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6.3.35 Plaice (*Pleuronectes platessa*) in Division 7.d (eastern English Channel)

ICES stock advice

ICES advises that when the MSY approach is applied, catches of the Division 7.d plaice stock in 2017 should be no more than 12 805 tonnes. If discard rates do not change from the average of the last three years (2013–2015), this implies landings of no more than 7550 tonnes.

Assuming the same proportion of the Division 7.e and Subarea 4 plaice stocks is taken in Division 7.d as during 2003–2015, this will correspond to catches of plaice in Division 7.d in 2017 of no more than 14 864 tonnes. If discard rates do not change from the average of the last three years (2013–2015), this implies landings of no more than 8764 tonnes.

Stock development over time

Fishing mortality (F) has declined since the mid-1990s and has been below F_{MSY} since 2009. Spawning-stock biomass (SSB) has increased since 2008 and has been above MSY $B_{trigger}$ since 2009. Recruitment (R) has been high since 2009.

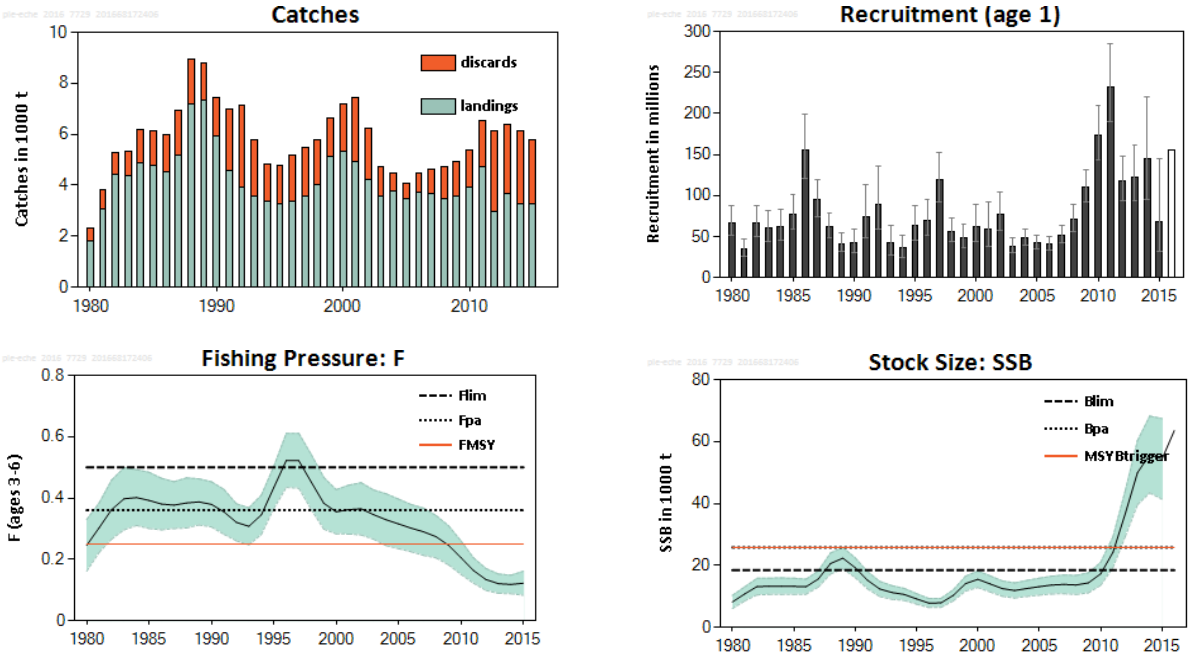

Figure 6.3.35.1 Plaice in Division 7.d. Summary of stock assessment. Predicted recruitment values are not shaded. Discards data have been reconstructed from 1980 to 2005.

Stock and exploitation status

Table 6.3.35.1 Plaice in Division 7.d. 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 $B_{trigger}$	✓	✓	✓	Above trigger
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓	Harvested sustainably	B_{pa}, B_{lim}	✓	✓	✓	Full reproductive capacity
Management plan	F_{MGT}	-	-	-	Not applicable	SSB_{MGT}	-	-	-	Not applicable

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Catch options

Table 6.3.35.2 Plaice in Division 7.d. The basis for the catch options.

