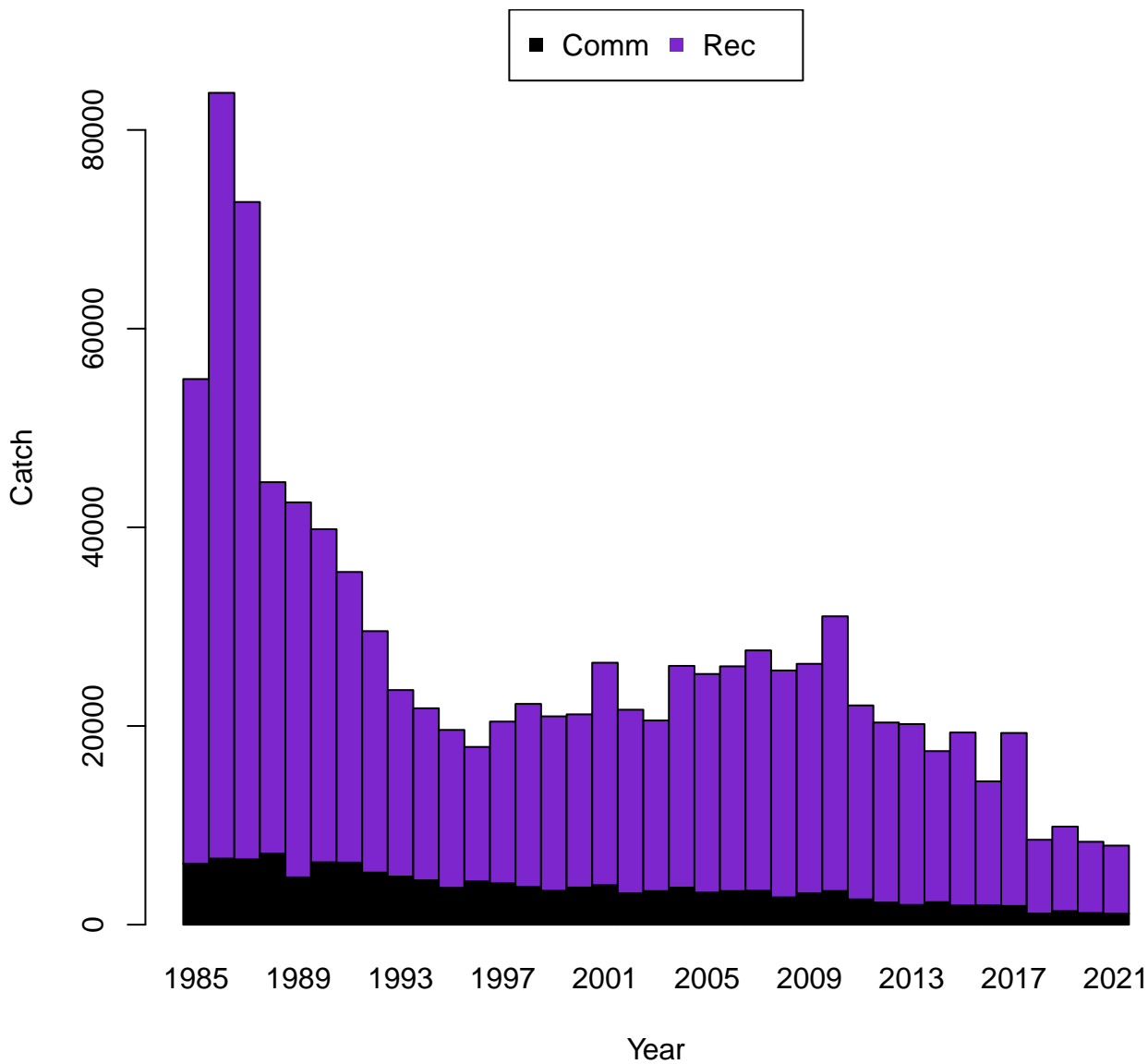
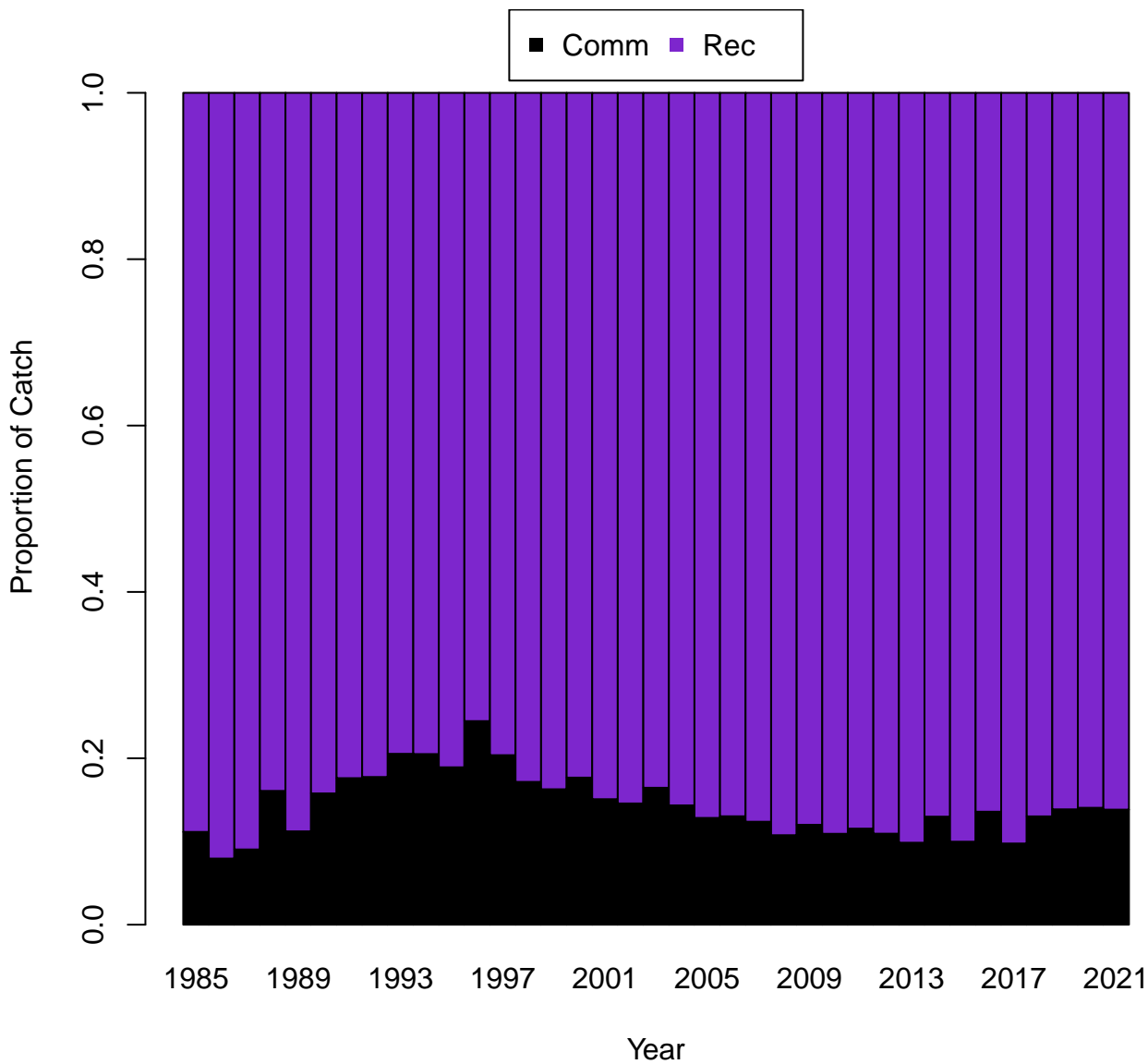


BF24

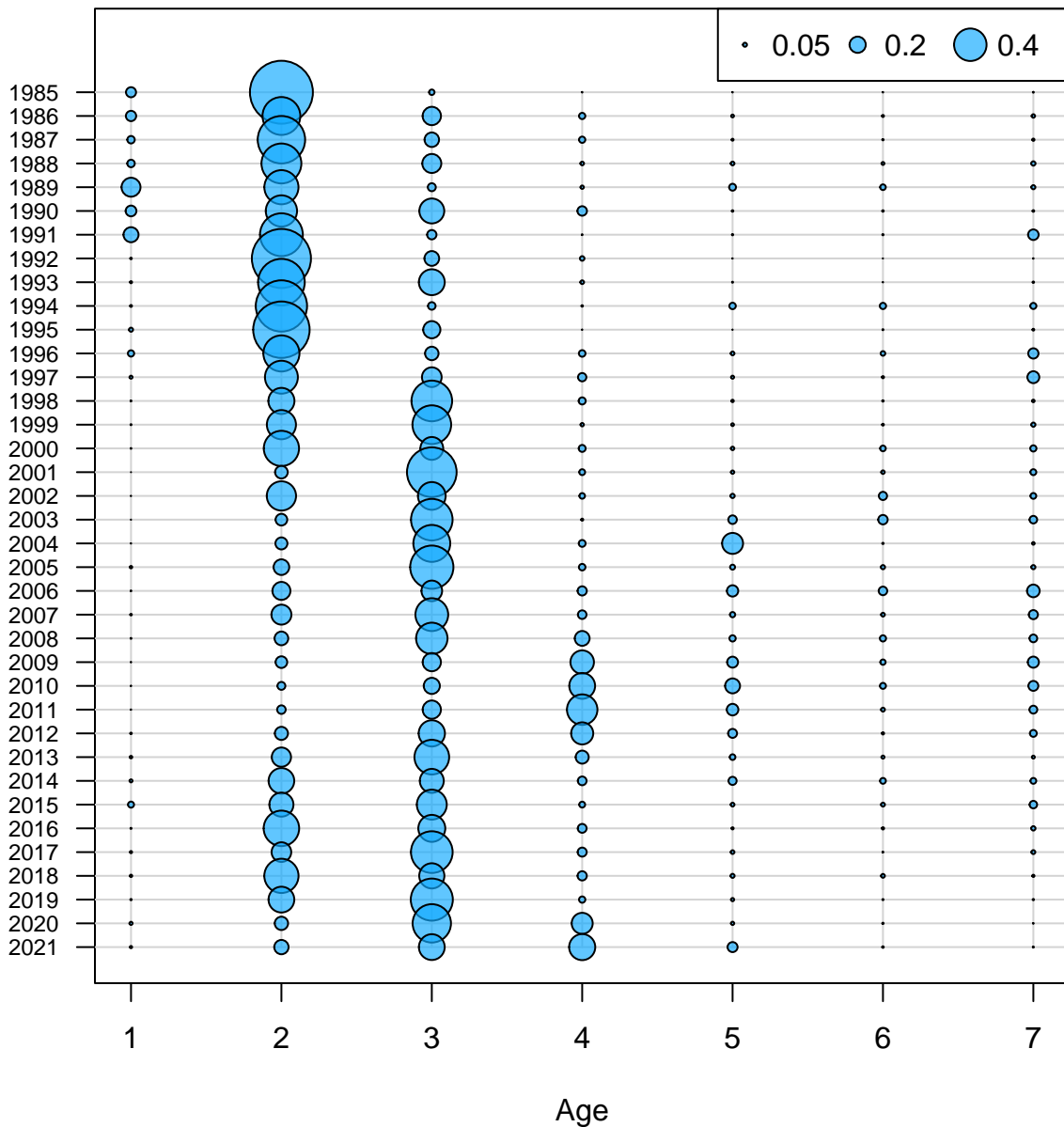
Final ASAP model

DATA PLOTS

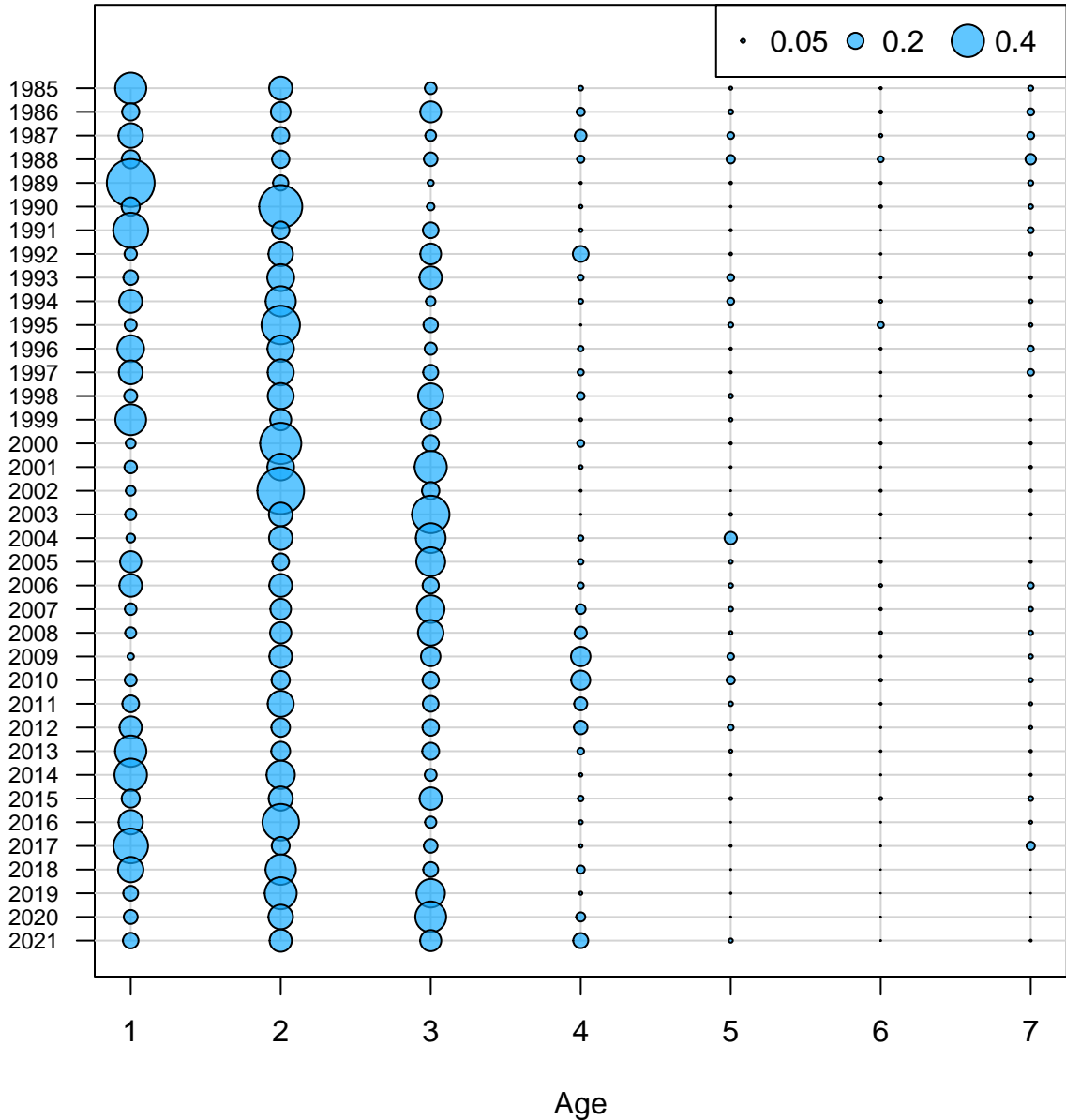


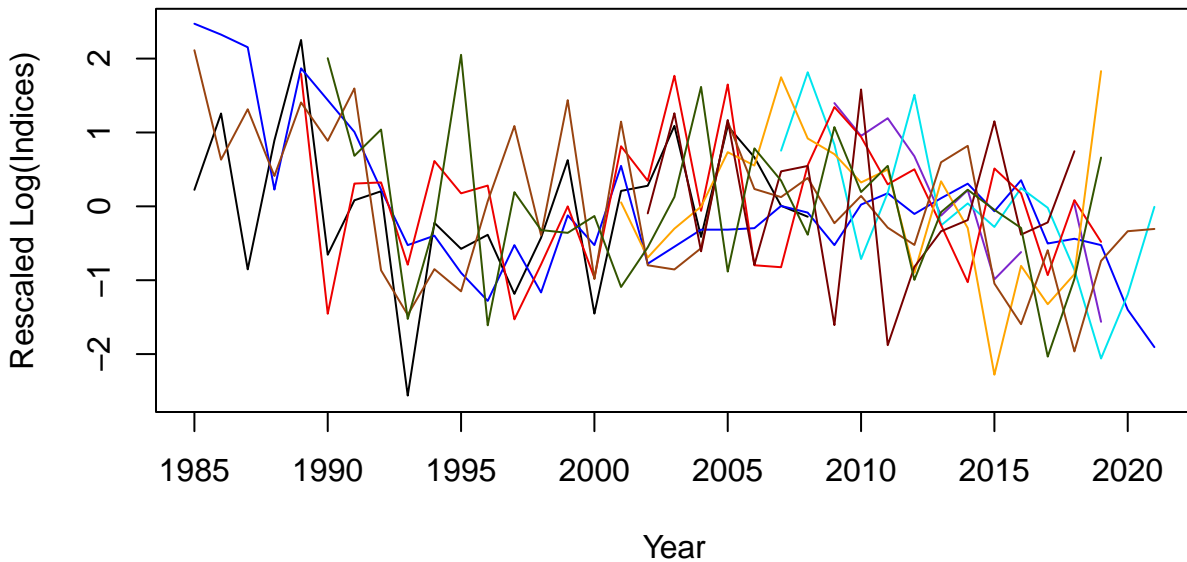
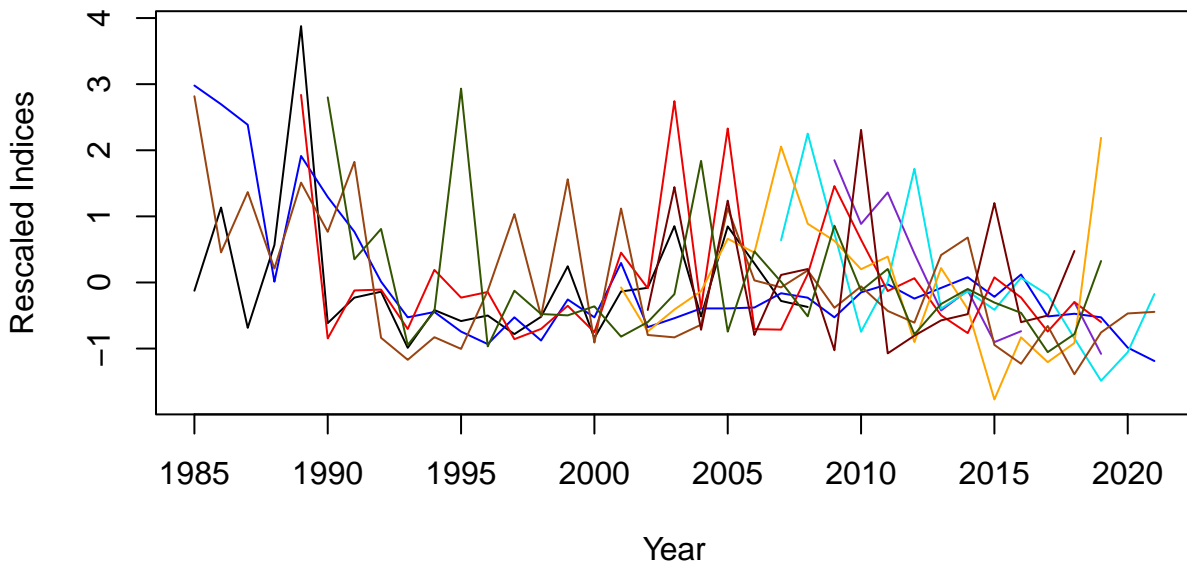


Age Comps for Catch by Fleet 1 (Comm)

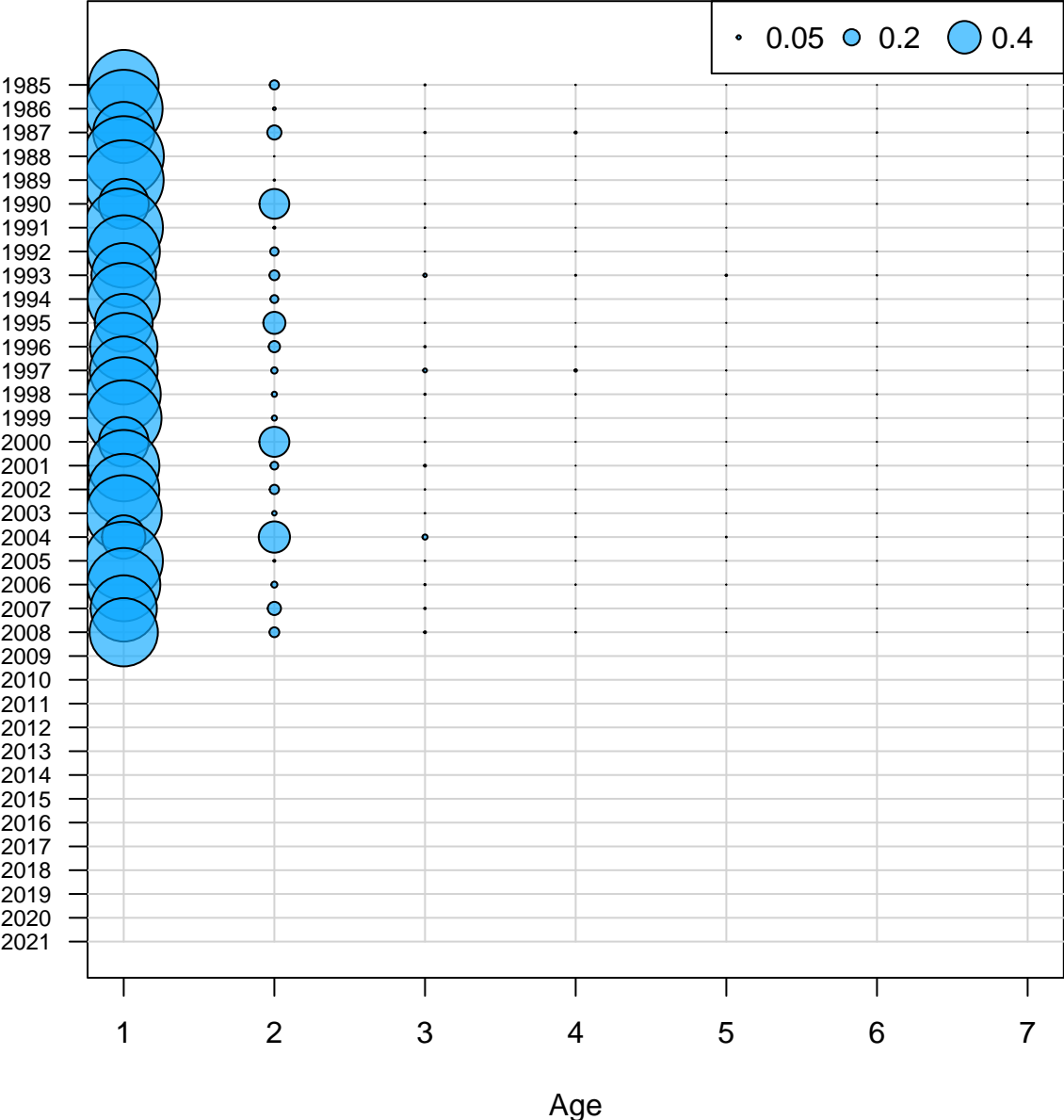


Age Comps for Catch by Fleet 2 (Rec)

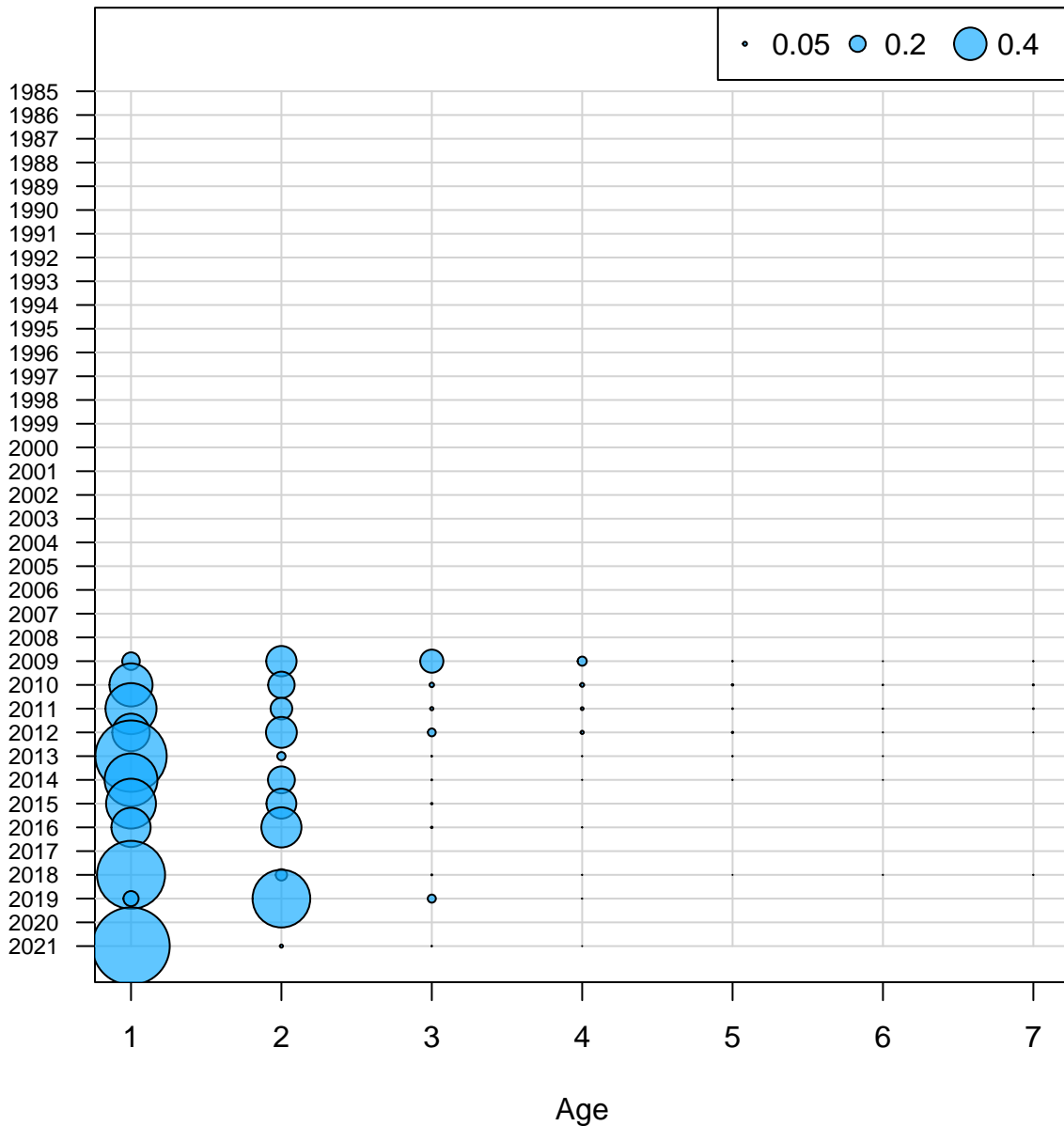




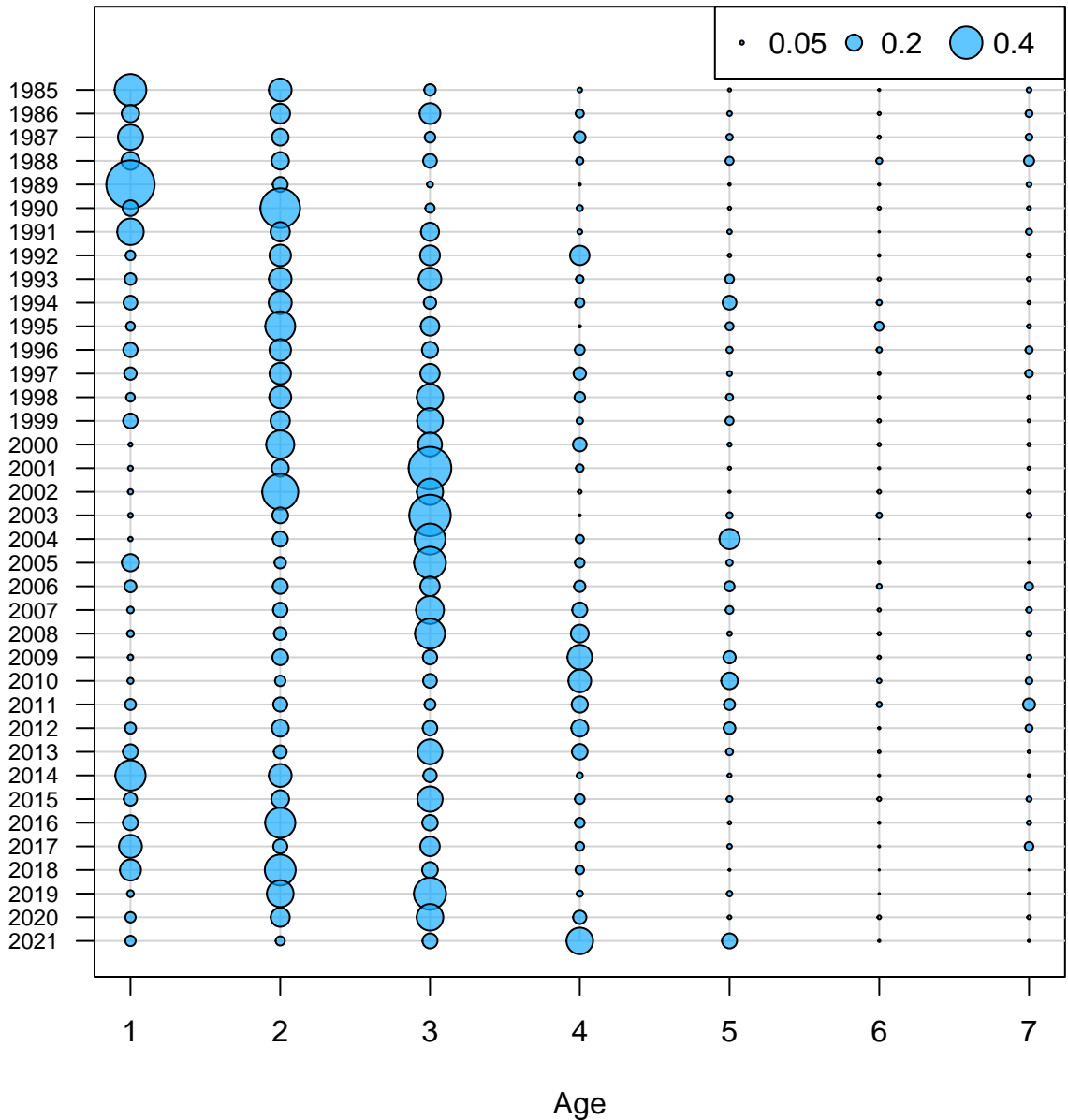
Age Comps for Index 1 (NEFSC Inshore)



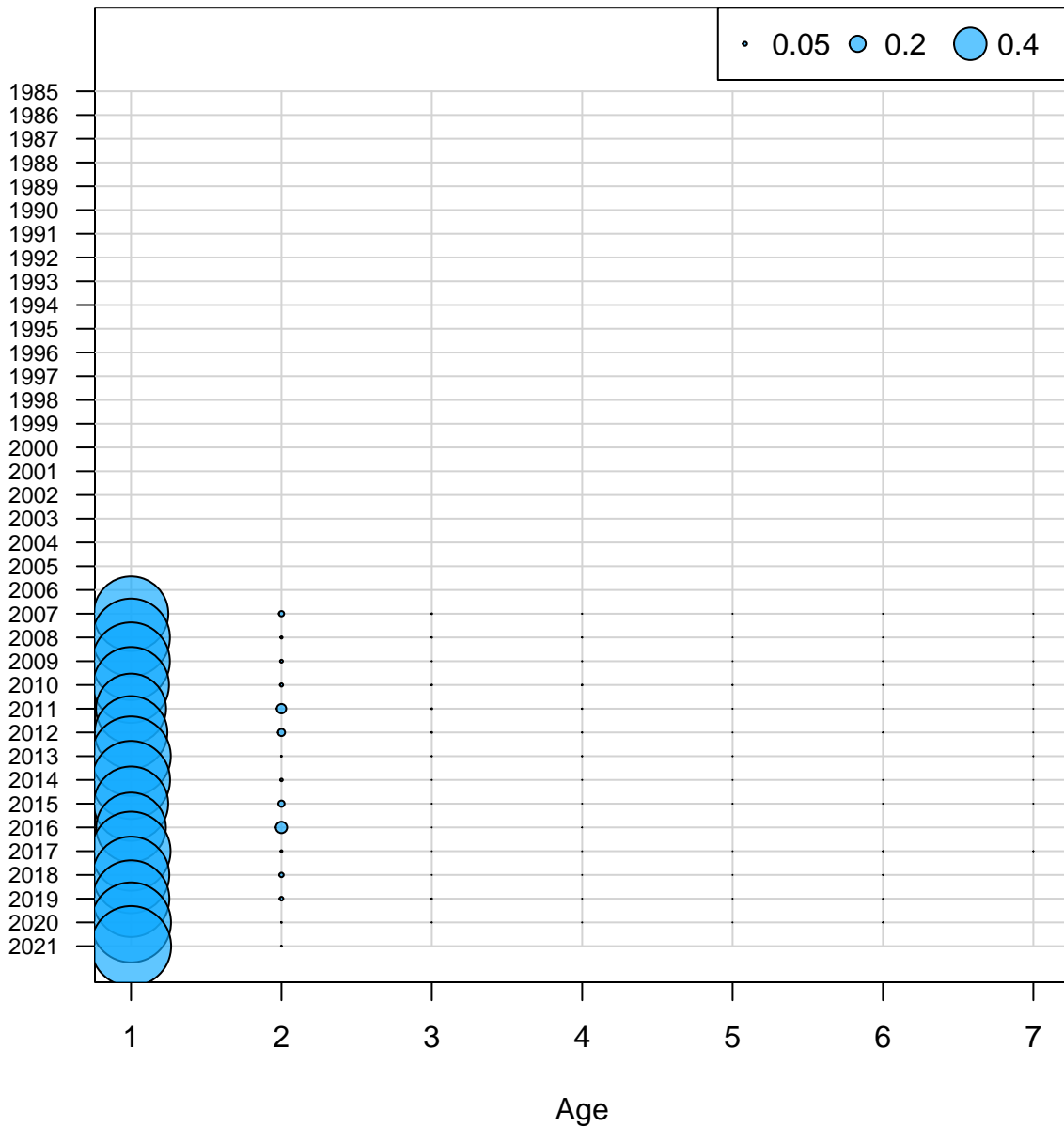
Age Comps for Index 2 (Bigelow)



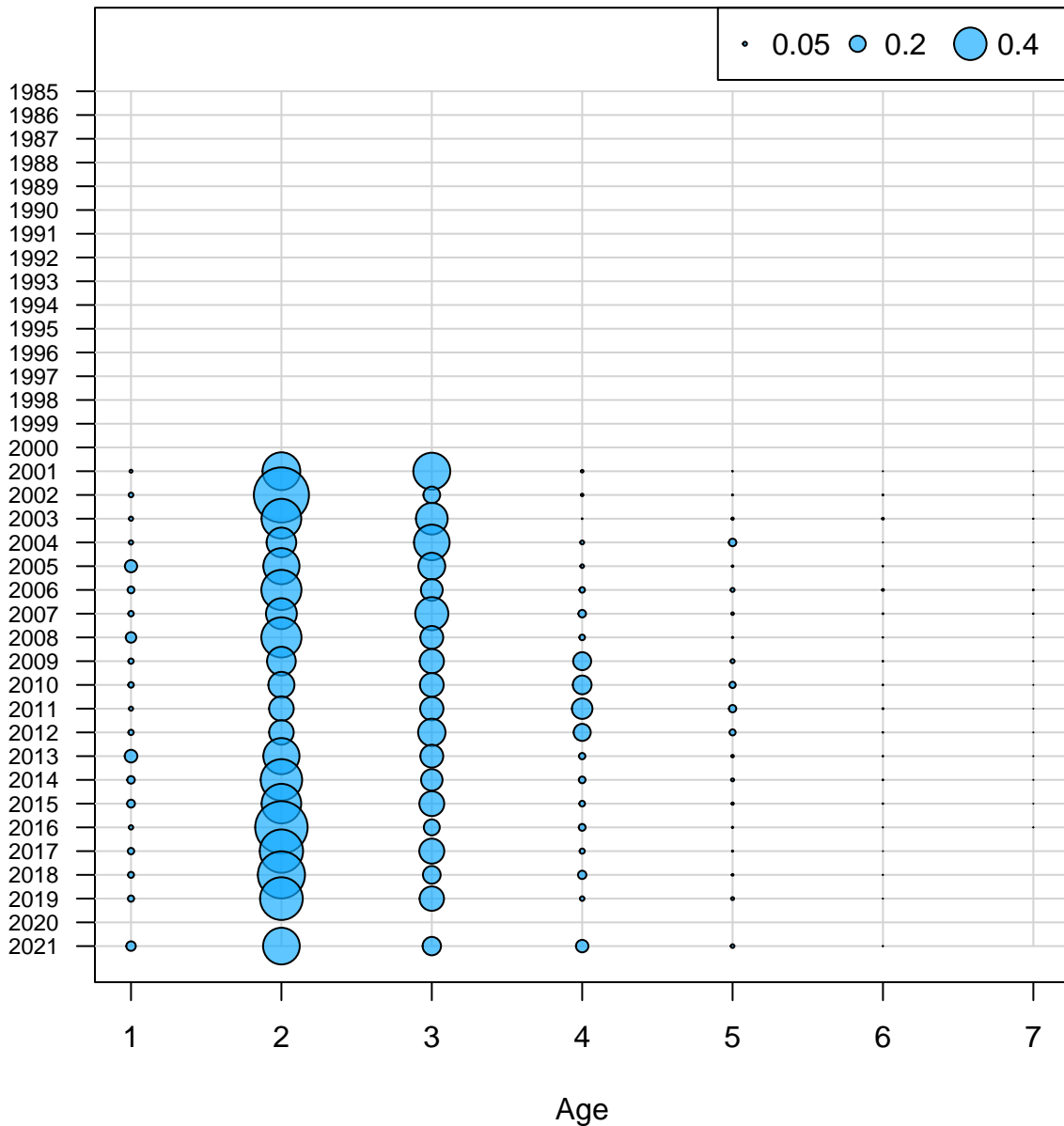
Age Comps for Index 3 (MRIP)



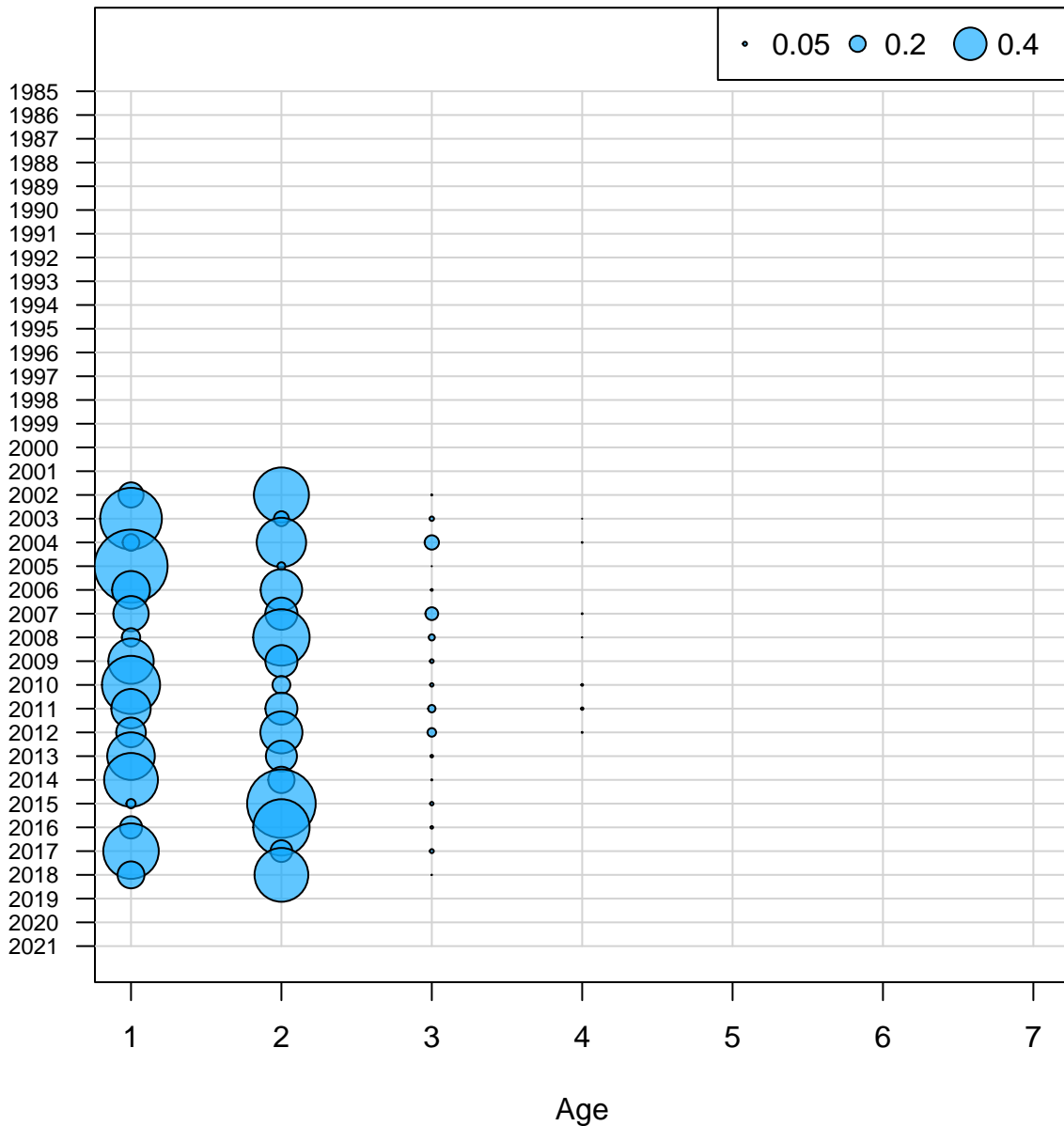
Age Comps for Index 4 (NEAMAP)



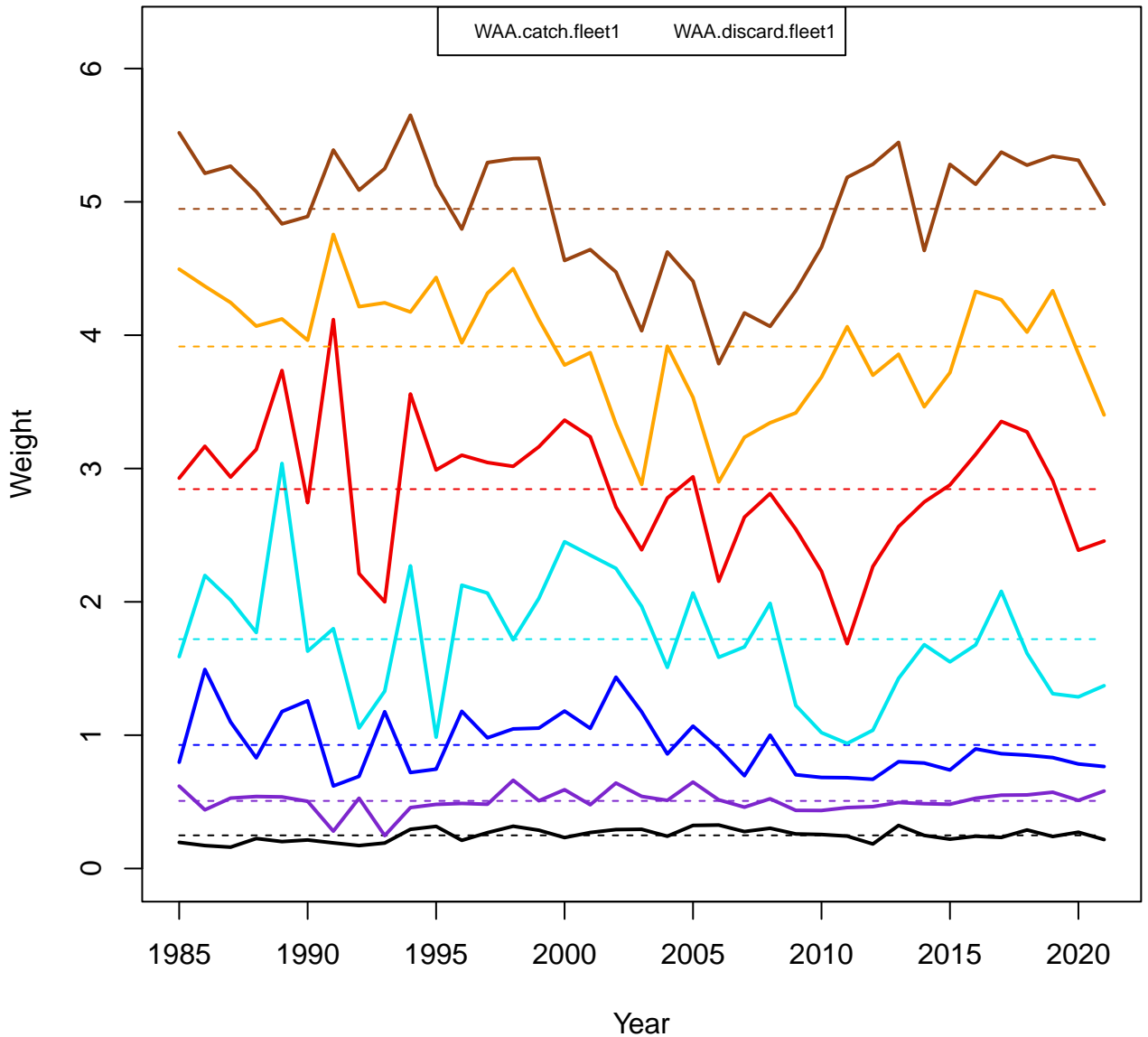
Age Comps for Index 6 (PSIGN)



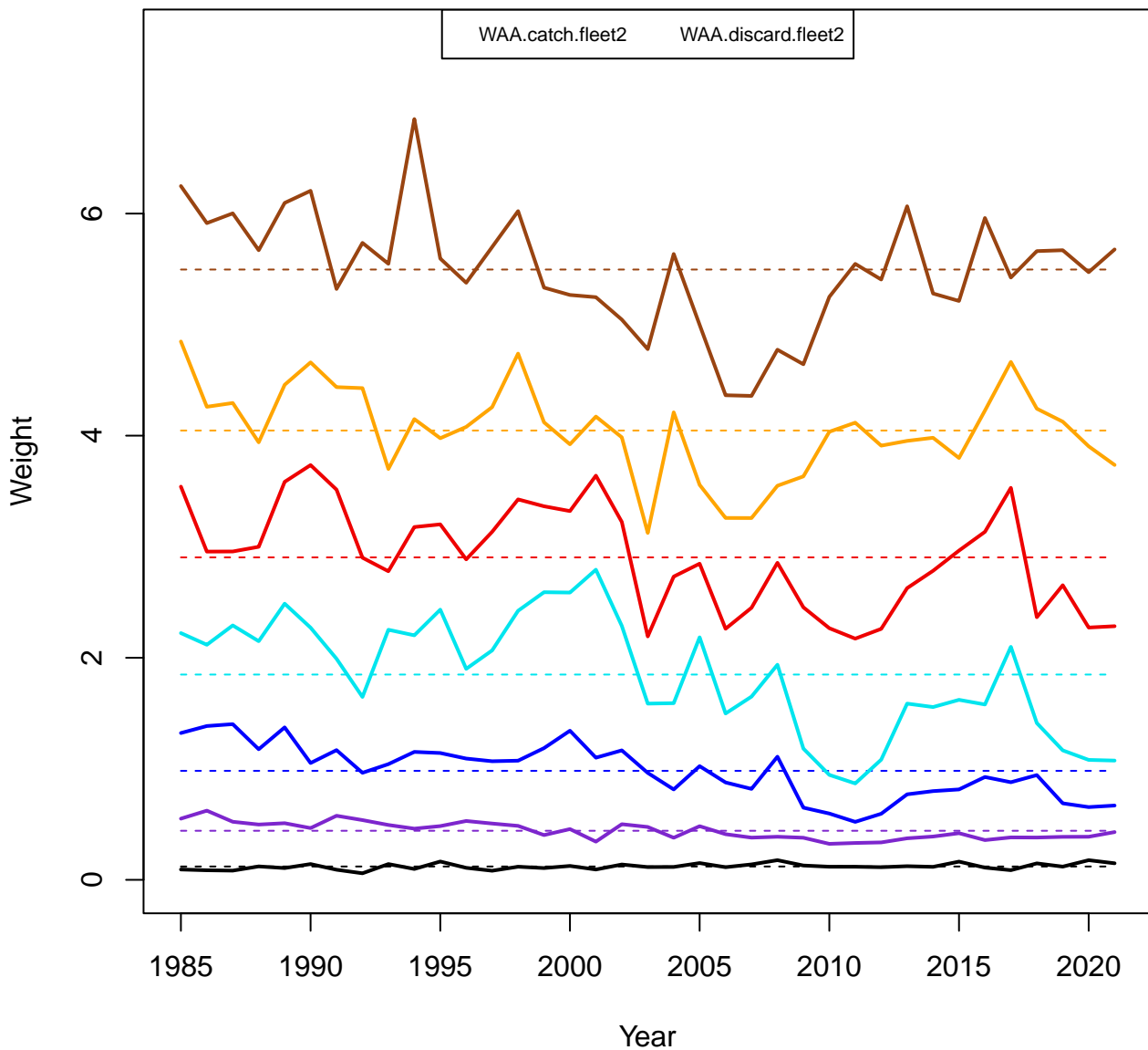
Age Comps for Index 8 (ChesMMAPI)



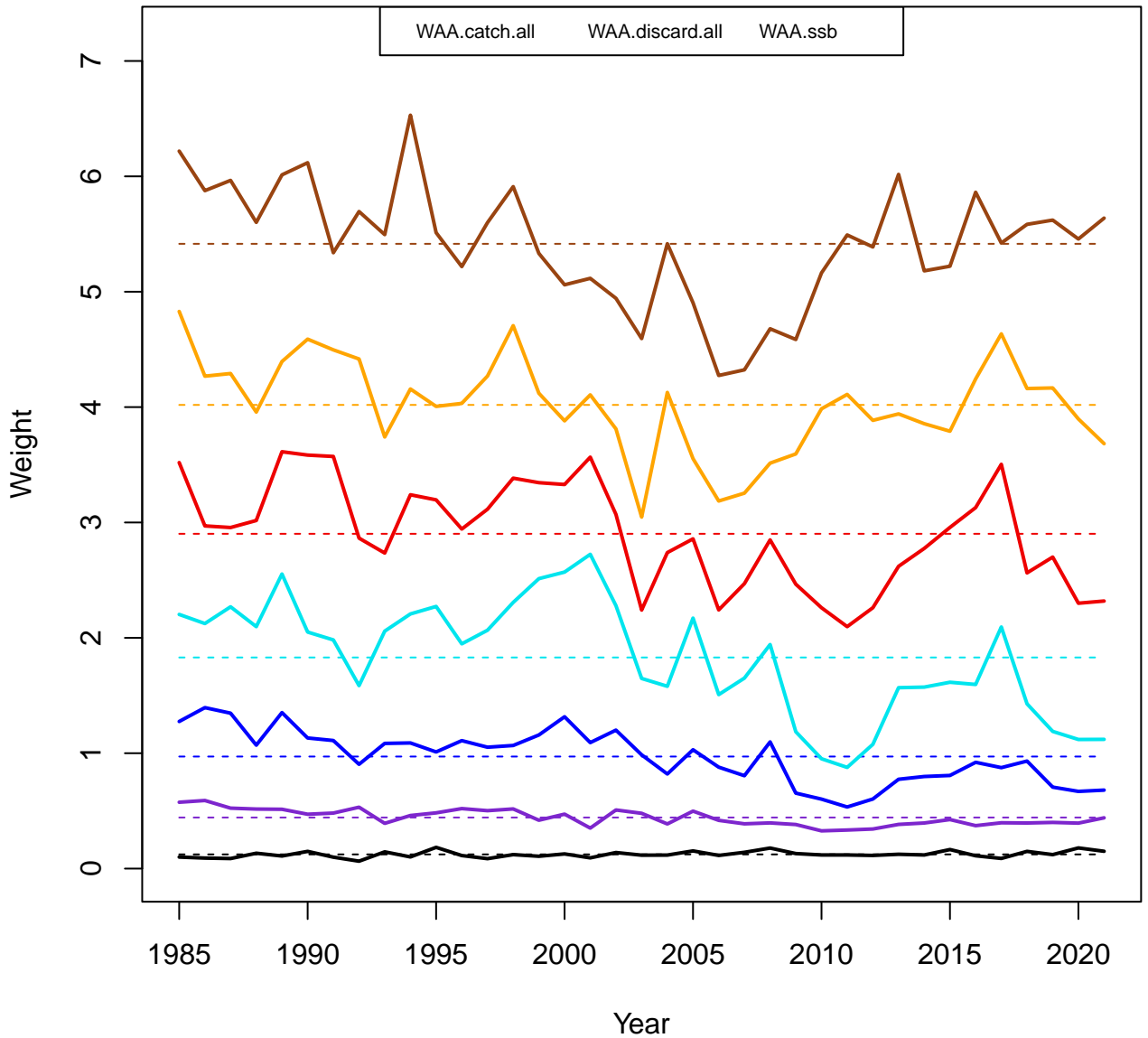
WAA matrix 1



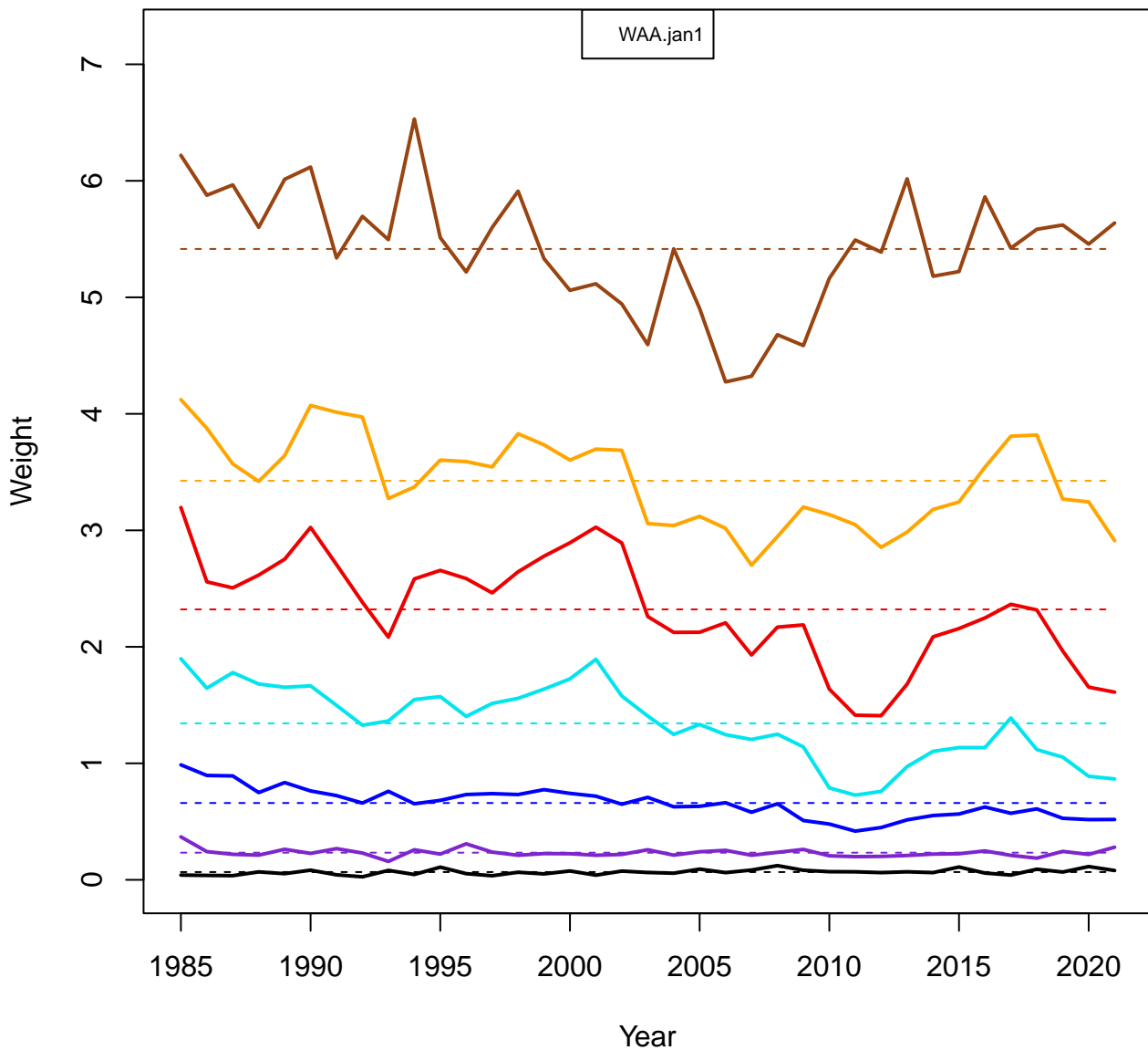
WAA matrix 2



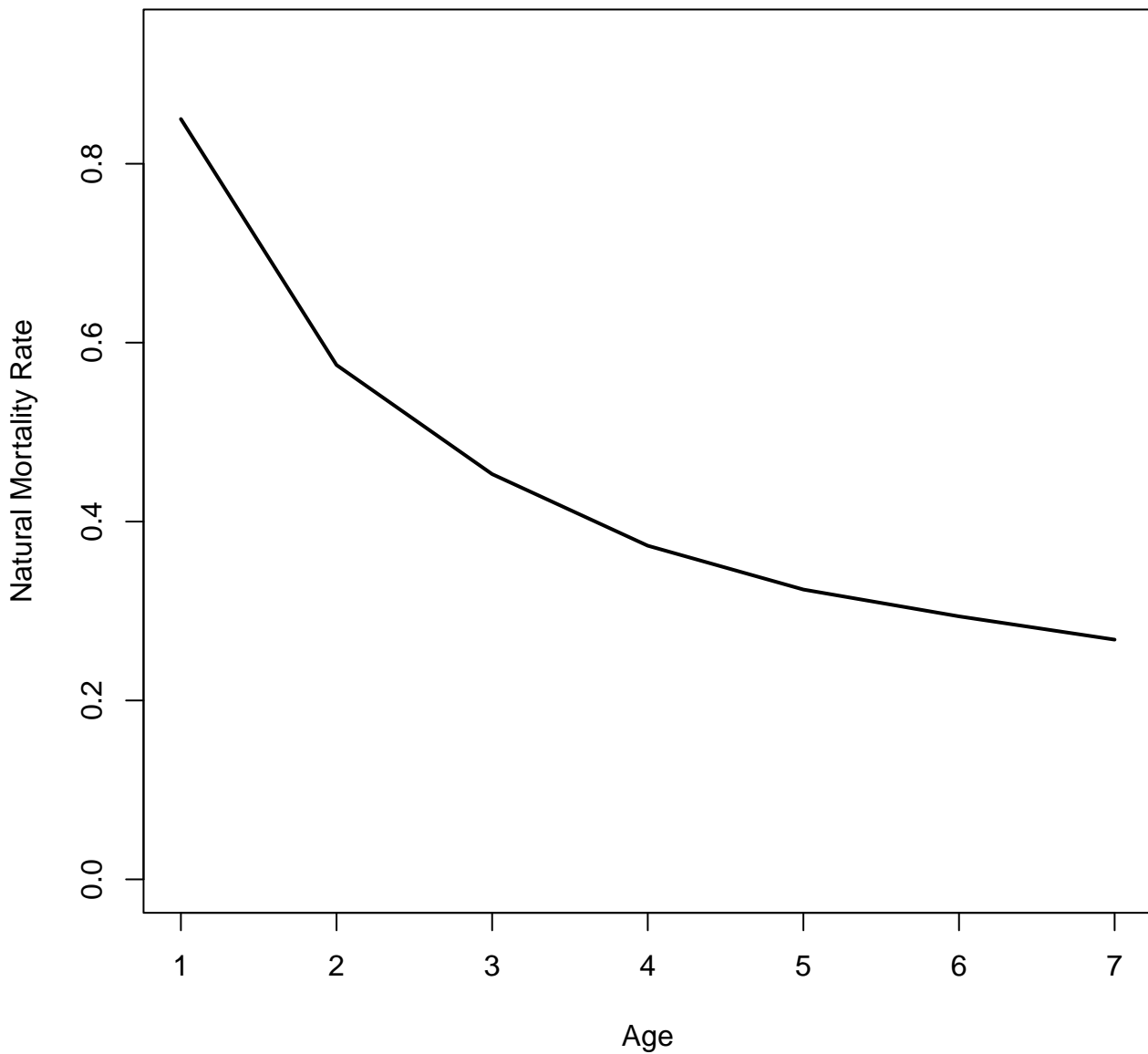
WAA matrix 3



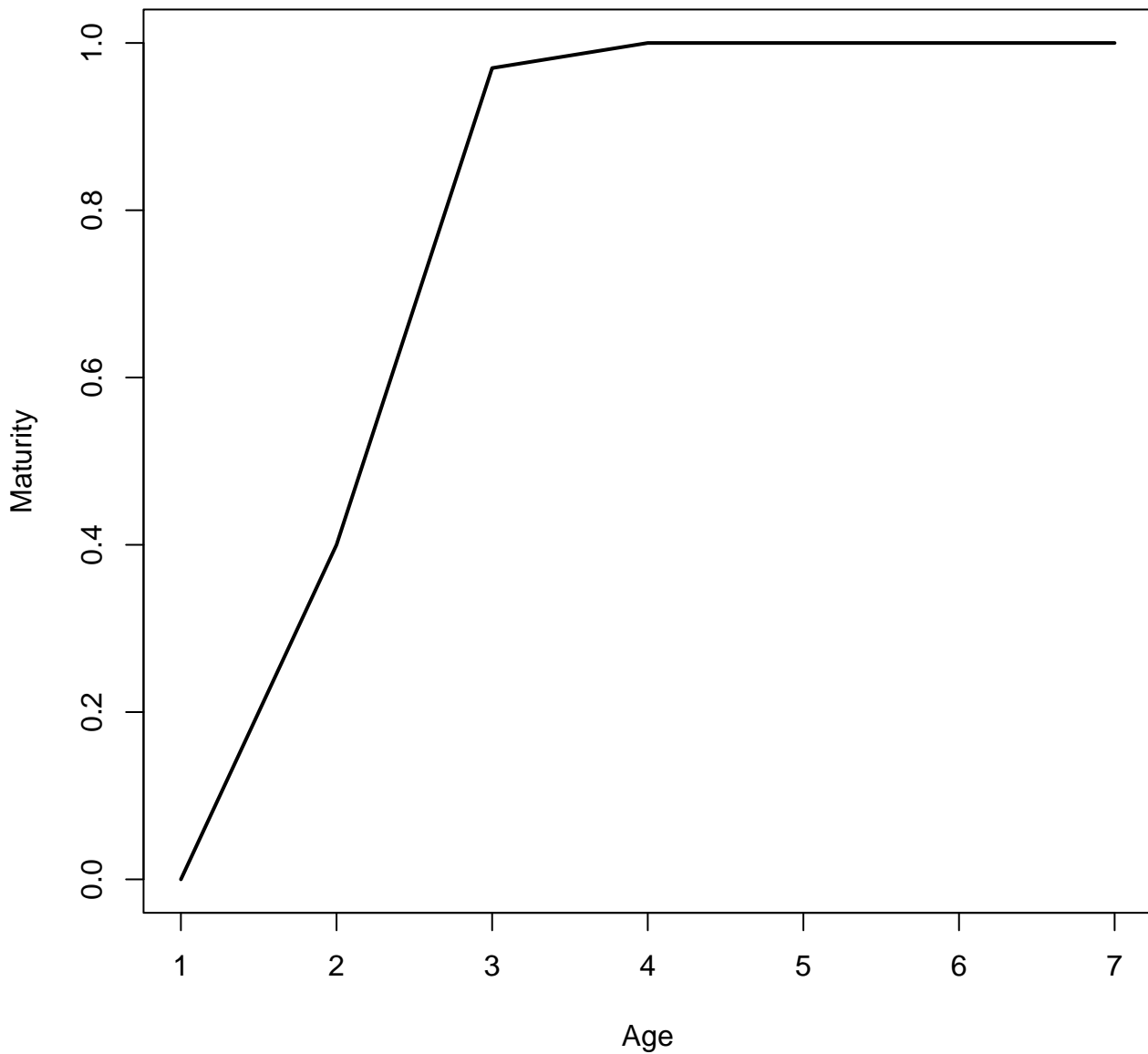
WAA matrix 4



M



Maturity



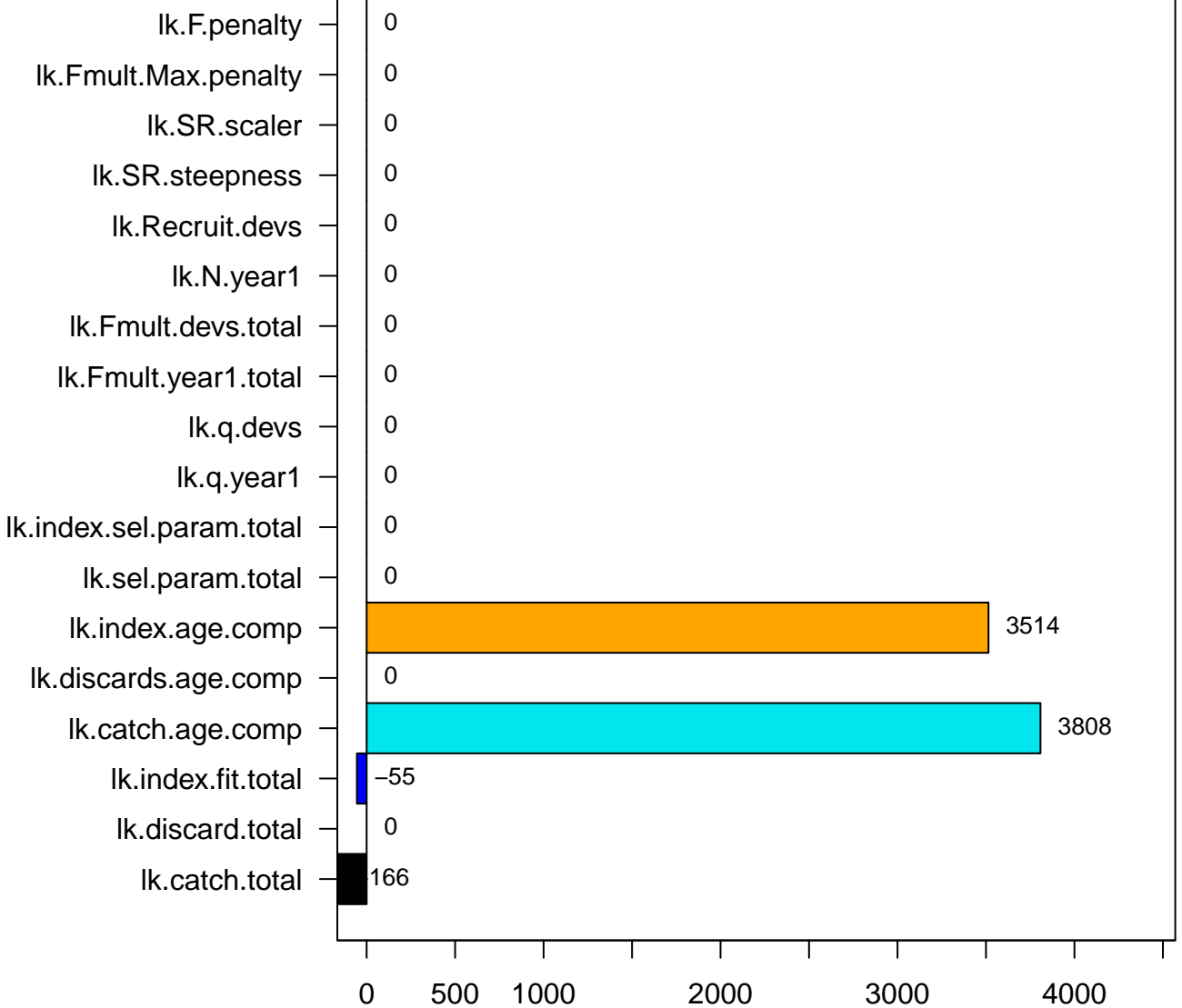
BF24

Final ASAP model

DIAGNOSTIC PLOTS

Components of Obj. Function (7102), npar=178

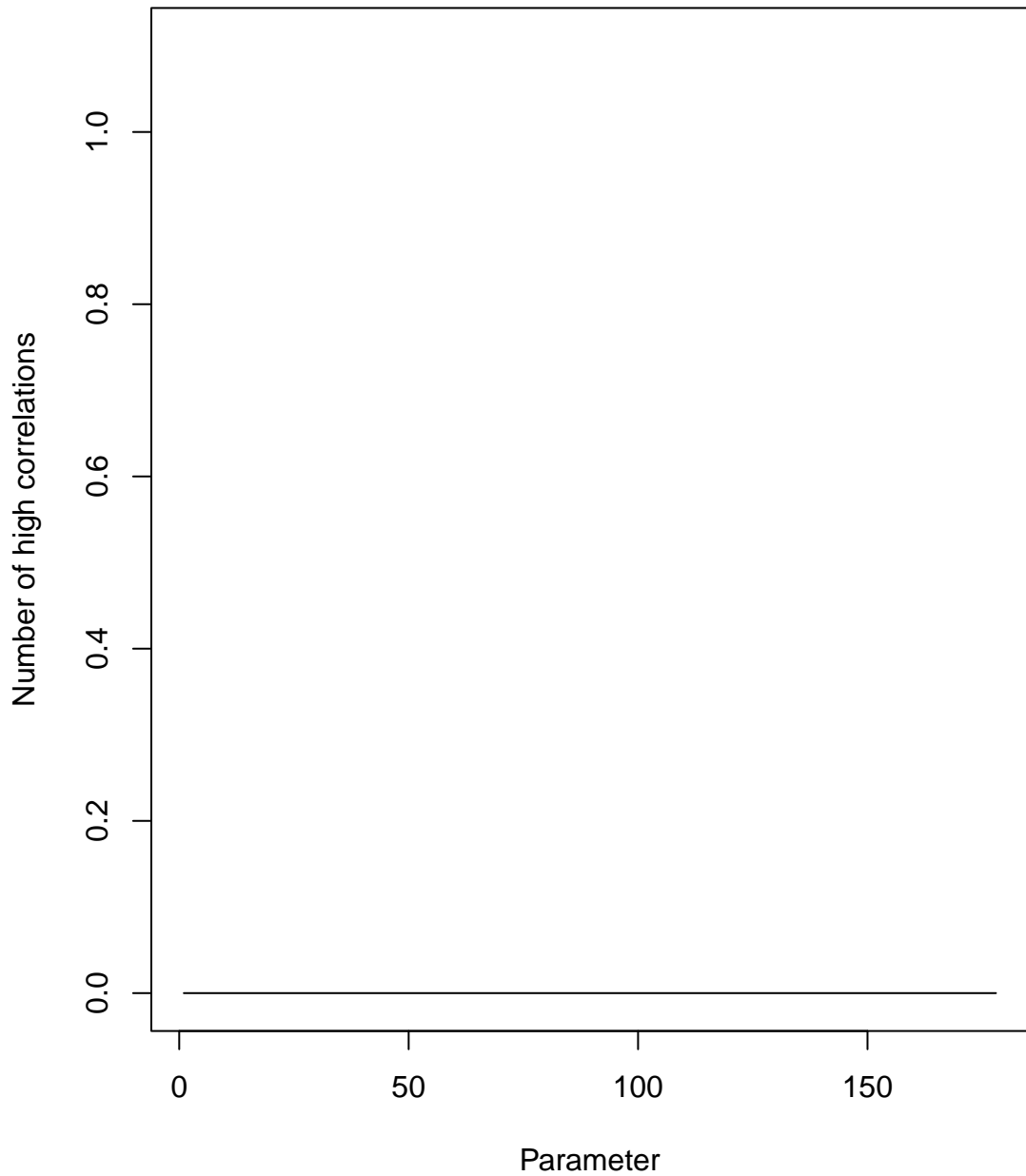
Maximum gradient = $4.3\text{e-}05$

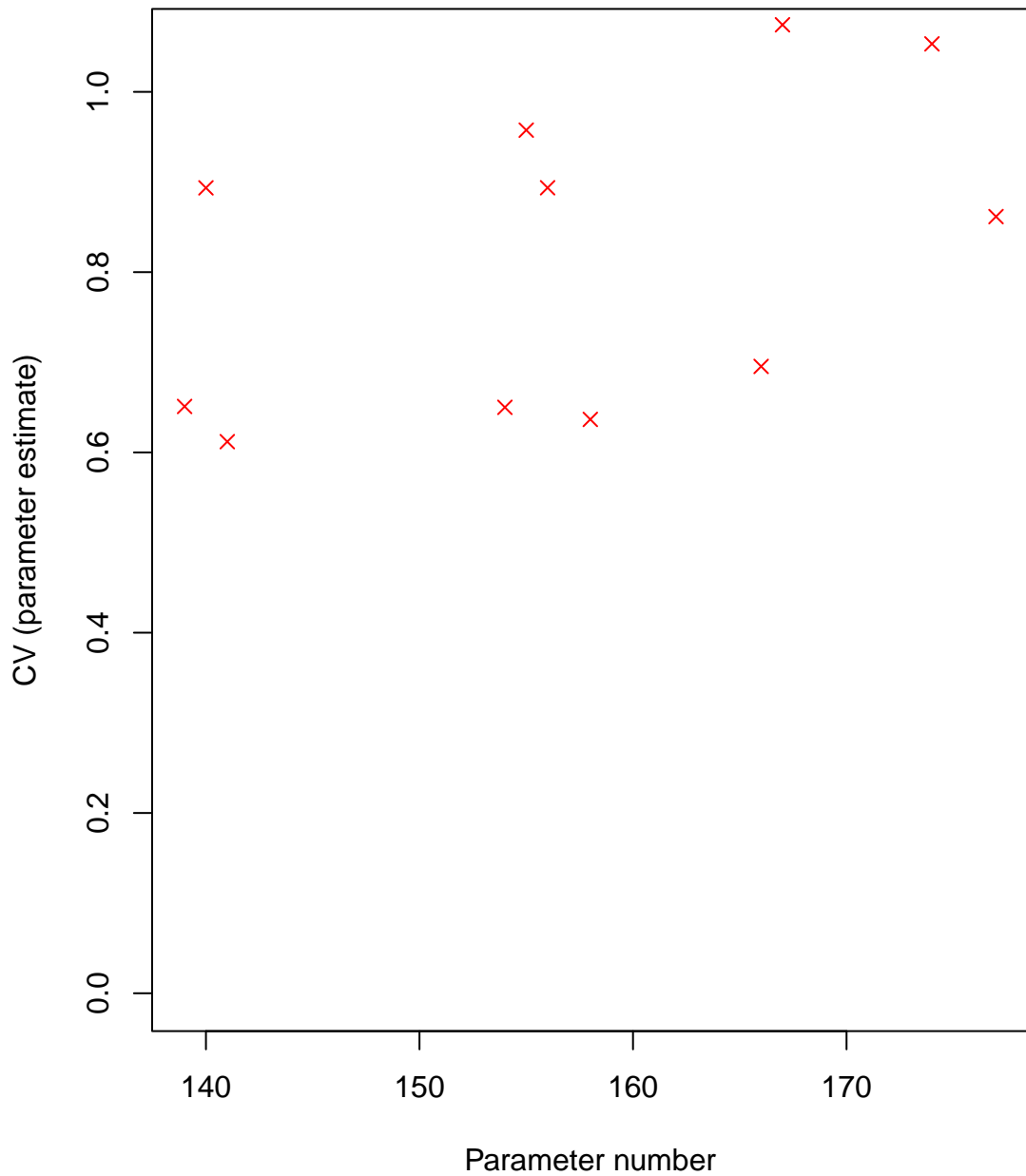


Likelihood Contribution

Model: BF24

Tuesday, 18 Oct 2022 at 10:39:21

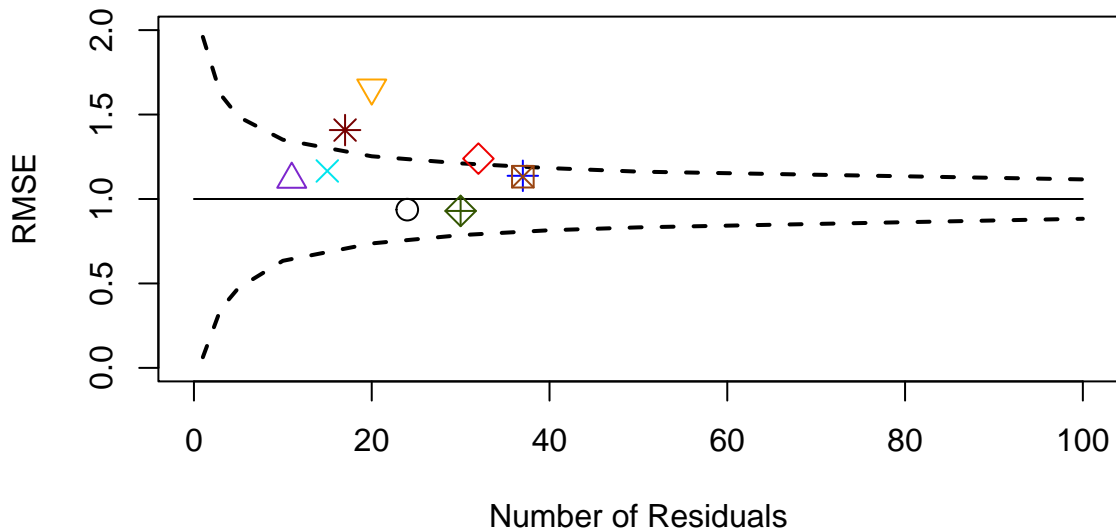




Root Mean Square Error computed from Standardized Residuals

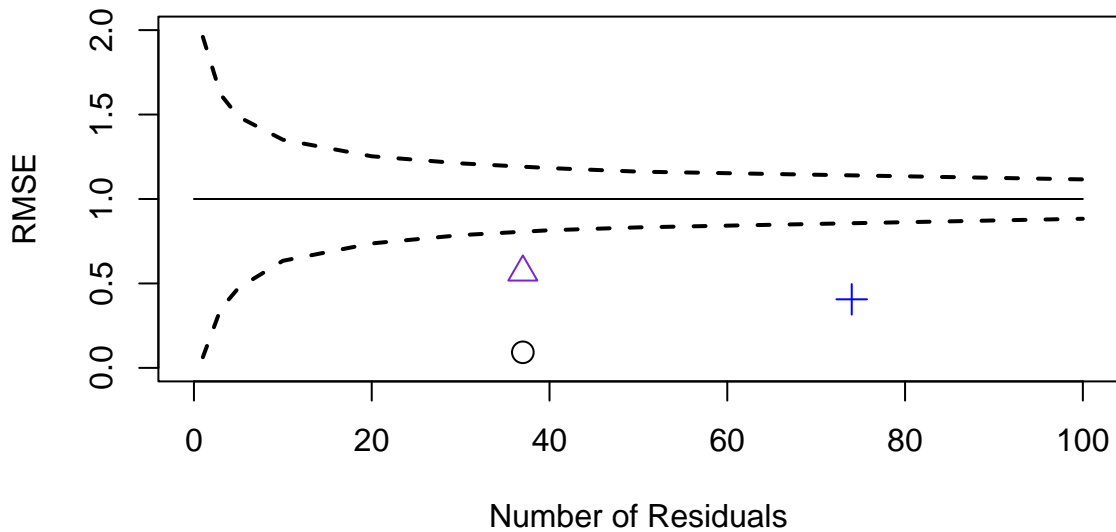
Component	# resids	RMSE
catch.fleet1	37	0.0923
catch.fleet2	37	0.567
catch.tot	74	0.406
discard.fleet1	0	0
discard.fleet2	0	0
discard.tot	0	0
ind01	24	0.937
ind02	11	1.12
ind03	37	1.14
ind04	15	1.17
ind05	32	1.24
ind06	20	1.66
ind07	37	1.13
ind08	17	1.41
ind09	30	0.929
ind.total	223	1.19
N.year1	0	0
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



