

Greater silver smelt (*Argentina silus*) in subareas 1, 2, and 4, and in Division 3.a (Northeast Arctic, North Sea, Skagerrak and Kattegat)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, catches should be no more than 10 270 tonnes in each of the years 2020 and 2021. Discarding is known to take place, but is negligible.

Stock development over time

Catches from directed fisheries in subareas 1 and 2 and have been relatively stable since 2007. There has been a marked increase in catches in Subarea 4 in the last three years, and these are all bycatch in other fisheries. Currently, very minor catches are coming from Subarea 3. The acoustic index from Subarea 2 showed an increase between 2012 and 2016, but has been decreasing since then.

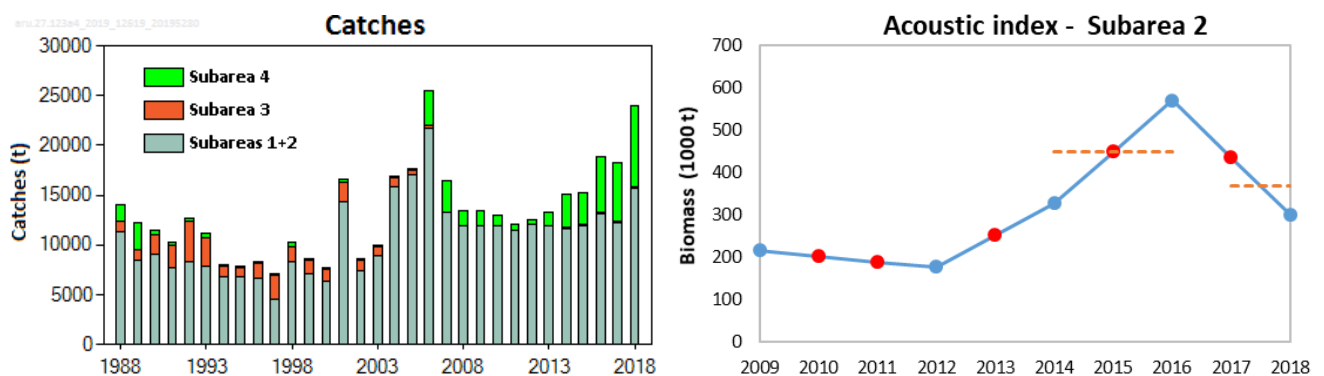


Figure 1 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. Summary of the stock assessment. Left: Total catches in tonnes. Right: Norwegian acoustic biomass index from Subarea 2. The blue dots are measurements and red dots are an interpolation between observations. Dashed orange lines indicate the average of the biomass index for 2014–2016 and for 2017–2018.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is below $F_{MSY proxy}$; no reference points for stock size have been defined for this stock.

Table 1 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. State of the stock and fishery relative to reference points. The status evaluation is based on a reference point proxy for F_{MSY} , using the length-based indicator method (ICES, 2019; see Figure 2).

		Fishing pressure				Stock size				
		2016	2017	2018		2016	2017	2018		
Maximum sustainable yield	$F_{MSY proxy}$	✓	✓	✓	Below	MSY	?	?	?	Undefined
Precautionary approach	$F_{pa} F_{lim}$	✓	✓	✓	Below possible reference points	$B_{pa} B_{lim}$?	?	?	Undefined
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—	—	Not applicable
Qualitative evaluation	-	—	—	—	Not applicable	-	↗	?	↘	Decreasing

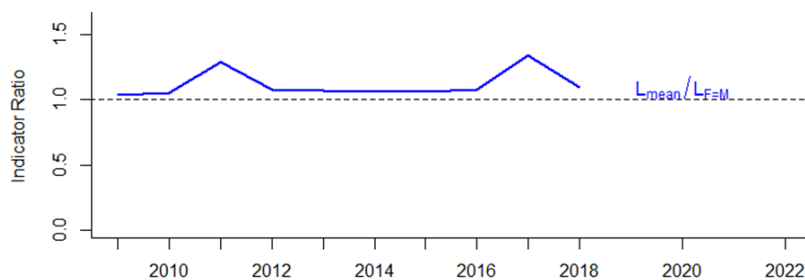


Figure 2 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. Index ratio $L_{mean}/L_{F=M}$ from the length-based indicator method used for the evaluation of the exploitation status in subareas 1 and 2. The exploitation status is below the $F_{MSY proxy}$ when the index ratio value is higher than 1.

