Diagnostics of the SEDAR 76 Assessment Model of Black Sea Bass

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This document contains additional diagnostic plots created during the SEDAR 76 Assessment that are not in the final report. These diagnostics were implemented either during model development or on the base model configuation. The plots do not have any particular order to them, other than that the first set are diagnostics run on the base model configuration described in the SEDAR 76 report, and the second set are diagnostices made during the model development phase and were used to inform decisions about model structure. The distinction is separated by section and flagged in the Figure/Table number as either "B" for base or "D" for development.

List of Tables

B1 Estimated parameters and standard errors . . . 3

List of Figures

B1 Observed and estimated annual length and age compositions . . . 14
B2 OSA residuals: Commercial lines length composition. . . . 29
B3 OSA residuals: Commercial pots length composition. . . . 30
B4 OSA residuals: Headboat length composition. . . . 31
B5 OSA residuals: General recreational length composition. . . . 32
B6 OSA residuals: Headboat discard length composition. . . . 33
B7 OSA residuals: MARMAP blackfish/snapper survey trap length composition. . . . 34
B8 OSA residuals: Commercial lines age composition. . . . 35
B9 OSA residuals: Commercial pots age composition. . . . 36
B10 OSA residuals: Headboat age composition. . . . 37
B11 OSA residuals: MARMAP blackfish/snapper survey trap age composition. . . . 38
B12 OSA residuals: SERFS chevron trap index age composition. . . . 39
B13 Bound checks on parameter estimates . . . 40
B14 Cohort tracking: commercial lines age compositions. . . . 44
B15 Cohort tracking: commercial pots age compositions. . . . 45
B16 Cohort tracking: headboat age compositions. . . . 46
B17 Cohort tracking: SERFS chevron trap age compositions. . . . 47
B18 Likelihood profile: LogR0. . . . 48
B19 Likelihood profile: M. . . . 49
B20 Likelihood profiles: SERFS selectivity dome parameters. . . . 50
D1 Likelihood profiles: Last three years of recruitment deviates. . . . 51
D2 Likelihood profile: h. . . . 52
D3 Correlation of M, LogR0 and domed SERFS selectivity parameters. . . . 53

1 Base Model Diagnostics

Table B1. Estimated parameters from the base model and the associated asymptotic standard error.

Index	Name	Value	Standard Error
1	len_cv_val	9.1433e-02	1.3564e-03
2	log_Nage_dev	6.5749e-01	1.0030e-01
3	log_Nage_dev	3.1593e-01	1.3172e-01
4	log_Nage_dev	4.9057e-01	2.2597e-01
5	log_Nage_dev	6.8263e-01	4.3658e-01
6	log_Nage_dev	9.3607e-01	5.7343e-01
7	log_Nage_dev	4.6079e-01	9.8457e-01
8	log_Nage_dev	1.6537e+00	6.5190e-01
9	log_Nage_dev	4.7795e-01	1.0090e+00
10	log_Nage_dev	3.5267e-01	8.7005e-01
11	log_Nage_dev	2.3819e-01	8.0116e-01
12	log_Nage_dev	5.5956e-01	8.6937e-01
13	log_R0	1.8076e+01	9.3652e-03
14	rec_sigma	5.3632e-01	5.2665e-02
15	log_rec_dev	5.6863e-01	9.0598e-02
16	log_rec_dev	6.6268e-01	6.7979e-02
17	log_rec_dev	6.9318e-01	5.9828e-02
18	log_rec_dev	3.7026e-01	6.6876e-02
19	log_rec_dev	3.2109e-01	5.7001e-02
20	log_rec_dev	3.2746e-01	5.5744e-02
21	log_rec_dev	3.9960e-01	5.2670e-02
22	log_rec_dev	4.7130e-01	5.1261e-02
23	log_rec_dev	1.9996e-01	6.4106e-02
24	log_rec_dev	2.8286e-01	5.8229e-02
25	log_rec_dev	3.0711e-01	5.7232e-02
26	log_rec_dev	5.4985e-02	7.4100e-02
27	log_rec_dev	1.3503e-01	6.1419e-02
28	log_rec_dev	-2.4745e-01	6.7479e-02
29	log_rec_dev	-2.7720e-01	6.7559e-02
30	log_rec_dev	9.0573e-02	5.6261e-02
31	log_rec_dev	-8.3283e-03	5.9539e-02
32	log_rec_dev	-1.1191e-01	5.9002e-02
33	log_rec_dev	-5.4871e-02	5.6442e-02
34	log_rec_dev	2.7225e-01	5.3531e-02
35	log_rec_dev	1.0582e-03	6.0252e-02
36	log_rec_dev	2.1899e-01	4.9465e-02
37	log_rec_dev	1.5950e-01	5.5096e-02
38	log_rec_dev	1.3154e-01	5.9841e-02
39	log_rec_dev	6.7776e-02	5.6720e-02
40	log_rec_dev	2.4605e-01	4.7479e-02
41	log_rec_dev	-4.6120e-02	5.4411e-02

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
42	log_rec_dev	1.3310e-01	5.0617e-02
43	log_rec_dev	1.5551e-01	5.3469e-02
44	log_rec_dev	2.3209e-01	5.2887e-02
45	log_rec_dev	3.1143e-01	5.2355e-02
46	log_rec_dev	6.2242e-01	4.1275e-02
47	log_rec_dev	3.4756e-01	4.5160e-02
48	log_rec_dev	1.4954e-02	5.1852e-02
49	log_rec_dev	-4.9296e-02	5.0100e-02
50	log_rec_dev	-1.5085e-01	5.0366e-02
51	log_rec_dev	-5.5794e-01	6.2022e-02
52	log_rec_dev	-9.0232e-01	7.4674e-02
53	log_rec_dev	-9.0688e-01	7.6935e-02
54	log_rec_dev	-1.1011e+00	9.7304e-02
55	log_rec_dev	-1.5329e+00	1.3728e-01
56	log_rec_dev	-1.8518e+00	1.7288e-01
57	log_dm_Mbft_lc	3.7287e+00	6.5087e-01
58	log_dm_cL_lc	4.6529e+00	5.9330e-01
59	log_dm_cP_lc	3.6109e+00	6.4620e-01
60	log_dm_HB_lc	3.7088e+00	6.4442e-01
61	log_dm_HB_D_lc	5.7929e+00	8.0056e-01
62	log_dm_mrip_lc	3.4766e-01	1.0114e-01
63	log_dm_Mbft_ac	-3.2278e+00	3.7470e-01
64	log_dm_Mcvt_ac	-1.2211e+00	1.3456e-01
65	log_dm_cL_ac	1.0863e+00	5.0896e-01
66	log_dm_cP_ac	5.4563e-01	3.7592e-01
67	log_dm_HB_ac	-8.1652e-01	2.1142e-01
68	selpar_A50_Mbft	1.5880e+00	7.7307e-02
69	selpar_slope_Mbft	5.9776e+00	7.0221e-01
70	selpar_A50_Mcvt	2.0316e+00	3.8449e-02
71	selpar_slope_Mcvt	3.3945e+00	1.0031e-01
72	selpar_A502_Mcvt	4.7992e+00	1.1951e+00
73	selpar_slope2_Mcvt	3.5466e-01	1.0384e-01
74	selpar_A50_cL2	3.5348e+00	1.0913e-01
75	selpar_slope_cL2	2.4733e+00	1.8516e-01
76	selpar_A50_cL3	3.6781e+00	7.1655e-02
77	selpar_slope_cL3	2.6176e+00	1.2497e-01
78	selpar_A50_cL4	3.9960e+00	8.8845e-02
79	selpar_slope_cL4	2.3270e+00	1.3705e-01
80	selpar_A50_cP2	2.3075e+00	9.2565e-02
81	selpar_slope_cP2	4.8255e+00	8.6087e-01
82	selpar_A50_cP3	3.0380e+00	3.2945e-02
83	selpar_slope_cP3	4.7570e+00	2.5757e-01
84	selpar_A50_cP4	3.5658e+00	1.6456e-01
85	selpar_slope_cP4	2.5675e+00	3.3680e-01
86	selpar_A50_HB1	1.6745e+00	5.8092e-02

Continued on next page

Table B1 – continued from previous page

Index	Name	Value	Standard Error
87	selpar_slope_HB1	4.3427e+00	3.0352e-01
88	selpar_A50_HB2	1.8649e+00	1.9323e-02
89	selpar_slope_HB2	6.1499e+00	2.7918e-01
90	selpar_A50_HB3	2.6069e+00	4.2929e-02
91	selpar_slope_HB3	6.8296e+00	4.8927e-01
92	selpar_A50_HB4	3.2135e+00	6.6297e-02
93	selpar_slope_HB4	3.1211e+00	2.0363e-01
94	selpar_A50_HB5	3.6994e+00	9.6287e-02
95	selpar_slope_HB5	2.7109e+00	2.0805e-01
96	selpar_A50_HBD4	1.9020e+00	1.0060e-01
97	selpar_slope_HBD4	2.7767e+00	1.8928e-01
98	selpar_A502_HBD4	2.0864e+00	2.6670e-01
99	selpar_A50_HBD5	1.9525e+00	1.1915e-01
100	selpar_slope_HBD5	2.6107e+00	2.0790e-01
101	selpar_A502_HBD5	1.7628e+00	1.8265e-01
102	selpar_Age0_HB_D_logit	-3.9434e+00	3.4122e-01
103	selpar_Age1_HB_D_logit	-9.5046e-01	2.7830e-01
104	selpar_Age2_HB_D_logit	3.4995e+00	1.0727e+00
105	selpar_A50_mrip1	1.2085e+00	1.1080e-01
106	selpar_slope_mrip1	3.8984e+00	7.0227e-01
107	selpar_A50_mrip2	2.1021e+00	3.8506e-02
108	selpar_slope_mrip2	3.2888e+00	1.4013e-01
109	selpar_A50_mrip3	3.0678e+00	3.5951e-02
110	selpar_slope_mrip3	4.9441e+00	5.0784e-01
111	selpar_A50_mrip4	4.5396e+00	9.2971e-02
112	selpar_slope_mrip4	2.8763e+00	1.9738e-01
113	selpar_A50_mrip5	5.5095e+00	1.0929e-01
114	selpar_slope_mrip5	2.3217e+00	1.5439e-01
115	log_q_Mbft	-1.6753e+01	5.7324e-02
116	log_q_Mcvt	-1.6218e+01	2.9961e-02
117	log_q_cL	-8.1765e+00	1.1526e-01
118	log_q_HB	-8.7882e+00	1.6627e-01
119	q_RW_log_dev_cL	-6.3747e-02	1.1104e-01
120	q_RW_log_dev_cL	-2.1670e-01	1.0673e-01
121	q_RW_log_dev_cL	3.4627e-02	1.0660e-01
122	q_RW_log_dev_cL	1.8975e-01	1.0672e-01
123	q_RW_log_dev_cL	2.3006e-01	1.0704e-01
124	q_RW_log_dev_cL	8.0791e-02	1.1170e-01
125	q_RW_log_dev_cL	-2.0852e-01	1.0716e-01
126	q_RW_log_dev_cL	-2.2621e-02	1.0722e-01
127	q_RW_log_dev_cL	-1.8363e-02	1.0683e-01
128	q_RW_log_dev_cL	1.2175e-01	1.0675e-01
129	q_RW_log_dev_cL	2.5436e-01	1.0710e-01
130	q_RW_log_dev_cL	-6.8887e-02	1.0724e-01
131	q_RW_log_dev_cL	-1.2848e-01	1.0728e-01

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
132	q_RW_log_dev_cL	-2.8290e-01	1.0737e-01
133	q_RW_log_dev_cL	1.3307e-01	1.0733e-01
134	q_RW_log_dev_cL	2.3927e-01	1.1138e-01
135	q_RW_log_dev_HB	-2.7830e-03	1.4532e-01
136	q_RW_log_dev_HB	6.8813e-02	1.3891e-01
137	q_RW_log_dev_HB	6.9215e-02	1.3726e-01
138	q_RW_log_dev_HB	4.7178e-02	1.3543e-01
139	q_RW_log_dev_HB	7.4822e-02	1.2717e-01
140	q_RW_log_dev_HB	1.2522e-01	1.0780e-01
141	q_RW_log_dev_HB	-9.8548e-02	1.0666e-01
142	q_RW_log_dev_HB	-9.9082e-02	1.0659e-01
143	q_RW_log_dev_HB	-6.7876e-02	1.0658e-01
144	q_RW_log_dev_HB	-1.2067e-01	1.0657e-01
145	q_RW_log_dev_HB	-7.2876e-02	1.0657e-01
146	q_RW_log_dev_HB	-1.7160e-01	1.0657e-01
147	q_RW_log_dev_HB	-2.9683e-01	1.0648e-01
148	q_RW_log_dev_HB	-2.6602e-01	1.0630e-01
149	q_RW_log_dev_HB	7.1319e-02	1.0629e-01
150	q_RW_log_dev_HB	2.2670e-02	1.0647e-01
151	q_RW_log_dev_HB	3.0473e-02	1.0643e-01
152	q_RW_log_dev_HB	7.3782e-02	1.0638e-01
153	q_RW_log_dev_HB	-2.4038e-02	1.0643e-01
154	q_RW_log_dev_HB	1.7470e-01	1.0653e-01
155	q_RW_log_dev_HB	-2.1637e-01	1.0728e-01
156	q_RW_log_dev_HB	1.2635e-02	1.0692e-01
157	q_RW_log_dev_HB	-2.9058e-02	1.0683e-01
158	q_RW_log_dev_HB	8.5521e-02	1.0689e-01
159	q_RW_log_dev_HB	2.6822e-01	1.0715e-01
160	q_RW_log_dev_HB	5.6974e-02	1.0719e-01
161	q_RW_log_dev_HB	-1.8223e-03	1.0743e-01
162	q_RW_log_dev_HB	-9.5430e-02	1.0920e-01
163	q_RW_log_dev_HB	-1.2137e-01	1.0703e-01
164	q_RW_log_dev_HB	2.3027e-01	1.0713e-01
165	q_RW_log_dev_HB	3.0824e-01	1.1130e-01
166	log_avg_F_cL	-3.3473e+00	4.0885e-02
167	log_F_dev_cL	-9.7567e-01	9.0942e-02
168	log_F_dev_cL	-7.1242e-01	8.4497e-02
169	log_F_dev_cL	-8.5587e-01	7.9676e-02
170	log_F_dev_cL	-3.5615e-01	7.5323e-02
171	log_F_dev_cL	-3.1881e-01	7.2790e-02
172	log_F_dev_cL	-3.0799e-01	7.1640e-02
173	log_F_dev_cL	5.0094e-02	6.9870e-02
174	log_F_dev_cL	1.2728e-01	7.3195e-02
175	log_F_dev_cL	2.4871e-01	7.6929e-02
176	log_F_dev_cL	1.4337e-01	7.8273e-02

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
177	log_F_dev_cL	5.2297e-01	7.7687e-02
178	log_F_dev_cL	5.5182e-01	7.5467e-02
179	log_F_dev_cL	6.2971e-01	7.4570e-02
180	log_F_dev_cL	6.3652e-01	7.3794e-02
181	log_F_dev_cL	4.5624e-01	7.0195e-02
182	log_F_dev_cL	2.7797e-01	6.7155e-02
183	log_F_dev_cL	4.3926e-01	6.5651e-02
184	log_F_dev_cL	1.2063e-01	6.4646e-02
185	log_F_dev_cL	5.9187e-02	6.4826e-02
186	log_F_dev_cL	2.9648e-01	6.5070e-02
187	log_F_dev_cL	5.9530e-01	6.3322e-02
188	log_F_dev_cL	5.1689e-01	6.7850e-02
189	log_F_dev_cL	-1.9855e-01	7.0492e-02
190	log_F_dev_cL	-2.7585e-01	7.1474e-02
191	log_F_dev_cL	-1.6453e-01	7.2556e-02
192	log_F_dev_cL	-3.4945e-01	7.2553e-02
193	log_F_dev_cL	-1.3322e-01	7.2167e-02
194	log_F_dev_cL	-4.2948e-01	7.4141e-02
195	log_F_dev_cL	-4.7276e-01	7.3786e-02
196	log_F_dev_cL	-6.1370e-01	7.4704e-02
197	log_F_dev_cL	-5.9000e-01	7.3326e-02
198	log_F_dev_cL	-2.6118e-01	7.2089e-02
199	log_F_dev_cL	-4.7624e-01	7.2217e-02
200	log_F_dev_cL	-9.5218e-01	7.2261e-02
201	log_F_dev_cL	-2.8859e-01	7.0075e-02
202	log_F_dev_cL	3.0103e-01	8.3509e-02
203	log_F_dev_cL	7.2945e-01	7.7743e-02
204	log_F_dev_cL	2.2185e-01	7.3831e-02
205	log_F_dev_cL	4.0366e-01	7.2592e-02
206	log_F_dev_cL	5.1395e-01	7.3831e-02
207	log_F_dev_cL	3.6368e-01	7.4917e-02
208	log_F_dev_cL	3.9660e-01	8.1935e-02
209	log_F_dev_cL	-1.2847e-01	9.5352e-02
210	log_F_dev_cL	2.5847e-01	1.1769e-01
211	log_avg_F_cP	-2.6525e+00	2.9498e-02
212	log_F_dev_cP	-1.8770e+00	8.2557e-02
213	log_F_dev_cP	-1.6775e-01	7.5864e-02
214	log_F_dev_cP	1.3893e-01	6.9373e-02
215	log_F_dev_cP	3.4723e-01	6.5422e-02
216	log_F_dev_cP	1.6243e-01	6.3639e-02
217	log_F_dev_cP	-2.8352e-01	6.2344e-02
218	log_F_dev_cP	-3.2971e-01	6.2548e-02
219	log_F_dev_cP	-1.6807e-01	6.5020e-02
220	log_F_dev_cP	1.2195e-01	6.6526e-02
221	log_F_dev_cP	-1.6028e-01	6.6475e-02

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
222	log_F_dev_cP	2.1779e-02	6.3724e-02
223	log_F_dev_cP	8.7309e-02	6.4195e-02
224	log_F_dev_cP	3.7530e-01	6.4256e-02
225	log_F_dev_cP	2.4987e-01	6.1860e-02
226	log_F_dev_cP	1.7398e-01	6.1064e-02
227	log_F_dev_cP	1.0769e-01	5.9328e-02
228	log_F_dev_cP	2.6385e-01	5.9471e-02
229	log_F_dev_cP	7.8321e-02	6.1483e-02
230	log_F_dev_cP	2.2824e-01	5.9572e-02
231	log_F_dev_cP	3.0805e-01	5.8781e-02
232	log_F_dev_cP	1.4190e-01	5.9729e-02
233	log_F_dev_cP	5.4346e-01	6.2952e-02
234	log_F_dev_cP	2.5829e-01	6.4669e-02
235	log_F_dev_cP	4.5091e-01	6.4412e-02
236	log_F_dev_cP	2.7766e-01	6.7244e-02
237	log_F_dev_cP	3.0545e-01	6.3839e-02
238	log_F_dev_cP	6.3443e-01	6.2279e-02
239	log_F_dev_cP	3.0721e-01	6.3546e-02
240	log_F_dev_cP	5.2197e-01	6.3258e-02
241	log_F_dev_cP	2.0714e-01	6.3238e-02
242	log_F_dev_cP	1.9072e-01	6.3500e-02
243	log_F_dev_cP	5.3906e-01	6.1853e-02
244	log_F_dev_cP	2.0331e-01	6.2615e-02
245	log_F_dev_cP	-1.6359e-02	6.3133e-02
246	log_F_dev_cP	-4.4435e-01	6.2564e-02
247	log_F_dev_cP	-3.0942e-01	9.6168e-02
248	log_F_dev_cP	-6.6784e-01	8.3291e-02
249	log_F_dev_cP	-5.3324e-01	7.7188e-02
250	log_F_dev_cP	-9.0380e-01	7.7078e-02
251	log_F_dev_cP	-3.2550e-02	7.7695e-02
252	log_F_dev_cP	4.8647e-02	7.5890e-02
253	log_F_dev_cP	1.5244e-01	8.4283e-02
254	log_F_dev_cP	-5.2743e-01	9.7985e-02
255	log_F_dev_cP	-1.0263e+00	1.1564e-01
256	log_avg_F_cT	-6.1043e+00	4.2882e-02
257	log_F_dev_cT	1.3583e-01	7.4425e-02
258	log_F_dev_cT	7.6506e-02	6.6810e-02
259	log_F_dev_cT	3.8986e-02	6.0489e-02
260	log_F_dev_cT	3.4058e-01	5.6465e-02
261	log_F_dev_cT	-2.6791e-02	5.4322e-02
262	log_F_dev_cT	-8.7157e-01	5.4462e-02
263	log_F_dev_cT	-1.7242e-02	5.4963e-02
264	log_F_dev_cT	4.7431e-01	5.6369e-02
265	log_F_dev_cT	4.6103e-01	5.7498e-02
266	log_F_dev_cT	-6.9541e-01	5.7759e-02

Continued on next page

Table B1 – continued from previous page

Index	Name	Value	Standard Error
267	log_F_dev_cT	2.8523e-01	5.7492e-02
268	log_F_dev_cT	-1.0846e-01	5.8954e-02
269	log_F_dev_cT	-9.3007e-02	6.0525e-02
270	log_avg_F_HB	-3.4031e+00	2.4596e-02
271	log_F_dev_HB	7.6320e-02	8.0898e-02
272	log_F_dev_HB	1.7011e-01	7.5110e-02
273	log_F_dev_HB	2.9025e-01	6.9138e-02
274	log_F_dev_HB	4.1771e-01	6.5564e-02
275	log_F_dev_HB	5.2160e-01	6.3152e-02
276	log_F_dev_HB	5.9206e-01	6.0117e-02
277	log_F_dev_HB	7.0293e-01	6.0126e-02
278	log_F_dev_HB	7.0778e-01	6.1742e-02
279	log_F_dev_HB	6.7153e-01	6.2415e-02
280	log_F_dev_HB	7.4311e-01	6.1266e-02
281	log_F_dev_HB	7.7769e-01	6.0119e-02
282	log_F_dev_HB	5.2846e-01	6.0152e-02
283	log_F_dev_HB	2.9522e-01	5.9352e-02
284	log_F_dev_HB	4.0347e-02	5.7987e-02
285	log_F_dev_HB	-2.1698e-01	5.7505e-02
286	log_F_dev_HB	-5.6303e-01	5.7367e-02
287	log_F_dev_HB	-5.3131e-01	5.7738e-02
288	log_F_dev_HB	-5.8287e-01	5.7295e-02
289	log_F_dev_HB	-4.7339e-01	5.6272e-02
290	log_F_dev_HB	-4.2741e-01	5.6140e-02
291	log_F_dev_HB	-4.6697e-01	5.6662e-02
292	log_F_dev_HB	1.2216e-01	6.1227e-02
293	log_F_dev_HB	-3.0512e-01	6.0073e-02
294	log_F_dev_HB	-6.9918e-02	6.0356e-02
295	log_F_dev_HB	-4.6101e-01	6.1394e-02
296	log_F_dev_HB	-4.5380e-01	6.0769e-02
297	log_F_dev_HB	1.9787e-01	6.0359e-02
298	log_F_dev_HB	5.6191e-02	6.0578e-02
299	log_F_dev_HB	-2.6618e-02	5.9784e-02
300	log_F_dev_HB	2.6604e-01	6.9859e-02
301	log_F_dev_HB	-2.5212e-01	7.0285e-02
302	log_F_dev_HB	1.2033e-01	6.8168e-02
303	log_F_dev_HB	6.7949e-01	6.7798e-02
304	log_F_dev_HB	4.0732e-01	6.7475e-02
305	log_F_dev_HB	-3.8113e-01	6.7197e-02
306	log_F_dev_HB	-3.6904e-01	7.7572e-02
307	log_F_dev_HB	-4.4821e-01	7.0369e-02
308	log_F_dev_HB	-5.3994e-01	6.7087e-02
309	log_F_dev_HB	-5.7565e-01	6.6803e-02
310	log_F_dev_HB	-5.3912e-01	6.7801e-02
311	log_F_dev_HB	-1.8084e-01	6.8437e-02

