

6.3.35 Saithe (*Pollachius virens*) in Subareas IV and VI and Division IIIa (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat)

ICES stock advice

ICES advises that when the EU–Norway management strategy is applied, catches in 2016 should be no more than 75 049 tonnes. If this stock is not under the EU landing obligation in 2016 and discard rates do not change from the average (2012–2014), this implies landings of no more than 68 601 tonnes.

Stock development over time

Recruitment has been below the long-term average since 2006. Fishing mortality (F) has fluctuated around F_{MSY} since 1997. Spawning-stock biomass (SSB) has declined and has been fluctuating around $MSY_{Btrigger}$ since 2011.

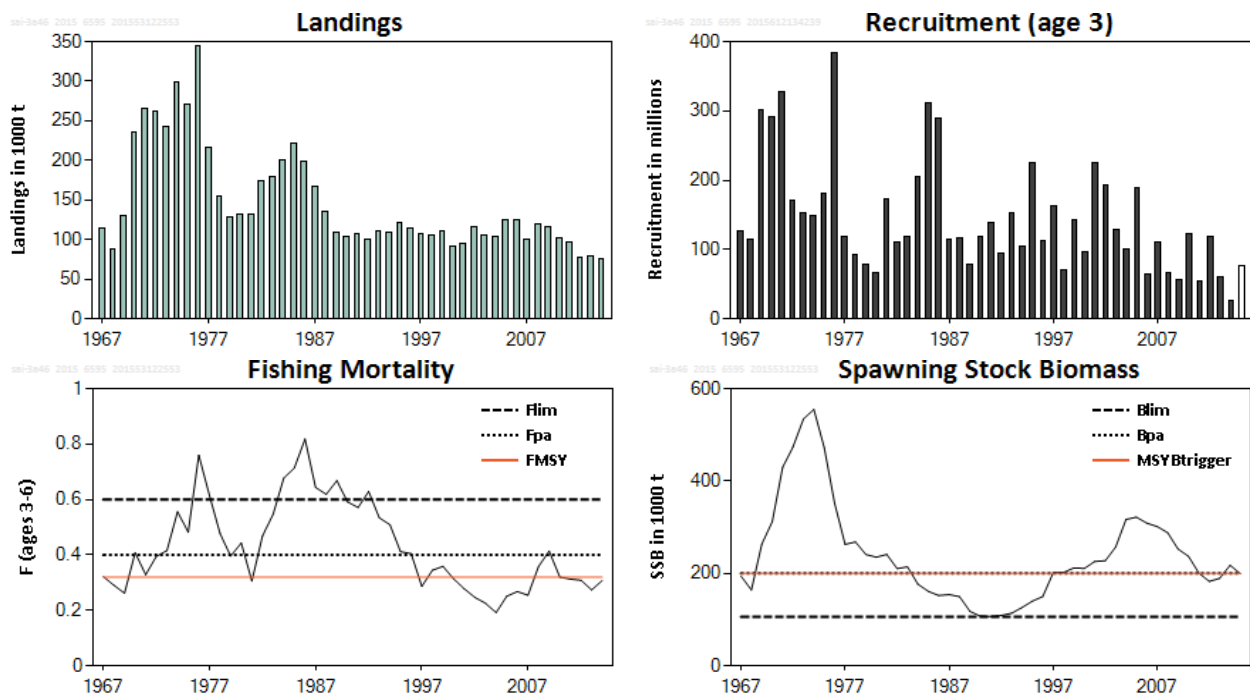


Figure 6.3.35.1 Saithe in Subareas IV and VI and Division IIIa. Summary of stock assessment (weights in thousand tonnes). Top right: SSB and F for the time-series used in the assessment.

Stock and exploitation status

Table 6.3.35.1 Saithe in Subareas IV and VI and Division IIIa. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size			
		2012	2013	2014	2013	2014	2015	
Maximum Sustainable Yield	F_{MSY}	✓	✓	✓	Appropriate	MSY	✗	Below trigger
Precautionary approach	F_{pa}	✓	✓	✓	Harvested sustainably	B_{pa}, B_{lim}	○	Increased risk
	F_{lim}	✗	✓	✗		SSB _{MGT}	✗	
Management plan	F_{MGT}	✗	✓	✗	Above $F_{MS-upper}$			✓

Catch options

Since SSB is marginally below 200 000 tonnes in 2015, paragraph 3 of the EU–Norway management strategy applies, resulting in an F of 0.298.

