

Yellowtail flounder in Divisions 3LNO










Advice June 2018 for 2019-2021

Recommendation for 2019 to 2021

At a fishing mortality of 85% F_{msy} , catches of 24 900 t, 22 500 t, and 21 100 t in 2019 to 2021, respectively, have less than a 30% risk of exceeding F_{lim} . At these yields the stock is projected to have an 82% probability of remaining above B_{msy} .

Management objectives

No explicit management plan or management objectives are defined by the Commission. General convention objectives (NAFO/GC Doc 08/3) are applied. Advice is provided in the context of the Precautionary Approach Framework (NAFO/FC 04/18).

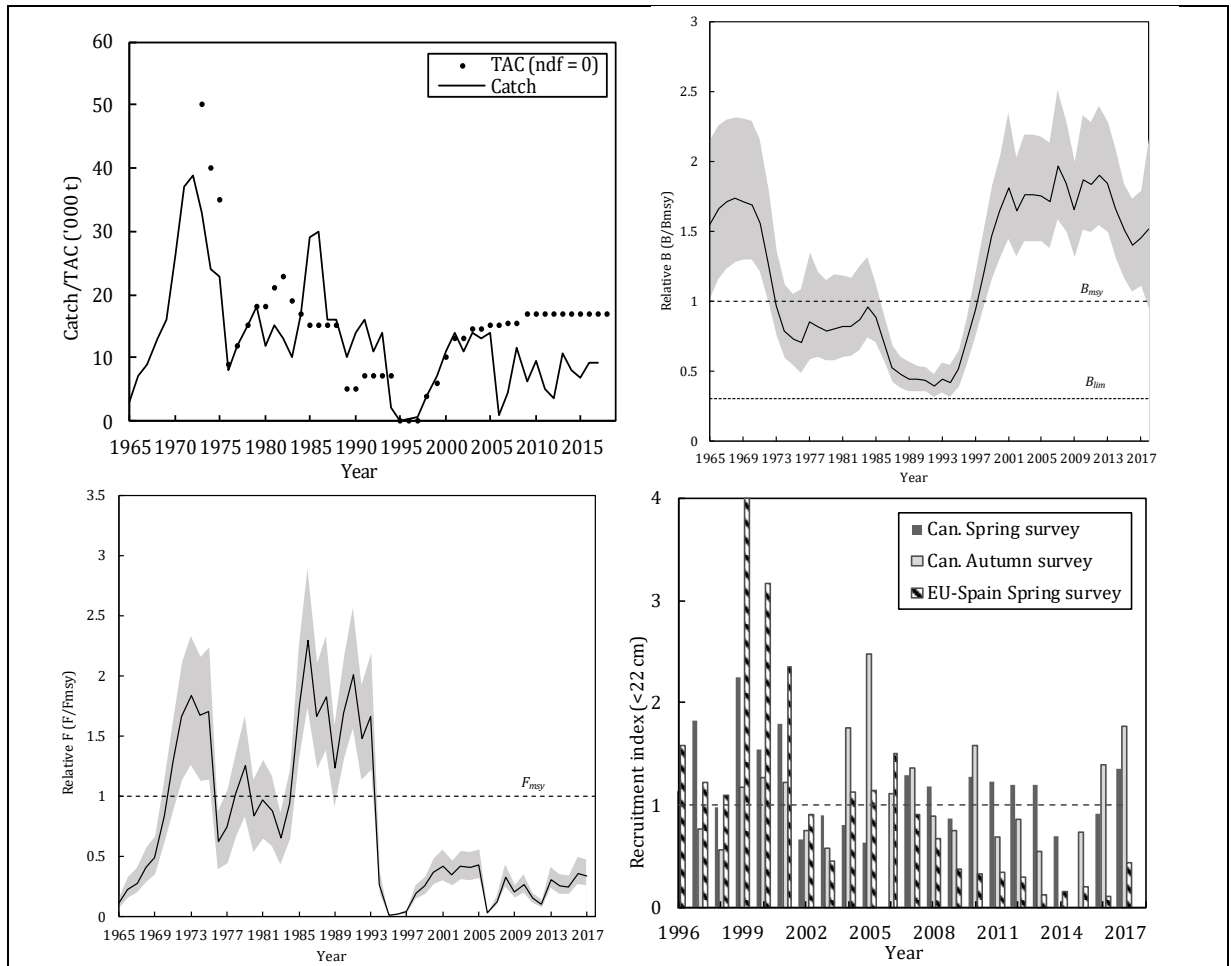
<i>Convention objectives</i>	<i>Status</i>	<i>Comment/consideration</i>		
Restore to or maintain at B_{msy}		$B > B_{msy}$		OK
Eliminate overfishing		$F < F_{lim}$		Intermediate
Apply Precautionary Approach		Stock in the safe zone of PA framework		Not accomplished
Minimise harmful impacts on living marine resources and ecosystems		By-catch regulations in place for moratorium stocks, general VME closures in effect		Unknown
Preserve marine biodiversity		Cannot be evaluated		

Management unit

The stock occurs in Divisions 3LNO, mainly concentrated on the southern Grand Bank and is recruited from the Southeast Shoal area nursery ground.

