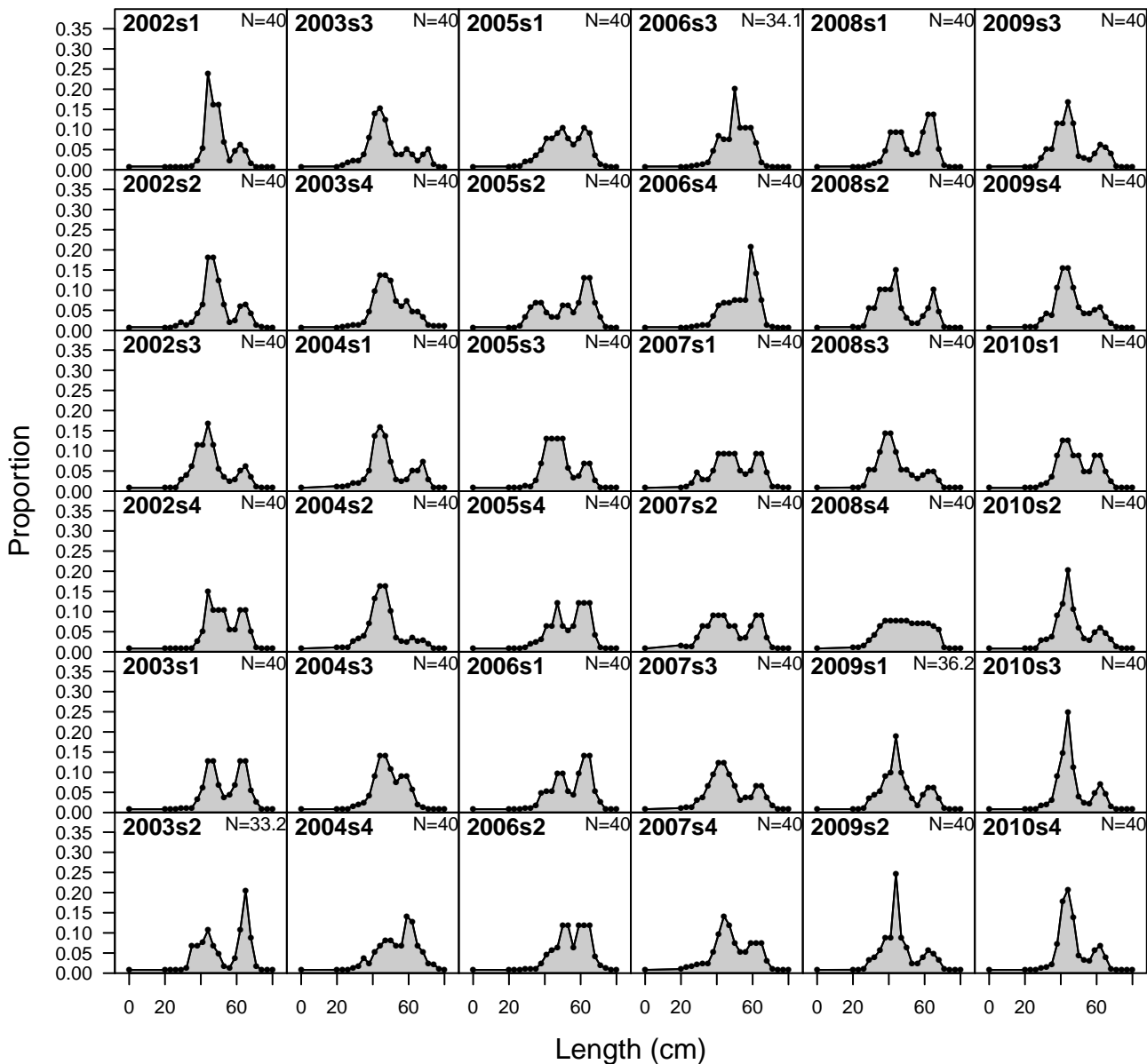




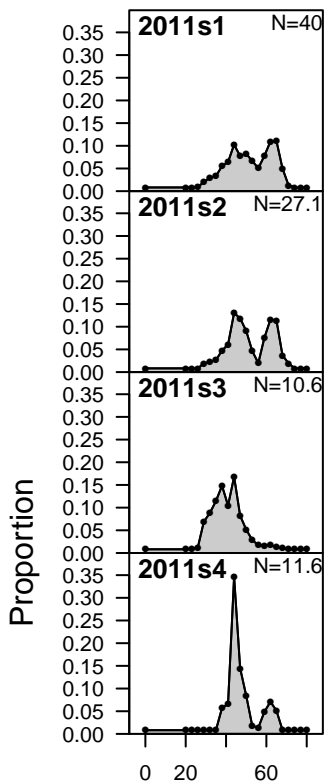
# length comp data, sexes combined, whole catch, PL



# length comp data, sexes combined, whole catch, PL

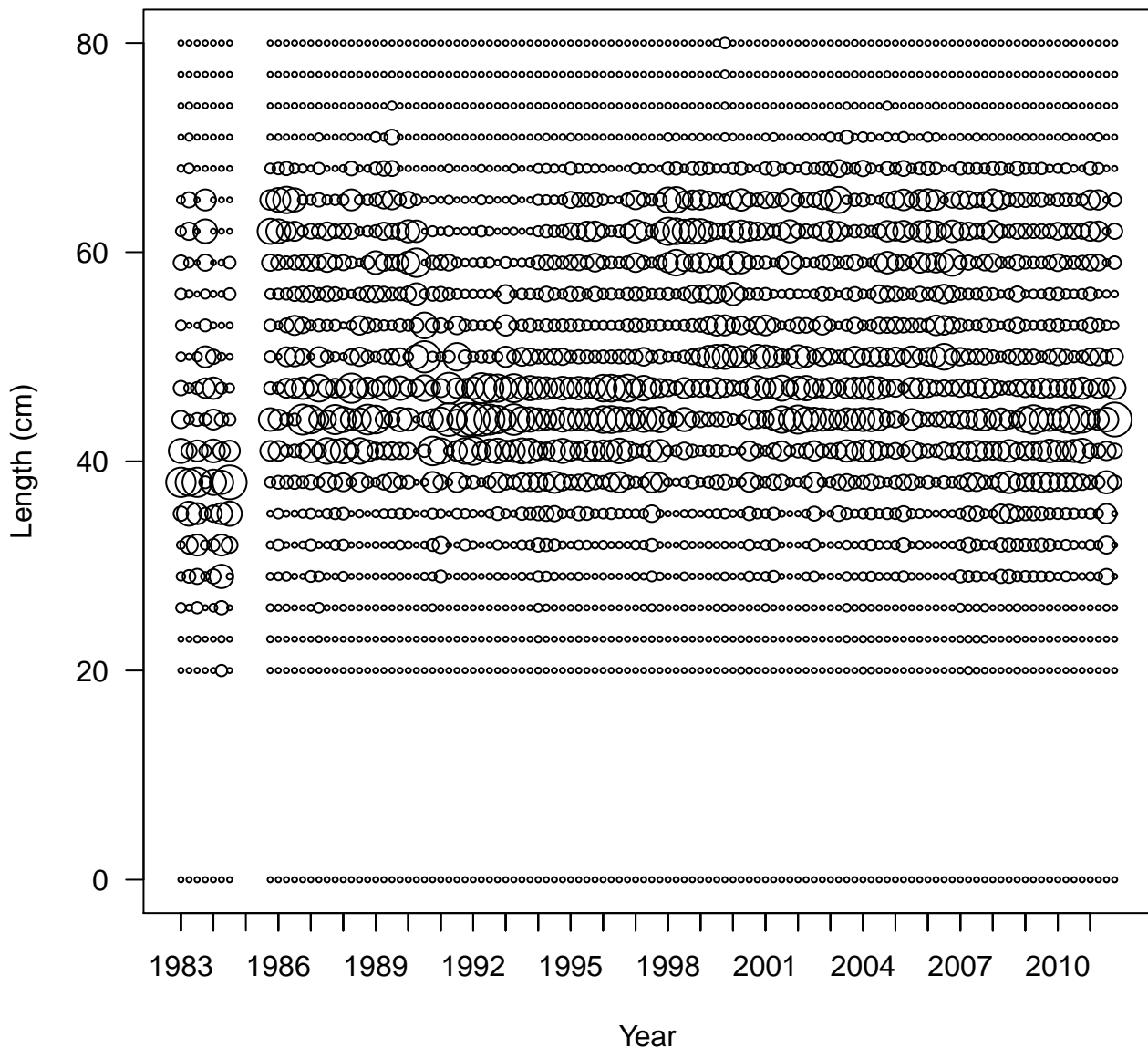


# length comp data, sexes combined, whole catch, PL

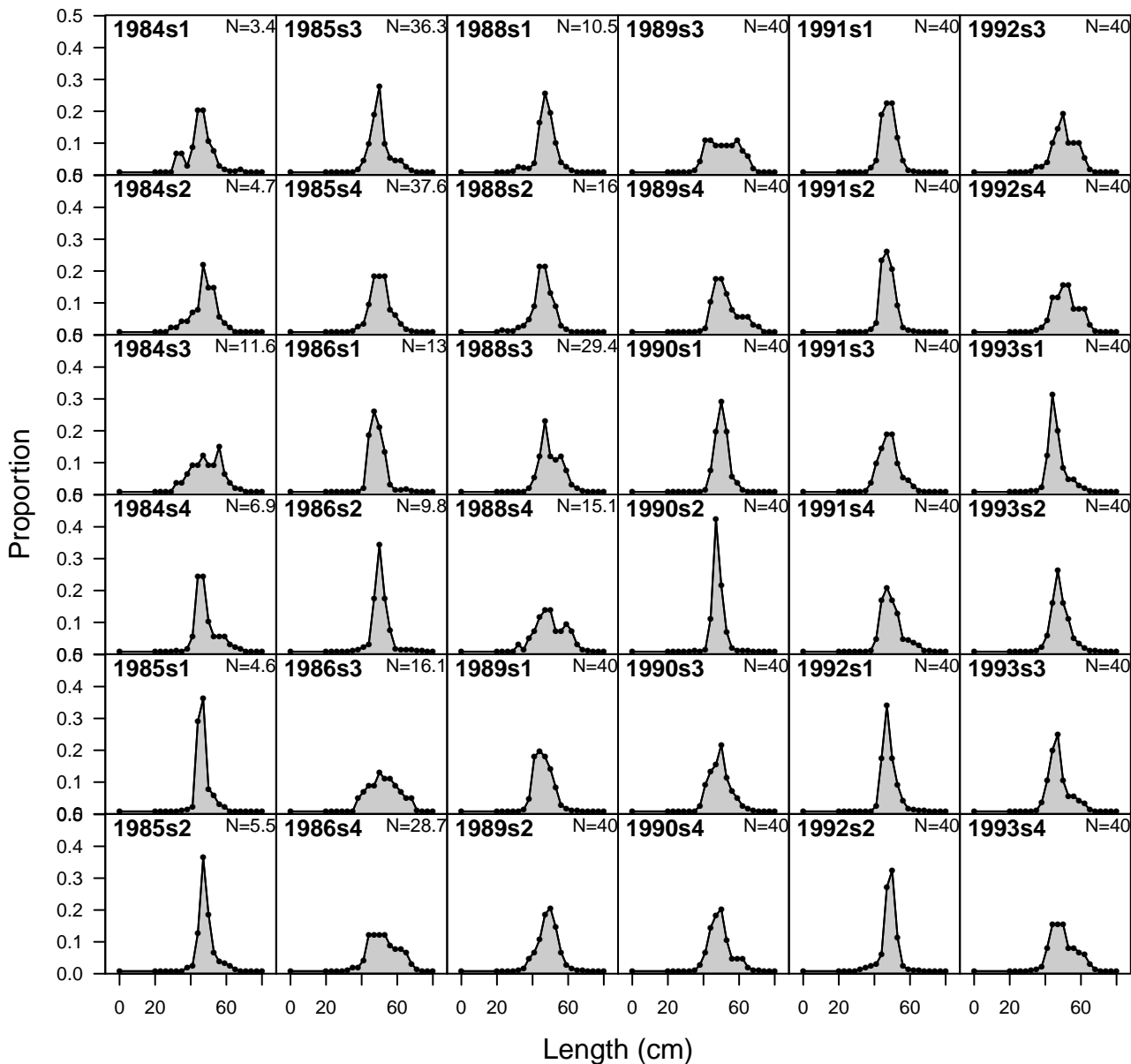


Length (cm)

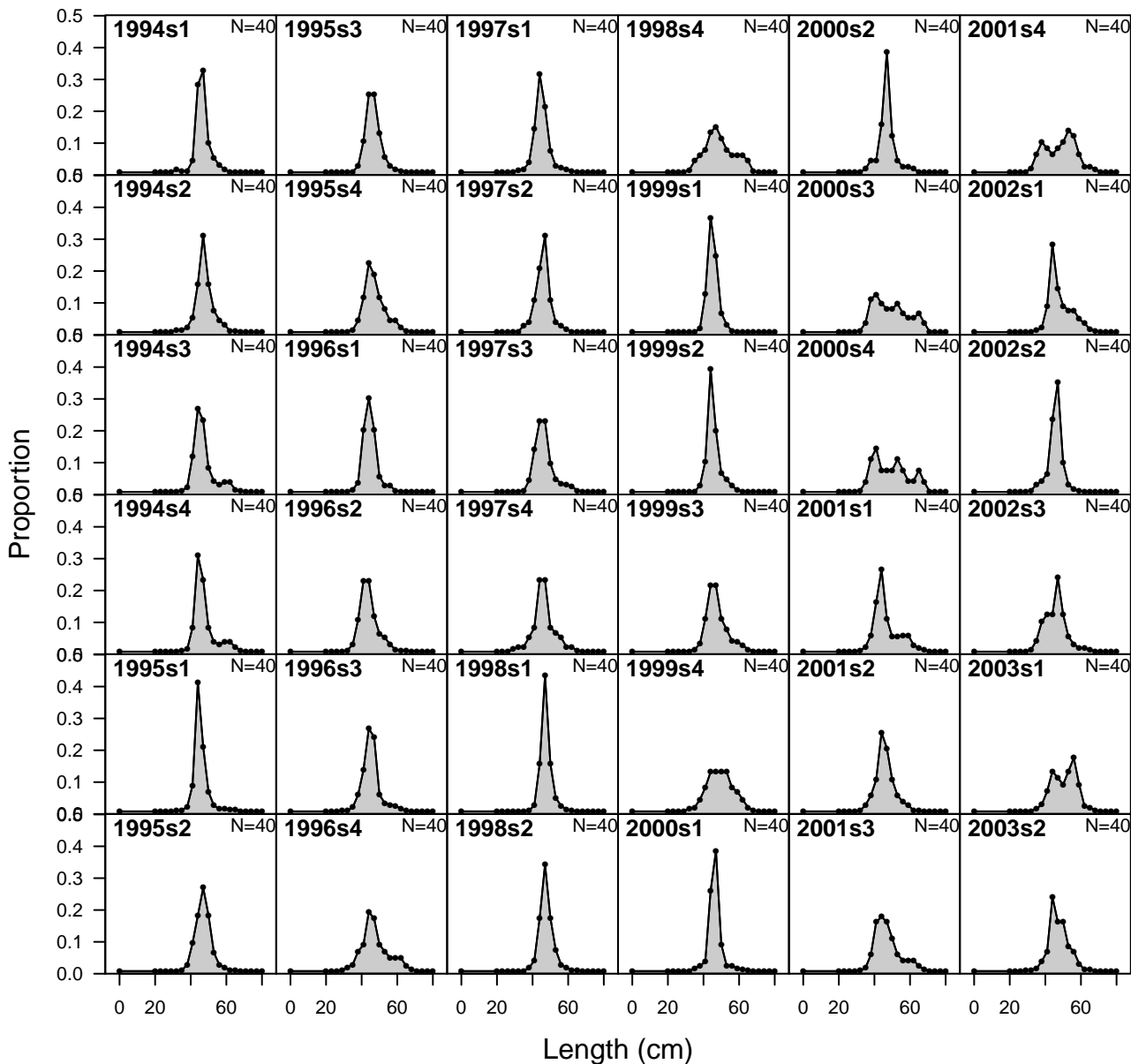
# length comp data, sexes combined, whole catch, PL (max=0.35)



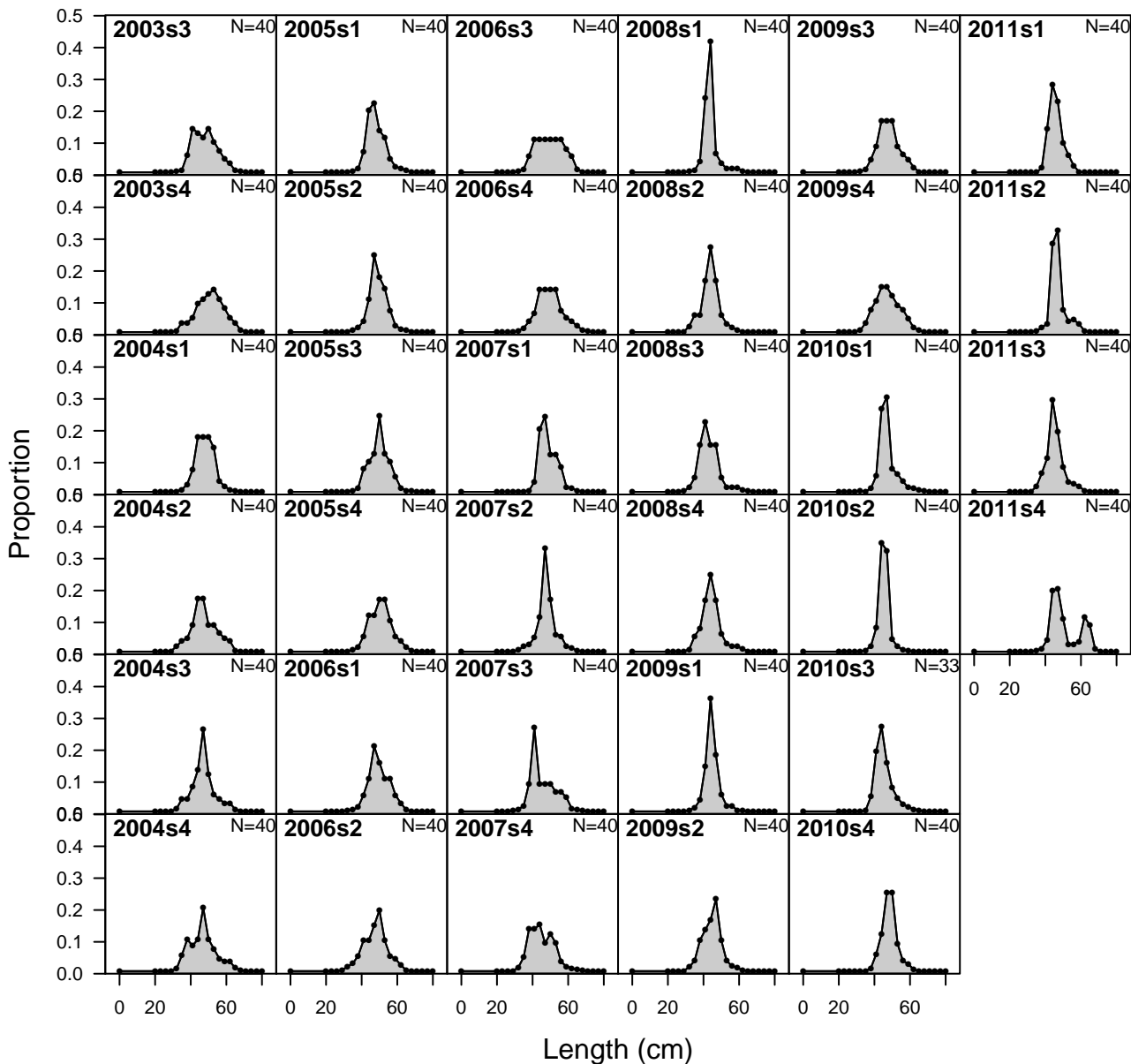
# length comp data, sexes combined, whole catch, PSLS



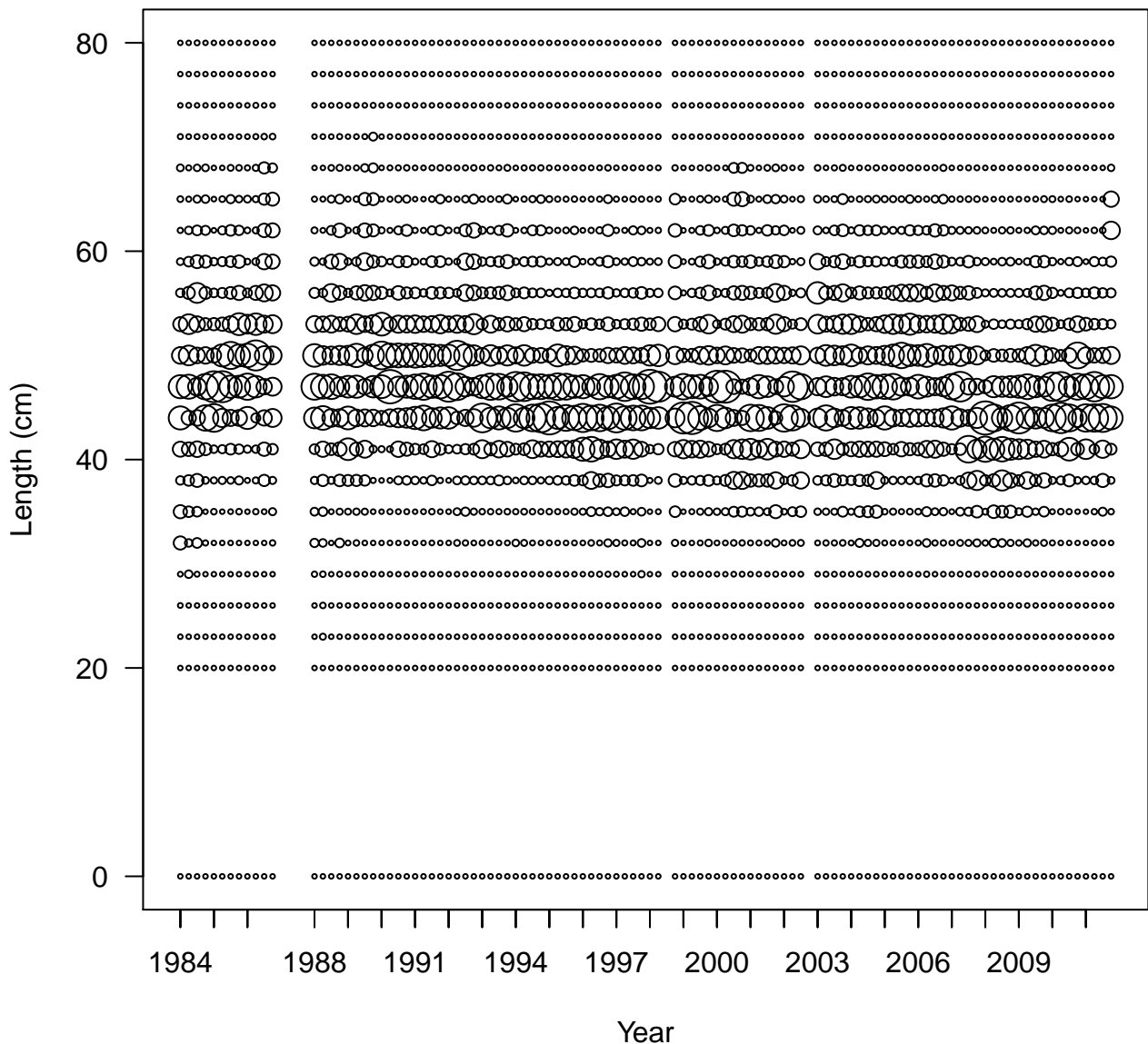
# length comp data, sexes combined, whole catch, PSLS



# length comp data, sexes combined, whole catch, PSLS

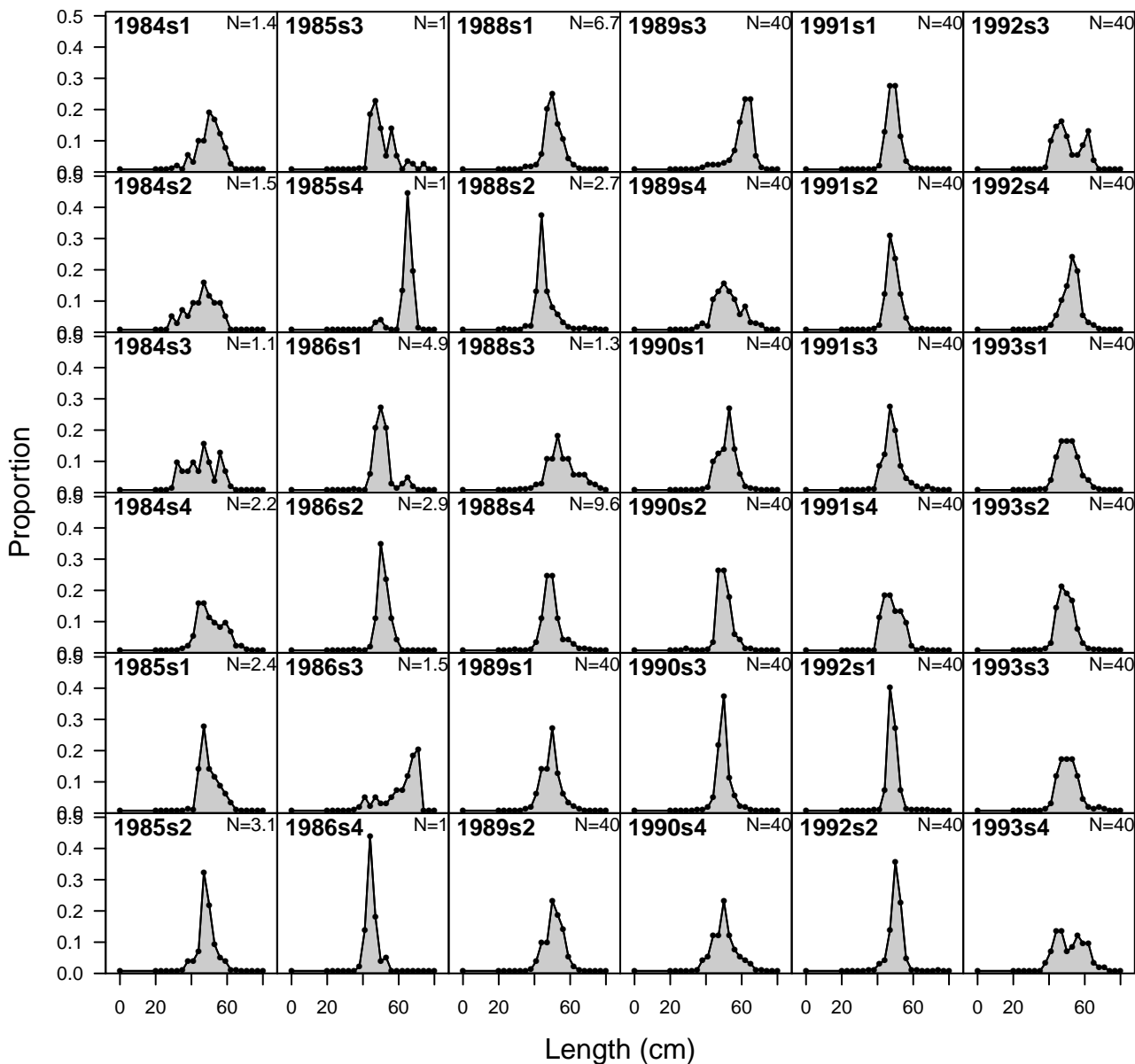


length comp data, sexes combined, whole catch, PSLS (max=0.44)

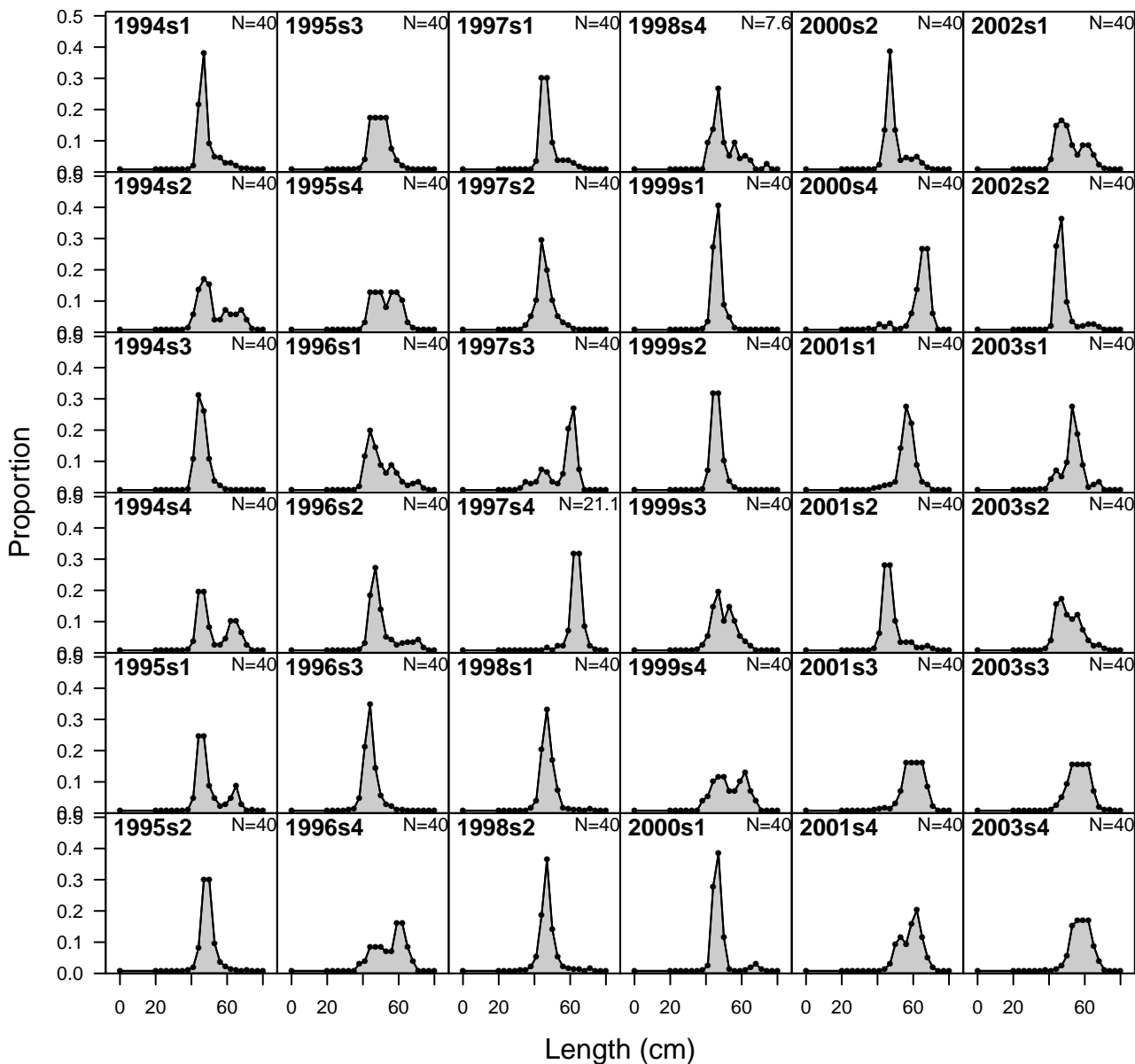




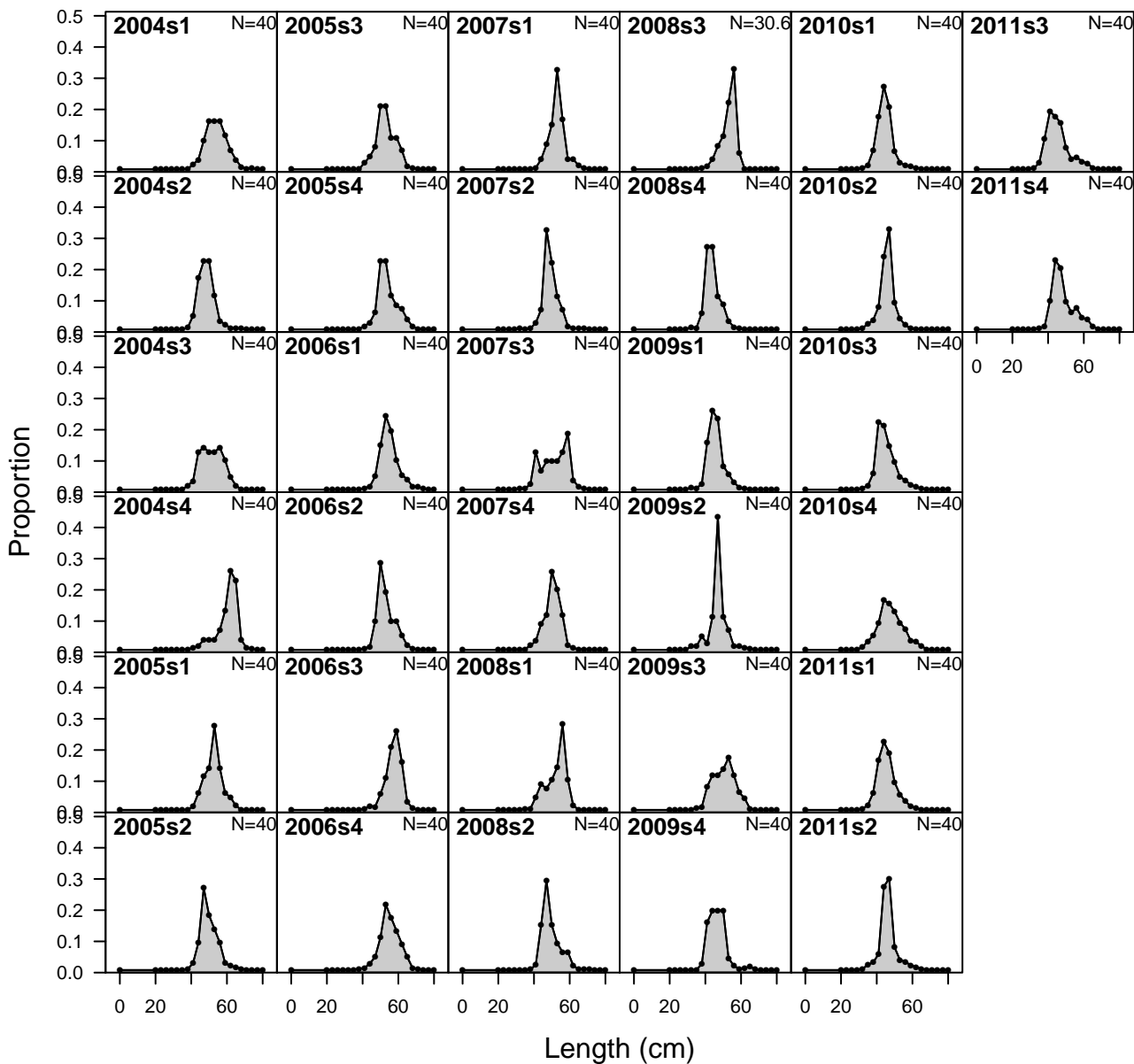
# length comp data, sexes combined, whole catch, PSFS