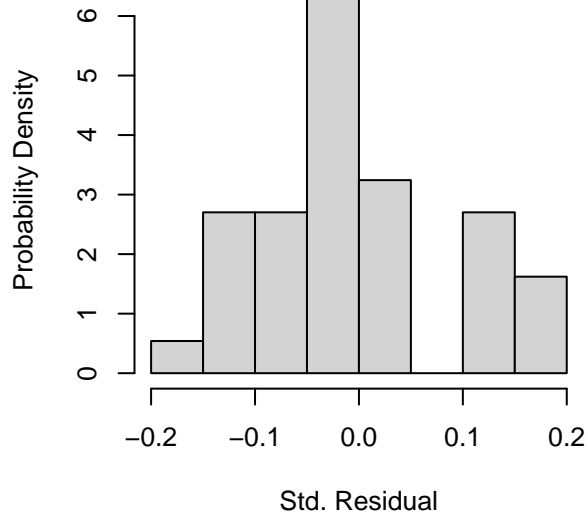
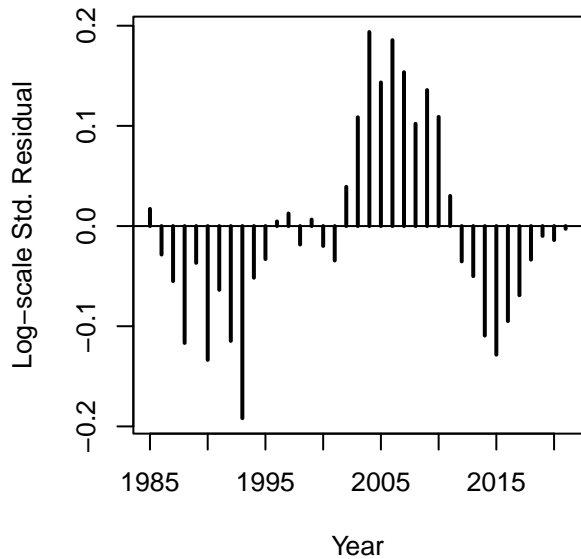
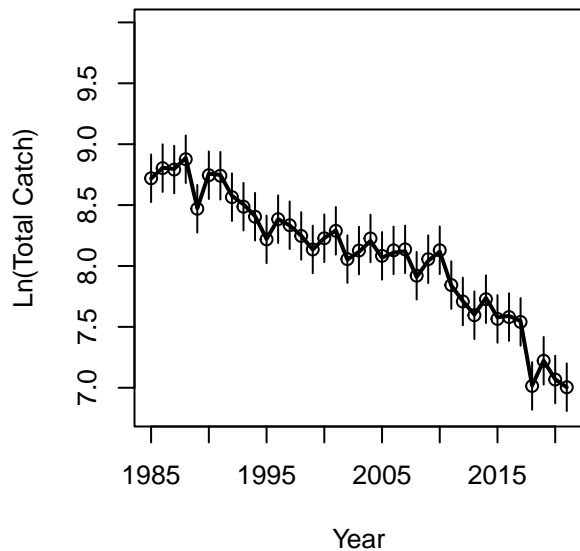
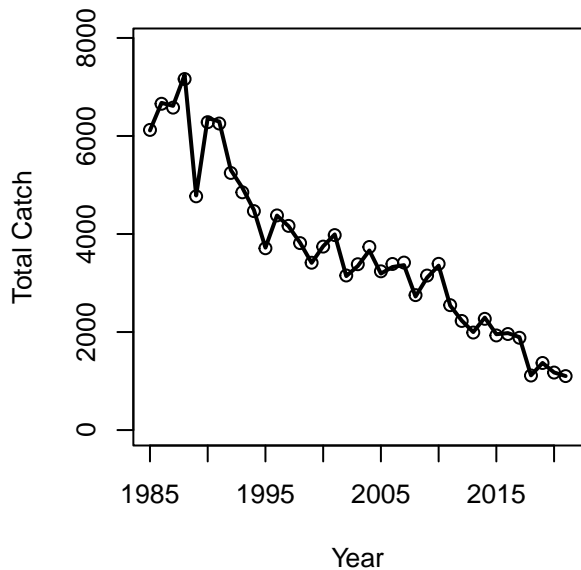
- ind.total
- SEAMAP1
- ChesMMAp
- Compound YOY
- SSIGN
- SEAMAP
- NEAMAP
- MRIP
- Bigelow
- NEFSC Inshore

Root Mean Square Error for Catch

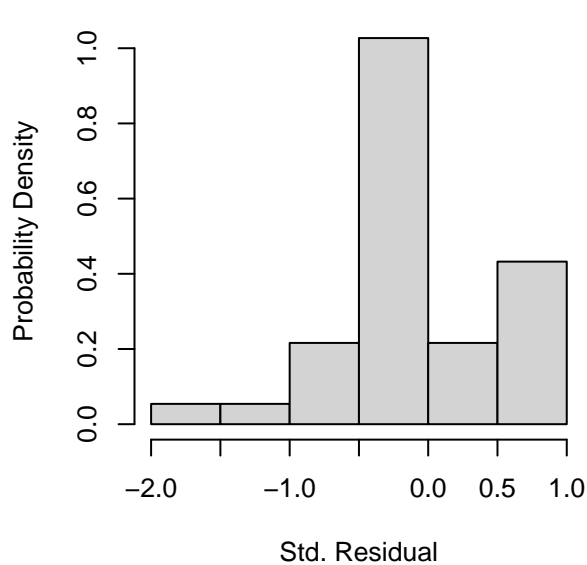
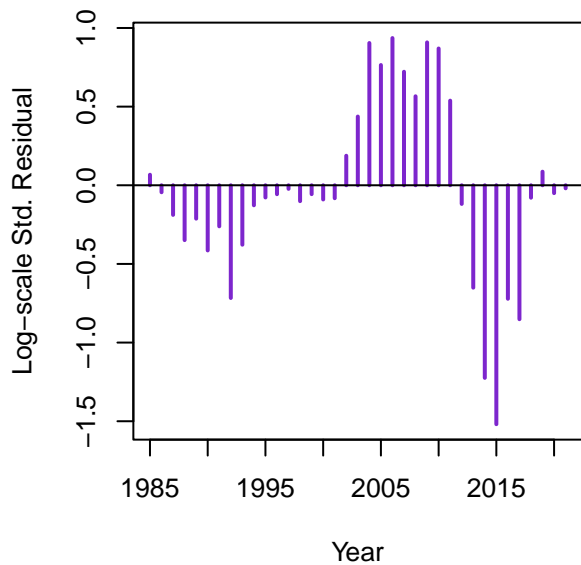
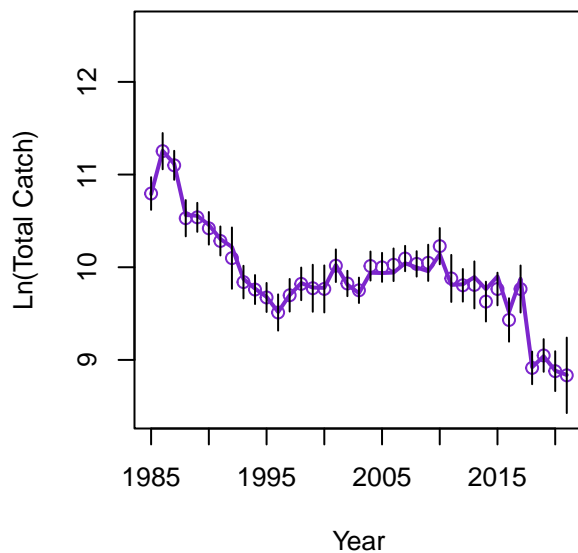
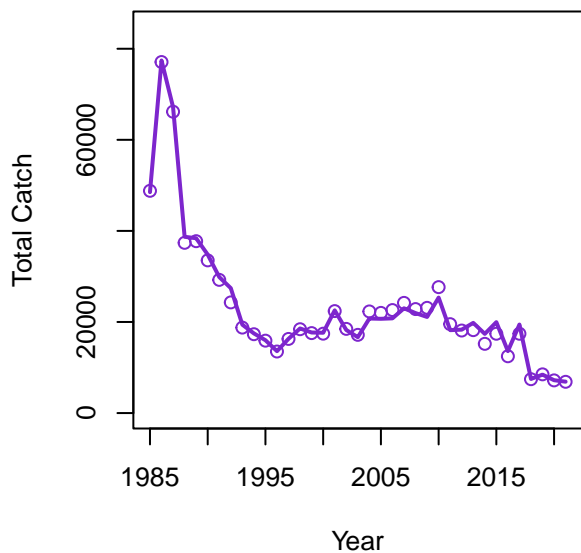


+ `catch.tot`
△ `catch.fleet2`
○ `catch.fleet1`

Fleet 1 Catch (Comm)



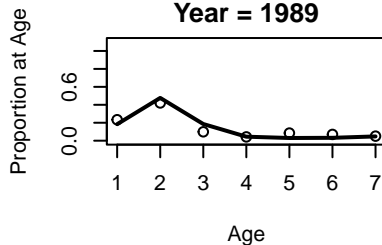
Fleet 2 Catch (Rec)



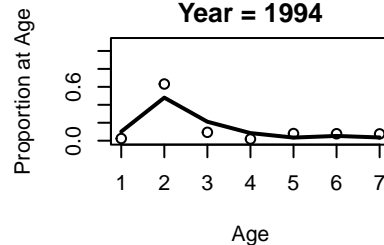
Catch

Fleet 1
Comm
↓

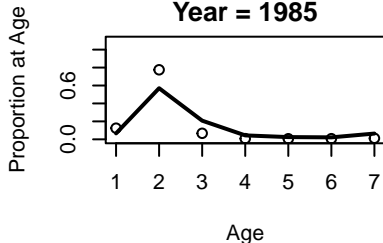
Year = 1989



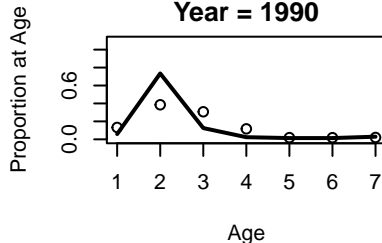
Year = 1994



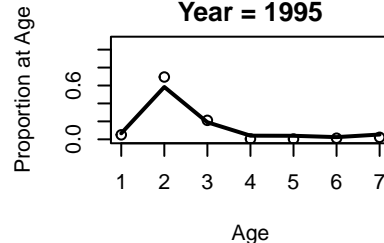
Year = 1985



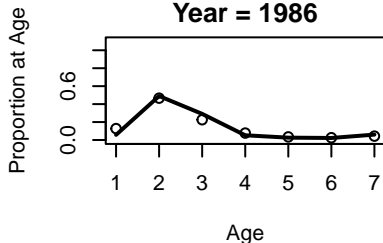
Year = 1990



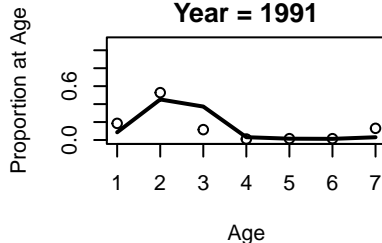
Year = 1995



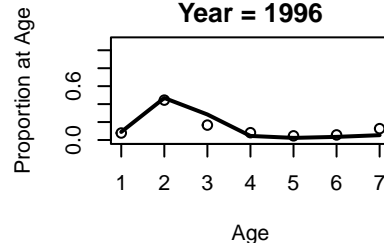
Year = 1986



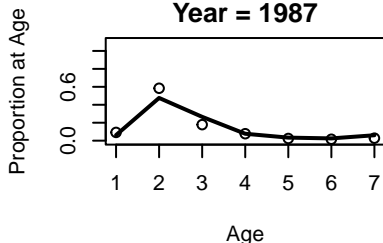
Year = 1991



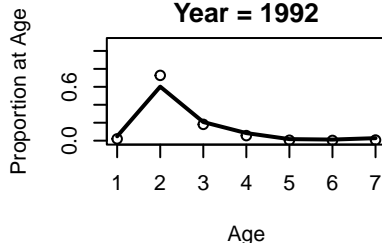
Year = 1996



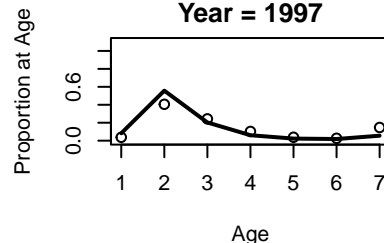
Year = 1987



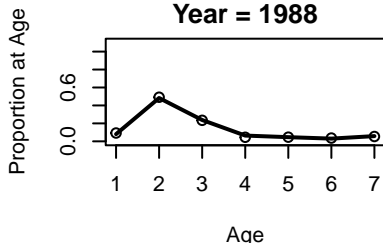
Year = 1992



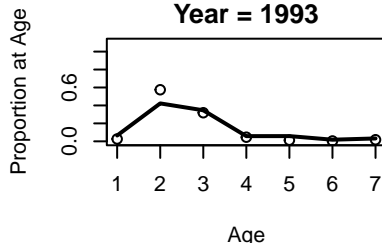
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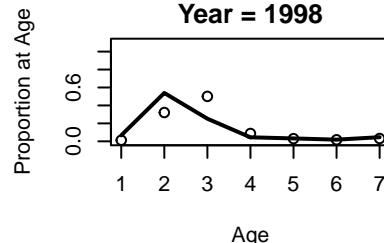
Year = 1988



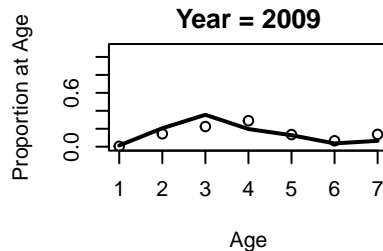
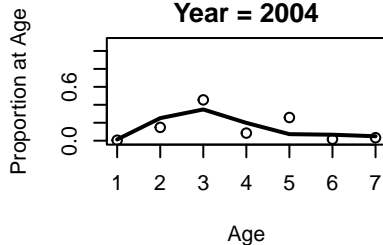
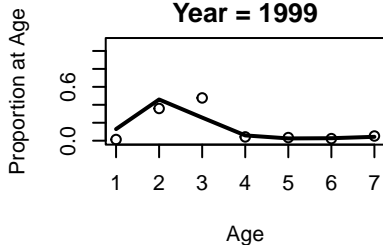
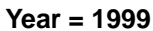
Year = 1993



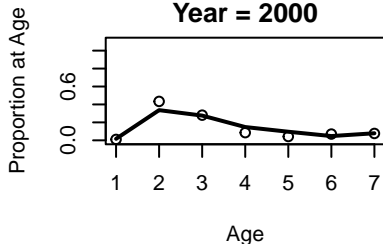
Year = 1998



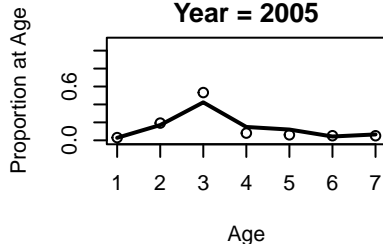
Year = 2004



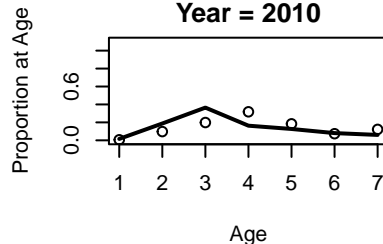
Year = 2000



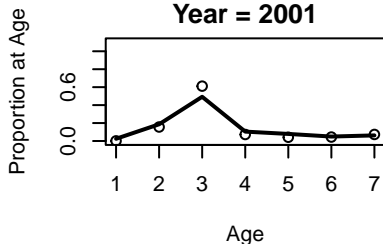
Year = 2005



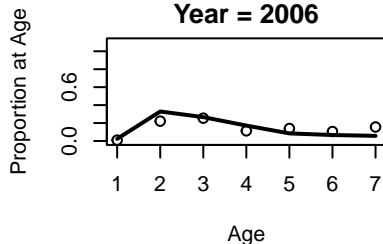
Year = 2010



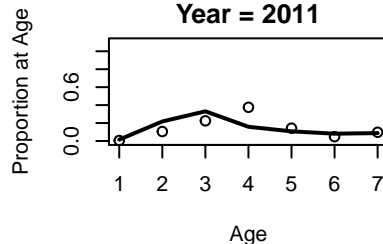
Year = 2001



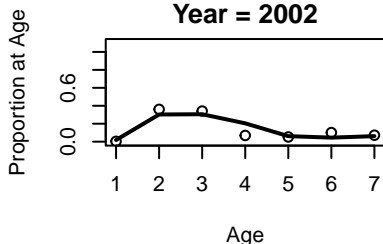
Year = 2006



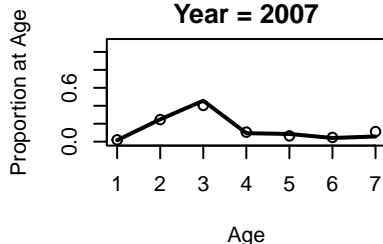
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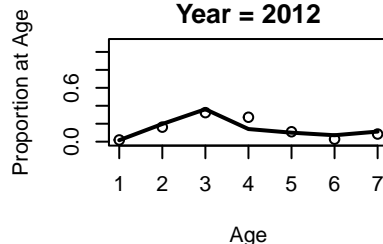
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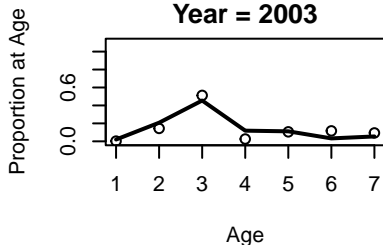
Year = 2007



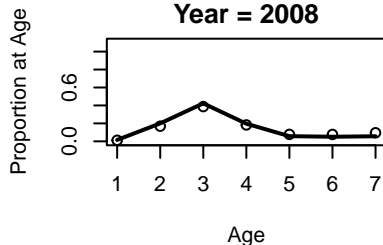
Year = 2012



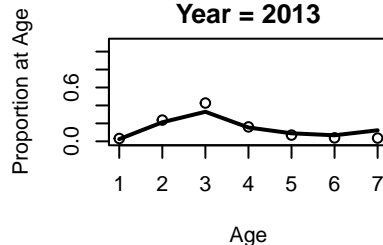
Year = 2003



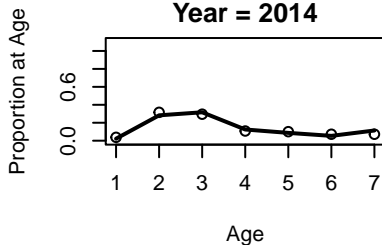
Year = 2008



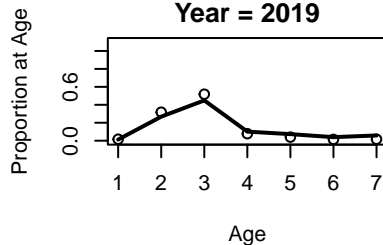
Year = 2013



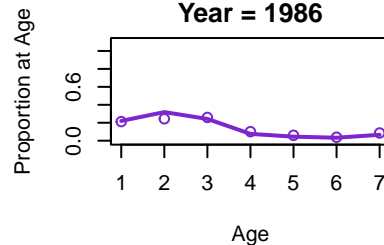
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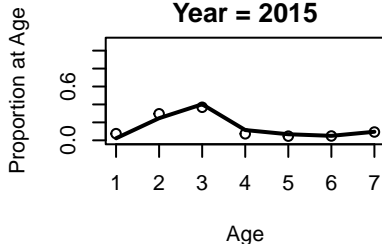
Year = 2019



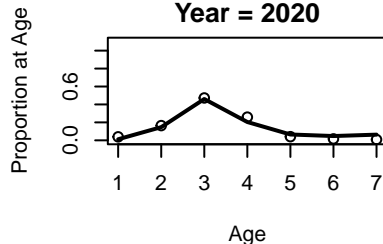
Year = 1986



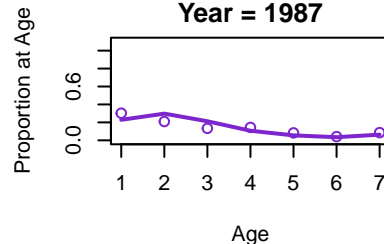
Year = 2015



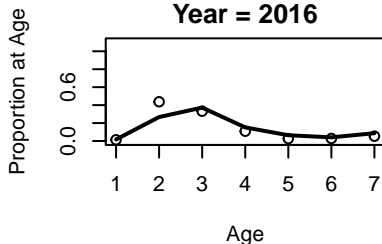
Year = 2020



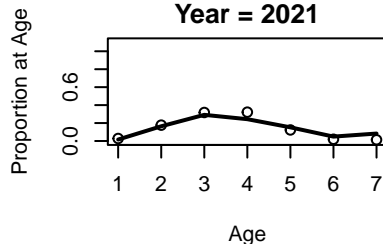
Year = 1987



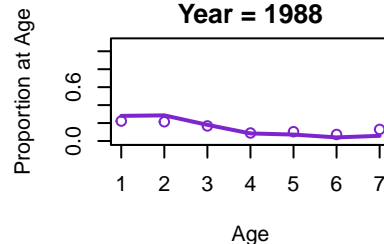
Year = 2016



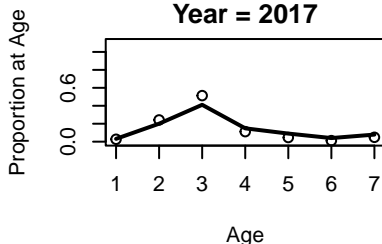
Year = 2021



Year = 1988

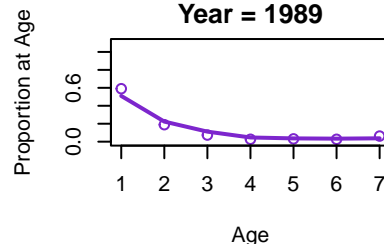


Year = 2017

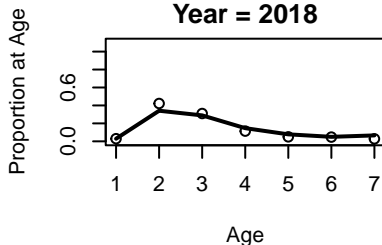


Fleet
Rec
↓

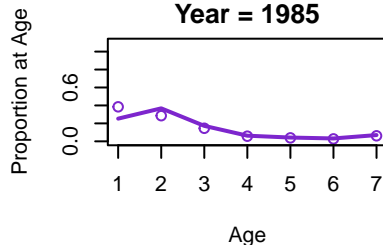
Year = 1989



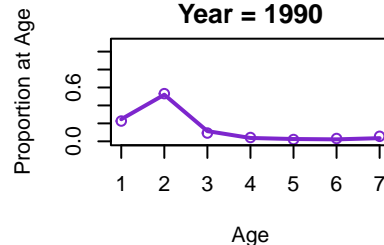
Year = 2018



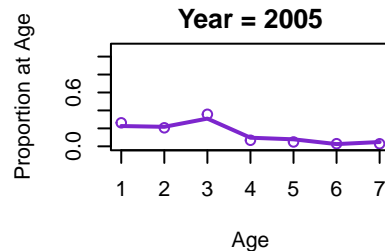
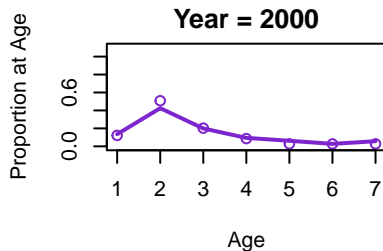
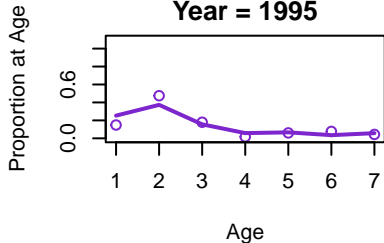
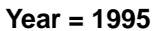
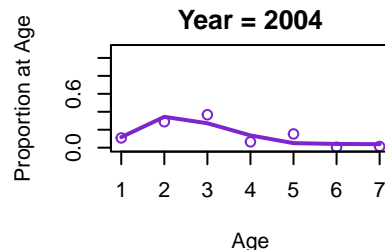
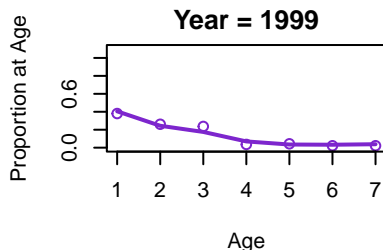
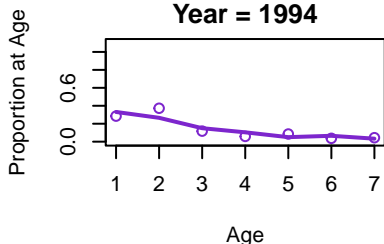
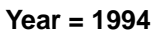
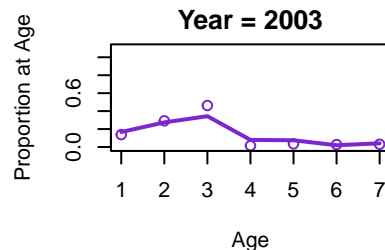
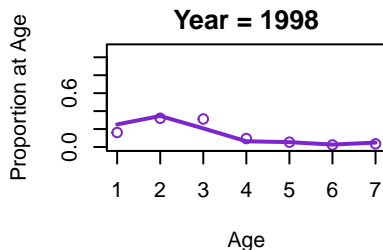
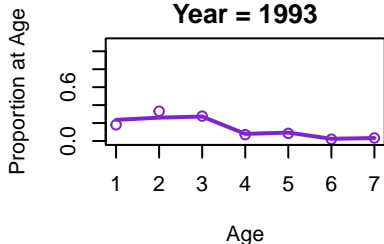
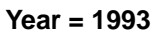
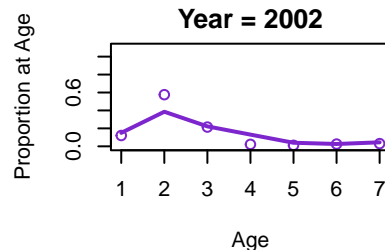
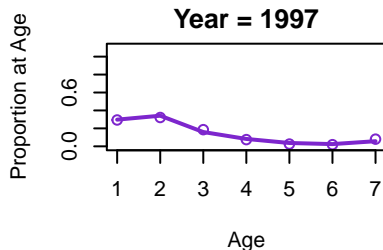
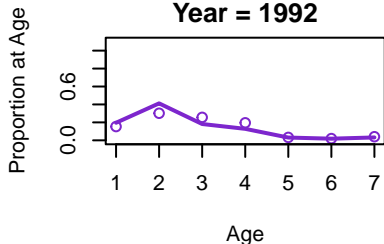
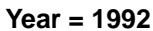
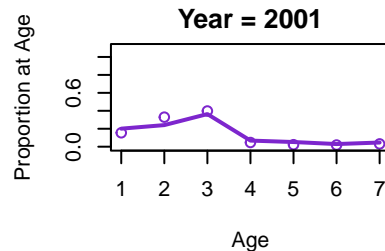
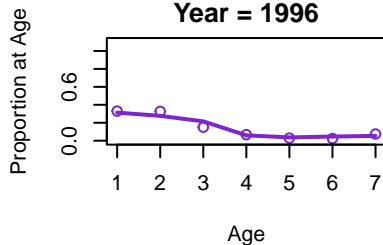
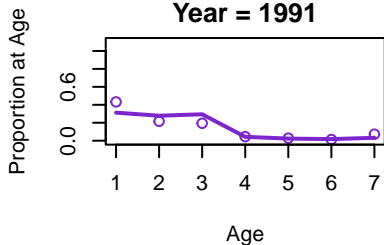
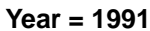
Year = 1985



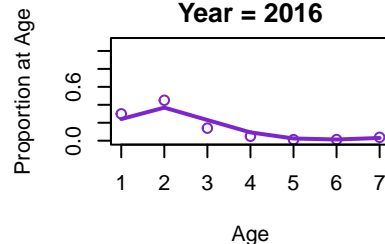
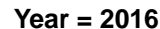
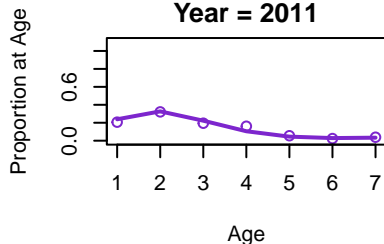
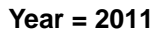
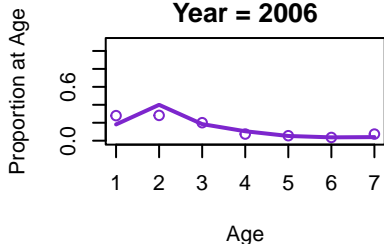
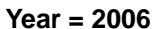
Year = 1990



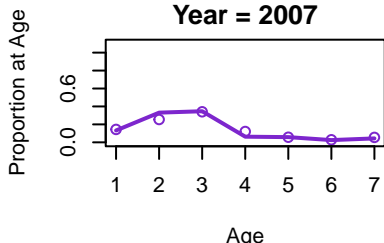
Year = 1996



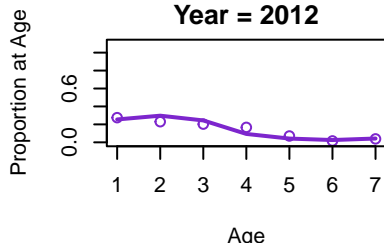
Year = 2011



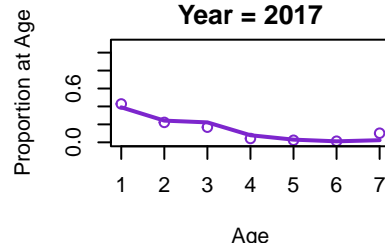
Year = 2007



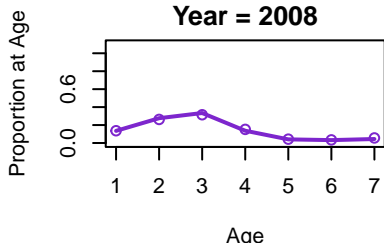
Year = 2012



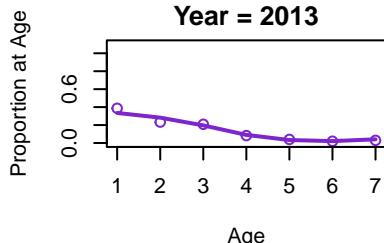
Year = 2017



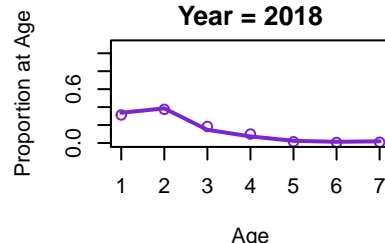
Year = 2008



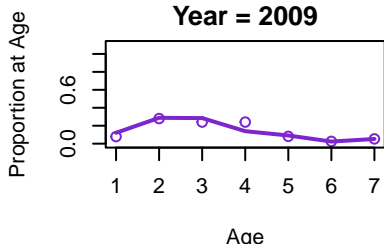
Year = 2013



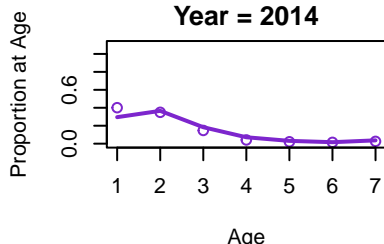
Year = 2018



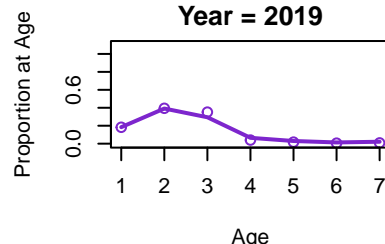
Year = 2009



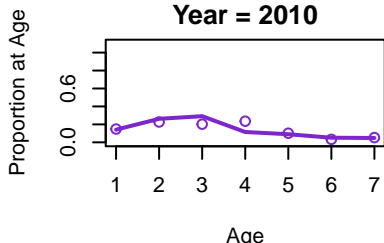
Year = 2014



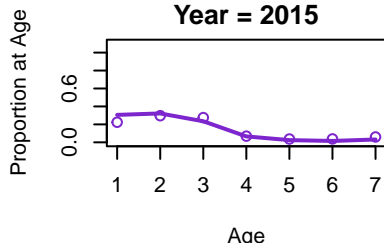
Year = 2019



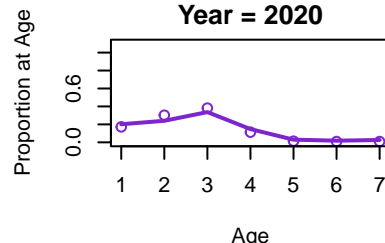
Year = 2010



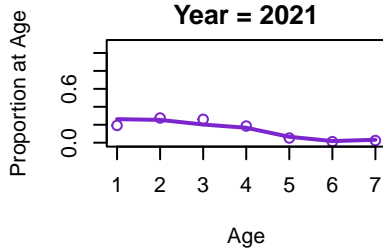
Year = 2015



Year = 2020

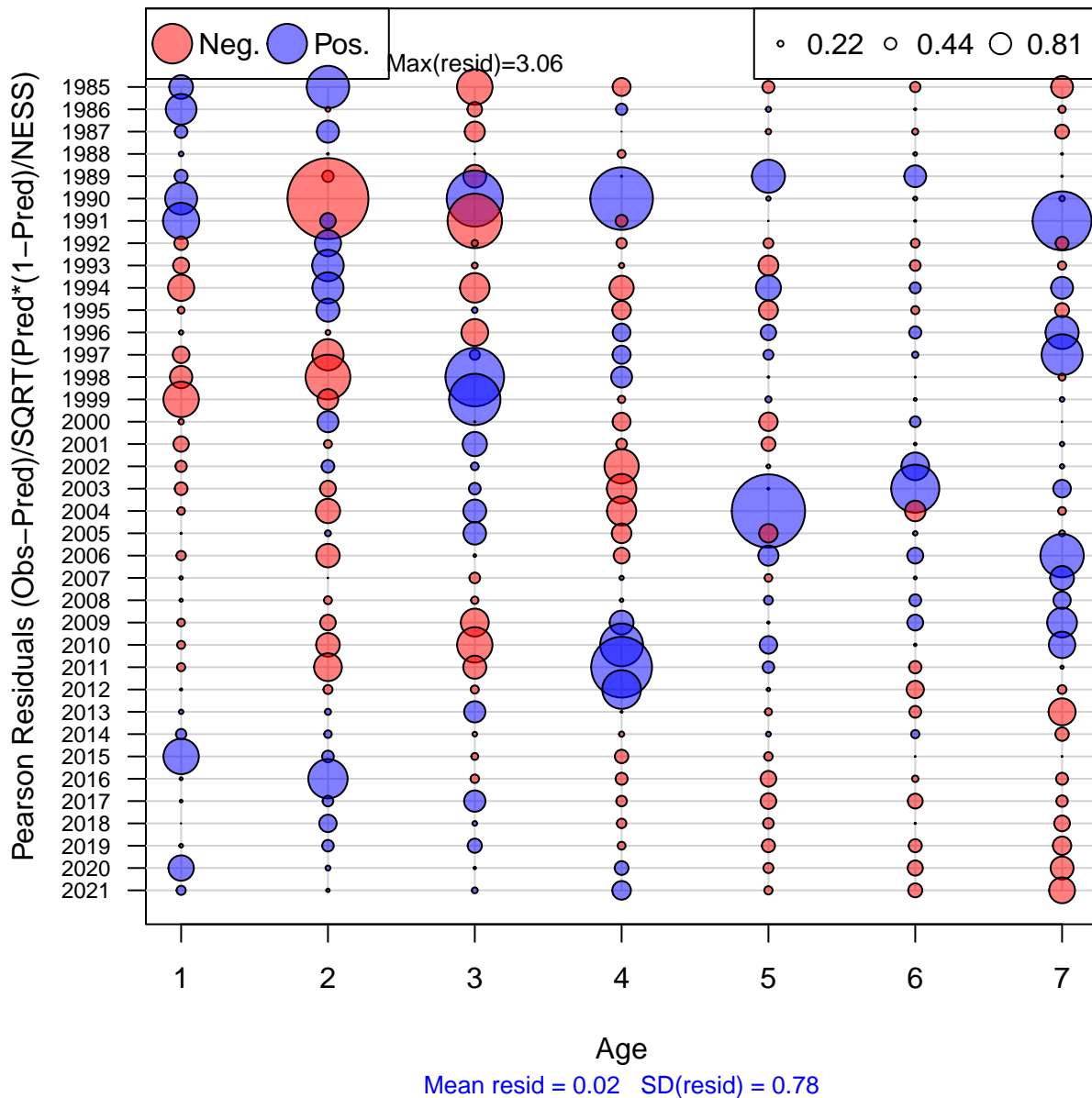


Year = 2021

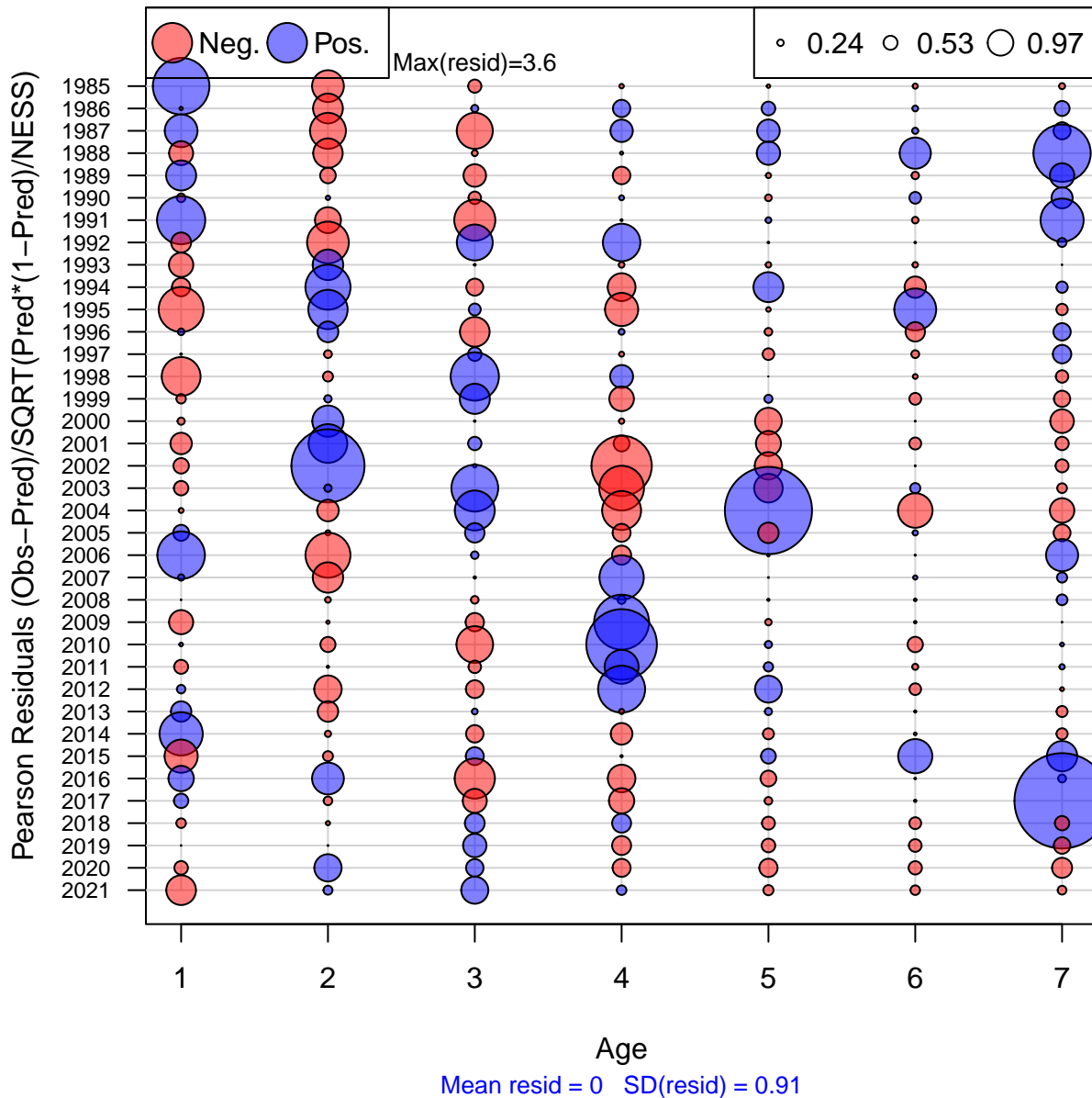


Catch

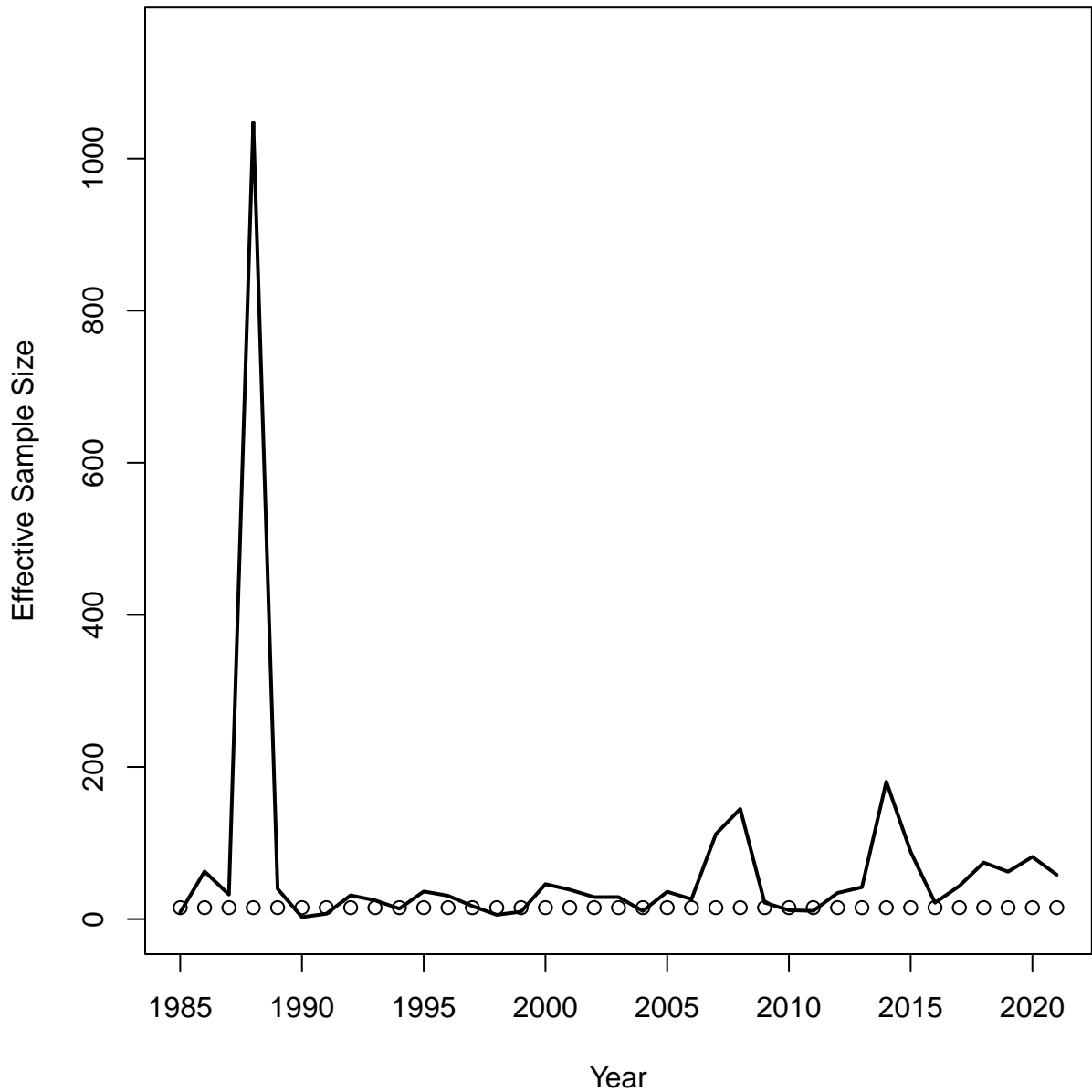
Age Comp Residuals for Catch by Fleet 1 (Comm)



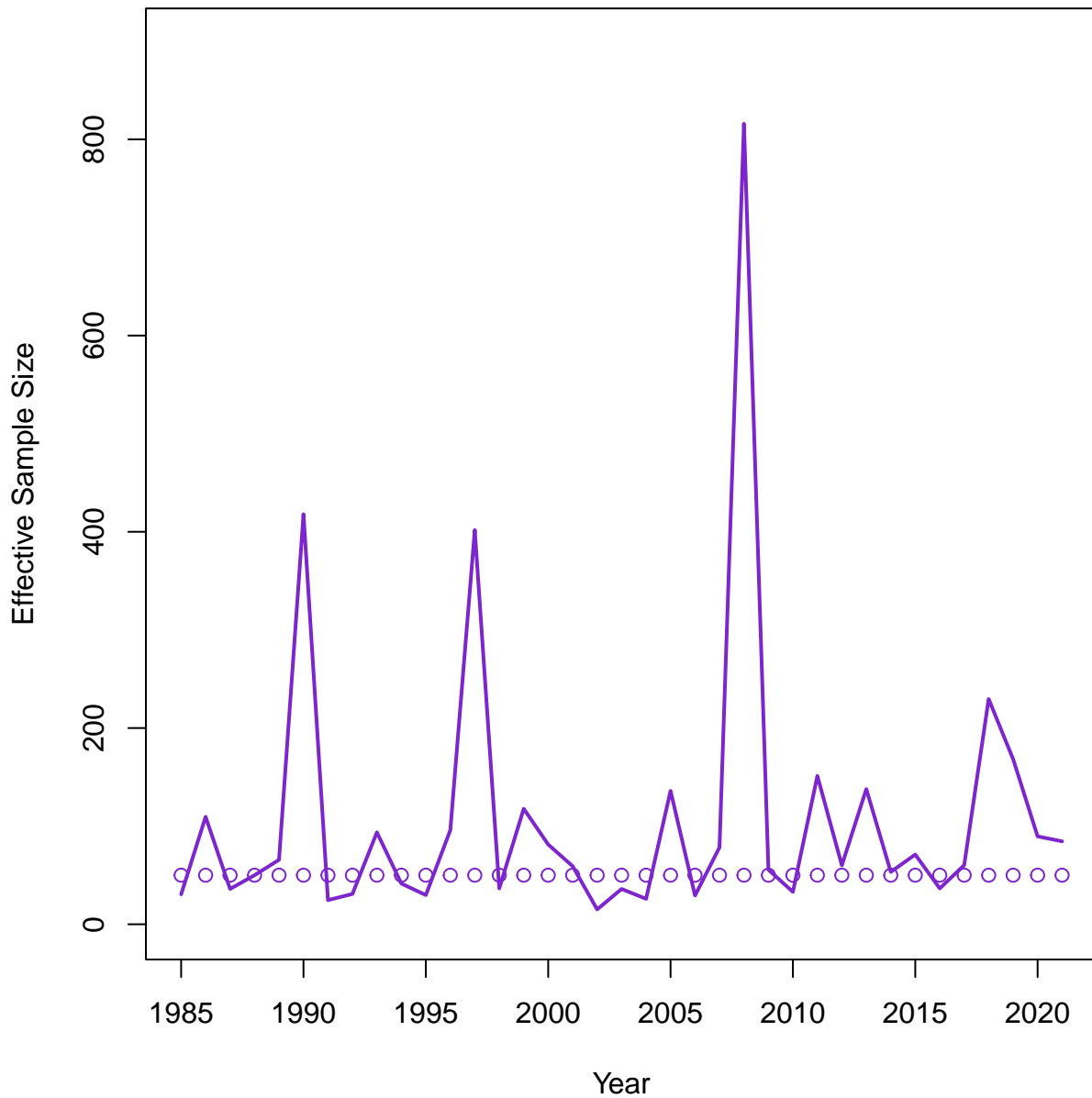
Age Comp Residuals for Catch by Fleet 2 (Rec)



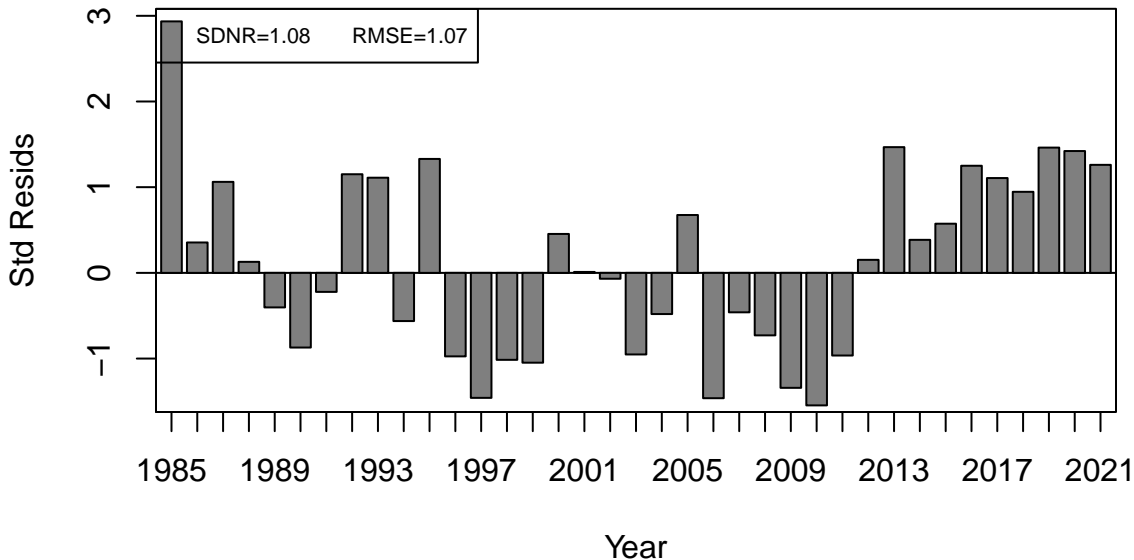
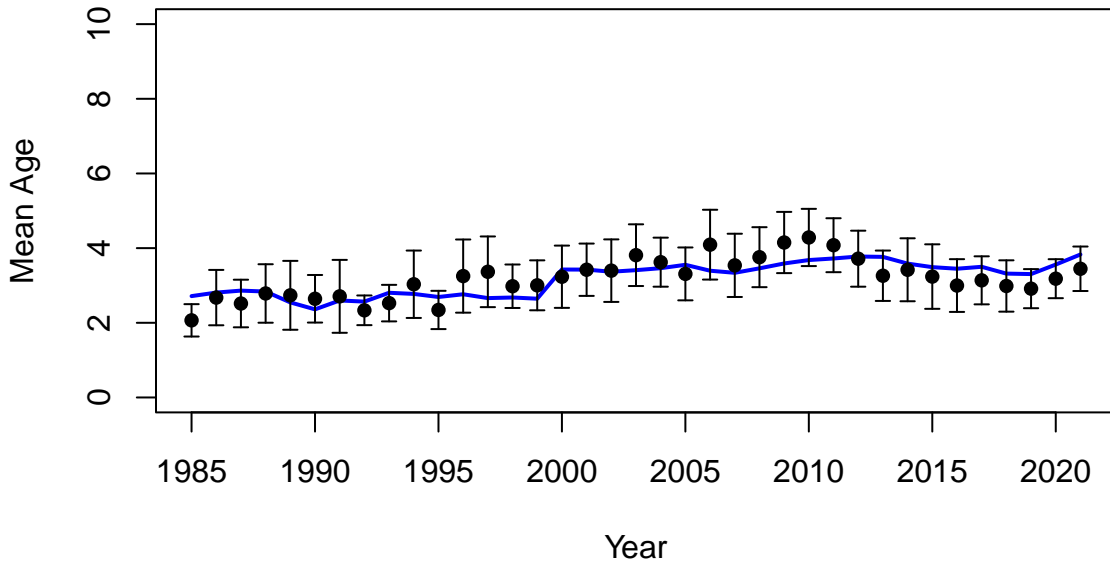
Catch Neff Fleet 1 (Comm)



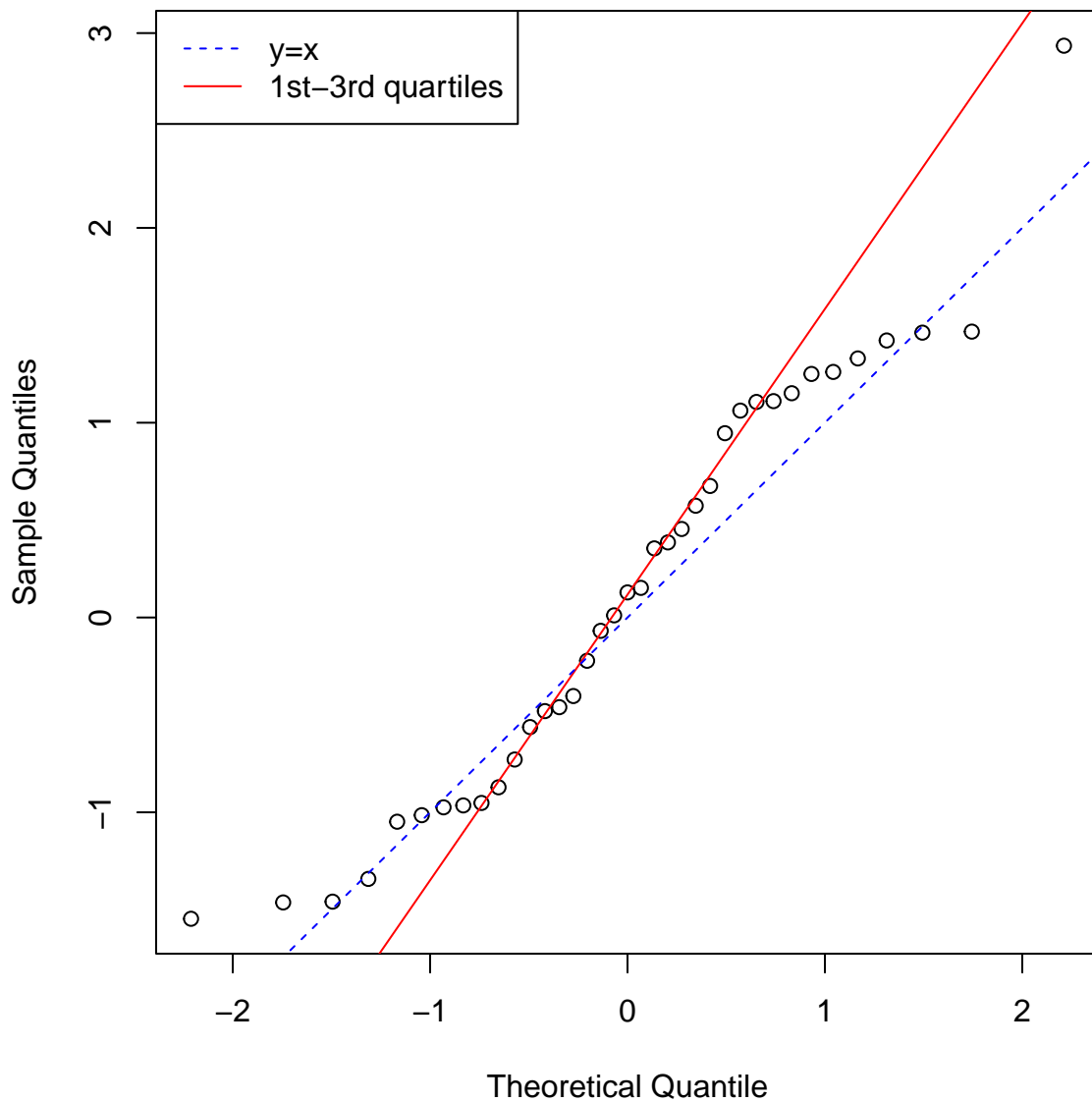
Catch Neff Fleet 2 (Rec)



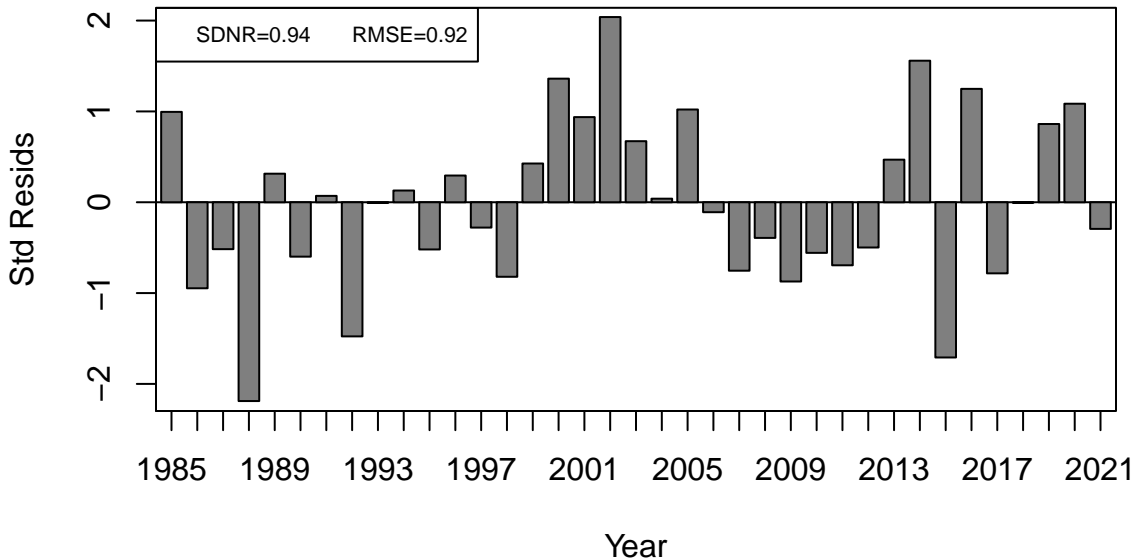
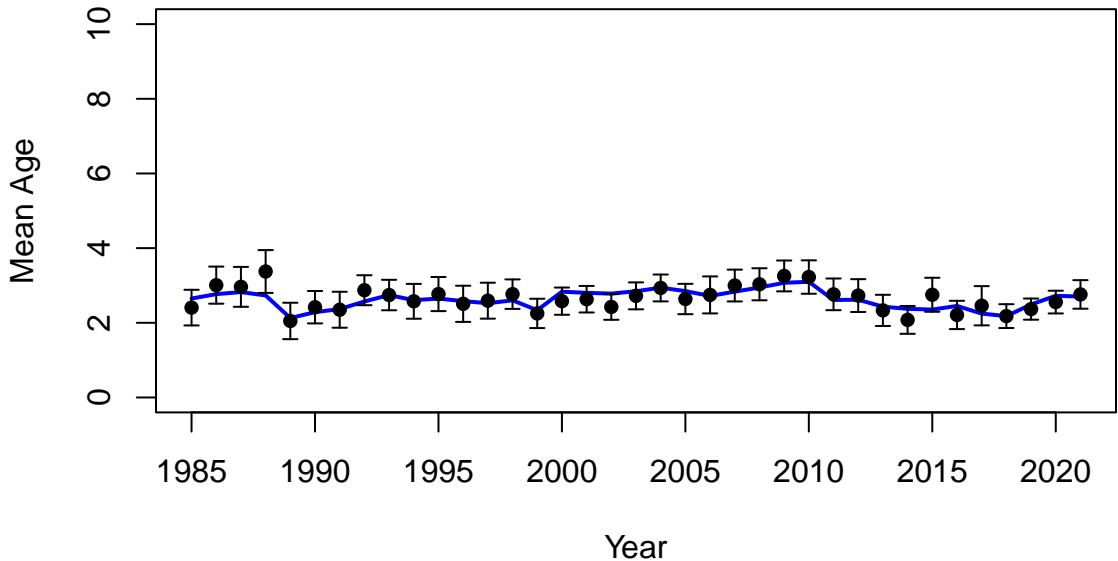
Catch Fleet 1 (Comm) ESS = 15



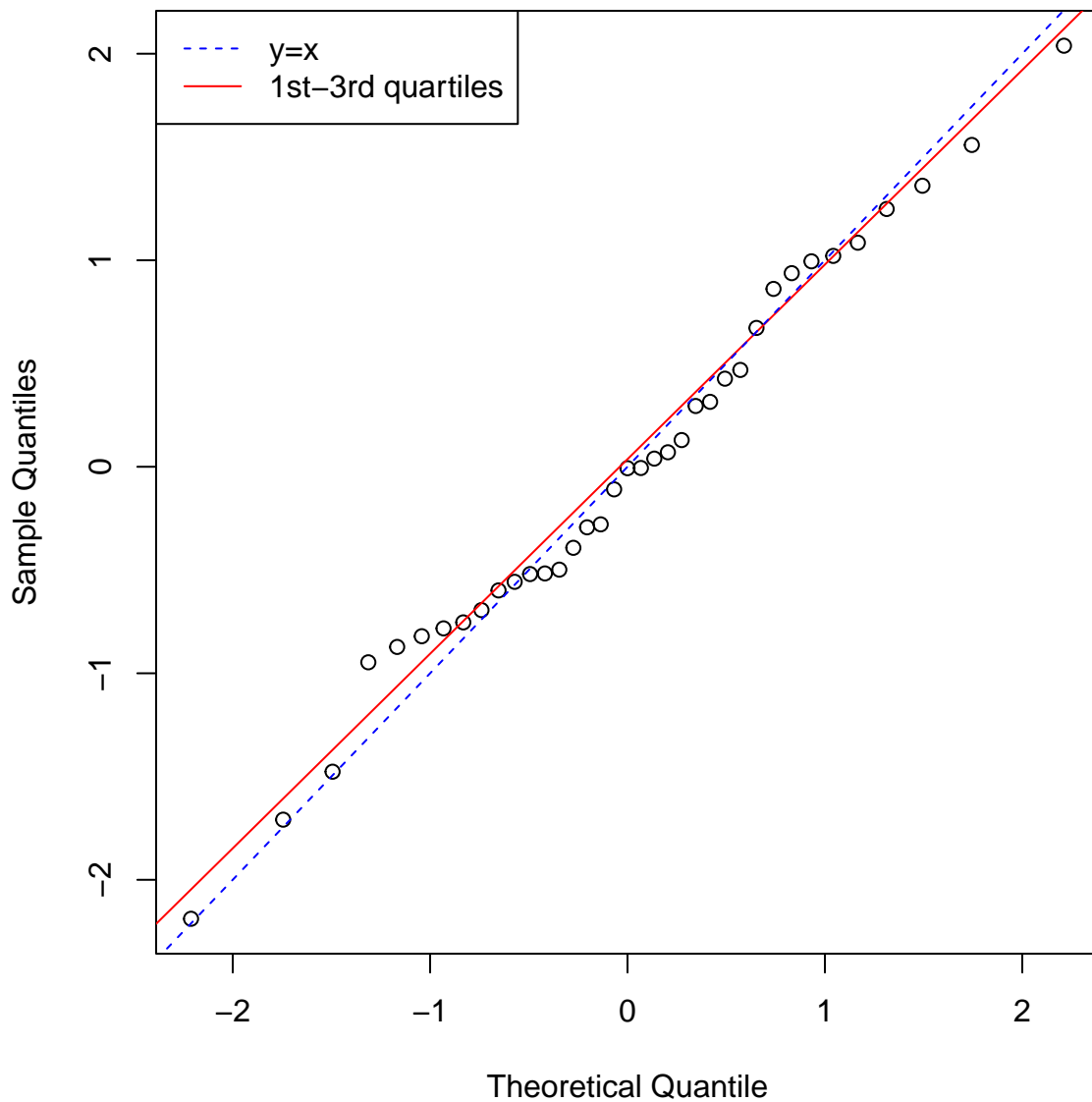
Catch Fleet 1 (Comm) ESS = 15



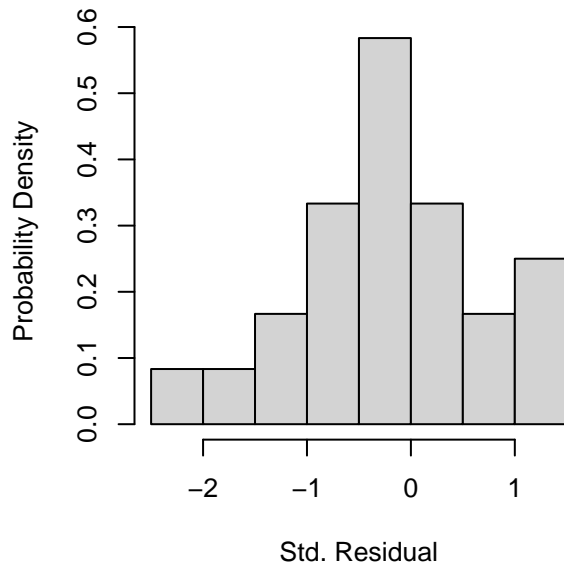
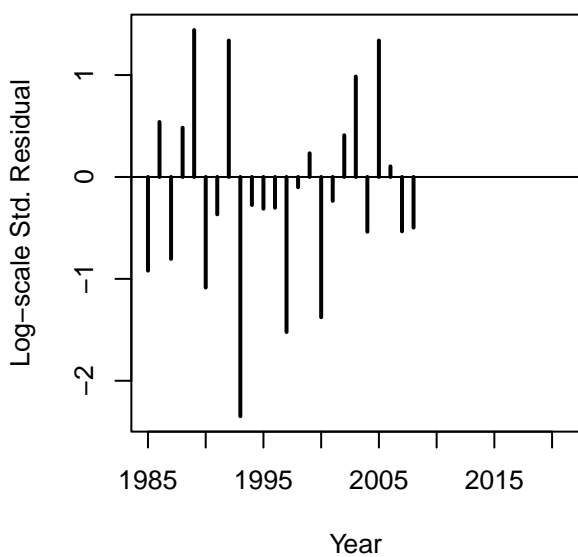
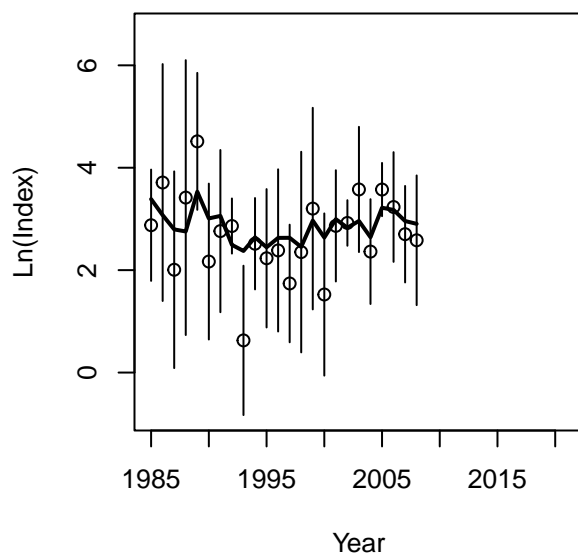
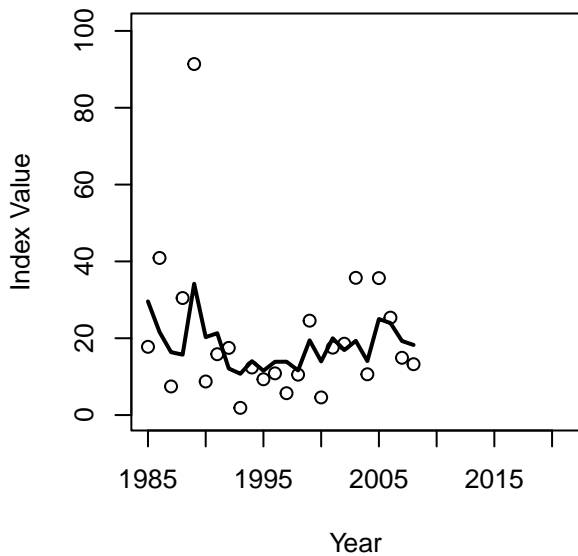
Catch Fleet 2 (Rec) ESS = 50



