Summer School in Quantitative Fisheries Stock Assessment

Biological Reference Points

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From Day 1: “The ultimate aim of stock assessment is to provide **biological reference points** to be used as guidelines for the rational management of the fishery (e.g. sustainable harvest levels, such as maximum sustainable yield [MSY], sustainable exploitation rates [fishing mortality], etc.)”

Decision-makers need to have options that permit sustainability, and rewards for choosing them (Norse, 1993).

Through stock assessments, scientists attempt to estimate the amount of fish in a stock and the rate of fishing mortality. A stock assessment produces a series of estimates for stock size and fishing mortality over time.

A biological reference point is a concrete number, a value for stock size or fishing mortality.

Therefore, biological reference points serve as a way to judge estimates coming from stock assessment.

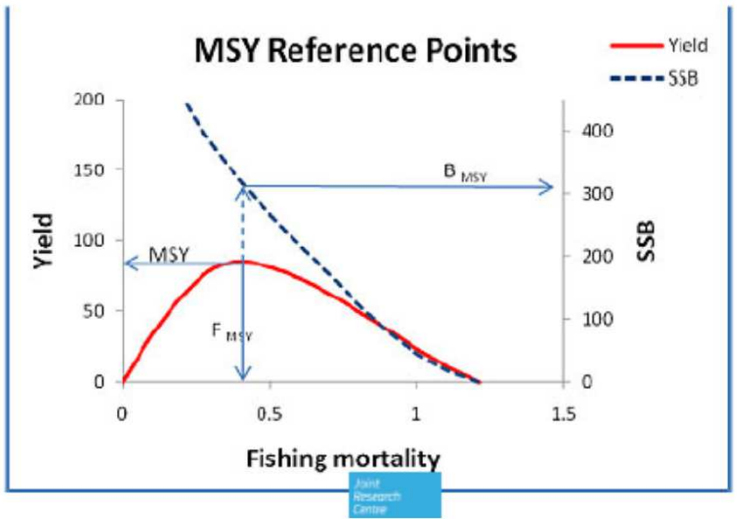
Biological reference points provide quantitative values for targets and thresholds. **Target Reference Points (TRP)** are values for stock size and fishing mortality rate that a manager aims to achieve and maintain.

While targets are levels that managers aim for, thresholds are levels they aim to avoid. Thresholds are also referred to as **Limit Reference Points (LRP).**

Biological Reference Points

Management requires targets and limits:

- Where to go
- When to stop



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F_{MSY}

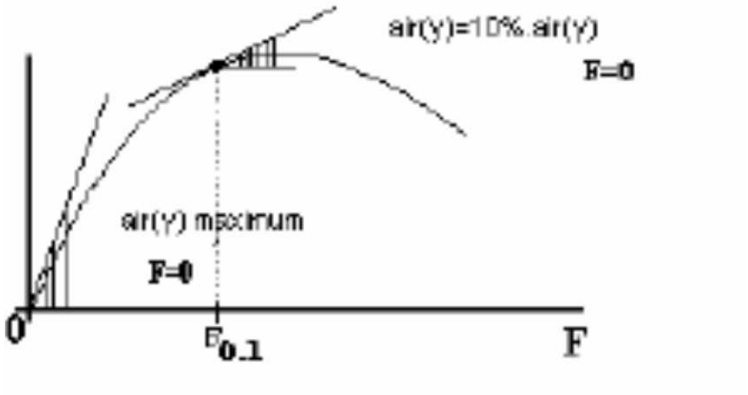
F_{MSY} is defined as being the value of fishing mortality which produces the maximum sustainable yield in the long-term. Both EU CFP and GFCM Mid-term Strategy mandate stocks to be at the level of F_{MSY}.

$F_{0.1}$

$F_{0.1}$ 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.

$F_{0.1}$ can be calculated even when the curve is asymptotical or flat-top.

$F_{0.1}$ is used as a proxy of F_{MSY}



Y/R showing the reference target point $F_{0.1}$

From Cadima E.L. 2003. Fish stock assessment manual. FAO Fish. Tech. Paper n. 393. Rome, FAO. 161 pp.

FLBRP

In FLR ➔ FLBRP

- From stock assessment results
- Let’s have a look and see how it works