ASA Results

Parameter estimates

Parameter	Estimate	SE
dummy	0.0000	NA
fsh_sel50	74.8540	NaN
fsh_sel95	42.8400	12.3168
srv_sel50	1.9279	0.1990
srv_sel95	4.4244	0.4650
fsh_logq	-9.9588	0.8555
srv1_logq	-7.8321	0.9580
srv2_logq	-8.6438	0.9119
mr_logq	-0.0006	0.0100
log_rbar	13.8677	0.3623
log_rec_devs	-0.0726	2.3009
log_rec_devs	-0.0717	2.3080
log_rec_devs	-0.0681	2.3160
log_rec_devs	-0.0612	2.3253
log_rec_devs	-0.0500	2.3361
log_rec_devs	-0.0324	2.3491
log_rec_devs	-0.0067	2.3649
log_rec_devs	0.0279	2.3844
log_rec_devs	0.0726	2.4089
log_rec_devs	0.1271	2.4397
log_rec_devs	0.1915	2.4789
log_rec_devs	0.2648	2.5291
log_rec_devs	0.3450	2.5930
log_rec_devs	0.4286	2.6730
log_rec_devs	0.5101	2.7682
log_rec_devs	0.5841	2.8707
log_rec_devs	0.6501	2.9506
log_rec_devs	0.2837	1.7680
log_rec_devs	0.6820	1.2932
log_rec_devs	0.4947	1.2045
log_rec_devs	0.5092	1.0345
log_rec_devs	0.8545	0.8540
log_rec_devs	0.4287	0.8671
log_rec_devs	0.3793	0.7932
log_rec_devs	0.2766	0.7524
log_rec_devs	0.4916	0.6295
log_rec_devs	0.5274	0.5909
log_rec_devs	0.3588	0.5954
log_rec_devs	0.4799	0.5436
log_rec_devs	0.6148	0.4923
log_rec_devs	0.5030	0.4866
log_rec_devs	0.7024	0.4378
log_rec_devs	0.6371	0.4317
log_rec_devs	0.6738	0.4142
log_rec_devs	0.6737	0.4029

(continued)

Parameter	Estimate	SE
log_rec_devs	0.9756	0.3672
log_rec_devs	1.1039	0.3509
log_rec_devs	1.1894	0.3400
log_rec_devs	1.2516	0.3321
log_rec_devs	0.8748	0.3465
log_rec_devs	0.9468	0.3371
log_rec_devs	0.9012	0.3345
log_rec_devs	0.6796	0.3406
log_rec_devs	0.4937	0.3453
log_rec_devs	0.3493	0.3476
log_rec_devs	0.1846	0.3495
log_rec_devs	0.1150	0.3449
log_rec_devs	-0.0118	0.3438
log_rec_devs	-0.1634	0.3438
log_rec_devs	-0.2091	0.3380
log_rec_devs	-0.0967	0.3249
log_rec_devs	-0.1729	0.3211
log_rec_devs	-0.1248	0.3125
log_rec_devs	-0.0589	0.3039
log_rec_devs	0.2194	0.2926
log_rec_devs	0.1447	0.2917
log_rec_devs	0.4400	0.2852
log_rec_devs	0.3900	0.2860
log_rec_devs	0.2151	0.2898
log_rec_devs	0.1684	0.2919
log_rec_devs	-0.2248	0.3003
log_rec_devs	-0.5618	0.3087
log_rec_devs	-0.7368	0.3157
log_rec_devs	-0.9866	0.3261
log_rec_devs	-0.9994	0.3312
log_rec_devs	-1.1292	0.3410
log_rec_devs	-1.3196	0.3548
log_rec_devs	-1.1621	0.3565
log_rec_devs	-1.1684	0.3657
log_rec_devs	-1.3640	0.3811
log_rec_devs	-1.7930	0.4114
log_rec_devs	-1.9610	0.4346
log_rec_devs	-2.0195	0.4574
log_rec_devs	-1.6363	0.4549
log_rec_devs	-1.3527	0.4662
log_rec_devs	-1.6335	0.5351
log_rec_devs	-2.7245	0.8815
log_Fbar	-3.7066	0.4808
log_F_devs	-2.2192	0.3974
log_F_devs	-3.2749	0.3969
log_F_devs	-2.7434	0.3966
log_F_devs	-2.8324	0.3963
log_F_devs	-2.1265	0.3961
log_F_devs	-0.2222	0.3953
log_F_devs	0.1234	0.3938

