ICES Advice on fishing opportunities, catch, and effort
Arctic Ocean, Barents Sea, Celtic Seas, Greater North Sea,
and Norwegian Sea ecoregions
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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 MSY approach is applied, catches should be no more than 9 499 tonnes in each of the years 2024 and 2025. All catches are assumed to be landed.

ICES advice on conservation aspects

ICES has not identified any conservation aspects.

Stock development over time

Fishing pressure on the stock is below the $F_{MSY\ proxy}$, and the stock size index is above $I_{trigger}$.
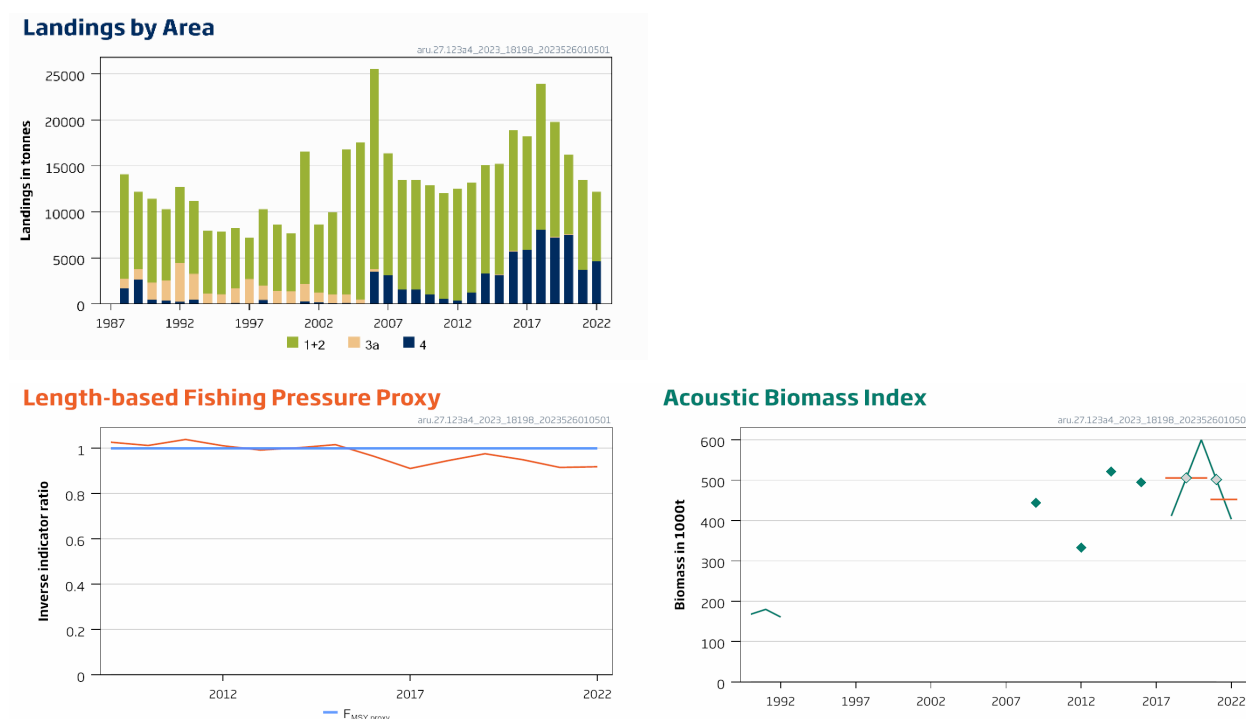

Figure 1 Greater silver smelt in subareas 1, 2, and 4 and in Division 3.a. Summary of the stock assessment. Top left: Total landings in tonnes by area. Bottom left: Indicator ratio $L_{F=M}/L_{mean}$ (inverse of the indicator ratio, *f*) from the length-based indicator (LBI) method is used for the evaluation of the exploitation status in subareas 1 and 2. The proxy fishing pressure is less than that corresponding to the FMSY proxy ($L_{F=M}$) when the indicator ratio value is lower than 1 (shown by the horizontal blue line). Right: Norwegian acoustic biomass index from Subarea 2. The blue dots are measurements, and the red dots are an interpolation between observations. Dashed lines indicate the average index values of the respective year range used to calculate the advice.

