ECOREGIONCeltic Sea and West of ScotlandSTOCKNephrops off the southeastern and southwestern coasts of Ireland (FU 19)

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 715 tonnes. Assuming that discard rates do not change from the average of the last three years (2011–2013) the resulting catch would be no more than 1119 tonnes.

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

Stock status **Fishing pressure** 2011 2012 2013 MSY (FMSY) Above target \sim \mathbf{x} х Precautionary 2 ? Undefined approach (Fpa, Flim) Stock size 2012-2014 MSY (Btrigger) Undefined ? Precautionary ? Undefined approach (Bpa, Blim) Qualitative evaluation $(\rightarrow$ Stable Catch TV abundance 1400 Discards Landings 80 1000 800 Abundance (millions) 009 009 400 400 200 200 0 2006 2007 2008 2009 2010 2011 2012 2013 c 2006 2008 2010 2012 2014 Harvest rate 0.08 Harvest Rate 0.0 0.0 2006 2008 2010 2012 2014

Figure 5.3.21.5.1 *Nephrops* off the southeastern and southwestern coasts of Ireland (FU 19). Landings (in tonnes), UWTV abundance (in millions; SSB proxy, confidence intervals 95%), and harvest rates (F_{MSY} proxy shown as the dashed green line).

Recent harvest rates (removals/UWTV abundance) are above the F_{MSY} proxy. The time-series of reliable abundance estimates is too short to detect a significant trend within the uncertainty bounds.

Management plans

No specific management objectives are known to ICES.

Biology

This area has several small and spatially discrete mud patches. Survey information indicates consistent differences in catch mean length and burrow densities between these mud patches, suggesting variable population growth. Sampling of commercial landings also shows large variations in size because of this.

The fisheries

The *Nephrops* fishery in this functional unit is mainly an otter trawl fishery using single- and twin-rigs and a codend mesh size of 80–99 mm.

Catch distribution Total catch (2013) = 1.2 kt, where 0.8 kt were estimated landings (almost entirely in otter trawl fisheries) and 0.4 kt discards.

Effects of the fisheries on the ecosystem

Nephrops fisheries in this area have bycatches of megrim, hake, and monkfish.

Quality considerations

An annual UWTV survey has been carried out since 2011, with full coverage since 2013. The survey gives estimates of burrow densities for the main patches of *Nephrops* habitat in FU 19 and an abundance estimate for the entire stock with acceptable precision.

The main quality concern relates to mean weight estimates and discard rates which are quite variable over the timeseries, partially reflecting the difference in mean sizes of patches with different underlying densities. Adequate catch sampling remains difficult for such a heterogeneous area.

Scientific basis	
Stock data category	1 (<u>ICES, 2014a</u>).
Assessment type	Underwater TV survey combined with yield-per-recruit analysis from length data.
Input data	Commercial catches (international landings from Ireland, France, and UK); length
	frequencies from catch and discard sampling (Ireland); one UWTV survey indices
	(UWTV-FU 19); maturity data from commercial catch and survey sampling; fixed
	natural mortality. Discard survival rate.
Discards and bycatch	Included in the assessment since 2008, with data series from the main fleet covering
	>90% of the landings.
Indicators	Commercial effort and lpue, IRGFS-WIBTS-Q4 length frequencies of the catches by sex.
Other information	This stock was benchmarked in 2014 (WKCELT).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE).

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Reference points

	Туре	Value	Technical basis
MSY	MSY B _{trigger}	Not defined.	
approach	F _{MSY}	HR 8.1%.	F_{MSY} proxy equivalent to $F_{0.1}$ for combined sexes in 2014.
Precautionary	Not defined.		
approach			

(Last changed in: 2014).

Harvest ratio reference points (2014):							
	Male	Female	Combined				
F _{0.1}	8.1%	9.0%	8.1%				
F _{max}	12.3%	13.0%	12.3%				
F35%SpR	13.0%	15.2%	14.5%				

The density of *Nephrops* in FU 19 is considered moderate (average density 0.3 individuals m⁻²). Recent harvest rates (~9%) are low in comparison to other FUs and the mean size and lpue indicators appear stable. For this FU, the exploitation rate on males is usually higher than on females. A harvest ratio consistent with a combined-sex $F_{0.1}$ of 8.1% is suggested as a proxy for F_{MSY} .

