Norway lobster (*Nephrops norvegicus*) in Division 6.a, Functional Unit 12 (West of Scotland, South Minch)

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 3977 tonnes.

To ensure that the stock in Functional Unit (FU) 12 is exploited sustainably, management should be implemented at the FU level.

ICES notes the existence of a management plan, developed and adopted by one of the relevant management authorities for Subarea 6. ICES considers this plan to be precautionary when implemented at the FU level.

Stock development over time

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

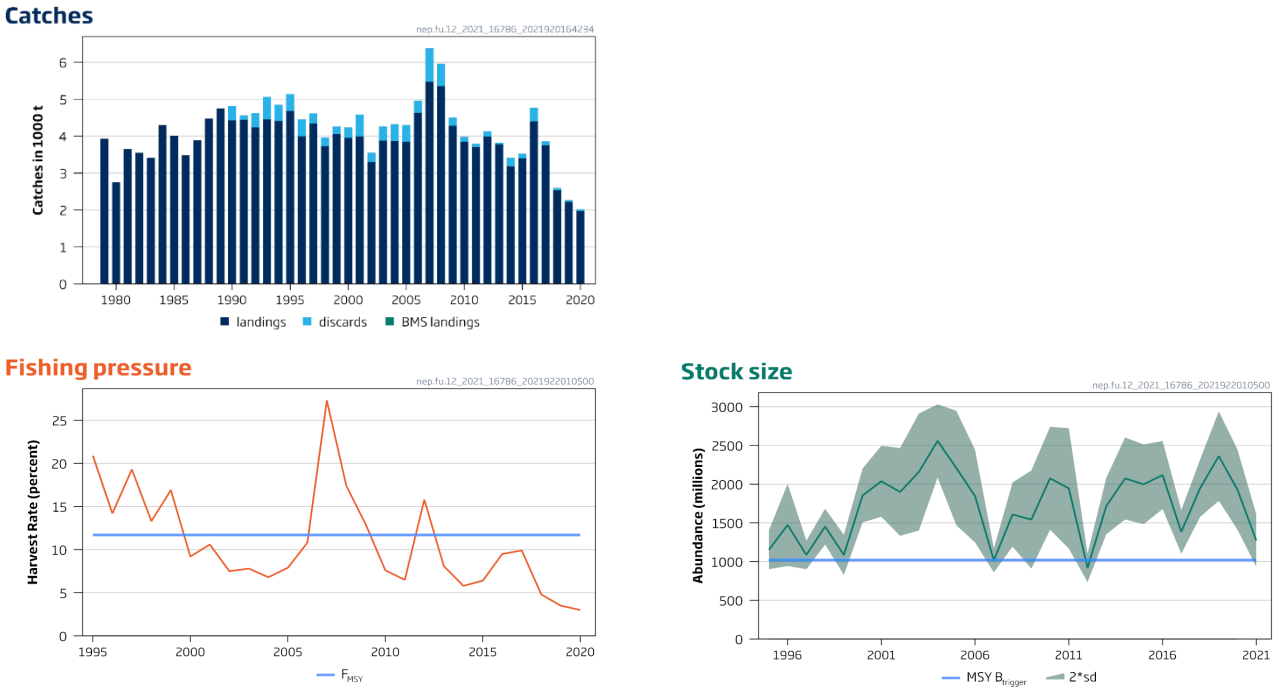

Figure 1 Norway lobster in Division 6.a, Functional Unit 12. Summary of the stock assessment. Catches (discard data only available from 1990), harvest rate (sum of landings and dead discards in numbers, divided by stock abundance), and stock abundance (underwater TV survey). Harvest rates before 2006 may be underestimated because of the underreporting of landings.

Catch scenarios

Table 1 Norway lobster in Division 6.a, Functional Unit 12. The basis for the catch scenarios.

Variable	Value	Notes
Stock abundance (2022)	1272	UWTV survey 2021; individuals in millions
Mean weight in projected landings	27.32	Average 1999–2020; in grammes
Mean weight in projected discards	10.13	Average 1999–2020; in grammes
Projected discard rate	5.7	Average 2018–2020; percentage by number of the total catch
Discards survival rate	25	Percentage by number of the discards

Table 2 Norway lobster in Division 6.a, Functional Unit 12. Annual catch advice and scenarios. All weights are in tonnes. 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.

