Vedlegg 14/appendix 14

Clarification of the effects of overfishing in 2007 on the TAC for NEA cod for 2008

*Report from a sub-group of the Scientific working group during 36th session of the NRFC upon request from the heads of delegations. The request is **only** to clarify the effects of various levels of catches in 2007 on the TAC for 2008 and onwards.*

IUU(illegal, unregulated and unreported) catches creates considerable problems for fish stock assessment and predictions, and leads to increased uncertainty and hence lower quality of the scientific advice. Unfortunately, this problem has been an inherent part of the stock assessment of NEA cod in recent years. To generate a prognosis as basis for TAC-calculation, assumptions about the catches in the assessment year has to be made. Basically, this can be done by assuming a certain total catch in the assessment year, for instance the TAC. However, in some cases the TAC is considered not to be appropriate basis for such analysis. For NEA cod, ICES has used a so-called $F_{status\ quo}$ projection. This implies an assumption that the same fishing mortality coefficient (F) as calculated for a recent period of years (1-3) is applied also for the assessment year. This approach has been found to produce prognoses, which are better in accordance with reality when considered on a retrospective basis, than the use of TAC. This technique incorporates a possible overfishing of TAC, but also other underlying deficiencies of data and methods.

The use of $F_{status\ quo}$ implies an assumption that the fisheries in the assessment year is carried out in a relatively stable manner compared to a recent period (similar fishing effort, exploitation pattern etc.). If there are reasons to believe that these assumptions are not valid for the assessment year, another approach could be used when giving prognoses and TAC for the coming years. Several intermediate options between a TAC constraint and an $F_{status\ quo}$ approach could be proposed. In the tables below, the effects of several levels of exploitation in 2007, ranging from the agreed TAC (424 000 t.) to the $F_{status\ quo}$ level (530 000 t.) is applied to the assessment made by ICES in June 2007.

The members of the subgroup undertaking these calculations have not yet seen any estimates of the anticipated total catch for 2007.

Table 1. Level of TAC for the three coming years for different catch levels in 2007, and fishing according to the catch rule during 2008-10. All numbers are in '000 tonnes.

Prognosed catch in 2007 ('000 tonnes)	TAC		
	2008	2009	2010
424 (= TAC)	440	480	516
435	437	478	514
445	434	476	512
466	428	471	508
488	423	466	505
509	417	461	501
530 (ICES progn. based on Fsq)	409	455	496

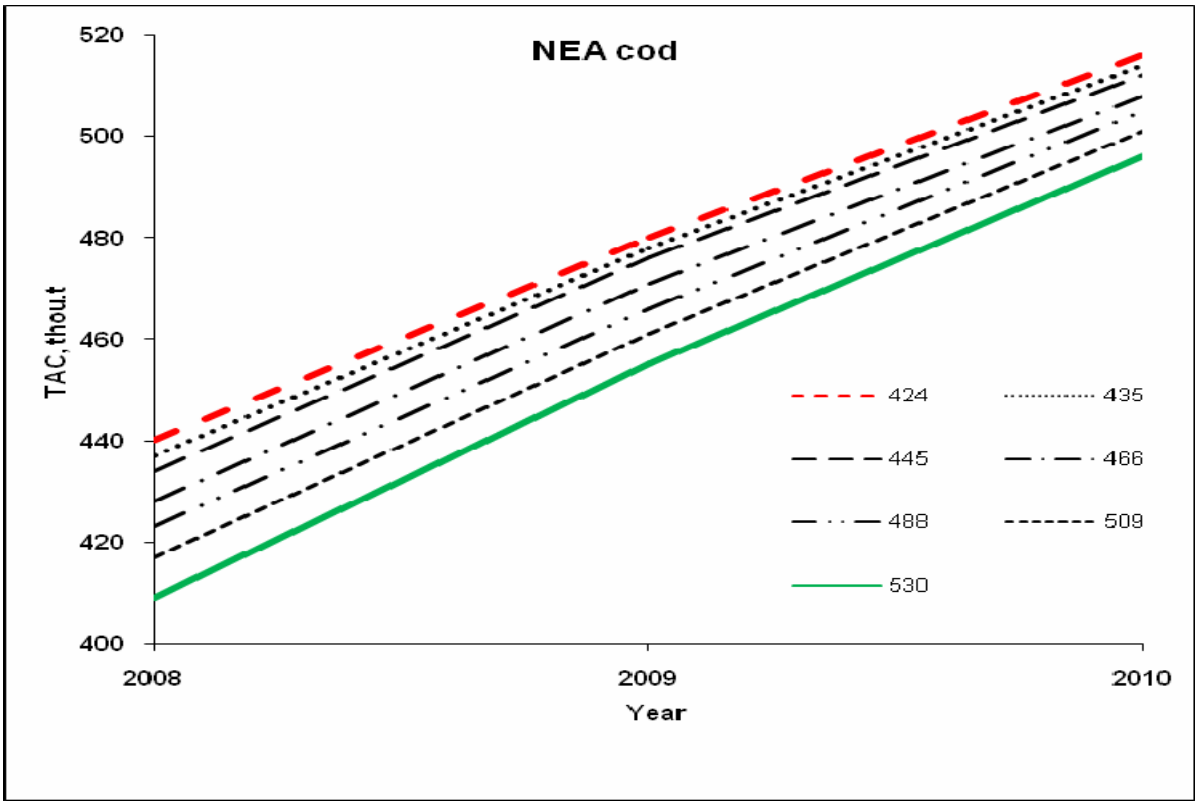

Figure 1. TAC in 2008-2010 as a function of catch in 2007, when fishing according to the catch rule is implied for the following years.