(continued)

Parameter	Estimate	SE
log_F_devs	0.1197	0.3921
log_F_devs	0.2513	0.3903
log_F_devs	0.2006	0.3884
log_F_devs	0.1396	0.3867
log_F_devs	0.3763	0.3848
log_F_devs	0.5267	0.3825
log_F_devs	0.9019	0.3796
log_F_devs	0.7736	0.3766
log_F_devs	0.7951	0.3739
log_F_devs	0.8827	0.3714
log_F_devs	0.9310	0.3691
log_F_devs	0.9572	0.3674
log_F_devs	0.5622	0.3665
log_F_devs	0.6099	0.3663
log_F_devs	0.3132	0.3666
log_F_devs	0.2971	0.3672
log_F_devs	0.3560	0.3682
log_F_devs	0.5220	0.3698
log_F_devs	0.5182	0.3722
log_F_devs	0.5866	0.3754
log_F_devs	0.3857	0.3793
log_F_devs	0.4679	0.3837
log_F_devs	0.2198	0.3884
log_F_devs	0.2350	0.3932
log_F_devs	0.1292	0.3984
log_F_devs	0.3287	0.4044
log_F_devs	0.3940	0.4120
log_F_devs	0.2643	0.4202
log_F_devs	0.3219	0.4290
log_F_devs	0.1953	0.4383
log_F_devs	0.3507	0.4483

