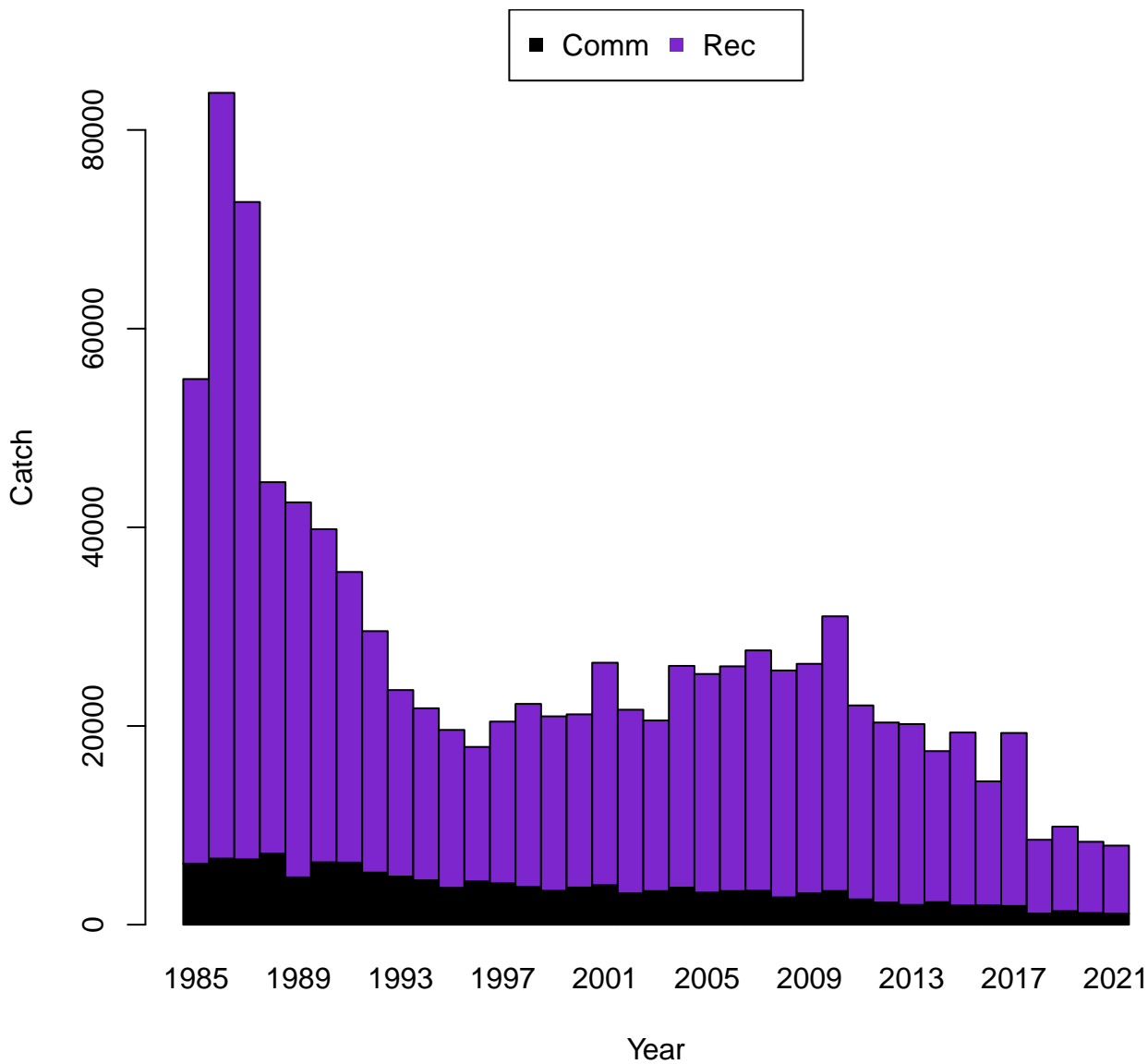
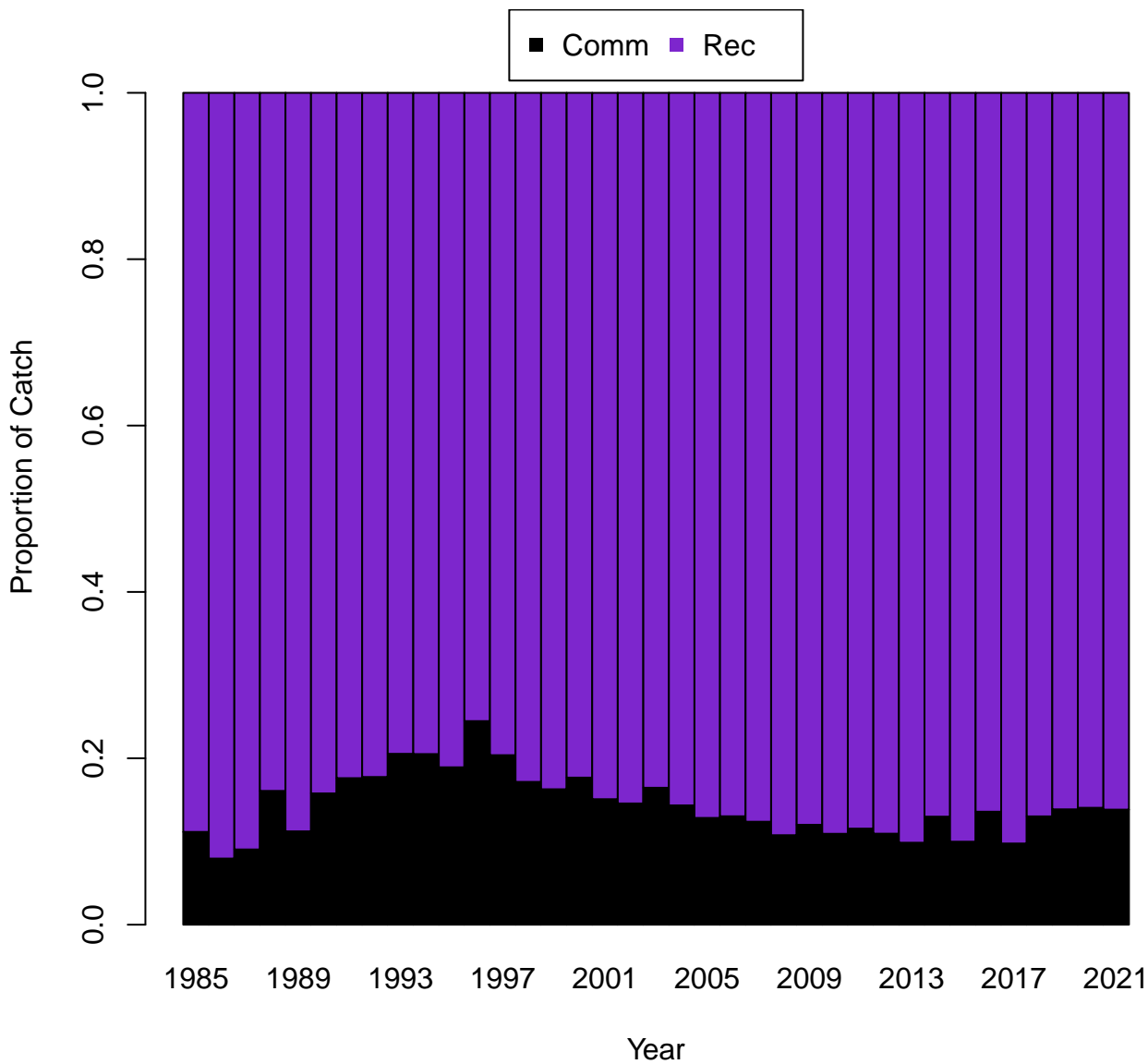


BF19

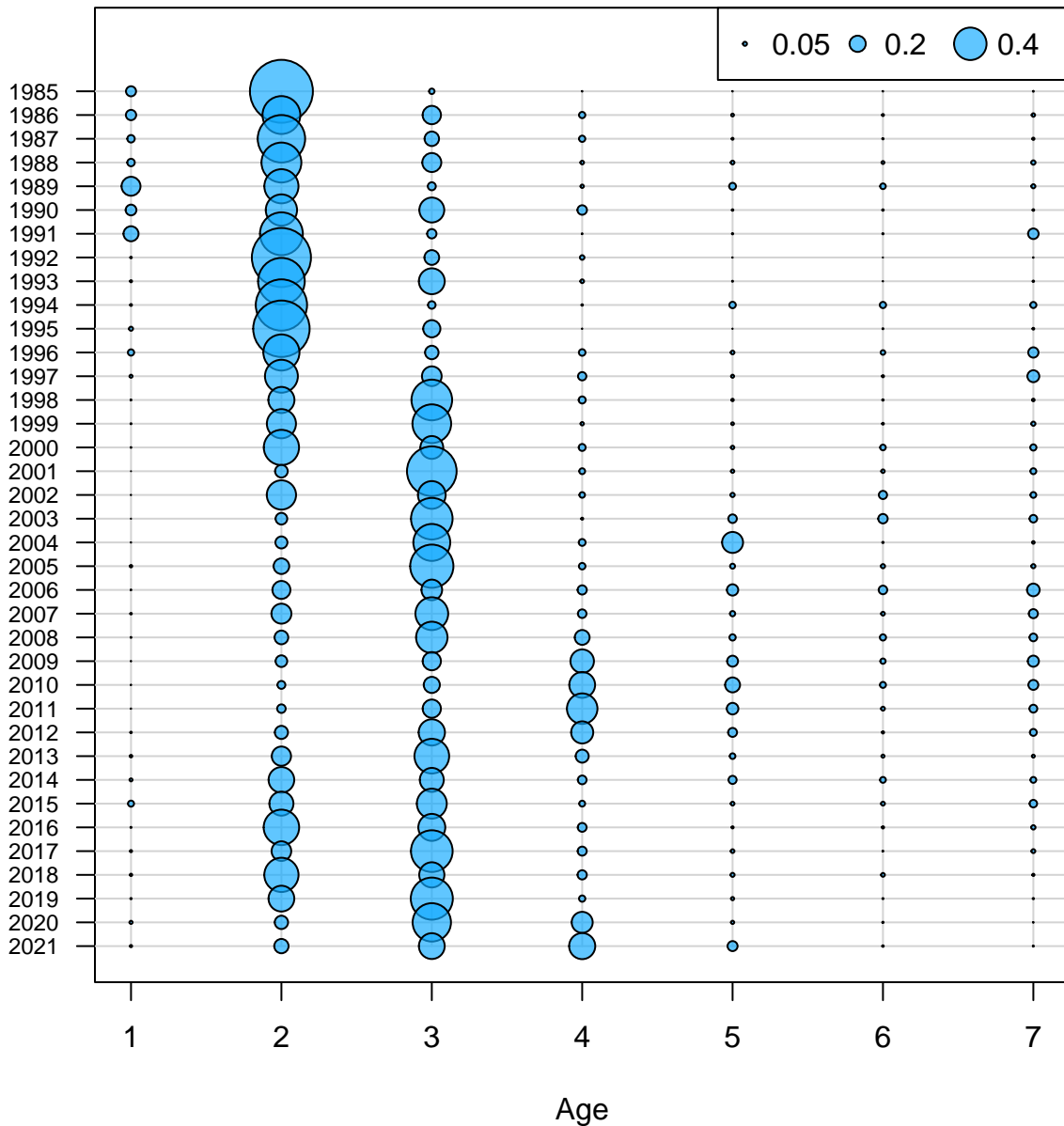
5 fleet selectivity blocks, average F from age 1 to ages 1-2

DATA PLOTS

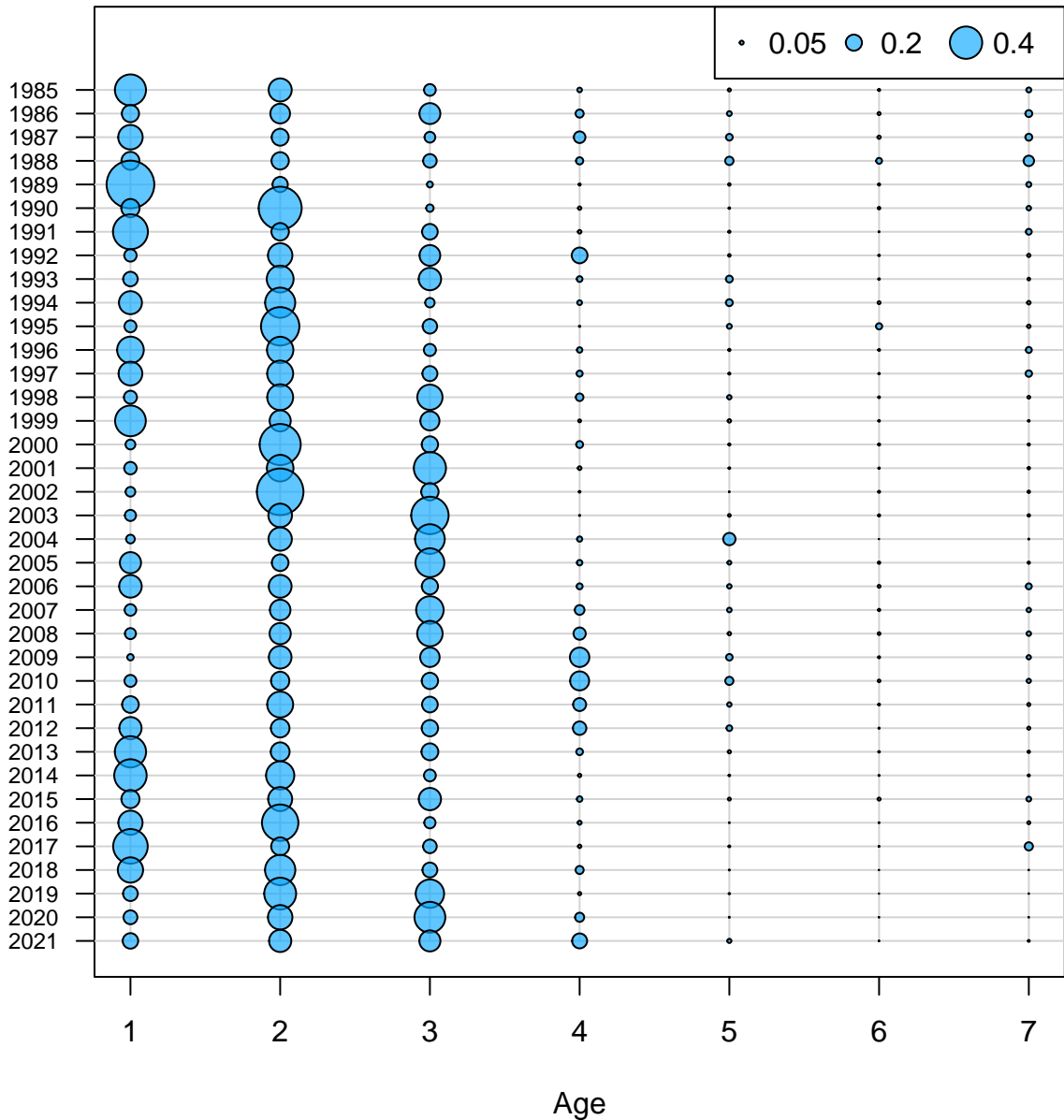


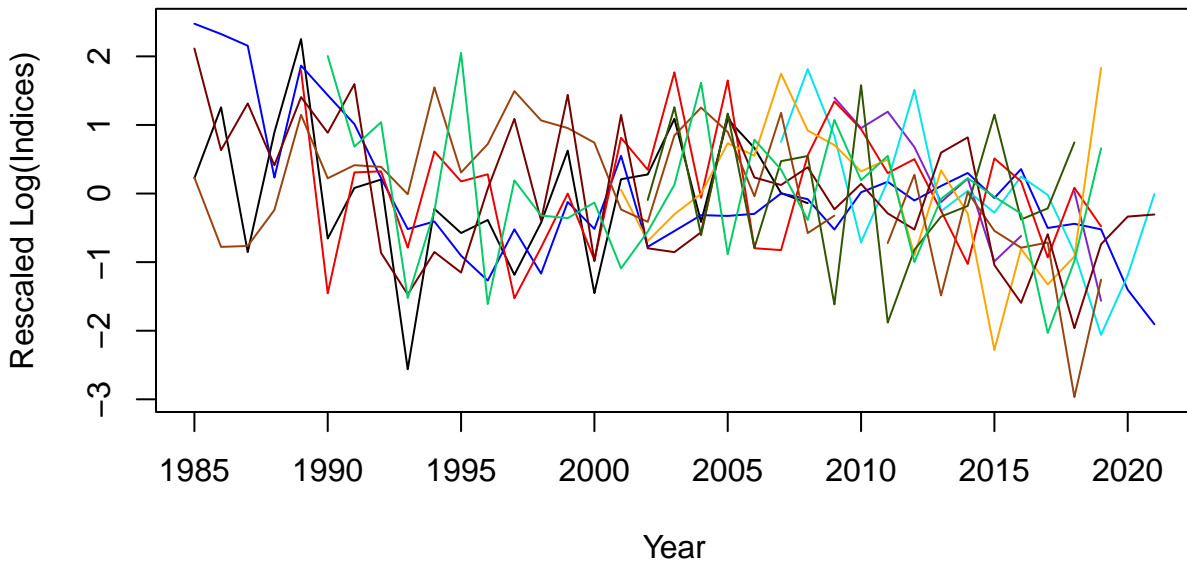
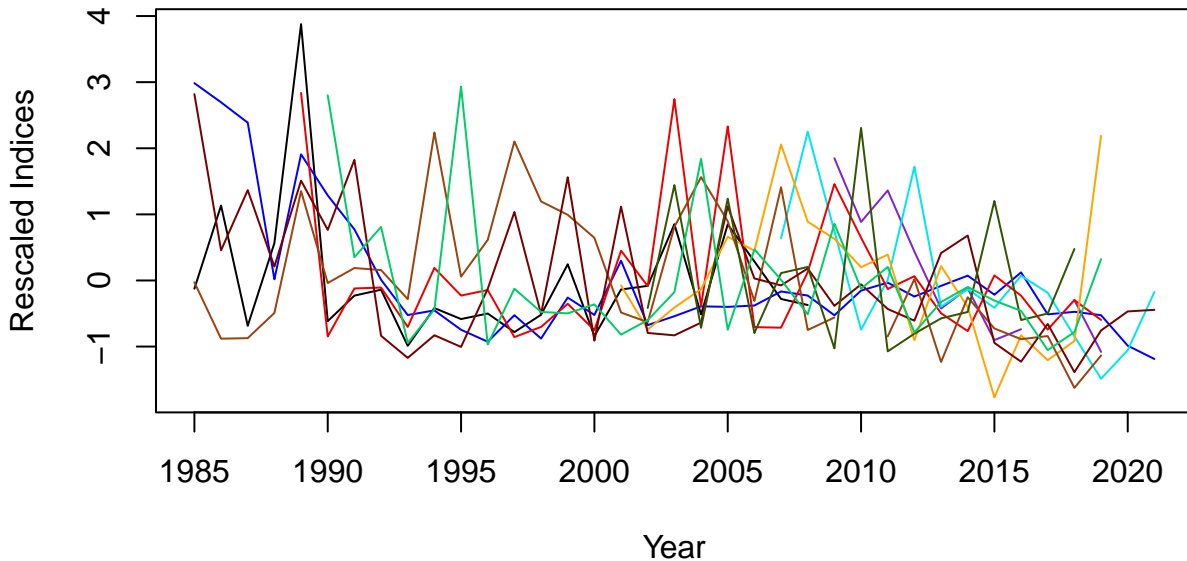


Age Comps for Catch by Fleet 1 (Comm)

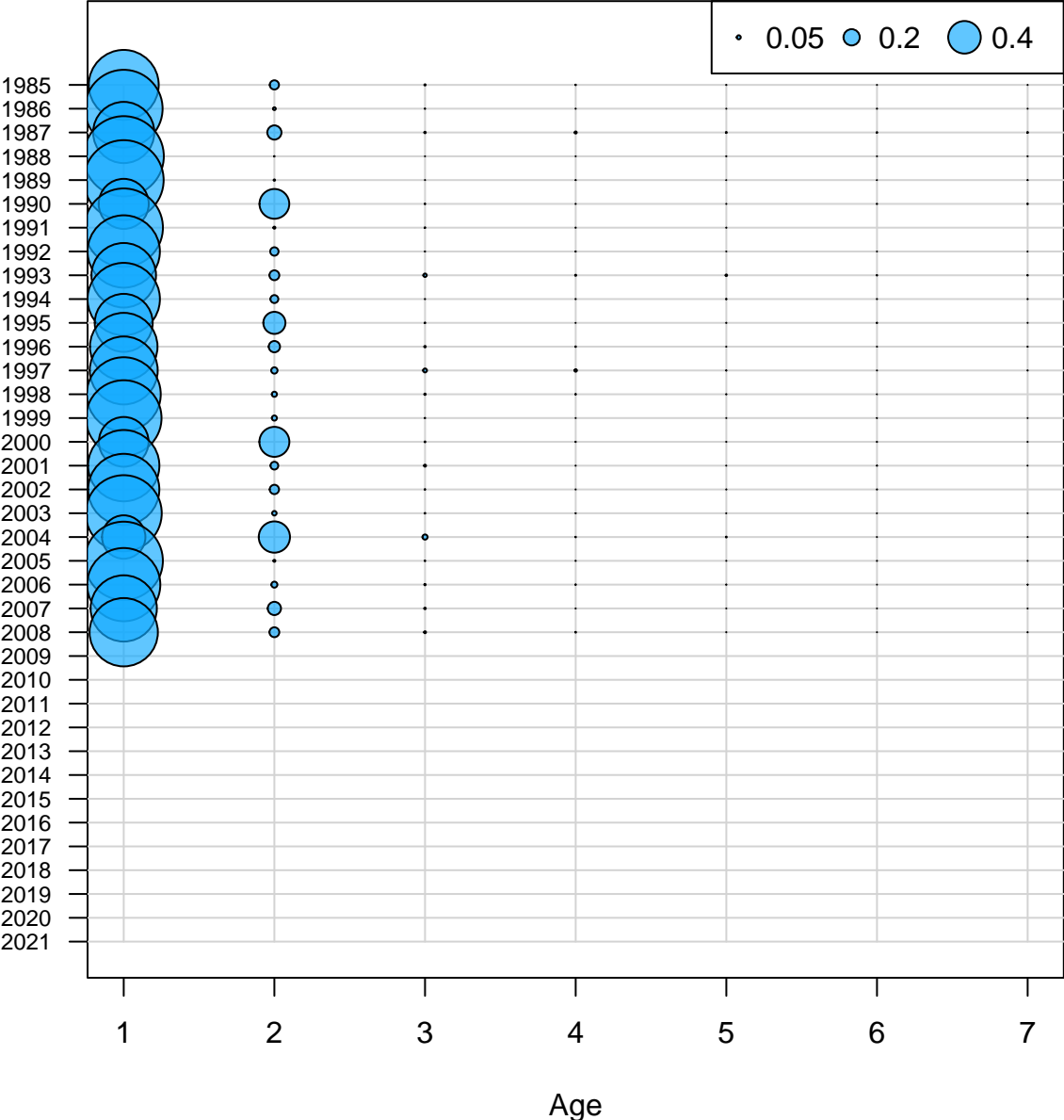


Age Comps for Catch by Fleet 2 (Rec)

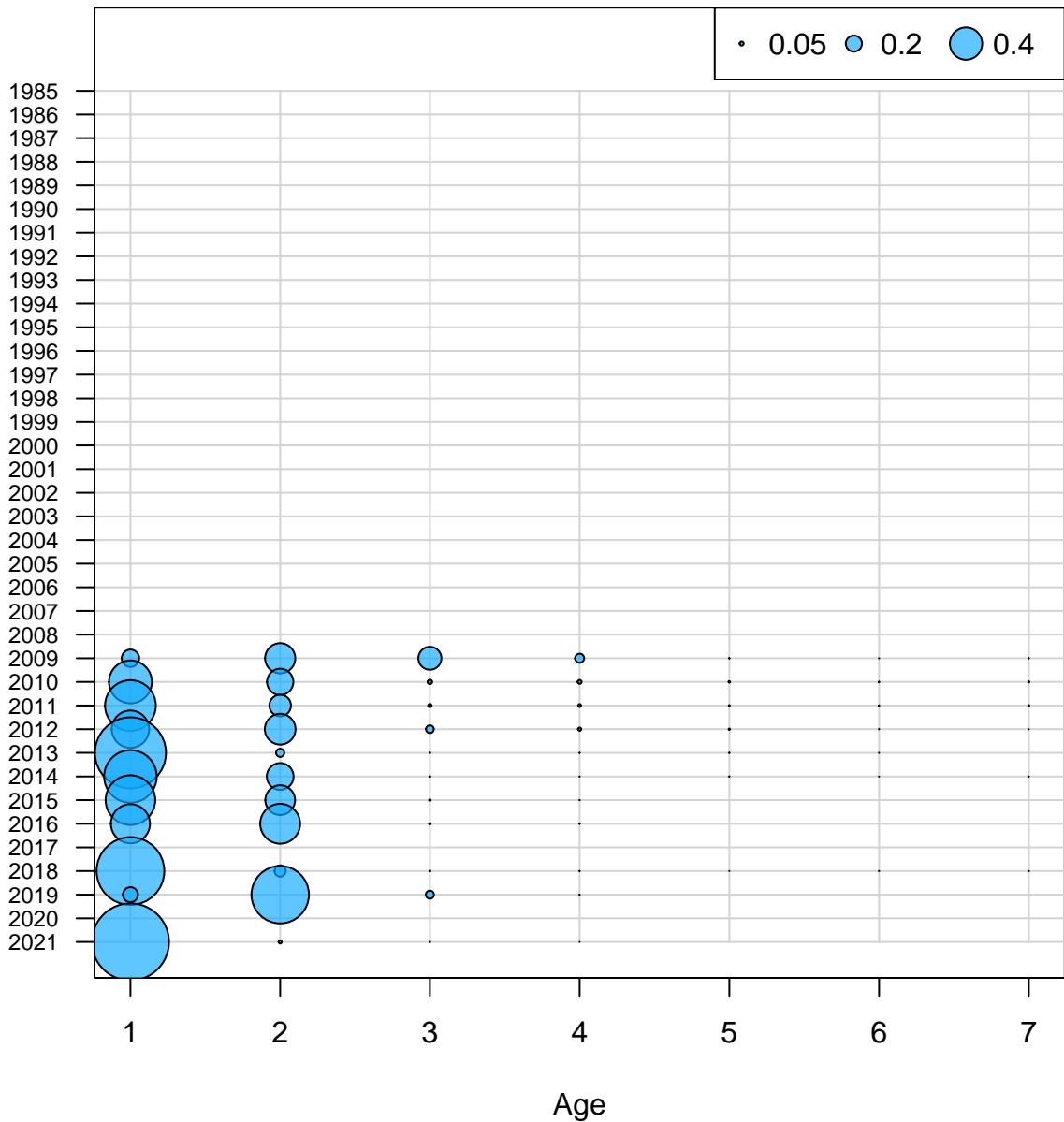




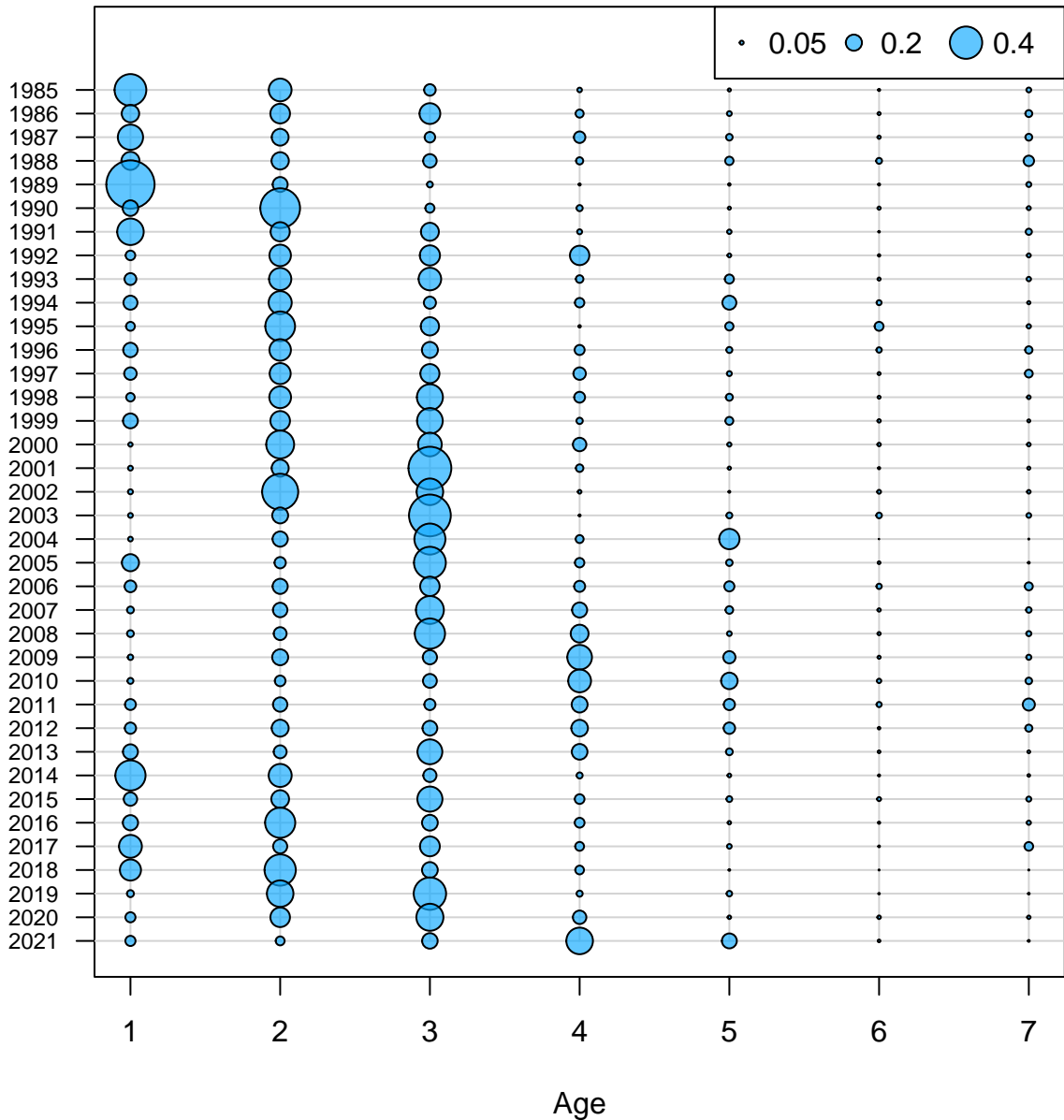
Age Comps for Index 1 (NEFSC Inshore)



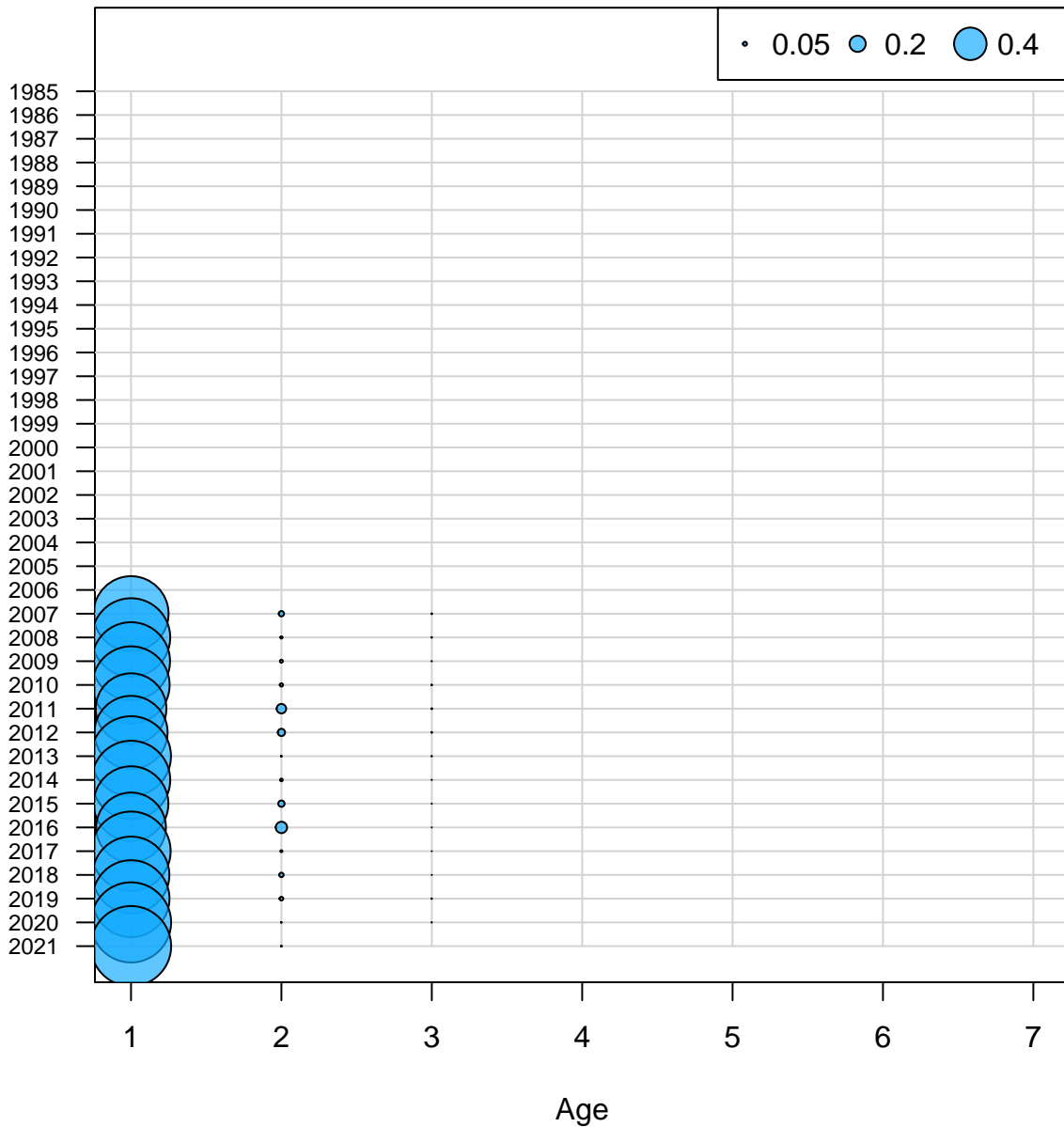
Age Comps for Index 2 (Bigelow)



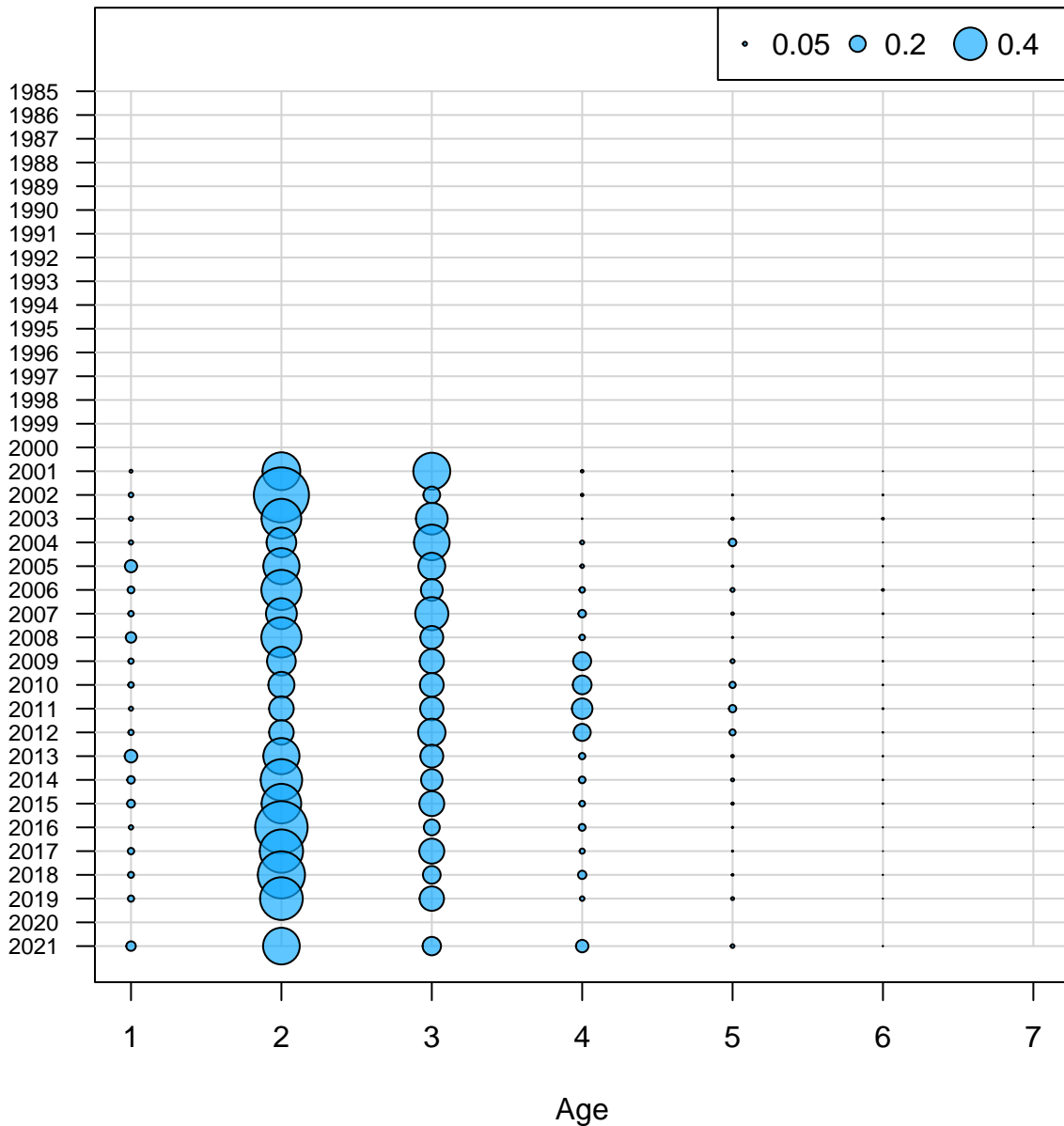
Age Comps for Index 3 (MRIP)



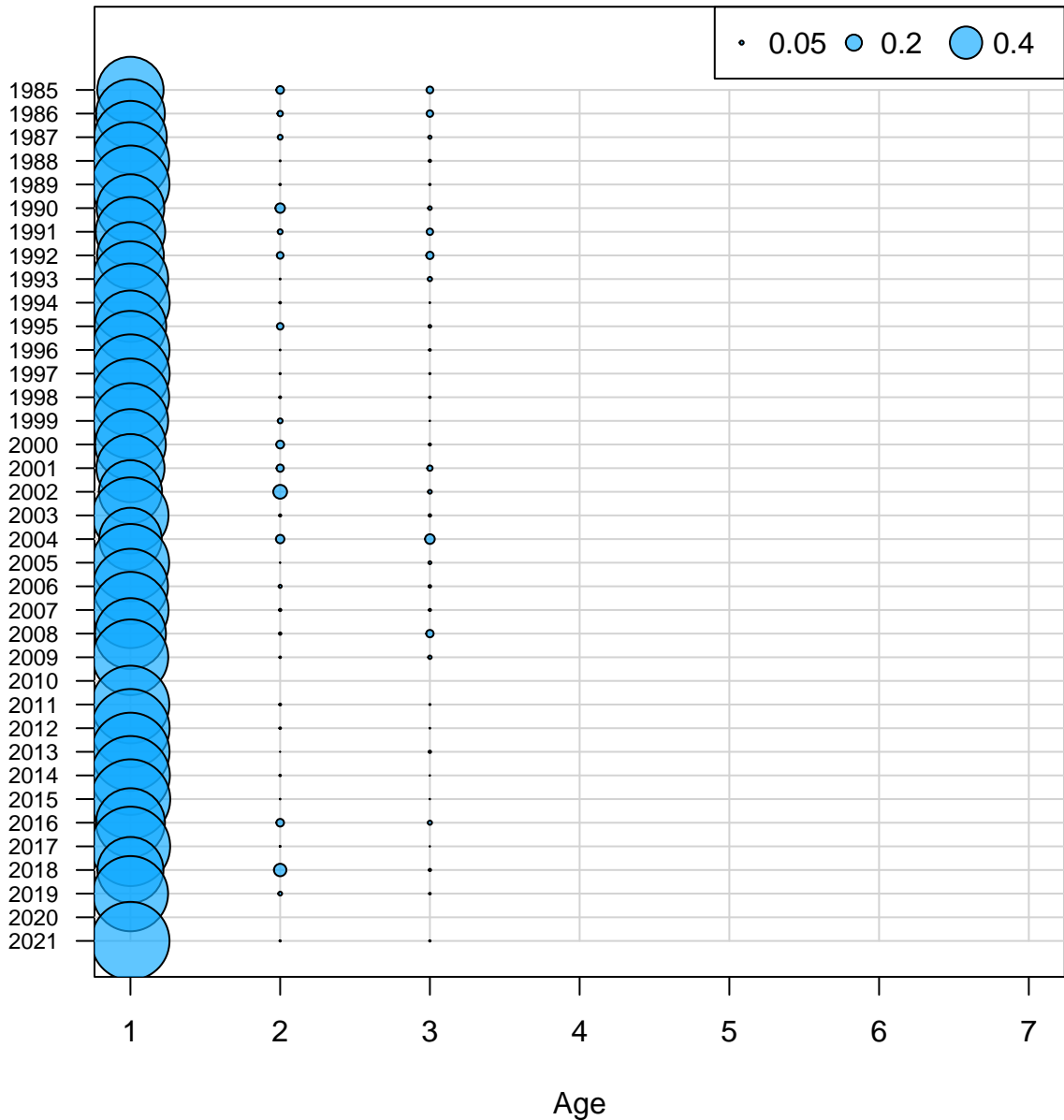
Age Comps for Index 4 (NEAMAP)



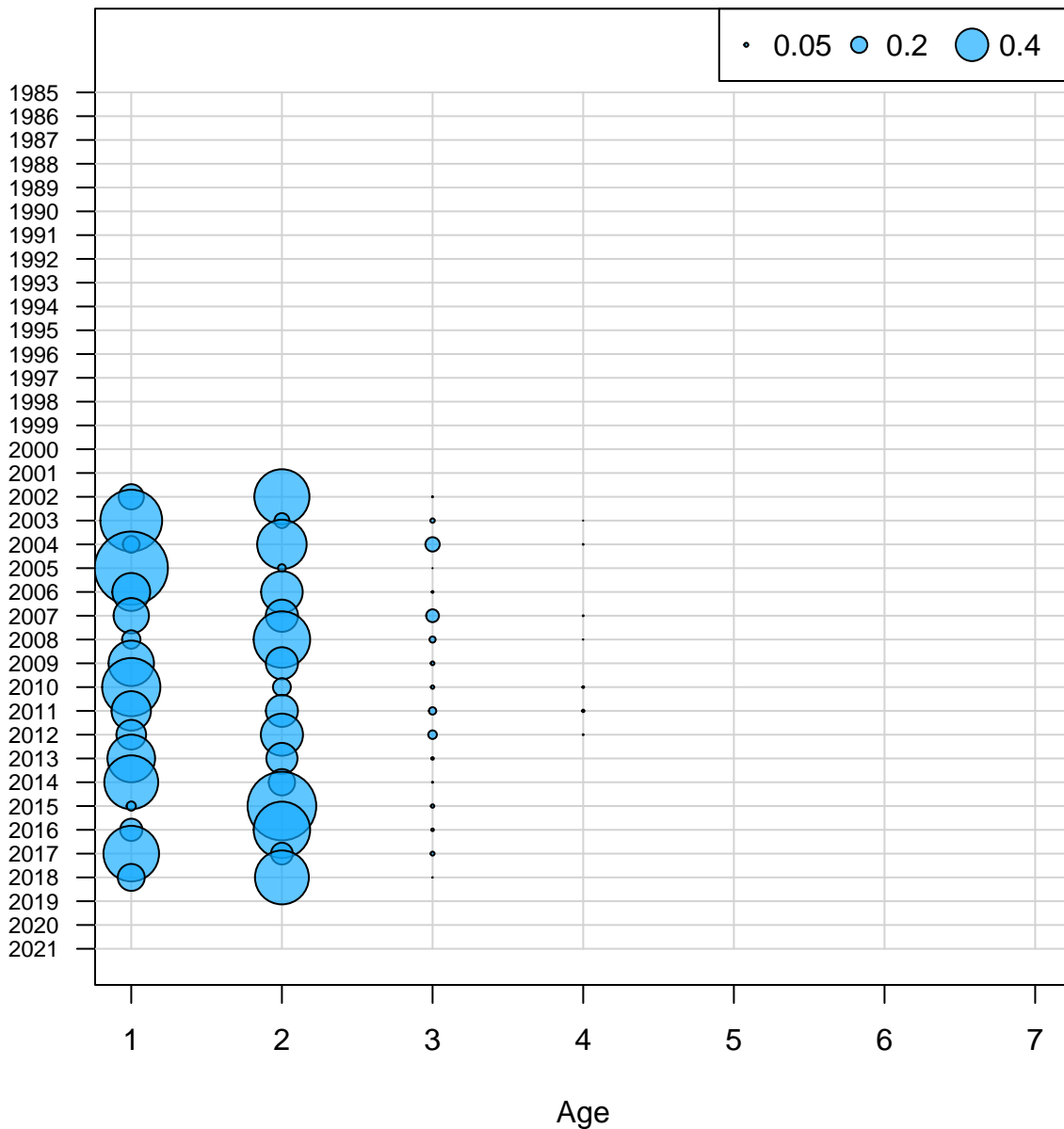
Age Comps for Index 6 (PSIGN)



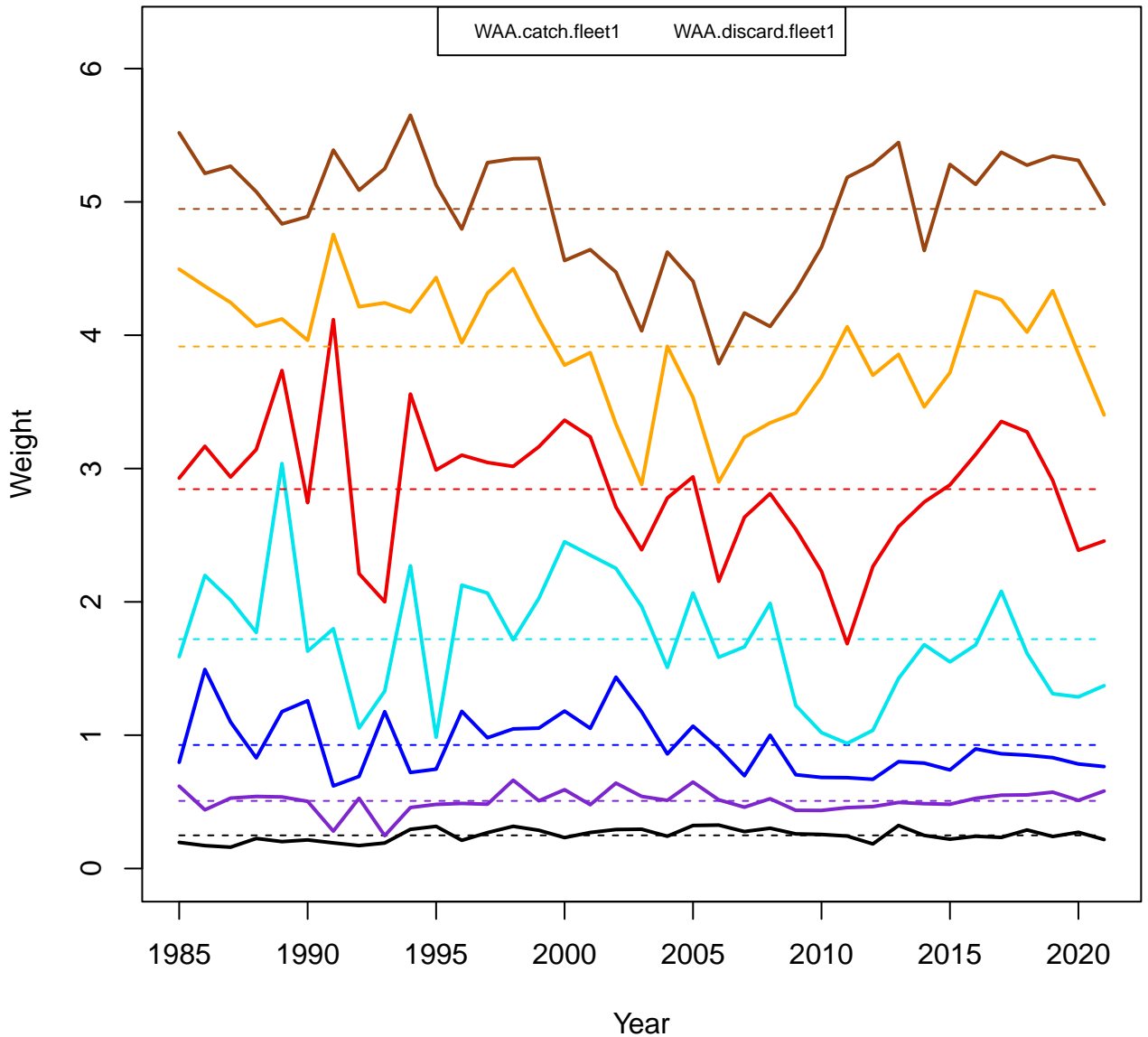
Age Comps for Index 7 (CT Trawl)



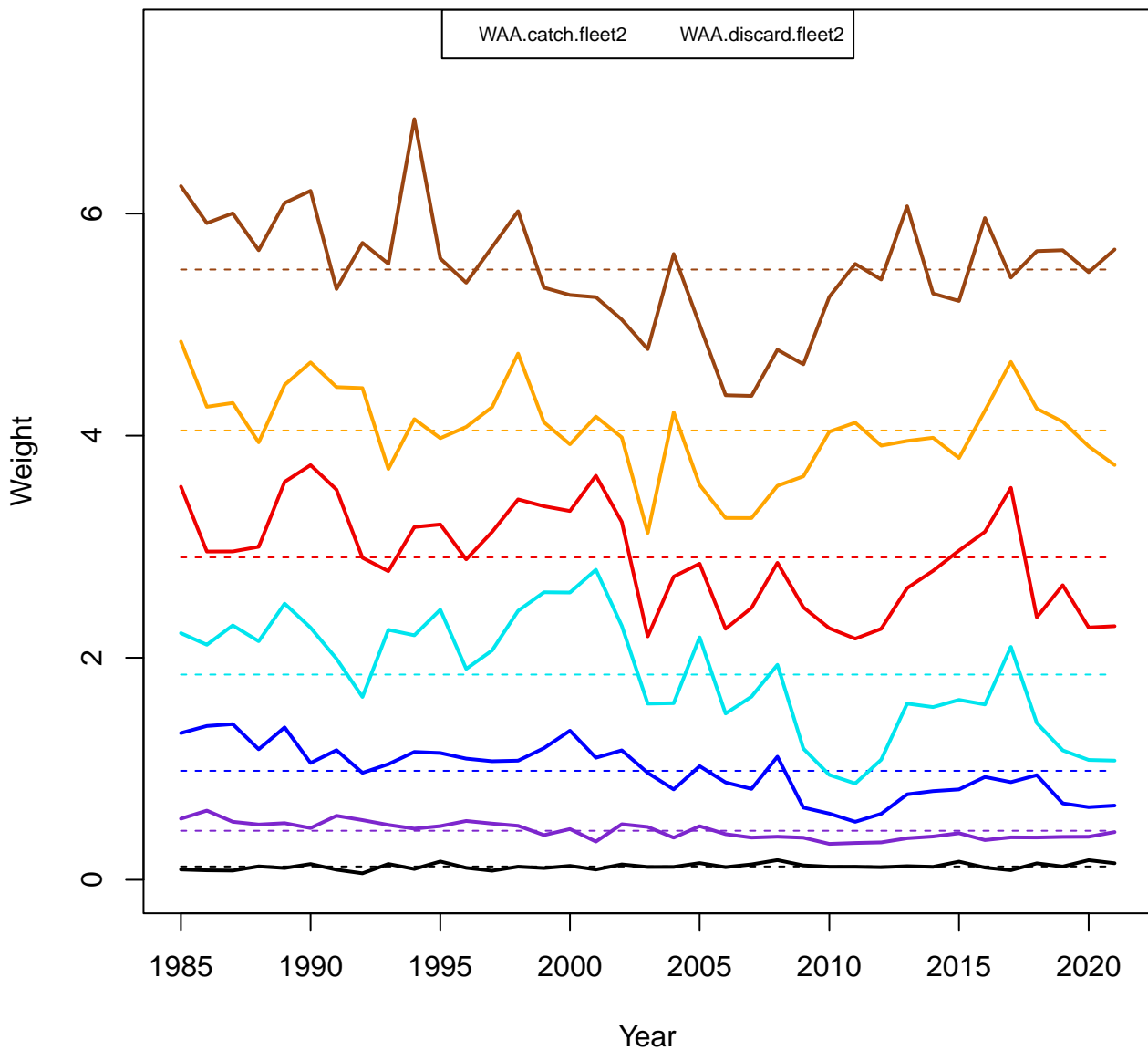
Age Comps for Index 9 (ChesMMAP)



