ECOREGIONCeltic Sea and West of ScotlandSTOCKNephrops in Irish Sea East (FU 14)

Advice for 2015

ICES advises that, on the basis of the MSY approach and considering that no discard ban is in place in 2015, landings should be no more than 662 tonnes. Assuming that discard rates do not change from the 2013 estimate the resulting catch would be no more than 715 t.

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level.

Stock status



Figure 5.3.21.1.1 *Nephrops*, Irish Sea East (FU 14). Catches (in tonnes); UWTV survey abundance with 95% confidence limits (in millions); and harvest rate (green dashed line is the F_{MSY} proxy).

The abundance of *Nephrops* in FU 14 is relatively stable but has been decreasing recently. The time-series is not long enough to determine a candidate for MSY $B_{trigger}$. The current harvest rate (removals/UWTV abundance) is below the F_{MSY} proxy.

Management plans

No specific management objectives are known to ICES.

Biology

The Eastern Irish Sea stock has medium density (~0.3 to 0.4 individuals m^{-2}) and is limited to two discrete areas of muddy sediment. The main part of the stock sits between the Isle of Man and the Cumbrian coast of England, with a smaller patch in Wigtown Bay off the southern coast of Scotland.

The fisheries

The fleet of vessels targeting *Nephrops* in 2013, with mesh sizes of 70–99 mm and where the weight of *Nephrops* landed is more than 25% of the total landing, consisted of 18 English vessels and around 34 generally larger Northern Irish vessels. 37% of the Northern Irish landings came from multi-rig trawls, with no landings by multi-rig gear for the English fleet. Overall the multi-riggers took around one third of the landings in 2012, but this fell to ~23% in 2013. 80 mm codends are commonly used for both types of trawl. The fishery takes place mainly in spring and early summer, when male *Nephrops* predominate.

Catch distribution Total landings (2013): 495 t (23% twin-rig *Nephrops* otter trawls, 70% single *Nephrops* otter trawl, 7% other gears). Discards are estimated at 28% by number.

Effects of the fisheries on the ecosystem

The Nephrops trawl fishery takes bycatch of other species, especially plaice, but also whiting and cod.

Quality considerations

After a period without reliable length composition data (2009–2012), enough samples were collected in sufficient quantity and quality in 2013 to be deemed suitable for inclusion in the assessment. As such the mean weight in landings and discards, and the proportion discarded estimates have been updated. These estimates are often given as the mean of the previous three years in order to smooth the data and reduce the influence of outlying years, but as 2011–2012 data are not deemed to be of high enough quality only the 2013 data are available for use.

1 (<u>ICES, 2014a</u>).
Underwater TV survey combined with yield-per-recruit analysis from length data.
One survey index (UWTV-FUs 14-15); commercial catches (international landings and
length frequencies from the Nephrops catch sampling programme and the CEFAS
Observer programme); maturity data from commercial catch sampling; fixed natural
mortality.
Included in the assessment since 1999, data series from the English trawl (covering 65%
of the landings).
Size structure of catches, sex ratio, and lpue.
None.
Working Group for the Celtic Seas Ecoregion (WGCSE; ICES, 2014b).

ECOREGION	Celtic Sea and West of Scotland
STOCK	Nephrops in Irish Sea East (FU 14)

Reference points

	Туре	Value	Technical basis
MSY approach	MSY B _{trigger}	Not defined.	No available reference. The UWTV time-series is too short.
	F _{MSY}	Harvest ratio 9.8%.	F_{MSY} proxy equivalent to $F_{0.1}$ for combined sexes, based on length-based yield-per-recruit analysis.
Precautionary approach	Not defined.		

(unchanged since 2011)

Harvest ratio reference points (2010):

	Male	Female	Combined
F _{max}	15.8%	17.4%	16.4%
F _{0.1}	9.6%	10.2%	9.8%
$F_{35\%SpR}$	12.5%	13.5%	13.0%

Compared to other *Nephrops* stocks in the ICES area the absolute population density of this stock appears to be medium (< 0.34 individuals m⁻²) in a highly seasonal male dominant fishery. The area covered by this fishery is relatively small and the confidence intervals for the abundance estimate are large for a geostatistical survey. The annual variability of lpue for the smaller individuals in the catch suggest that recruitment to this fishery is quite variable. However, the fishery appears to have been sustainable with harvest rates below $F_{0.1}$. In this instance, therefore, the use of $F_{0.1}$ as a proxy for F_{MSY} (for the combined sexes) is considered appropriate as it will deliver high long-term yield with a low probability of recruitment overfishing.

