

Norway lobster (*Nephrops norvegicus*) in Division 4.a, Functional Unit 9 (central North Sea, Moray Firth)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, and assuming that discard rates and fishery selection patterns do not change from the average of the years 2018–2020, catches in 2022 should be no more than 2062 tonnes.

To ensure that the stock in Functional Unit (FU) 9 is exploited sustainably, management should be implemented at the functional unit level.

ICES notes the existence of a management plan, developed and adopted by one of the relevant management authorities for Subarea 4. ICES considers this plan to be precautionary when implemented at the functional unit level.

Stock development over time

Fishing pressure on the stock is below F_{MSY} , and stock size is above MSY $B_{trigger}$.

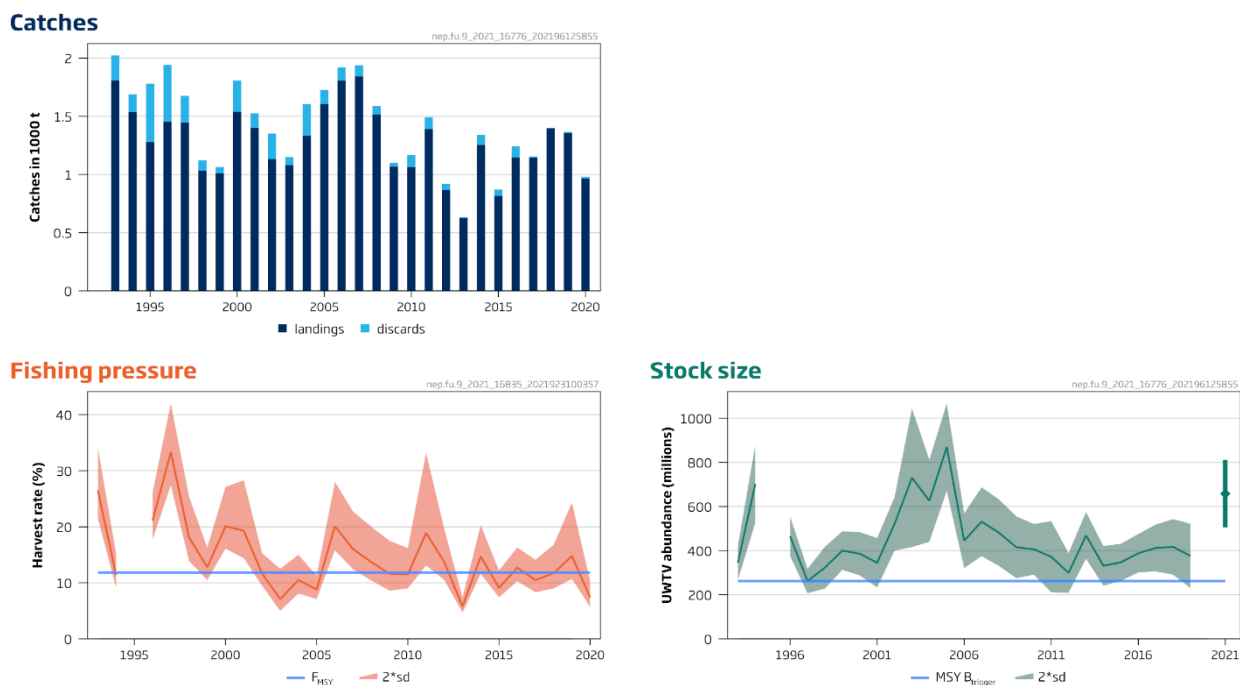


Figure 1 Norway lobster in Division 4.a, Functional Unit 9. Summary of the stock assessment. Catches, harvest rate (sum of landings and dead discards in numbers, divided by stock abundance), and stock abundance (underwater TV survey). Harvest rates before 2006 may be underestimated because of underreporting of landings. The harvest rate in 2020 was calculated using an interpolated value for abundance (average of 2019 and 2021), as no survey data are available for 2020.

