



SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES (STECF)

Advice on fishing opportunities for anchovy in the Bay of Biscay (ICES Subarea VIII) for 2009/10

JUNE 2009, WRITTEN PROCEDURE

Edited by John Casey & Hendrik Dörner

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OPINION OF THE SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES BY WRITTEN PROCEDURE

Advice on fishing opportunities for anchovy in the Bay of Biscay (ICES Subarea VIII) for 2009/10

JUNE 2009

Background

Annual stock assessment for anchovy in the bay of Biscay are conducted by ICES and are based on the results of annual acoustic and DEPM surveys and the commercial catch data. Fishing opportunities in any particular calendar year are heavily influenced by the strength of the recruitment of 1-year-old fish spawned in the preceding year. Since 2005, scientific advice on fishing opportunities for anchovy in the Bay of Biscay, have been based on an in-year monitoring regime and TACs have been agreed for the year extending from 1 July to 30 June the following year. The Commission currently requires scientific advice on fishing opportunities for the period July 2009 to June 2010.

Request to STECF

STECF is requested to advise on fishing opportunities for 2009-2010 for the stock of anchovy in the Bay of Biscay (ICES Sub-area VIII)), taking into account the most recent assessment and advice from ICES. STECF is requested to provide its advice to the Commission by 29 June 2009.

STECF observations and conclusions

The most recent advice from ICES on the stock of anchovy in the Bay of Biscay was released on 23 June 2009. This is appended at Annex I. The STECF observation and advice below is provided in the format of the Annual Review of advice for stocks of Community interest.

FISHERIES: The fishery for anchovy in the Bay of Biscay has been closed since 2005. Traditionally, anchovy in the Bay of Biscay are mainly taken by pelagic trawlers and purse-seiners from France and Spain. The Spanish and French fleets fishing for anchovy in Subarea VIII are well separated geographically and in time. The Spanish fleet operates mainly in Division VIIIc and VIIIb in spring, while the French fleets operate in Division VIIIa in summer and autumn and in Division VIIIb in winter and summer. There is fishing for anchovy throughout the year. The fishery is mostly dependent on the year-class recruiting at age 1. The estimated total catch in 2006 was 1,753 t. and the estimated catch in 2007 (only from experimental fisheries) amounted to 141 t. There were no catches up to June in 2009. This fishery has been managed by annual TACs, which have been set at a fixed level (in the range of 30,000 t to 33,000 t) independent of the advice (from 1979 to 2005). Since 2002, the total annual catches have been well below the fixed annual TAC

indicating that when the recruitment is low, a management regime based on such annual TACs has not constrained the fishery.

SOURCE OF MANAGEMENT ADVICE: Annual advice on management is provided by ICES. The assessment is based on stock biomass estimates from egg (1987–2009) and acoustic surveys (1989–2009) and catches from the French and Spanish fisheries.

PRECAUTIONARY REFERENCE POINTS: ICES considers that B_{lim} is 21,000 t, the lowest observed biomass in the 2003 assessment, and proposed B_{pa} be set a 33,000 t. There is no biological basis for defining F_{lim} , and it is proposed that F_{pa} be established between $F=1.0$ and $F=1.2$. A B_{pa} reference point is difficult to use in management for this short-lived stock and the advice given by ICES is therefore not linked to this reference point.

Because the assessment provides the probability distributions for the SSB, it is possible to estimate directly the risk of the SSB falling below B_{lim} , B_{pa} and F_{pa} reference points may become unnecessary.

STOCK STATUS: Based on the most recent estimates of SSB, ICES classifies the stock as being at risk of reduced reproductive capacity. Although median SSB in 2009 is estimated to be above B_{lim} , this estimate has a 47% probability of being below B_{lim} . Low recruitment at age 1 since 2002 and almost complete recruitment failure of the 2004 year class are the primary causes of the low stock size. The recruitment at age 1 in 2009 is at the same level as last year but lower than in 2006 and 2007.