Conservation status

ICES is not aware of any information on stock/species-specific conservation status.

Catch scenarios

ICES framework for category 3 stocks was applied (rfb rule, method 2.1, ICES, 2022). The biomass trend derived from the Norwegian acoustic slope survey was used as the index for the stock development. The advice is based on the recent advised catches (2023), multiplied by the ratio of the mean of the last two index values (index A) and the mean of the three preceding values (index B), a ratio of observed mean length in the catch relative to the target mean length, a biomass safeguard, and a precautionary multiplier. The stability clause was not applied since the change from the previous advice was between +20% or −30%. The discard rate is considered negligible.

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

Previous catch advice A$_y$ (2023)		10 271 tonnes
Stock biomass trend		
Index A (2021, 2022)		450 000 tonnes
Index B (2018, 2019, 2020)		510 000 tonnes
r: Index ratio (A/B)		0.89
Fishing pressure proxy		
Mean catch length (L$_{mean}$ = L$_{2022}$)		37 cm
MSY proxy length (L$_{F=M}$)		34 cm
f: multiplier for relative mean length in catches (L$_{2022}$/L$_{F=M}$)		1.09
Biomass safeguard		
Last index value (I$_{2022}$)		400 000 tonnes
Index trigger value (I$_{trigger}$ = I$_{loss}$ × 1.4)		230 000 tonnes
b: multiplier for index relative to trigger min{I$_{2022}$/I$_{trigger}$, 1}		1
Precautionary multiplier to maintain biomass above B$_{lim}$ with 95% probability		
m: multiplier (generic multiplier based on life history)		0.95
Stability clause (+20%/−30% compared to A$_y$, only applied if b ≥ 1)	Not applied	
Discard rate		Considered negligible
Catch advice for 2024 and 2025**		9 499 tonnes
% advice change^		−7.5 %

* 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.
** Formula [A$_y$ × r × f × b × m].
^ Advice value for 2024 and 2025 relative to the advice value for 2022 and 2023 (10 271 tonnes).

The catch advice has decreased due to the implementation of the rfb rule and a change of index used.

Basis of the advice

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

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

Quality of the assessment

At the benchmark in 2020 (ICES, 2021), a SPiCT assessment was examined but was not considered representative of the absolute level of biomass. Application of the rfb rule has required interpolation of acoustic biomass index values. The acoustic survey is run every second year (ICES, 2023b).

Issues relevant for the advice

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 lesser silver smelt.

Bycatch of greater silver smelt in the industrial fisheries in Subarea 4 and Division 3.a increased rapidly between 2012 and 2020, when almost half of the total catches of this stock were taken as bycatch in these industrial fisheries. Since 2020, these catches have decreased again (Figure 1). Managers should be aware that this ICES advice relates to all catches from this stock.

This stock is classified as Category 4 in the NEAFC categorization of deep-sea species/stocks. This implies that fisheries are primarily restricted to coastal state exclusive economic zones (EEZs); therefore, management measures are not taken by NEAFC unless complementary to coastal state conservation and management measures (NEAFC, 2016).

