

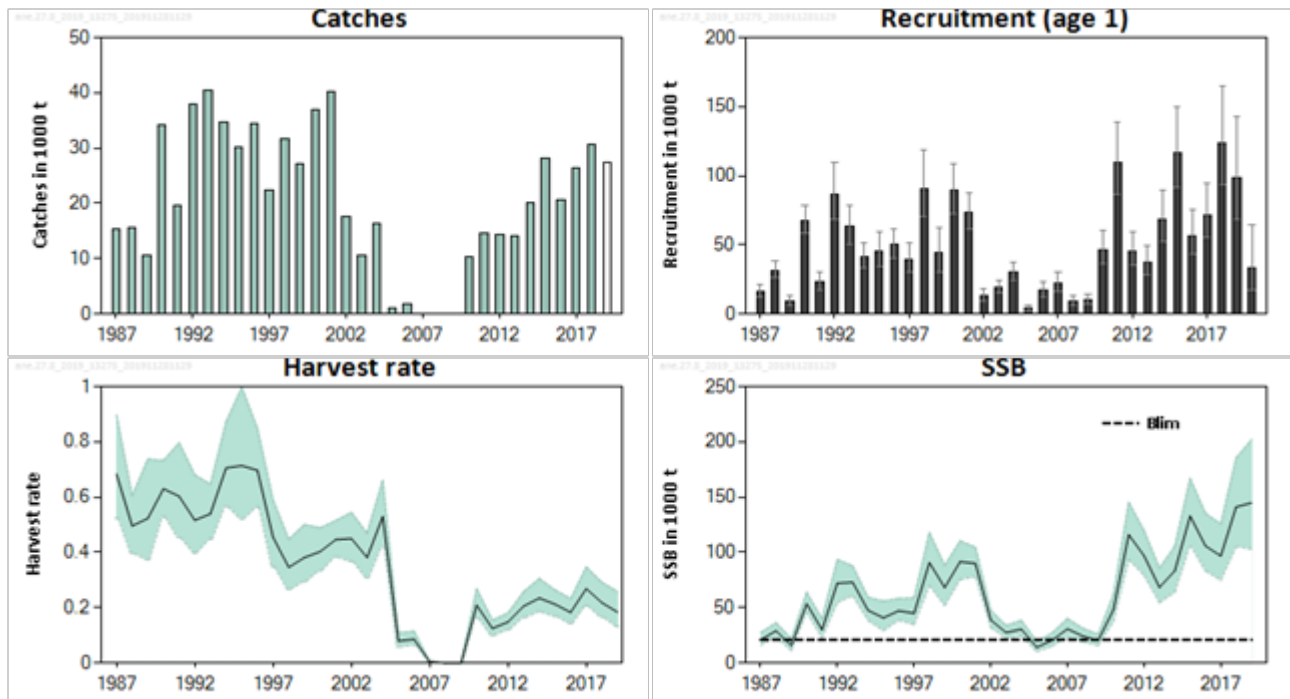
## Anchovy (*Engraulis encrasicolus*) in Subarea 8 (Bay of Biscay)

### ICES advice on fishing opportunities

ICES advises that when the EU management strategy is applied, catches in 2020 should be no more than 31 892 tonnes.

### Stock development over time

The spawning-stock biomass (SSB) has been above  $B_{lim}$  since 2010, and the year 2019 is assessed as the highest in the historical series. Recruitment has been mostly above the long-term average since 2010 but is estimated to be below average in 2020. Harvest rates have been below the long-term average since the reopening of the fishery in 2010.



**Figure 1** Anchovy in Subarea 8. Summary of the stock assessment. Trends in catch (preliminary value not shaded), recruitment (age 1 biomass, January 1), harvest rate (catch / SSB; in 2019 it is preliminary), and spawning-stock biomass (mid-May). 90% confidence limits are indicated for recruitment, harvest rate, and SSB.

### Stock and exploitation status

ICES assesses that the spawning-stock size is above  $B_{lim}$ . The reference points  $B_{pa}$  and  $MSY B_{trigger}$  have not been defined for this stock. In addition, no reference points have been defined for fishing pressure.