RECENT MANAGEMENT ADVICE: There are no explicit management objectives for this stock. The present closure of the fishery aims at protecting the remaining stock until a strong year class recruits to the stock. There is a 37% risk that SSB in 2010 will be below B_{lim} even with no catch. ICES advises on the basis of exploitation boundaries in relation to precautionary limits that the fishery should remain closed until the stock condition has improved. The stock condition can be re-evaluated when estimates of the 2010 SSB and 2009 year class are available based on the spring 2010 acoustic and DEPM surveys. This implies a closure of the fishery until at least July 2010.

STECF COMMENTS:

STECF agrees with the ICES advice and notes that there have been large inter-annual fluctuations in recruitment, which are strongly dependent on environmental factors.

STECF further notes that there is a 37% risk that SSB in 2010 will be below B_{lim} even with no catch.

STECF recommendations:

- With the current poor stock situation, maximum protection of the remaining spawning population is required.
- STECF **recommends** that the Biscay anchovy fishery should remain closed until reliable estimates of the 2010 SSB and 2009 year-class, based on the results from the spring 2010 acoustic and DEPM surveys, become available. This implies closure of the fishery for anchovy in the Bay of Biscay (ICES Subarea VIII) until at least July 2010.

STECF stresses that any recovery is entirely dependent on good incoming recruitment. STECF also agrees with ICES that supplementary management measures (e.g. closed areas, minimum landing size) may be considered in addition to TACs

STECF adopted this report by written procedure on 29 June 2009.

Annex I: ICES advice:

7.4.6 Anchovy in Subarea VIII (Bay of Biscay)

State of the stock

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to highest yield	Comment
Increased risk	Not harvested	Undefined	Fishery closed since July 2005

Based on the most recent estimates of SSB, ICES classifies the stock as being at risk of reduced reproductive capacity. Although median SSB in 2009 is estimated to be above B_{lim} , this estimate has a 47% probability of being below B_{lim} . Low recruitment at age 1 since 2002 and almost complete recruitment failure of the 2004 year class are the primary causes of the low stock size. The recruitment at age 1 in 2009 is at the same level as last year but lower than in 2006 and 2007.

Management objectives

There are no explicit management objectives for this stock. The present closure of the fishery aims at protecting the remaining stock until a strong year class recruits to the stock.

Reference points

	Type	Value	Technical basis
Precautionary approach	B_{lim}	21 000 t	$B_{lim} = B_{1989} = 21\,000\text{ t}$ (1989 SSB).
	B_{pa}	33 000 t	$B_{pa} = B_{lim} \times \exp(1.645\sigma)$.
	F_{lim}	-	Not defined.
	F_{pa}	1.0–1.2	$F_{pa} = F$ for 50% spawning potential ratio, i.e. the F at which the SSB/ R is half of what it would have been in the absence of fishing.
Targets	F_y	-	Not defined.

(unchanged since 2003)

Because the assessment provides the probability distributions for the SSB, it is possible to estimate directly the risk of the SSB falling below B_{lim} , B_{pa} and F_{pa} reference points may become unnecessary.

Single stock exploitation boundaries

There is a 37% risk that SSB in 2010 will be below B_{lim} even with no catch. ICES advises on the basis of exploitation boundaries in relation to precautionary limits that the fishery should remain closed until the stock condition has improved. The stock condition can be re-evaluated when estimates of the 2010 SSB and 2009 year class are available based on the spring 2010 acoustic and DEPM surveys. This implies a closure of the fishery until at least July 2010.

Short-term implications

Outlook for 2010

Basis: $R(2010)$ from distribution of recruitment at age 1 in biomass (2002–2009) = 17400 t. (median). Total catch: 50% allocated to second half of 2009 and 50% to first half of 2010.

Catch (t) (1st July 2009–30 June 2010)	Probability (SSB ₂₀₁₀ < B_{lim})	Median SSB 2010
0	0.37	25550
1000	0.40	24962
3000	0.44	23785
5000	0.47	22609
7000	0.49	21432
9000	0.52	20256

Weights in tonnes

Shaded scenarios are not considered consistent with the precautionary approach

Management considerations

Anchovy is a short-lived species, with the fishable stock consisting primarily of one-year-old fish. The estimate of recruitment at age 1 is a key factor in determining a TAC.