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
312	log_F_dev_HB	-1.3113e-01	7.6196e-02
313	log_F_dev_HB	-2.1228e-01	8.9676e-02
314	log_F_dev_HB	-1.7660e-01	1.1119e-01
315	log_avg_F_mrip	-1.2447e+00	3.2532e-02
316	log_F_dev_mrip	-7.7099e-01	6.7800e-02
317	log_F_dev_mrip	-1.8952e-01	6.4472e-02
318	log_F_dev_mrip	-1.6398e+00	6.6549e-02
319	log_F_dev_mrip	2.2586e-01	5.9614e-02
320	log_F_dev_mrip	4.1176e-02	6.1875e-02
321	log_F_dev_mrip	-4.0258e-01	6.4069e-02
322	log_F_dev_mrip	-5.3445e-01	6.3593e-02
323	log_F_dev_mrip	-8.3693e-01	6.2947e-02
324	log_F_dev_mrip	-3.1063e-01	6.1905e-02
325	log_F_dev_mrip	-9.9193e-01	6.2593e-02
326	log_F_dev_mrip	-7.3111e-01	6.0796e-02
327	log_F_dev_mrip	-7.5416e-01	6.0088e-02
328	log_F_dev_mrip	-9.1582e-01	5.9453e-02
329	log_F_dev_mrip	-5.5636e-01	5.9126e-02
330	log_F_dev_mrip	-1.0752e+00	5.9778e-02
331	log_F_dev_mrip	-5.1762e-01	5.7747e-02
332	log_F_dev_mrip	-7.8076e-01	5.8030e-02
333	log_F_dev_mrip	-1.1854e+00	5.9200e-02
334	log_F_dev_mrip	-6.7566e-01	6.3941e-02
335	log_F_dev_mrip	-3.2754e-01	6.4474e-02
336	log_F_dev_mrip	1.6269e-01	6.2648e-02
337	log_F_dev_mrip	-4.4279e-01	6.5974e-02
338	log_F_dev_mrip	-5.0919e-01	6.4405e-02
339	log_F_dev_mrip	4.3624e-01	6.1485e-02
340	log_F_dev_mrip	2.7590e-01	6.2958e-02
341	log_F_dev_mrip	2.2478e-02	6.3924e-02
342	log_F_dev_mrip	8.0445e-01	8.6684e-02
343	log_F_dev_mrip	6.5503e-01	8.7173e-02
344	log_F_dev_mrip	3.5462e-01	8.3736e-02
345	log_F_dev_mrip	1.0145e+00	8.2798e-02
346	log_F_dev_mrip	7.0928e-01	8.7144e-02
347	log_F_dev_mrip	2.9731e-01	8.7195e-02
348	log_F_dev_mrip	7.9896e-01	9.0673e-02
349	log_F_dev_mrip	1.5888e+00	9.4027e-02
350	log_F_dev_mrip	9.9432e-01	9.0642e-02
351	log_F_dev_mrip	7.5224e-01	8.0804e-02
352	log_F_dev_mrip	1.2681e+00	8.1943e-02
353	log_F_dev_mrip	6.3074e-01	9.0329e-02
354	log_F_dev_mrip	1.0387e+00	9.8674e-02
355	log_F_dev_mrip	7.8800e-01	1.2155e-01
356	log_F_dev_mrip	1.2892e+00	1.6690e-01

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
357	log_avg_F_comm_D	-7.4368e+00	5.8965e-02
358	log_F_dev_comm_D	7.7272e-01	5.7642e-02
359	log_F_dev_comm_D	1.1106e+00	5.9819e-02
360	log_F_dev_comm_D	9.1073e-01	5.6357e-02
361	log_F_dev_comm_D	9.6238e-01	5.5904e-02
362	log_F_dev_comm_D	1.0240e+00	5.6864e-02
363	log_F_dev_comm_D	7.9284e-01	5.7870e-02
364	log_F_dev_comm_D	5.6915e-01	5.6328e-02
365	log_F_dev_comm_D	3.4022e-01	5.6077e-02
366	log_F_dev_comm_D	4.6151e-01	5.5906e-02
367	log_F_dev_comm_D	5.9648e-02	5.6050e-02
368	log_F_dev_comm_D	7.6667e-01	5.6619e-02
369	log_F_dev_comm_D	3.1660e-01	5.6890e-02
370	log_F_dev_comm_D	2.5019e-01	5.6153e-02
371	log_F_dev_comm_D	9.9008e-01	5.5662e-02
372	log_F_dev_comm_D	-1.0515e+00	5.5730e-02
373	log_F_dev_comm_D	-1.1205e+00	5.5793e-02
374	log_F_dev_comm_D	-4.0785e-01	5.4669e-02
375	log_F_dev_comm_D	-8.9762e-01	5.4809e-02
376	log_F_dev_comm_D	-6.2814e-01	5.4979e-02
377	log_F_dev_comm_D	-1.5997e-01	5.6839e-02
378	log_F_dev_comm_D	-3.0450e-01	5.5612e-02
379	log_F_dev_comm_D	-4.0261e-01	5.5349e-02
380	log_F_dev_comm_D	-8.0554e-01	5.7497e-02
381	log_F_dev_comm_D	-9.1284e-01	5.8753e-02
382	log_F_dev_comm_D	-4.9691e-01	5.9530e-02
383	log_F_dev_comm_D	4.7702e-02	6.3357e-02
384	log_F_dev_comm_D	1.4099e-01	7.0332e-02
385	log_F_dev_comm_D	-7.3100e-01	7.7255e-02
386	log_F_dev_comm_D	-1.5970e+00	8.4436e-02
387	log_avg_F_HB_D	-5.9927e+00	4.4753e-02
388	log_F_dev_HB_D	-1.0060e+00	7.0173e-02
389	log_F_dev_HB_D	6.1955e-01	6.5163e-02
390	log_F_dev_HB_D	1.2496e+00	6.7989e-02
391	log_F_dev_HB_D	-1.3419e+00	6.8857e-02
392	log_F_dev_HB_D	-4.0949e+00	6.4342e-02
393	log_F_dev_HB_D	6.8843e-01	6.7205e-02
394	log_F_dev_HB_D	-1.1488e+00	6.4533e-02
395	log_F_dev_HB_D	-1.3149e+00	6.5549e-02
396	log_F_dev_HB_D	9.4644e-02	7.4137e-02
397	log_F_dev_HB_D	-7.6861e-01	6.7050e-02
398	log_F_dev_HB_D	-1.5553e-01	6.4812e-02
399	log_F_dev_HB_D	-1.1435e-01	6.8045e-02
400	log_F_dev_HB_D	-1.3244e+00	7.1913e-02
401	log_F_dev_HB_D	-4.5057e-01	6.4239e-02

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
402	log_F_dev_HB_D	-3.8693e-01	6.6735e-02
403	log_F_dev_HB_D	-7.9977e-02	6.5721e-02
404	log_F_dev_HB_D	-7.1580e-01	6.4704e-02
405	log_F_dev_HB_D	-7.3692e-01	6.5270e-02
406	log_F_dev_HB_D	-1.2363e+00	6.8942e-02
407	log_F_dev_HB_D	-1.6931e+00	6.4318e-02
408	log_F_dev_HB_D	-7.9359e-01	6.6098e-02
409	log_F_dev_HB_D	-4.9470e-01	9.6122e-02
410	log_F_dev_HB_D	-2.1587e-01	9.3673e-02
411	log_F_dev_HB_D	6.3157e-02	9.2871e-02
412	log_F_dev_HB_D	3.0829e-01	9.3027e-02
413	log_F_dev_HB_D	6.7036e-01	9.2552e-02
414	log_F_dev_HB_D	9.1297e-01	8.4076e-02
415	log_F_dev_HB_D	8.4227e-01	8.7371e-02
416	log_F_dev_HB_D	1.0102e+00	9.3639e-02
417	log_F_dev_HB_D	1.1803e+00	9.1809e-02
418	log_F_dev_HB_D	1.3843e+00	8.6332e-02
419	log_F_dev_HB_D	1.4466e+00	9.3320e-02
420	log_F_dev_HB_D	1.5661e+00	1.0037e-01
421	log_F_dev_HB_D	1.9259e+00	9.6913e-02
422	log_F_dev_HB_D	1.7536e+00	9.8932e-02
423	log_F_dev_HB_D	2.3568e+00	1.1426e-01
424	log_avg_F_mrip_D	-3.2802e+00	4.5662e-02
425	log_F_dev_mrip_D	-9.5845e-01	6.8572e-02
426	log_F_dev_mrip_D	-1.1424e+00	6.4464e-02
427	log_F_dev_mrip_D	-1.9766e+00	6.5988e-02
428	log_F_dev_mrip_D	-1.1257e+00	6.6939e-02
429	log_F_dev_mrip_D	-1.0155e+00	6.7967e-02
430	log_F_dev_mrip_D	-8.1498e-01	6.7188e-02
431	log_F_dev_mrip_D	-1.2180e+00	6.2925e-02
432	log_F_dev_mrip_D	-1.1759e+00	6.5643e-02
433	log_F_dev_mrip_D	-1.0198e+00	6.6422e-02
434	log_F_dev_mrip_D	-1.4056e+00	6.2384e-02
435	log_F_dev_mrip_D	-1.0452e+00	6.4990e-02
436	log_F_dev_mrip_D	-1.0668e+00	6.2741e-02
437	log_F_dev_mrip_D	-8.4042e-01	6.3434e-02
438	log_F_dev_mrip_D	-3.5152e-01	7.1269e-02
439	log_F_dev_mrip_D	-1.1265e+00	6.4662e-02
440	log_F_dev_mrip_D	-9.4403e-01	6.2589e-02
441	log_F_dev_mrip_D	-6.5777e-01	6.5525e-02
442	log_F_dev_mrip_D	-9.4727e-01	6.9050e-02
443	log_F_dev_mrip_D	-4.1163e-01	6.2022e-02
444	log_F_dev_mrip_D	-8.4366e-02	6.4239e-02
445	log_F_dev_mrip_D	-1.3408e-01	6.3211e-02
446	log_F_dev_mrip_D	-4.4472e-01	6.2401e-02

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Table B1 – continued from previous page

Index	Name	Value	Standard Error
447	log_F_dev_mrip_D	-4.1027e-01	6.2849e-02
448	log_F_dev_mrip_D	2.2074e-01	6.5756e-02
449	log_F_dev_mrip_D	6.5478e-02	6.1816e-02
450	log_F_dev_mrip_D	2.1244e-01	6.3401e-02
451	log_F_dev_mrip_D	5.7581e-01	9.7783e-02
452	log_F_dev_mrip_D	5.1756e-01	9.4977e-02
453	log_F_dev_mrip_D	3.0595e-01	9.4435e-02
454	log_F_dev_mrip_D	5.0159e-01	9.4692e-02
455	log_F_dev_mrip_D	7.5969e-01	9.4463e-02
456	log_F_dev_mrip_D	9.1744e-01	8.5558e-02
457	log_F_dev_mrip_D	6.8466e-01	8.9863e-02
458	log_F_dev_mrip_D	1.7008e+00	9.5643e-02
459	log_F_dev_mrip_D	1.5537e+00	9.4104e-02
460	log_F_dev_mrip_D	1.6765e+00	8.7385e-02
461	log_F_dev_mrip_D	2.1455e+00	9.4127e-02
462	log_F_dev_mrip_D	1.7219e+00	1.0326e-01
463	log_F_dev_mrip_D	2.1916e+00	1.0001e-01
464	log_F_dev_mrip_D	2.2245e+00	1.0126e-01
465	log_F_dev_mrip_D	2.3417e+00	1.1730e-01

Figure B1. Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run. In panels indicating the data set, lcomp refers to length compositions, acomp to age compositions, Mbft to MARMAP blackfish/snapper traps, Mcvt to SERFS chevron traps, cl to commercial lines, cp to commercial pots, hb to headboat, mrip to general recreational, and hb.D to headboat discards. N indicates the number of trips from which individual fish samples were taken.

