

Supplemental Appendix for Enberg et al. CJFAS:

Fishing-Induced Evolution and Changing Reproductive Ecology of Fish: The Evolution of Steepness

Katja Enberg, Christian Jørgensen, and Marc Mangel

Contents

- Sensitivity analysis, including figures S1-S4.
- Maturity ogives for length and age fitted to the model population (Fig. S5).

Sensitivity analysis

We tested the model's sensitivity to two central processes: the relationship between the population's total egg production and recruitment (Fig. S1a), and the density-dependent feedback regulation from total population biomass on individual growth rate (Fig. S1b). The effects on the model's predicted stock–recruitment curves are shown for different proxies: total population biomass (Fig. S2); spawning stock biomass (Fig. S3); and the number of spawners (Fig. S4). In each case we present stock–recruitment curves as it would have been observed during a fishing moratorium, but the results are qualitatively similar if fishing on the stock were continued.

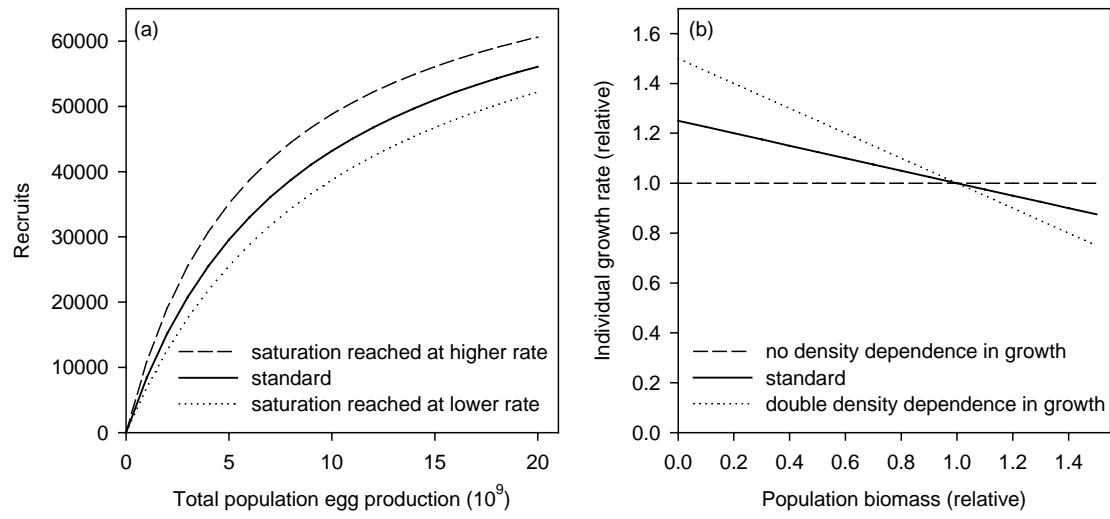


Figure S1. Recruitment (a) and growth density-dependence (b) functions used in the sensitivity analysis. In the main results the ‘standard’ functions were used (Enberg et al. 2009 also use the ‘standard’ functions).

