ASA Results

Parameter estimates

Parameter	Estimate	SE
dummy	0.0000	NA
fsh_sel50	99.0470	NaN
fsh_sel95	45.0085	17.3387
srv_sel50	1.9257	0.1990
srv_sel95	4.4237	0.4653
fsh_logq	-9.9570	0.8562
srv1_logq	-7.8323	0.9580
srv2_logq	-8.6431	0.9123
mr_logq	0.0002	0.0100
log_rbar	13.8691	0.3694
log_rec_devs	0.0691	2.3121
log_rec_devs	0.0964	2.3226
log_rec_devs	0.1333	2.3356
log_rec_devs	0.1775	2.3514
log_rec_devs	0.2260	2.3705
log_rec_devs	0.2776	2.3932
log_rec_devs	0.3275	2.4195
log_rec_devs	0.3686	2.4484
log_rec_devs	0.3929	2.4776
log_rec_devs	0.3931	2.5040
log_rec_devs	0.3665	2.5252
log_rec_devs	0.3184	2.5410
log_rec_devs	0.2613	2.5548
log_rec_devs	0.2138	2.5724
log_rec_devs	0.1941	2.6009
log_rec_devs	0.2214	2.6498
log_rec_devs	0.3195	2.7300
log_rec_devs	0.4091	1.7003
log_rec_devs	0.7090	1.2678
log_rec_devs	0.5147	1.1857
log_rec_devs	0.5071	1.0275
log_rec_devs	0.8609	0.8454
log_rec_devs	0.4317	0.8603
log_rec_devs	0.3807	0.7877
log_rec_devs	0.2771	0.7476
log_rec_devs	0.4903	0.6258
log_rec_devs	0.5254	0.5876
log_rec_devs	0.3567	0.5920
log_rec_devs	0.4770	0.5406
log_rec_devs	0.6092	0.4899
log_rec_devs	0.4979	0.4841
log_rec_devs	0.7001	0.4349
log_rec_devs	0.6340	0.4290
log_rec_devs	0.6738	0.4111
log_rec_devs	0.6720	0.4000

(continued)

Parameter	Estimate	SE
log_rec_devs	0.9742	0.3643
log_rec_devs	1.1027	0.3479
log_rec_devs	1.1887	0.3370
log_rec_devs	1.2508	0.3291
log_rec_devs	0.8742	0.3436
log_rec_devs	0.9464	0.3342
log_rec_devs	0.9009	0.3316
log_rec_devs	0.6795	0.3377
log_rec_devs	0.4935	0.3425
log_rec_devs	0.3492	0.3448
log_rec_devs	0.1846	0.3467
log_rec_devs	0.1150	0.3420
log_rec_devs	-0.0117	0.3407
log_rec_devs	-0.1632	0.3407
log_rec_devs	-0.2094	0.3347
log_rec_devs	-0.0964	0.3214
log_rec_devs	-0.1728	0.3176
log_rec_devs	-0.1266	0.3088
log_rec_devs	-0.0636	0.3001
log_rec_devs	0.2219	0.2885
log_rec_devs	0.1475	0.2877
log_rec_devs	0.4397	0.2814
log_rec_devs	0.3929	0.2826
log_rec_devs	0.2173	0.2870
log_rec_devs	0.1674	0.2897
log_rec_devs	-0.2281	0.2988
log_rec_devs	-0.5661	0.3078
log_rec_devs	-0.7411	0.3155
log_rec_devs	-0.9784	0.3263
log_rec_devs	-0.9983	0.3325
log_rec_devs	-1.1321	0.3434
log_rec_devs	-1.3203	0.3582
log_rec_devs	-1.1651	0.3612
log_rec_devs	-1.1692	0.3715
log_rec_devs	-1.3646	0.3877
log_rec_devs	-1.7942	0.4185
log_rec_devs	-1.9620	0.4423
log_rec_devs	-2.0209	0.4660
log_rec_devs	-1.6376	0.4652
log_rec_devs	-1.3542	0.4778
log_rec_devs	-1.6353	0.5466
log_rec_devs	-2.7264	0.8889
log_Fbar	-3.6487	0.4962
log_F_devs	-2.2709	0.4015
log_F_devs	-3.3278	0.4011
log_F_devs	-2.7960	0.4007
log_F_devs	-2.8851	0.4005
log_F_devs	-2.1788	0.4002
log_F_devs	-0.2740	0.3994
log_F_devs	0.0705	0.3977

