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ASAP3 run on Friday, 15 Dec 2017 at 12:02:07

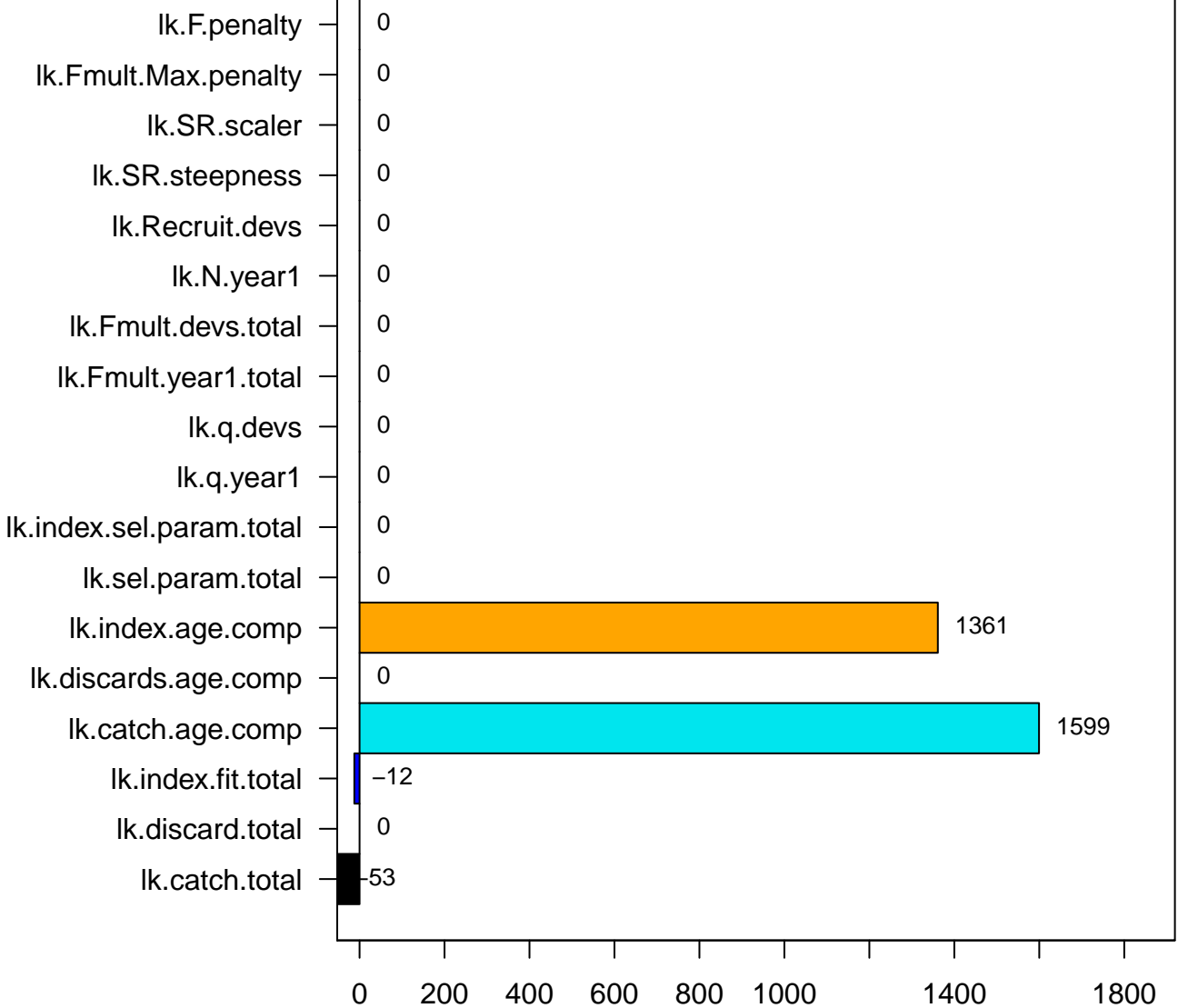
sers\jonathan.deroba\Documents\GitHub\MGWG\state-space\SNEMAYT\ASA

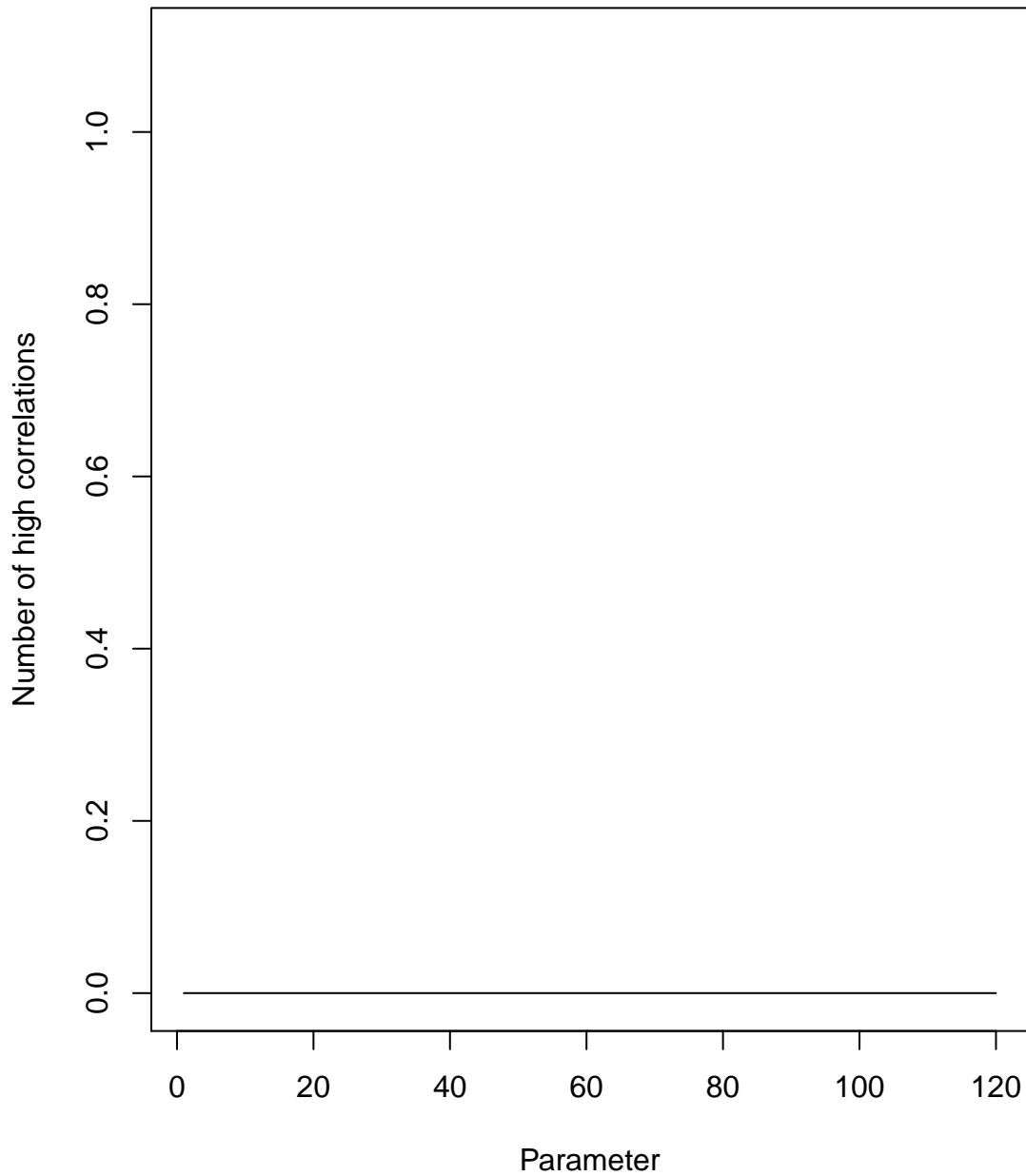
ASAPplots version = 0.1.10

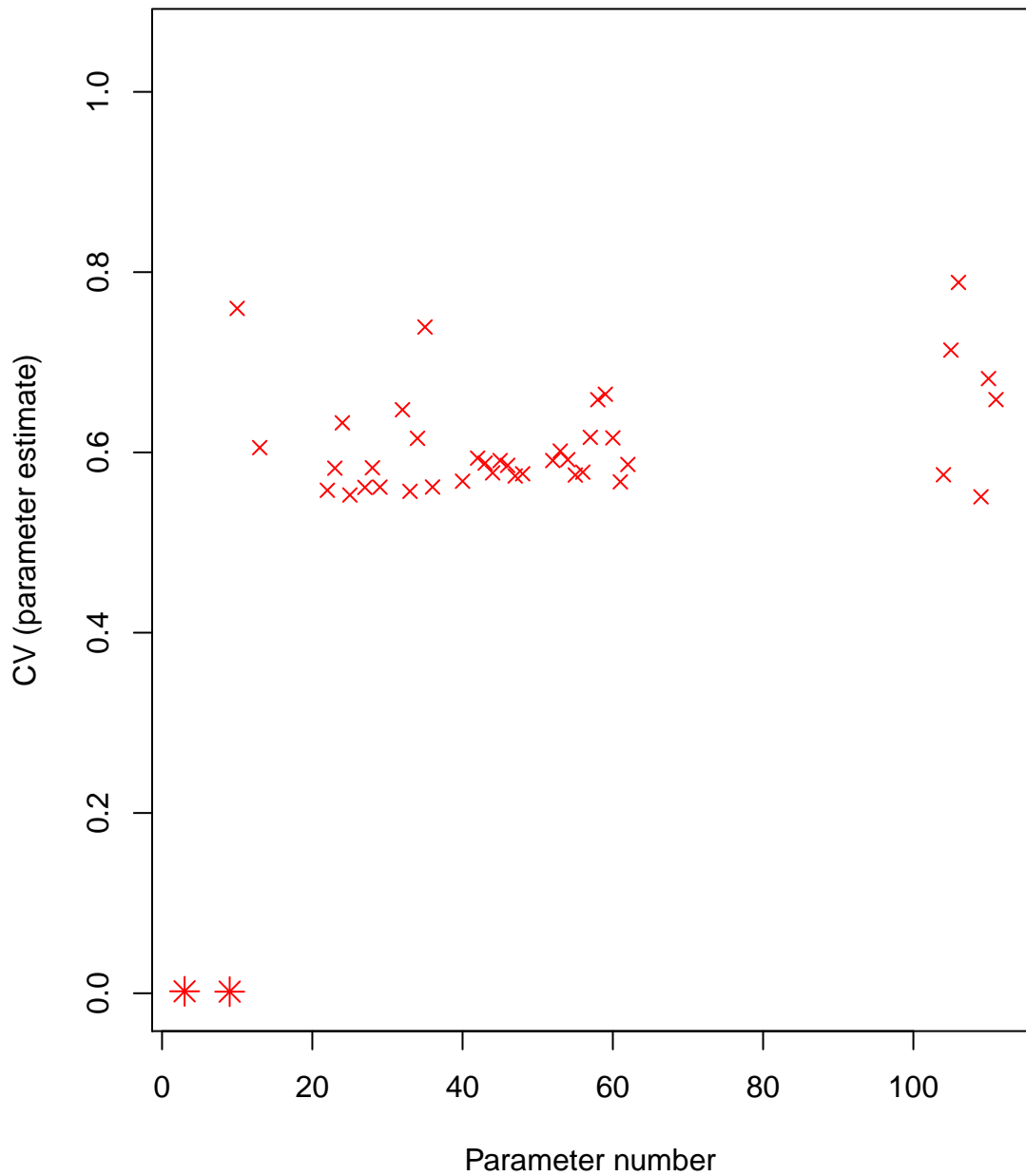
npar = 120, maximum gradient = 0.000286004

# Components of Obj. Function (2896), npar=120

Maximum gradient = 0.000286



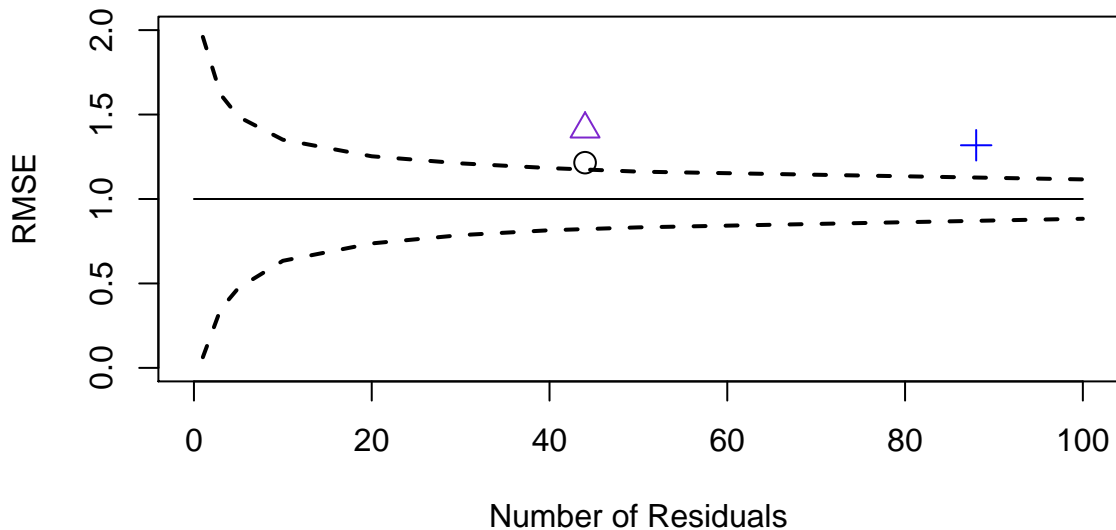




## Root Mean Square Error computed from Standardized Residuals

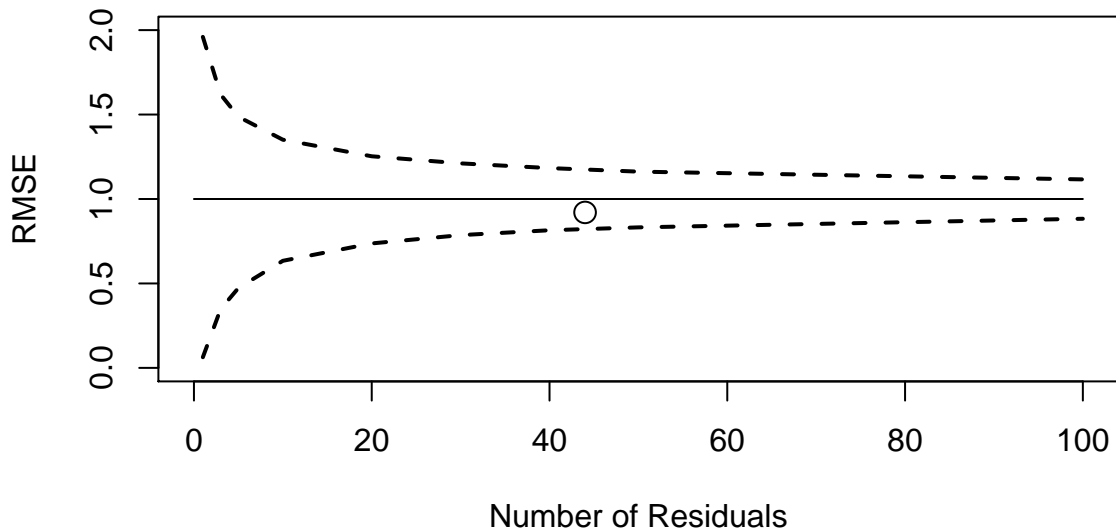
Component	# resids	RMSE
catch.tot	44	0.921
discard.tot	0	0
ind01	44	1.22
ind02	44	1.41
ind.total	88	1.32
N.year1	0	0
Fmult.year1	0	0
Fmult.devs.total	0	0
recruit.devs	0	0
fleet.sel.params	0	0
index.sel.params	0	0
q.year1	0	0
q.devs	0	0
SR.steepness	0	0
SR.scaler	0	0

Root Mean Square Error for Indices



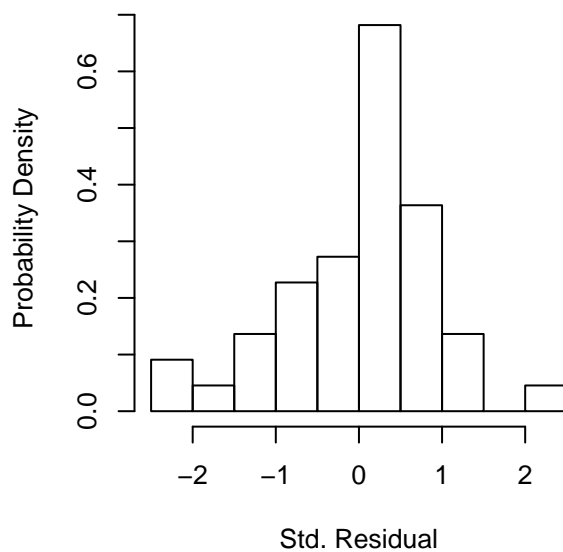
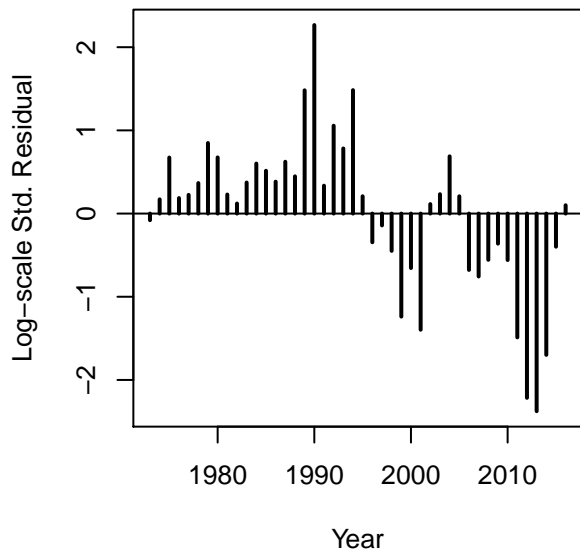
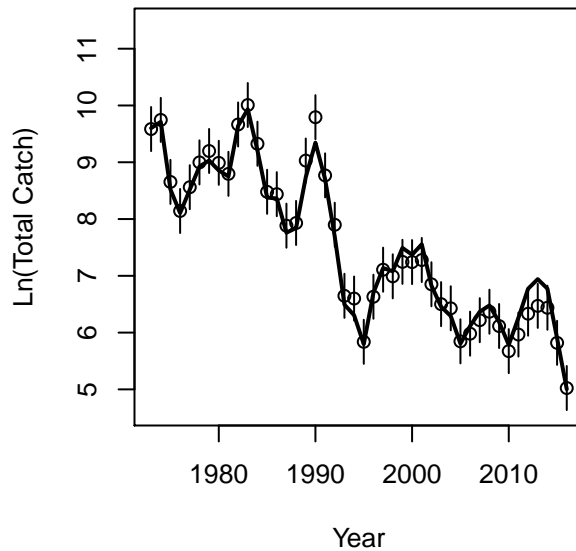
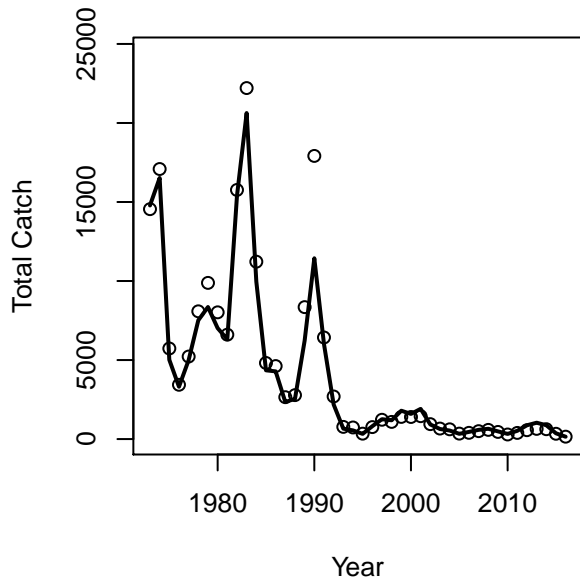
+ ind total  
△ INDEX-2  
○ INDEX-1

## Root Mean Square Error for Catch



○ catch.tot

# Fleet 1 Catch (FLEET-1)

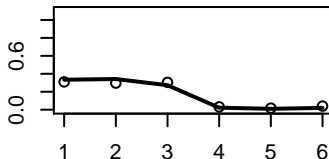




# Catch

Year = 1977

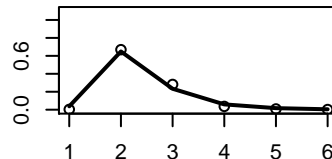
Proportion at Age



Age

Year = 1982

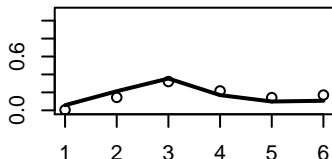
Proportion at Age



Age

Year = 1973

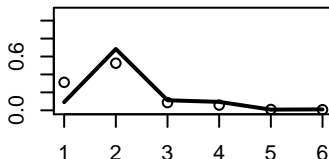
Proportion at Age



Age

Year = 1978

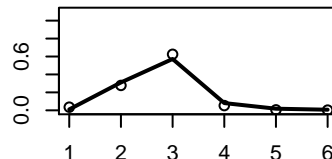
Proportion at Age



Age

Year = 1983

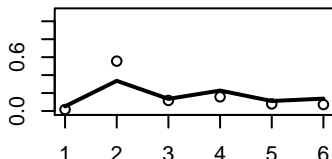
Proportion at Age



Age

Year = 1974

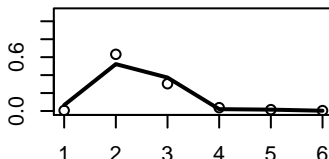
Proportion at Age



Age

Year = 1979

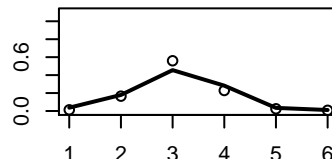
Proportion at Age



Age

Year = 1984

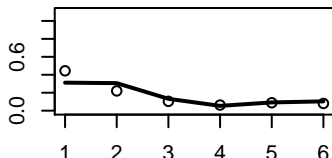
Proportion at Age



Age

Year = 1975

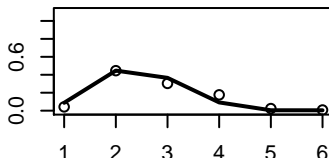
Proportion at Age



Age

Year = 1980

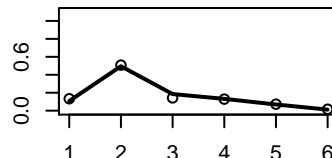
Proportion at Age



Age

Year = 1985

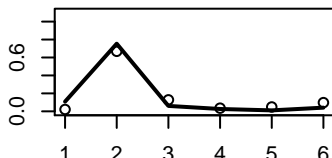
Proportion at Age



Age

Year = 1976

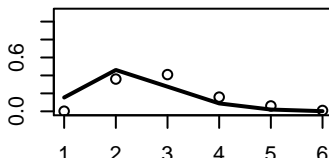
Proportion at Age



Age

Year = 1981

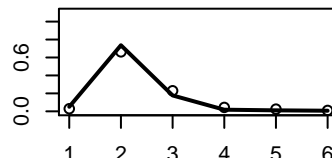
Proportion at Age



Age

Year = 1986

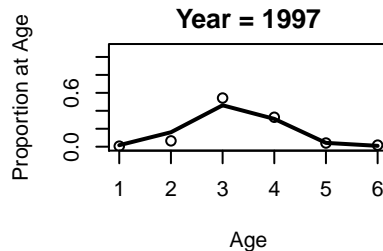
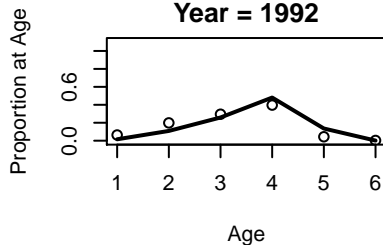
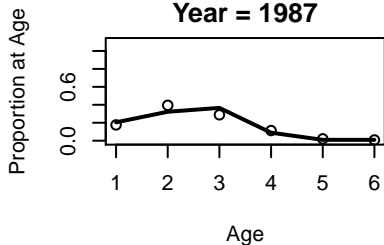
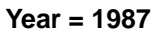
Proportion at Age



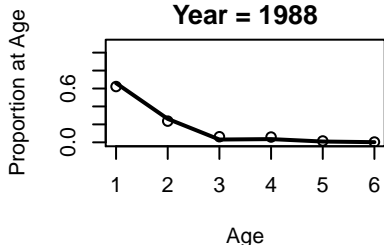
Age

Fleet 1  
FLEET-1  
↓

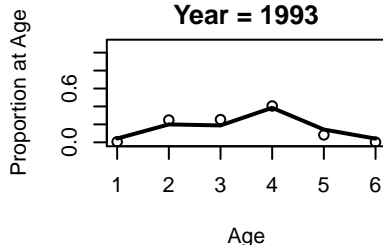
**Year = 1992**



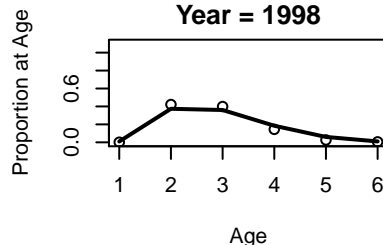
**Year = 1988**



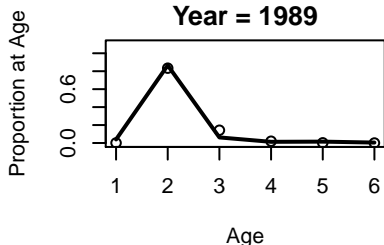
**Year = 1993**



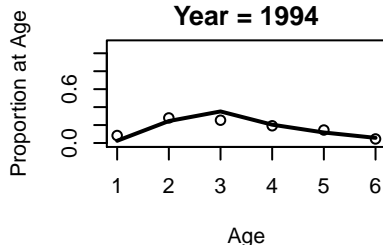
**Year = 1998**



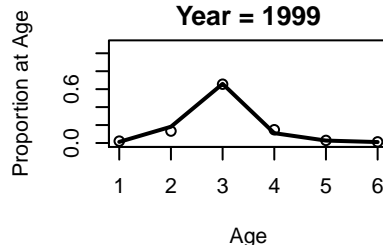
**Year = 1989**



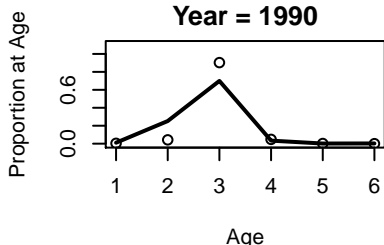
**Year = 1994**



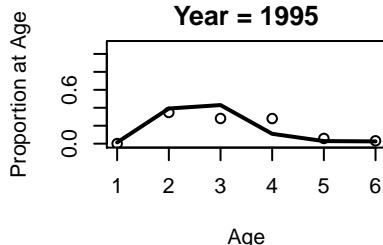
**Year = 1999**



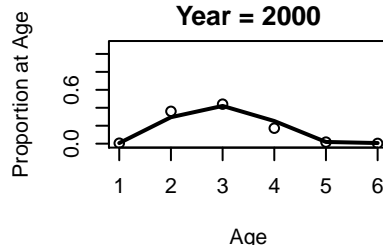
**Year = 1990**



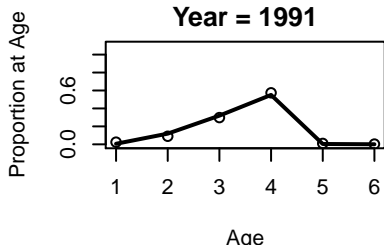
**Year = 1995**



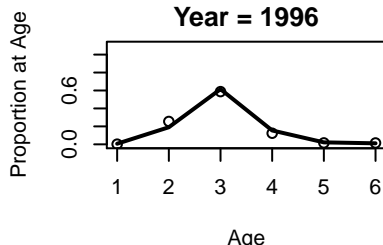
**Year = 2000**



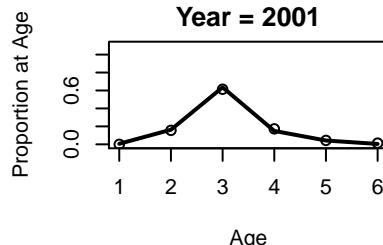
**Year = 1991**



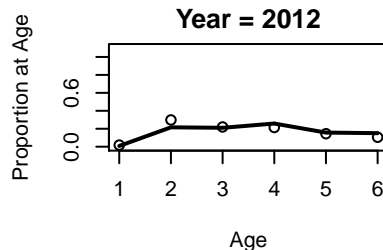
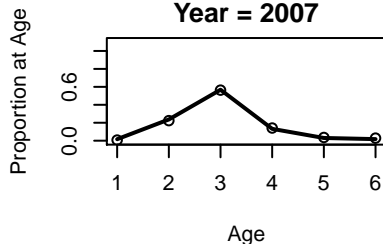
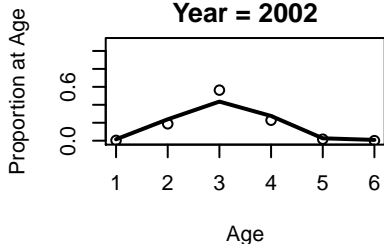
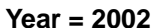
**Year = 1996**