Catch scenarios

Table 1 Norway lobster in Division 4.a, Functional Unit 9. The basis for the catch scenarios.

Variable	Value	Notes
Stock abundance (2022)	658	Underwater TV (UWTV) survey 2021; individuals in millions
Mean weight in projected landings	26.87	Average 2018–2020; grammes
Mean weight in projected discards	9.10	Average 2018–2020; grammes
Projected total discard rate	2.8	Average 2018–2020; percentage by number of the total catch
Discard survival rate	25	Percentage by number of the discards

Table 2 Norway lobster in Division 4.a, Functional Unit 9. Annual catch scenarios. All weights are in tonnes.

Catch scenarios assuming recent discard rates

Basis	Total catch	Dead removals	Projected landings	Projected dead discards	Projected surviving discards	% harvest rate *	% advice change **
	PL + PDD + PSD	PL + PDD	PL	PDD	PSD	For PL + PDD	
ICES advice basis							
MSY approach	2062	2057	2042	15	5	11.8	75
Other scenarios							
F ₂₀₂₀ [^]	1284	1281	1272	9	3	7.4	8.8
F _{0.1}	1363	1360	1350	10	3	7.8	15.5
F _{MSY lower}	1591	1587	1575	12	4	9.1	35
F _{2018–2020} [^]	1975	1970	1956	14	5	11.3	67
F _{MSY upper} ***	2062	2057	2042	15	5	11.8	75
F _{max}	2604	2598	2579	19	6	14.9	121

* Calculated for dead removals.

** Advice basis values for 2022 are relative to the 2021 advice value (MAP F_{MSY} advice of 1180 tonnes).

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

[^] The harvest rate in 2020 was calculated using an interpolated value for abundance (average of 2019 and 2021).

The 75% increase in the catch advice is mainly a result of the increase in the abundance observed between the 2019 and 2021 UWTV surveys as well as updated mean weights and discard rates.

Basis of the advice

Table 3 Norway lobster in Division 4.a, Functional Unit 9. The basis of the advice.

Advice basis	MSY approach
Management plan	ICES is aware of the EU multiannual management plan (MAP) that has been agreed for this stock (EU, 2018) and considers it to be precautionary when implemented at the functional unit level. There is no agreement with UK regarding this plan, and it is not used as the basis of the advice for this stock. ICES provides catch scenarios consistent with the F _{MSY} ranges in the MAP.

Quality of the assessment

The length and sex composition of the landings is considered to be well sampled. Catch sampling has been conducted on a quarterly basis for Scottish Norway lobster trawlers in this fishery since 1990 and is considered to represent the fishery adequately.

Discard sampling in 2020 was impacted by the COVID-19 pandemic and only samples for quarter 1 were available. Discard rates and allocations for length frequencies in quarters 2–4 were based on the available 2020 data. The observed discard rate in 2020 quarter 1 was similar to those observed in previous years where the level of discarding has been relatively low with no seasonal variation, so the approach was considered appropriate.

The 2020 UWTV survey was not deemed robust enough for the assessment because of the reduced number of stations completed on the survey schedule after the COVID-19 disruption. As such, the stock size and harvest rate are unknown for 2020; therefore, an interpolated abundance estimate was used to calculate a harvest rate (average of 2019 and 2021). The FU 9 UWTV survey was carried out as normal in 2021.

Issues relevant for the advice

During 2016–2020, the EU landing obligation was applied to all catches of Norway lobster fisheries with exemptions for high survival. From 2021, the high survivability exemption has not been extended and was replaced by a *de minimis* exemption for vessels fishing with certain gears in UK waters of ICES Subarea 4 and Division 2.a. The new exemption applies to catches of Norway lobster below the minimum conservation reference size (MCRS), which shall not exceed 2% of the total annual catches of that species.