(continued)

Parameter	Estimate	SE
log_F_devs	0.0667	0.3958
log_F_devs	0.1972	0.3937
log_F_devs	0.1473	0.3916
log_F_devs	0.0868	0.3896
log_F_devs	0.3249	0.3874
log_F_devs	0.4757	0.3848
log_F_devs	0.8498	0.3815
log_F_devs	0.7208	0.3781
log_F_devs	0.7443	0.3750
log_F_devs	0.8291	0.3721
log_F_devs	0.8774	0.3695
log_F_devs	0.9035	0.3675
log_F_devs	0.5078	0.3665
log_F_devs	0.5561	0.3663
log_F_devs	0.2584	0.3666
log_F_devs	0.2423	0.3673
log_F_devs	0.3015	0.3685
log_F_devs	0.4676	0.3703
log_F_devs	0.4634	0.3730
log_F_devs	0.5331	0.3768
log_F_devs	0.3317	0.3812
log_F_devs	0.4138	0.3862
log_F_devs	0.1657	0.3916
log_F_devs	0.1806	0.3971
log_F_devs	0.0749	0.4029
log_F_devs	0.2769	0.4097
log_F_devs	0.3415	0.4183
log_F_devs	0.2119	0.4276
log_F_devs	0.2684	0.4374
log_F_devs	0.1418	0.4478
log_F_devs	0.2958	0.4590

