

File = whitehake\_000.dat

ASAP3 run on Thursday, 31 Oct 2019 at 09:20:42

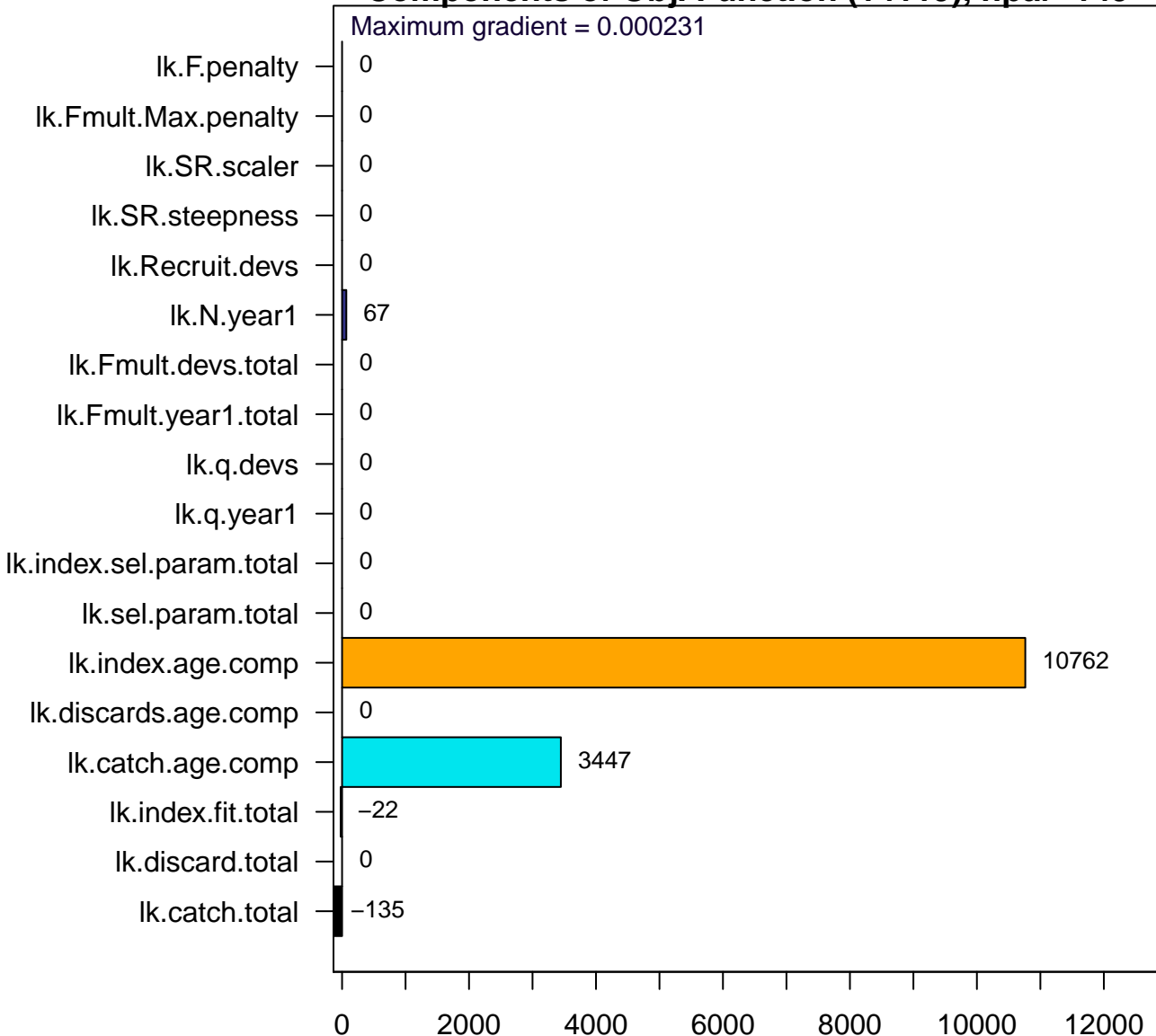
dir = .

ASAPplots version = 0.2.14

npar = 149, maximum gradient = 0.000230912

# Components of Obj. Function (14119), npar=149

Maximum gradient = 0.000231

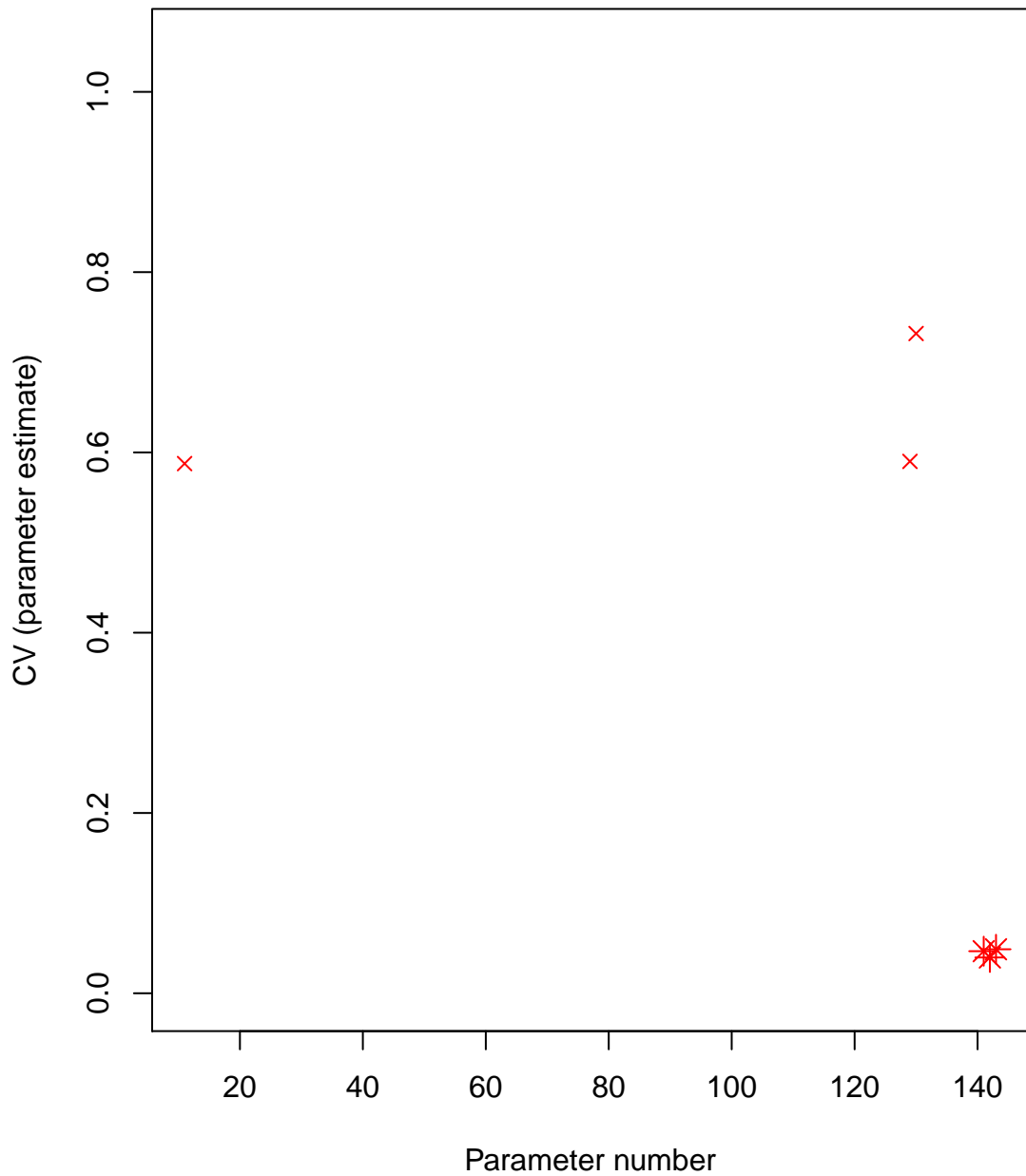


Likelihood Contribution

Model: whitehake\_000

Thursday, 31 Oct 2019 at 09:20:42

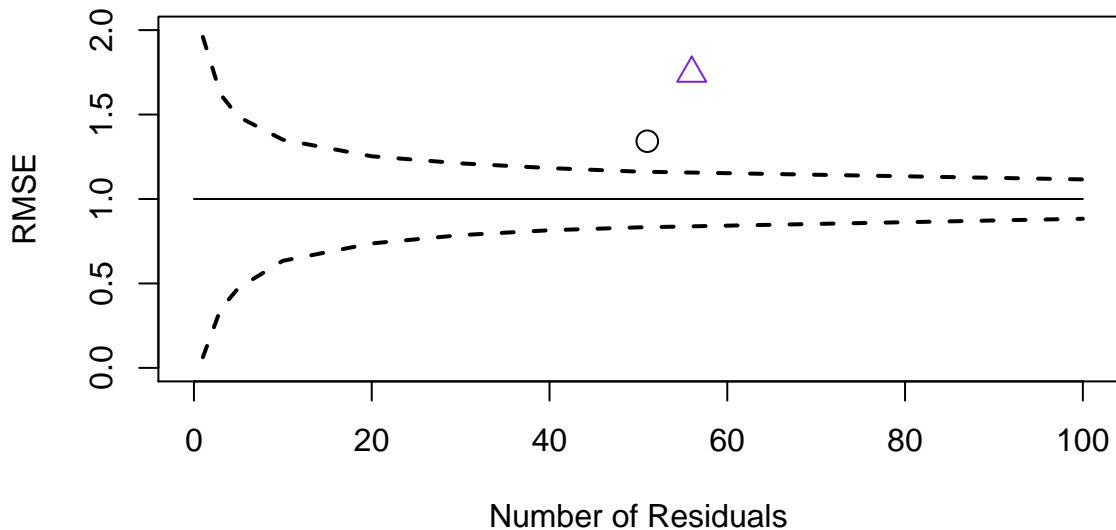




## Root Mean Square Error computed from Standardized Residuals

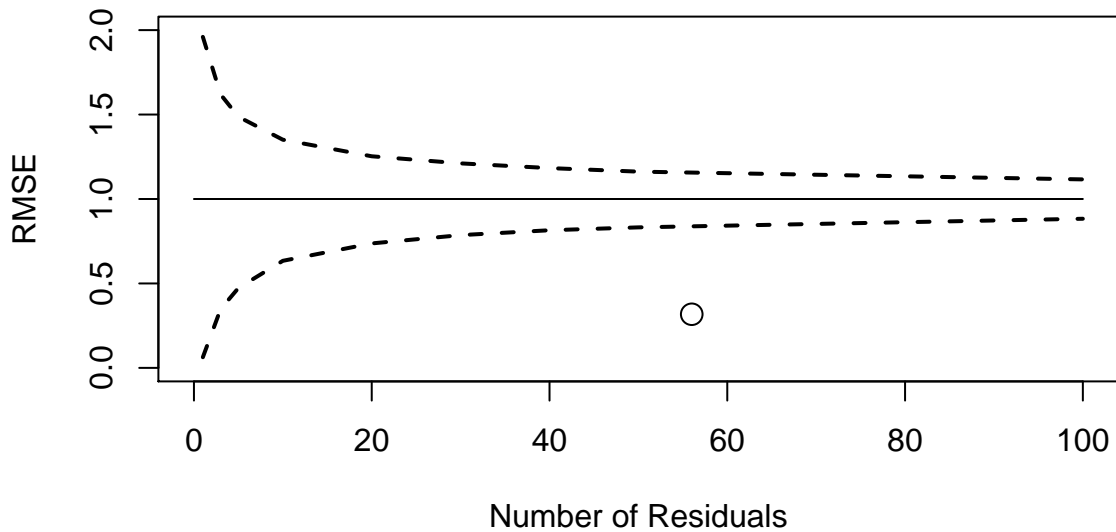
Component	# resids	RMSE
catch.tot	56	0.318
discard.tot	0	0
ind01	51	1.34
ind02	56	1.74
ind.total	107	1.57
N.year1	8	0.576
Fmult.year1	0	0
Fmult.devs.total	0	0
recruit.devs	0	0
fleet.sel.params	0	0
index.sel.params	0	0
q.year1	0	0
q.devs	0	0
SR.steepness	0	0
SR.scaler	0	0

Root Mean Square Error for Indices



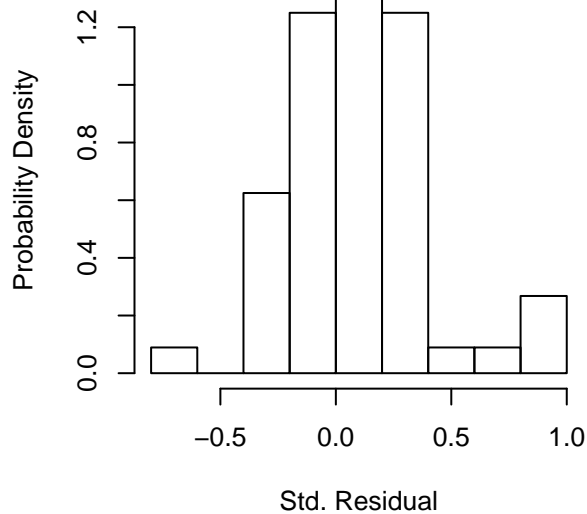
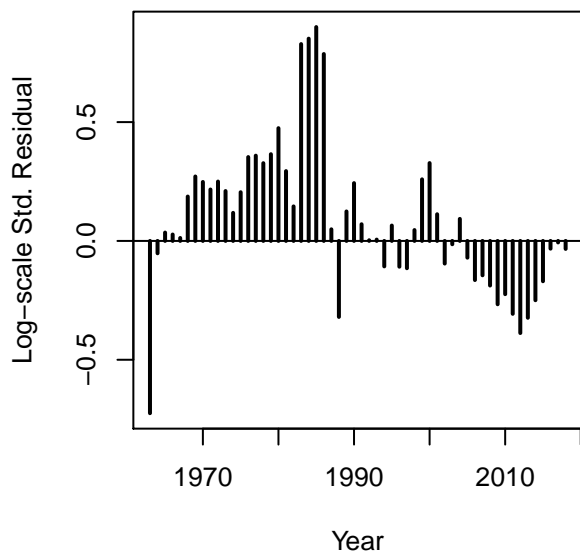
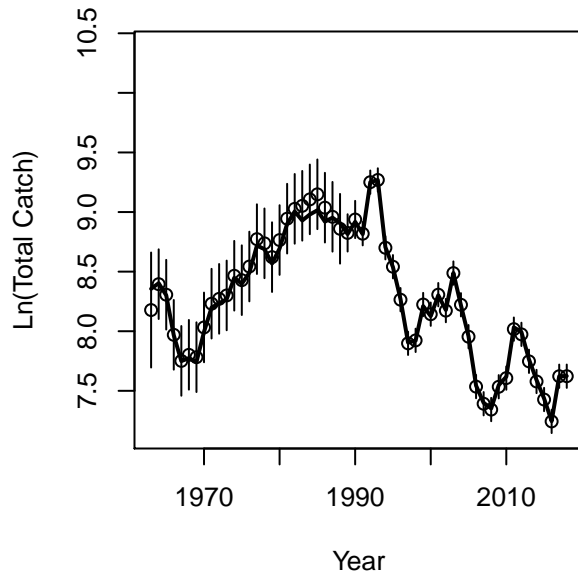
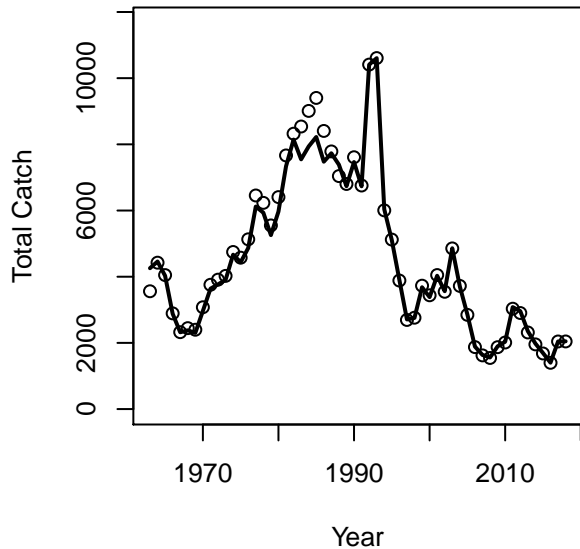
+ ind total  
△ INDEX-2  
○ INDEX-1

# Root Mean Square Error for Catch



○ catch.tot

# Fleet 1 Catch (FLEET-1)



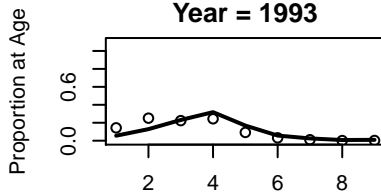


# Catch

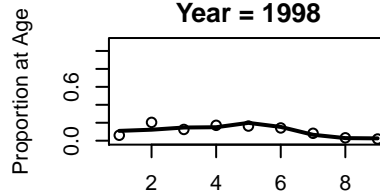
Fleet 1  
FLEET-1



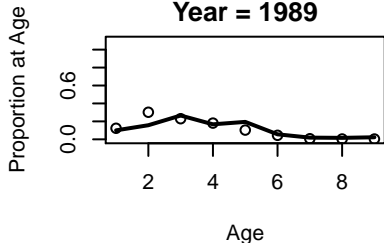
Year = 1993



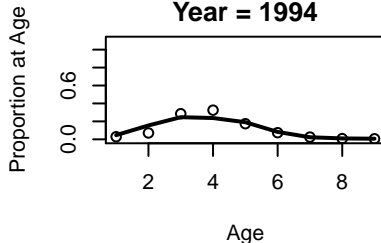
Year = 1998



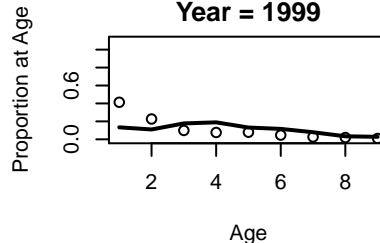
Year = 1989



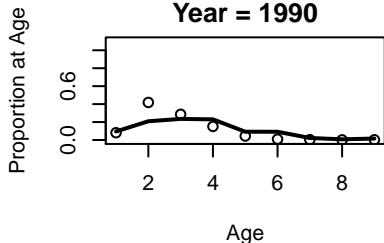
Year = 1994



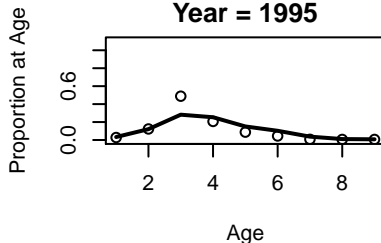
Year = 1999



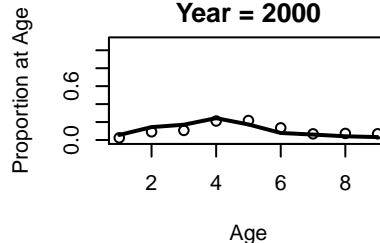
Year = 1990



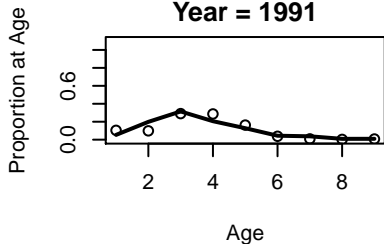
Year = 1995



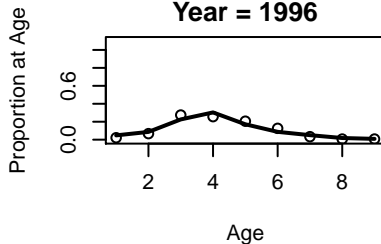
Year = 2000



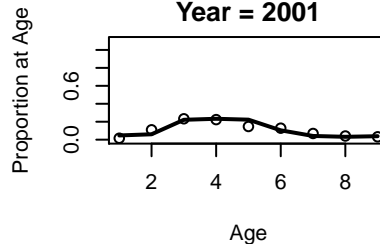
Year = 1991



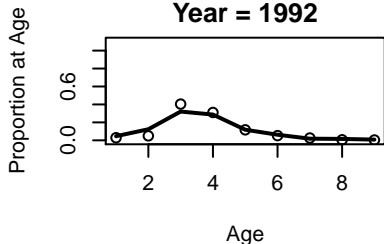
Year = 1996



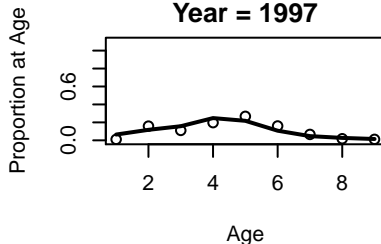
Year = 2001



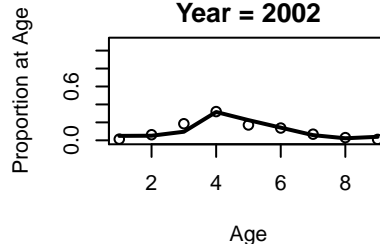
Year = 1992



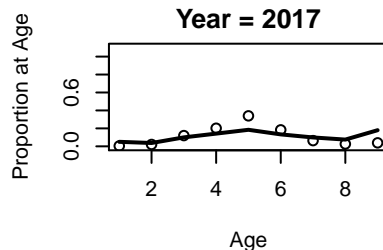
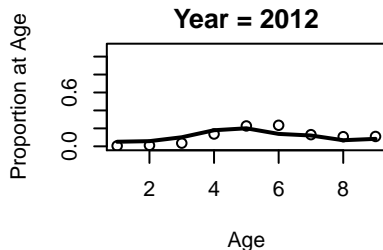
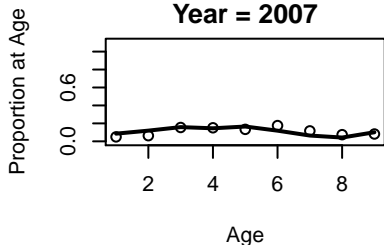
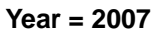
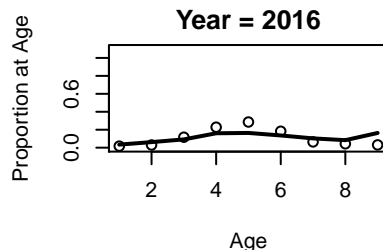
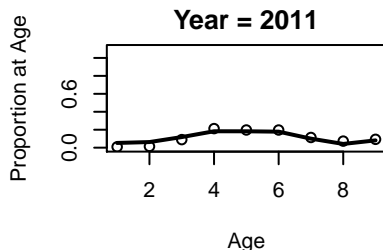
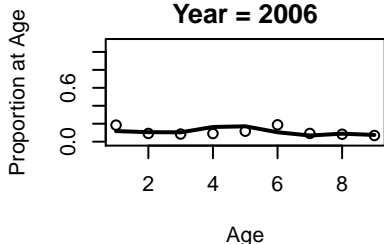
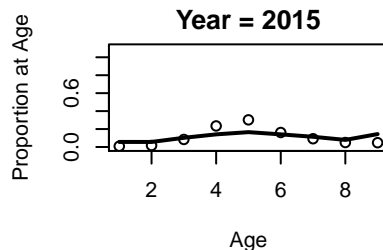
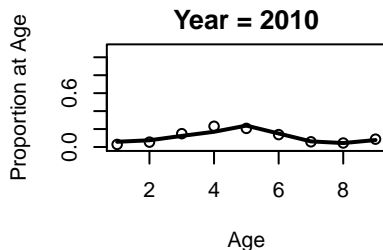
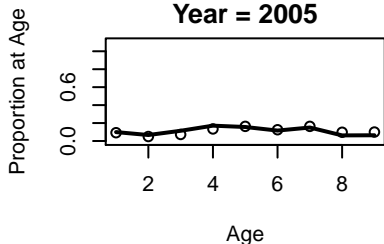
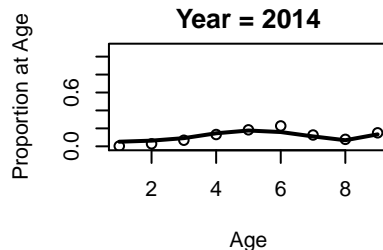
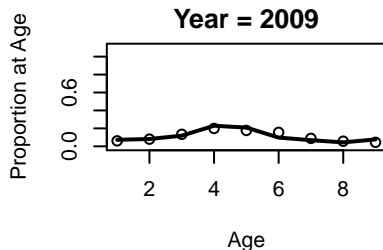
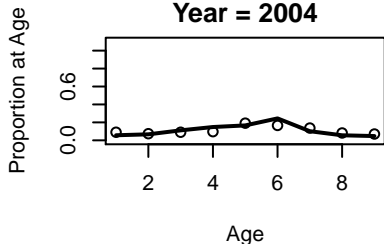
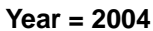
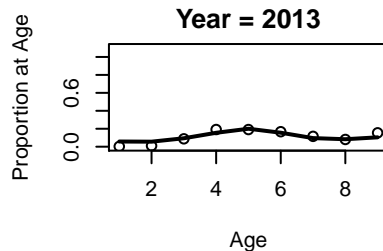
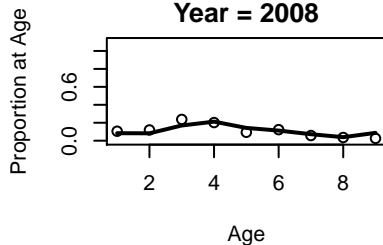
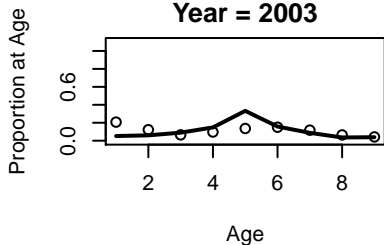
Year = 1997