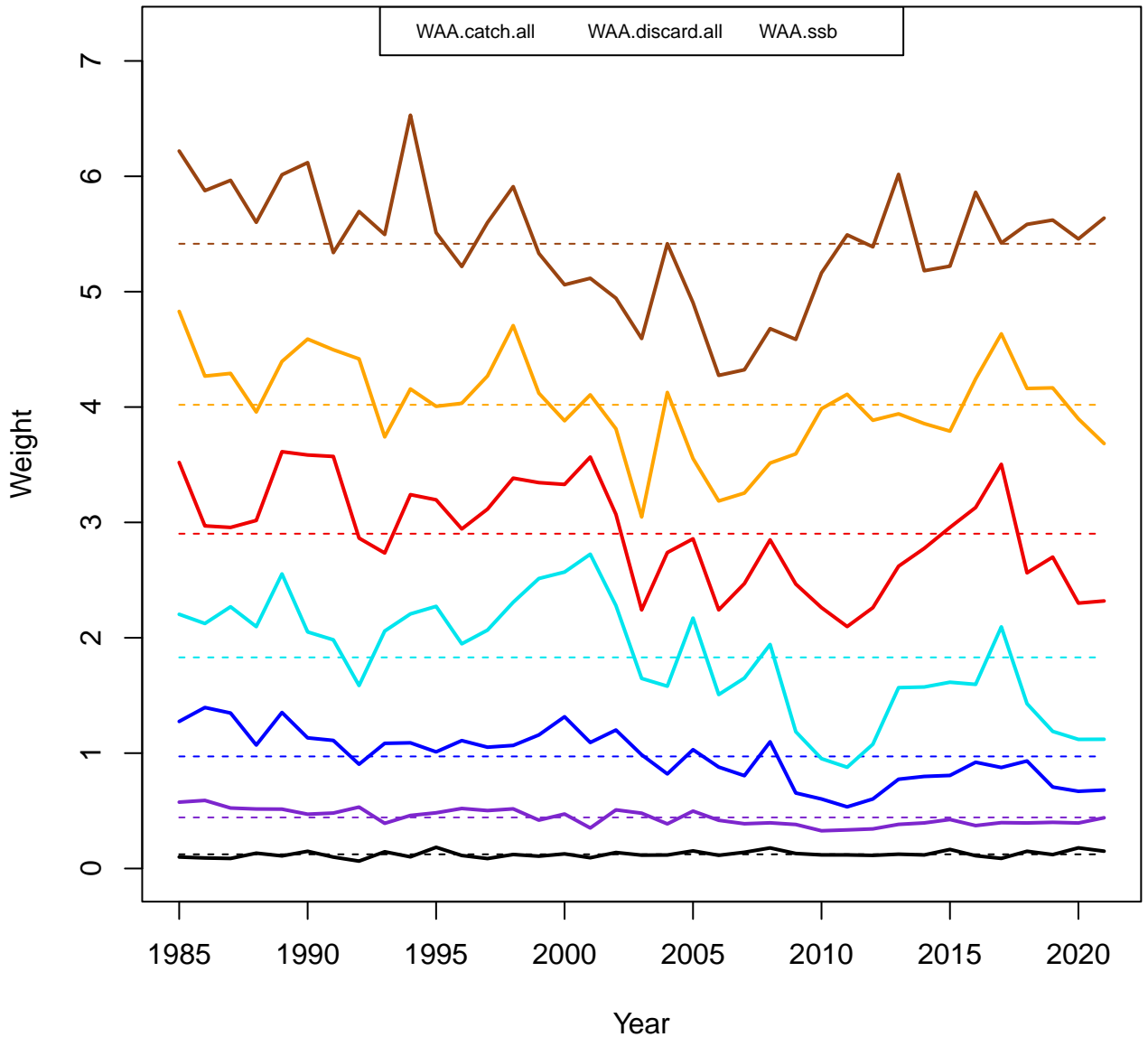
WAA matrix 1



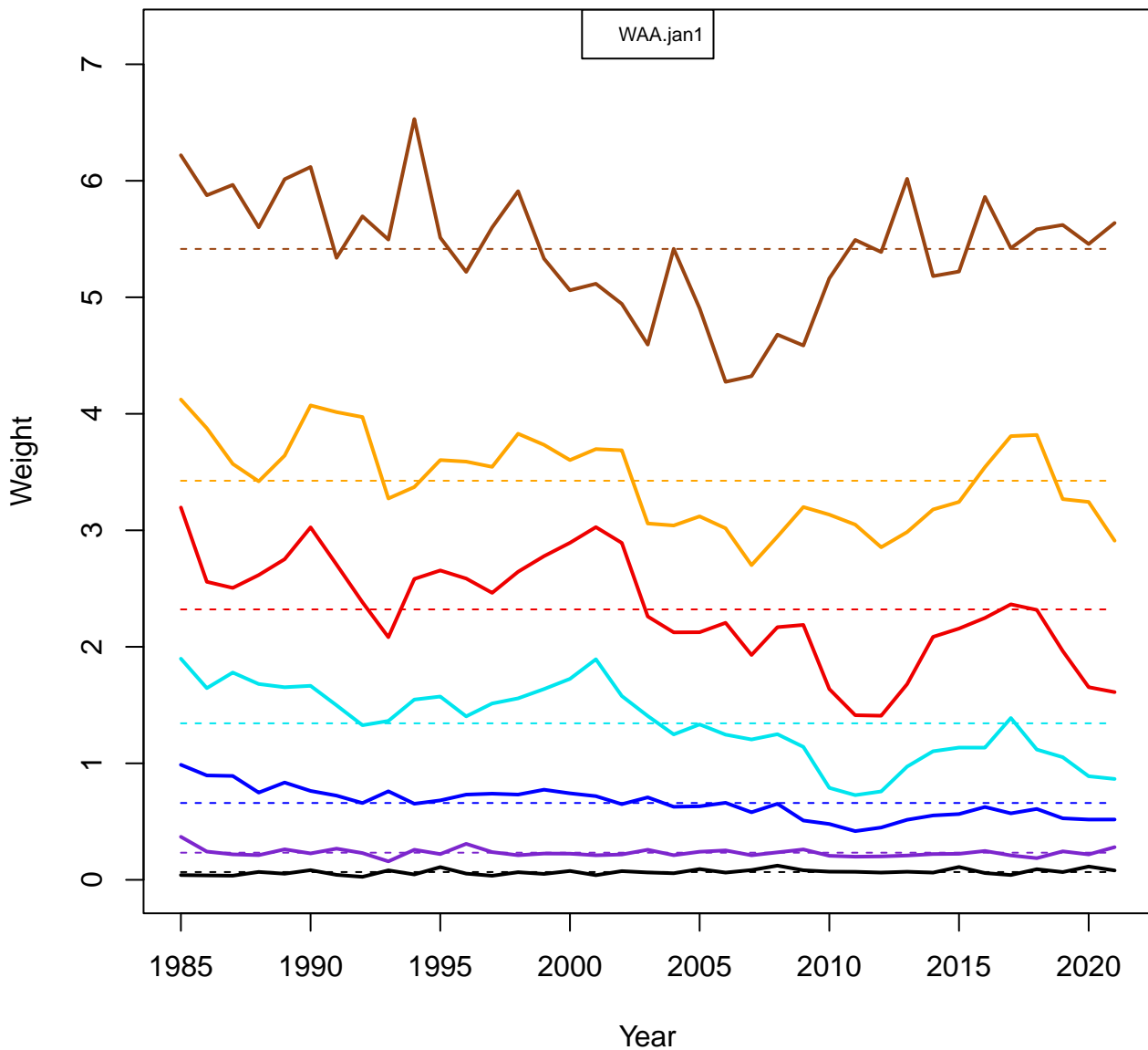
WAA matrix 2



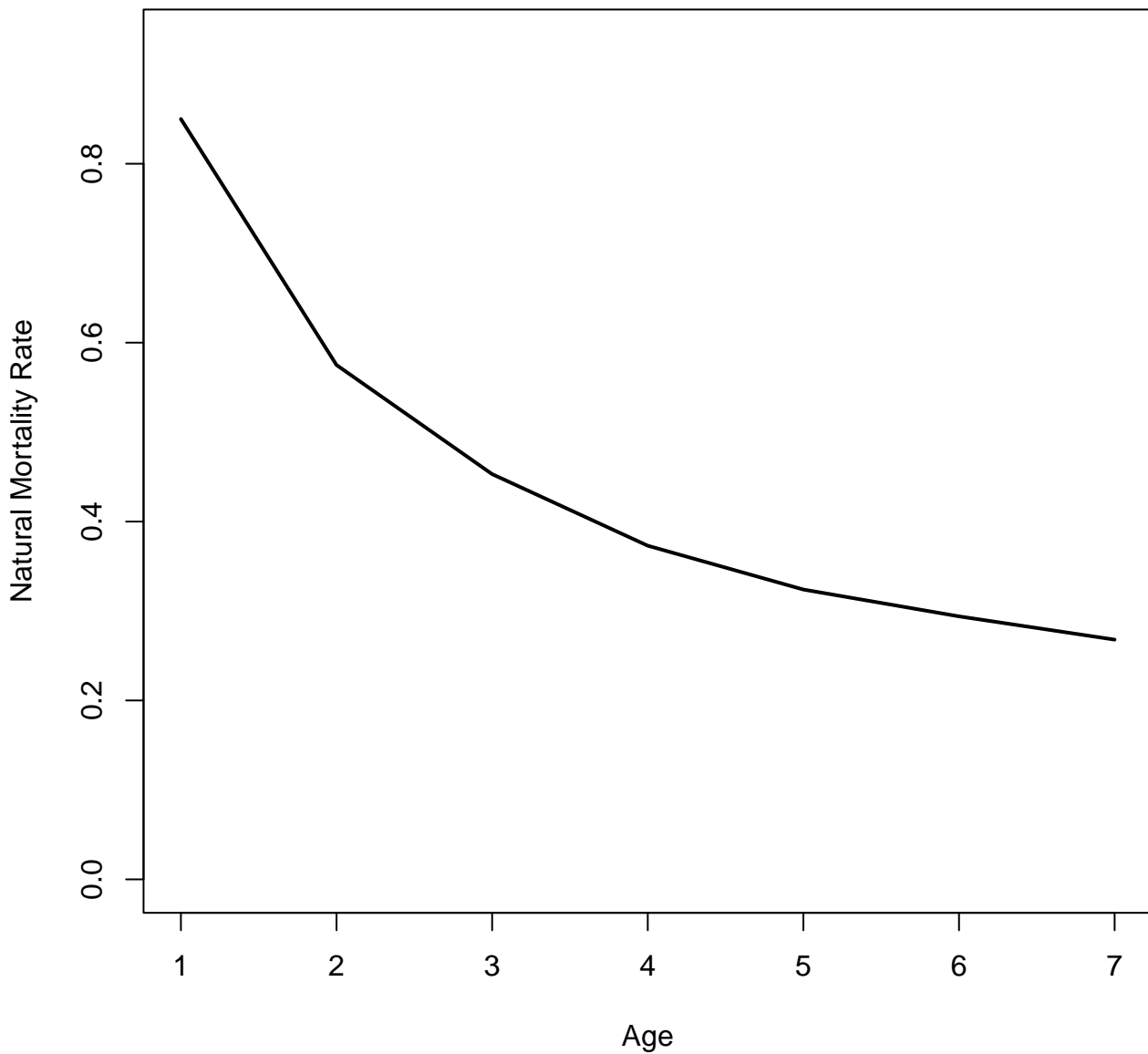
WAA matrix 3



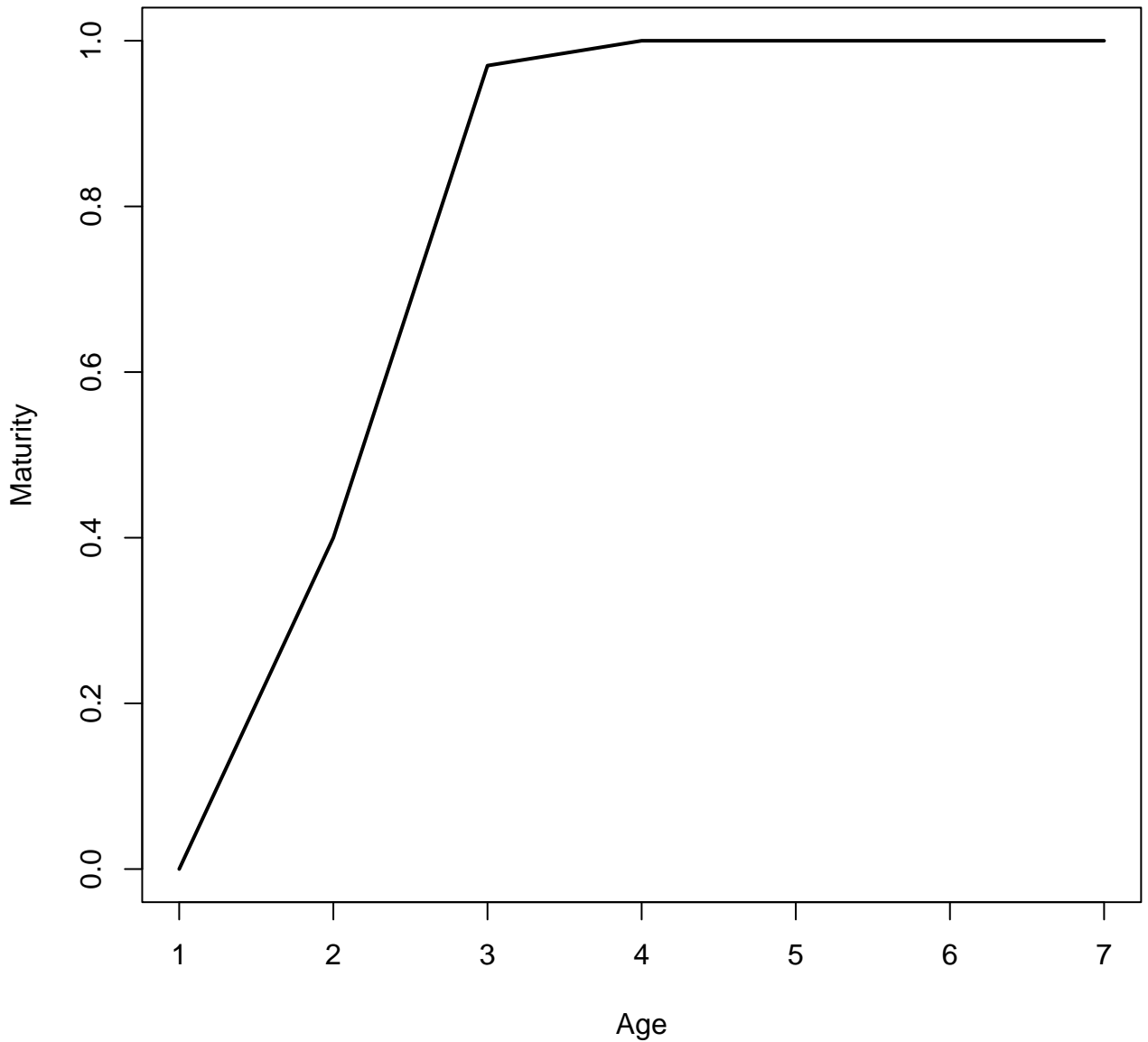
WAA matrix 4



M



Maturity



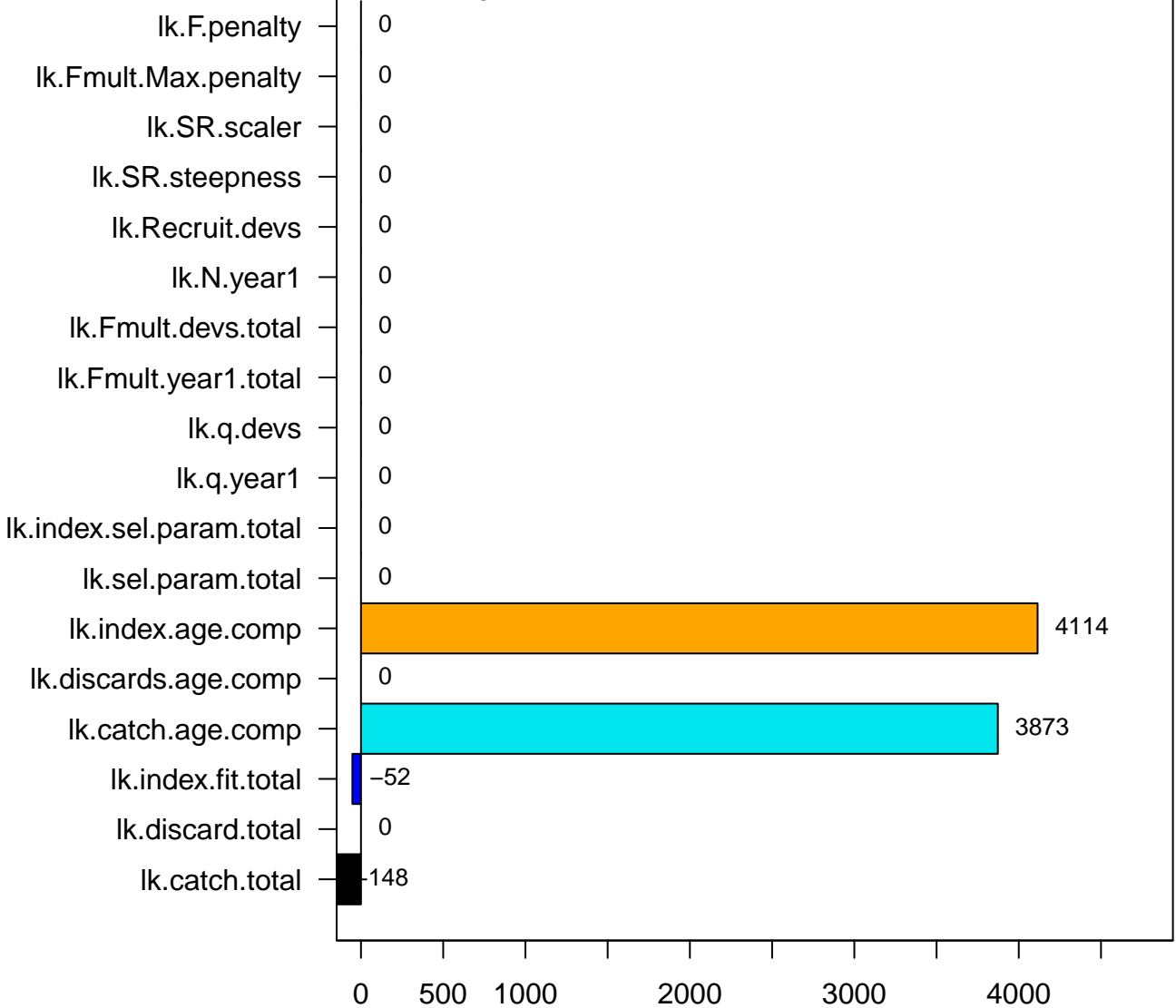
BF19

5 fleet selectivity blocks, average F from age 1 to ages 1-2

DIAGNOSTIC PLOTS

Components of Obj. Function (7787), npar=178

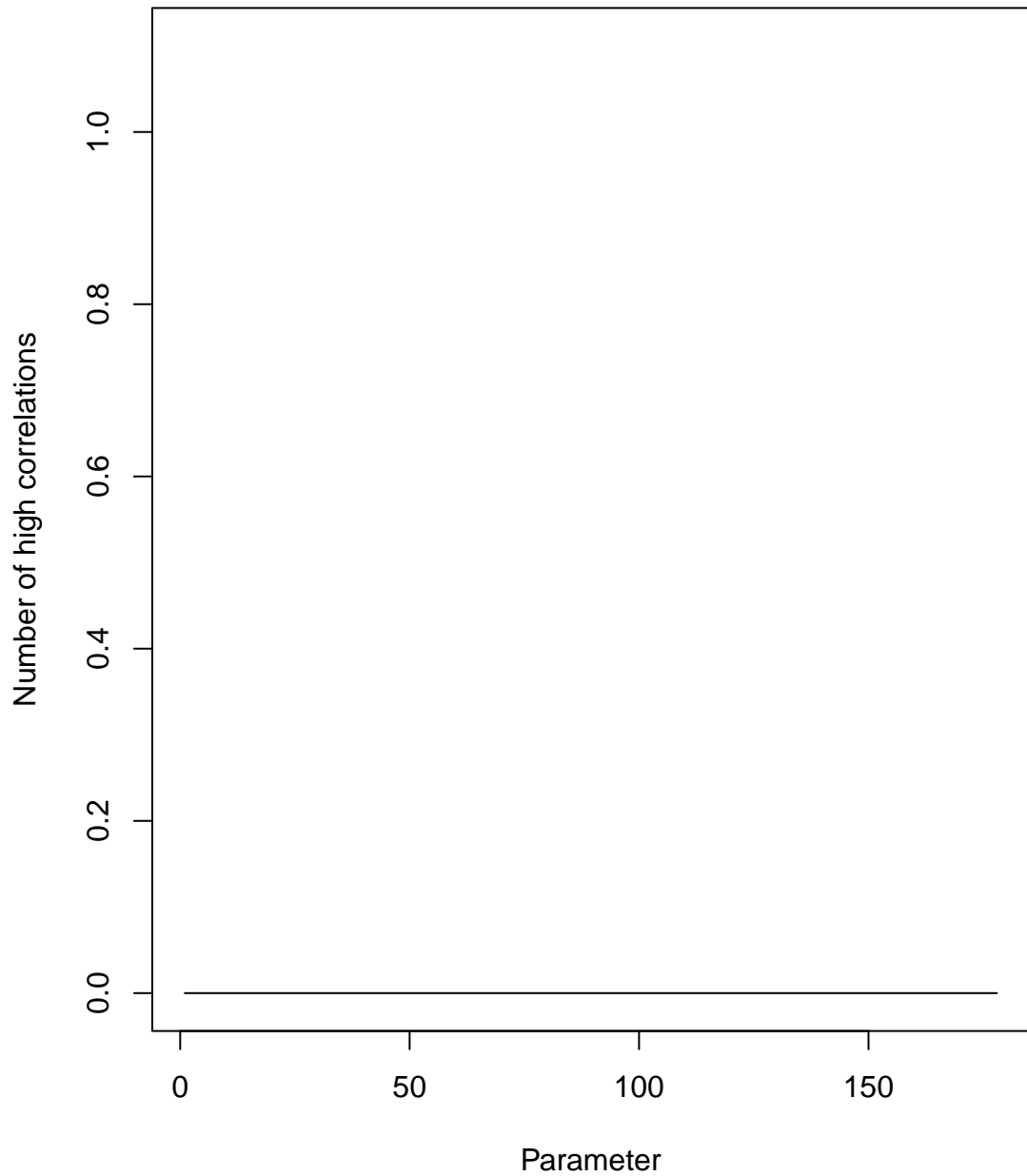
Maximum gradient = 3.8×10^{-5}

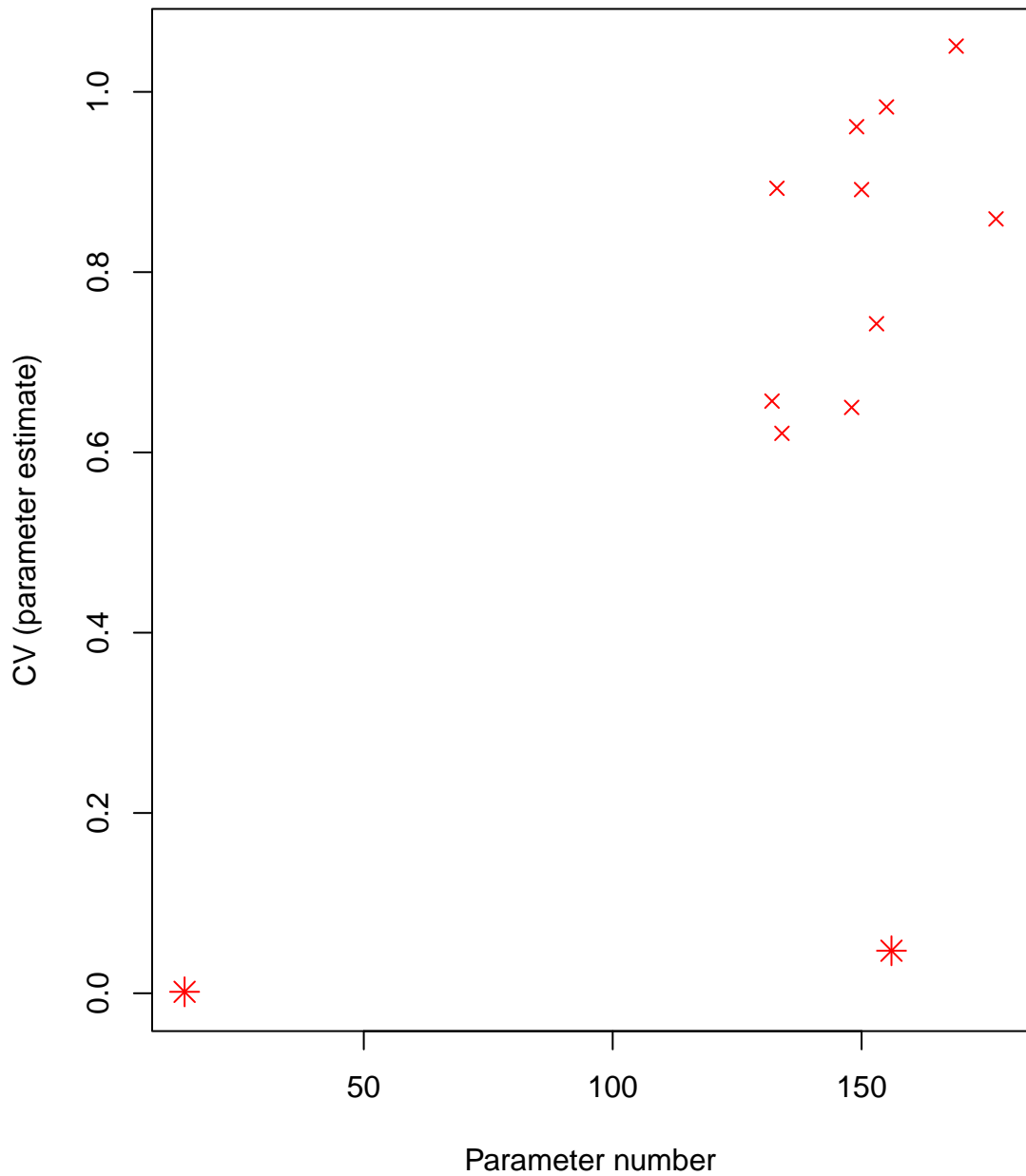


Likelihood Contribution

Model: BF19

Tuesday, 18 Oct 2022 at 18:05:05

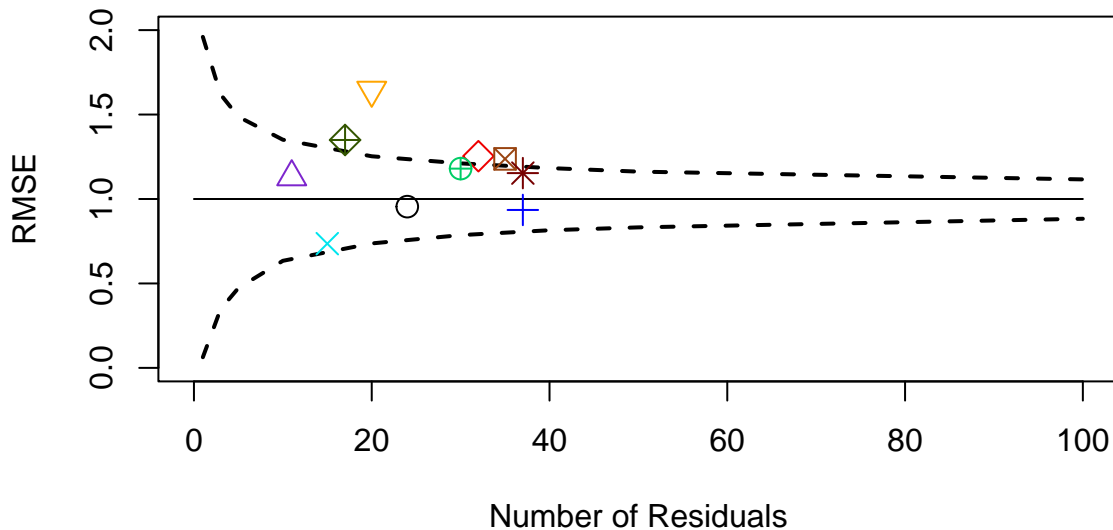




Root Mean Square Error computed from Standardized Residuals

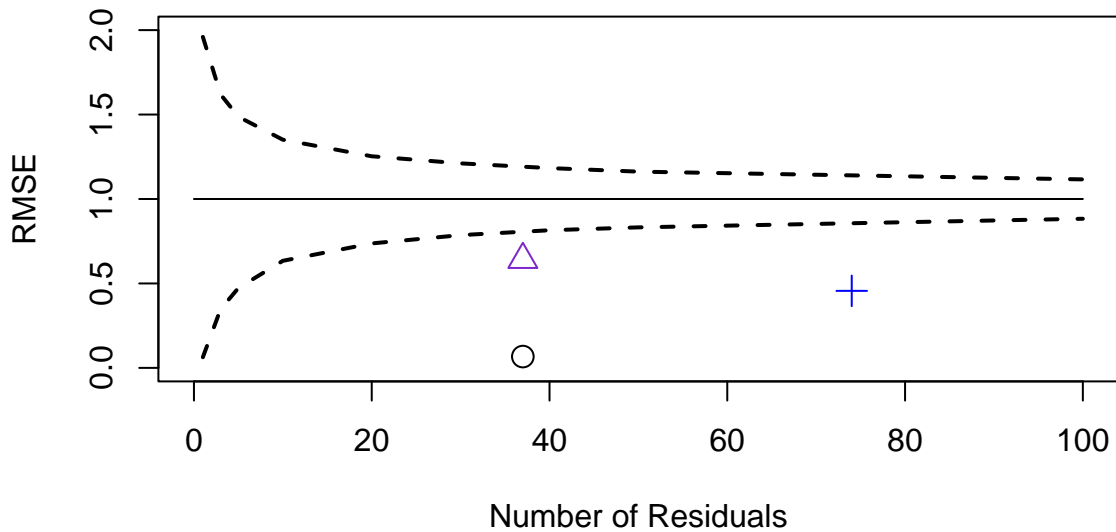
Component	# resids	RMSE
catch.fleet1	37	0.067
catch.fleet2	37	0.641
catch.tot	74	0.456
discard.fleet1	0	0
discard.fleet2	0	0
discard.tot	0	0
ind01	24	0.955
ind02	11	1.13
ind03	37	0.935
ind04	15	0.735
ind05	32	1.25
ind06	20	1.64
ind07	35	1.24
ind08	37	1.15
ind09	17	1.35
ind10	30	1.18
ind.total	258	1.18
N.year1	0	0
Fmult.year1	0	0
Fmult.devs.fleet1	0	0
Fmult.devs.fleet2	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



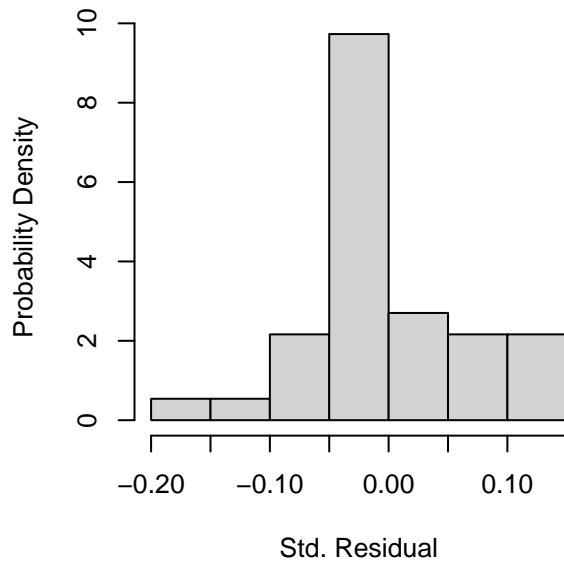
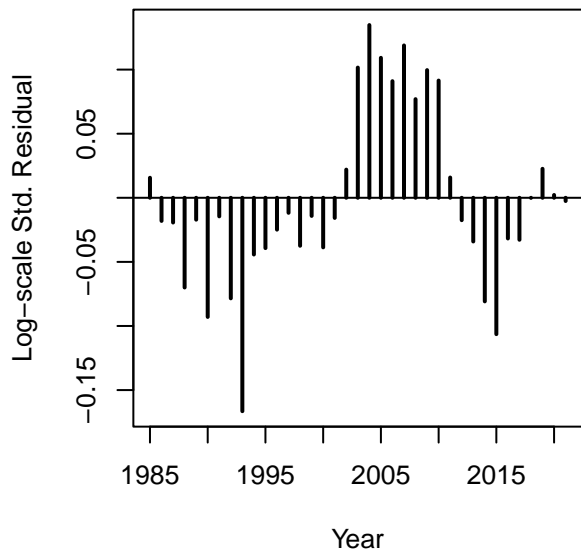
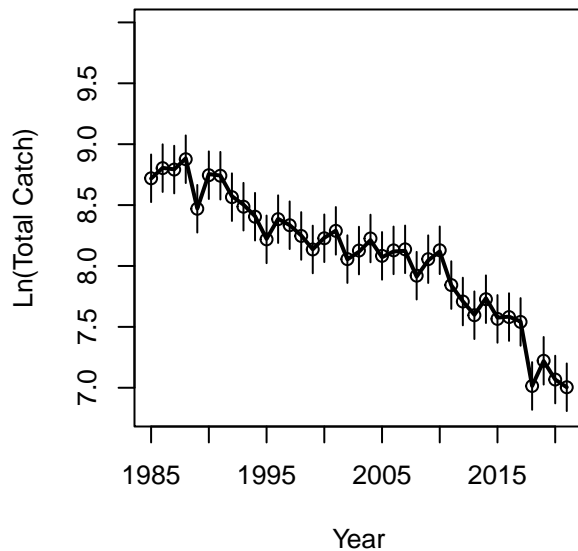
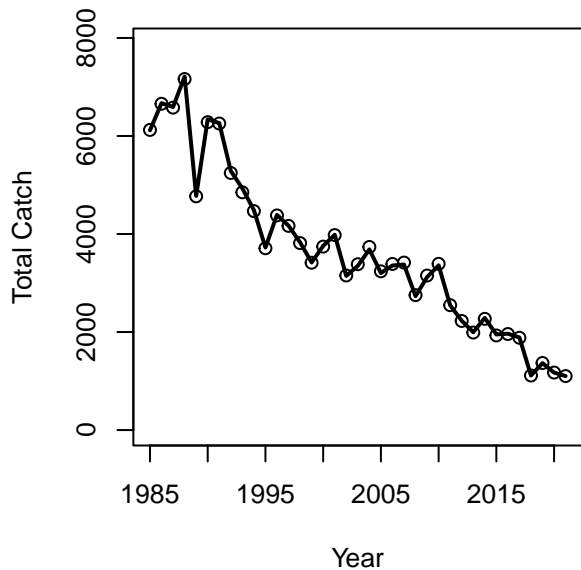
- ind.total
- SEAMAP1
- ChesMMA
- Compound YOY
- OCTrawl
- SSIGN
- NEAMAP
- MRIP
- Bigelow
- NEFSC Inshore

Root Mean Square Error for Catch

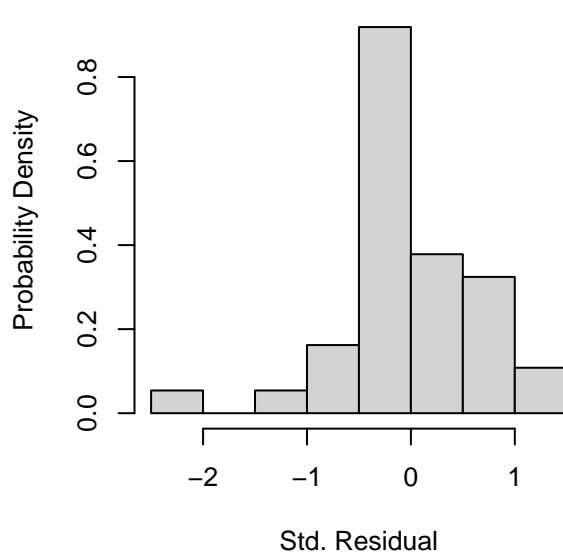
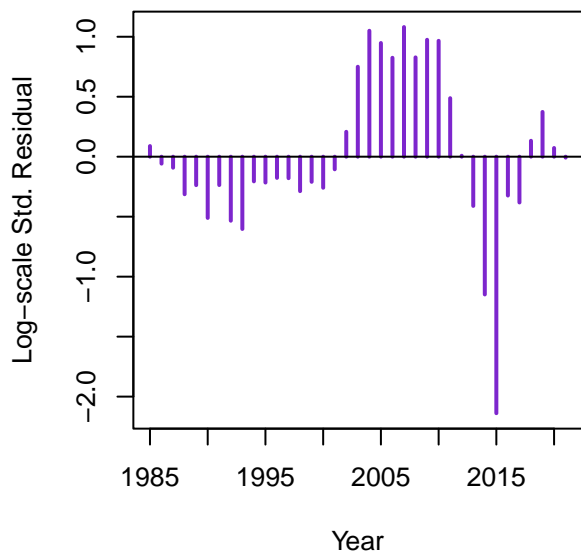
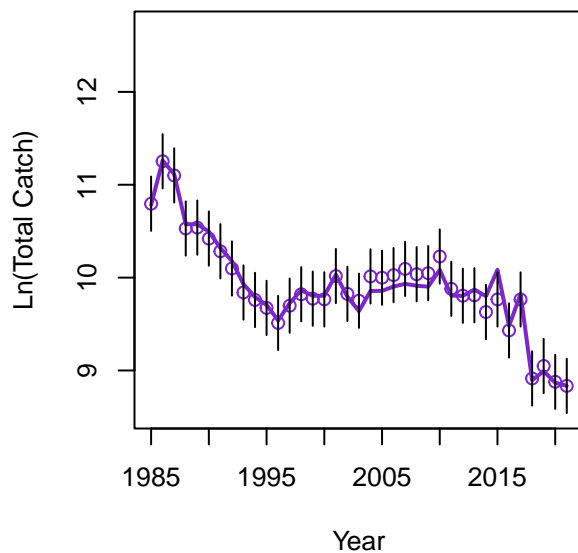
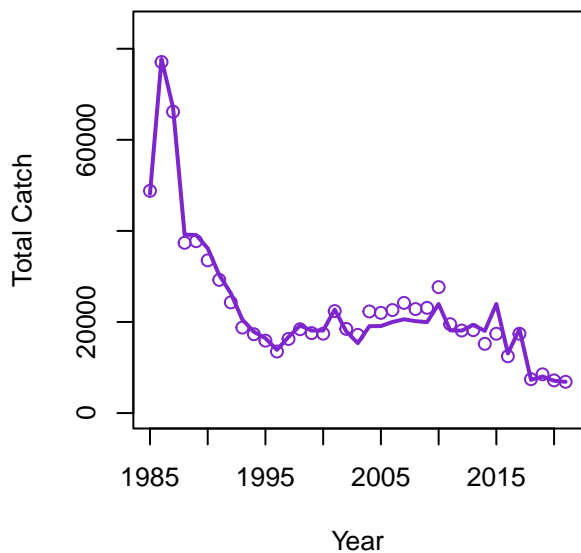


+ `catch.tot`
△ `catch.fleet2`
○ `catch.fleet1`

Fleet 1 Catch (Comm)



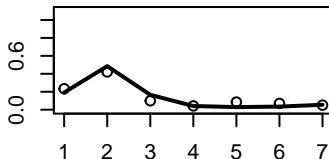
Fleet 2 Catch (Rec)



Catch

Year = 1989

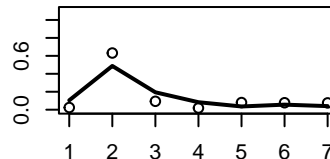
Proportion at Age



Age

Year = 1994

Proportion at Age

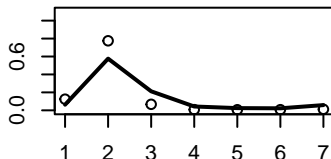


Age

Fleet 1
Comm
↓

Year = 1985

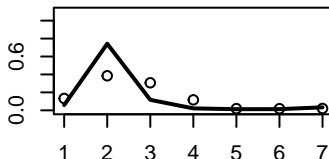
Proportion at Age



Age

Year = 1990

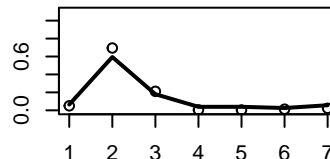
Proportion at Age



Age

Year = 1995

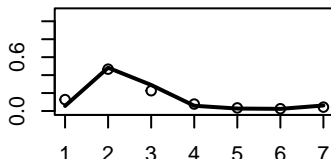
Proportion at Age



Age

Year = 1986

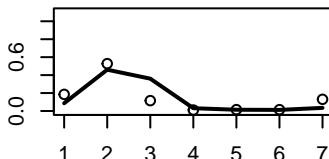
Proportion at Age



Age

Year = 1991

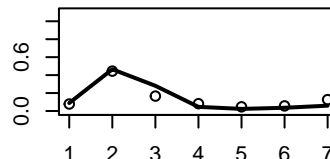
Proportion at Age



Age

Year = 1996

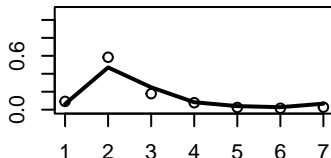
Proportion at Age



Age

Year = 1987

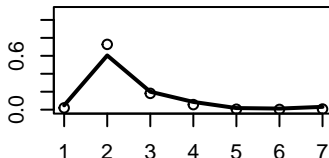
Proportion at Age



Age

Year = 1992

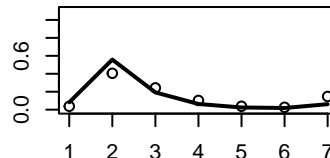
Proportion at Age



Age

Year = 1997

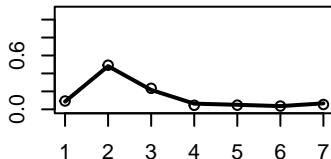
Proportion at Age



Age

Year = 1988

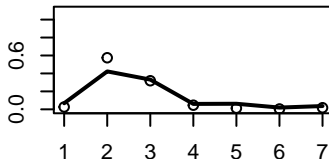
Proportion at Age



Age

Year = 1993

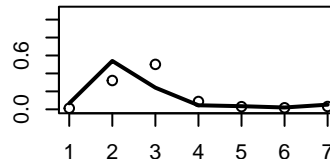
Proportion at Age



Age

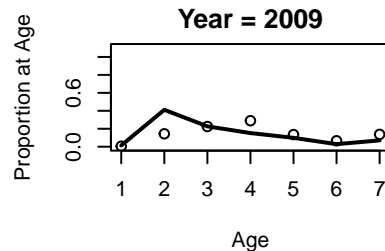
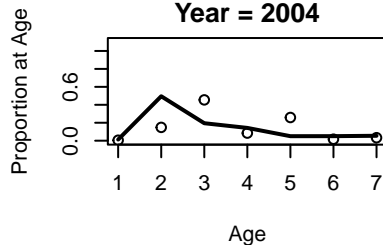
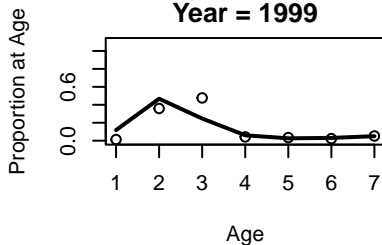
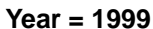
Year = 1998

Proportion at Age

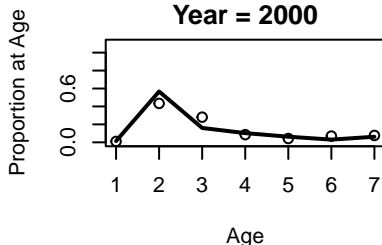


Age

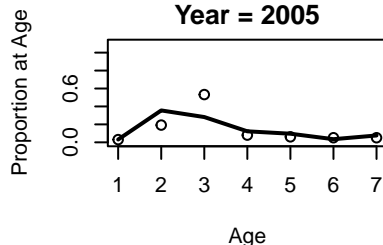
Year = 2004



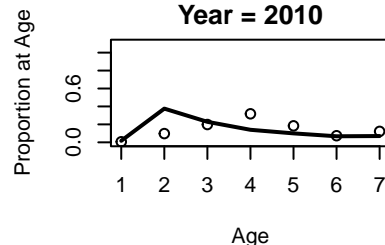
Year = 2000



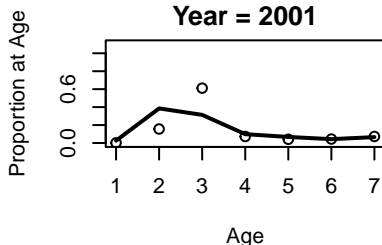
Year = 2005



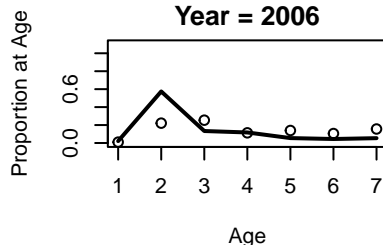
Year = 2010



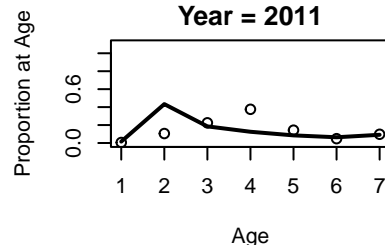
Year = 2001



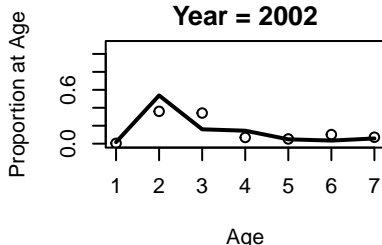
Year = 2006



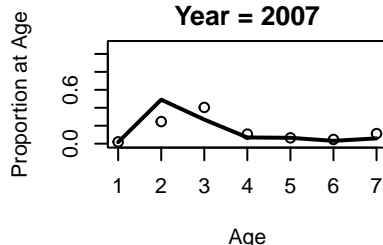
Year = 2011



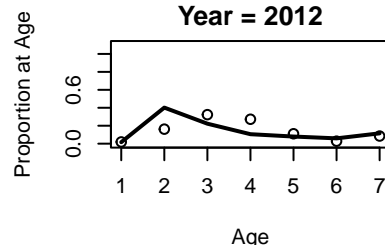
Year = 2002



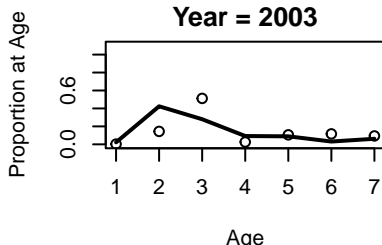
Year = 2007



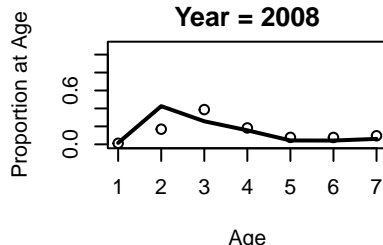
Year = 2012



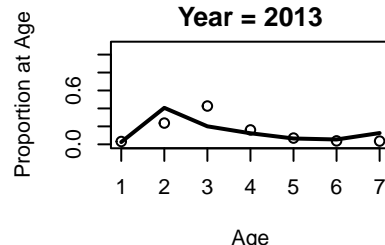
Year = 2003



Year = 2008

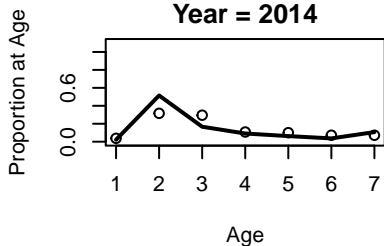


Year = 2013

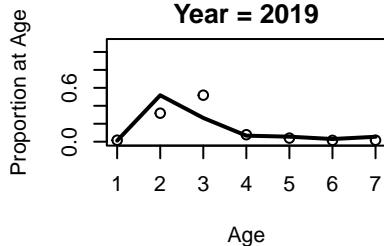


Catch

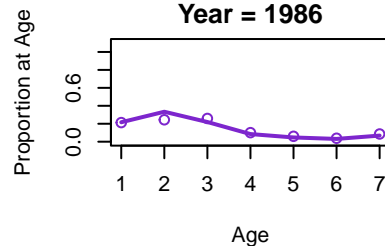
Year = 2014



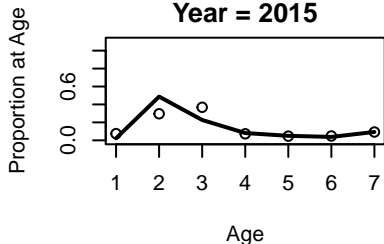
Year = 2019



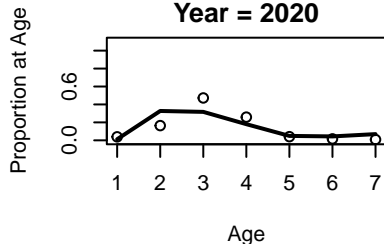
Year = 1986



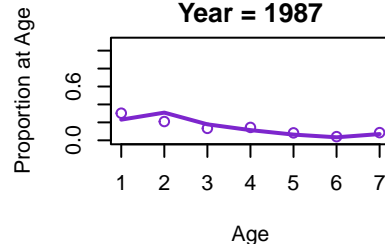
Year = 2015



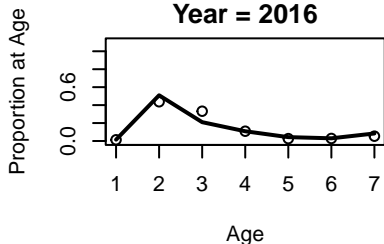
Year = 2020



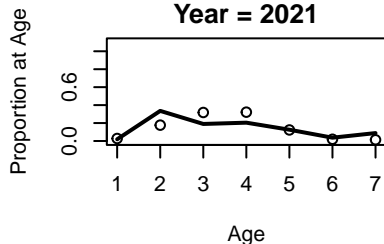
Year = 1987



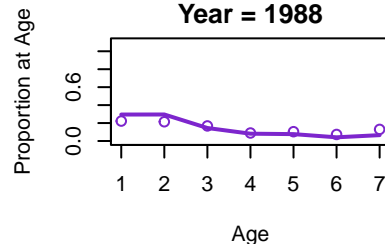
Year = 2016



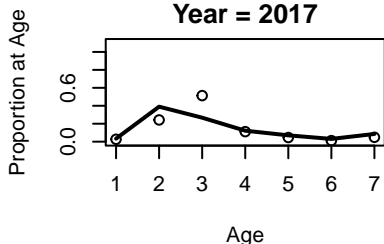
Year = 2021



Year = 1988

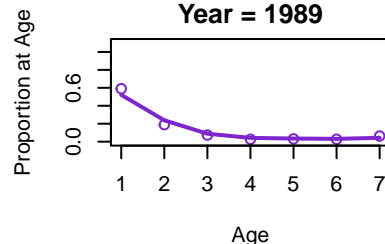


Year = 2017

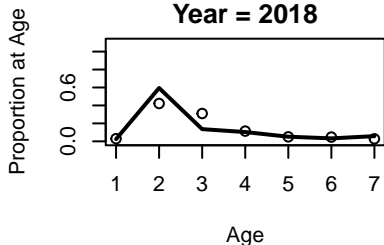


Fleet 2
Rec
↓

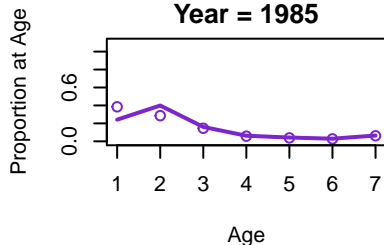
Year = 1989



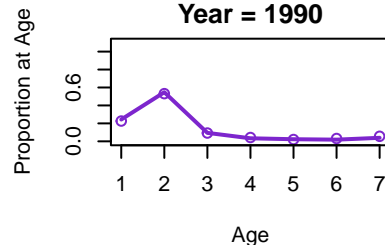
Year = 2018



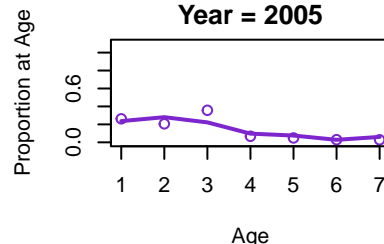
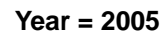
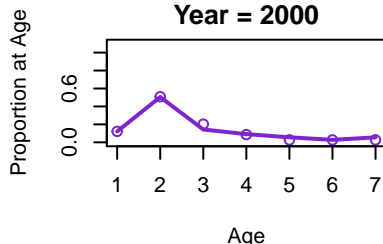
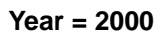
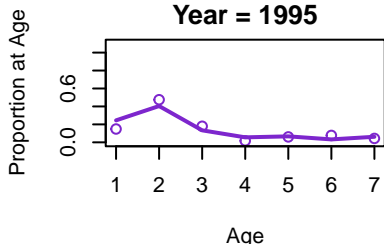
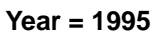
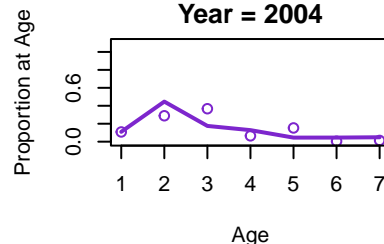
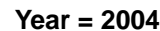
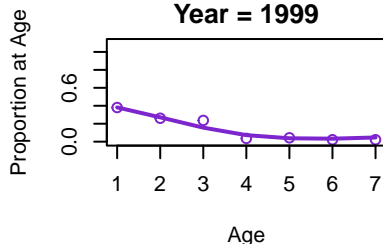
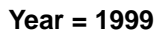
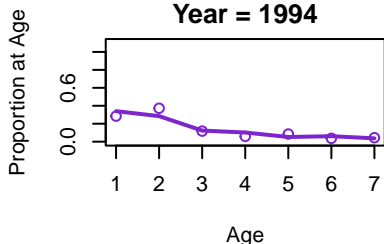
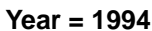
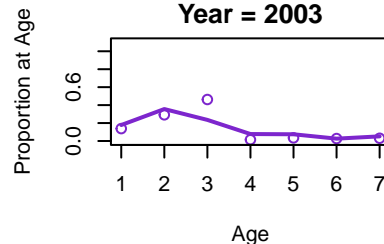
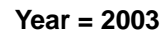
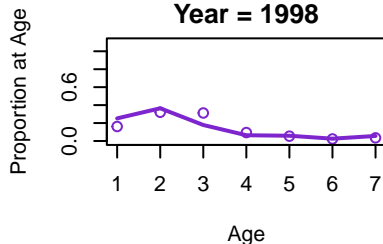
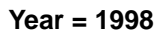
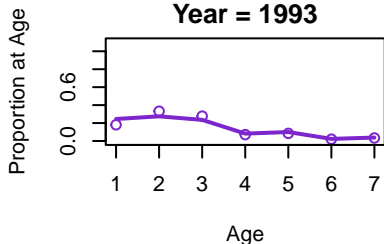
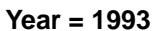
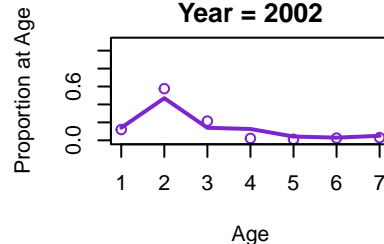
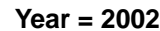
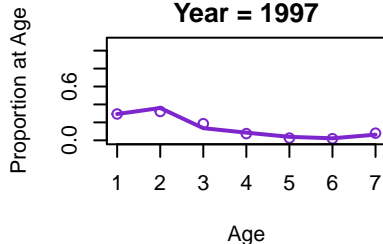
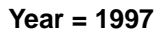
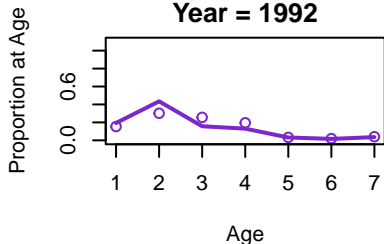
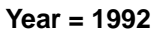
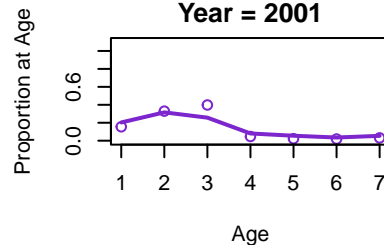
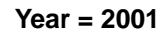
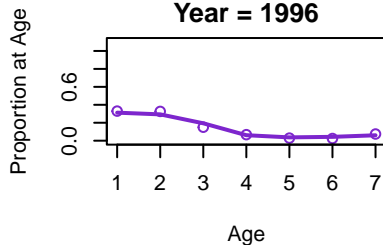
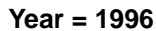
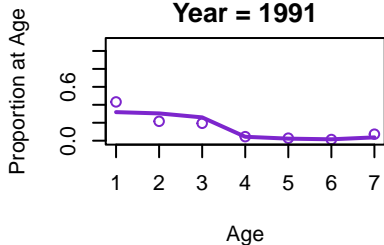
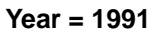
Year = 1985



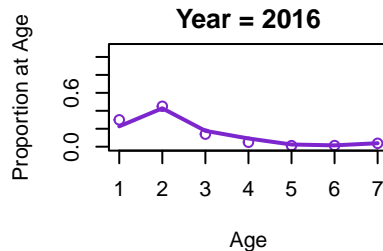
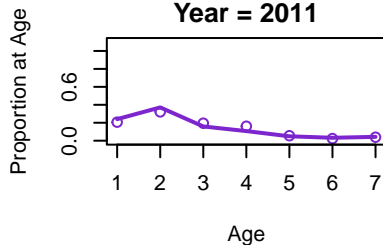
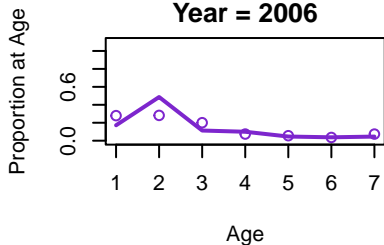
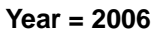
Year = 1990



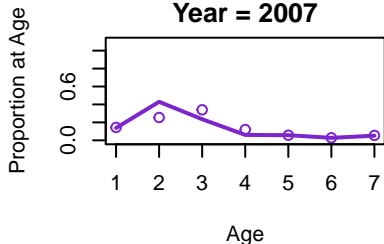
Year = 1996



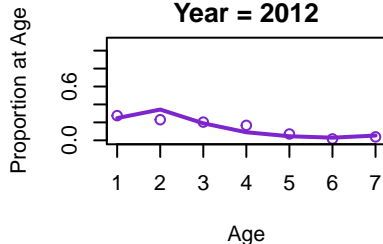
Year = 2011



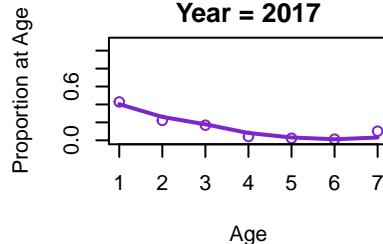
Year = 2007



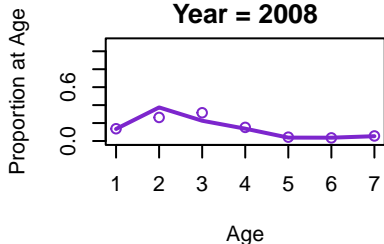
Year = 2012



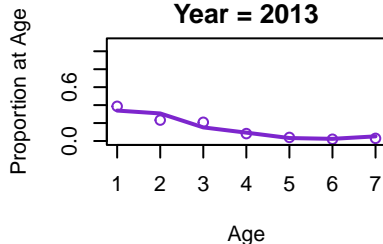
Year = 2017



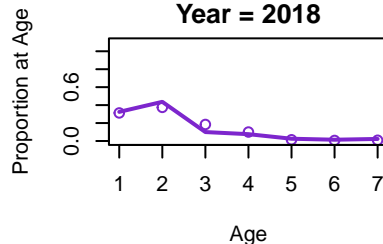
Year = 2008



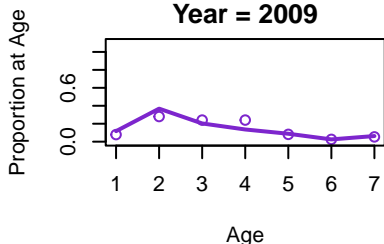
Year = 2013



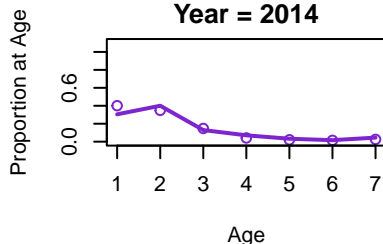
Year = 2018



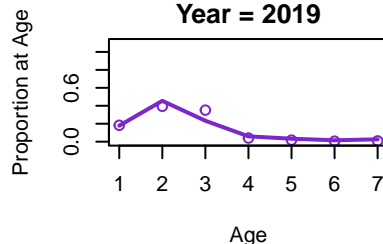
Year = 2009



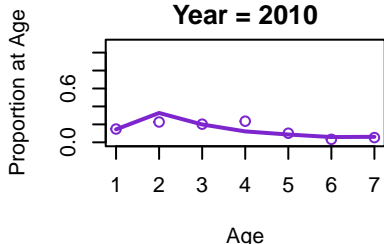
Year = 2014



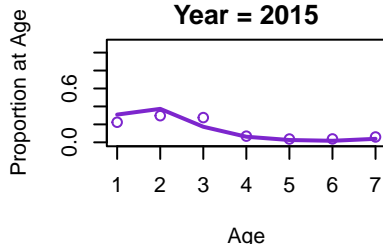
Year = 2019



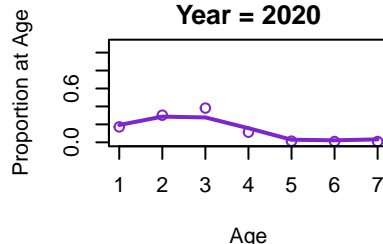
Year = 2010



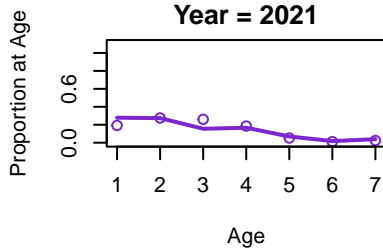
Year = 2015



Year = 2020

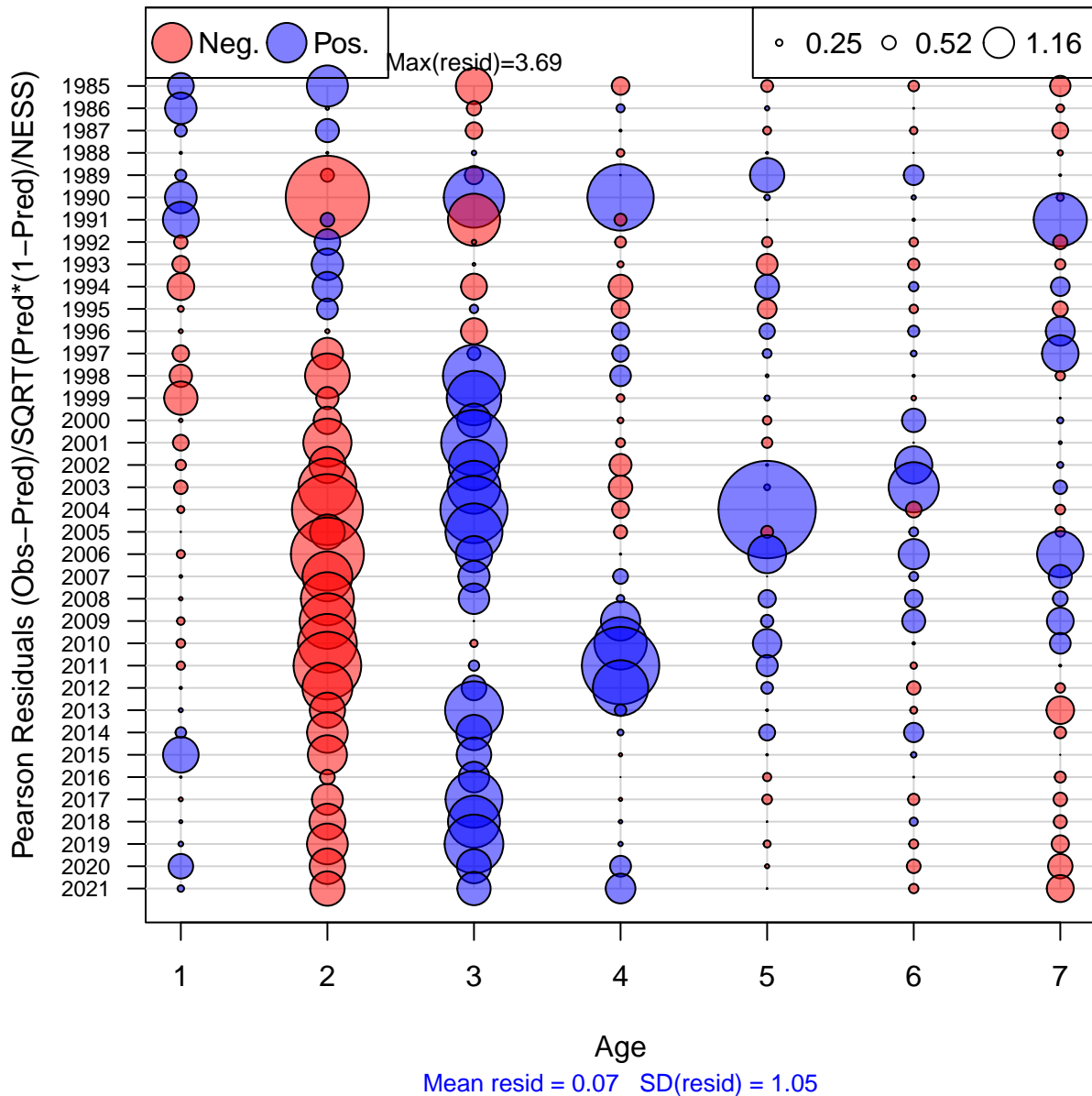


Year = 2021

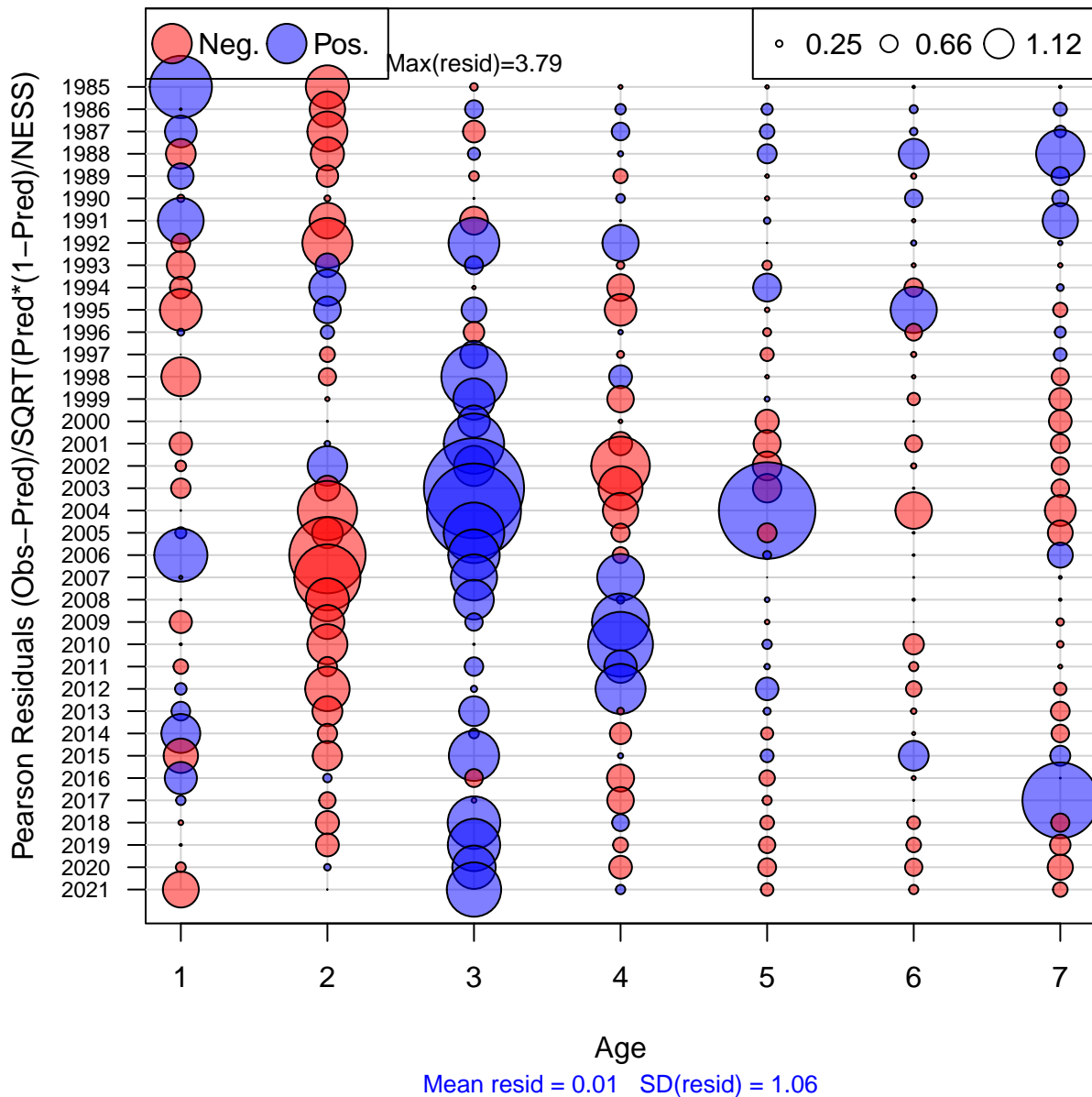


Catch

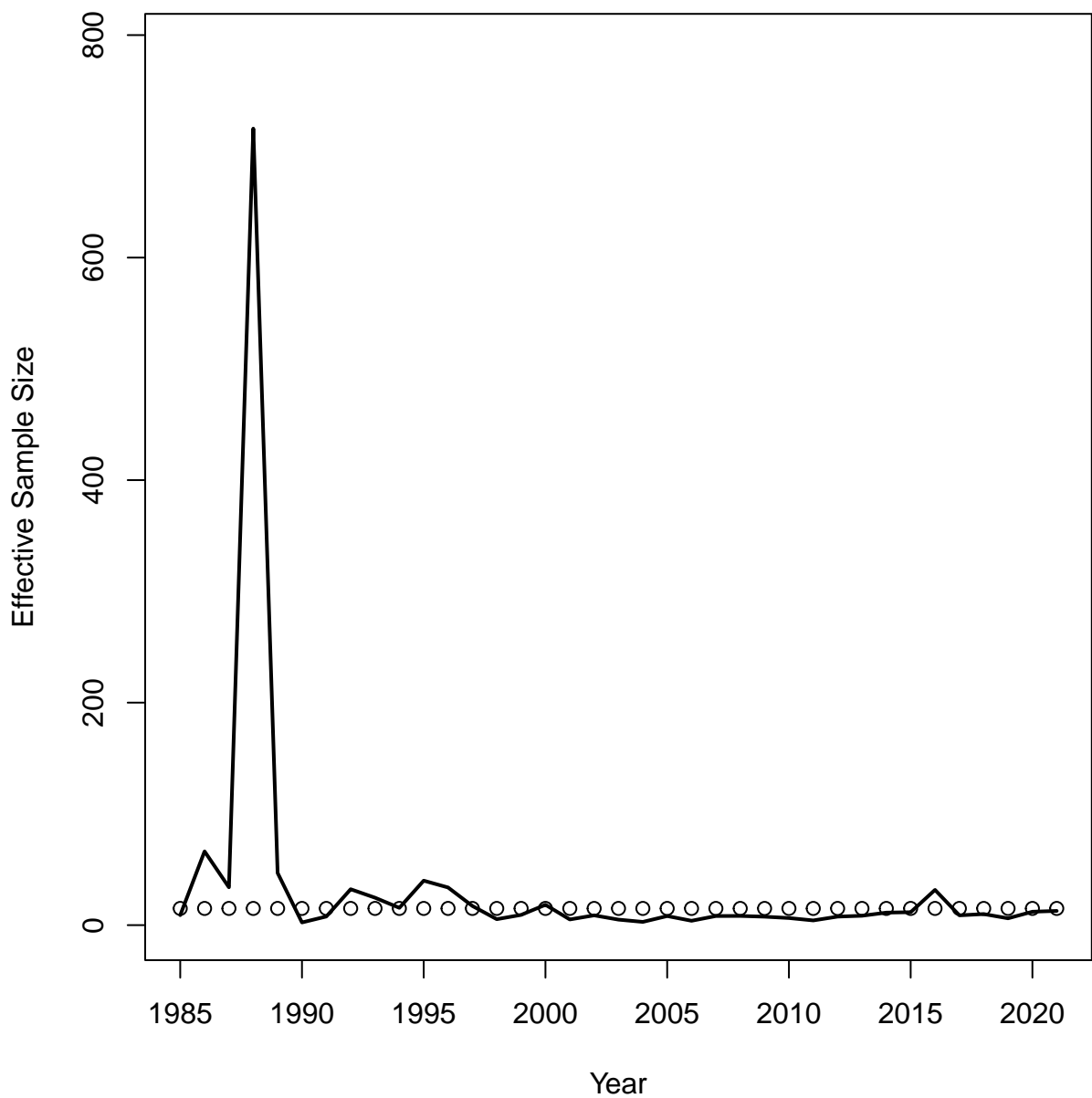
Age Comp Residuals for Catch by Fleet 1 (Comm)



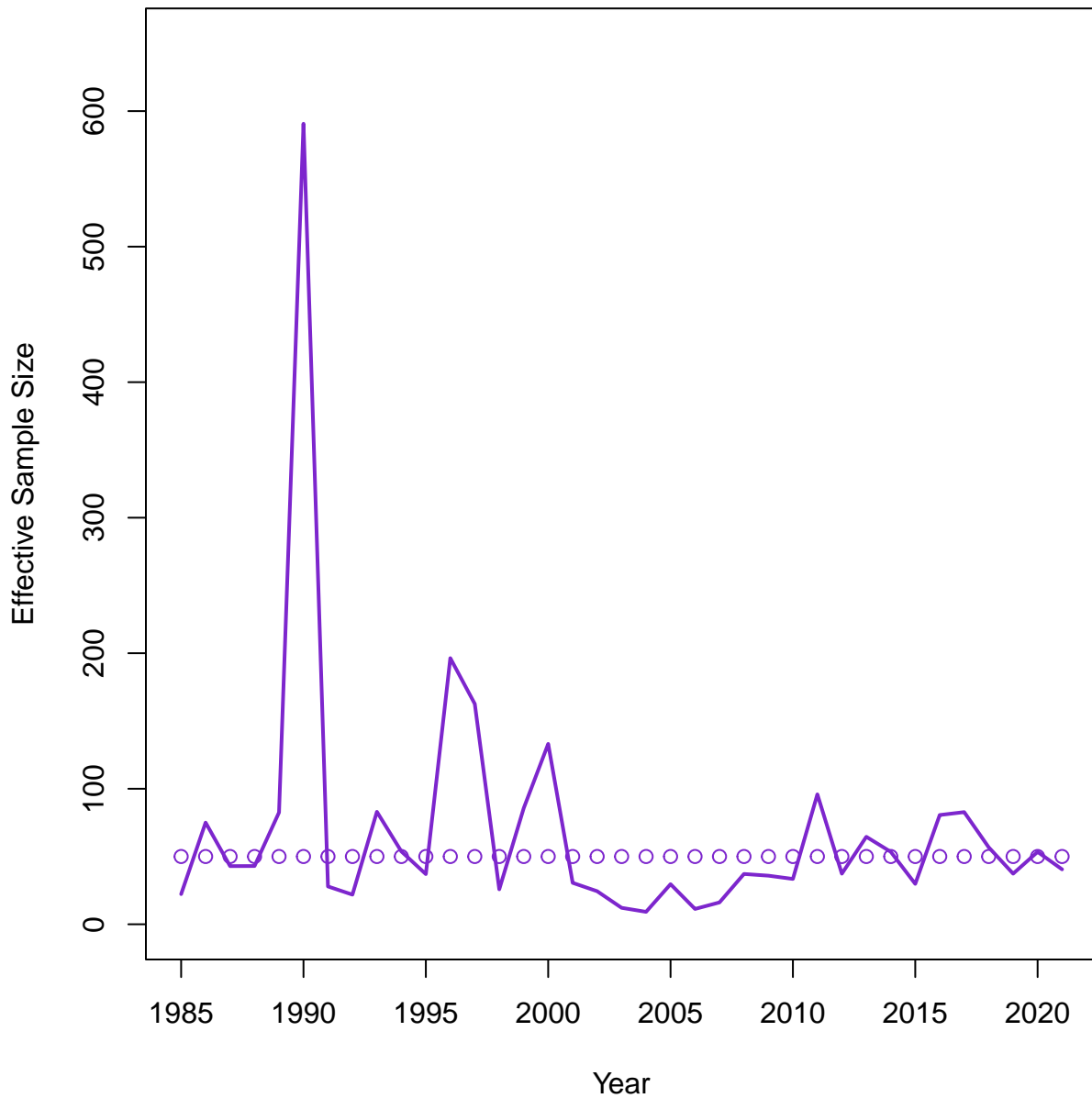
Age Comp Residuals for Catch by Fleet 2 (Rec)



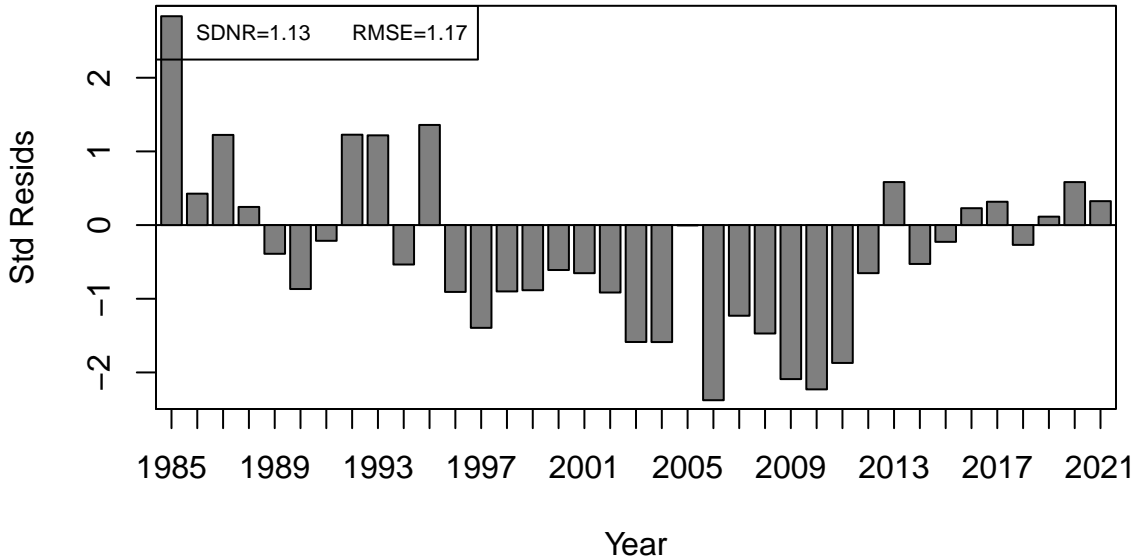
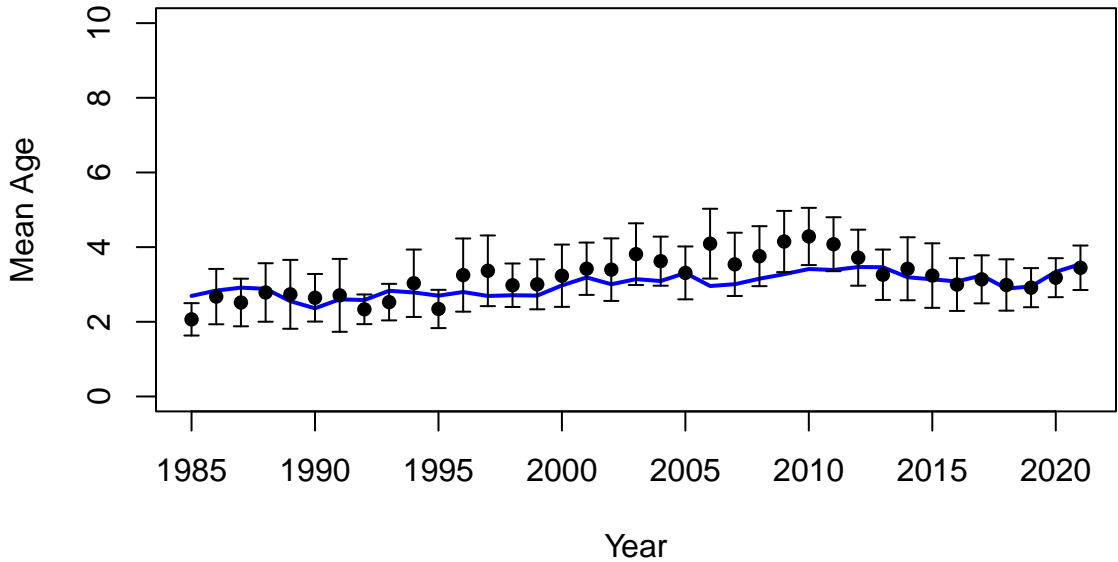
Catch Neff Fleet 1 (Comm)



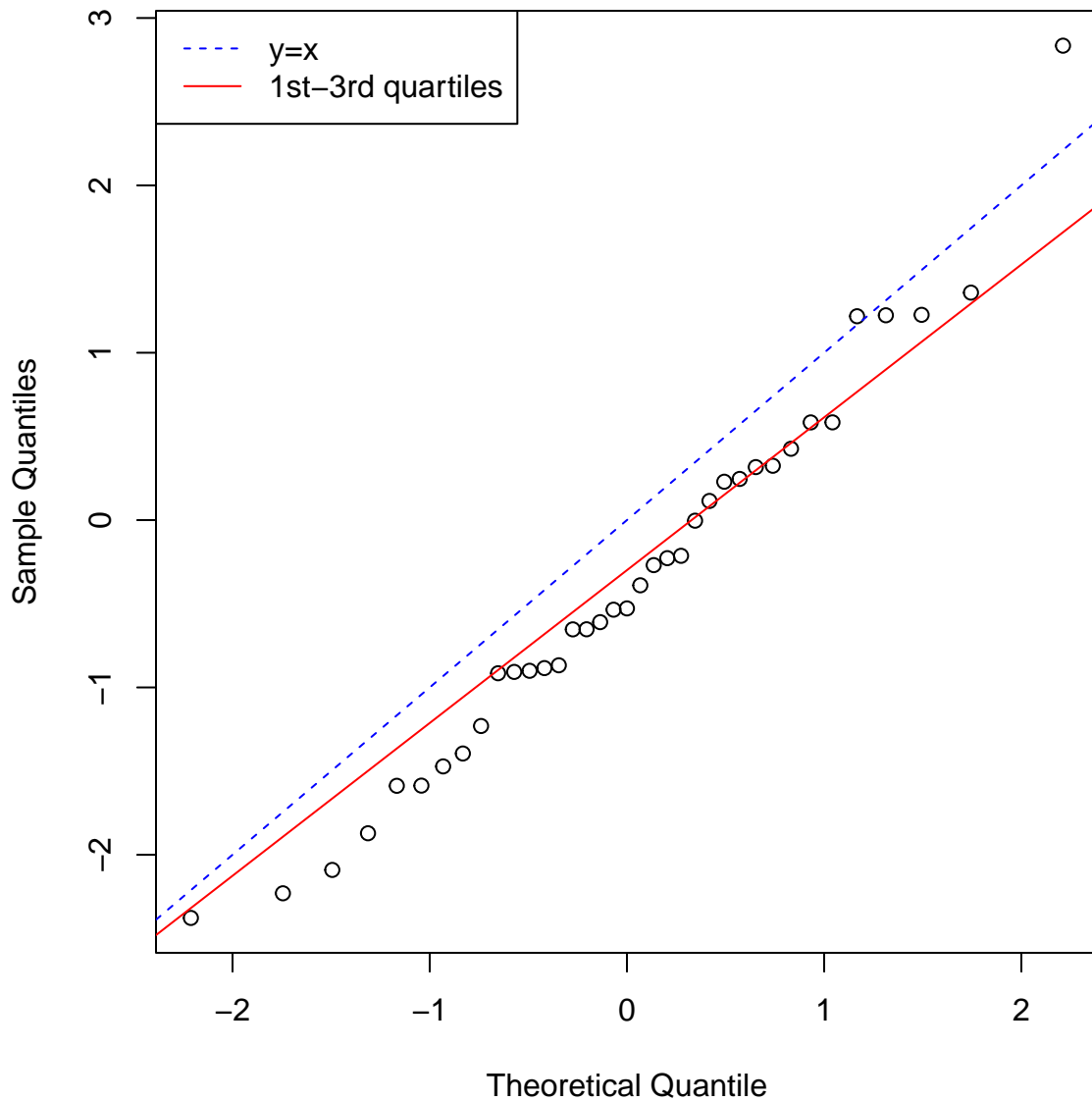
Catch Neff Fleet 2 (Rec)



