

Norway lobster (*Nephrops norvegicus*) in Division 4.b, Functional Unit 8 (central North Sea, Firth of Forth)

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 3216 tonnes.

To ensure that the stock in Functional Unit (FU) 8 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 $B_{trigger}$.

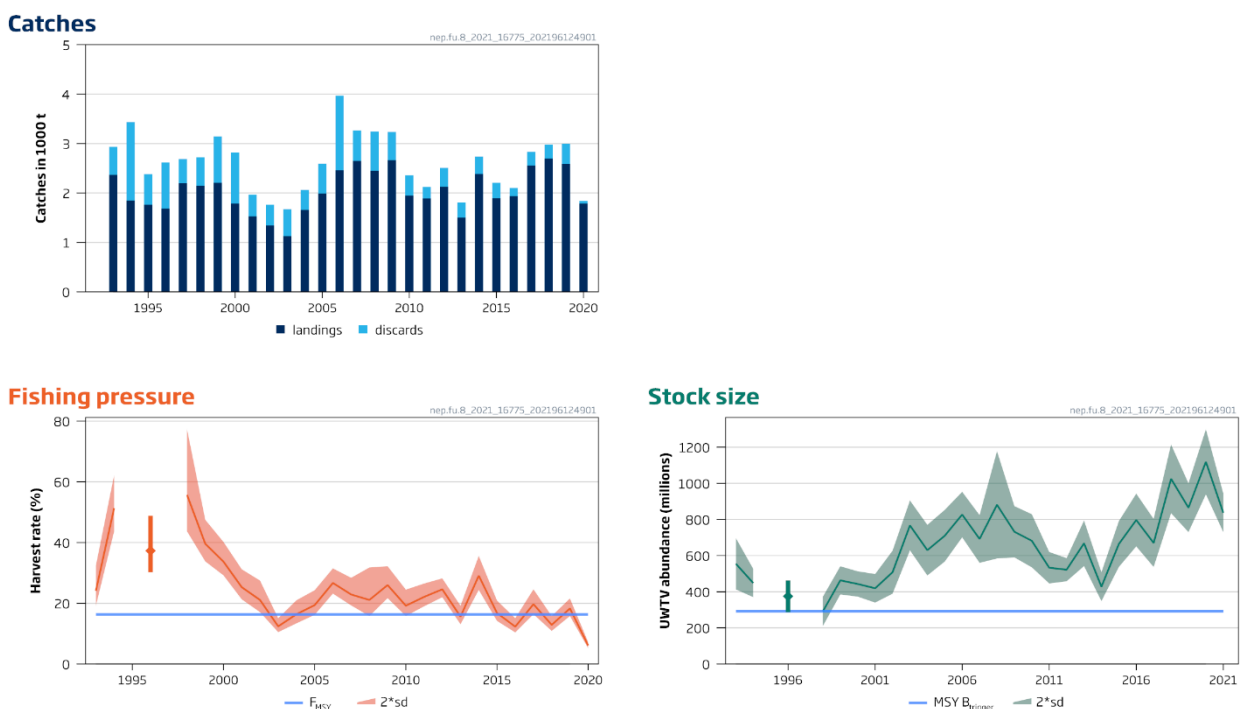


Figure 1 Norway lobster in Division 4.b, Functional Unit 8. Summary of the stock assessment. Catches, harvest rate (sum of landings and dead discards in numbers, divided by stock abundance), and stock abundance (underwater TV survey). Harvest rates prior to 2006 may be underestimated because of underreporting of landings.

Catch scenarios

Table 1 Norway lobster in Division 4.b, Functional Unit 8. The basis for the catch scenarios.

Variable	Value	Notes
Stock abundance (2022)	837	Underwater TV (UWTV) survey 2021; millions
Mean weight in projected landings	24.95	Average 2018–2020; grammes
Mean weight in projected discards	10.67	Average 2018–2020; grammes
Projected total discard rate	16.4	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.b, Functional Unit 8. 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	3216	3154	2967	187	62	16.3	-18.2
Other scenarios							
F ₂₀₂₀	1195	1172	1103	69	23	6.1	-70
F _{0.1}	1855	1819	1711	108	36	9.4	-53
F _{MSY lower}	2091	2051	1930	121	40	10.6	-47
F _{2018–2020}	2446	2399	2257	142	47	12.4	-38
F _{35SpR}	2505	2457	2312	145	48	12.7	-36
F _{MSY upper} ***	3216	3154	2967	187	62	16.3	-18.2

* Calculated for dead removals.