Observations from the fishery indicate that discarding above the MCRS continues (Figure 3). ICES is providing advice for 2022 assuming average discard rates as observed over the last three years. This is considered to be the most realistic assumption. In 2016–2020, no Norway lobster were officially recorded as below MCRS (BMS category) in FU 9, despite catches having been observed below the MCRS (Figure 3). In a situation where all catch is landed, there would be no surviving discards, and the total catch advice and MSY harvest rate would be lower than those given in the catch scenario table (Table 2). However, reducing the catch of smaller Norway lobster would allow an increase in landings above those given in the catch scenario table.

Catches in FU 9 have been higher than the advised level, highlighting the issue that current management arrangements are not sufficient to contain the fishery within the sustainable limits determined by ICES. A single total allowable catch (TAC) covers all of ICES Subarea 4, except the Norwegian Deep. Management should ensure that fishing opportunities are in line with the scale of the resources in each of the stocks.

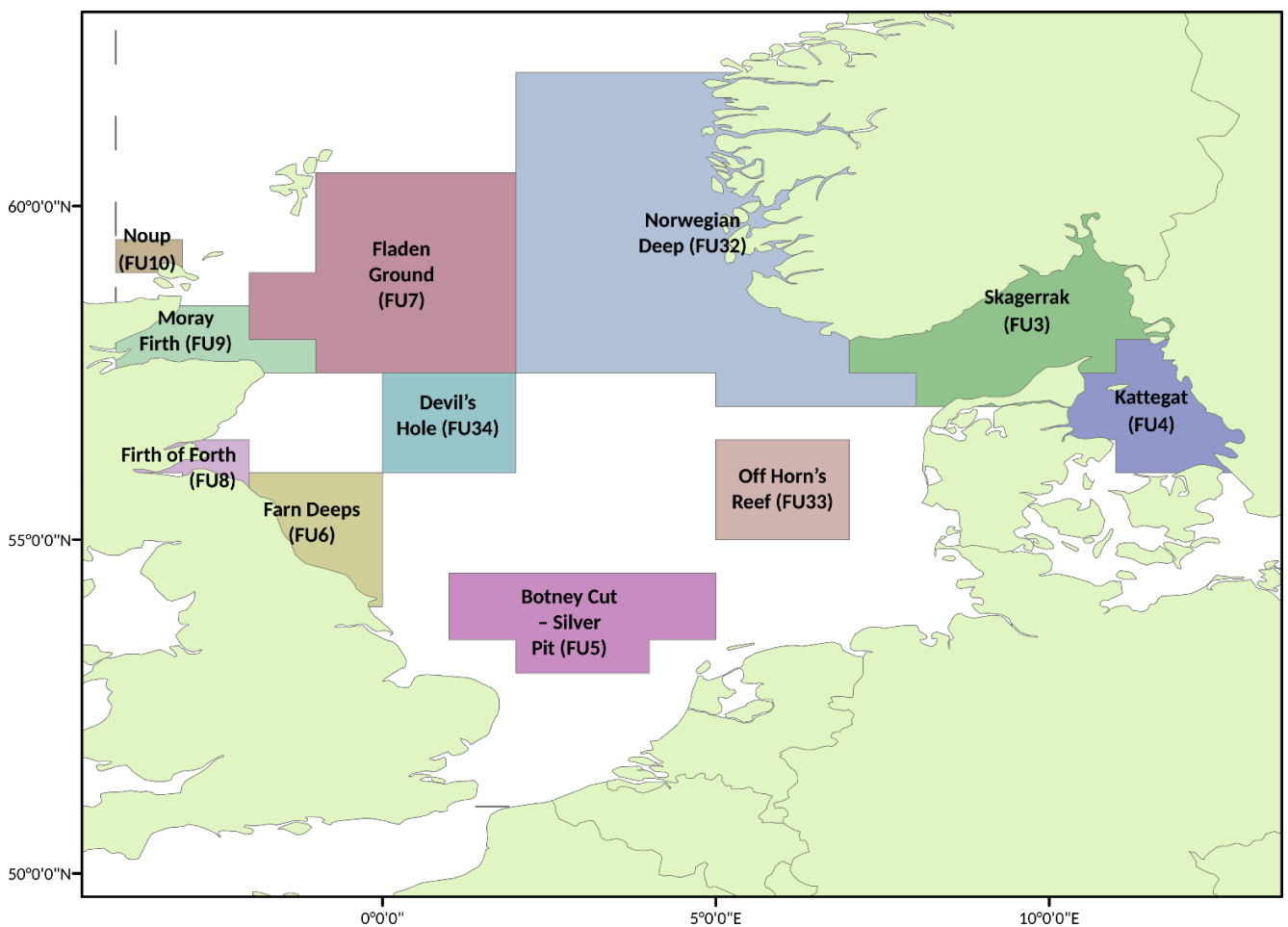


Figure 2 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 4 Norway lobster in Division 4.a, Functional Unit 9. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	262	Lowest observed UWTV survey estimate of abundance (1993–2010); individuals in millions	ICES (2010)
	F_{MSY}	11.8	Proxy, harvest rate equivalent to $F_{35\%SPR}$ for combined sexes; percentage by number	ICES (2012)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
EU Management plan (MAP) (EU, 2018).	MAP MSY $B_{trigger}$	262	MSY $B_{trigger}$; individuals in millions	ICES (2010)
	MAP B_{lim}	Not defined		
	MAP F_{MSY}	11.8	Harvest rate equivalent to F_{MSY} ; percentage by number	ICES (2012)