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: 0.9994

Likelihood components

Catchability priors: 4.6545, 0.4272, 1.507, 0.0017

Catch: 0.0074

Abundance indices (fsh, srv1, srv2, mr): 12.2961, 4.7457, 7.1891, 0.0915

Age comp 2793.2598, 3467.2867

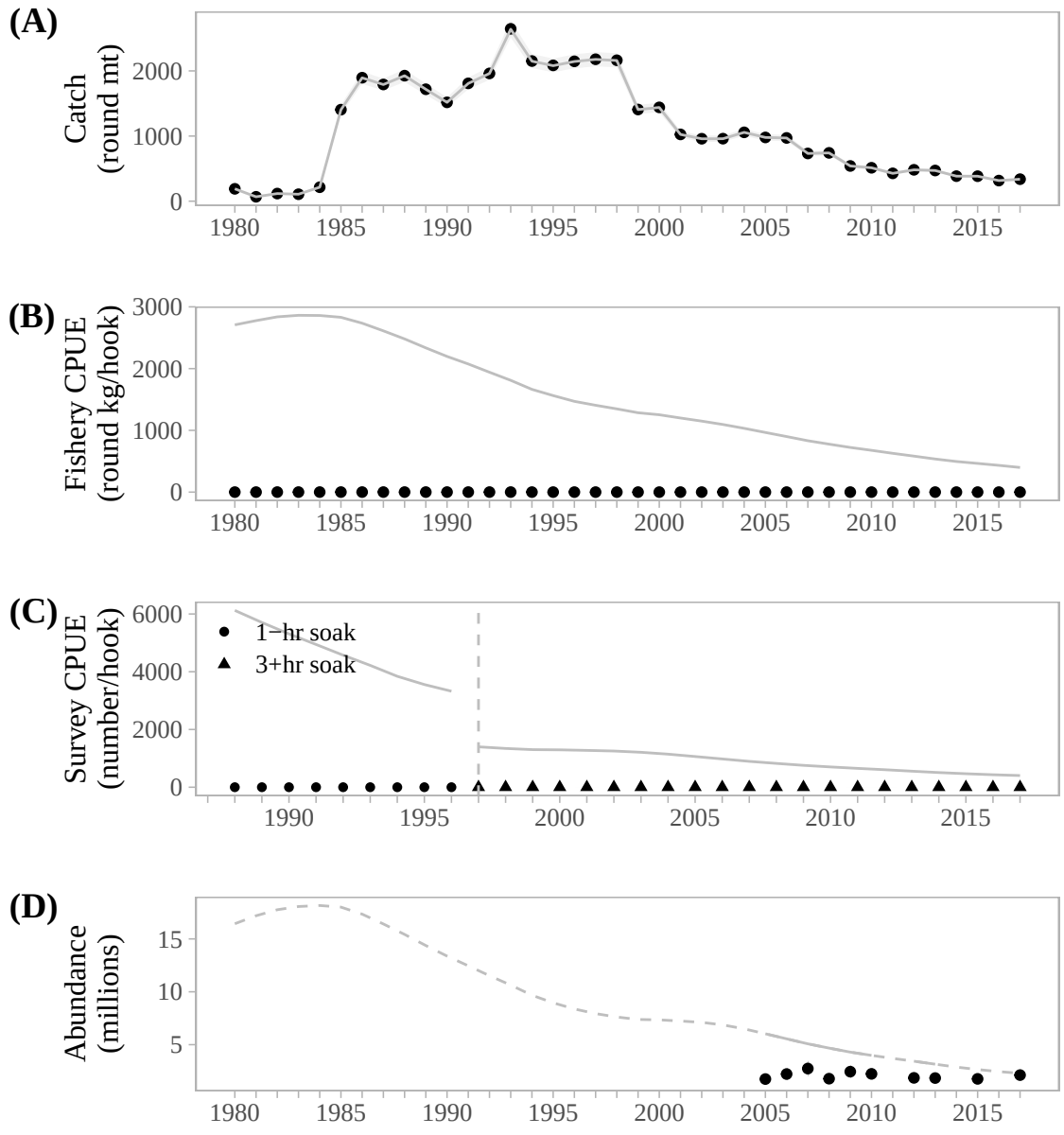
Multinomial offsets 2.8754, 33.992

Penalty on fishing mortality deviations: 4.3919

Penalty on recruitment deviations: 5.2309

