

Figures

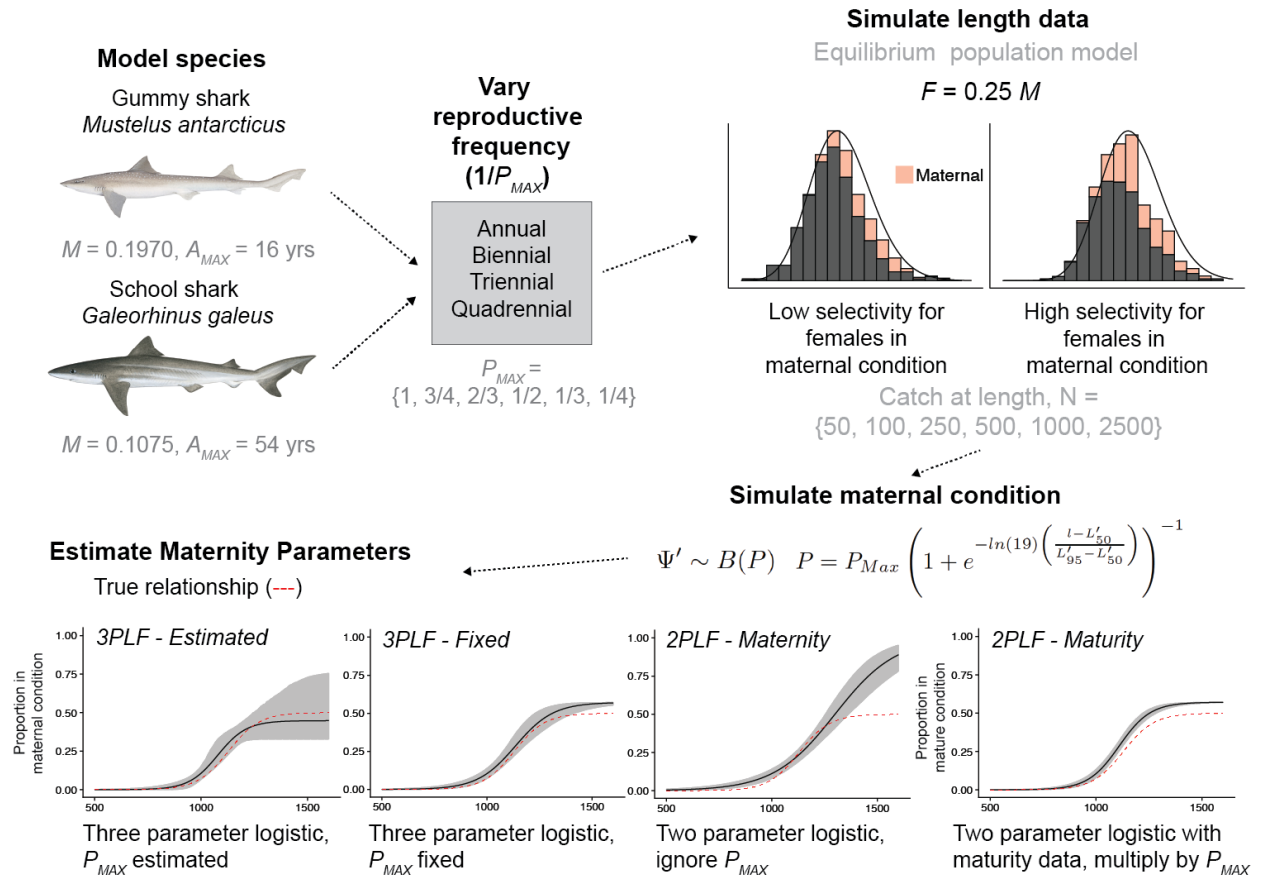


Figure 1. Approach used to generate simulated data and test the performance of four methods for calculating maternity parameters. Illustrations © R.Swainston/www.anima.net.au