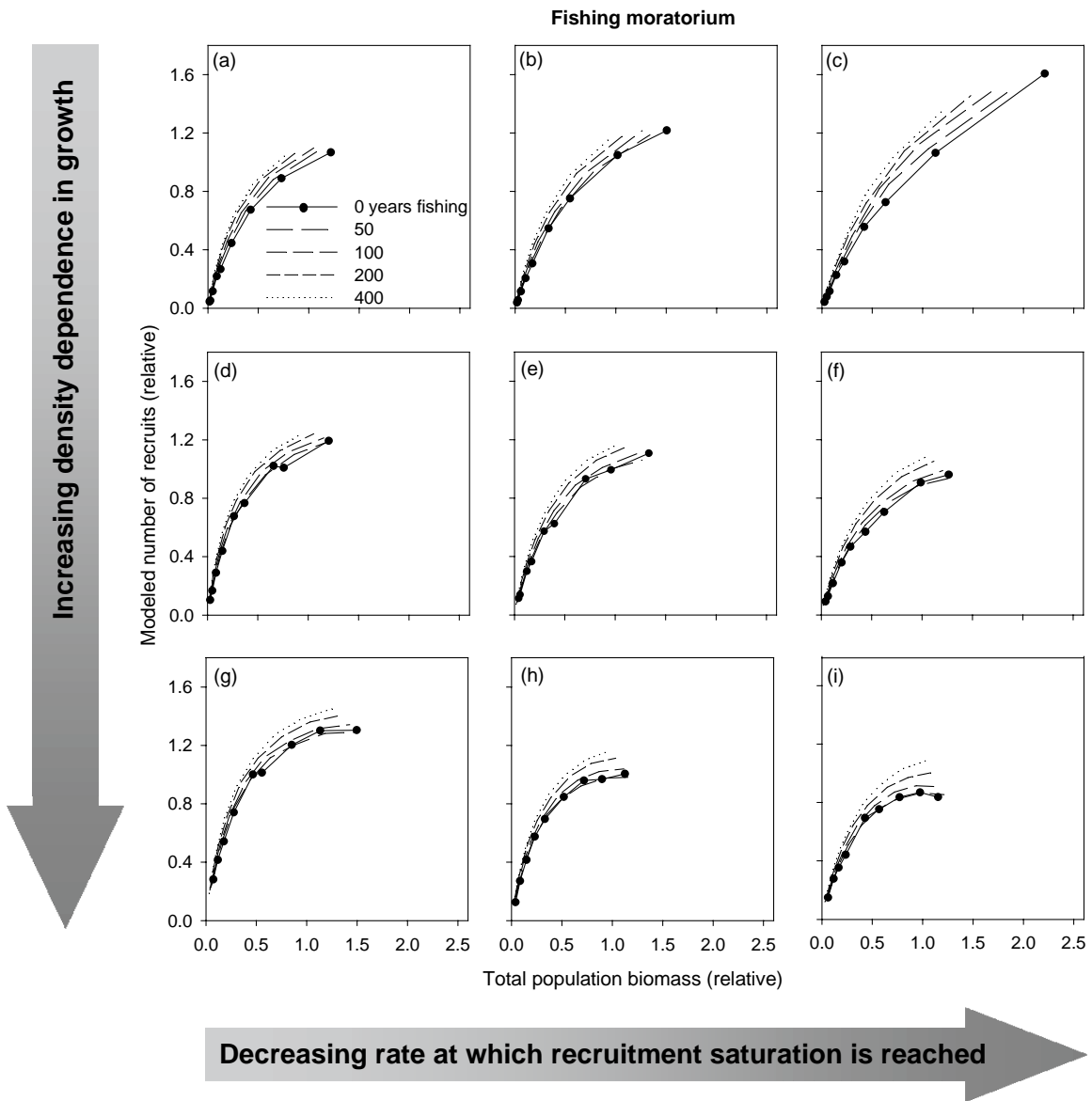


Figure S2. Total population biomass–recruitment curves with different parameters used in the functions for recruitment and density-dependent individual growth (see Fig. S1).