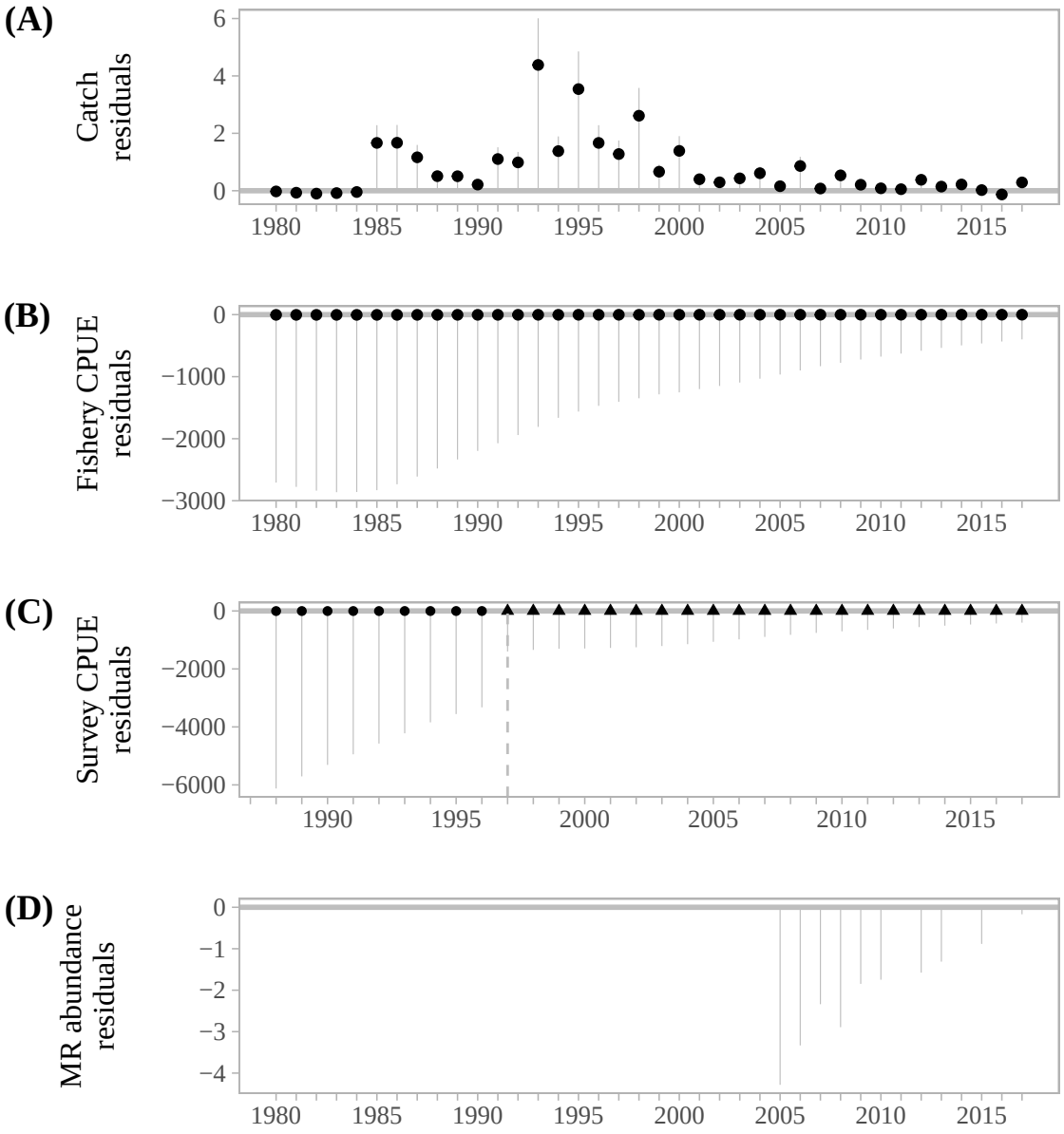
Total likelihood: 6301.0895

Time series of catch and abundance indices

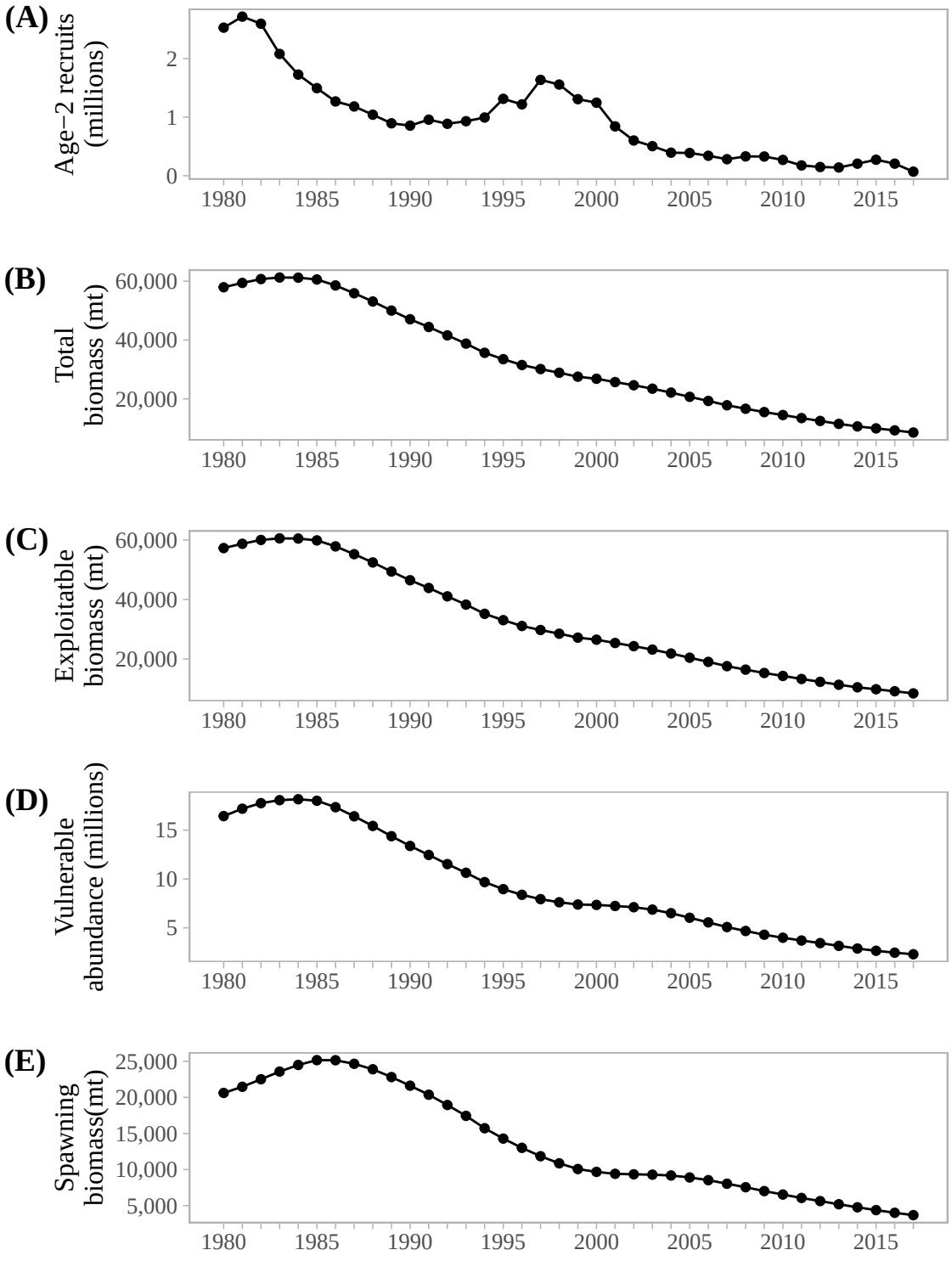


Residuals for time series of catch and abundance indices

Standardized residuals:

