

vi) Productivity of Cod in Div. 3NO and define MSY reference points (Item 8)

In the medium term, the Fisheries Commission requests the Scientific Council to continue research on the productivity of 3NO Cod and define MSY reference points.

Scientific Council responded:

Scientific Council concluded that there have been major changes in productivity for Div. 3NO cod. During the 1990s sustainable yield was near zero. As an interim F target Scientific Council recommends either $F_{0.1}$ (0.19) or $F_{35\%SPR}$ (0.2) based on long term data. Scientific Council further recommends a level of 180 000 - 185 000 t of SSB as an interim B_{target} .

There have been major changes in productivity for Div. 3NO cod. This has had a major impact on the level of fishing mortality that the population can sustain without decline. The population was in a low productivity period for an extended period of time during the 1990s. During this period sustainable yield was near zero. Current levels of productivity are much higher, although not as high as in the 1960s. Fishing mortality reference points based on average conditions and/or that do not take variation in recruitment into account can result in levels of fishing that produce severe population decline. There is a need to develop fishing mortality reference points that can be updated using only recent data, but that incorporate all components of productivity.

Despite the problem of changing productivity, Scientific Council revised the Div. 3NO reference points approved by the Fisheries Commission and considers as interim reference points proxies based on the yield per recruit (YPR) and spawner per recruit (SPR) using long term data to estimate the reference points. It is recommended that until more information is available: a value of $F_{0.1}$ (0.19) or $F_{35\%}$ (0.20) be considered as a possible F_{target} . These levels of F have a very low probability of being higher than $F_{lim} = F_{max}$ (less than 5%). A possible candidate for B_{target} could be the equilibrium SSB of the proposed F_{target} ($F_{0.1}$ or $F_{35\%}$), which gives a value around 180 000 – 185 000 t. Taking a similar definition for B_{isr} as the ICES MSY $B_{trigger}$, a B_{isr} candidate for Div. 3NO cod could be a value around 120 000 t if a very low probability is taken (less than 5%) or 135 000 t if a low probability is taken (less than 10%). A population which has reached equilibrium when fishing at the proposed F targets has a low probability (5 or 10%) of falling below these levels.