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ASAP3 run on Monday, 04 Nov 2019 at 10:49:07

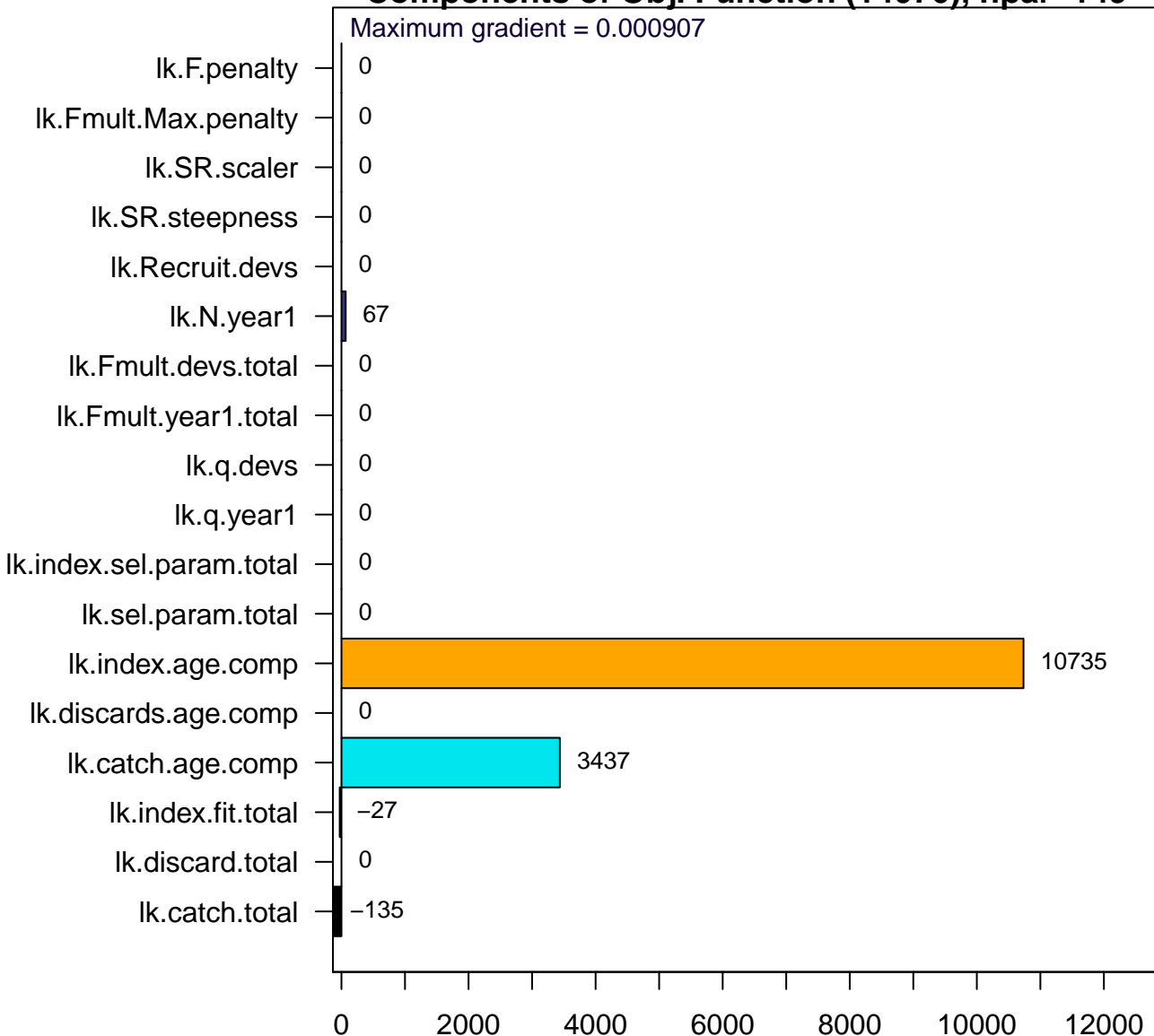
chris.legault\Documents\Working\ICES-WKFORBIAS 2019\WhiteHake\Rose\w

ASAPplots version = 0.2.14

npar = 149, maximum gradient = 0.000907393

# Components of Obj. Function (14076), npar=149

Maximum gradient = 0.000907

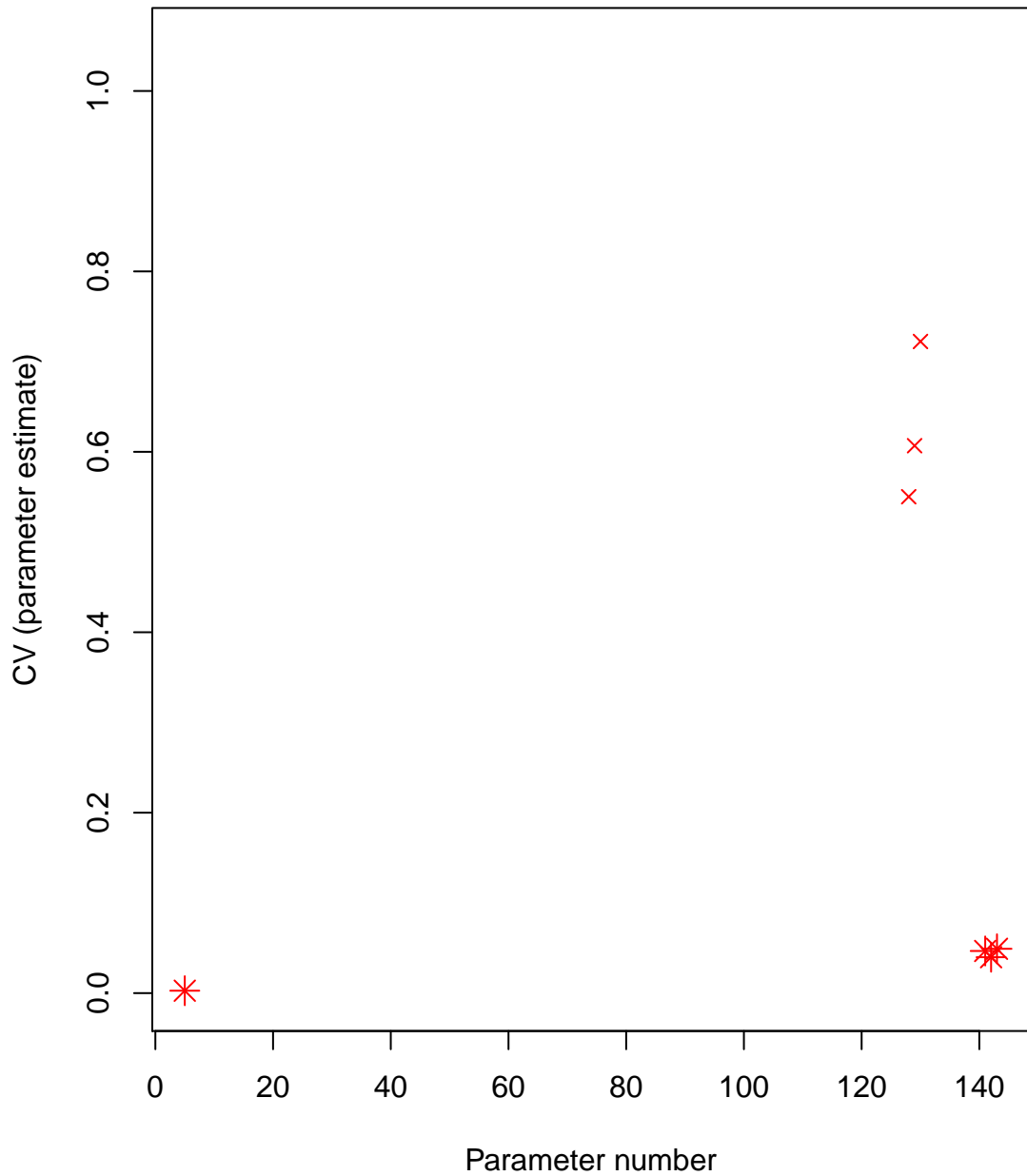


Likelihood Contribution

Model: y2000r0c1m1.7s1111111111\_000

Monday, 04 Nov 2019 at 10:49

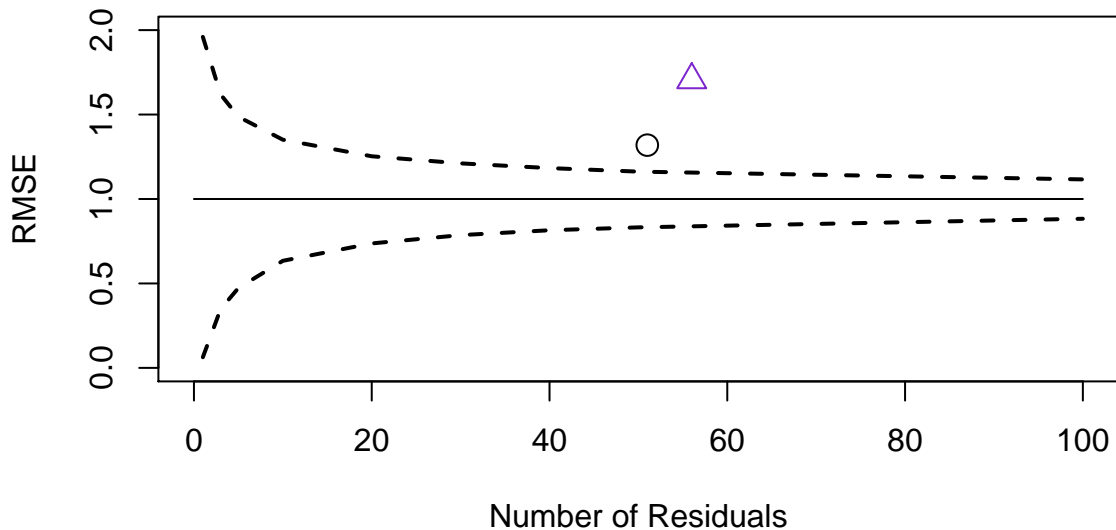




## Root Mean Square Error computed from Standardized Residuals

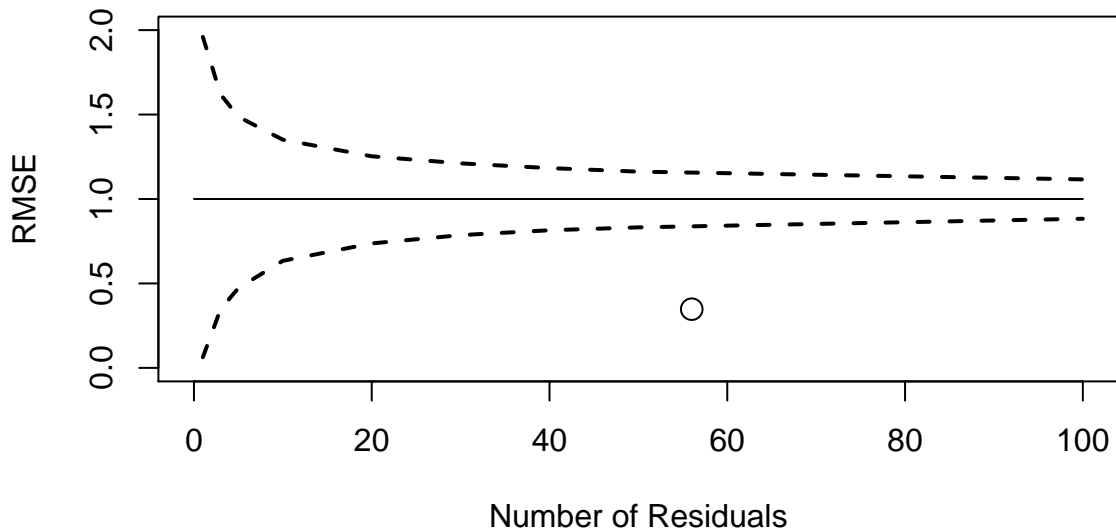
Component	# resids	RMSE
catch.tot	56	0.348
discard.tot	0	0
ind01	51	1.32
ind02	56	1.71
ind.total	107	1.53
N.year1	8	0.748
Fmult.year1	0	0
Fmult.devs.total	0	0
recruit.devs	0	0
fleet.sel.params	0	0
index.sel.params	0	0
q.year1	0	0
q.devs	0	0
SR.steepness	0	0
SR.scaler	0	0

Root Mean Square Error for Indices



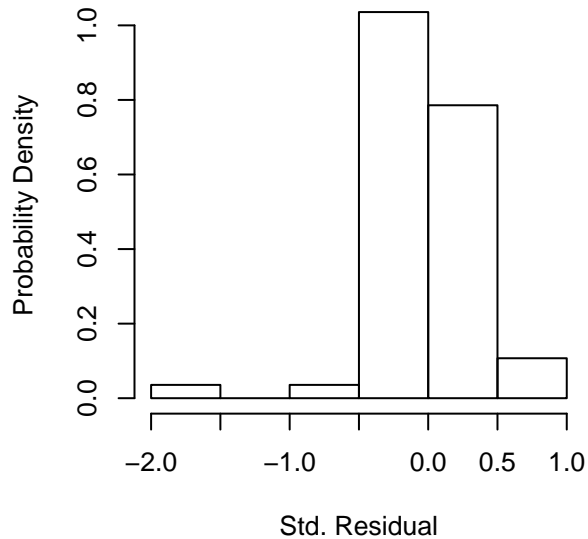
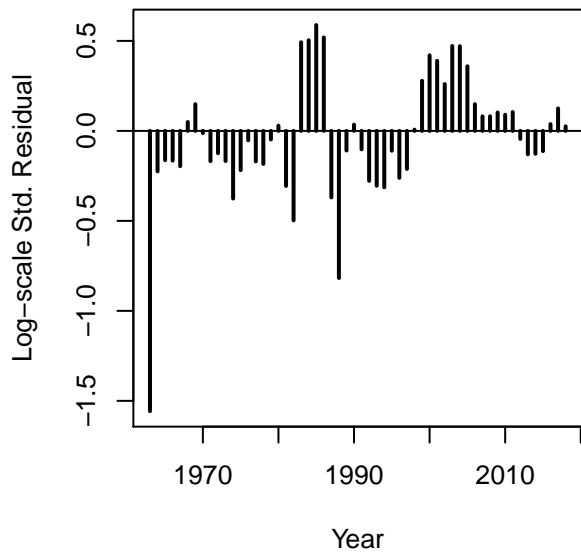
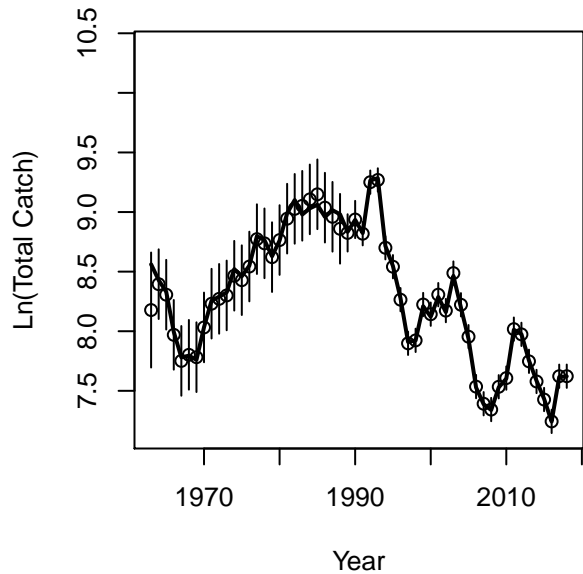
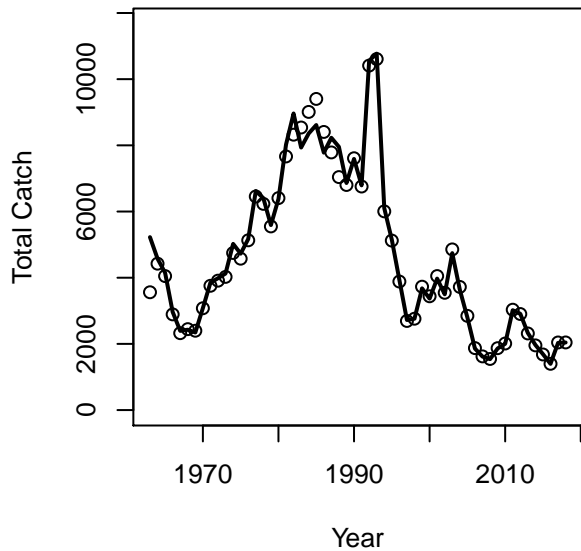
+ ind total  
△ INDEX-2  
○ INDEX-1

## Root Mean Square Error for Catch



○ catch.tot

# Fleet 1 Catch (FLEET-1)



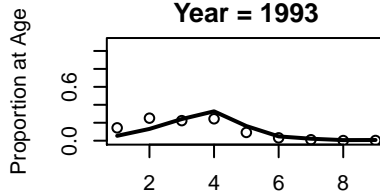


# Catch

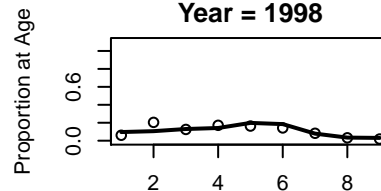
Fleet 1  
FLEET-1



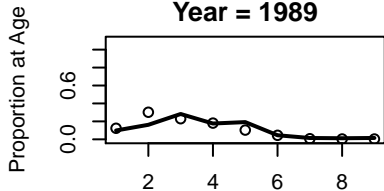
Year = 1993



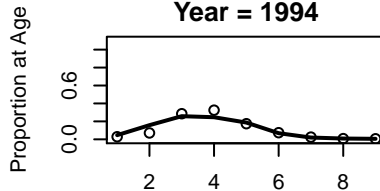
Year = 1998



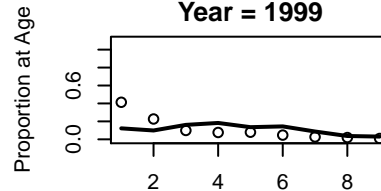
Year = 1989



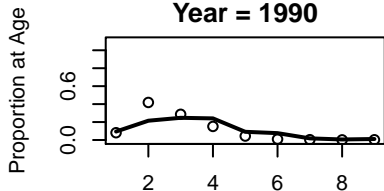
Year = 1994



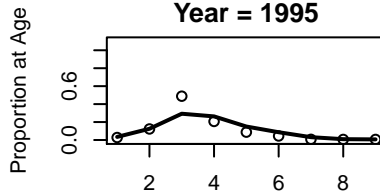
Year = 1999



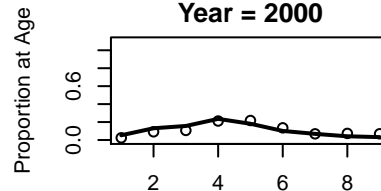
Year = 1990



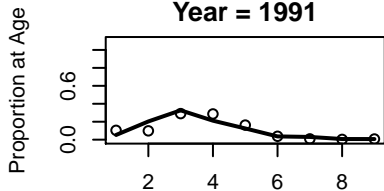
Year = 1995



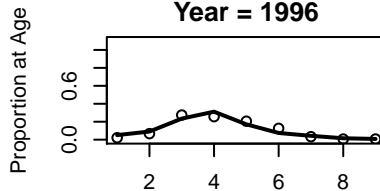
Year = 2000



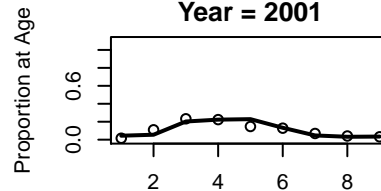
Year = 1991



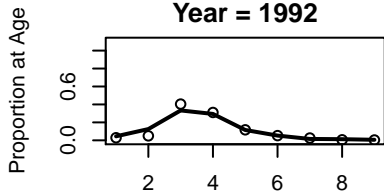
Year = 1996



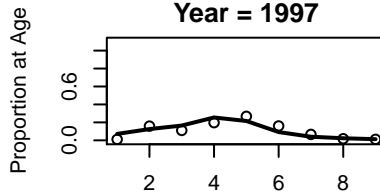
Year = 2001



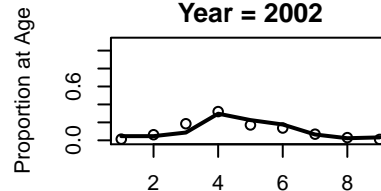
Year = 1992



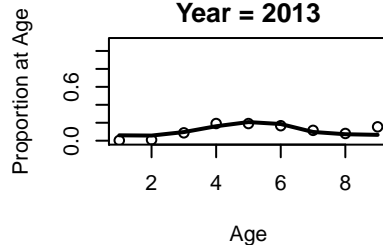
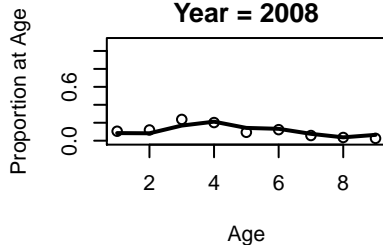
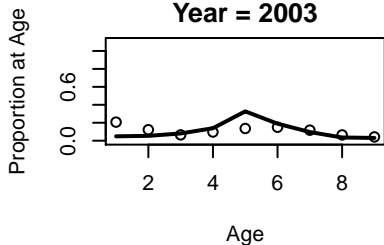
Year = 1997



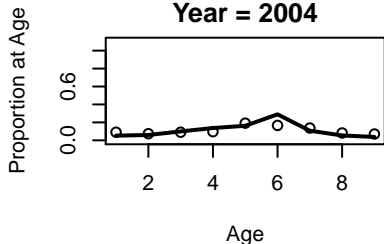
Year = 2002



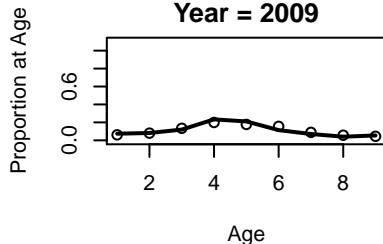
**Year = 2008**



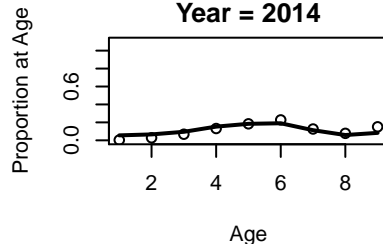
**Year = 2004**



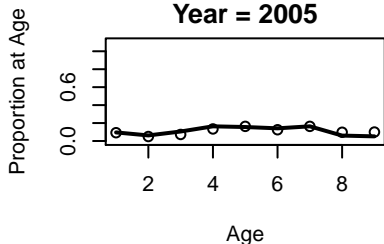
**Year = 2009**



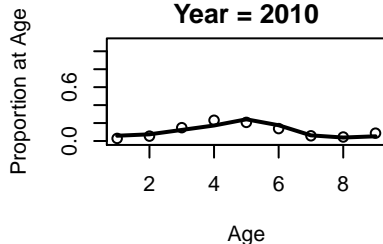
**Year = 2014**



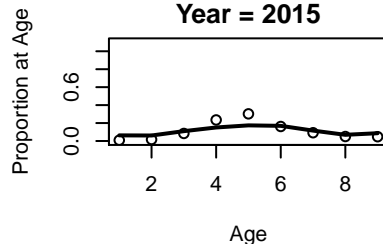
**Year = 2005**



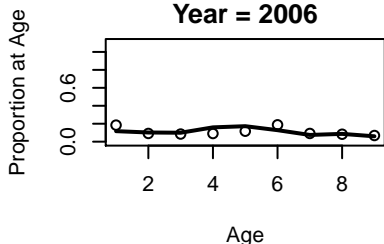
**Year = 2010**



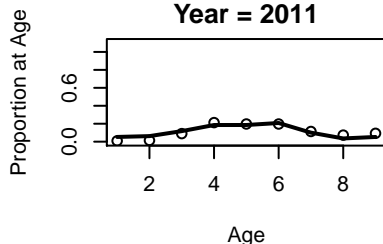
**Year = 2015**



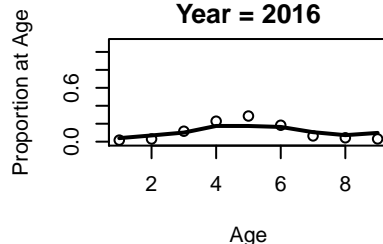
**Year = 2006**



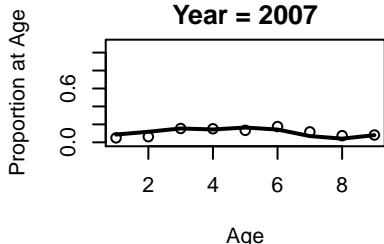
**Year = 2011**



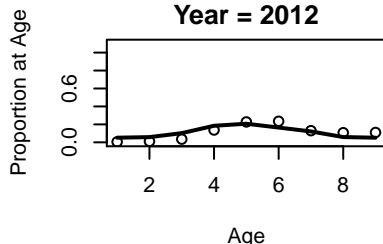
**Year = 2016**



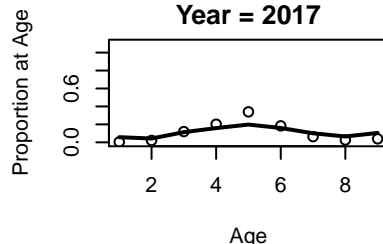
**Year = 2007**



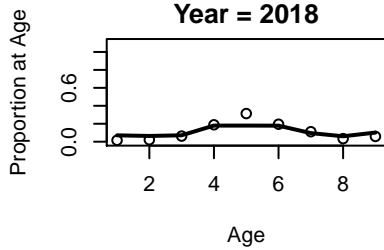
**Year = 2012**



**Year = 2017**

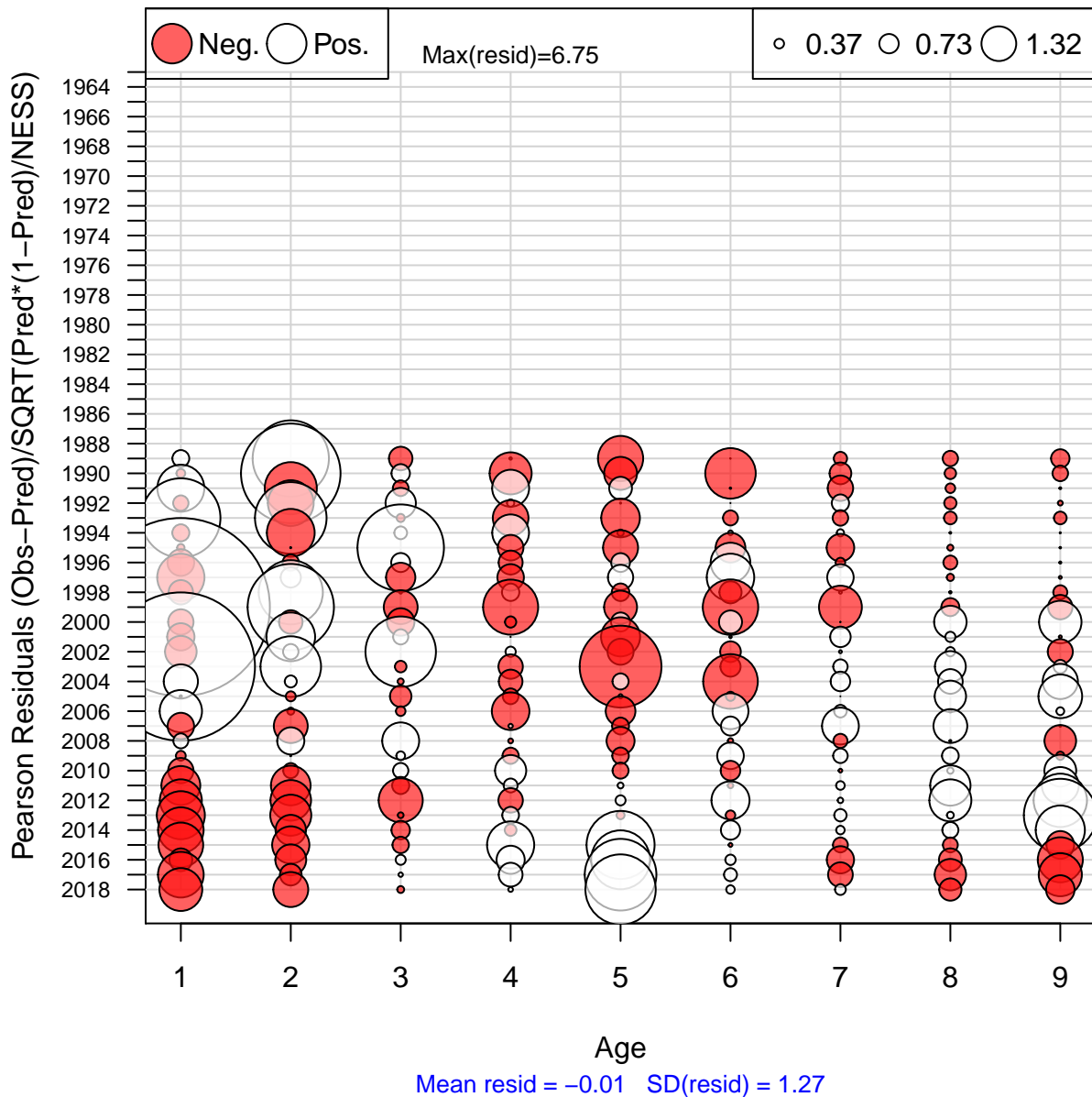


Year = 2018

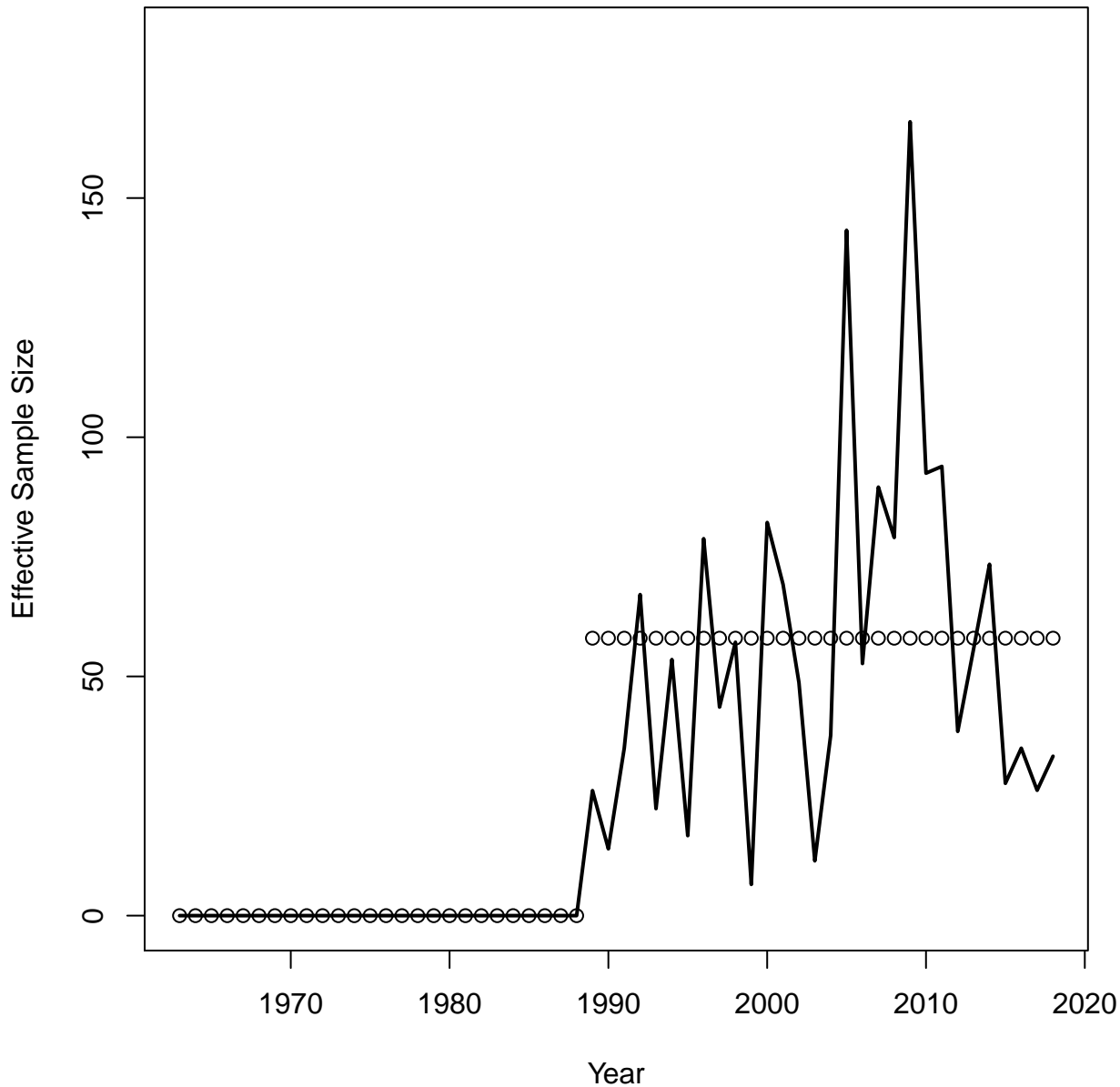


Catch

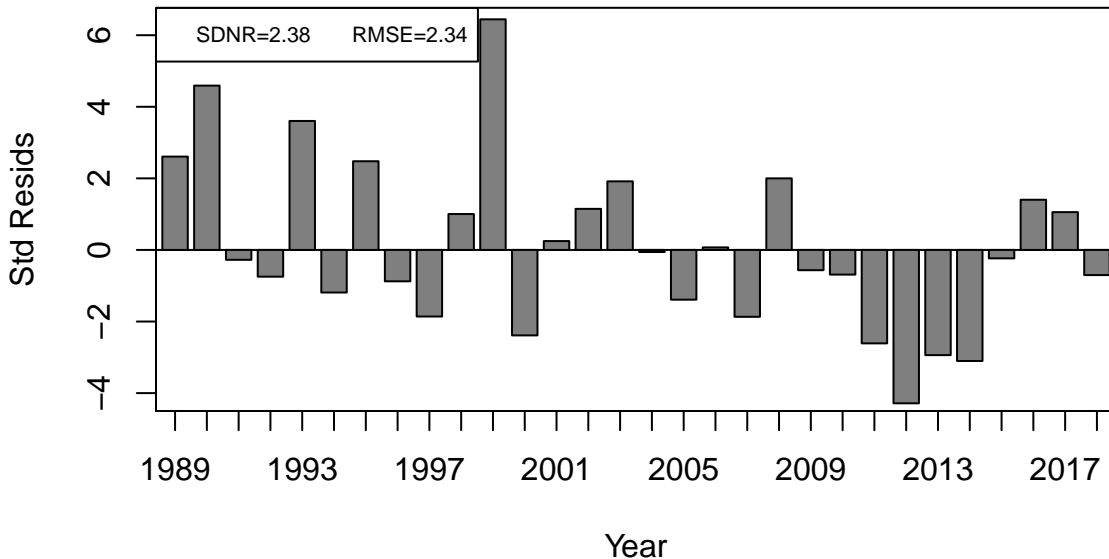
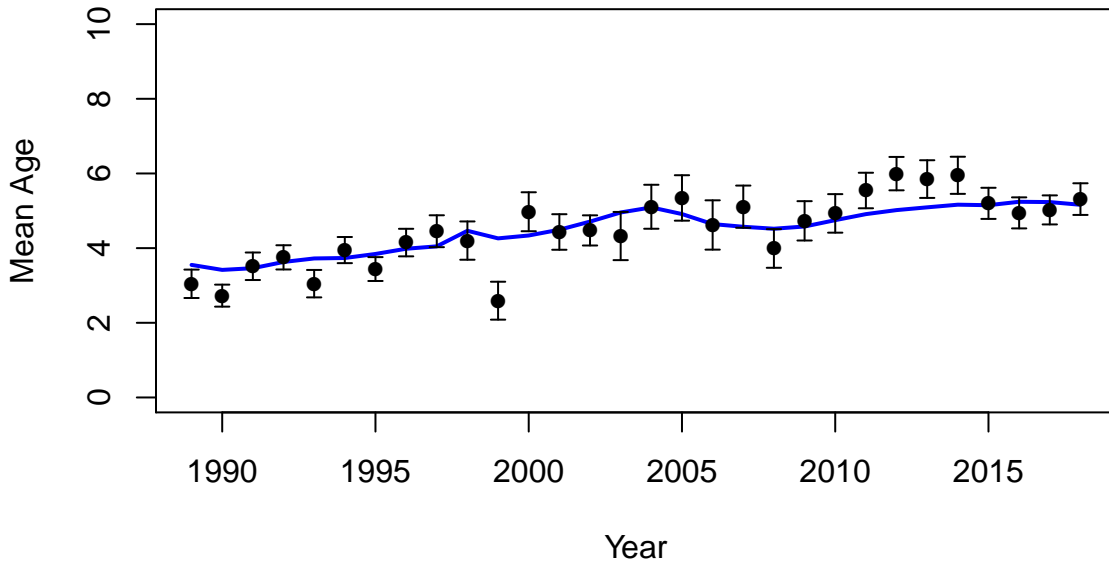
# Age Comp Residuals for Catch by Fleet 1 (FLEET-1)