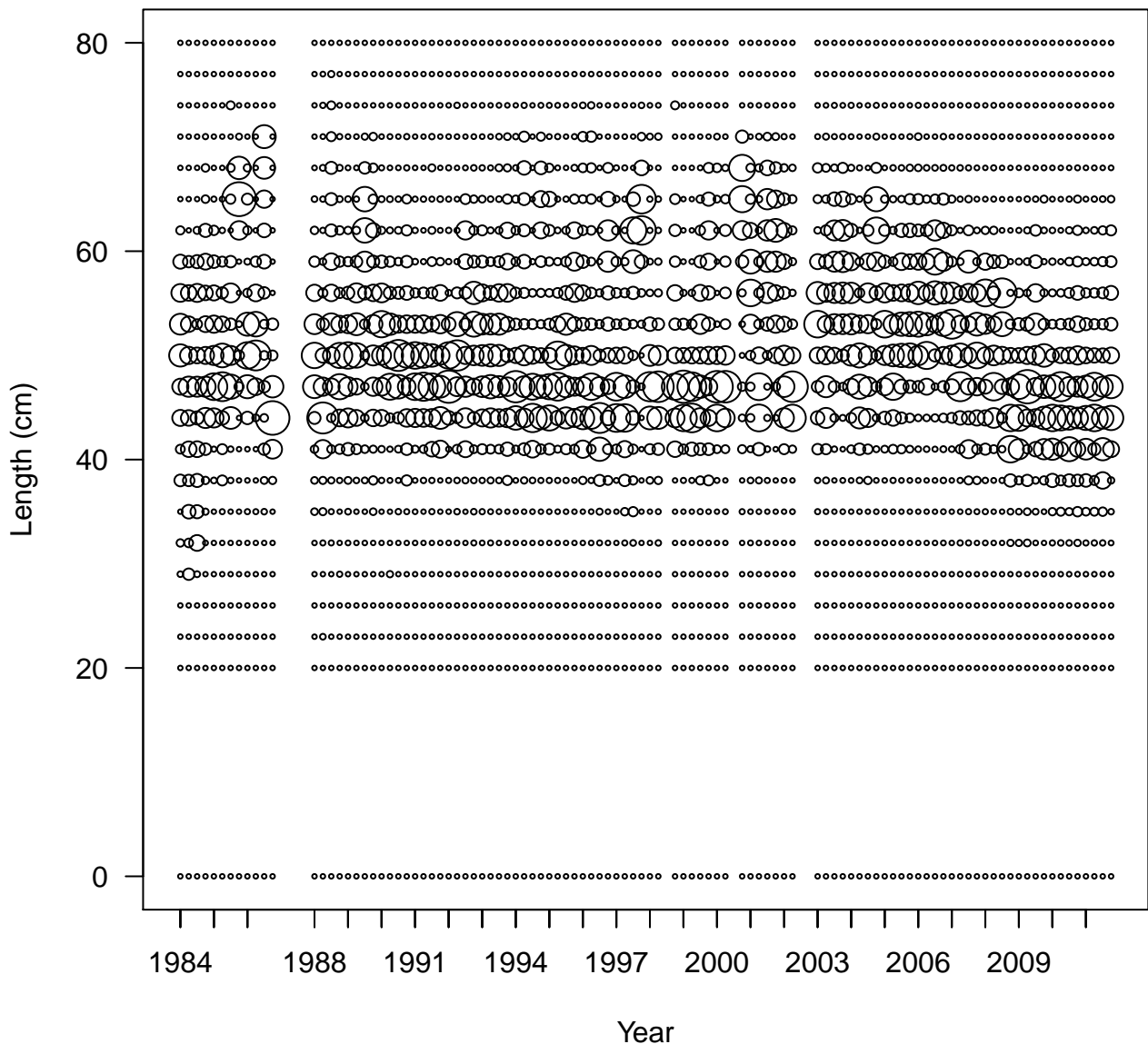
# length comp data, sexes combined, whole catch, PSFS



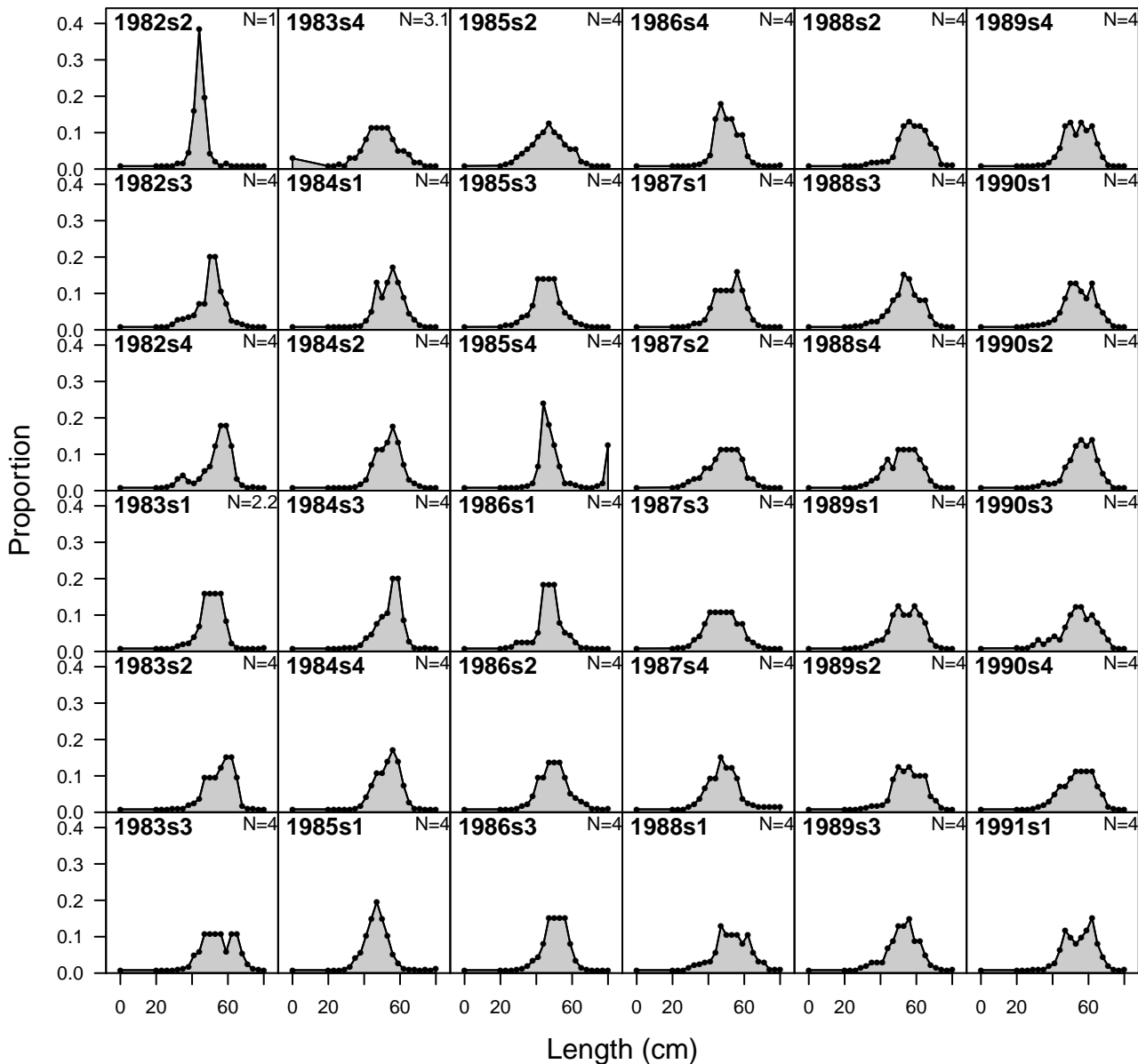
# length comp data, sexes combined, whole catch, PSFS



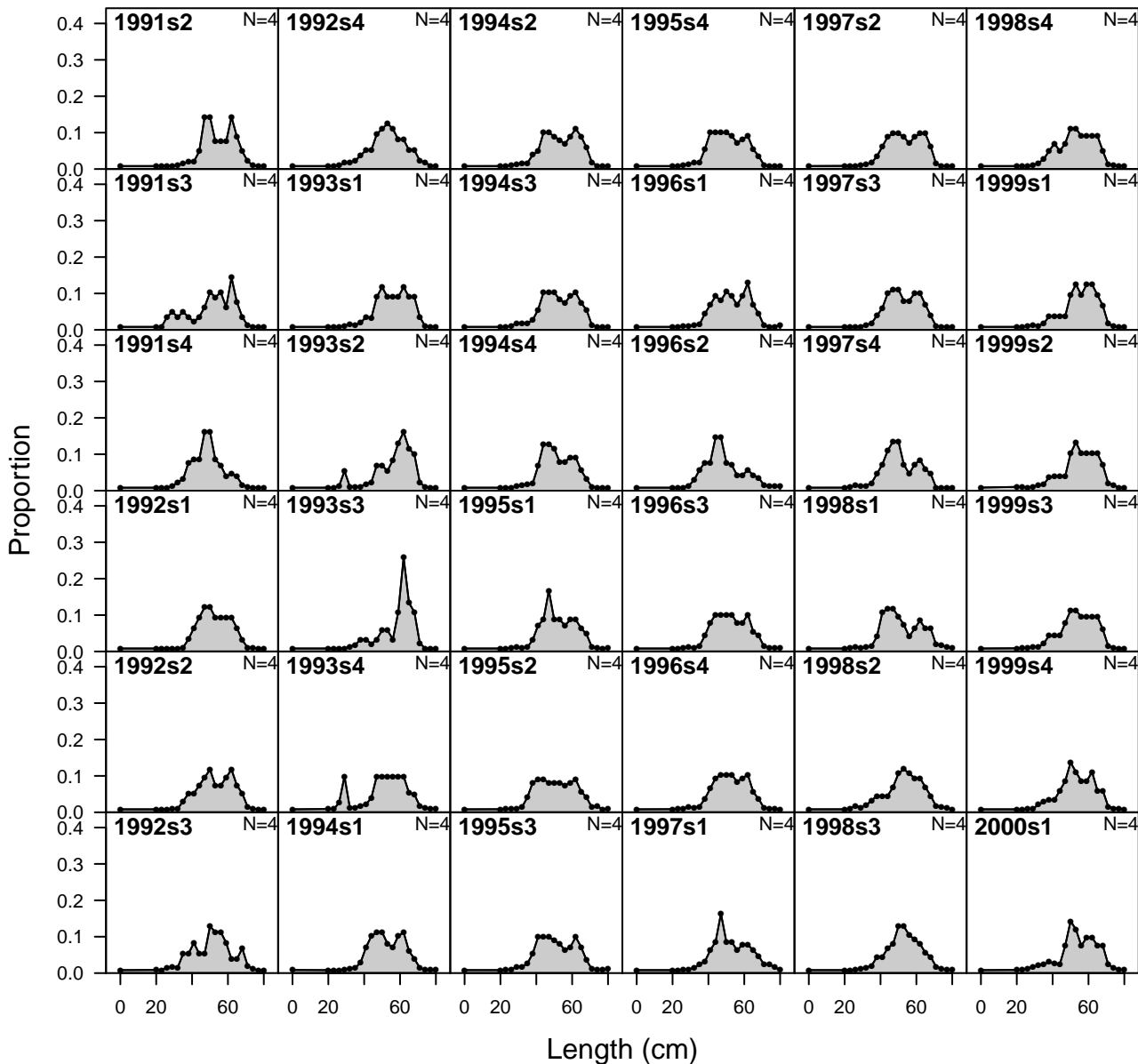
length comp data, sexes combined, whole catch, PSFS (max=0.45)



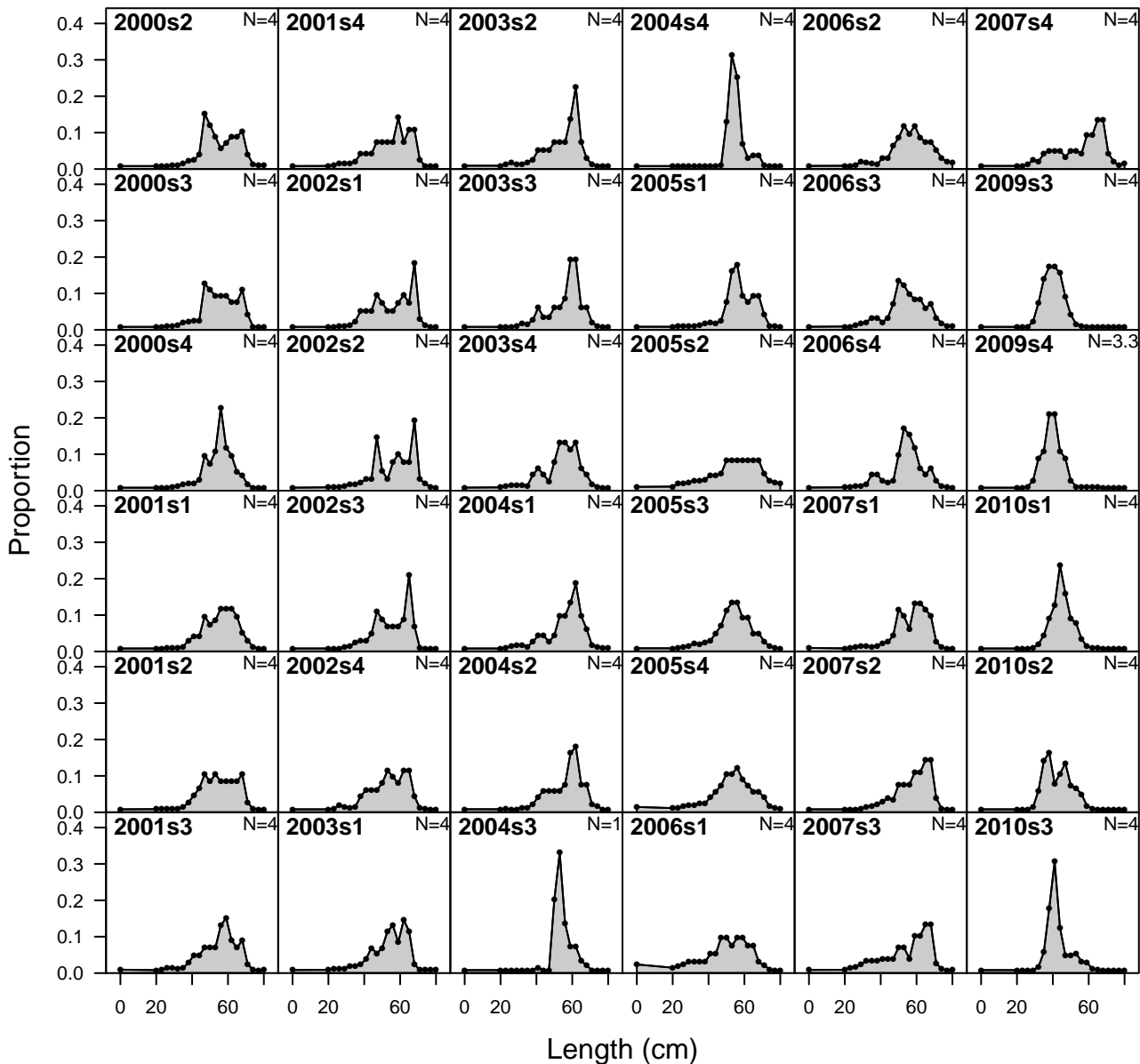
# length comp data, sexes combined, whole catch, Other



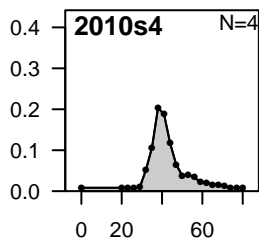
# length comp data, sexes combined, whole catch, Other



# length comp data, sexes combined, whole catch, Other



# length comp data, sexes combined, whole catch, Other

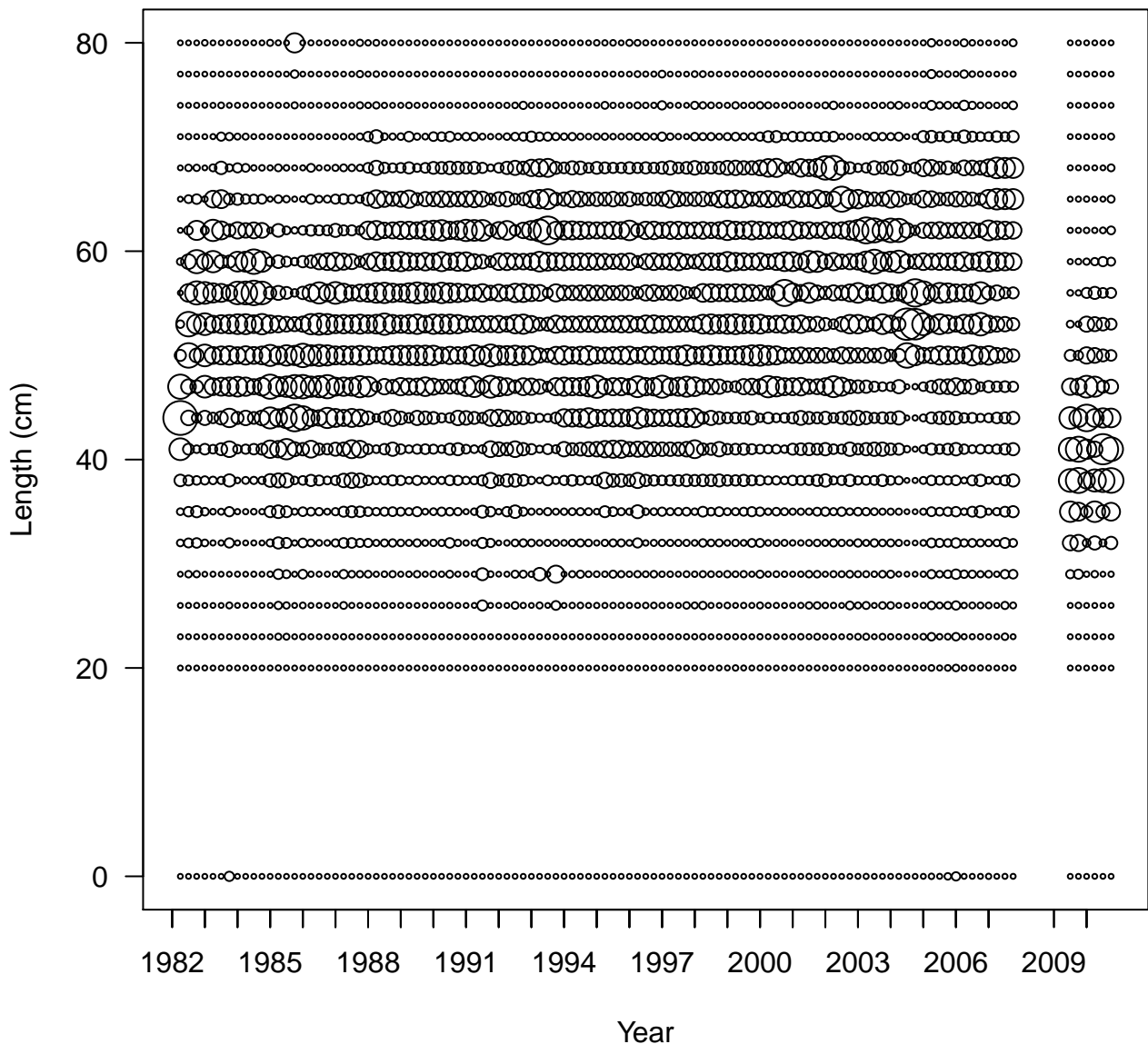


Proportion

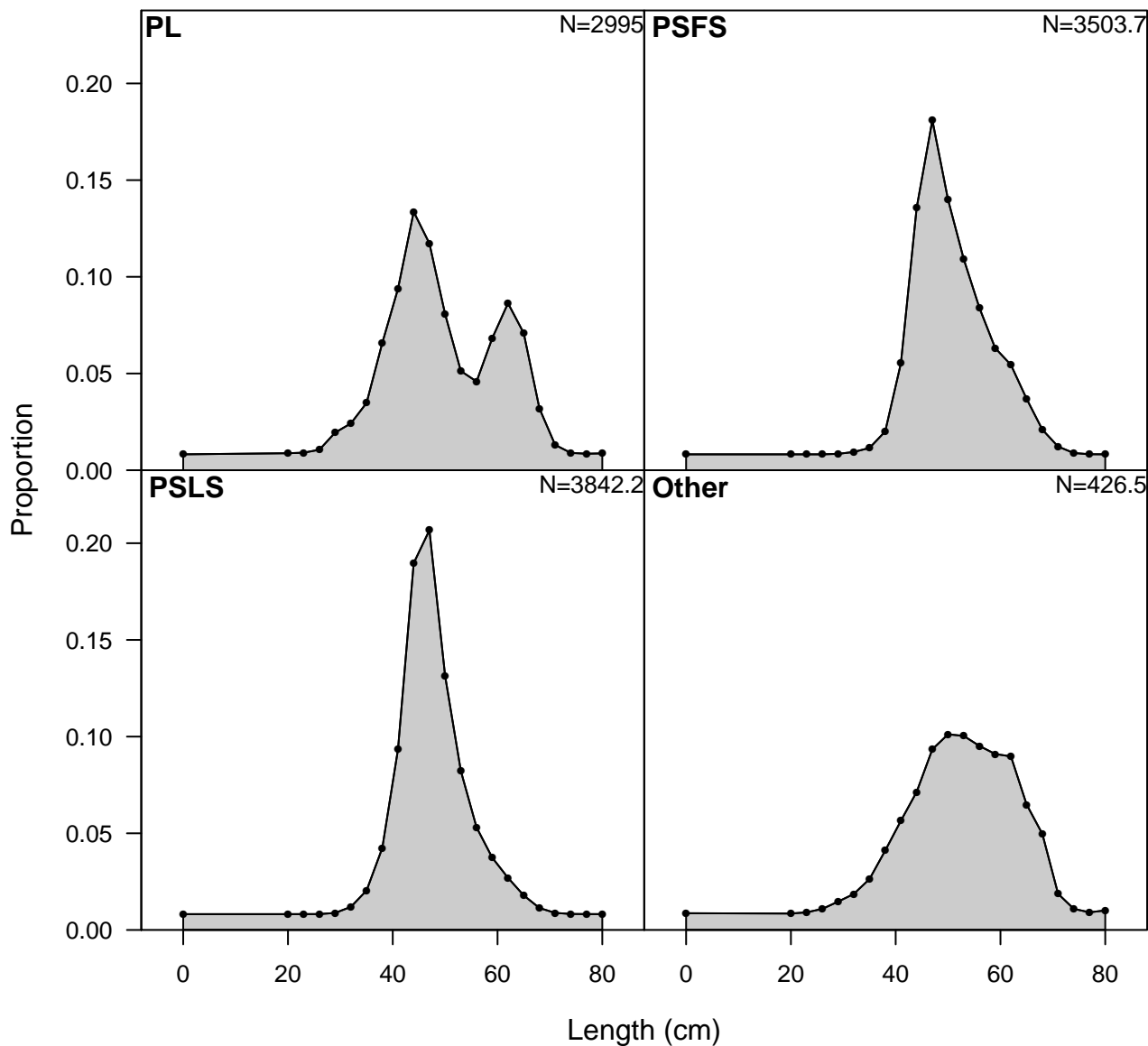
Length (cm)



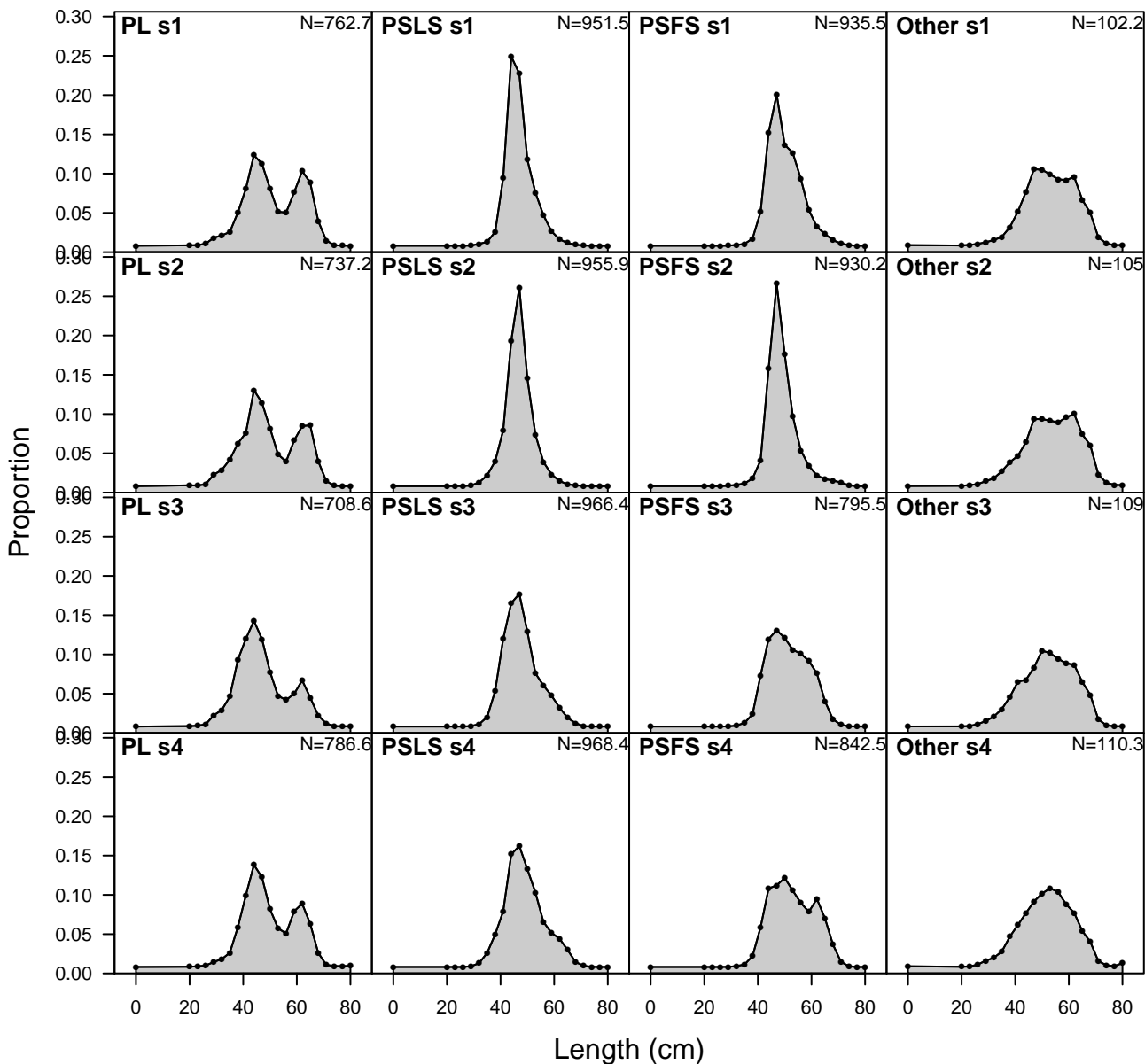
length comp data, sexes combined, whole catch, Other (max=0.38)



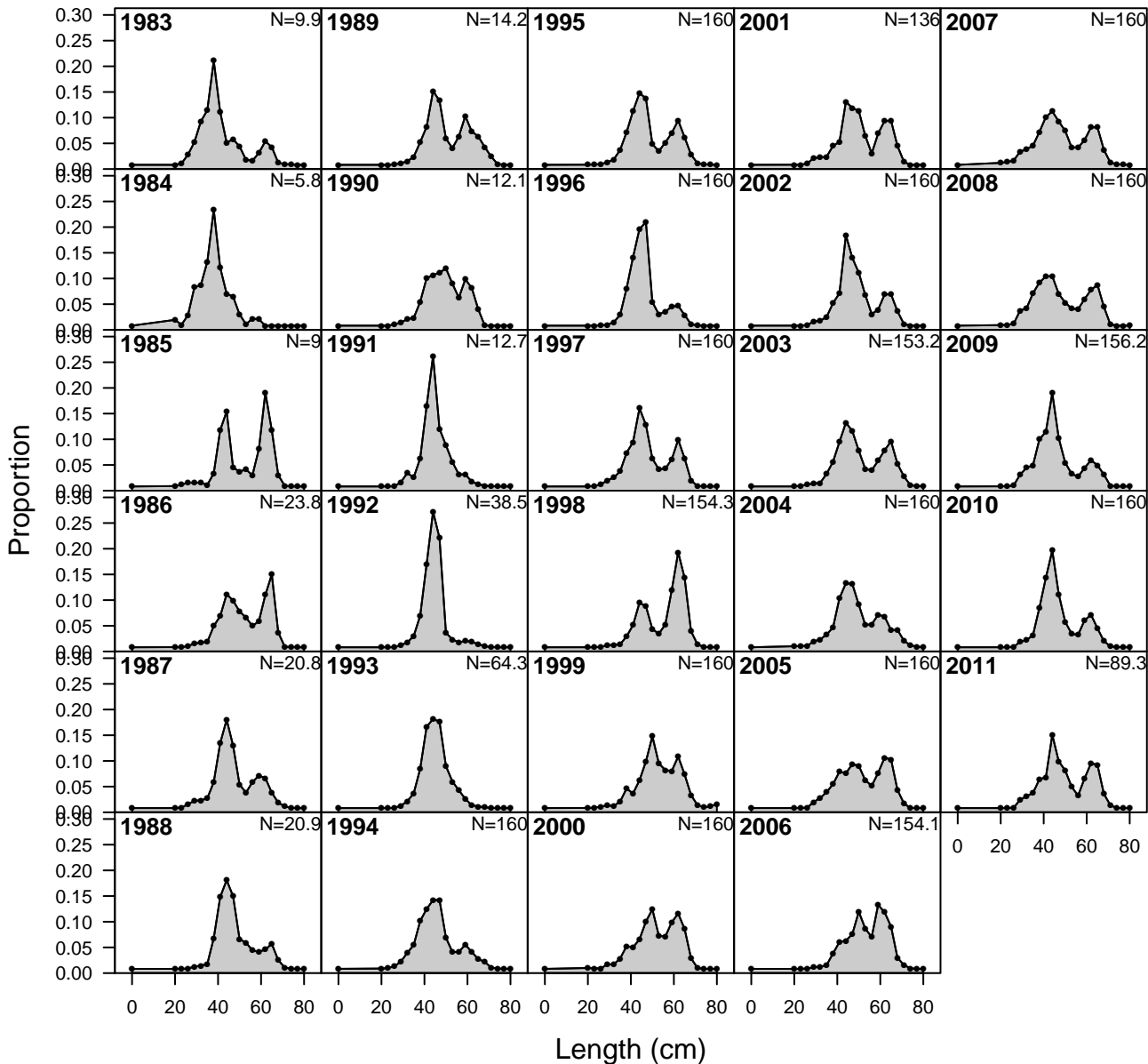
length comp data, sexes combined, whole catch, aggregated across time by fleet