** Advice basis values for 2022 relative to the 2021 advice value (MAP F_{MSY} advice of 3931 tonnes).

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

The 18.2% decrease in the advice relative to 2021 results from a decrease in stock abundance in combination with updated individual mean weight in landings and discard rates.

Basis of the advice

Table 3 Norway lobster in Division 4.b, Functional Unit 8. 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.

Only commercial catch samples from quarter 1 were available in 2020 as a result of the COVID-19 pandemic. As observed discard rates in quarter 1 were lower than average, it was decided to calculate averages for the reference period 2017–2019 and scale to quarter 1 values in 2020. There was no seasonal pattern in discard rate in the past, so the approach was considered appropriate.

Underwater TV (UWTV) surveys have been conducted for this stock since 1993, with a continuous annual series available since 1998.

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.

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. Observations from the fishery indicate that discarding above the MCRS continues

(Figure 3). In 2016–2020, only negligible amounts of Norway lobster were recorded as being below MCRS (BMS category) in FU 8, 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.

A single TAC covers the entire ICES Subarea 4, except for the Norwegian Deep. Management should be implemented at the functional unit level to ensure that fishing opportunities are in line with the scale of the resource for each of the stocks and the corresponding MSY approach.

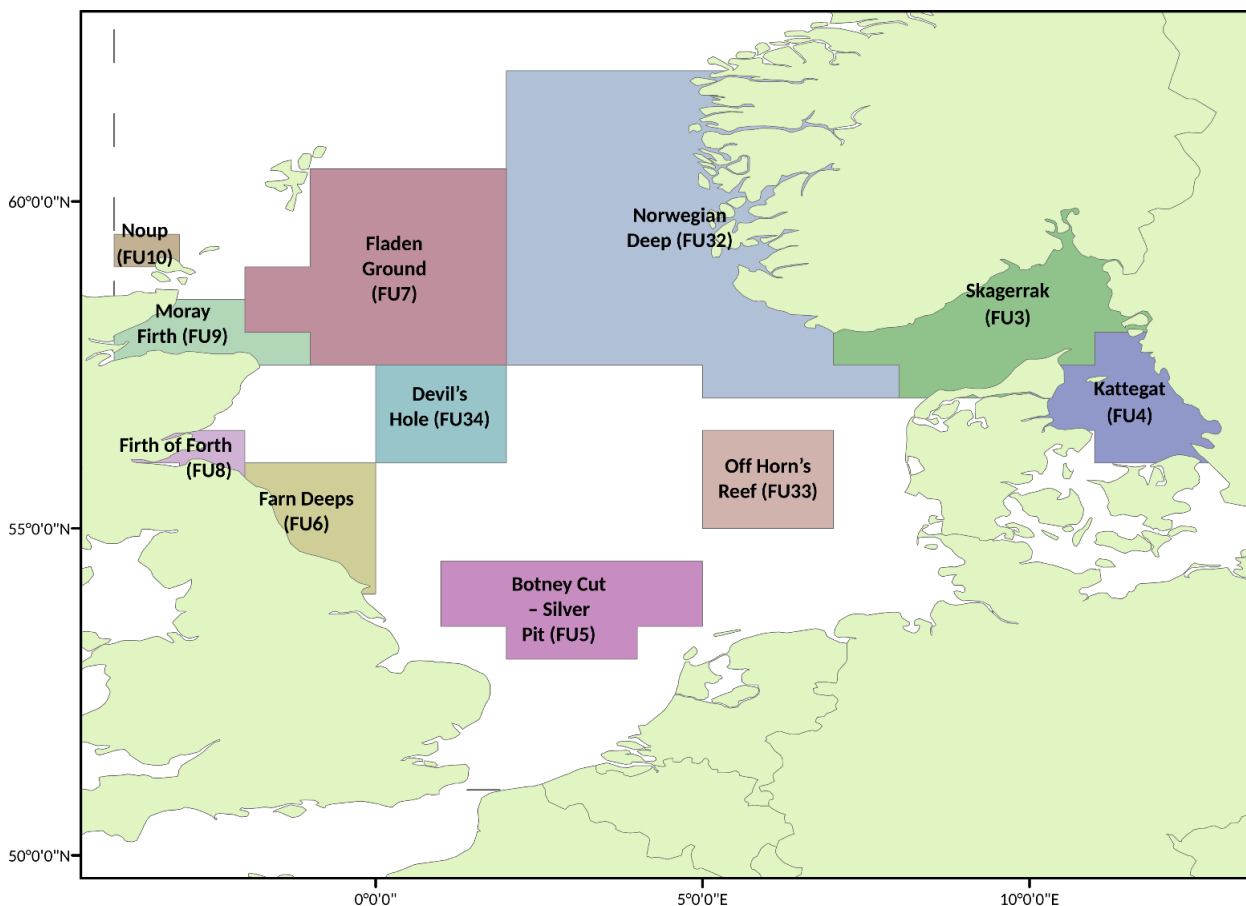


Figure 2 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 4 Norway lobster in Division 4.b, Functional Unit 8. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	292	Lowest observed UWTV survey estimate of abundance (1993–2010); individuals in millions	ICES (2010)
	F_{MSY}	16.3	Proxy, harvest rate equivalent to F_{max} 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 $B_{trigger}$	292	MSY $B_{trigger}$; individuals in millions	ICES (2010)
	MAP B_{lim}	Not defined		
	MAP F_{MSY}	16.3	Harvest rate equivalent to F_{MSY} ; percentage by number	ICES (2012)
	MAP range F_{lower}	10.6–16.3	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}^*	16.3–16.3	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)

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

Basis of the assessment

Table 5 Norway lobster in Division 4.b, Functional Unit 8. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2021a)