Variable	Value	Source	Notes
F ages 3–6 (2016)	0.27	ICES (2016a)	Assuming that the Division 7.d proportion of the TAC 2016 is fully landed *,**
SSB (2017)	61116	ICES (2016a)	Short-term forecast (STF), tonnes
R_{age1} (2016)	155235	ICES (2016a)	GM 2010–2013, thousand individuals
R_{age1} (2017)	155235	ICES (2016a)	GM 2010–2013, thousand individuals
Catch (2016)	14074	ICES (2016a)	STF, tonnes (Division 7.d plaice stock)
Landings (2016)	8223	ICES (2016a)	STF, tonnes (Division 7.d plaice stock)
Discards (2016)	5851	ICES (2016a)	STF, projection based on the average discard ratio (2013–2015) by age (Division 7.d plaice stock)

* Based on the recent average proportion of the TAC for Divisions 7.d,e landed in Division 7.d (76.7%, 2003–2015).

** Based on the landings of all plaice in Division 7.d including plaice originating from the North Sea and western English Channel, according to a ratio calculated over the last 14 years (13.85% of the plaice landed in Division 7.d are assumed to originate from the North Sea and western English Channel, average 2003–2015).

Table 6.3.35.3 Plaice in Division 7.d. The catch options. Weights are in tonnes.

	Division 7.d plaice stock										Plaice in Division 7.d*			
Rationale	Total catch (2017)	Wanted^ catch (2017)	Unwanted^ catch (2017)	Basis	F_{total} (2017)	F_{wanted} (2017)	$F_{unwanted}$ (2017)	SSB (2018)	% SSB change **	% change in wanted catch^^	Total catch (2017)	Wanted^ catch (2017)	Unwanted^ catch (2017)	% change in wanted catch^^^
MSY approach	12805	7550	5255	F_{MSY}	0.25	0.135	0115	59077	−3	155	14864	8764	6100	135
Other options	17607	10402	7205	F_{PA}	0.36	0.195	0.165	53543	−12	252	20438	12075	8364	224
	23098	13678	9420	F_{lim}	0.5	0.271	0.229	47334	−23	363	26813	15878	10935	326
	6502	3824	2678	F_{2015}	0.12	0.065	0.055	66476	9	29	7548	4439	3109	19
	5030	2957	2073	Landings 2015 roll over	0.09	0.05	0.042	68224	12	0	5839	3433	2406	−8
	6034	3548	2486	Landings 2015 + 20%	0.11	0.06	0.051	67031	10	20	7004	4119	2886	11
	4025	2365	1660	Landings 2015 − 20%	0.07	0.039	0.033	69421	14	−20	4672	2745	1927	−26
	51007	30590	20417	$SSB > B_{lim}$	1.66	0.897	0.761	18448	−70	934	59209	35509	23700	853
	43346	25905	17441	$SSB > B_{pa}$	1.23	0.663	0.563	25826	−58	776	50317	30071	20246	707
	43346	25905	17441	$SSB > MSY\ B_{trigger}$	1.23	0.663	0.563	25826	−58	776	50317	30071	20246	707
Mixed fisheries options –differences with calculations above can occur because of the different methodology used (ICES, 2016c.)[†]														
Maximum	14428			A	0.25			66030	8					
Minimum	3743			B	0.06			78761	29					
Cod	6278			C	0.10			75708	24					
SQ effort	7693			D	0.13			74013	21					
Value	6747			E	0.11			75146	23					

* Catch of all plaice in Division 7.d, including plaice originating from the North Sea and the western English Channel, according to a ratio calculated over the years 2003–2015: 13.85% of the plaice landed in Division 7.d is assumed to originate from the North Sea and the western English Channel, and this is added to the predicted values for the Division 7.d plaice stock. The ratio is applied to total catch, wanted catch, and unwanted catch.

** SSB in 2018 relative to SSB in 2017.

^ "Wanted" and "unwanted" catch are used to describe fish that would be landed and discarded in the absence of the EU landing obligation, based on discard rates estimates for 2013–2015.

^^ Wanted catch in 2016 relative to the ICES estimates of landings of the Division 7.d plaice stock in 2015 (2957 t).

^^^ Wanted catch in 2016 relative to the ICES estimates of landings of plaice in Division 7.d in 2014 (3727 t).

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 2017 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 2016 and 2017 is as in 2015.

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.

[†] Version 2: Mixed-fisheries considerations as part of this advice added

Basis of the advice

Table 6.3.35.4 Plaice in Division 7.d. The basis of the advice.