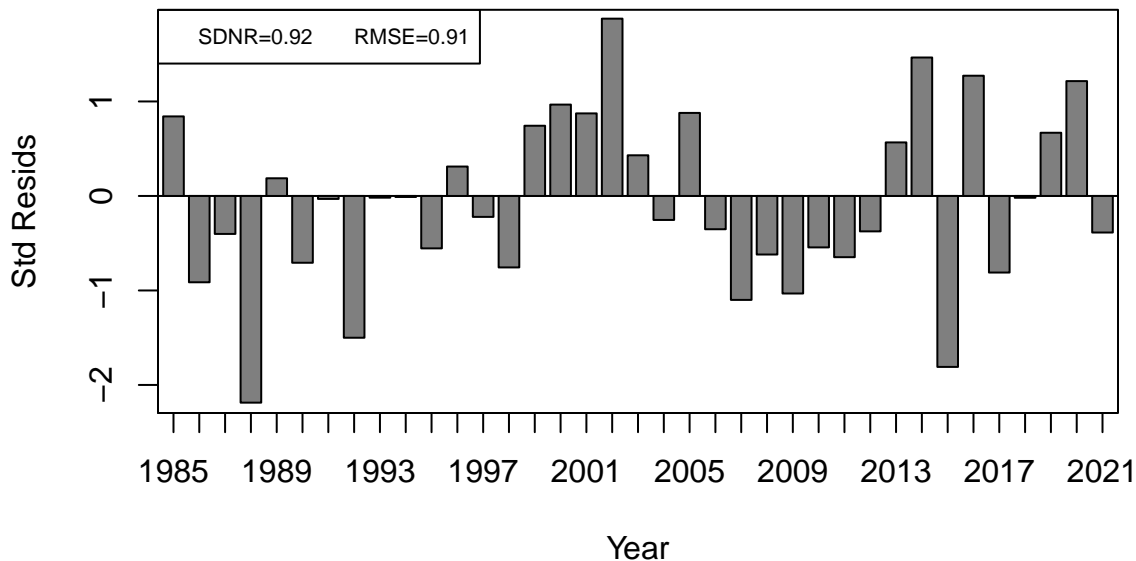
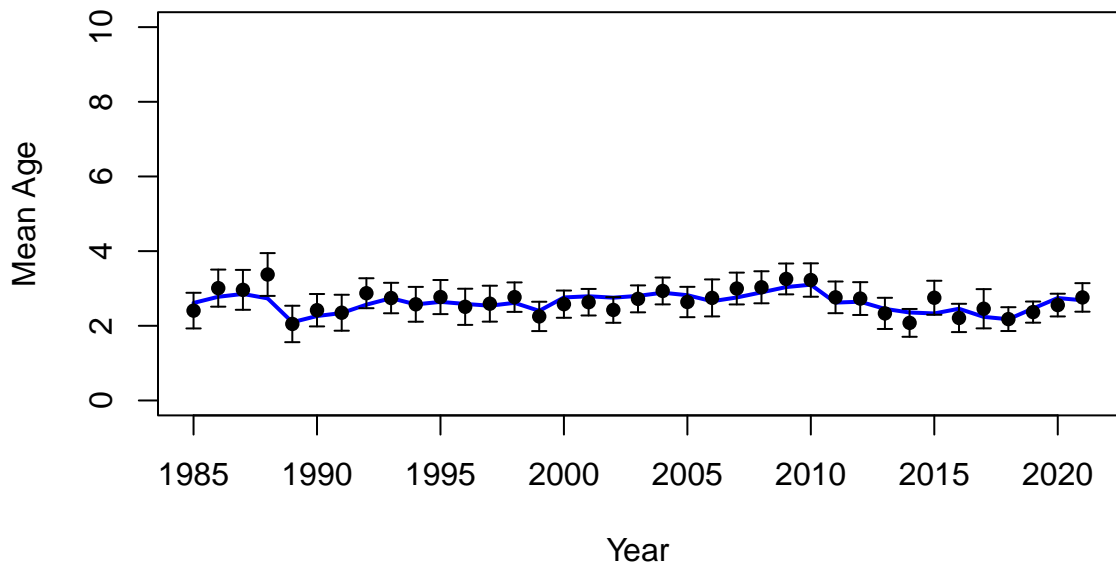
Catch Fleet 1 (Comm) ESS = 15



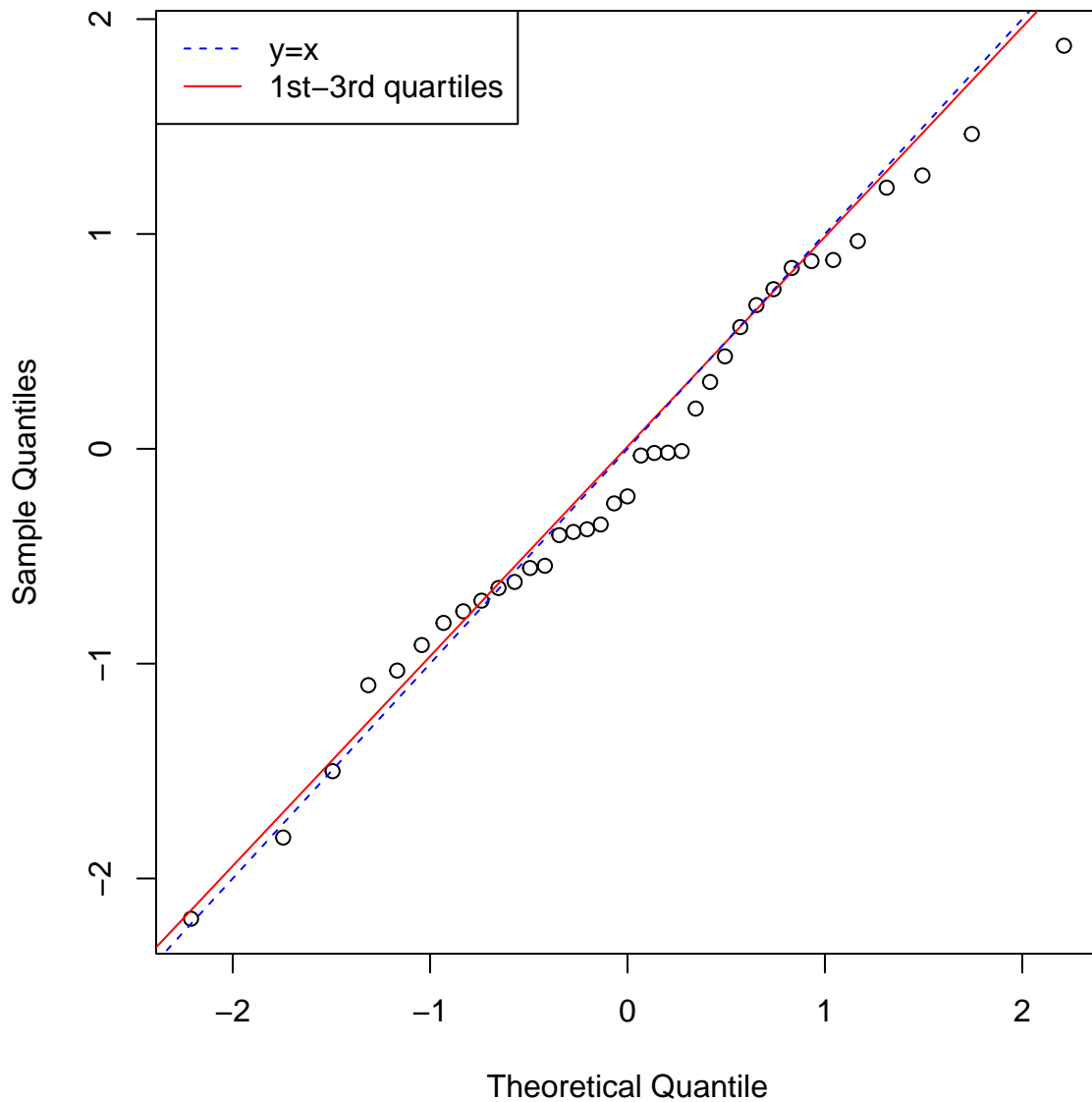
Catch Fleet 1 (Comm) ESS = 15



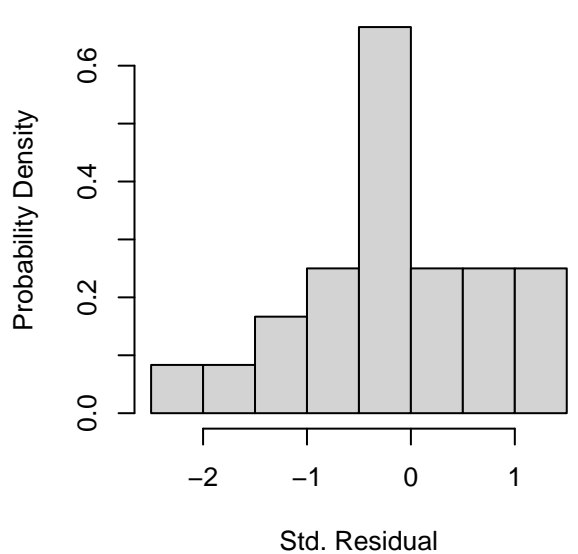
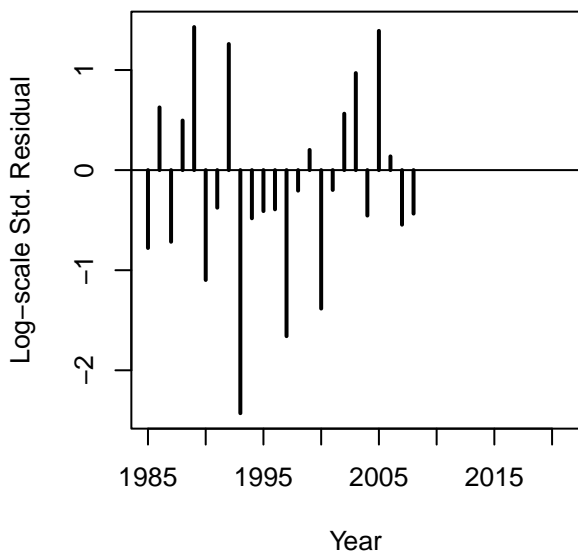
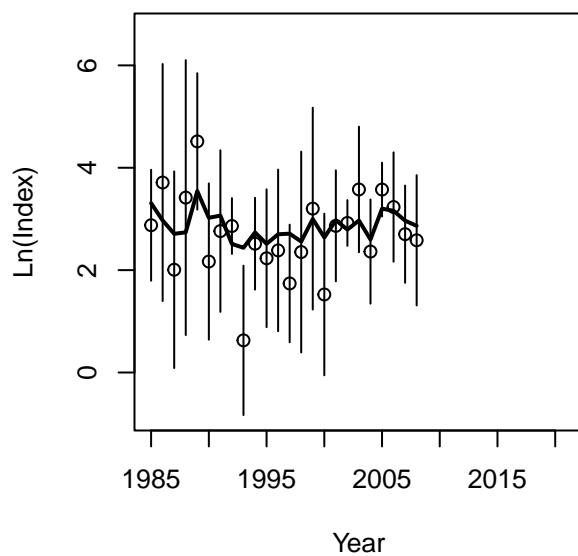
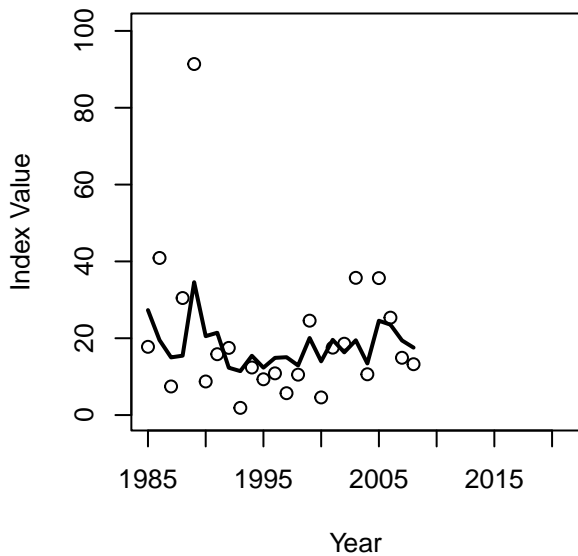
Catch Fleet 2 (Rec) ESS = 50



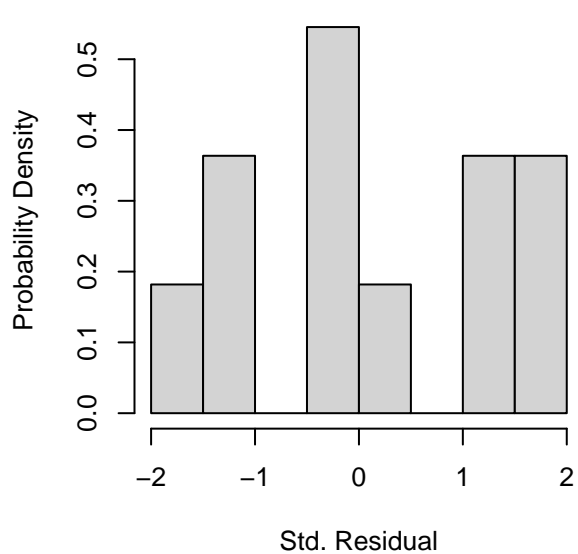
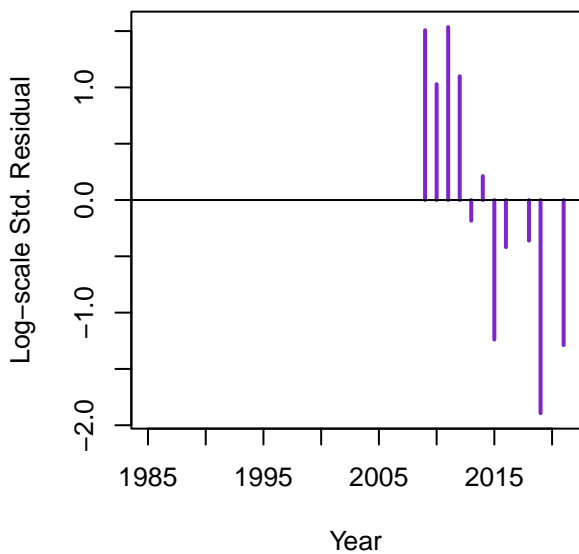
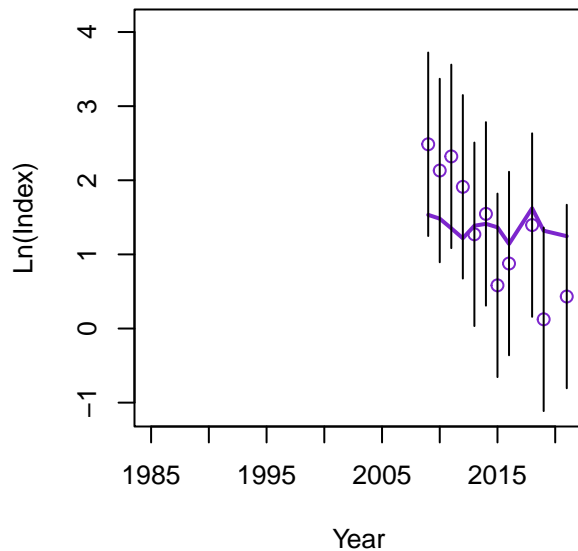
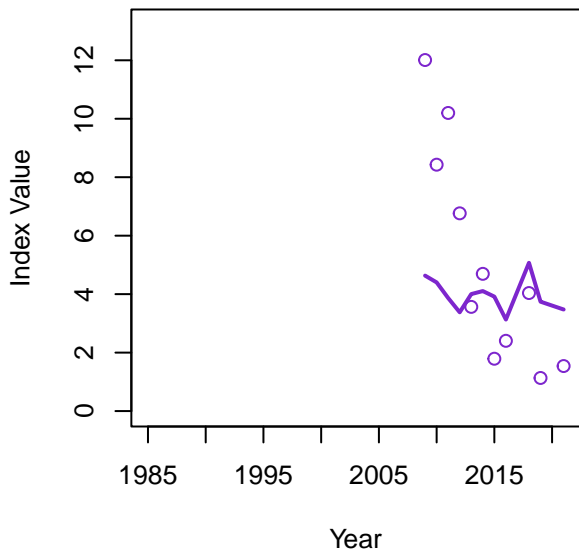
Catch Fleet 2 (Rec) ESS = 50



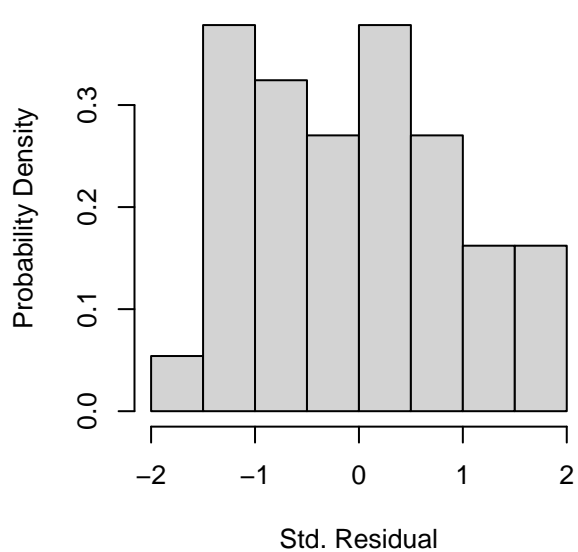
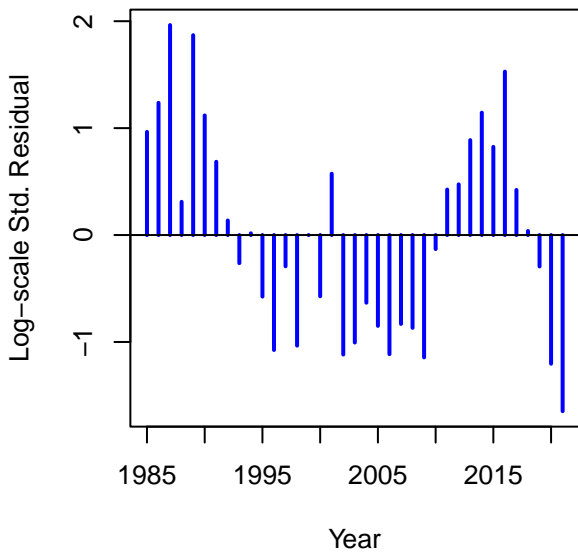
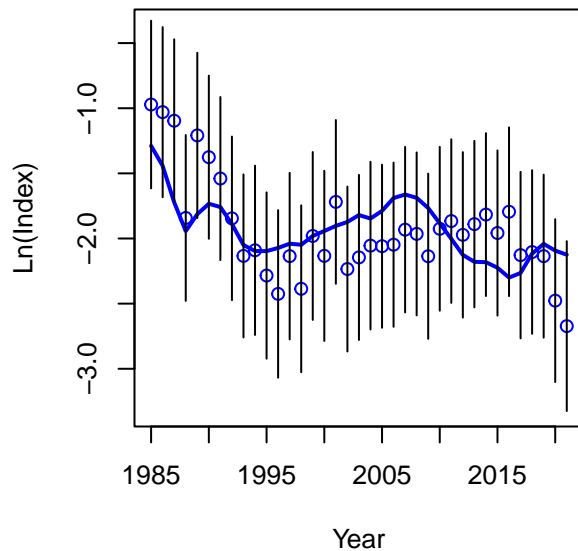
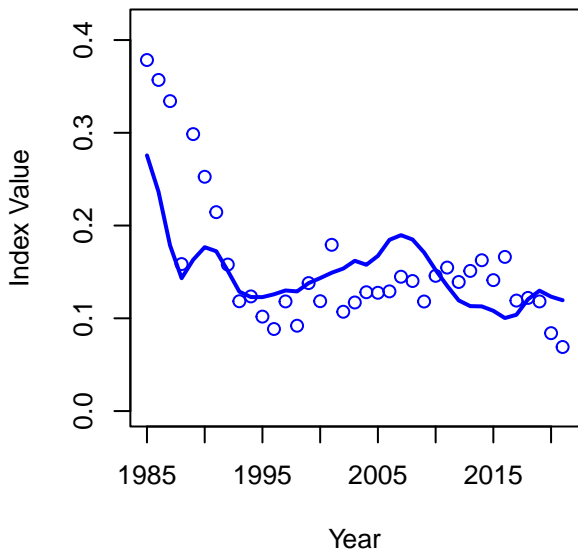
Index 1 (NEFSC Inshore)



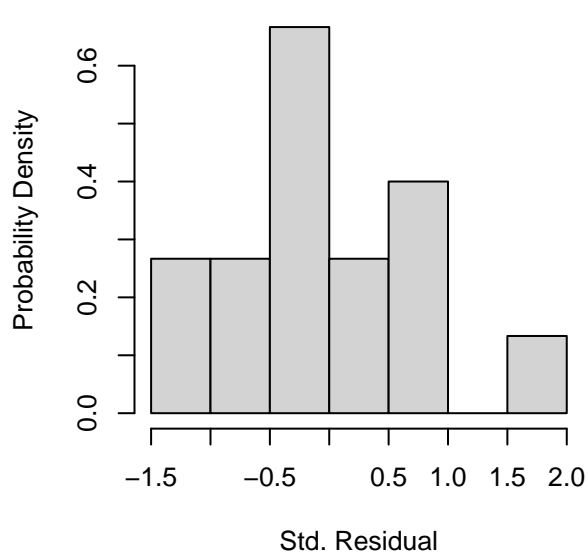
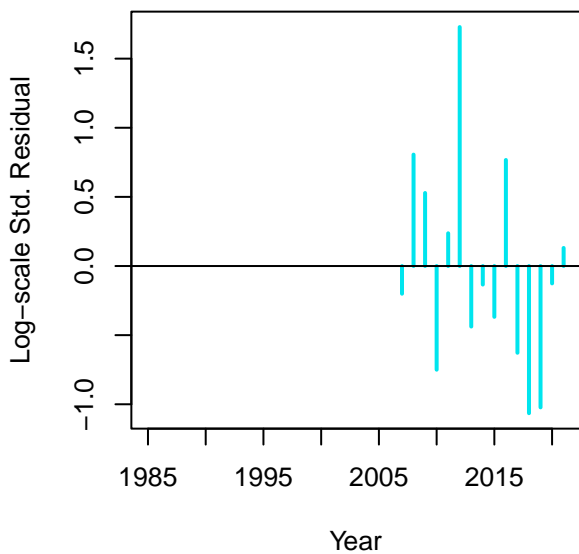
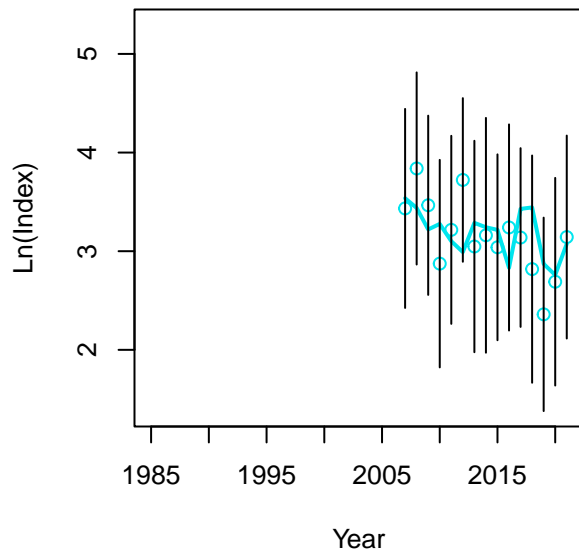
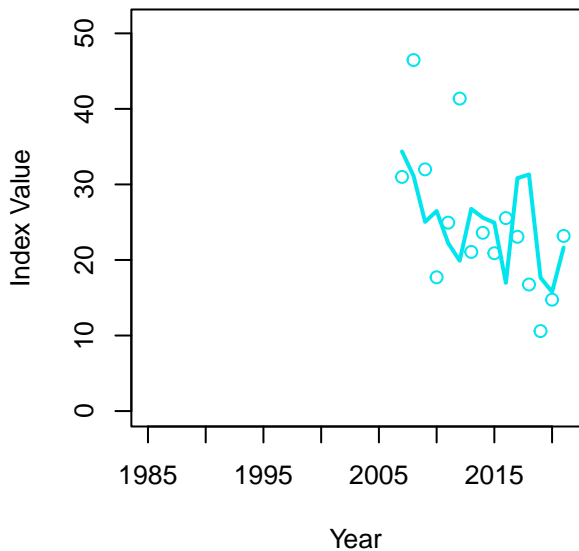
Index 2 (Bigelow)



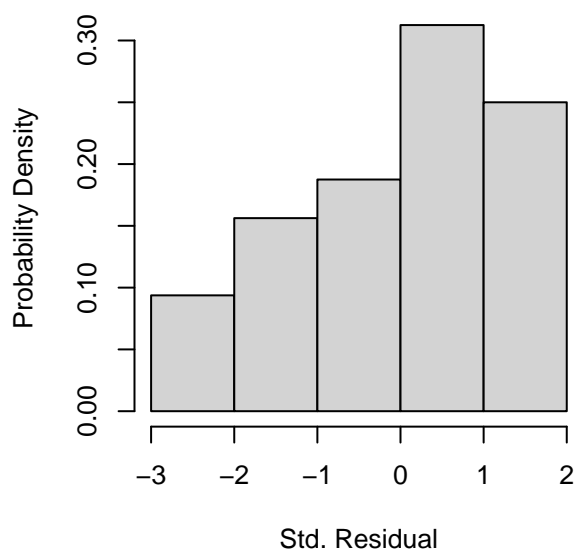
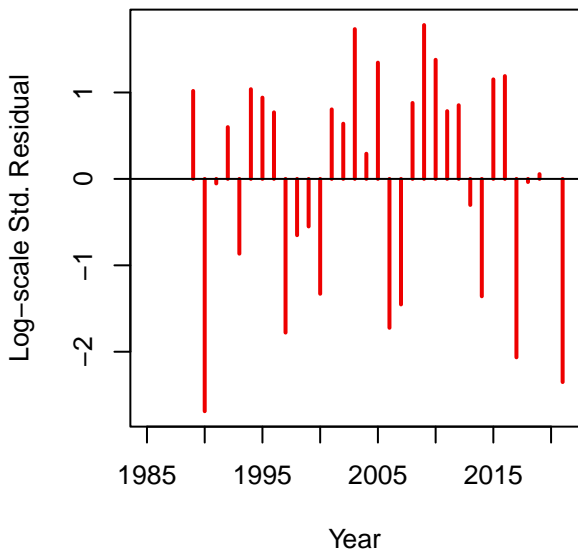
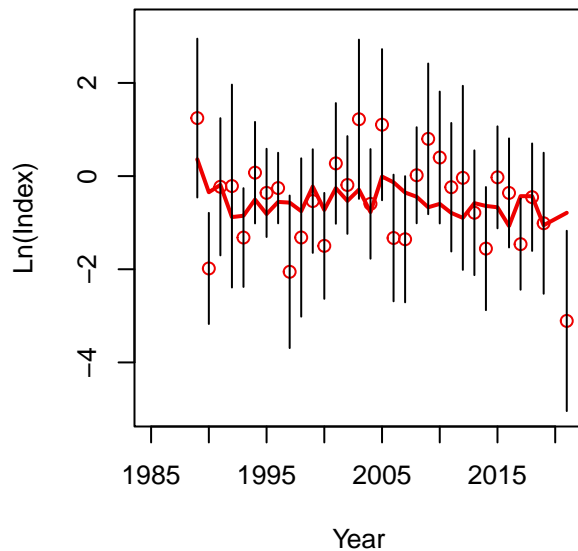
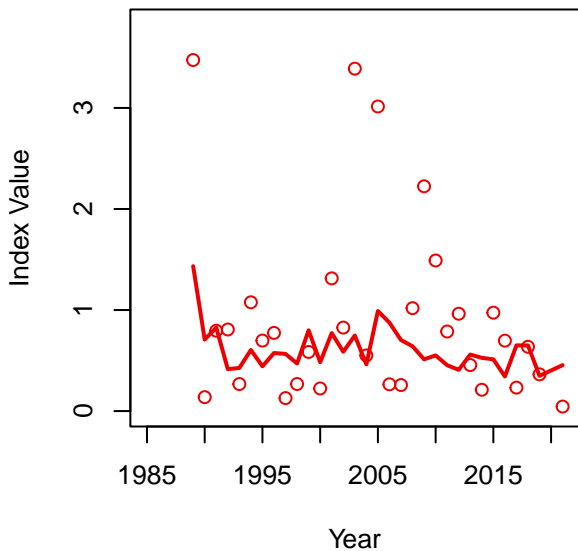
Index 3 (MRIP)



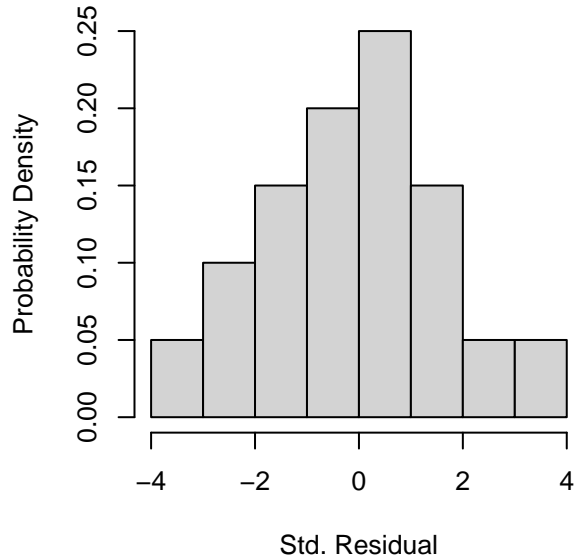
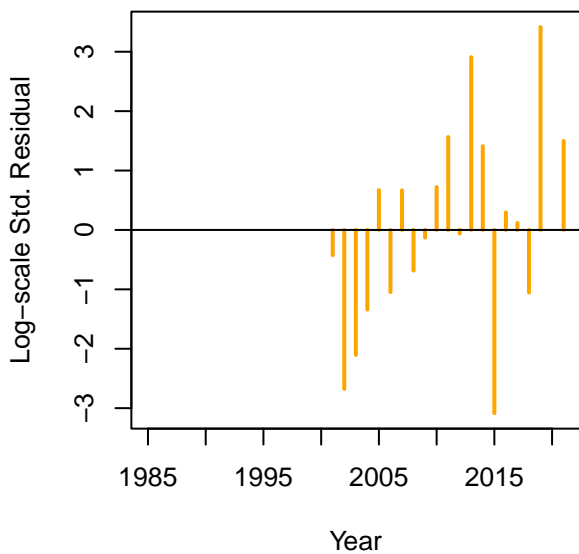
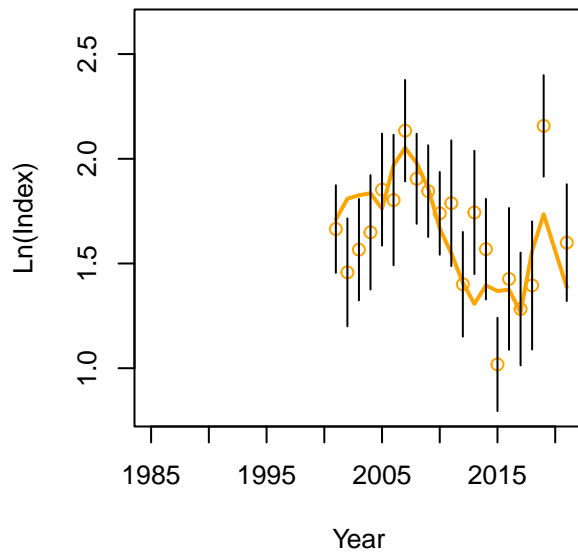
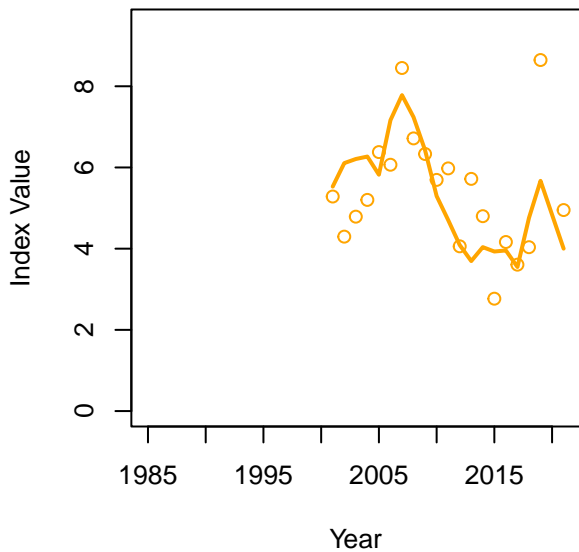
Index 4 (NEAMAP)



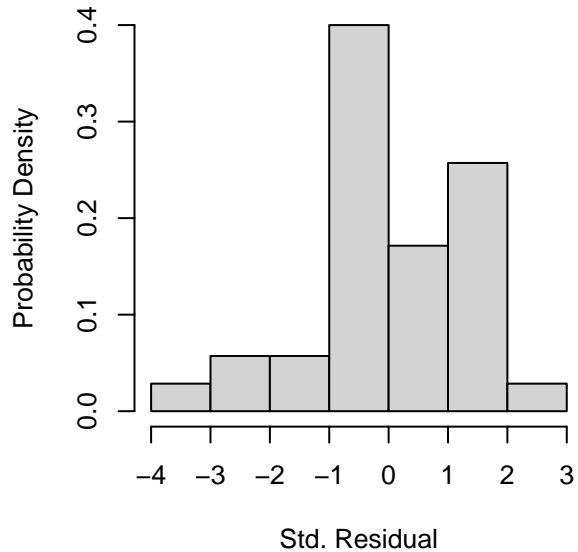
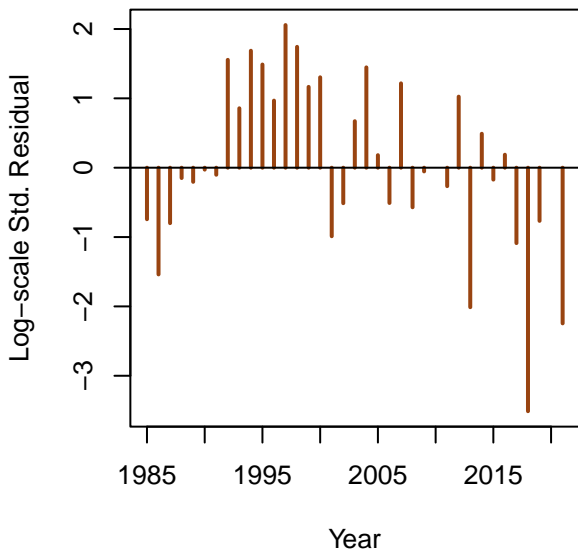
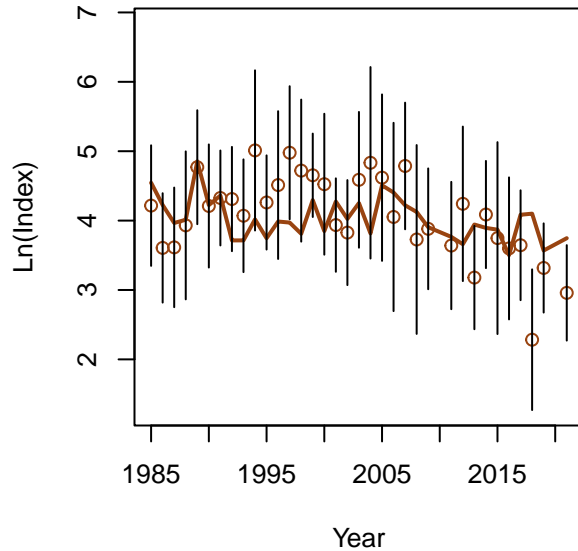
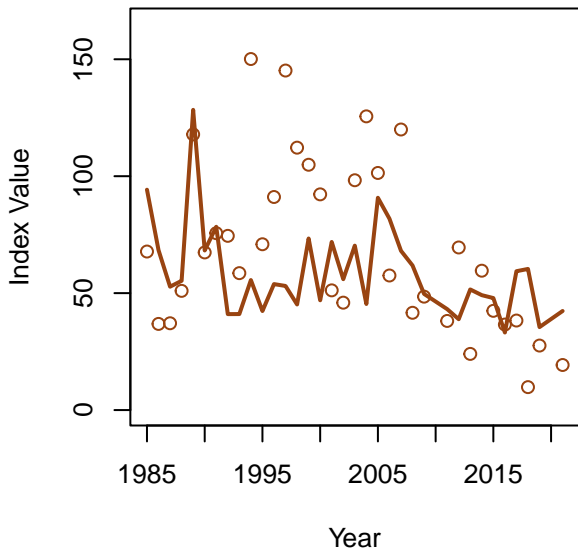
Index 5 (SEAMAP)



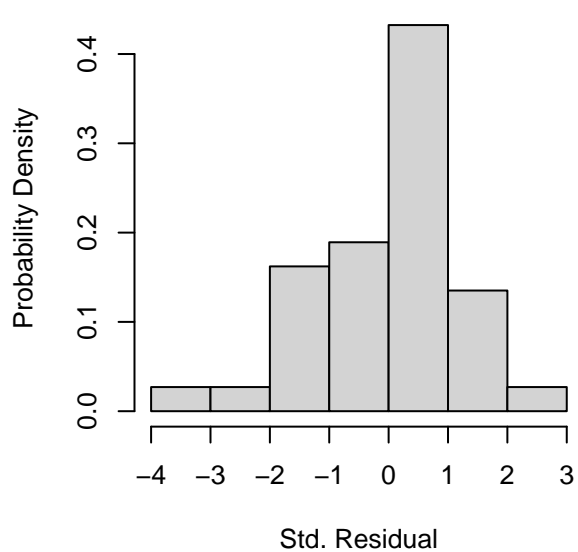
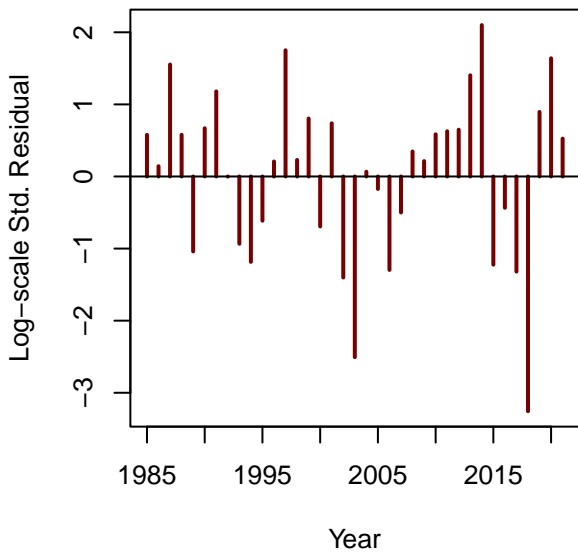
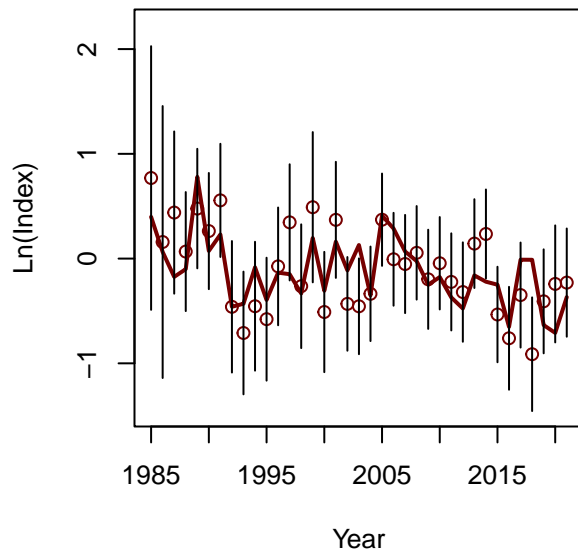
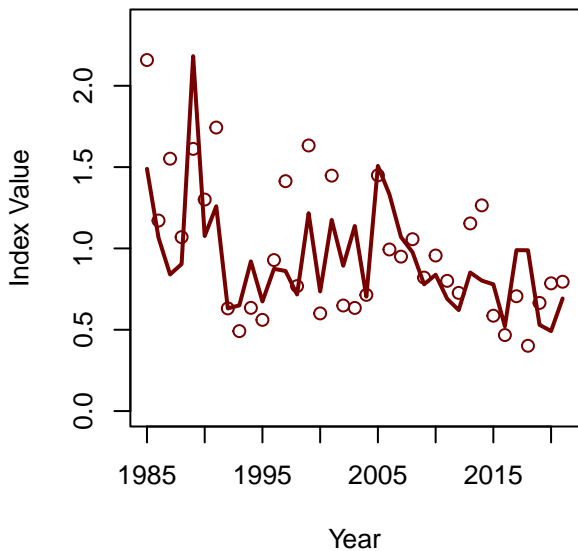
Index 6 (PSIGN)



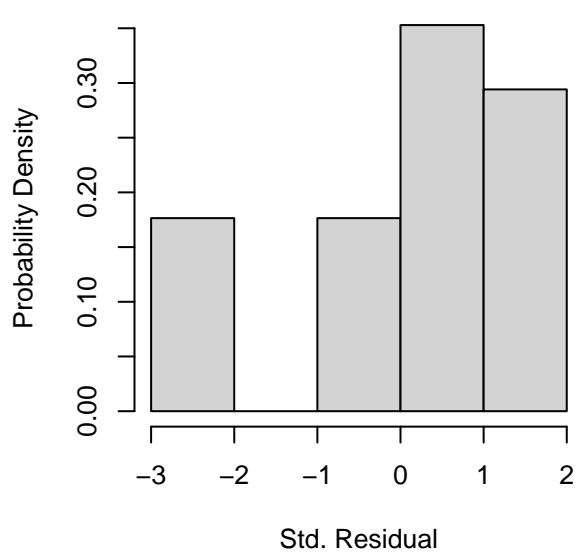
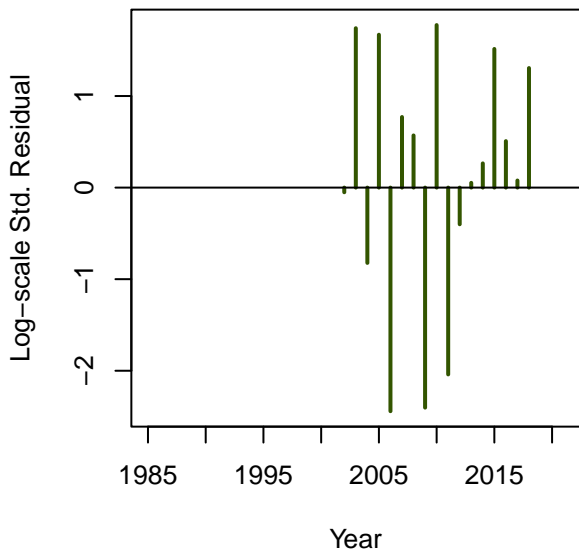
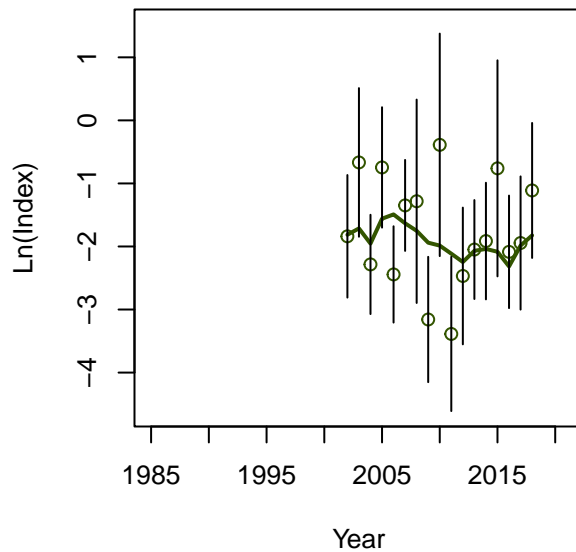
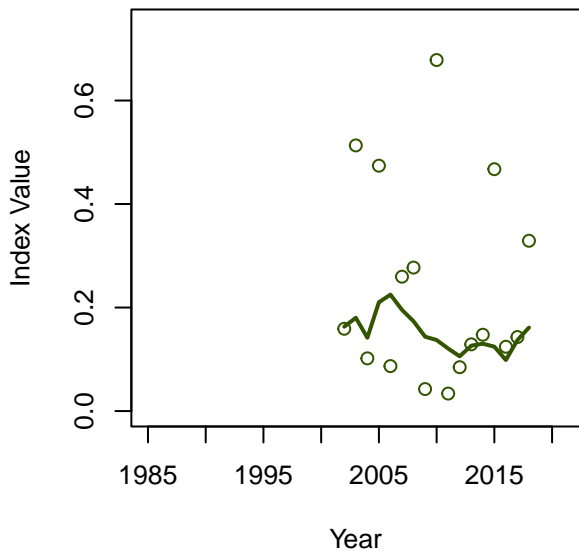
Index 7 (CT Trawl)



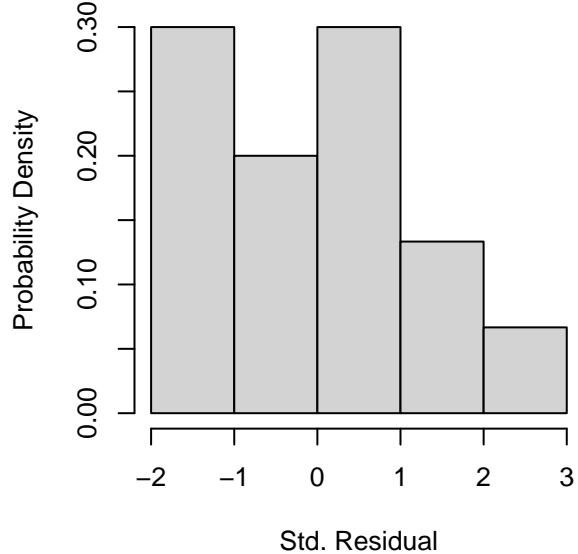
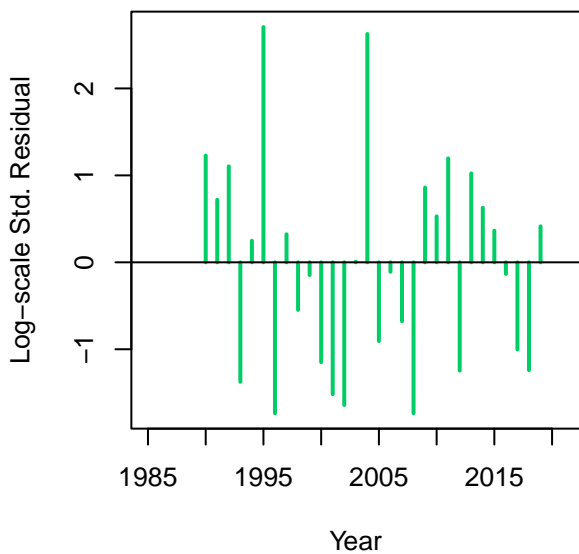
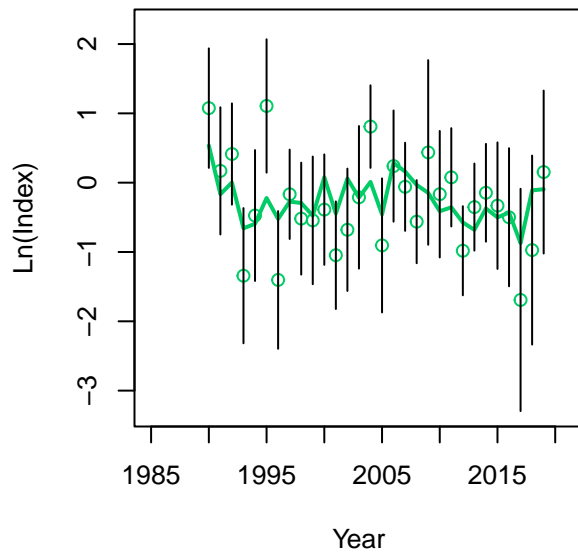
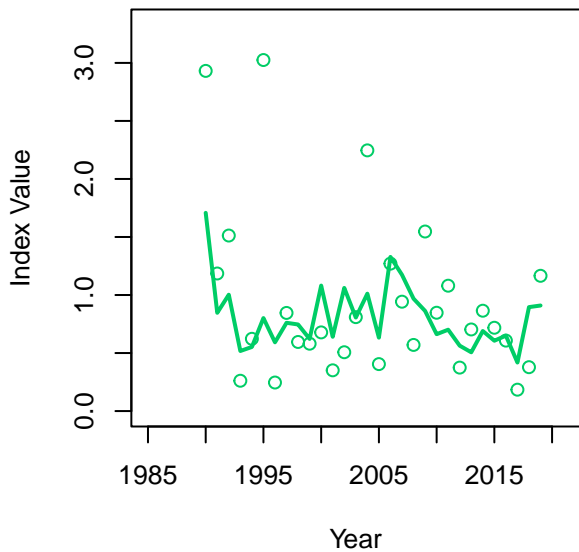
Index 8 (Compound YOY)



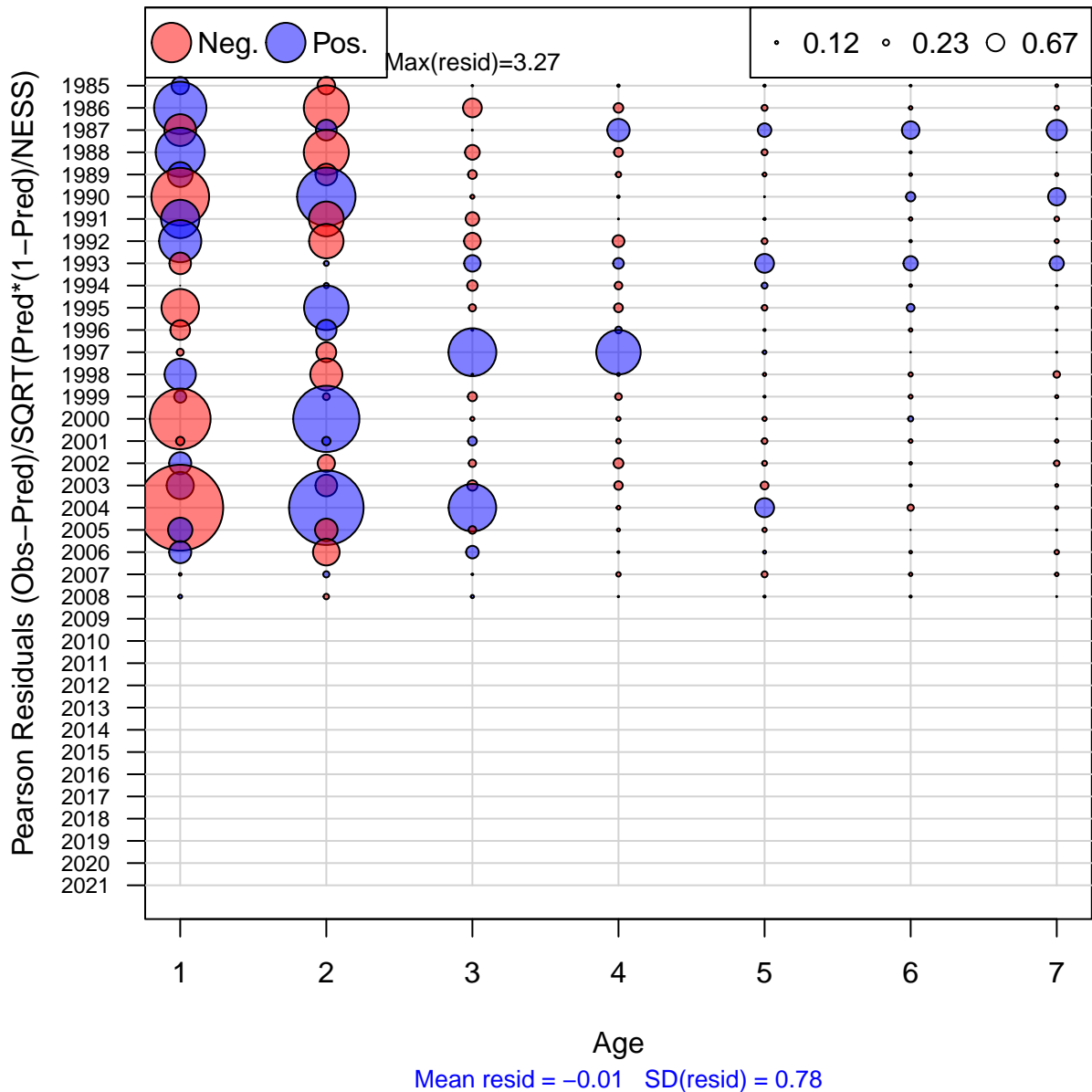
Index 9 (ChesMMAP)



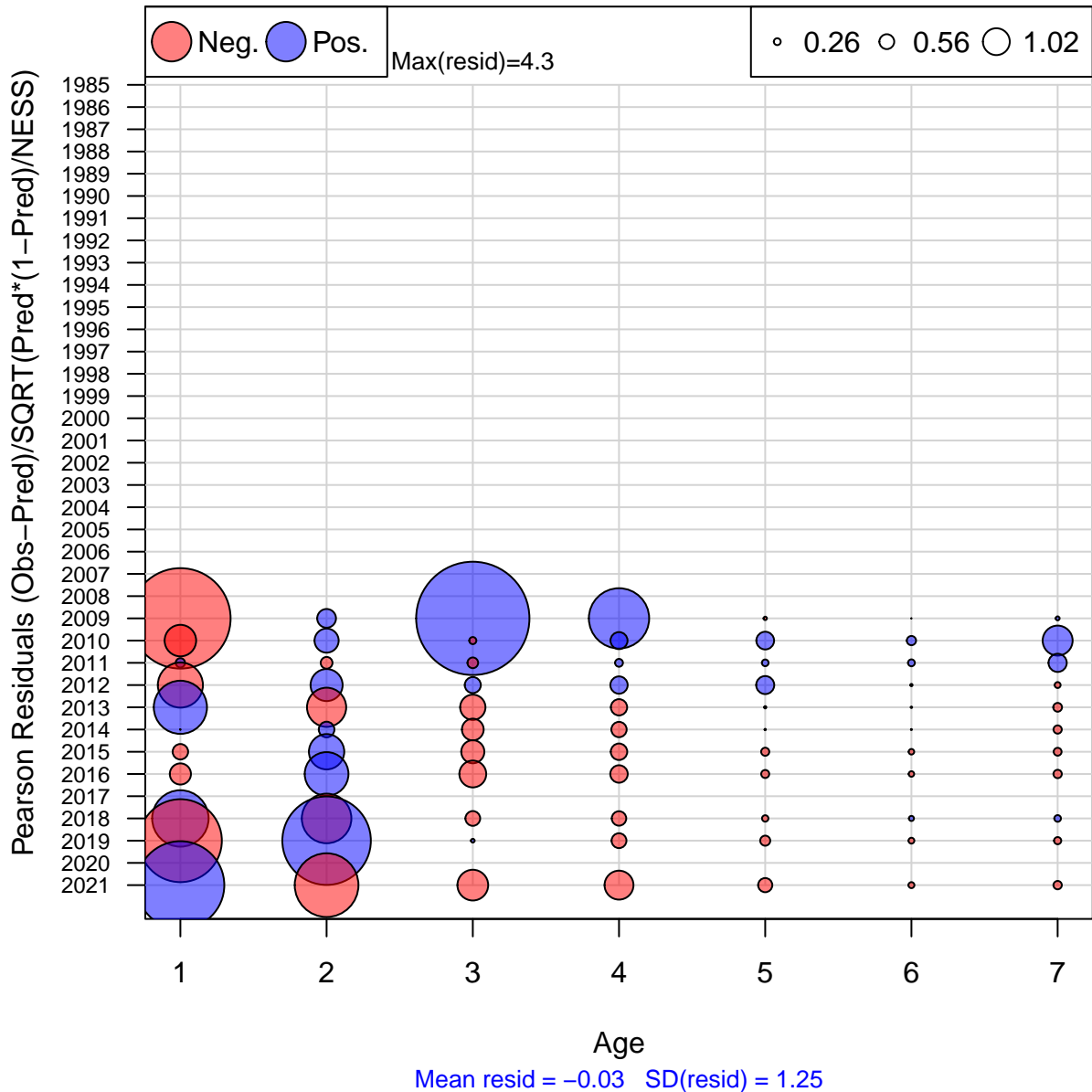
Index 10 (SEAMAP1)



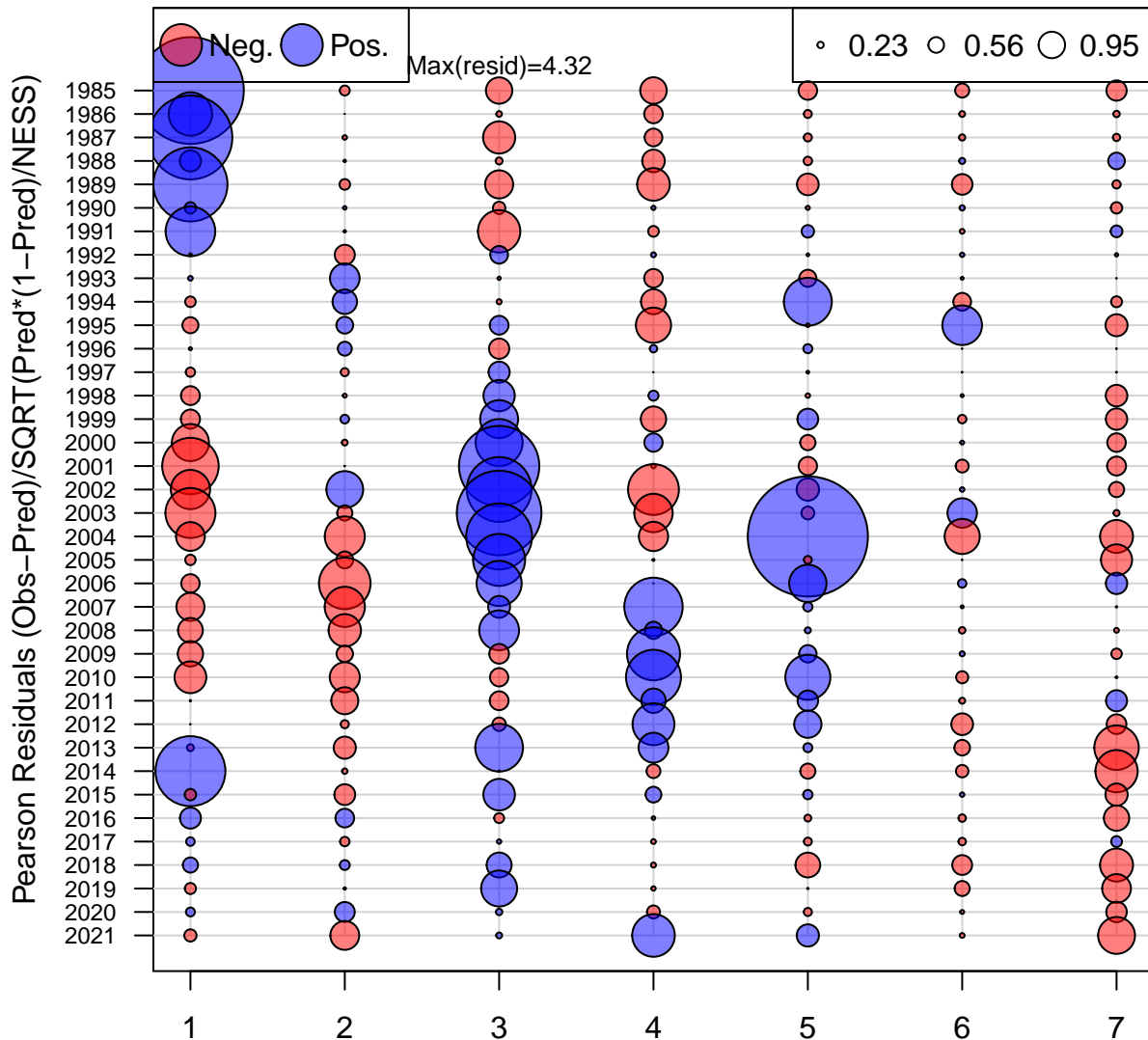
Age Comp Residuals for Index 1 (NEFSC Inshore)



Age Comp Residuals for Index 2 (Bigelow)



Age Comp Residuals for Index 3 (MRIP)

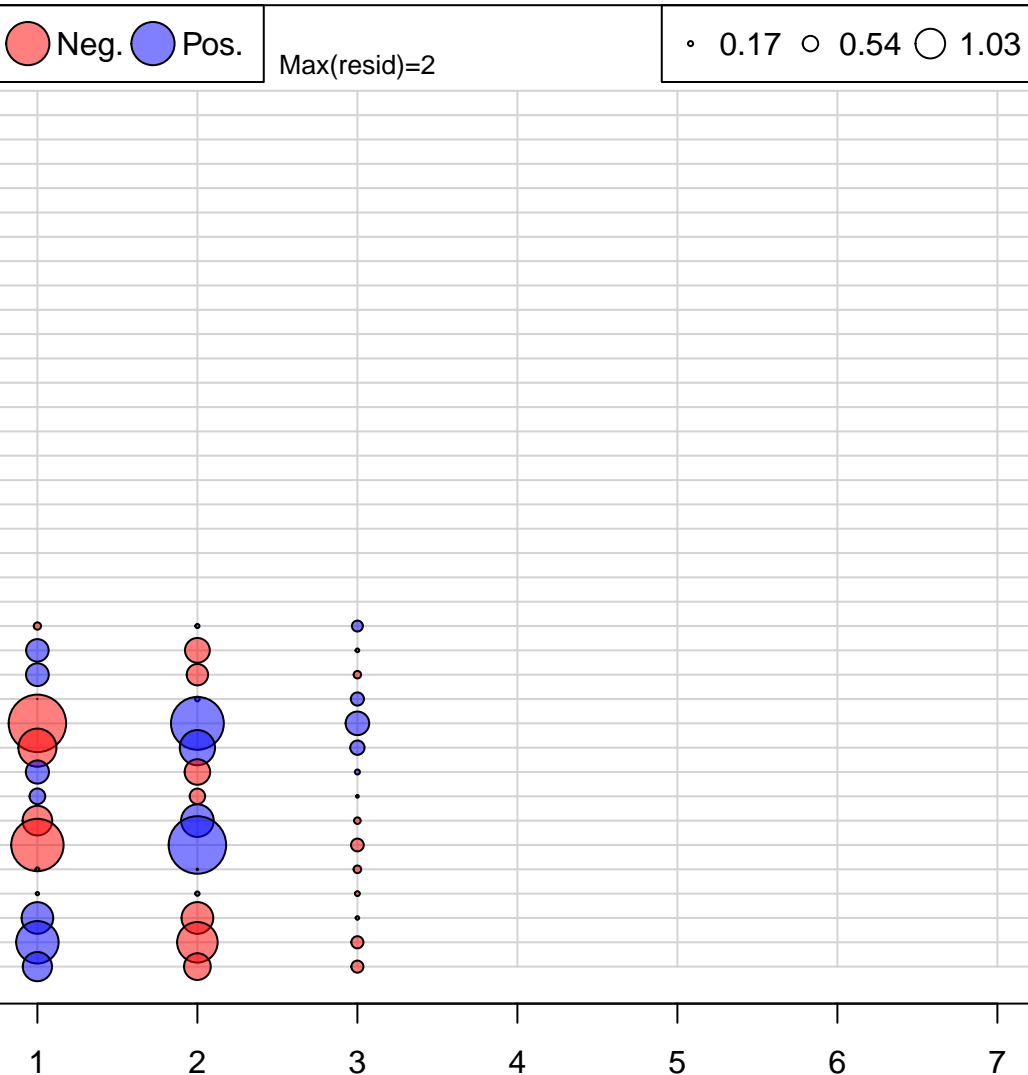


Age

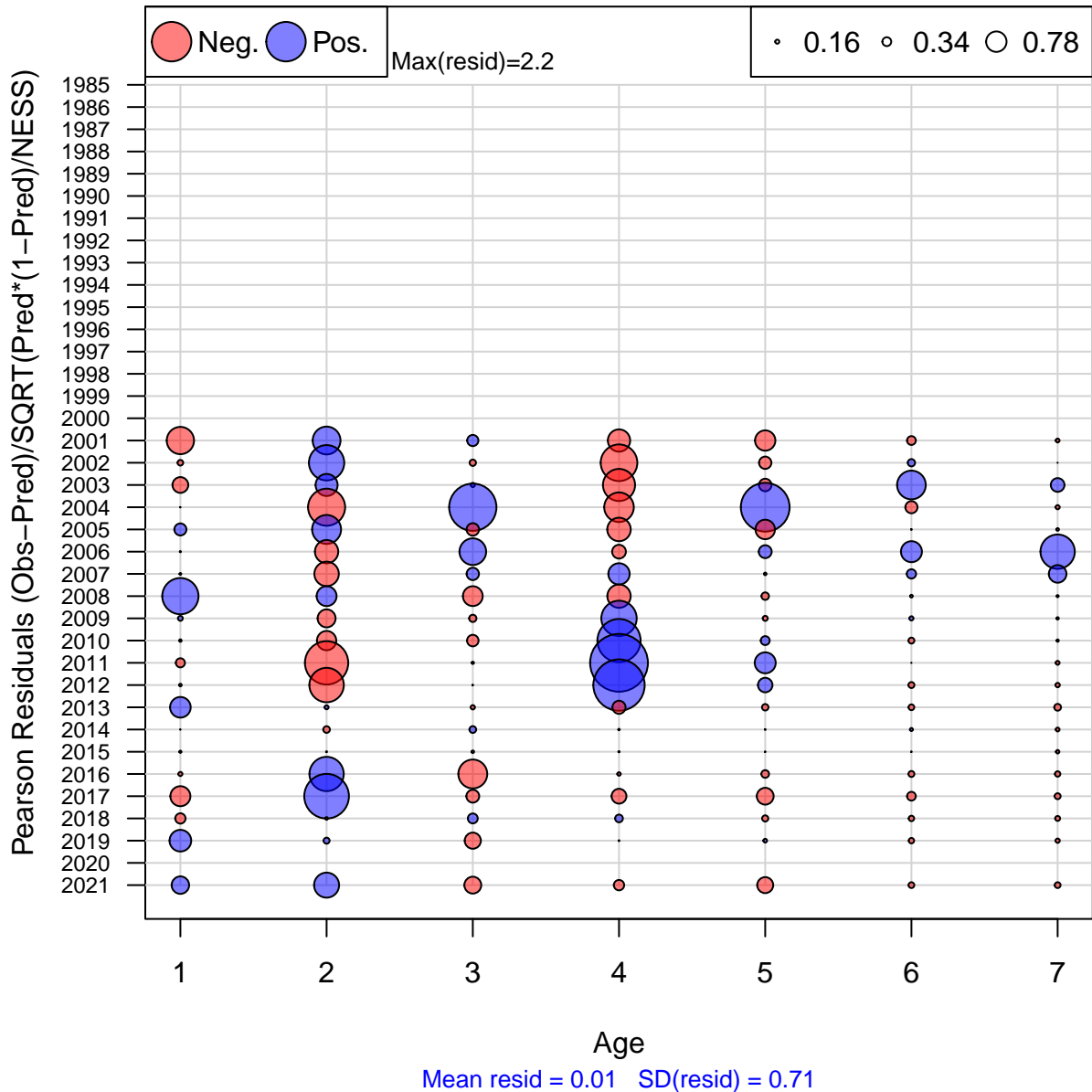
Mean resid = -0.02 SD(resid) = 0.97

Age Comp Residuals for Index 4 (NEAMAP)

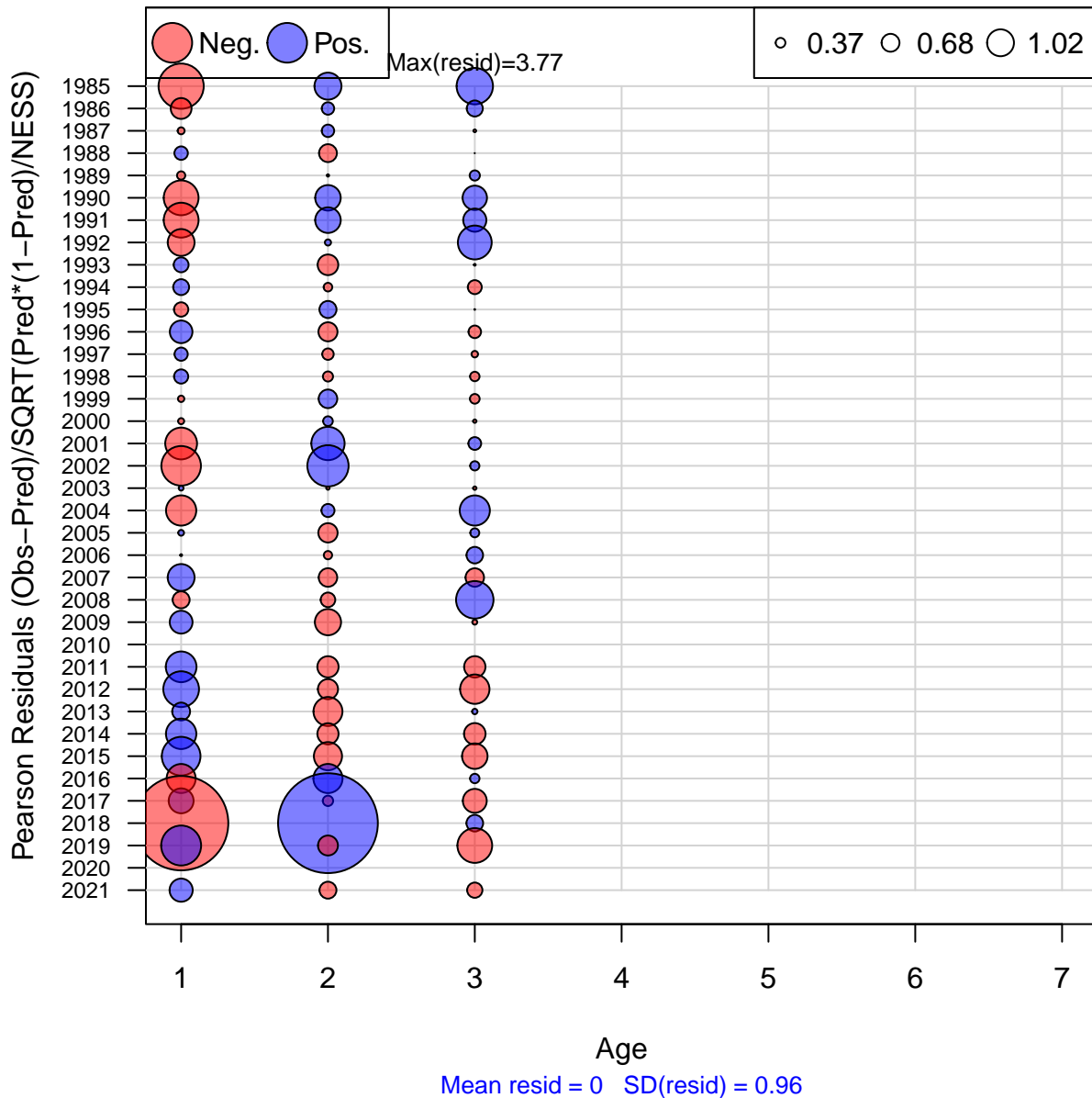
Pearson Residuals (Obs-Pred)/SQRT(Pred*(1-Pred)/NESS)