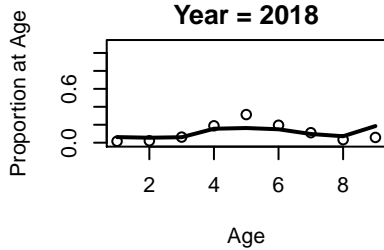
Year = 2002



**Year = 2008**

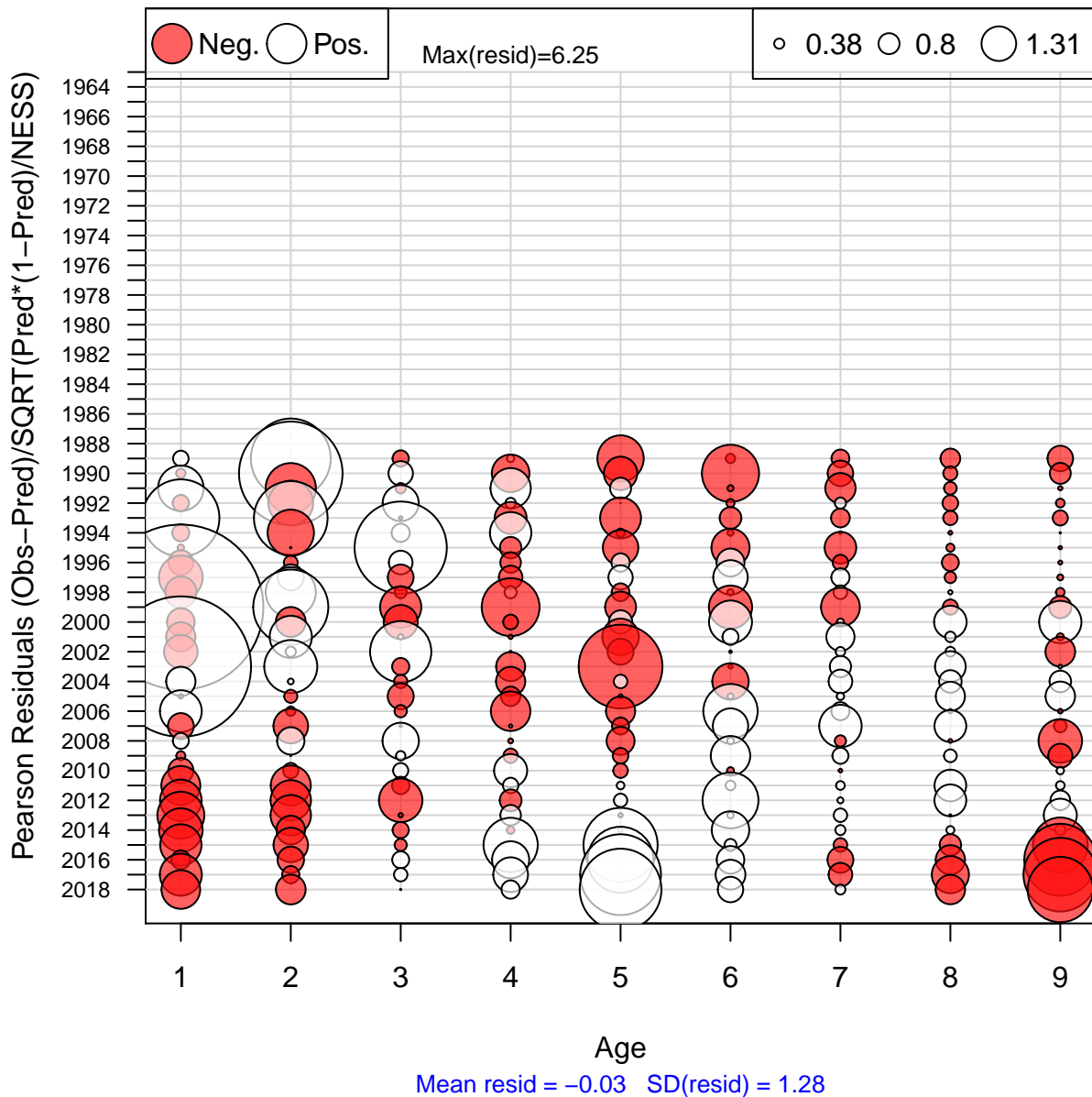


**Year = 2018**

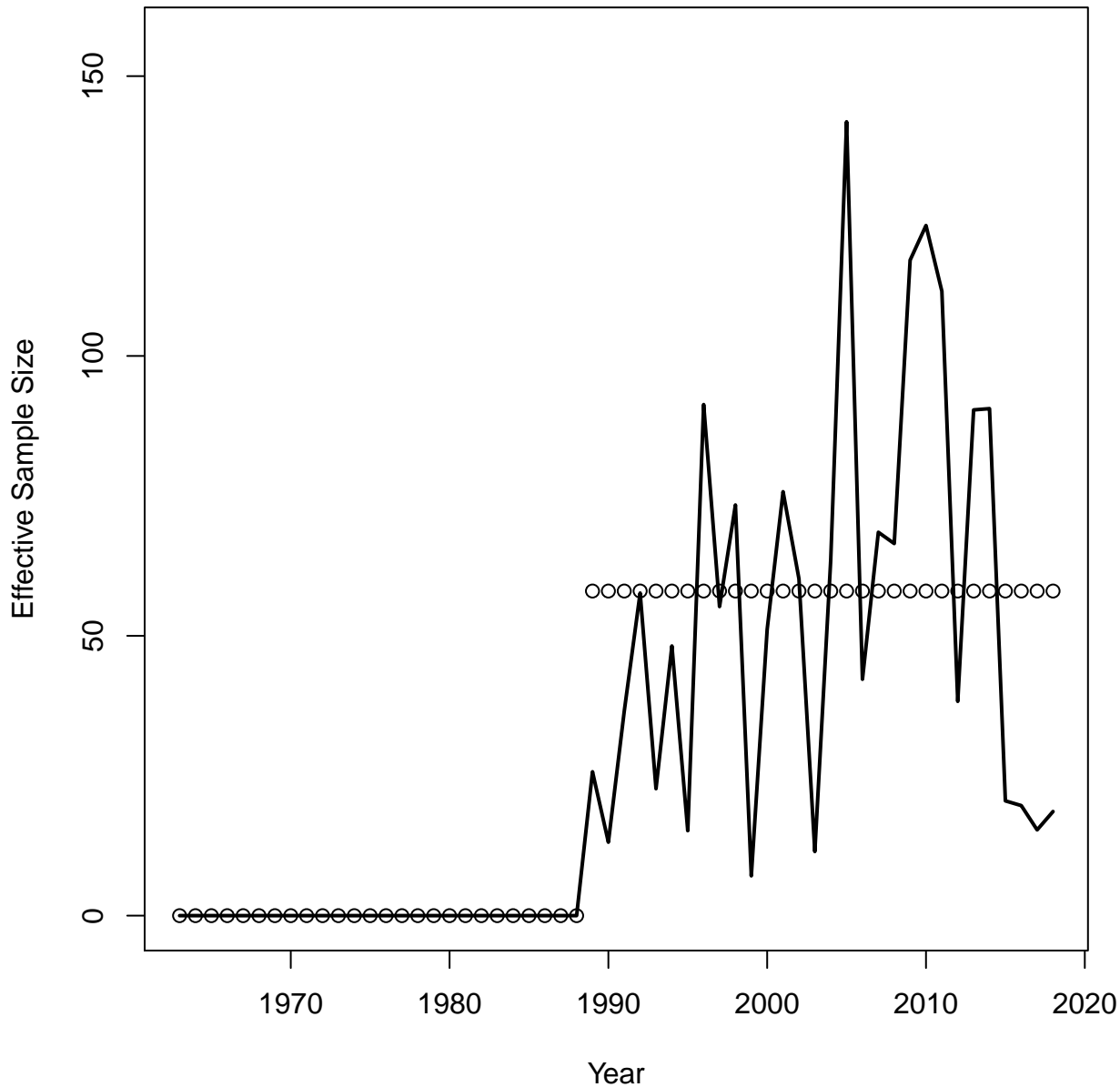


**Catch**

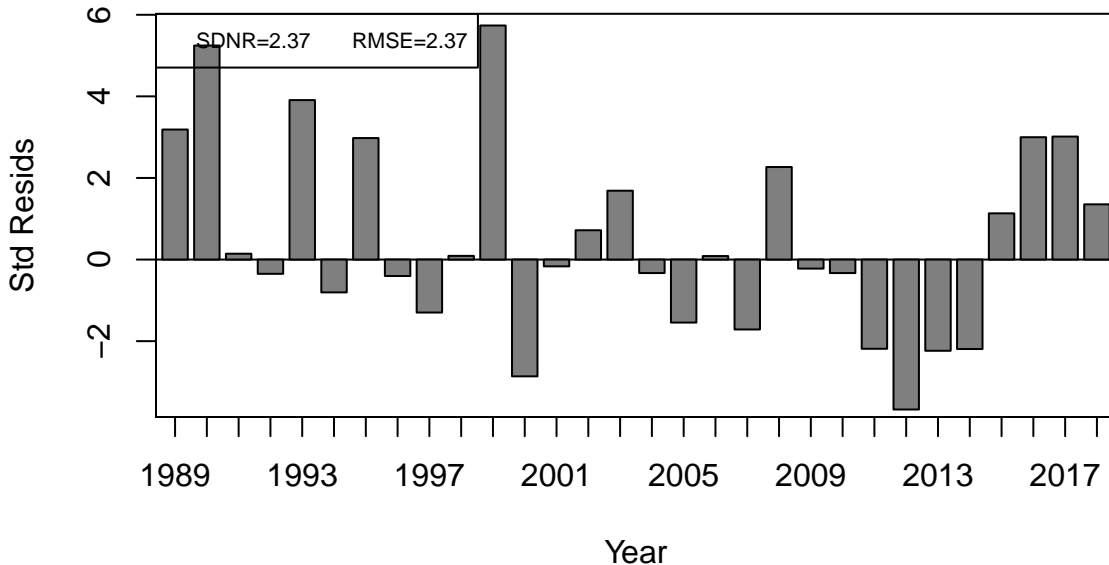
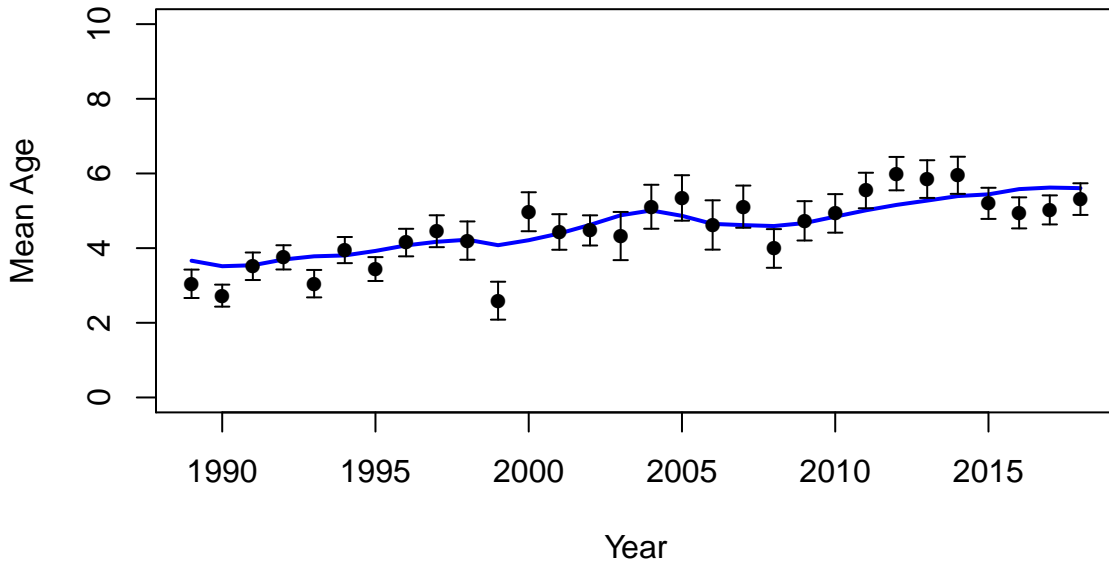
# Age Comp Residuals for Catch by Fleet 1 (FLEET-1)



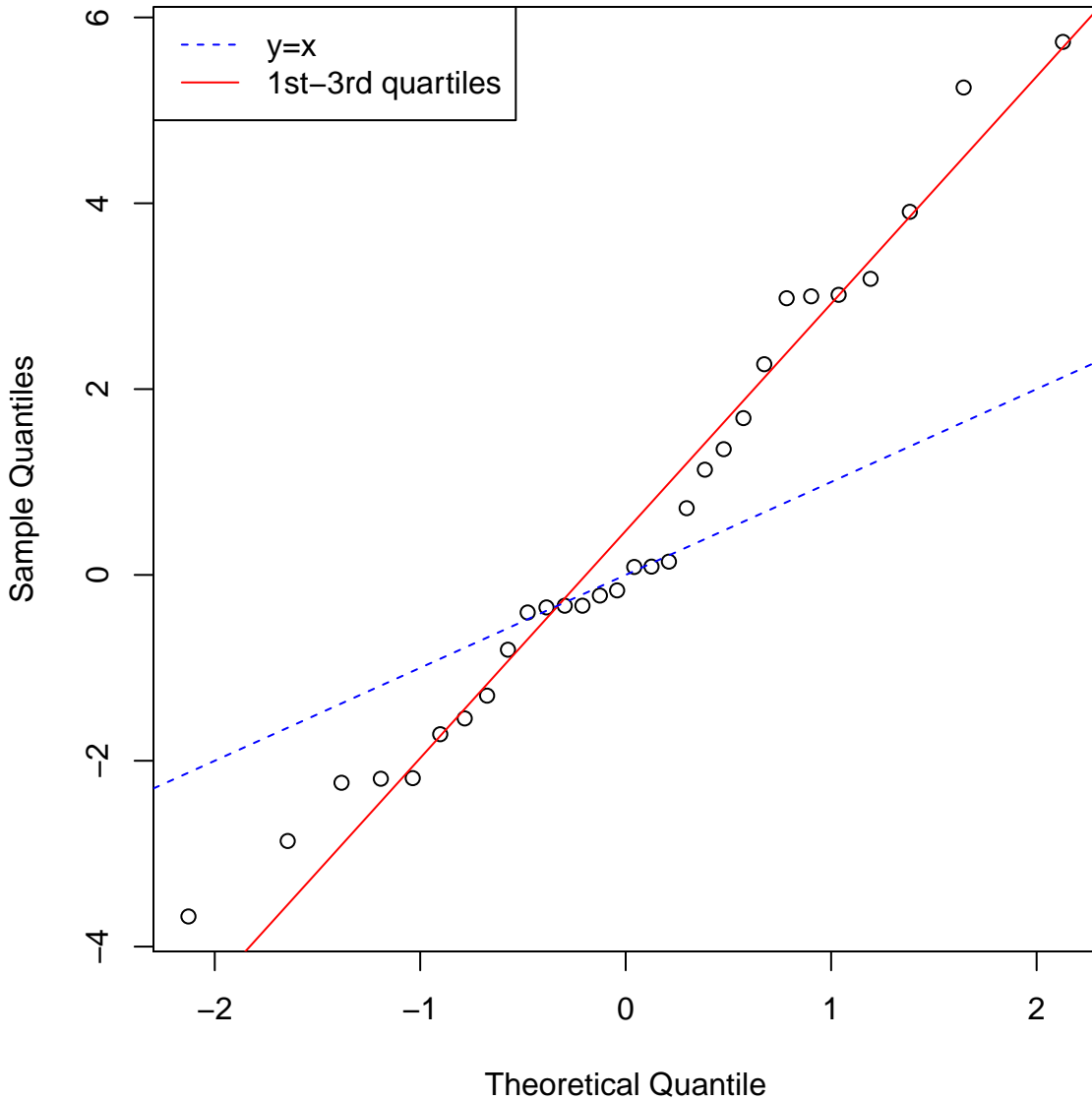
# Catch Neff Fleet 1 (FLEET-1)



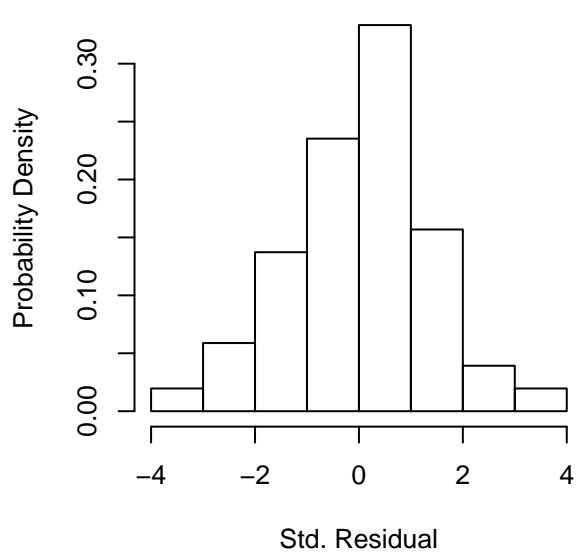
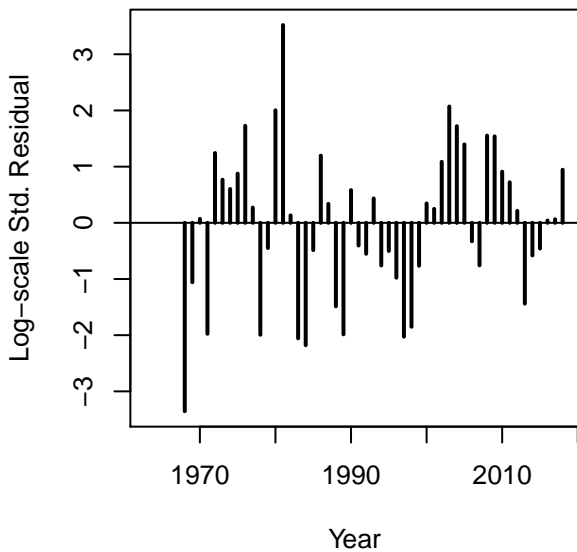
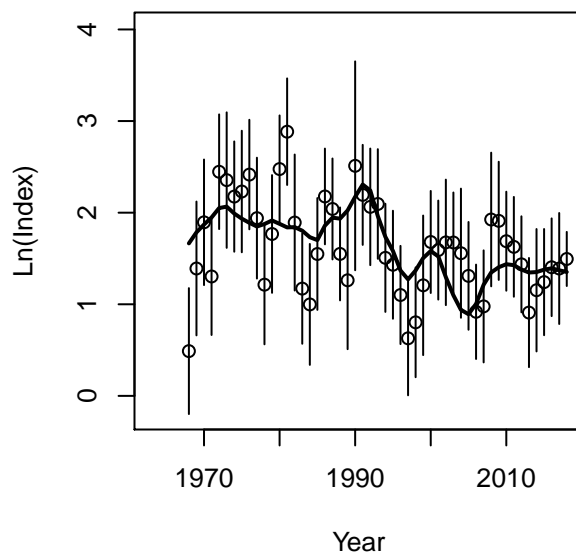
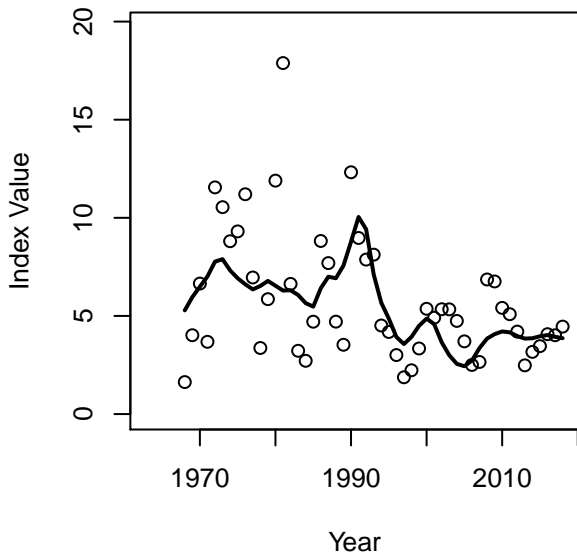
# Catch Fleet 1 (FLEET-1) ESS = 58



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

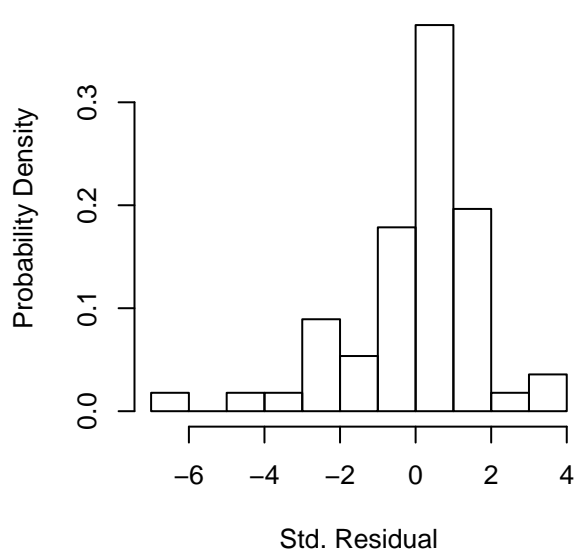
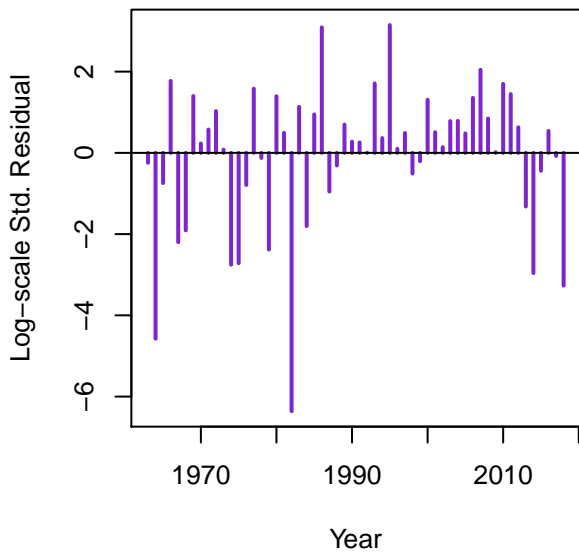
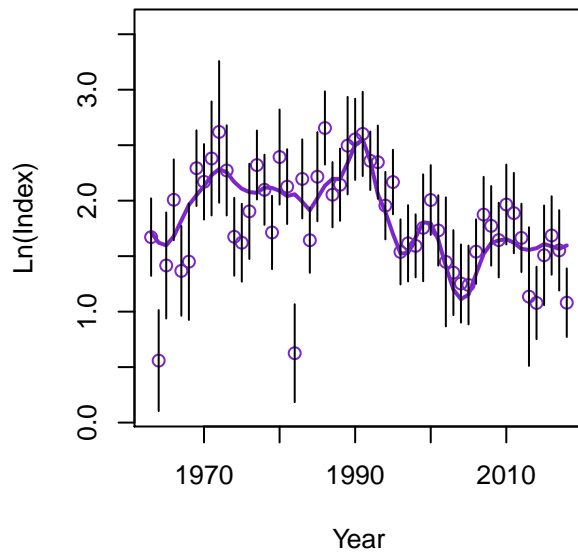
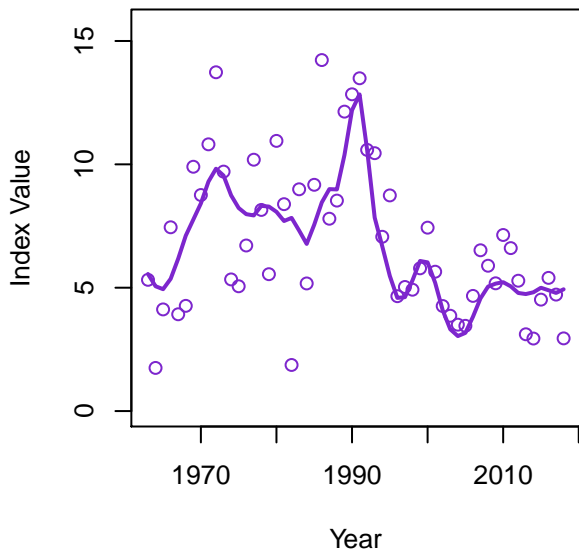


Index 1 (INDEX-1)

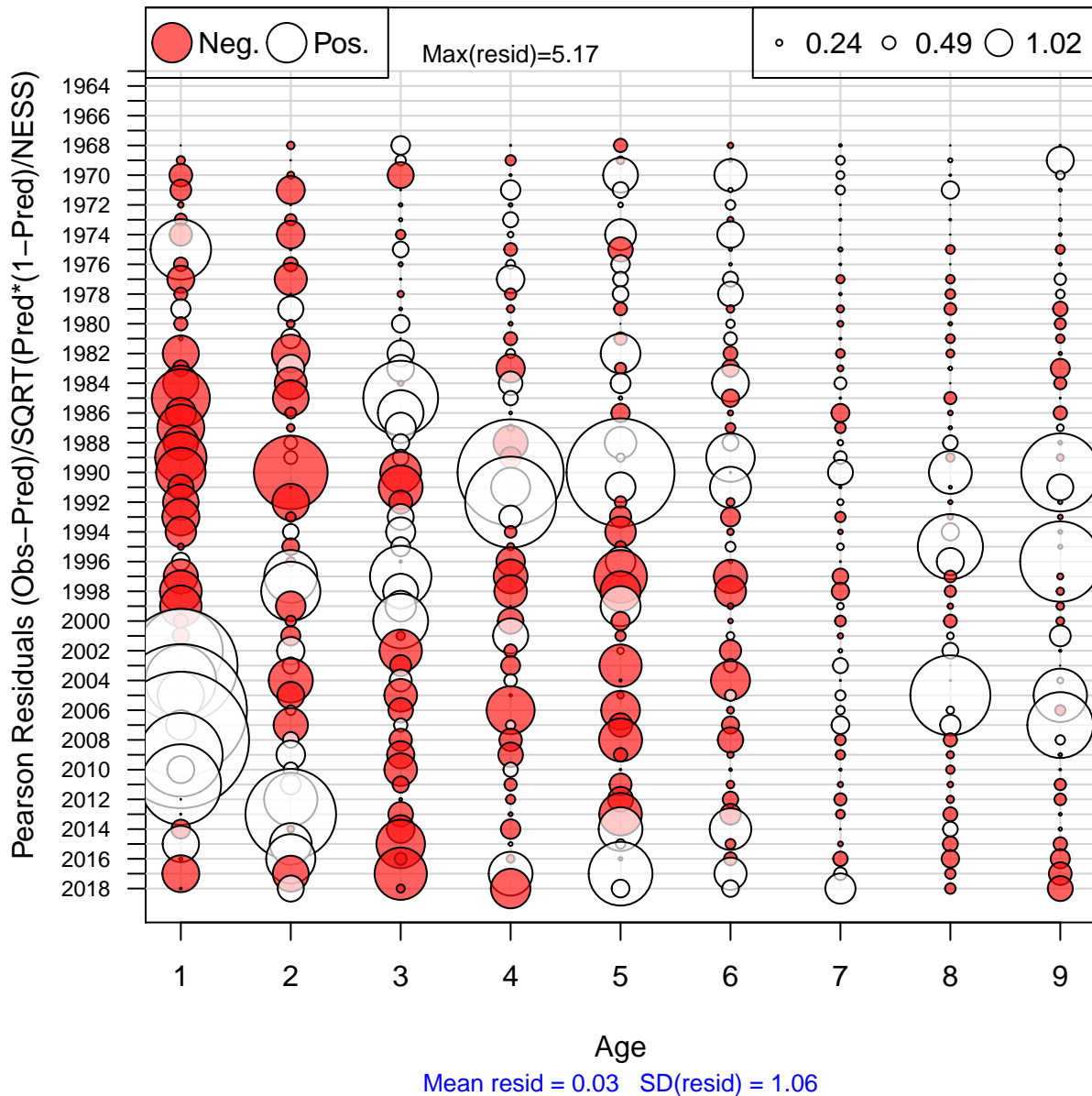




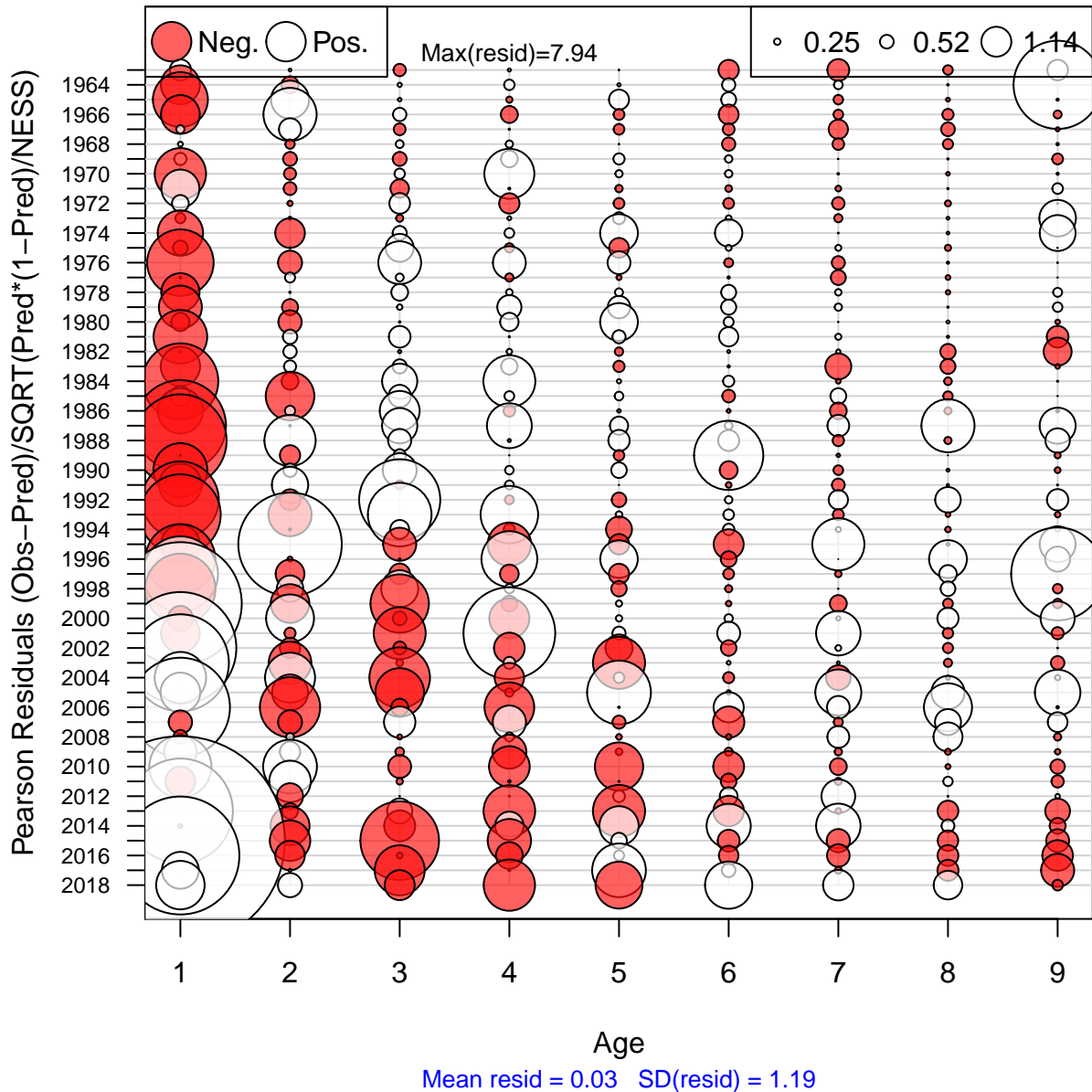
## Index 2 (INDEX-2)



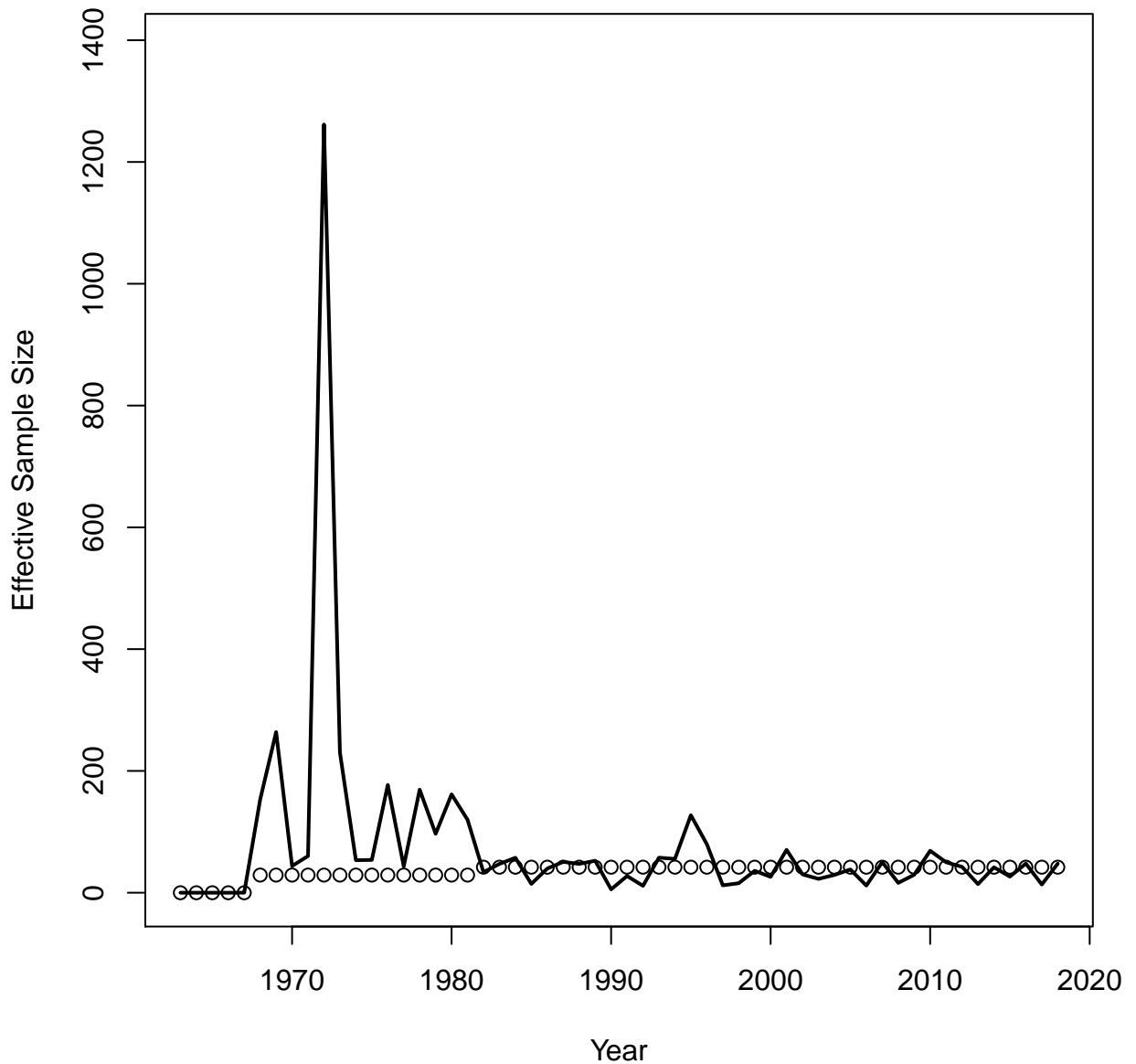
## Age Comp Residuals for Index 1 (INDEX-1)



