

Norway lobster (*Nephrops norvegicus*) in Division 3.a, functional units 3 and 4 (Skagerrak and Kattegat)

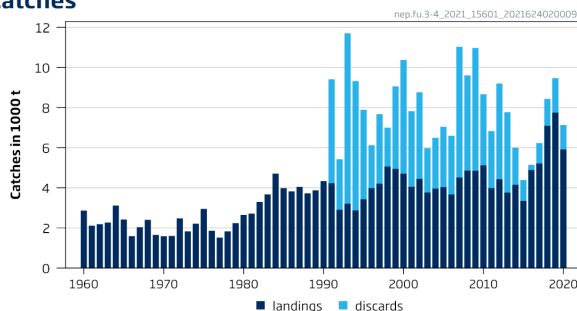
ICES advice on fishing opportunities

ICES advises that when the EU multiannual plan (MAP) for the North Sea is applied, catches in 2022 that correspond to the F ranges in the MAP are between 10 241 tonnes and 14 449 tonnes, assuming recent discard rates. The entire range is considered precautionary when applying ICES advice rule.

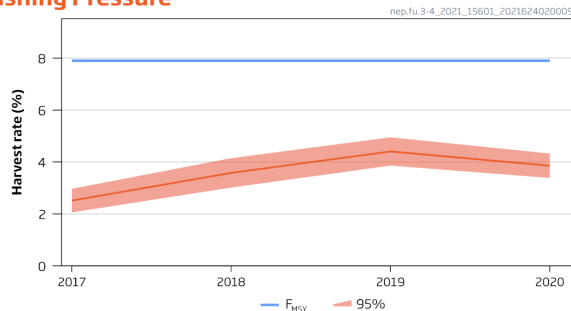
Stock development over time

Fishing pressure on the stock is below FMSY; no reference points for stock size have been defined for this stock.

Catches



Fishing Pressure



UWTV_index

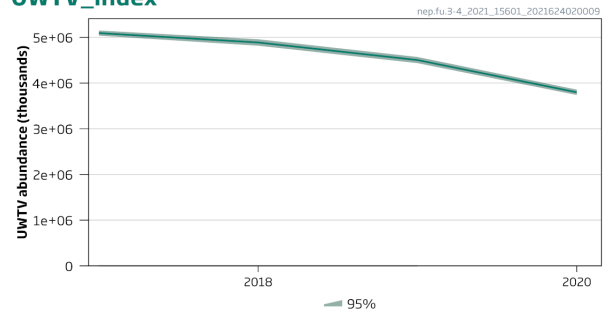


Figure 1 Norway lobster in Division 3.a, functional units 3 and 4. Summary of the stock assessment. Long-term trends in landings (1960–2020) and catches (1991–2020), harvest rate, and underwater TV survey (UWTV) abundance (for animals with carapace length > 17 mm).

Catch scenarios

Table 1 Norway lobster in Division 3.a, functional units 3 and 4. The basis for the catch scenarios.

Variable	Value	Notes
Stock abundance	3797	Abundance in TV assessment UWTV 2020; millions
Mean weight in projected landings	54.13	Average 2018–2020; grammes
Mean weight in projected discards	23.49	Average 2018–2020; grammes
Projected discard rate (total)	32.1%	Average (percentage by number) 2018–2020
Discard survival ratio	25%	Percentage by number
Projected dead discard ratio	26.2%	Average 2018–2020 (percentage by number)

Table 2 Norway lobster in Division 3.a, functional units 3 and 4. All weights are in tonnes.

Catch scenarios assuming recent discard rates

Basis	Total catch	Dead removals	Projected landings	Projected dead discards (PDD)	Projected surviving discards	% harvest rate*	% advice change
	PL + PDD + PSD	PL + PDD	PL	PDD	PSD	for PL+ PDD	
ICES advice basis							
EU MAP [^] : F _{MSY}	14449	13835	11993	1842	614	7.9	-15.7**
F = MAP [^] F _{MSY lower}	10241	9806	8501	1305	435	5.6	-15.7**
F = MAP [^] F _{MSY upper} ***	14449	13835	11993	1842	614	7.9	-15.7**
Other scenarios							
F = F _{MSY}	14449	13835	11993	1842	614	7.9	-15.7
F = F _{35%SpR}	19204	18388	15940	2448	816	10.5	12.0
F = F ₂₀₂₀	7051	6751	5852	899	300	3.9	-59

[^] EU multiannual plan (MAP) for the North Sea (EU, 2018)

* Calculated in numbers for dead removals.