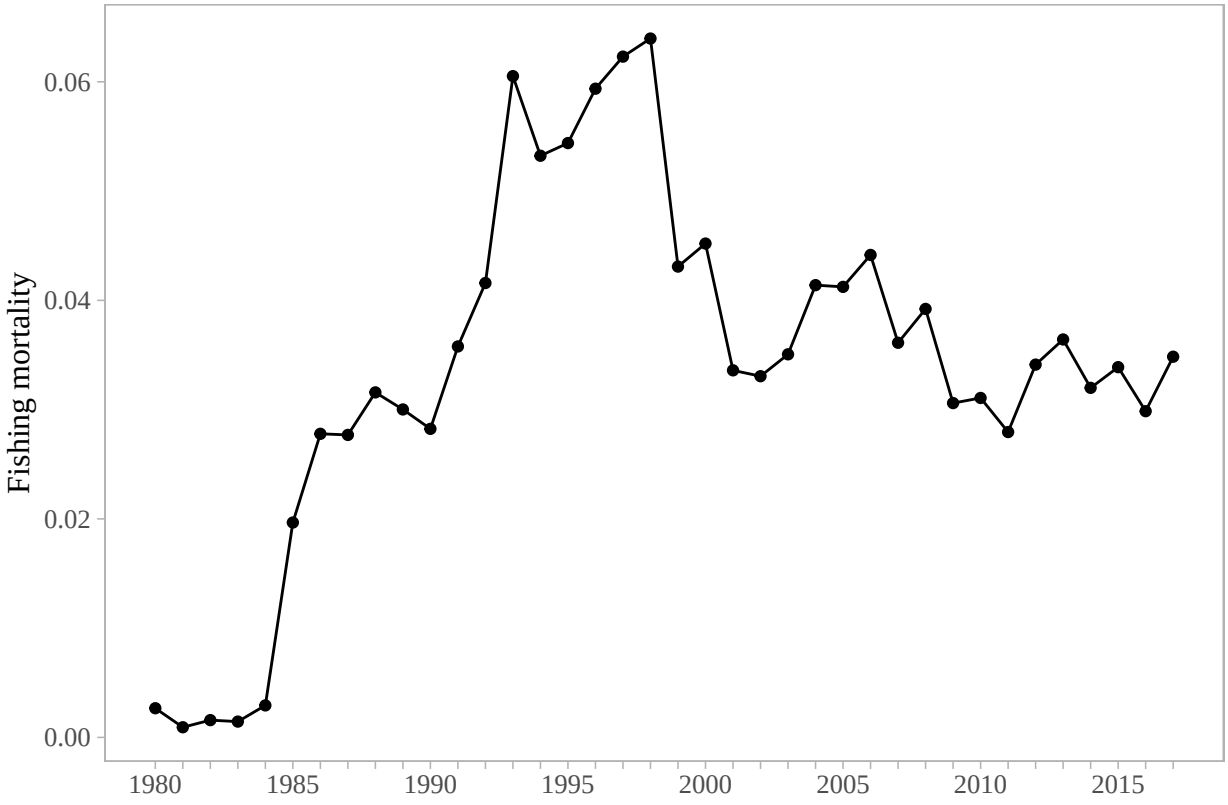

(A)
Catch residuals
6
4
2
0
1980
1985
1990
1995
2000
2005
2010
2015
(B)
Fishery CPUE residuals
0
−1000
−2000
−3000
1980
1985
1990
1995
2000
2005
2010
2015
(C)
Survey CPUE residuals
0
−2000
−4000
−6000
1990
1995
2000
2005
2010
2015
(D)
MR abundance residuals
0
−1
−2
−3
−4
1980
1985
1990
1995
2000
2005
2010
2015