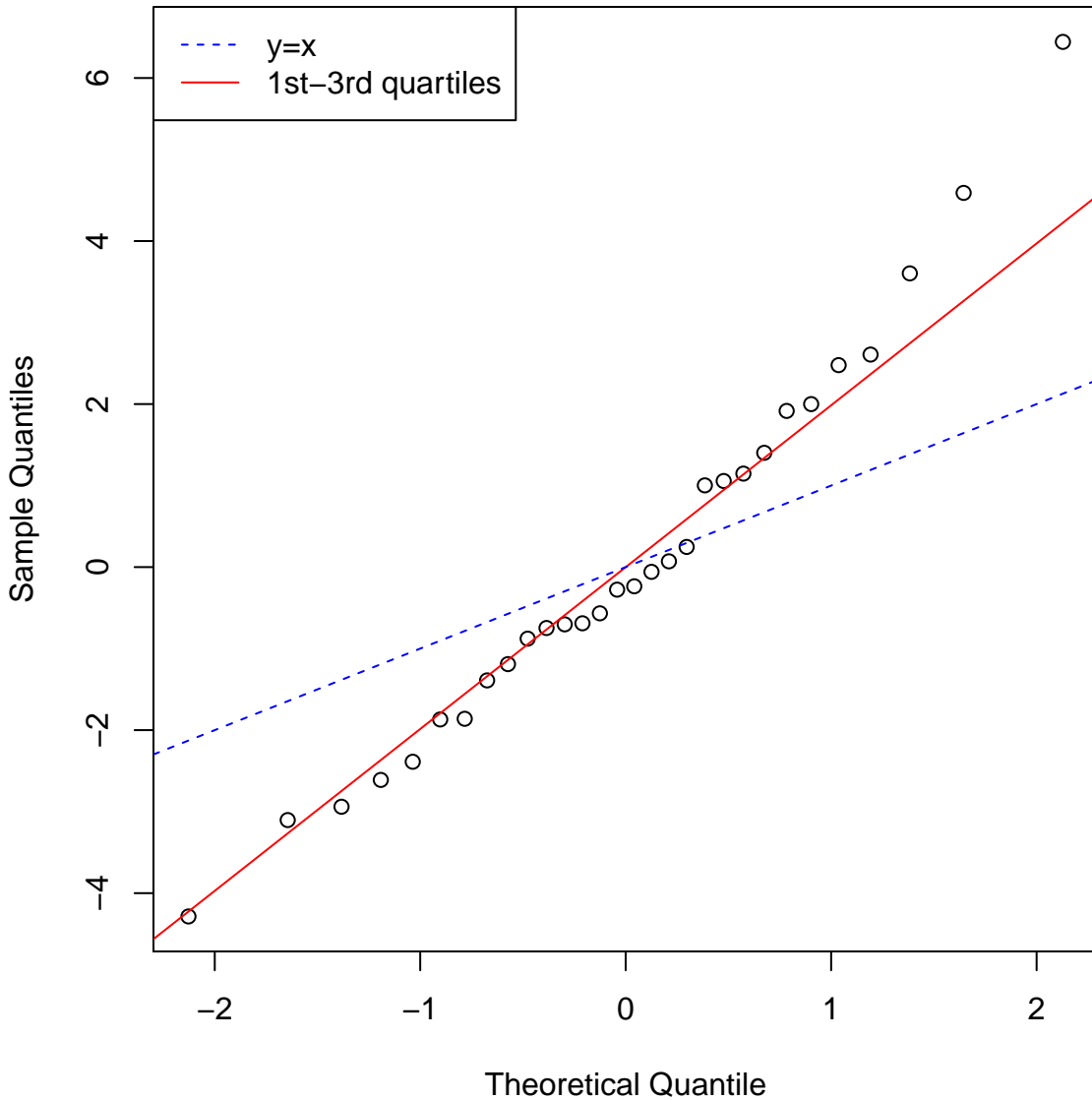
# Catch Neff Fleet 1 (FLEET-1)



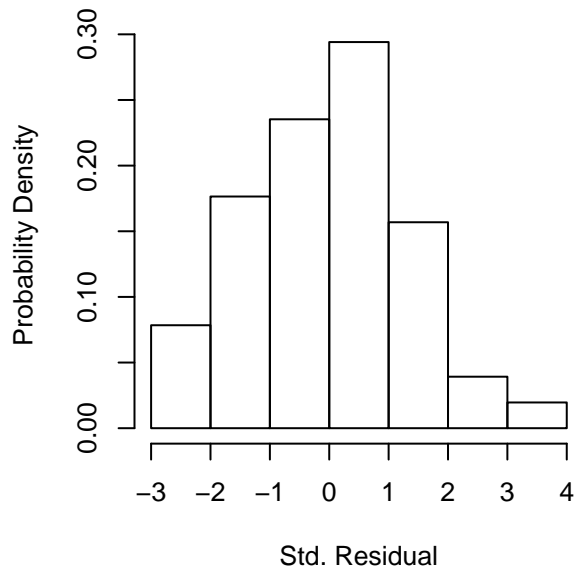
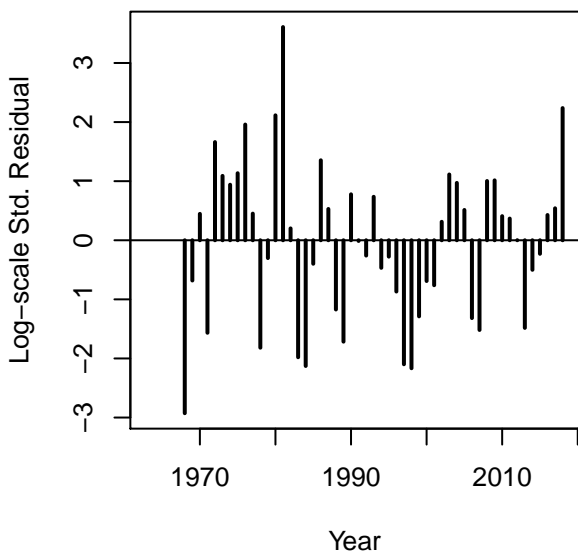
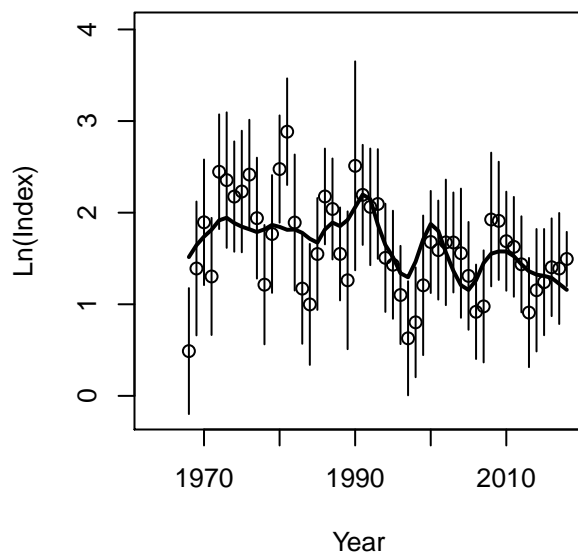
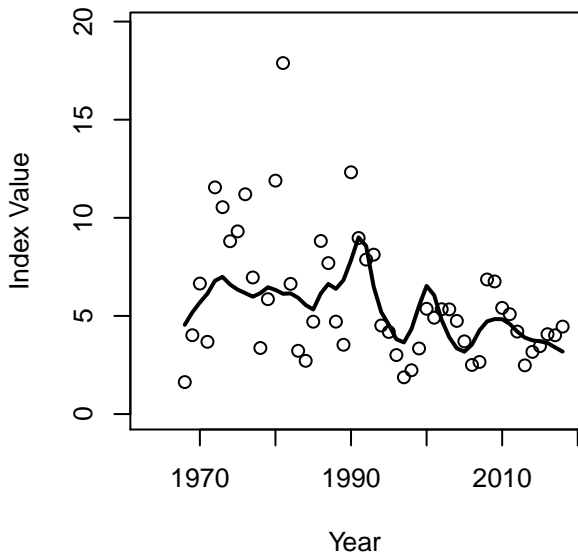
### Catch Fleet 1 (FLEET-1) ESS = 58



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

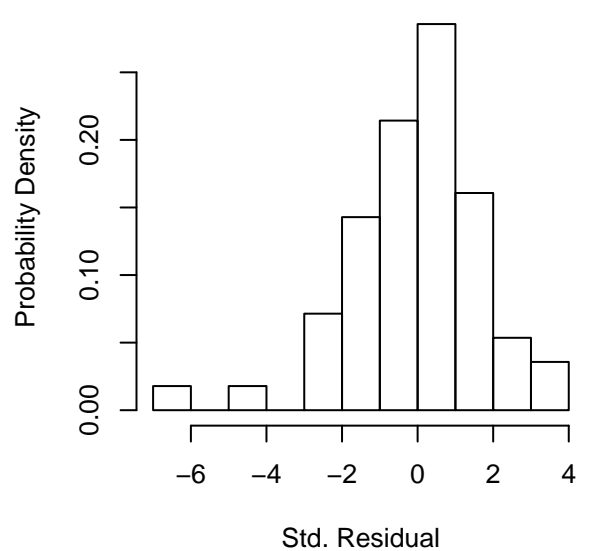
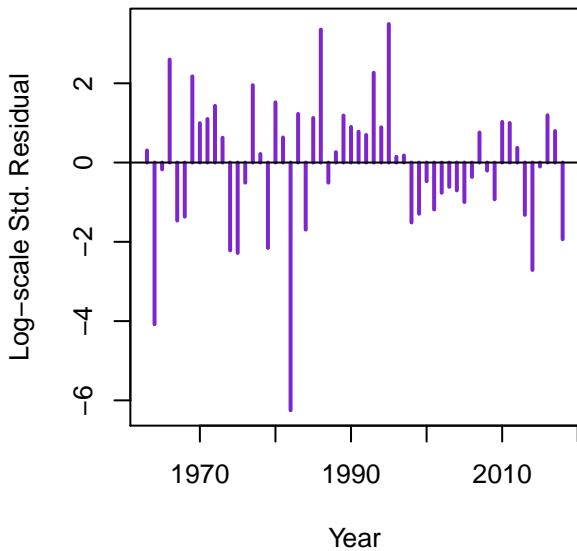
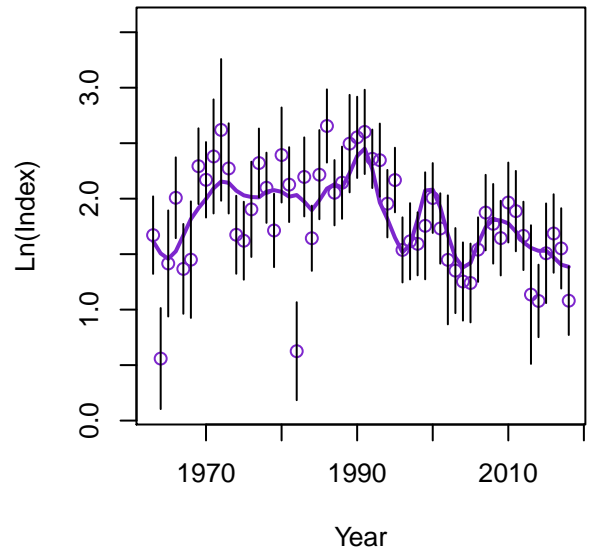
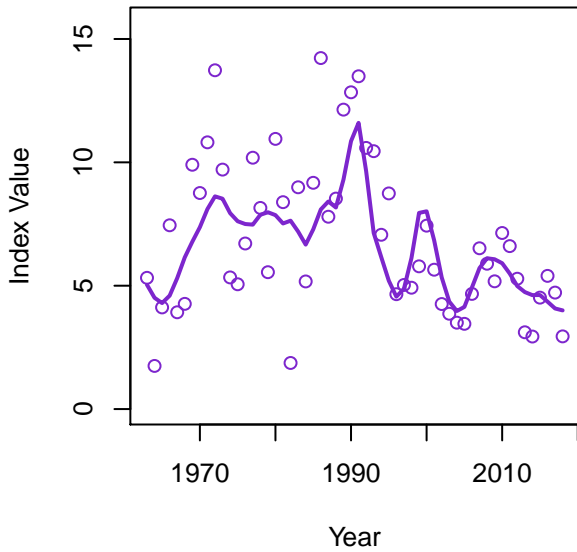


# Index 1 (INDEX-1)

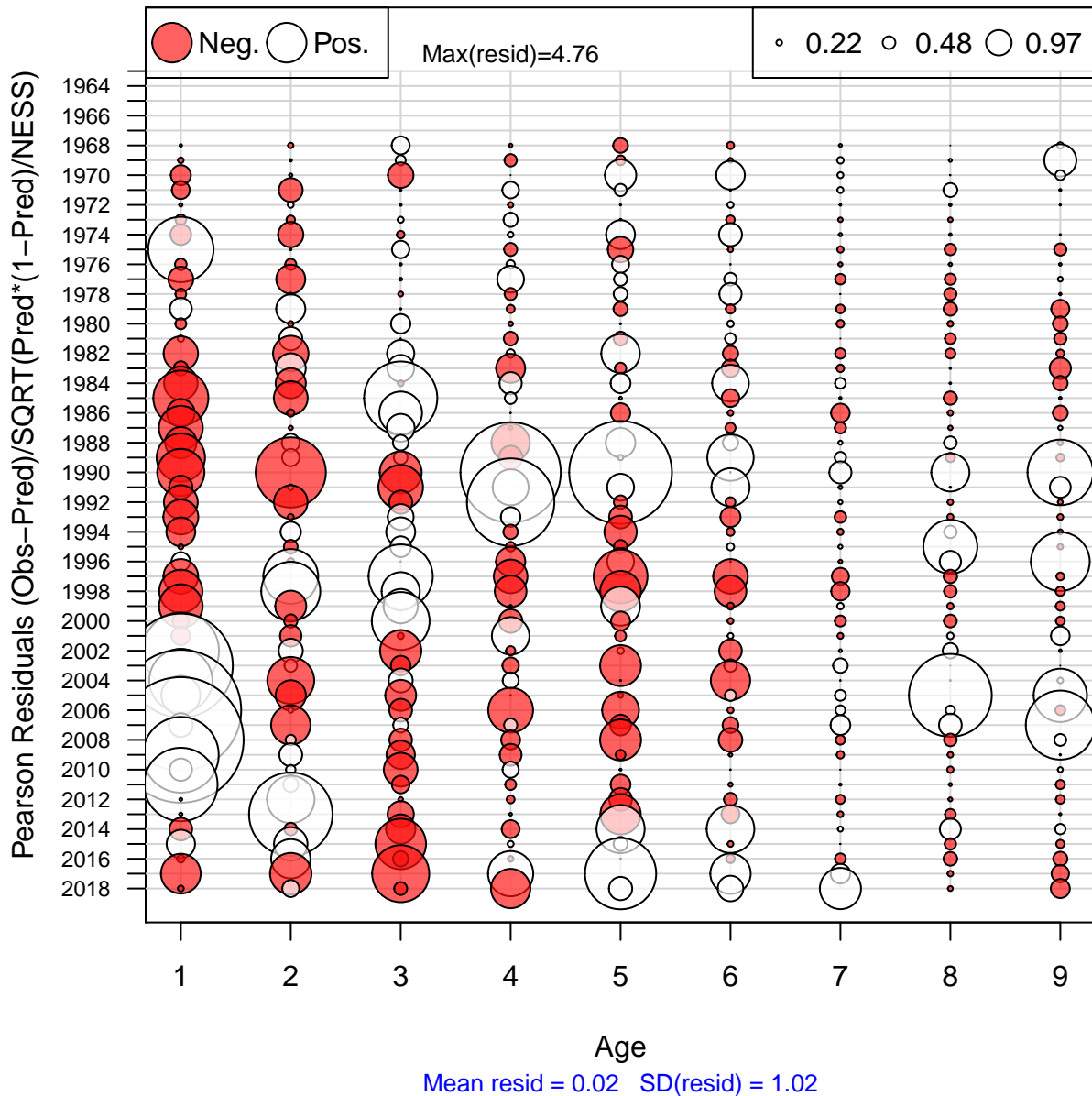




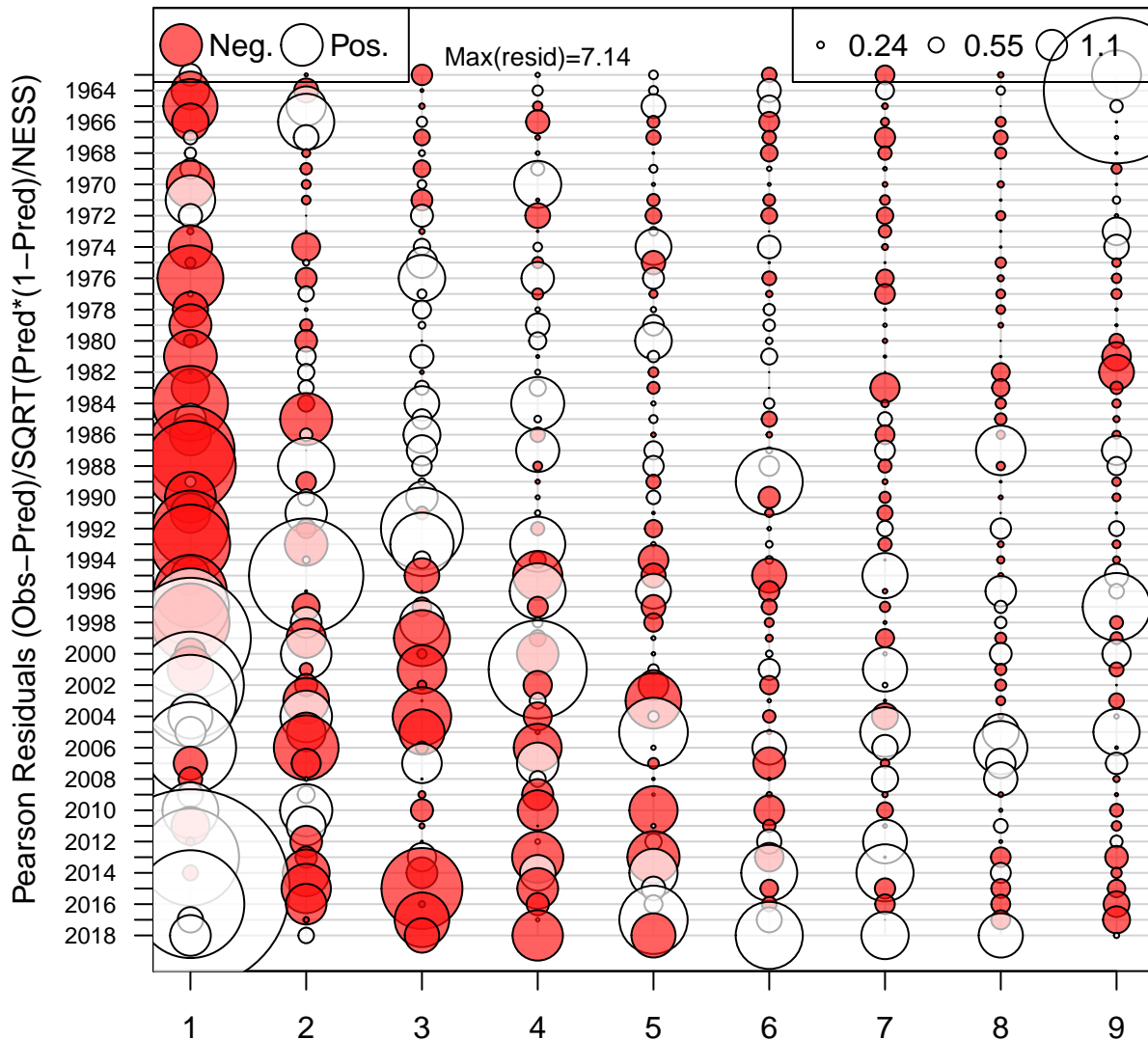
## Index 2 (INDEX-2)



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

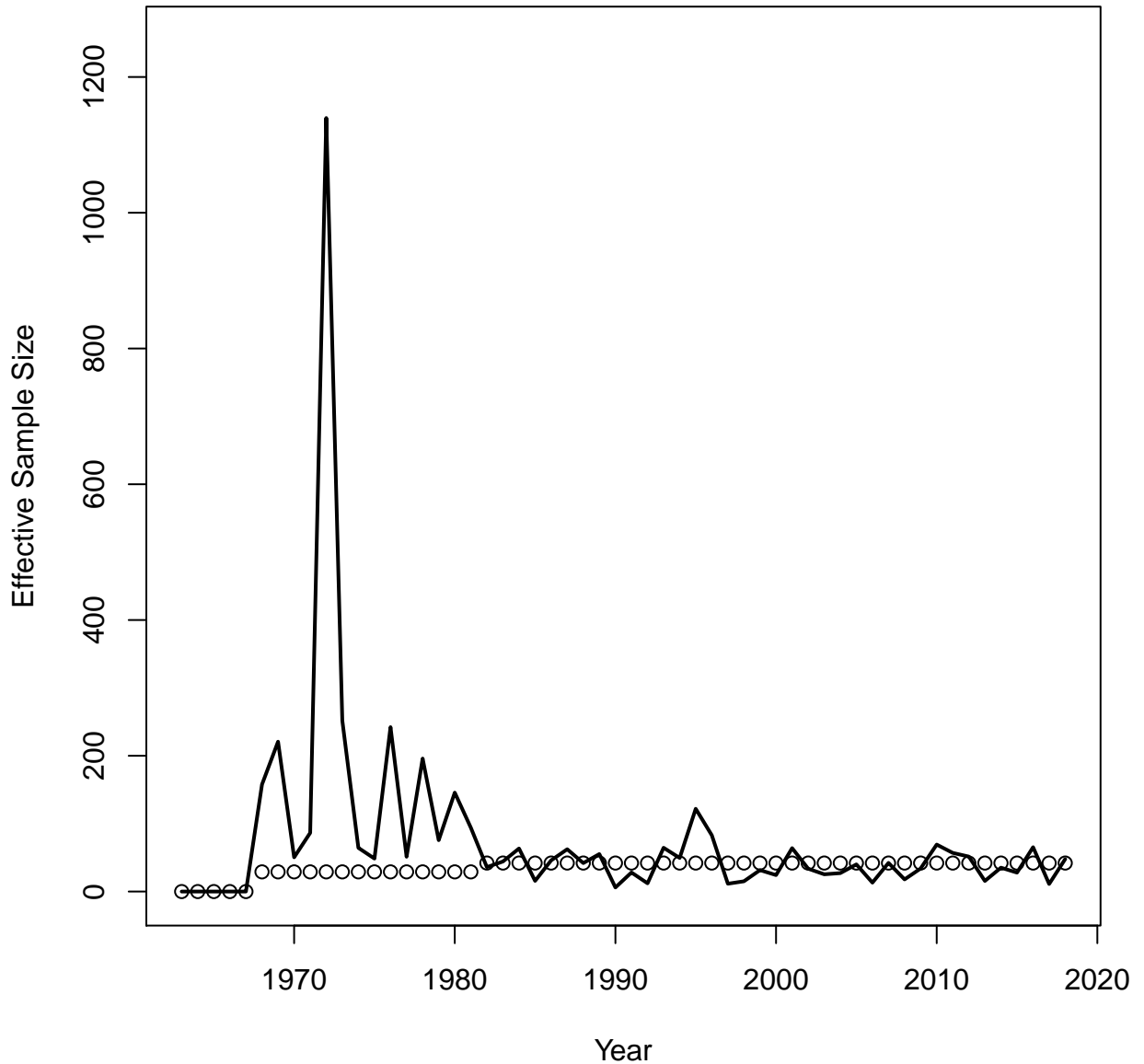


## Age Comp Residuals for Index 2 (INDEX-2)

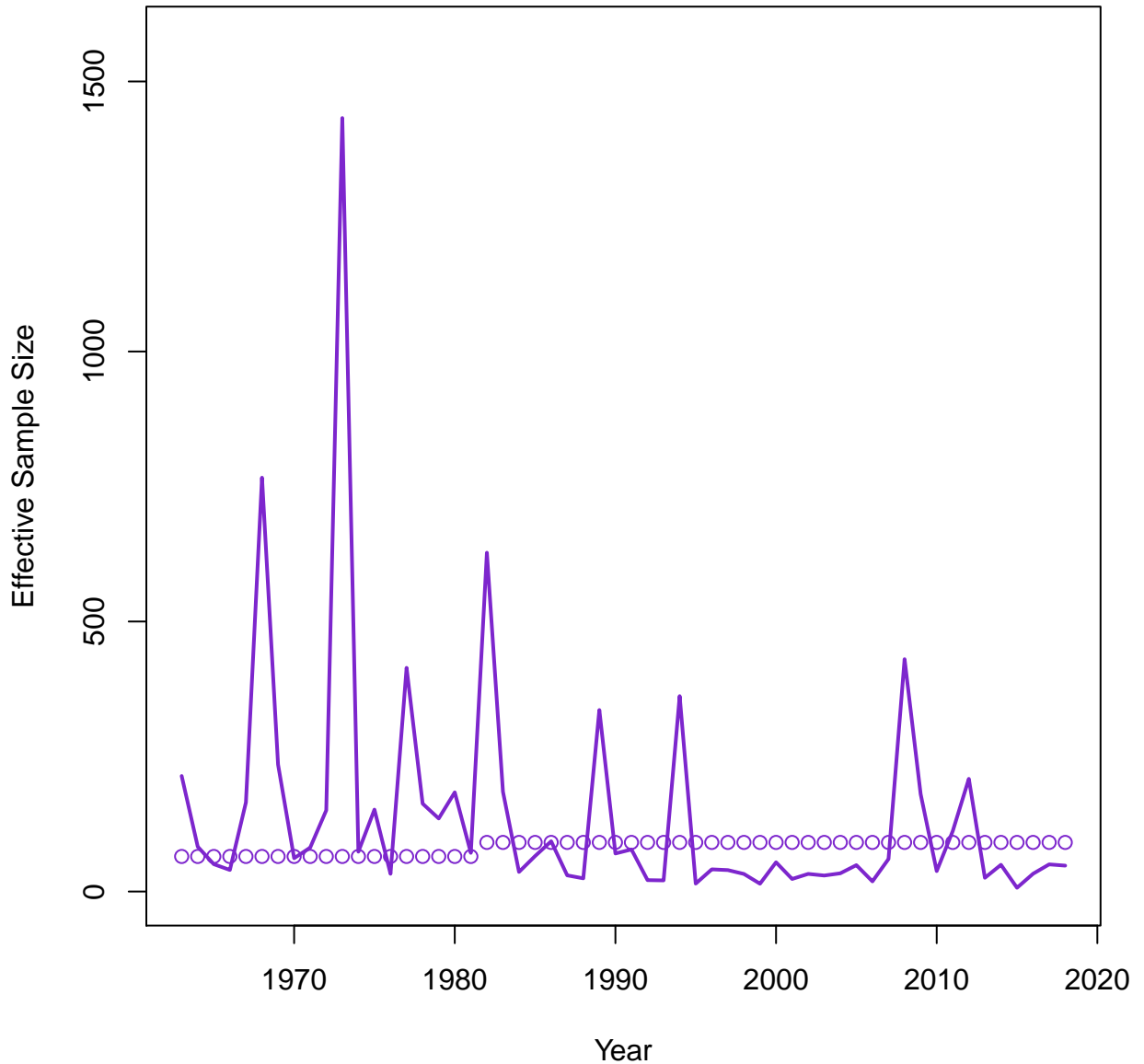


Mean resid = 0.02 SD(resid) = 1.15

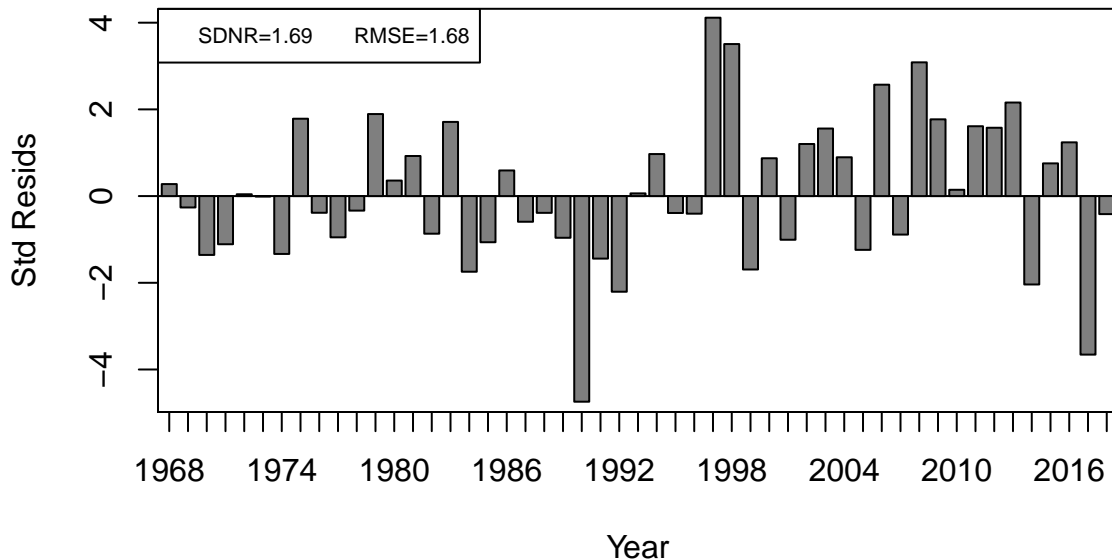
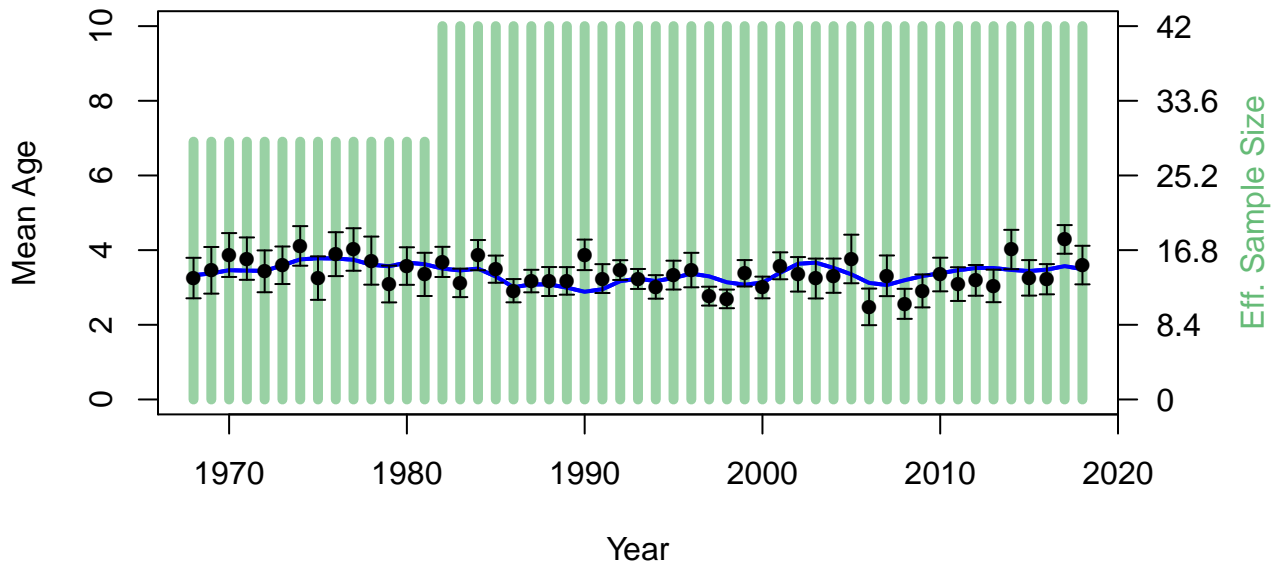
# Index Neff 1 (INDEX-1)