**Table 1** Anchovy in Subarea 8. State of the stock and fishery relative to reference points.

|                           | Fishing pressure       |      |      | Stock size |                |                   |      |   |   |                                      |
|---------------------------|------------------------|------|------|------------|----------------|-------------------|------|---|---|--------------------------------------|
|                           |                        | 2016 | 2017 | 2018       | 2017           | 2018              | 2019 |   |   |                                      |
| Maximum sustainable yield | $F_{MSY}$              | ?    | ?    | ?          | Undefined      | $MSY B_{trigger}$ | ?    | ? | ? | Undefined                            |
| Precautionary approach    | $F_{pa} \cdot F_{lim}$ | ?    | ?    | ?          | Undefined      | $B_{lim}$         | ✓    | ✓ | ✓ | Above $B_{lim}$                      |
| Management plan           | $F_{MGT}$              | —    | —    | —          | Not applicable | $B_{MGT}$         | ✓    | ✓ | ✓ | Above lower management trigger point |

## Catch scenarios

**Table 2** Anchovy in Subarea 8. Basis for the catch scenarios.

| Variable                 | Value          | Notes  |
|--------------------------|----------------|--|
| HR (2019)                | 0.184          | Harvest rate estimate from the stock assessment.   |
| SSB (2019)               | 144 834 tonnes | SSB (mid-May) estimate from the stock assessment.  |
| R <sub>age1</sub> (2020) | 33 706 tonnes  | Recruitment estimate from the stock assessment (on 1 January, in biomass).   |
| Catch (2019)             | 26 622 tonnes  | Preliminary value, used as input in the stock assessment. The November and December catches were assumed to be 3.3% of the annual catches (average percentage in 2010–2017). |
| Discards (2019)          | Negligible     | Discarding is considered negligible.   |

**Table 3** Anchovy in Subarea 8. Annual catch scenarios. All weights are in tonnes.

| Basis   | Total catch (2020) | Probability of SSB < B <sub>lim</sub> * (2020) based on stochastic short-term forecast | SSB* (2020) | HR** (2020) | % SSB change*** | % TAC change ^ | % Advice change ^^ |
|---|--------------------|--|-------------|-------------|-----------------|----------------|--------------------|
| ICES advice basis                               |                    |  |             |             |                 |                |                    |
| Harvest control rule in the management strategy | 31892              | < 0.001  | 86229       | 0.37        | -40             | -3.4           | -3.4               |
| Other scenarios                                 |                    |  |             |             |                 |                |                    |
| HR (2020) = 0                                   | 0                  | < 0.001  | 99254       | 0           | -31             | -100           | -100               |
| HR(2020) = HR(2019)                             | 17230              | < 0.001  | 92379       | 0.184       | -36             | -49            | -49                |
| Catch (2020) = 10000                            | 10000              | < 0.001  | 95221       | 0.105       | -34             | -70            | -70                |
| Catch (2020) = 20000                            | 20000              | < 0.001  | 91142       | 0.22        | -37             | -39            | -39                |
| Catch (2020) = 30000                            | 30000              | < 0.001  | 87016       | 0.35        | -40             | -9.1           | -9.1               |
| Catch (2020) = 40000                            | 40000              | < 0.001  | 82839       | 0.48        | -43             | 21             | 21                 |
| Catch (2020) = 50000                            | 50000              | < 0.001  | 78608       | 0.64        | -46             | 52             | 52                 |

\* The SSB corresponds to mid-May, with 60% of the catch assumed to be taken in the first six months of the year.

\*\* Harvest rate (HR) is calculated as Catch/SSB.

\*\*\* SSB (2020) relative to SSB (2019).

^ Catch (2020) relative to the 2019 TAC (33 000 t).

^^ Advice for 2020 relative to advice for 2019 (33 000 t).

The advice for 2020 is lower than the advice for 2019, because of an expected lower SSB in 2020.