Stock biomass has been low because recruitment has been low since 2002. The fishery has been stopped from 2005 onwards. There are no indications how long the low recruitment period will last and whether continued low SSB will reduce future recruitments. ICES advice is made in the frame of the precautionary approach, therefore, in the present situation, the catch forecast is made under the assumption that the recent low recruitment will continue. The recruitment in 2010 in the forecast is assumed to be similar to recent low recruitments (2002–2009). The forecast indicates that the probability of SSB in 2010 being below B_{lim} is 37% without any catches. The forecast is relatively insensitive to the allocation of catches to different seasons.

The closure of the fishery for the last four years has led to an increase in the abundance of older anchovy. If recruitment persist to be low, the contribution of older fish to spawning becomes crucial.

In the past, a TAC was set independent of the state of the stock in the range of 30 000 t to 33 000 t, and this had limited impact in regulating catches in the fishery.

Recent developments in management have been moving towards an in-year monitoring regime, as recommended previously by ICES. The assessment of anchovy is based on the survey results in the spring and the catch data. Hence, the most up-to-date assessment can be obtained in June as done in this assessment. TACs may be set for the whole period July–June, as the only input data for the time being are available in spring.

Harvest control rules (HCR) for anchovy are currently under development outside ICES, to be implemented when the stock has recovered. The results of an ICES benchmark assessment planned for anchovy in September 2009 may be useful in the evaluation of proposed management measures. ICES notes that the criterion for accepting HCR as precautionary would include rules that imply a low risk of reducing the SSB to a level which may imply further reduction in recruitment. Supplementary measures (area closures, minimum landing size) may be considered in addition to TACs.

Surveys to estimate juvenile abundance in autumn have now been conducted for six years. ICES considers these surveys as a promising approach to providing the information necessary to revise the TAC at the beginning of the year. However, the series so far covers only a period where the recruitment has been low. It is not known how a medium or strong year class will show in the survey. Therefore, until at least one medium or strong year class has been both measured in the survey and confirmed in the subsequent assessment, ICES will not be in the position to advice on a revised TAC for the first half year on the basis of the survey.

Factors affecting the fisheries and the stock

Presently the fishery is closed. Usually the fisheries for anchovy are targeted by trawlers and purse-seiners. The Spanish and French fleets fishing for anchovy in Subarea VIII are spatially and temporally well separated. The Spanish fleet operates mainly in Divisions VIIIc and VIIIb in spring, while the French fleets operate in Division VIIIa in summer and autumn and in Division VIIIb in winter and summer.

Impacts of the environment on the fish stock

Anchovy is a prey species for other pelagic and demersal species, and also for cetaceans and birds.

Although recruitment depends strongly on environmental factors, recruitment predictions based on environmental variables are not yet sufficiently accurate to estimate the population one year in advance.

Scientific basis

Data and methods

A two-stage Bayesian biomass dynamic model (BBM) assessment was used, based on the Daily Egg Production Method (DEPM) (survey since 1987), acoustic surveys (since 1989) and catches from the French and Spanish fisheries. The assessment method is consistent with that used last year.

Uncertainties in assessment and forecast

This year the assessment indicates a reduction of SSB (by about 20 %) despite the apparent stability in the survey SSB estimates. The low fraction of age 1 in both surveys, both in 2008 (implying a low estimate of age 2 in 2009) and in 2009 implies the small drop in SSB suggested by the model.

The current assessment is mainly driven by inputs provided by the surveys (SSB and proportion of 1-group). For the DEPM survey, uncertainties include the assumed spawning frequency (which is under revision) and the daily mortality rate of egg. For the acoustic estimate, even though commercial vessels were used during the survey to explore the coastal area, there may still be problems with the coverage of coastal areas where age 1 dominates.