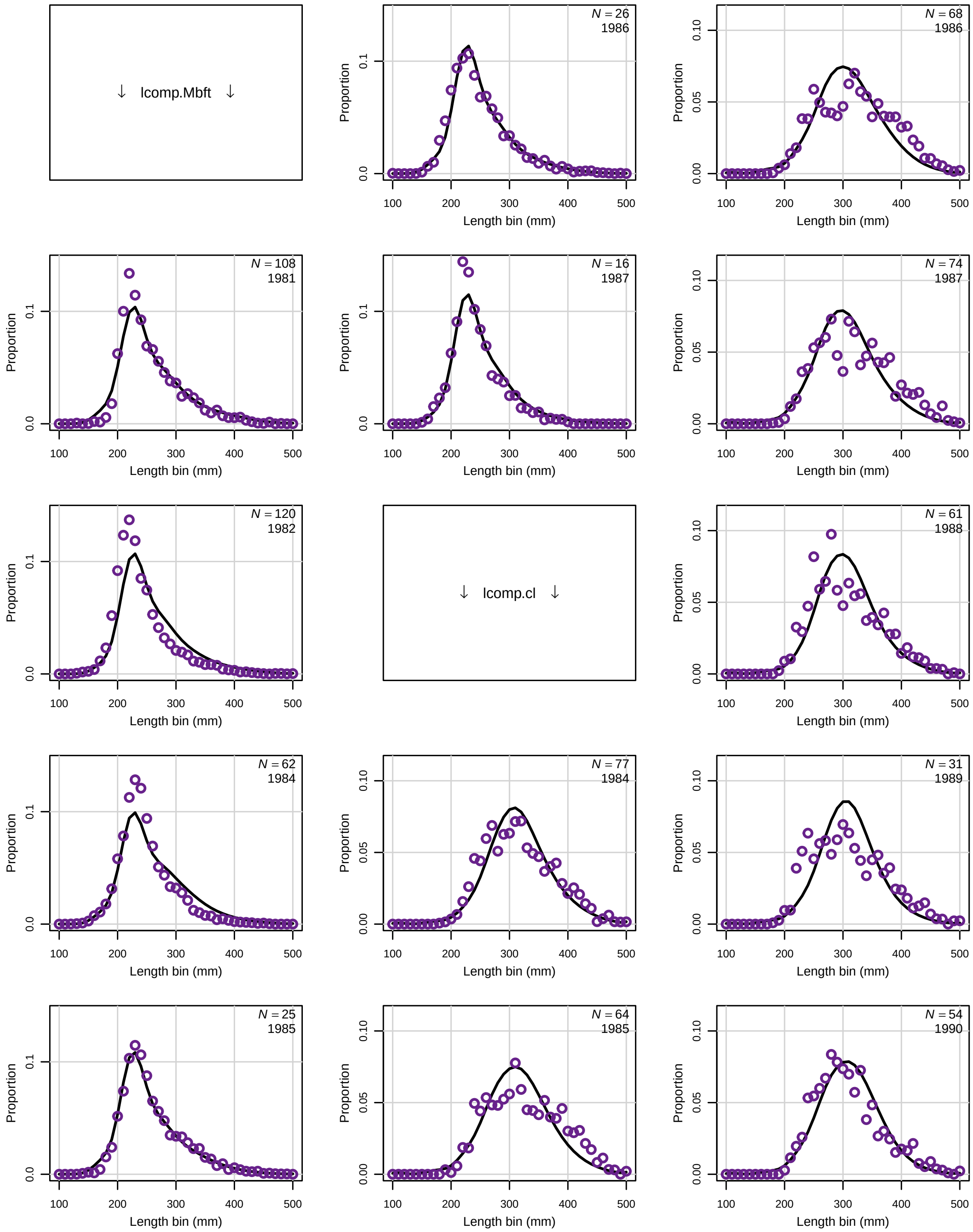


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

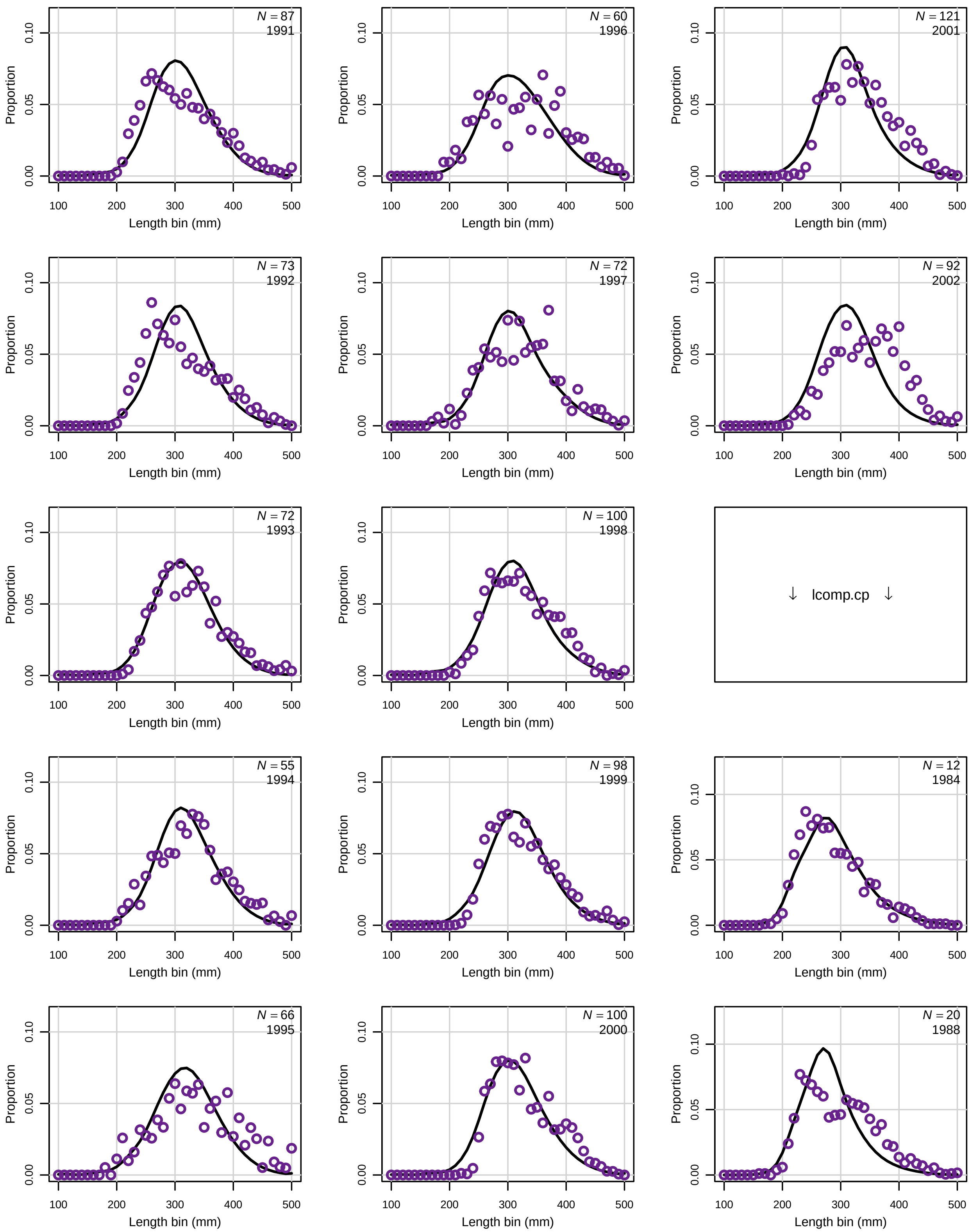


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

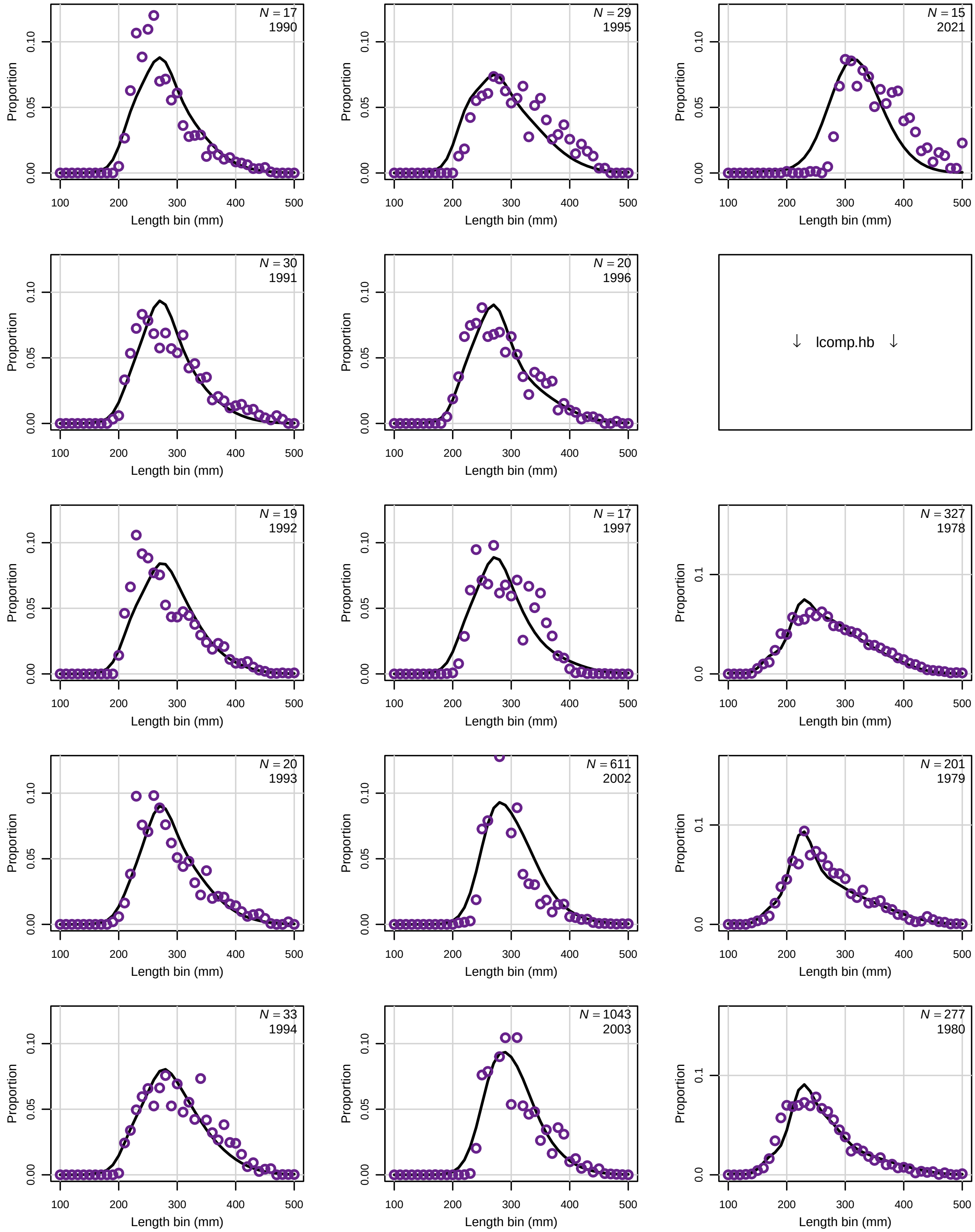


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

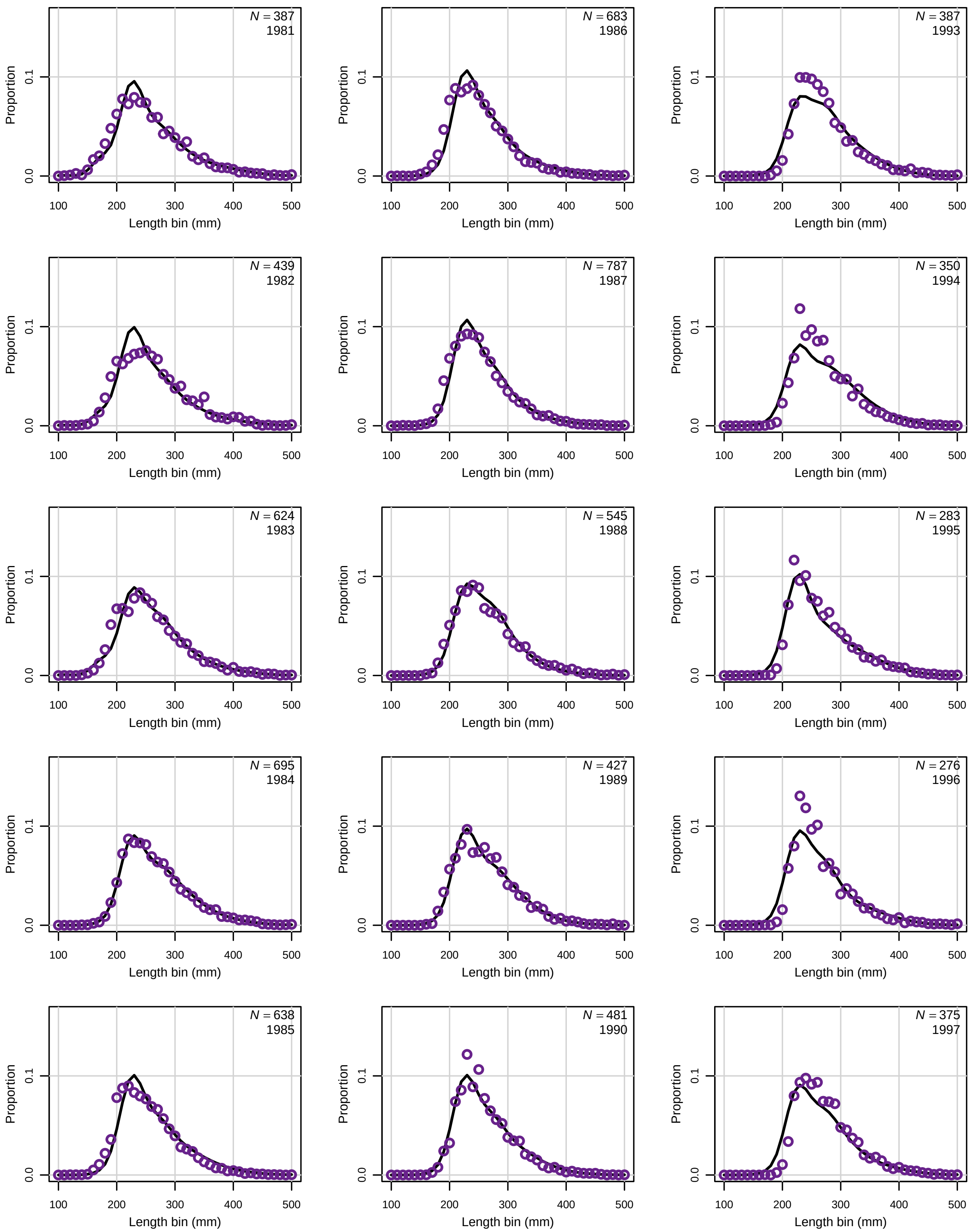


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

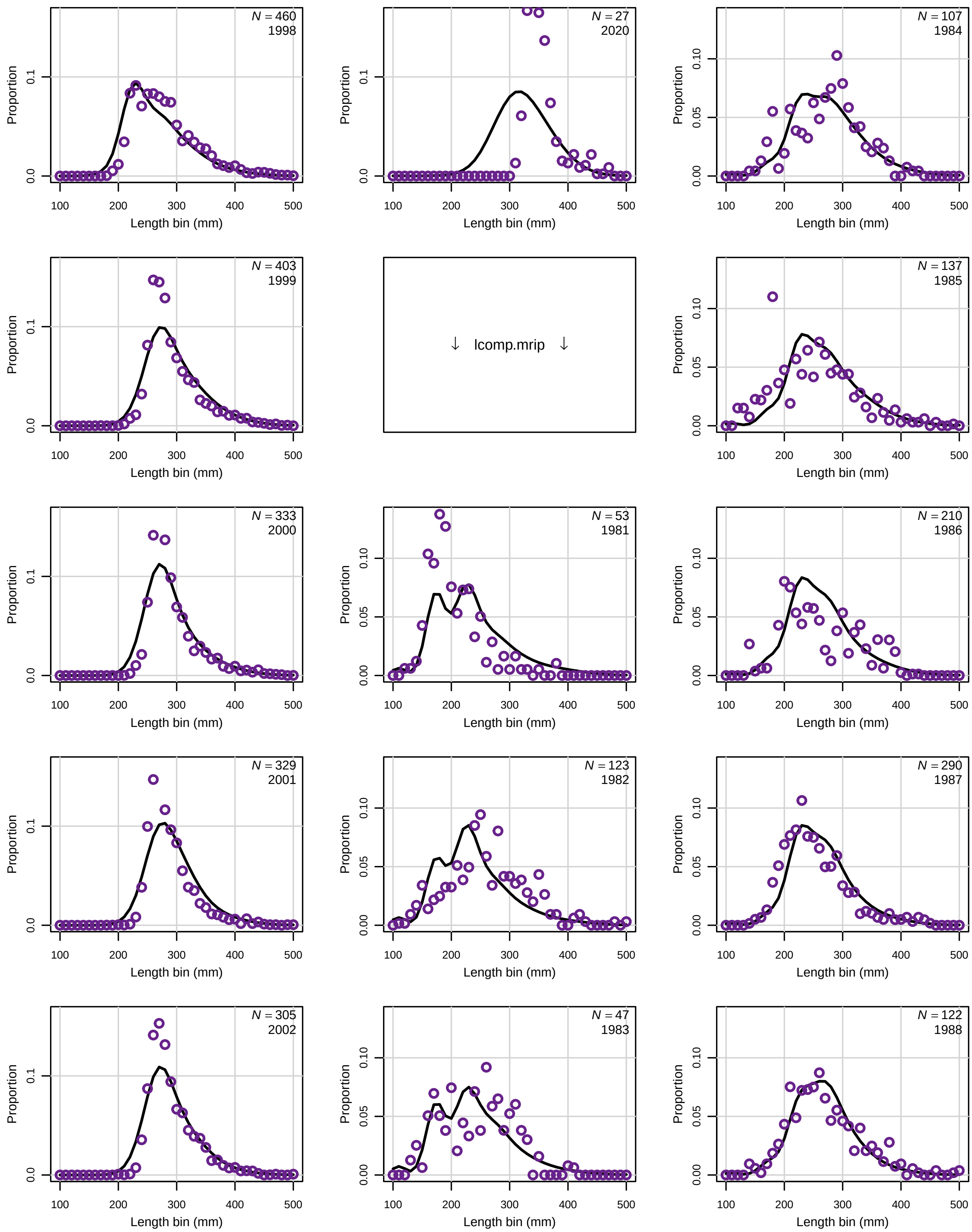


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

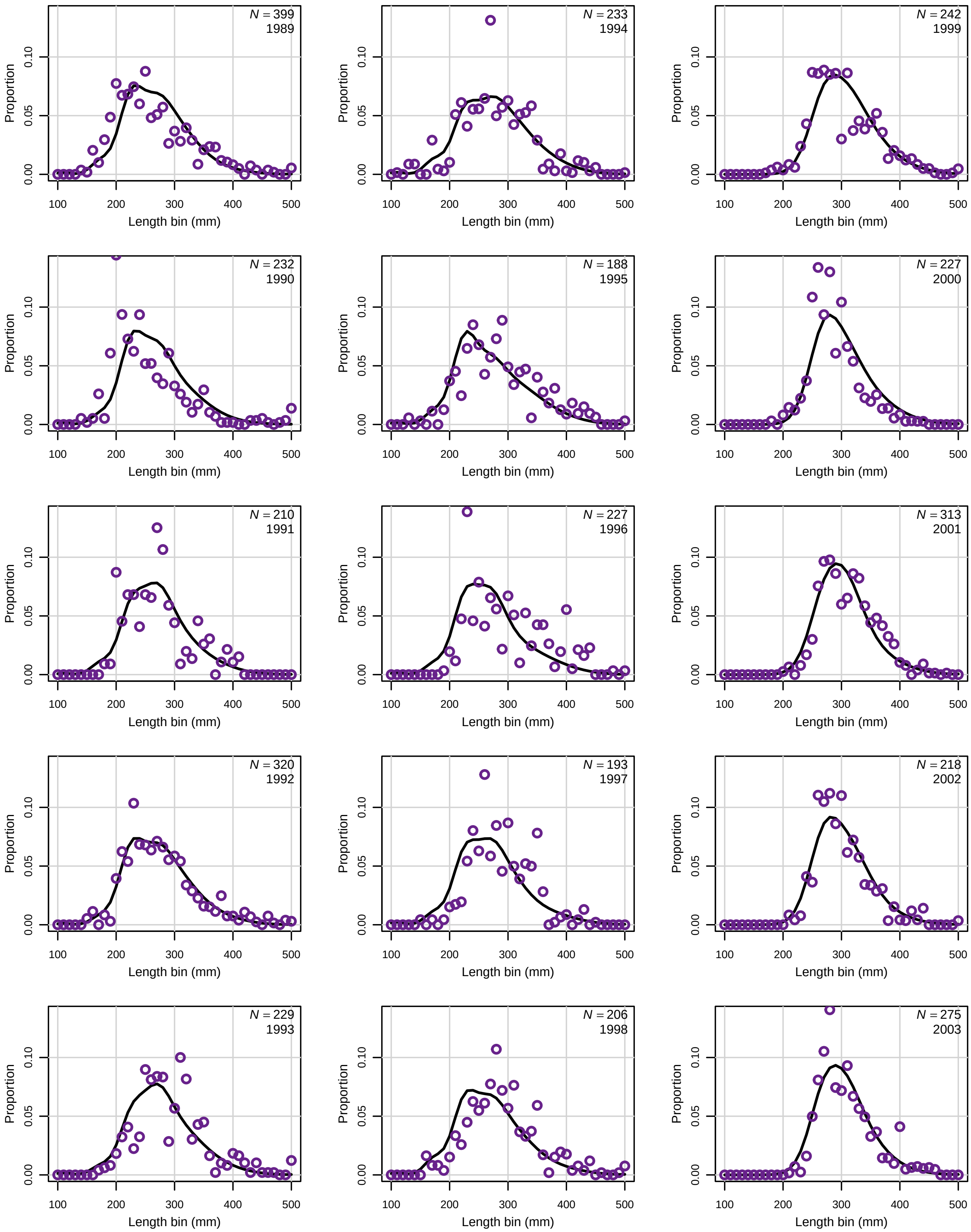


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

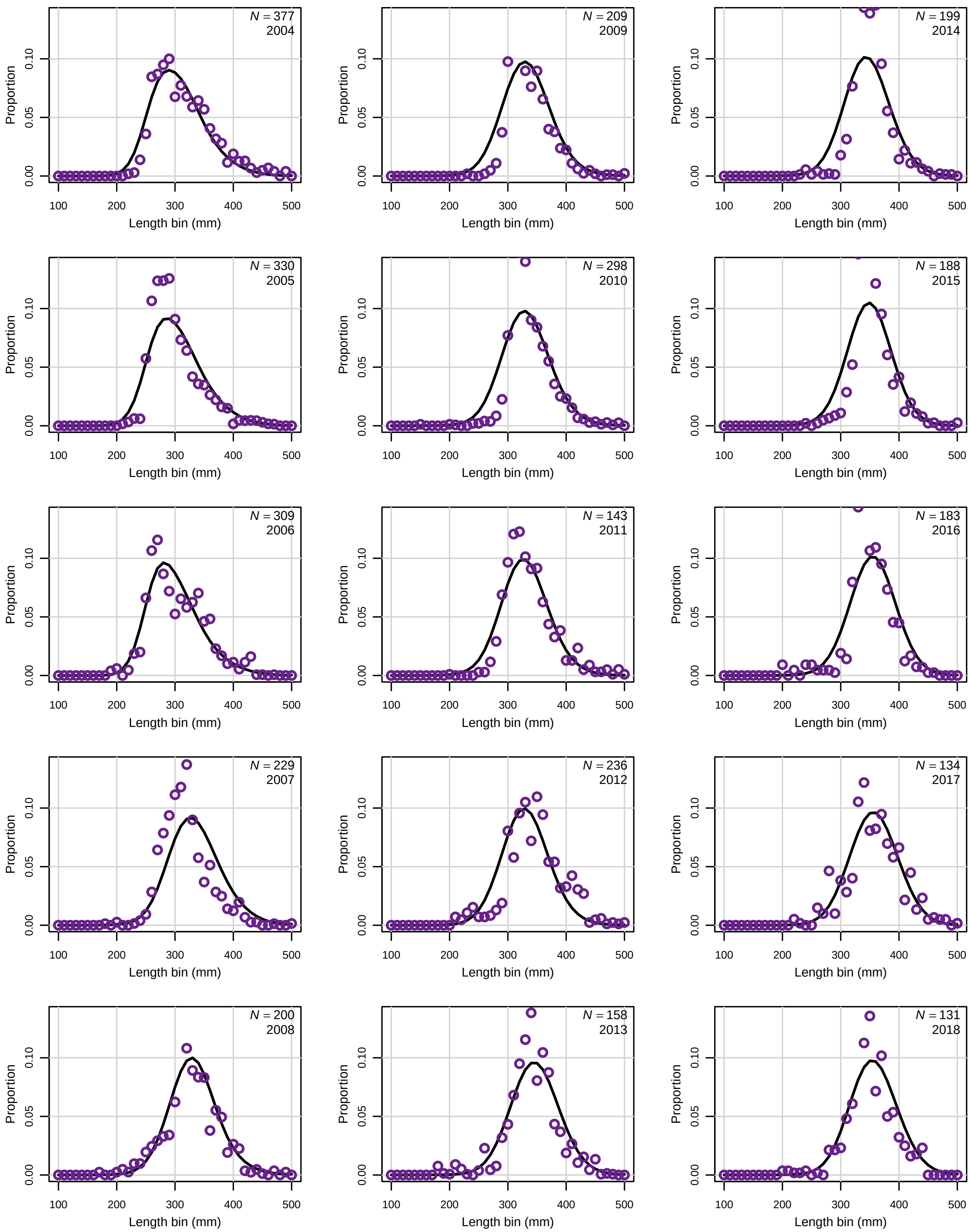


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

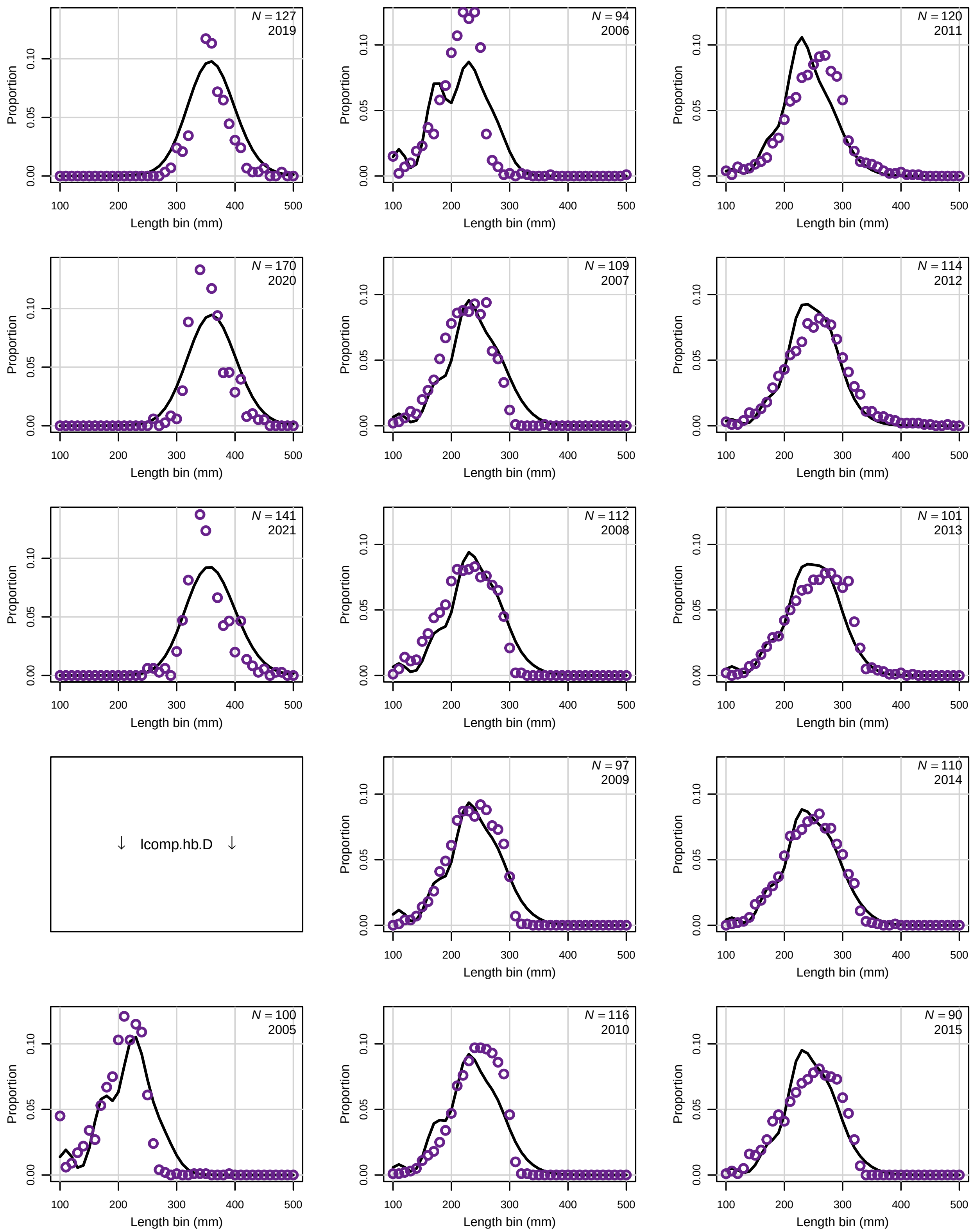