** Advice basis values for 2022 relative to the 2021 advice values (MAP advice of 17 148, 12 115, and 17 148 tonnes respectively).

*** F_{MSY upper} = F_{MSY} for this stock.

The change in advice (-15.7% for the F_{MSY} scenario) is mainly because the UWTV abundance is 15.7% lower in 2020 than in 2019.

Basis of the advice

Table 3 Norway lobster in Division 3.a, functional units 3 and 4. The basis of the advice.

Advice basis	EU multiannual plan (MAP)
Management plan	The EU multiannual plan (MAP) for stocks in the North Sea and adjacent waters applies to this stock. The plan specifies conditions for setting fishing opportunities depending on stock status and making use of the F _{MSY} range for the stock. ICES considers that the F _{MSY} range for this stock used in the MAP is precautionary.

Quality of the assessment

Since 2011, UWTV surveys have been conducted in all six main fishing areas in Division 3.a. The spatial coverage has increased over time. The survey area has been modified since 2014 (including an extension into the western Skagerrak), and since 2017 the grounds in Division 3.a have been redefined following a benchmark meeting in 2016 (WKNEPH; ICES, 2016). The spatial area was therefore 27% larger from 2017 and onwards compared to assessments in earlier years.

Further work is required to update the methodology for estimating MSY reference points for this stock. Until this work has been completed, existing methodology will continue to be used.

Due to Covid-19 restrictions, part of the on-board catch sampling programs could not be completed in 2020. For the Swedish trawl and creel fleets, on-board sampling data was aggregated for 2018–2020 to better reflect size composition of landings and discards.

Issues relevant for the advice

From 2016 the EU landing obligation was applied to all catches of Norway lobster fisheries in functional units (FUs) 3 and 4, with exemptions for high survival. ICES advice for 2021 assumes average discard rates as observed over the last three years. This is considered to be the most realistic assumption. In a situation where all catch is landed, there would be no discards and therefore no surviving discards. Thus, the catch advice and MSY harvest rate would be lower than those given in the catch scenario table assuming recent discard rates.

Since 1 January 2016 the minimum conservation reference size (MCRS) was lowered from 40 to 32 mm carapace length for EU countries fishing in this area (Figure 3). This reduced the proportion of the catch that was discarded. A discard ban

implemented in the Norwegian zone of the Skagerrak on 1 January 2015 retains a minimum landing size of 40 mm carapace length.

For this stock, Swedish discard survival experiments indicate that the trawl discard survival may be around 50% (Valentinsson and Nilsson, 2015). As a result, an exemption from the landing obligation based on high survivability has been granted by the European Commission. ICES continues to use a survival rate of 25% (ICES, 2016), because the survival rates estimated by Valentinsson and Nilsson (2015) would need to be evaluated in a benchmark process.

The two functional units in Division 3.a, Skagerrak (FU 3) and Kattegat (FU 4), are considered to be a single stock.

