

File = y2015r4c1m2s111111111\_000.dat

ASAP3 run on Monday, 04 Nov 2019 at 10:57:04

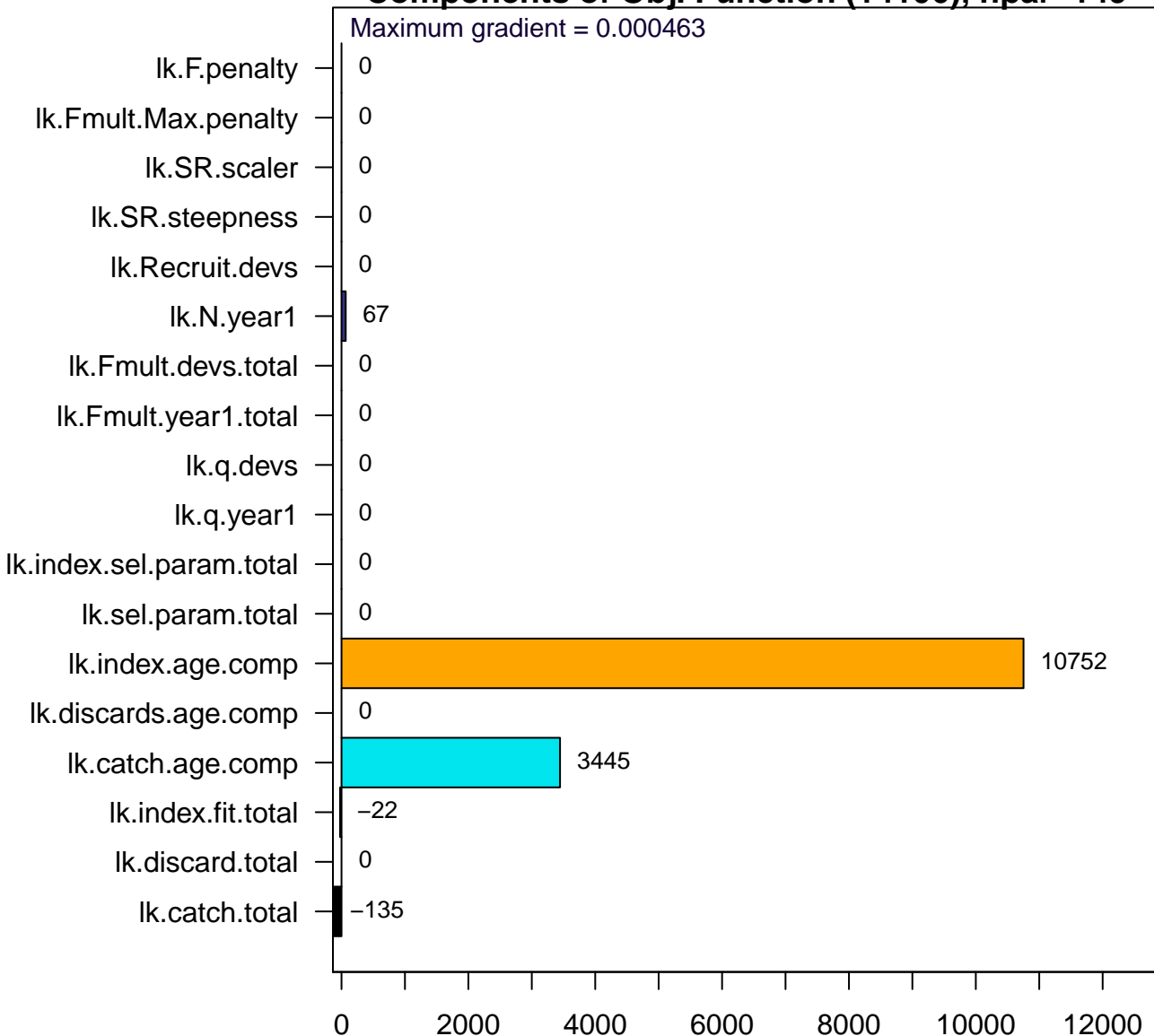
chris.legault\Documents\Working\ICES-WKFORBIAS 2019\WhiteHake\Rose\w

ASAPplots version = 0.2.14

npar = 149, maximum gradient = 0.000462901

# Components of Obj. Function (14106), npar=149

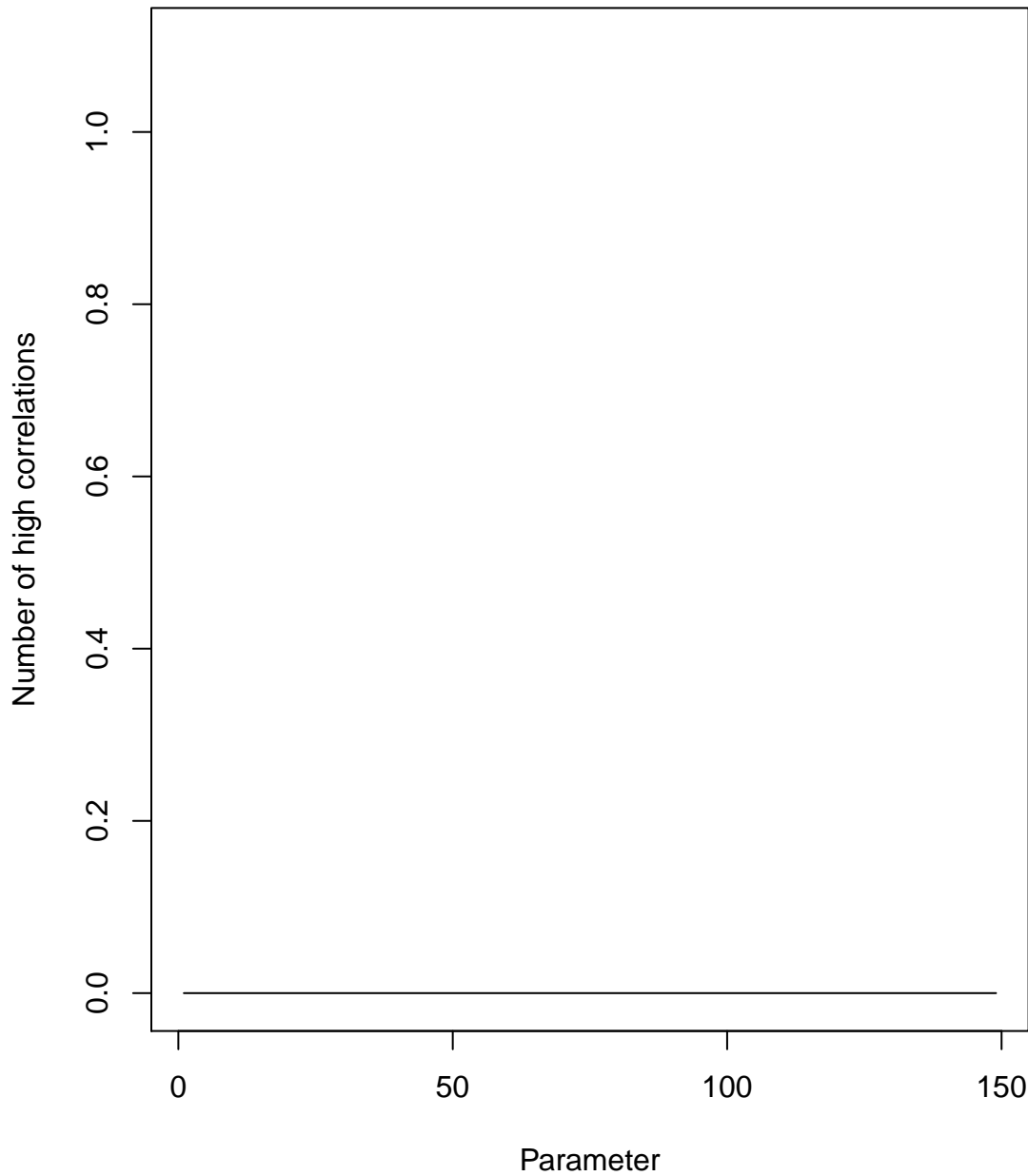
Maximum gradient = 0.000463

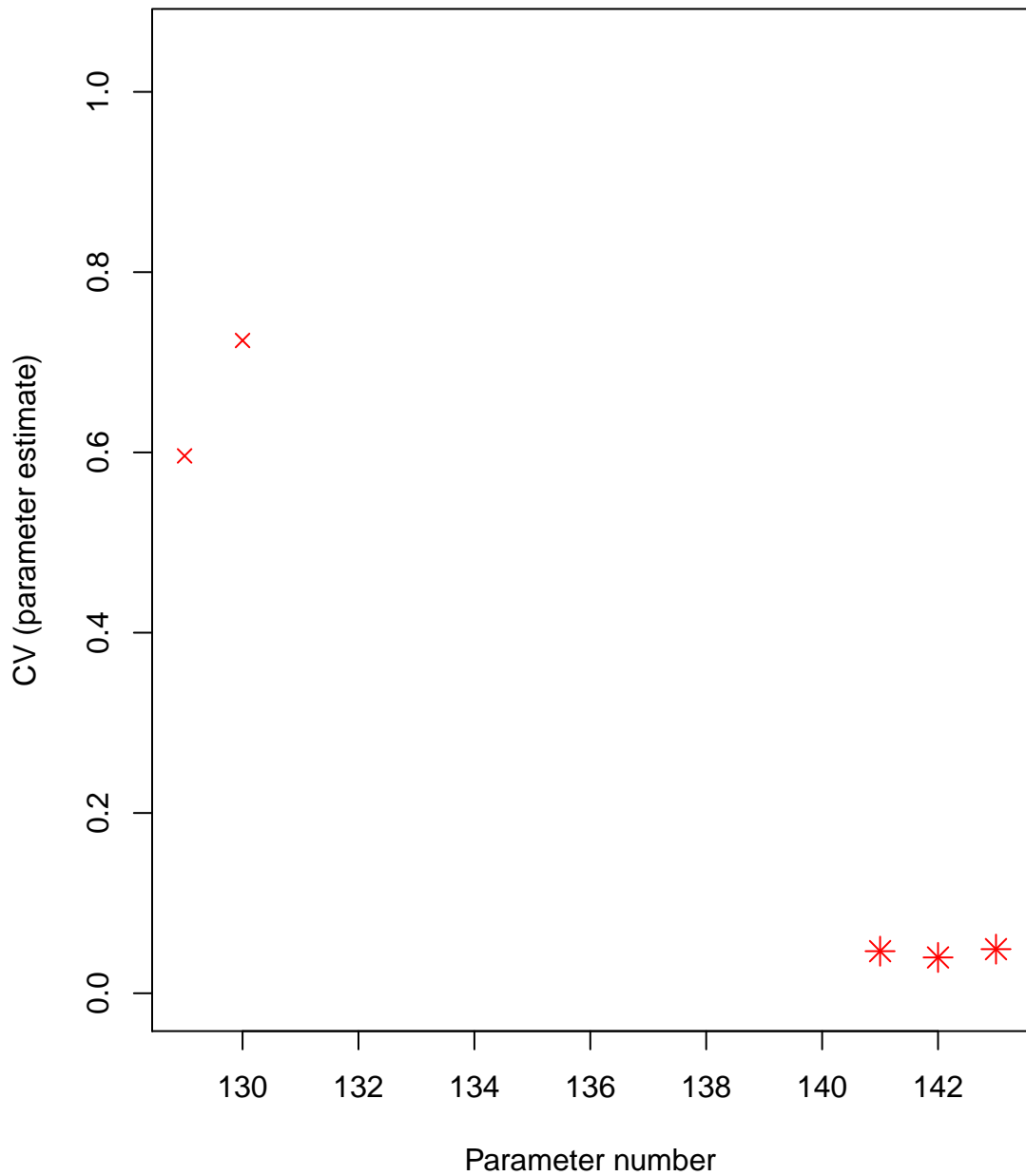


Likelihood Contribution

Model: y2015r4c1m2s111111111\_000

Monday, 04 Nov 2019 at 10:57:

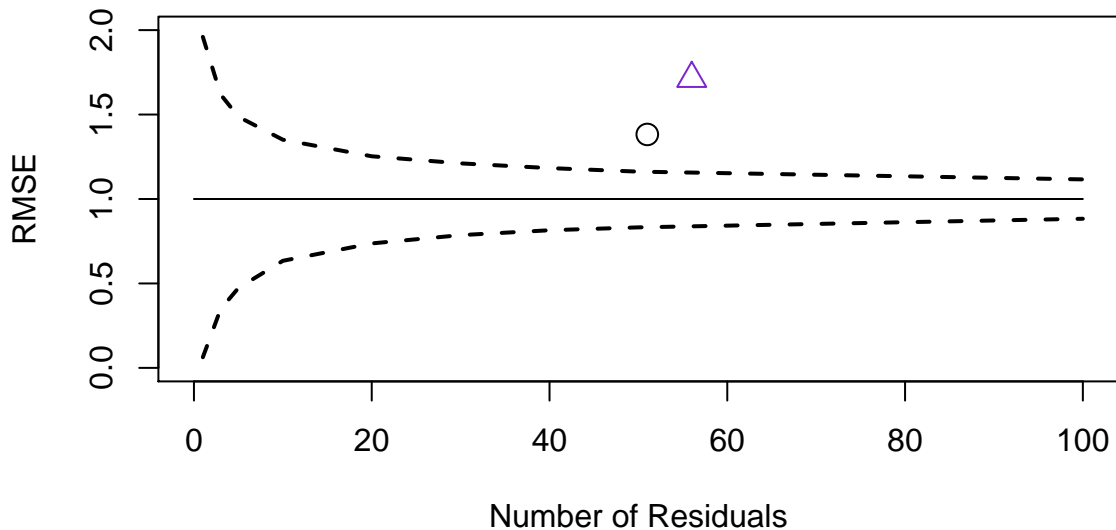




## Root Mean Square Error computed from Standardized Residuals

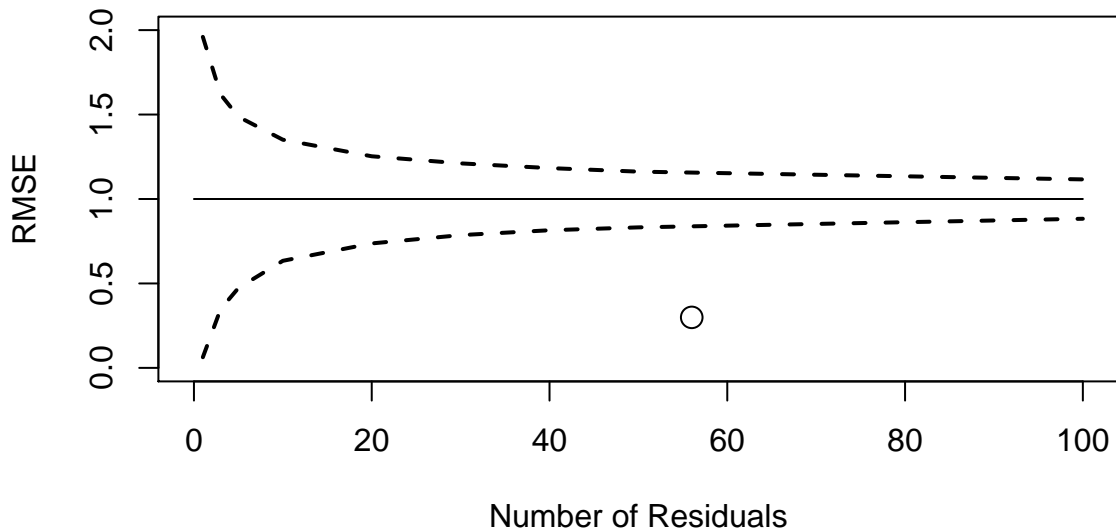
Component	# resids	RMSE
catch.tot	56	0.299
discard.tot	0	0
ind01	51	1.38
ind02	56	1.71
ind.total	107	1.56
N.year1	8	0.637
Fmult.year1	0	0
Fmult.devs.total	0	0
recruit.devs	0	0
fleet.sel.params	0	0
index.sel.params	0	0
q.year1	0	0
q.devs	0	0
SR.steepness	0	0
SR.scaler	0	0

Root Mean Square Error for Indices



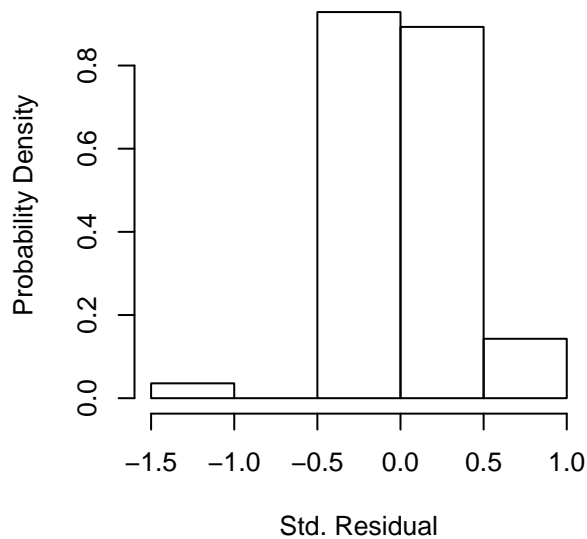
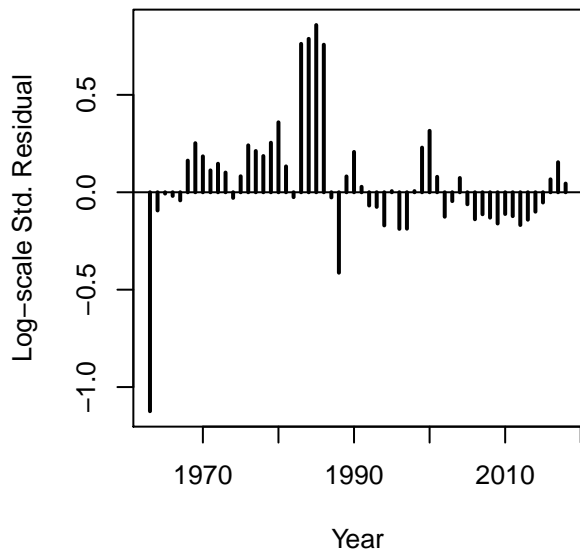
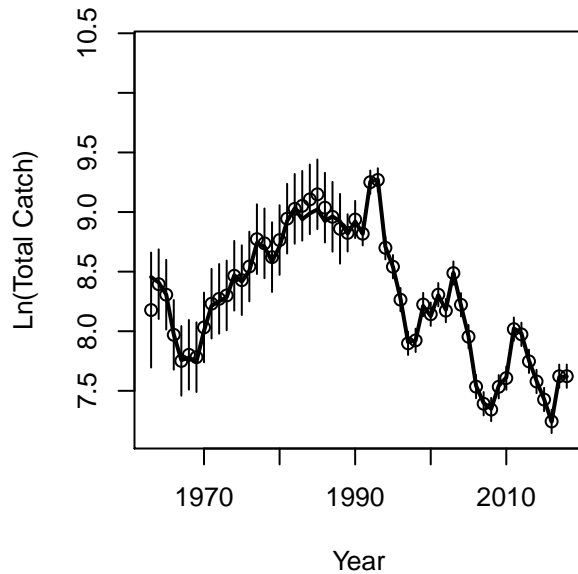
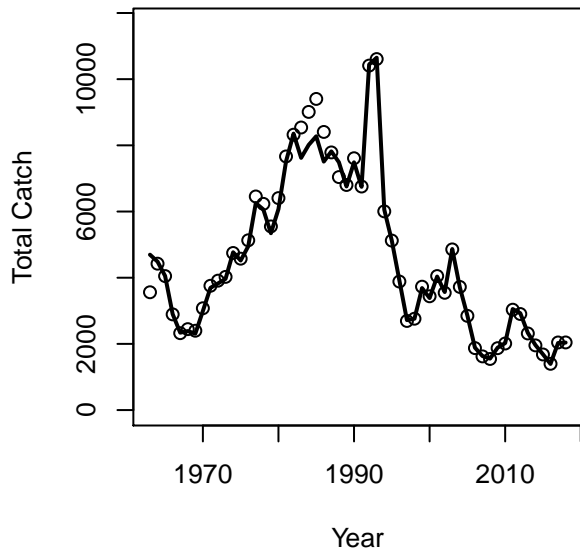
+ ind total  
△ INDEX-2  
○ INDEX-1

## Root Mean Square Error for Catch



○ catch.tot

# Fleet 1 Catch (FLEET-1)

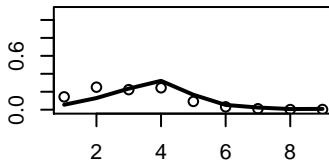




**Catch**

**Year = 1993**

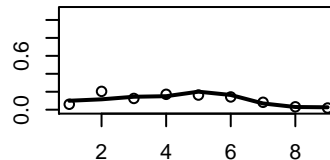
Proportion at Age



Age

**Year = 1998**

Proportion at Age



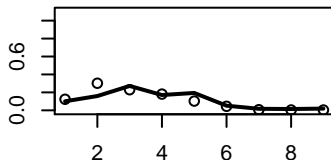
Age

Fleet 1  
FLEET-1



**Year = 1989**

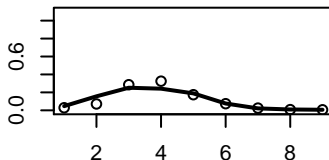
Proportion at Age



Age

**Year = 1994**

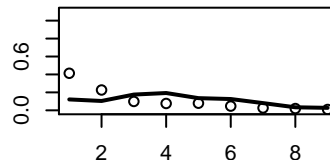
Proportion at Age



Age

**Year = 1999**

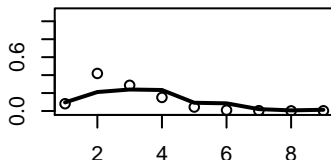
Proportion at Age



Age

**Year = 1990**

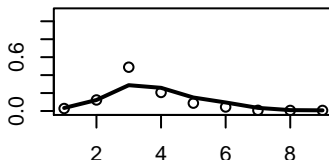
Proportion at Age



Age

**Year = 1995**

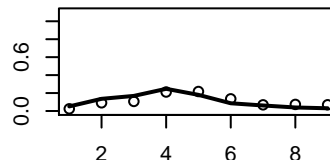
Proportion at Age



Age

**Year = 2000**

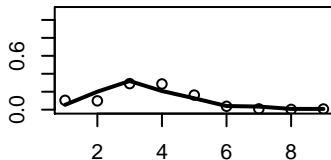
Proportion at Age



Age

**Year = 1991**

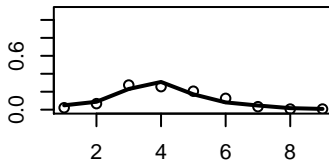
Proportion at Age



Age

**Year = 1996**

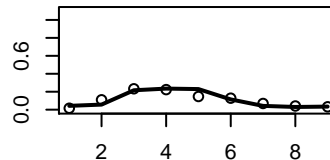
Proportion at Age



Age

**Year = 2001**

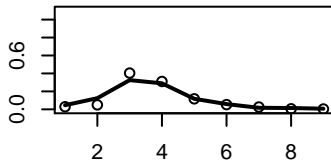
Proportion at Age



Age

**Year = 1992**

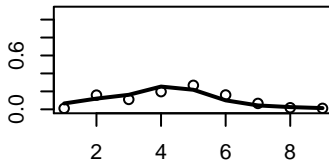
Proportion at Age



Age

**Year = 1997**

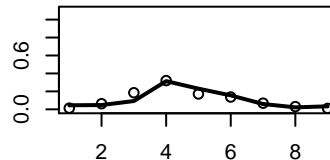
Proportion at Age



Age

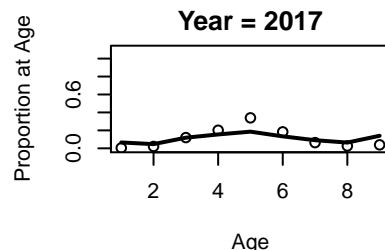
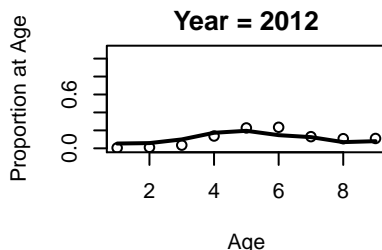
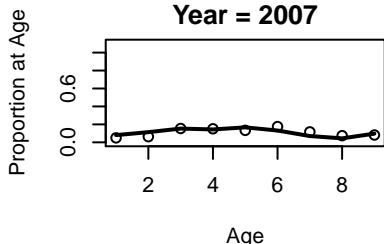
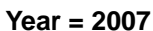
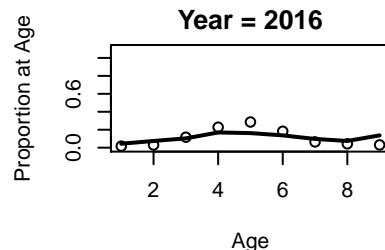
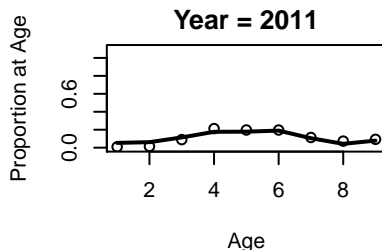
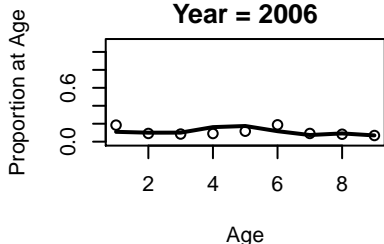
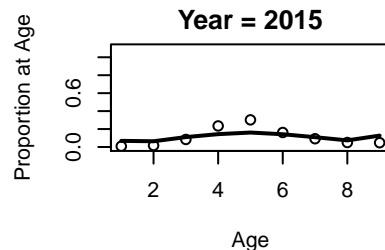
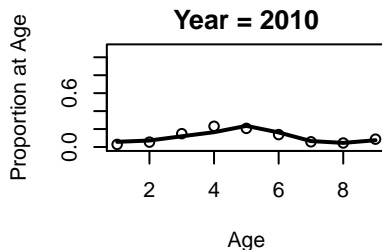
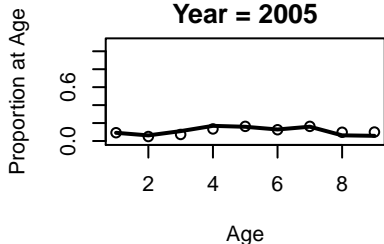
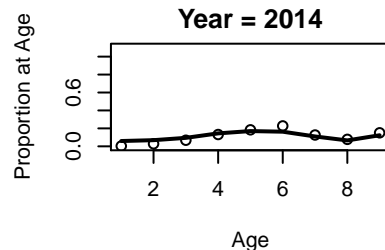
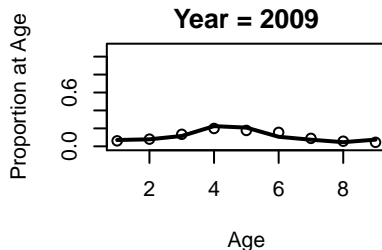
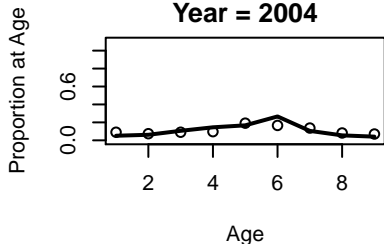
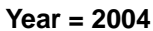
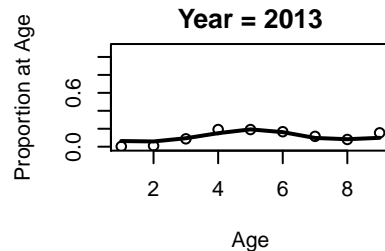
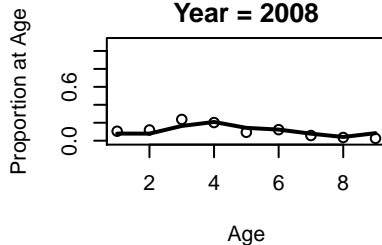
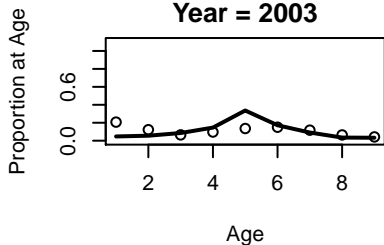
**Year = 2002**