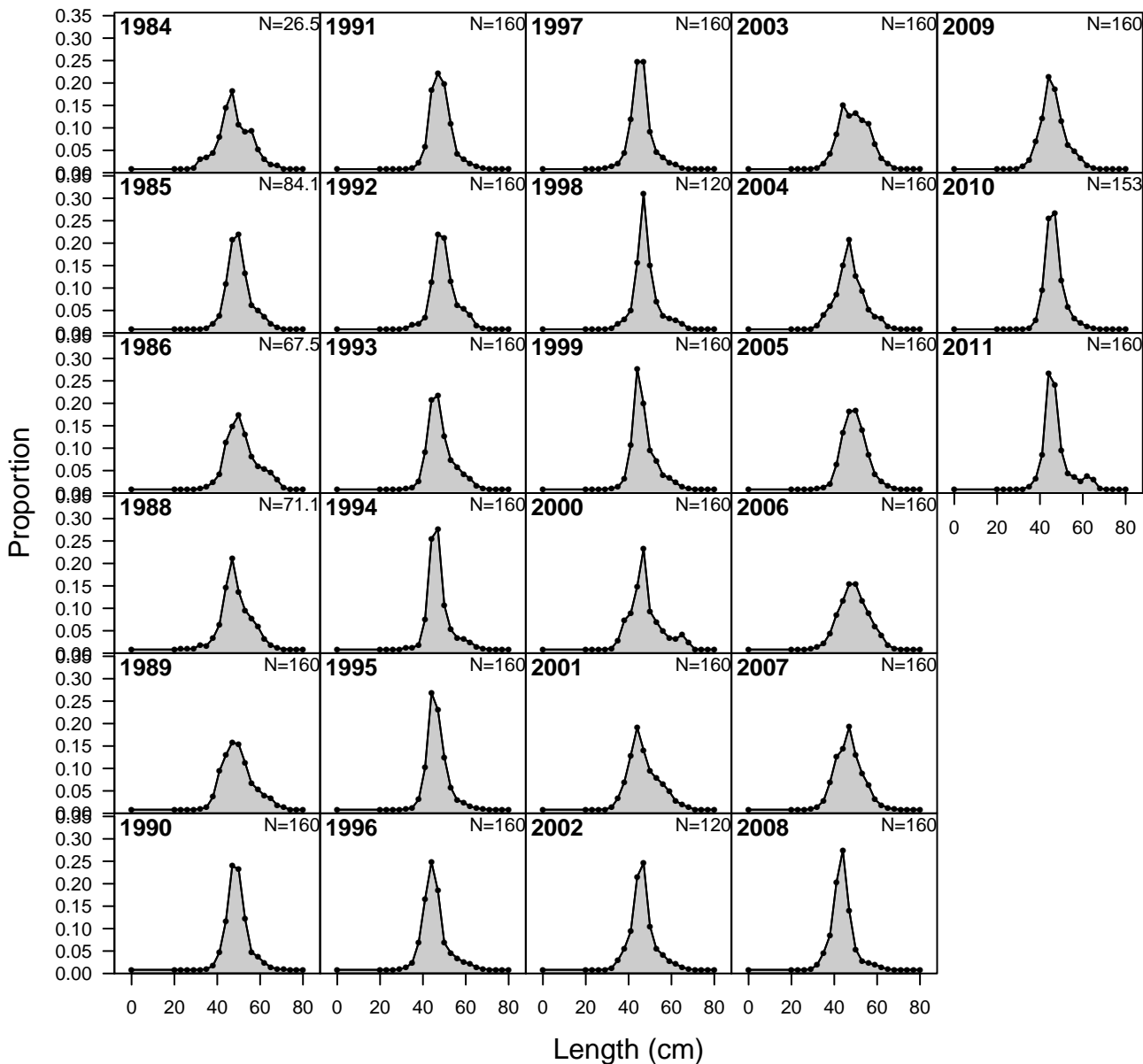
length comp data, sexes combined, whole catch,  
aggregated within season by fleet



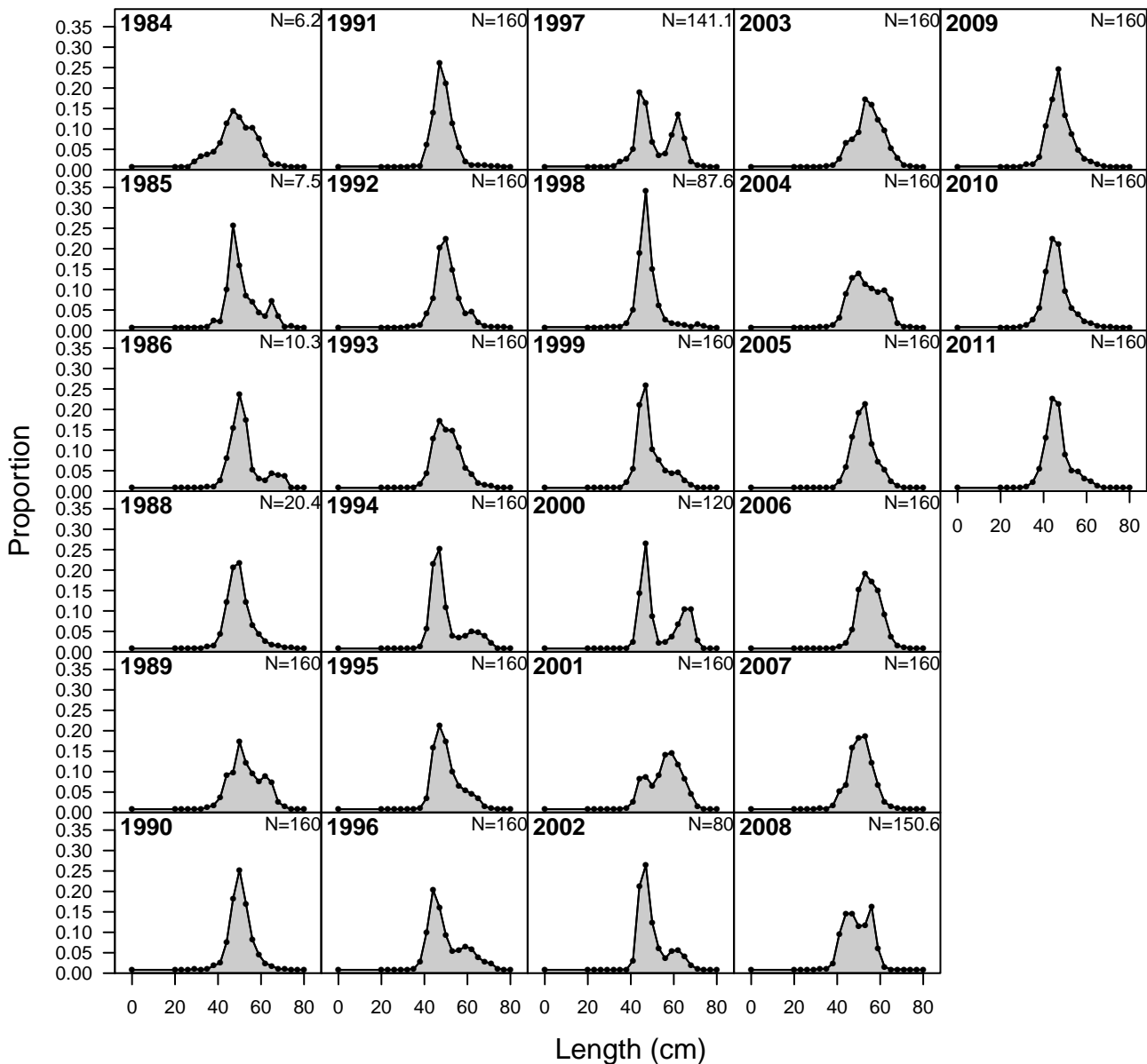
length comp data, sexes combined, whole catch, PL  
aggregated across seasons within year



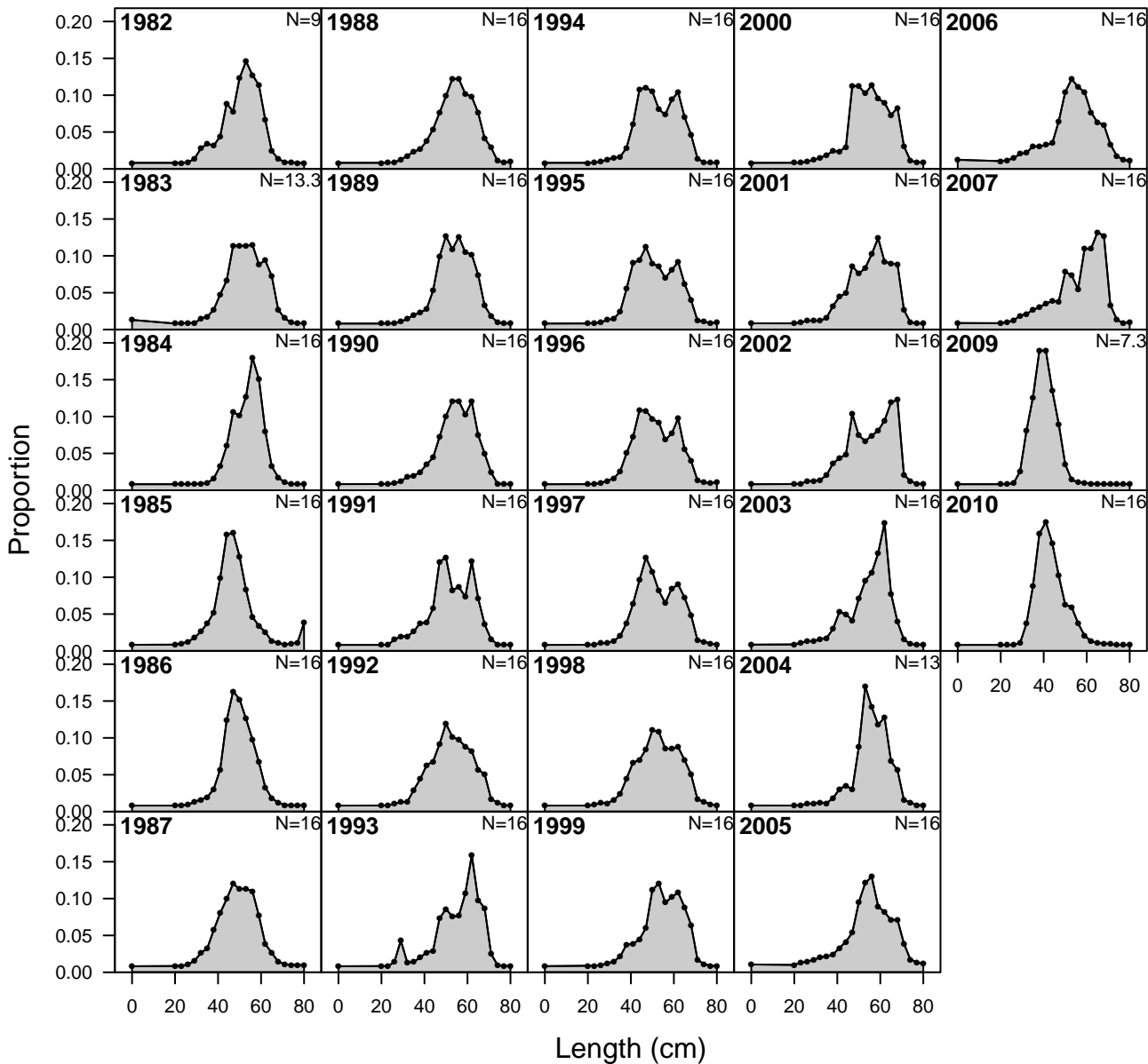
# length comp data, sexes combined, whole catch, PSLS aggregated across seasons within year



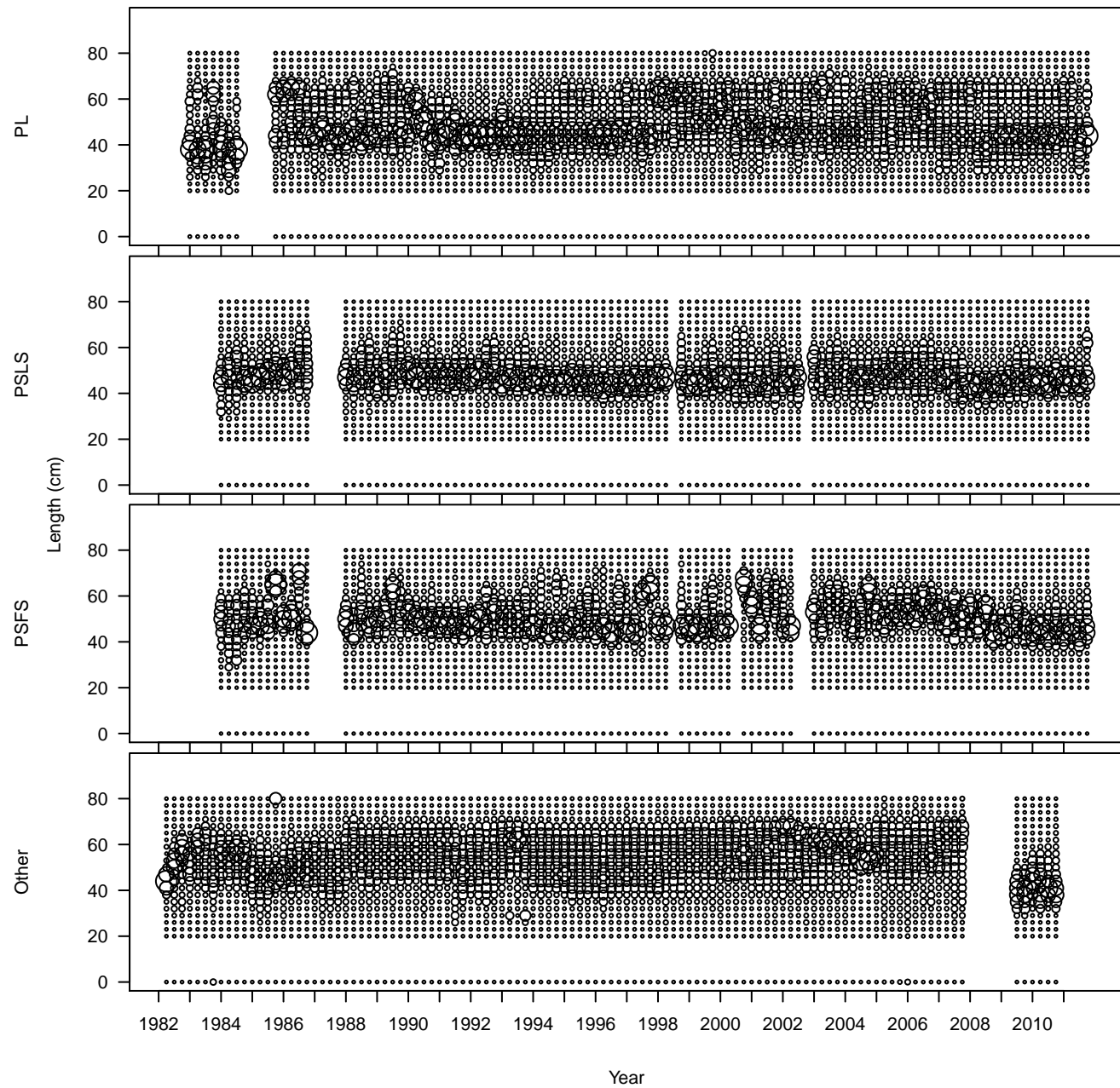
# length comp data, sexes combined, whole catch, PSFS aggregated across seasons within year



length comp data, sexes combined, whole catch, Other  
aggregated across seasons within year

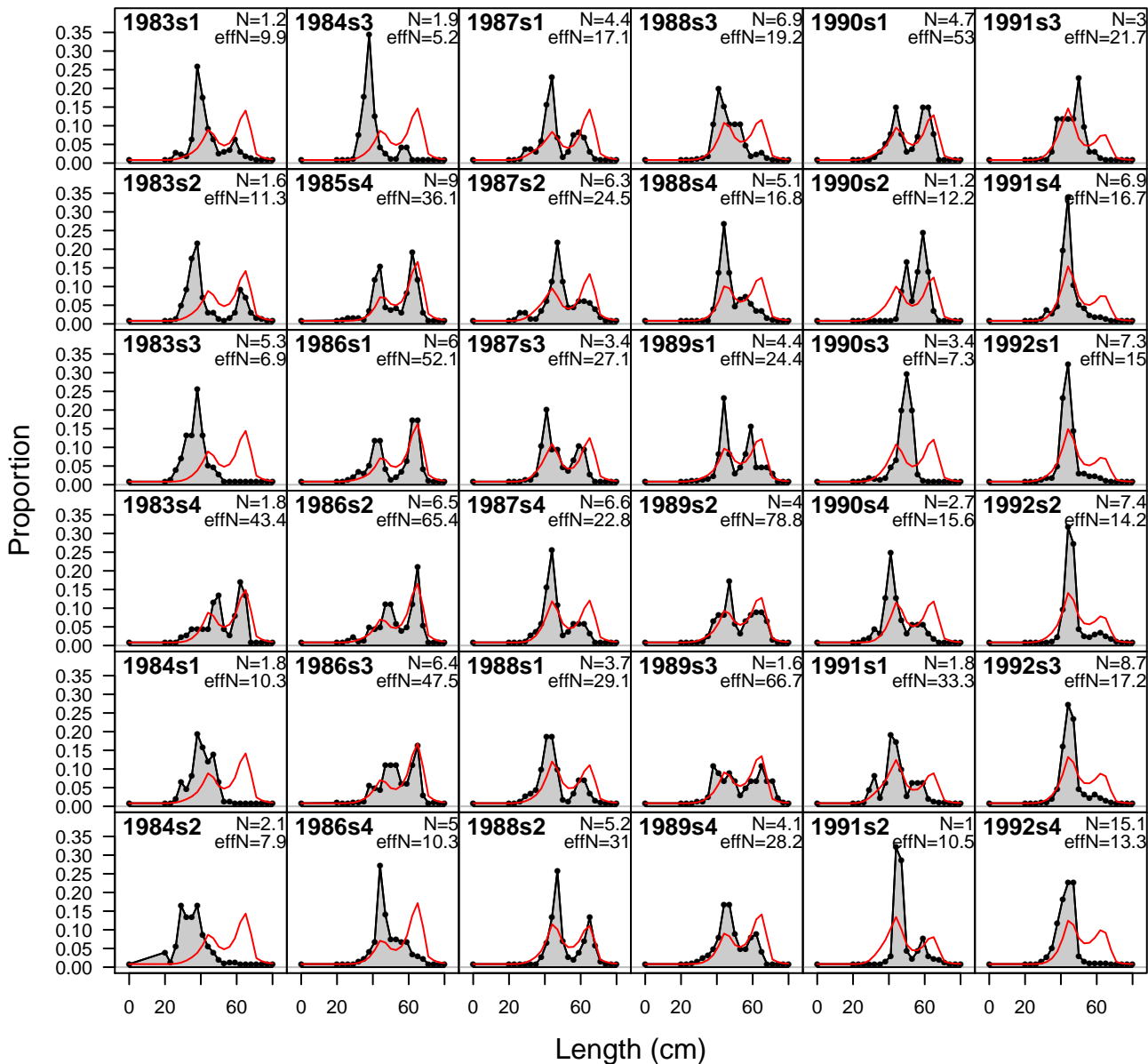


length comp data, sexes combined, whole catch, comparing across fleets

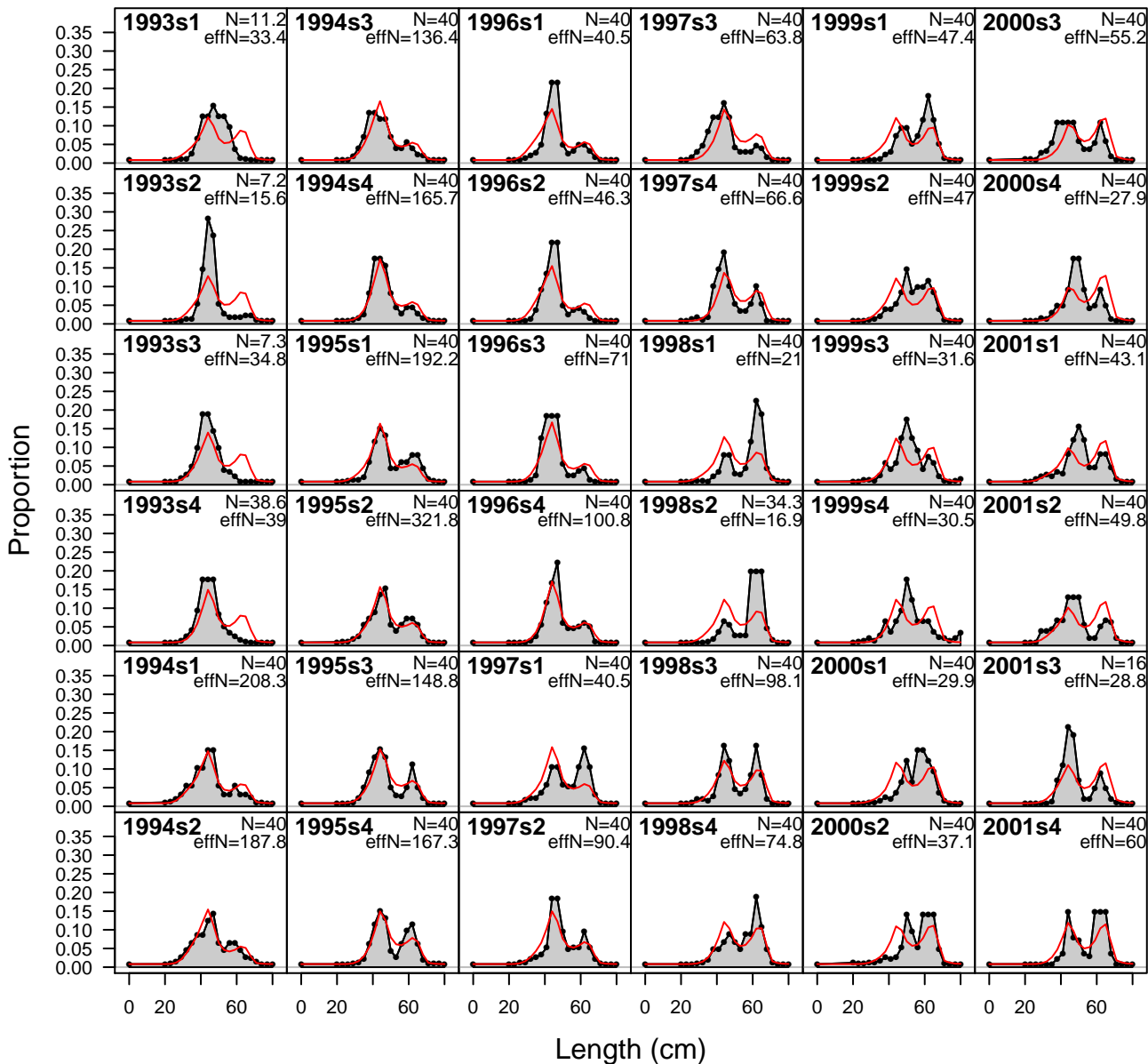




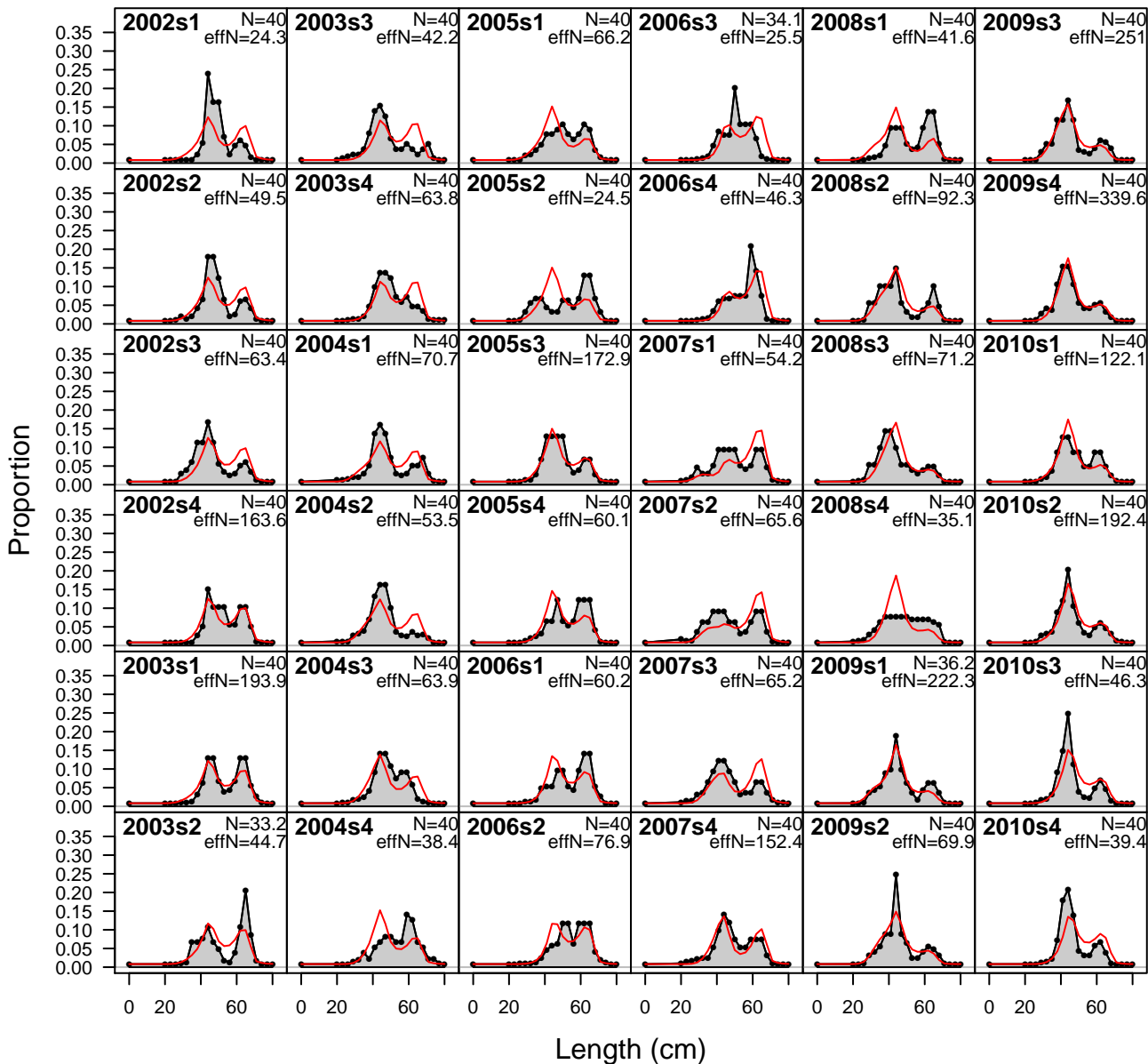
# length comps, sexes combined, whole catch, PL



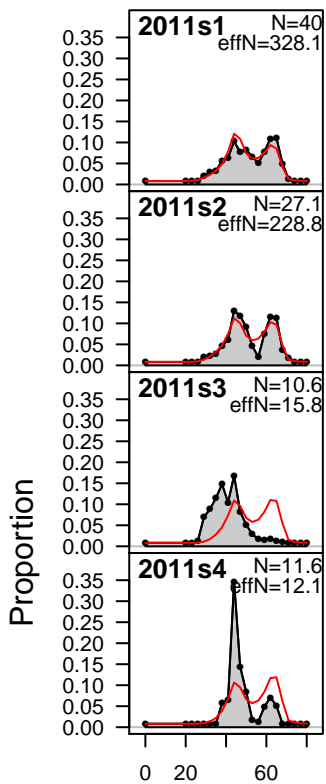
# length comps, sexes combined, whole catch, PL



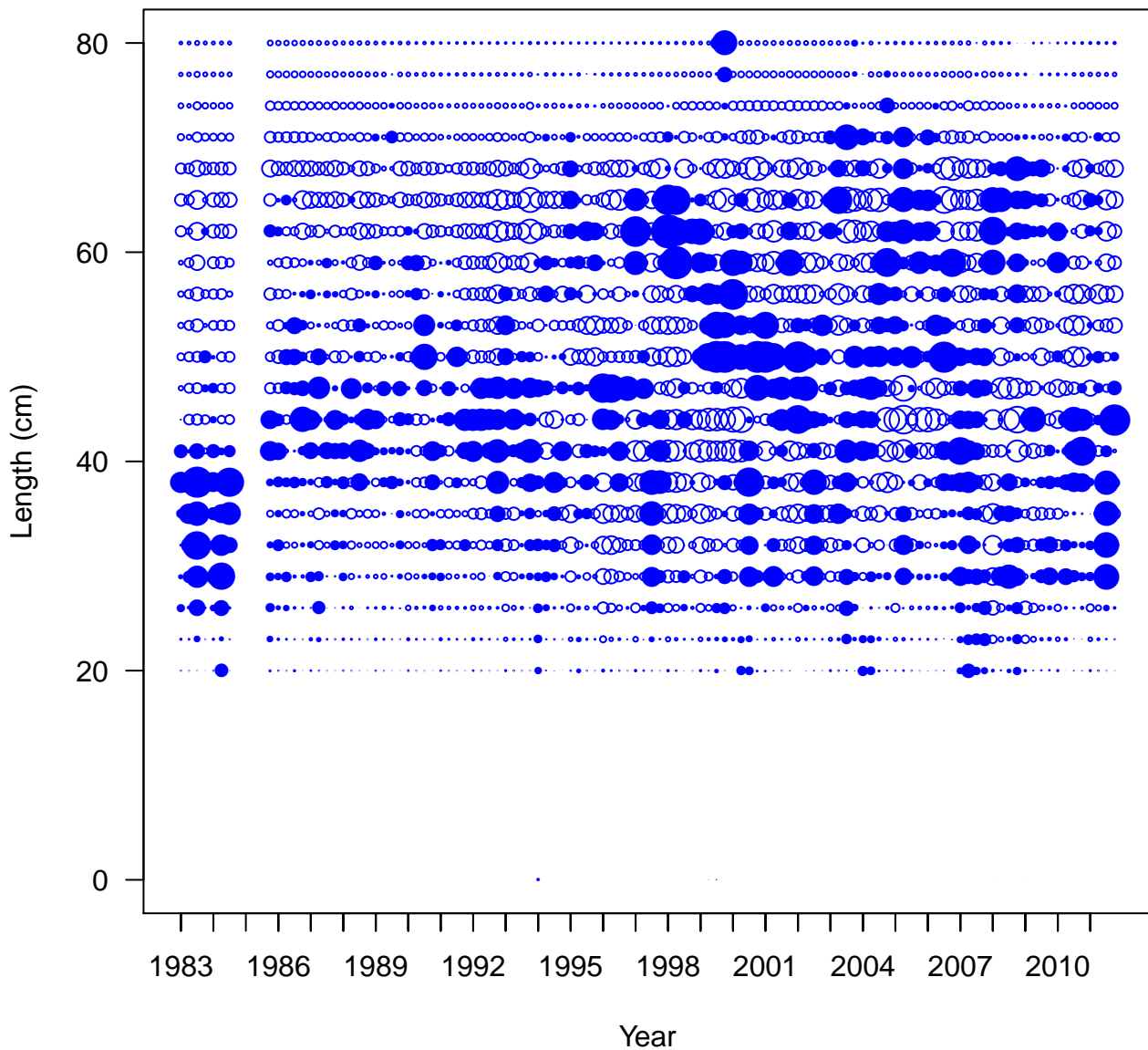
# length comps, sexes combined, whole catch, PL