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	3977	3955	3890	65	22	11.7	−33
Other scenarios							
$F_{MSY\ lower}$	3161	3144	3092	52	17	9.3	−47
$F_{MSY\ upper}$***	3977	3955	3890	65	22	11.7	−33
F_{2020}	1020	1014	997	17	6	3.0	−83

* By number.
** Advice values for 2022 are relative to the 2021 advice (MAP F_{MSY} advice of 5916 tonnes).
*** $F_{MSY\ upper} = F_{MSY}$ for this stock.

The advice for 2022 is lower than for 2021 because of a lower estimated stock abundance.

Basis of the advice

Table 3 Norway lobster in Division 6.a, Functional Unit 12. 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, 2019) and considers it to be precautionary when implemented at the FU 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

Discard sampling was impacted by the COVID-19 pandemic, with samples only ccollected in quarter 1 of 2020. Estimates of discard rates for quarters 2–4 in the assessment were based on mean discard rates across all quarters from 2017–2019 (ICES, 2021a). Landings in quarter 2 were not sampled due to COVID-19 and samples from quarter 3 were used as replacements. This change is considered to have had minimal impact on the quality of the assessment because discard rates have been consistently low in recent years.

The underwater TV survey (UWTV) has provided abundance estimates for FU 12 (Figure 2) with acceptable precision since 1995. However, some patches of muddy sediment supporting Norway lobster populations in the inshore areas and sea lochs of FU 12 are not routinely surveyed and are not included in the estimate of abundance. The current estimate of abundance is therefore likely to be a slight underestimate of actual abundance.

The long-term average – rather than a three-year average – is considered to be more appropriate as input for the mean weight in landings and discards in the calculation of catch scenarios; this is due to interannual variation.