Catchability

Estimates on natural scale

Fishery q: 0

Survey (1-hr soak) q: 0.0004

Survey (3+hr soak) q: 0.0002

Mark-recapture q: 1.0002

Likelihood components

Catchability priors: 4.6488, 0.4274, 1.5057, 0.0003

Catch: 0.008

Abundance indices (fsh, srv1, srv2, mr): 12.2879, 4.746, 7.193, 0.0921

Age comp 2793.3852, 3467.4412

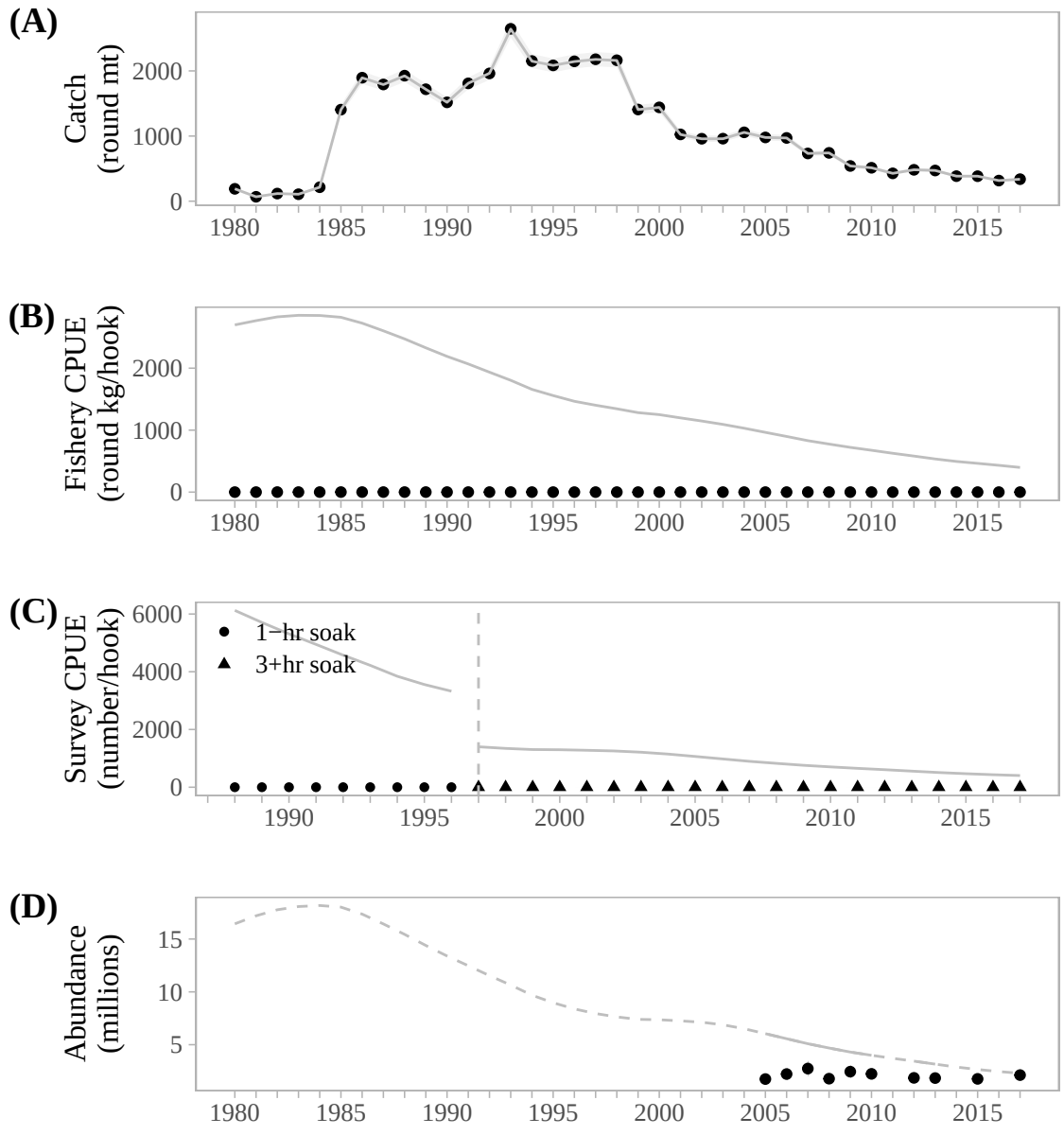
Multinomial offsets 2796.2606, 3501.4332

