

File = y2005r4c1m2.8s000111_000.dat

ASAP3 run on Tuesday, 22 Oct 2019 at 14:09:53

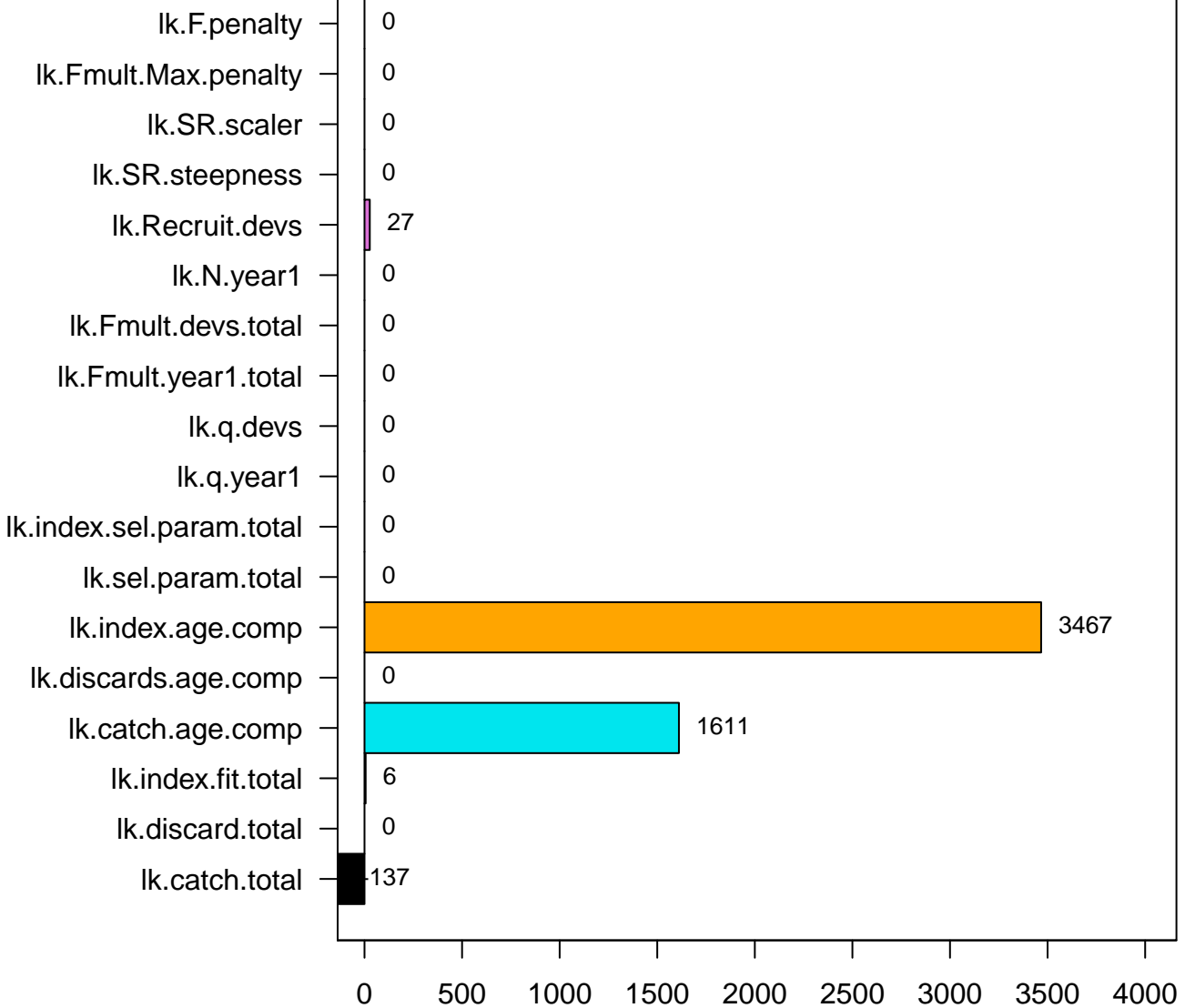
·s\chris.legault\Documents\Working\ICES–WKFORBIAS 2019\GBYT\Rose\wor

ASAPplots version = 0.2.14

npar = 118, maximum gradient = 0.000304850

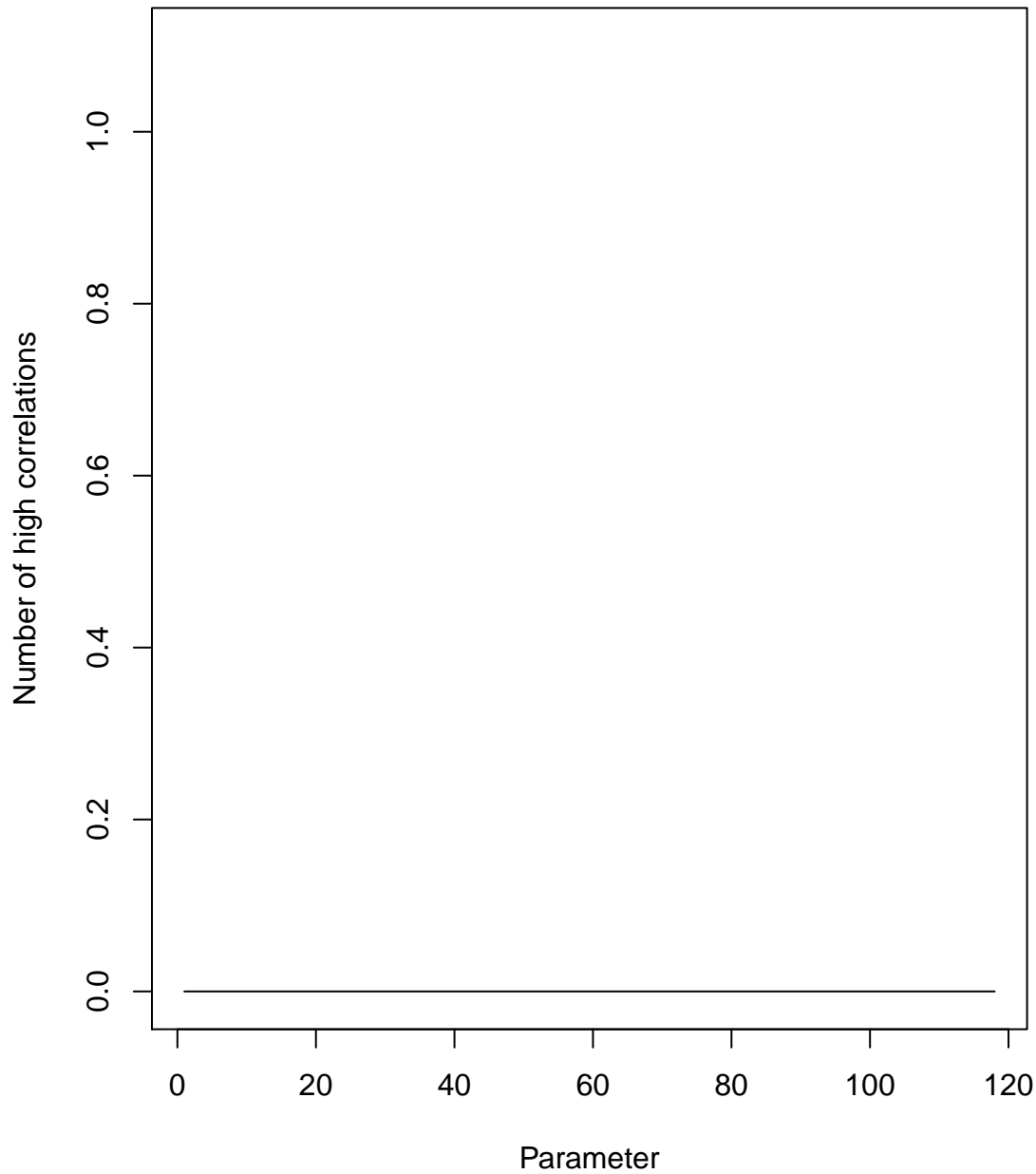
Components of Obj. Function (4973), npar=118

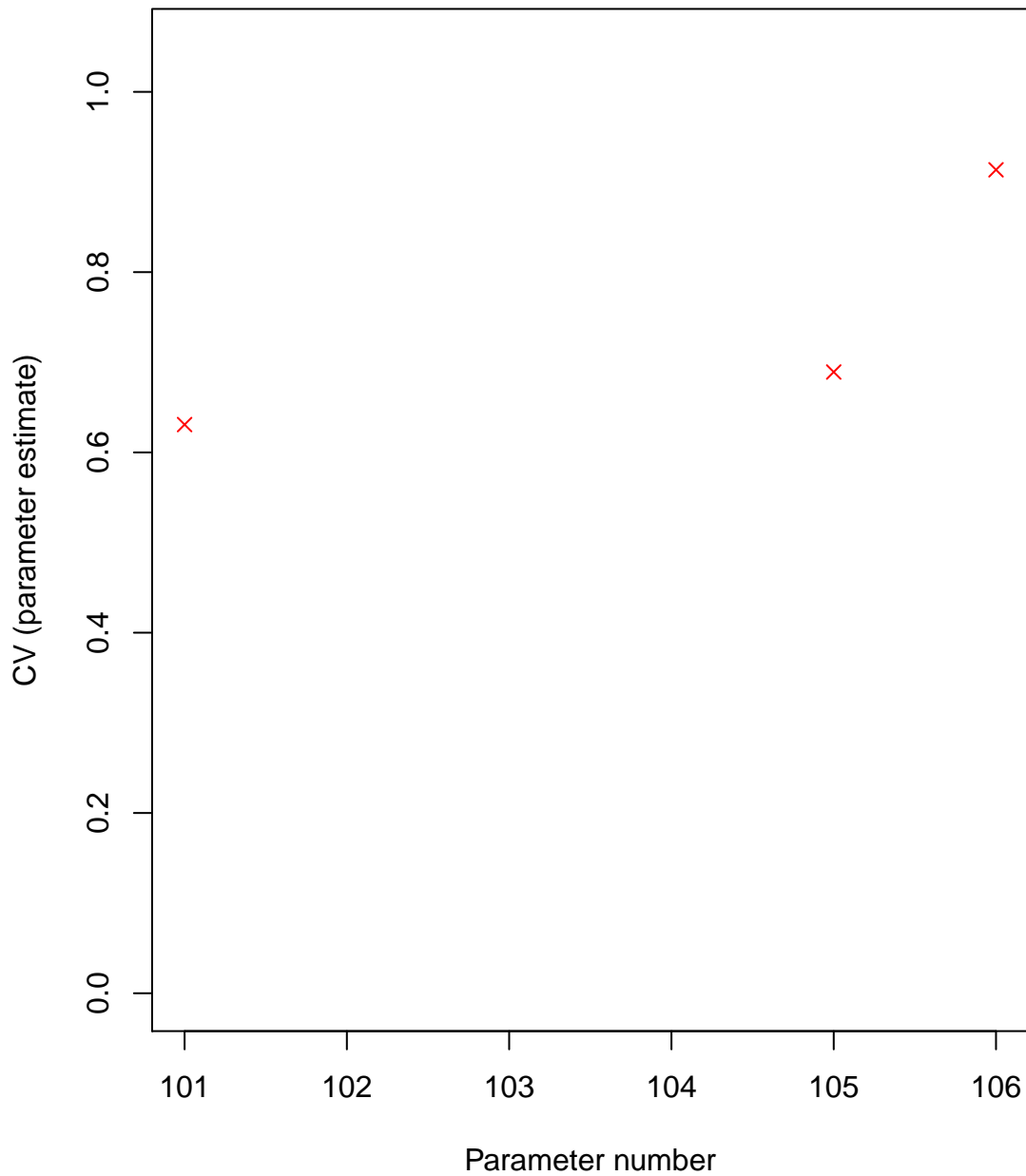
Maximum gradient = 0.000305



Likelihood Contribution

Model: y2005r4c1m2.8s000111_000 Tuesday, 22 Oct 2019 at 14:09:5

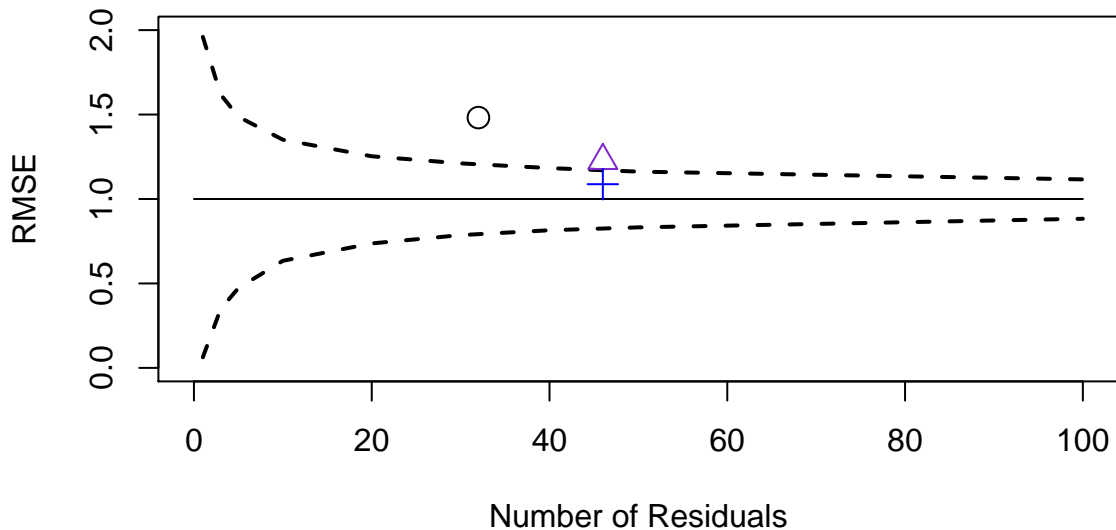




Root Mean Square Error computed from Standardized Residuals

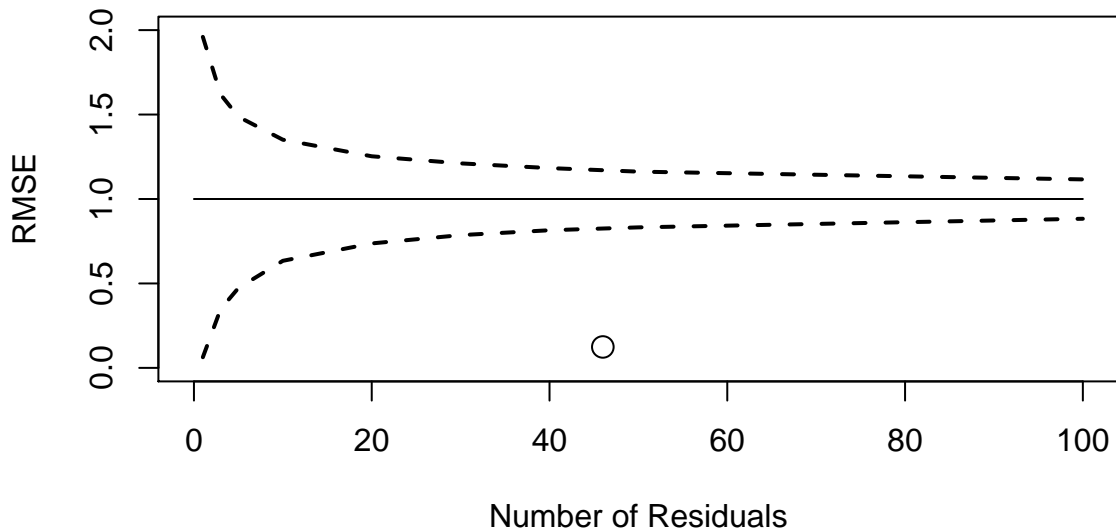
Component	# resids	RMSE
catch.tot	46	0.124
discard.tot	0	0
ind01	32	1.48
ind02	46	1.23
ind03	46	1.09
ind.total	124	1.25
N.year1	0	0
Fmult.year1	0	0
Fmult.devs.total	0	0
recruit.devs	46	1.54
fleet.sel.params	0	0
index.sel.params	0	0
q.year1	0	0
q.devs	0	0
SR.steepness	0	0
SR.scaler	0	0

Root Mean Square Error for Indices



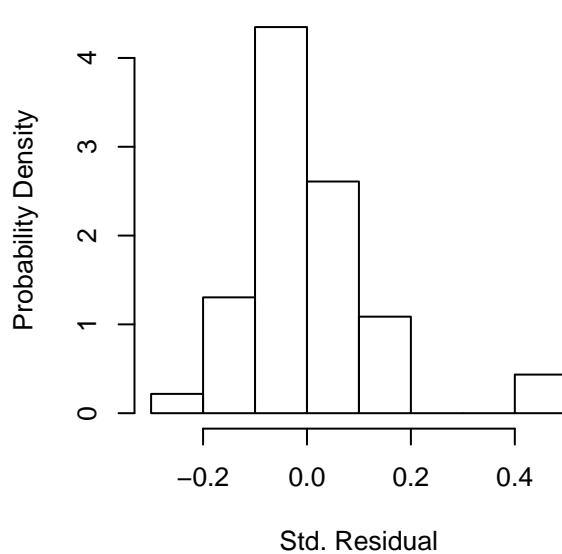
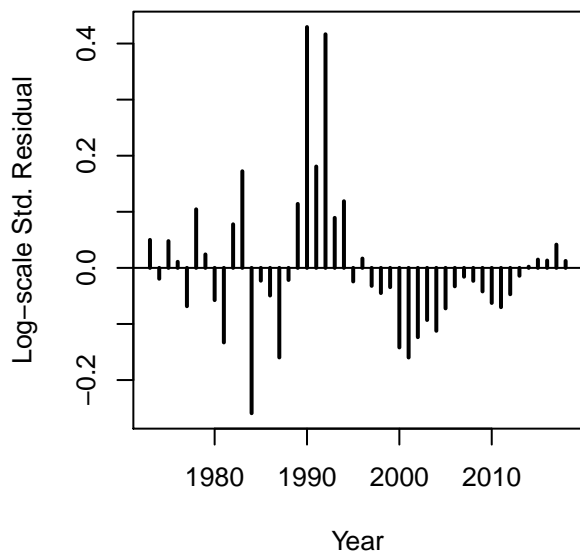
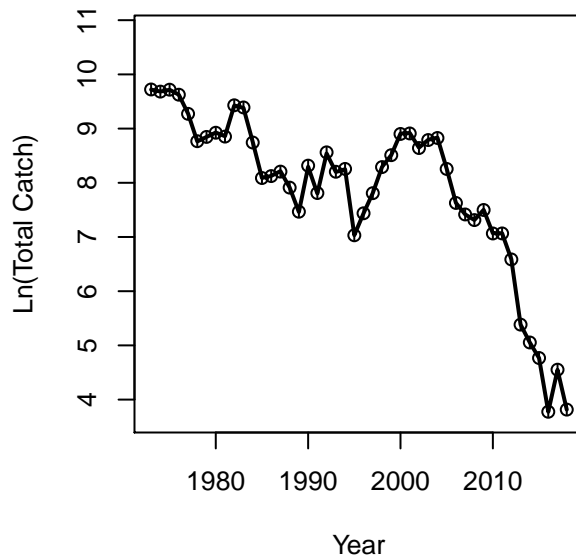
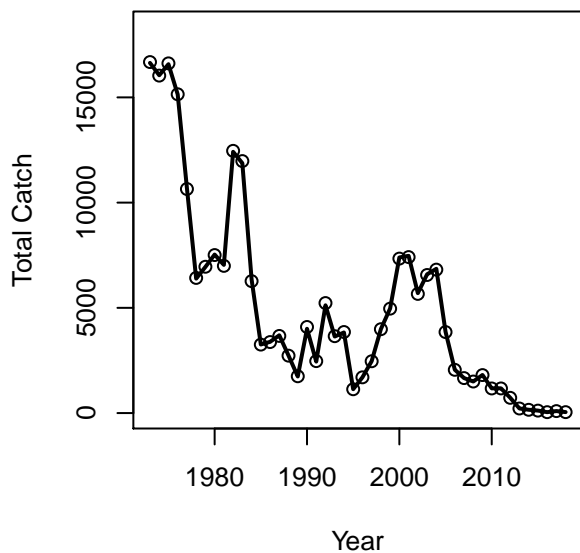
ind total
INDEX-3
INDEX-2
INDEX-1

Root Mean Square Error for Catch



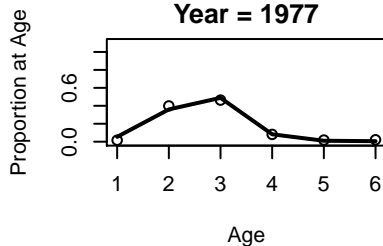
○ catch.tot

Fleet 1 Catch (FLEET-1)

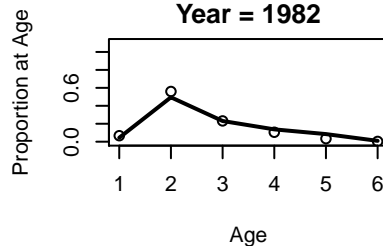


Catch

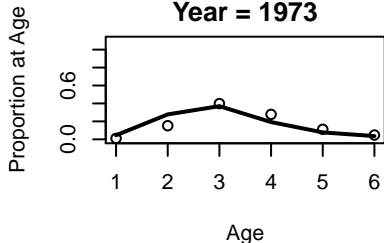
Year = 1977



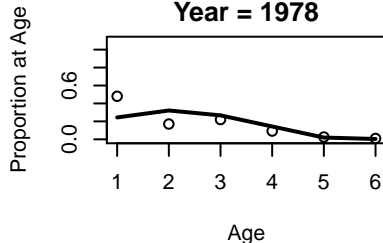
Year = 1982



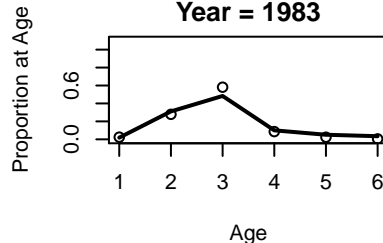
Year = 1973



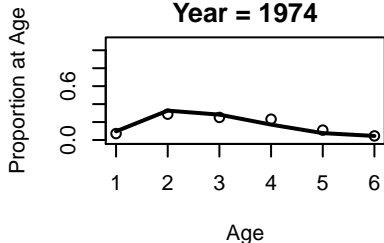
Year = 1978



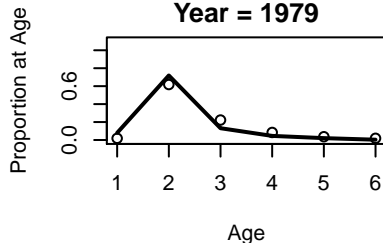
Year = 1983



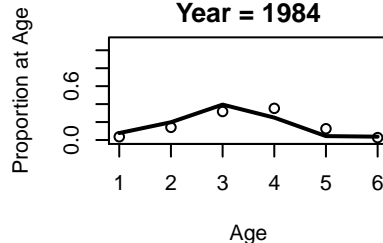
Year = 1974



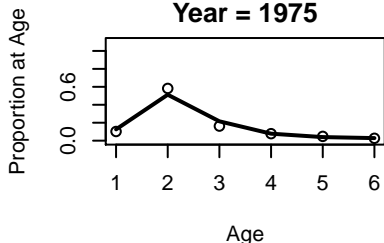
Year = 1979



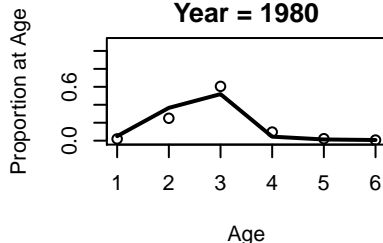
Year = 1984



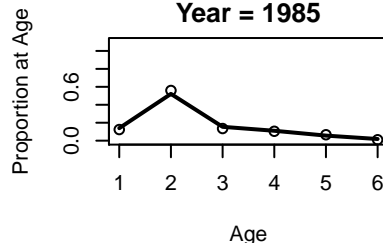
Year = 1975



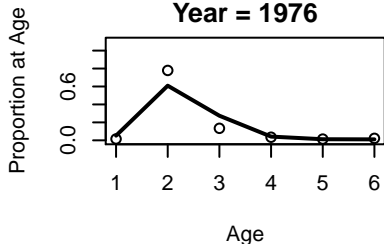
Year = 1980



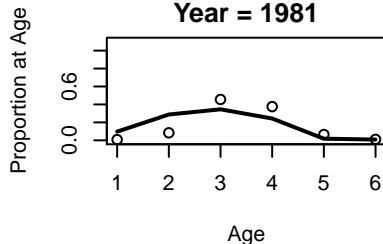
Year = 1985



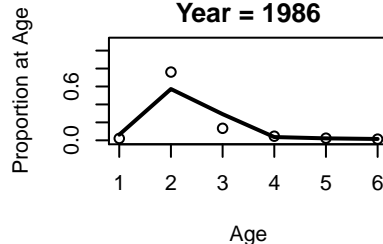
Year = 1976



Year = 1981

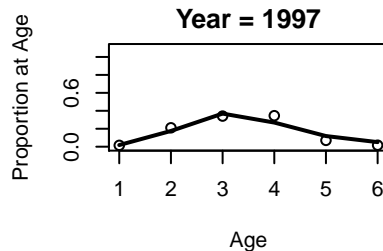
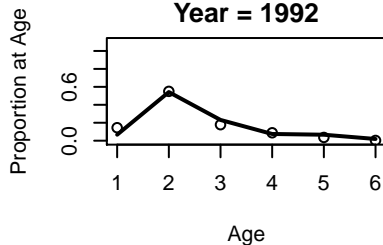
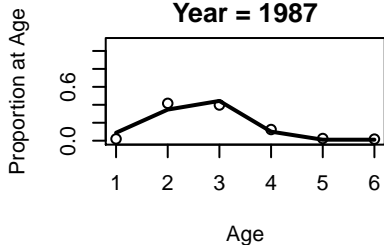
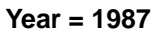


Year = 1986

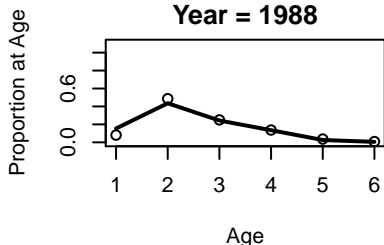


Fleet 1
FLEET-1
↓

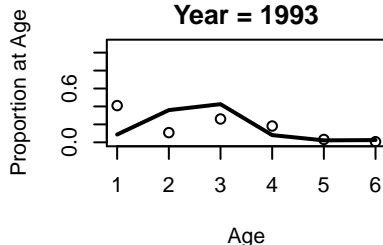
Year = 1992



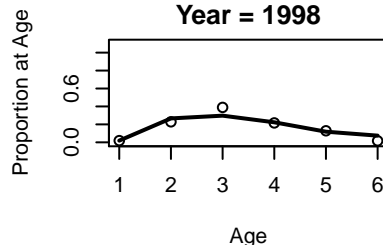
Year = 1988



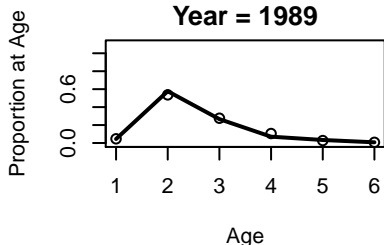
Year = 1993



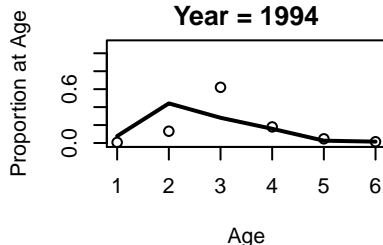
Year = 1998



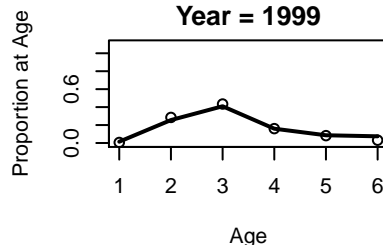
Year = 1989



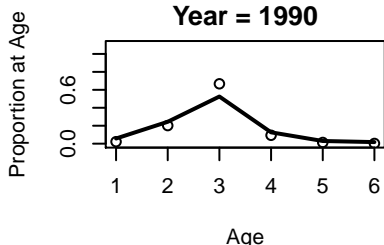
Year = 1994



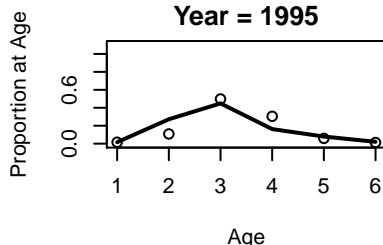
Year = 1999



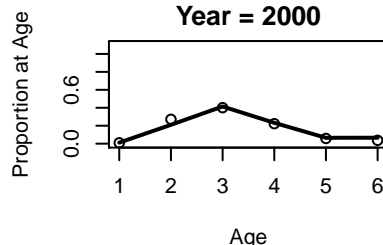
Year = 1990



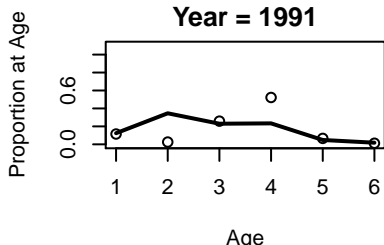
Year = 1995



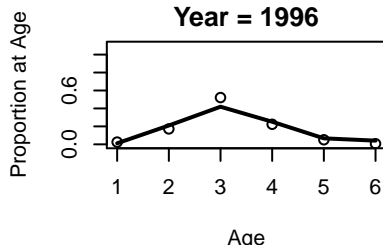
Year = 2000



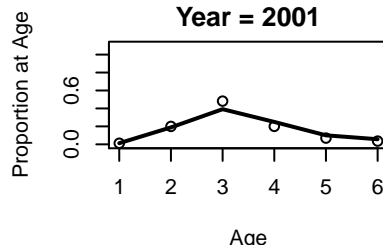
Year = 1991



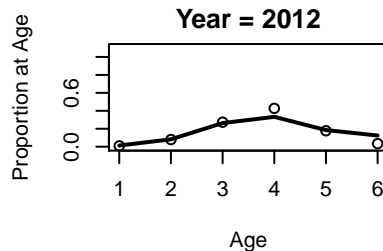
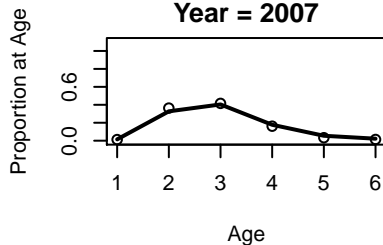
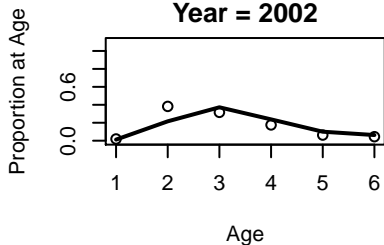
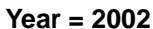
Year = 1996



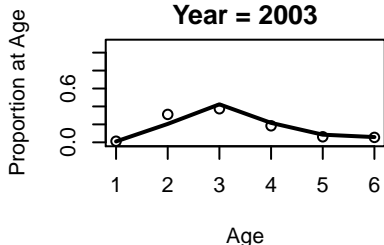
Year = 2001



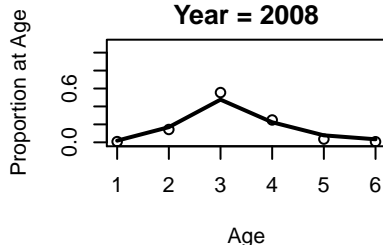
Year = 2007



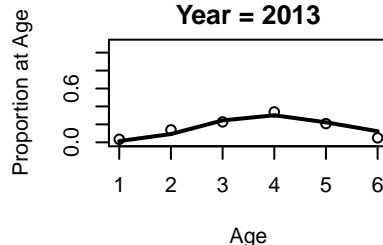
Year = 2003



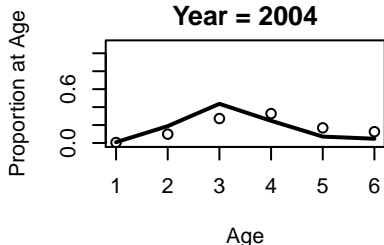
Year = 2008



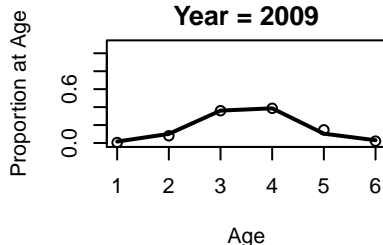
Year = 2013



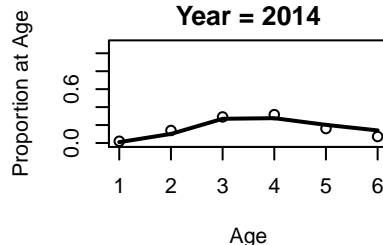
Year = 2004



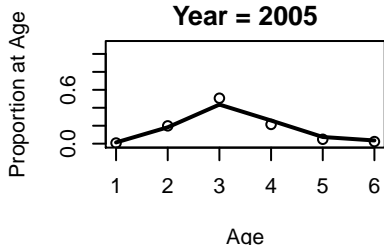
Year = 2009



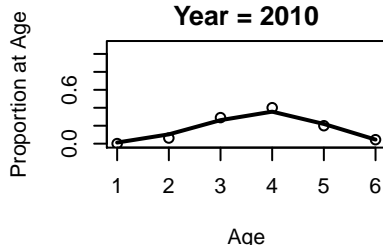
Year = 2014



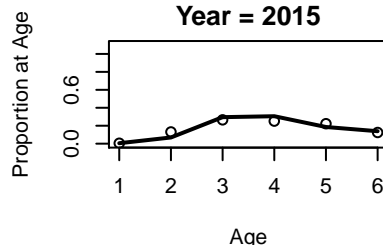
Year = 2005



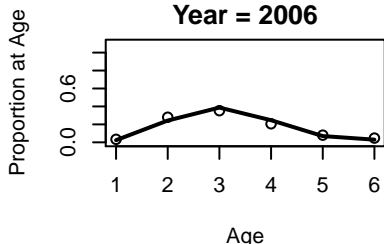
Year = 2010



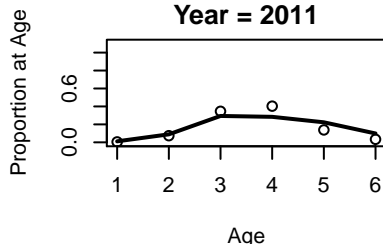
Year = 2015



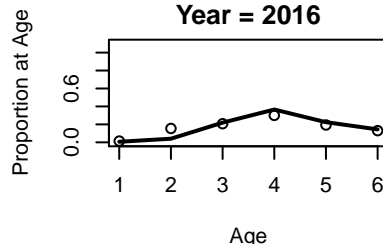
Year = 2006



Year = 2011

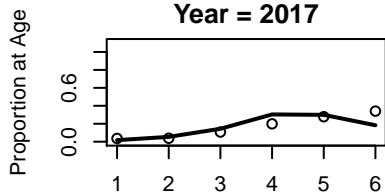


Year = 2016



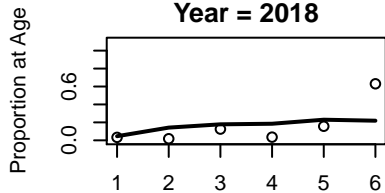
Catch

Year = 2017



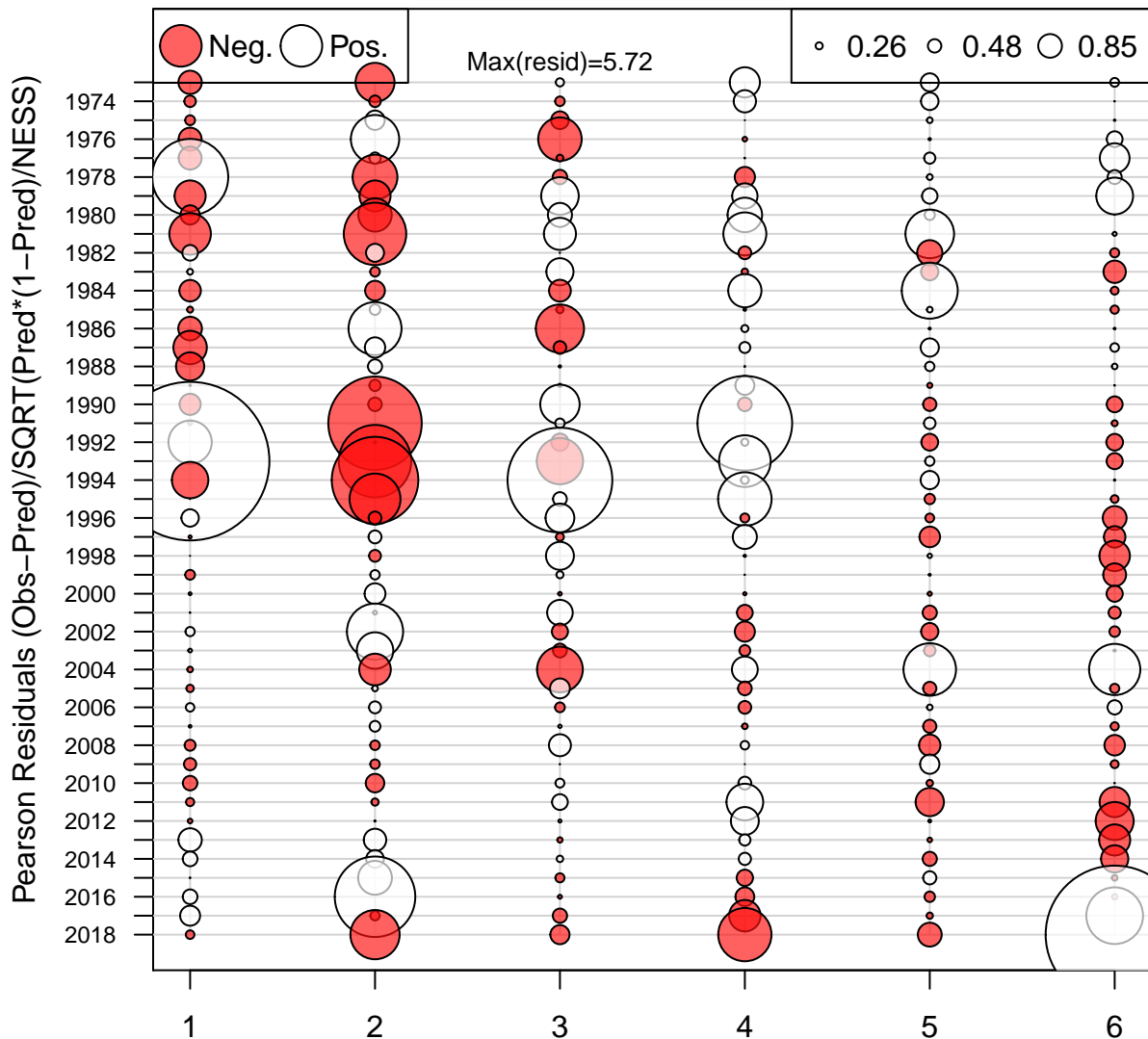
Age

Year = 2018



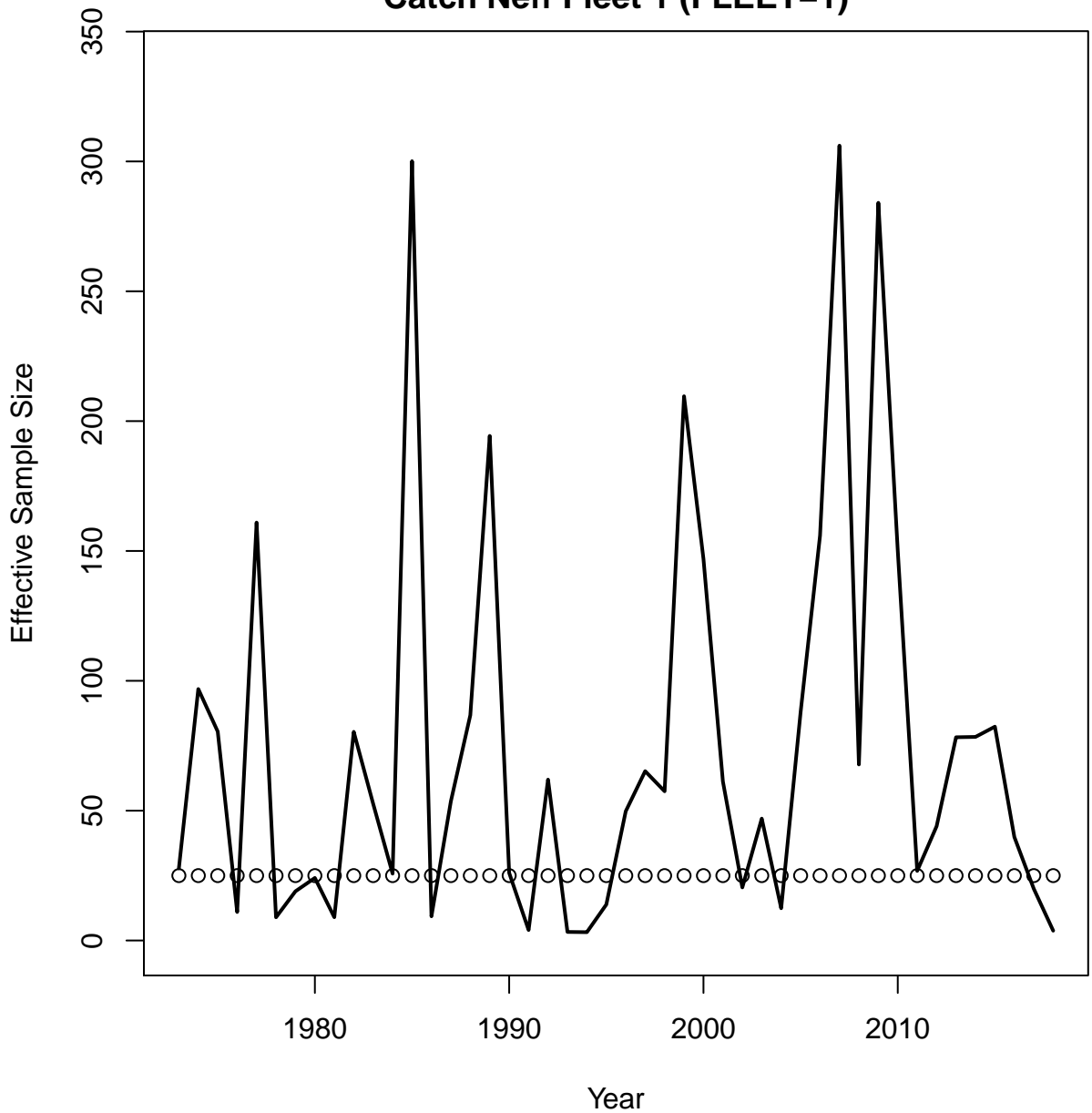
Age

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

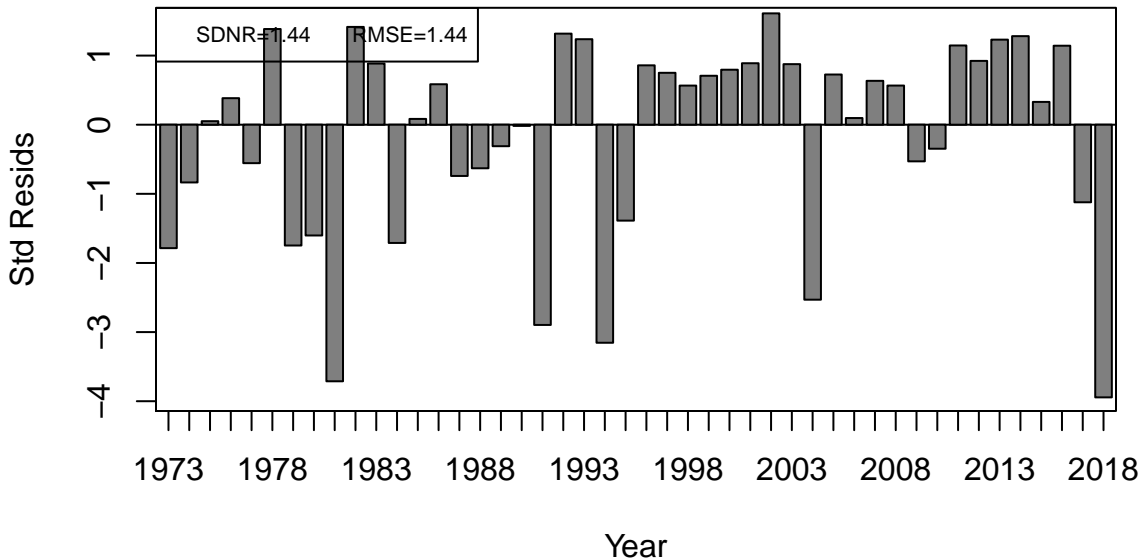
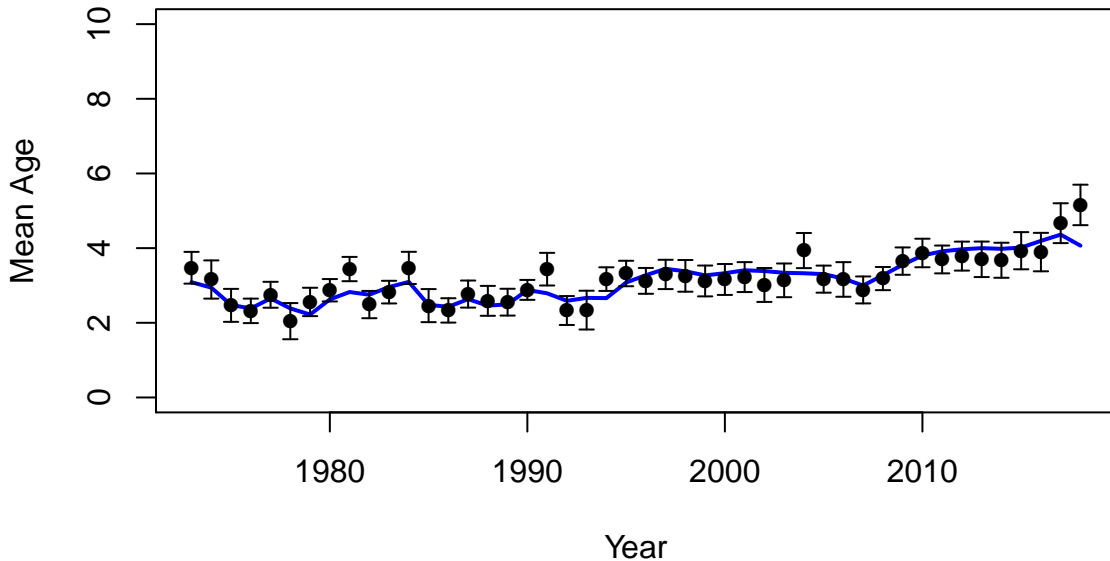