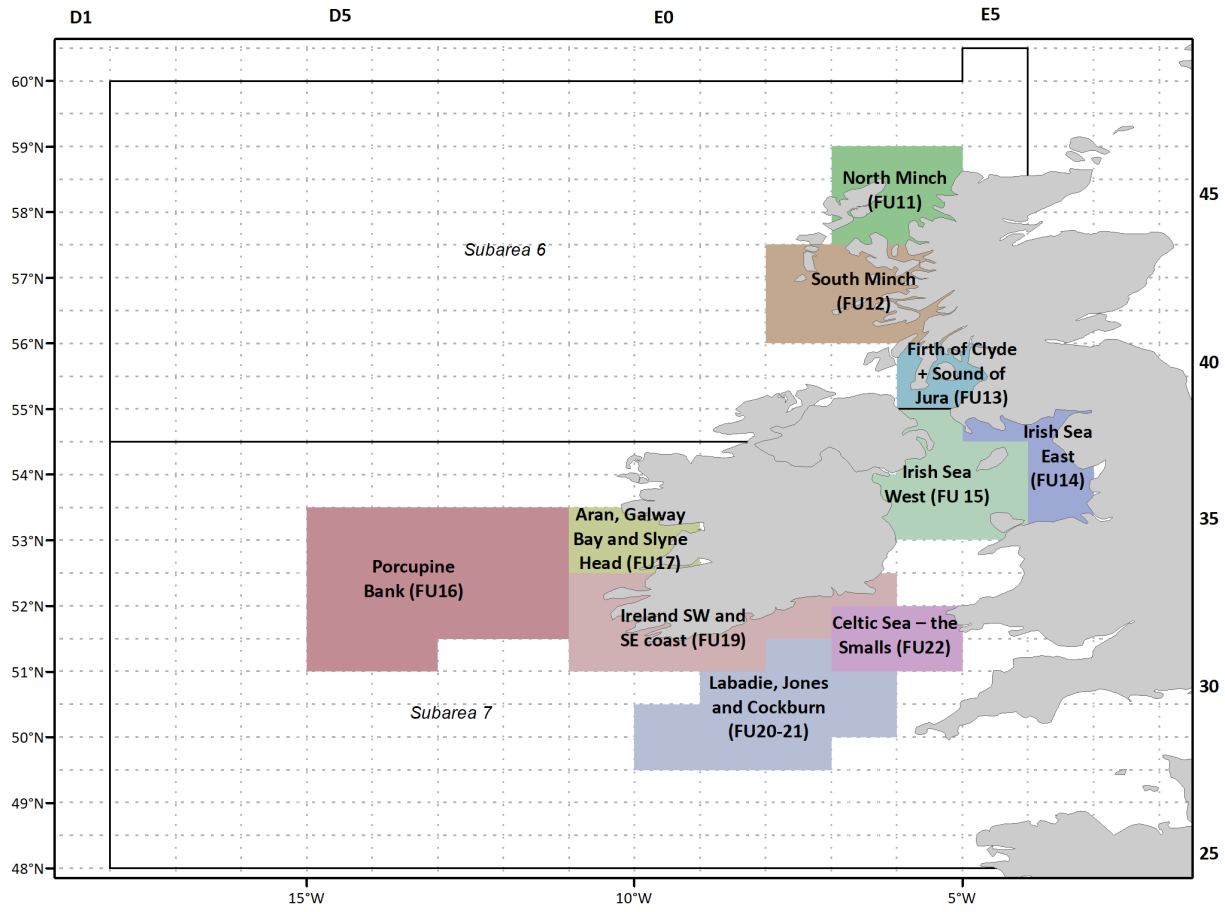

Figure 2 Norway lobster functional units in subareas 6 and 7.

Issues relevant for the advice

During 2016–2020, the EU landing obligation was applied to all catches of Norway lobster fisheries in ICES Subarea 6 with exemptions for high survival. From 2021, this stock is still under a landing obligation, and there are still exemptions in place. Observations from the 2018–2020 fishery indicate that some discarding above the minimum conservation reference size (MCRS) continues (Figure 3). Consequently, 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 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.

The absolute density observed for FU 12 in the UWTV survey is below average (~0.25 individuals m^{-2}). This suggests that the stock may have a lower than average productivity capability. The fishery in this area has been in existence since the 1960s. Historical harvest rates in this FU have been variable but have generally remained around $F_{35\%SPR}$ (the fishing mortality that gives 35% spawning potential ratio). $F_{35\%SPR}$ (combined between sexes) is expected to deliver high long-term yield with a low probability of recruitment overfishing; thus it is chosen as proxy for F_{MSY}.

A single TAC covers the entire ICES Subarea 6. Management should be implemented at the FU level to ensure that fishing opportunities are in line with the scale of the resource for each of the stocks and consistent with a MSY approach.

Reference points

Table 4 Norway lobster in Division 6.a, Functional Unit 12. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	1020	Lowest observed abundance estimate from the UWTV survey time-series as calculated in 2010; individuals in millions	ICES (2016)
	F_{MSY}	11.7	Proxy harvest rate equivalent to the $F_{35\%SPR}$ for combined sexes derived from the length-based per recruit analysis; percentage by number	ICES (2016)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
EU management plan (EU, 2019)	MAP MSY $B_{trigger}$	1020	MSY $B_{trigger}$; individuals in millions	ICES (2016)
	MAP B_{lim}	Not defined		
	MAP F_{MSY}	11.7	Harvest rate equivalent to F_{MSY}; percentage by number	ICES (2016)
	MAP range $F_{MSY\ lower}$	9.3–11.7	Harvest rate, consistent with ranges provided by ICES, resulting in no more than 5% reduction in long-term yield compared with MSY; percentage by number	ICES (2016)
	MAP range $F_{MSY\ upper}$	11.7–11.7	Harvest rate, $F_{MSY\ upper}$ value capped at F_{MSY} because it has not been possible to evaluate the probability of SSB < B_{lim}; percentage by number	ICES (2016)

Basis of the assessment

Table 5 Norway lobster in Division 6.a, Functional Unit 12. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2021b)
Assessment type	Underwater TV survey (ICES, 2021a)
Input data	One survey index (UWTV-FU12 [U6028]); commercial catches (international landings, length frequencies from Scottish catch sampling); fixed maturity parameters (from survey data); and natural mortality. Discard survival rate.
Discards and bycatch	Included in the assessment since 1990; data series from the majority of the main fleets cover almost all landings
Indicators	Size structure, mean size, and sex ratio of catches
Other information	The latest benchmark (based on the UWTV survey) was performed in 2009 (WKNEPH; ICES, 2009)
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

History of the advice, catch, and management

Table 6 Norway lobster in Division 6.a, Functional Unit 12. ICES advice, landings, and discards. All weights are in tonnes.