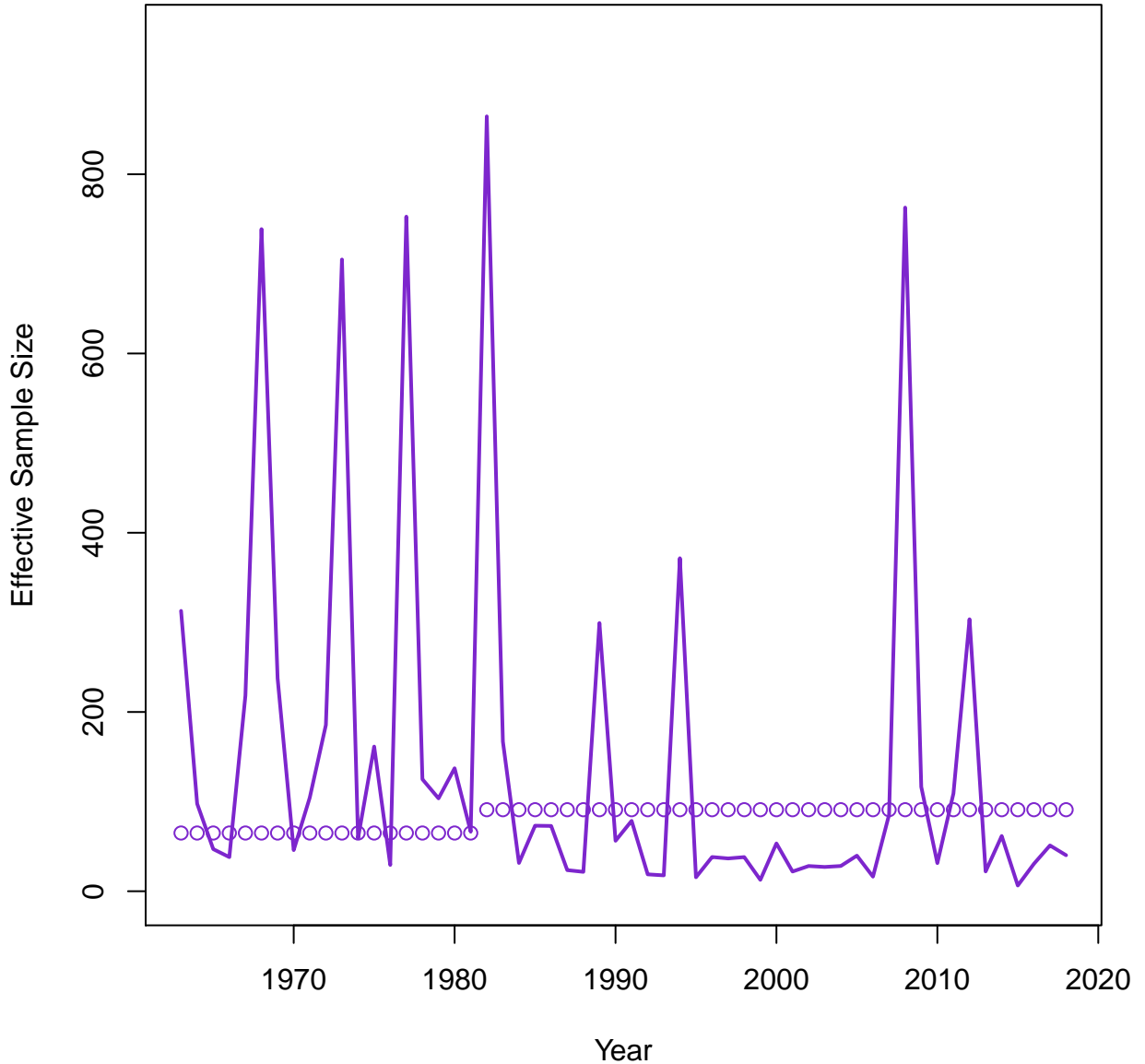
## Age Comp Residuals for Index 2 (INDEX-2)



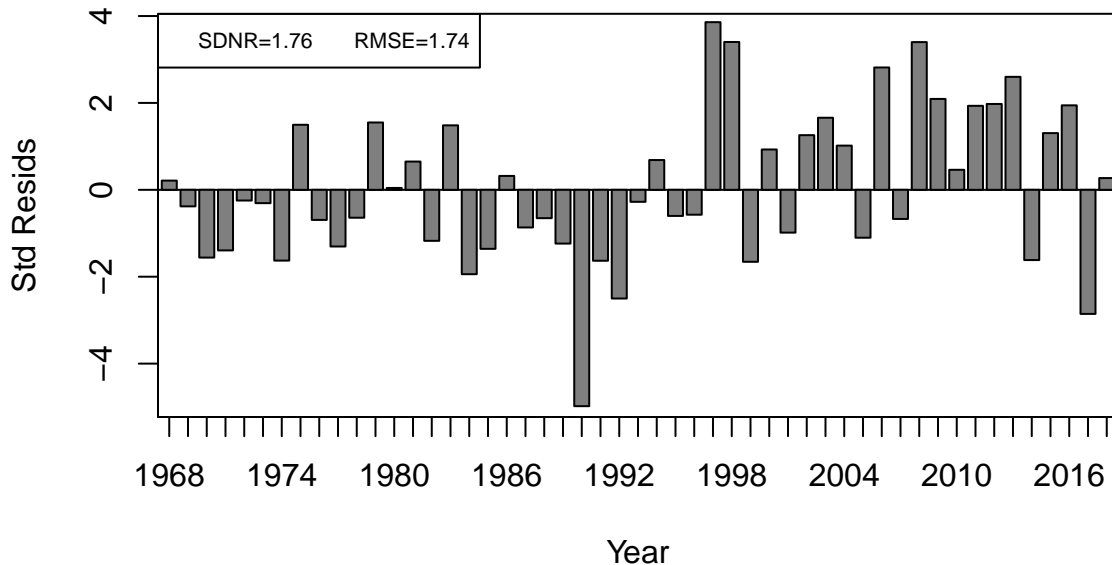
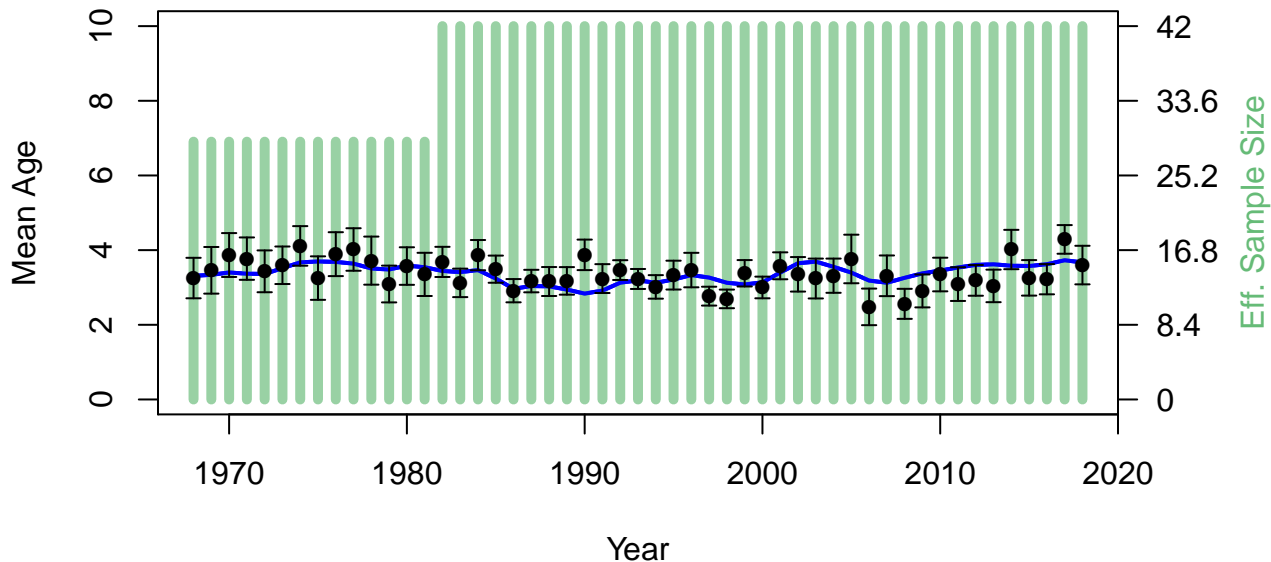
# Index Neff 1 (INDEX-1)



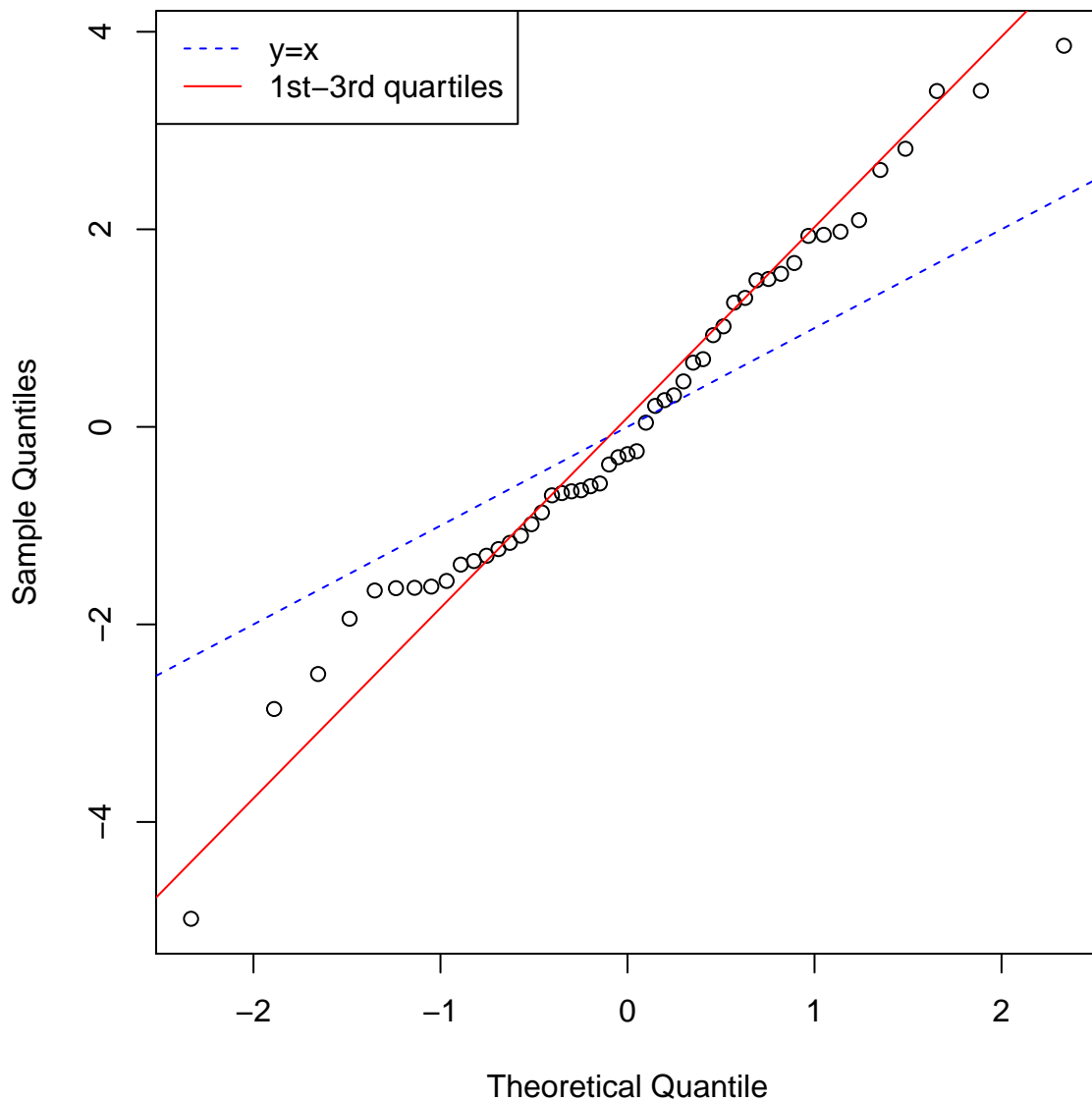
## Index Neff 2 (INDEX-2)



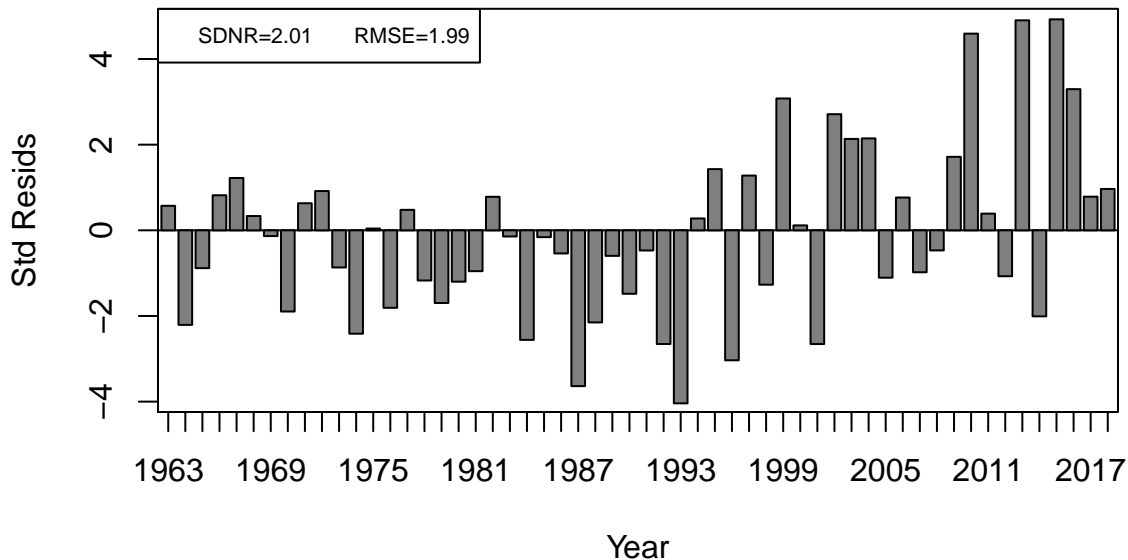
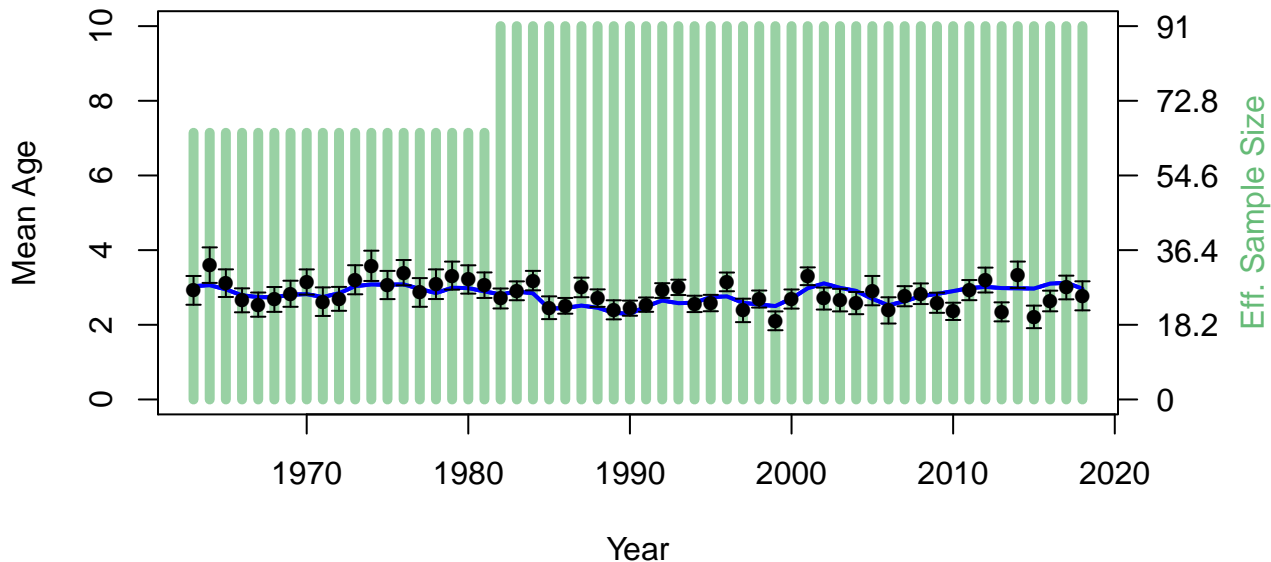
Index 1 (INDEX-1)