Mean resid = 0.02 SD(resid) = 1.02

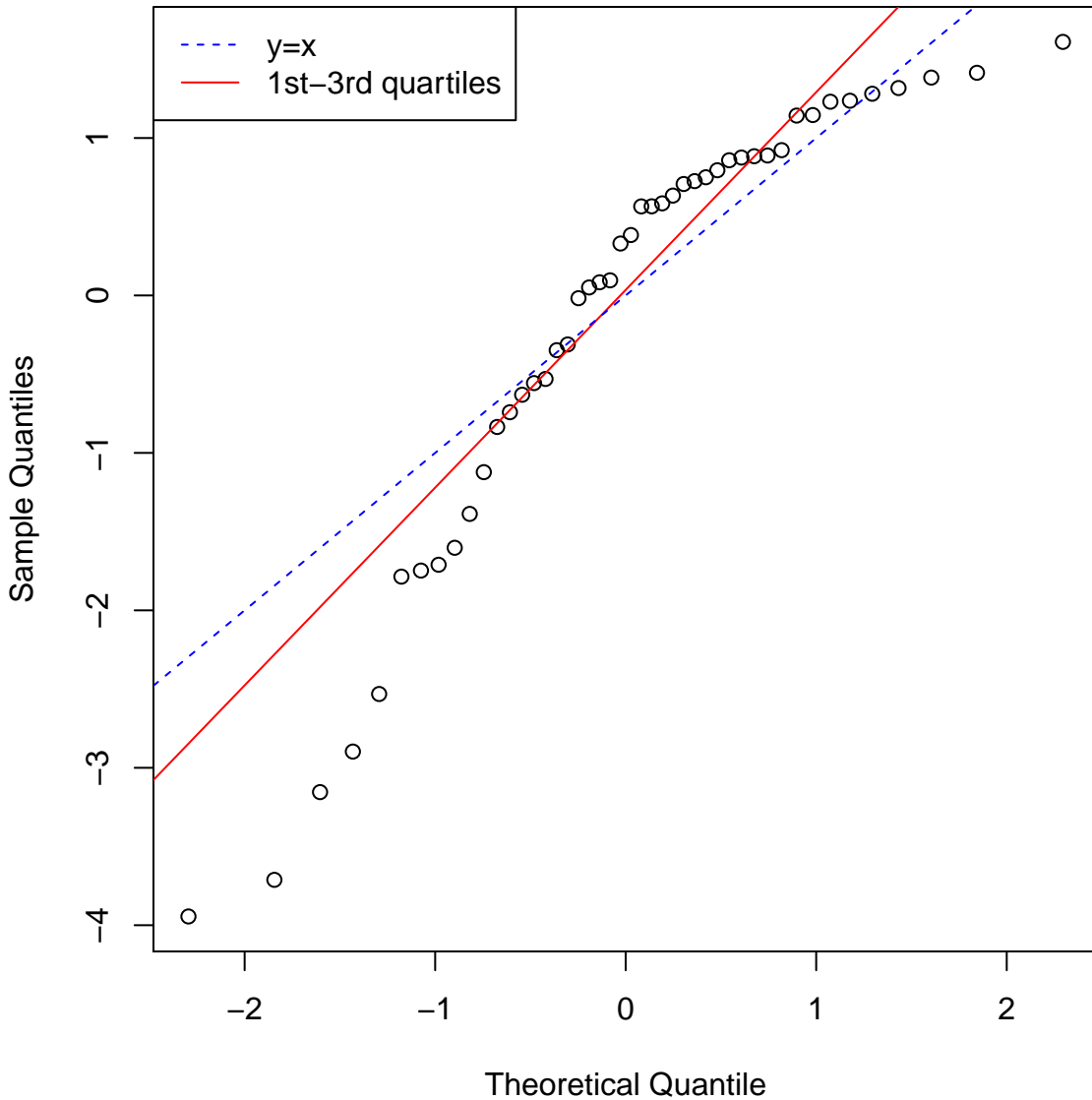
Catch Neff Fleet 1 (FLEET-1)



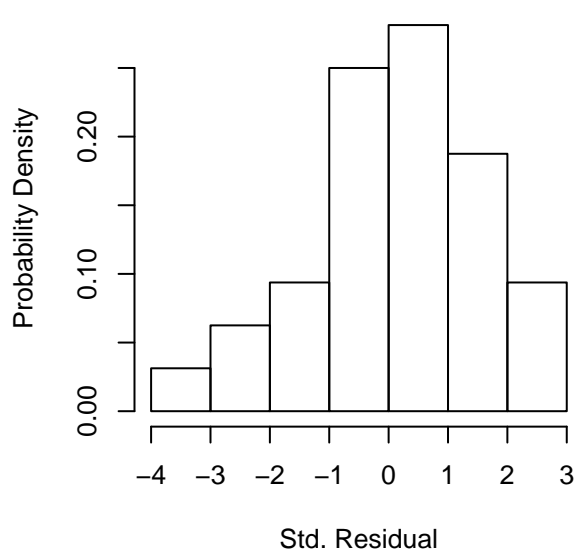
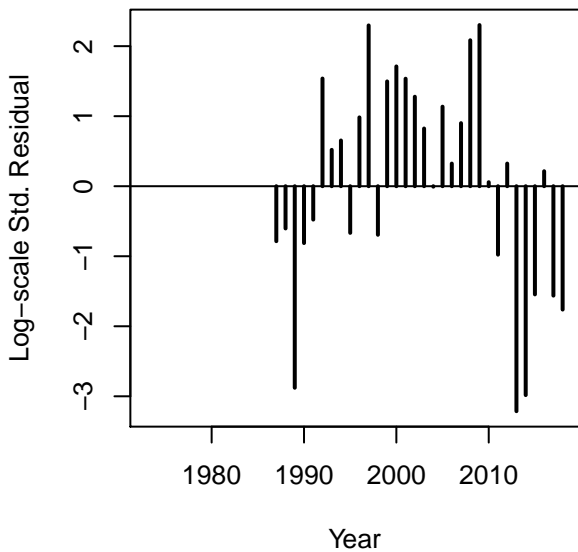
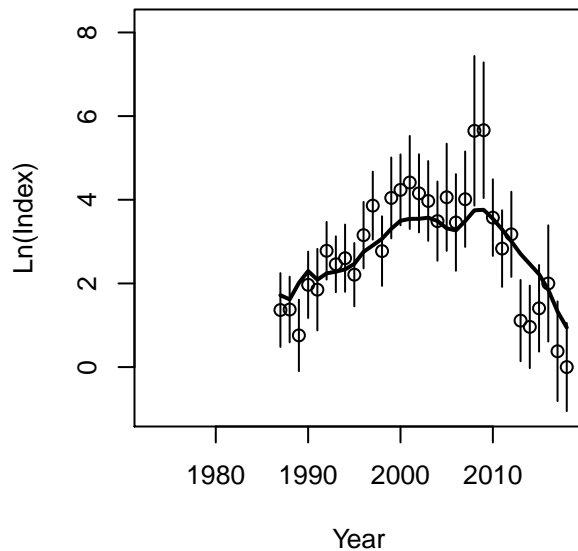
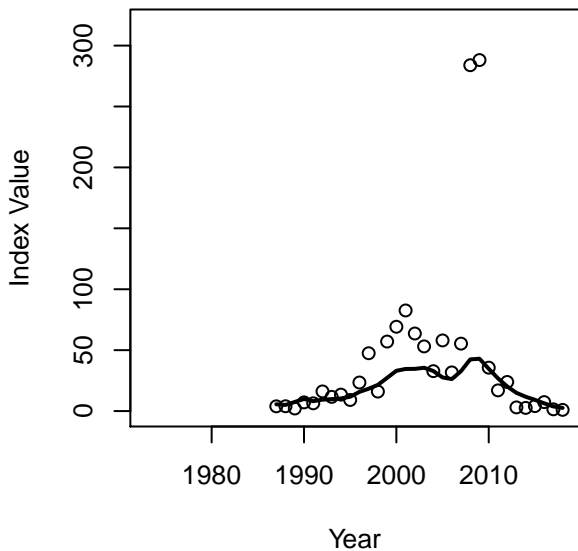
Catch Fleet 1 (FLEET-1) ESS = 25



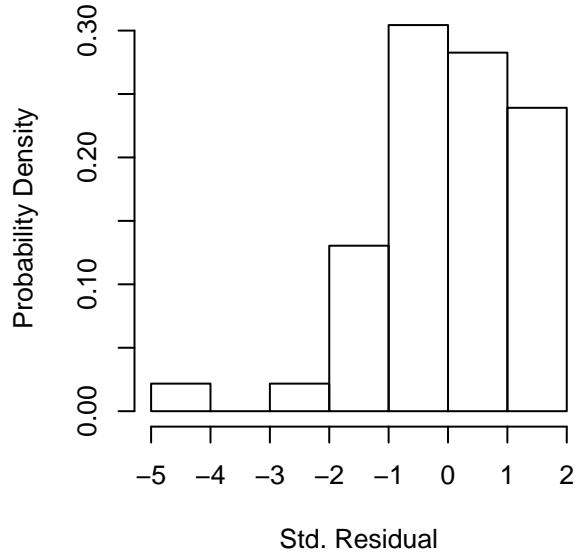
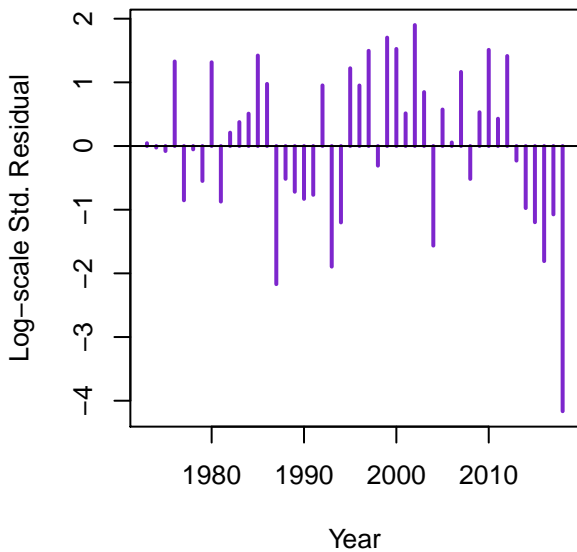
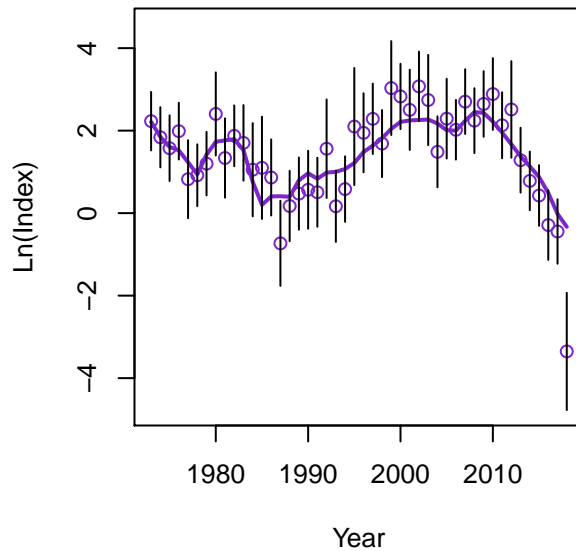
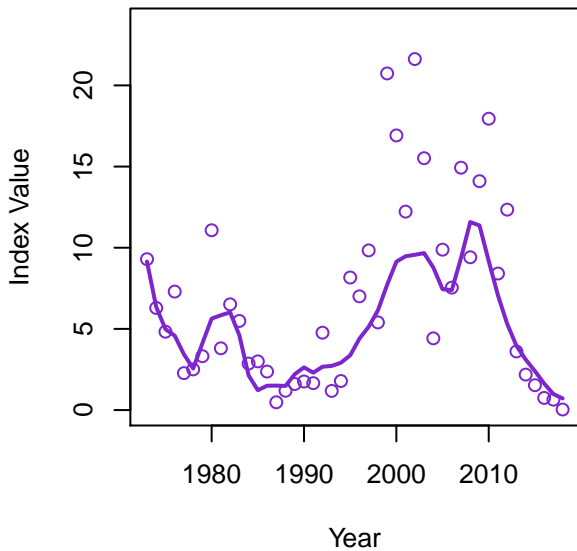
Catch Fleet 1 (FLEET-1) ESS = 25



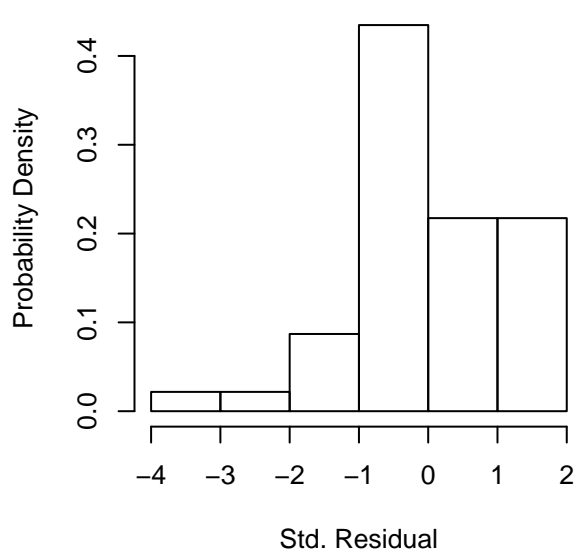
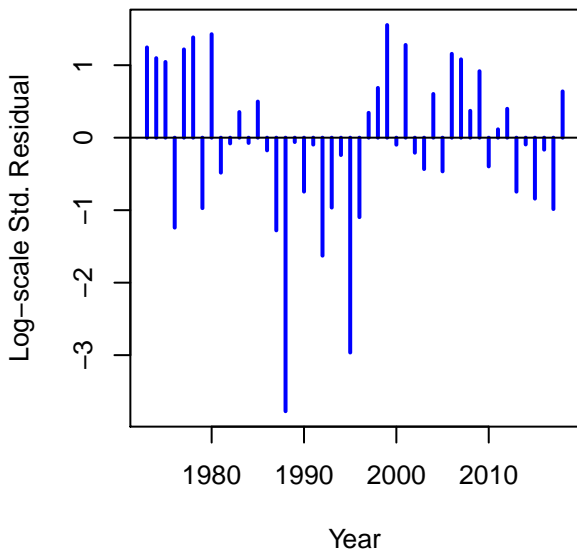
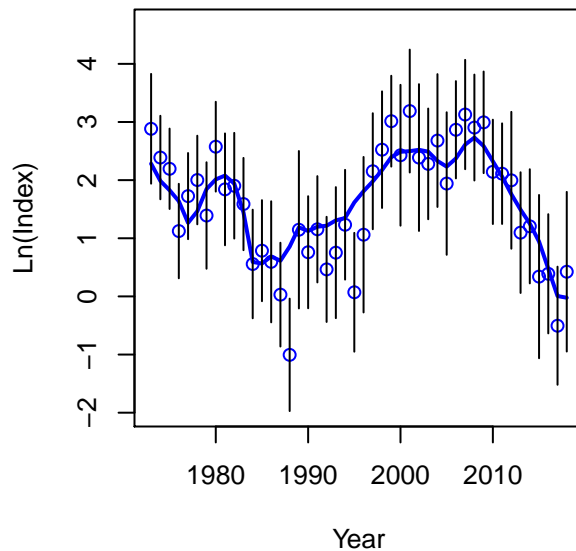
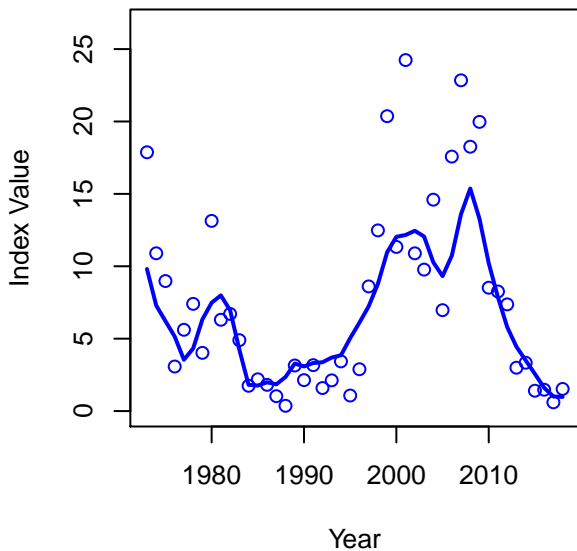
Index 1 (INDEX-1)



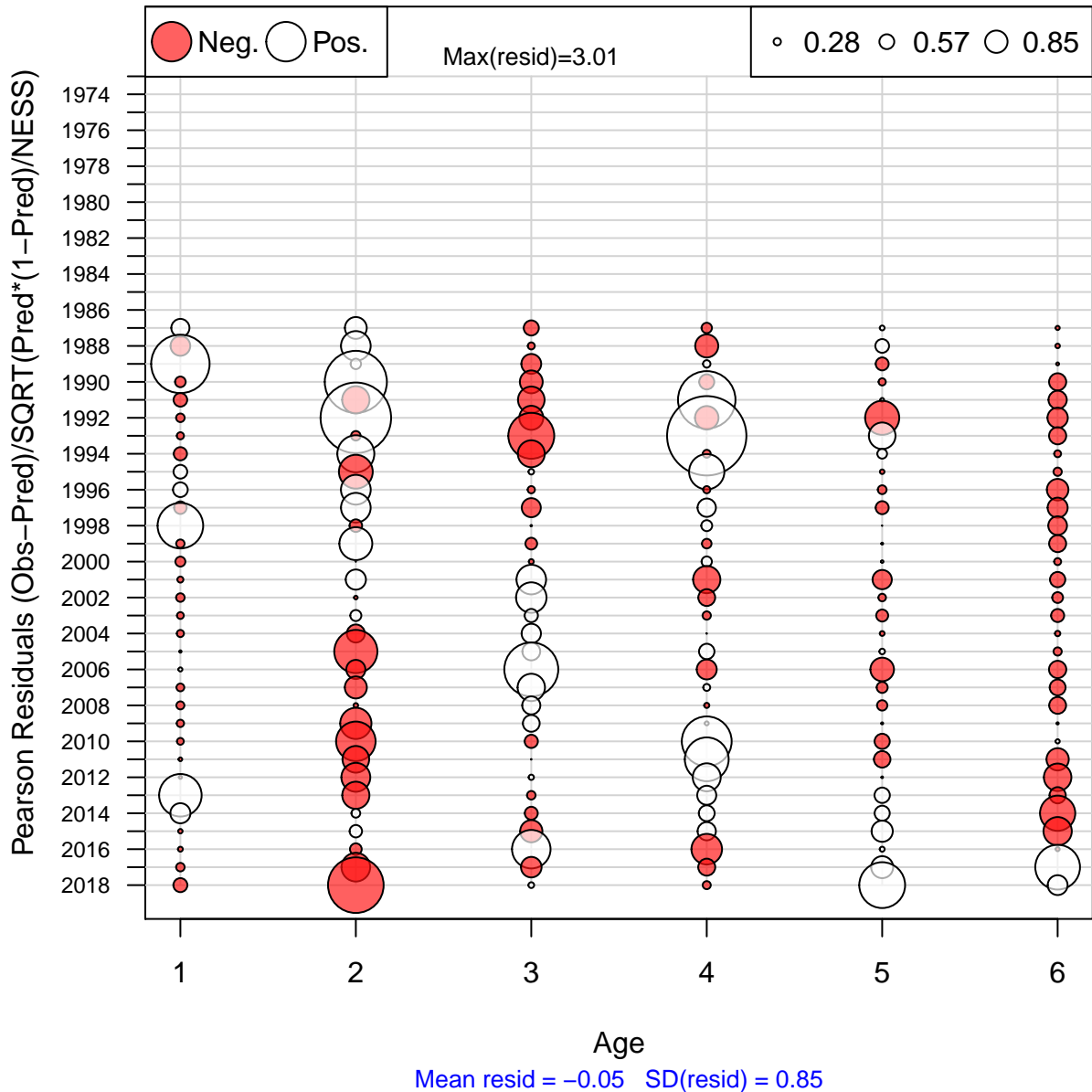
Index 2 (INDEX-2)



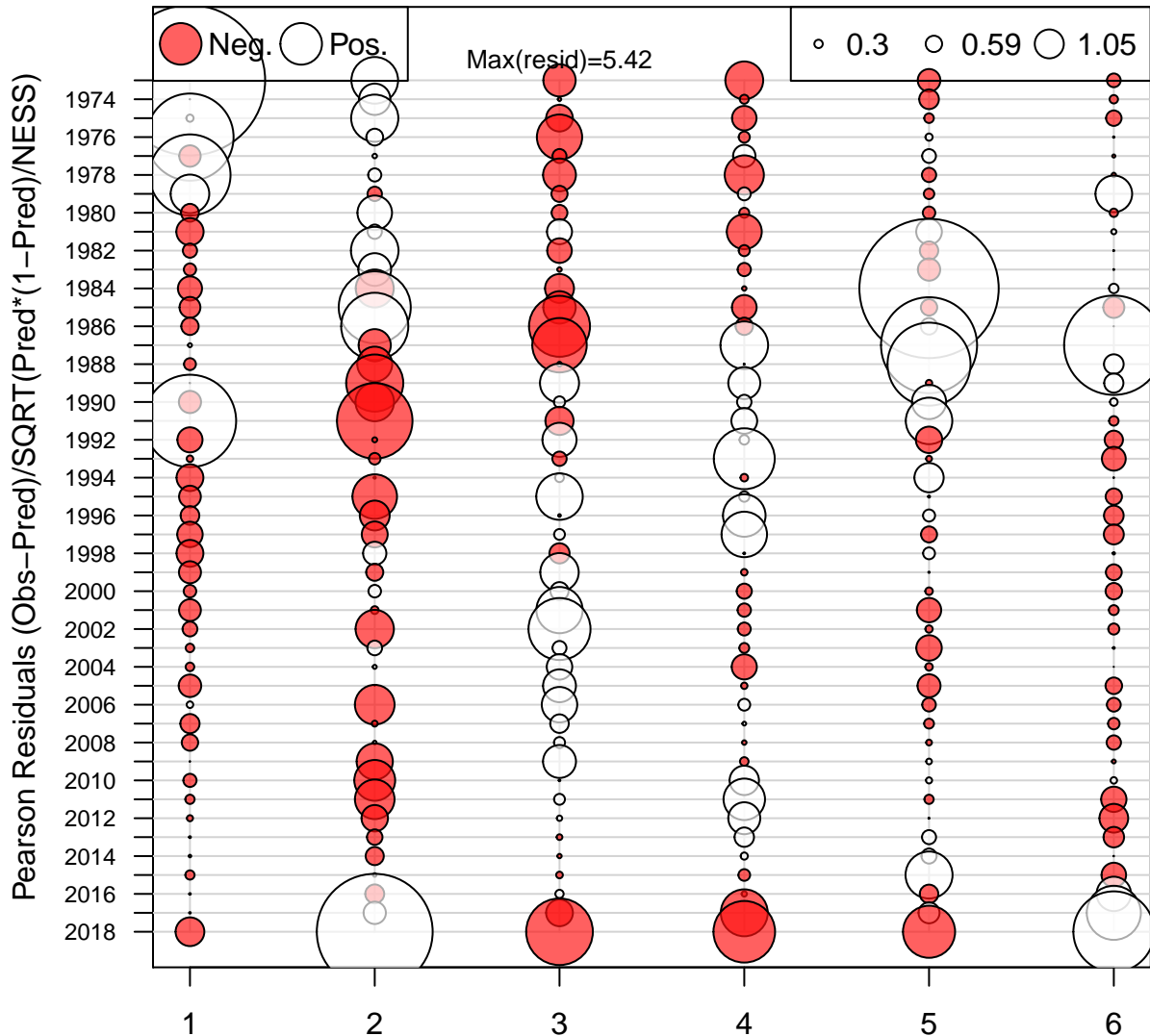
Index 3 (INDEX-3)



Age Comp Residuals for Index 1 (INDEX-1)

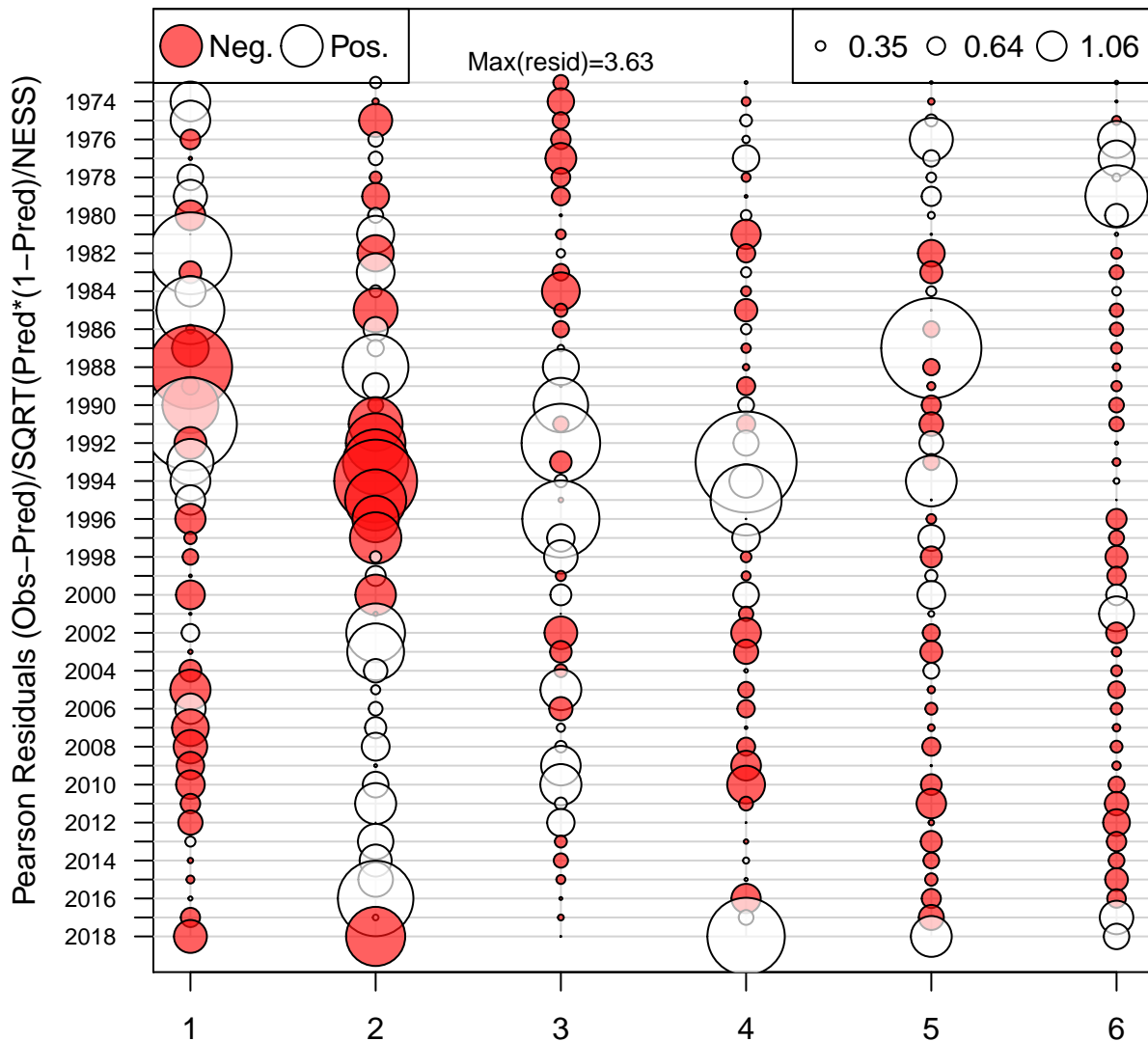


Age Comp Residuals for Index 2 (INDEX-2)



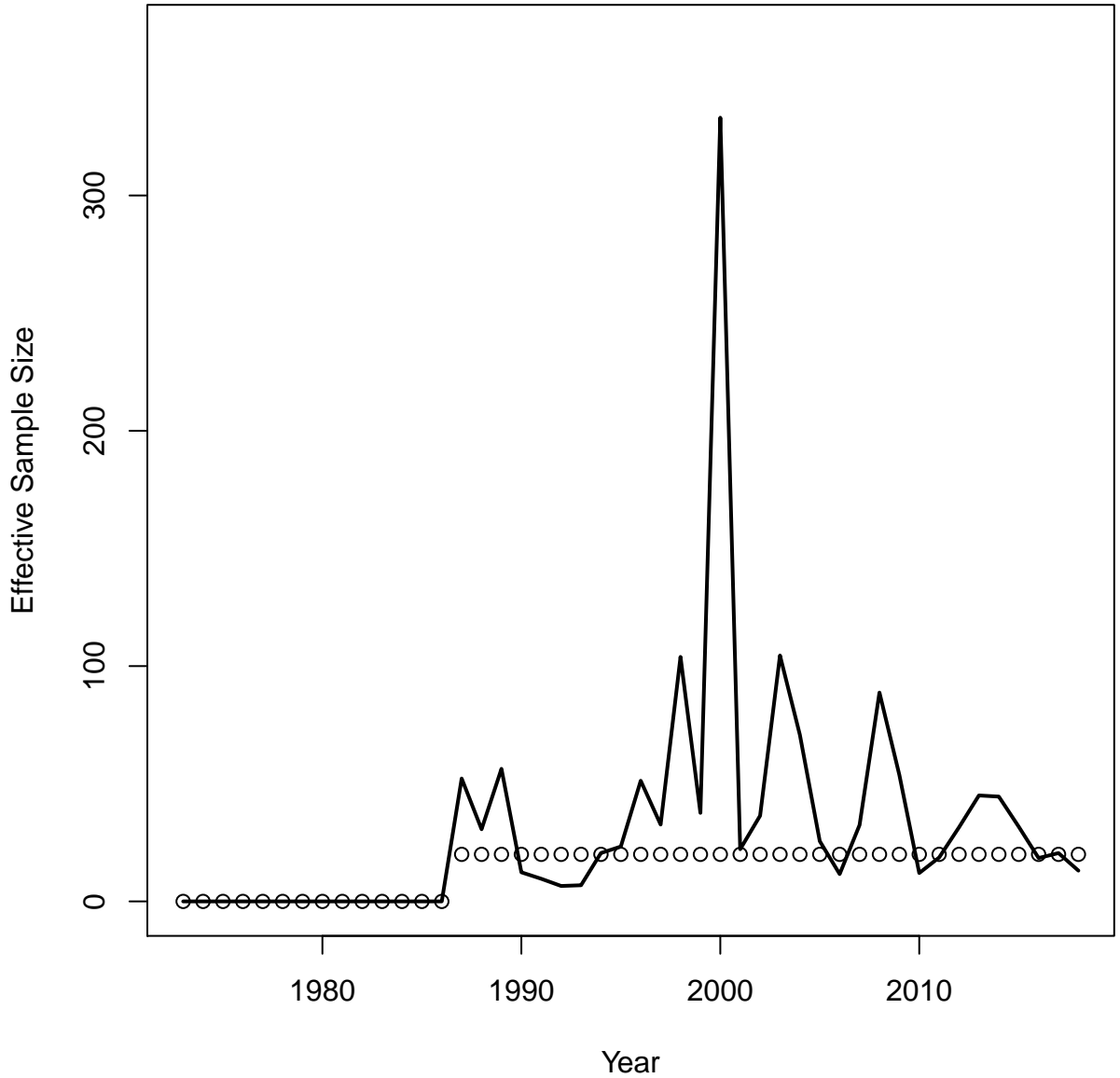
Mean resid = 0 SD(resid) = 1.14

Age Comp Residuals for Index 3 (INDEX-3)

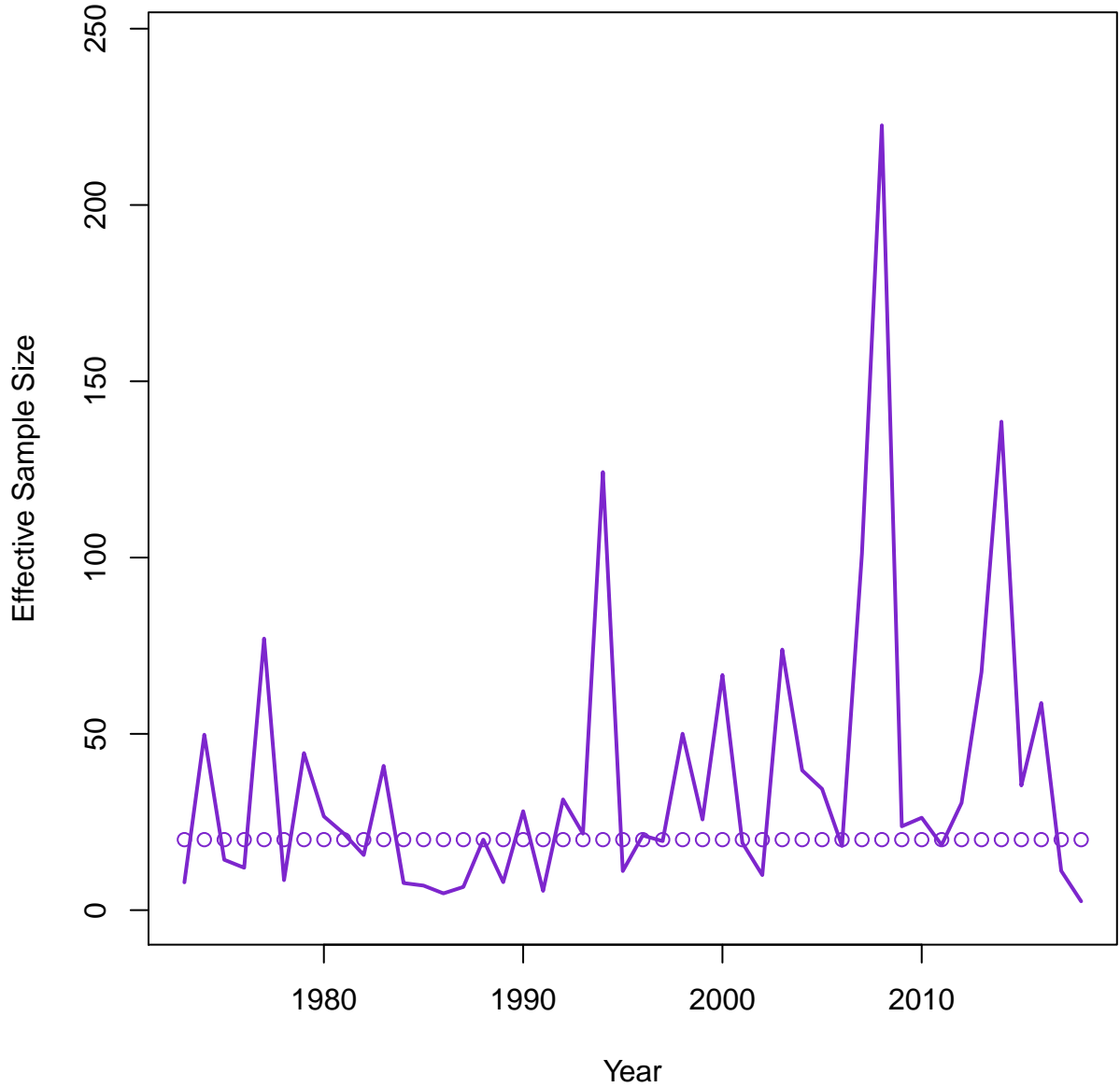


Mean resid = 0 SD(resid) = 1.06

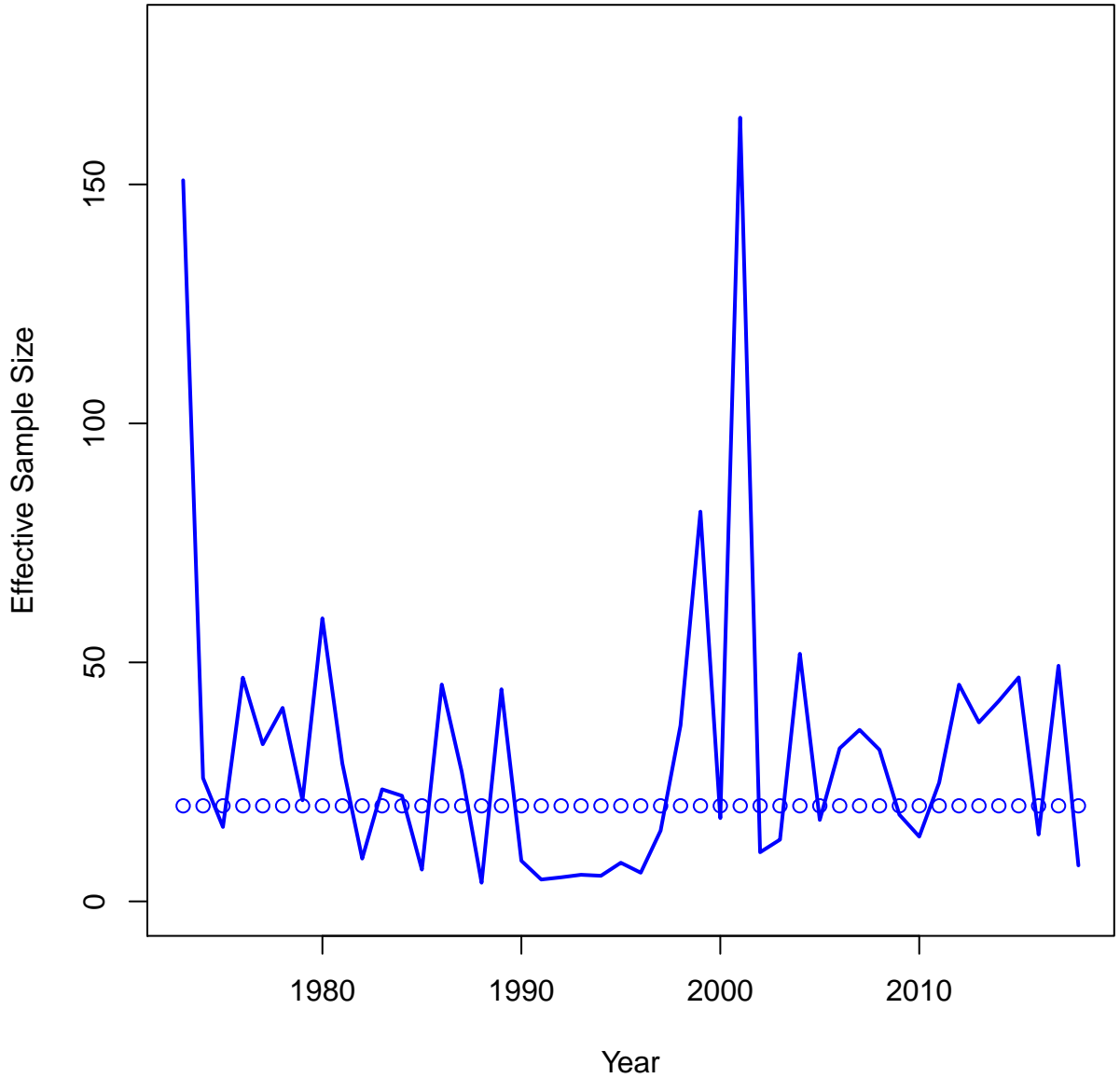
Index Neff 1 (INDEX-1)



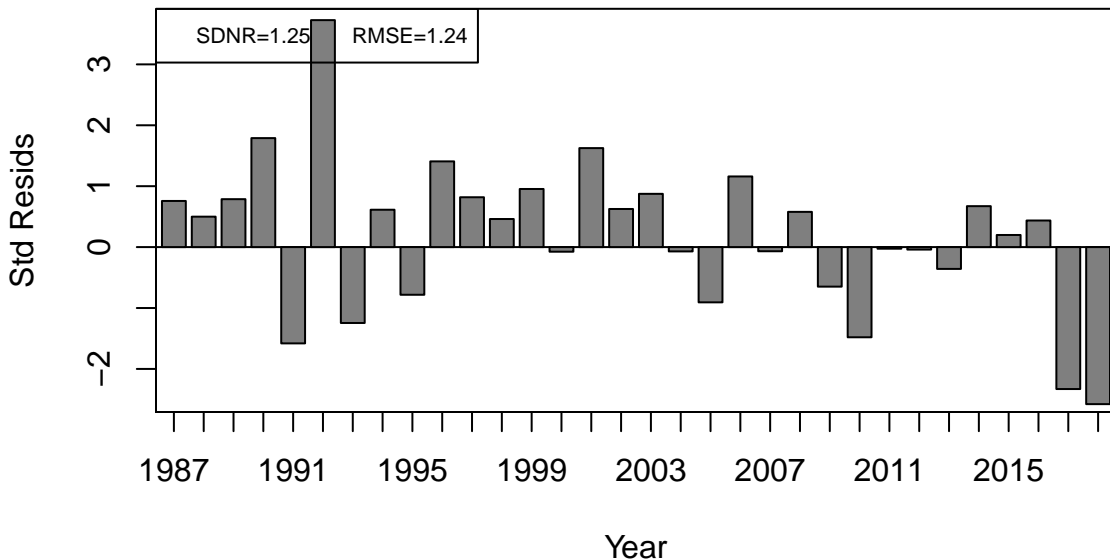
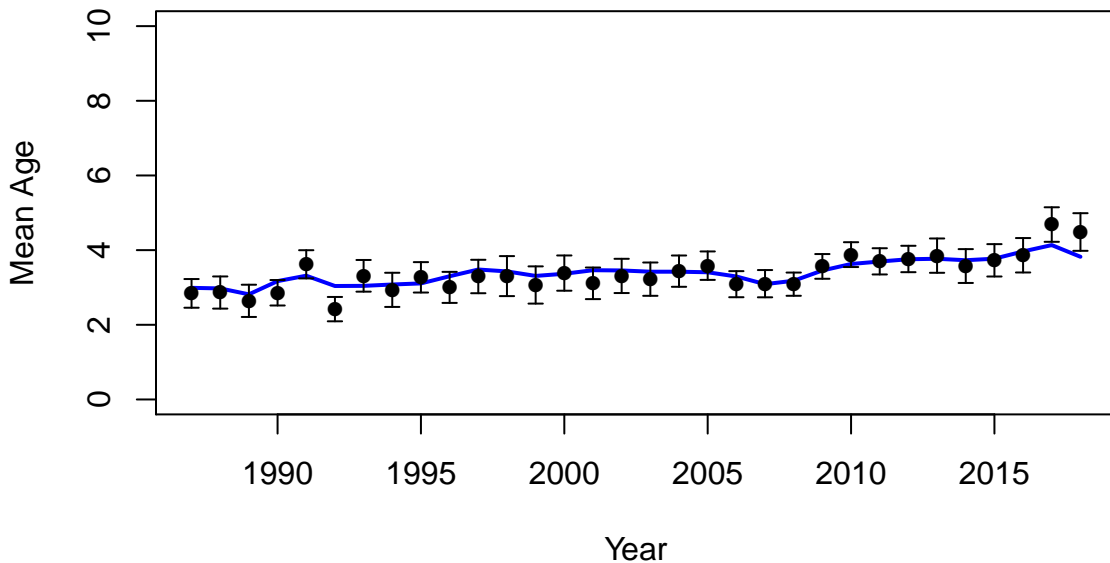
Index Neff 2 (INDEX-2)