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

Quality of the assessment

There is uncertainty about the landing statistics of the Division 7.d plaice stock because of migrations between this area and the North Sea and the western English Channel during the spawning period. Stock structure and mixing rate during the spawning period need to be investigated, new data are needed to determine if the current mixing rate estimates are still valid given the general increase of plaice stocks. The current assessment results are dependent on the proportion of quarter 1 removals estimated from the existing tagging survey (ICES, 2010).

The most recent benchmark (ICES, 2015a) has estimated new natural mortality values which resulted in a substantial rescaling of SSB, F, and recruitment values. Other changes made to the assessment include the incorporation of discard estimates (2006–2015), which is highly relevant for this stock; discards for earlier years are reconstructed internally in the assessment model.

French and UK survey indices have been revised in 2016, which led to a slight revision of the assessment, but has not changed the perception of the stock.

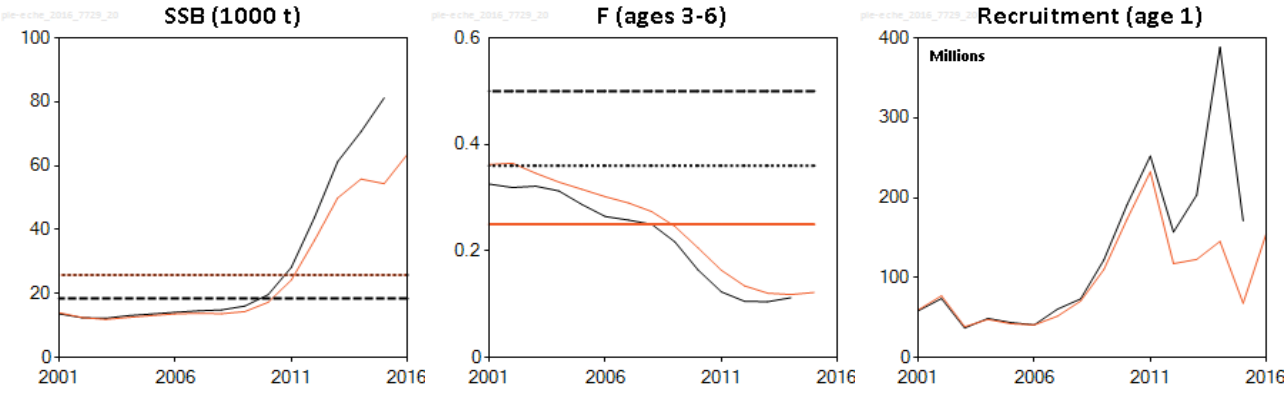

Figure 6.3.35.2 Plaice in Division 7.d. Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

The mesh size regulation (80 mm) leads to a large number of plaice being discarded because this mesh size is not matched to the minimum conservation reference size (MRCS).

The stock area is Division 7.d, which does not match the management area (Divisions 7.d and 7.e combined). The large increase in advised catch for Division 7.d could lead to overexploitation in Division 7.e. Separate management areas would be desirable.

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.

Results for the Division 7d (eastern English Channel) plaice stock are also included as additional rows in the catch options table of this advice sheet.

Reference points

Table 6.3.35.5 Plaice in Division 7.d. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	25826 t	B_{pa}	ICES (2015b)
	F_{MSY}	0.25	F_{MSY} computed with EqSim, based on the 2015 assessment and the segmented regression and on Beverton and Holt relationships.	ICES (2015b)
Precautionary approach	B_{lim}	18448 t	Break point of the segmented regression SRR.	ICES (2015b)
	B_{pa}	25826 t	$B_{pa} = B_{lim}*\exp(1.645\ \sigma_B)$; $\sigma_B = 0.20$	ICES (2015b)
	F_{lim}	0.5	F that in equilibrium will maintain the stock above B_{lim} with a 50% probability	ICES (2016a)
	F_{pa}	0.36	$F_{pa} = F_{lim}*\exp(-1.645\ \sigma_F)$; $\sigma_F = 0.20$	ICES (2016a)
Management plan	SSB_{MGT}	Not defined.		
	F_{MGT}	Not defined.		

Basis of the assessment

Table 6.3.35.6 Plaice in Division 7.d. The basis of the assessment.