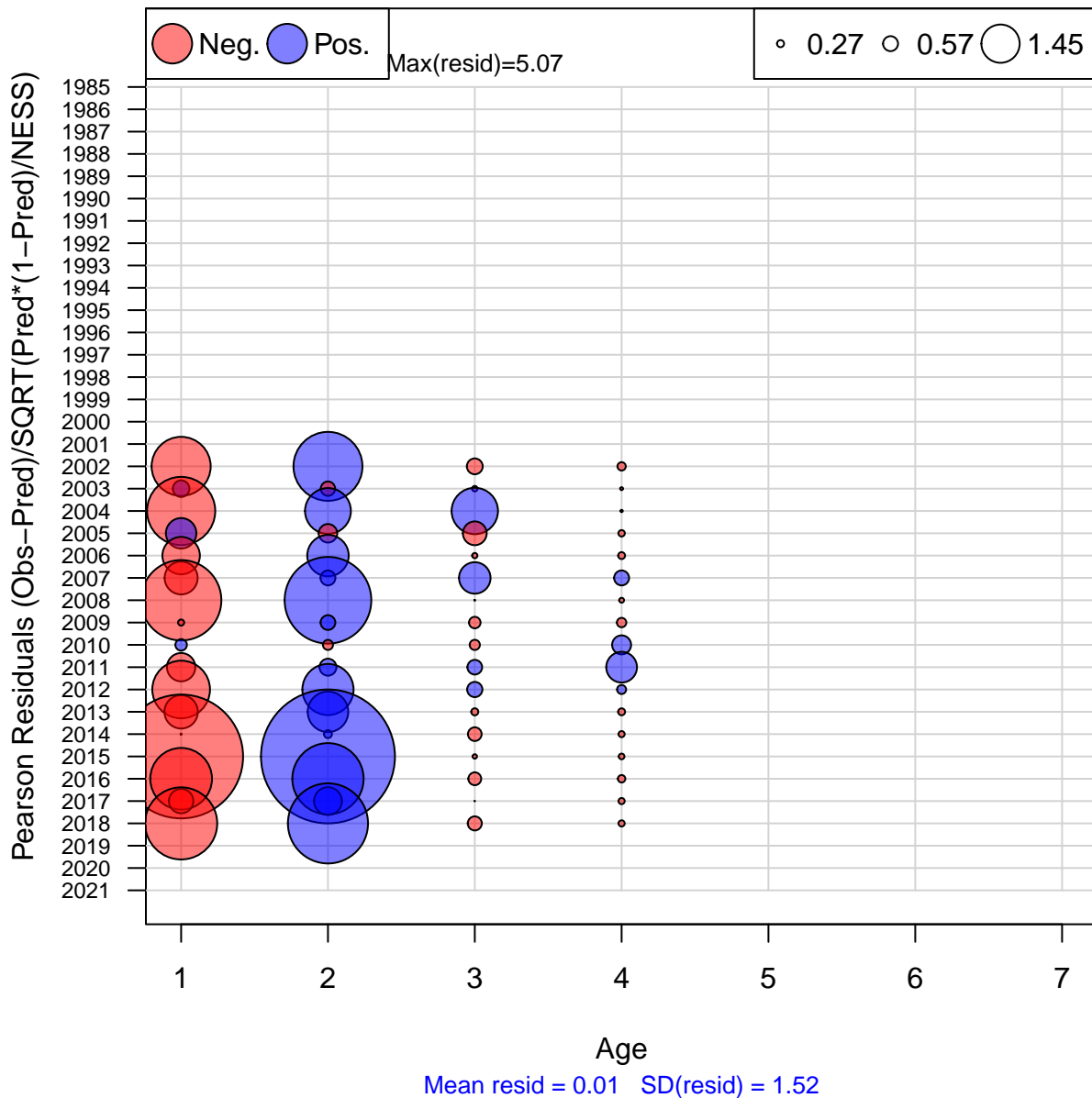
Age Comp Residuals for Index 6 (PSIGN)



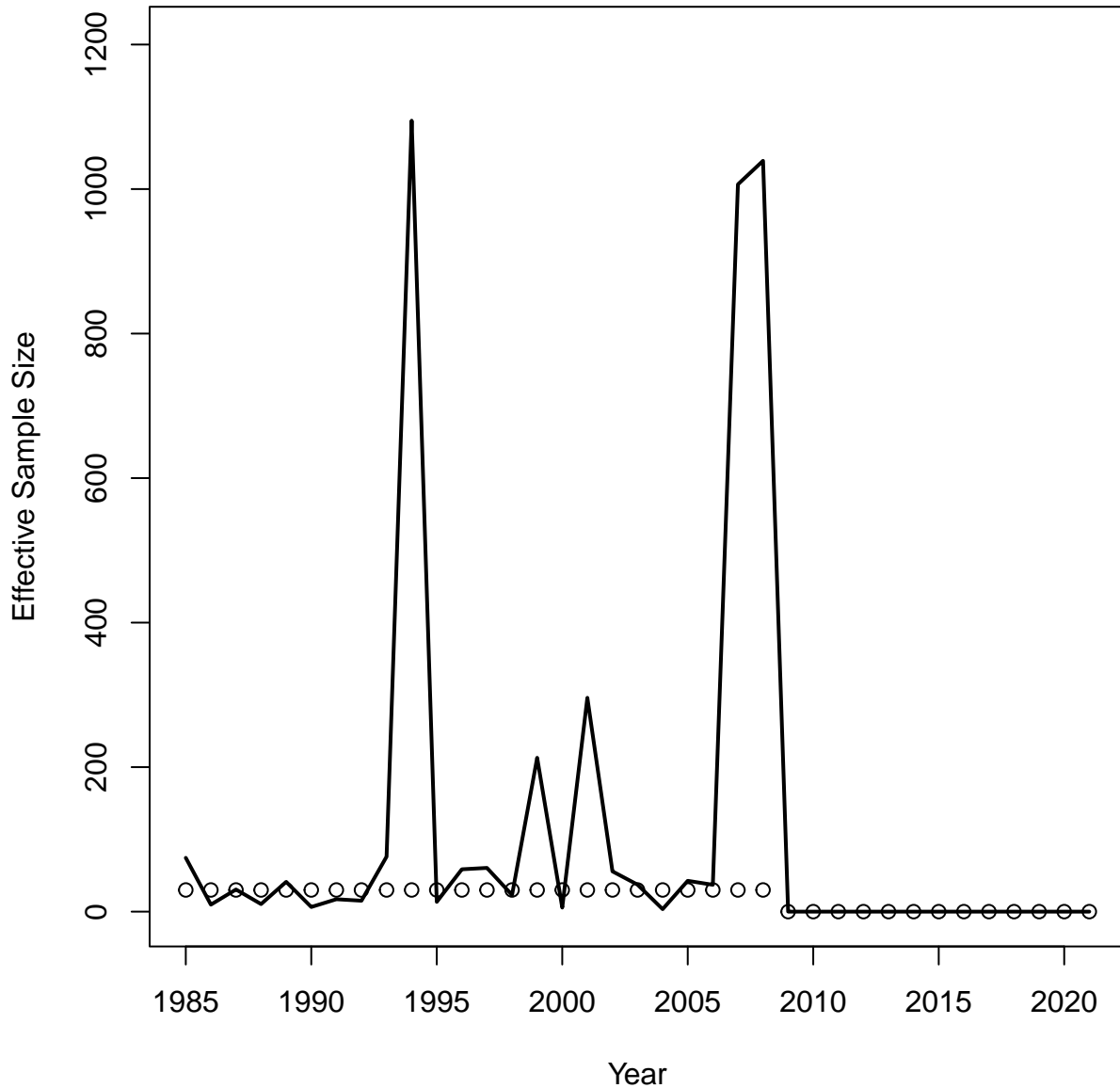
Age Comp Residuals for Index 7 (CT Trawl)



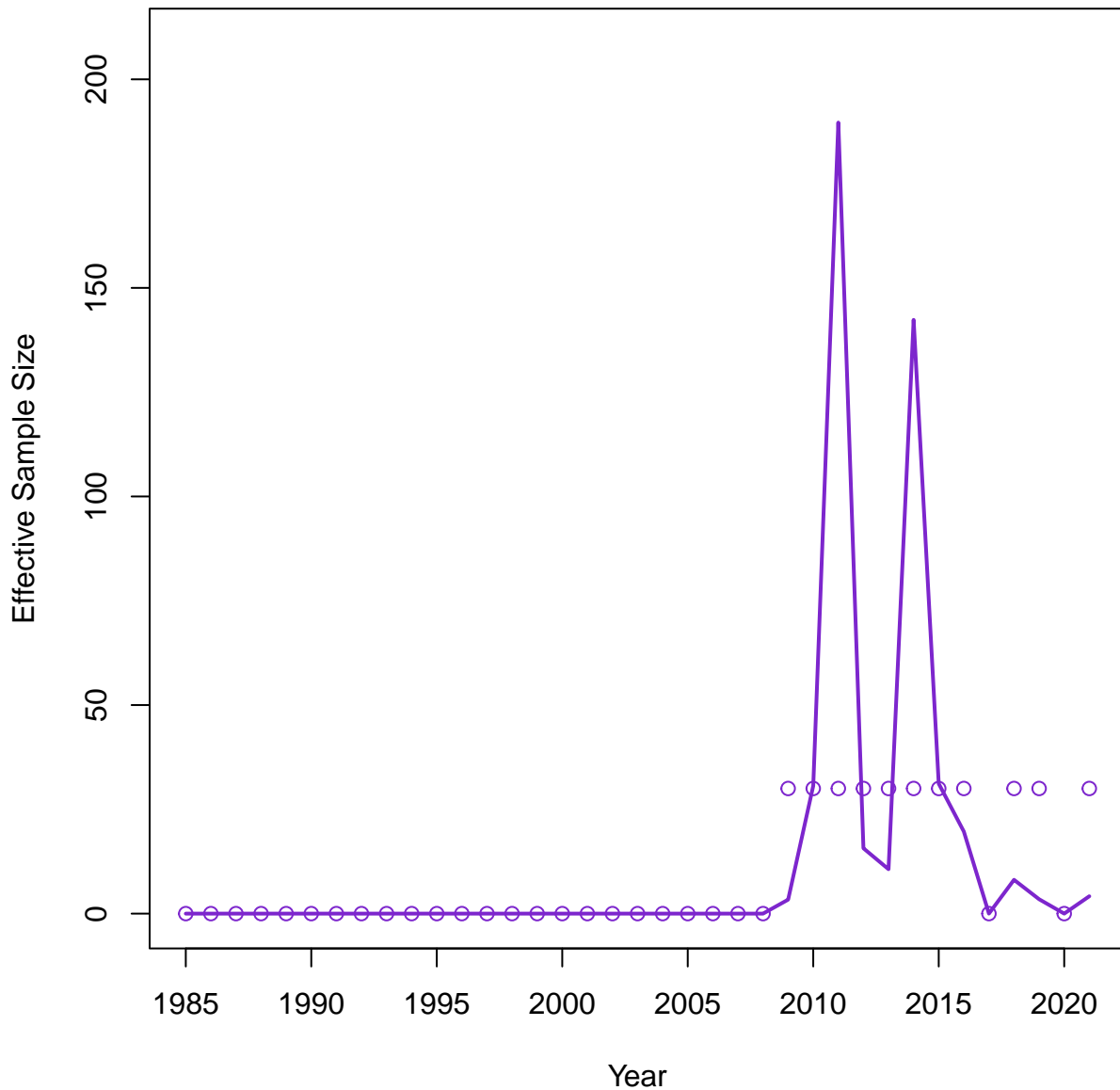
Age Comp Residuals for Index 9 (ChesMMAp)



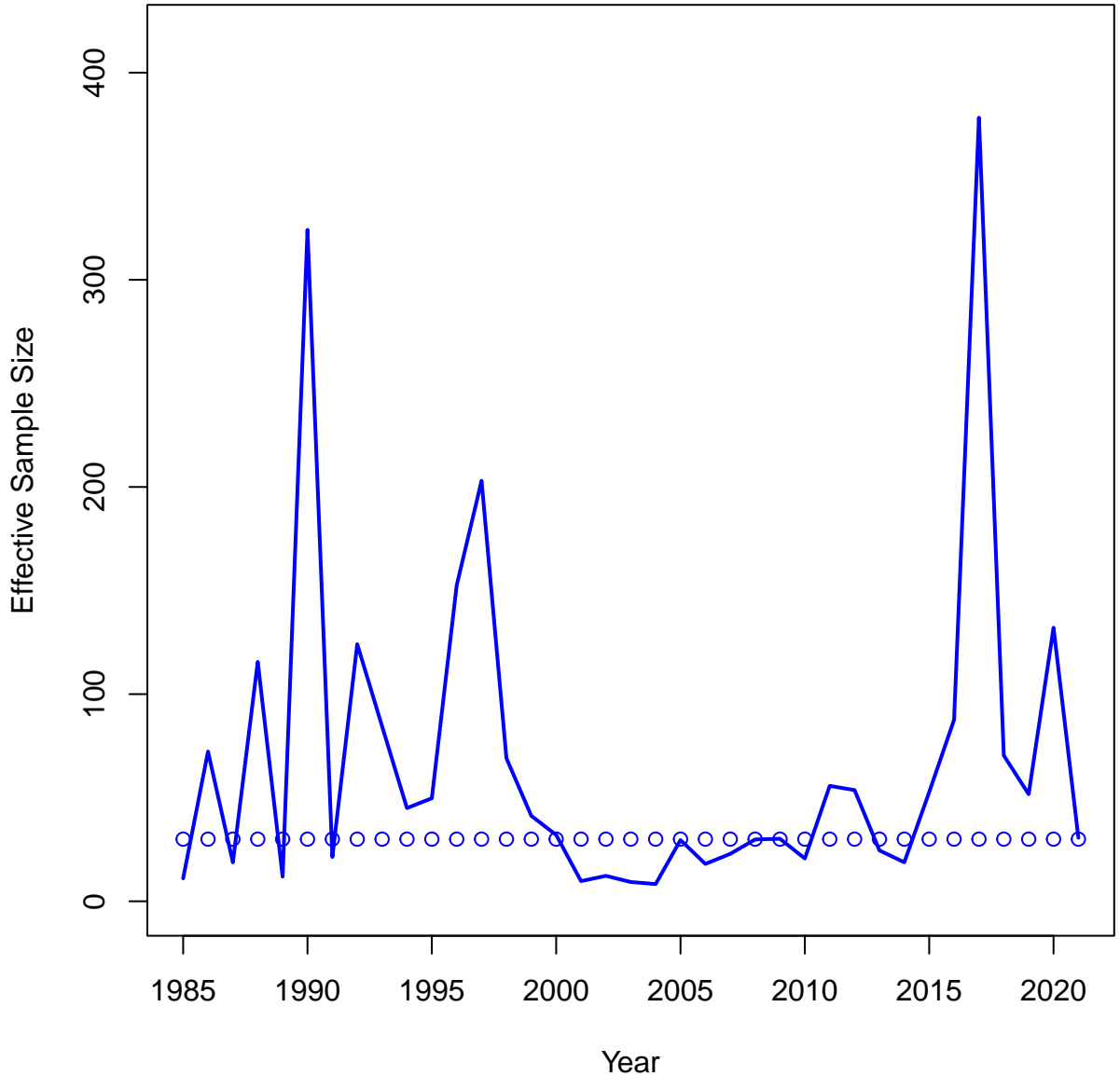
Index Neff 1 (NEFSC Inshore)



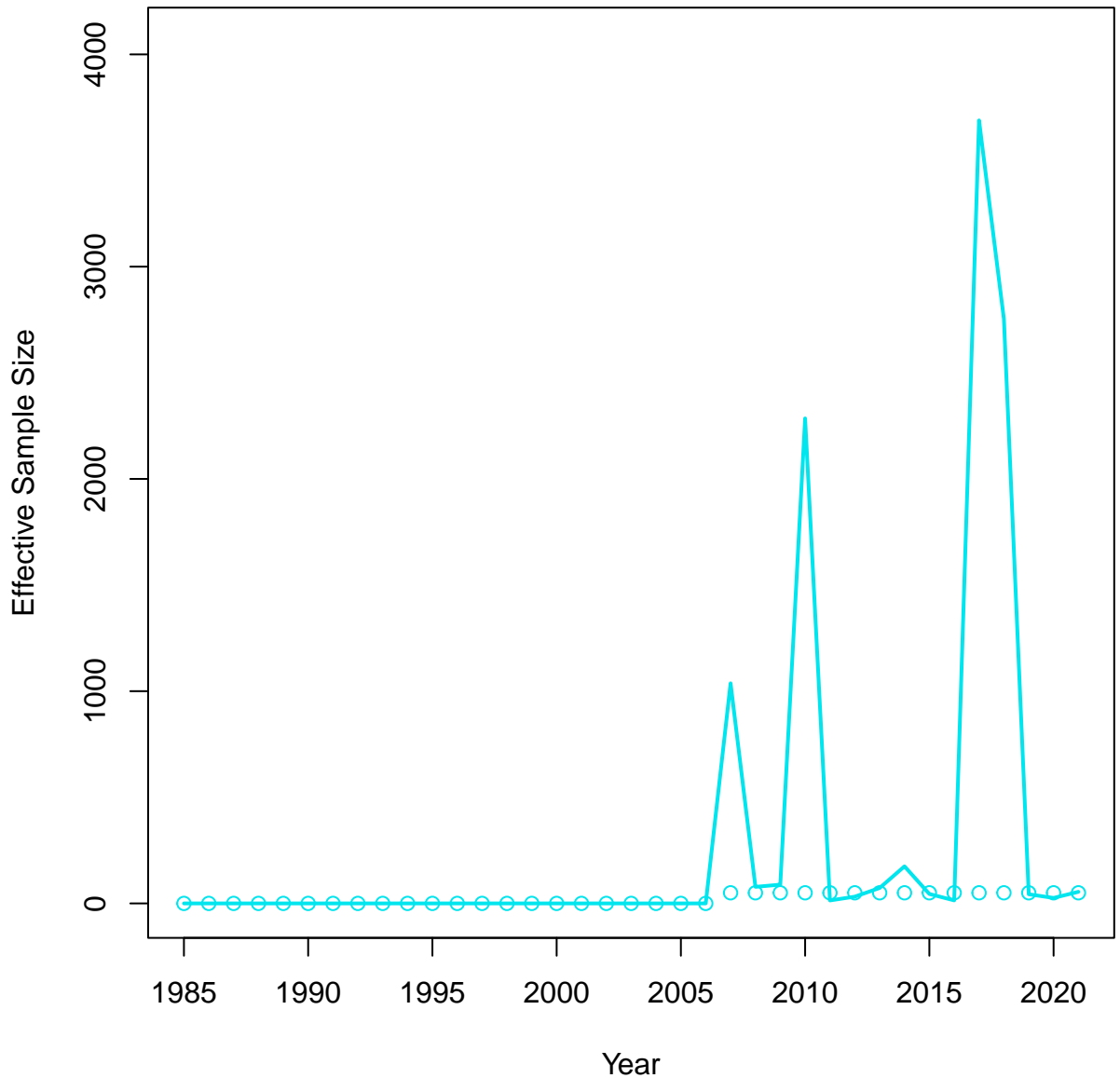
Index Neff 2 (Bigelow)



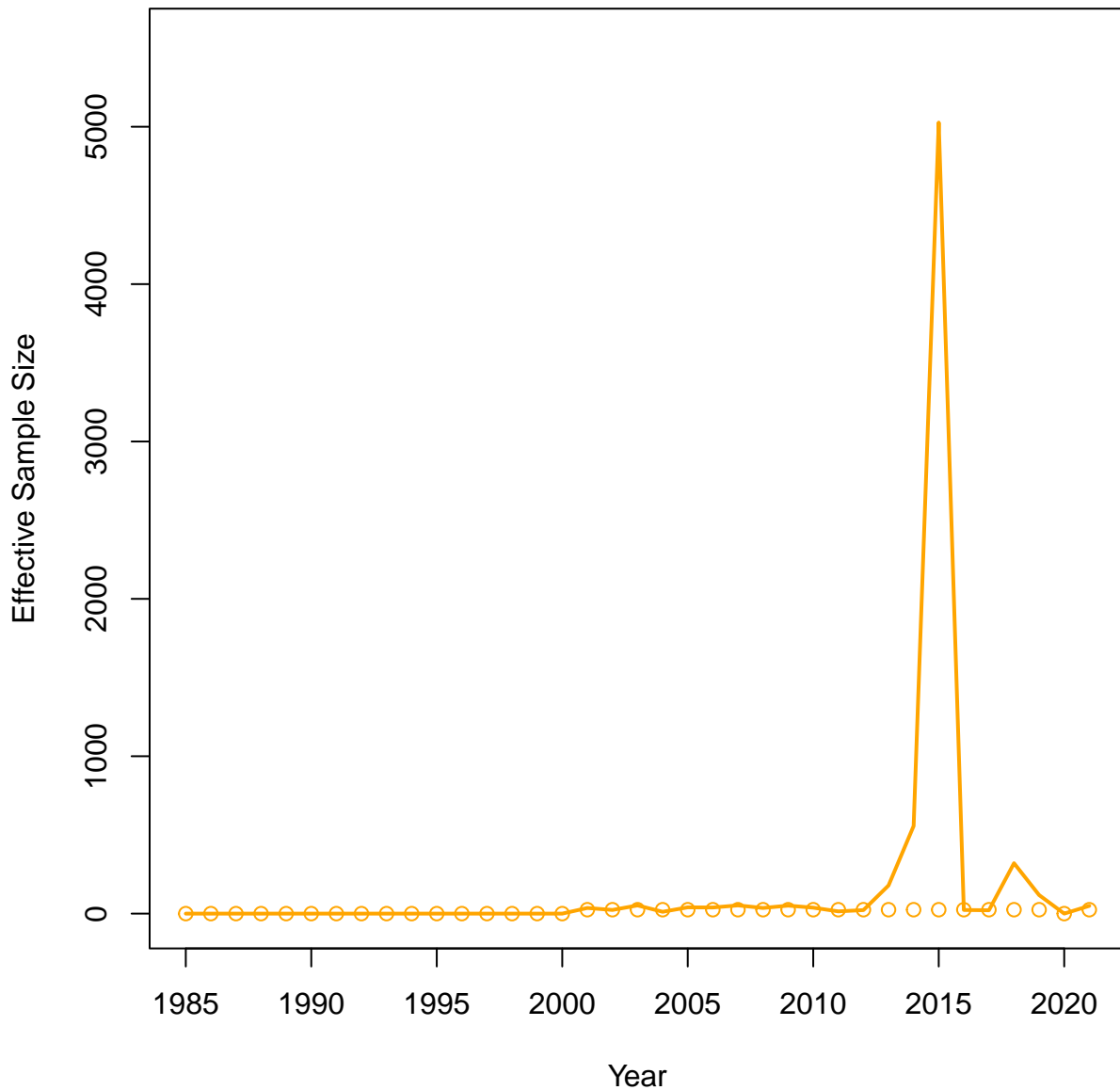
Index Neff 3 (MRIP)



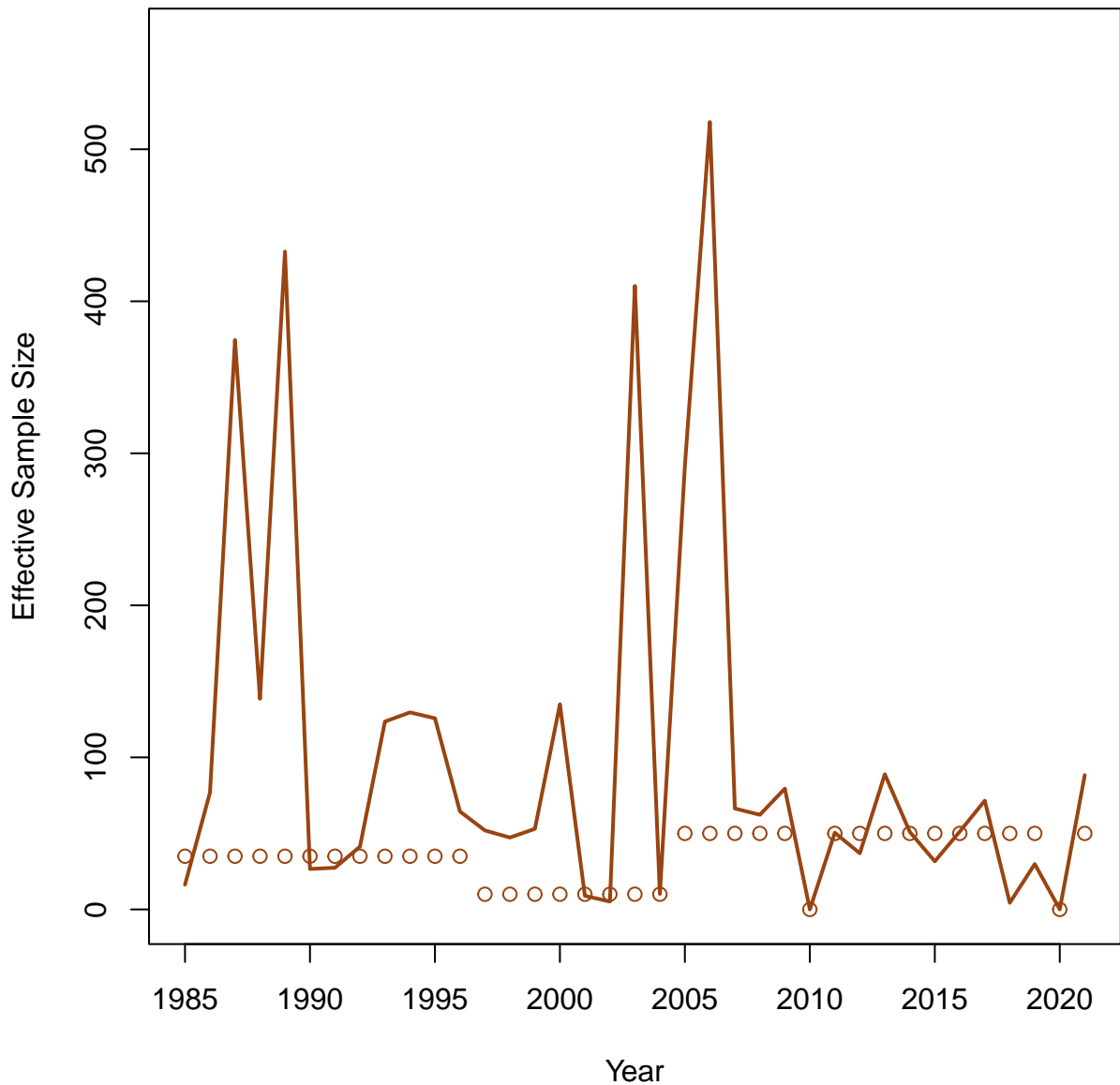
Index Neff 4 (NEAMAP)



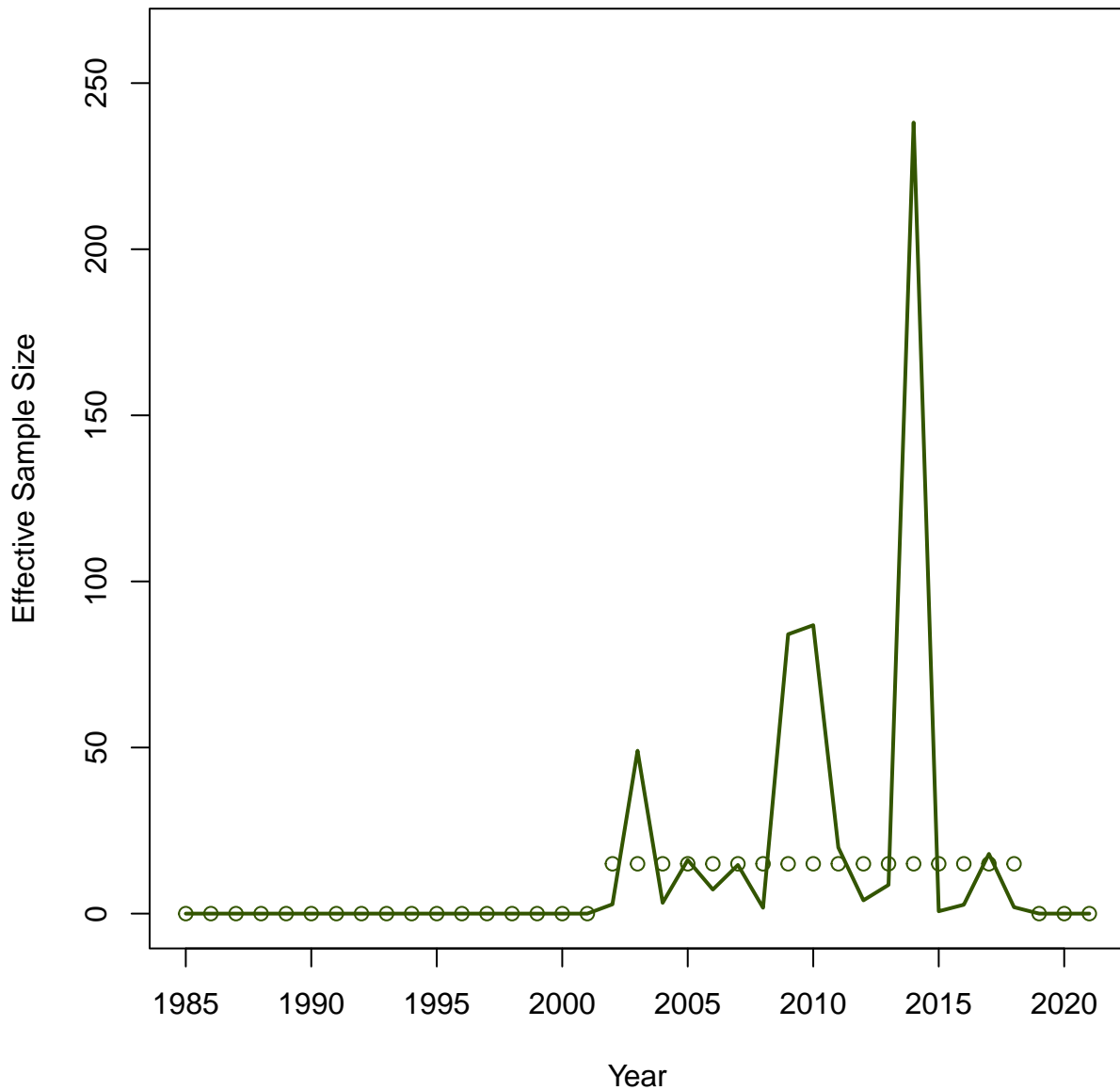
Index Neff 6 (PSIGN)



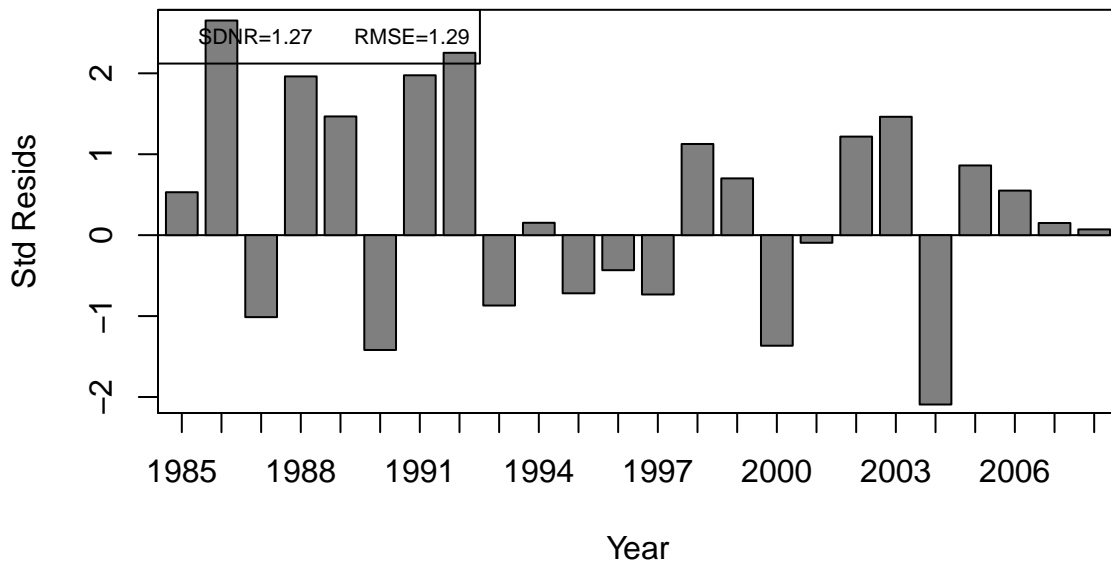
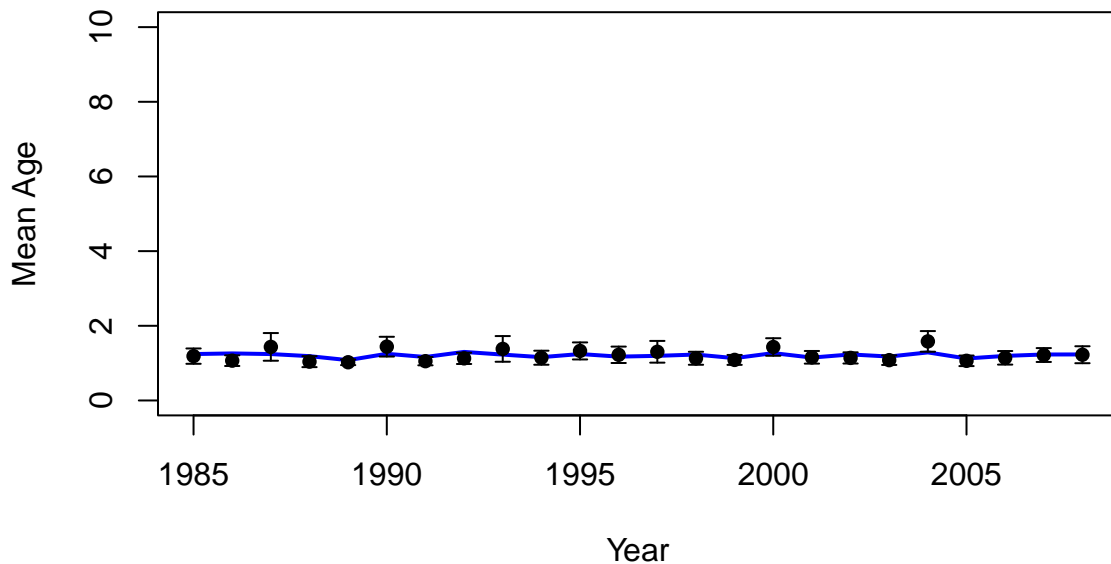
Index Neff 7 (CT Trawl)



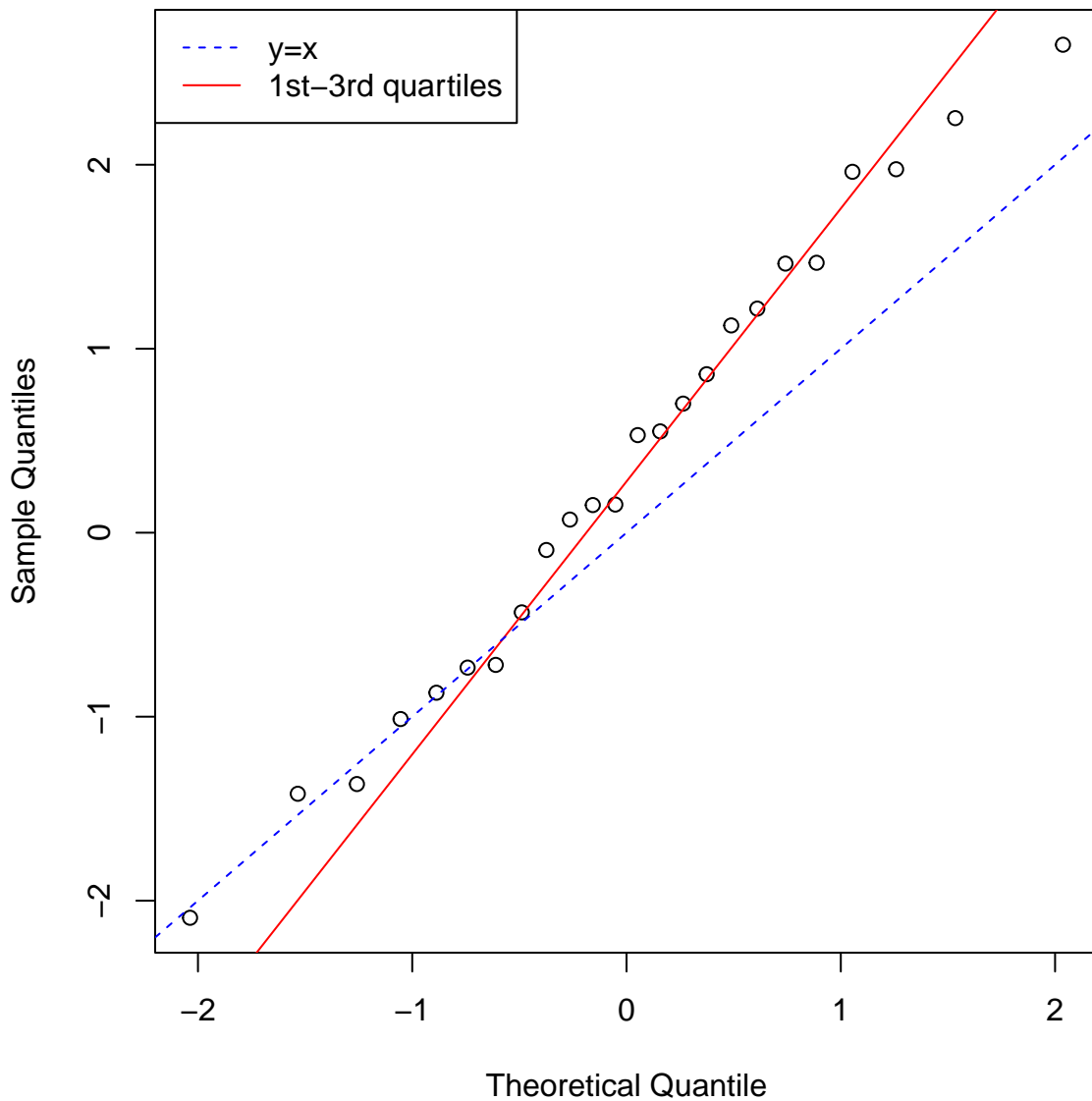
Index Neff 9 (ChesMMAp)



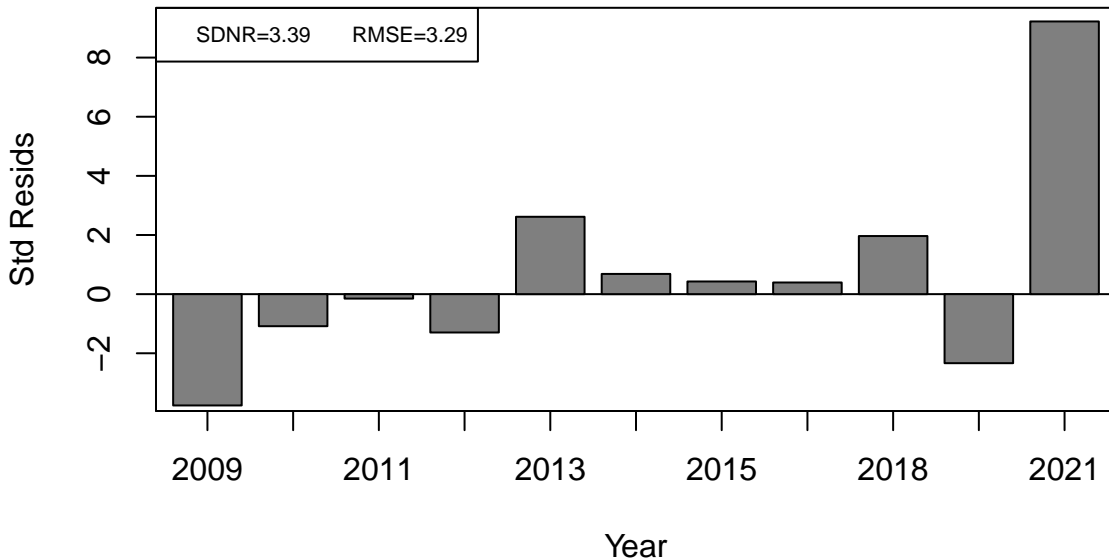
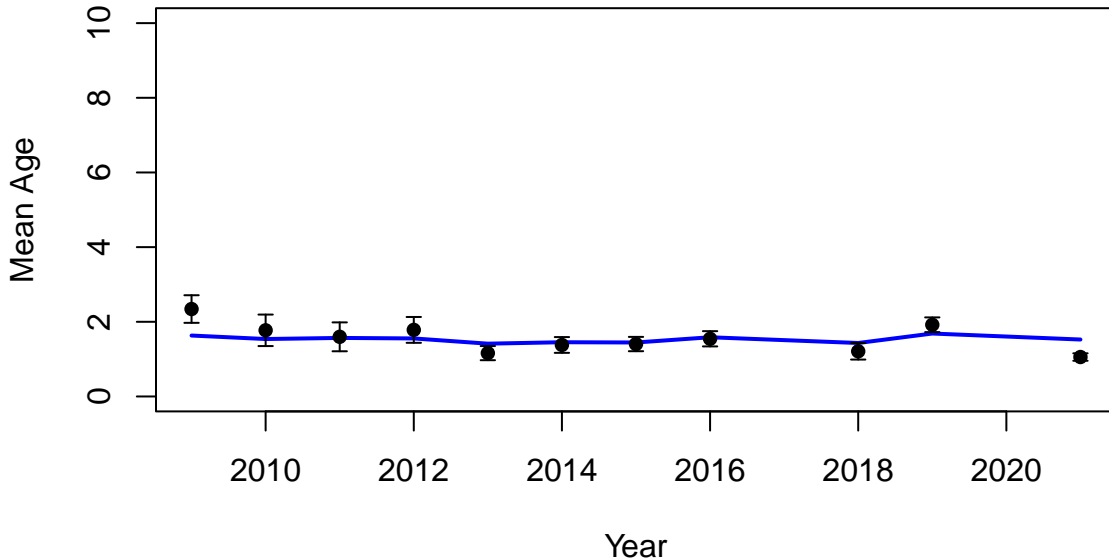
Index 1 (NEFSC Inshore) ESS = 30



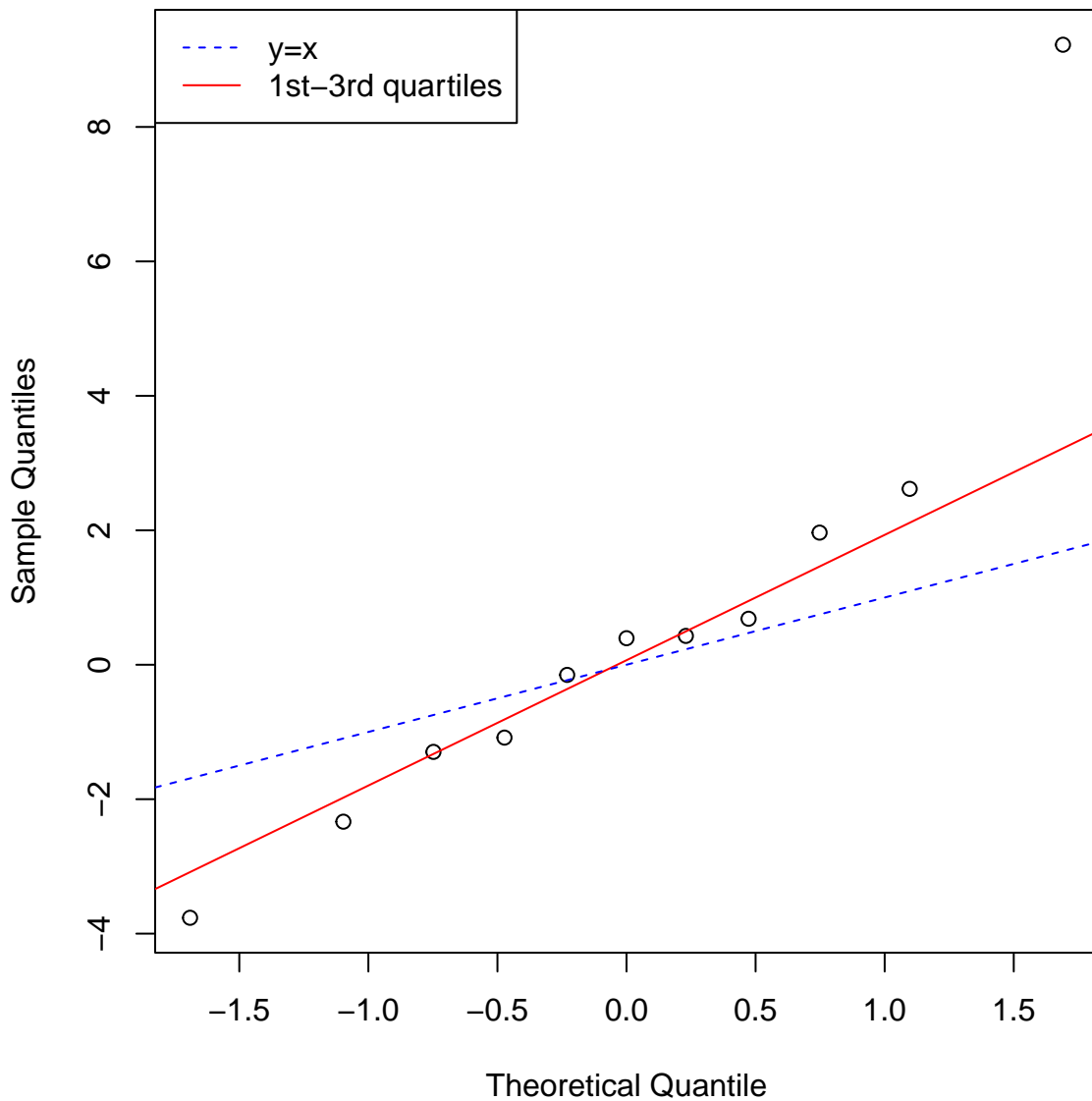
Index 1 (NEFSC Inshore) ESS = 30



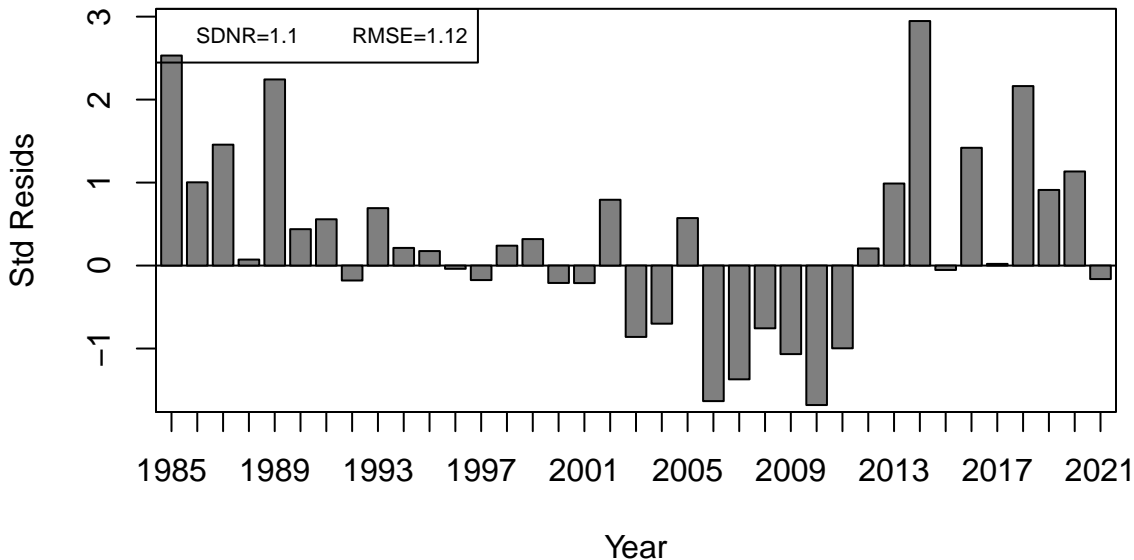
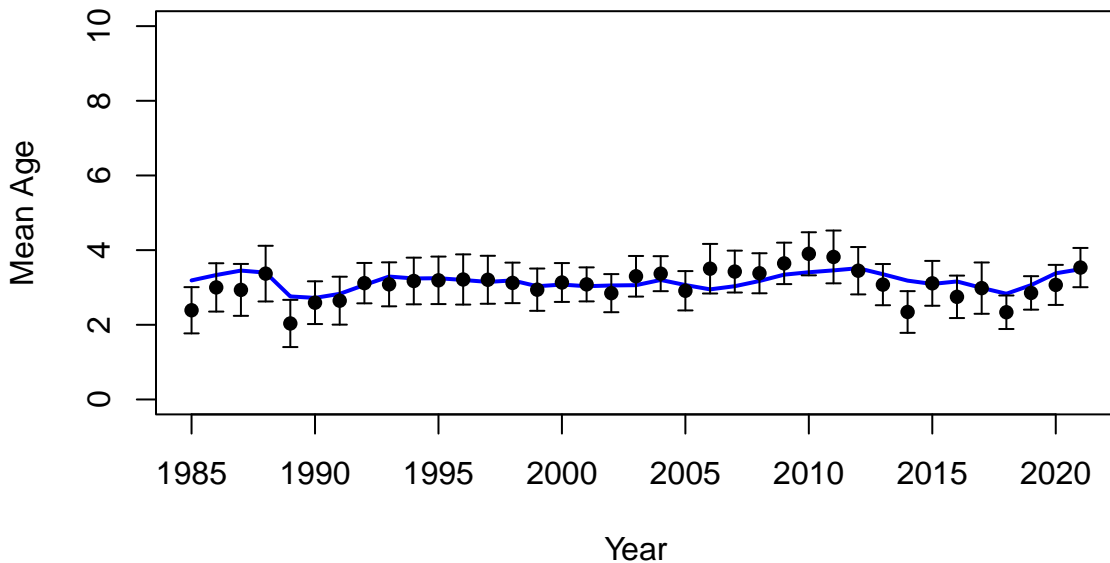
Index 2 (Bigelow) ESS = 30



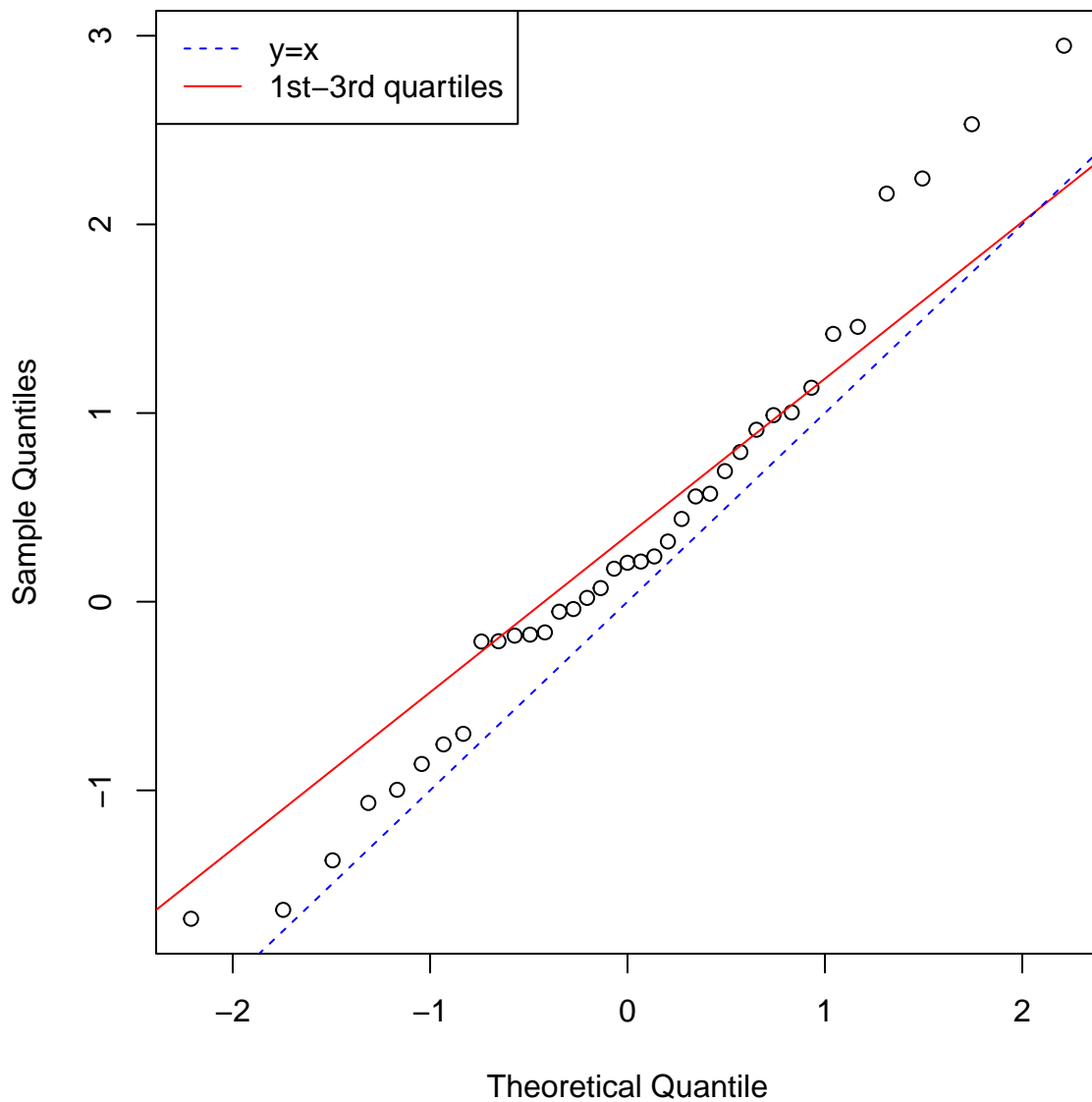
Index 2 (Bigelow) ESS = 30



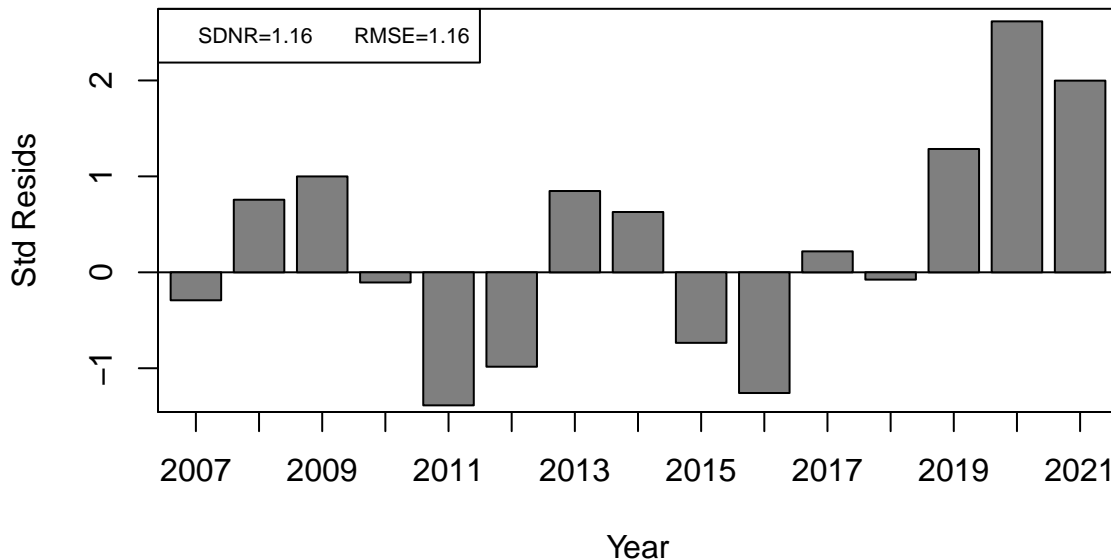
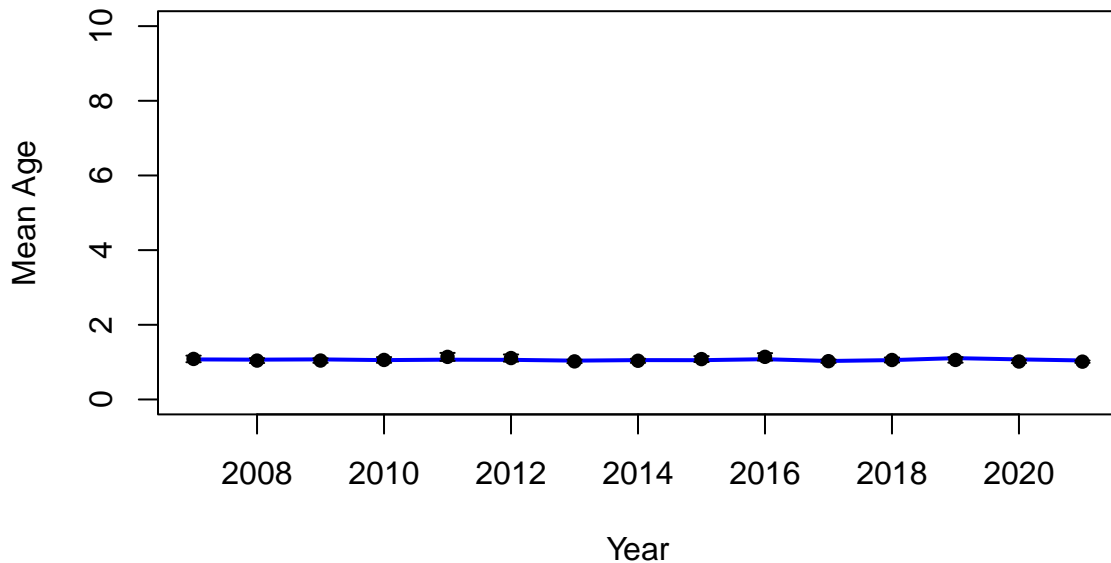
Index 3 (MRIP) ESS = 30



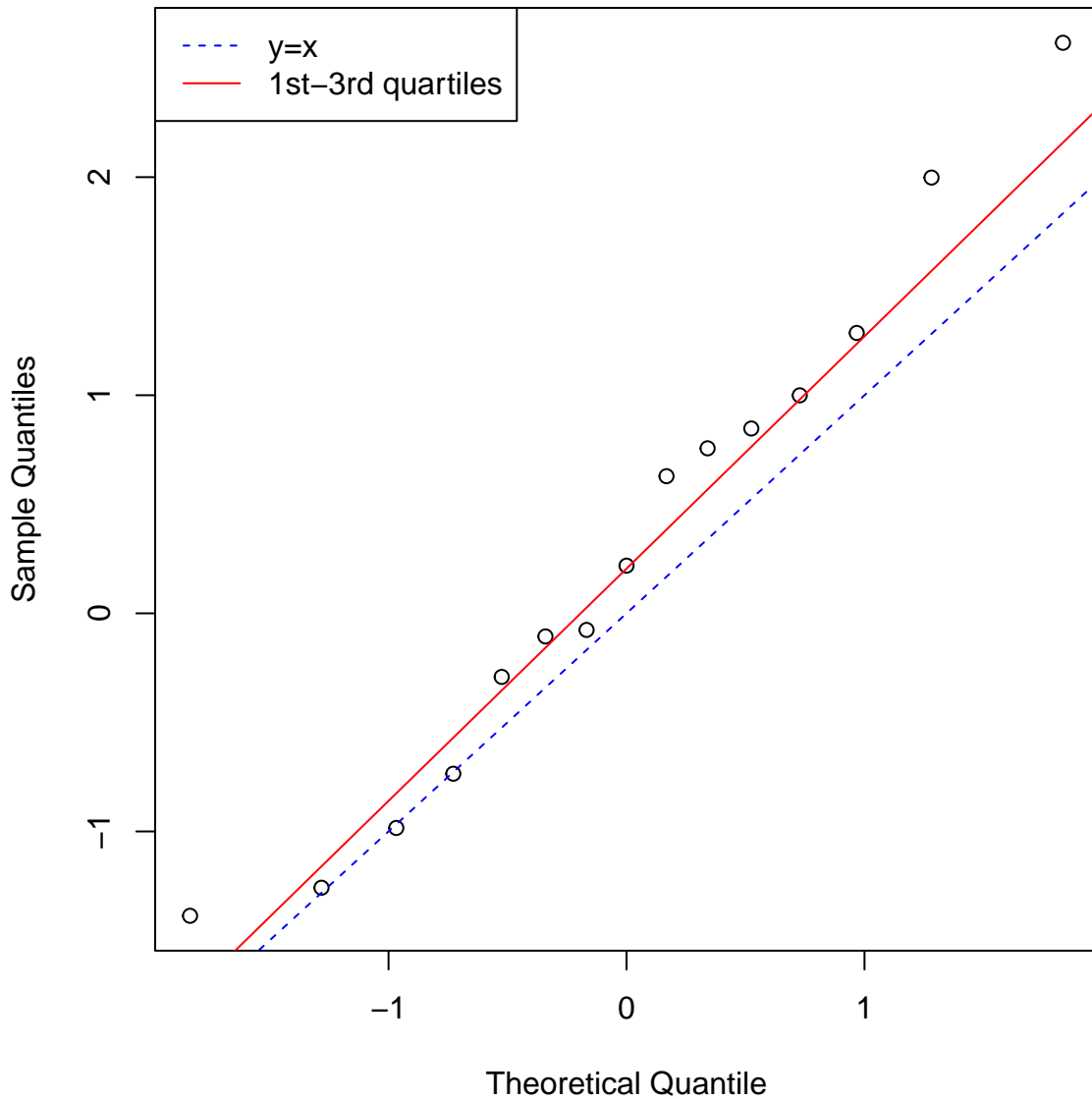
Index 3 (MRIP) ESS = 30



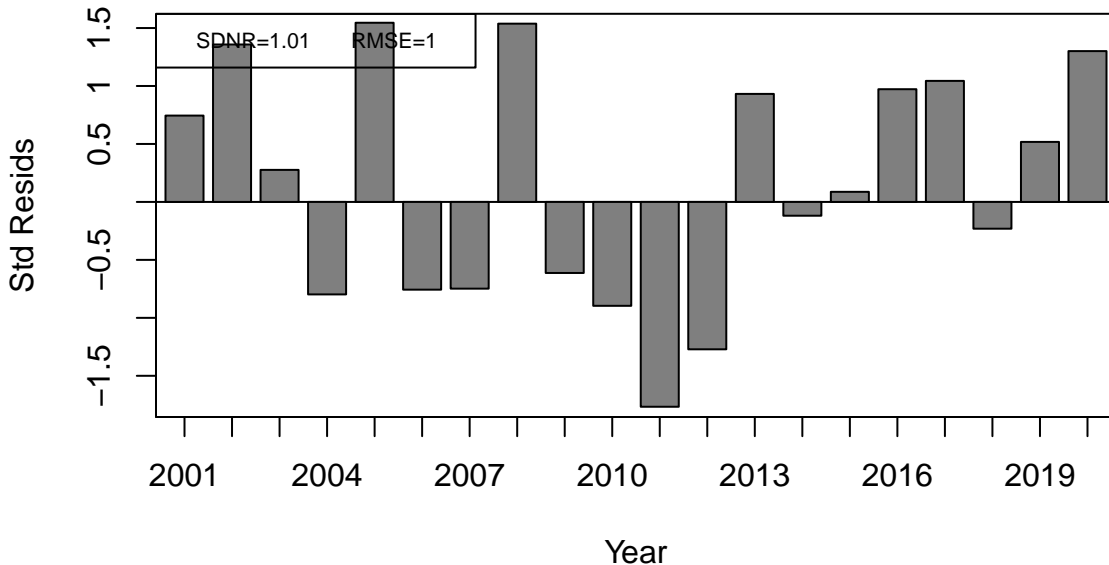
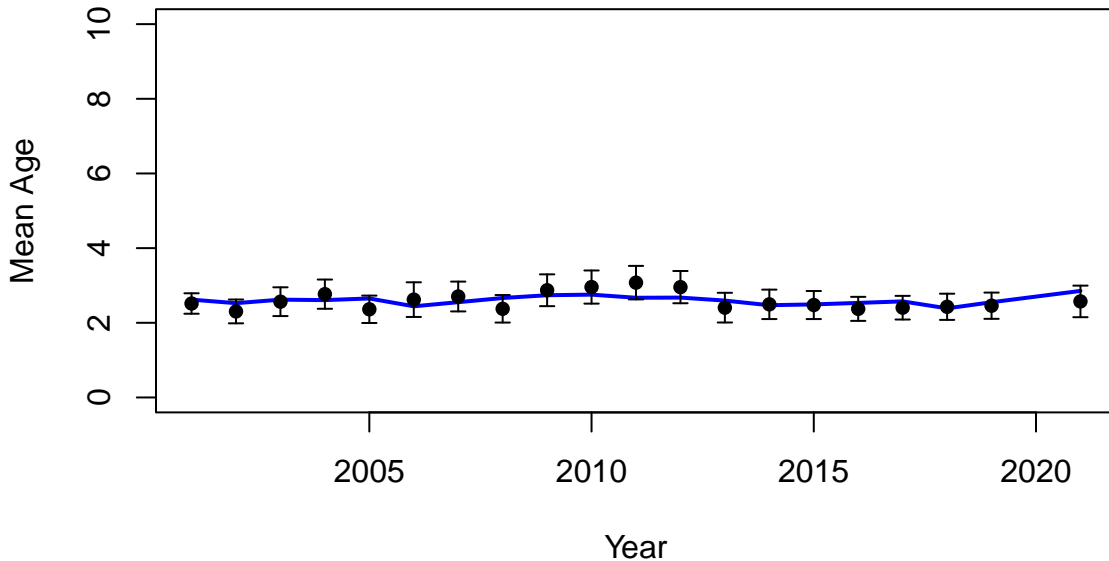
Index 4 (NEAMAP) ESS = 50



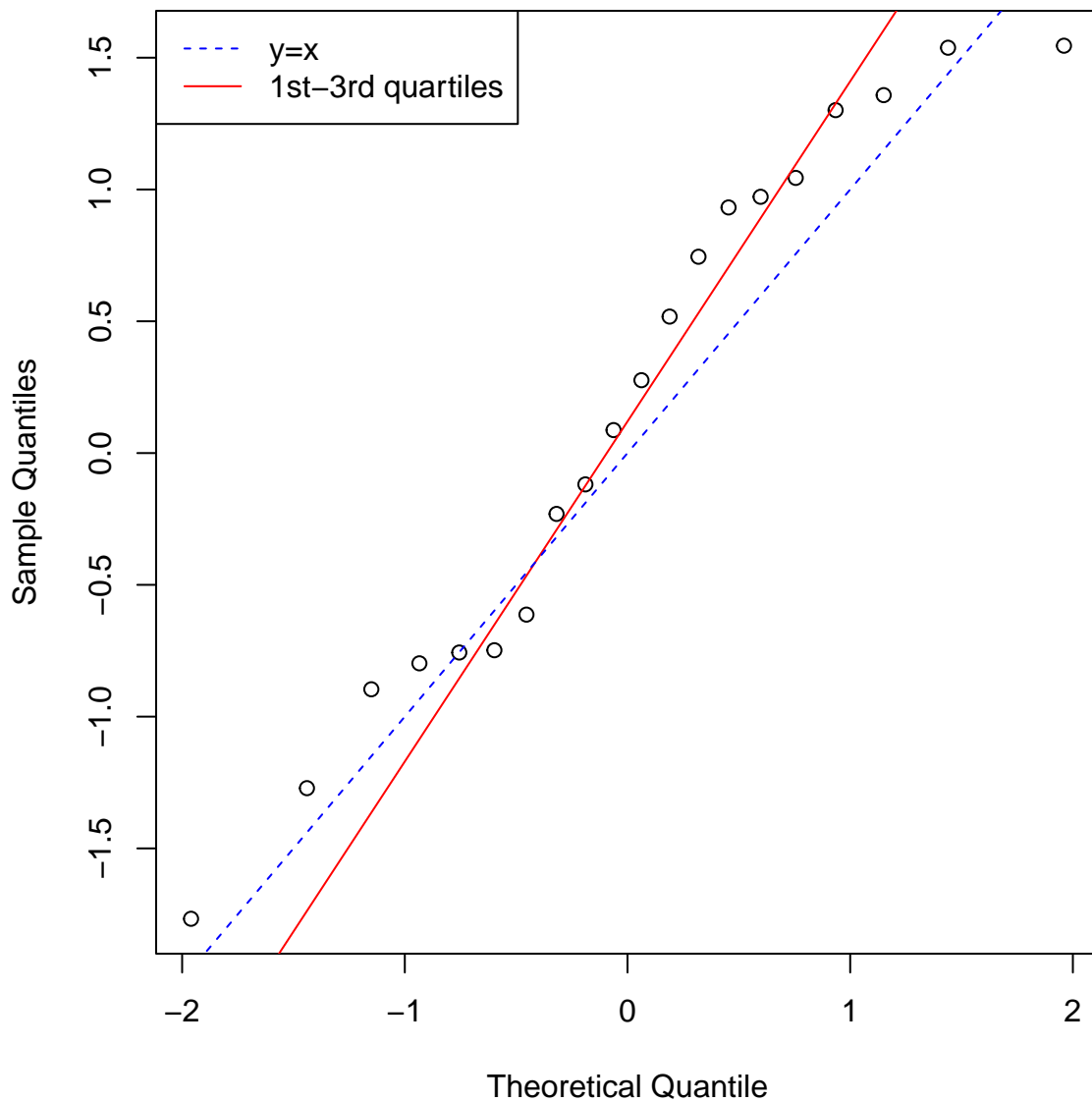
Index 4 (NEAMAP) ESS = 50



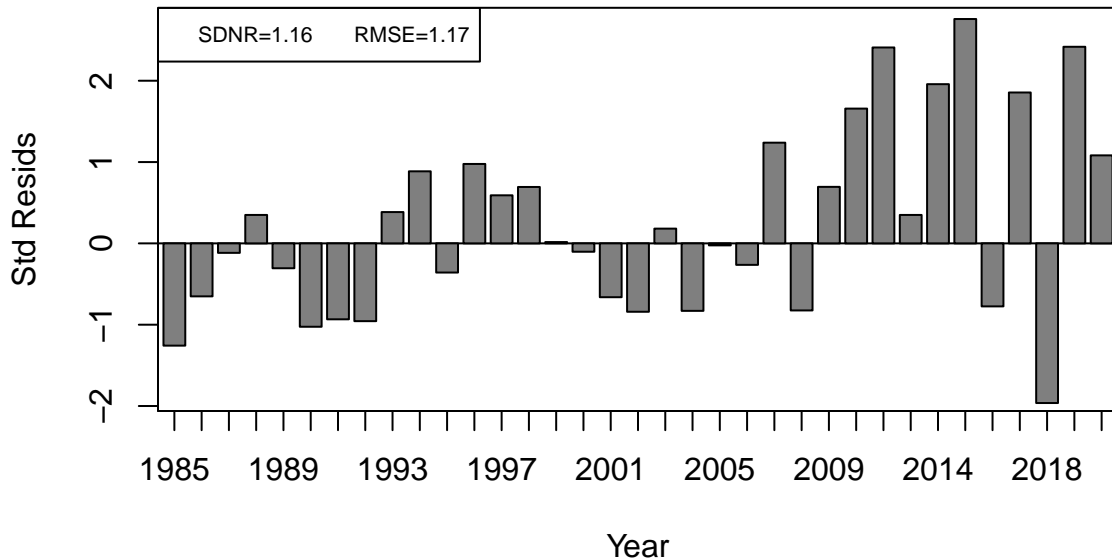
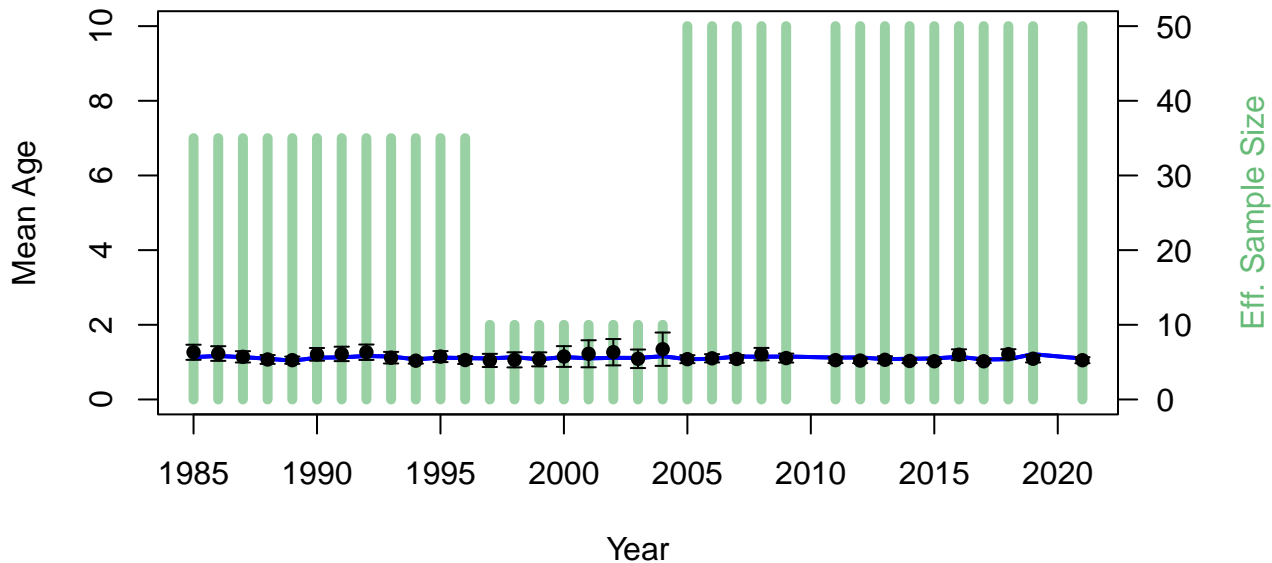
Index 6 (PSIGN) ESS = 25