Derived time series of recruitment, abundance, and biomass

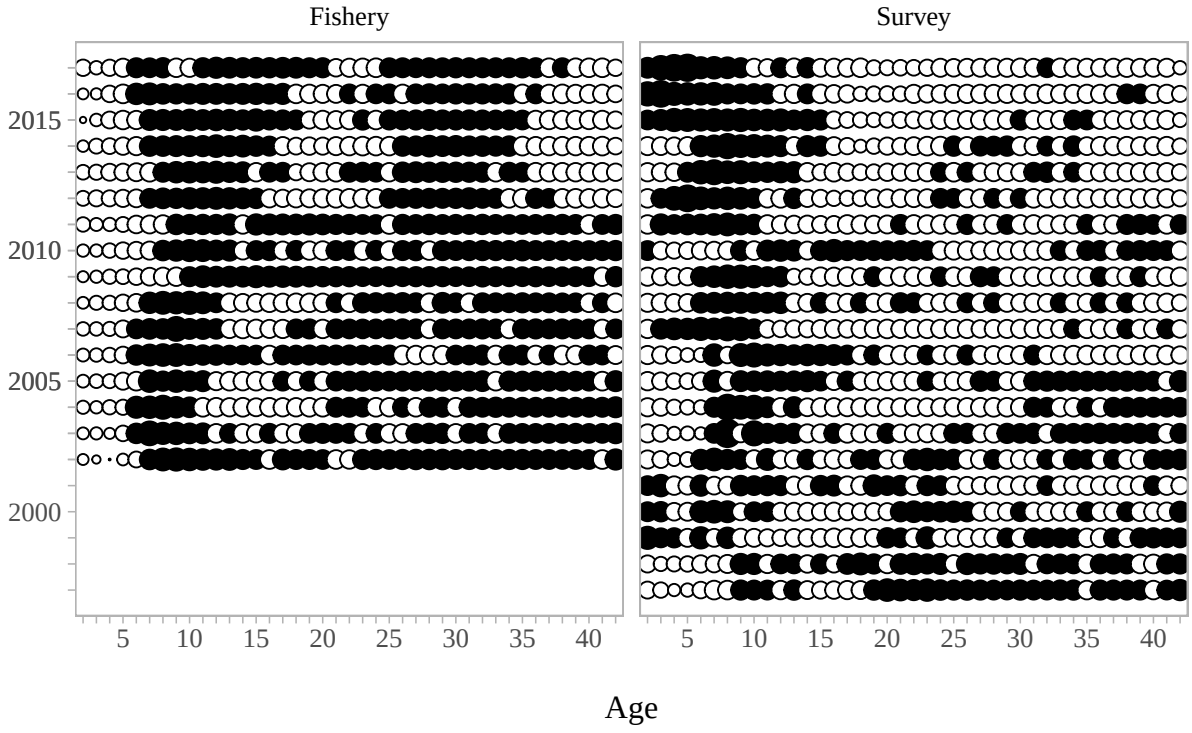


Estimate of fishing mortality

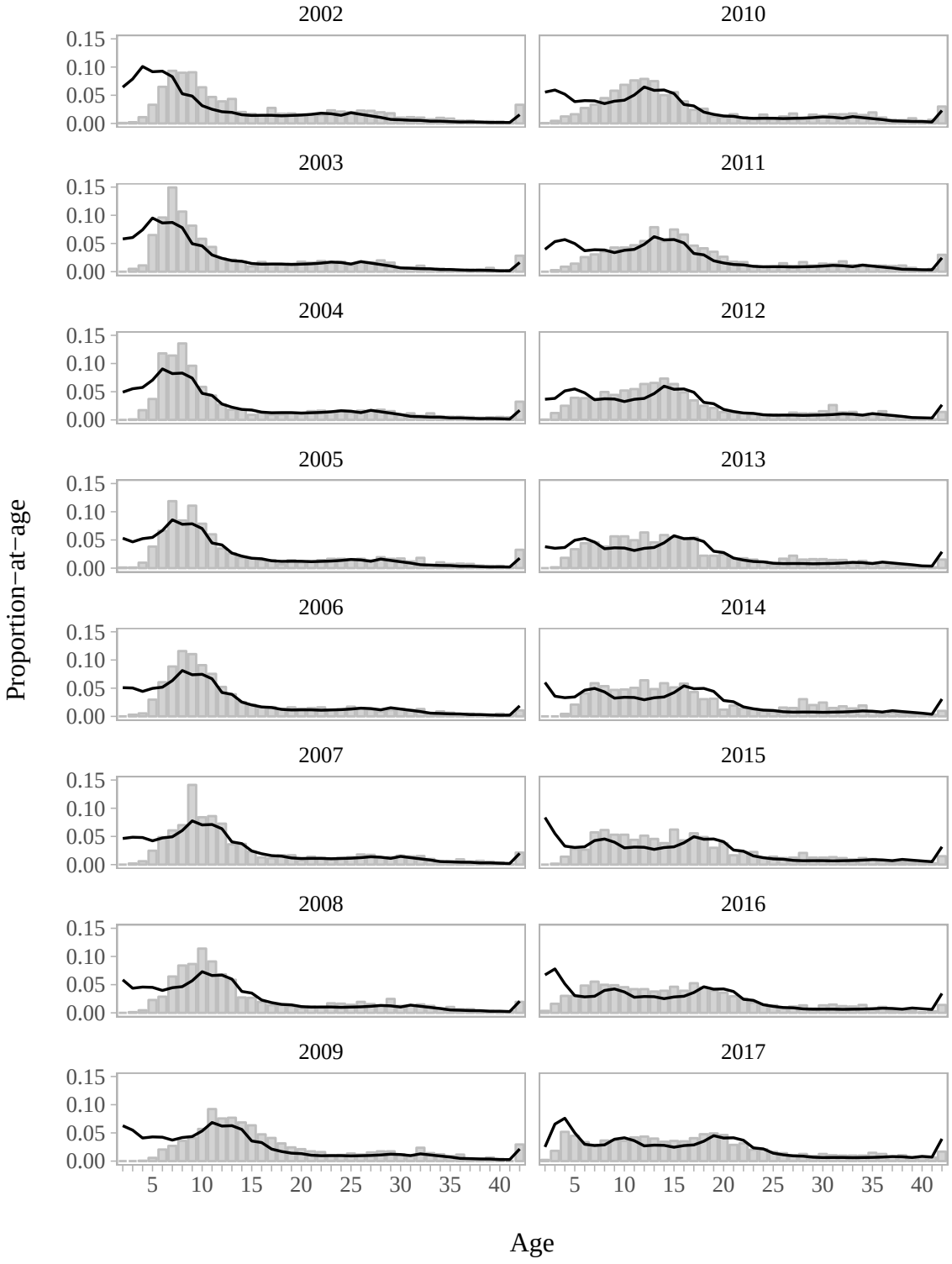