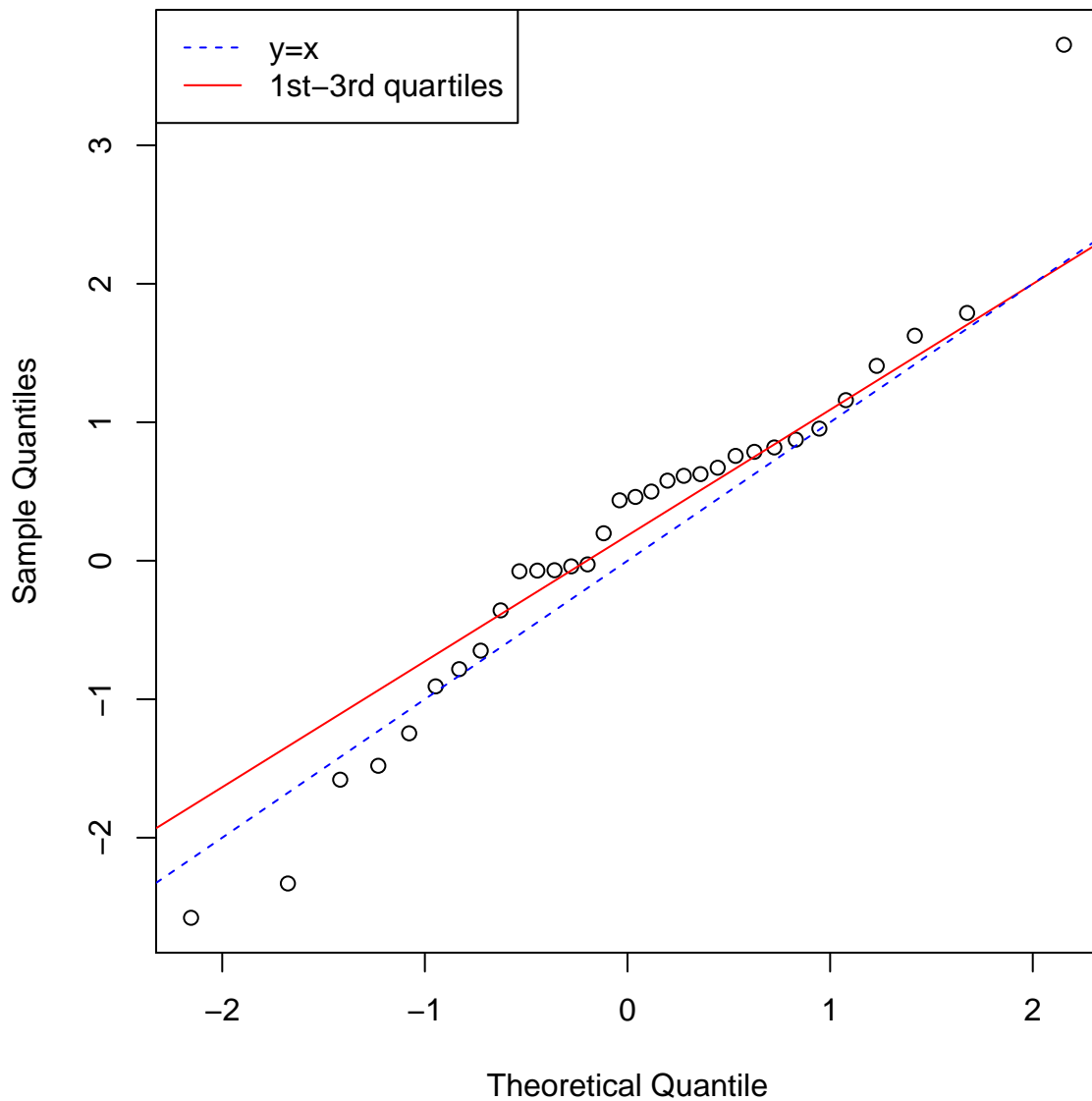
Index Neff 3 (INDEX-3)



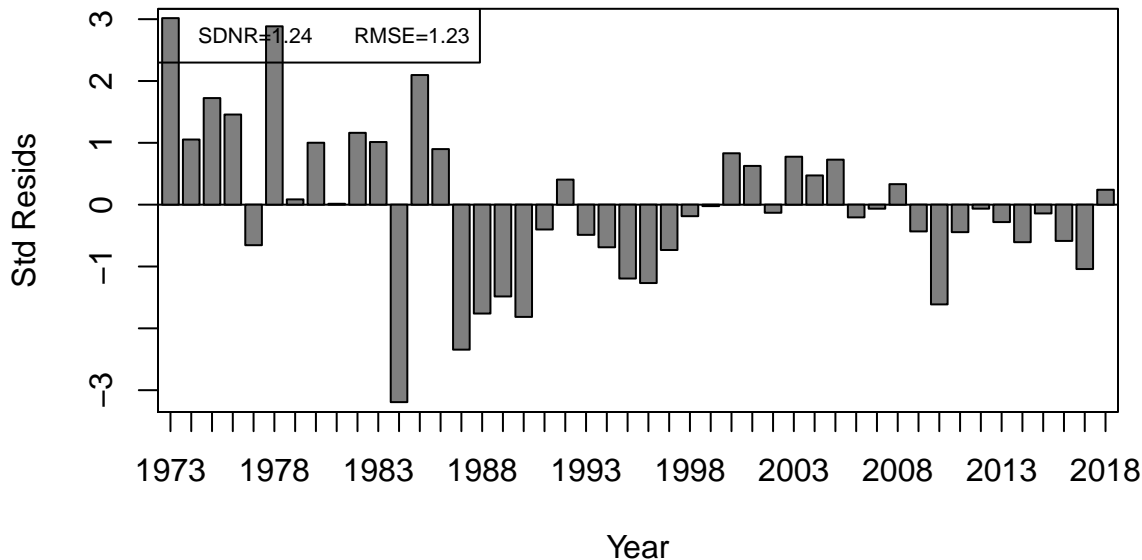
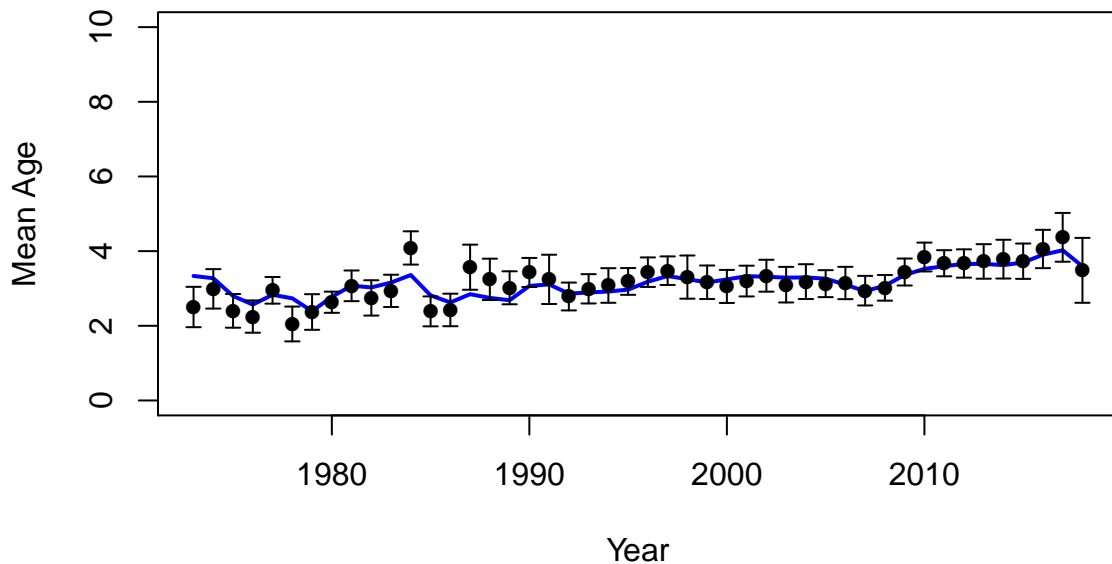
Index 1 (INDEX-1) ESS = 20



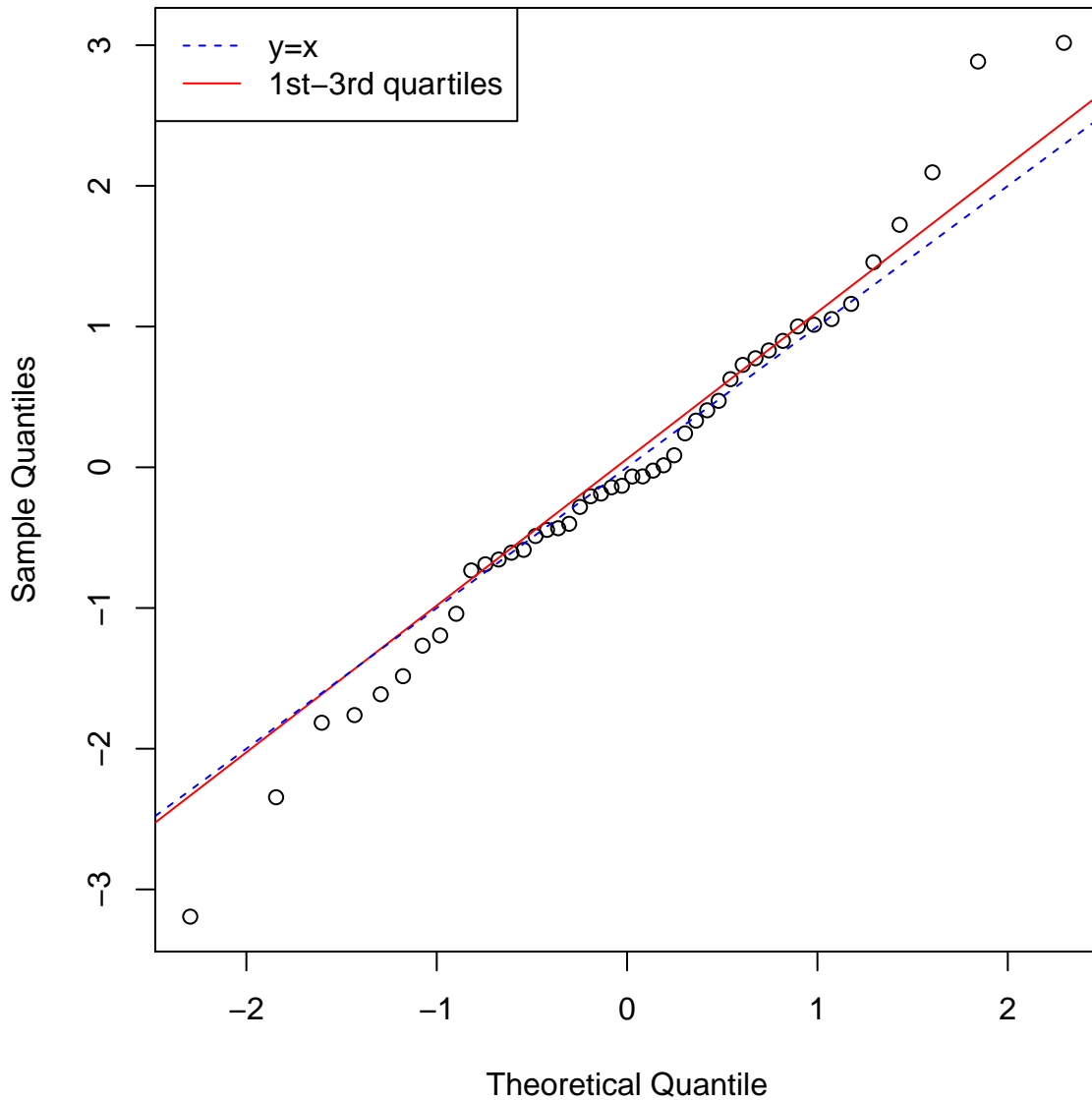
Index 1 (INDEX-1) ESS = 20



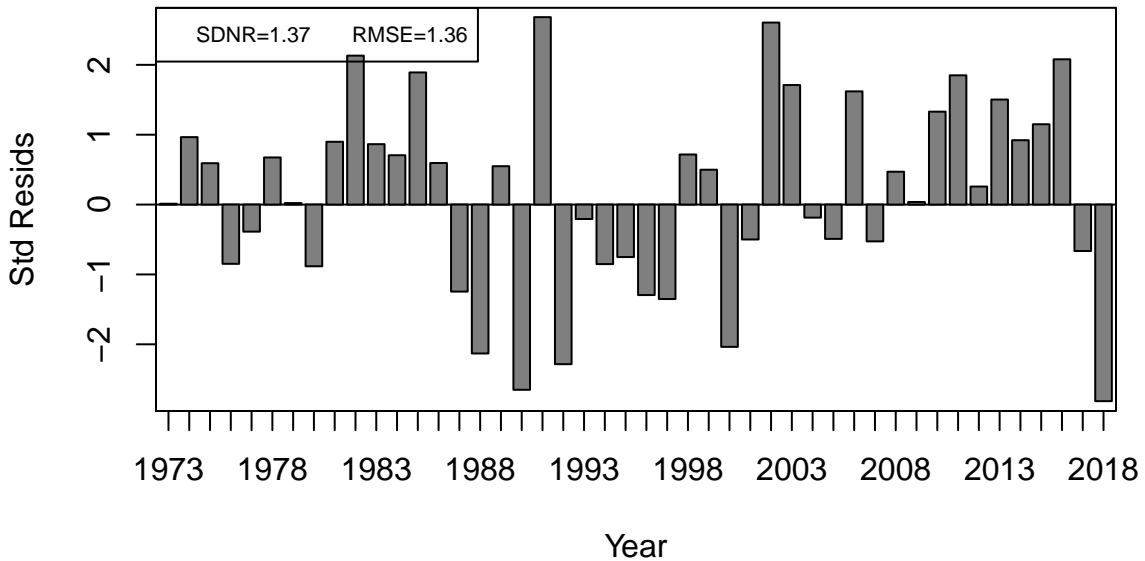
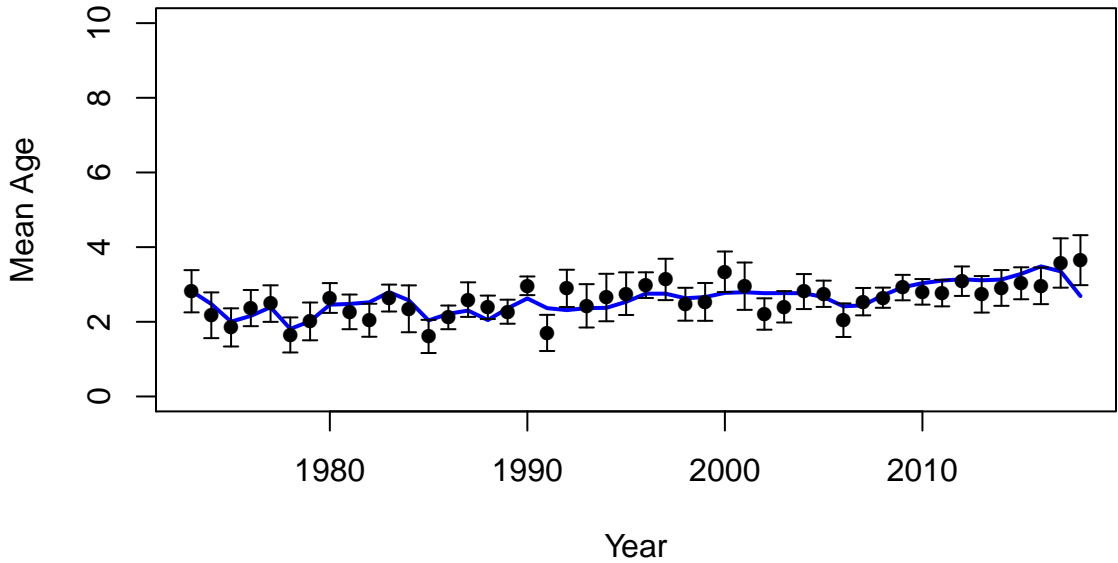
Index 2 (INDEX-2) ESS = 20



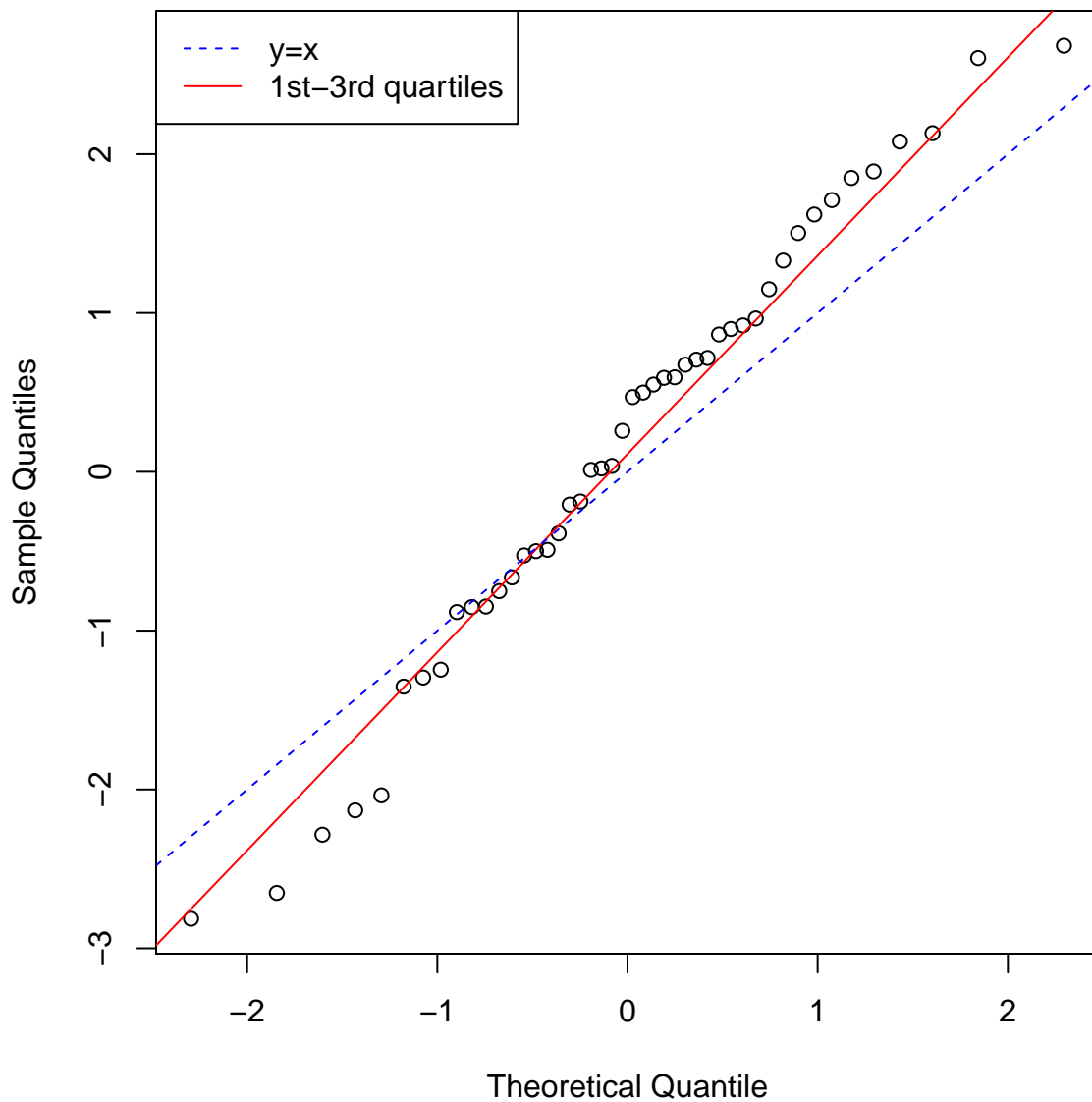
Index 2 (INDEX-2) ESS = 20



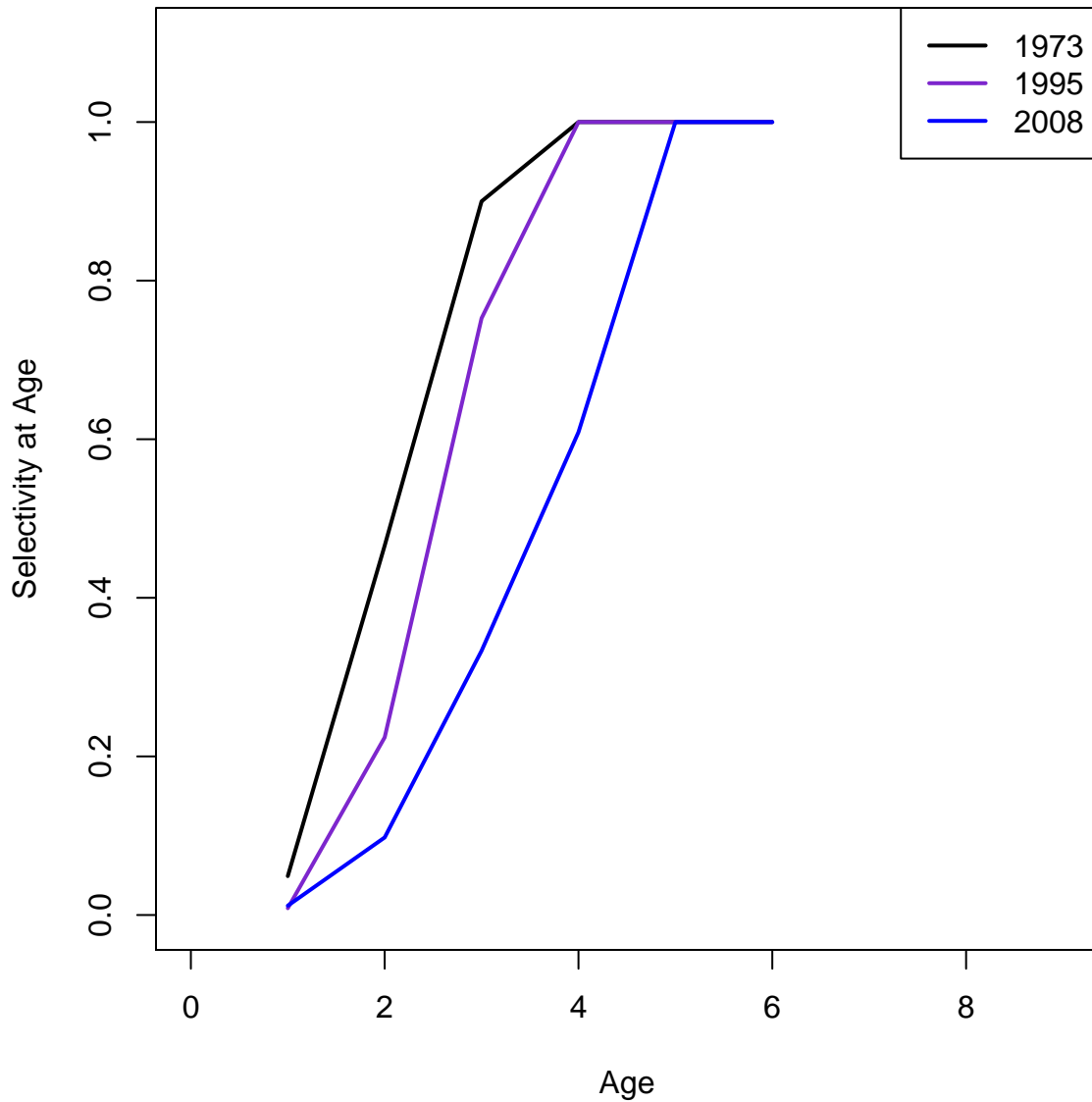
Index 3 (INDEX-3) ESS = 20

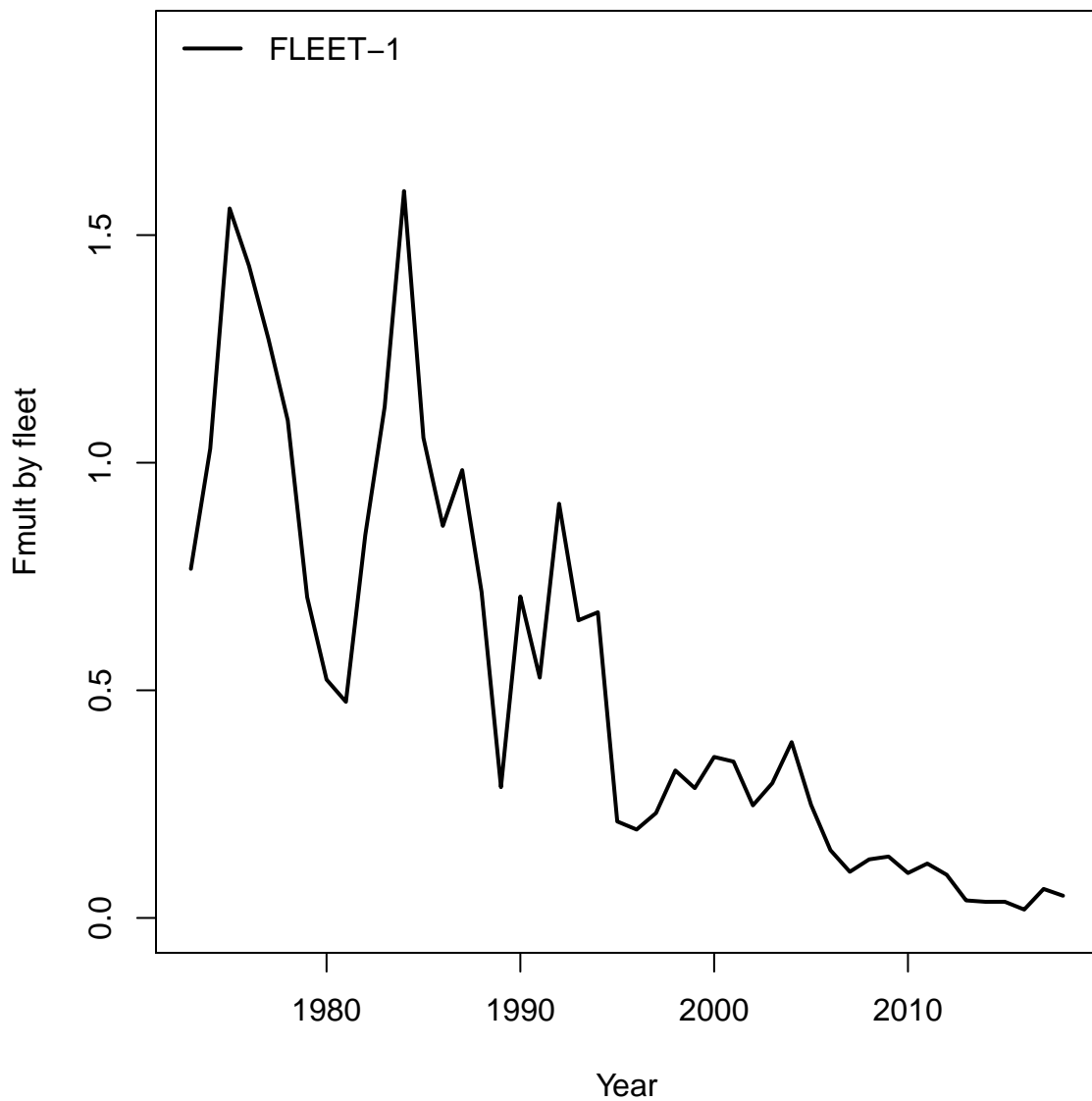


Index 3 (INDEX-3) ESS = 20

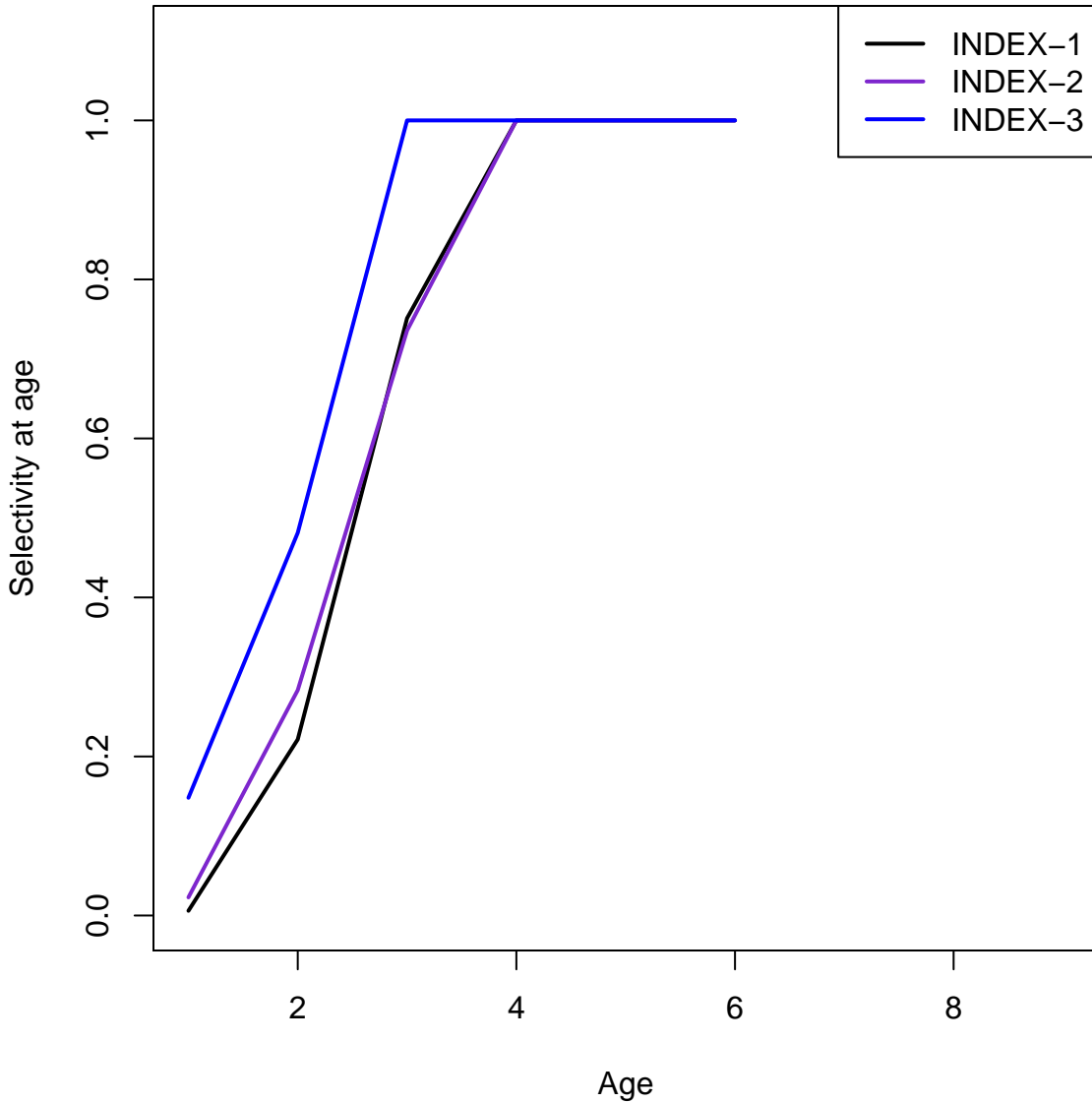


Fleet 1 (FLEET-1)

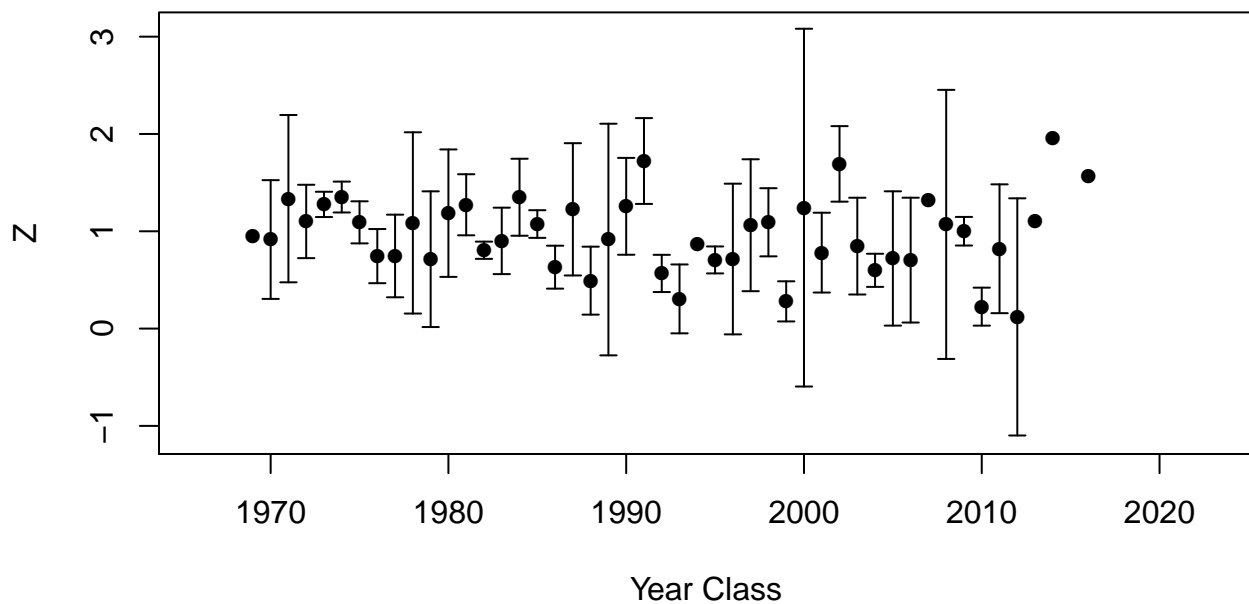
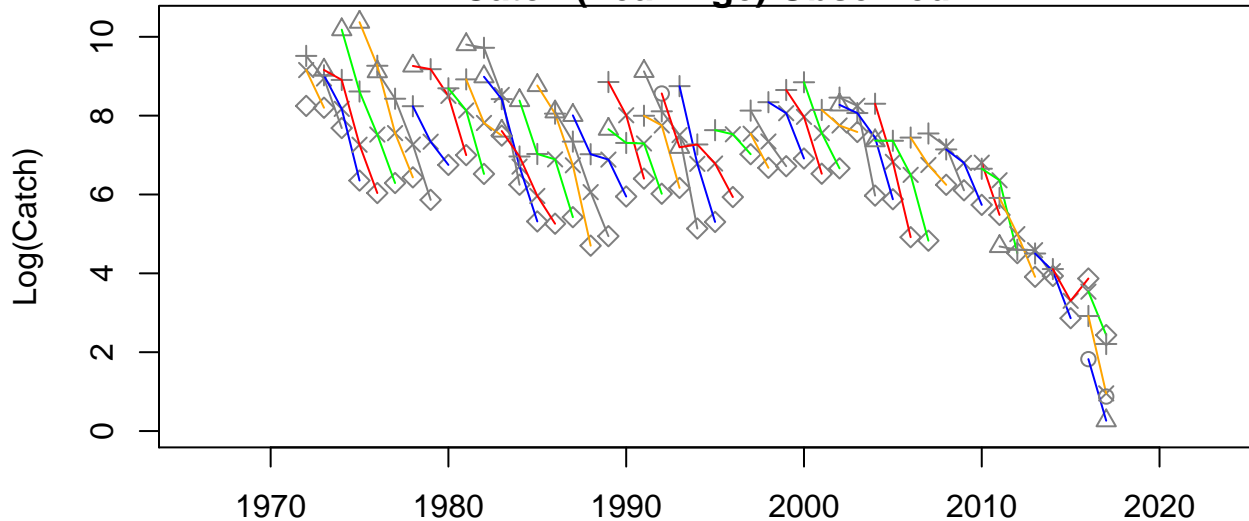




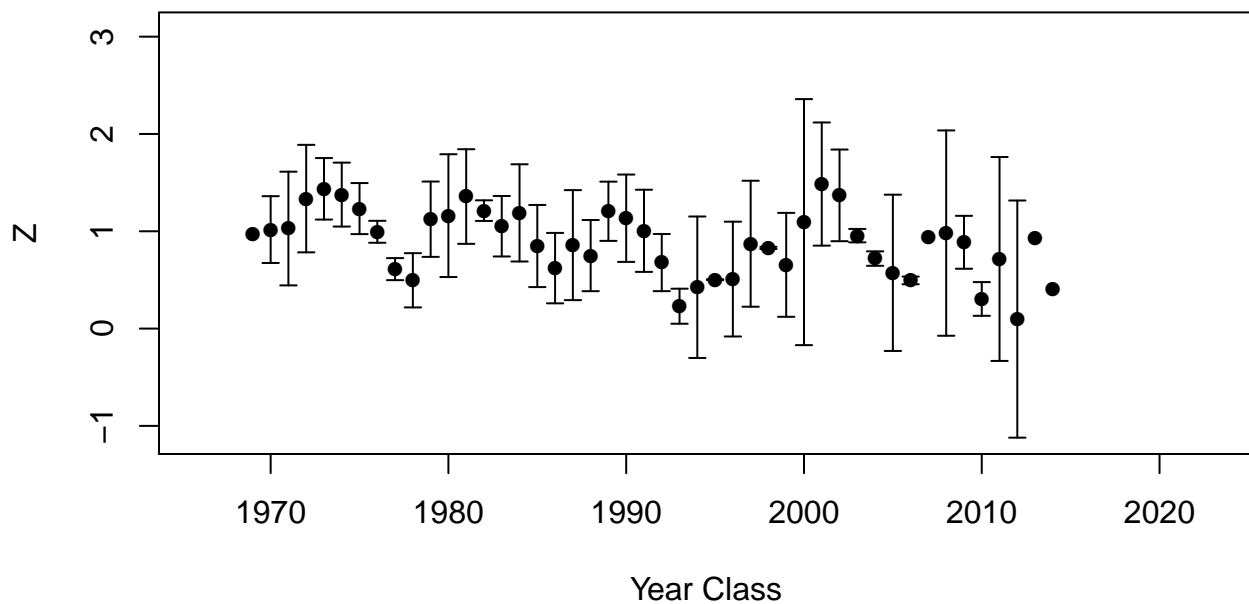
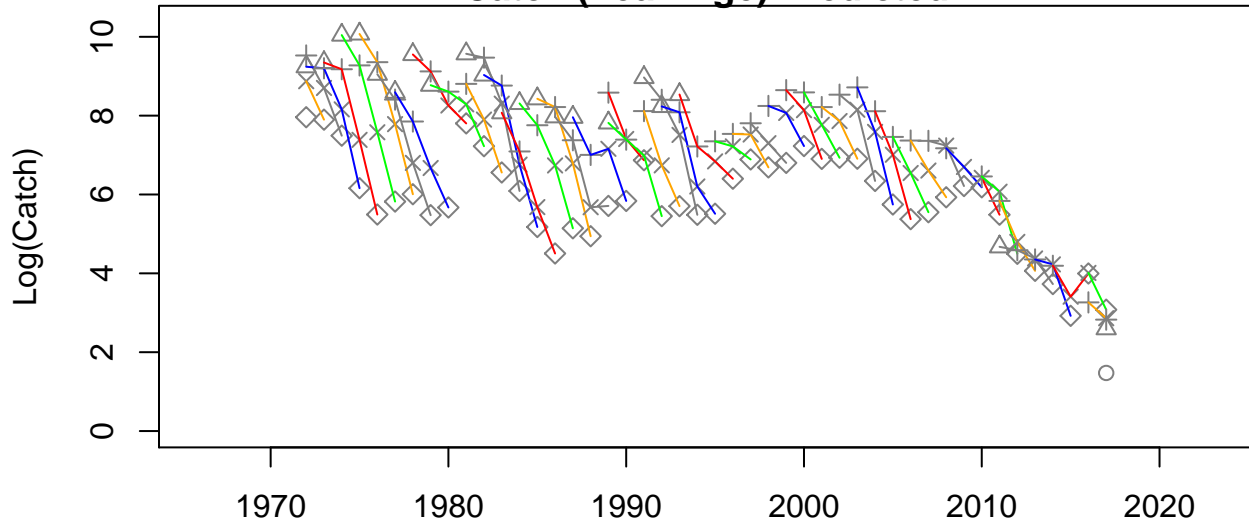
Indices



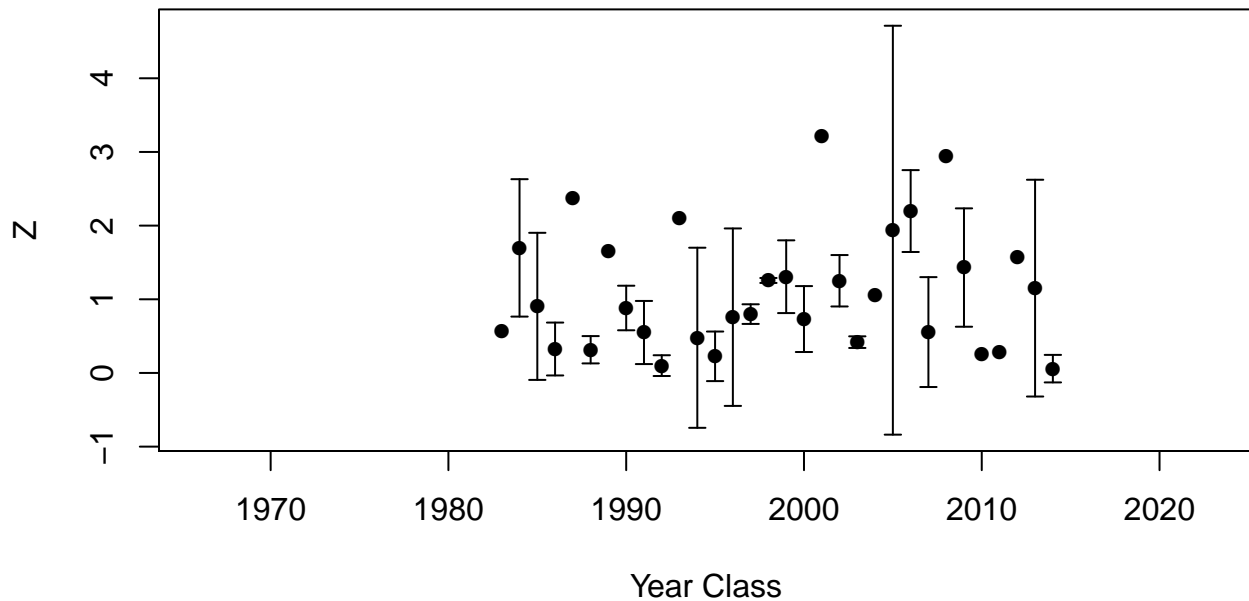
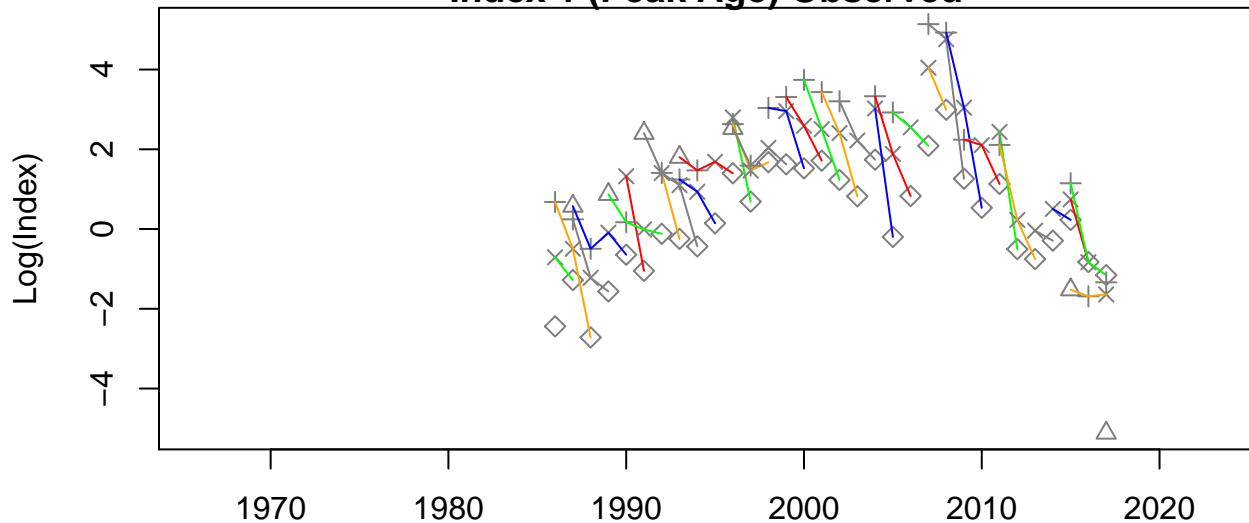
Catch (Peak Age) Observed