Assessment type	Underwater TV survey (UWTV) 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 8; [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 15% of the landings due to COVID-19 pandemic). Fifteen percent of the discards were obtained from sampling (85% 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	The latest benchmark (on the use of UWTV surveys) 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.b, Functional Unit 8. ICES advice and ICES catches. All weights are in tonnes.

Year	ICES advice	Landings advice	Catch advice	ICES landings	ICES total discards*, ^^^
1993				2368	567
1994				1850	1584
1995				1762	620
1996				1687	930
1997				2193	494
1998				2144	578
1999				2207	938
2000				1785	1032
2001				1527	436
2002				1340	421
2003				1127	546
2004				1657	406
2005				1989	602
2006	No increase in effort			2458	1510

Year	ICES advice	Landings advice	Catch advice	ICES landings	ICES total discards*, ^^^
2007	No increase in effort, harvest rate < 15%	1500		2651	614
2008	No new advice, same as for 2007	1500		2450	796
2009	No increase in effort and recent average landings	< 2500		2663	573
2010	Harvest rate no greater than that equivalent to fishing at Fmax	< 1600		1950	407
2011	MSY transition	< 2000		1889	231
2012	MSY transition	< 1700		2129	379
2013	MSY transition	< 1400		1503	301
2014	MSY transition	< 1417		2384	353
2015	MSY approach	< 1769		1897	311
2016	MSY approach	< 1866	≤ 2040 **	1935	167
2017	MSY approach		≤ 2548 ***	2554	280
2018	MSY approach		≤ 2376 ^	2698	275
2019	MAP ^^ F ranges (Harvest rate = 10.6–16.3%)		2321–3569 ^	2585	411
2020	Management plan		2045–3143 ^	1787	53
2021	Management plan		2556–3931 ^		
2022	MSY approach		≤ 3216 ^		

* Dead + surviving discards.

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

*** Assuming discarding includes Norway lobster below 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).

^^^ Since 2016, discards include BMS landings.

History of the catch and landings

Table 7 Norway lobster in Division 4.b, Functional Unit 8. Catch distribution by fleet in 2020 as estimated by ICES.

Catch		Landings			Discards	
99% dead	1% surviving	Directed <i>Nephrops</i> fishery TR2 86%	Mixed <i>Nephrops</i> /demersal fishery TR1 14%	Creel 0%	75% dead *	25% surviving
1840 tonnes		1787 tonnes			53 tonnes	

* Discards include BMS landings.

Table 8 Norway lobster in Division 4.b, Functional Unit 8. ICES estimates of landings by gear for UK (Scotland), total landings for UK (E, W & NI), and total discards. All weights are in tonnes.

