

6.3.23 Norway lobster (*Nephrops norvegicus*) in Division 3.a (Skagerrak and Kattegat)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2017 should be no more than 13 098 tonnes.

With the high survival exemption under the EU landing obligation in 2017 and if discarding continues below the minimum conservation size (MCS), this implies landings of no more than 12 715 tonnes.

Stock development over time

The stock size is considered to be stable. The estimated harvest rate for this stock is currently below F_{MSY} .

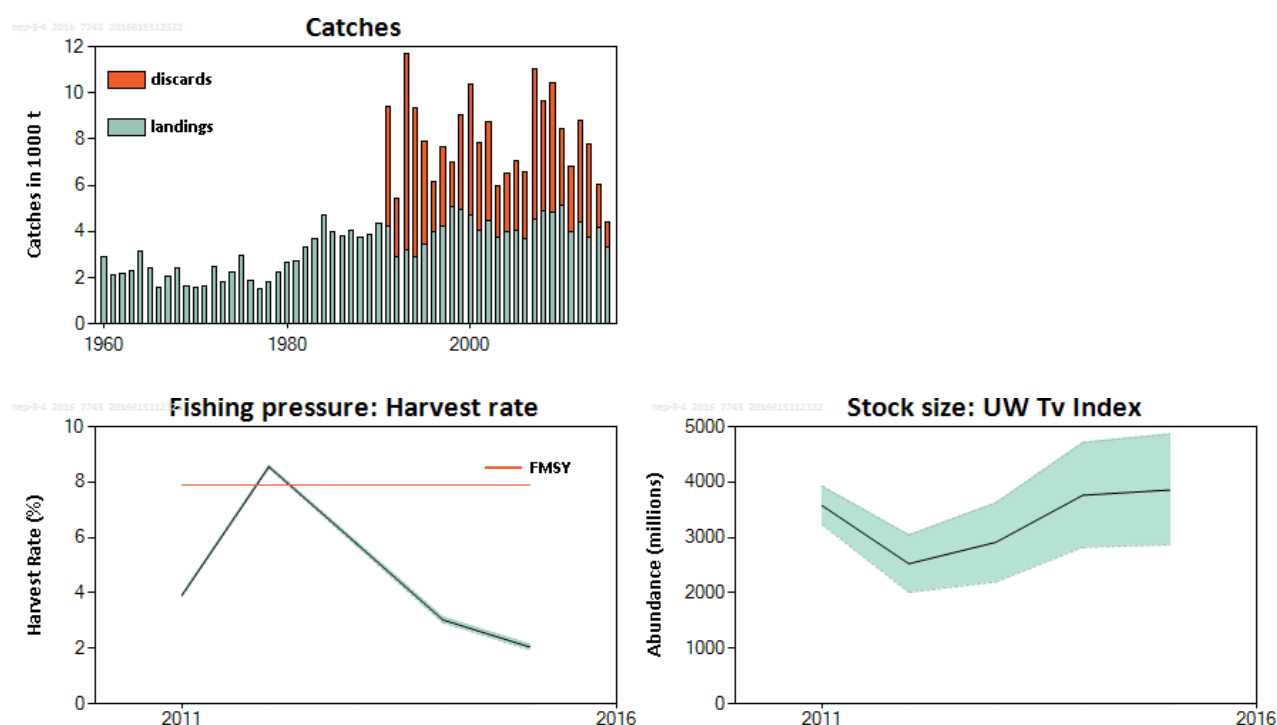


Figure 6.3.23.1 Norway lobster in Division 3.a. Long-term trends in landings (1960–2015) and catches (1991–2015), harvest rate, and underwater TV survey (UWTV) abundance. Orange line shows proxy for F_{MSY} .

Stock and exploitation status

Table 6.3.23.1 Norway lobster in Division 3.a. State of the stock and fishery, relative to reference points.

		Fishing pressure			Stock size		
		2013	2014	2015	2014	2015	2016
Maximum sustainable yield	F_{MSY}	✓	✓	✓	Appropriate	MSY	?
Precautionary approach	F_{pa} , F_{lim}	?	?	?	Undefined	$B_{trigger}$?
Management plan	F_{MGT}	-	-	-	Not applicable	B_{pa} , B_{lim}	?
						SSB_{MGT}	-

Catch options

Table 6.3.23.2 Norway lobster in Division 3.a. The basis for the catch options.