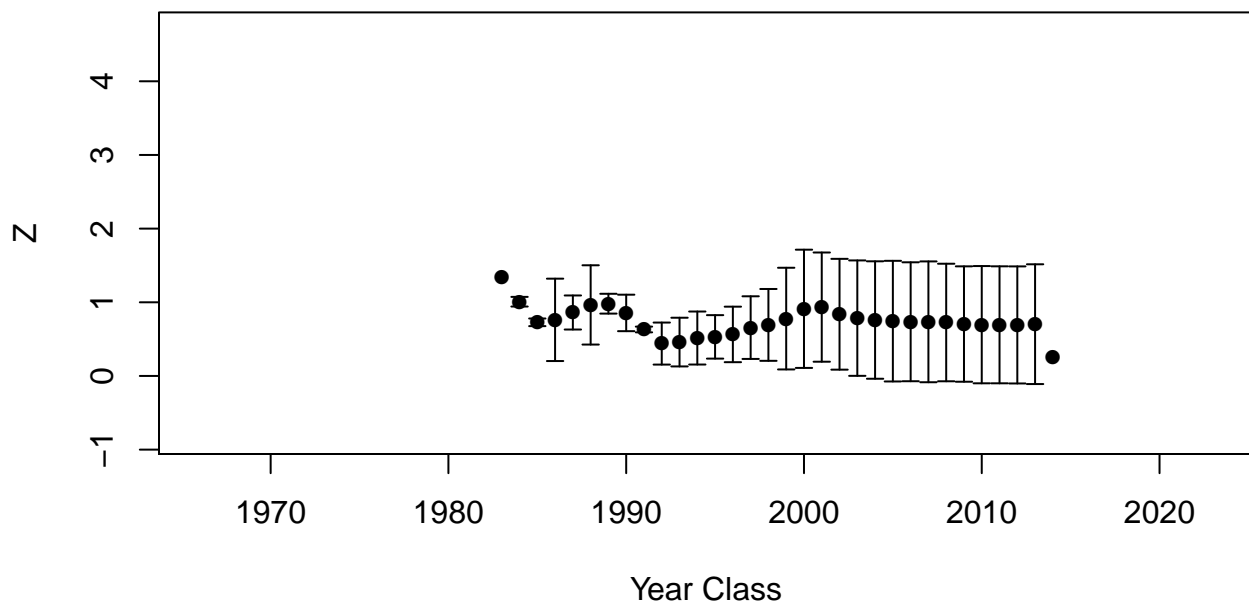
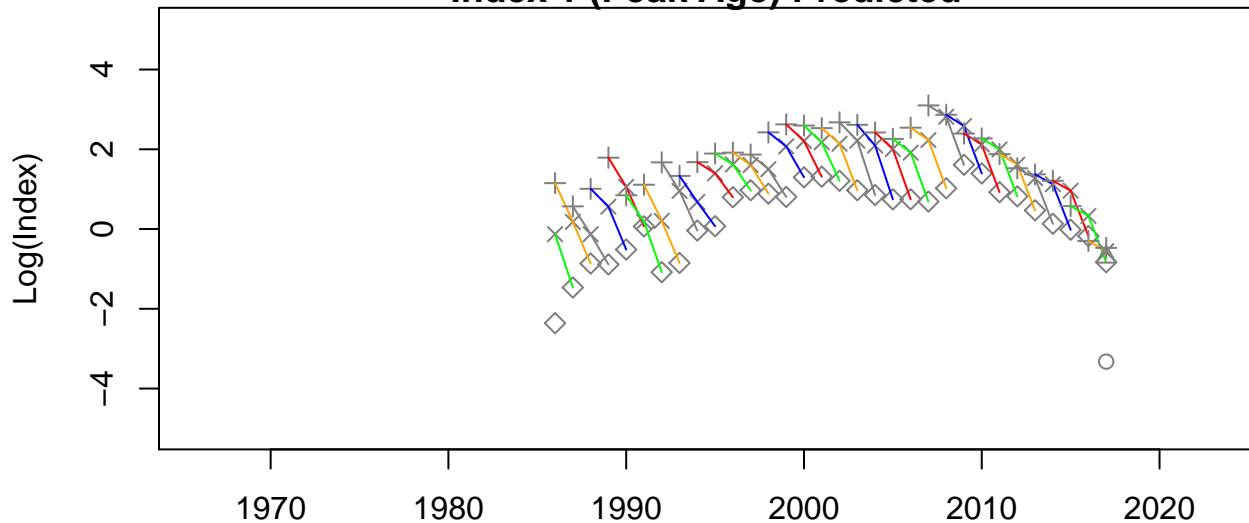
Catch (Peak Age) Predicted



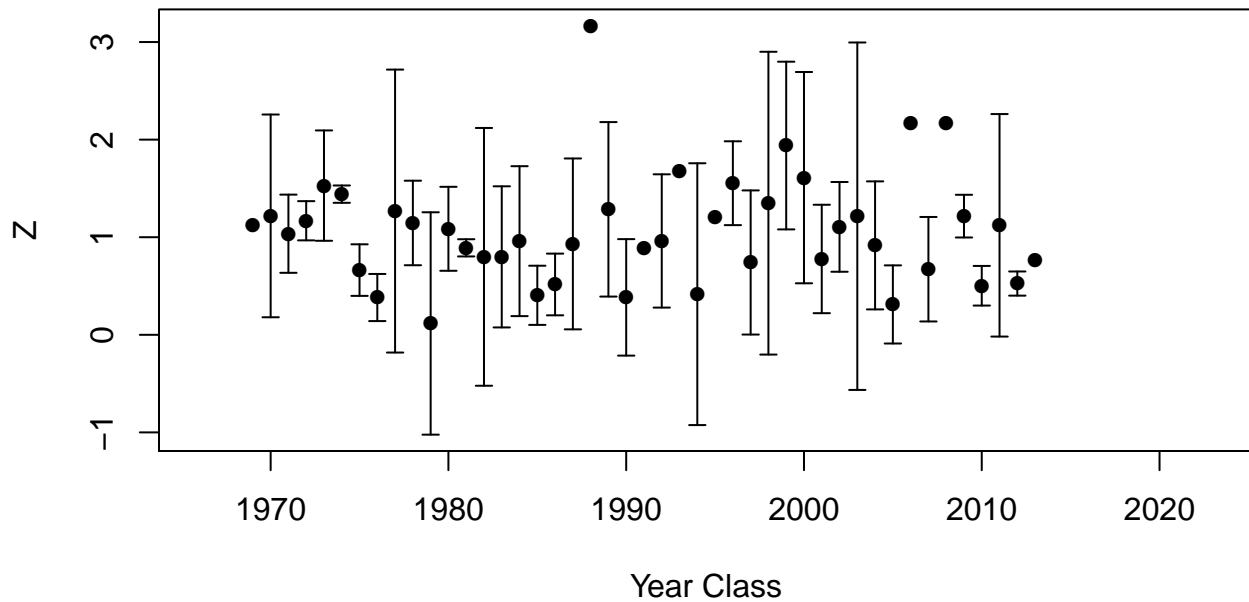
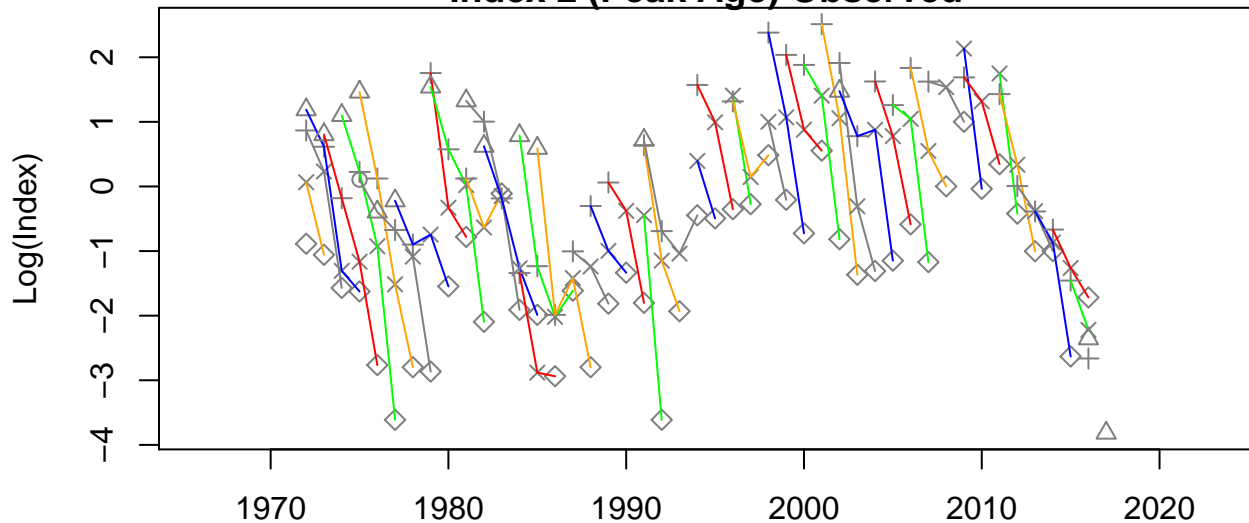
Index 1 (Peak Age) Observed



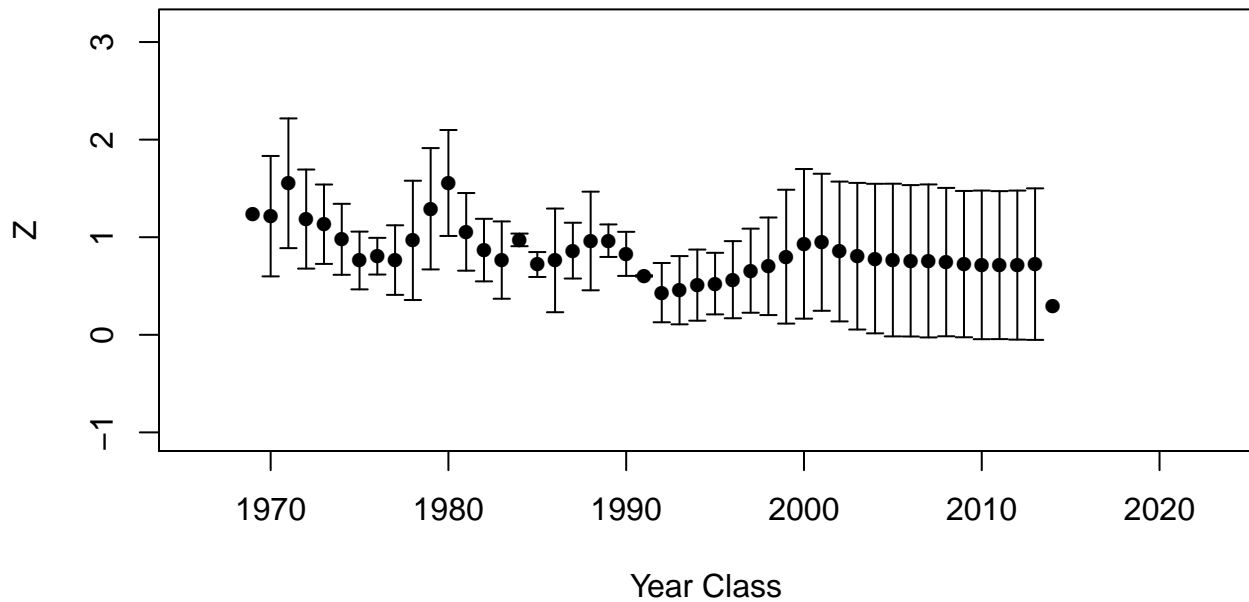
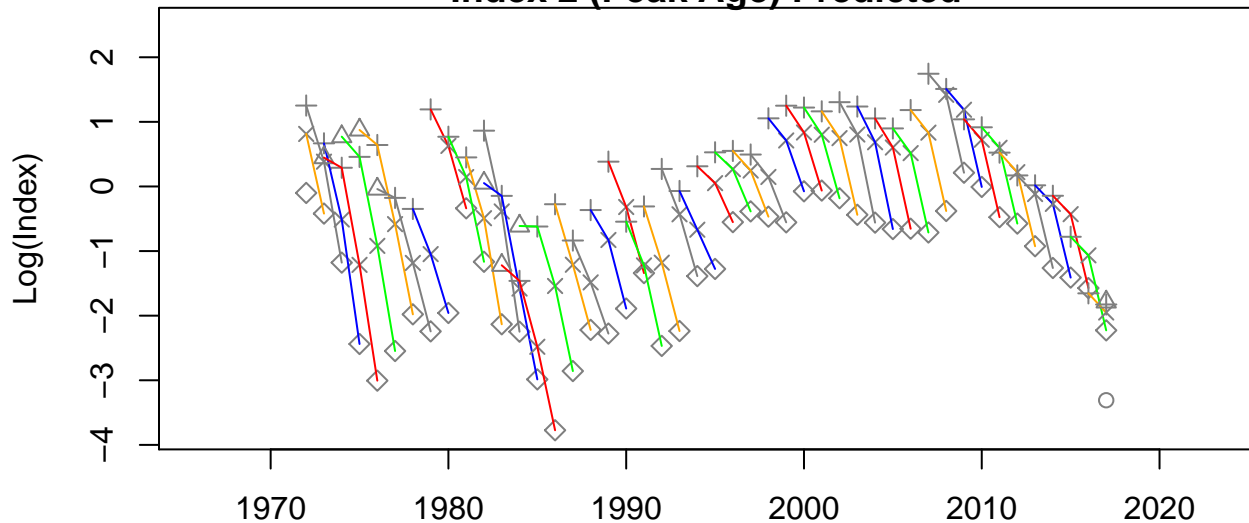
Index 1 (Peak Age) Predicted



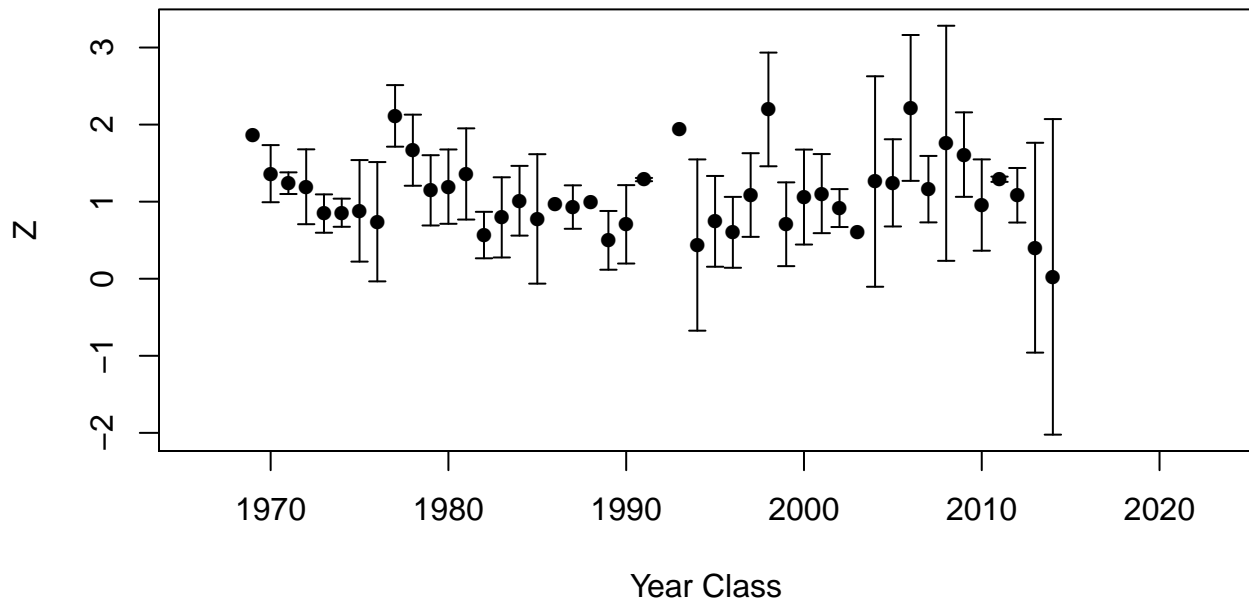
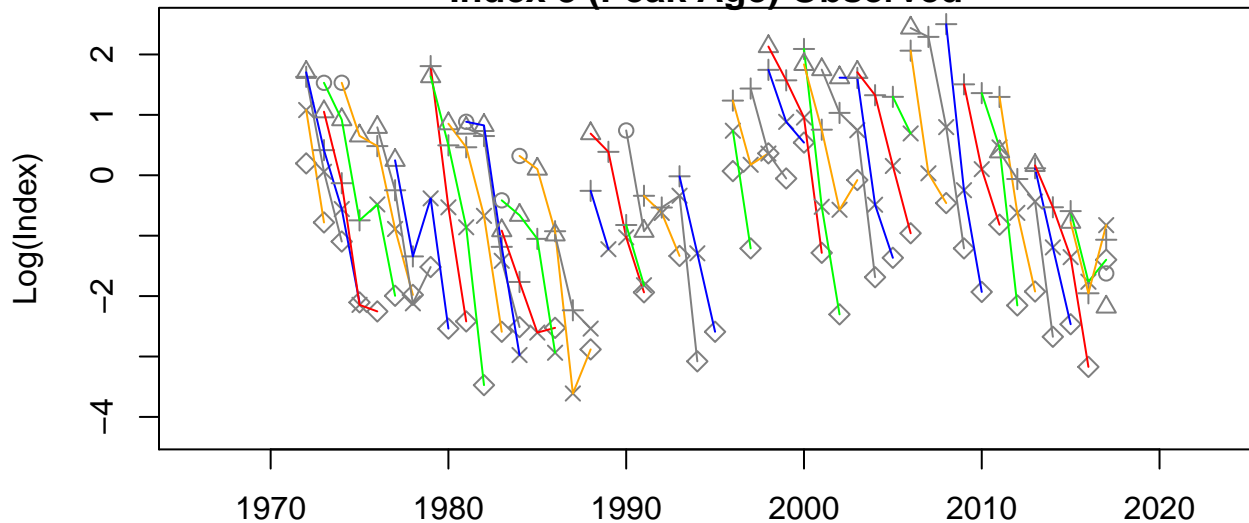
Index 2 (Peak Age) Observed



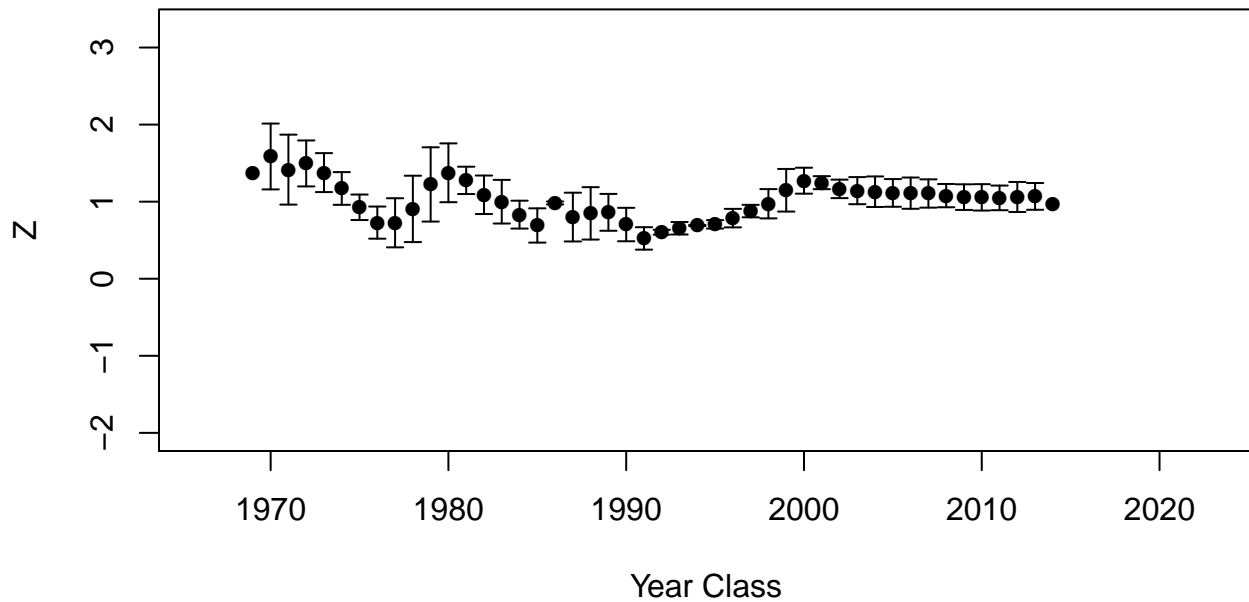
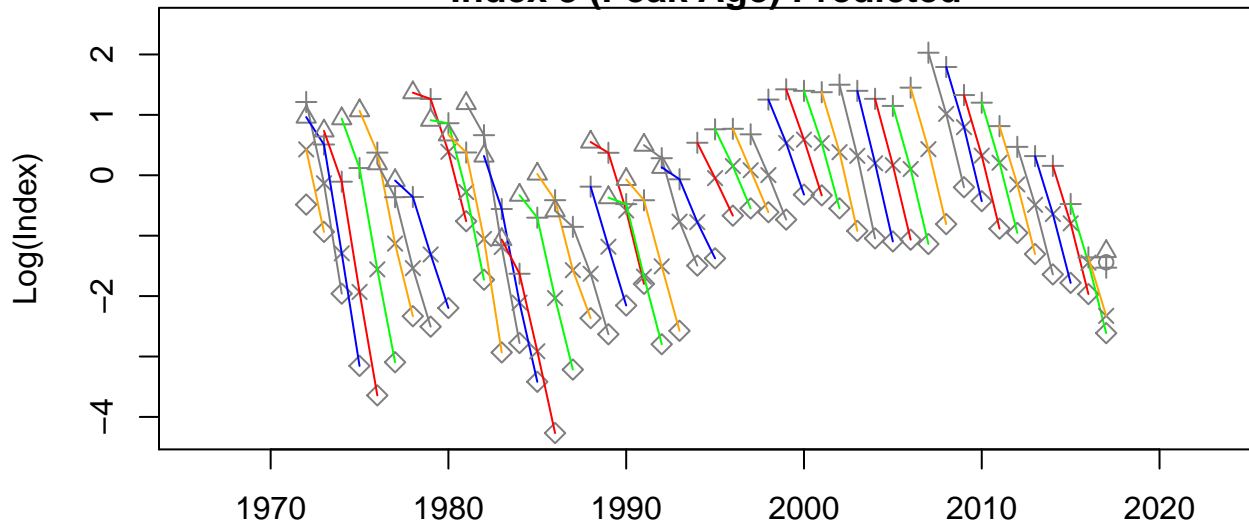
Index 2 (Peak Age) Predicted