Outlook for 2015

Basis: Absolute survey abundance index 2015 = 432.5 millions (2014 index); mean individual weight in landings (2013) = 18.83 g; mean individual weight in discards (2013) = 7.28 g; dead discards in number (17.0%; based on 2013 sampling).

Basis	Total catches*	Landings	Dead discards**	Surviving discards**	Harvest rate (%)
	L+DD+SD	L	DD	SD	for L+DD
F _{MSY} proxy	715	662	52	0	9.8
F ₂₀₁₃	496	460	36	0	6.8
F35% SpR Combined	948	48 879 70 0		13	
F _{max Combined}	1196	1109	88	0	16.4

Weights in tonnes.

* Total catches are the landings plus dead and surviving discards.

** Total discard rate is assumed to be 17.0% of the catches (in number, from 2013 data); discard survival is assumed to be 0%.

MSY approach

Since MSY $B_{trigger}$ has not been identified for this stock, the ICES MSY approach has been applied without consideration of SSB in relation to MSY $B_{trigger}$. Following the ICES MSY approach implies a harvest ratio of 9.8%. Considering that no discard ban is in place in 2015, this results in landings of no more than 662 t. Assuming that discard rates do not change from the 2013 estimate, this implies total catches of no more than 715 t.

Additional considerations

General considerations for *Nephrops* in Division VII can be found at the beginning of Section 5.3.21.

Advice considerations

In order to ensure the stock in this FU is exploited sustainably, management should be implemented at the functional unit level (see Section 5.3.21).

Management considerations

The *Nephrops* trawl fishery takes bycatches of other species, especially plaice, but also whiting and cod. Selectivity of this fishery needs to be improved to reduce bycatches of cod, whiting, and undersized plaice.

The catch sampling data from 2013 indicate that on average around 17% (in numbers) or 7% (in weight) of the *Nephrops* caught are estimated to have been discarded.

The fishery peaks in spring/summer. Some UK vessels temporarily relocate, targeting the Farn Deeps *Nephrops* fishery on the east coast of England in the winter months.

Regulations and their effects

The cod long-term plan was introduced in 2009 (EC 1342/2008). Annual effort baselines in *Nephrops* trawl fisheries (Effort group TR2 OTB 70–99 mm) in Division VIIa have been reduced by 25% annually since 2009. There are provisions in the cod long-term plan to be exempt from these effort restrictions, or to have them reduced, making the impact of this regulation on overall effort difficult to assess. The use of species-selective gears has increased steadily since 2009 to avoid effort limits.

Changes in fishing technology and fishing patterns

The UK *Nephrops*-directed effort in FU 14 has declined since 2007 and is estimated in 2013 to be at its lowest level since 1974 (Figure 5.3.21.1.3).

Data and methods

The advice takes the 2014 UWTV survey results into account.

The new estimates of mean weights and discard proportion are significantly lower than the values used previously.

Uncertainties in assessment and forecast

Some general uncertainties are discussed in the introduction of Section 5.3.21.

The main uncertainty for this stock concerns the estimates of mean weight in the past when mean weight in the landings may have been overestimated, leading to an underestimation of historical harvest rates. The coverage and intensity of sampling between 2010 and 2012 was poor, and mean weights in that period remain uncertain. Sampling has improved in 2013; as these mean weights and discard proportions are expected to be more accurate and precise, these have been used in the advice calculations.

Uncertainties in the mean weight in the landings and discard rates are not taken into account in the advice.

Comparison with previous assessment and advice

The basis for the assessment has not changed from last year. The basis for this year's advice is therefore the same as last year: the MSY approach.

The adviced reduction in catches is due to a reduction in the mean weight and a lower TV abundance in 2014.

Sources

ICES. 2014a. Advice basis. *In* Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.2. ICES. 2014b. Report of the Working Group for the Celtic Seas Ecoregion (WGCSE), 13–22 May 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:12.



Length frequencies for catch (dotted) and landed(solid): Nephrops in fu14





Figure 5.3.21.1.3

Nephrops in Irish Sea East (FU 14). Long-term trends in landings, effort, lpues, and mean sizes of *Nephrops*. Note that mean sizes have not been updated since 2009 due to insufficient sampling levels. The introduction of the buyers and sellers legislation in 2006 by the UK precludes direct comparison with previous years as reported levels are considered to have significantly improved.

