Northern short-finned squid in SA 3+4

Advice June 2016 for 2017-2019

Recommendation for 2017 - 2019
During 2015, the northern stock component remained in a state of low productivity. Therefore, the SC advice is a TAC of no more than 34 000 tons/yr.

Management objectives

No explicit management objectives have been defined by Fisheries Commission. General Convention objectives (NAFO/GC Doc 08/3) are applied.

Convention objectives	Status	Comment/consideration
Restore to or maintain at B_{msy}	○	B_{msy} inappropriate given life history
Eliminate overfishing	○	Not quantifiable
Apply Precautionary Approach	●	Reference points based on productivity level
Minimize harmful impacts on living marine resources and ecosystems	●	VME closures in effect, no bycatch in SA 3 jig fishery, no SA 4 directed trawl fishery since 1999
Preserve marine biological biodiversity	○	Cannot be evaluated

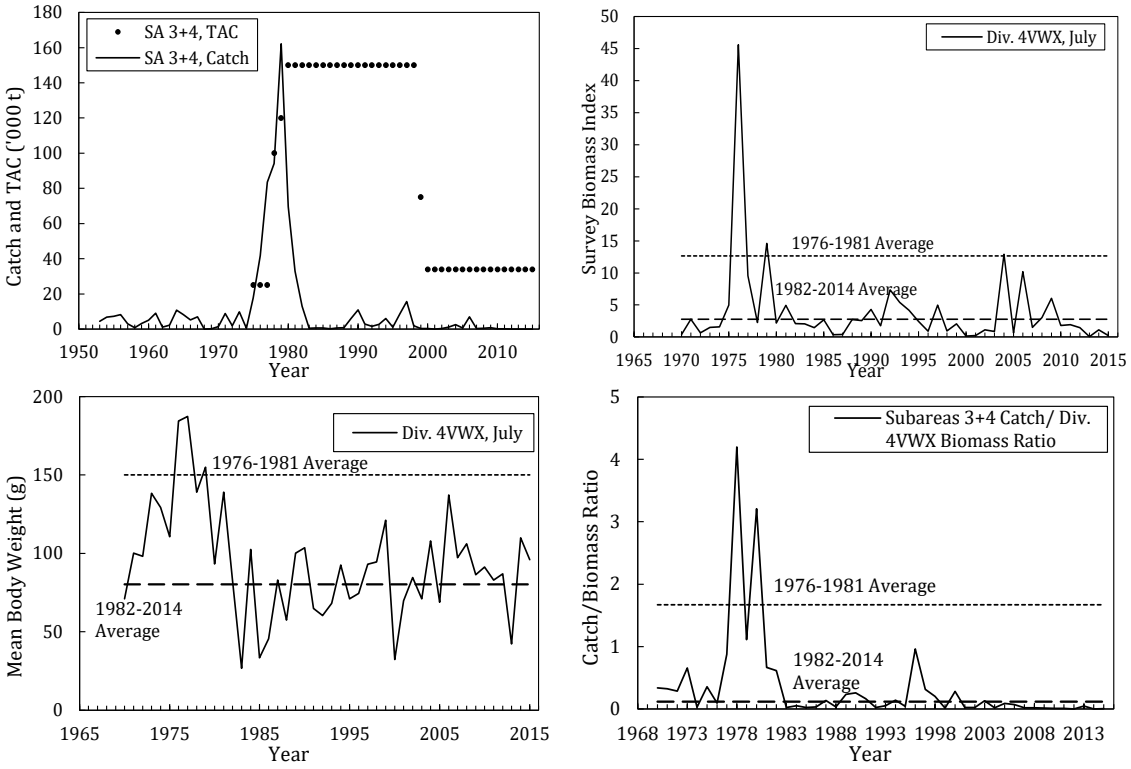
● OK ● Intermediate ● Not accomplished ○ Unknown

Management unit

The species is assumed to constitute a single stock throughout its range in the Northwest Atlantic Ocean, from Newfoundland to Florida, including Subareas 2-6, but is managed as northern (Subareas 3+4) and southern stock components (Subareas 5+6) by NAFO and the USA, respectively. However, fishery removals in relation to the biomass levels of each stock component affect one another.

Stock status

During 2015, the northern stock component remained in a state of low productivity and the fishing mortality index was at the lowest level in the time series.