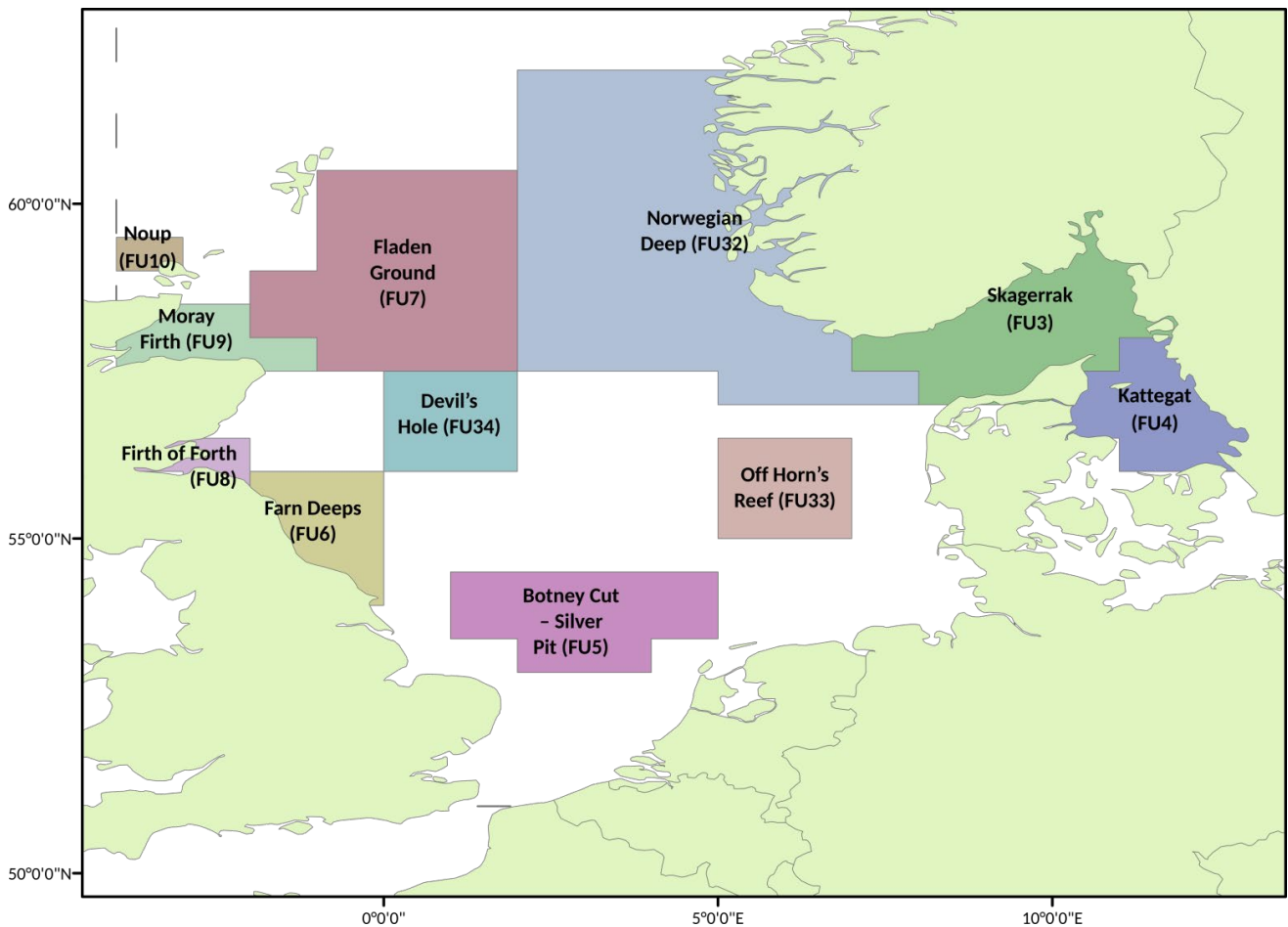


Figure 2 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 4 Norway lobster in Division 3.a, functional units 3 and 4. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	Not defined	It is not possible to determine an appropriate MSY $B_{trigger}$ at this time because of the short survey series	ICES (2016)
	F_{MSY}	Harvest rate 7.9%	Proxy, equivalent to F_{max} combined sex	ICES (2011)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
EU Management plan (MAP) *	MAP MSY $B_{trigger}$	Not defined		
	MAP B_{lim}	Not defined		
	MAP F_{MSY}	Harvest rate 7.9%	F_{MSY}	ICES (2015)
	MAP range F_{lower}	Harvest rate 5.6–7.9%	Consistent with ranges provided by ICES, resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2015)
	MAP range F_{upper} **	Harvest rate 7.9–7.9%	Consistent with ranges provided by ICES, resulting in no more than 5% reduction in long-term yield compared with MSY	ICES (2015)

* EU multiannual plan (MAP) for the North Sea (EU, 2018)

** For this stock, $F_{MSY upper} = F_{MSY}$

Basis of the assessment

Table 5 Norway lobster in Division 3.a, functional units 3 and 4. Basis of assessment and advice.