Outlook for 2015

Basis: Absolute survey abundance index 2015 = 636 million (2014 index); Mean individual weight in landings (2011–2013) = 26.25 g; Dead discard rate (in numbers) = 47.1%; Mean individual weight in discards (2011–2013) = 12.48 g.

Basis	Total catches*	al catches* Landings Dead discards** d		Surviving discards**	Harvest rate	
	L+DD+SD	L	DD	SD	for L+DD	
MSY approach	1119	715	303	101	8.1%	
F ₂₀₁₁₋₁₃	1254	801	339	113	9.1%	
F35%SpR	2004	1281	542	181	14.5%	
F _{max}	1700	1086	460	153	12.3%	

Weights in tonnes.

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

** Total discard rate is assumed to be 54.2% of the catches (in numbers, last three years' average, 2011–2013); discard survival is assumed to be 25%.

MSY approach

Since MSY $B_{trigger}$ has not been identified for this stock, the ICES MSY approach has been applied without considering SSB in relation to MSY $B_{trigger}$. Following the ICES MSY approach implies a harvest ratio at $F_{MSY} = 8.1\%$. Considering that no discard ban is in place in 2015, this results in landings of no more than 715 t. Assuming that discard rates do not change from the average of the last three years (2011–2013), this implies total catches of no more than 1119 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

Abundance estimates and the F_{MSY} harvest rate are considered conservative; the time-series of UWTV observations is short, and scientific knowledge about *Nephrops* populations and fisheries in this area is limited, but improving.

Nephrops fisheries in this area are fairly mixed, landing also megrim, anglerfish, haddock, and other demersal species. Around 44% of the total catch by weight is discarded. The main discarded fish species are haddock and boarfish (Anon., 2011).

The proportion of discarded *Nephrops* in this FU is high relative to other areas. This is because the vessels tend to be small with limited space and crew so the on-board tailing of the catch is not as prevalent as in other FUs around Ireland.

Changes in fishing technology and fishing patterns

Vessels smaller than 18 m are the main participants in the *Nephrops* fishery in FU 19 as most of the discrete grounds are mainly found inshore. Effort of larger vessels (>18 m) has been declining since 2003 (Figure 5.3.21.5.3).

Data and methods

The advice takes into account the 2014 UWTV survey results (Lordan et al., 2014).

Uncertainties in the assessment and forecast

General comments of uncertainties in the assessment and forecast using the information from the UWTV surveys are discussed in the introduction of Section 5.3.21.

For this area, the main uncertainties relate to the heterogeneity in size and density of the *Nephrops* populations in the different discrete patches within FU 19. This underlying variability results in relatively high spatio-temporal variability estimates of mean weight and discard parameters. There is also some uncertainty relating to ground boundaries in FU 19, with the current estimates of the FU 19 area likely being underestimates of the true FU 19 area in most cases.

Comparison of the basis of previous assessment and advice

The basis for the assessment has not changed from last year, although the 2014 benchmark revised some of the ground boundaries, biological parameters, discard survival assumption, and F reference points.

The basis for the advice this year is the same as last year: the MSY approach.

Sources

Anon. 2011. Atlas of Demersal Discarding, Scientific Observations and Potential Solutions, Marine Institute, Bord Iascaigh Mhara, September 2011. ISBN 978-1-902895-50-5. 82 pp.

ICES. 2014a. Advice basis. In Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.2.

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Length frequencies for IGFS Survey Catches: Nephrops in FU19

Figure 5.3.21.5.2 *Nephrops* off the southeastern and southwestern coasts of Ireland (FU 19). Annual length composition of IRGFS-WIBTS-Q4 survey catch. Males (right) and females (left) from 2003 (bottom) to 2013 (top). The vertical solid line is the mean length in the survey catch. The straight vertical lines correspond to 25 mm (MLS) and 33 mm carapace length.



Figure 5.3.21.5.3Nephrops off the southeastern and southwestern coasts of Ireland (FU 19). Fishing effort and lpue by all Irish
vessels targeting Nephrops (black line) and by vessels >18 m total length (blue line).