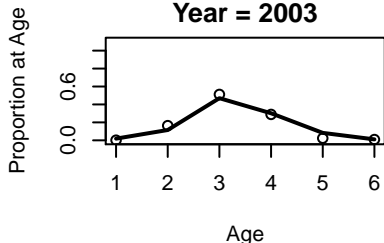
**Year = 2001**



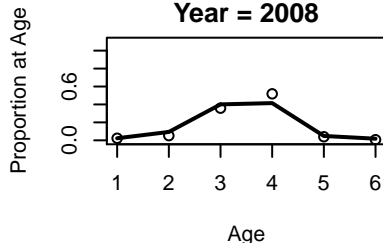
**Year = 2007**



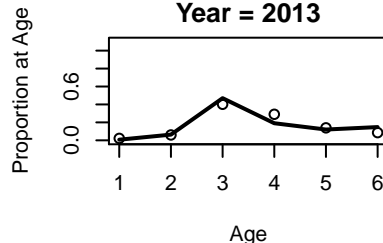
**Year = 2003**



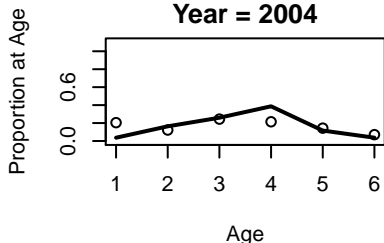
**Year = 2008**



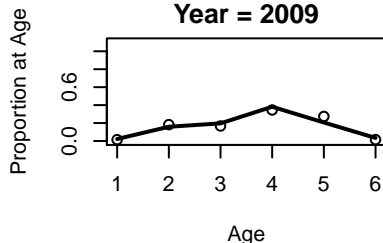
**Year = 2013**



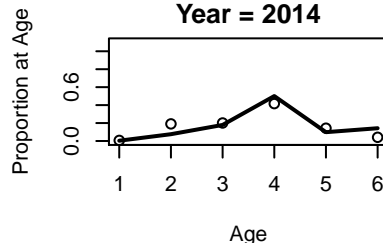
**Year = 2004**



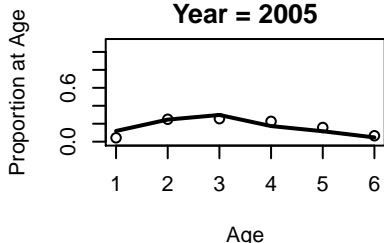
**Year = 2009**



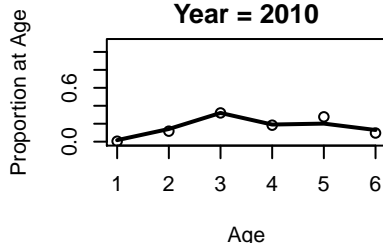
**Year = 2014**



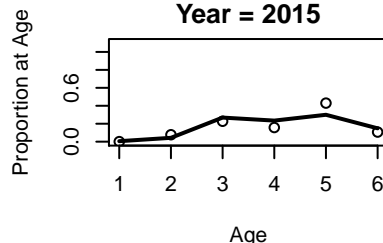
**Year = 2005**



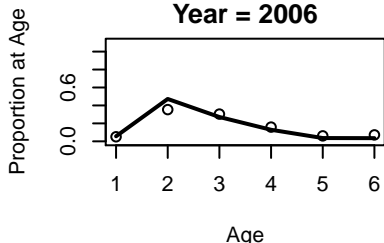
**Year = 2010**



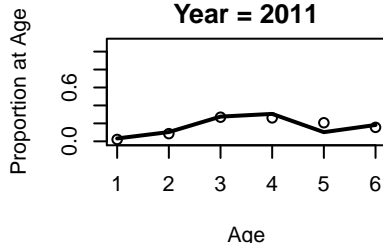
**Year = 2015**



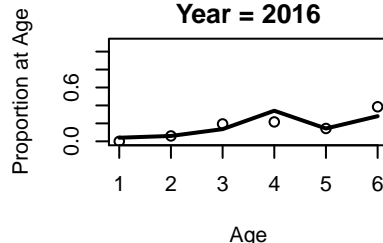
**Year = 2006**



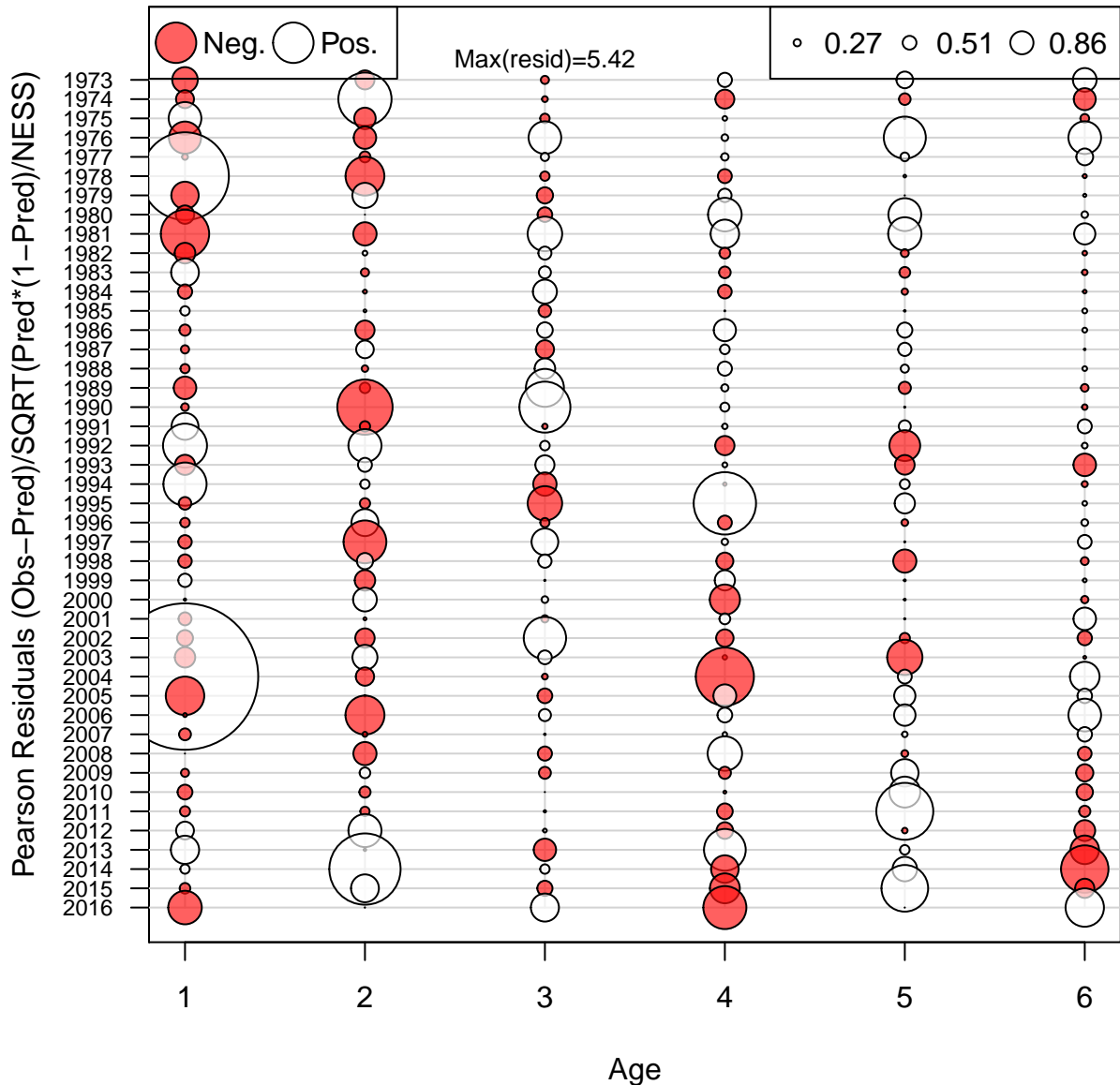
**Year = 2011**



**Year = 2016**

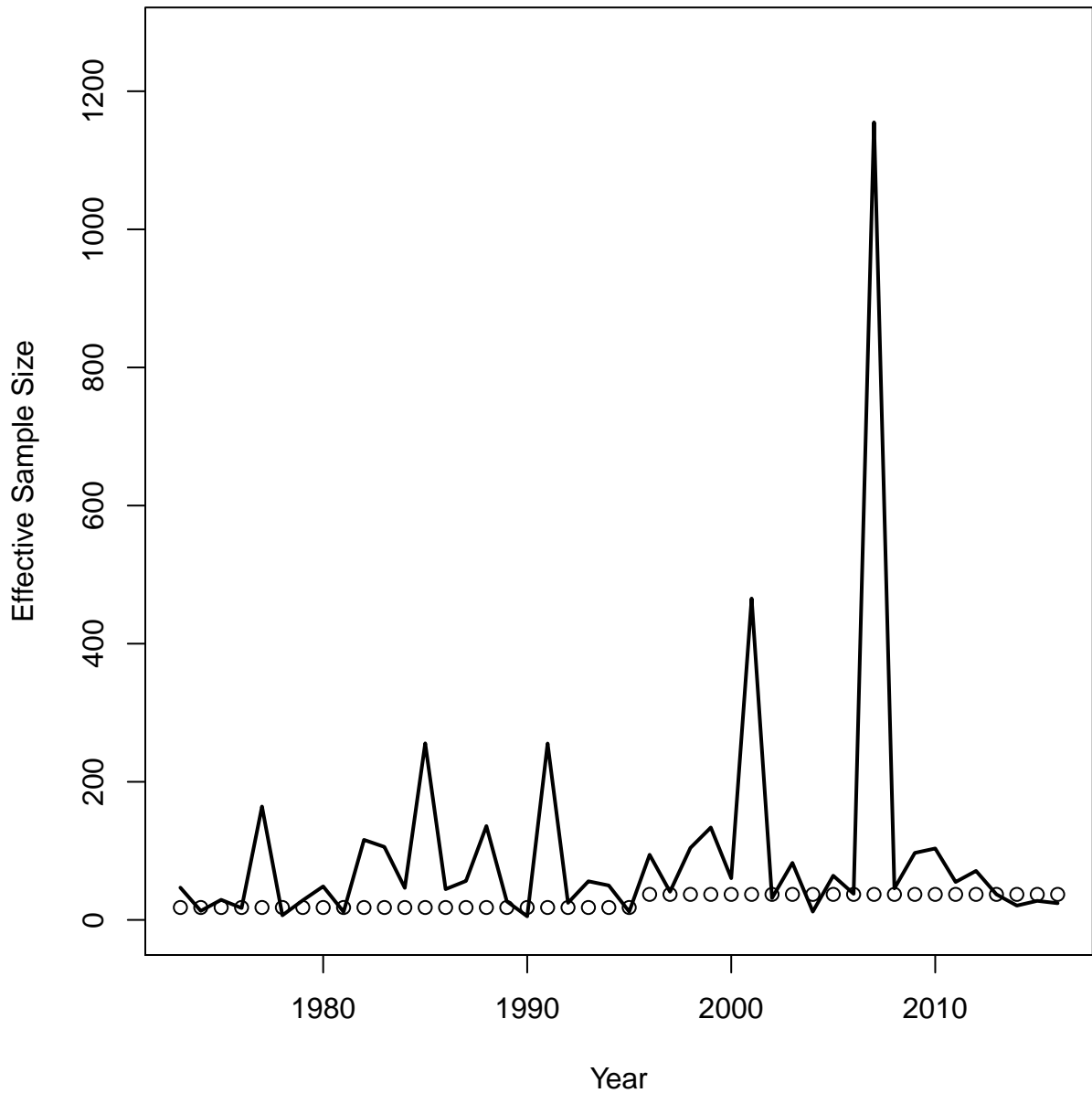


# Age Comp Residuals for Catch by Fleet 1 (FLEET-1)

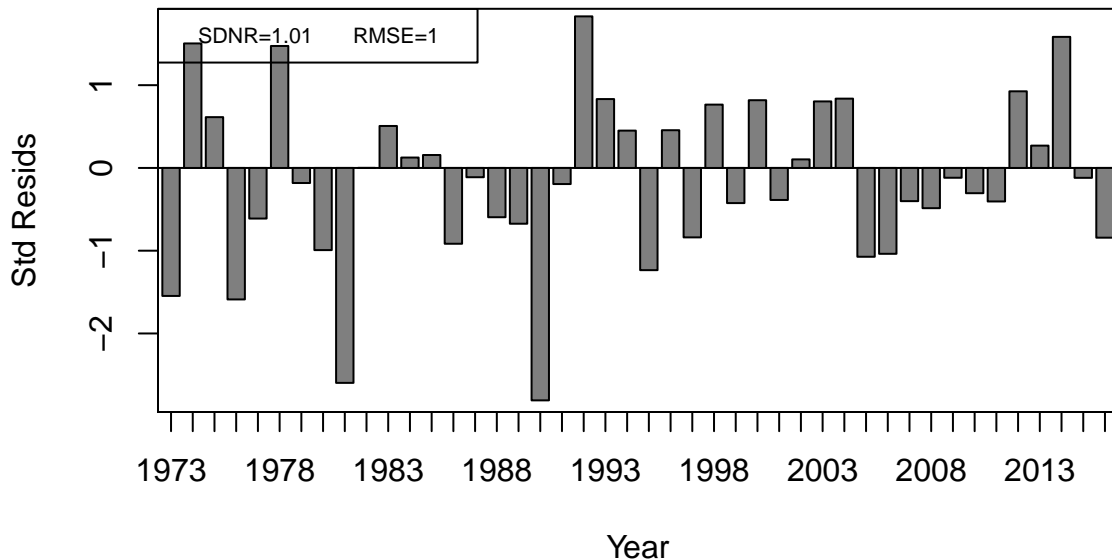
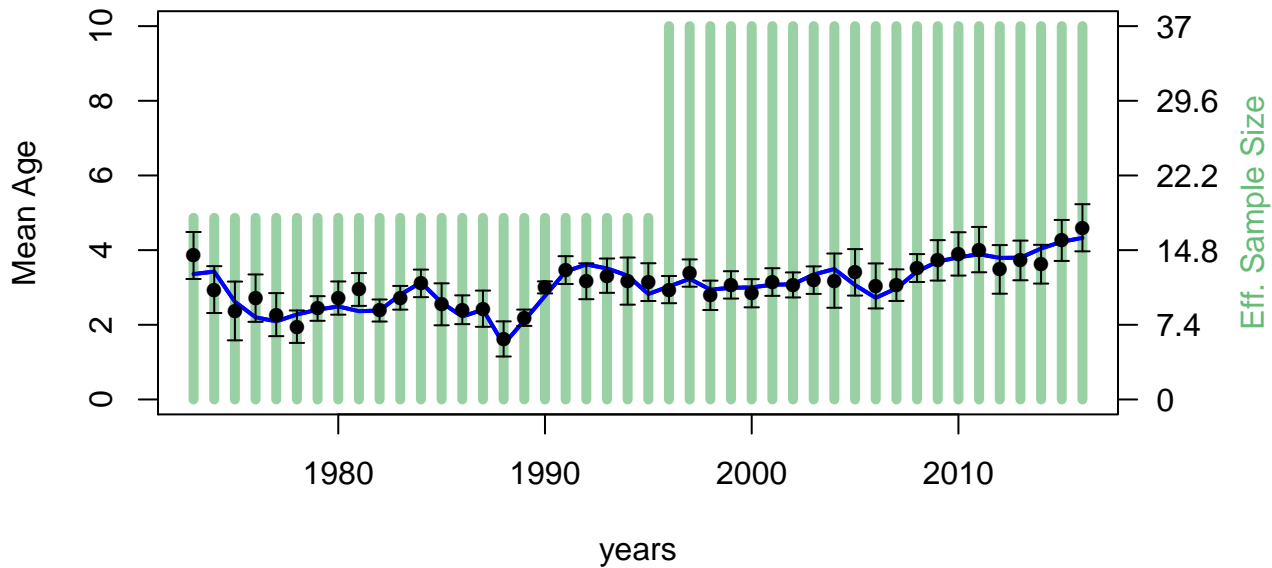


Mean resid = 0.06 SD(resid) = 0.87

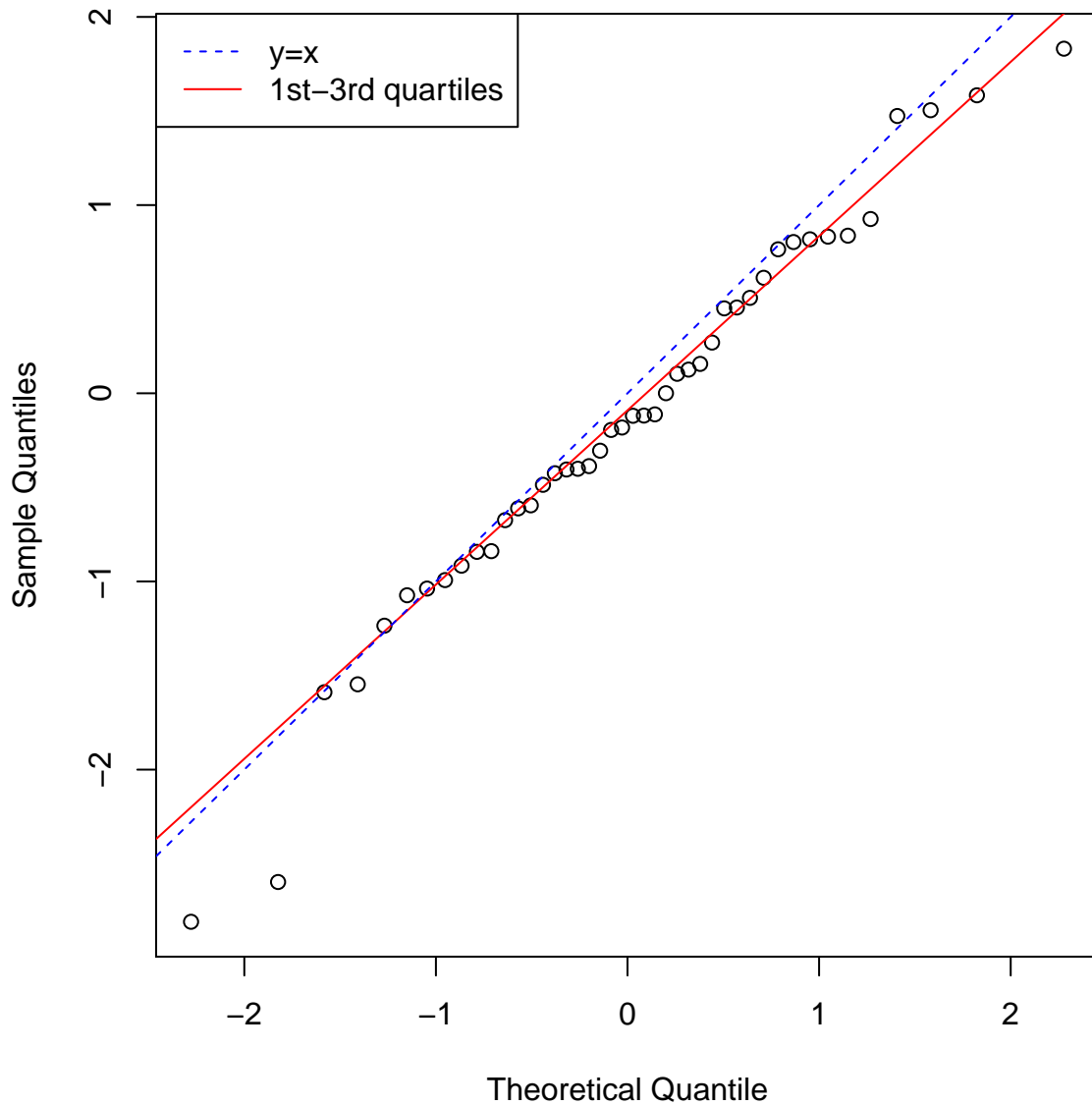
# Catch Neff Fleet 1 (FLEET-1)



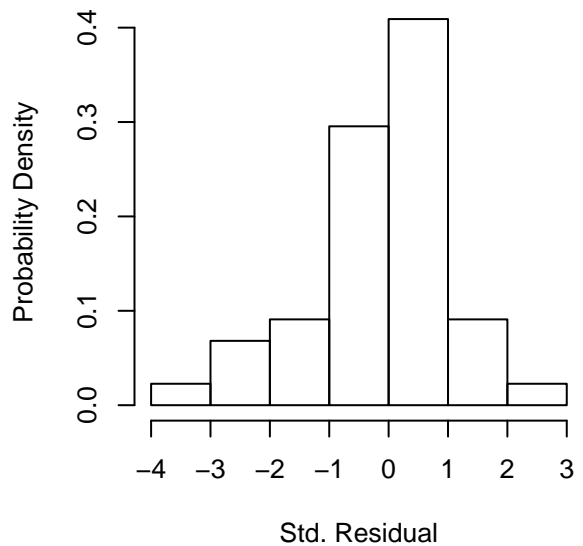
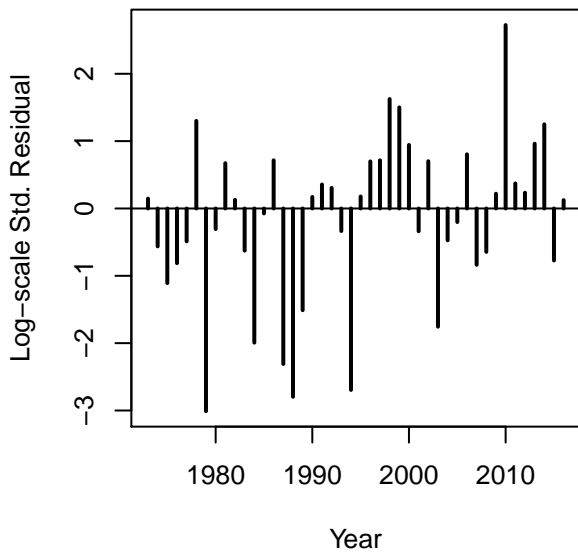
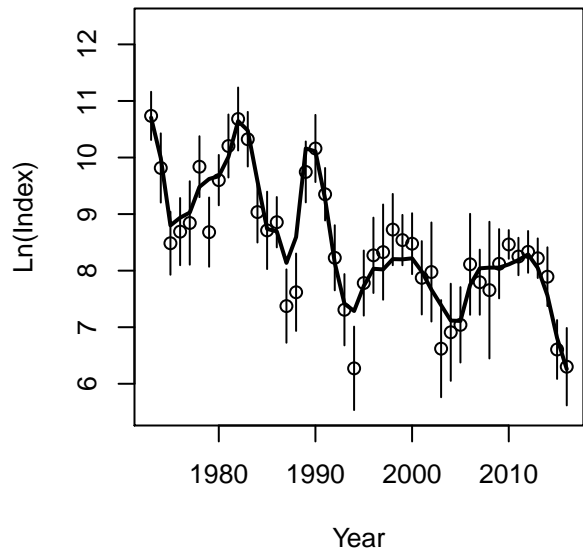
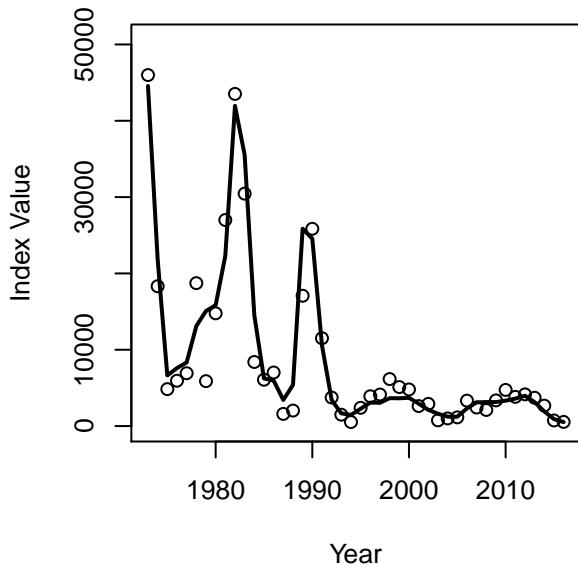
# Catch Fleet 1 (FLEET-1)



# Catch Fleet 1 (FLEET-1)

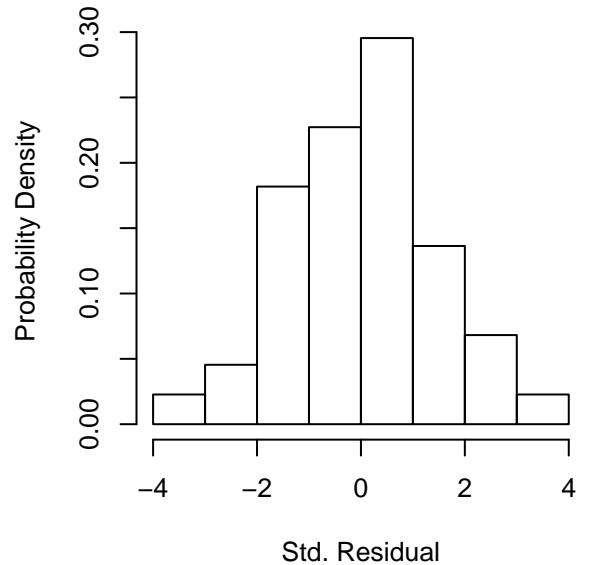
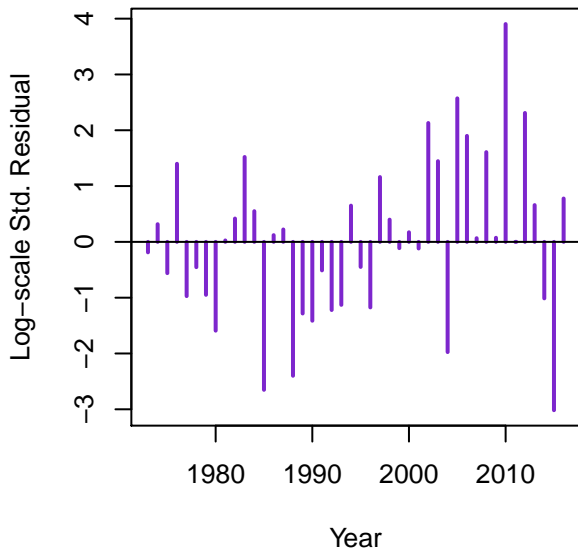
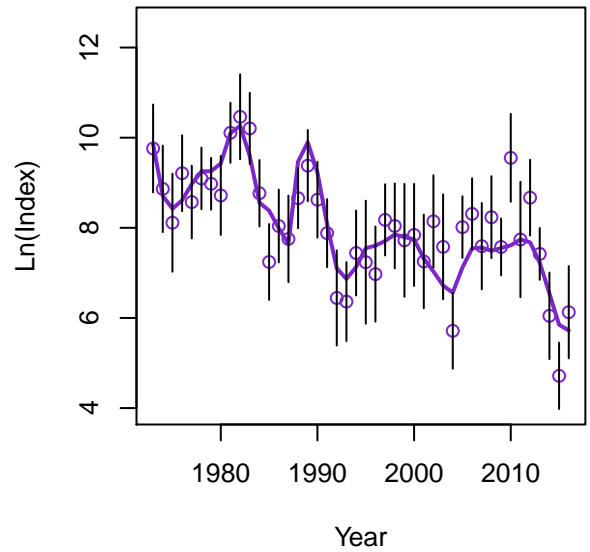
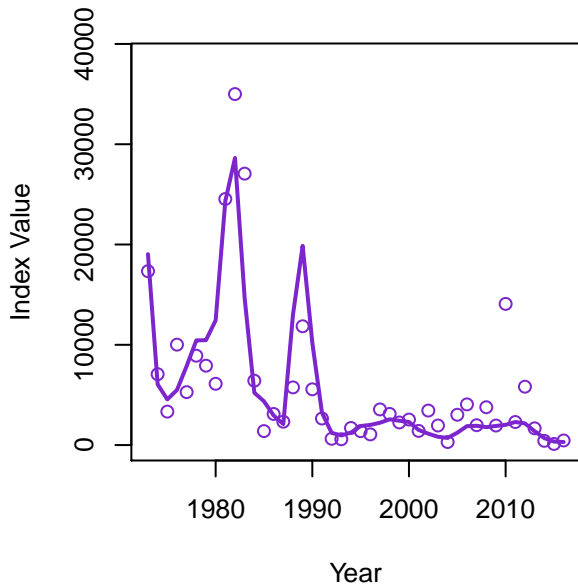


Index 1 (INDEX-1)

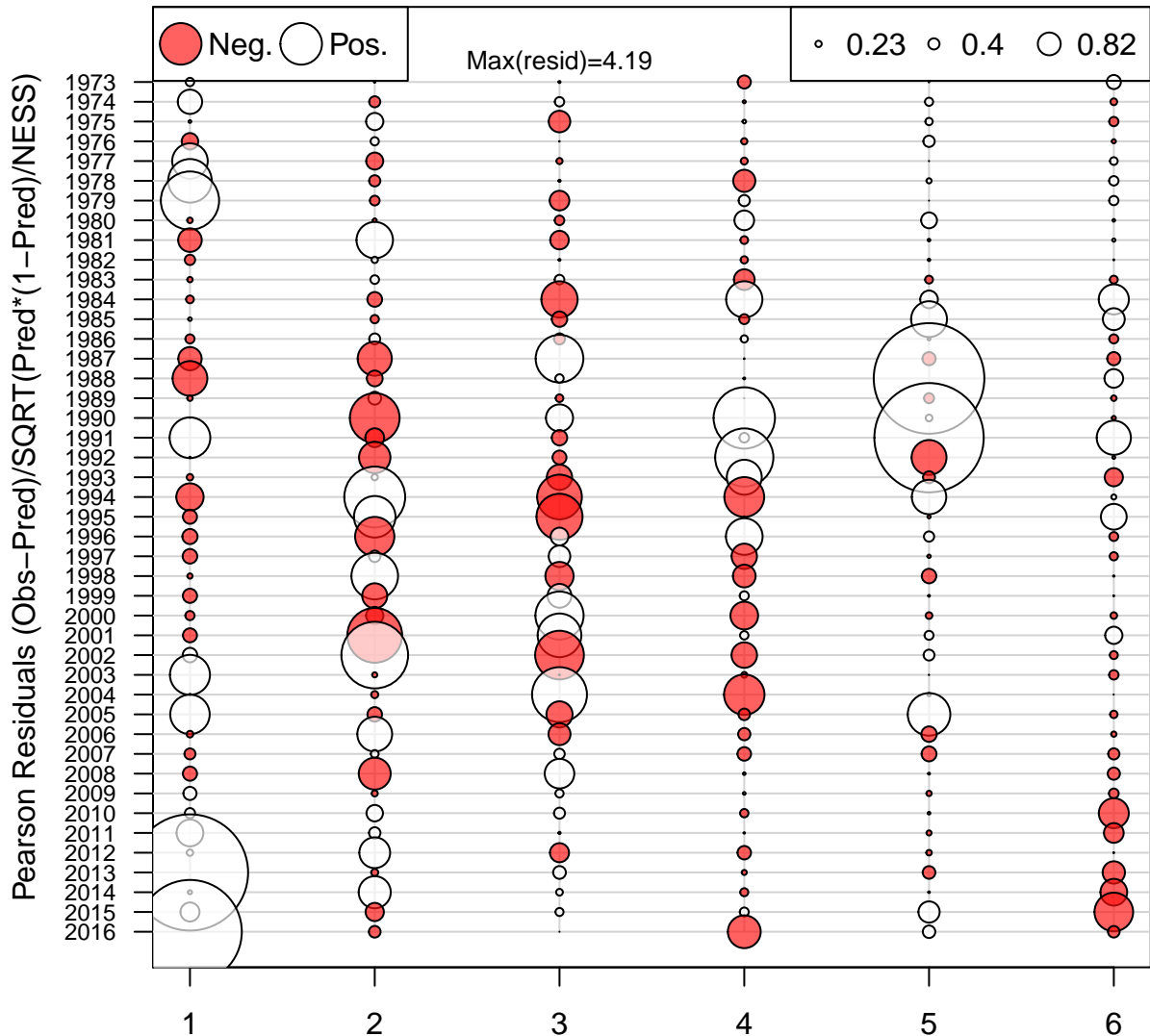




Index 2 (INDEX-2)