ICES stock data category	1 (ICES, 2016b)
Assessment type	Age-based analytical assessment (Aarts and Poos, 2009; ICES, 2015a) that uses catches in the model and in the forecast.
Input data	Commercial catch (international landings, with age frequencies from catch sampling covering 85% of the landings), two survey indices UK-BTS, FGFS. Constant natural mortality by age is calculated from Peterson and Wroblewski (1984). Fixed maturity ogive is based on biological sampling.
Discards and bycatch	Discards are included in the assessment and all major fleets are covered. 87% of landings had associated discard data imported into InterCatch in 2015, with age frequencies from catch sampling covering 79% of the discards (imported plus raised). 86% of the discard estimates are based on observations. The model reconstructs discards for years where data is not available (before 2006).
Indicators	None
Other information	Last benchmarked in 2015 (WKPLE; ICES, 2015a).
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK) and Working Group on Mixed Fisheries Advice (WGMIXFISH-ADVICE)

Information from stakeholders

There is no available information.

History of the advice, catch, and management

Table 6.3.35.7 Plaice in Division 7.d. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in thousand tonnes.

Year	ICES advice	Predicted landings of corresp. to advice			Predicted catch corresp. to advice		Agreed TAC 7.d, e	Official landings of plaice in 7.d*	ICES landings of plaice in 7.d*	ICES landings 7.d plaice	ICES discards 7.d plaice	ICES discards of plaice in 7.d
		7.d plaice	Plaice in 7.d	Plaice in 7.d,e	7.d plaice stock	Plaice in 7.d						
1987	Precautionary TAC for 7.d,e			6.8			8.3	7.9	8.4	7.0		
1988	Precautionary TAC for 7.d,e			6.9			9.96	9.1	10.4	8.8		
1989	No increase in effort for 7.d,e			11.7			11.7	6.7 **	8.8	7.1		
1990	No increase in F; TAC for 7.d,e			10.7			10.7	7.8 **	9.0	7.3		
1991	TAC for 7.d,e			8.8			10.7	7.4 **	7.8	6.4		
1992	*Status quo* F gives mean SSB		7.6				9.6	6.2	6.3	5.2		
1993	*Status quo* F within safe biological limits		6.4				8.5	4.8	5.3	4.5		
1994	No long-term gains in increased F		-				9.1	5.6	6.1	5.0		
1995	No increase in F		5.6				8.0	4.6	5.1	4.2		
1996	No long-term gains in increasing F		6.5				7.53	4.6	5.4	4.4		
1997	No advice		-				7.09	5.3	6.3	5.2		
1998	Reduce F in 98 by 30% from 96 value		4.3				5.7	4.8	5.8	4.8		
1999	Fishing at F_{pa}		6.3				7.4	5.4	6.3	5.3		
2000	Fishing at F_{pa}		4.9				6.5	5.2	6.0	4.5		
2001	Fishing at < F_{pa}		< 4.4				6.0	5.0	5.3	4.4		
2002	Fishing at < F_{pa}		< 5.8				6.7	5.5	5.8	4.8		
2003	Fishing at < F_{pa}		< 5.3				5.97	4.6	4.1	3.6		
2004	Fishing at < F_{pa} ***		< 5.4				6.06	4.3	4.7	4.2		
2005	Fishing at < F_{pa} ***		< 4.4				5.15	3.7	4.0	3.5		
2006	No effort increase ***						5.15	3.5	3.6	3.2	0.727	0.749
2007	Average landings ***		< 4.0				5.05	3.8	4.0	3.4	1.220	1.252
2008	Average landings ***		< 3.5				5.05	3.6	3.9	3.3	0.888	0.936
2009	Average landings (2006–2008) ***		< 3.5				4.65	3.5	3.6	3.1	1.473	1.528
2010	Average landings (2007–2009)		< 3.5				4.274	3.9	4.4	3.9	2.412	2.511
2011	Average landings (2008–2010)		< 3.5				4.665	3.6	3.6	3.3	1.926	2.024
2012	No increase in catches and reduce discards		-				5.062	3.612	3.7	3.2	3.043	3.336
2013	Transition to F_{MSY} proxy for data-limited stocks by 2015 and reduce discards		< 4.3				6.4	4.182	4.127	3.6	2.696	2.955
2014	Transition to F_{MSY} proxy for data-limited stocks by 2015 and reduce discards	< 3.016	< 3.925				5.322	4.327	4.320	3.7	3.325	3.886
2015	ICES DLS approach (F_{MSY} proxy)	< 2.811	< 3.469				4.787	3.712	3.727	2.957	2.368	2.821
2016	MSY approach	≤ 10.855	≤ 12.512	≤ 16.249	≤ 16.923	≤ 19.506	12.446					
2017	MSY approach	≤ 7.550	≤ 8.764	≤ 11.381	≤ 12.805	≤ 14.864						

* Plaice in Division 7.d, taking into account fish caught in the first quarter in Division 7.d that come from Division 7.e and Subarea 4 to spawn.