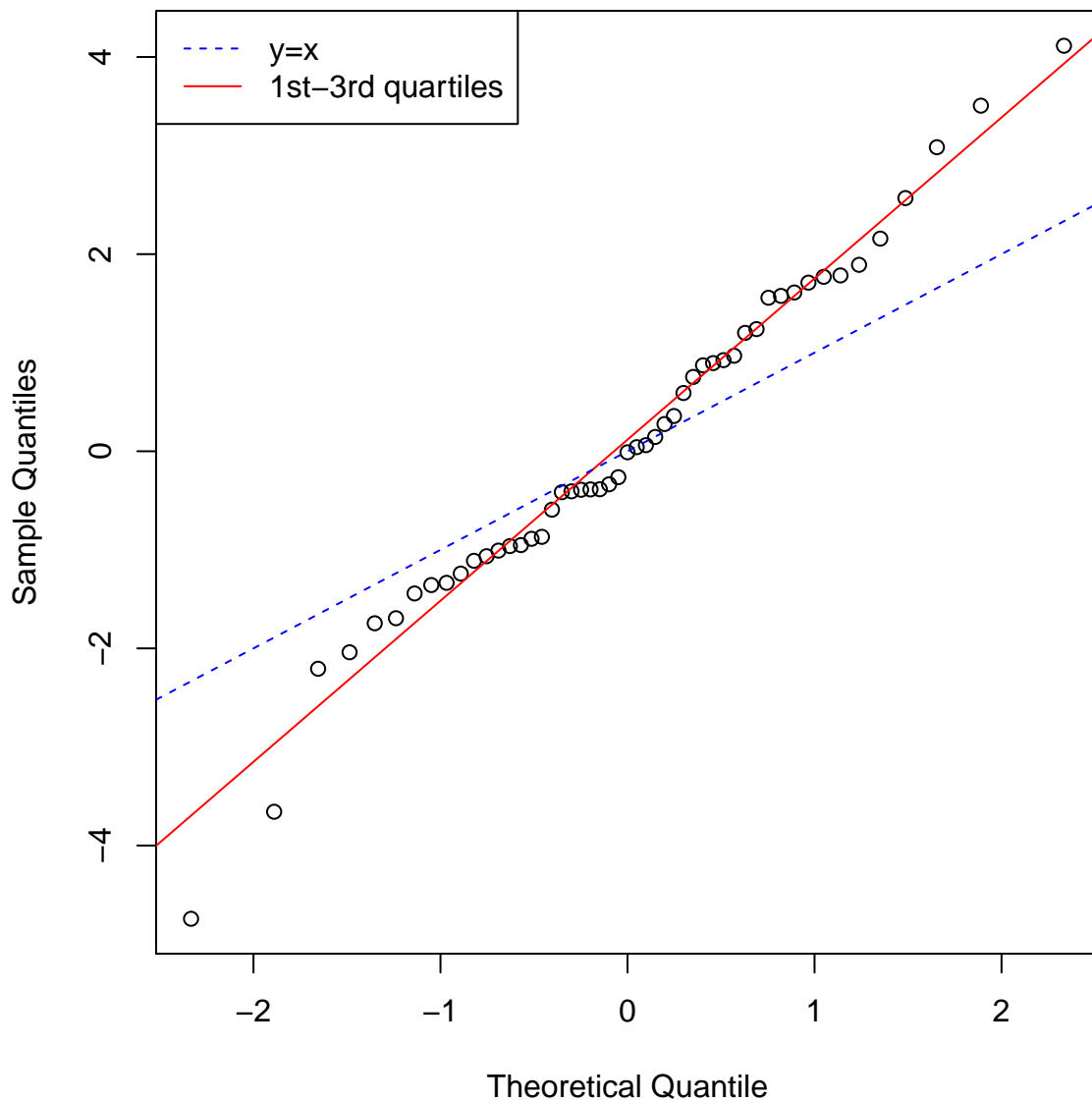
## Index Neff 2 (INDEX-2)



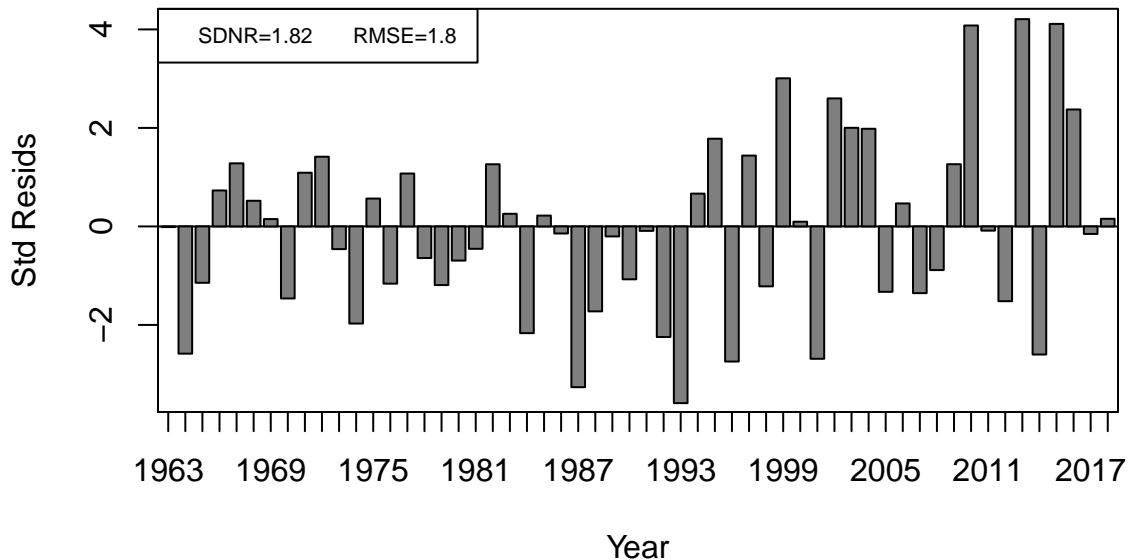
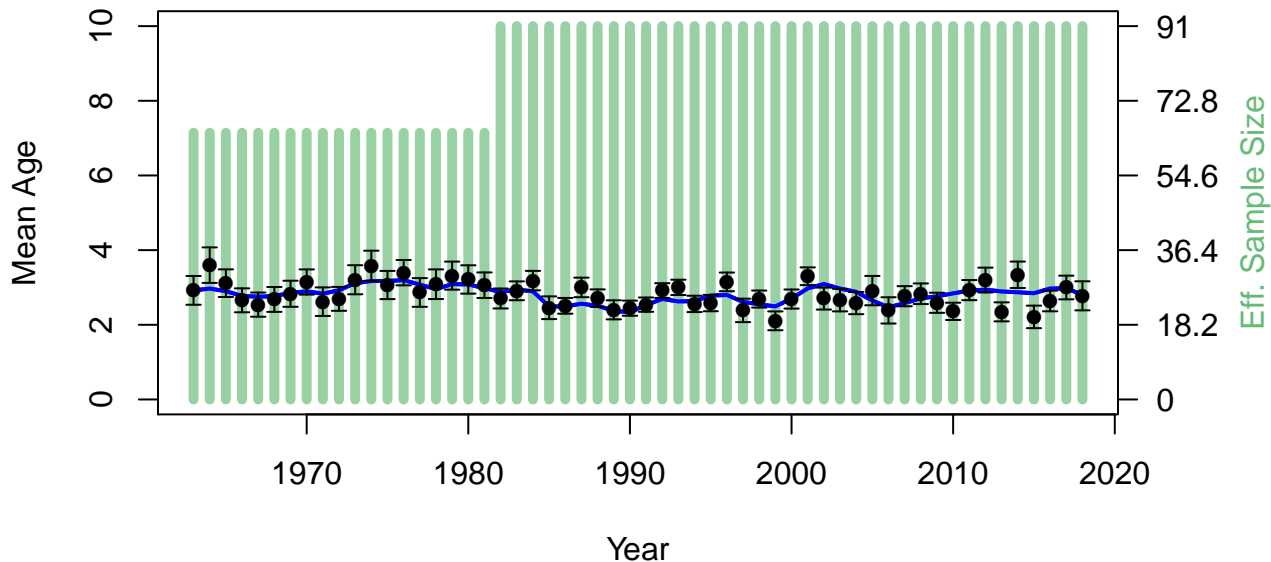
# Index 1 (INDEX-1)



# Index 1 (INDEX-1)

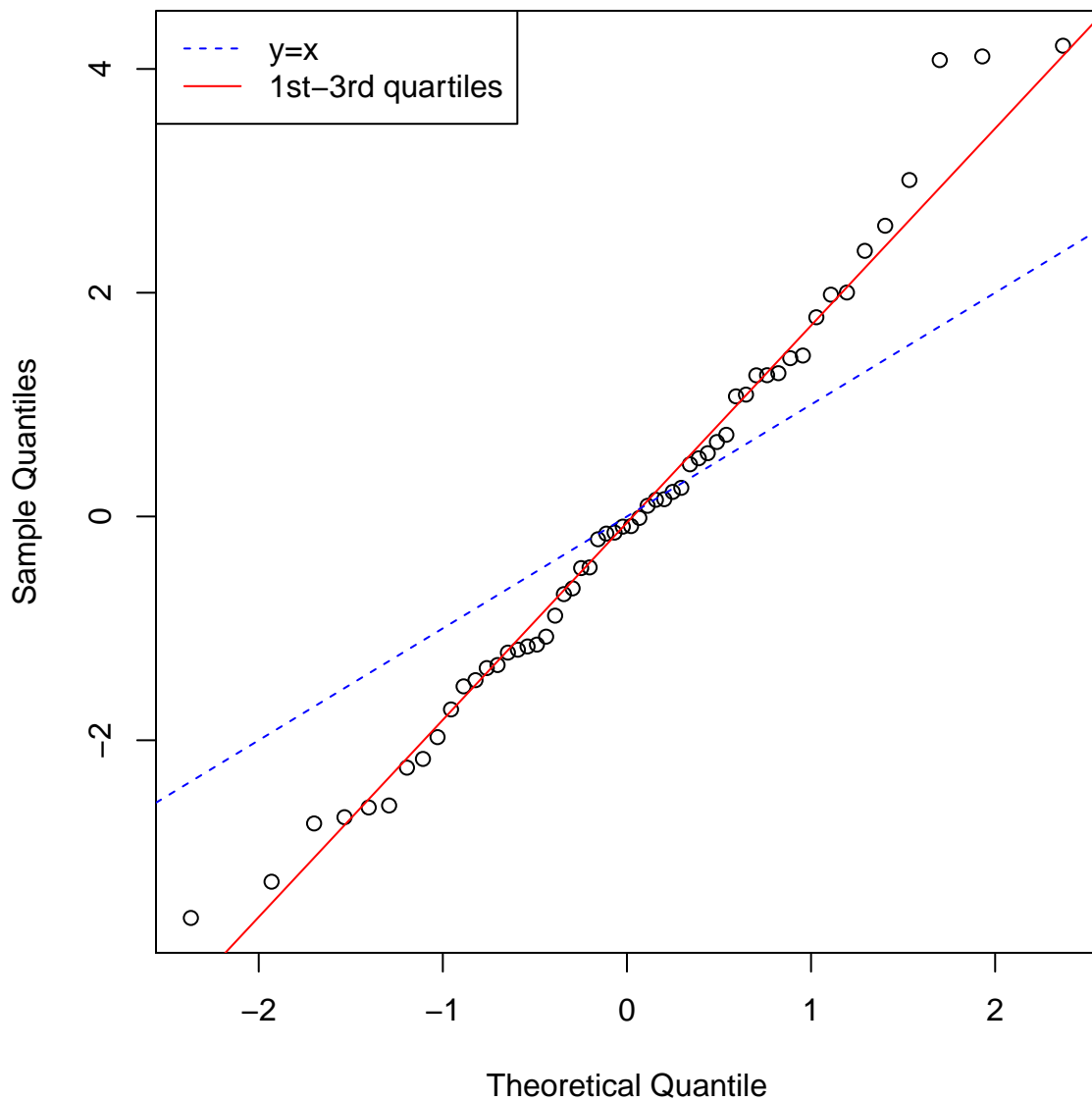


Index 2 (INDEX-2)

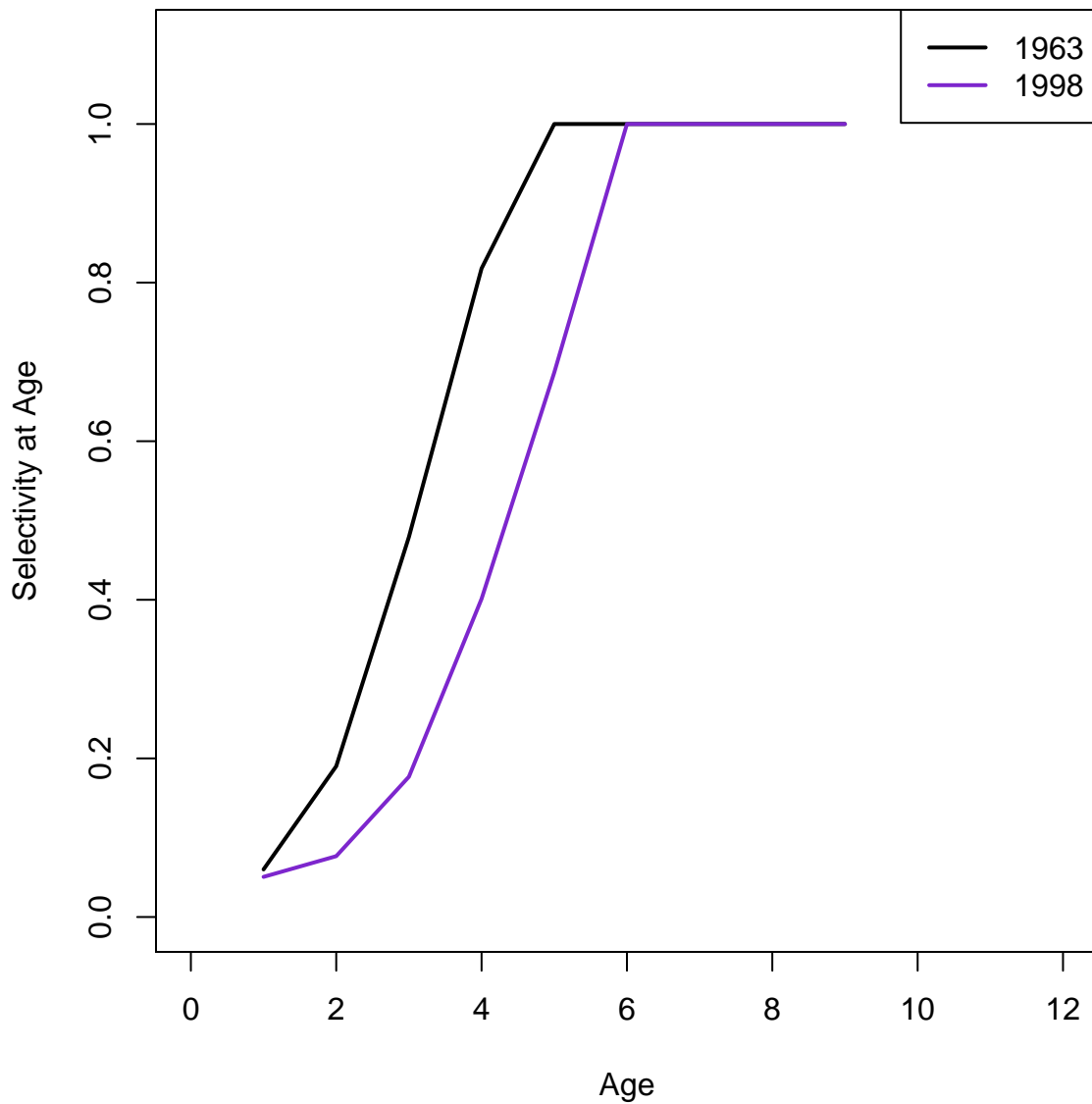


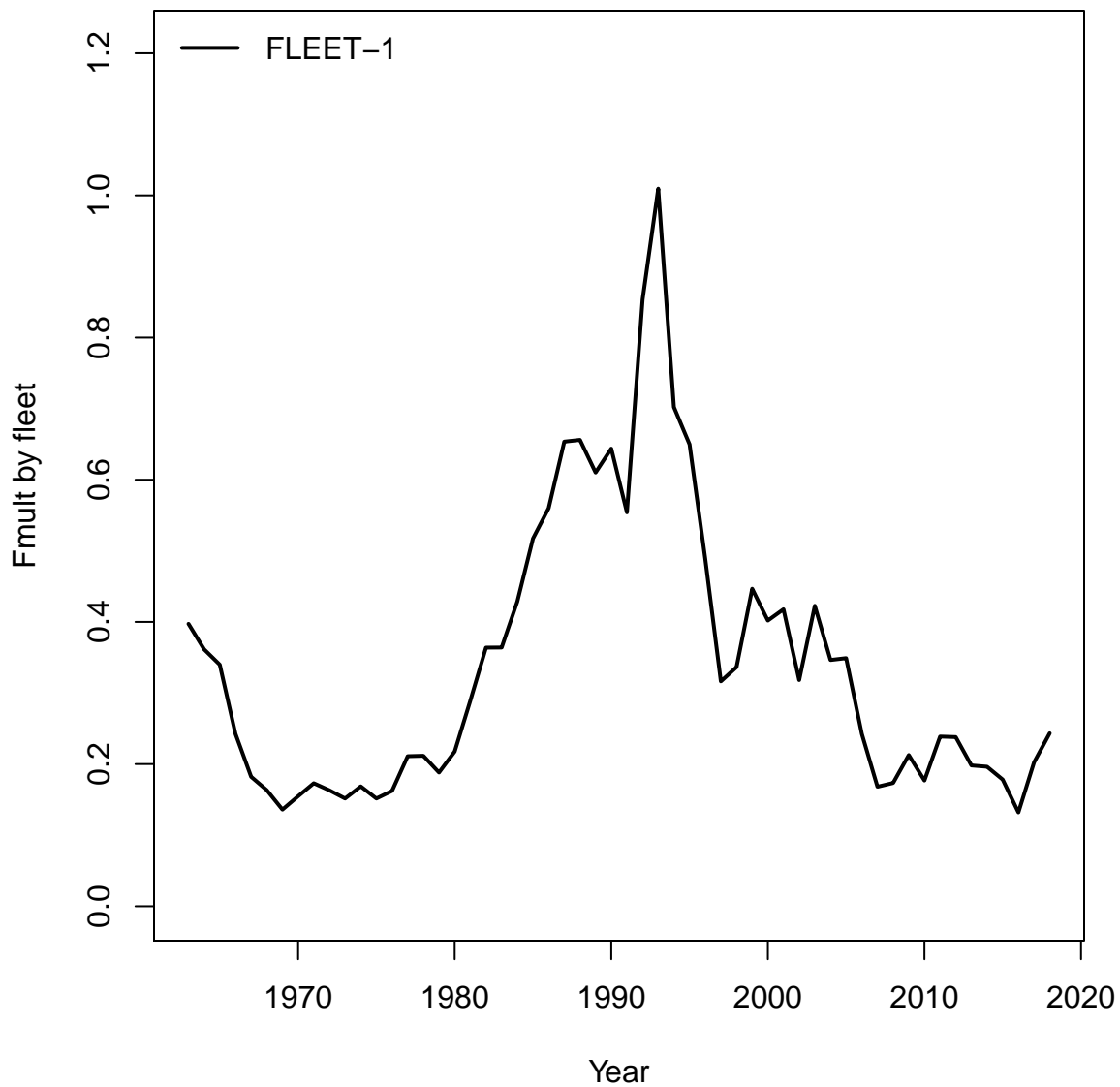


## Index 2 (INDEX-2)

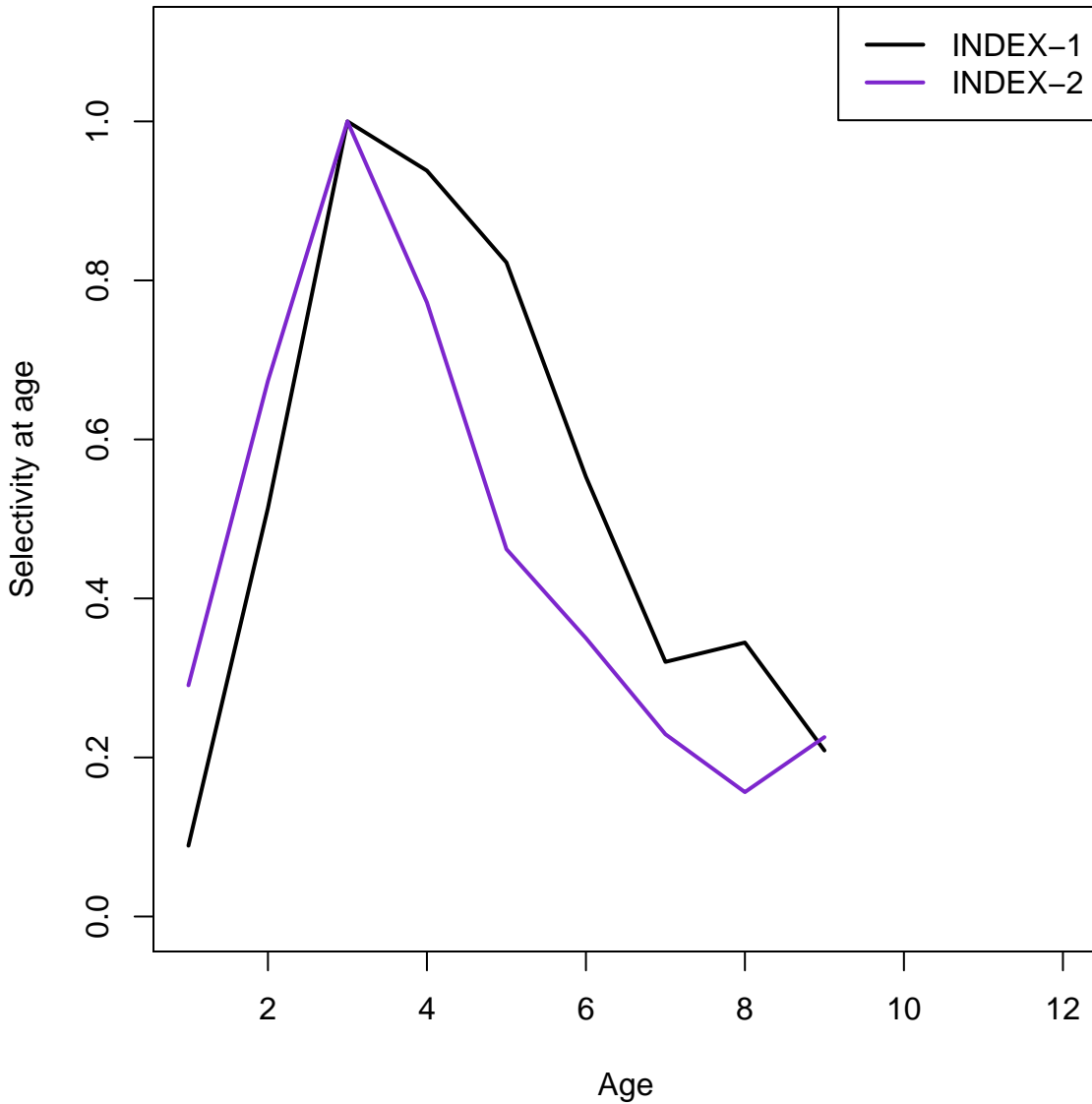


# Fleet 1 (FLEET-1)





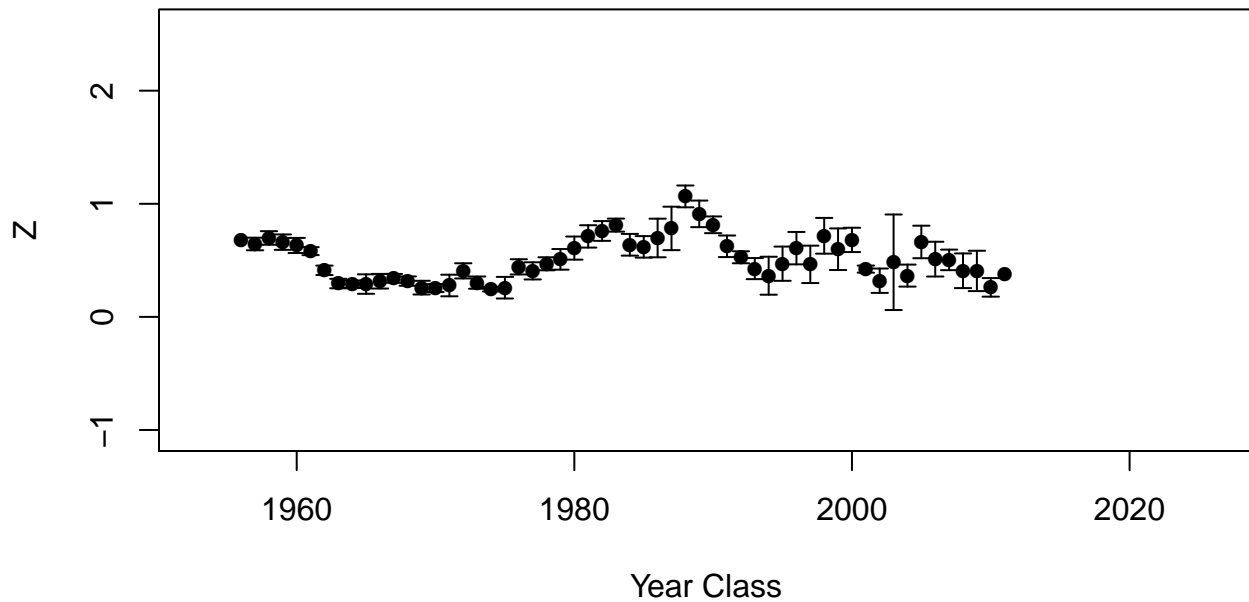
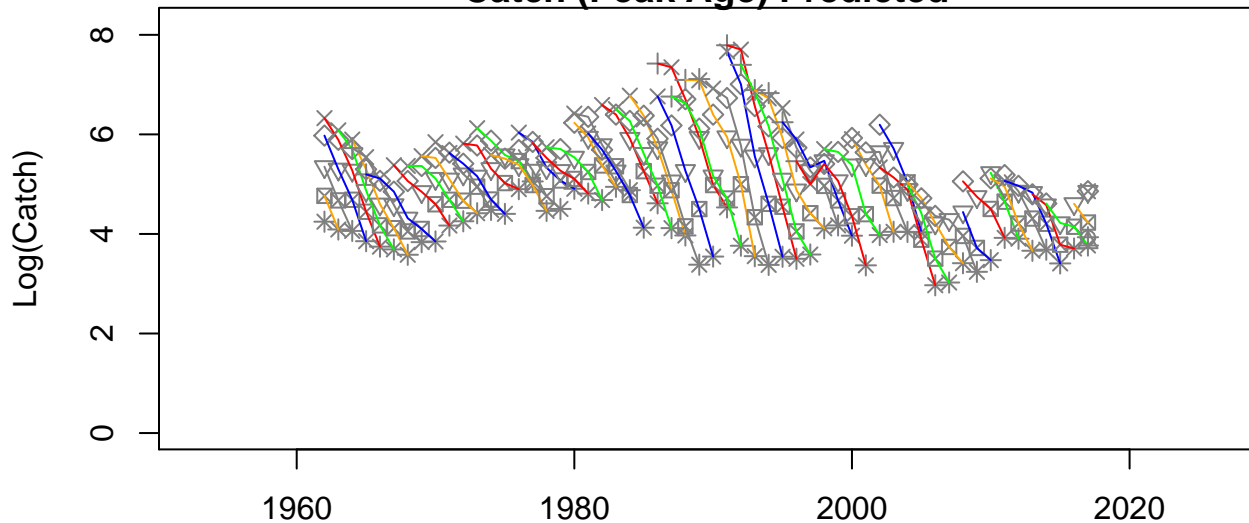
# Indices