Variable	Value	Source	Notes
Abundance in TV assessment	3857 million	ICES (2016a)	UWTV 2015
Mean weight in landings*	46.2g	ICES (2016a)	Average 2013–2015
Mean weight in discards*	20.5g	ICES (2016a)	Average 2013–2015
Discard proportion*	12.5%	ICES (2016a)	Average (proportion by number) 2013–2015
Discard survival rate	25%	ICES (2016a)	Proportion by number. Only applies in scenarios where discarding allowed.
Dead discard rate*	9.7%	ICES (2016a)	Average 2013–2015 (proportion by number). Only applies in scenarios where discarding allowed

* Simulated that MCS was 32 mm carapace length during 2013–2015. See issues relevant for the advice below.

Table 6.3.23.3 Norway lobster in Division 3.a. The catch options. All weights in tonnes.

Catch options assuming zero discards

Rationale	Basis	Total catch	Wanted catch*	Unwanted catch**	Harvest rate**
MSY approach	MSY approach	13098	12318	781	7.9%
Other options	F _{current} (2013–2015)	6301	5925	376	3.8%

* “Wanted” and “unwanted” catch are used to described Norway lobster that would be landed and discarded in the absence of the EU landing obligation based on discard rates estimates for average (2013–2015).

** calculated for dead removals and applied to total catch.

Discarding assumed below MCS only*

Rationale	Basis	Total catch	Dead removals	Landings	Dead discards	Surviving discards	Harvest rate**
		L+DD+SD	L+DD	L	DD	SD	for L+DD
MSY approach	MSY approach	13521	13319	12715	604	201	7.9%
Other options	F ₂₀₁₅	3594	3541	3380	161	54	2.1%
	F _{current} (2013–2015)	6504	6407	6116	291	97	3.8%
	F _{0.1}	9584	9442	9013	429	143	5.6%

* Assumed for all fleets

** Calculated for dead removals

All harvest rates are calculated in numbers and refer to the dead removals. The difference in catch weights between catch options with the same harvest rates is related to the fact that, in the scenario allowing for discarding, a proportion of the discards are assumed to survive (25%).

Basis of the advice

Table 6.3.23.4 Norway lobster in Division 3.a. The basis of the advice.

Advice basis	MSY approach
Management plan	There is no management plan for Norway lobster in this area.

Quality of the assessment

The UWTV surveys from 2011 to 2015 were conducted in all six main fishing areas in Division 3.a. Since 2014, the survey area has been extended into the western Skagerrak. Creel fished Norway lobsters grounds in Division 3.a are not covered by the survey but would add to the abundance estimate. The abundance for the total ground is likely to be higher than currently estimated. The Norway lobster grounds in Division 3.a will be updated during the benchmark meeting in 2016.

Issues relevant for the advice

F_{\max} is used as a proxy for F_{MSY} . As the minimum landing size (MLS) was lowered in 2016, a new length cohort analysis (yield per recruit) that provides updates of proxies for F_{MSY} needs to be carried out during the benchmark process in 2016.

In this area, there was a mismatch between the minimum conservation size (MCS; previously, MLS) and mesh size in *Nephrops* trawl fisheries. Since 1st January 2016 the MCS/MLS was lowered from 40 to 32 mm carapace length for EU countries fishing in this area. This is expected to reduce the proportion of the catch discarded considerably. Norway still apply 40 mm MCS but a discard ban was implemented in the Skagerrak since 1st of January 2015.

To simulate the effect of a decreased MCS on the proportion of discards, the average (2013–2015) total sampled length distribution (graph left below) was first used to estimate fishers selection when sorting the catch at a MCS of 40 mm carapace length (red line in middle graph below). This selection ogive was then shifted down to 32 mm MCS (assuming that fishers' selection is equally effective at the new MCS) in order to predict the new composition of landings and discards (see graph right below). This new mean weight in discards, landings, discard proportion, and dead discard rate was used in this years assessment (see Table 6.3.23.2).

