

ECOREGION Celtic Sea and West of Scotland
STOCK Plaice in Division VIIa (Irish Sea)

Advice for 2015

Based on ICES approach to data-limited stocks, ICES advises that catches should be no more than 1244 t in 2015. If discard rates do not change from the average of the last two years (2012–2013), this implies landings of no more than 394 t in 2015.

ICES advises that management measures to reduce discards in the mixed fishery are needed.

Stock status

Fishing pressure		
2011–2013		
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa}, F_{lim})	?	Unknown
Qualitative evaluation	✓	Below poss. reference points
Stock size		
2012–2014		
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa}, B_{lim})	?	Unknown
Qualitative evaluation	→	Stable

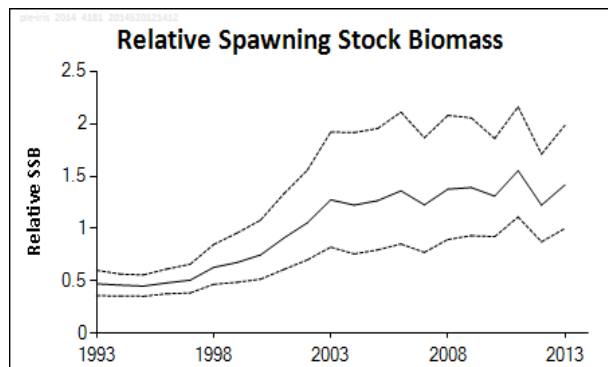
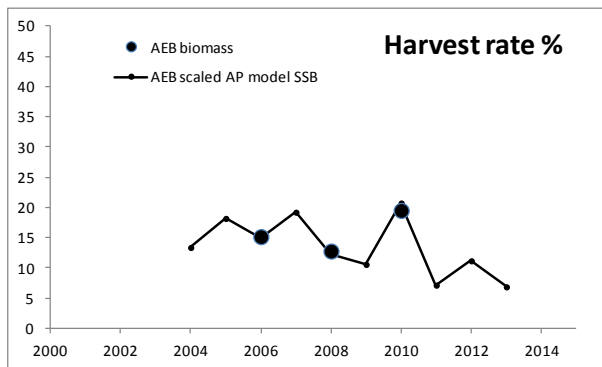
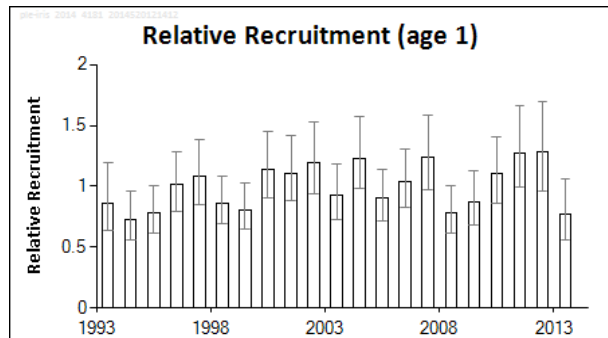
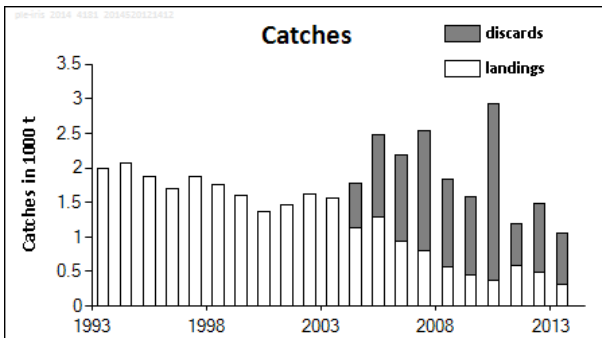
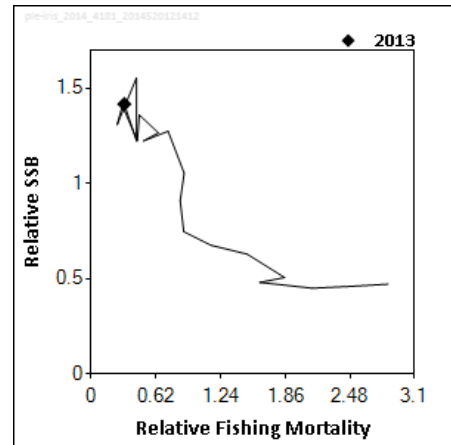