# Index 1 (INDEX-1)

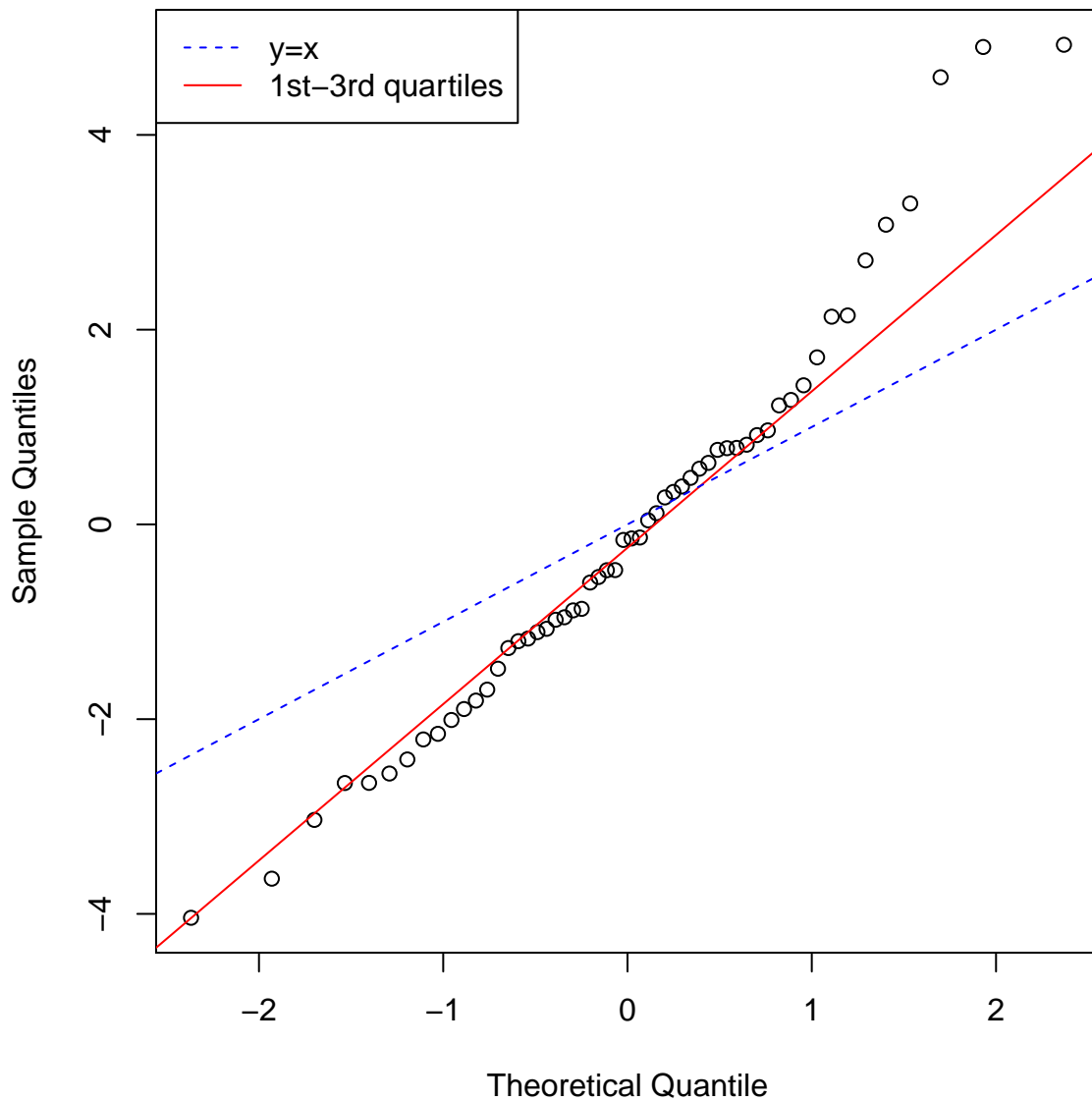


## Index 2 (INDEX-2)

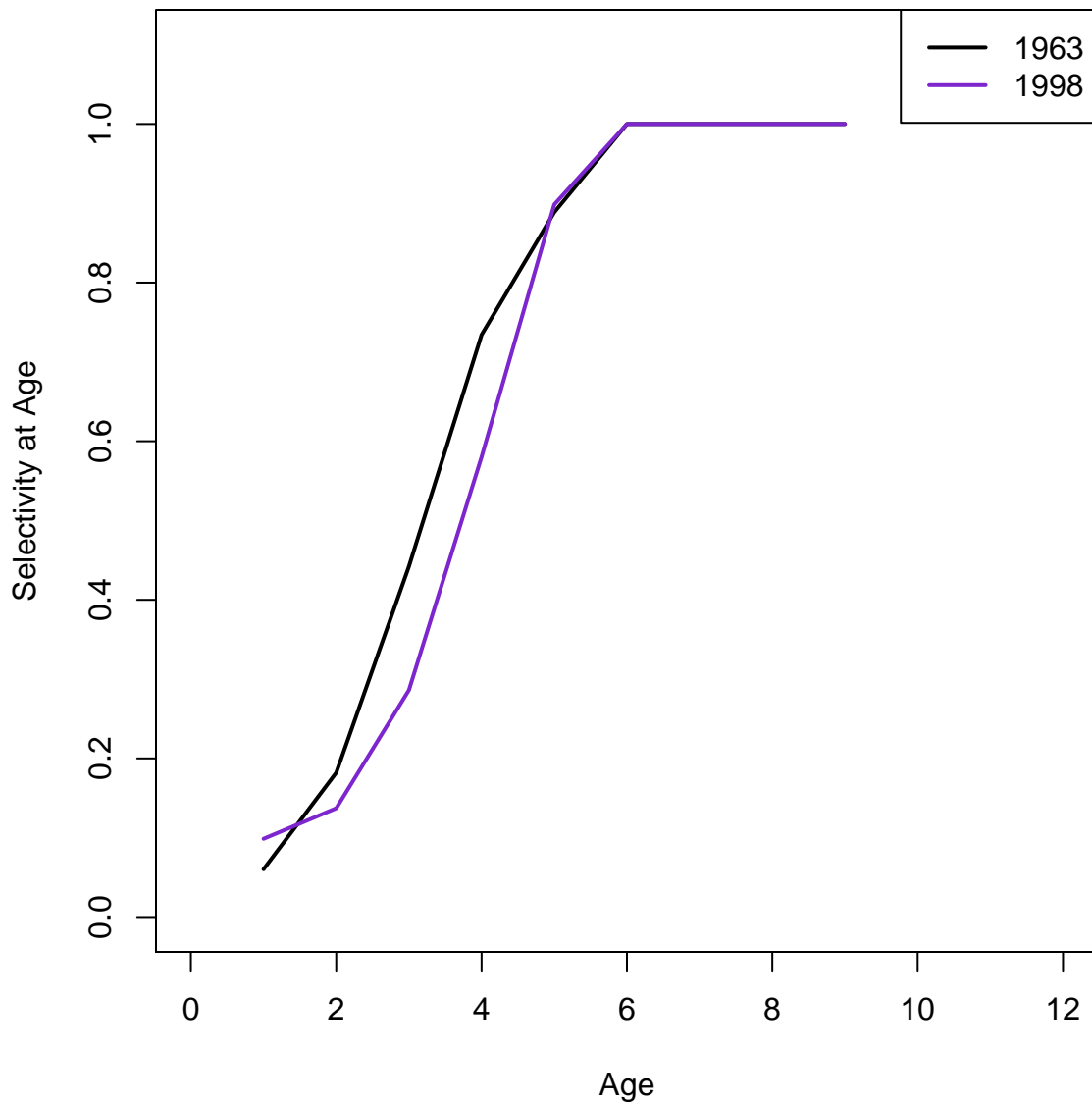


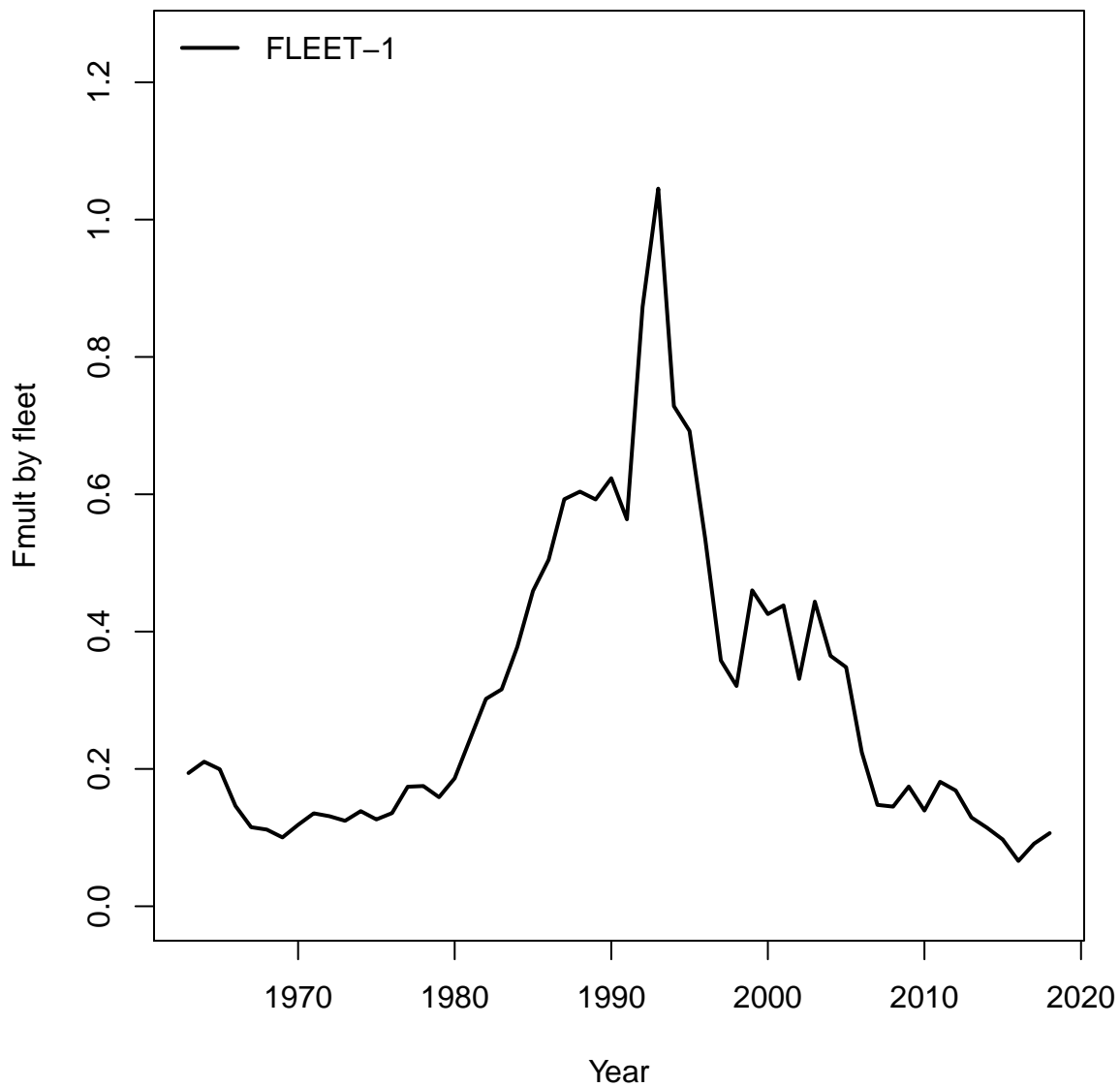


## Index 2 (INDEX-2)

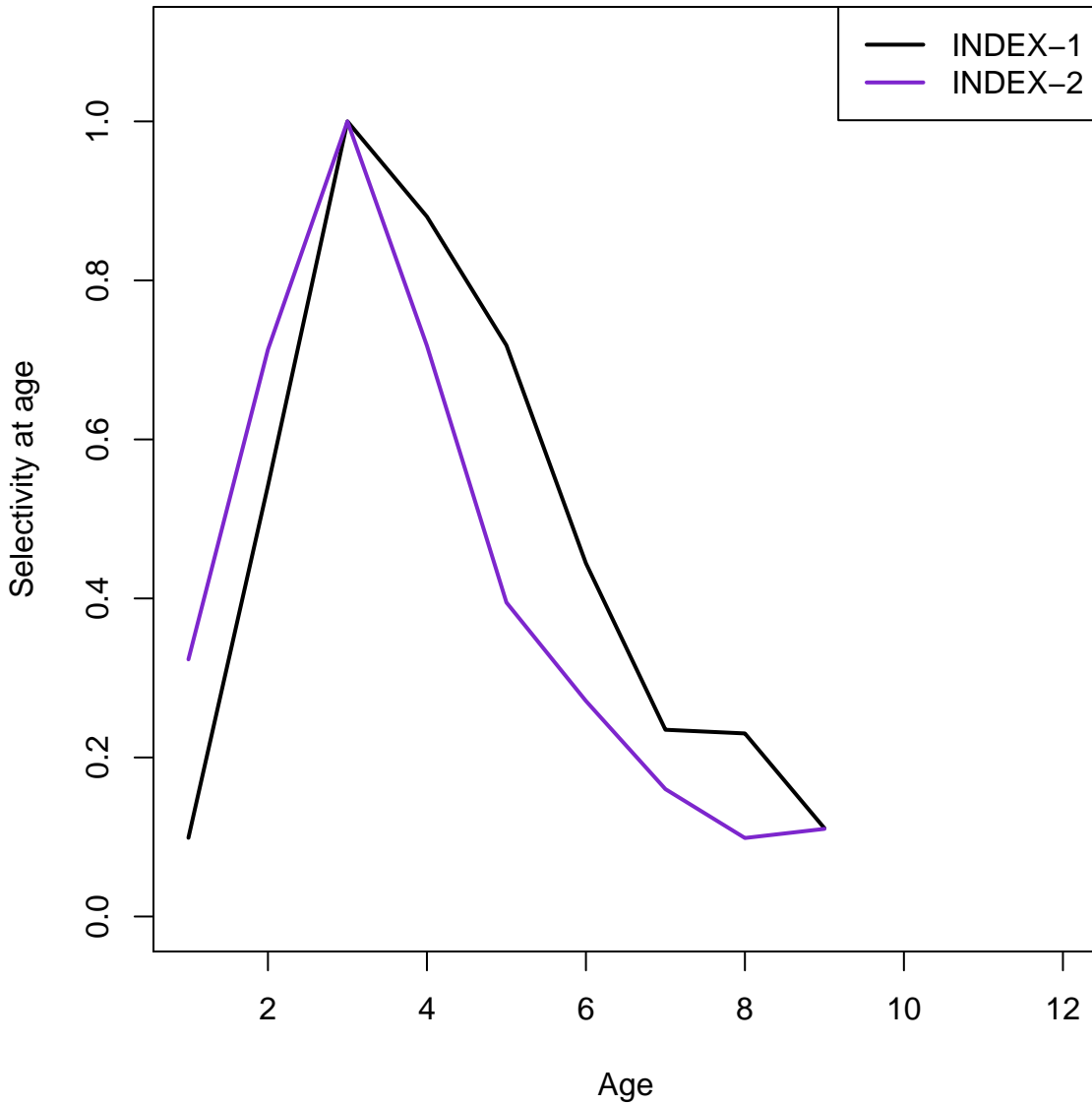


# Fleet 1 (FLEET-1)





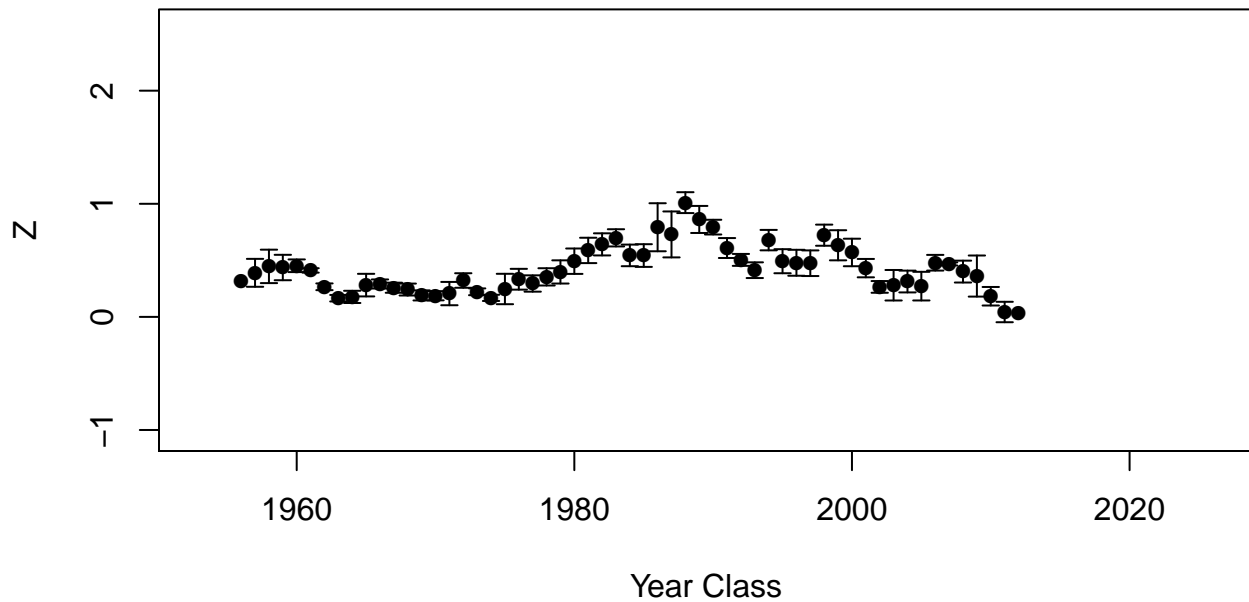
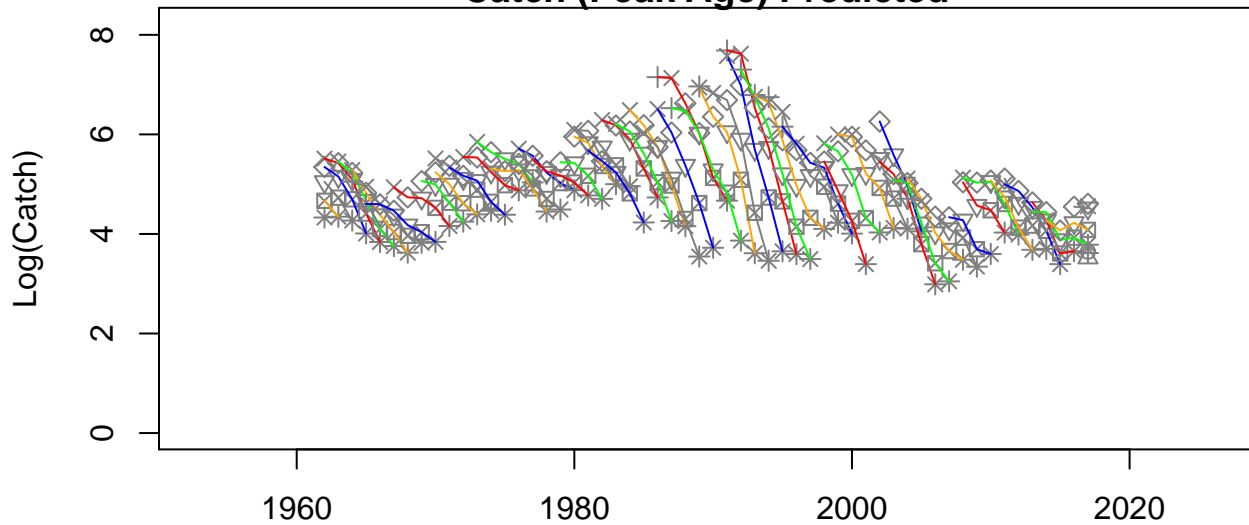
# Indices



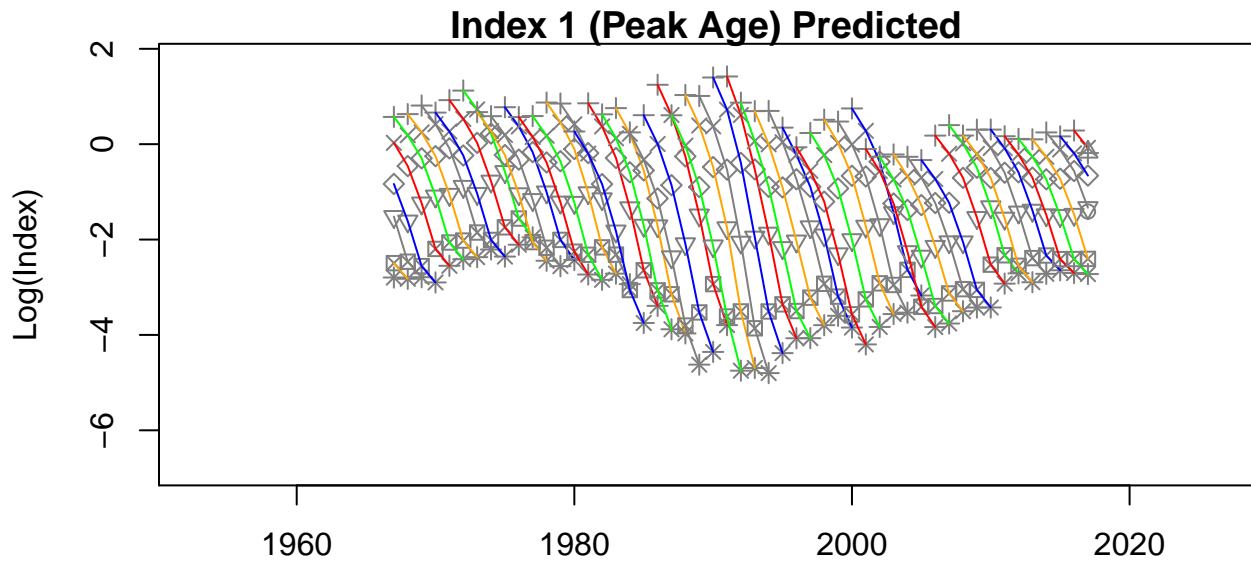
**Catch (Peak Age) Observed**



**Catch (Peak Age) Predicted**

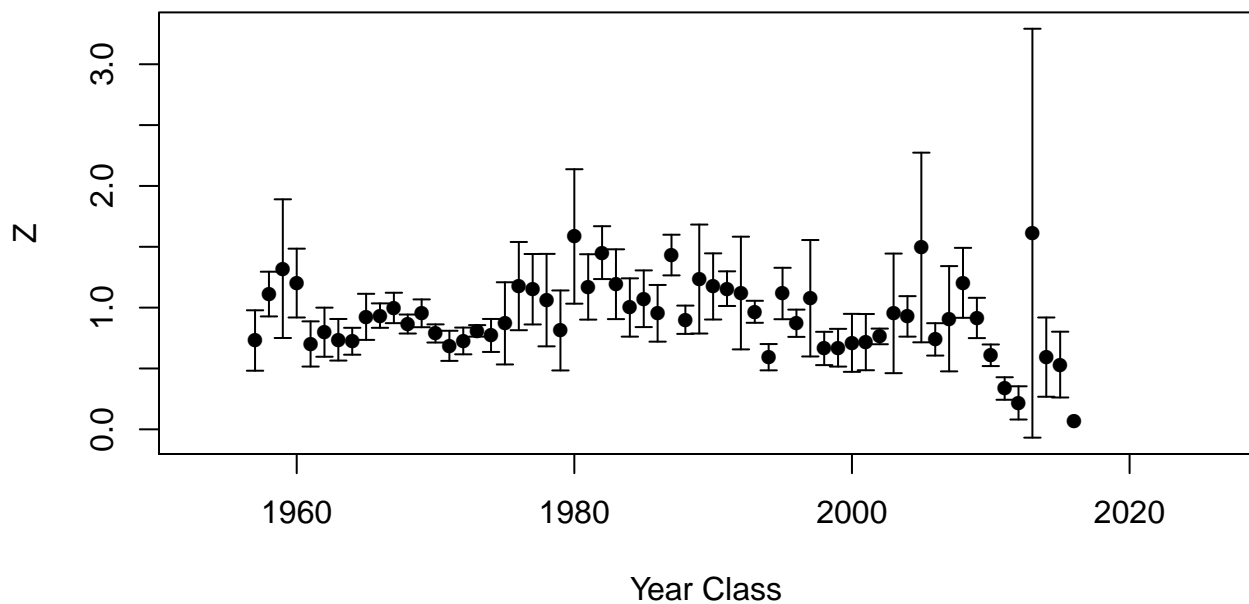




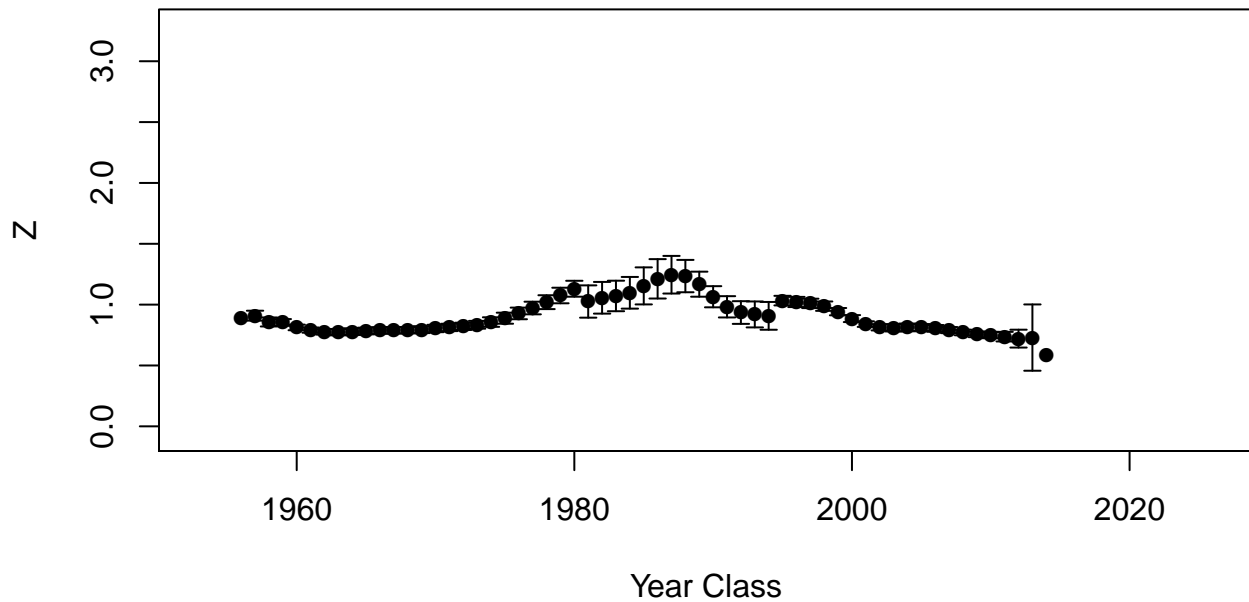
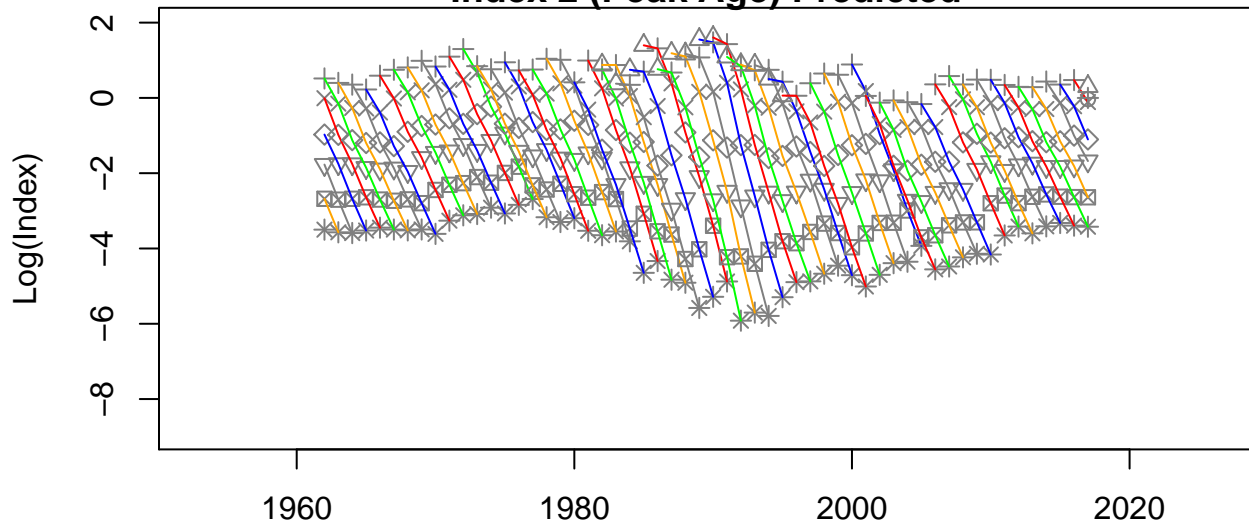




**Index 2 (Peak Age) Observed**



**Index 2 (Peak Age) Predicted**



# Catch Observed

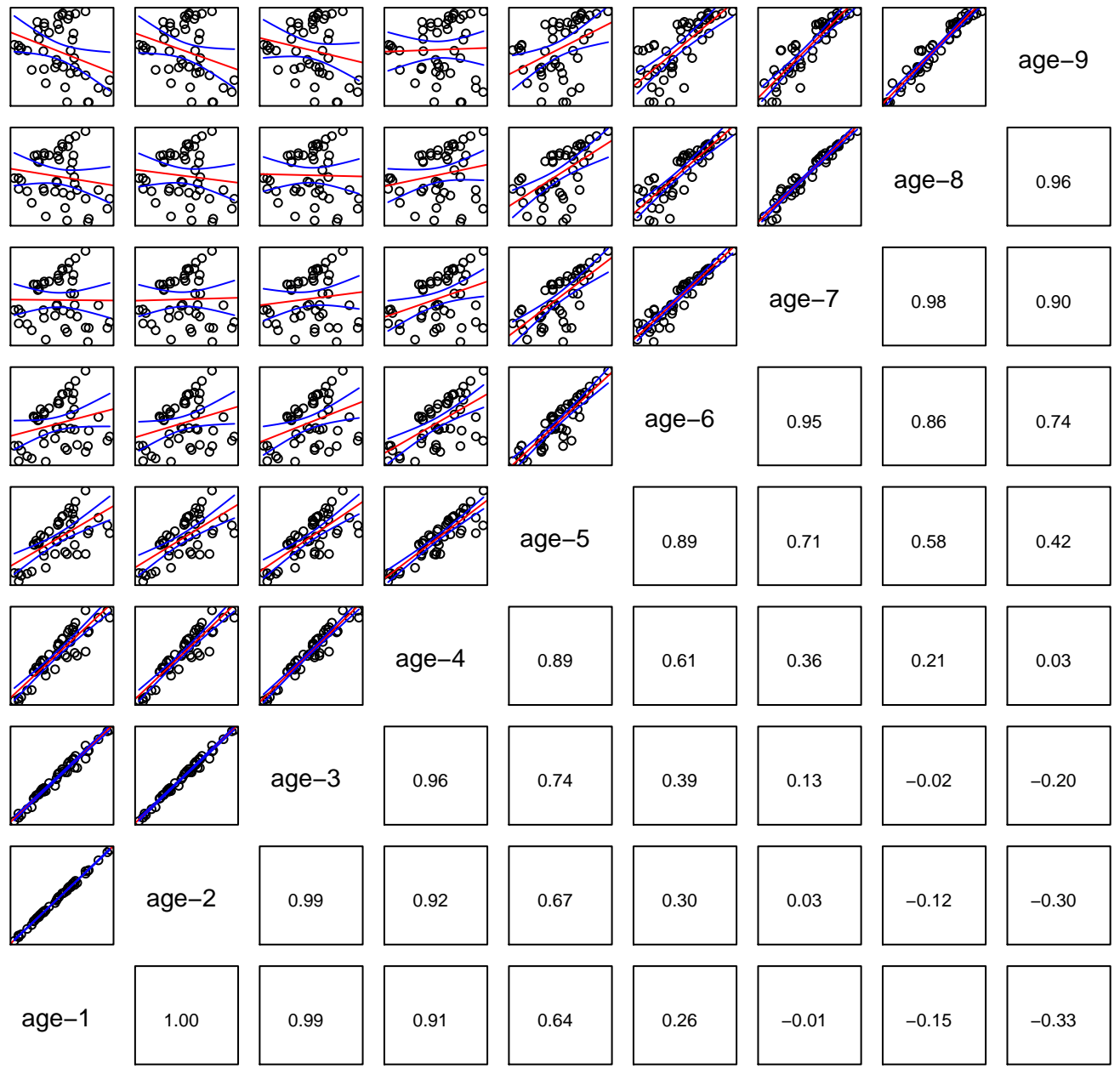




Index 1 (INDEX-1) Observed

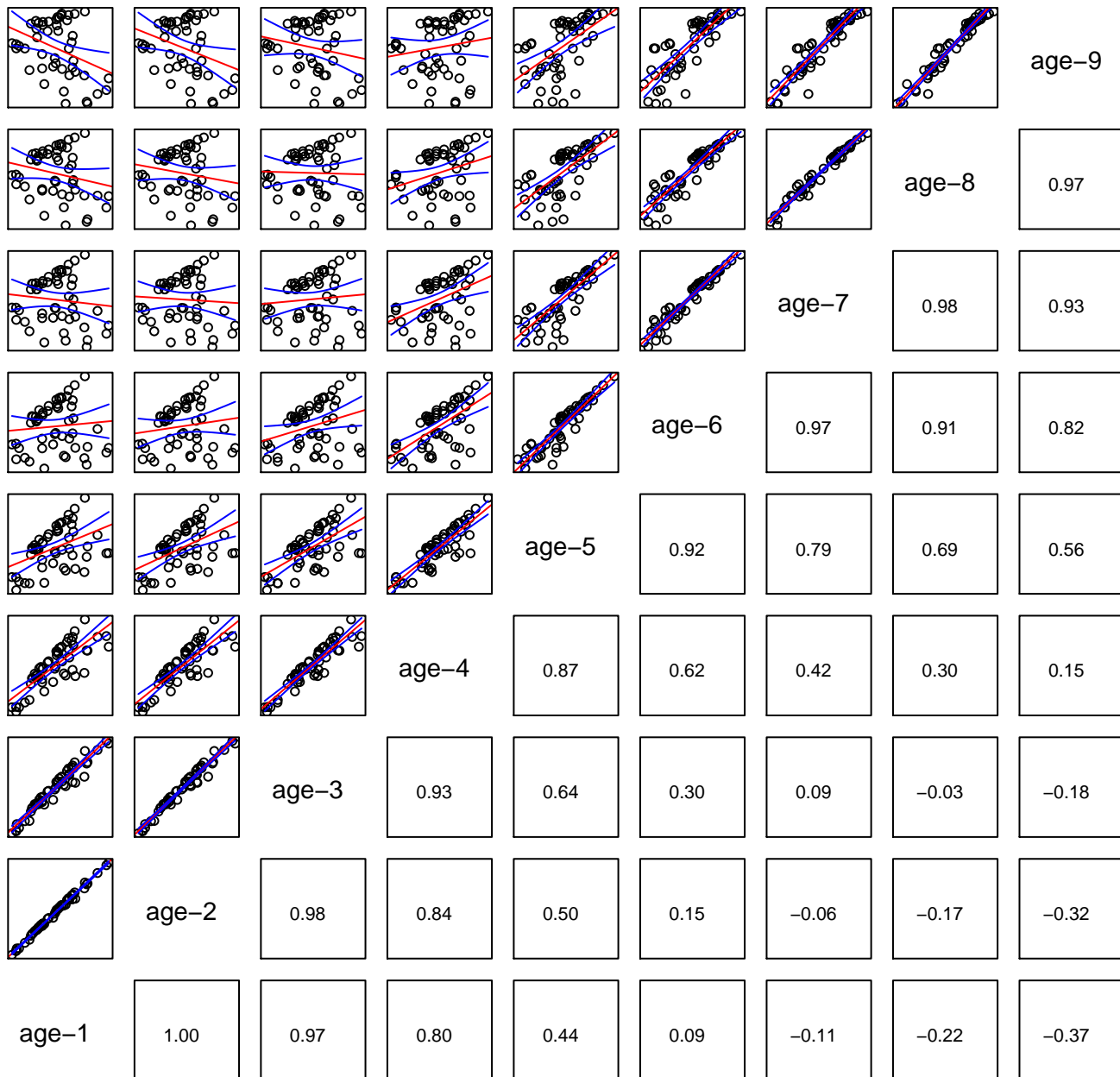


Index 1 (INDEX-1) Predicted									
							age-9		
							age-8	0.96	
						age-7	0.98	0.90	
					age-6	0.95	0.86	0.74	
				age-5	0.89	0.71	0.58	0.42	
			age-4	0.89	0.61	0.36	0.21	0.03	
		age-3	0.96	0.74	0.39	0.13	-0.02	-0.20	
	age-2	0.99	0.92	0.67	0.30	0.03	-0.12	-0.30	
age-1	1.00	0.99	0.91	0.64	0.26	-0.01	-0.15	-0.33	

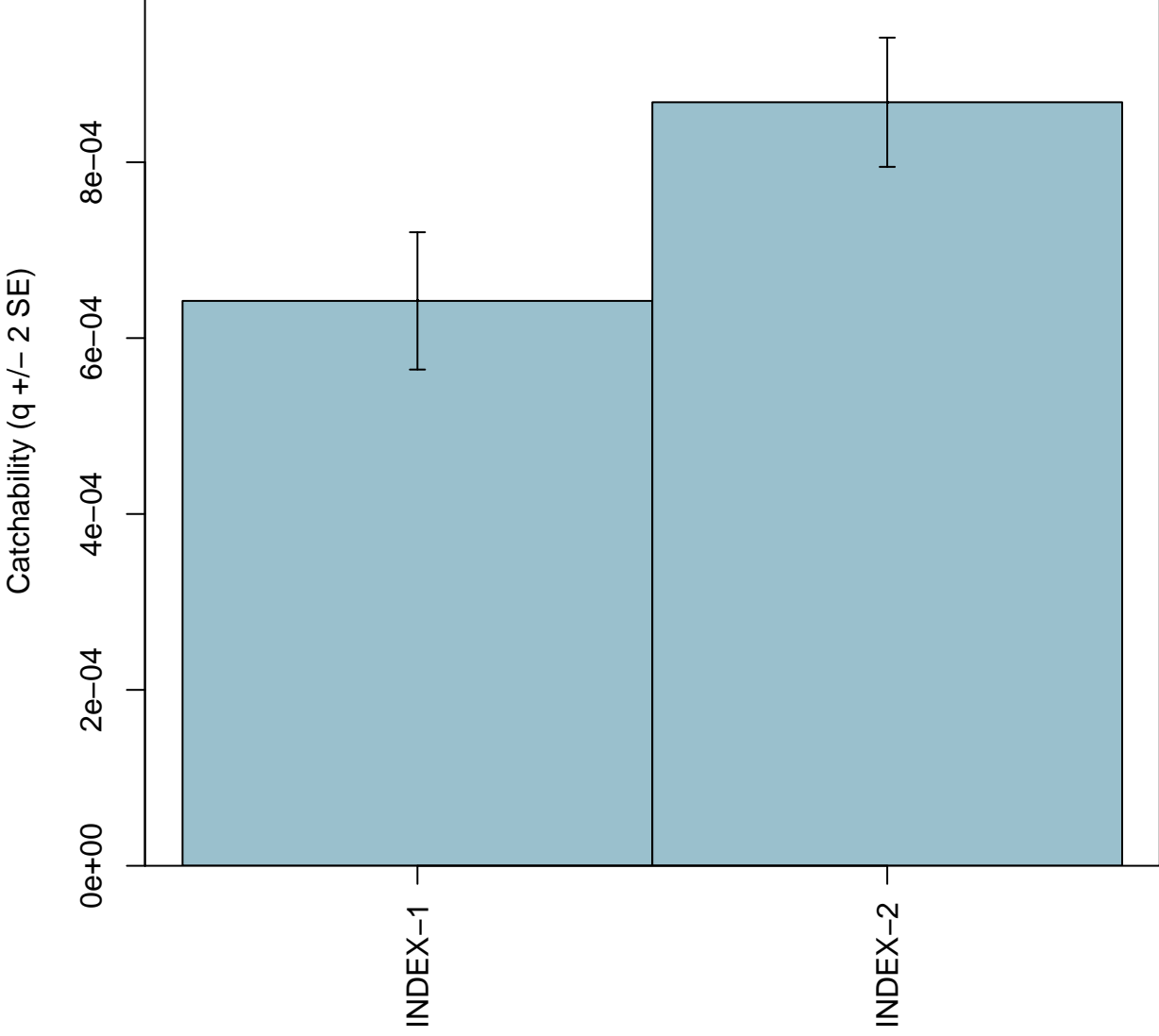


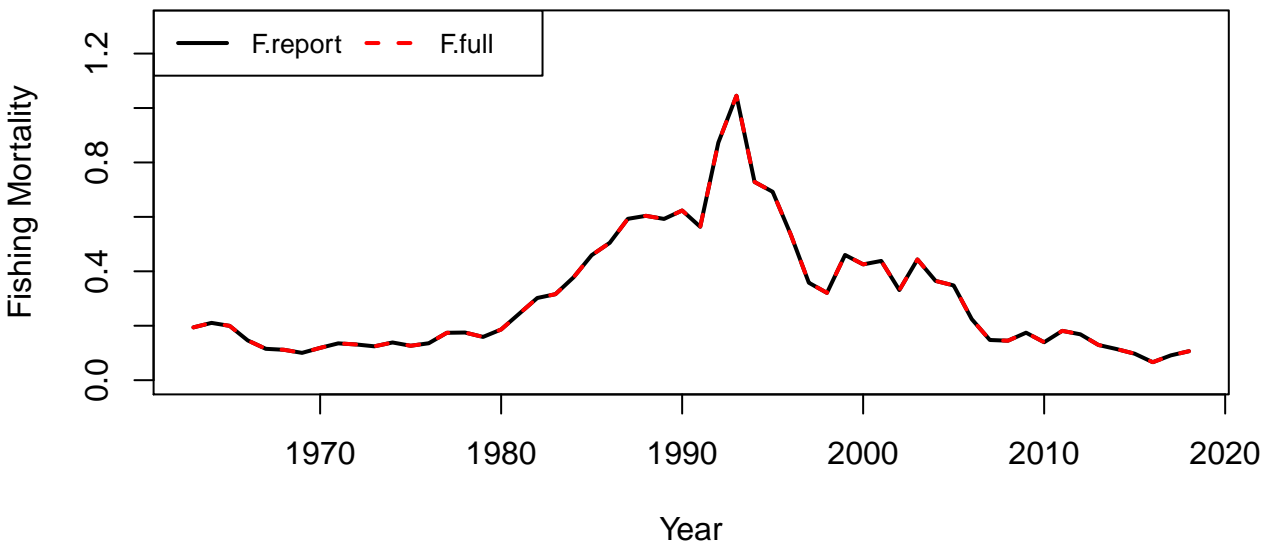
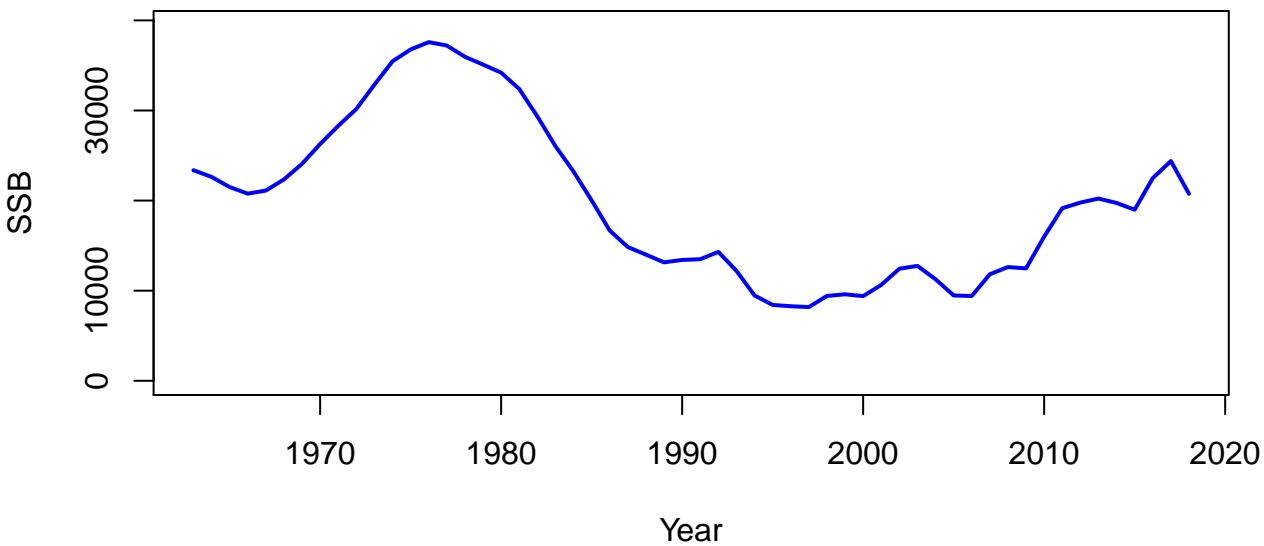