ICES stock data category	1 (ICES, 2021a)
Assessment type	Underwater TV survey (ICES, 2021b)
Input data	Commercial catches. One survey index (UWTV, [U6412]), length–frequency data, and discard samples. Annual maturity data from commercial catch samples. Natural mortalities from literature: 0.3 for males and immature females, and 0.2 for mature females (Morizur, 1982) for all years.
Discards and bycatch	Included in the assessment, data from the majority of the main fleets (covering 73% of the landings in 2020)
Indicators	Landings per unit effort, mean size
Other information	This stock was benchmarked in 2016 (WKNEPH; ICES, 2016) for spatial area definition only
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

History of the advice, catch, and management

Table 6 Norway lobster in Division 3.a, functional units 3 and 4. ICES advice, TACs, and ICES catches. All weights are in tonnes. Values of landings and catches corresponding to advice and TAC prior to 2013 are presented to the nearest hundred tonnes.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	TAC**	ICES landings	ICES discards
1991					4228	5183
1992		~ 4000		3500	2905	2523
1993		~ 4300		3500	3212	8493
1994		2900		3500	2874	6450
1995		2900		4800	3427	4464
1996	<i>Status quo</i> TAC	2900		4800	3980	2148
1997	<i>Status quo</i> TAC	2900		4800	4206	3469
1998		4000		4800	5056	1944
1999		4000		4800	4949	4108
2000		3800		5000	4710	5664
2001		3800		4500	4056	3767

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	TAC**	ICES landings	ICES discards
2002	Catches to be maintained at the 2000 level	4700		4500	4448	4311
2003	Catches to be maintained at the 2000 level	4700		4500	3767	2208
2004	Catches to be maintained at the 2000 level	4700		4700	3965	2532
2005	Catches to be maintained at the 2000 level	4700		5200	4034	3014
2006	No increase in effort	-		5200	3672	2926
2007	No increase in effort	-		5200	4512	6524
2008	No increase in effort	-		5200	4860	4746
2009	Current effort appears to be sustainable	< 5200		5200	4846	6129
2010	Current effort appears to be sustainable	< 5200		5200	5123	3548
2011	Recent average landings (2007–2009)	< 4700		5200	3986	2847
2012	MSY approach	< 6000		6000	4429	4771
2013	MSY approach	< 5200		5200	3760	4010
2014	MSY approach	< 5019		5019	4150	1854
2015	MSY approach	< 5318	< 10290	5318	3350	1038
2016	MSY approach	< 7827	< 11793	11001	4889	256^
2017	MSY approach		< 13099	12715	5211	1024^
2018	MSY approach		≤ 12431	11738	7100	1336^
2019	MAP *** F ranges (Harvest rate = 5.6–.9%)		15339–21639	13733	7753	1719^
2020	Management plan		14109–19904	13733	5915	1214^
2021	Management plan		12155–17148*	12360		
2022	Management plan		10241–14449			

* Revised in May 2021 from a total catch of 12 465–17 585 tonnes.

** Since 2016, catch quota.

*** EU multiannual plan (MAP) for the North Sea (EU, 2018).

^ Since 2016, discard estimates include below minimum size (BMS) landings from EU fleets as reported to ICES.

History of the catch and landings

Table 7 Norway lobster in Division 3.a, functional units 3 and 4. Catch distribution by fleet in 2020 as estimated by ICES.

Catch (2020)		Landings		Discards	
97.4% dead	2.6% surviving	Trawling 93.9%	Creeling 6.1%	75% dead	25% surviving
7129 tonnes		5915 tonnes		1214 tonnes	

Table 8 Norway lobster in Division 3.a, functional units 3 and 4. History of commercial catch and landings; official landings and ICES estimated discards are presented by country. All weights are in tonnes.

Year	Denmark	Norway	Sweden	Germany	Total landings	Total discards*	Total catch
1991	2824	185	1219		4228	5183	9411
1992	2052	104	749		2905	2523	5428
1993	2250	103	859		3212	8493	11 705
1994	2049	62	763		2874	6450	9324
1995	2419	90	918		3427	4464	7891
1996	2844	102	1034		3980	2148	6128
1997	2959	117	1130		4206	3469	7675
1998	3541	184	1319	12	5056	1944	7000
1999	3486	214	1243	6	4949	4108	9057
2000	3325	181	1197	7	4710	5664	10 374
2001	2880	138	1037	1	4056	3767	7823
2002	3293	116	1032	7	4448	4311	8760

