Appendix 1. Supplementary material.

The equation used to convert instantaneous mortality to annual mortality:

$$S = e^{-Z} \qquad \text{[A1.1]}$$

Where *S* is the annual survival and *Z* is the instantaneous mortality (Gulland 1969).

The equation to convert annual mortality to weekly mortality:

$$S_w = S^{\frac{1}{52}} \qquad \text{[A1.2]}$$

Where S_w is the weekly survival rate (Krebs 2017).

Table A1.1. The age and size distribution used to convert piscivorous fish biomass (g/m2) to a number of fish (estimated from NJ Division of Fish & Wildlife 2010, Sharov et al. 2013). Weight was estimated using a striped bass length-weight equation (Kimmerer et al. 2005).

Age (years)	Length (inches)	Weight (g)	Proportion of population
1	7.07	71.23	0.25
2	12.86	460.46	0.22
3	17.60	1225.58	0.18
4	21.48	2282.08	0.15
5	24.48	3509.48	0.1
6	27.25	4798.87	0.05
7	29.38	6068.37	0.025
8	31.13	7263.93	0.015
9	32.55	8354.56	0.002
10	33.72	9326.35	0.002
11	34.68	10177.01	0.002
12	35.46	10911.55	0.002
13+	36.10	11539.12	0.002

Table A1.2. The power, linear, and static abundance-catch relationships used to represent the likelihood of catching a keeper or sublegal fish from shore or boat fishing methods, where A represents abundance. Value sources for these equations can be found in the main text (see "Submodels" section).

Relationship	Keeper/Boat	Keeper/Shore	Sublegal/Boat	Sublegal/Shore
Power	$0.04A^{0.40}$	$0.02A^{0.23}$	$0.08A^{0.26}$	$0.04A^{0.25}$
Linear	$0.0002A$	$0.00003A$	$0.00008A$	$0.00009A$
Static	0.40	0.07	0.67	0.34

Table A1.3. Forecasted biomasses (g/m^2) for the six mid and upper trophic level functional groups at the year 2030 under the four scenarios of commercial forage fish harvest.

Functional Group	Zero (F=0)	Status Quo (F=0.202)	Intermediate (F=1.68)	Extreme (F=3.167)
Forage Fish	20.16	19.09	12.93	9.06
Piscivorous Fish	9.92	9.60	8.10	7.48
Benthivorous Fish	14.14	13.93	12.88	12.34
Carnivorous Benthos	12.74	12.75	12.73	12.63
Large Squid	1.15	1.12	0.93	0.80
Small Squid	0.96	0.91	0.64	0.52

Fig. A1.1. Piscivorous fish biomass forecasts of the coupled social-ecological model for the four scenarios of commercial forage fish harvest compared to the food web (EwE) forecast. The different color lines represent the three variations of abundance-catch relationship in the social-ecological model, and the black line represents the stand-alone food web forecast.