Index 2 (INDEX-2) Predicted

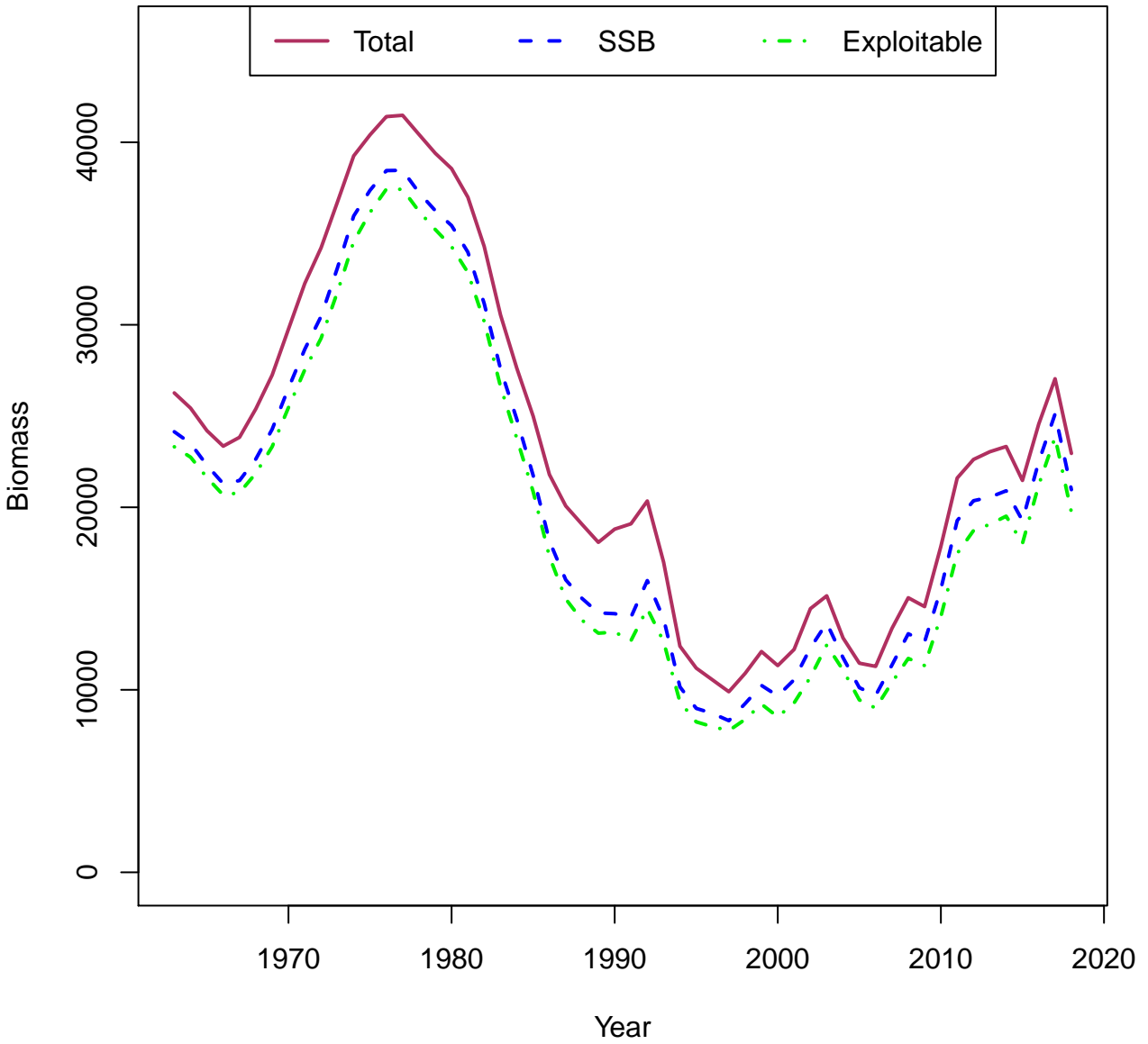




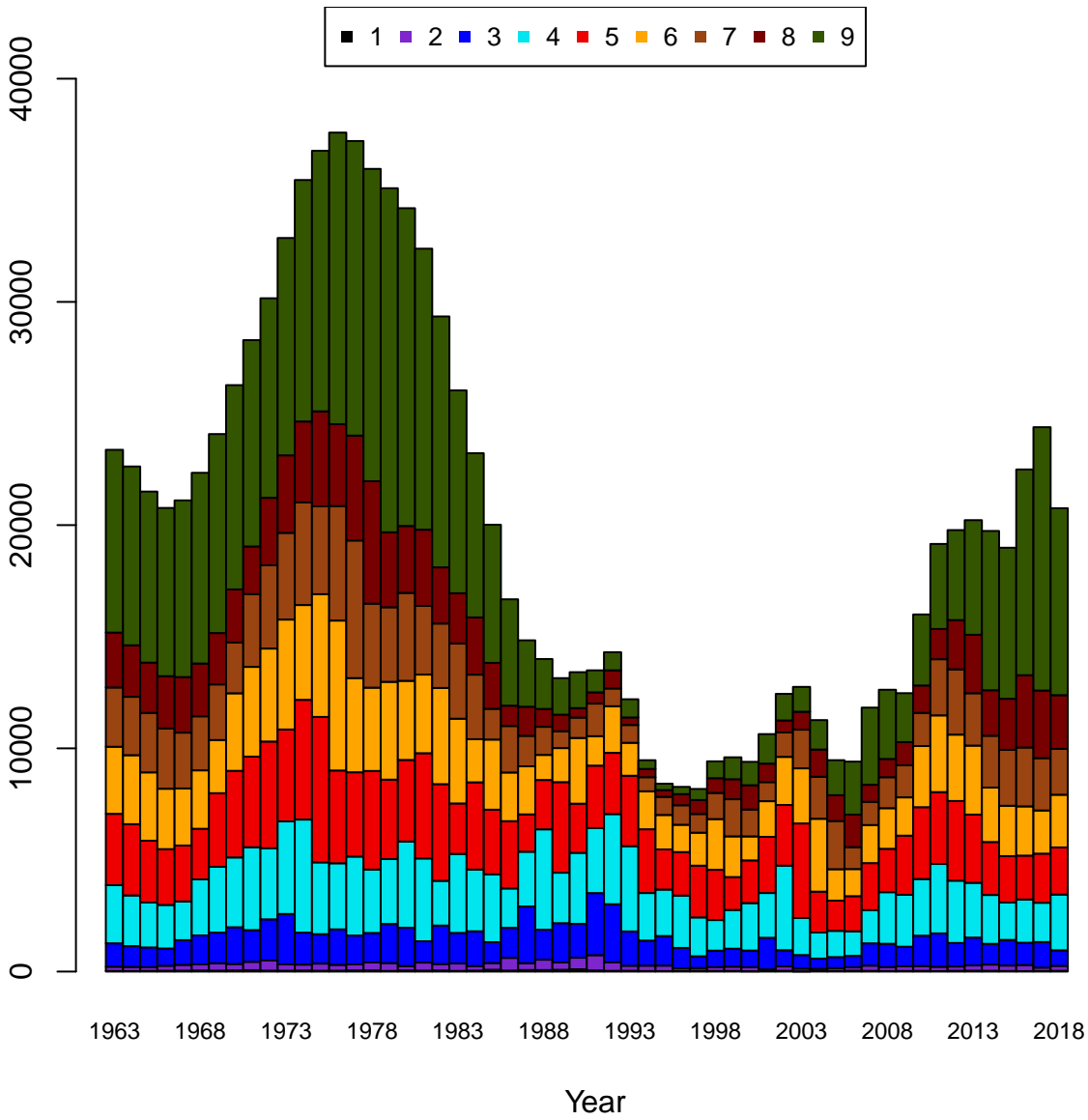


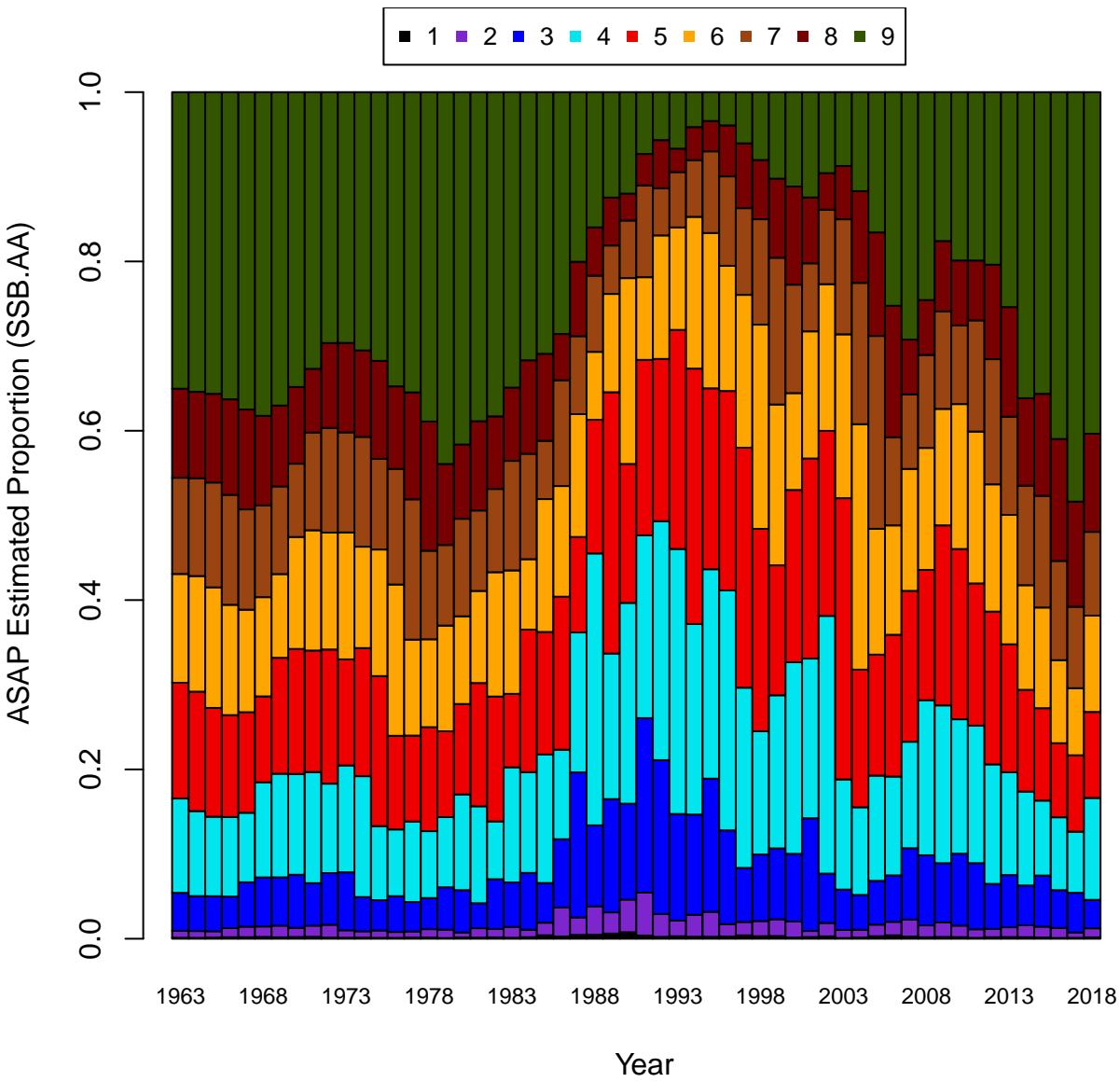


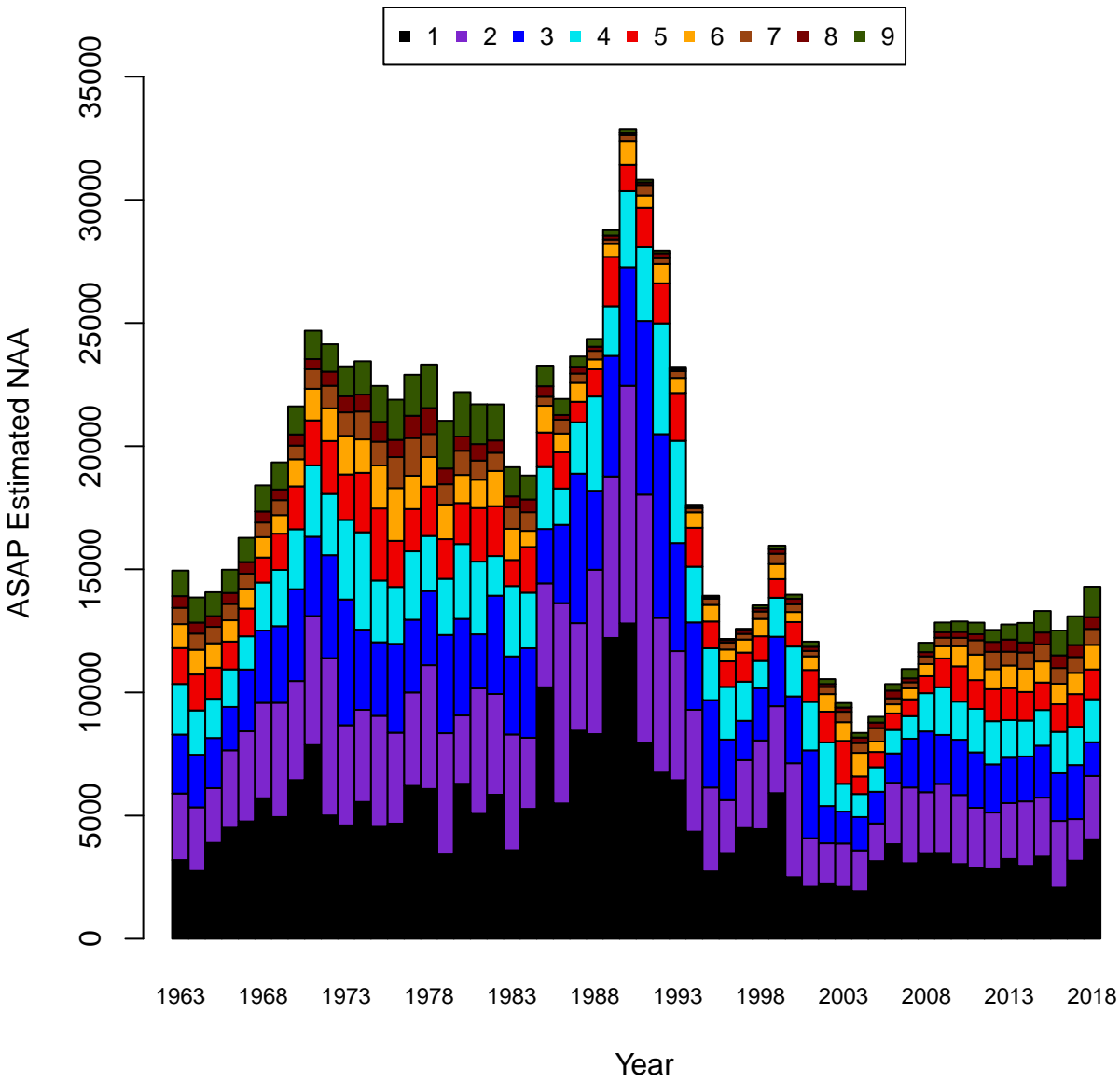
**Comparison of January 1 Biomass**

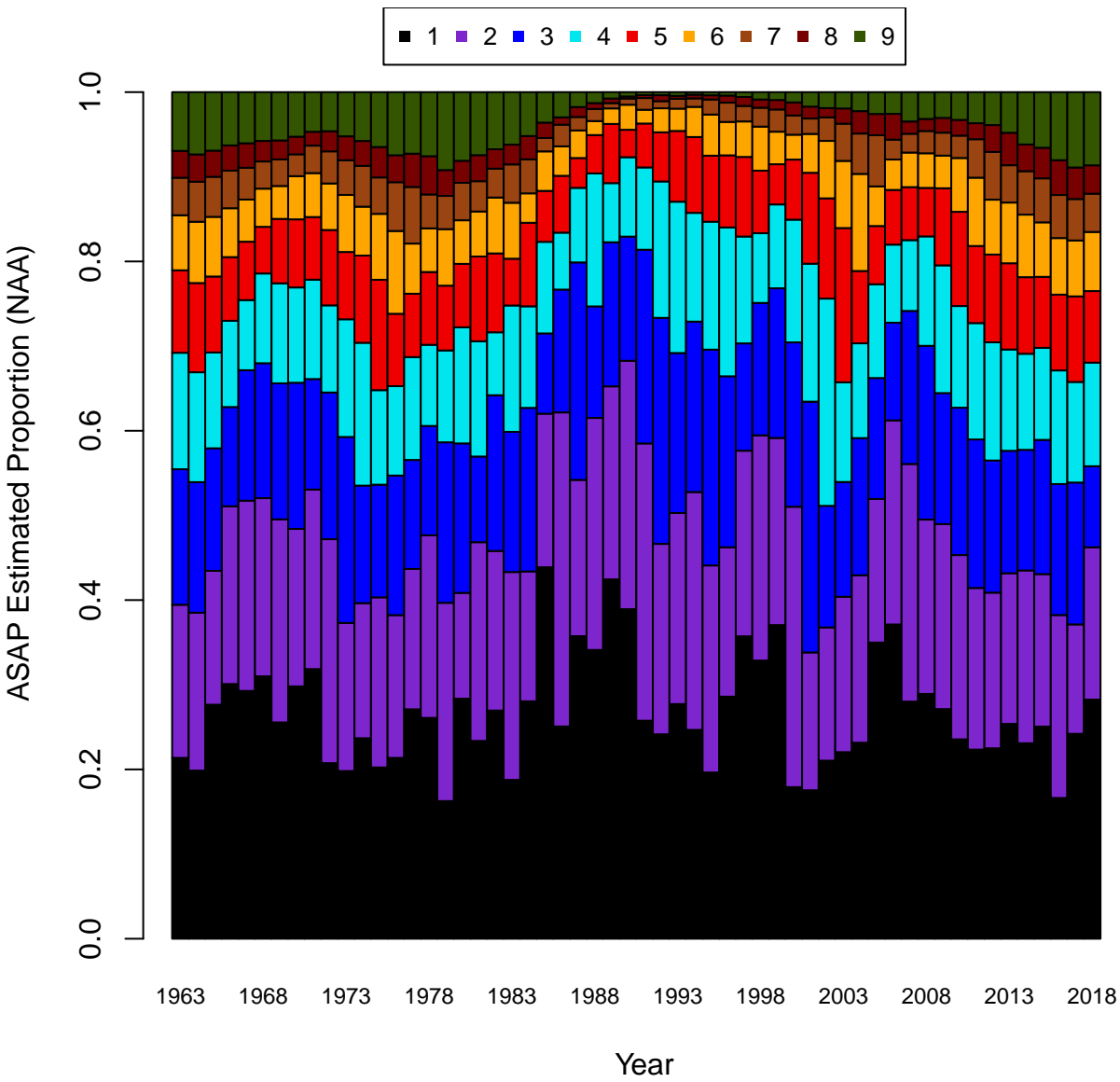


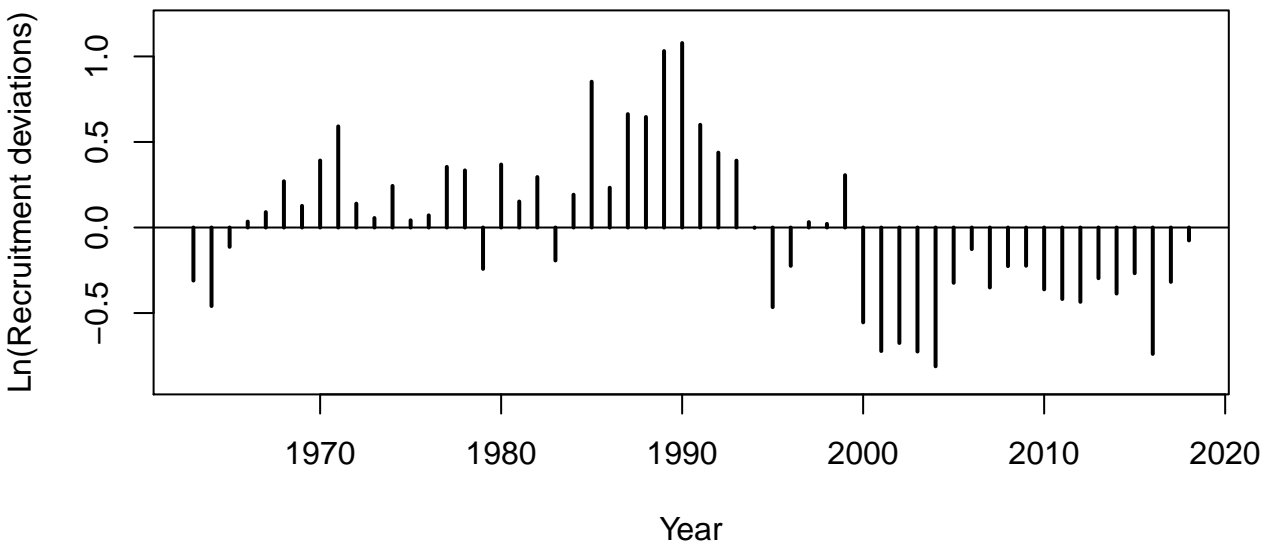
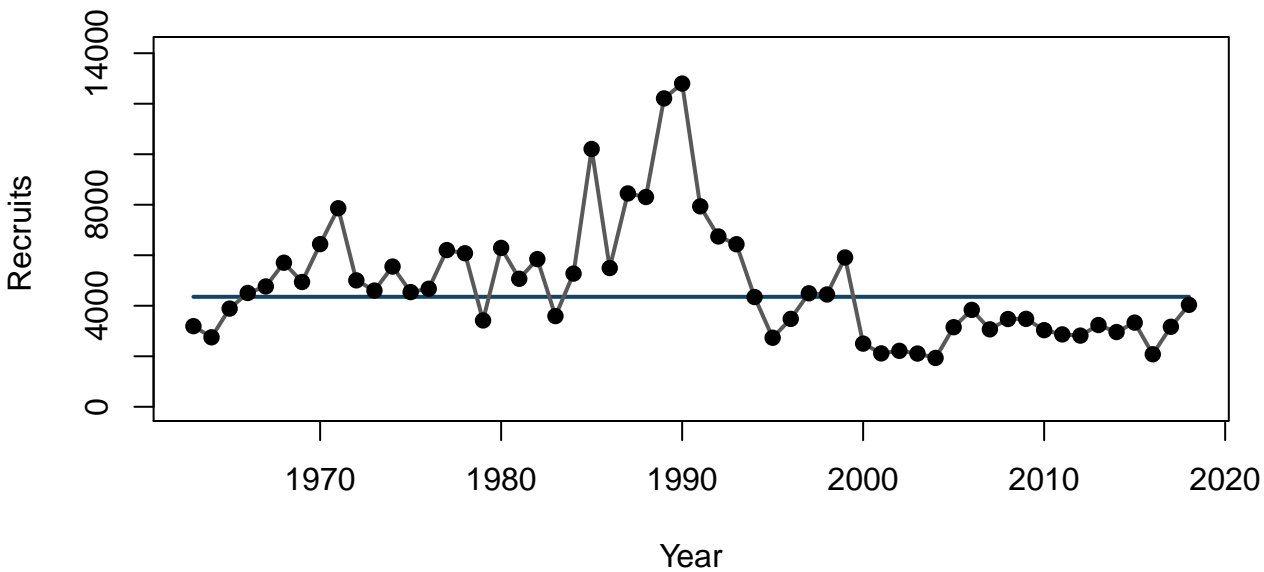
ASAP Estimated SSB.AA