Year	ICES advice	Landings advice	Catch advice**	ICES landings	Total discards*
1989				4745	
1990				4430	384
1991				4442	122
1992	Maintain current effort			4237	385
1993	Maintain current effort			4458	602
1994	Maintain current effort			4414	435
1995	Maintain current effort			4682	455
1996	Maintain current effort			3995	457
1997	As for 1996			4344	271
1998	Maintain current effort			3730	233
1999	As for 1998			4052	206
2000	Maintain current effort			3953	284
2001	As for 2000			3991	591
2002	Maintain current effort			3305	247

Year	ICES advice	Landings advice	Catch advice**	ICES landings	Total discards*
2003	As for 2002			3879	381
2004	Maintain current effort			3869	454
2005	As for 2004			3848	452
2006	No increase in effort			4633	324
2007	No increase in effort and harvest rate of 15%	7200		5471	903
2008	As for 2007	7200		5356	605
2009	No increase in effort and recent average catch	< 5000		4285	216
2010	Harvest rate no greater than that equivalent to fishing at $F_{0.1}$	< 4100		3846	133
2011	MSY transition scheme	< 4000		3702	92
2012	MSY approach	< 5500		3989	145
2013	MSY approach	< 5800		3776	50
2014	MSY approach	< 5211		3179	233
2015	MSY approach	< 6382		3400	121
2016	MSY approach		≤ 6163***	4402	365
2017	MSY approach		≤ 6419	3757	105
2018	MSY approach		≤ 4112	2540	54
2019	MSY approach		≤ 5844	2220	46
2020	Management plan		7134 (range 5671–7134)	1976	46
2021	Management plan		5916 (range 4703–5916)		
2022	MSY approach		≤ 3977		

* Dead + surviving discards.
** Assuming recent discard rates from 2017 onwards
*** Assuming all catches are landed

History of the catch and landings

Table 7 Norway lobster in Division 6.a, Functional Unit 12. Catch distribution by fleet in 2020 as estimated by ICES. All weights are in tonnes.

Catch		Landings			Discards	
99.5% dead	0.5% surviving	Directed *Nephrops* fishery		Mixed *Nephrops*/demersal fishery	75% dead	25% surviving
2022 tonnes		69.5% trawl	29.2% creels	1.3%	46 tonnes	
		1976 tonnes				

Table 8 Norway lobster in Division 6.a, Functional Unit 12. History of ICES estimates of landings (for Scotland by gear) and total discards. All weights are in tonnes.

Year	UK Scotland				Other UK	Ireland	Total Landings	Discards*
	Nephrops trawl	Other trawl	Creel	Subtotal				
1981	2966	254	432	3652	0	0	3652	
1982	2925	206	421	3552	0	0	3552	
1983	2595	362	456	3413	0	0	3413	
1984	3229	477	594	4300	0	0	4300	
1985	3096	424	488	4008	0	0	4008	
1986	2694	288	502	3484	0	0	3484	
1987	2928	418	546	3892	0	0	3892	
1988	3544	364	555	4463	10	0	4473	
1989	3846	338	561	4745	0	0	4745	
1990	3732	263	435	4430	0	0	4430	384
1991	3596	342	503	4441	1	0	4442	122
1992	3478	209	549	4236	1	0	4237	385
1993	3609	194	650	4453	5	0	4458	602
1994	3742	264	405	4411	3	0	4414	435
1995	3443	717	508	4668	14	0	4682	455
1996	3108	417	469	3994	1	0	3995	457