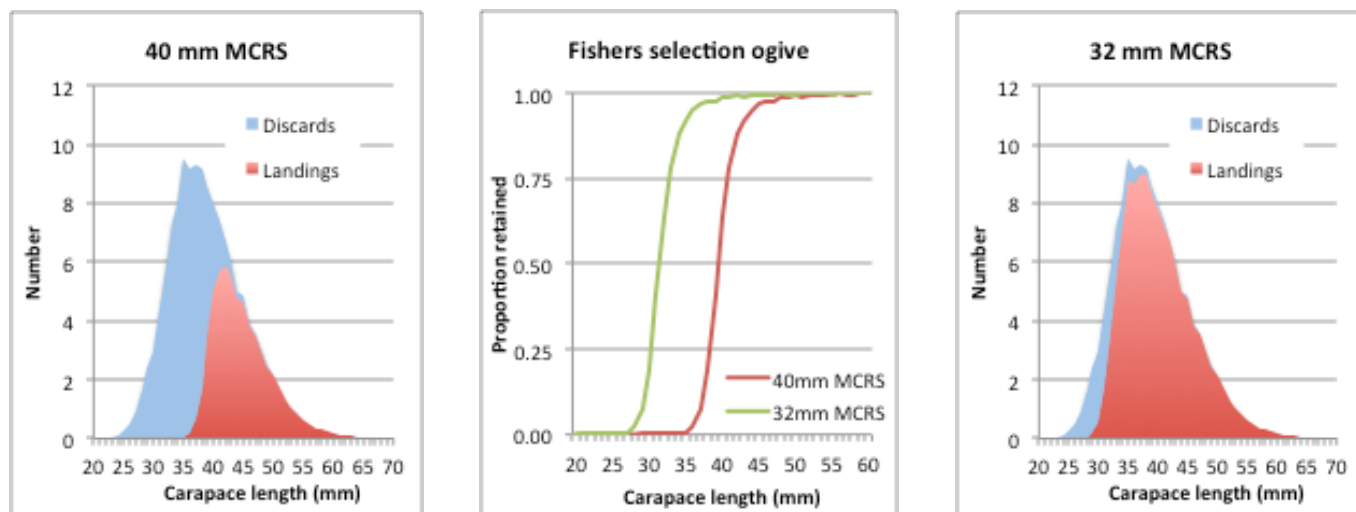


Figure 6.3.23.2 Average size distribution (2013–2015) of landings and discards with MCS of 40 mm (to the left) and with MCS of 32 mm (to the right) assuming that fishers selection is equally effective at the new MCS. The selection ogives are shown in the middle graph.

For this stock, recent Swedish discard survival experiments indicate that the trawl discard survival may be higher (around 50%) compared to the 25% currently used in the assessment (Valentinsson and Nilsson, 2015). As a result, an exemption from the landing obligation based on high survivability has been granted by the European Commission. Effects of new discard survival estimates will be considered during the coming benchmark meeting in 2016.

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

Results from a North Sea mixed-fisheries analysis are presented in ICES (2016c). For 2017, assuming a strictly implemented discard ban (corresponding to the “Minimum” scenario), haddock would be the most limiting stock (assuming that the full advised catch is taken), constraining 36 out of 41 fleet segments (corresponding to 91% of the 2015 kW days of effort). Cod and eastern Channel sole would be limiting for fleets, corresponding to 5% and 4% of the 2015 effort, respectively. Conversely, in the “Maximum” scenario with *Nephrops* managed by separate TACs for the individual functional units (FUs), *Nephrops* would be considered the least limiting stocks in many FUs. *Nephrops* in FU 33, FU 5, FU 32, FU 7, and FU Others would be the least limiting stocks for fleets in these FUs, representing 32%, 16%, 10%, 4%, and 17% of the 2015 effort,

respectively. Eastern Channel plaice and saithe would be least limiting for other fleet segments, representing 12% and 9% of the 2015 effort, respectively*.