The main uncertainties of the model are that the growth and natural mortality of anchovy are assumed independent of age. Similarly, there is no age differential catchability in the surveys. The assumption that DEPM survey data measures the spawning biomass in absolute terms might also increase uncertainty. Stock assessment modelling results do not reflect the additional uncertainty stemming from these factors.

The current model provides an estimate of the precision of the results and these are translated into risk that can be included in harvest rules. The 95% credibility intervals indicate that SSB in 2009 is between 15 and 32 thousand tonnes. The uncertainty in recruitment and harvest rate is relatively low. There is also low uncertainty about the current state of the SSB which is among the lowest in the time-series starting in 1987.

Comparison with previous assessment and advice

The assessment results are consistent with last year. The perception of the stock and the advice are unchanged.

SSB in 2008 has been revised upwards by 9% compared to last year.

Source of information

ICES. 2009. Report of the Working Group on Anchovy and Sardine, ICES Headquarters, 15-20 June 2009. ICES CM 2009/ACOM:13.

Table 7.4.6.1 Anchovy in Subarea VIII (Bay of Biscay). Single stock exploitation boundaries (advice), management and landings.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	Official landings	ICES landings
1987	Not assessed	-	32	14	15
1988	Not assessed	-	32	14	16
1989	Increase SSB; TAC	10.0 ¹	32	n/a	11
1990	Precautionary TAC	12.3	30	n/a	34
1991	Precautionary TAC	14.0	30	n/a	20
1992	No advice	-	30	n/a	38
1993	Reduced F on juveniles; closed area	-	30	n/a	40
1994	Reduced F on juveniles; closed area	-	30	n/a	35
1995	Reduced F on juveniles; closed area	-	33	n/a	30
1996	Reduced F on juveniles; closed area	-	33	n/a	34
1997	Reduced F on juveniles; closed area	-	33	n/a	22
1998	Reduced F on juveniles; closed area	-	33	n/a	32
1999	Reduced F on juveniles; closed area	-	33	n/a	27
2000	Closure of the fishery	0	33	n/a	37
2001	Preliminary TAC corresponding to recent exploitation	18	33	n/a	40
2002	Preliminary TAC corresponding to recent exploitation	33	33	n/a	17.5
2003	Preliminary TAC corresponding to recent exploitation	12.5	33	n/a	10.6
2004	Preliminary TAC corresponding to recent exploitation	11	33	n/a	16.4
2005	Rebuilding SSB	5	30	n/a	1.1
2006	Closure of the fishery*	0	5	-	1.8
2007	Closure of the fishery*	0	0	-	0.1 ²
2008	Closure of the fishery *	0	0	-	0
2009	Closure of the fishery *	0	0	-	0 ³
2010	Closure of the fishery *	0			

Weights in '000 t.

¹Mean catch of 1985–1987.

²Experimental fisheries.

³Preliminary estimate of catches up to 1st of July.

n/a: not available.

* to be reconsidered after new information from Spring survey.