Year	UK Scotland				Other UK	Ireland	Total Landings	Discards*
	Nephrops trawl	Other trawl	Creel	Subtotal				
1997	3518	329	493	4340	3	1	4344	271
1998	2851	340	538	3729	0	1	3730	233
1999	3165	359	514	4038	0	14	4052	206
2000	2940	311	700	3951	0	2	3953	284
2001	2823	391	768	3982	0	9	3991	591
2002	2234	314	743	3291	0	14	3305	247
2003	2812	203	858	3873	0	6	3879	381
2004	2864	105	879	3848	0	21	3869	454
2005	2812	46	955	3813	1	34	3848	452
2006	3570	97	922	4589	9	35	4633	324
2007	4437	21	959	5417	19	35	5471	903
2008	4433	12	896	5341	2	13	5356	605
2009	3346	24	900	4270	4	11	4285	216
2010	2836	19	969	3824	16	6	3846	133
2011	2876	11	783	3670	23	9	3702	92
2012	3159	32	773	3964	19	6	3989	145
2013	2490	543	729	3762	13	1	3776	50
2014	2490	3	637	3130	32	17	3179	233
2015	2662	18	665	3345	22	33	3400	121
2016	3450	22	838	4310	33	59	4402	365
2017	2833	60	775	3668	23	66	3757	105
2018	1693	86	682	2461	45	34	2540	54
2019**	1493	39	621	2153	29	38	2220	46
2020**	1320	25	554	1899	8	69	1976	46

* Dead + surviving discards.
**Landing values are preliminary.

Summary of the assessment

Table 9 Norway lobster in Division 6.a, Functional Unit 12. Assessment summary.

Year	UWTV abundance estimate	± 2*Standard deviations	Landings in number	Total discards in number*	Removals in number	Harvest rate (by number) **	Landings	Total discards *	Discard proportion (by number)	Dead discard proportion (by number)	Mean weight in landings	Mean weight in discards
	millions					%	tonnes		%		grammes	
1995	1152	251	213	37	241	21	4682	455	14.8	11.5	21.96	12.28
1996	1473	530	173	48	209	14.2	3995	457	22	17.1	23.10	9.61
1997	1086	185	186	31	209	19.3	4344	271	14.3	11.2	23.37	8.70
1998	1452	232	168	32	192	13.3	3730	233	16.1	12.6	22.18	7.23
1999	1086	260	161	29	183	16.9	4052	206	15.4	12.0	25.14	7.00
2000	1854	348	145	33	170	9.2	3953	284	18.7	14.7	27.30	8.50
2001	2037	459	168	65	216	10.6	3991	591	28	23	23.79	9.11
2002	1899	567	123	26	143	7.5	3305	247	17.6	13.8	26.83	9.37
2003	2157	756	139	38	168	7.8	3879	381	21	16.9	27.86	10.10
2004	2558	473	141	44	175	6.8	3869	454	24	19.0	27.37	10.26
2005	2208	740	137	49	174	7.9	3848	452	27	21	28.11	9.17
2006	1845	598	177	30	199	10.8	4633	324	14.3	11.1	26.24	10.97
2007	1016	155	228	66	278	27	5471	903	22	17.8	23.95	13.73
2008	1608	415	224	74	279	17.4	5356	605	25	19.8	23.91	8.23
2009	1542	634	179	26	199	12.9	4285	216	12.5	9.6	23.87	8.44
2010	2076	665	149	12	158	7.6	3846	133	7.7	5.9	25.86	10.76
2011	1945	778	118	11	126	6.5	3702	92	8.2	6.3	31.10	8.78
2012	919	185	133	16	145	15.8	3989	145	10.8	8.3	29.17	9.05
2013	1718	365	136	4	140	8.1	3776	50	3.1	2.4	27.48	11.31

2014	2073	530	105	19	120	5.8	3179	233	15.6	12.1	29.91	12.04
2015	1998	514	120	10	128	6.4	3400	121	7.7	5.9	28.15	12.04
2016	2118	440	177	31	201	9.5	4402	365	14.9	11.6	24.76	11.74
2017^	1384	282	131	13	140	10.1	3757	108	9.4	7.0	27.76	8.29
2018^	1946	371	91	4	94	4.8	2540	54	4.5	3.4	27.27	12.74
2019^	2362	578	79	4	83	3.5	2220	46	4.9	3.7	28.54	11.22
2020	1927	517	54	5	57	3.0	1976	46	7.8	6.0	36.58	9.95
2021	1272	339										

* Values prior to 2006 may be underestimates because of underreporting of landings.

** Dead + surviving discards.

^ Values updated in 2021 due to minor revisions in landings data.