** For France Division 7.d landings are estimated by ICES from the combined landings of divisions 7.d and 7.e.

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

History of catch and landings

Table 6.3.35.8 Plaice in Division 7.d. Catch distribution by fleet in 2015 as estimated by ICES.

Catch (2015)	Landings				Discards
6548 t	53% beam trawl	28% otter trawl	10% trammelnets	8% other gears	2821 t
	3727 t				

Table 6.3.35.9 Plaice in Division 7.d. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery.

Year	Belgium	Denmark	France	UK(E+W)	Others	Official landings in 7.d	Unallocated in 7.d	ICES estimated landings of plaice in 7.d	Quarter 1 removals ^	ICES estimated landings for 7.d plaice ^	ICES estimated landings for plaice in 7.e	Agreed TAC for 7.d,e ***
1976	147	1*	1439	376	-	1963	0	1963		1963	640	
1977	149	81**	1714	302	-	2246	0	2246		2246	702	
1978	161	156**	1810	349	-	2476	0	2476		2476	784	
1979	217	28**	2094	278	-	2617	0	2617		2617	977	
1980	435	112**	2905	304	-	3756	−1106	2650	427	2223	1215	
1981	815	-	3431	489	-	4735	34	4769	760	4009	1746	
1982	738	-	3504	541	22	4805	60	4865	825	4040	1938	
1983	1013	-	3119	548	-	4680	363	5043	950	4093	1754	
1984	947	-	2844	640	-	4431	730	5161	912	4249	1813	
1985	1148	-	3943	866	-	5957	65	6022	1022	5000	1751	
1986	1158	-	3288	828	488 **	5762	1072	6834	1161	5673	2161	
1987	1807	-	4768	1292	-	7867	499	8366	1360	7006	2388	8300
1988	2165	-	5688 **	1250	-	9103	1317	10420	1635	8785	2994	9960
1989	2019	-	3265 *	1383	-	6667	2091	8758	1665	7093	2808	11700
1990	2149	-	4170 *	1479	-	7798	1249	9047	1698	7349	3058	10700
1991	2265	-	3606 *	1566	-	7437	376	7813	1451	6362	2250	10700
1992	1560	1	3099	1553	19	6232	105	6337	1118	5220	1950	9600
1993	877	**	2792	1075	27	4771	560	5331	852	4479	1691	8500
1994	1418	-	3199	993	23	5633	488	6121	1074	5047	1471	9100
1995	1157	-	2598 **	796	18	4569	561	5130	934	4196	1295	8000
1996	1112	-	2630 **	856	-	4598	795	5393	963	4430	1321	7530
1997	1161	-	3077	1078	-	5316	991	6307	1127	5180	1654	7090
1998	854	-	3276 (23)	700	-	4830	932	5762	931	4832	1430	5700
1999	1306	-	3388 (23)	743	-	5437	889	6326	1058	5268	1616	7400
2000	1298	-	3183	752	-	5233	782	6014	1494	4522	1678	6500
2001	1346	-	2962	655	-	4963	303	5266	886	4380	1379	6000
2002	1204	-	3454	841	-	5499	278	5777	931	4846	1608	6700
2003	998	-	2893	756	3	4650	−564	4086	476	3610	1478	6000
2004	954	-	2766	582	10	4312	438	4750	544	4206	1402	6060
2005	832	-	2432	421	21	3706	285	3991	506	3485	1370	5150
2006	1024	-	1935	549	17	3525	121	3646	421	3225	1466	5080
2007	1355	-	2017	461	12	3845	156	4001	620	3381	1184	5050
2008	1386	-	1740	471	12	3609	255	3864	586	3278	1144	4646
2009	1002	-	1892	612	16	3522	38	3560	436	3124	1065	4274
2010	1123	-	2190	517	62	3892	519	4411	501	3910	1241	4665
2011	1067	-	1994	472	56	3589	60	3649	358	3291	1507	5062
2012	1045	-	1962	542	63	3612	111	3723	544	3179	1519	5342
2013	1295	-	2159	641	87	4182	−55	4127	523	3604	1526	6400
2014	1389	-	2229	633	76	4327	−7	4320	645	3675	1339	6223
2015	1605		1664	390	53	3712	15	3727	770	2957		12446

* Estimated by the working group from the combined divisions 7.d and 7.e.