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

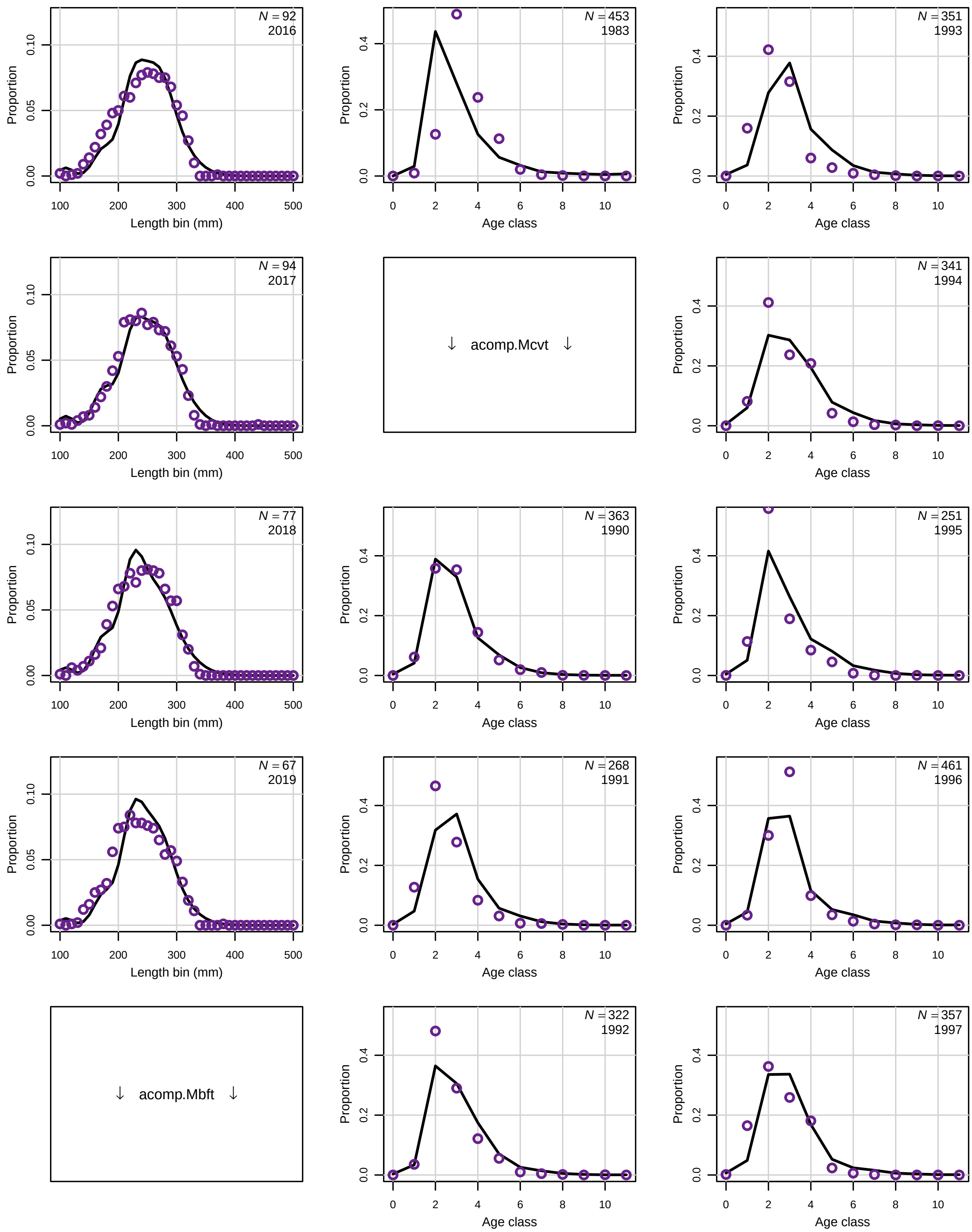


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

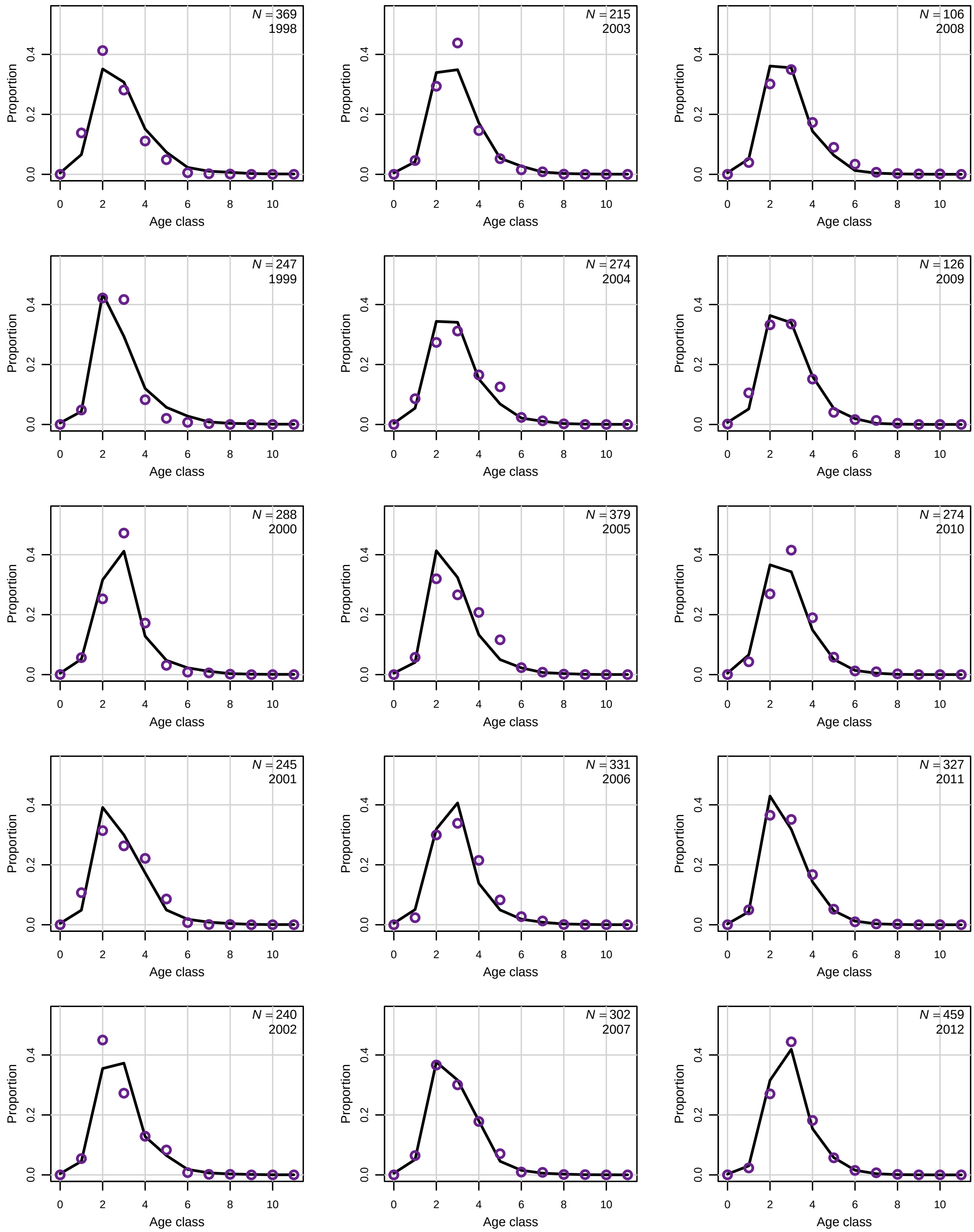


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

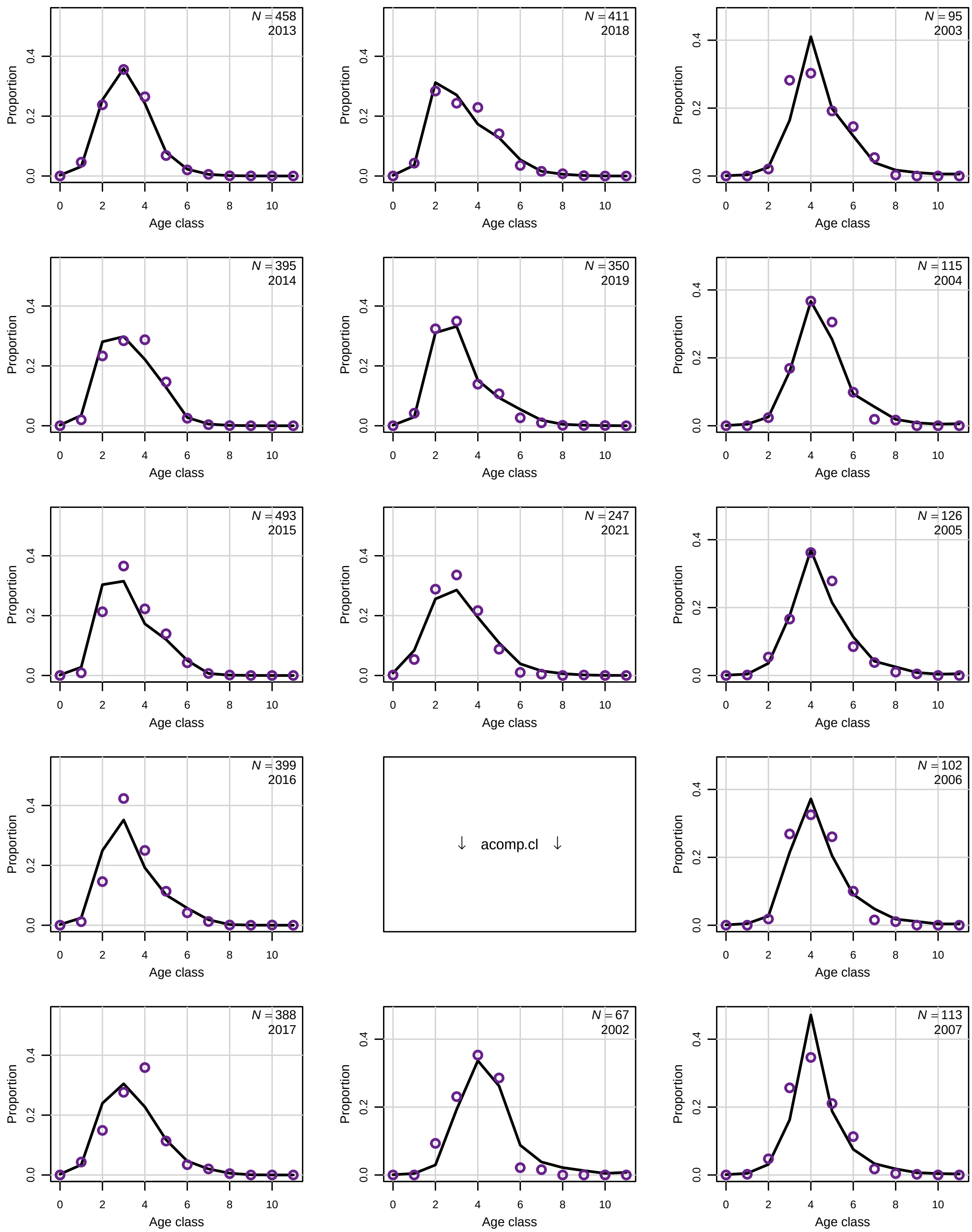


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey from the base run.

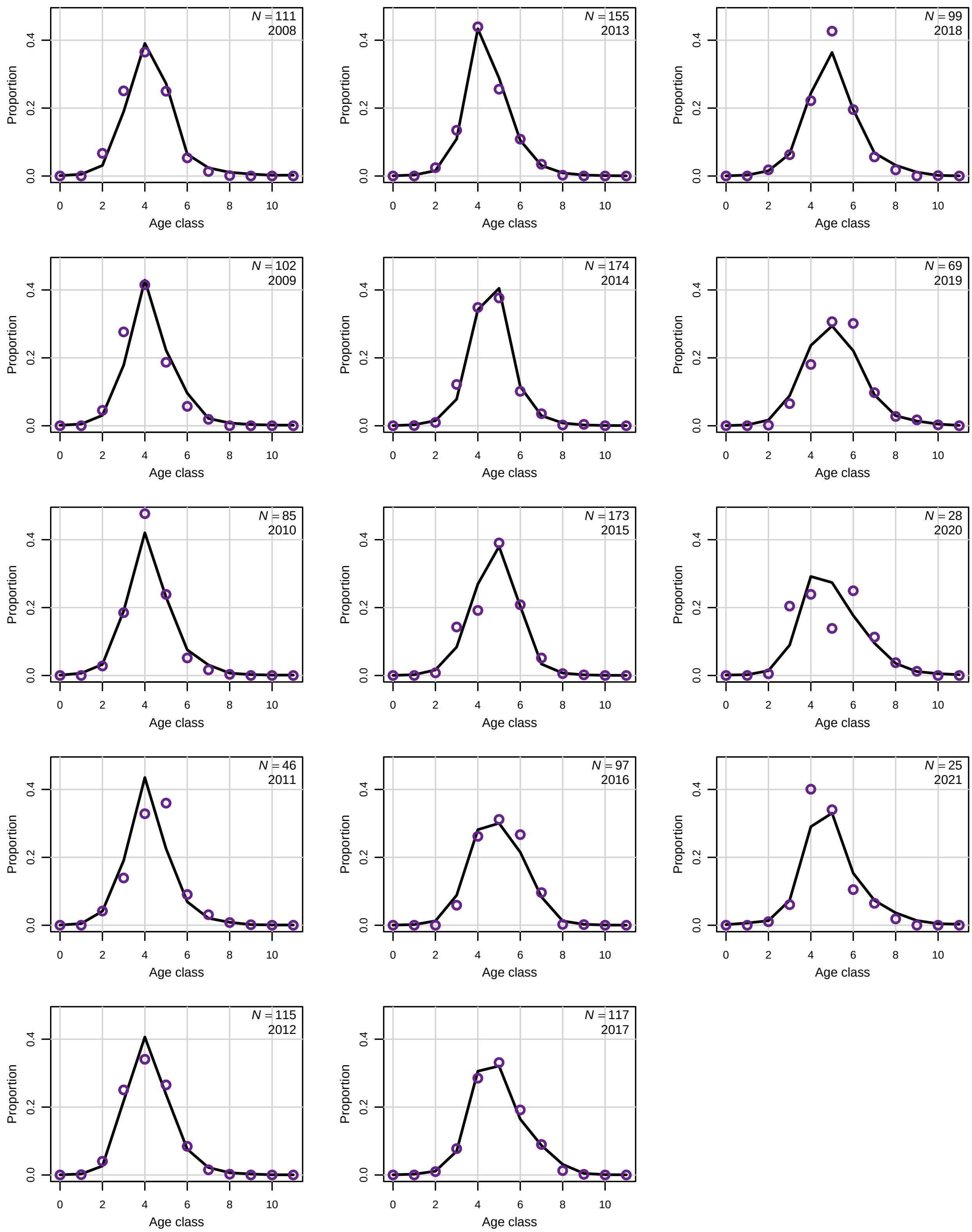


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey.

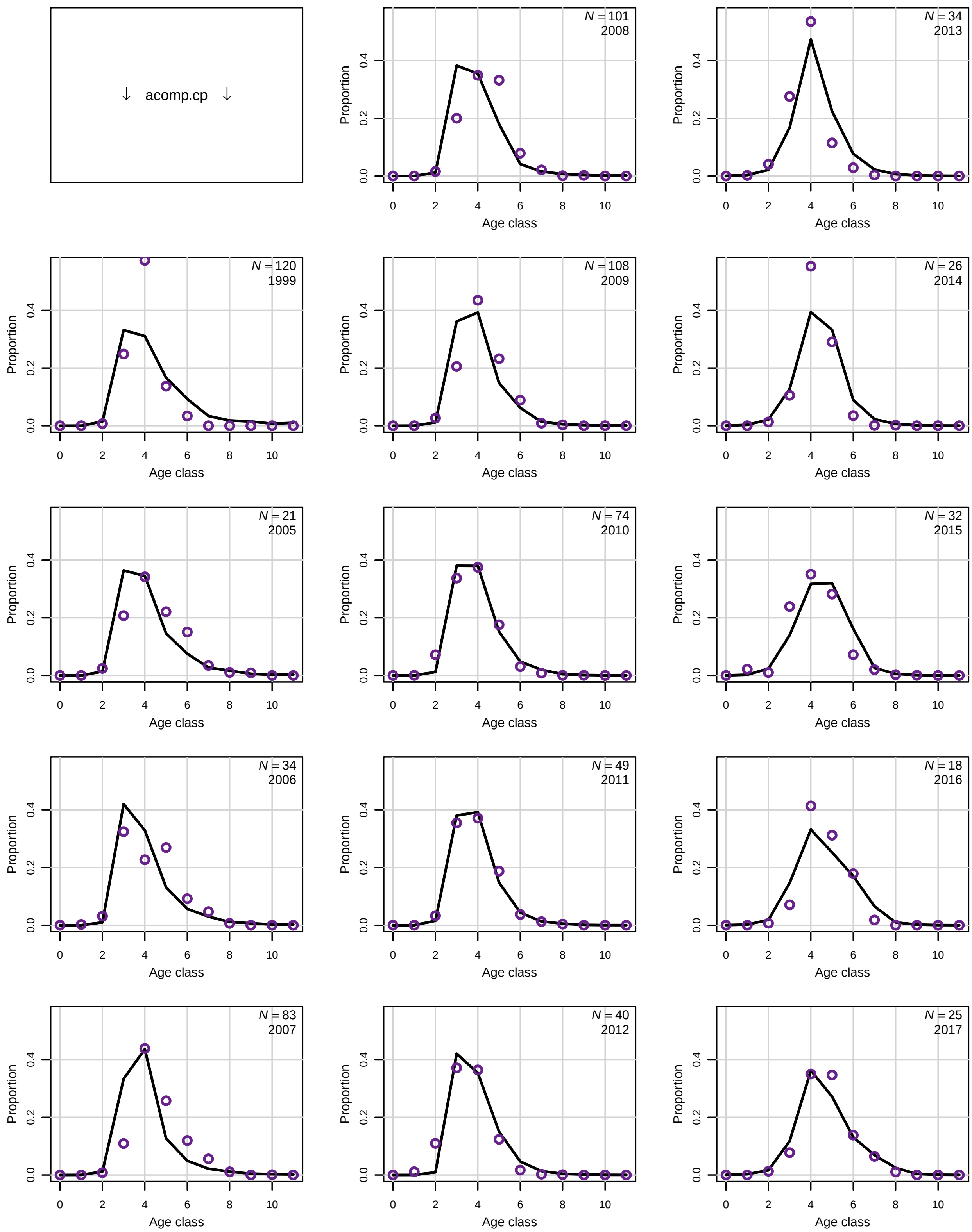


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey.

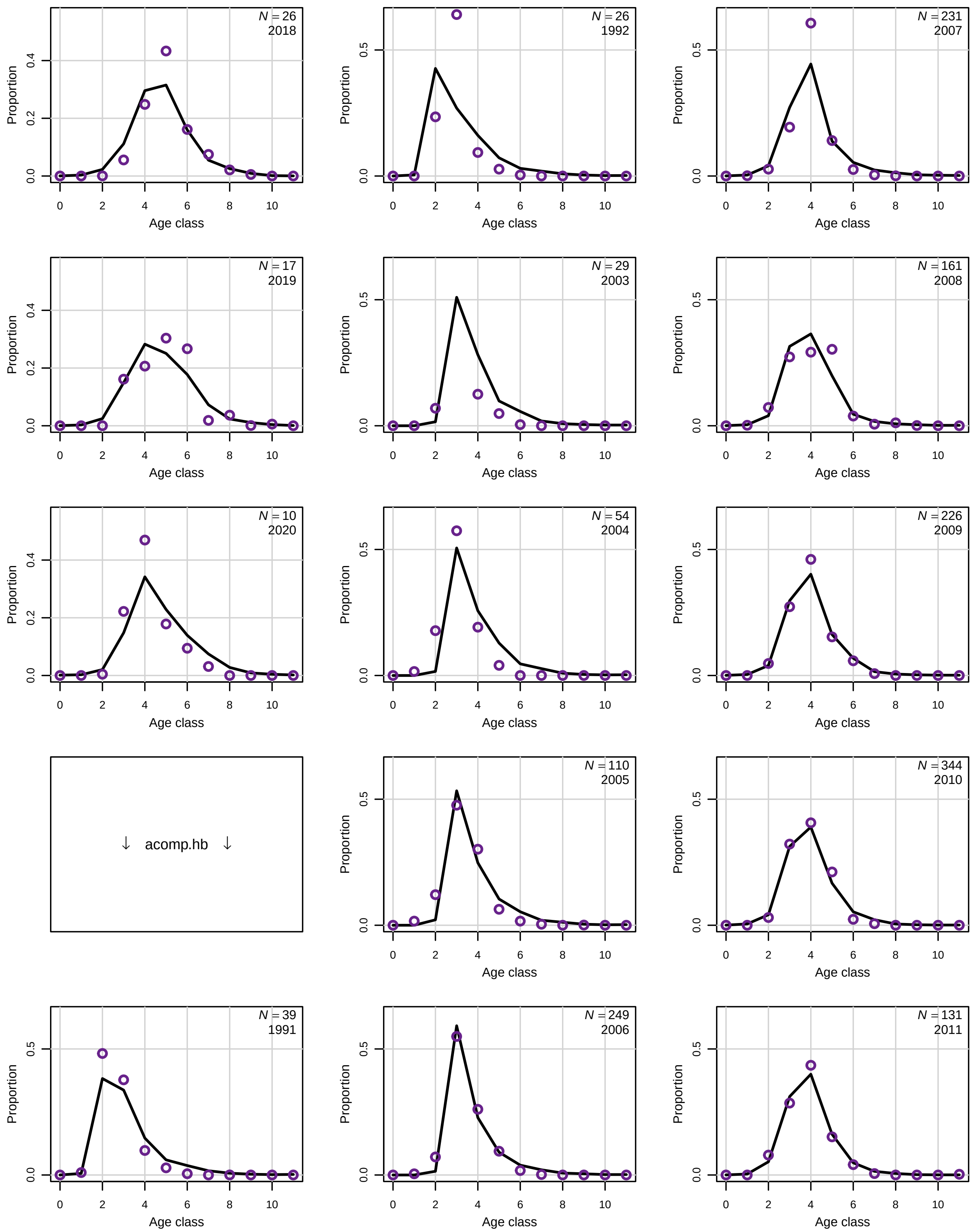


Figure B1. (cont.) Observed (open circles) and estimated (solid line) annual length and age compositions by fleet or survey.