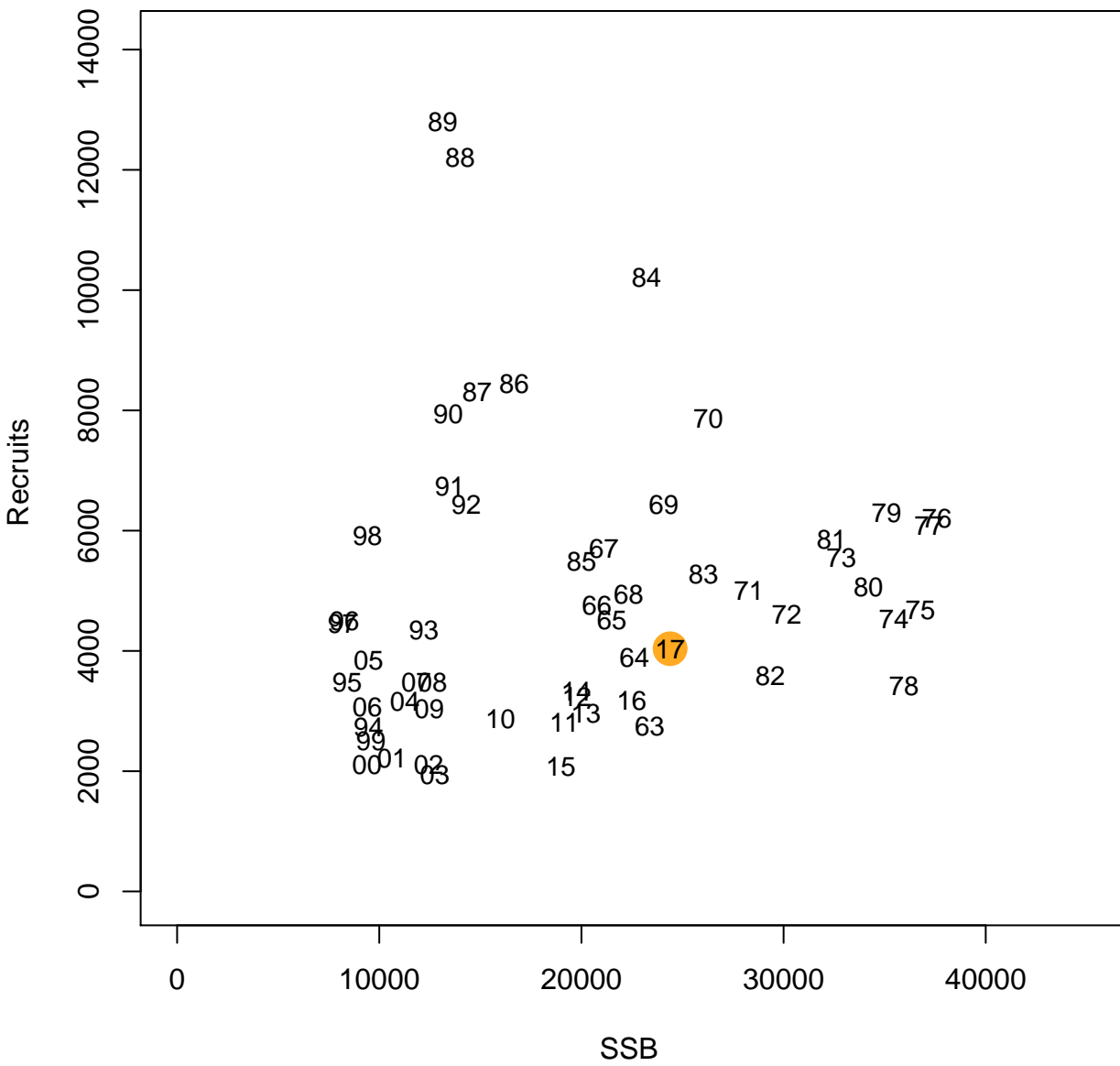


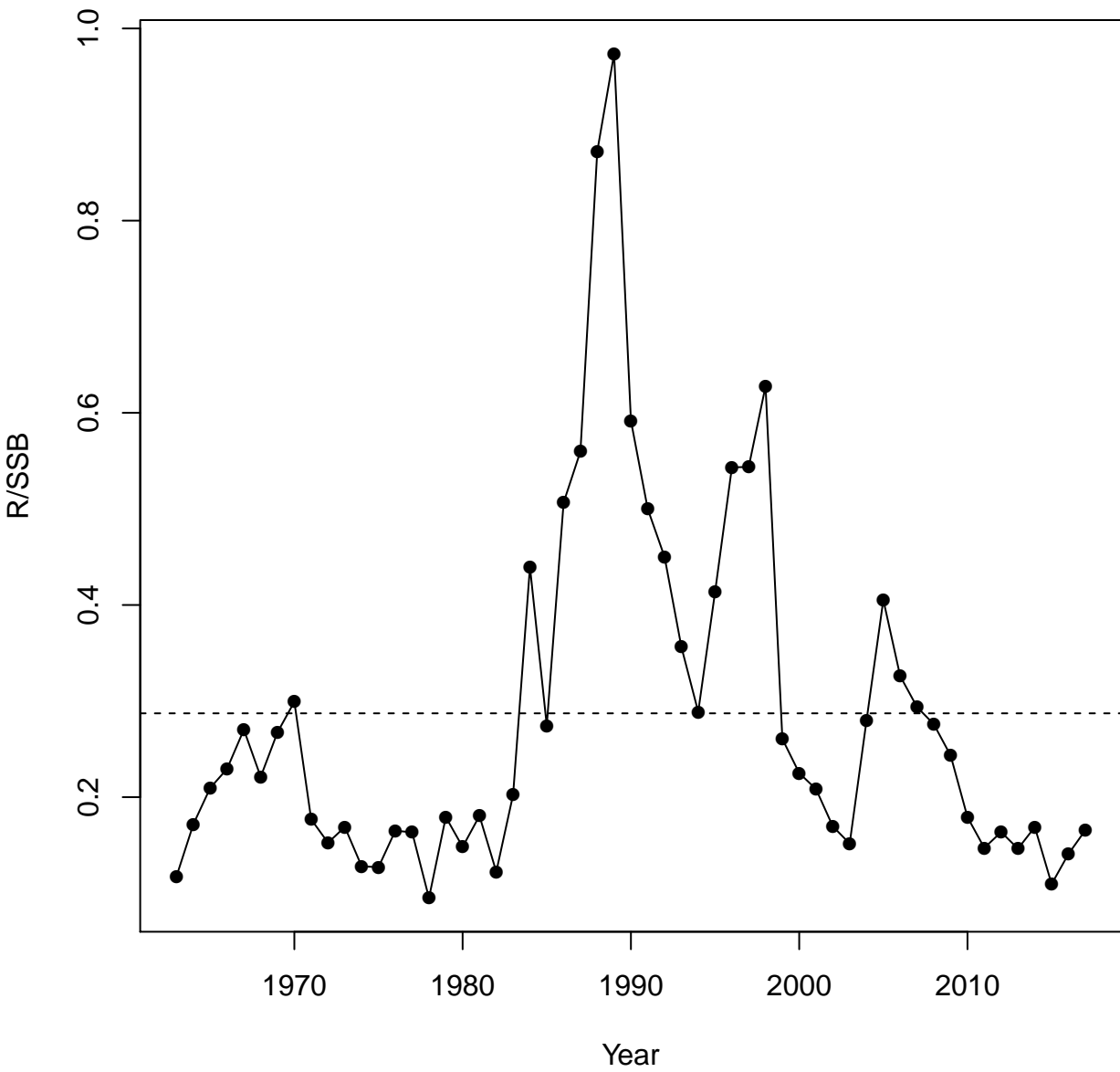


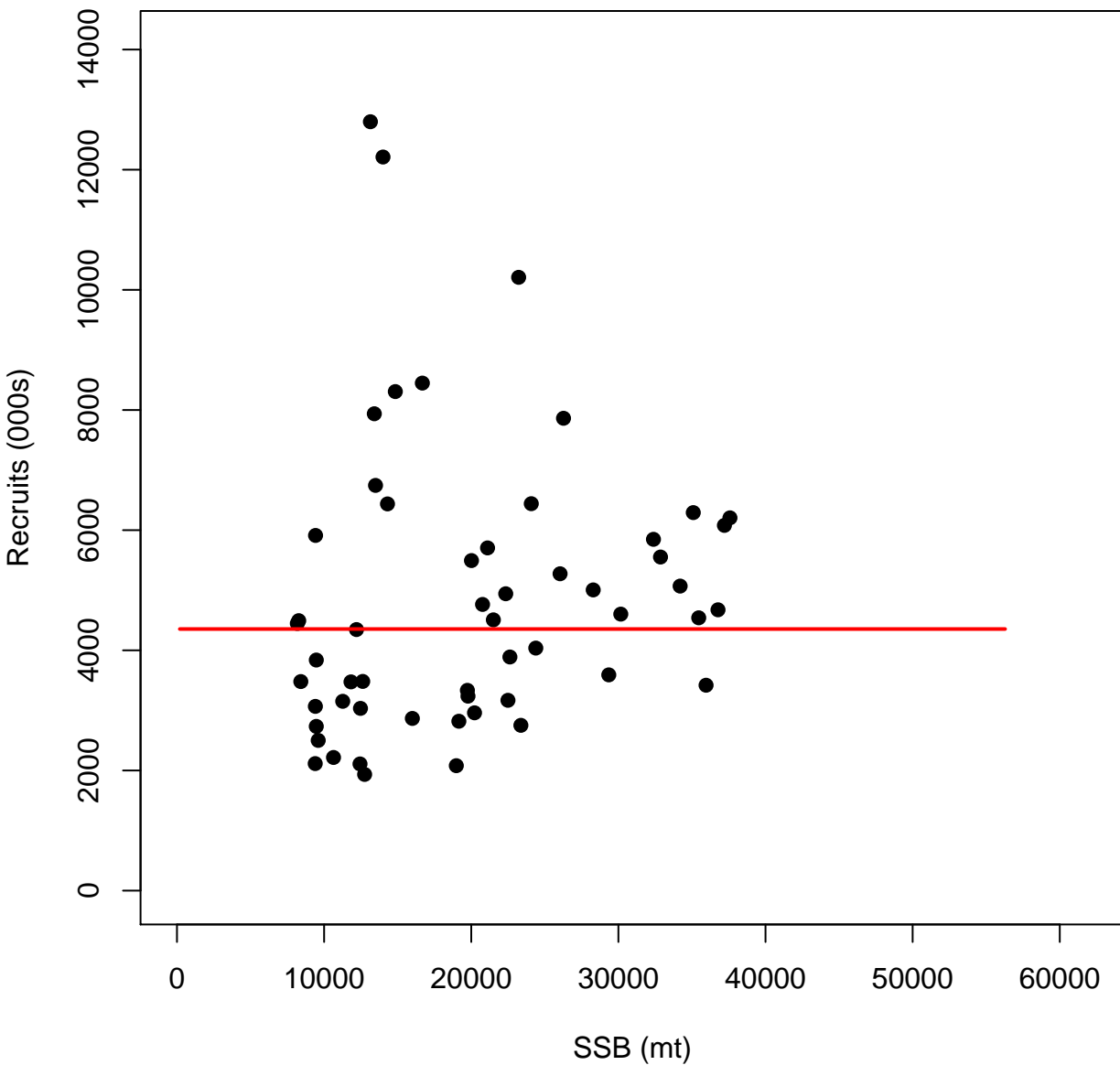


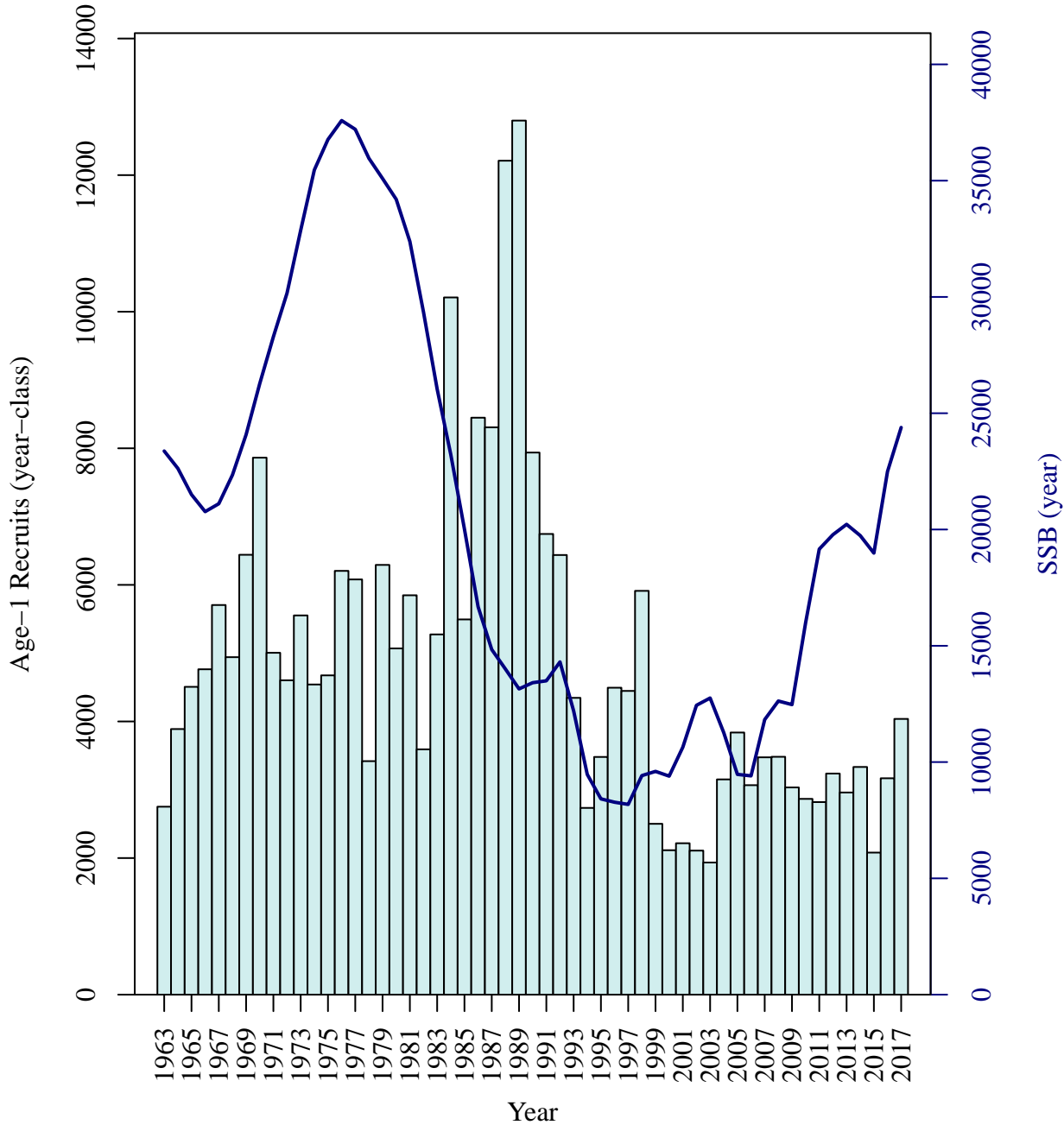




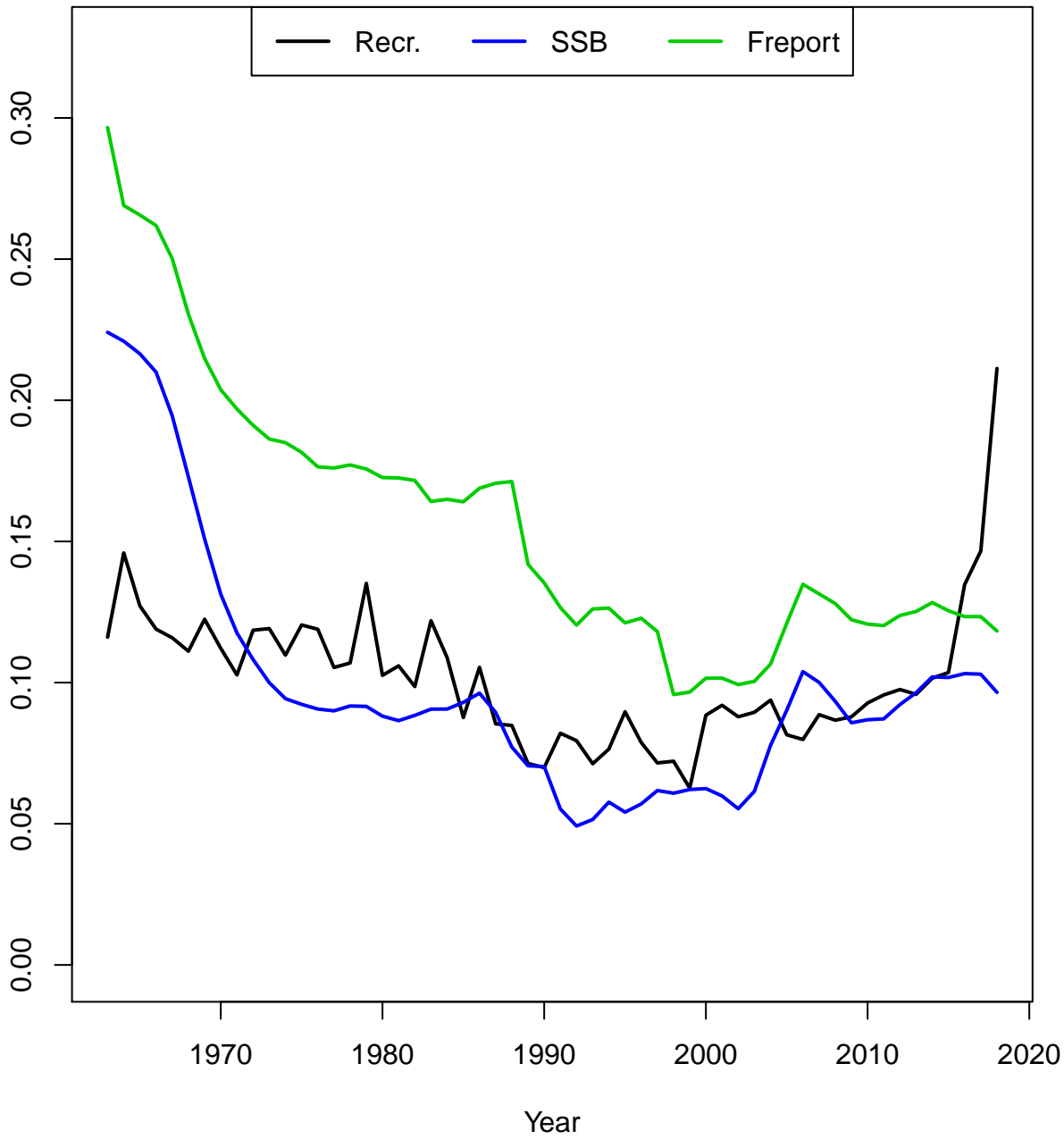




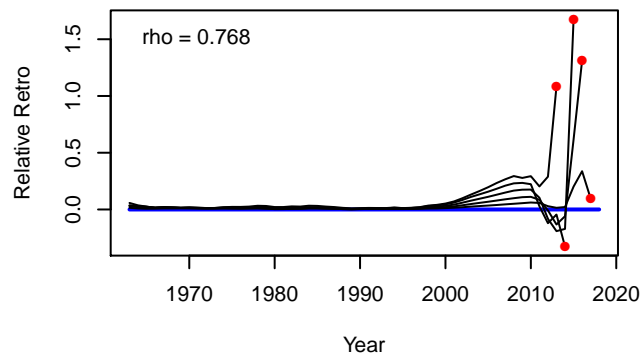
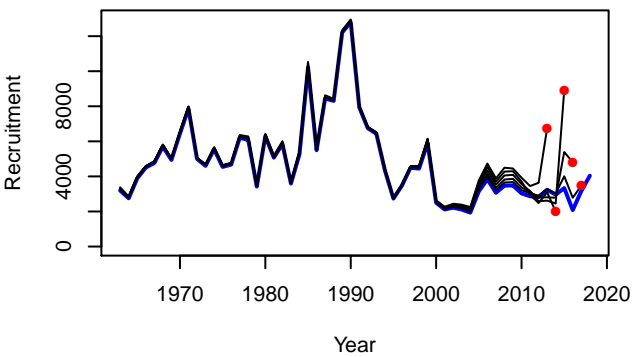
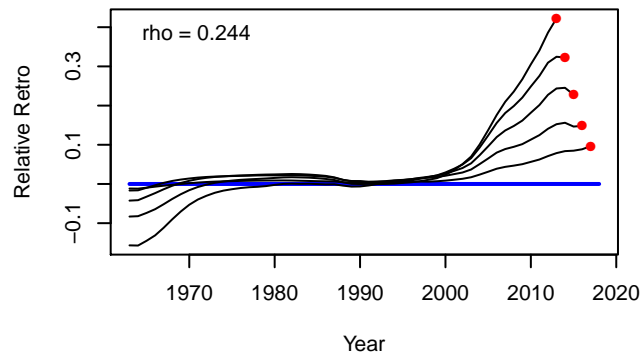
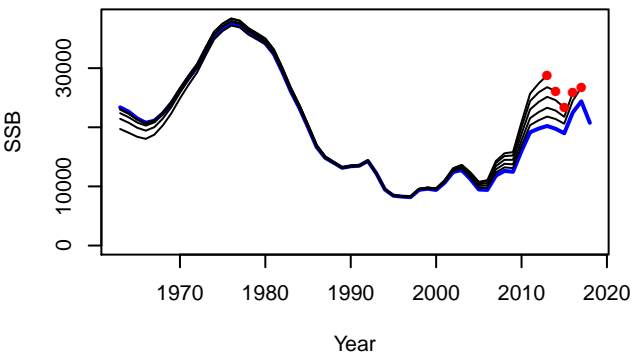
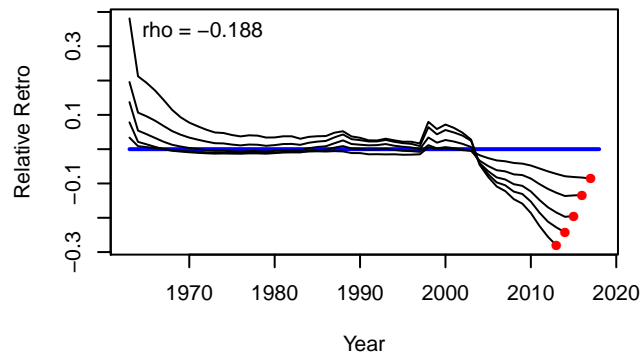
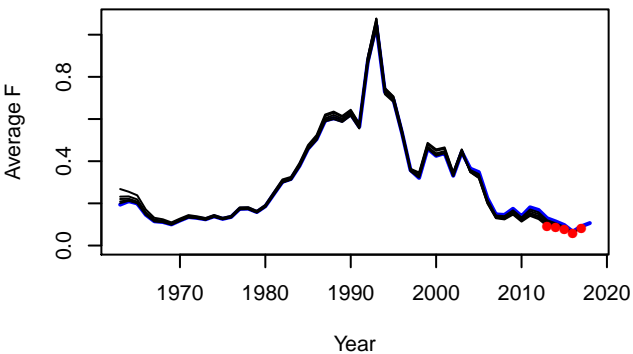




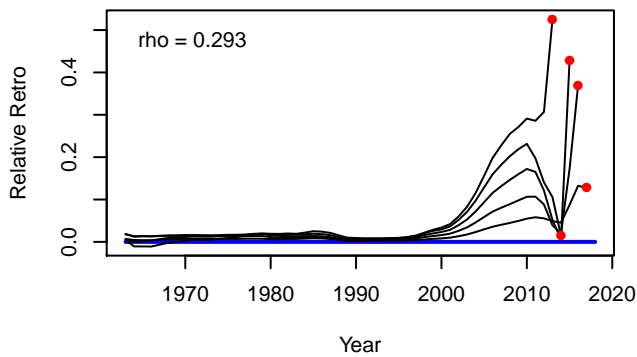
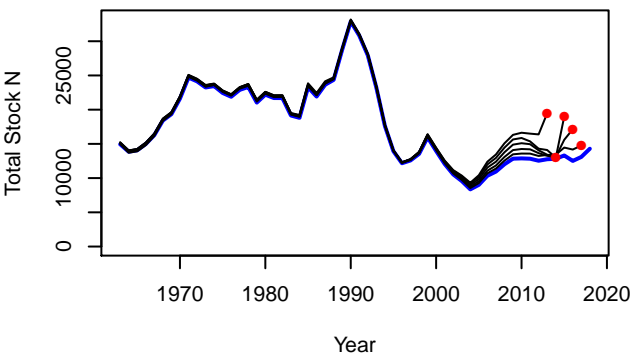
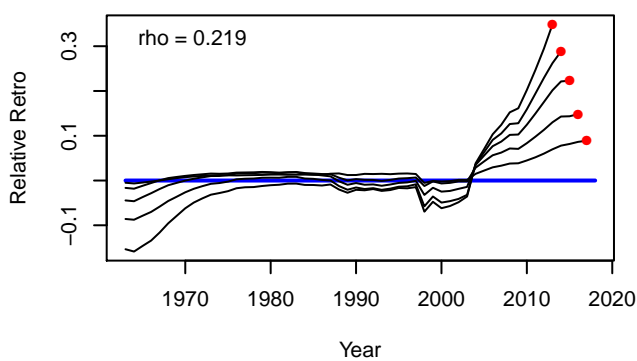
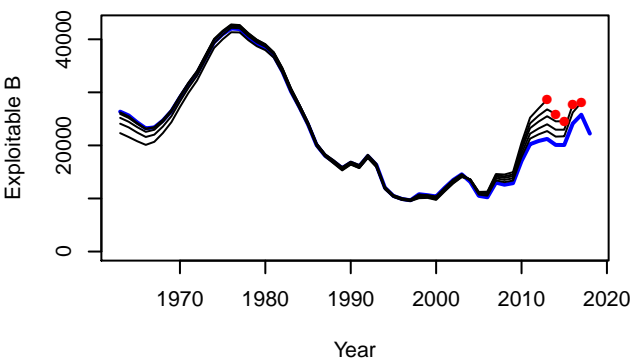
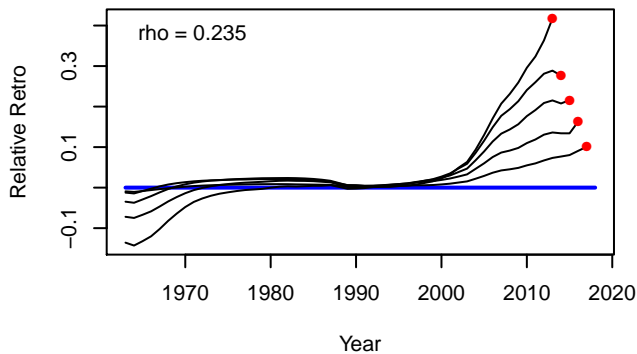
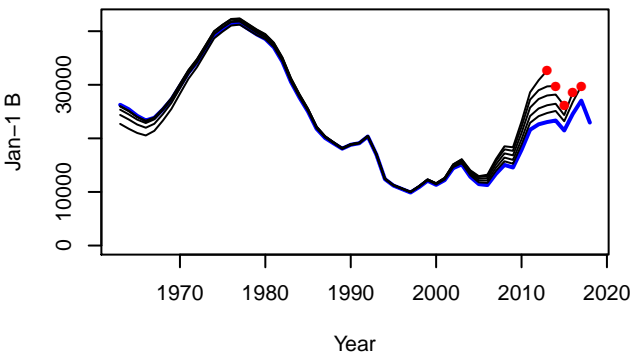
CV



# F, SSB, R

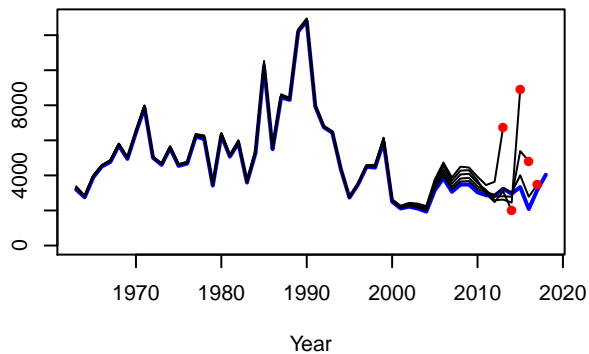


# Jan-1 B, Exploitable B, Total Stock N

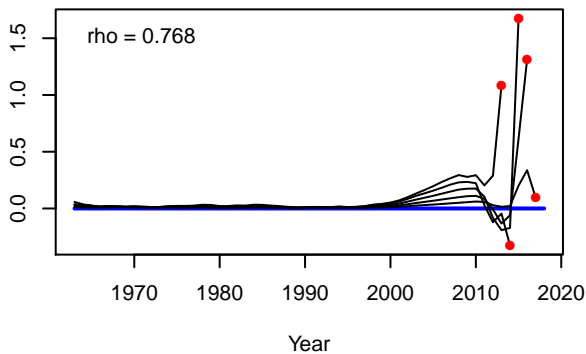


# Stock Numbers at Age

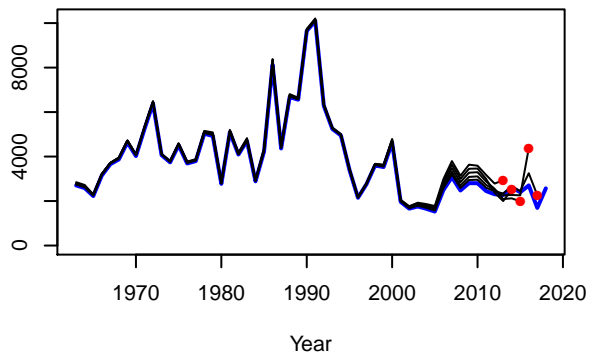
N at Age 1



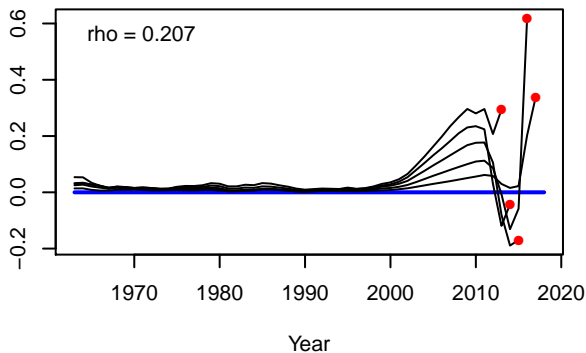
Relative Retro



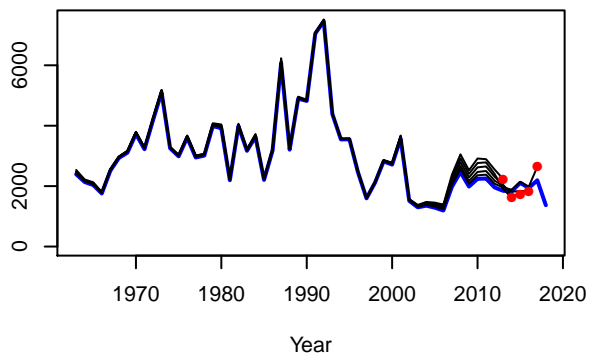
N at Age 2



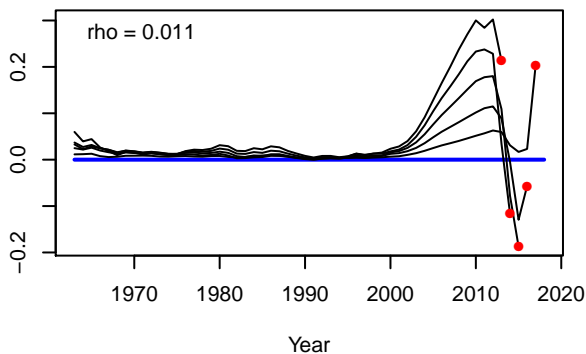
Relative Retro



N at Age 3



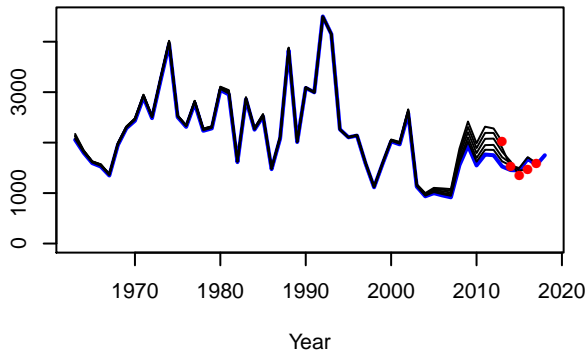
Relative Retro



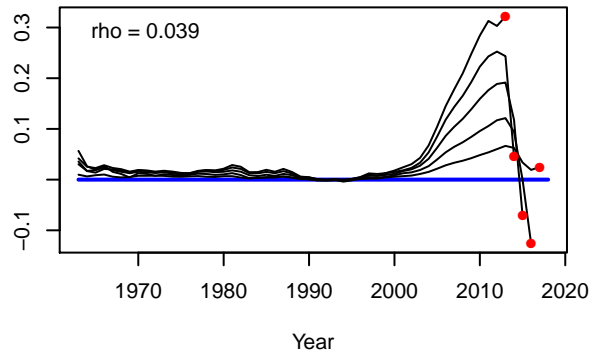


# Stock Numbers at Age

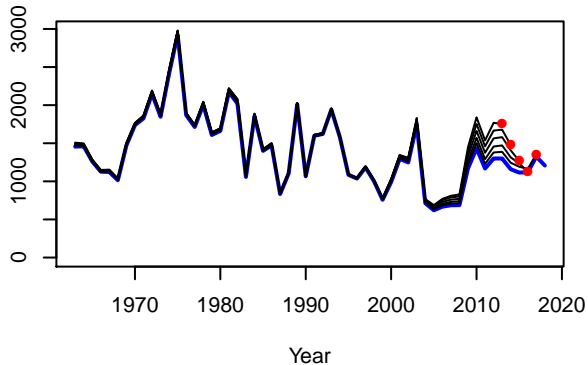
N at Age 4



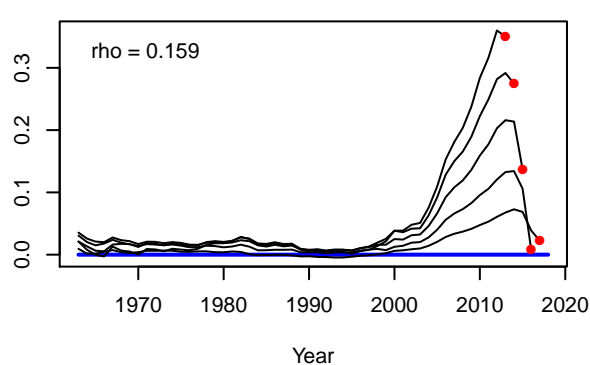
Relative Retro



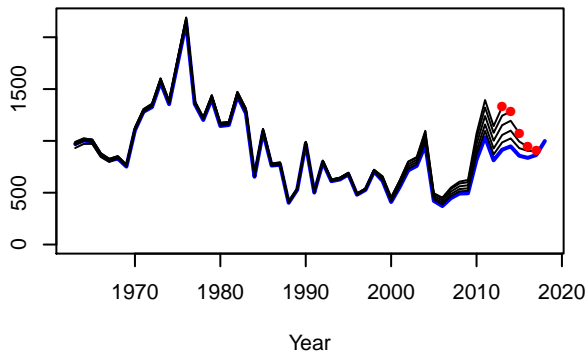
N at Age 5



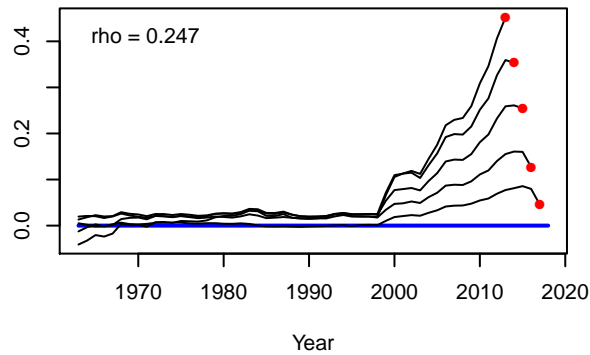
Relative Retro



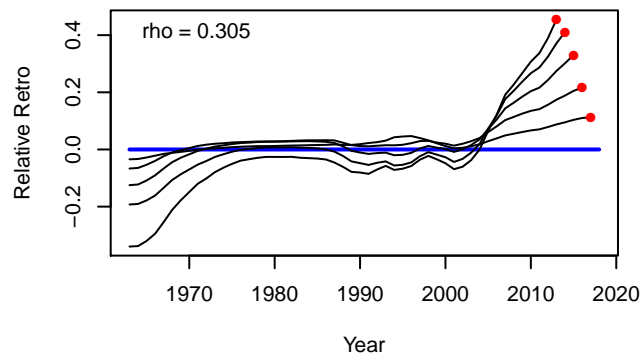
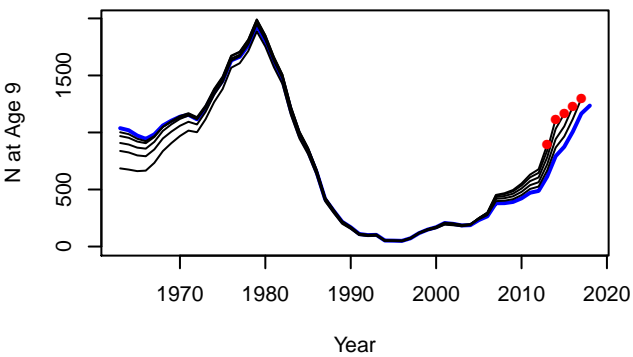
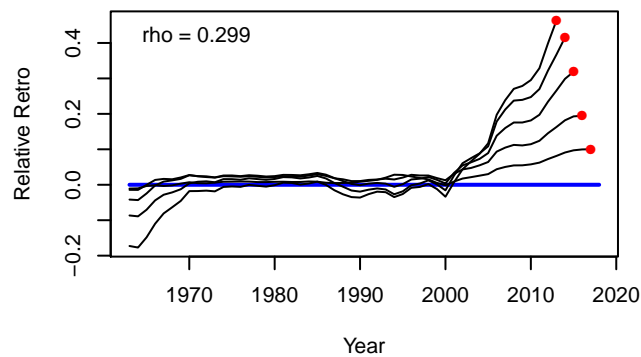
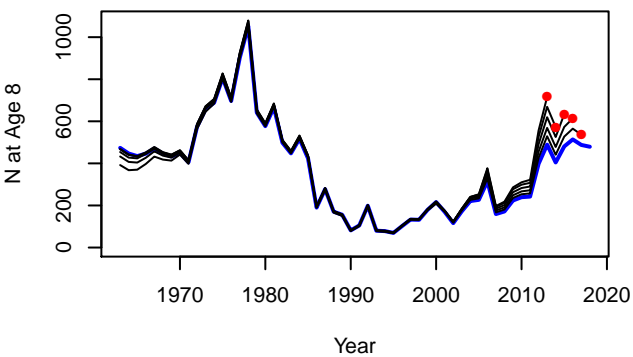
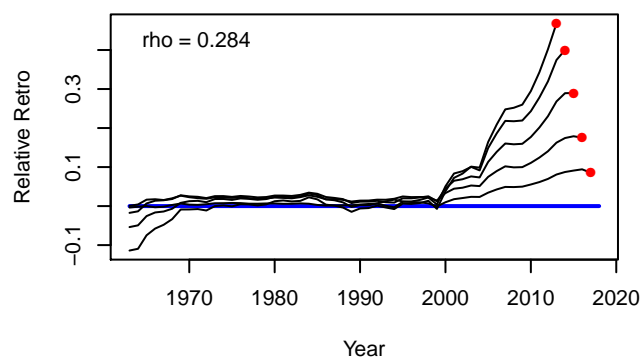
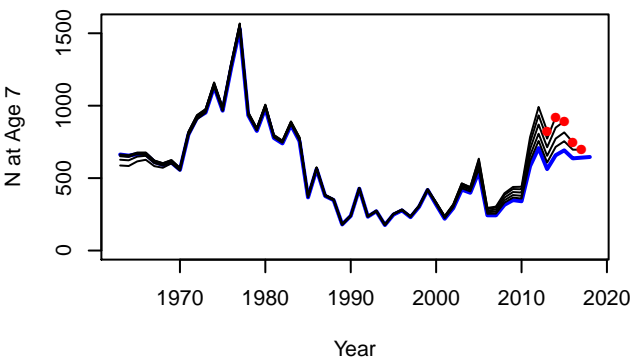
N at Age 6