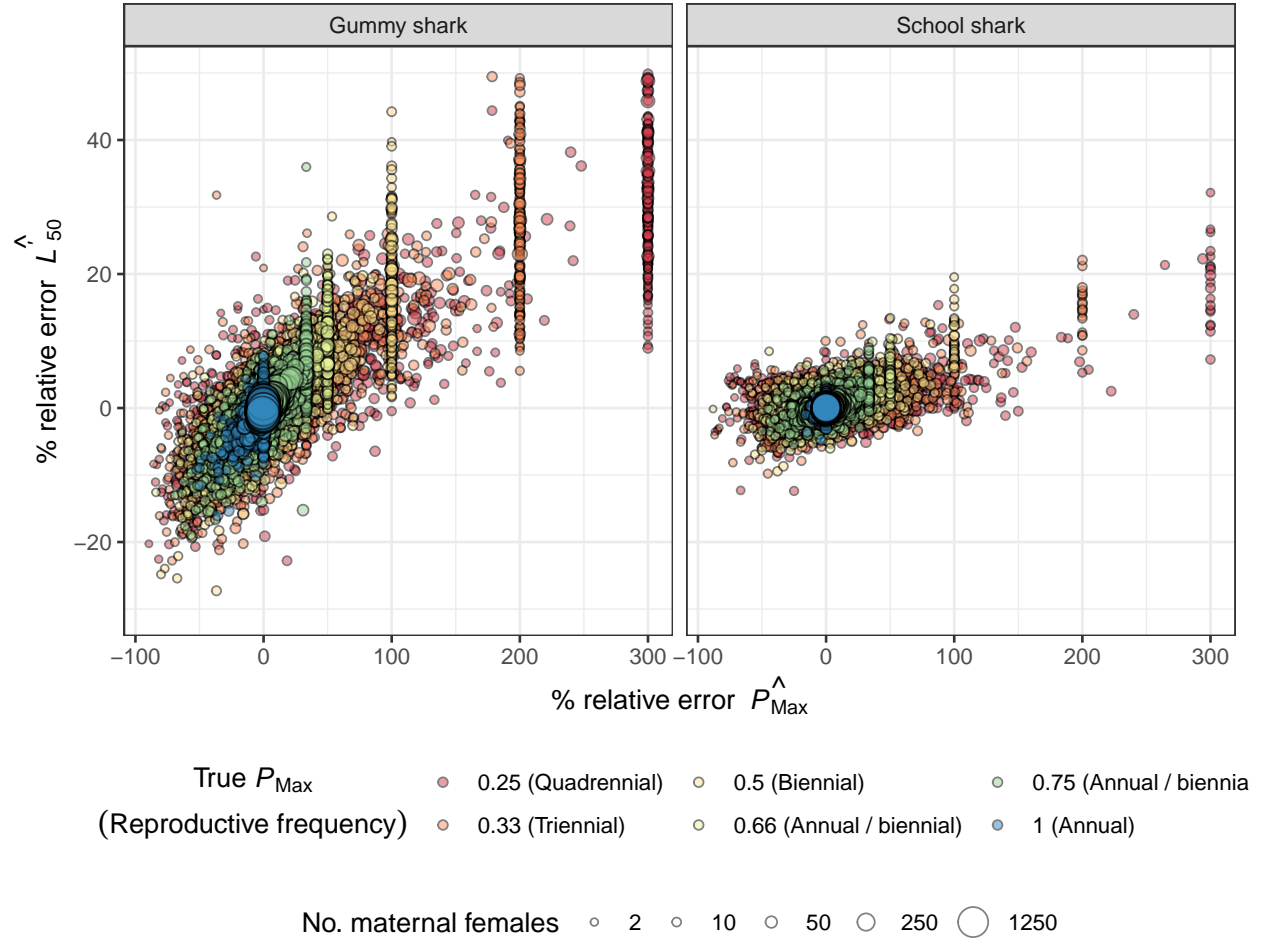


Figure 2. Bias (per cent relative error) in parameter estimates for \hat{L}_{50} and \hat{P}_{Max} for the 3PLF maternity function with P_{Max} estimated. Each point represents parameter estimates from one iteration of simulated data ($n = 43,129$), including all combinations of variables. Simulations with longer reproductive cycles and fewer maternal females were associated with higher bias in both \hat{L}_{50} and \hat{P}_{Max} . Note: 42 data points were cropped to aid with data visualization (see Figure S13 for uncropped figure).