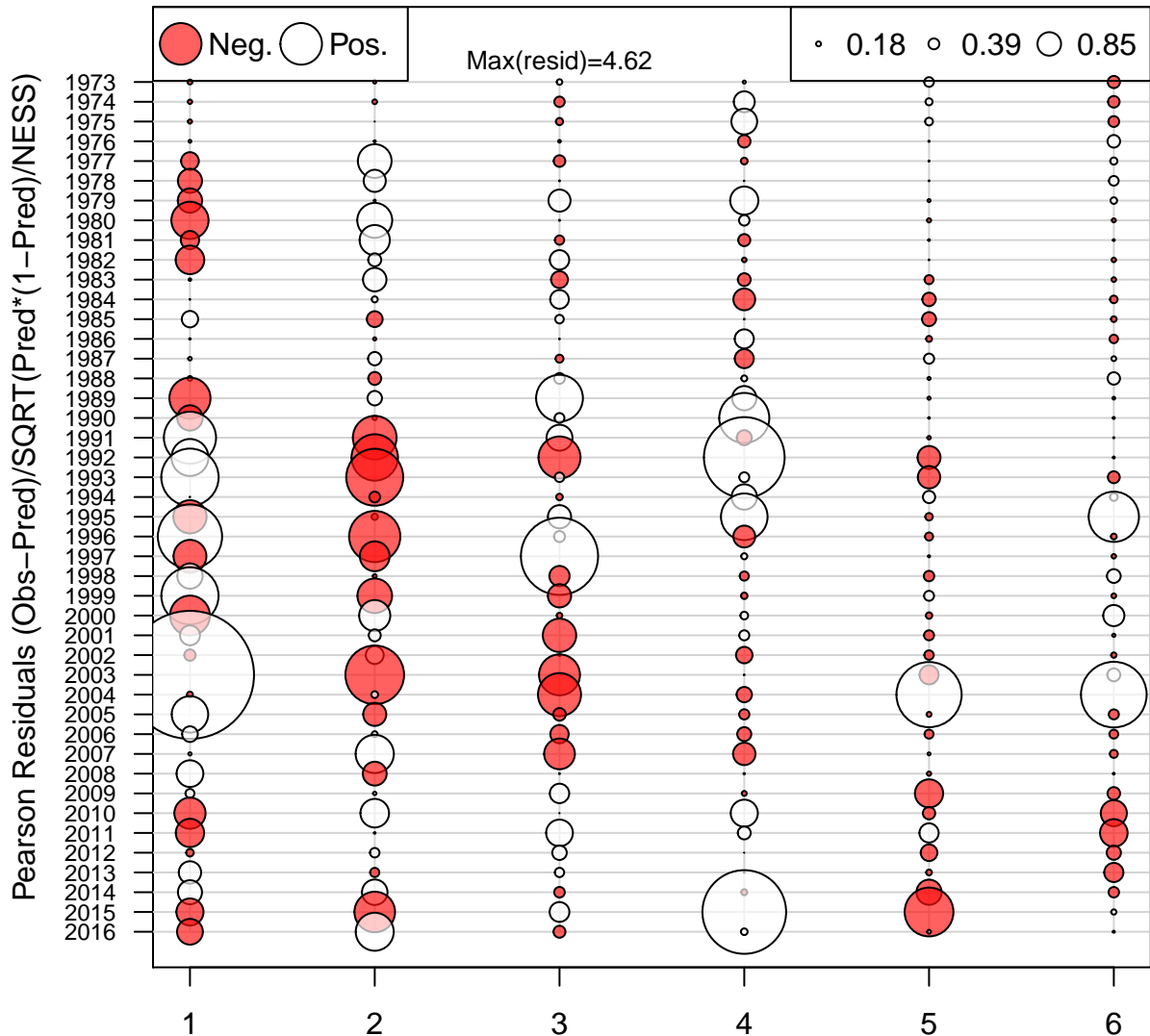


# Age Comp Residuals for Index 1 (INDEX-1)



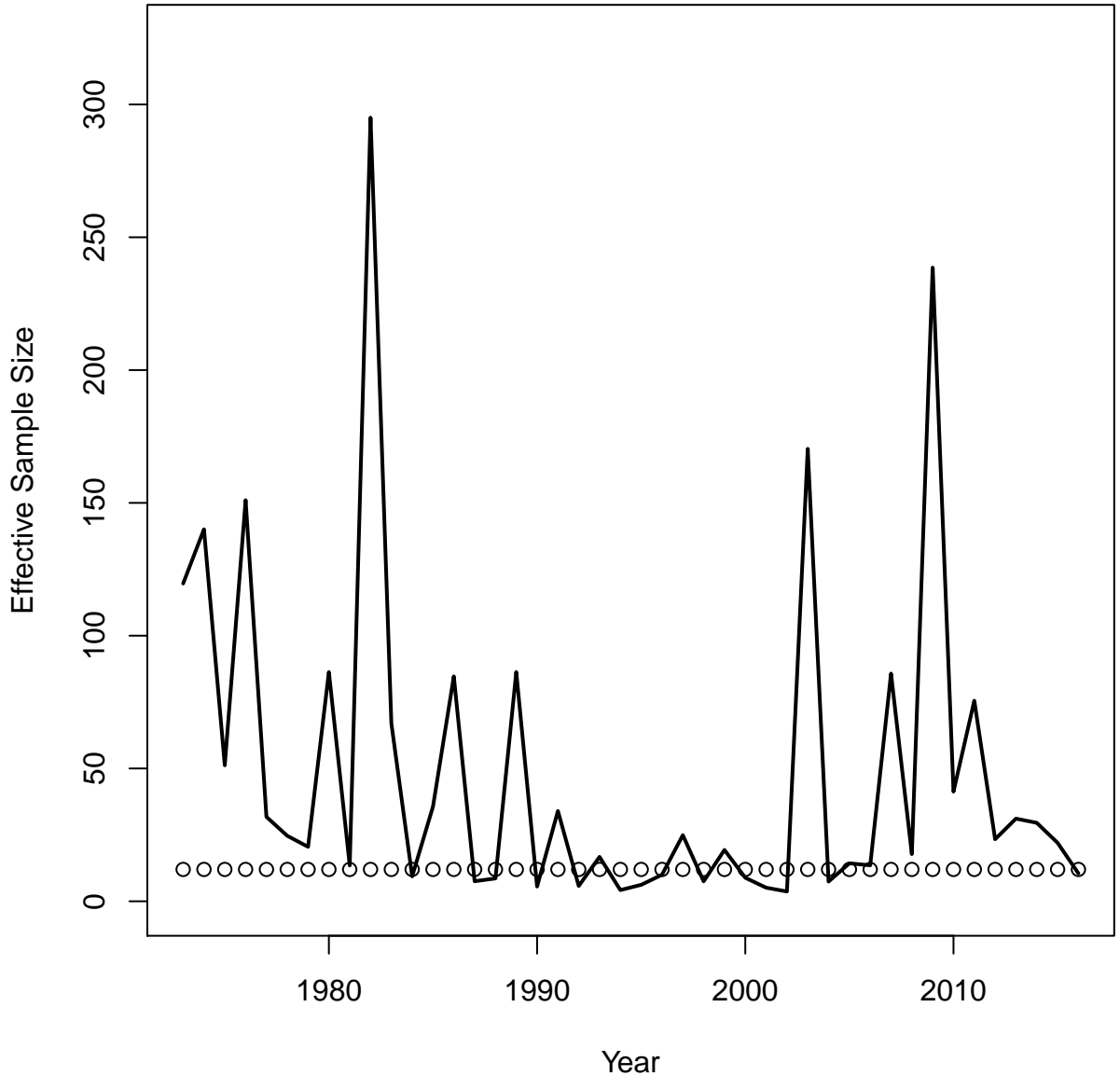
Mean resid = 0.05 SD(resid) = 0.9

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

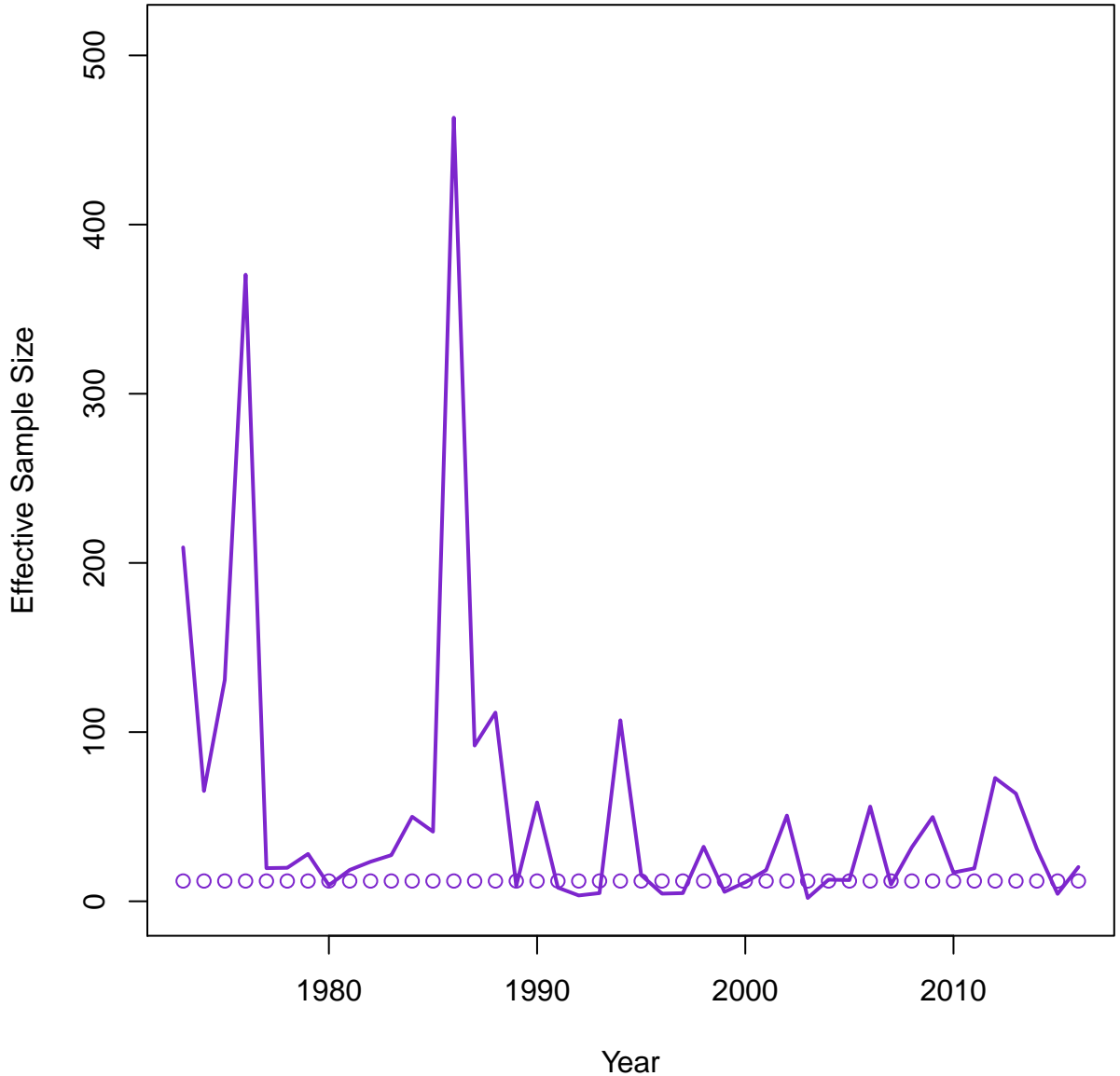


Mean resid = 0.02 SD(resid) = 0.87

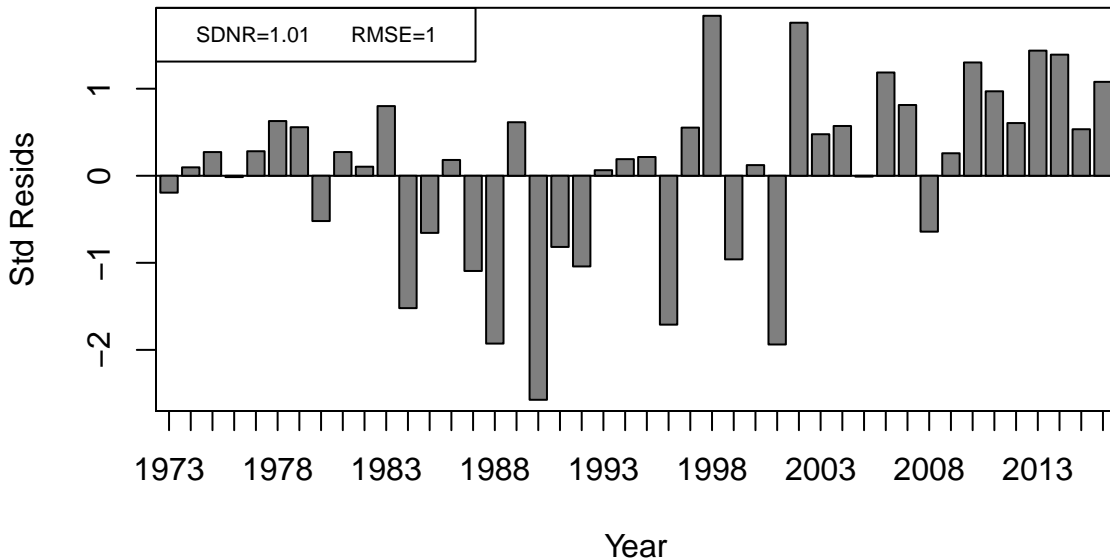
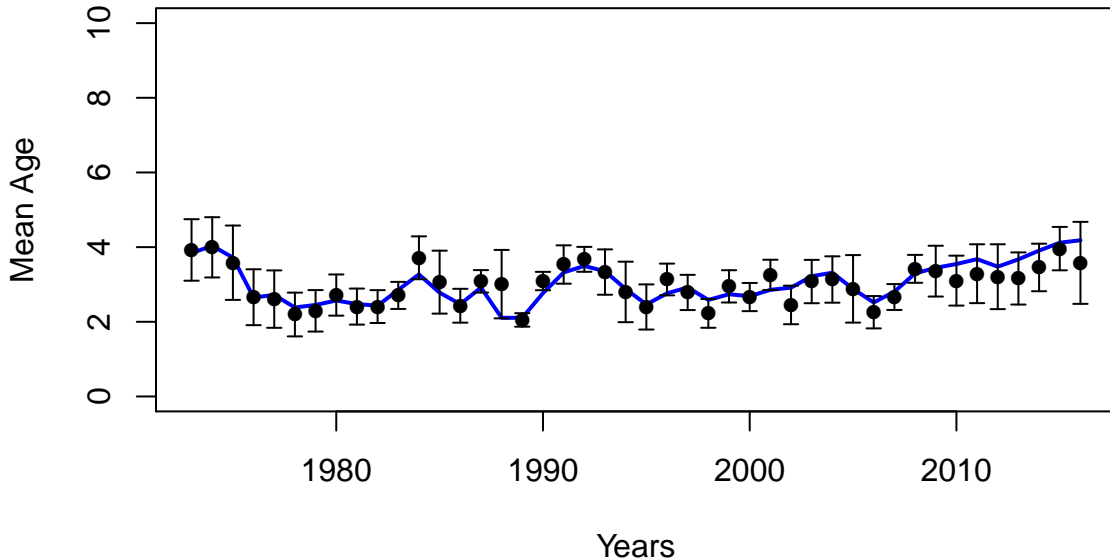
# Index Neff 1 (INDEX-1)



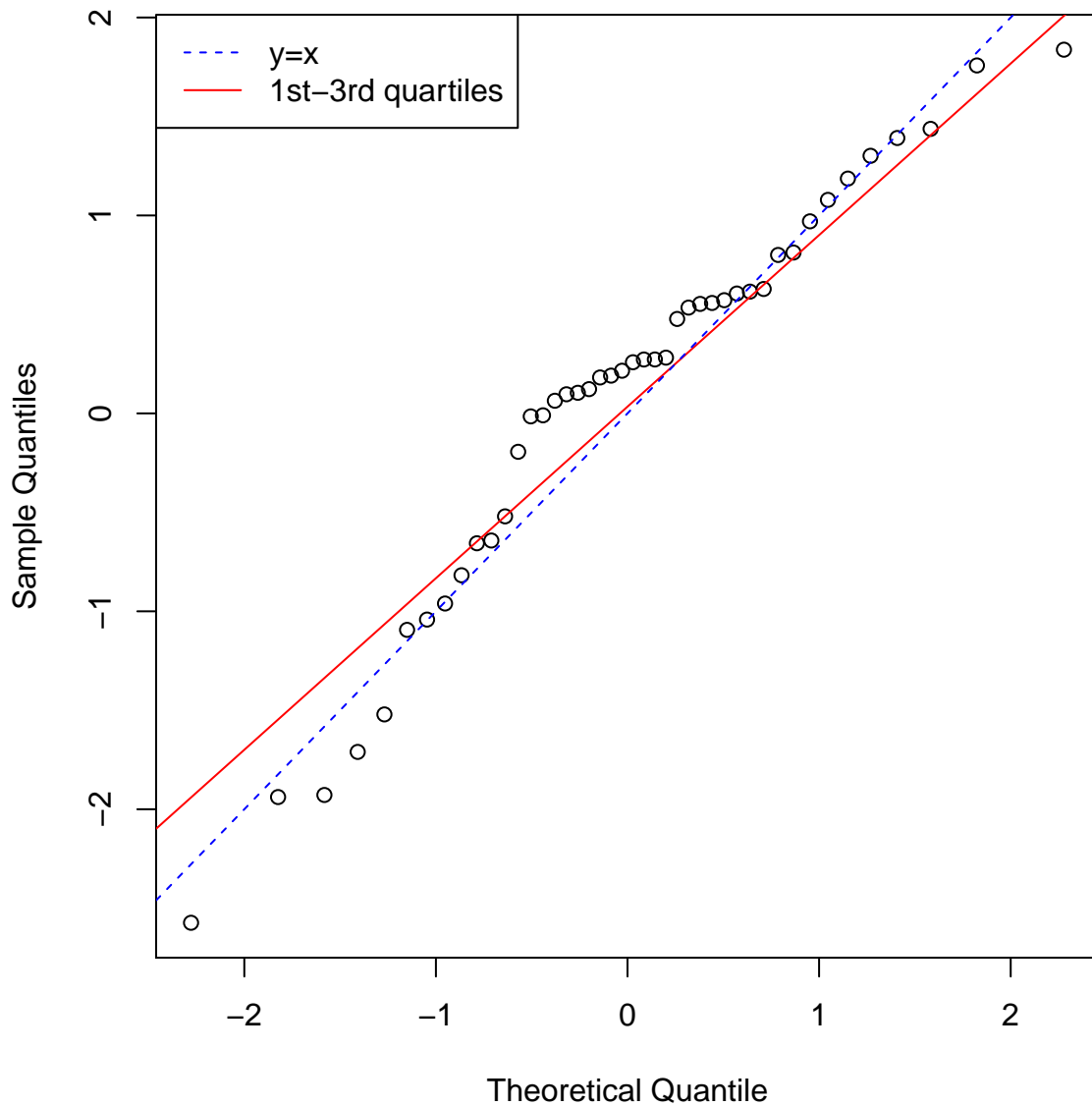
Index Neff 2 (INDEX-2)



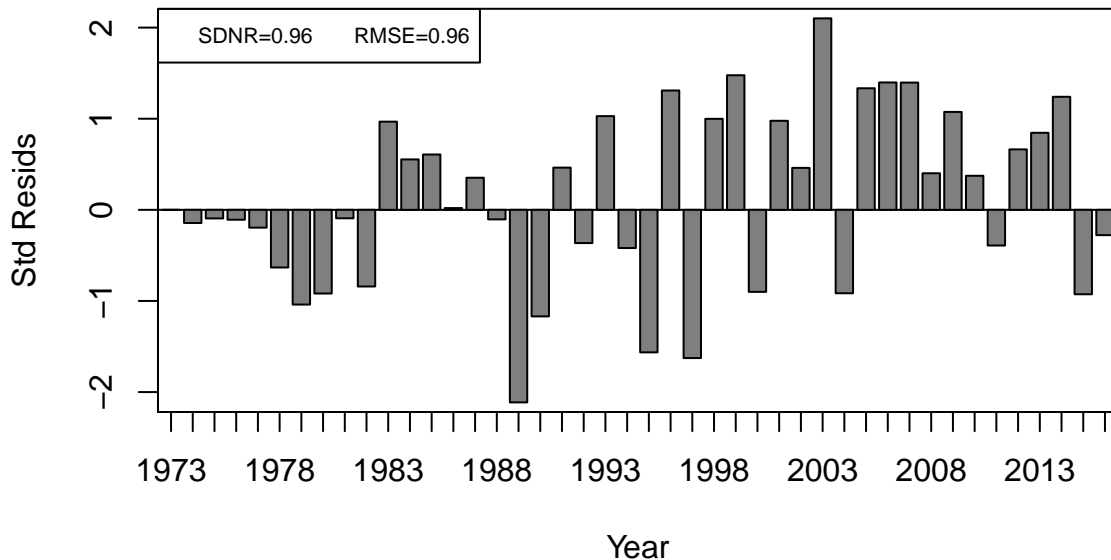
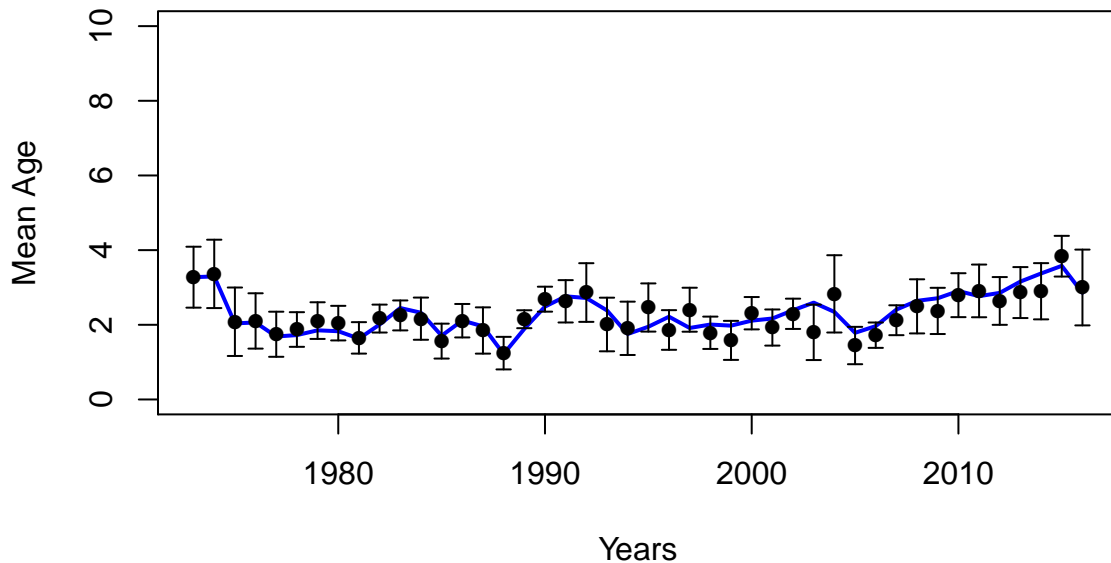
# Index 1 (INDEX-1) ESS = 12



# Index 1 (INDEX-1) ESS = 12

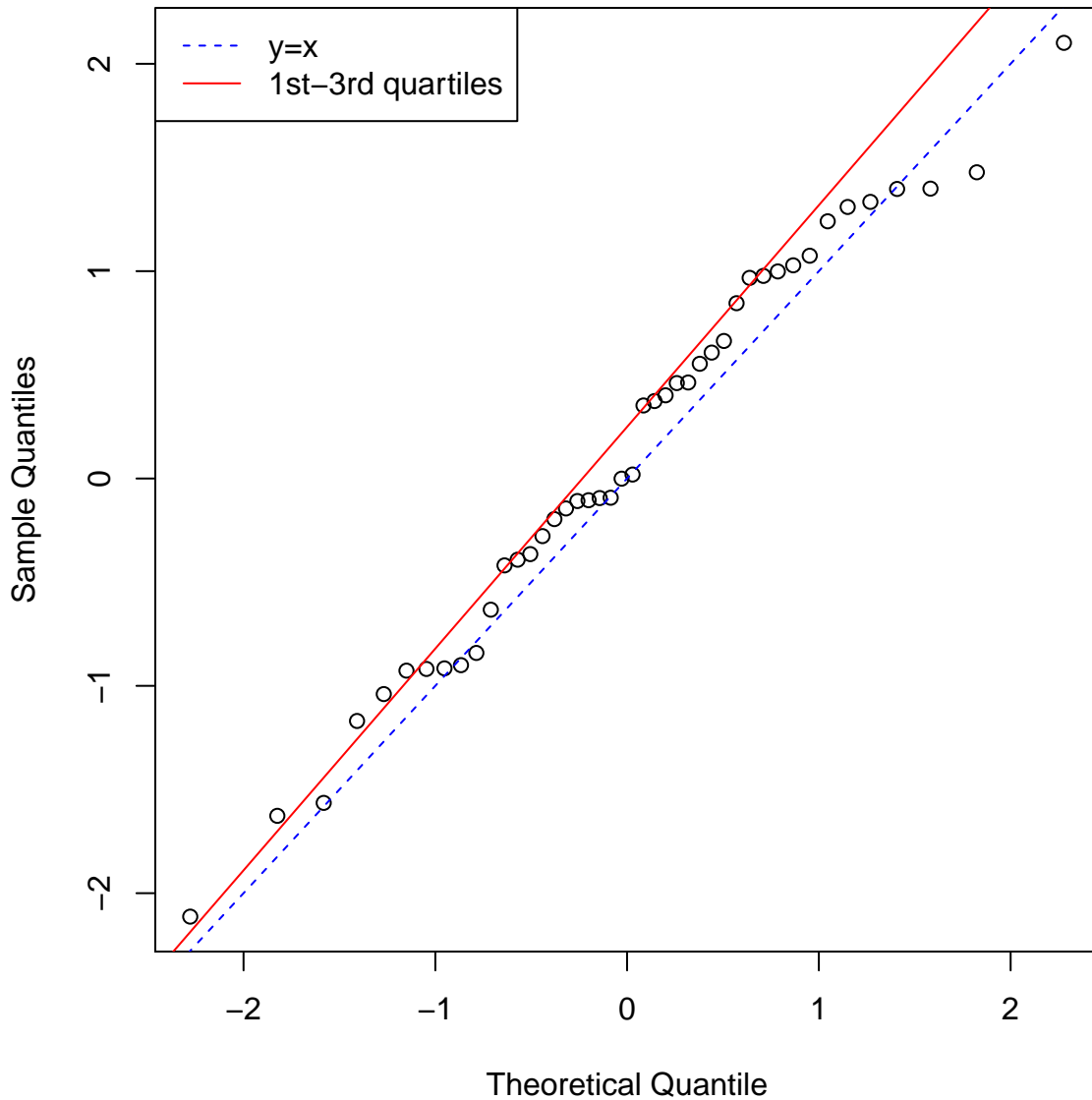


## Index 2 (INDEX-2) ESS = 12

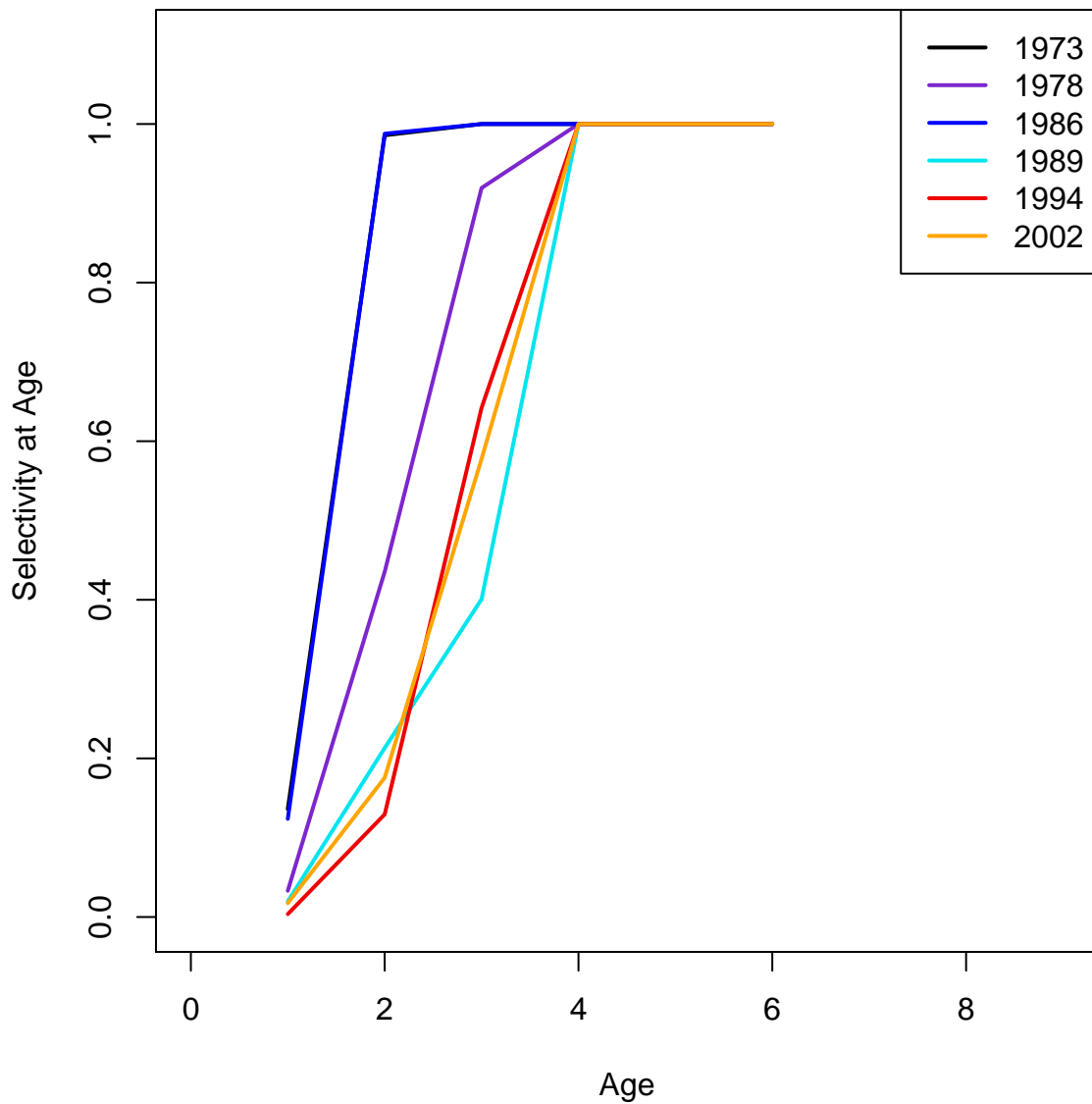


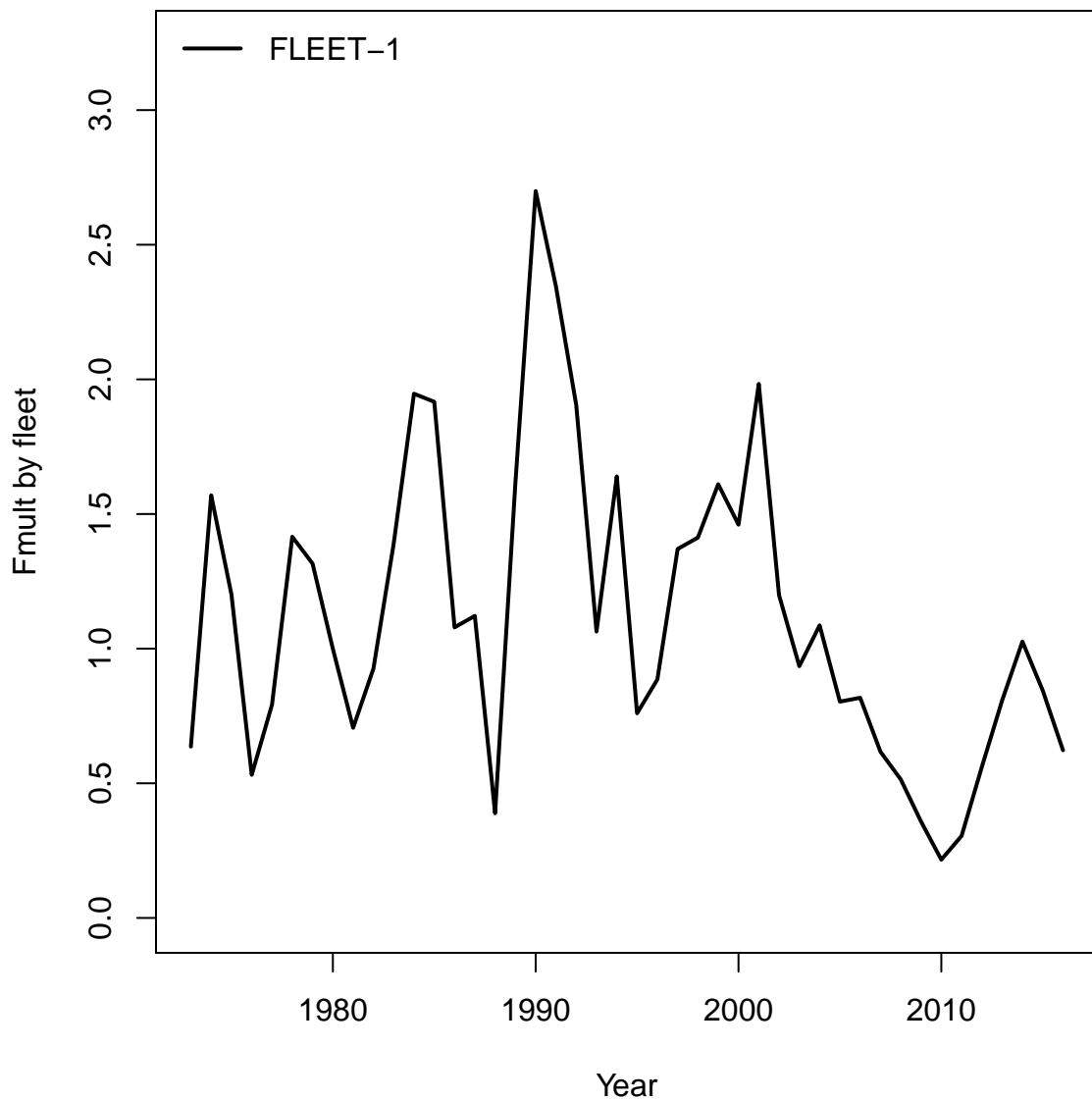


## Index 2 (INDEX-2) ESS = 12

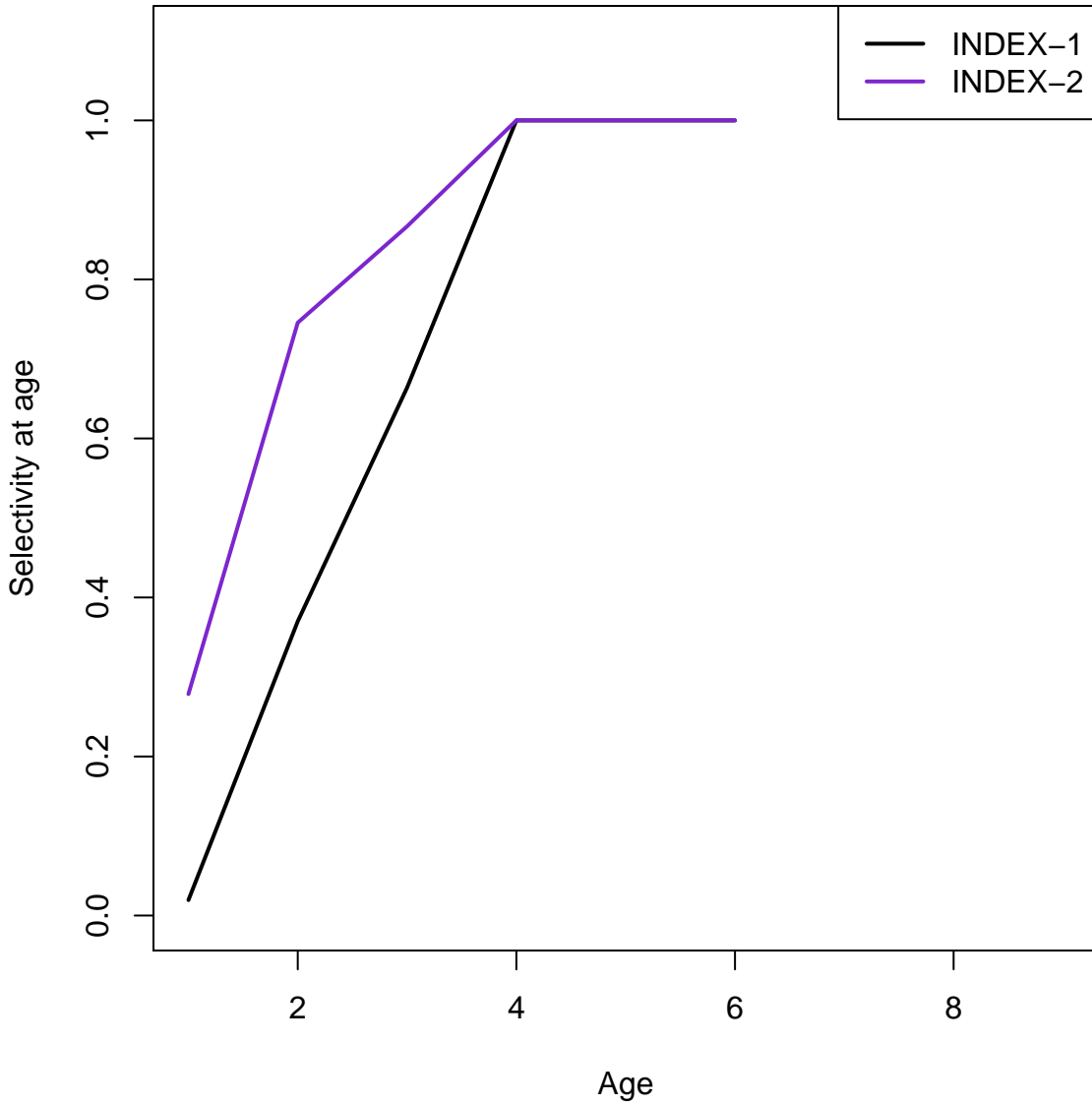


# Fleet 1 (FLEET-1)

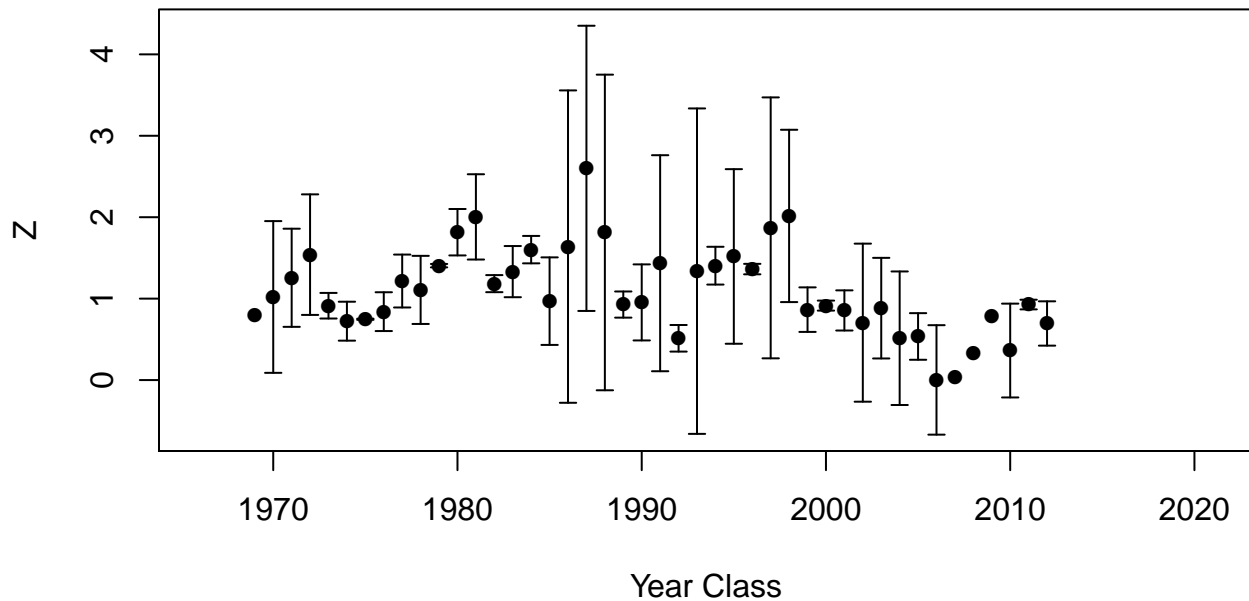
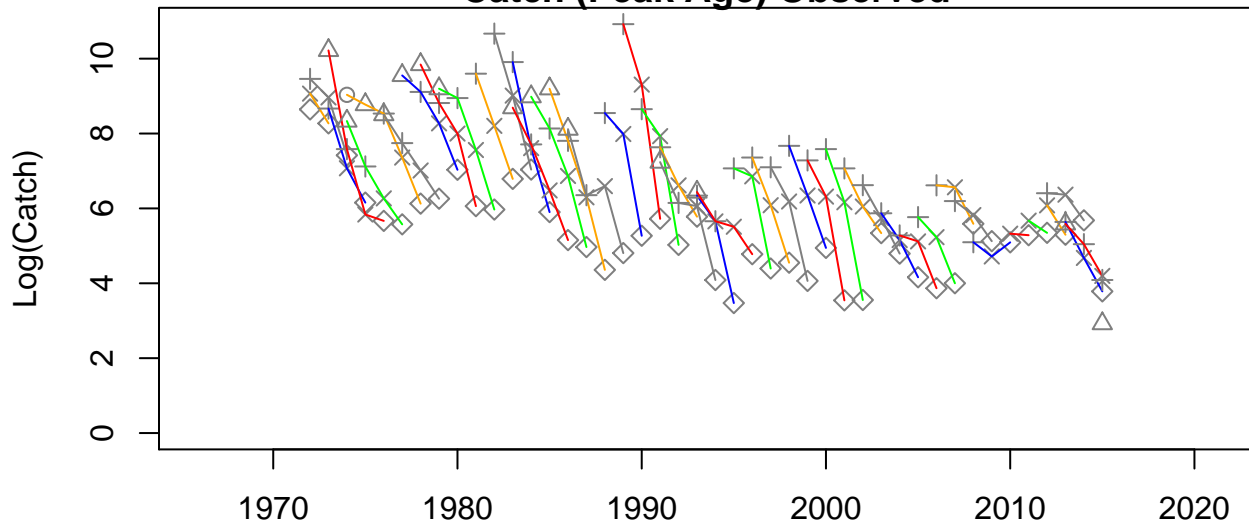