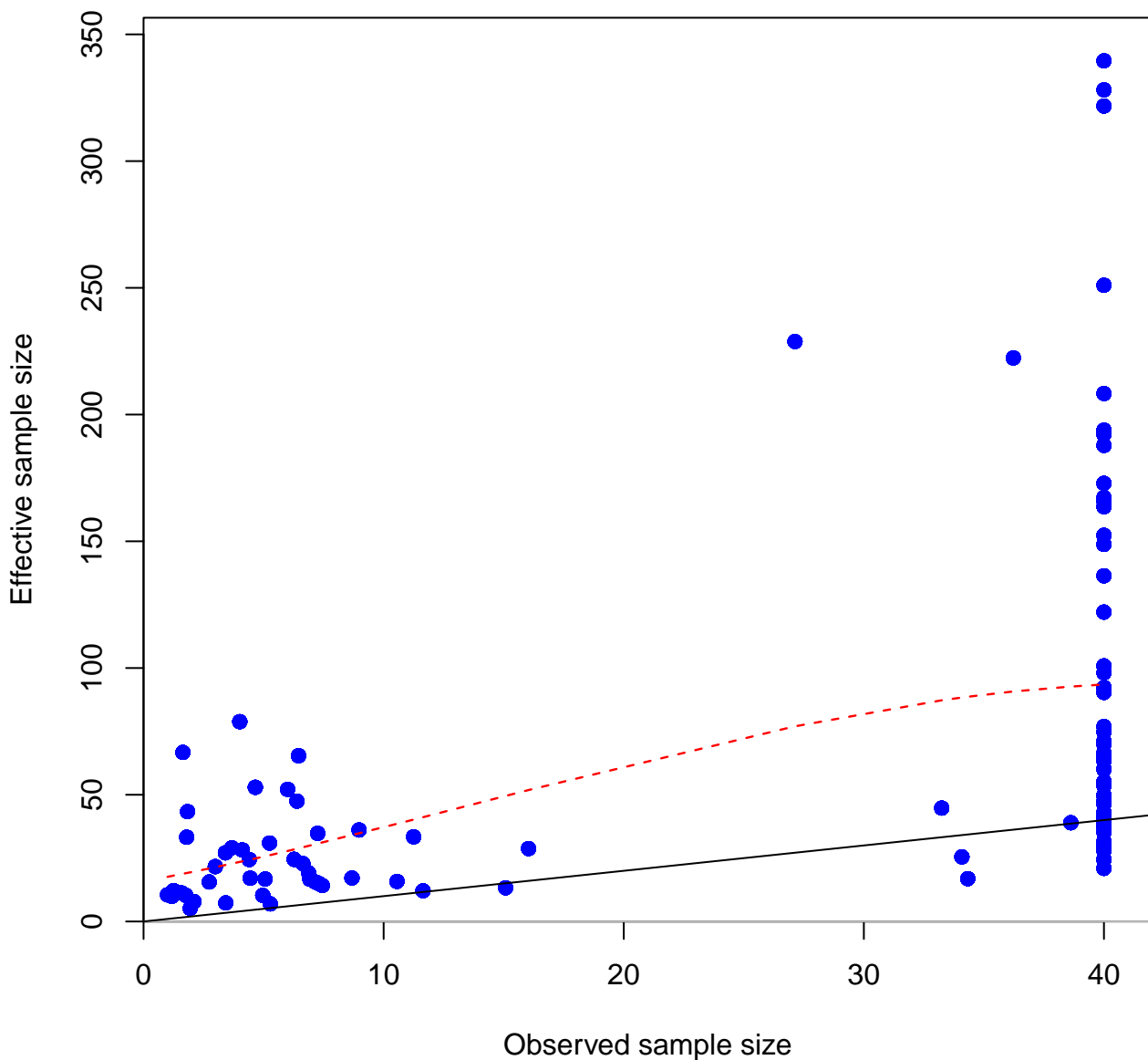
# length comps, sexes combined, whole catch, PL



Pearson residuals, sexes combined, whole catch, PL (max=3.12)

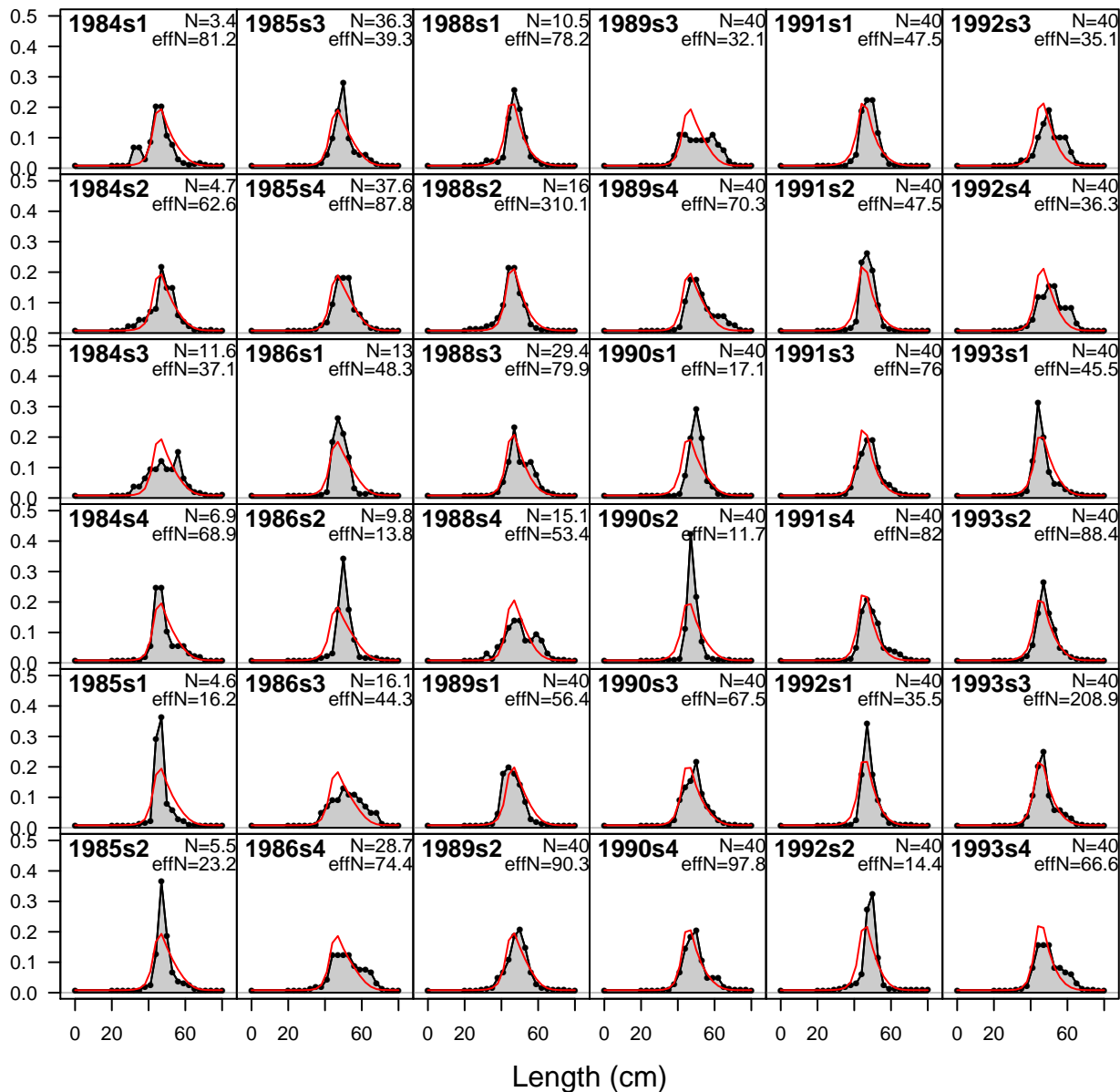


**N-EffN comparison, length comps, sexes combined, whole catch, PL**

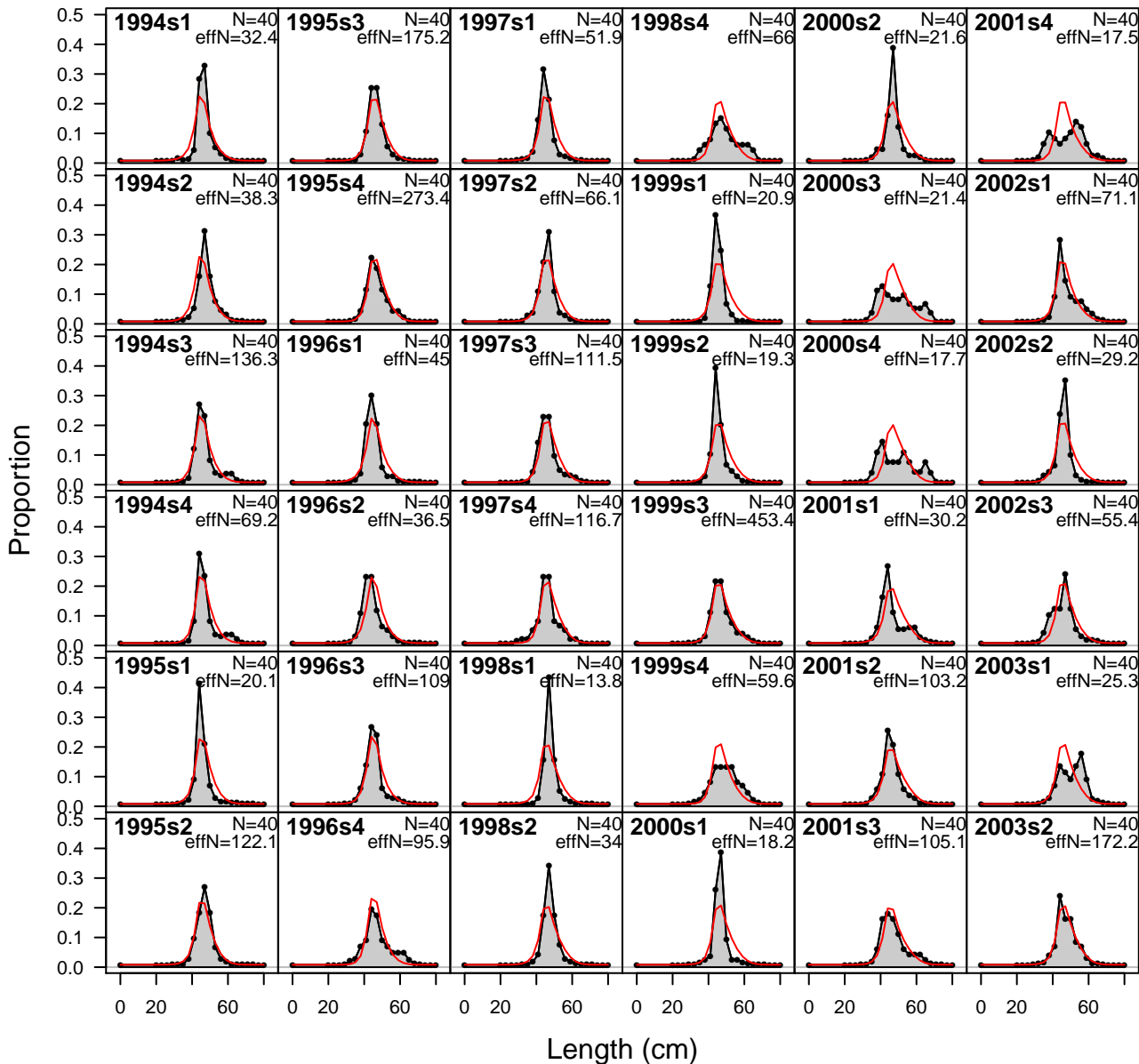


# length comps, sexes combined, whole catch, PSLS

Proportion

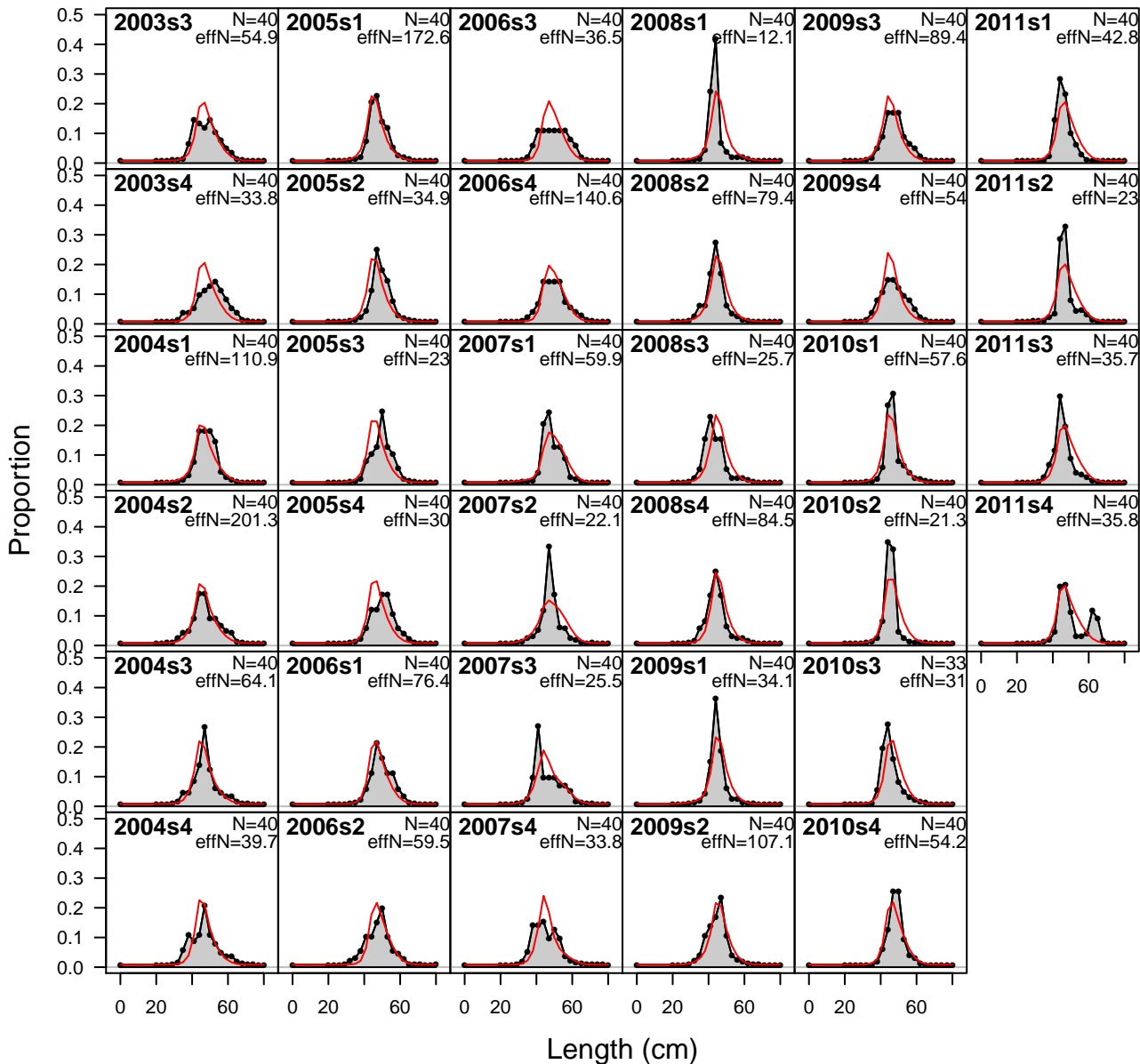


# length comps, sexes combined, whole catch, PSLS

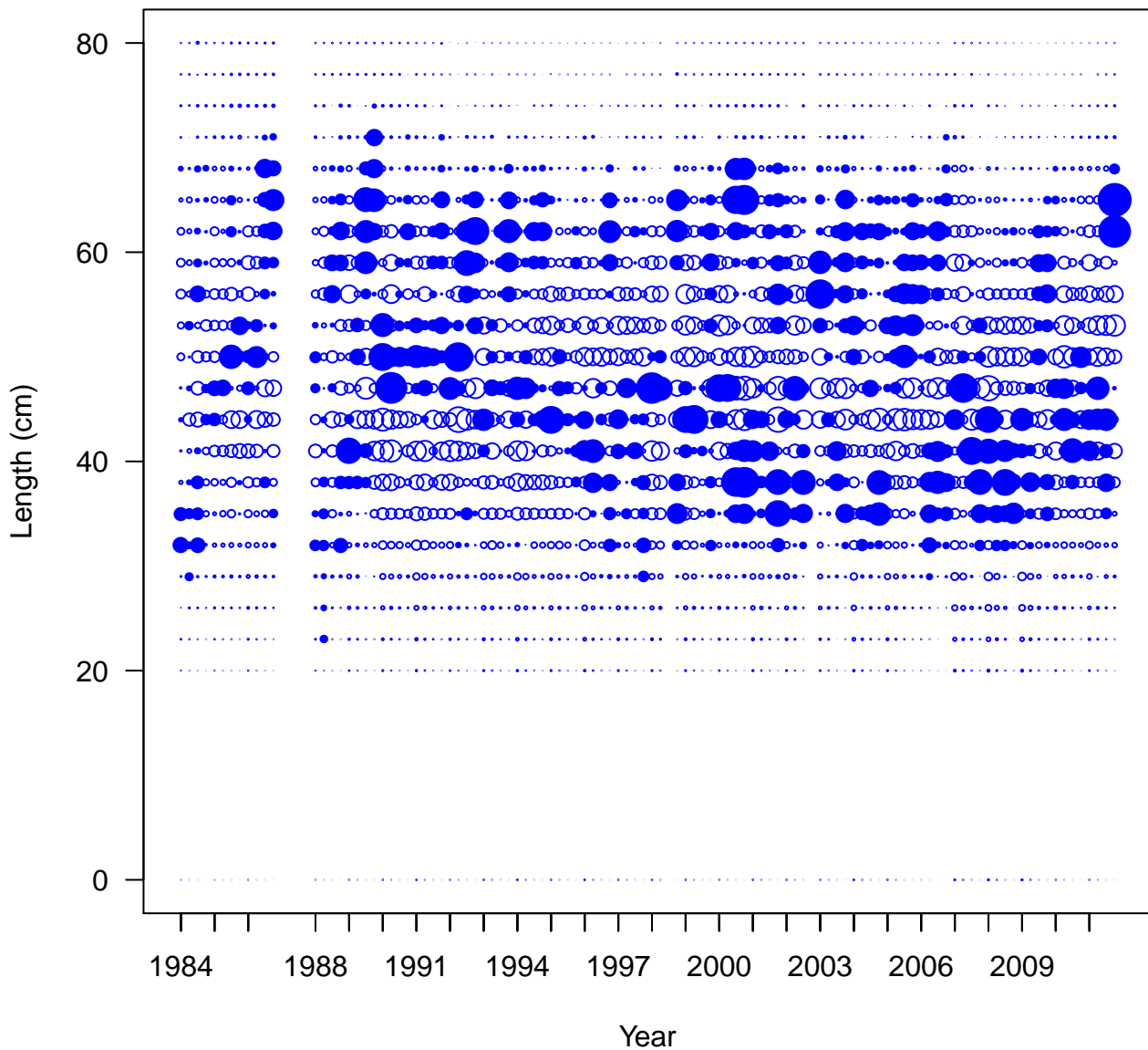




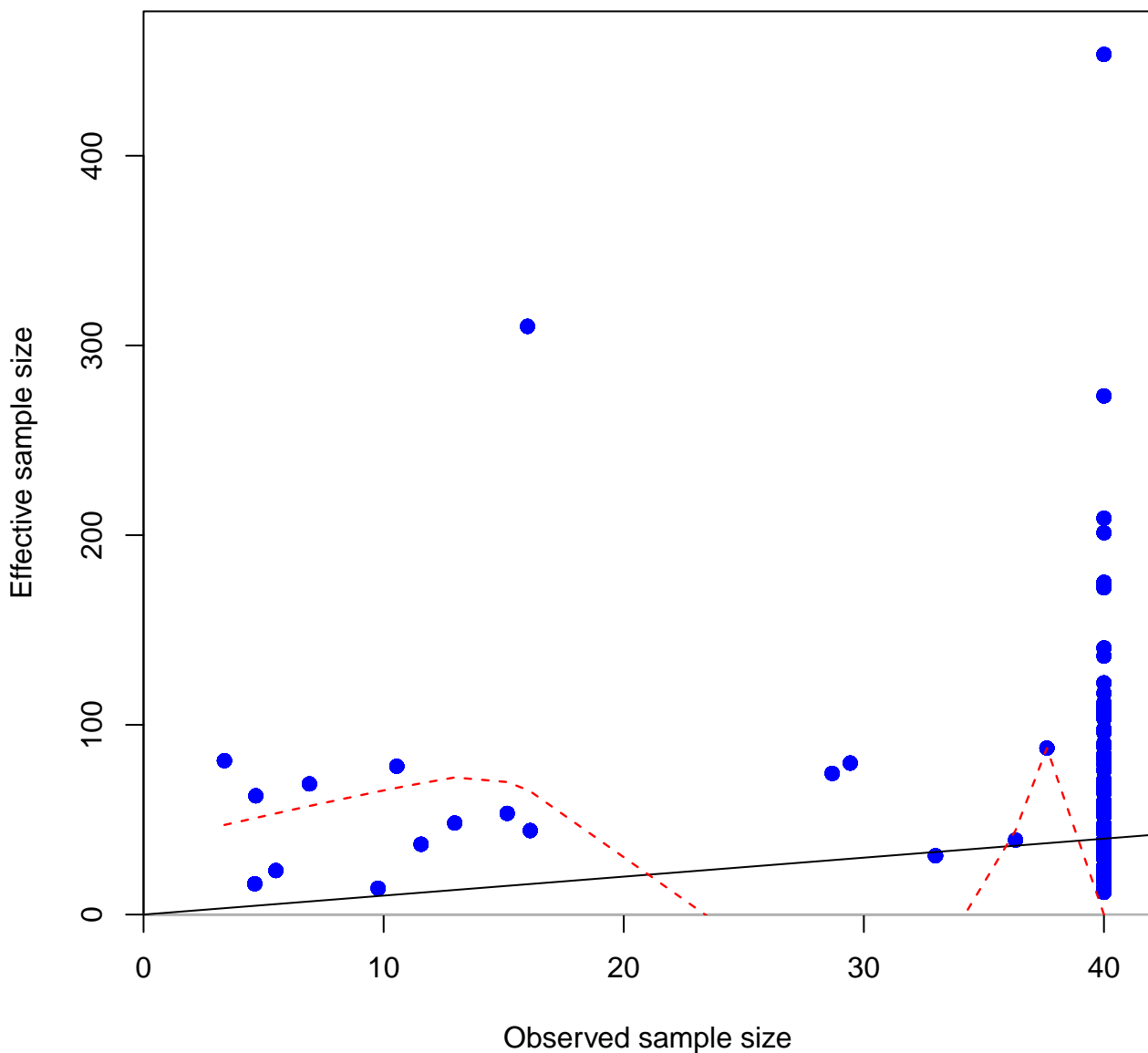
# length comps, sexes combined, whole catch, PSLS



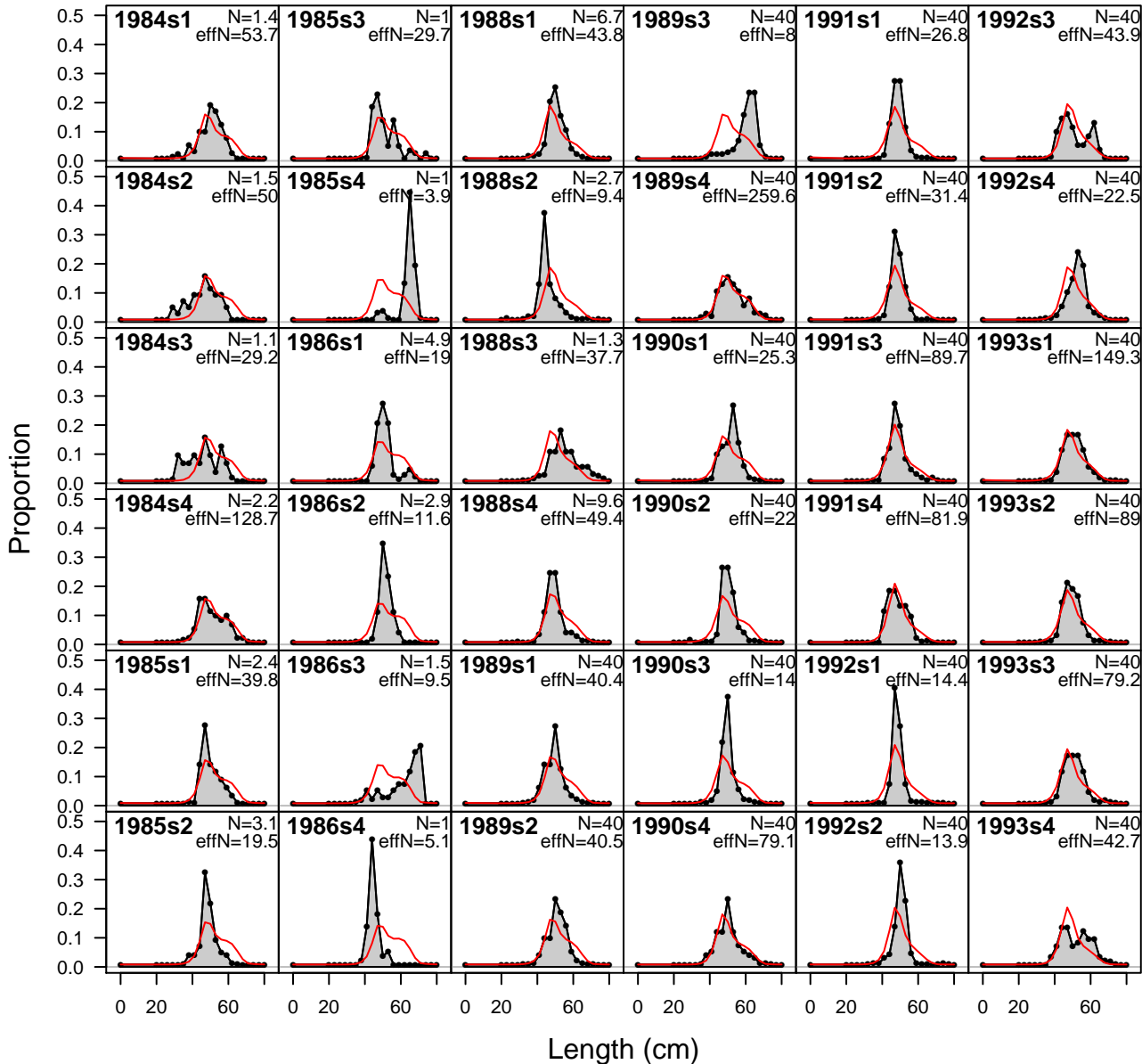
# Pearson residuals, sexes combined, whole catch, PSLS (max=4.2)



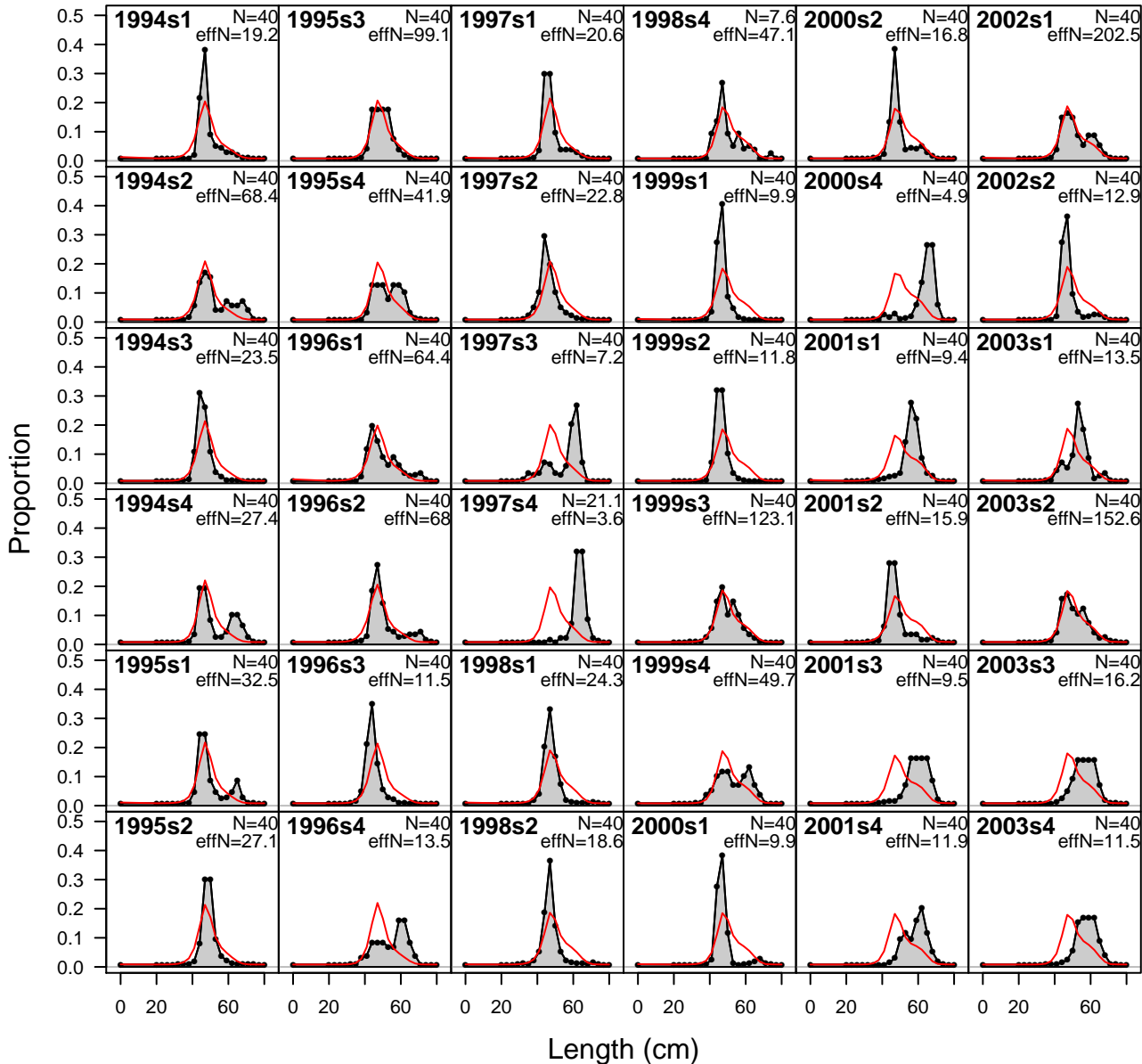
# N-EffN comparison, length comps, sexes combined, whole catch, PSLS



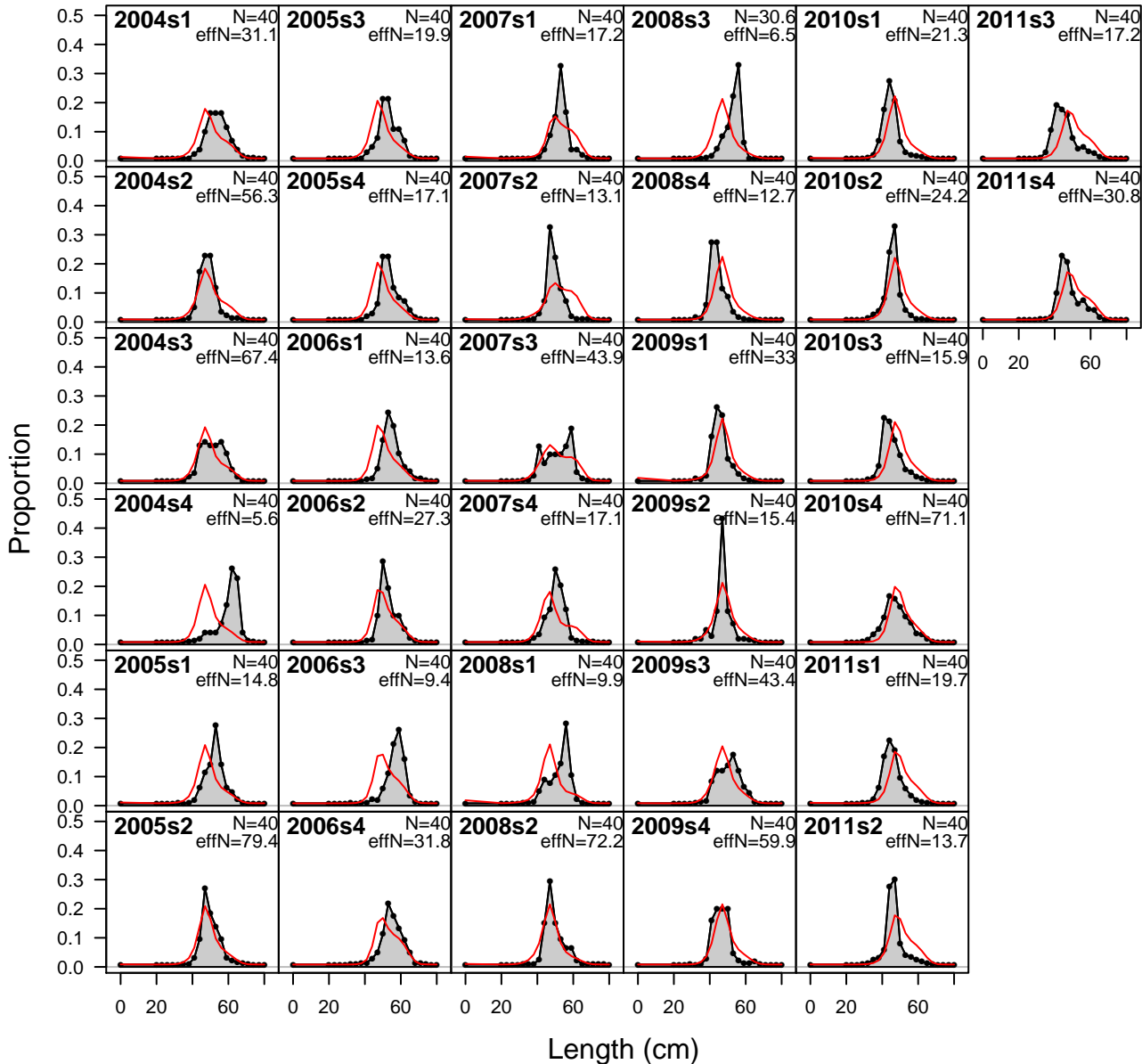
# length comps, sexes combined, whole catch, PSFS