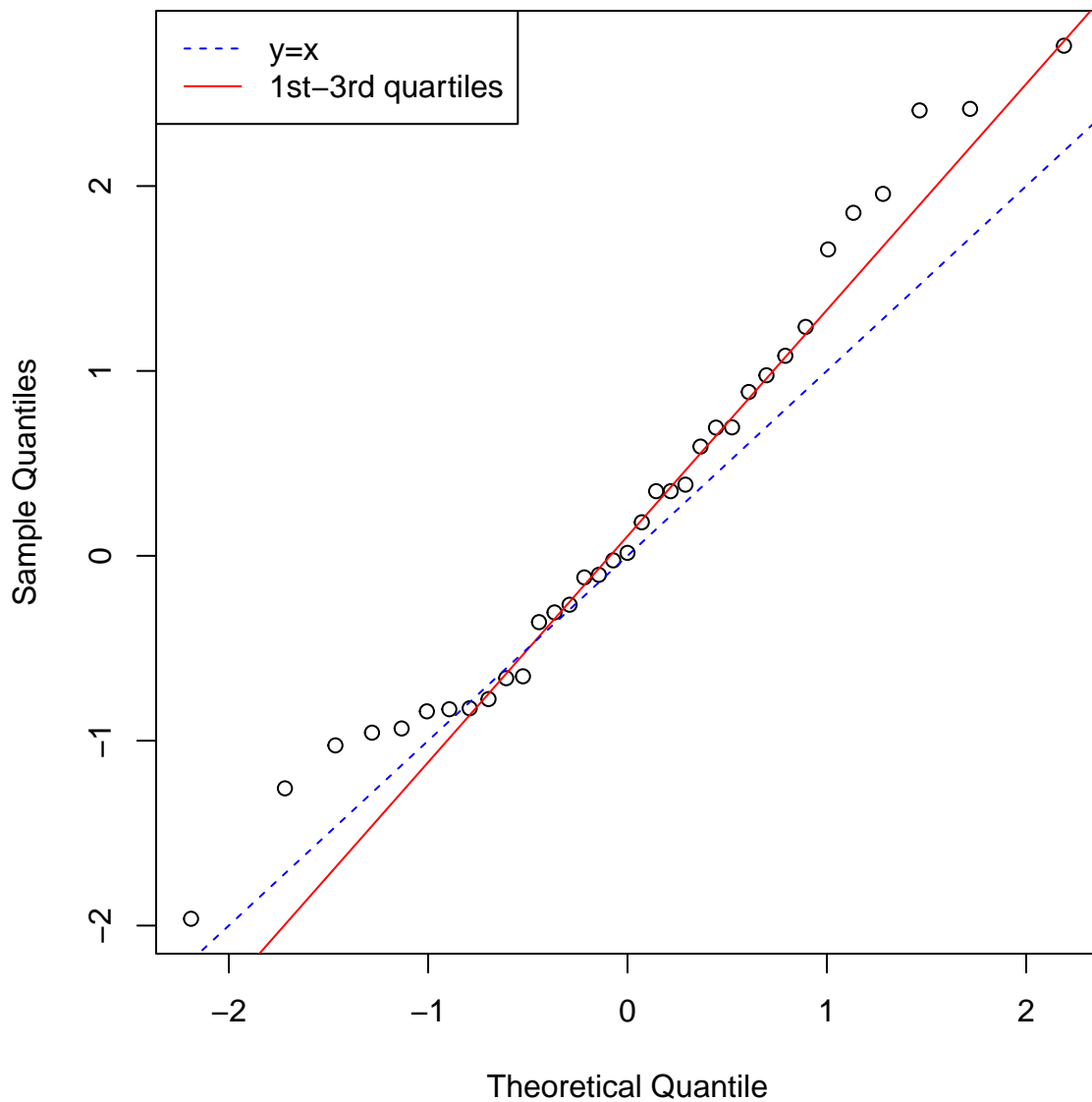
Index 6 (PSIGN) ESS = 25



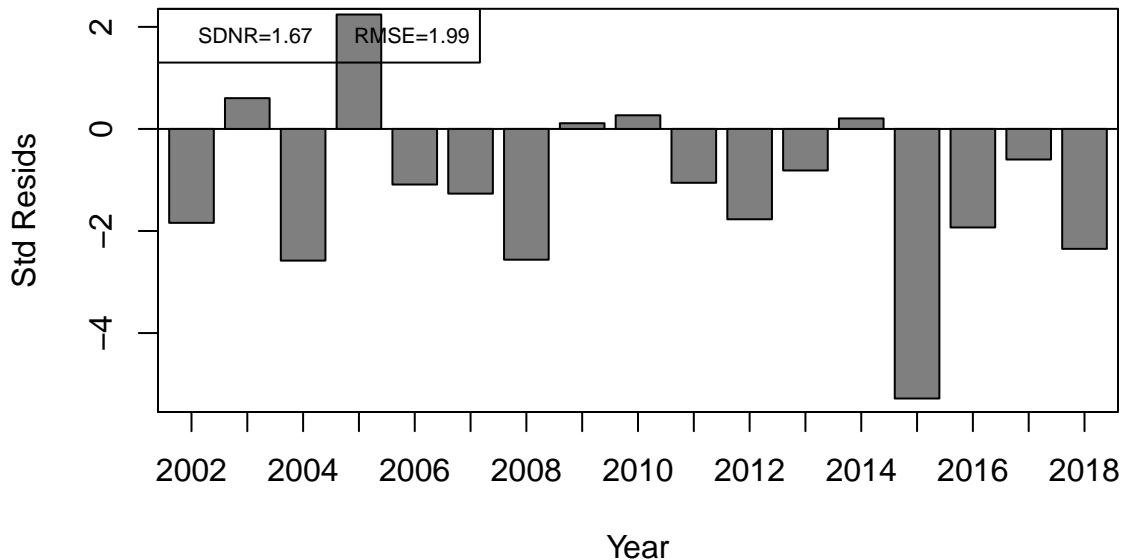
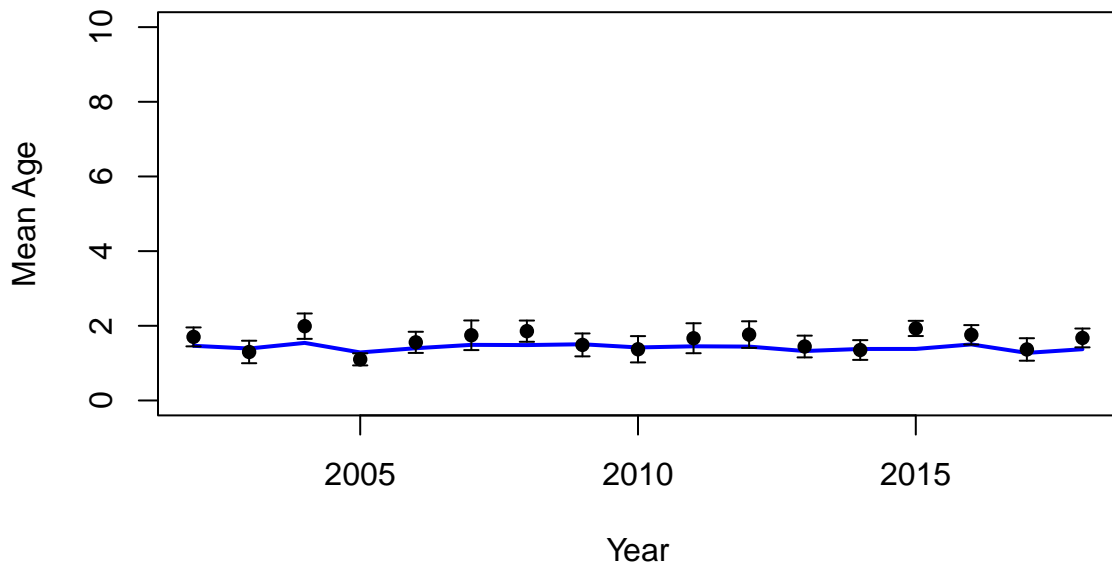
Index 7 (CT Trawl)



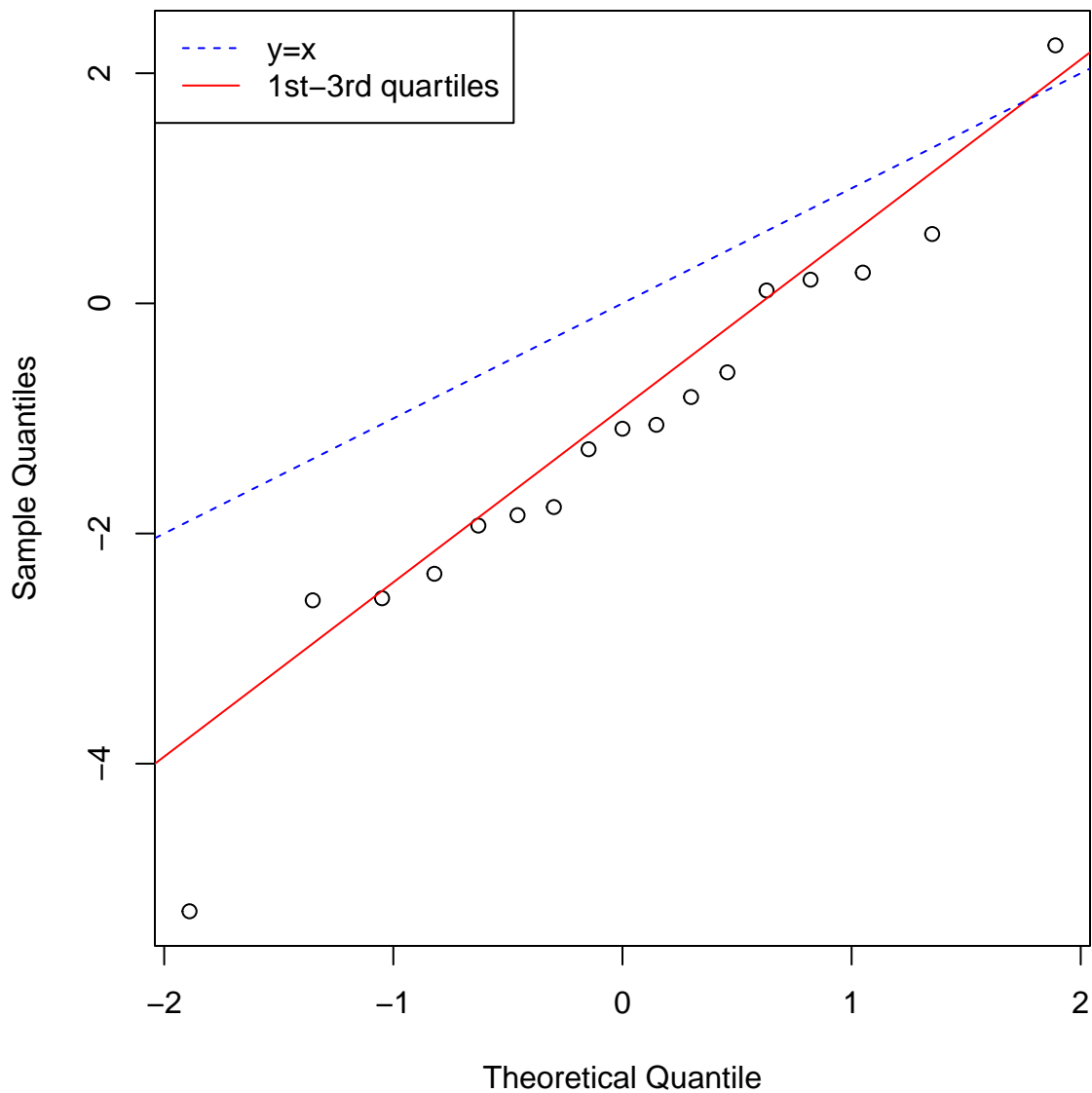
Index 7 (CT Trawl)



Index 9 (ChesMMAPE) ESS = 15



Index 9 (ChesMMAp) ESS = 15

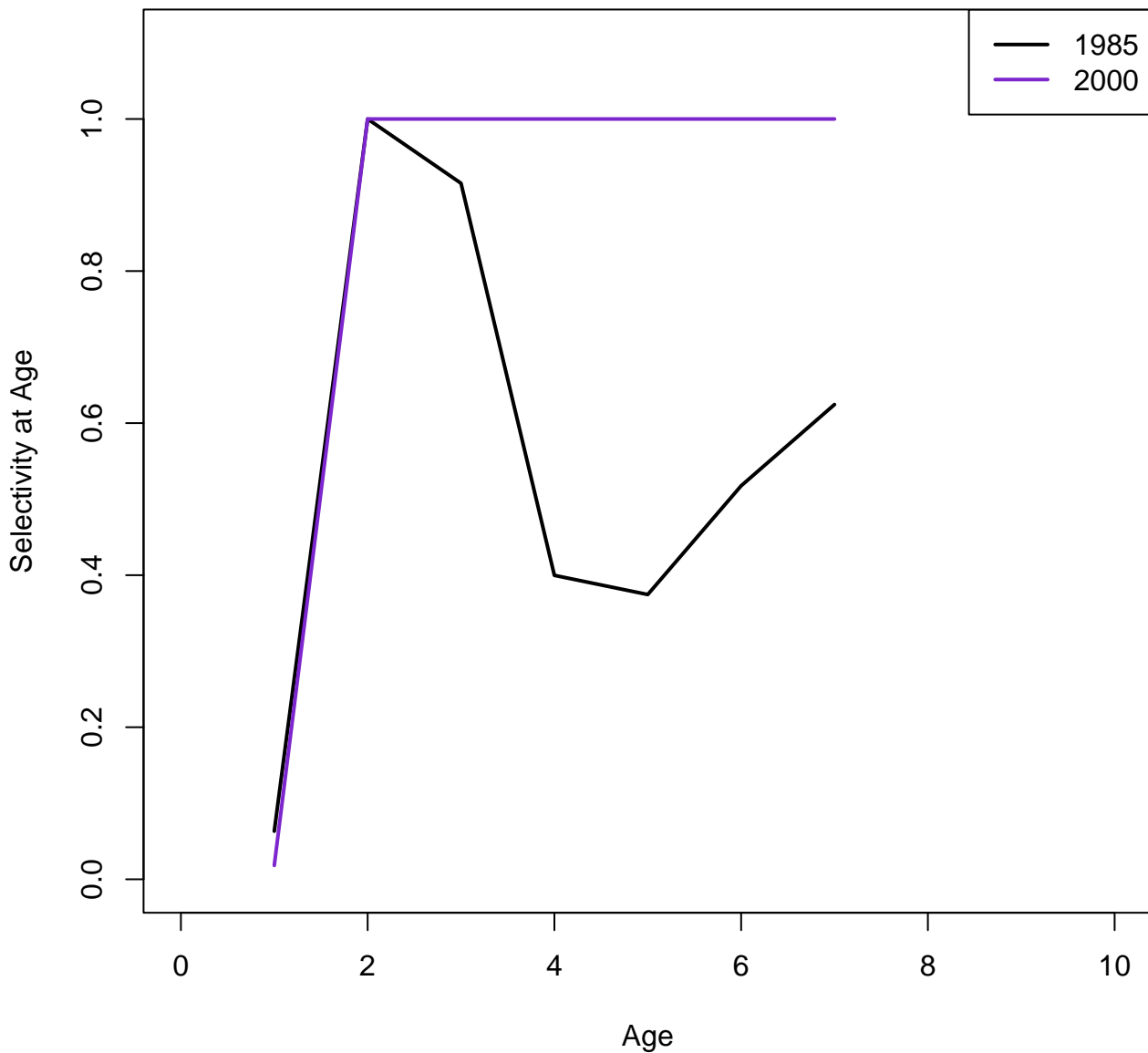


BF19

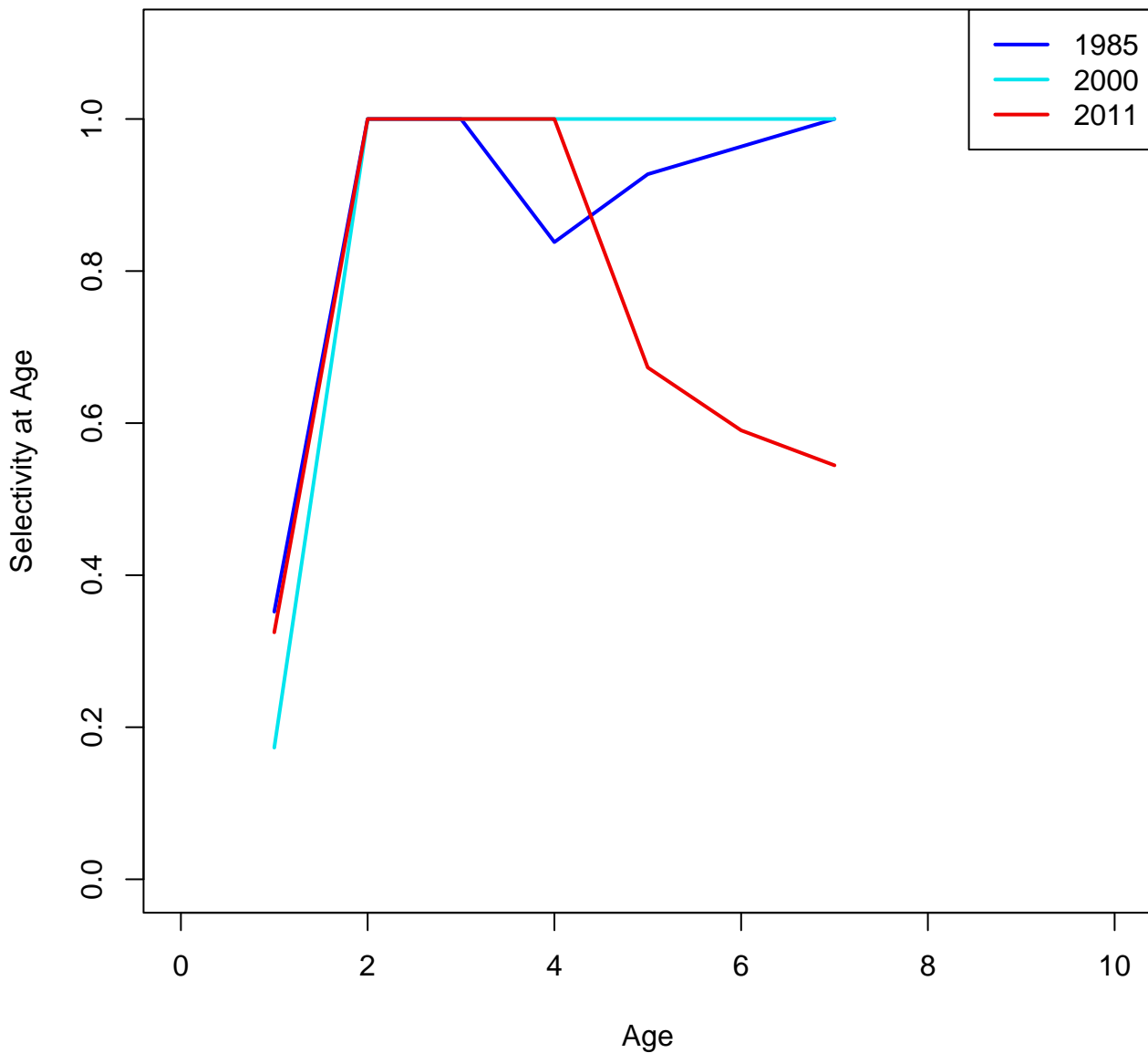
5 fleet selectivity blocks, average F from age 1 to ages 1-2

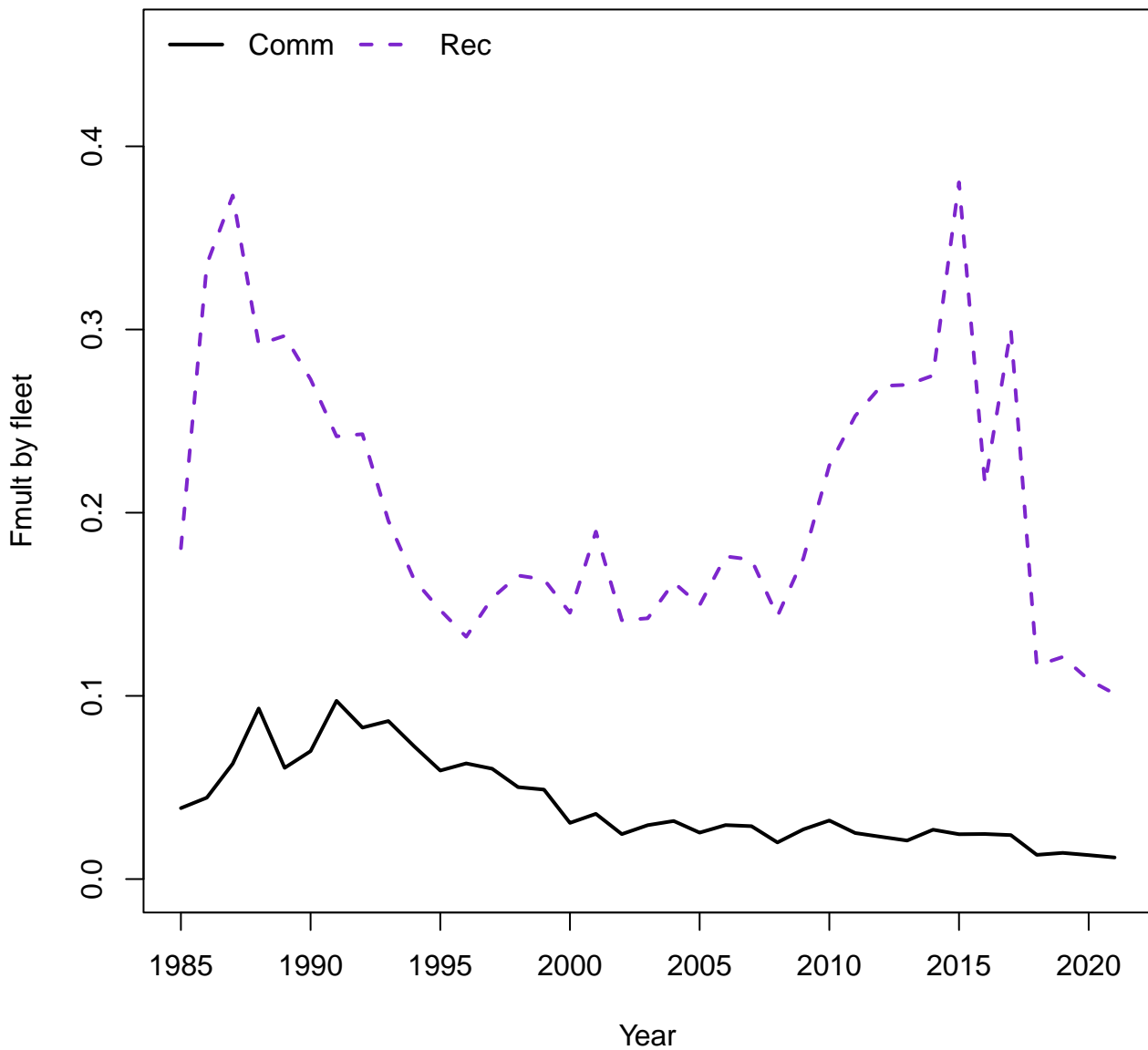
RESULTS PLOTS

Fleet 1 (Comm)

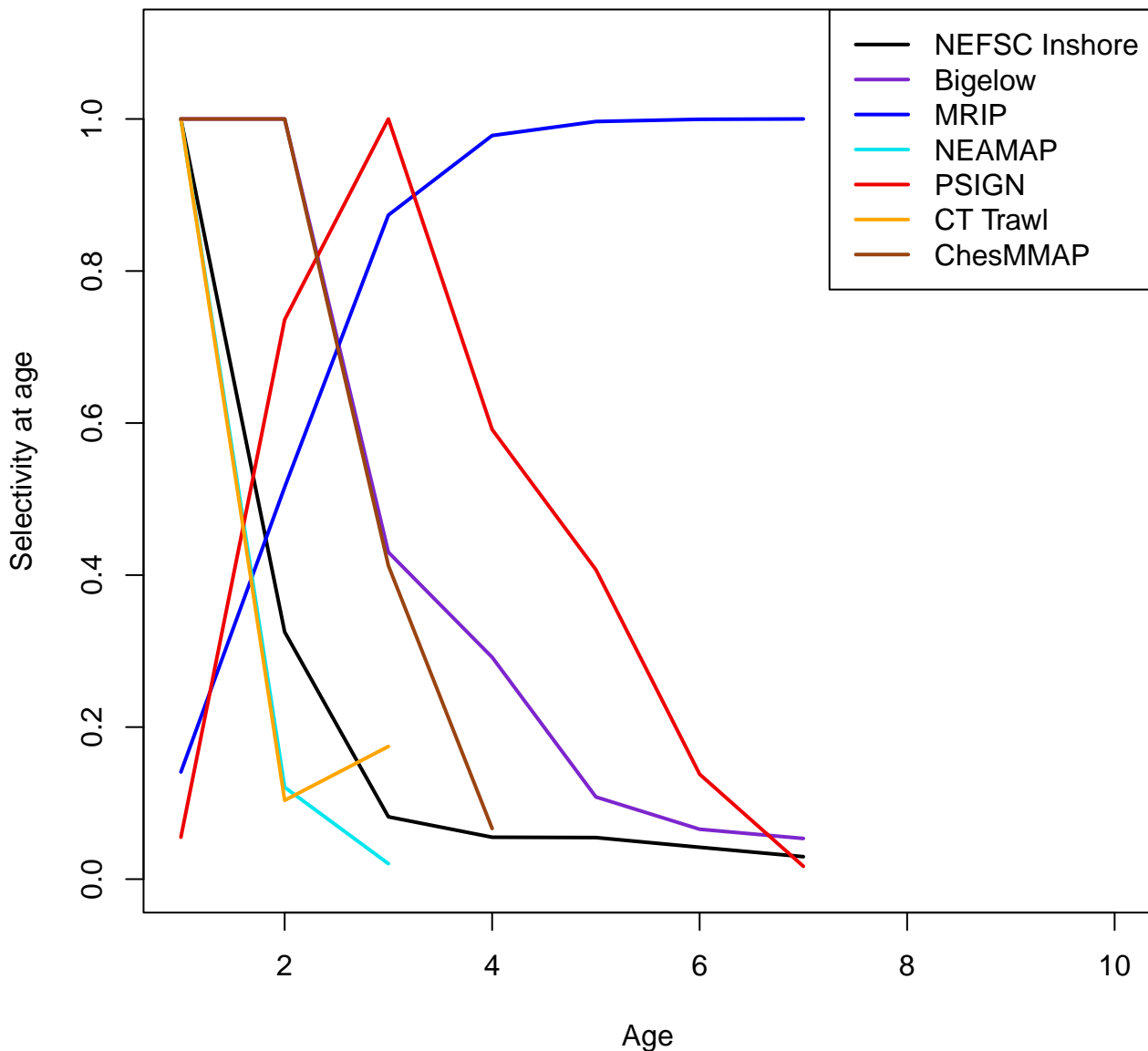


Fleet 2 (Rec)

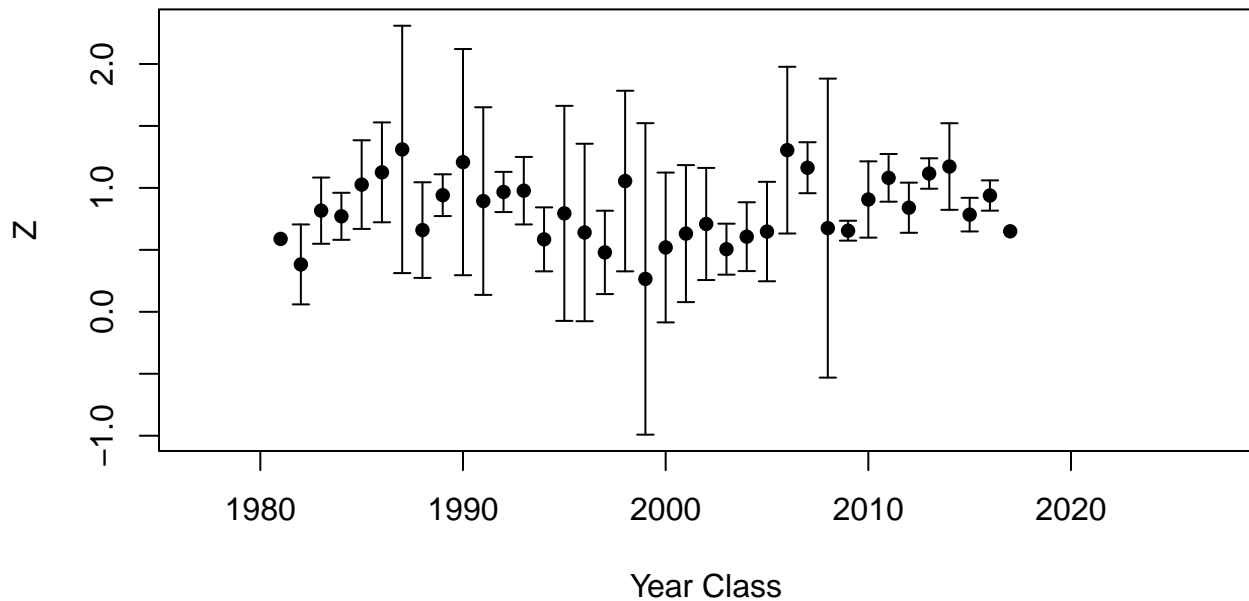
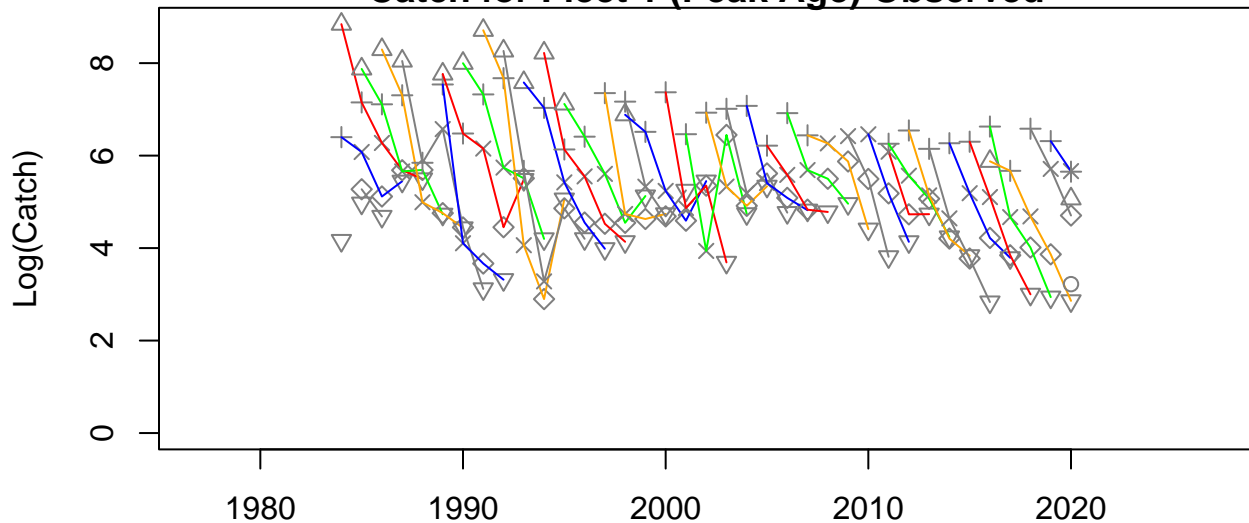




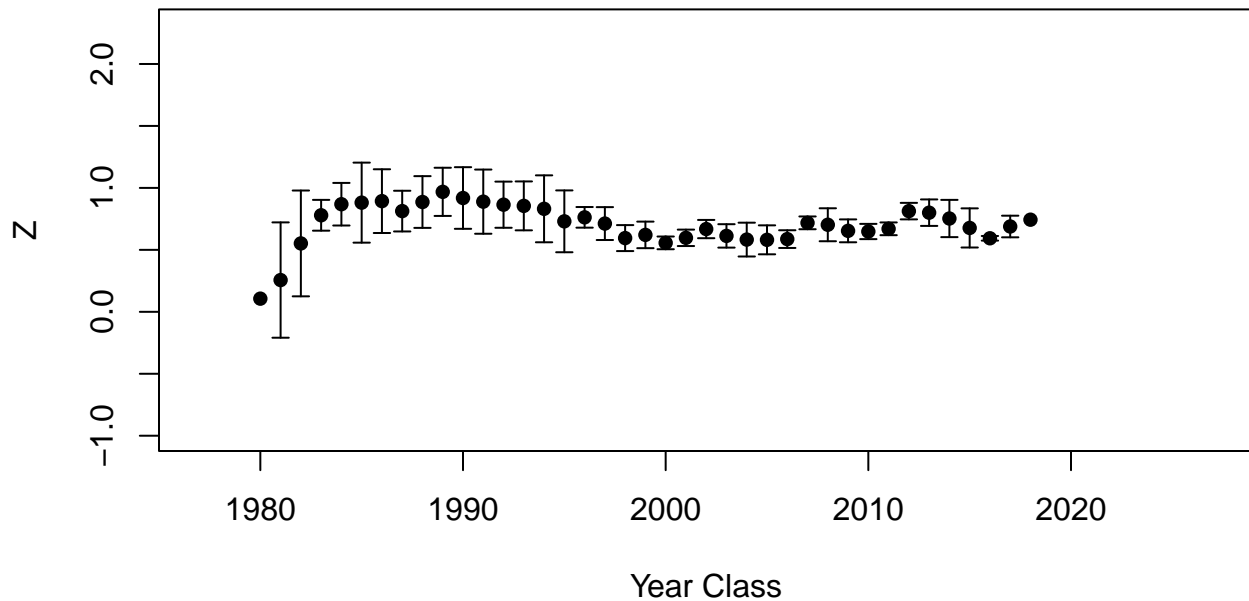
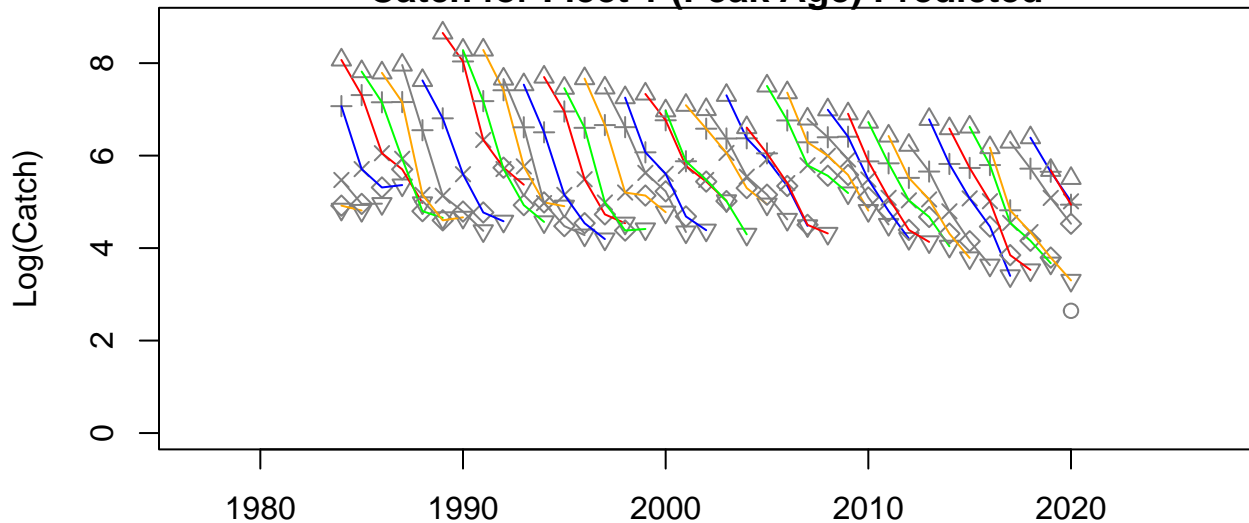
Indices



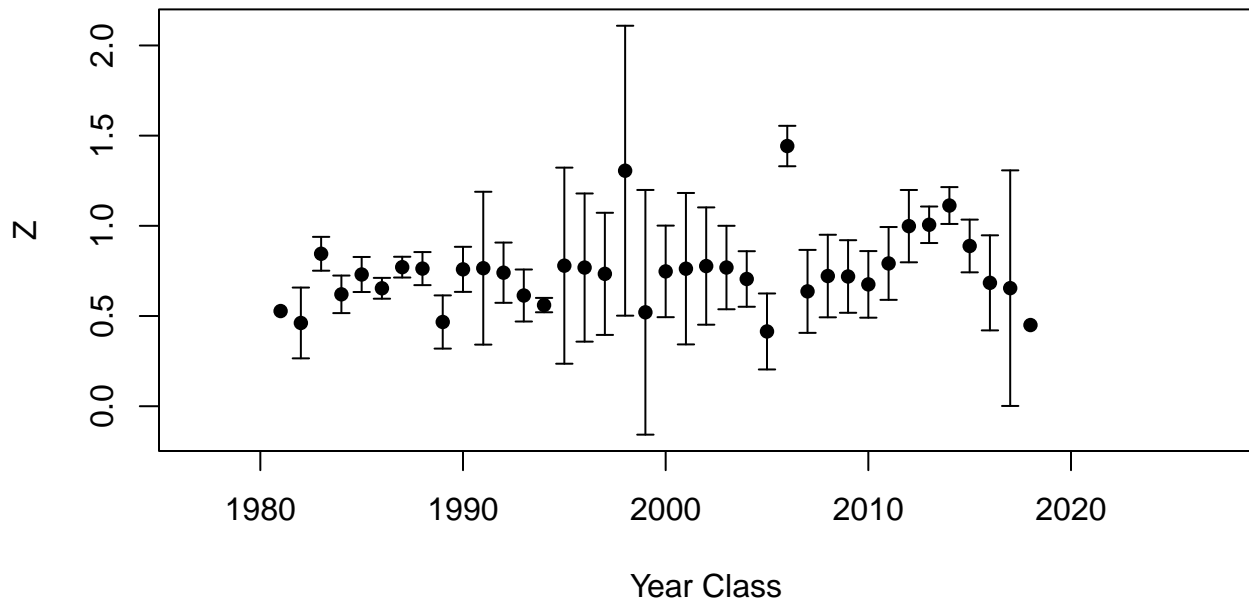
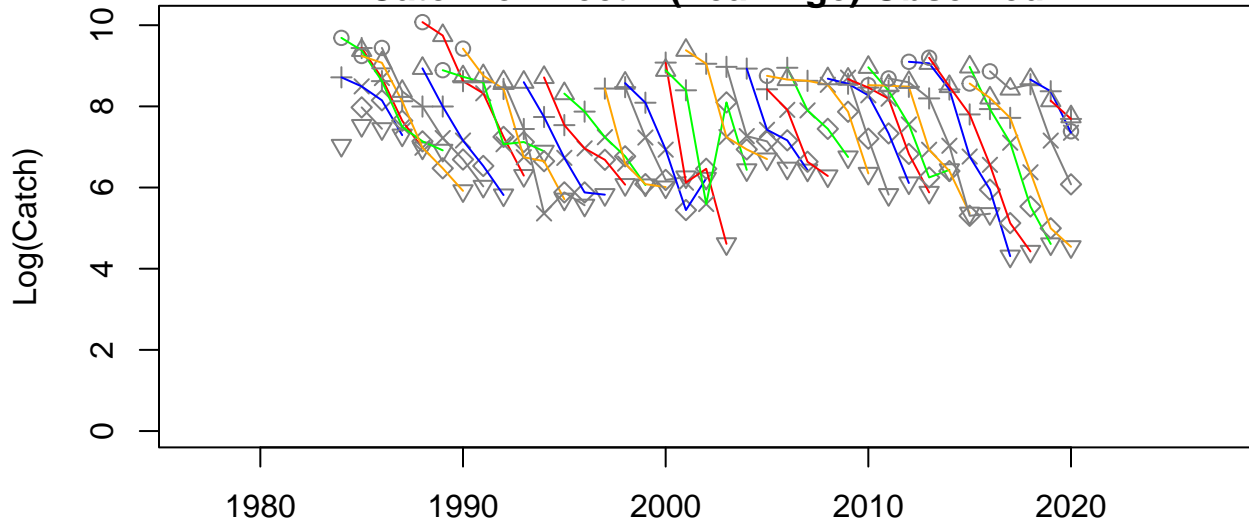
Catch for Fleet 1 (Peak Age) Observed



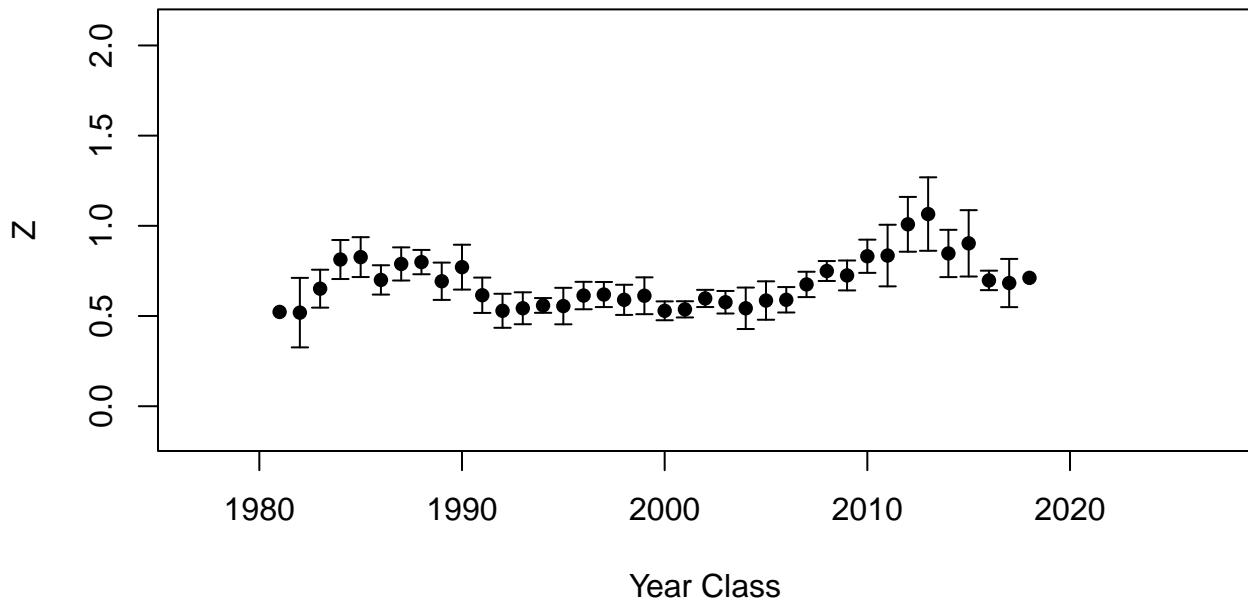
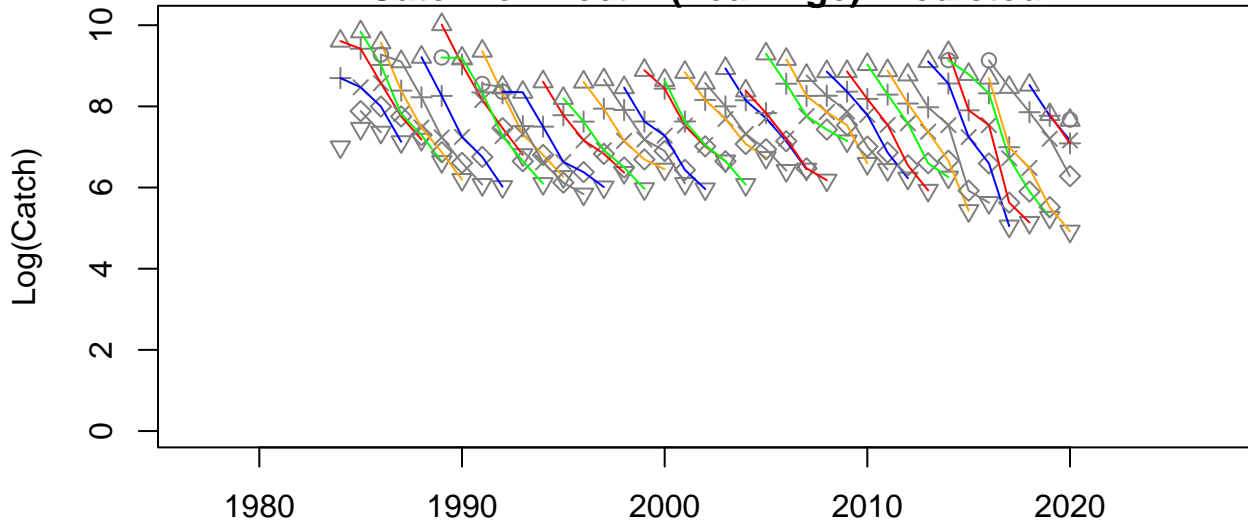
Catch for Fleet 1 (Peak Age) Predicted



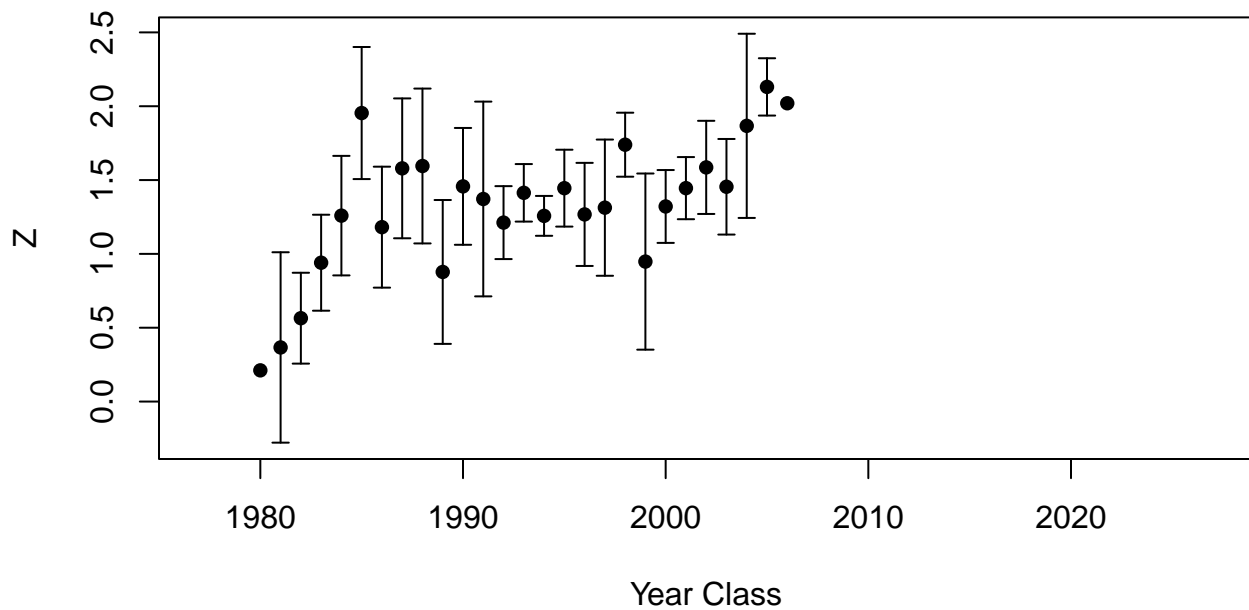
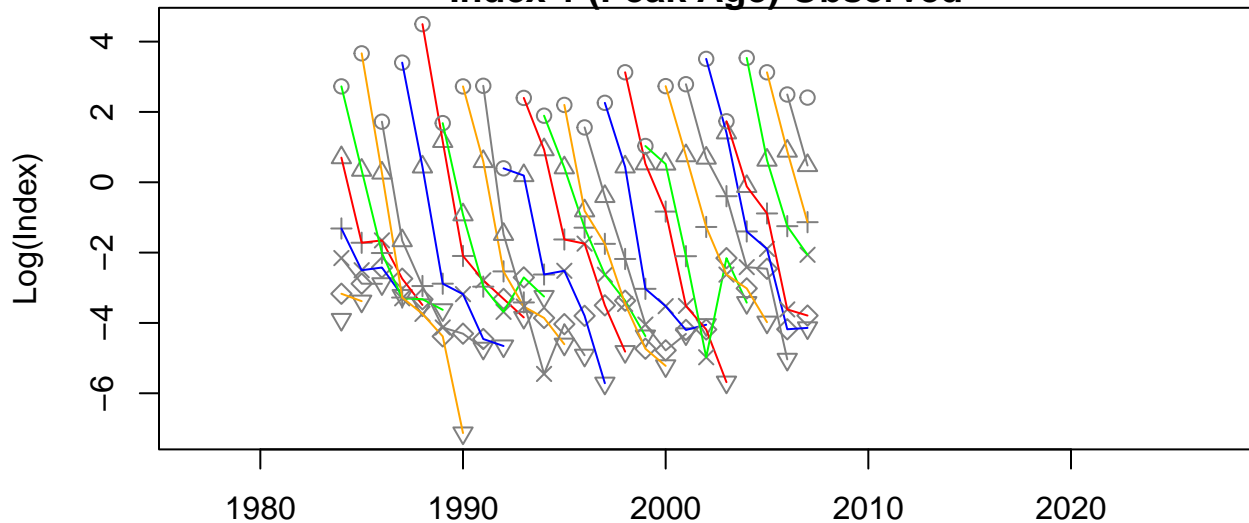
Catch for Fleet 2 (Peak Age) Observed



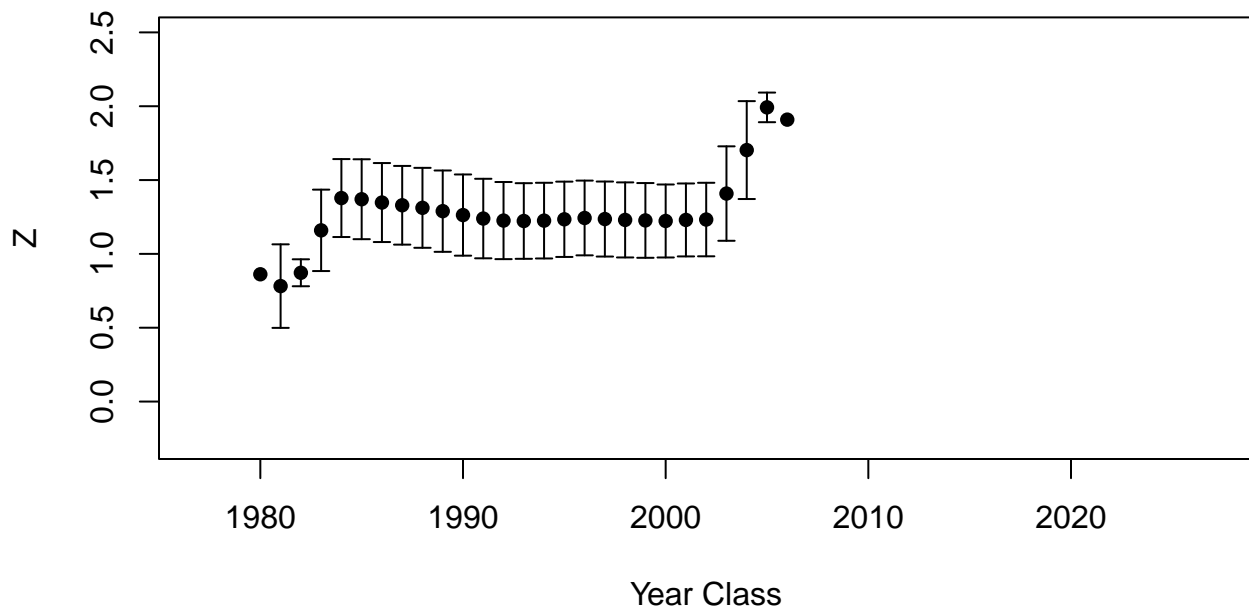
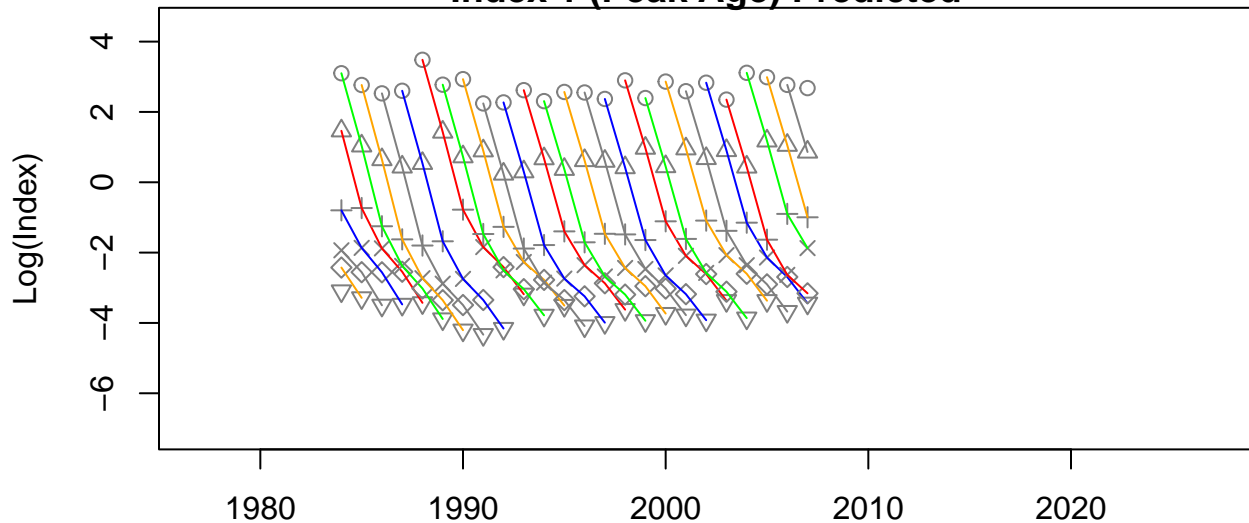
Catch for Fleet 2 (Peak Age) Predicted



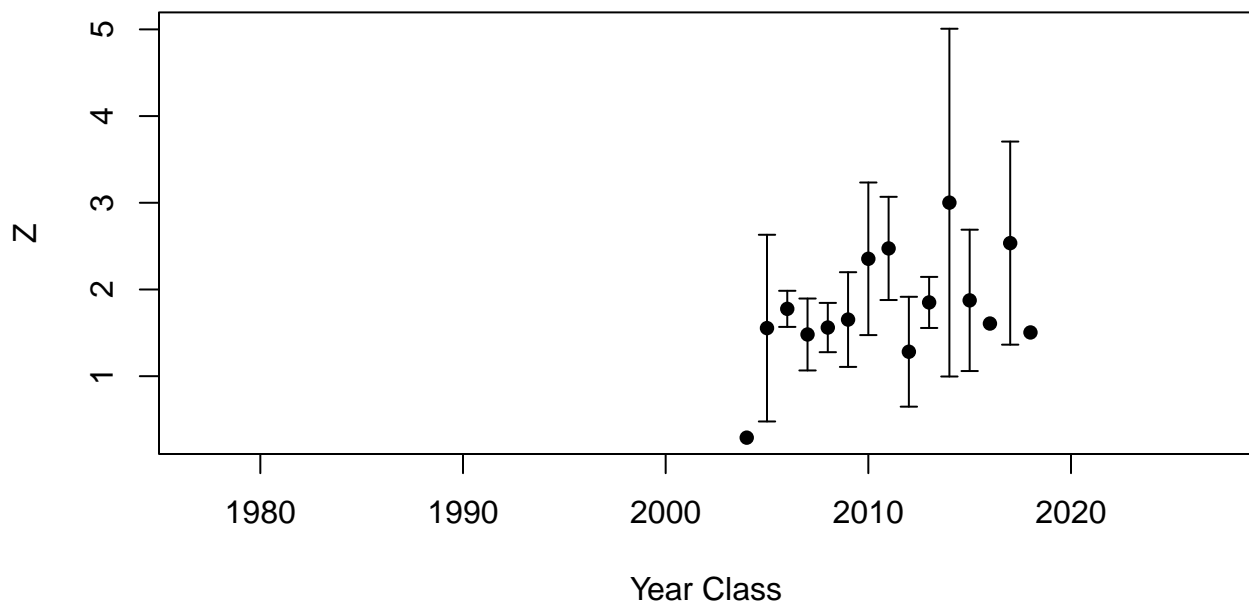
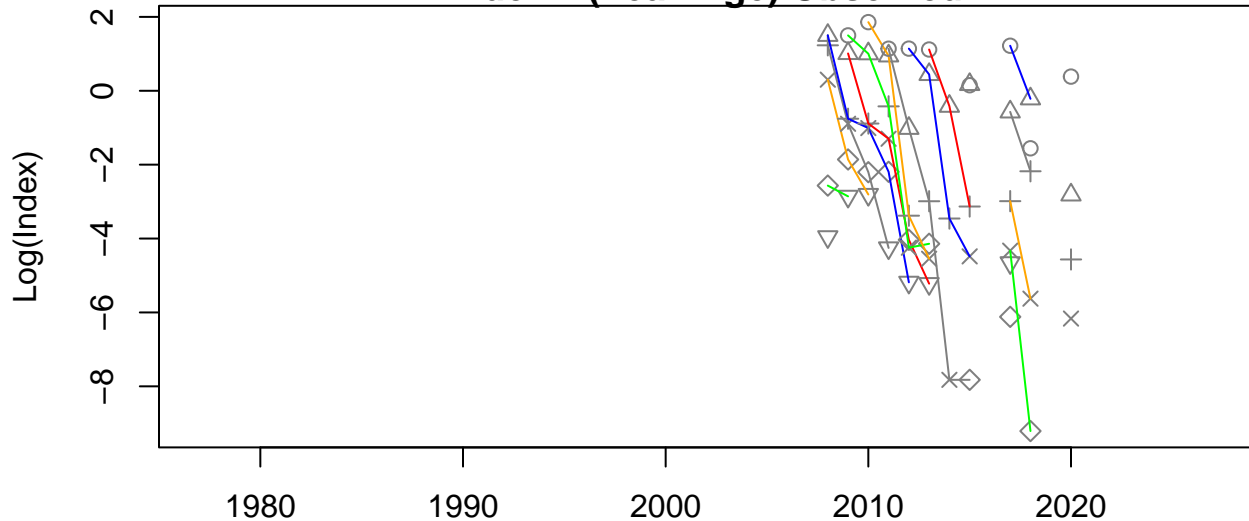
Index 1 (Peak Age) Observed



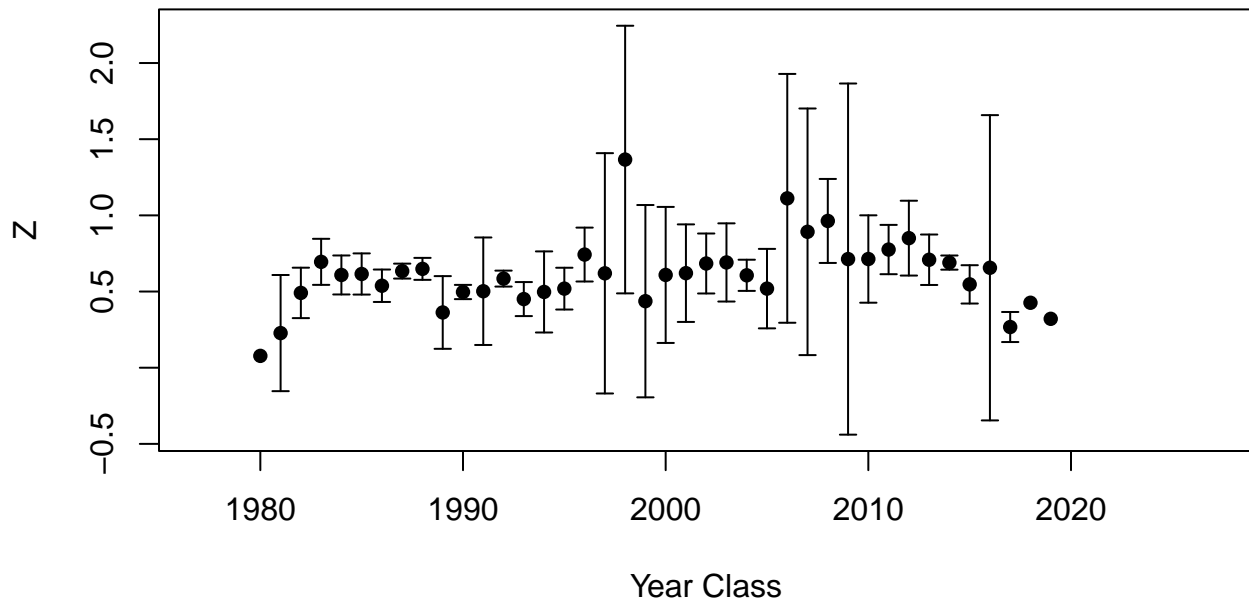
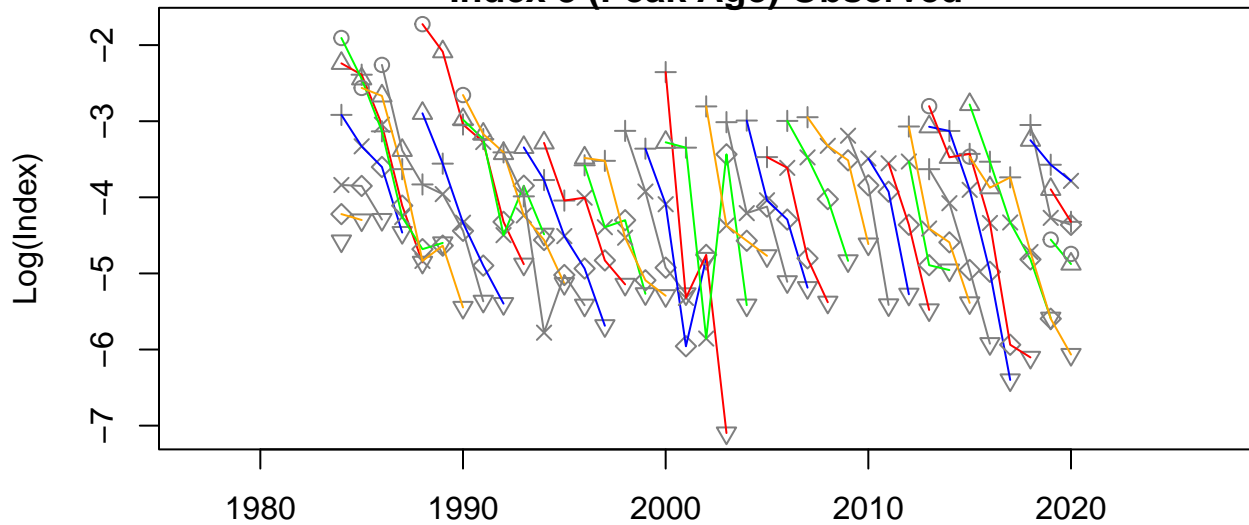
Index 1 (Peak Age) Predicted



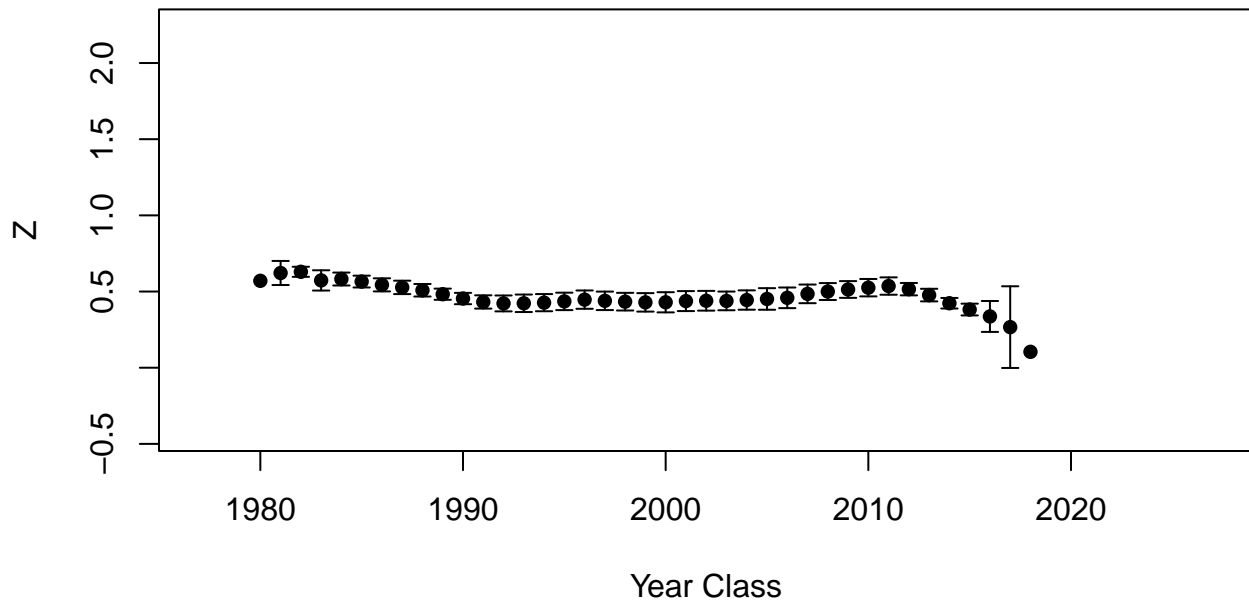
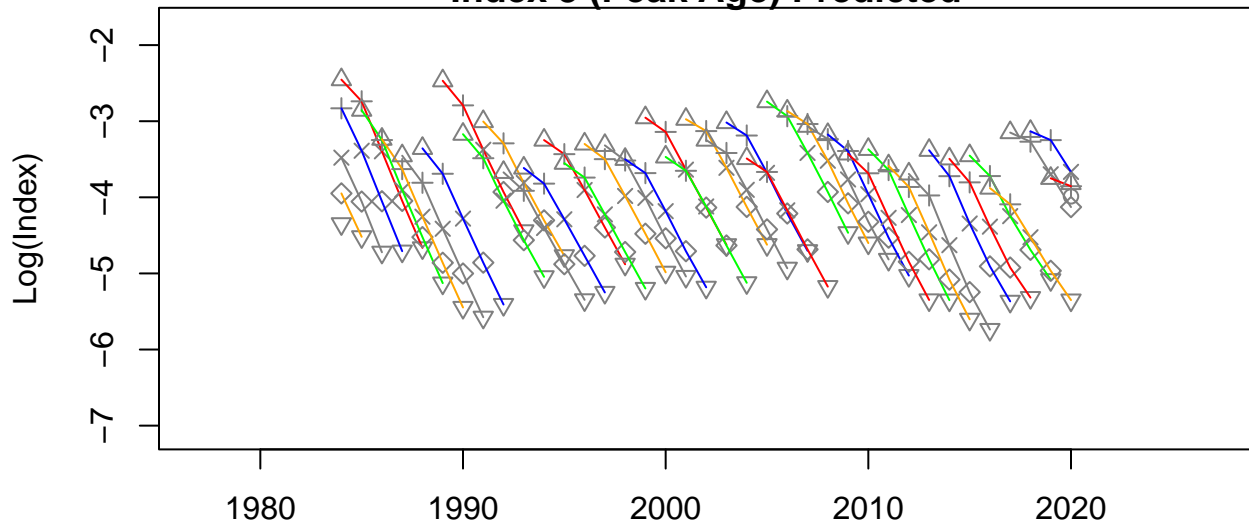
Index 2 (Peak Age) Observed