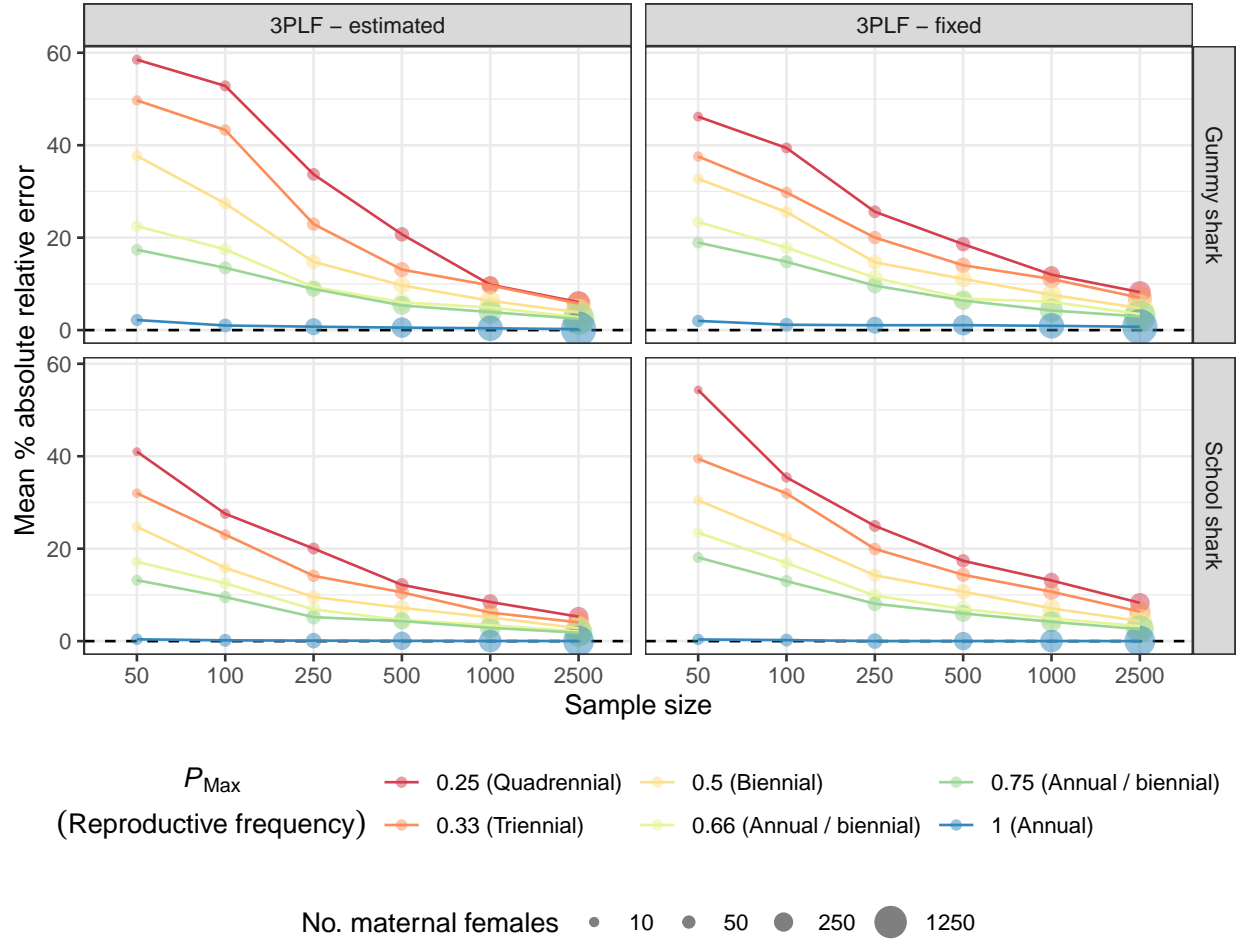


Figure 3. Accuracy (per cent absolute error) in parameter estimates of P_{Max} for 3PLF methods with high maternal selectivity. Large sample sizes were needed to accurately estimate P_{Max} and accuracy decreased as the duration of the reproductive cycle increased. Each point reflects a mean value from 300 simulated data sets. Point size denotes mean number of females in maternal condition at a given sample size.