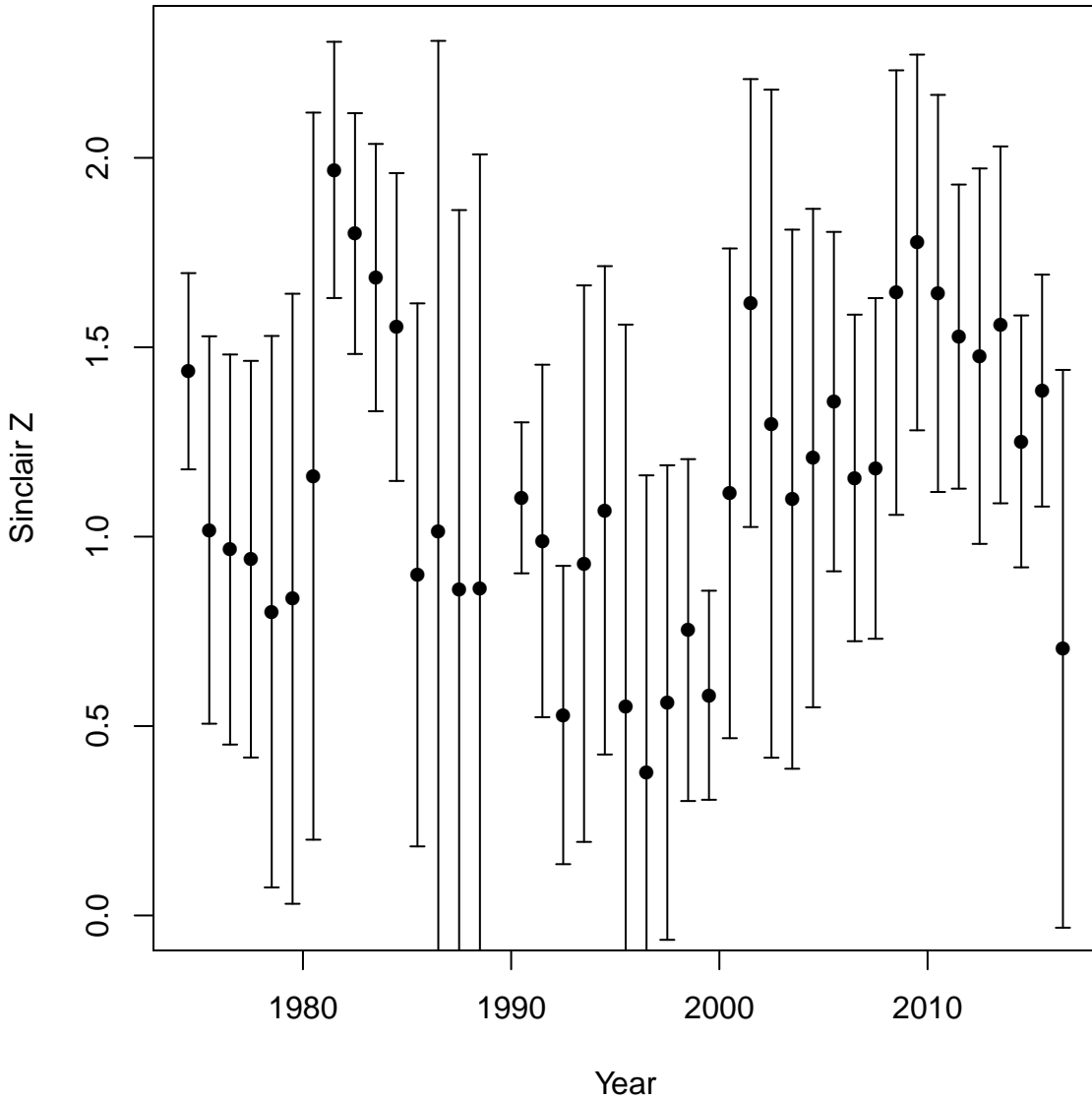
Index 3 (Peak Age) Observed



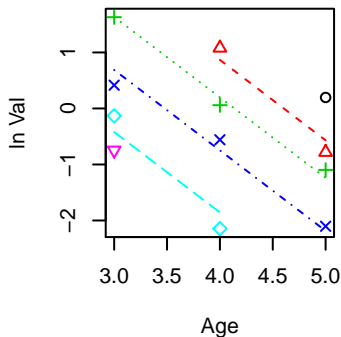
Index 3 (Peak Age) Predicted



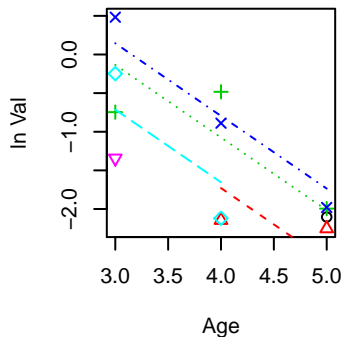
INDEX-3



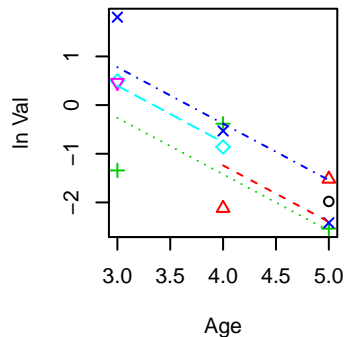
Years 1973 to 1976
Z = 1.437



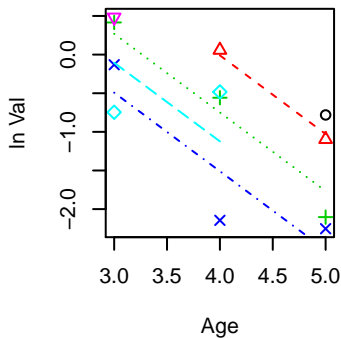
Years 1976 to 1979
Z = 0.94



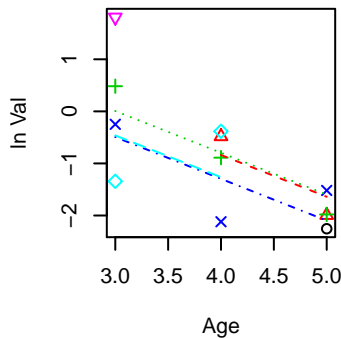
Years 1979 to 1982
Z = 1.16



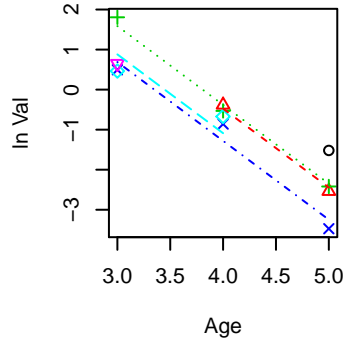
Years 1974 to 1977
Z = 1.018



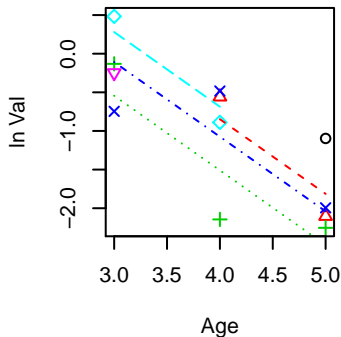
Years 1977 to 1980
Z = 0.802



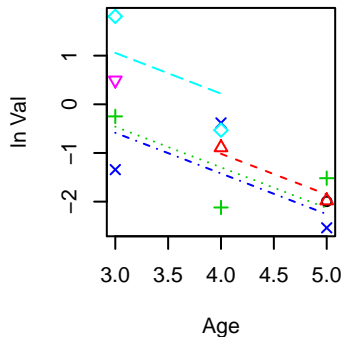
Years 1980 to 1983
Z = 1.968



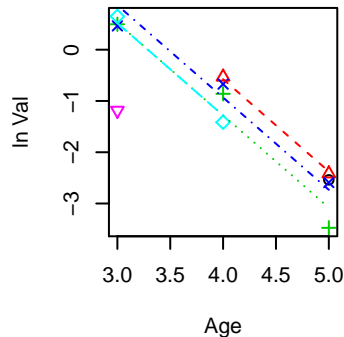
Years 1975 to 1978
Z = 0.966



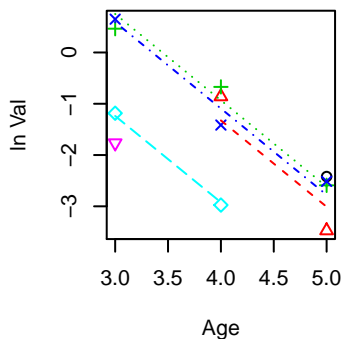
Years 1978 to 1981
Z = 0.836



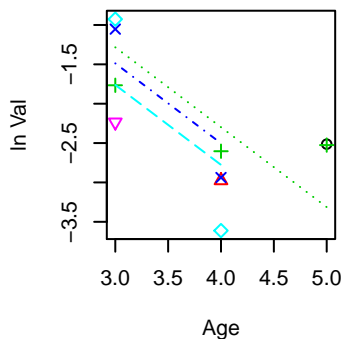
Years 1981 to 1984
Z = 1.8



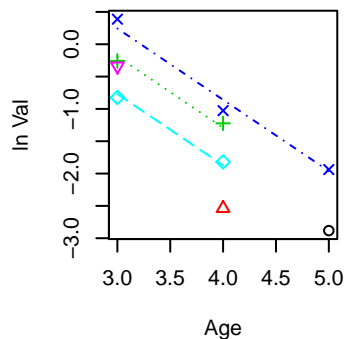
Years 1982 to 1985
Z = 1.684



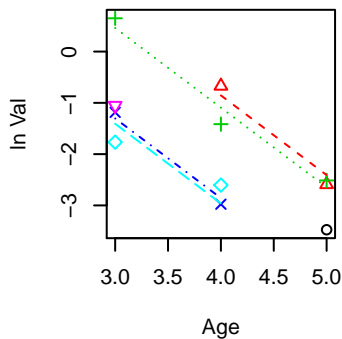
Years 1985 to 1988
Z = 1.015



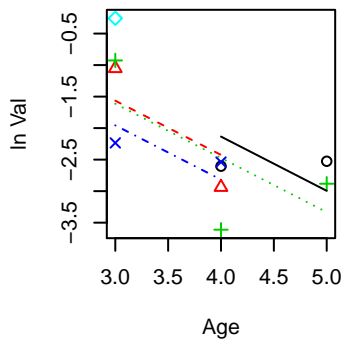
Years 1989 to 1992
Z = 1.102



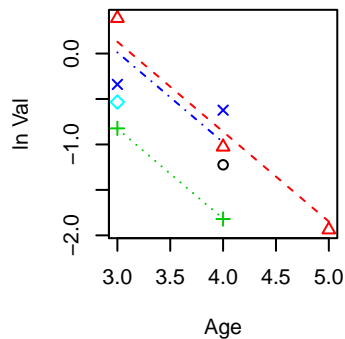
Years 1983 to 1986
Z = 1.553



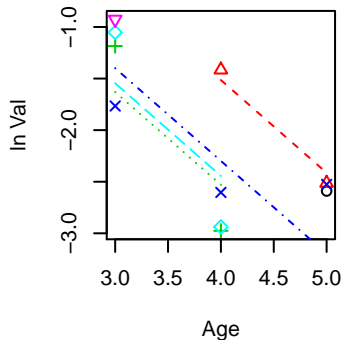
Years 1986 to 1989
Z = 0.86



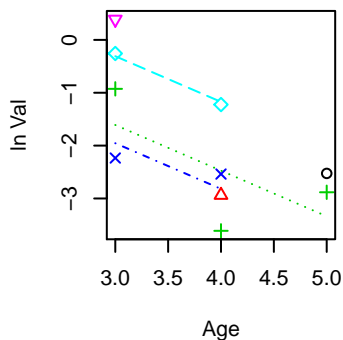
Years 1990 to 1993
Z = 0.989



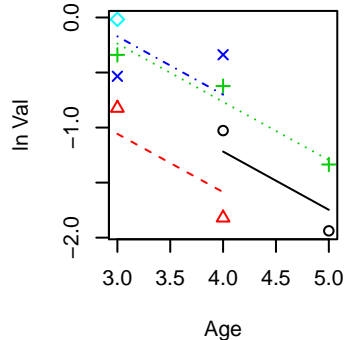
Years 1984 to 1987
Z = 0.899



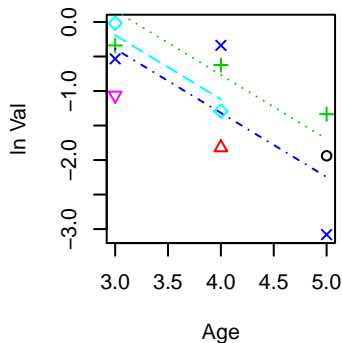
Years 1987 to 1990
Z = 0.864



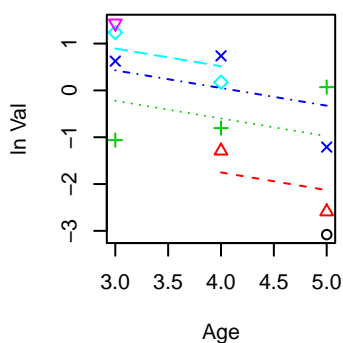
Years 1991 to 1994
Z = 0.529



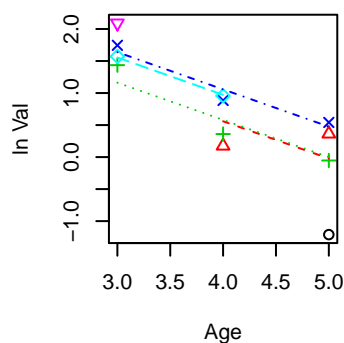
Years 1992 to 1995
Z = 0.929



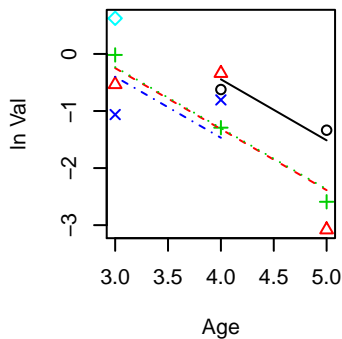
Years 1995 to 1998
Z = 0.377



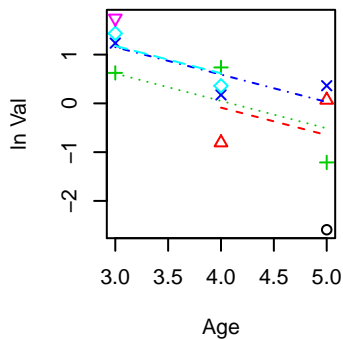
Years 1998 to 2001
Z = 0.581



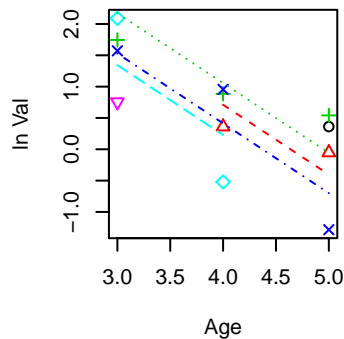
Years 1993 to 1996
Z = 1.069



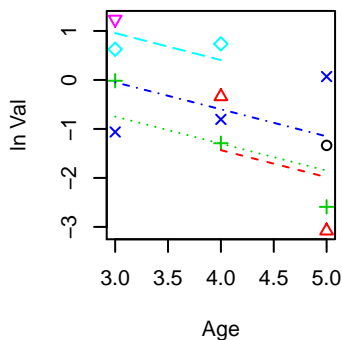
Years 1996 to 1999
Z = 0.562



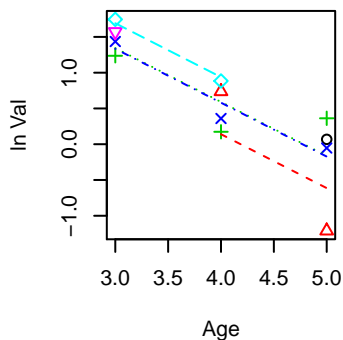
Years 1999 to 2002
Z = 1.114



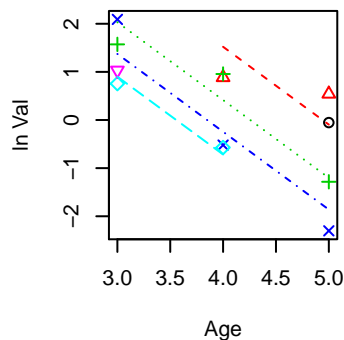
Years 1994 to 1997
Z = 0.551



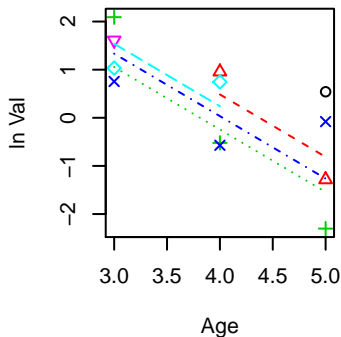
Years 1997 to 2000
Z = 0.753



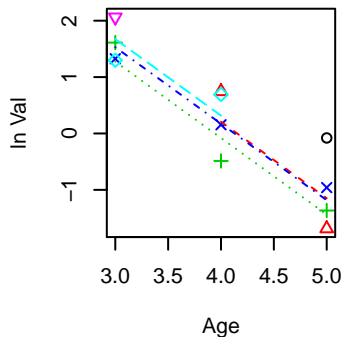
Years 2000 to 2003
Z = 1.617



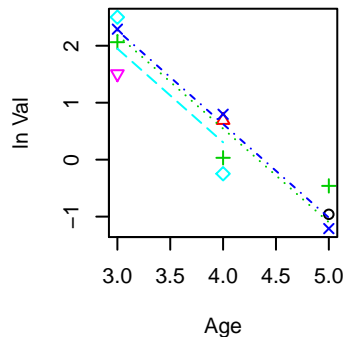
Years 2001 to 2004
Z = 1.298



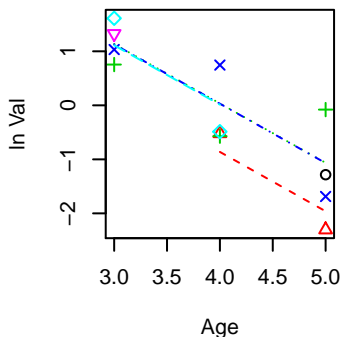
Years 2004 to 2007
Z = 1.356



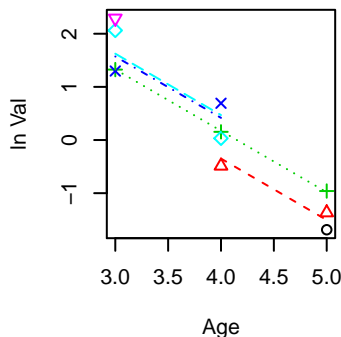
Years 2007 to 2010
Z = 1.644



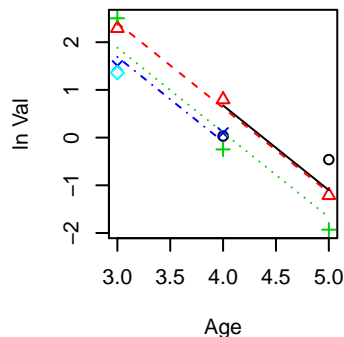
Years 2002 to 2005
Z = 1.099



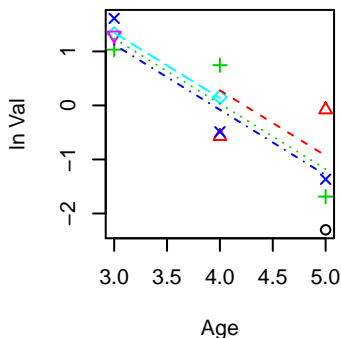
Years 2005 to 2008
Z = 1.155



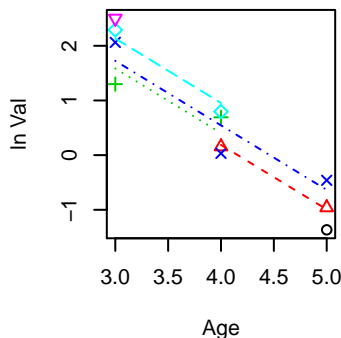
Years 2008 to 2011
Z = 1.777



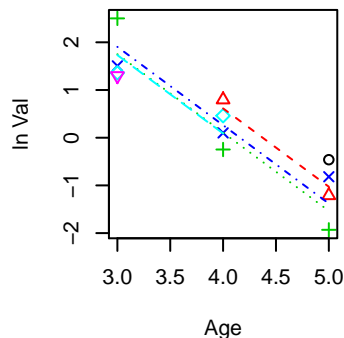
Years 2003 to 2006
Z = 1.207



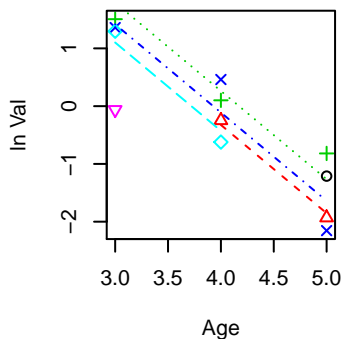
Years 2006 to 2009
Z = 1.18



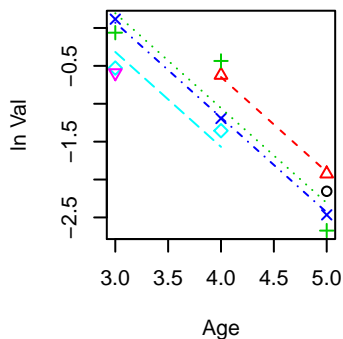
Years 2009 to 2012
Z = 1.642



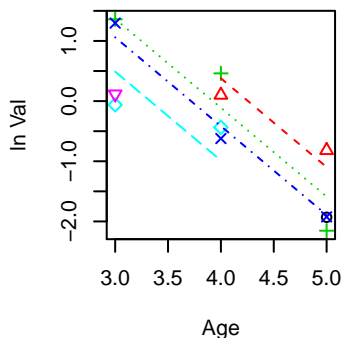
Years 2010 to 2013
Z = 1.528



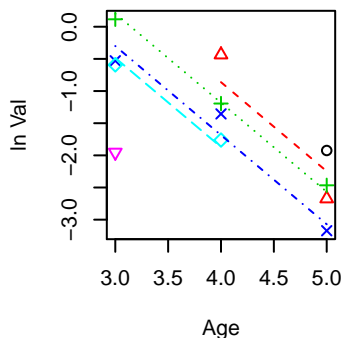
Years 2013 to 2016
Z = 1.251



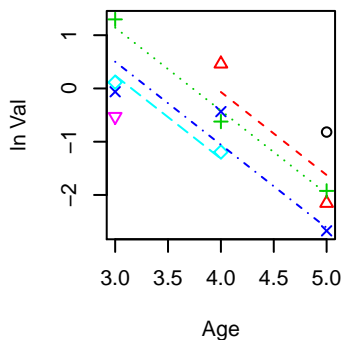
Years 2011 to 2014
Z = 1.476



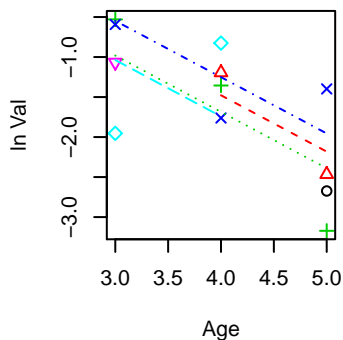
Years 2014 to 2017
Z = 1.386



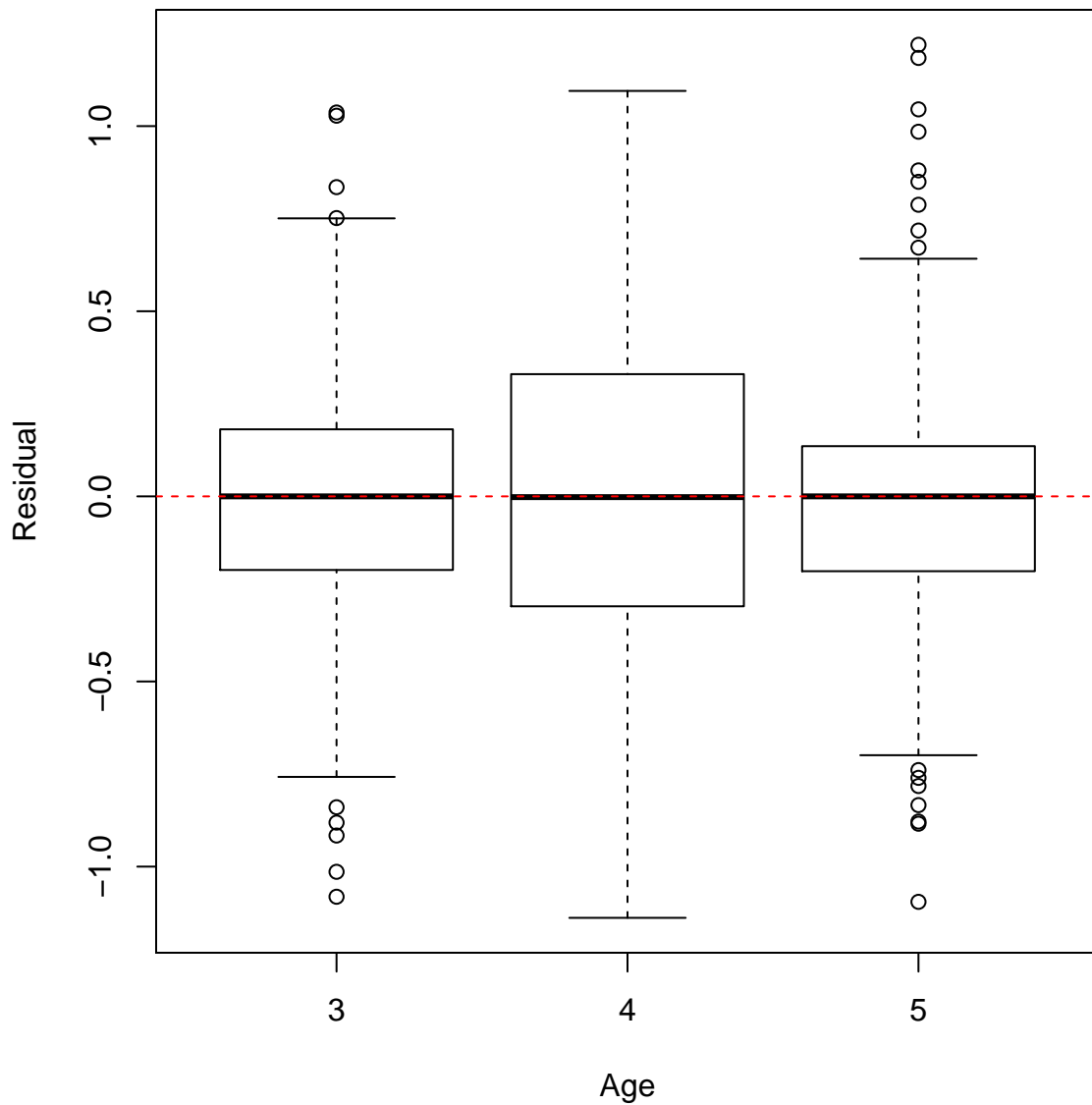
Years 2012 to 2015
Z = 1.559



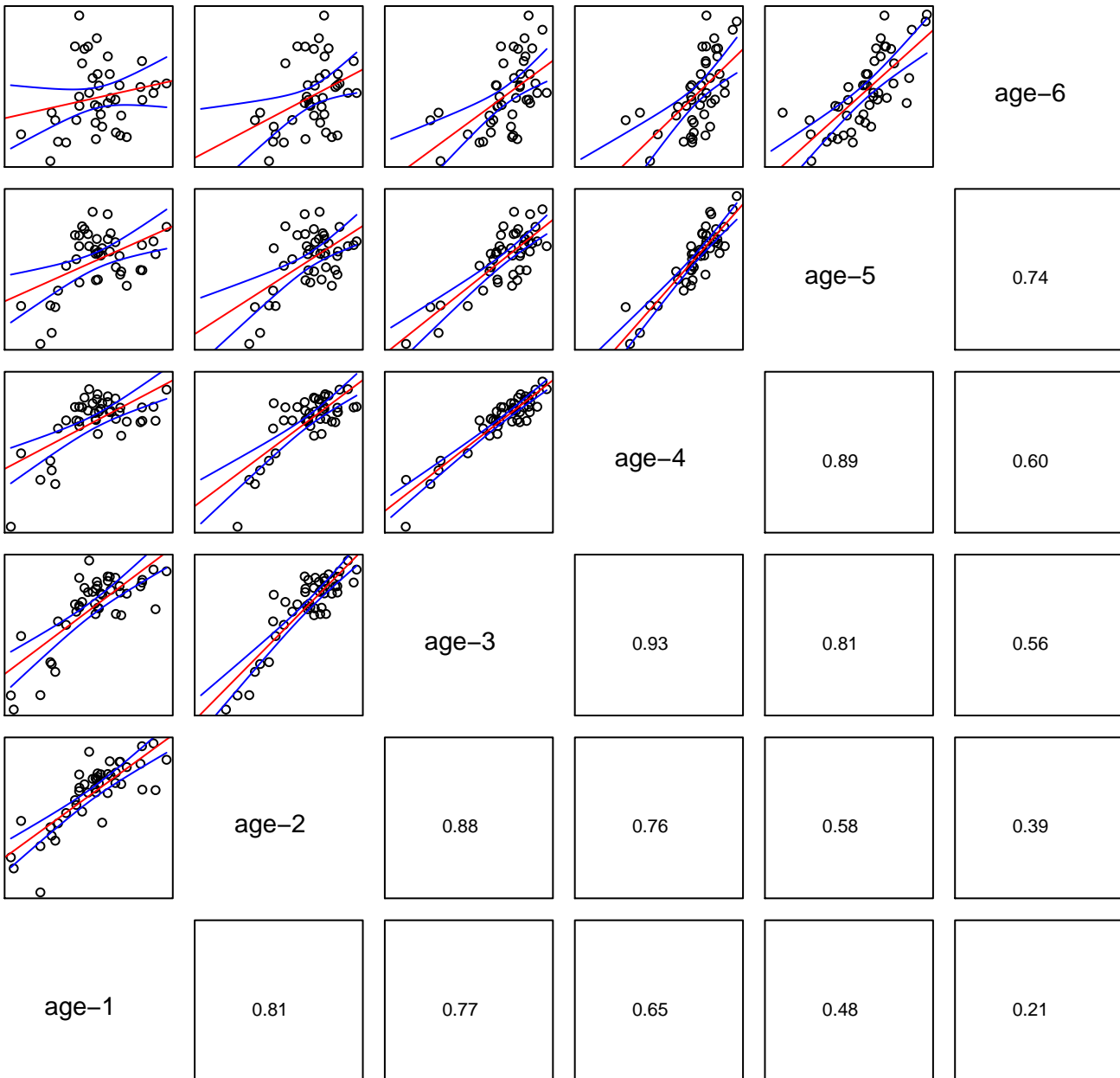
Years 2015 to 2018
Z = 0.704



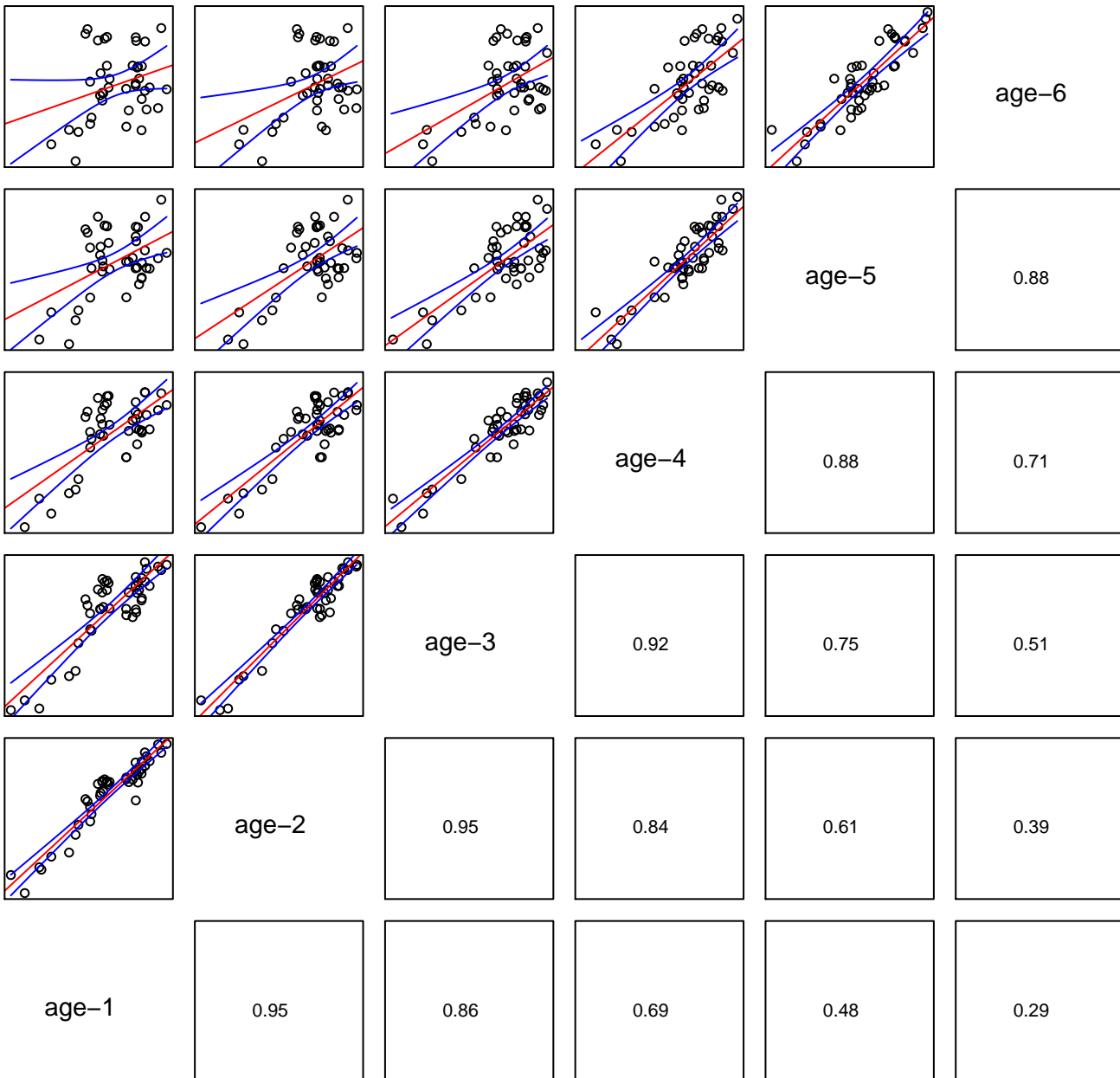
INDEX-3



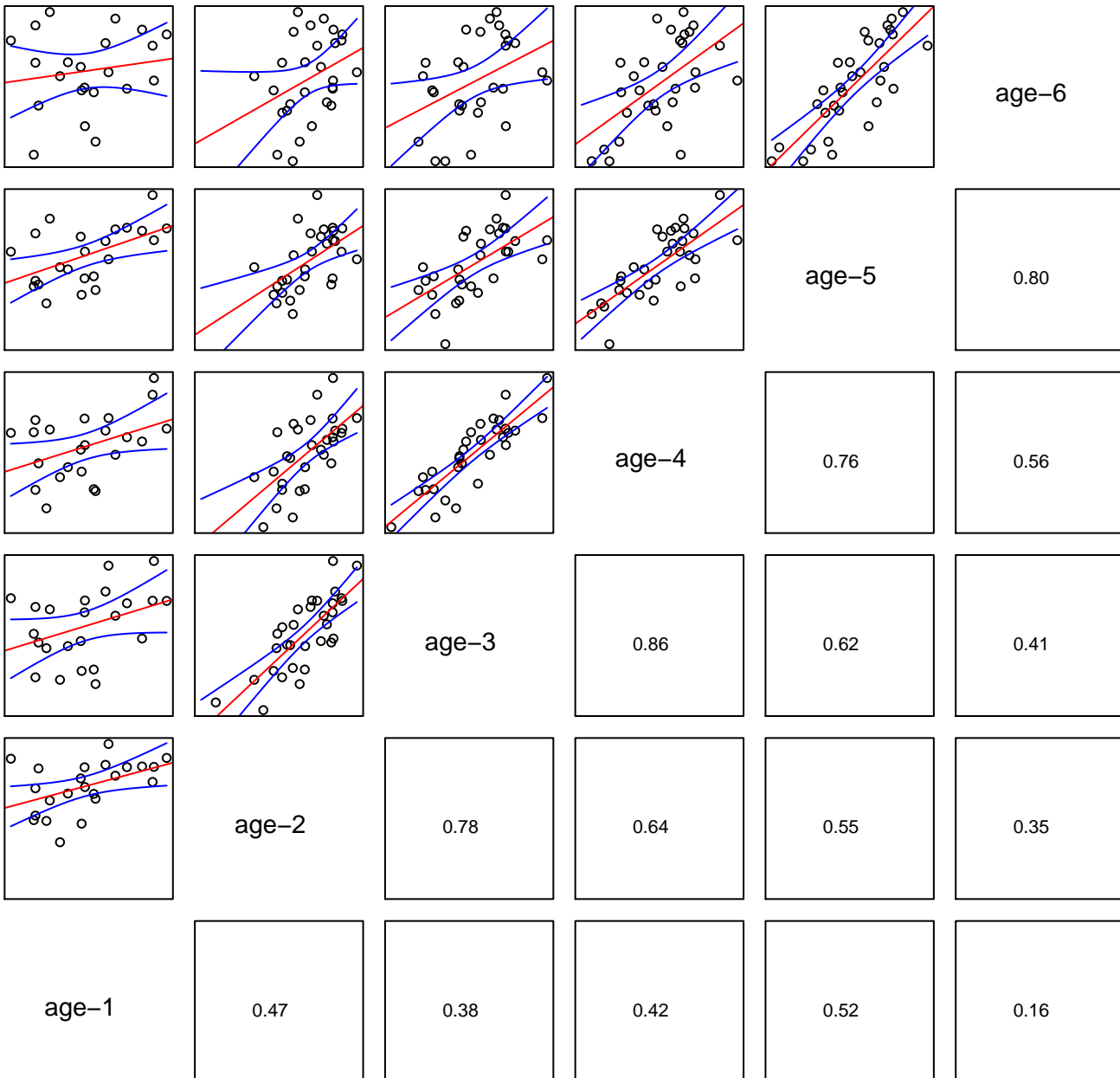
Catch Observed



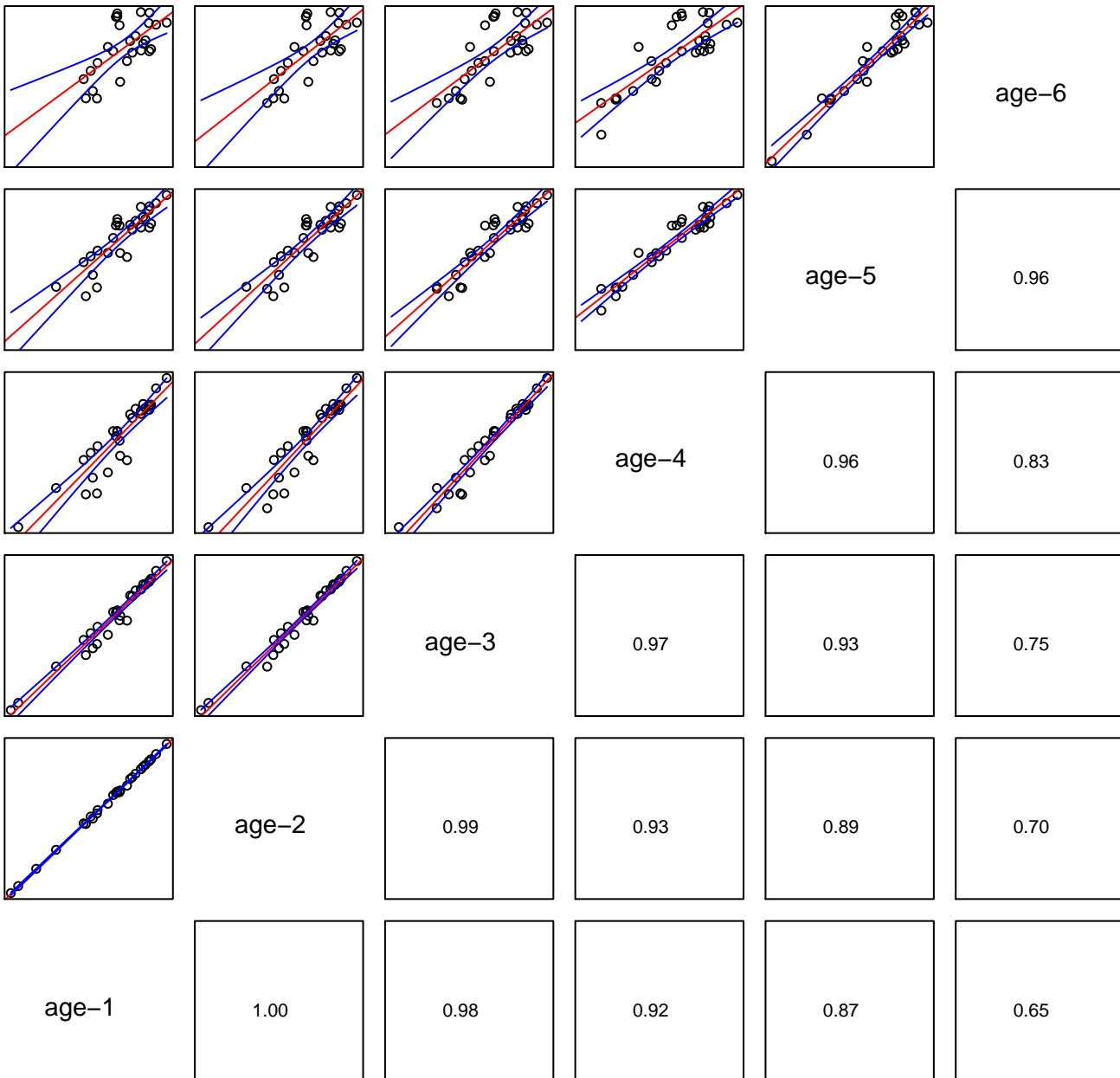
Catch Predicted



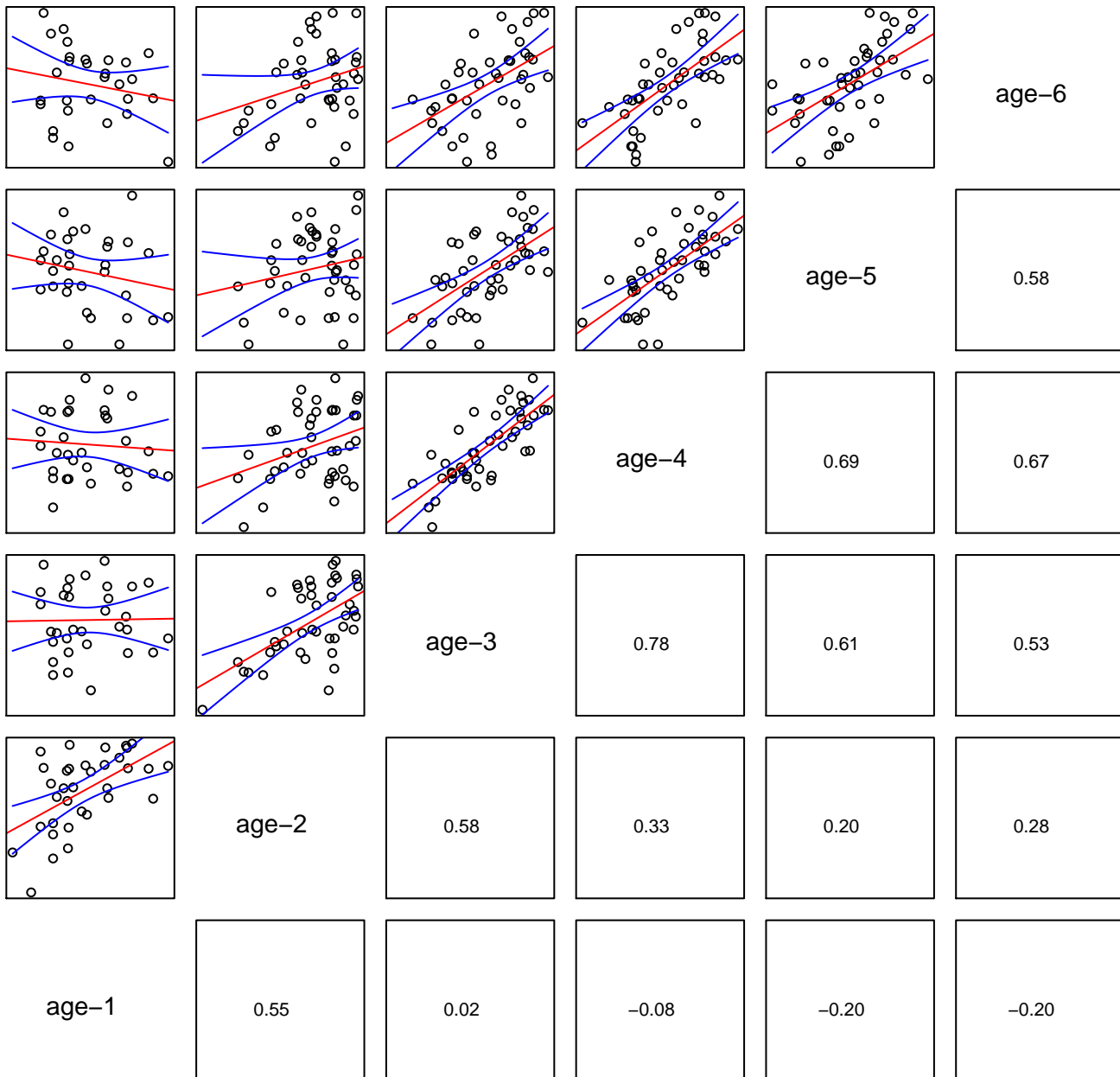
Index 1 (INDEX-1) Observed



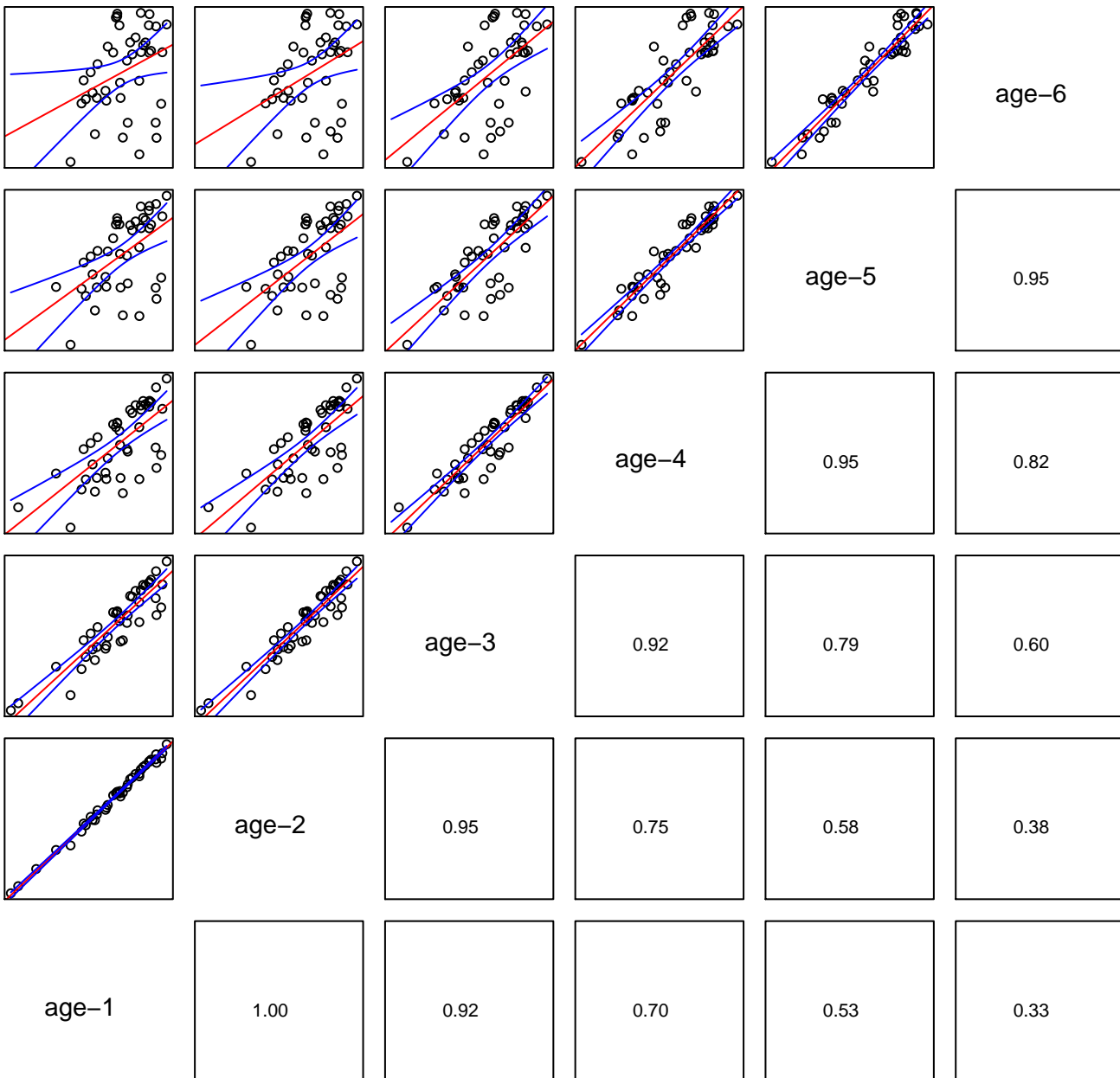
Index 1 (INDEX-1) Predicted



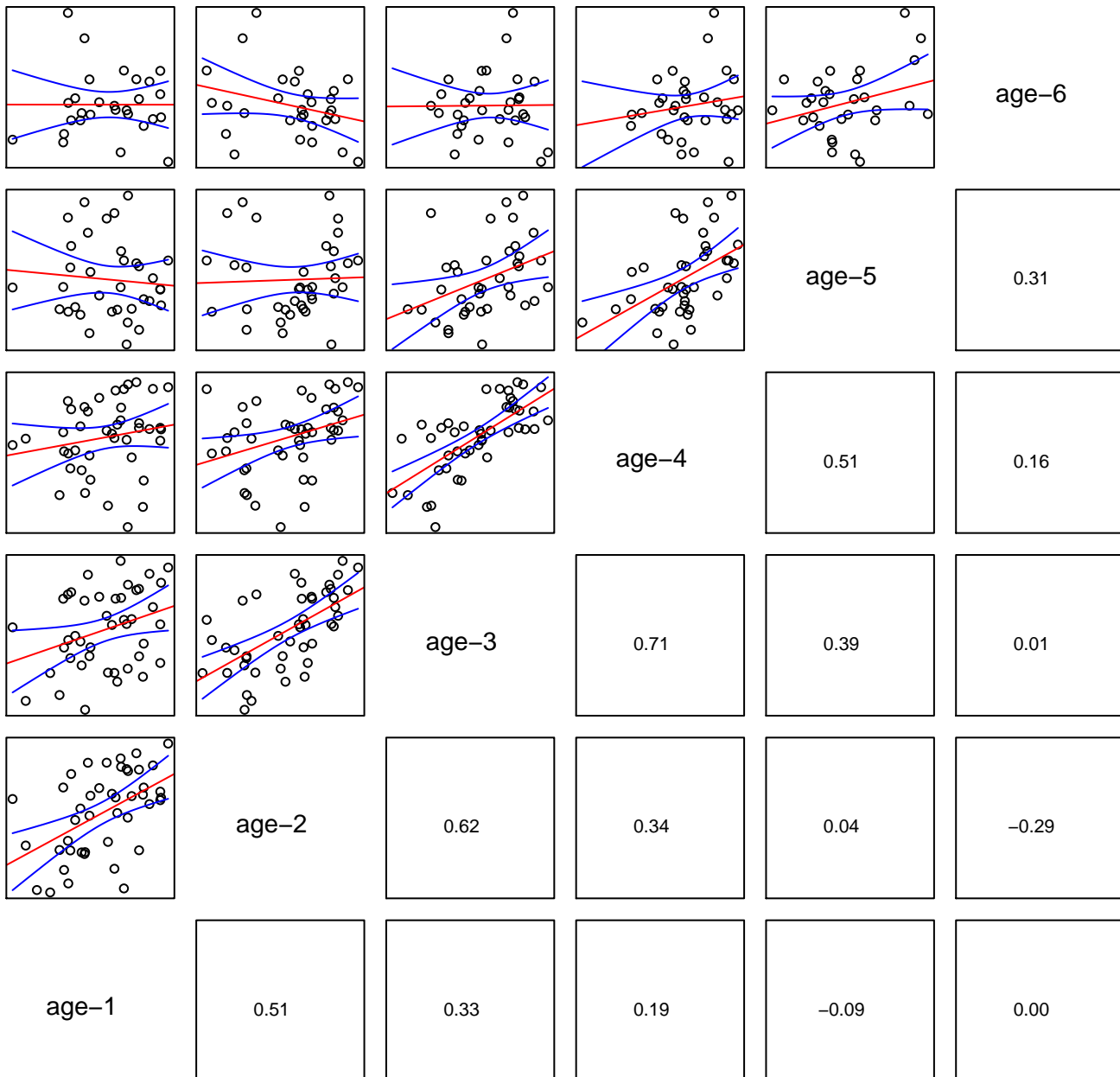
Index 2 (INDEX-2) Observed



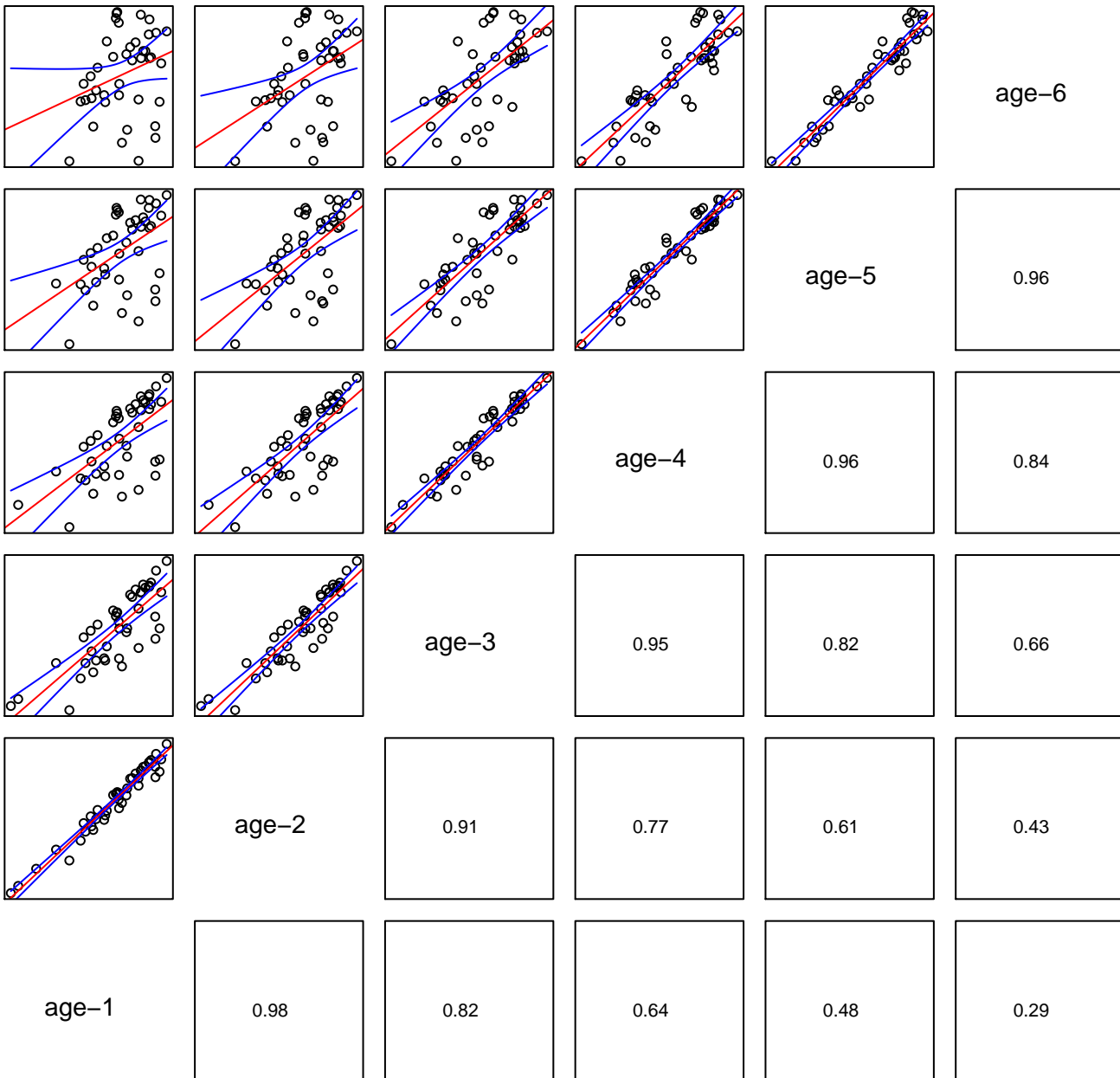
Index 2 (INDEX-2) Predicted

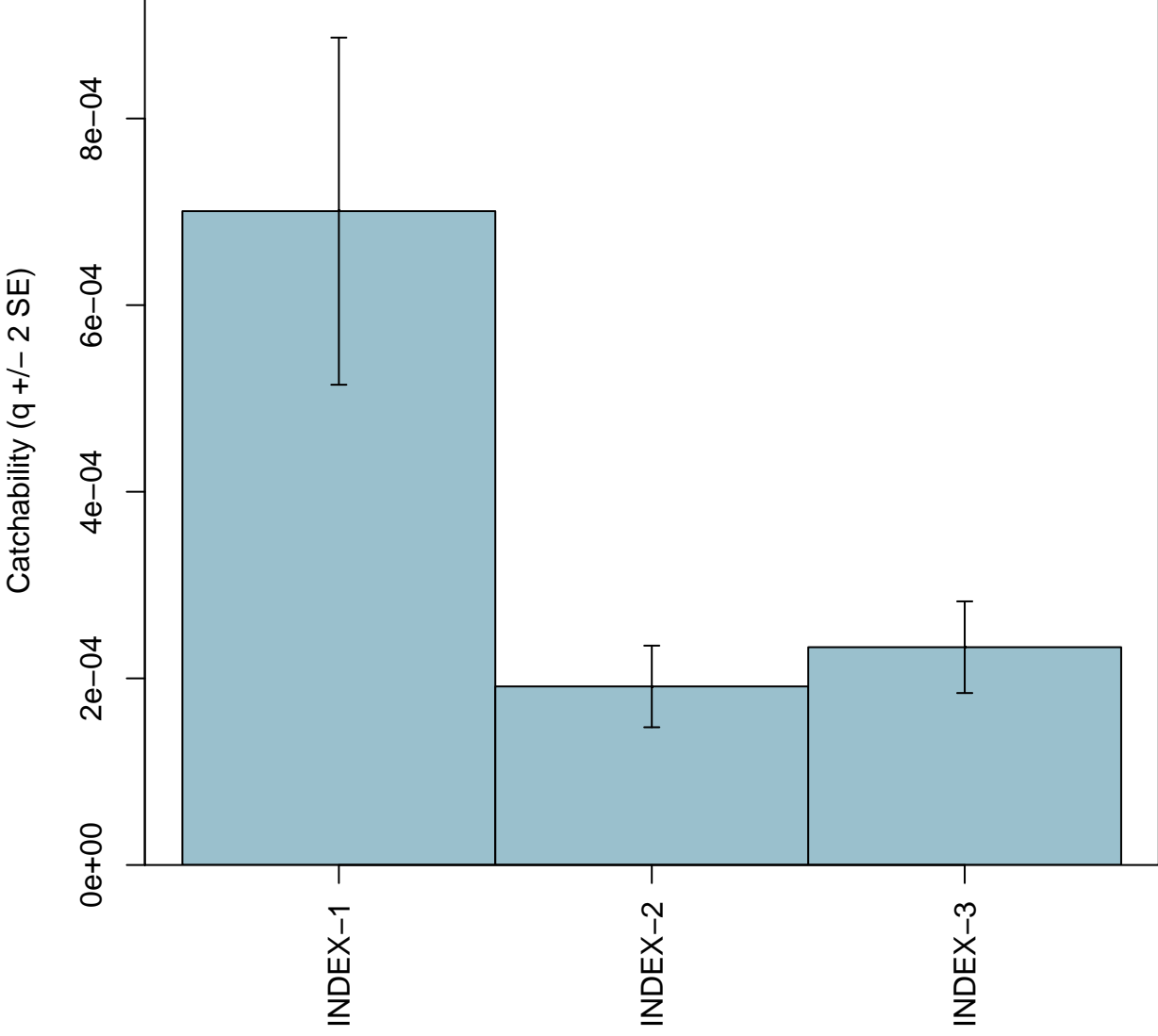


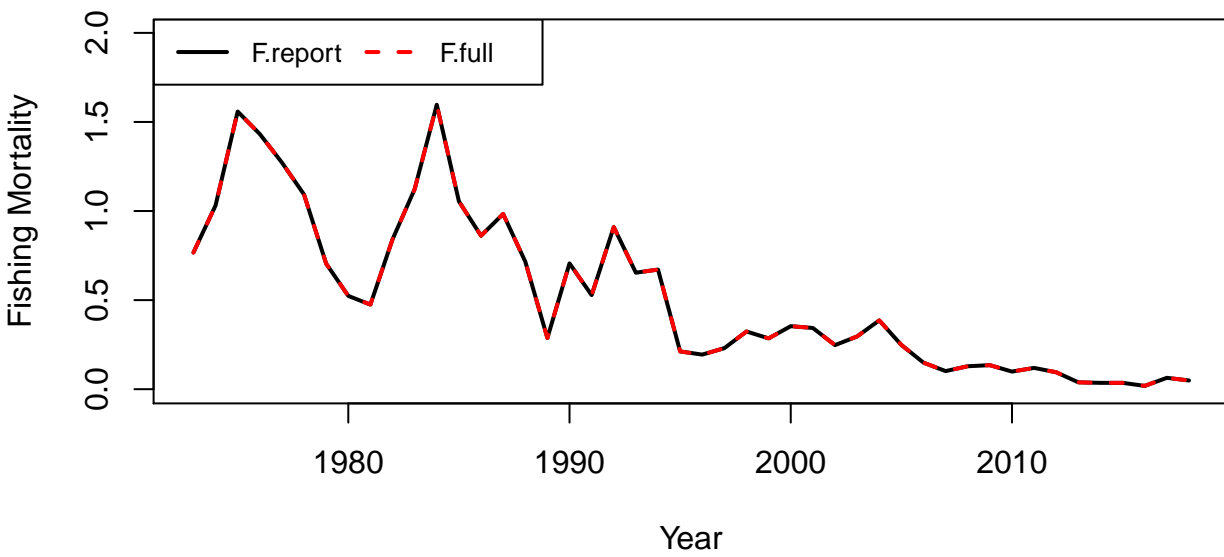
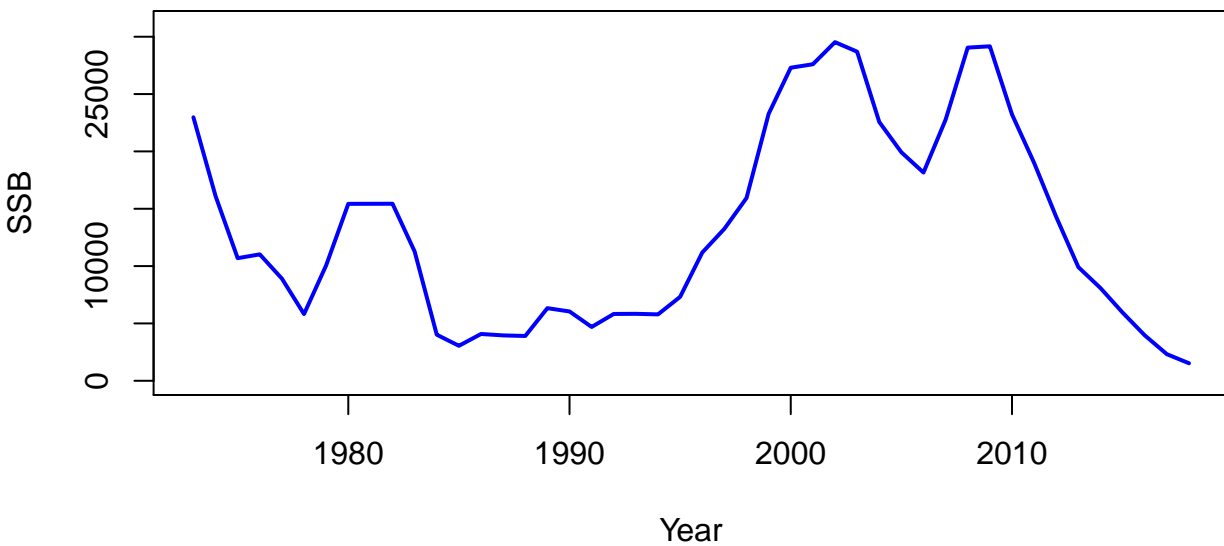
Index 3 (INDEX-3) Observed