Reference points

Table 3   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	$I_{trigger}$	230 000	$I_{loss} \times 1.4$; I_{loss} defined as the lowest observed biomass from the acoustic survey index.	ICES (2023b)
	$F_{MSY\ proxy}$	$L_{mean}/L_{F=M} = 1$	Relative value from LBI analysis, assuming $M/k = 1.5$. $L_{F=M}$ is based on L_c (length at 50% of modal abundance).	ICES (2021)

Basis of the assessment

Table 4   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, 2023a)
Assessment type	Biomass trends-based assessment (ICES, 2023b)
Input data	Biomass estimates using an acoustic index from the Norwegian Continental Slope Deep Sea Survey in spring in Subarea 2 (G5678). Growth parameters: $k = 0.12$ years^{-1}, $L_{inf} = 44.65$ cm. Length data from the target fisheries in the Norwegian Sea (ICES, 2023b).
Discards and bycatch	Discarding is considered to be negligible
Indicators	None
Other information	Benchmarked in 2020 (ICES, 2021)
Working group	Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources (WGDEEP)

History of the advice, catch, and management

Table 5   Greater silver smelt in subareas 1, 2, and 4 and in Division 3.a. ICES advice and official landings. Weights are in tonnes.

Year	ICES advice*	Catch corresponding to advice	TAC EU in subareas 1 and 2	TAC EU in subareas 3 and 4	TAC Norway in subareas 1 and 2	Official landings
2003	No fisheries unless data collection on (by)catch; no expansion unless proven to be sustainable	-	-	1 566		9 969
2004	Biennial	-	-	1 566		16 817
2005	No fisheries unless accompanied by programmes to collect data on both target and bycatch fish	-	116	5 310		17 595
2006	Biennial	-	116	5 310		25 496
2007	The fishery should not be allowed to expand unless it can be shown that it is sustainable	-	116	5 311	12 000	16 374
2008	Biennial	-	116	5 311	12 000	13 424
2009	Same advice as in 2007	-	116	5 311	12 000	13 495
2010	Biennial	-	111	5 099	12 000	12 898
2011	The fishery should not be allowed to expand, and a reduction in catches should be considered	-	103	4 691	12 000	12 064
2012	No new advice, same as in 2011		95	4 316	12 000	12 485
2013	Reduce catches by 10%		90	4 316	12 000	13 229
2014	No new advice, same as in 2013		90	4 316	12 000	15 069

Year	ICES advice*	Catch corresponding to advice	TAC EU in subareas 1 and 2	TAC EU in subareas 3 and 4	TAC Norway in subareas 1 and 2	Official landings
2015	No new advice, same as in 2013		90	1 028	13 047	15 236
2016	Precautionary approach with application of PA buffer	13 047	90	1 028	13 047	18 917
2017	Same as in 2016	13 047	90	1 028	13 047	18 223
2018	Precautionary approach with application of PA buffer	≤ 15 656	90	1 234	13 770	23902
2019	Same as in 2018	≤ 15 656	90	1 234	13 770	19 777
2020	Precautionary approach	≤ 10 270	90	1 234	9 033	16 129
2021	Same as in 2020	≤ 10 270	34	796	9 033	13 271
2022	Precautionary approach	≤ 10 271	9**	199***	7 603	12 126
2023	Precautionary approach, same as in 2022	≤ 10 271	34**	796***	7 603	
2024	MSY approach	≤ 9 499				
2025	MSY approach, same as in 2024	≤ 9 499				

* 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.
** EU TAC in UK and international waters.
*** EU TAC in UK and EU waters of Subarea 4 and EU waters of Subarea 3.

History of the catch and landings

There are no reported catches in the NEAFC regulatory area.

Table 6   Greater silver smelt in subareas 1, 2, and 4 and in Division 3.a. Catch distribution by fleet in 2022 as estimated by ICES.