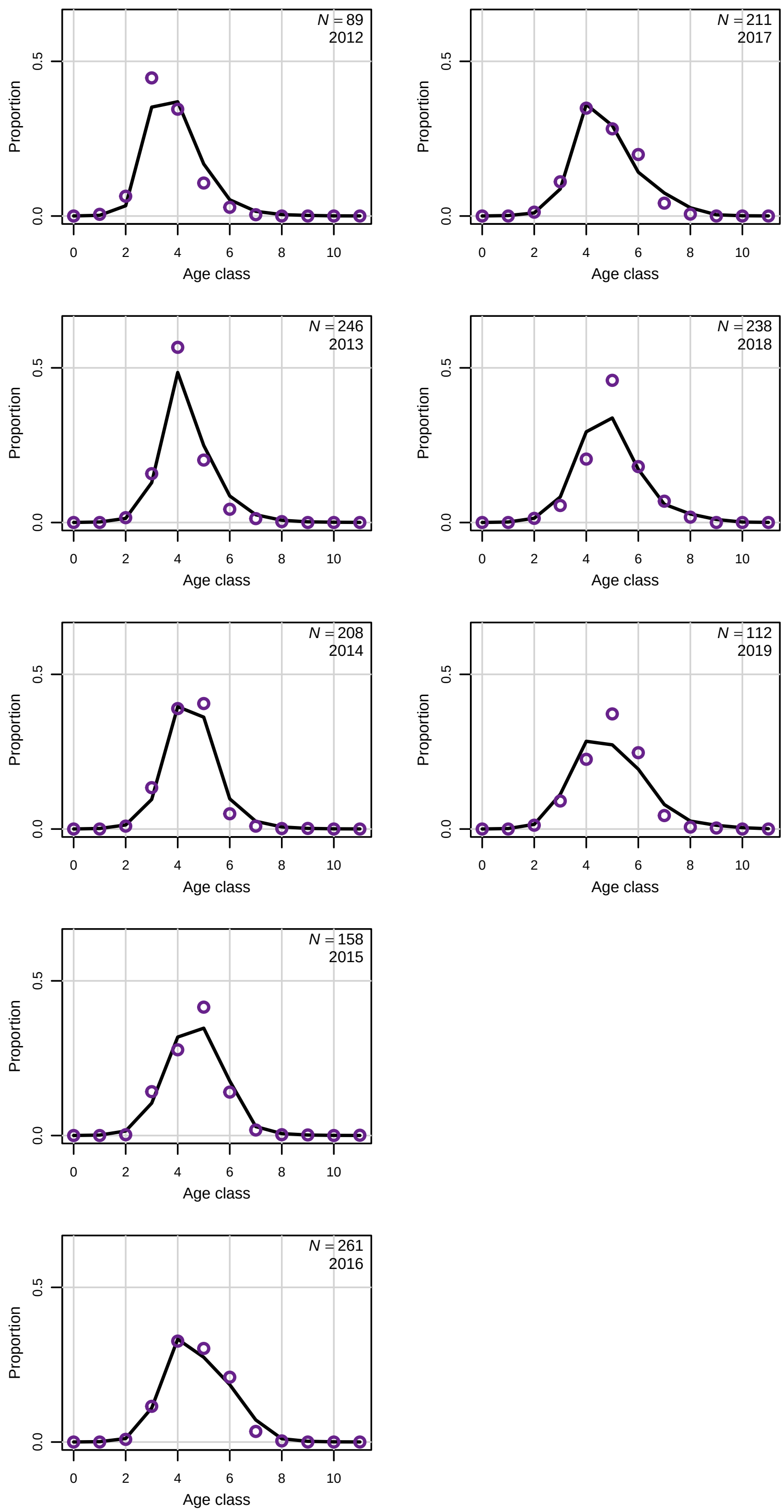


Figure B2. One-Step Ahead (OSA) residuals of commercial lines length composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

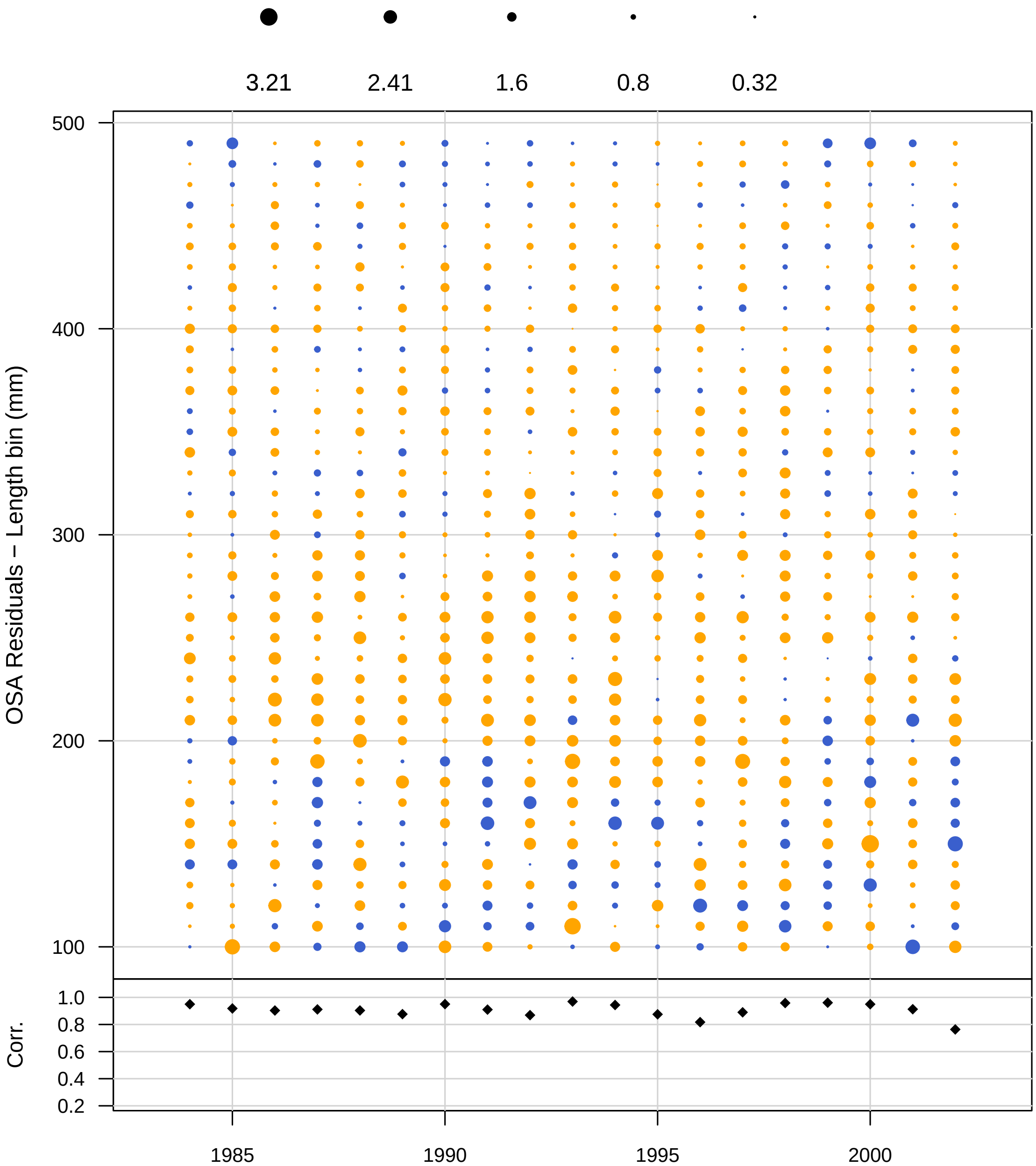


Figure B3. One-Step Ahead (OSA) residuals of commercial pots length composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

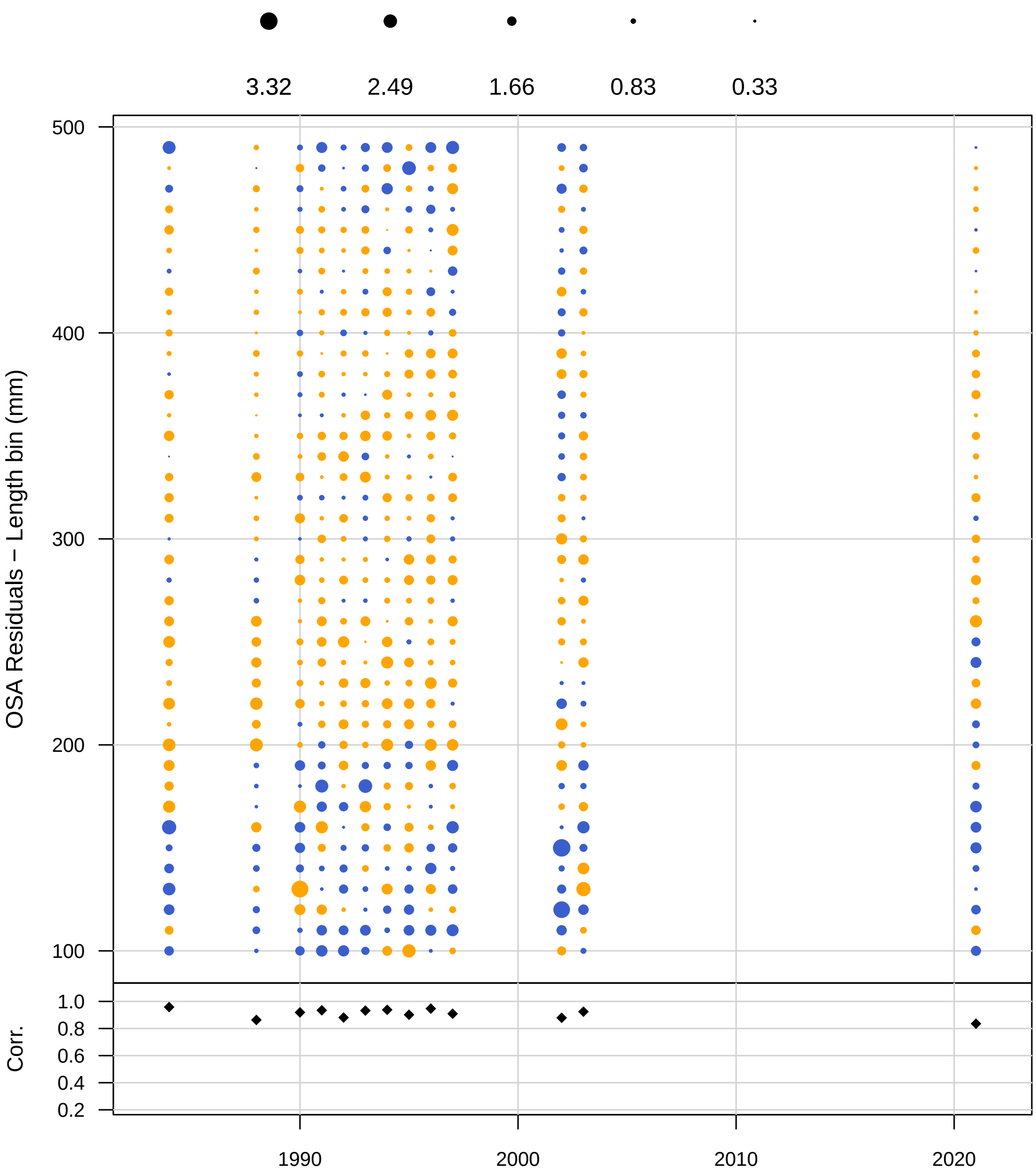


Figure B4. One-Step Ahead (OSA) residuals of headboat length composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

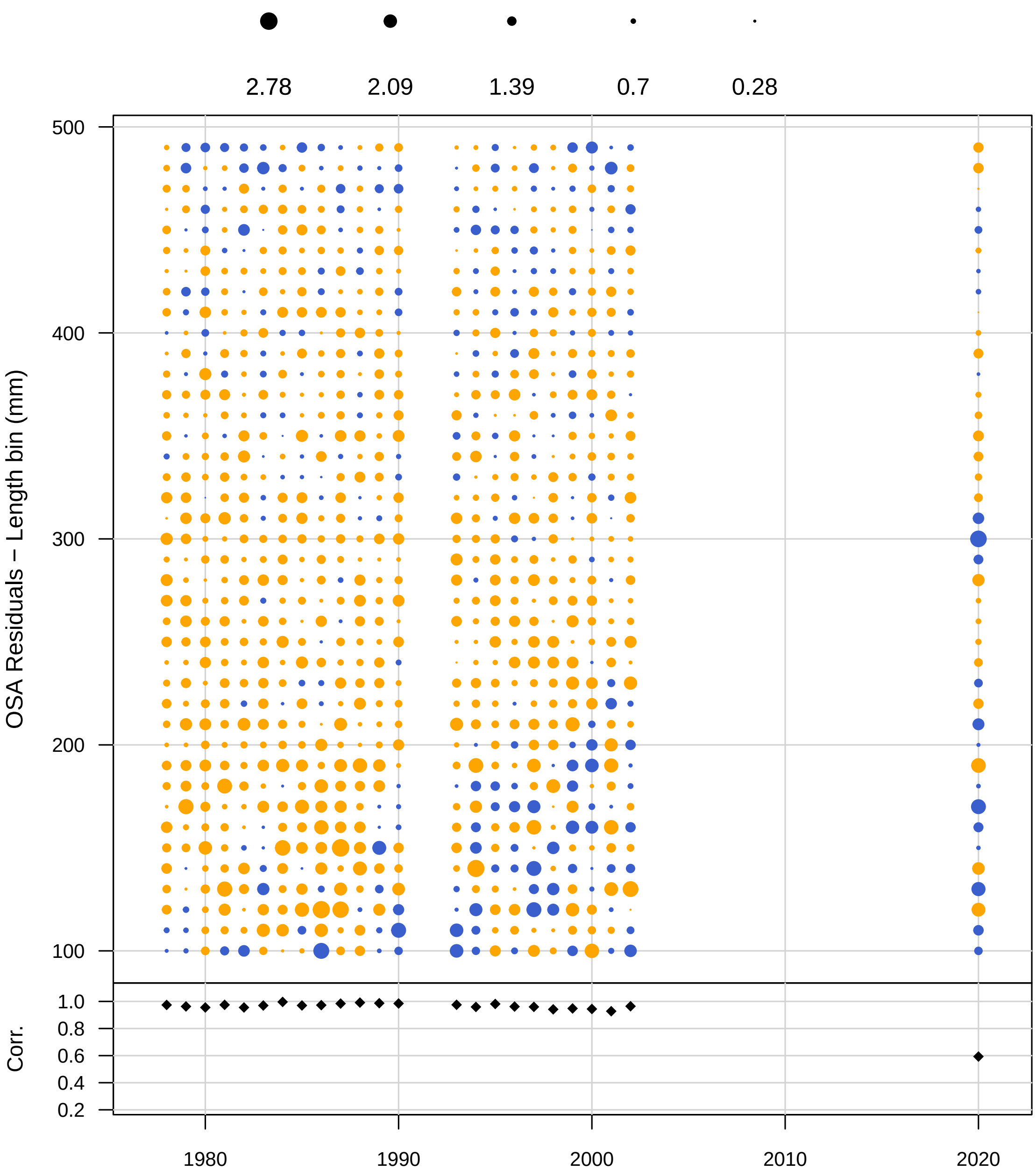


Figure B5. One-Step Ahead (OSA) residuals of general recreational length composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

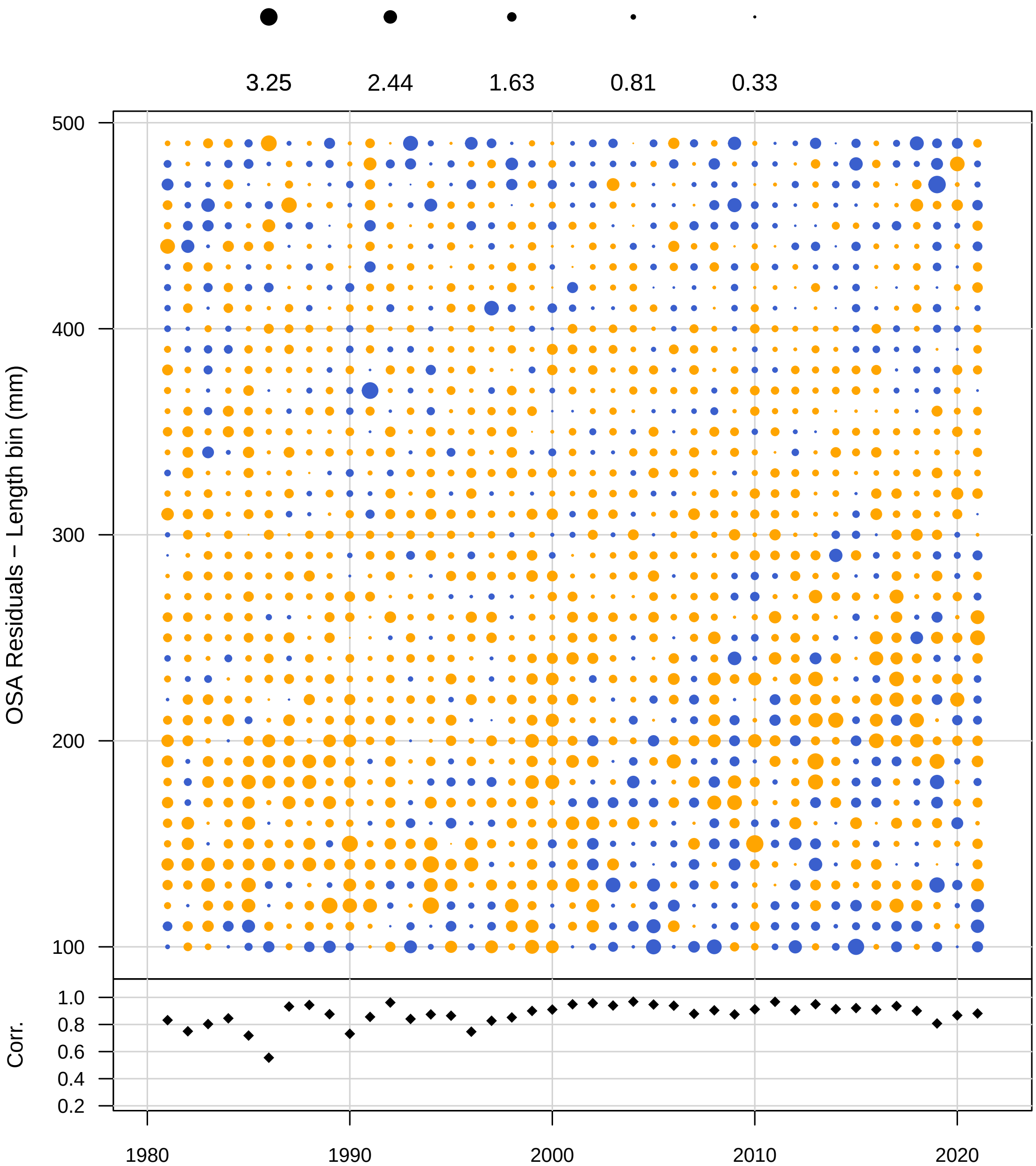


Figure B6. One-Step Ahead (OSA) residuals of headboat discard length composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

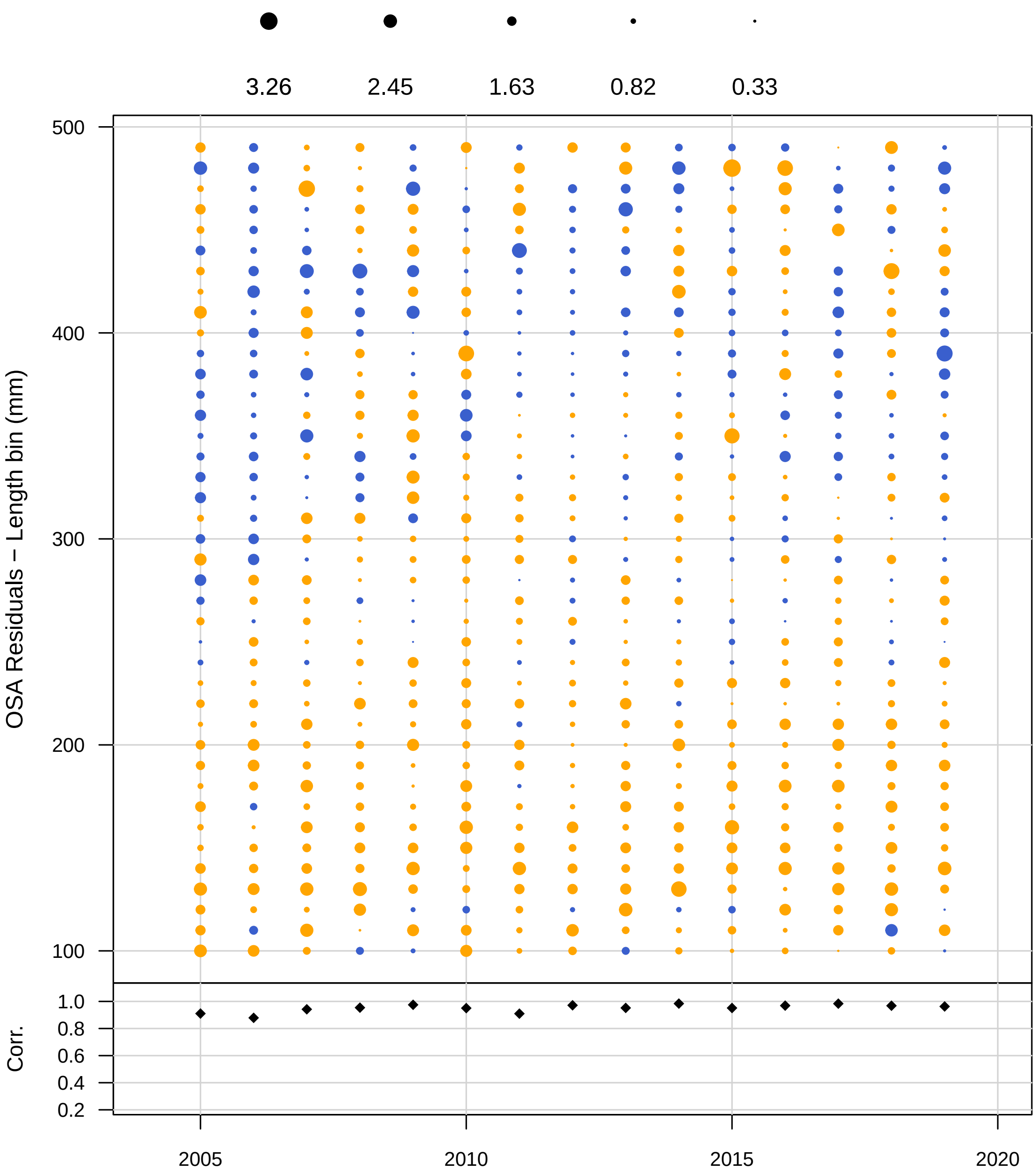


Figure B7. One-Step Ahead (OSA) residuals of MARMAP blackfish/snapper survey trap length composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

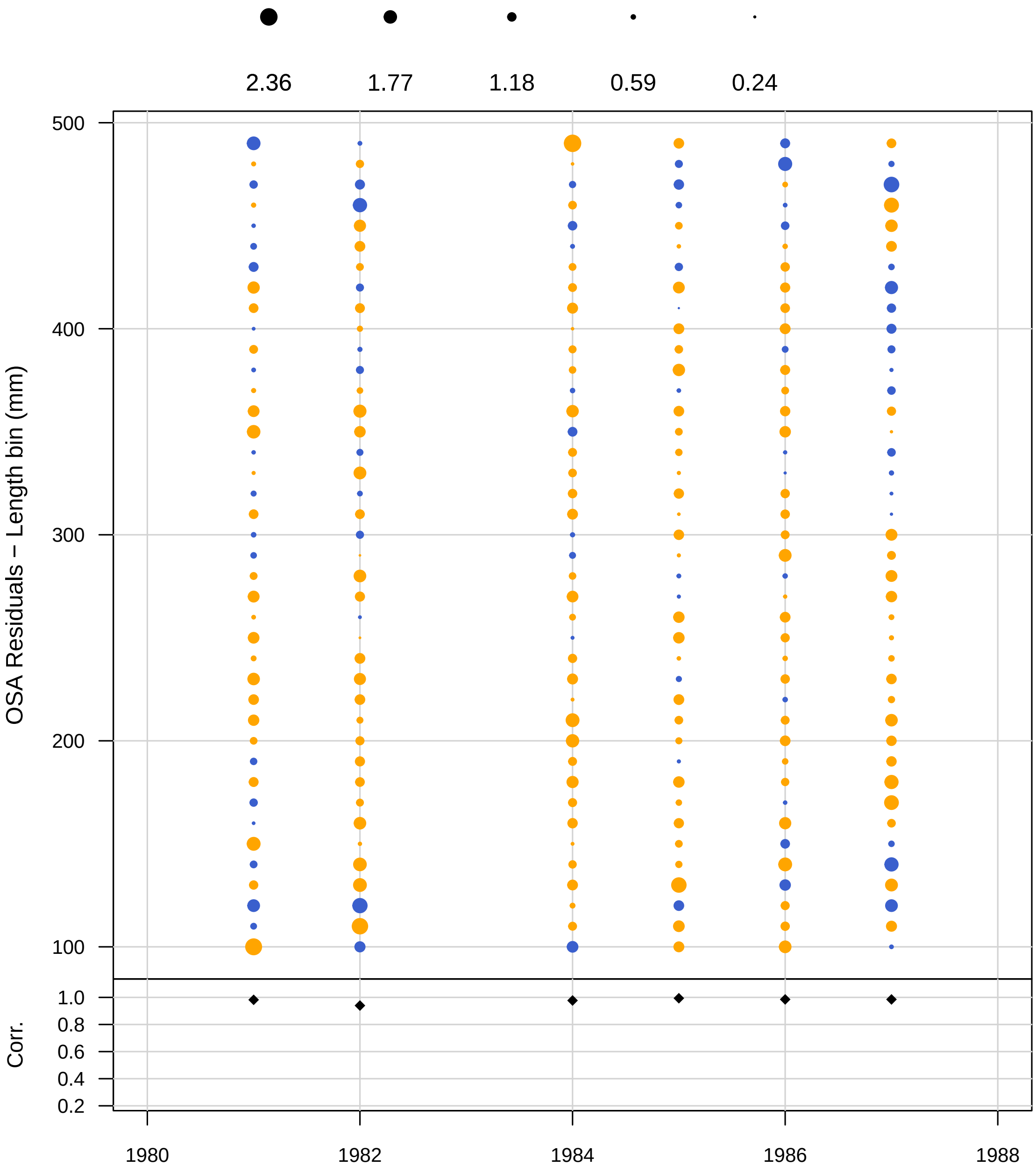


Figure B8. One-Step Ahead (OSA) residuals of commercial lines age composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