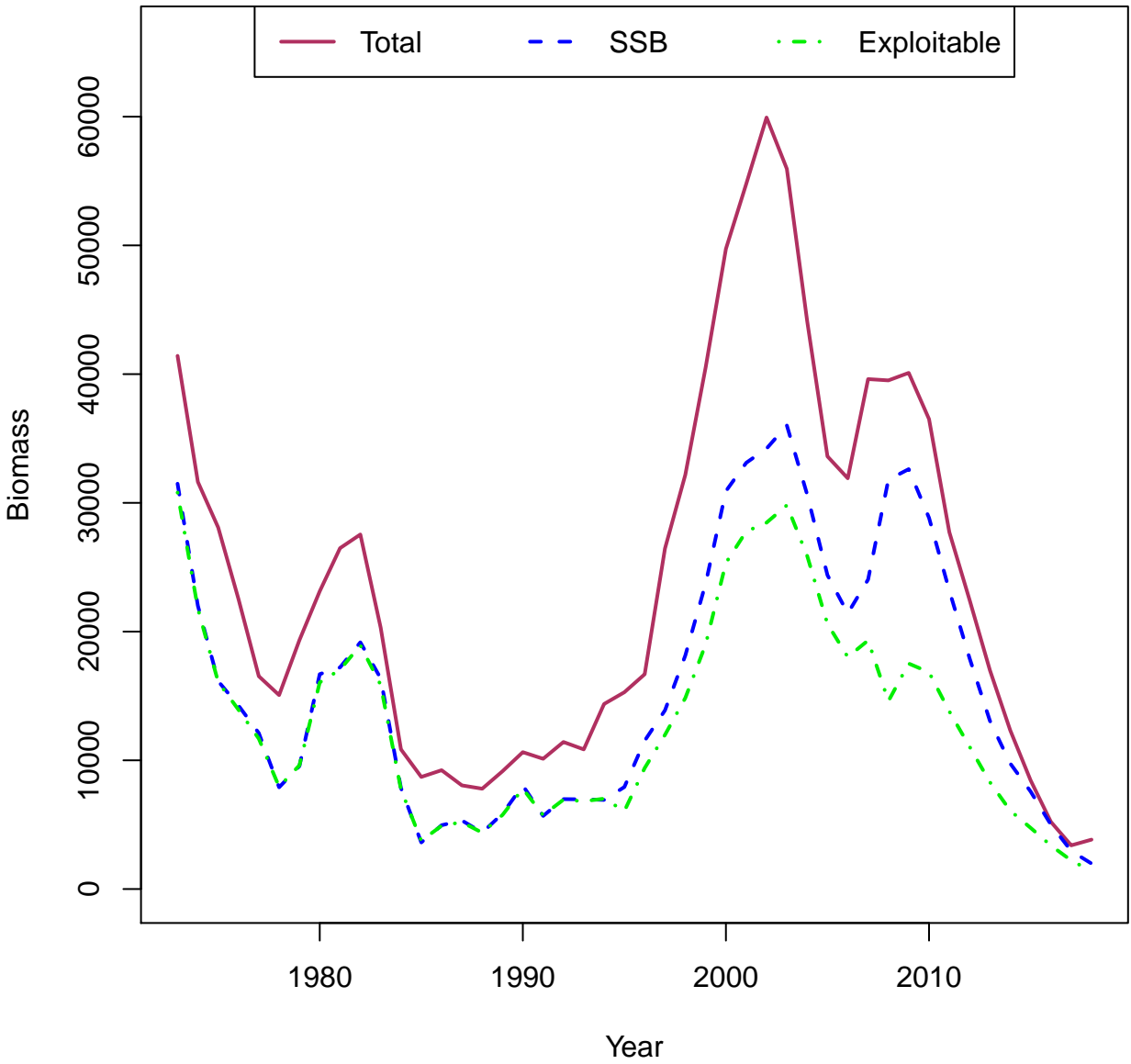
Index 3 (INDEX-3) Predicted

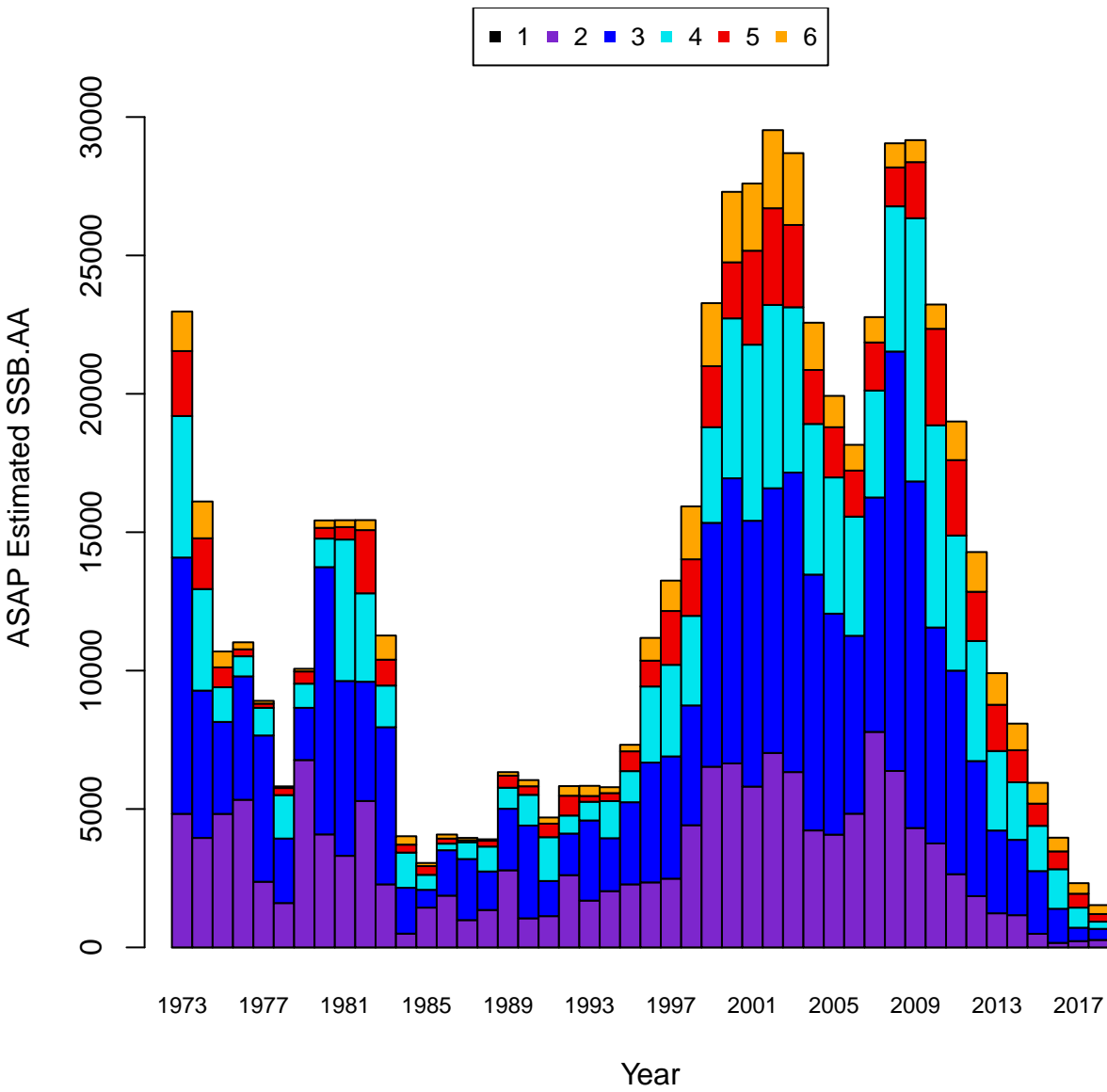


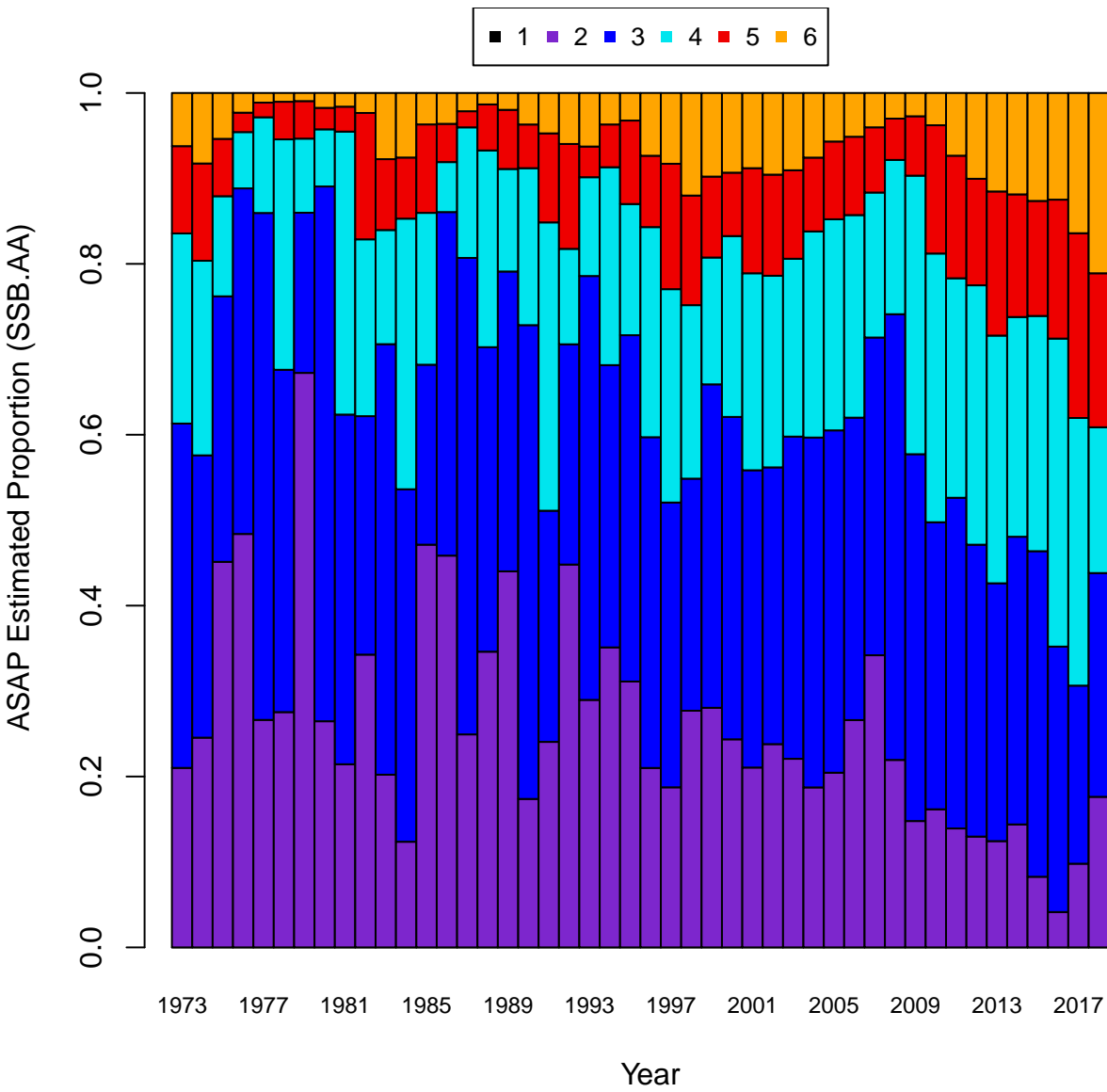


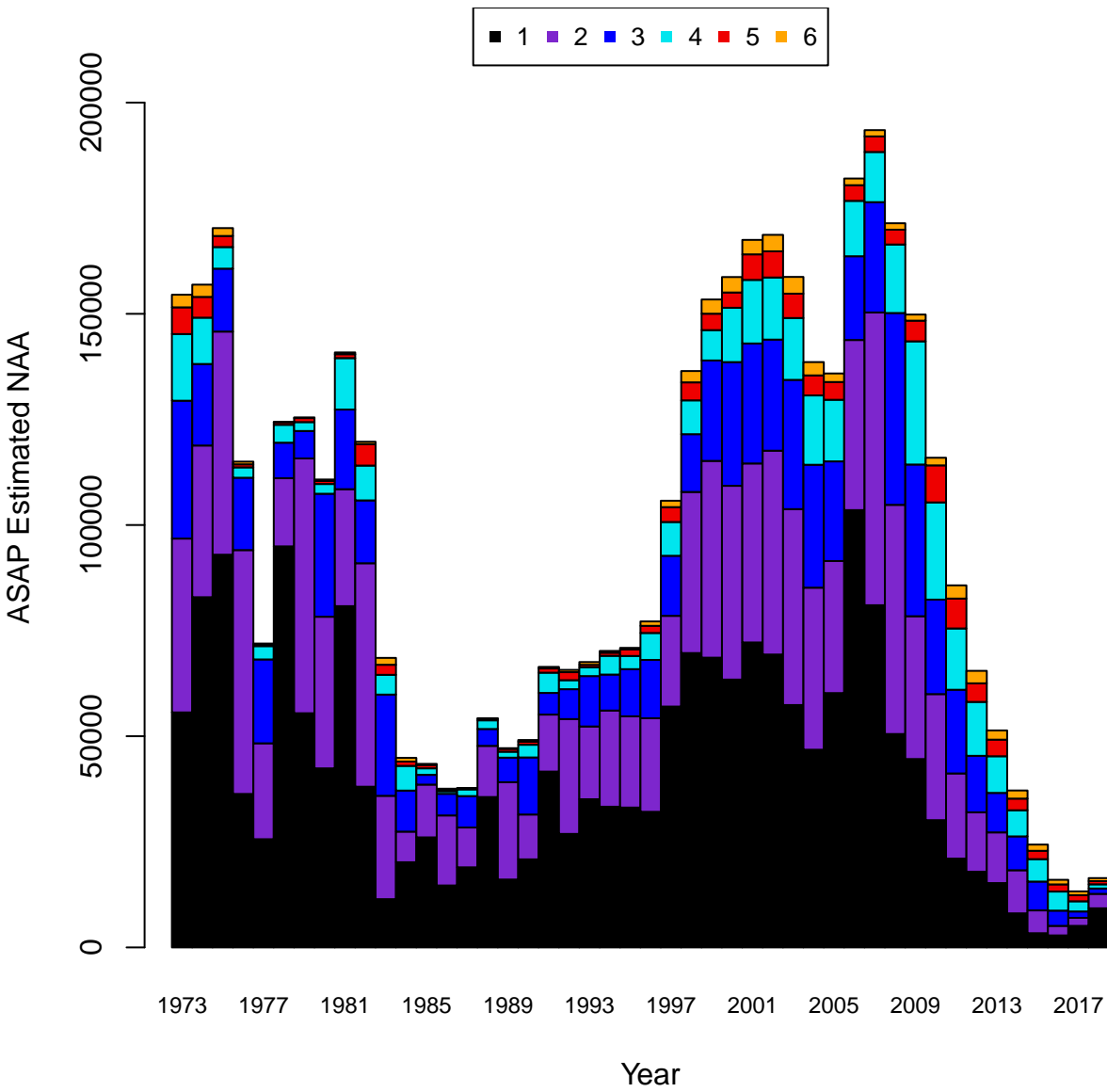


Comparison of January 1 Biomass

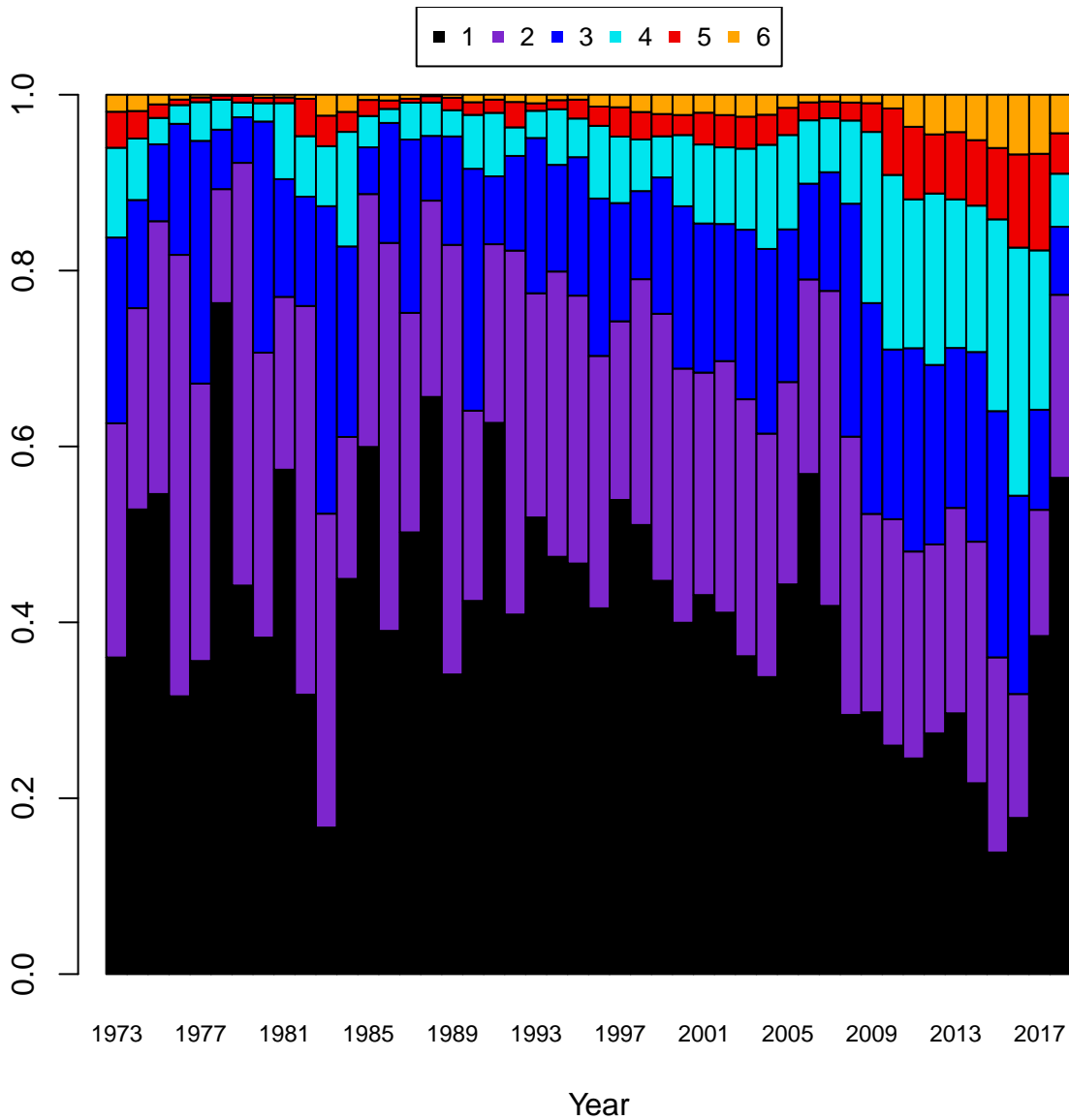


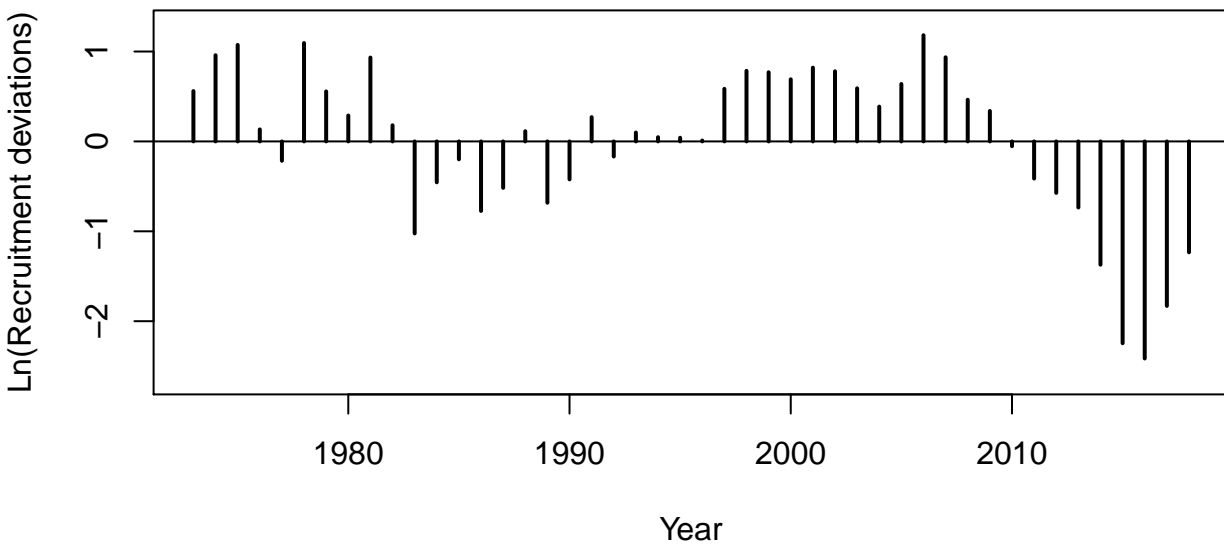
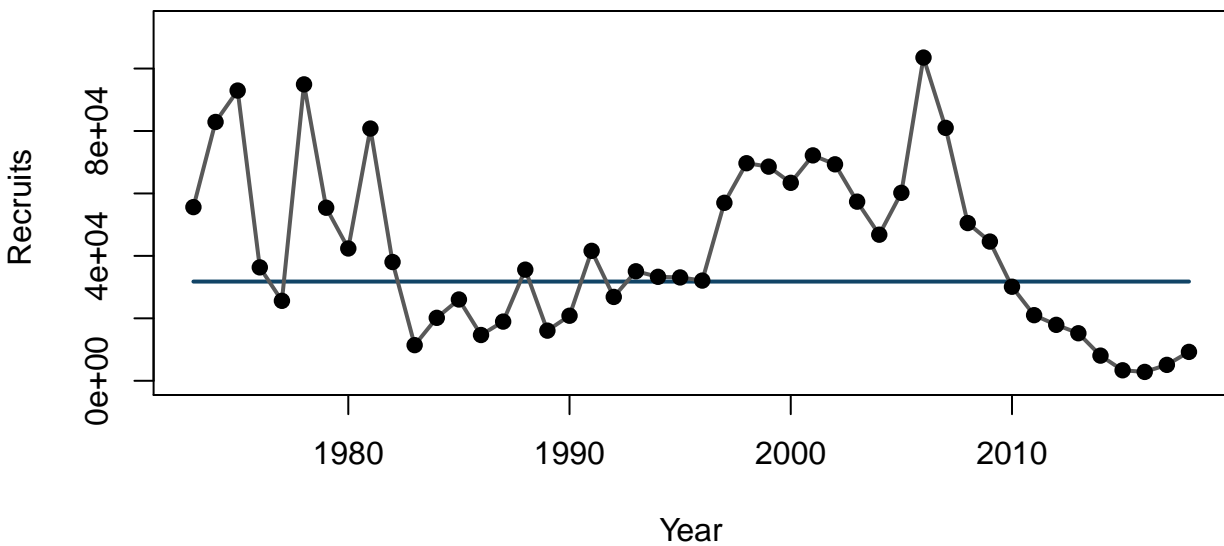


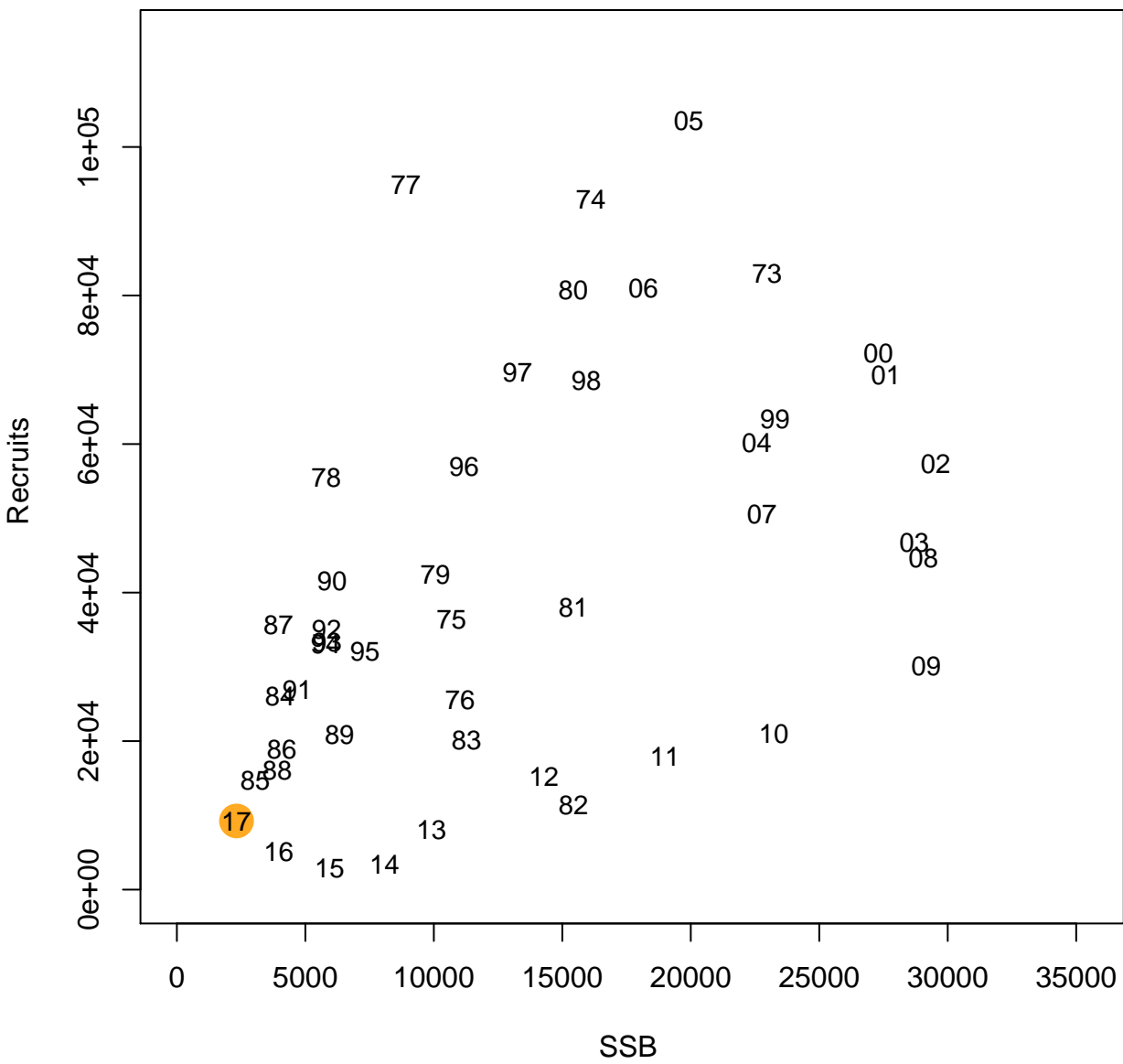


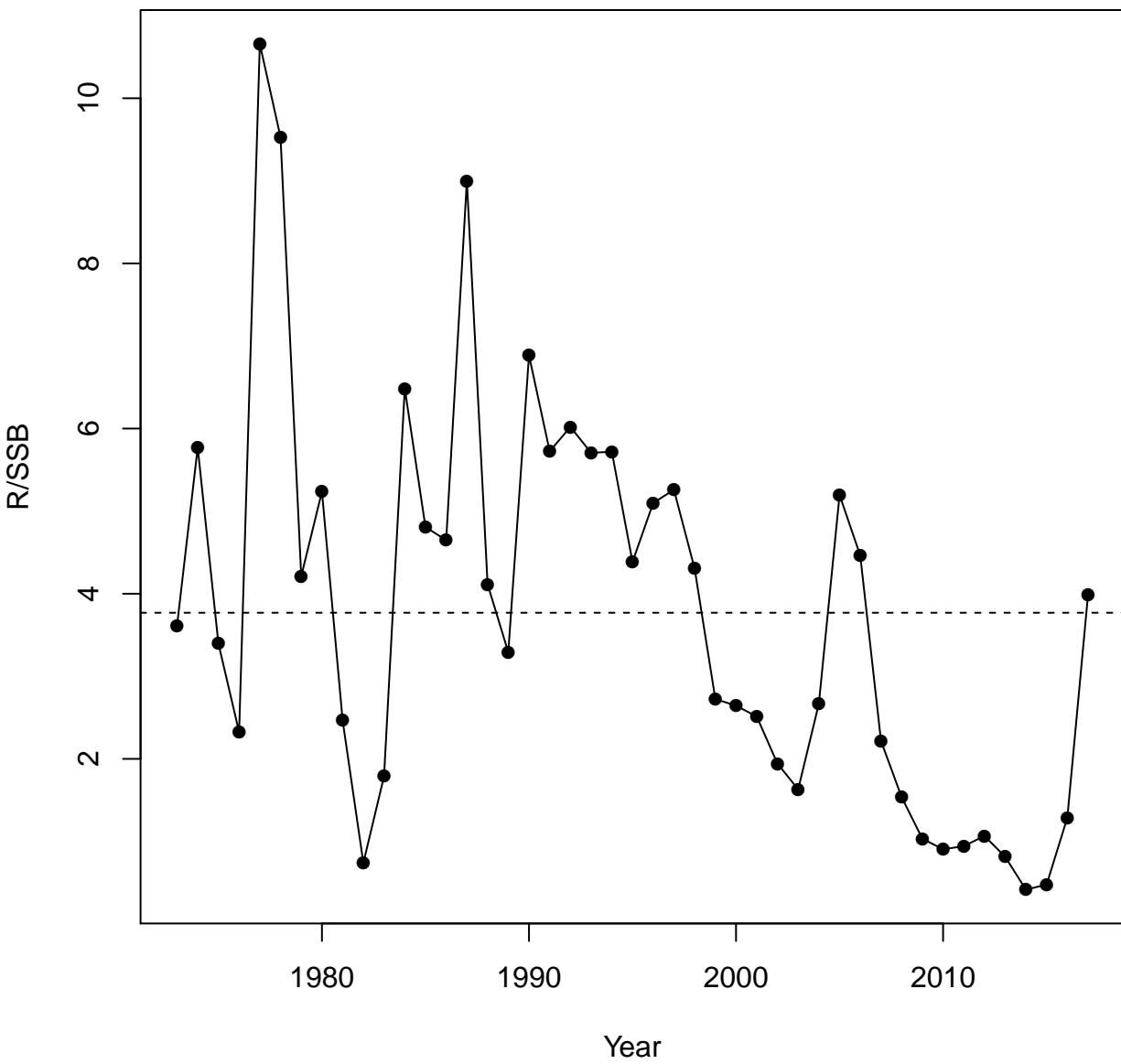


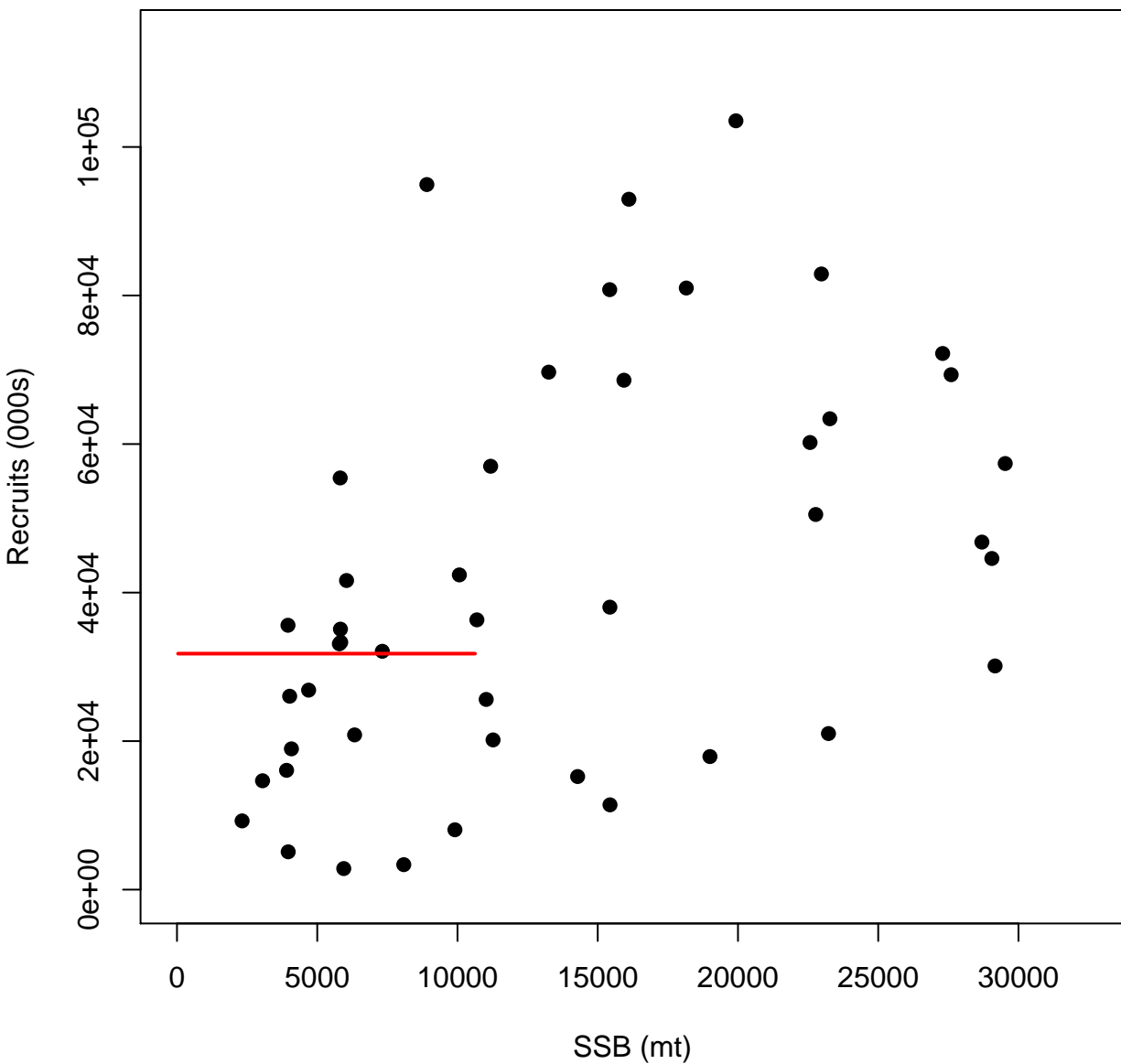
ASAP Estimated Proportion (NAA)

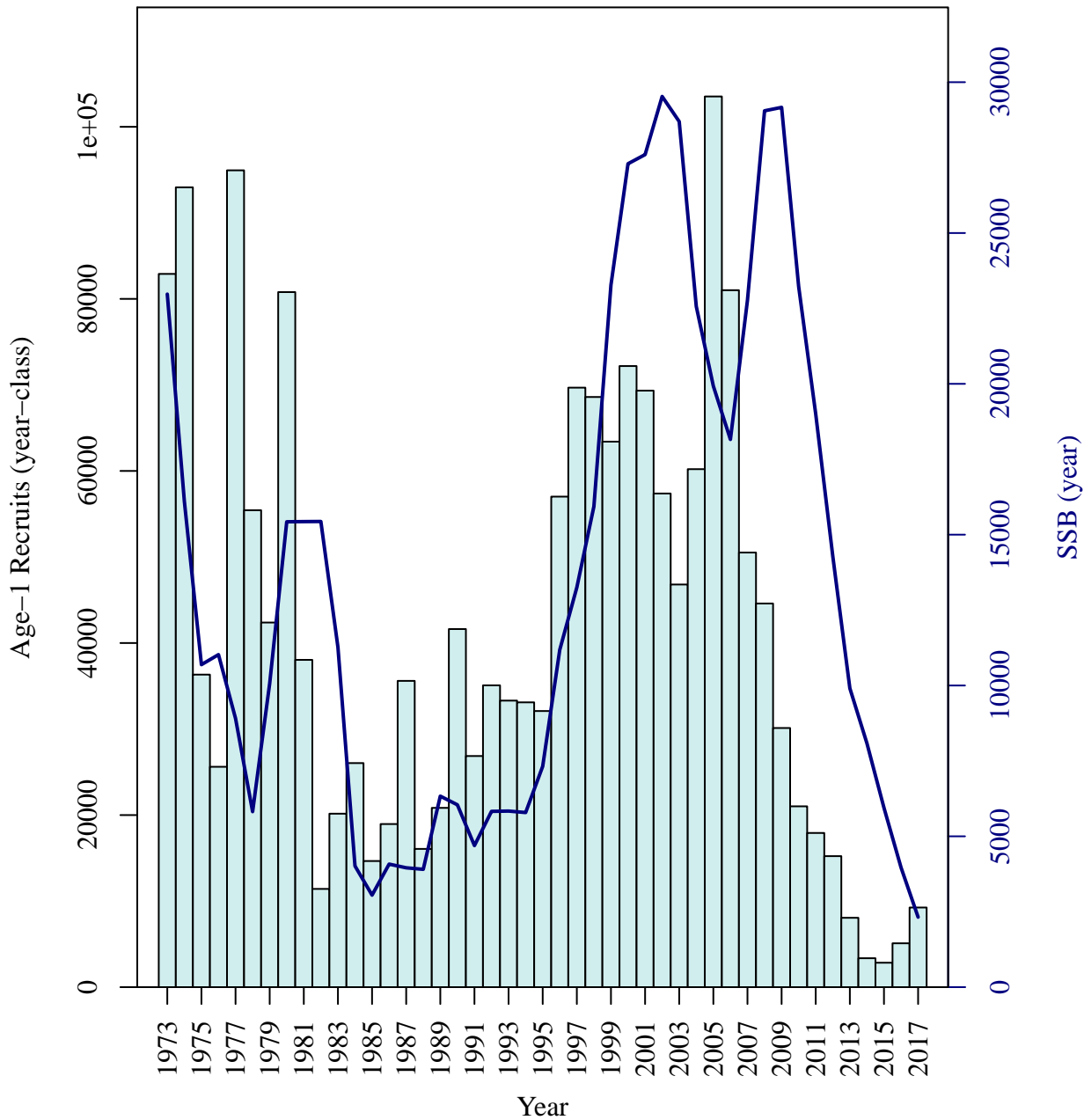


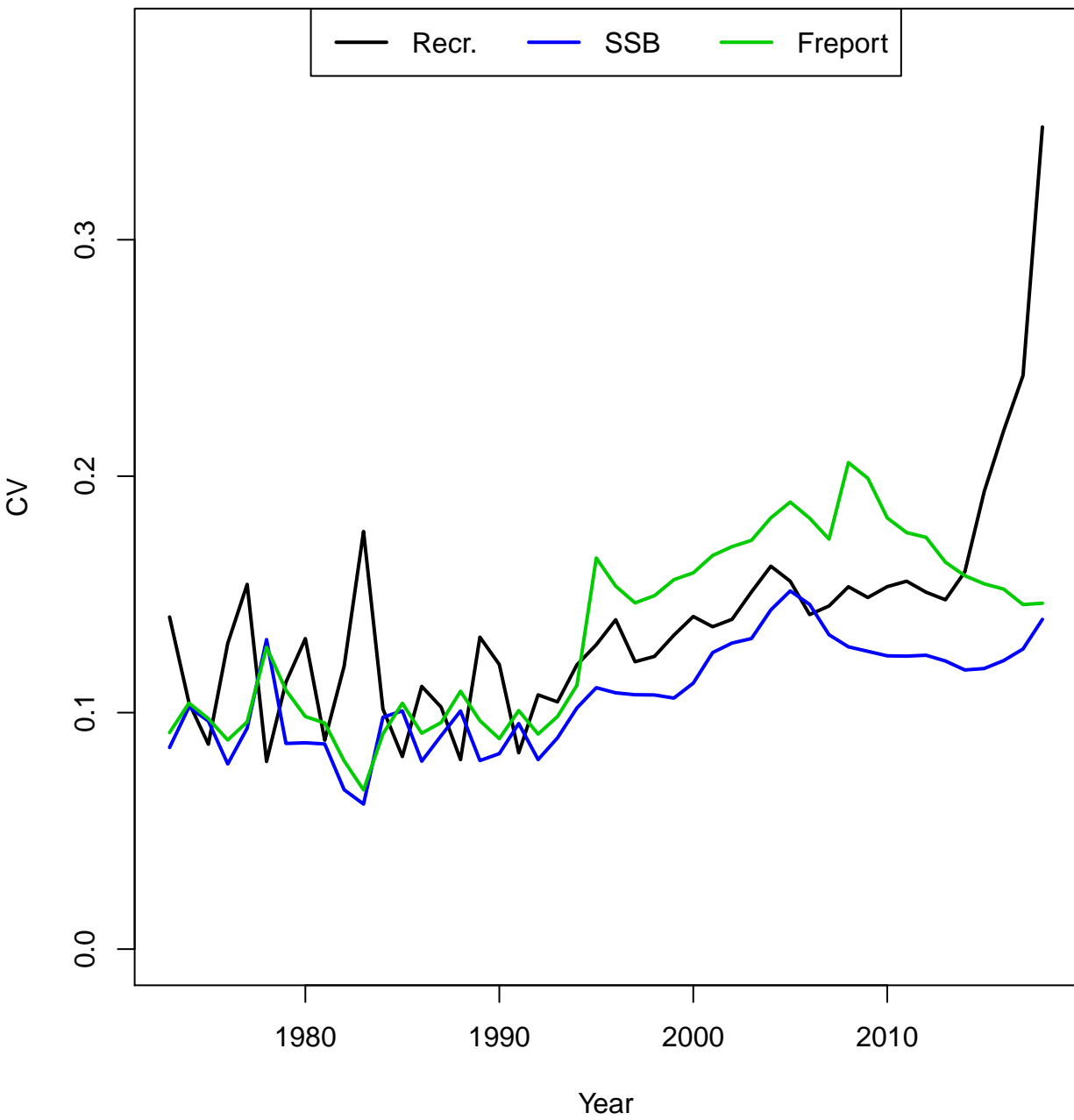




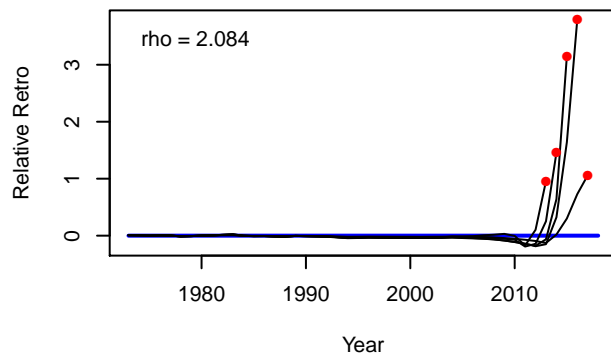
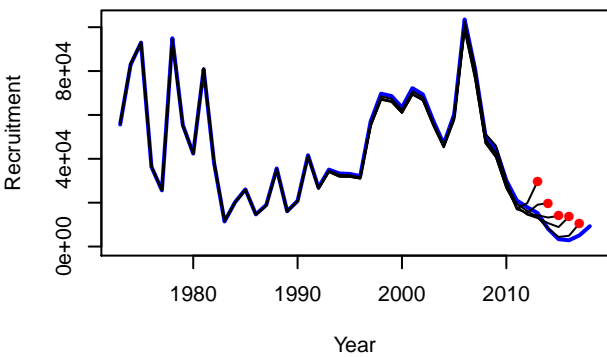
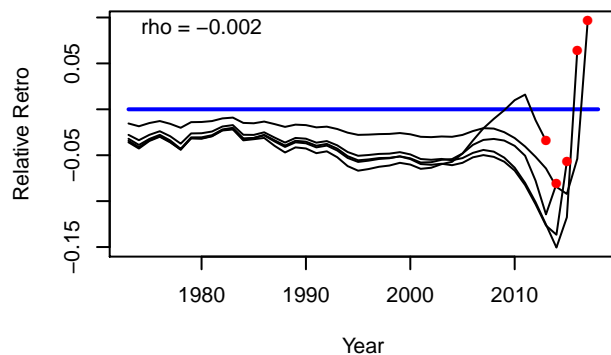
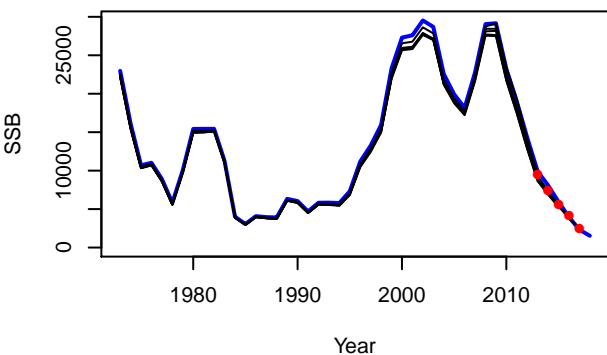
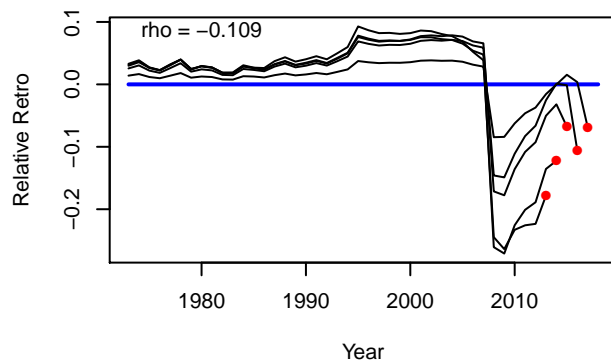
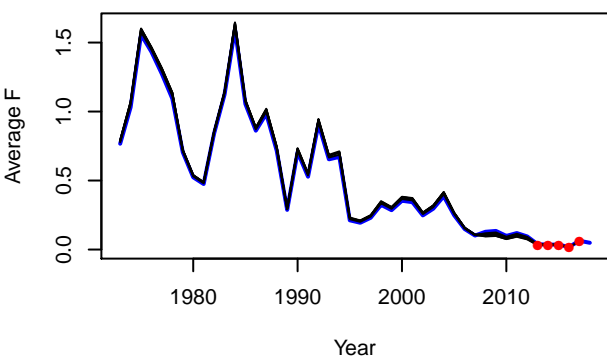