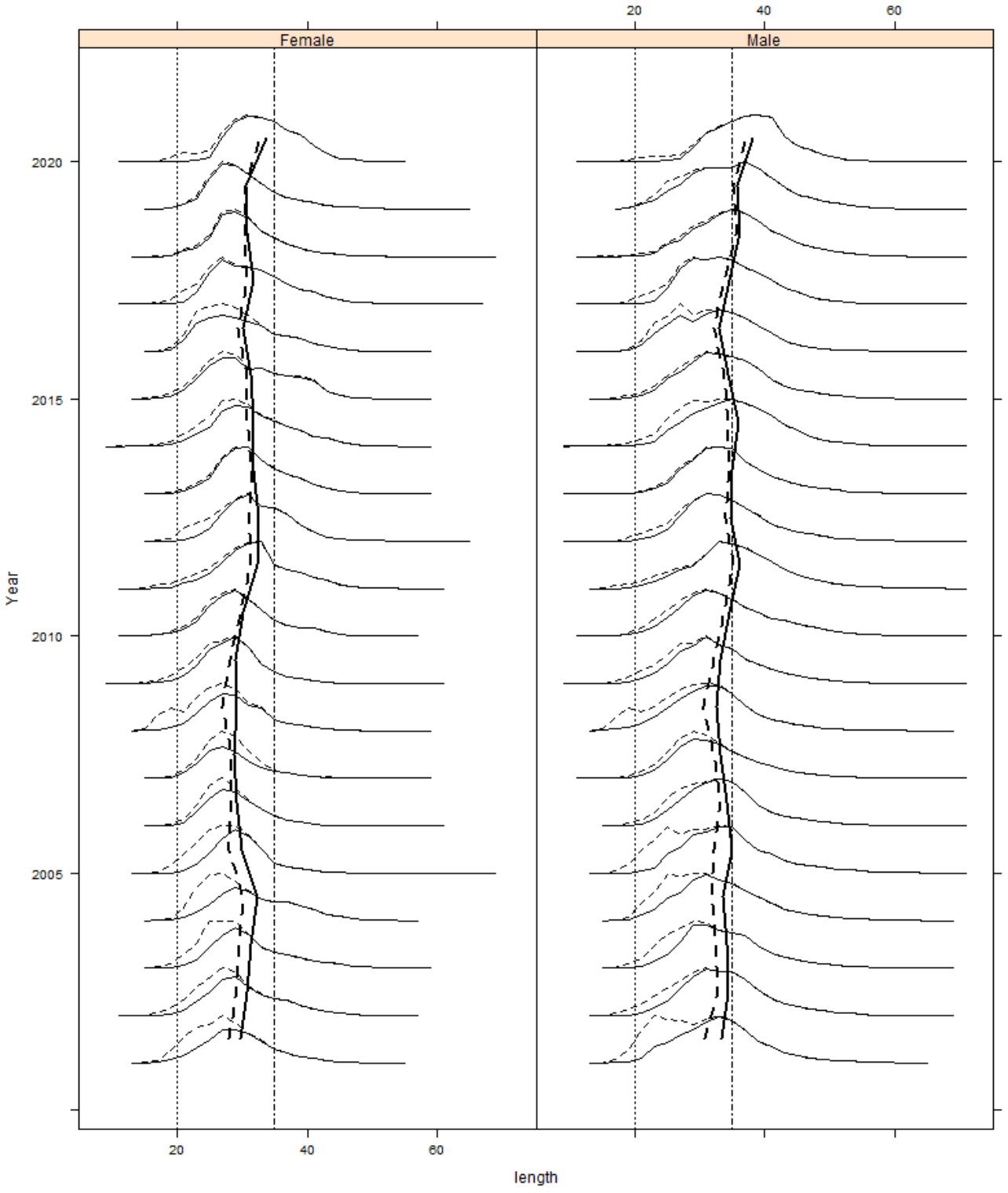

Figure 3 Norway lobster in Division 6.a, Functional Unit 12. The dashed lines represent catches while the solid lines represent landings. Annual length–frequency distributions are shown on the horizontal; the vertical bold lines represent mean lengths. Minimum conservation reference size (20 mm) and 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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