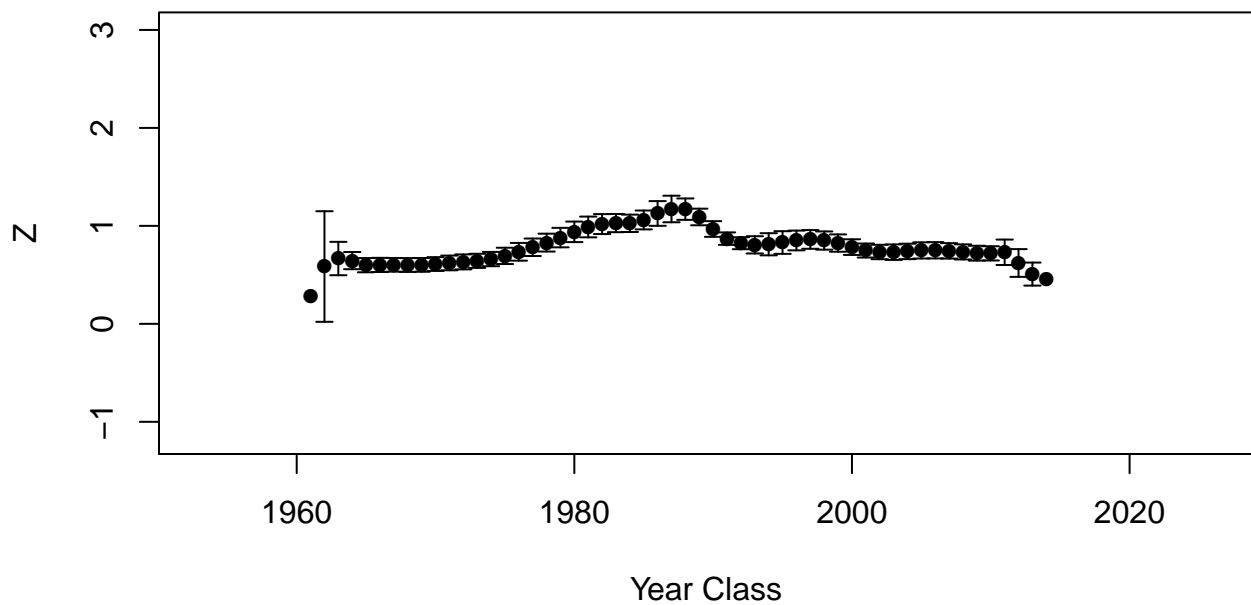
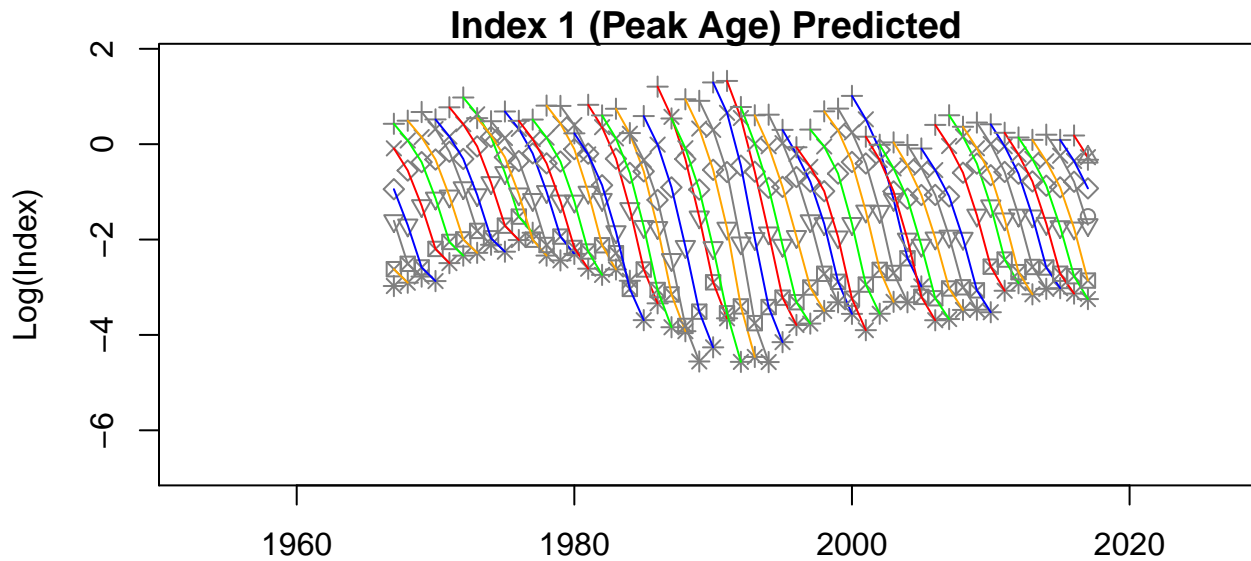
**Catch (Peak Age) Observed**



**Catch (Peak Age) Predicted**

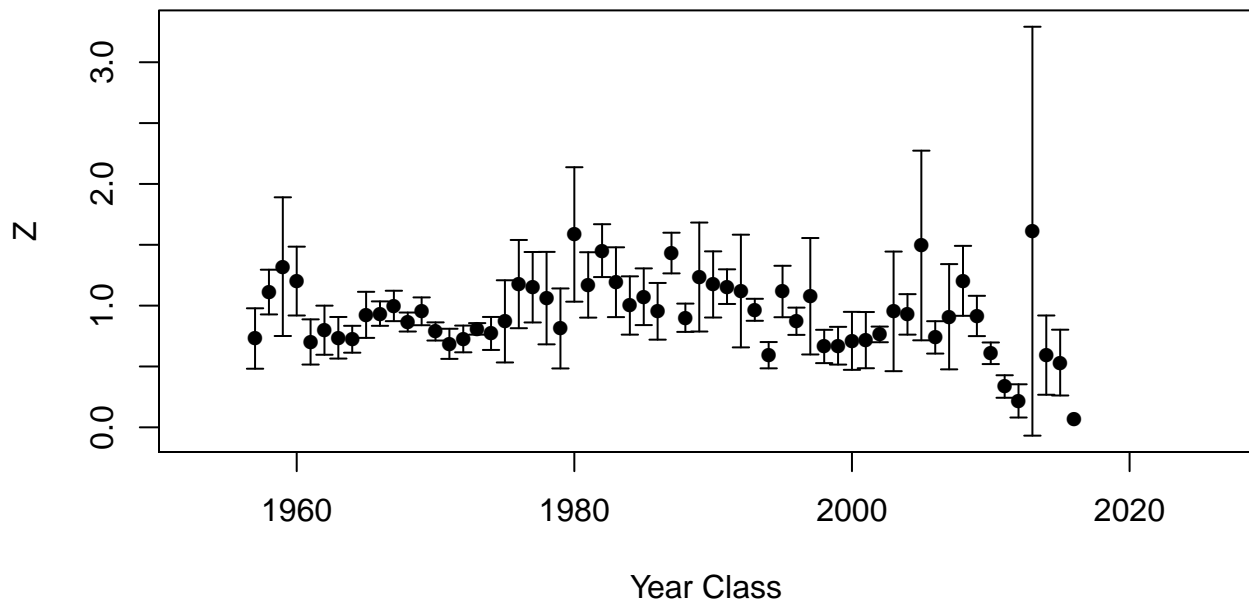




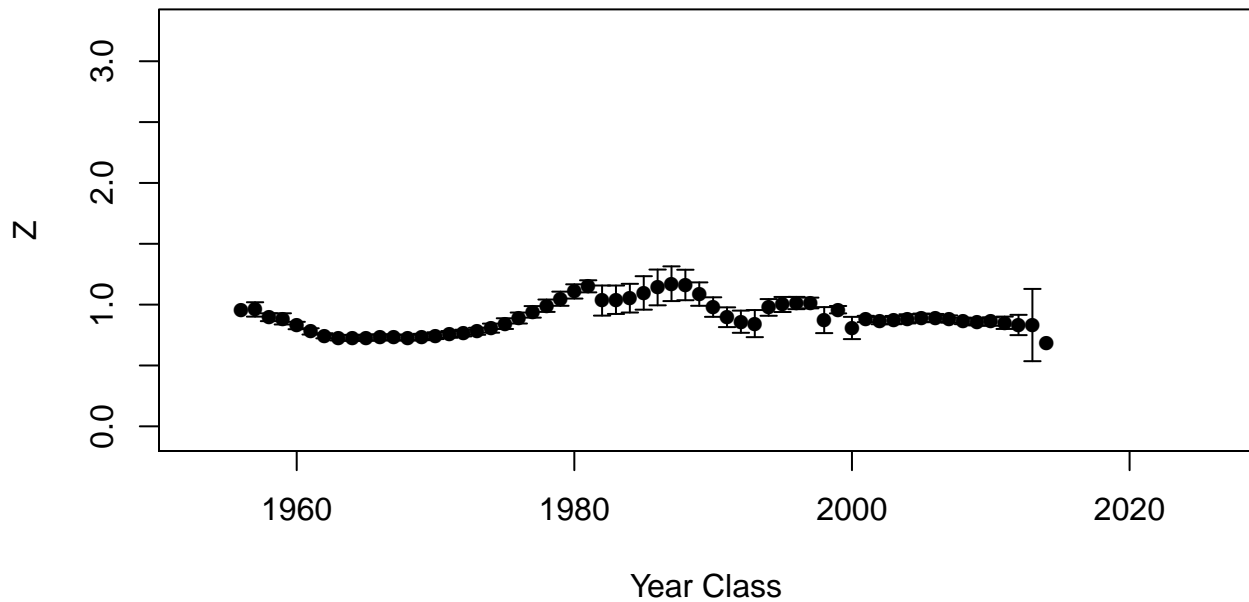
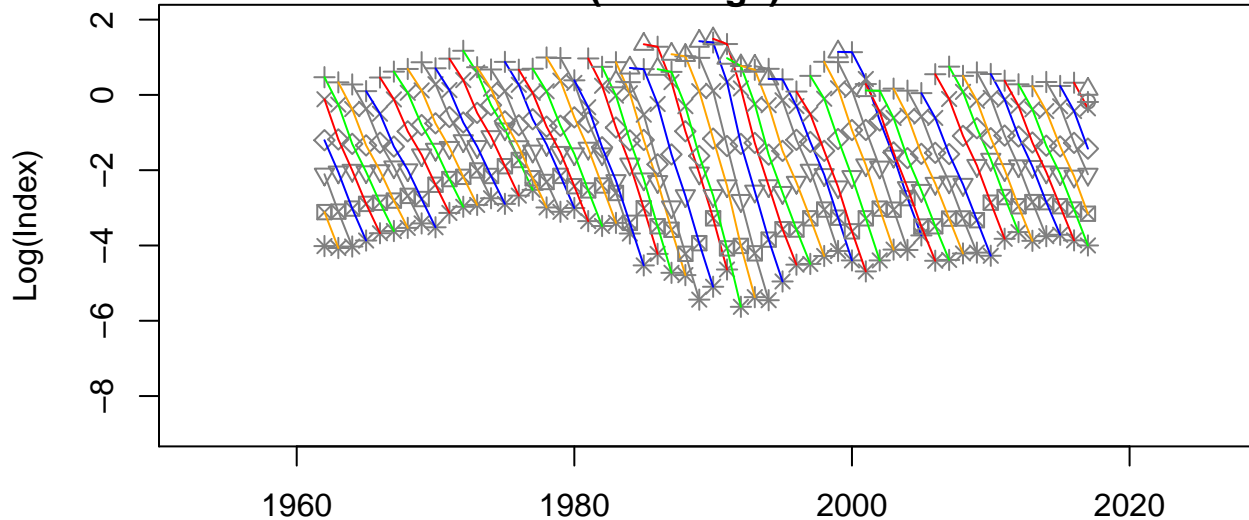