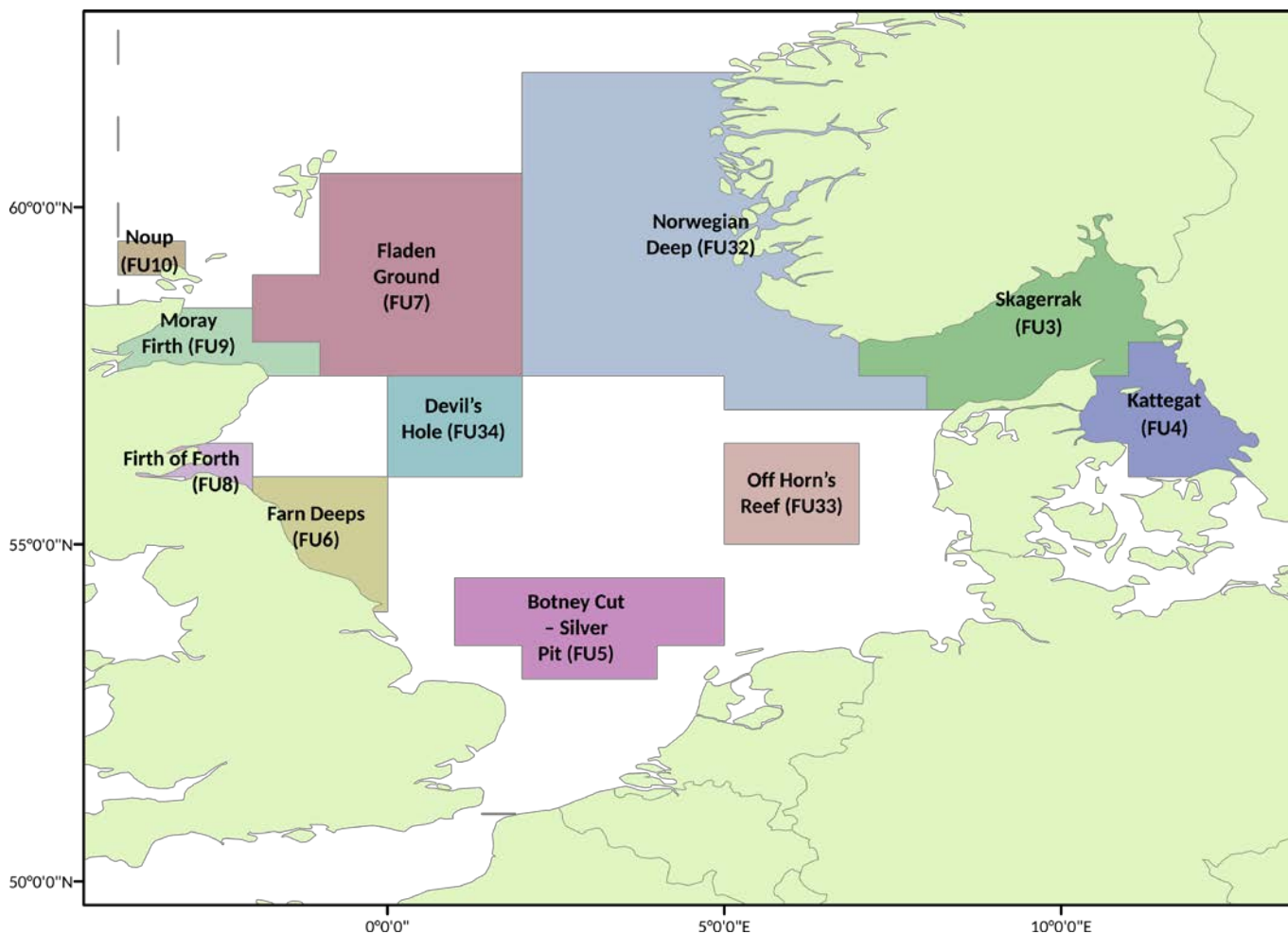


Figure 6.3.26.3 Norway lobster functional units in the North Sea and Skagerrak/Kattegat region.

