

Survey Shell Height to Meat Weight Relationships

Dvora Hart, NEFSC

The 2025 RT assessment used GAMs to model survey shell height to meat weight relationships. These models used (Julian) day and year as predictors. Baseline relationships used $jday = 150$ in the Mid-Atlantic and $jday = 180$ on Georges Bank and $year = 2010$. In the CASA model, the baseline relationships are used to calculate shell height/meat weight anomalies based on observer data; it is these anomalies that are used to calculate model landings so the choice of day and year for the baseline is not important.

However, the baseline values may not be the appropriate ones for projections, particularly if the meat weight yields in 2010 are not similar to those in 2025/26.

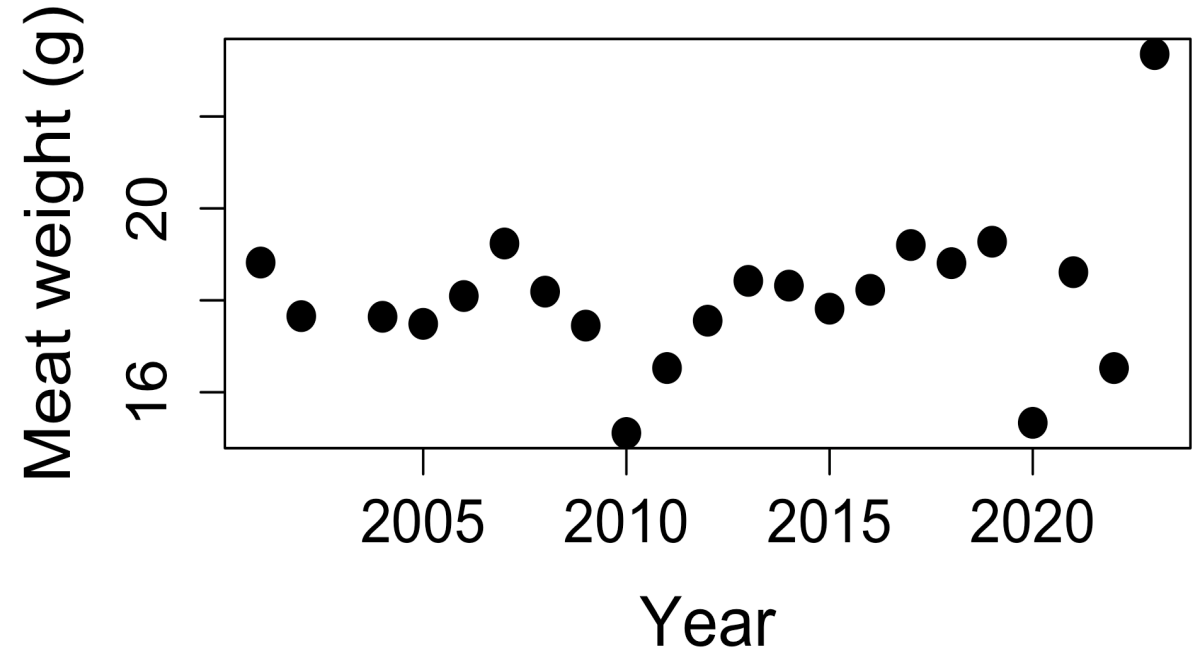
Georges Bank Shell Height to Meat Weight Relationships

For Georges Bank, the relationship is (in R-speak):

$$W \sim \ln(H)*D + s(J) + \text{as.factor}(Y) + L$$

using a gamma family with a log link, and station-level random effects, where W is weight, H is shell height, D is Depth, J is (Julian) day, Y is year and L is latitude.

Meat yield in 2010 was actually the lowest in the time series. A better predictor of current meat weights is to use the mean of the year effects. This would change the intercept of the relationship from -7.3309 to -7.1565, and would increase biomass estimates by a factor of 1.1905.

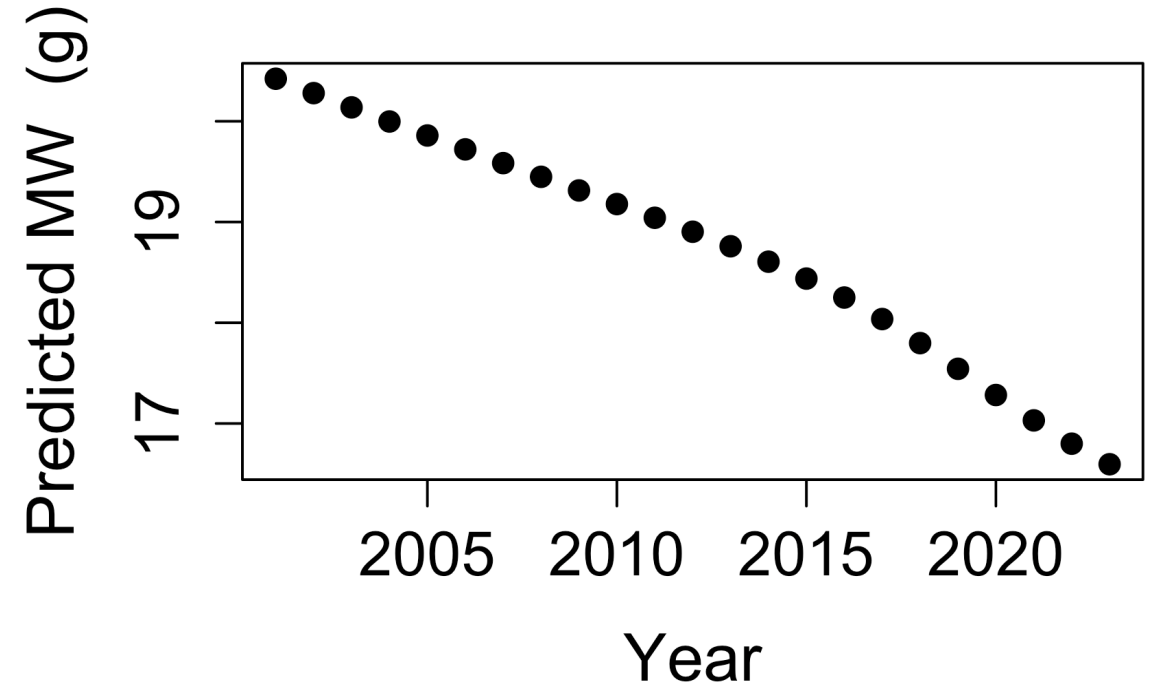


Mid-Atlantic Shell Height to Meat Weight Relationships

The Mid-Atlantic relationship is similar, but uses a smoother for the year effect:

$$W \sim \ln(H)*D + s(Y,J) + L$$

Meat yields have been trending downwards in the Mid-Atlantic, so 2010 meat weights overestimate what would be expected in 2025/6. Using the 2023 prediction (recommended) would reduce the intercept from -12.6319 to -12.7766, which would reduce estimated biomasses by a factor of 0.8528.



Recommended shell height to meat weight relationships

Georges Bank (mean year effect):

$$MW = \exp(-7.1565 + 2.9911 \ln(sh) - 0.0804 \text{ lat} + [0.00159 - 0.00156 \ln(sh)] \text{ depth})$$

Mid-Atlantic (2023 year effect):

$$MW = \exp(-12.7766 + 3.2834 \ln(sh) + 0.0181 \text{ lat} + [0.03895 - 0.00933 \ln(sh)] \text{ depth})$$

Survey groups do not need to recalculate biomasses; instead, reported 2025 survey biomasses can be adjusted by the appropriate factor.