## Basis of the advice

**Table 4** Anchovy in Subarea 8. The basis of the advice.

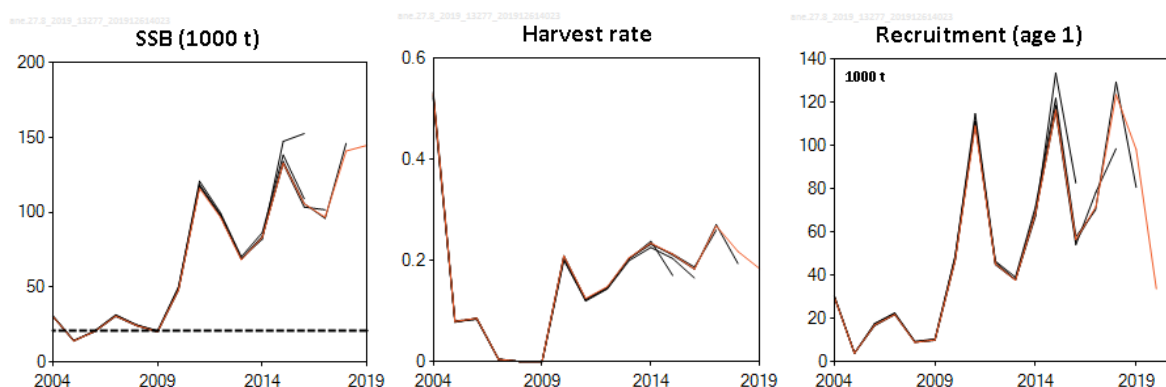
| Advice basis    | EU Management strategy   |
|-----------------|--|
| Management plan | <p>A set of harvest control rules for a management calendar year from January to December was evaluated by STECF (2013, 2014). The European Commission requested that ICES provide its advice in 2015 according to one of these rules, and according to a different one since 2016. ICES has reviewed the harvest control rule selected in 2016 and concluded that it is precautionary (Annex 9 in ICES, 2016). The harvest control rule upon which the current advice is based sets the TAC from January to December as:</p> $TAC_{y+1} = \begin{cases} 0 & \text{if } \widehat{SSB}_{y+1} \leq 24000 \\ -2600 + 0.40 \cdot \widehat{SSB}_{y+1} & \text{if } 24000 < \widehat{SSB}_{y+1} \leq 89000 \\ 33000 & \text{if } \widehat{SSB}_{y+1} > 89000 \end{cases}$ <p>where <math>\widehat{SSB}_{y+1}</math> is the expected spawning-stock biomass in mid-May year <math>y+1</math>.</p> |

## Quality of the assessment

The current assessment results align well, in general, with the observed trend in the surveys. Due to bad weather conditions the JUVENA 2019 survey could not cover the whole distribution area, and the 2019 juvenile biomass index may be slightly underestimated. In previous years, the part of the survey that was missed in 2019 accounted on average for about 10% of the estimated juvenile survey biomass. This leads to a possible slight underestimation of the 2020 SSB.

The catch data for 2019 are preliminary. Preliminary catch statistics were available from January to October. The catches in November and December were assumed to be 3.3% of the total annual catch (based on the average proportion observed since the reopening of the fishery, 2010–2017). Age-structured catches in the first six months of the year were also preliminary. The harvest rate estimate for 2019, therefore, is also preliminary.

Some French catches are usually taken in Subarea 7, near the border to Subarea 8 (ICES rectangles 25E4 and 25E5), and are considered to belong to the same stock and fishery. These catches have, therefore, been included in the assessment and typically represent less than 2% of the total stock catches.



**Figure 2** Anchovy in Subarea 8. Historical assessment results. Horizontal line refers to  $B_{lim}$ .

## Issues relevant for the advice

SSB in 2020 is estimated to be 39% lower than that in 2019. The advised catch for 2020, however, is only 3% lower than the advised catch for 2019. This happened because in 2019, despite the high SSB, the advised catches were capped at the highest level allowed under the management strategy.

## Reference points

**Table 5** Anchovy in Subarea 8. Reference points, values, and their technical basis.

| Framework              | Reference point   | Value  | Technical basis   | Source       |
|------------------------|-------------------|--|---|--------------|
| MSY approach           | MSY $B_{trigger}$ | Not defined  |   |              |
|                        | $F_{MSY}$         | Not defined  |   |              |
| Precautionary approach | $B_{lim}$         | 21000 t  | $B_{lim}$ : mean of SSB estimates in the two years 1987 and 2009, the minimum estimated biomass that produced substantial recruitment (Annex 8 in ICES, 2013).                            | ICES (2013)  |
|                        | $B_{pa}$          | Not defined  |   |              |
|                        | $F_{lim}$         | Not defined  |   |              |
|                        | $F_{pa}$          | Not defined  |   |              |
| Management plan        | $SSB_{mgt}$       | 24000 t<br>(lower trigger)<br>89000 t<br>(upper trigger) | TAC set to zero if SSB below the lower trigger, and to 33000 t if SSB is above the upper trigger. The harvest control rule results in 5% probability of $SSB < B_{lim}$ in the long term. | STECF (2014) |
|                        | $F_{mgt}$         | Not defined  |   |              |

## Basis of the assessment

**Table 6** Anchovy in Subarea 8. Basis of the assessment and advice.

|                          |   |
|--------------------------|---|
| ICES stock data category | 1 ( <a href="#">ICES, 2018</a> ).   |
| Assessment type          | Two-stage Bayesian biomass dynamic model (CBBM) assessment that uses catches in the model and in the forecast (ICES, 2019).   |
| Input data               | Commercial catches (international landings, ages and length frequencies from catch sampling), three surveys (BIOMAN (1987-2019), PELGAS (1989-2019), JUVENA (2003-3019)); annual maturity data from DEPM survey (BIOMAN) and natural mortalities derived from spring surveys. |
| Discards and bycatch     | Discarding and bycatch are considered negligible.   |
| Indicators               | None.   |
| Other information        | The assessment was benchmarked in 2013 (WKPELA; ICES, 2013).  |
| Working group            | Working Group on Southern Horse Mackerel, Anchovy and Sardine ( <a href="#">WGHANSA</a> )   |

## Information from stakeholders

There is no available information.