Year	Denmark	Norway	Sweden	Germany	Total landings	Total discards*	Total catch
2003	2757	99	898	13	3767	2208	5975
2004	2955	95	903	12	3965	2532	6497
2005	2901	83	1048	2	4034	3014	7048
2006	2432	91	1143	6	3672	2926	6598
2007	2887	145	1467	13	4512	6524	11 036
2008	3174	158	1509	19	4860	4746	9606
2009	3372	128	1331	15	4846	6129	10 975
2010	3721	124	1249	29	5123	3548	8671
2011	2937	87	945	17	3986	2847	6833
2012	2970	104	1355	0	4429	4771	9200
2013	2550	73	1134	3	3760	4010	7770
2014	2785	88	1269	7	4150	1854	6004
2015	2121	91	1138	0	3350	1038	4389
2016	3440	87	1363	0	4889	256	5145
2017	3700	81	1430	1	5211	1024	6234
2018	5133	97	1870	0	7100	1336	8435
2019	5697	112	1944	21	7774	1719	9493
2020	3977	124	1796	17	5915	1214	7129

* Dead + surviving discards.

Summary of the assessment

Table 9 Norway lobster in Division 3.a, functional units 3 and 4. Assessment summary.

Year	UWTV abundance* (millions)	2 standard deviations	Harvest rate* (% by number)	Landings numbers (millions)	Discards numbers (millions)	Removals numbers (millions)	Landings (tonnes)	Discards ** (tonnes)	Dead discards (tonnes)	Discard ratio (% by number)	Mean weight landings (grammes)	Mean weight discards (grammes)	Dead discard ratio (% by number)
1960							2871						
1961							2118						
1962							2188						
1963							2275						
1964							3112						
1965							2424						
1966							1595						
1967							2036						
1968							2408						
1969							1657						
1970							1584						
1971							1606						
1972							2478						
1973							1829						
1974							2215						
1975							2950						
1976							1863						
1977							1518						
1978							1830						
1979							2240						
1980							2648						
1981							2720						
1982							3298						
1983							3676						
1984							4711						
1985							3989						
1986							3825						
1987							4046						
1988							3727						
1989							3877						
1990							4341						
1991							4228	5183					
1992							2905	2523					
1993							3212	8493					
1994							2874	6450					

Year	UWTV abundance* (millions)	2 standard deviations	Harvest rate* (% by number)	Landings numbers (millions)	Discards numbers (millions)	Removals numbers (millions)	Landings (tonnes)	Discards ** (tonnes)	Dead discards (tonnes)	Discard ratio (% by number)	Mean weight landings (grammes)	Mean weight discards (grammes)	Dead discard ratio (% by number)
1995							3427	4464					
1996							3980	2148					
1997							4206	3469					
1998							5056	1944					
1999							4949	4108					
2000							4710	5664					
2001							4056	3767					
2002							4448	4311					
2003							3767	2208					
2004							3965	2532					
2005							4034	3014					
2006							3672	2926					
2007							4512	6524					
2008							4860	4746					
2009							4846	6129					
2010							5123	3548					
2011	3577	35	4.2	66	110	149	3986	2847	2135	63	60.7	25.9	56
2012	2526	51	8.6	79	183	216	4430	4771	3578	70	55.9	26.1	63
2013	2914	70	5.8	63	142	169	3760	4010	3008	69	59.8	28.2	63
2014	3762	91	3.0	66	63	114	4150	1854	1391	49	62.5	29.4	42
2015	3857	88	2.1	52	36	79	3350	1038	779	40	63.9	29.2	34
2016	2863	49	3.1	80	11	88	4889	256	192	12.4	61.3	22.7	9.6
2017	5093	57	2.5	94	45	128	5211	1024	768	32	55.4	22.9	26
2018	4887	70	3.6	131	60	175	7100	1336	1002	31	54.4	22.3	26
2019	4502	69	4.4	145	72	198	7774	1719	1289	33	53.6	24	27
2020	3797	59	3.9	109	50	146	5915	1214	911	32	54.4	24.2	26

* The area of the Norway lobster ground surveyed has changed over time, with spatial changes between 2013 and 2014 and a 27% increase in the area between 2016 and 2017. This implies that the harvest rate was overestimated and that abundance was underestimated before 2017.