Figure 5.3.23.1 Plaice in Division VIIa (Irish Sea). Upper left: Official landings and raised discard. Upper right: Recruitment trend (mean standardized AP model estimates). Bottom left: Harvest rate – total catch/annual egg production SSB (AEB) and total catch/AP model SSB scaled by the egg production estimates. Bottom right: SSB trend (mean standardized AP model estimates). Top right: relative SSB and F over the years.

The SSB trend has been stable since 2003. Fishery-independent estimates of plaice SSB from the annual egg production method (AEPM) surveys increased by 66% between 1995 and 2010. The recent fishing mortality is likely to be very low as the estimates of total catch (landings and discards) since 2006 are between 15% and 20% of the AEPM estimates of SSB over this period.

Management plans

No specific management objectives are known to ICES.

Biology

There are considered to be three main spawning areas of plaice in the Irish Sea: one off the Irish coast, another northeast of the Isle of Man towards the Cumbrian coast, and the third off the north Wales coast. Cardigan Bay in St. George's Channel has also been identified as a spawning ground for plaice in the Irish Sea. The level of mixing between the eastern and western components of the Irish Sea stock appears small. Males are smaller than females and mean length at age of both sexes has generally declined since the mid-1990s. Survey data indicate that males of ages 1–5 and females of age 1–3 are generally below minimum landing size (MLS).

Environmental influence on the stock

For all plaice stocks in the Northeast Atlantic there is a high degree of synchrony and significant negative relationships with sea surface temperature and recruitment.

The fisheries

A high proportion of the catch is discarded. In the eastern Irish Sea plaice are caught in the mixed demersal fishery, largely by UK otter trawlers, and as a bycatch in targeted sole beam trawl fisheries, dominated by Belgian trawlers. Total effort (hours fished) in the UK fleets targeting plaice have declined to the lowest levels recorded. Total effort by the Belgian beam trawl fleet has declined steadily from a peak in 2002. In the western Irish Sea, plaice are caught by the Irish and UK *Nephrops* fisheries: effort (in hours fished) by these fisheries is greater than in the mixed demersal and beam trawl fisheries combined. The regulations affecting plaice and other demersal stocks in Division VIIa remain linked to those implemented under the Irish Sea cod long-term management plan.

Catch distribution Catch (2013) = 1049 t (32% landings, 68% discards). ICES estimates of landings = 309 t (52% beam trawl, 46% otter trawl, and 2% other gear types). ICES estimates of discards = 740 t (46% beam trawl, 52% otter trawl, and 1% other gear types).

Effects of the fisheries on the ecosystem

A proportion of the plaice catch is taken in beam trawl fisheries. Beam trawling, especially when using chain-mat gear, is known to have a significant impact on the benthic communities, although less so on soft substrates and in areas which have been historically exploited by this fishing method.

Quality considerations

The Aarts and Poos (2009) model continues to have difficulty in interpreting the data, although convergence properties have improved compared to last year's assessment. Despite these concerns with the model, the SSB trends from the model are still considered to be a suitable indicator of stock size.

The discard data are noisy and the assessment would benefit from increased sampling intensity. Discard information from Northern Irish *Nephrops* fleets became available for the first time in 2012, enabling improved discard estimates for the most recent years (2010–2013).

The advice is based on an assessment model accepted for trends, used as an indicator of stock size. The methods applied to derive quantitative advice for data-limited stocks are expected to evolve as they are further developed and validated. The harvest control rules are expected to stabilize stock size in the short term (3–5 years), but they may not be suitable if the stock size is low and/or overfished.