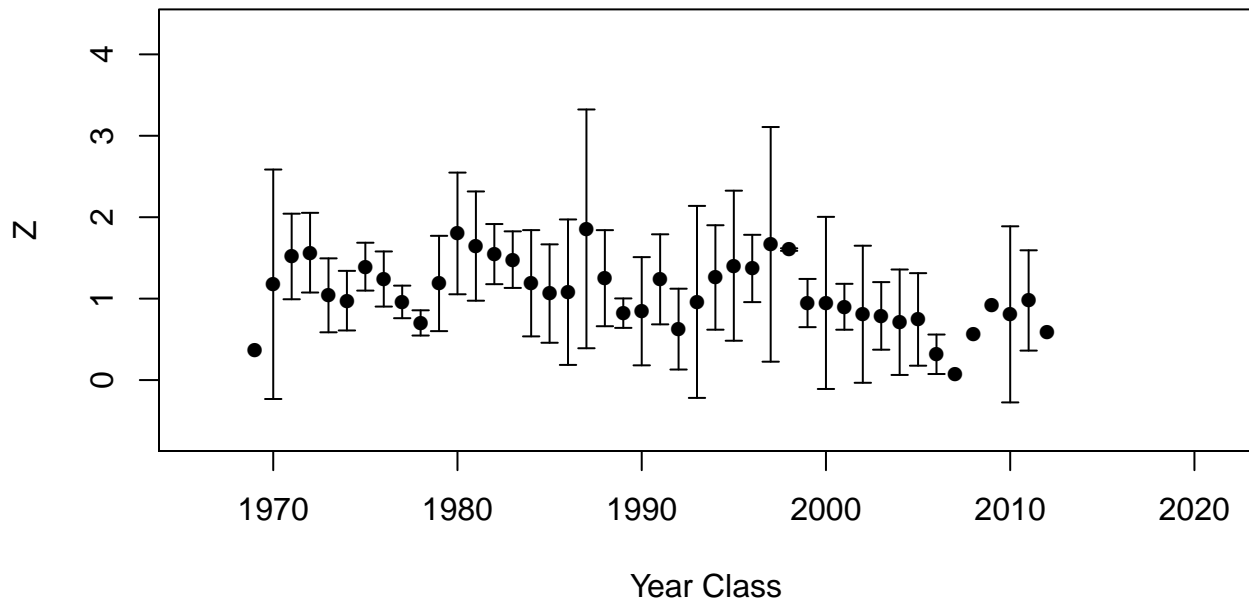
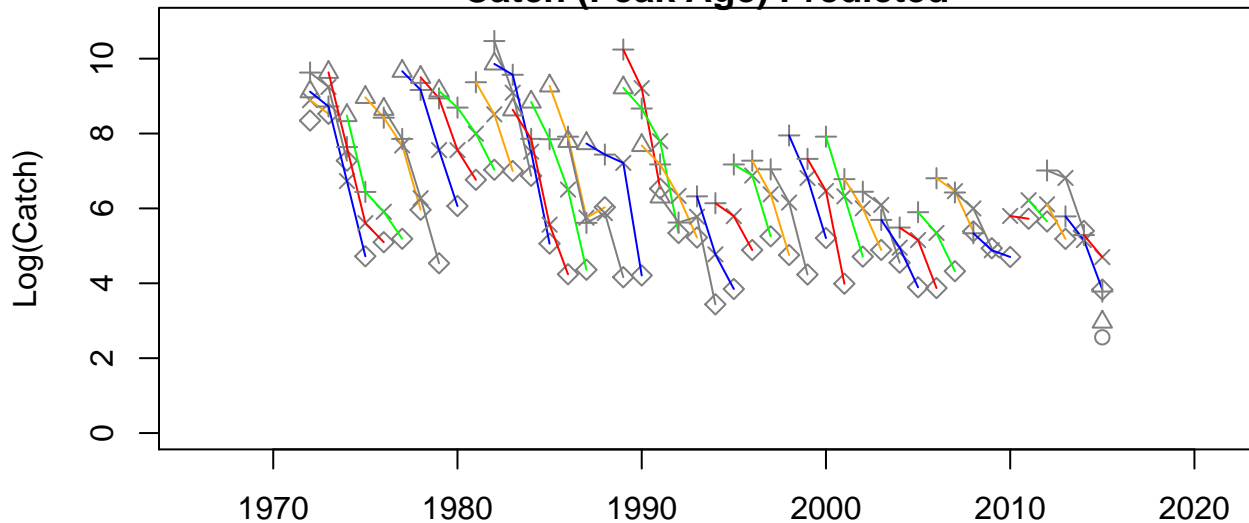
# Indices

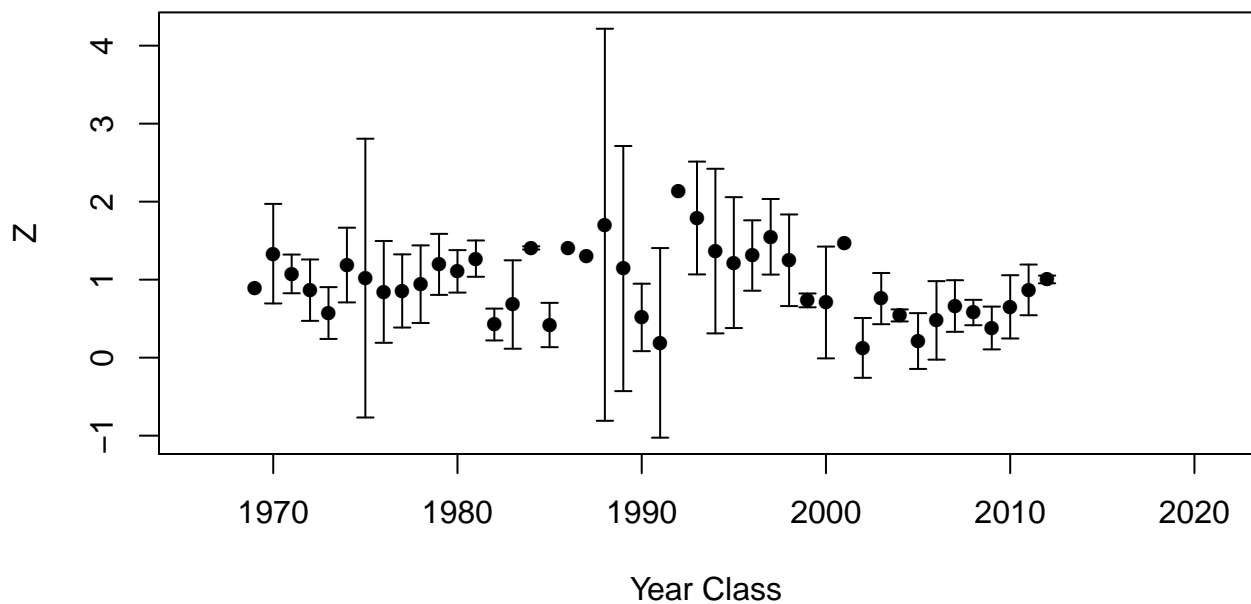
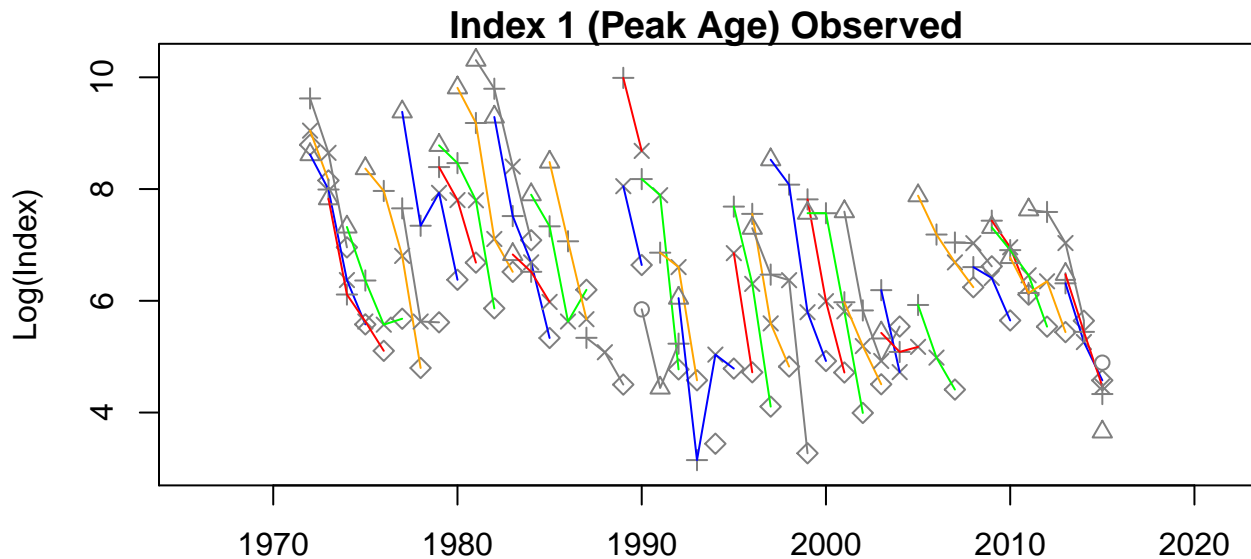


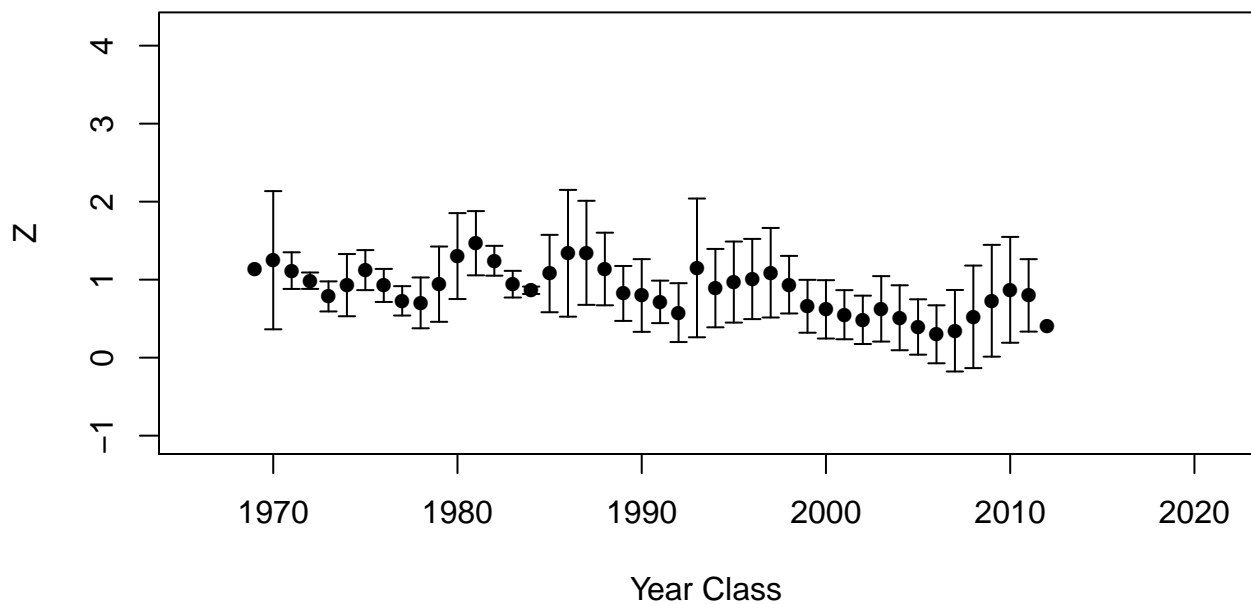
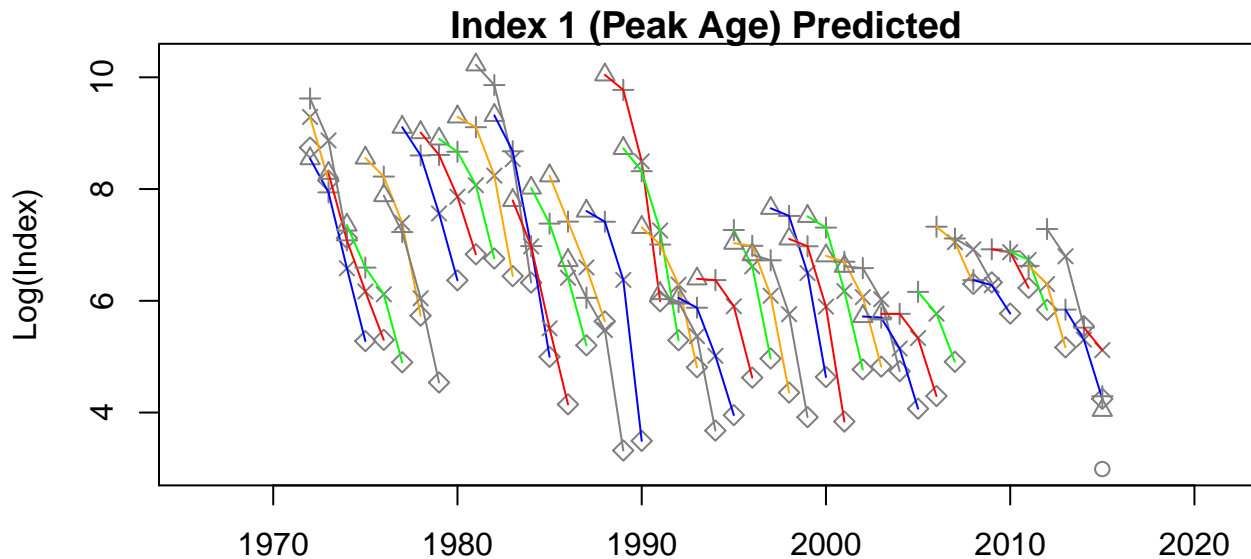
**Catch (Peak Age) Observed**



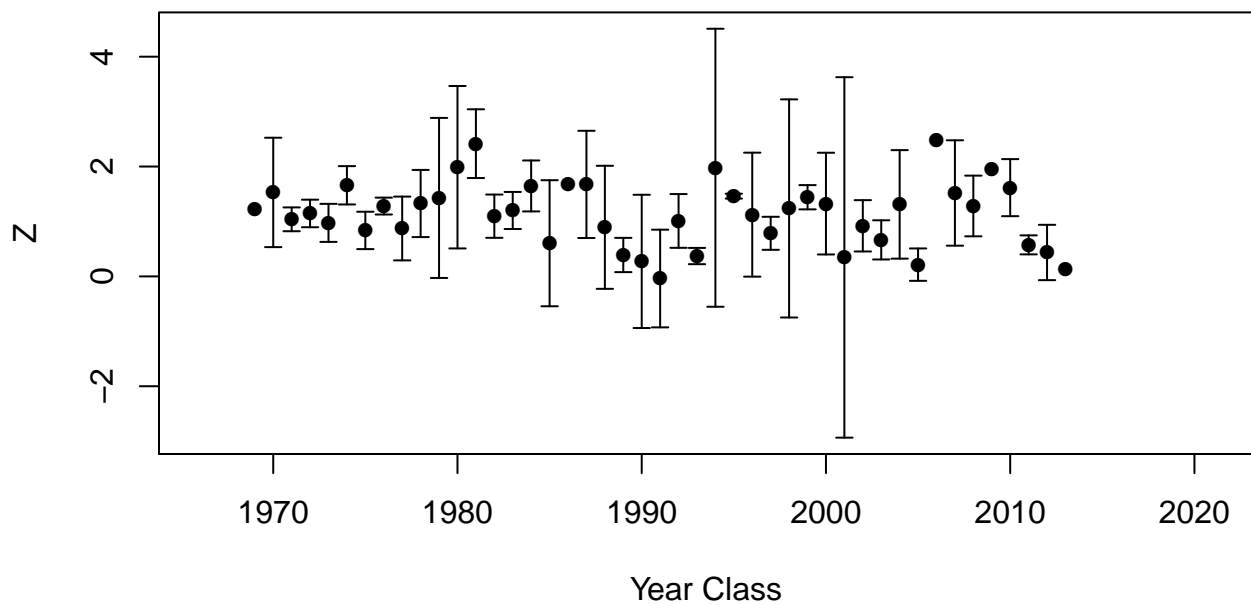
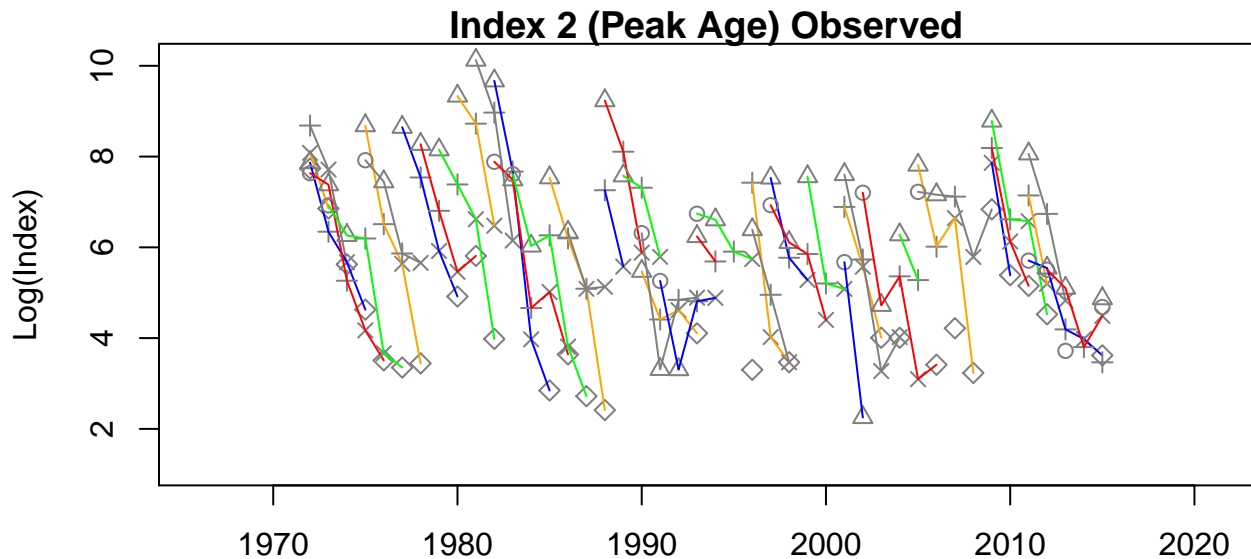
**Catch (Peak Age) Predicted**

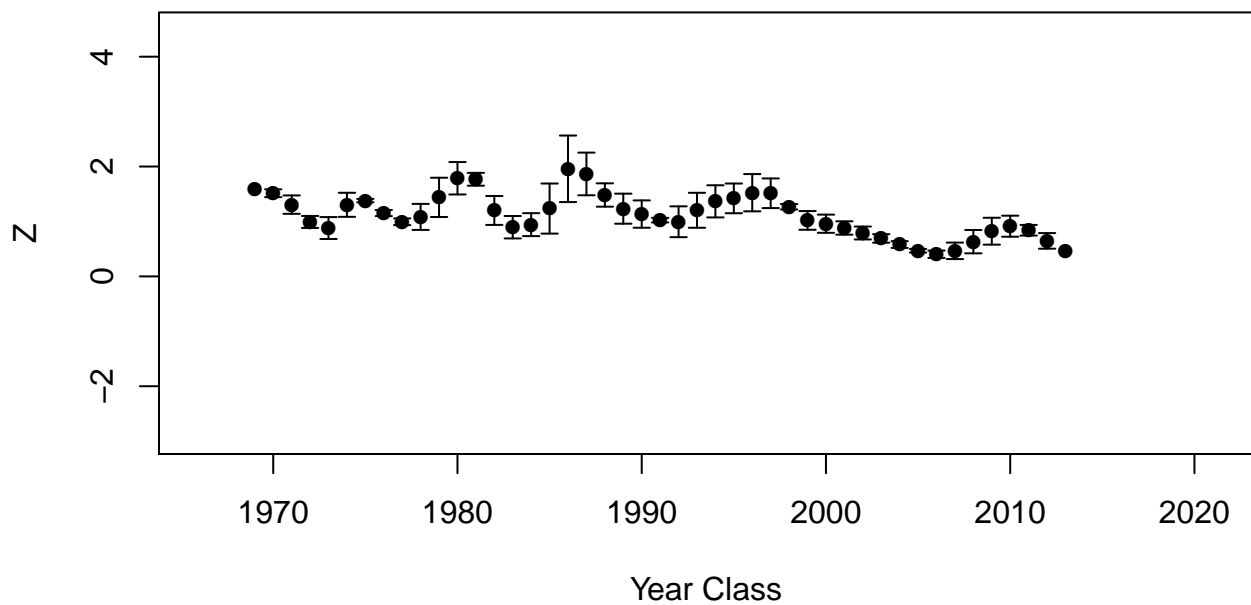
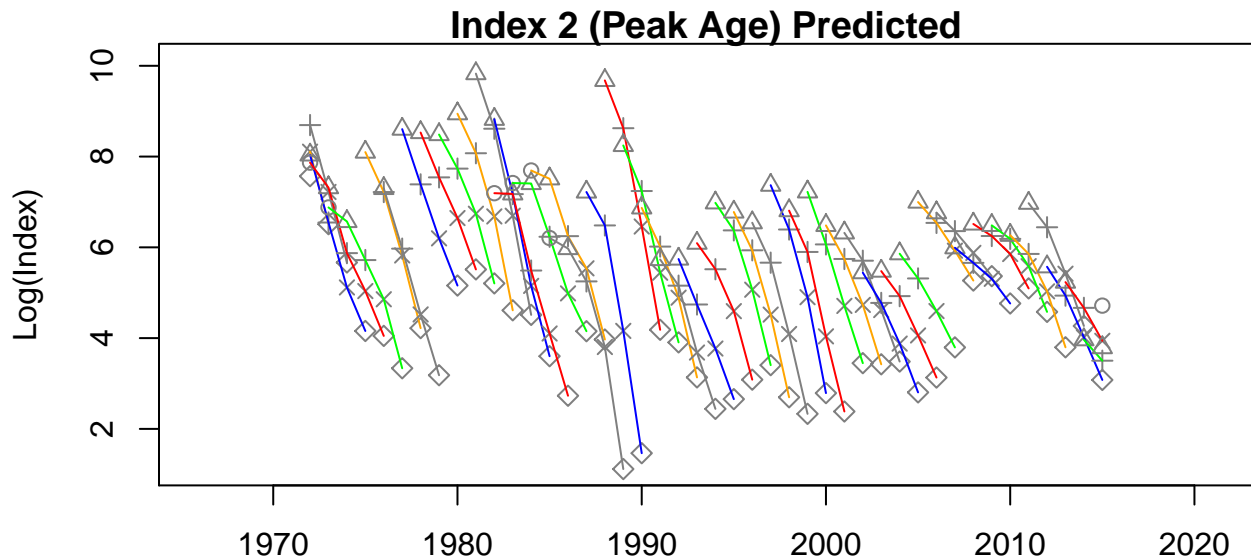