	MAP range F_{lower}	9.1–11.8	Harvest rate consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY; percentage by number	ICES (2015)
	MAP range F_{upper}	11.8–11.8	Harvest rate, F_{MSY} upper value capped at F_{MSY} because it has not been possible to evaluate the probability of $SSB < B_{lim}$ as no B_{lim} is defined; percentage by number	ICES (2015)

Basis of the assessment

Table 5 Norway lobster in Division 4.a, Functional Unit 9. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2021a).
Assessment type	Underwater TV survey linked to yield-per-recruit analysis from length data (ICES, 2021b)
Input data	Commercial catches (international landings, length frequencies from Scottish catch sampling), one survey index (FU 9 [UWTV; U6028]). Maturity data from commercial catch sampling. Natural mortalities from Morizur (1982): 0.3 for males and immature females, 0.2 for mature females for all years.
Discards, BMS landings, and bycatch	Included in the assessment, data from the majority of the main fleets (in 2020 covering only 16% of the landings due to COVID-19 pandemic). Seventeen percent of the discards were obtained from sampling (83% raised discards). BMS landings, where reported, are included as dead removals in the assessment since 2016.
Indicators	Sex ratio, length frequencies, mean size, LPUE
Other information	Latest benchmark was performed in 2009 (ICES, 2009)
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 4.a, Functional Unit 9. ICES advice and ICES estimated landings and discards. All weights are in tonnes.

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	ICES landings	ICES total discards *
1993				1809	214
1994				1537	153
1995				1279	502
1996	Status quo TAC			1451	492
1997	Status quo TAC			1447	230
1998				1032	89
1999				1009	55
2000				1539	269
2001				1401	125
2002	Catches to be maintained at the 2000 level			1132	220

