Stock Annex: Greater Silver Smelt (*Argentina silus*) in Subareas 7, 8, 9, 10 and 12, and Division 6b ((Irish Sea, West of Ireland, Porcupine Bank, Eastern and Western English Channel, Bay of Biscay, Portuguese Waters, Azores Grounds and Northeast Atlantic South, North of Azores and North Ireland)

Stock	Greater Silver Smelt (*Argentina silus*) in Subareas 7, 8, 9, 10 and 12, and Division 6b (aru.27.6b7_1012)
Working Group	Working Group on the Biology and Assessment of Deep-sea Fisheries Resources (WGDEEP)
Created:	24 March 2010
Authors:	Elvar H. Hallfredsson and Lise Helen Ofstad
Last revised:	April 2021
Main revision:	Change in stock definition in 2015
Last revised by:	WGDEEP 2021, Lise Heggebakken and Elvar H. Hallfredsson

A. General

A.1. Stock definition

The stock definitions for greater silver smelt in 2010 was unclear and further research asked for. At the WGDEEP 2014 it was suggested that unit arg-oth should be further split into advisory units as fishing grounds are sufficiently isolated (WD, WGDEEP2014). This change was implemented at the WGDEEP meeting in 2015. Greater silver smelt was from 2015 divided into four managements units by ICES areas;

- aru.27.123a4 in ICES areas 1, 2, 3a and 4;
- aru.27.5a14 in ICES areas 5a and 14;
- aru.27.5b6a in ICES areas 5b and 6a;
- aru.27.6b7–1012 in ICES areas 6b, 7-10 and 12.

The first three stocks were benchmarked in 2020, while aru.27.6b7_1012 has not been benchmarked.

A.2. Fishery

A.2.1 General description

The fisheries from this area is very minor and there are no directed fisheries.

Landings from this area are reported from 1966 to 2020. Landings increased until 2002 to 4662 tonnes then declined again to low levels of less than a ton in 2016. Landings from 2006 until 2020 have been less than 76 tonnes. The main landings have been from Subareas 6b and 7, with peak mainly due to fisheries by Ireland in 2000 to 2003 (Figure 1).

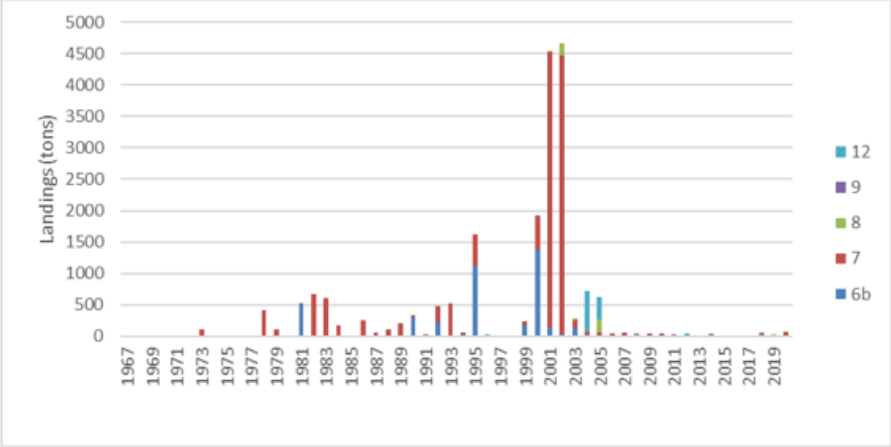

Figure 1: Total landings from 1966-2020 of Greater silver smelt in 6b,7,8,9,10 and 12

A.2.2 Fishery management regulations

The EU introduced TAC management in 2003, and for each year quotas were set for greater silver smelt. For 2019 and 2020 the EU TAC in Subareas 5, 6 and 7 were 4661 t and 3729 t, respectively. Catches of blue whiting may include unavoidable bycatches of greater silver smelt in the area. In some of the years where landings are very high, there is possibly some misreporting, but no documentation of quantities is available.

A 3. Ecosystem aspects

No information is available on impacts on the ecosystem of fishing for greater silver smelt.