Year	ICES advice	Predicted	Recommended	ICES	Total
		landings	landings	landings	discards
		advice (FU 14)	(FUS 14 + 15)	(FU 14)	(FU 14)
1989				0.40	
1990				0.56	
1991				0.75	
1992			8.9	0.43	
1993			9.4	0.13	
1994			9.4	0.52	
1995			9.4	0.45	
1996			9.4	0.48	
1997			9.4	0.57	
1998			9.4	0.39	
1999			9.4	0.62	
2000			9.4	0.57	
2001			9.4	0.53	
2002	Set TAC in line with 1995–99 landings		9.55	0.58	
2003	Set TAC in line with 1995–99 landings		9.55	0.38	0.15
2004	Set TAC in line with 1995–99 landings		9.55	0.47	0.15
2005	Set TAC in line with 1995–99 landings		9.55	0.57	0.13
2006	No increase in effort		9.55	0.63	0.11
2007	No increase in effort		-	0.96	0.18
2008	As for 2007		-	0.68	0.14
2009	No increase in effort and landings (2007)	< 1.0	-	0.70	0.03
2010	No new advice, same as for 2009	< 1.0	-	0.58	na
2011	Transition towards the ICES MSY framework	< 0.68	*	0.56	na
2012	MSY approach	< 0.96	*	0.53	na
2013	MSY approach	< 0.88	*	0.50	0.04
2014	MSY approach	< 0.951	*		
2015	MSY approach	< 0.662	*		

Table 5.3.21.1.1 Nephrops in Irish Sea East (FU14). ICES advice, management, landings, and discards.

Weights in thousand tonnes. * It is not recommended to manage the two stocks as a single unit.

Year	Rep. of Ireland	UK	Other countries	Total
2000	114	451	2	567
2001	26	506	0	532
2002	203	373	1	577
2003	69	306	1	376
2004	62	409	1	472
2005	34	536	0	570
2006	34	594	0	628
2007	86	873	0	959
2008	29	652	0	681
2009	16	692	0	708
2010	45	538	0	583
2011	31	530	0	561
2012	53	478	0.1	530
2013	35	460	0.2	495

Table 5.3.21.1.2Nephrops in Irish Sea East (FU 14). ICES landings (tonnes) by country.

Table 5.3.21.1.3Nephrops in Irish Sea East (FU 14). Results from the UWTV-FU 14 survey of Nephrops grounds.

Year	No. of valid stations	Mean station density (no./m ²)	Mean Krigged density (no./m ²)	Abundance (millions) including Wigtown Bay	95% CI	Landings	Removals (millions)	Harvest
2008	32	0.34	0.38	407.6	63	676	32.4	7.96%
2009	32	0.28	0.33	350	76	707	33.9	9.69%
2010	26	0.33	0.4	422	103	582	27.9	6.62%
2011	26	0.36	0.41	431	109	561	26.9	6.25%
2012	26	0.48	0.62	652.7	114.1	530	25.4	3.90%
2013	31	0.39	0.44	465.7	92.9	495	31.7	6.80%
2014	34	0.34	0.39	432.5	89	-	-	-

Table 5.3.21.1.4Nephrops in Irish Sea East (FU 14). Landings, discards and removals in number, proportions of the removals
retained, UWTV survey abundance estimates, harvest ratio, and total weight and mean weights of landings
and discard weight and rate.

										Mean
	Landings	Discards	Removals						Dead	weight
	in	in	in	Propor.	Adjusted	Harvest			discard	in
	numbers	numbers	numbers	removals	survey	ratio	Landings	Discards	rate	landings
Year	(millions)	(millions)	(millions)	retained	(millions)	(%)	(t)	(t)	(%)	(g)
2003	9.6	8.7	18.4	0.52			376	151	0.48	39.2
2004	14.9	11.3	26.2	0.57			472	150	0.43	31.6
2005	18.5	8.6	27.1	0.68			570	128	0.32	30.7
2006	19.8	6.9	26.7	0.74			628	111	0.26	31.6
2007	34.1	13.7	47.8	0.72			959	178	0.28	28.1
2008	23.4	9.0	32.4	0.72	407.6	0.08	676	138	0.28	28.9
2009	24.5	9.4	33.9	0.72	350	0.097	707	33	*	28.9
2010	20.1	7.8	27.9	0.72	422	0.066	582		*	28.9
2011	19.4	7.5	26.9	0.72	431	0.062	561		*	28.9
2012	18.3	7.1	25.4	0.72	652.7	0.039	530		*	28.9
2013	26.3	5.4	31.7	0.83	465.7	0.068	495	39	0.17	18.8

* Dead discard rate assumed to be the average of 2005–2007 dead discards.