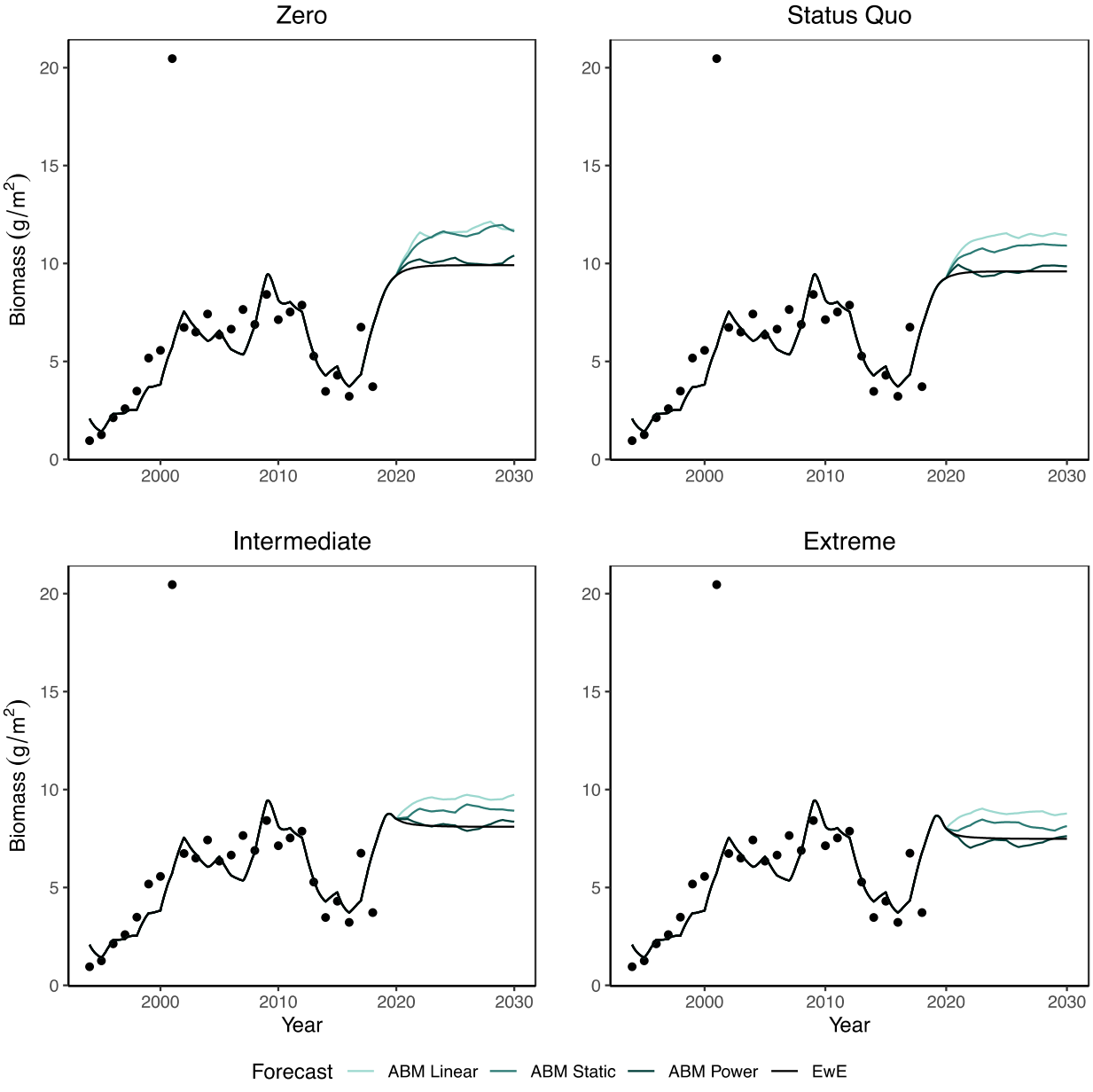
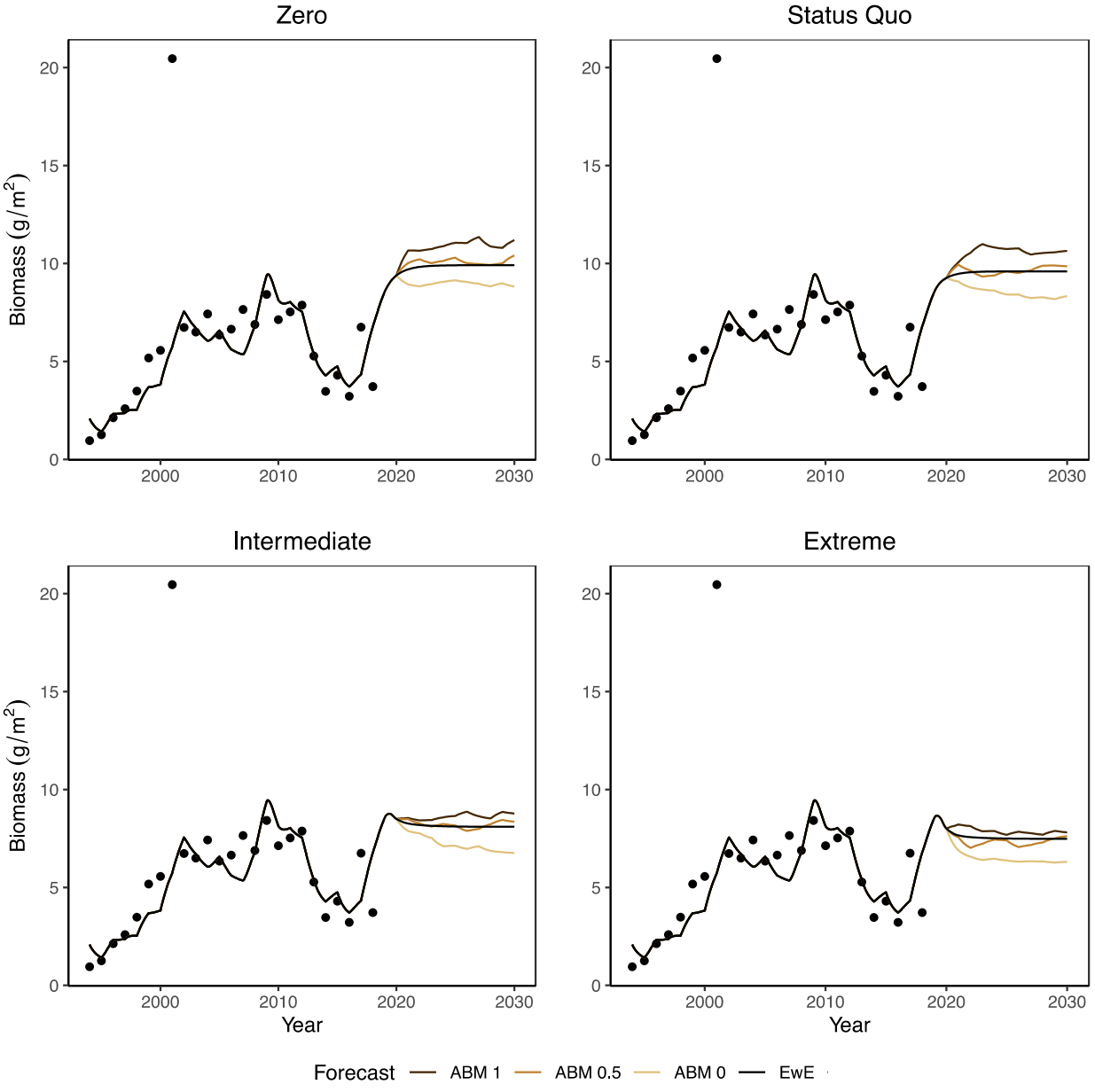


Fig. A1.2. Piscivorous fish biomass forecasts of the coupled social-ecological model for the four scenarios of commercial forage fish harvest compared to the EwE forecast. The three different color lines are the variations of satisfaction loss rate in the social-ecological model, and the black line represents the stand-alone food web forecast.



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