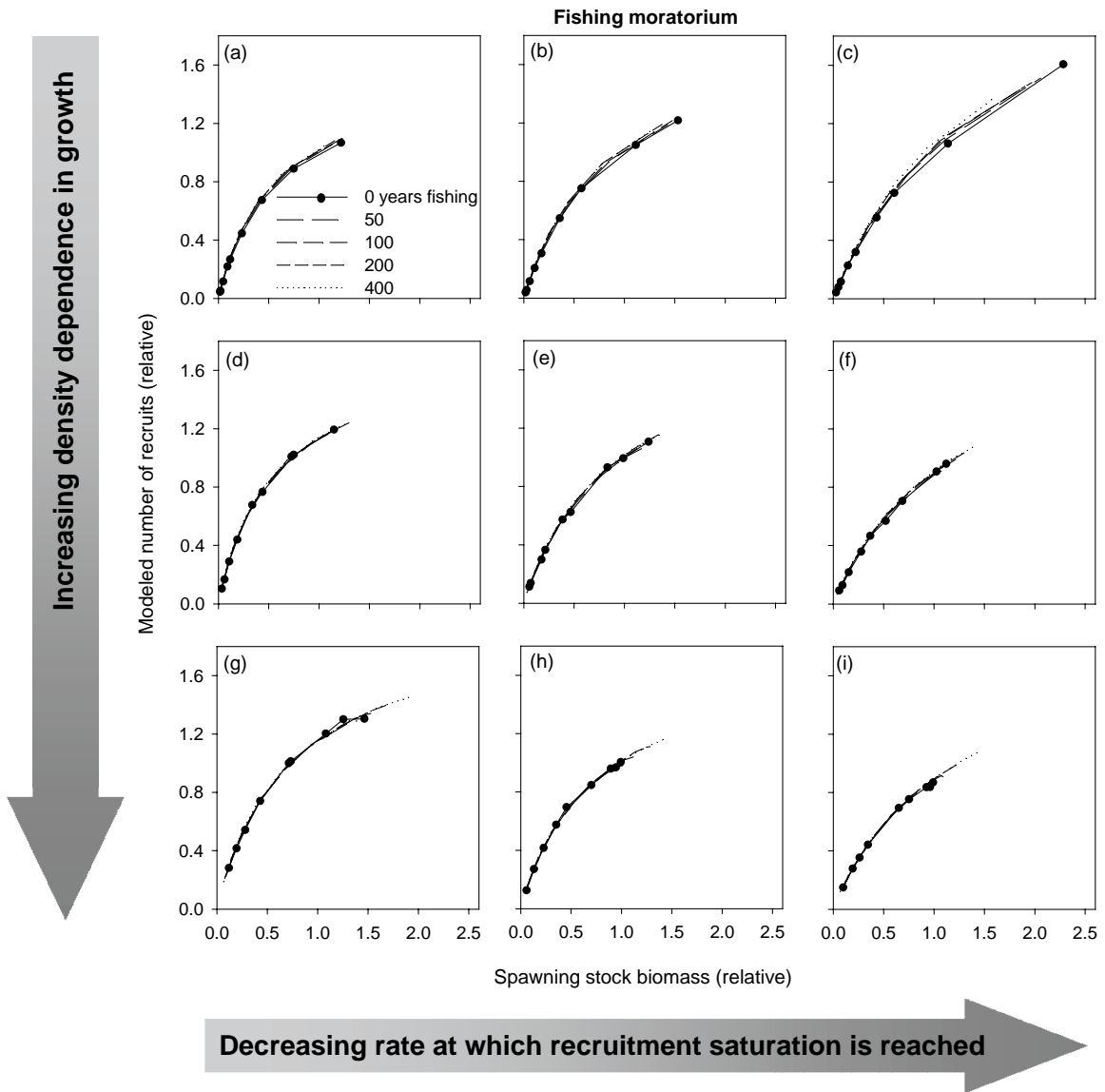


Figure S3. Spawning stock biomass–recruitment curves with different parameters used in the functions for recruitment and density-dependent individual growth (see Fig. S1).