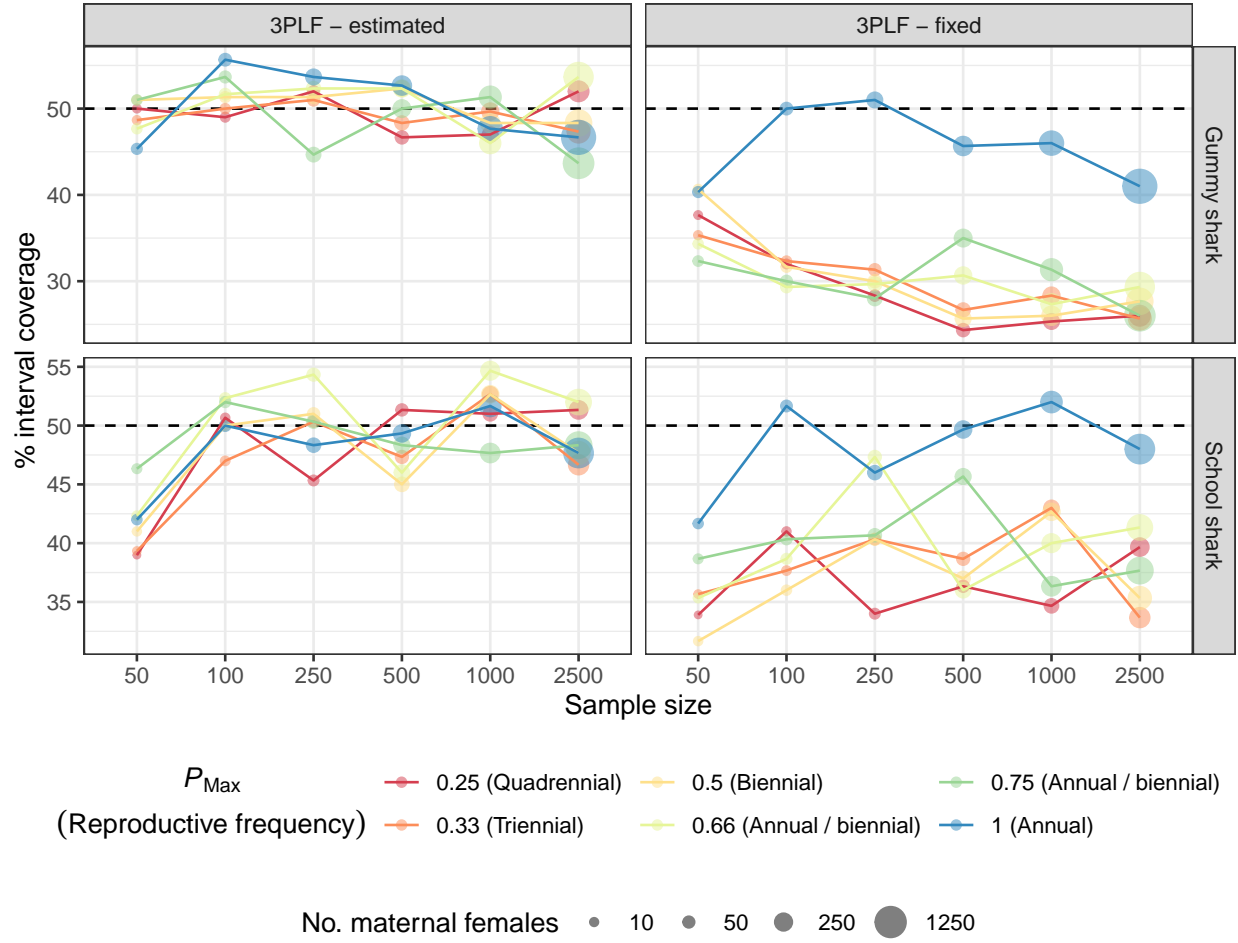


Figure 4. Confidence interval coverage for $L_{50}^{\hat{L}}$ for 3PLF methods with high maternal selectivity. Figure shows the percentage of simulations ($n = 300$) where the true parameter value fell within the 50% bootstrap confidence interval. Point size denotes mean number of females in maternal condition at a given sample size.