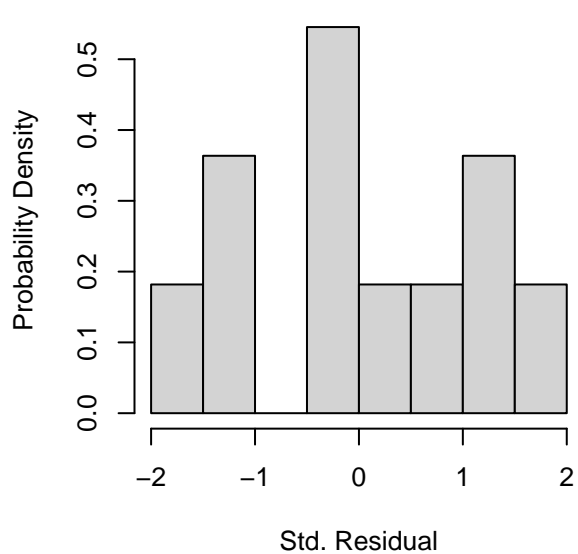
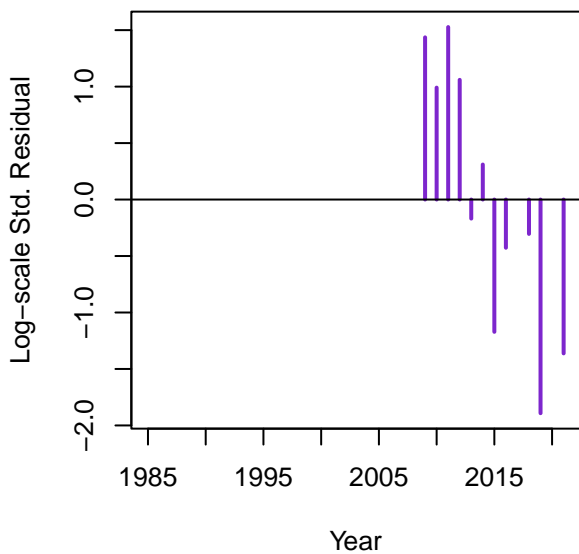
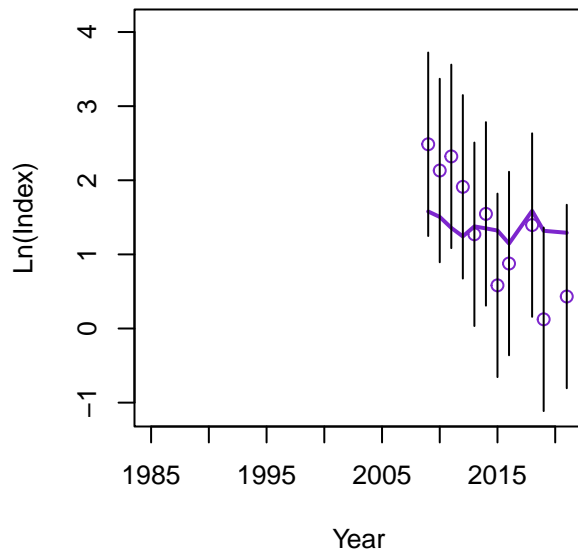
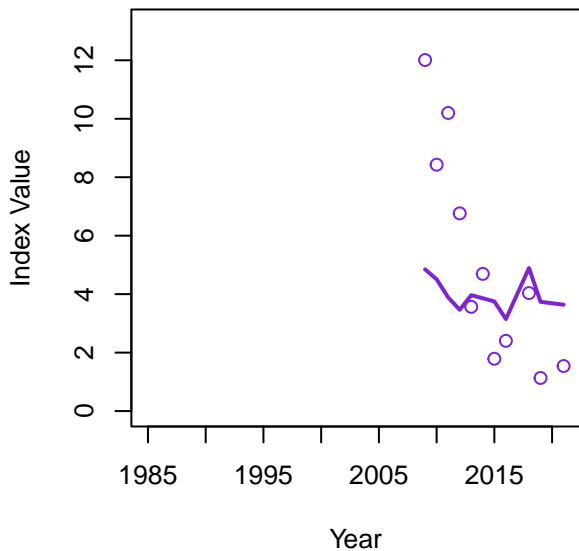
Catch Fleet 2 (Rec) ESS = 50



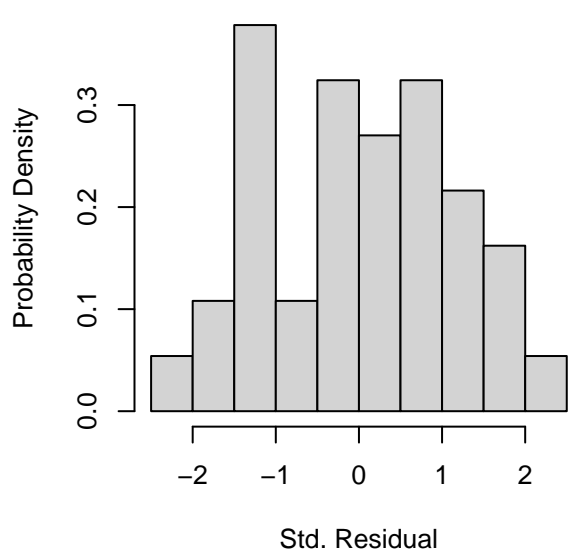
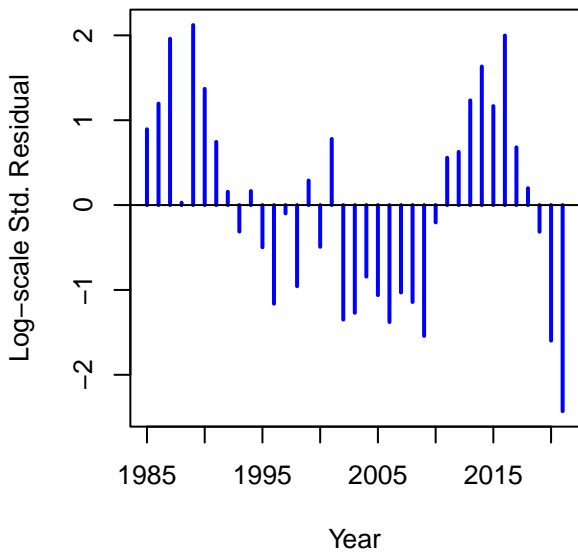
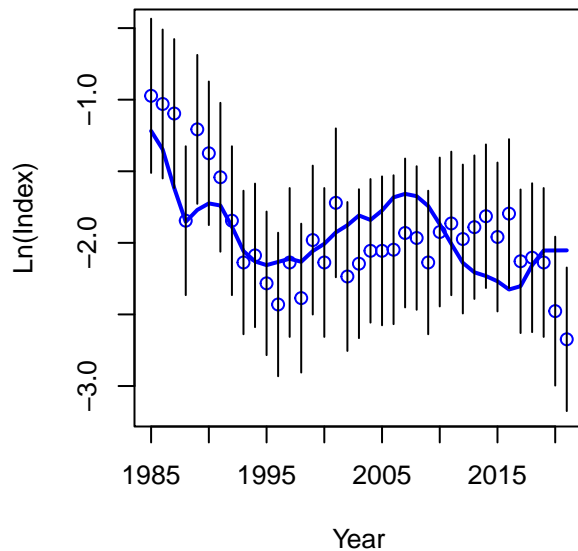
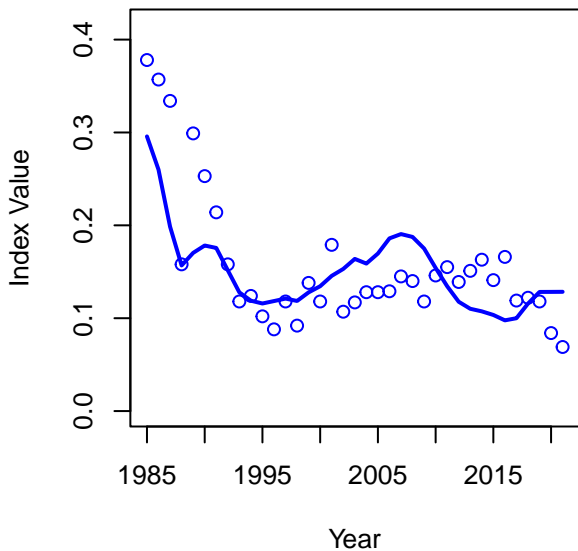
Index 1 (NEFSC Inshore)



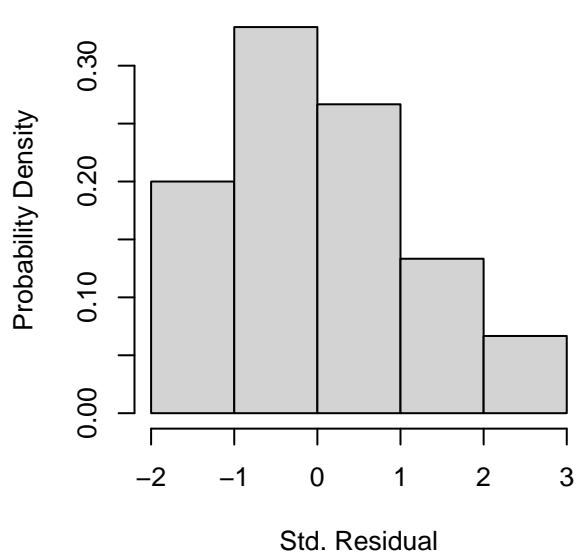
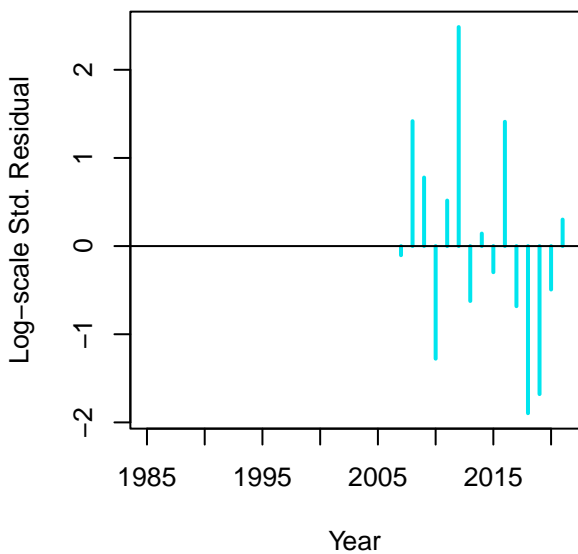
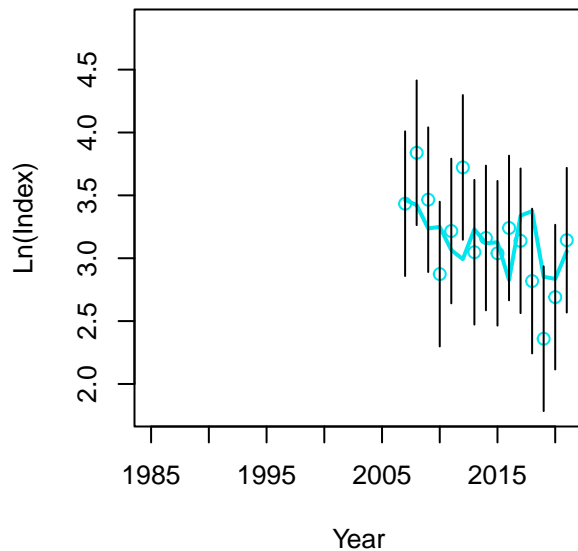
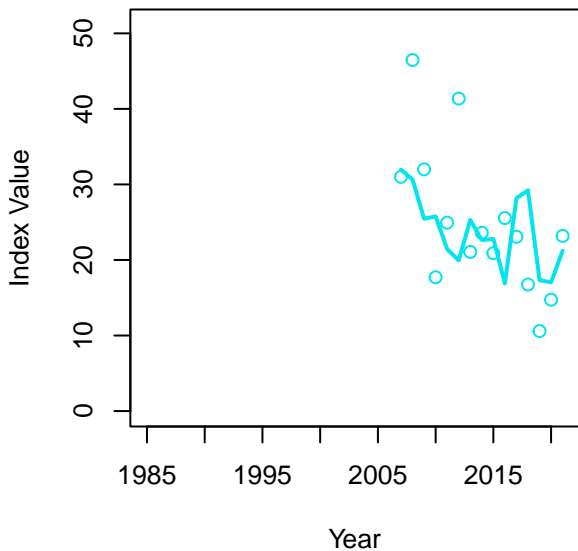
Index 2 (Bigelow)



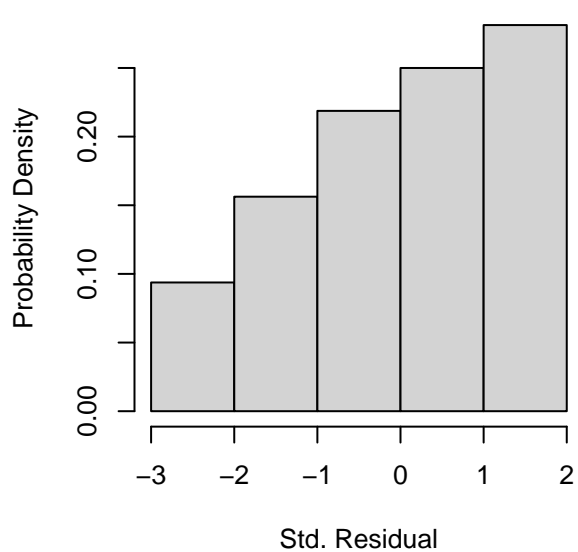
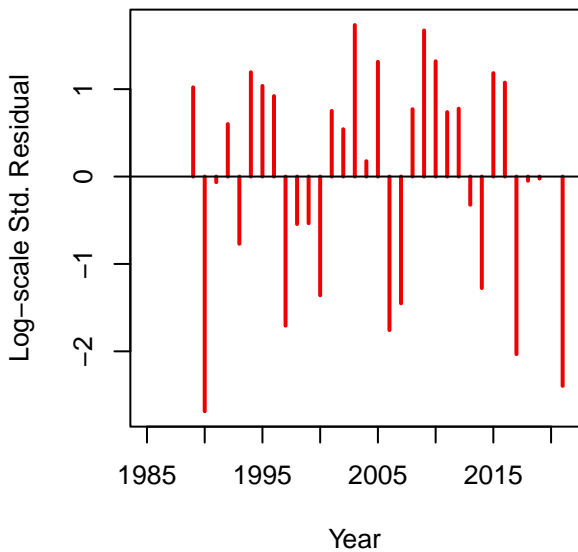
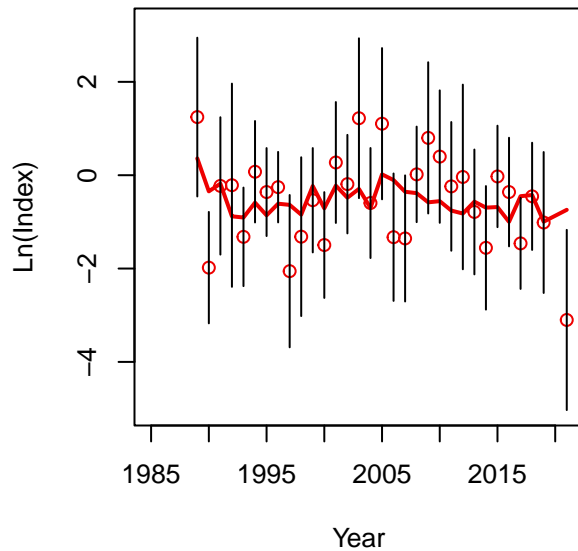
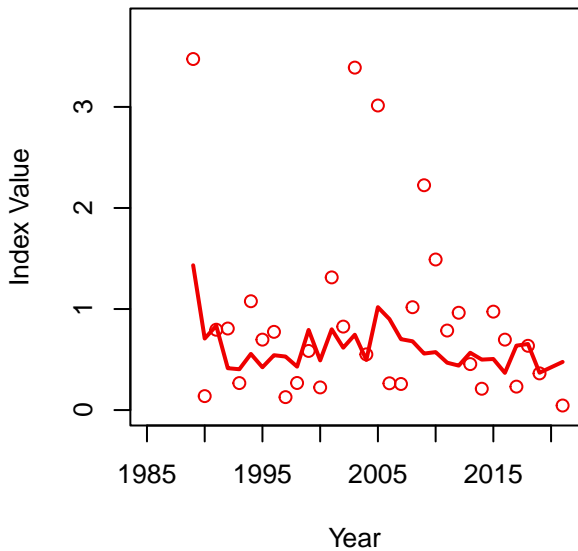
Index 3 (MRIP)



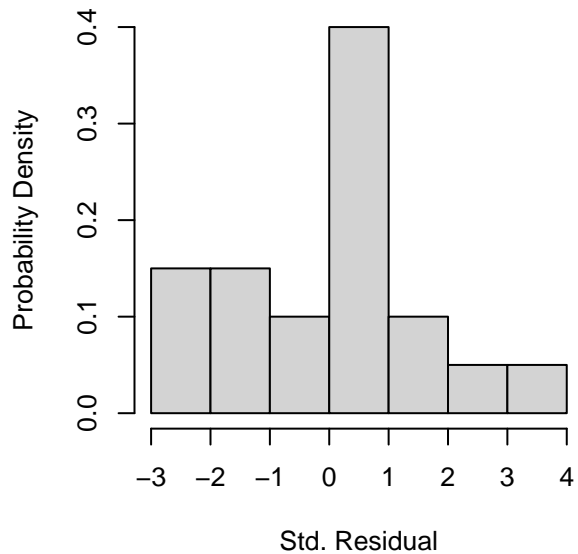
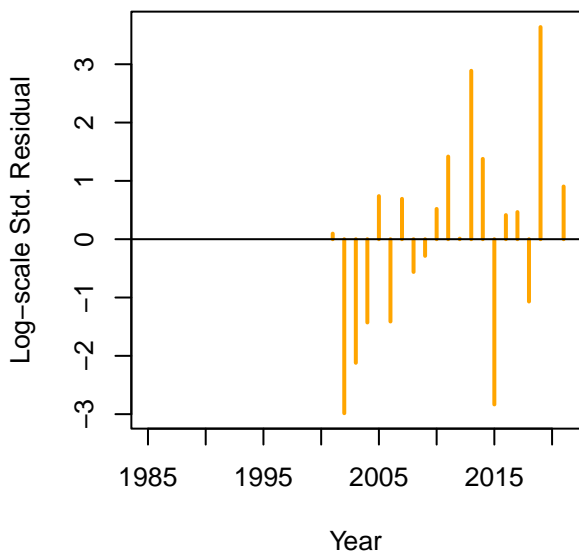
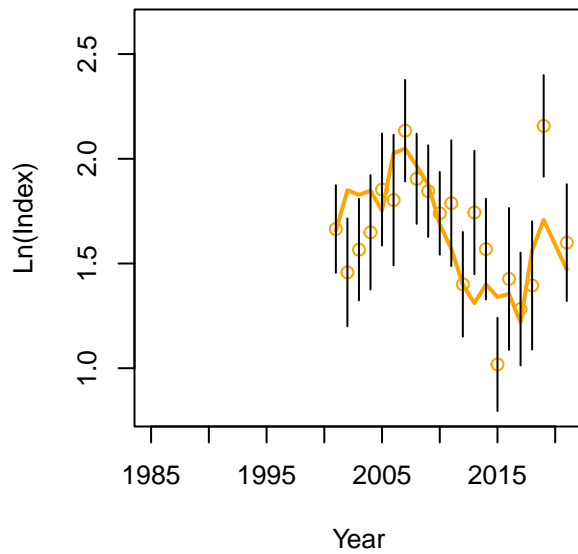
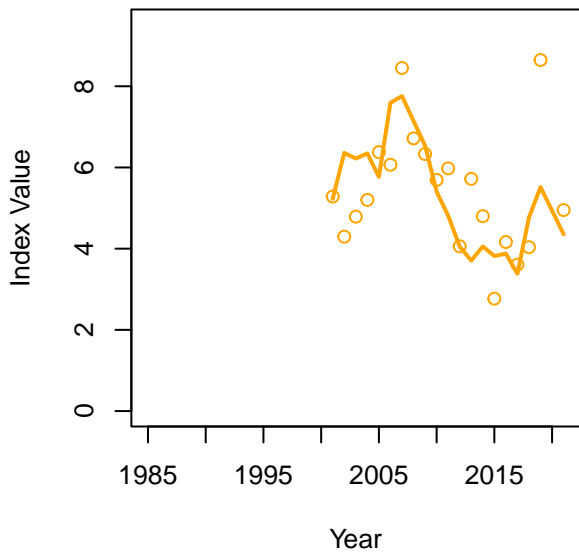
Index 4 (NEAMAP)



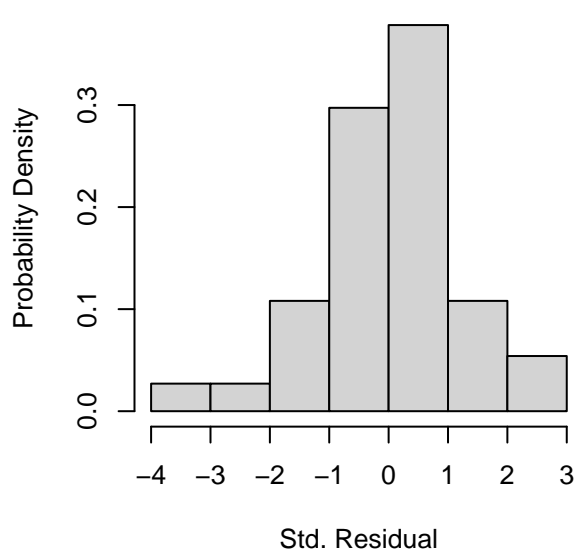
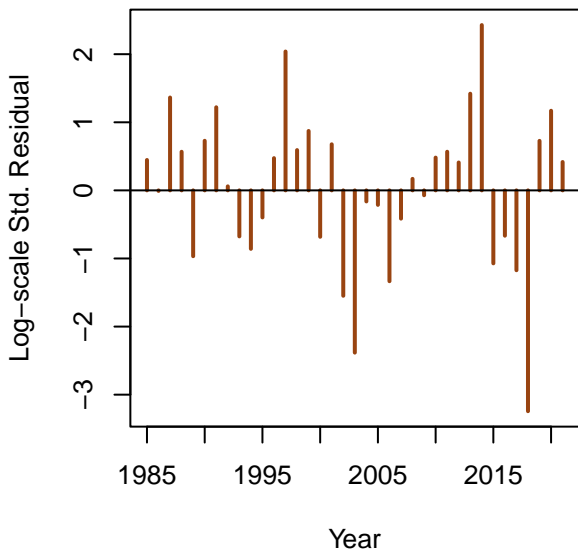
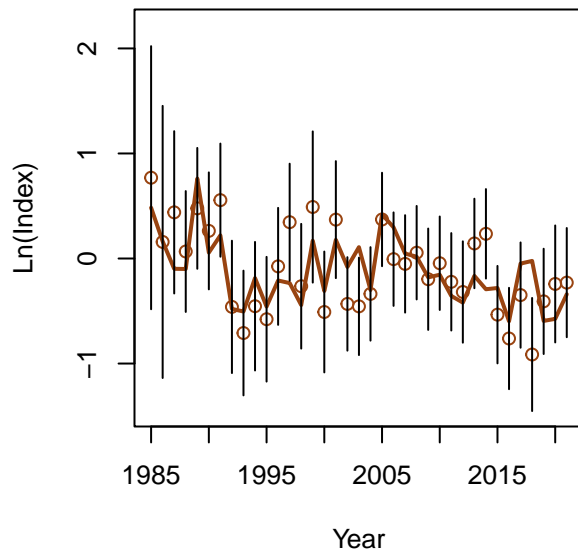
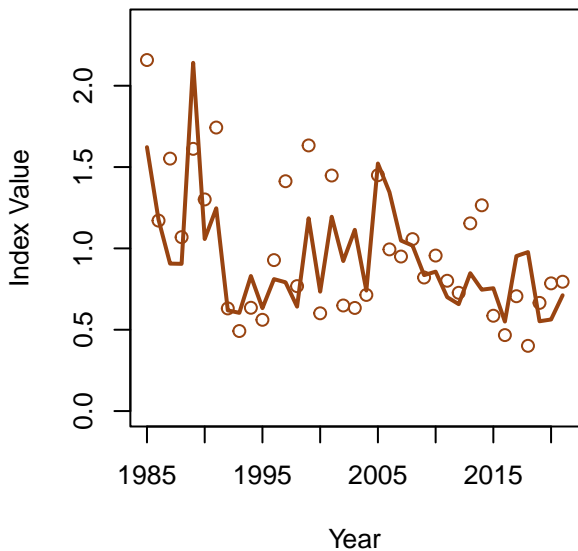
Index 5 (SEAMAP)



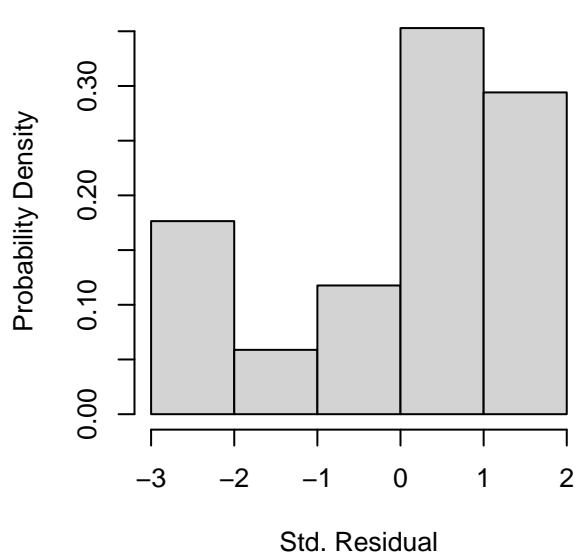
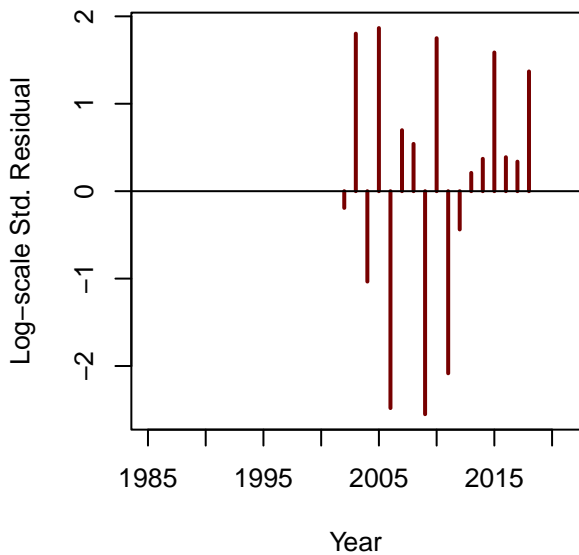
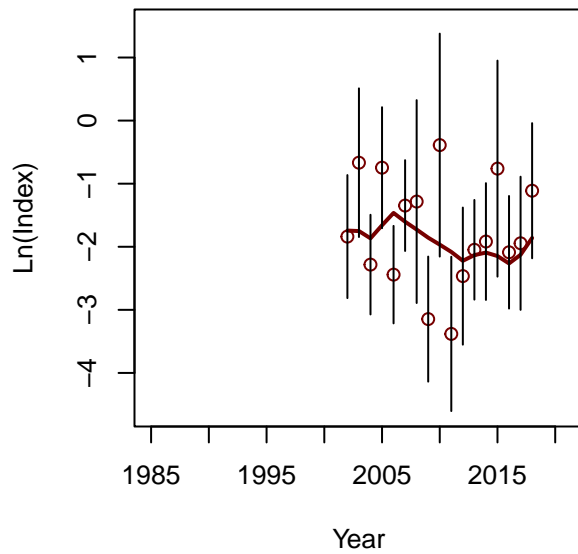
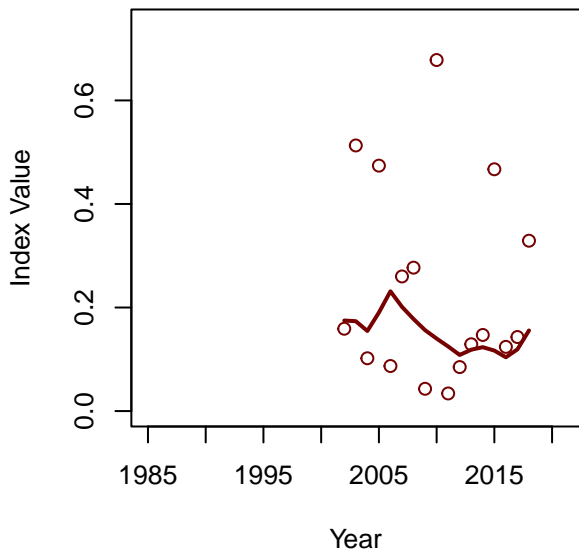
Index 6 (PSIGN)



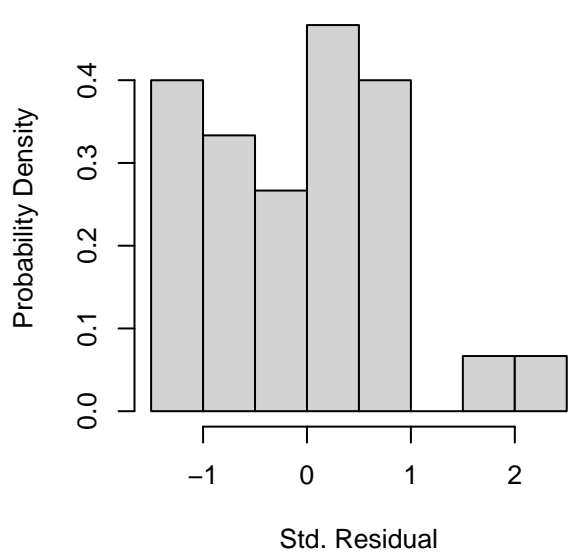
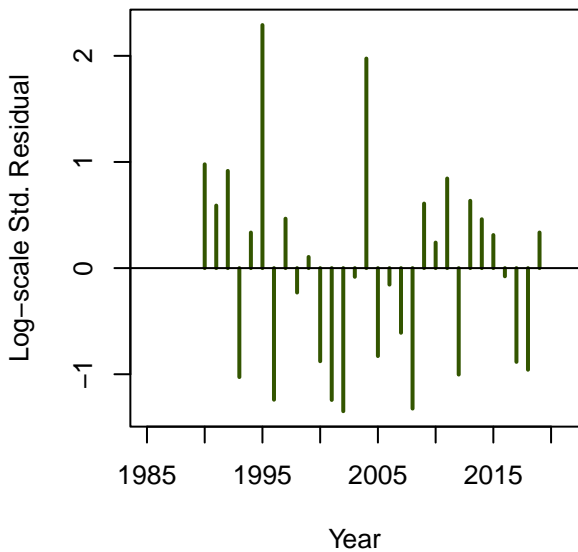
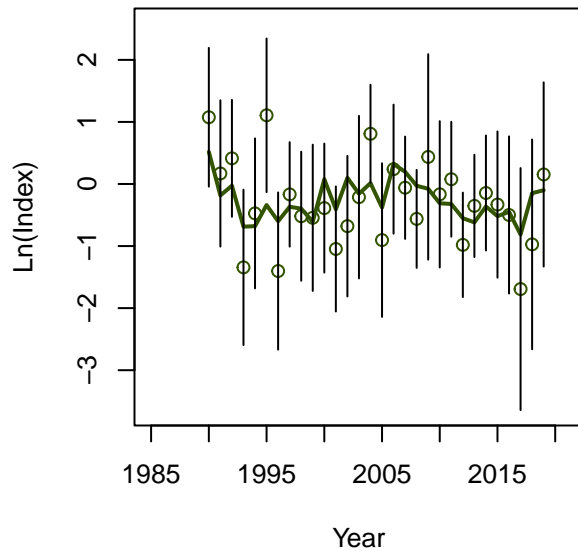
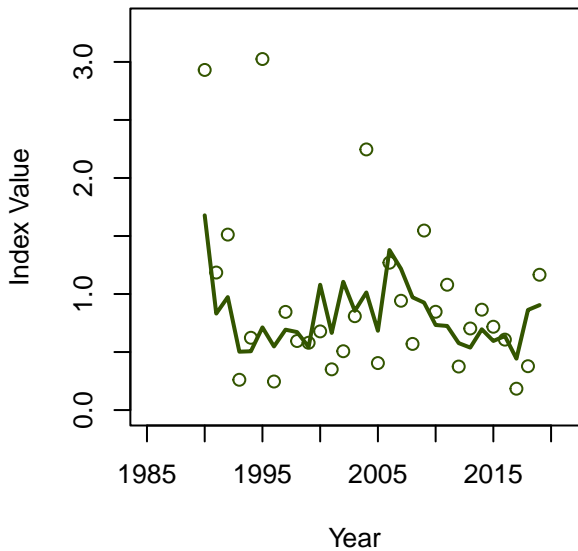
Index 7 (Compound YOY)



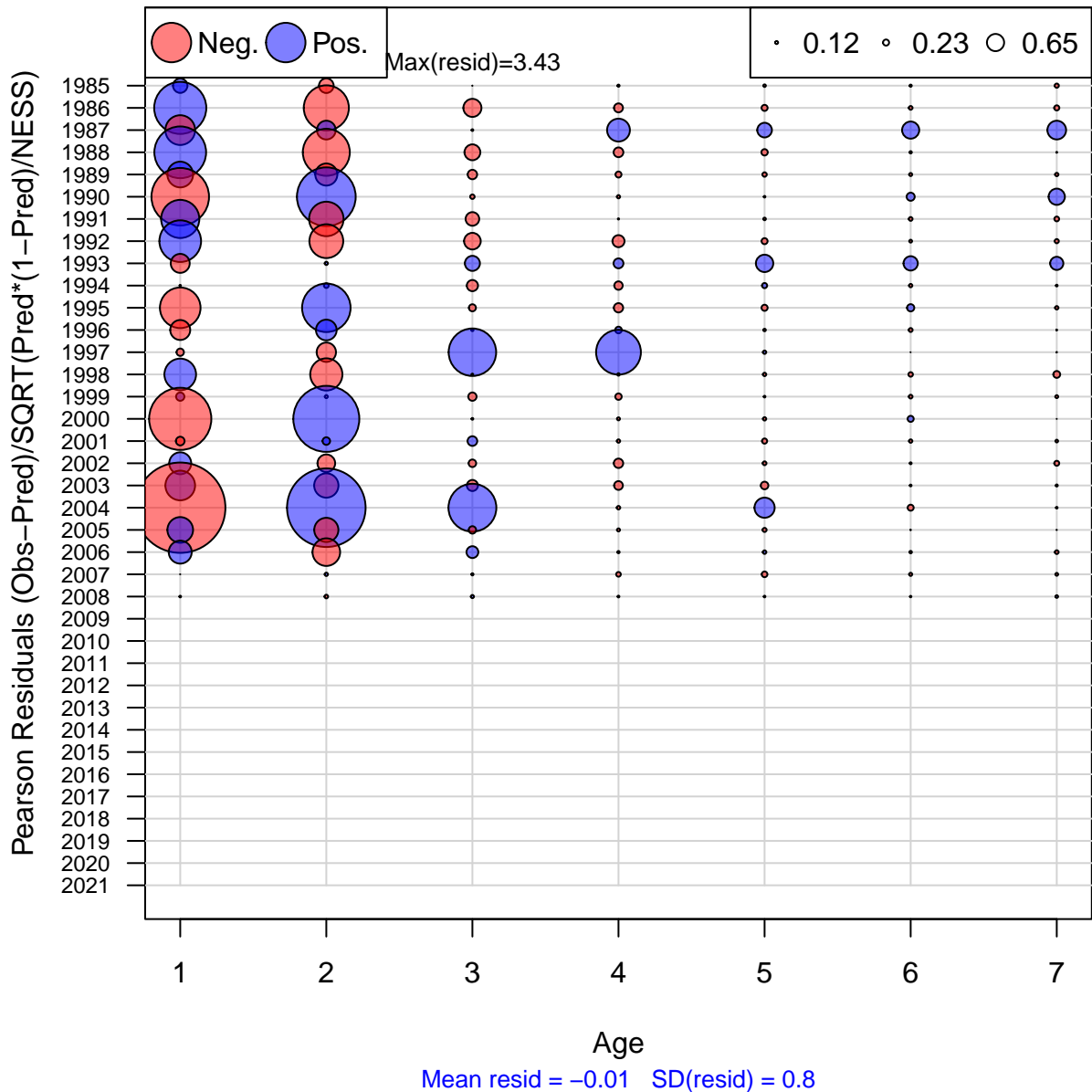
Index 8 (ChesMMAP)



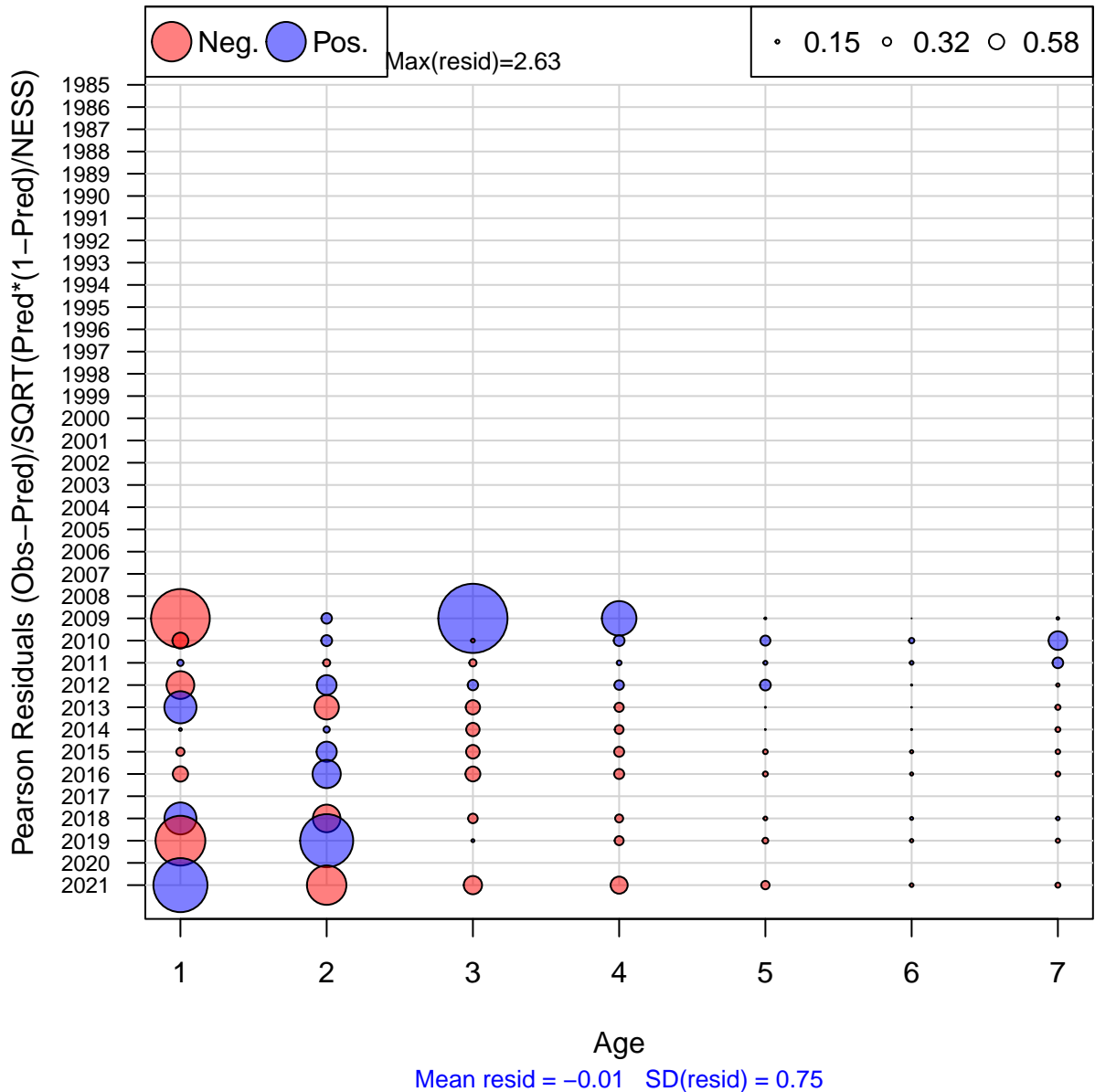
Index 9 (SEAMAP1)



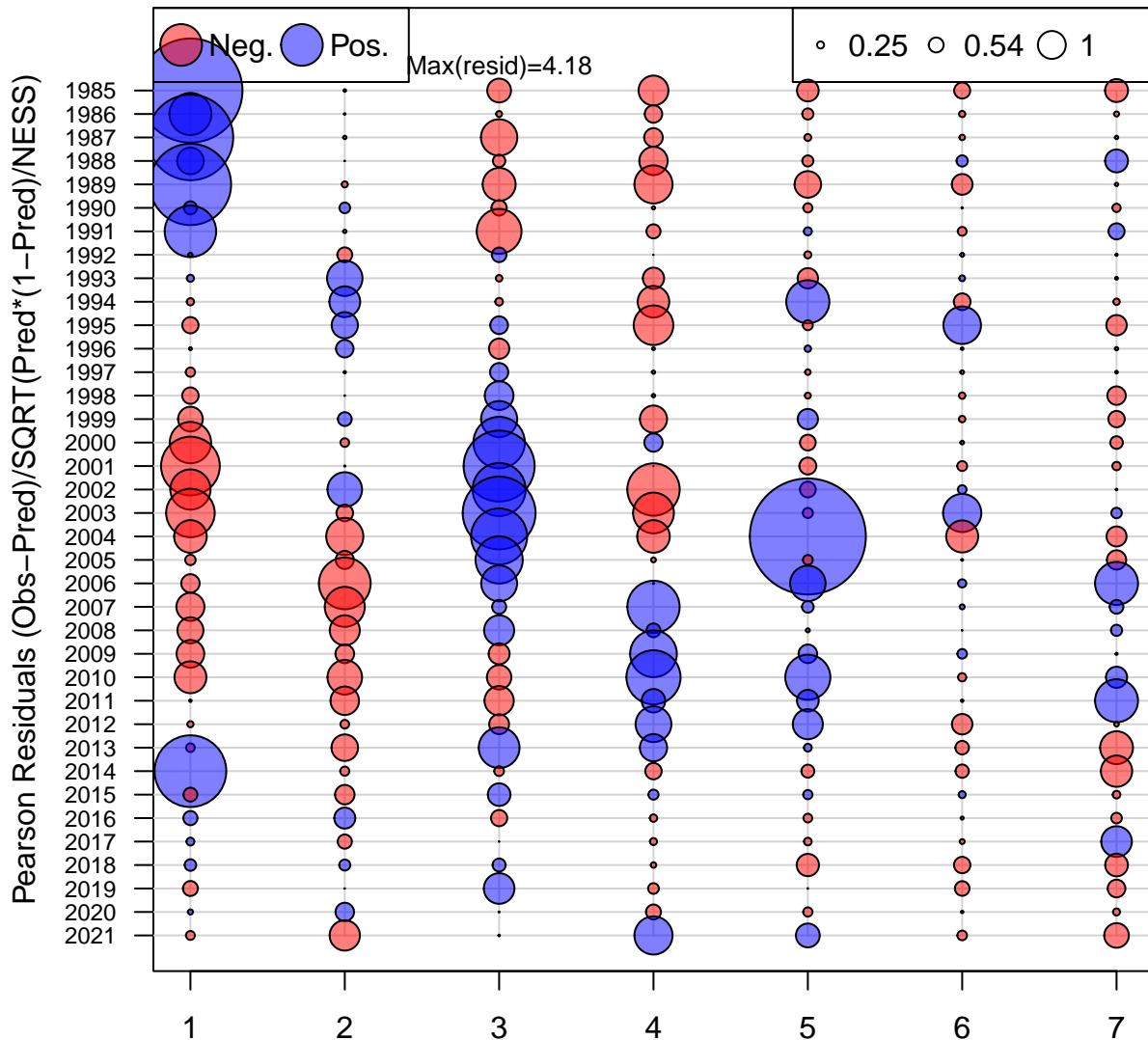
Age Comp Residuals for Index 1 (NEFSC Inshore)



Age Comp Residuals for Index 2 (Bigelow)

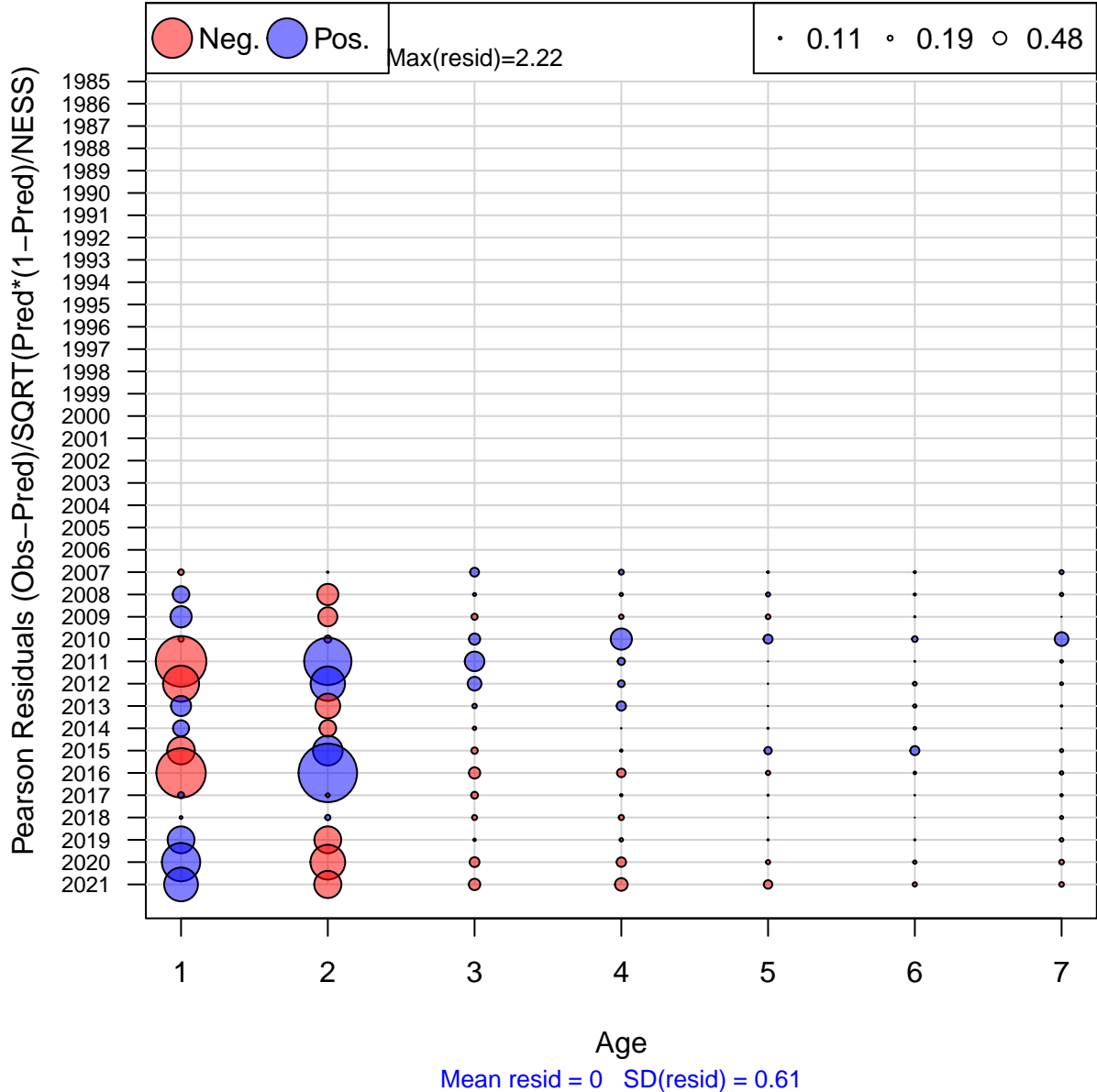


Age Comp Residuals for Index 3 (MRIP)

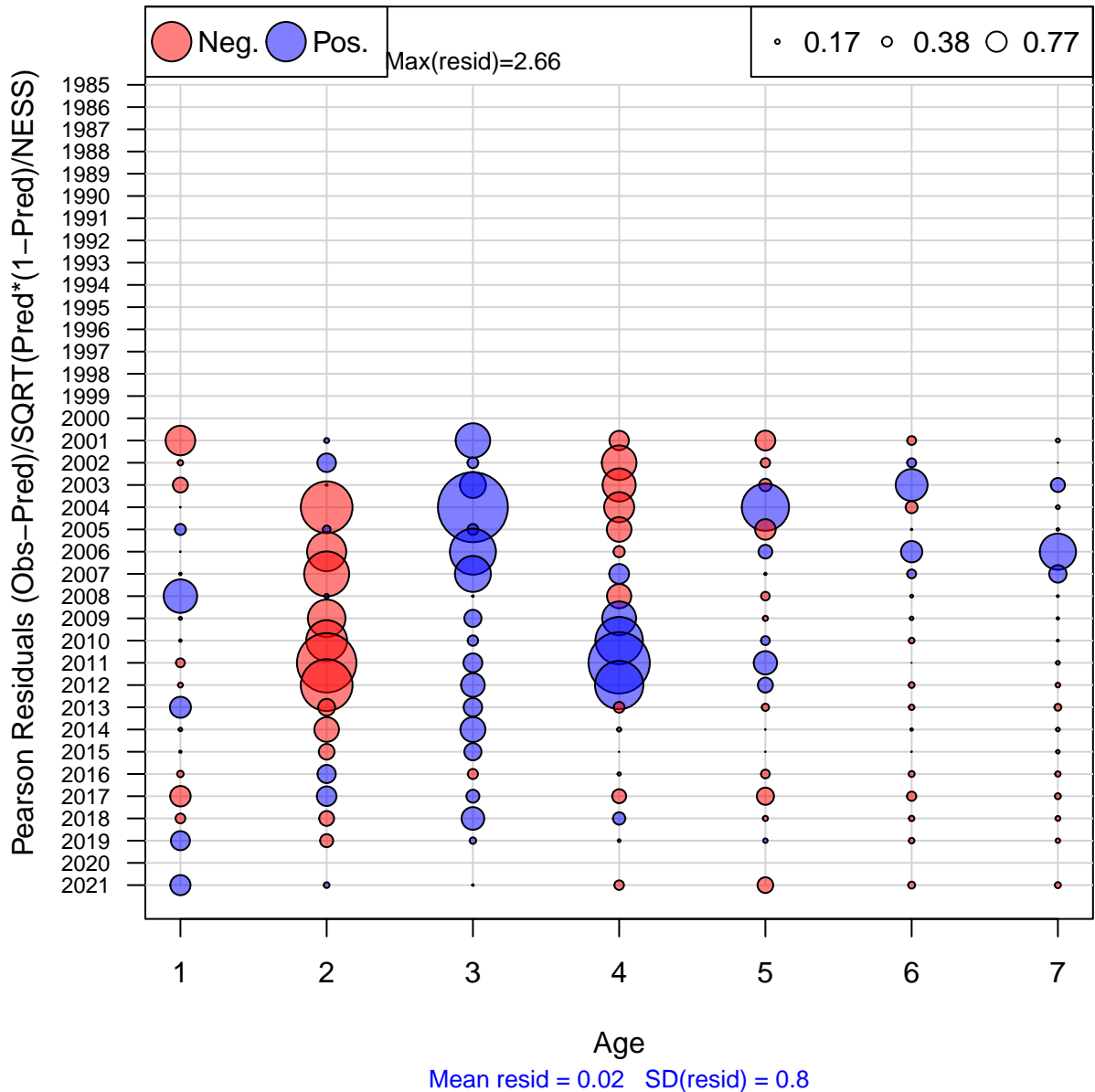


Mean resid = -0.01 SD(resid) = 0.95

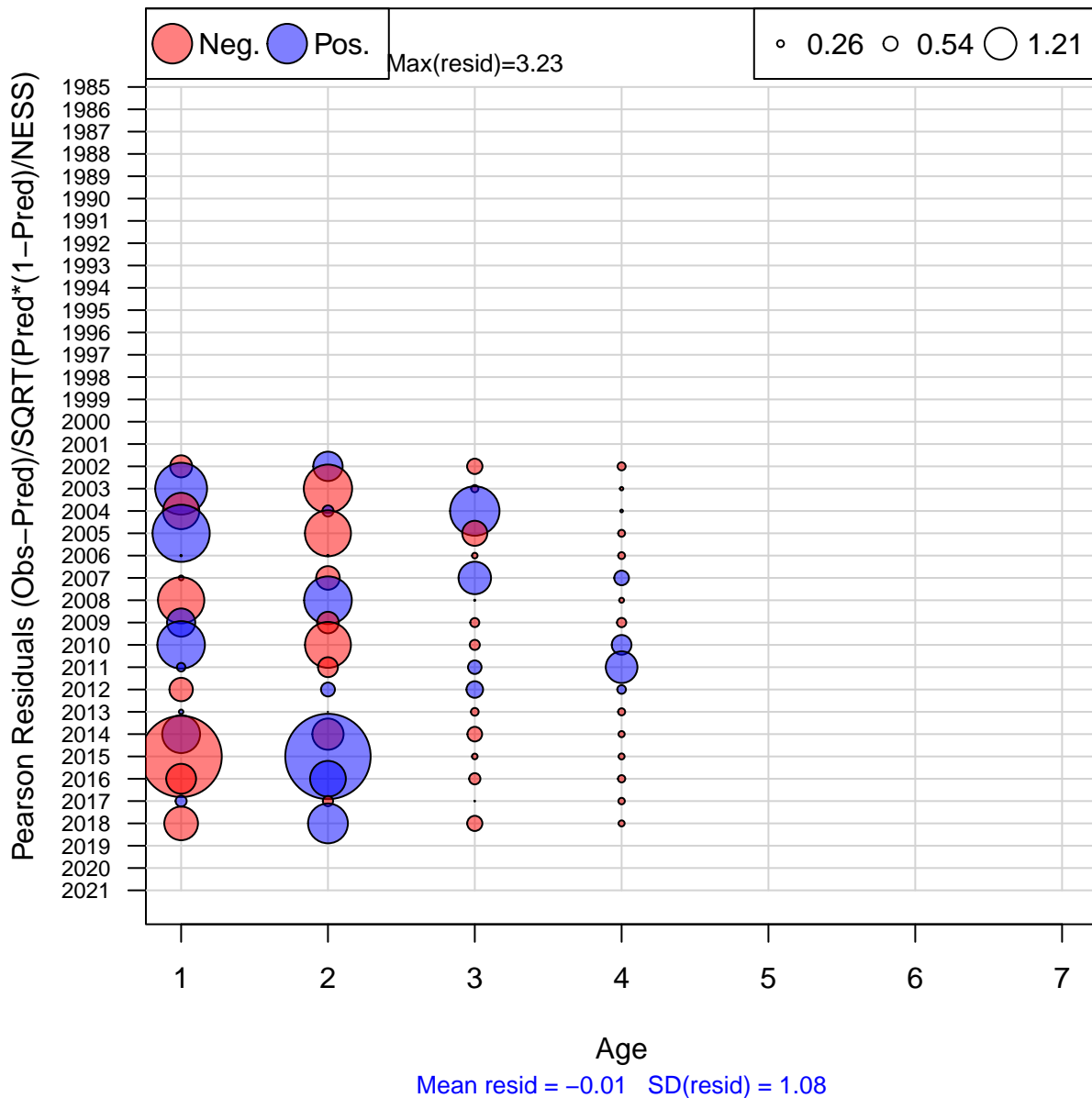
Age Comp Residuals for Index 4 (NEAMAP)



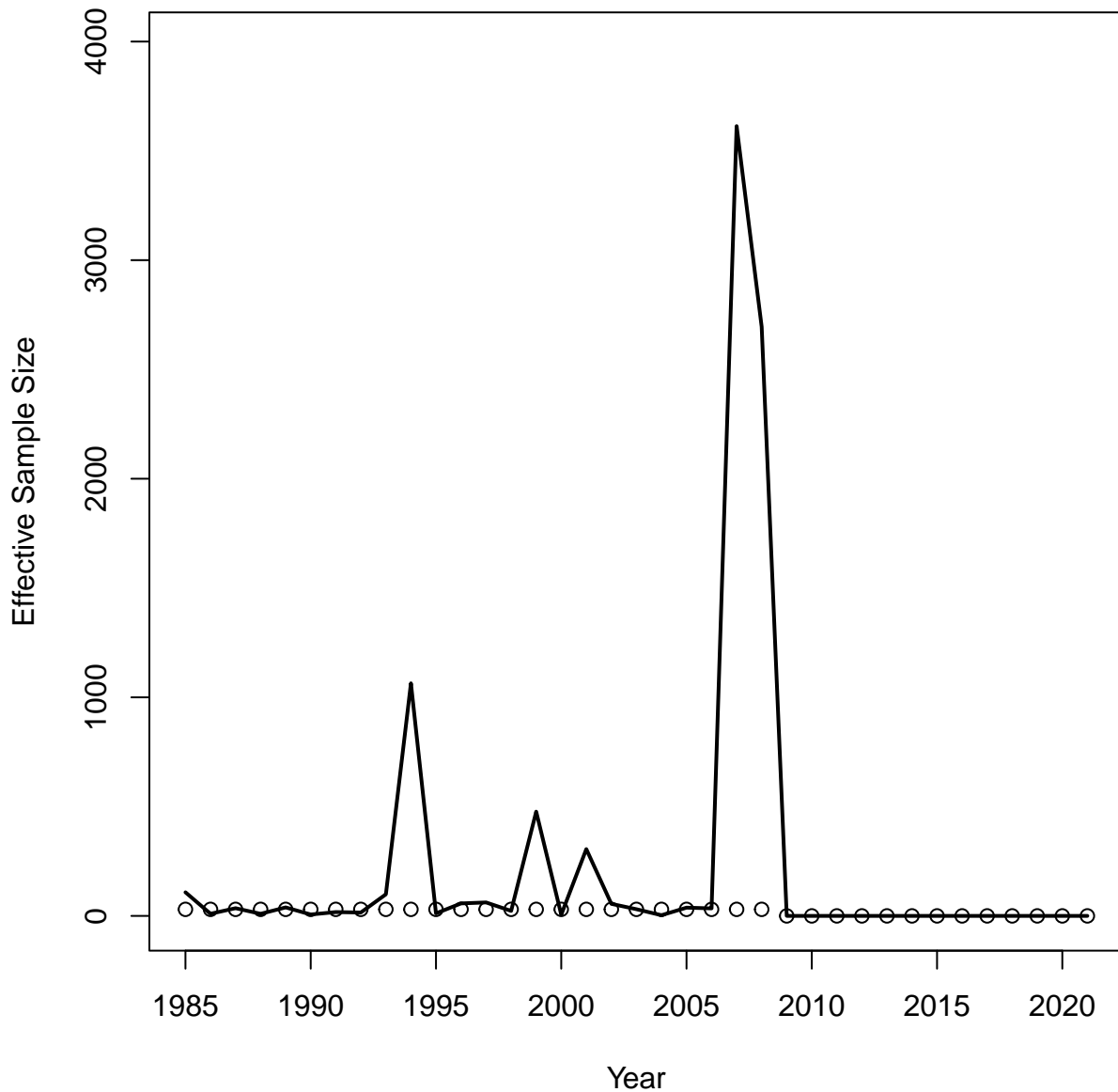
Age Comp Residuals for Index 6 (PSIGN)



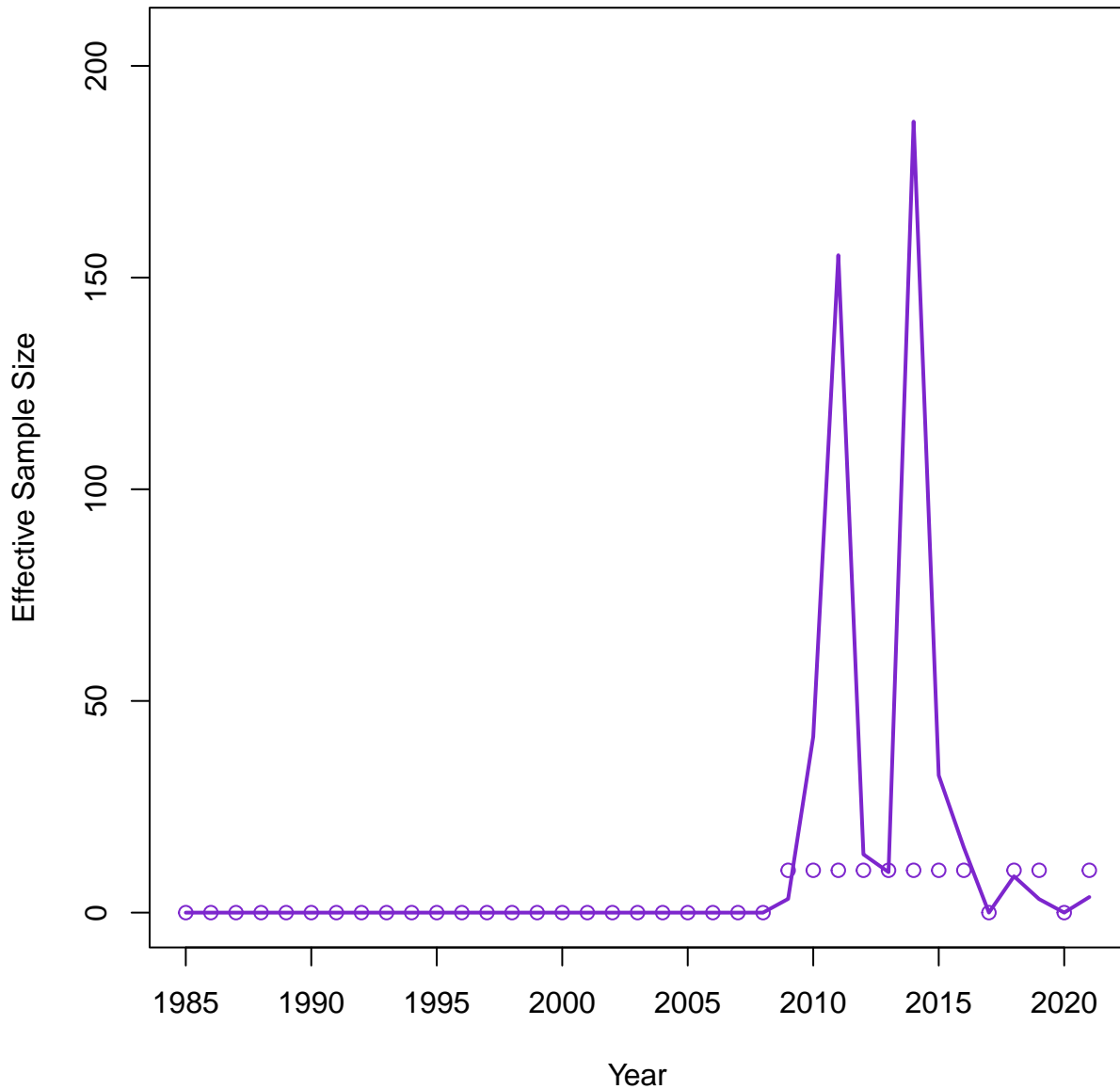
Age Comp Residuals for Index 8 (ChesMMAp)



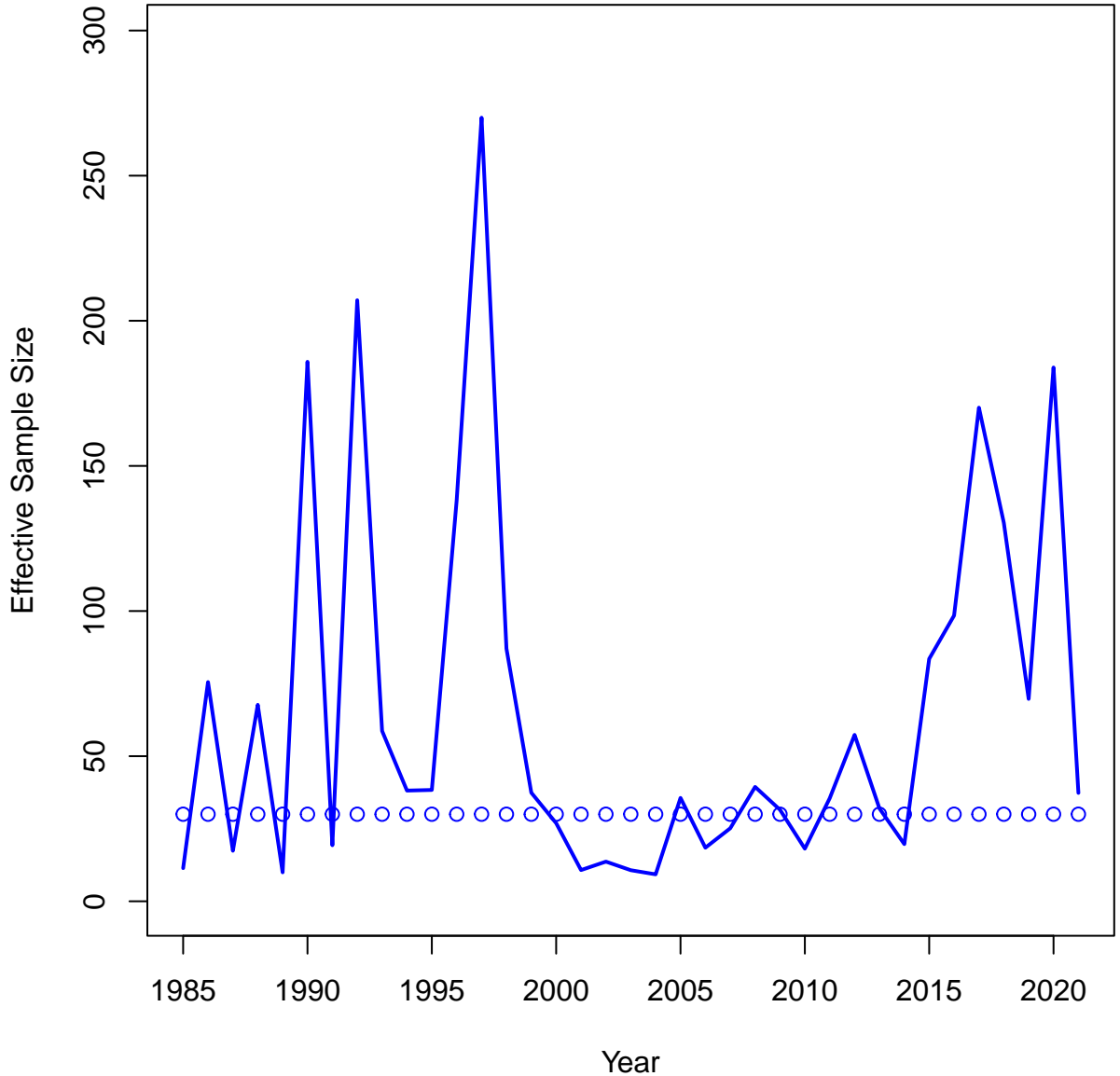
Index Neff 1 (NEFSC Inshore)



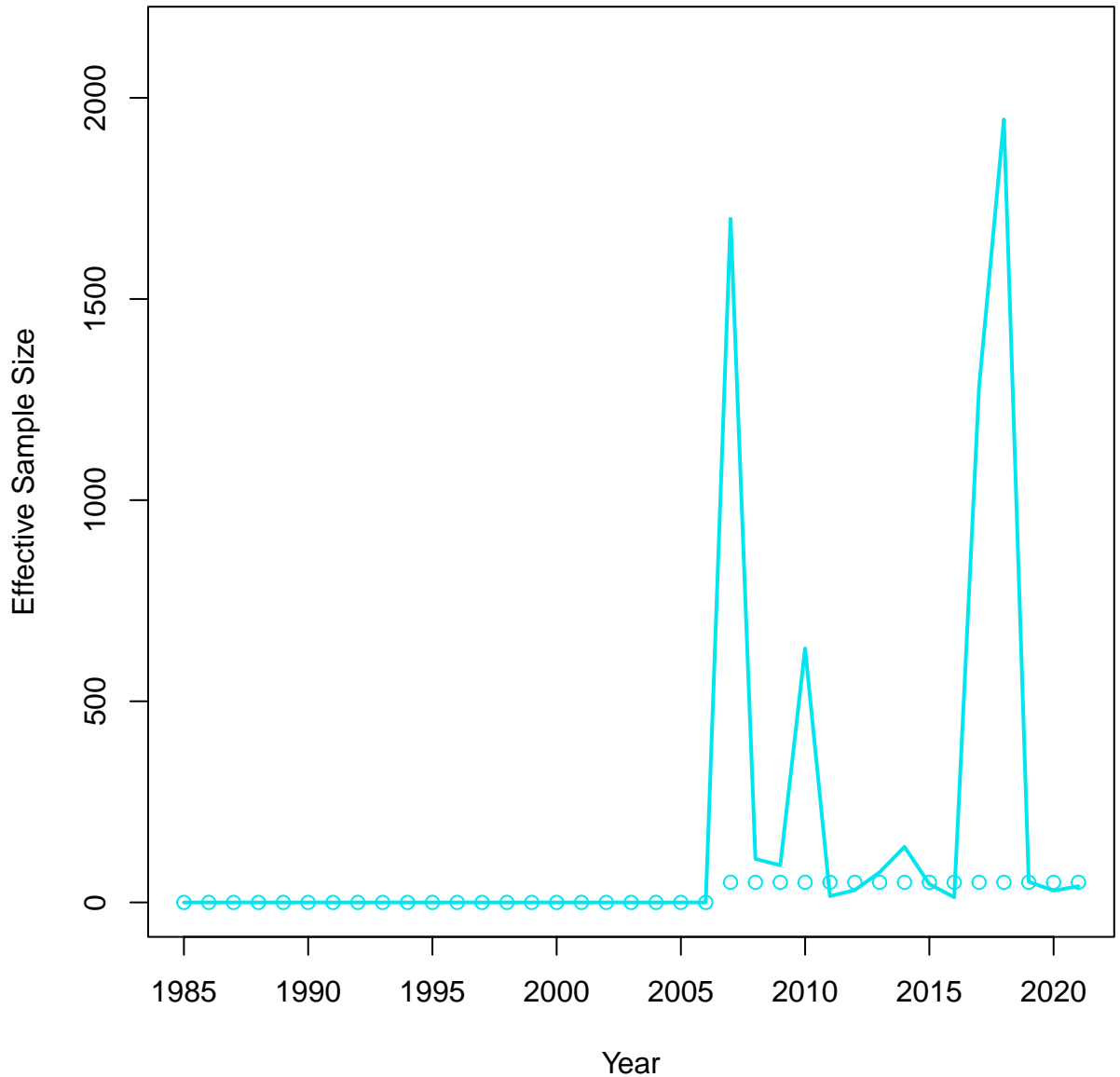
Index Neff 2 (Bigelow)



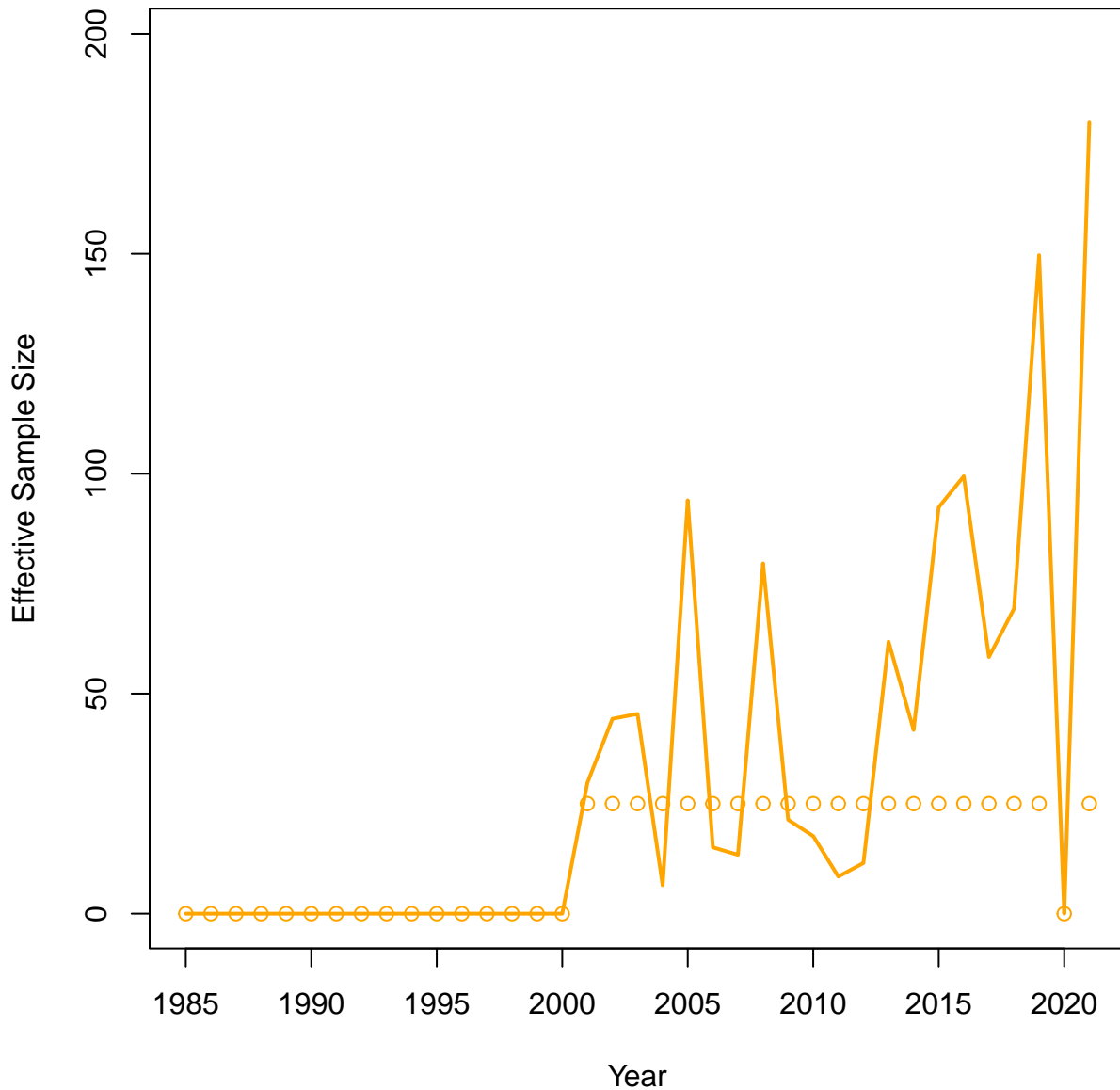
Index Neff 3 (MRIP)