Penalty on fishing mortality deviations: 4.3939

Penalty on recruitment deviations: 5.2286

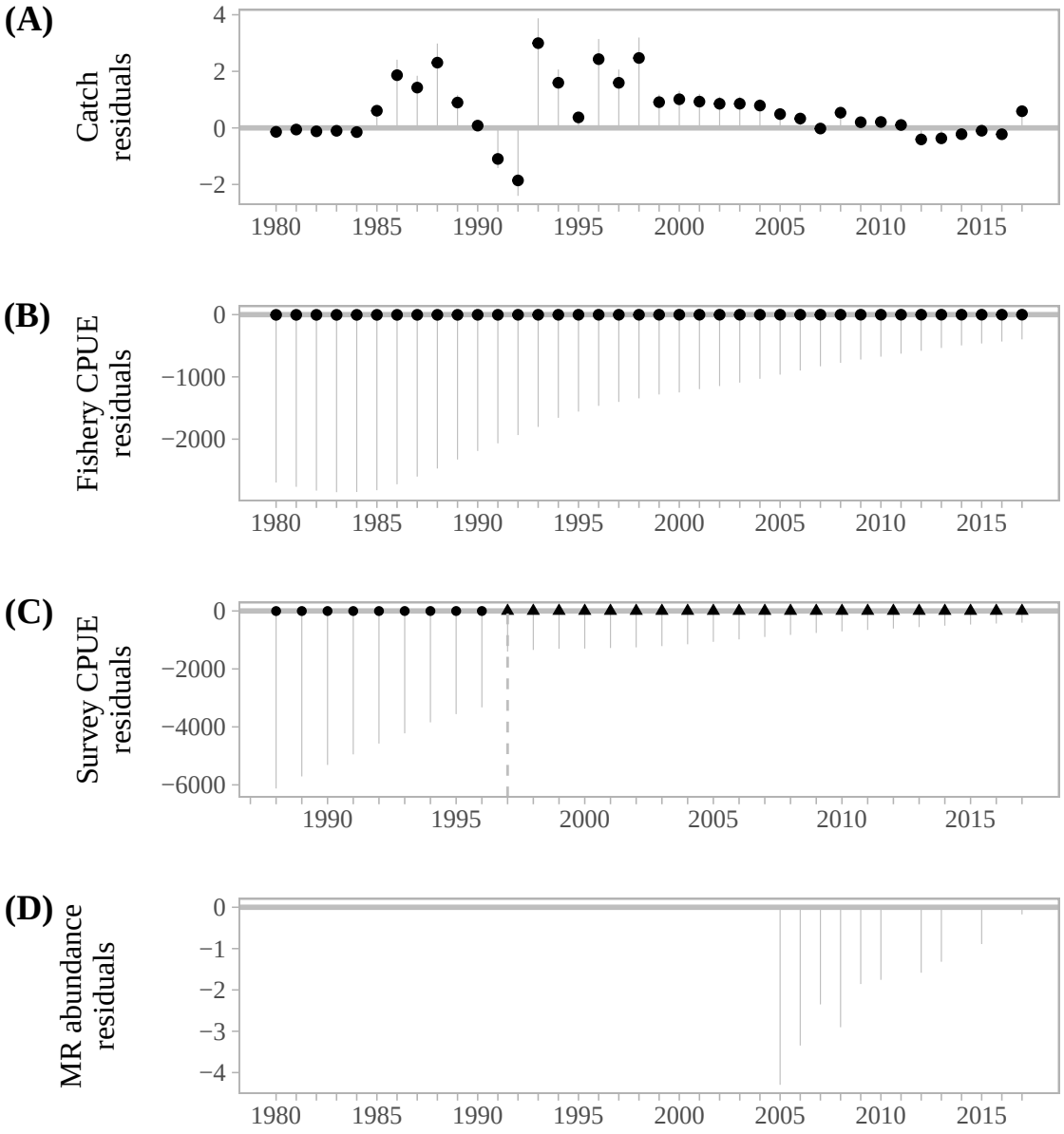
Total likelihood: 6264.4907