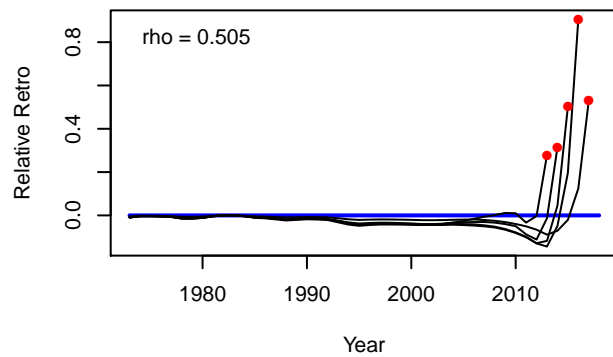
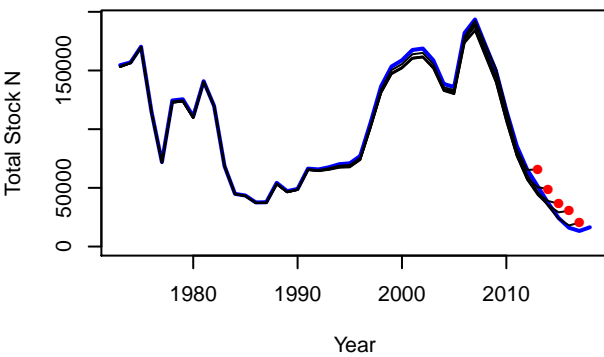
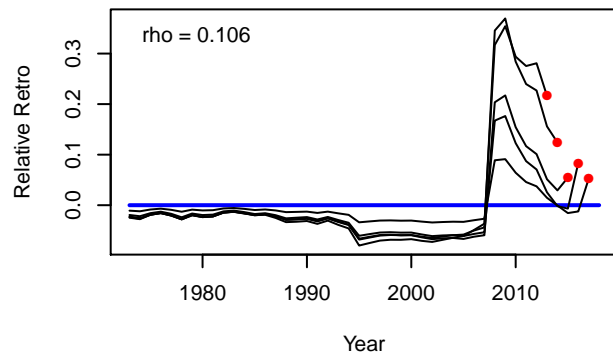
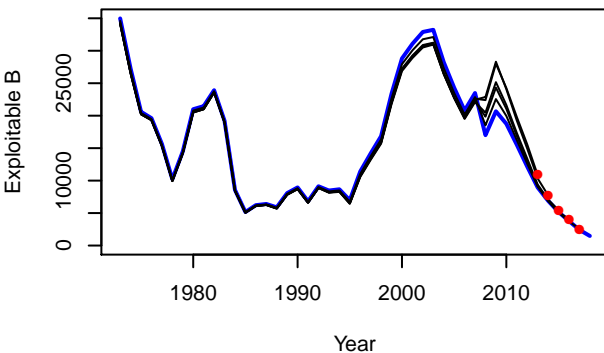
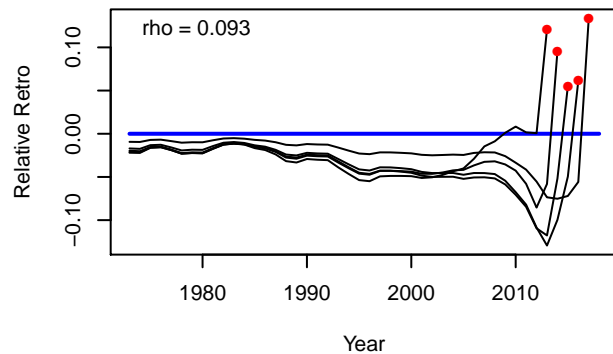
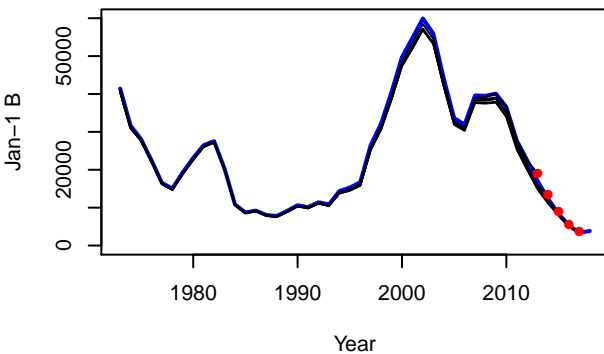




F, SSB, R

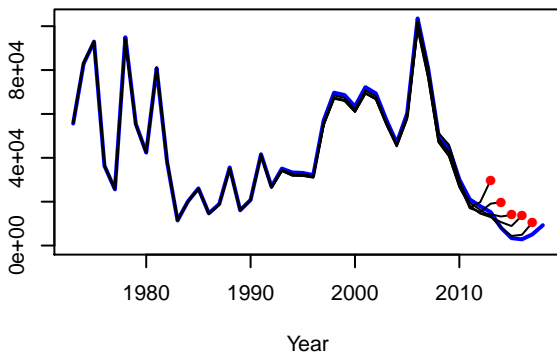


Jan-1 B, Exploitable B, Total Stock N

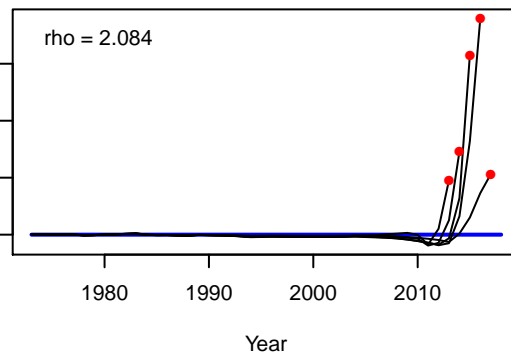


Stock Numbers at Age

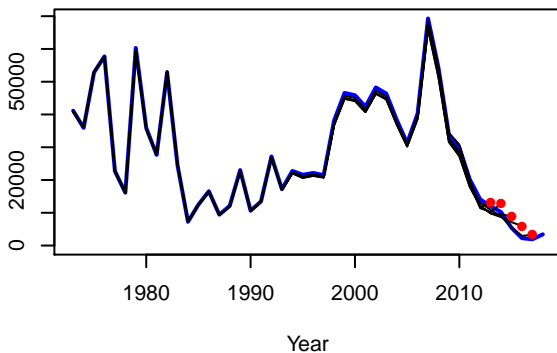
N at Age 1



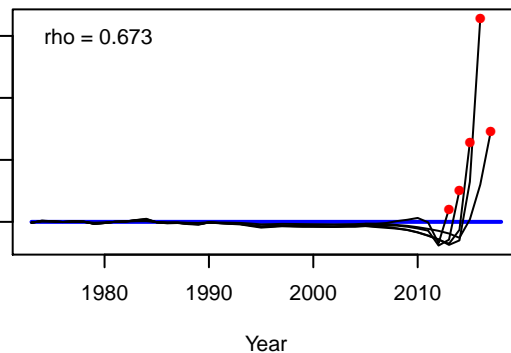
Relative Retro



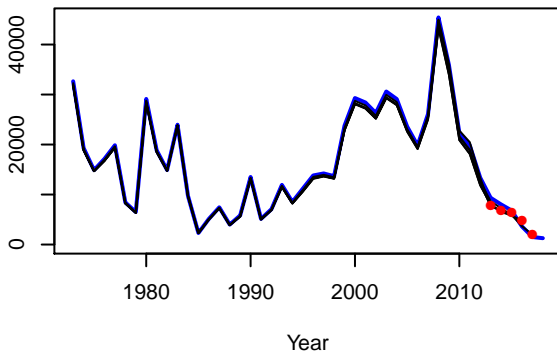
N at Age 2



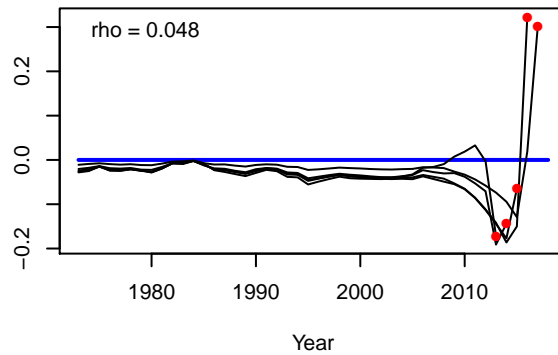
Relative Retro



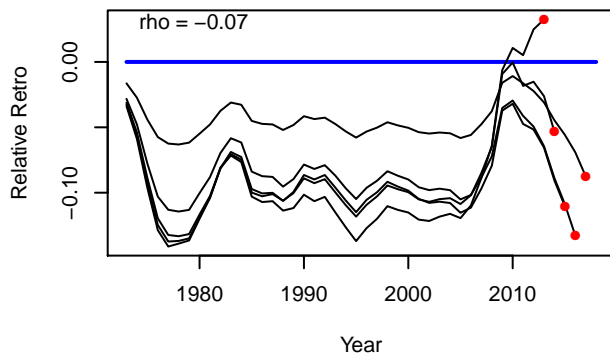
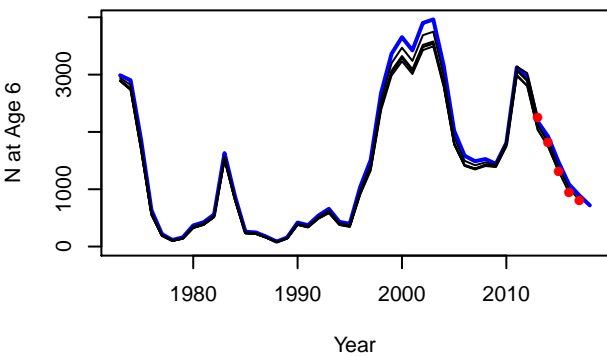
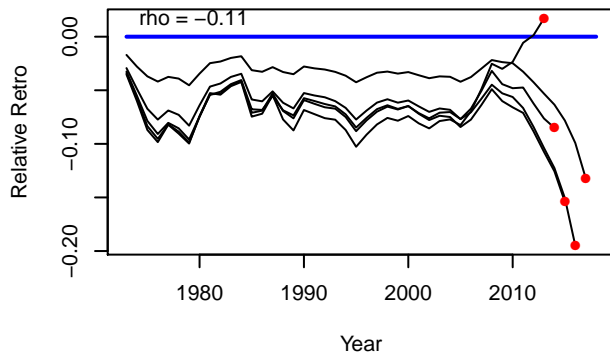
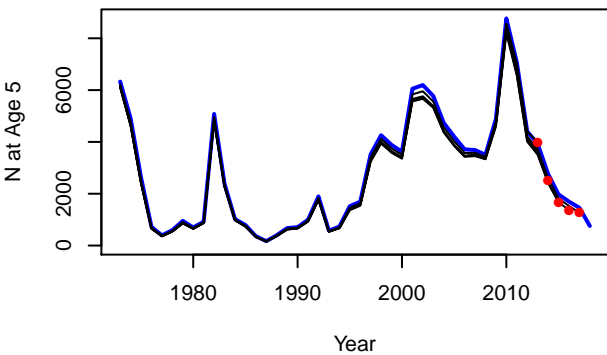
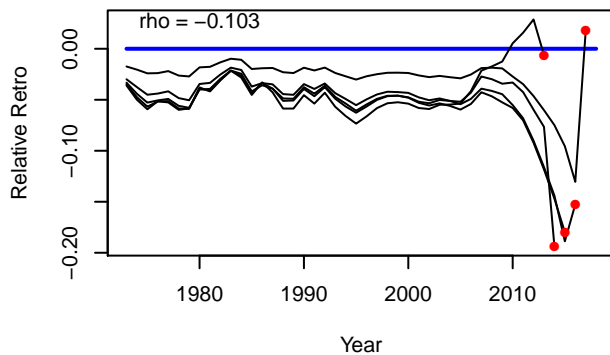
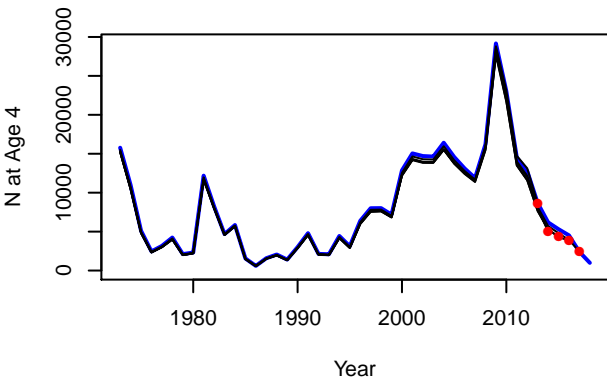
N at Age 3



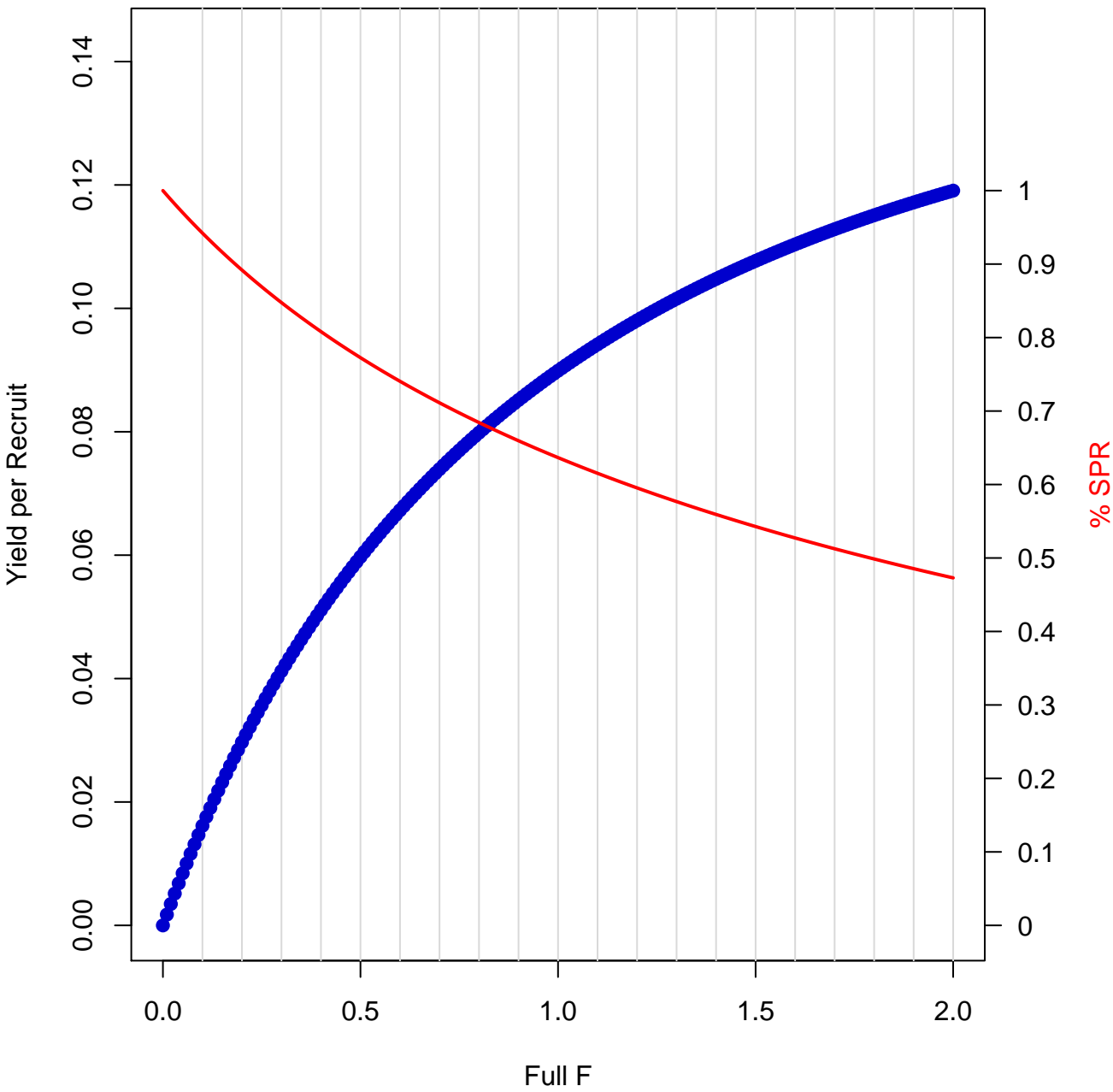
Relative Retro



Stock Numbers at Age



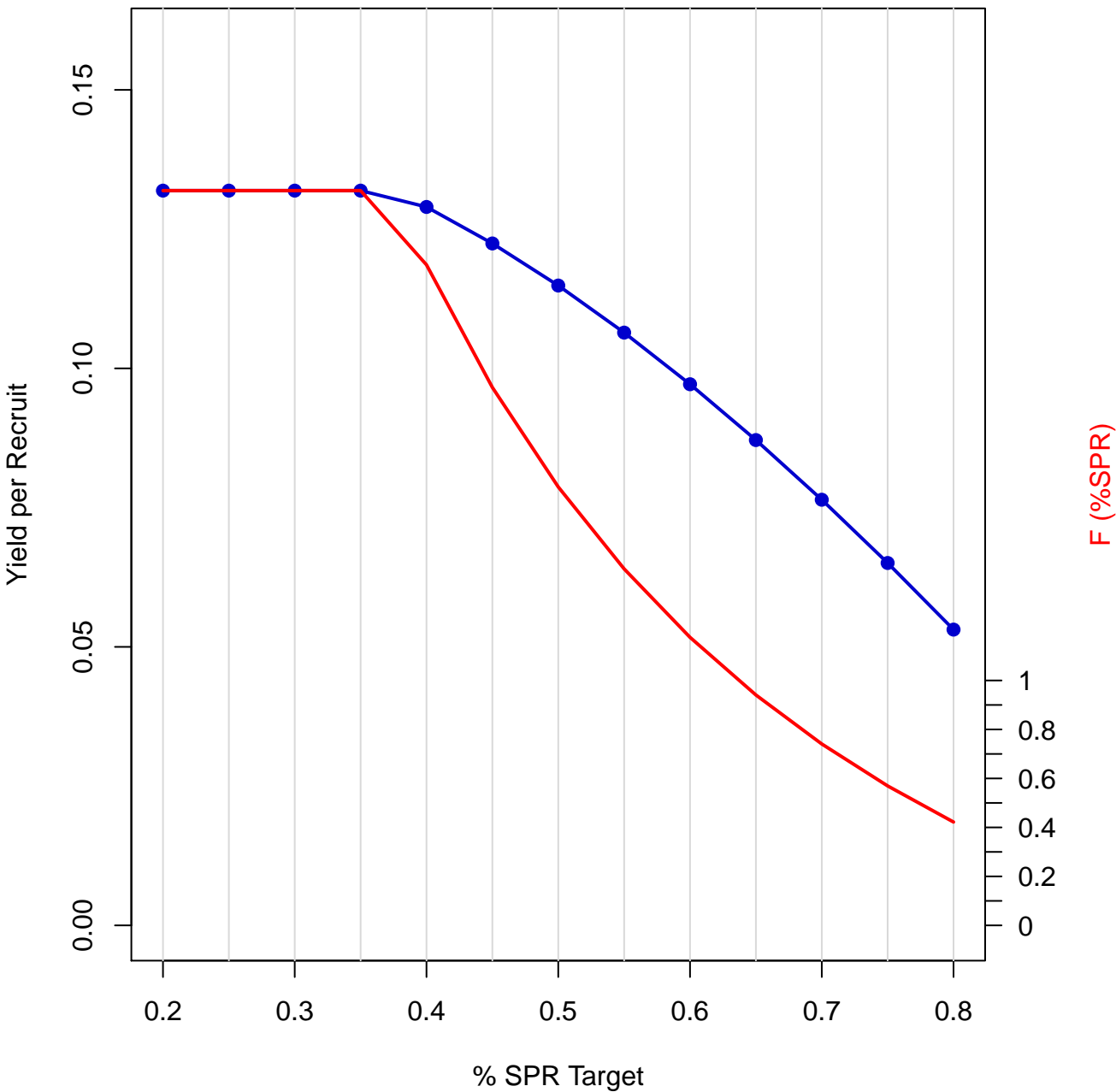
YPR-SPR Reference Points (Years Avg = 5)



YPR–SPR Reference Points (Years Avg = 5)

F	YPR	SPR	F	YPR	SPR	F	YPR	SPR
0	0	1	0.35	0.0463	0.8273	0.7	0.0739	0.7112
0.01	0.0018	0.9938	0.36	0.0473	0.8234	0.71	0.0746	0.7084
0.02	0.0035	0.9877	0.37	0.0483	0.8195	0.72	0.0752	0.7056
0.03	0.0052	0.9818	0.38	0.0492	0.8157	0.73	0.0758	0.7029
0.04	0.0068	0.9759	0.39	0.0502	0.8119	0.74	0.0764	0.7002
0.05	0.0084	0.97	0.4	0.0511	0.8081	0.75	0.077	0.6975
0.06	0.01	0.9643	0.41	0.052	0.8044	0.76	0.0776	0.6948
0.07	0.0116	0.9587	0.42	0.0529	0.8007	0.77	0.0781	0.6922
0.08	0.0131	0.9531	0.43	0.0538	0.7971	0.78	0.0787	0.6895
0.09	0.0147	0.9476	0.44	0.0547	0.7935	0.79	0.0793	0.6869
0.1	0.0161	0.9422	0.45	0.0556	0.7899	0.8	0.0799	0.6843
0.11	0.0176	0.9369	0.46	0.0564	0.7864	0.81	0.0804	0.6818
0.12	0.019	0.9316	0.47	0.0573	0.7829	0.82	0.081	0.6792
0.13	0.0205	0.9264	0.48	0.0581	0.7794	0.83	0.0815	0.6767
0.14	0.0218	0.9213	0.49	0.0589	0.776	0.84	0.082	0.6742
0.15	0.0232	0.9162	0.5	0.0597	0.7726	0.85	0.0826	0.6717
0.16	0.0245	0.9112	0.51	0.0605	0.7693	0.86	0.0831	0.6692
0.17	0.0259	0.9063	0.52	0.0613	0.766	0.87	0.0836	0.6668
0.18	0.0272	0.9014	0.53	0.0621	0.7627	0.88	0.0841	0.6644
0.19	0.0284	0.8966	0.54	0.0629	0.7594	0.89	0.0846	0.6619
0.2	0.0297	0.8919	0.55	0.0636	0.7562	0.9	0.0851	0.6596
0.21	0.0309	0.8872	0.56	0.0644	0.753	0.91	0.0856	0.6572
0.22	0.0321	0.8826	0.57	0.0651	0.7498	0.92	0.0861	0.6548
0.23	0.0333	0.878	0.58	0.0658	0.7467	0.93	0.0866	0.6525
0.24	0.0345	0.8735	0.59	0.0666	0.7436	0.94	0.0871	0.6502
0.25	0.0357	0.8691	0.6	0.0673	0.7405	0.95	0.0876	0.6479
0.26	0.0368	0.8647	0.61	0.068	0.7374	0.96	0.0881	0.6456
0.27	0.0379	0.8603	0.62	0.0687	0.7344	0.97	0.0885	0.6433
0.28	0.039	0.856	0.63	0.0694	0.7314	0.98	0.089	0.6411
0.29	0.0401	0.8518	0.64	0.07	0.7285	0.99	0.0894	0.6388
0.3	0.0412	0.8476	0.65	0.0707	0.7255	1	0.0899	0.6366
0.31	0.0423	0.8434	0.66	0.0714	0.7226	1.01	0.0903	0.6344
0.32	0.0433	0.8393	0.67	0.072	0.7197	1.02	0.0908	0.6322
0.33	0.0443	0.8353	0.68	0.0727	0.7169	1.03	0.0912	0.63
0.34	0.0453	0.8313	0.69	0.0733	0.714	1.04	0.0917	0.6279

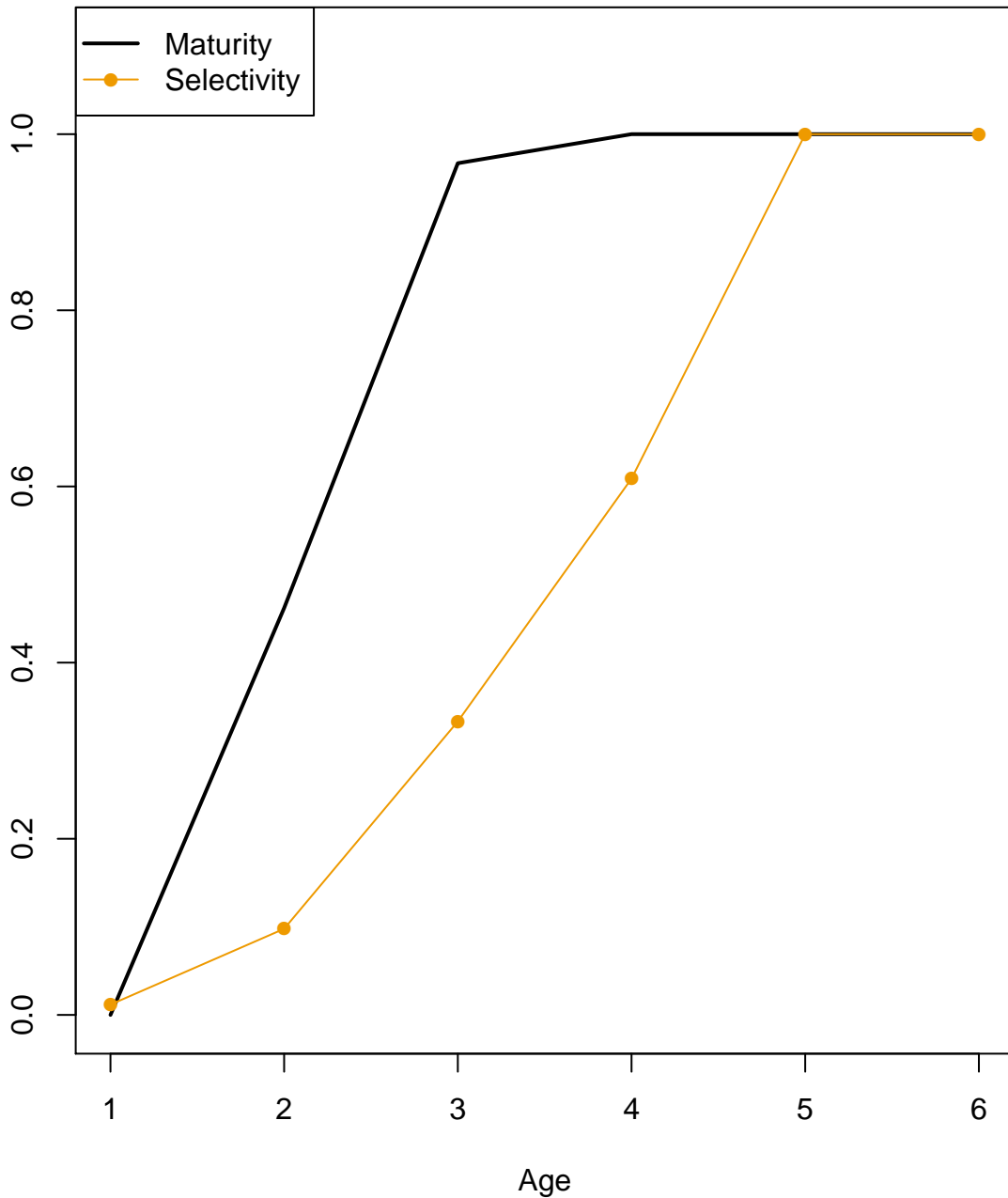
SPR Target Reference Points (Years Avg = 5)



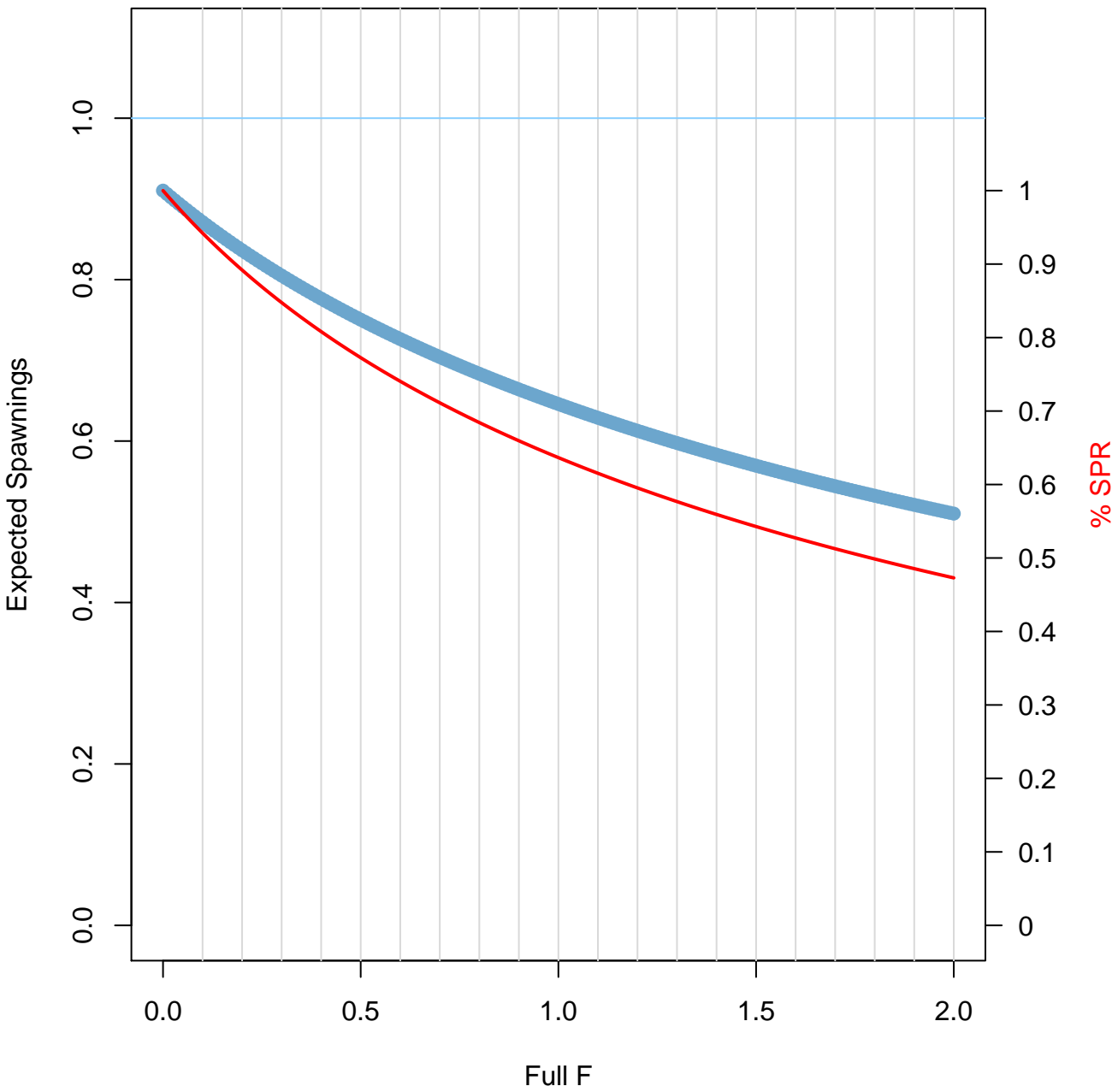
SPR Target Reference Points (Years Avg = 5)

% SPR	F(%SPR)	YPR
0.2	3	0.1319
0.25	3	0.1319
0.3	3	0.1319
0.35	3	0.1319
0.4	2.697	0.129
0.45	2.1964	0.1224
0.5	1.7903	0.1149
0.55	1.4555	0.1064
0.6	1.1762	0.0972
0.65	0.9407	0.0871
0.7	0.7407	0.0764
0.75	0.5694	0.0651
0.8	0.422	0.0531

Selectivity or Maturity at age



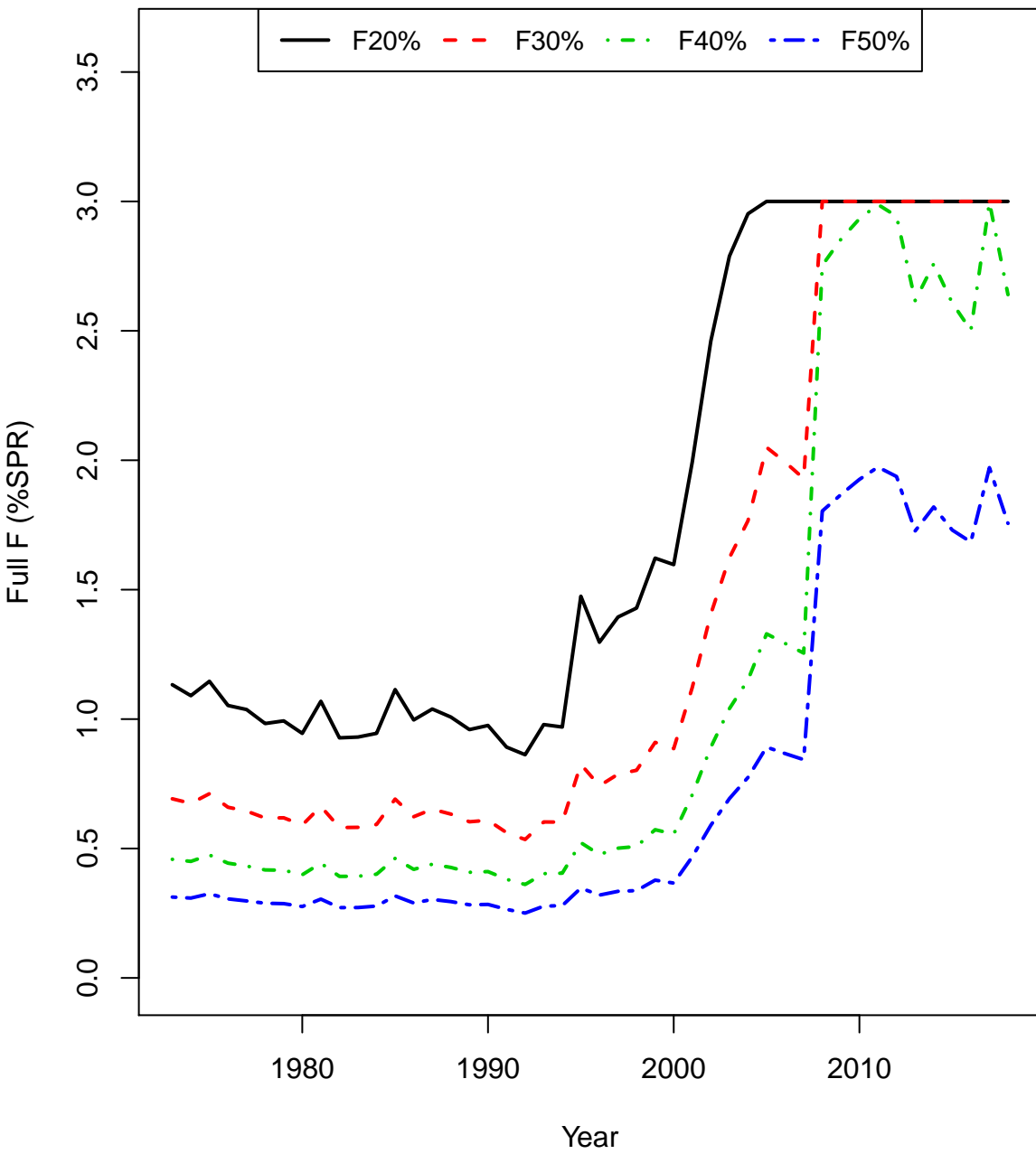
Expected Spawns and SPR Reference Points (Years Avg = 5)



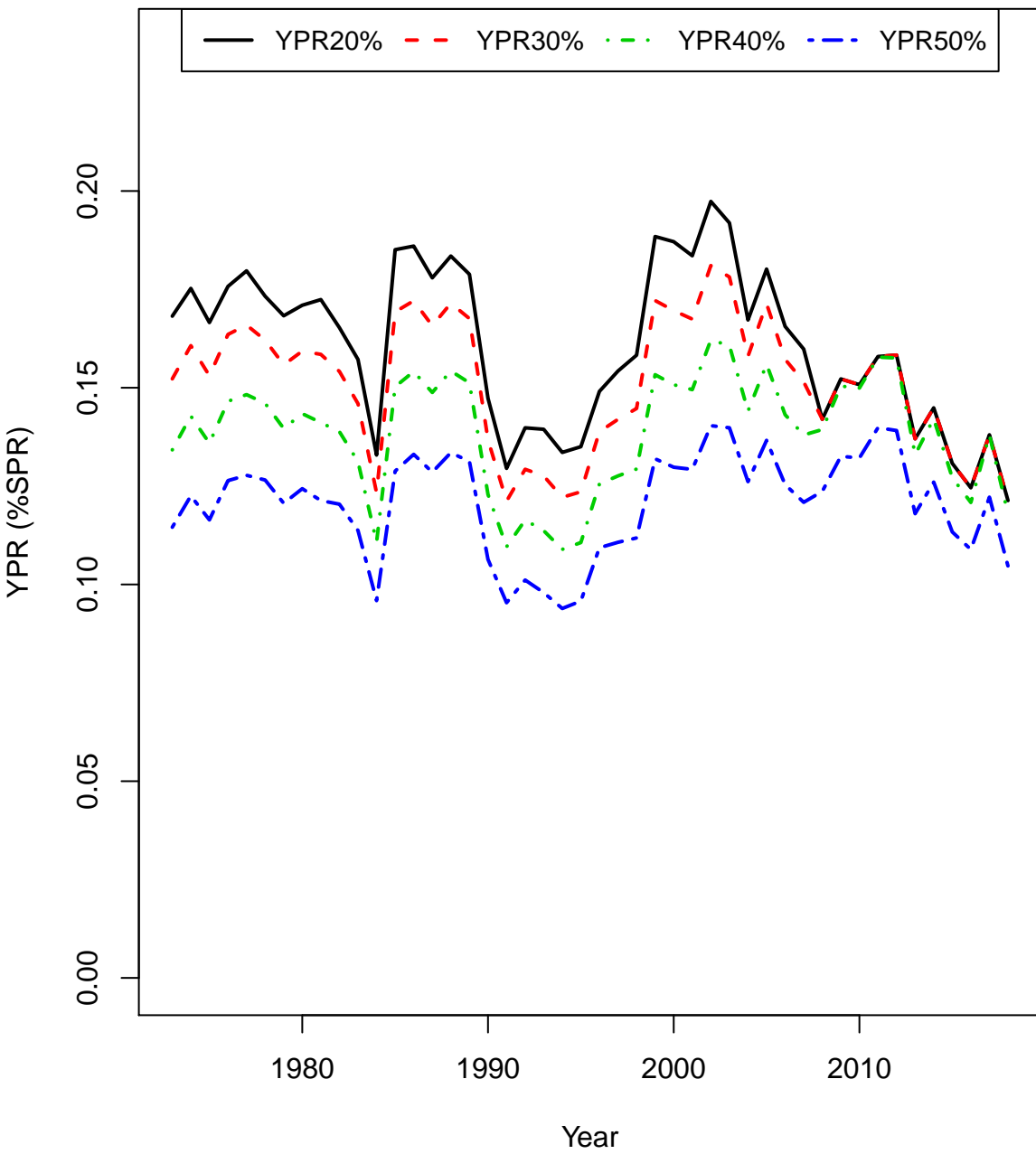
Expected Spawnings & SPR Reference Points (Years Avg = 5)

F	E[Sp]	SPR	F	E[Sp]	SPR	F	E[Sp]	SPR
0	0.9103	1	0.35	0.7904	0.8273	0.7	0.7041	0.7112
0.01	0.9061	0.9938	0.36	0.7876	0.8234	0.71	0.702	0.7084
0.02	0.9021	0.9877	0.37	0.7848	0.8195	0.72	0.6998	0.7056
0.03	0.898	0.9818	0.38	0.782	0.8157	0.73	0.6977	0.7029
0.04	0.8941	0.9759	0.39	0.7792	0.8119	0.74	0.6956	0.7002
0.05	0.8901	0.97	0.4	0.7765	0.8081	0.75	0.6936	0.6975
0.06	0.8863	0.9643	0.41	0.7738	0.8044	0.76	0.6915	0.6948
0.07	0.8824	0.9587	0.42	0.7711	0.8007	0.77	0.6894	0.6922
0.08	0.8786	0.9531	0.43	0.7684	0.7971	0.78	0.6874	0.6895
0.09	0.8749	0.9476	0.44	0.7658	0.7935	0.79	0.6854	0.6869
0.1	0.8712	0.9422	0.45	0.7632	0.7899	0.8	0.6834	0.6843
0.11	0.8675	0.9369	0.46	0.7606	0.7864	0.81	0.6814	0.6818
0.12	0.8639	0.9316	0.47	0.758	0.7829	0.82	0.6794	0.6792
0.13	0.8603	0.9264	0.48	0.7554	0.7794	0.83	0.6774	0.6767
0.14	0.8568	0.9213	0.49	0.7529	0.776	0.84	0.6755	0.6742
0.15	0.8533	0.9162	0.5	0.7504	0.7726	0.85	0.6735	0.6717
0.16	0.8498	0.9112	0.51	0.7479	0.7693	0.86	0.6716	0.6692
0.17	0.8464	0.9063	0.52	0.7454	0.766	0.87	0.6697	0.6668
0.18	0.843	0.9014	0.53	0.743	0.7627	0.88	0.6678	0.6644
0.19	0.8397	0.8966	0.54	0.7405	0.7594	0.89	0.6659	0.6619
0.2	0.8364	0.8919	0.55	0.7381	0.7562	0.9	0.664	0.6596
0.21	0.8331	0.8872	0.56	0.7357	0.753	0.91	0.6622	0.6572
0.22	0.8298	0.8826	0.57	0.7334	0.7498	0.92	0.6603	0.6548
0.23	0.8266	0.878	0.58	0.731	0.7467	0.93	0.6585	0.6525
0.24	0.8234	0.8735	0.59	0.7287	0.7436	0.94	0.6566	0.6502
0.25	0.8203	0.8691	0.6	0.7264	0.7405	0.95	0.6548	0.6479
0.26	0.8172	0.8647	0.61	0.724	0.7374	0.96	0.653	0.6456
0.27	0.8141	0.8603	0.62	0.7218	0.7344	0.97	0.6512	0.6433
0.28	0.811	0.856	0.63	0.7195	0.7314	0.98	0.6494	0.6411
0.29	0.808	0.8518	0.64	0.7172	0.7285	0.99	0.6477	0.6388
0.3	0.805	0.8476	0.65	0.715	0.7255	1	0.6459	0.6366
0.31	0.802	0.8434	0.66	0.7128	0.7226	1.01	0.6441	0.6344
0.32	0.7991	0.8393	0.67	0.7106	0.7197	1.02	0.6424	0.6322
0.33	0.7962	0.8353	0.68	0.7084	0.7169	1.03	0.6407	0.63
0.34	0.7933	0.8313	0.69	0.7062	0.714	1.04	0.6389	0.6279