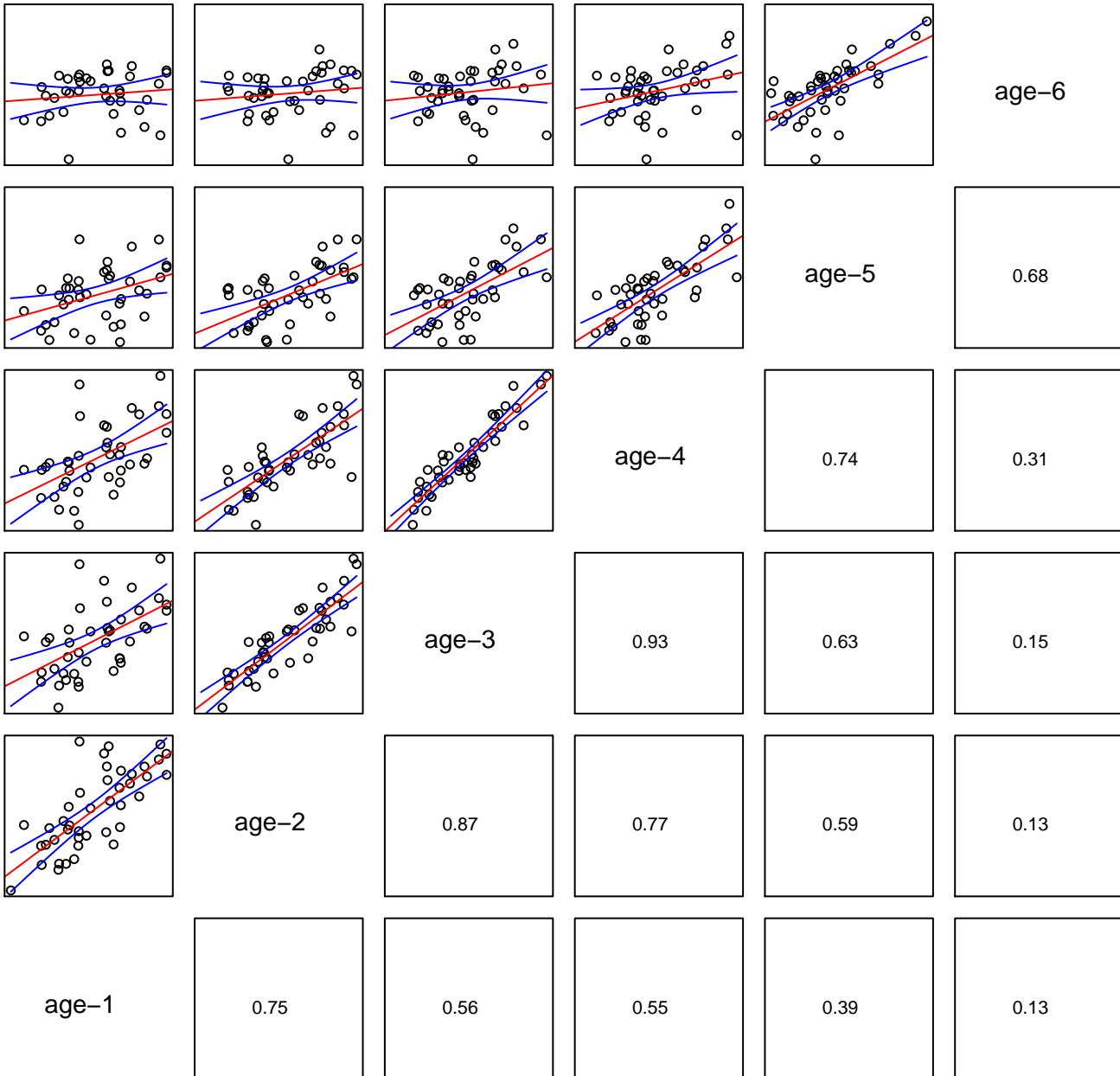




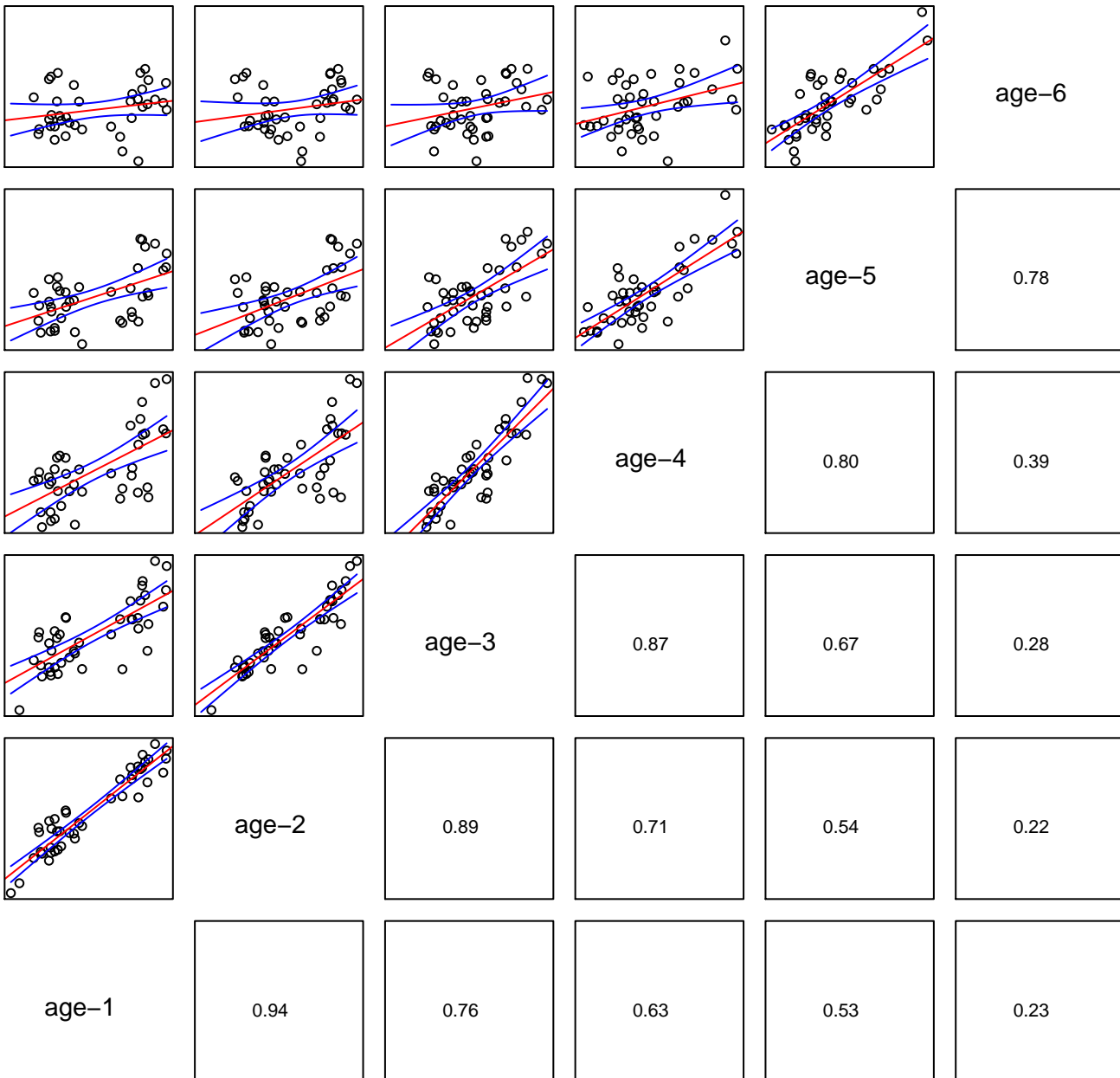




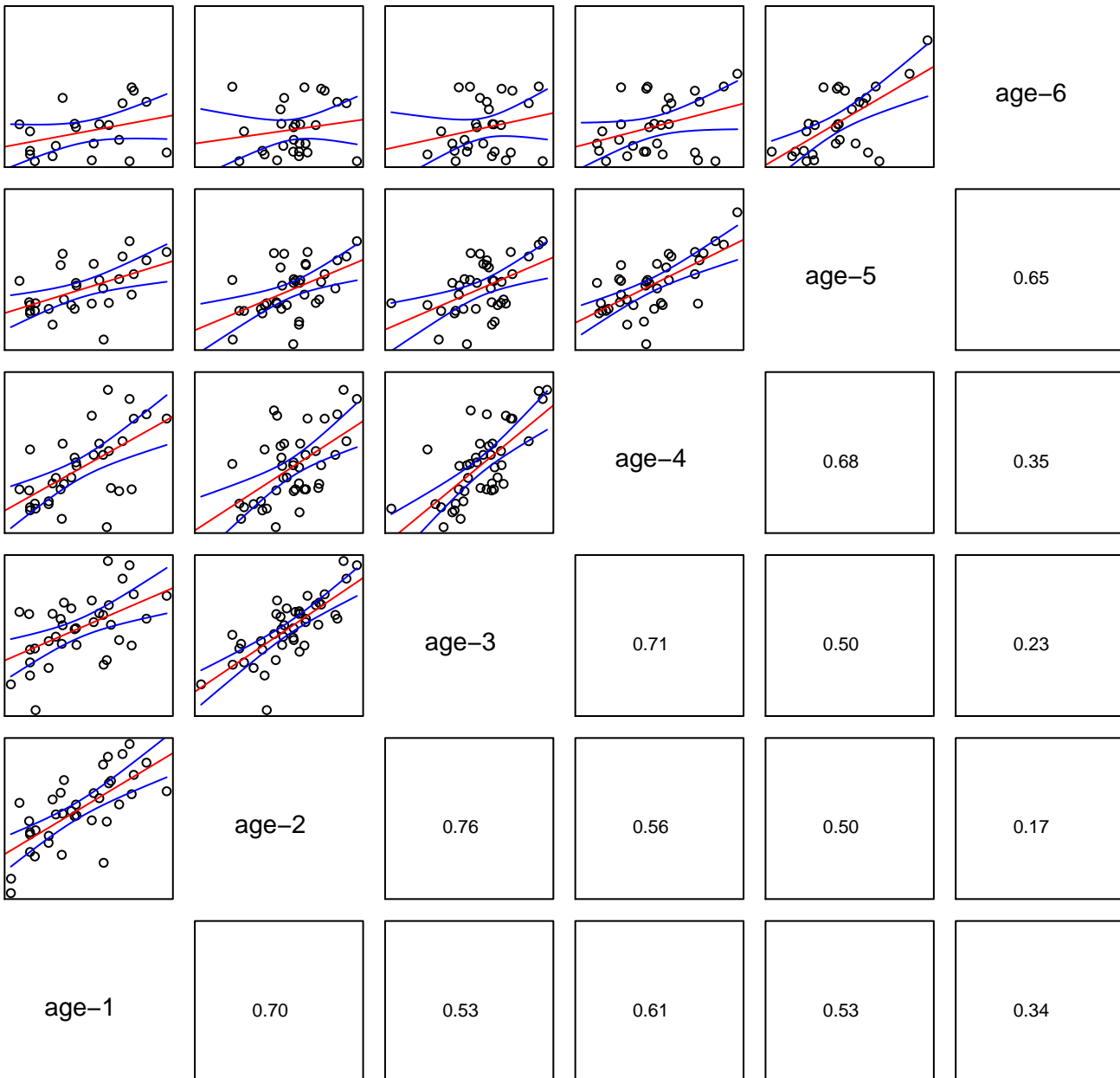
# Catch Observed



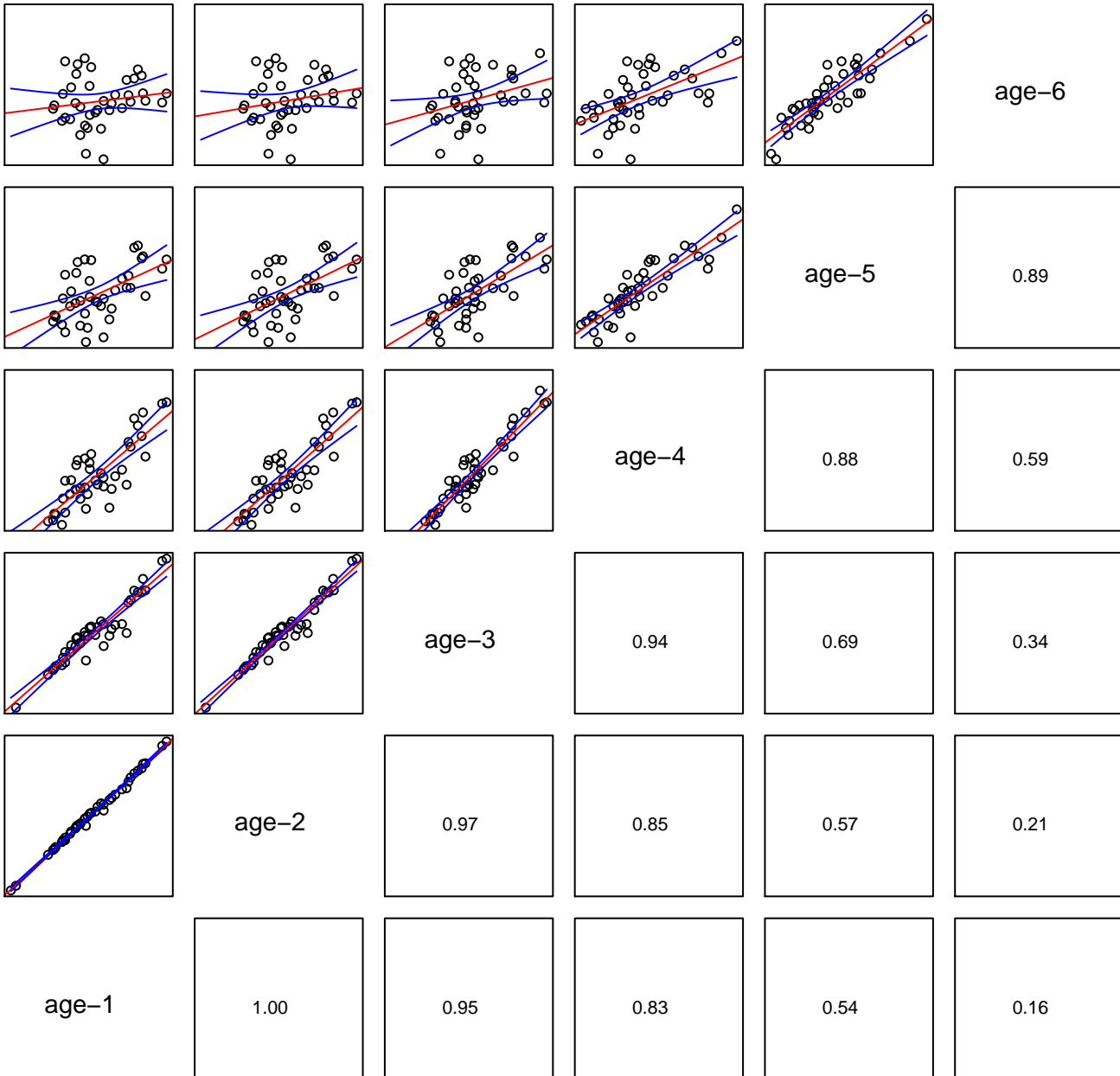
# Catch Predicted



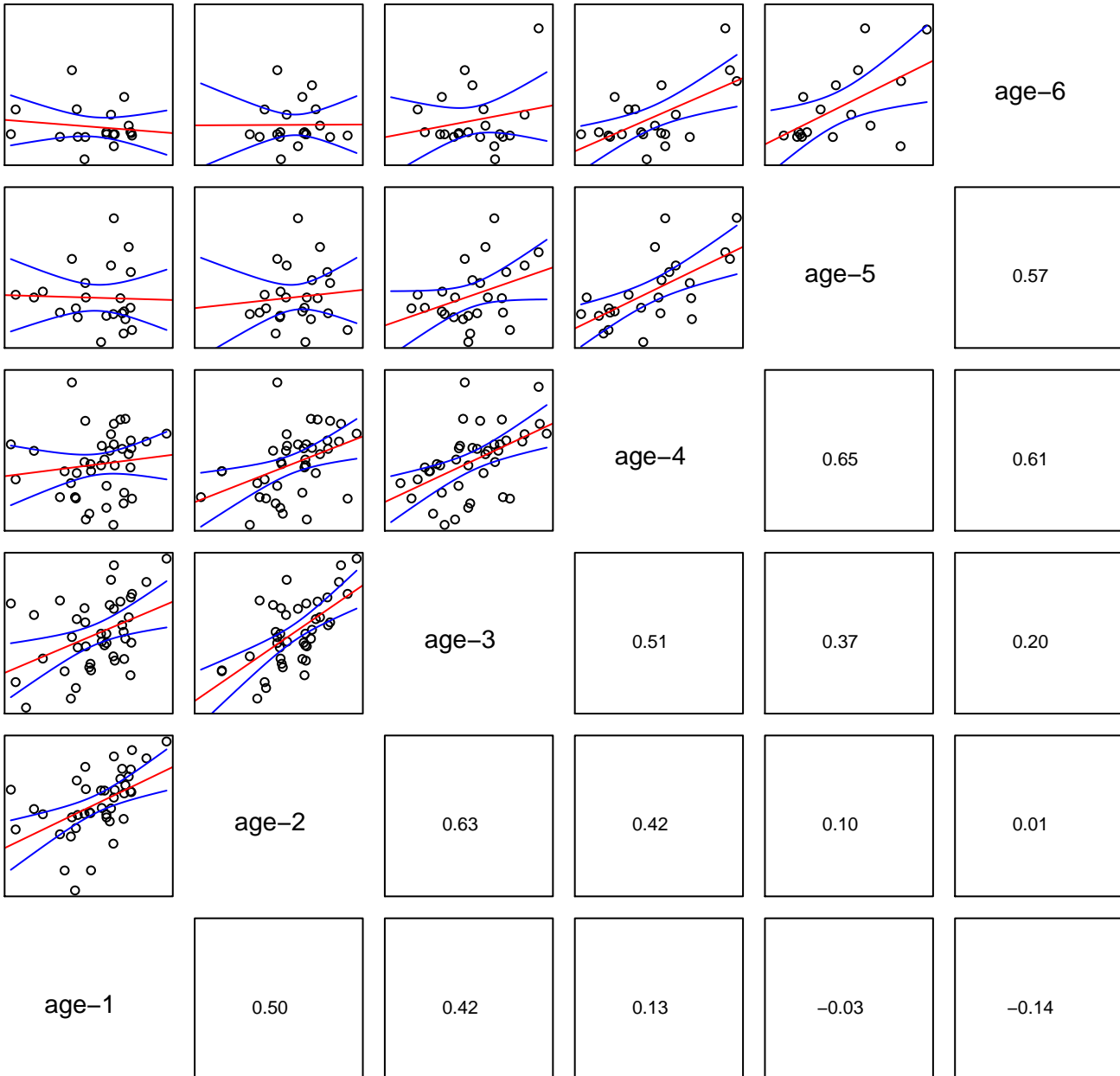
# Index 1 Observed



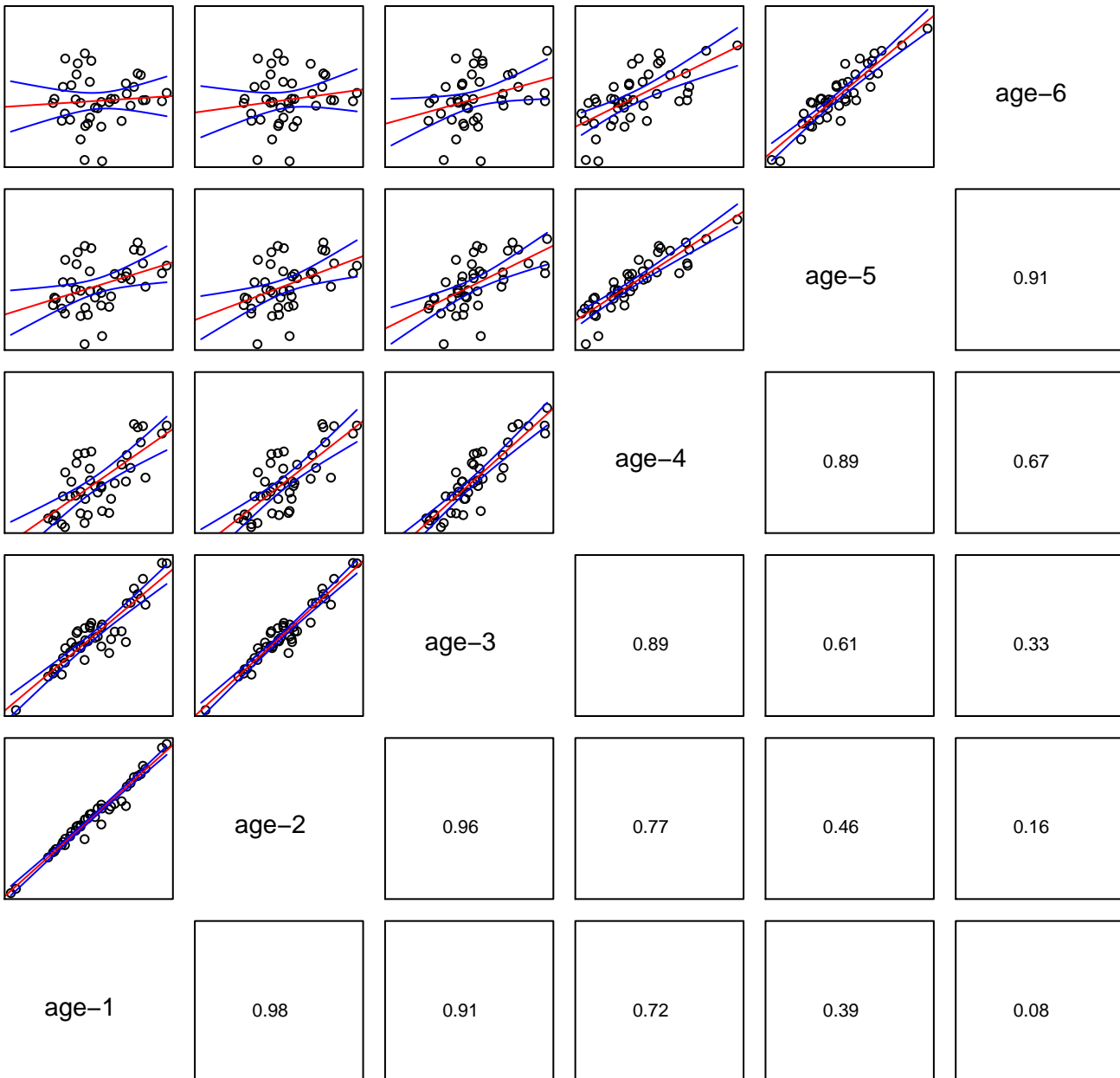
# Index 1 Predicted



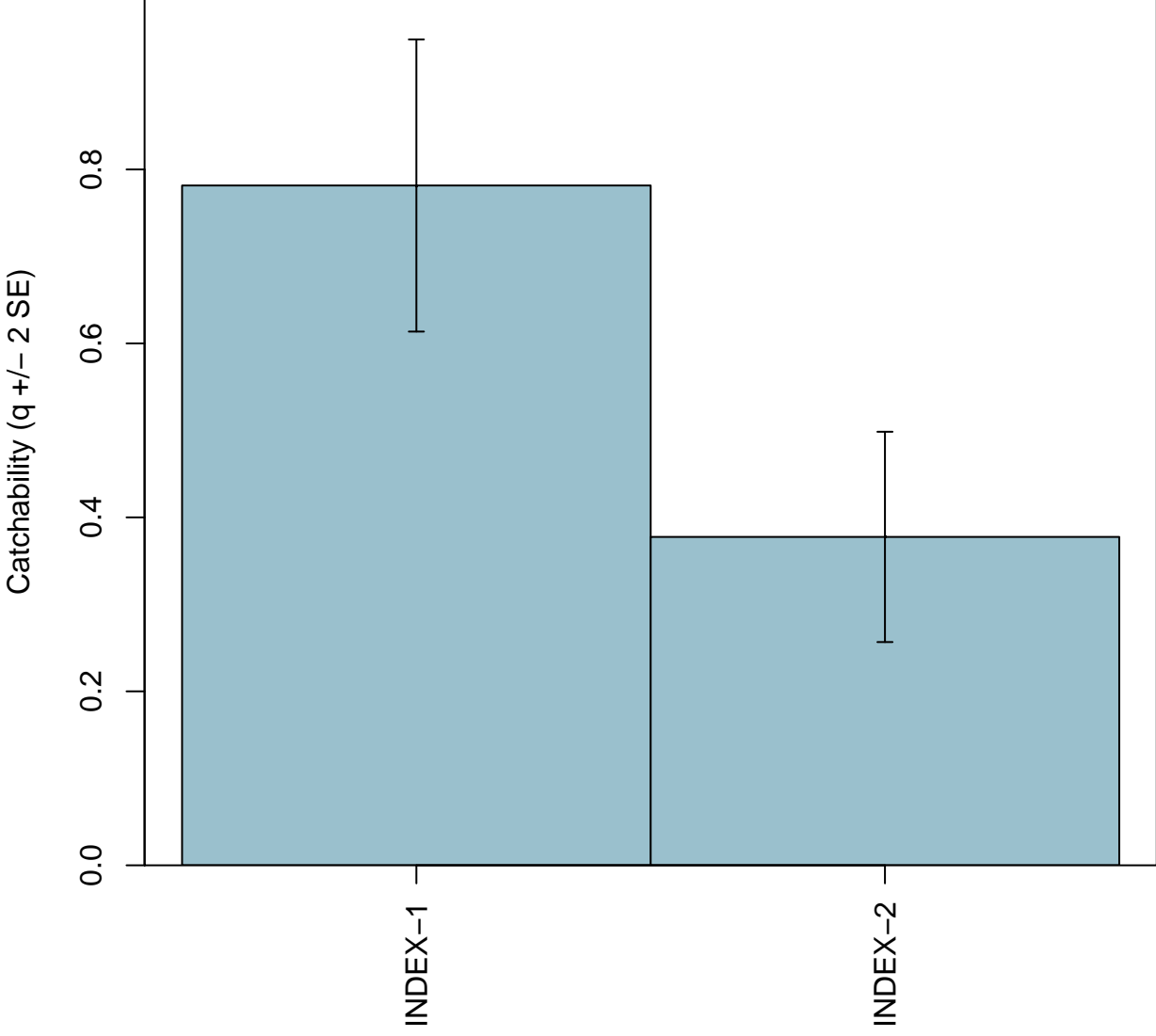
# Index 2 Observed

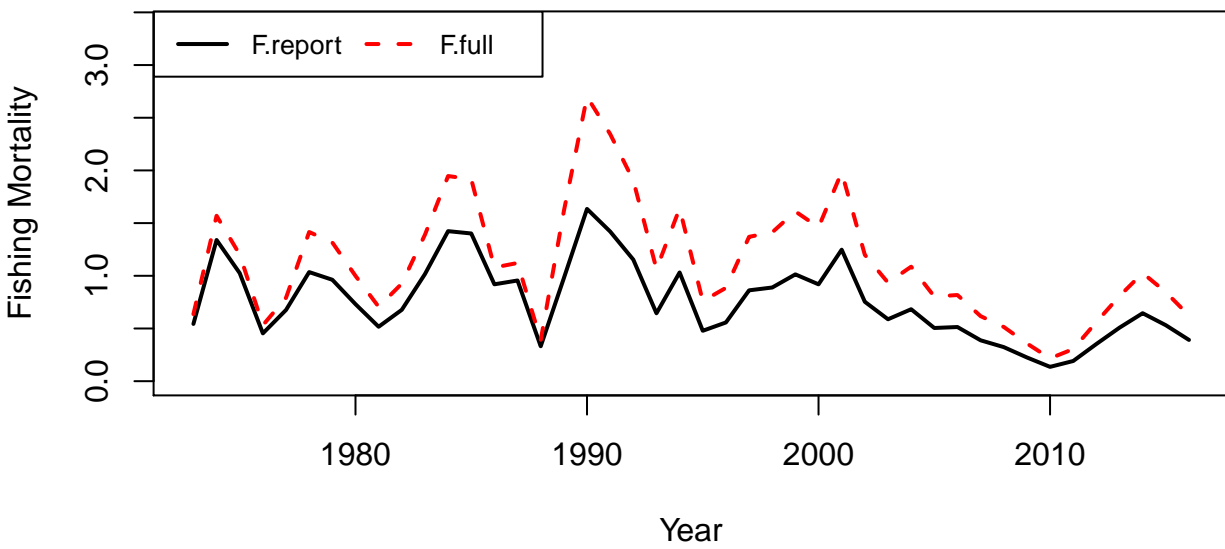
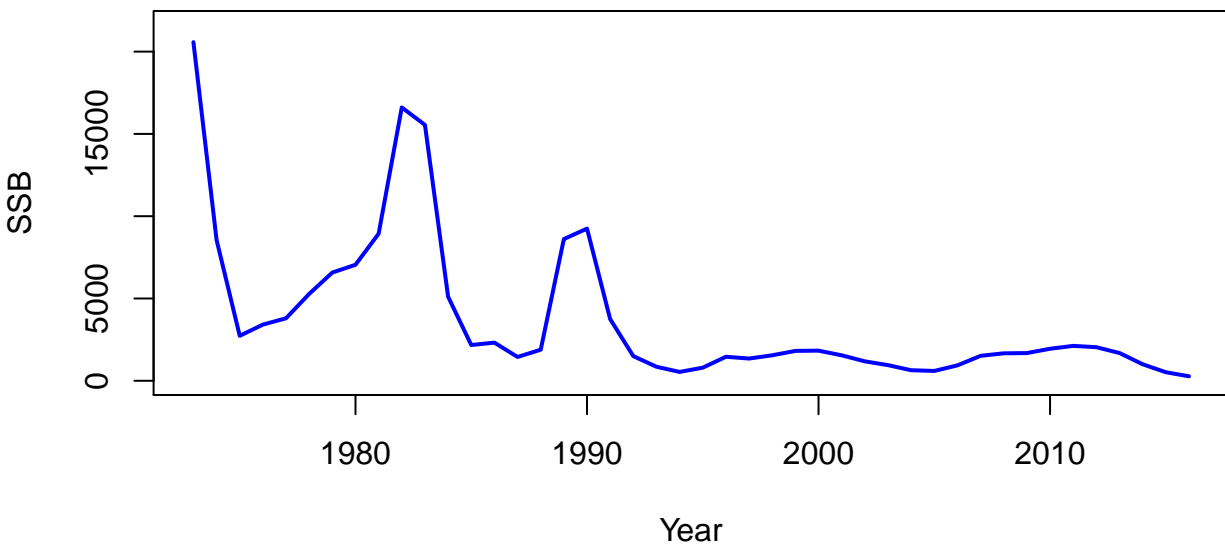