Reference points

Table 6.3.23.5 Norway lobster in Division 3.a. 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 (2016a)
	$F_{MSY} = F_{max}$	Harvest ratio 7.9%.	Equivalent to F_{max} combined sex.	ICES (2012)
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	Not defined		
	F_{lim}	Not defined		

* Version 3: Paragraph on mixed fisheries considerations added

	F_{pa}	Not defined		
Management plan	SSB_{MGT}	Not defined		
	F_{MGT}	Not defined		

Basis of the assessment

Table 6.3.23.6 Norway lobster in Division 3.a. The basis of the assessment.

ICES stock Data Category	1 (ICES, 2016b)
Assessment type	Underwater TV survey linked to yield-per-recruit analysis from length data (ICES 2016a)
Input data	Commercial catches. One survey index (UWTV), length–frequency data, and discard samples. Annual maturity data from commercial catch samples. Natural mortalities from literature (Morizur, 1982).
Discards and bycatch	Included in the assessment, data series from the majority of the fleet/ main fleets (covering 97% of the landings in 2015)
Indicators	Landings per unit effort, mean size.
Other information	None
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

Information from stakeholders

Results for Norway lobster exist in the fishers' survey for Area 8–9, which indicates that the abundance has increased in this area during the last decade (Napier, 2014). No new information has been provided for 2015.

Abundance Index

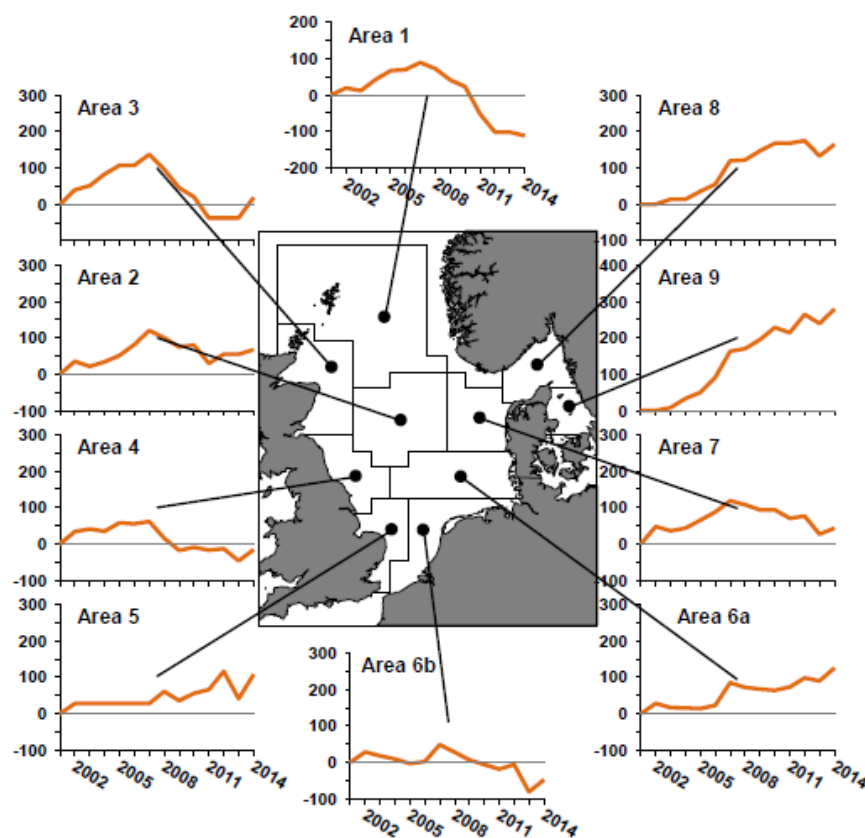


Figure 6.3.23.4 Cumulative time-series of index of perceptions of abundance of Norway lobster by roundfish sampling area from the Fishers' North Sea Stock Survey (Napier (2014); see page 14 for explanation of the index).

History of advice, catch and management

Table 6.3.23.7 Norway lobster in Division 3.a. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights in thousand tonnes.