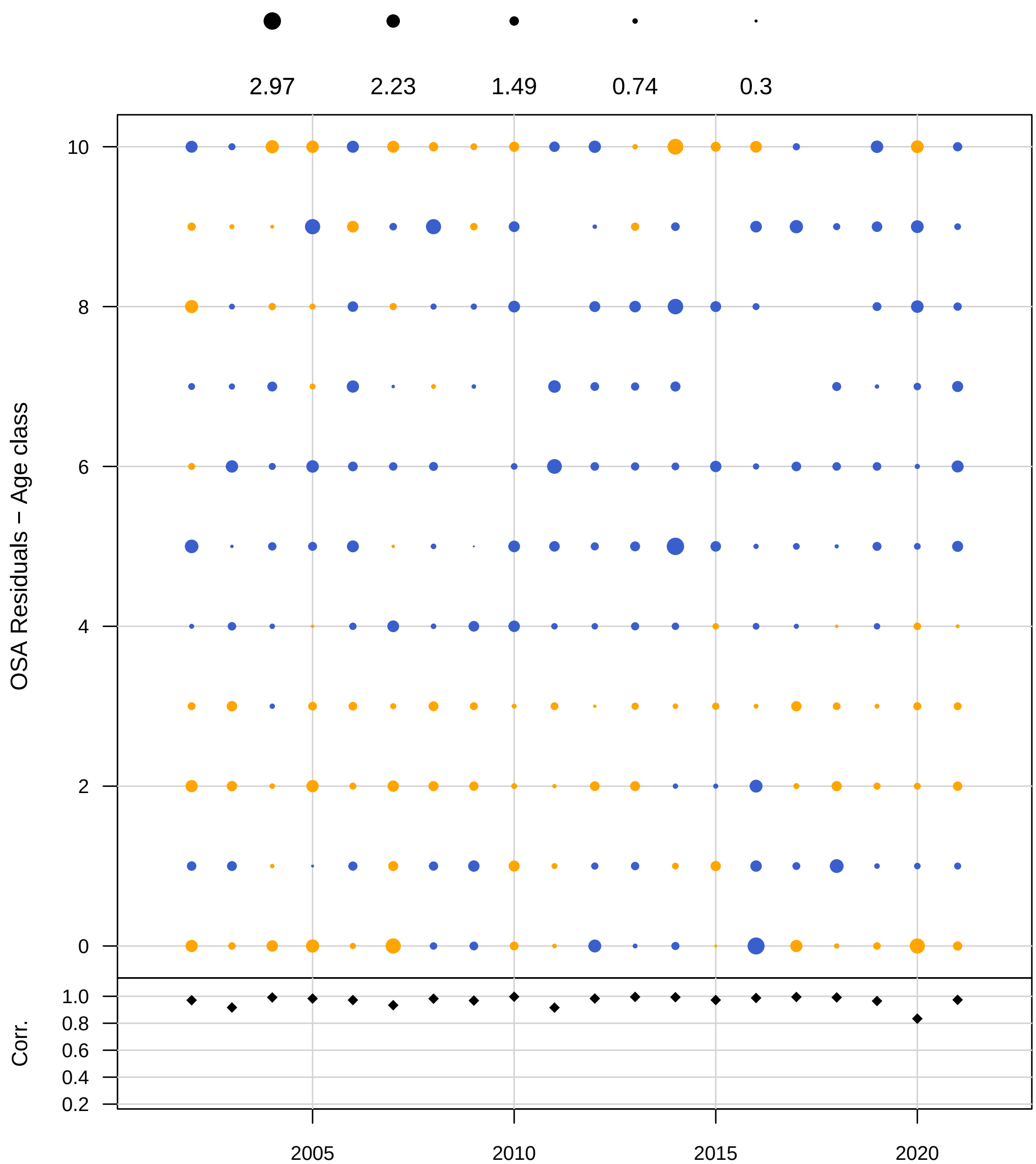


Figure B9. One-Step Ahead (OSA) residuals of commercial pots age composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

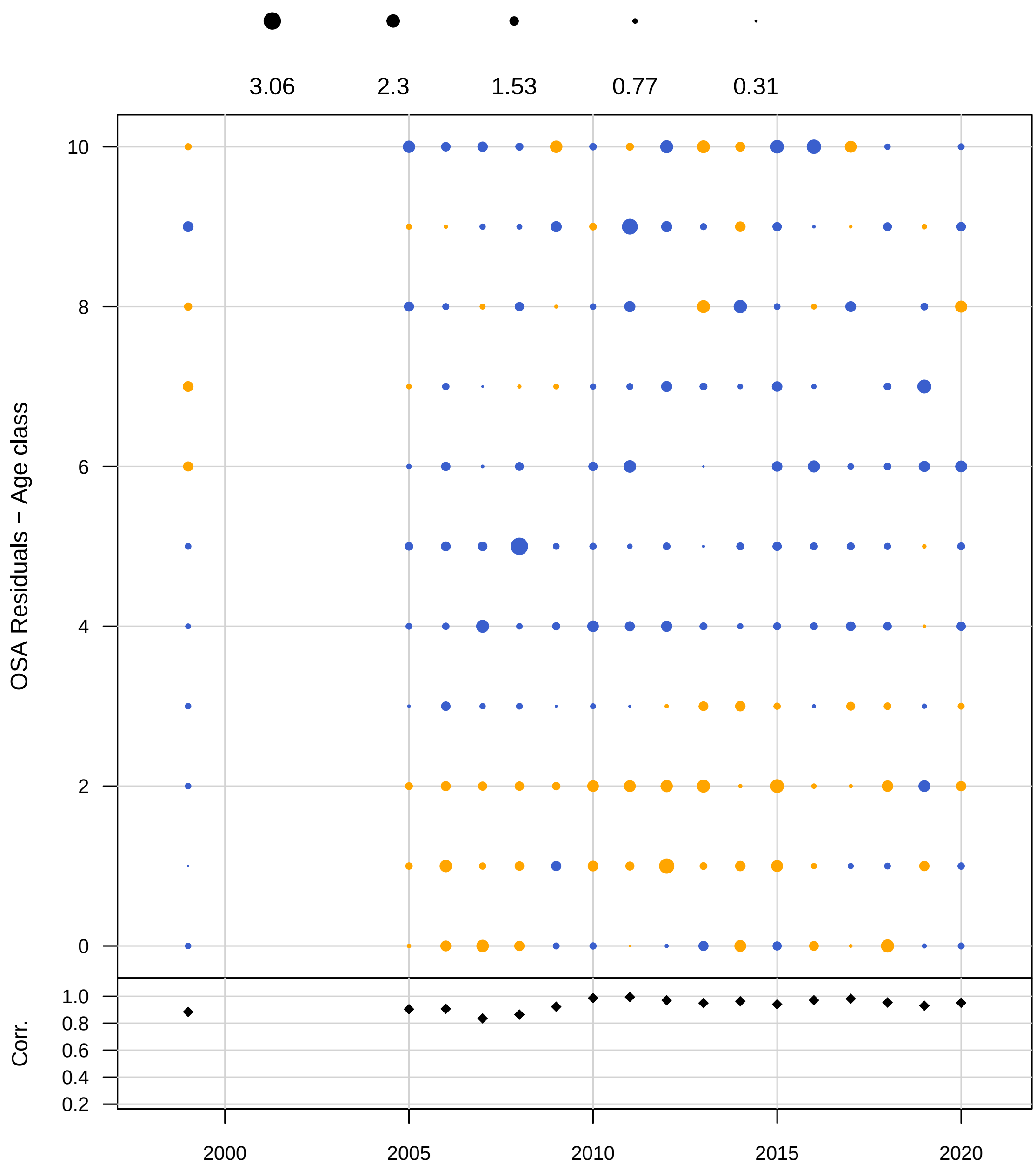


Figure B10. One-Step Ahead (OSA) residuals of headboat age composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

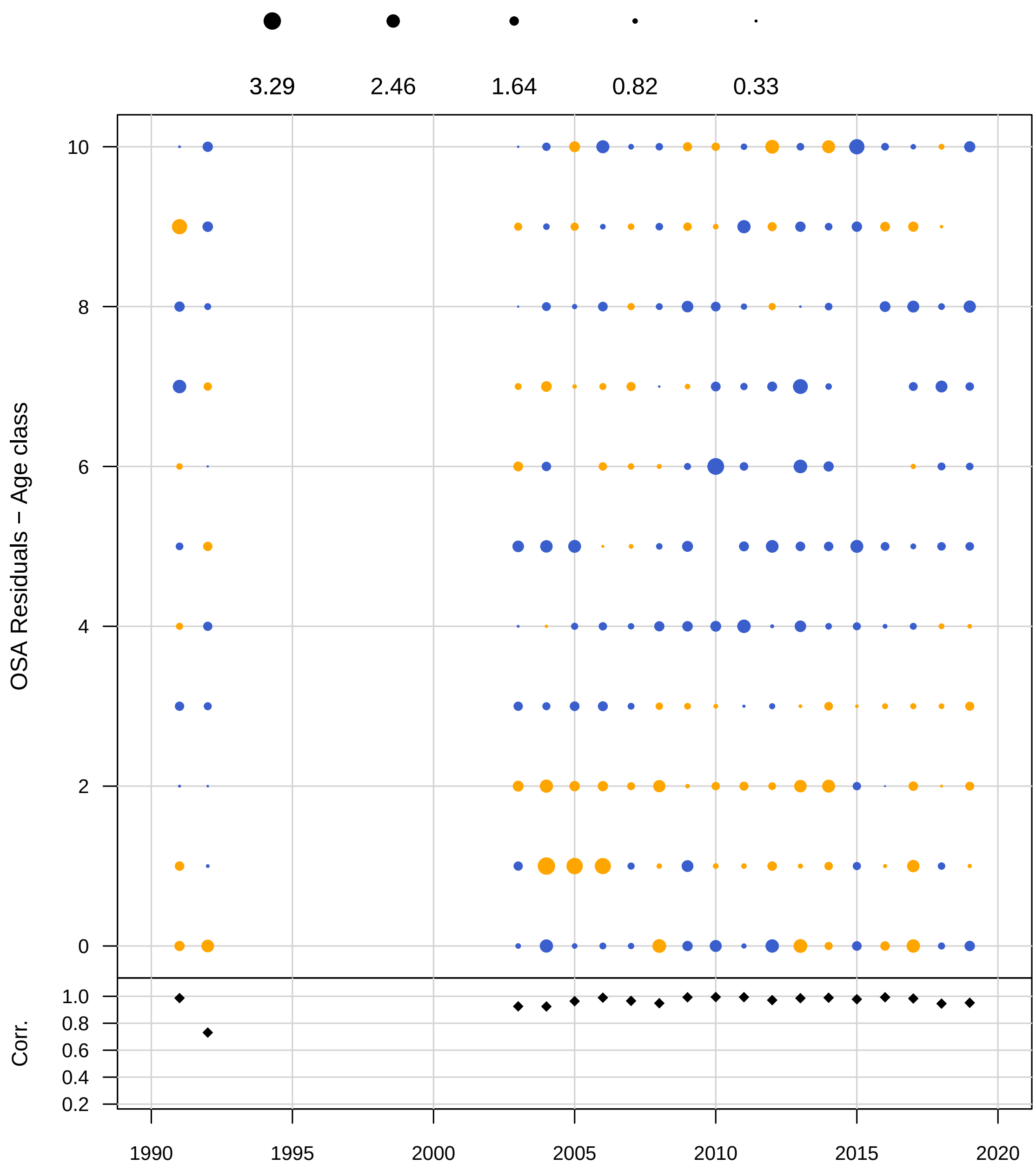


Figure B11. One-Step Ahead (OSA) residuals of MARMAP blackfish/snapper survey trap age composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

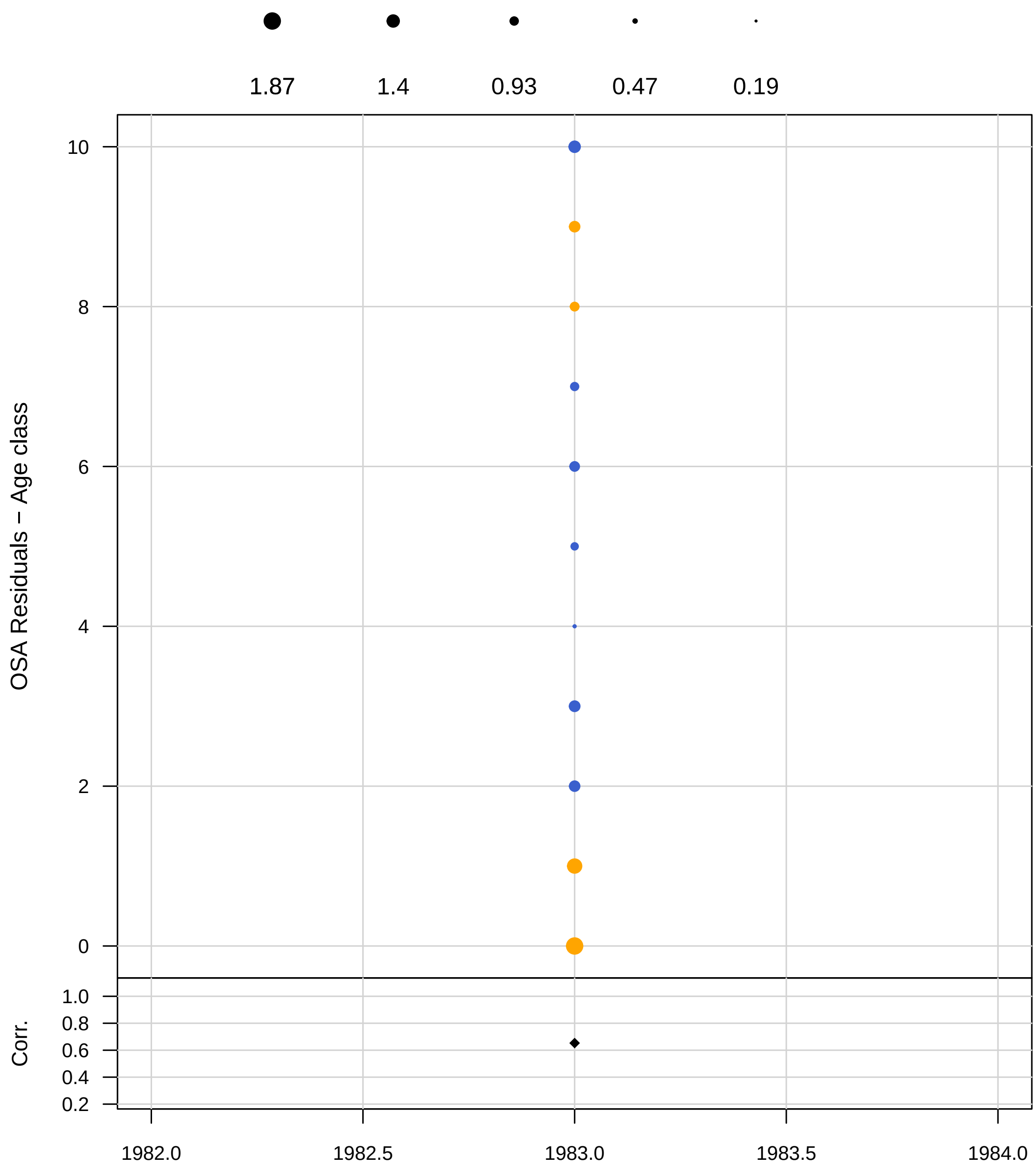


Figure B12. One-Step Ahead (OSA) residuals of SERFS chevron trap index age composition data as described in Trjoulet et al 2023. Fisheries Research 257: 106487. Dark represents overestimates and light underestimates. Bottom Panel: correlations between vectors of estimated and observed values.

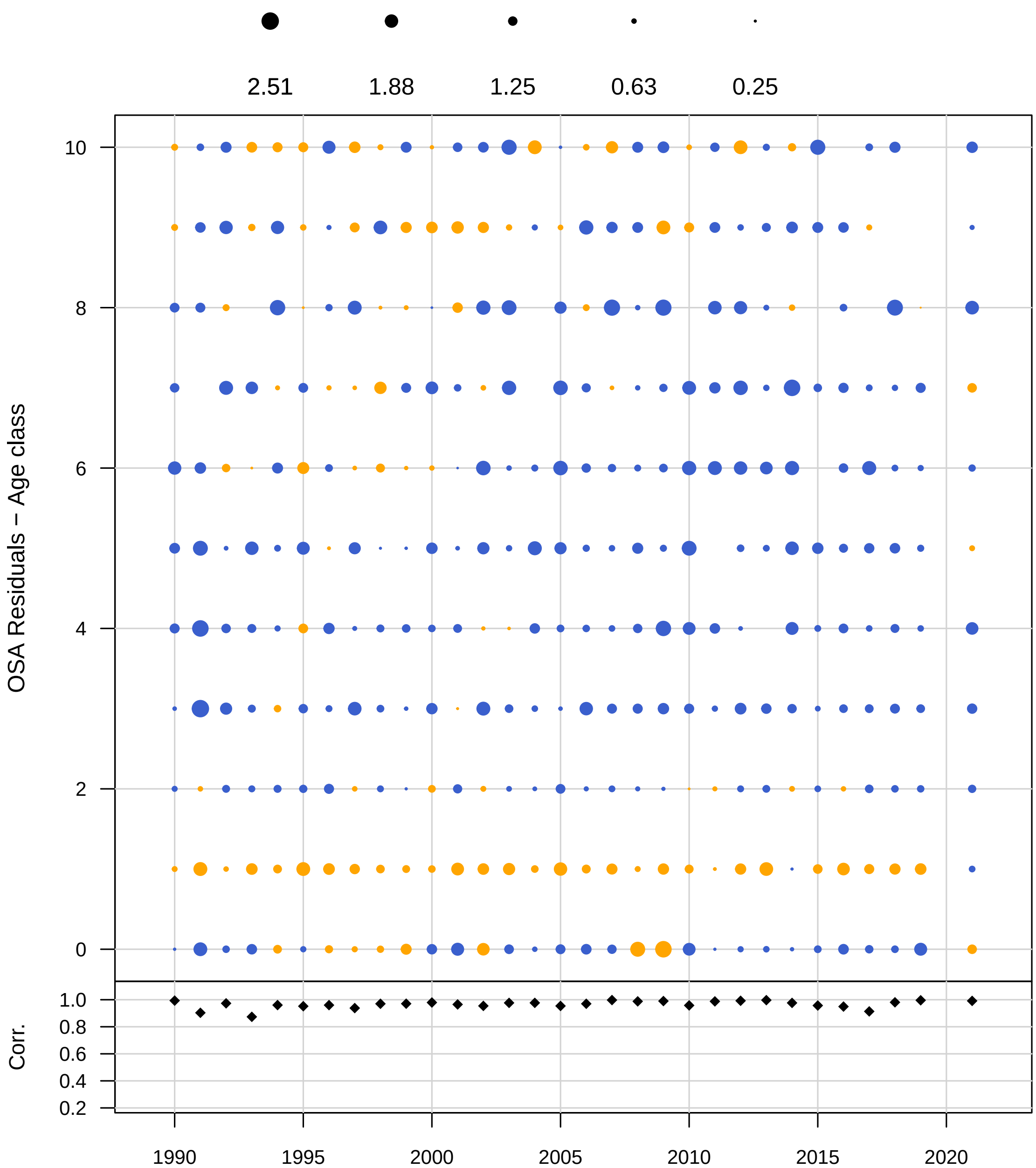


Figure B13. Bound checks on parameter estimates.