Table 6.3.35.2 Saithe in Subareas IV and VI and Division IIIa. The basis for the catch options.

Variable	Value	Source	Notes
F ages 3–5 (2015)	0.325	ICES (2015a)	TAC constraint
SSB (2015)	199270 t	ICES (2015a)	SSB in the intermediate year
SSB (2016)	173473 t	ICES (2015a)	SSB at the beginning of the TAC year
R _{age3} (2015)	76.092 million	ICES (2015a)	Geometric mean 2005–2014
R _{age3} (2016)	76.092 million	ICES (2015a)	Geometric mean 2005–2014
Total catch (2015)	79702 t	ICES (2015a)	
Commercial landings (2015)	72854 t	ICES (2015a)	TAC 2015
Discards (2015)	6848 t	ICES (2015a)	8.6% discard rate in weight (average 2012–2014)

Table 6.3.35.3 Saithe in Subareas IV and VI and Division IIIa. The catch options. All weights in tonnes.

Rationale	Total catches 2016 *	Wanted catch 2016 *	Wanted catch IIIa & IV 2016 **	Wanted catch VI 2016 **	Basis	F (wanted catch) 2016	SSB 2017	% SSB change ***	% TAC change wanted catch^
EU–Norway management strategy	75049	68601	62153	6448	Paragraph 3 of management strategy	0.298	168129	-3	-6
MSY approach	70508	64450	58392	6058	$F_{MSY} \times (SSB_{2016}/MSY_{B_{trigger}})$	0.28	171892	-1	-12
Precautionary approach	36860	33693	30526	3167	$SSB = B_{pa}$ in 2017	0.14	200001	15	-54
Zero catch	0	0	0	0	$F = 0$	0	231173	33	-100
Other options	79634	72792	65950	6842	F_{MSY}	0.32	164337	-5	-0.1
	80684	73751	66818	6933	F_{2015}	0.33	163470	-6	1
	79702	72854	66006	6848	TAC_{2015}	0.32	164280	-5	0
<i>Mixed fisheries options – minor differences with calculation above can occur due to different methodology used (ICES, 2015b)</i>									
Maximum	136251^^				A	0.71	111205	-36	
Minimum	47078^^				B	0.19	191047	10	
Cod	62243^^				C	0.26	177186	2	
SQ Effort	71446^^				D	0.31	168821	-3	
Value	77836^^				E	0.34	163035	-6	
Effort Mgt	64889^^				F	0.28	174777	1	

* “Wanted catch” is used to described fish that would be landed in the absence of the EU landing obligation. Total catches are calculated based on predicted wanted catch and the average discard rate (2012–2014; average discard rate 8.6%).

** Wanted catch split according to the average in 1993–1998, i.e. 90.6% in Subarea IV and Division IIIa West and 9.4% in Subarea VI.

*** SSB 2017 relative to SSB 2016.

^ Wanted catch 2016 relative to TAC 2015.

^^For mixed fisheries catch options, the raising from wanted catch to total catch done for the saithe single-stock advice has not been undertaken; therefore, for this stock, the catch values resulting from mixed fisheries options are more directly comparable to the “wanted catch” single stock advice values.

Mixed-fisheries assumptions

(note: “fleet’s stock share” is used to describe the share of the fishing opportunities for each particular fleet, which has been calculated based on the single-stock advice for 2016 and the historical proportion of the stock landings taken by the fleet):

- A. Maximum scenario: Each fleet stops fishing when its last stock share is exhausted.
- B. Minimum scenario: Each fleet stops fishing when its first stock share is exhausted.
- C. Cod scenario: Each fleet stops fishing when its cod stock share is exhausted.
- D. SQ (*status quo*) effort scenario: The effort of each fleet in 2015 and 2016 is as in 2014.
- E. Value scenario: The effort of each fleet is equal to the weighted average of the efforts required to catch the fleet’s quota share of each of the stocks, where the weights are the relative catch values of each stock in the fleet’s portfolio.
- F. Effort management scenario: Effort reductions according to cod and flatfish management plans.

Basis of the advice

Table 6.3.35.4 Saithe in Subareas IV and VI and Division IIIa. The basis of the advice.