B. Data

B.1. Commercial catch

B.1.1 Landings data

Landings data are presented by area and countries (Table 1-5). From 1967 to 1994 the landings from Subarea 6b and 7 of *A.silus* has been low and for many years not exceeded 500 tonnes. The first peak was in 1995 with landings around 1500 tonnes. After this peak the landings dropped considerably until 2000-2002 with landings of 1900 t, 4415 t and 4437 t, respectively, by Irish, Dutch and Scottish fishing boats. A main fleet conducting catches of greater silver smelt are the Dutch freezer trawlers operating in 5b, 6 and 7, west and northwest of the Hebrides, and west of Ireland (Porcupine Bank) where greater silver smelt is a minor bycatch in the fishery directed at blue whiting.

Table 1: Greater silver smelt in Division 6b.

Year	Faroes	Germany	Ireland	Netherlands	Scotland	Russia	Spain	TOTAL
1979								
1980		13						13
1981		525						525
1982								
1983		4						4

Year	Faroes	Germany	Ireland	Netherlands	Scotland	Russia	Spain	TOTAL
1984								
1985								
1986								
1987								
1988								
1989								
1990			300					300
1991				5				5
1992			220		1			221
1993					3			3
1994					20			20
1995	1114							1114
1996								
1997								
1998								
1999			178					178
2000			1355			29		1384
2001					62	68		130
2002					1	29		30
2003					6	120		126
2004				11		12		23
2005						4		4
2006								
2007								
2008						1	8	9
2009								
2010								
2011								
2012								

Year	Faroes	Germany	Ireland	Netherlands	Scotland	Russia	Spain	TOTAL
2013								
2014						20.5		20.5
2015								0
2016								0
2017								0
2018								0
2019						1		1
2020						11		11

Table 2: Greater silver smelt in Subarea 7.

Year	France	Germany	Ireland	Netherlands	Scotland	Norway	Poland	Spain	UK E/W	TOTAL
1972										
1973	40									103
1974							63			
1975										
1976										
1977			1							1
1978		404					5			409
1979		103								103
1980										
1981										
1982						666				666
1983						595				595
1984						163				163
1985										
1986						258				258
1987						50				50
1988						100				100
1989						200				200
1990		23		1						24

Year	France	Germany	Ireland	Netherlands	Scotland	Norway	Poland	Spain	UK E/W	TOTAL
1991				9						9
1992				254						254
1993				505						505
1994				39						39
1995		73	6	431						510
1996		10								10
1997				12						12
1998										
1999			50							50
2000		79	166	244				34		523
2001	5		1592	2	2782			34		4415
2002			4433		2			2		4437
2003			95	19				5		119
2004				13	19			15		47
2005		26	1		14			17		58
2006								40		40
2007								35		35
2008										
2009	13		1					6		20
2010	10			8				2	3	23
2011		4			8					12
2012		2			1					3
2013				1						1
2014				1						1
2015				5						5
2016	0			0				0		0
2017				8						8
2018				31				1		32
2019			0	5						5

Year	France	Germany	Ireland	Netherlands	Scotland	Norway	Poland	Spain	UK E/W	TOTAL
2020			1	62						63

Table 3: Greater silver smelt in Subarea 8.

Year	Netherlands	Spain	Ireland	TOTAL
2002	195			194.61
2003	43			42.525
2004	23			22.722
2005	202			202.29
2006				0
2007				0
2008		10		10
2009				0
2010				0
2011	1			1
2012				0
2013				0
2014	1.1			1.1
2015				0
2016		0		0
2017		0		0
2018		3.9		3.9
2019		1.6	0.5	2.1
2020		1.6		1.6

Table 4: Greater silver smelt in Subarea 9.

Year	Netherlands	Spain	Portugal	TOTAL
2006				0
2007	1			1
2008			0.5	0.5
2009			1.9	1.9
2010			1.9	1.9

Year	Netherlands	Spain	Portugal	TOTAL
2011			0.9	0.9
2012			1.9	1.9
2013*				0
2014				0
2015				0
2016				0
2017				0
2018		0.1		0.1
2019				0
2020				0

Table 5: Greater silver smelt in Subarea 12.