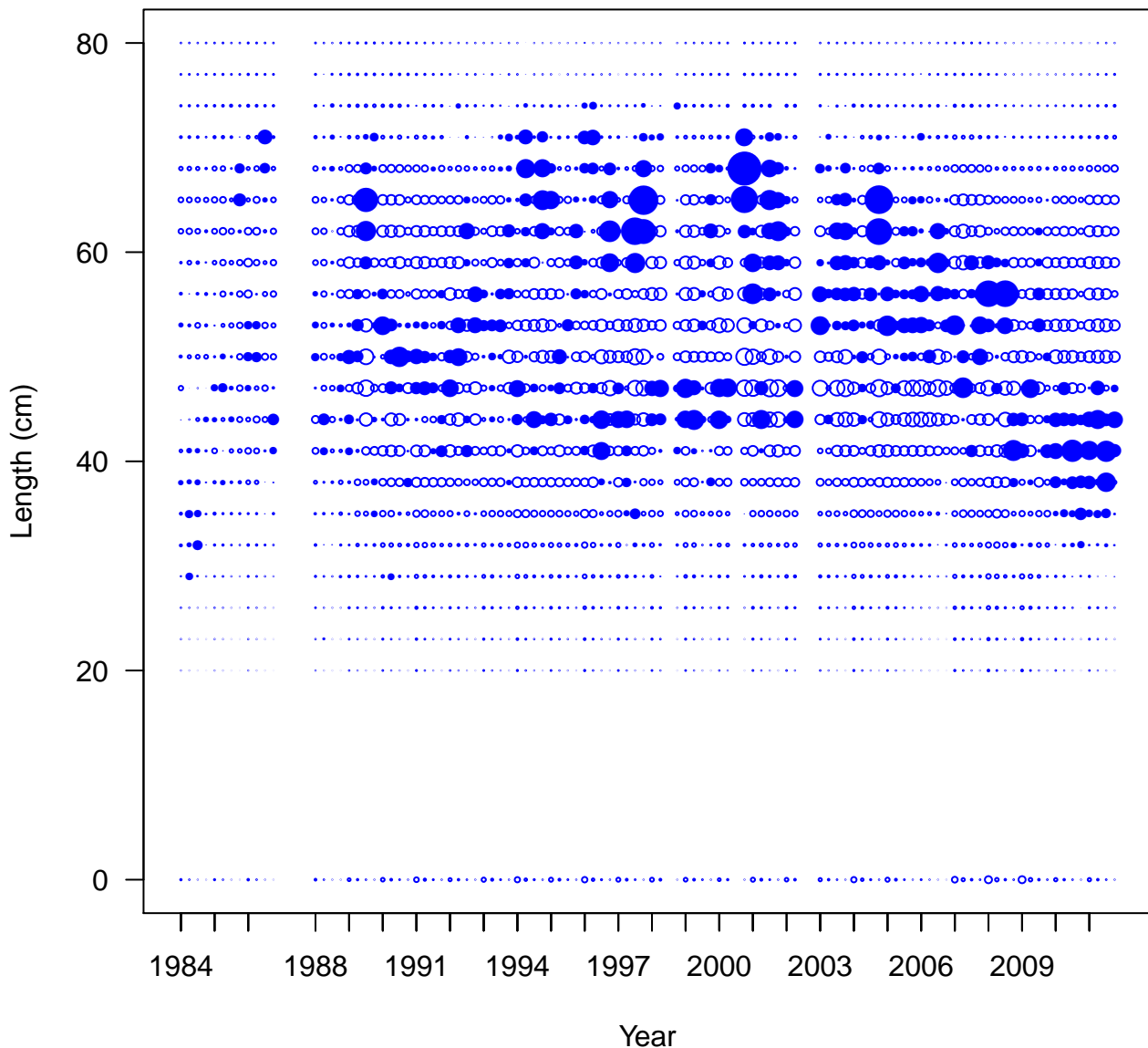
# length comps, sexes combined, whole catch, PSFS



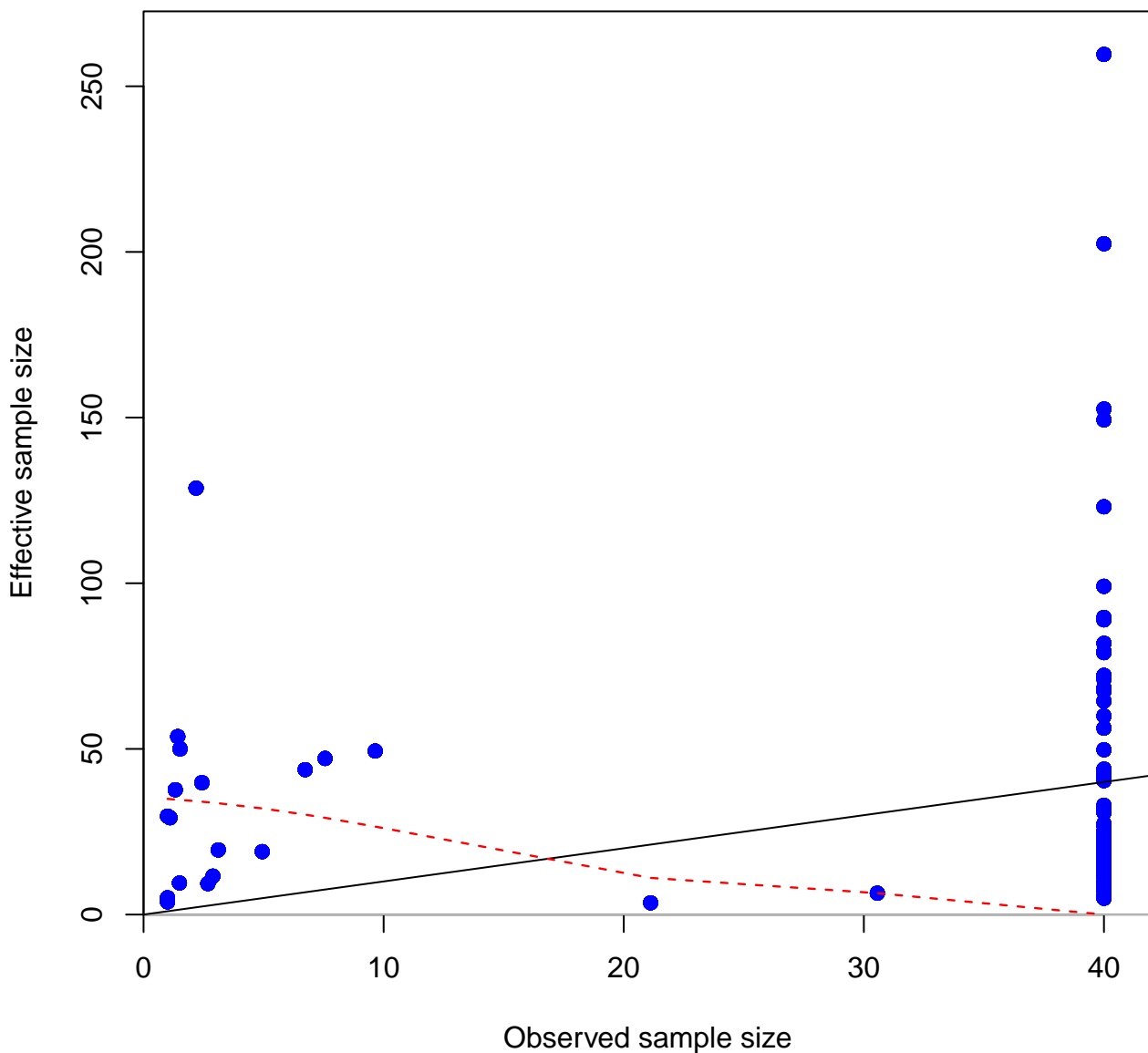
# length comps, sexes combined, whole catch, PSFS



# Pearson residuals, sexes combined, whole catch, PSFS (max=11.16)



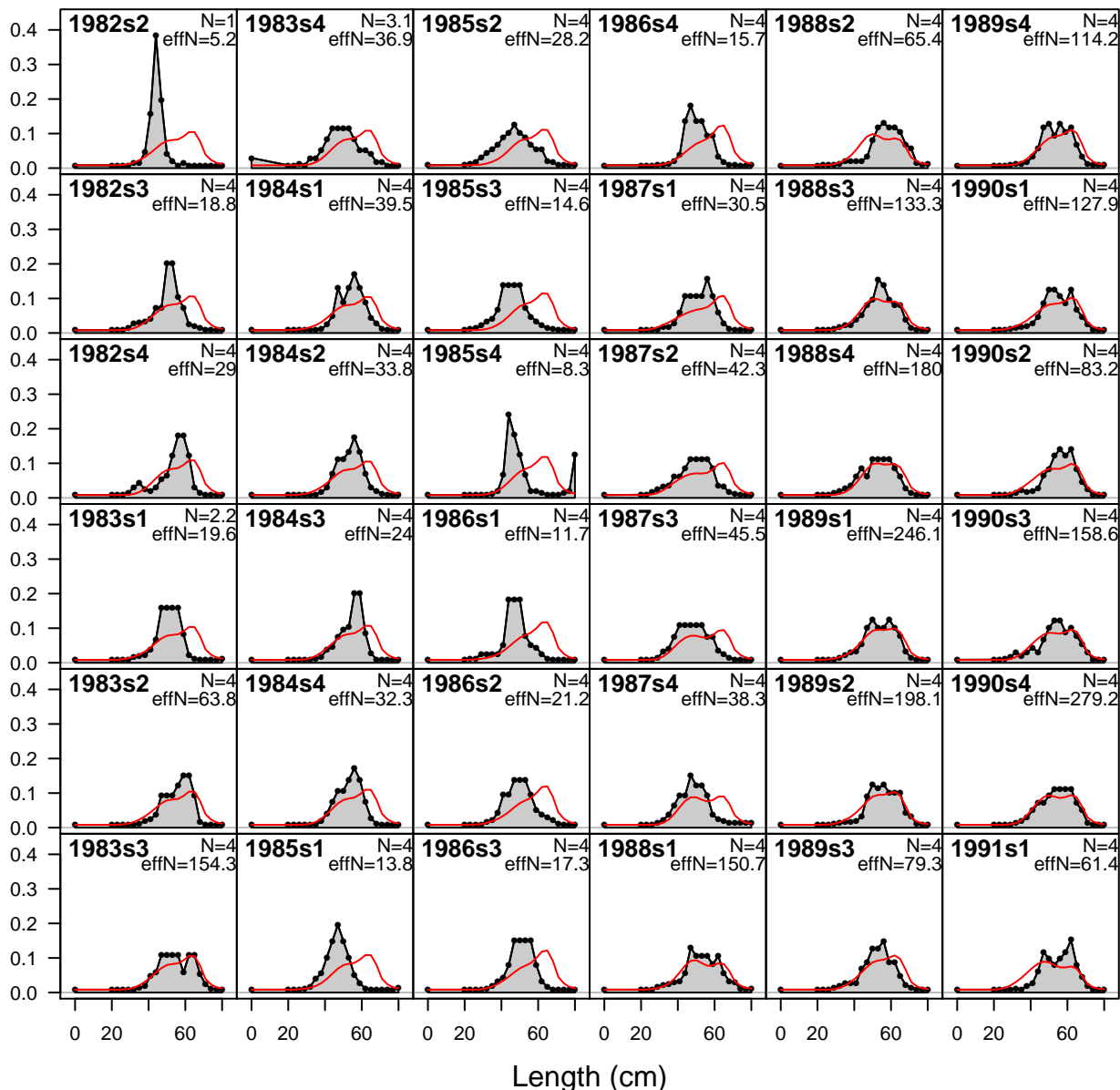
# N-EffN comparison, length comps, sexes combined, whole catch, PSFS





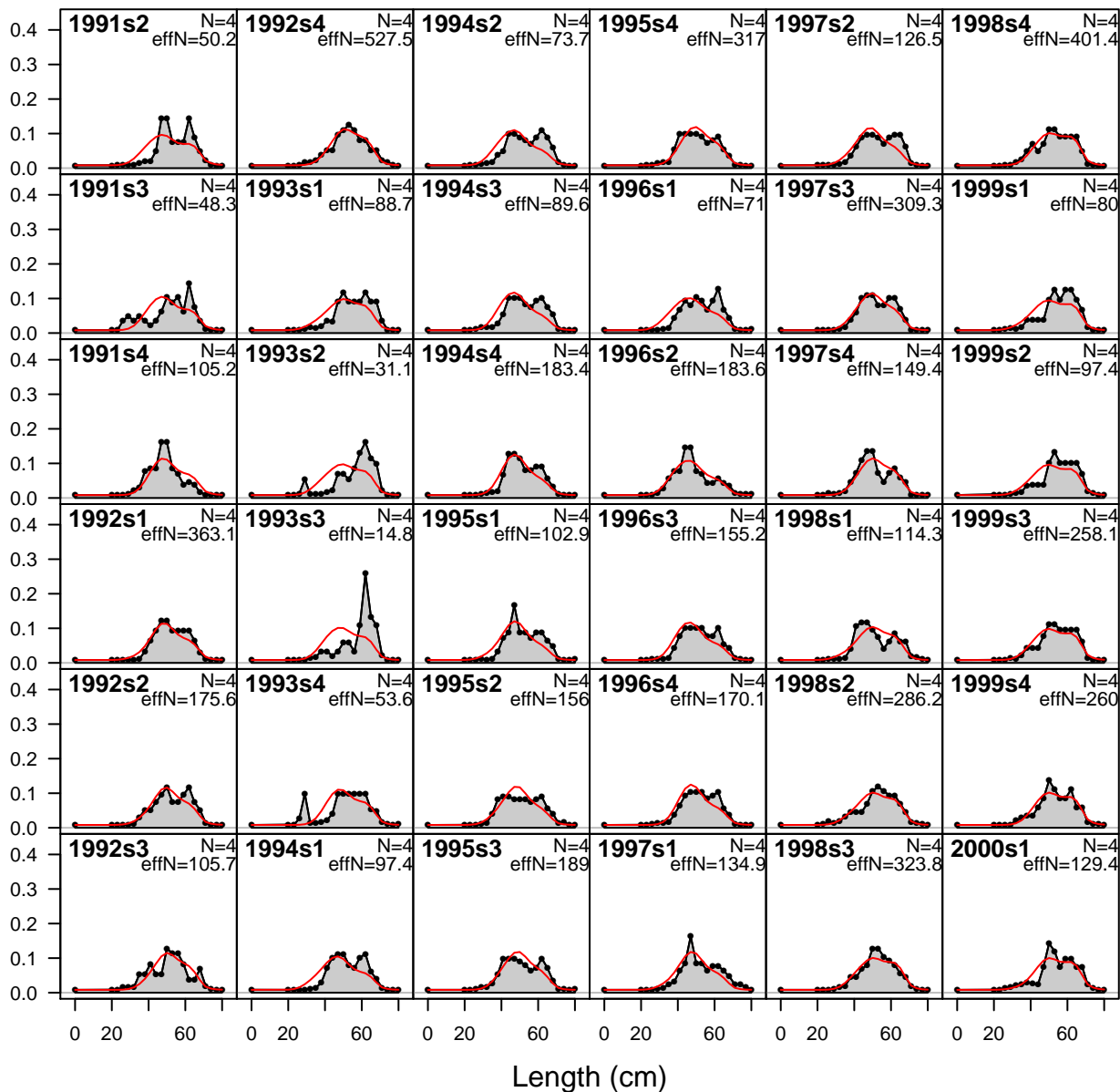
# length comps, sexes combined, whole catch, Other

Proportion



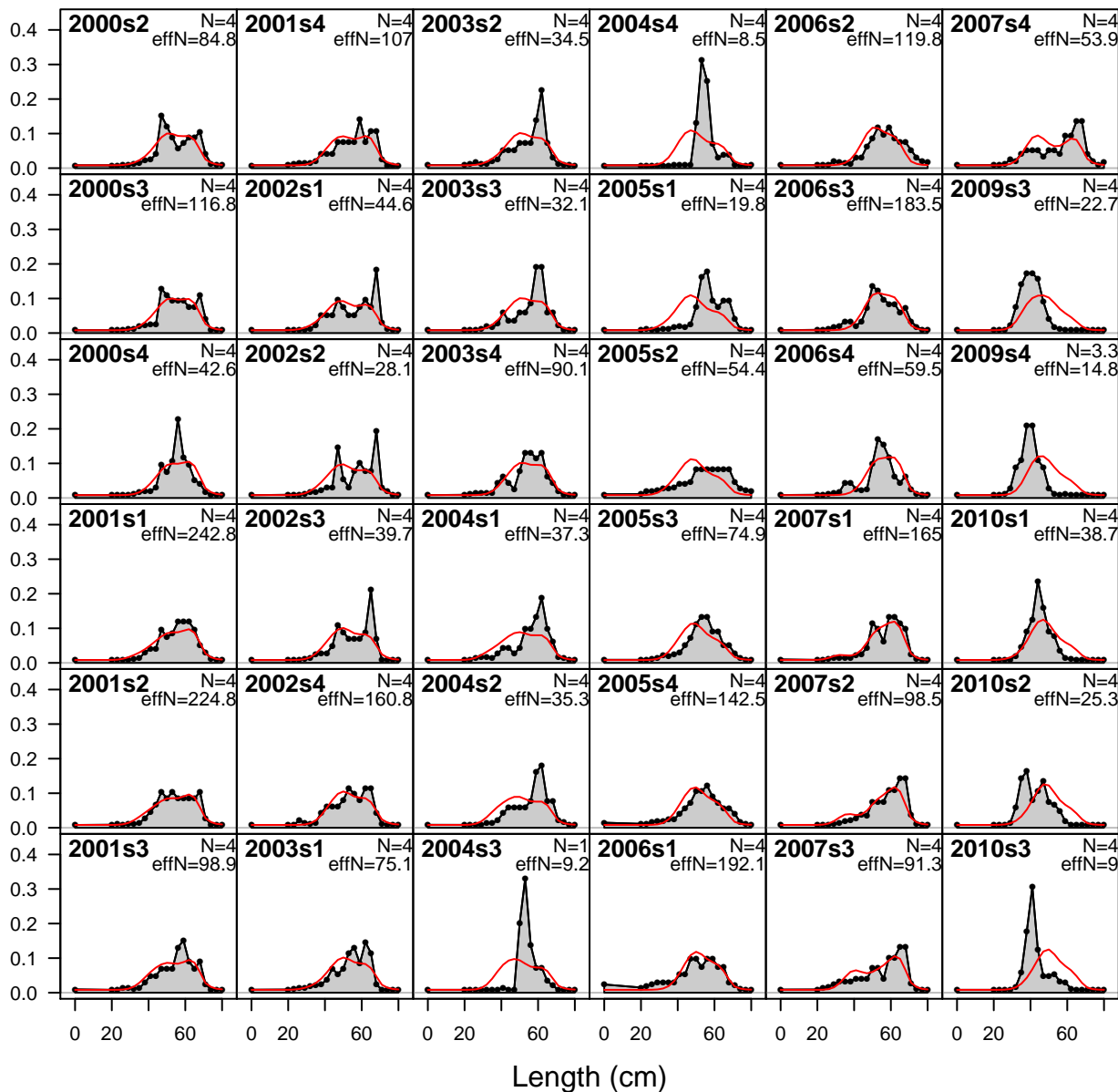
# length comps, sexes combined, whole catch, Other

Proportion

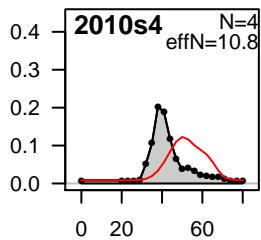


# length comps, sexes combined, whole catch, Other

Proportion



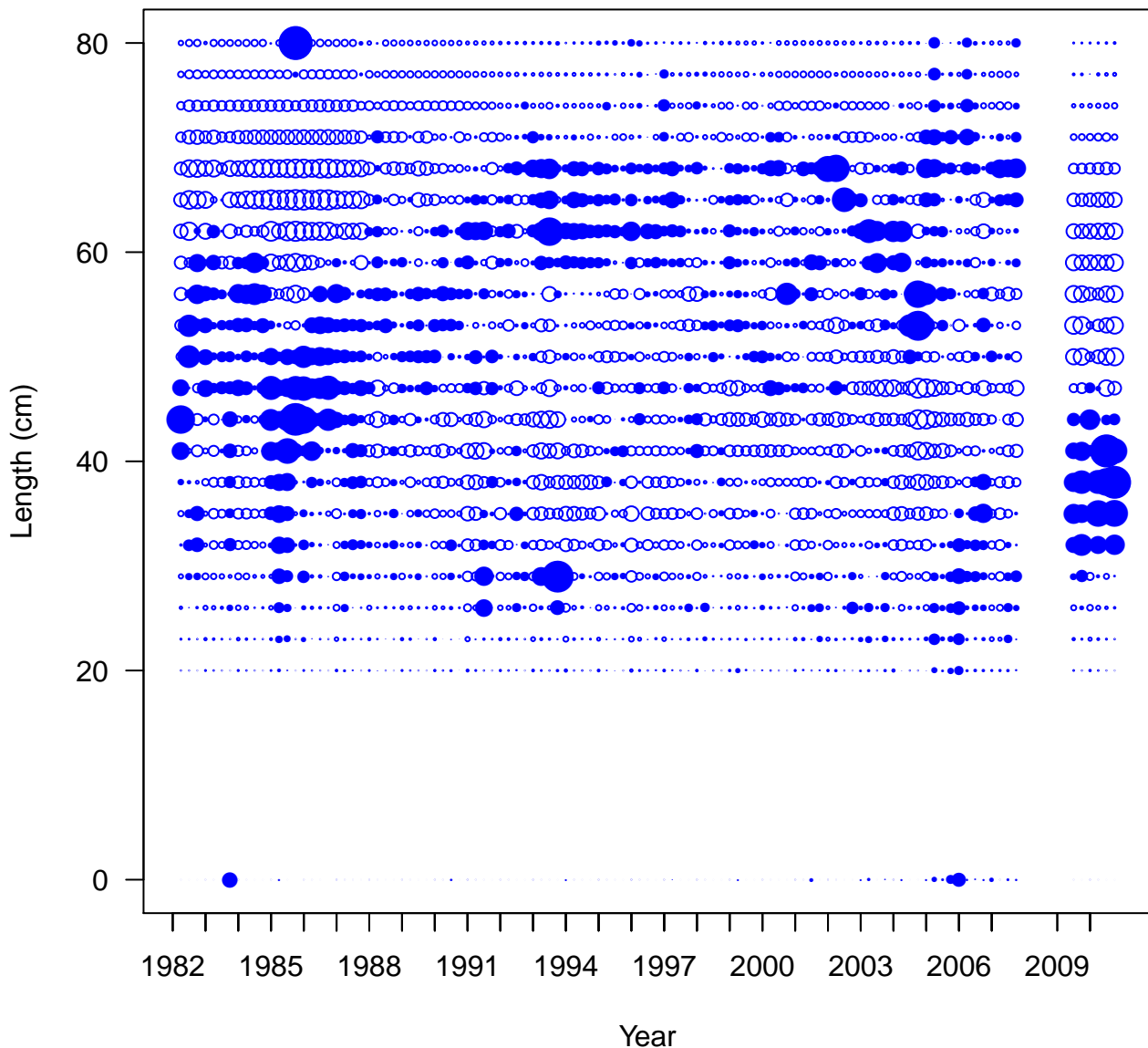
# length comps, sexes combined, whole catch, Other



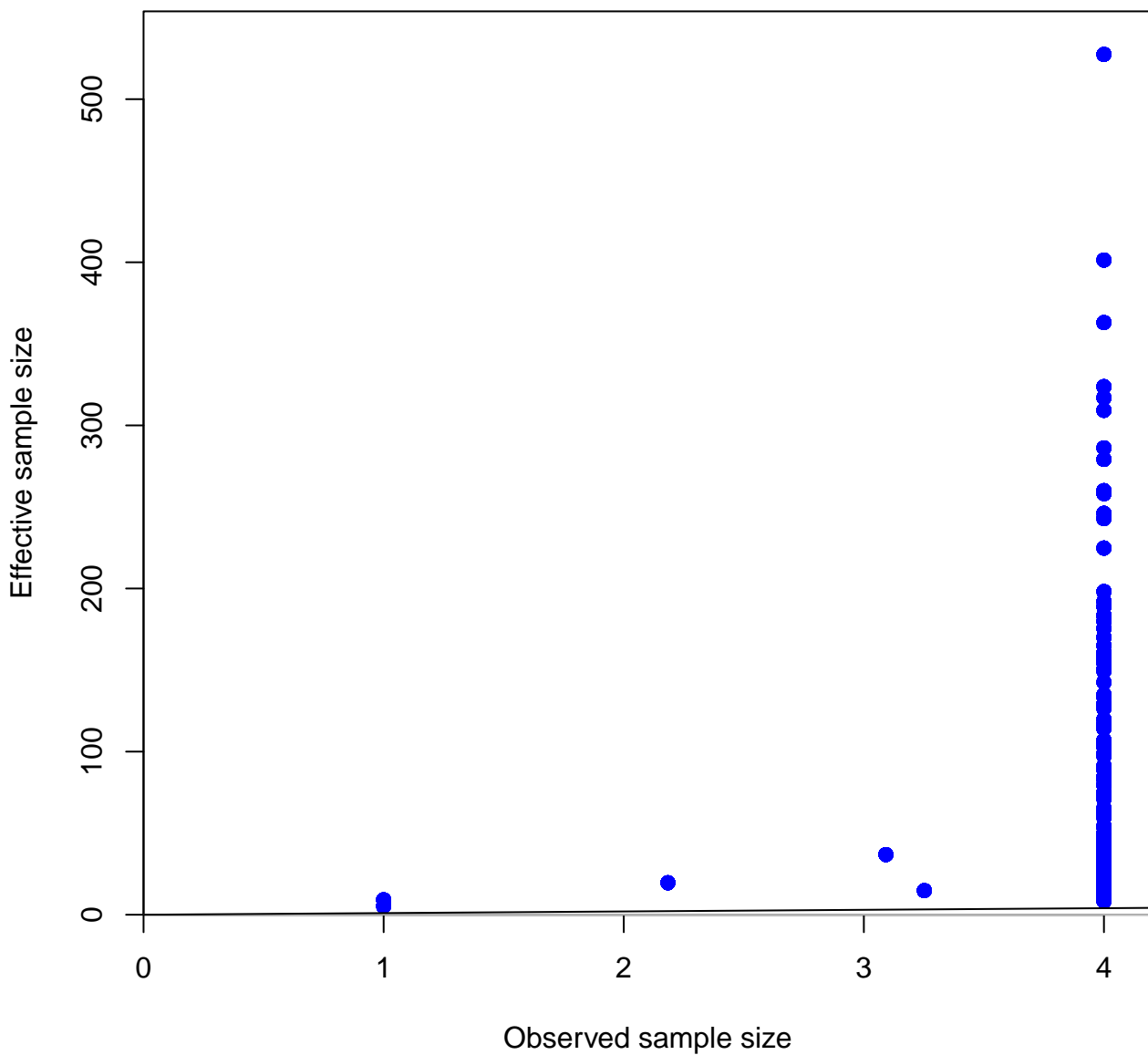
Proportion

Length (cm)

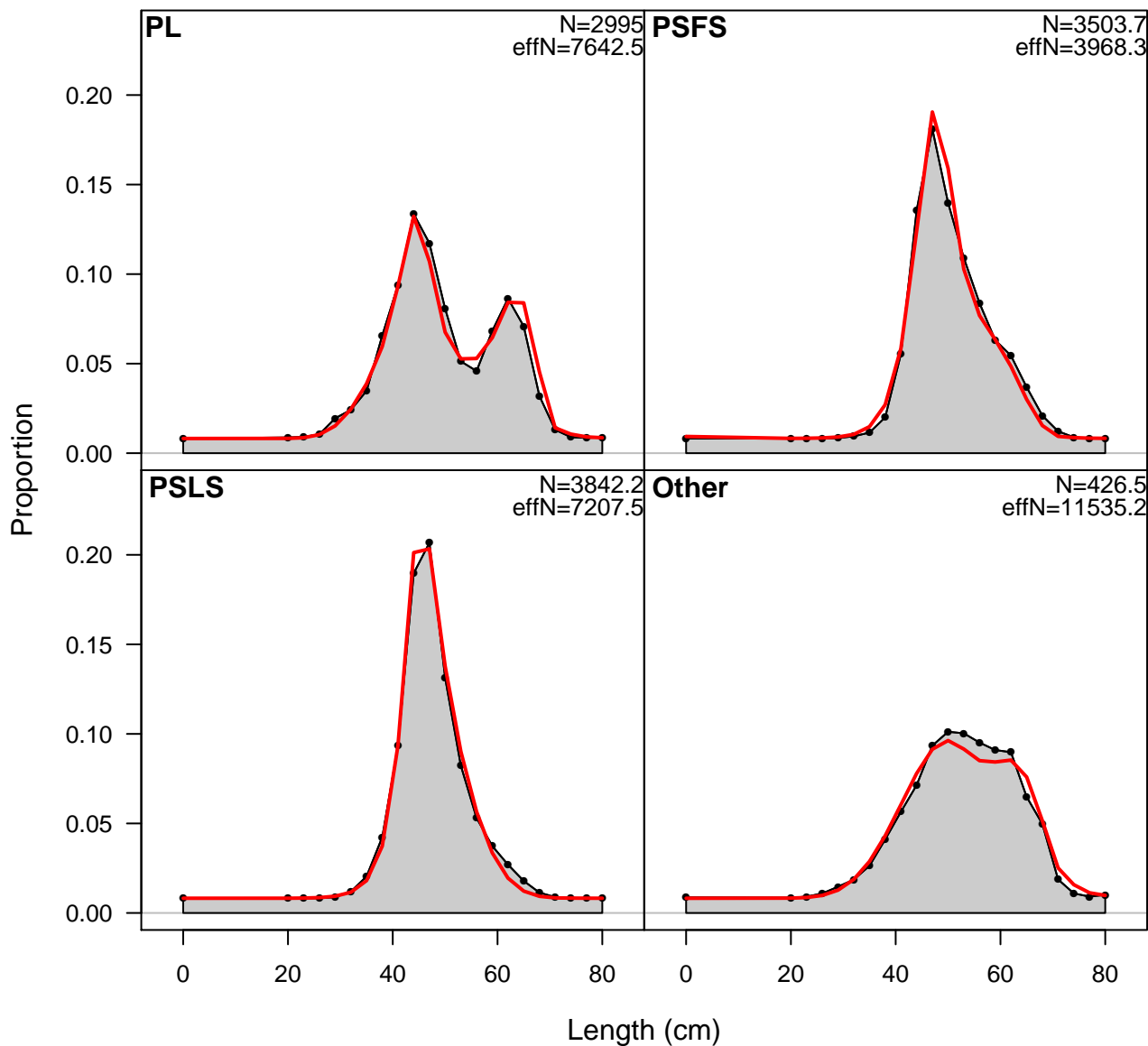
# Pearson residuals, sexes combined, whole catch, Other (max=2)