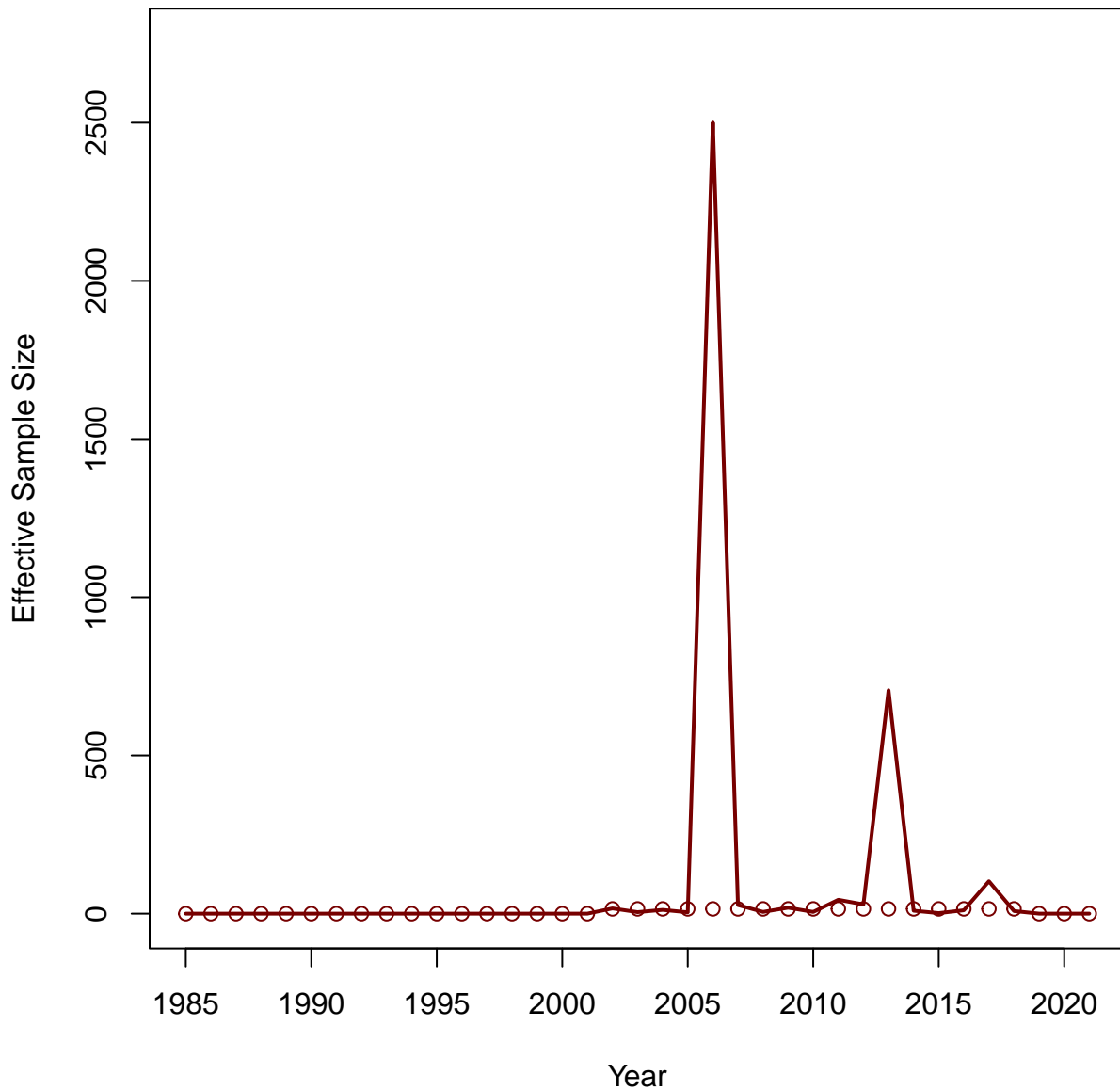
Index Neff 4 (NEAMAP)



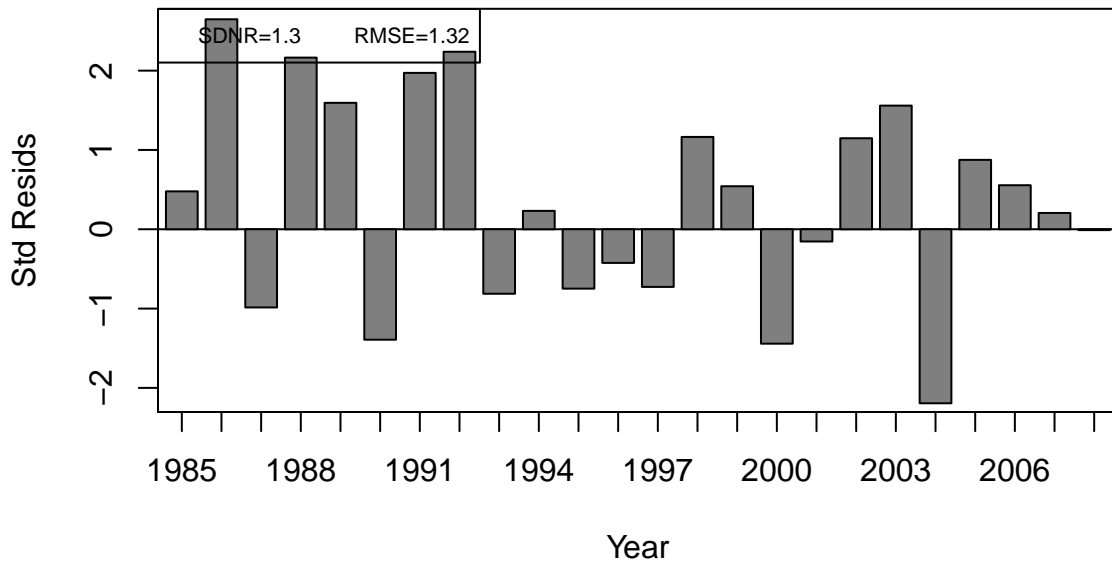
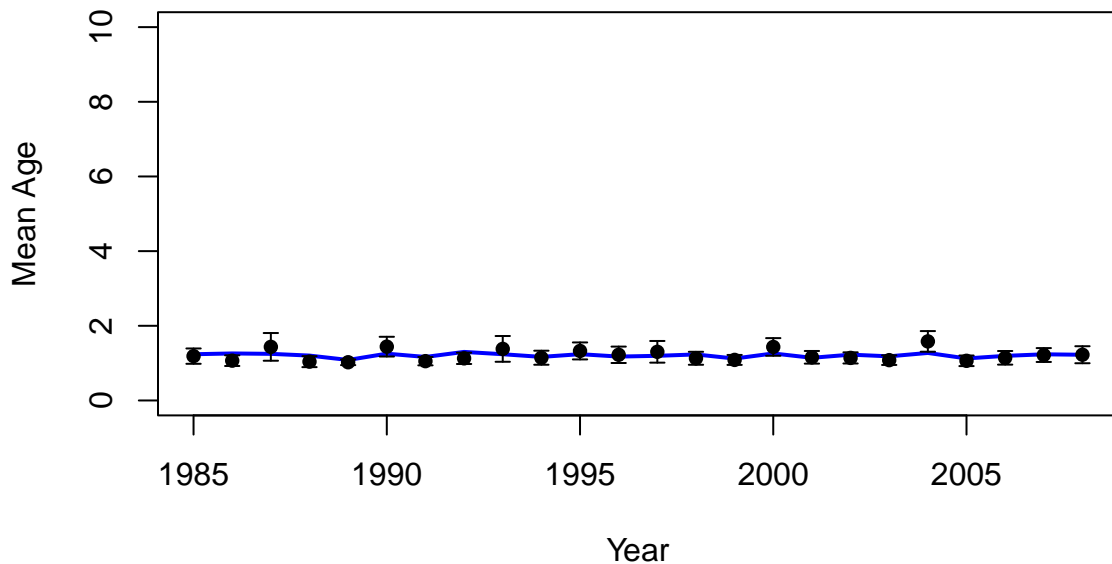
Index Neff 6 (PSIGN)



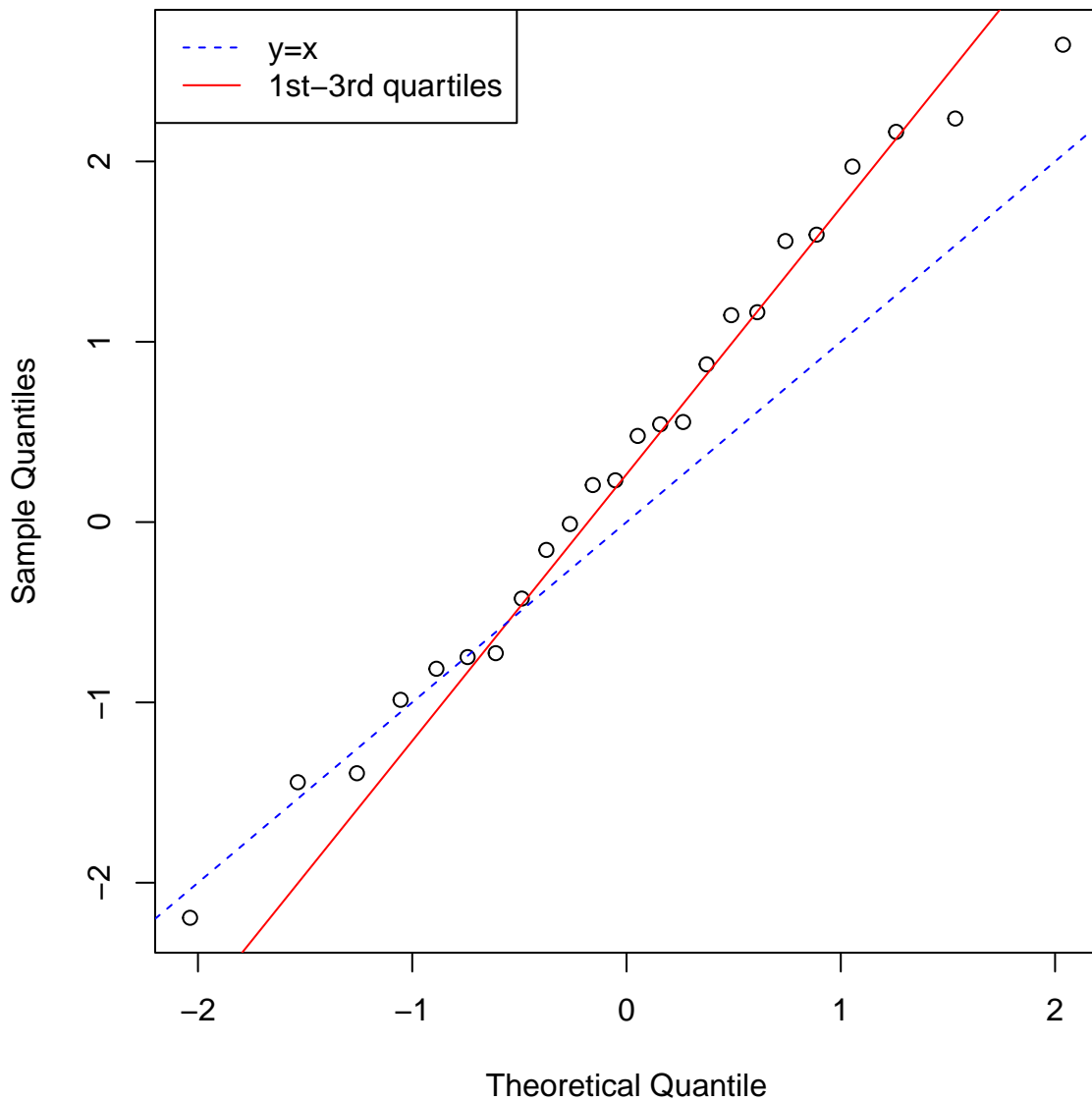
Index Neff 8 (ChesMMAp)



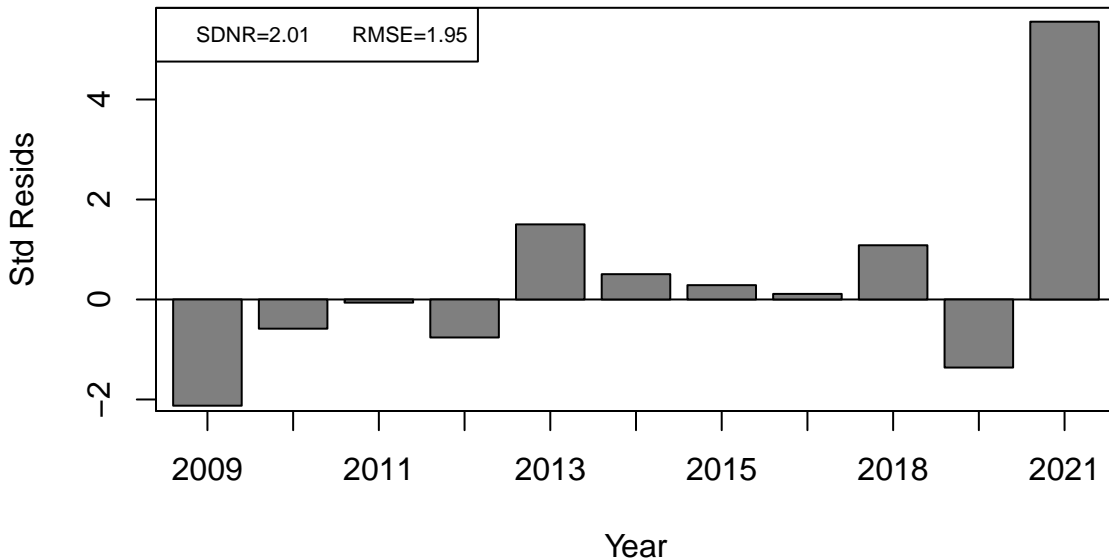
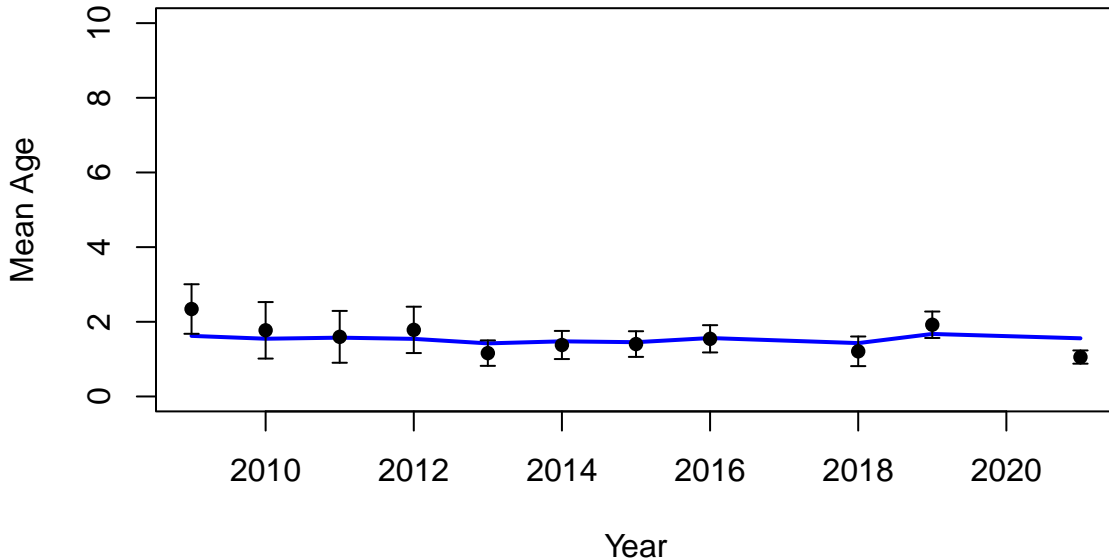
Index 1 (NEFSC Inshore) ESS = 30



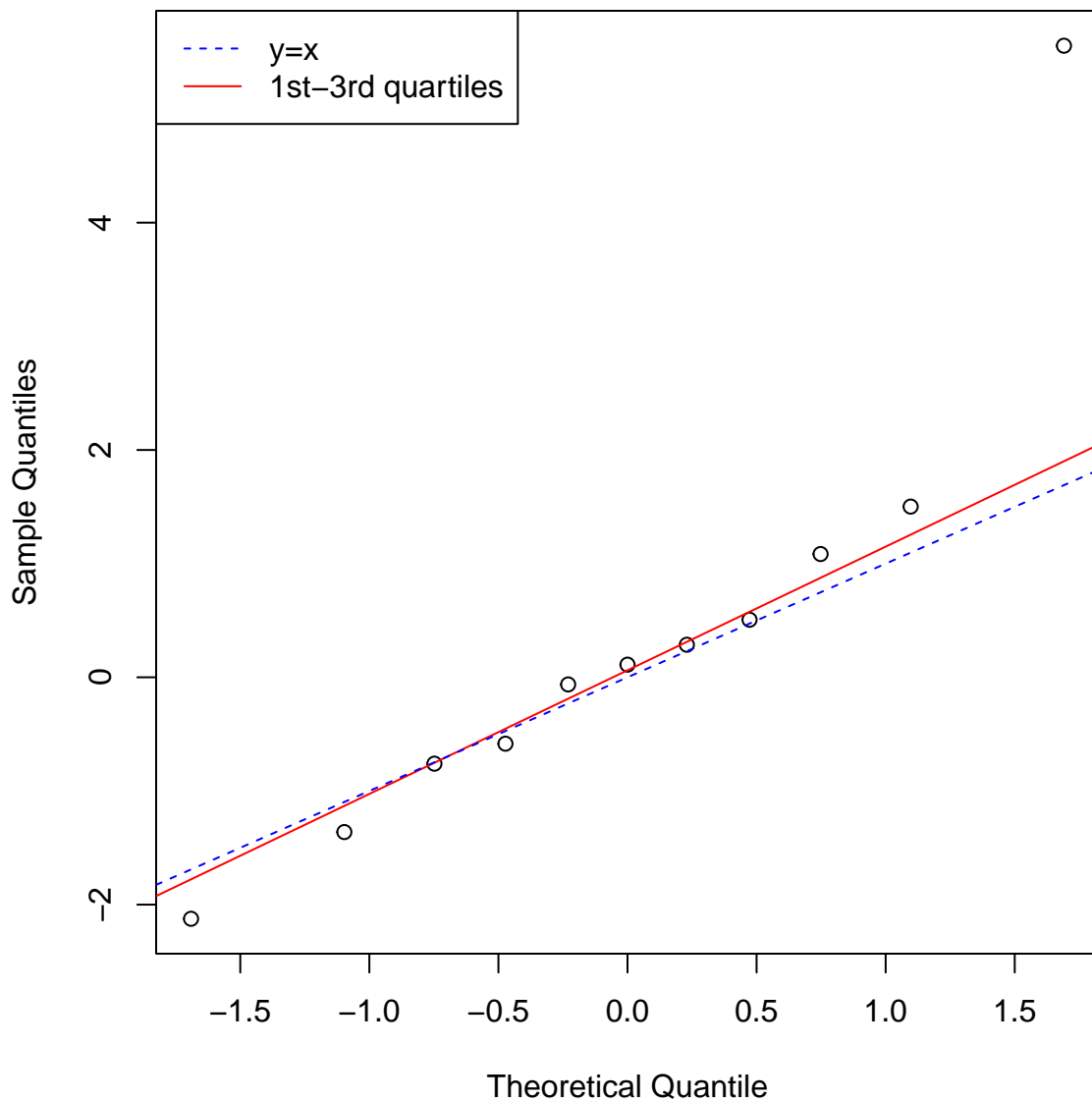
Index 1 (NEFSC Inshore) ESS = 30



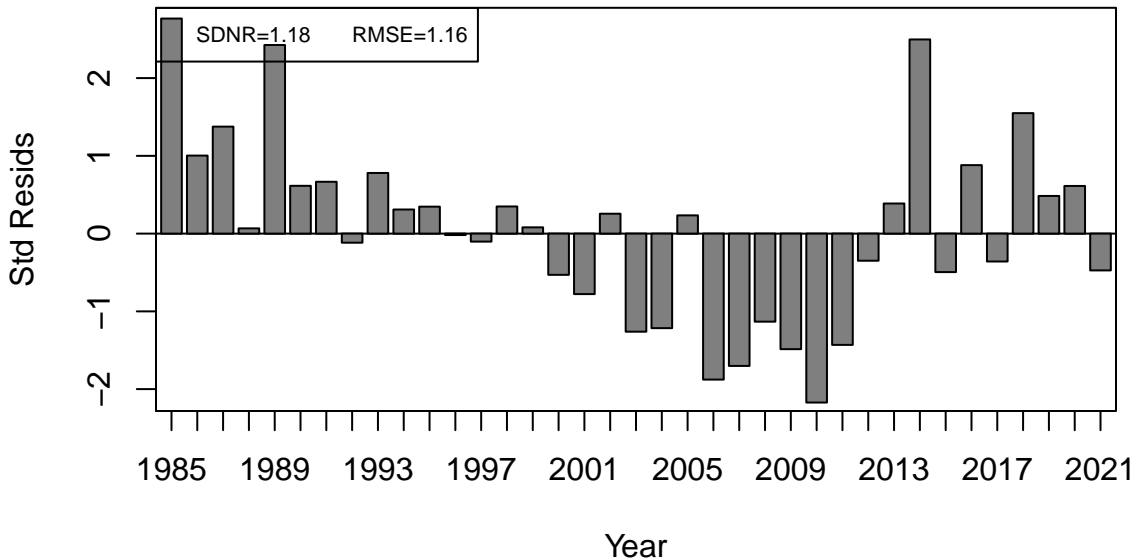
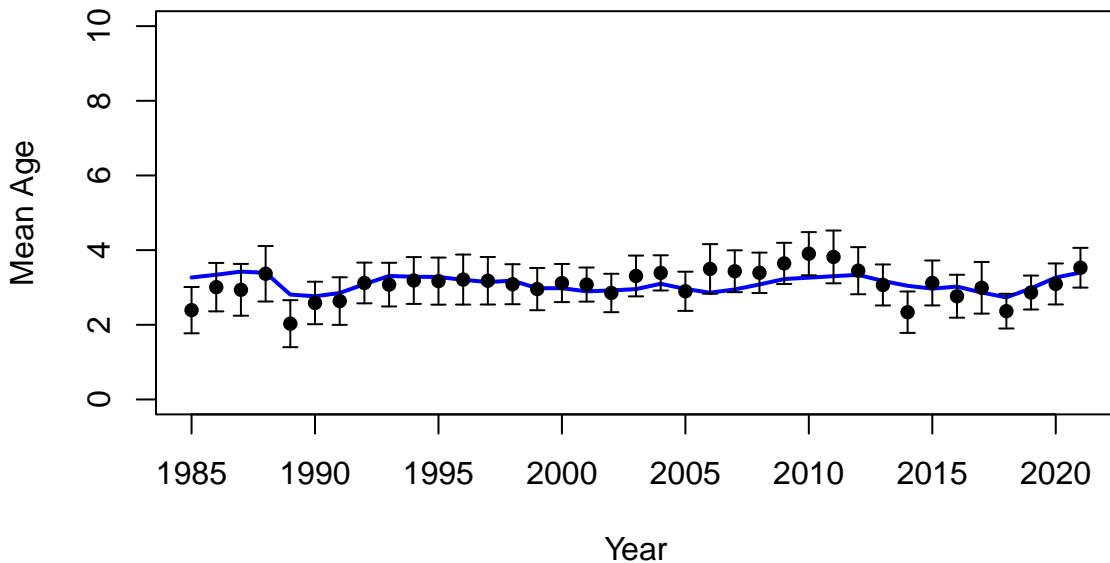
Index 2 (Bigelow) ESS = 10



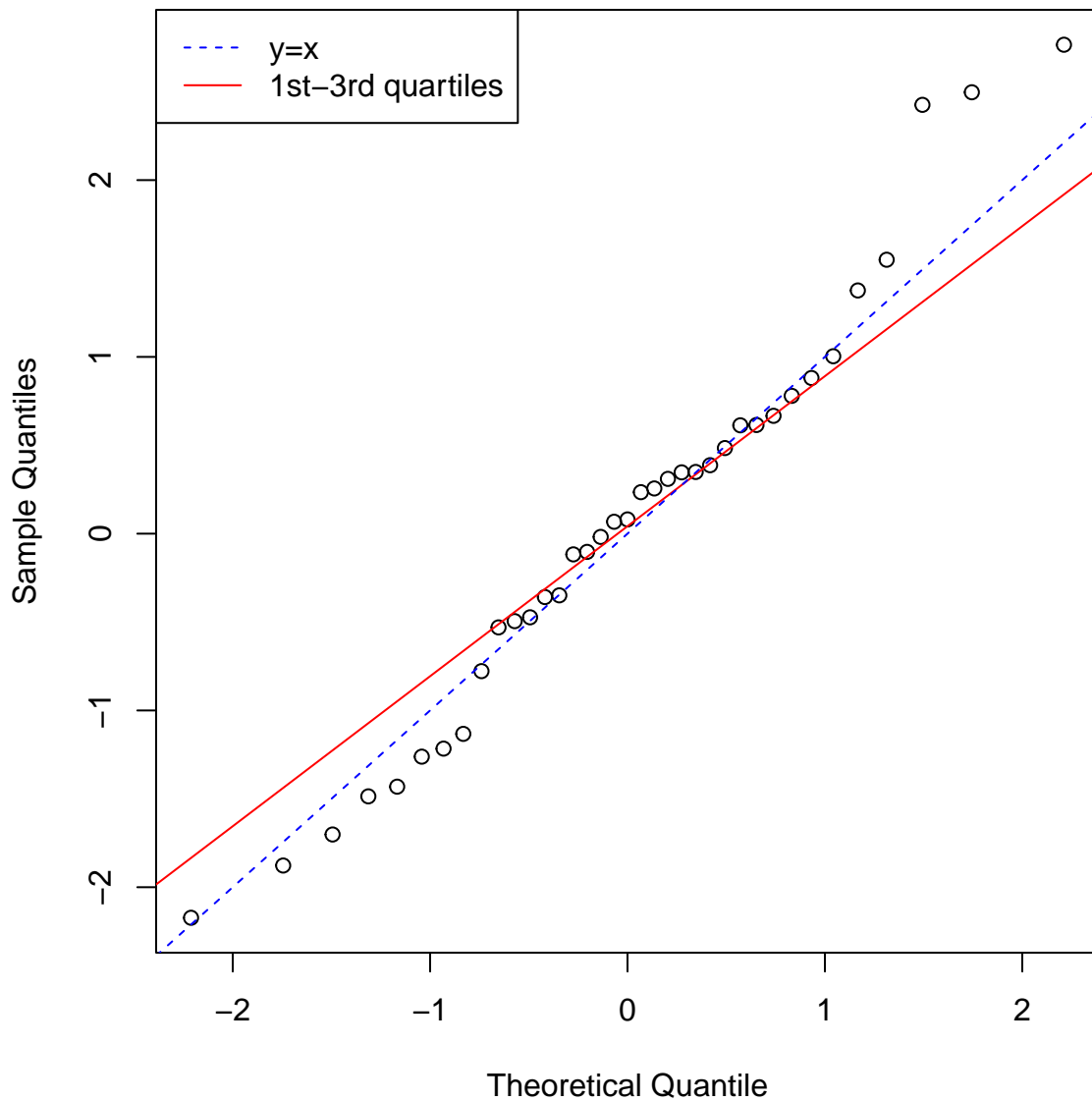
Index 2 (Bigelow) ESS = 10



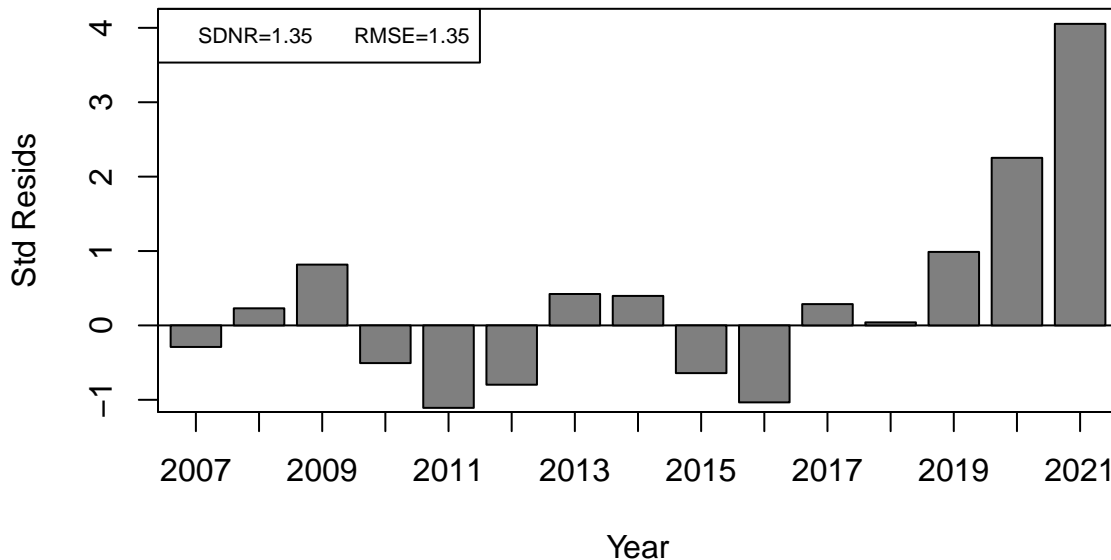
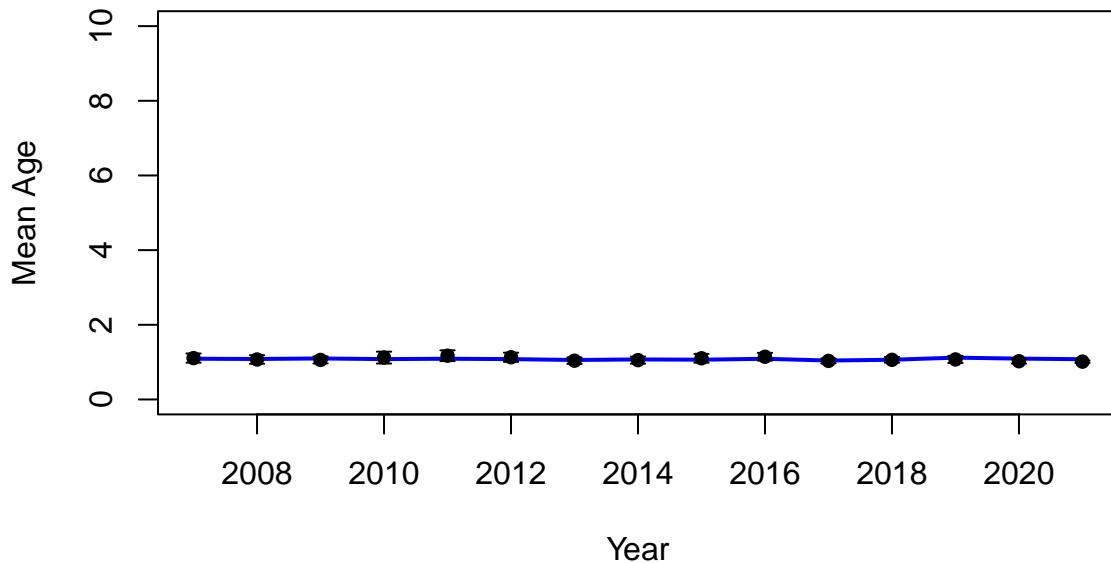
Index 3 (MRIP) ESS = 30



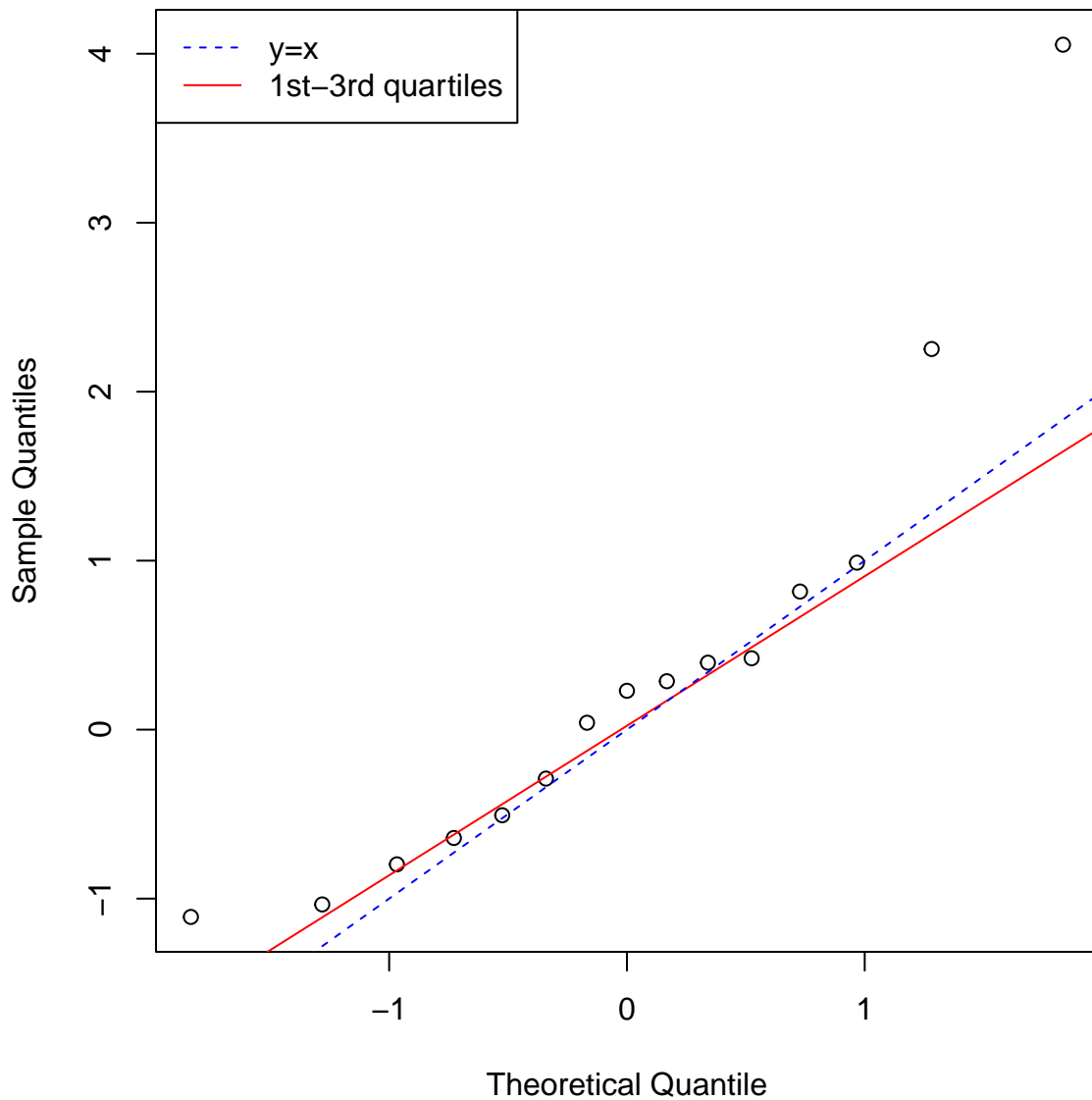
Index 3 (MRIP) ESS = 30



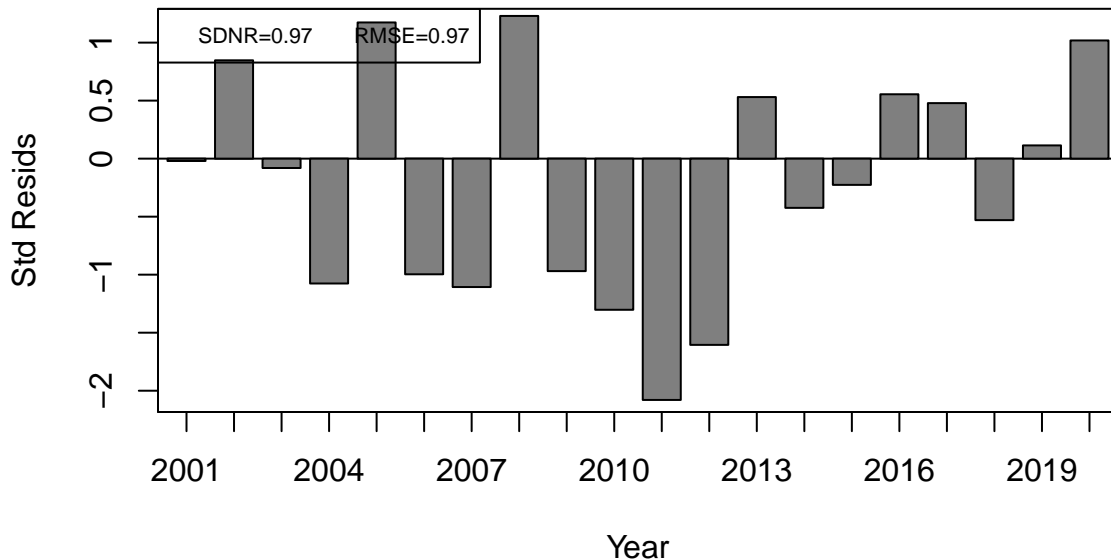
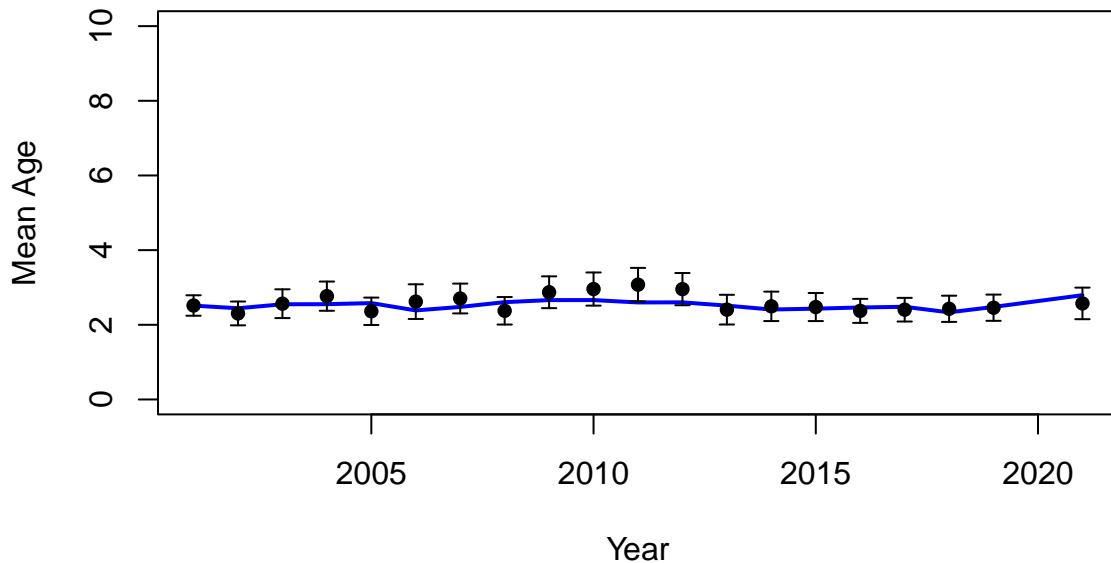
Index 4 (NEAMAP) ESS = 50



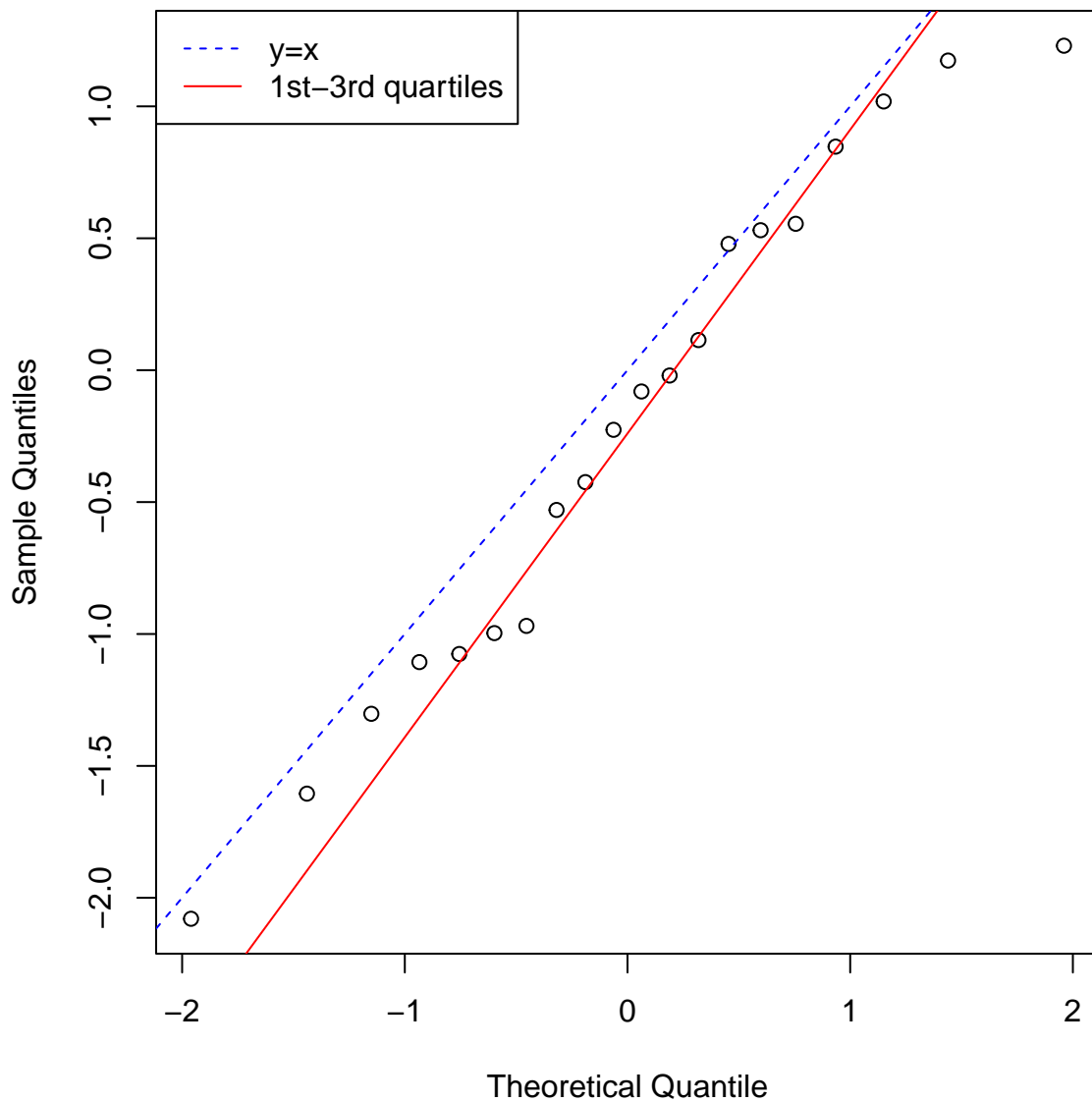
Index 4 (NEAMAP) ESS = 50



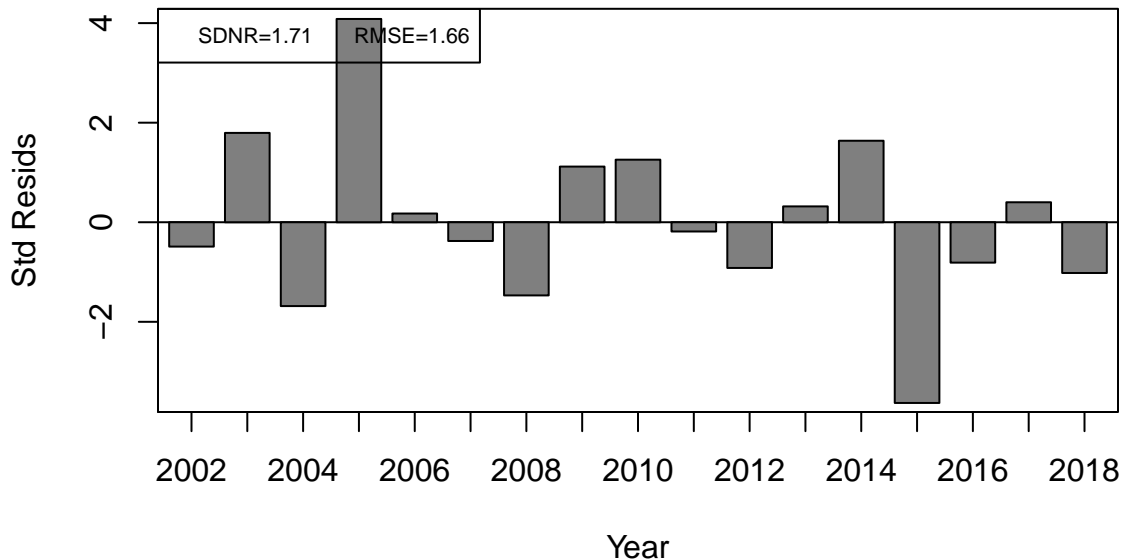
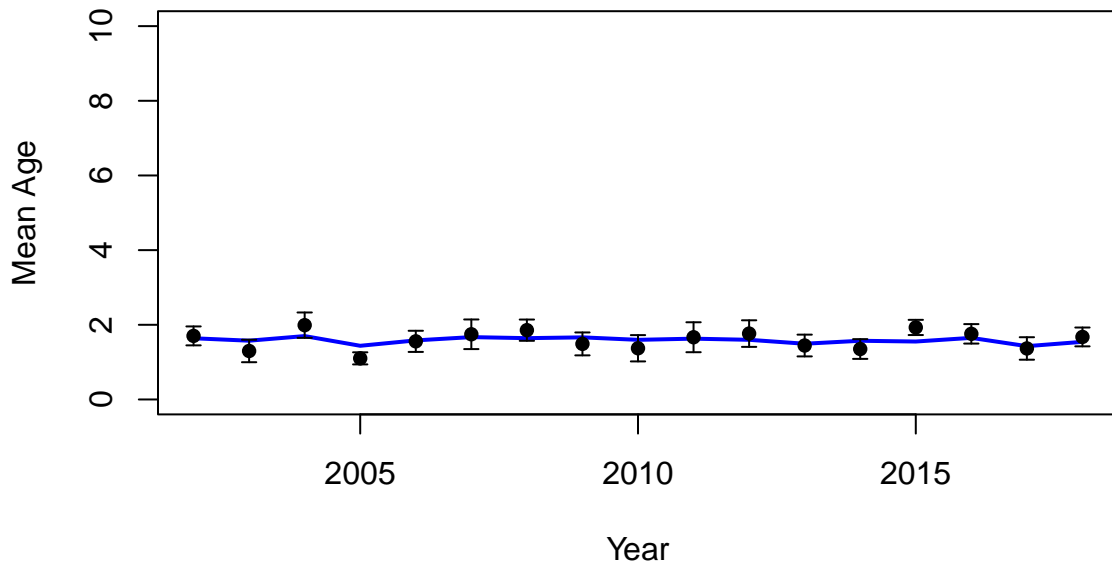
Index 6 (PSIGN) ESS = 25



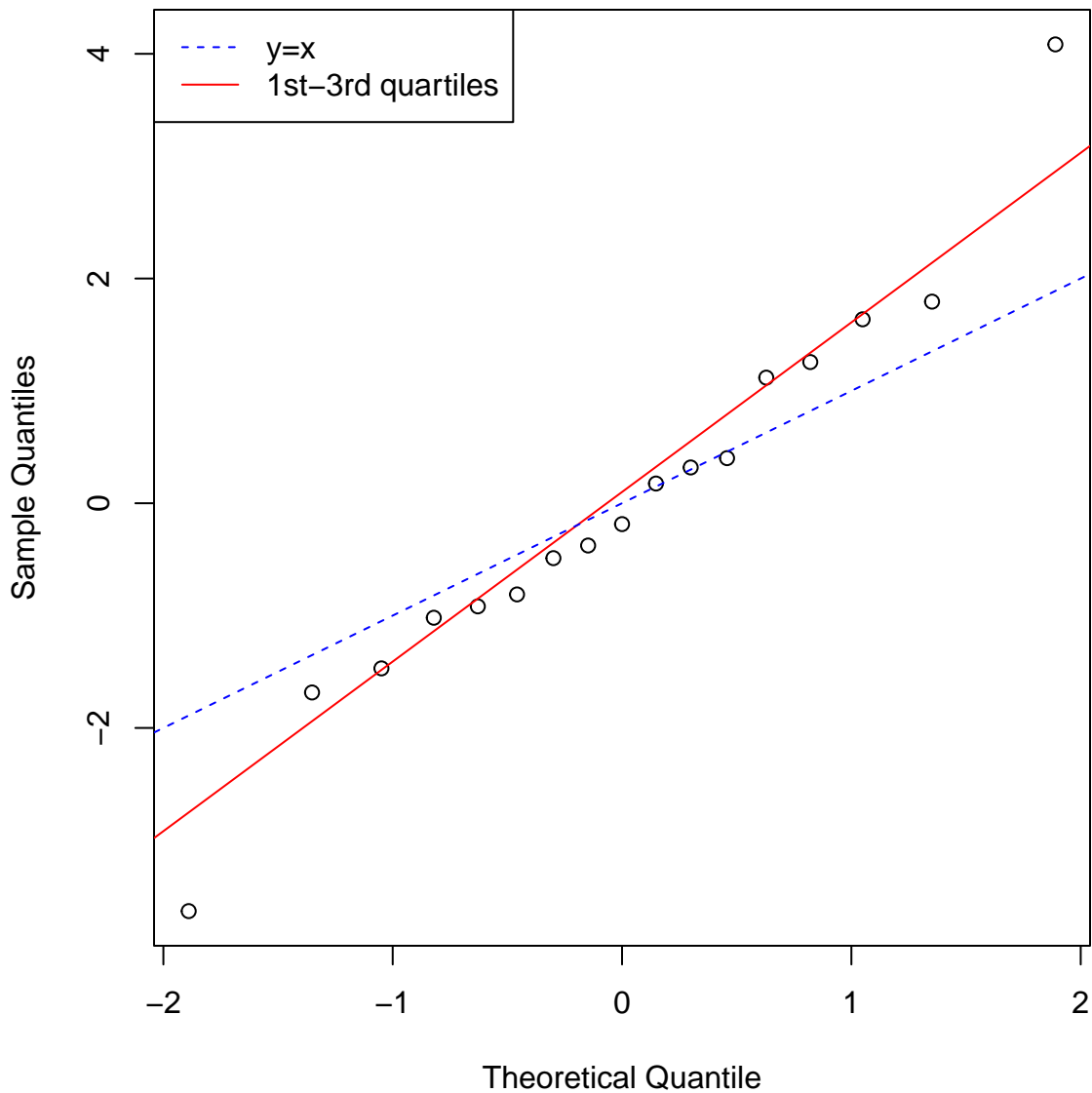
Index 6 (PSIGN) ESS = 25



Index 8 (ChesMMAPE) ESS = 15



Index 8 (ChesMMAp) ESS = 15

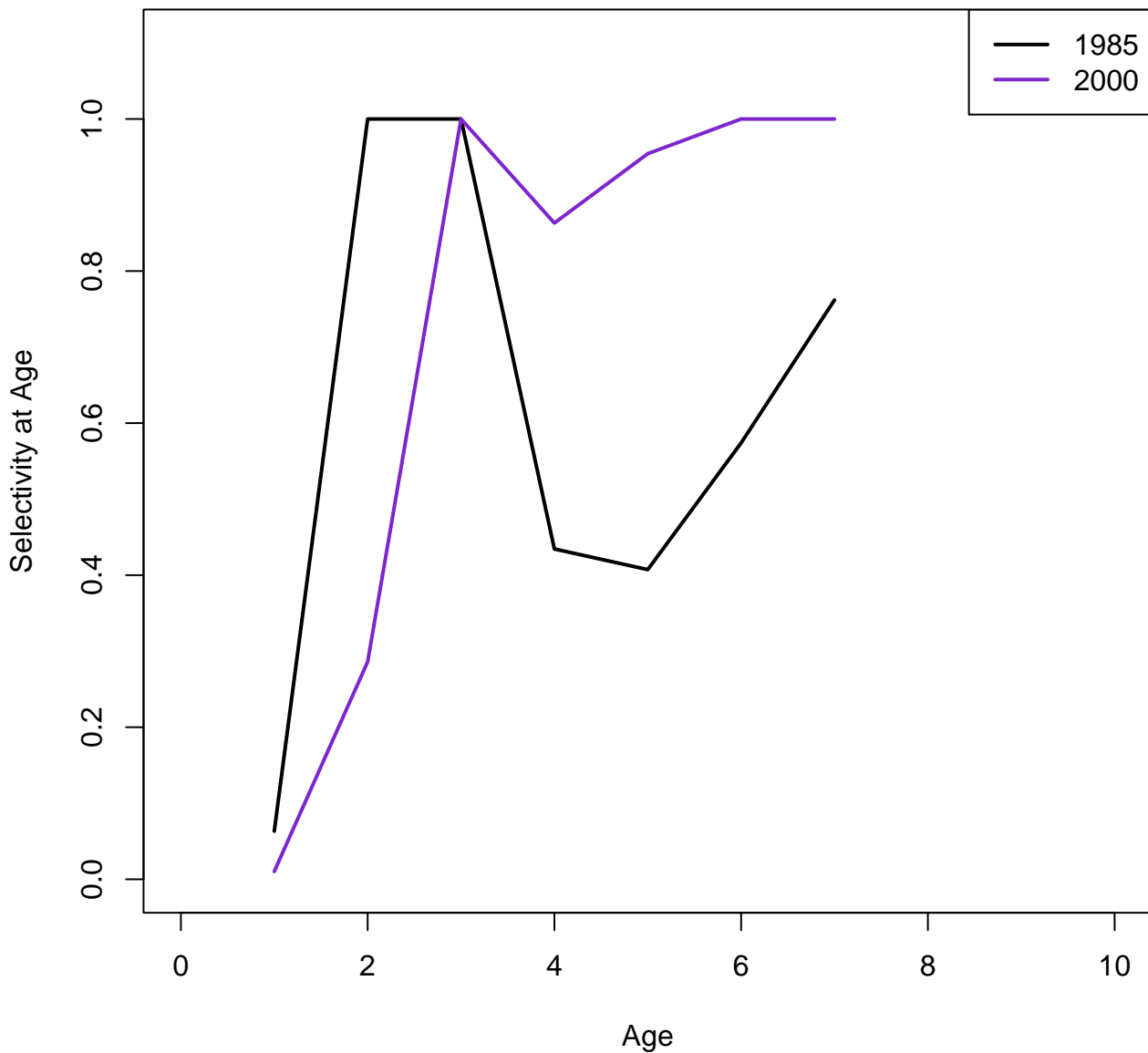


BF24

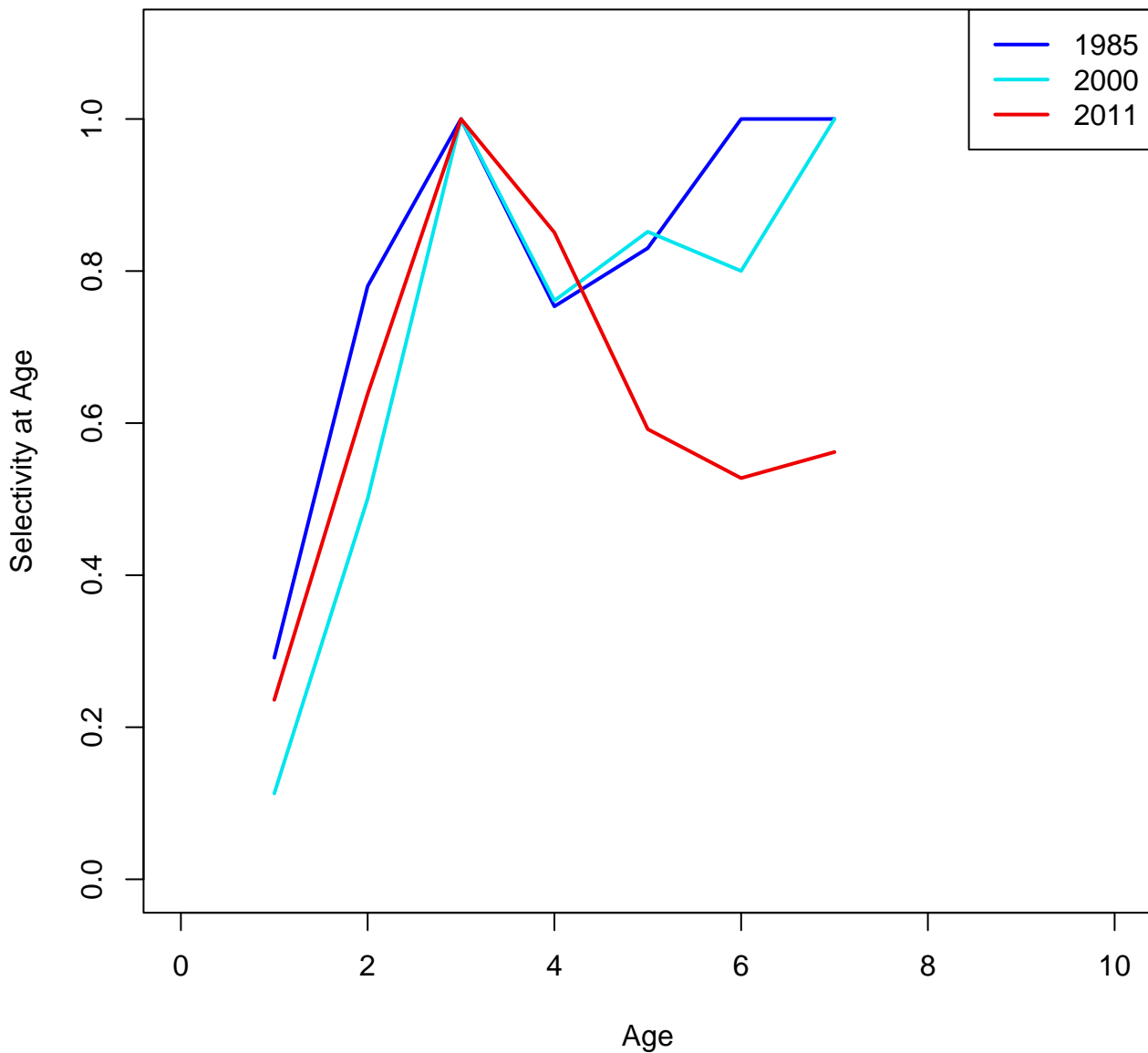
Final ASAP model

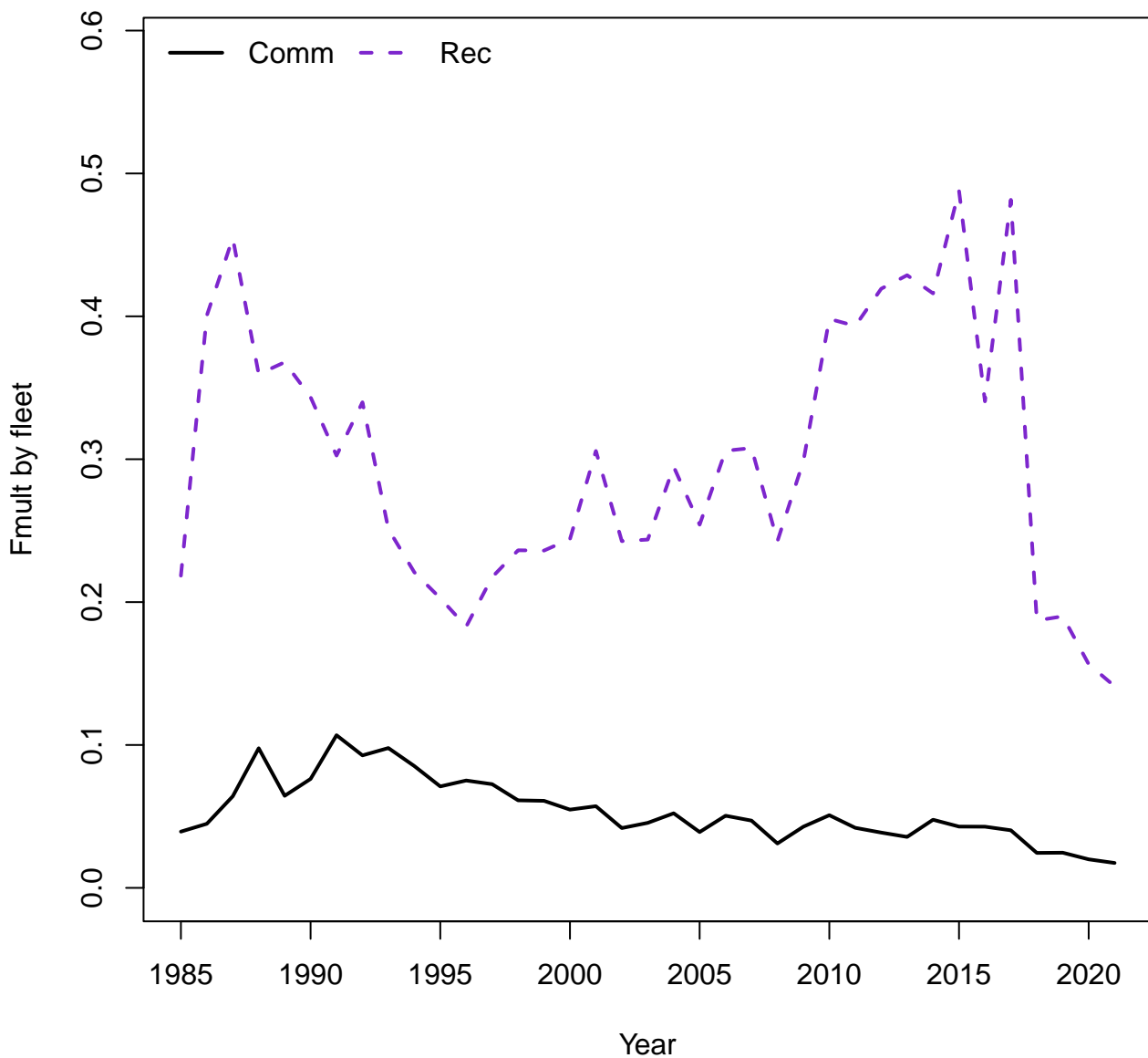
RESULTS PLOTS

Fleet 1 (Comm)

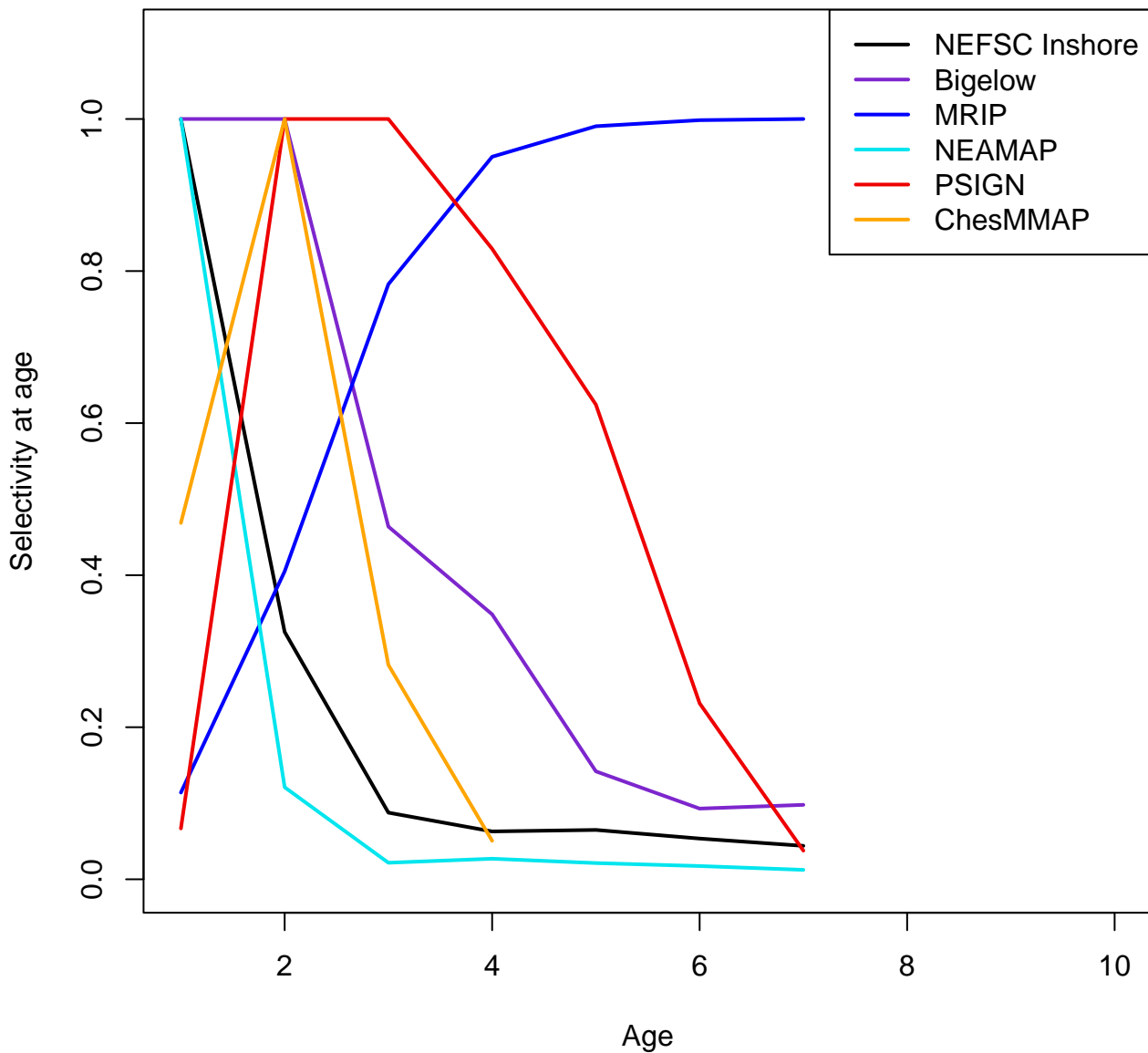


Fleet 2 (Rec)

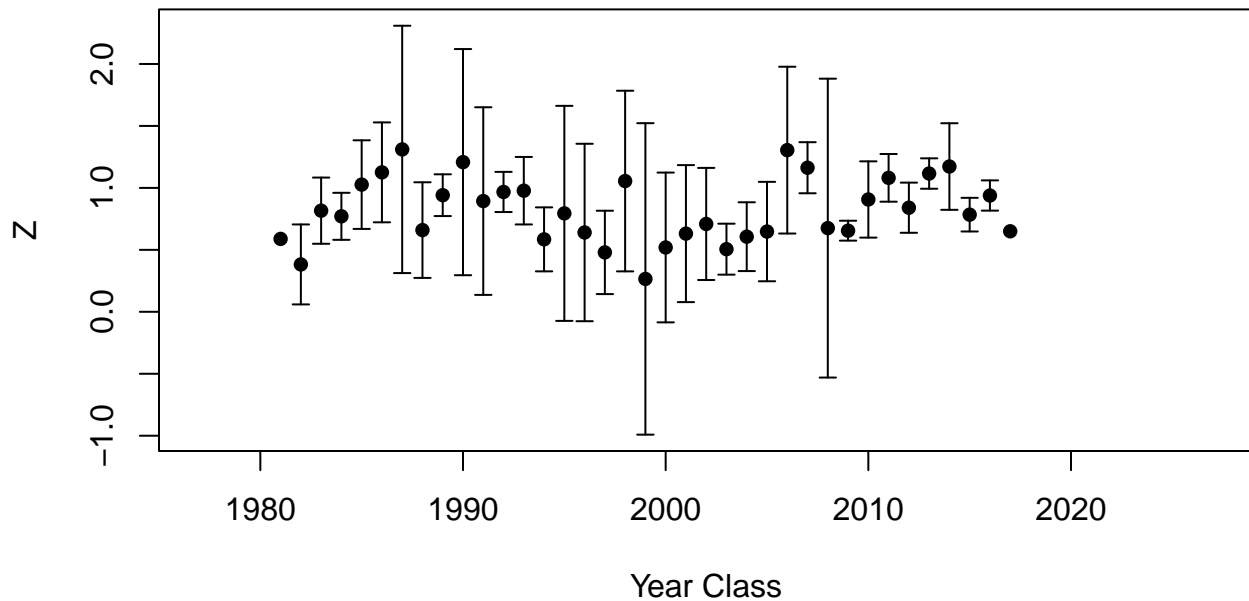
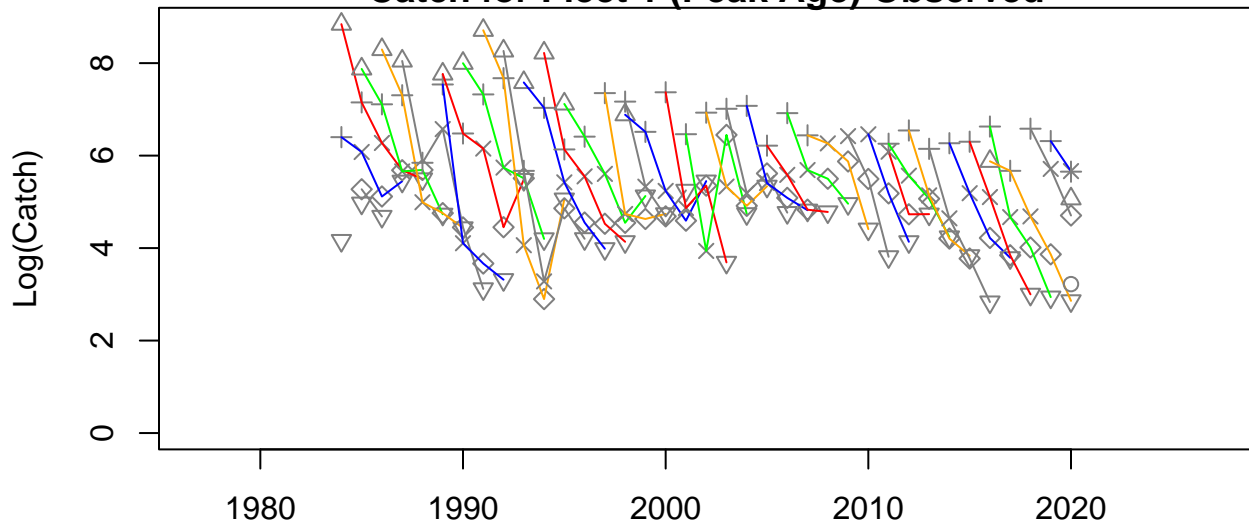




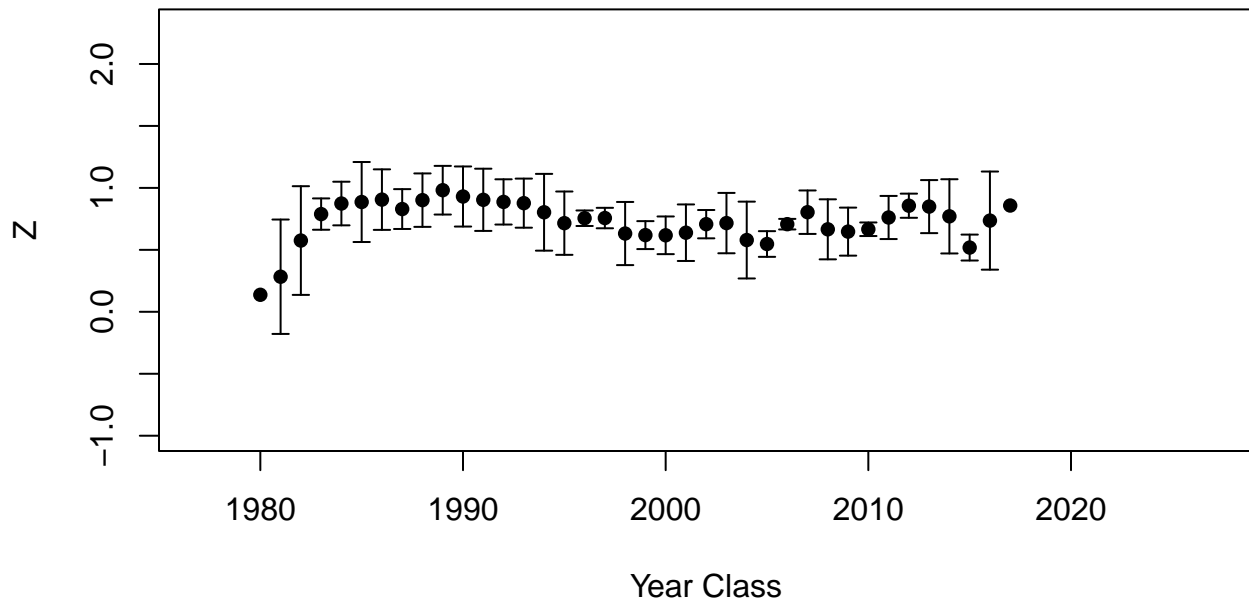
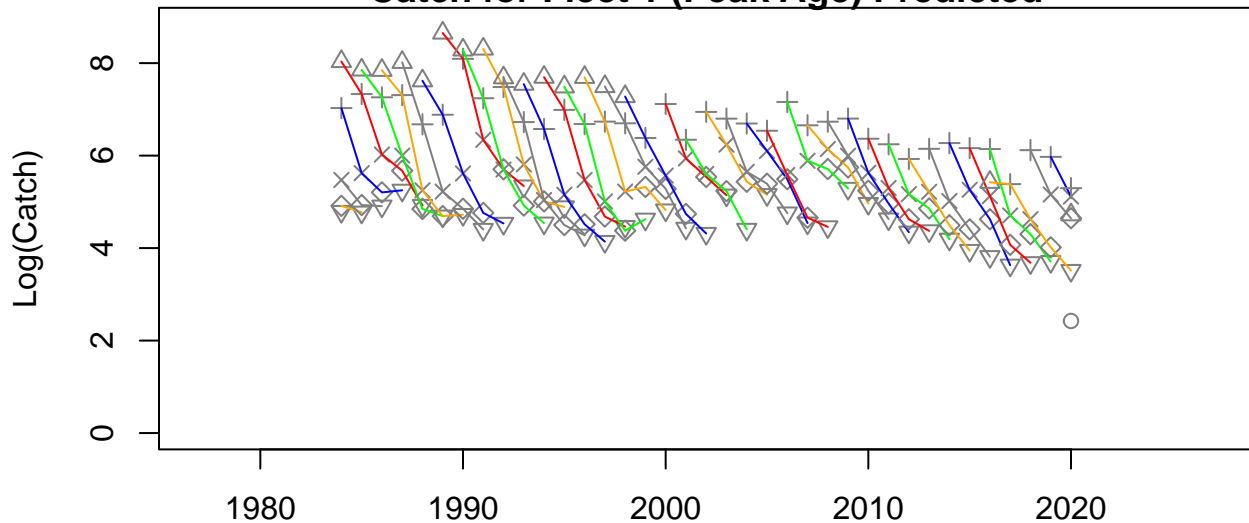
Indices



