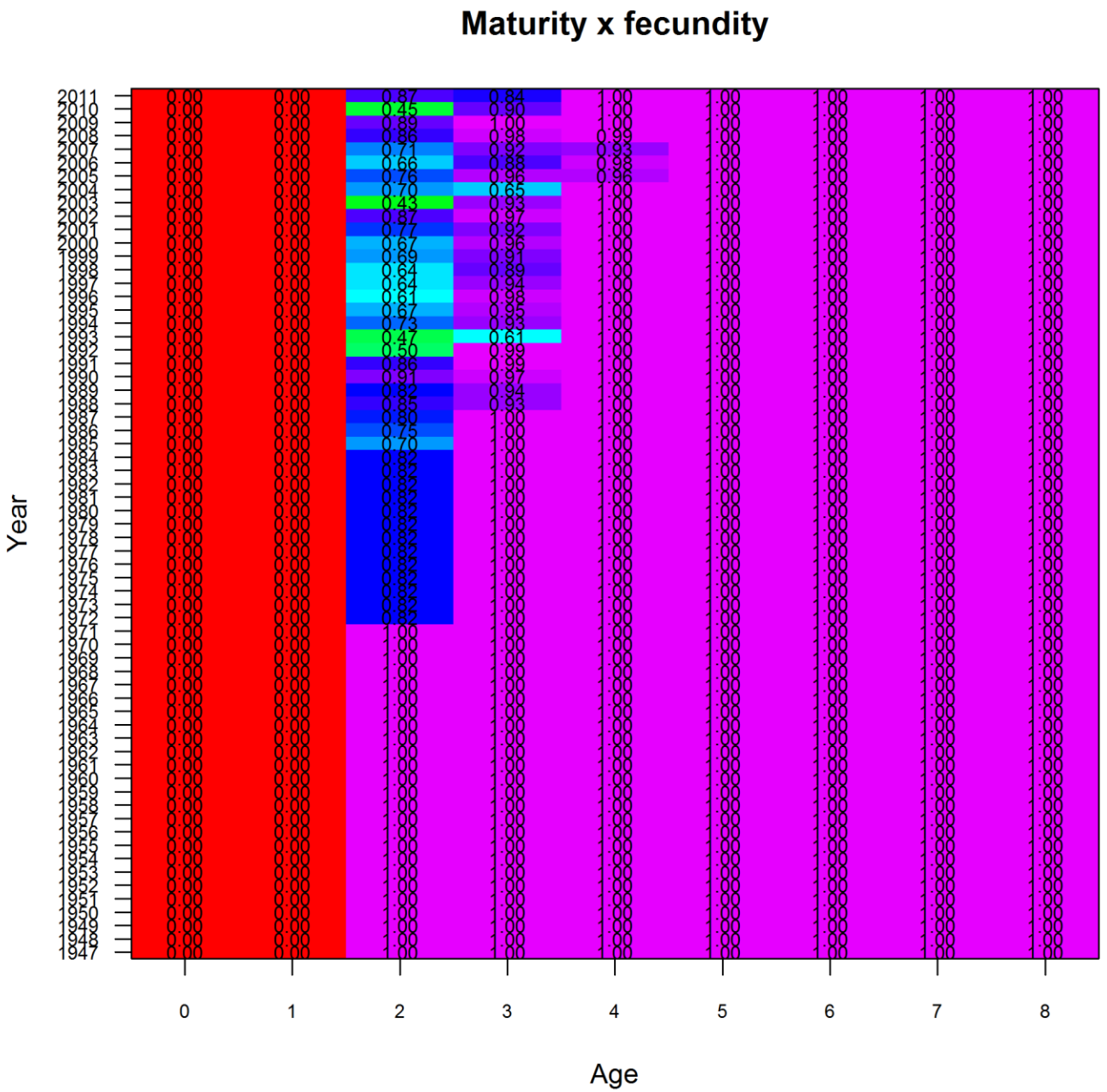
Modeling Maturity and Fecundity in Stock Synthesis

Maturity

Several options to model maturity:

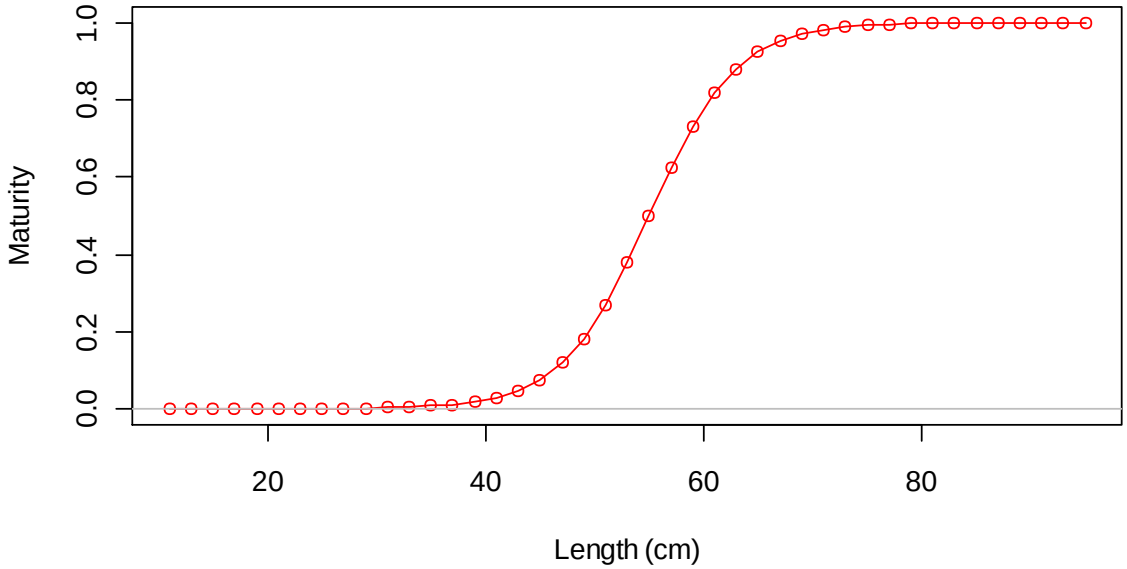
- Logistic function of length
- Logistic function of age
- Input vector of maturity at each age
- Input vector of fecundity at each age (ignore maturity)