Proportion at Age

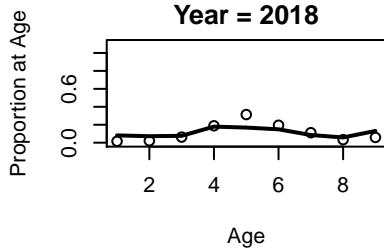


Age

**Year = 2008**

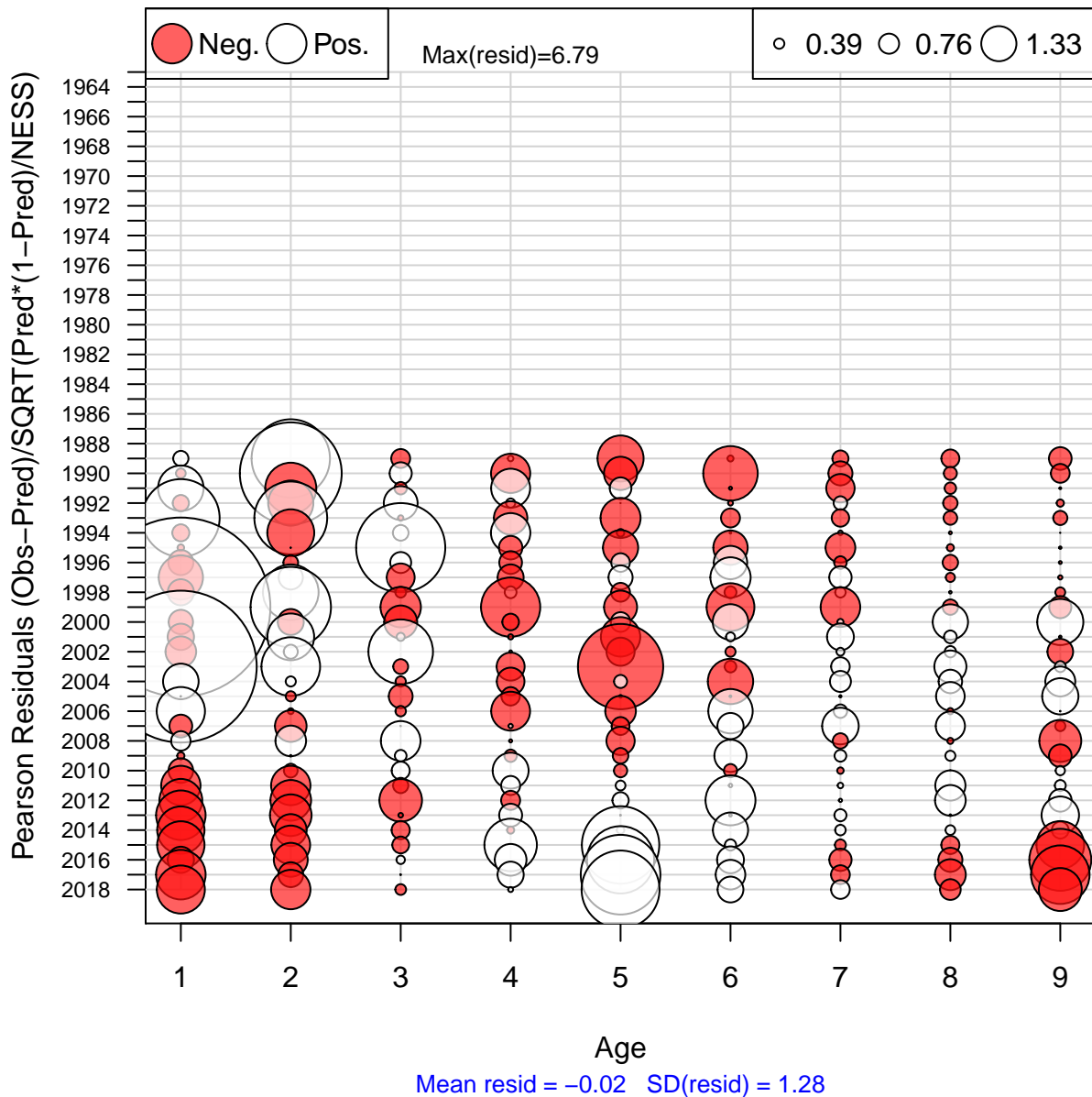


Year = 2018

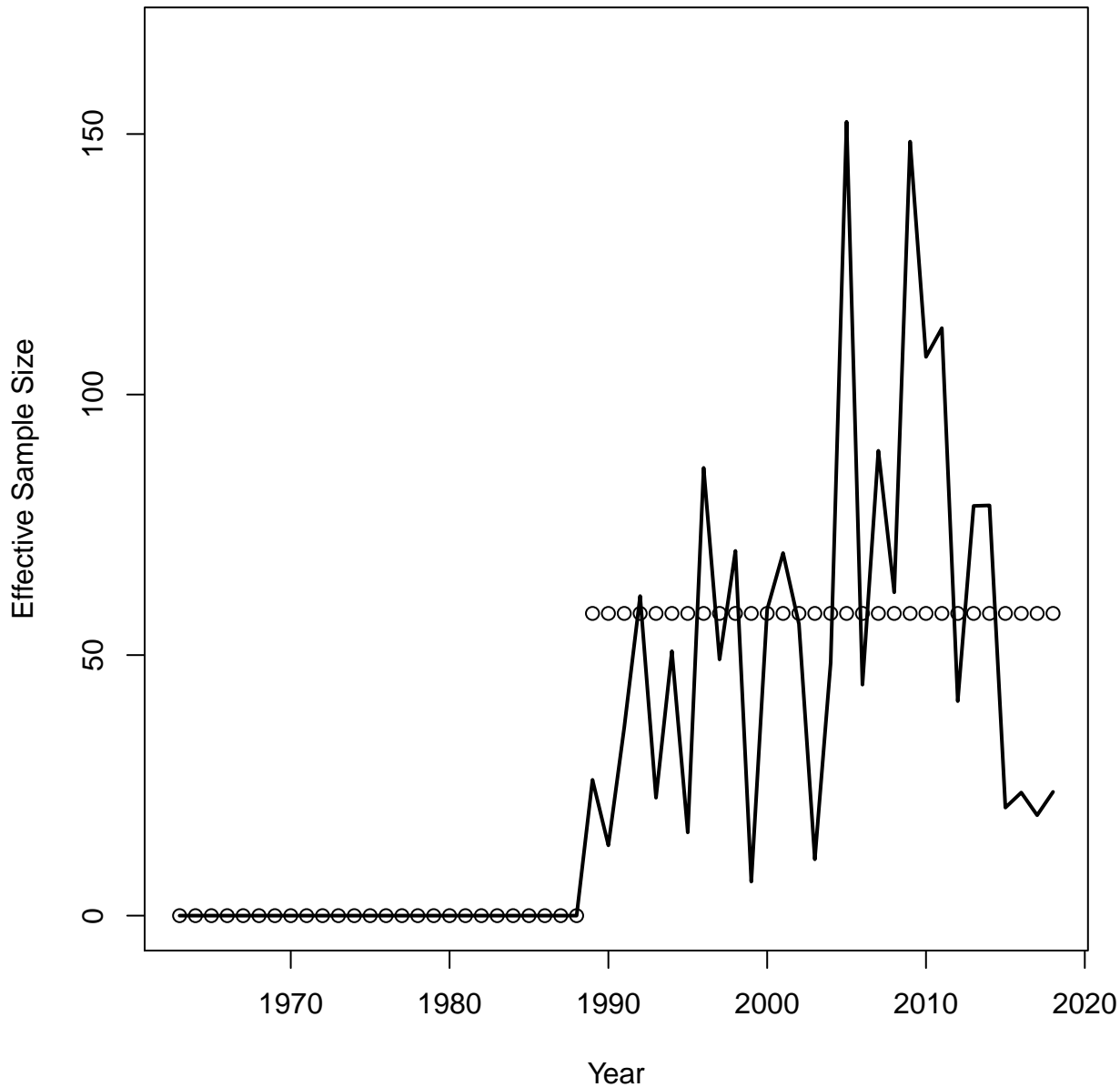


Catch

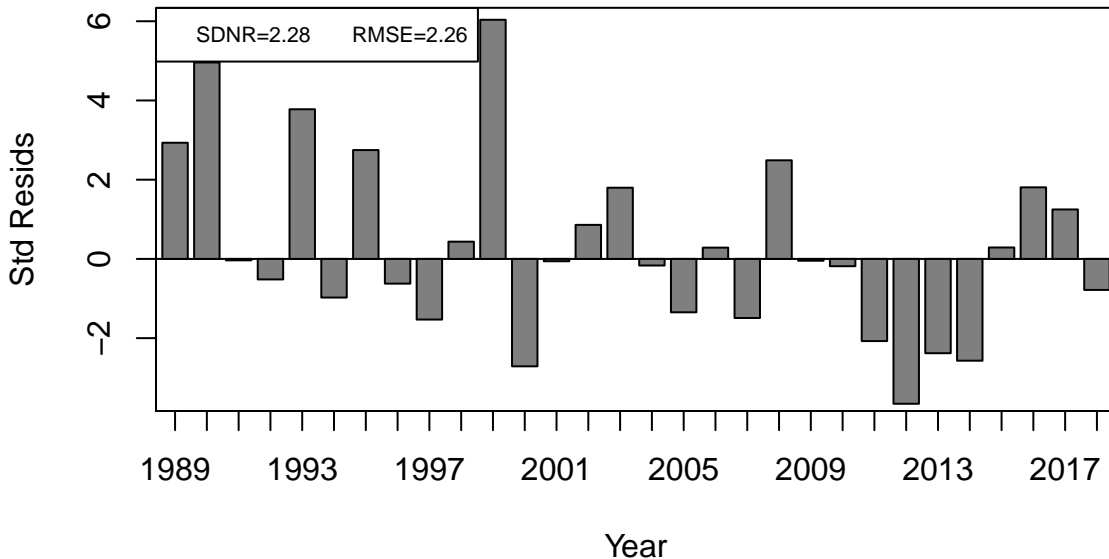
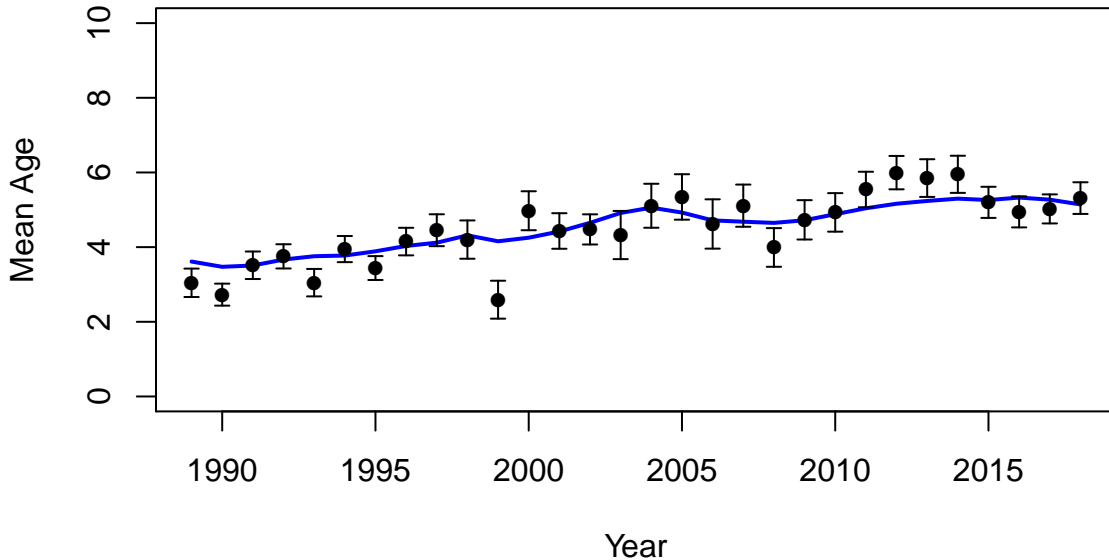
# Age Comp Residuals for Catch by Fleet 1 (FLEET-1)



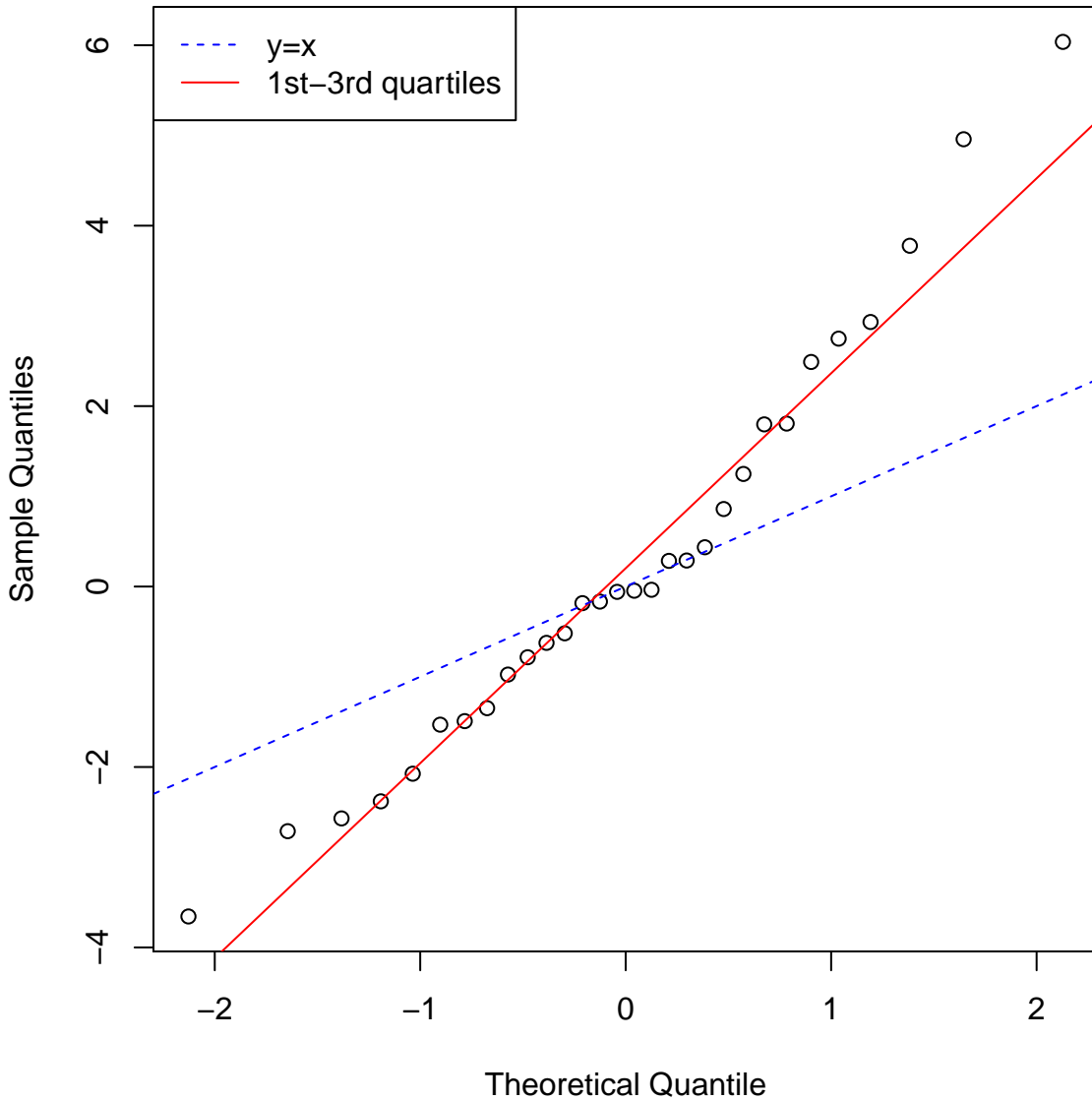
# Catch Neff Fleet 1 (FLEET-1)



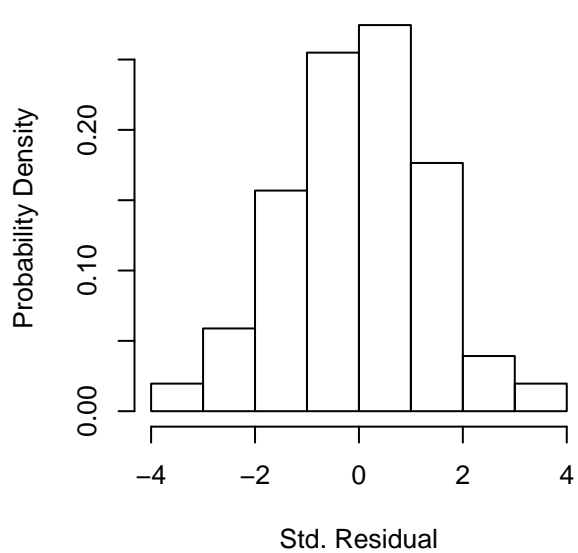
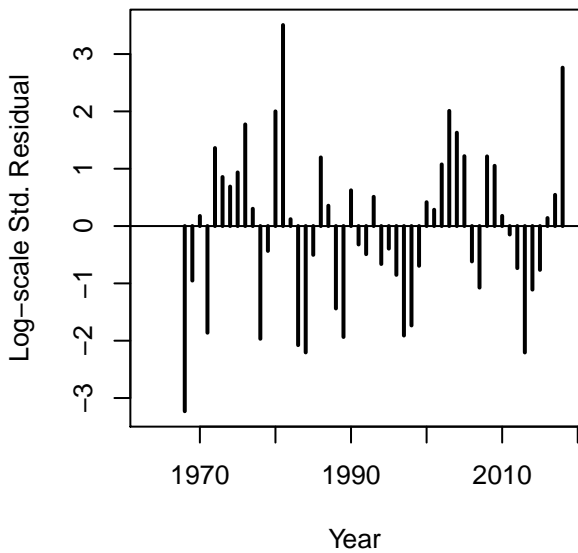
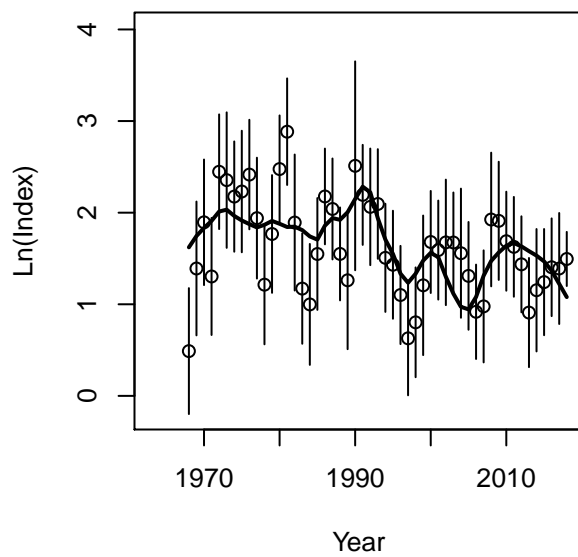
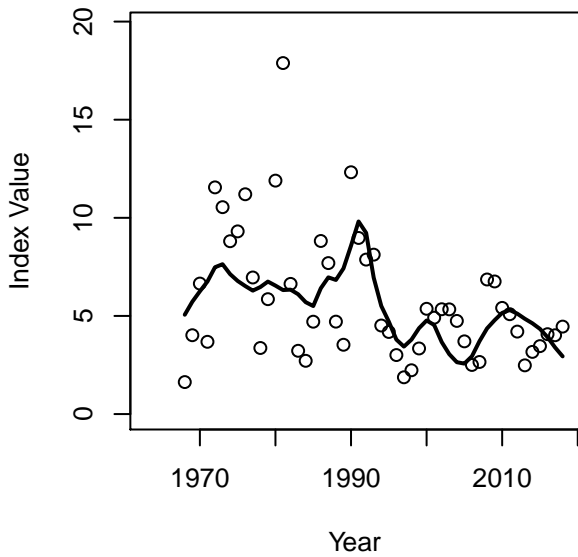
### Catch Fleet 1 (FLEET-1) ESS = 58



# Catch Fleet 1 (FLEET-1) ESS = 58

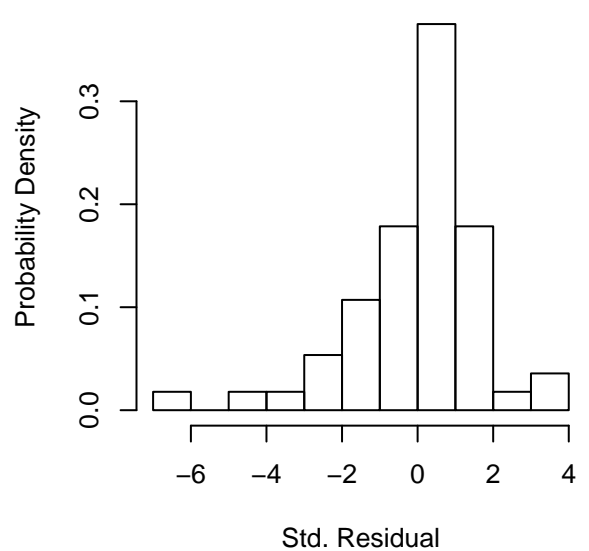
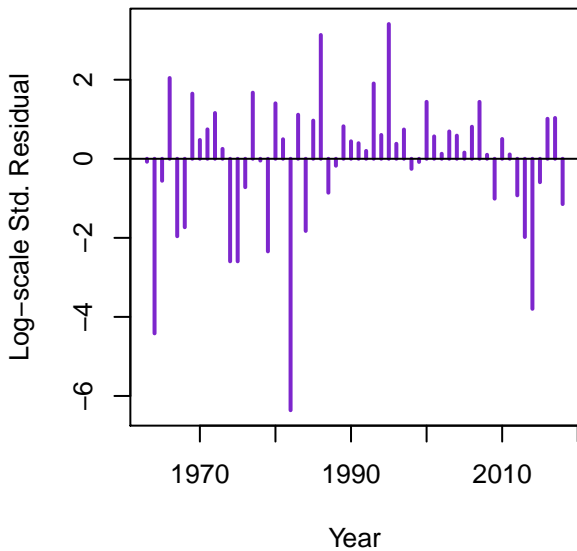
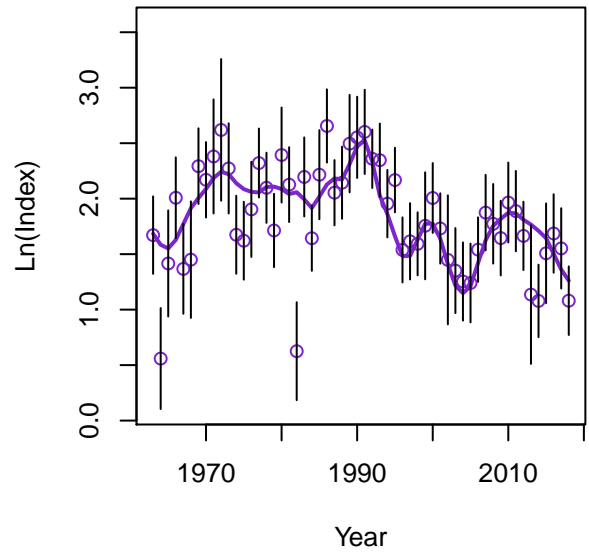
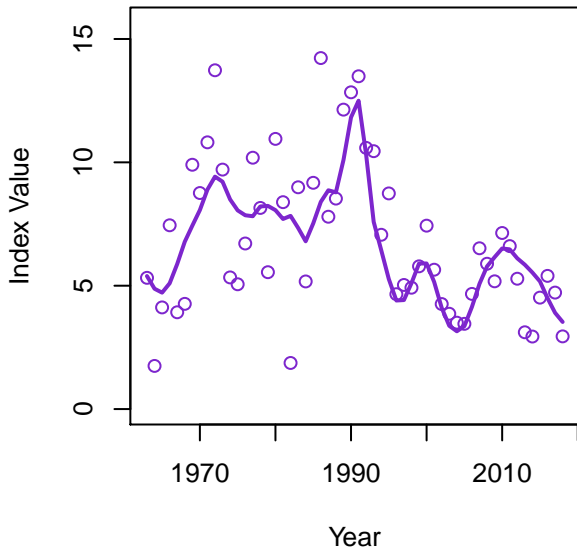


Index 1 (INDEX-1)