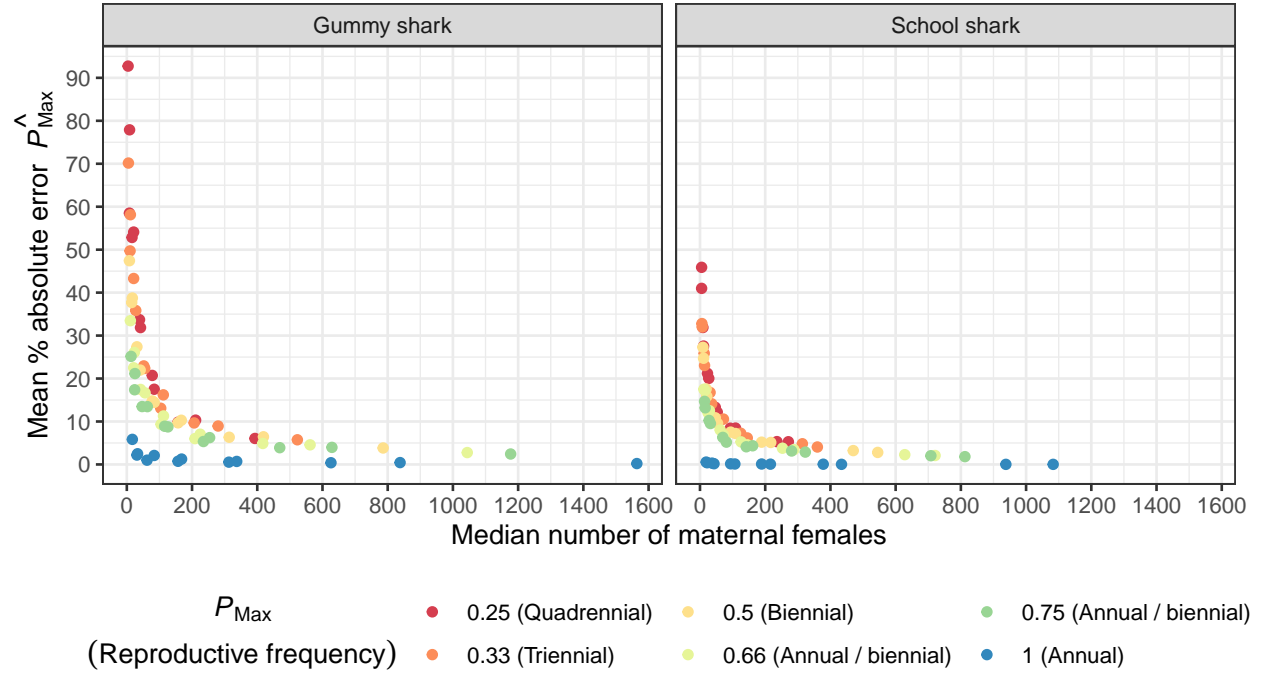


Figure 5. Accuracy (per cent absolute error) in parameter estimates of \hat{P}_{Max} for the 3PLF - estimated method as a function of number of maternal females. Each point reflects a value from 300 simulated data sets.