Advice basis	EU–Norway management strategy (Annex 2 in ICES, 2012)
Management plan	EU–Norway management strategy

Quality of the assessment

In 2014, modifications to the design and target identification of the NORACU survey showed that what had been identified as saithe in the acoustic signal in the past was most likely incorrect. Therefore, it has been removed from the assessment, which only slightly influenced assessment results.

The overall reporting of catch data provided to ICES has improved during 2012–2014 through such aspects as the fully documented fisheries (FDF) programme and increased coverage by the Scottish industry/science observer sampling scheme.

Recruitment is poorly estimated with the IBTS Q3 survey because fish of age 3 are poorly represented. Catches from older age classes in the surveys are not representative and commercial l_{pue} indices are also used for tuning and are highly influential on assessment results. Therefore, the assessment is dependent on commercial indices, which may not fully reflect changes in stock size for a schooling species like saithe.



Figure 6.3.35.2 Saithe in Subareas IV and VI and Division IIIa. Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

In 2012, an EU–Norway request was made to ICES on options to revise the long-term management strategy for saithe (ICES, 2012). Based upon the evaluations, the EU and Norway agreed to keep the existing management strategy. Because the long-term performance was not clear, ICES advised that the strategy should be re-evaluated within four years (i.e. no later than 2016) and revised if necessary.

In 2013, the effects of interannual quota flexibility in the management strategy for saithe were evaluated (ICES, 2013). ICES concluded that the management strategy evaluated is robust to inclusion of interannual quota flexibility in terms of the probability of the stock biomass falling below B_{lim} . This conclusion is conditional on the interannual quota flexibility being suspended when the stock is estimated to be outside safe biological limits. SSB is estimated to be 199 270 tonnes for 2015, which is below B_{pa} (200 000 tonnes).

Results from a North Sea mixed fisheries analysis are presented in ICES (2015c). Assuming fishing patterns and catchability in 2015 and 2016 are unchanged from those in 2014, and in the case of a strictly implemented discard ban, North Sea whiting and *Nephrops* FU 6 (if it was managed with an own TAC for the FU) would be the most limiting stocks, constraining 46% and 34% of the 2014 effort, respectively. Results for the saithe stock are also included as additional rows in the catch options table of this advice sheet.

Reference points

Table 6.3.35.5 Saithe in Subareas IV and VI and Division IIIa. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	200000 t	Default value B_{pa}	ICES (2014)
	F_{MSY}	0.32	Stochastic simulation using hockey-stick stock–recruitment.	ICES (2014)
Precautionary approach	B_{lim}	106000 t	$B_{loss} = 106\ 000$ t (estimated in 1998).	
	B_{pa}	200000 t	Affords a high probability of maintaining SSB above B_{lim} .	ICES (2006)
	F_{lim}	0.6	F_{loss} is the fishing mortality estimated to lead to the stock falling below B_{lim} in the long term.	ICES (2006)
	F_{pa}	0.4	Implies that $B_{eq} > B_{pa}$ and $P(SSB < B_{pa}) < 10\%$.	ICES (2006)
EU–Norway management strategy	$SSB_{MS-lower}$	106000 t	B_{lim}	Annex 2 in ICES (2012)
	$SSB_{MS-upper}$	200000 t	B_{pa}	
	$F_{MS-lower}$	0.1	Fishing mortality when $SSB < SSB_{MS-lower}$	
	$F_{MS-upper}$	0.3	Fishing mortality when $SSB > SSB_{MS-upper}$	

Basis of the assessment

Table 6.3.35.6 Saithe in Subareas IV and VI and Division IIIa. The basis of the assessment.

ICES stock data category	1 (ICES, 2015d).
Assessment type	Age-based analytical assessment (XSA; ICES, 2015a) that uses landings in the model, and discards are then included to calculate a catch forecast.
Input data	Commercial catches (international landings and discards, age and length frequencies from catch sampling); survey index (IBTS Q3); 3 commercial indices (FRATRB_IV, GER_OTB_IV, NORTR_IV2). Maturity-at-age and natural mortality are assumed to be constant.
Discards and bycatch	Used to provide advice, but not included in the assessment. Discard information 2012–2014 (covers 90% of the landings).
Indicators	None.
Other information	Benchmarked in 2011 (ICES, 2011). NORACU survey index removed in 2015.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK). Working Group on Mixed-Fisheries Advice (WGMIXFISH-NS).