Reference points

Conventional reference points are inappropriate for squid stocks because of their unique life history. Two reference states, "high productivity" or "low productivity" states are defined by trends in stock biomass and mean body weight. Low productivity periods have an estimated potential annual yield of 19 000 tons to 34 000 tons. The potential yields of a high productivity state have not been determined**.**

Projections

Projections were not possible because, like most squid stocks, recruitment is highly variable and cannot currently be predicted.

Assessment

Assessment data were from the Division 4VWX July bottom trawl surveys and the catches in Subareas 3+4 (STACFIS Report 2016). The next assessment will occur in 2019. The assessment consisted of a comparison of average survey biomass indices and mean body weights, during high (1976 – 1981) and low (1982 – 2014) productivity periods, with the values of these indices during. Fishing mortality indices (catch/Div. 4VWX biomass index) were used to assess exploitation. Uncertainty in the assessment is high because of the species' sub-annual lifespan and the fact that recruitment, occurrence of the species in the survey area, and growth rates are highly variable and greatly influenced by oceanographic conditions.

Human impacts

Fishery related mortality in SA 3+4 has been very low since 2006. Other sources (e.g. pollution, shipping, oil-industry) are undocumented.

Biology and Environmental Interactions

Recruitment for this species is highly variable, and the species is semelparous (spawns once during its lifetime then dies). A sufficient numbers of spawners must survive the fishery (spawner escapement) each year in order to ensure a high probability of successful recruitment during the subsequent year, to reduce the risk of stock collapse. Although environmental factors play a role in the recruitment process, such factors cannot be controlled or predicted. Ideally, fishing intensity should be such that spawner escapement is set at some target level which is above a minimum spawning stock biomass (SSBmin) threshold. Without the ability to estimate stock size in real-time during the fishing season, as well as before and after the fishing season, the TAC should be set at a conservative level in order to avoid recruitment overfishing.

Ocean climate effects have a strong influence on the distribution, growth rates, and recruitment of Northern shortfin squid. For example, variation in the latitudinal position of the Shelf Slope Front is related to efficiency of downstream dispersal by the Gulf Stream and increased survival of young stages.

This species is both an important prey and predator in the ecosystem. The natural mortality of this prey species, which is consumed by a wide range of cetacean, pinniped, avian, invertebrate, and finfish predators, is very high. Small Northern shortfin squid prey primarily upon crustaceans and larger squid prey primarily upon finfish, and during the fall, on smaller shortfin squid.

Fisheries

Prior to the mid-1980s, international bottom trawl and midwater trawl fleets participated in directed fisheries in Subareas 3, 4 and 5+6. Since 1999, there has been no directed fishery in Subarea 4, but some squid is taken as bycatch in the Canadian small-mesh bottom trawl fishery for silver hake. Directed fisheries currently consist of a Canadian inshore jig fishery in Subarea 3 and a small-mesh bottom trawl fishery in Subareas 5+6. There is no bycatch in the jig fishery. Fisheries that occur in Subareas 3+4 and Subareas 5+6 are regulated by two separate quotas (TACs).

Recent catch estimates and TACs are as follows:

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TAC SA 3+4	34	34	34	34	34	34	34	34	34	34
STATLANT21 SA 3+4	0.2	0.5	0.7	0.1	0.2	<0.1	0.1[1]	nd[2]	0.1	
STACFIS SA 3+4	0.2[3]	0.5	0.7	0.1[3]	0.1[3]	<0.1[3]	<0.1[3]	<0.1[3]	<0.1[3]	

[1] CA-Maritimes Region did not submit data during 2013-2015.
[2] No data submitted by CA-Maritimes or Scotia-Fundy Regions, but CA-Newfoundland catch was zero.
[3] Includes amounts, ranging from 0.001-18 t, reported as Unspecified Squid from Subarea 4.

Effects of the fishery on the ecosystem

The effects of the directed fisheries on the ecosystem are unknown, but are generally limited to June through November (depending on fishery Subarea) as a result of the species' migration patterns on and off the continental shelves. There has not been a directed fishery in Subarea 4 since 1999 and catches from the inshore jig fishery in Subarea 3, which is highly dependent on inshore squid availability, has been low since 2007.

Special comments

The assessment of this stock component may not reflect stock conditions during the three years for which management advice is given because the species has a sub-annual lifespan and the most recent year of data used in the assessment is always for two years prior.

Sources of information

SCR Doc. 98/59,75; 99/66; 06/45; 16/34