Time series of catch and abundance indices

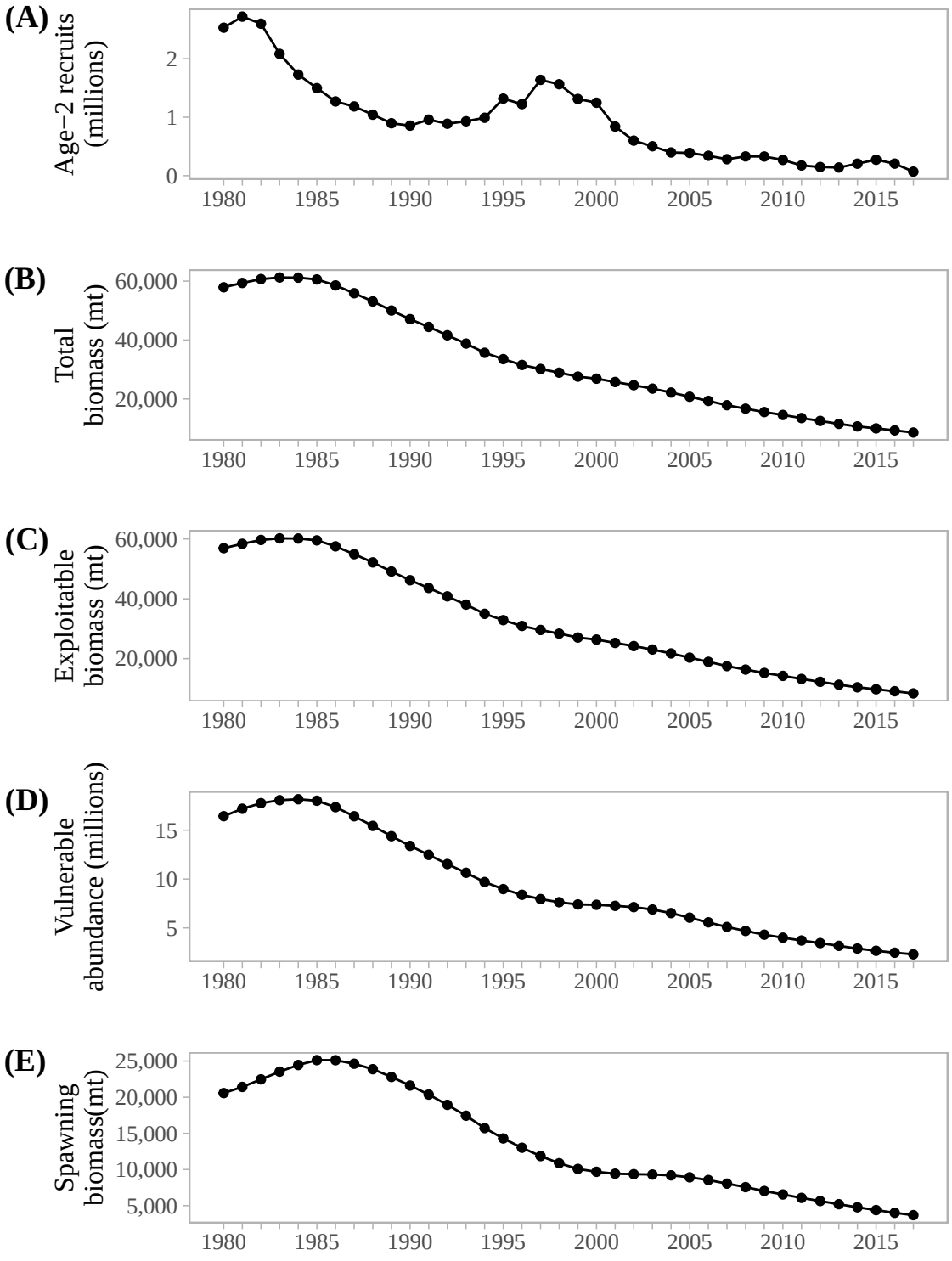


Residuals for time series of catch and abundance indices

Standardized residuals:

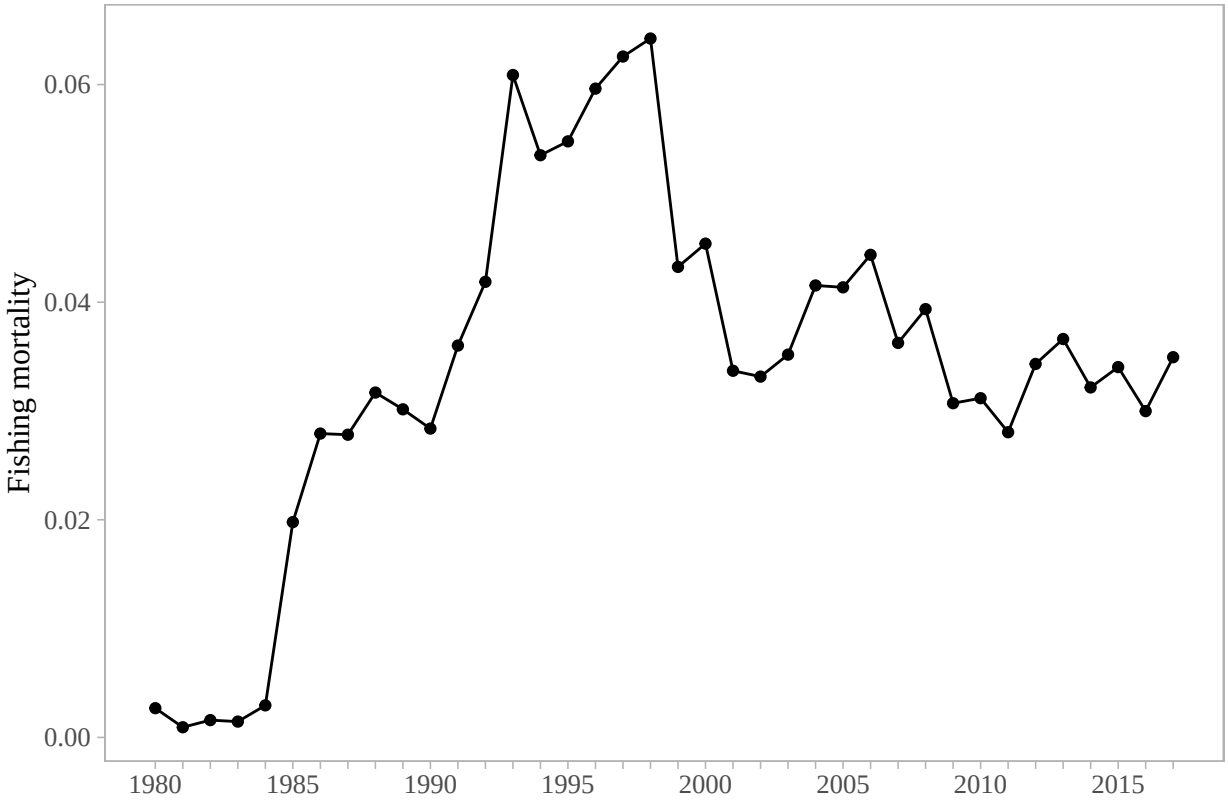

(A)
Catch residuals
4
2
0
−2
1980
1985
1990
1995
2000
2005
2010
2015
(B)
Fishery CPUE residuals
0
−1000
−2000
1980
1985
1990
1995
2000
2005
2010
2015
(C)
Survey CPUE residuals
0
−2000
−4000
−6000
1990
1995
2000
2005
2010
2015
(D)
MR abundance residuals
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005
2010
2015