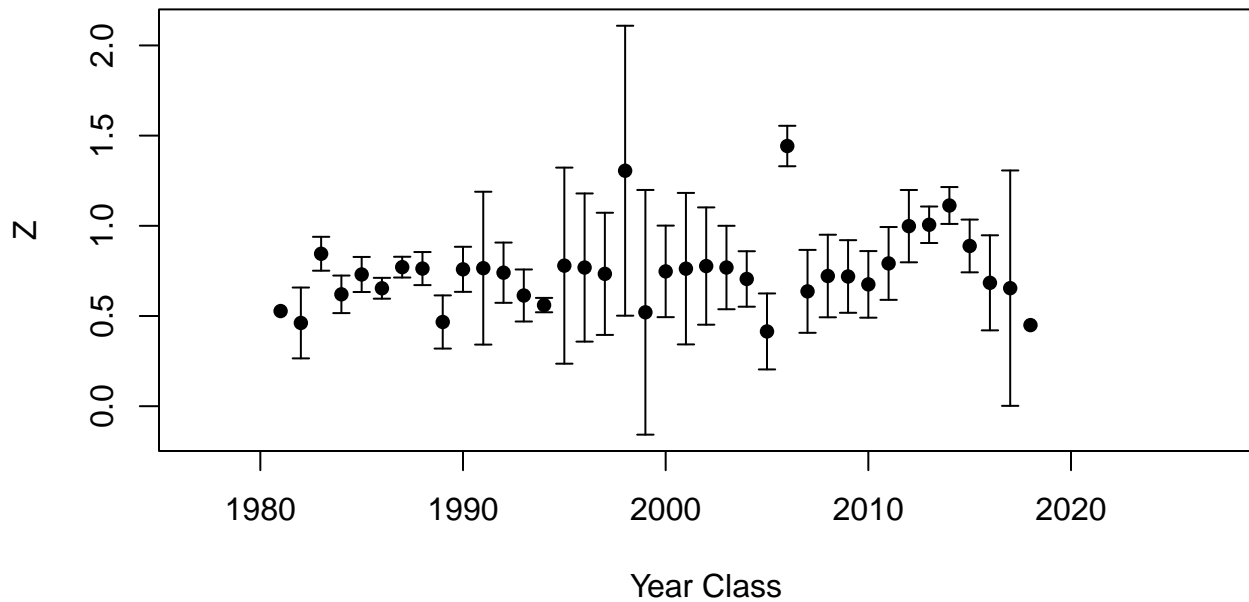
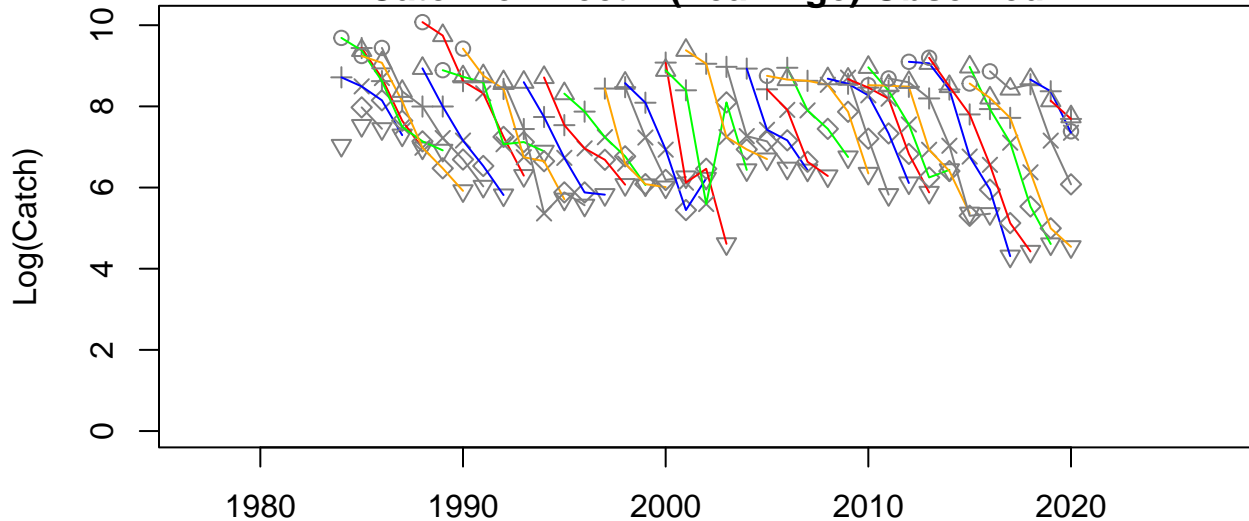
Catch for Fleet 1 (Peak Age) Observed



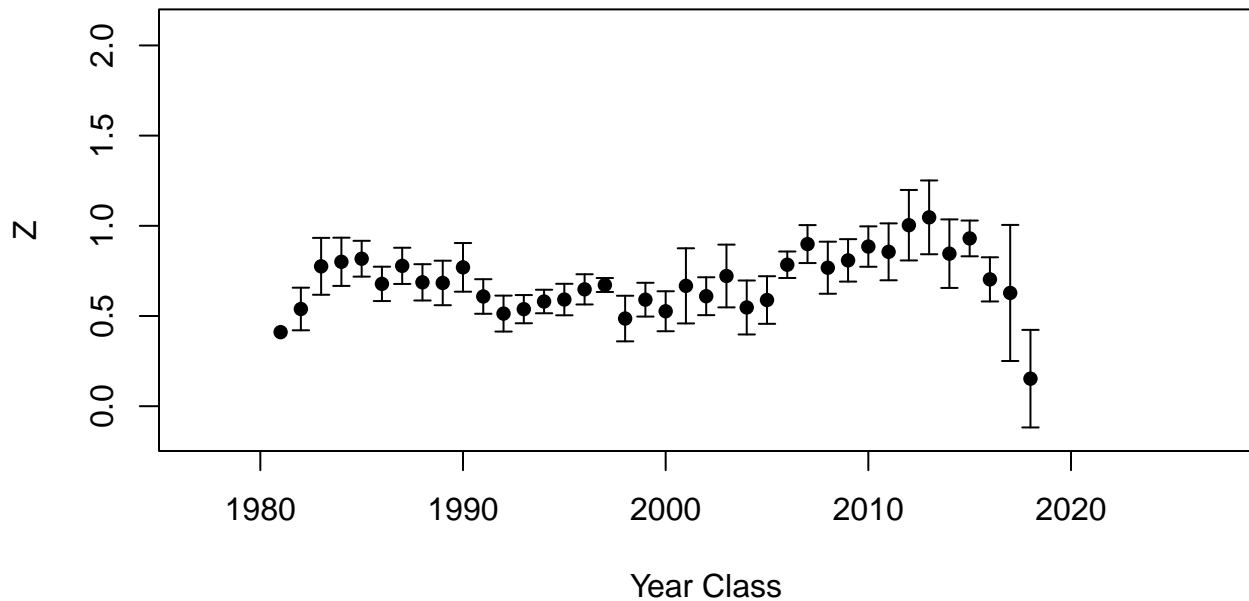
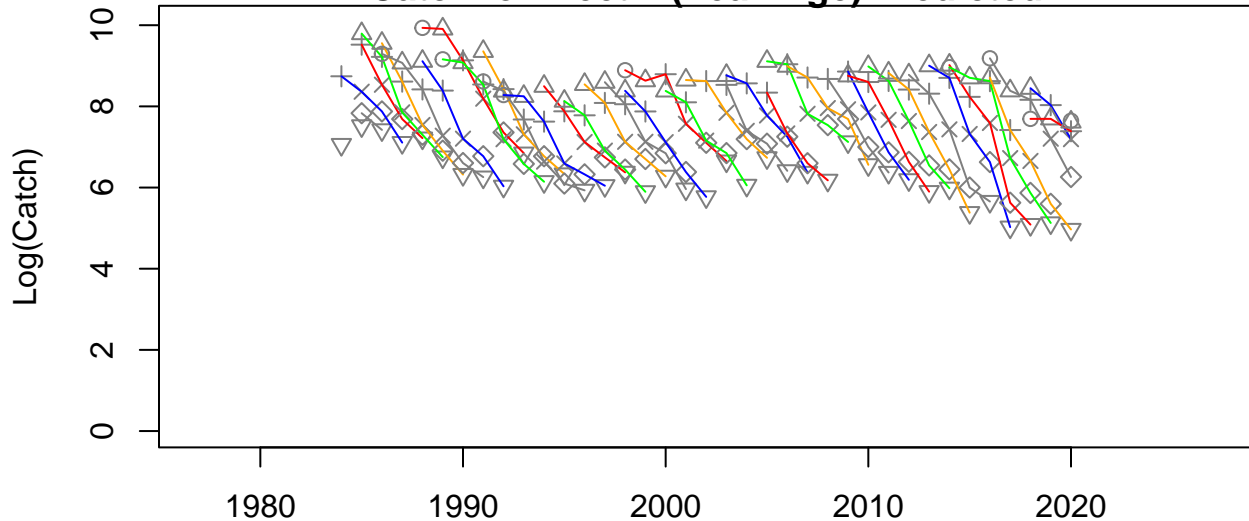
Catch for Fleet 1 (Peak Age) Predicted



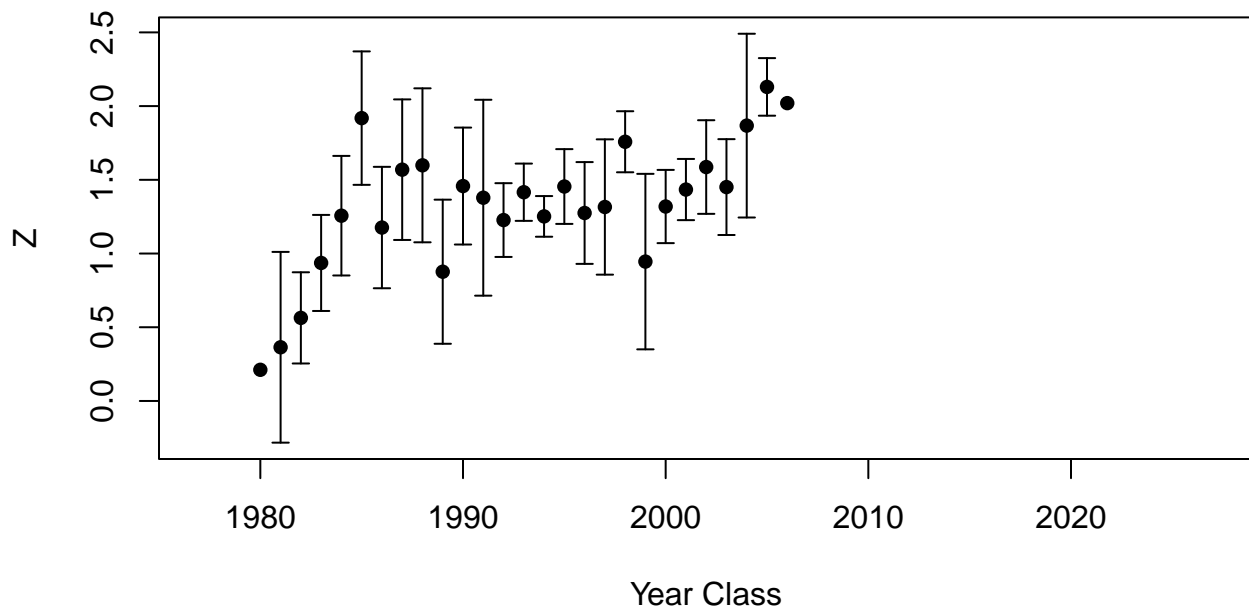
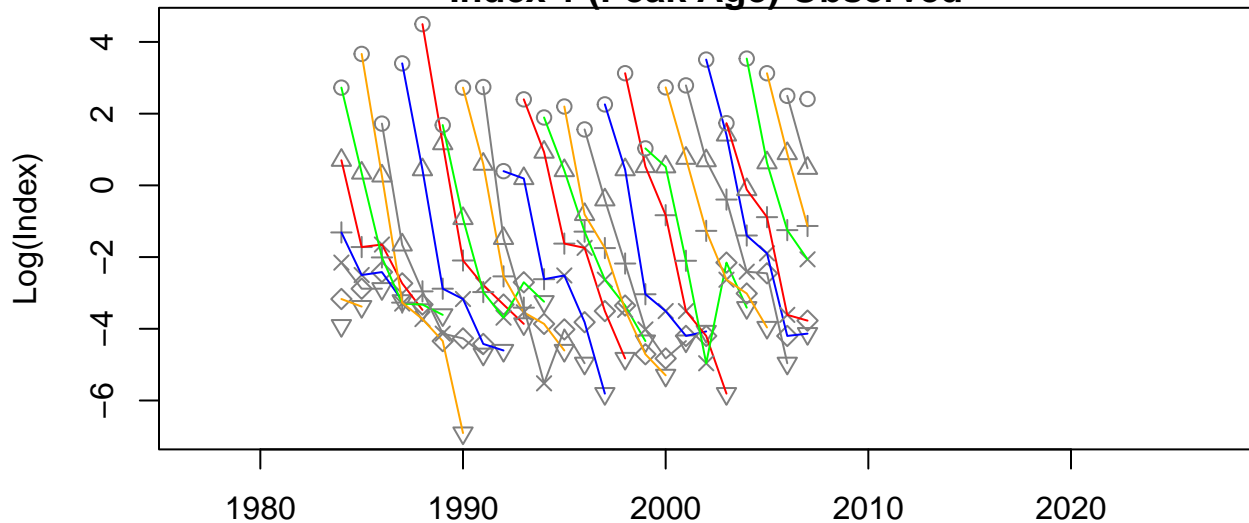
Catch for Fleet 2 (Peak Age) Observed



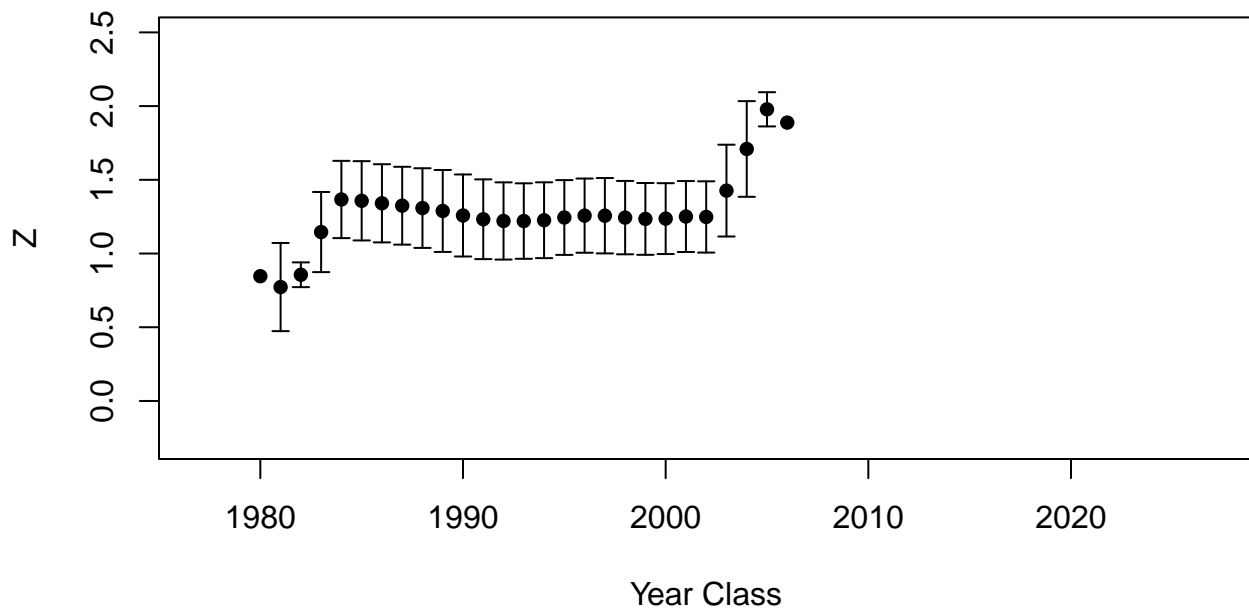
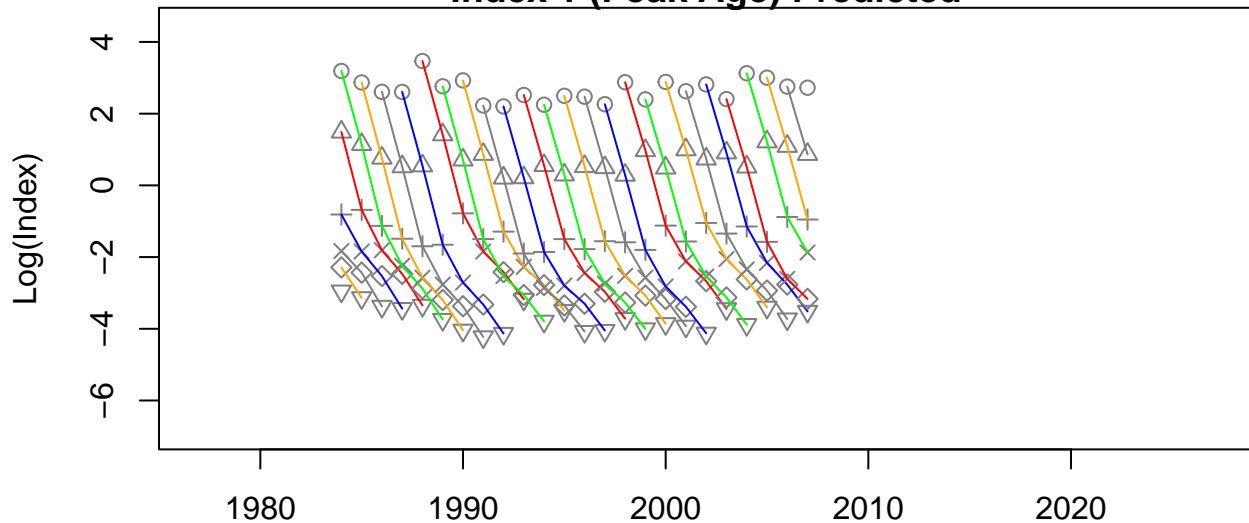
Catch for Fleet 2 (Peak Age) Predicted



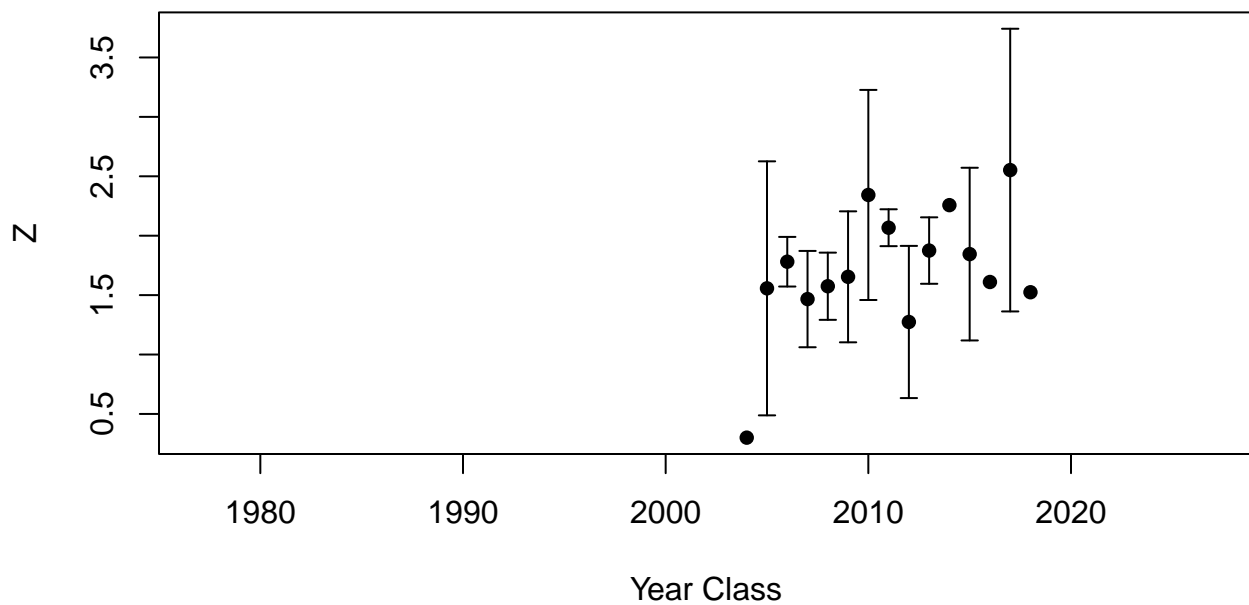
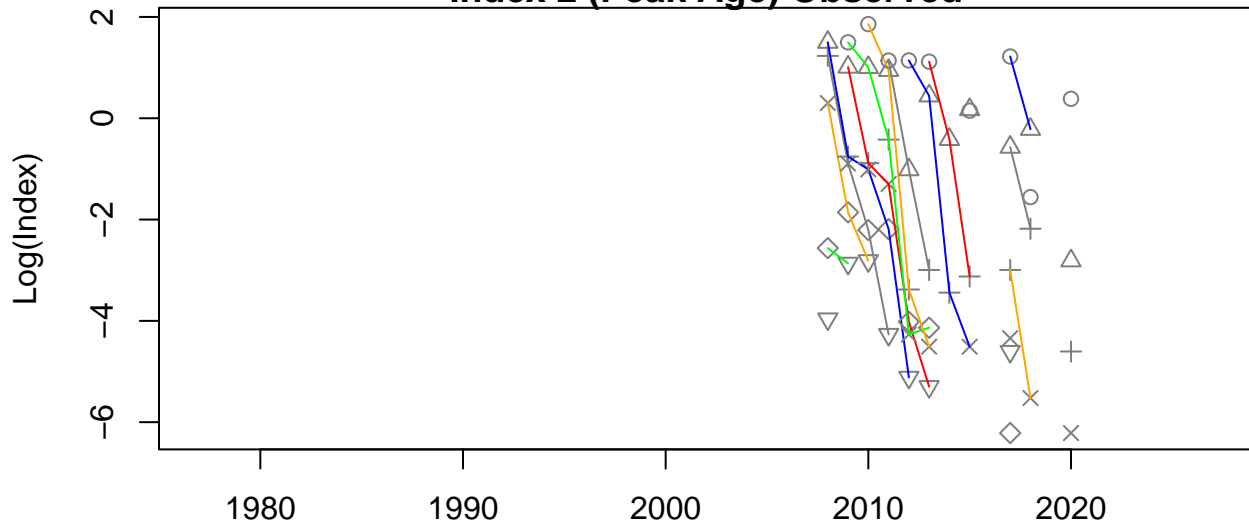
Index 1 (Peak Age) Observed



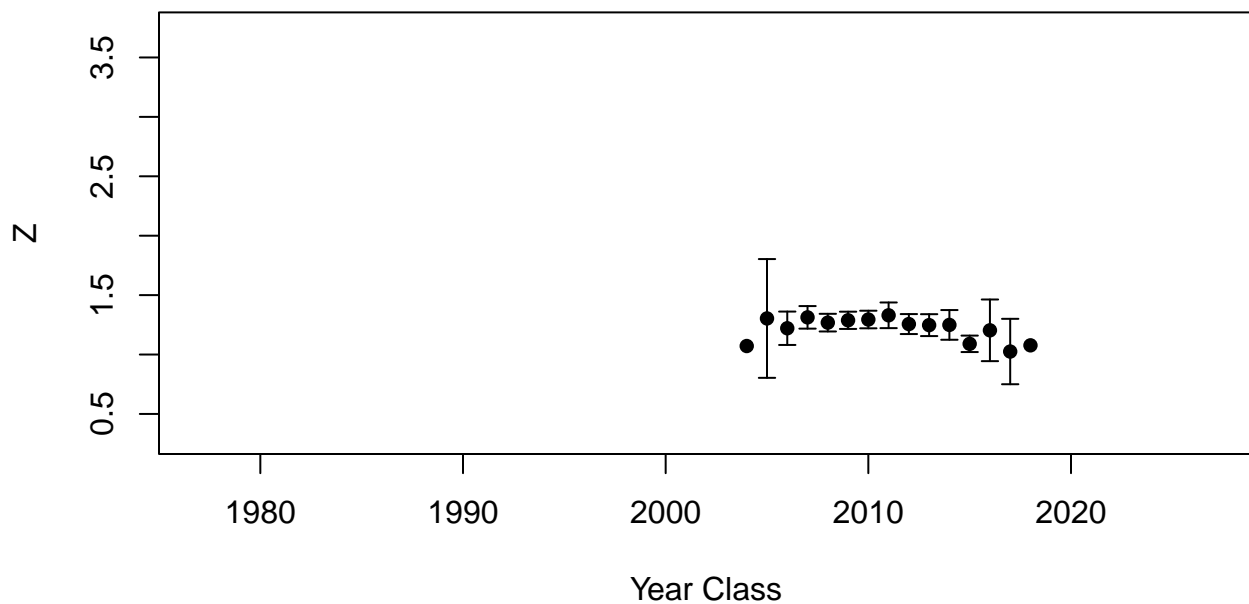
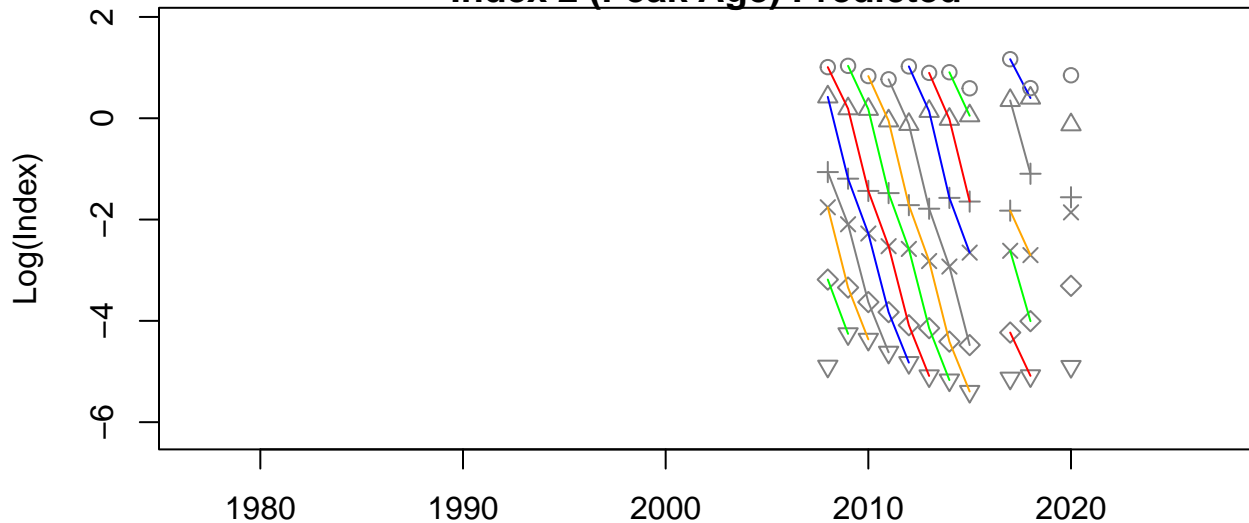
Index 1 (Peak Age) Predicted



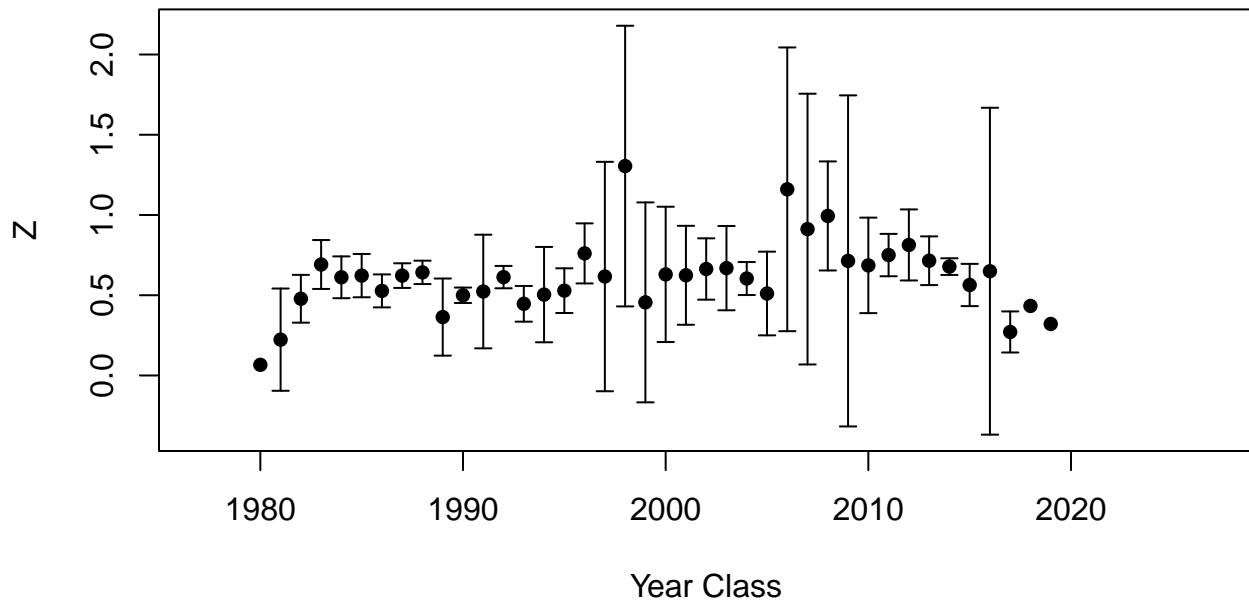
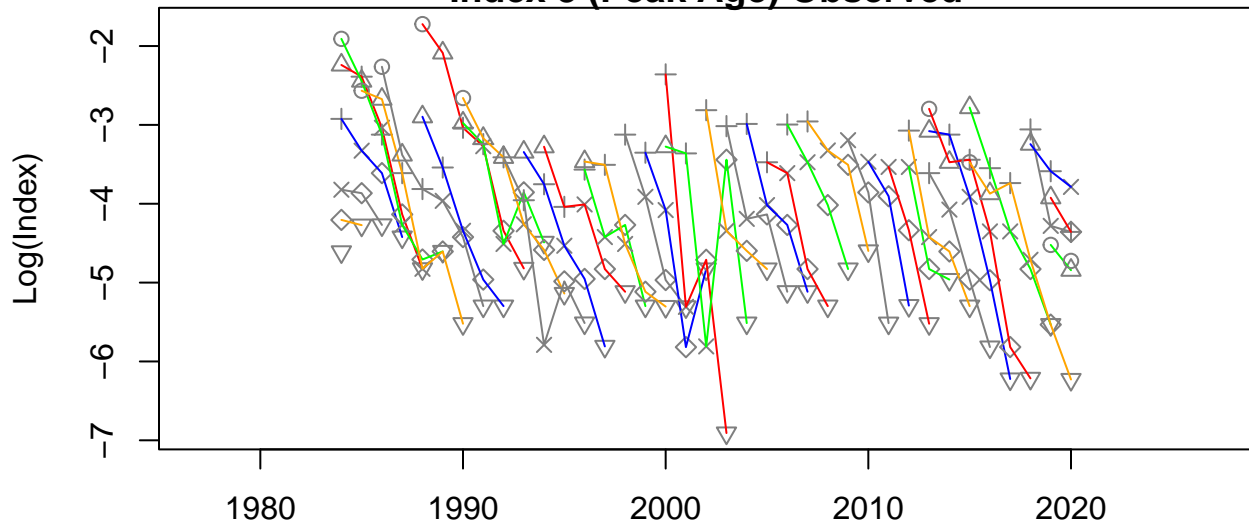
Index 2 (Peak Age) Observed



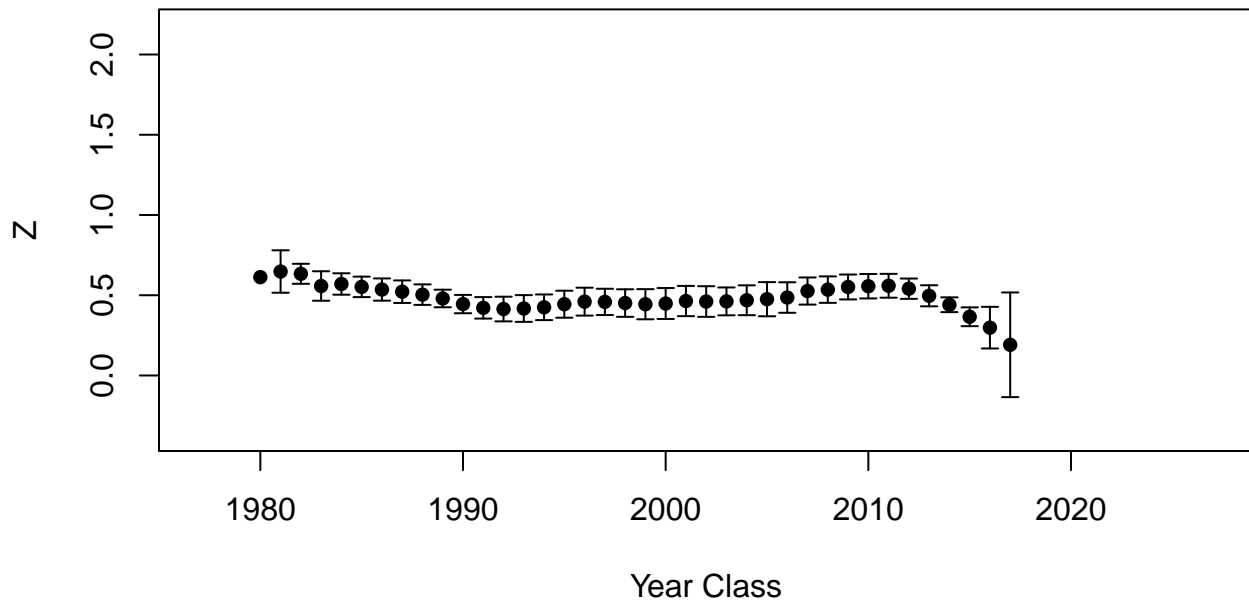
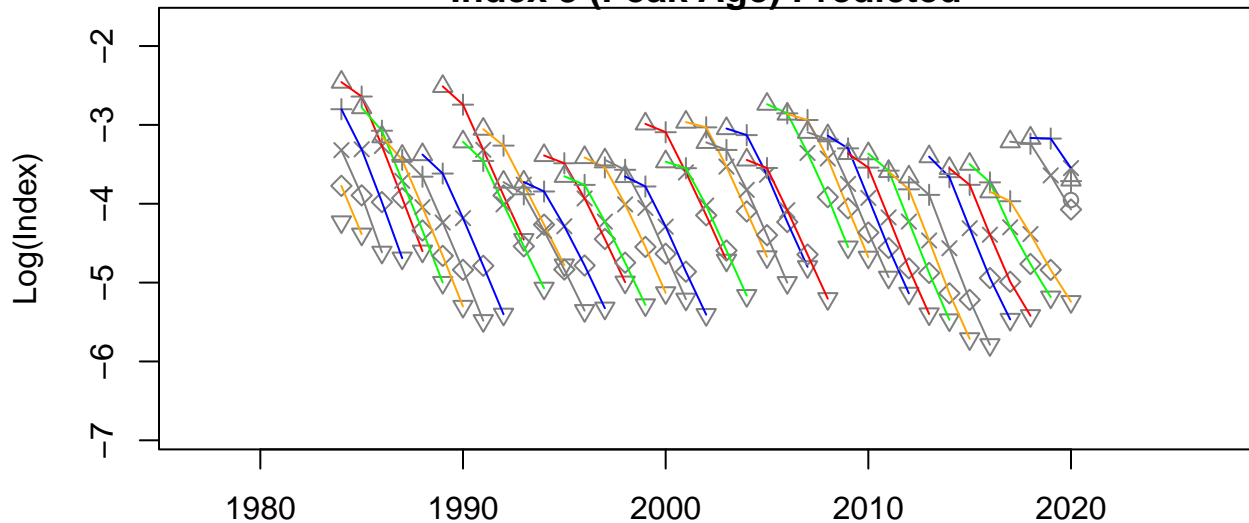
Index 2 (Peak Age) Predicted



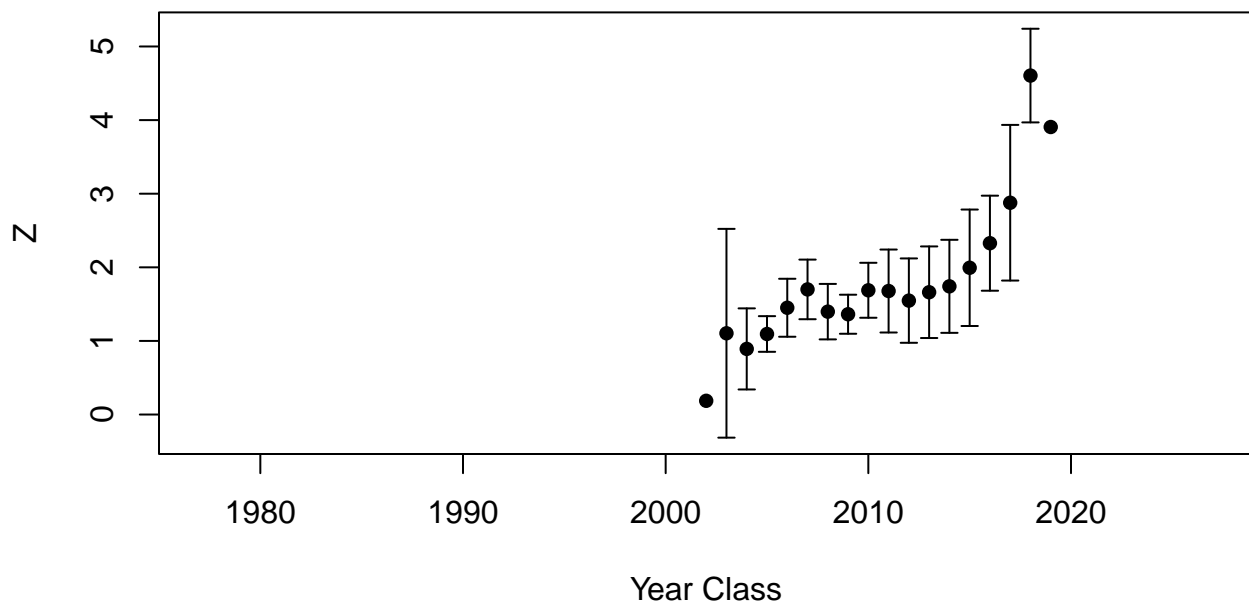
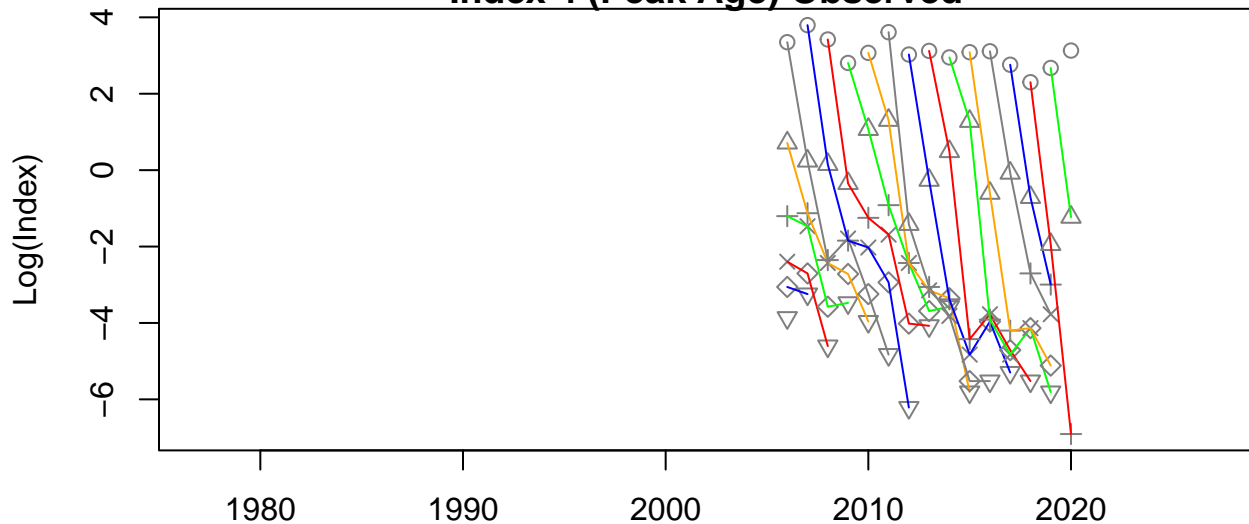
Index 3 (Peak Age) Observed



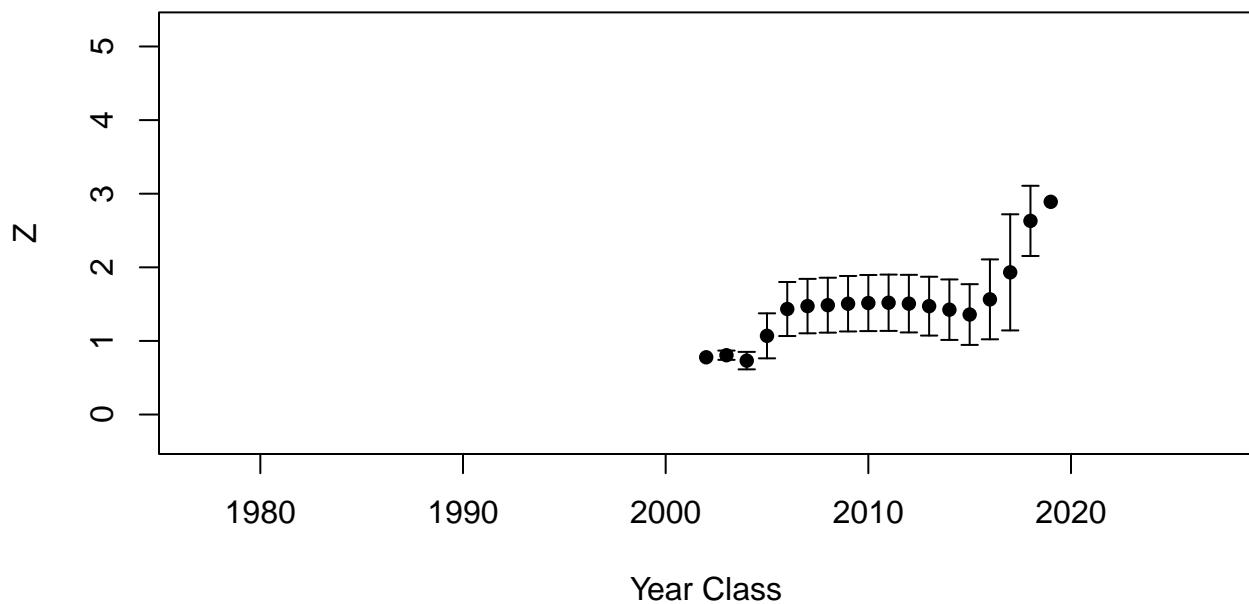
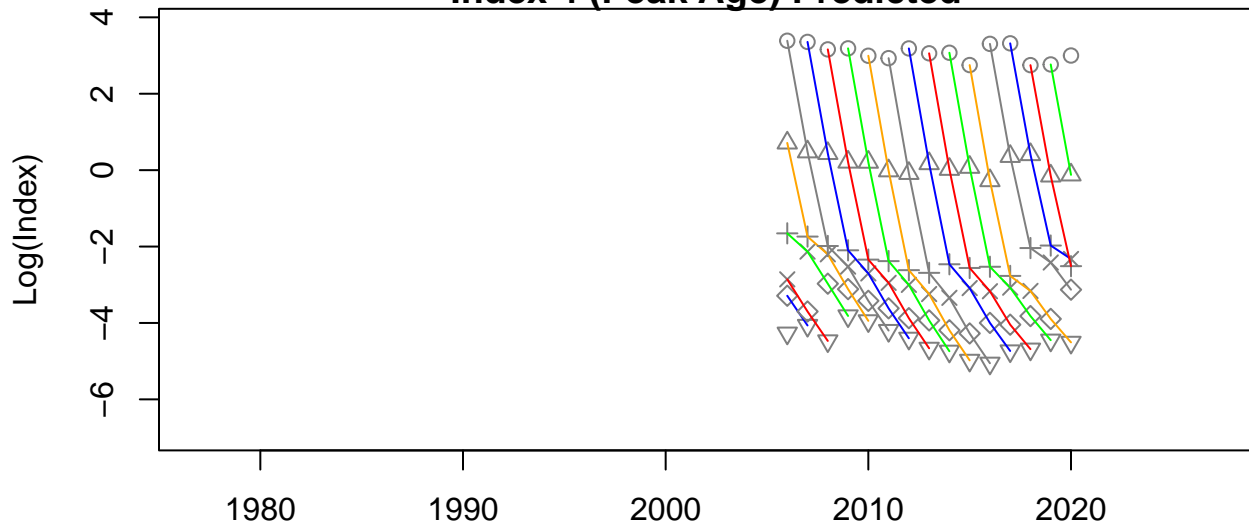
Index 3 (Peak Age) Predicted



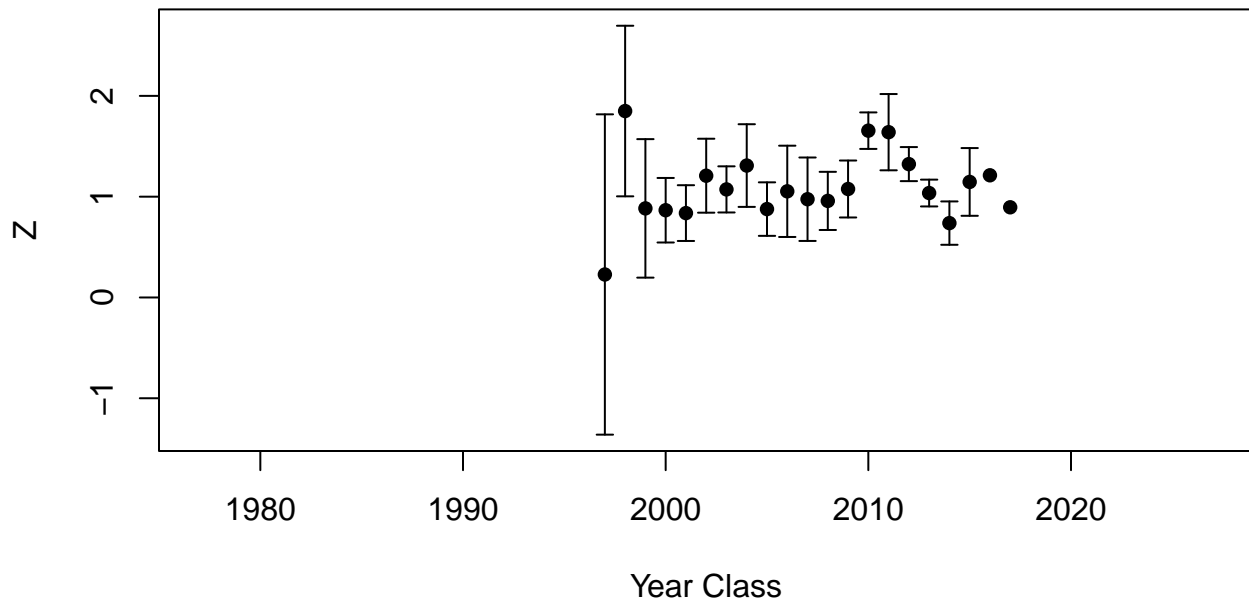
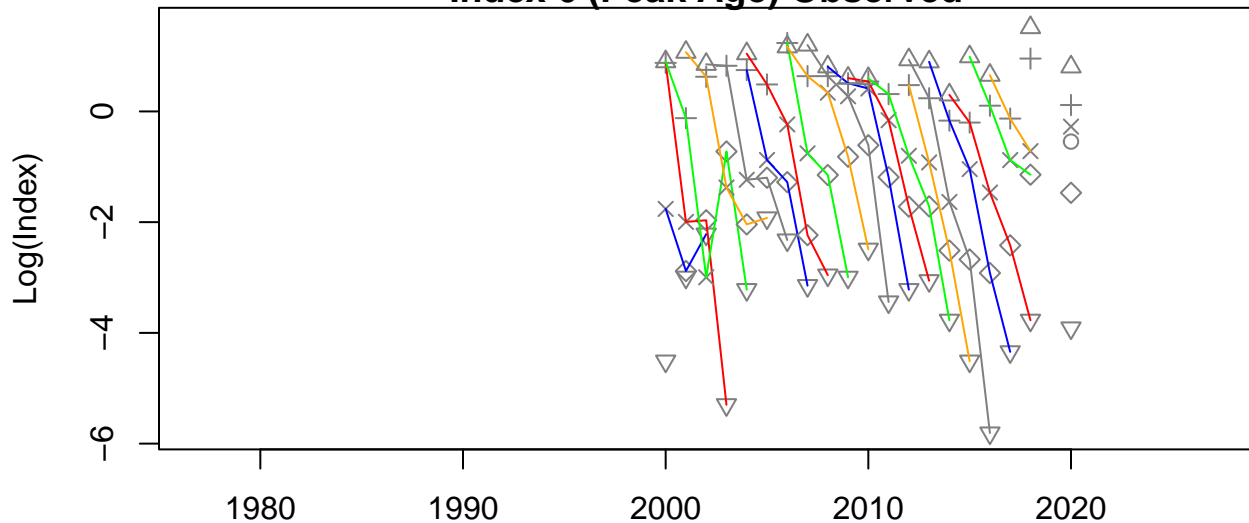
Index 4 (Peak Age) Observed



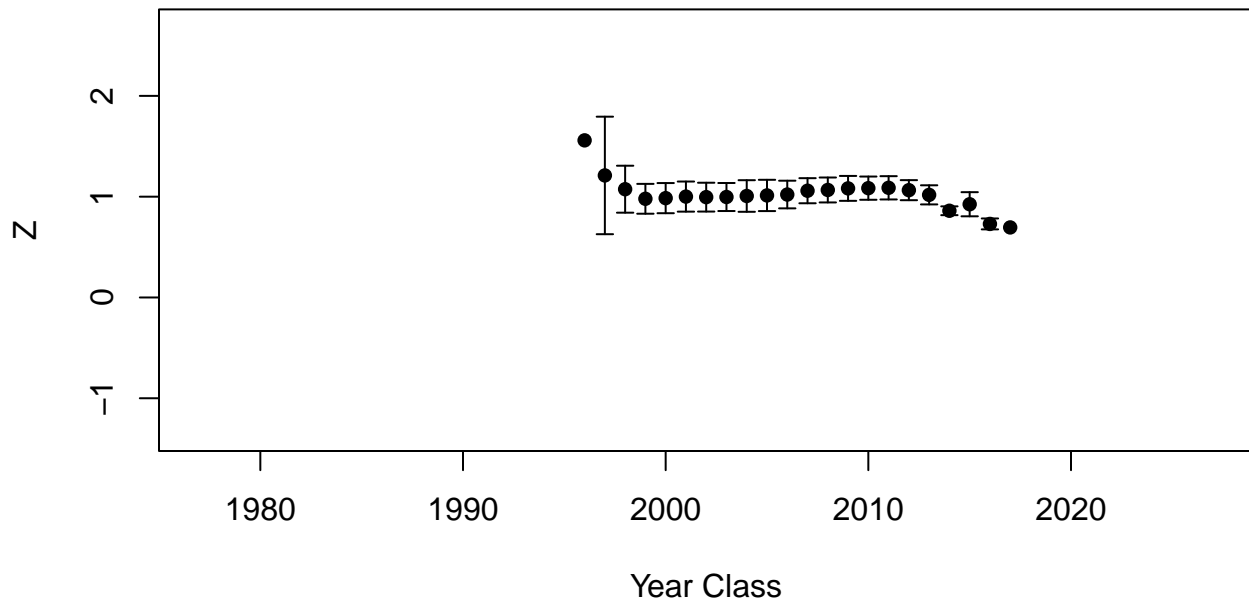
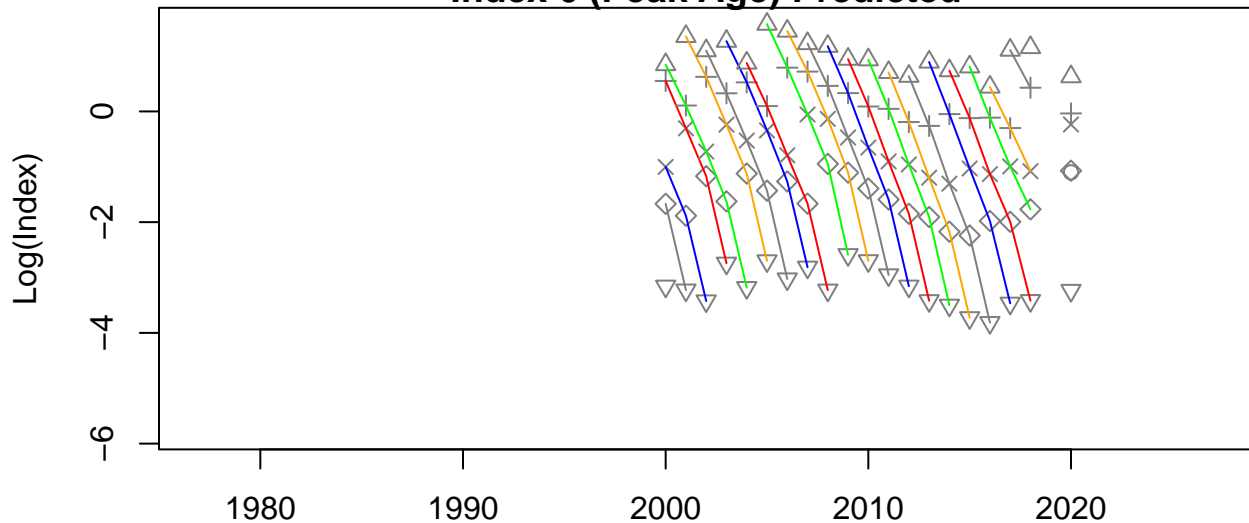
Index 4 (Peak Age) Predicted



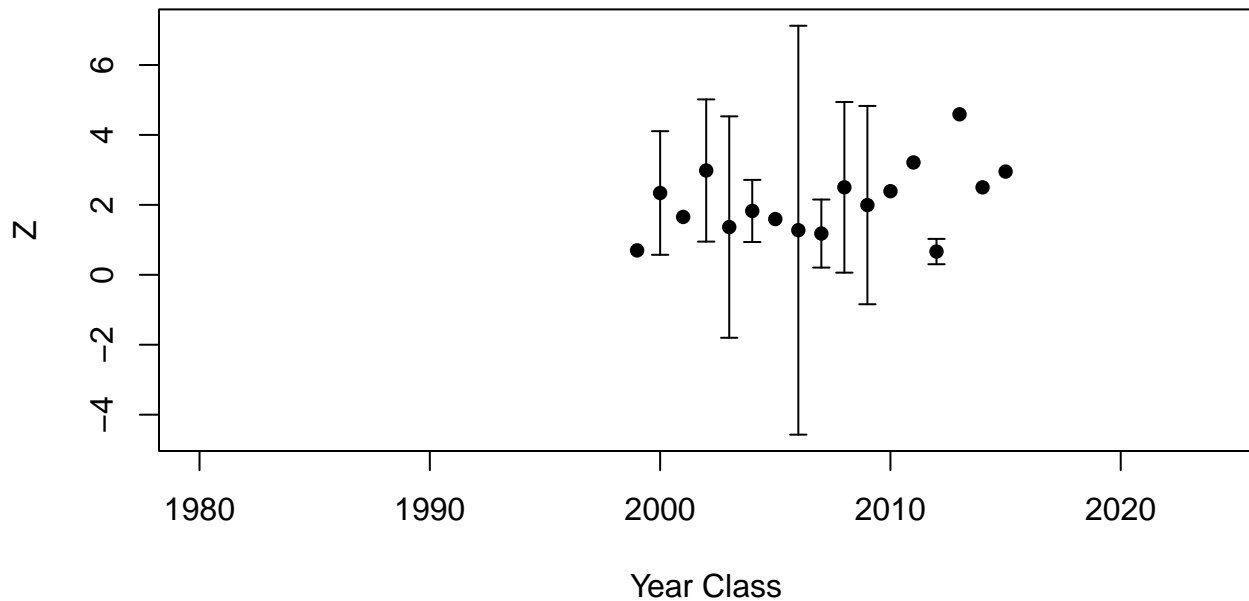
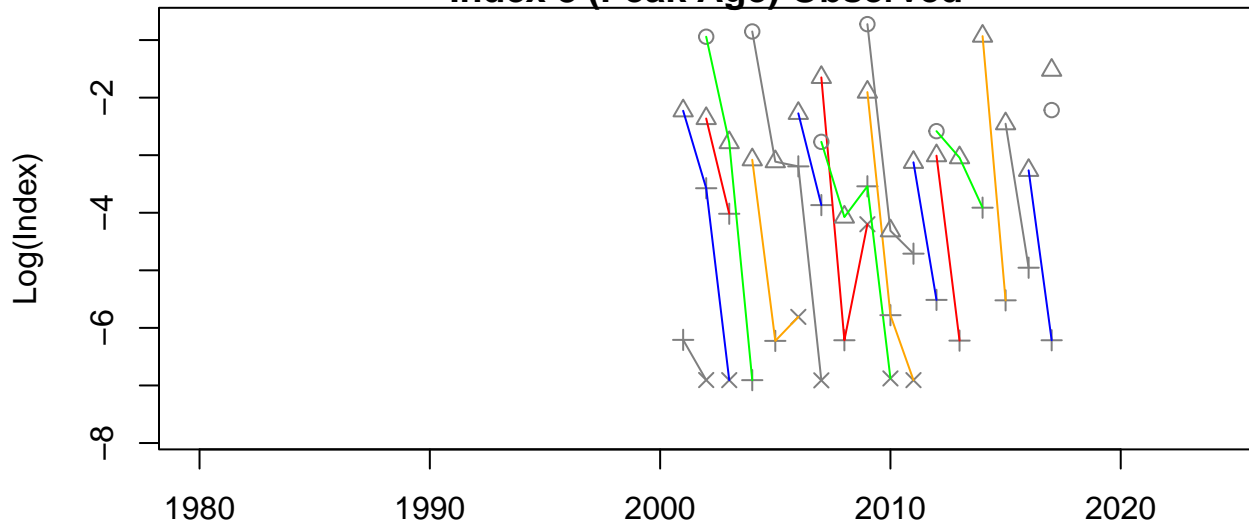
Index 6 (Peak Age) Observed



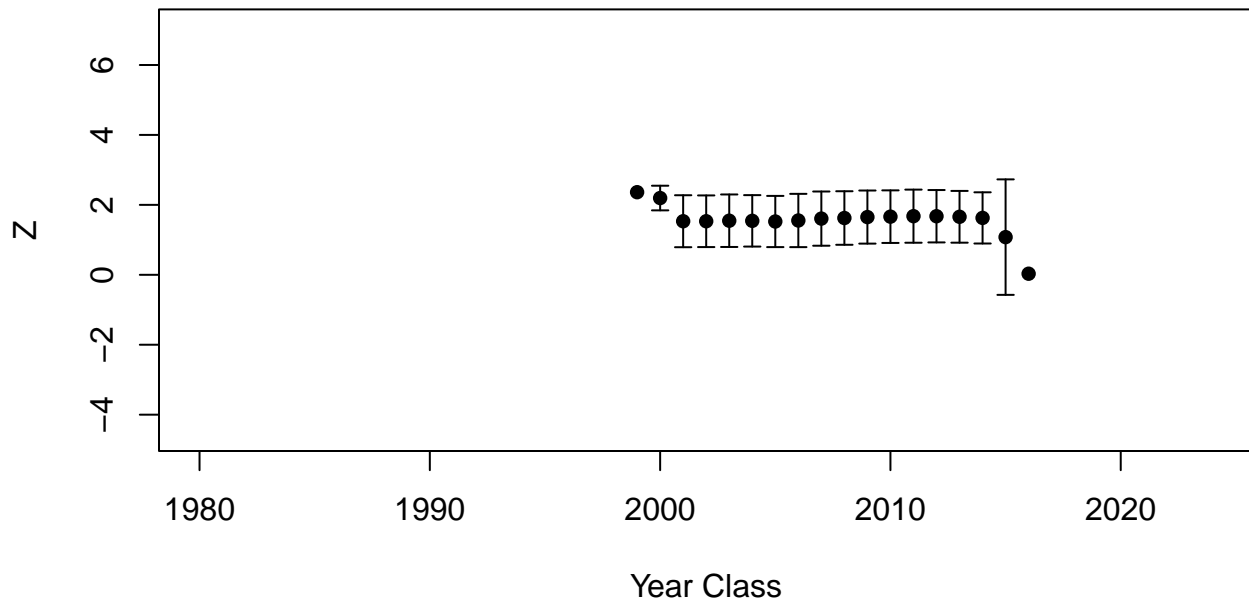
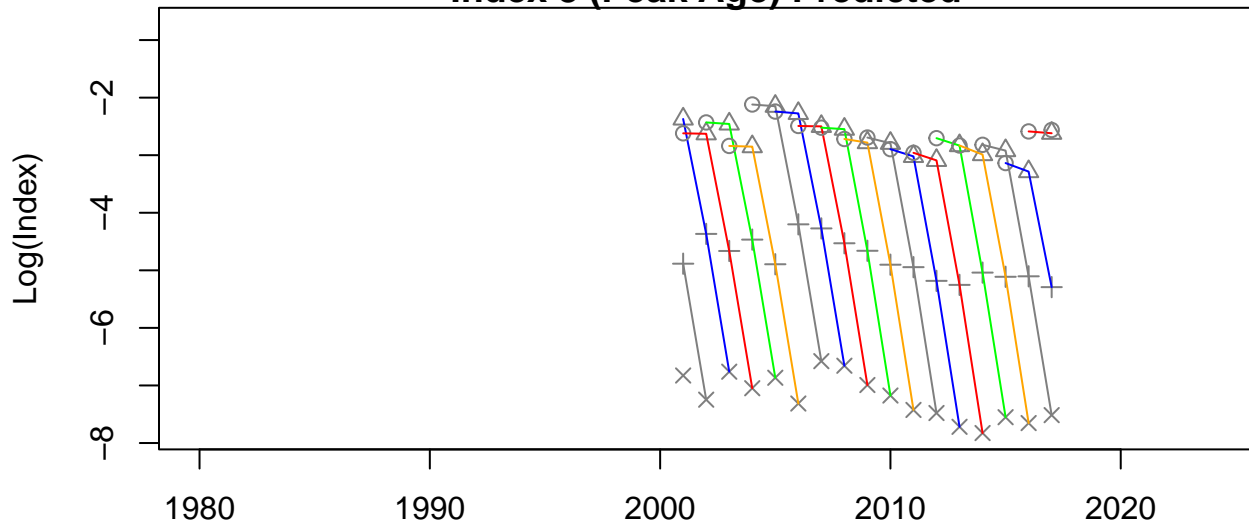
Index 6 (Peak Age) Predicted