Scientific basis

Stock data category	3.2.0 (ICES, 2014a).
Assessment type	Age-based Aarts and Poos (2009) assessment model accepted for trends.
Input data	Commercial catches (international landings, ages and length frequencies from catch sampling); three survey indices (UK (E&W)-BTS-Q3, NIGFS-WIBTS-Q1, and NIGFS-WIBTS-Q4); fixed maturity ogive; constant natural mortality.
Discards and bycatch	Included in the assessment, data series from the majority of the fleet (covering 92% of the landings).
Indicators	None.
Other information	Latest benchmark was in 2011 (ICES, 2011).

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Reference points

No reference points are defined for this stock.

Outlook for 2015

No reliable forecast can be presented for this stock, because the assessment is only indicative of trends and the absolute level of stock size is uncertain.

ICES approach to data-limited stocks

For data-limited stocks for which an abundance index is available, ICES uses as a harvest control rule an index-adjusted *status quo* catch. The advice is based on a comparison of the two most recent index values with the three preceding values, combined with recent catch or landings data. Knowledge about the exploitation status also influences the advised catch.

For this stock the biomass is estimated to have decreased by 7% between the periods 2009–2011 (average of the three years) and 2012–2013 (average of the two years). Considering the stable trend in SSB over the last decade and the large uncertainty in the annual estimates, this implies no changes in catches compared to the average of the last three years, corresponding to catches in 2015 of 1244 t. If discard rates do not change from the average of the last two years (68% in 2012–2013, a period that includes North Ireland discards), this implies landings in 2015 of no more than 394 t.

The recent harvest rate is considered to be very low (Figure 5.3.23.1), therefore no additional precautionary reduction is needed.

Additional considerations

Advice considerations

The high level of discarding in this fishery is a consequence of the mesh sizes used in the *Nephrops* trawl TR2 (70–99 mm) and beam trawl BT2 (80–99 mm) fleets. These gears catch large numbers of fish below the MLS of 27 cm. The options for technical measures to reduce small plaice catches while retaining the main target species, *Nephrops* and sole, are limited. Spatiotemporal changes in the fishery may help avoid areas or periods with high small plaice bycatch.

Regulations and their effects

Technical measures in force are minimum mesh sizes and minimum landing size (27 cm).

The TAC is not a constraint; from 1998 onwards landings have been consistently below the TAC.

Considering the high level of discarding observed in this stock, gear selectivity regulations have had little effect. The closures of cod spawning grounds that have been in force since 2000 are unlikely to have had a significant impact on catches by the plaice fishery. In 2000, the closure covered the western and eastern Irish Sea. Since then, the closure has been mainly in the western part, whereas the majority of the plaice fishery has taken place in the eastern part of the Irish Sea.

Changes in fishing technology and fishing patterns

Fishing effort in the Irish Sea beam trawl fleet declined significantly in 2008 and remained at a low level between 2009 and 2013 (Figure 5.3.23.1). Fishing effort in larger mesh (>100 mm) otter trawl fleets declined substantially from 2002 with the introduction of the cod recovery plan. Total effort (hours fished) in these fleets has declined to the lowest level since 1979.

Data and methods

The assessment includes landings data for the full time-series and discards since 1994. The quality and coverage of the discard data has improved in recent years but the estimates remain imprecise. The survey data are also variable but show similar trends and are consistent with the assessment.

Uncertainties in the assessment and forecast

The model continues to have difficulty in interpreting the data, although convergence properties have improved compared to last year's assessment. This year a review of the Aarts and Poos (2009) model discovered an error in the coding of the method. This was corrected and resulted in a rescaling of the estimated SSB, recruitment, and fishing mortality. The trends in each metric were unaffected and therefore the previous trend-based advice was appropriate.

Comparison of the basis of previous assessment and advice

The assessment is consistent with last year's assessment

The basis for the advice this year is the same as last year: ICES approach to data-limited stocks.

Sources

- Aarts, G., and Poos, J. J. 2009. Comprehensive discard reconstruction and abundance estimation using flexible selectivity functions. *ICES Journal of Marine Science*, 66: 763–771.
- ICES. 2011. Report of the Benchmark Workshop on Flatfish (WKFLAT), 1–8 February 2011, Copenhagen, Denmark. ICES CM 2011/ACOM:39.
- 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.