On natural scale



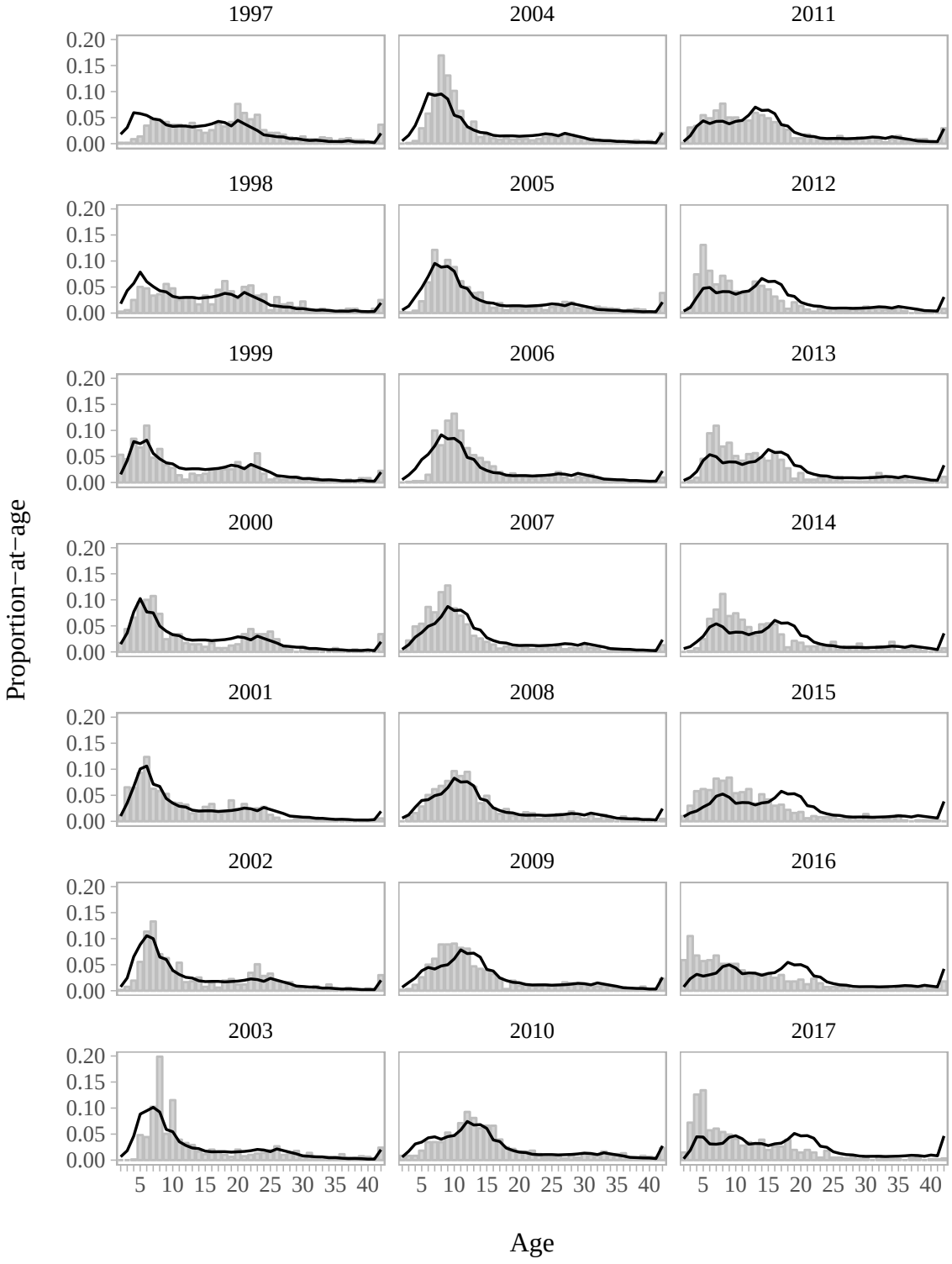
Fits to age comps



Fits to fishery age comps



Fits to survey age comps



Selectivity