Year	UK (Scotland)				UK (E, W & NI)	Total landings *	Total discards ***, ^
	<i>Nephrops</i> trawl	Other trawl	Creel	Subtotal			
1981	947	60	0	1007	0	1007	
1982	1138	57	0	1195	0	1195	
1983	1681	43	0	1724	0	1724	
1984	2078	56	0	2134	0	2134	
1985	1907	61	0	1968	0	1968	
1986	2204	59	0	2263	0	2263	
1987	1583	90	2	1675	0	1675	
1988	2455	74	0	2529	0	2529	
1989	1834	53	0	1887	1	1888	
1990	1900	30	0	1930	1	1931	
1991	1362	43	0	1405	0	1405	
1992	1715	41	0	1756	0	1756	
1993	2349	17	0	2366	2	2368	567
1994	1827	17	0	1844	6	1850	1584
1995	1707	53	0	1760	2	1762	620
1996	1621	66	0	1687	0	1687	930

Year	UK (Scotland)				UK (E, W & NI)	Total landings *	Total discards ***, ^
	<i>Nephrops</i> trawl	Other trawl	Creel	Subtotal			
1997	2136	55	0	2191	2	2193	494
1998	2105	37	0	2142	2	2144	578
1999	2193	10	1	2204	3	2207	938
2000	1775	9	0	1784	1	1785	1032
2001	1484	34	0	1518	9	1527	436
2002	1302	31	1	1334	6	1340	421
2003	1116	8	0	1124	3	1127	546
2004	1650	4	0	1654	3	1657	406
2005	1974	0	4	1978	11	1989	602
2006	2438	3	12	2453	5	2458	1510
2007	2627	10	7	2644	7	2651	614
2008	2435	2	8	2445	5	2450	796
2009	2620	8	26	2654	9	2663	573
2010	1923	5	13	1941	9	1950	407
2011	1789	6	89	1884	5	1889	231
2012	1944	17	126	2087	42	2129	379
2013	1409	24	58	1491	12	1503	301
2014	2344	4	14	2362	22	2384	353
2015	1784	2	43	1829	68	1897	311
2016	1786	1	116	1903	32	1935	167
2017	2472	11	10	0	61	2554	280
2018	2646	7	4	0	41	2698	275
2019	2531	10	5	2546	39	2585	411
2020**	1768	3	0	1771	16	1787	53

* There are no landings by other countries from this FU.

** Provisional.

*** Dead + surviving discards.

^ Since 2016, discards include BMS landings.

Summary of the assessment

Table 9 Norway lobster in Division 4.b, Functional Unit 8. Assessment summary.

Year	UWTV abundance * (millions)	Two standard deviations	Harvest rate (% by number)	Landings numbers (millions)	Discard numbers (millions)	Removal 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	555	142	24	97	49	134	2368	567	426	33	24.30	11.64	27
1994	448	78	51	95	180	230	1850	1584	1188	66	19.51	8.79	59
1995	NA	NA	NA	90	59	134	1762	620	465	40	19.55	10.54	33
1996	375	88	37	81	78	140	1687	930	697	49	20.81	11.85	42
1997	NA	NA	NA	116	56	158	2193	494	371	33	18.87	8.79	27
1998	292	81	56	118	60	163	2144	578	434	34	18.23	9.60	28
1999	463	78	40	110	97	183	2207	938	704	47	20.05	9.63	40
2000	443	70	34	82	90	150	1785	1032	774	52	21.83	11.42	45
2001	419	79	25	72	45	106	1527	436	327	39	21.22	9.59	32
2002	508	119	21	68	52	107	1340	421	316	43	19.62	8.16	36
2003	767	138	12.4	51	59	95	1127	546	410	54	22.31	9.25	47
2004	630	140	16.4	74	40	103	1657	406	304	35	22.45	10.25	29
2005	710	143	19.4	89	65	138	1989	602	452	42	22.33	9.28	35
2006	827	126	27	115	142	221	2458	1510	1133	55	21.43	10.67	48
2007	692	132	23	126	43	159	2651	614	461	25	20.97	14.34	20
2008	881	297	21	142	58	186	2450	796	597	29	17.23	13.65	24
2009	732	142	26	137	71	190	2663	573	430	34	19.41	8.09	28
2010	682	147	19.2	99	43	131	1950	407	305	30	19.76	9.55	24
2011	533	87	22	100	24	118	1889	231	173	19.5	19.75	9.56	15.3
2012	522	64	25	100	38	129	2129	379	284	27	21.66	10.10	22
2013	668	126	15.6	81	31	104	1503	301	226	27	19.30	9.82	22
2014	428	80	29	102	30	124	2384	353	265	23	24.30	11.66	18.3
2015	664	127	16.8	90	29	112	1897	311	234	24	21.84	10.74	19.5
2016	797	146	12.3	85	17	98	1935	165	123	16.4	23.62	9.86	12.8
2017	670	133	19.7	111	28	132	2554	280	210	20	23.07	10.07	15.8
2018	1025	190	12.9	114	24	132	2698	275	206	17.4	24.29	11.42	13.6
2019	865	135	18.3	127	42	158	2585	411	308	25	21.81	9.76	19.9
2020	1119	180	6.1	64	5	68	1787	53	40	6.9	28.75	10.83	5.5
2021	837	107											

* For Norway lobster greater than 17 mm carapace length.