Catch scenarios

The ICES framework for category 3 stocks was applied (ICES, 2012). The Norwegian acoustic survey in Subarea 2 was used as the index for the stock development. The advice is based on a comparison of the two latest index values (index A) with the three preceding values (index B), multiplied by the advised catch for years 2018–2019. For years where index values are not available, the values are obtained by interpolation (Figure 1). The index is estimated to have decreased by less than 20% and thus the uncertainty cap was not applied. The precautionary buffer was applied in 2015. While there is no sign of overexploitation, there is no evidence that the stock is increasing significantly; the precautionary buffer was thus applied again. Discarding is considered negligible.

Table 2 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. The basis for the catch scenarios [^].

Index A (2017–2018)		369 099
Index B (2014–2016)		449 852
Index ratio (A/B)		0.82
Uncertainty cap	Not applied	-
Advised catch for 2018 and 2019		15 656 tonnes
Discard rate		Negligible
Precautionary buffer	Applied	0.8
Catch advice *		10 270 tonnes
% Advice change **		-34.4%

[^] The figures in the table are rounded. Calculations were done with unrounded inputs and computed values may not match exactly when calculated using the rounded figures in the table.

* [advice for 2018–2019] × [index ratio] × [precautionary buffer].

** Advice value for 2020 and 2021 relative to advice value for 2018 and 2019.

The catch advice has decreased because of a decrease in the index ratio, and the application of the precautionary buffer.

Basis of the advice

Table 3 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. The basis of the advice.

Advice basis	Precautionary approach.
Management plan	ICES is not aware of any agreed precautionary management plan for greater silver smelt in these areas.

Quality of the assessment

While all landings in Subarea 4 are treated as greater silver smelt, samples from the fisheries indicate that around 10% of the catches may be lesser silver smelt (*Argentina sphyraena*). ICES does not advise on the latter species.

The acoustic survey time-series in Subarea 2 is considered the best stock indicator available, and although it is short and intermittent it is used as the basis for the advice. Missing survey values increase uncertainty in the assessment of survey trends. The use of interpolated values tends to dampen changes (positive or negative) in the index ratio. The Norwegian shrimp survey in Subarea 4 and Division 3.a showed an increase in biomass from 2010 to 2015, with the biomass remaining relatively stable since then. However, the representativeness of the Norwegian shrimp survey trend for the whole stock is unknown.

Issues relevant for the advice

The stock structure of greater silver smelt is uncertain. The subareas 1, 2, and 4 and Division 3.a stock unit was defined in 2015 when ICES revised the advice units for the greater silver smelt. ICES provides separate advice for three other stock units (Subarea 14 and Division 5.a; divisions 5.b and 6.a; and subareas 7–10 and 12 and Division 6.b).

Bycatch of greater silver smelt in the industrial fisheries in Subarea 4 and Division 3.a has been increasing rapidly since 2012.

Reference points

Table 4 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{\text{trigger_proxy}}$	Not defined		
	$F_{\text{MSY_proxy}}$	33.25 cm	Expected mean length of catch above L_{mean} when $F = M$	ICES (2019)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	SSB_{mgt}	Not defined		
	F_{mgt}	Not defined		

Basis of the assessment

Table 5 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. Basis of the assessment and advice.

ICES stock data category	3 (ICES, 2018).
Assessment type	Survey trends-based assessment (ICES, 2019).
Input data	Acoustic index from the Norwegian Sea Continental Slope (NOR) deep sea fish cruise in spring survey in Subarea 2.
Discards and bycatch	Discarding is considered to be negligible.
Indicators	Length-based indicator.
Other information	Trawl biomass index from the Norwegian shrimp survey in Subarea 4 and Division 3.a.
Working group	Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources (WGDEEP).

Information from stakeholders

There is no additional available information.