Information from stakeholders

Across individual areas the proportions reporting higher abundances of saithe in 2014 tended to be greater in more northern areas (areas 1, 2, 3, and 8), while the proportions reporting lower abundances tended to be higher in more southerly areas (areas 4, 6a, and 7; Figure 6.3.35.3; Napier, 2014).

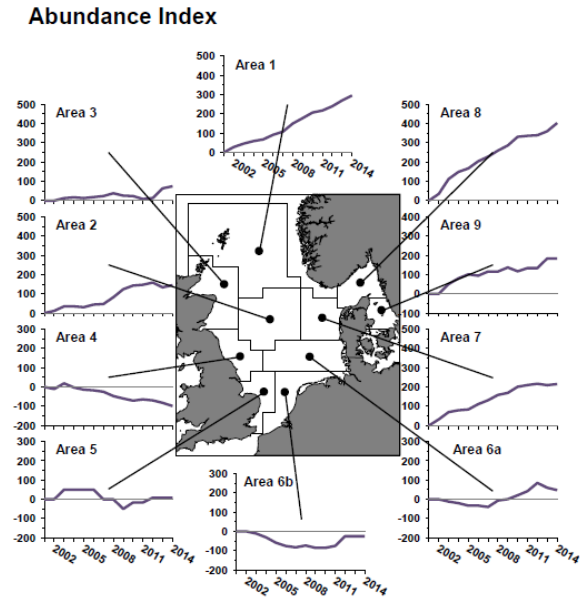


Figure 6.3.35.3 Cumulative time-series of index of perceptions of abundance of saithe, by area (see page 14 in Napier (2014) for an explanation of the index).

History of advice, catch, and management

Table 6.3.35.7 Saithe in Subareas IV and VI and Division IIIa. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights in thousand tonnes.

Subarea IV and Division IIIa

Year	ICES advice	Predicted landings corresp. to advice	Predicted catches corresp. to advice	Agreed TAC	Official landings	ICES landings	ICES discards
1987	Reduce F	< 198		173	154	149	
1988	60% of F(86); TAC	156		165	113	107	
1989	No increase in F; TAC	170		170	92	92	
1990	No increase in F; TAC	120		120	85	88	
1991	No increase in F; TAC	125		125	93	99	
1992	No increase in F; TAC	102		110	92	92	
1993	70% of F(91) ~ 93 000 t	93		93	99	105	
1994	Reduce F by 30%	72		97	90	102	
1995	No increase in F	107		107	97	113	
1996	No increase in F	111		111	96	110	
1997	No increase in F	113		115	86	103	
1998	Reduce F by 20%	97		97	88	100	
1999	Reduce F to F_{pa}	104		110	108	107	
2000	Reduce F by 30%	75		85	85	87	
2001	Reduce F by 20%	87		87	88	90	
2002	$F < F_{pa}$	< 135		135	115	116	
2003	$F < F_{pa}$	< 176		165	107.47	101.66	
2004	$F < F_{pa}^*$	< 211		190	103.61	99.96	
2005	F according to man. plan*	< 137		145	110.58	111.54	
2006	F according to man. plan ($< F_{pa}$)*	< 123		123	109.80	117.11	
2007	F according to man. plan ($< F_{pa}$)*	< 124		123	87.38	93.62	
2008	F according to man. plan ($< F_{pa}$)*	< 137		136	114.52	111.43	
2009	F according to man. plan ($< F_{pa}$)*	< 126		126	100.68	105.53	
2010	F according to man. plan ($< F_{pa}$)*	< 107		107	91.07	95.10	
2011	See scenarios	-		93	89.28	89.70	
2012**	F according to man. plan ($< F_{pa}$)*	< 79.320		79	68.93	69.89	4913
2013	Management plan (TAC +15%)*	< 91.219		91.220	71.60	71.83	6517
2014	Management plan (TAC -15%)*	< 77.536		77.536	68.318	68.637	5701
2015	Management plan	< 66.006	< 72.211	66.006			
2016	EU-Norway management strategy	≤ 62.153	≤ 67.995				

* Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries.