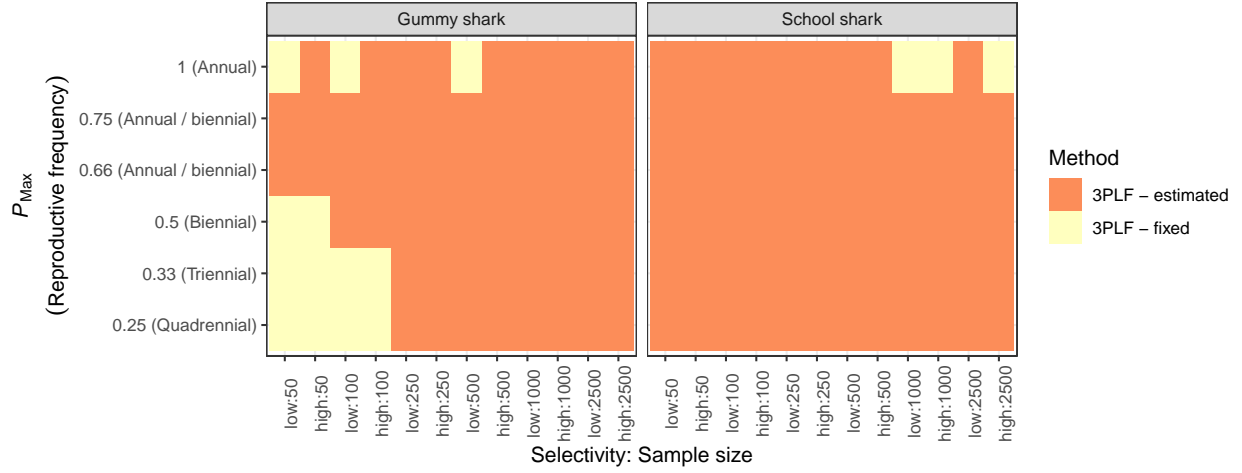


Figure 6. Performance of four alternative maternity functions in accurately calculating R_0 . The best performing method was that which minimised mean absolute error across 300 simulated datasets. Note 2PLF-maternity (Annual) scenarios were excluded for this comparison.

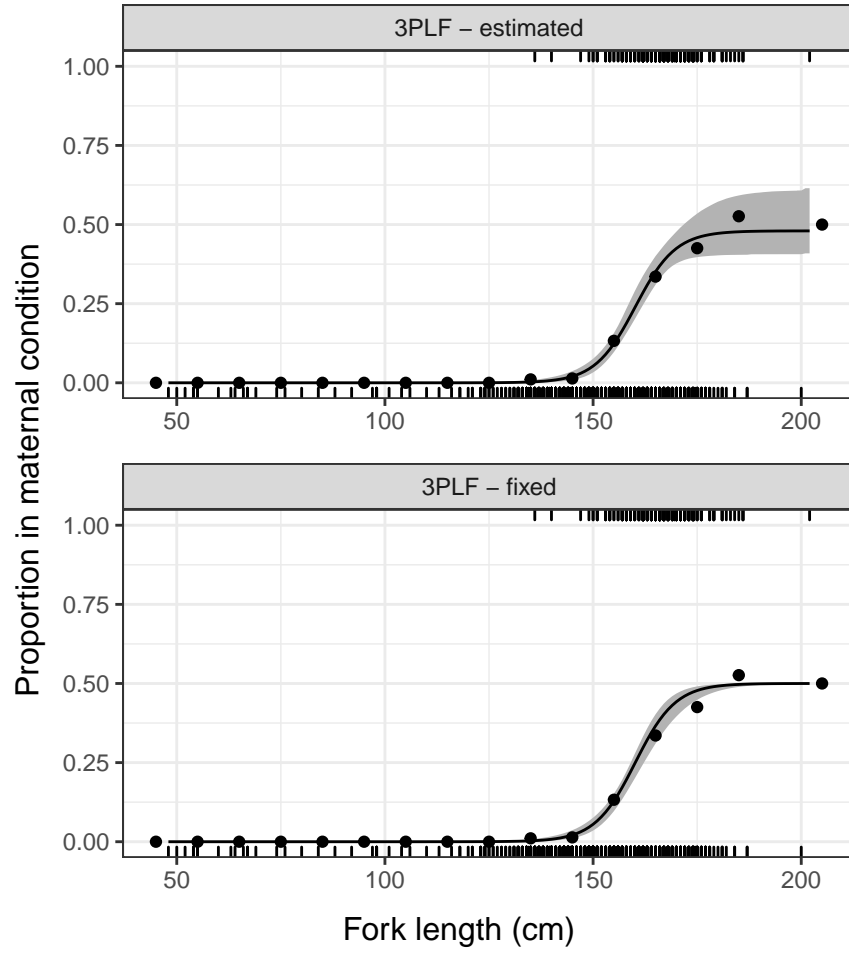


Figure 7. Comparison of 3PLF-estimated and 3PLF-fixed methods used to estimate maternal parameters for sandbar shark, *C. plumbeus*, in the Gulf of Mexico and Western North Atlantic. Solid line is the expected proportion in maternal condition at length, $\Psi'(L)$. The grey shaded region denotes 95% confidence intervals based on bootstrap resampling. Black points show proportion in maternal condition in 10cm length intervals. Marginal rug plots denote raw data that models were fit to. P_{Max} was fixed at 0.5 in the lower panel.