**Index 2 (Peak Age) Observed**



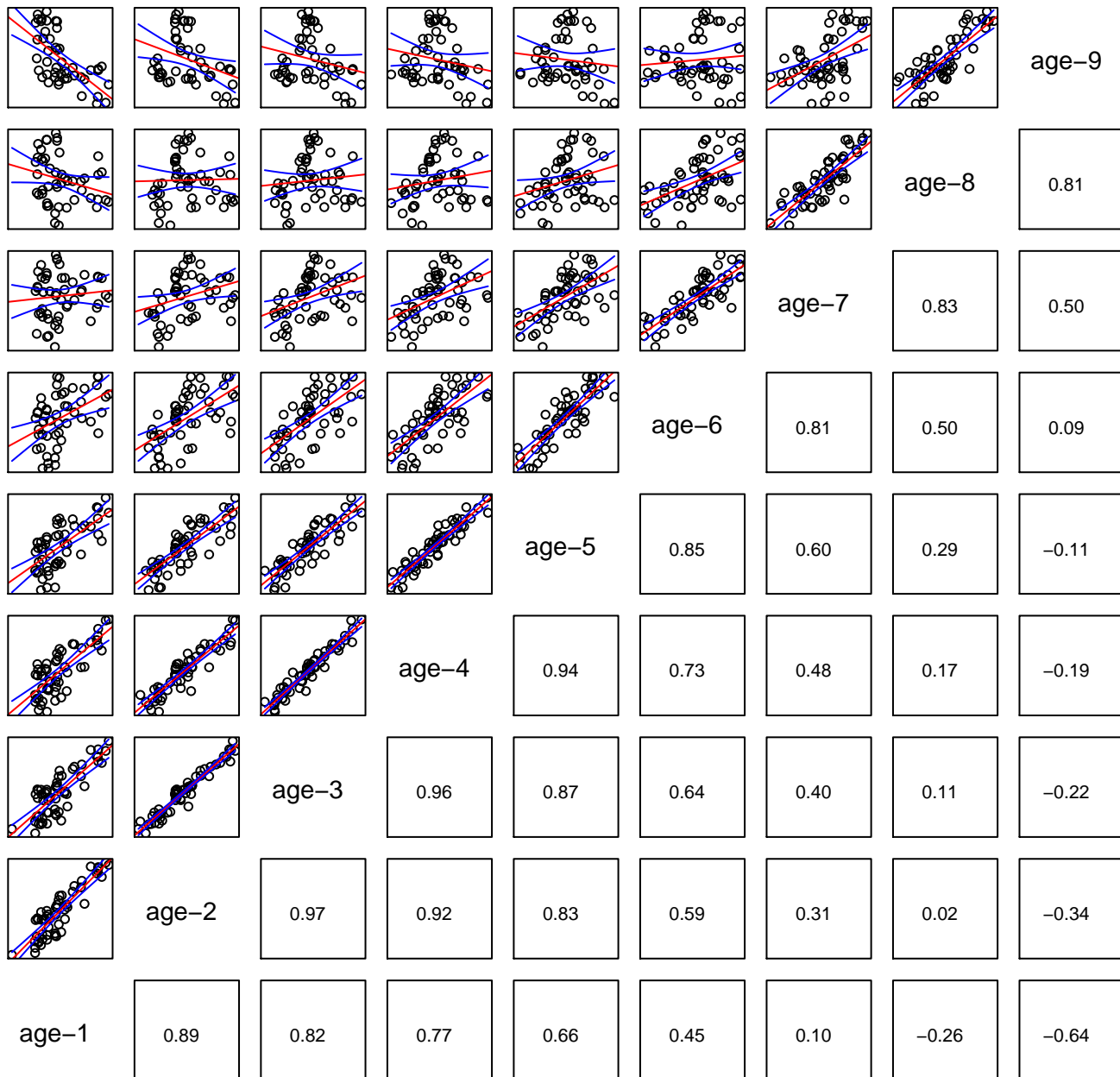
**Index 2 (Peak Age) Predicted**



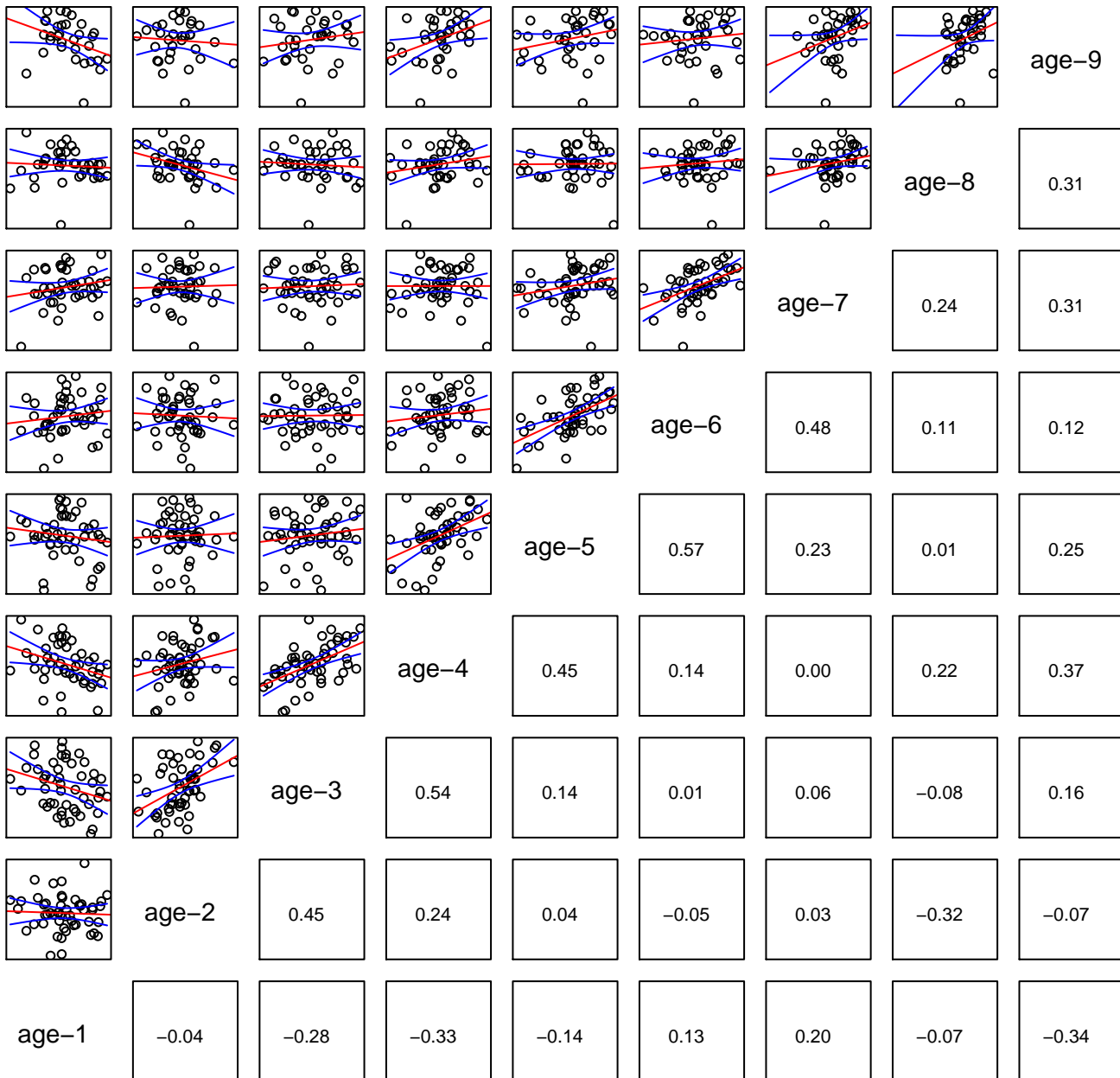
## Catch Observed



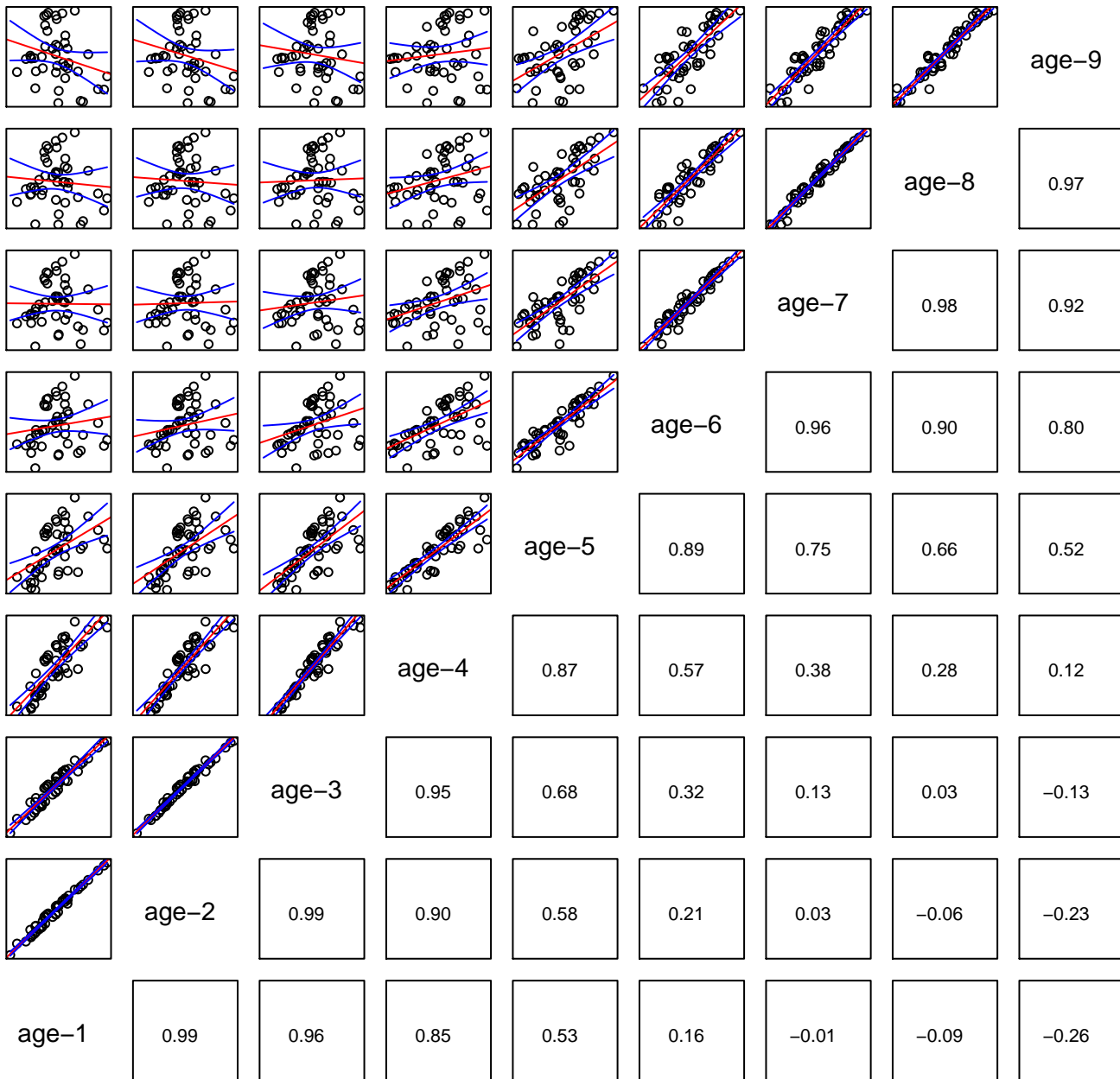
## Catch Predicted



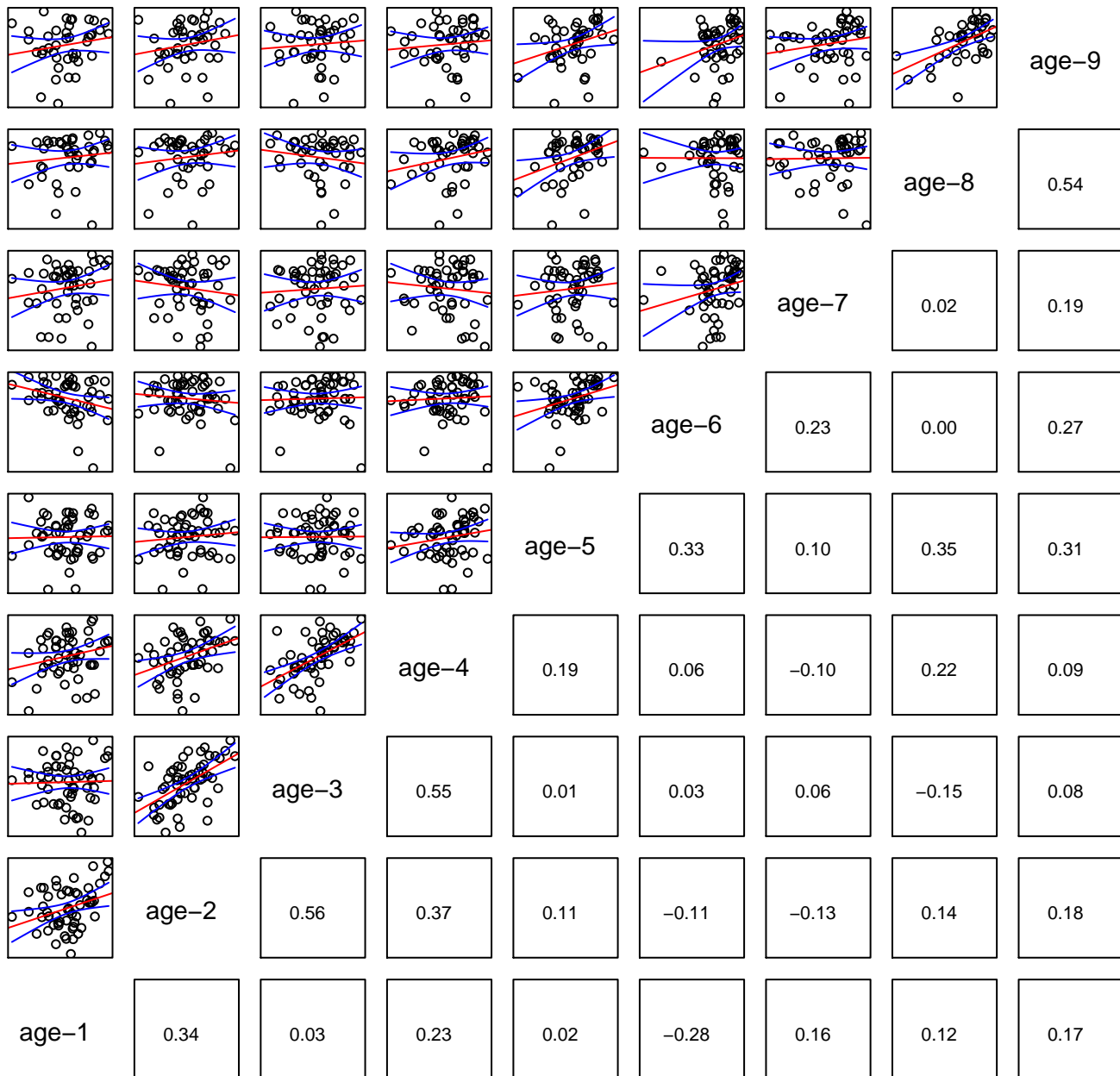
Index 1 (INDEX-1) Observed



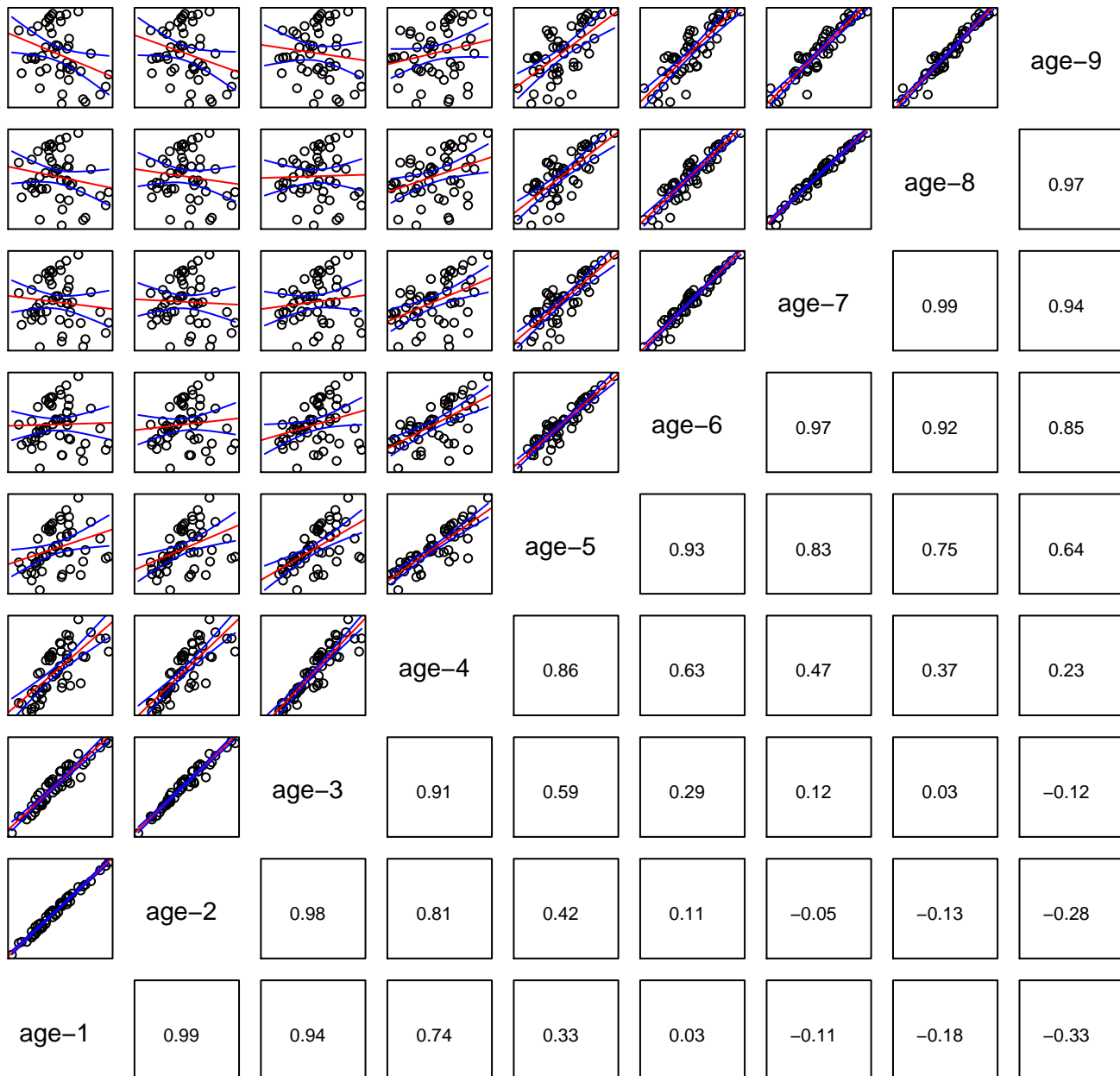
Index 1 (INDEX-1) Predicted



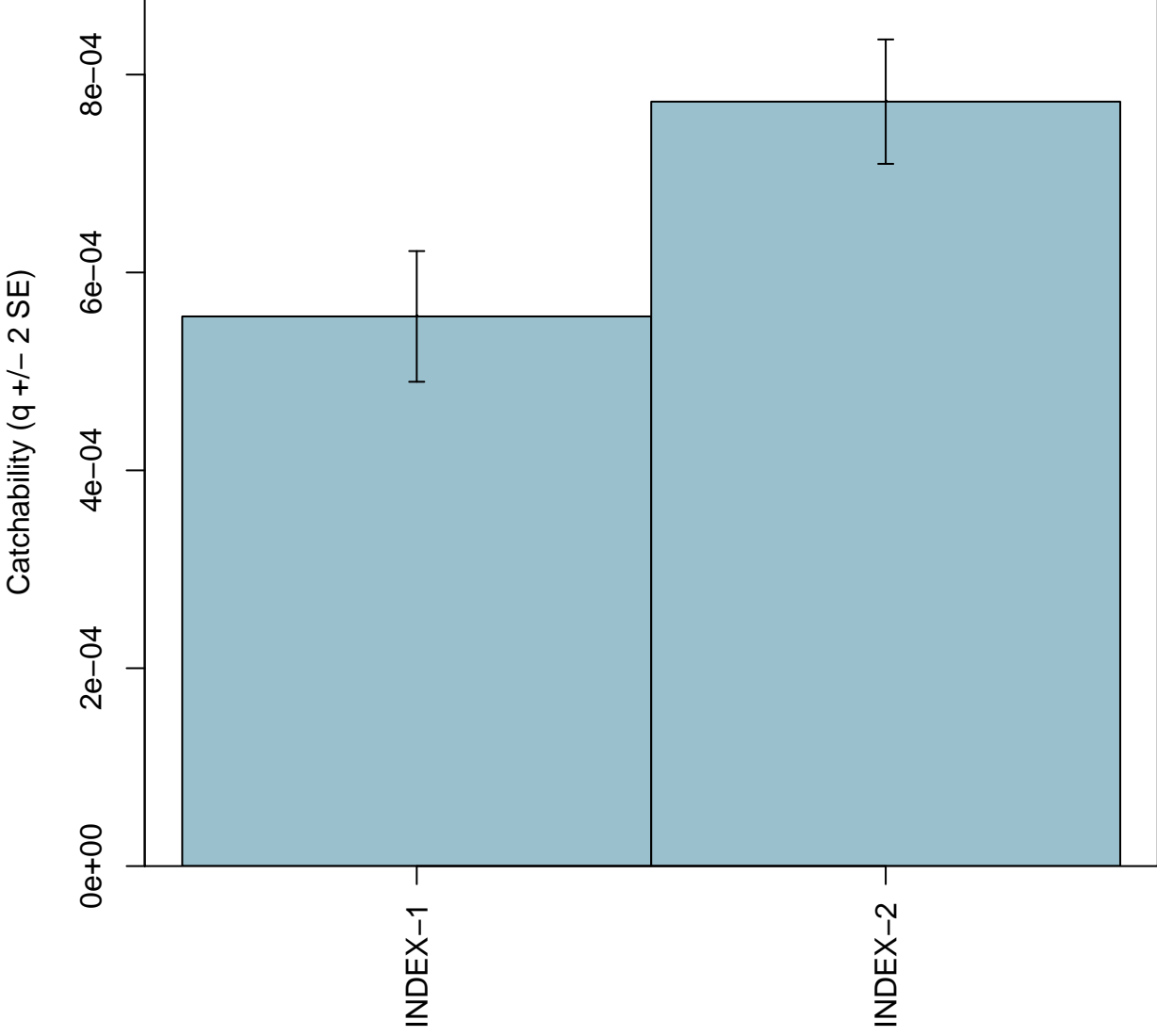
# Index 2 (INDEX-2) Observed

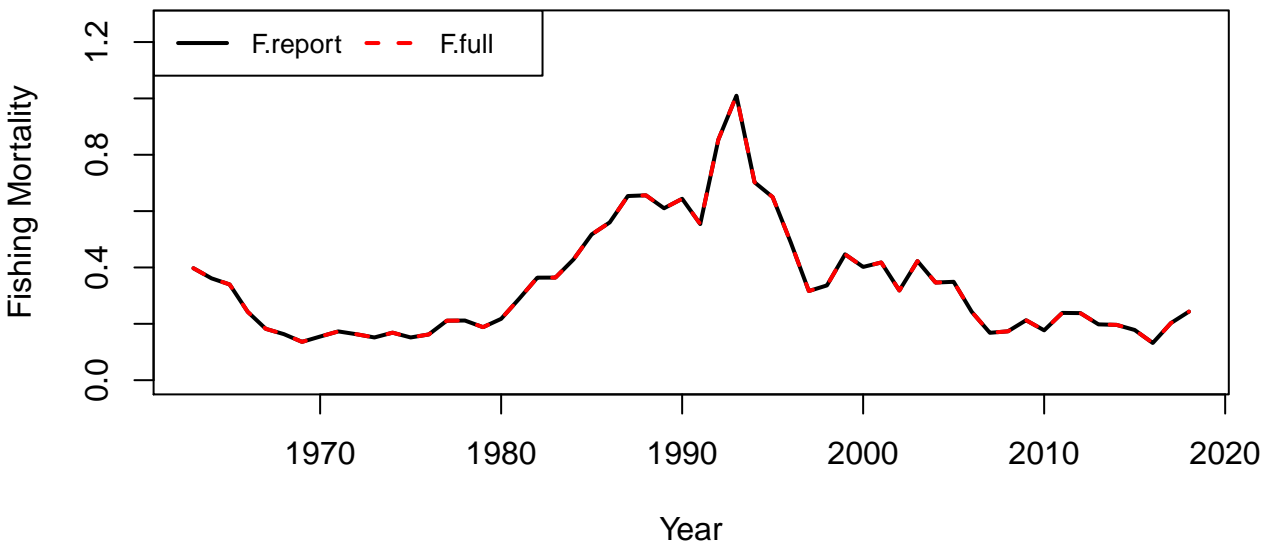
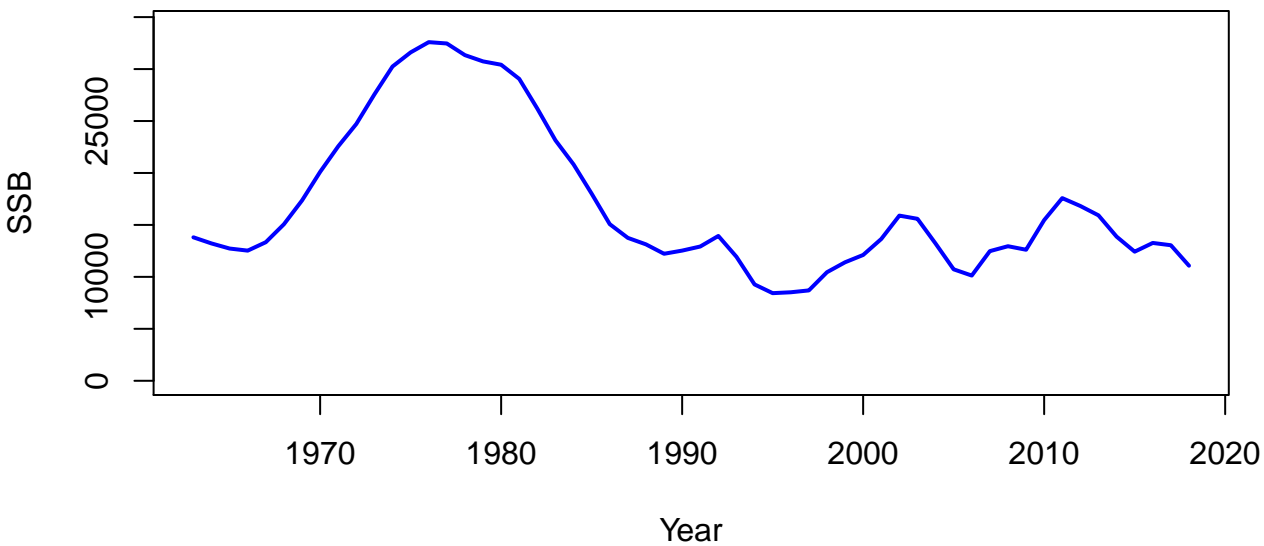


Index 2 (INDEX-2) Predicted

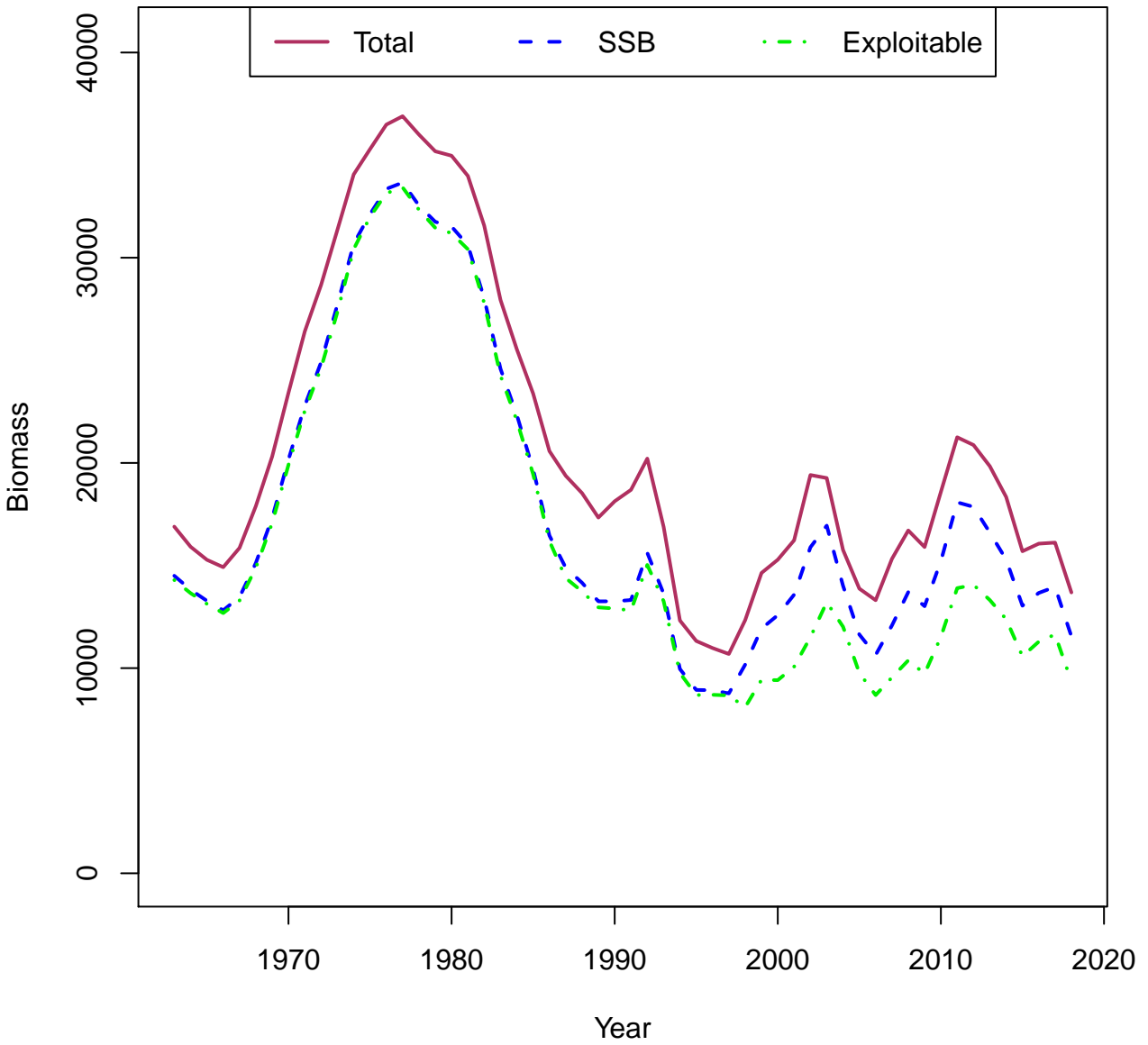


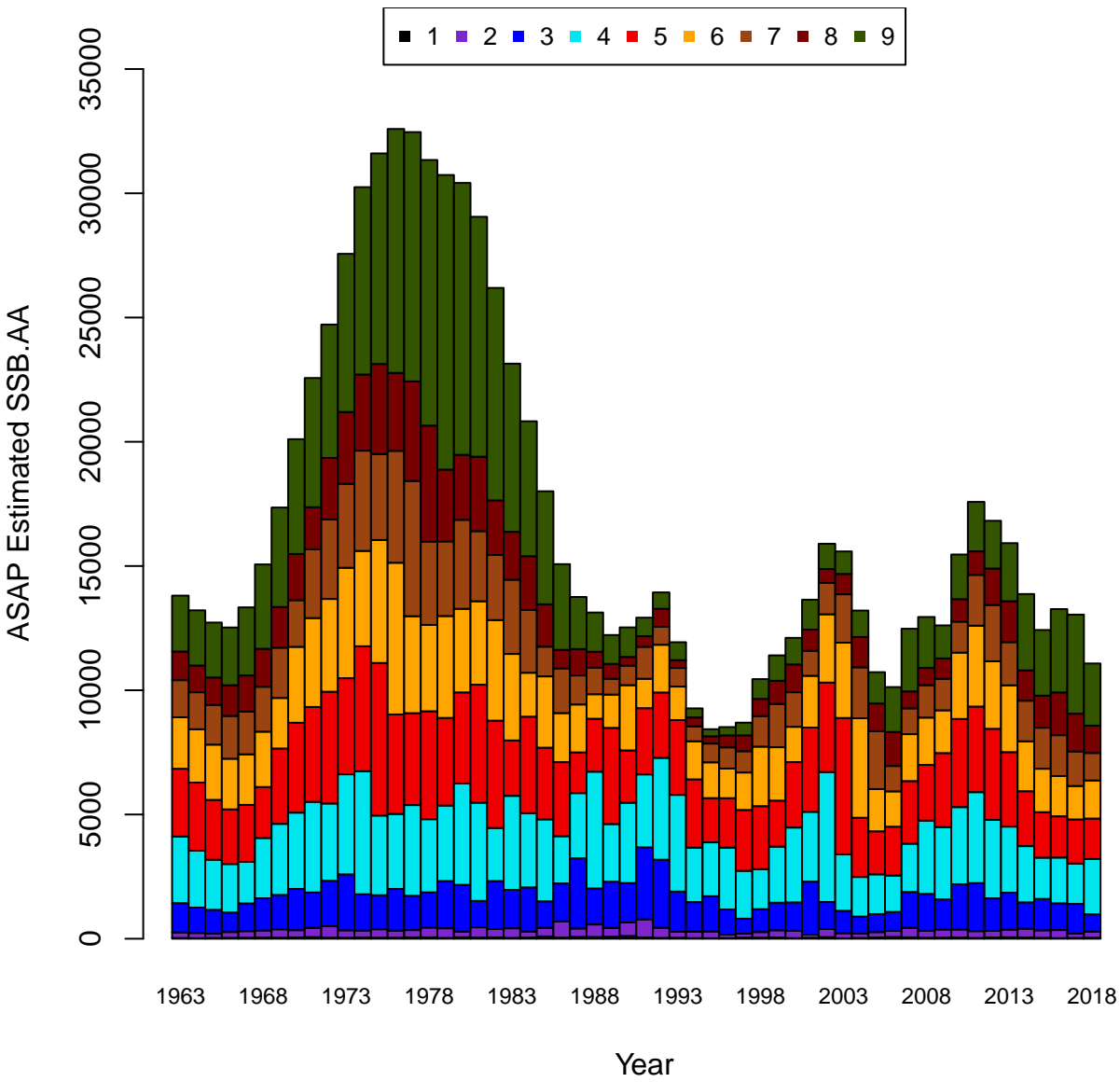


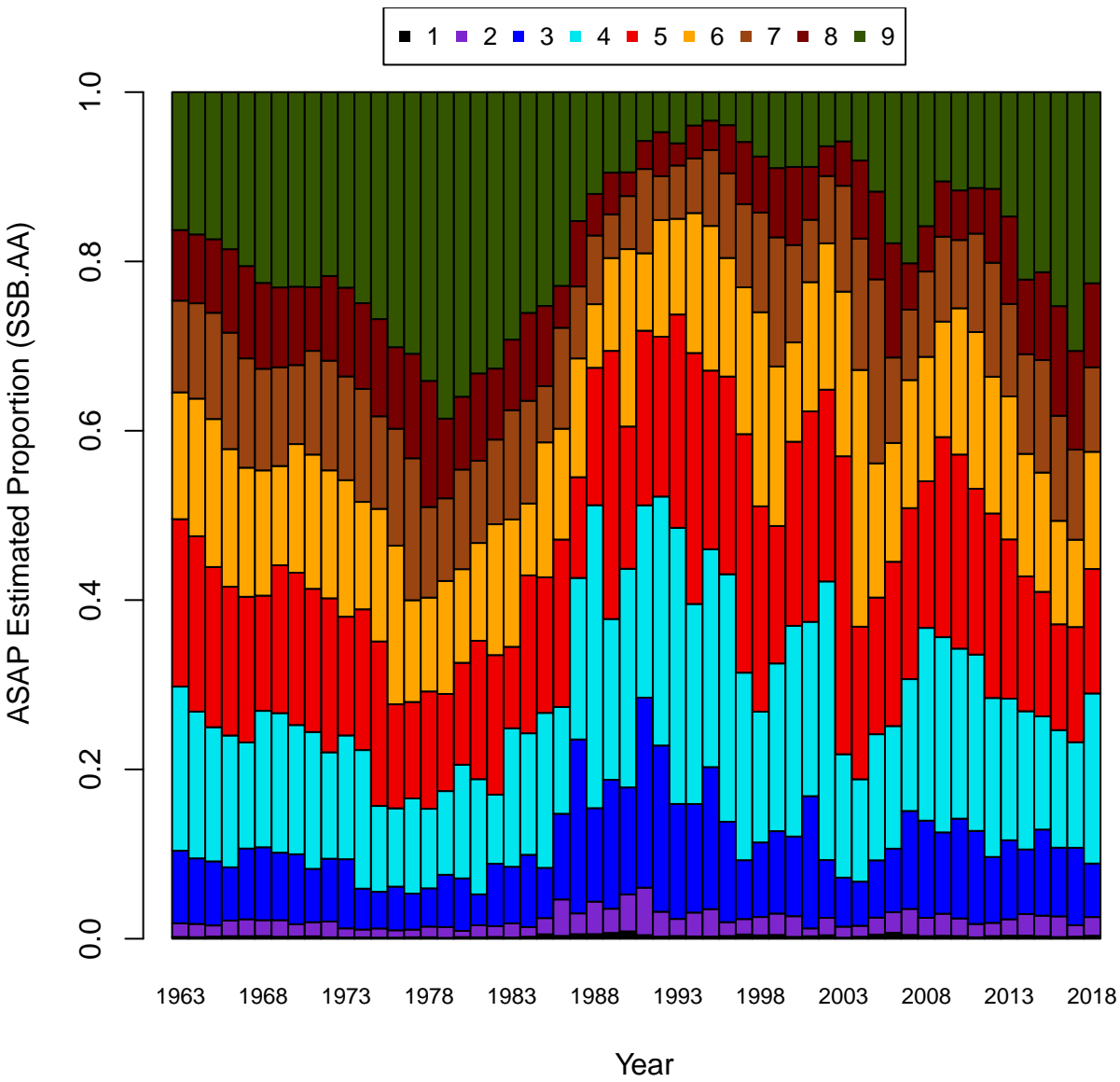




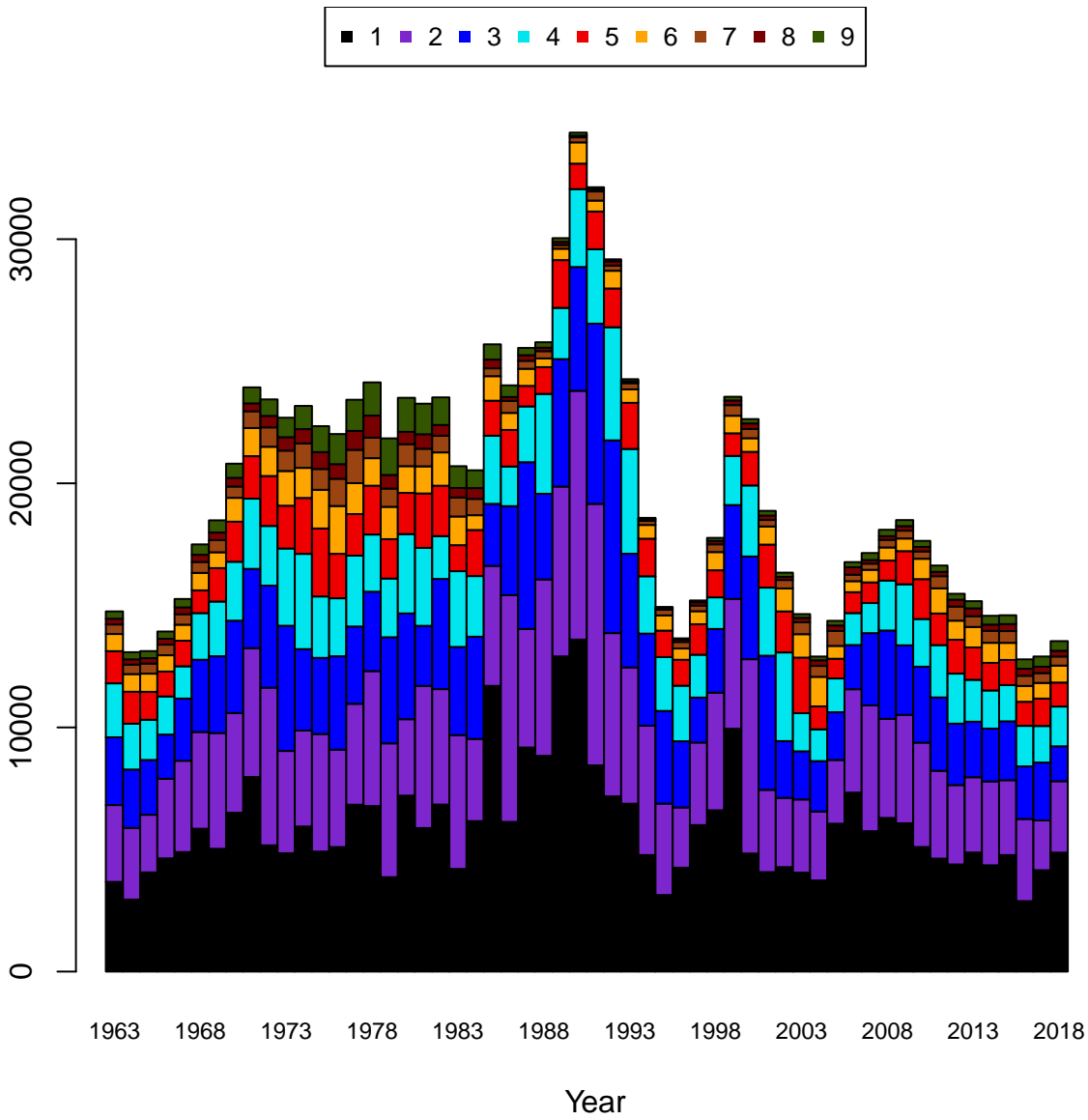
**Comparison of January 1 Biomass**



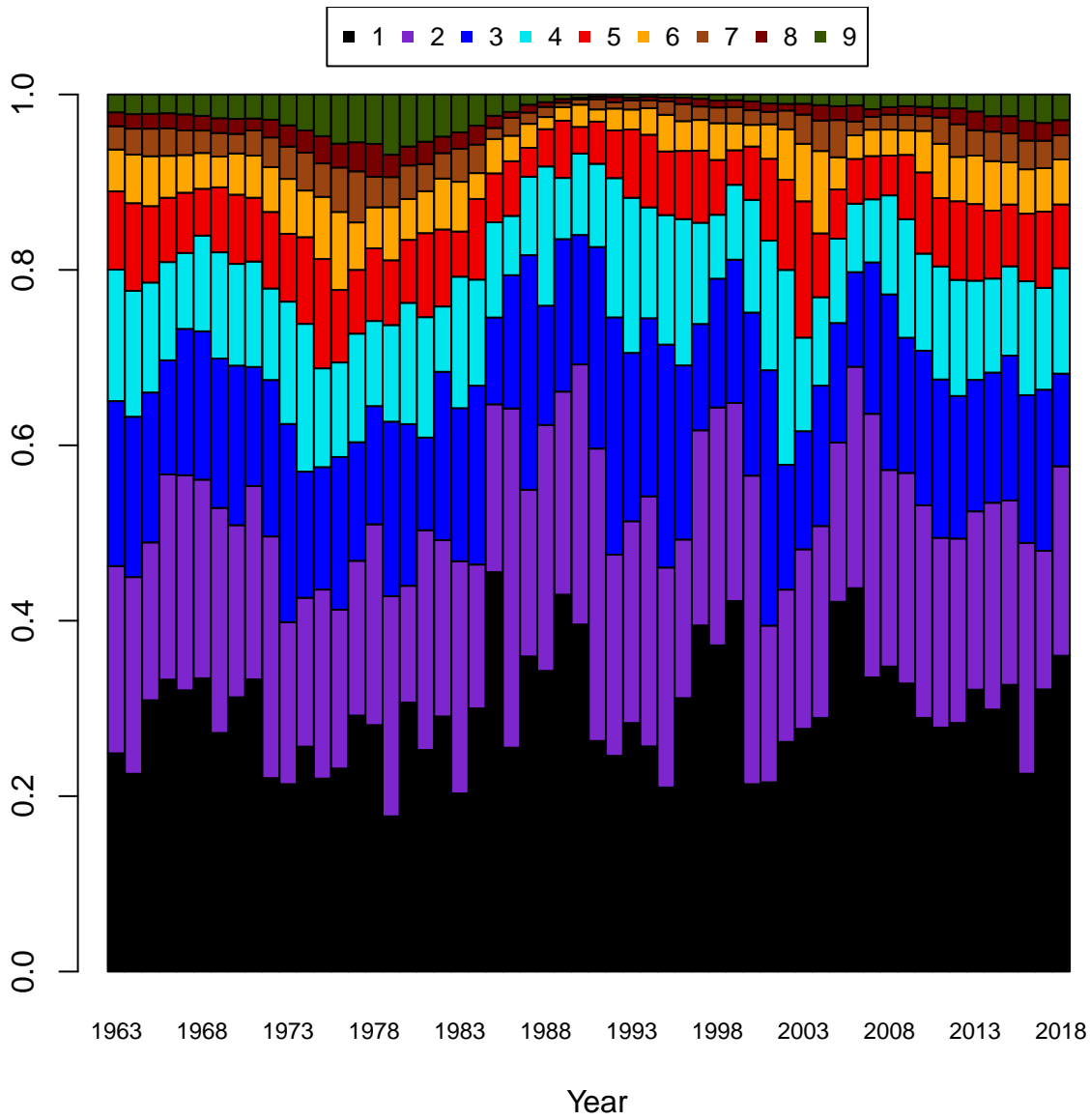


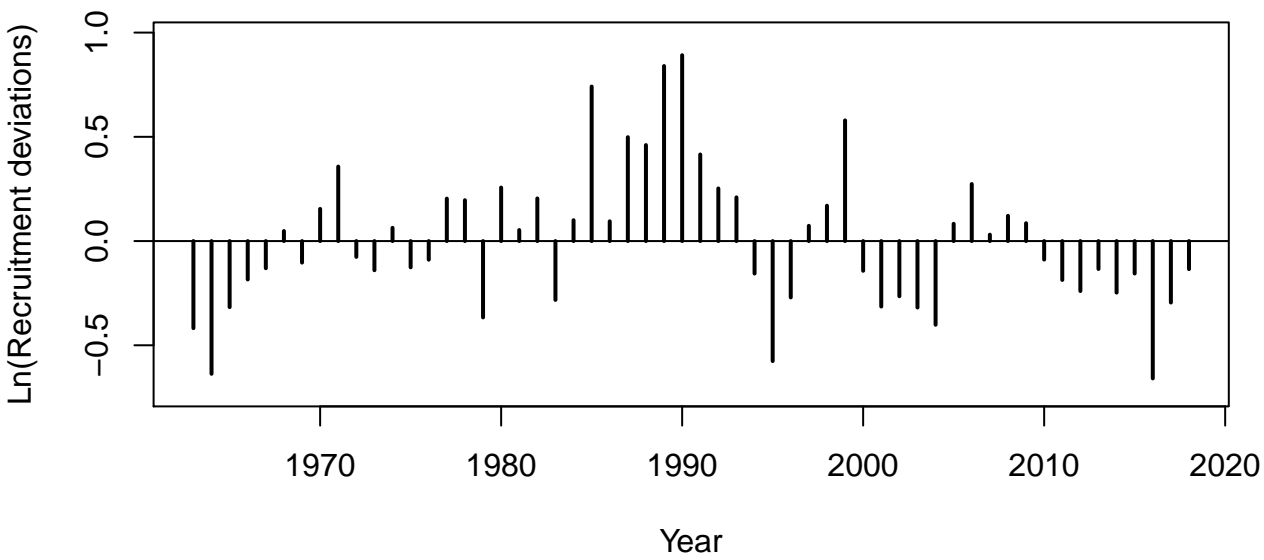
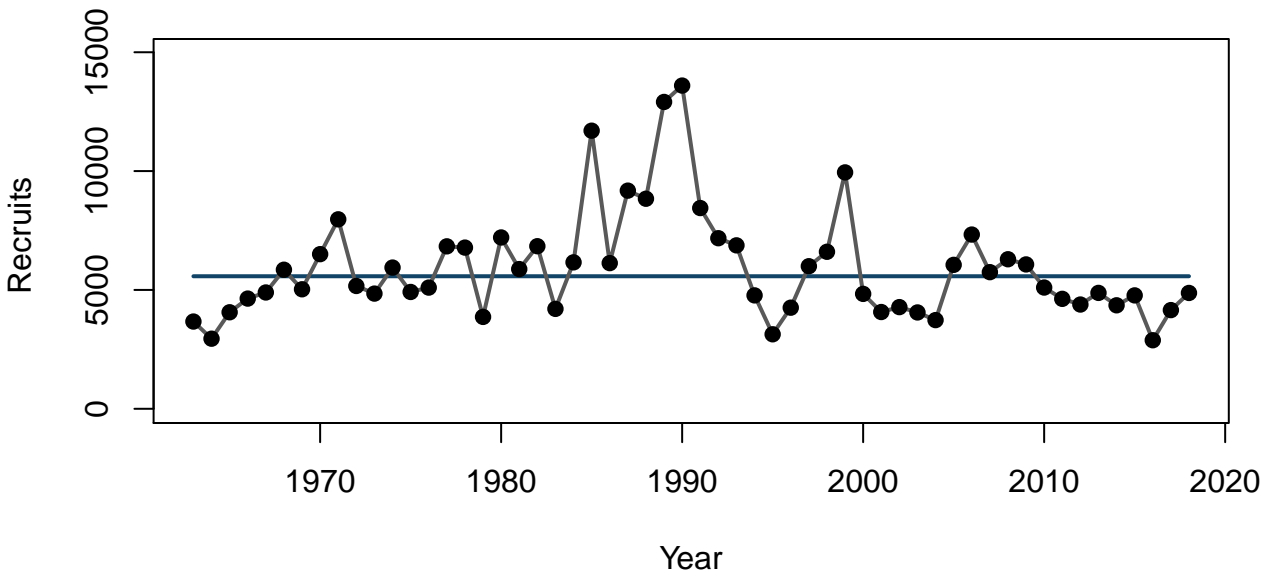