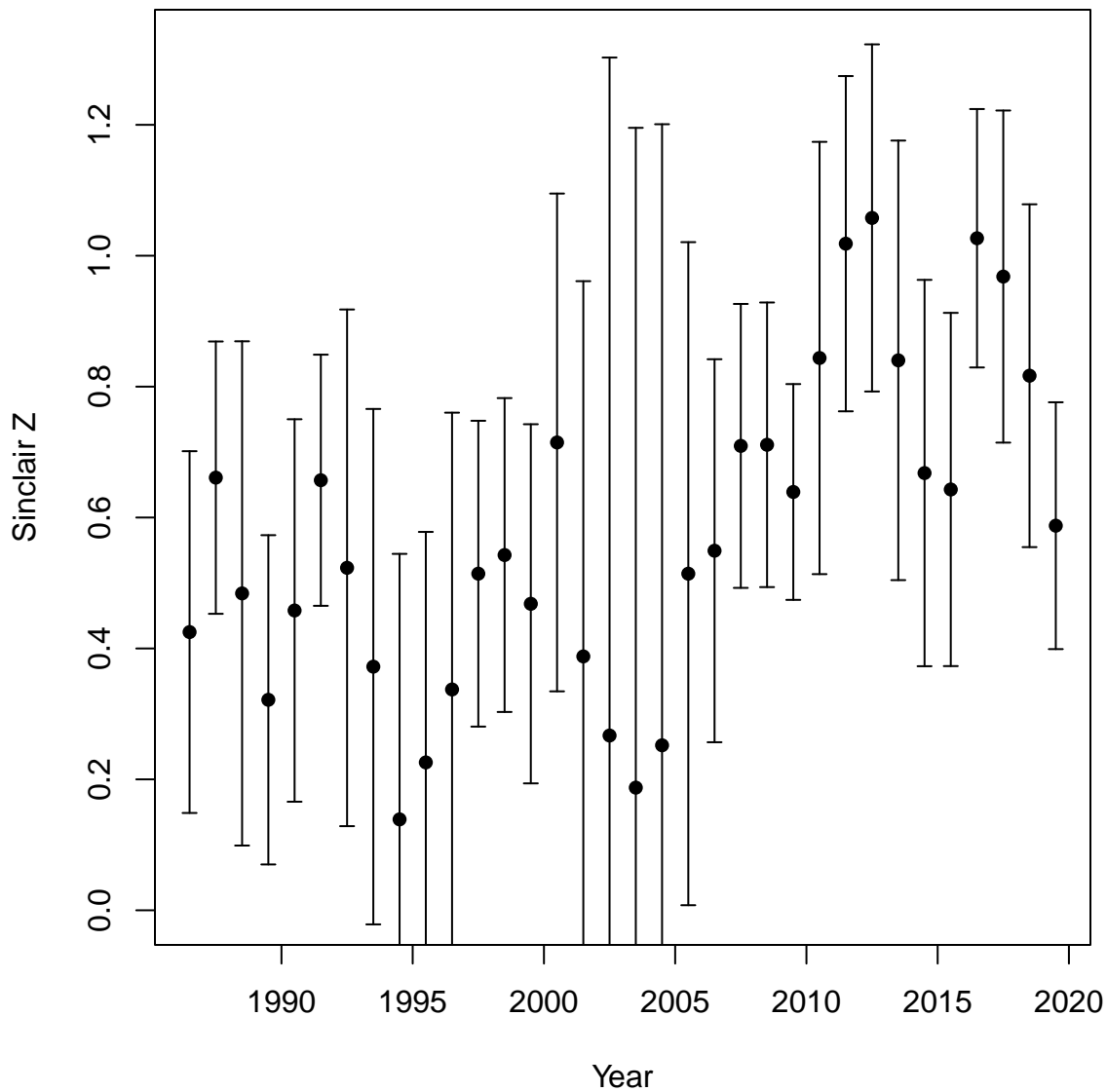
Index 8 (Peak Age) Observed



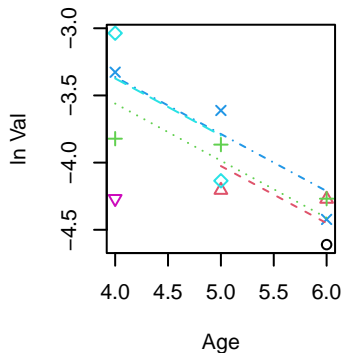
Index 8 (Peak Age) Predicted



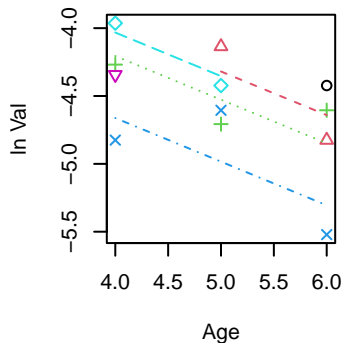
MRIP



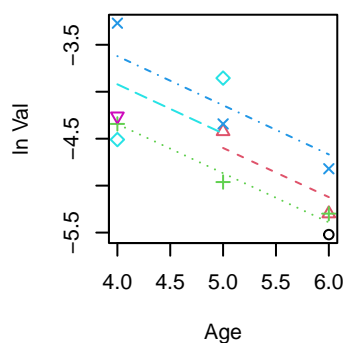
Years 1985 to 1988
Z = 0.425



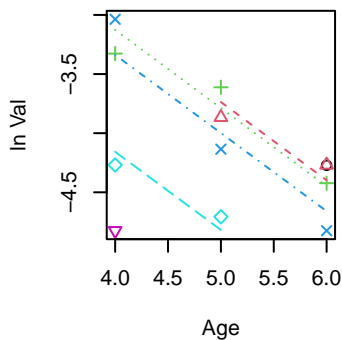
Years 1988 to 1991
Z = 0.322



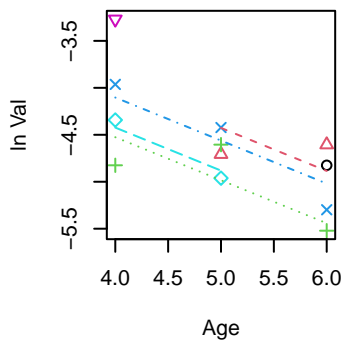
Years 1991 to 1994
Z = 0.523



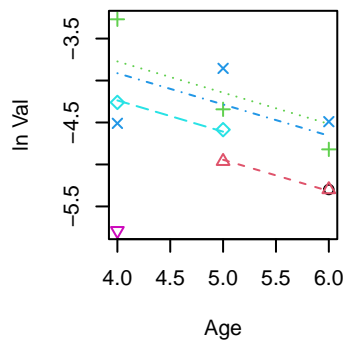
Years 1986 to 1989
Z = 0.661



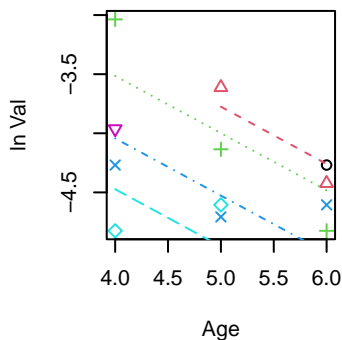
Years 1989 to 1992
Z = 0.458



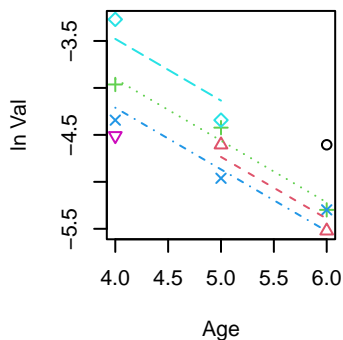
Years 1992 to 1995
Z = 0.372



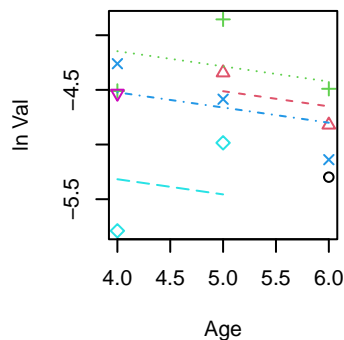
Years 1987 to 1990
Z = 0.484



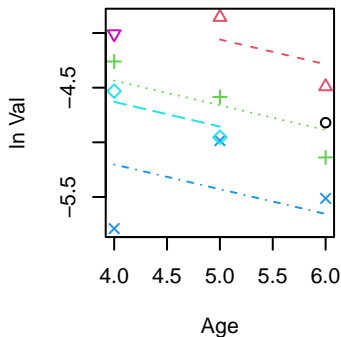
Years 1990 to 1993
Z = 0.657



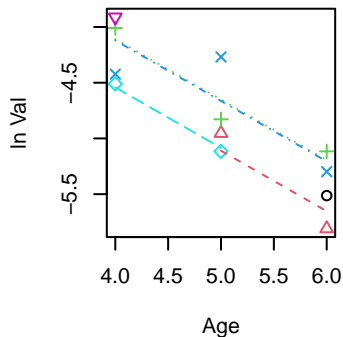
Years 1993 to 1996
Z = 0.139



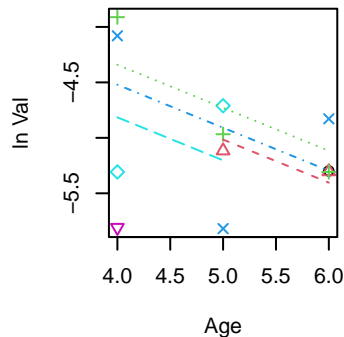
Years 1994 to 1997
Z = 0.226



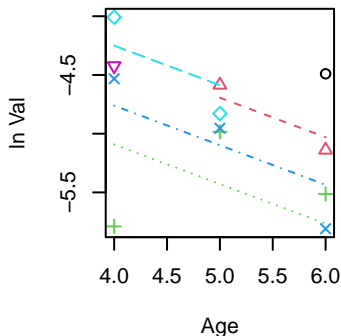
Years 1997 to 2000
Z = 0.543



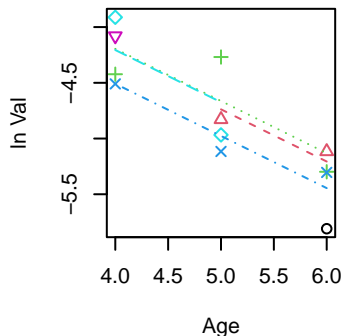
Years 2000 to 2003
Z = 0.388



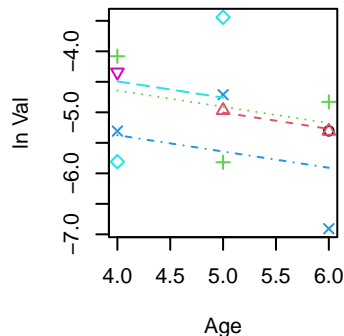
Years 1995 to 1998
Z = 0.337



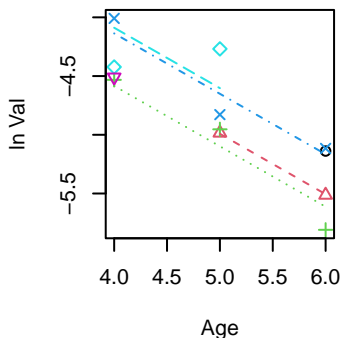
Years 1998 to 2001
Z = 0.468



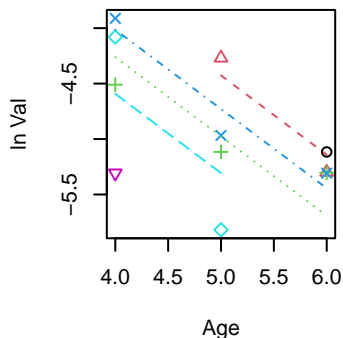
Years 2001 to 2004
Z = 0.267



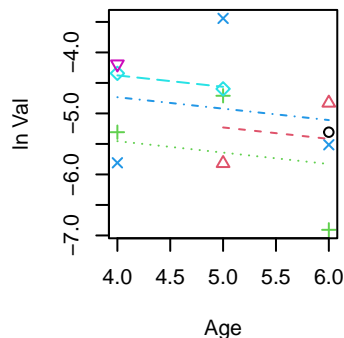
Years 1996 to 1999
Z = 0.514



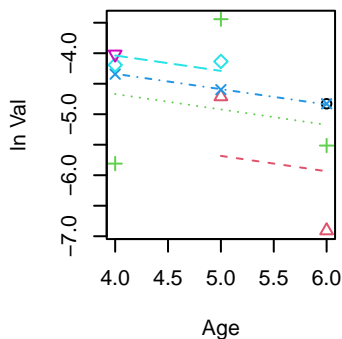
Years 1999 to 2002
Z = 0.715



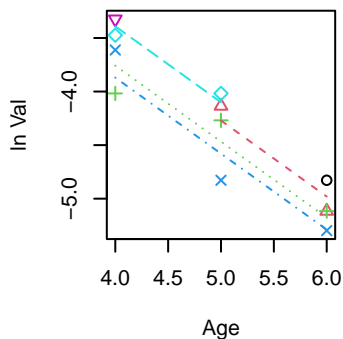
Years 2002 to 2005
Z = 0.187



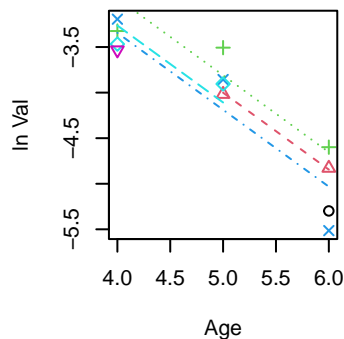
Years 2003 to 2006
Z = 0.252



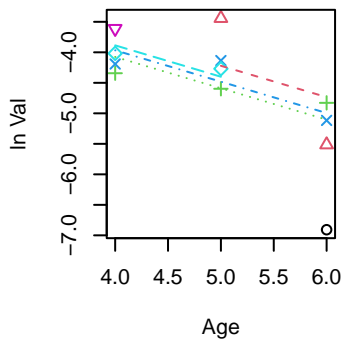
Years 2006 to 2009
Z = 0.709



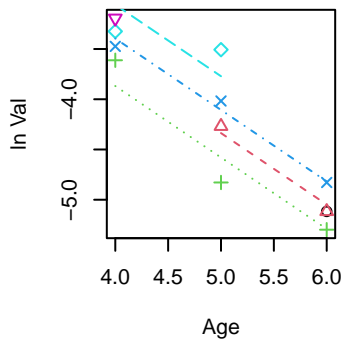
Years 2009 to 2012
Z = 0.844



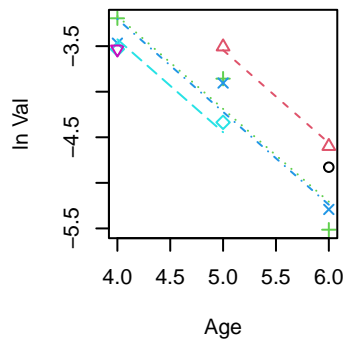
Years 2004 to 2007
Z = 0.514



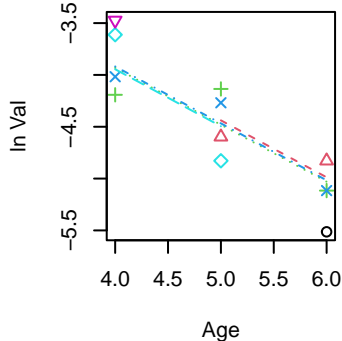
Years 2007 to 2010
Z = 0.711



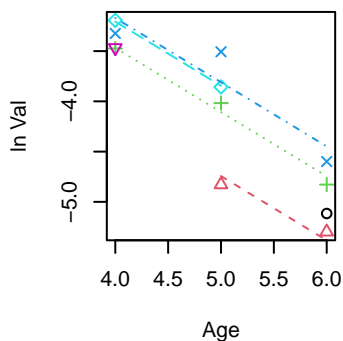
Years 2010 to 2013
Z = 1.018



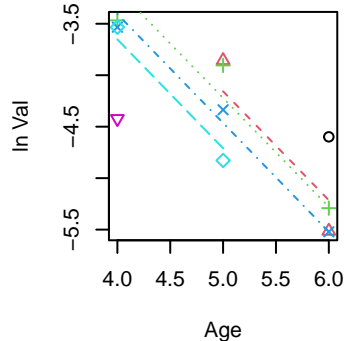
Years 2005 to 2008
Z = 0.549



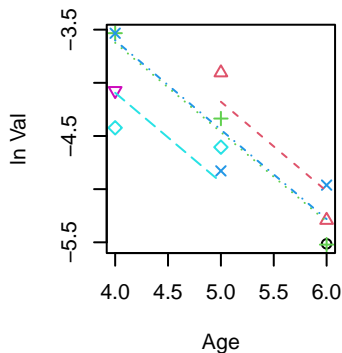
Years 2008 to 2011
Z = 0.639



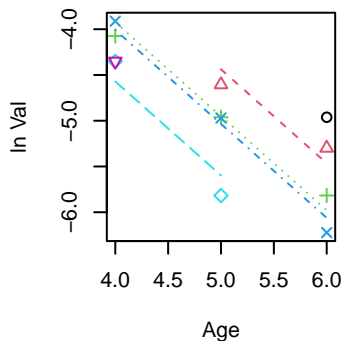
Years 2011 to 2014
Z = 1.058



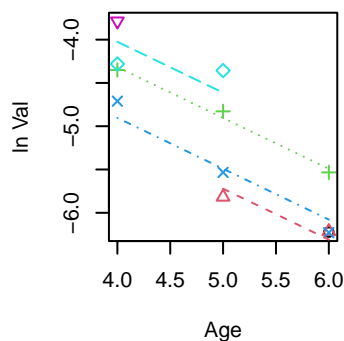
Years 2012 to 2015
Z = 0.84



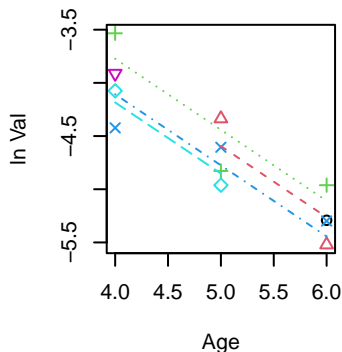
Years 2015 to 2018
Z = 1.027



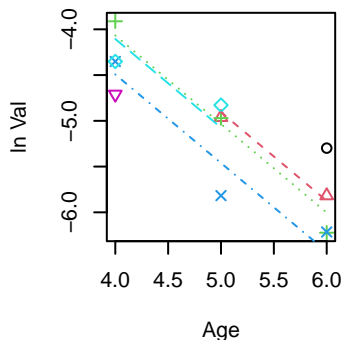
Years 2018 to 2021
Z = 0.588



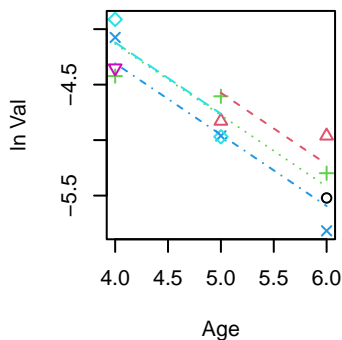
Years 2013 to 2016
Z = 0.668



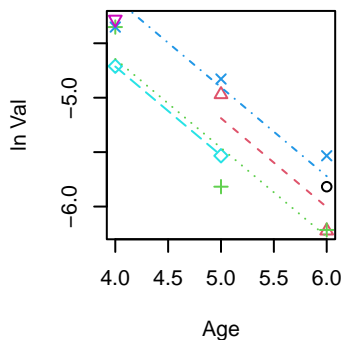
Years 2016 to 2019
Z = 0.968



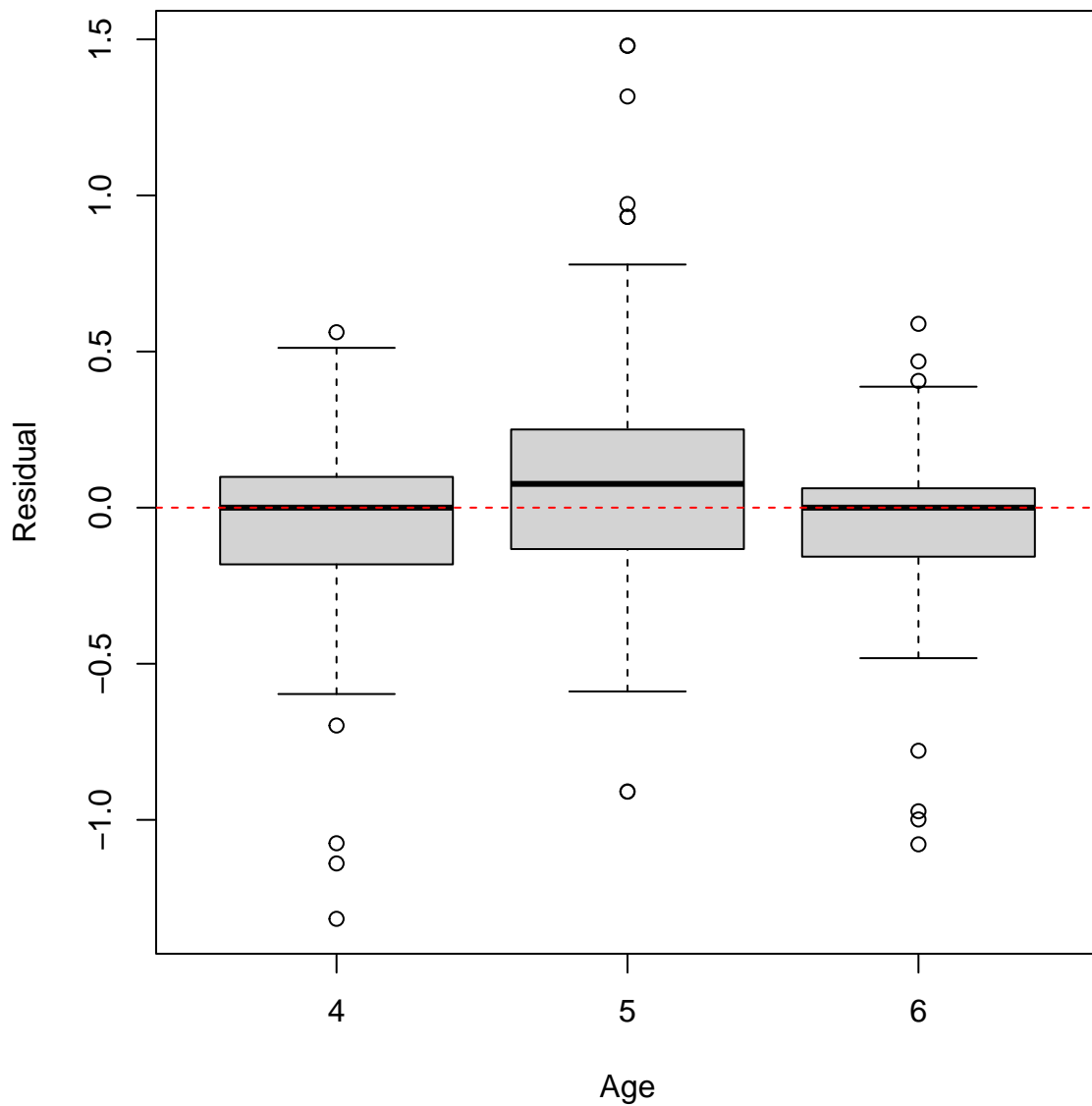
Years 2014 to 2017
Z = 0.643



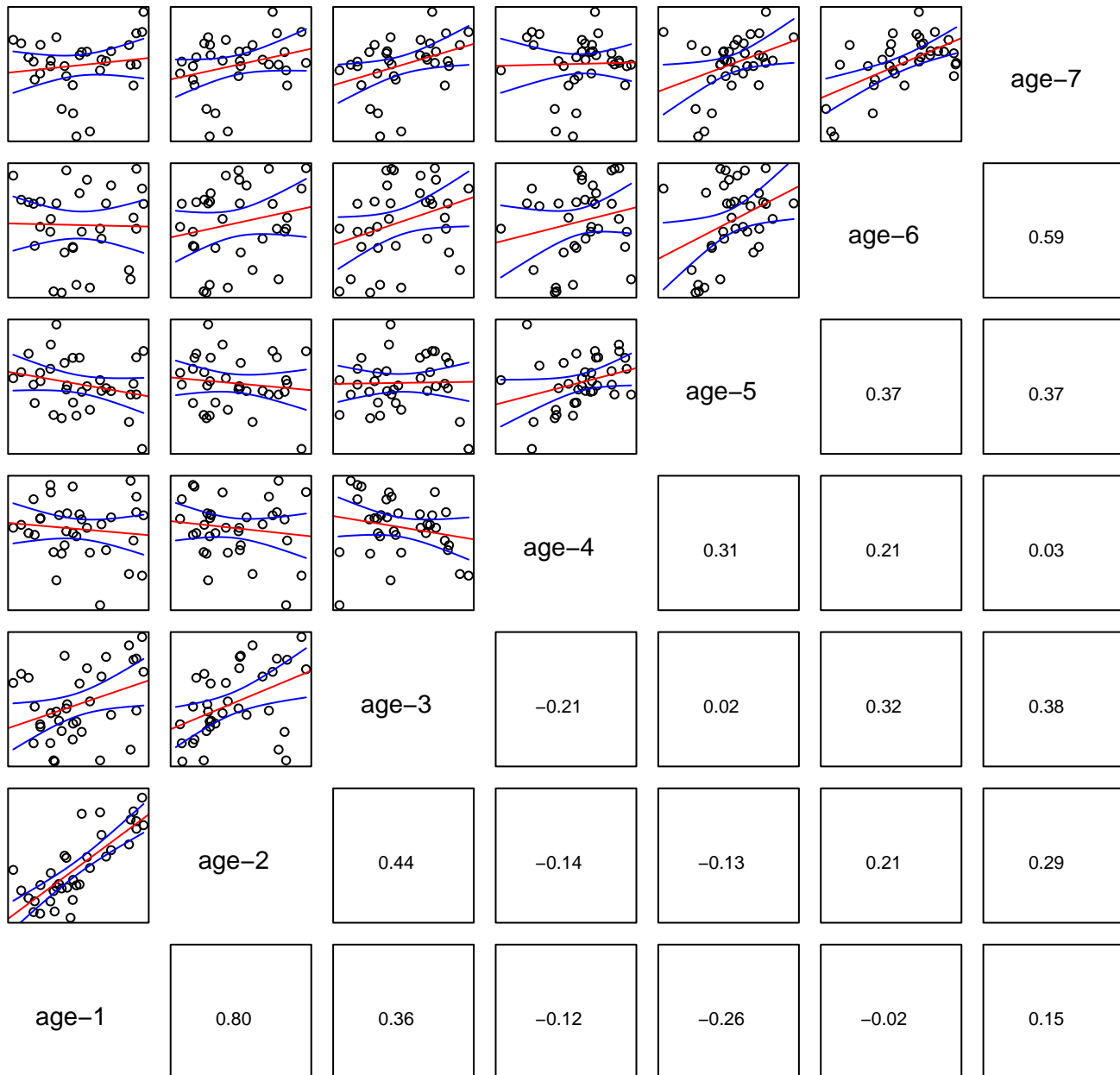
Years 2017 to 2020
Z = 0.817



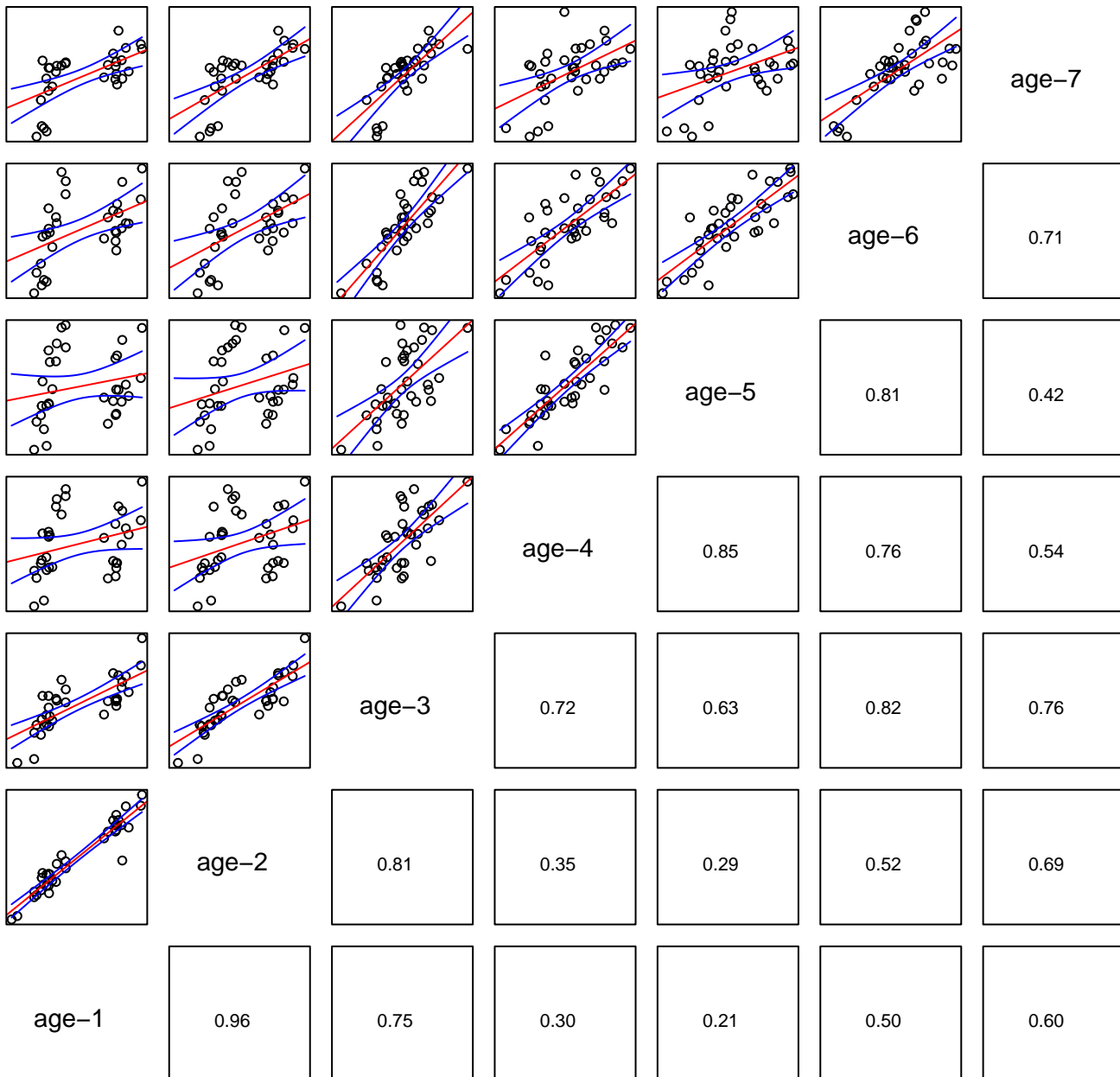
MRIP



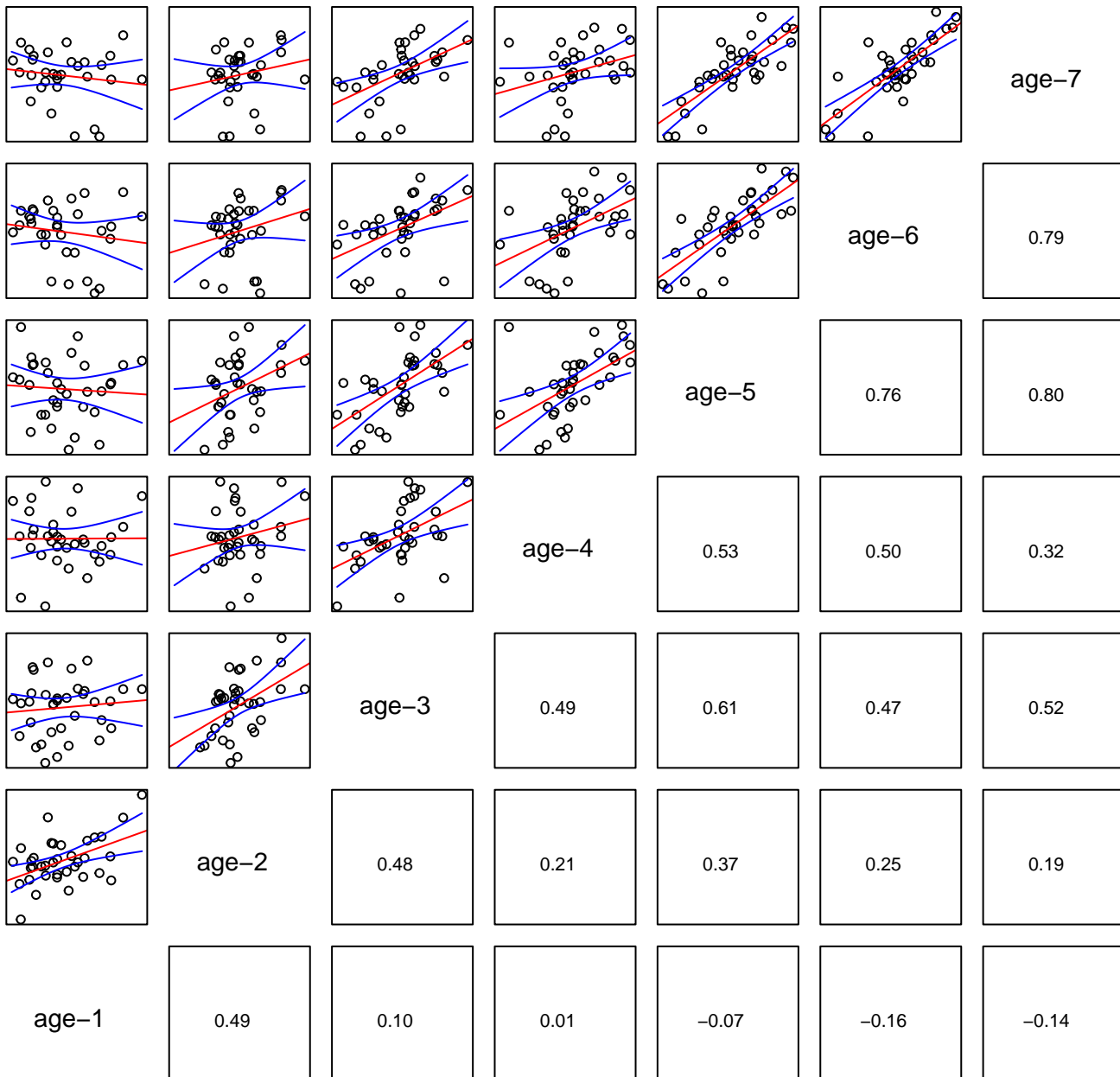
Catch for Fleet 1 (Comm) Observed

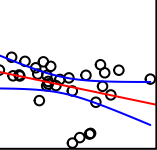
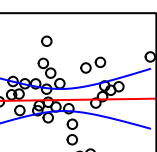
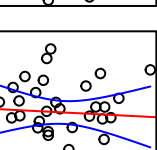
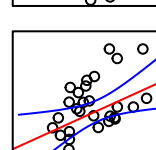
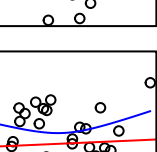
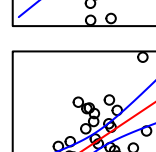
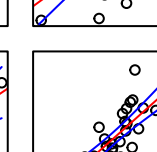
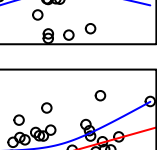
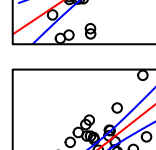
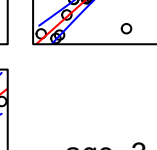

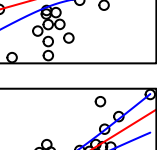
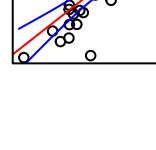

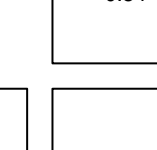
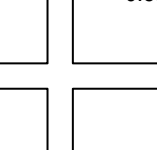
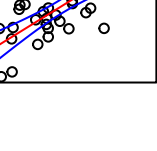
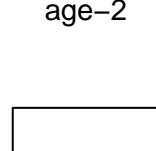
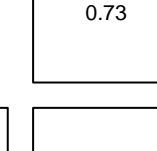
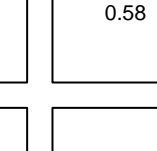
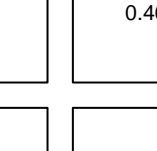
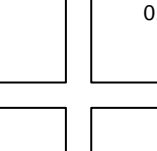


Catch for Fleet 1 (Comm) Predicted

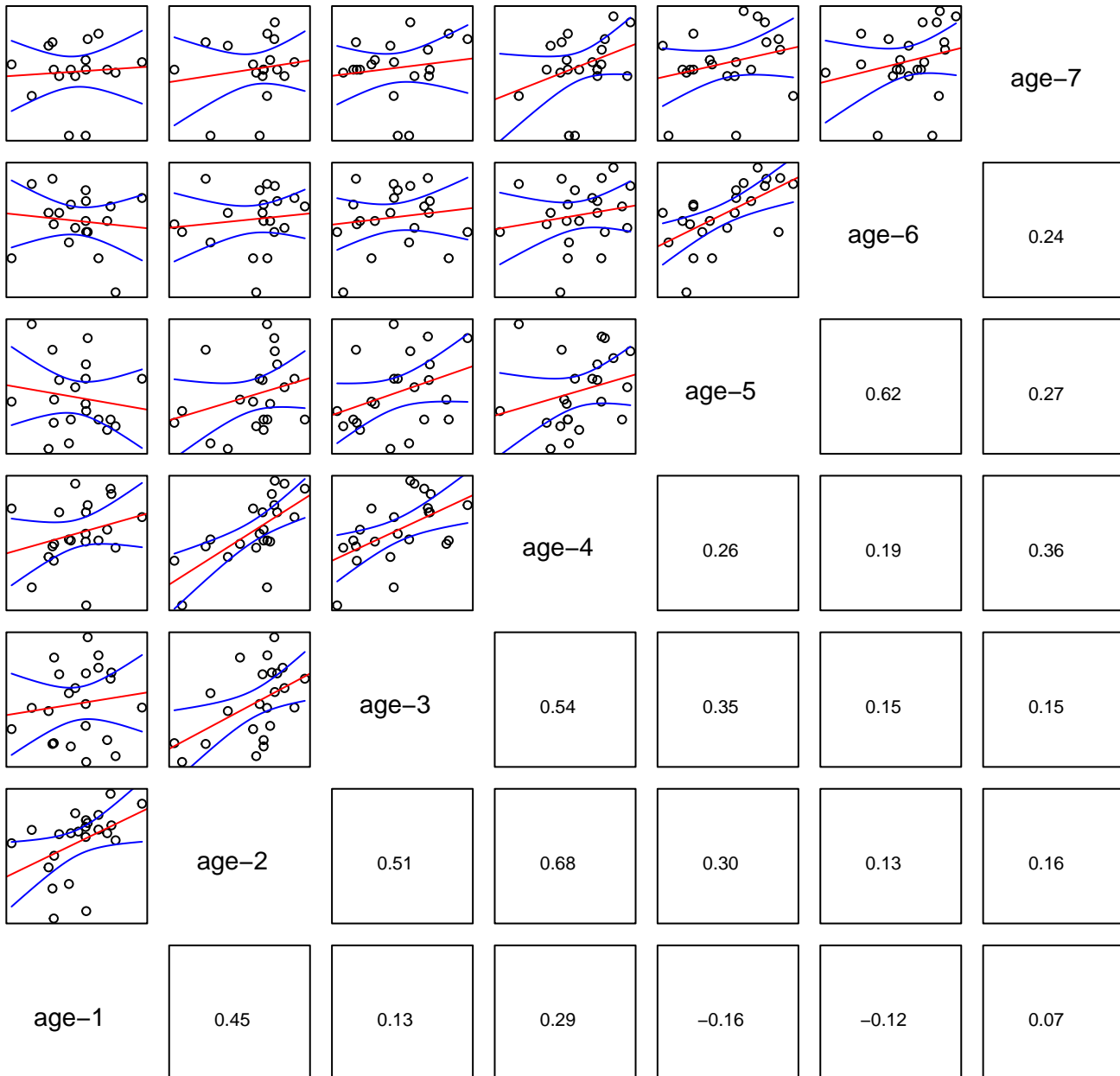


Catch for Fleet 2 (Rec) Observed

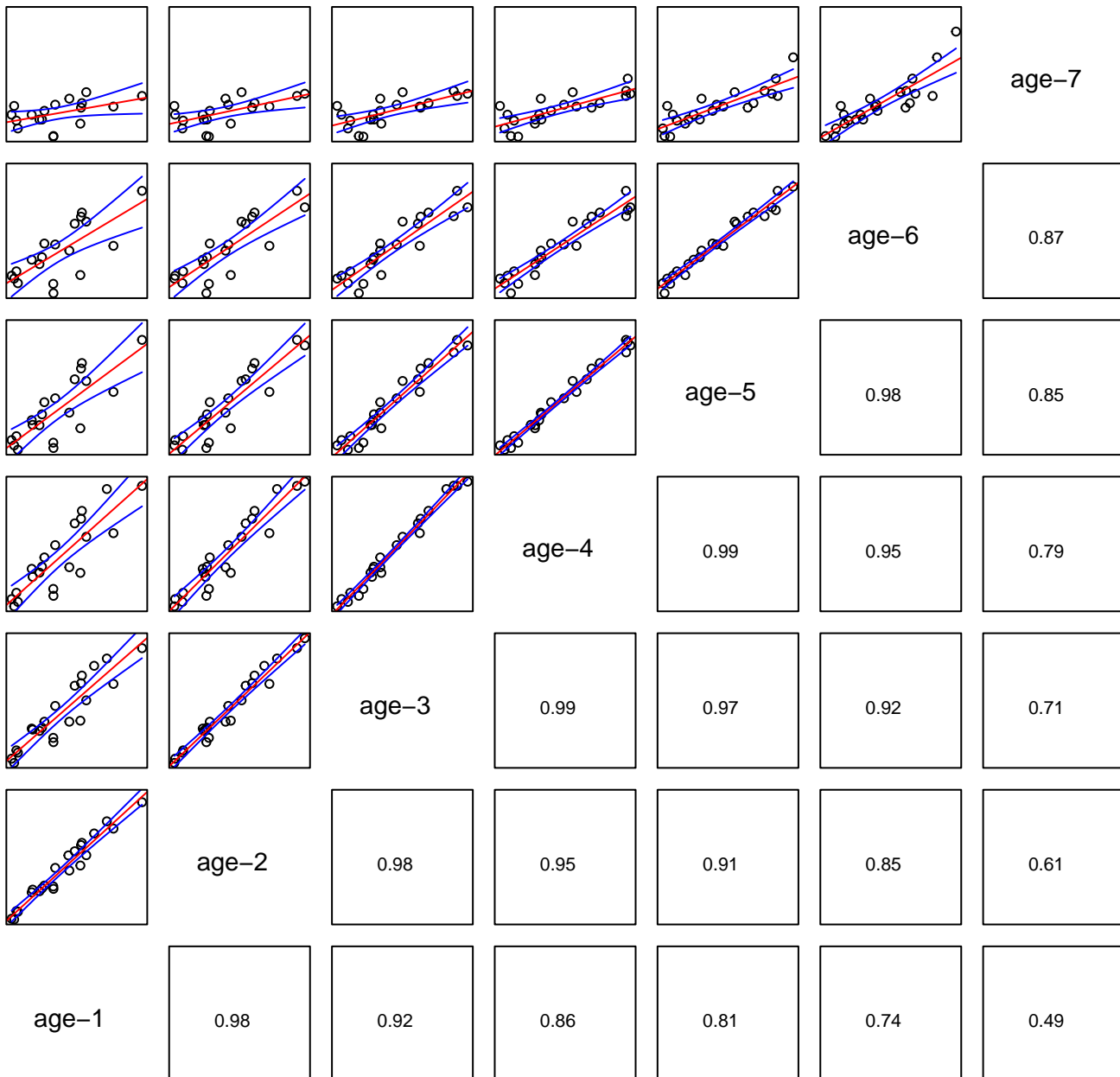


	age-1	age-2	age-3	age-4	age-5	age-6	age-7
age-1		0.74	0.33	0.05	-0.06	0.02	-0.33
age-2		age-2	0.73	0.58	0.40	0.32	-0.01
age-3			age-3	0.84	0.69	0.57	0.21
age-4				age-4	0.76	0.65	0.42
age-5					age-5	0.88	0.75
age-6						age-6	0.83
age-7							age-7

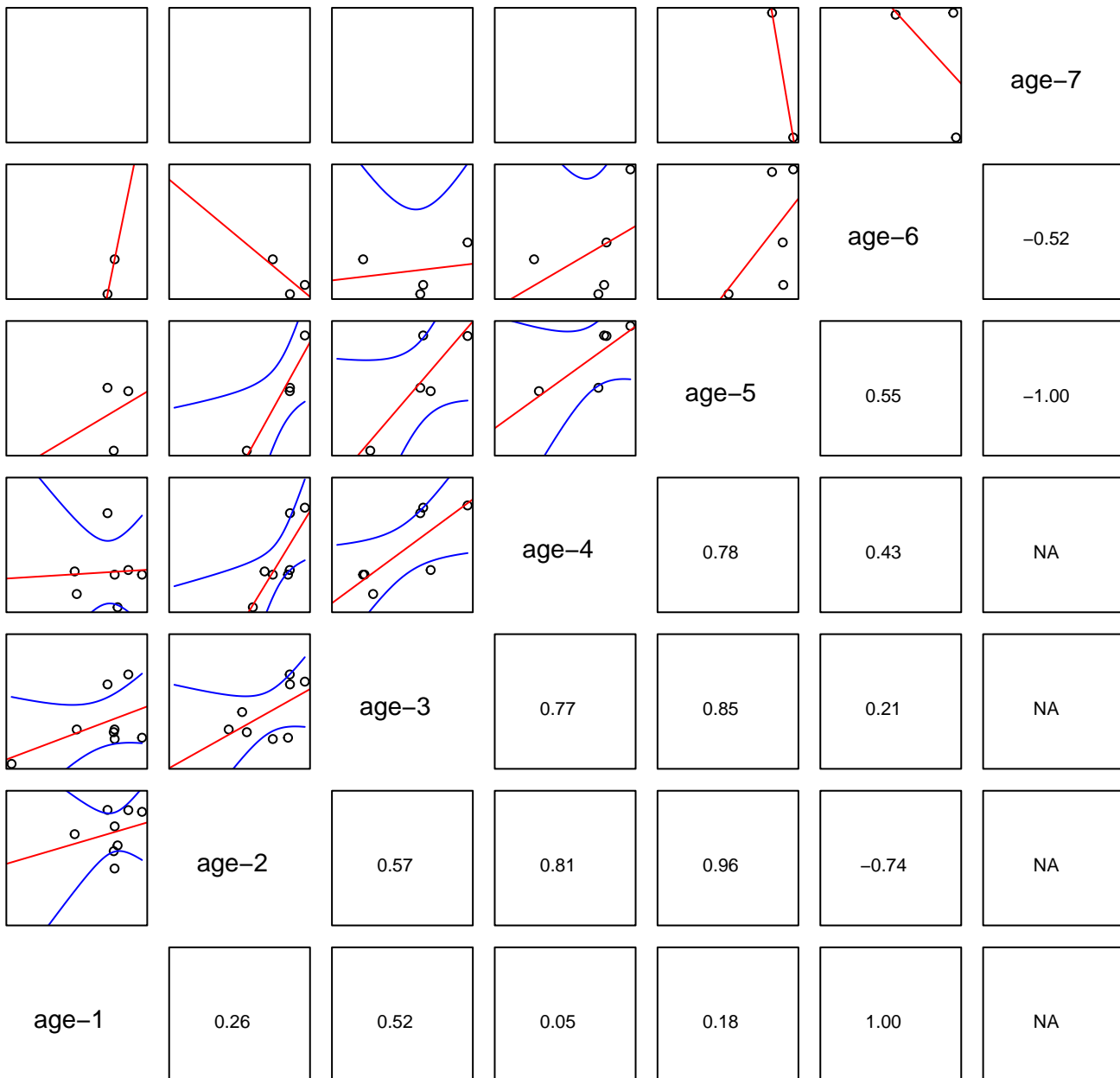
Index 1 (NEFSC Inshore) Observed



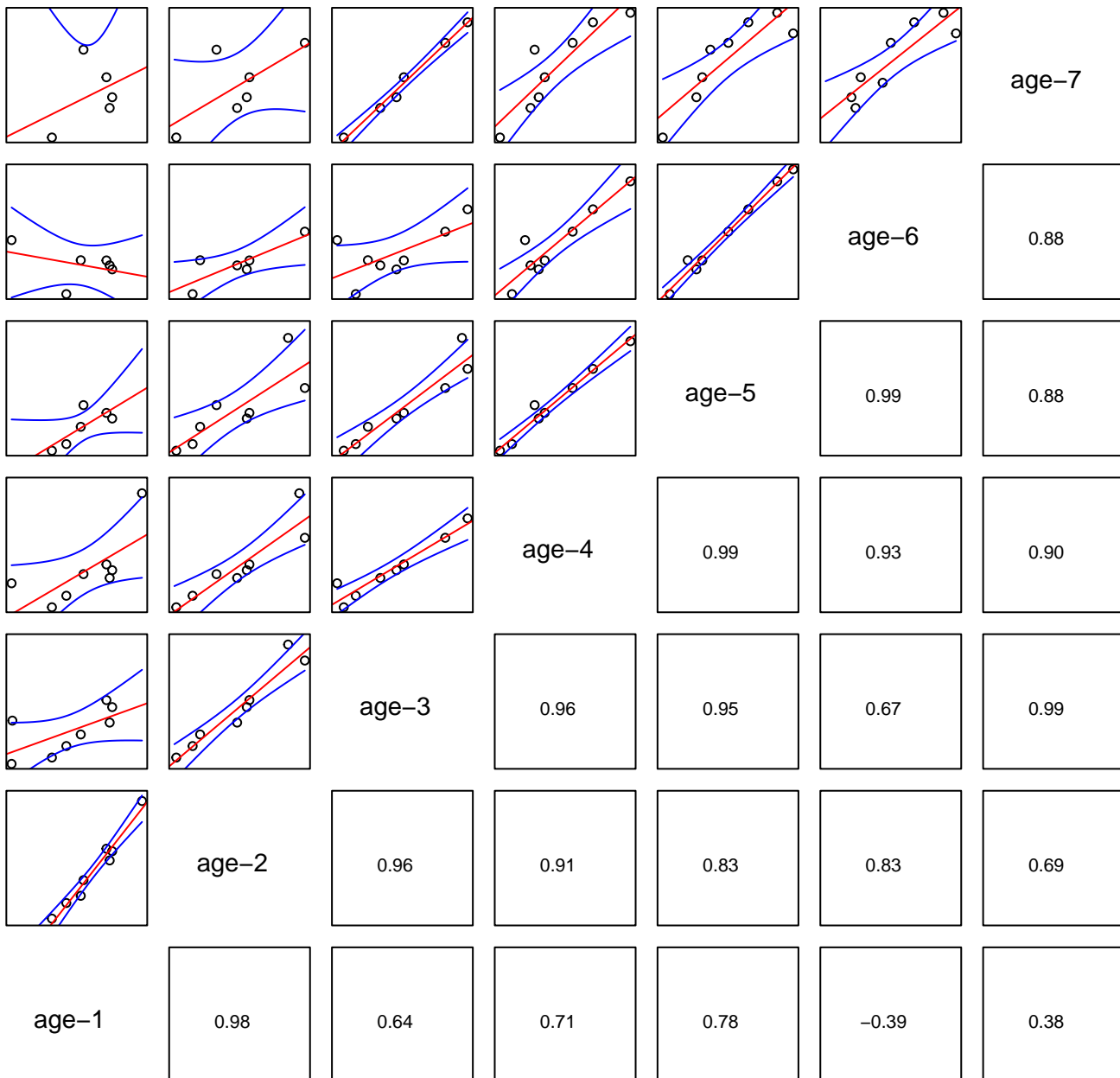
Index 1 (NEFSC Inshore) Predicted



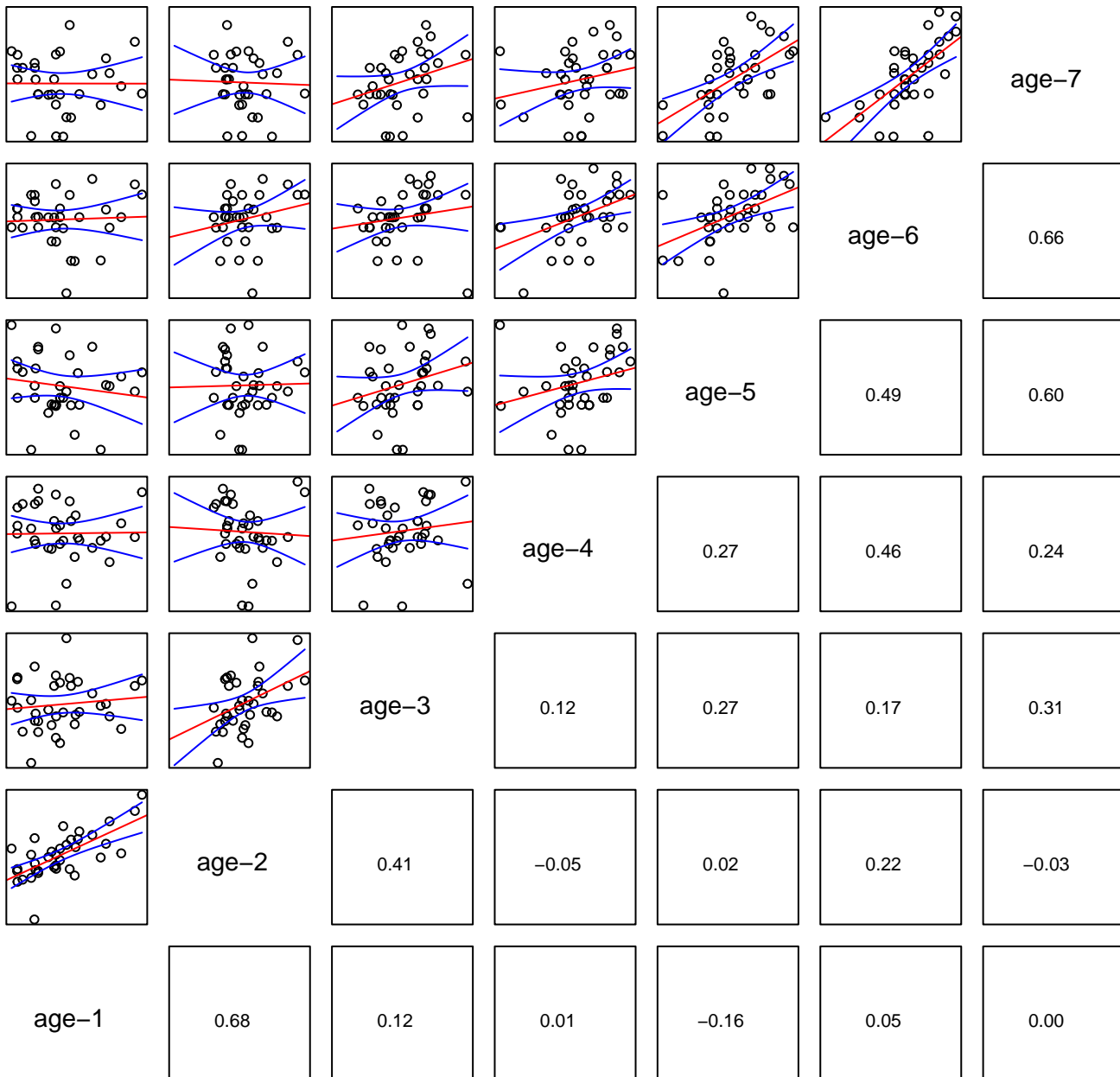
Index 2 (Bigelow) Observed



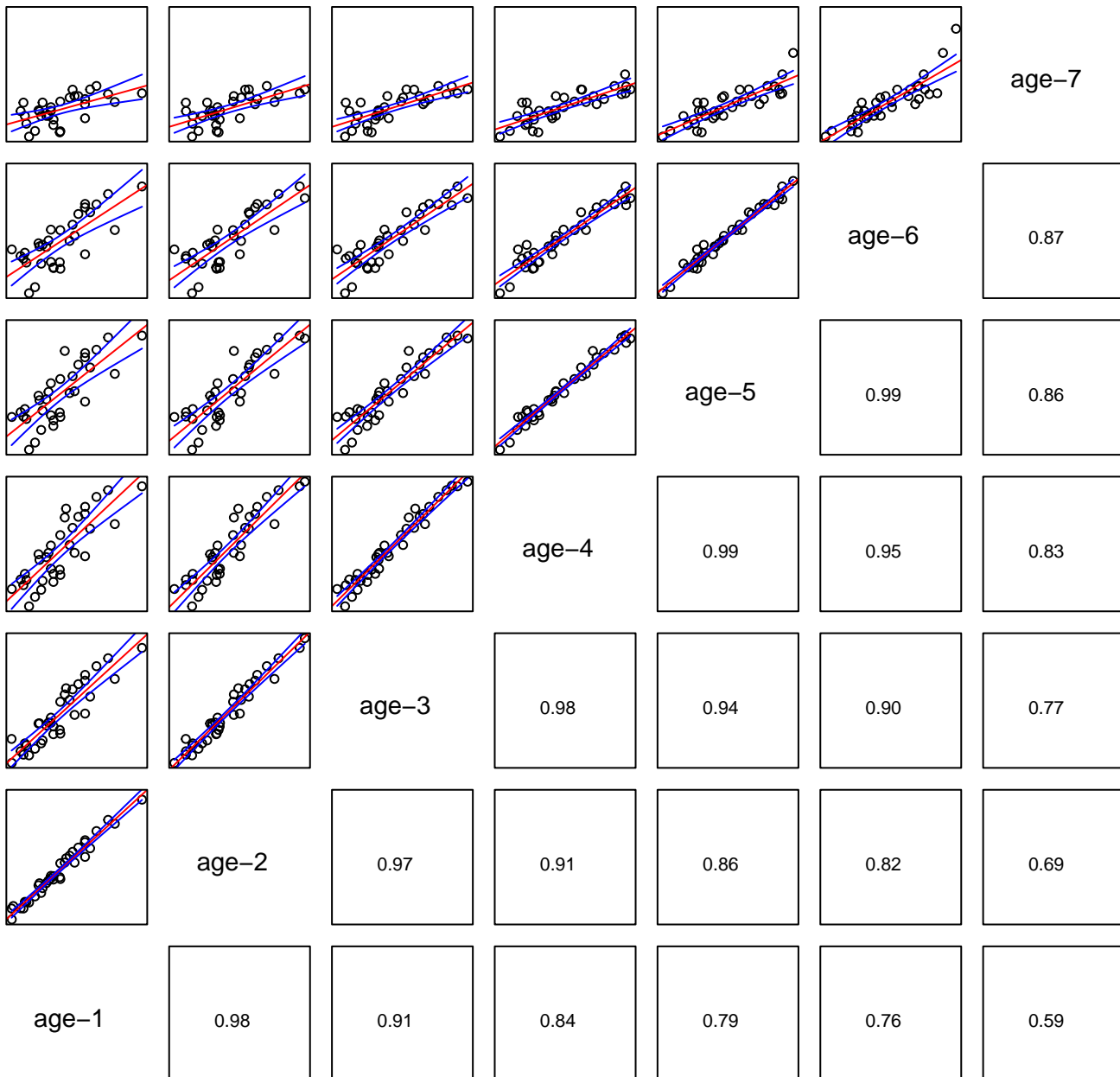
Index 2 (Bigelow) Predicted



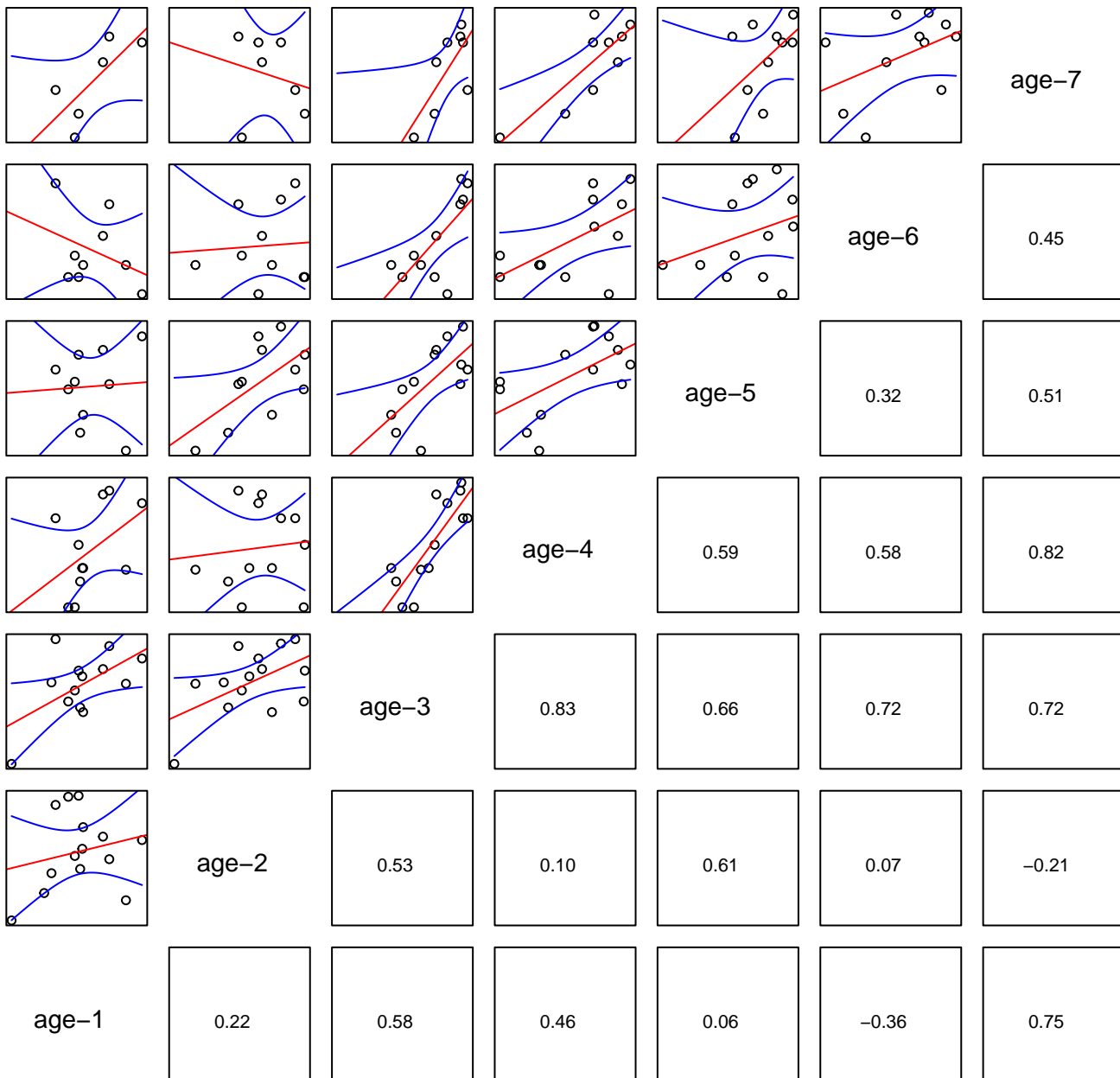
Index 3 (MRIP) Observed



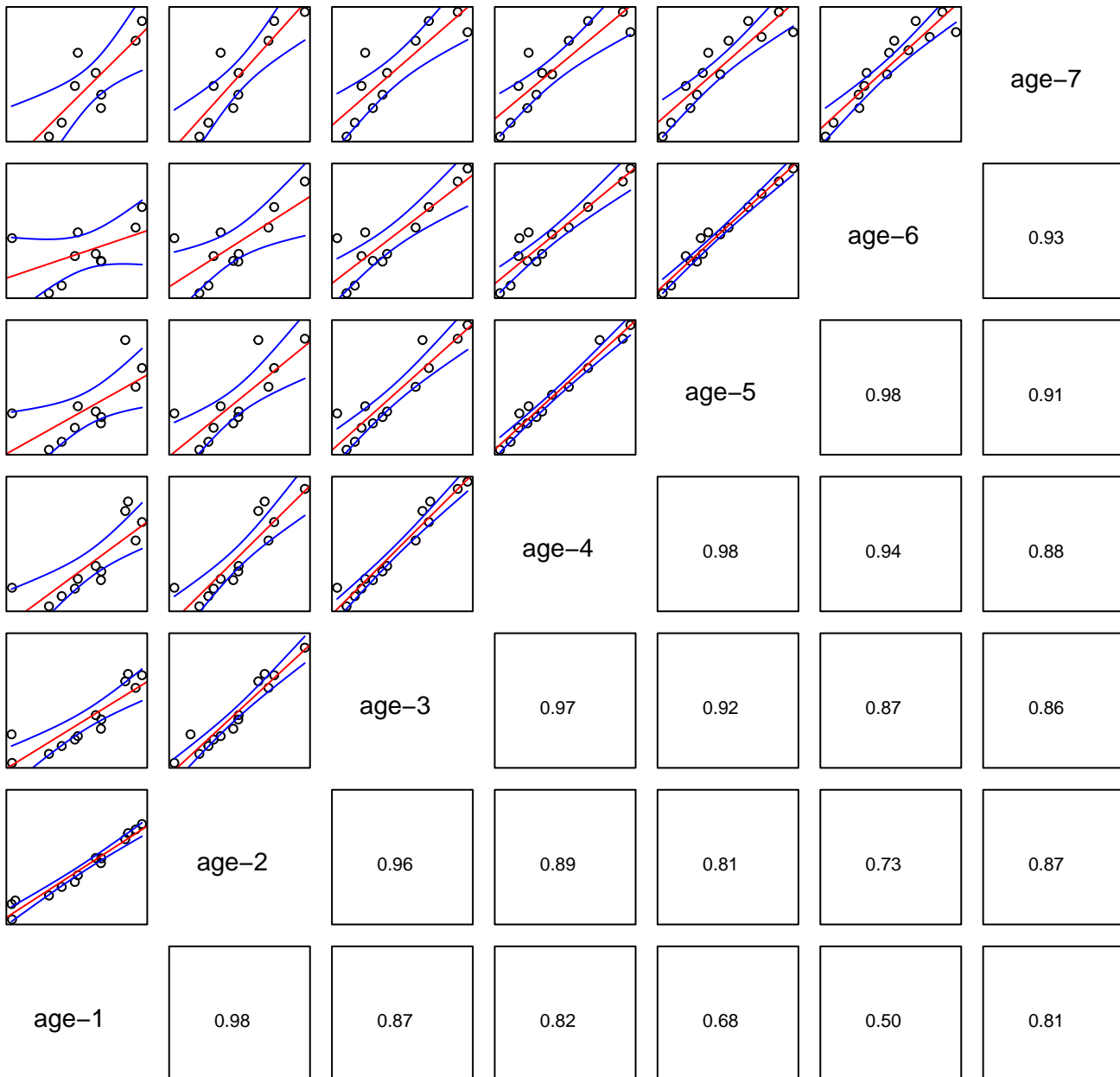
Index 3 (MRIP) Predicted



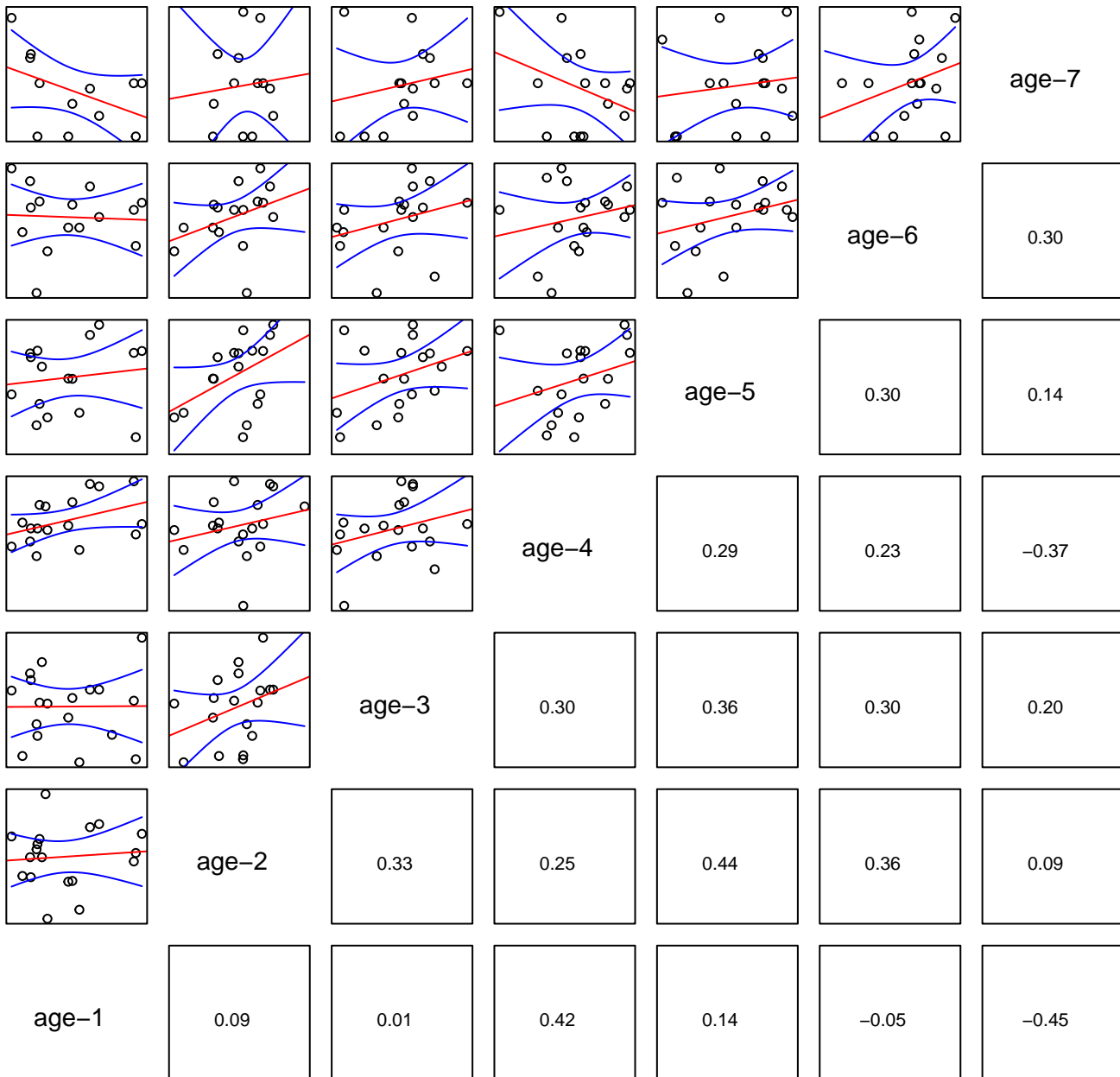
Index 4 (NEAMAP) Observed



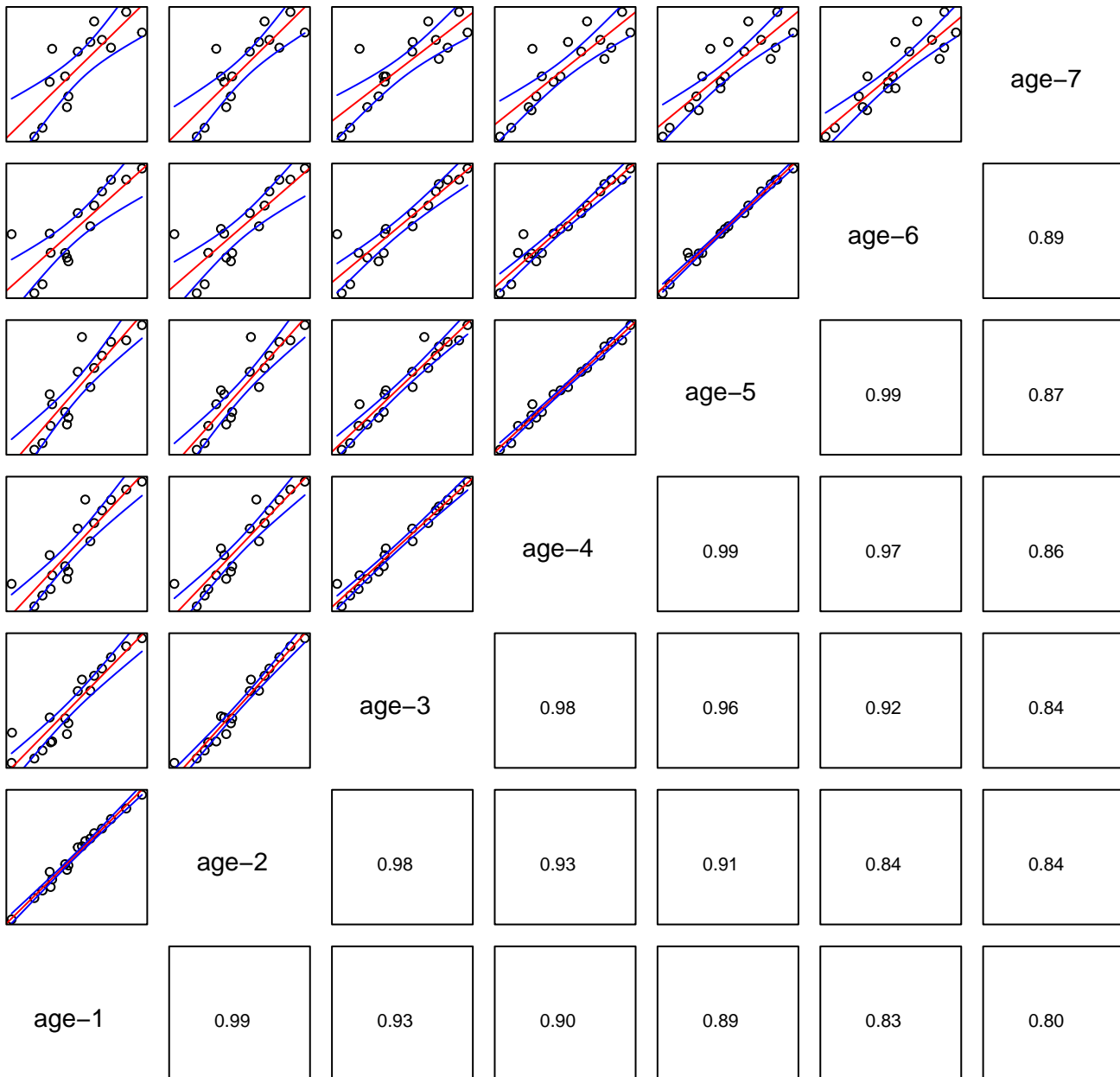
Index 4 (NEAMAP) Predicted



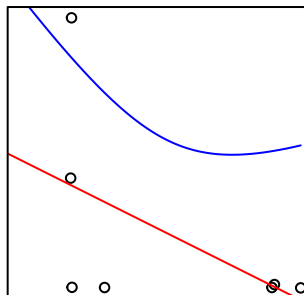
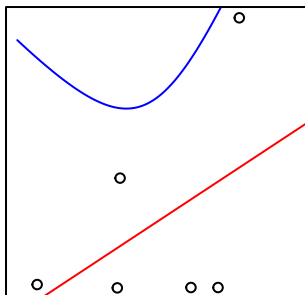
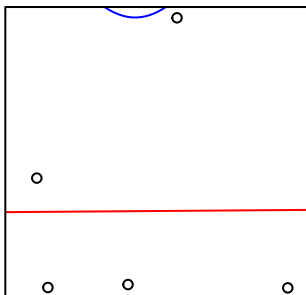
Index 6 (PSIGN) Observed



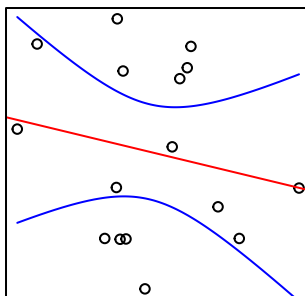
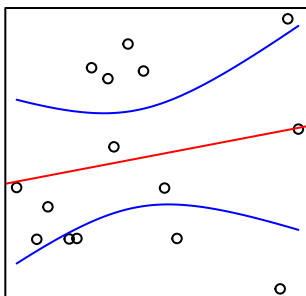
Index 6 (PSIGN) Predicted



Index 8 (ChesMMAp) Observed

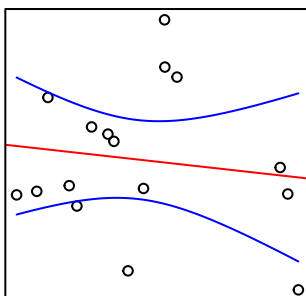


age-4



age-3

-0.53



age-2

-0.20

0.46

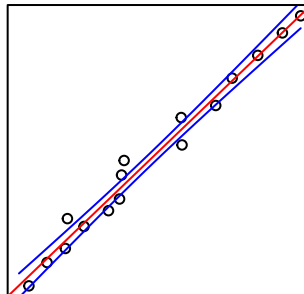
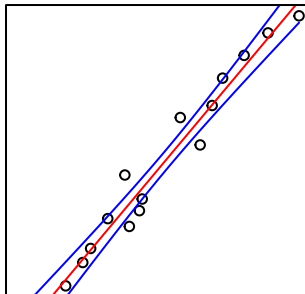
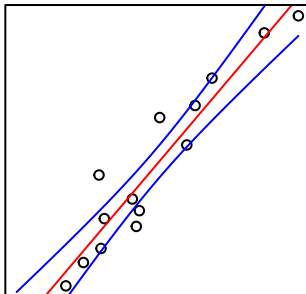
age-1

-0.14

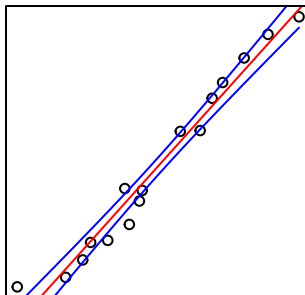
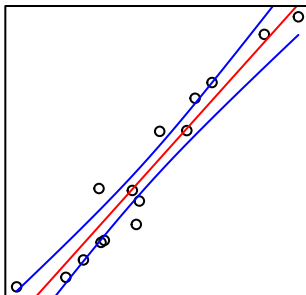
0.20

0.01

Index 8 (ChesMMAp) Predicted

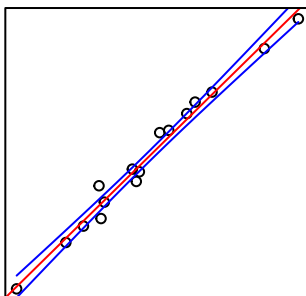


age-4



age-3

0.99



age-2

0.98

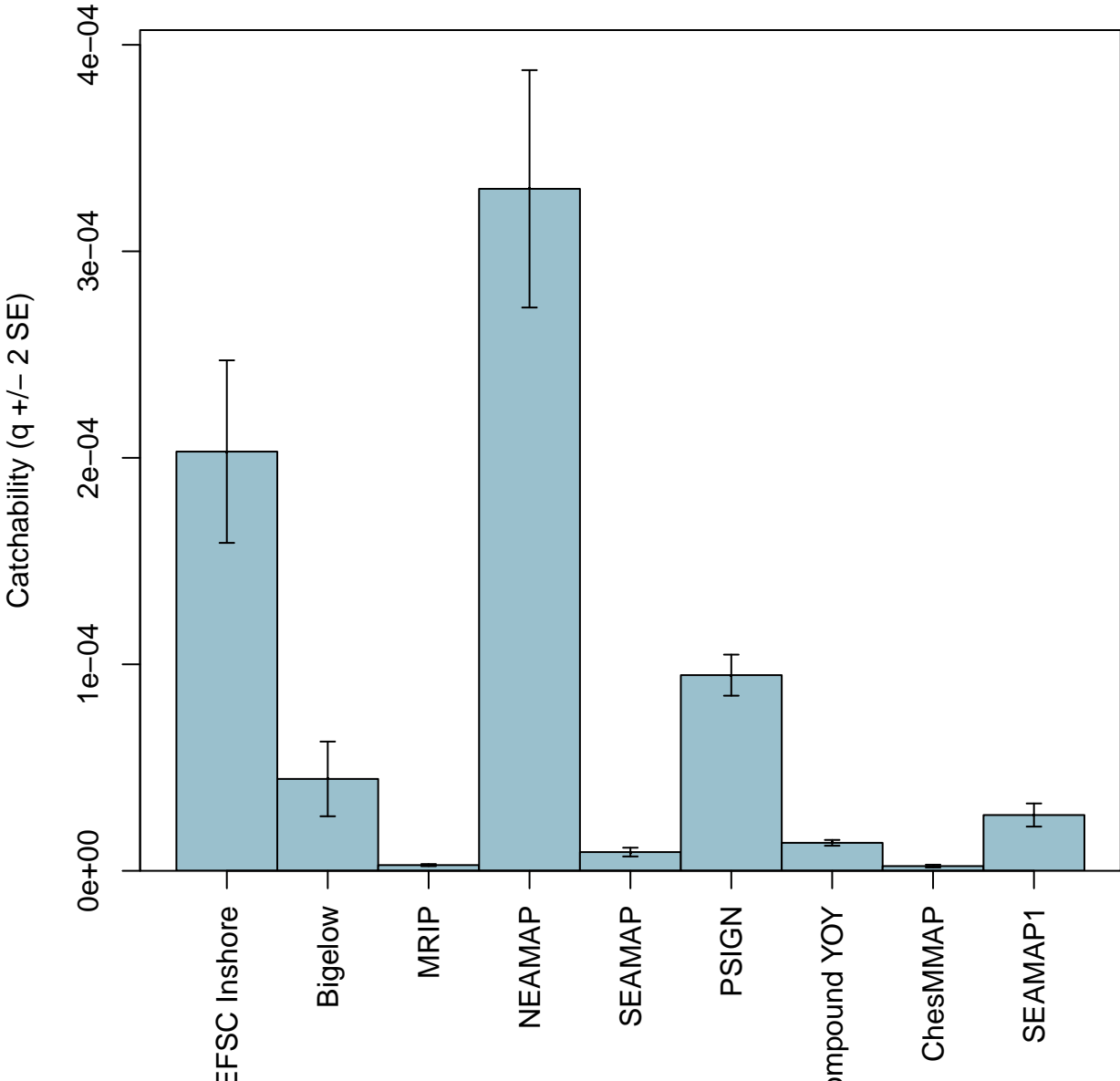
0.98

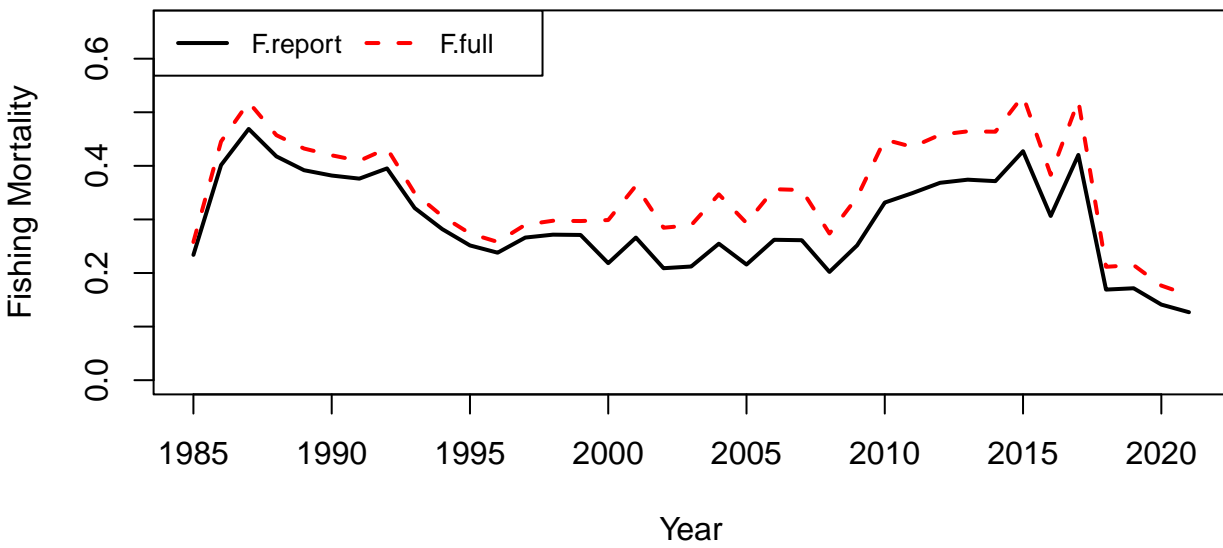
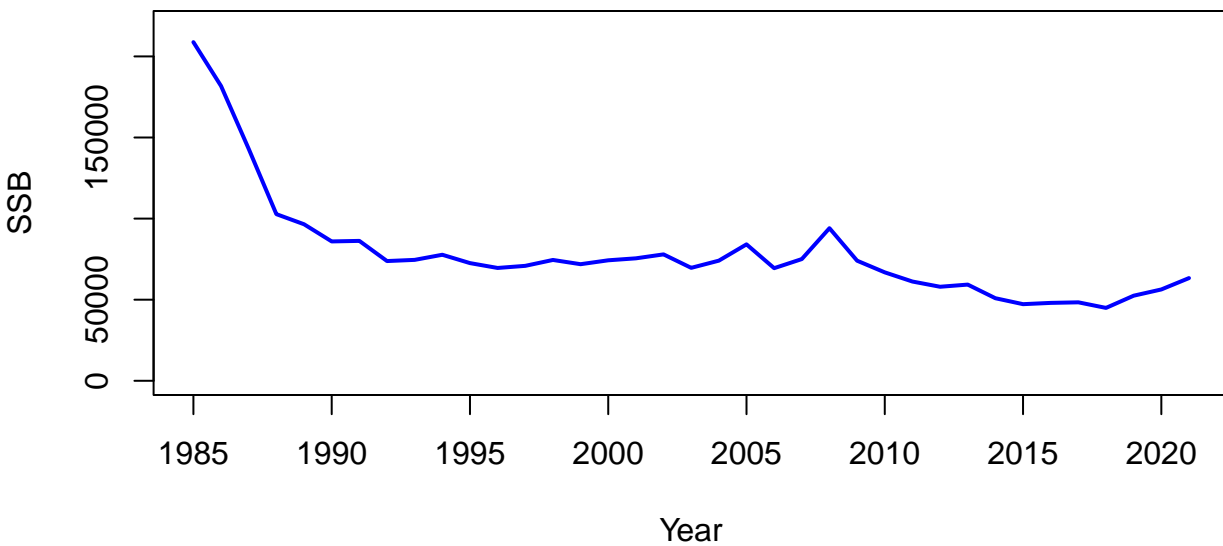
age-1

