Cod in Divisions 3NO Advice June 2015

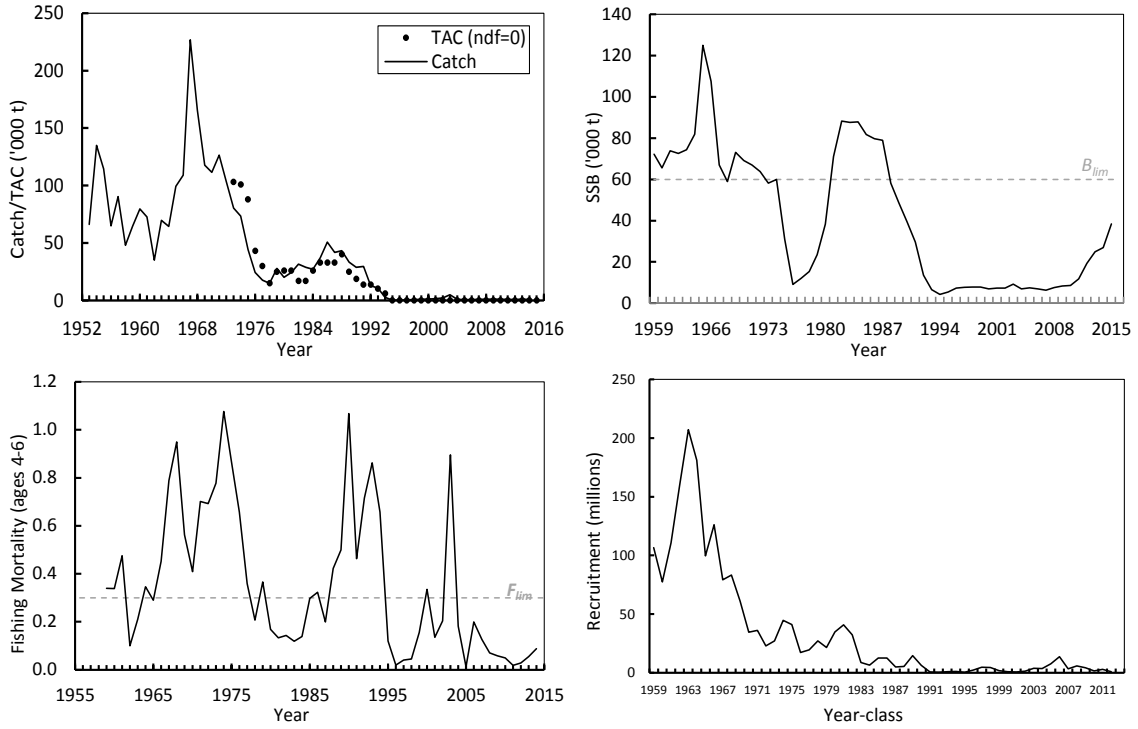
Recommendation for 2016 – 2018
No directed fishing on cod in 2016 to 2018 to allow for continued stock rebuilding. By-catches of cod in fisheries targeting other species should be kept at the lowest possible level. Projections based on either F_{SQ} or F=0 suggest a >99% probability that the stock will remain below B_{lim} by 2018.

Management objectives
General convention objective are applied in conjunction with an Interim Conservation Plan and Rebuilding Strategy adopted in 2011 (NAFO/FC Doc. 11/22). The long-term objective of this plan is to achieve and to maintain the spawning stock biomass in the "safe zone" (PA framework, FC Doc. 04/18), and at or near B_{msy}.

Convention objectives	*Status*	*Comment/consideration*
Restore to or maintain at B_{msy}		$B < B_{lim}$
Eliminate overfishing		F is very low, $F < F_{lim}$ (0.3)
Apply Precautionary Approach		B_{lim} and F_{lim} established, no directed fishery.
Minimise harmful impacts on living marine resources and ecosystems		No directed fishery
Preserve marine biodiversity		Cannot be evaluated

OK
Intermediate
Not accomplished
Unknown

Management unit
The stock occurs in Divs. 3NO, with fish occupying shallow parts of the bank, particularly the southeast shoal area (Div. 3N) in summer and on the slopes of the bank in winter.



Stock status
The spawning biomass has increased considerably over the past five years but the 2015 estimate of 38,454 t still represents only 64% of B_{lim} (60,000 t). This increase in biomass has been driven by the relatively strong 2005 and 2006 year classes and by fishing mortality values that are amongst the lowest in the time series (F<0.1) and well below F_{lim} (0.3). More recent year classes do not appear as strong and hence despite the low fishing mortality, the increasing trend in SSB may not persist beyond the short term.

Reference points

B_{lim}: 60 000 t of spawning biomass (SC, 1999)

F_{lim} (=F_{msy}): 0.3 (SC, 2011).

Projections

SSB is projected to remain below B_{lim} for both scenarios, increasing initially but then decreasing.

Fishing Mortality	Yield		P ($B_{year} < B_{lim}$)			P($B_{2018} > B_{2015}$)
	2016	2017	2016	2017	2018	
$F = 0$	-	-	>99%	>99%	>99%	46%
F_{sq}	1348	1178	>99%	>99%	>99%	22%

Assessment

A sequential population analysis model was used, and the results were consistent with the previous assessment. Input data from 2011-2014 comes from research surveys and commercial removals (STACFIS 2015).

The next assessment is planned for 2018.

Human impact

Mainly bycatch related fishery mortality has been documented. Other sources (e.g. pollution, shipping, oil-industry) are undocumented.

Biology and Environmental interactions

Productivity of this stock was above average during the warm 1960s. During the cold 1990s, productivity was very low and surplus production was near zero.

Fishery

A moratorium was implemented in 1994. Catches since that time are by-catch in other fisheries.

Recent catch estimates and TACs are as follows:

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
TAC	ndf	ndf	ndf	ndf	ndf	ndf	ndf	ndf	ndf	ndf
STATLANT 21	0.3	0.7	0.7	0.6	0.8	0.8	0.7	1.1	0.7	
STACFIS	0.6	0.8	0.9	1.1	0.9	0.8	0.7	1.1	0.7	

ndf : No directed fishery

Effects of the fishery on the ecosystem

There is no directed fishery.

Special comments

As part of the Divs. 3NO Cod Conservation and Rebuilding Strategy "The Fisheries Commission shall request the Scientific Council to review in detail the limit reference point when the Spawning Stock Biomass has reached 30 000 t" (FC Doc. 15/01). As the stock has reached this level, SC notes that multiple stock-recruit points are required at SSB levels greater than 30,000 t prior to re-evaluation of this reference point as productivity at these levels of biomass is not well known.

Sources of information

SCR Docs. 15/7, 34; SCS Docs. 15-4, 5, 6, 7, 8, 9, 10