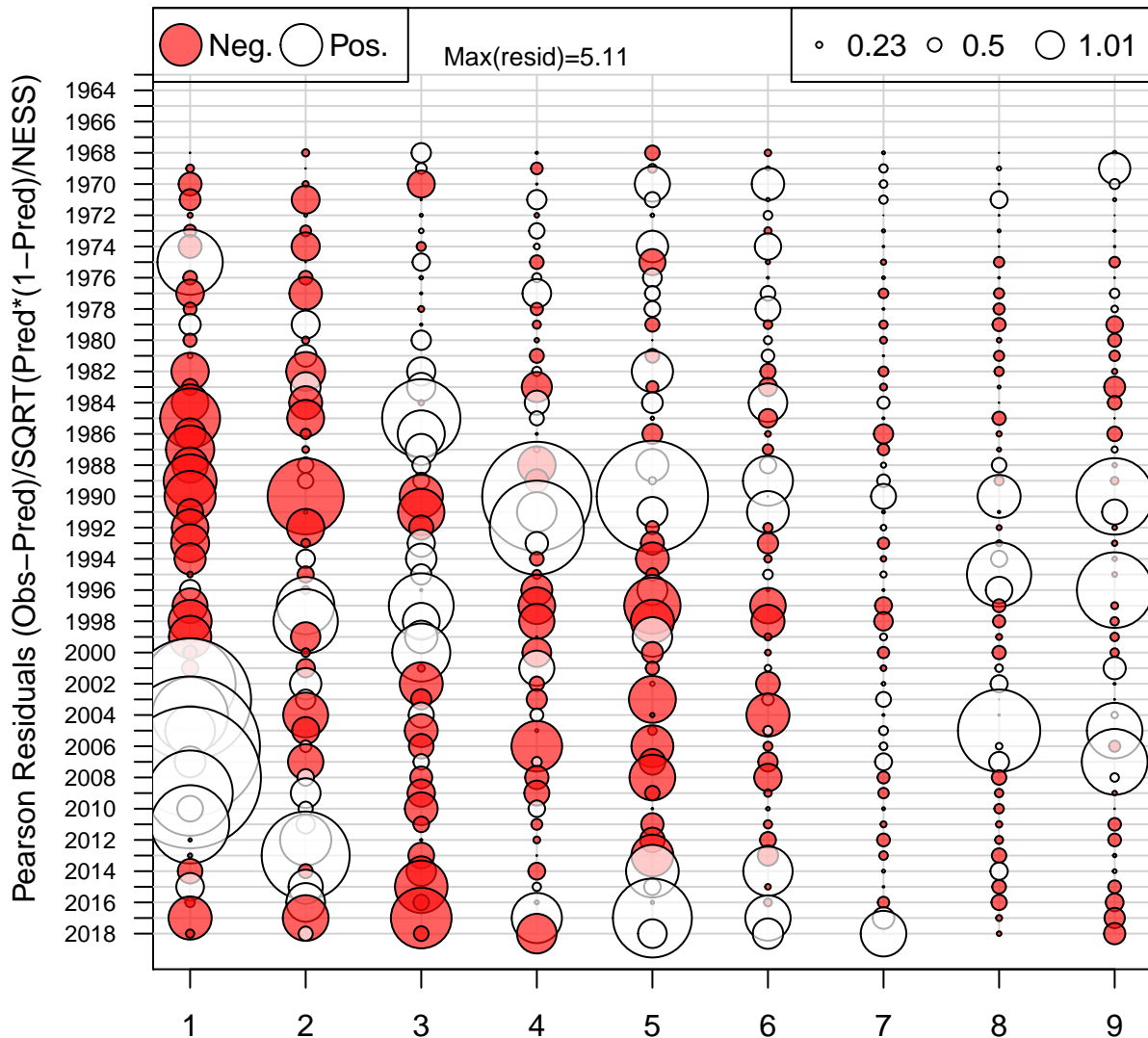




## Index 2 (INDEX-2)

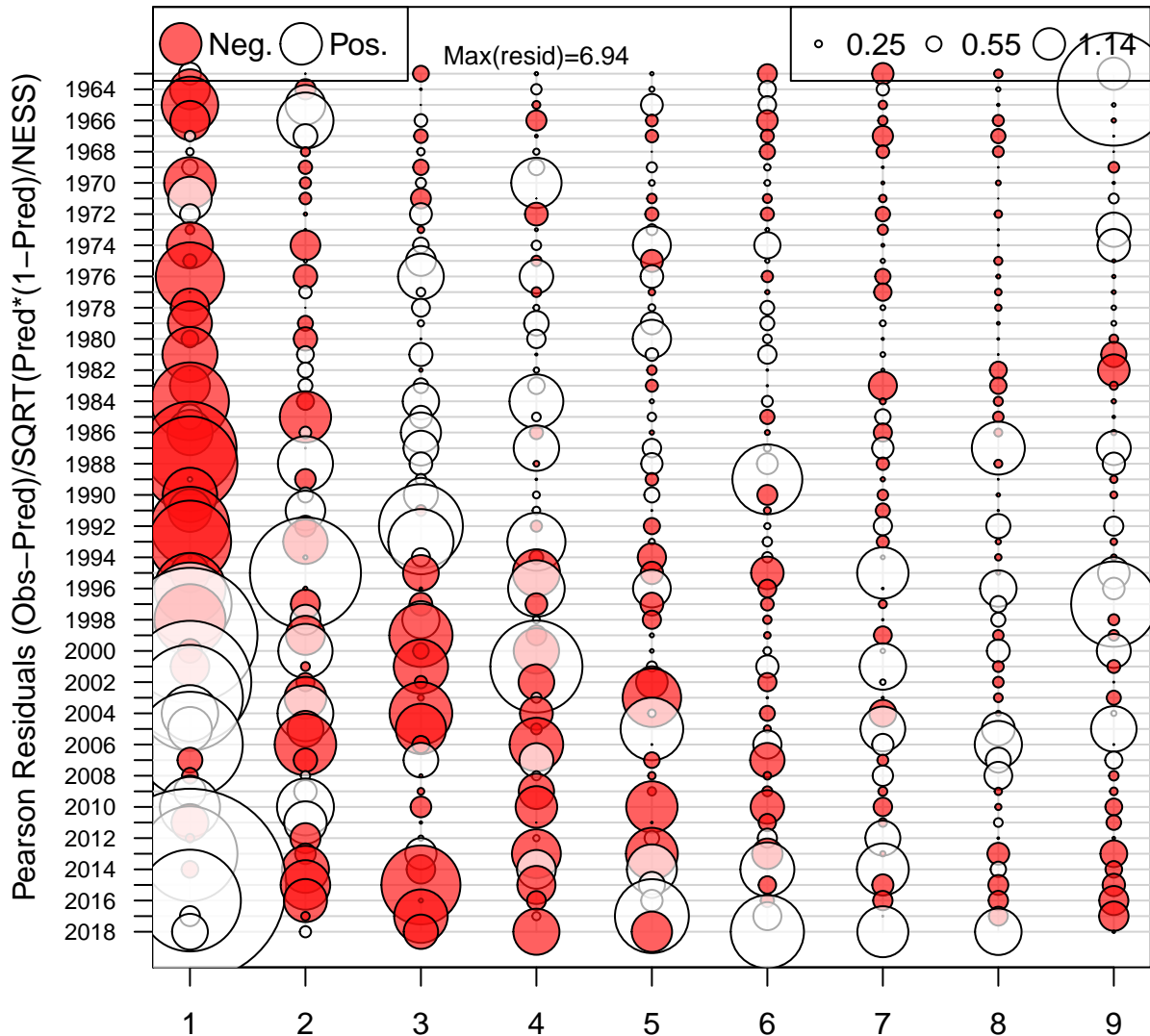


# Age Comp Residuals for Index 1 (INDEX-1)



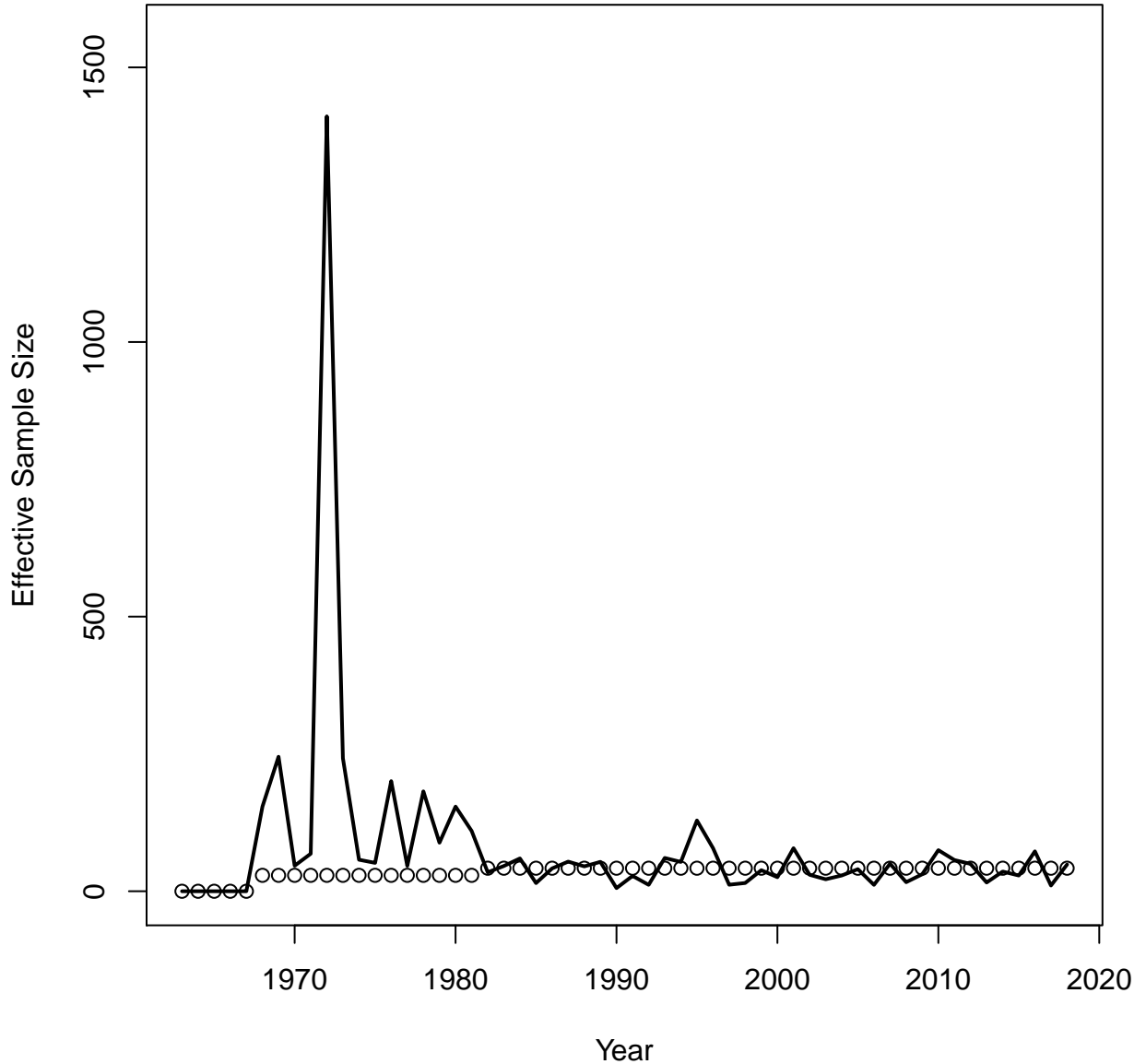
Mean resid = 0.03 SD(resid) = 1.05

## Age Comp Residuals for Index 2 (INDEX-2)

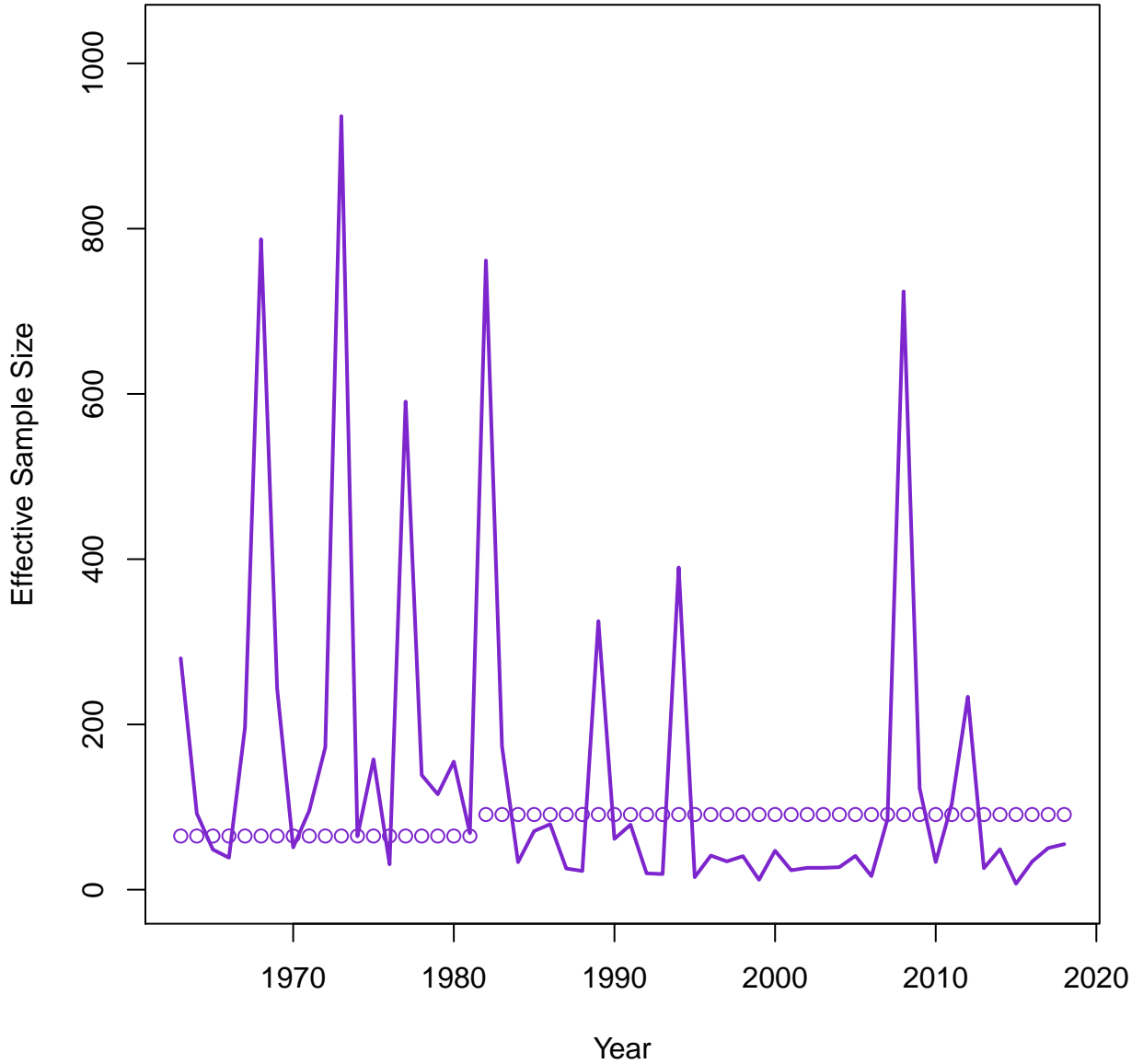


Mean resid = 0.02 SD(resid) = 1.17

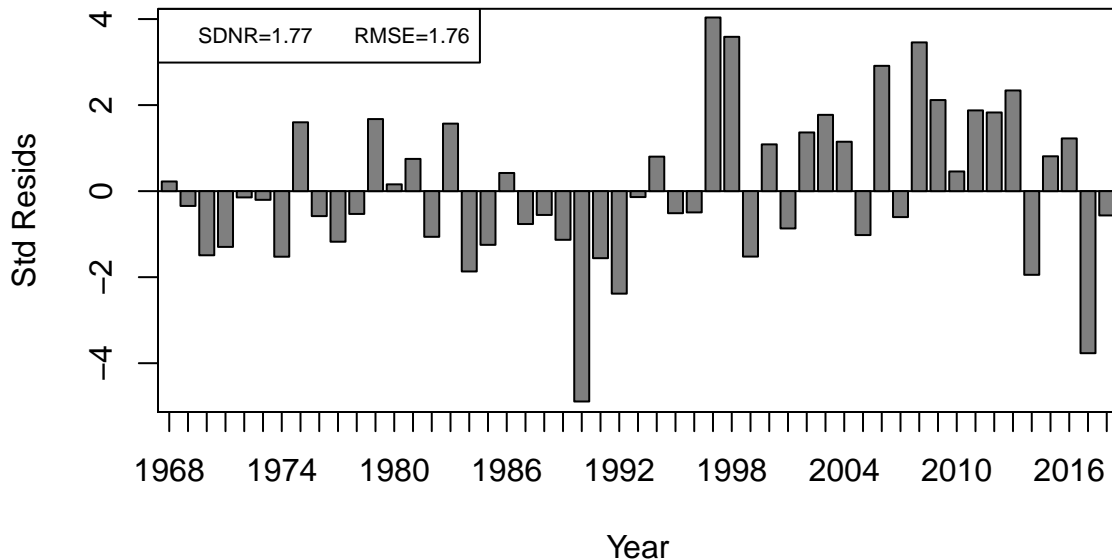
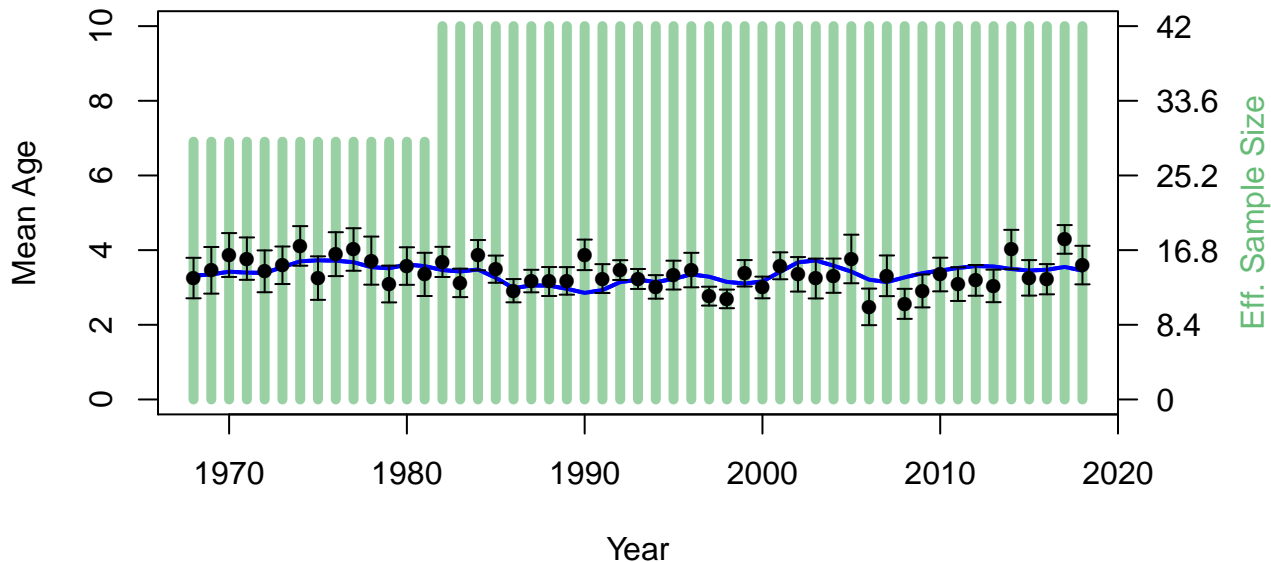
# Index Neff 1 (INDEX-1)



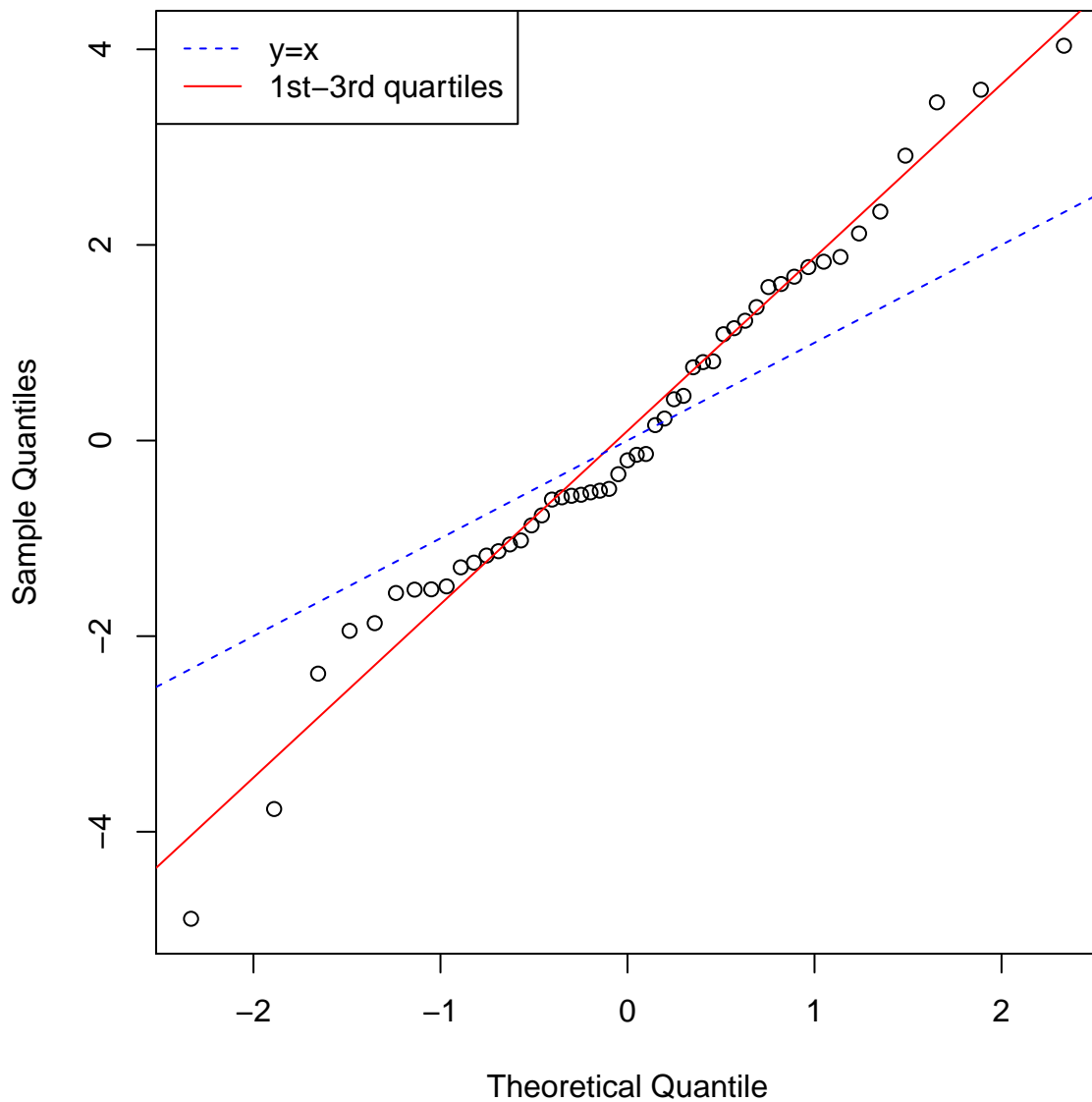
## Index Neff 2 (INDEX-2)



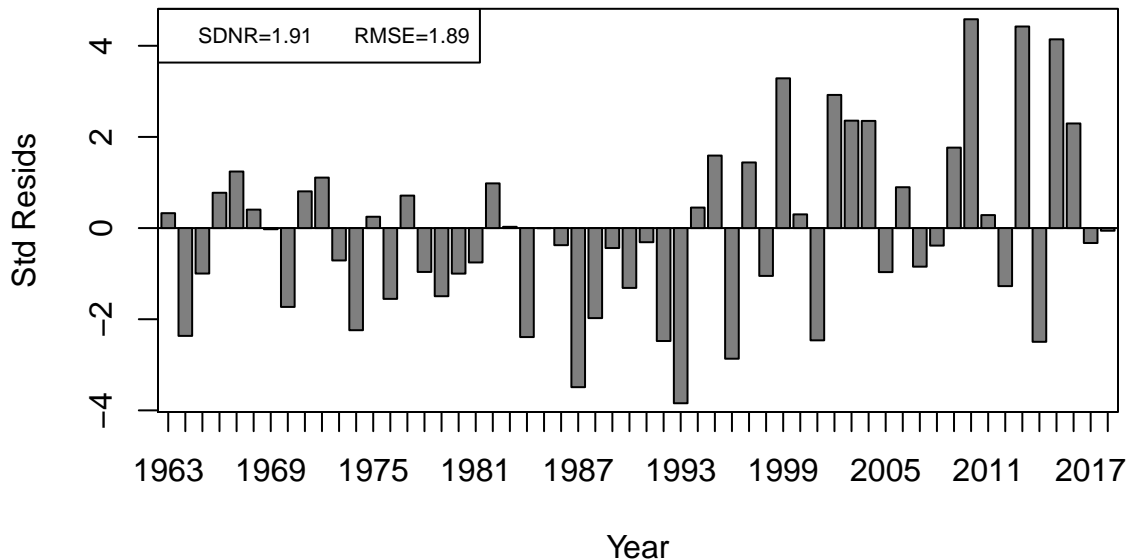
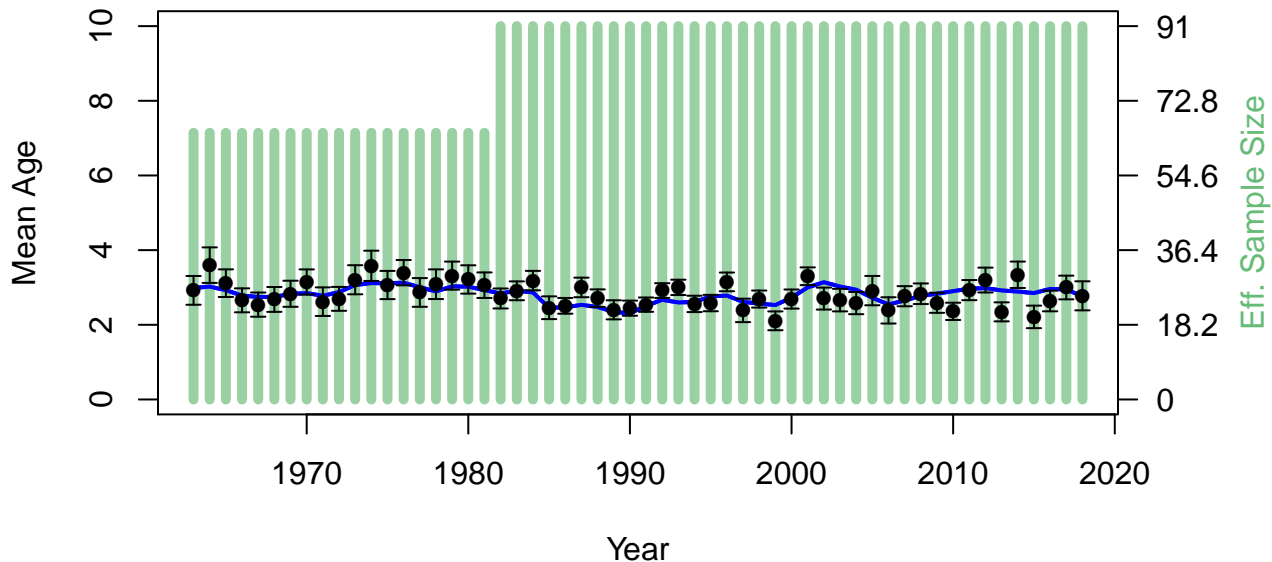
# Index 1 (INDEX-1)



# Index 1 (INDEX-1)

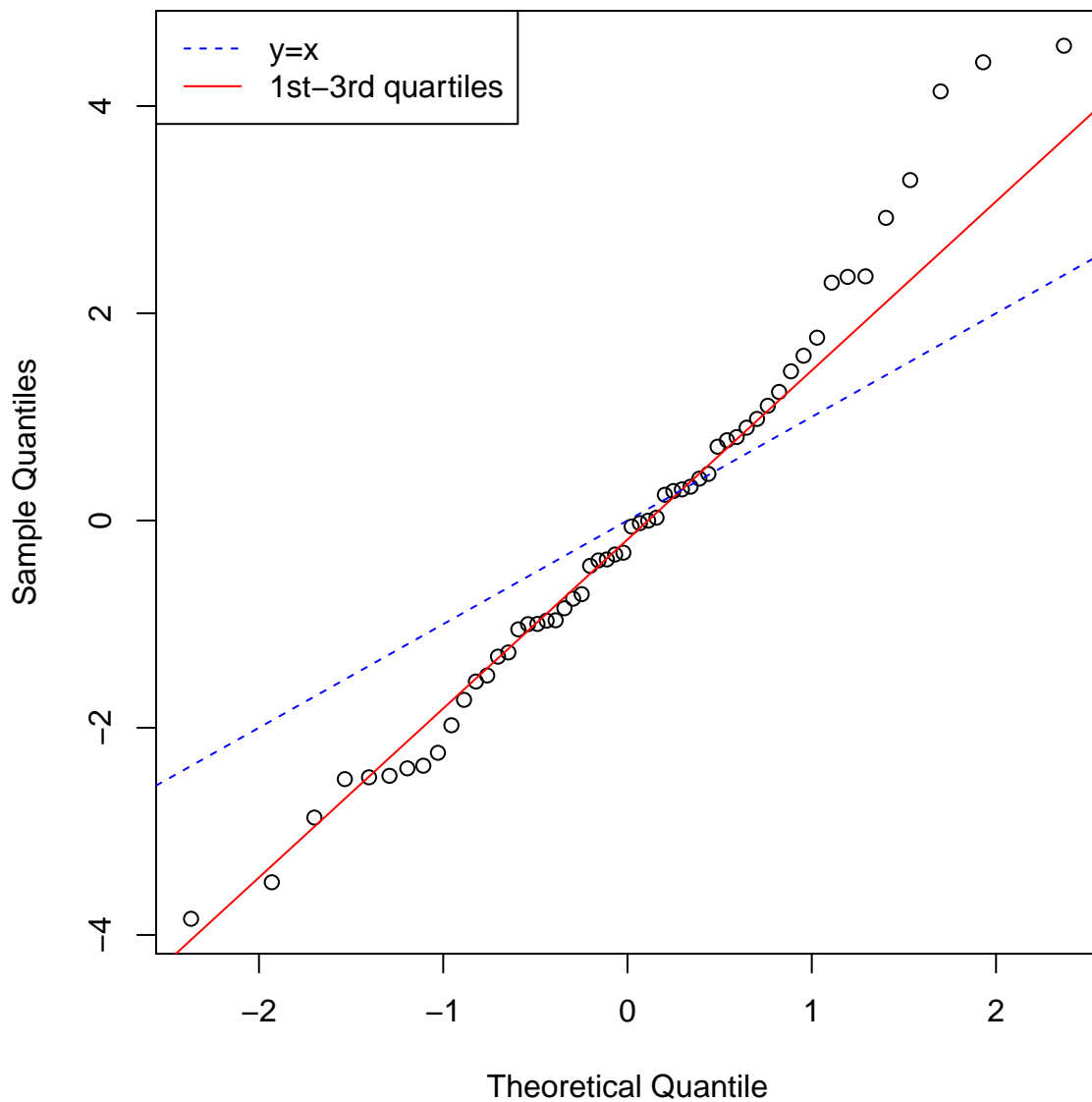


Index 2 (INDEX-2)