0.99

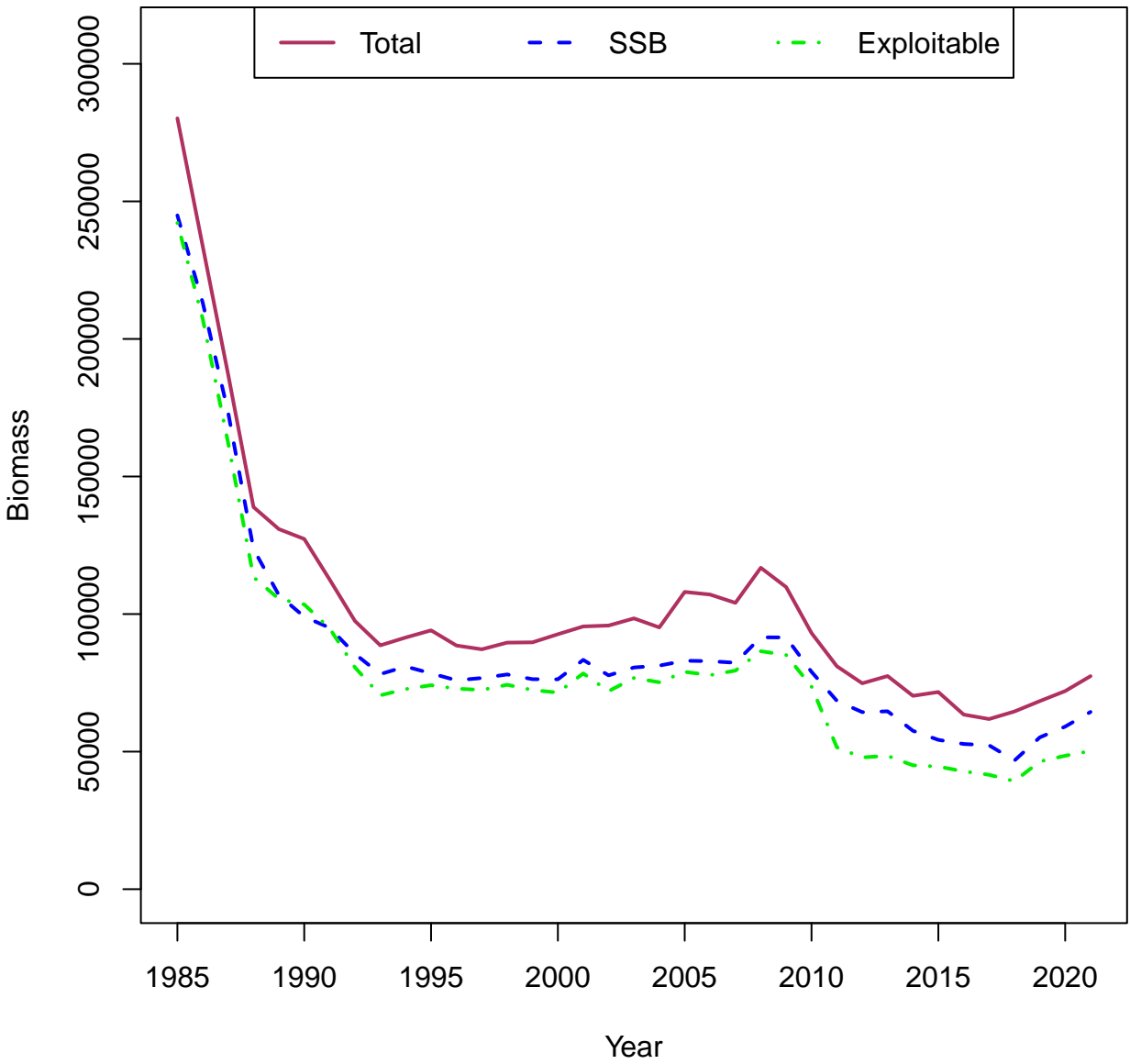
0.96

0.95

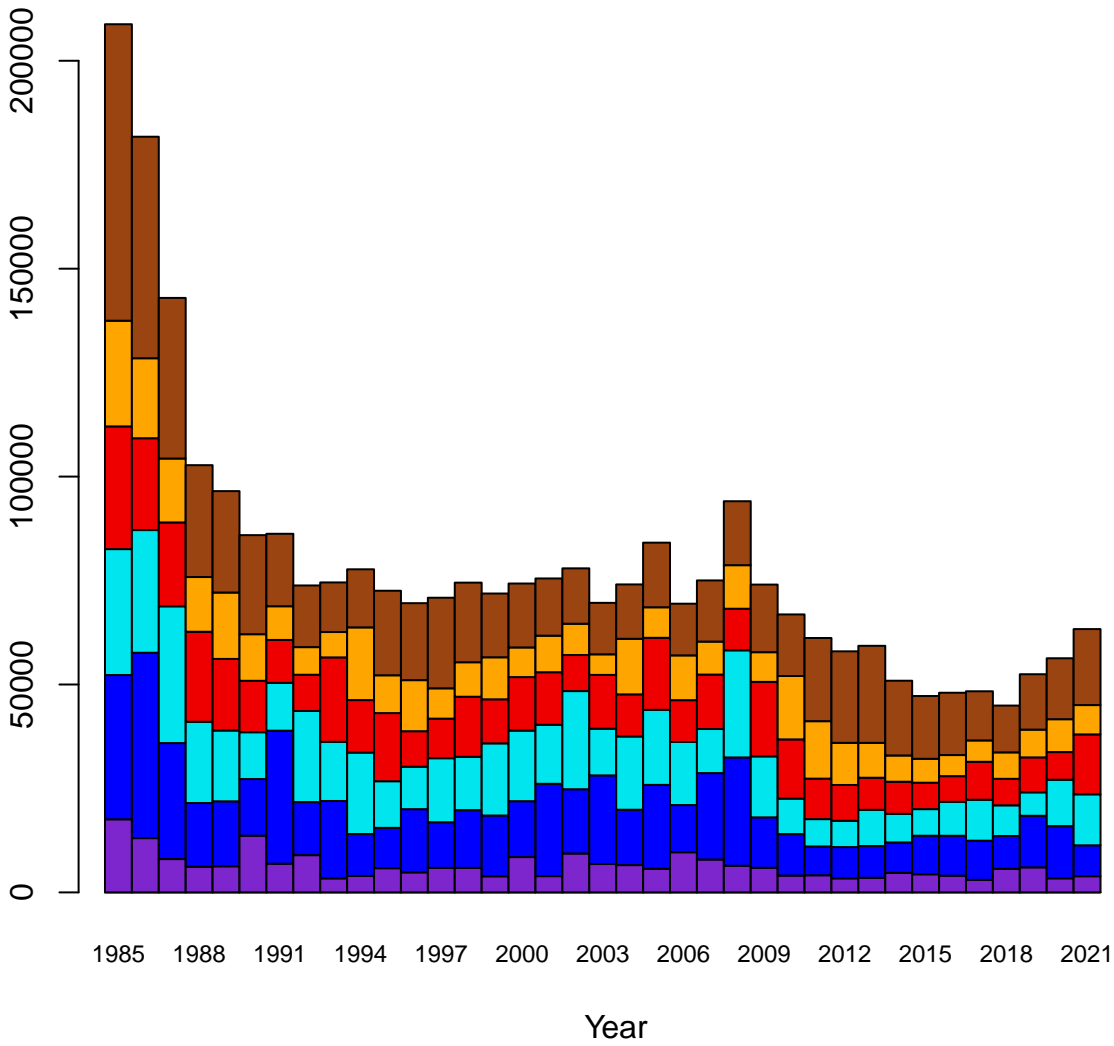


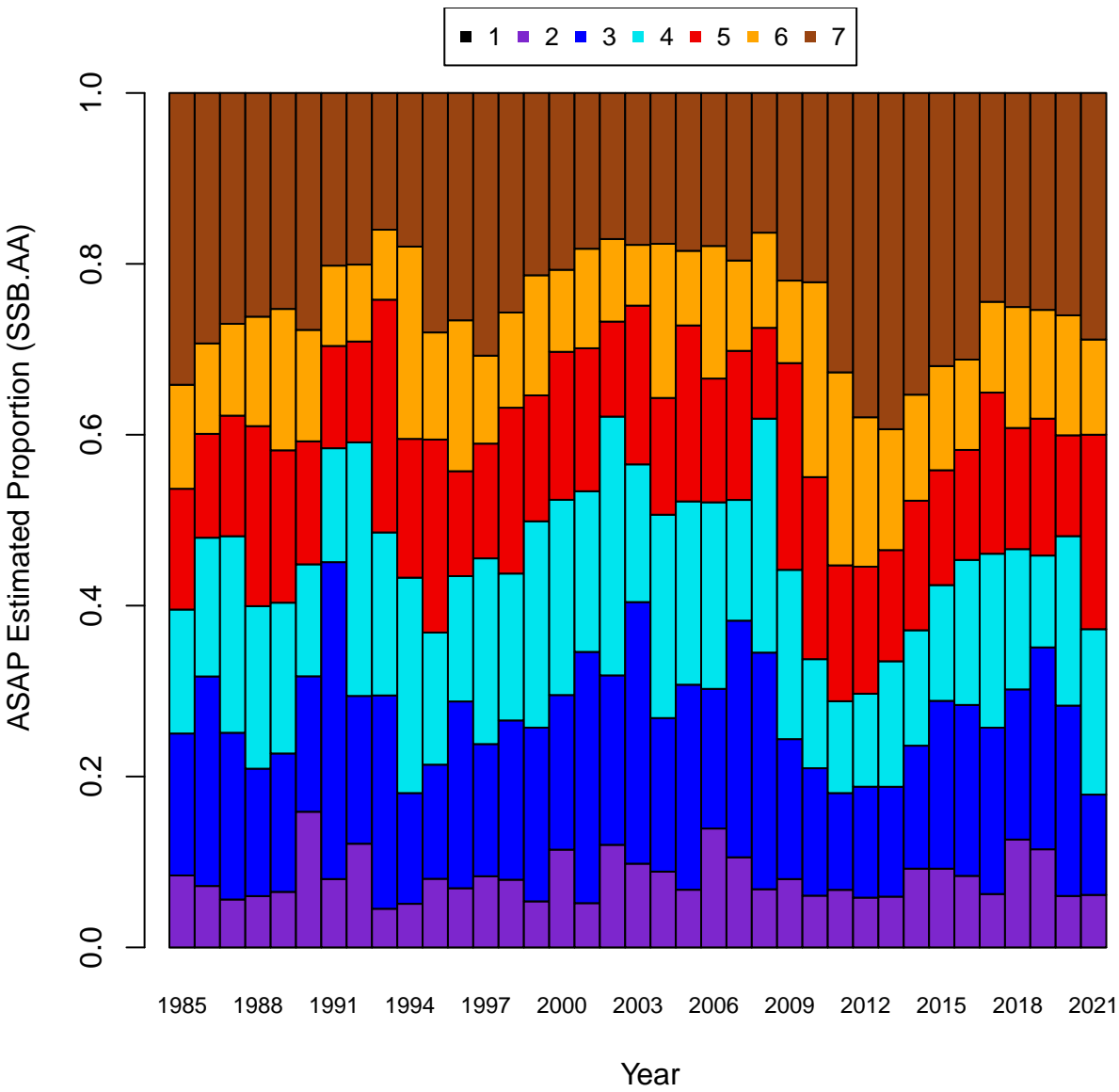


Comparison of January 1 Biomass

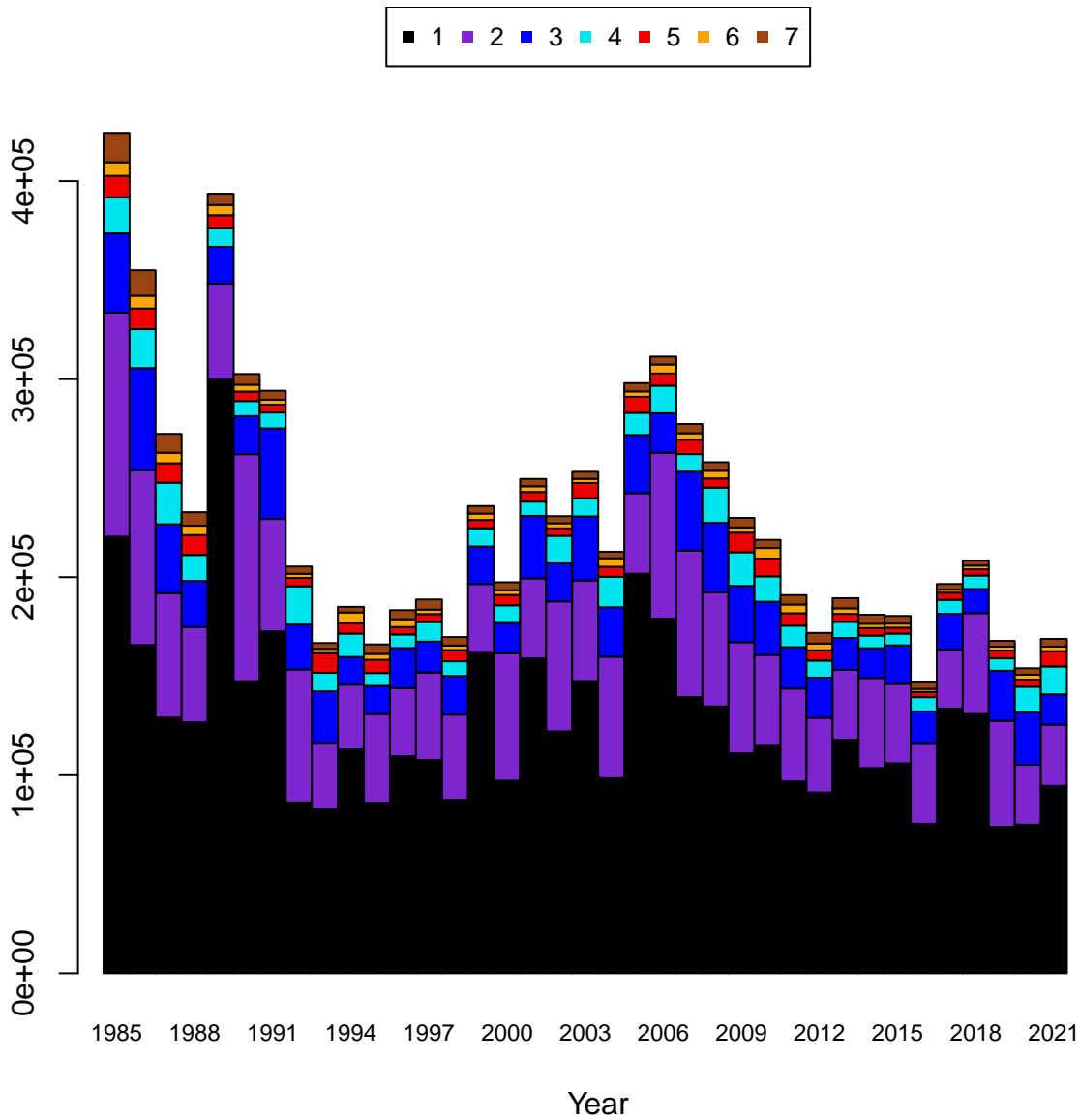


ASAP Estimated SSB.AA

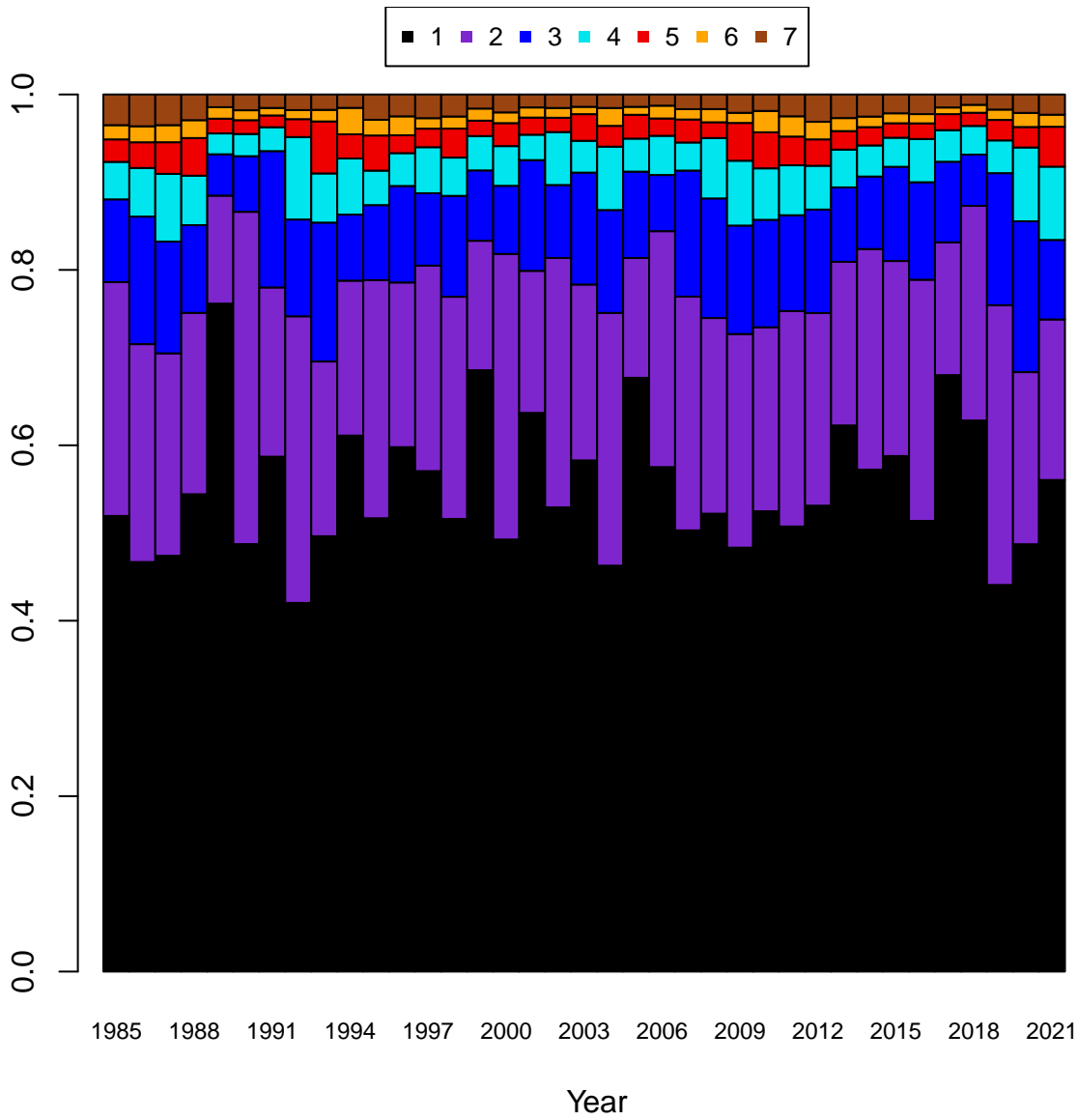


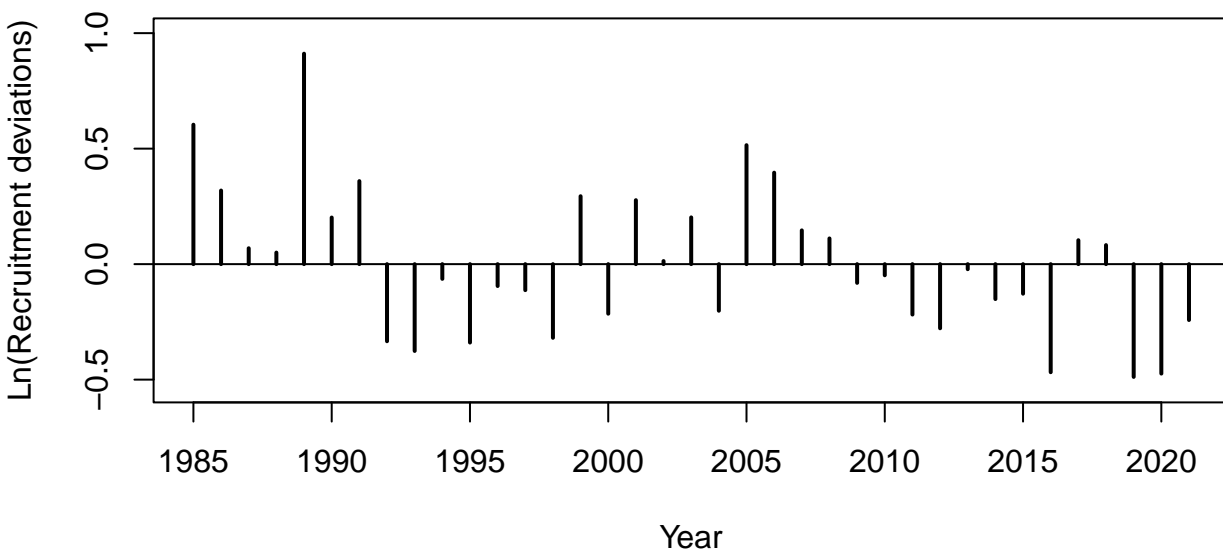
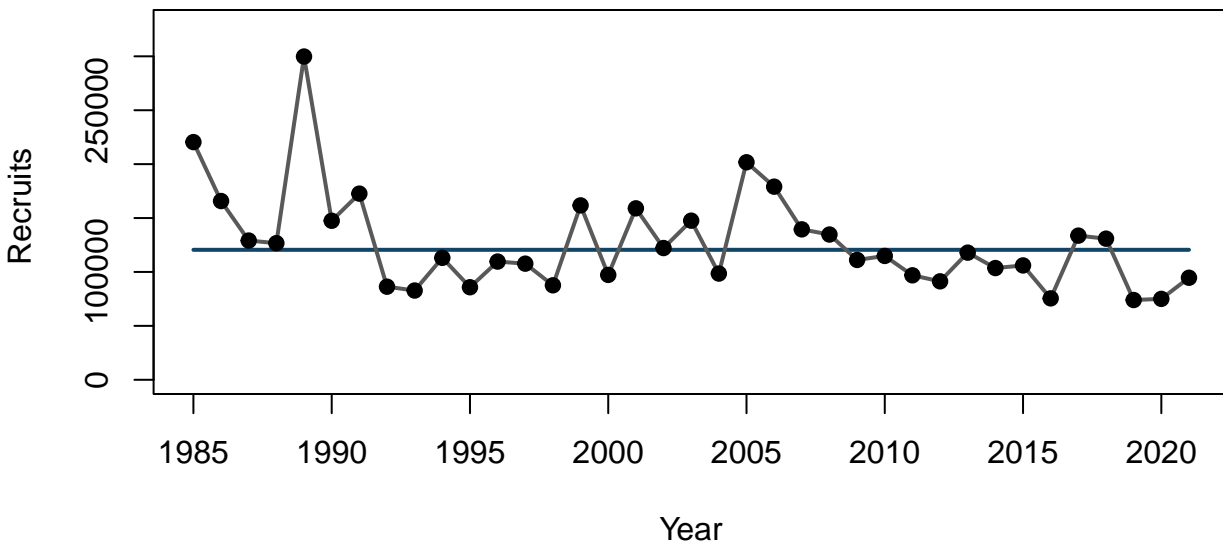


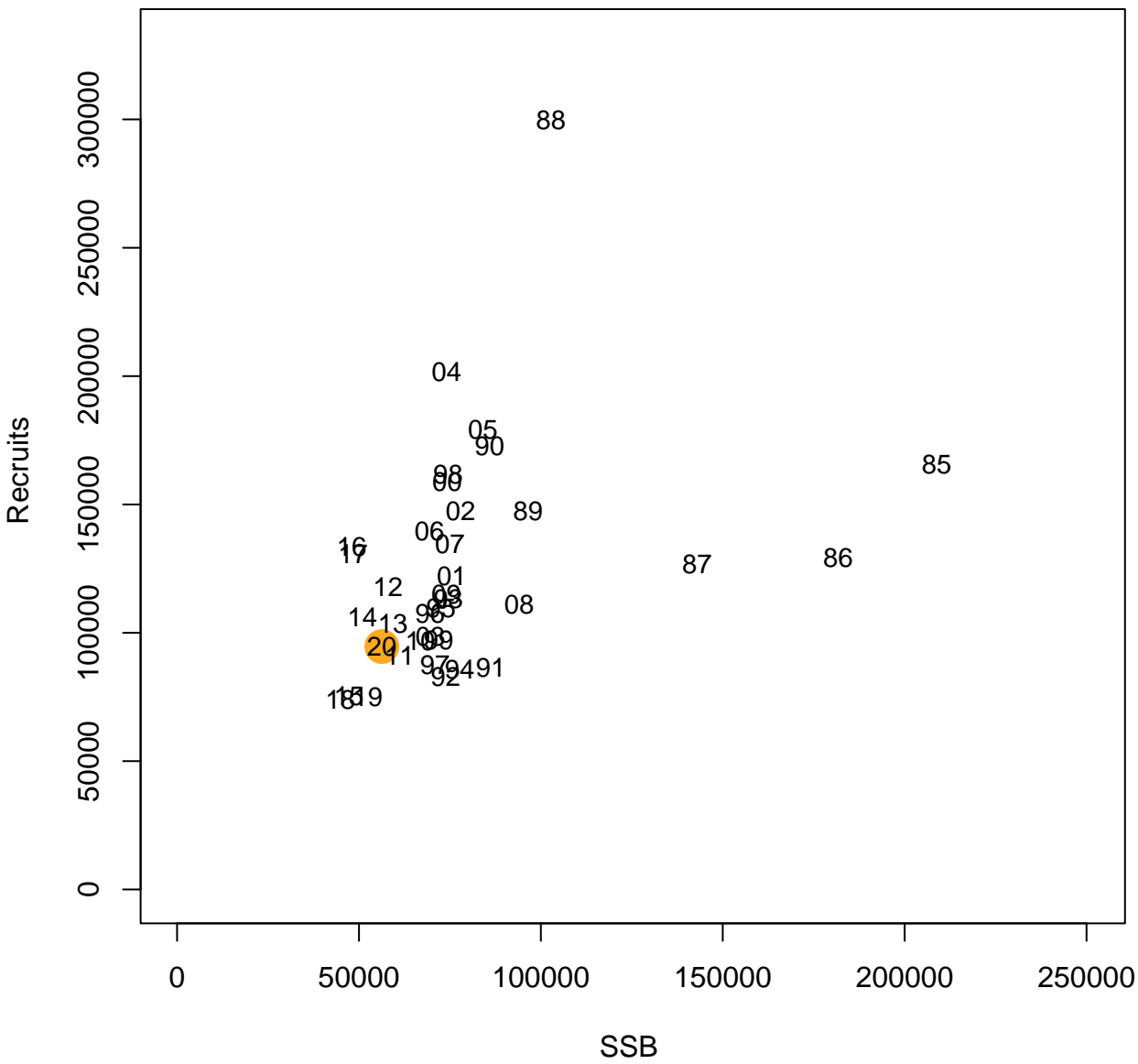
ASAP Estimated NAA

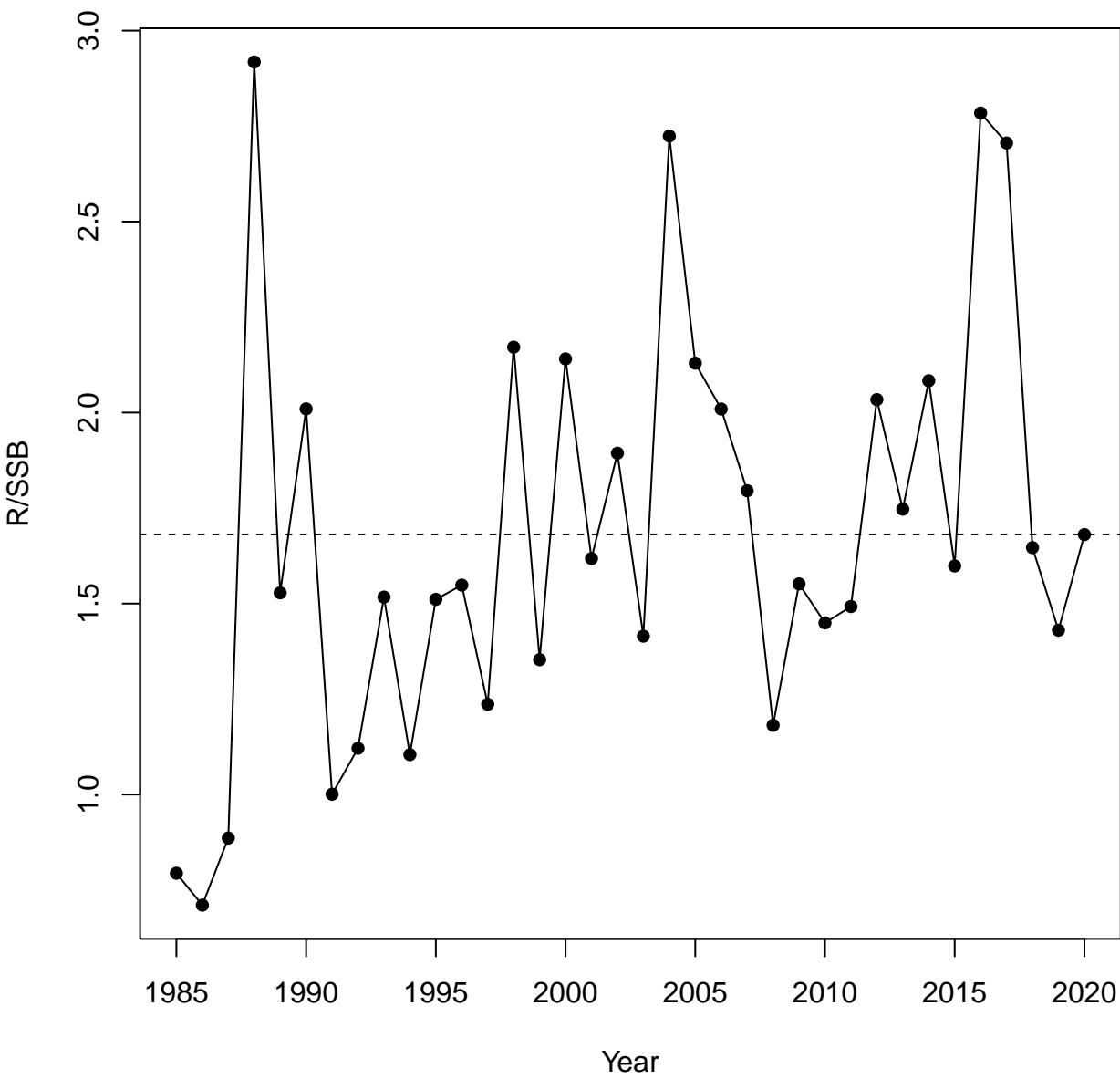


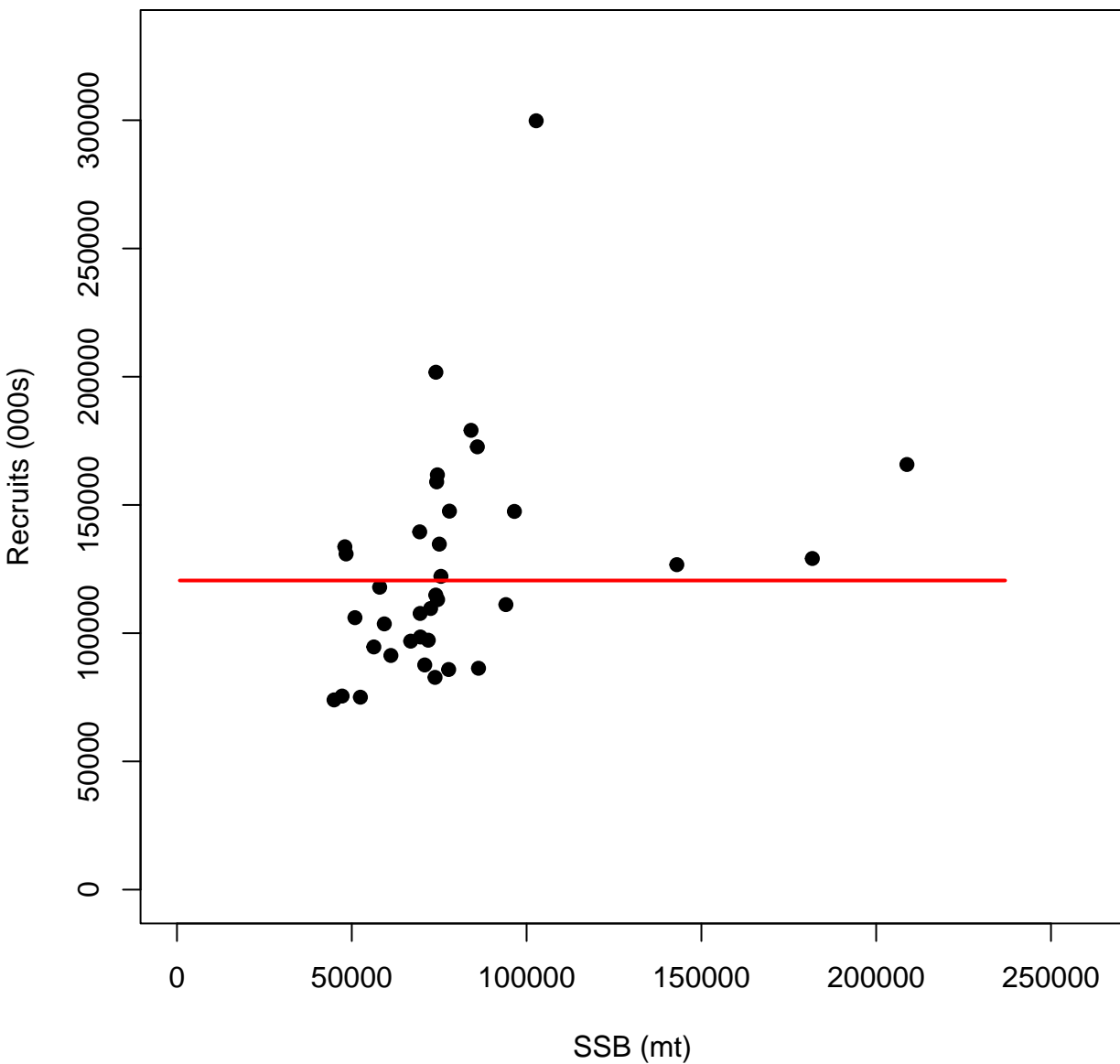
ASAP Estimated Proportion (NAA)

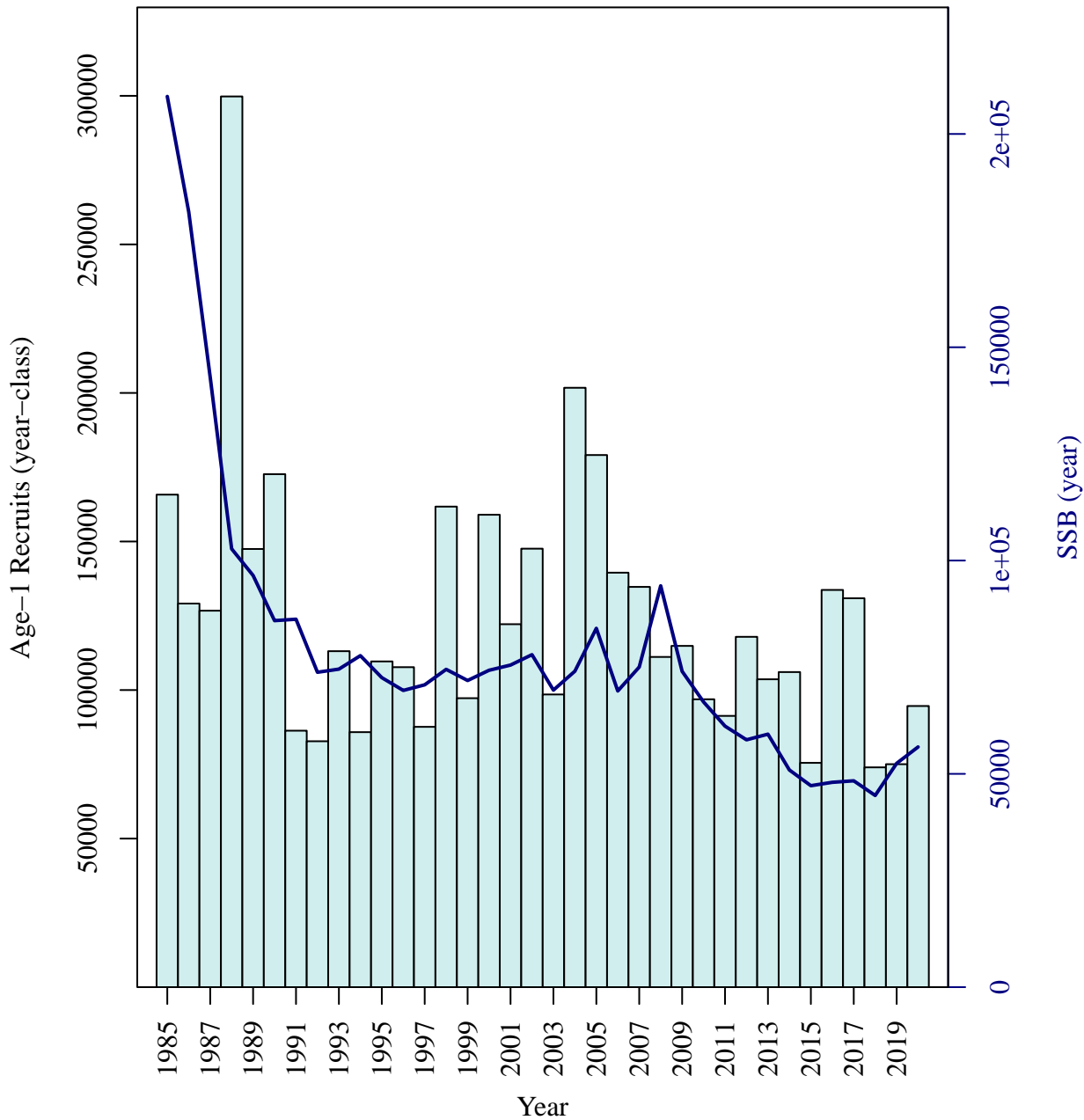


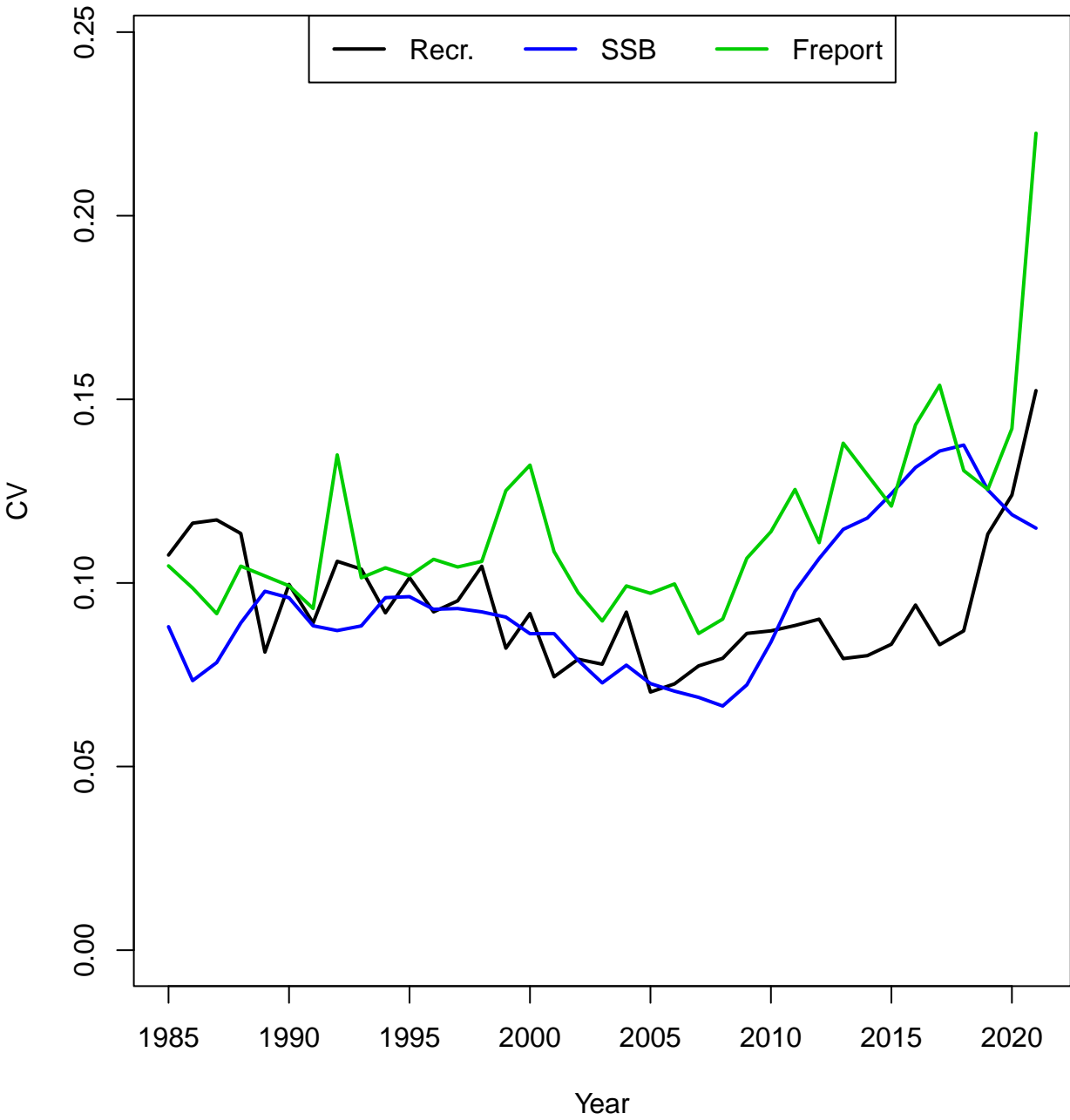




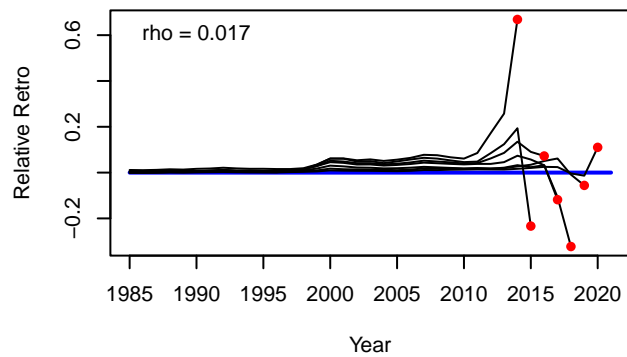
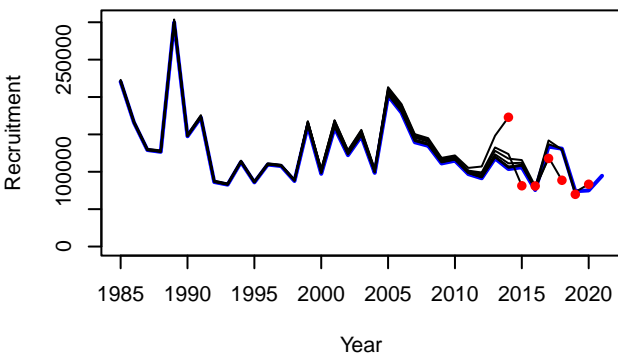
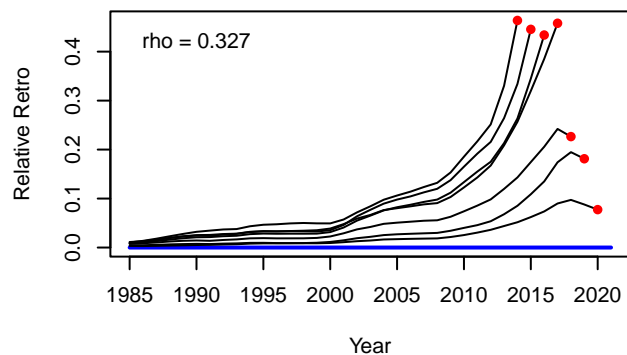
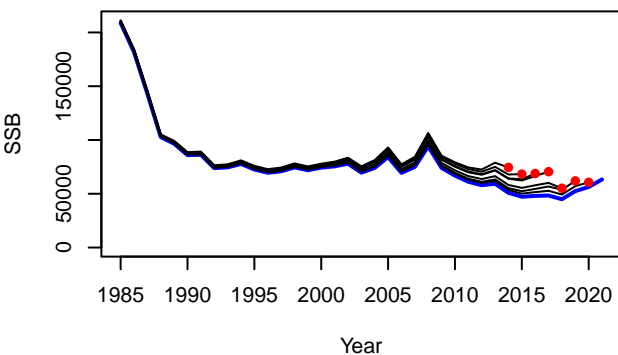
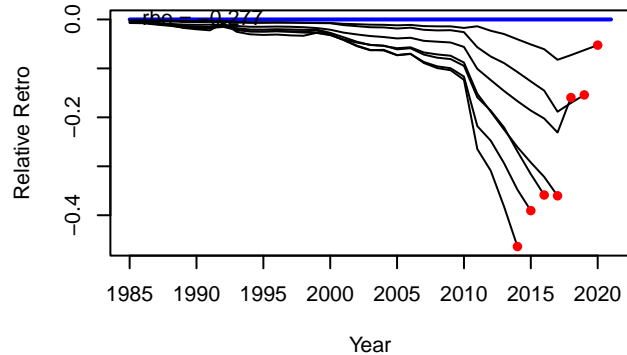
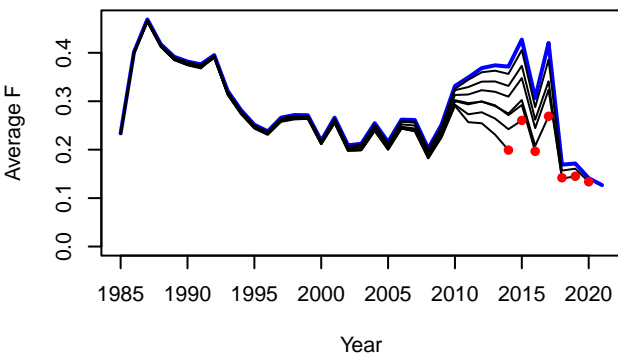






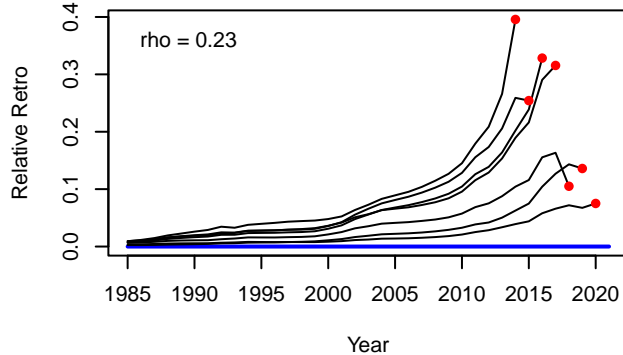
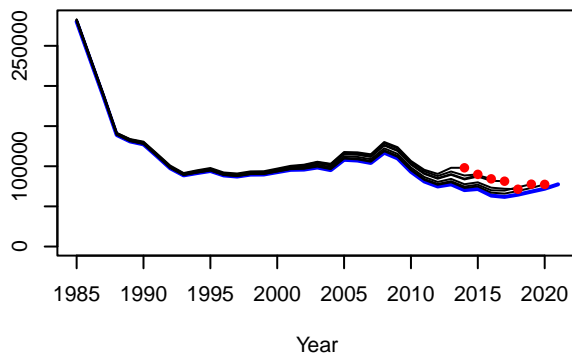


F, SSB, R

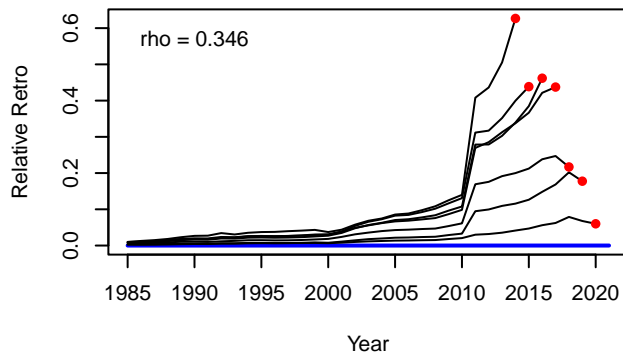
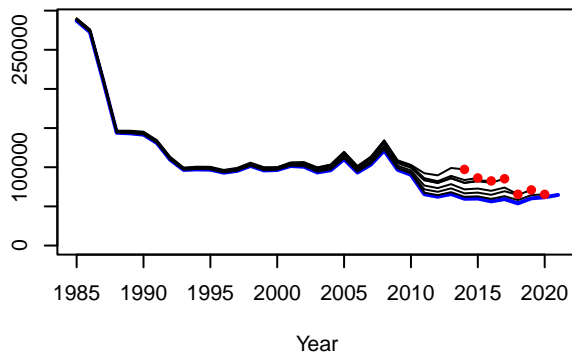


Jan-1 B, Exploitable B, Total Stock N

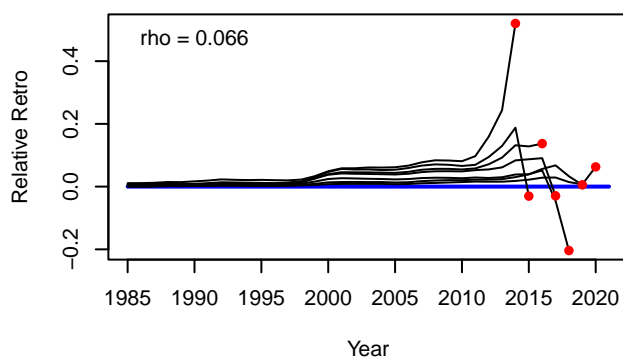
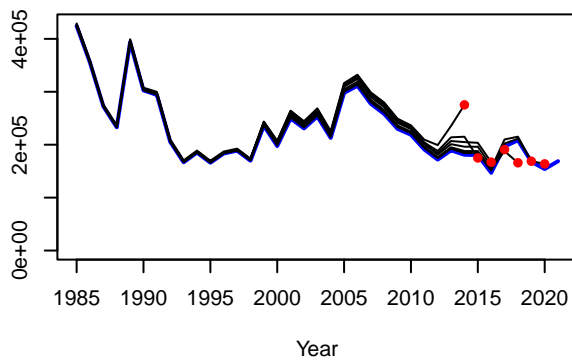
Jan-1 B



Exploitable B

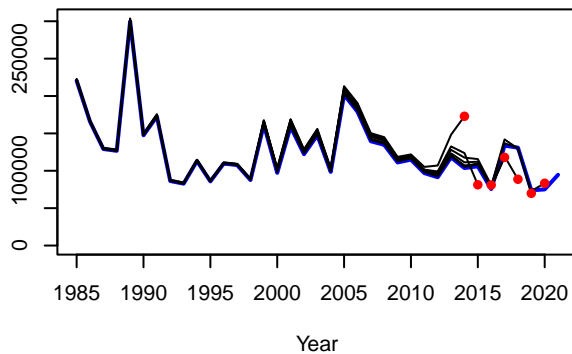


Total Stock N

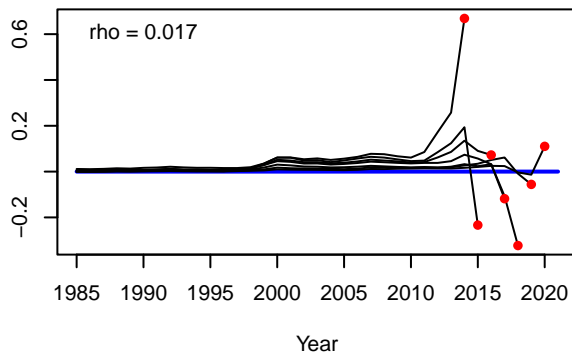


Stock Numbers at Age

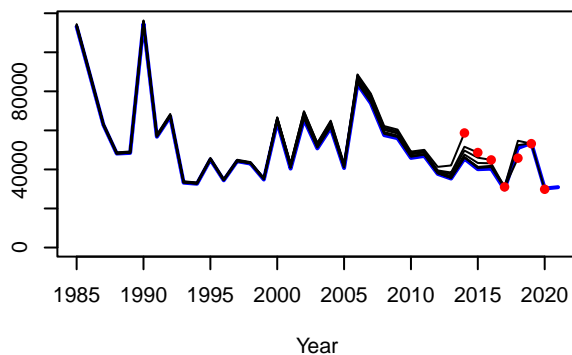
N at Age 1



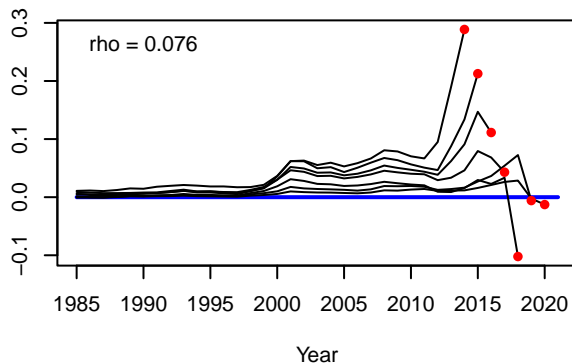
Relative Retro



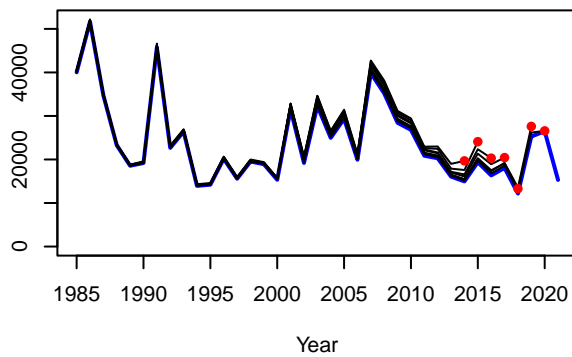
N at Age 2



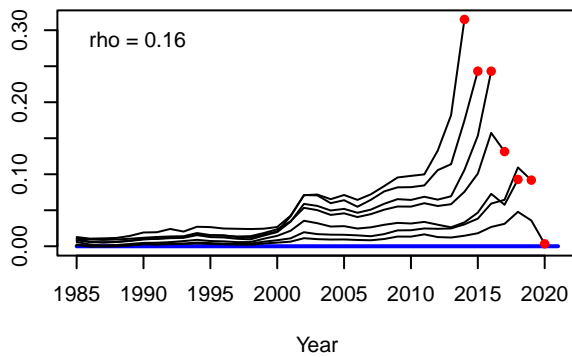
Relative Retro



N at Age 3

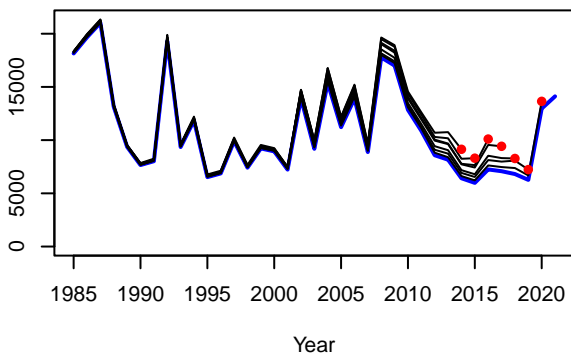


Relative Retro

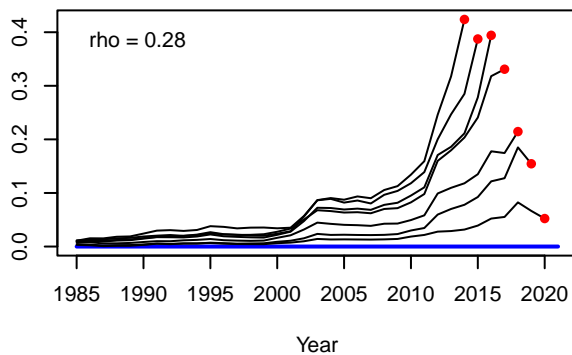


Stock Numbers at Age

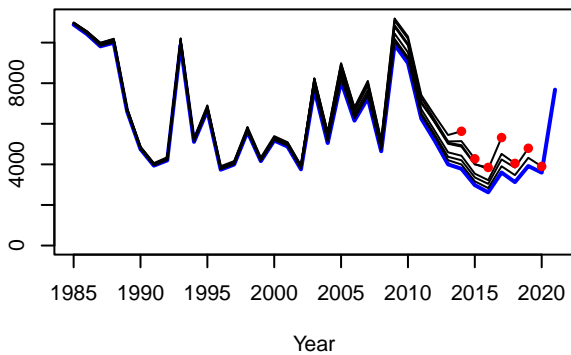
N at Age 4



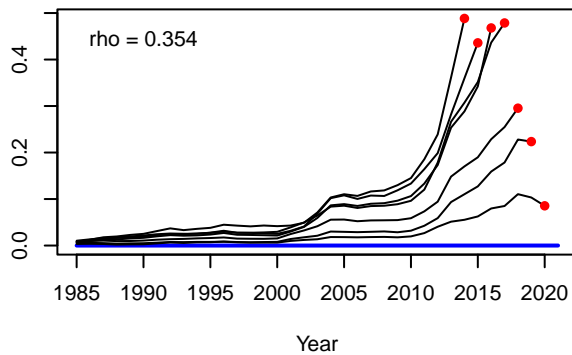
Relative Retro



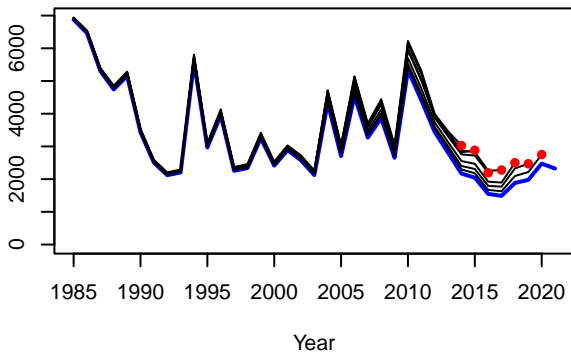
N at Age 5



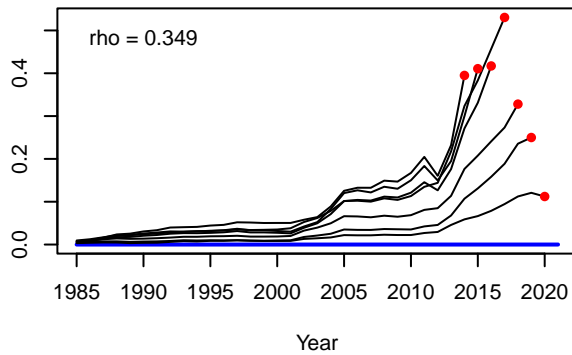
Relative Retro



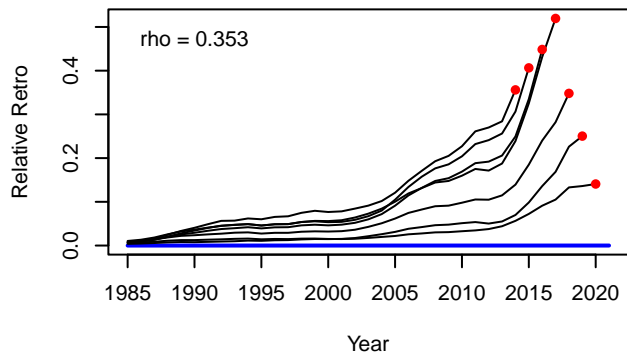
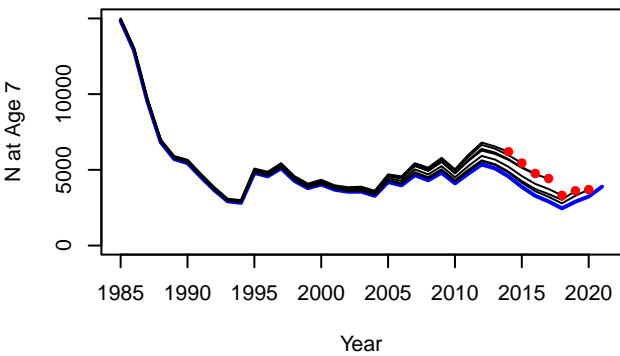
N at Age 6



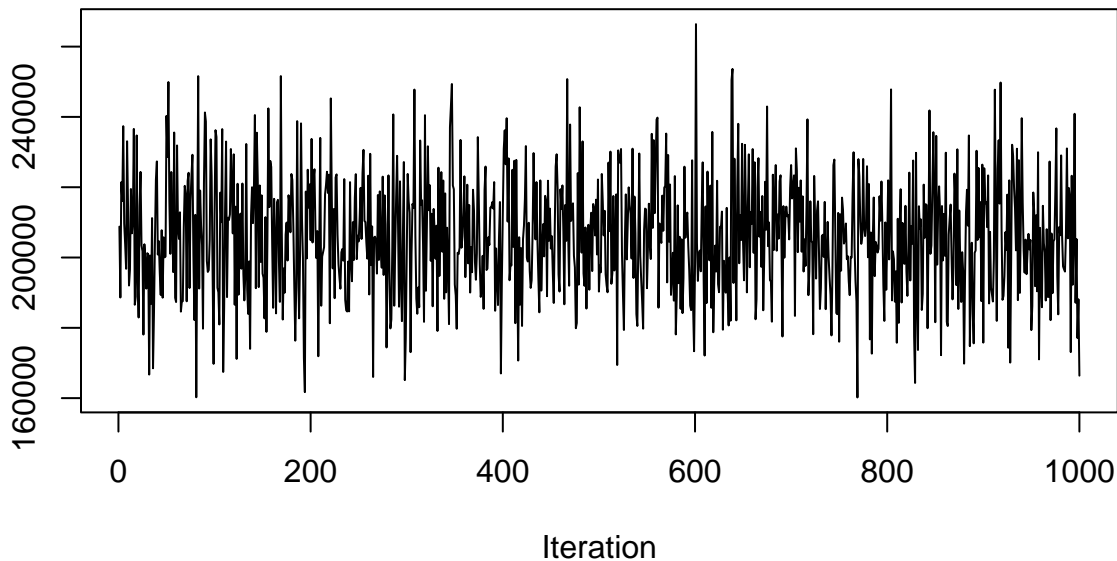
Relative Retro



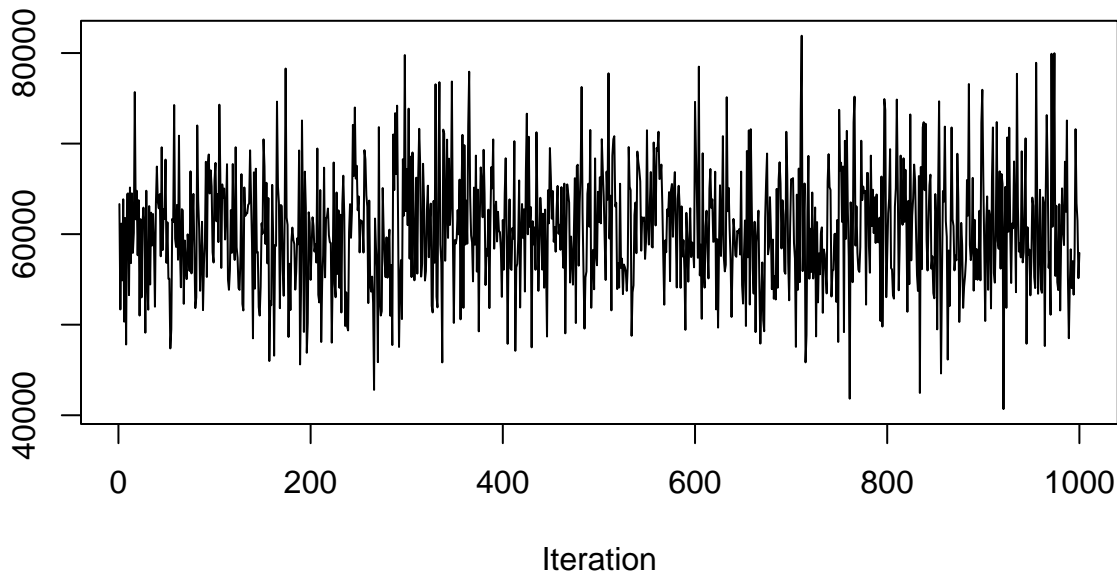
Stock Numbers at Age

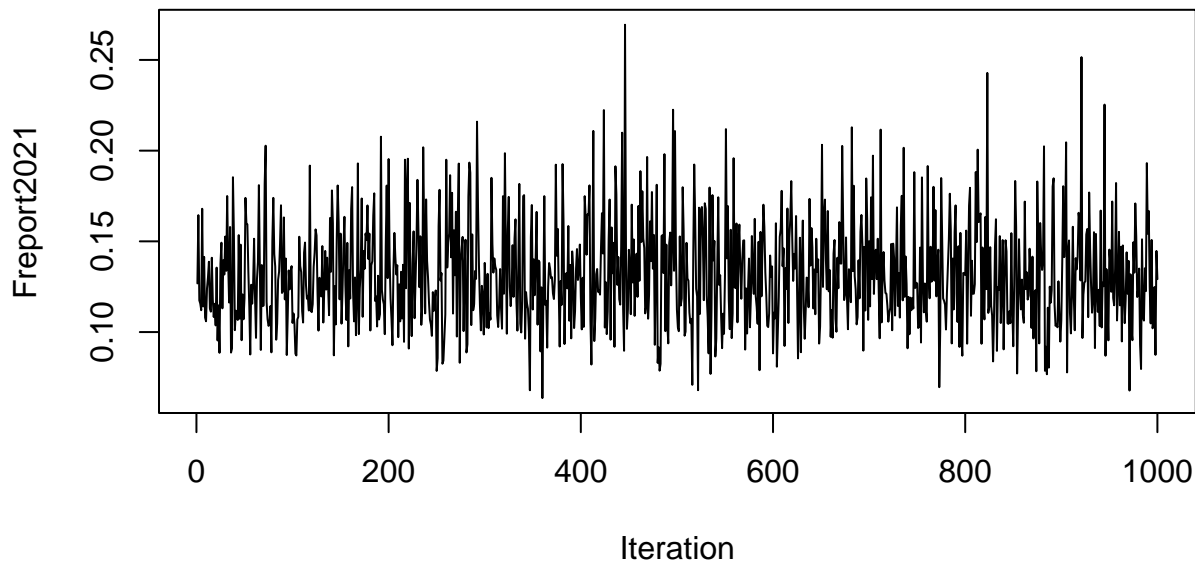
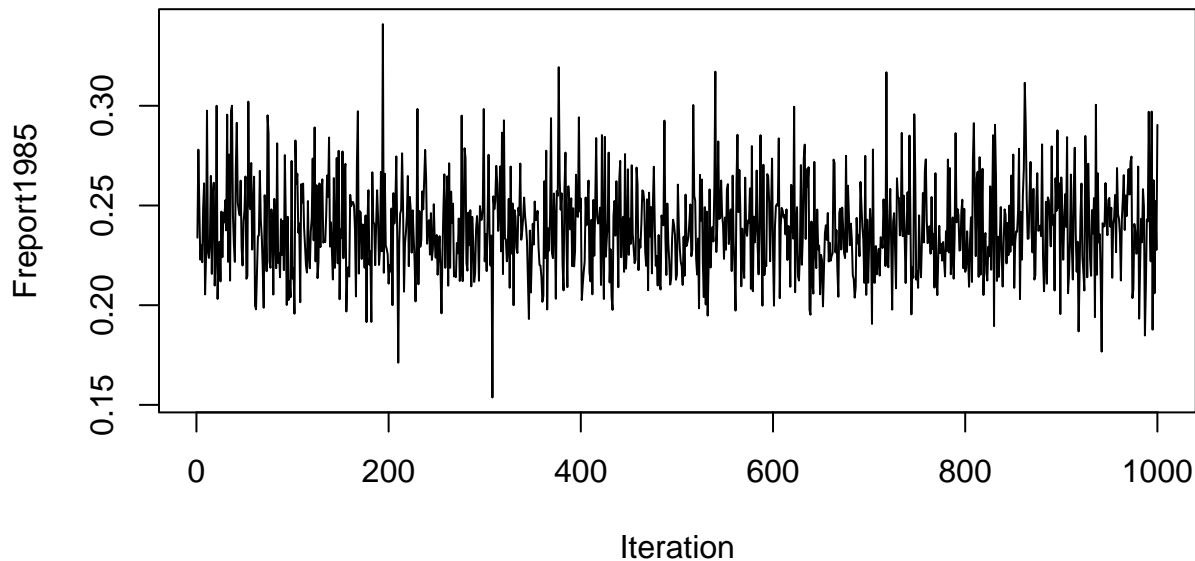


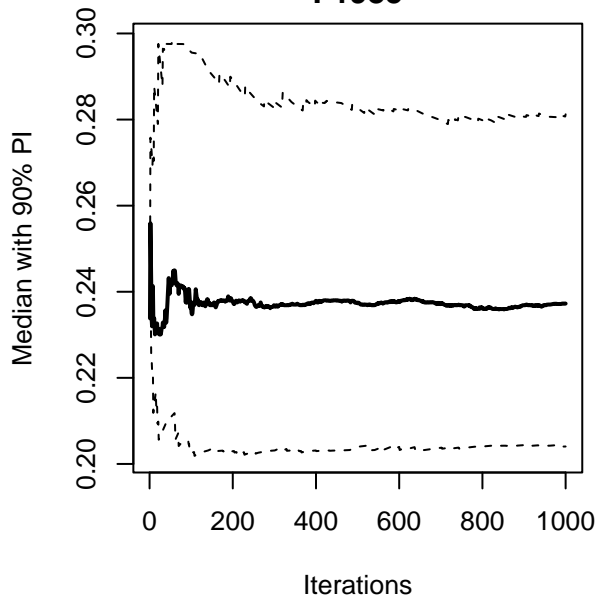
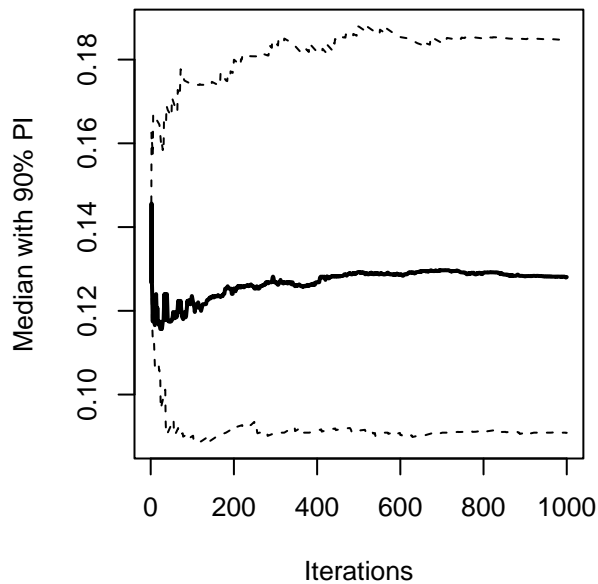
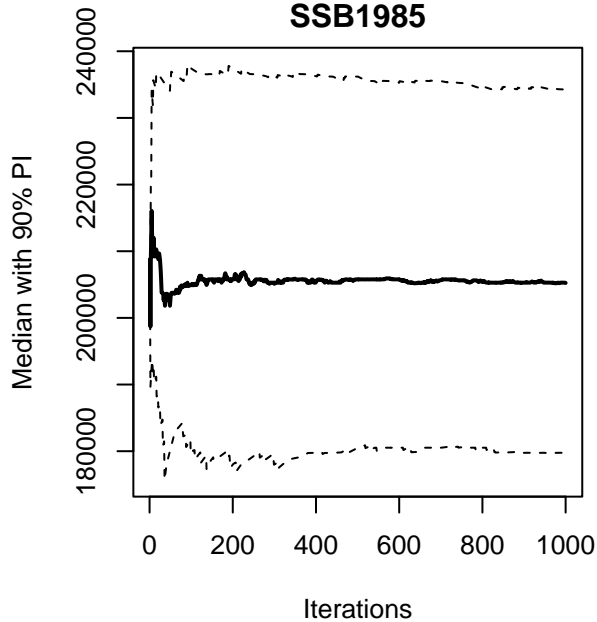
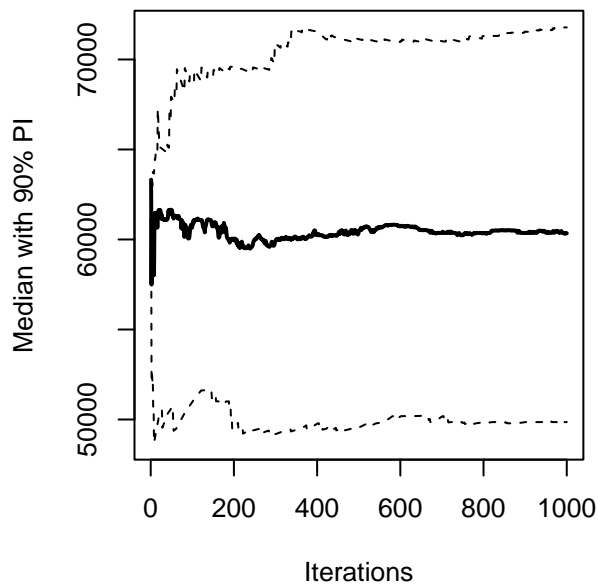
SSB1985