Year	Faroes	Iceland	Russia	Netherlands	TOTAL
1988					0
1989					0
1990					0
1991					0
1992					0
1993	6				6
1994					0
1995					0
1996	1				1
1997					0
1998					0
1999					0
2000		2			2
2001					0
2002					0
2003					0
2004			4	625	629

Year	Faroes	Iceland	Russia	Netherlands	TOTAL
2005				362	362
2006					0
2007					0
2008					0
2009					0
2010					0
2011					0
2012		31			31
2013					0
2014					0
2015					0
2016					0
2017					0
2018					0
2019					0
2020					0

B.1.2 Discards estimates

Discards data from the six last years are presented in Table 6, while discards from previous stock unit is shown in Table 7. Discards from 2015-2019 are mainly from the Spanish fishery and the Scottish fishery. For previous years, the discards were very high compared to the landings.

Argentina silus can be a very significant discard of the trawl fisheries of the continental slope of Subareas 6 and 7 particularly at depths 300–700 m (e.g. Girard and Biseau) (Table 7). Information have been available on discards in 2009 and 2012 in Basque country and Spanish fisheries in Subareas 6–7, and Divisions 5.3.abcd and northern 9.a. These estimates have been in the range 1000–4000 t since 2003. In 2010 and 2011 they were around 2000 t. New calculation of the estimates for 2012 and 2013 reduce strongly the discards reported by Spain. Same applies for discards registered by the Netherlands. Based upon on-board observations from DCF sampling, the catch composition of the French mixed trawl fisheries in 5.b, 6 and 7 include 5.3% of greater silver smelt, based upon data for year 2011 (Dubé *et al*., 2012). This species is discarded in that fishery; it represents 25.3% of the discards. Raised to the total landings from that fishery an estimated 280 t of discarded greater silver smelt was estimated for 2011. It should be noted that after redefinition of stock structure in 2015 area 6.a is not included in this stock.

Table 6: Discard data form 2015-2020 from Subarea 6b,7-10 and 12.

Year	Spain				UK (Scotland)	TOTAL
	6b	7	8	9	6b	
2015	0.7	28			0.5	29.2
2016		237	2	1		240
2017	1.82	148.8			0.3	151
2018	2.9	97.9	1.8	0.8	10.3	114
2019	5	146	0.2	0.1	0.29	152
2020	2	44.6	7.4	2.9	50	107

Table 7: Discards by Spain and Netherlands from before the redefinition of the stock area (Subarea 6,7 and 8) from year 2003-2014

Year	Spain	Denmark	Germany	Sweden	Netherland	Total
2003	2807				1247	4053
2004	3075				300	3375
2005	2438				0	2438
2006	1250				149	1399
2007	2038				45	2083
2008	3060				58	3118
2009	4109				74	4183
2010	2006				23	2029
2011	2050				6	2056
2012	177				26	203
2013	91			21	20	133
2014	160	6	120	1	111	398

B.2. Biological sampling

Length distribution from discards are available in InterCatch for 2015 (Scotland), 2016 (Spain), 2017 (Spain and Scotland), 2018 (Spain and Scotland), 2019 (Spain) and 2020 (Scotland and Spain). For landings, length distributions are available from 2020 (Netherland). These length distributions have, for the time being, not been analysed.

B.3. Surveys

The Spanish bottom-trawl survey on the Porcupine Bank (ICES Divisions 7c and 7k) has been carried out annually on the third quarter (September) since 2001. Recent investigations have revealed that survey catches from the Spanish Porcupine survey contain both *A. Silus* and *A.*

Sphyraena (Table 8 and Figures 2, 3 and 4). Abundance and biomass indices from survey catches of mixed *A. silus* and *A. sphyraena* is presented in Figure 4. The Spanish survey only covers depths to 400 m and is unlikely to fully cover the depth range of greater silver smelt. Blue whiting is the most abundant species in the survey area.

Table 8. Greater silver smelt in subareas 7–10 and 12, and in Division 6.b. Assessment summary. Biomass index from the Spanish Porcupine Bank survey for both greater and lesser silver smelt. Also given is the biomass index for A.silus only and the proportion between the two species. High and low refer to standard errors.