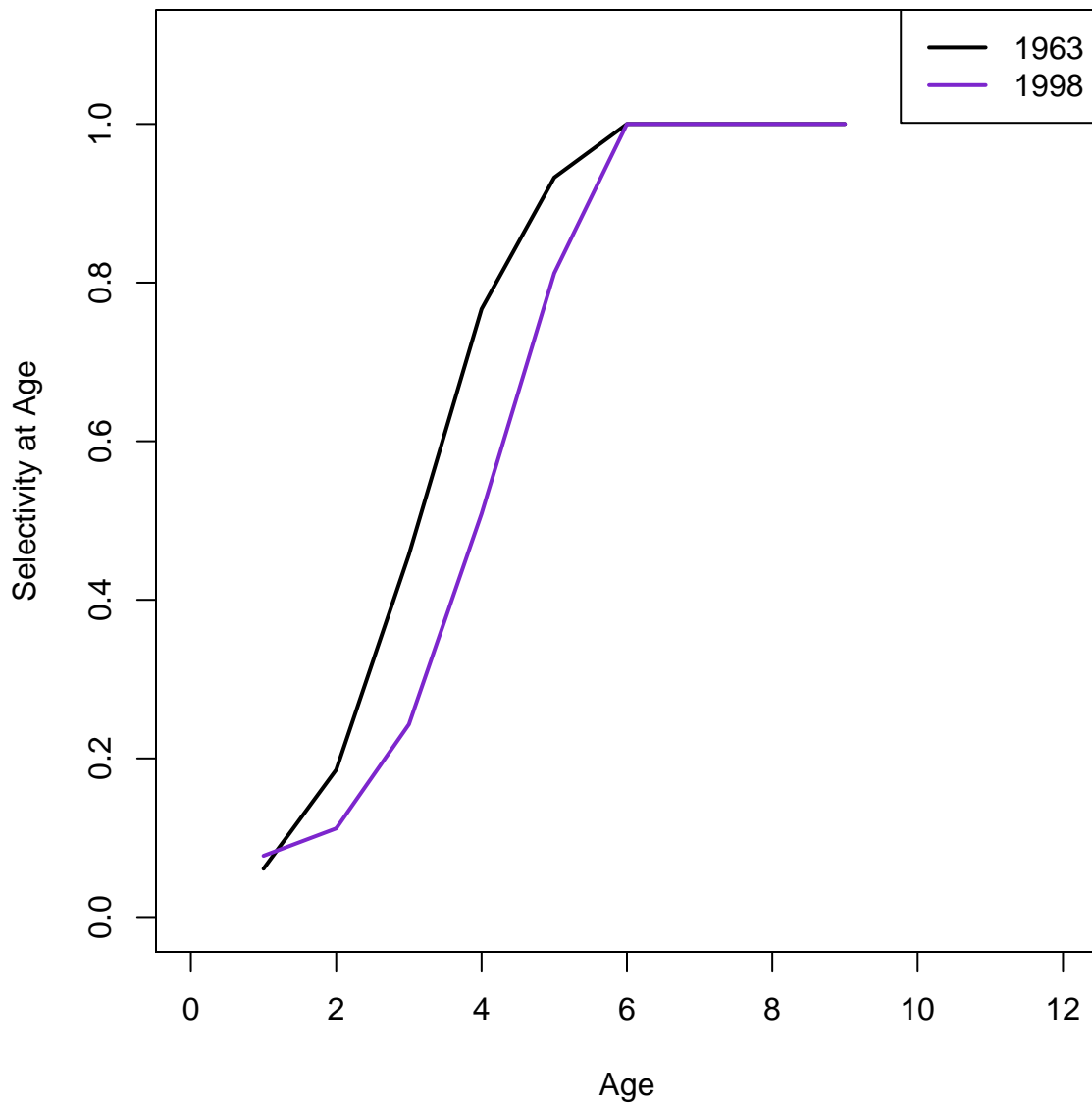


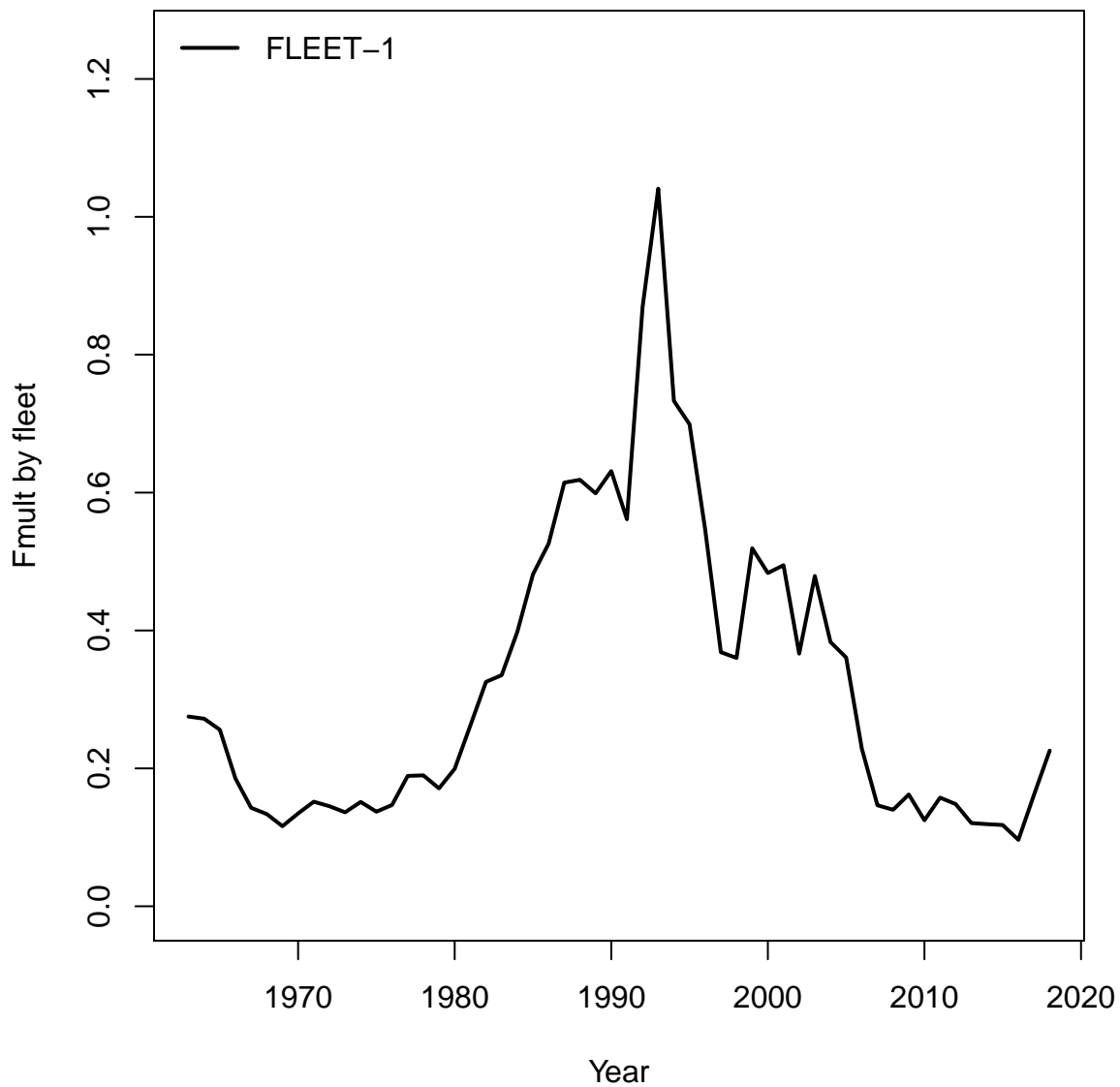


## Index 2 (INDEX-2)

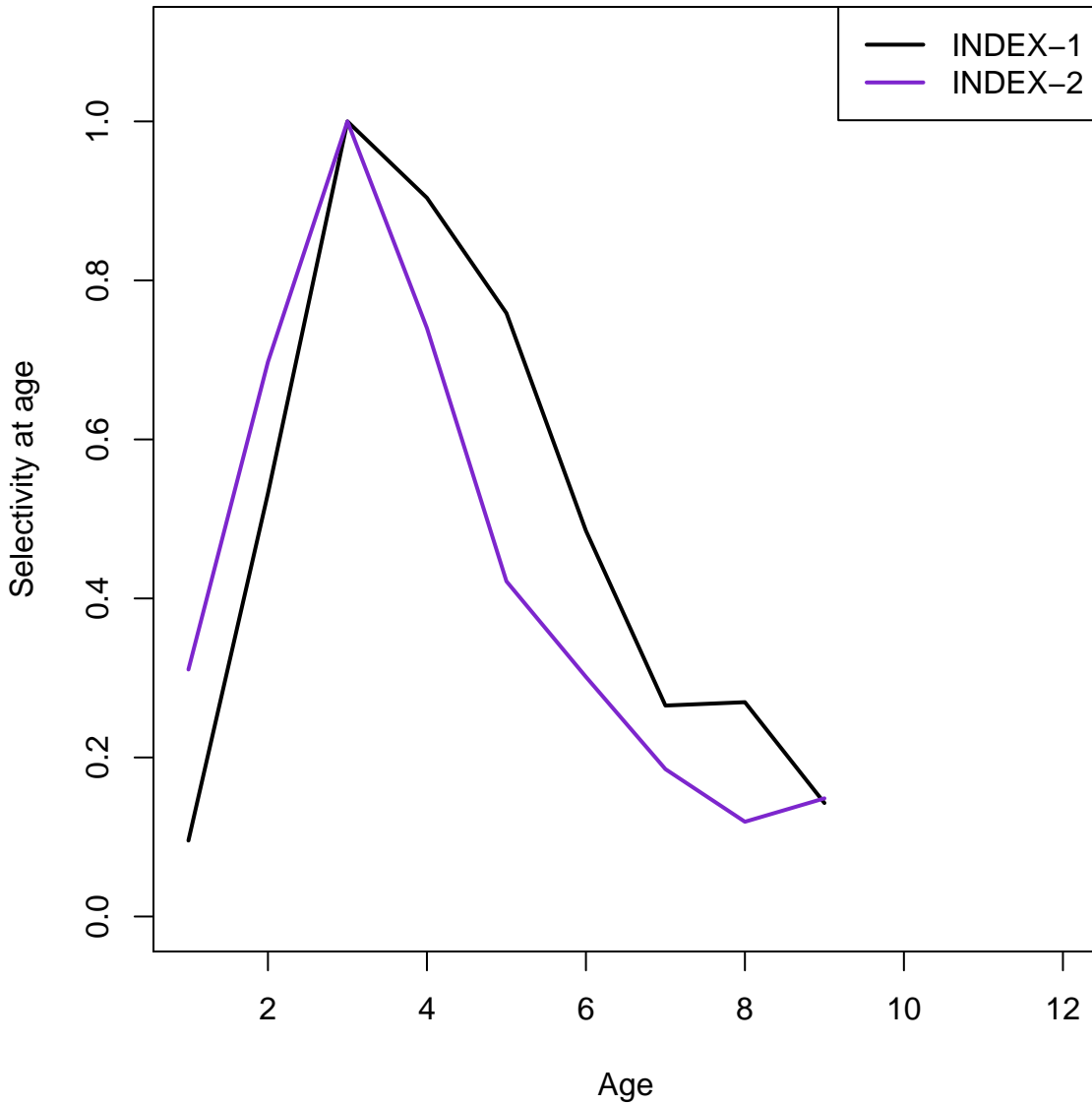


# Fleet 1 (FLEET-1)

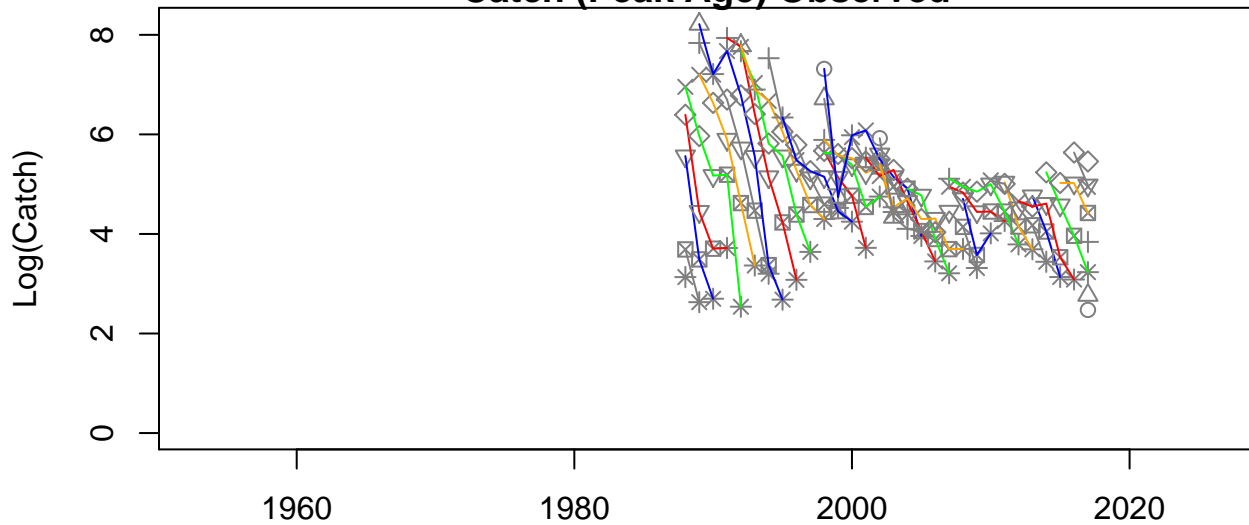




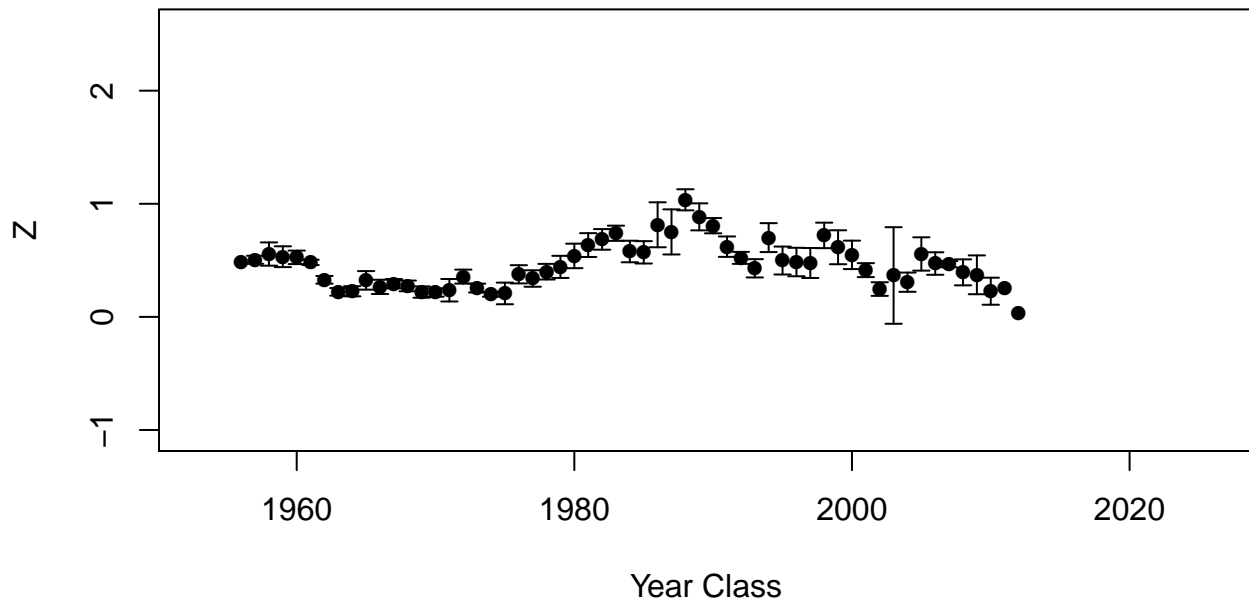
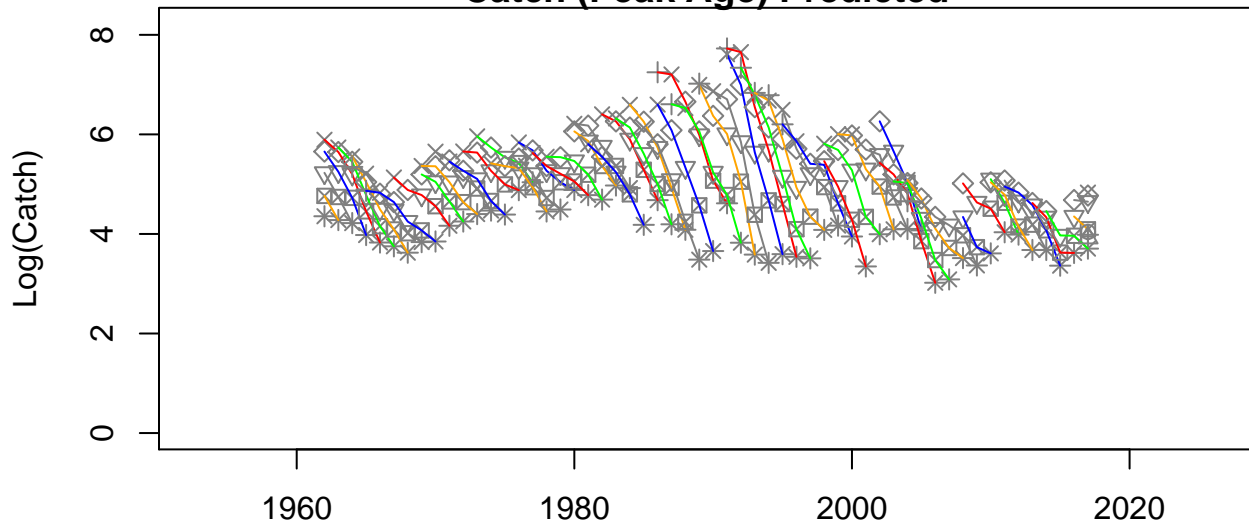
## Indices