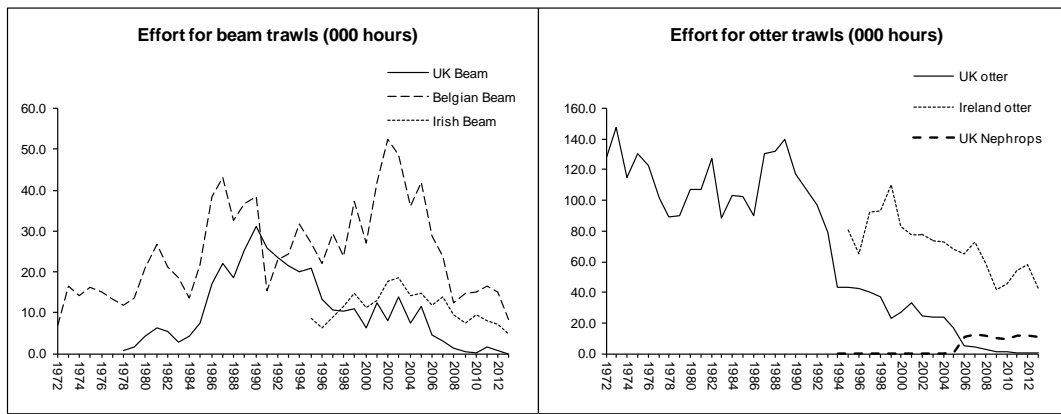


Figure 5.3.23.2 Plaice in Division VIIa (Irish Sea). Effort trends for the main fleets in the Irish Sea.

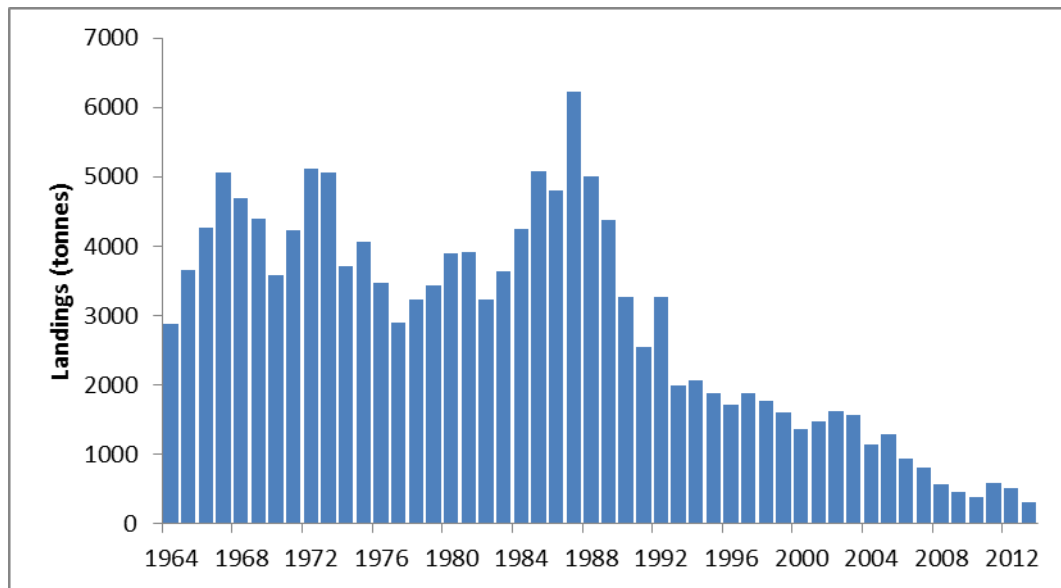


Figure 5.3.23.3 Plaice in Division VIIa (Irish Sea). Total landings.

Table 5.3.23.1

Plaice in Division VIIa (Irish Sea). ICES advice, management, and landings.