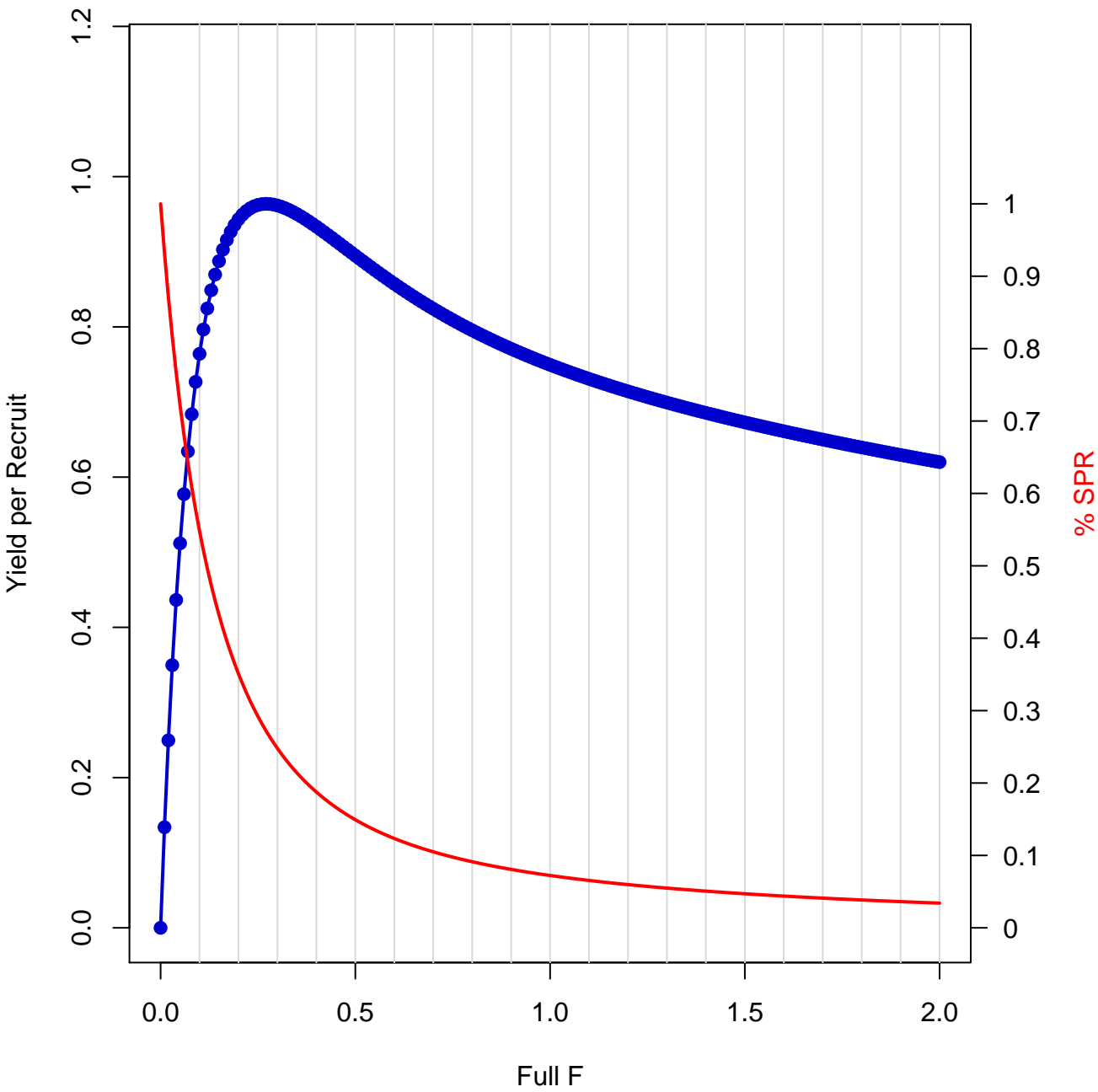
Relative Retro



# Stock Numbers at Age



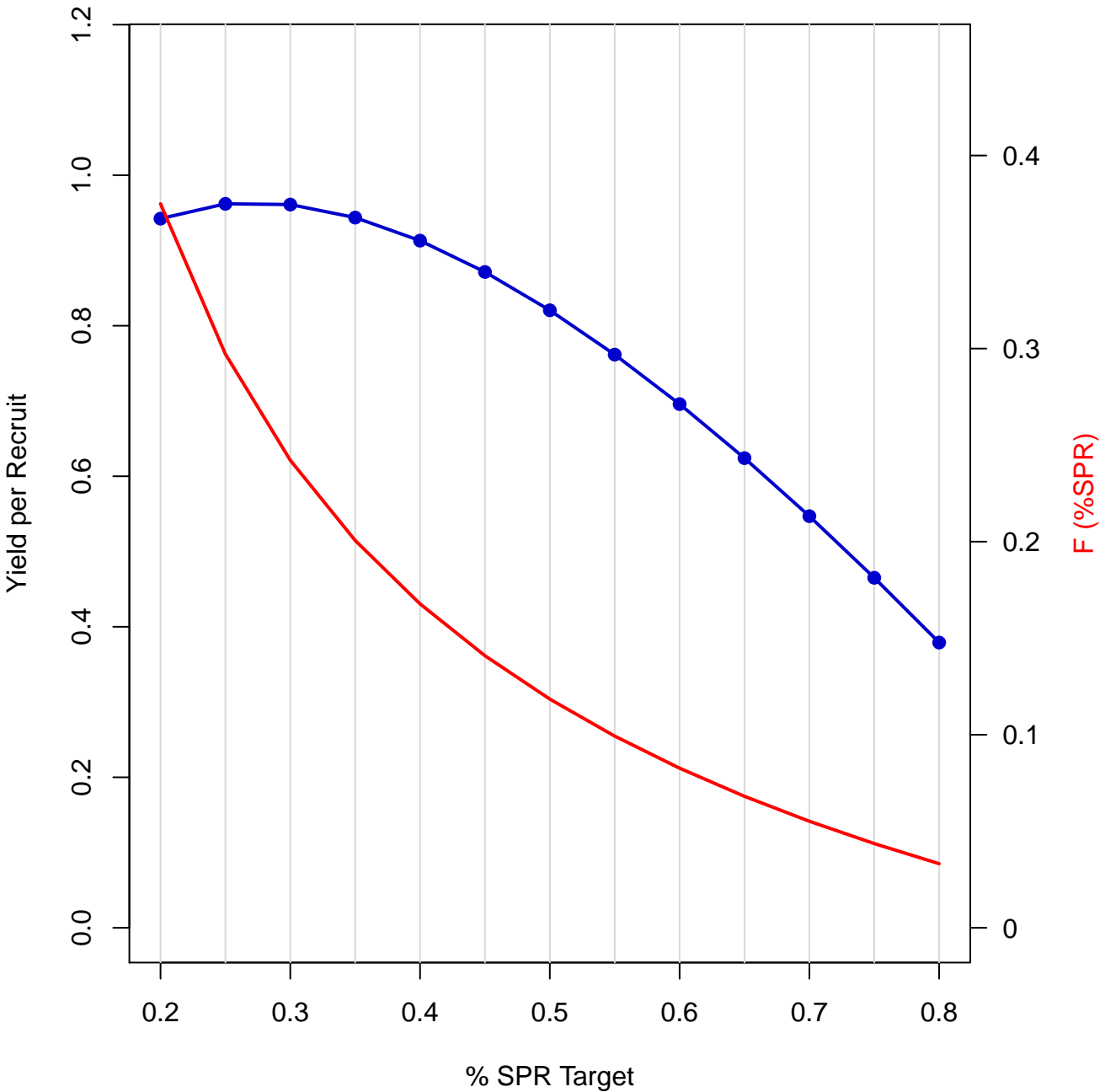
YPR-SPR Reference Points (Years Avg = 5)



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

F	YPR	SPR	F	YPR	SPR	F	YPR	SPR
0	0	1	0.35	0.9502	0.214	0.7	0.8241	0.105
0.01	0.1339	0.9322	0.36	0.9472	0.2082	0.71	0.8211	0.1034
0.02	0.2496	0.8714	0.37	0.9439	0.2027	0.72	0.818	0.1019
0.03	0.3497	0.8165	0.38	0.9406	0.1974	0.73	0.8151	0.1005
0.04	0.4365	0.7669	0.39	0.9371	0.1923	0.74	0.8121	0.099
0.05	0.5119	0.7218	0.4	0.9335	0.1875	0.75	0.8092	0.0977
0.06	0.5774	0.6807	0.41	0.9298	0.1829	0.76	0.8064	0.0963
0.07	0.6343	0.6431	0.42	0.926	0.1785	0.77	0.8036	0.095
0.08	0.6838	0.6087	0.43	0.9222	0.1743	0.78	0.8008	0.0937
0.09	0.7268	0.5771	0.44	0.9184	0.1703	0.79	0.7981	0.0925
0.1	0.7641	0.548	0.45	0.9145	0.1664	0.8	0.7955	0.0913
0.11	0.7965	0.5212	0.46	0.9106	0.1627	0.81	0.7928	0.0901
0.12	0.8246	0.4963	0.47	0.9067	0.1591	0.82	0.7902	0.0889
0.13	0.8488	0.4733	0.48	0.9027	0.1557	0.83	0.7877	0.0878
0.14	0.8697	0.4519	0.49	0.8988	0.1524	0.84	0.7852	0.0867
0.15	0.8876	0.4321	0.5	0.8949	0.1493	0.85	0.7827	0.0857
0.16	0.9028	0.4135	0.51	0.891	0.1462	0.86	0.7802	0.0846
0.17	0.9158	0.3963	0.52	0.8872	0.1433	0.87	0.7778	0.0836
0.18	0.9267	0.3801	0.53	0.8833	0.1405	0.88	0.7755	0.0826
0.19	0.9358	0.365	0.54	0.8795	0.1378	0.89	0.7731	0.0816
0.2	0.9433	0.3509	0.55	0.8757	0.1352	0.9	0.7708	0.0807
0.21	0.9493	0.3376	0.56	0.872	0.1327	0.91	0.7686	0.0798
0.22	0.9541	0.3251	0.57	0.8683	0.1302	0.92	0.7663	0.0789
0.23	0.9578	0.3134	0.58	0.8646	0.1279	0.93	0.7641	0.078
0.24	0.9605	0.3023	0.59	0.861	0.1256	0.94	0.7619	0.0771
0.25	0.9624	0.2919	0.6	0.8574	0.1234	0.95	0.7598	0.0763
0.26	0.9634	0.2821	0.61	0.8539	0.1213	0.96	0.7577	0.0754
0.27	0.9638	0.2728	0.62	0.8504	0.1192	0.97	0.7556	0.0746
0.28	0.9636	0.264	0.63	0.8469	0.1173	0.98	0.7535	0.0738
0.29	0.9628	0.2557	0.64	0.8435	0.1153	0.99	0.7515	0.073
0.3	0.9616	0.2478	0.65	0.8402	0.1135	1	0.7495	0.0723
0.31	0.9599	0.2403	0.66	0.8369	0.1117	1.01	0.7475	0.0715
0.32	0.9579	0.2332	0.67	0.8336	0.1099	1.02	0.7456	0.0708
0.33	0.9556	0.2265	0.68	0.8304	0.1082	1.03	0.7437	0.0701
0.34	0.953	0.2201	0.69	0.8272	0.1066	1.04	0.7418	0.0694

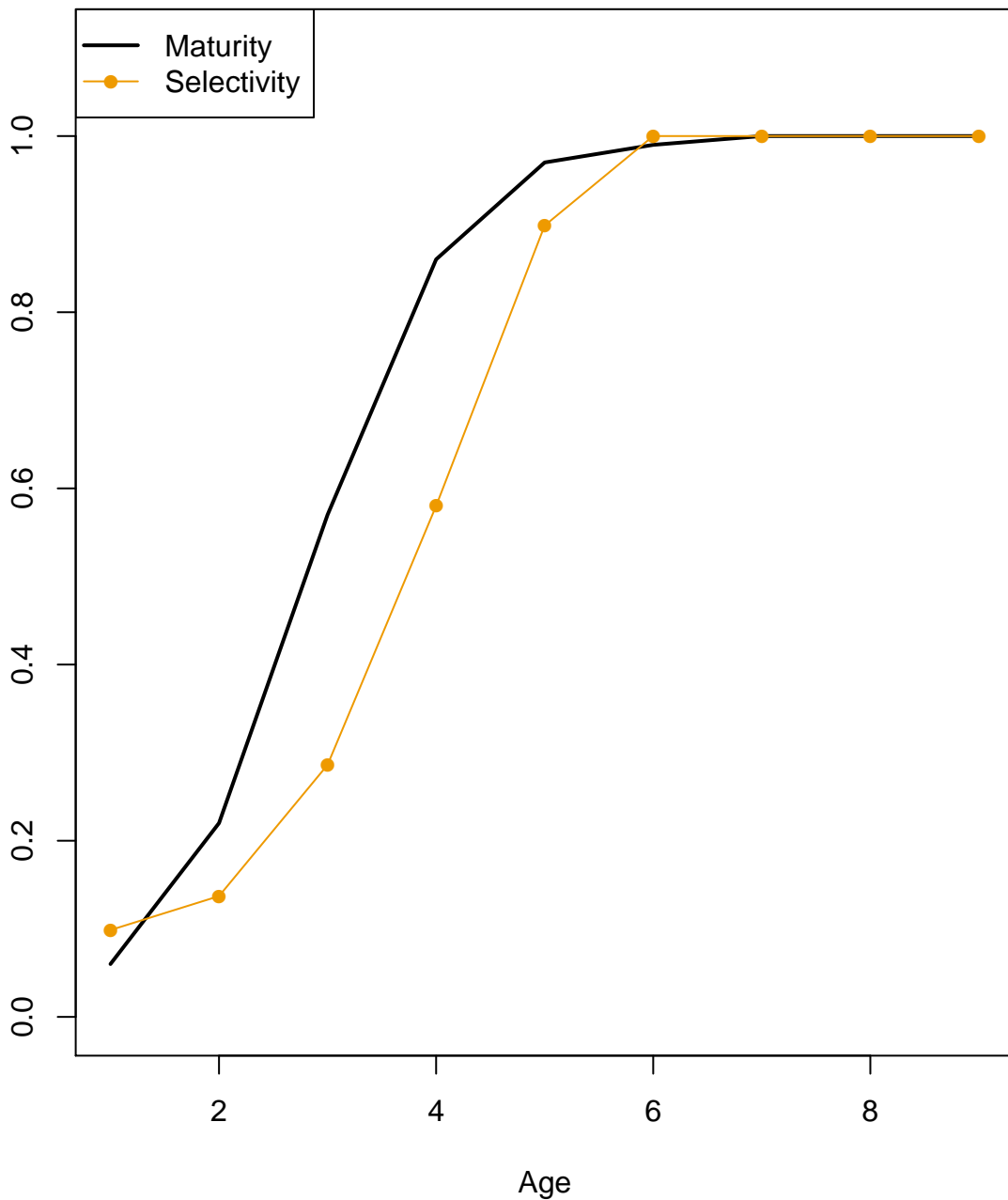
**SPR Target Reference Points (Years Avg = 5)**



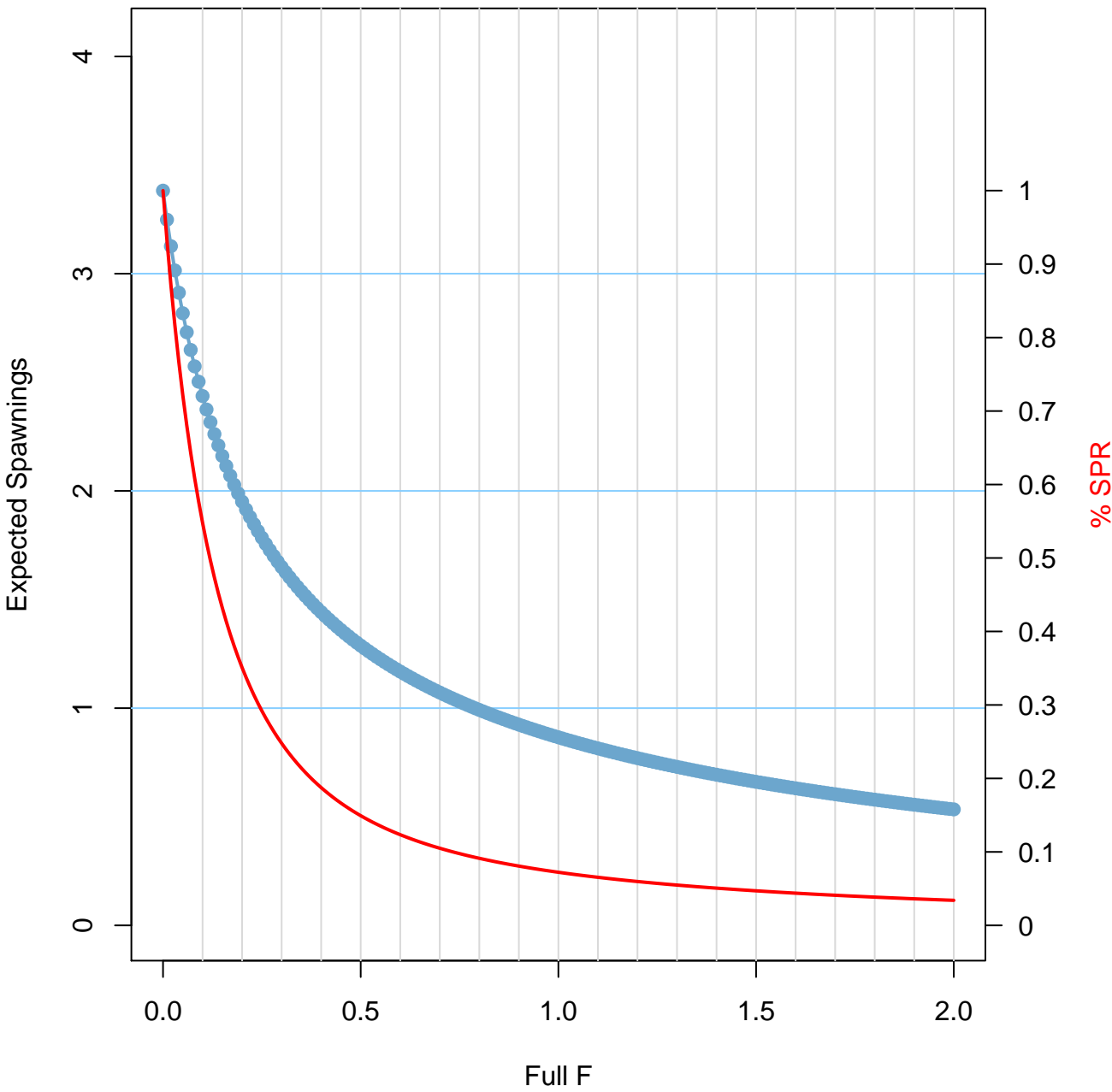
## SPR Target Reference Points (Years Avg = 5)

% SPR	F(%SPR)	YPR
0.2	0.375	0.9423
0.25	0.2972	0.962
0.3	0.2422	0.961
0.35	0.2006	0.9437
0.4	0.1678	0.9131
0.45	0.1409	0.8715
0.5	0.1185	0.8205
0.55	0.0993	0.7617
0.6	0.0827	0.6959
0.65	0.0681	0.6241
0.7	0.0552	0.547
0.75	0.0436	0.4651
0.8	0.0332	0.379

Selectivity or Maturity at age



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

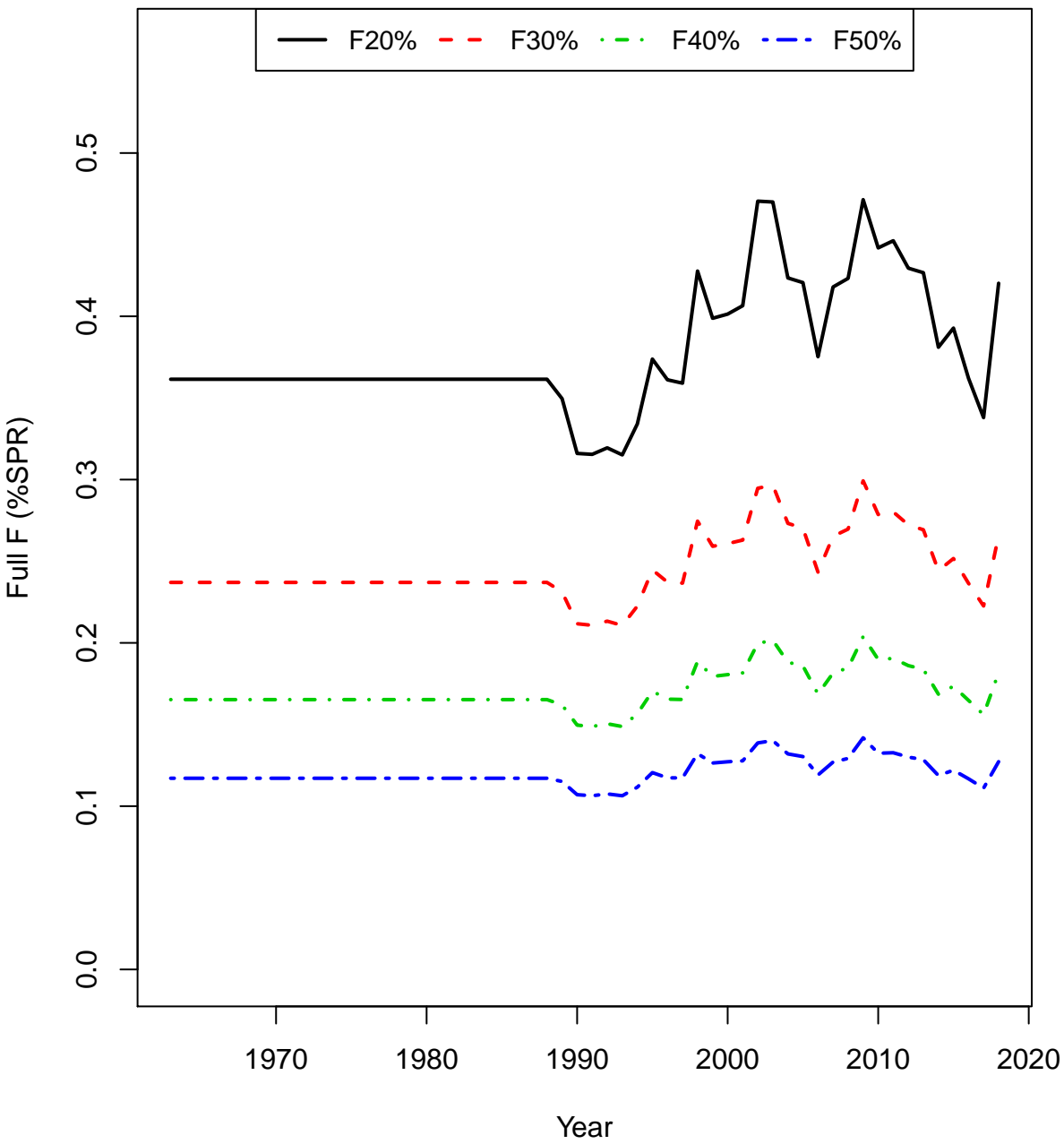




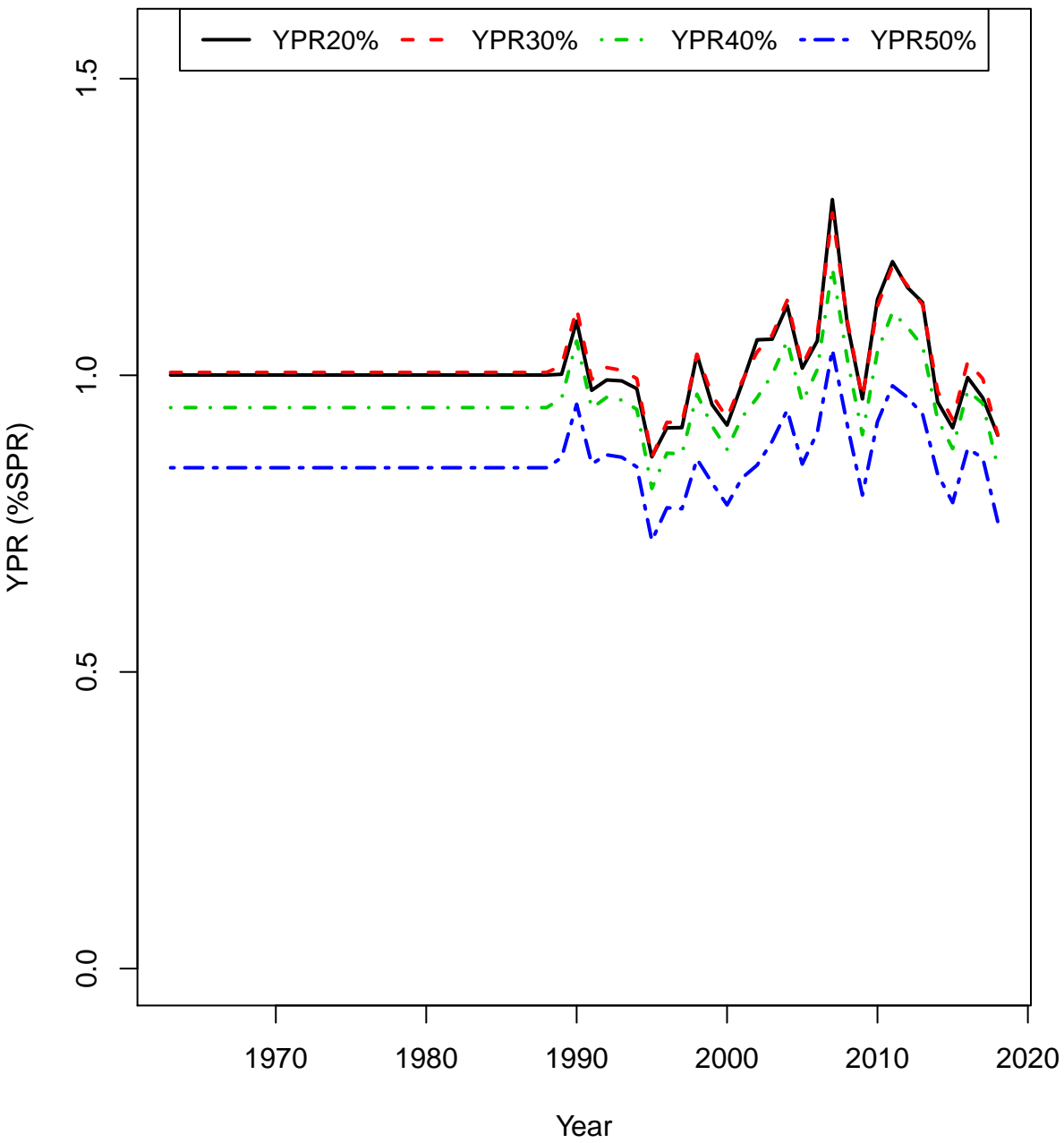
**Expected Spawnings & SPR Reference Points (Years Avg = 5)**