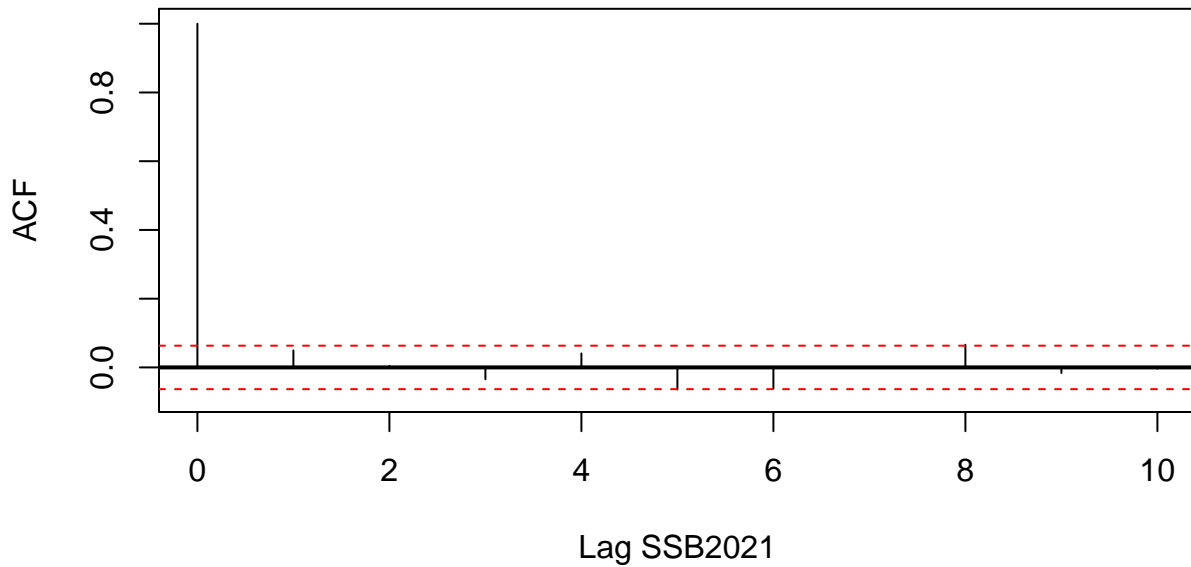
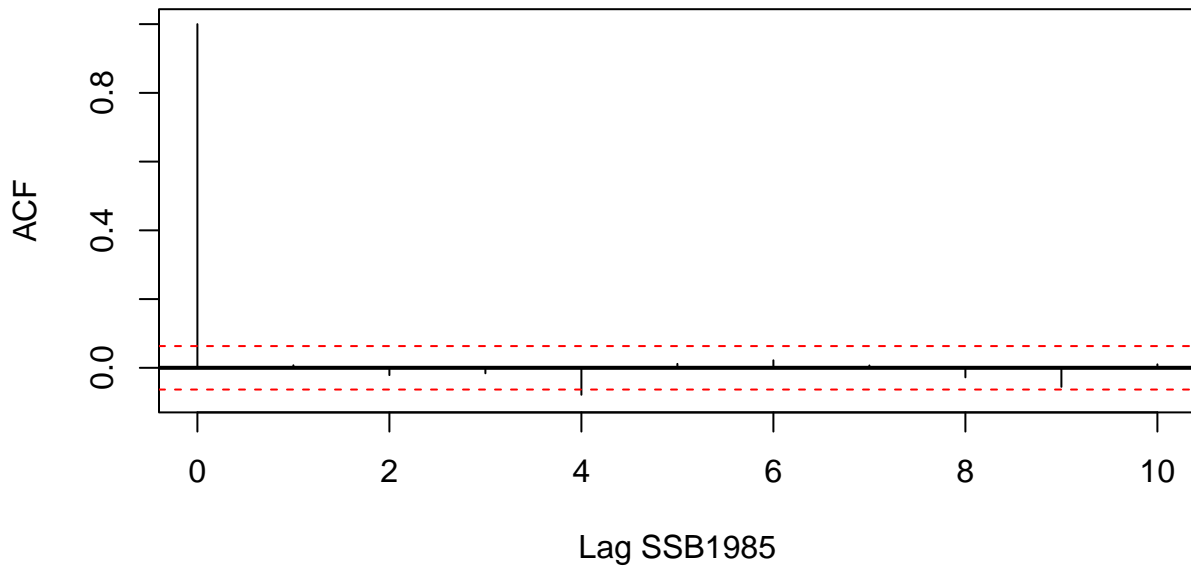


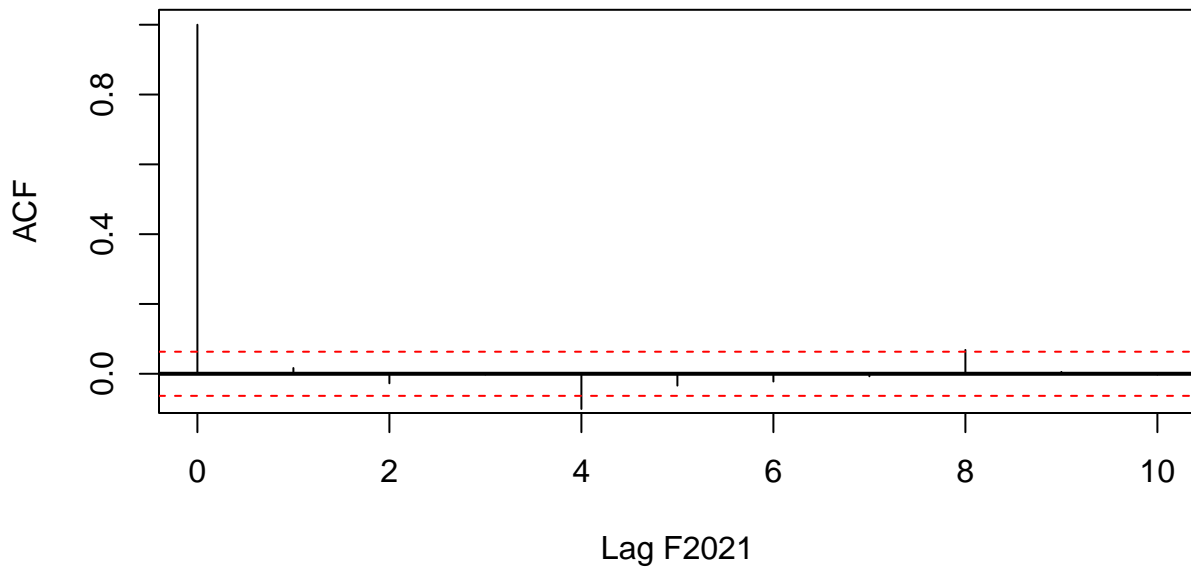
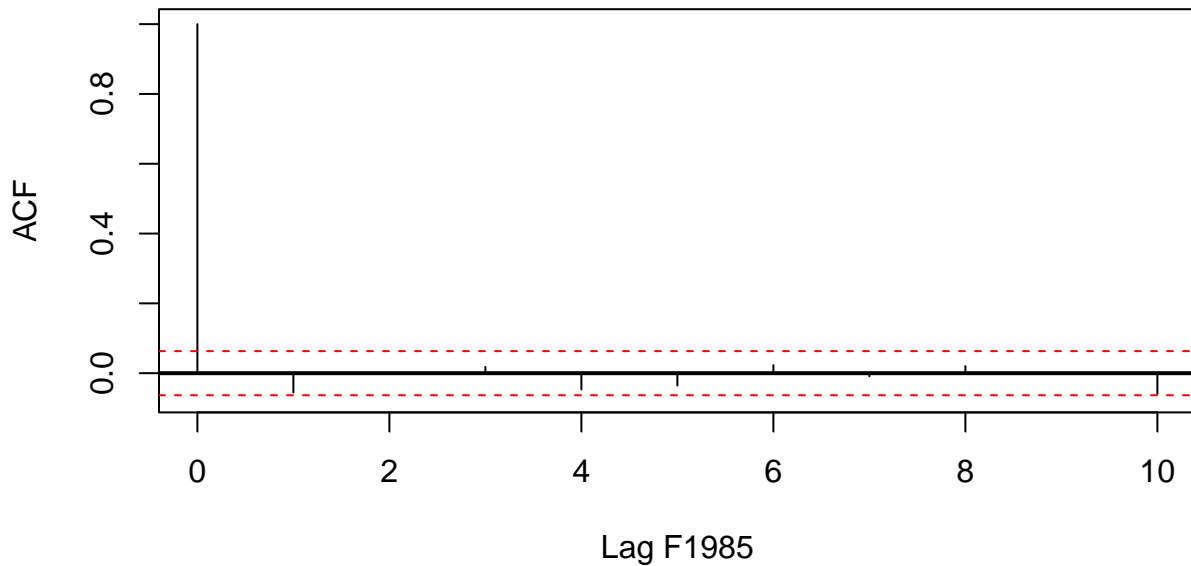
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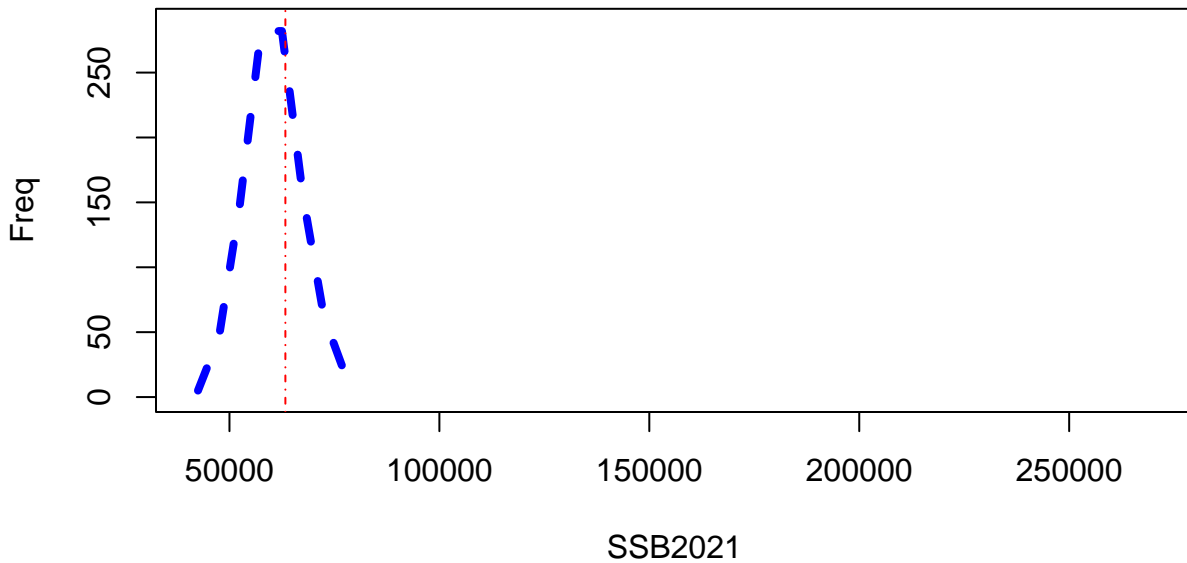
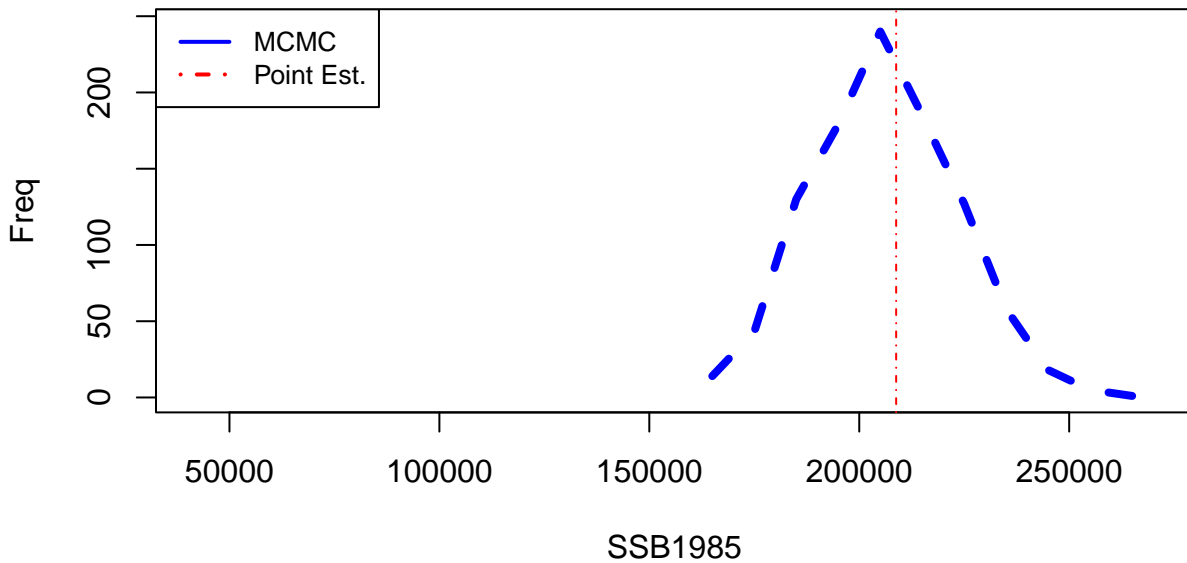


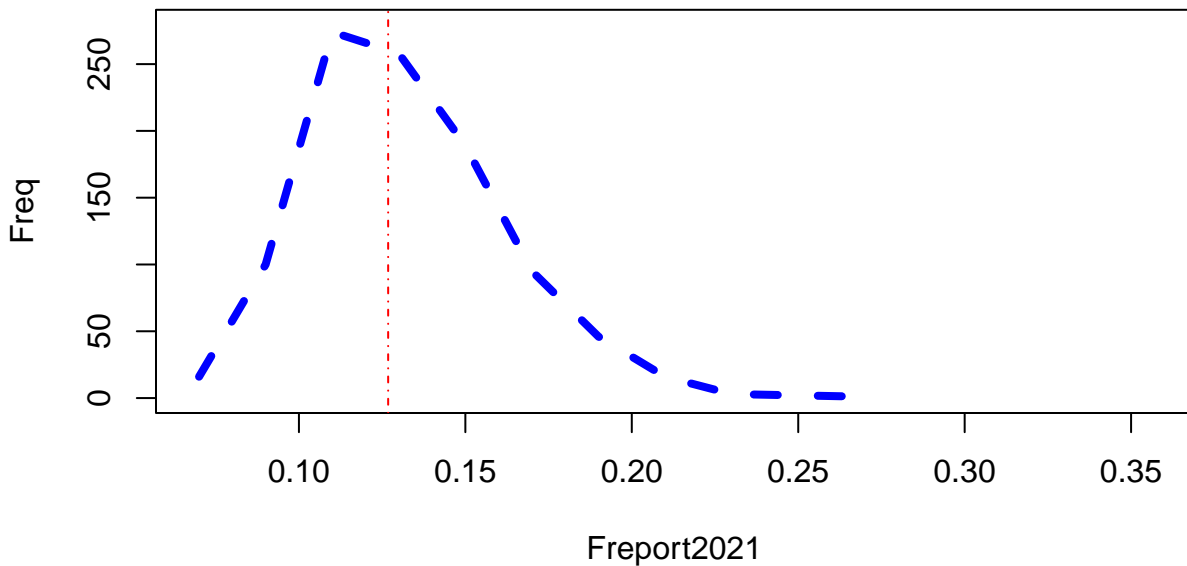
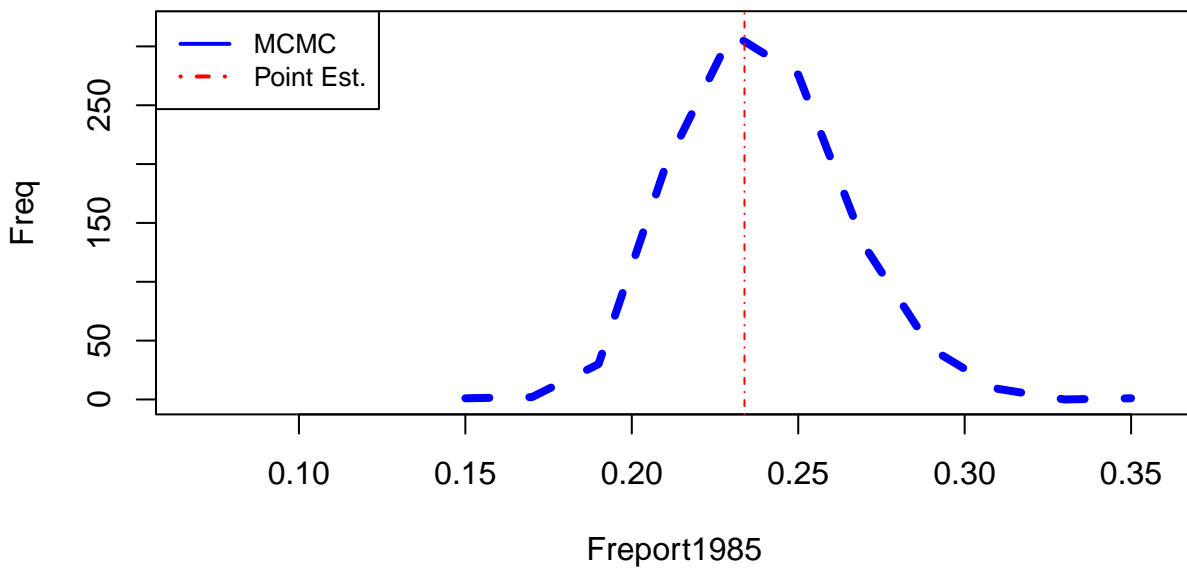


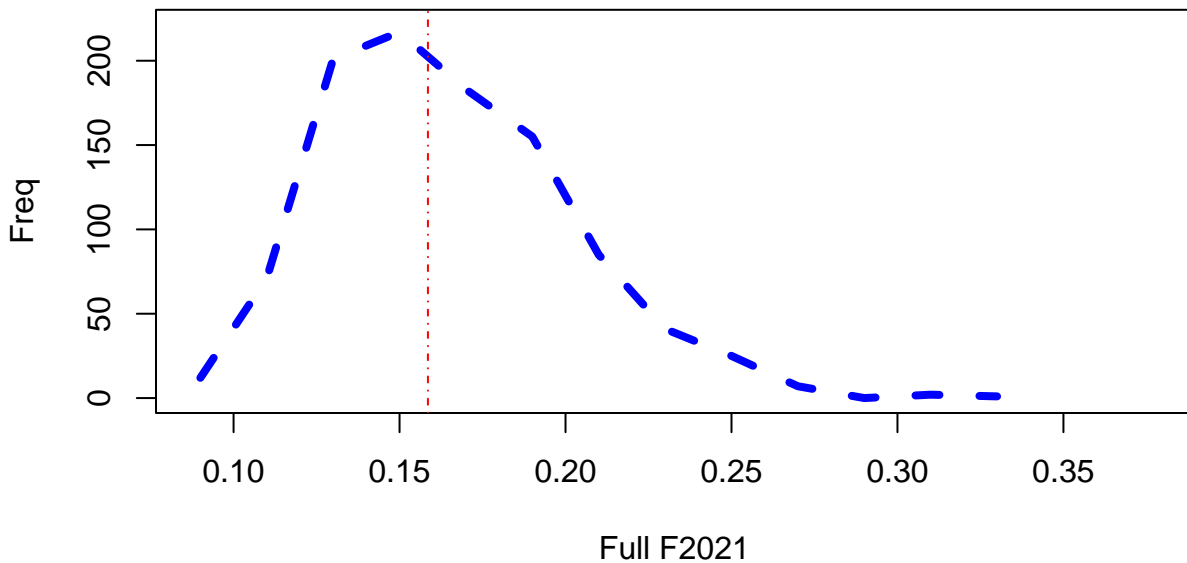
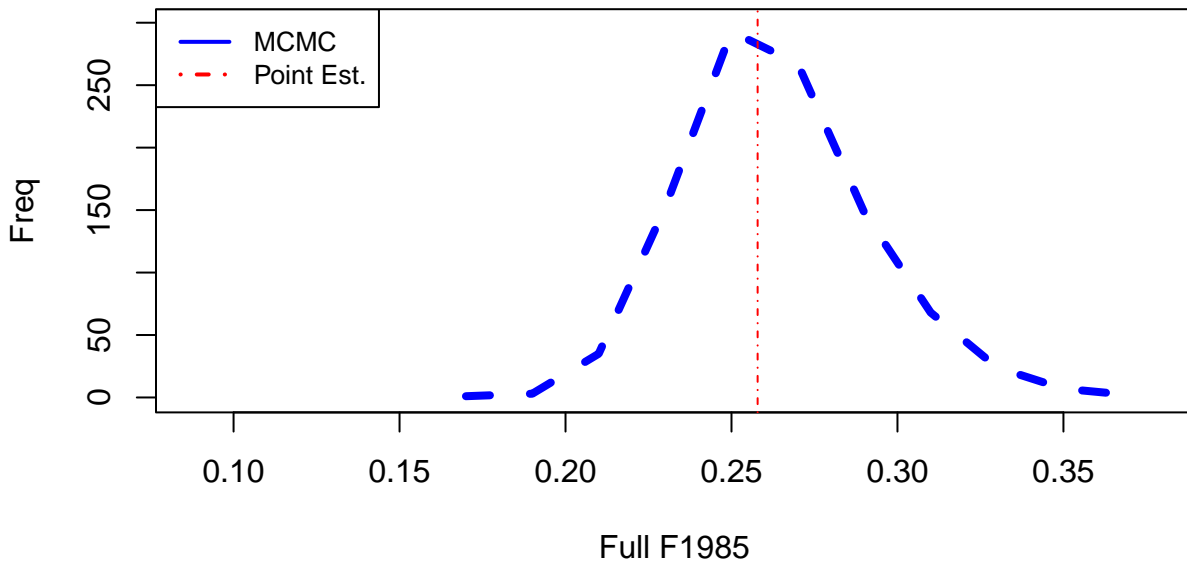
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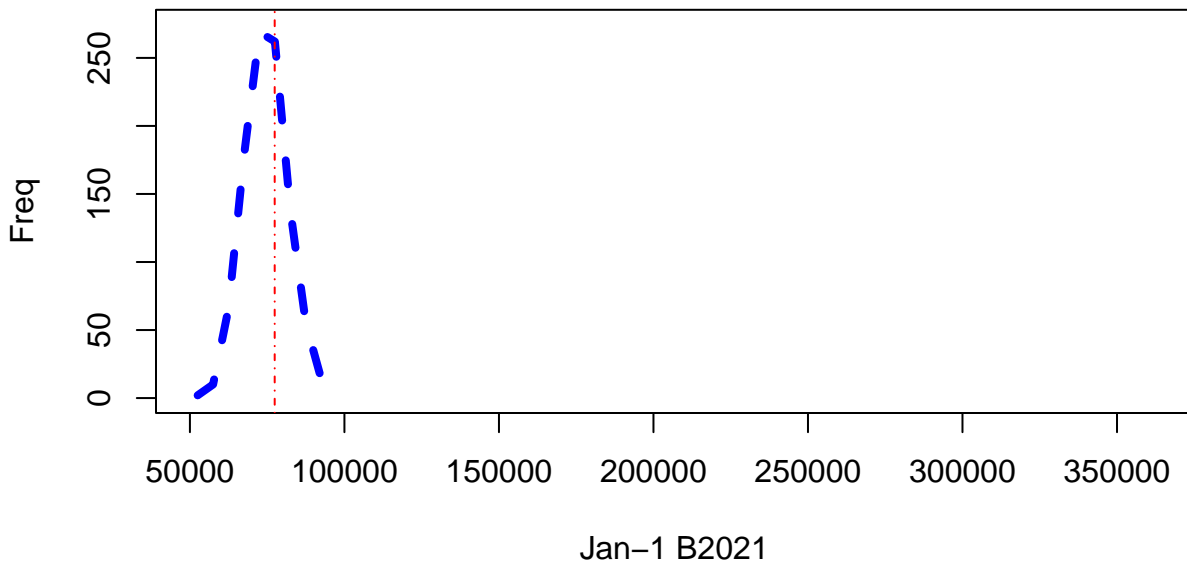
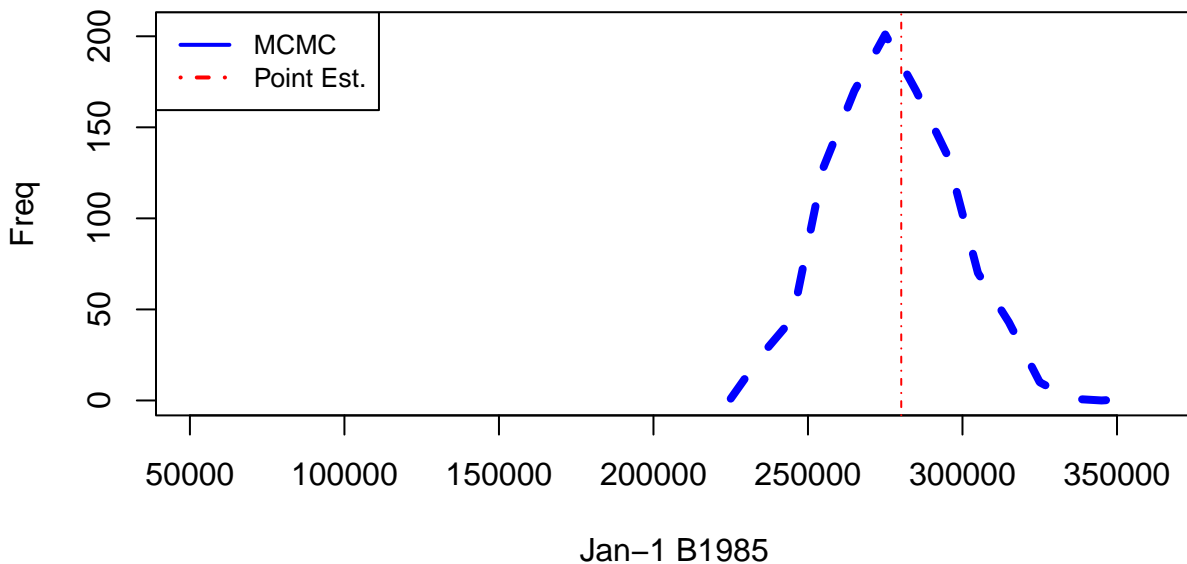


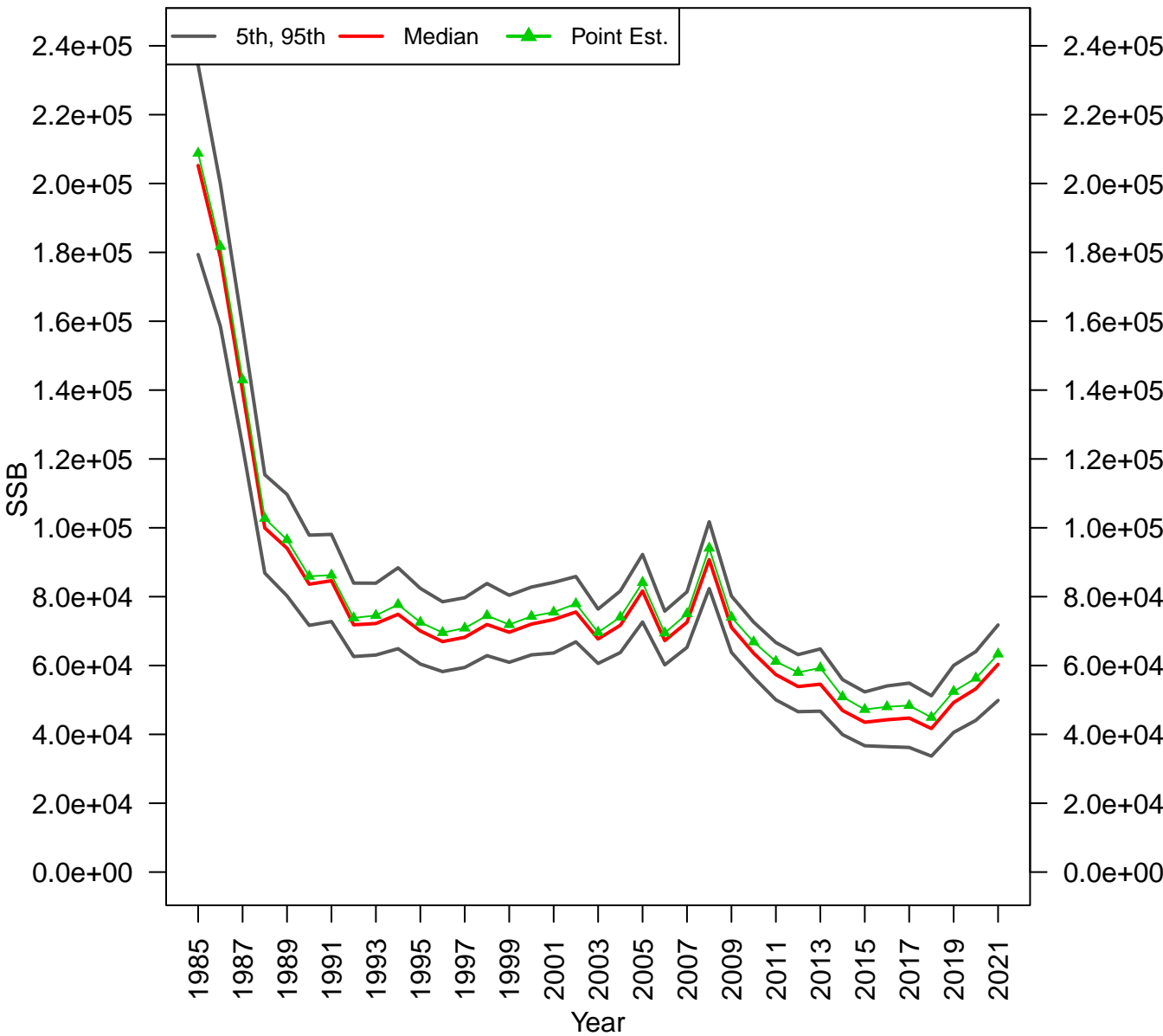


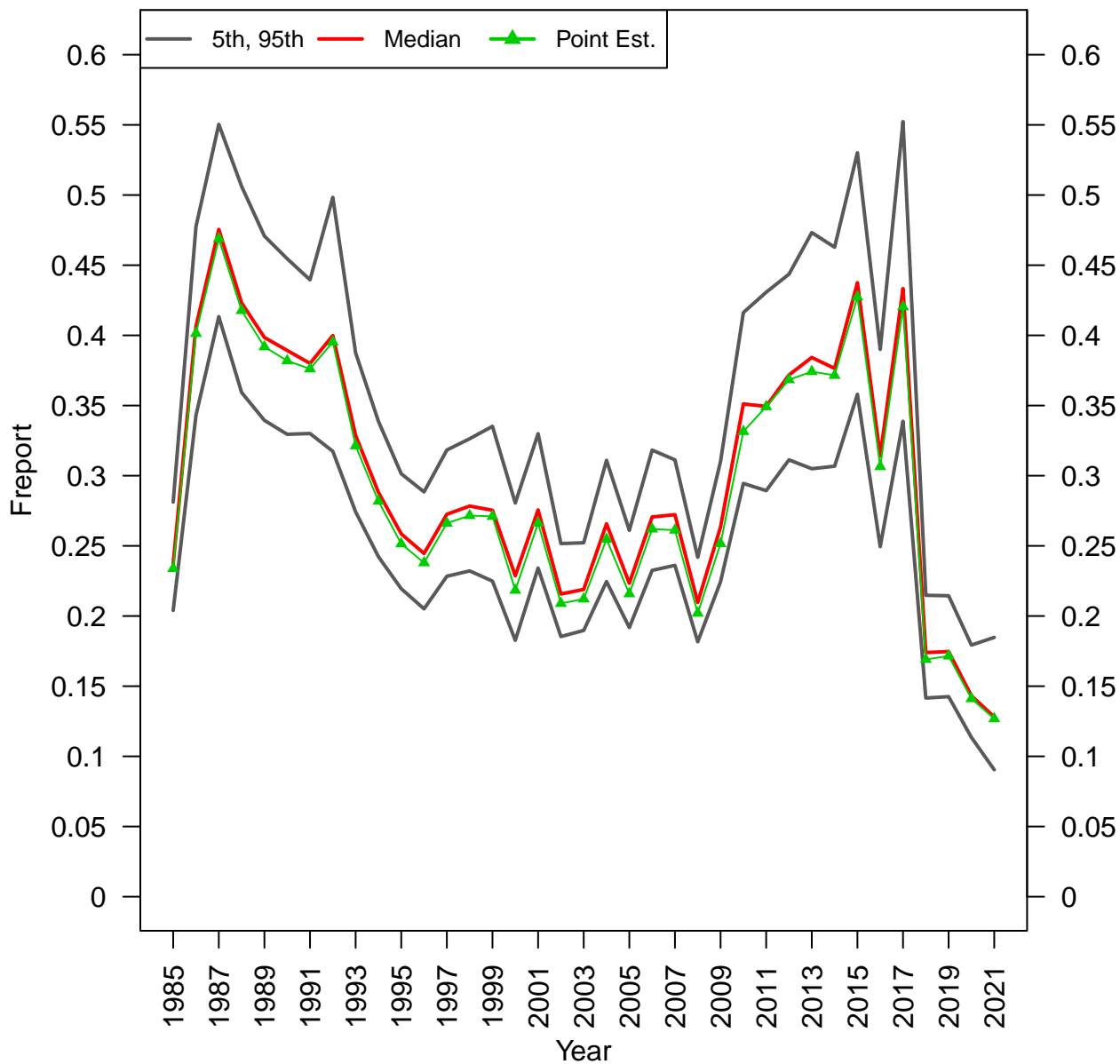


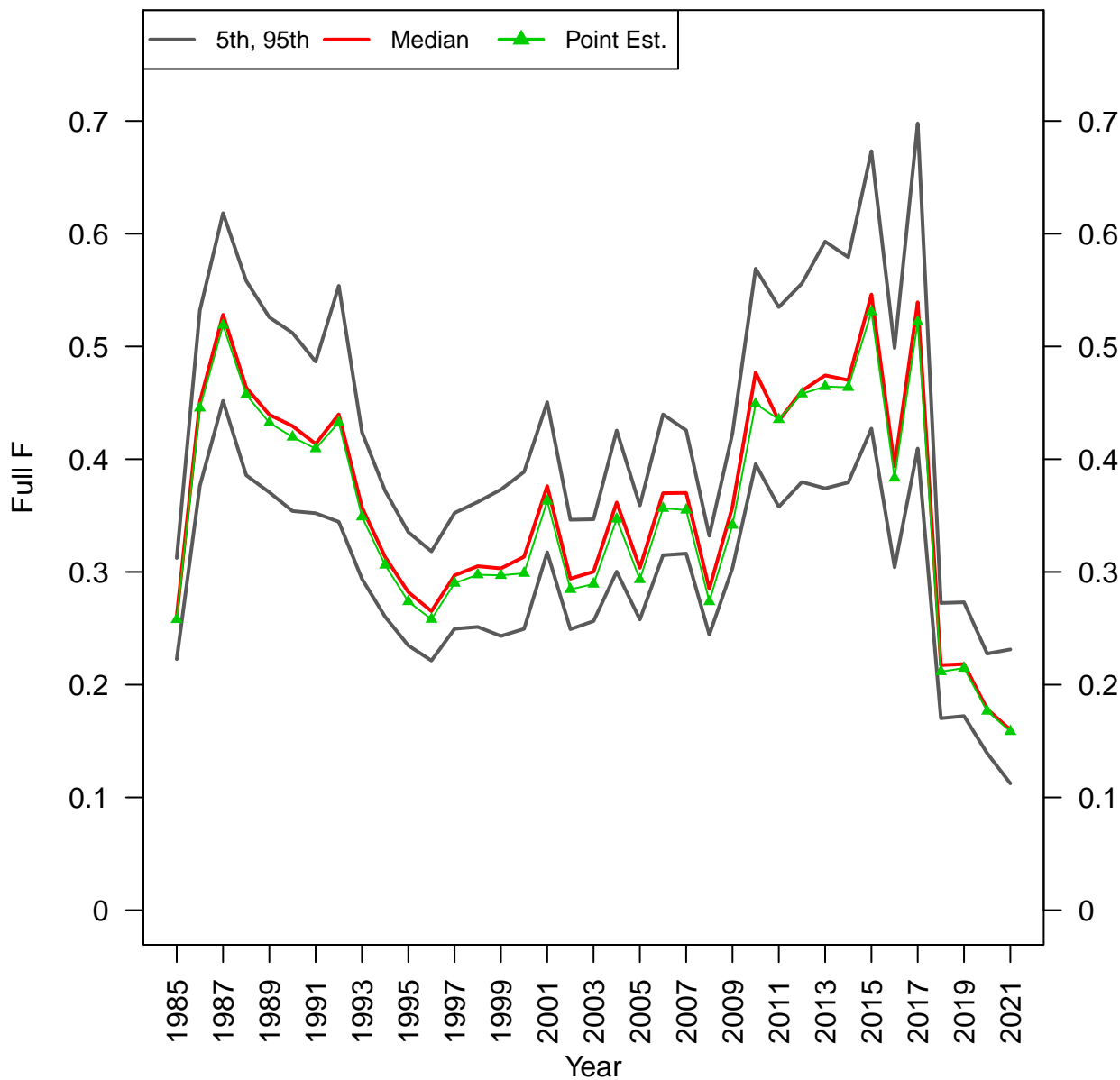


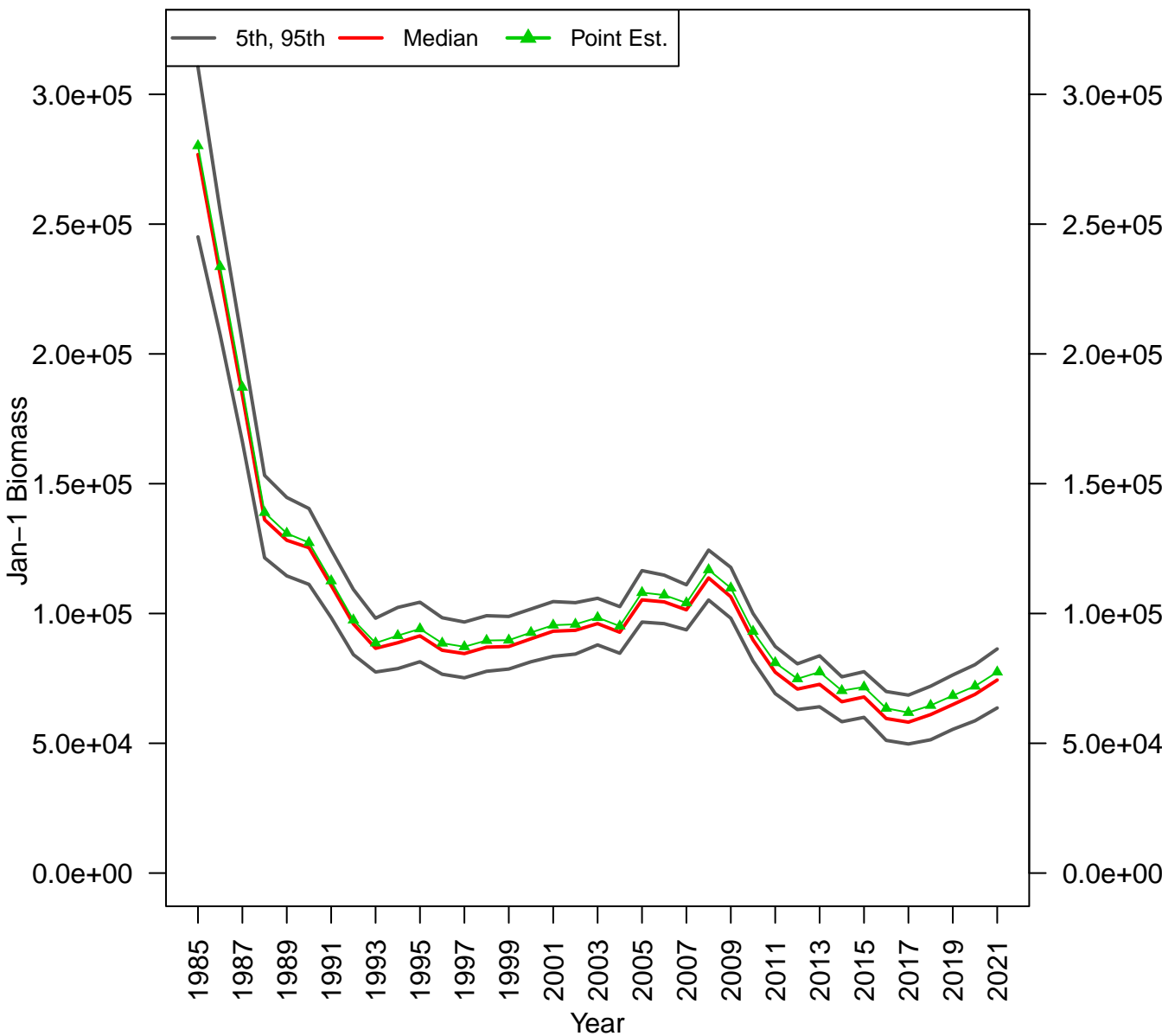










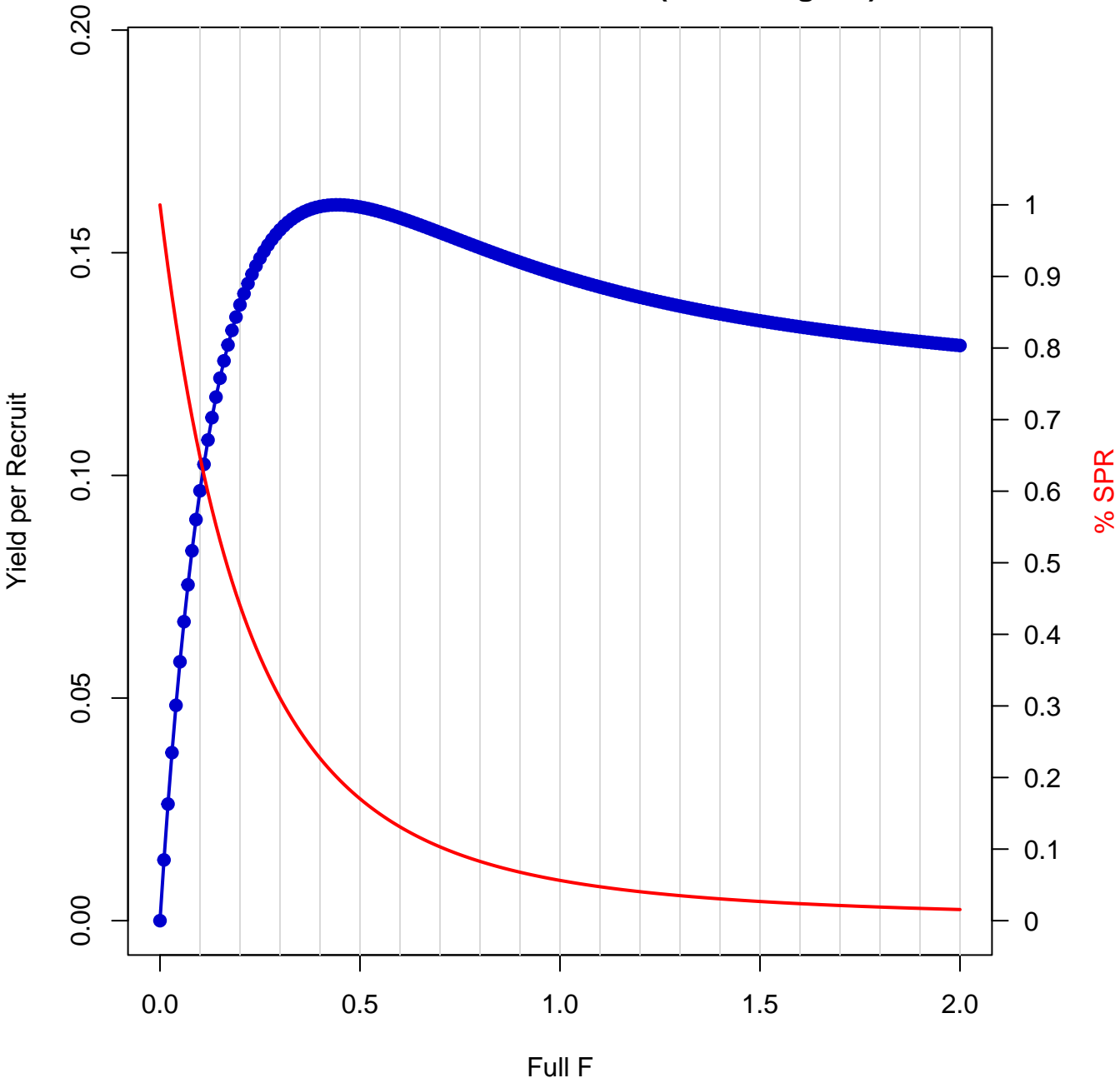


BF24

Final ASAP model

REFERENCE POINT PLOTS

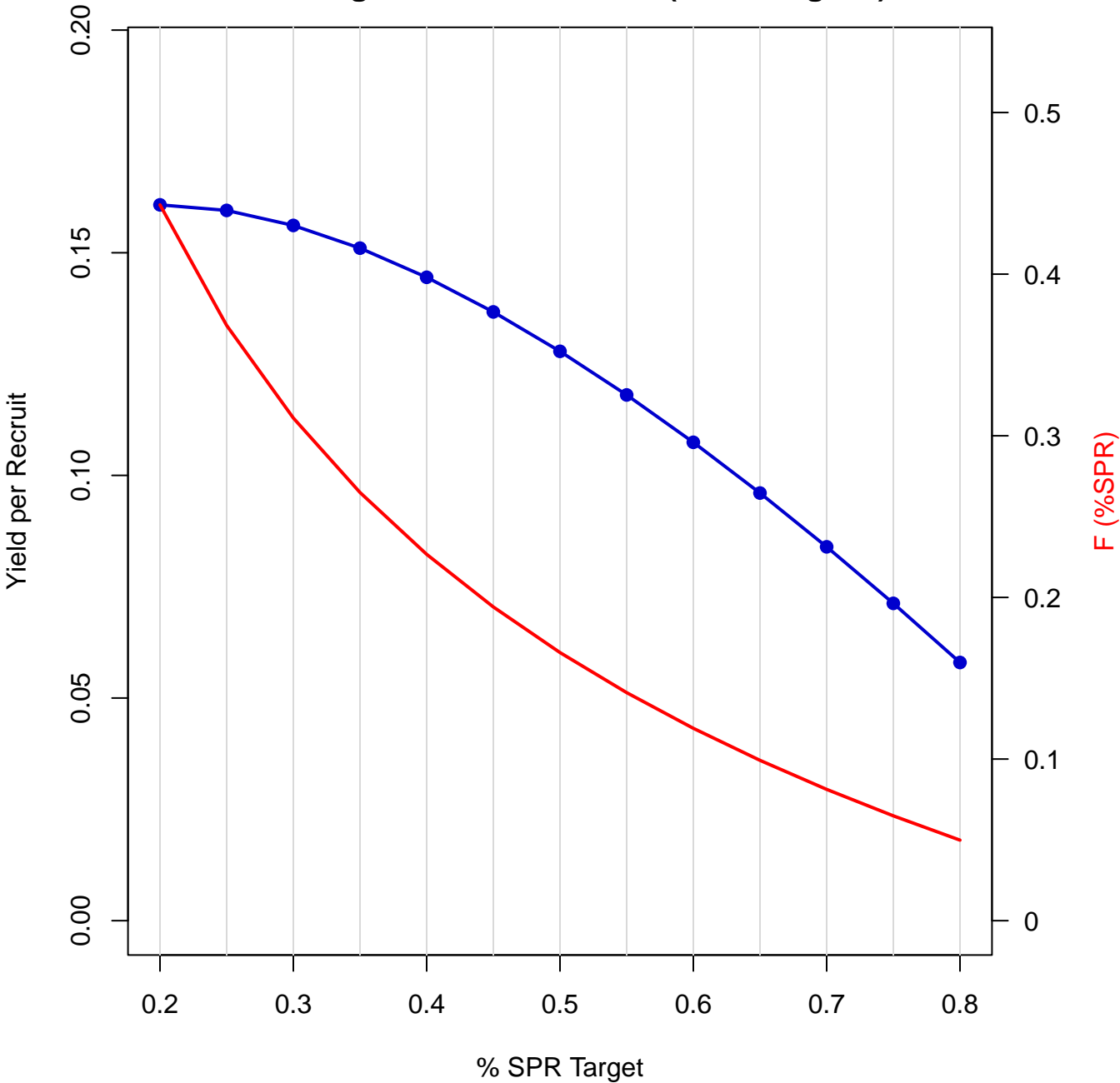
YPR-SPR Reference Points (Years Avg = 5)



YPR–SPR Reference Points (Years Avg = 5)

F	YPR	SPR	F	YPR	SPR	F	YPR	SPR
0	0	1	0.35	0.1587	0.2647	0.7	0.1545	0.1031
0.01	0.0136	0.9551	0.36	0.1592	0.2565	0.71	0.1542	0.1008
0.02	0.0262	0.9127	0.37	0.1596	0.2487	0.72	0.1538	0.0985
0.03	0.0377	0.8728	0.38	0.1599	0.2411	0.73	0.1535	0.0964
0.04	0.0484	0.8351	0.39	0.1602	0.2339	0.74	0.1532	0.0942
0.05	0.0581	0.7994	0.4	0.1604	0.2269	0.75	0.1528	0.0922
0.06	0.0671	0.7657	0.41	0.1605	0.2202	0.76	0.1525	0.0902
0.07	0.0754	0.7338	0.42	0.1607	0.2138	0.77	0.1521	0.0883
0.08	0.0831	0.7036	0.43	0.1607	0.2076	0.78	0.1518	0.0864
0.09	0.0901	0.675	0.44	0.1608	0.2017	0.79	0.1514	0.0846
0.1	0.0965	0.6479	0.45	0.1607	0.1959	0.8	0.1511	0.0828
0.11	0.1025	0.6221	0.46	0.1607	0.1904	0.81	0.1508	0.0811
0.12	0.1079	0.5977	0.47	0.1606	0.1851	0.82	0.1504	0.0794
0.13	0.113	0.5744	0.48	0.1605	0.18	0.83	0.1501	0.0778
0.14	0.1176	0.5523	0.49	0.1604	0.1751	0.84	0.1498	0.0762
0.15	0.1218	0.5313	0.5	0.1603	0.1703	0.85	0.1494	0.0747
0.16	0.1257	0.5113	0.51	0.1601	0.1657	0.86	0.1491	0.0732
0.17	0.1293	0.4923	0.52	0.1599	0.1613	0.87	0.1488	0.0718
0.18	0.1326	0.4742	0.53	0.1597	0.157	0.88	0.1485	0.0704
0.19	0.1356	0.4569	0.54	0.1595	0.1529	0.89	0.1482	0.069
0.2	0.1383	0.4404	0.55	0.1592	0.1489	0.9	0.1479	0.0677
0.21	0.1408	0.4246	0.56	0.159	0.1451	0.91	0.1475	0.0664
0.22	0.1431	0.4096	0.57	0.1587	0.1414	0.92	0.1472	0.0652
0.23	0.1452	0.3953	0.58	0.1584	0.1378	0.93	0.1469	0.0639
0.24	0.1471	0.3816	0.59	0.1581	0.1344	0.94	0.1466	0.0628
0.25	0.1488	0.3685	0.6	0.1578	0.131	0.95	0.1463	0.0616
0.26	0.1503	0.356	0.61	0.1575	0.1278	0.96	0.1461	0.0605
0.27	0.1517	0.344	0.62	0.1572	0.1247	0.97	0.1458	0.0594
0.28	0.153	0.3325	0.63	0.1569	0.1217	0.98	0.1455	0.0583
0.29	0.1541	0.3216	0.64	0.1566	0.1188	0.99	0.1452	0.0573
0.3	0.1551	0.3111	0.65	0.1562	0.1159	1	0.1449	0.0563
0.31	0.156	0.301	0.66	0.1559	0.1132	1.01	0.1446	0.0553
0.32	0.1568	0.2913	0.67	0.1556	0.1106	1.02	0.1444	0.0543
0.33	0.1576	0.2821	0.68	0.1552	0.108	1.03	0.1441	0.0534
0.34	0.1582	0.2732	0.69	0.1549	0.1055	1.04	0.1438	0.0525

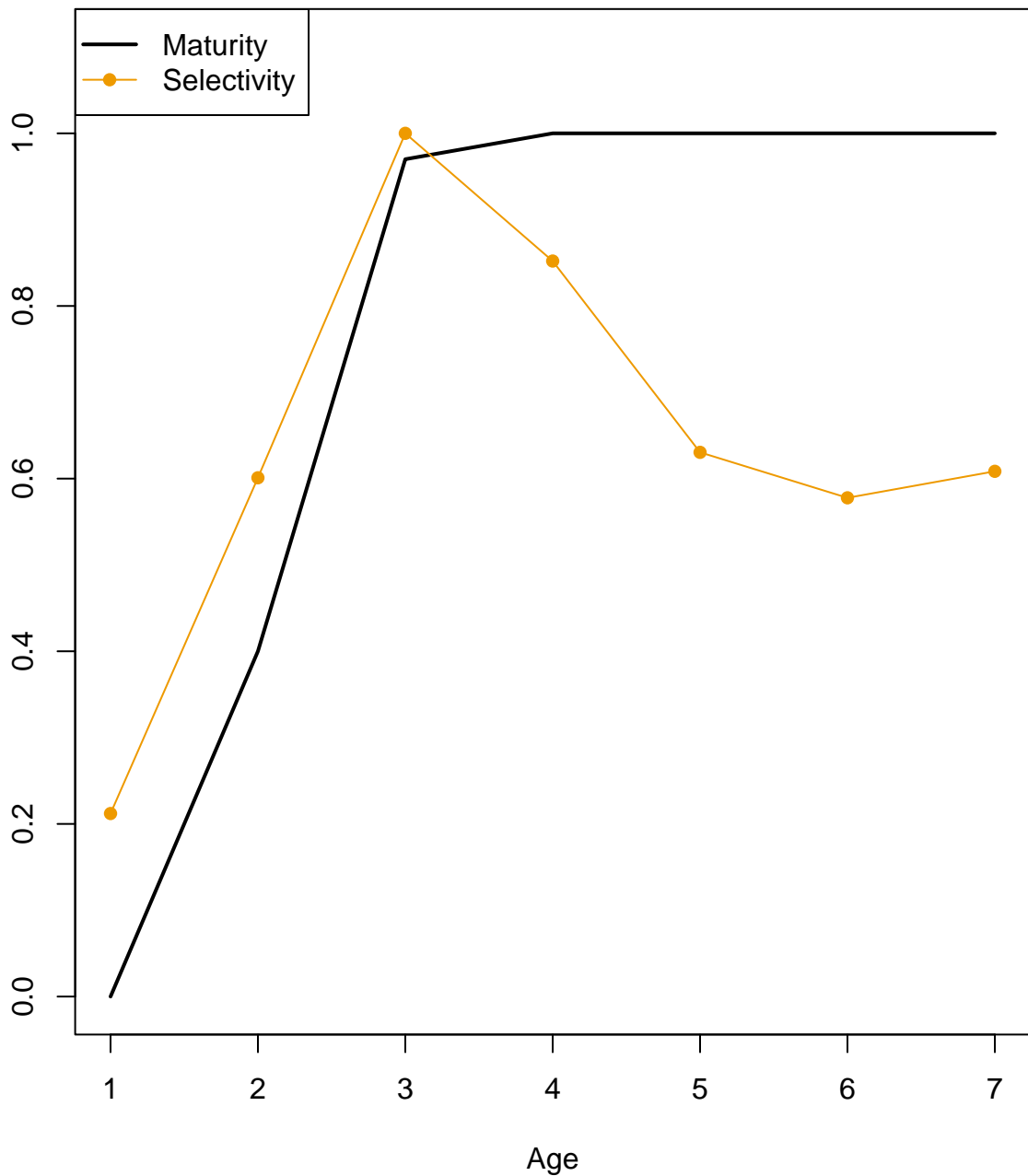
SPR Target Reference Points (Years Avg = 5)



SPR Target Reference Points (Years Avg = 5)

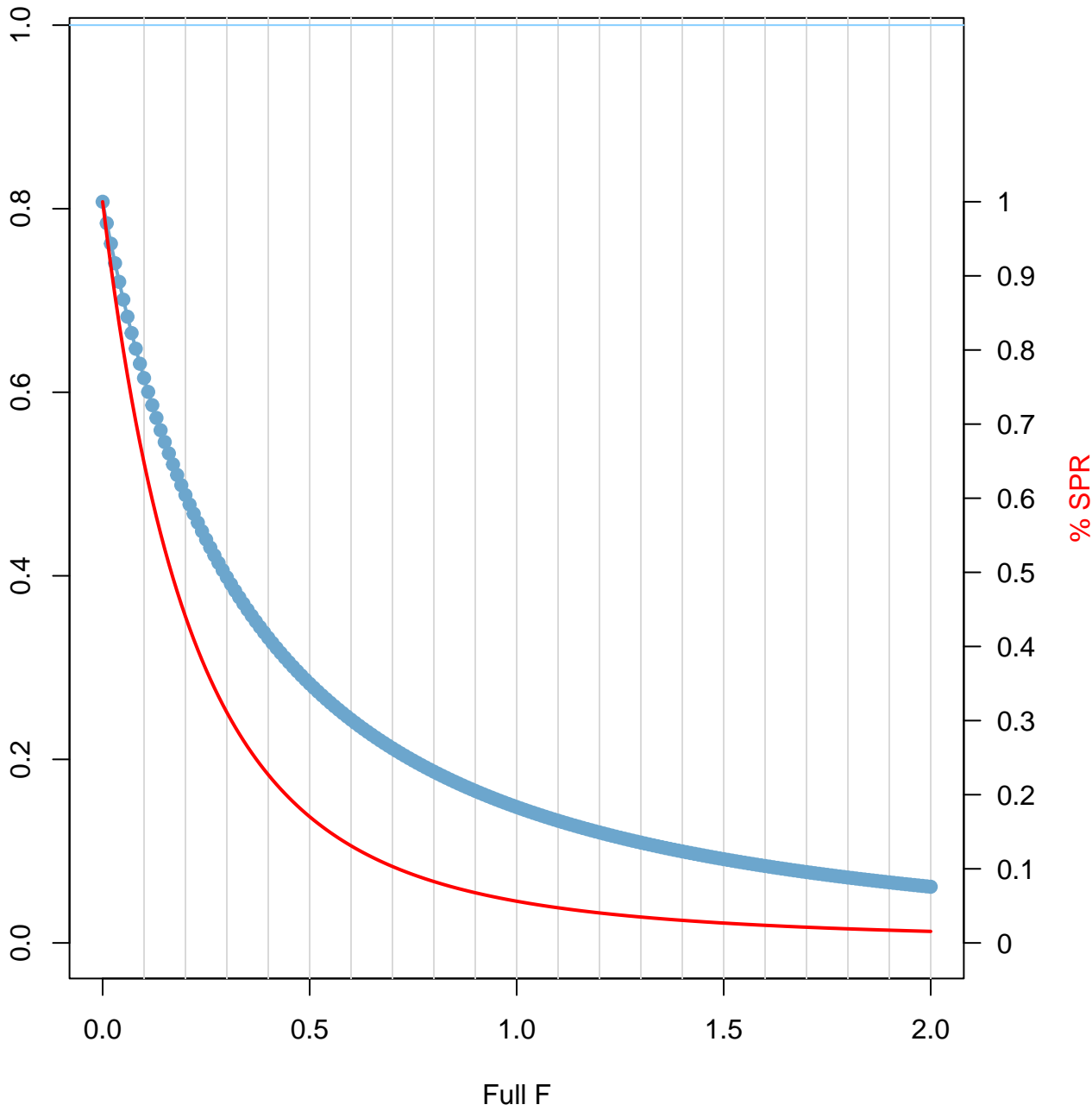
% SPR	F(%SPR)	YPR
0.2	0.4429	0.1608
0.25	0.3683	0.1595
0.3	0.311	0.1561
0.35	0.2649	0.151
0.4	0.2267	0.1445
0.45	0.1941	0.1367
0.5	0.1659	0.1279
0.55	0.1411	0.1181
0.6	0.119	0.1074
0.65	0.0992	0.096
0.7	0.0812	0.084
0.75	0.0649	0.0713
0.8	0.0498	0.058

Selectivity or Maturity at age



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

Expected Spawns



% SPR

Full F

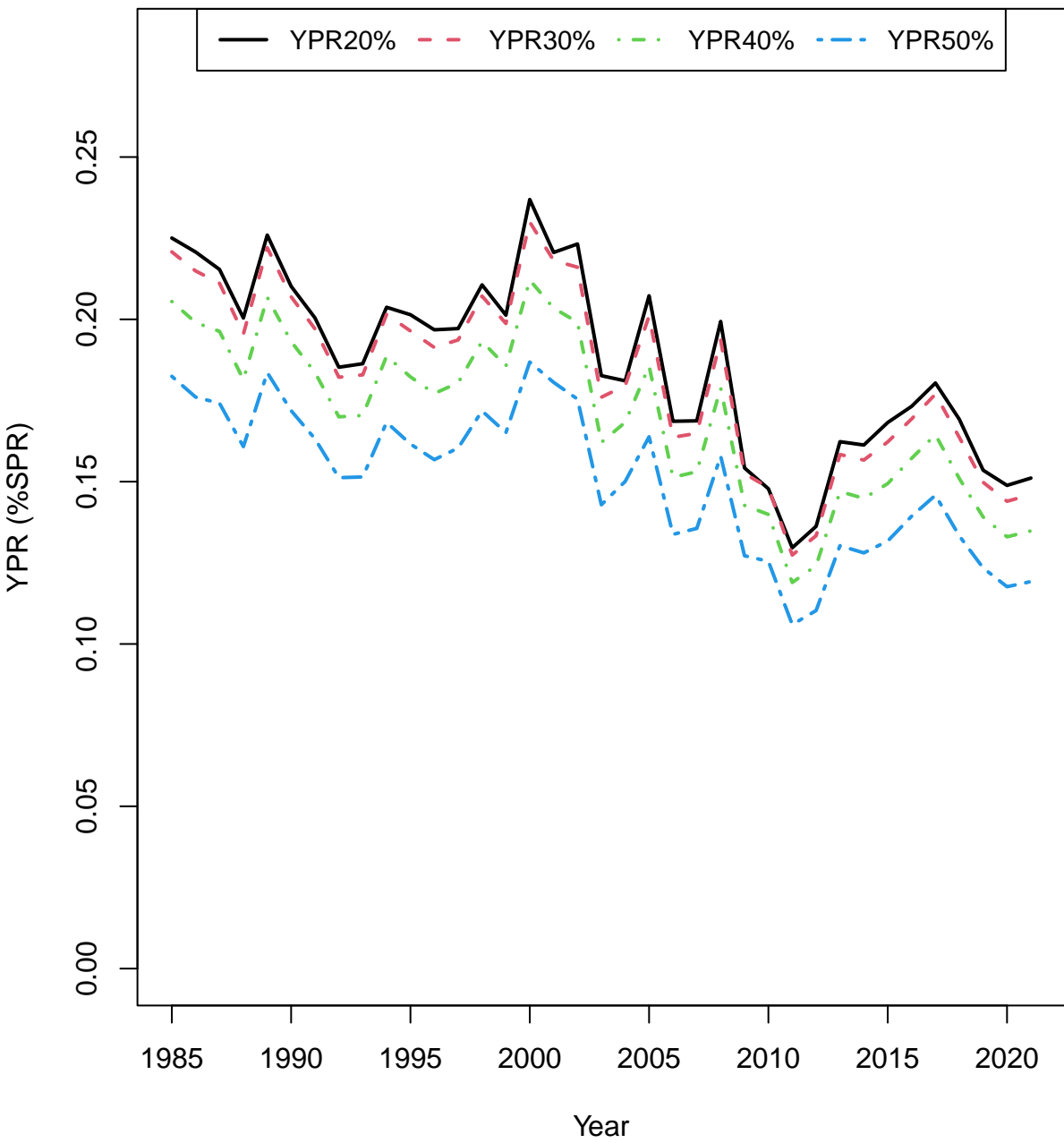
Expected Spawnings & SPR Reference Points (Years Avg = 5)

F	E[Sp]	SPR	F	E[Sp]	SPR	F	E[Sp]	SPR
0	0.8076	1	0.35	0.363	0.2647	0.7	0.212	0.1031
0.01	0.7842	0.9551	0.36	0.3566	0.2565	0.71	0.2093	0.1008
0.02	0.7619	0.9127	0.37	0.3503	0.2487	0.72	0.2065	0.0985
0.03	0.7406	0.8728	0.38	0.3442	0.2411	0.73	0.2039	0.0964
0.04	0.7203	0.8351	0.39	0.3383	0.2339	0.74	0.2013	0.0942
0.05	0.7009	0.7994	0.4	0.3325	0.2269	0.75	0.1987	0.0922
0.06	0.6823	0.7657	0.41	0.3269	0.2202	0.76	0.1962	0.0902
0.07	0.6645	0.7338	0.42	0.3214	0.2138	0.77	0.1937	0.0883
0.08	0.6475	0.7036	0.43	0.3161	0.2076	0.78	0.1913	0.0864
0.09	0.6311	0.675	0.44	0.3109	0.2017	0.79	0.189	0.0846
0.1	0.6154	0.6479	0.45	0.3058	0.1959	0.8	0.1866	0.0828
0.11	0.6004	0.6221	0.46	0.3009	0.1904	0.81	0.1844	0.0811
0.12	0.5859	0.5977	0.47	0.2961	0.1851	0.82	0.1821	0.0794
0.13	0.572	0.5744	0.48	0.2914	0.18	0.83	0.1799	0.0778
0.14	0.5586	0.5523	0.49	0.2868	0.1751	0.84	0.1778	0.0762
0.15	0.5458	0.5313	0.5	0.2824	0.1703	0.85	0.1757	0.0747
0.16	0.5334	0.5113	0.51	0.278	0.1657	0.86	0.1736	0.0732
0.17	0.5214	0.4923	0.52	0.2738	0.1613	0.87	0.1715	0.0718
0.18	0.5099	0.4742	0.53	0.2697	0.157	0.88	0.1695	0.0704
0.19	0.4988	0.4569	0.54	0.2656	0.1529	0.89	0.1676	0.069
0.2	0.488	0.4404	0.55	0.2617	0.1489	0.9	0.1656	0.0677
0.21	0.4777	0.4246	0.56	0.2578	0.1451	0.91	0.1637	0.0664
0.22	0.4676	0.4096	0.57	0.2541	0.1414	0.92	0.1619	0.0652
0.23	0.458	0.3953	0.58	0.2504	0.1378	0.93	0.16	0.0639
0.24	0.4486	0.3816	0.59	0.2468	0.1344	0.94	0.1582	0.0628
0.25	0.4395	0.3685	0.6	0.2433	0.131	0.95	0.1565	0.0616
0.26	0.4308	0.356	0.61	0.2398	0.1278	0.96	0.1547	0.0605
0.27	0.4223	0.344	0.62	0.2365	0.1247	0.97	0.153	0.0594
0.28	0.4141	0.3325	0.63	0.2332	0.1217	0.98	0.1513	0.0583
0.29	0.4061	0.3216	0.64	0.23	0.1188	0.99	0.1497	0.0573
0.3	0.3984	0.3111	0.65	0.2268	0.1159	1	0.1481	0.0563
0.31	0.3909	0.301	0.66	0.2237	0.1132	1.01	0.1465	0.0553
0.32	0.3836	0.2913	0.67	0.2207	0.1106	1.02	0.1449	0.0543
0.33	0.3765	0.2821	0.68	0.2178	0.108	1.03	0.1433	0.0534
0.34	0.3697	0.2732	0.69	0.2149	0.1055	1.04	0.1418	0.0525

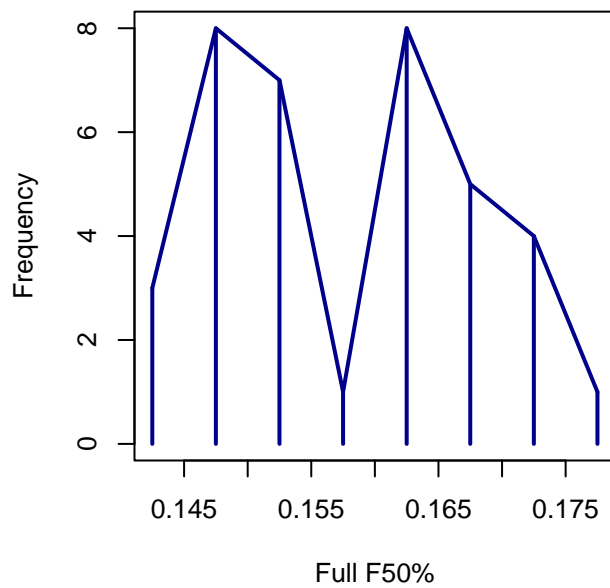
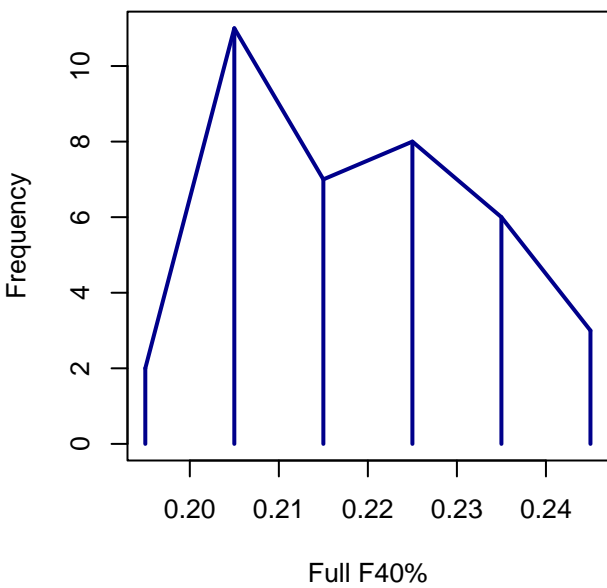
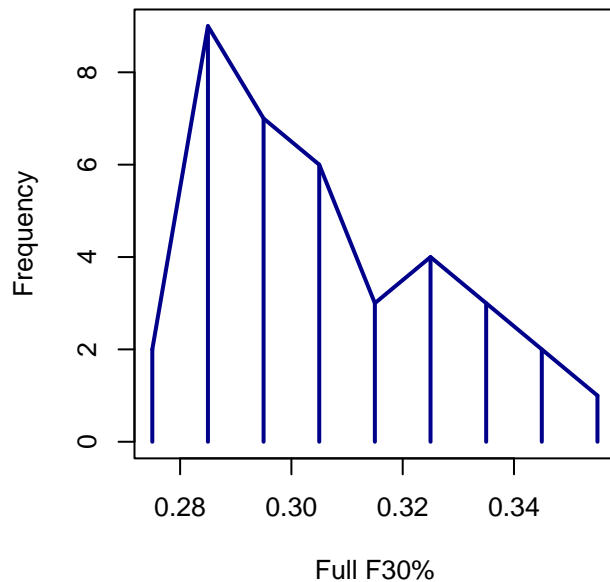
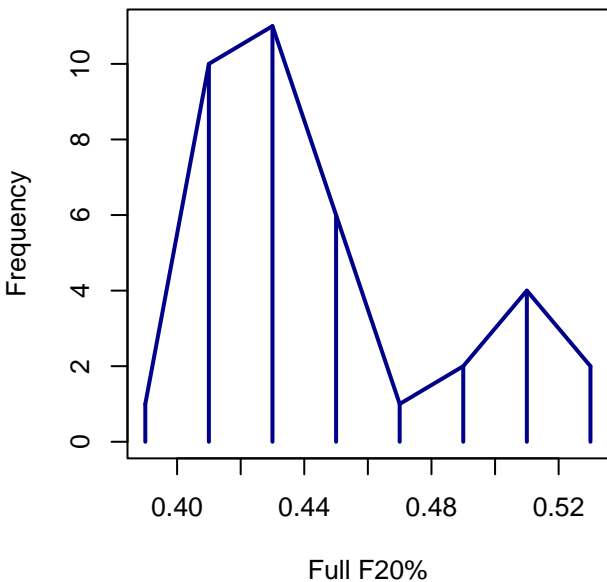
Annual F(%SPR) Reference Points



Annual YPR(%SPR) Reference Points



Annual F (%SPR) Reference Points



Annual YPR (%SPR) Reference Points