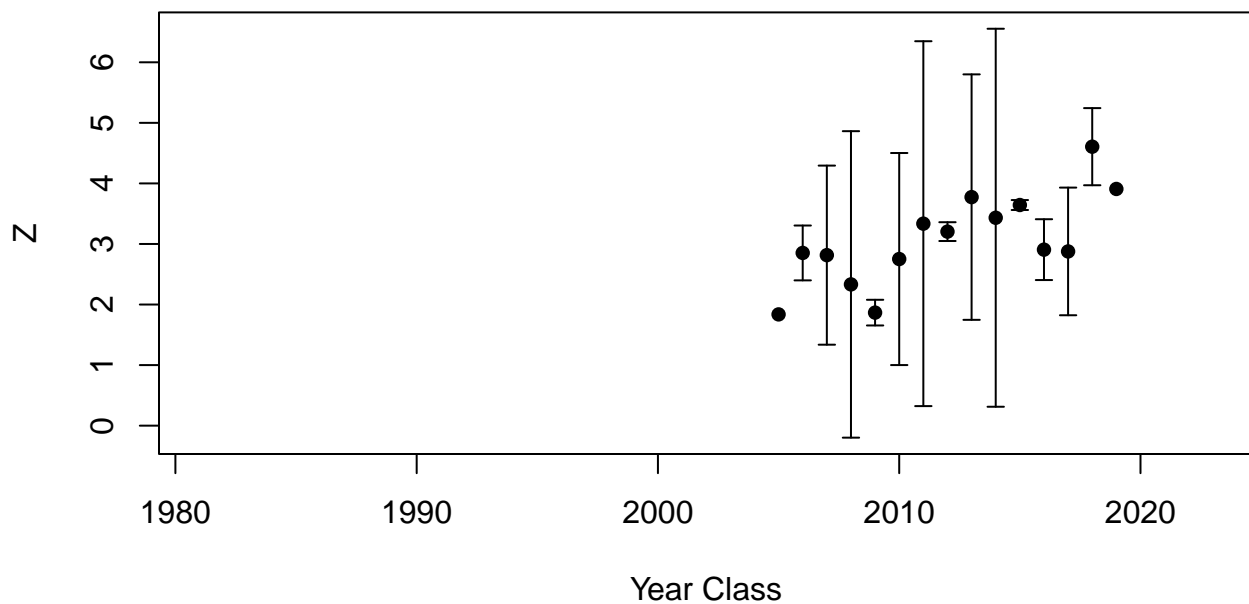
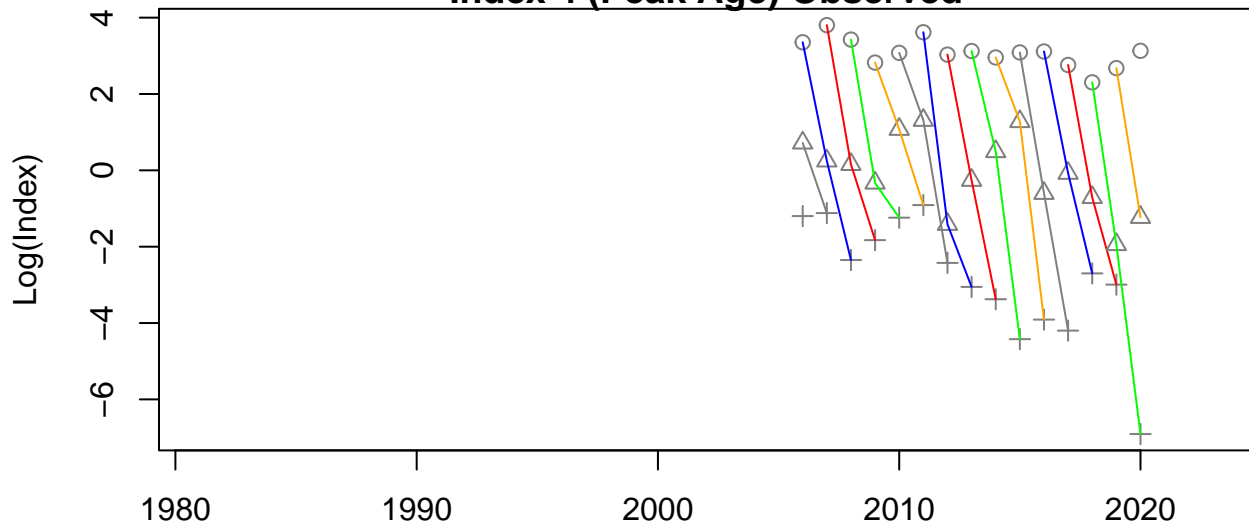
Index 3 (Peak Age) Observed



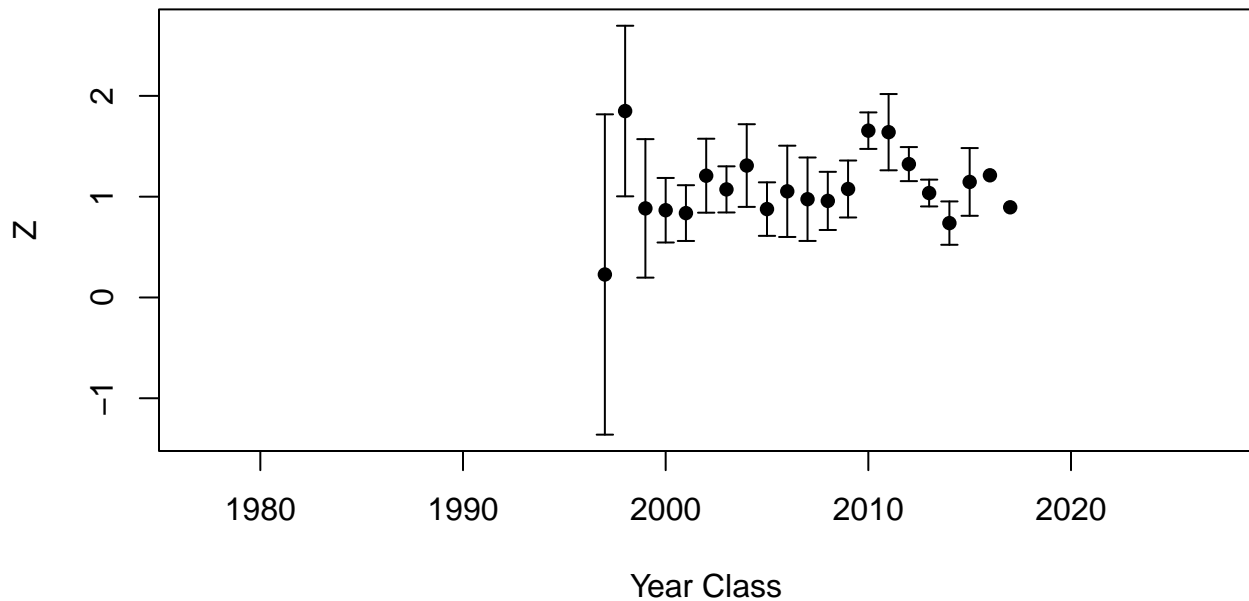
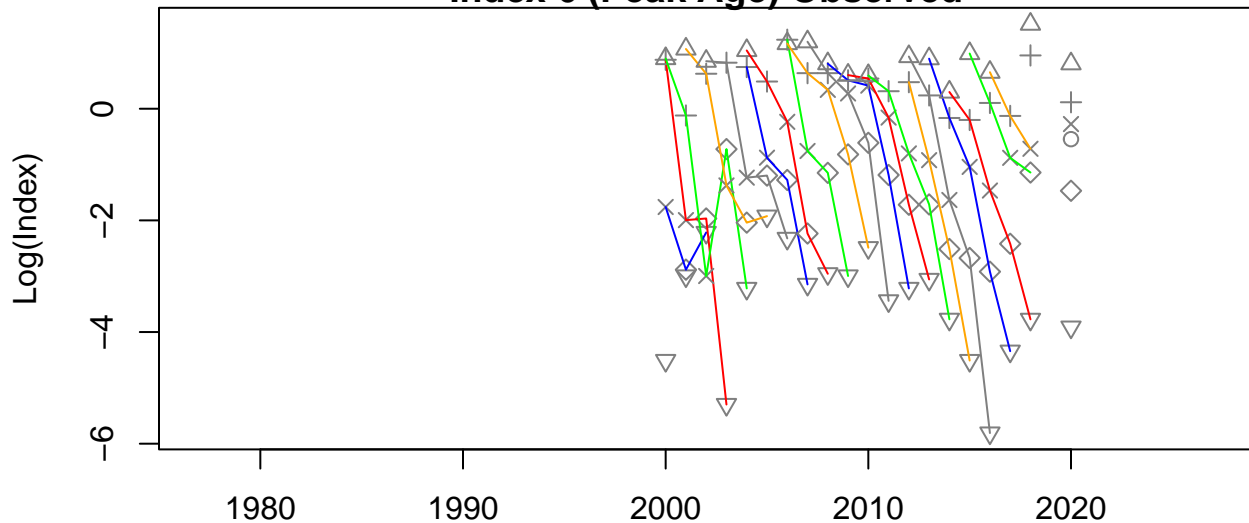
Index 3 (Peak Age) Predicted



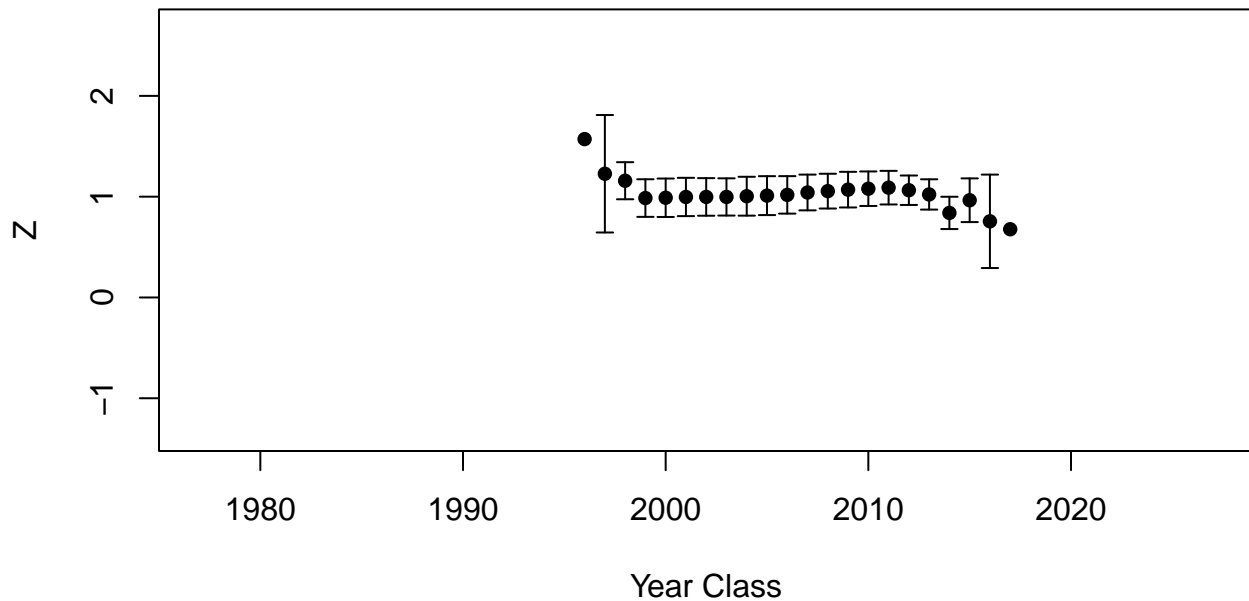
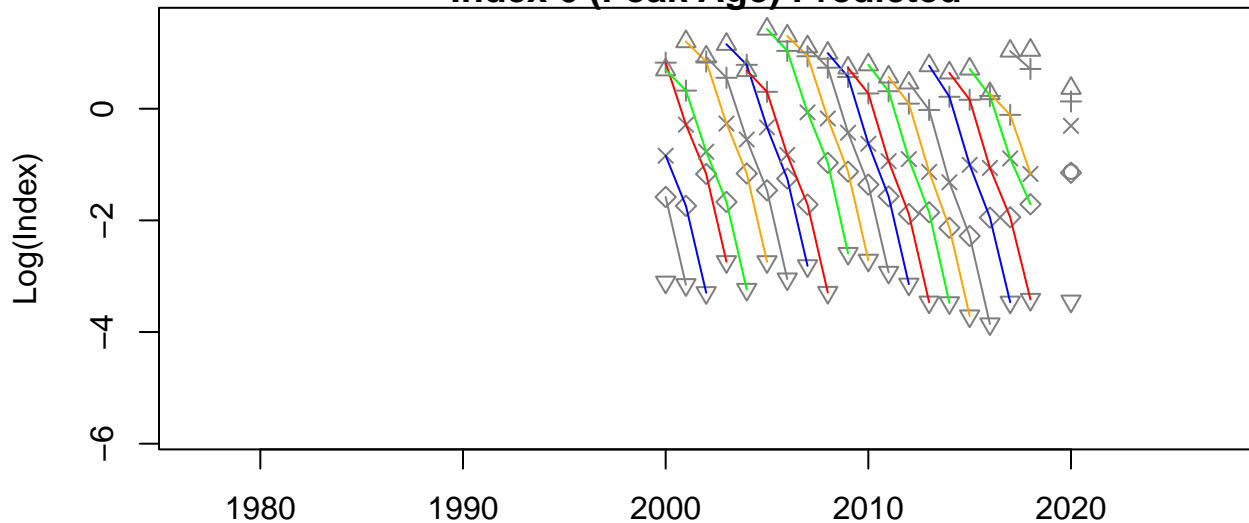
Index 4 (Peak Age) Observed



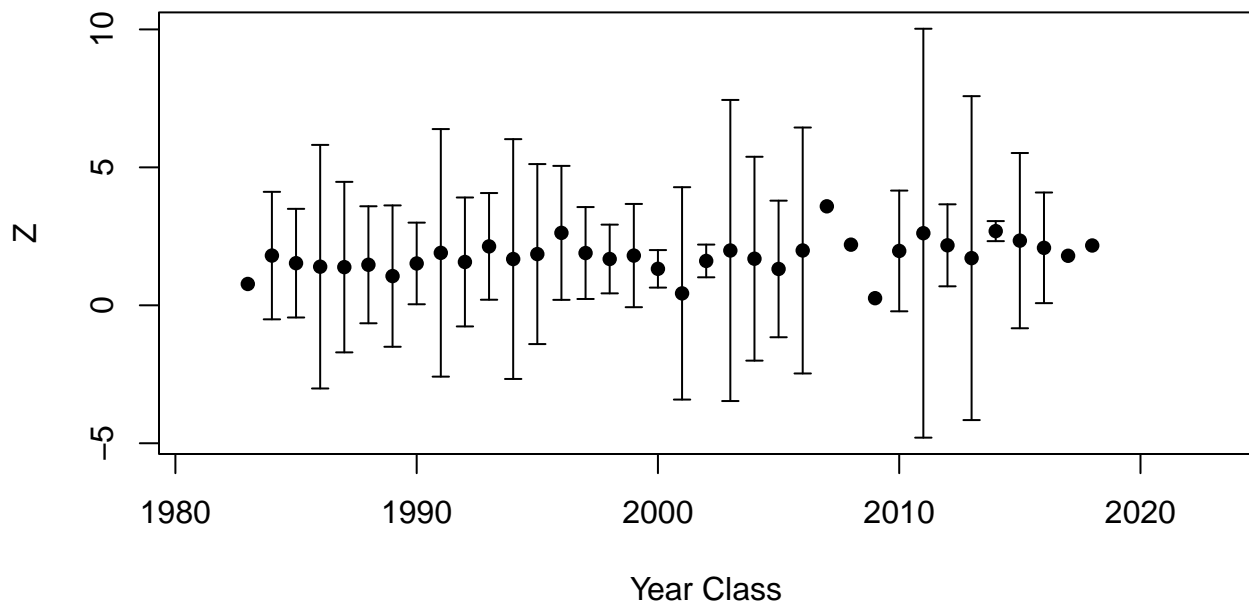
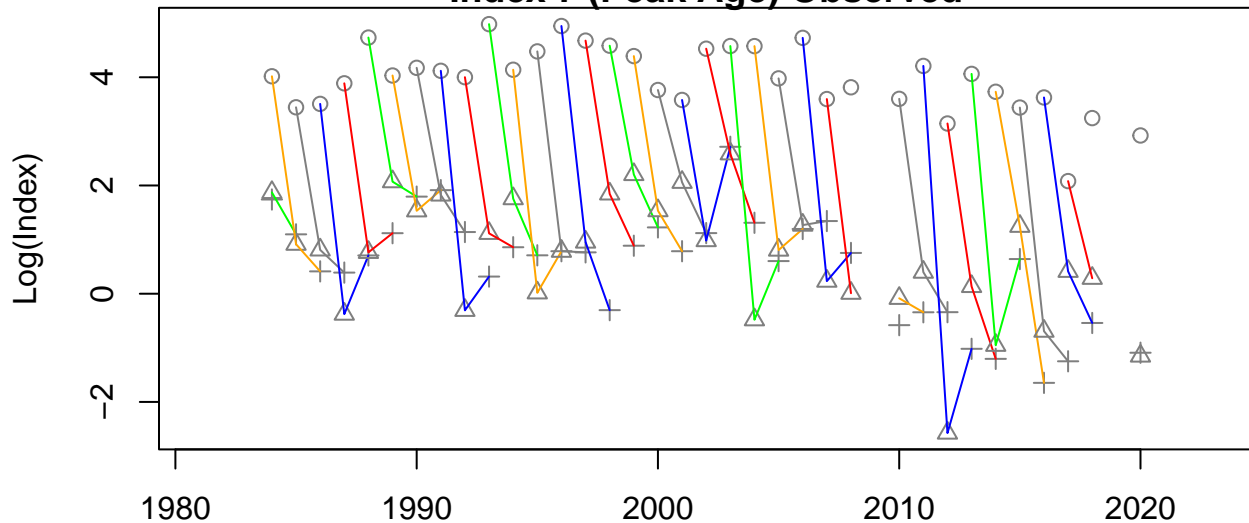
Index 6 (Peak Age) Observed



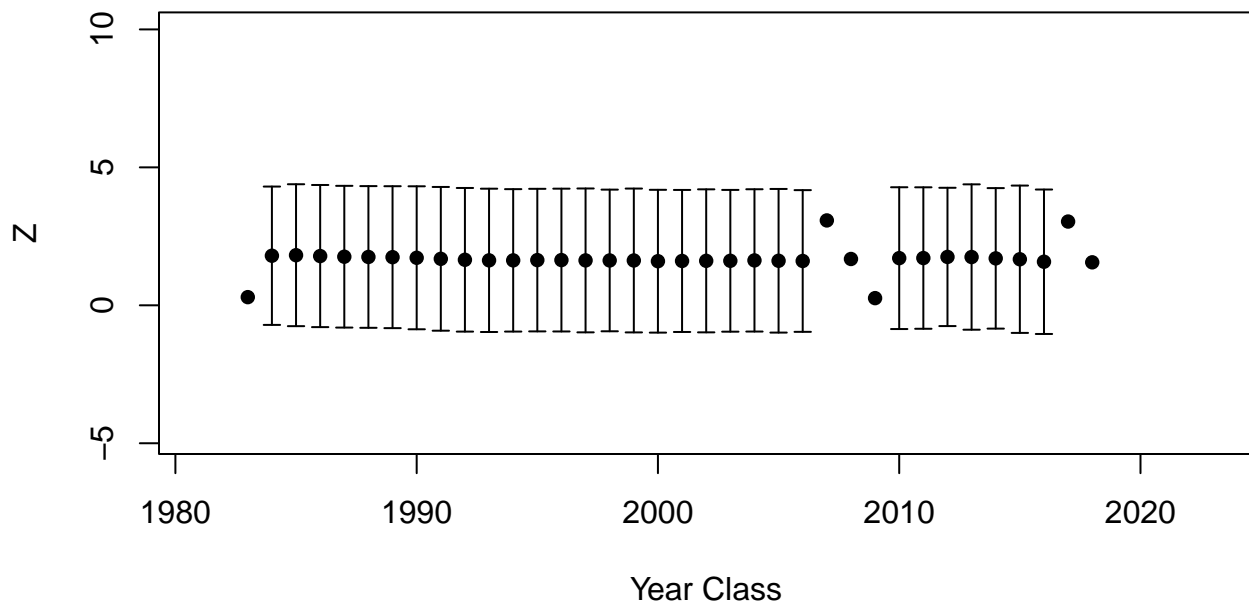
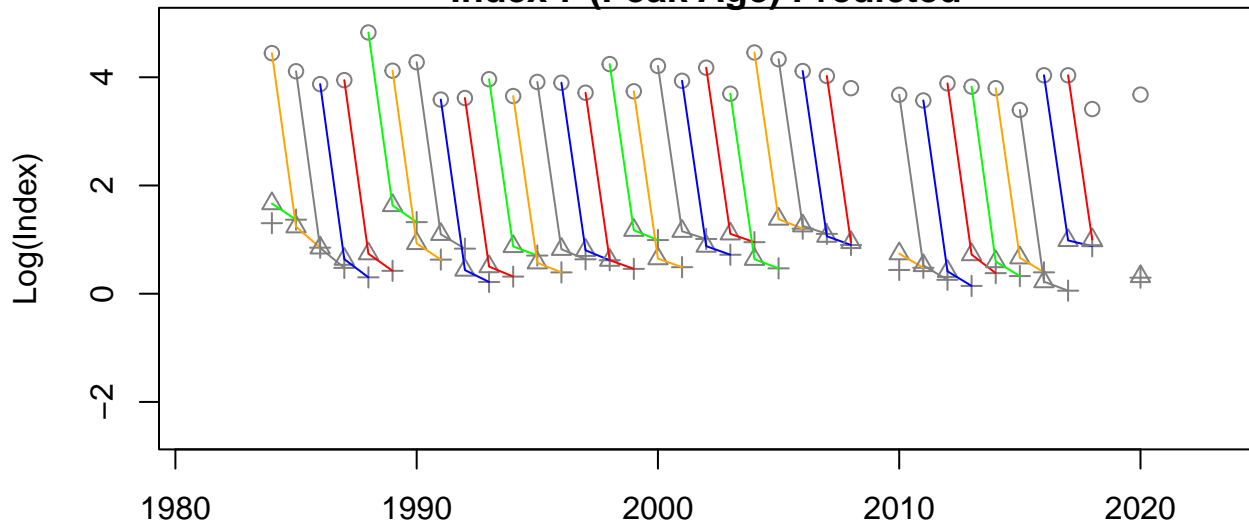
Index 6 (Peak Age) Predicted



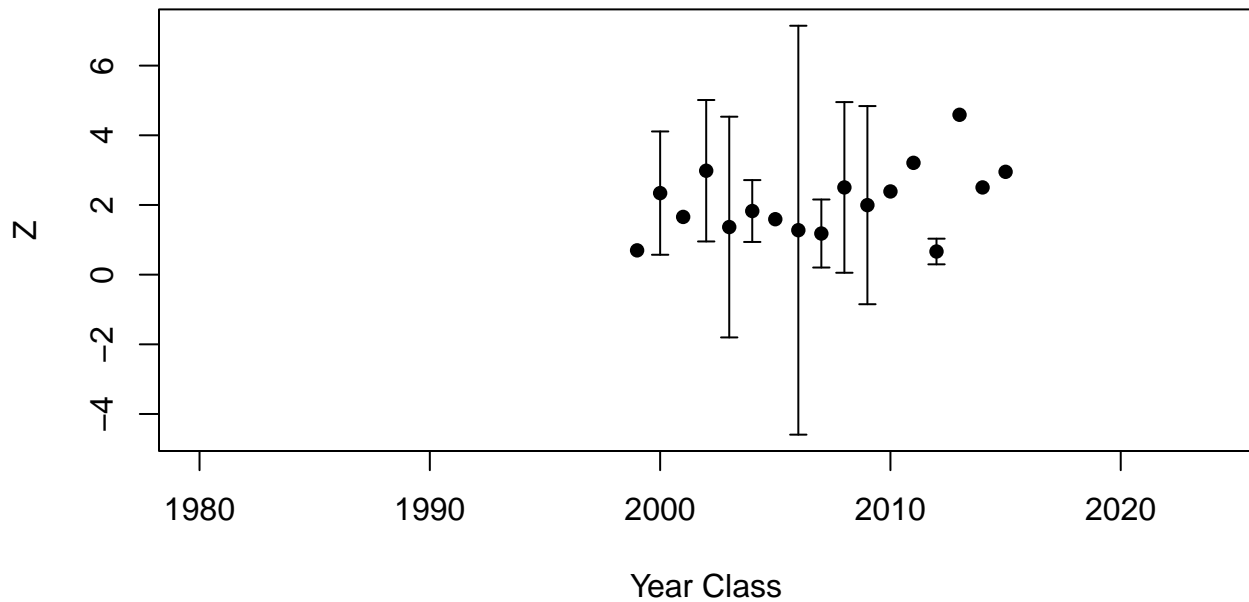
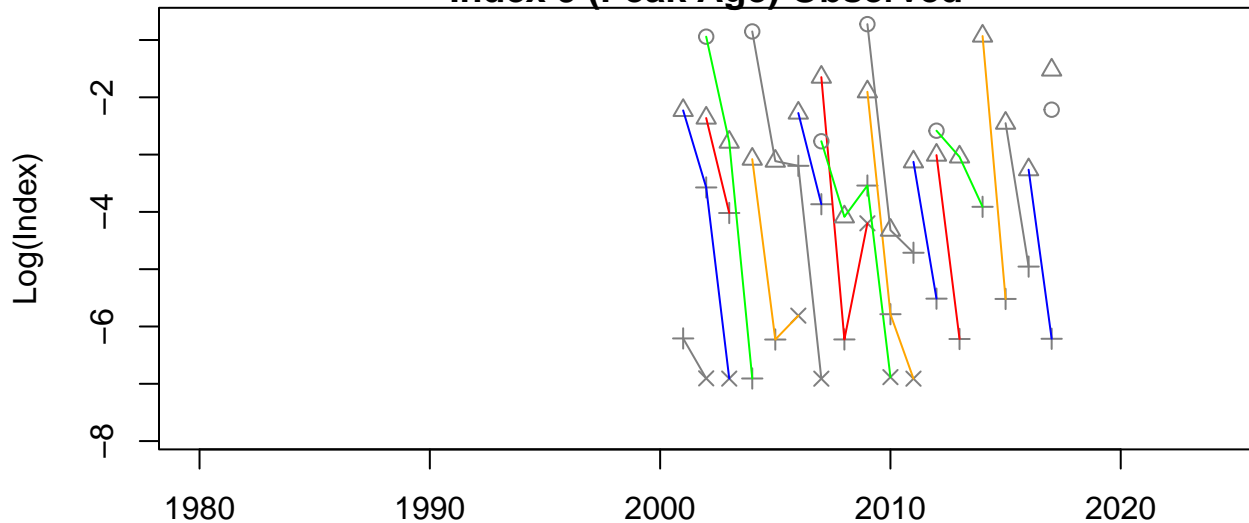
Index 7 (Peak Age) Observed



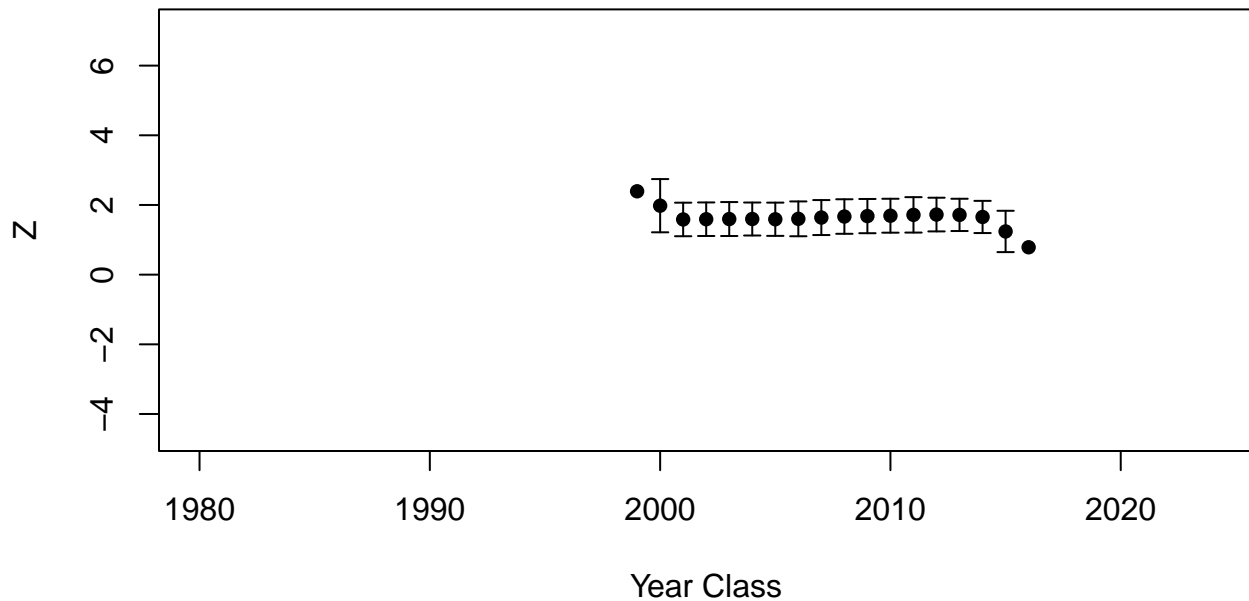
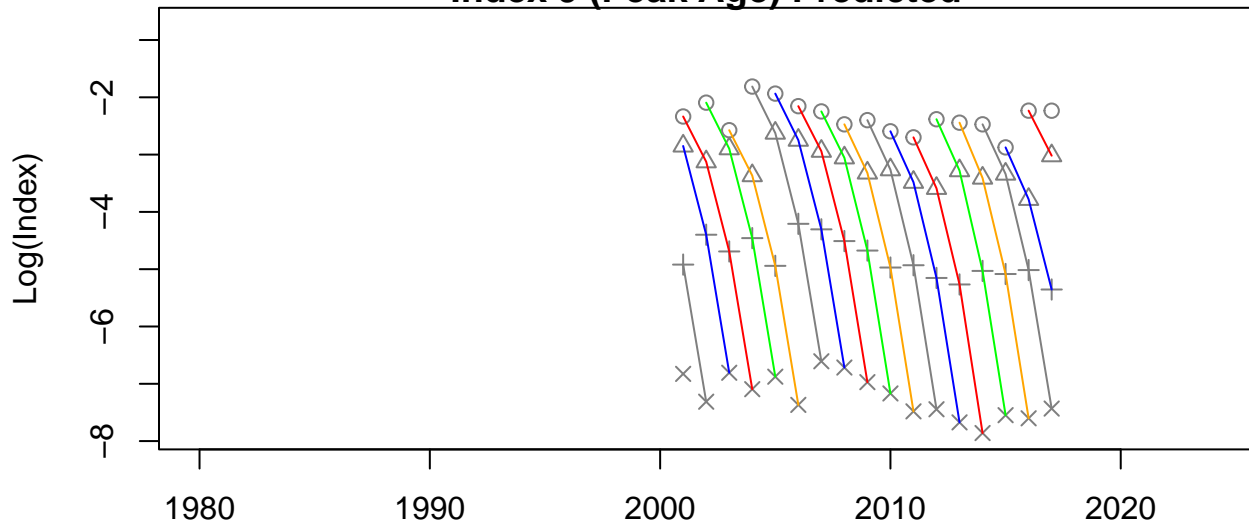
Index 7 (Peak Age) Predicted