Year	*Argentina sp.*			*Argentina silus*			Proportion of *A. silus*/*A. sphyrena* in the survey
	kg haul^{-1}	Low	High	kg haul^{-1}	Low	High	
2001	133.17	72.76	193.57				
2002	143.72	62.36	225.08				
2003	141.33	82.19	200.47				
2004	142.76	68.42	217.09				
2005	111.15	59.60	162.69				
2006	98.05	36.29	159.81				
2007	79.03	43.71	114.35				
2008	82.16	32.93	131.40				
2009	79.74	43.65	115.83	72.95	37.69	108.21	0.91
2010	97.39	41.19	153.59	89.97	34.02	145.91	0.92
2011	57.57	32.38	82.75	50.32	25.85	74.78	0.87
2012	93.52	51.51	135.53	83.02	42.52	123.53	0.89
2013	135.63	76.35	194.91	121.50	66.25	176.75	0.90
2014	75.59	48.41	102.77	59.57	35.53	83.61	0.79
2015	92.80	53.82	131.79	72.56	41.95	103.18	0.78
2016	199.00	109.49	288.51	172.94	92.32	253.55	0.87
2017	159.31	89.22	229.41	129.63	73.41	185.86	0.81
2018	112.36	38.57	186.16	98.72	25.44	172.00	0.88
2019	92.59	70.69	114.49	67.60	48.07	87.13	0.73
2020	125.34	87.95	162.72	109.81	75.28	144.34	0.88

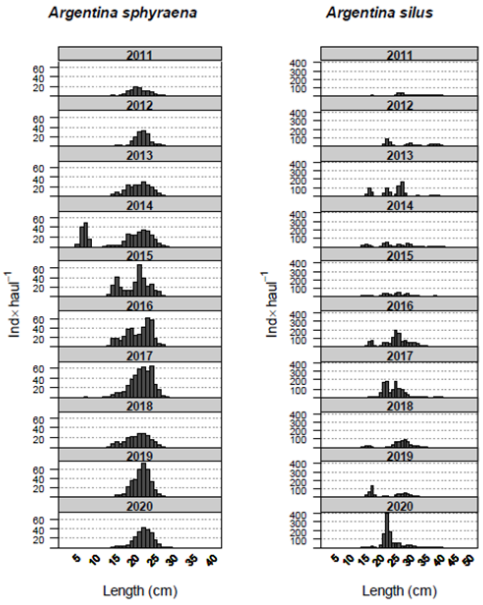

Figure 2: Mean stratified length distributions of *Argentina* spp. in Spanish Porcupine surveys from 2009–2020. Note different range in the y-axis values between species.

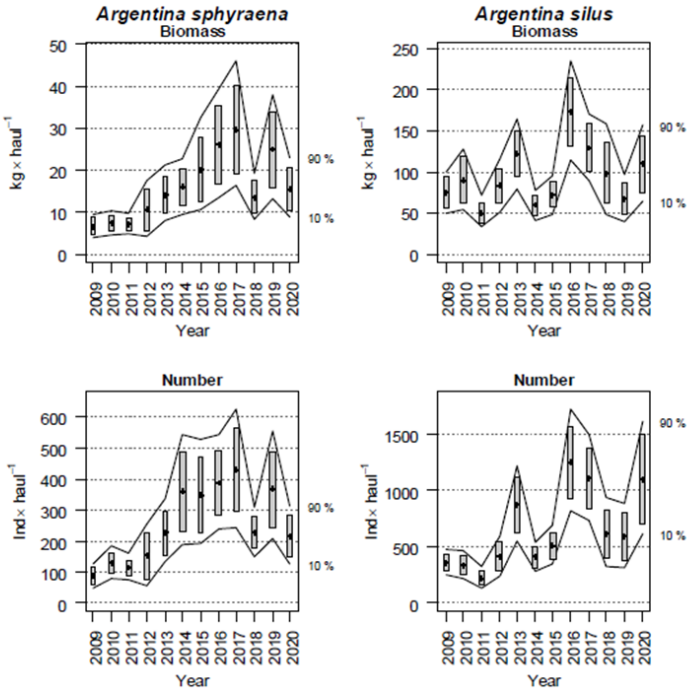

Figure 3: Evolution of *Argentina sphyraena* and *Argentina silus* biomass and abundance indices in Porcupine surveys (2009–2020). Boxes mark parametric standard error of the stratified biomass index. Lines mark bootstrap confidence intervals (a=0.80, bootstrap iterations=1000).