# Index 2 Predicted

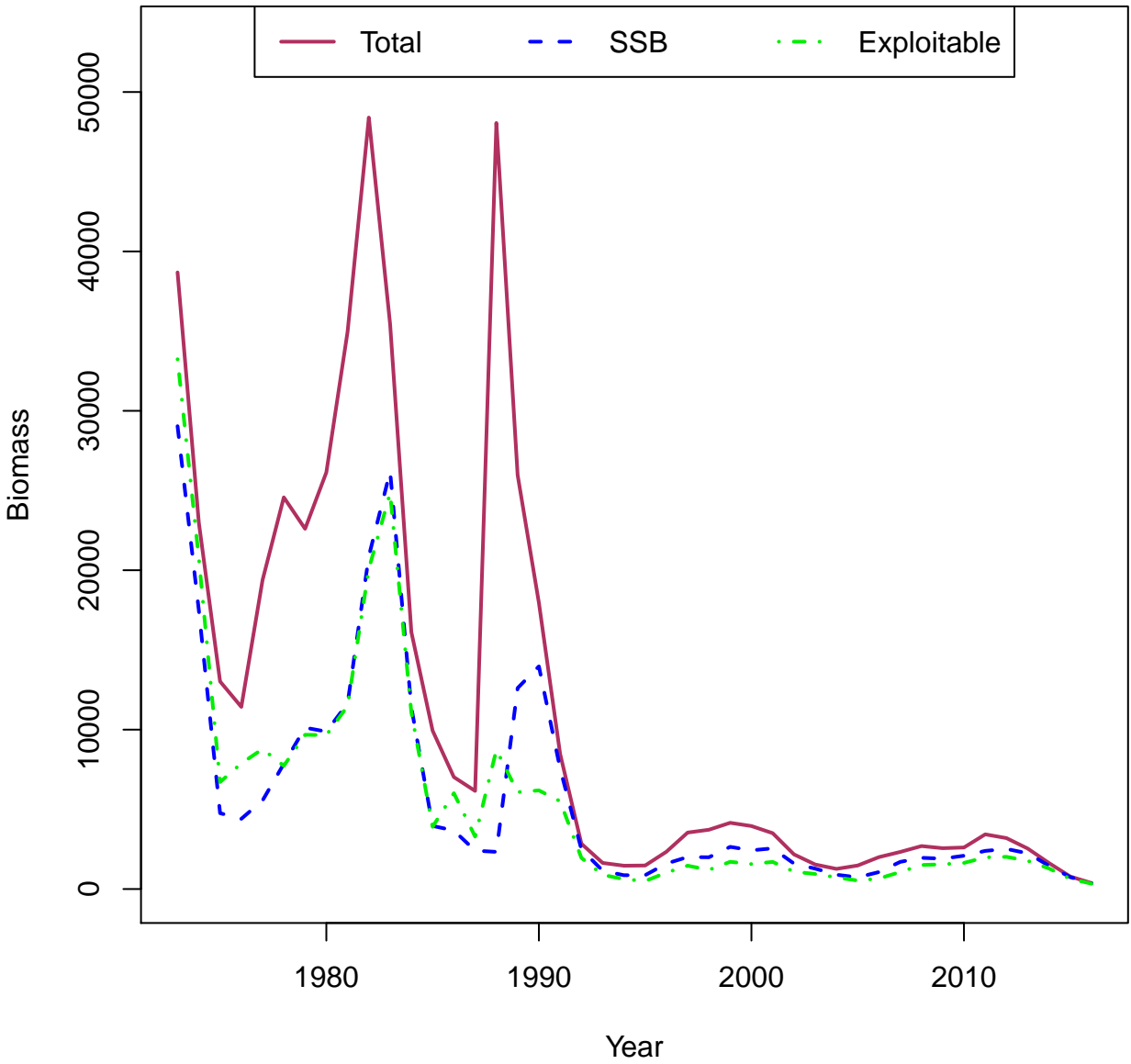




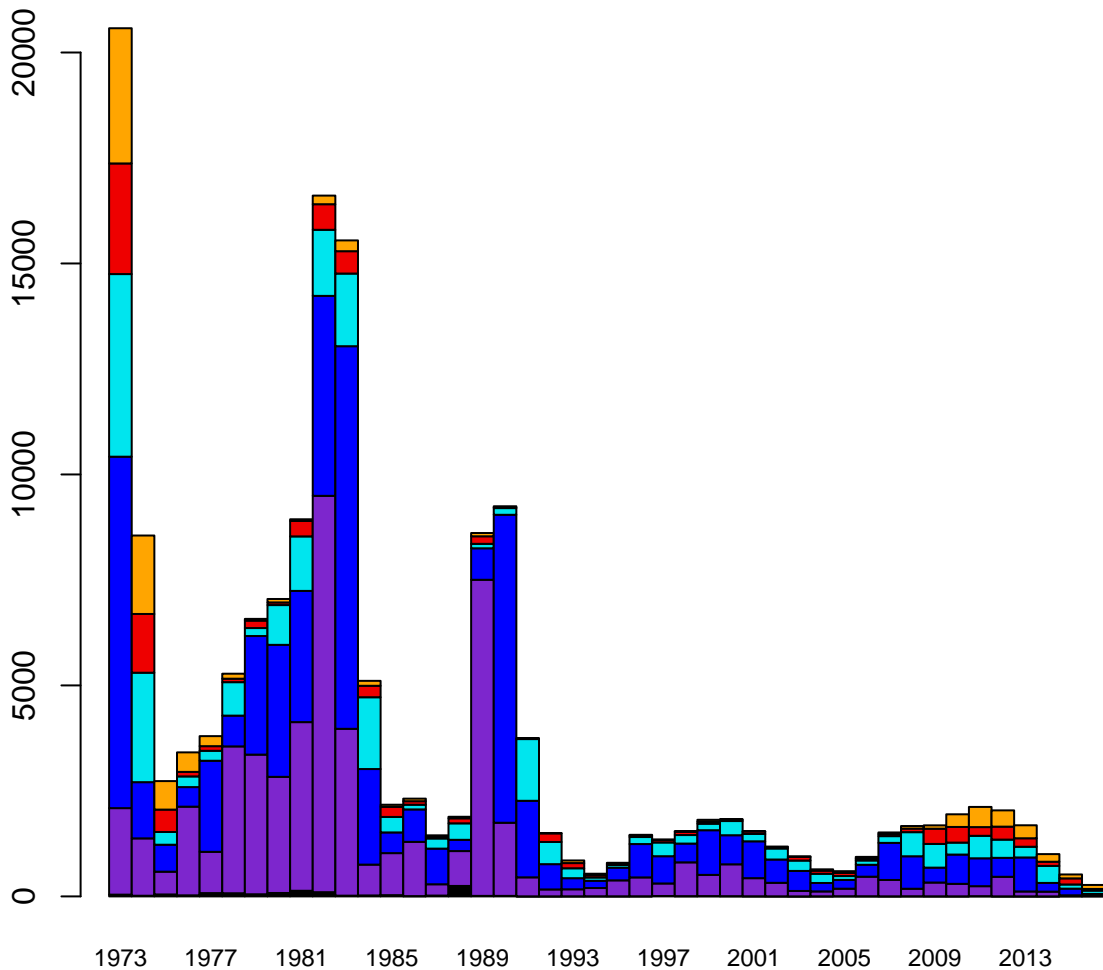




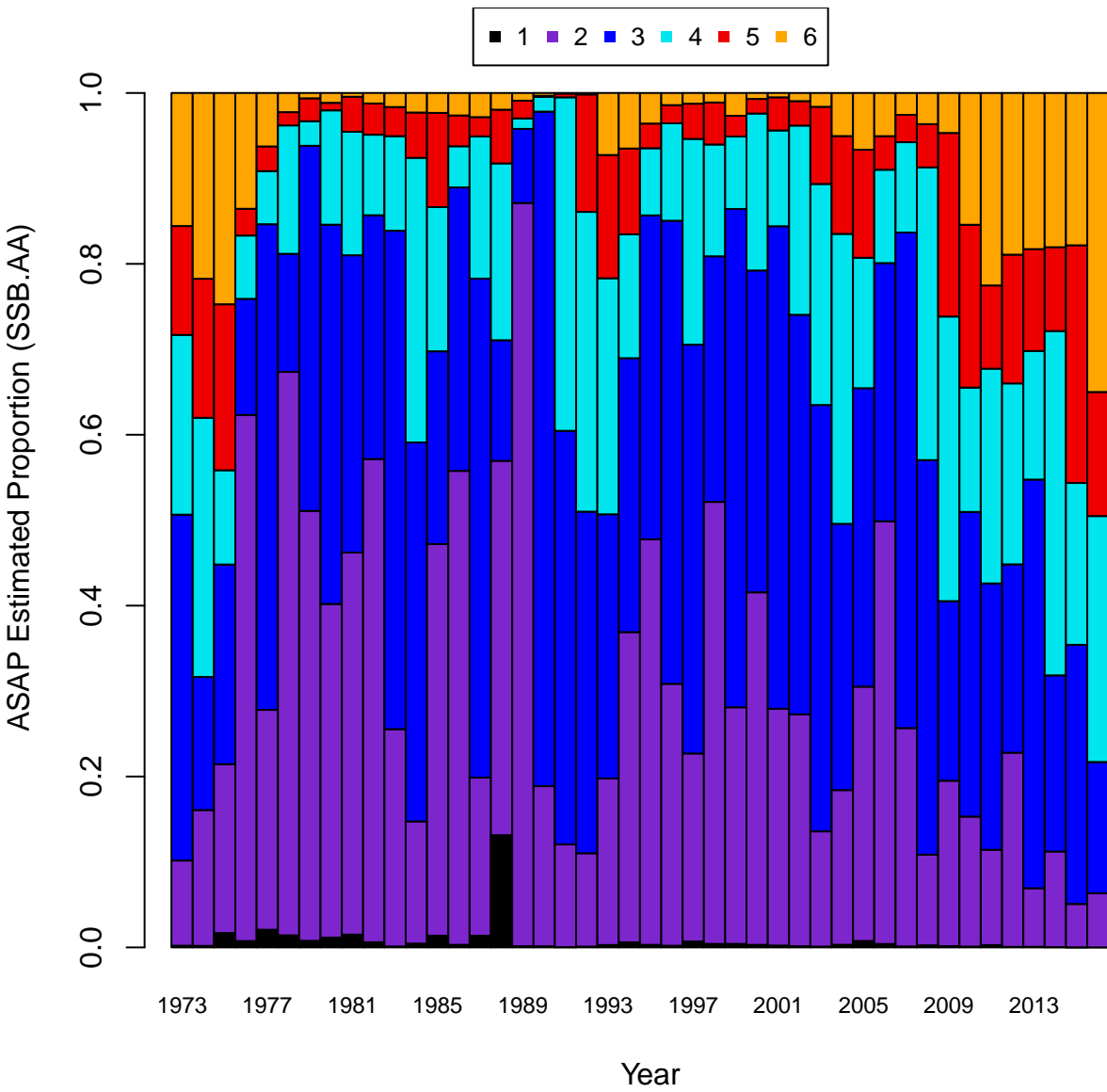
**Comparison of January 1 Biomass**

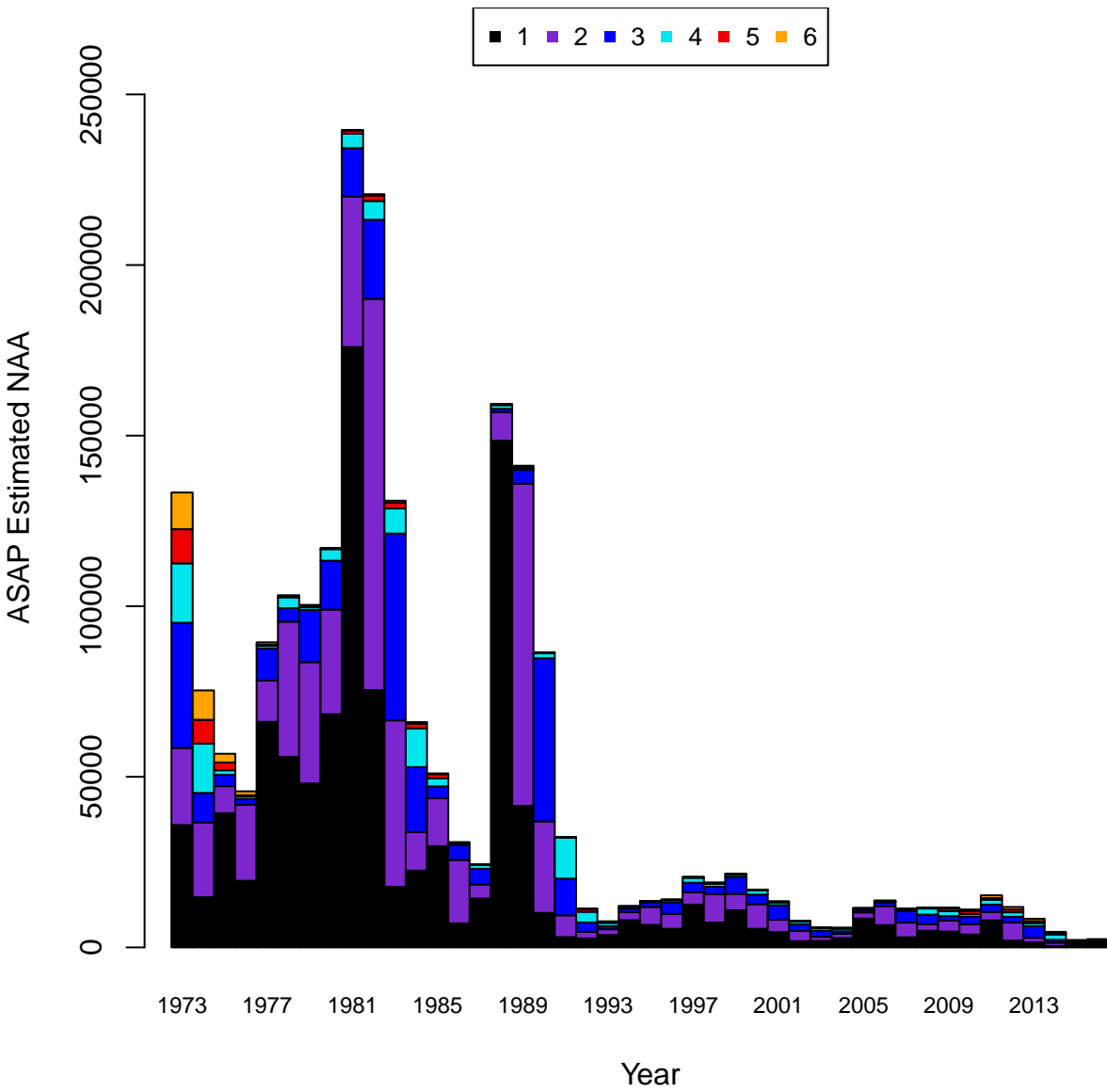


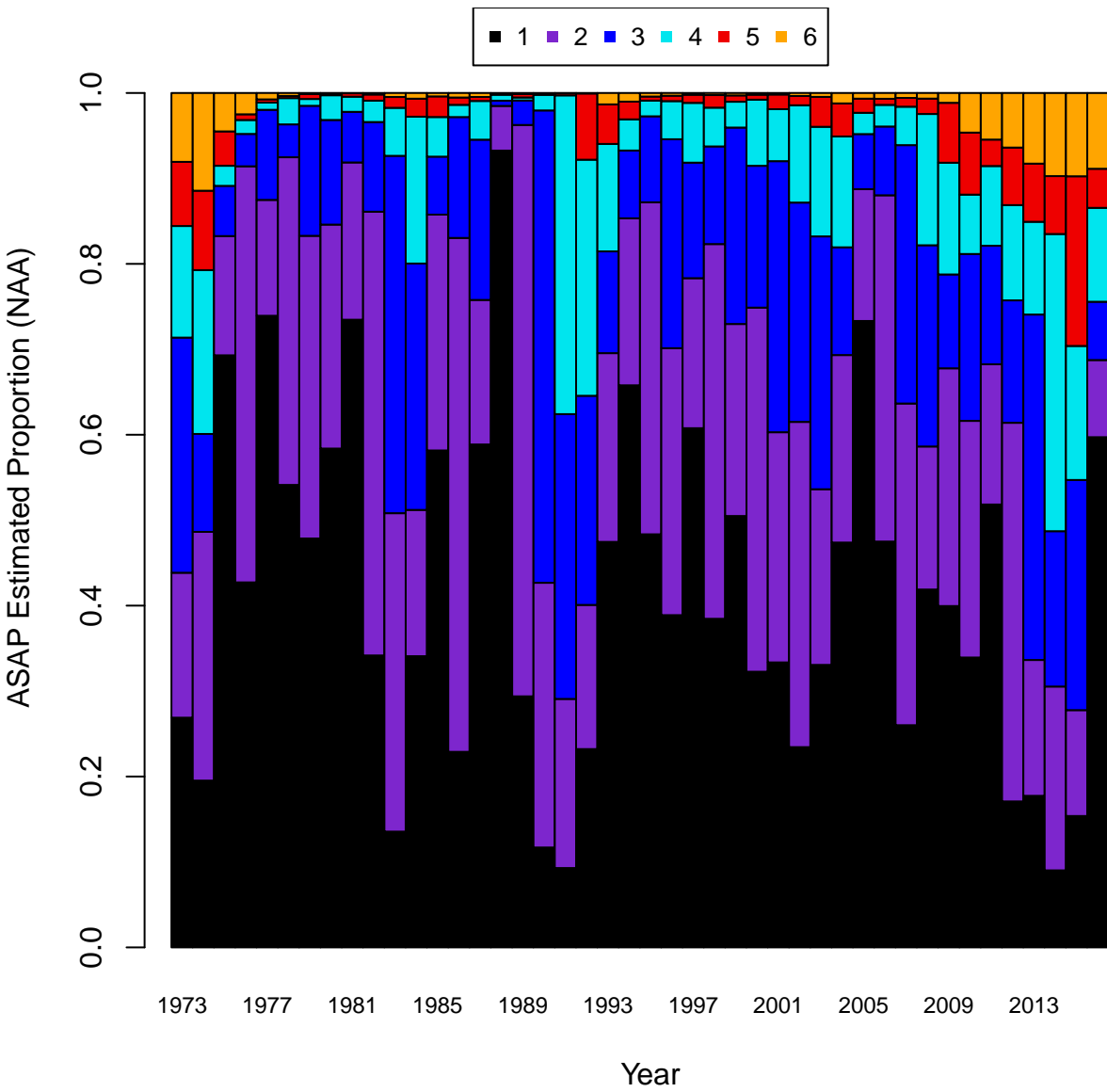
ASAP Estimated SSB.AA

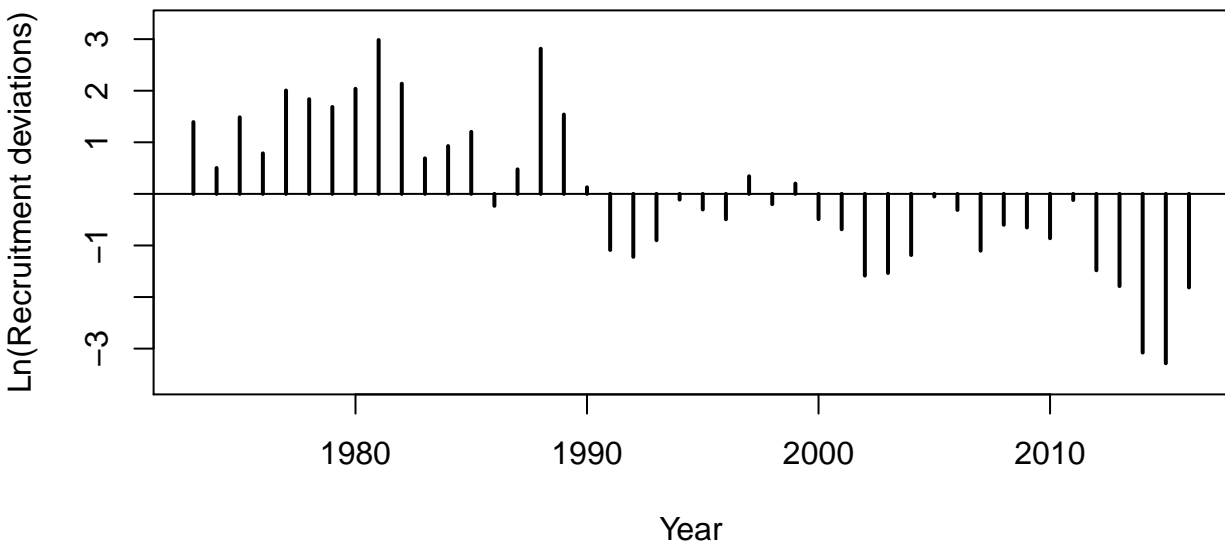
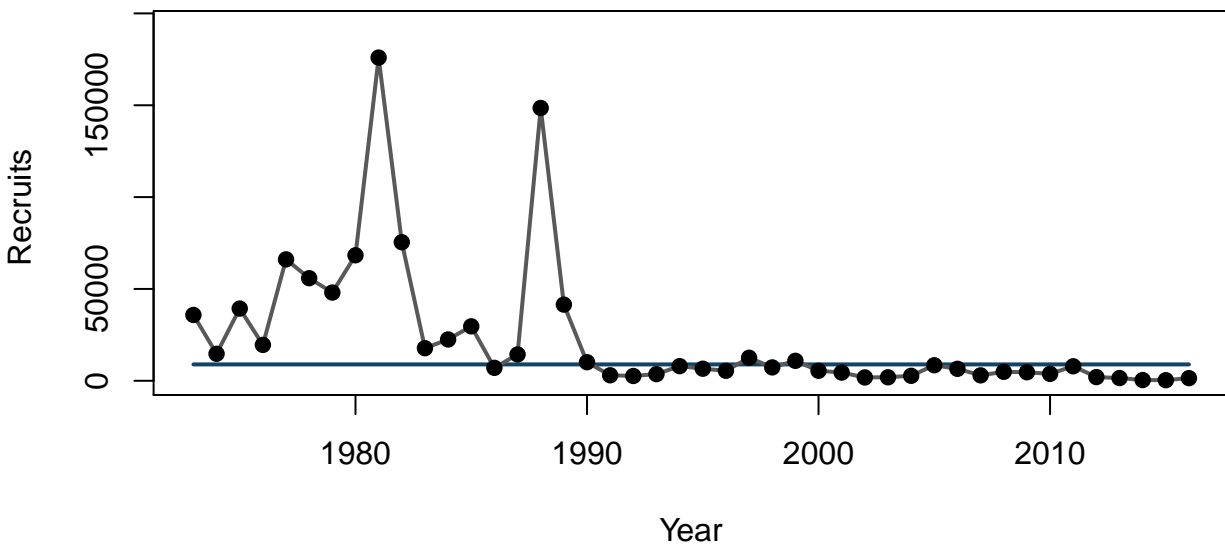


Year

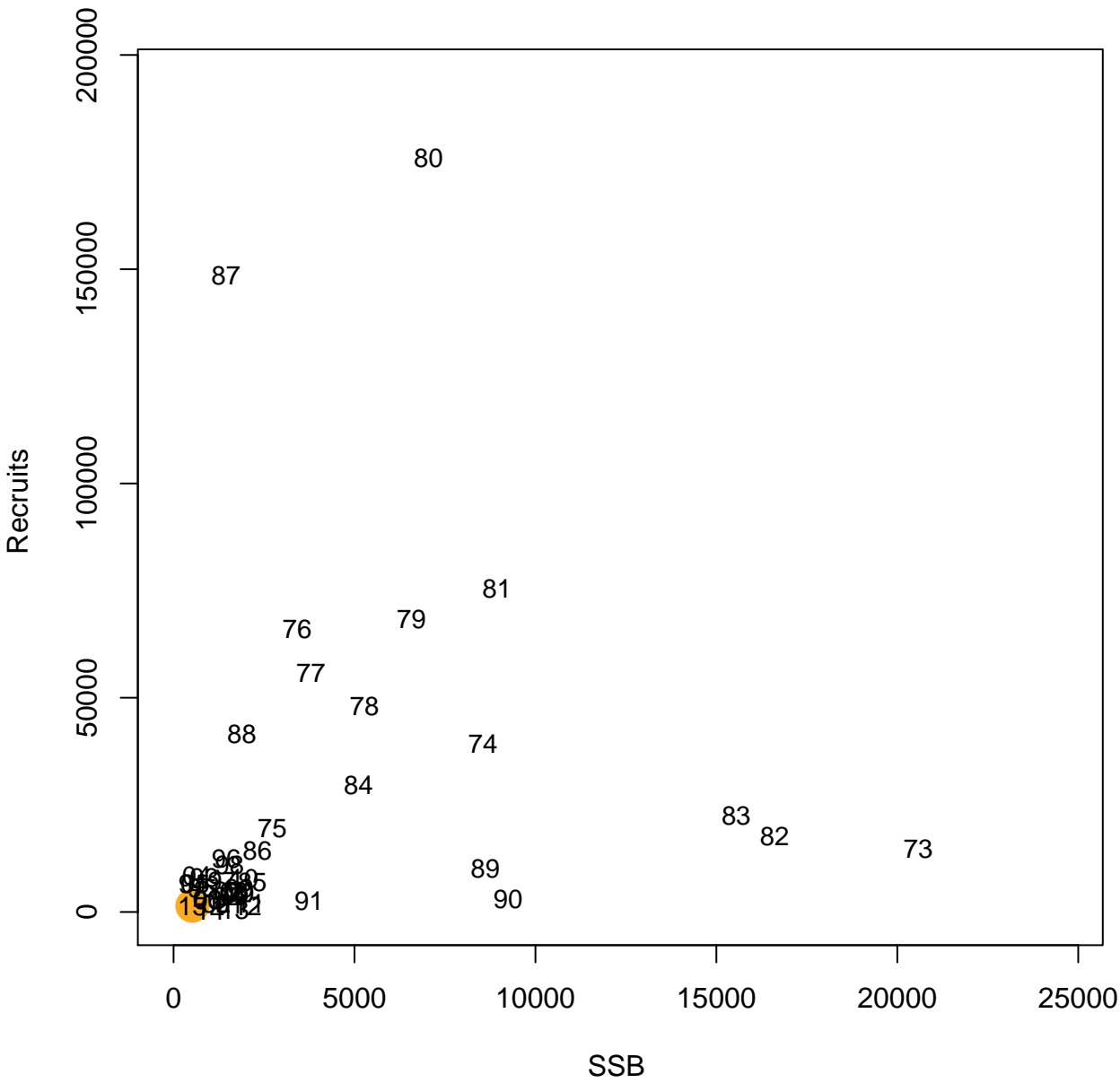


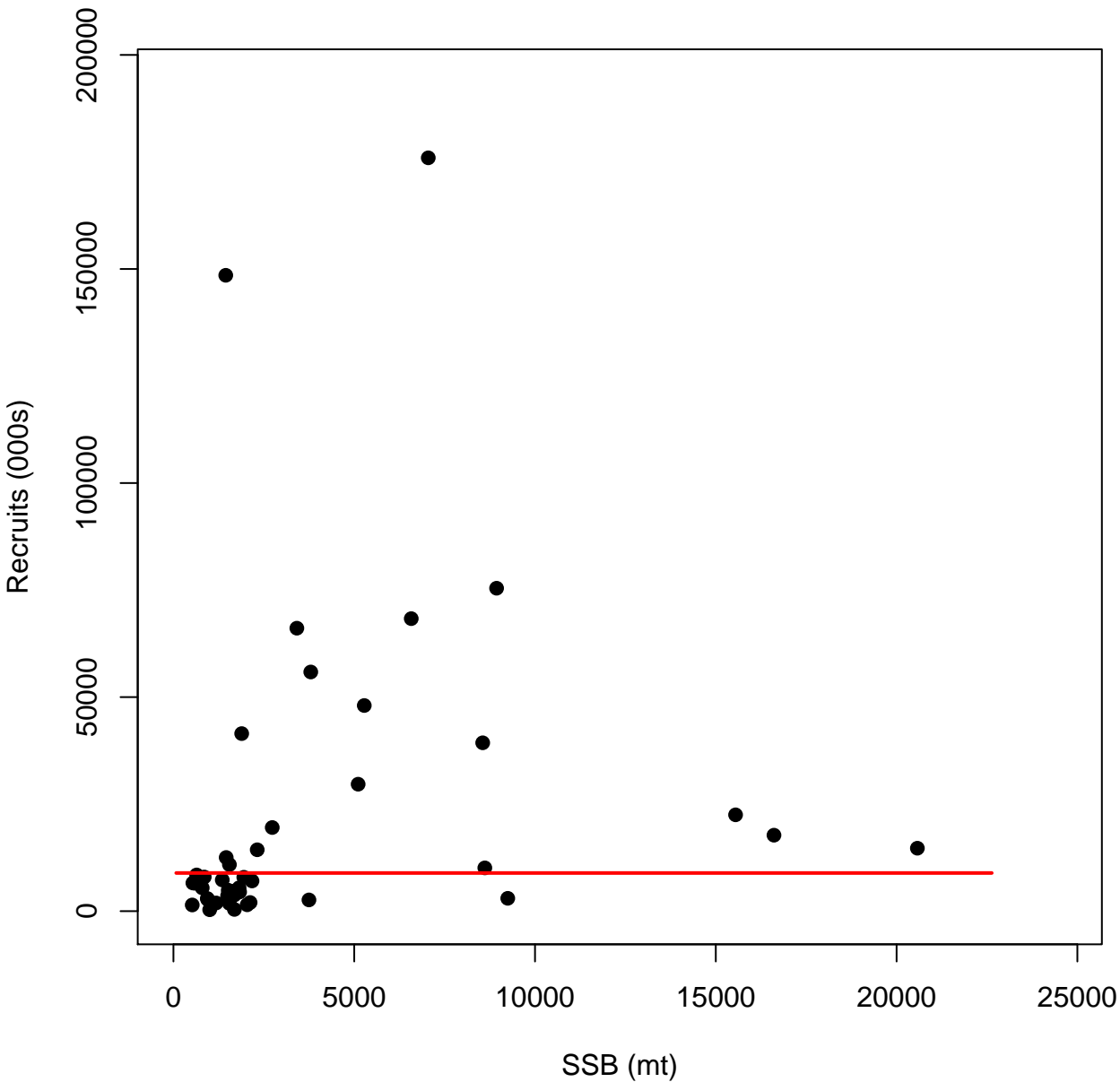


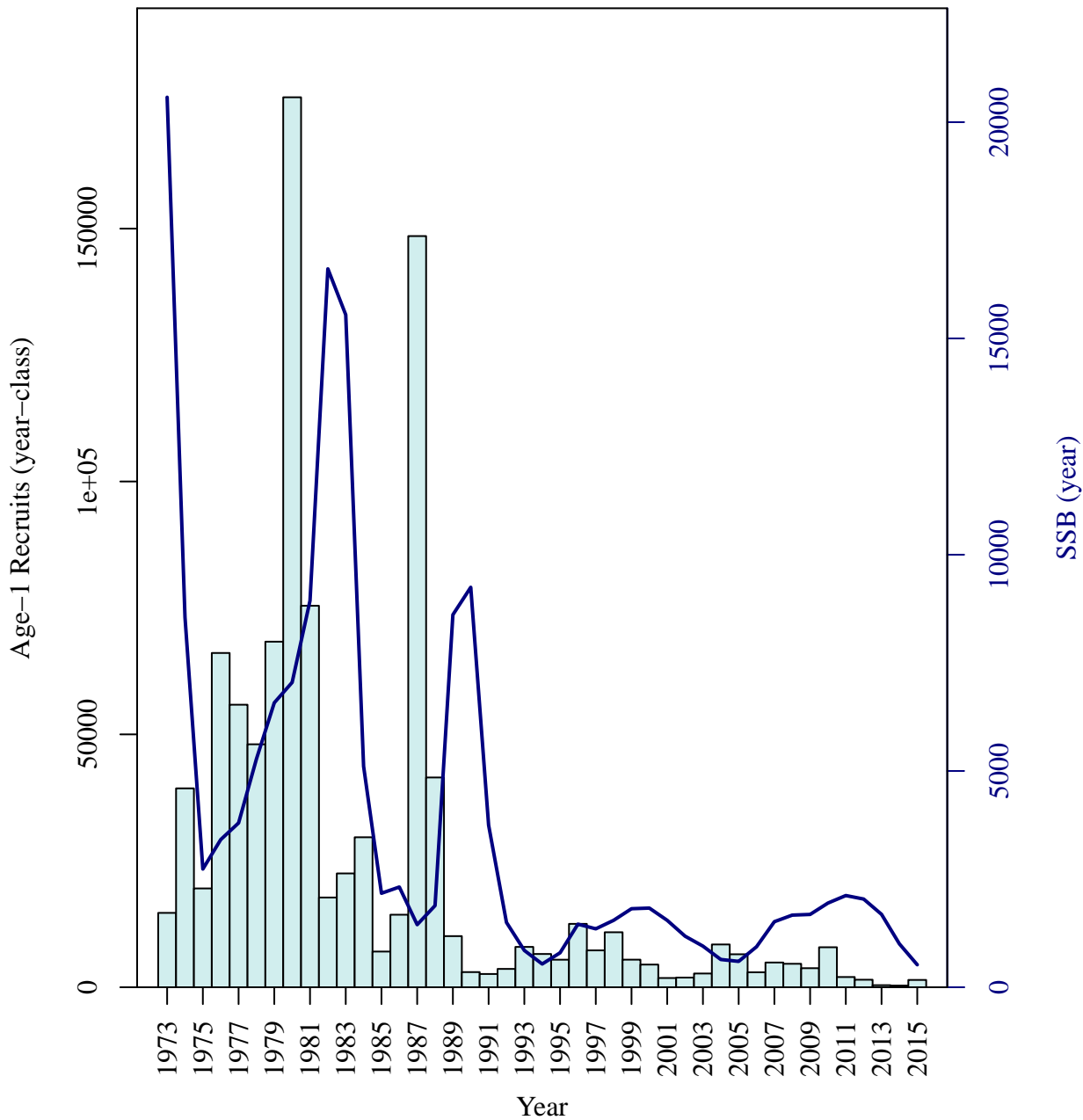




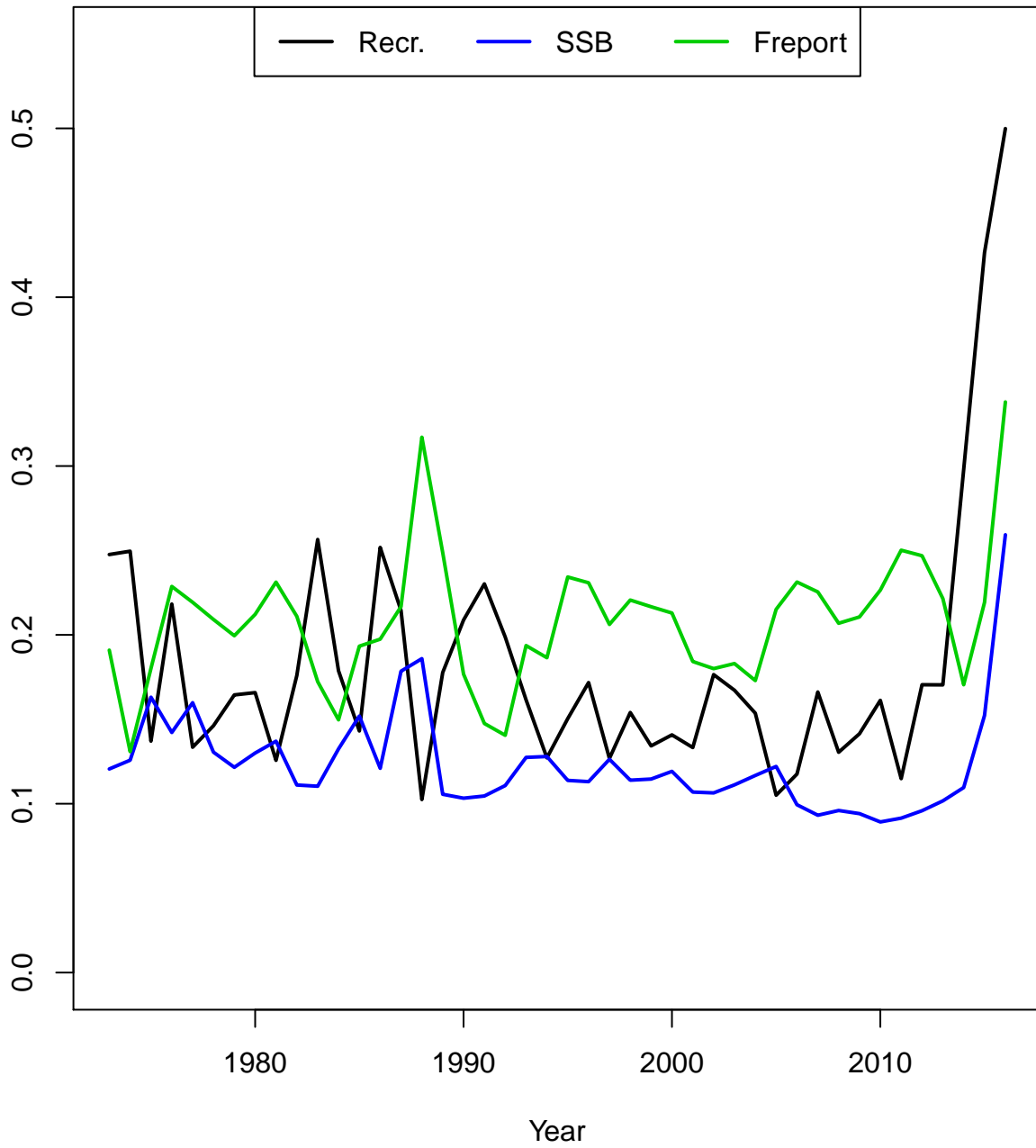




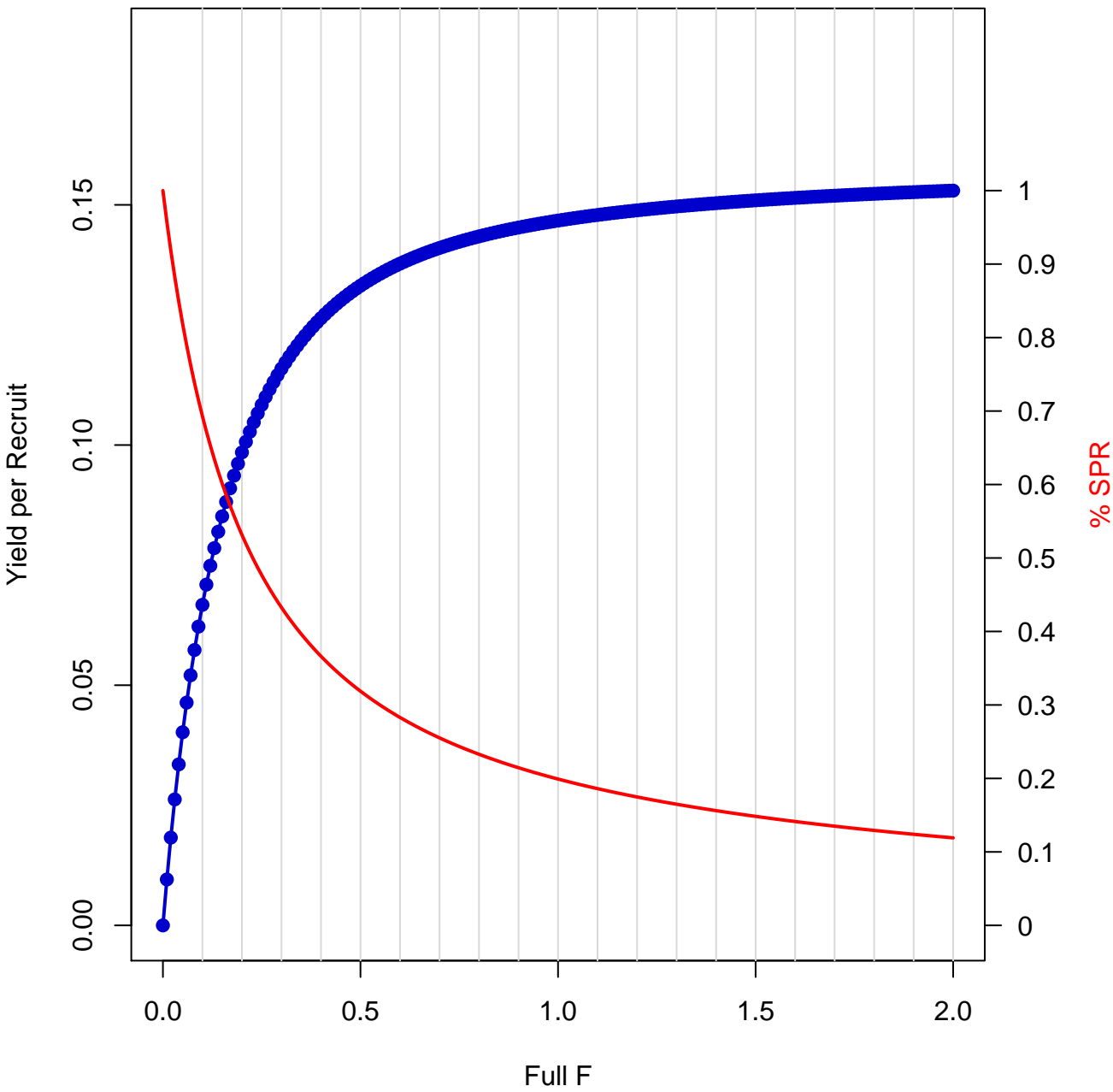




CV



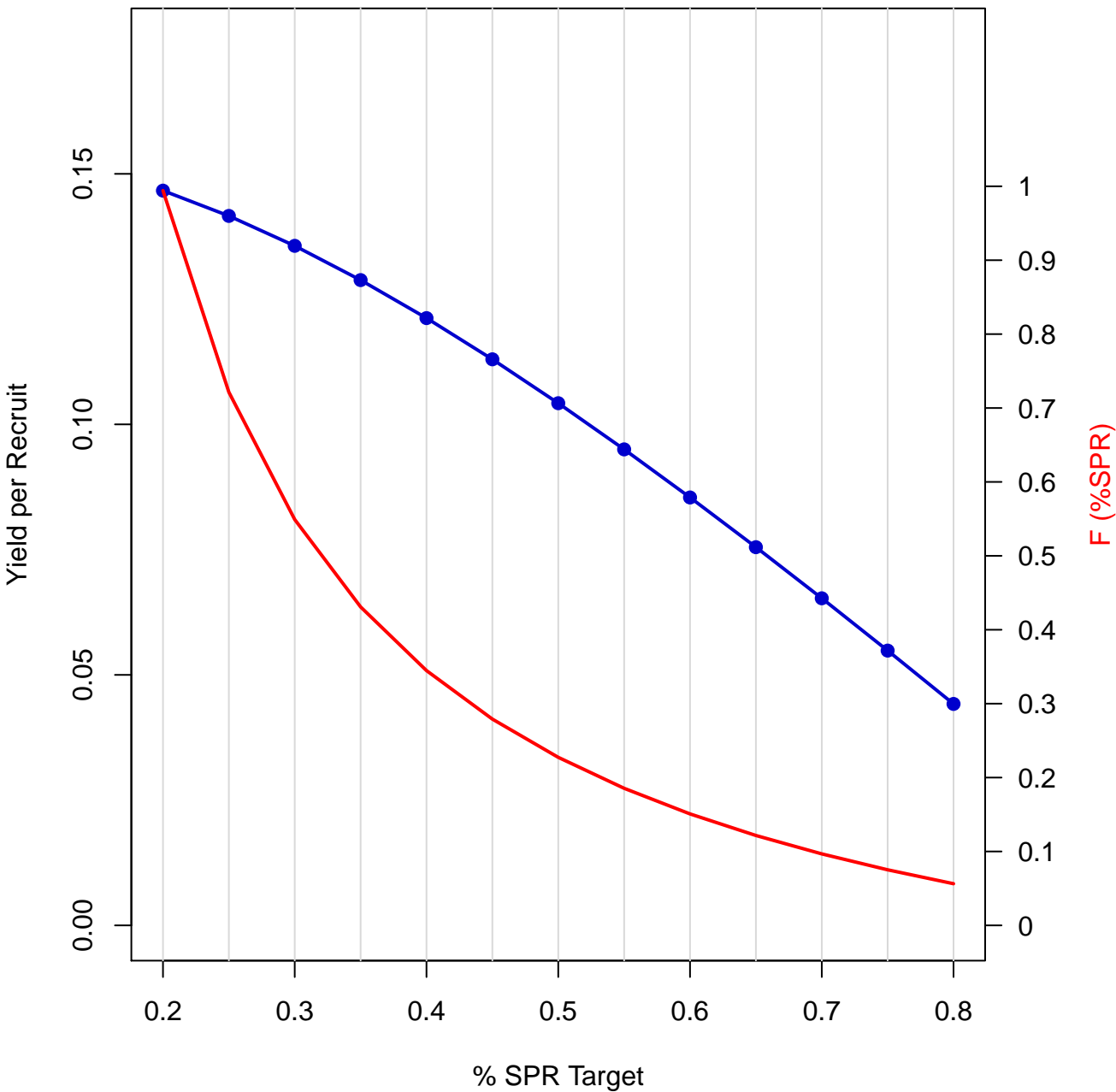
YPR-SPR Reference Points (Years Avg = 5)