** Since 2016, discard estimates include BMS landings from EU fleets as reported to ICES.

Length frequencies for catch (dotted) and landed(solid): Nephrops in FU 3-4

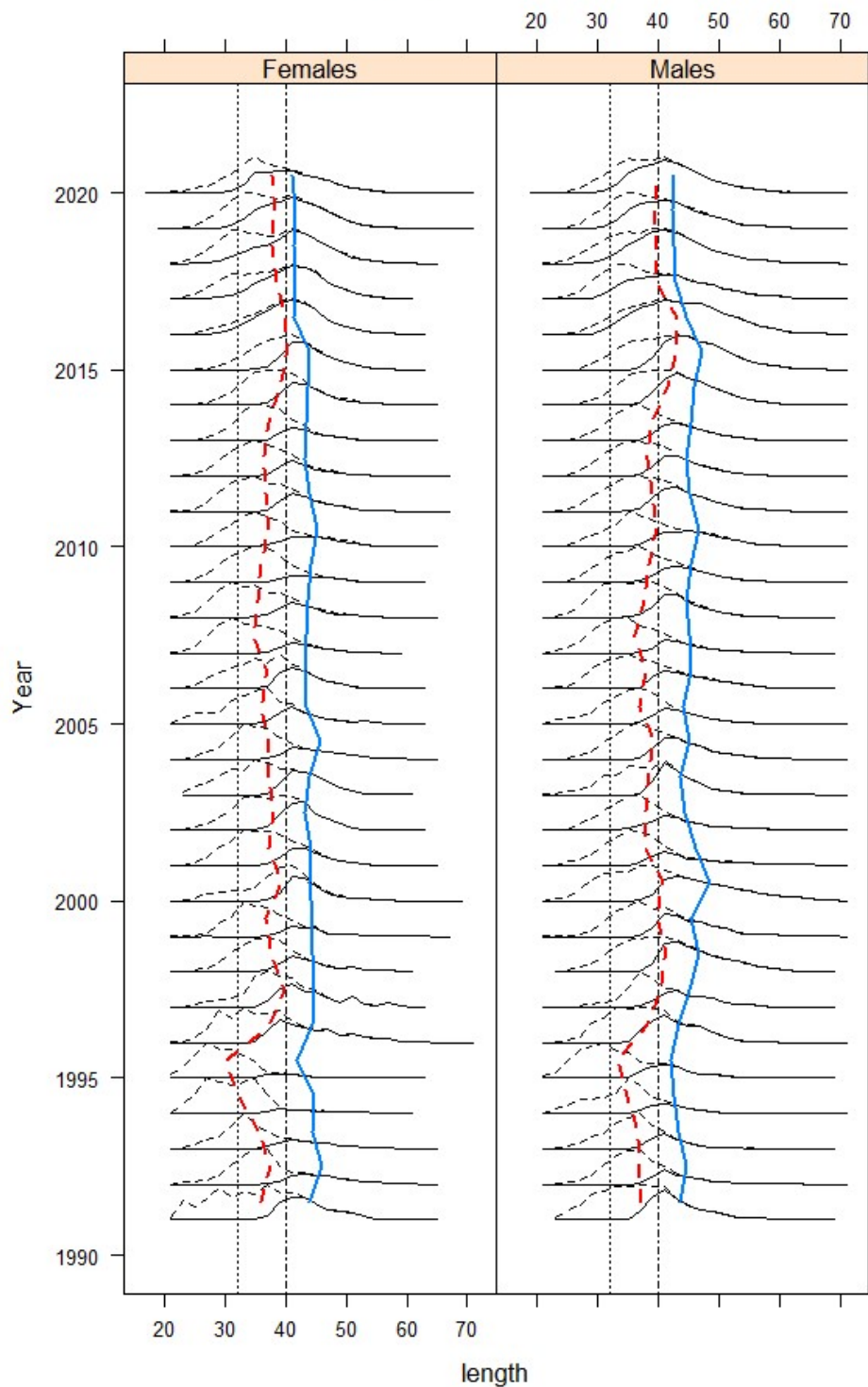


Figure 3 Norway lobster in Division 3.a, functional units 3 and 4. Catch length–frequency distribution and mean size in catches (broken red line) and landings (solid blue line). Vertical lines indicate the current minimum conservation reference size (MCRS) at 32 mm and the old minimum landing size (MLS) at 40 mm. The Swedish on-board sampling programme in 2020 was interrupted because of the COVID-19 pandemic and only performed for quarter 1. Size composition for the Swedish fleets (trawl and creel) in 2020 was pooled by fleet for 2018–2020 and used for assessment.

Sources and references

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[Download the stock assessment data and figures.](#)

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