ASAP Estimated NAA

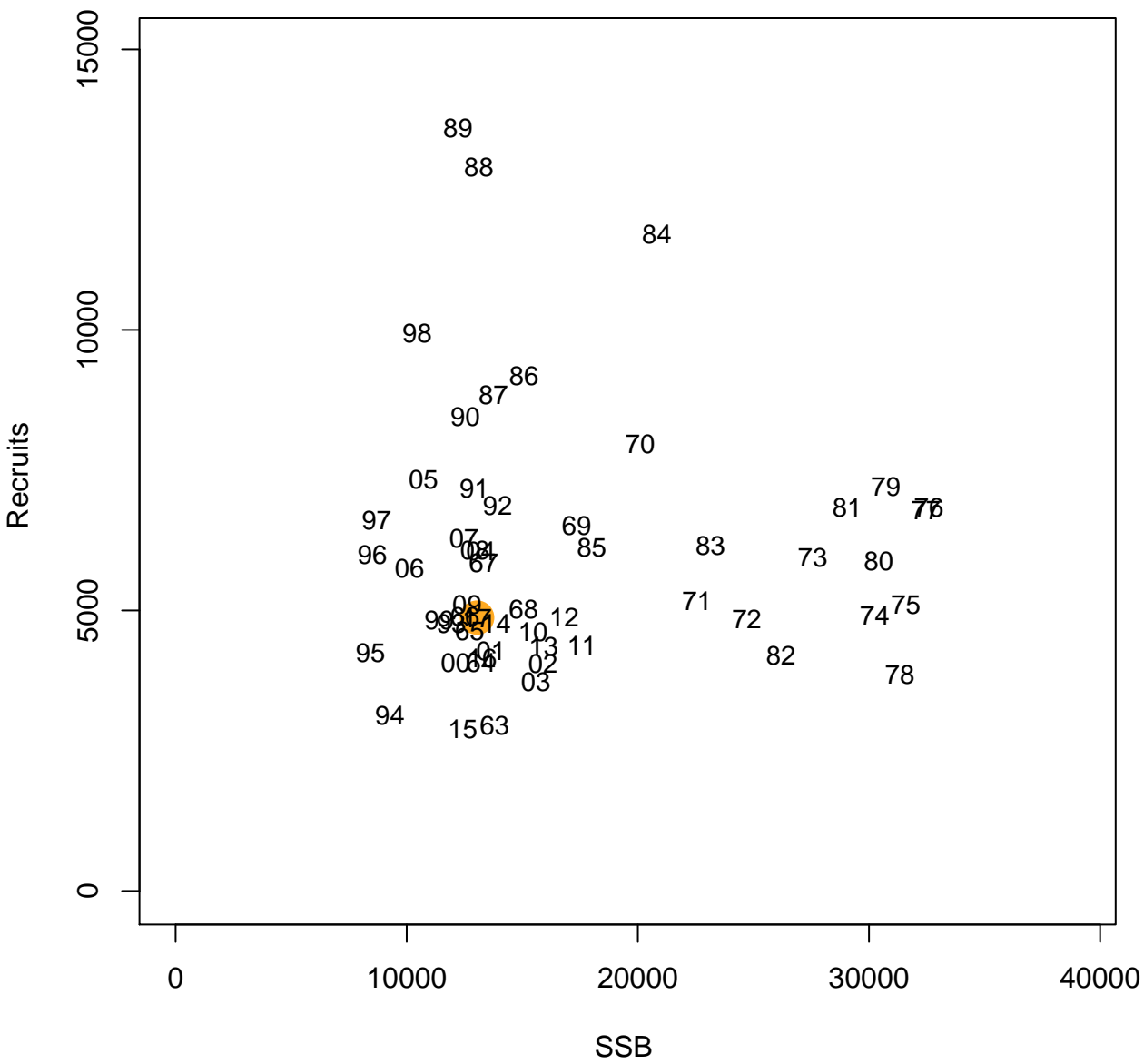


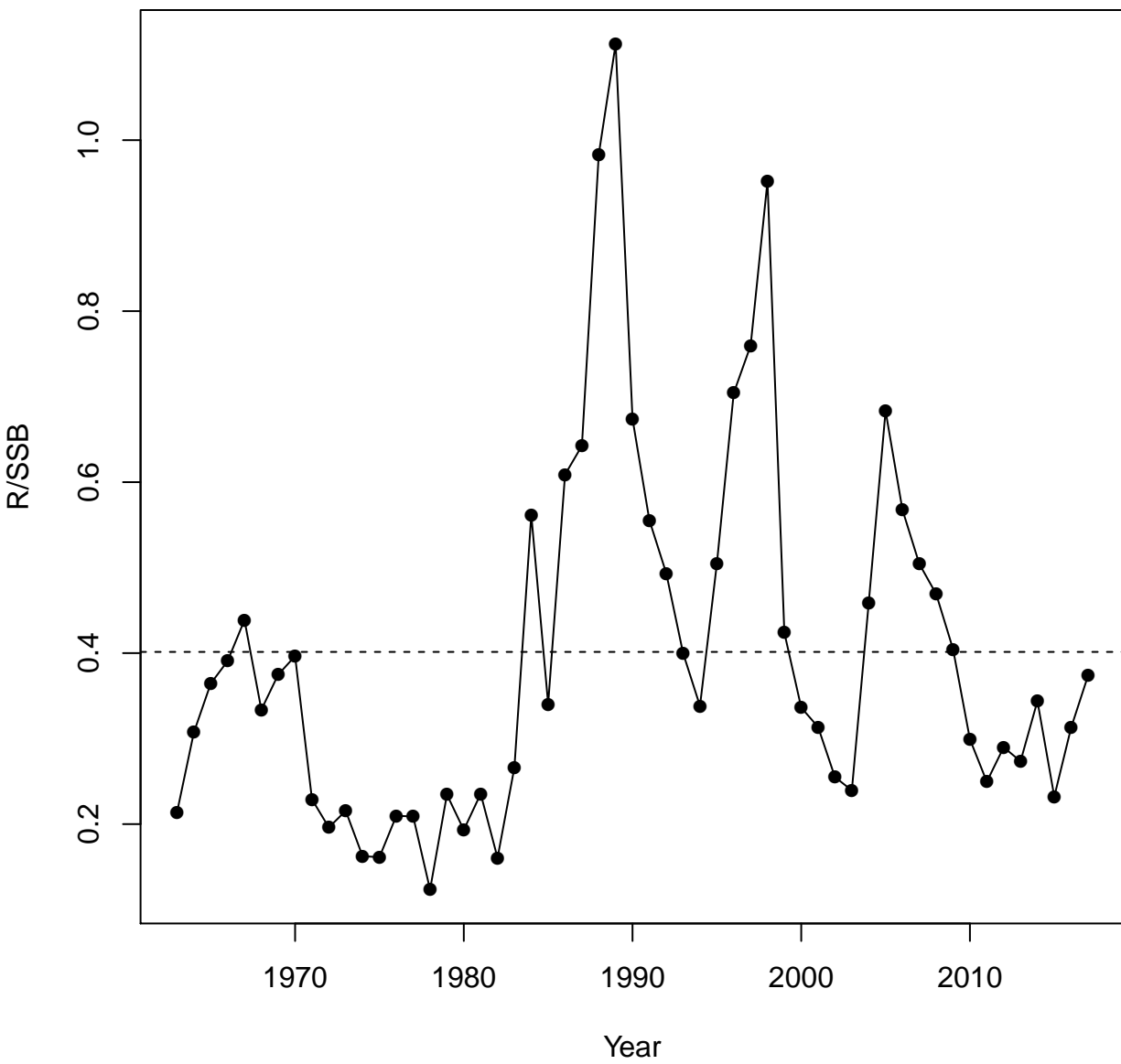
ASAP Estimated Proportion (NAA)

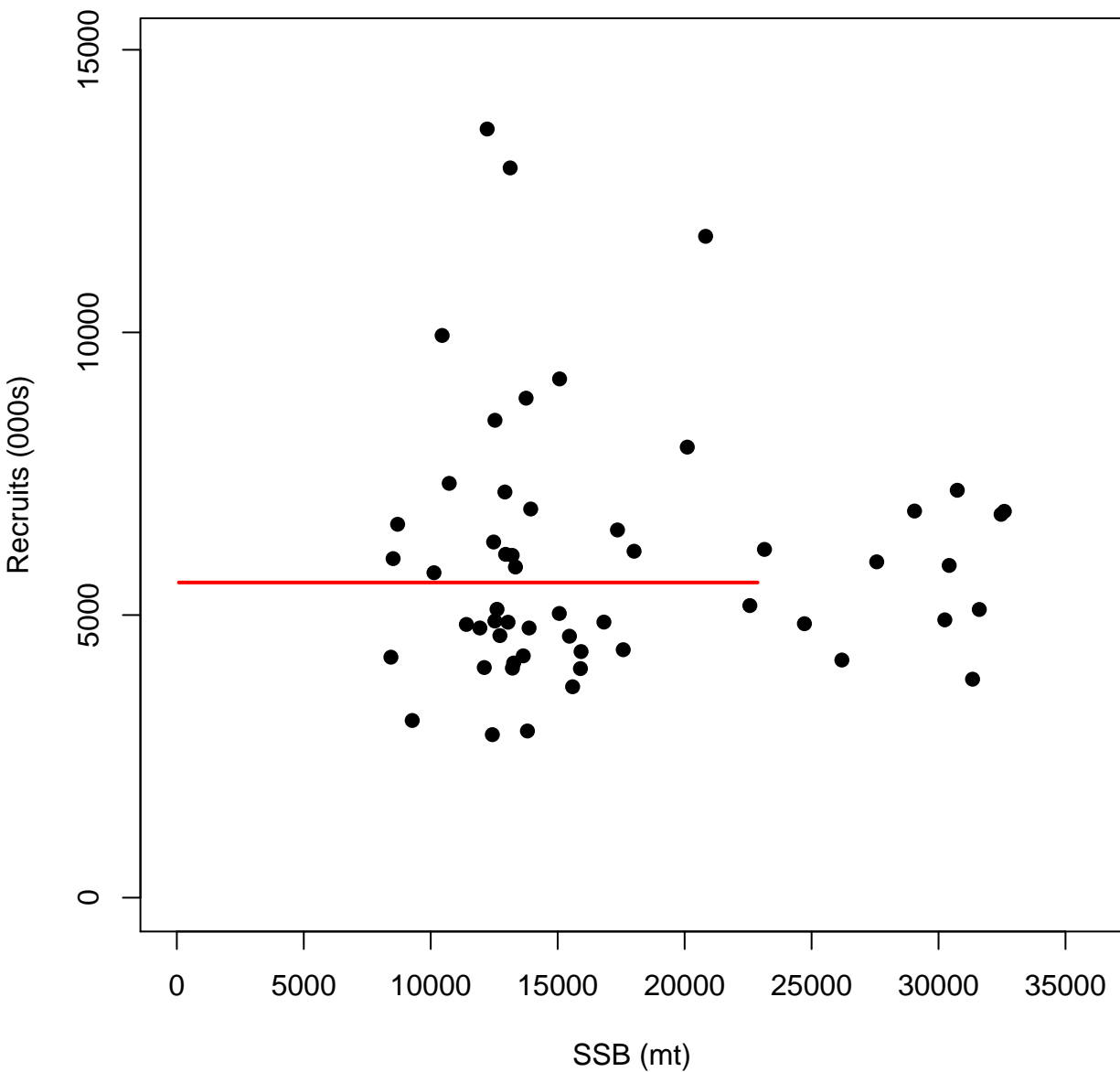


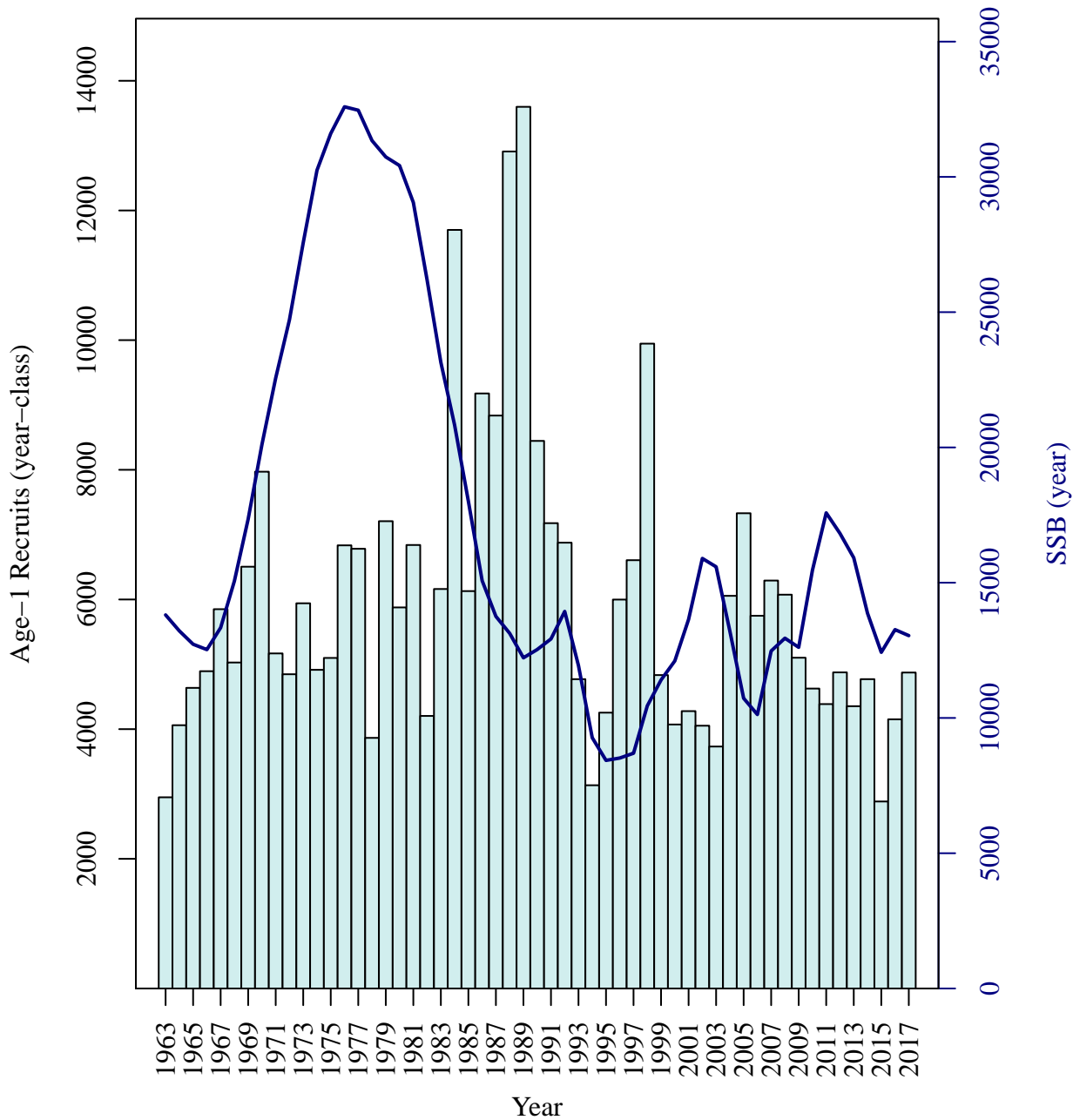


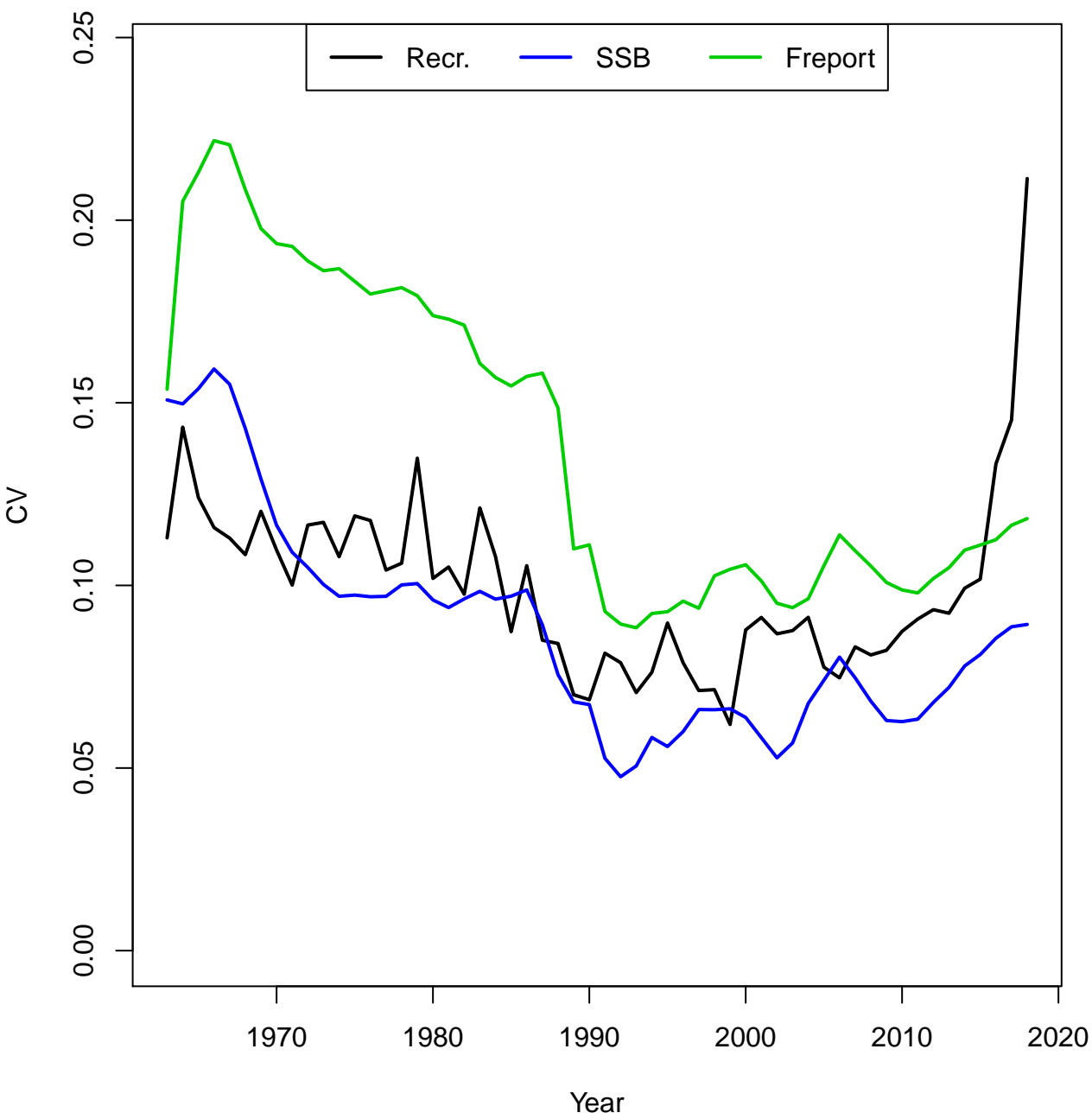




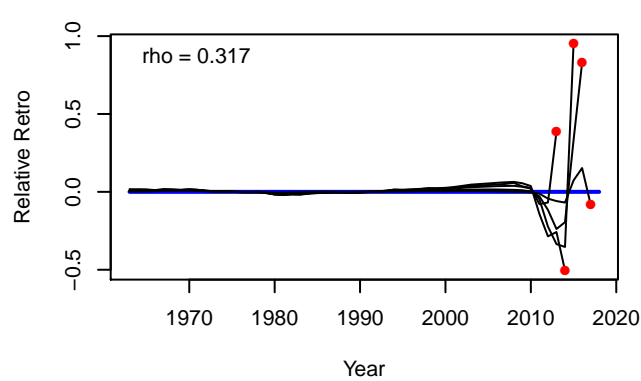
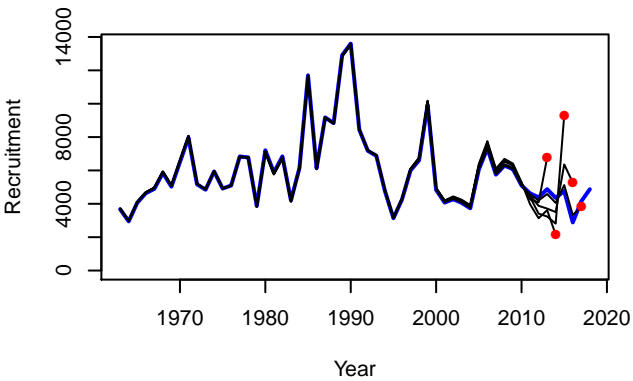
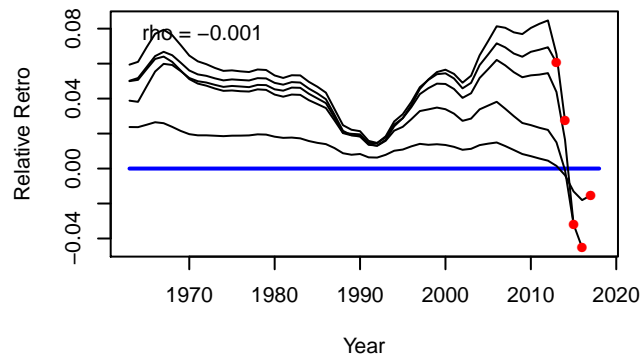
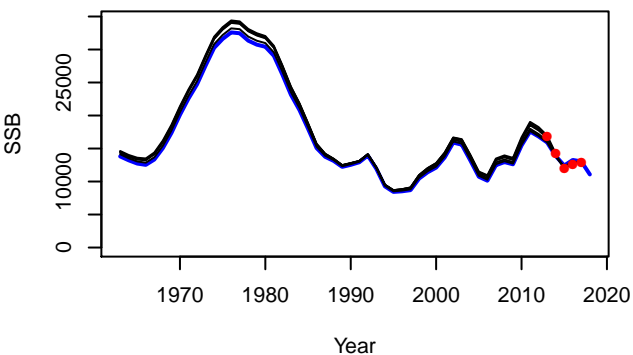
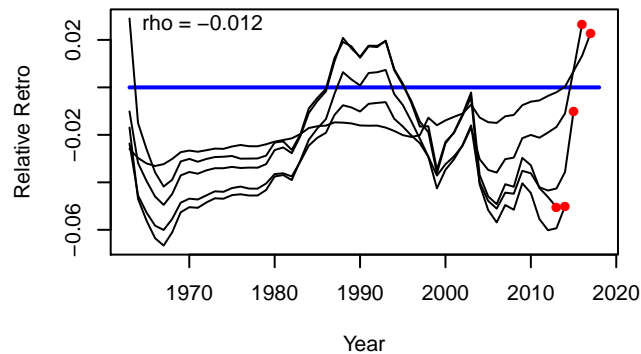
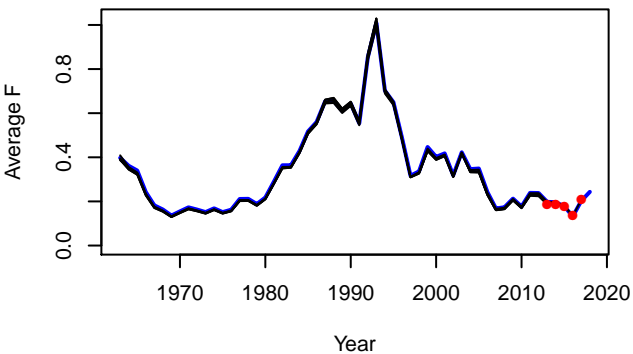






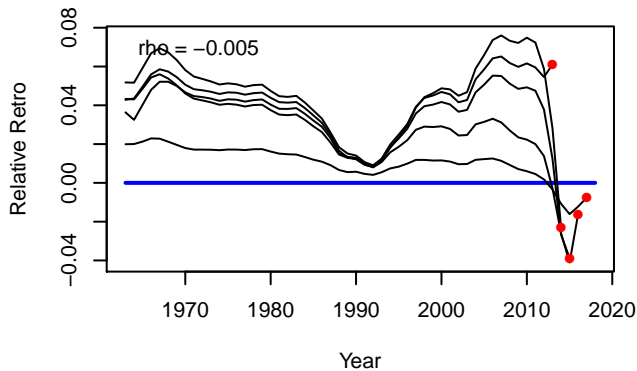
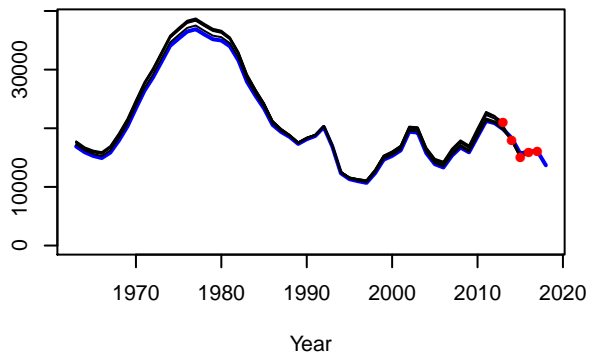


# F, SSB, R

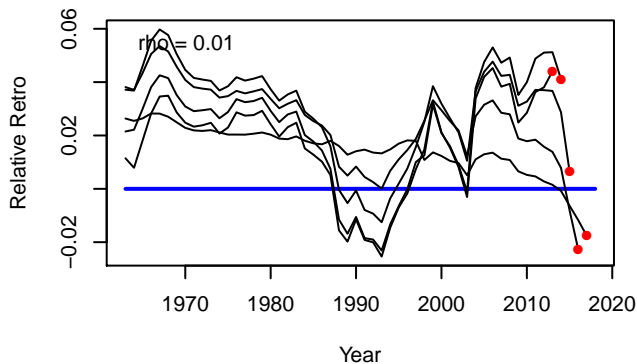
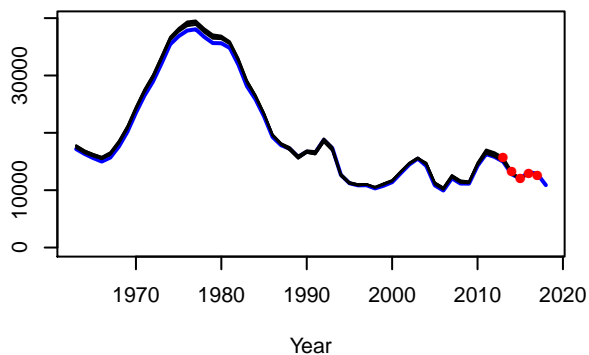


# Jan-1 B, Exploitable B, Total Stock N

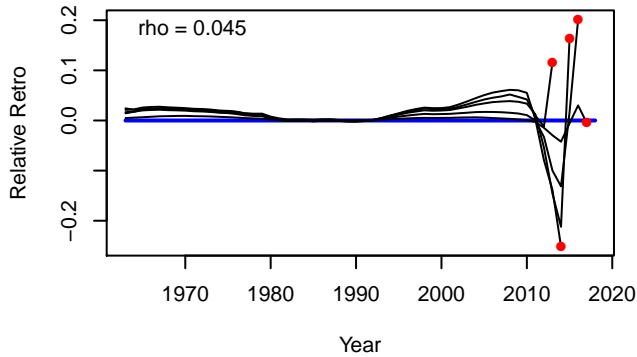
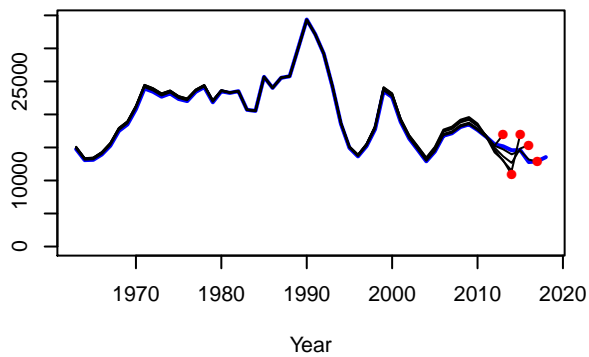
Jan-1 B



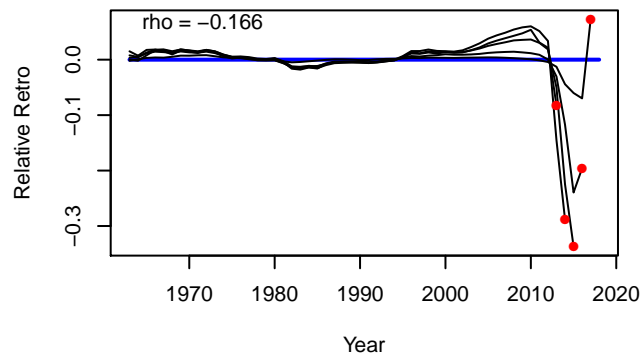
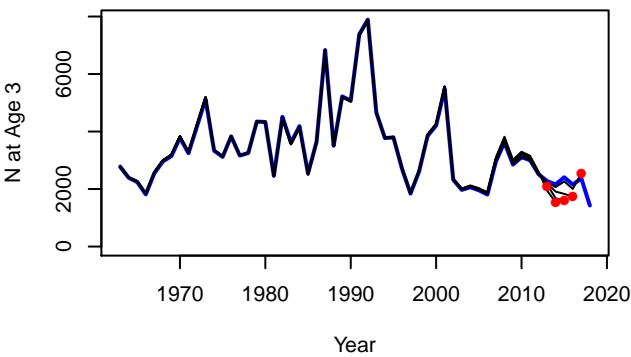
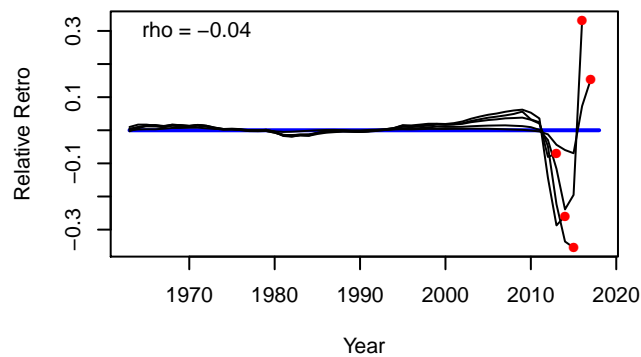
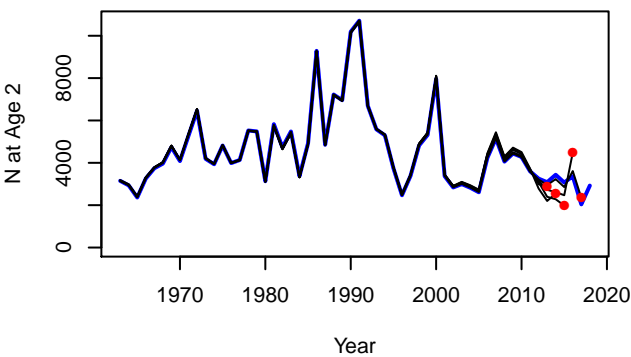
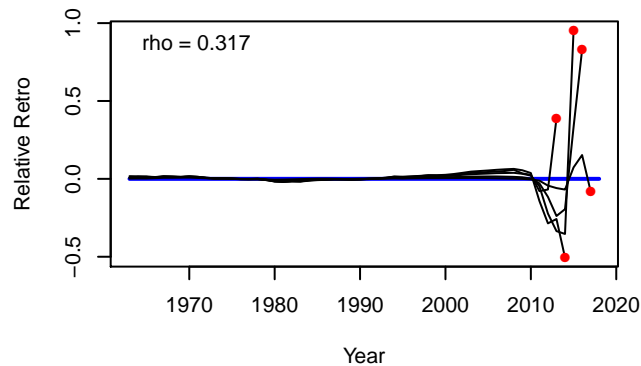
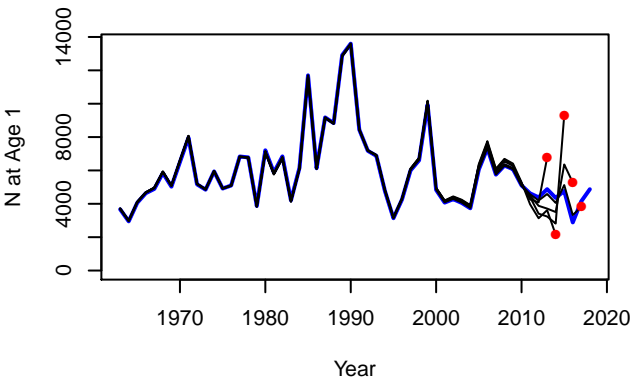
Exploitable B