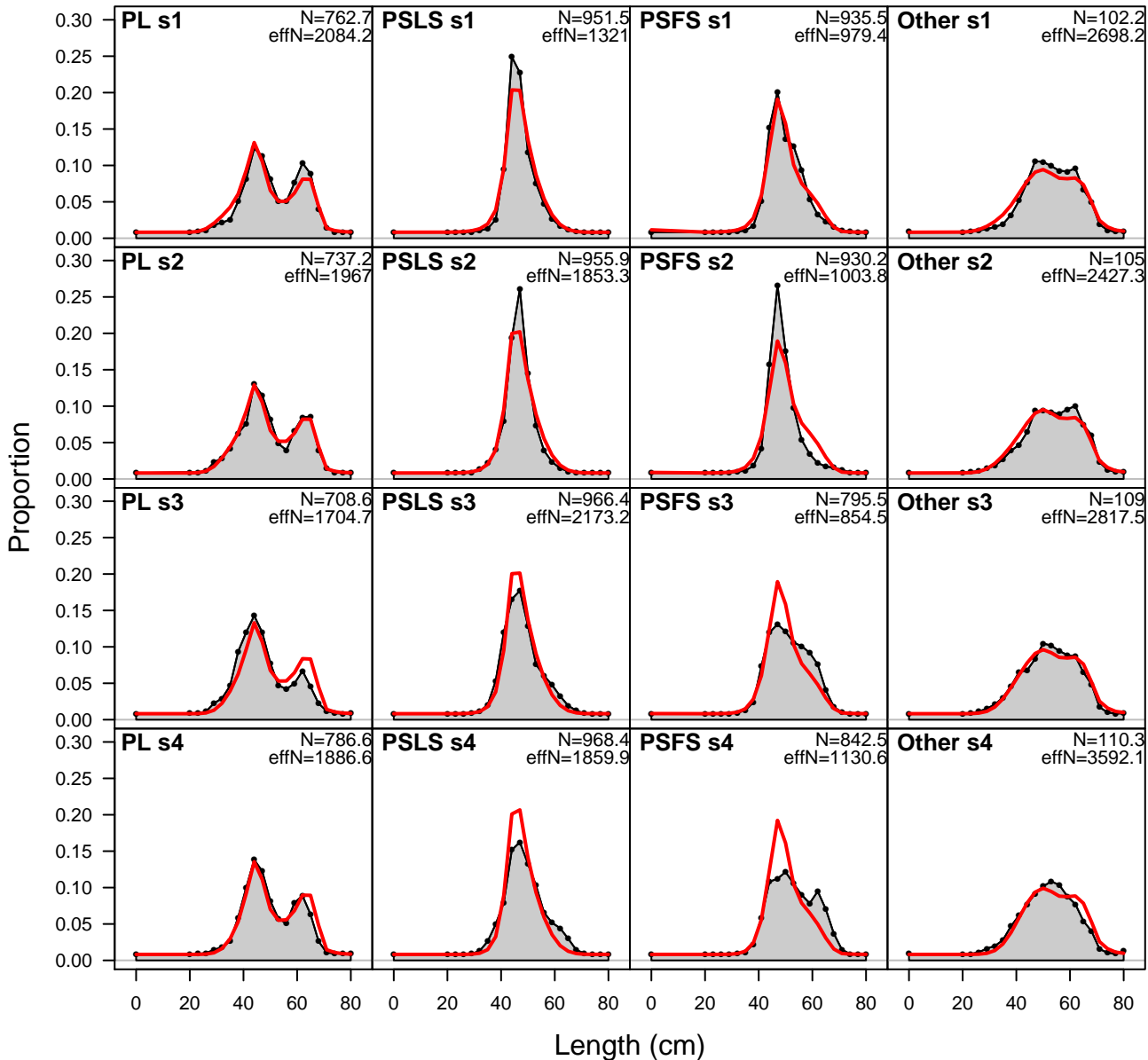
# N-EffN comparison, length comps, sexes combined, whole catch, Other



length comps, sexes combined, whole catch, aggregated across time by fleet

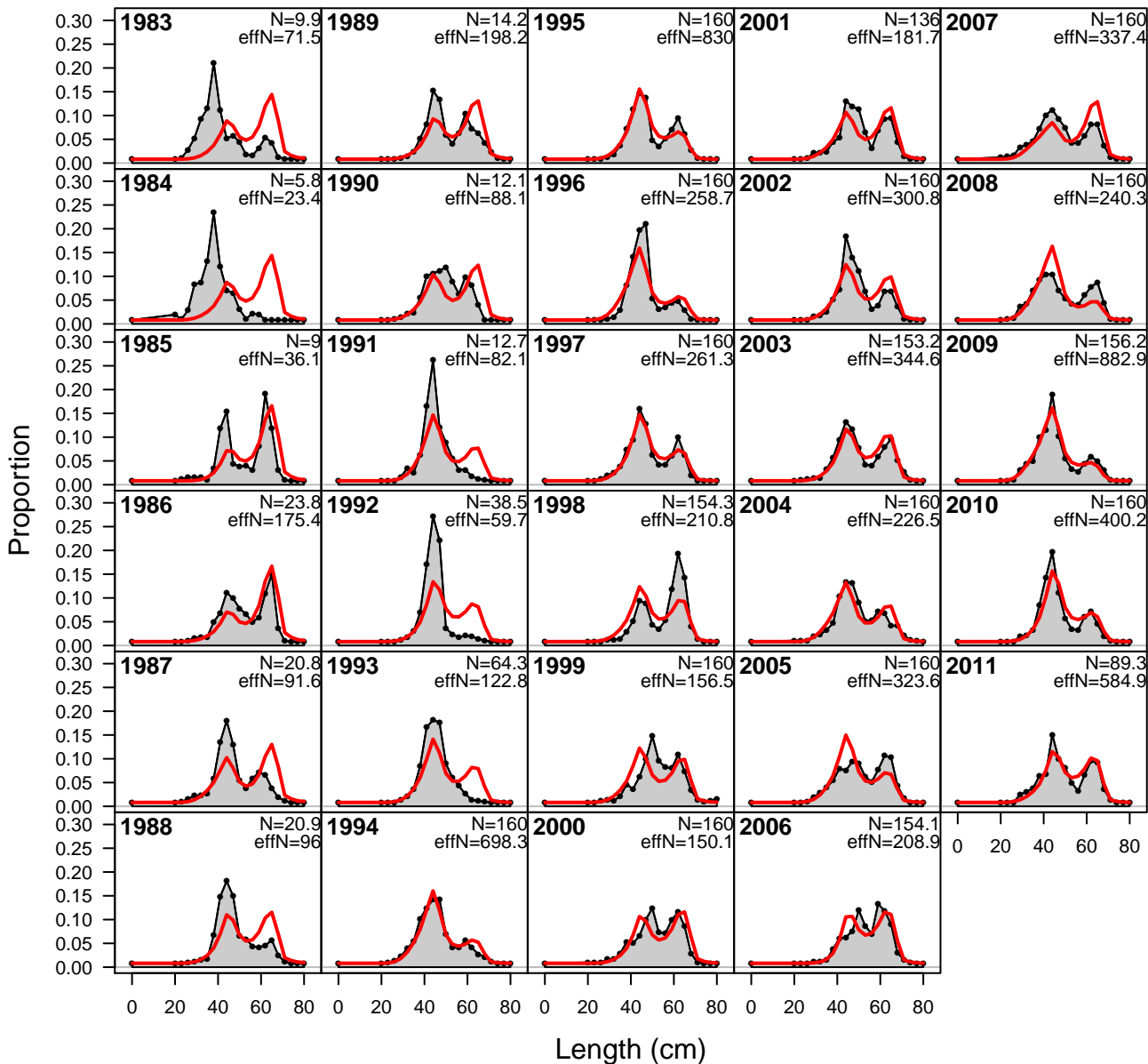


length comps, sexes combined, whole catch,  
aggregated within season by fleet

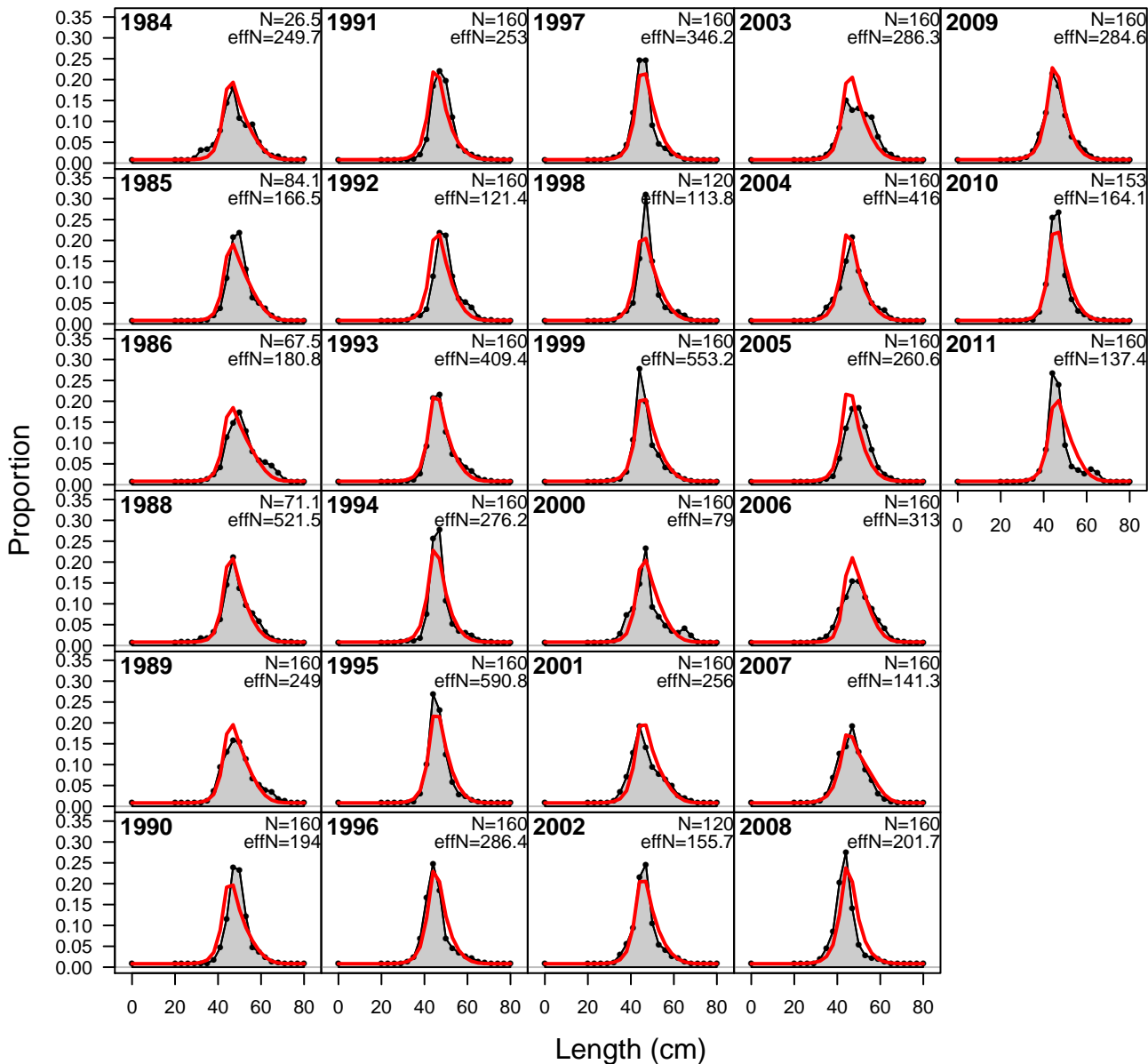




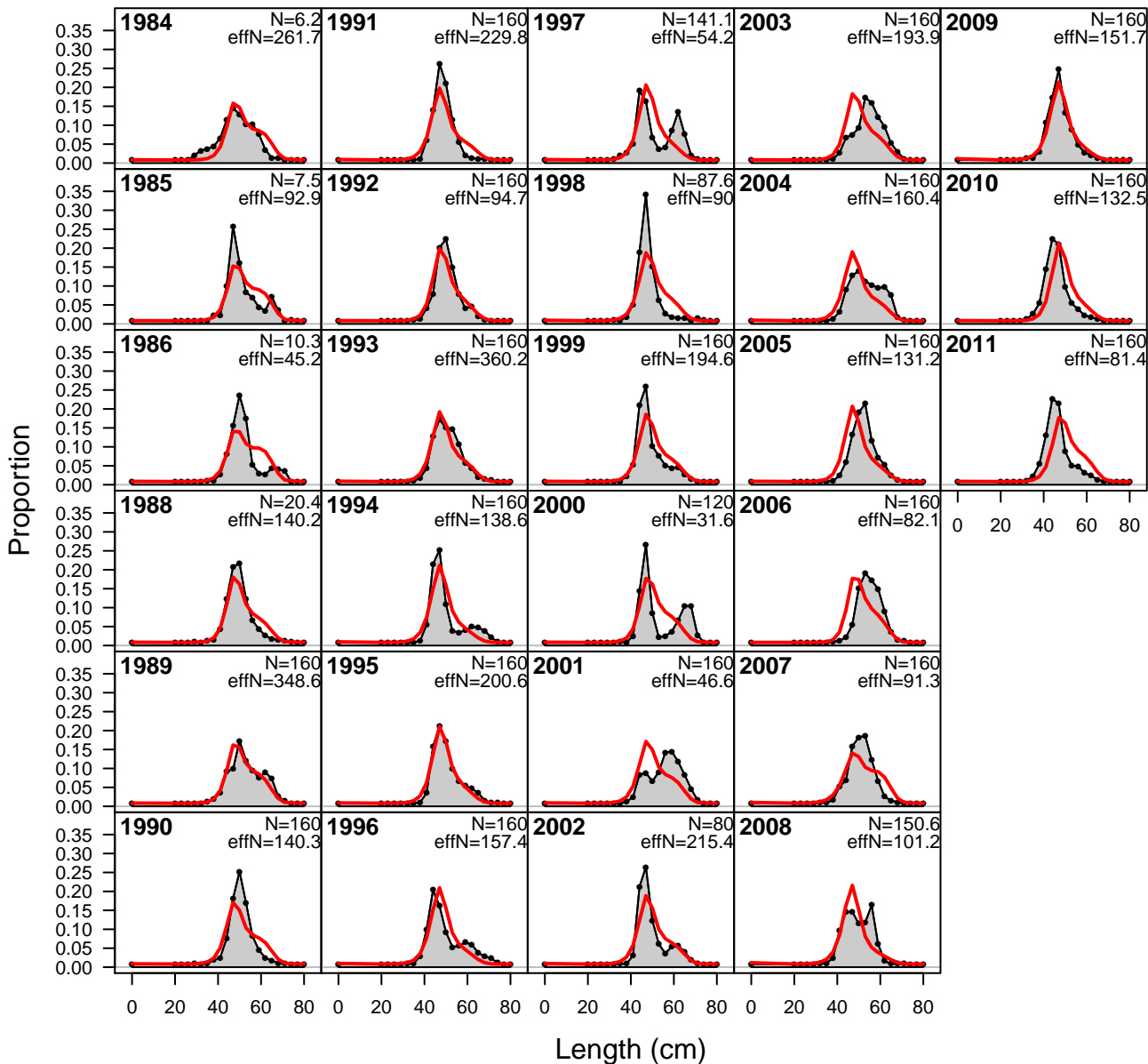
length comps, sexes combined, whole catch, PL  
aggregated across seasons within year



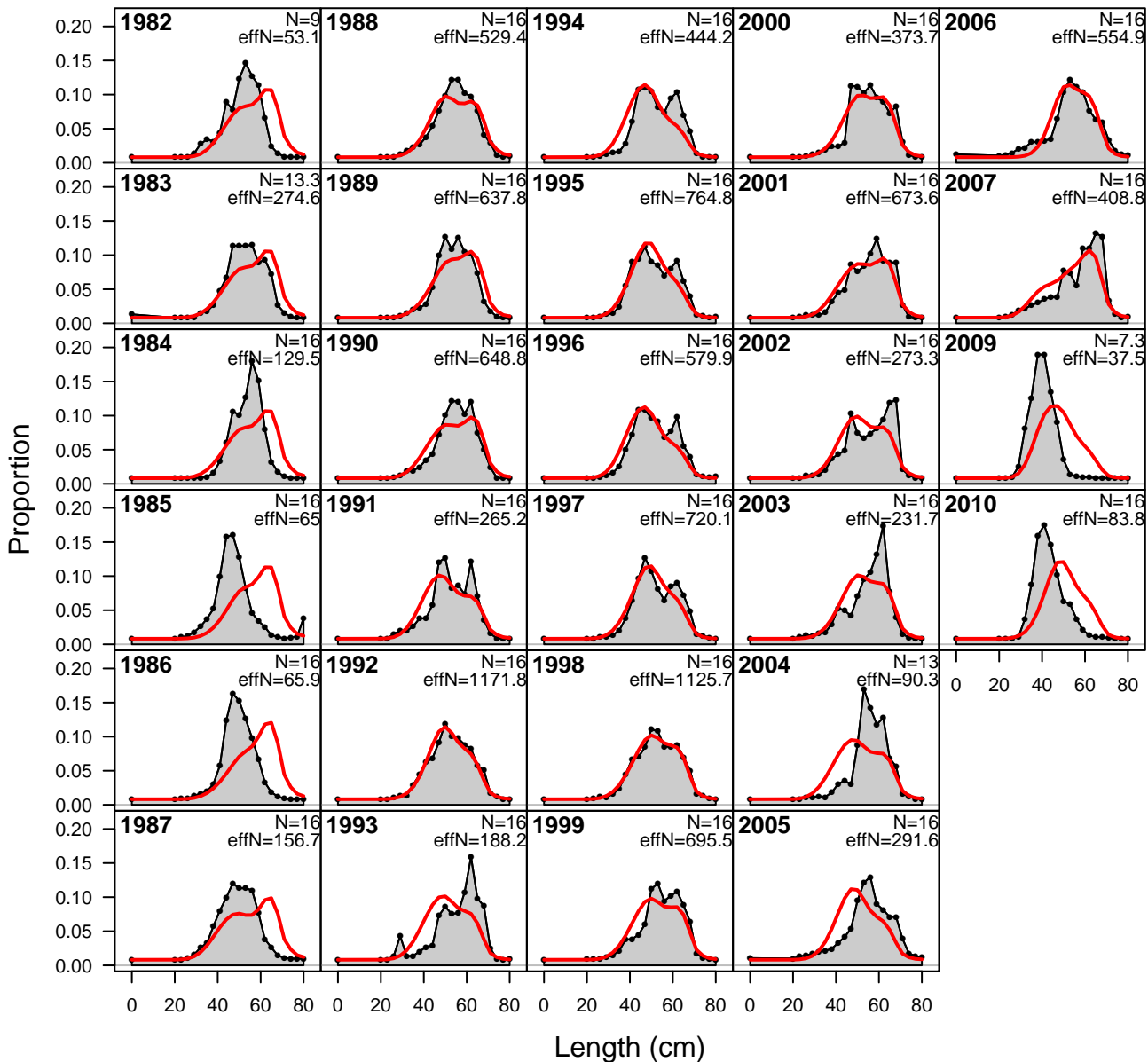
length comps, sexes combined, whole catch, PSLS  
aggregated across seasons within year



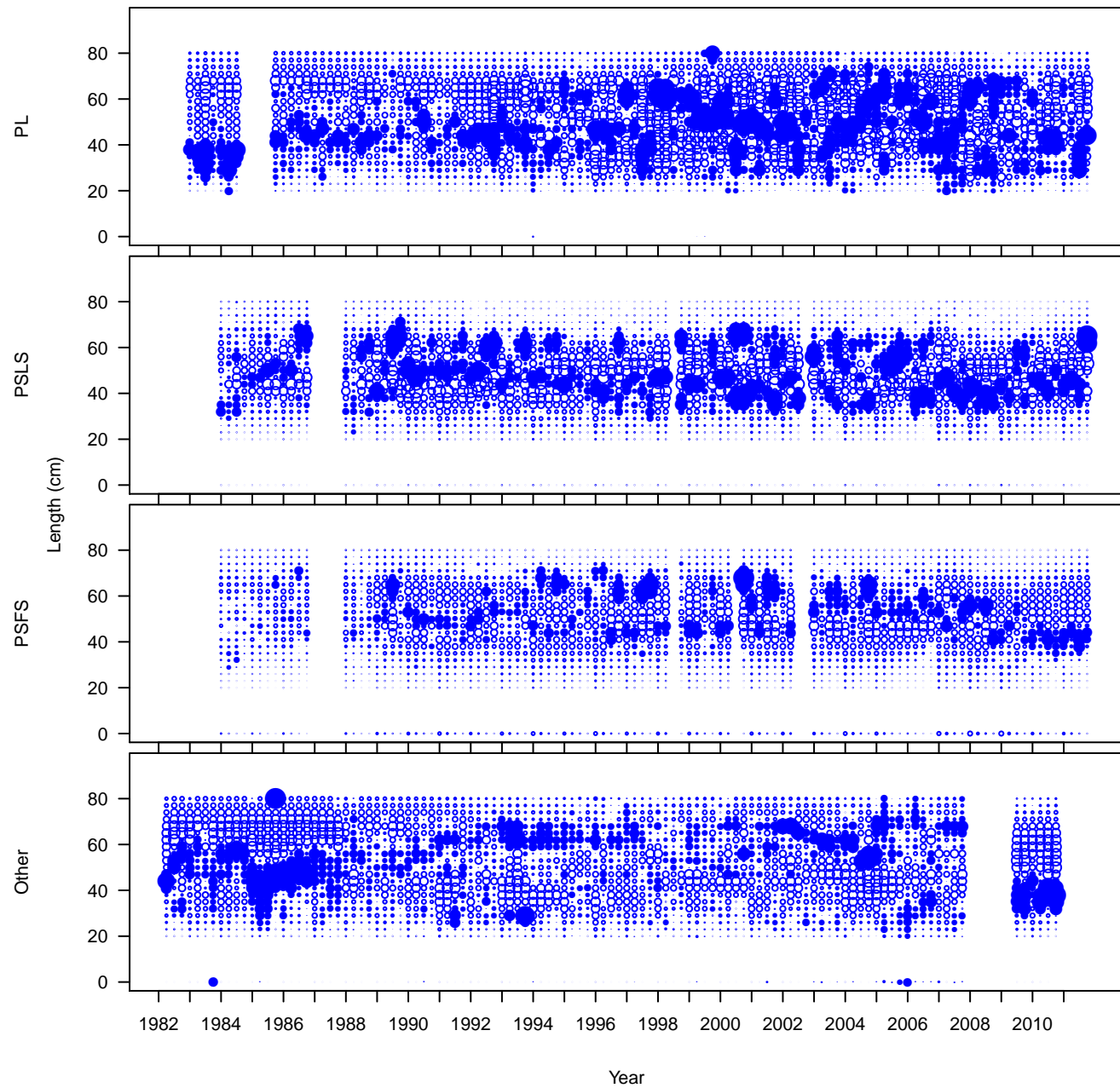
length comps, sexes combined, whole catch, PSFS  
aggregated across seasons within year



length comps, sexes combined, whole catch, Other  
aggregated across seasons within year