<b>F</b>	<b>E[Sp]</b>	<b>SPR</b>	<b>F</b>	<b>E[Sp]</b>	<b>SPR</b>	<b>F</b>	<b>E[Sp]</b>	<b>SPR</b>
0	3.3824	1	0.35	1.5373	0.214	0.7	1.0719	0.105
0.01	3.2485	0.9322	0.36	1.517	0.2082	0.71	1.0633	0.1034
0.02	3.1266	0.8714	0.37	1.4974	0.2027	0.72	1.0548	0.1019
0.03	3.015	0.8165	0.38	1.4783	0.1974	0.73	1.0464	0.1005
0.04	2.9124	0.7669	0.39	1.4599	0.1923	0.74	1.0382	0.099
0.05	2.8178	0.7218	0.4	1.442	0.1875	0.75	1.0302	0.0977
0.06	2.7303	0.6807	0.41	1.4246	0.1829	0.76	1.0223	0.0963
0.07	2.6491	0.6431	0.42	1.4077	0.1785	0.77	1.0145	0.095
0.08	2.5735	0.6087	0.43	1.3913	0.1743	0.78	1.0068	0.0937
0.09	2.5029	0.5771	0.44	1.3753	0.1703	0.79	0.9993	0.0925
0.1	2.4368	0.548	0.45	1.3598	0.1664	0.8	0.9919	0.0913
0.11	2.3748	0.5212	0.46	1.3447	0.1627	0.81	0.9847	0.0901
0.12	2.3166	0.4963	0.47	1.33	0.1591	0.82	0.9775	0.0889
0.13	2.2617	0.4733	0.48	1.3157	0.1557	0.83	0.9705	0.0878
0.14	2.2099	0.4519	0.49	1.3017	0.1524	0.84	0.9636	0.0867
0.15	2.1609	0.4321	0.5	1.2881	0.1493	0.85	0.9567	0.0857
0.16	2.1145	0.4135	0.51	1.2748	0.1462	0.86	0.95	0.0846
0.17	2.0704	0.3963	0.52	1.2619	0.1433	0.87	0.9434	0.0836
0.18	2.0286	0.3801	0.53	1.2492	0.1405	0.88	0.9369	0.0826
0.19	1.9888	0.365	0.54	1.2369	0.1378	0.89	0.9305	0.0816
0.2	1.9508	0.3509	0.55	1.2248	0.1352	0.9	0.9242	0.0807
0.21	1.9146	0.3376	0.56	1.213	0.1327	0.91	0.918	0.0798
0.22	1.88	0.3251	0.57	1.2015	0.1302	0.92	0.9119	0.0789
0.23	1.8469	0.3134	0.58	1.1902	0.1279	0.93	0.9058	0.078
0.24	1.8152	0.3023	0.59	1.1792	0.1256	0.94	0.8999	0.0771
0.25	1.7848	0.2919	0.6	1.1684	0.1234	0.95	0.894	0.0763
0.26	1.7556	0.2821	0.61	1.1579	0.1213	0.96	0.8882	0.0754
0.27	1.7276	0.2728	0.62	1.1475	0.1192	0.97	0.8825	0.0746
0.28	1.7007	0.264	0.63	1.1374	0.1173	0.98	0.8769	0.0738
0.29	1.6747	0.2557	0.64	1.1275	0.1153	0.99	0.8713	0.073
0.3	1.6497	0.2478	0.65	1.1178	0.1135	1	0.8659	0.0723
0.31	1.6257	0.2403	0.66	1.1082	0.1117	1.01	0.8605	0.0715
0.32	1.6024	0.2332	0.67	1.0989	0.1099	1.02	0.8551	0.0708
0.33	1.58	0.2265	0.68	1.0897	0.1082	1.03	0.8499	0.0701
0.34	1.5583	0.2201	0.69	1.0807	0.1066	1.04	0.8447	0.0694

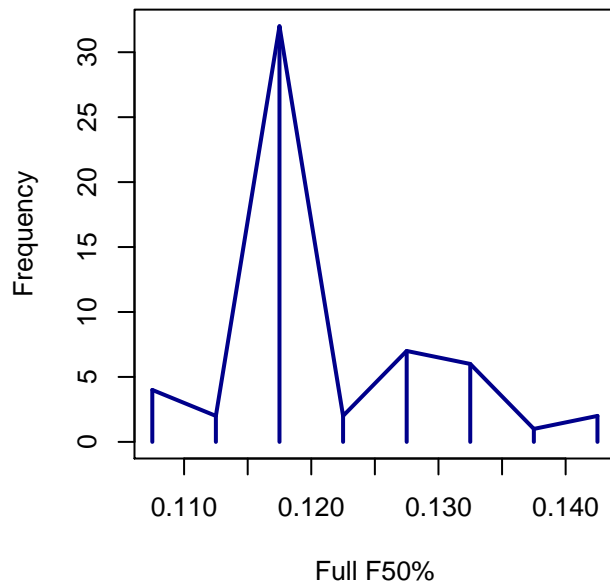
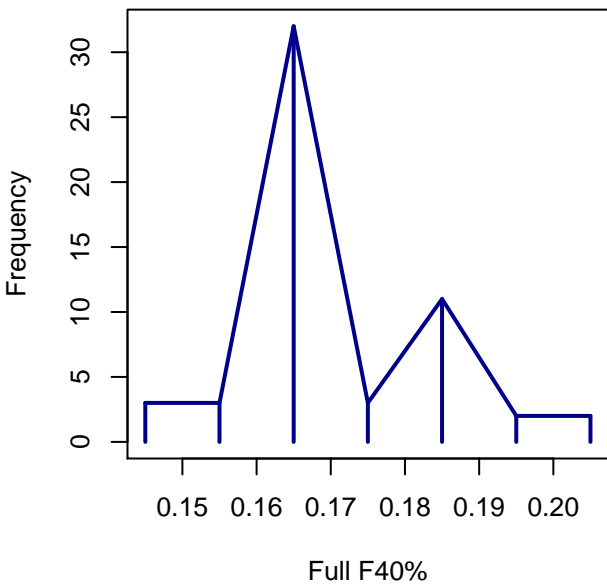
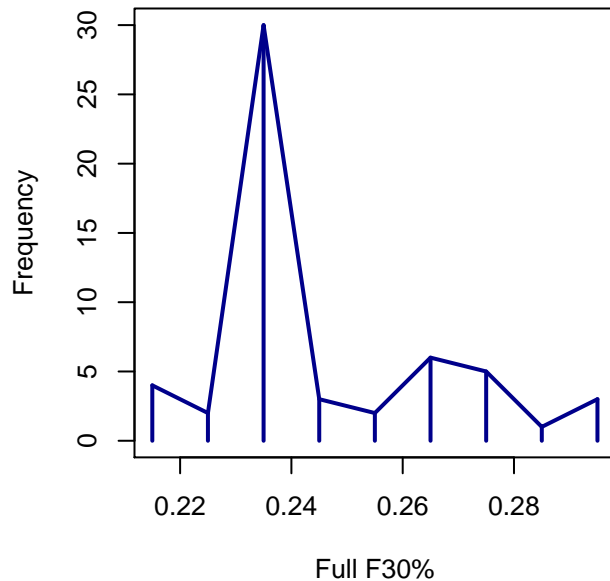
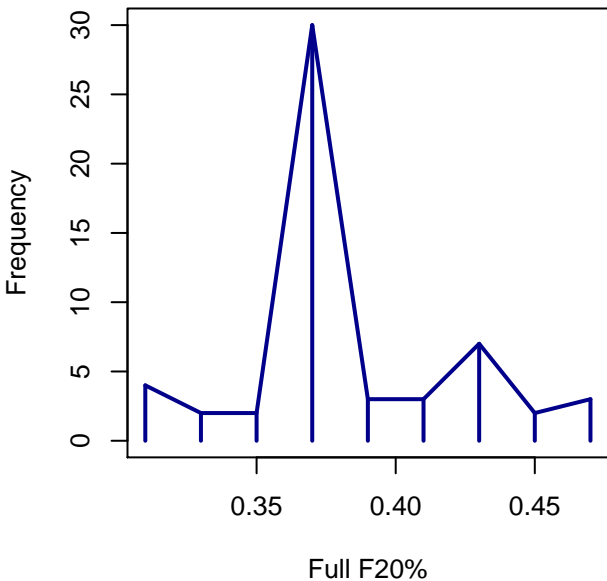
Annual F(%SPR) Reference Points



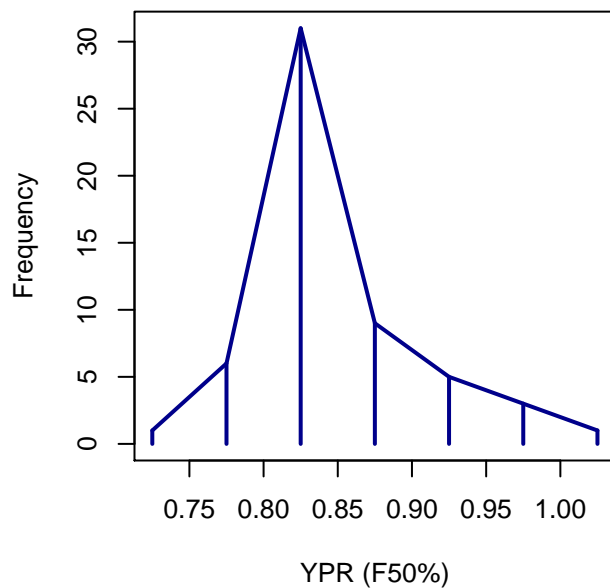
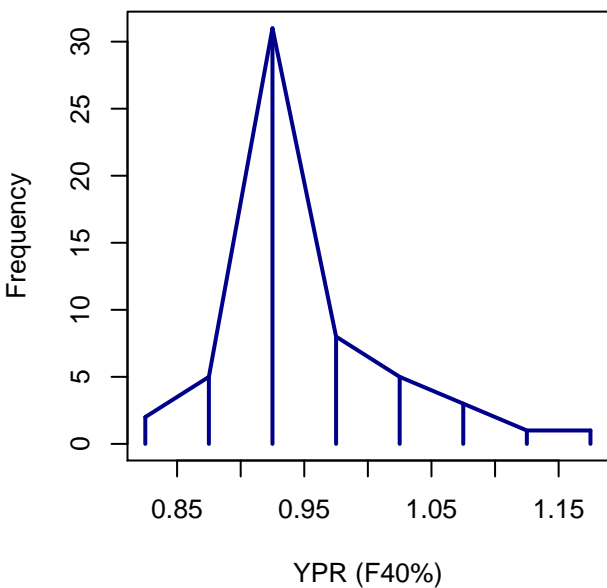
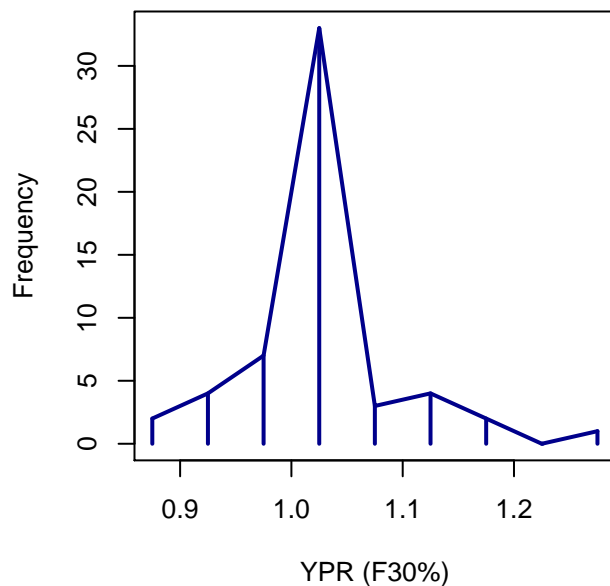
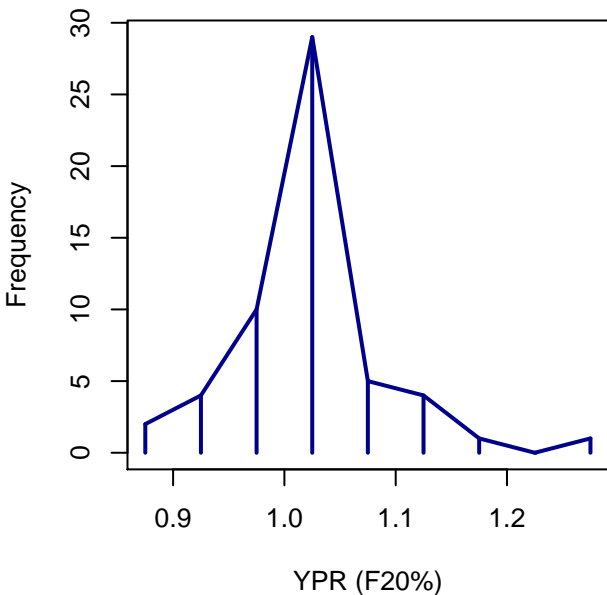
Annual YPR(%SPR) Reference Points



## Annual F (%SPR) Reference Points

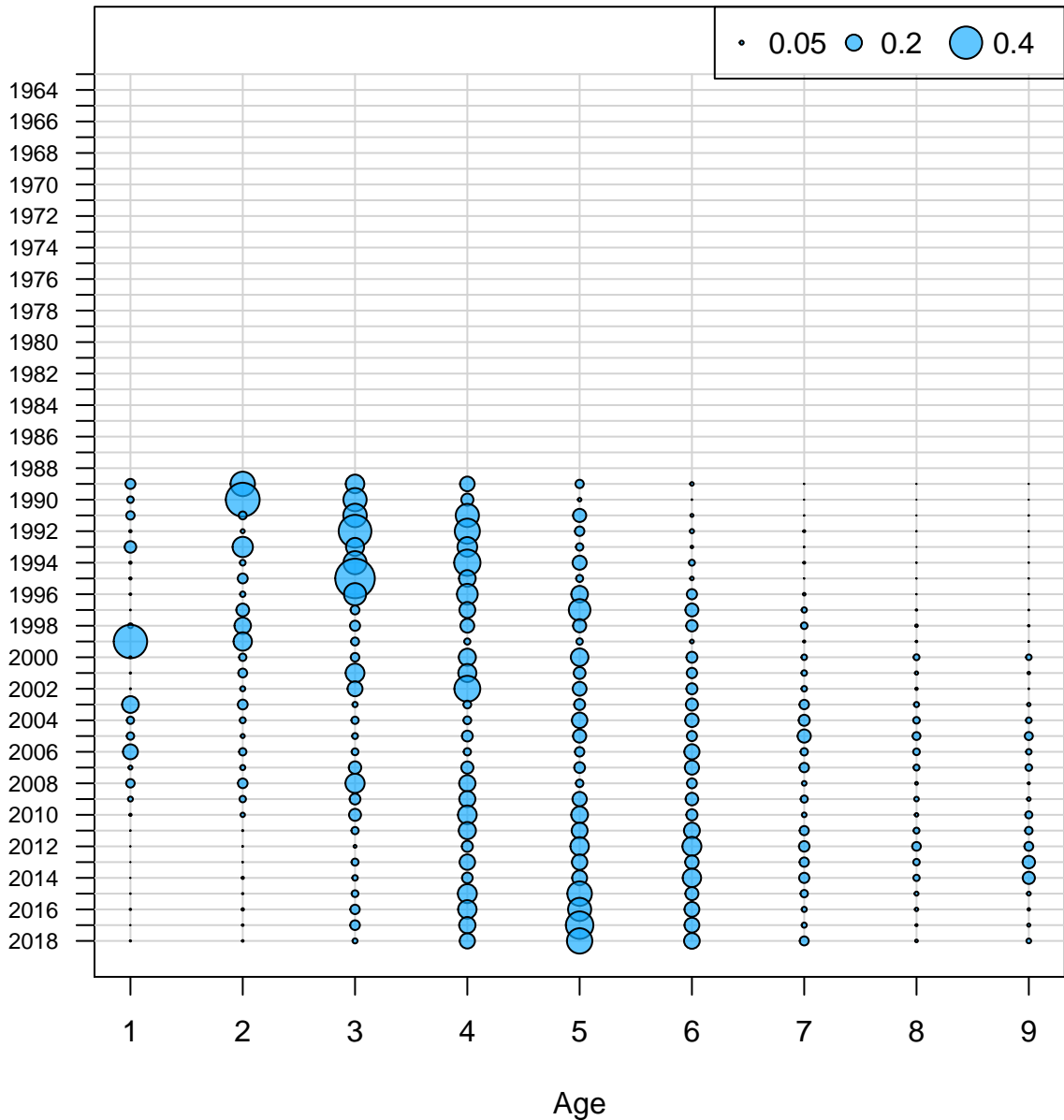


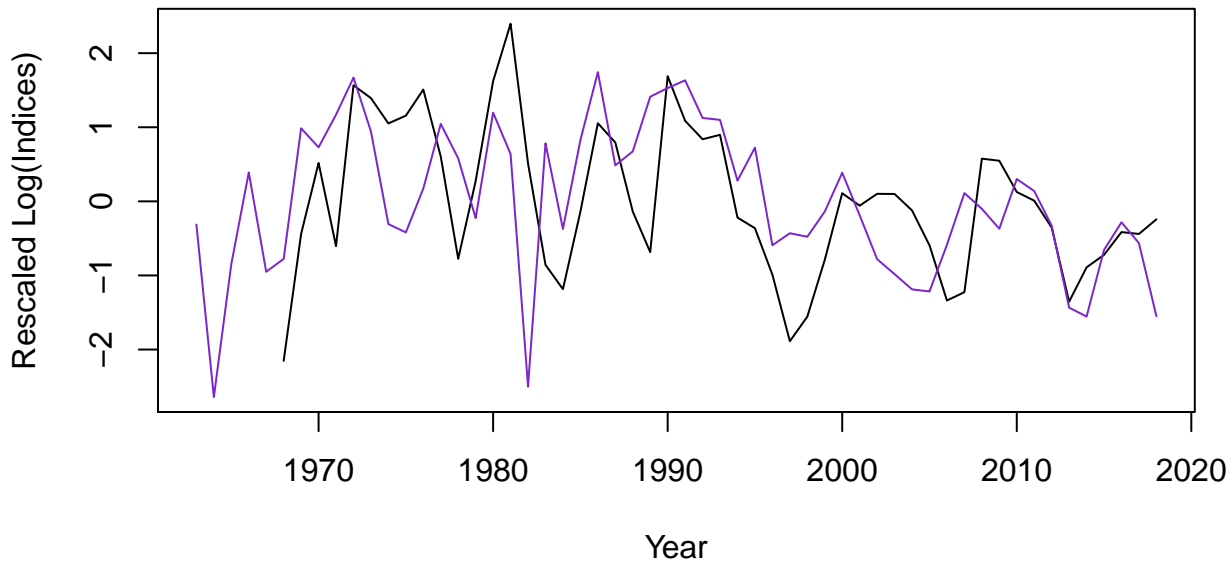
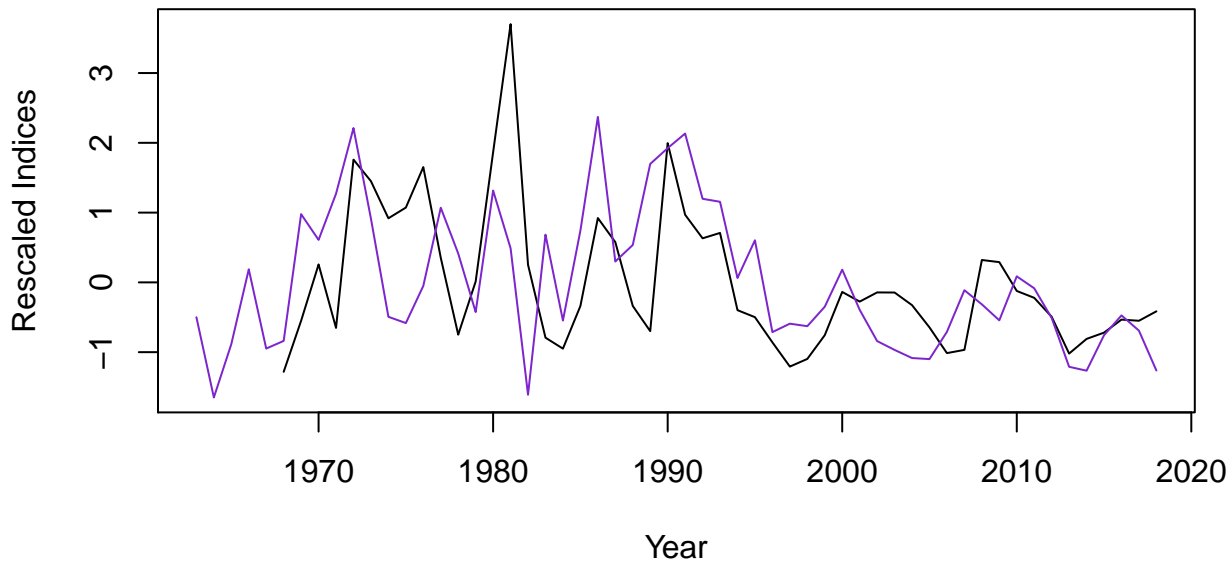
## Annual YPR (%SPR) Reference Points





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







# Age Comps for Index 1 (INDEX-1)

• 0.05 • 0.2 • 0.4

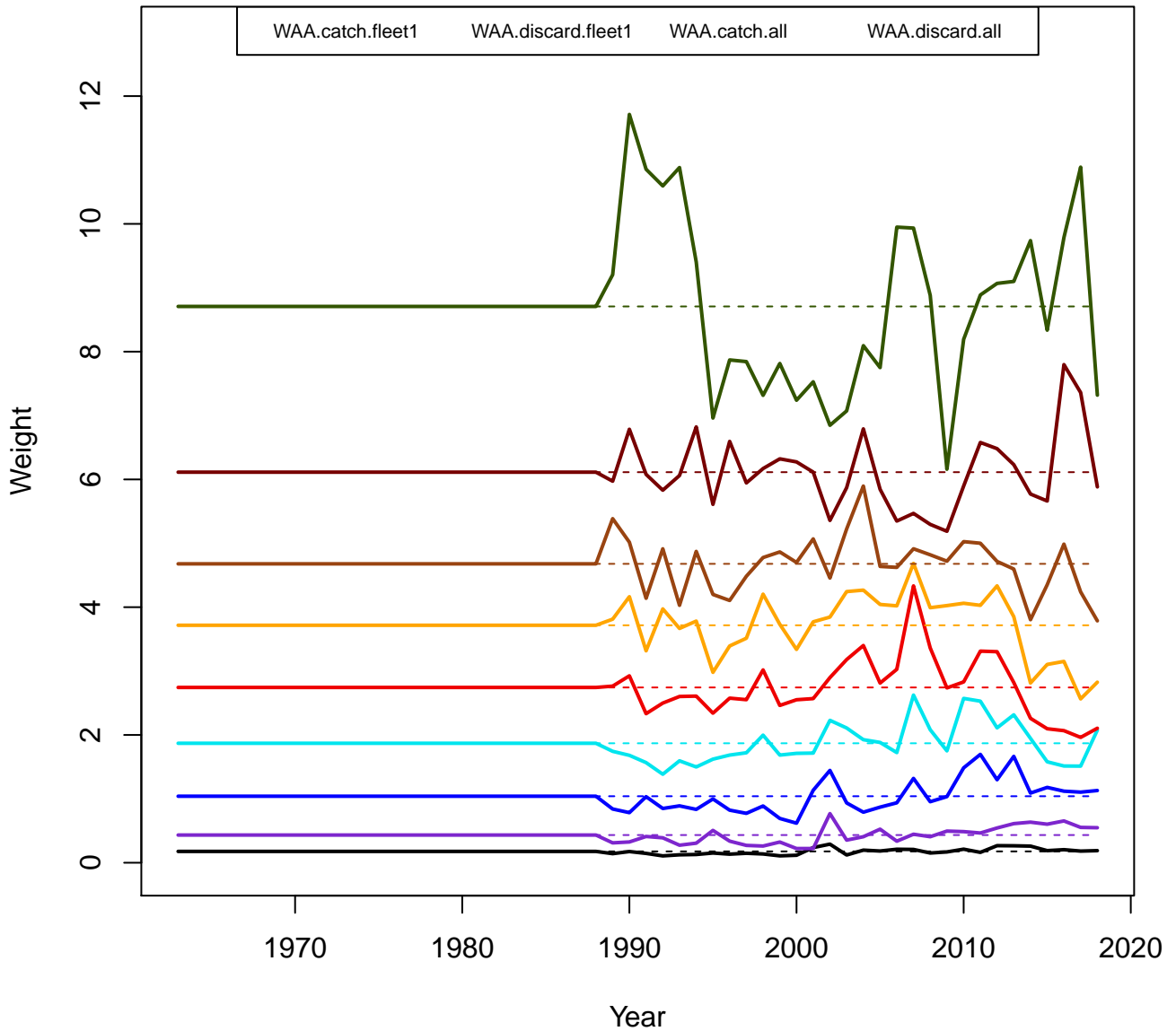


Age

# Age Comps for Index 2 (INDEX-2)



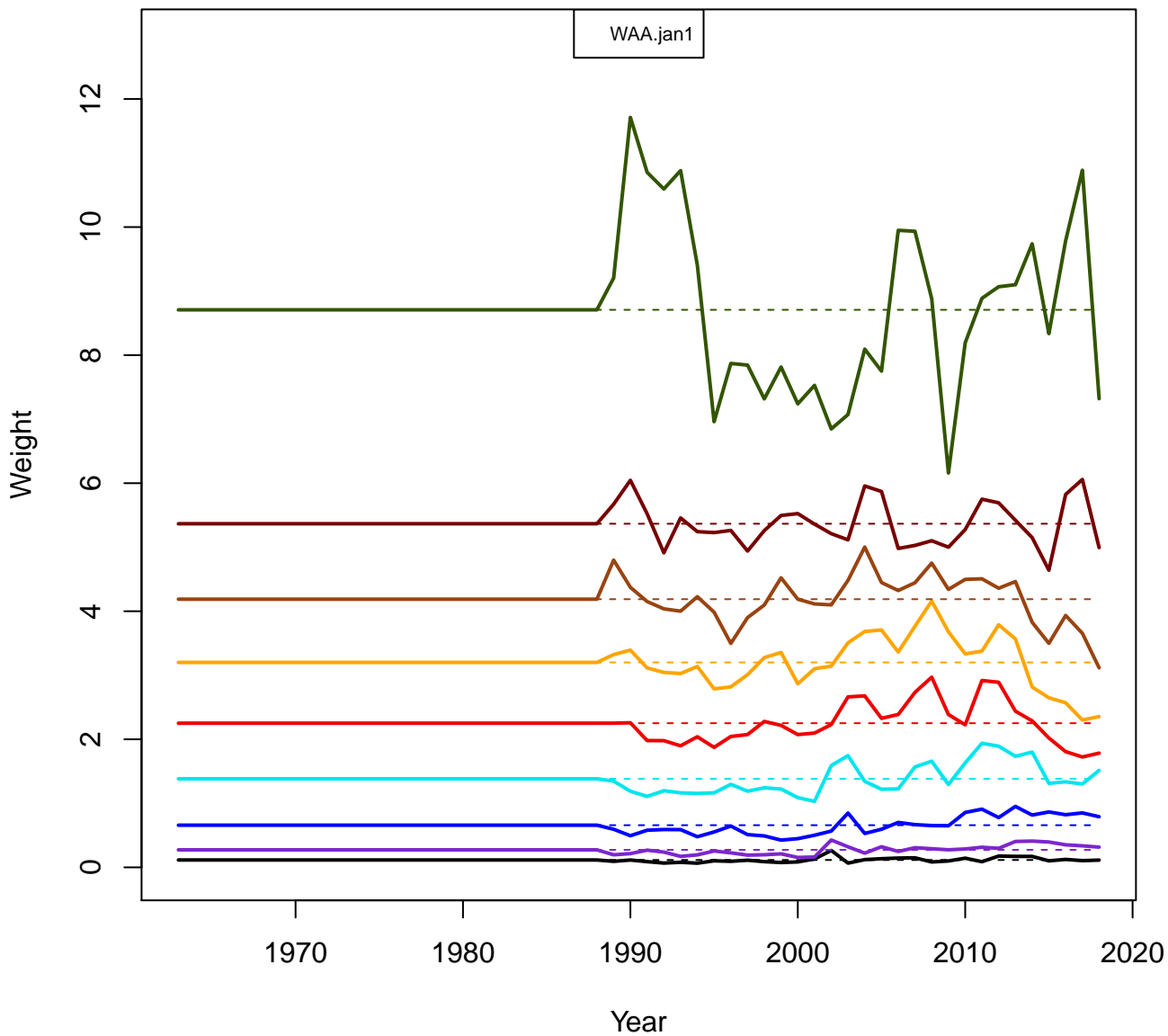
# WAA matrix 1



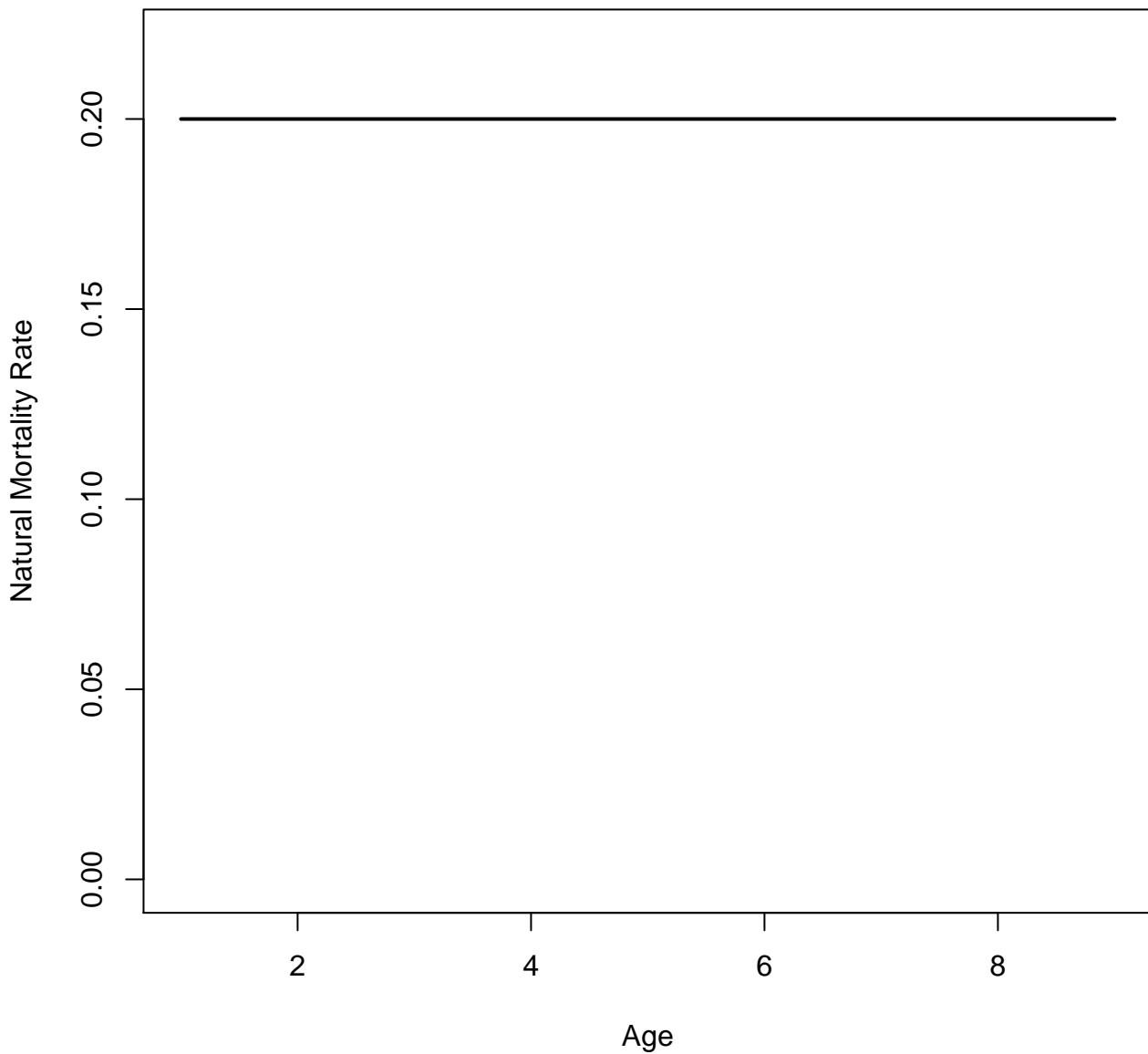
# WAA matrix 2



# WAA matrix 3



**M**



# Maturity