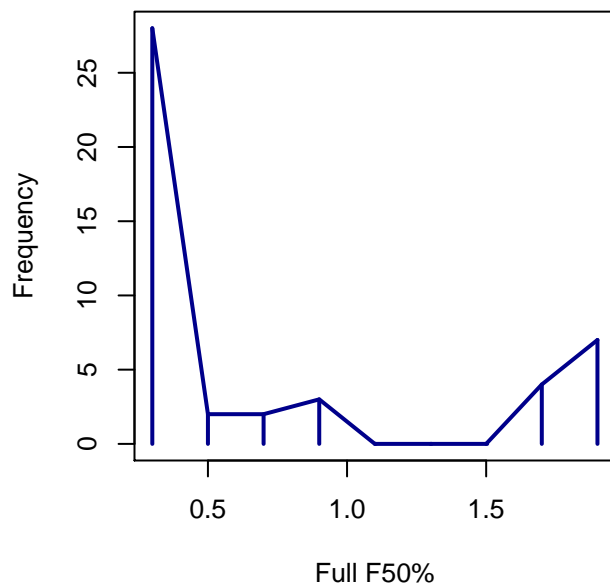
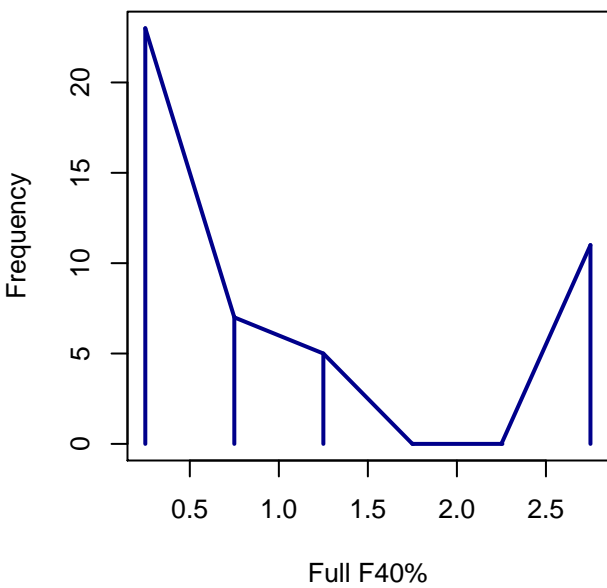
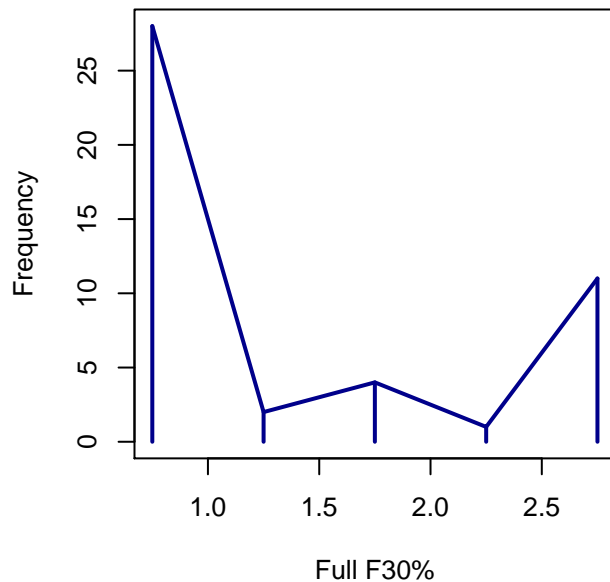
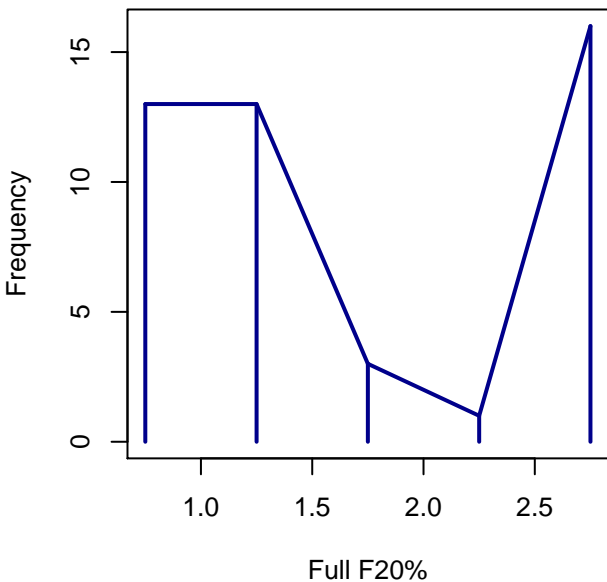
Annual F(%SPR) Reference Points



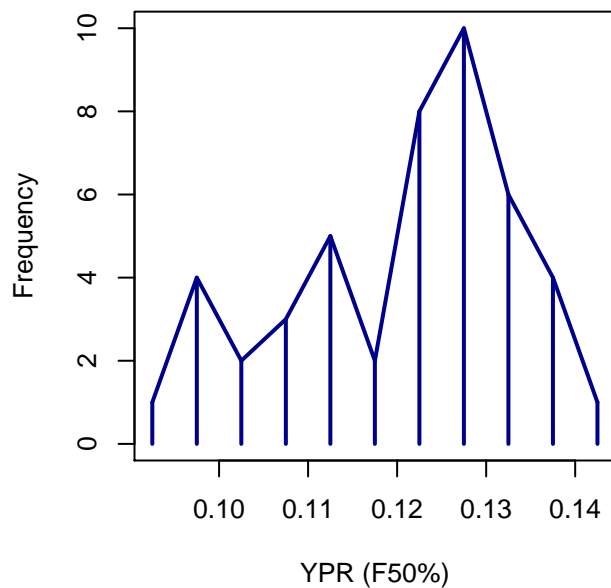
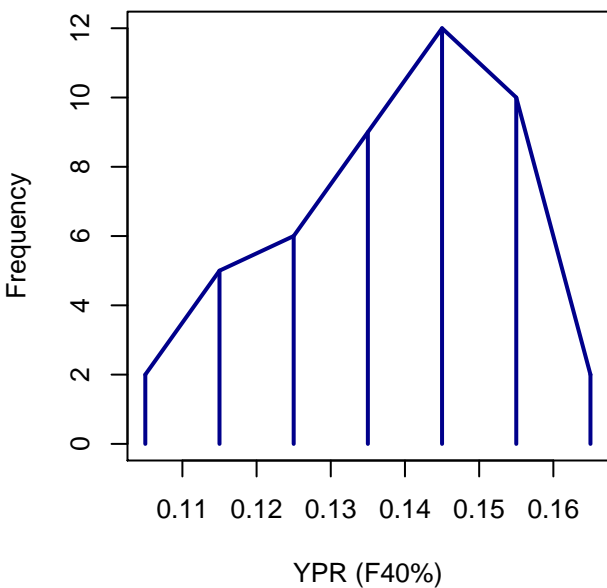
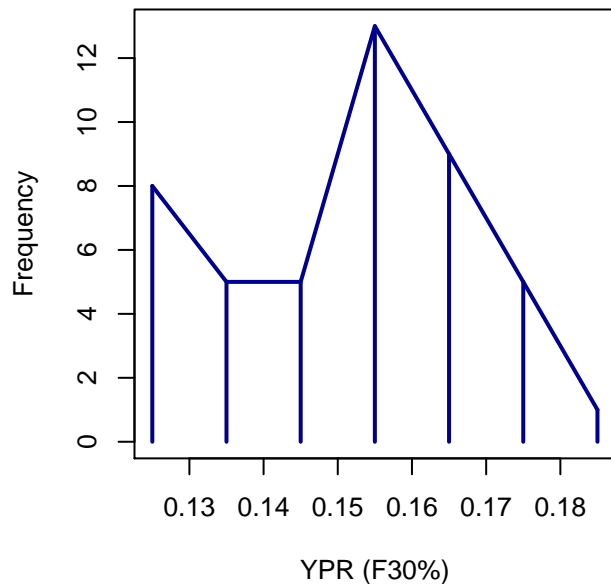
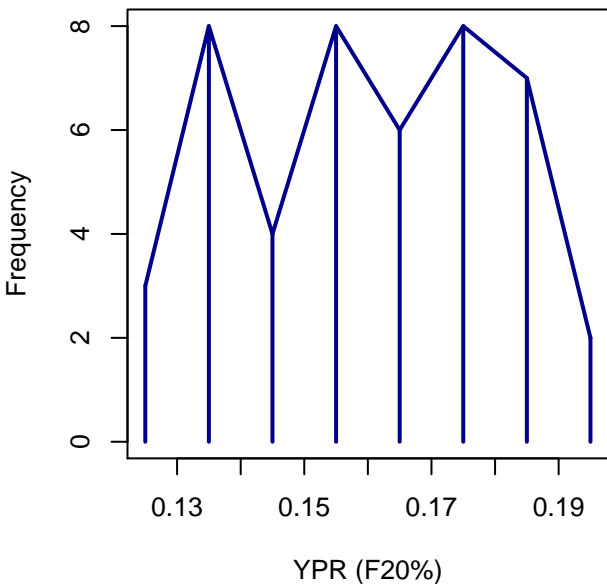
Annual YPR(%SPR) Reference Points

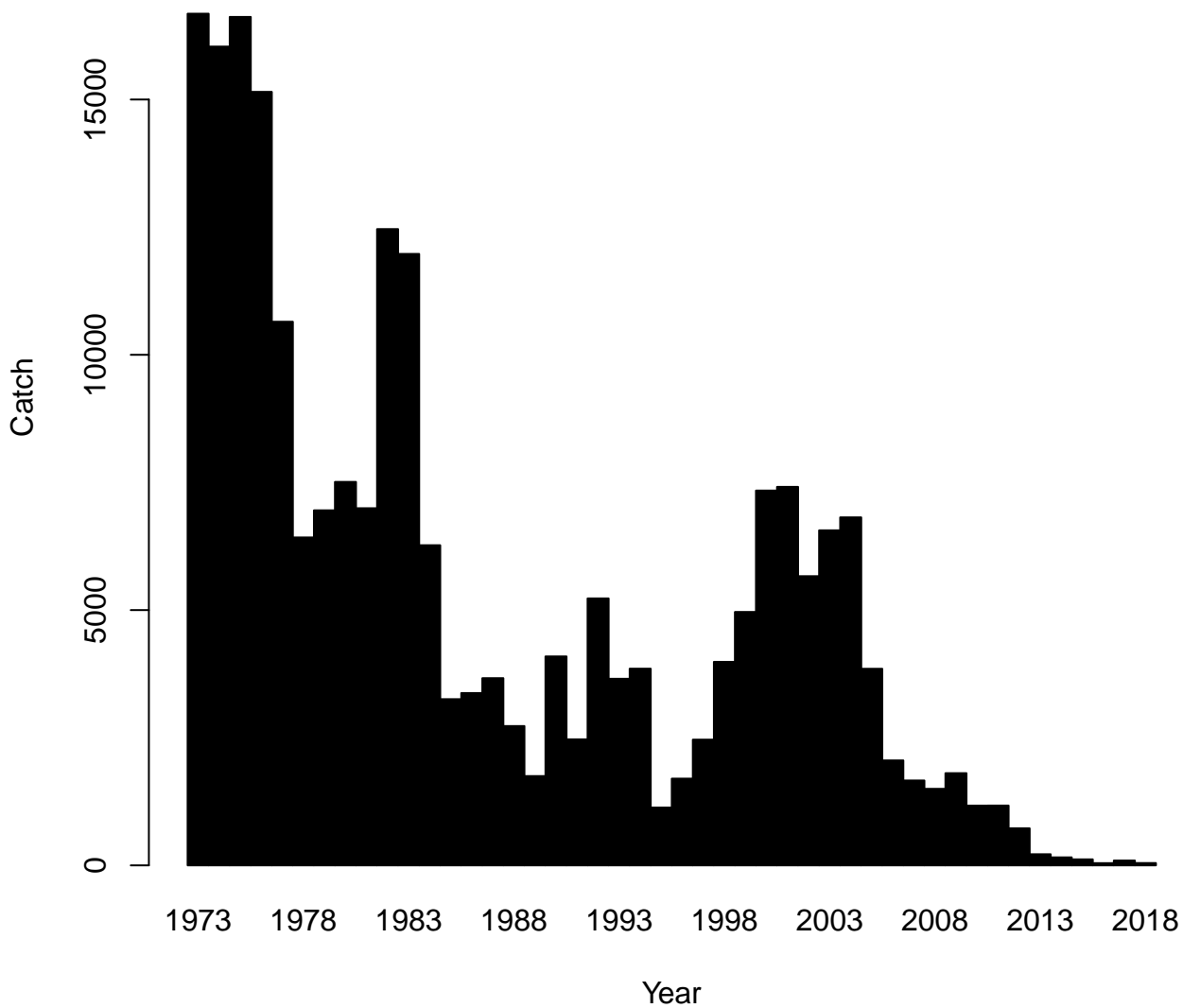


Annual F (%SPR) Reference Points

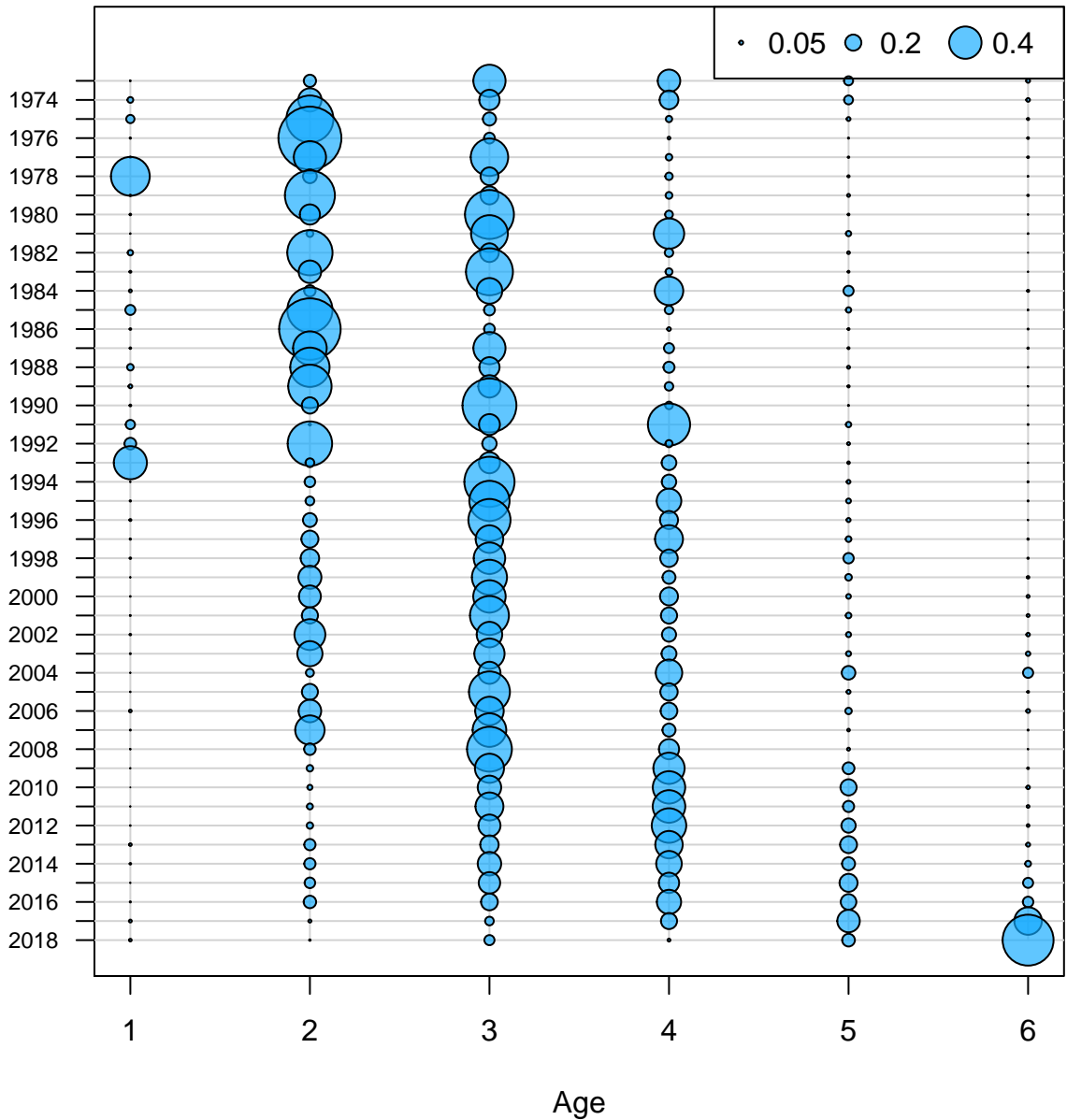


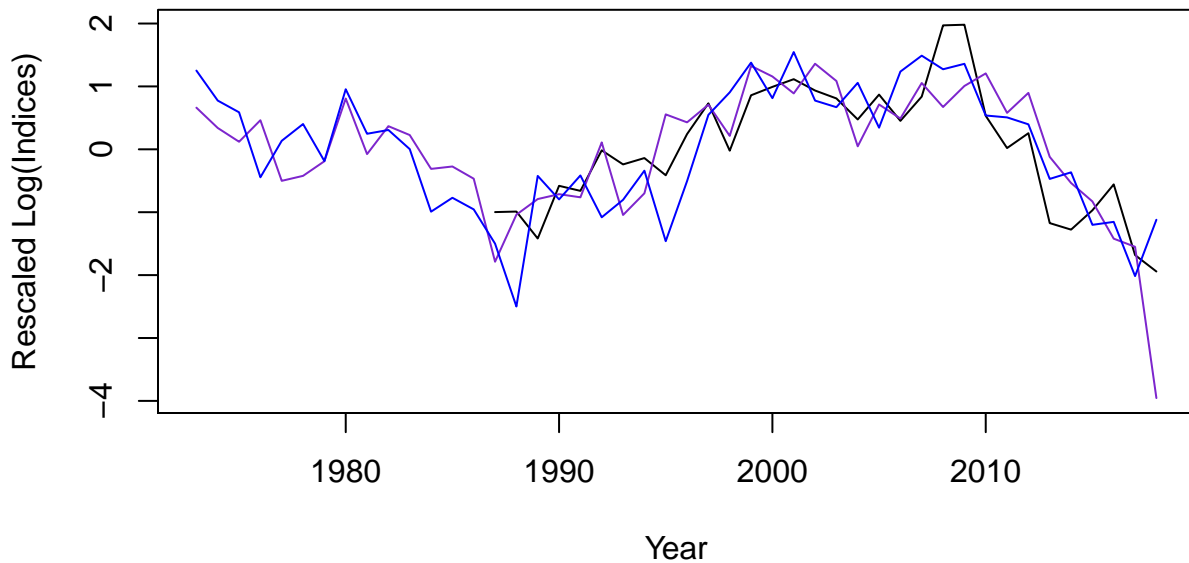
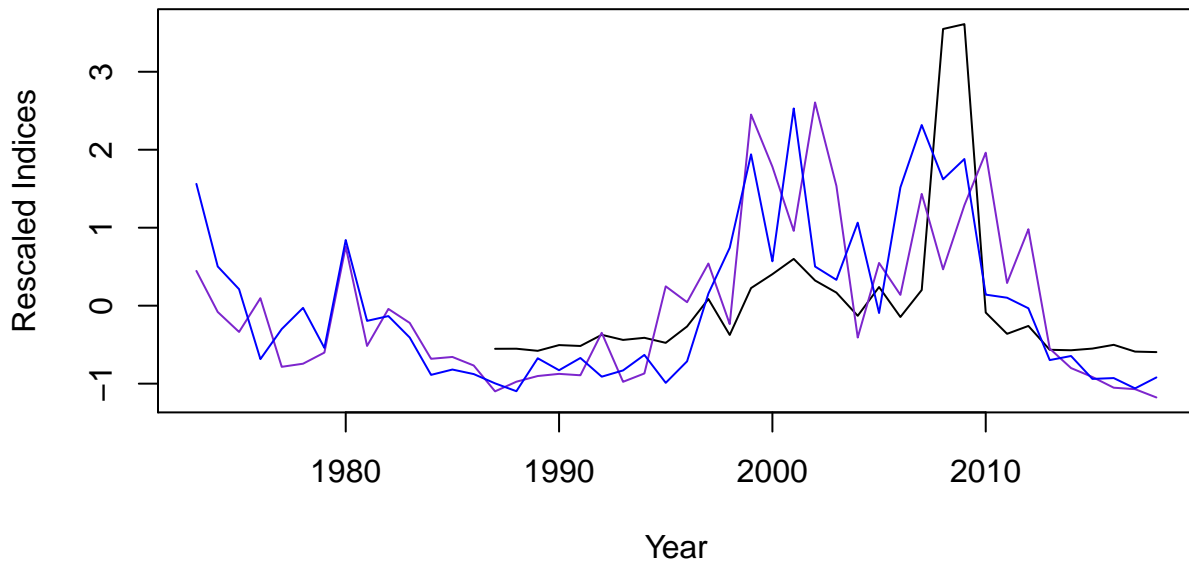
Annual YPR (%SPR) Reference Points





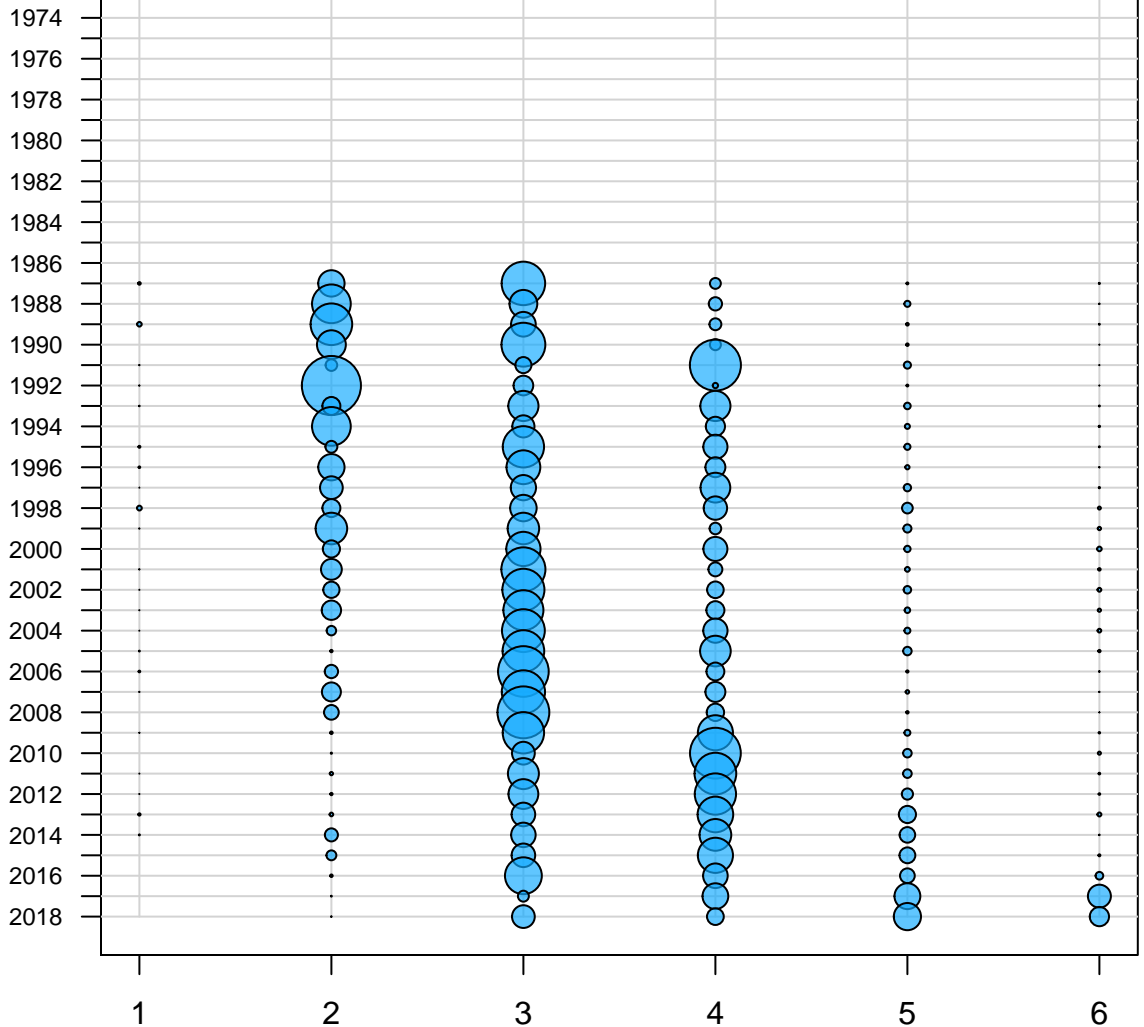
Age Comps for Catch by Fleet 1 (FLEET-1)





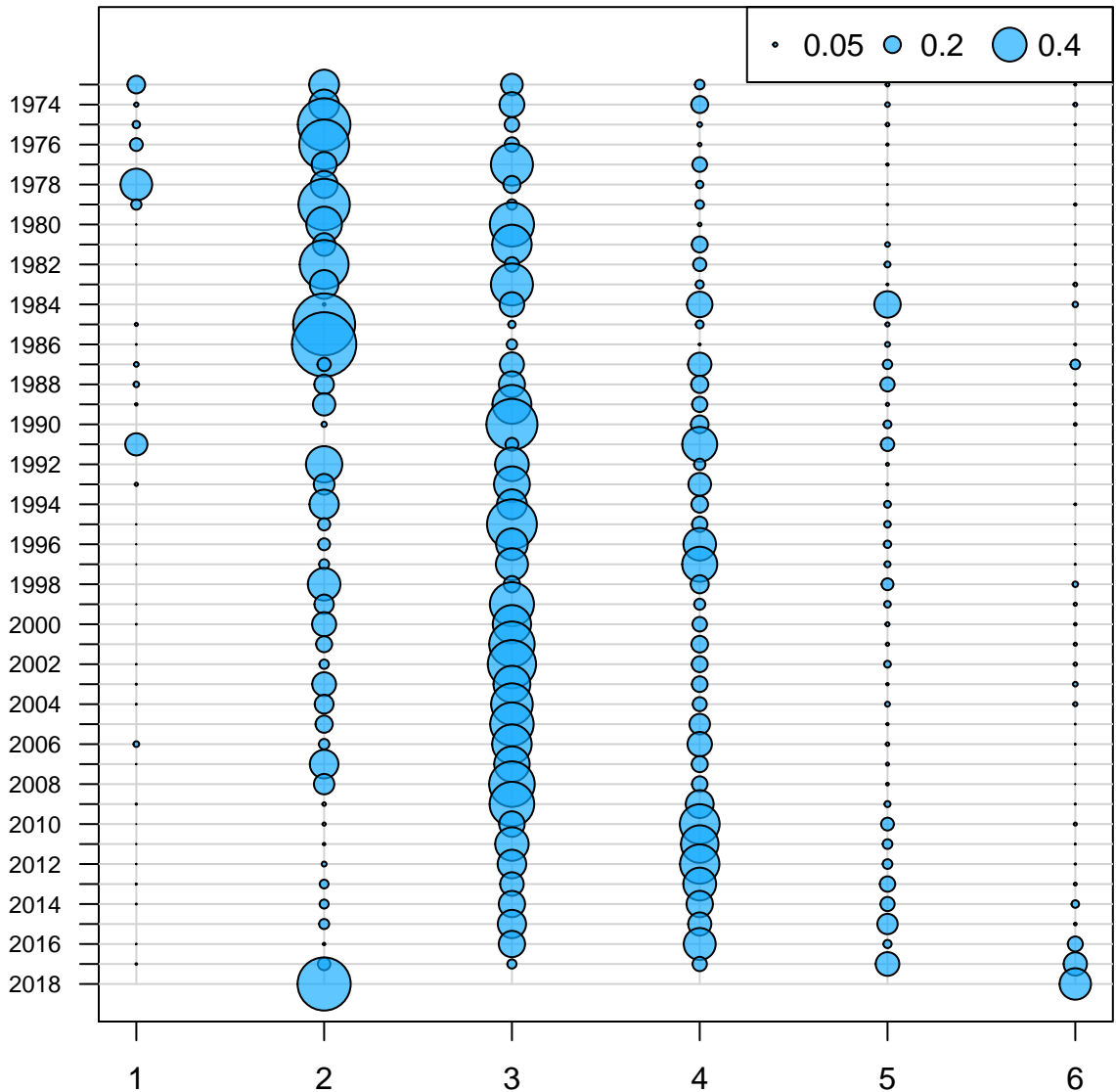
Age Comps for Index 1 (INDEX-1)

• 0.05 • 0.2 • 0.4



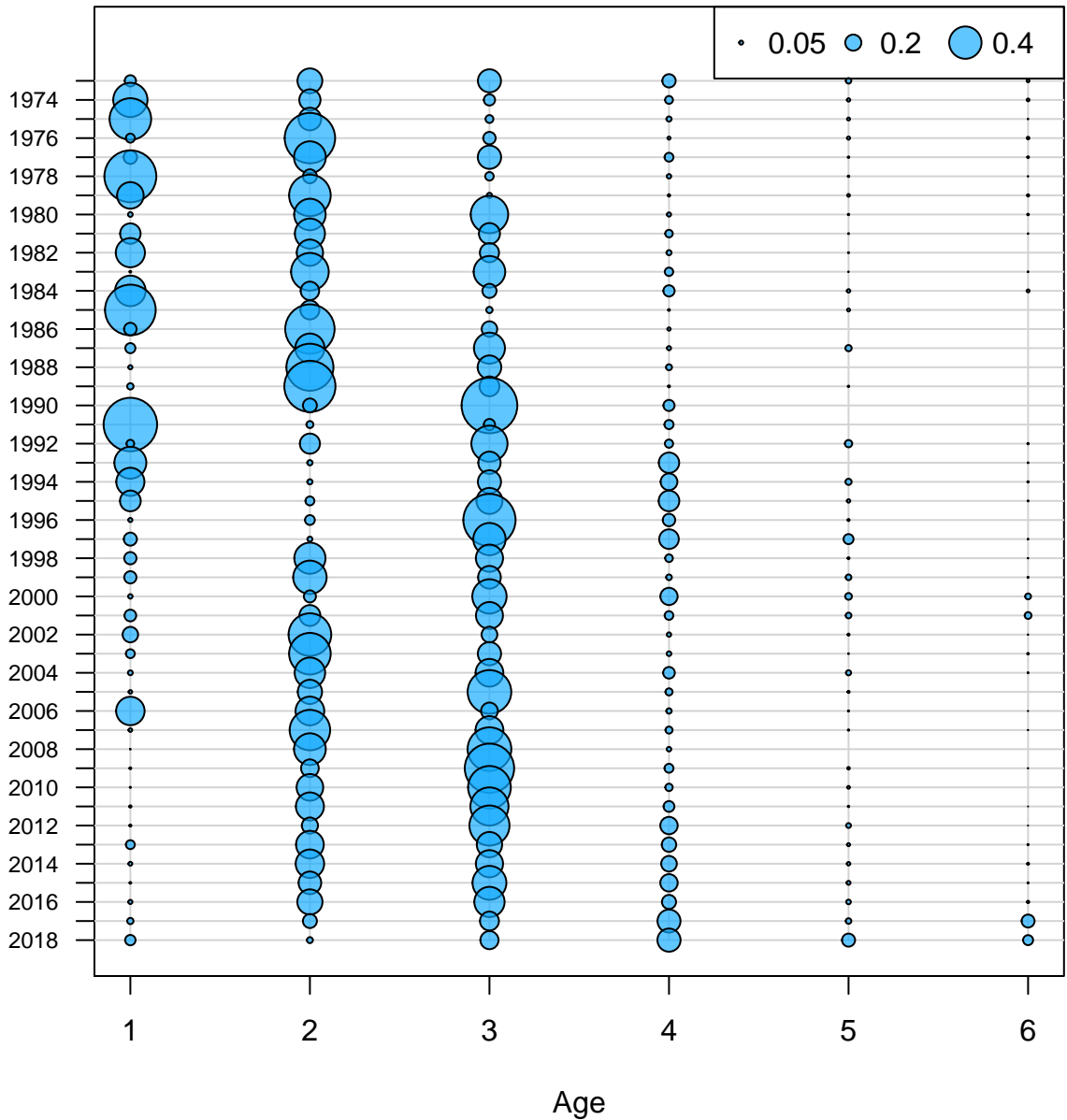
Age

Age Comps for Index 2 (INDEX-2)

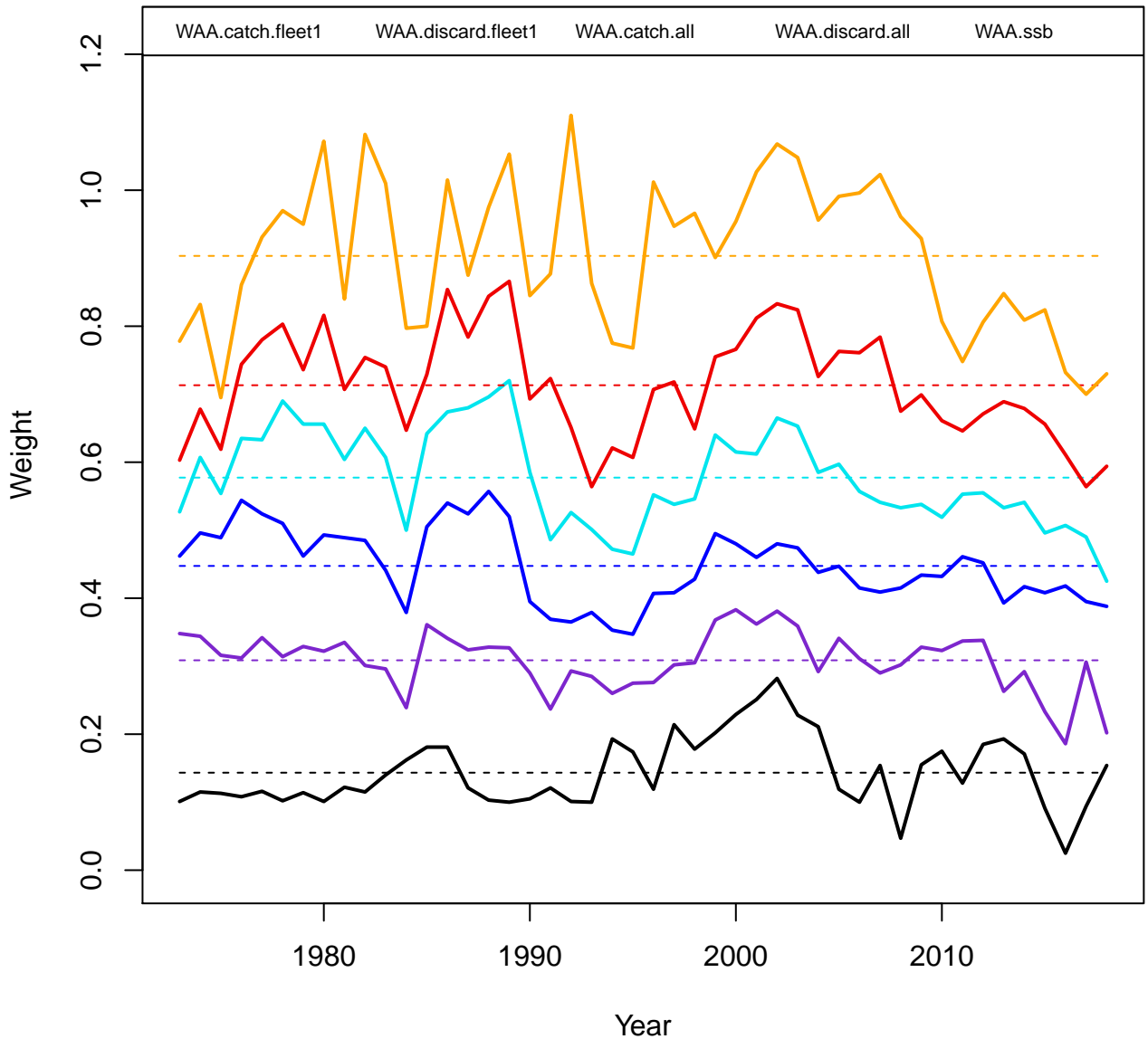


Age

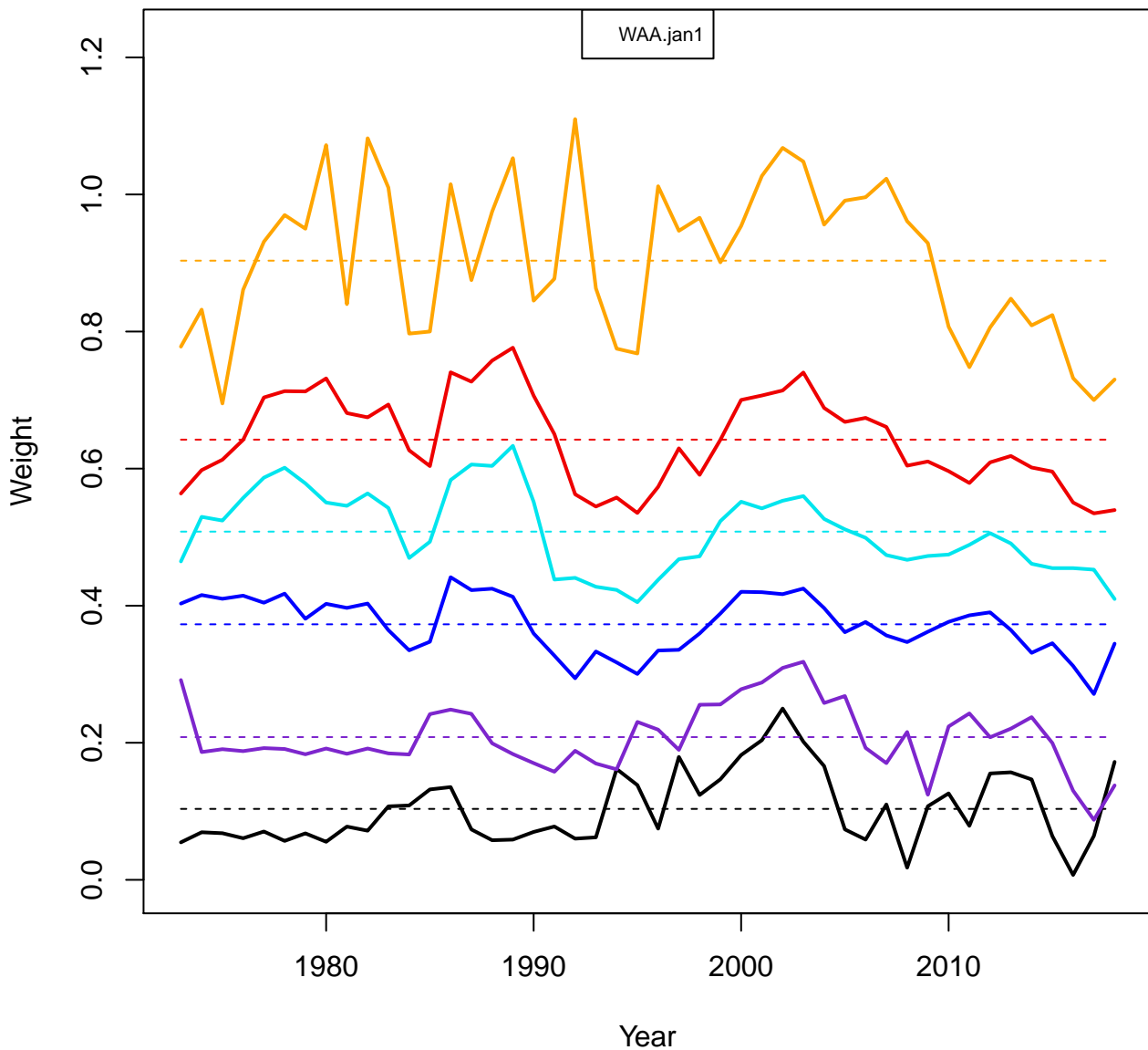
Age Comps for Index 3 (INDEX-3)



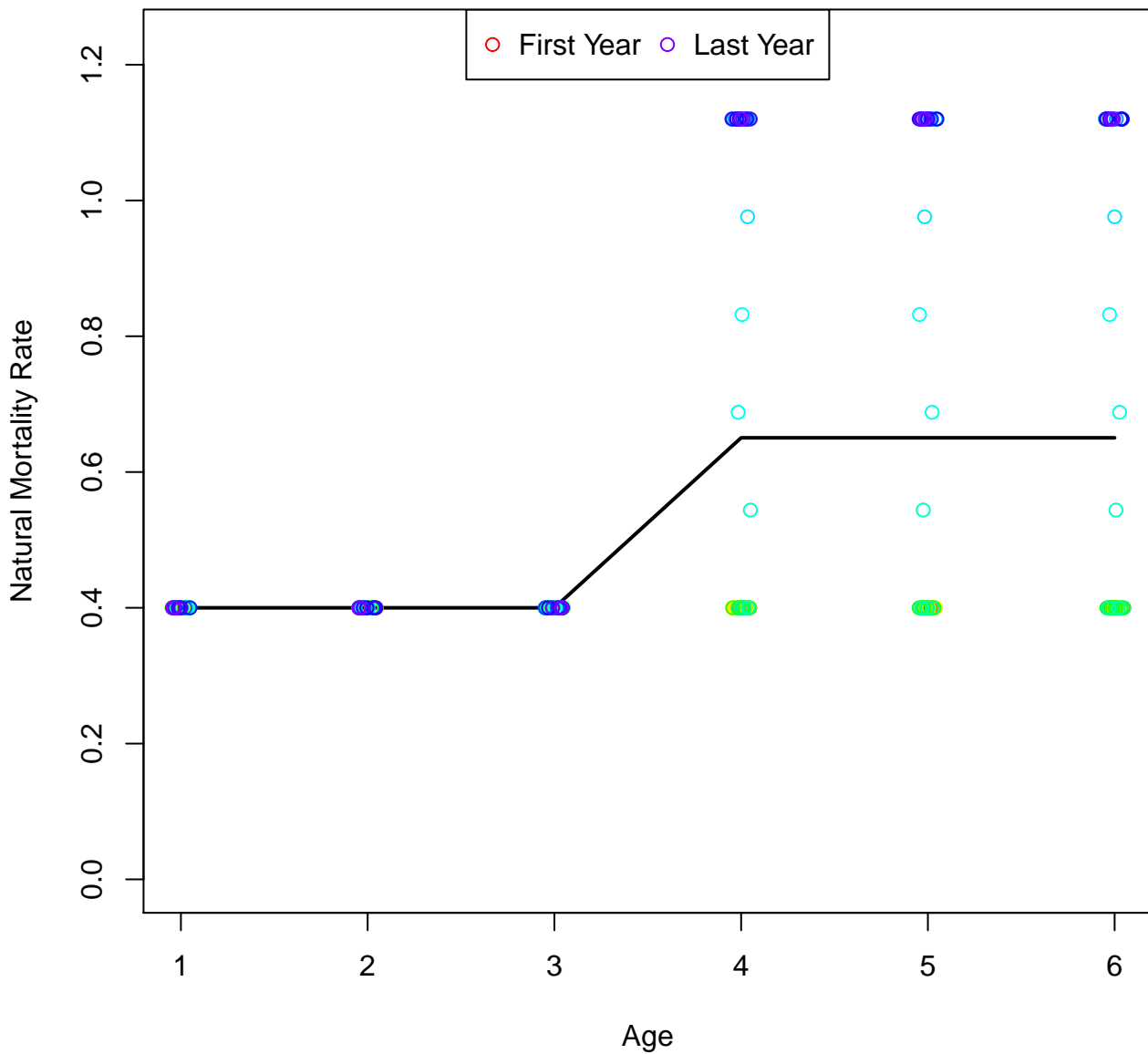
WAA matrix 1



WAA matrix 2



M



Maturity