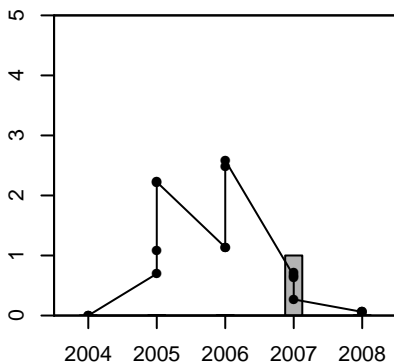


Pearson residuals, sexes combined, whole catch, comparing across fleets

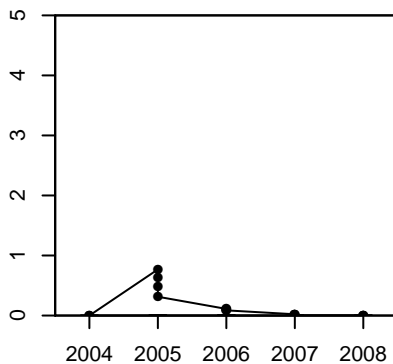


# Fit to tag recaptures by tag group

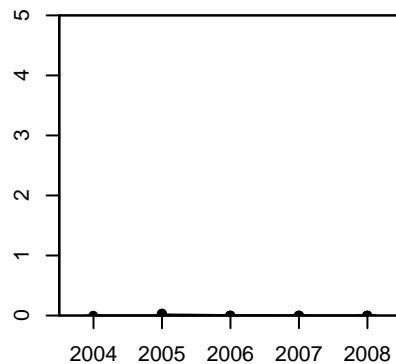
TG 1



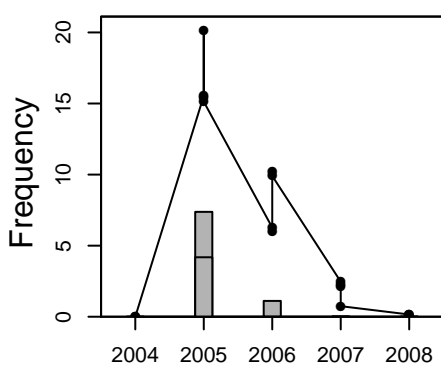
TG 4



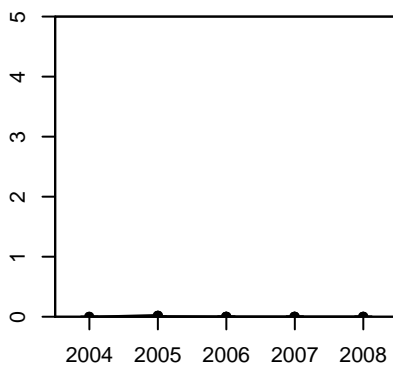
TG 7



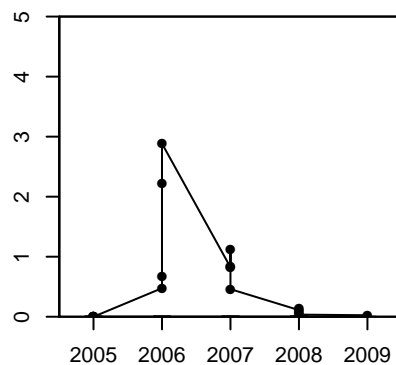
TG 2



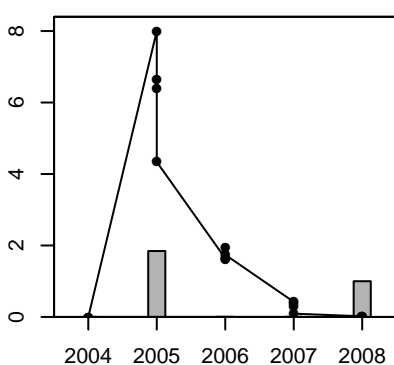
TG 5



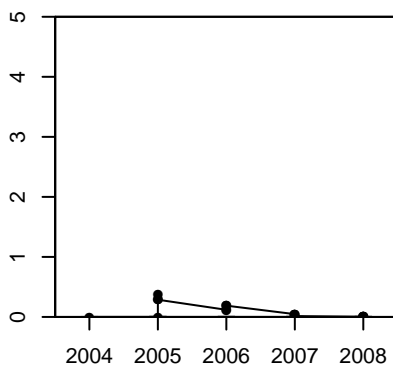
TG 8



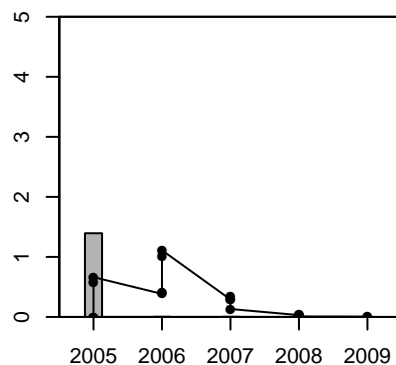
TG 3



TG 6



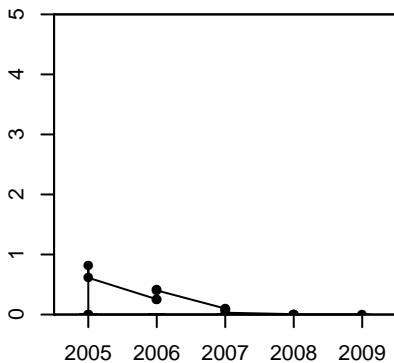
TG 9



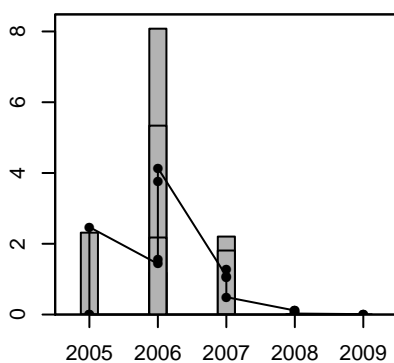
Year

# Fit to tag recaptures by tag group

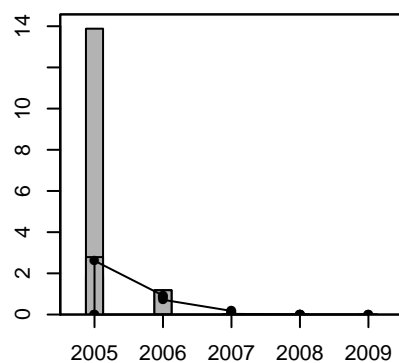
**TG 10**



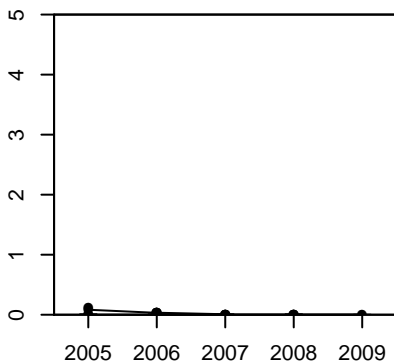
**TG 13**



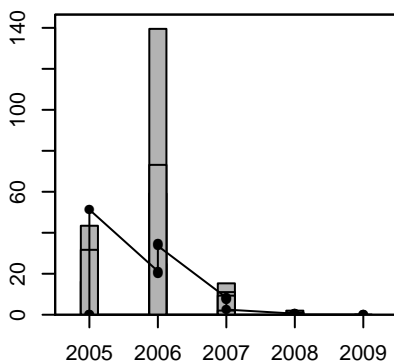
**TG 16**



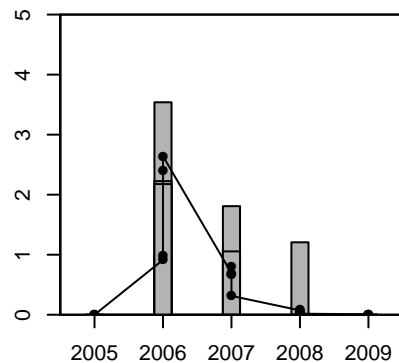
**TG 11**



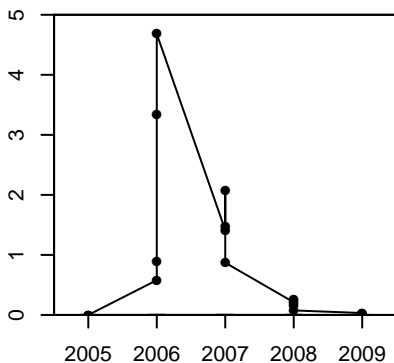
**TG 14**



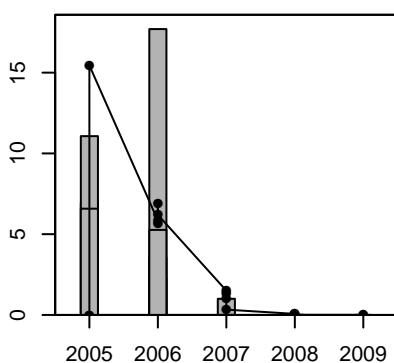
**TG 17**



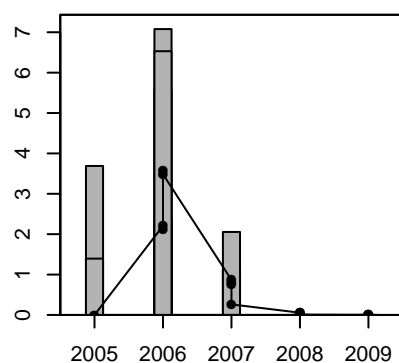
**TG 12**



**TG 15**



**TG 18**

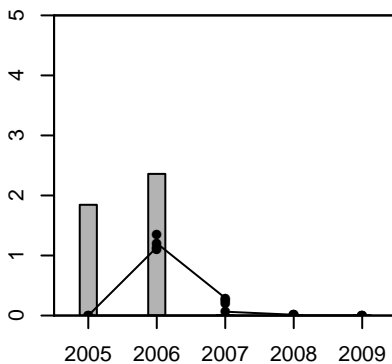


Frequency

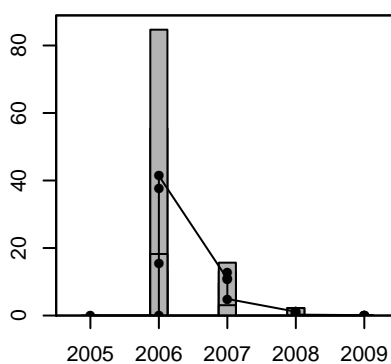
Year

# Fit to tag recaptures by tag group

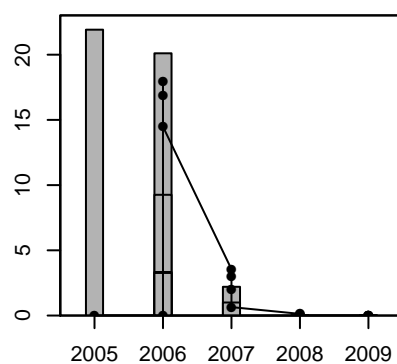
TG 19



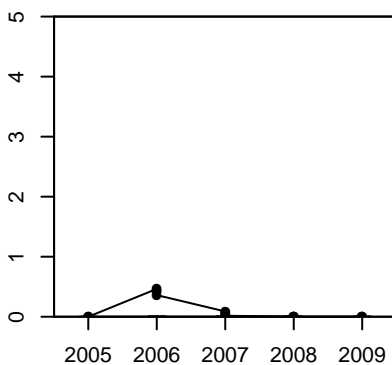
TG 22



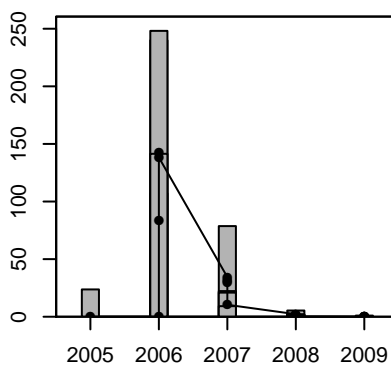
TG 25



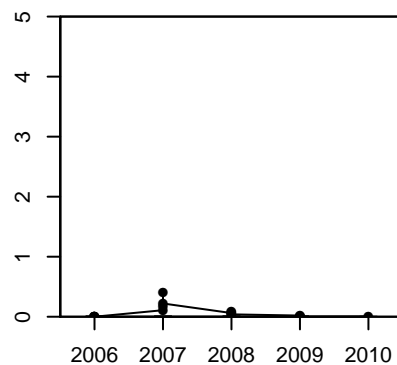
TG 20



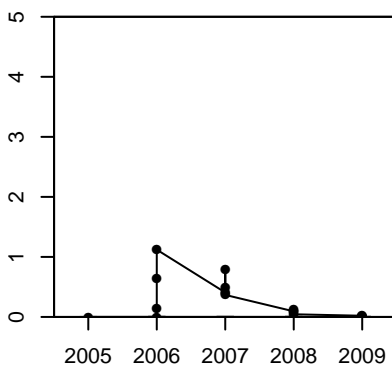
TG 23



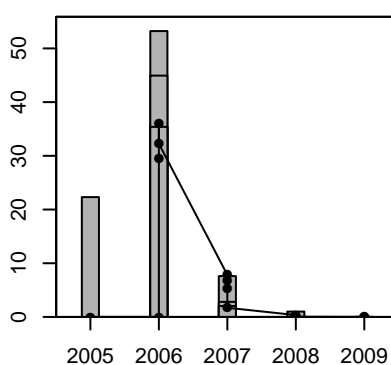
TG 26



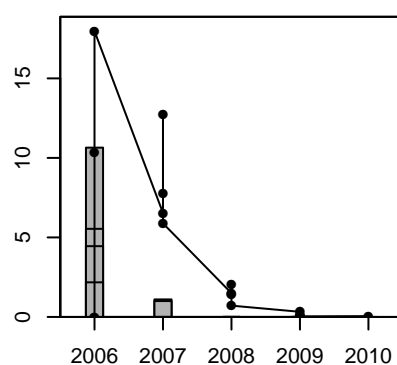
TG 21



TG 24



TG 27



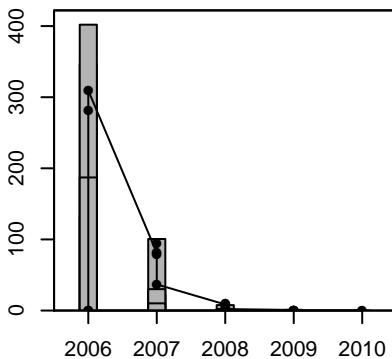
Frequency

Year

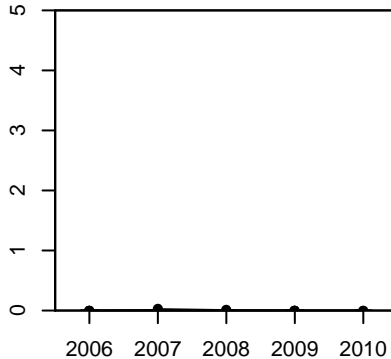


# Fit to tag recaptures by tag group

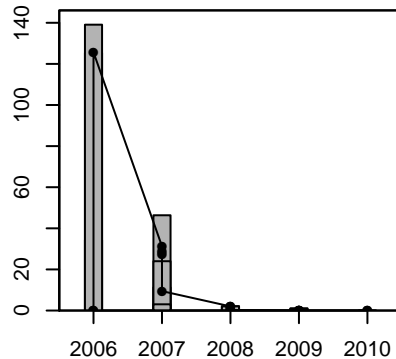
**TG 28**



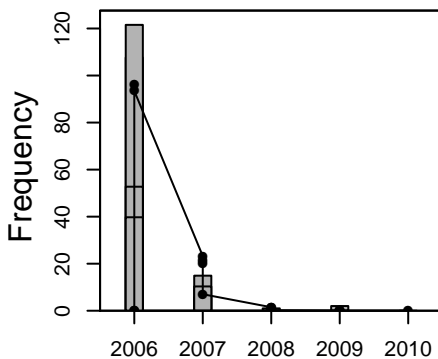
**TG 31**



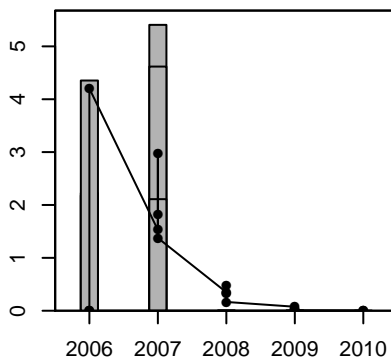
**TG 34**



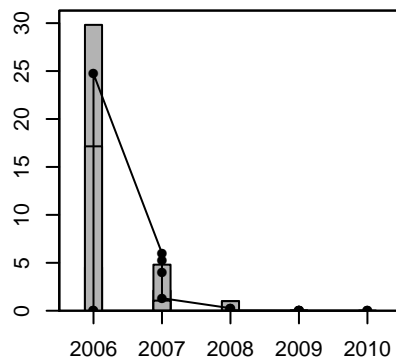
**TG 29**



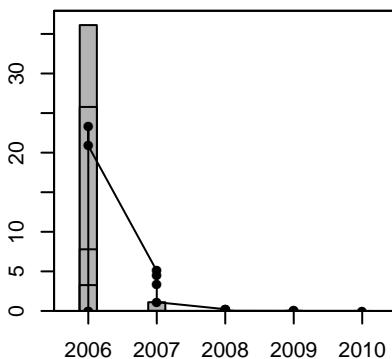
**TG 32**



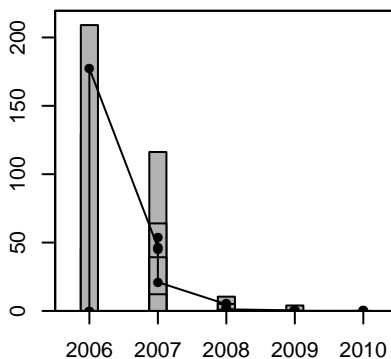
**TG 35**



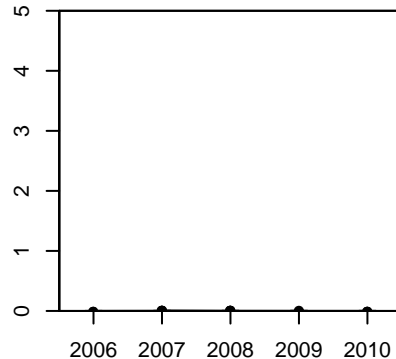
**TG 30**



**TG 33**

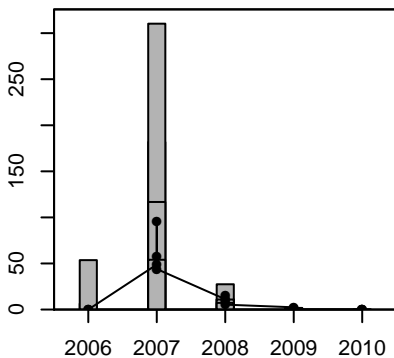


**TG 36**

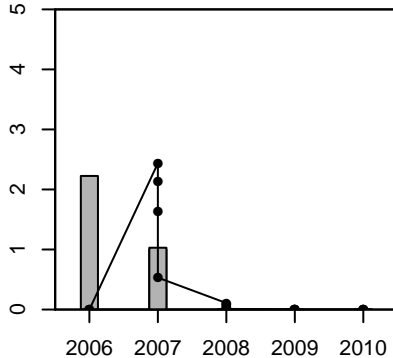


# Fit to tag recaptures by tag group

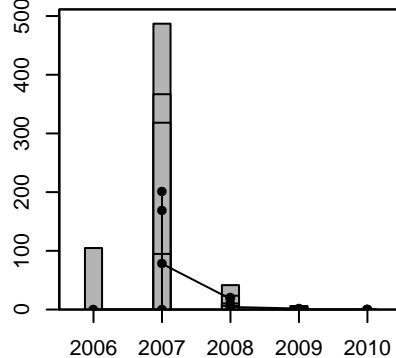
TG 37



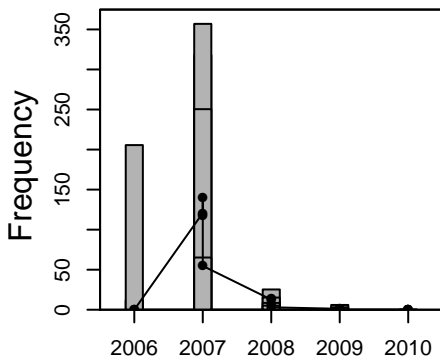
TG 40



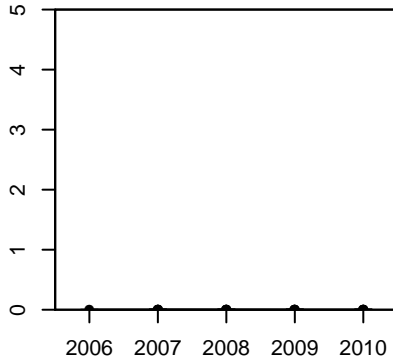
TG 43



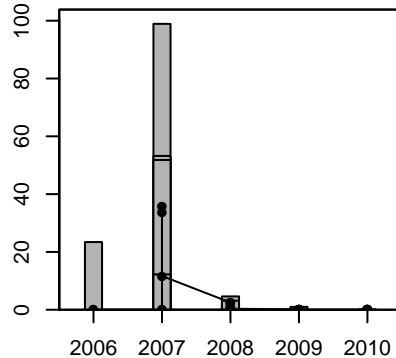
TG 38



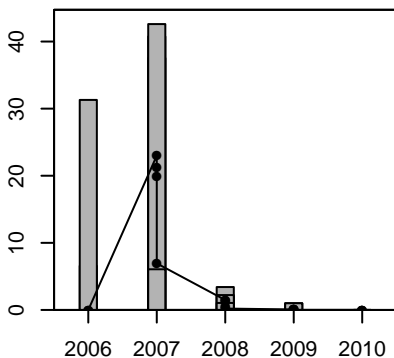
TG 41



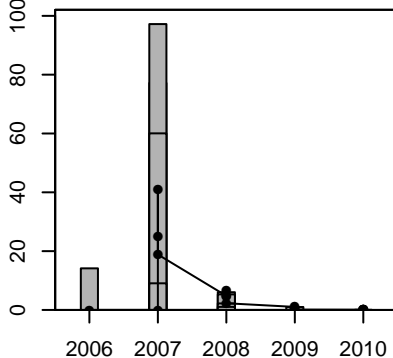
TG 44



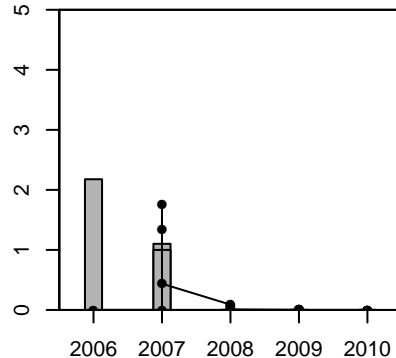
TG 39



TG 42

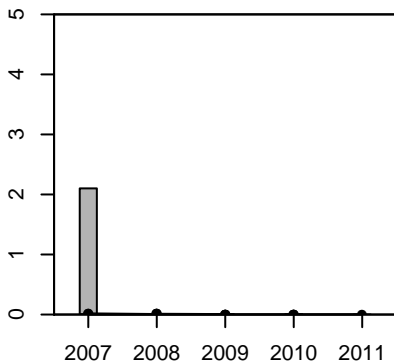


TG 45

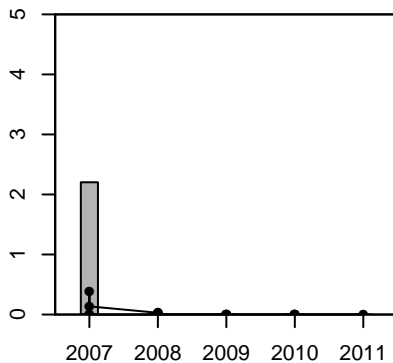


# Fit to tag recaptures by tag group

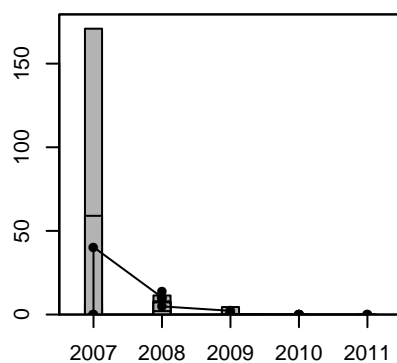
**TG 46**



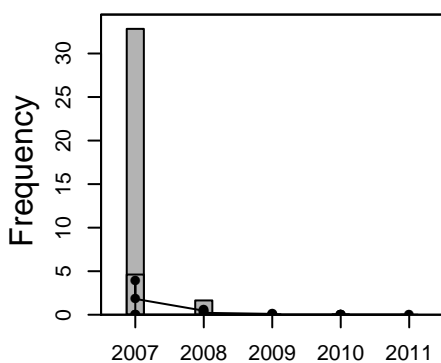
**TG 49**



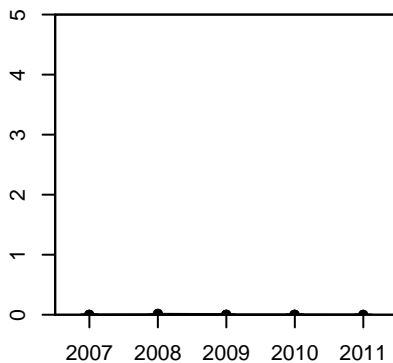
**TG 52**



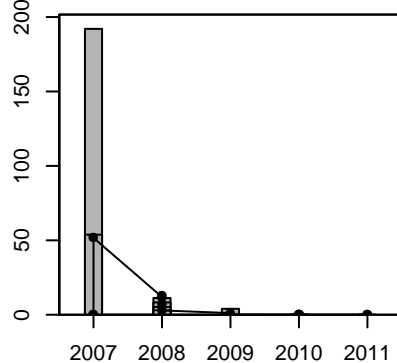