Year	ICES Advice	Predicted catch corresp. to advice	Predicted landings corresp. to advice	Agreed TAC	Official landings	ICES landings	ICES discards
1987	F high; no long-term gains in increasing F	-	5.0	5.0	5.6	6.2	-
1988	No increase in F	-	4.8	5.0	4.4	5.0	-
1989	80% of F(87); TAC	-	5.8	5.8	4.2	4.4	-
1990	Halt decline in SSB; TAC	-	5.1	5.1	4.0	3.3	-
1991	Rebuild SSB to SSB(90); TAC	-	3.3	4.5	2.8	2.6	-
1992	70% of F(90)	-	3.0	3.8	3.2	3.3	-
1993	F = 0.55 ~ 2800 t	-	2.8	2.8	2.0	2.0	-
1994	Long-term gains in decreasing F	-	< 3.7	3.1	2.1	2.1	-
1995	Long-term gains in decreasing F	-	2.4 ^a	2.8	2.0	1.9	-
1996	No long-term gain in increasing F	-	2.5	2.45	1.9	1.7	-
1997	No advice	-	-	2.1	2.0	1.9	-
1998	No increase in F	-	2.4	2.4	1.8	1.8	-
1999	Keep F below F _{pa}	-	2.4	2.4	1.6	1.6	-
2000	Keep F below F _{pa}	-	< 2.3	2.4	1.4	1.4	-
2001	Keep F below F _{pa}	-	< 2.4	2.0	1.5	1.5	-
2002	Keep F below F _{pa}	-	< 2.8	2.4	1.5	1.6	-
2003	No increase in F	-	1.9	1.675	1.6	1.6	-
2004	F < F _{pa}	-	1.6	1.34	1.1	1.1	0.63
2005	F < F _{pa}	-	2.97	1.608	1.3	1.3	1.21
2006	F < F _{pa}	-	5.9	1.608	0.9	0.9	1.25
2007	F < F _{pa}	-	6.5	1.849	0.8	0.8	1.74
2008	F < F _{pa}	-	5.2	1.849	0.5	0.6	1.27
2009	No long-term gains in increasing F above F _{0.1}	-	1.43	1.43	0.48	0.46	1.13
2010	No long-term gains in increasing F above F _{0.1}	-	1.63	1.63	0.38	0.38	2.56
2011	Effort should be consistent with no increase in catches	-	-	1.627	0.59	0.59	0.60
2012	Catches should not increase	-	-	1.627	0.50	0.50	0.98
2013	Landings should be no more than 2% more than recent landings (last 3 years)	-	< 0.490	1.627	0.34	0.31	0.74
2014	Catches should be no more than 1% more than recent catches (last 3 years)	< 1.827	< 0.497	1.22			
2015	Catches should be no more than recent catches (last 3 years)	< 1.242	< 0.392				

Weights in thousand tonnes.

^a Catch at *status quo* F.

Table 5.3.23.2 Plaice in Division VIIa (Irish Sea). Landings (tonnes) by country and ICES estimates of total catch.

Country	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 ^a
Belgium	332	327	344	459	327	275	325	482	636	628	431	566	343	194	157	197	138	332	236	144
France	13	10	11	8	8	5	14	9	8	7	2	9	2	2	2	0.4	0.2	0.28	0.08	0.29
Ireland	547	557	538	543	730	541	420	378	370	490	328	272	179	194	102	73	89	118	106	103
Netherlands	-	-	69	110	27	30	47	-	-	-	-	-	-	-	-	-	-	-	-	-
UK (Eng.&Wales) ^b	1 082	1 050	878	798	679	687	610	607	569	409	369	422	413	412	300	185	148	145	154	91
UK (Isle of Man)	14	20	16	11	14	5	6	1	1	1	0	0	0	0	1	...	0.5	0.25	0.11	0.02
UK (Scotland)	63	60	18	25	18	23	21	11	7	9	4	1	0	0	1	2	3	0	0	0
Total	2 051	2 024	1 874	1 954	1 803	1 566	1 443	1 488	1 591	1 544	1 134	1 270	937	802	562	457	379	594	496	338
Discards ^c	-	-	-	-	-	-	-	-	-	-	628	1210	1254	1743	1270	1131	2560	604	981	740
Unallocated	15	-150	-167	-83	-38	34	-72	-15	32	15	9	11	-3	3	1	0	-1	1	7	-29
Total figures used by the Working Group for stock assessment	2 066	1 874	1 707	1 871	1 765	1 600	1 371	1 473	1 623	1 559	1 771	2 491	2 188	2 548	1 834	1 588	2 938	1 200	1 484	1049

^a Provisional.^b Northern Ireland included with England and Wales.^c Discard data used in the assessment model.

