

F0.1 was considered a reasonable proxy for  $F_{MSY}$ , although it can be higher or lower than  $F_{MSY}$  depending on the stock recruitment relationship, which in this case is poorly determined. However given the uncertainties about future recruitment, estimates of biomass base reference points were unreliable. In addition to those uncertainties, the current perception of the stock status was also closely related to the assumptions made about stock structure and migratory behaviour, which remain poorly known. Nonetheless, compared to 2014 the extra data now available do better confirm recent stock increase though the level of increase remains difficult to quantify.  $F_{cur}$  appears to be clearly below  $F_{0.1}$   $F_{cur}/F_{0.1} = 0.34$ . The current status of the stock, and status in 2022 under a F0.1 strategy, relative to B0.1 depends on assumptions made for longer term future recruitment. For medium<sup>1</sup> and low recruitment levels, the stock is already above B0.1, whereas for the high level it is below.

If an F0.1 strategy were to continue to be applied, over the longer term the resource would fluctuate around the true, but unknown value of B0.1 whatever the future recruitment level.

#### ***BFTE- 4. Outlook***

In 2017, the Committee presented short-term projections (2017-2022, **BFTE Figure 5**) using the average recruitment over a six year period (2006-2011) and replacing the last four years (2012-2015) recruitments, which are considered poorly estimated, with that average. According to the base model annual constant catches up to 36,000 t have higher than 60% probability of maintaining F below  $F_{0.1}$  throughout 2022 (**BFTE Table 1**).

Projections are known to be impaired by various sources of uncertainties that have not yet been fully quantified. Due to the limited possibility of improving the quality of the data the Committee does not expect to provide further clarity regarding future recruitment therefore the Kobe matrix is presented only in terms of the probability that F is less than  $F_{0.1}$  (**BFTE Table 1**). If the Committee were to continue the past practice of assuming three different constant recruitment levels, under the medium and low scenarios the stock is already above B0.1, whereas for the high level it is below.

The updated indices of abundance were consistent with the projections for 2016.

#### ***BFTE-5. Effect of current regulations***

The 2011, 2012, and 2013 TACs were set at 12,900 t, 12,900 t, and 13,400 t respectively by Rec. 10-04 and Rec. 12-03, at 13,400 t in 2014 (Rec. 13-07), 16,142 t in 2015 (Rec. 14-04), 19,296 t in 2016 (Rec. 14-04) and 23,655 t in 2017 (Rec. 14-04 and Rec. 16-09). Nevertheless, the reported catch in 2016 exceeded the TAC.

The Committee agreed that a substantial decrease in the catch occurred in the eastern Atlantic and Mediterranean Sea through implementation of the rebuilding plan and through monitoring and enforcement controls.

2017 analyses from the reported catch-at-size and catch-at-age displayed substantial changes in selectivity patterns towards larger fish over the last years for several fleets operating in the Mediterranean Sea or the East Atlantic, partly resulting from the enforcement of minimum size regulations under Rec. 06-05. This also resulted in improved yield-per-recruit levels due to higher survival of juvenile fish in comparison to the early 2000s, meaning that the stock can produce larger yield at any given level of SSB.

An important source of uncertainty originated from the reduction in TAC and size limits which may have caused changes in the fishing strategy that has strongly affected all the index calculations. It is also worth noting that the transfer of quotas from one fisheries to another may also affect stock assessment outcomes, as such transfers have implications for the repartition of the fishing effort and thus for selectivity patterns, which are known to impact the reference points. Therefore, the Committee reiterates the importance to continue effort, through national programmes and GBYP, to improve the quality of currently used abundance indices and obtain robust fisheries-independent indicators. It notes however that necessary decisions regarding management of the stock have often the side effect of adding uncertainties to stock assessment, e.g., by changing fleet behaviour and fisheries selection pattern.

<sup>1</sup> Averages taken over the years 1968-1980/ 1968-2012/1990-2005, for the low medium and high scenarios respectively.