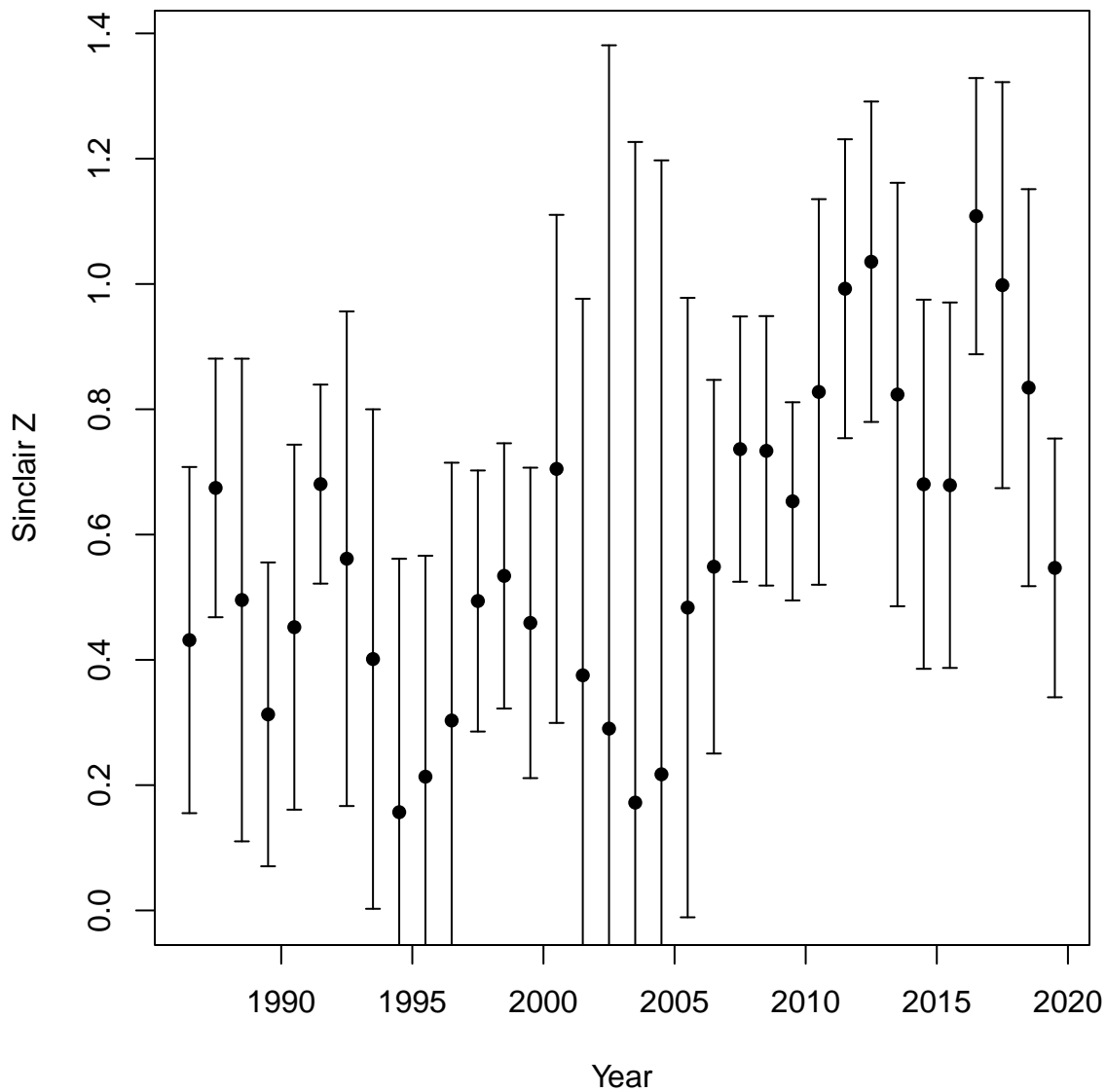
Index 9 (Peak Age) Observed



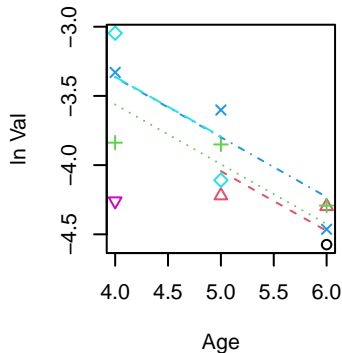
Index 9 (Peak Age) Predicted



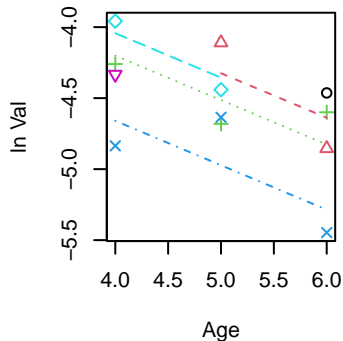
MRIP



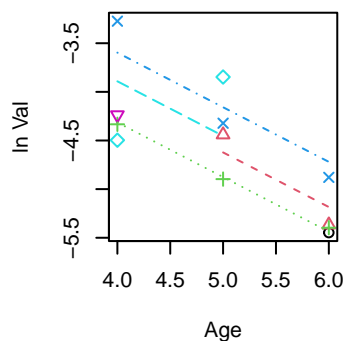
Years 1985 to 1988
Z = 0.432



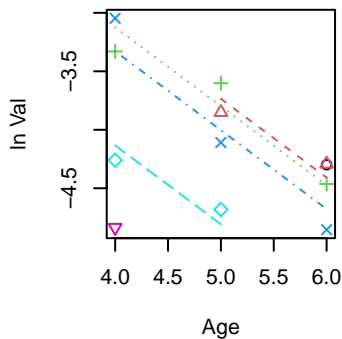
Years 1988 to 1991
Z = 0.313



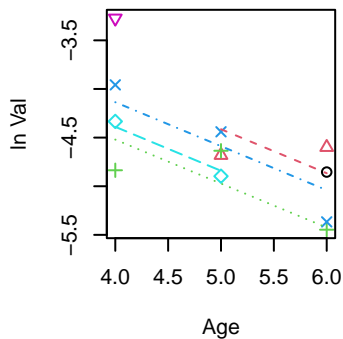
Years 1991 to 1994
Z = 0.561



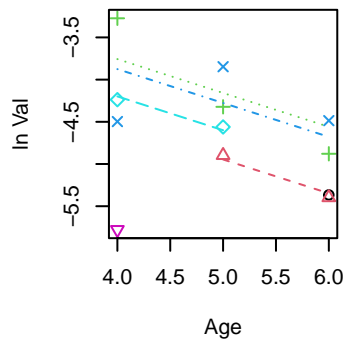
Years 1986 to 1989
Z = 0.674



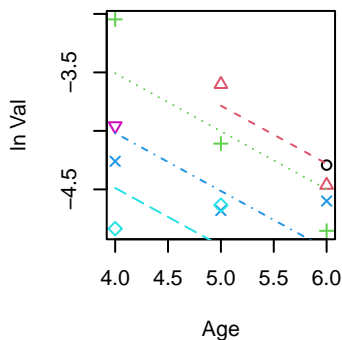
Years 1989 to 1992
Z = 0.452



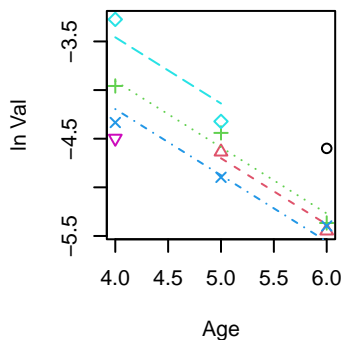
Years 1992 to 1995
Z = 0.401



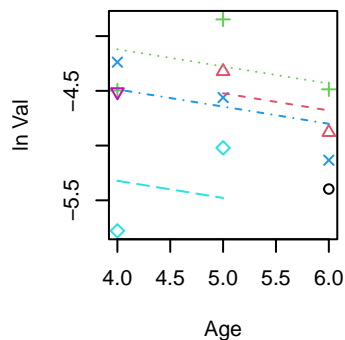
Years 1987 to 1990
Z = 0.496



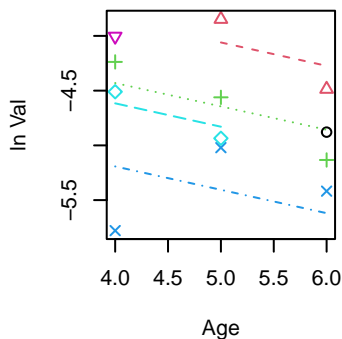
Years 1990 to 1993
Z = 0.681



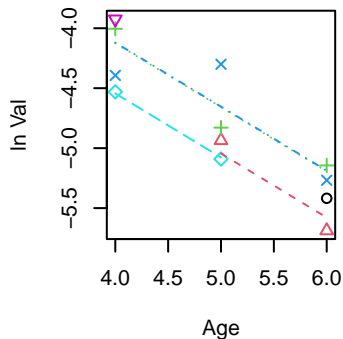
Years 1993 to 1996
Z = 0.157



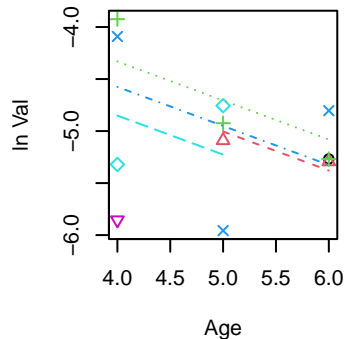
Years 1994 to 1997
Z = 0.214



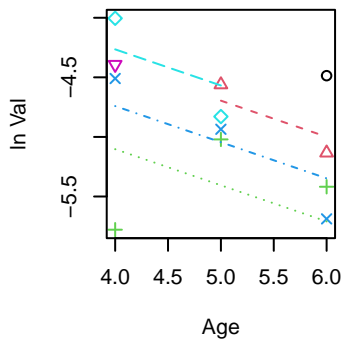
Years 1997 to 2000
Z = 0.534



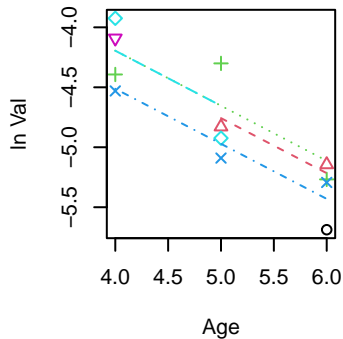
Years 2000 to 2003
Z = 0.375



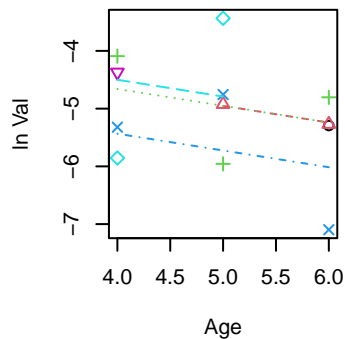
Years 1995 to 1998
Z = 0.303



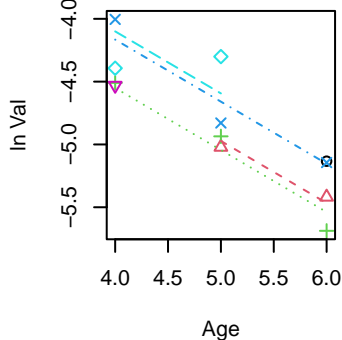
Years 1998 to 2001
Z = 0.459



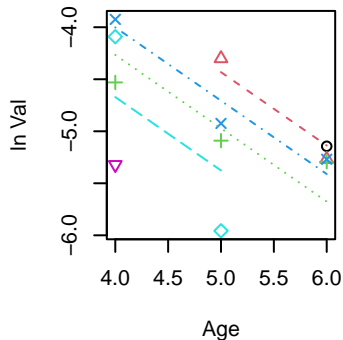
Years 2001 to 2004
Z = 0.29



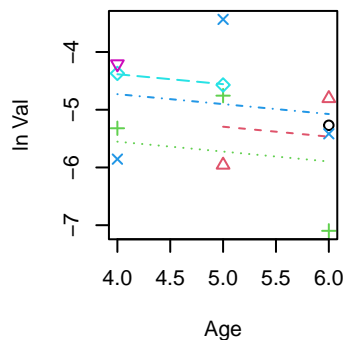
Years 1996 to 1999
Z = 0.494



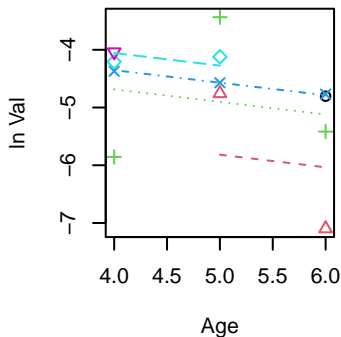
Years 1999 to 2002
Z = 0.705



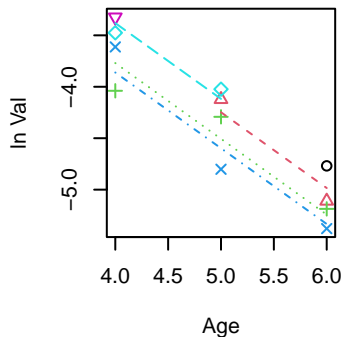
Years 2002 to 2005
Z = 0.172



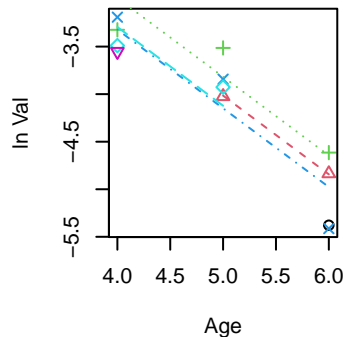
Years 2003 to 2006
Z = 0.217



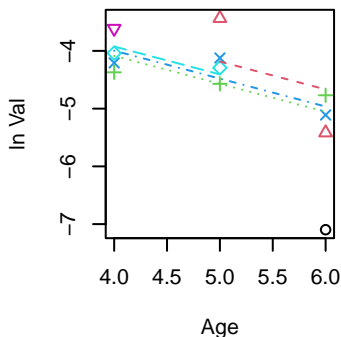
Years 2006 to 2009
Z = 0.736



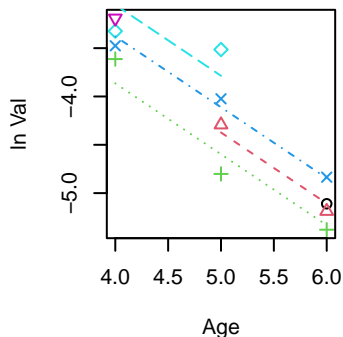
Years 2009 to 2012
Z = 0.828



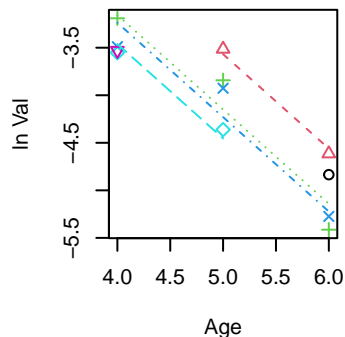
Years 2004 to 2007
Z = 0.483



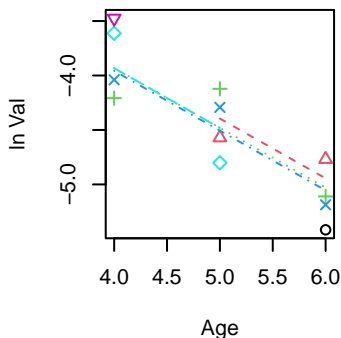
Years 2007 to 2010
Z = 0.734



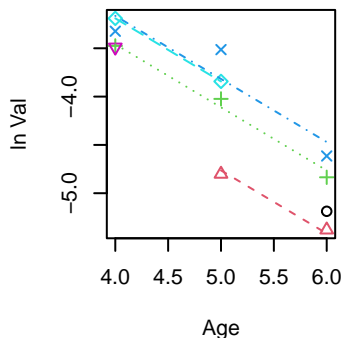
Years 2010 to 2013
Z = 0.992



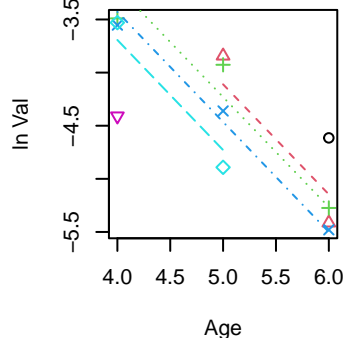
Years 2005 to 2008
Z = 0.549



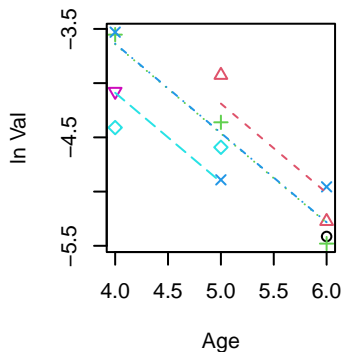
Years 2008 to 2011
Z = 0.653



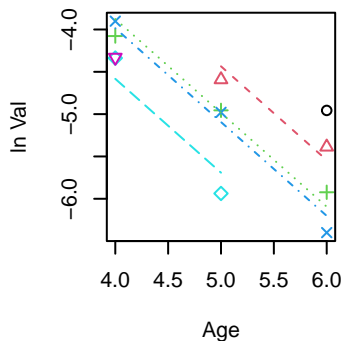
Years 2011 to 2014
Z = 1.036



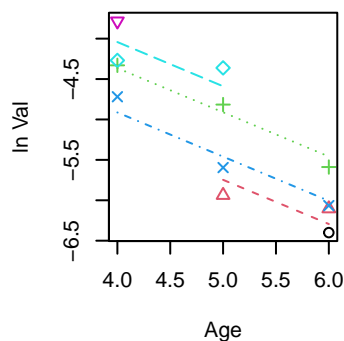
Years 2012 to 2015
Z = 0.824



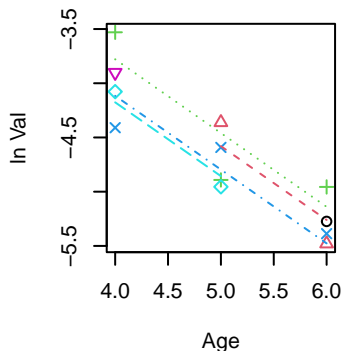
Years 2015 to 2018
Z = 1.108



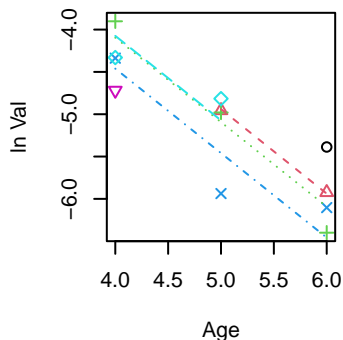
Years 2018 to 2021
Z = 0.547



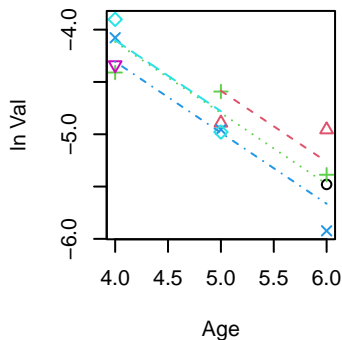
Years 2013 to 2016
Z = 0.68



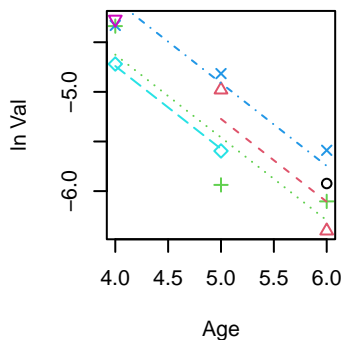
Years 2016 to 2019
Z = 0.998



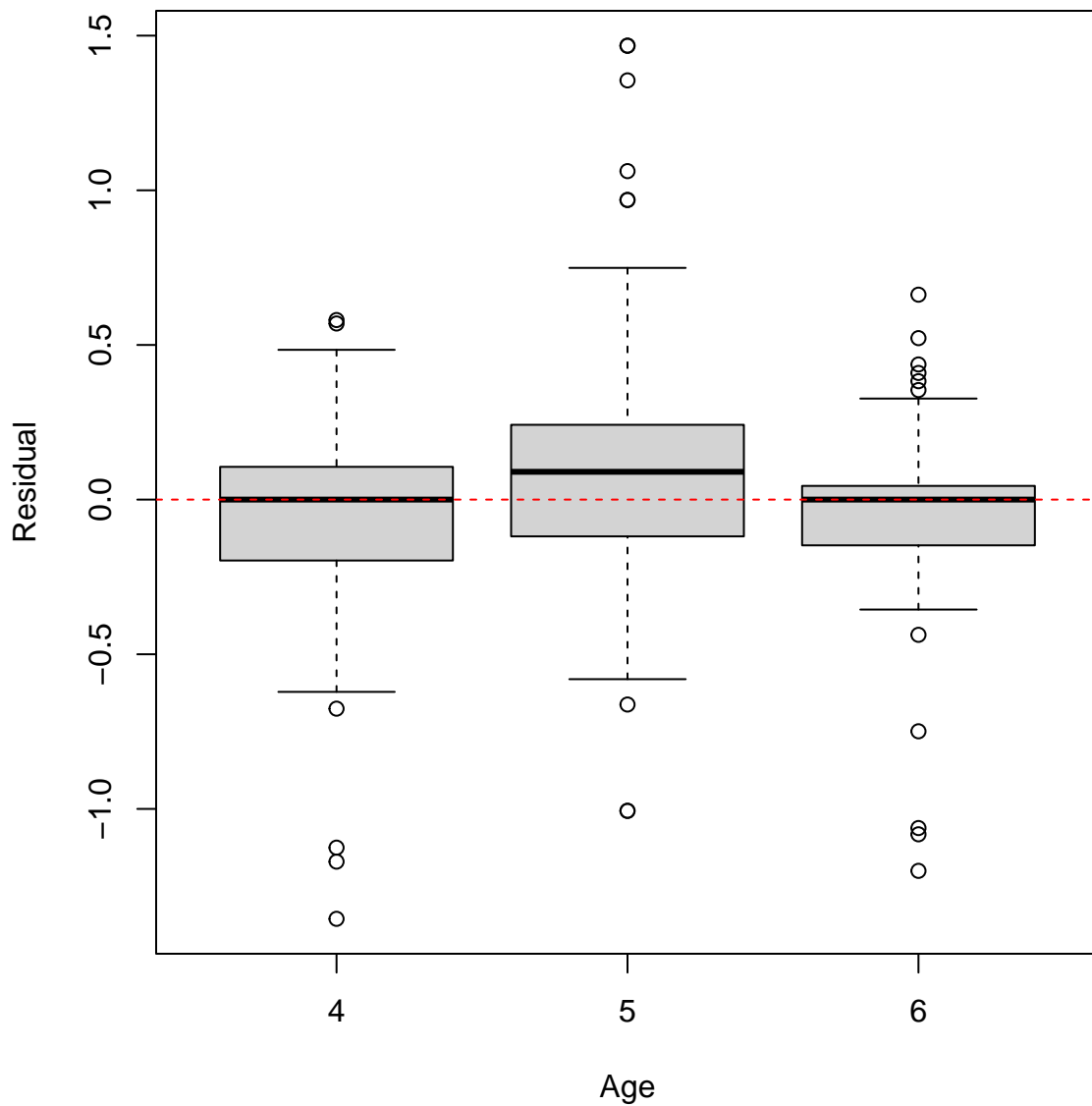
Years 2014 to 2017
Z = 0.679



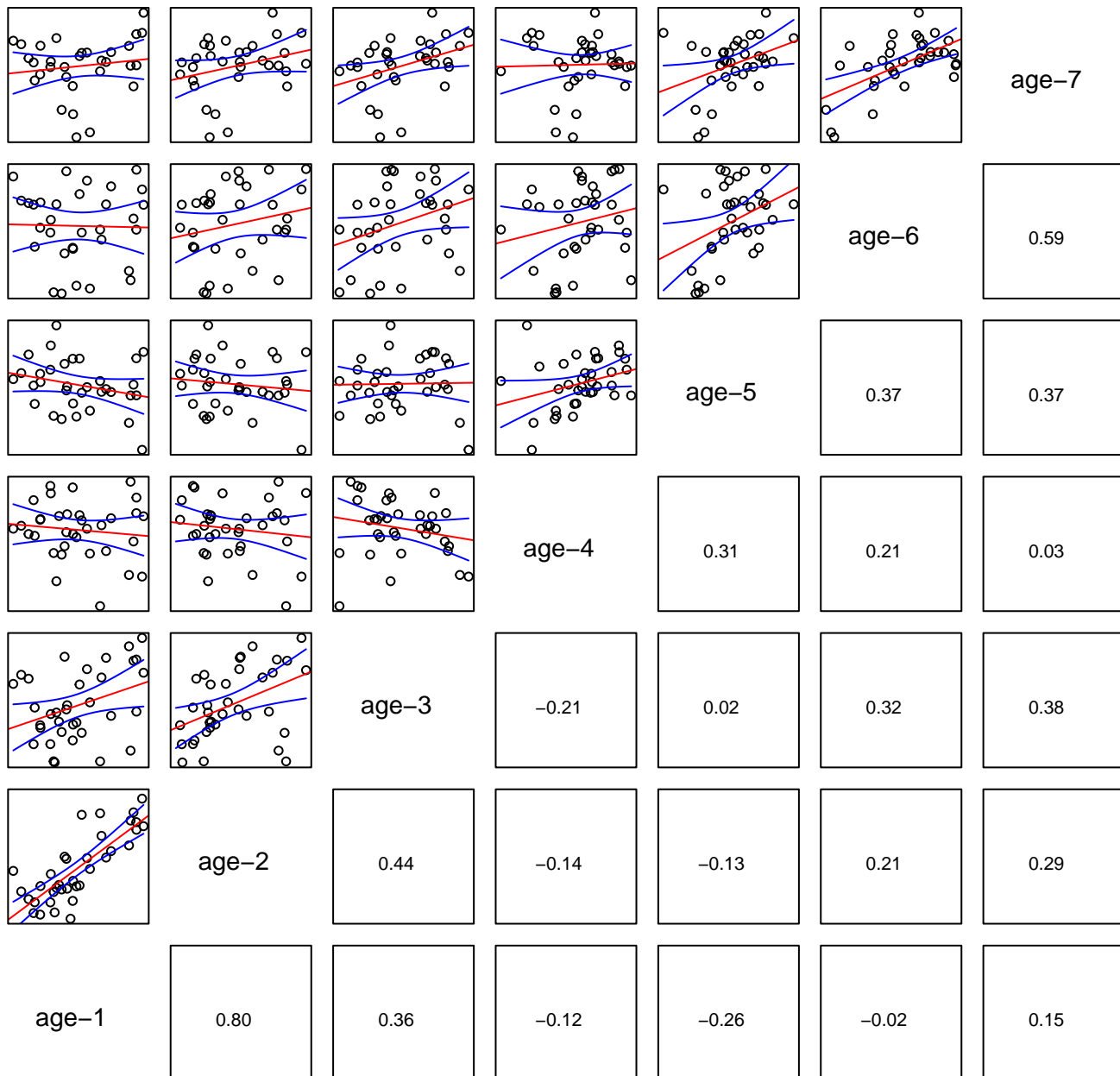
Years 2017 to 2020
Z = 0.835



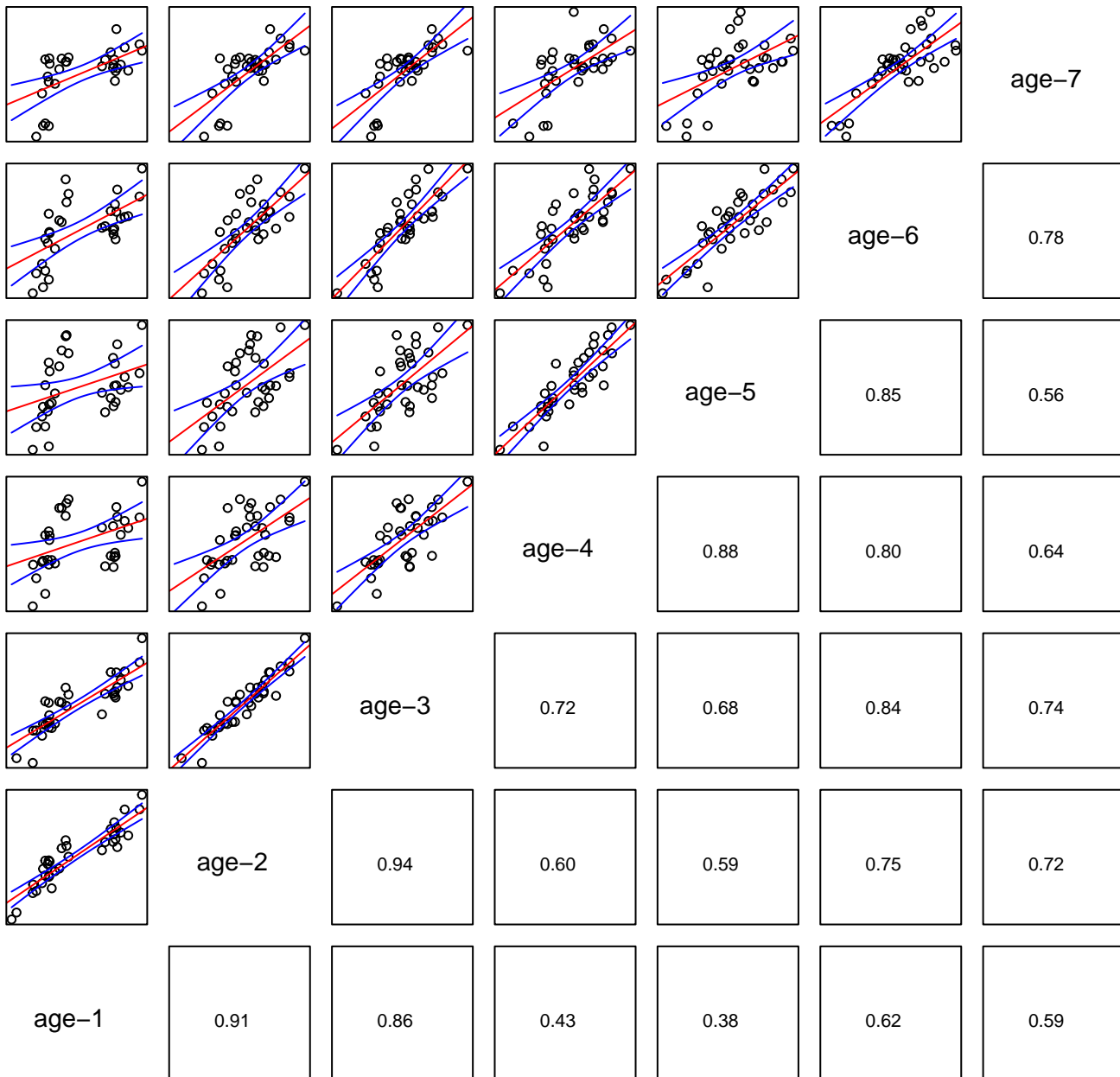
MRIP



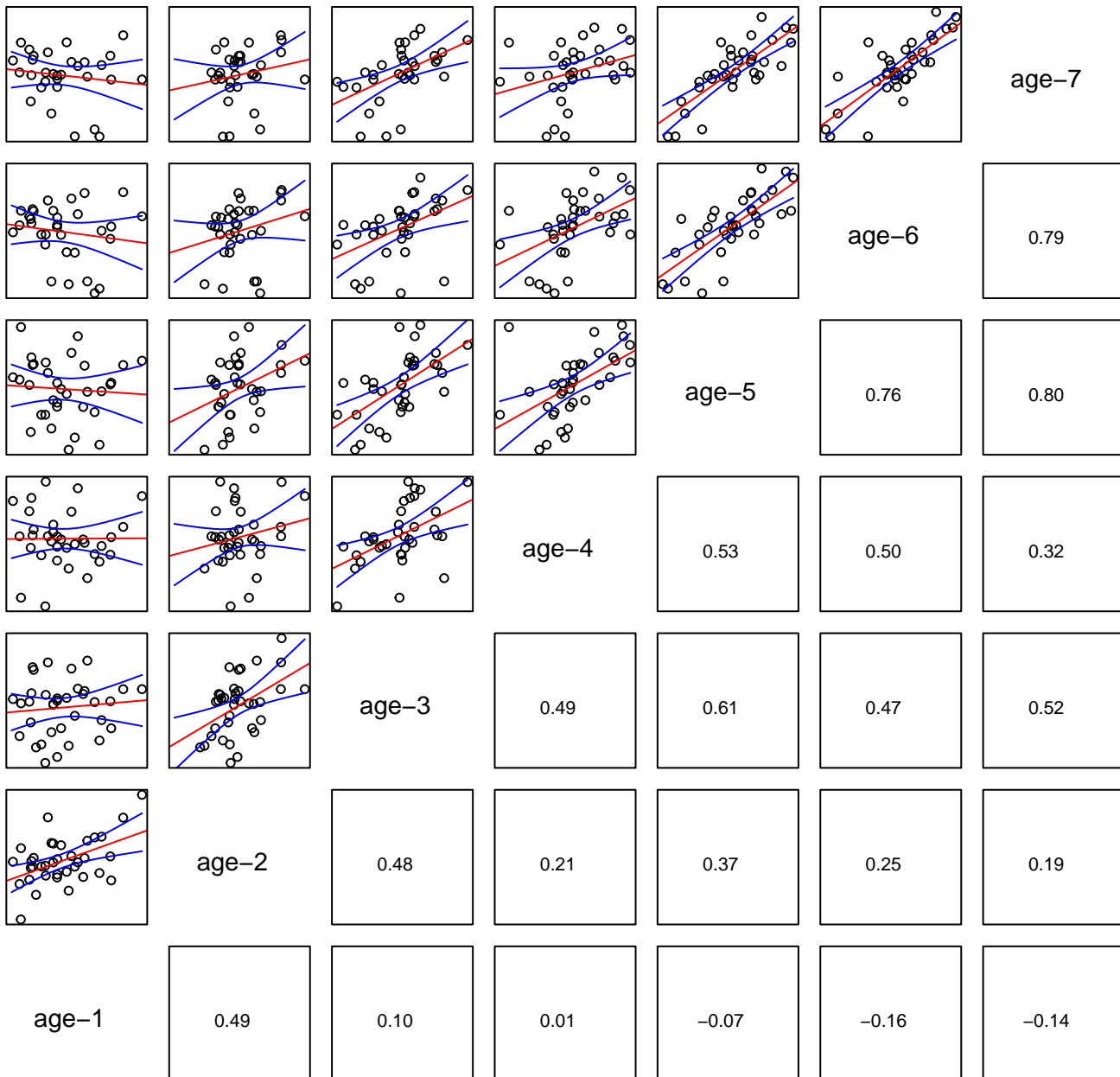
Catch for Fleet 1 (Comm) Observed



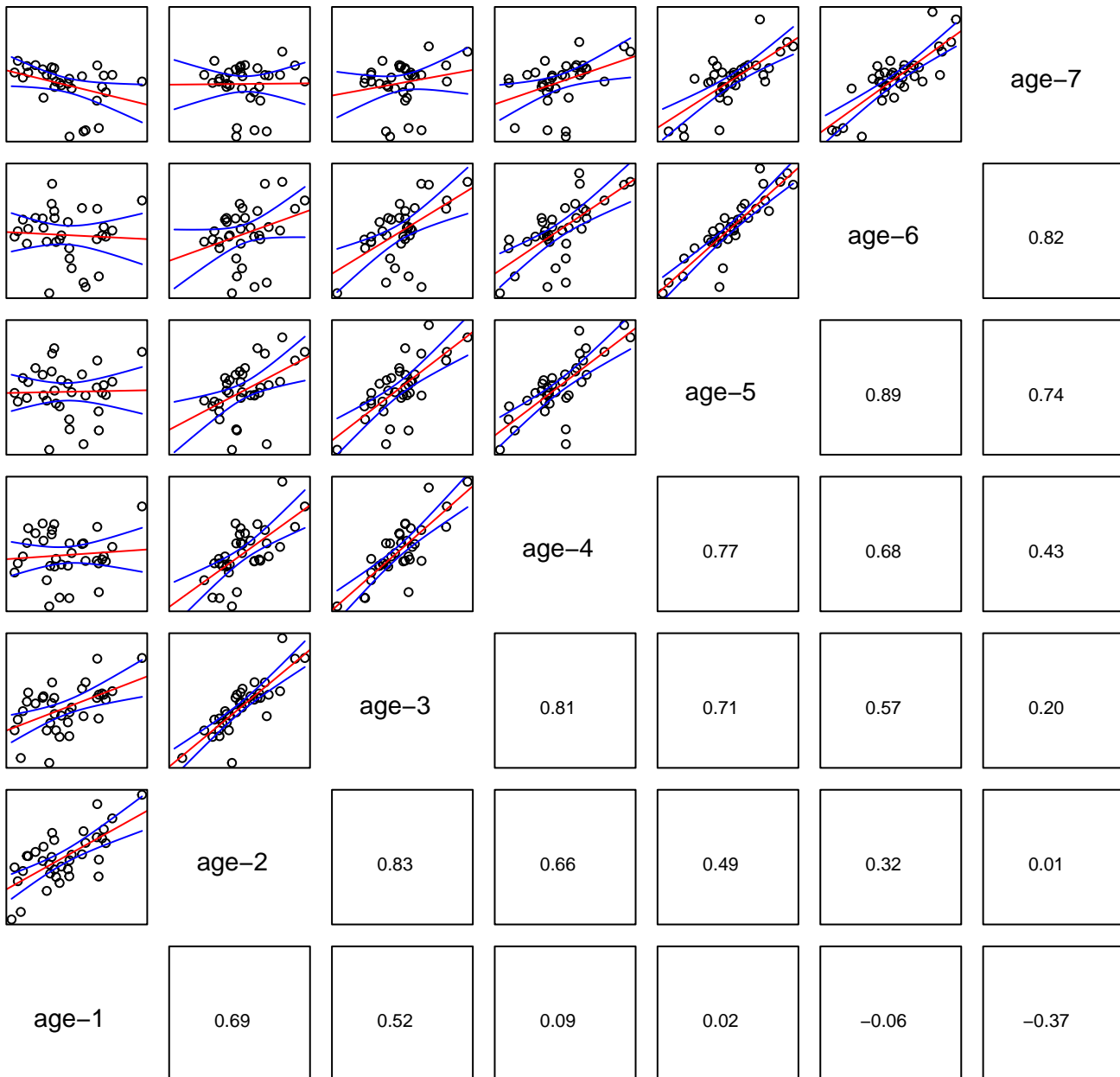
Catch for Fleet 1 (Comm) Predicted



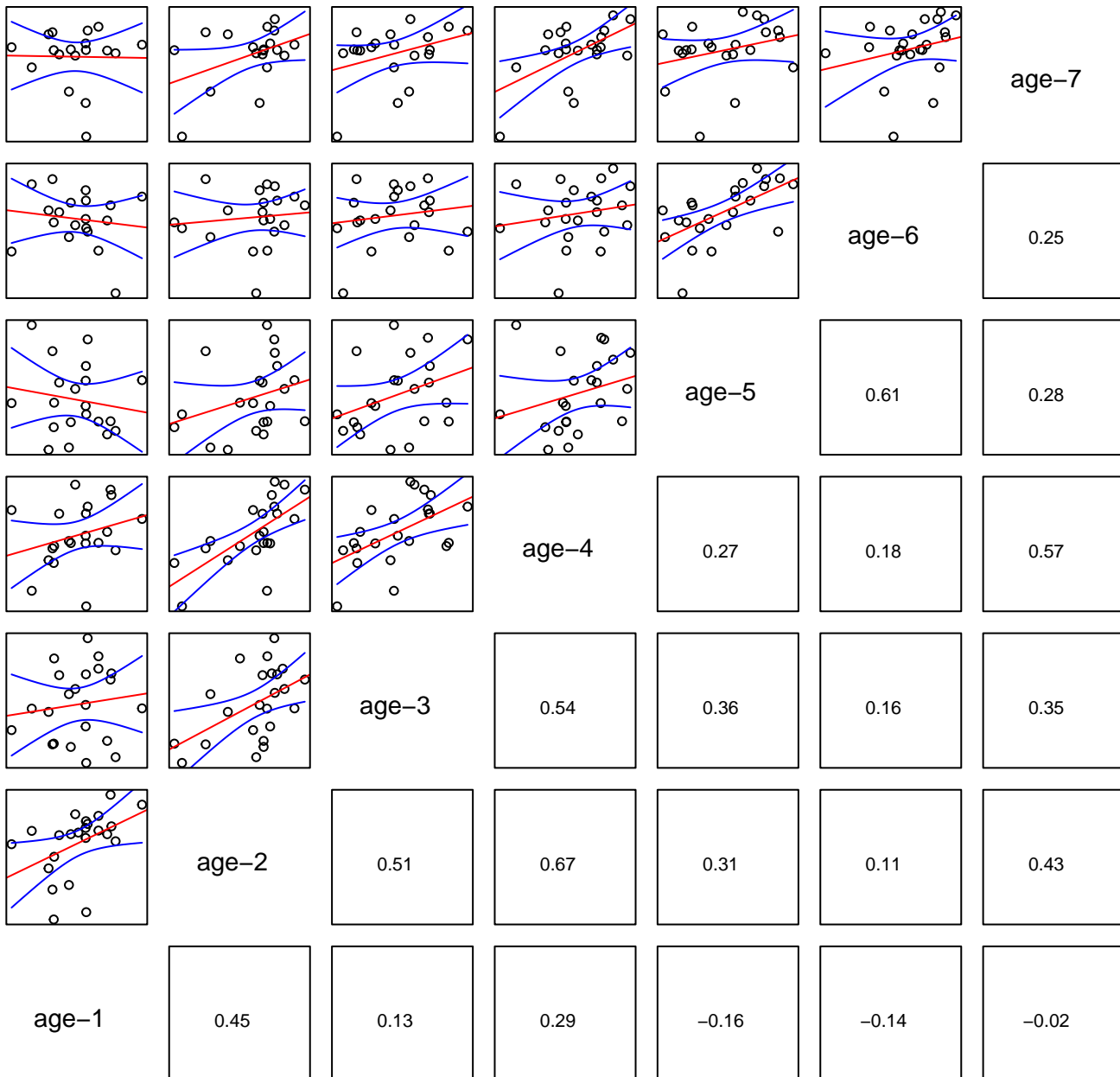
Catch for Fleet 2 (Rec) Observed



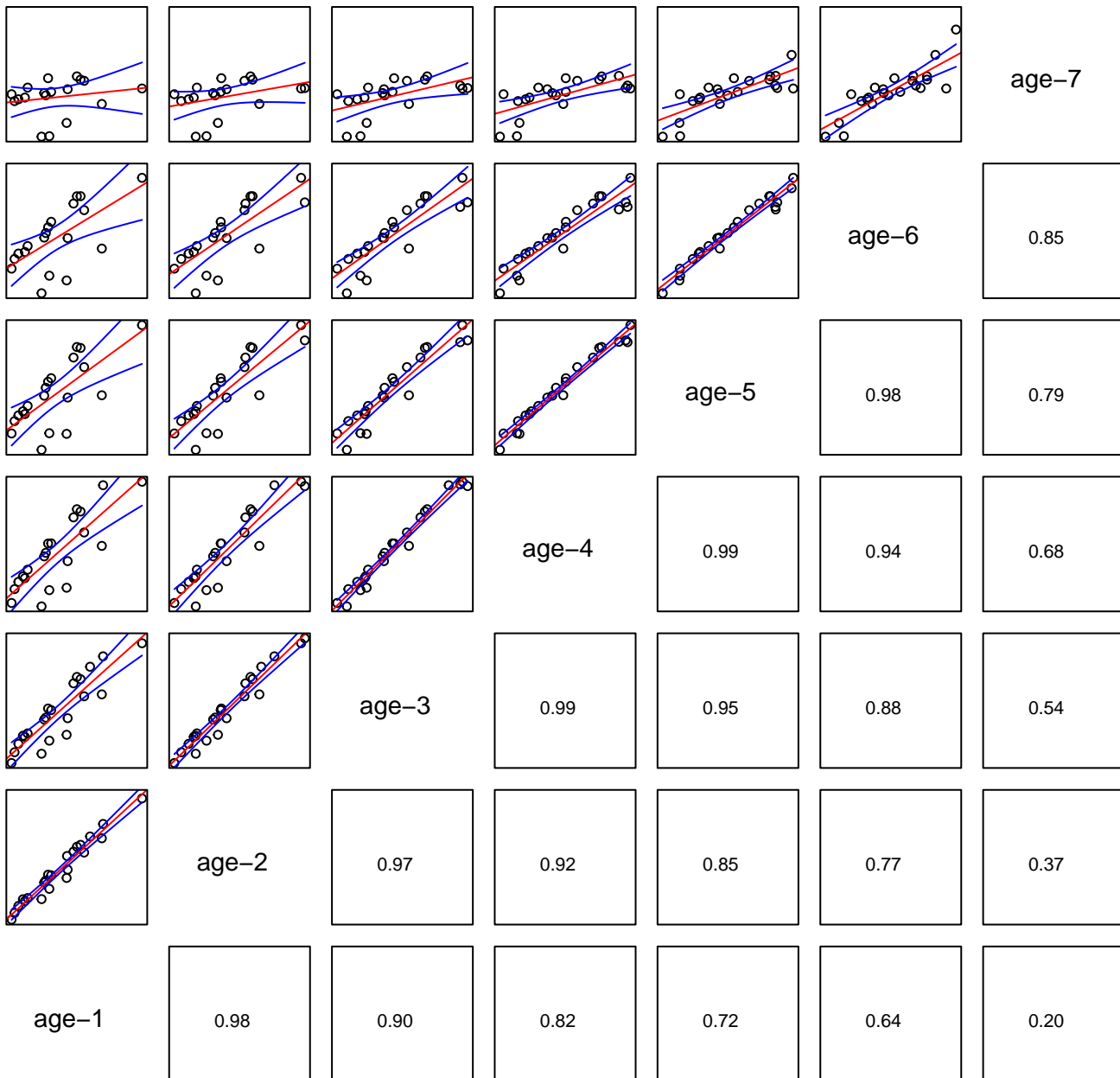
Catch for Fleet 2 (Rec) Predicted



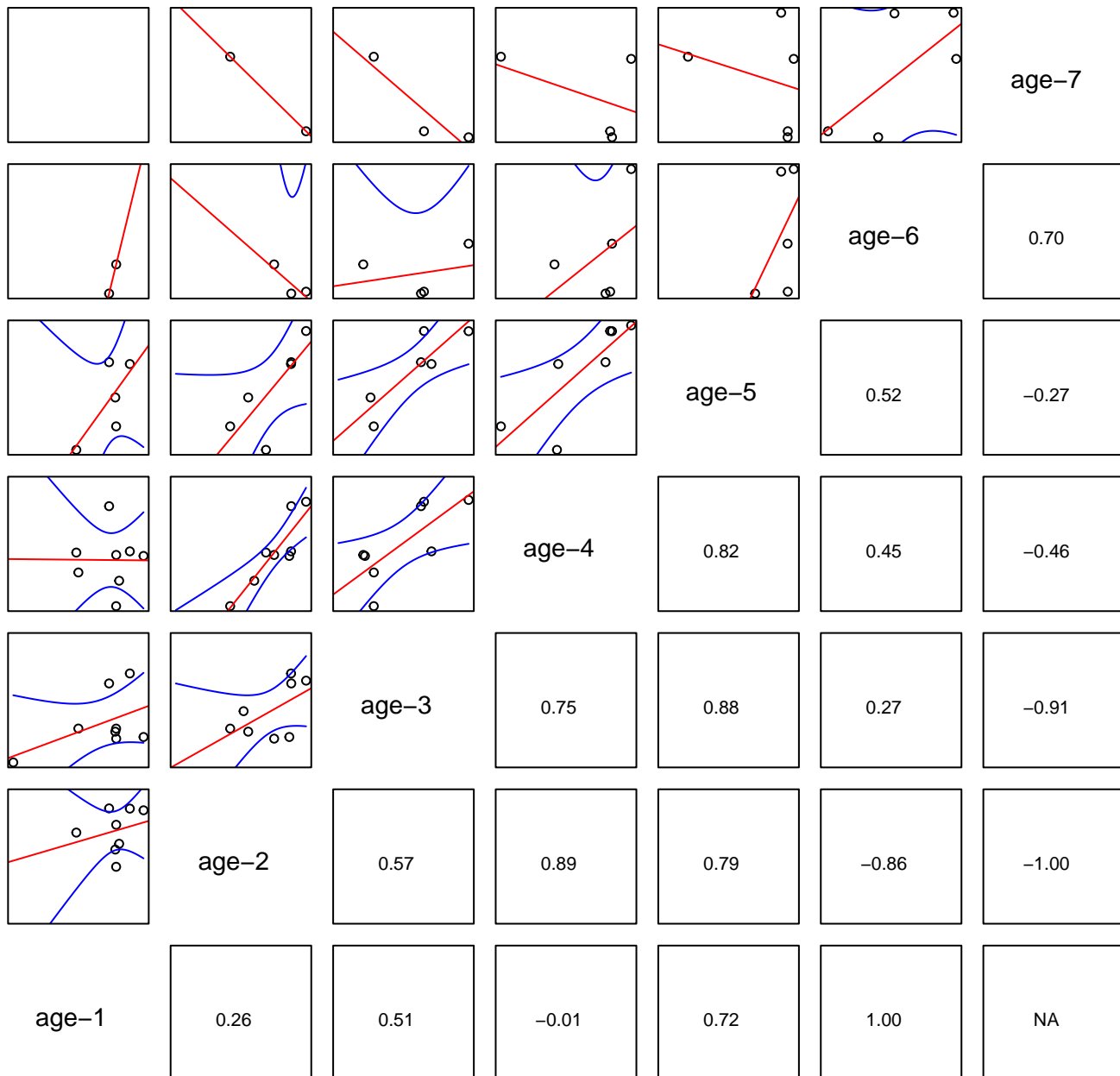
Index 1 (NEFSC Inshore) Observed



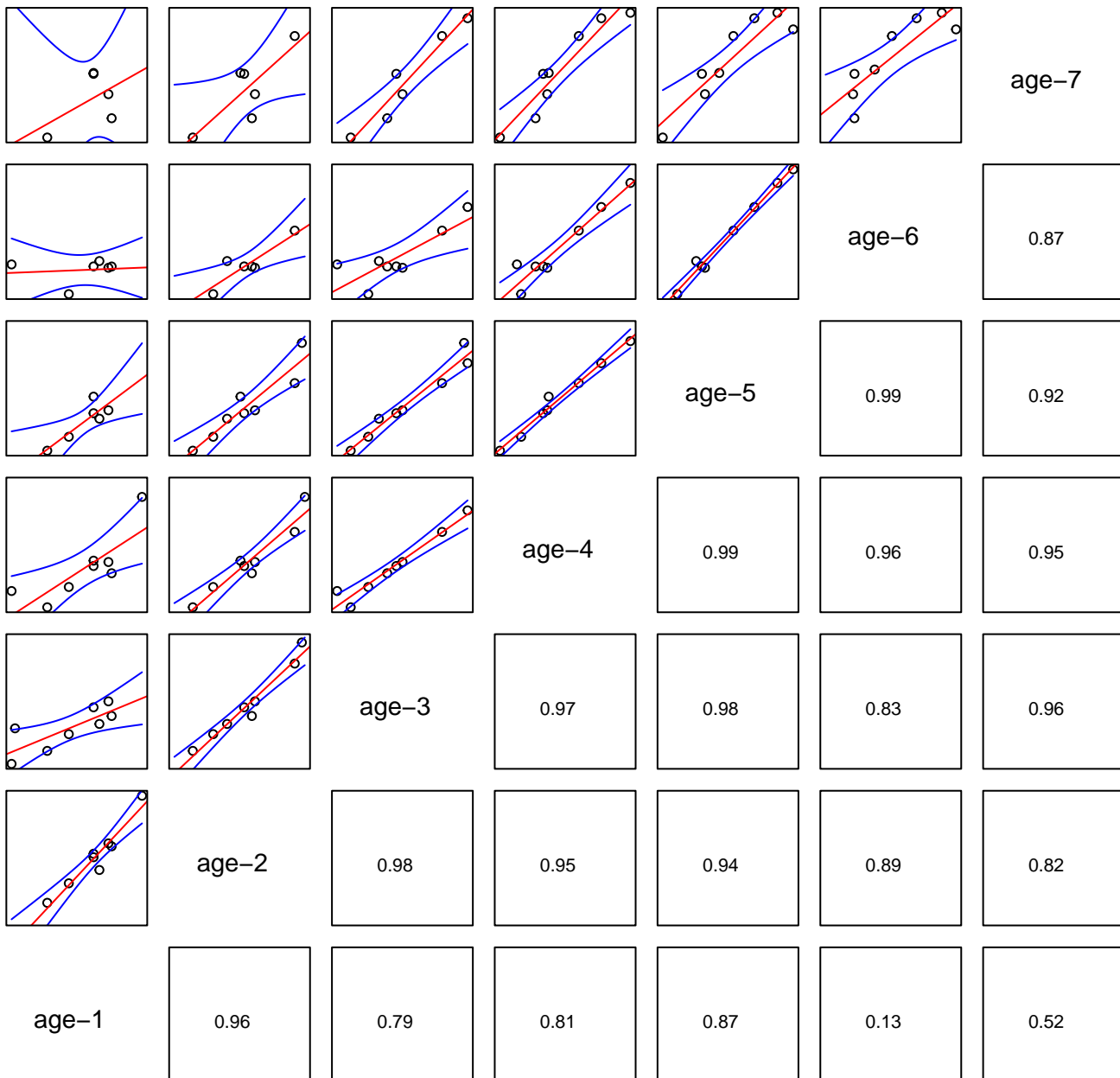
Index 1 (NEFSC Inshore) Predicted



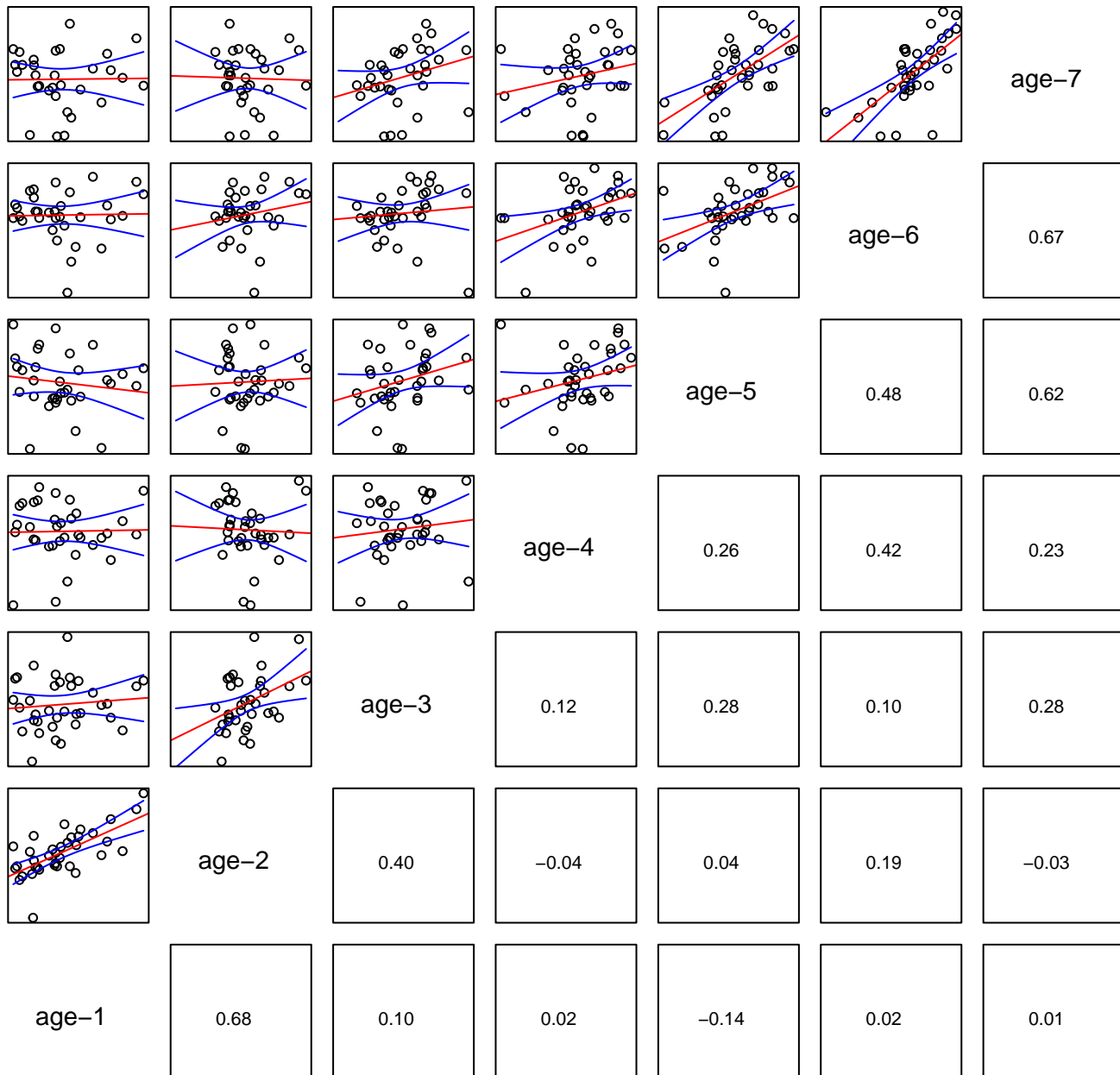
Index 2 (Bigelow) Observed



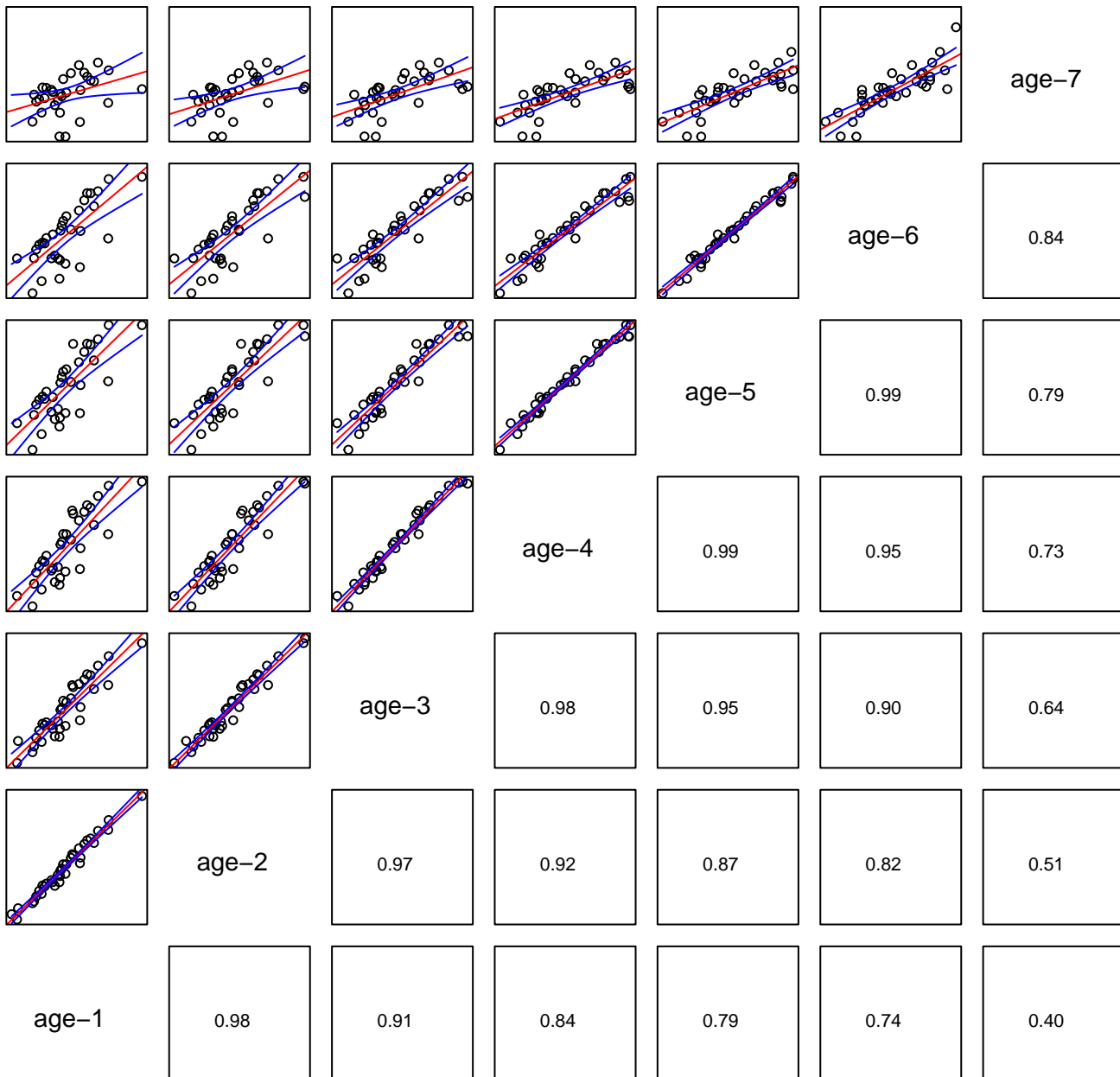
Index 2 (Bigelow) Predicted



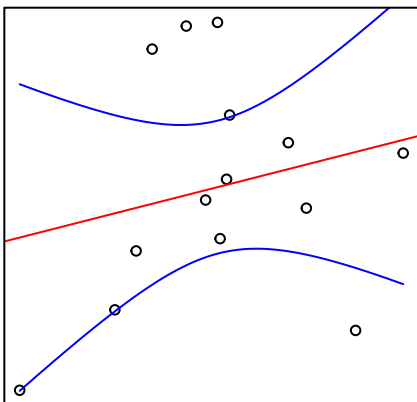
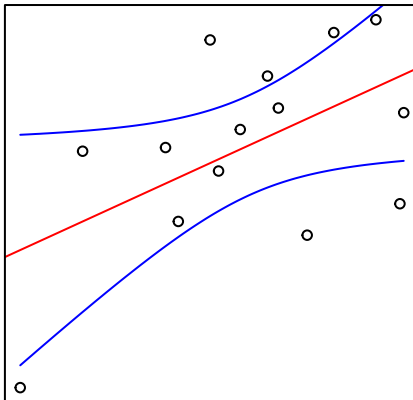
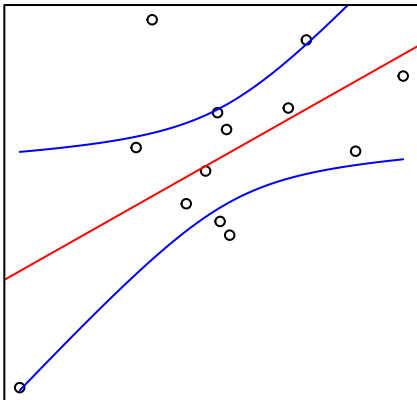
Index 3 (MRIP) Observed



Index 3 (MRIP) Predicted



Index 4 (NEAMAP) Observed



age-3

age-2

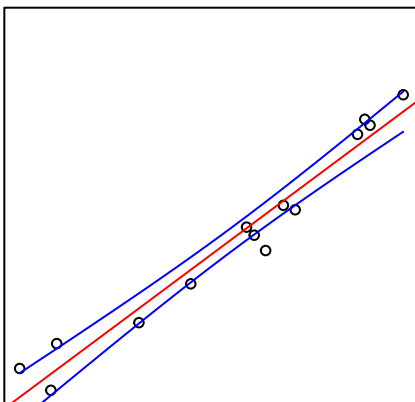
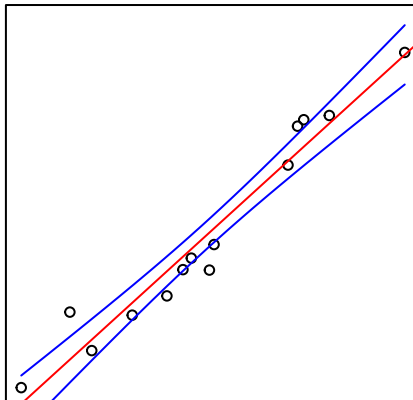
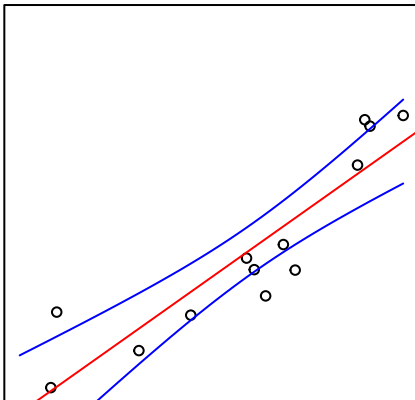
0.54

age-1

0.22

0.58

Index 4 (NEAMAP) Predicted



age-3

age-2

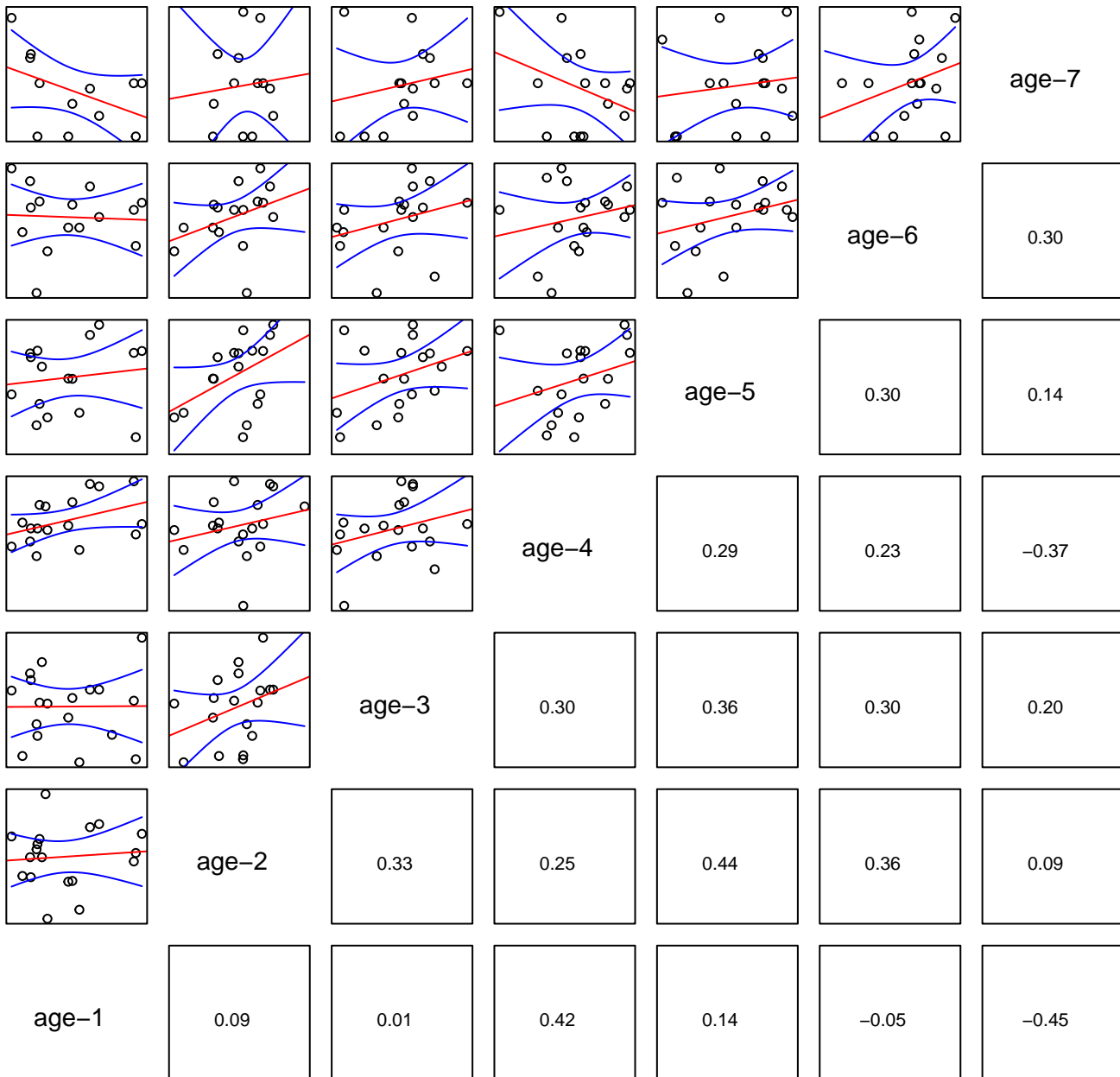
0.97

age-1

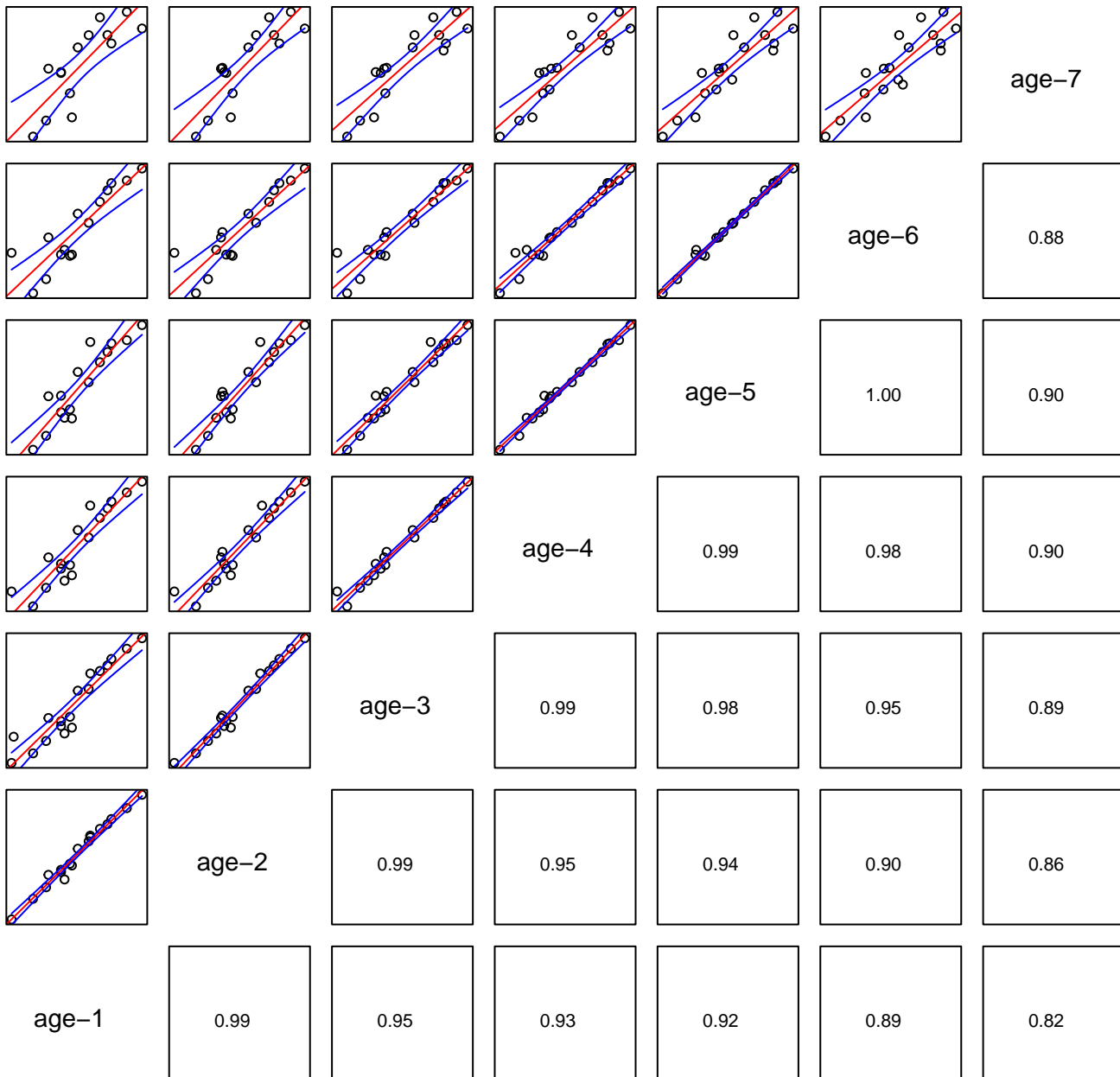
0.98

0.90

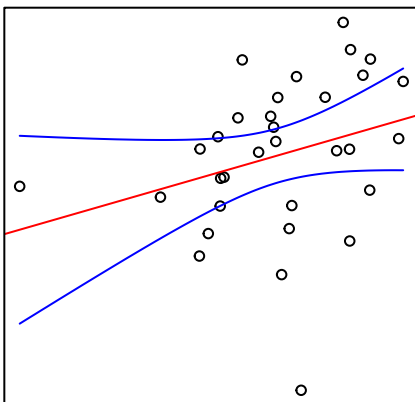
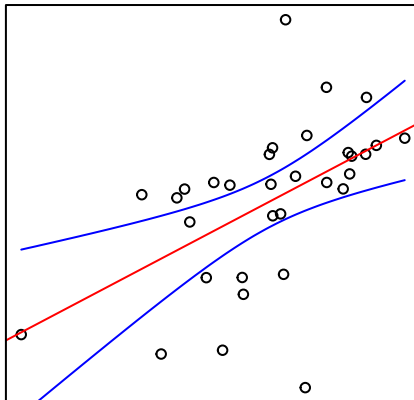
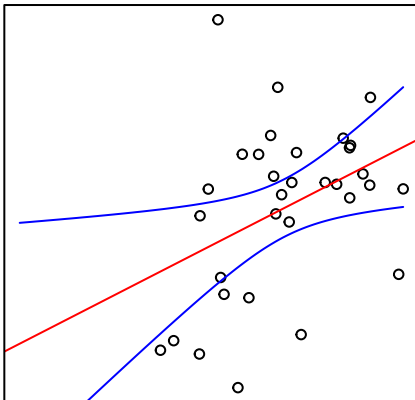
Index 6 (PSIGN) Observed



Index 6 (PSIGN) Predicted



Index 7 (CT Trawl) Observed



age-3

age-2

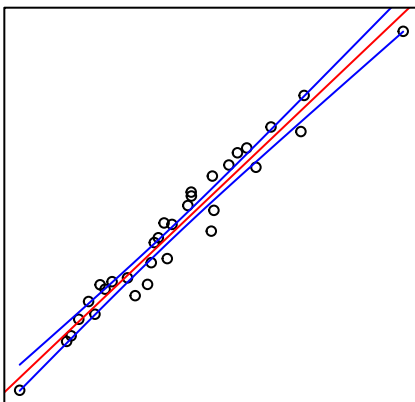
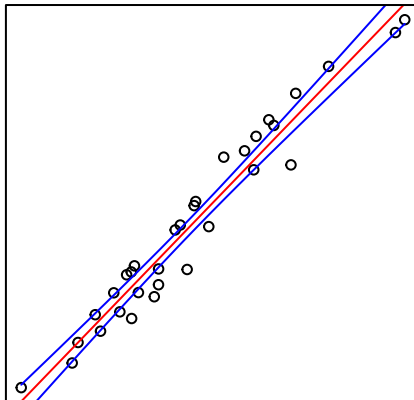
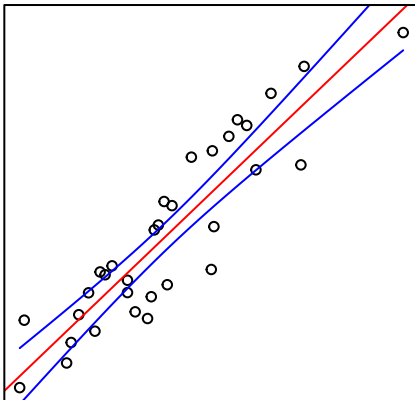
age-1

0.30

0.40

0.53

Index 7 (CT Trawl) Predicted



age-3

age-2

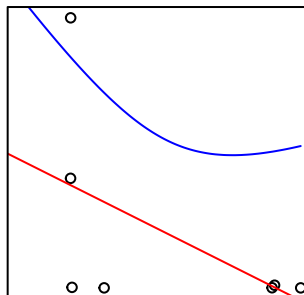
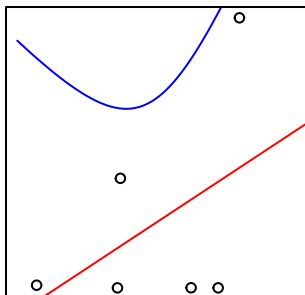
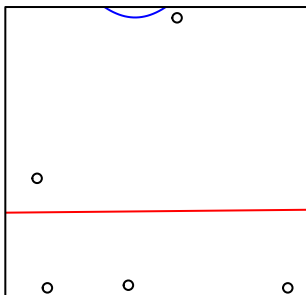
0.98

age-1

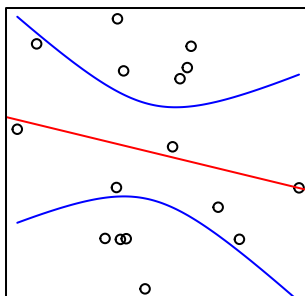
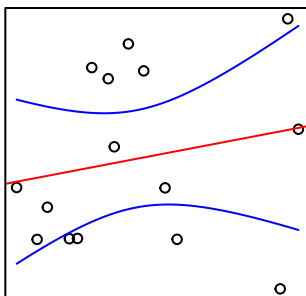
0.98

0.91

Index 9 (ChesMMAp) Observed

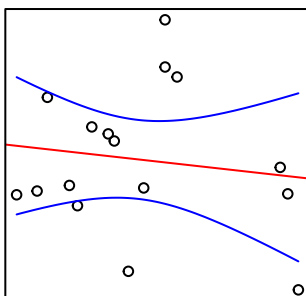


age-4



age-3

-0.53



age-2

-0.20

0.46

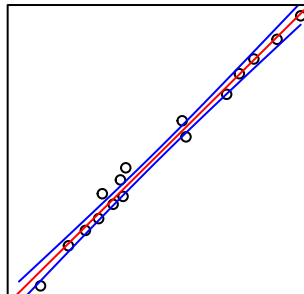
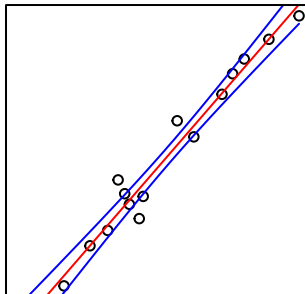
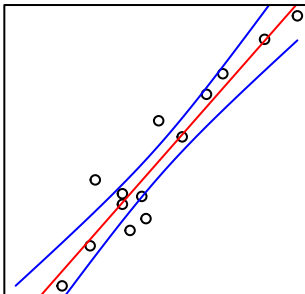
age-1

-0.14

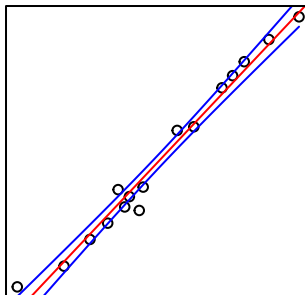
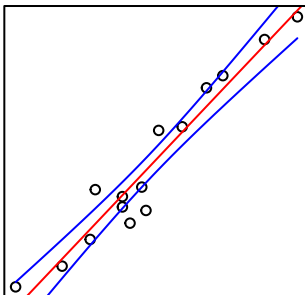
0.20

0.01

Index 9 (ChesMMAp) Predicted

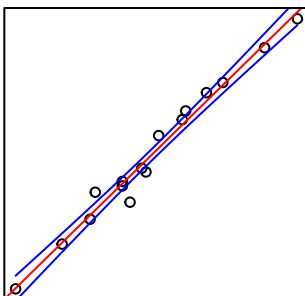


age-4



age-3

0.99



age-2

0.99

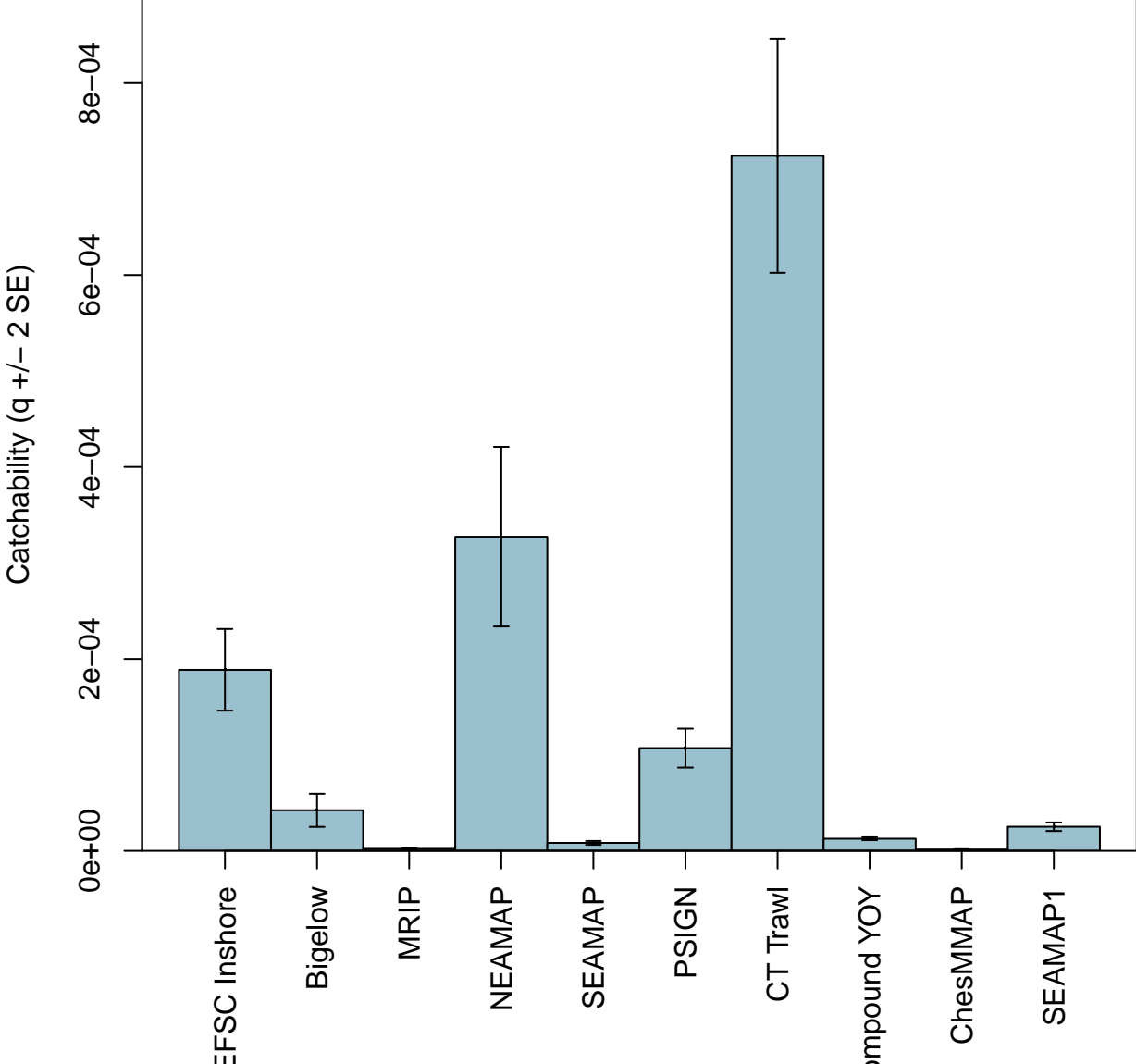
0.98

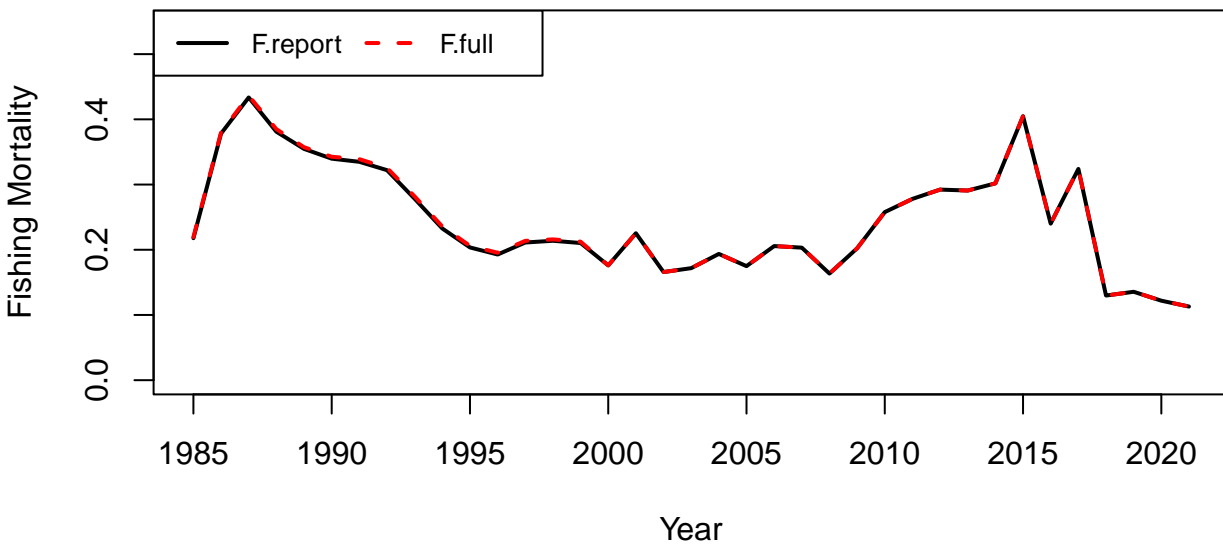
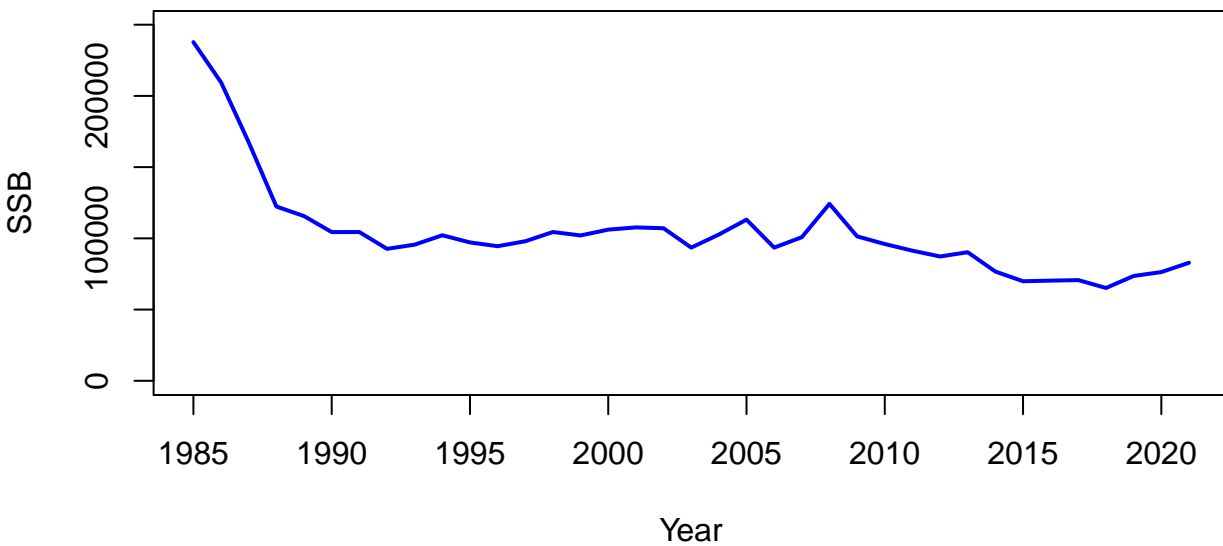
age-1

0.99

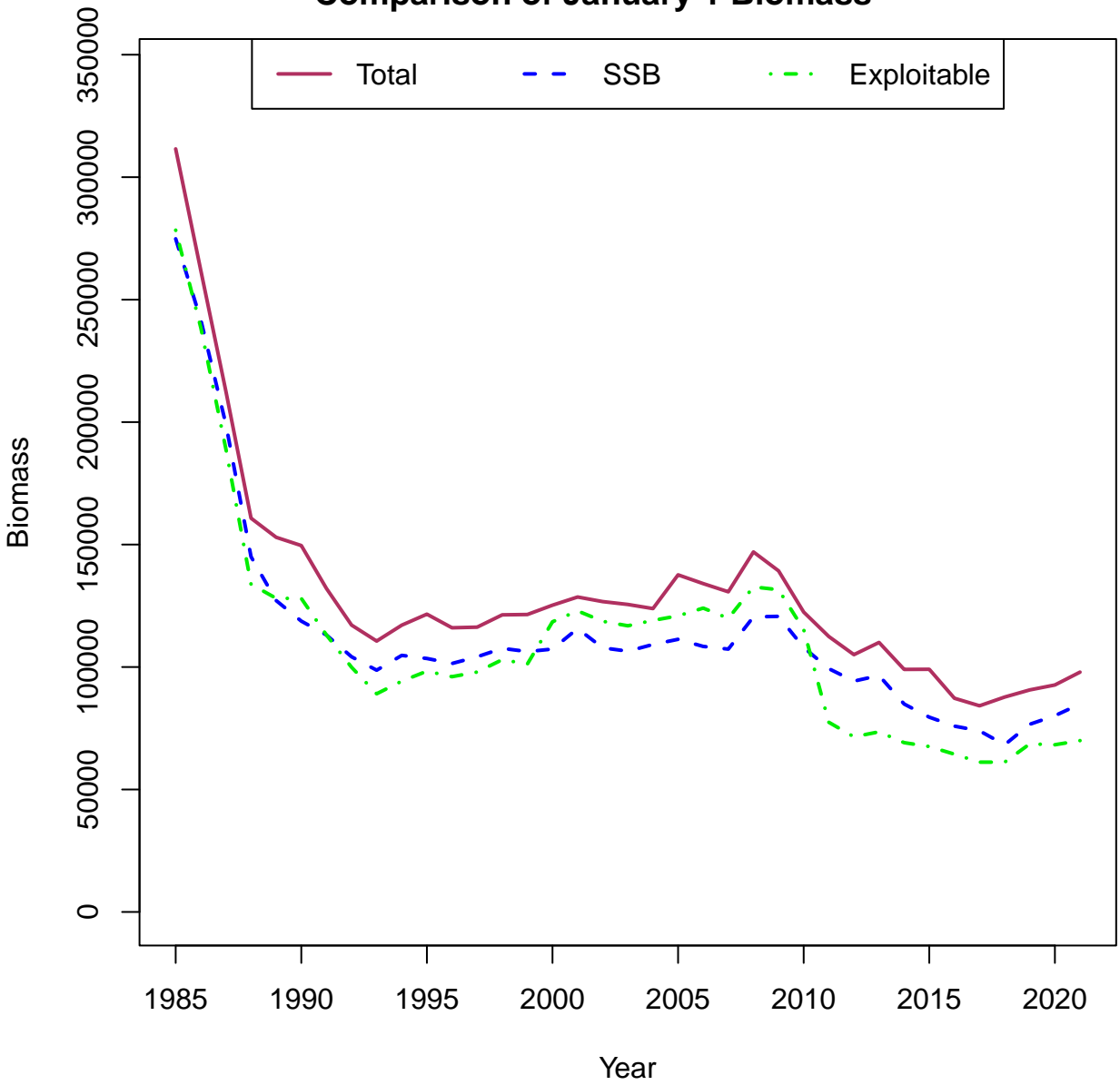
0.97

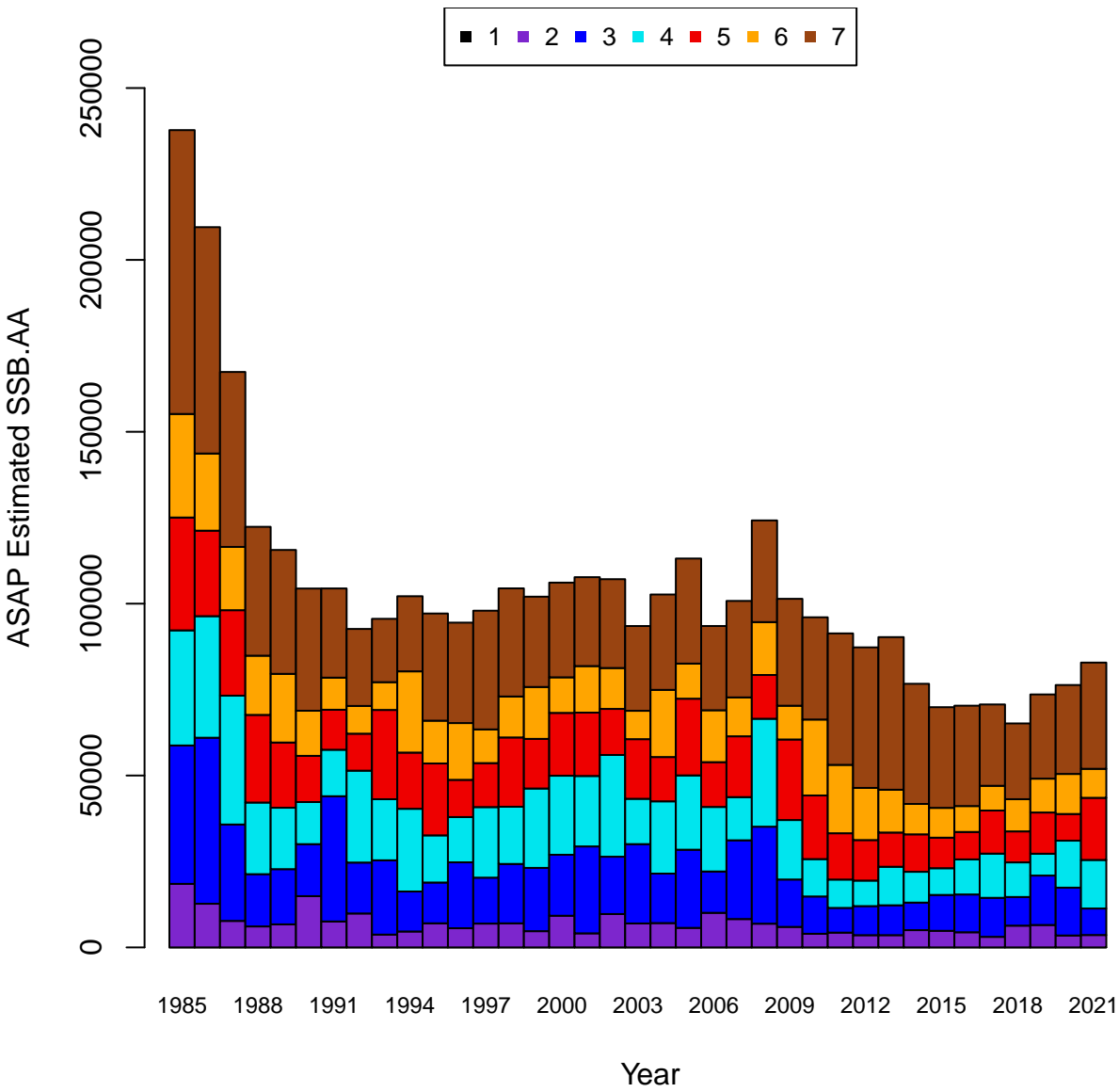
0.95

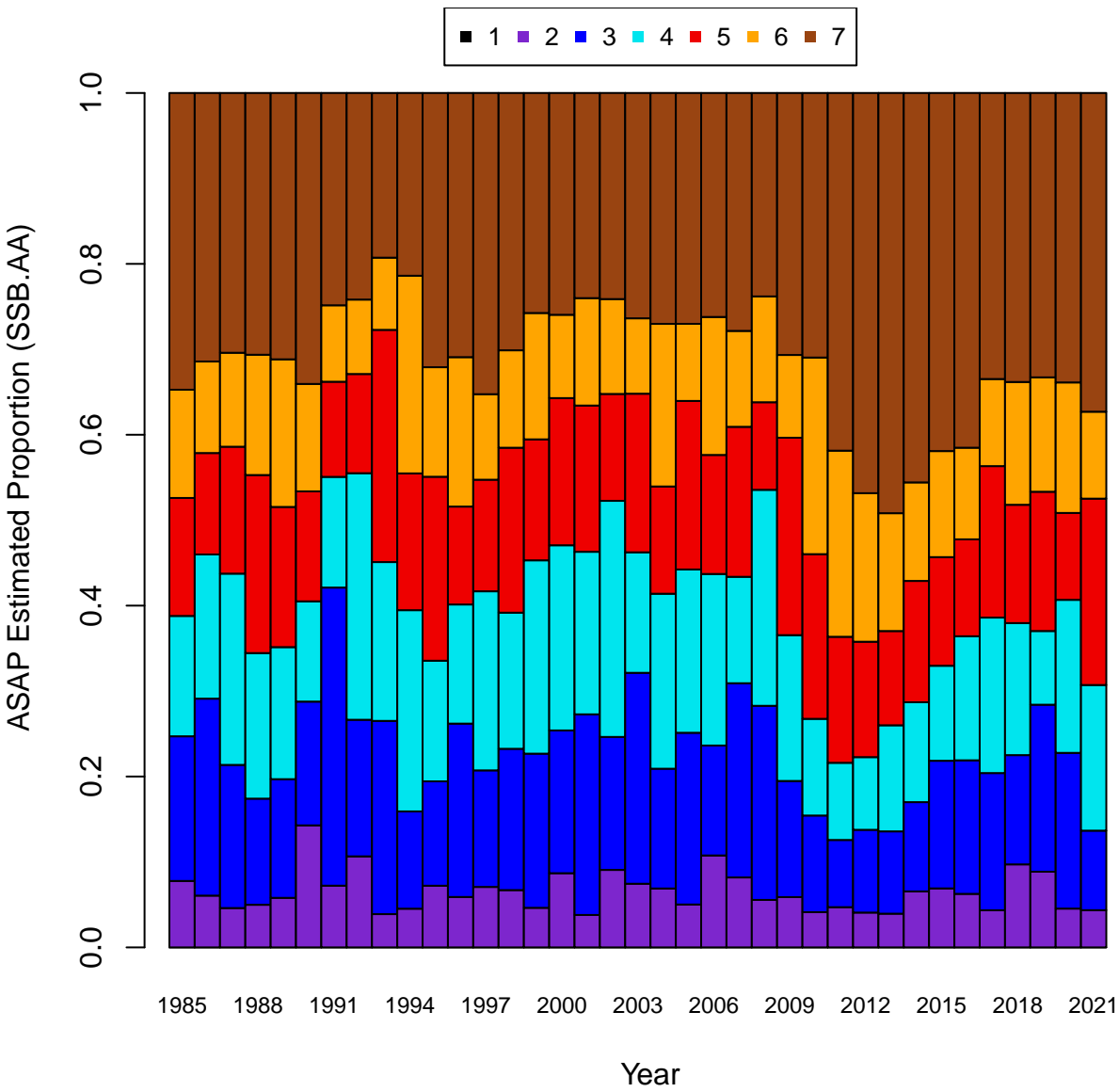


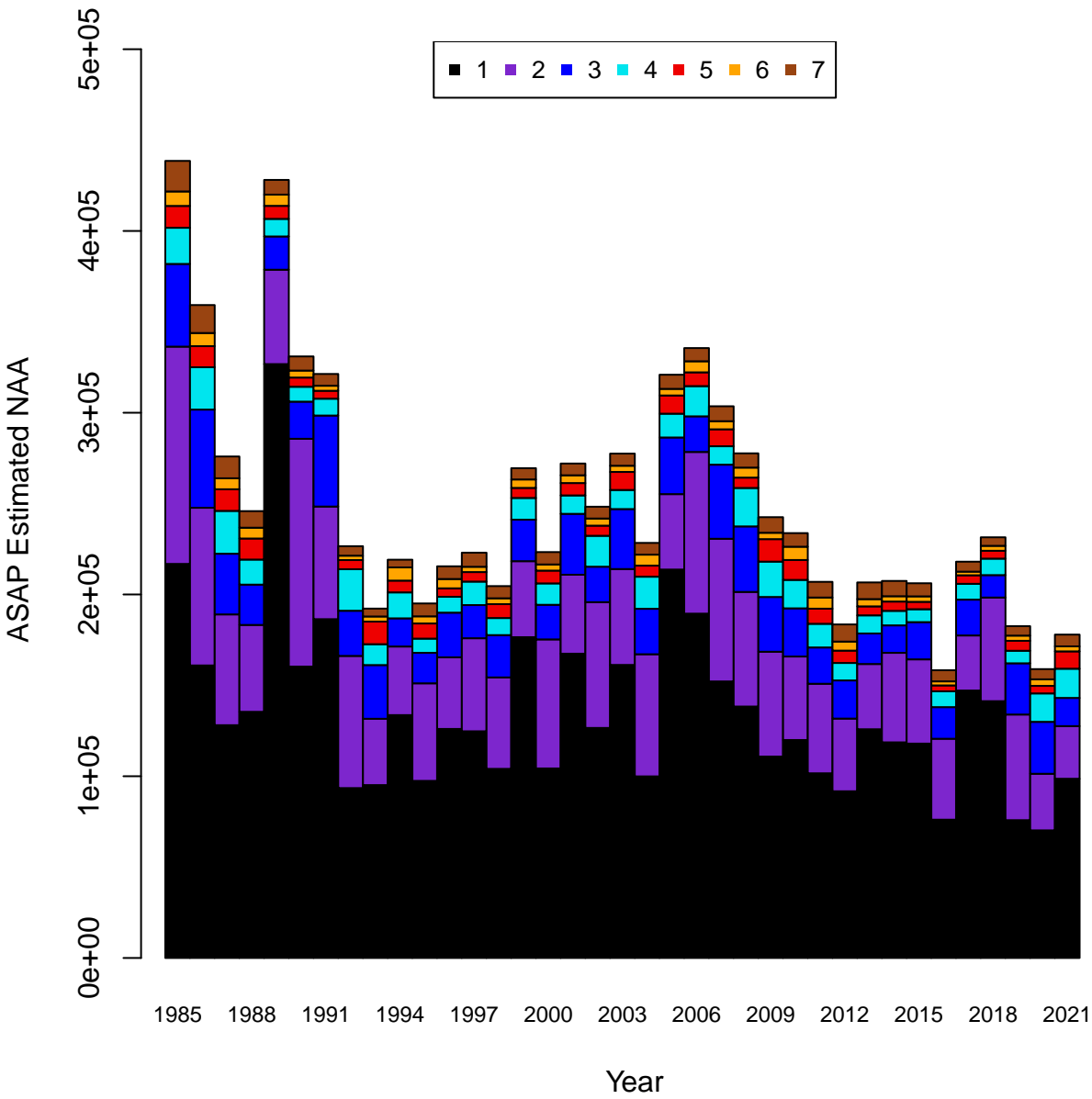


Comparison of January 1 Biomass

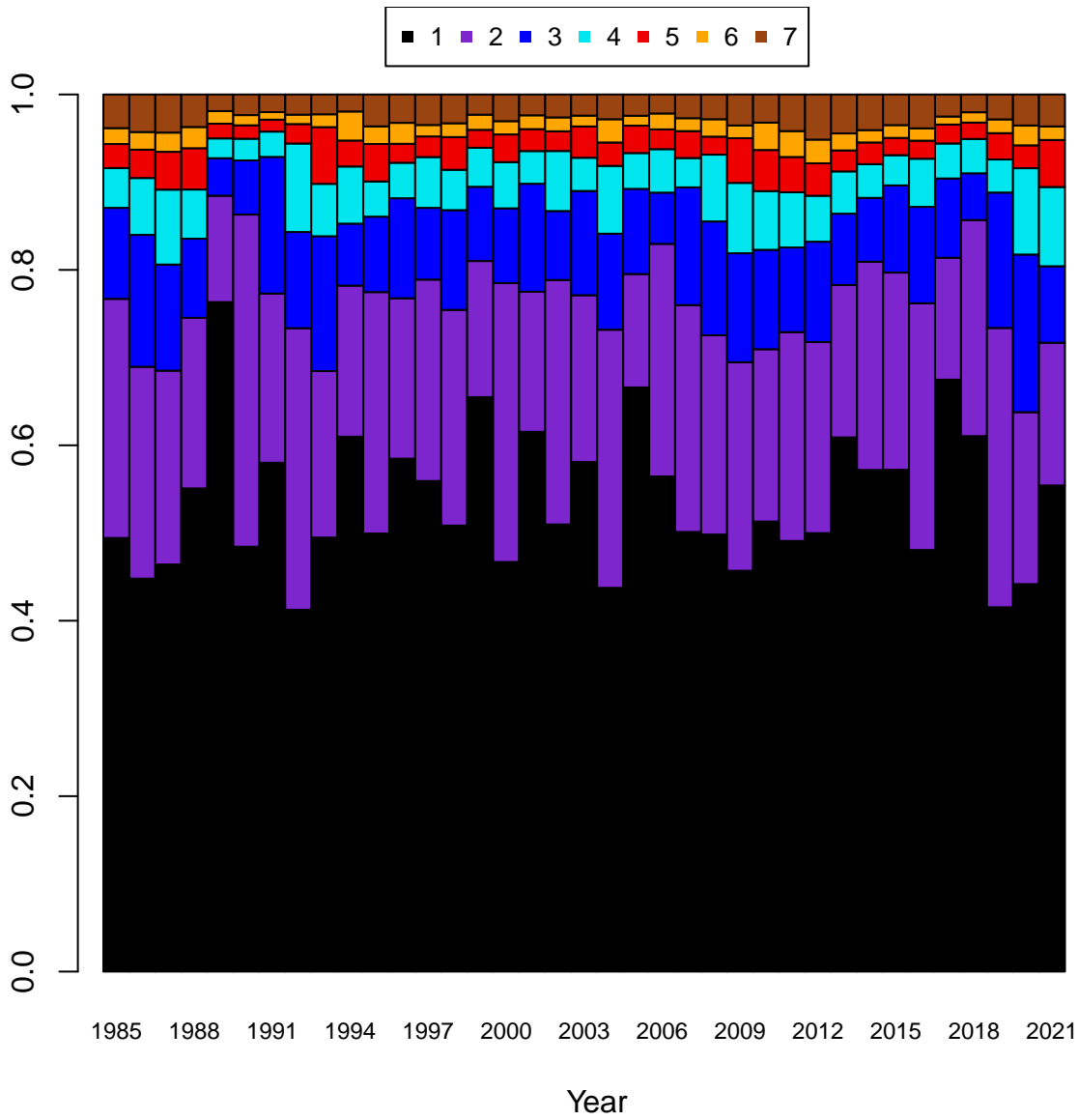


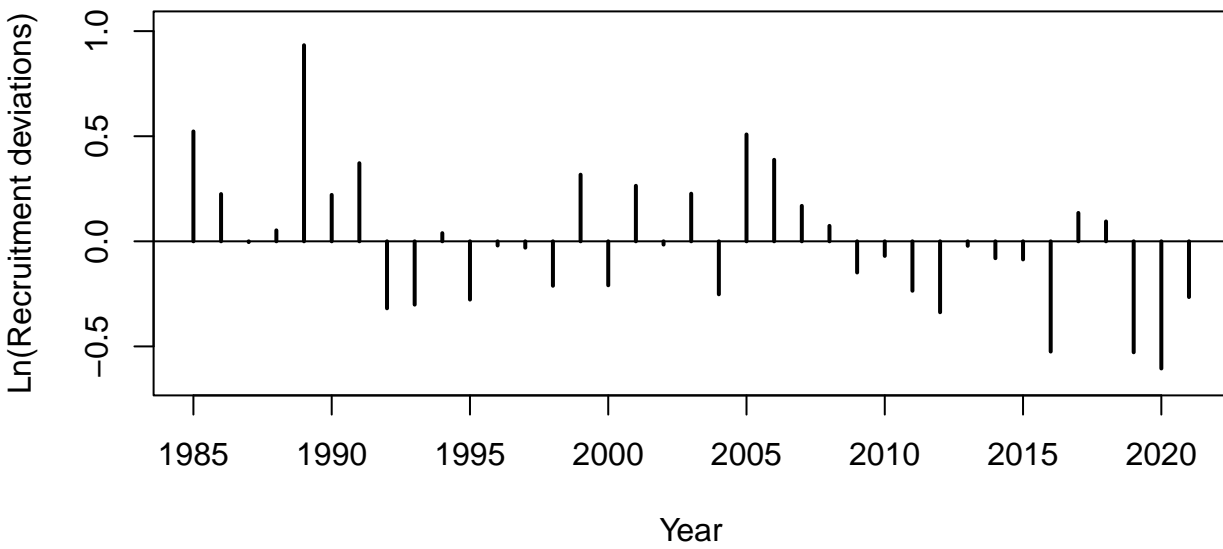
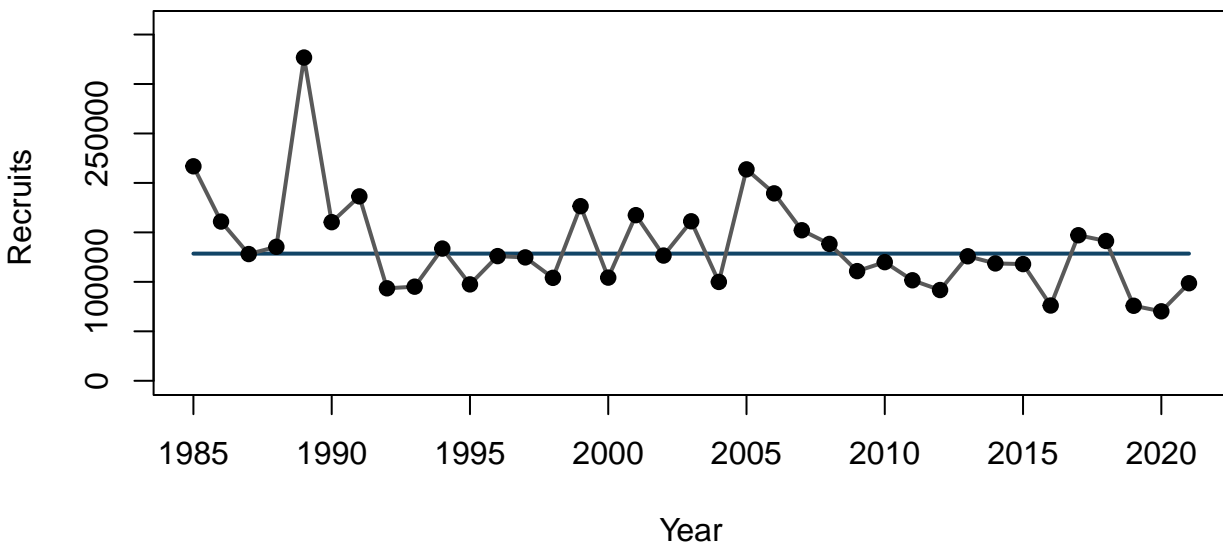