Total Stock N



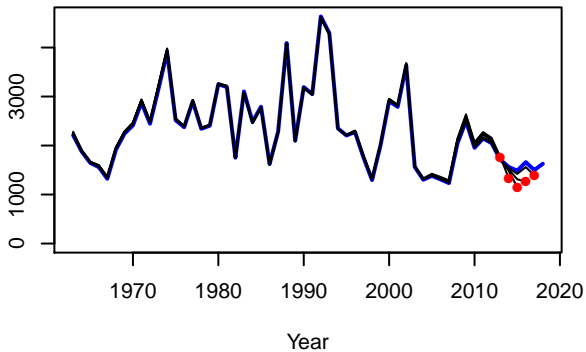
# Stock Numbers at Age



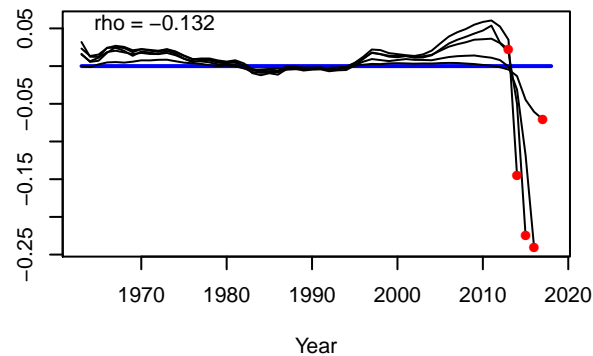


# Stock Numbers at Age

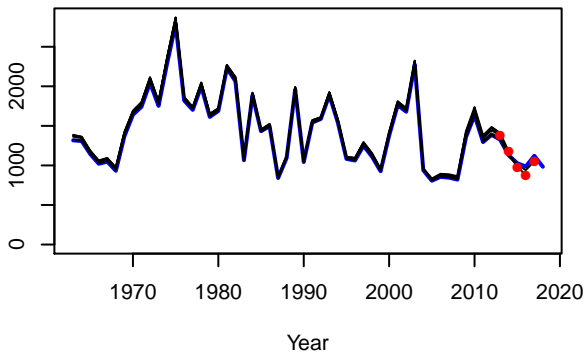
N at Age 4



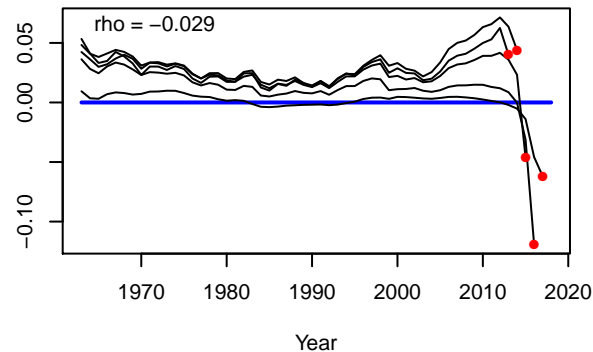
Relative Retro



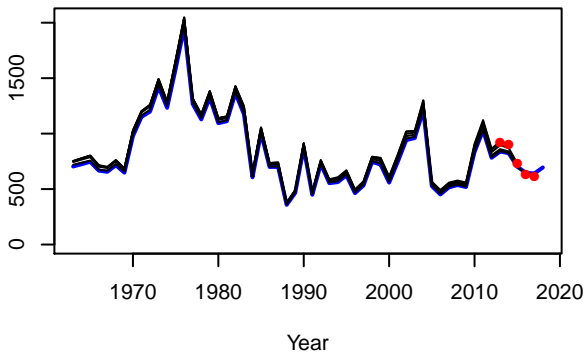
N at Age 5



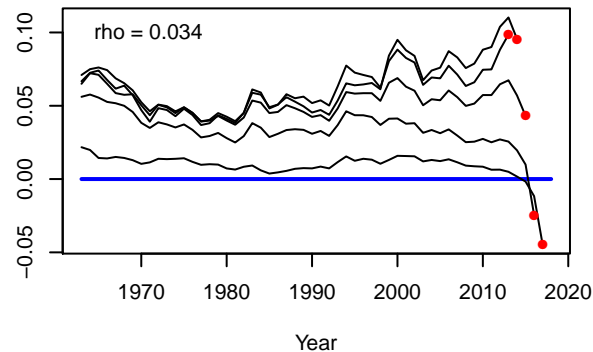
Relative Retro



N at Age 6

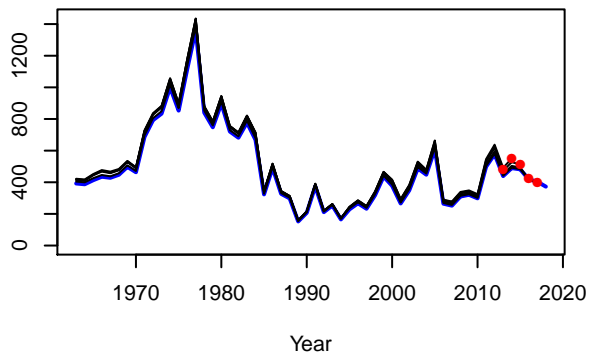


Relative Retro

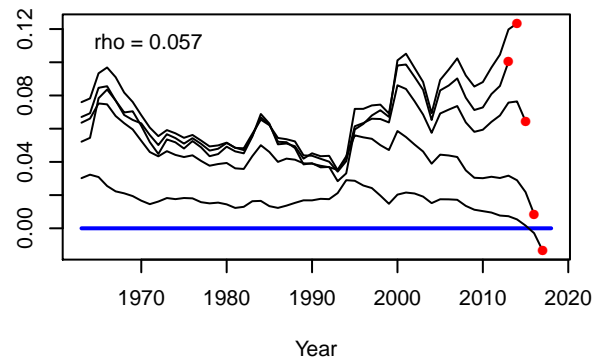


# Stock Numbers at Age

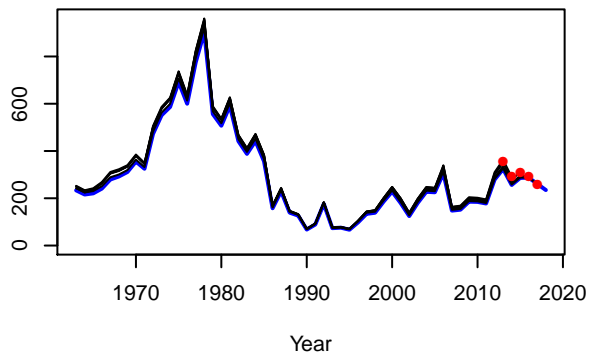
N at Age 7



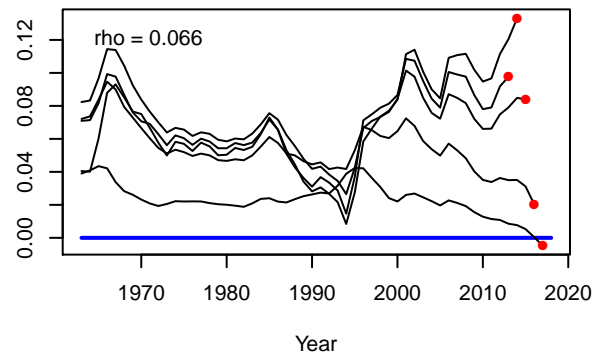
Relative Retro



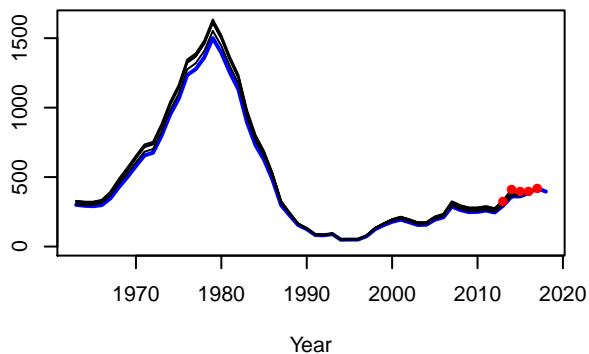
N at Age 8



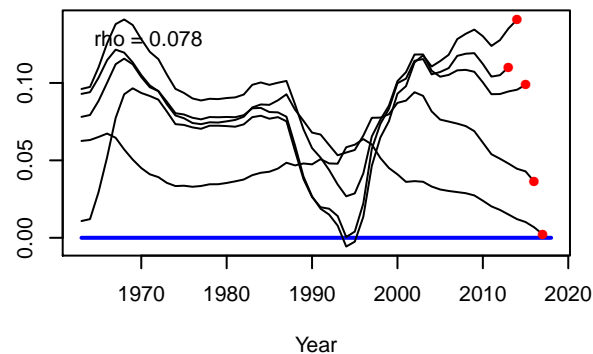
Relative Retro



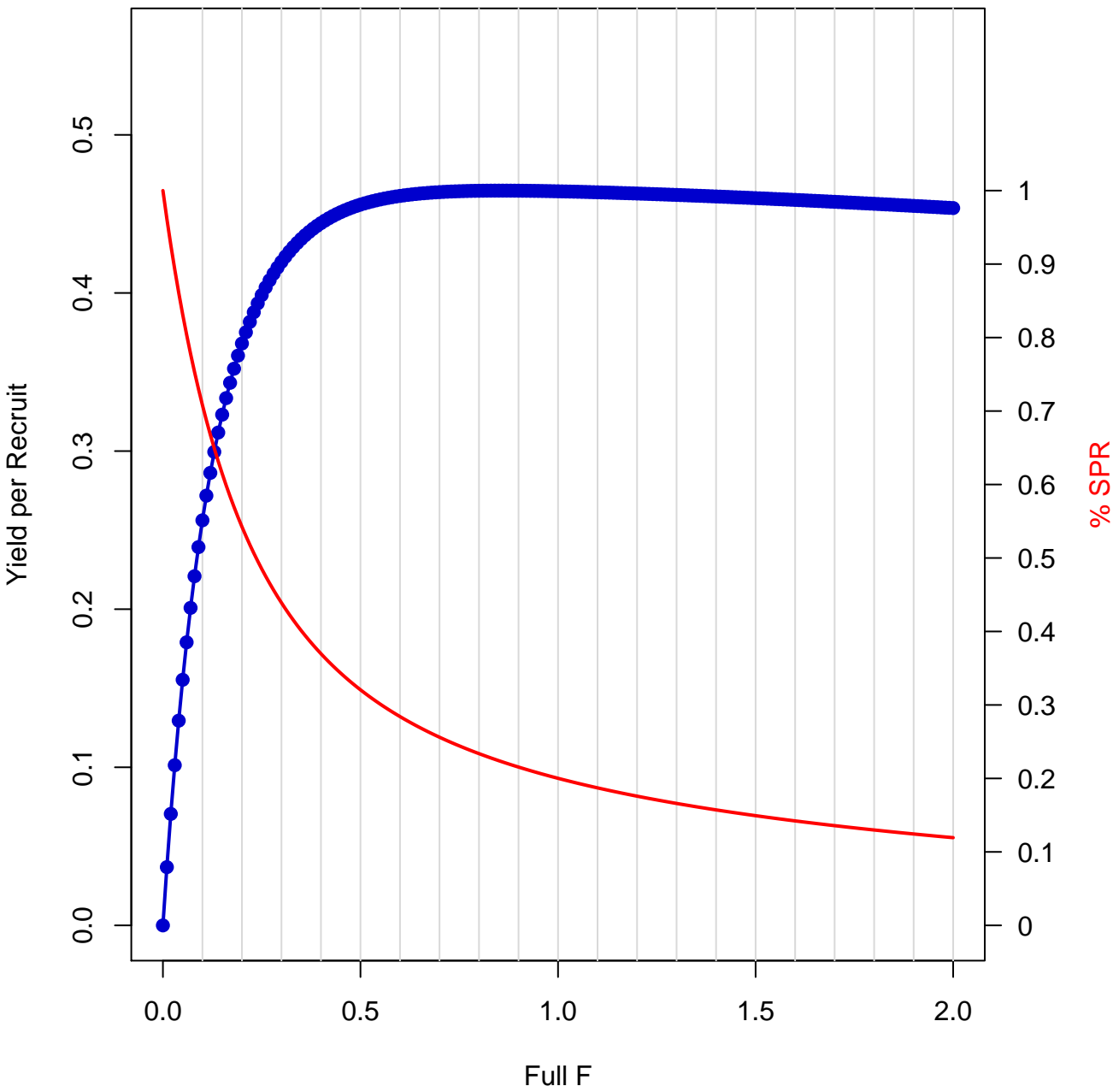
N at Age 9



Relative Retro



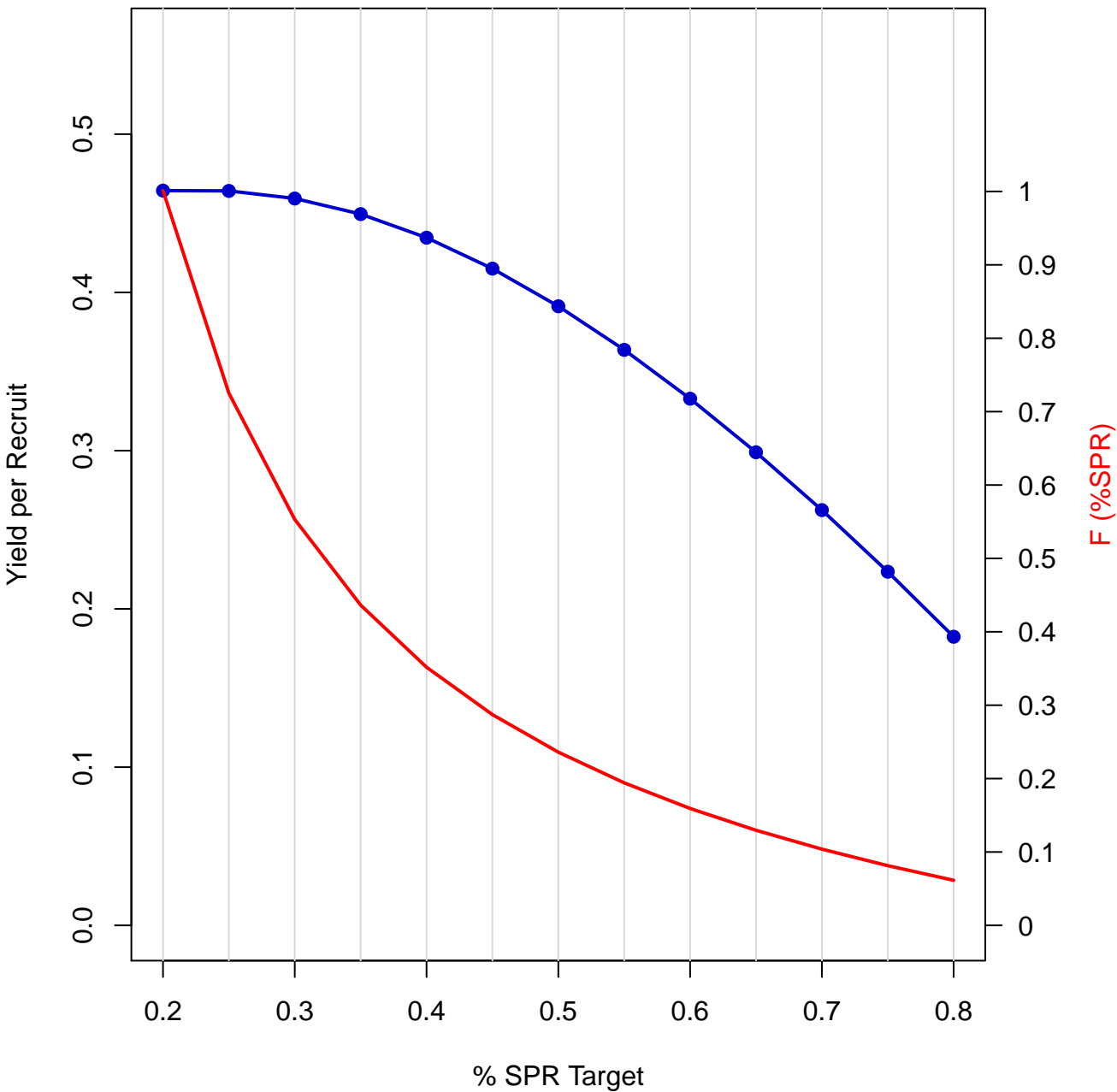
YPR-SPR Reference Points (Years Avg = 5)



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

F	YPR	SPR	F	YPR	SPR	F	YPR	SPR
0	0	1	0.35	0.4342	0.4012	0.7	0.4638	0.2561
0.01	0.0369	0.9617	0.36	0.4365	0.3945	0.71	0.4639	0.2536
0.02	0.0705	0.926	0.37	0.4386	0.3879	0.72	0.4641	0.2512
0.03	0.1013	0.8925	0.38	0.4406	0.3817	0.73	0.4642	0.2489
0.04	0.1295	0.8611	0.39	0.4425	0.3756	0.74	0.4643	0.2466
0.05	0.1554	0.8316	0.4	0.4442	0.3697	0.75	0.4644	0.2443
0.06	0.1791	0.8039	0.41	0.4458	0.3641	0.76	0.4644	0.2421
0.07	0.2008	0.7779	0.42	0.4473	0.3586	0.77	0.4645	0.2399
0.08	0.2209	0.7533	0.43	0.4486	0.3533	0.78	0.4646	0.2378
0.09	0.2393	0.7301	0.44	0.4499	0.3482	0.79	0.4646	0.2358
0.1	0.2562	0.7082	0.45	0.4511	0.3432	0.8	0.4647	0.2337
0.11	0.2718	0.6875	0.46	0.4522	0.3384	0.81	0.4647	0.2317
0.12	0.2862	0.6679	0.47	0.4532	0.3337	0.82	0.4647	0.2298
0.13	0.2995	0.6493	0.48	0.4542	0.3292	0.83	0.4647	0.2279
0.14	0.3117	0.6316	0.49	0.4551	0.3249	0.84	0.4647	0.226
0.15	0.3231	0.6149	0.5	0.4559	0.3206	0.85	0.4648	0.2242
0.16	0.3335	0.5989	0.51	0.4567	0.3165	0.86	0.4648	0.2223
0.17	0.3432	0.5838	0.52	0.4574	0.3125	0.87	0.4647	0.2206
0.18	0.3521	0.5694	0.53	0.458	0.3086	0.88	0.4647	0.2188
0.19	0.3604	0.5556	0.54	0.4586	0.3048	0.89	0.4647	0.2171
0.2	0.368	0.5425	0.55	0.4592	0.3011	0.9	0.4647	0.2154
0.21	0.3751	0.53	0.56	0.4597	0.2975	0.91	0.4647	0.2138
0.22	0.3817	0.5181	0.57	0.4602	0.2941	0.92	0.4647	0.2122
0.23	0.3878	0.5066	0.58	0.4606	0.2907	0.93	0.4646	0.2106
0.24	0.3934	0.4957	0.59	0.461	0.2874	0.94	0.4646	0.209
0.25	0.3987	0.4852	0.6	0.4614	0.2842	0.95	0.4646	0.2075
0.26	0.4035	0.4752	0.61	0.4617	0.281	0.96	0.4645	0.206
0.27	0.408	0.4656	0.62	0.4621	0.278	0.97	0.4645	0.2045
0.28	0.4122	0.4564	0.63	0.4624	0.275	0.98	0.4644	0.203
0.29	0.4161	0.4476	0.64	0.4626	0.2721	0.99	0.4644	0.2016
0.3	0.4197	0.4391	0.65	0.4629	0.2693	1	0.4643	0.2002
0.31	0.423	0.4309	0.66	0.4631	0.2665	1.01	0.4643	0.1988
0.32	0.4261	0.423	0.67	0.4633	0.2638	1.02	0.4642	0.1974
0.33	0.429	0.4155	0.68	0.4635	0.2612	1.03	0.4642	0.196
0.34	0.4317	0.4082	0.69	0.4637	0.2586	1.04	0.4641	0.1947

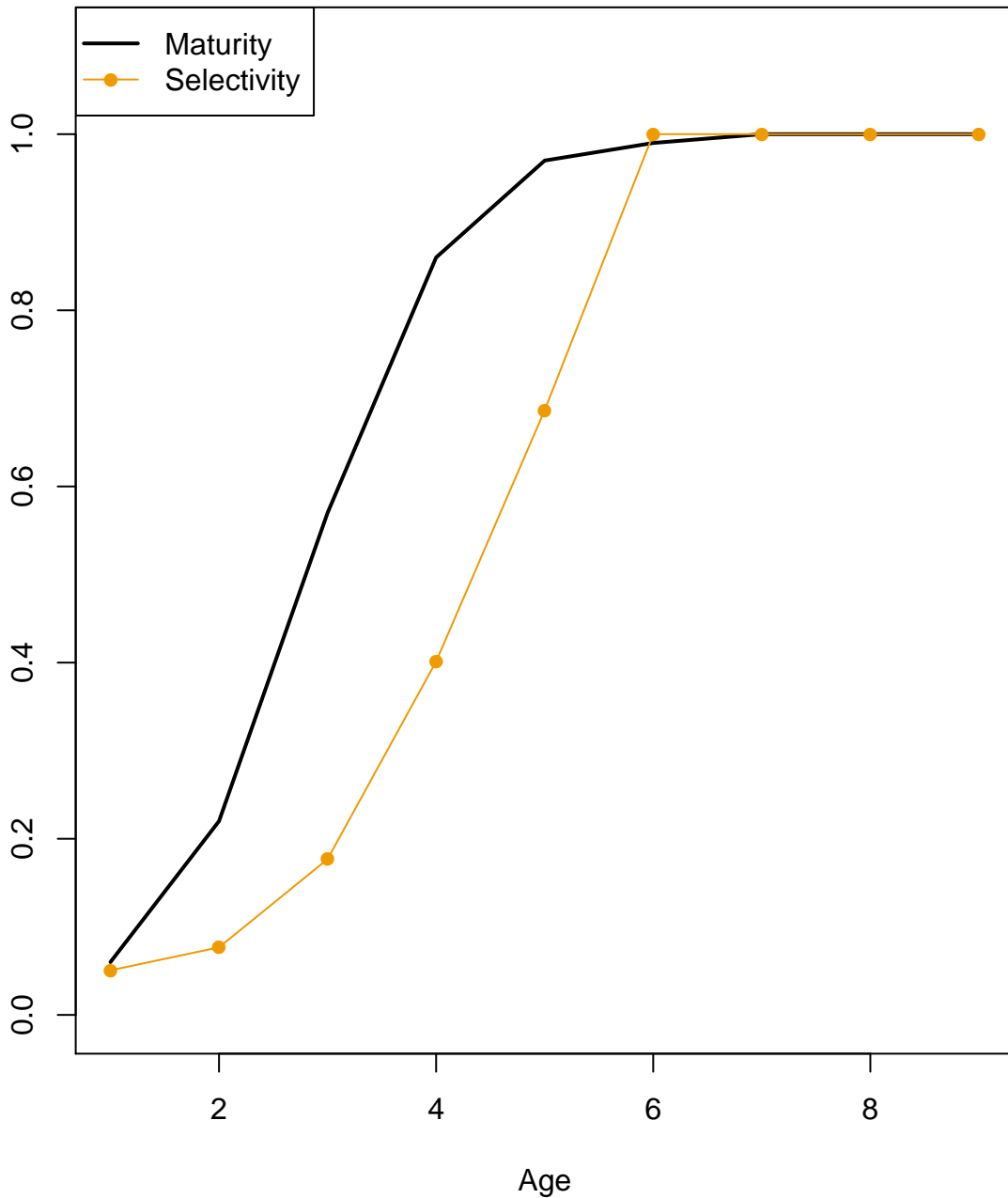
**SPR Target Reference Points (Years Avg = 5)**



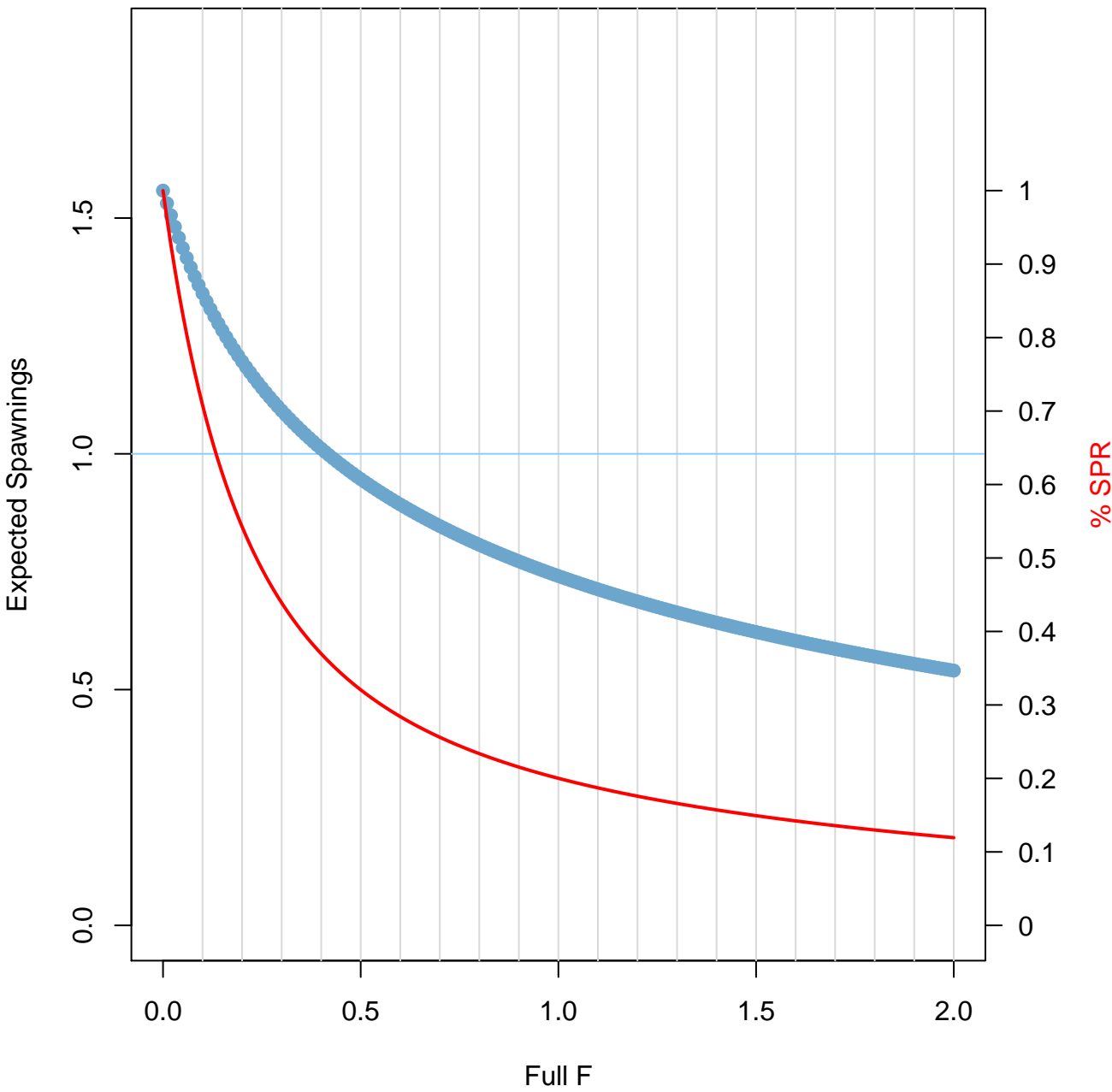
# SPR Target Reference Points (Years Avg = 5)

% SPR	F(%SPR)	YPR
0.2	1.0011	0.4643
0.25	0.7251	0.4641
0.3	0.5531	0.4593
0.35	0.4364	0.4495
0.4	0.3518	0.4346
0.45	0.2872	0.415
0.5	0.236	0.3912
0.55	0.1942	0.3637
0.6	0.1593	0.3328
0.65	0.1296	0.299
0.7	0.1039	0.2624
0.75	0.0814	0.2235
0.8	0.0615	0.1824

Selectivity or Maturity at age



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

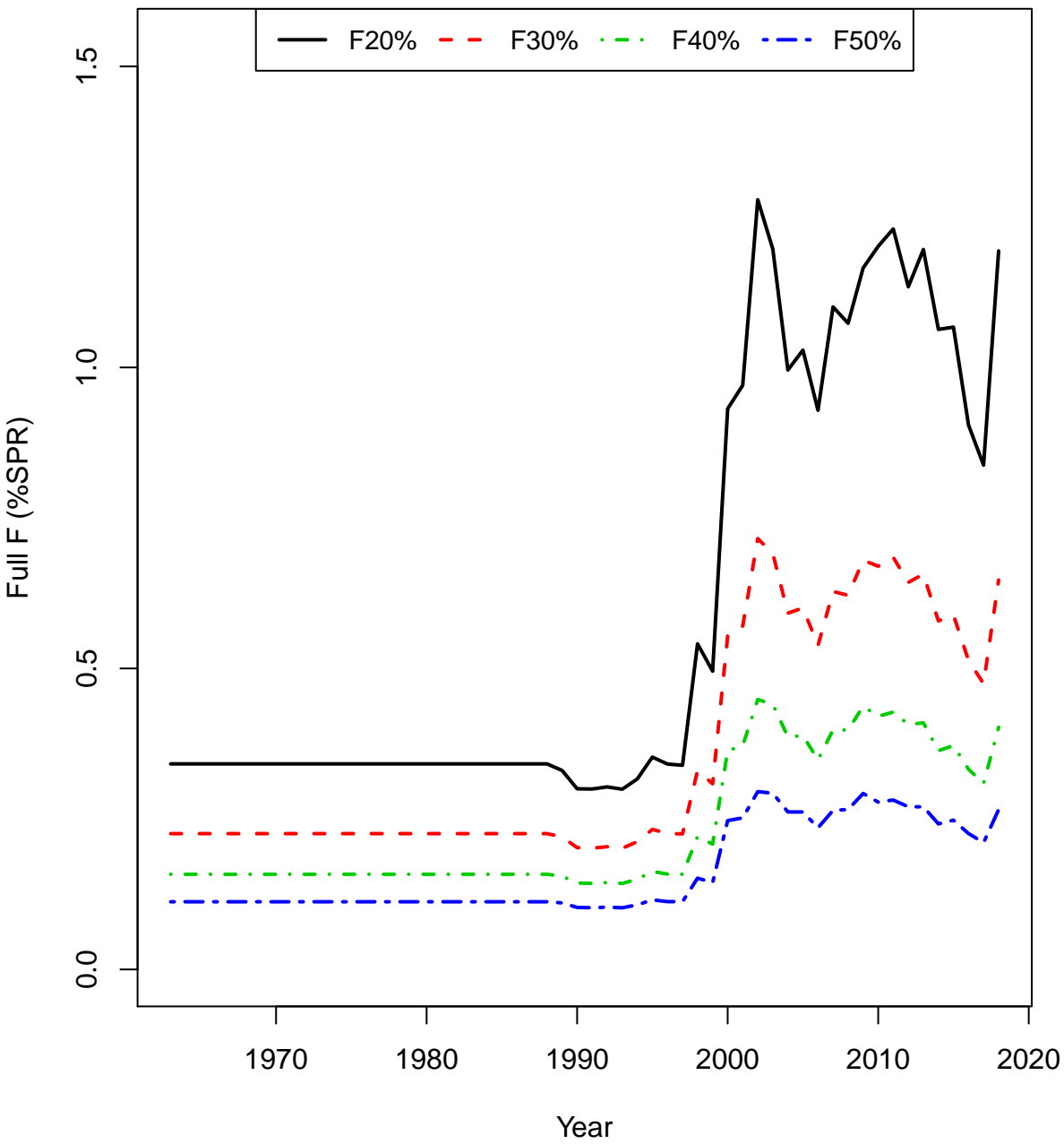




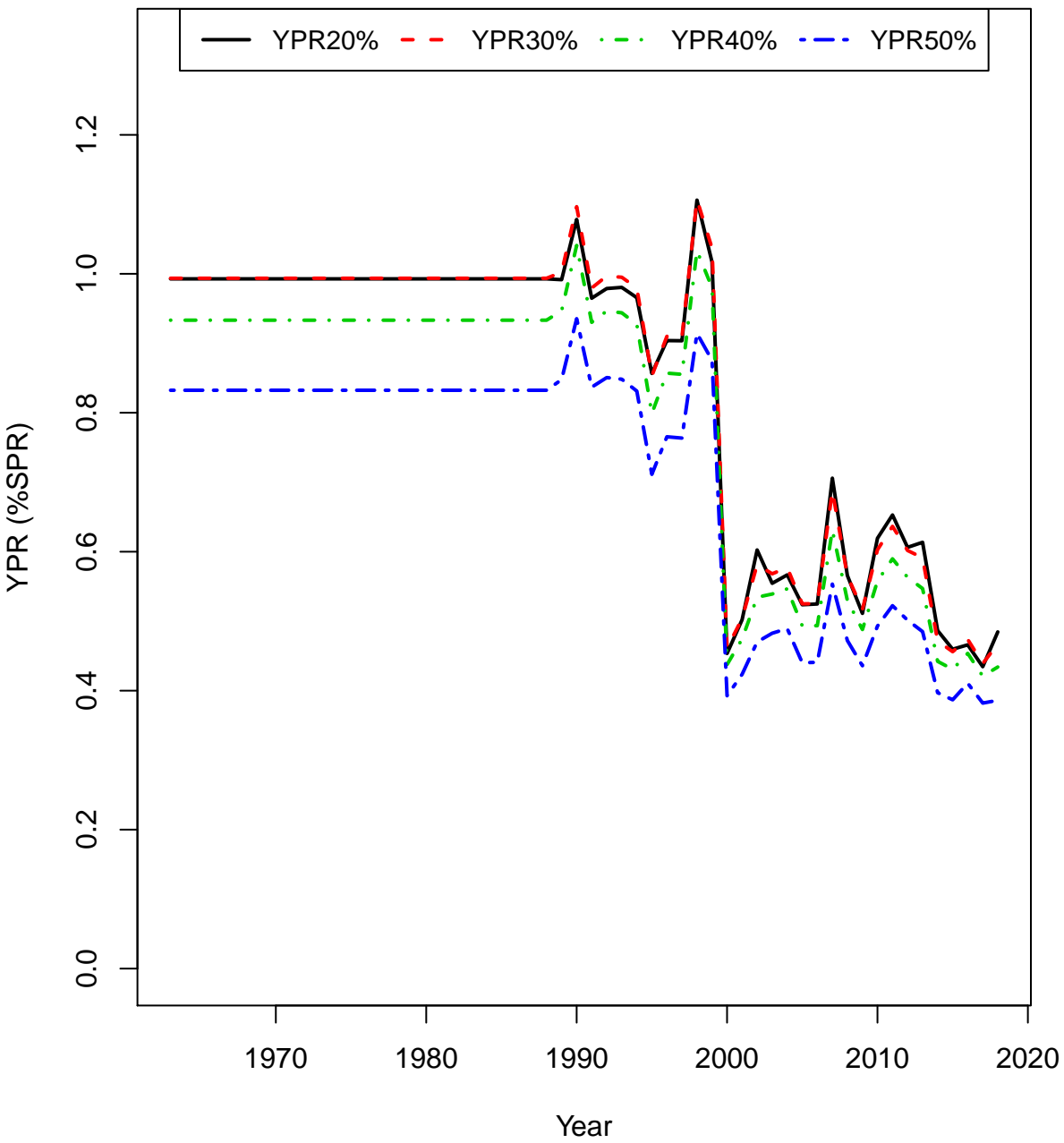
# Expected Spawns & SPR Reference Points (Years Avg = 5)