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

F	YPR	SPR	F	YPR	SPR	F	YPR	SPR
0	0	1	0.35	0.1218	0.3965	0.7	0.141	0.2552
0.01	0.0096	0.9575	0.36	0.1228	0.39	0.71	0.1413	0.2527
0.02	0.0183	0.9185	0.37	0.1237	0.3838	0.72	0.1416	0.2503
0.03	0.0262	0.8826	0.38	0.1247	0.3778	0.73	0.1418	0.248
0.04	0.0335	0.8493	0.39	0.1256	0.3719	0.74	0.1421	0.2457
0.05	0.0402	0.8185	0.4	0.1264	0.3663	0.75	0.1423	0.2435
0.06	0.0464	0.7898	0.41	0.1272	0.3609	0.76	0.1426	0.2412
0.07	0.0521	0.7631	0.42	0.128	0.3556	0.77	0.1428	0.2391
0.08	0.0573	0.7382	0.43	0.1287	0.3505	0.78	0.143	0.237
0.09	0.0622	0.7149	0.44	0.1294	0.3455	0.79	0.1432	0.2349
0.1	0.0667	0.693	0.45	0.1301	0.3407	0.8	0.1434	0.2329
0.11	0.0709	0.6724	0.46	0.1308	0.336	0.81	0.1436	0.2309
0.12	0.0749	0.6531	0.47	0.1314	0.3315	0.82	0.1438	0.2289
0.13	0.0785	0.6348	0.48	0.132	0.3271	0.83	0.144	0.227
0.14	0.082	0.6176	0.49	0.1326	0.3229	0.84	0.1442	0.2251
0.15	0.0852	0.6013	0.5	0.1332	0.3187	0.85	0.1444	0.2233
0.16	0.0882	0.5858	0.51	0.1337	0.3147	0.86	0.1446	0.2215
0.17	0.091	0.5712	0.52	0.1342	0.3108	0.87	0.1448	0.2197
0.18	0.0936	0.5573	0.53	0.1347	0.307	0.88	0.145	0.2179
0.19	0.0961	0.5441	0.54	0.1352	0.3033	0.89	0.1451	0.2162
0.2	0.0985	0.5315	0.55	0.1357	0.2997	0.9	0.1453	0.2145
0.21	0.1007	0.5195	0.56	0.1361	0.2962	0.91	0.1454	0.2129
0.22	0.1028	0.5081	0.57	0.1366	0.2928	0.92	0.1456	0.2112
0.23	0.1047	0.4972	0.58	0.137	0.2894	0.93	0.1458	0.2096
0.24	0.1066	0.4867	0.59	0.1374	0.2862	0.94	0.1459	0.2081
0.25	0.1084	0.4768	0.6	0.1378	0.283	0.95	0.146	0.2065
0.26	0.11	0.4672	0.61	0.1381	0.2799	0.96	0.1462	0.205
0.27	0.1116	0.458	0.62	0.1385	0.2769	0.97	0.1463	0.2035
0.28	0.1131	0.4492	0.63	0.1389	0.274	0.98	0.1465	0.202
0.29	0.1145	0.4408	0.64	0.1392	0.2711	0.99	0.1466	0.2006
0.3	0.1159	0.4327	0.65	0.1395	0.2683	1	0.1467	0.1992
0.31	0.1172	0.4249	0.66	0.1398	0.2656	1.01	0.1469	0.1978
0.32	0.1184	0.4174	0.67	0.1402	0.2629	1.02	0.147	0.1964
0.33	0.1196	0.4102	0.68	0.1405	0.2603	1.03	0.1471	0.195
0.34	0.1207	0.4032	0.69	0.1407	0.2577	1.04	0.1472	0.1937

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

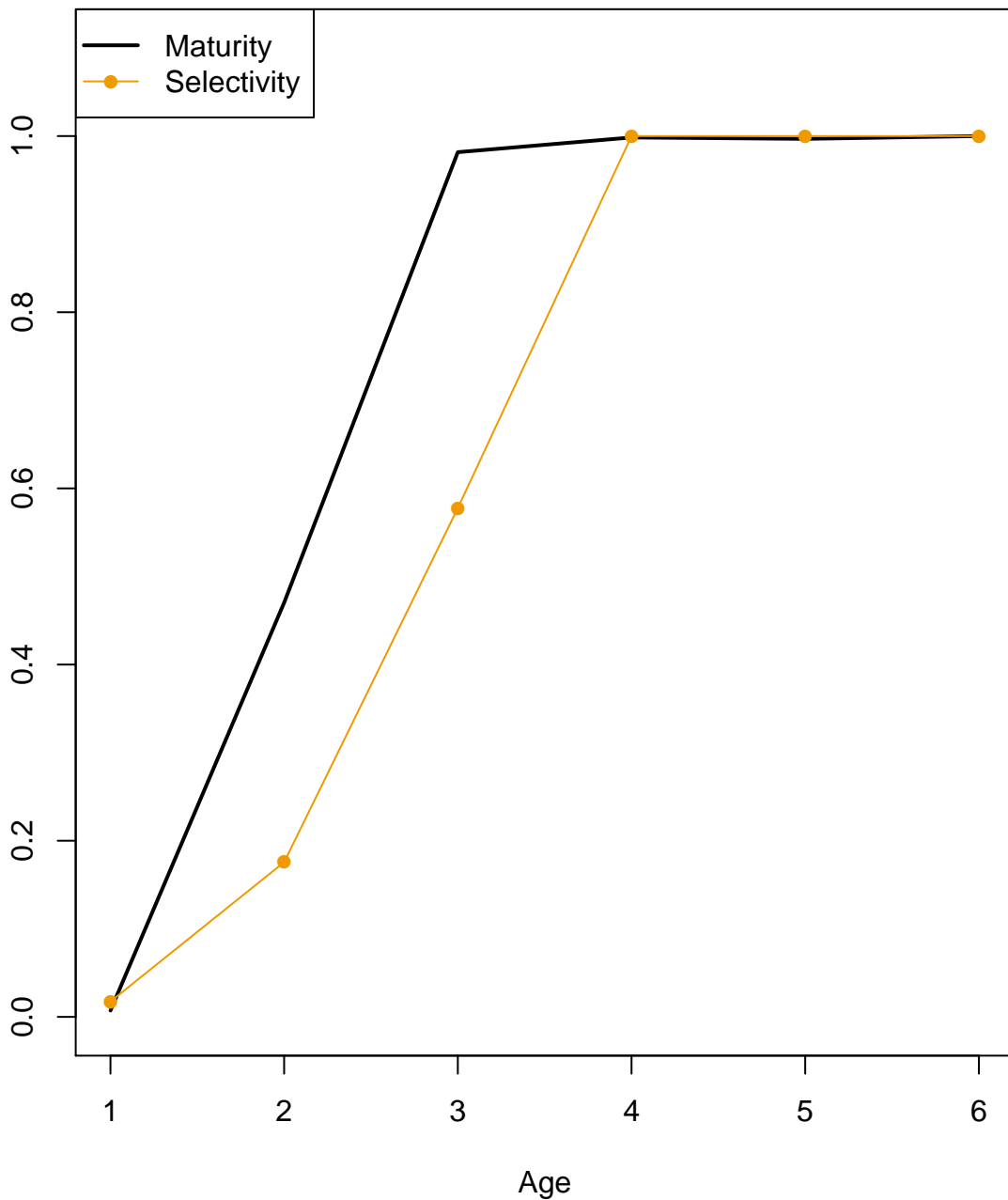


## SPR Target Reference Points (Years Avg = 5)

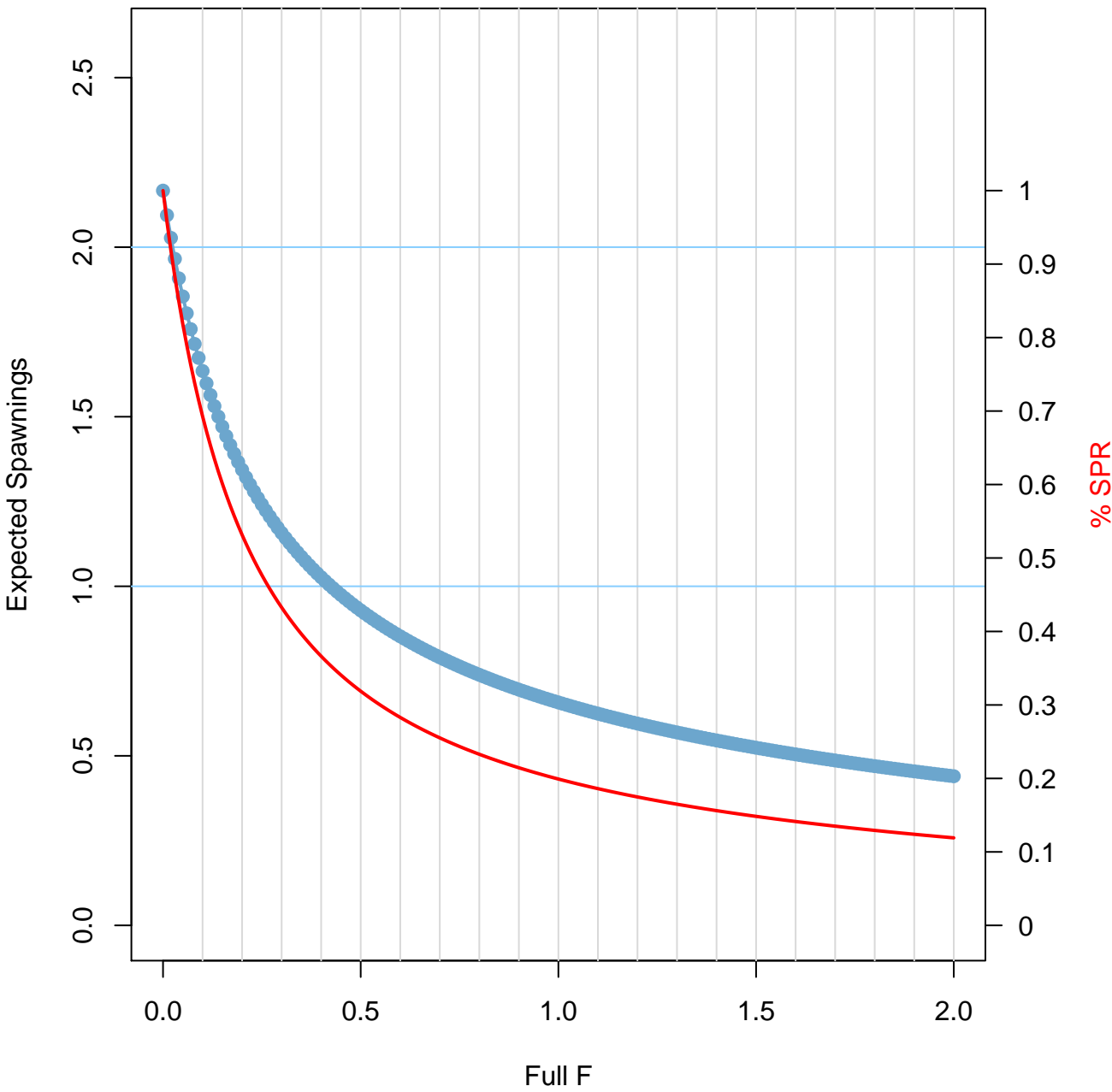
% SPR	F(%SPR)	YPR
0.2	0.9942	0.1467
0.25	0.7215	0.1416
0.3	0.5492	0.1356
0.35	0.4309	0.1288
0.4	0.3448	0.1212
0.45	0.2791	0.113
0.5	0.2274	0.1042
0.55	0.1855	0.095
0.6	0.1508	0.0854
0.65	0.1216	0.0755
0.7	0.0967	0.0653
0.75	0.0752	0.0548
0.8	0.0564	0.0442



Selectivity or Maturity at age



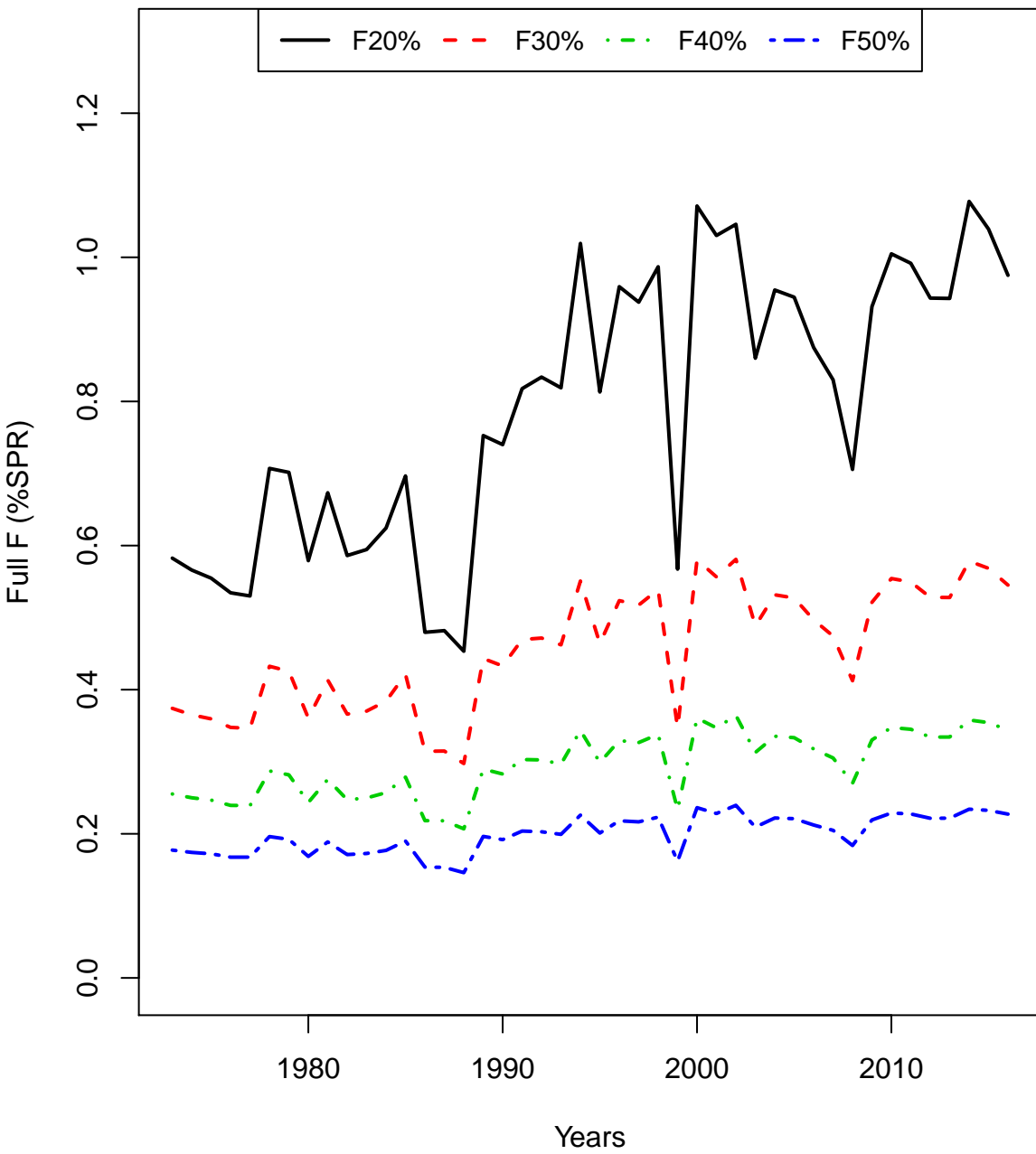
**Expected Spawns and SPR Reference Points (Years Avg = 5)**



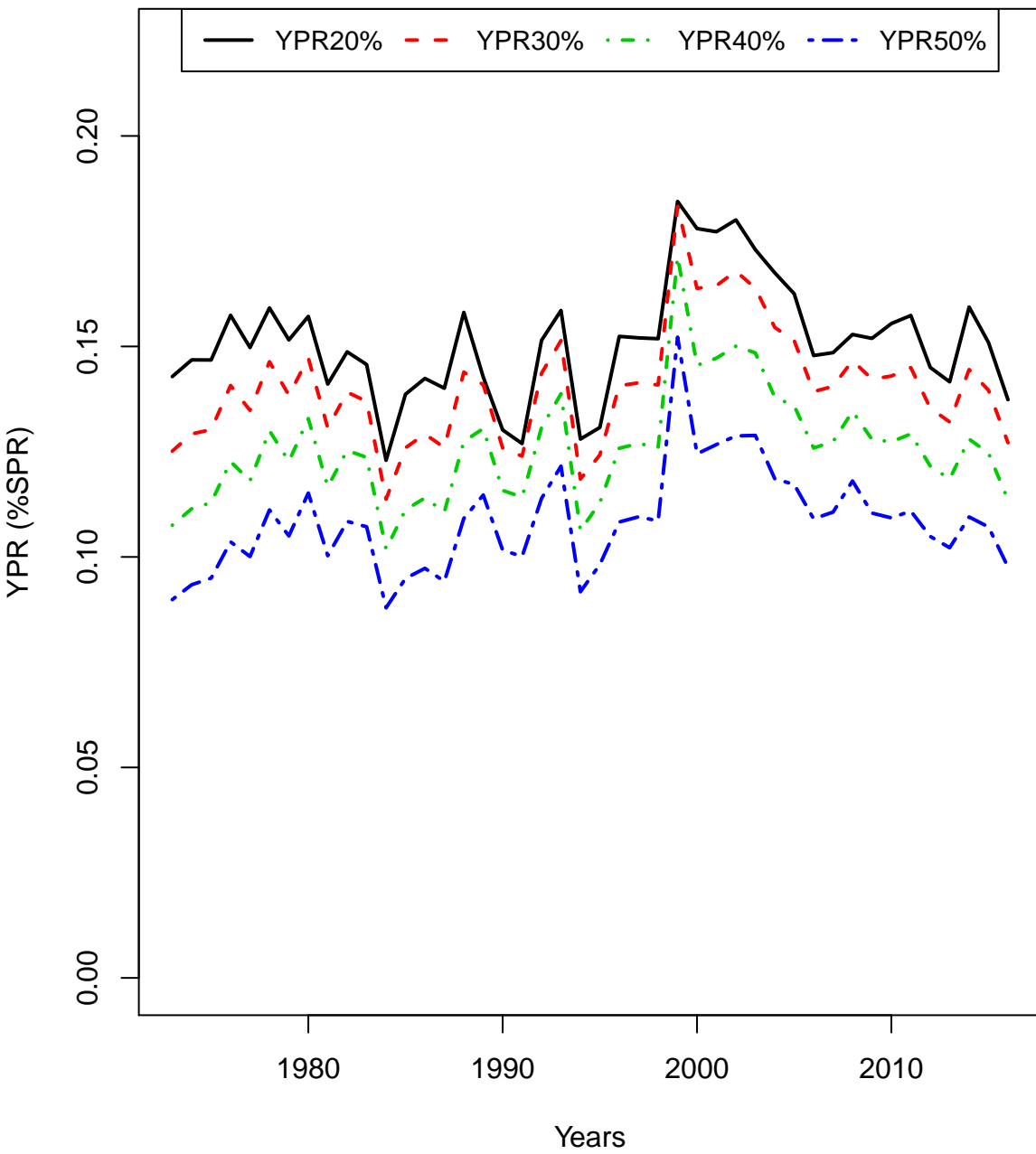
# Expected Spawns & SPR Reference Points (Years Avg = 5)

F	E[Sp]	SPR	F	E[Sp]	SPR	F	E[Sp]	SPR
0	2.1668	1	0.35	1.0869	0.3965	0.7	0.7905	0.2552
0.01	2.0943	0.9575	0.36	1.0741	0.39	0.71	0.7849	0.2527
0.02	2.0274	0.9185	0.37	1.0617	0.3838	0.72	0.7794	0.2503
0.03	1.9656	0.8826	0.38	1.0497	0.3778	0.73	0.7741	0.248
0.04	1.9082	0.8493	0.39	1.038	0.3719	0.74	0.7688	0.2457
0.05	1.8548	0.8185	0.4	1.0267	0.3663	0.75	0.7636	0.2435
0.06	1.8049	0.7898	0.41	1.0157	0.3609	0.76	0.7585	0.2412
0.07	1.7583	0.7631	0.42	1.005	0.3556	0.77	0.7535	0.2391
0.08	1.7146	0.7382	0.43	0.9946	0.3505	0.78	0.7486	0.237
0.09	1.6735	0.7149	0.44	0.9844	0.3455	0.79	0.7437	0.2349
0.1	1.6349	0.693	0.45	0.9746	0.3407	0.8	0.739	0.2329
0.11	1.5984	0.6724	0.46	0.965	0.336	0.81	0.7343	0.2309
0.12	1.5639	0.6531	0.47	0.9556	0.3315	0.82	0.7297	0.2289
0.13	1.5313	0.6348	0.48	0.9465	0.3271	0.83	0.7251	0.227
0.14	1.5003	0.6176	0.49	0.9376	0.3229	0.84	0.7207	0.2251
0.15	1.4709	0.6013	0.5	0.9289	0.3187	0.85	0.7163	0.2233
0.16	1.443	0.5858	0.51	0.9205	0.3147	0.86	0.7119	0.2215
0.17	1.4164	0.5712	0.52	0.9122	0.3108	0.87	0.7077	0.2197
0.18	1.391	0.5573	0.53	0.9041	0.307	0.88	0.7035	0.2179
0.19	1.3667	0.5441	0.54	0.8962	0.3033	0.89	0.6993	0.2162
0.2	1.3436	0.5315	0.55	0.8885	0.2997	0.9	0.6953	0.2145
0.21	1.3214	0.5195	0.56	0.881	0.2962	0.91	0.6912	0.2129
0.22	1.3001	0.5081	0.57	0.8736	0.2928	0.92	0.6873	0.2112
0.23	1.2798	0.4972	0.58	0.8664	0.2894	0.93	0.6834	0.2096
0.24	1.2602	0.4867	0.59	0.8593	0.2862	0.94	0.6795	0.2081
0.25	1.2414	0.4768	0.6	0.8524	0.283	0.95	0.6757	0.2065
0.26	1.2233	0.4672	0.61	0.8457	0.2799	0.96	0.672	0.205
0.27	1.2059	0.458	0.62	0.839	0.2769	0.97	0.6683	0.2035
0.28	1.1892	0.4492	0.63	0.8325	0.274	0.98	0.6647	0.202
0.29	1.173	0.4408	0.64	0.8262	0.2711	0.99	0.6611	0.2006
0.3	1.1574	0.4327	0.65	0.8199	0.2683	1	0.6575	0.1992
0.31	1.1423	0.4249	0.66	0.8138	0.2656	1.01	0.654	0.1978
0.32	1.1278	0.4174	0.67	0.8078	0.2629	1.02	0.6506	0.1964
0.33	1.1137	0.4102	0.68	0.8019	0.2603	1.03	0.6472	0.195
0.34	1.1001	0.4032	0.69	0.7961	0.2577	1.04	0.6438	0.1937

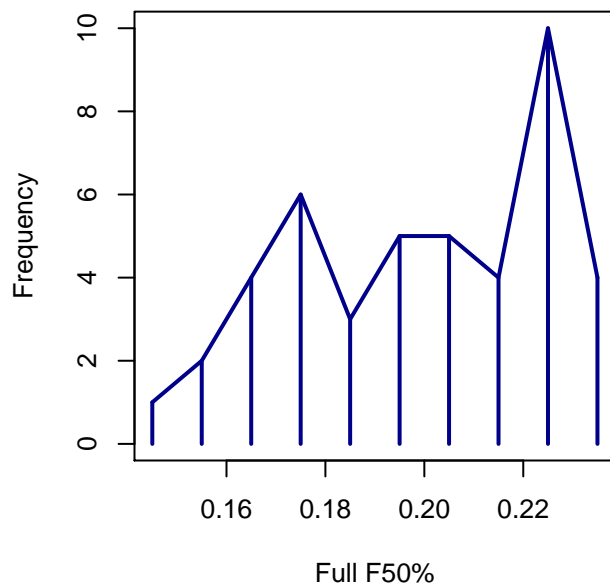
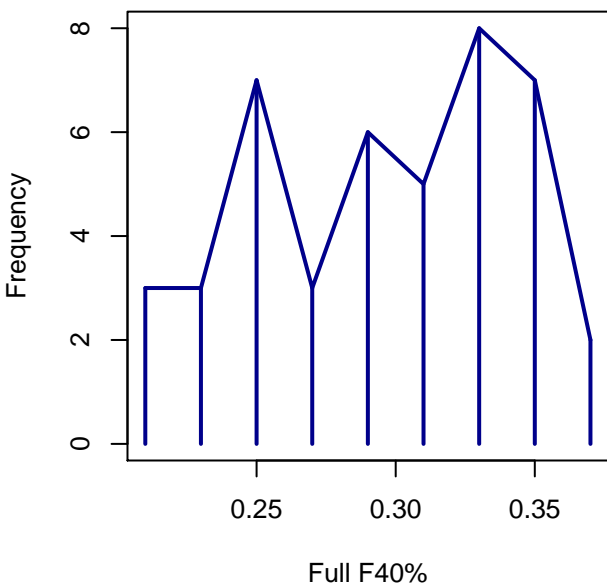
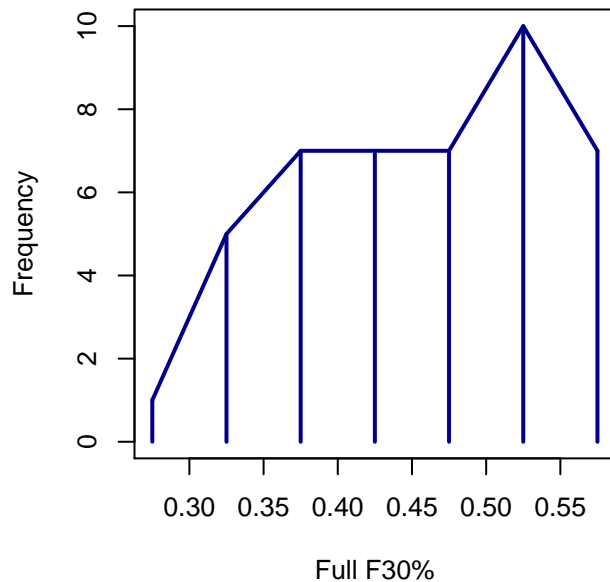
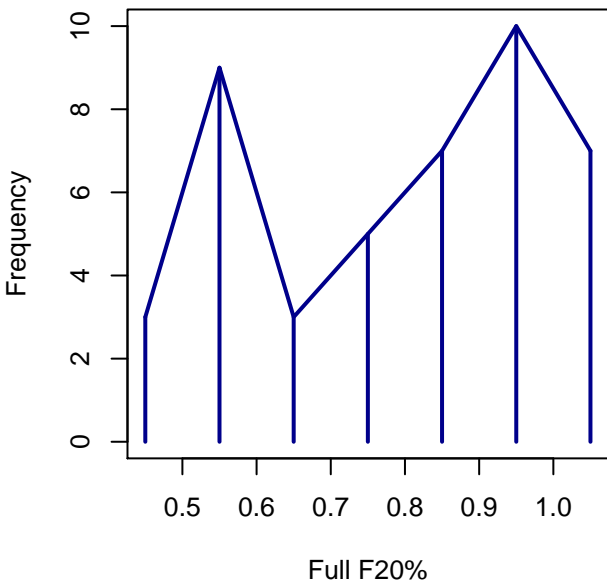
Annual F(%SPR) Reference Points



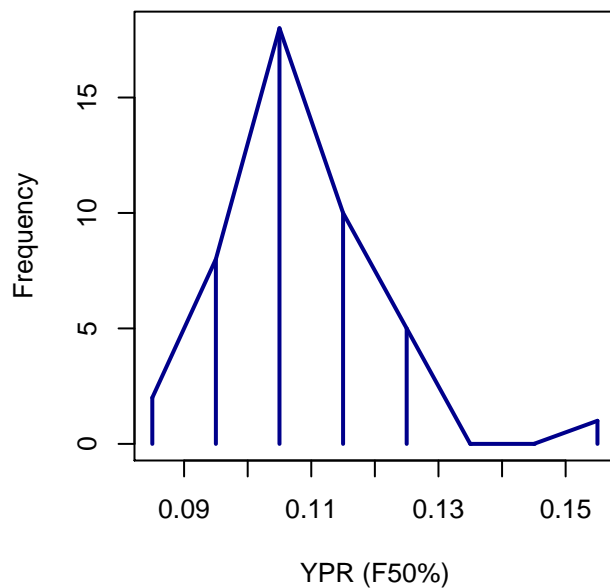
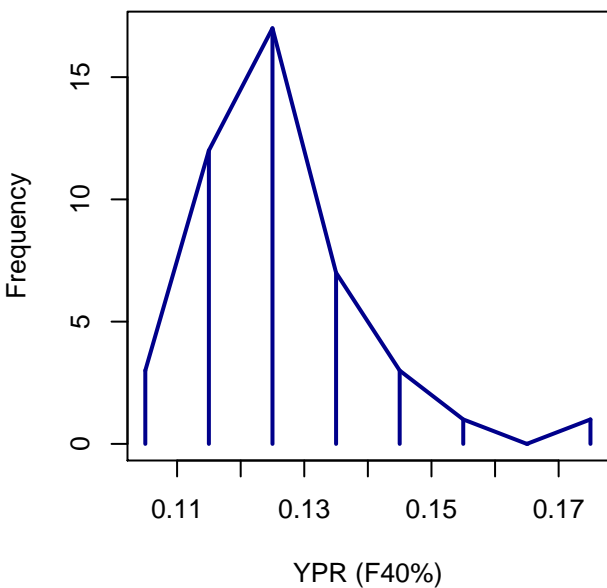
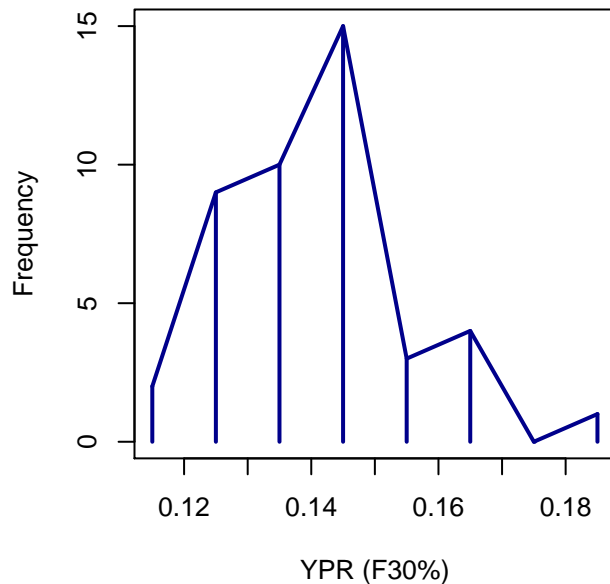
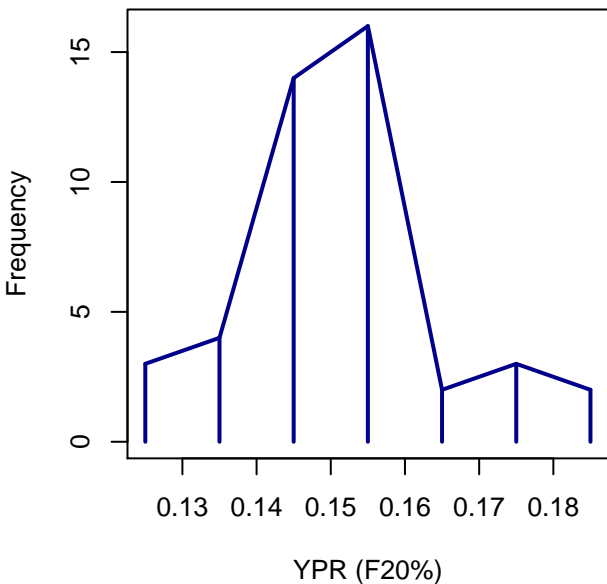
Annual YPR(%SPR) Reference Points