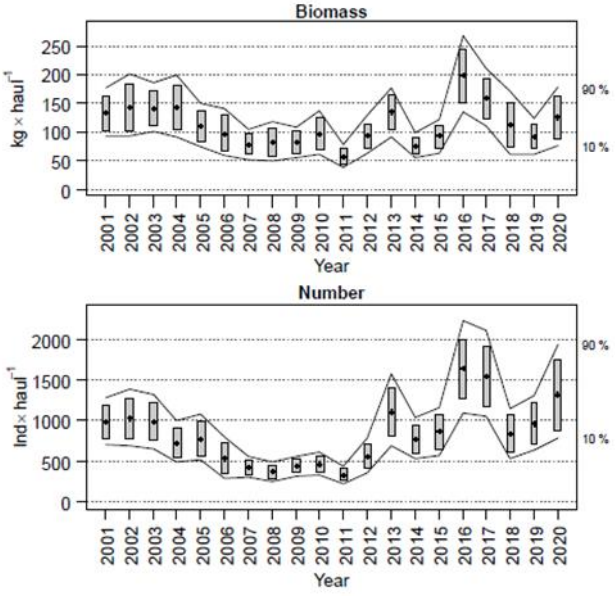

Figure 4: Evolution of *Argentina* spp. (mainly *Argentina silus*) biomass and abundance indices in Porcupine surveys (2001-2020). Boxes mark parametric standard error of the stratified abundance index. Lines mark bootstrap confidence intervals (α = 0.80, bootstrap iterations = 1000)

B.3.1. Survey design and analysis

The survey area covered extends from longitude 12°W to 15°W and from latitude 51°N to 54°N, following the standard IBTS methodology for the western and southern areas (ICES 2017). The sampling design was random stratified to the area (Velasco and Serrano, 2003) with two geographical sectors (Northern and Southern) and three depth strata (<300m, 300-450m and 450-800m).

B.3.2. Survey data used

Biomass index for greater silver smelt (Table 8 and Figure 3) from the Porcupine Bank survey is used in the advice. For Subarea 7, abundances and biomass in the indices that are joint for both species from the Spanish porcupine survey have been showing a decreasing trend from 2002 until 2011 but have been rising since then until 2016 (Figure 4). The index has decreased for *A.silus* the last three years compared to 2016 (Figure 3). However, the survey is unlikely to cover all the exploitable biomass of the stock as it only covers depth down to 400 meters. In 2019, the biomass of both species of Argentina continued decreasing, whereas the abundance increased slightly (Figure 4). *A.silus*, followed the downward trend of the previous years, whereas *A.sphyraena* increased abruptly both regarding biomass and abundance (Figure 3). However, the index from the survey conducted in 2020 shows that both the biomass and he number of *A.silus* increased considerably, breaking the downward trend of recent years and staying in the medium-high values of historical series. *A.sphyraena*, by contrast, decreased sharply, getting medium-low values of the time series. *A. silus* is the dominating species in both abundance and biomass in the survey, and as the time series is longer for the joint index it gives a historic overview. The biomass index for only greater silver smelt (Table 8 and Figure 3) has been chosen to use in the assessment.

C. Assessment: data and method

The Spanish Porcupine Bank survey greater silver smelt index is used in the ICES 2 over 3 method; given the mean index for the latest two years over the mean index from the previous three years (ICES, 2012).

D. Short–Term Projection

No short-term predictions are performed.

E. Medium–Term Projections

No medium-term predictions are performed.

F. Long–Term Projections

No long-term predictions are performed.

G. Biological Reference Points

No biological reference points are defined for Greater Silver Smelt in Subareas 6b, 7, 8, 9, 10 and 12.

H. Other issues

WGDEEP has discussed whether this stock is reasonable regarding the boundaries for the stock and the areas joined. The present catches are minor, but it is important to monitor and follow if new fisheries emerge, as catches have been considerable in the past.

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