** The June advice in 2012 was updated in November 2012.

Subarea VI

Year	ICES advice	Predicted landings corresp. to advice	Predicted catches corresp. to advice	Agreed TAC ^{^^}	Official landings	ICES landings	ICES discards
1987	F reduced towards F_{max}	19		27.8	32.5	31.4	
1988	80% of F(86); TAC	35		35	32.8	34.2	
1989	$F < 0.3$; TAC	20		30	22.4	25.6	
1990	80% of F(88); TAC	24		29	18.0	19.9	
1991	Stop SSB decline; TAC	21		22	17.9	17.0	
1992	Avoid further reduction in SSB	< 19		17	10.8	11.8	
1993	$F = 0.21$	6.3		14	14.5	13.9	
1994	Lowest possible F			14	13.0**	12.8	
1995	Significant reduction in effort	-		16	10.6**	11.8	
1996	No increase in F	10.2*		13	9.4**	9.4	
1997	Significant reduction in F			12	8.6**	9.4	
1998	60% reduction in F	4.8		10.9	7.4**	8.4	
1999	60% reduction in F	4.8		7.5	6.8	7.3	
2000	Reduce F by 30%	6.0		7	6.4	5.9	
2001	Reduce F by 20%	9.0		9	8.7	8.4	
2002	$F < F_{pa}$	< 13		14	5.6	5.2	
2003	$F < F_{pa}$	< 17		17.1	5.22	5.25	
2004	$F < F_{pa}^{\wedge}$	< 21		20	4.81	4.51	
2005	F according to man. plan ($< F_{pa}$) [^]	< 14		15	8.70	5.74	
2006	F according to man. plan ($< F_{pa}$) [^]	< 12		13	9.42	8.57	
2007	F according to man. plan ($< F_{pa}$) [^]	< 12		13	6.69	6.79	
2008	F according to man. plan ($< F_{pa}$) [^]	< 14		14	6.01	7.23	
2009	F according to man. plan ($< F_{pa}$) [^]	< 13		13	6.17	6.96	
2010	F according to man. plan ($< F_{pa}$) [^]	< 11		11	6.22	6.84	
2011	See scenarios	-		10	7.31	7.40	
2012***	F according to man. plan ($< F_{pa}$) [^]	< 8.230		8	7.56	7.21	2536
2013	Management plan (TAC +15%) [^]	< 9.464		9.464	8.47	8.06	1555
2014	Management plan (TAC -15%) [^]	< 8.045		8.045	6.842	6.782	577
2015	Management plan	< 6.848	< 7.492	6.848			
2016	EU-Norway management strategy	≤ 6.448	≤ 7.054				

* Status quo catch.

** Incomplete data.

*** The June advice in 2012 was updated in November 2012.

[^] Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries.

^{^^} Since 1996, the saithe in this area has been assessed together with North Sea/Skagerrak saithe, with allocation of TAC based on historical landings. In recent years TACs in Subarea VI have been included in a total TAC for Divisions VIIb and VIIc, but it is unclear if anything is added. The areas were combined shortly after the Saithe Study Group meeting in 1995. Presumably the assessment was merged in 1996, and used in the advice for 1997.

History of catch and landings

Table 6.3.35.8 Saithe in Subareas IV and VI and Division IIIa. Catch distribution by fleet in 2014 as estimated by ICES.

Catch (2014)	Landings			Discards
	91% bottom trawl fleets	4% by gillnetters	5% other gears	
81.697 kt	75.419 kt			Discards 6.278 kt

Table 6.3.35.9 Saithe in Subareas IV and VI and Division IIIa. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. Weights are in tonnes.

Subarea IV and Division IIIa

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014*
Belgium	22	28	15	18	7	27	15	2	1	3	4
Denmark	7991	7498	7470	5443	8066	8802	8018	6331	5171	5691	5056
Faroe Isl.	558	463	60	15	108	841	146	2	8	3	0
France	13628	11830	16953	15083	15881	7203	4582*	13856*	14093*	8475	7906
Germany	9589	12401	14397	12791	14140	13410	11193	10234	8052	9687	8562
Greenland	403	1042	924	564	888	927	0	0	0	0	0
Ireland	1	0	0	0	0	1	0	0	0	0	0
Lithuania	0	149	0	0	0	0	0	0	0	0	0
Netherlands	3	40	28	5	3	16	3	24	34	168	0
Norway	62783	68122	61318	45396	61464	57708	52712	46809	33288	35701	37463
Poland	0	1100	1084	1384	1407	988	654	584	0	0	0
Russia	0	35	2	5	5	13	0	0	0	0	0
Sweden	2249	2132	1745	1381	1639	1363	1545	1335	1306	1401	1272
UK (E/W/Ni)	457	960	9128**	9625**	11804**	12584**	11887**	10250**	7287**	10379**	687
UK (Scotland)	5924	6170									7686
Total reported	103608	111970	113124	91710	115412	103883	90755	89427	69240	71508	68318
Unallocated	-3646	-427	3988	1908	-3979	1646	4345	277	645	317	319
ICES estimate	99962	111543	117112	93618	111433	105529	95100	89704	70510	71825	68637
TAC	190000	145000	123250	135900	135900	125934	107000	93600	79320	91220	77536

*Preliminary.