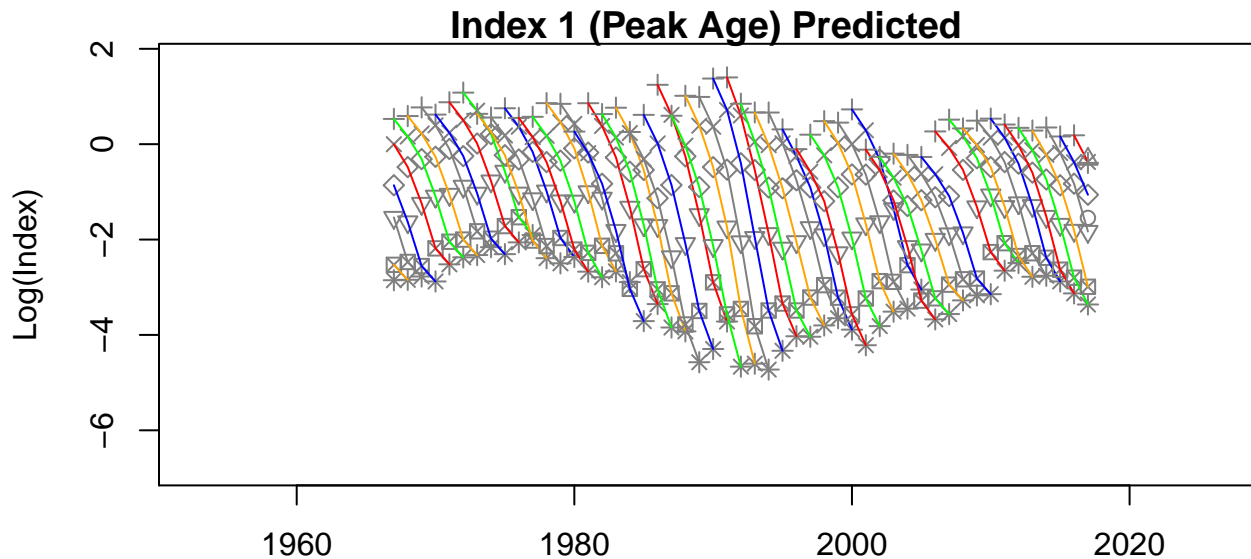
**Catch (Peak Age) Observed**



**Catch (Peak Age) Predicted**

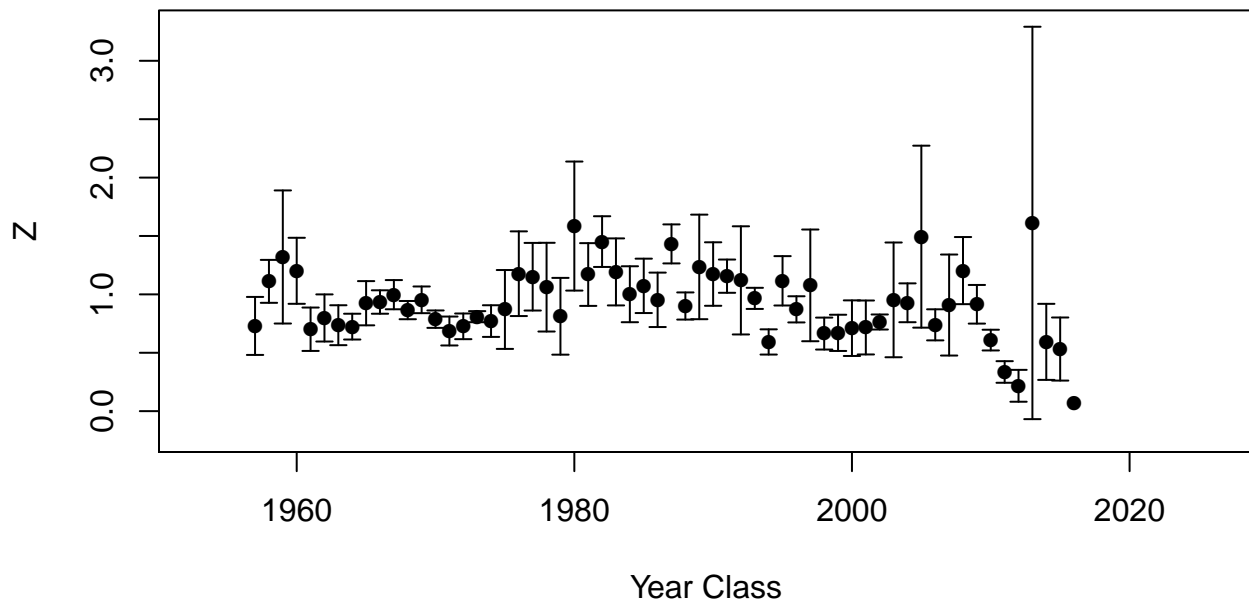




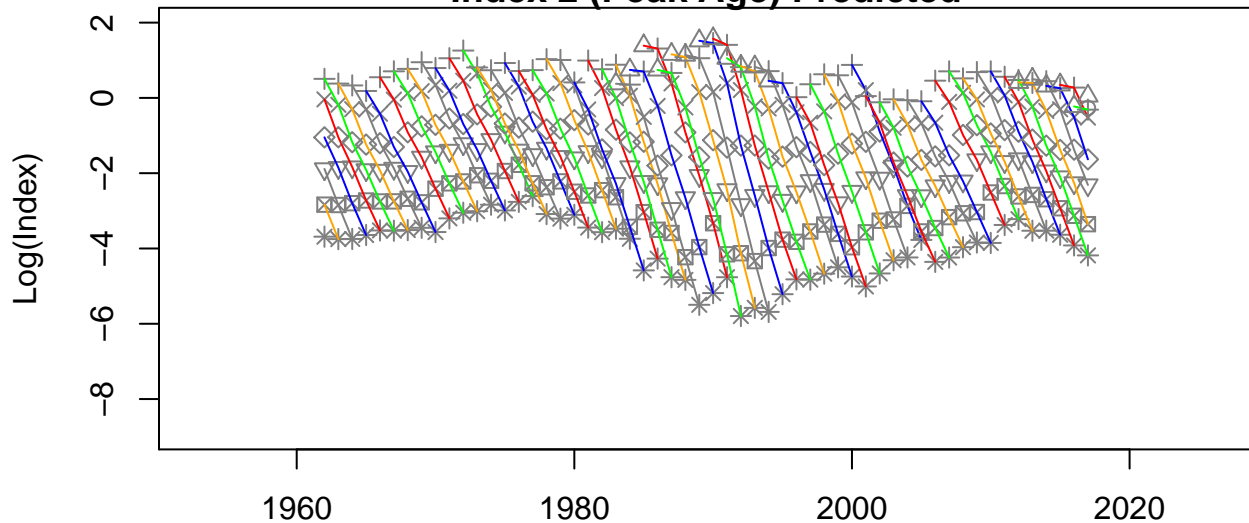




**Index 2 (Peak Age) Observed**



**Index 2 (Peak Age) Predicted**



## Catch Observed

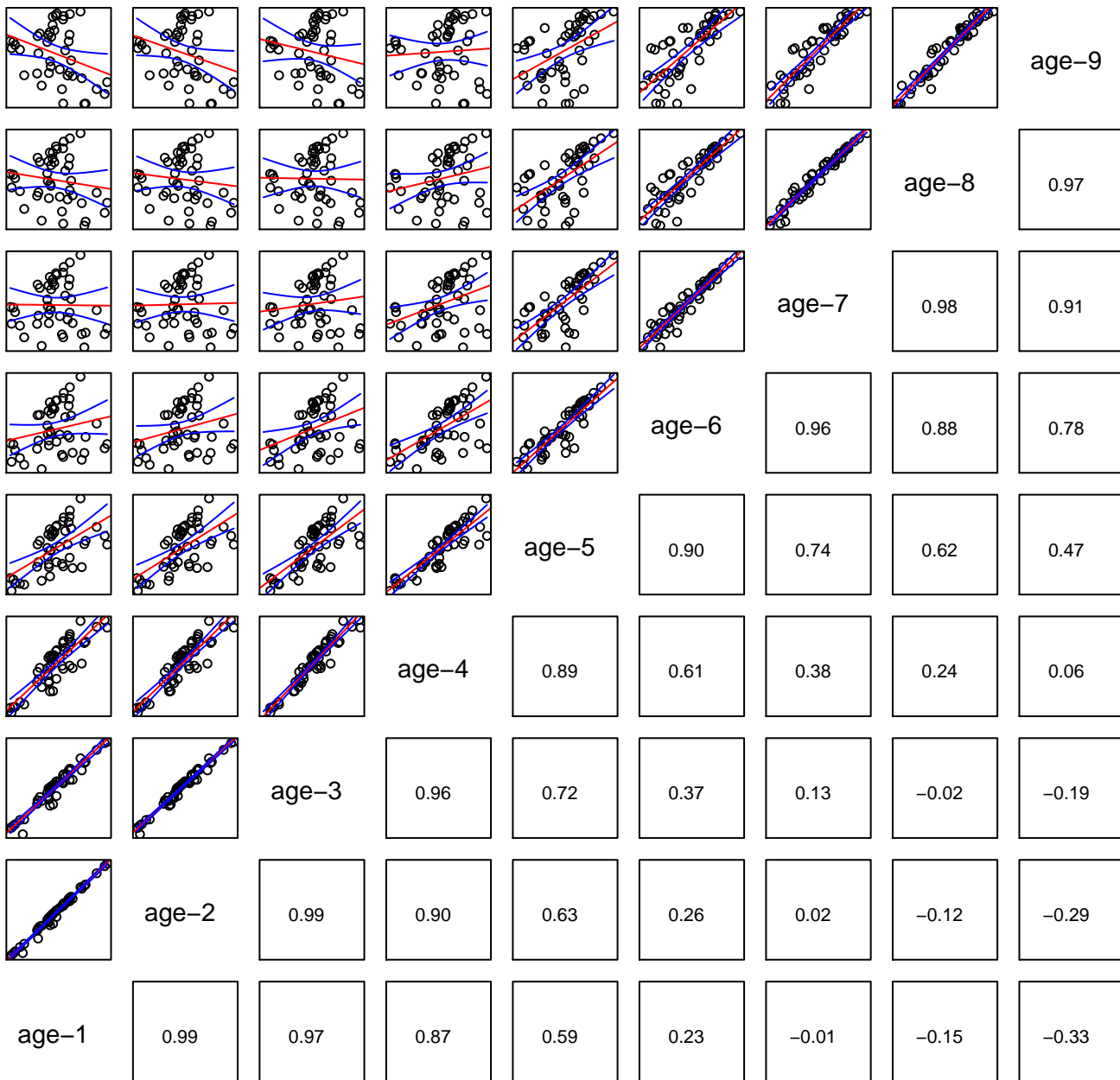




Index 1 (INDEX-1) Observed

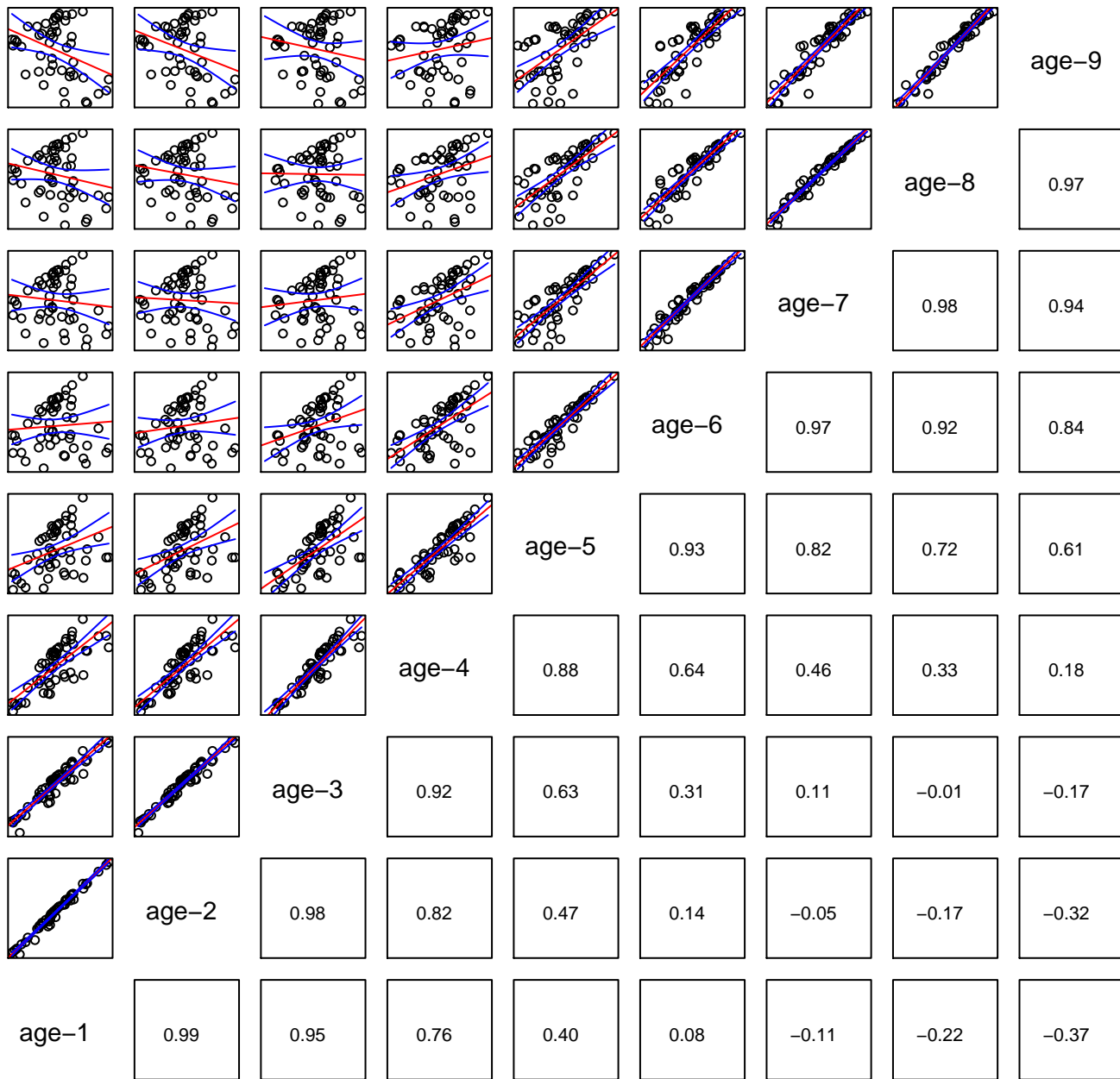


### Index 1 (INDEX-1) Predicted

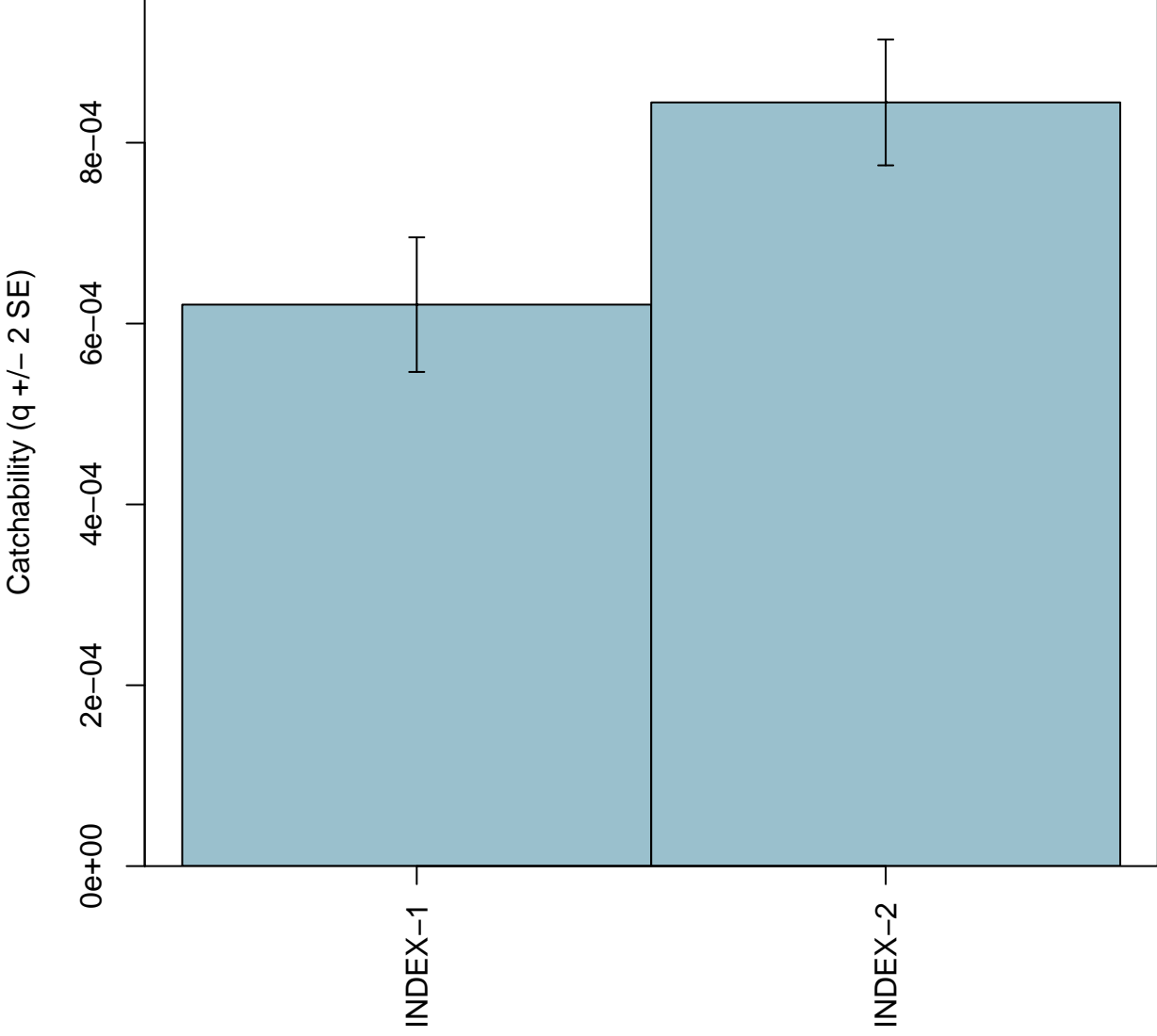


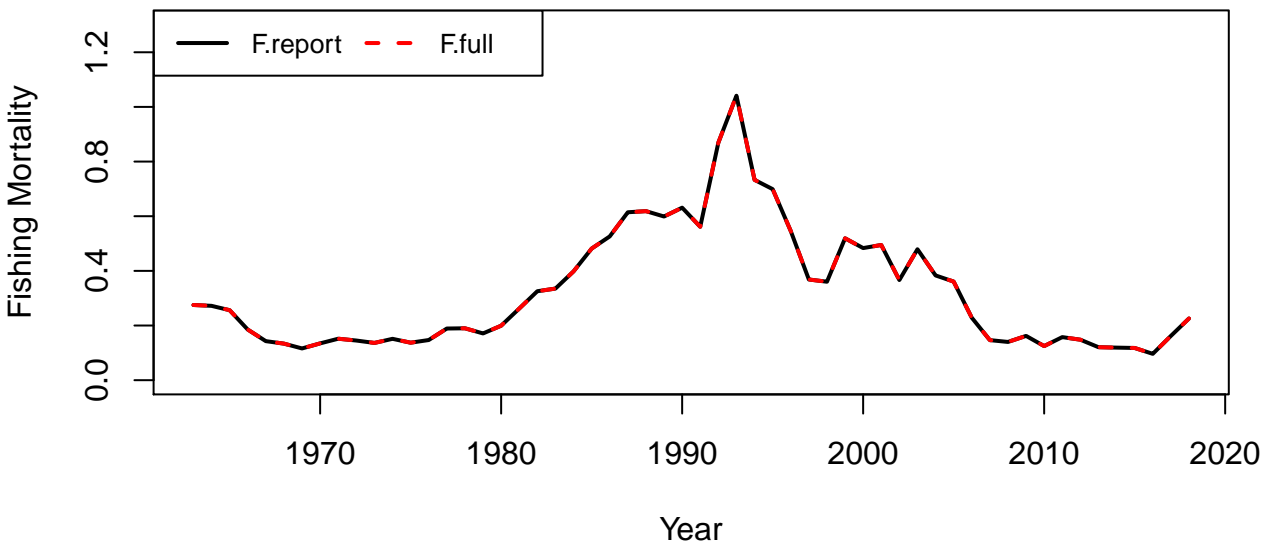
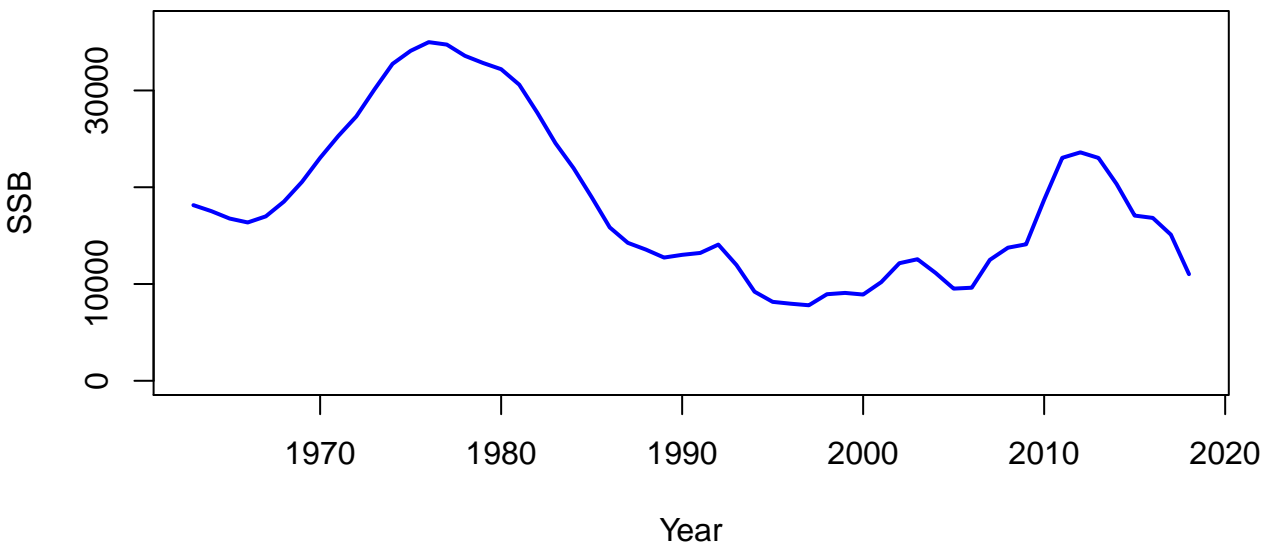


Index 2 (INDEX-2) Predicted

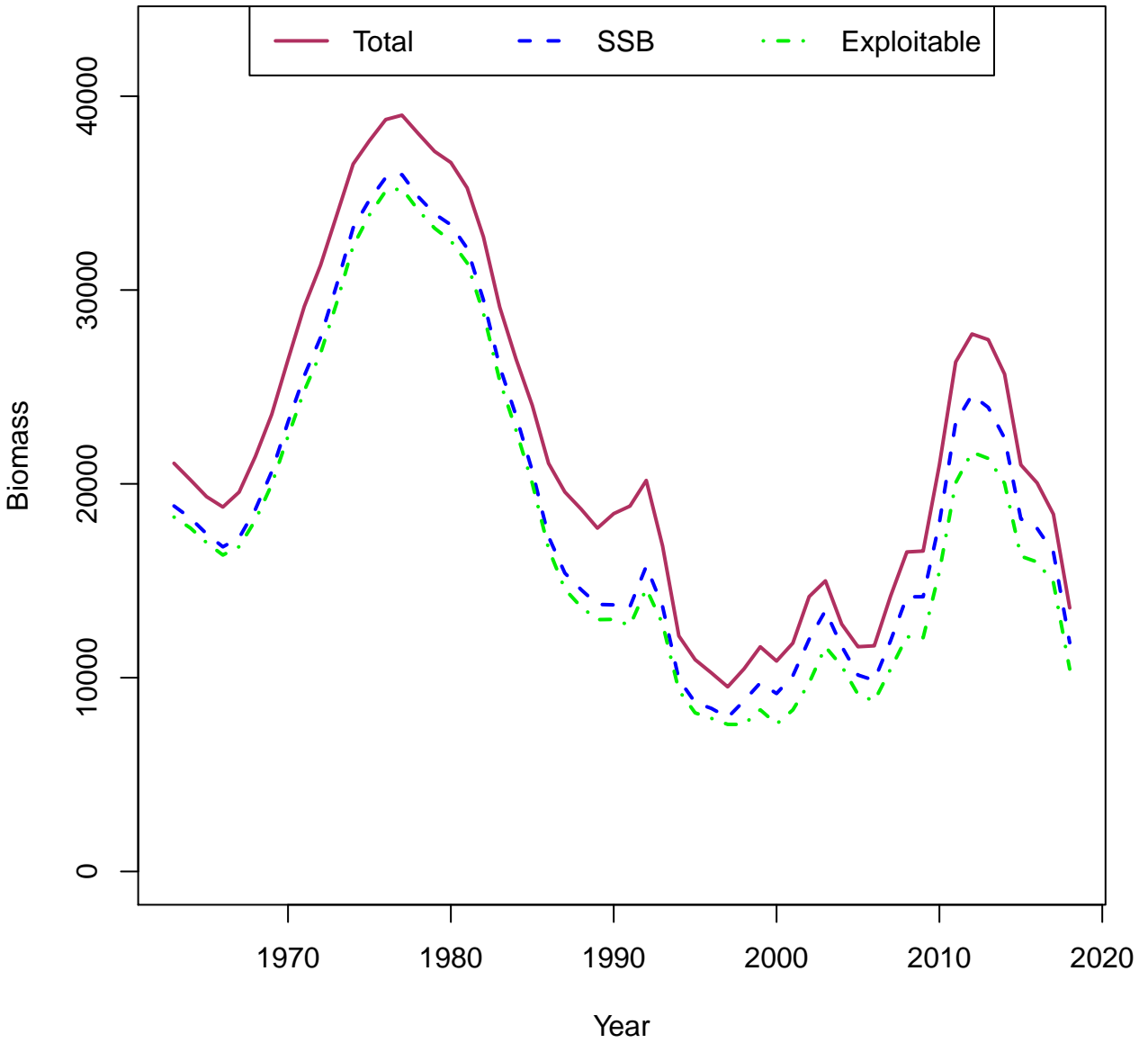


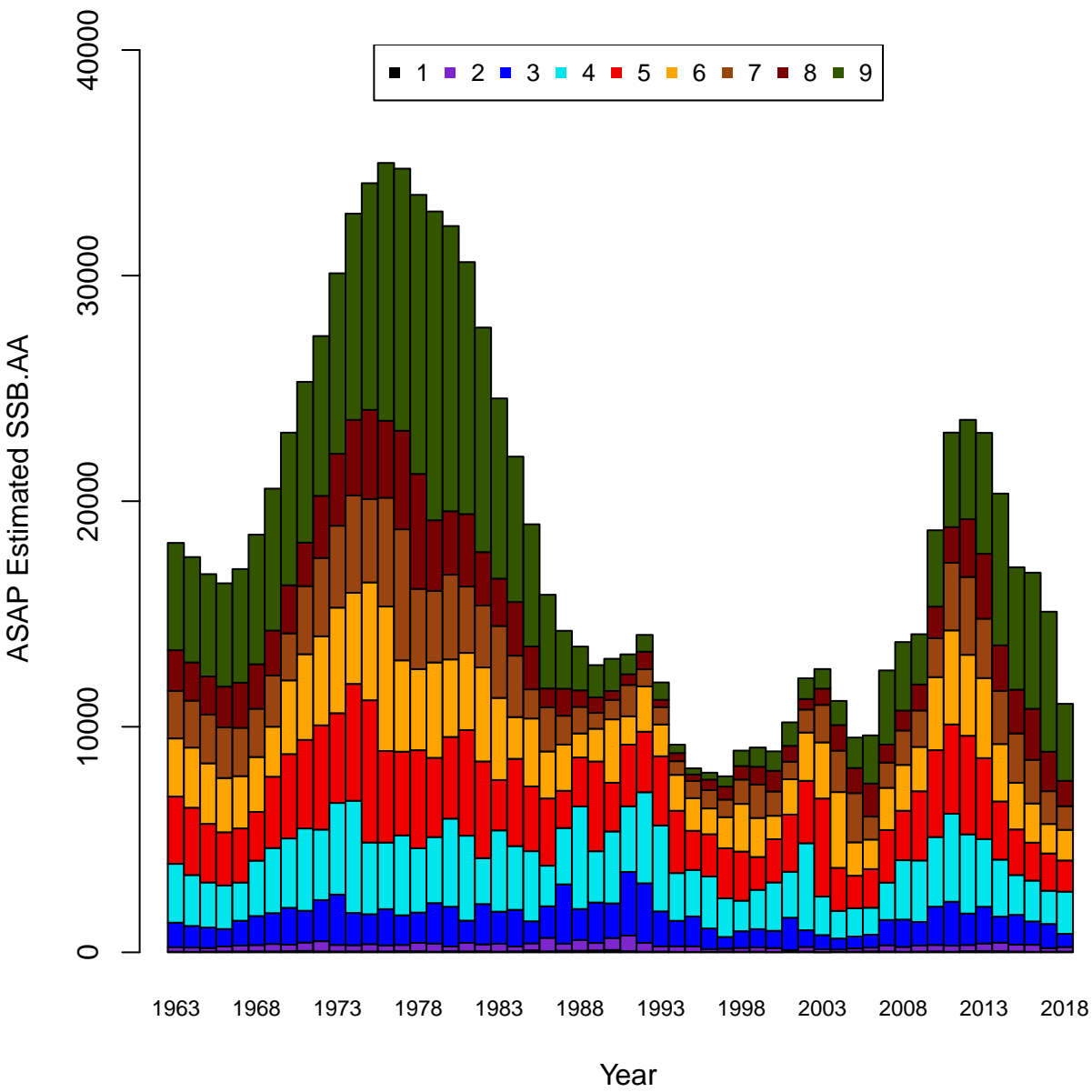


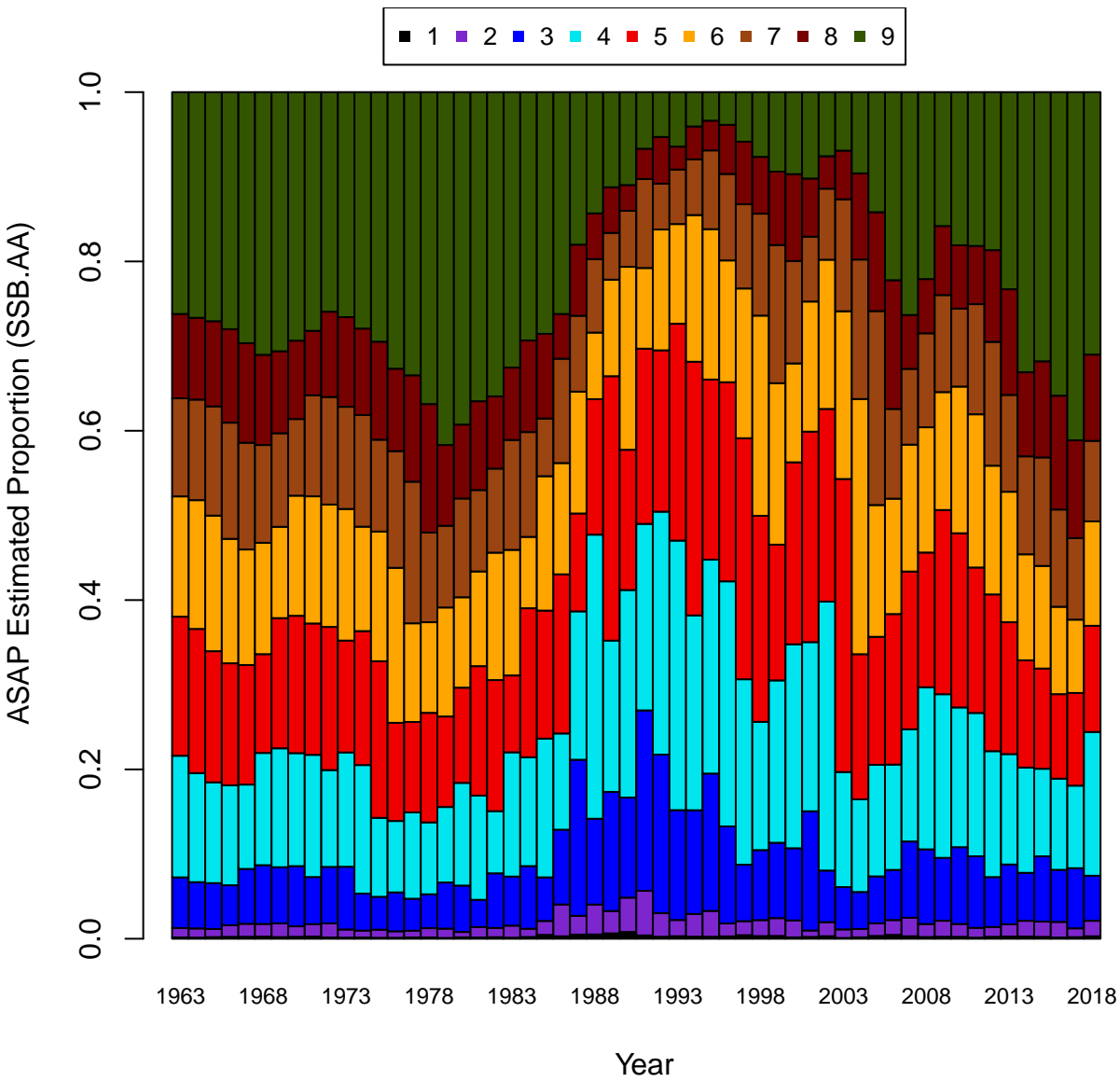


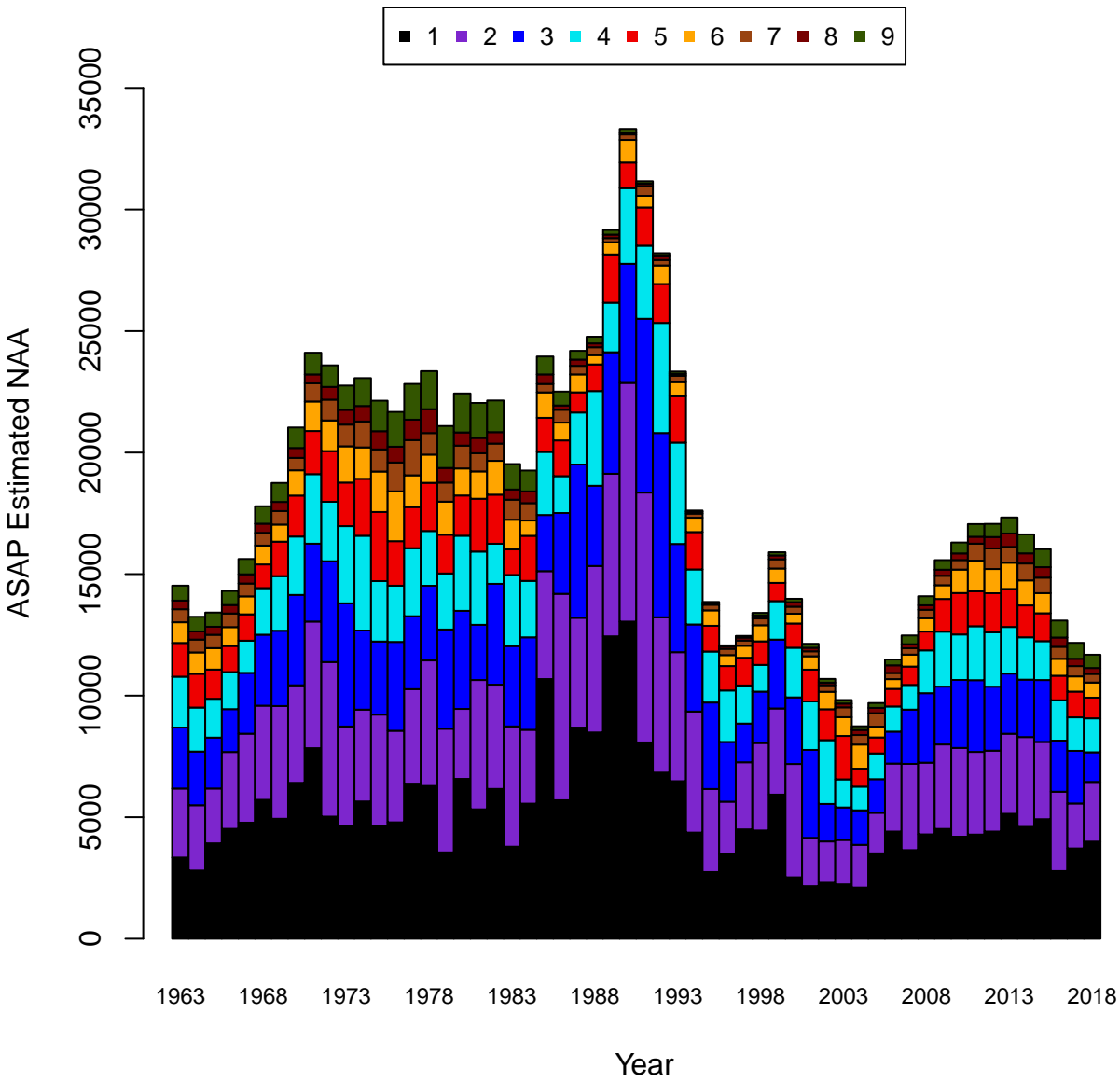


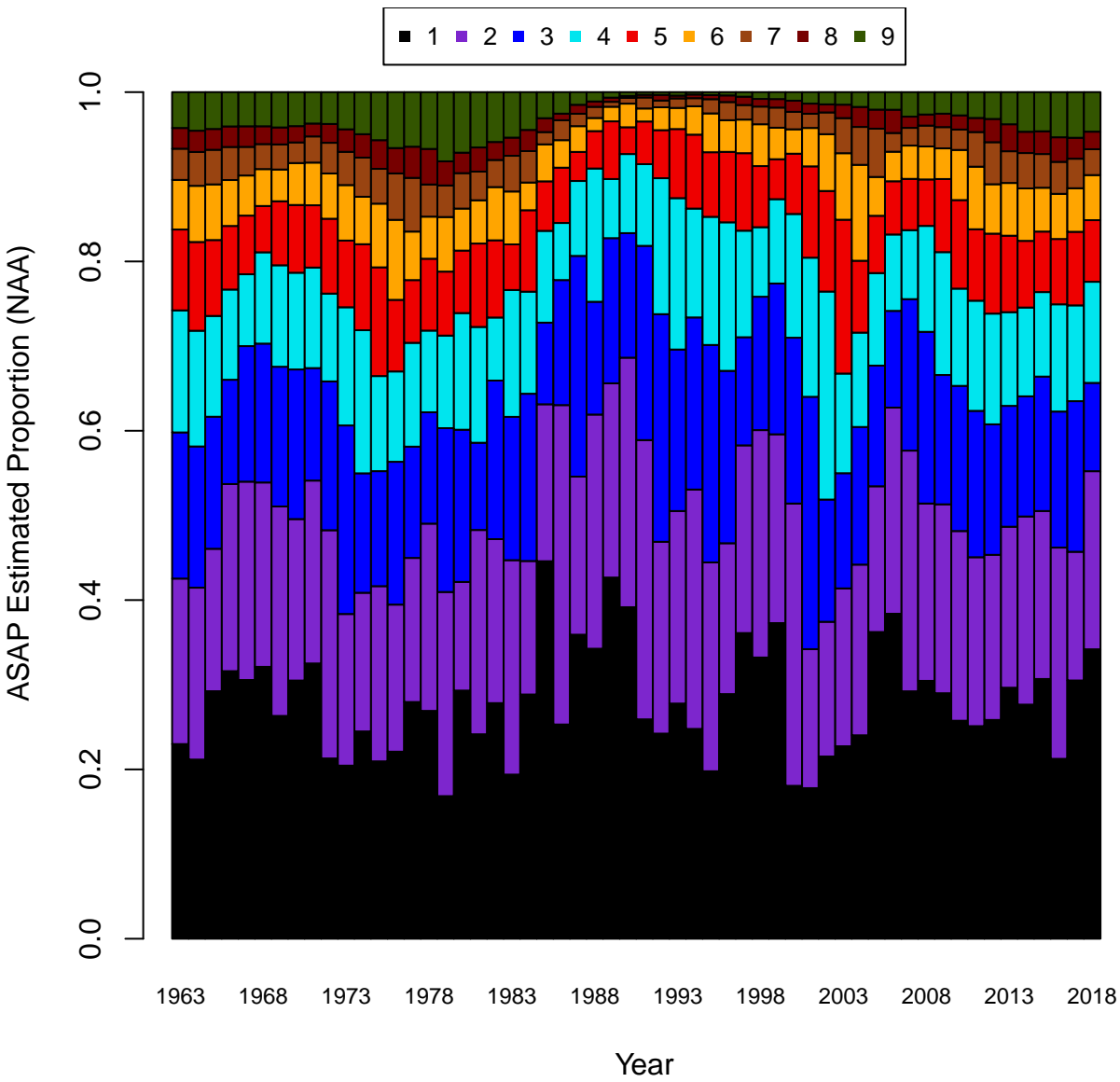
**Comparison of January 1 Biomass**

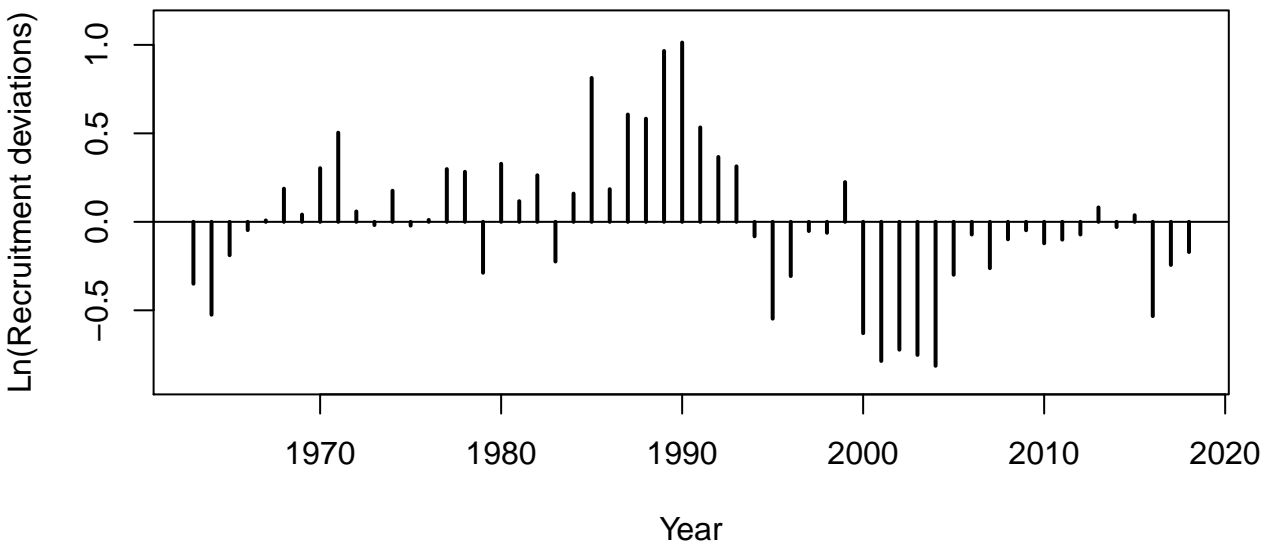
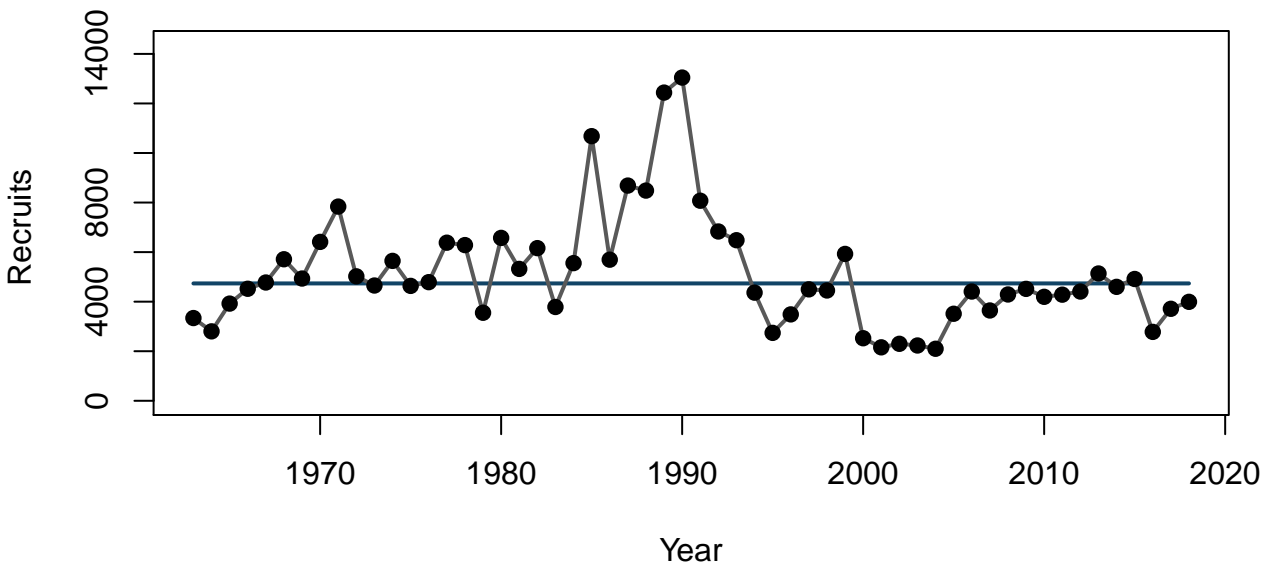