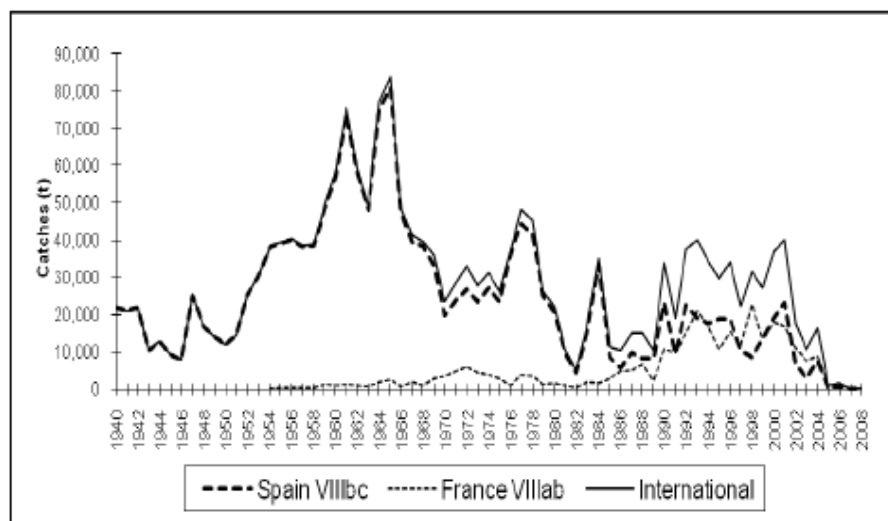


Figure 7.4.6.1 Anchovy in Subarea VIII (Bay of Biscay). Catches (in tonnes).

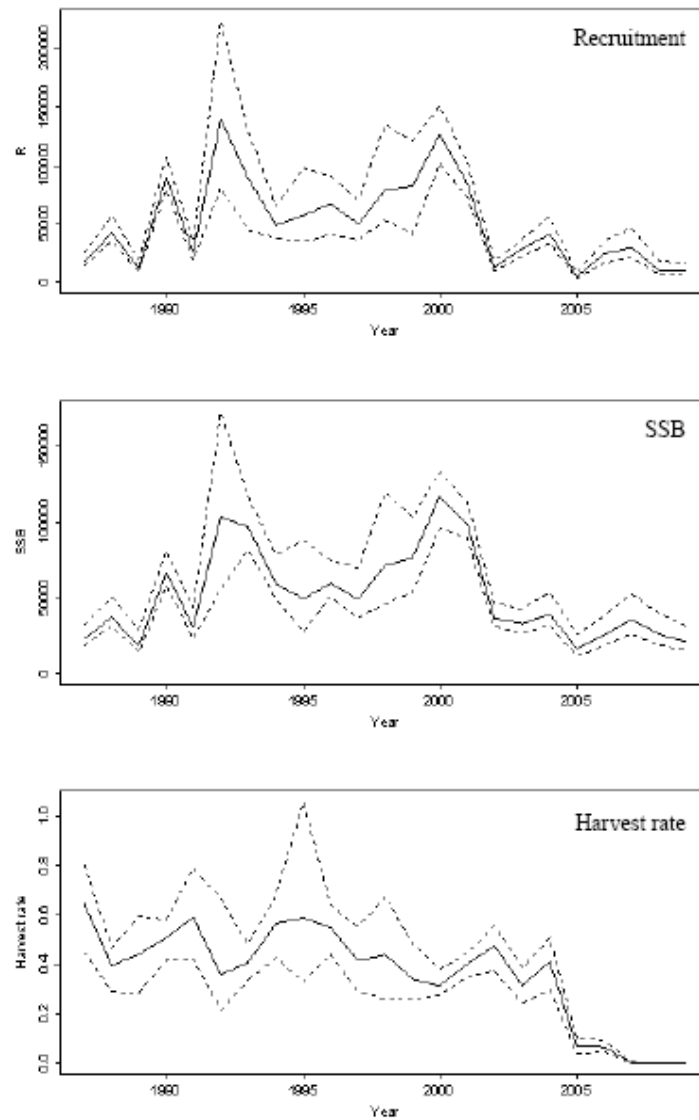


Figure 7.4.6.2 Anchovy in Subarea VIII (Bay of Biscay). Posterior median (solid line) and 95% credible intervals (dashed lines) for the recruitment series (top panel, in tonnes), the spawning-stock biomass (middle panel, in tonnes), and the harvest rates (Catch/SSB, bottom panel) from the BBM.