**TG 47**



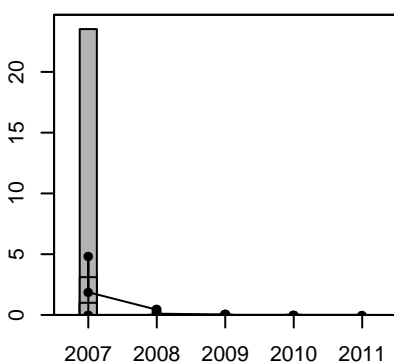
**TG 50**



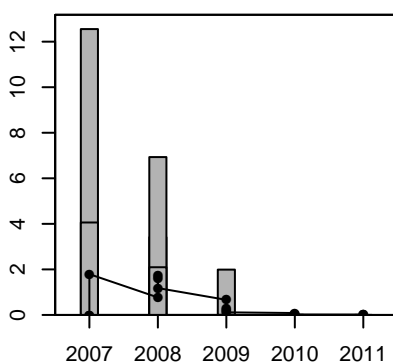
**TG 53**



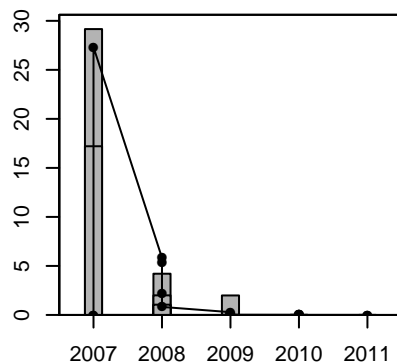
**TG 48**



**TG 51**



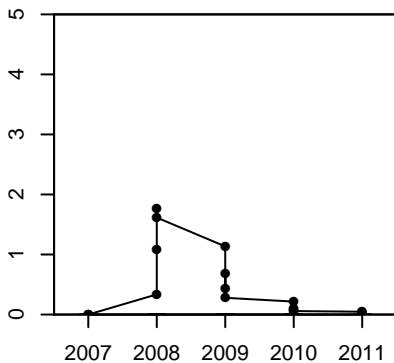
**TG 54**



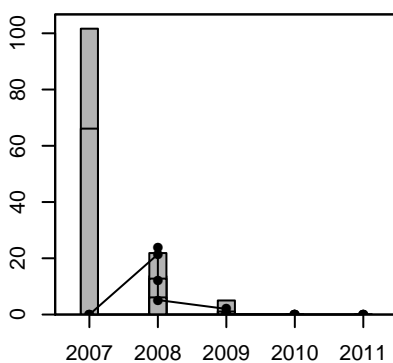
Year

# Fit to tag recaptures by tag group

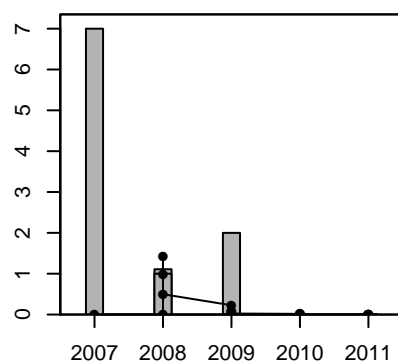
**TG 55**



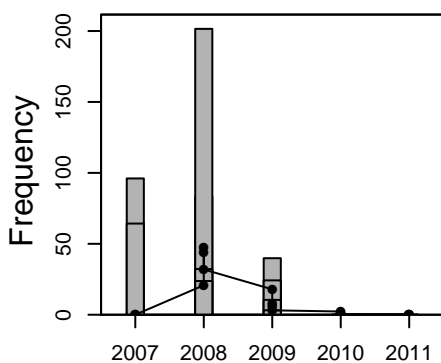
**TG 58**



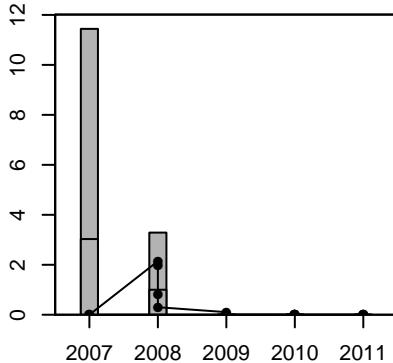
**TG 61**



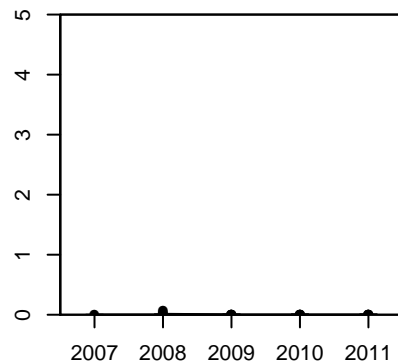
**TG 56**



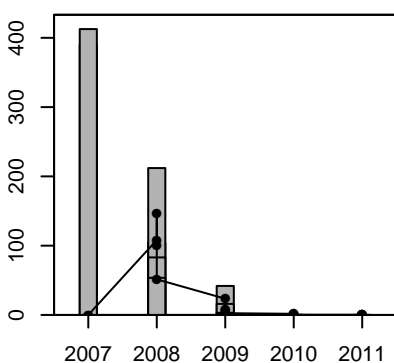
**TG 59**



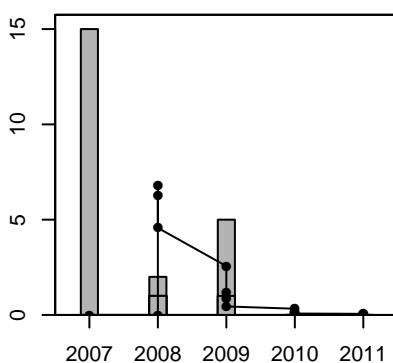
**TG 62**



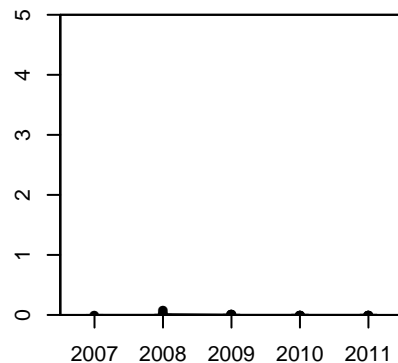
**TG 57**



**TG 60**



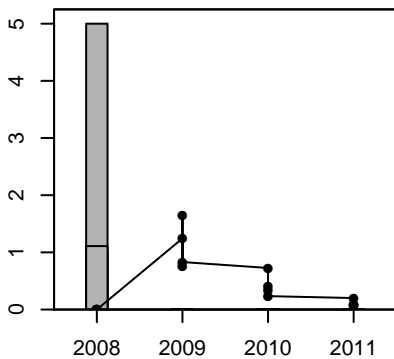
**TG 63**



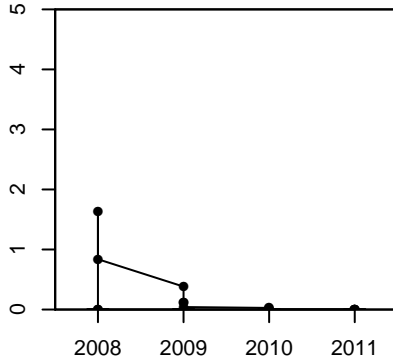
Year

# Fit to tag recaptures by tag group

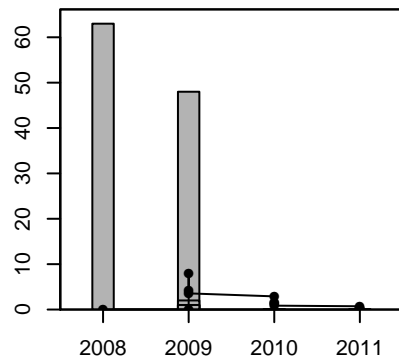
**TG 64**



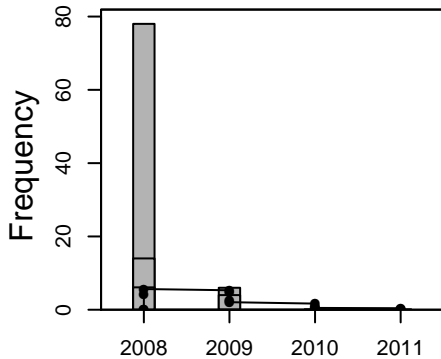
**TG 67**



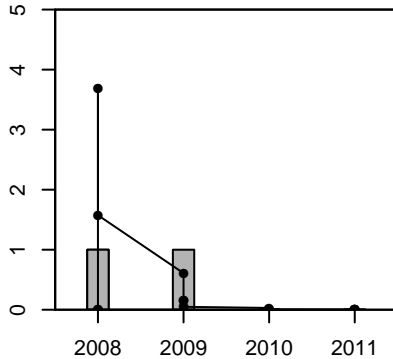
**TG 70**



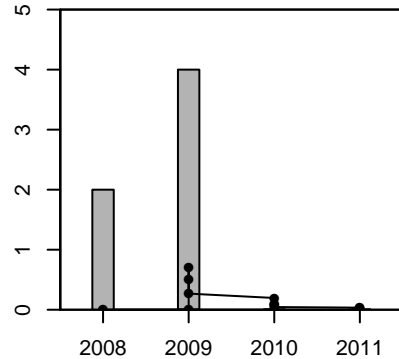
**TG 65**



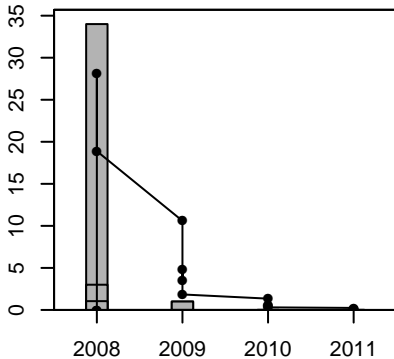
**TG 68**



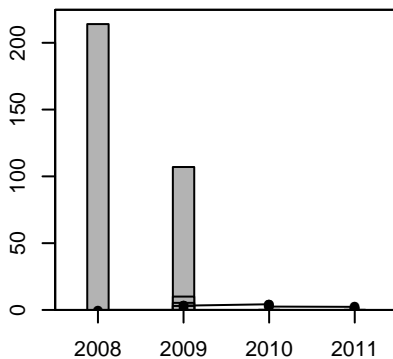
**TG 71**



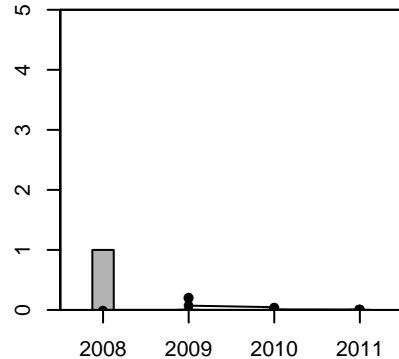
**TG 66**



**TG 69**



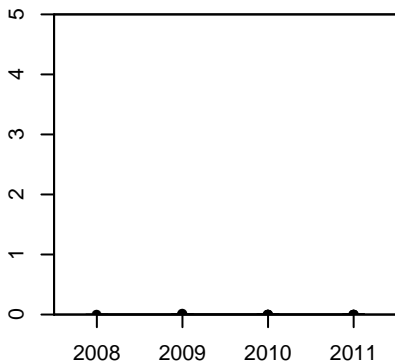
**TG 72**



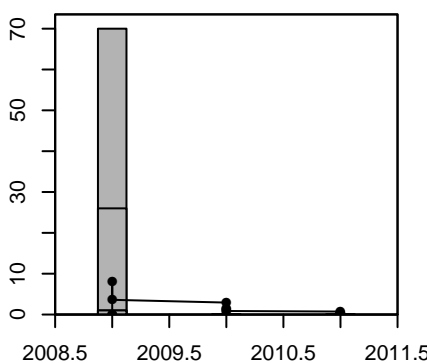
Year

# Fit to tag recaptures by tag group

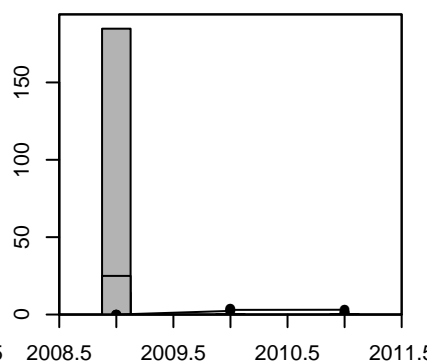
TG 73



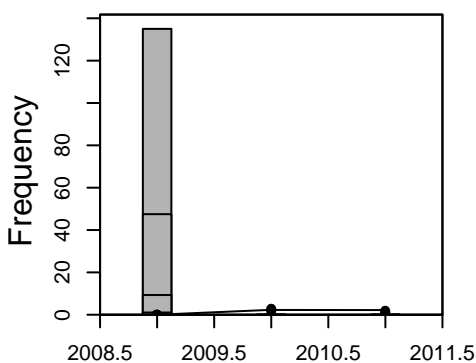
TG 76



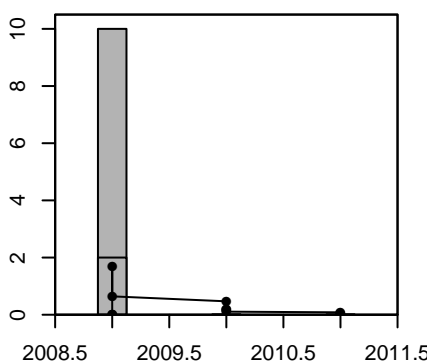
TG 79



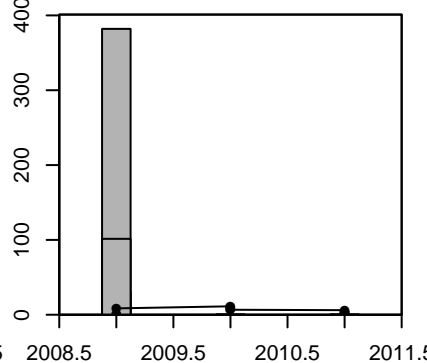
TG 74



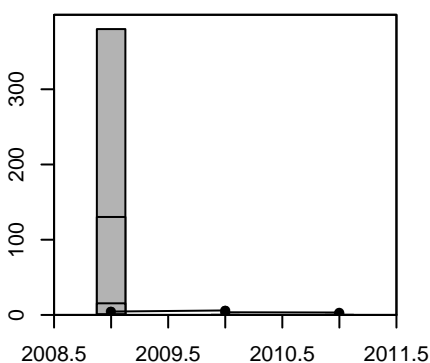
TG 77



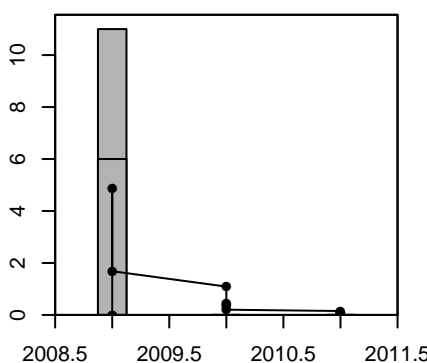
TG 80



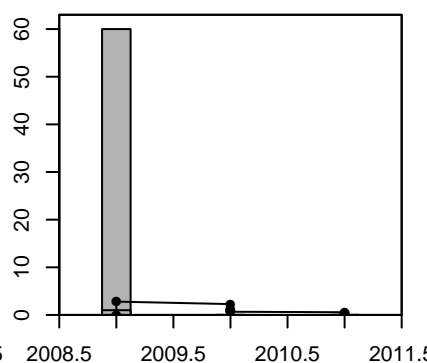
TG 75



TG 78



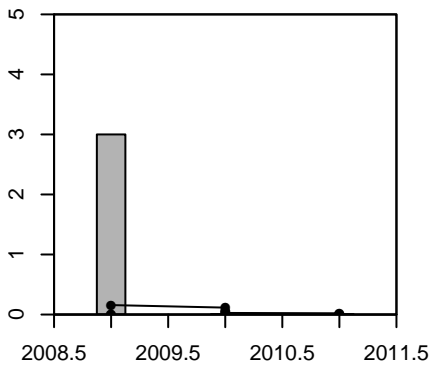
TG 81



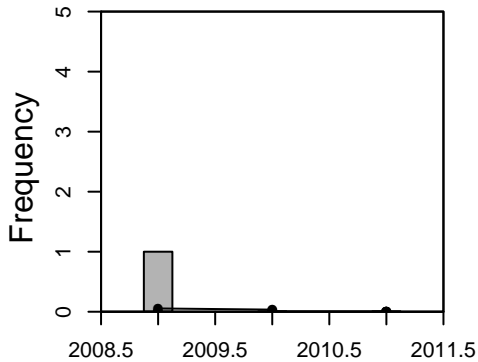
Year

# Fit to tag recaptures by tag group

TG 82

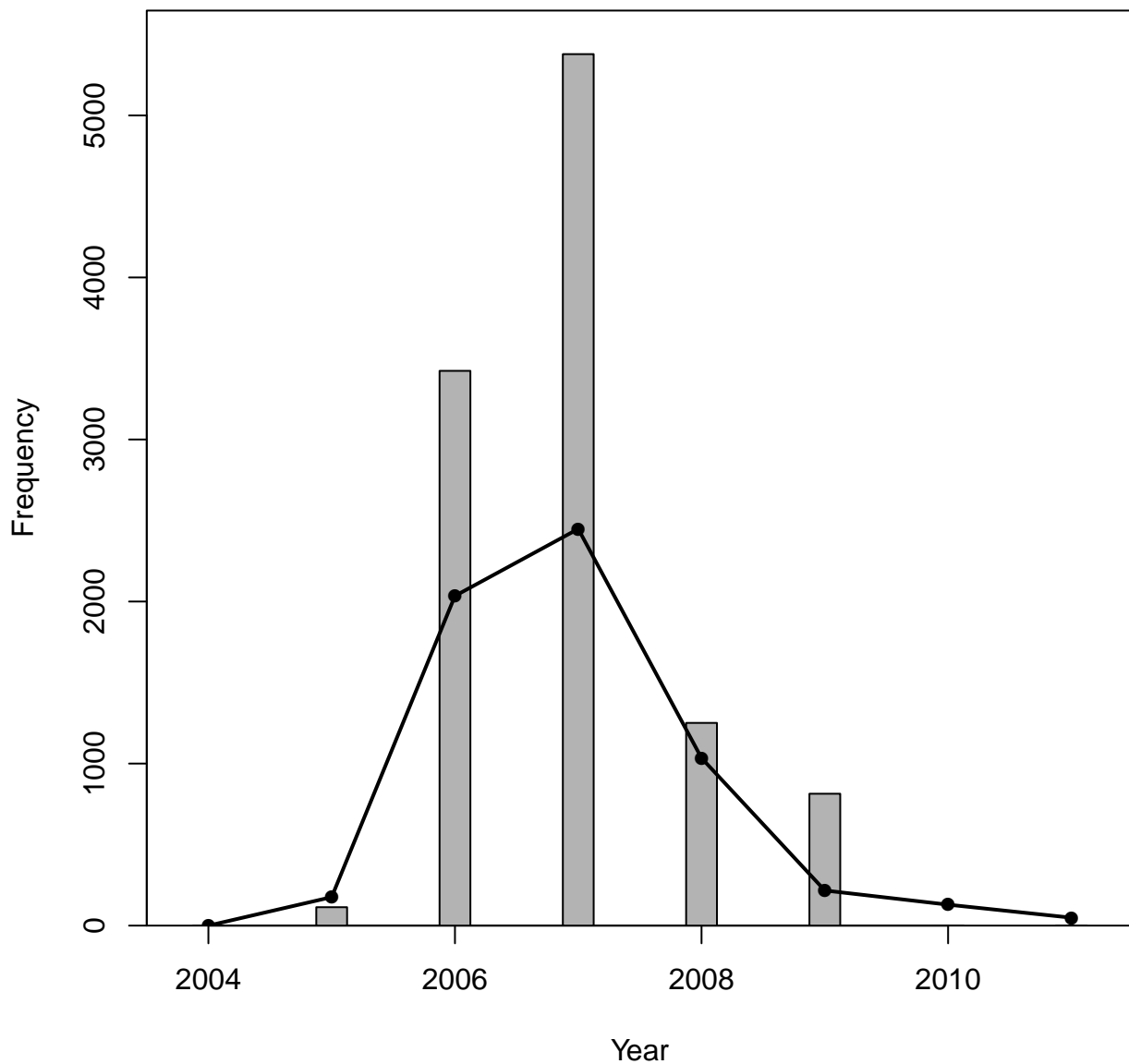


TG 83



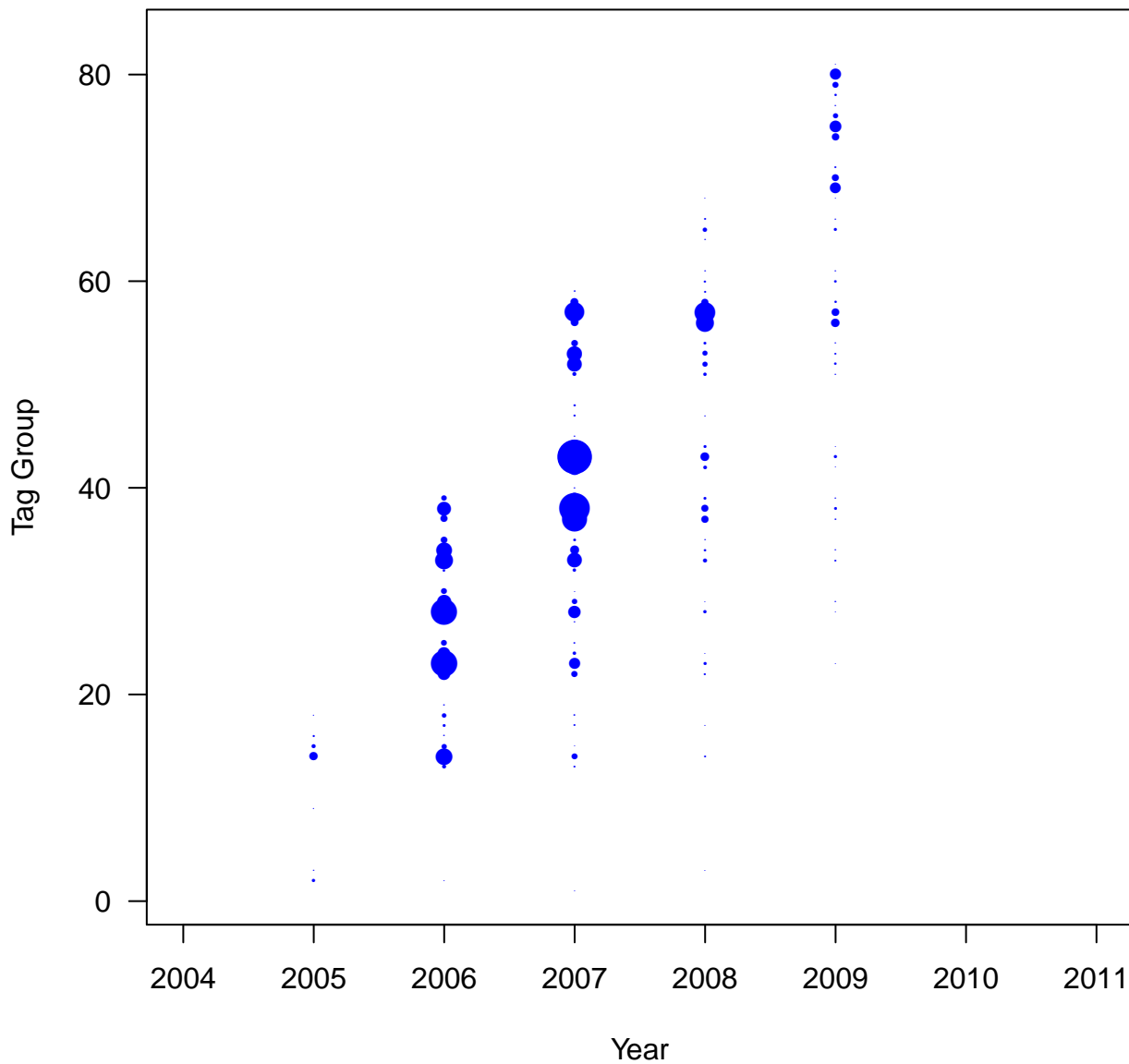
Year

Tag recaptures aggregated across tag groups

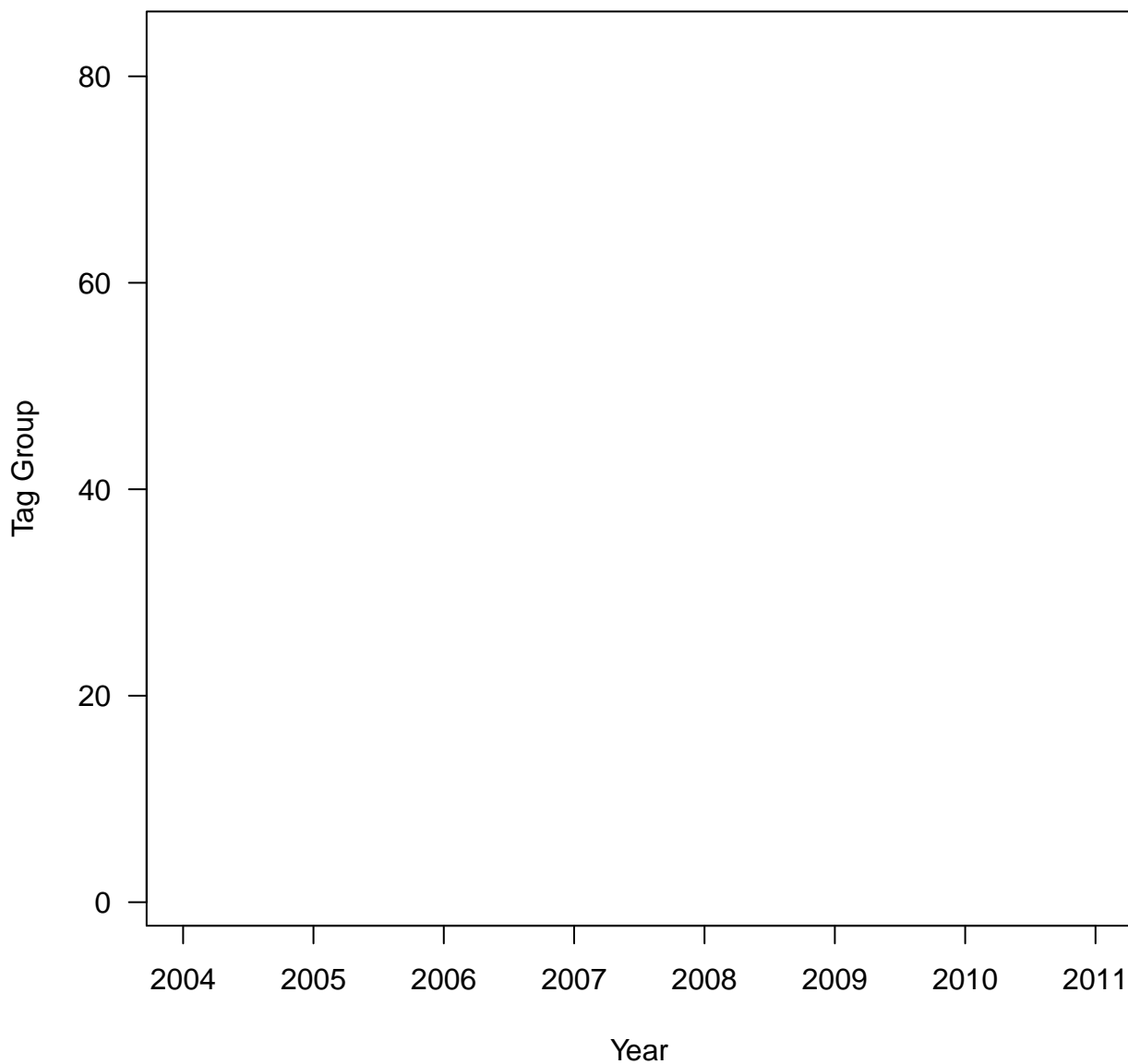




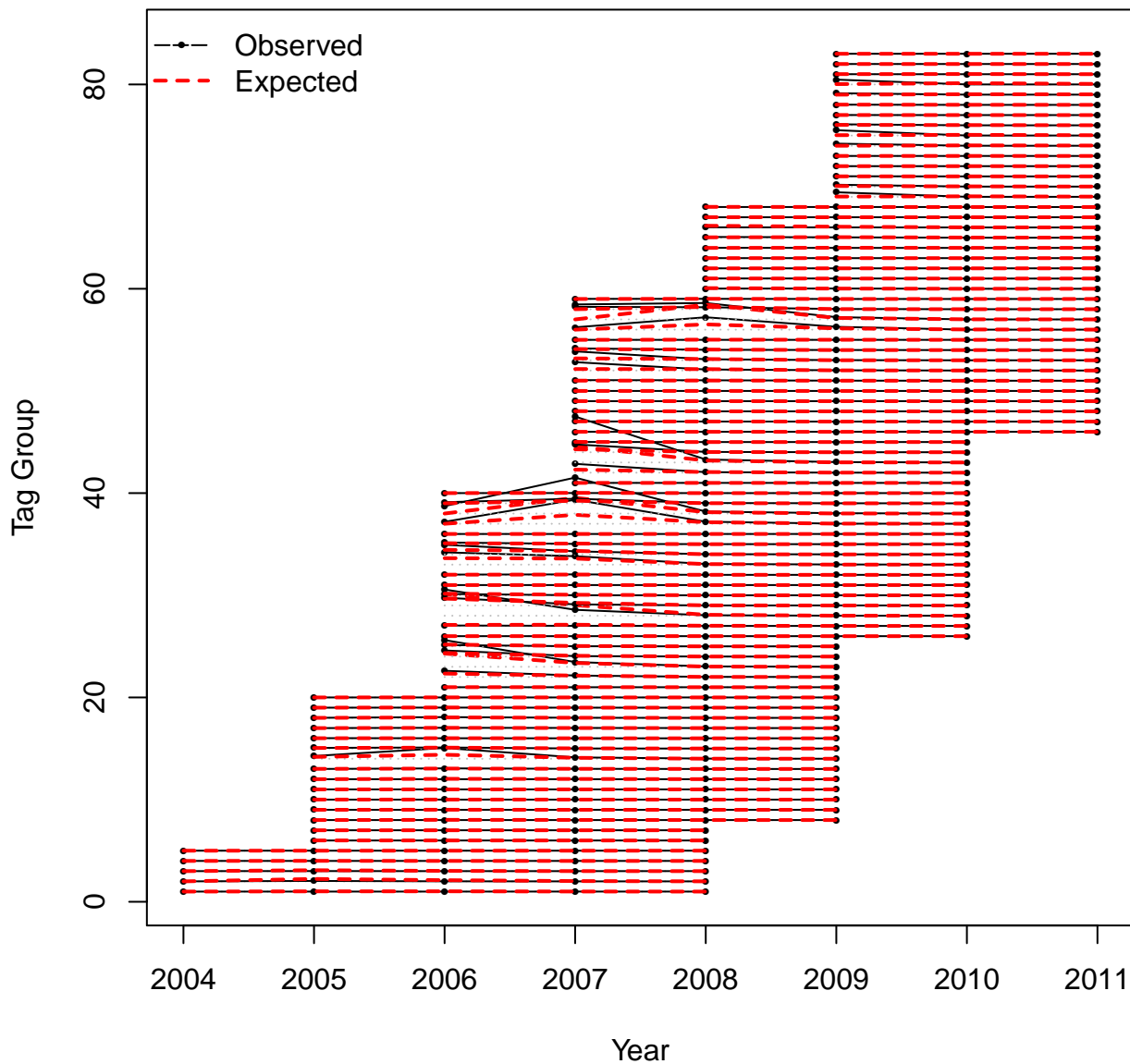
**Observed tag recaptures by year and tag group**



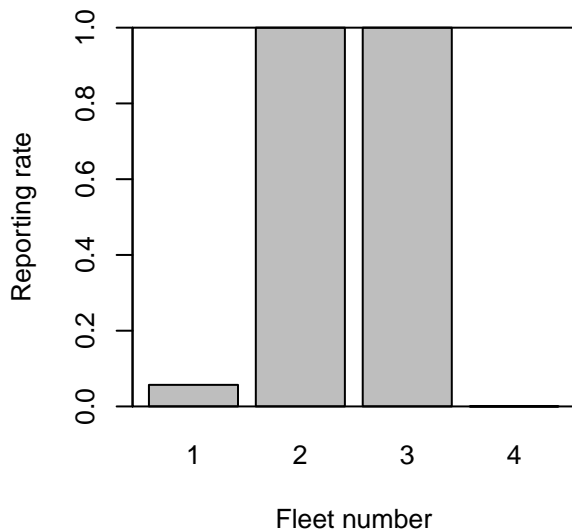
# Residuals for tag recaptures: $(\text{obs} - \text{exp}) / \sqrt{\text{exp}}$



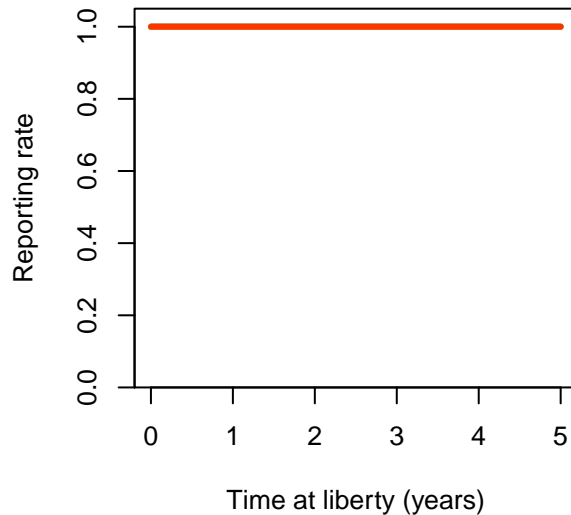
Observed and expected tag recaptures by year and tag group



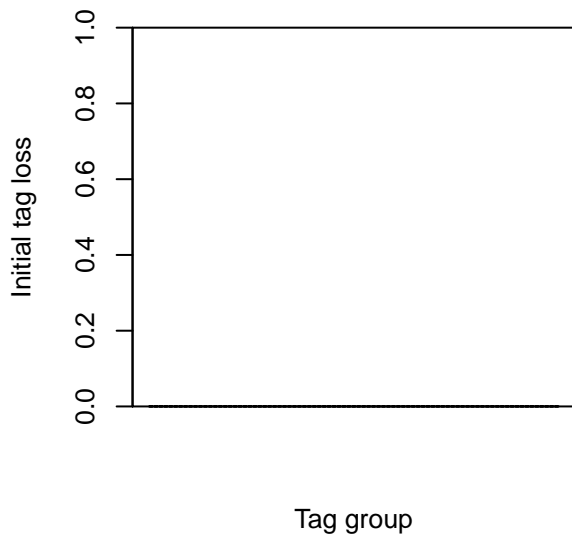
**Initial reporting rate**



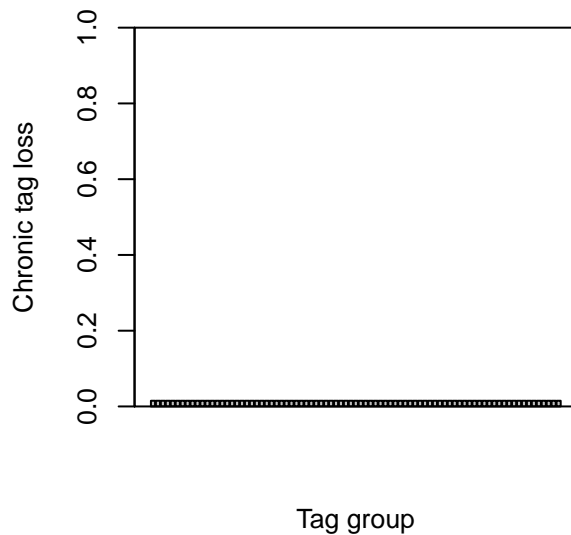
**Reporting rate decay**



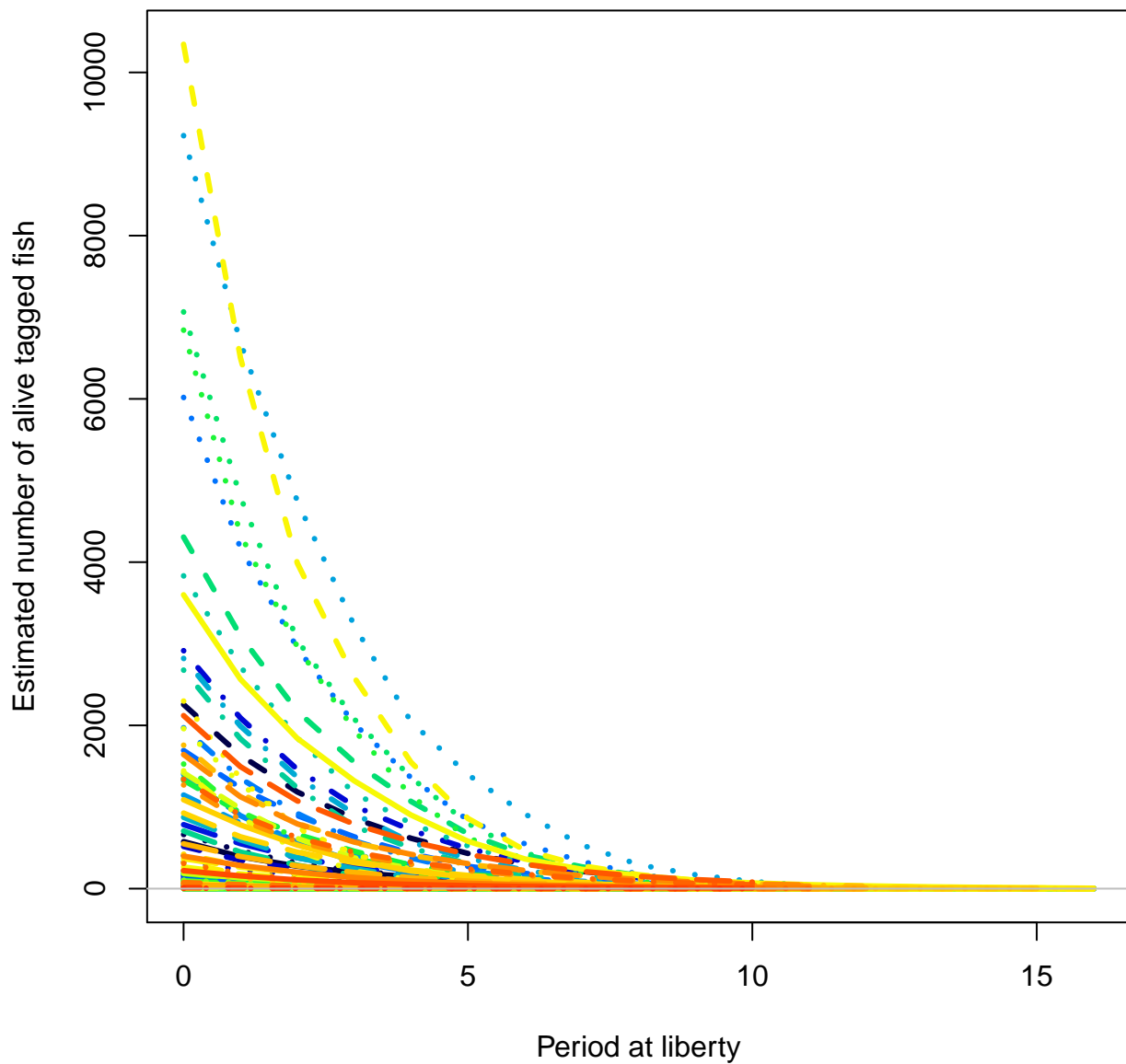
**Initial tag loss**  
(fraction of tags lost at time of tagging)



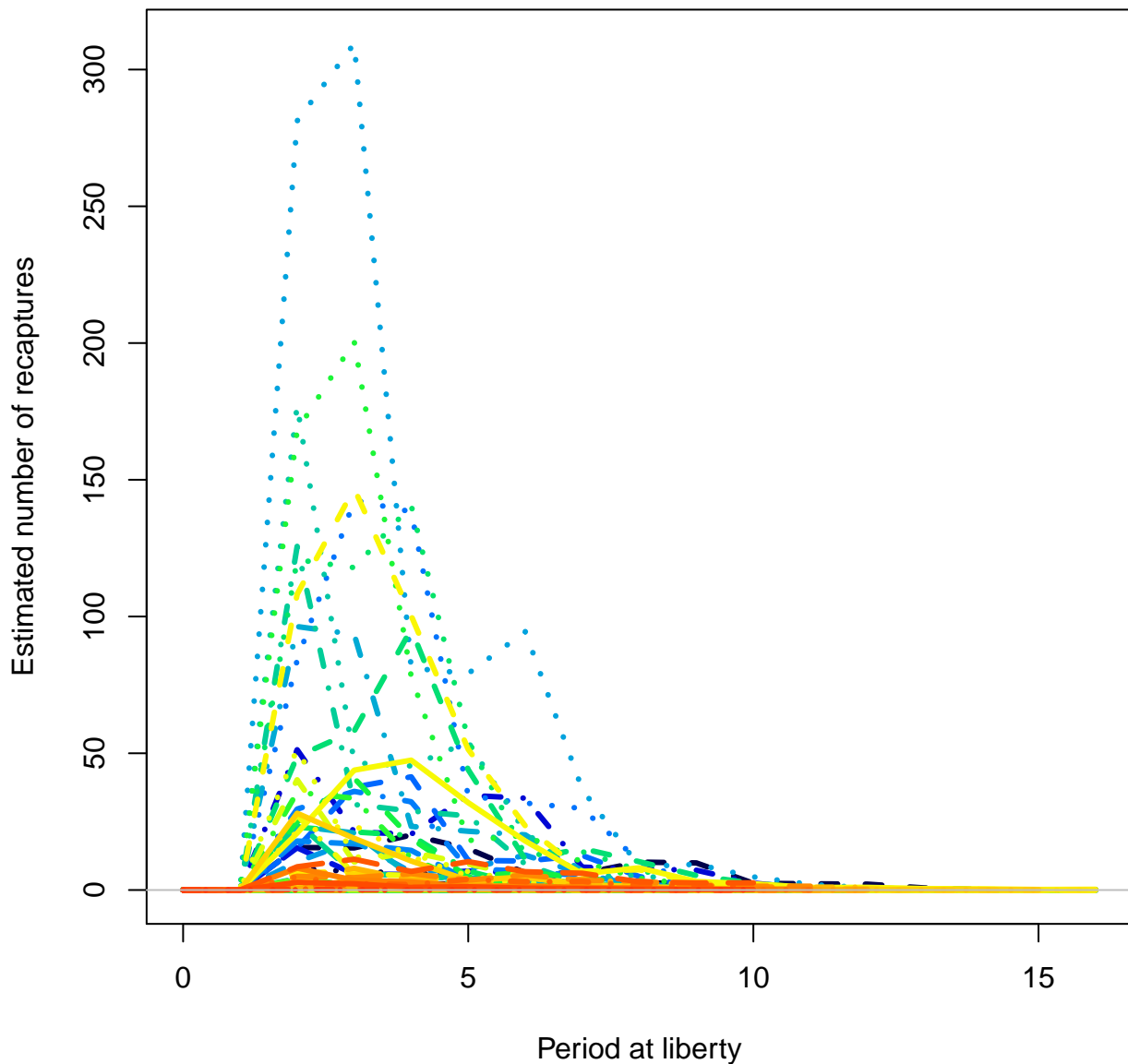
**Chronic tag loss**  
(fraction of tags lost per year)

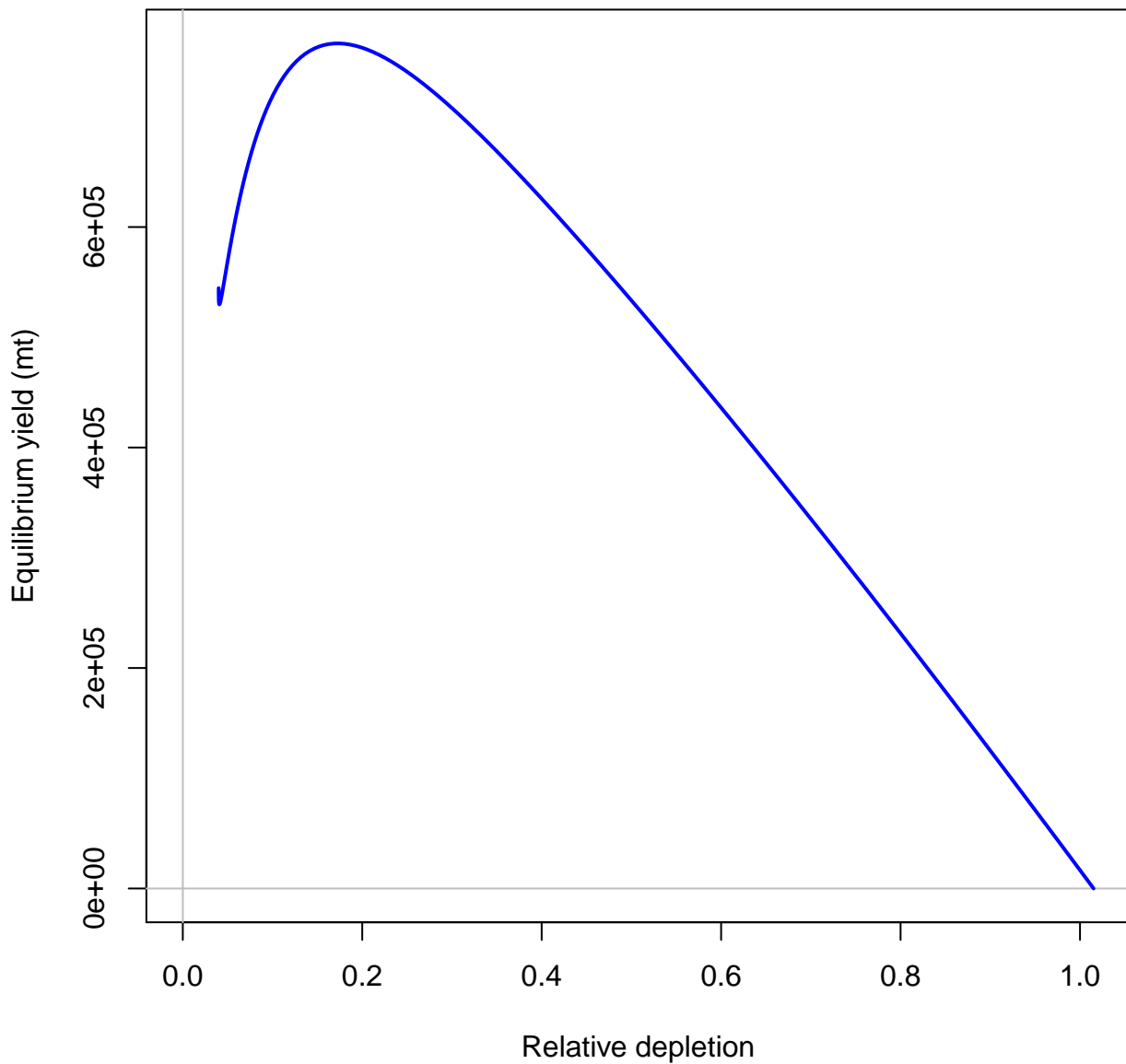


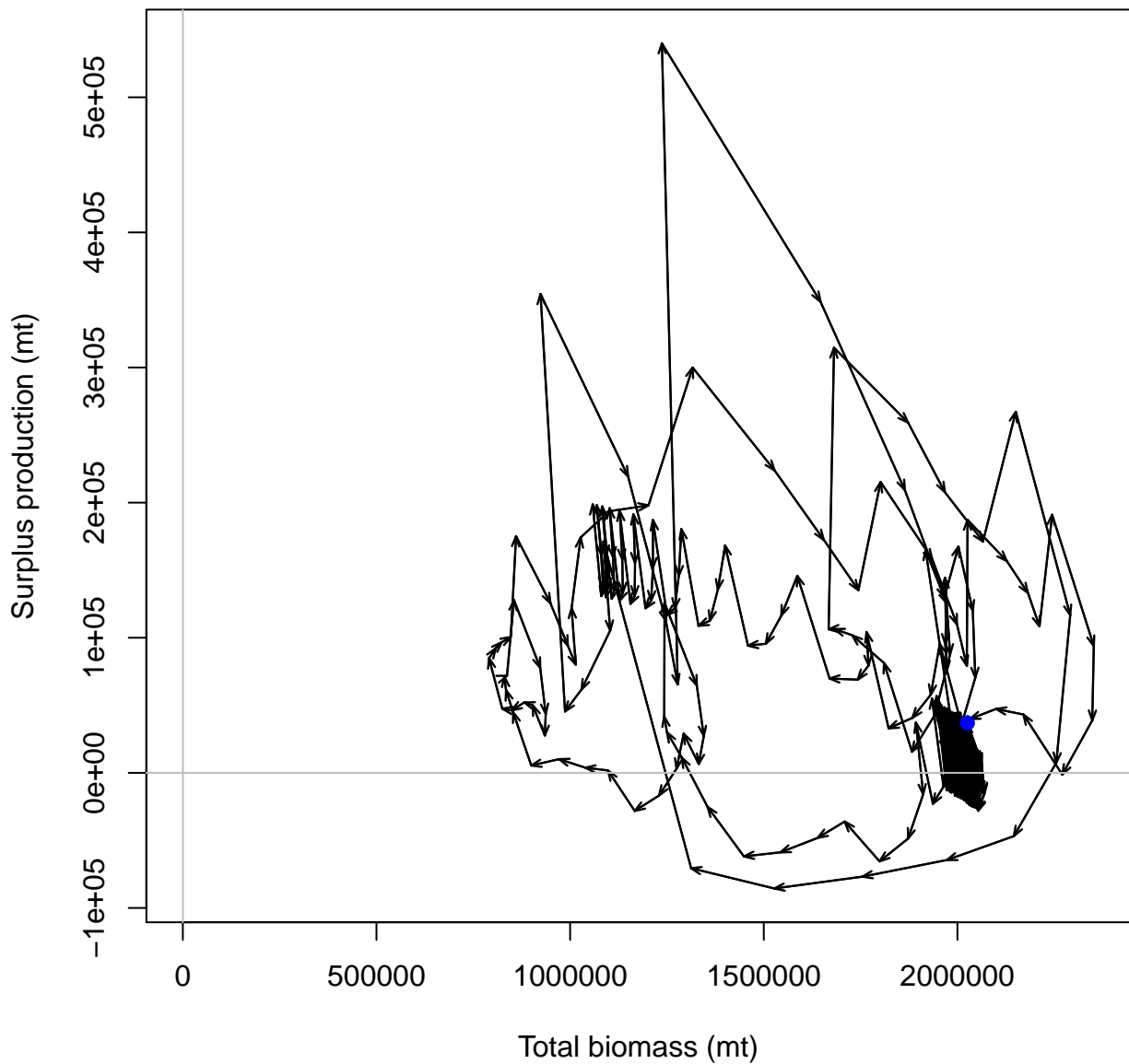
'Tags alive' by tag group



**'Total recaptures' by tag group**









## Data by type and year