Derived time series of recruitment, abundance, and biomass

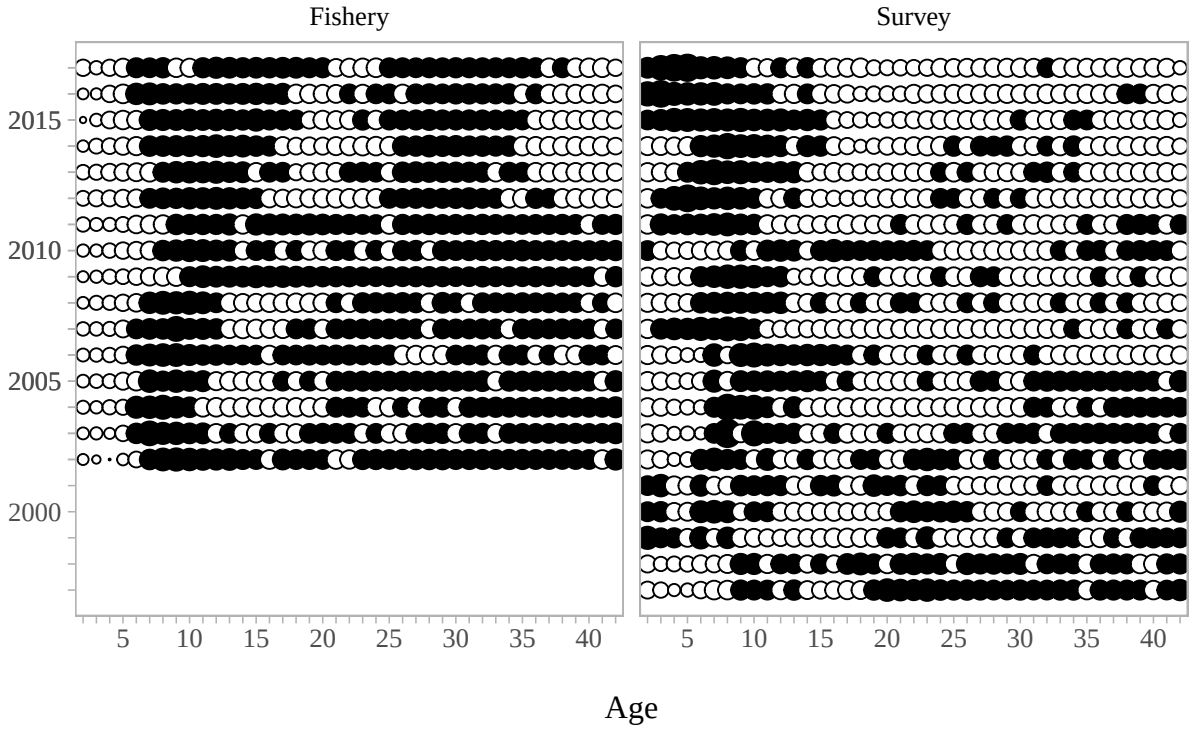


Estimate of fishing mortality

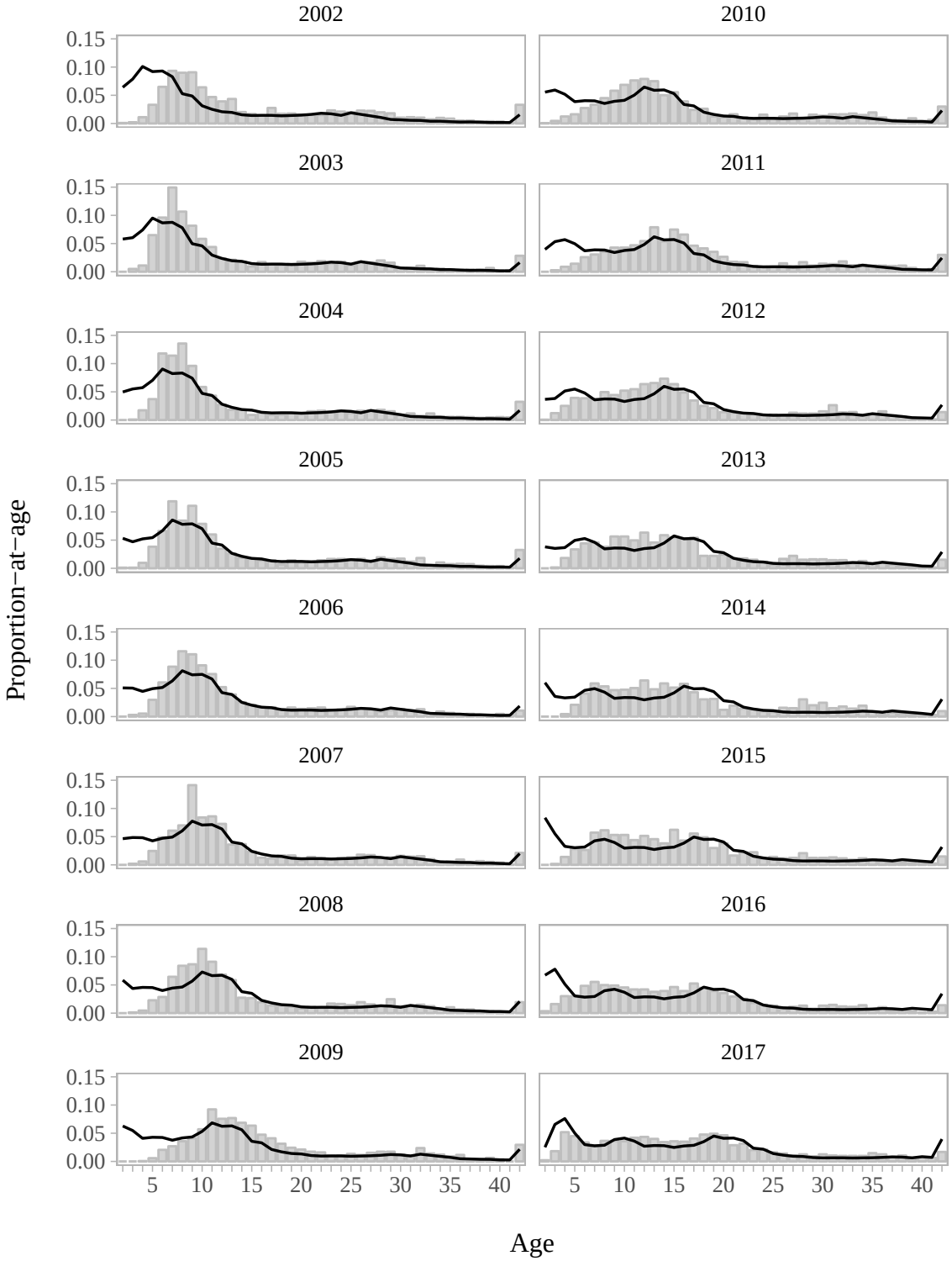