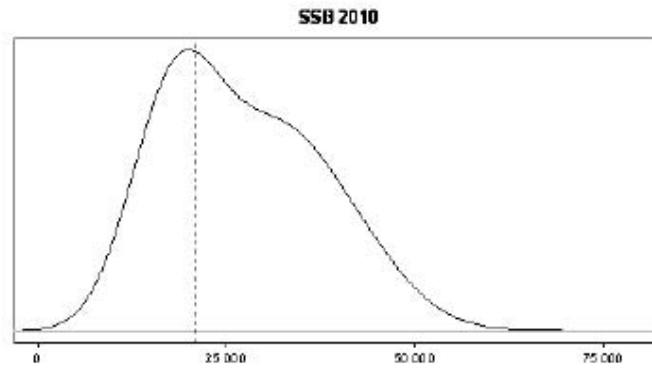


Figure 7.4.6.3 Anchovy in Subarea VIII (Bay of Biscay). Distribution of SSB in 2010 constructed from the posterior distribution of SSB in 2009 and the recent years recruitment scenario in the absence of fishing. The vertical dashed line represents Blim (21 000 t).

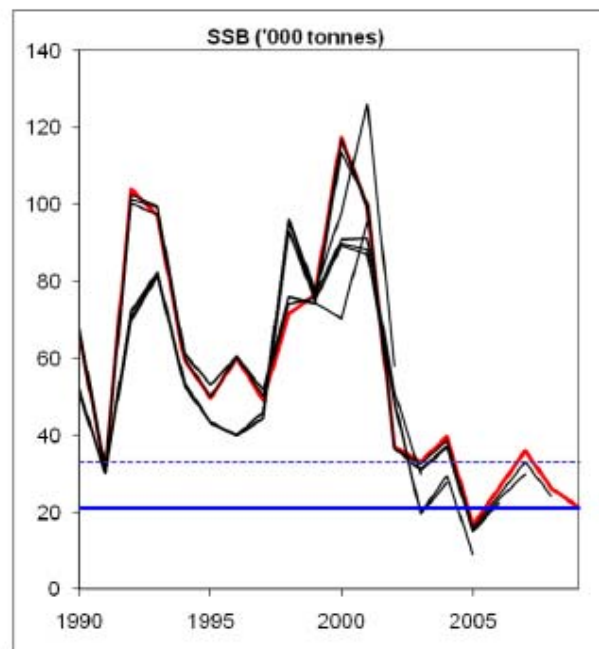


Figure 7.4.6.4 Anchovy in Subarea VIII (Bay of Biscay). Comparison of current assessment for SSB with previous assessments.

Table 7.4.6.2 Anchovy in Subarea VIII (Bay of Biscay). Annual catches (in tonnes) (Subarea VIII) as estimated by the Working Group members.

YEAR	FRANCE VIIIab	SPAIN VIIIbc, Landings	SPAIN Live Bait Catches	INTERNATIONAL VIII
1960	1,085	57,000	n/a	58,085
1961	1,494	74,000	n/a	75,494
1962	1,123	58,000	n/a	59,123
1963	652	48,000	n/a	48,652
1964	1,973	75,000	n/a	76,973
1965	2,615	81,000	n/a	83,615
1966	839	47,519	n/a	48,358
1967	1,812	39,363	n/a	41,175
1968	1,190	38,429	n/a	39,619
1969	2,991	33,092	n/a	36,083
1970	3,665	19,820	n/a	23,485
1971	4,825	23,787	n/a	28,612
1972	6,150	26,917	n/a	33,067
1973	4,395	23,614	n/a	28,009
1974	3,835	27,282	n/a	31,117
1975	2,913	23,389	n/a	26,302
1976	1,095	36,166	n/a	37,261
1977	3,807	44,384	n/a	48,191
1978	3,683	41,536	n/a	45,219
1979	1,349	25,000	n/a	26,349
1980	1,564	20,538	n/a	22,102
1981	1,021	9,794	n/a	10,815
1982	381	4,610	n/a	4,991
1983	1,911	12,242	n/a	14,153
1984	1,711	33,468	n/a	35,179
1985	3,005	8,481	n/a	11,486
1986	2,311	5,612	n/a	7,923
1987	4,899	9,863	546	15,308
1988	6,822	8,266	493	15,581
1989	2,255	8,174	185	10,614
1990	10,598	23,258	416	34,272
1991	9,708	9,573	353	19,634
1992	15,217	22,468	200	37,885
1993	20,914	19,173	306	40,393
1994	16,934	17,554	143	34,631
1995	10,892	18,950	273	30,115
1996	15,238	18,937	198	34,373
1997	12,020	9,939	378	22,337
1998	22,987	8,455	176	31,617
1999	13,649	13,145	465	27,259
2000	17,765	19,230	n/a	36,994
2001	17,097	23,052	n/a	40,149
2002	10,988	6,519	n/a	17,507
2003	7,593	3,002	n/a	10,595
2004	8,781	7,580	n/a	16,361
2005	952	176	n/a	1,128
2006	913	840	n/a	1,753
2007	140 **	1.2 **	n/a	141
2008	0	0	n/a	0
AVERAGE (1990-2004)	6,394	26,337	318	32,824