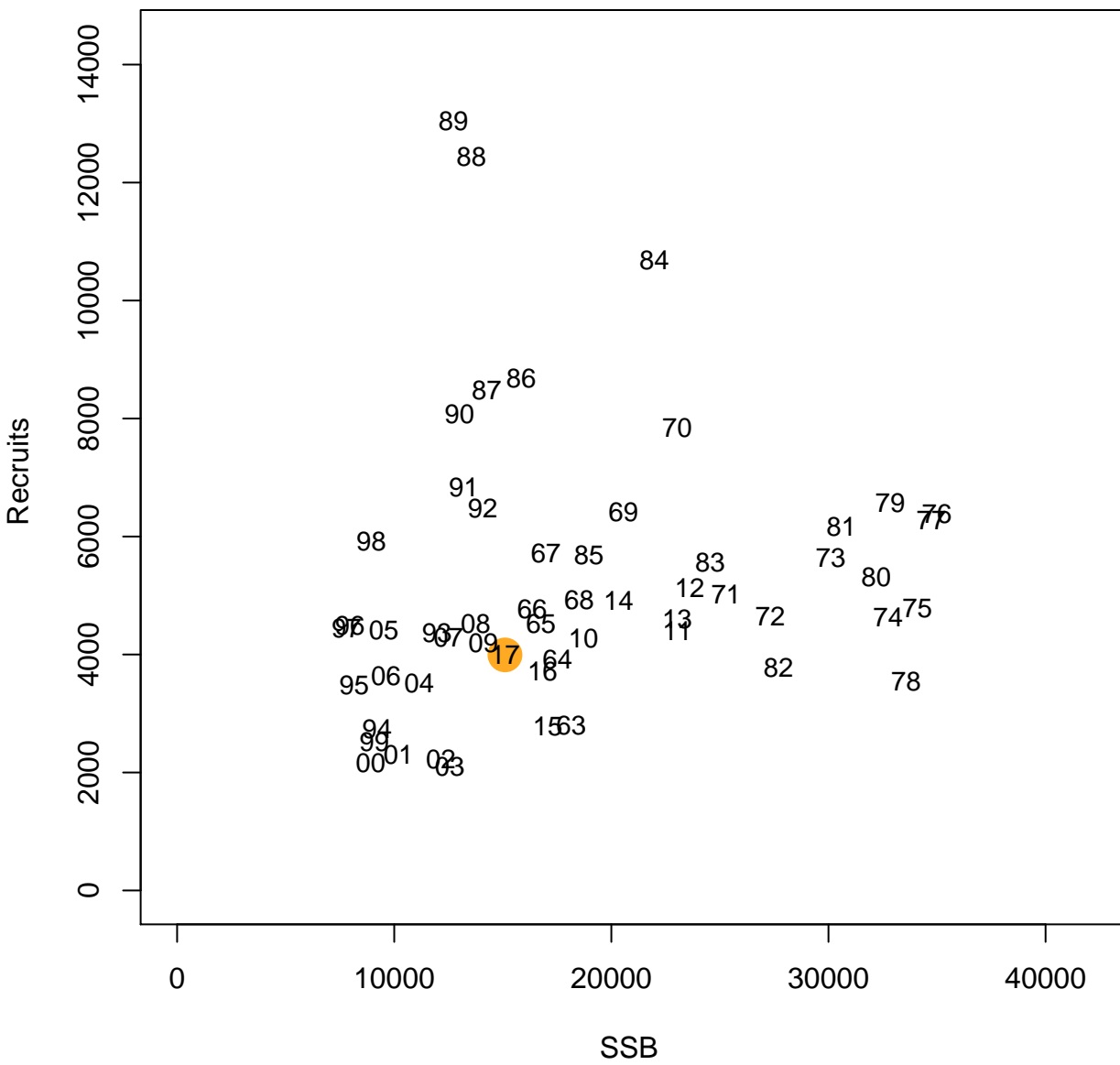


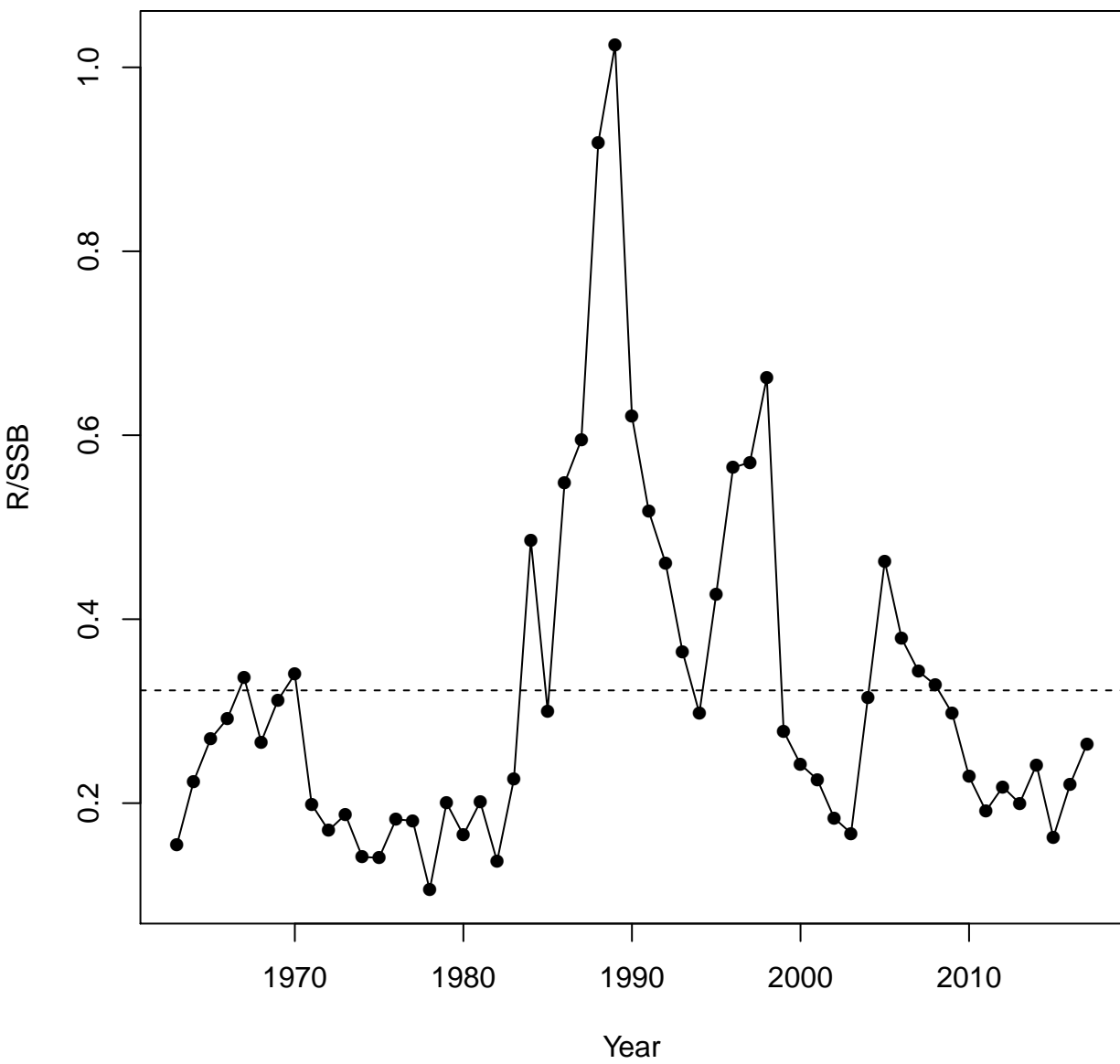


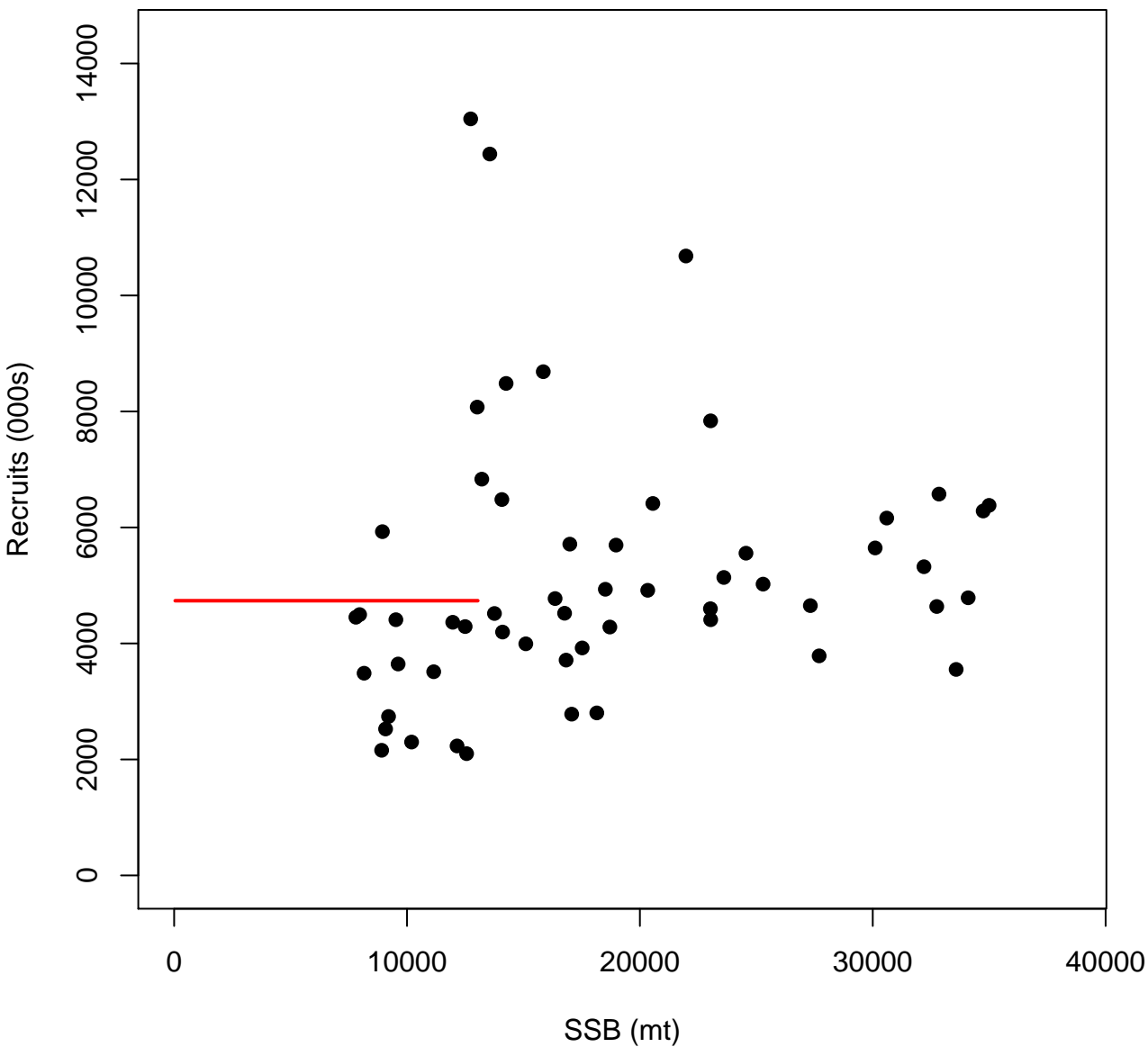


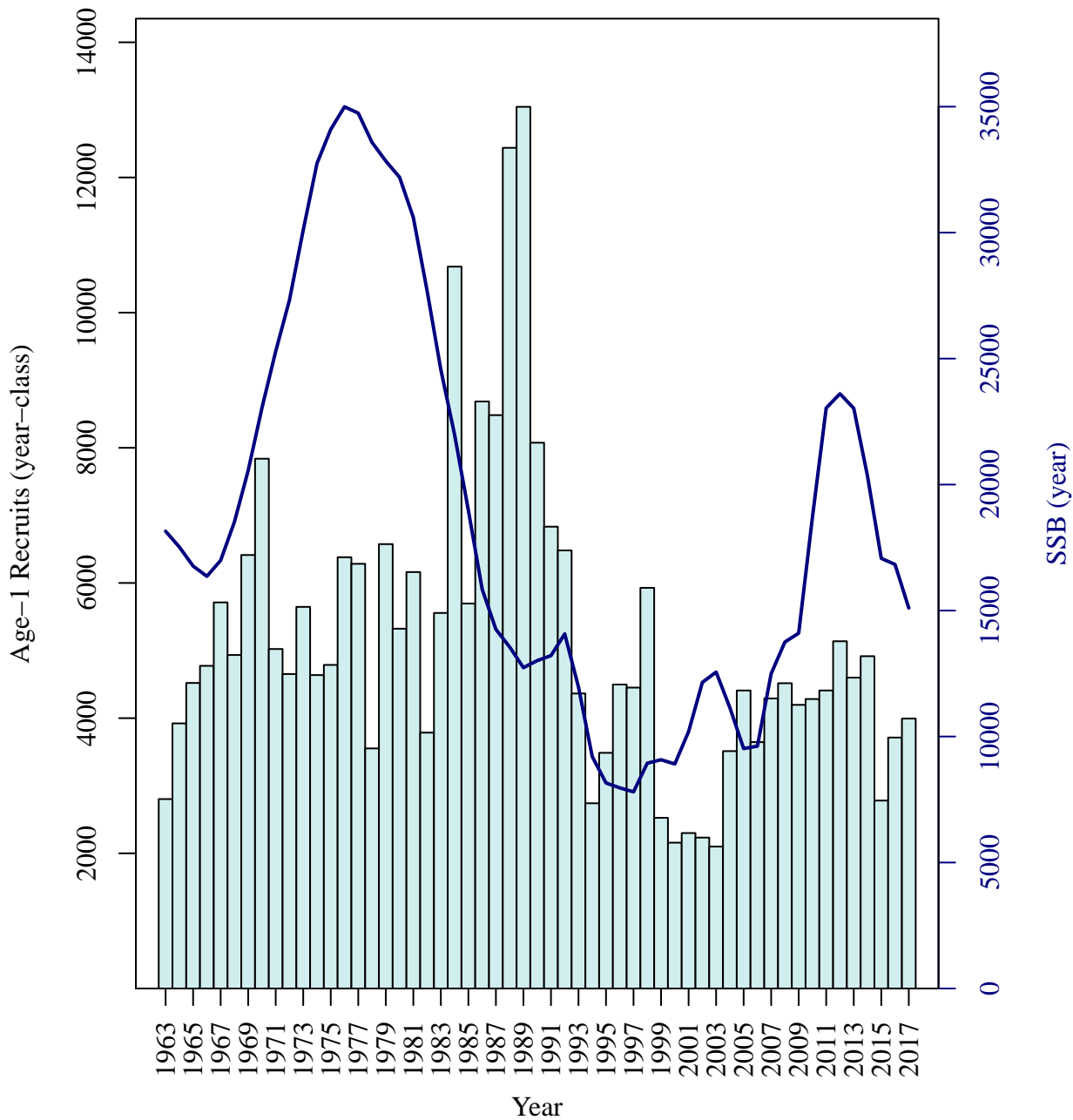


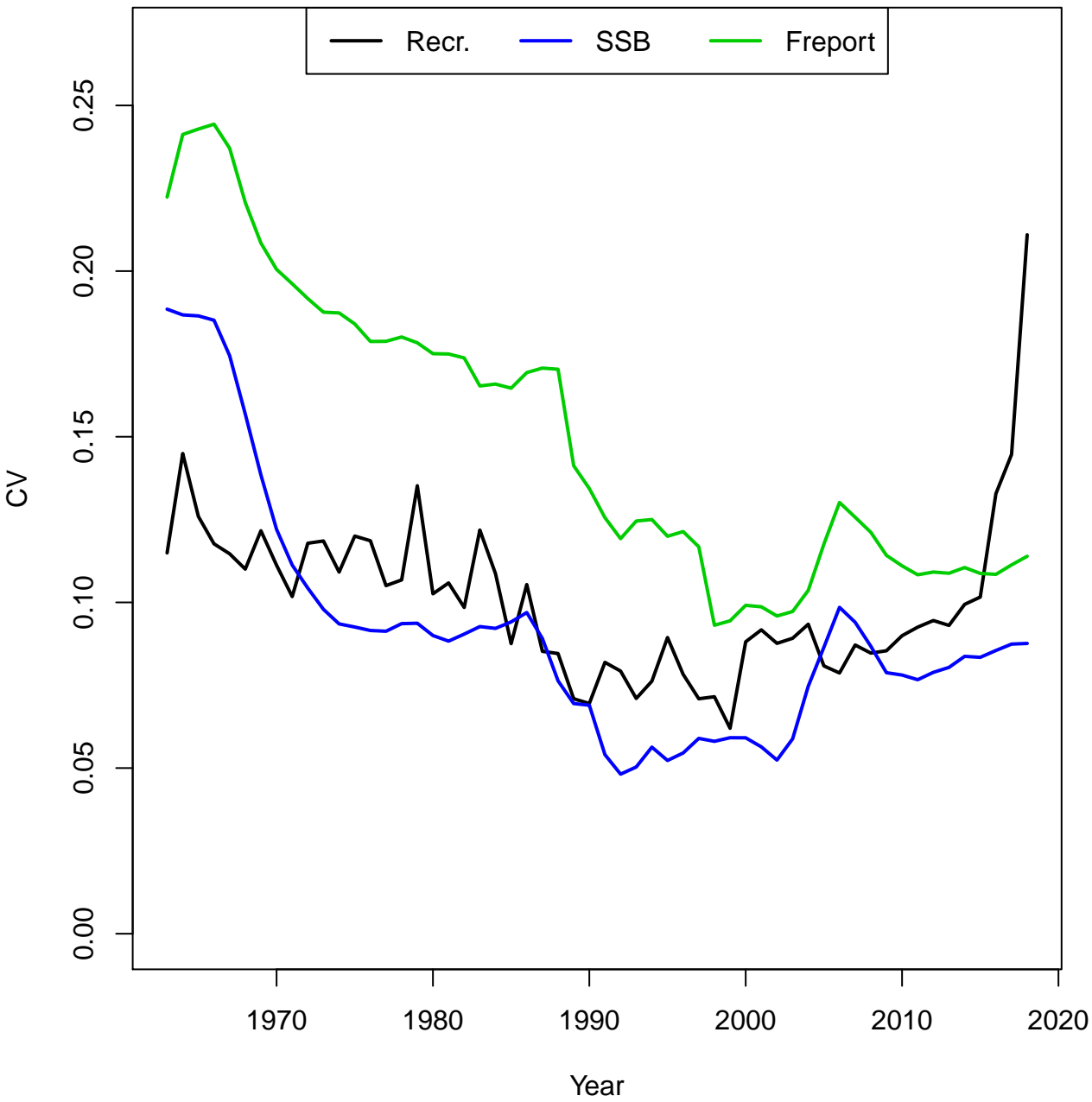




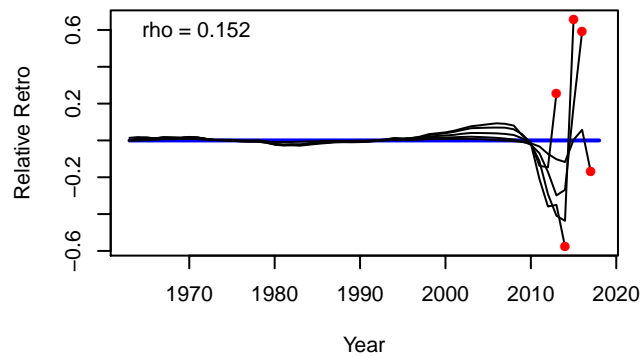
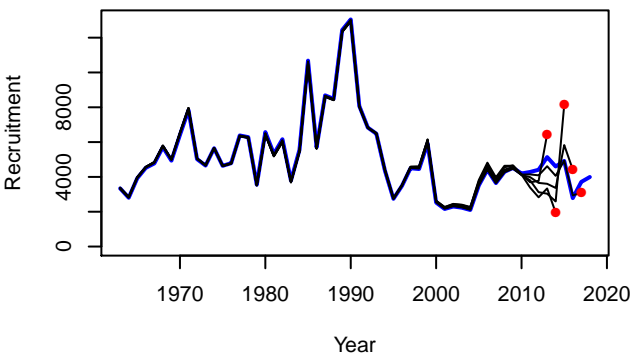
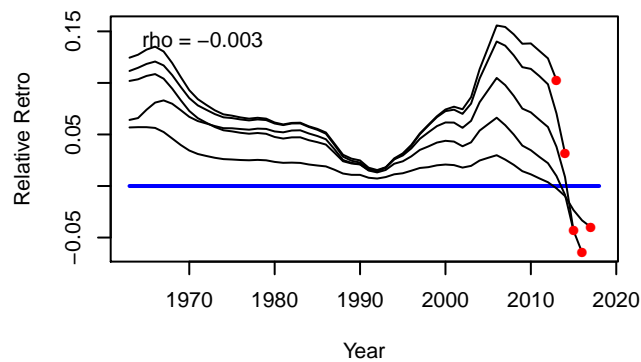
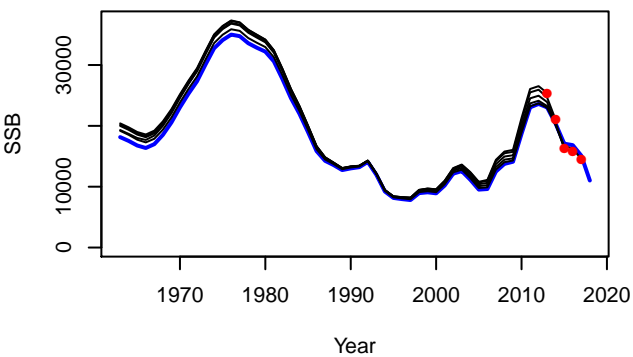
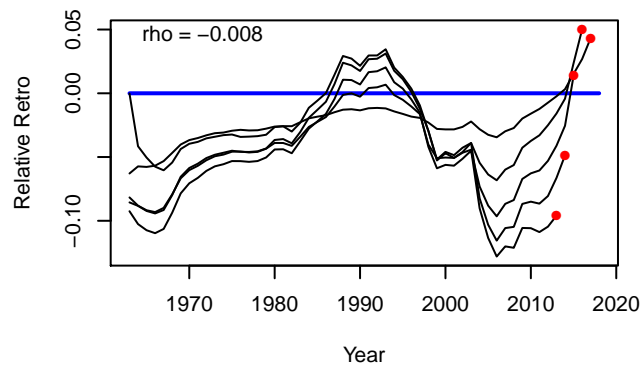
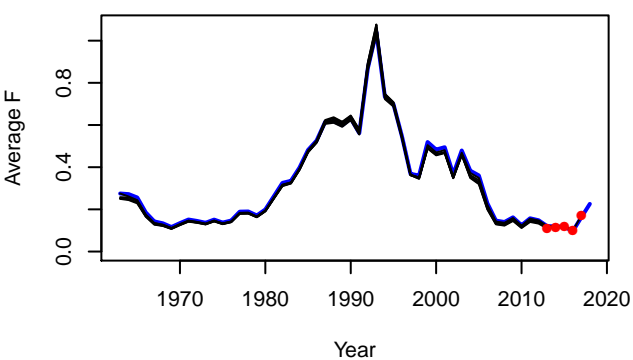