Year	ICES advice	Landings advice	Catch advice	Agreed TAC	ICES landings	ICES discards
1991					4.228	5.183
1992		~4.0		3.5	2.905	2.523
1993		~4.3		3.5	3.212	8.493
1994		2.9		3.5	2.874	6.450
1995		2.9		4.8	3.427	4.464
1996	<i>Status quo</i> TAC	2.9		4.8	3.980	2.148
1997	<i>Status quo</i> TAC	2.9		4.8	4.206	3.469
1998		4.0		4.8	5.056	1.944
1999		4.0		4.8	4.949	4.108
2000		3.8		5.0	4.710	5.664
2001		3.8		4.5	4.056	3.767
2002	Catches to be maintained at the 2000 level	4.7		4.5	4.448	4.311
2003	Catches to be maintained at the 2000 level	4.7		4.5	3.767	2.208
2004	Catches to be maintained at the 2000 level	4.7		4.7	3.965	2.532
2005	Catches to be maintained at the 2000 level	4.7		5.2	4.034	3.014
2006	No increase in effort	-		5.2	3.672	2.926
2007	No increase in effort	-		5.2	4.512	6.524
2008	No increase in effort	-		5.2	4.860	4.746
2009	Current effort appears to be sustainable	< 5.2		5.2	4.846	5.599
2010	Current effort appears to be sustainable	< 5.2		5.2	5.123	3.332
2011	Recent average landings (2007–2009)	< 4.7		5.2	3.986	2.835
2012	MSY approach	< 6.0		6.0	4.429	4.361
2013	MSY approach	< 5.2		5.2	3.760	4.010
2014	MSY approach	< 5.019		5.019	4.150	1.854
2015	MSY approach	< 5.318	< 10.290	5.318	3.350	1.038
2016	MSY approach	< 7.827	≤ 11.793*	11.001**		
2017	MSY approach		≤ 13.099*			

* Assumes the landing obligation comes into force and selection patterns do not change.

** Catch quota

History of catch and landings

Table 6.3.23.8 Norway lobster in Division 3.a. Catch distribution by fleet in 2015 as estimated by ICES.

Catch (2015)		Landings		Discards	
94% Dead	6% Surviving	89% trawling	11% creels	75% Dead	25% Surviving
4388 t		3350 t		1038 t	

Table 6.3.23.9 Norway lobster in Division 3.a. History of commercial catch and landings, both official and ICES estimated values are presented by area for each country participating in the fishery. All weights 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	11705
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	10374
2001	2880	138	1037	1	4056	3767	7823
2002	3293	116	1032	7	4448	4311	8760
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	11036
2008	3174	158	1509	19	4860	4746	9606
2009	3372	128	1331	15	4846	6129	10975
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

* Dead + surviving discards

Summary of the assessment

Table 6.3.23.10 Norway lobster in Division 3.a. Assessment summary with weights (in tonnes).²

Year	TV abundance index (millions)	UWTV low	UWTV high	Landings (t)	Discards (t)	Discard rate (weight)	Mean Weight Landings (g)	Mean Weight Discards (g)	N removed (millions)	Harvest Rate (%)	Harvest Rate (%) high	Harvest Rate (%) low
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				2912	2523							
1993				3209	8493							

² Version 2: The high and low confidence intervals of the harvest rate (HR) values were corrected.

Year	TV abundance index (millions)	UWTV low	UWTV high	Landings (t)	Discards (t)	Discard rate (weight)	Mean Weight Landings (g)	Mean Weight Discards (g)	N removed (millions)	Harvest Rate (%)	Harvest Rate (%) high	Harvest Rate (%) low
1994				2874	6450							
1995				3427	4464							
1996				3979	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				4876	4746							
2009				4829	5599							
2010				5123	3332							
2011	3577	3238	3927	3986	2835	41.70%	60.5	25.8	149	3.91	3.95	3.88
2012	2526	2013	3046	4429	4361	51.90%	55.9	26.1	216	8.55	8.6	8.5
2013	2914	2200	3627	3760	4010	51.60%	59.8	28.2	169	6.28	5.87	5.73
2014	3762	2825	4714	4150	1854	30.90%	62.5	29.4	114	3.03	3.13	2.93
2015	3857	2869	4867	3350	1038	23.70%	63.9	29.2	79	2.05	2.15	1.95

Sources and references

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