** Experimental Fishery

Table 7.4.6.3 Anchovy in Subarea VIII (Bay of Biscay). Summary of the assessment. Median and 95% credibility intervals for recruitment, spawning-stock biomass, harvest rates (Catch/SSB), and the ratio of SSB with respect to SSB in 1989 as derived from the BBM.

Year	R (tonnes)			SSB (tonnes)			Harvest rate			SSB/SSB ₁₉₈₉		
	2.50%	Median	97.50%	2.50%	Median	97.50%	2.50%	Median	97.50%	2.50%	Median	97.50%
1987	14070	17770	25370	18430	22900	32820	0.453	0.649	0.806	0.822	1.235	1.668
1988	35790	42670	57101	31500	37290	50611	0.293	0.397	0.470	1.586	2.001	2.350
1989	9123	12450	19660	13990	18820	29390	0.283	0.442	0.595	1.000	1.000	1.000
1990	79800	90015	107000	58490	66840	81221	0.420	0.511	0.584	2.394	3.557	4.857
1991	19250	25840	35281	23220	31065	43600	0.422	0.592	0.792	1.055	1.639	2.416
1992	81409	139200	223800	56130	103900	172808	0.216	0.360	0.666	2.687	5.509	9.557
1993	45020	89735	130303	81880	97095	117403	0.337	0.408	0.484	3.247	5.206	7.144
1994	38010	49030	65111	49420	59530	78713	0.429	0.567	0.683	1.963	3.201	4.596
1995	34739	57690	98211	27720	49695	88383	0.332	0.591	1.059	1.283	2.608	4.915
1996	41140	67070	90530	51370	60040	74960	0.441	0.551	0.644	2.027	3.201	4.610
1997	36610	50260	70360	36980	49190	70010	0.293	0.417	0.554	1.510	2.613	4.159
1998	53060	79215	135203	46710	71575	120500	0.262	0.441	0.676	1.991	3.788	6.856
1999	41258	82480	120900	54158	76610	103300	0.256	0.345	0.488	2.334	4.007	6.271
2000	101800	126800	151200	96490	117400	133700	0.276	0.314	0.382	3.869	6.204	8.529
2001	73299	84590	103200	89990	99380	113900	0.352	0.404	0.446	3.456	5.315	7.267
2002	10070	13020	19160	31430	36870	46820	0.374	0.474	0.557	1.297	1.970	2.789
2003	22200	29010	37291	26930	33045	42941	0.244	0.317	0.389	1.088	1.764	2.547
2004	33540	41380	56021	31870	39440	54311	0.300	0.413	0.511	1.305	2.094	3.193
2005	3262	5321	8579	11570	16650	25920	0.045	0.070	0.100	0.517	0.879	1.502
2006	16570	24200	35720	18780	26180	38631	0.046	0.067	0.094	0.808	1.385	2.277
2007	21320	29950	46130	26580	35980	53061	0.003	0.004	0.005	1.153	1.888	3.095
2008	6765	10420	18591	19300	26240	40060	0.000	0.000	0.000	0.855	1.385	2.272
2009	6645	10190	16370	15370	21270	32170	0.000	0.000	0.000	0.692	1.118	1.855

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Abstract

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