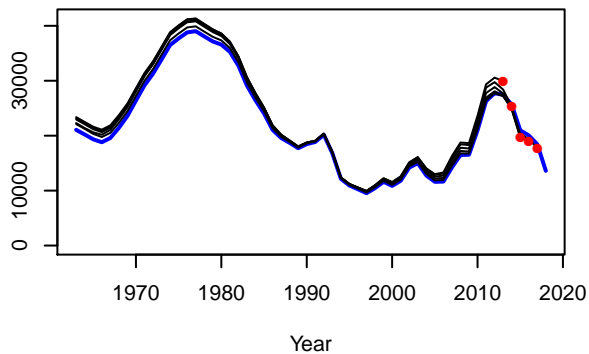


# F, SSB, R

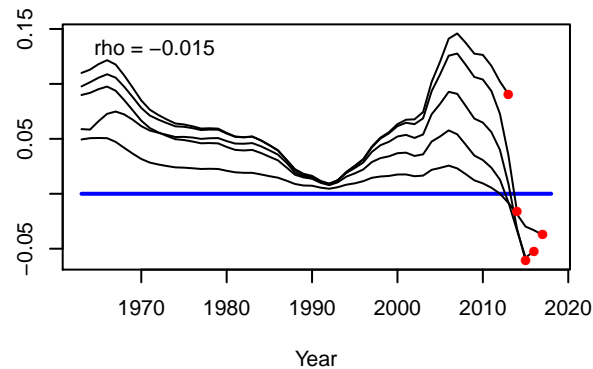


# Jan-1 B, Exploitable B, Total Stock N

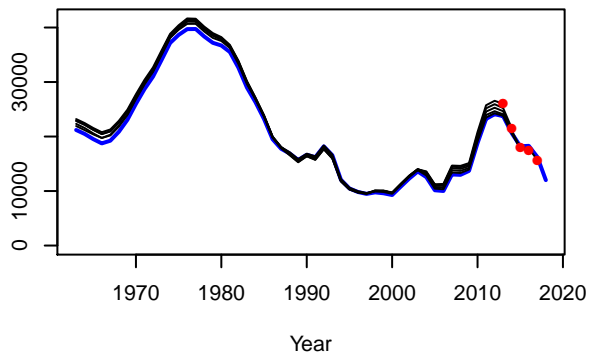
Jan-1 B



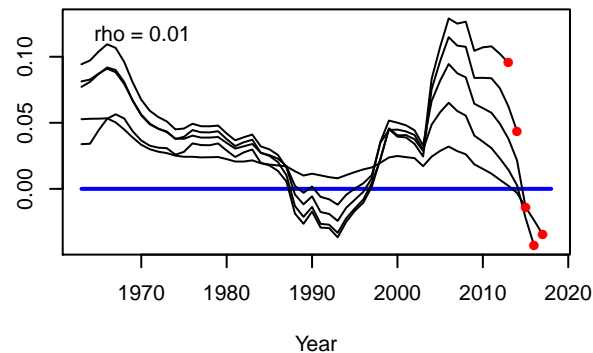
Relative Retro



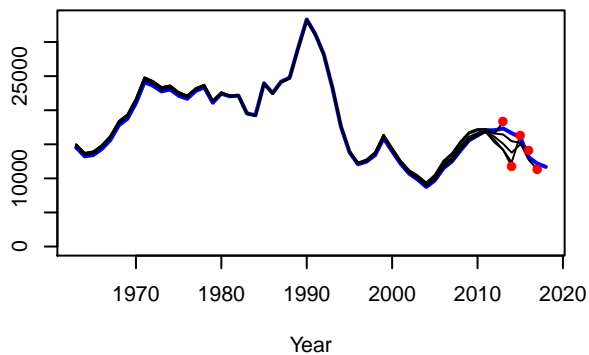
Exploitable B



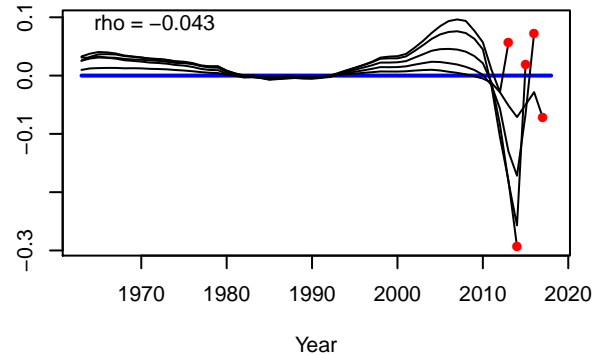
Relative Retro



Total Stock N

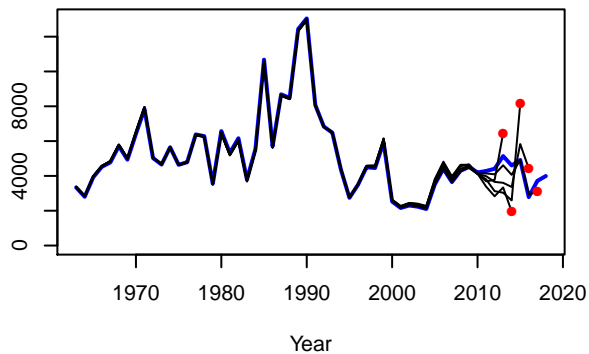


Relative Retro

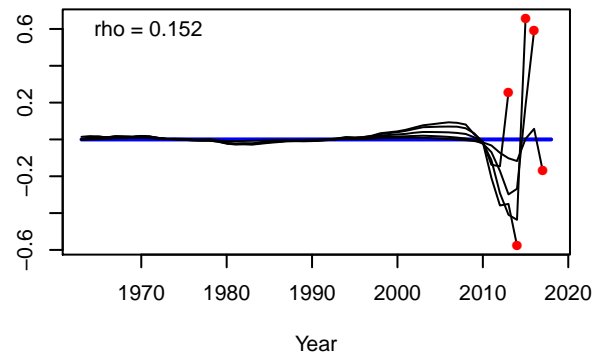


# Stock Numbers at Age

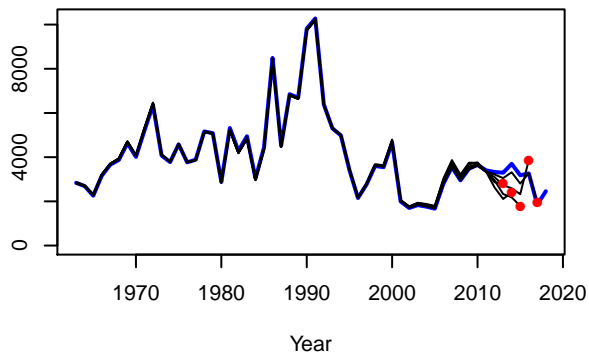
N at Age 1



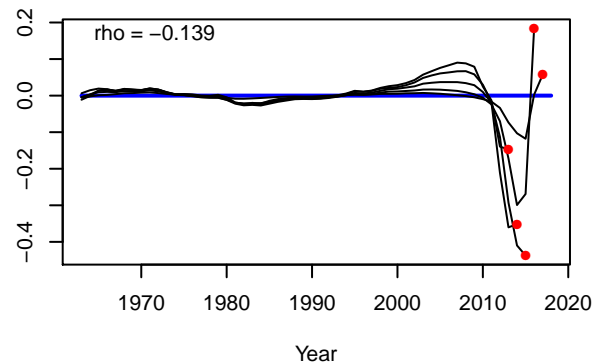
Relative Retro



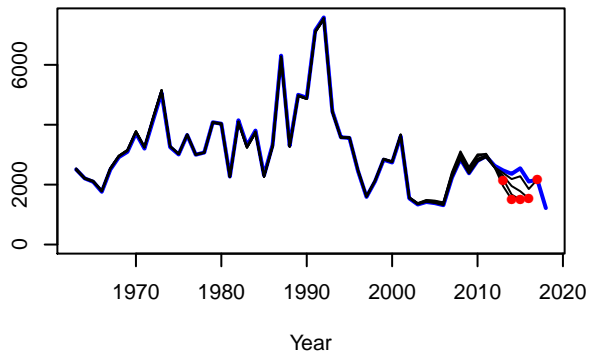
N at Age 2



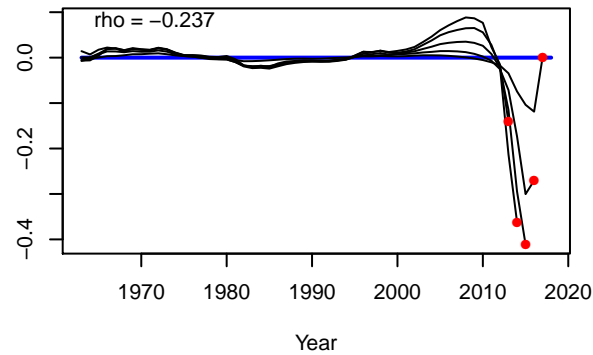
Relative Retro



N at Age 3



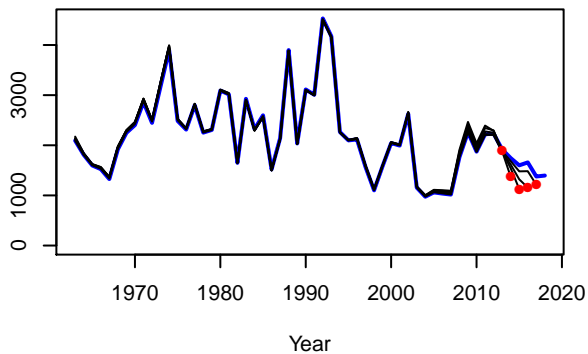
Relative Retro



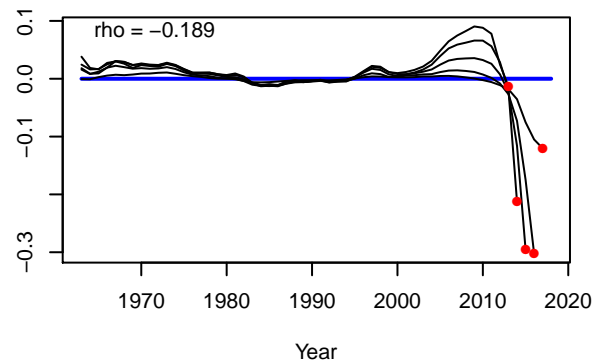


# Stock Numbers at Age

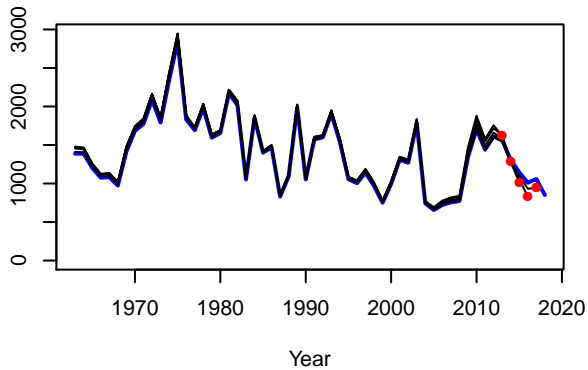
N at Age 4



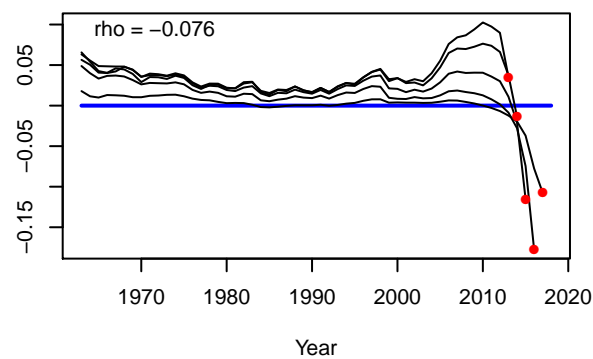
Relative Retro



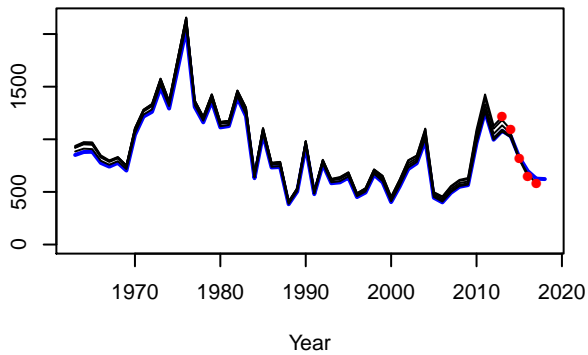
N at Age 5



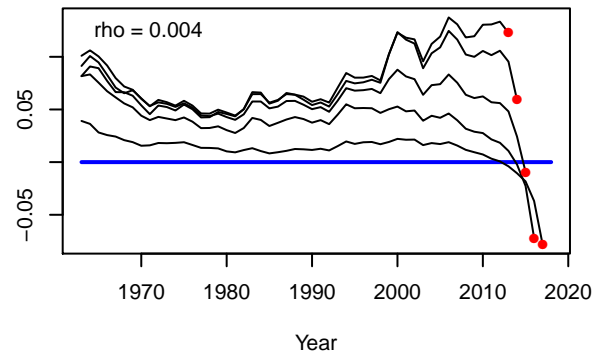
Relative Retro



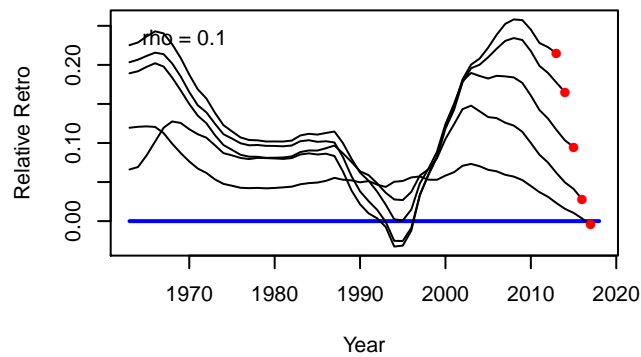
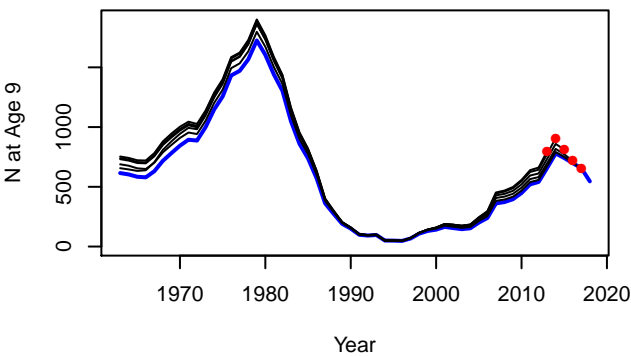
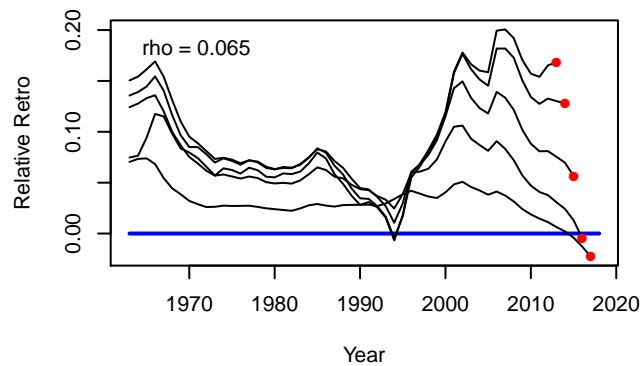
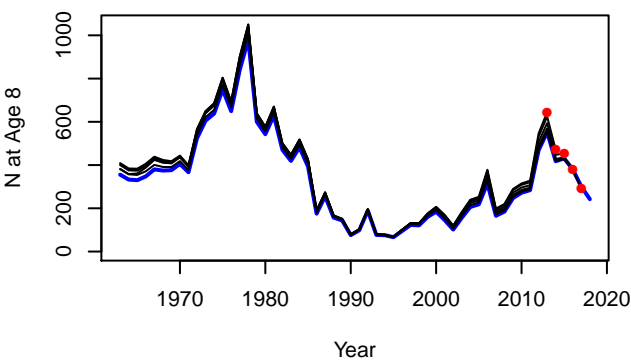
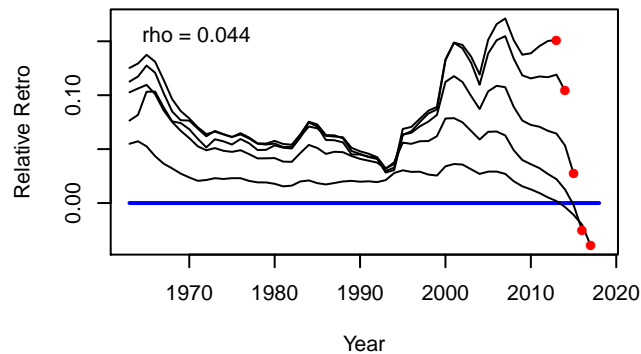
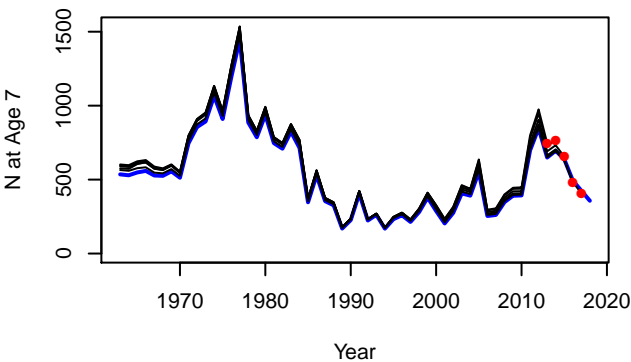
N at Age 6



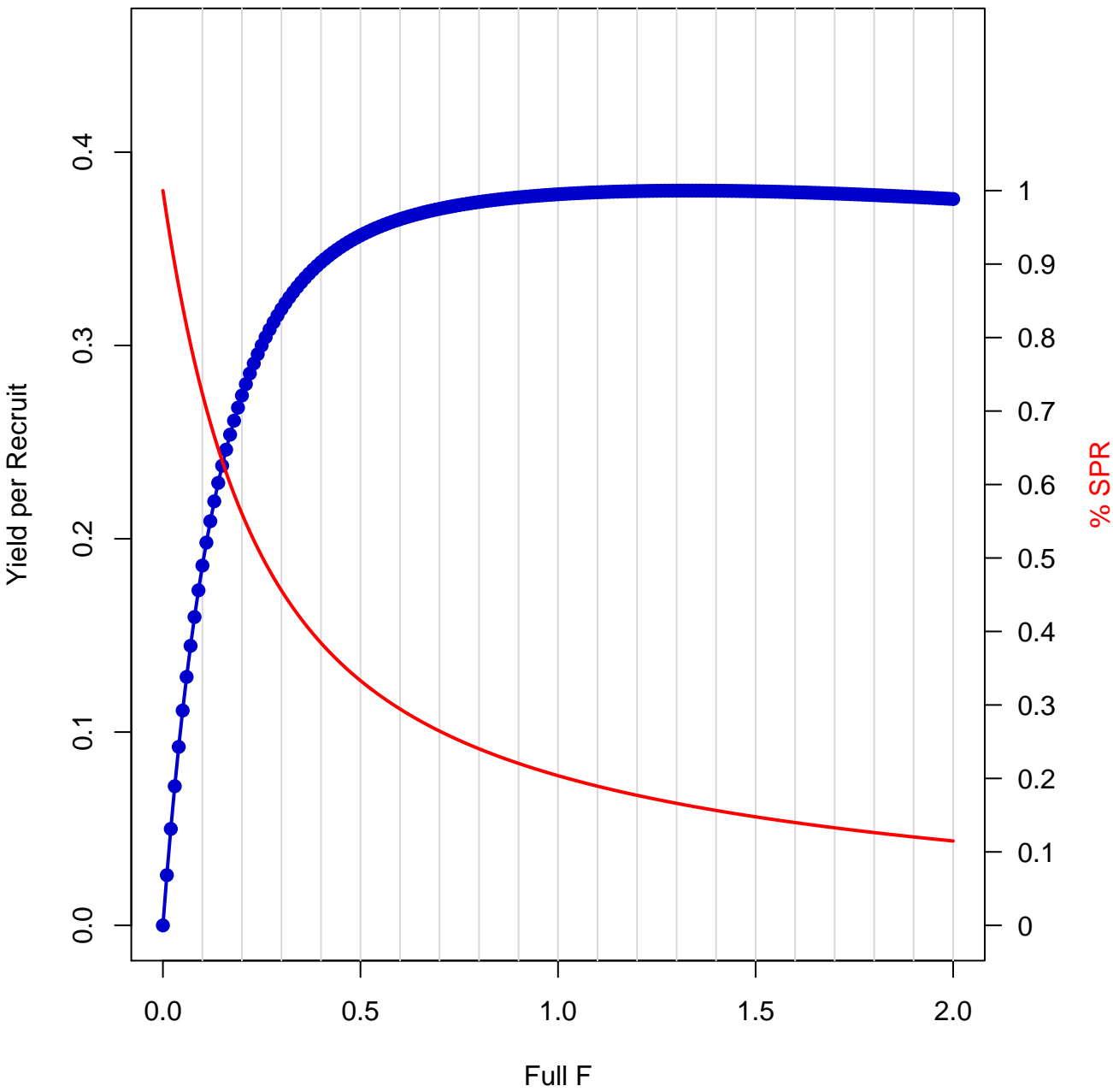
Relative Retro



# Stock Numbers at Age



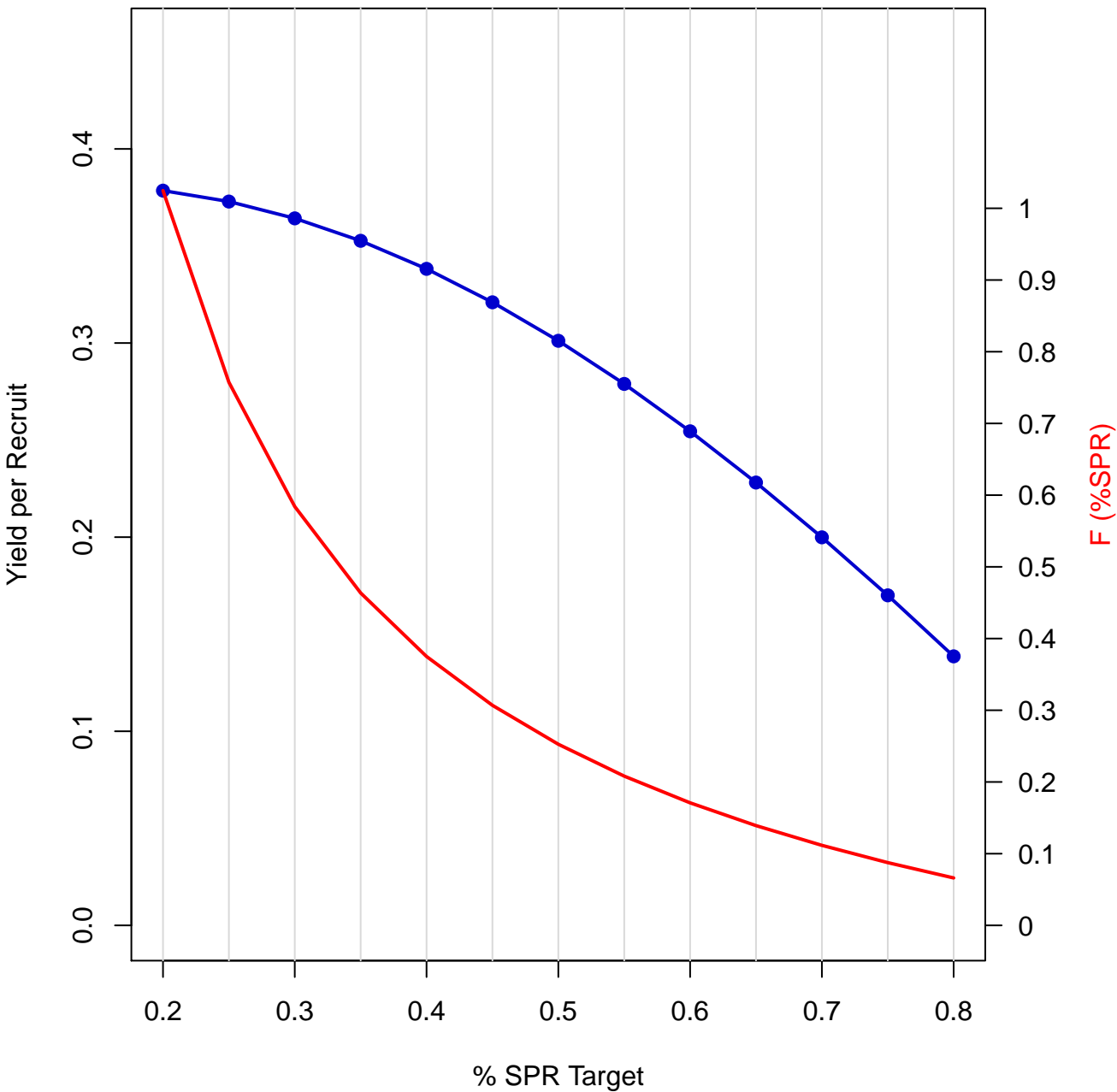
YPR-SPR Reference Points (Years Avg = 5)



# YPR–SPR Reference Points (Years Avg = 5)

F	YPR	SPR	F	YPR	SPR	F	YPR	SPR
0	0	1	0.35	0.3327	0.417	0.7	0.3707	0.2645
0.01	0.026	0.9644	0.36	0.335	0.41	0.71	0.3711	0.2618
0.02	0.0499	0.931	0.37	0.3372	0.4033	0.72	0.3715	0.2592
0.03	0.072	0.8996	0.38	0.3392	0.3968	0.73	0.3719	0.2567
0.04	0.0923	0.8699	0.39	0.3412	0.3905	0.74	0.3723	0.2542
0.05	0.1112	0.842	0.4	0.343	0.3844	0.75	0.3726	0.2518
0.06	0.1285	0.8156	0.41	0.3448	0.3785	0.76	0.373	0.2494
0.07	0.1446	0.7906	0.42	0.3464	0.3729	0.77	0.3733	0.2471
0.08	0.1595	0.767	0.43	0.348	0.3673	0.78	0.3736	0.2448
0.09	0.1733	0.7446	0.44	0.3495	0.362	0.79	0.3739	0.2425
0.1	0.1861	0.7234	0.45	0.3509	0.3568	0.8	0.3742	0.2403
0.11	0.198	0.7032	0.46	0.3522	0.3518	0.81	0.3745	0.2382
0.12	0.2091	0.6841	0.47	0.3535	0.3469	0.82	0.3748	0.236
0.13	0.2194	0.6659	0.48	0.3547	0.3422	0.83	0.375	0.234
0.14	0.2289	0.6486	0.49	0.3558	0.3376	0.84	0.3753	0.2319
0.15	0.2378	0.6321	0.5	0.3569	0.3331	0.85	0.3755	0.2299
0.16	0.2461	0.6163	0.51	0.3579	0.3287	0.86	0.3758	0.228
0.17	0.2539	0.6013	0.52	0.3589	0.3245	0.87	0.376	0.226
0.18	0.2611	0.587	0.53	0.3599	0.3204	0.88	0.3762	0.2241
0.19	0.2678	0.5733	0.54	0.3608	0.3164	0.89	0.3764	0.2223
0.2	0.2741	0.5602	0.55	0.3616	0.3125	0.9	0.3766	0.2204
0.21	0.28	0.5477	0.56	0.3624	0.3087	0.91	0.3768	0.2186
0.22	0.2855	0.5357	0.57	0.3632	0.305	0.92	0.377	0.2169
0.23	0.2907	0.5243	0.58	0.3639	0.3014	0.93	0.3772	0.2151
0.24	0.2955	0.5132	0.59	0.3646	0.2979	0.94	0.3773	0.2134
0.25	0.3	0.5027	0.6	0.3653	0.2945	0.95	0.3775	0.2117
0.26	0.3043	0.4925	0.61	0.366	0.2912	0.96	0.3777	0.2101
0.27	0.3083	0.4828	0.62	0.3666	0.2879	0.97	0.3778	0.2085
0.28	0.312	0.4734	0.63	0.3672	0.2847	0.98	0.378	0.2069
0.29	0.3155	0.4644	0.64	0.3677	0.2816	0.99	0.3781	0.2053
0.3	0.3188	0.4558	0.65	0.3683	0.2786	1	0.3782	0.2037
0.31	0.3219	0.4474	0.66	0.3688	0.2757	1.01	0.3783	0.2022
0.32	0.3249	0.4394	0.67	0.3693	0.2728	1.02	0.3785	0.2007
0.33	0.3276	0.4316	0.68	0.3698	0.2699	1.03	0.3786	0.1992
0.34	0.3302	0.4242	0.69	0.3702	0.2672	1.04	0.3787	0.1978

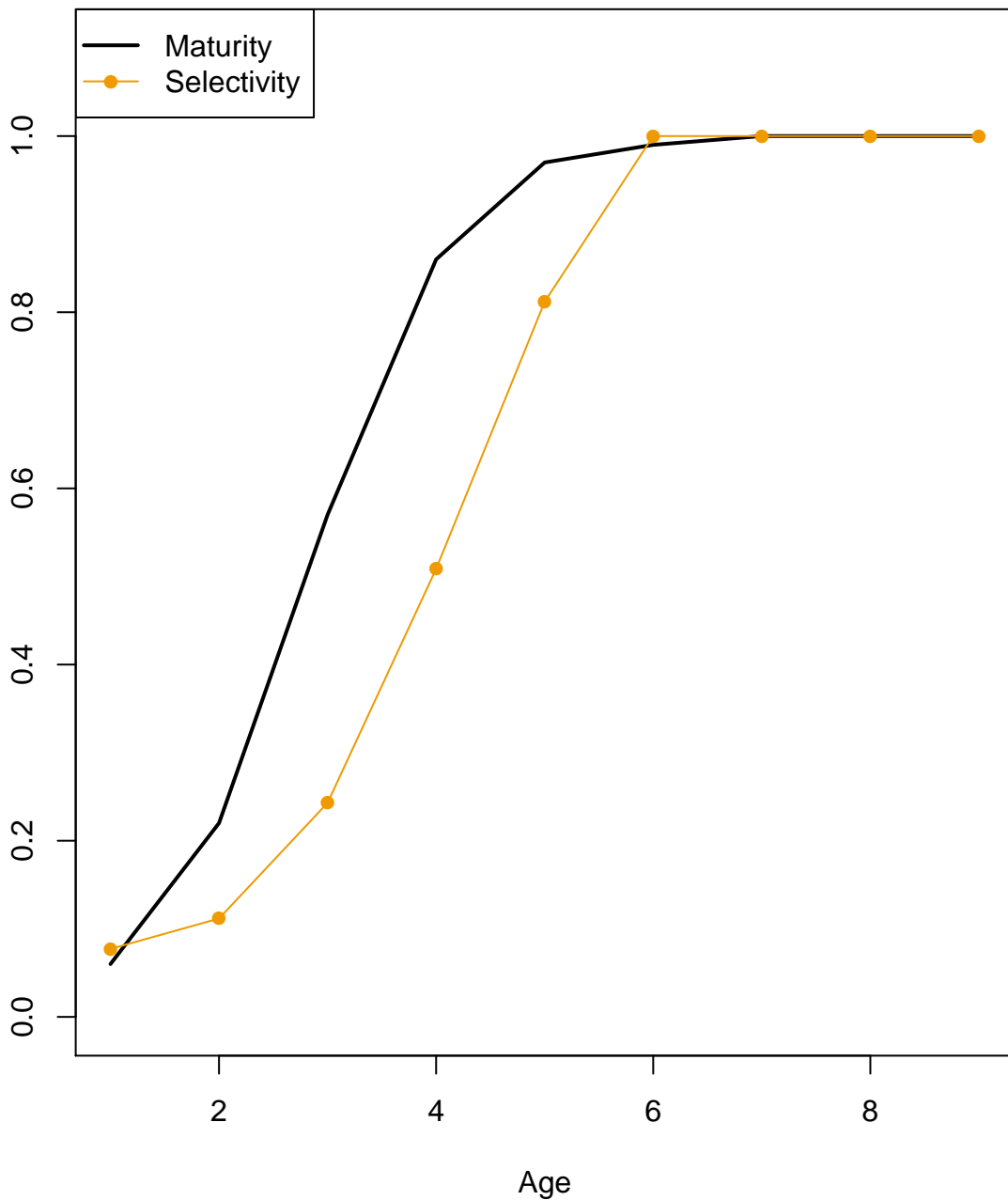
**SPR Target Reference Points (Years Avg = 5)**



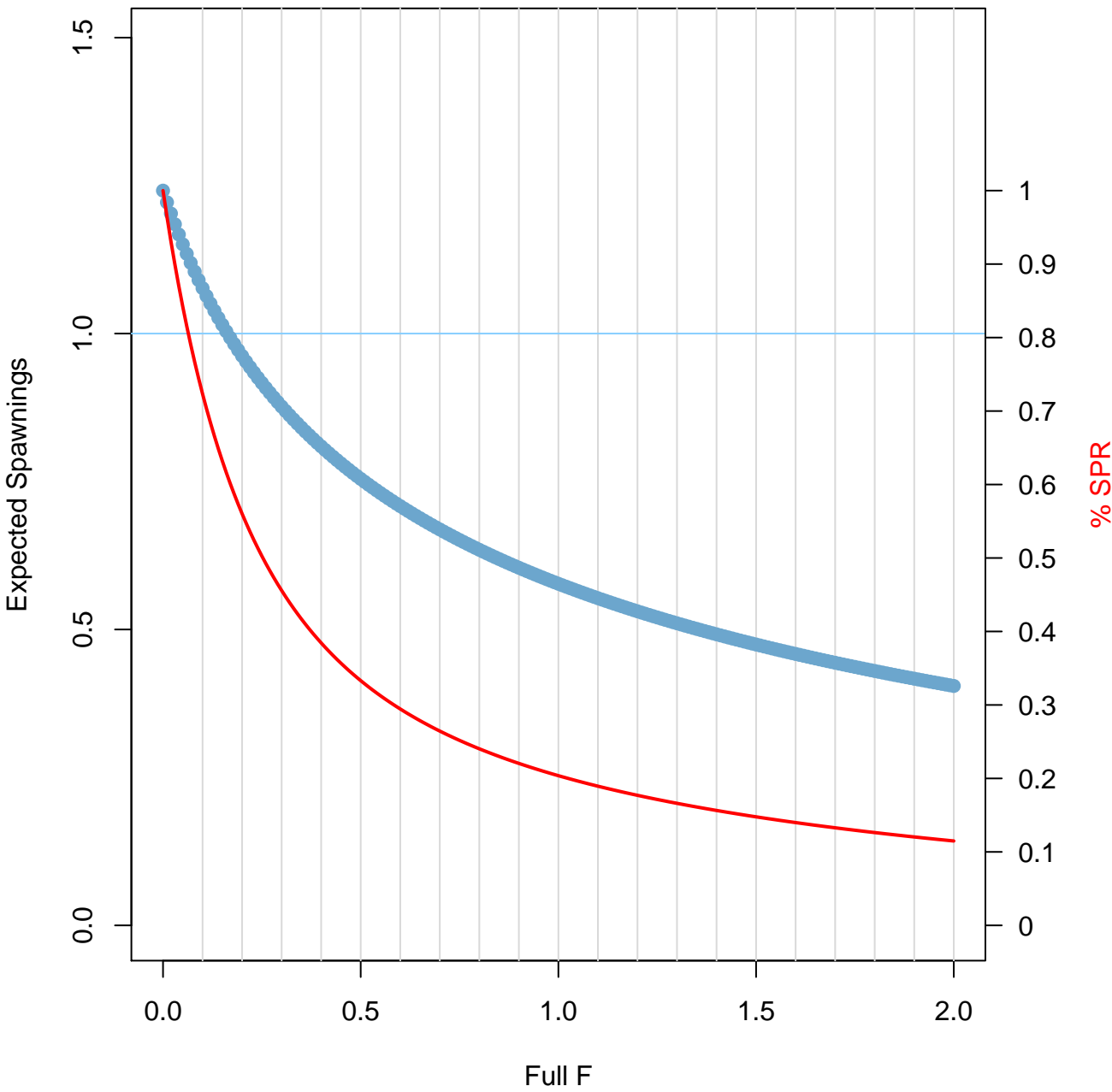
# SPR Target Reference Points (Years Avg = 5)