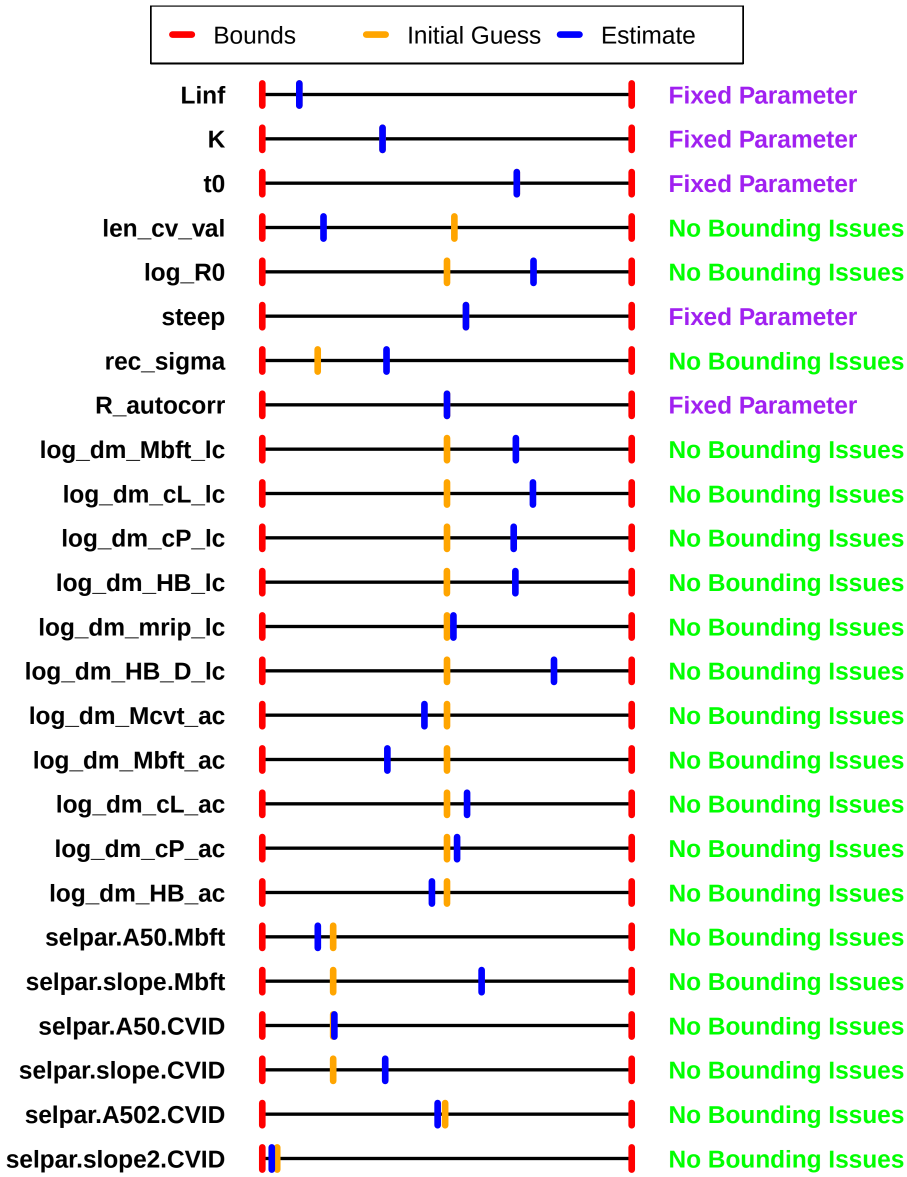


Figure B13. (cont.) Bound checks on parameter estimates.

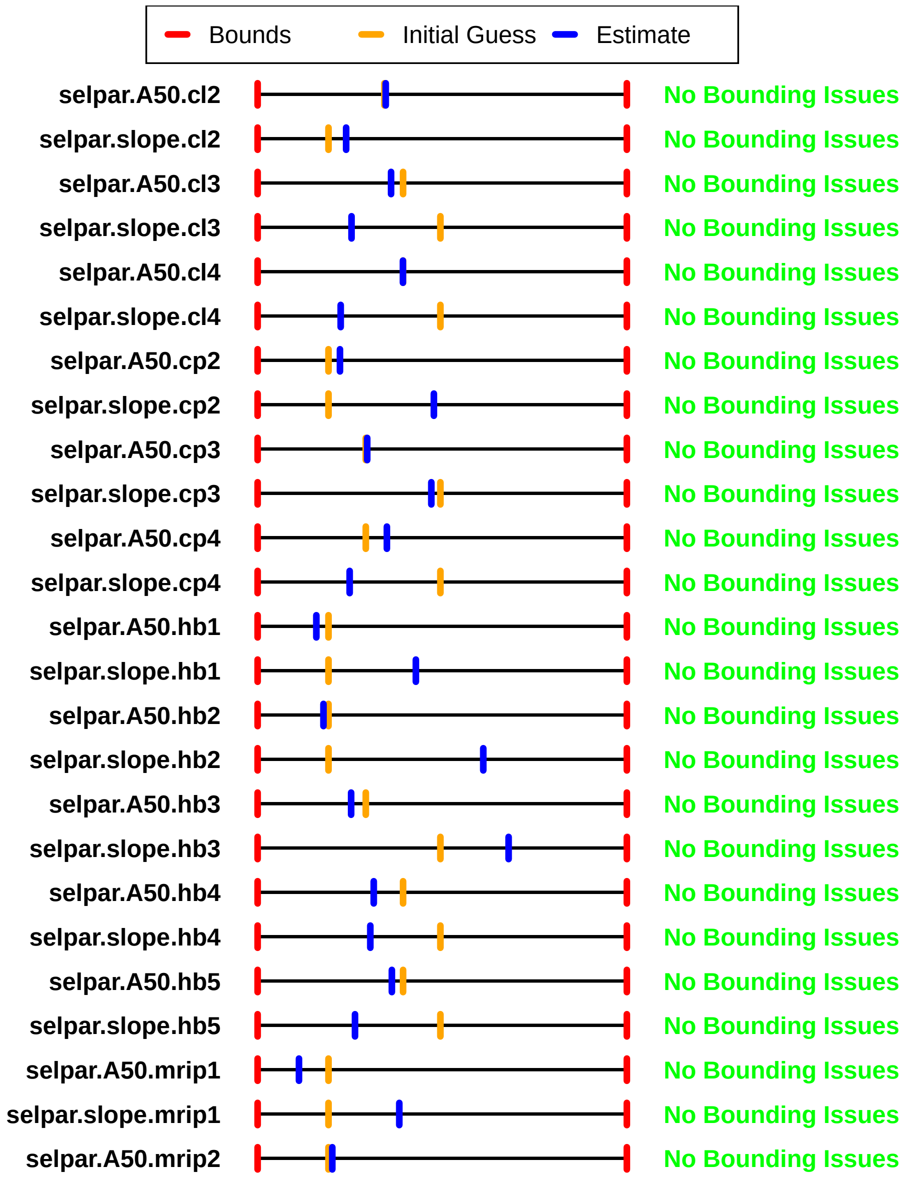


Figure B13. (cont.) Bound checks on parameter estimates.

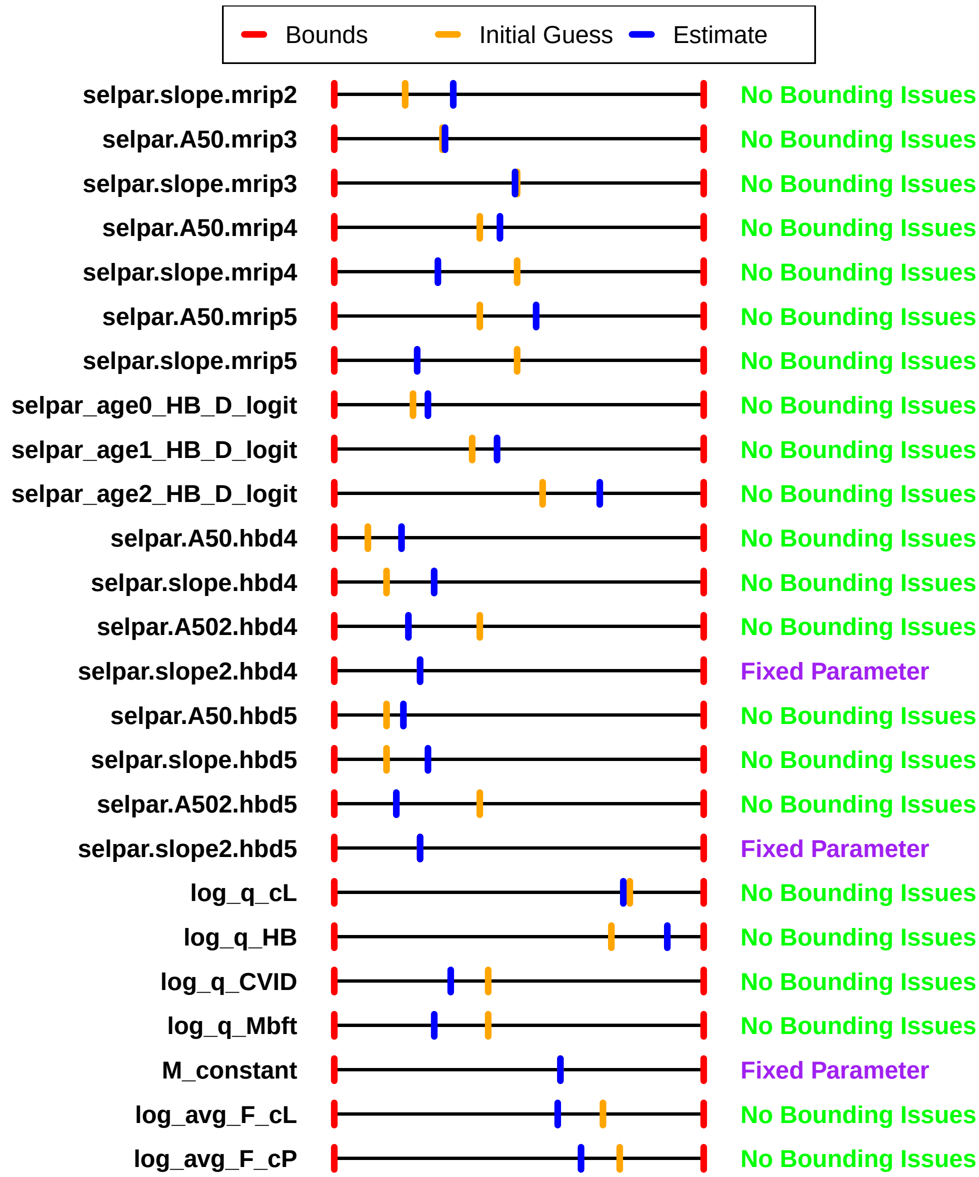


Figure B13. (cont.) Bound checks on parameter estimates.

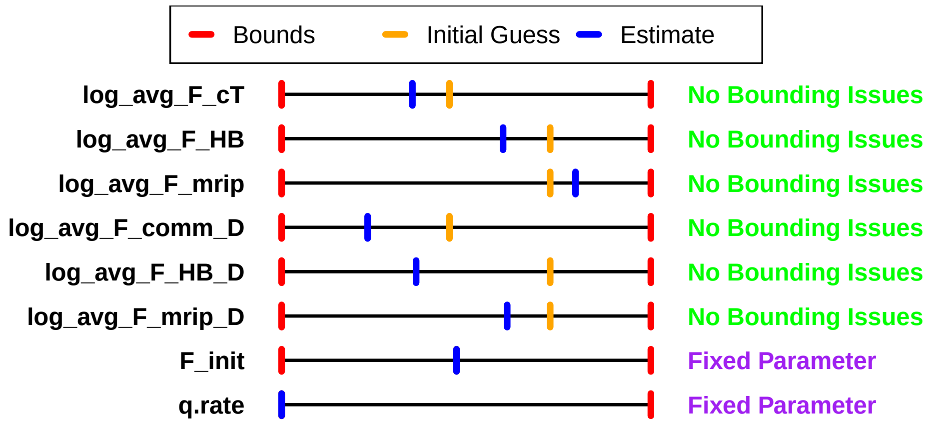


Figure B14. Cohort tracking through commercial lines age compositions.

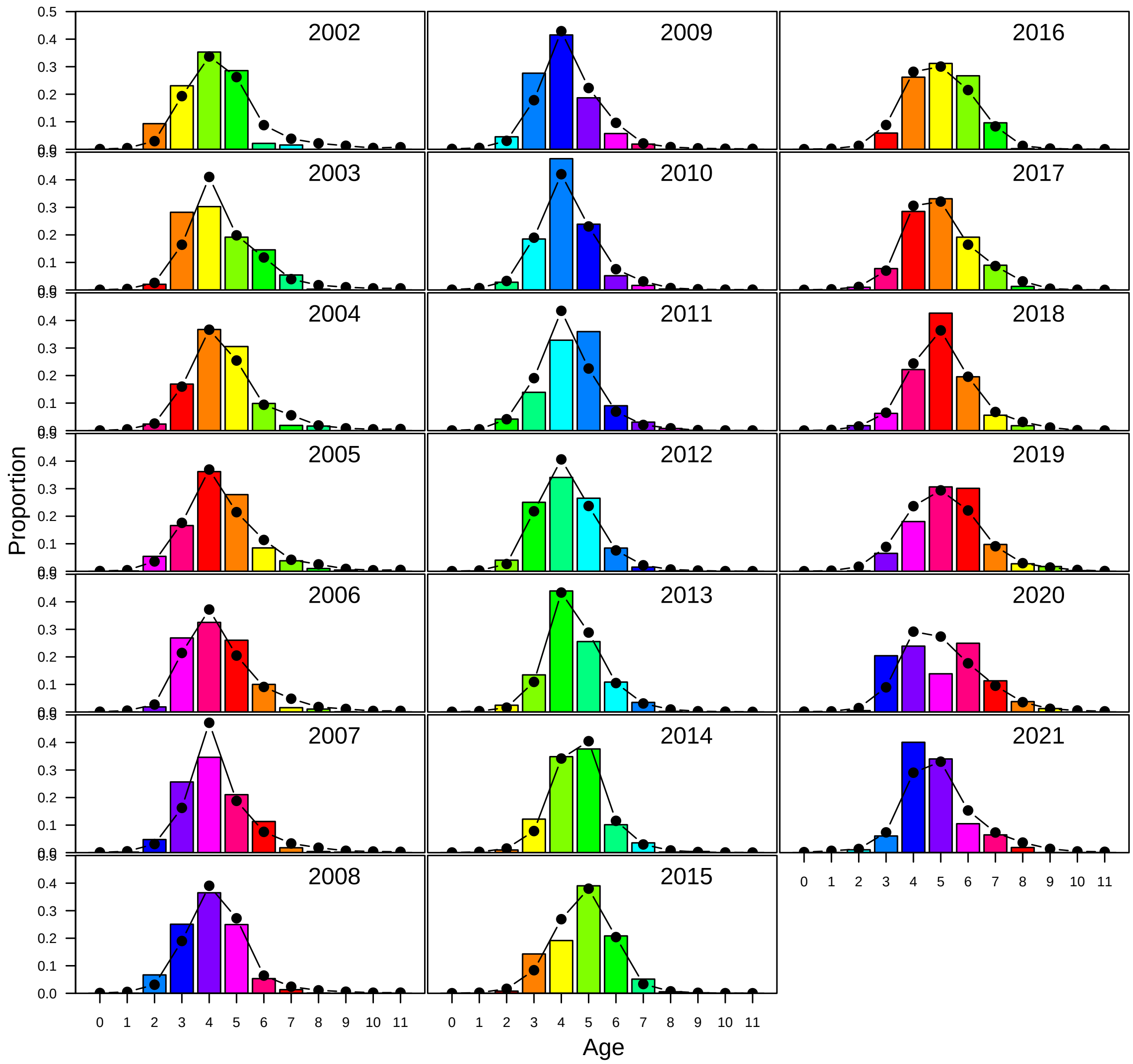


Figure B15. Cohort tracking through commercial pots age compositions.

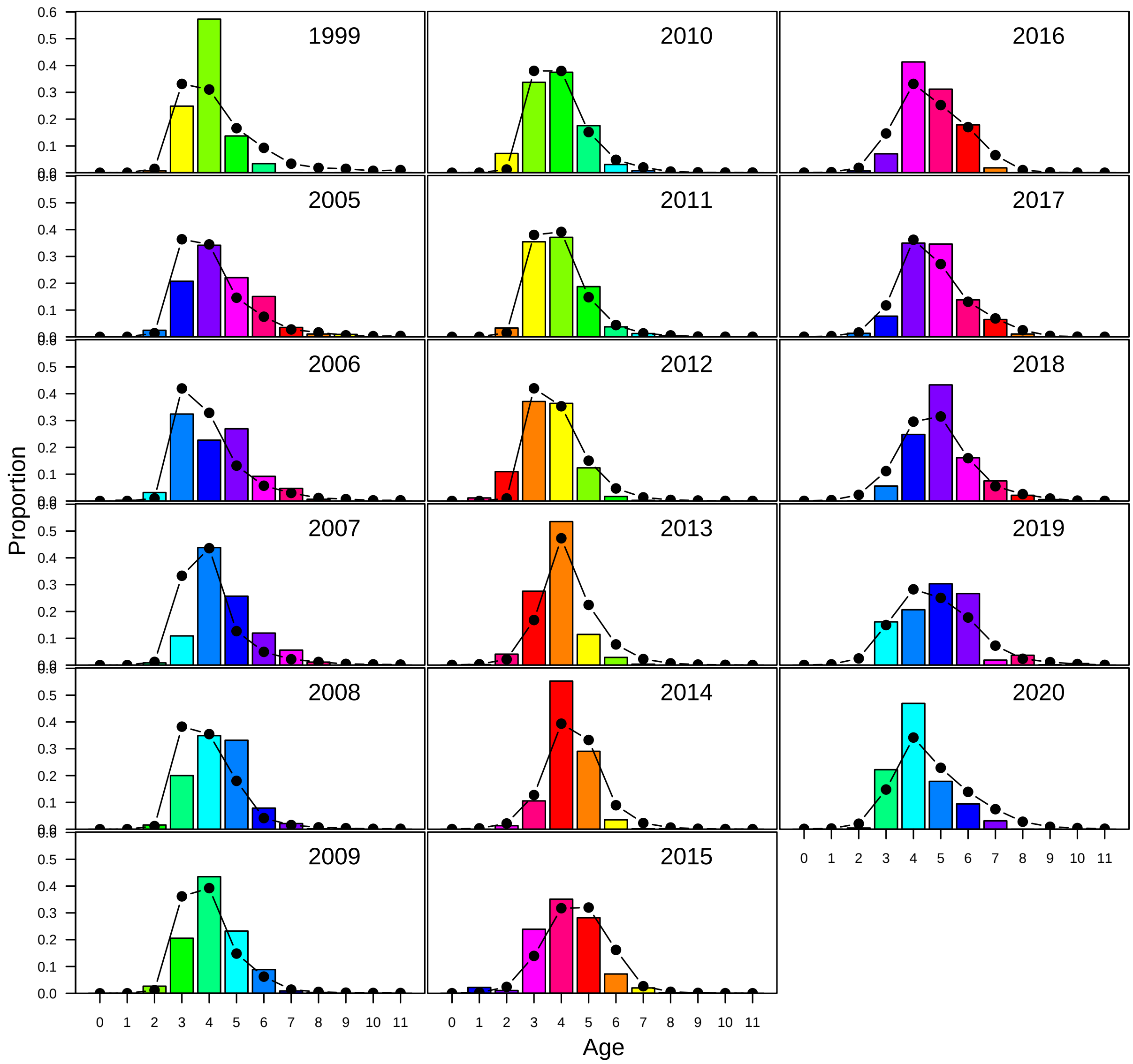


Figure B16. Cohort tracking through headboat age compositions.

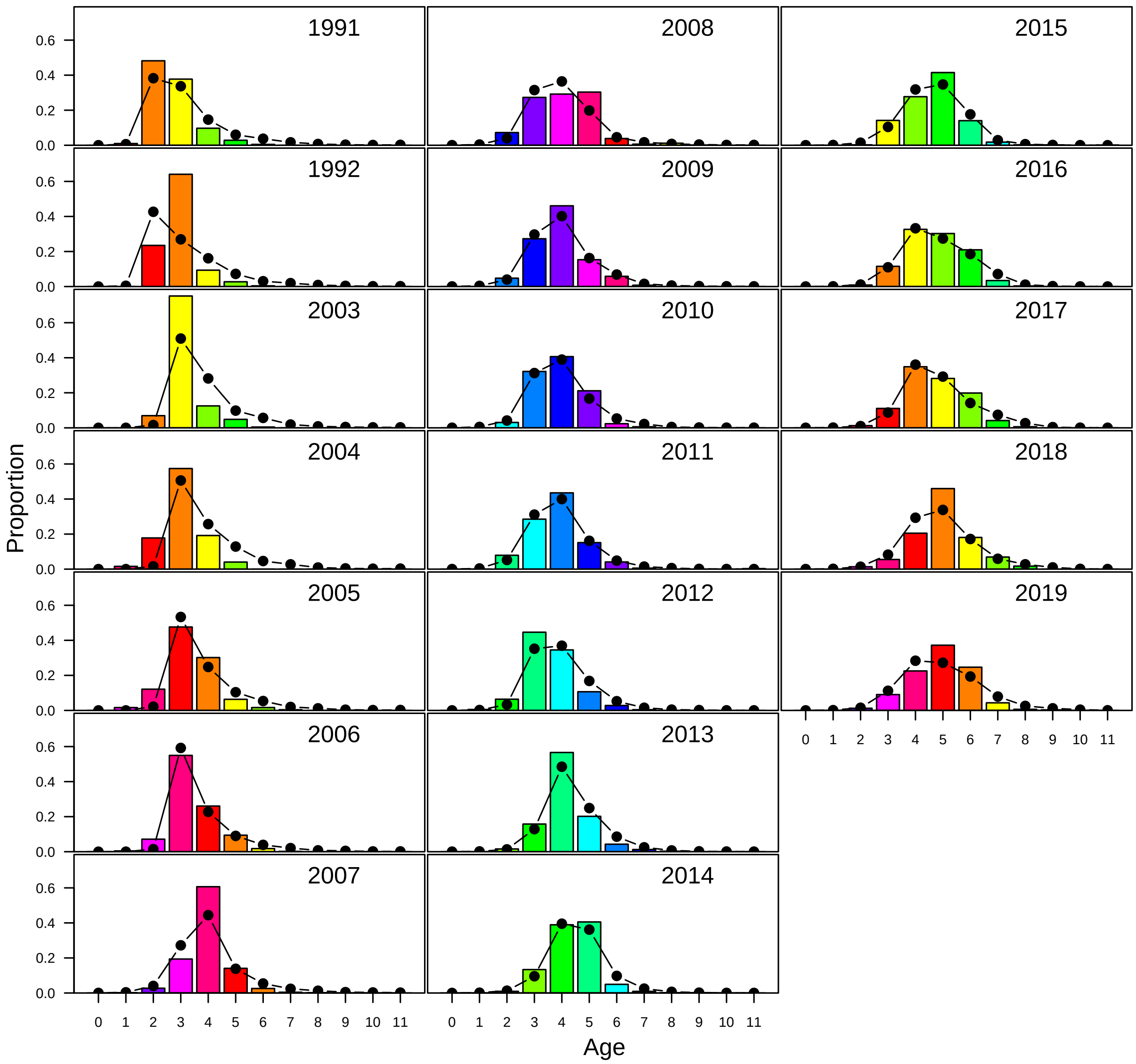


Figure B17. Cohort tracking through SERFS chevron trap age compositions.