** Includes Division 7e.

*** TACs for divisions 7.d and 7.e.

^ Takes into account the 'quarter 1 removal' of 65% of the quarter 1 Division 7.d catches of plaice that originate from Division 7.e and Subarea 4.

Summary of the assessment

Table 6.3.35.10 Plaice in Division 7.d. Assessment summary for the Division 7.d plaice stock. Weights are in tonnes.

Year	Recruitment (thousands)			Stock size: SSB (tonnes)			Landings (tonnes)	Discards (tonnes)	Fishing pressure: F		
	Age 1	High	Low	Tonnes	High	Low			Ages 3–6	High	Low
1980	66487	87291	50665	8181	10316	6046	1826	466	0.246	0.33	0.161
1981	34817	46604	26018	10781	13052	8510	3074	740	0.303	0.384	0.223
1982	65693	87146	49546	13150	15813	10487	4444	816	0.362	0.458	0.266
1983	59878	80867	44331	13256	15899	10613	4386	953	0.398	0.499	0.296
1984	61544	82527	45941	13273	15941	10605	4893	1267	0.401	0.492	0.311
1985	77470	101213	59339	13237	15869	10605	4783	1361	0.392	0.484	0.3
1986	155094	198710	12110	13121	15537	10705	4514	1451	0.38	0.464	0.296
1987	94476	119475	74693	15623	18244	13002	5168	1753	0.377	0.453	0.301
1988	61810	78989	48385	20628	24026	17230	7190	1731	0.384	0.466	0.302
1989	41184	54206	31303	22361	25833	18889	7347	1457	0.387	0.462	0.312
1990	42486	59520	30331	19277	22458	16096	5952	1466	0.379	0.453	0.306
1991	73291	112659	47662	15254	18050	12458	4597	2392	0.355	0.428	0.282
1992	88778	135007	58391	12404	14858	9950	3916	3222	0.321	0.381	0.26
1993	41776	62950	27720	11262	13452	9072	3567	2210	0.308	0.368	0.247
1994	35889	52054	24735	10631	12580	8682	3391	1447	0.345	0.409	0.281
1995	62768	87867	44820	9206	10894	7519	3267	1530	0.434	0.503	0.366
1996	69715	94565	51378	7849	9315	6382	3382	1774	0.522	0.61	0.434
1997	118778	152211	92687	7922	9380	6464	3552	1935	0.522	0.611	0.432
1998	56204	71862	43980	10351	12153	8549	4043	1725	0.452	0.542	0.363
1999	48590	64614	36527	14138	16528	11748	5137	1492	0.383	0.468	0.299
2000	62203	89717	43113	15533	18199	12867	5343	1839	0.355	0.427	0.283
2001	59643	92605	38403	14013	16614	11412	4921	2500	0.362	0.442	0.283
2002	77267	104707	57016	12501	14977	10025	4198	2049	0.365	0.45	0.28
2003	38574	48091	30920	11918	14358	9478	3587	1149	0.346	0.426	0.266
2004	47697	58454	38949	12561	15140	9982	3747	702	0.329	0.414	0.245
2005	42295	51036	35021	13136	15867	10405	3459	609	0.316	0.396	0.235
2006	40843	49555	33629	13652	16527	10777	3705	776	0.302	0.379	0.225
2007	51775	63395	42313	13865	16882	10848	3676	930	0.29	0.367	0.213
2008	70735	89676	55829	13691	16785	10597	3476	1257	0.274	0.343	0.205
2009	110054	131535	92131	14375	17602	11148	3561	1351	0.246	0.31	0.182
2010	173358	209468	14344	17278	20980	13576	3933	1441	0.206	0.26	0.151
2011	232267	284651	18965	24231	29179	19283	4702	1828	0.164	0.205	0.123
2012	117472	147435	93607	36661	44020	29302	2977	3141	0.135	0.17	0.099
2013	122771	160643	93813	49924	60258	39590	3674	2726	0.121	0.152	0.089
2014	145350	220660	95762	55810	68212	43408	3288	2846	0.118	0.148	0.088
2015	67953	144278	32032	54378	67394	41362	3253	2534	0.122	0.161	0.083
2016	155235			63535							

* GM (2010–2013).

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[†] Version 2: Reference added