% SPR	F(%SPR)	YPR
0.2	1.0247	0.3785
0.25	0.7574	0.3729
0.3	0.5841	0.3642
0.35	0.4636	0.3527
0.4	0.375	0.3382
0.45	0.3069	0.321
0.5	0.2526	0.3012
0.55	0.2081	0.2789
0.6	0.1709	0.2545
0.65	0.1391	0.2281
0.7	0.1116	0.1999
0.75	0.0875	0.17
0.8	0.0662	0.1386

Selectivity or Maturity at age



**Expected Spawns and SPR Reference Points (Years Avg = 5)**

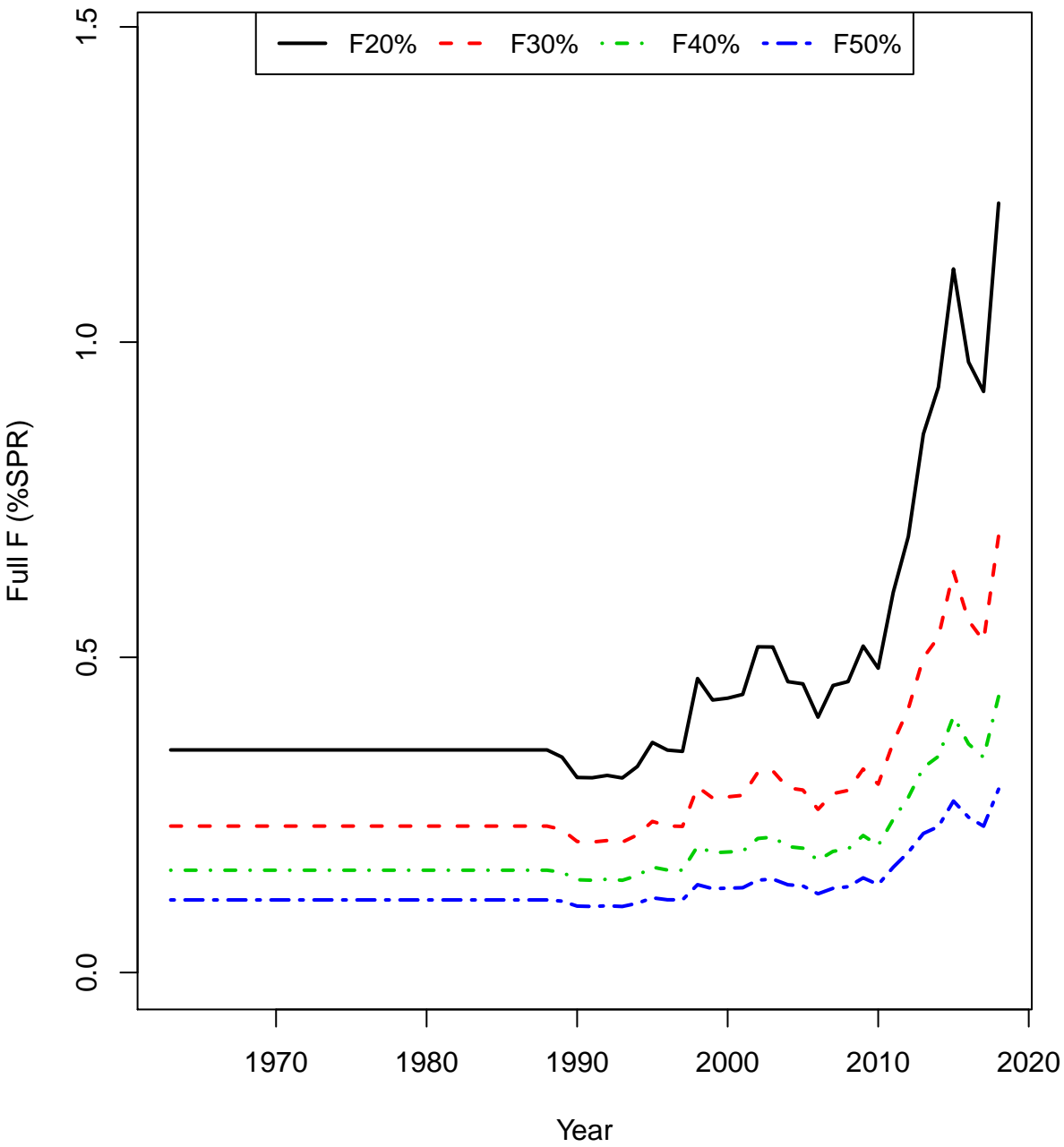




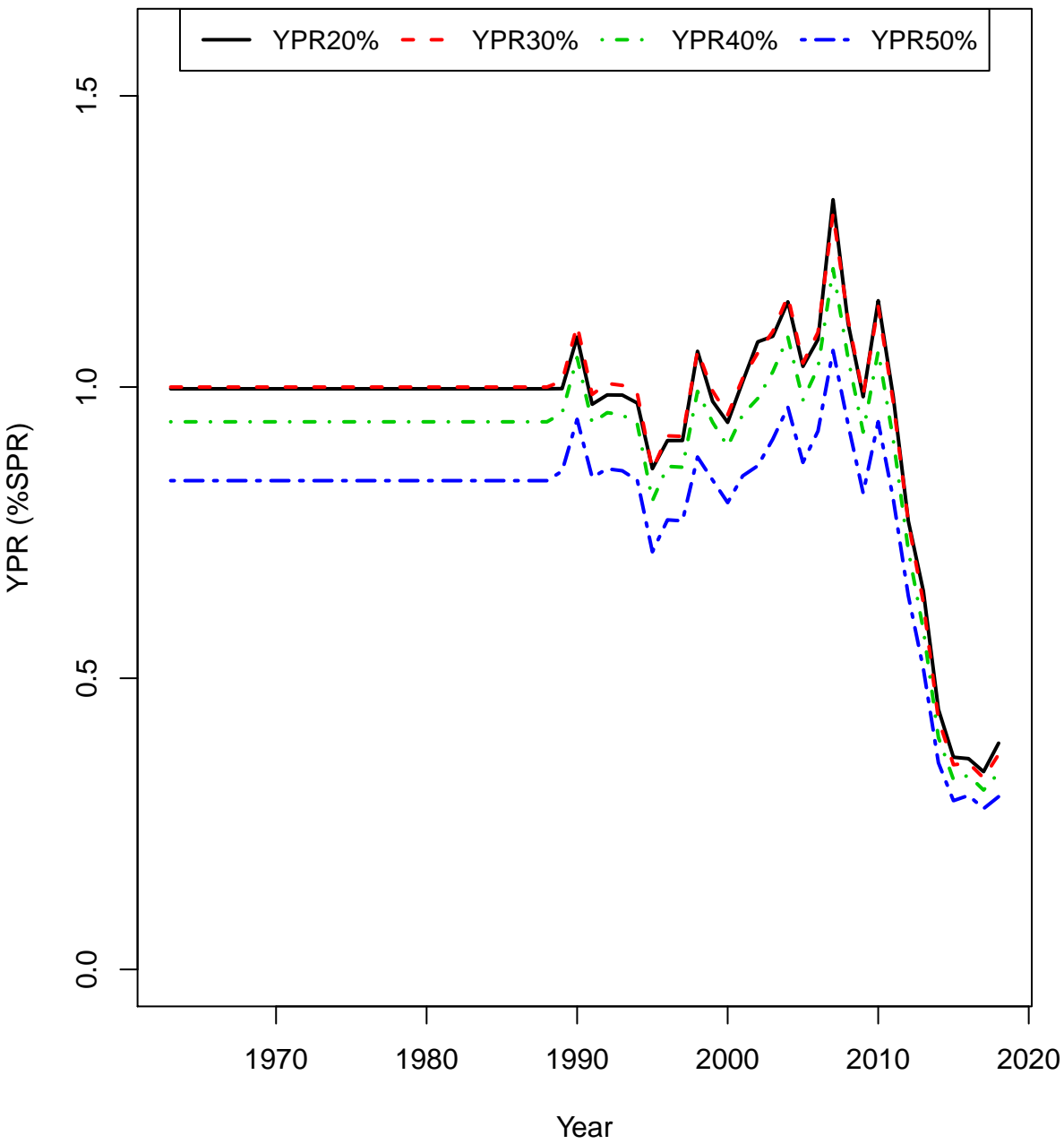
**Expected Spawnings & SPR Reference Points (Years Avg = 5)**

F	E[Sp]	SPR	F	E[Sp]	SPR	F	E[Sp]	SPR
0	1.2415	1	0.35	0.8412	0.417	0.7	0.669	0.2645
0.01	1.2218	0.9644	0.36	0.8345	0.41	0.71	0.6654	0.2618
0.02	1.2028	0.931	0.37	0.828	0.4033	0.72	0.6618	0.2592
0.03	1.1847	0.8996	0.38	0.8217	0.3968	0.73	0.6582	0.2567
0.04	1.1674	0.8699	0.39	0.8155	0.3905	0.74	0.6547	0.2542
0.05	1.1508	0.842	0.4	0.8094	0.3844	0.75	0.6513	0.2518
0.06	1.1348	0.8156	0.41	0.8034	0.3785	0.76	0.6479	0.2494
0.07	1.1195	0.7906	0.42	0.7975	0.3729	0.77	0.6445	0.2471
0.08	1.1047	0.767	0.43	0.7918	0.3673	0.78	0.6412	0.2448
0.09	1.0905	0.7446	0.44	0.7862	0.362	0.79	0.6379	0.2425
0.1	1.0768	0.7234	0.45	0.7806	0.3568	0.8	0.6347	0.2403
0.11	1.0635	0.7032	0.46	0.7752	0.3518	0.81	0.6315	0.2382
0.12	1.0508	0.6841	0.47	0.7699	0.3469	0.82	0.6283	0.236
0.13	1.0384	0.6659	0.48	0.7646	0.3422	0.83	0.6252	0.234
0.14	1.0265	0.6486	0.49	0.7595	0.3376	0.84	0.6221	0.2319
0.15	1.0149	0.6321	0.5	0.7545	0.3331	0.85	0.6191	0.2299
0.16	1.0037	0.6163	0.51	0.7495	0.3287	0.86	0.6161	0.228
0.17	0.9929	0.6013	0.52	0.7446	0.3245	0.87	0.6131	0.226
0.18	0.9824	0.587	0.53	0.7399	0.3204	0.88	0.6101	0.2241
0.19	0.9722	0.5733	0.54	0.7351	0.3164	0.89	0.6072	0.2223
0.2	0.9623	0.5602	0.55	0.7305	0.3125	0.9	0.6044	0.2204
0.21	0.9526	0.5477	0.56	0.726	0.3087	0.91	0.6015	0.2186
0.22	0.9433	0.5357	0.57	0.7215	0.305	0.92	0.5987	0.2169
0.23	0.9342	0.5243	0.58	0.7171	0.3014	0.93	0.5959	0.2151
0.24	0.9253	0.5132	0.59	0.7127	0.2979	0.94	0.5932	0.2134
0.25	0.9167	0.5027	0.6	0.7084	0.2945	0.95	0.5905	0.2117
0.26	0.9083	0.4925	0.61	0.7042	0.2912	0.96	0.5878	0.2101
0.27	0.9001	0.4828	0.62	0.7001	0.2879	0.97	0.5851	0.2085
0.28	0.8921	0.4734	0.63	0.696	0.2847	0.98	0.5825	0.2069
0.29	0.8843	0.4644	0.64	0.692	0.2816	0.99	0.5799	0.2053
0.3	0.8767	0.4558	0.65	0.688	0.2786	1	0.5773	0.2037
0.31	0.8692	0.4474	0.66	0.6841	0.2757	1.01	0.5747	0.2022
0.32	0.862	0.4394	0.67	0.6803	0.2728	1.02	0.5722	0.2007
0.33	0.8549	0.4316	0.68	0.6765	0.2699	1.03	0.5697	0.1992
0.34	0.8479	0.4242	0.69	0.6727	0.2672	1.04	0.5672	0.1978

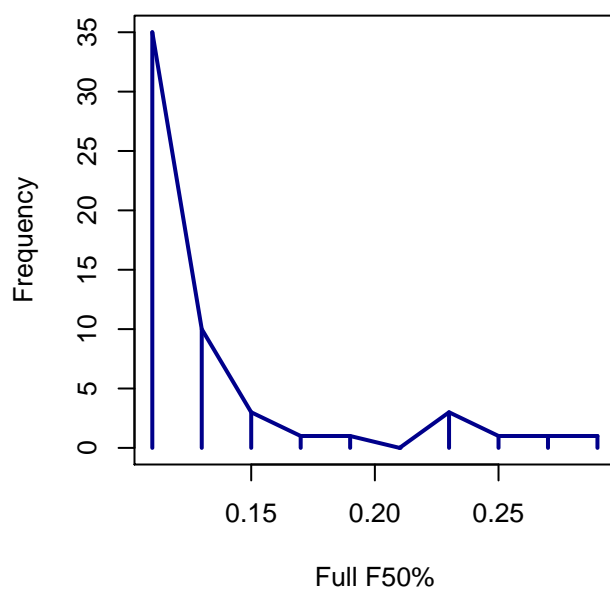
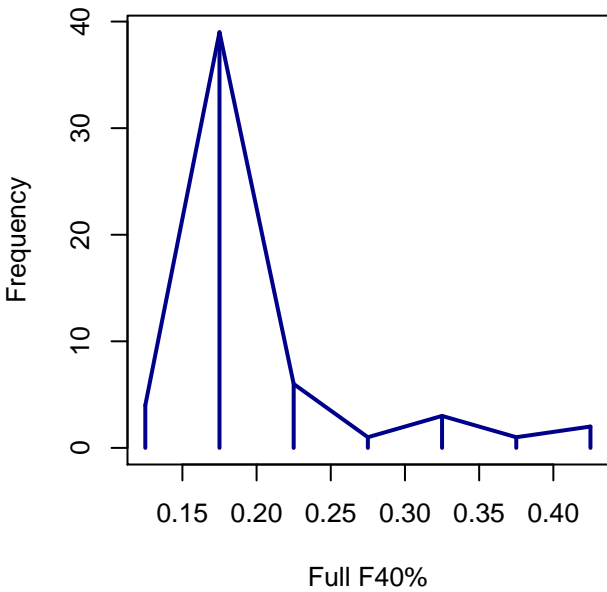
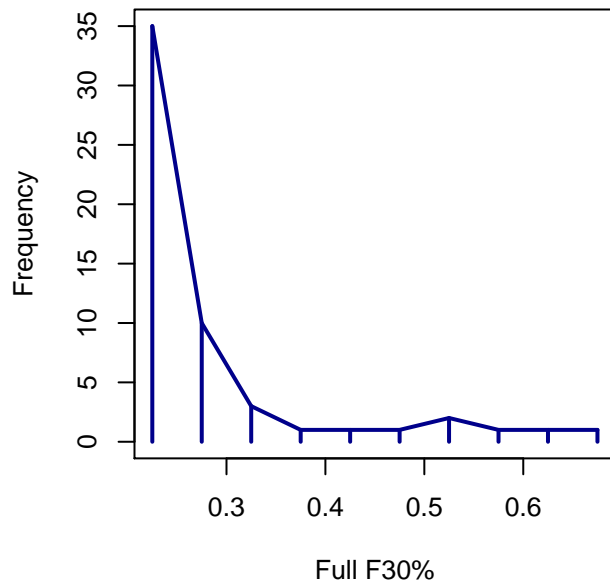
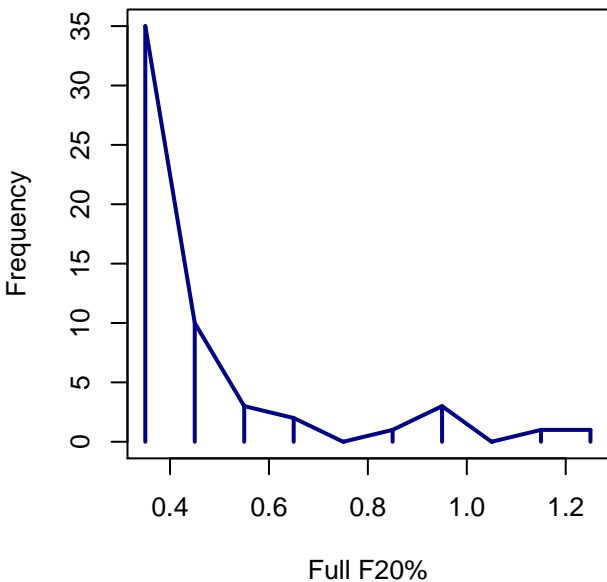
Annual F(%SPR) Reference Points



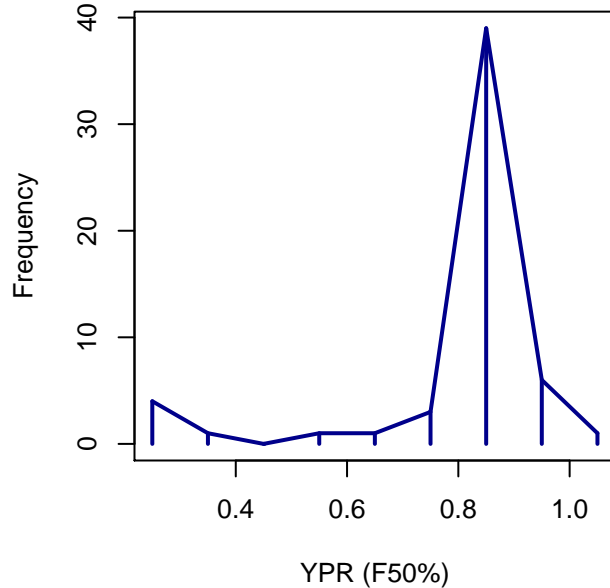
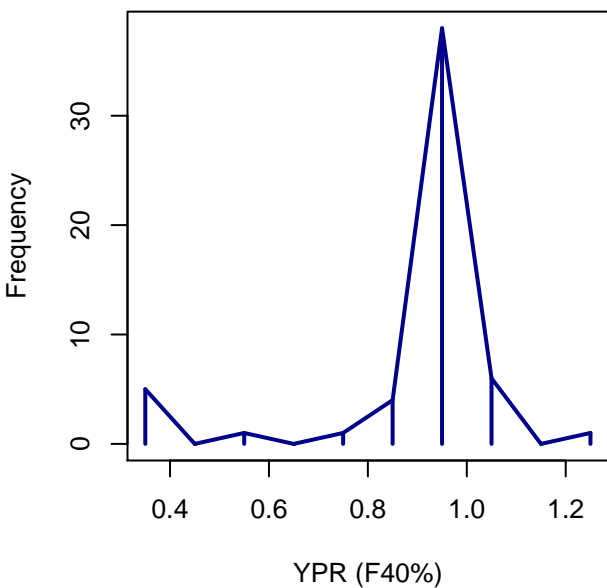
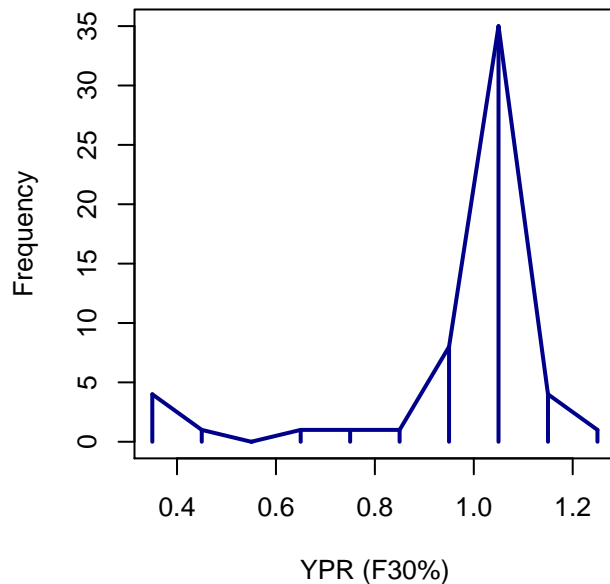
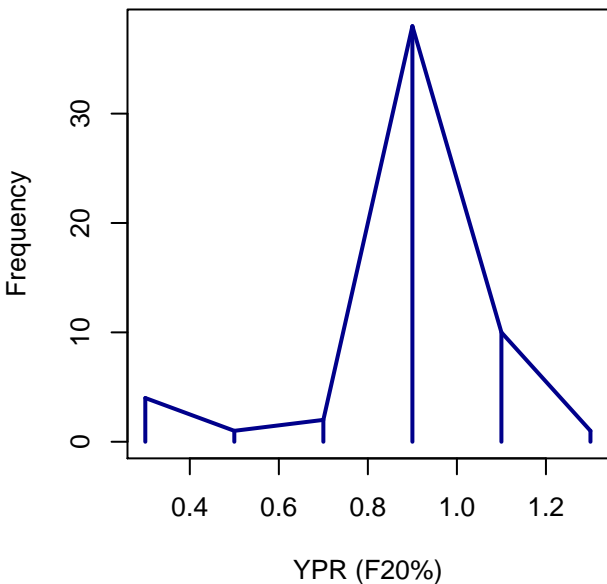
Annual YPR(%SPR) Reference Points



## Annual F (%SPR) Reference Points



## Annual YPR (%SPR) Reference Points





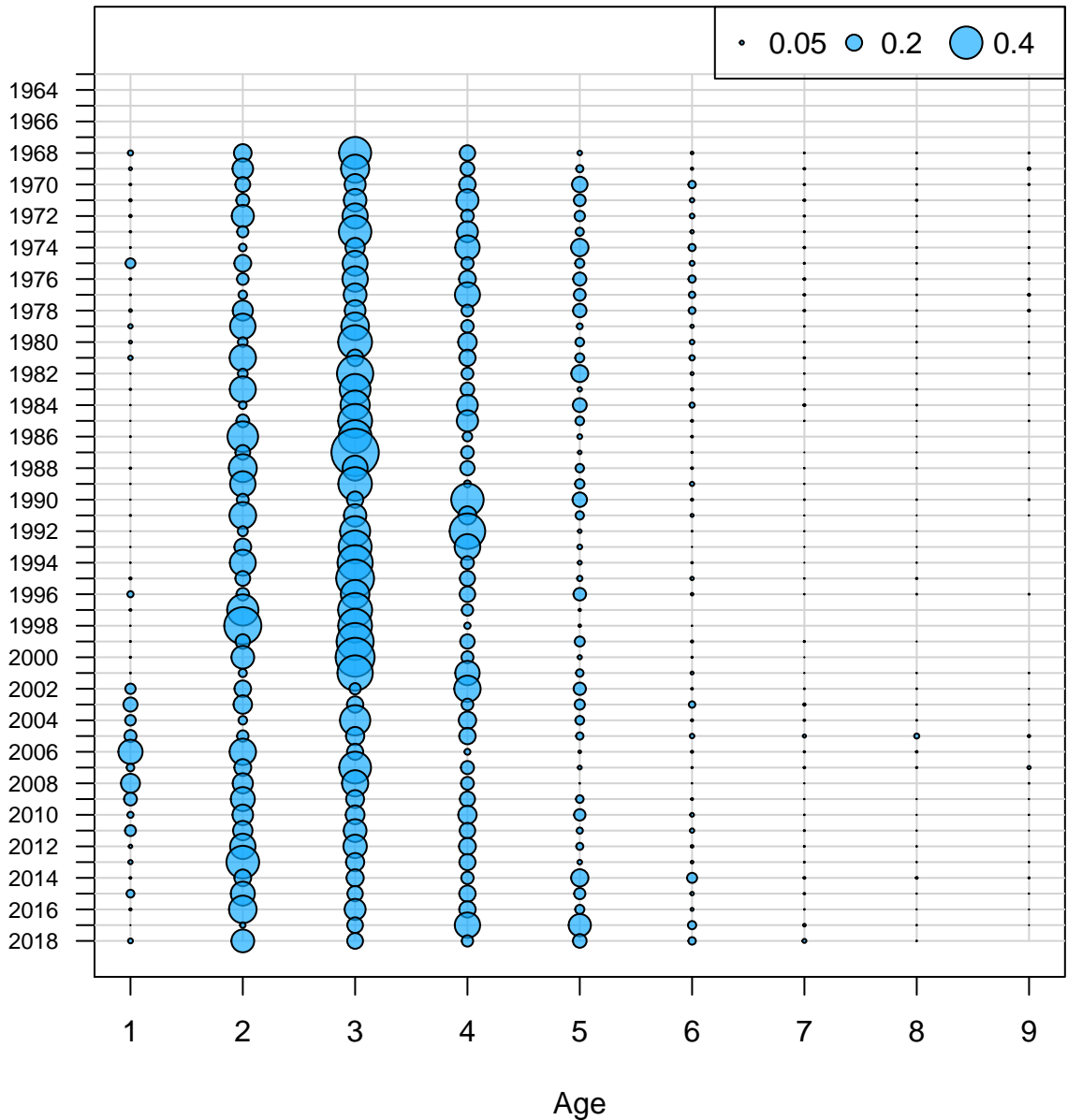
# Age Comps for Catch by Fleet 1 (FLEET-1)







# Age Comps for Index 1 (INDEX-1)



# Age Comps for Index 2 (INDEX-2)



# WAA matrix 1



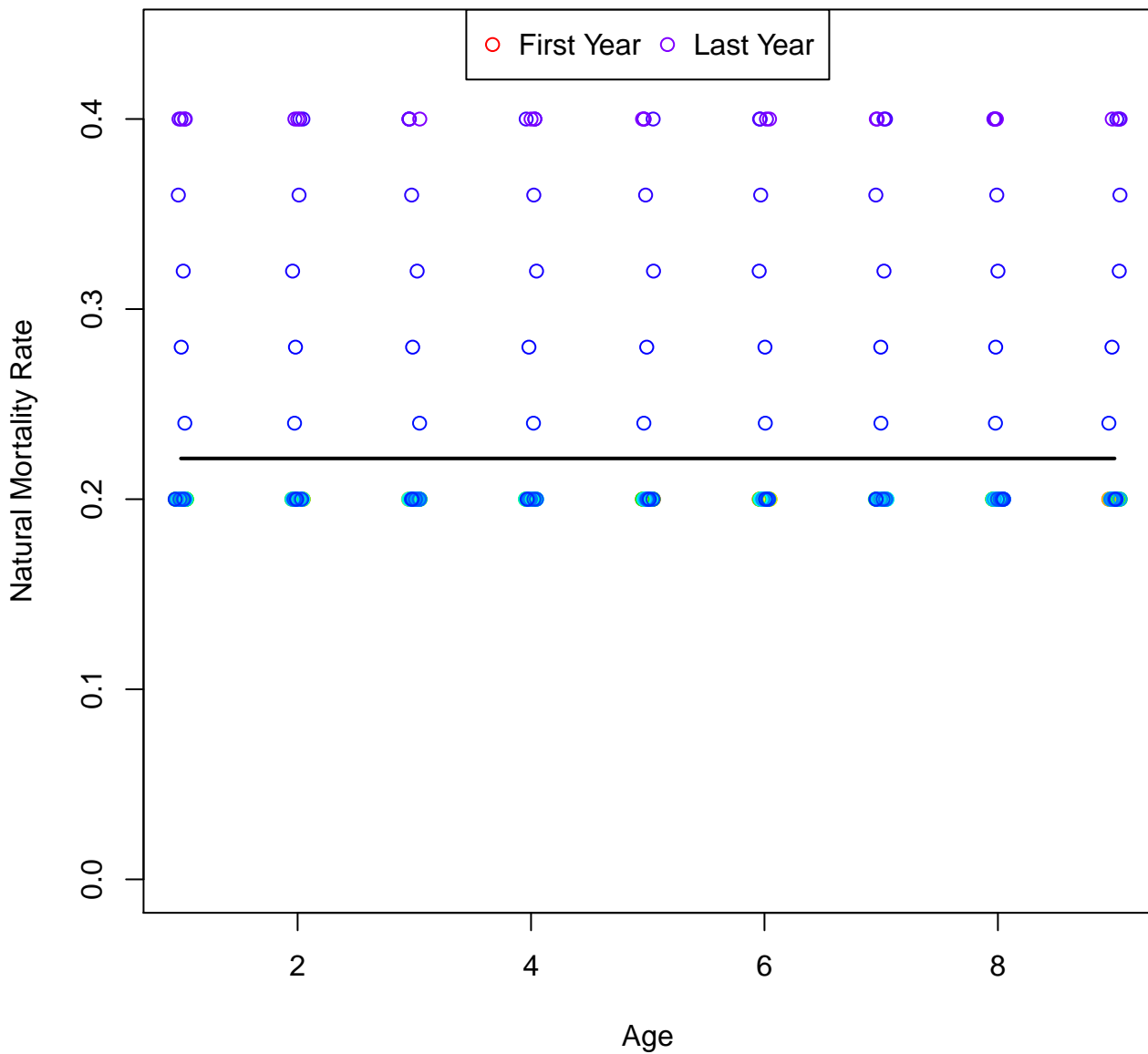
# WAA matrix 2



# WAA matrix 3



M



# Maturity