Catch	Landings		Discards
12 184 tonnes	100% trawl		58 tonnes
	12 126 tonnes		

Table 7   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	Total catch	Discards in subareas 3 and 4
1988	1 1351	1 089	1 656	14 096	
1989	8 390	1 174	2 612	12 176	
1990	9 120	1 882	439	11 441	
1991	7 741	2 221	333	10 295	
1992	8 234	4 198	236	12 668	
1993	7 913	2 830	445	11 188	
1994	6 807	1 108	38	7 953	
1995	6 775	1 061	21	7 857	
1996	6 604	1 548	111	8 263	
1997	4 463	2 700	2	7 165	
1998	8 261	1 589	427	10 277	
1999	7 163	1 422	11	8 596	
2000	6 293	1 316	45	7 654	
2001	14 369	1 918	262	16 549	
2002	7 407	1 098	167	8 672	
2003	8 937	960	72	9 969	
2004	15 796	911	110	16 817	
2005	17 093	470	32	17 595	
2006	21 685	324	3 487	25 496	
2007	13 273	0	3 101	16 374	
2008	11 876	0	1 548	13 424	
2009	11 929	0	1 566	13 495	
2010	11 854	0	1 044	12 898	
2011	11 476	0	588	12 064	
2012	12 134	0	351	12 485	
2013	11 978	0	1 251	13 229	

Year	Landings Subareas 1 and 2	Landings Division 3.a	Landings Subarea 4	Total catch	Discards in subareas 3 and 4
2014	11 752	3	3 314	15 069	7
2015	12 049	23	3 164	15 236	
2016	13 122	102	5 693	18 917	
2017	12 322	4	5 896	18 223	389
2018	15 832	4	8 067	23 902	44
2019	12 501	66	7 210	19 777	105
2020	8 705	7	7 417	16 248	119
2021	9 706	0	3 565	13 440	169
2022*	7 550	0	4 576	12 184	58

* Preliminary.
** Discard data is not available prior to 2014.

Summary of the assessment

Table 8   Greater silver smelt in subareas 1, 2, and 4 and in Division 3.a. Assessment summary. All weights are in tonnes.

Year	Acoustic biomass index	Length-based fishing pressure proxy ($L_{F=M}/L_{mean}$)	ICES landings	ICES discards
1988			14 096	
1989			12 176	
1990	168 000		11 441	
1991	180 000		10 295	
1992	161 000		12 668	
1993			11 188	
1994			7 953	
1995			7 857	
1996			8 263	
1997			7 165	
1998			10 277	
1999			8 596	
2000			7 654	
2001			16 549	
2002			8 672	
2003			9 969	
2004			16 817	
2005			17 595	
2006			25 496	
2007			16 374	
2008			13 424	
2009	443 886	1.03	13 495	
2010		1.01	12 898	
2011		1.04	12 064	
2012	333 013	1.01	12 485	
2013		0.99	13 229	
2014	521 049	1.00	15 062	7
2015		1.02	15 236	
2016	494 604	0.97	18 917	24
2017		0.91	17 834	389
2018	411 335	0.95	23 858	44
2019	505 843*	0.98	19 672	105
2020	600 351	0.95	16 129	119
2021	501 813*	0.92	13 271	169
2022	403 275	0.92	12 126	58

* Interpolated value.

Sources and references

ICES. 2021. Benchmark Workshop of Greater silver smelt (WKGSS). ICES Scientific Reports. 3:5. 482 pp. https://doi.org/10.17895/ices.pub.5986

ICES. 2022. ICES technical guidance for harvest control rules and stock assessments for stocks in categories 2 and 3. *In* Report of ICES Advisory Committee, 2022. ICES Advice 2022, Section 16.4.11.

https://doi.org/10.17895/ices.advice.19801564

ICES. 2023a. Advice on fishing opportunities. *In* Report of the ICES Advisory Committee, 2023. ICES Advice 2023, Section 1.1.1. https://doi.org/10.17895/ices.advice.22240624

ICES. 2023b. Working Group on the Biology and Assessment of Deep-sea Fisheries Resources (WGDEEP). ICES Scientific Reports. 5:43. http://doi.org/10.17895/ices.pub.22691596

NEAFC. 2016. The NEAFC approach to conservation and management of deep-sea species and categorization of deep-sea species/stocks. Adopted at the 35th Annual Meeting, November 2016. https://www.neafc.org/system/files/NEAFC_approach_to_DSS_conservation-and-management_Nov16.pdf

Download the stock assessment data and figures

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