Stock status

The stock size has steadily increased since 1994 and is presently 1.5 times B_{msy} ($B_{msy}=87.63$ Kt). There is very low (<1%) risk of the stock being below B_{msy} or F being above F_{msy} . Recent recruitment appears higher than average.



Reference points

B_{lim} is 30% B_{msy} and F_{lim} is F_{msy} (NAFO 2004 p 133).



Projections

Projections with catch in 2018 = avg catch 2013-2017 (8 800 t)		
Year	Yield ('000t) median	Projected relative Biomass(B/B_{msy}) median (90% CL)
$F_{status\ quo} = 0.07$		
2019	9.14	1.56 (1.07, 2.1)
2020	9.30	1.59 (1.09, 2.14)
2021	9.41	1.62 (1.11, 2.17)
2022		1.63 (1.12, 2.19)
$2/3 F_{MSY} = 0.14$		
2019	19.52	1.56 (1.07, 2.1)
2020	18.41	1.47 (0.99, 2)
2021	17.77	1.42 (0.93, 1.96)
2022		1.39 (0.89, 1.93)
$85\% F_{MSY} = 0.18$		
2019	24.88	1.56 (1.07, 2.1)
2020	22.49	1.41 (0.94, 1.94)
2021	21.09	1.32 (0.85, 1.86)
2022		1.27 (0.77, 1.82)
$F_{MSY} = 0.21$		
2019	29.28	1.56 (1.07, 2.1)
2020	25.50	1.36 (0.9, 1.88)
2021	23.37	1.25 (0.77, 1.79)
2022		1.17 (0.67, 1.73)

	Yield ('000t)			$P(F > F_{lim})$			$P(B > B_{lim})$				$P(B > B_{msy})$				$P(B_{2022} > B_{2018})$
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2022	2019	2020	2021	2022	
$F_{status\ quo} = 0.07$	9.14	9.30	9.41	<1%	<1%	<1%	<1%	<1%	<1%	<1%	3%	3%	3%	2%	62%
$2/3 F_{MSY} = 0.14$	19.52	18.41	17.77	6%	7%	8%	<1%	<1%	<1%	<1%	3%	5%	7%	10%	37%
$85\% F_{MSY} = 0.18$	24.88	22.49	21.09	25%	25%	27%	<1%	<1%	<1%	<1%	3%	7%	12%	18%	28%
$F_{MSY} = 0.21$	29.28	25.50	23.37	50%	50%	50%	<1%	<1%	<1%	<1%	3%	9%	18%	27%	22%

Projections were conducted assuming catch in 2018 to be the average of that in 2013-2017, followed by constant fishing mortality from 2019-2021 at either $F_{status\ quo}$, $2/3 F_{msy}$, $85\% F_{msy}$, and F_{msy} . Fishing at F_{msy} would first lead to a considerable yield in 2019, but yields are then projected to decline in the medium term with catch at $2/3 F_{msy}$, $85\% F_{msy}$, and F_{msy} . The risk of biomass being below B_{lim} is less than 1% in all years for each scenario. The probability that biomass in 2022 is greater than B_{2018} is 0.62, 0.37, 0.28 and 0.22 for $F_{status\ quo}$, $2/3 F_{msy}$, $85\% F_{msy}$, and F_{msy} respectively.

Assessment

A Bayesian surplus production model was used for the first time and results were comparable to the previous assessment. Input data comes from research surveys and the fishery.

The next assessment is planned for 2021.

Human impact

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

Biology and Environmental interactions

As stock size increased from the low level in the mid-90s, the stock expanded northward and continues to occupy this wider distribution. This expansion of the stock coincided with warmer temperatures; temperatures continue to warm, and will likely not limit the stock distribution in the near future.

Despite the increase in stock size observed since the mid-90s, the average length at which 50% of fish are mature has been lower for both males and females in the recent period. There also seems to have been a slight downward trend in weight at length since 1996. The cause of these changes is unknown.

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

Fishery

Yellowtail flounder is caught in a directed trawl fishery and as by-catch in other trawl fisheries. The fishery is regulated by quota and minimum size restrictions. Catches in recent years have been low due to industry-related factors. American plaice and cod are taken as by-catch in the yellowtail fishery. There is a 15% by-catch restriction on American plaice and a 4% limit on cod.

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

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
TAC	17	17	17	17	17	17	17	17	17	17
STATLANT 21	5.5	9.1	5.2	3.1	10.7	8.0	6.7	8.3	9.2	
STACFIS	6.2	9.4	5.2	3.1	10.7	8.0	6.9	9.3	9.2	

Effects of the fishery on the ecosystem

Fishing intensity on yellowtail flounder has impacts on Div. 3NO cod and Div. 3LNO American plaice through by-catch. General impacts of fishing gears on the ecosystem should also be considered. Areas within Divs. 3LNO have been closed to protect sponge and coral.

Special comments

Catch of yellowtail flounder has been below TAC in recent years. Management decisions on this stock should also take into consideration impacts on other fisheries. Increased catch of yellowtail flounder may increase by-catch of Div. 3NO cod and Div. 3LNO American plaice.

Sources of information

SCR 11/34, 18/012, 18/017, 18/036, 18/038, 18/048; SCS 18/05, 18/06, 18/07, 18/08, 18/13, 18/14, 18/15; NAFO/GC Doc 08/3 NAFO/FC 04/18.