Where do we want to go: biological reference points in FLR
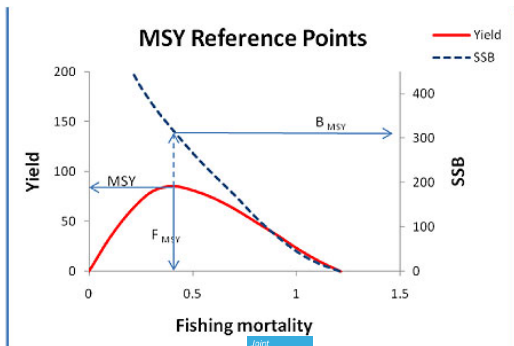
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Biological Reference Points

Management requires targets and limits:

- Where to go
- When to stop

YPR and SPR

In general, reference points from yield-per-recruit (YPR) and spawning-stock-biomass-per-recruit (SPR) analyses are easy to calculate because relatively few data are required; in particular, it is not necessary to obtain stock-recruitment data.
For this reason, YPR and SPR reference points are often used as proxies for other ref- erence points that do require stock and recruitment data

Common Target Reference Points

Fmax

- Consider the long-term yield per recruit, Y/R, as a function of F, for a certain exploitation pattern.
- Fmax is the point of the curve, Y/R against F, where Y/R is maximum. If Y/R is flat topped Fmax can't be estimated. Fmax only indicates the value of F which gives the maximum possible yield per recruit from a cohort during its life, for a given exploitation pattern

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F0.1

- F0.1 is the fishing mortality rate at which the slope of the yield per recruit curve as a function of fishing mortality is 10% of its value at the origin
- F0.1 can be calculated even when the curve is asymptotical or flat-top.
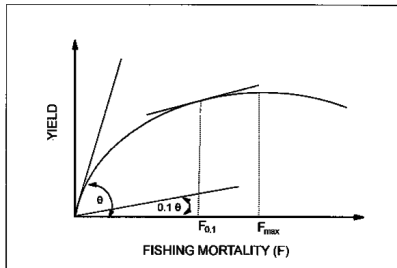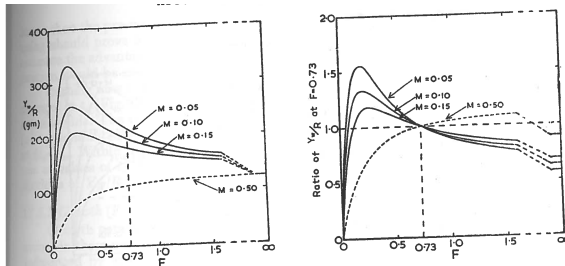
Fmsy

- Fmsy is defined as being the value of F which produces the maximum yield in the long-term. It is necessary to select an S-R relat.ion to estimate FMSY. This point is different from Fmax, if no S-R will be equal to Fmax. The EU CFP mandates stocks to be at the level of Fmsy

YPR sensitivity to change in M

Levels of M in the stock change significantly the YPR curve.

source(Beverton & Holt 1957)

YPR sensitivity to change in max age

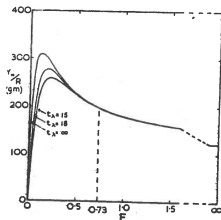Maximum age of fish in the stock affects YPR curve in the peak.

FIG. 17.20 PLAICE: EFFECT OF DIFFERENT VALUES OF MAXIMUM AGE ON YIELD-FISHING MORTALITY CURVES

[Yield per recruit, Y_W/R, as a function of F with $t_{\rho'} = 3.72$ yrs. taking $t_\lambda = 15$, 18 and ∞ yrs. respectively.]
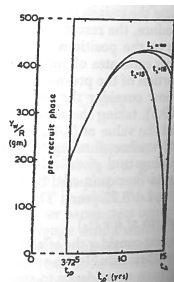
FIG. 17.21 PLAICE: EFFECT OF DIFFERENT VALUES OF MAXIMUM ON YIELD-MESH CURVES

[Yield per recruit, Y_W/R, as a function of $F = 0.73$, taking $t_\lambda = 15$, 18 and ∞ yrs. respec

source(Beverton & Holt 1957)

FLBRP

- From stock assessment results and SR model fit
- let's see how it works in FLR => FLBRP