On natural scale



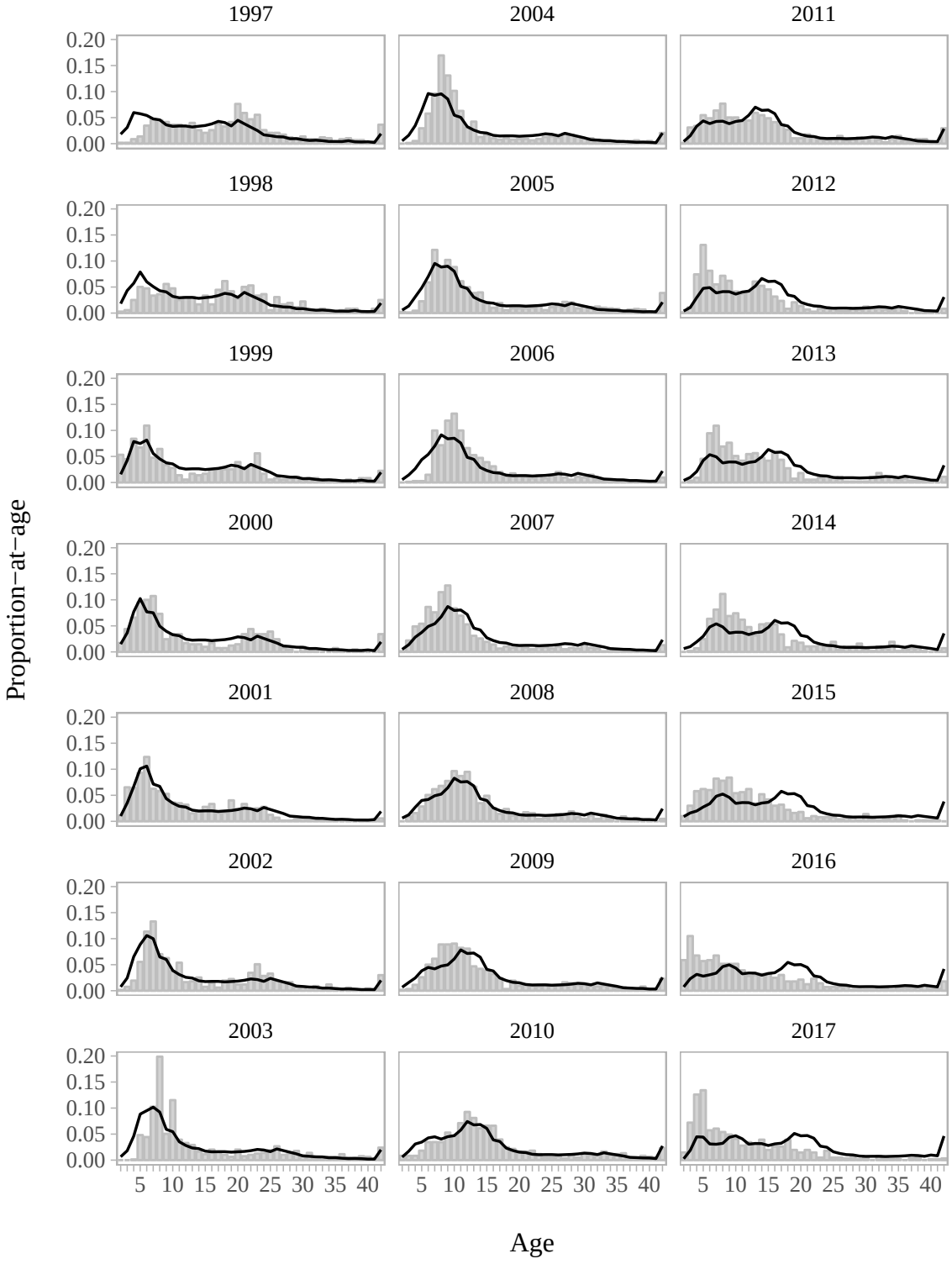
Fits to age comps



Fits to fishery age comps



Fits to survey age comps



Selectivity