Thorny Skate in Divisions 3LNO and Subdiv. 3Ps   Advice June 2018 for 2019-2020

Recommendation for 2019-2020
The stock has been stable at recent catch levels (approximately 4 060 t, 2013 - 2017) however, given the low resilience to fishing mortality and higher historic stock levels, Scientific Council advises no increase in catches.

Management objectives

No explicit management plan or management objectives defined by the Commission. General convention objectives (NAFO/GC Doc 08/3) are applied. Advice is based on survey indices and catch trends in relation to estimates of recruitment.

Convention objectives	Status	Comment/consideration		
Restore to or maintain at B_{msy}	🟡	B_{msy} unknown, stock at low level	🟢	OK
Eliminate overfishing	🟡	F_{msy} unknown, fishing mortality is low	🟡	Intermediate
Apply Precautionary Approach	🟢	B_{lim} defined from survey indices	🔴	Not accomplished
Minimise harmful impacts on living marine resources and ecosystems	🟡	No specific measures, general VME closures in effect	⚪	Unknown
Preserve marine biodiversity	⚪	Cannot be evaluated		

Management unit

The management unit is confined to NAFO Div. 3LNO, which is a portion of the stock that is distributed in NAFO Div. 3LNO and Subdivision 3Ps.

Stock status

The stock is currently above B_{lim}. The probability that the current biomass is above B_{lim} is >95%. Total survey biomass in Divs 3LNOPs has remained stable since 2007. Recruitment in 2017 was above average. Fishing mortality is currently low.
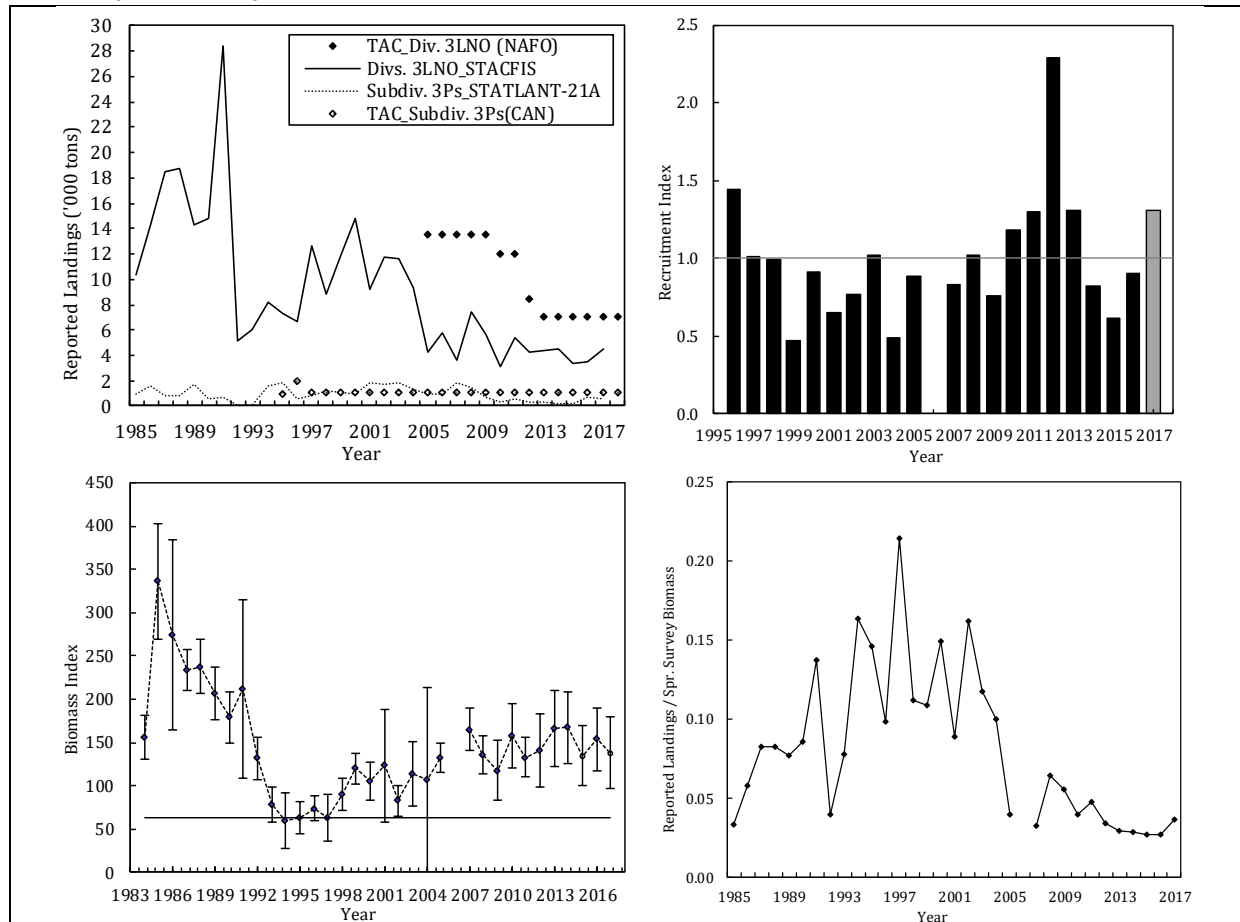
Reference points
B_{lim} defined from survey indices as B_{loss}; NAFO 2015

Assessment
Based upon a qualitative evaluation of stock biomass trends and recruitment indices, the assessment is considered data limited and as such associated with a relatively high uncertainty. Input data are research survey indices and fishery data. The next full assessment of this stock is planned for 2020.

Human impact
Mainly fishery related mortality has been documented. Mortality from other human sources (e.g. pollution, shipping, oil-industry) are undocumented.

Biology and Environmental interactions
Thorny Skate are found over a broad range of depths (down to 840 m) and bottom temperatures (-1.7 - 11.5ºC). Thorny Skate feed on a wide variety of prey species, mostly on crustaceans and fish. Recent studies have found that polychaete worms and shrimp dominate the diet of Thorny Skates in Div. 3LNO, while hyperiids, Snow Crabs, Sand Lance, and euphausiids are also important prey items.

The Grand Bank (3LNO) EPU is currently experiencing low productivity conditions and biomass has declined across multiple trophic levels and stocks since 2014.

Fishery
Thorny Skate is caught in directed gillnet, trawl and long-line fisheries. In directed Thorny Skate fisheries, Atlantic Cod, Monkfish, American Plaice and other species are landed as bycatch. In turn, Thorny Skate are also caught as bycatch in gillnet, trawl and long-line fisheries directing for other species. The fishery in NAFO division 3LNO is regulated by quota.

Recent catch estimates and TACs ('000 t) are:

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Div. 3LNO:										
TAC	13.5	12	12	8.5	7	7	7	7	7	7
STATLANT 21	5.7	5.4	5.5	4.3	4.4	4.5	3.3	3.5	4.2	
STACFIS	5.6	3.1	5.4	4.3	4.4	4.5	3.4	3.5	4.5	

Effects of the fishery on the ecosystem
No specific information is available. General impacts of fishing gears on the ecosystem should be considered.

Special comments
The life history characteristics of Thorny Skate result in low rates of population growth and are thought to lead to low resilience to fishing mortality.

Sources of Information
SCR Doc. 14/23, 15/40, 18/13,17,18,27; SCS Doc. 18/07,08,13,15.