Table 2. Level of Total stock size for the four coming years for different catch levels in 2007, and fishing according to the catch rule during 2008-10. All numbers are in '000 tonnes.

Prognosed catch in 2007 ('000 tonnes)	TSB			
	2008	2009	2010	2011
424 (= TAC)	1640	1777	1929	2070
435	1628	1767	1920	2063
445	1616	1757	1911	2055
466	1592	1736	1894	2042
488	1568	1715	1877	2027
509	1544	1695	1860	2014
530 (ICES progn. based on Fsq)	1513	1668	1838	1996

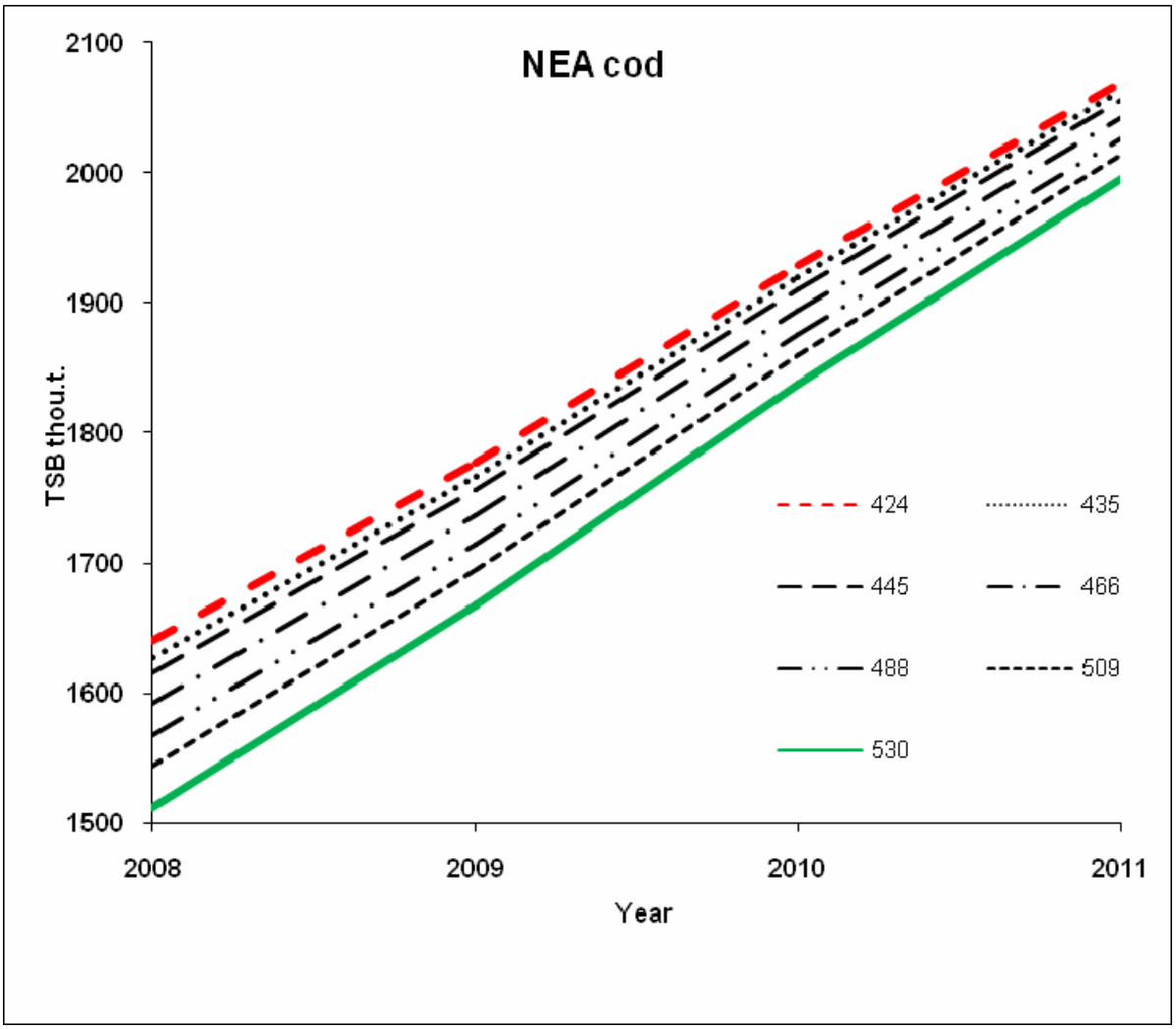

Figure 2 Total stock biomass in 2008-2010 as a function of catch in 2007, when fishing according to the catch rule is implied for the following years.

