

Perspectives on scientific advice in European fisheries: unassessed and data limited stocks (DLS)

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**Workshop:
SUSTAINABLE MANAGEMENT OF MARINE LIVING
RESOURCES**

Article 2.2

To ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels which can produce the **maximum sustainable yield (MSY)**. This exploitation rate shall be achieved by 2015 where possible and, on a progressive, incremental basis at the latest by **2020** for all stocks.

Article 2.4

The CFP shall contribute to the collection of **scientific data**.

From 2009, DCF established for sampling of commercial catches:

- Sampling strata: ***métier*** (group of fishing operations targeting a similar (assemblage of) species, using similar gear, during the same period of the year and/or within the same area and which are characterized by a similar exploitation pattern.).
- Type of sampling: **concurrent** (sampling all or a predefined assemblage of species, simultaneously in a vessel's catches or landings).

Many more stocks with data, but time series still too short (2009-2019)

Data Limited Stocks (DLS)

ICES classifies the stocks into six main categories, based on available data:

1. Stocks with quantitative assessments. **MSY**.
2. Stocks with analytical assessments treated qualitatively. **MSY**.
3. Stocks with reliable stock size indicators. **MSY Proxy**.
4. Stocks with reliable catch time-series. **MSY Proxy**.
5. Landings-only stocks. **PA**.
6. Negligible landings stocks and bycatch. **PA**.

		Fishing pressure				Stock size				
		2016	2017	2018		2017	2018	2019		
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	MSY	✓	✓	✓	Above trigger
Precautionary approach	$F_{pa} F_{lim}$	○	✓	✓	Harvested sustainably	$B_{pa} B_{lim}$	✓	✓	✓	Full reproductive capacity
Management plan	F_{MGT}	✗	✗	✗	Above the range	B_{MGT}	✓	✓	✓	Above trigger

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		Fishing pressure				Stock size					
		2016	2017	2018		2016	2017	2018			
Maximum sustainable yield	F_{MSY}	?	?	?	Unknown	MSY	$B_{trigger}$?	?	?	Unknown
Precautionary approach	$F_{pa} F_{lim}$?	?	?	Unknown	$B_{pa} B_{lim}$?	?	?	Unknown
Management plan	F_{MGT}	?	?	?	Unknown	B_{MGT}		?	?	?	Unknown
Qualitative evaluation	-	?	?	?	Unknown	-		?	?	?	Unknown

MSY reference points used by ICES:

- F_{MSY}** : F expected to give maximum sustainable yield in the long term, so that the long-term probability of $SSB < B_{lim}$ is $\leq 5\%$ when applying the ICES MSY advice rule:

 - $F = F_{MSY}$ (if $SSB \geq MSY B_{trigger}$)
 - $F = F_{MSY} \times SSB / MSY B_{trigger}$ (if $SSB < MSY B_{trigger}$)
- $MSY B_{trigger}$** : a lower bound to the SSB when the stock is fished at F_{MSY} . $MSY B_{trigger} = \text{maximum}(B_{pa}, \text{the } 5^{\text{th}} \text{ percentile of the distribution of SSB when fishing at } F_{MSY})$.

There are four methods approved by ICES for calculation of MSY reference points for category 3 and 4 stocks:

- **Length based indicators (LBI):** A length-based proxy for MSY is $L_{F=M} = 0.75L_c + 0.25L_{inf}$.
- **Mean length Z (MLZ):** from a time-series of mean length data, total mortality rates are estimated in blocks of time as well as the years in which the mortality changed.
- **Length based spawner per recruit (LBSPR):** compares size-based estimates of Z with sized-based YPR reference points (F_{max} or $F_{0.1}$).
- **Surplus Production model in Continuous Time (SPiCT):** just provides estimates of B_{MSY} , then ICES set MSY $B_{trigger}$ at $B_{MSY}/2$.

- CFP 2014 established that MSY exploitation rate shall be achieved by 2020 for all stocks.
- MSY reference points can only be properly calculated for rich-data stocks.
- Two approaches have been developed simultaneously:
 - More and better commercial and scientific data (DCF).
 - Development of new methodologies (both mathematical models and technical protocols) specific for data-limited stocks (ICES).