**Scotland+E/W/Ni combined.

Subarea VI

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014*
Denmark	0	0	0	0	0	0	0	0	0	0	20
Faroe Islands	34	25	76	32	23	60	24	5	6	25	0
France	3053	3954	6092	4327	4170	2102	2008	2357	2612	3814	2904
Germany	4	373	532	580	148	298	257	0	9	0	0
Ireland	95	168	267	322	288	407	520	359	364	313	128
Netherlands	0	0	3	36	1	0	0	0	0	0	0
Norway	16	20	28	377	78	68	121	240	5	715	442
Russia	6	25	7	2	50	4	2	0	0	0	0
Spain	2	3	6	3	4	8	18	31	13	21	0
UK (E/W/Ni)	37	133	2748**	1424**	2955**	3491**	3168**	4500**	4549**	3646**	97
UK (Scotland)	1563	2922									3191
Total reported	4810	7623	9759	7103	7717	6438	6118	7492	7558	8534	6842
Unallocated	-296	-1884	-1191	-317	-483	525	722	-92	-351	-472	-60
ICES estimate	4514	5739	8568	6786	7234	6963	6840	7400	7162	8062	6782
TAC	20000	15044	12787	14100	14100	13066	11000	9570	8230	9464	8045

*Preliminary.

**Scotland+E/W/Ni combined.

Subarea IV, Division IIIa, and Subarea VI

SAITHE Subarea IV, Division IIIa, and Subarea VI											
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
ICES estimate	108418	119593	125680	100404	118667	112492	101940	97104	77672	79887	75419
TAC	210000	160044	136037	150000	150000	139000	118000	103170	87550	100684	85581

Summary of the assessment

Table 6.3.35.10 Saithe in Subarea IV, VI and Division IIIa. Assessment summary with weights (in tonnes).

Year	Recruitment at age 3 thousands	SSB tonnes	Landings tonnes	Mean F Ages
1967	127456	194228	113751	0.322
1968	114114	164413	88326	0.291
1969	300689	263979	130588	0.262
1970	291836	311949	234962	0.408
1971	327932	429606	265381	0.329
1972	171373	474022	261877	0.395
1973	152852	534466	242499	0.416
1974	148741	554917	298351	0.556
1975	181240	472030	271584	0.482
1976	384114	351617	343967	0.76
1977	118019	263129	216395	0.615
1978	92456	268133	155141	0.477
1979	77657	241084	128360	0.396
1980	67153	235196	131908	0.443
1981	172858	241264	132278	0.306
1982	109995	210527	174351	0.469
1983	118273	214392	180044	0.547
1984	205300	176855	200834	0.677
1985	312017	161193	220869	0.714
1986	288646	152339	198596	0.818
1987	113892	154312	167514	0.644
1988	116418	150007	135172	0.619
1989	78480	117896	108877	0.668
1990	118812	107623	103800	0.592
1991	138530	107204	108048	0.571
1992	93719	109023	99742	0.629
1993	152795	113905	111491	0.534
1994	103877	126367	109622	0.509
1995	226143	140099	121810	0.412
1996	112940	150095	114997	0.405
1997	162978	201345	107327	0.287
1998	71108	202185	106123	0.345
1999	142599	212029	110716	0.359
2000	95854	210912	91322	0.314
2001	225383	226066	95042	0.278
2002	192574	227408	115395	0.247
2003	127879	256981	105569	0.226
2004	100458	316991	104237	0.192
2005	189512	321863	124532	0.251
2006	63520	308854	125681	0.268
2007	111034	301555	101202	0.255
2008	66210	288251	119305	0.359
2009	56407	252897	115747	0.414
2010	122173	237132	101940	0.32
2011	55060	200745	96217	0.313
2012	118842	182951	77447	0.309
2013	60184	189420	79684	0.274
2014	27097	217654	75176	0.308
2015	76092*	199270		
Average	144557	239722	146329	0.429

* GM 2005–2014.

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