F	E[Sp]	SPR	F	E[Sp]	SPR	F	E[Sp]	SPR
0	1.5582	1	0.35	1.049	0.4012	0.7	0.8469	0.2561
0.01	1.5313	0.9617	0.36	1.0411	0.3945	0.71	0.8427	0.2536
0.02	1.5058	0.926	0.37	1.0334	0.3879	0.72	0.8385	0.2512
0.03	1.4815	0.8925	0.38	1.0258	0.3817	0.73	0.8344	0.2489
0.04	1.4585	0.8611	0.39	1.0184	0.3756	0.74	0.8303	0.2466
0.05	1.4365	0.8316	0.4	1.0112	0.3697	0.75	0.8263	0.2443
0.06	1.4155	0.8039	0.41	1.0041	0.3641	0.76	0.8224	0.2421
0.07	1.3954	0.7779	0.42	0.9972	0.3586	0.77	0.8185	0.2399
0.08	1.3762	0.7533	0.43	0.9904	0.3533	0.78	0.8147	0.2378
0.09	1.3578	0.7301	0.44	0.9837	0.3482	0.79	0.8109	0.2358
0.1	1.3402	0.7082	0.45	0.9772	0.3432	0.8	0.8071	0.2337
0.11	1.3233	0.6875	0.46	0.9708	0.3384	0.81	0.8034	0.2317
0.12	1.307	0.6679	0.47	0.9645	0.3337	0.82	0.7998	0.2298
0.13	1.2913	0.6493	0.48	0.9584	0.3292	0.83	0.7962	0.2279
0.14	1.2762	0.6316	0.49	0.9524	0.3249	0.84	0.7926	0.226
0.15	1.2617	0.6149	0.5	0.9464	0.3206	0.85	0.7891	0.2242
0.16	1.2476	0.5989	0.51	0.9406	0.3165	0.86	0.7856	0.2223
0.17	1.2341	0.5838	0.52	0.9349	0.3125	0.87	0.7822	0.2206
0.18	1.221	0.5694	0.53	0.9293	0.3086	0.88	0.7788	0.2188
0.19	1.2083	0.5556	0.54	0.9238	0.3048	0.89	0.7754	0.2171
0.2	1.1961	0.5425	0.55	0.9184	0.3011	0.9	0.7721	0.2154
0.21	1.1842	0.53	0.56	0.9131	0.2975	0.91	0.7688	0.2138
0.22	1.1727	0.5181	0.57	0.9078	0.2941	0.92	0.7656	0.2122
0.23	1.1615	0.5066	0.58	0.9027	0.2907	0.93	0.7624	0.2106
0.24	1.1506	0.4957	0.59	0.8976	0.2874	0.94	0.7592	0.209
0.25	1.1401	0.4852	0.6	0.8927	0.2842	0.95	0.7561	0.2075
0.26	1.1299	0.4752	0.61	0.8878	0.281	0.96	0.753	0.206
0.27	1.1199	0.4656	0.62	0.8829	0.278	0.97	0.7499	0.2045
0.28	1.1102	0.4564	0.63	0.8782	0.275	0.98	0.7468	0.203
0.29	1.1008	0.4476	0.64	0.8735	0.2721	0.99	0.7438	0.2016
0.3	1.0916	0.4391	0.65	0.8689	0.2693	1	0.7409	0.2002
0.31	1.0827	0.4309	0.66	0.8644	0.2665	1.01	0.7379	0.1988
0.32	1.0739	0.423	0.67	0.8599	0.2638	1.02	0.735	0.1974
0.33	1.0654	0.4155	0.68	0.8555	0.2612	1.03	0.7321	0.196
0.34	1.0571	0.4082	0.69	0.8512	0.2586	1.04	0.7293	0.1947

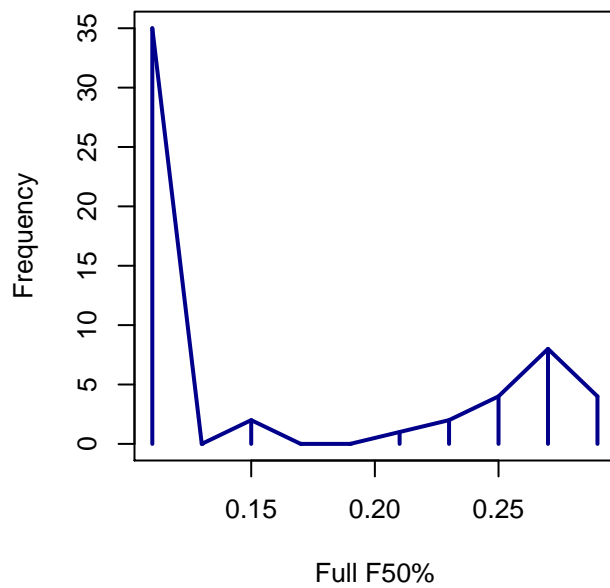
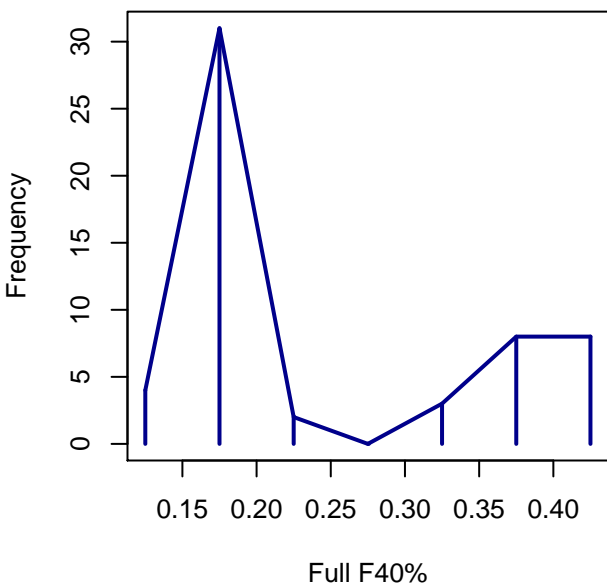
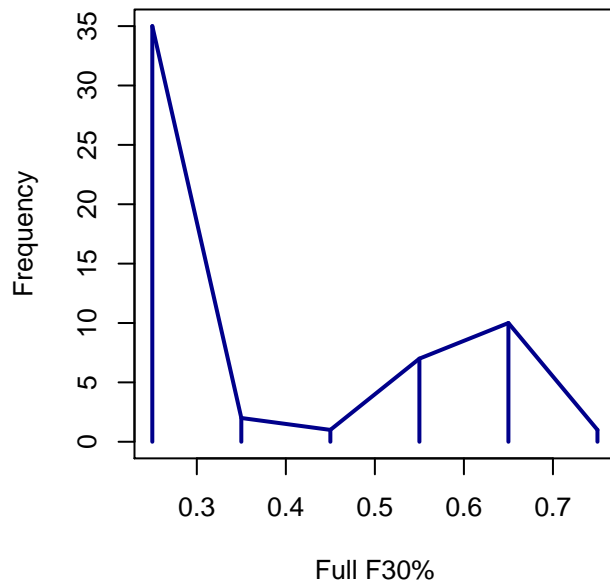
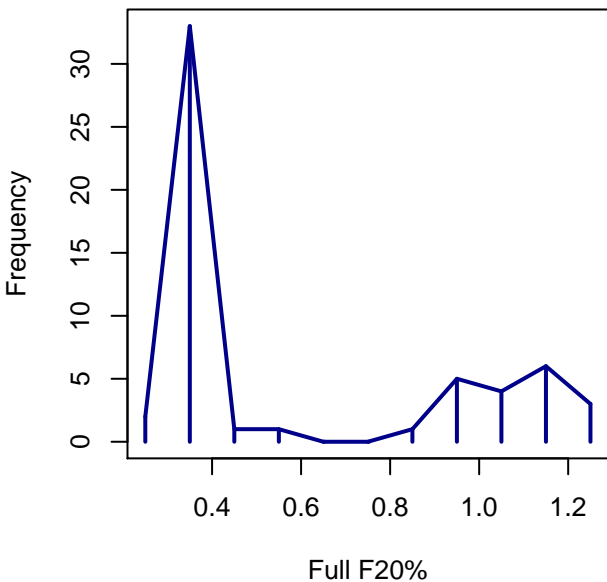
Annual F(%SPR) Reference Points



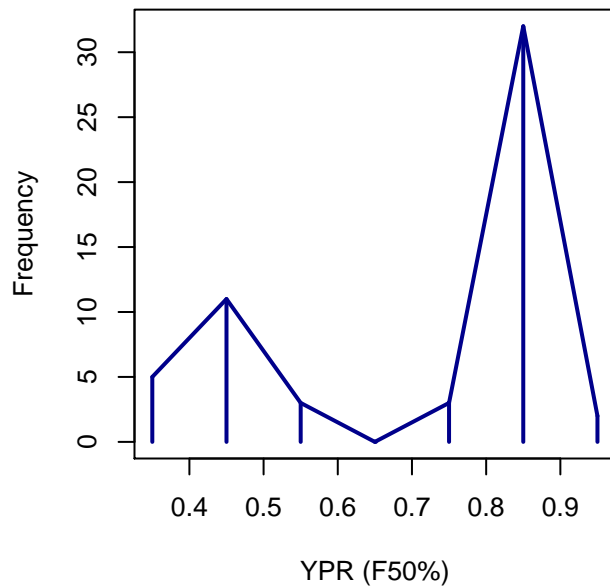
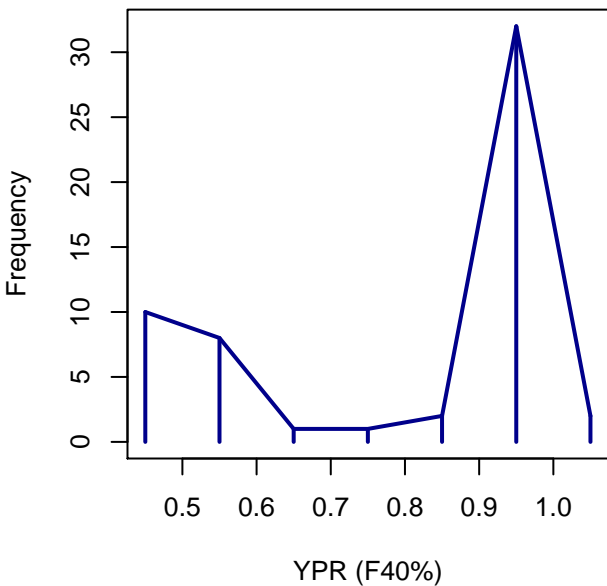
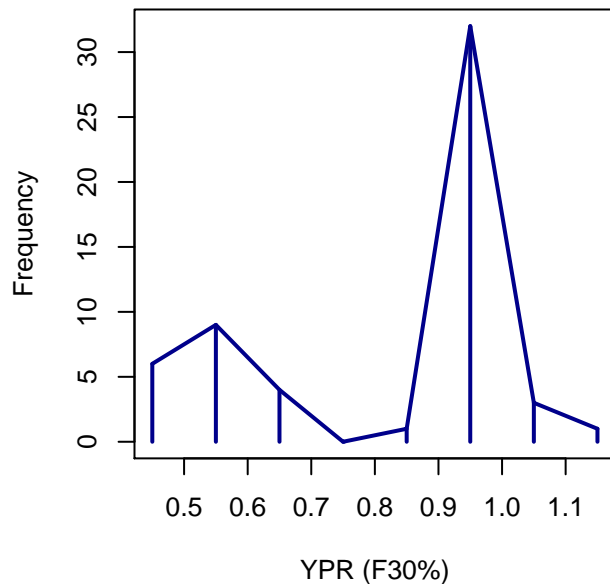
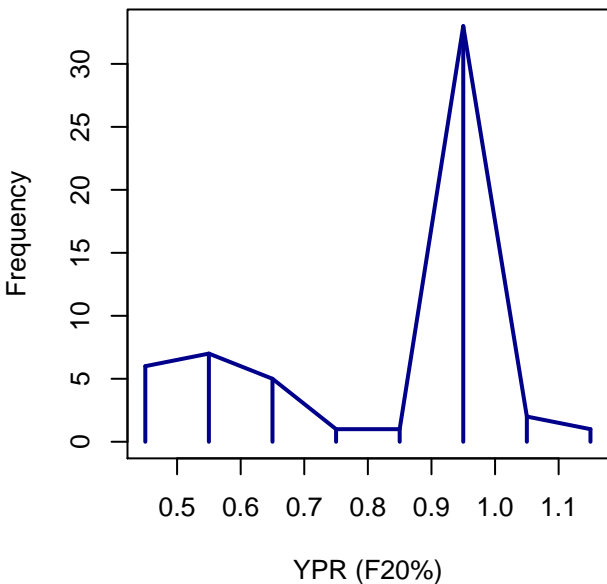
Annual YPR(%SPR) Reference Points



## Annual F (%SPR) Reference Points



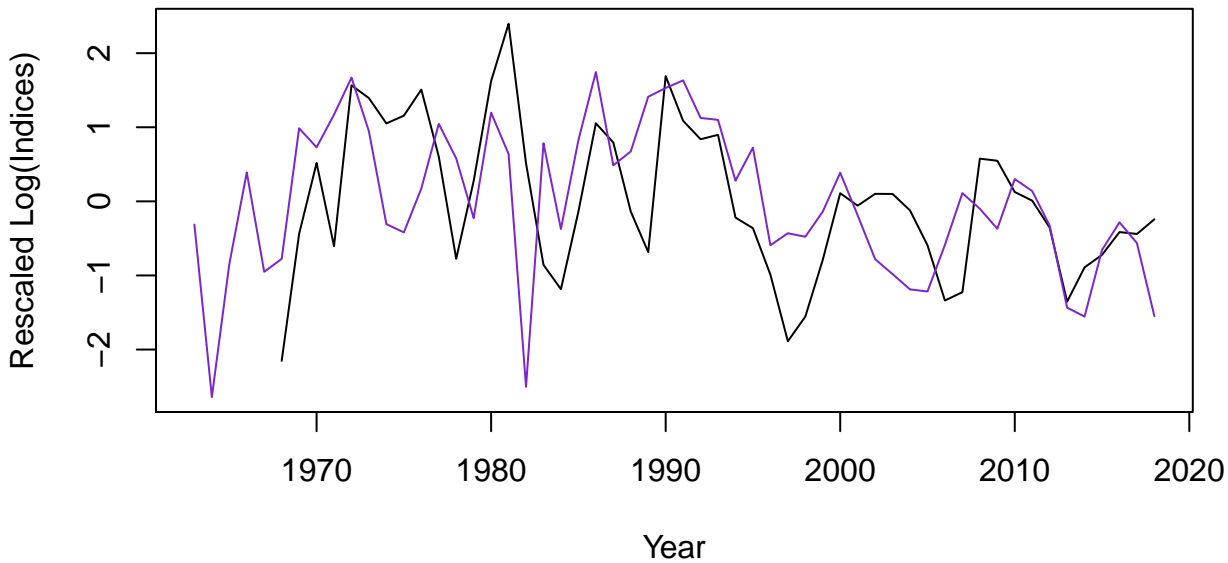
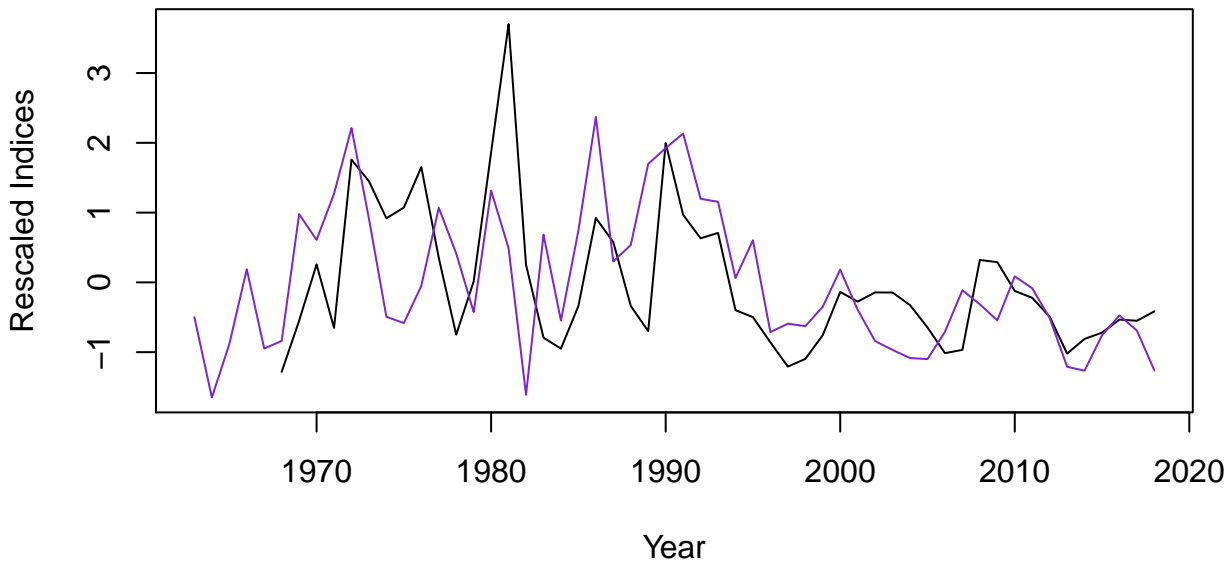
## Annual YPR (%SPR) Reference Points





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







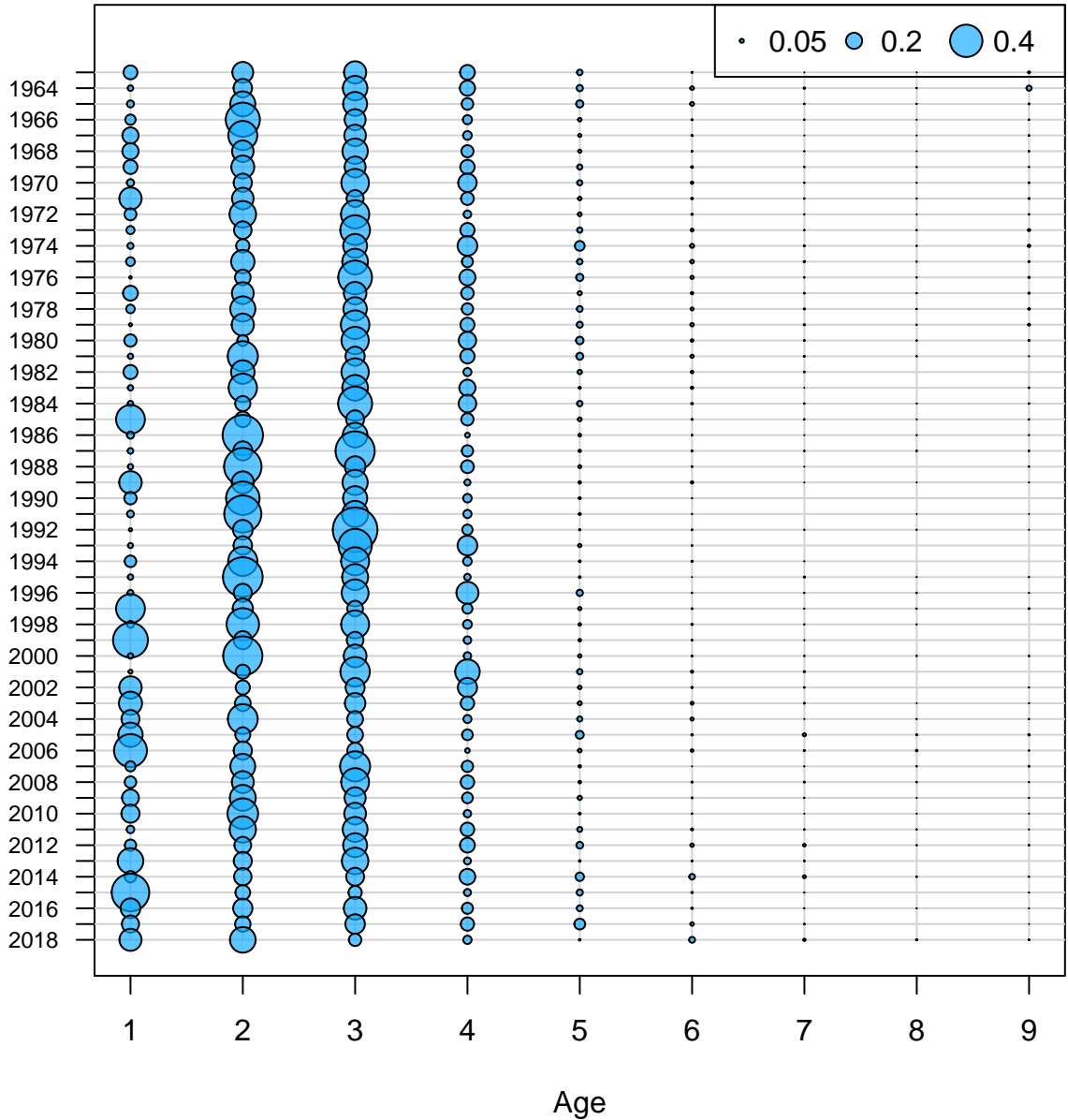
# Age Comps for Index 1 (INDEX-1)

• 0.05 • 0.2 • 0.4

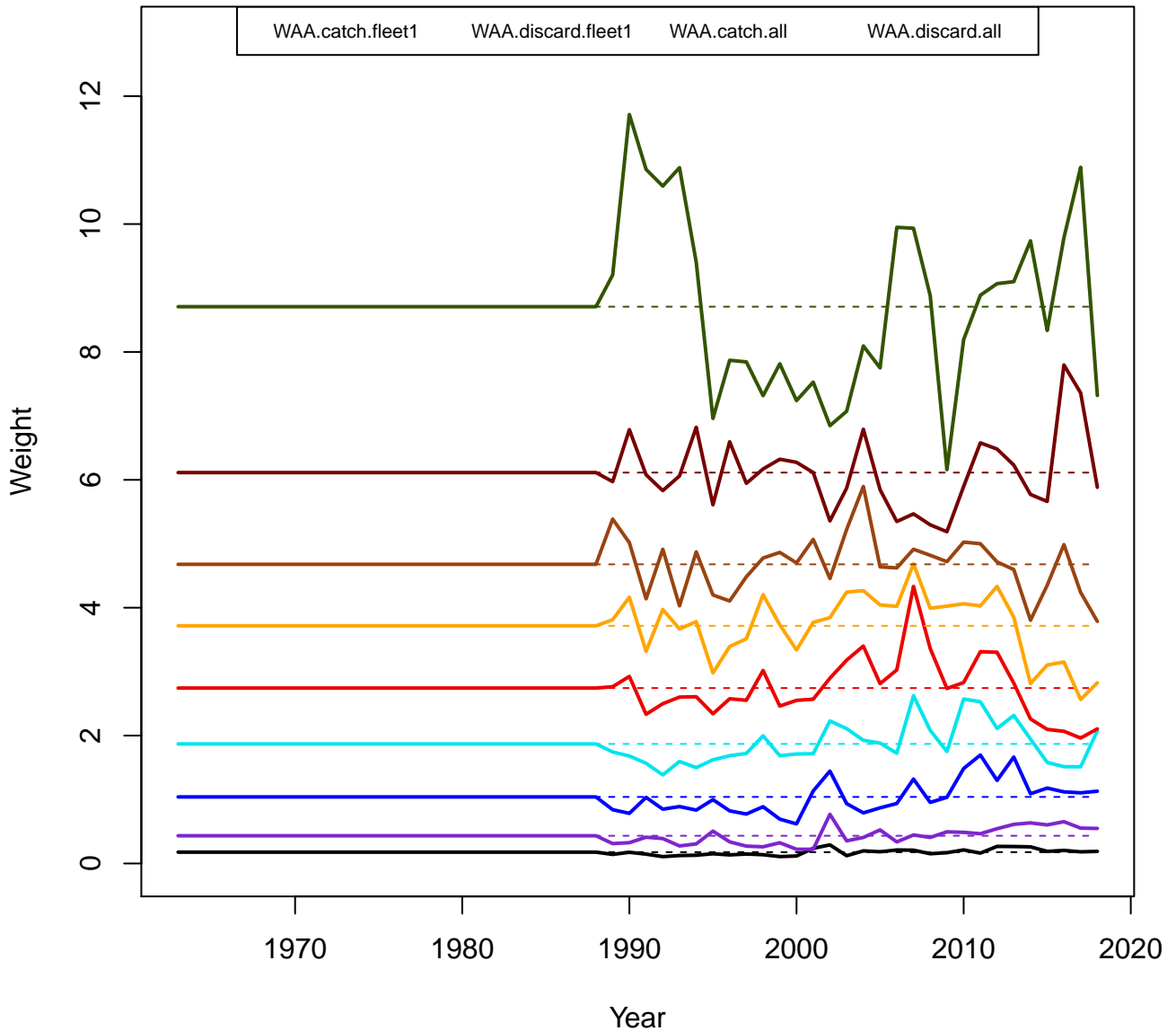


Age

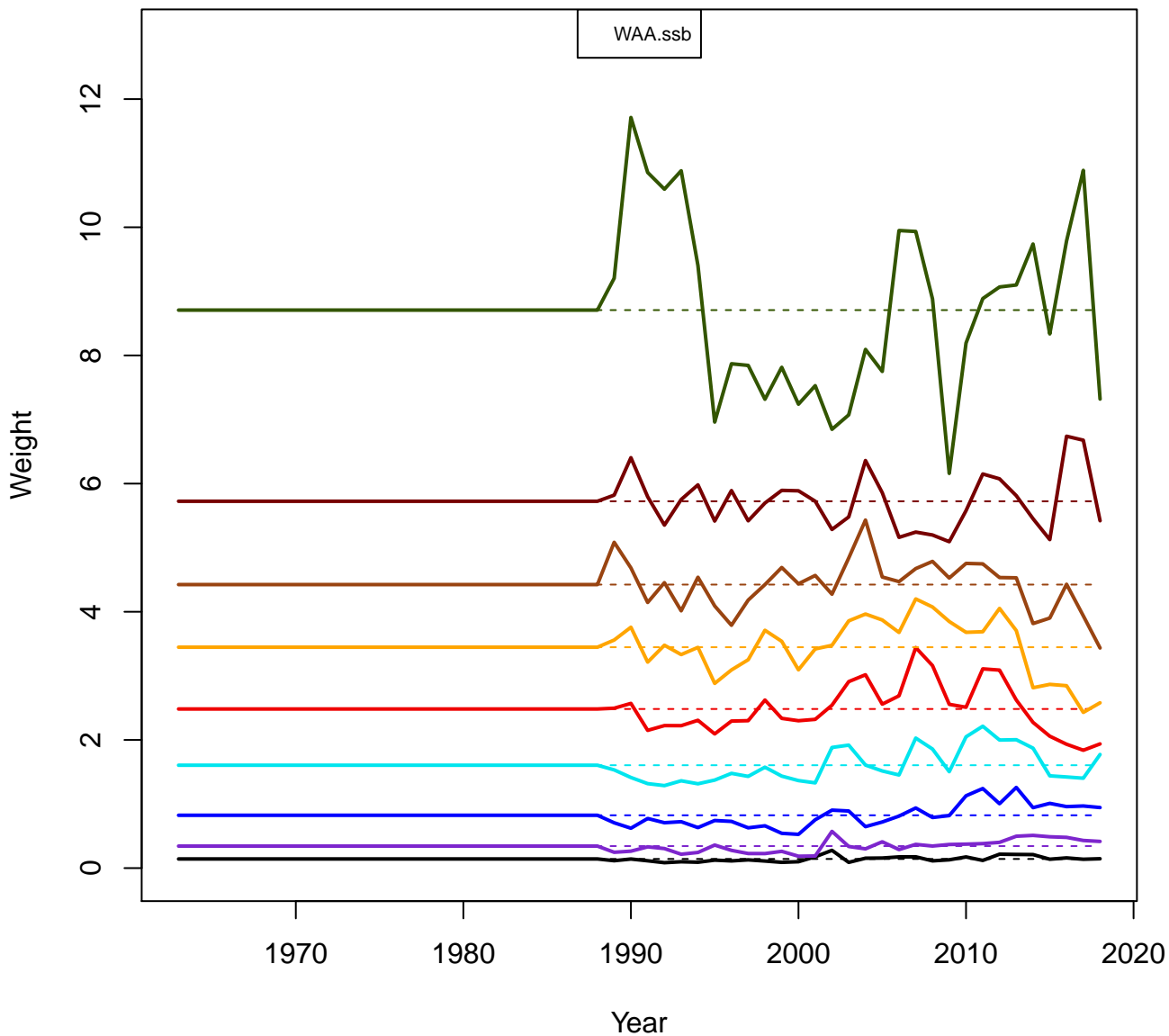
# Age Comps for Index 2 (INDEX-2)



# WAA matrix 1



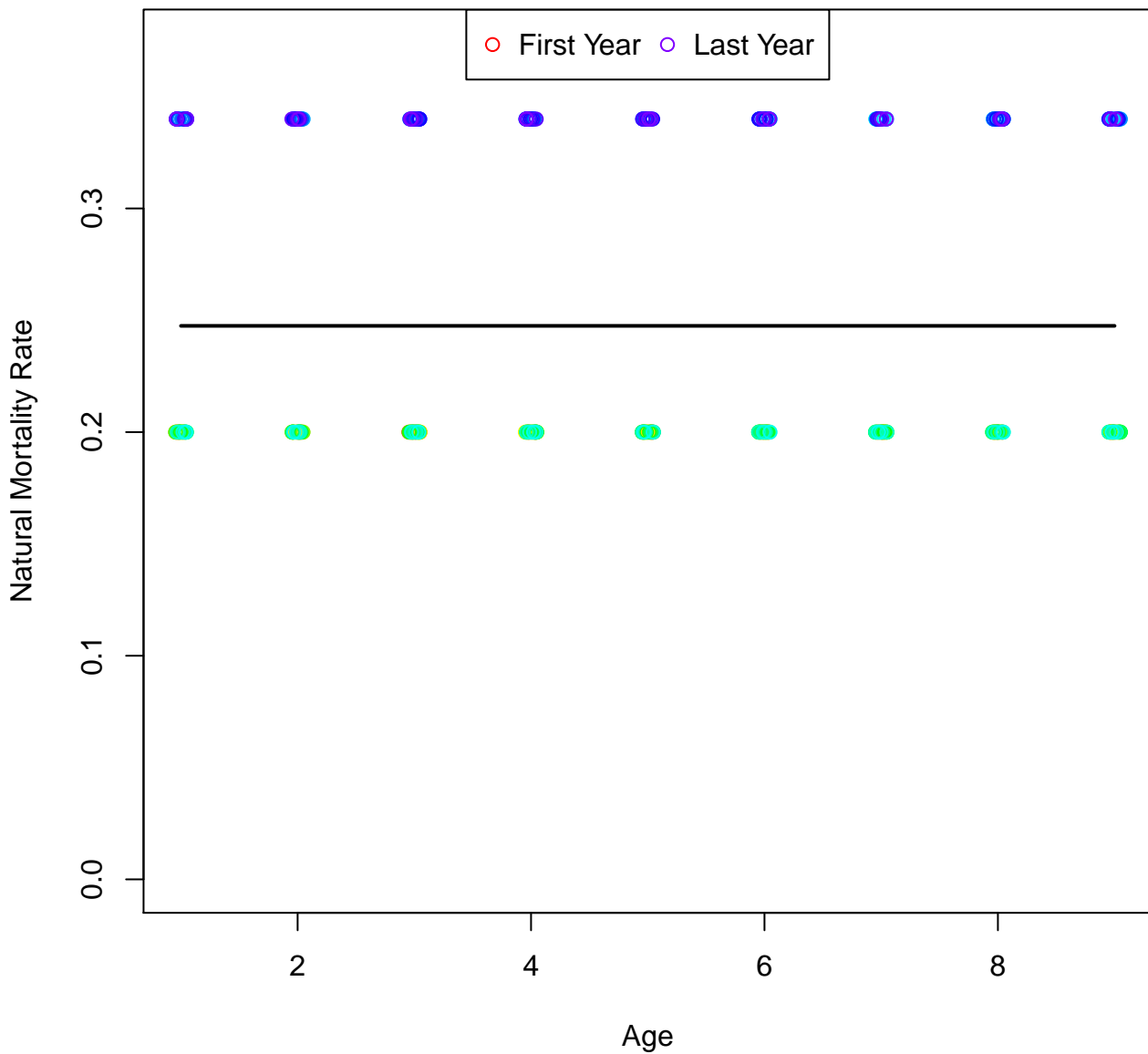
## WAA matrix 2



# WAA matrix 3



M



# Maturity