Year	ICES advice	Landings corresponding to advice	Catch corresponding to advice	ICES landings	ICES total discards *
2003	Catches to be maintained at the 2000 level			1080	70
2004	Catches to be maintained at the 2000 level			1333	272
2005	Catches to be maintained at the 2000 level			1605	122
2006	No increase in effort			1805	117
2007	No increase in effort, and harvest rate below 15%	2400		1843	95
2008	No new advice, same as for 2007	2400		1515	74
2009	No increase in effort and recent average landings	< 1800		1067	33
2010	Harvest rate no greater than that equivalent to fishing at F_{2008}	< 1400		1063	104
2011	MSY transition	< 1300		1391	102
2012	MSY approach	< 1100		866	54
2013	MSY approach	< 1000		623	10
2014	MSY approach	< 739		1253	87
2015	MSY approach	< 1185		816	56
2016	MSY approach	< 923	≤ 943 **	1146	95
2017	MSY approach		≤ 1070 ***	1143	12
2018	MSY approach		≤ 1219 ^	1397	4
2019	MAP ^^ F ranges (harvest rate = 9.1–11.8%)		982–1274 ^	1356	10
2020	Management plan		1008–1307 ^	963	17
2021	Management plan		911–1180 ^		
2022	MSY approach		≤ 2062 ^		

* Dead + surviving discards.

** Assuming all catches are landed and selection patterns do not change.

*** Assuming discarding below the minimum conservation reference size (MCRS) only.

^ Assuming average discard rates for the last three years.

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

History of the catch and landings

Table 7 Norway lobster in Division 4.a, Functional Unit 9. Catch distribution by fleet in 2020 as estimated by ICES.

Catch		Landings			Discards	
99.6% dead	0.4% surviving	Directed <i>Nephrops</i> fishery TR2 47%	Mixed <i>Nephrops</i> /demersal fishery TR1 52%	1% creel	75% dead	25% surviving
980 tonnes		963 tonnes			17 tonnes	

Table 8 Norway lobster in Division 4.a, Functional Unit 9. ICES estimates of landings by country (presented by gear for Scotland), and discards. All weights are in tonnes.

Year	UK Scotland				UK England	Total landings	Total discards **
	<i>Nephrops</i> trawl	Other trawl	Creel	Subtotal			
1981	1299	117	0	1416	0	1416	
1982	1033	86	0	1119	0	1119	
1983	850	91	0	941	0	941	
1984	960	209	0	1169	0	1169	
1985	1908	173	0	2081	0	2081	
1986	1932	211	0	2143	0	2143	
1987	1724	268	0	1992	0	1992	
1988	1637	322	0	1959	0	1959	
1989	2102	474	0	2576	0	2576	
1990	1698	339	0	2037	0	2037	
1991	1285	235	0	1520	0	1520	
1992	1285	306	0	1591	0	1591	

Year	UK Scotland				UK England	Total landings	Total discards **
	<i>Nephrops</i> trawl	Other trawl	Creel	Subtotal			
1993	1505	304	0	1809	0	1809	214
1994	1179	358	0	1537	0	1537	153
1995	967	312	0	1279	0	1279	502
1996	1084	364	1	1449	2	1451	492
1997	1103	343	0	1446	1	1447	230
1998	739	289	4	1032	0	1032	89
1999	813	194	2	1009	0	1009	55
2000	1341	196	2	1539	0	1539	269
2001	1186	213	2	1401	0	1401	125
2002	883	247	2	1132	0	1132	220
2003	873	196	11	1080	0	1080	70
2004	1222	103	8	1333	0	1333	272
2005	1526	64	12	1602	3	1605	122
2006	1751	42	11	1804	1	1805	117
2007	1818	17	6	1841	2	1843	95
2008	1444	68	3	1515	0	1515	74
2009	1033	31	2	1066	1	1067	33
2010	1026	28	9	1063	0	1063	104
2011	1358	23	9	1390	1	1391	102
2012	834	24	8	866	0	866	54
2013	497	116	7	620	3	623	10
2014	1183	56	2	1241	12	1253	87
2015	774	40	0	814	2	816	56
2016	1105	37	4	1146	< 1	1146	95
2017	943	191	8	1142	1	1143	12
2018	1203	183	9	1395	2	1397	4
2019*	1150	191	13	1354	2	1356	10
2020 *	800	154	7	961	2	963	17

* Provisional.