Table 3. Level of Spawning stock size for the four coming years for different catch levels in 2007, and fishing according to the catch rule during 2008-10. All numbers are in '000 tonnes.

	SSB			
Prognosed catch in 2007 ('000 tonnes)	**2008**	**2009**	**2010**	**2011**
424 (= TAC)	620	694	790	893
435	611	686	782	887
445	603	678	775	881
466	586	661	761	869
488	569	645	746	855
509	553	629	732	843
530 (ICES progn. based on Fsq)	531	608	713	828

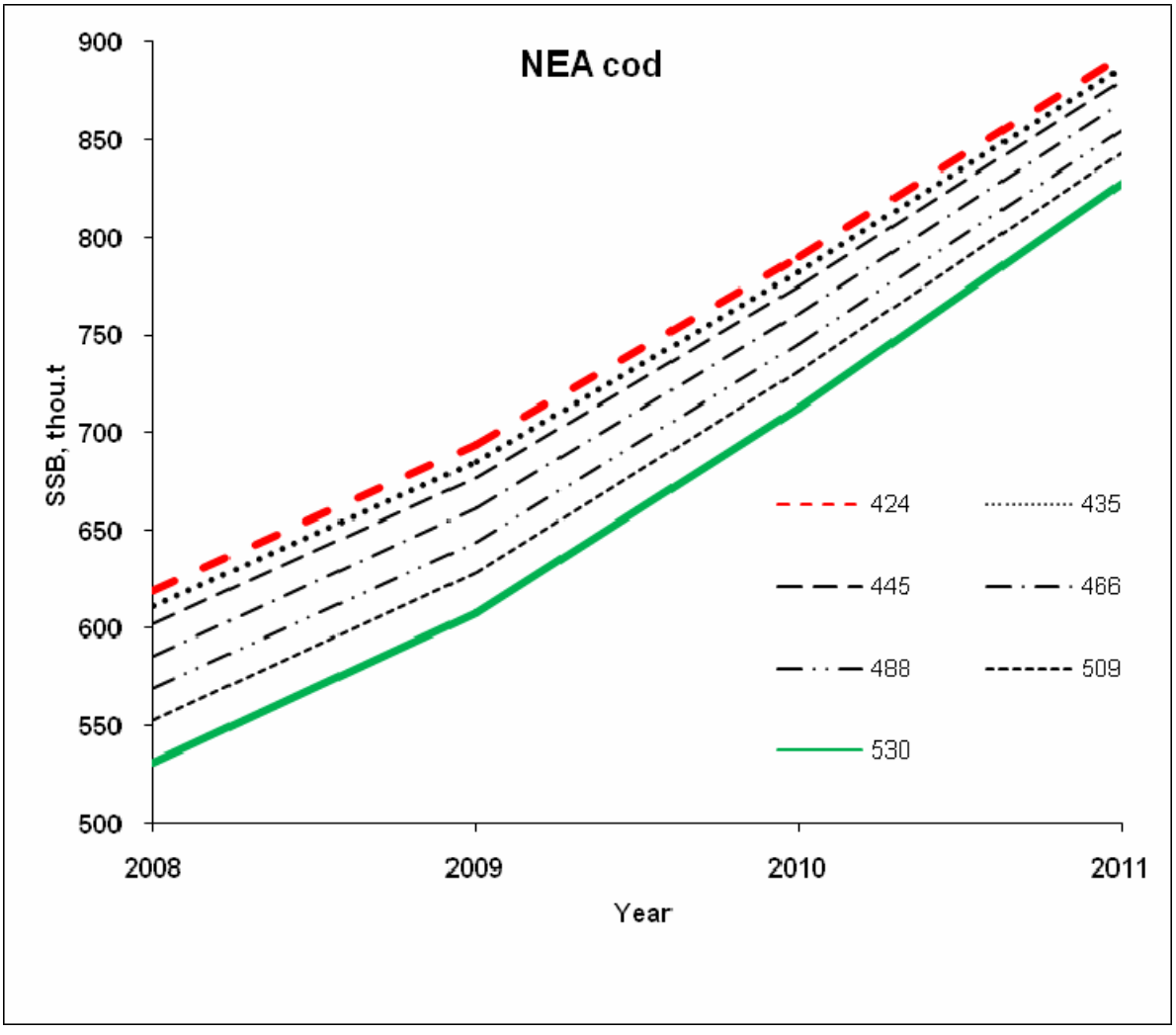

Figure 3 Spawning stock biomass in 2008-2010 as a function of catch in 2007, when fishing according to the catch rule is implied for the following years.