Year	ICES advice	Predicted	Recommended	ICES	Total discards ²⁾
		landings	landings	landings	FU 19
		corresp. to	Divisions	FU 19	
		advice	VIIbcjk ¹⁾		
		(FU 19)			
1992			3.8	0.9	
1993			~4.0	0.9	
1994			~4.0	0.4	
1995			~4.0	0.7	
1996			4.0	0.9	
1997			4.0	0.8	
1998			4.0	0.8	
1999			4.0	0.6	
2000			4.0	0.7	
2001			4.0	0.8	
2002			4.44	1.3	
2003			4.44	1.2	
2004	Restrict landings to 2000–2002 levels		3.3	1.1	
2005	Restrict landings to 2000–2002 levels		3.3	0.7	
2006	Restrict landings to 2000–2002 levels		3.3	0.7	0.0
2007	Constrain effort at recent levels			1.0	0.0
2008	Constrain effort at recent levels			0.9	0.1
2009	No increase in effort and landings	< 0.8			0.3
	(2007)			0.8	
2010	No new advice, same as for 2009	< 0.8		0.7	0.3
2011	See scenarios	-		0.6	0.4
2012	Reduce catches	-		0.8	0.4
2013	MSY approach	< 0.82		0.8	0.4
2014	MSY approach	< 0.521			
2015	MSY approach	< 0.715			

Nephrops off the southeastern and southwestern coasts of Ireland (FU 19). ICES advice, management, landings, and discards. Table 5.3.21.5.1

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Weights in thousand tonnes. ¹⁾ Previously ICES gave combined advice for FUs 16, 17, 18, and 19, and other rectangles in this area. ²⁾ 25% of discards are assumed to survive.

	FU 19						
Year	France	Rep. of Ireland	UK	Total			
1989	245	652	2	899			
1990	181	569	4	754			
1991	212	860	5	1077			
1992	233	640	15	888			
1993	229	672	4	905			
1994	216	153	21	390			
1995	175	507	12	695			
1996	145	736	7	888			
1997	93	656	7	756			
1998	92	733	2	827			
1999	77	499	3	579			
2000	144	541	11	696			
2001	111	702	2	815			
2002	188	1130	0	1318			
2003	165	1075	0	1239			
2004	76	997	1	1074			
2005	62	648	2	711			
2006	65	675	1	741			
2007	63	894	0	957			
2008	46	805	15	866			
2009	55	764	15	833			
2010	14	694	13	722			
2011	23	585	1	608			
2012	11	758	1	770			
2013*	4	771	6	781			

* Preliminary.

Table 5.3.21.5.3Nephrops off the southeastern and southwestern coasts of Ireland (FU 19). Results from the UWTV-FU 19
survey of Nephrops grounds in 2006 and 2011–2014.

FU	Year	Number of stations	Mean density adjusted (burrow m ⁻²)	Standard deviation	Raised abundance estimate adjusted (million burrows)	Upper 95%CI on abundance	Lower 95%CI on abundance	CVs			
	2006	6	0.21	0.18	408	789	26	36%			
	2007										
	2008	No Survey Dete									
	2009				No Survey Data						
FU 19	2010										
	2011	35	0.34	0.26	665	842	488	13%			
	2012	40	0.30	0.18	594	708	480	9%			
	2013	40	0.25	0.26	487	653	166	17%			
	2014	40	0.32	0.31	636	829	442	15%			

Table 5.3.21.5.4*Nephrops* off the southeastern and southwestern coasts of Ireland (FU 19). Landings, discards, and removals
in number, dead discard rate, UWTV abundance, harvest ratio, and total weight and mean weight of landings
and discards.

Year	Landings in numbers (millions) scaled	Discards in numbers (millions) scaled	Removals in numbers (millions)	Dead discard rate (in numbers)	Adjusted survey (millions)	Harvest ratio	Landings (t)	Discards (t)	Mean weight in landings (g)	Mean weight in discards (g)
2006	26.2	2.6	28.1	0.068			741	37	28.3	14.4
2007	30.8	1.5	31.9	0.036			957	26	31.1	17.0
2008	25.7	5.5	29.8	0.139			866	107	33.7	19.3
2009	27.3	17.8	40.6	0.328			833	258	30.5	14.5
2010	24.4	20.0	39.3	0.381			722	269	29.6	13.5
2011	24.3	30.7	47.3	0.487	665	7.1%	608	387	25.0	12.6
2012	29.2	33.0	54.0	0.459	594	9.1%	770	420	26.4	12.7
2013	28.5	33.4	53.6	0.468	487	11.0%	781	404	27.4	12.1
2014					636					
Avg.										
2011-										10.40
2013				0.471					26.25	12.48