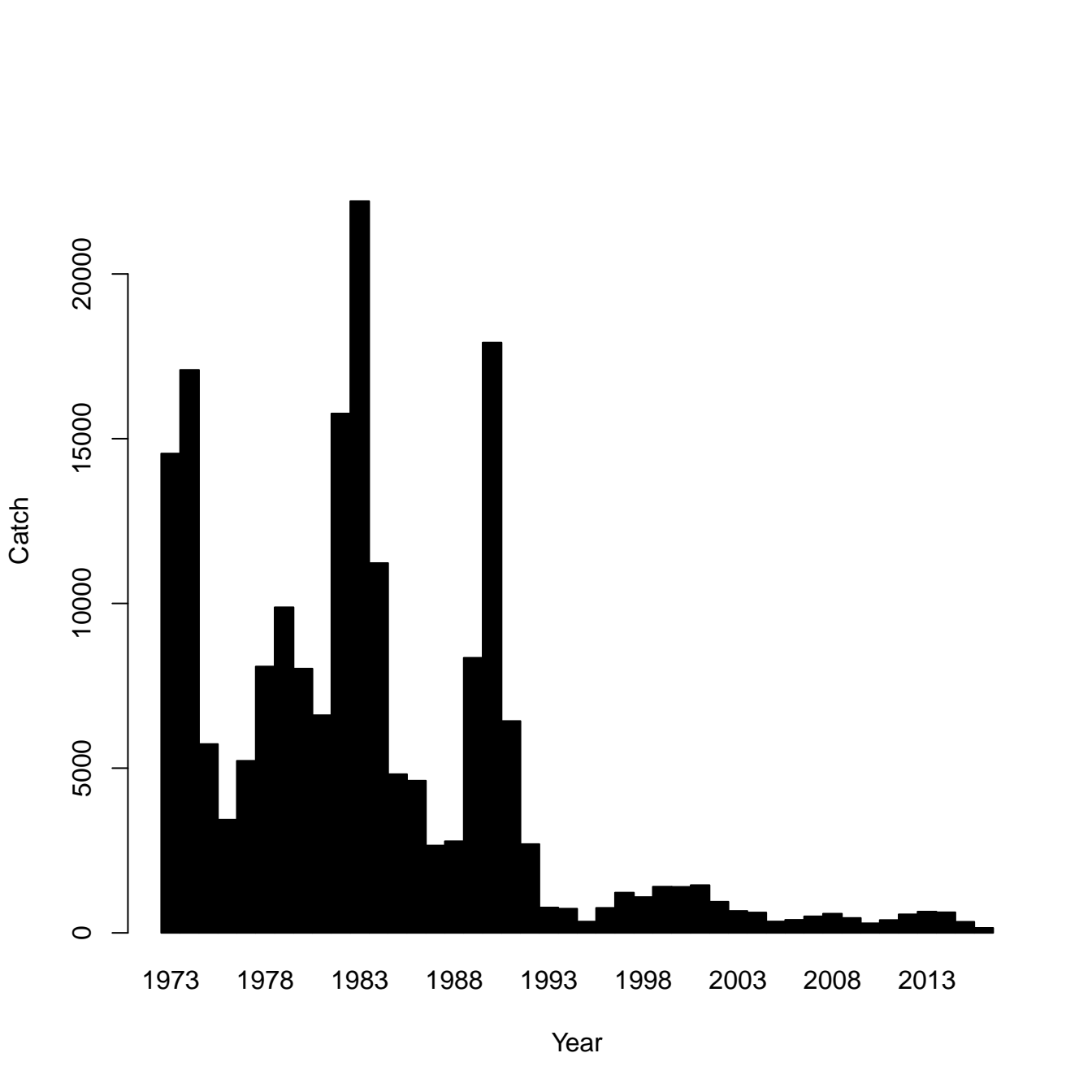


## Annual F (%SPR) Reference Points



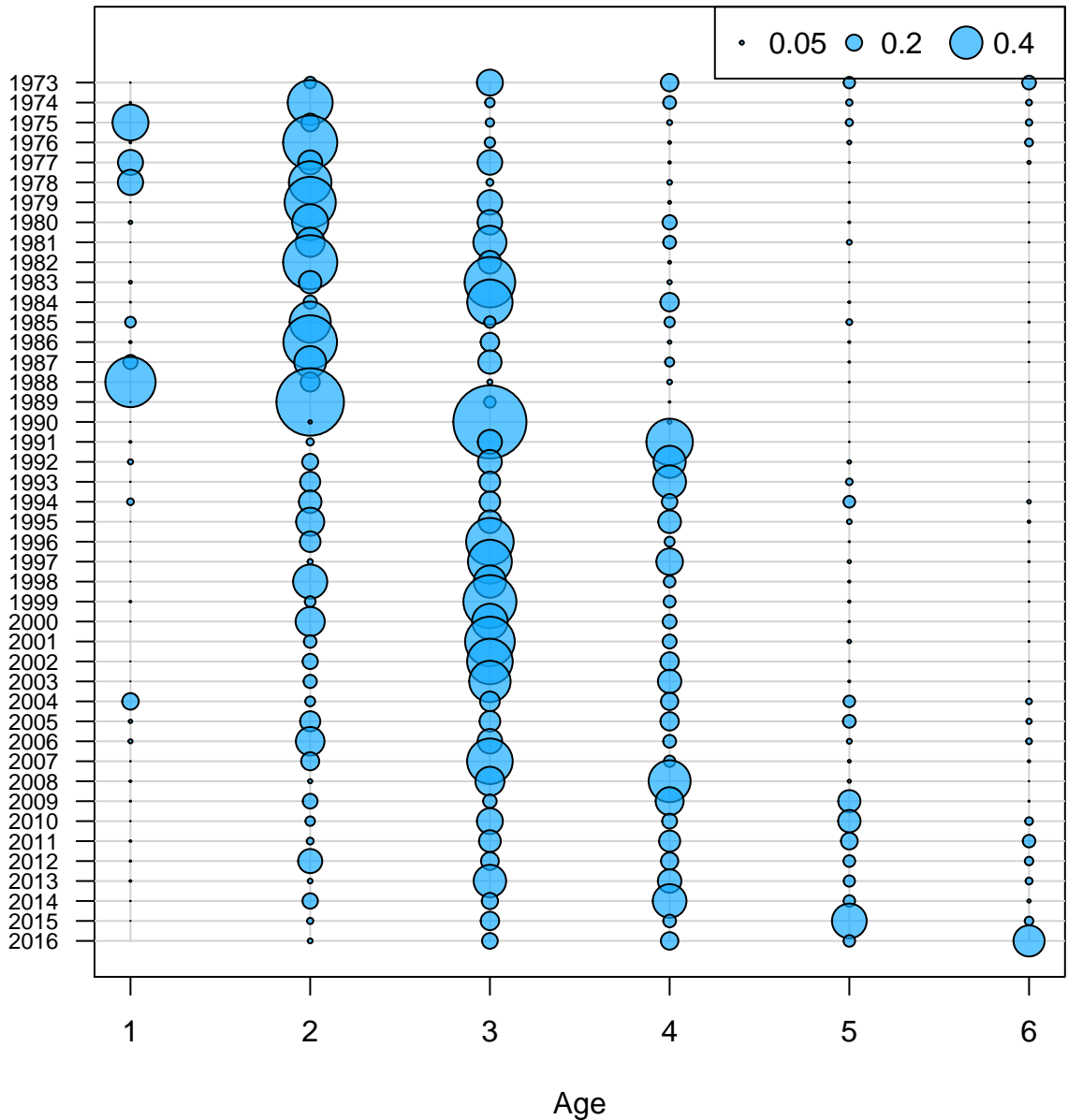
## Annual YPR (%SPR) Reference Points

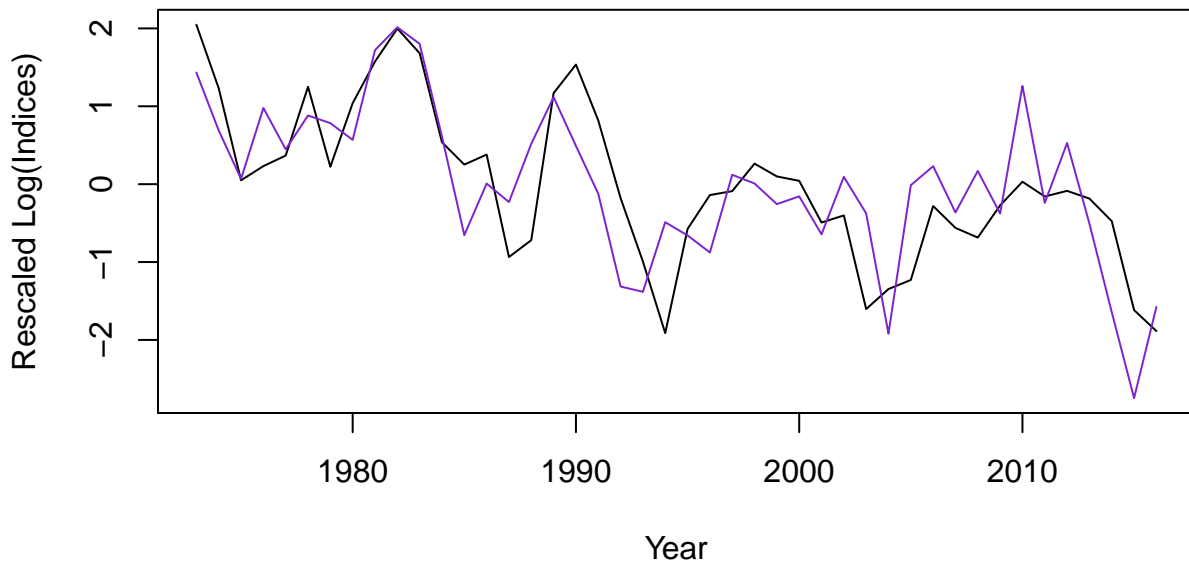
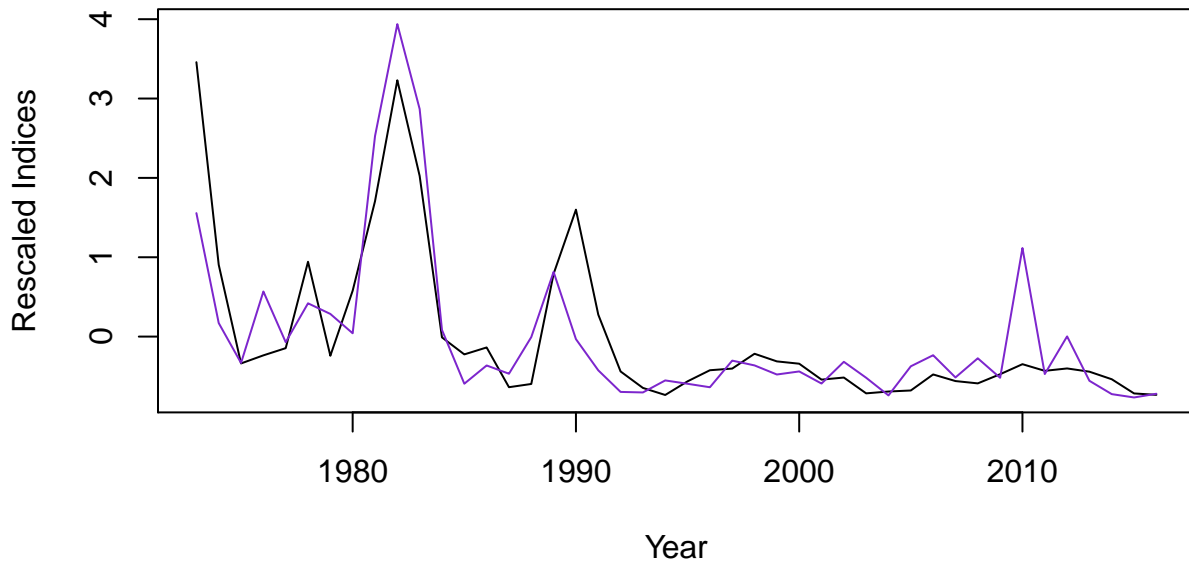




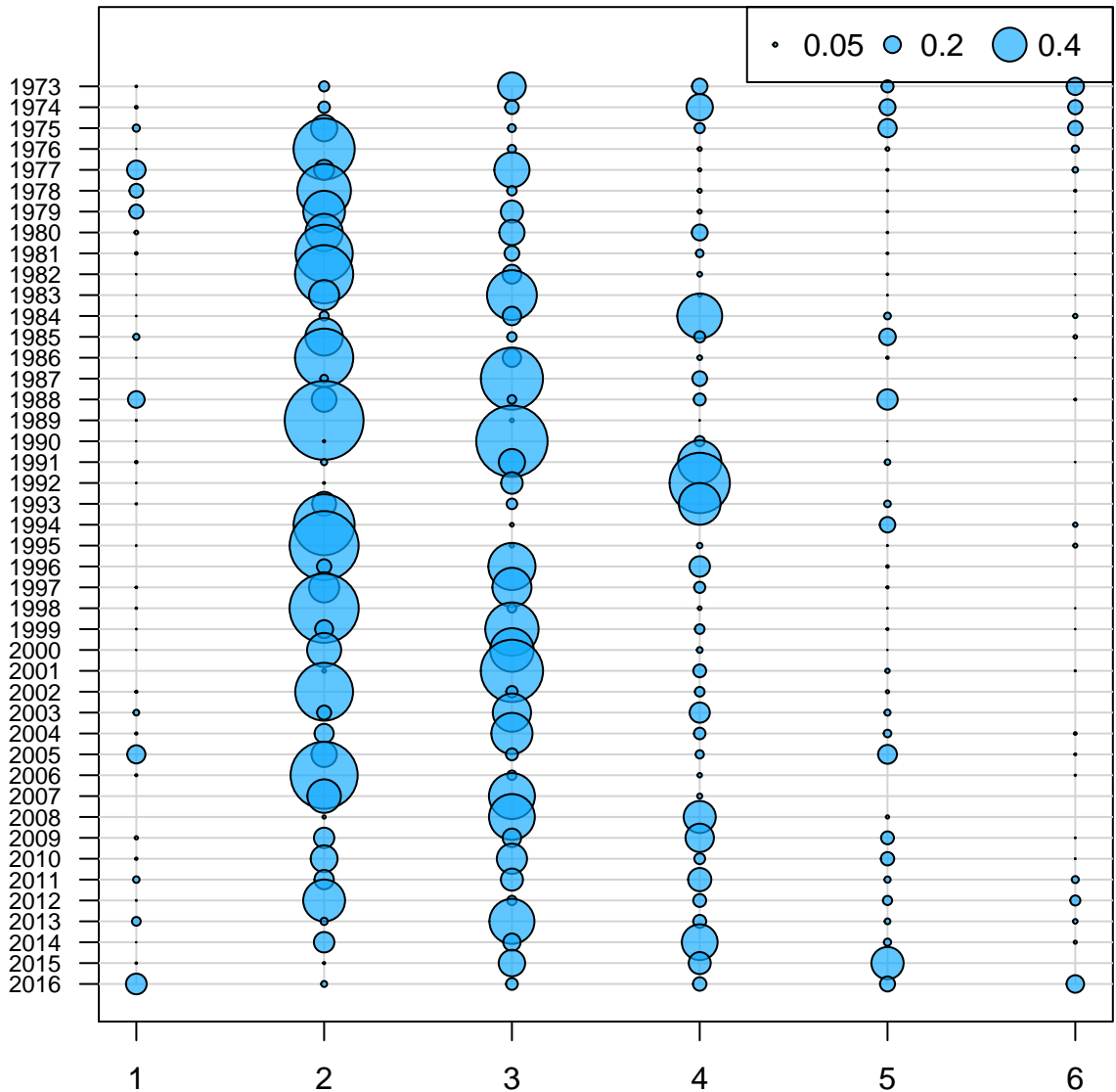


# Age Comps for Catch by Fleet 1 (FLEET-1)



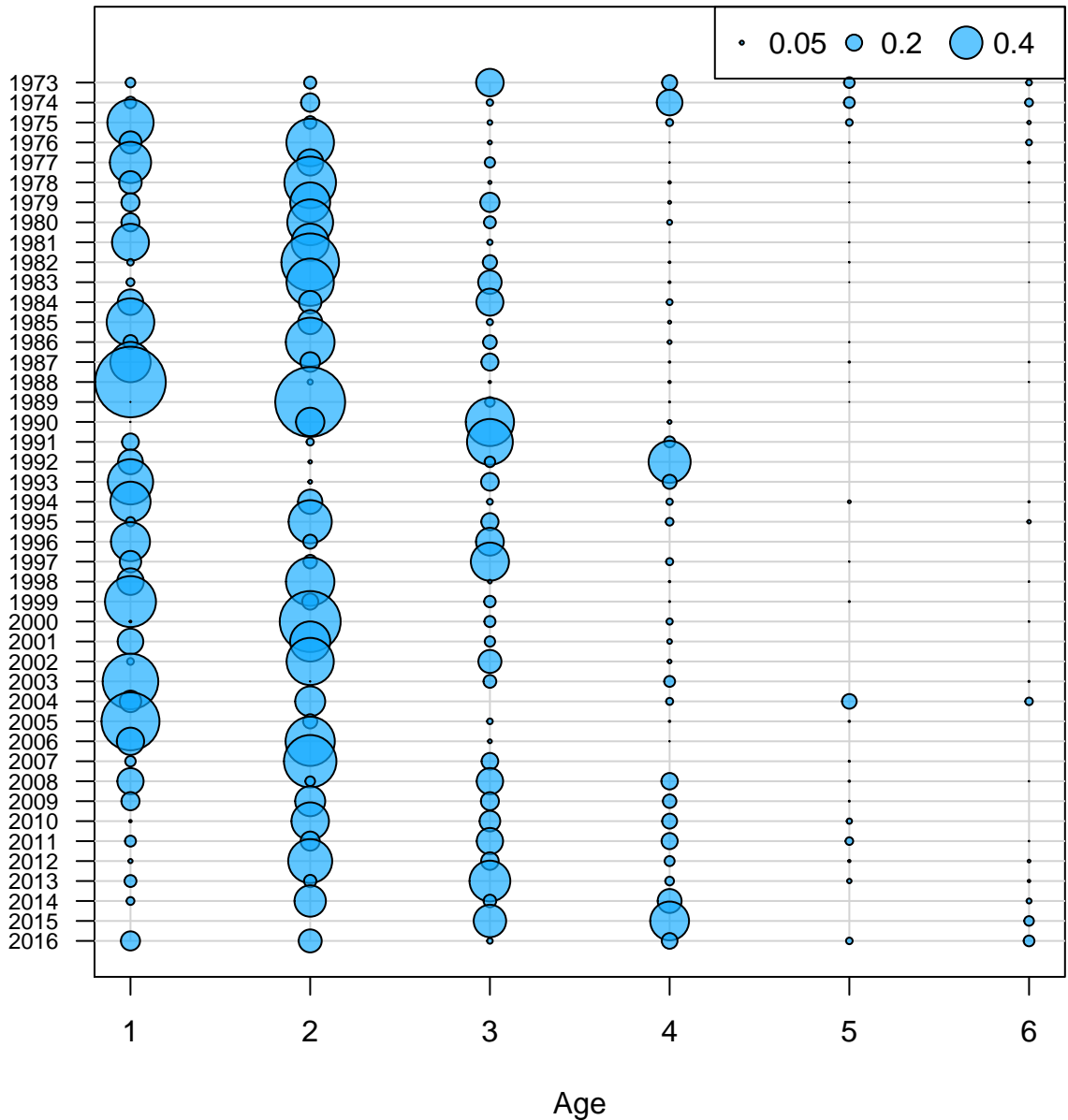


# Age Comps for Index 1 (INDEX-1)

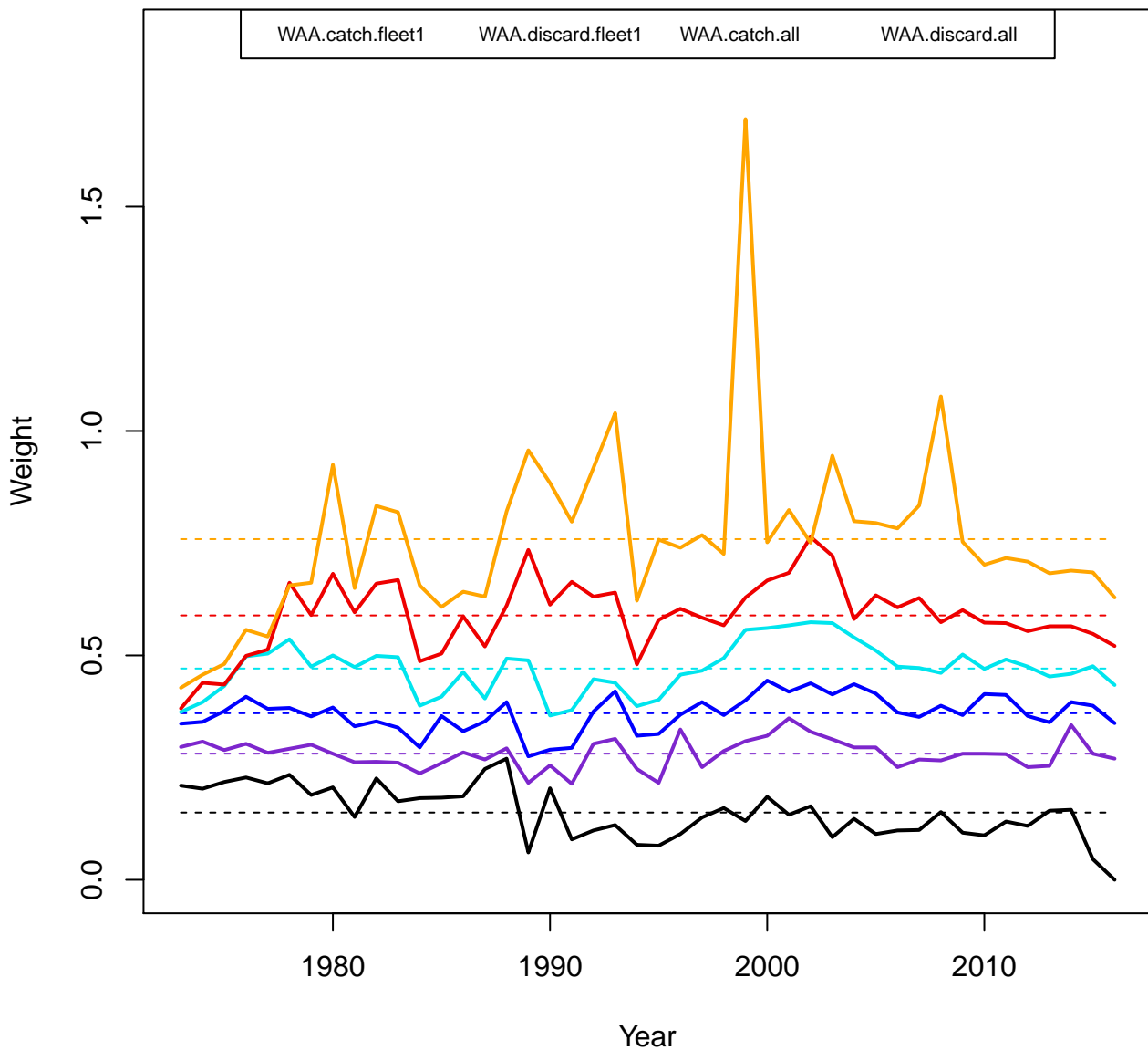


Age

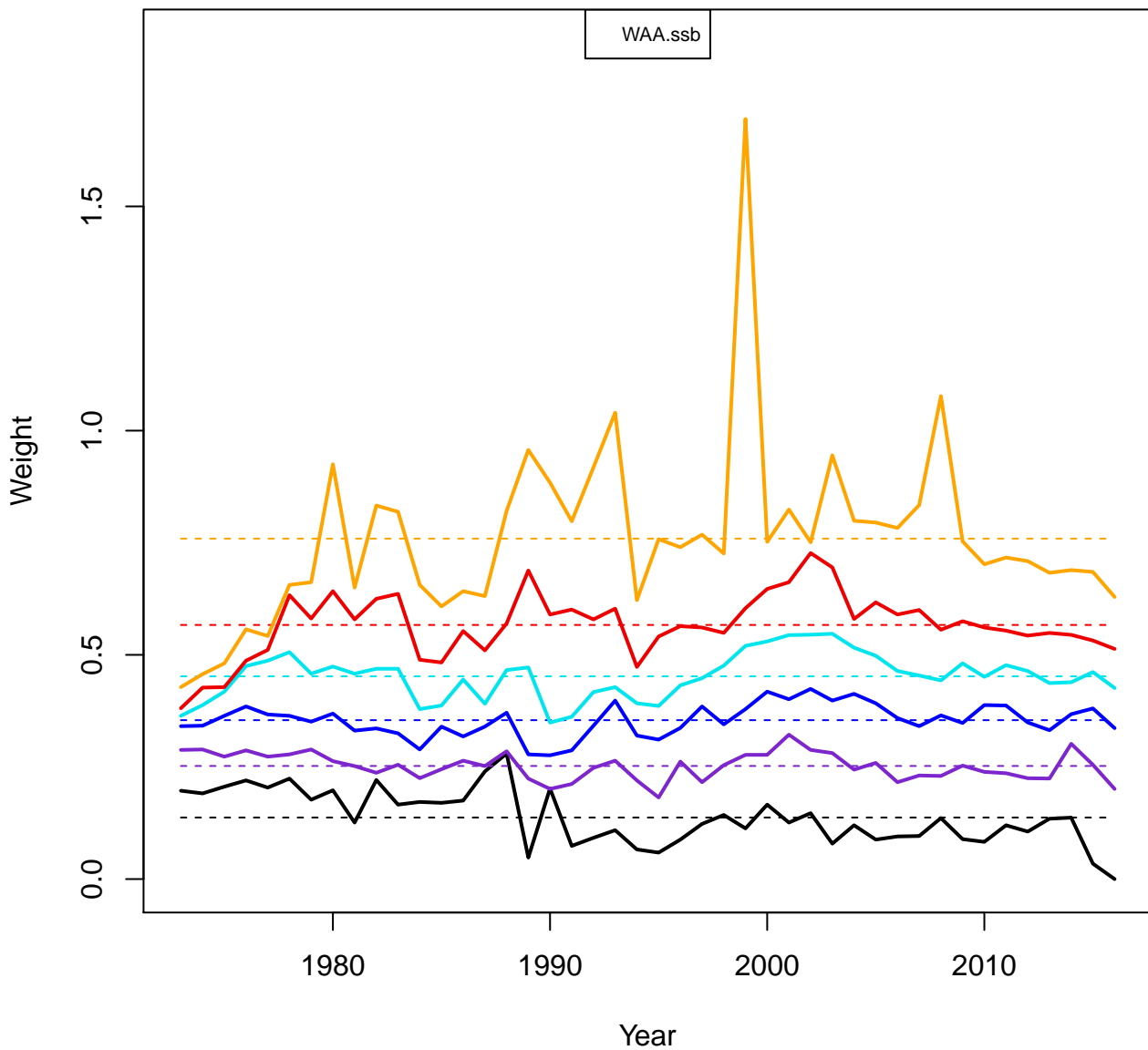
# Age Comps for Index 2 (INDEX-2)



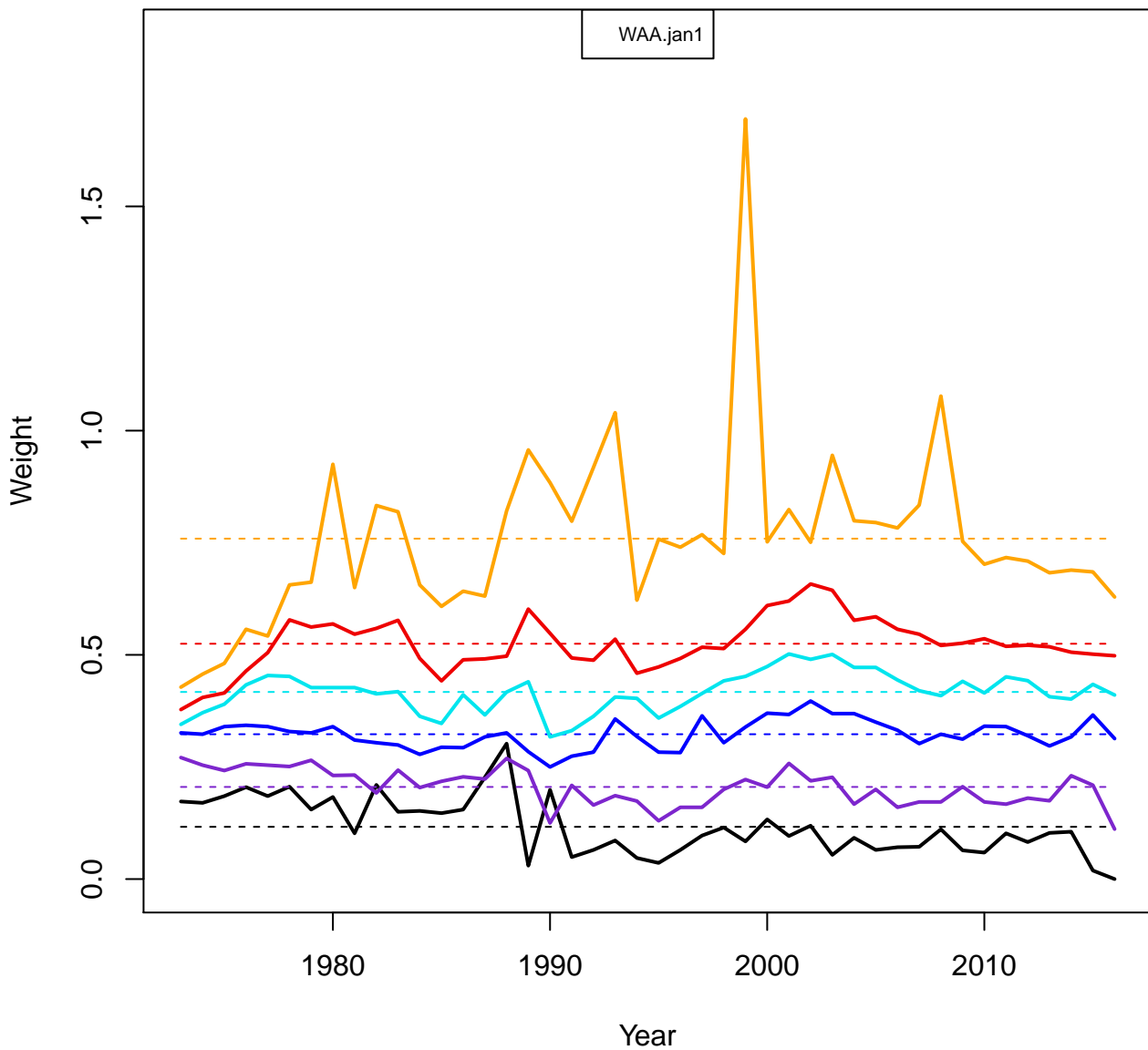
# WAA matrix 1



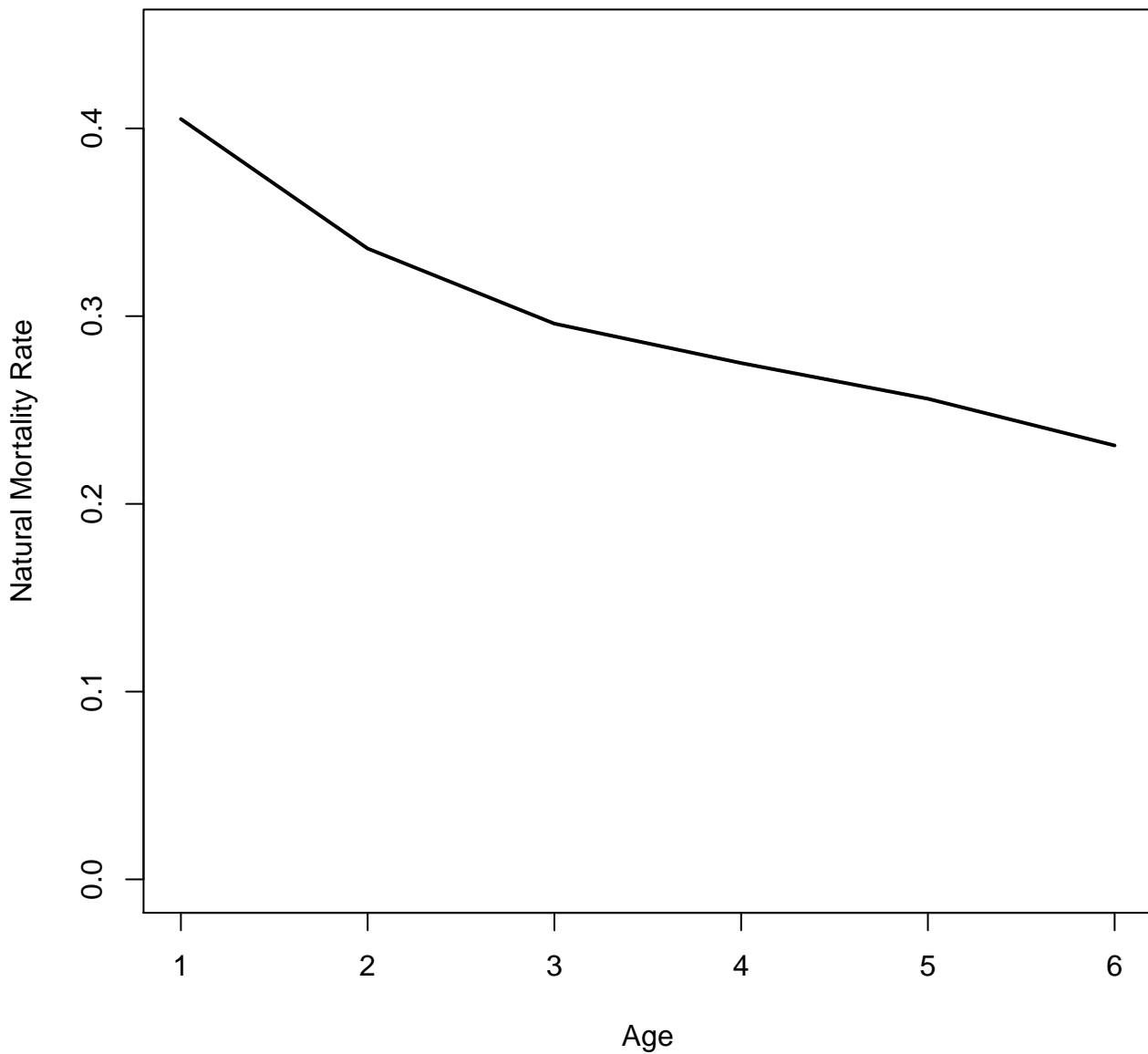
## WAA matrix 2



# WAA matrix 3



**M**





# Maturity