** Dead + surviving discards.

Summary of the assessment

Table 9 Norway lobster in Division 4.a, Functional Unit 9. Assessment summary.

Year	Abundance * (millions)	Two standard deviations	Harvest rate (% by number)	Landings numbers (millions)	Discards numbers (millions)	Removals numbers (millions)	Landings (tonnes)	Discards (tonnes)	Dead discards (tonnes)	Discard rate (% by number)	Mean weight in landings (grammes)	Mean weight in discards (grammes)	Dead discard rate (% by number)
1993	345	78	26	77	19	91	1809	214	161	19.8	23.42	11.26	15.6
1994	702	176	11.4	69	15	80	1537	153	115	17.8	22.25	10.21	14.0
1995	NA	NA	NA	62	72	116	1279	502	376	54	20.59	6.93	47
1996	465	90	21	68	41	98	1451	492	369	37	21.40	12.11	31
1997	262	55	33	71	22	87	1447	230	172	24	20.43	10.42	18.9
1998	323	95	18.1	50	11	58	1032	89	67	17.6	20.47	8.29	13.8
1999	400	87	12.8	46	6	51	1009	55	41	12.0	21.79	8.63	9.3
2000	386	98	20	61	23	78	1539	269	201	27	25.44	11.73	22
2001	345	112	19.3	58	11	66	1401	125	94	16.3	24.18	11.04	12.8
2002	521	121	11.7	41	27	61	1132	220	165	40	27.68	8.18	33
2003	730	314	7.1	46	7	52	1080	70	52	13.7	23.32	9.51	10.6
2004	626	186	10.5	48	23	66	1333	272	204	33	27.57	11.62	27
2005	869	198	8.8	67	12	76	1605	122	92	15.0	23.84	10.31	11.7
2006	445	124	20	81	12	90	1805	117	87	12.8	22.34	9.86	9.9
2007	531	156	16.0	80	7	85	1843	95	72	7.9	23.04	13.95	6.0
2008	481	151	13.7	60	8	66	1515	74	55	11.4	25.29	9.60	8.8
2009	415	140	11.6	45	4	48	1067	33	25	7.6	23.46	8.72	5.8
2010	406	115	11.5	39	10	47	1063	104	78	19.8	26.94	10.63	15.7
2011	372	161	18.9	63	10	70	1391	102	77	13.9	21.63	10.12	10.8
2012	299	90	13.7	37	6	41	866	54	41	13.2	23.16	9.72	10.3
2013	469	106	5.8	26	1	27	623	10	8	3.3	24.95	11.21	2.5
2014	331	90	14.7	43	7	49	1253	87	65	14.6	28.94	11.79	11.3
2015	347	84	9.1	28	5	32	816	56	42	15.1	29.10	11.35	11.8
2016	388	87	12.7	42	9	49	1146	95	71	18.0	26.83	10.16	14.2
2017	412	106	10.5	42	1	43	1143	12	9	2.6	26.34	10.74	1.99
2018	417	126	11.7	48	0	49	1397	4	3	0.87	28.86	9.58	0.66
2019	376	146	14.8	55	1	56	1356	10	8	1.86	25.13	9.84	1.40
2020	NA	NA	7.4^	36	2	38	963	17	13	5.5	26.63	7.88	4.2
2021	658	153											

* For Norway lobster greater than 17 mm carapace length.

** NA = Not available.

^ The harvest rate in 2020 was calculated using an interpolated value for abundance (average of 2019 and 2021).