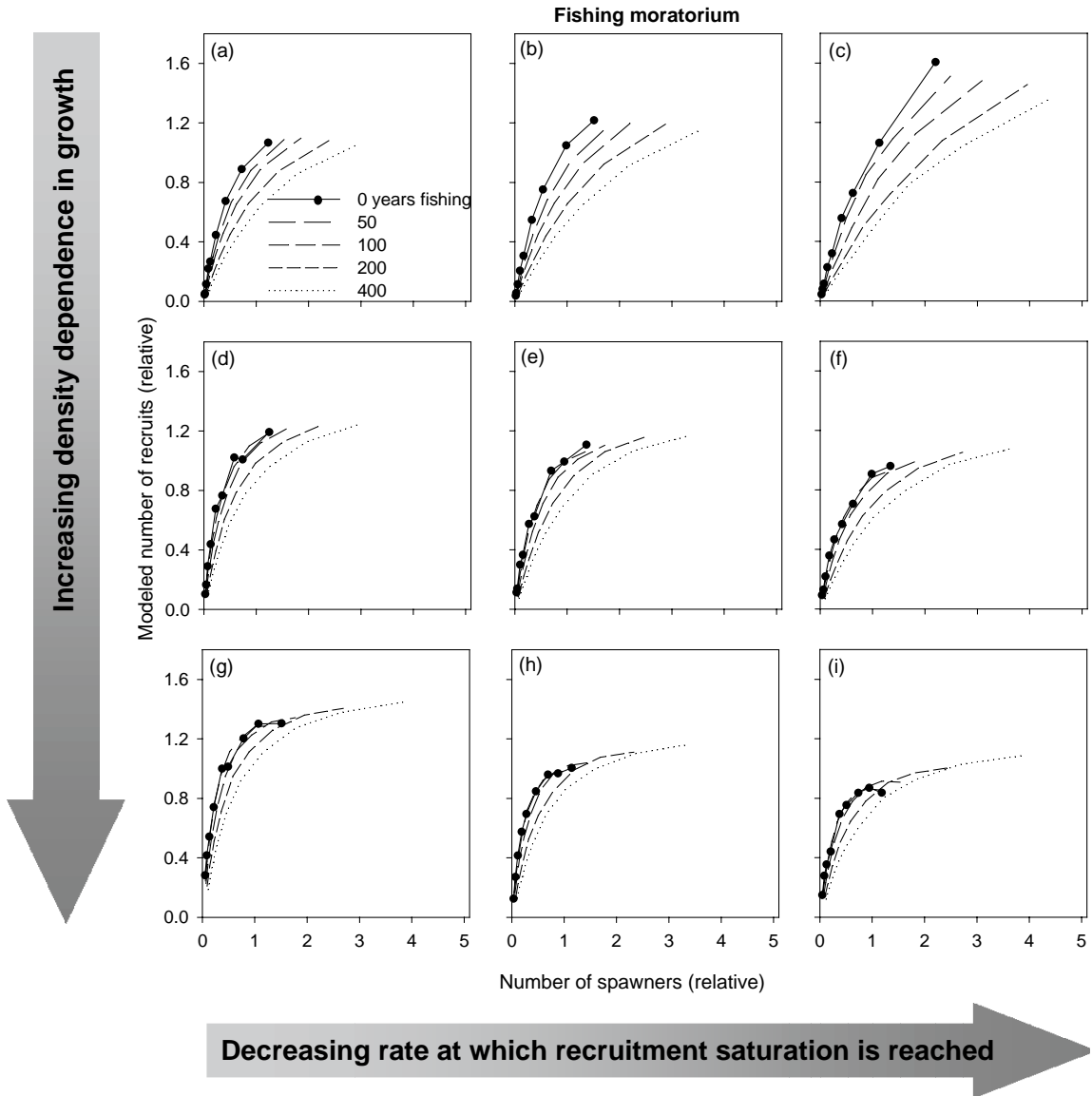


Figure S4. Number of spawners–recruitment curves with different parameters used in the functions for recruitment and density-dependent individual growth (see Fig. S1).

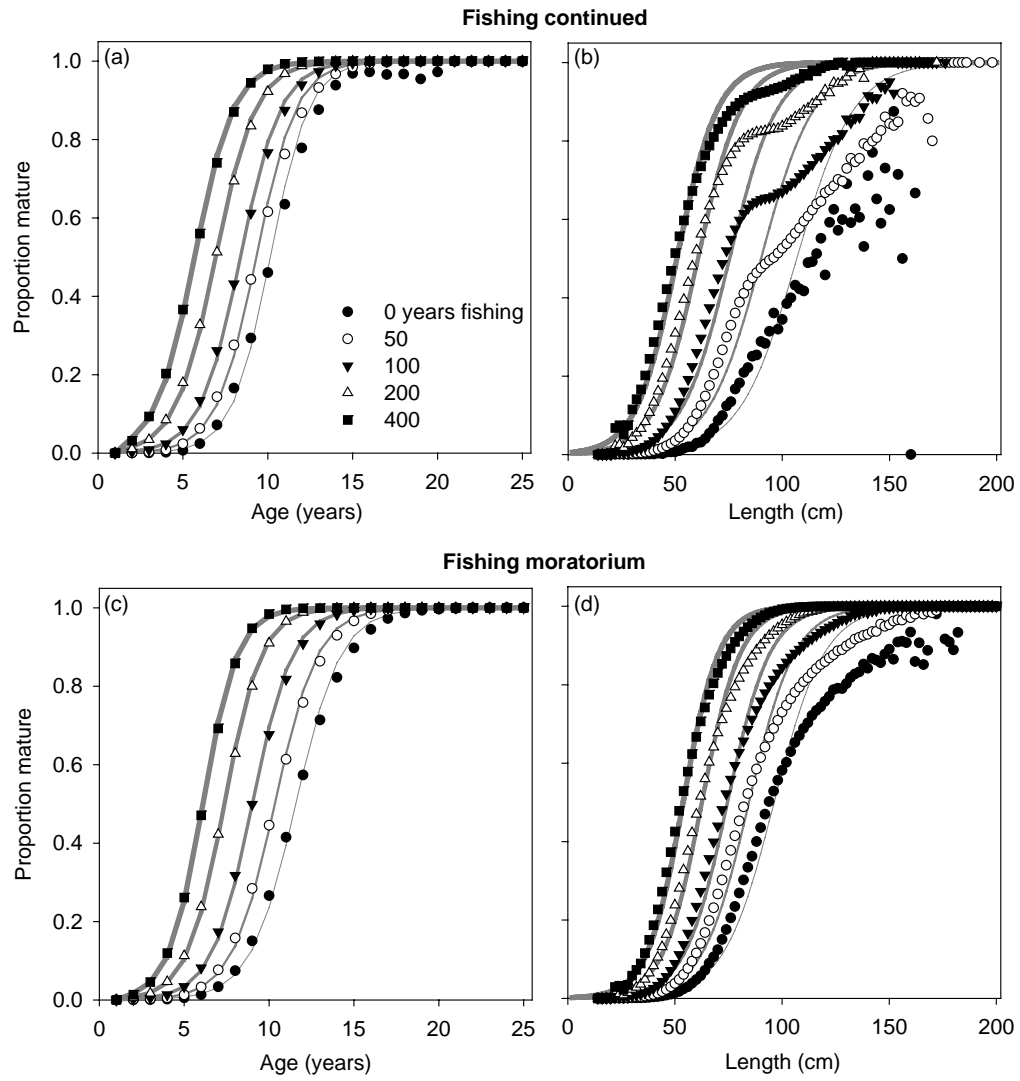


Figure S5. Maturity ogives for age (a and c) and length (b and d). The actual data points are shown with symbols, and the fitted logistic functions are shown with gray lines, where thickness indicates the duration of harvesting (the thicker the line, the longer the harvesting period: 0, 50, 100, 200, and 400 years).