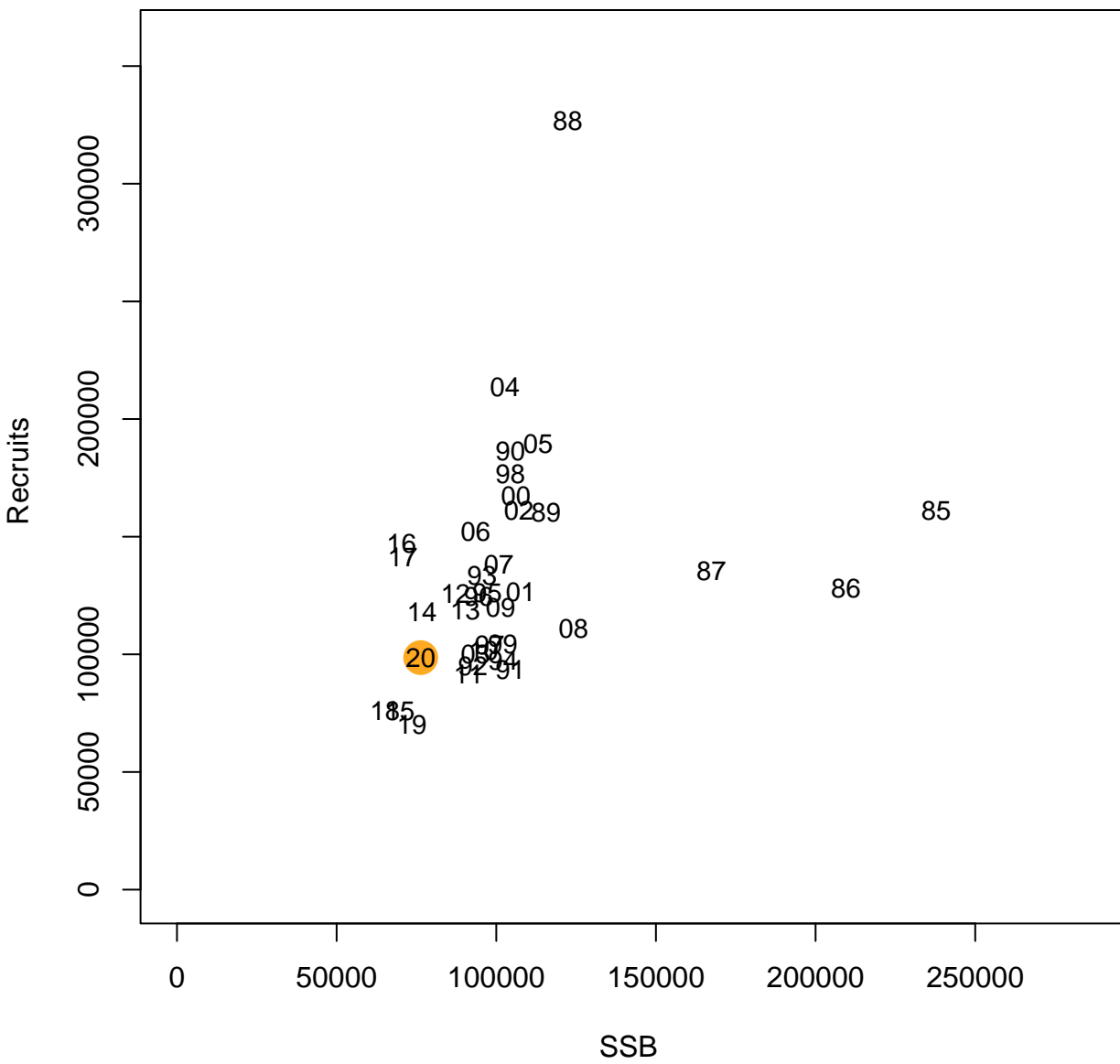


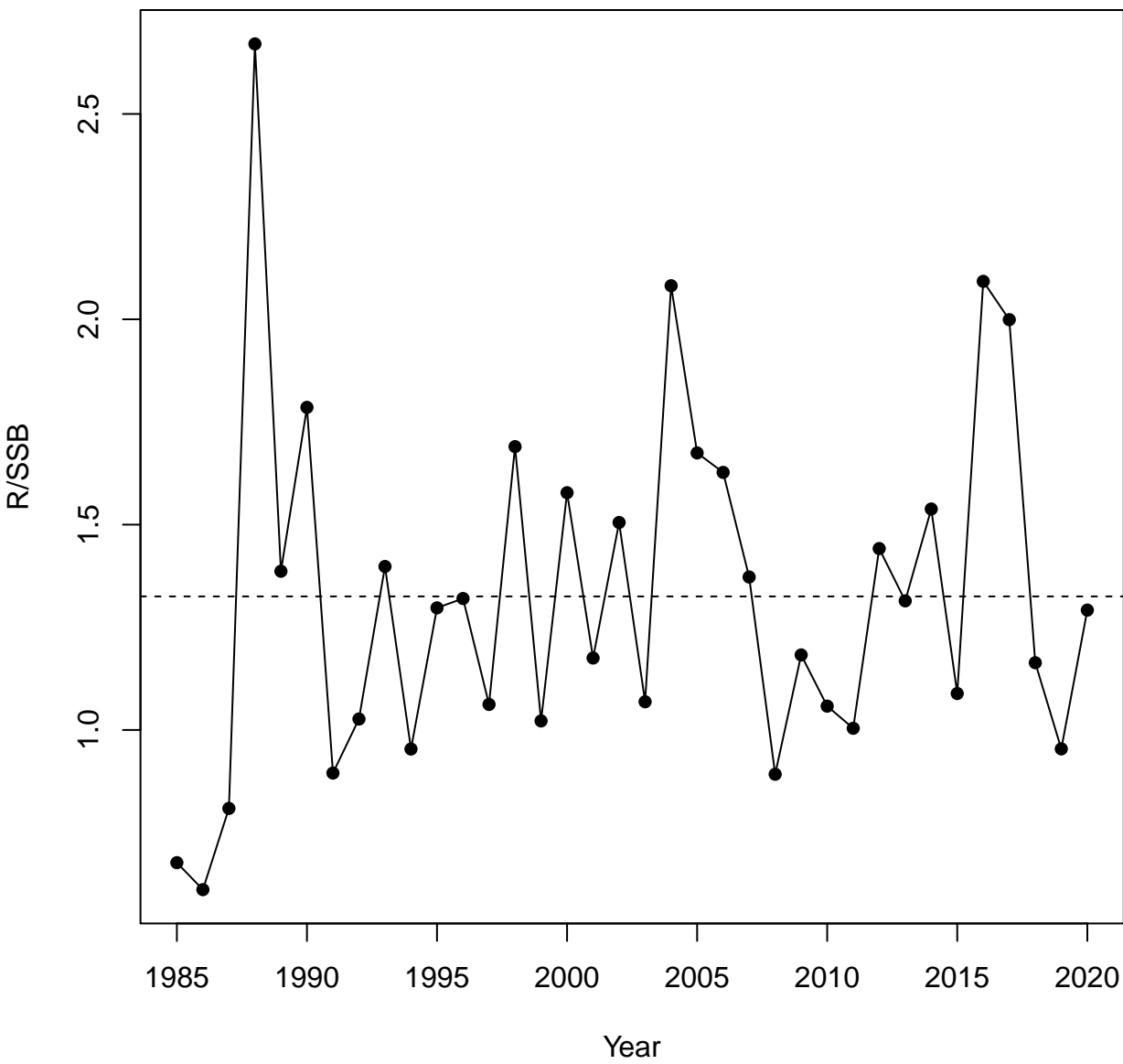


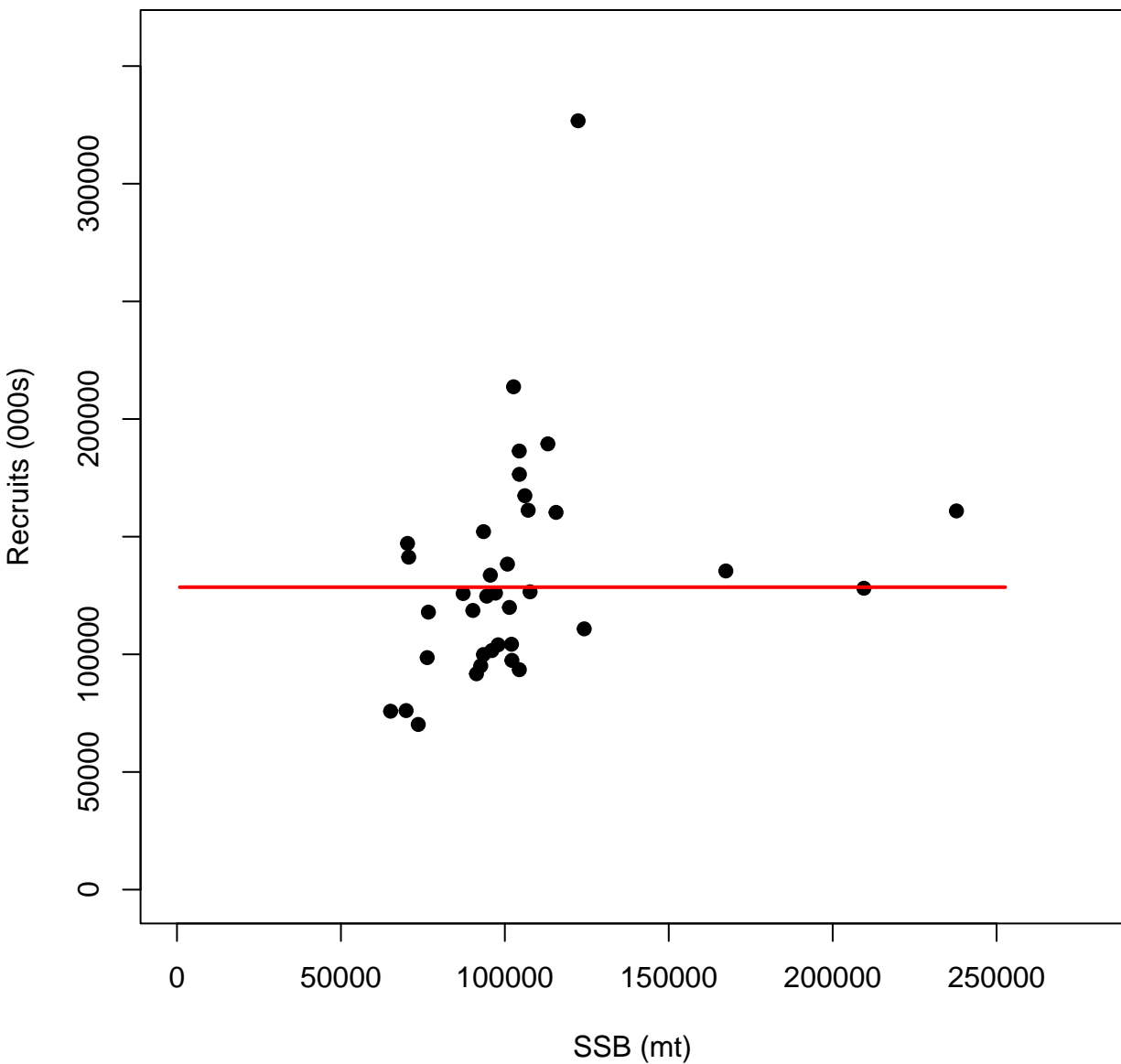
ASAP Estimated Proportion (NAA)











Age-1 Recruits (year-class)

350000
300000
250000
200000
150000
100000
50000

1985

1987

1989

1991

1993

1995

1997

1999

2001

2003

2005

2007

2009

2011

2013

2015

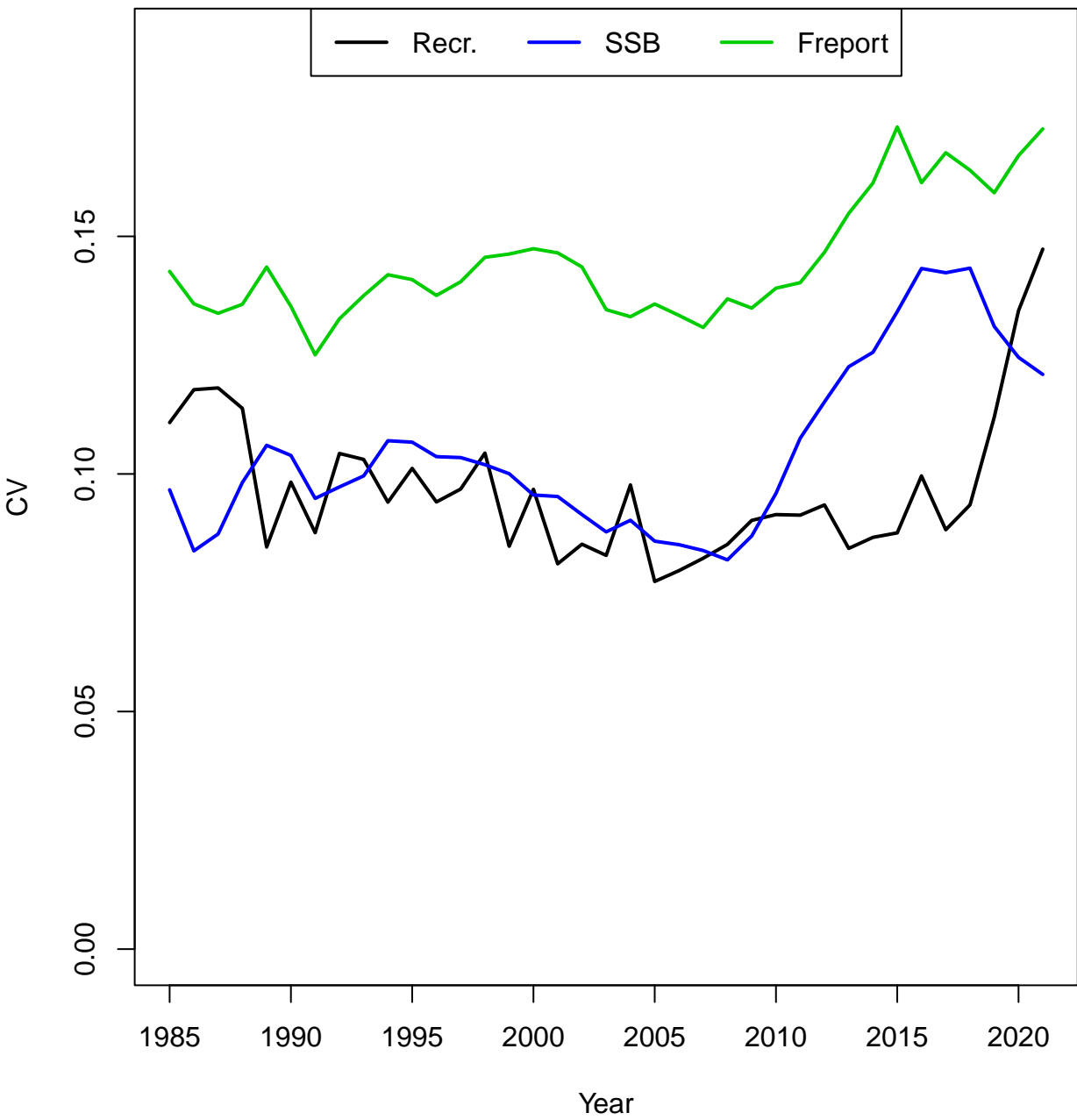
2017

2019

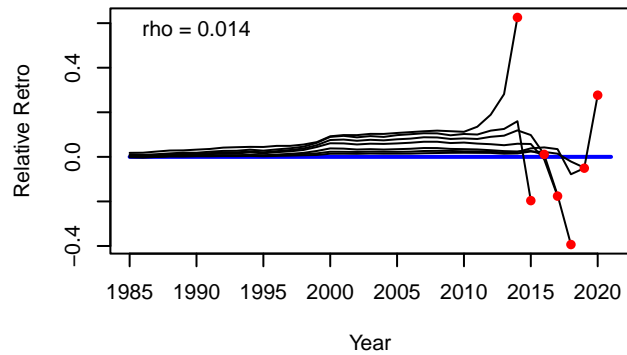
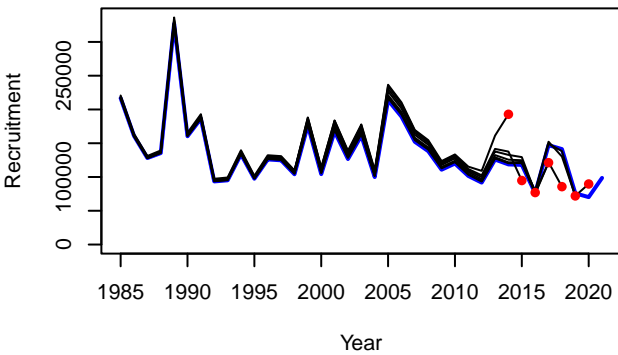
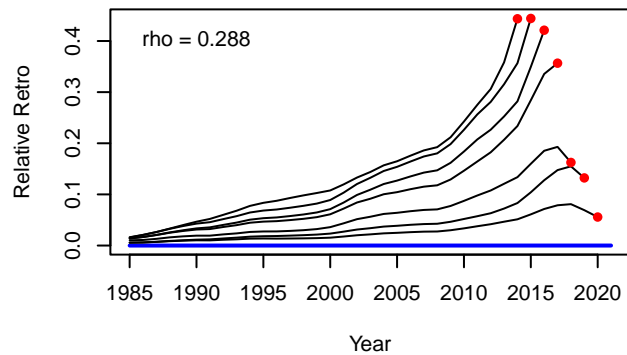
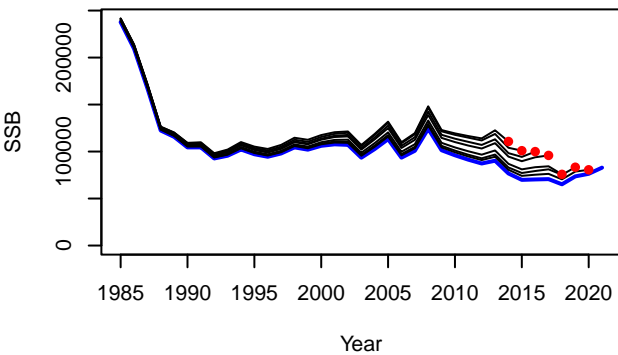
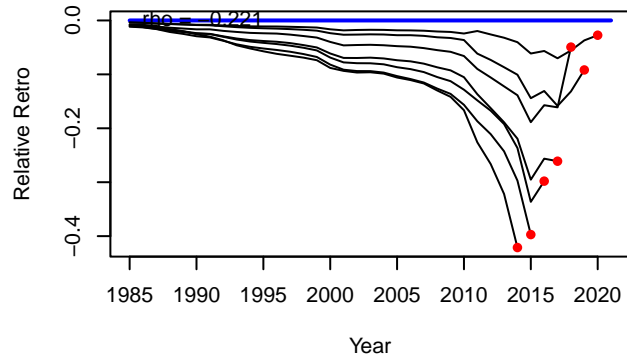
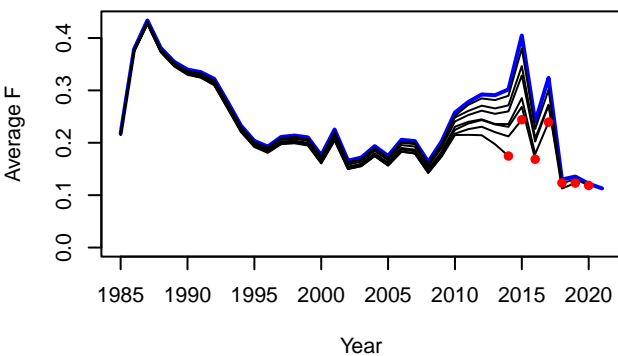
Year

SSB (year)

250000
200000
150000
100000
50000
0

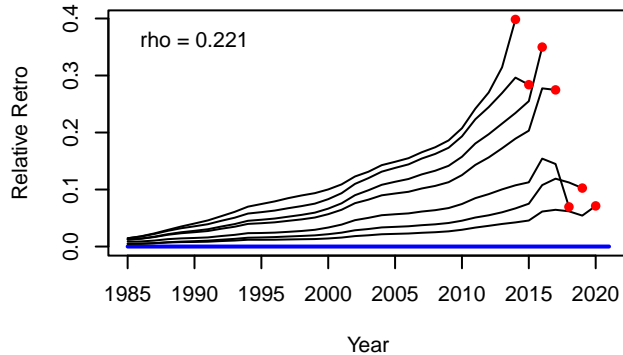
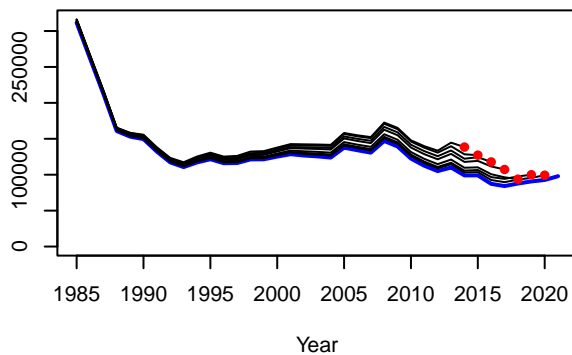


F, SSB, R

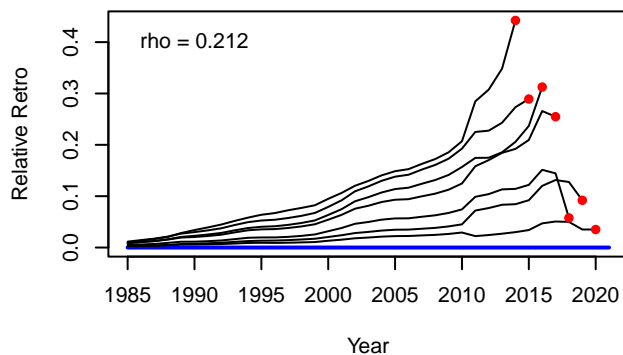
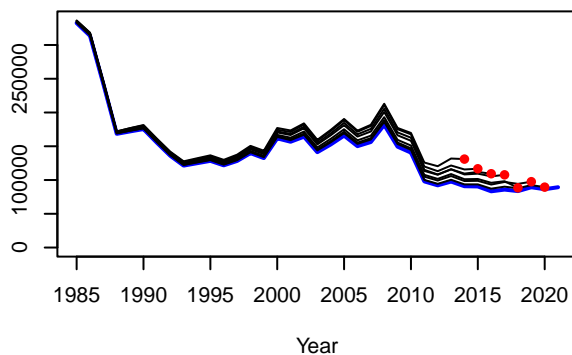


Jan-1 B, Exploitable B, Total Stock N

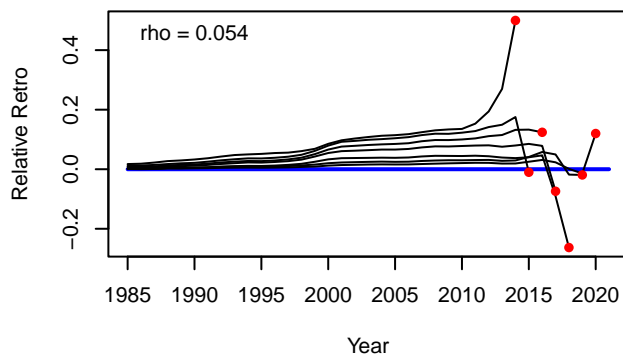
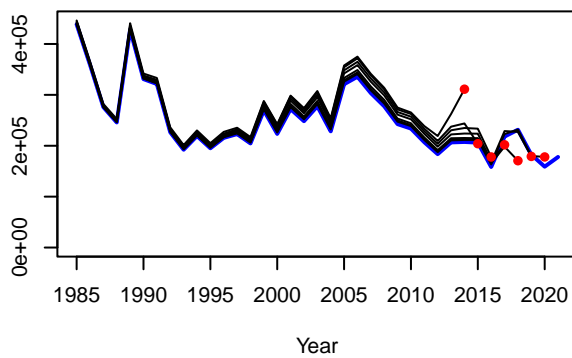
Jan-1 B



Exploitable B

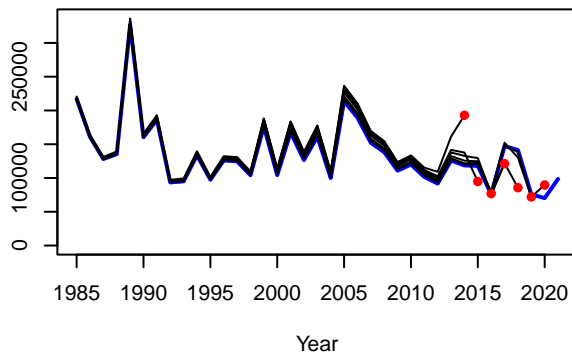


Total Stock N

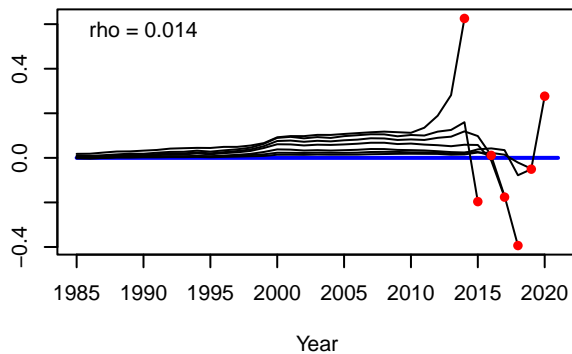


Stock Numbers at Age

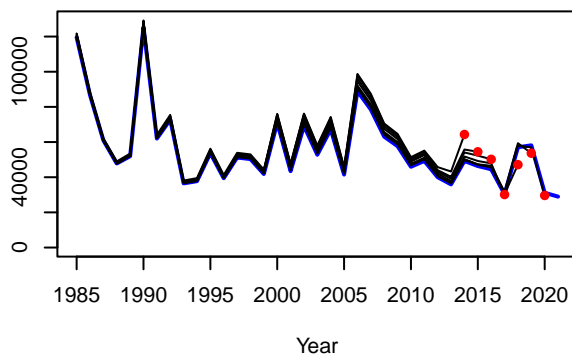
N at Age 1



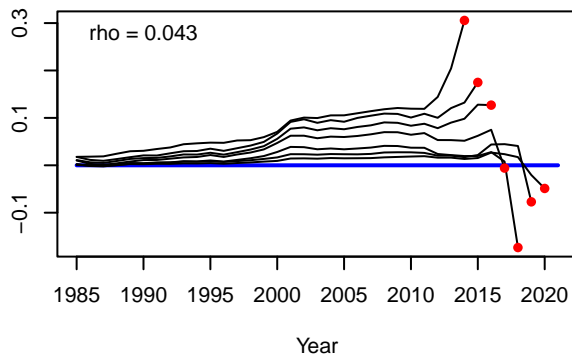
Relative Retro



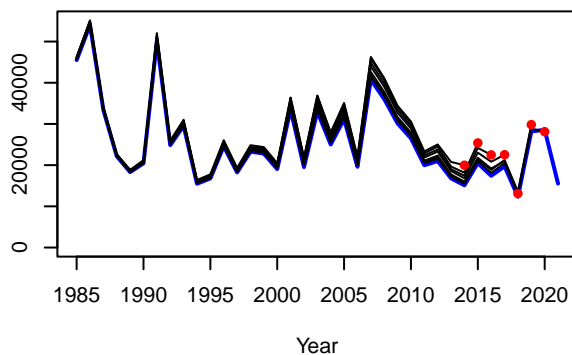
N at Age 2



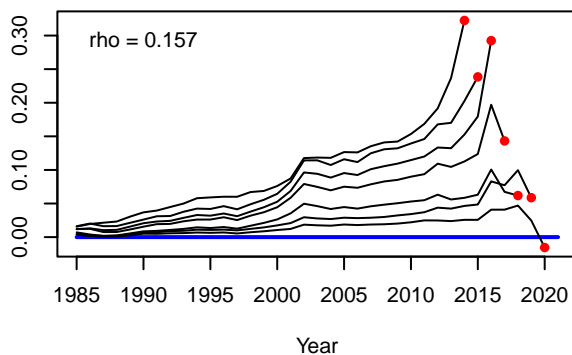
Relative Retro



N at Age 3

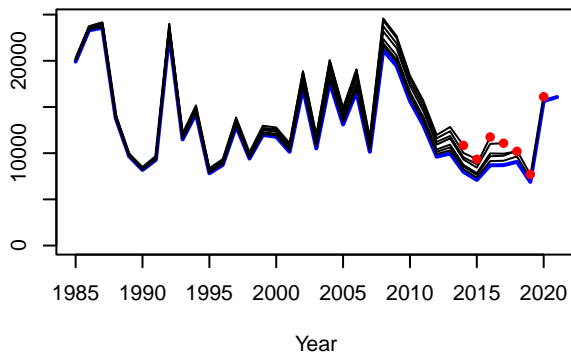


Relative Retro

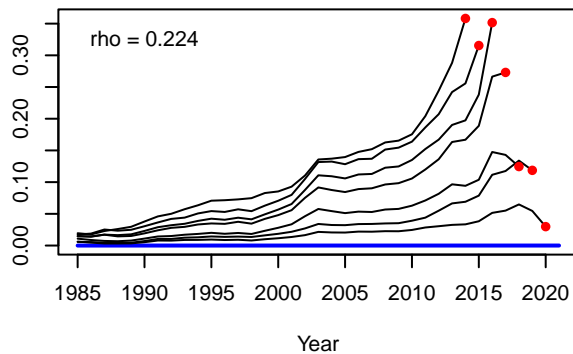


Stock Numbers at Age

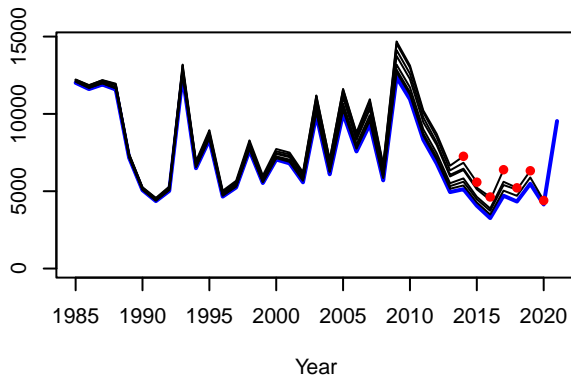
N at Age 4



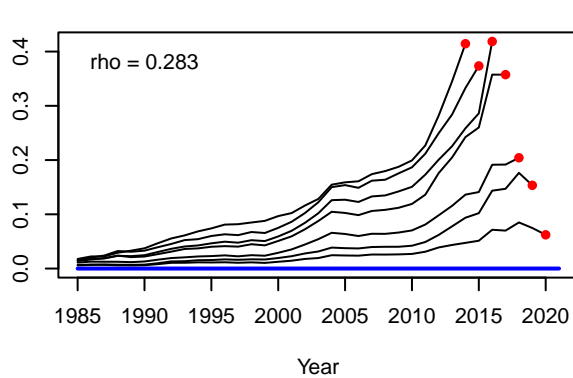
Relative Retro



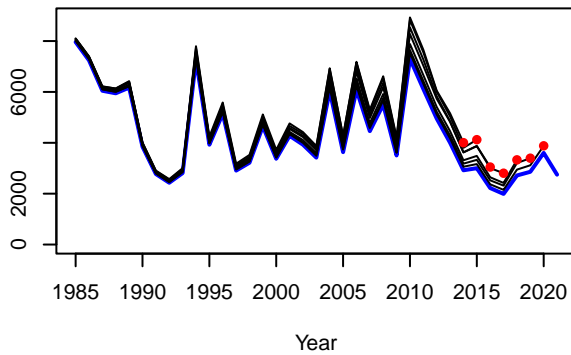
N at Age 5



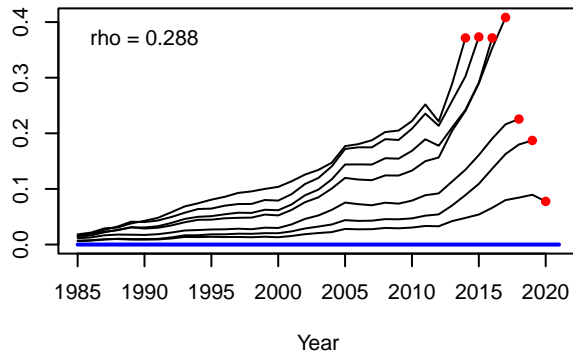
Relative Retro



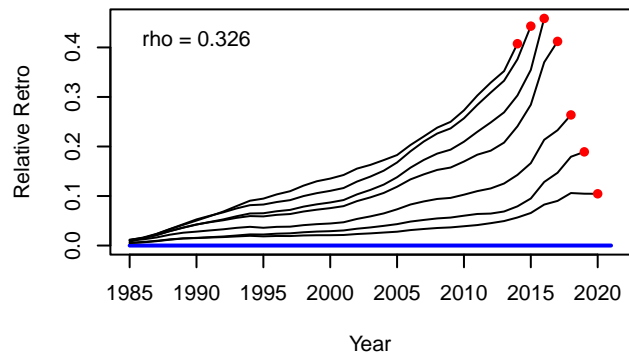
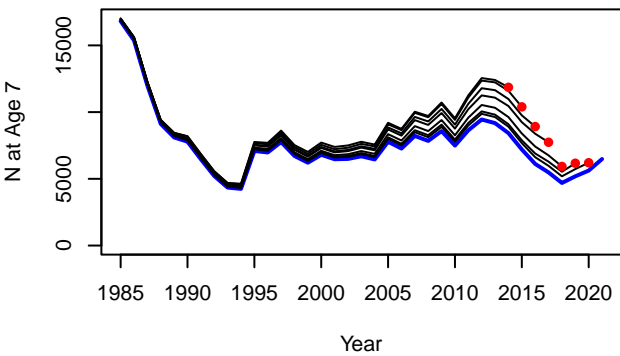
N at Age 6



Relative Retro



Stock Numbers at Age

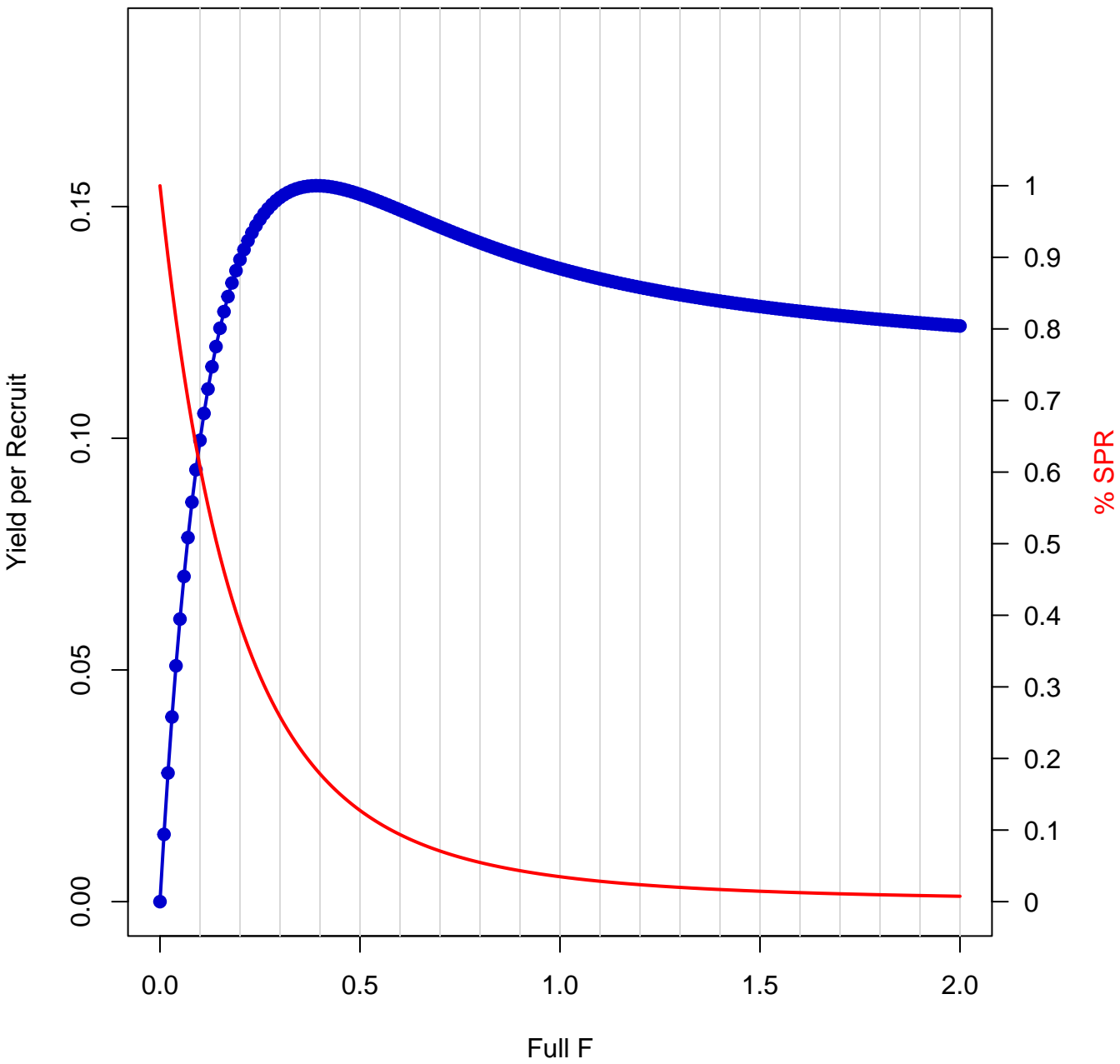


BF19

5 fleet selectivity blocks, average F from age 1 to ages 1-2

REFERENCE POINT PLOTS

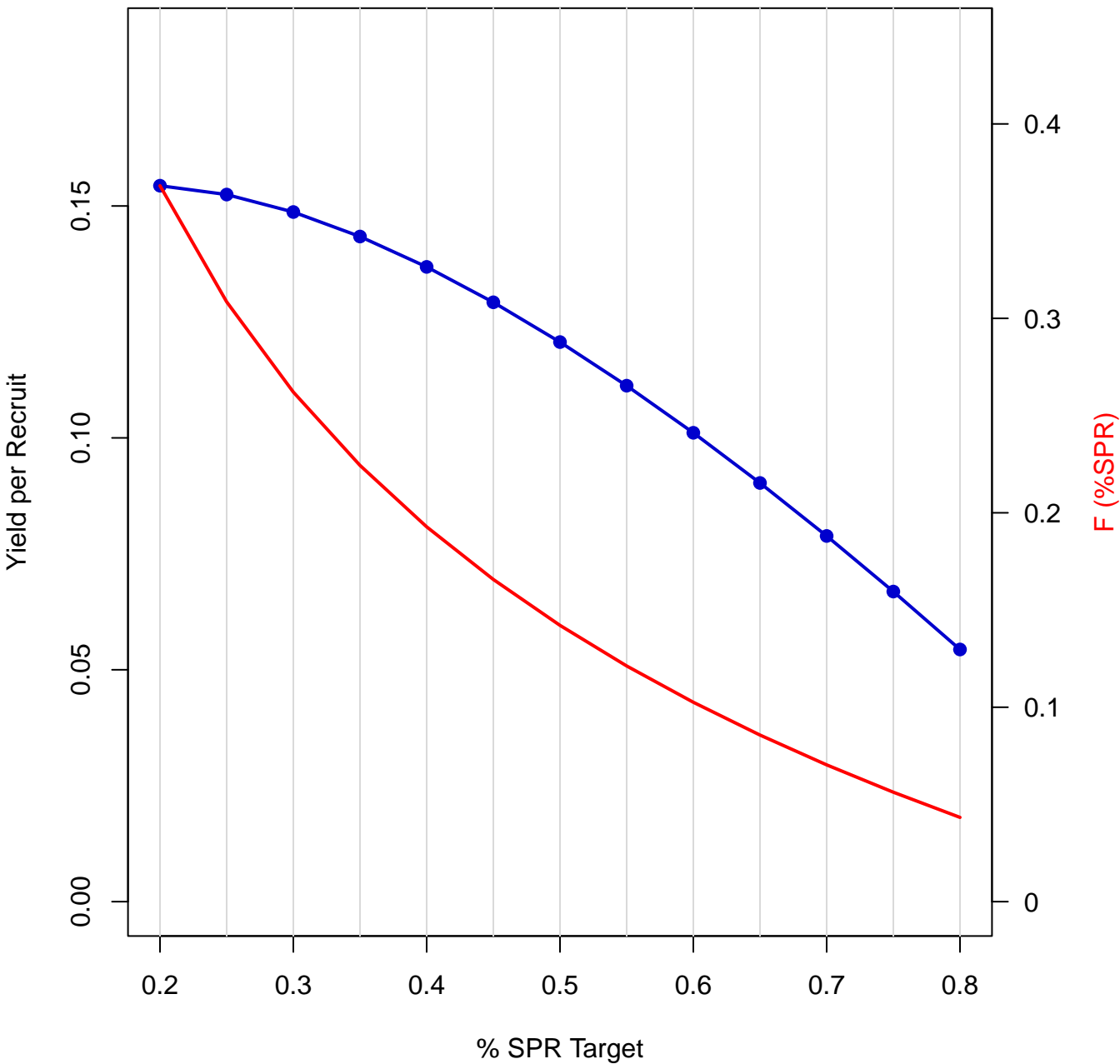
YPR-SPR Reference Points (Years Avg = 5)



YPR–SPR Reference Points (Years Avg = 5)

F	YPR	SPR	F	YPR	SPR	F	YPR	SPR
0	0	1	0.35	0.1541	0.2138	0.7	0.1456	0.0708
0.01	0.0145	0.9488	0.36	0.1543	0.2061	0.71	0.1453	0.0689
0.02	0.0278	0.9009	0.37	0.1544	0.1987	0.72	0.1449	0.0671
0.03	0.0399	0.8558	0.38	0.1545	0.1917	0.73	0.1446	0.0653
0.04	0.0509	0.8136	0.39	0.1545	0.1849	0.74	0.1442	0.0637
0.05	0.061	0.7738	0.4	0.1545	0.1785	0.75	0.1439	0.062
0.06	0.0702	0.7364	0.41	0.1544	0.1723	0.76	0.1435	0.0605
0.07	0.0786	0.7012	0.42	0.1543	0.1664	0.77	0.1432	0.059
0.08	0.0862	0.668	0.43	0.1542	0.1608	0.78	0.1429	0.0575
0.09	0.0932	0.6368	0.44	0.1541	0.1554	0.79	0.1425	0.0561
0.1	0.0996	0.6073	0.45	0.1539	0.1502	0.8	0.1422	0.0547
0.11	0.1054	0.5794	0.46	0.1537	0.1453	0.81	0.1419	0.0534
0.12	0.1106	0.5531	0.47	0.1534	0.1405	0.82	0.1416	0.0521
0.13	0.1154	0.5283	0.48	0.1532	0.136	0.83	0.1413	0.0509
0.14	0.1198	0.5048	0.49	0.1529	0.1316	0.84	0.1409	0.0497
0.15	0.1237	0.4826	0.5	0.1526	0.1274	0.85	0.1406	0.0485
0.16	0.1273	0.4615	0.51	0.1523	0.1234	0.86	0.1403	0.0474
0.17	0.1306	0.4416	0.52	0.152	0.1195	0.87	0.14	0.0463
0.18	0.1335	0.4227	0.53	0.1517	0.1158	0.88	0.1398	0.0453
0.19	0.1362	0.4048	0.54	0.1514	0.1123	0.89	0.1395	0.0442
0.2	0.1386	0.3879	0.55	0.151	0.1089	0.9	0.1392	0.0432
0.21	0.1407	0.3717	0.56	0.1507	0.1056	0.91	0.1389	0.0423
0.22	0.1426	0.3565	0.57	0.1503	0.1024	0.92	0.1386	0.0413
0.23	0.1444	0.3419	0.58	0.15	0.0994	0.93	0.1384	0.0404
0.24	0.1459	0.3281	0.59	0.1496	0.0965	0.94	0.1381	0.0396
0.25	0.1473	0.315	0.6	0.1493	0.0937	0.95	0.1378	0.0387
0.26	0.1485	0.3025	0.61	0.1489	0.091	0.96	0.1376	0.0379
0.27	0.1495	0.2907	0.62	0.1485	0.0884	0.97	0.1373	0.0371
0.28	0.1505	0.2794	0.63	0.1482	0.0859	0.98	0.1371	0.0363
0.29	0.1513	0.2686	0.64	0.1478	0.0835	0.99	0.1368	0.0356
0.3	0.152	0.2583	0.65	0.1474	0.0812	1	0.1366	0.0348
0.31	0.1525	0.2486	0.66	0.1471	0.0789	1.01	0.1364	0.0341
0.32	0.153	0.2393	0.67	0.1467	0.0768	1.02	0.1361	0.0334
0.33	0.1535	0.2304	0.68	0.1463	0.0747	1.03	0.1359	0.0327
0.34	0.1538	0.2219	0.69	0.146	0.0727	1.04	0.1357	0.0321

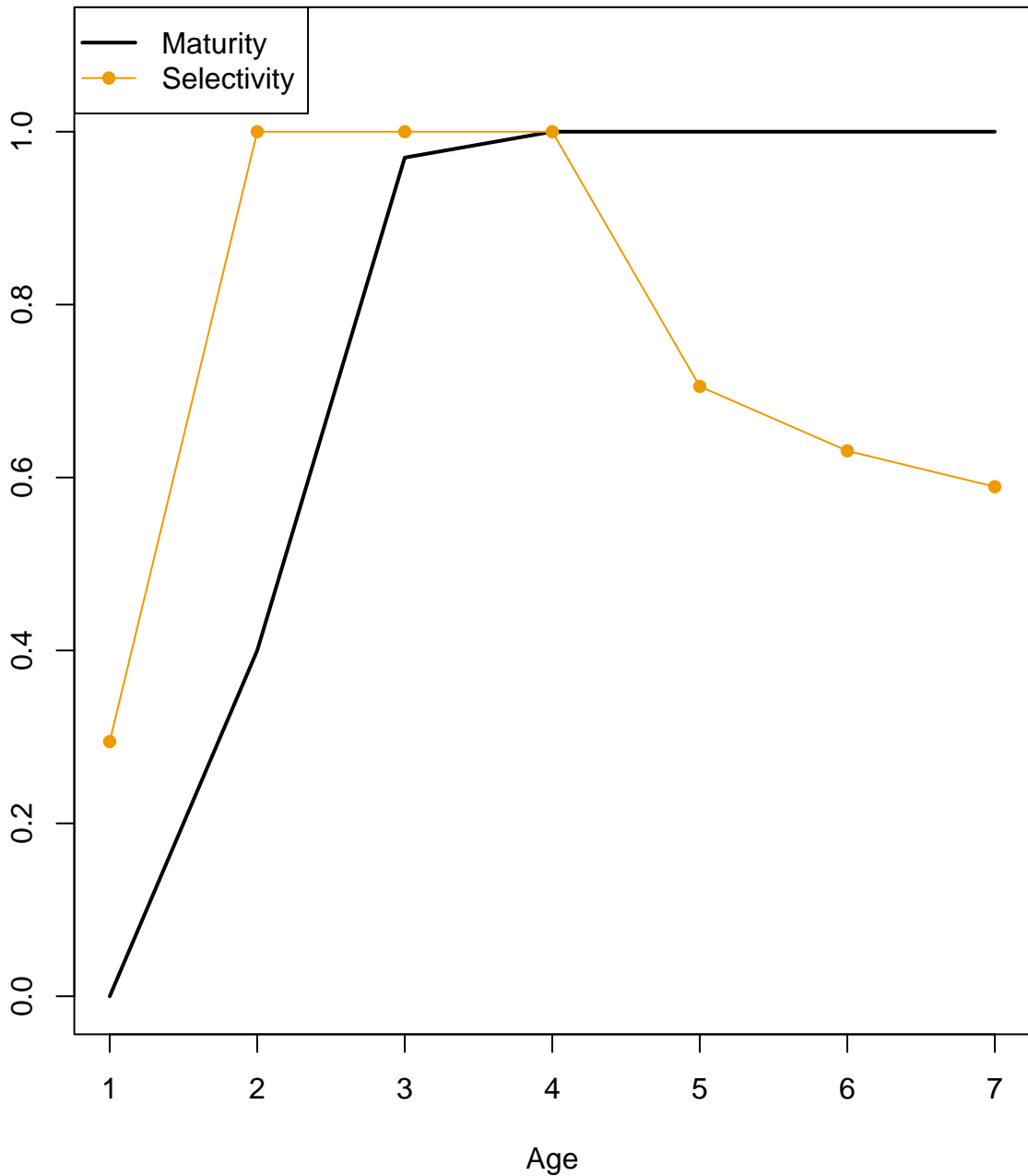
SPR Target Reference Points (Years Avg = 5)



SPR Target Reference Points (Years Avg = 5)

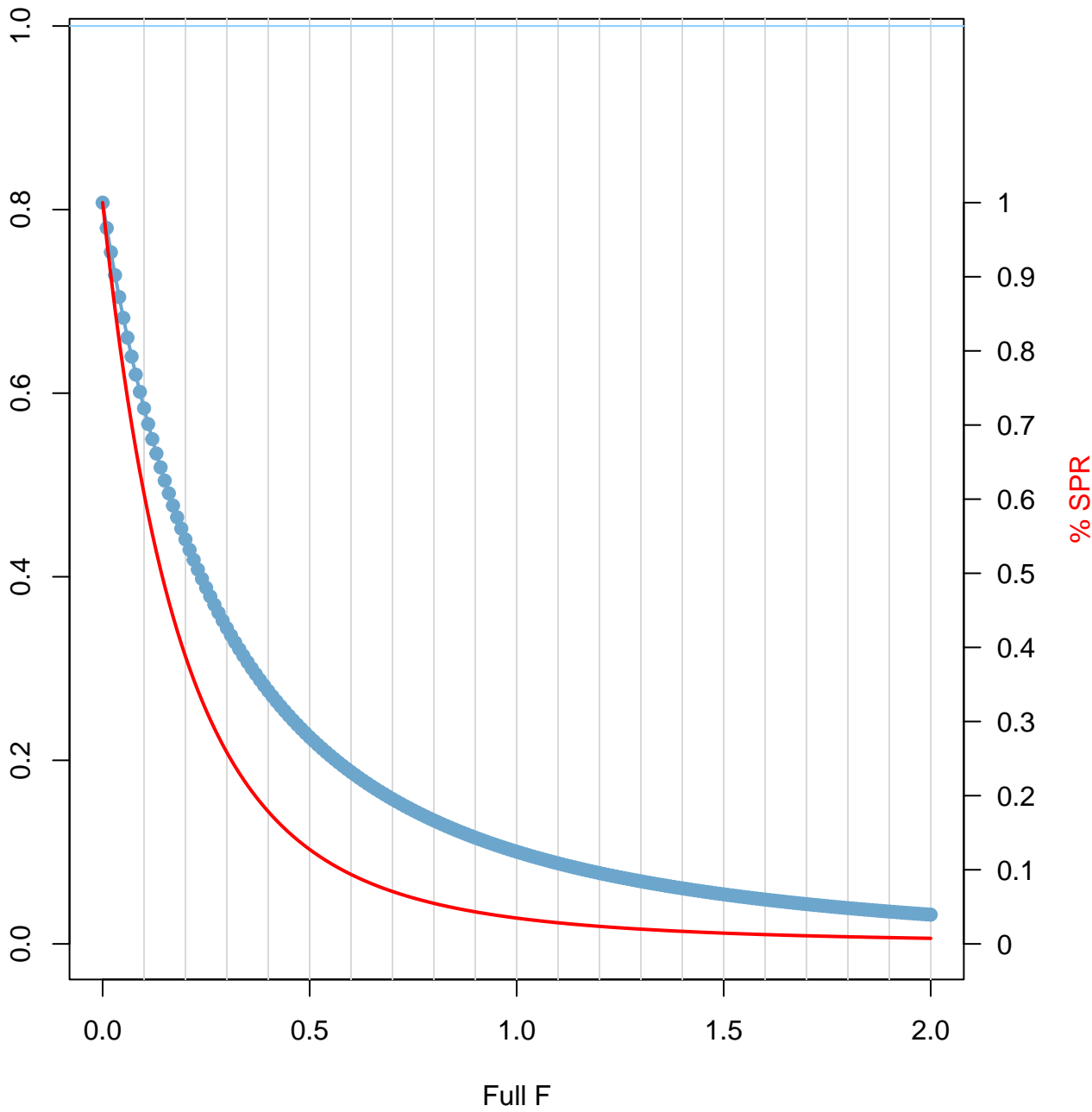
% SPR	F(%SPR)	YPR
0.2	0.3682	0.1544
0.25	0.3085	0.1525
0.3	0.2621	0.1487
0.35	0.2244	0.1434
0.4	0.1928	0.1369
0.45	0.1657	0.1292
0.5	0.1421	0.1207
0.55	0.1212	0.1112
0.6	0.1026	0.1011
0.65	0.0857	0.0903
0.7	0.0703	0.0788
0.75	0.0563	0.0669
0.8	0.0433	0.0544

Selectivity or Maturity at age



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

Expected Spawnings



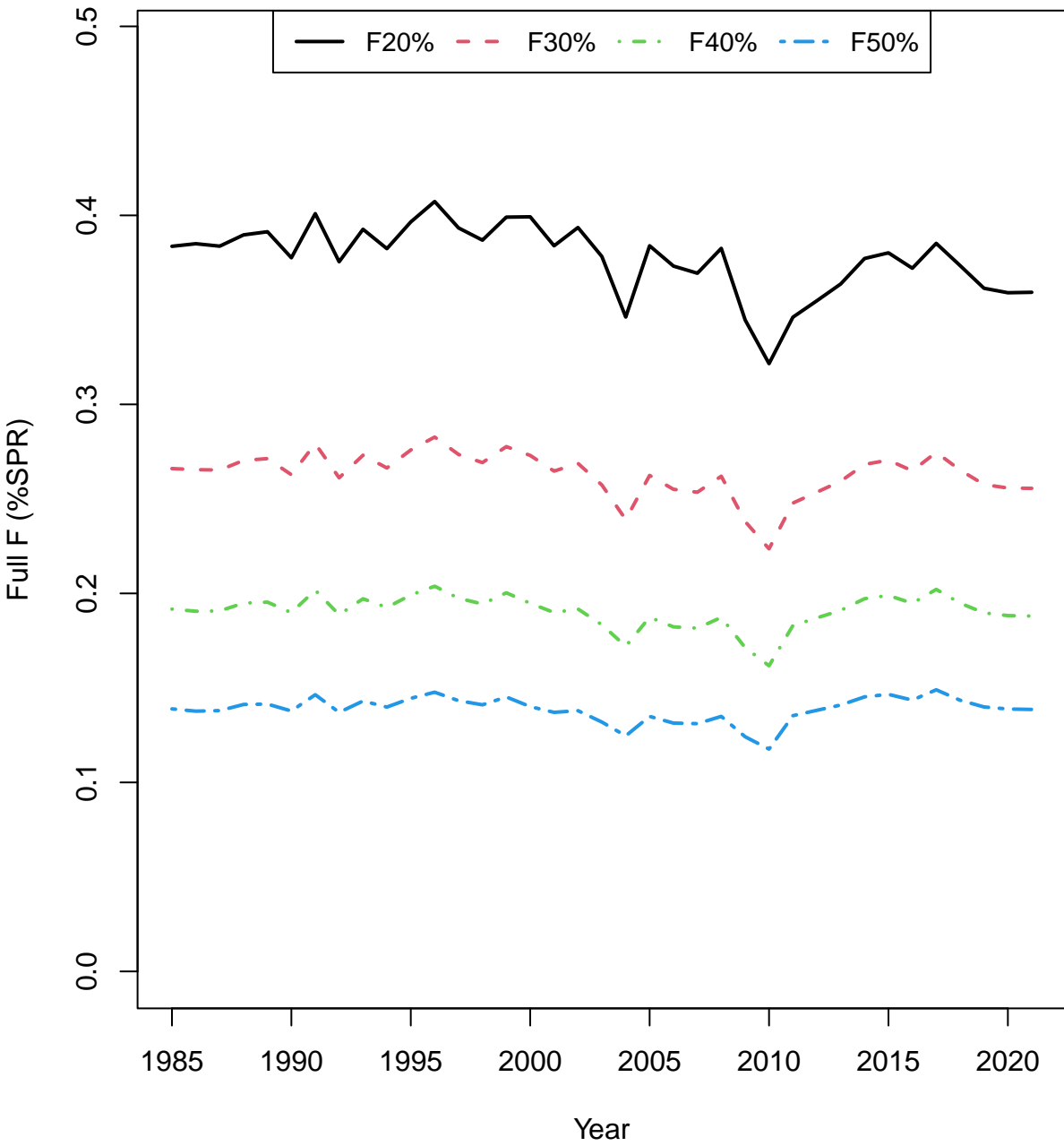
% SPR

Full F

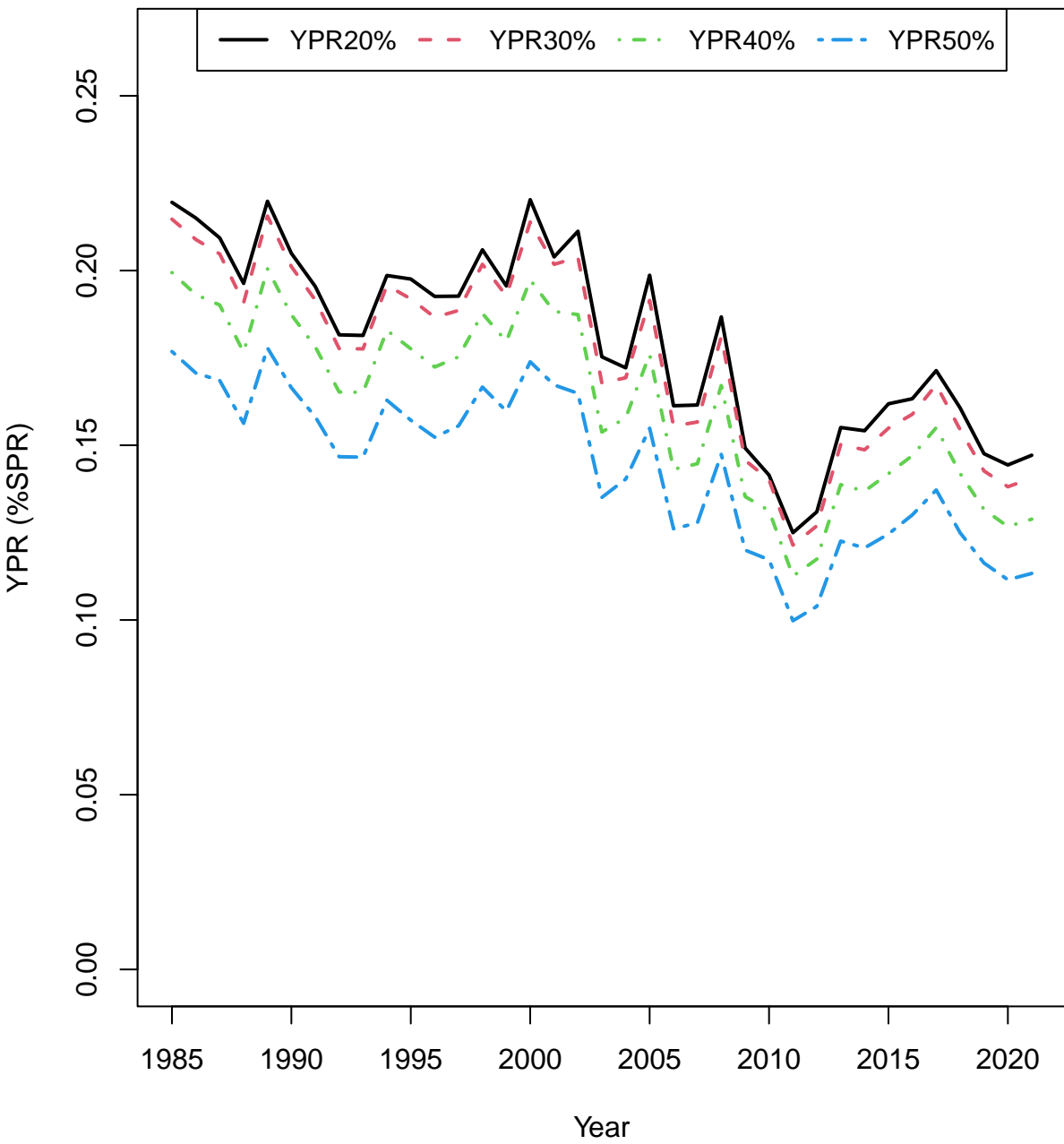
Expected Spawnings & SPR Reference Points (Years Avg = 5)

F	E[Sp]	SPR	F	E[Sp]	SPR	F	E[Sp]	SPR
0	0.8076	1	0.35	0.307	0.2138	0.7	0.1578	0.0708
0.01	0.7798	0.9488	0.36	0.3003	0.2061	0.71	0.1552	0.0689
0.02	0.7535	0.9009	0.37	0.2938	0.1987	0.72	0.1527	0.0671
0.03	0.7285	0.8558	0.38	0.2875	0.1917	0.73	0.1503	0.0653
0.04	0.7047	0.8136	0.39	0.2815	0.1849	0.74	0.1479	0.0637
0.05	0.682	0.7738	0.4	0.2756	0.1785	0.75	0.1455	0.062
0.06	0.6604	0.7364	0.41	0.2698	0.1723	0.76	0.1432	0.0605
0.07	0.6399	0.7012	0.42	0.2643	0.1664	0.77	0.141	0.059
0.08	0.6202	0.668	0.43	0.2589	0.1608	0.78	0.1388	0.0575
0.09	0.6014	0.6368	0.44	0.2537	0.1554	0.79	0.1366	0.0561
0.1	0.5835	0.6073	0.45	0.2486	0.1502	0.8	0.1345	0.0547
0.11	0.5663	0.5794	0.46	0.2437	0.1453	0.81	0.1325	0.0534
0.12	0.5499	0.5531	0.47	0.2389	0.1405	0.82	0.1304	0.0521
0.13	0.5342	0.5283	0.48	0.2342	0.136	0.83	0.1285	0.0509
0.14	0.5191	0.5048	0.49	0.2297	0.1316	0.84	0.1265	0.0497
0.15	0.5047	0.4826	0.5	0.2253	0.1274	0.85	0.1246	0.0485
0.16	0.4908	0.4615	0.51	0.221	0.1234	0.86	0.1228	0.0474
0.17	0.4775	0.4416	0.52	0.2168	0.1195	0.87	0.121	0.0463
0.18	0.4648	0.4227	0.53	0.2128	0.1158	0.88	0.1192	0.0453
0.19	0.4525	0.4048	0.54	0.2088	0.1123	0.89	0.1175	0.0442
0.2	0.4407	0.3879	0.55	0.205	0.1089	0.9	0.1158	0.0432
0.21	0.4293	0.3717	0.56	0.2013	0.1056	0.91	0.1141	0.0423
0.22	0.4184	0.3565	0.57	0.1976	0.1024	0.92	0.1125	0.0413
0.23	0.4079	0.3419	0.58	0.1941	0.0994	0.93	0.1108	0.0404
0.24	0.3977	0.3281	0.59	0.1906	0.0965	0.94	0.1093	0.0396
0.25	0.388	0.315	0.6	0.1873	0.0937	0.95	0.1077	0.0387
0.26	0.3785	0.3025	0.61	0.184	0.091	0.96	0.1062	0.0379
0.27	0.3694	0.2907	0.62	0.1808	0.0884	0.97	0.1047	0.0371
0.28	0.3607	0.2794	0.63	0.1777	0.0859	0.98	0.1033	0.0363
0.29	0.3522	0.2686	0.64	0.1746	0.0835	0.99	0.1018	0.0356
0.3	0.344	0.2583	0.65	0.1716	0.0812	1	0.1004	0.0348
0.31	0.3361	0.2486	0.66	0.1687	0.0789	1.01	0.0991	0.0341
0.32	0.3285	0.2393	0.67	0.1659	0.0768	1.02	0.0977	0.0334
0.33	0.3211	0.2304	0.68	0.1631	0.0747	1.03	0.0964	0.0327
0.34	0.3139	0.2219	0.69	0.1604	0.0727	1.04	0.0951	0.0321

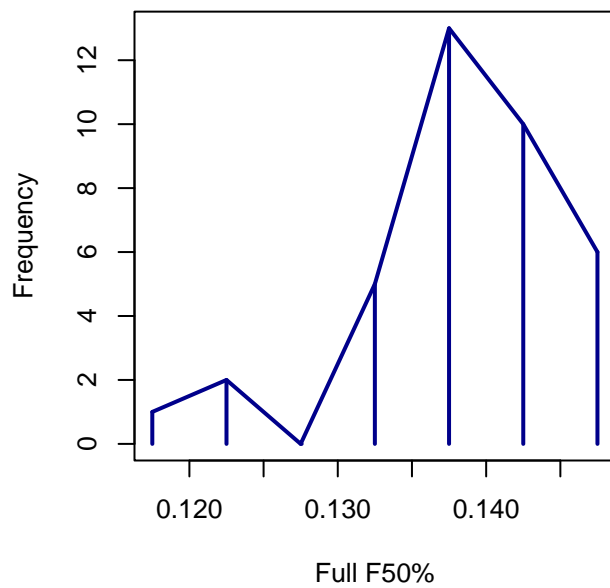
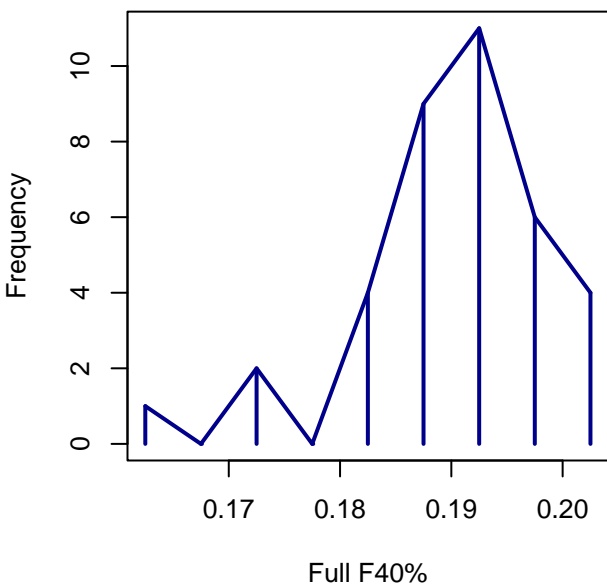
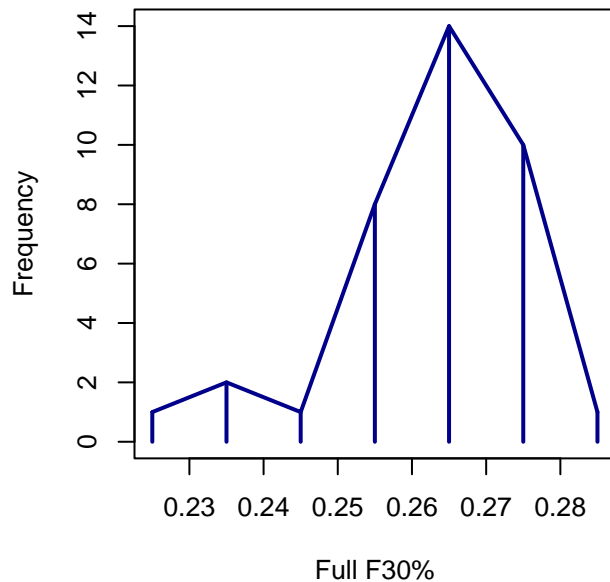
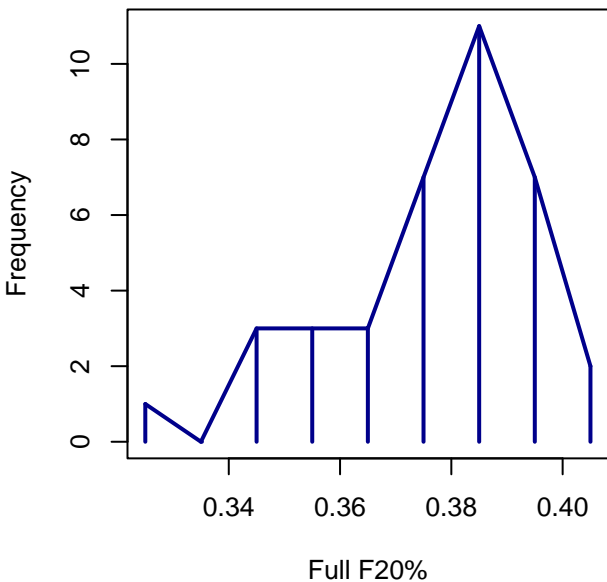
Annual F(%SPR) Reference Points



Annual YPR(%SPR) Reference Points



Annual F (%SPR) Reference Points



Annual YPR (%SPR) Reference Points