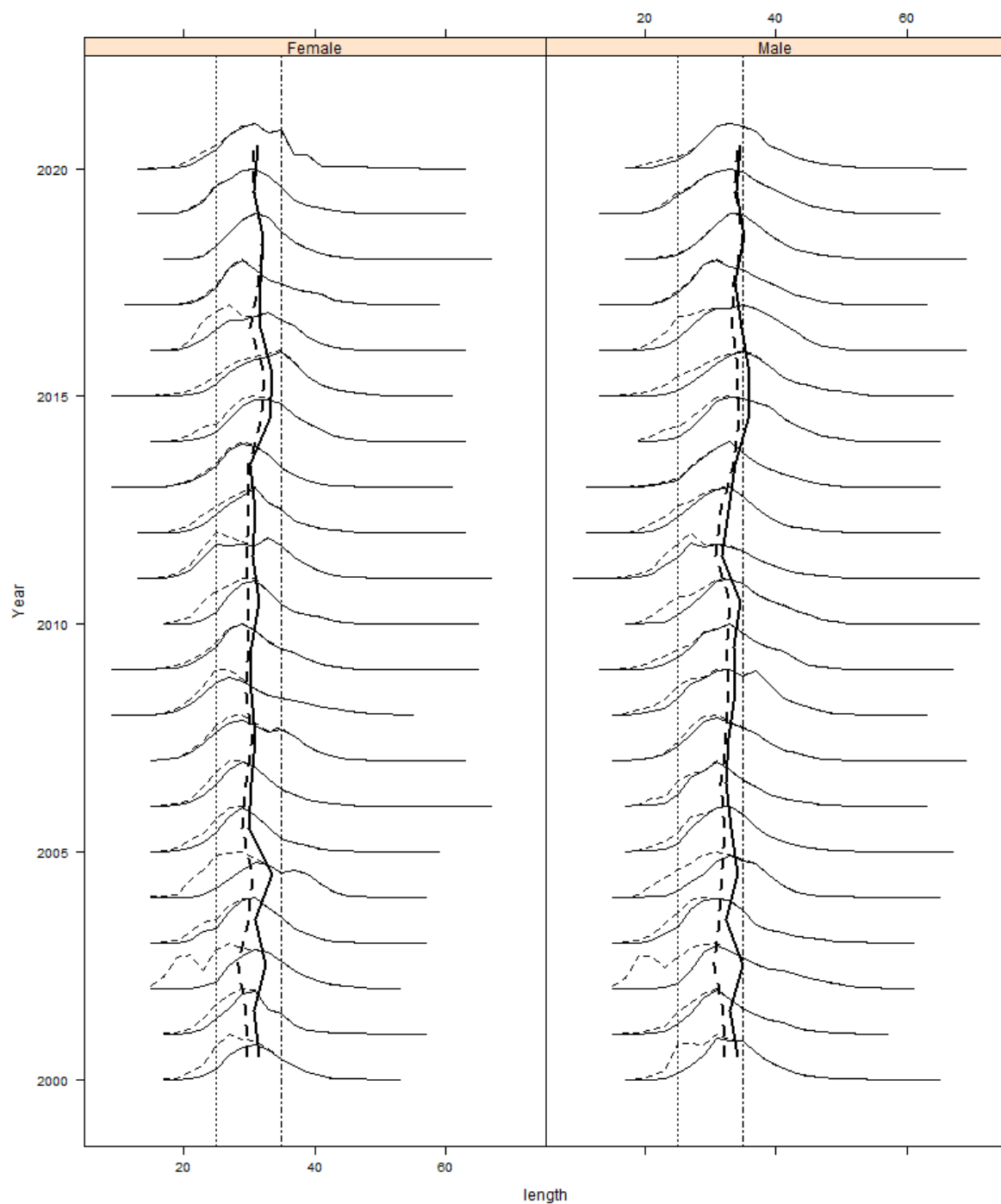


Figure 3 Norway lobster in Division 4.a, Functional Unit 9. The dashed lines represent catches while the solid lines represent landings. Annual length–frequency distributions are shown on the horizontal, the vertical bold lines represent mean lengths. Minimum conservation reference size (25 mm) and 35 mm visual reference levels indicated. All lengths are shown in carapace length (mm).

Sources and references

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

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