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

NA = not available.

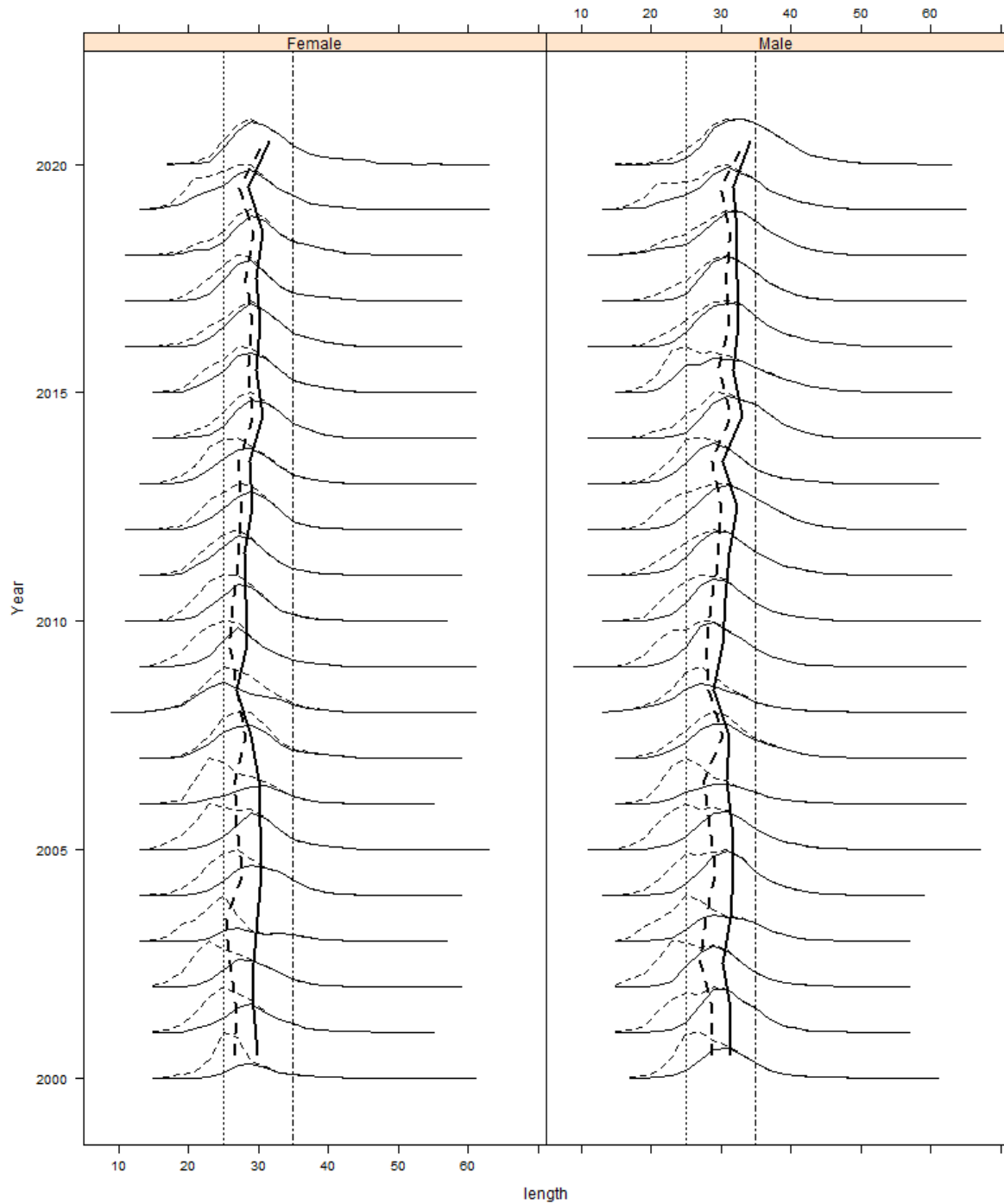


Figure 3 Norway lobster in Division 4.b, Functional Unit 8. The dashed lines represent catches while the solid lines represent landings. Annual length–frequency distributions are shown on the horizontal, the bold vertical lines represent mean lengths. Minimum conservation reference size (25 mm) and 35 mm visual reference levels indicated. All lengths are shown in carapace length (mm).

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

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