History of the advice, catch, and management

Table 6 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice*	Catch corresponding to advice	Official landings	TAC EU in subareas 1 and 2	TAC EU in subareas 3 and 4	TAC Norway in subareas 1 and 2
2003	No fisheries unless data collection on (by)catch; no expansion unless proven to be sustainable	-	9969	-	1566	
2004	Biennial	-	17183	-	1566	
2005	No fisheries unless accompanied by programmes to collect data on both target and bycatch fish	-	17595	116	5310	
2006	Biennial	-	25496	116	5310	
2007	The fishery should not be allowed to expand unless it can be shown that it is sustainable	-	16374	116	5311	12000
2008	Biennial	-	13424	116	5311	12000
2009	Same advice as in 2007	-	13495	116	5311	12000
2010	Biennial	-	12898	111	5099	12000
2011	The fishery should not be allowed to expand, and a reduction in catches should be considered	-	12064	103	4691	12000
2012	No new advice, same as in 2011		12485	95	4316	12000
2013	Reduce catches by 10%		13230	90	4316	12000
2014	No new advice, same as in 2013		15057	90	4316	12000
2015	No new advice, same as in 2013		15236	90	1028	13047
2016	Precautionary approach with application of PA buffer	13047	18893	90	1028	13047
2017	Same as in 2016	13047	17833	90	1028	13047
2018	Precautionary approach with application of PA buffer	≤ 15656	23861	90	1234	13770
2019	Same as in 2018	≤ 15656		90	1234	13770
2020	Precautionary approach	≤ 10270				
2021	Same as 2020	≤ 10270				

* Until 2014 the advice was combined for subareas 1, 2, 4, 6, 7, 8, 9, 10, 12, and 14, and divisions 3.a and 5.b.

History of the catch and landings

There are no reported catches in the NEAFC regulatory area.

Table 7 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. Catch distribution by fleet in 2018 as estimated by ICES.

Catch (2018)	Landings	Discards
23 905 tonnes	100% semi-pelagic trawl	44
	23 861 tonnes	

Table 8 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. History of commercial catch, landings and discards; the ICES estimated values are presented by area. All weights are in tonnes.

Year	Landings Subareas 1 and 2	Landings Division 3.a	Landings Subarea 4	Discards in subareas 3 and 4	Total catch
1988	11351	1089	1656		14096
1989	8390	1174	2612		12176
1990	9120	1882	439		11441
1991	7741	2221	333		10295
1992	8234	4198	236		12668
1993	7913	2830	445		11188
1994	6807	1108	38		7953
1995	6775	1061	21		7857
1996	6604	1548	111		8263
1997	4463	2700	2		7165
1998	8261	1589	427		10277
1999	7163	1422	11		8596
2000	6293	1316	45		7654
2001	14369	1918	262		16549
2002	7407	1098	167		8672
2003	8917	960	72		9969
2004	15796	911	110		16817
2005	17093	470	32		17595
2006	21685	324	3487		25496
2007	13273	0	3101		16374
2008	11876	0	1548		13424
2009	11929	0	1566		13495
2010	11854	0	1044		12898
2011	11476	0	588		12064
2012	12134	0	351		12485
2013	11979	0	1251		13230
2014	11747	0	3310	7	15064
2015	12049	23	3164		15236
2016	13122	102	5669		18893
2017	12322	3	5508	389	18222
2018*	15832	1	8028	44	23905

* Preliminary.

Summary of the assessment

Table 9 Greater silver smelt in subareas 1, 2, and 4, and in Division 3.a. Assessment summary from the Norwegian acoustic biomass index from Subarea 2. Weights are in tonnes.

Year	Biomass index	Catches
1988		14096
1989		12176
1990		11441
1991		10295
1992		12668
1993		11188
1994		7953
1995		7857
1996		8263
1997		7165
1998		10277
1999		8596
2000		7654
2001		16549
2002		8672
2003		9969
2004		16817
2005		17595
2006		25496
2007		16374
2008		13424
2009	216783	13495
2010*	202476	12898
2011*	189705	12064
2012	177897	12485
2013*	253020	13230
2014	328143	15064
2015*	449852	15236
2016	571561	18893
2017*	436586	18222
2018	301611	23905

*Numbers in italics are interpolated values.

Sources and references

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ICES. 2019. Working Group on the Biology and Assessment of Deep-sea Fisheries Resources (WGDEEP). ICES Scientific Reports. 1:21. 988 pp. <http://doi.org/10.17895/ices.pub.5262>

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