Empirical fecundity at age (NS Herring)



More on maturity

- Parameters of logistic are length (or age) at 50% maturity and slope.
- Extra input “first mature age” avoids youngest fish being mature, regardless of size



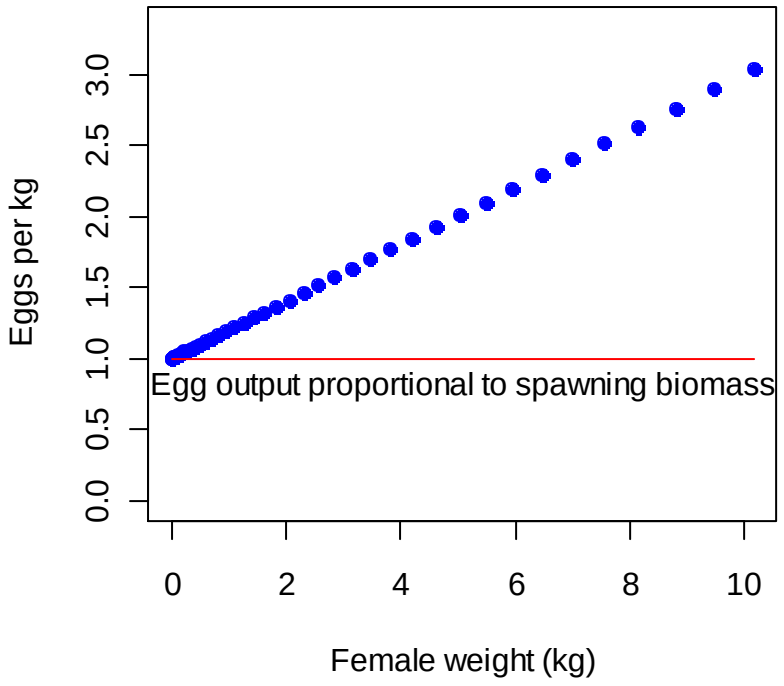
Fecundity

Several options to model fecundity:

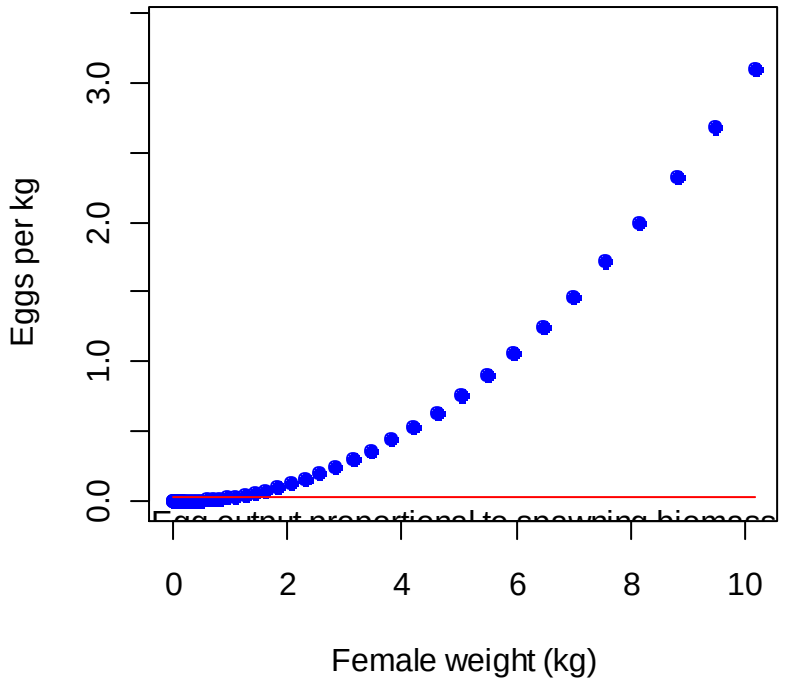
- Fixed vector of fecundity at age
- Function of weight or length
  - fecundity = $W(a+bW)$
  - fecundity = aL^b
  - fecundity = aW^b
- Males can also be included in the calculation of spawning biomass
- Hermaphroditism option available

Fecundity

fecundity = $W(a+bW)$



fecundity = aW^b



Spawning output

- Maturity x Fecundity
- Model tracks numbers at age,
  but maturity, fecundity, and their product
  account for distribution
  of length at each age