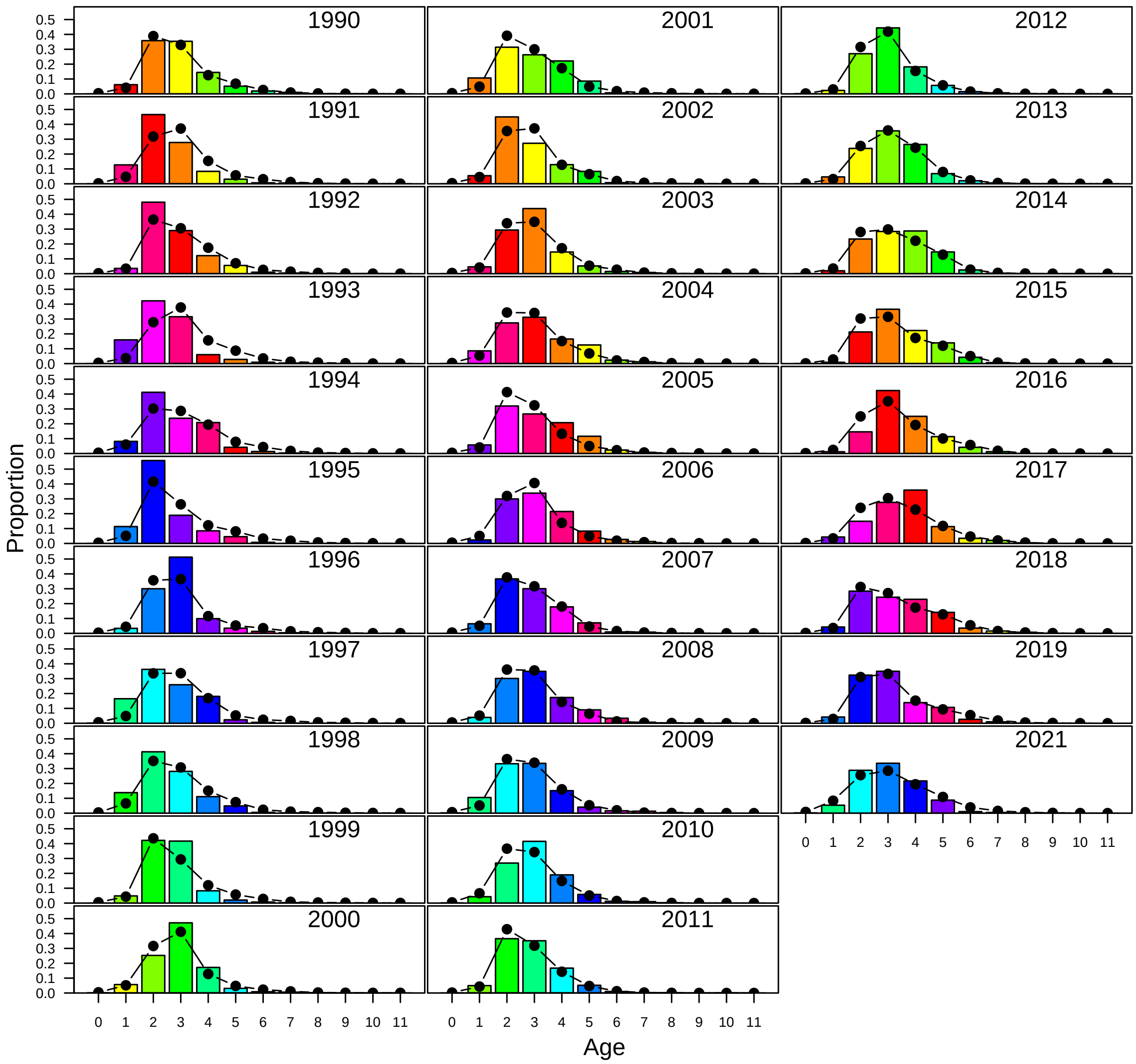


Figure B18. Likelihood profile of log mean recruitment (LogR0) parameter that estimates the scale of the population where the y-axis is the difference in likelihood from the best fit model. Age is the change in likelihood of the age composition date, Discards is the combined discard data, Index is the likelihood change for the four relative indices, Landings is the landings data, Length is the length composition data and Priors is the change in the penalties applied to all model parameters and Total is the change in all likelihood components (i.e., total likelihood).

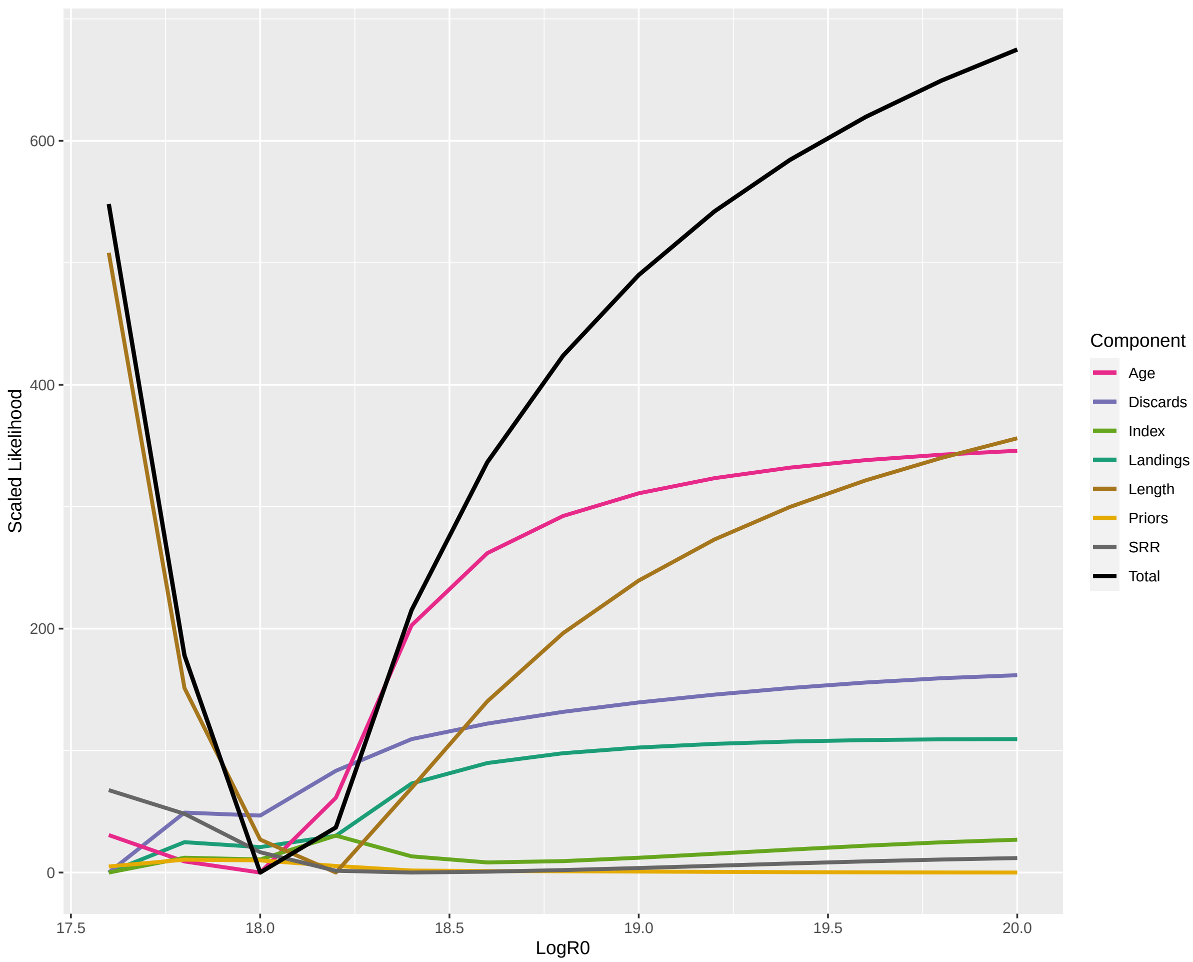


Figure B19. Likelihood profile of natural mortality where the y-axis is the difference in likelihood from the best fit model. Age is the change in likelihood of the age composition date, Discards is the combined discard data, Index is the likelihood change for the four relative indices, Landings is the landings data, Length is the length composition data and Priors is the change in the penalties applied to all model parameters and Total is the change in all likelihood components (i.e., total likelihood).

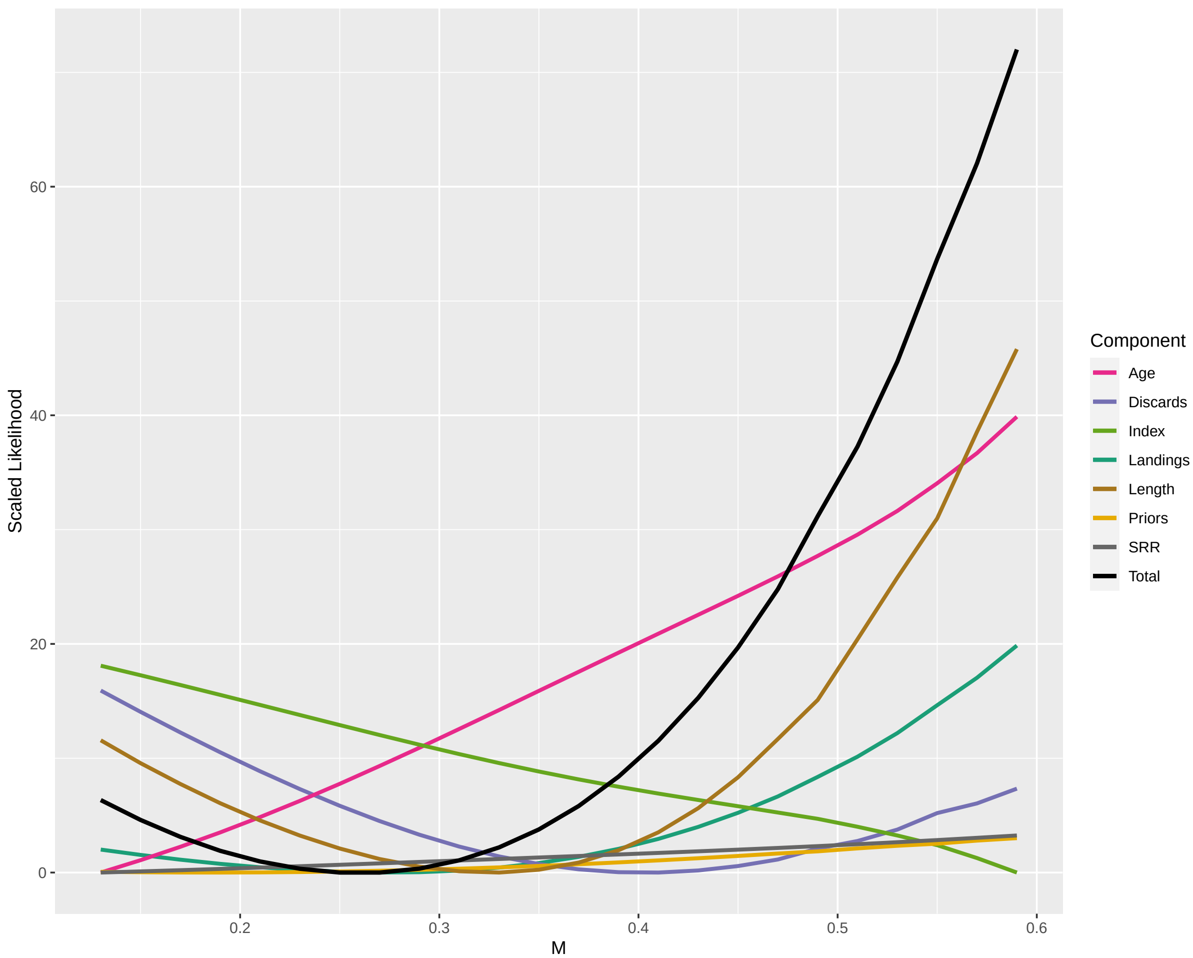
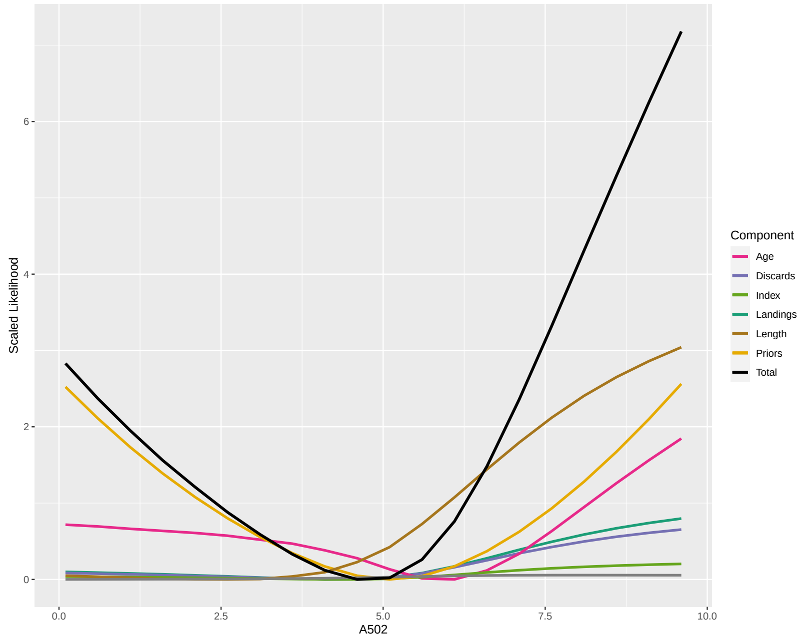
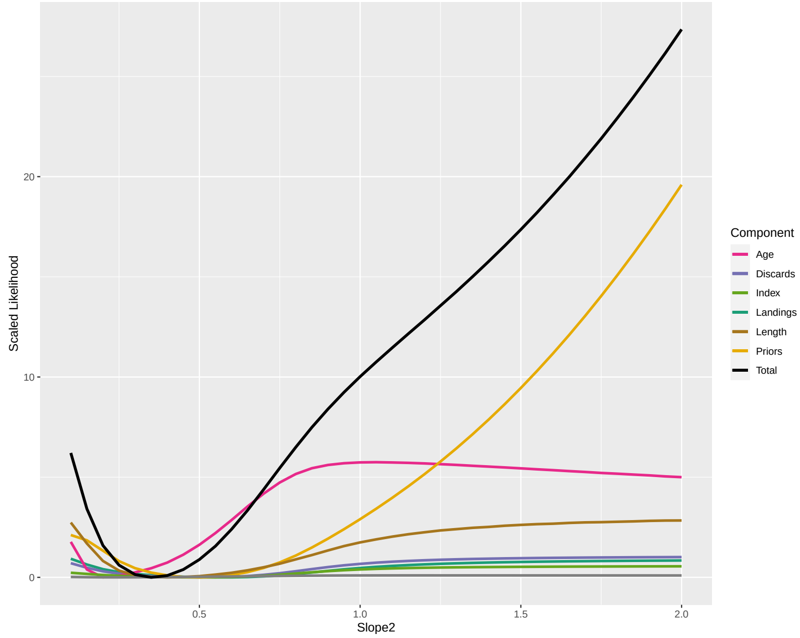


Figure B20. Likelihood profiles of the two parameters that control the descending limb of the domed shaped selectivity for the SERFS chevron trap/video index where the y-axis is the difference in likelihood from the best fit model. Age is the change in likelihood of the age composition date, Discards is the combined discard data, Index is the likelihood change for the four relative indices, Landings is the landings data, Length is the length composition data and Priors is the change in the penalties applied to all model parameters and Total is the change in all likelihood components (i.e., total likelihood). Top panel is the age where the descending limb starts declining, and the bottom panel is the slope of the descending limb.

(a) Age at 50%



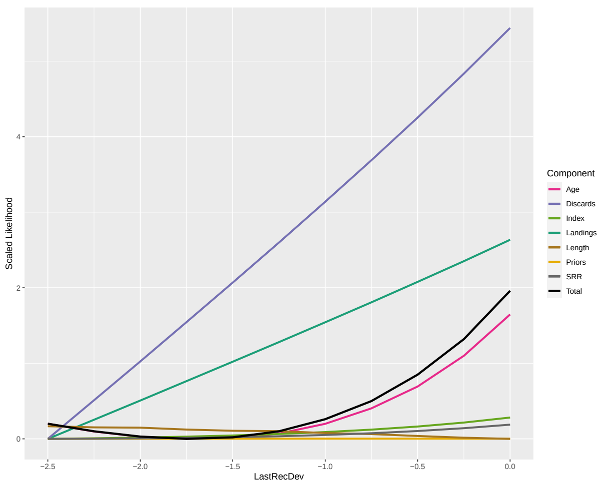
(b) Slope



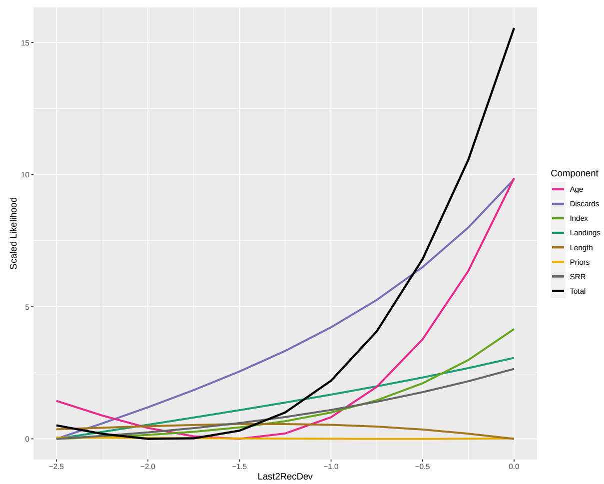
2 Model Development Diagnostics

Figure D1. Likelihood profiles of last three years of recruitment deviates where the y-axis is the difference in likelihood from the best fit model. Age is the change in likelihood of the age composition date, Discards is the combined discard data, Index is the likelihood change for the four relative indices, Landings is the landings data, Length is the length composition data and Priors is the change in the penalties applied to all model parameters and Total is the change in all likelihood components (i.e., total likelihood). Note the difference in scale between profiles.

(a) 2021



(b) 2020-2021



(c) 2019-2021

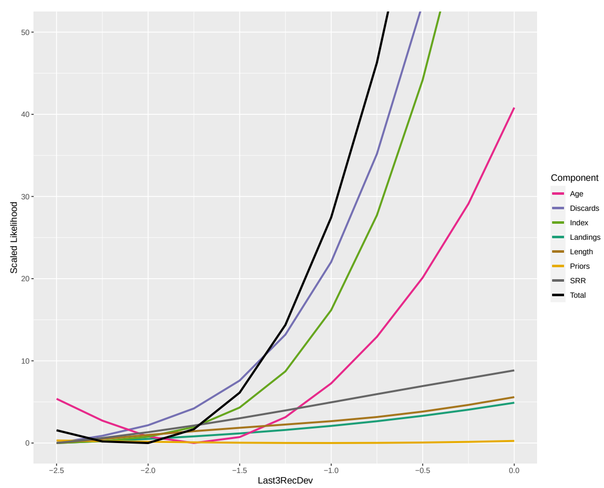


Figure D2. Likelihood profile of the Beverton-Holt steepness paramter (h) where the y-axis is the difference in likelihood from the best fit model. Age is the change in likelihood of the age composition date, Discards is the combined discard data, Index is the likelihood change for the four relative indices, Landings is the landings data, Length is the length composition data and Priors is the change in the penalties applied to all model parameters and Total is the change in all likelihood components (i.e., total likelihood).

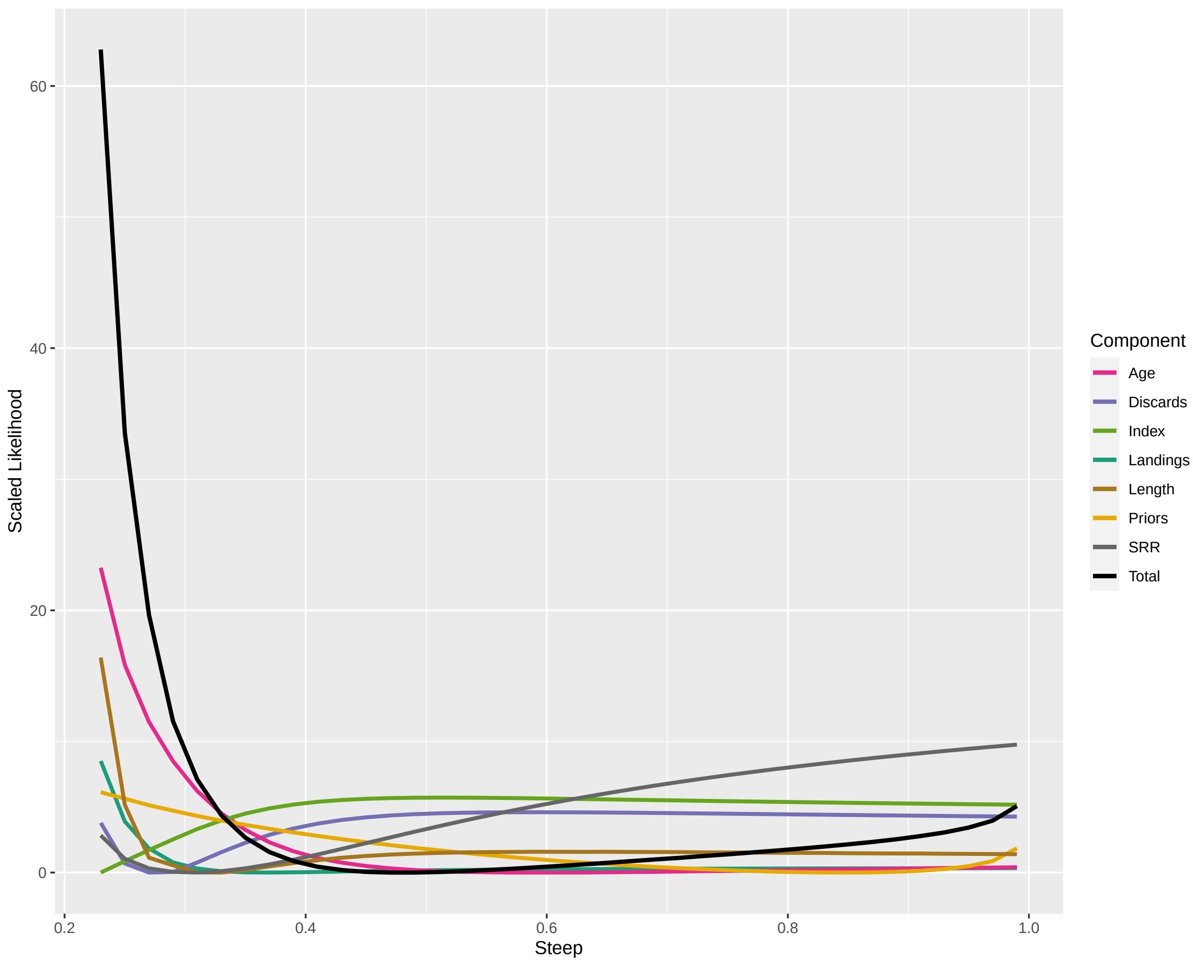


Figure D3. Pairwise plots of natural mortality (M), LogR0, and the two parameters that control the domed shape of the selectivity curve for the SERFS chevron trap index (A502 and slope2) from estimates in the Monte-Carlo Bootstrap Ensemble analysis.