Table 5.3.23.3

Plaice in Division VIIa (Irish Sea). Aarts and Poos (2009) model estimates of relative (mean scaled) recruitment, SSB, landings, discards, and fishing mortality.

Year	Relative Recruitment Age 1	Relative High	Relative Low	Relative SSB	Relative High	Relative Low	Landings (tonnes)	Discards (tonnes)	Relative Mean F Ages 3–6	Relative High	Relative Low
1993	0.863	2.692	1.445	0.472	0.601	0.359	1996		2.845	3.369	2.403
1994	0.729	2.166	1.249	0.46	0.565	0.355	2066		2.482	2.901	2.138
1995	0.783	2.27	1.391	0.45	0.557	0.353	1874		2.117	2.508	1.769
1996	1.021	2.901	1.78	0.481	0.613	0.377	1707		1.615	1.975	1.311
1997	1.08	3.115	1.924	0.506	0.659	0.385	1871		1.852	2.316	1.46
1998	0.861	2.437	1.553	0.629	0.847	0.467	1765		1.494	1.958	1.111
1999	0.809	2.302	1.45	0.675	0.957	0.486	1600		1.148	1.586	0.805
2000	1.136	3.273	2.039	0.747	1.079	0.516	1371		0.885	1.264	0.626
2001	1.109	3.199	2	0.91	1.332	0.609	1473		0.852	1.224	0.575
2002	1.197	3.457	2.105	1.054	1.557	0.701	1623		0.89	1.323	0.593
2003	0.926	2.658	1.632	1.274	1.921	0.822	1559		0.736	1.105	0.478
2004	1.231	3.548	2.211	1.224	1.917	0.757	1143	628	0.503	0.768	0.322
2005	0.905	2.575	1.609	1.266	1.955	0.796	1281	1210	0.641	0.97	0.411
2006	1.036	2.949	1.858	1.36	2.112	0.852	934	1254	0.46	0.696	0.307
2007	1.24	3.583	2.196	1.225	1.867	0.772	805	1743	0.44	0.635	0.297
2008	0.779	2.257	1.388	1.376	2.08	0.895	563	1270	0.323	0.462	0.223
2009	0.872	2.546	1.532	1.391	2.057	0.931	457	1131	0.289	0.407	0.203
2010	1.104	3.181	1.934	1.309	1.86	0.922	378	2560	0.248	0.348	0.178
2011	1.27	3.758	2.23	1.553	2.162	1.11	595	604	0.431	0.605	0.316
2012	1.281	3.816	2.173	1.223	1.711	0.874	503	981	0.434	0.613	0.31
2013	0.767	2.395	1.259	1.416	1.986	1.001	309	740	0.316	0.469	0.22

Table 5.3.23.4

Plaice in Division VIIa (Irish Sea). Absolute SSB (thousand tonnes) of the annual egg production estimates (AEPM), mean standardized SSB output from the Aarts and Poos model (AP), and catch (thousand tonnes) as used in the assessment and harvest rate (catch/AEPM SSB).

Year	SSB-AEPM (kt)	Relative SSB-AP model	Ratio AP SSB / AEPM	AP scaled by SSB-AEPM	Catch ¹ (kt)	SSB-AEPM Harvest rate (%)	Scaled AP Harvest rate (%)
2004		1.224		13.252	1.771		13
2005		1.266		13.706	2.491		18
2006	14.42	1.360	0.094	14.725	2.186	15.16	15
2007		1.225		13.268	2.548		19
2008	14.35	1.376	0.096	14.899	1.833	12.77	12
2009		1.391		15.065	1.591		11
2010	15.07	1.309	0.087	14.174	2.938	19.5	21
2011		1.553		16.819	1.198		7
2012		1.223		13.244	1.484		11
2013		1.416		15.338	1.049		7

Scaling ratio average AP SSB / AEPM 0.092.

¹ Discard data only available from 2004 onwards.