## History of the advice, catch, and management

**Table 7** Anchovy in Subarea 8. ICES advice and official landings. All weights are in tonnes. Official catches (shown as “-”) have not been provided for the management year.

| Year       | ICES advice                               | Catch corresponding to advice | Agreed TAC | Official catch | ICES catch ## |
|------------|---|-------------------------------|------------|----------------|---------------|
| 1987       | Not assessed                              | -                             | 32000      | 14188          | 15308         |
| 1988       | Not assessed                              | -                             | 32000      | 14045          | 15581         |
| 1989       | Increase SSB; TAC                         | 10000*                        | 32000      | 5898           | 10614         |
| 1990       | Precautionary TAC                         | 12300                         | 30000      | 22053          | 34272         |
| 1991       | Precautionary TAC                         | 14000                         | 30000      | 11581          | 19634         |
| 1992       | No advice                                 | -                             | 30000      | 25370          | 37885         |
| 1993       | Reduced F on juveniles; closed area       | -                             | 30000      | 29266          | 40393         |
| 1994       | Reduced F on juveniles; closed area       | -                             | 30000      | 28474          | 34631         |
| 1995       | Reduced F on juveniles; closed area       | -                             | 33000      | 28626          | 30115         |
| 1996       | Reduced F on juveniles; closed area       | -                             | 33000      | 25452          | 34373         |
| 1997       | Reduced F on juveniles; closed area       | -                             | 33000      | 18179          | 22337         |
| 1998       | Reduced F on juveniles; closed area       | -                             | 33000      | 27026          | 31617         |
| 1999       | Reduced F on juveniles, closed area       | -                             | 33000      | 15757          | 27259         |
| 2000       | Closure of the fishery                    | 0                             | 33000      | 34567          | 36994         |
| 2001       | Preliminary TAC at recent exploitation    | 18000                         | 33000      | 37086          | 40149         |
| 2002       | Preliminary TAC at recent exploitation    | 33000                         | 33000      | 19118          | 17507         |
| 2003       | Preliminary TAC at recent exploitation    | 12500                         | 33000      | 9964           | 10595         |
| 2004       | Preliminary TAC at recent exploitation    | 11000                         | 33000      | 15528          | 16361         |
| 2005       | Rebuilding SSB                            | 5000                          | 30000      | 1086           | 1128          |
| 2006       | Closure of the fishery                    | 0                             | 5000       | 1807           | 1753          |
| 2007       | Closure of the fishery                    | 0                             | 0          | 141            | 141**         |
| 2008       | Closure of the fishery                    | 0                             | 0          | 0              | 0             |
| 2009       | Closure of the fishery                    | 0                             | 0          | 190            | 0             |
| 2010       | Closure of the fishery                    | 0                             | 7000       | -              | 6111***       |
| 2010/2011^ | See scenarios                             | -                             | 15600      | -              | 15120         |
| 2011/2012^ | Risk of SSB falling below $B_{lim} < 5\%$ | < 47000                       | 29700      | -              | 12217         |
| 2012/2013^ | Risk of SSB falling below $B_{lim} < 5\%$ | < 28000                       | 20700      | -              | 16737         |
| 2013/2014^ | Risk of SSB falling below $B_{lim} < 5\%$ | < 18000                       | 17100      | -              | 17551         |
| 2014/2015^ | Risk of SSB falling below $B_{lim} < 5\%$ | < 23000                       | 20100      | -              | 5832^^        |

| Year | ICES advice         | Catch corresponding to advice | Agreed TAC | Official catch | ICES catch ## |
|------|---------------------|-------------------------------|------------|----------------|---------------|
| 2015 | Management plan     | < 25000                       | 25000      | 27562          | 28258         |
| 2016 | Management plan     | ≤ 25000                       | 33000#     | 20225          | 20670         |
| 2017 | Management strategy | ≤ 33000                       | 33000      | 25470          | 26450         |
| 2018 | Management strategy | ≤ 33000                       | 33000      | 30756          | 30773         |
| 2019 | Management strategy | ≤ 33000                       | 33000      |                | 25743^^^      |
| 2020 | Management strategy | ≤ 31892                       |            |                |               |

\* Mean catch in 1985–1987.

\*\* Experimental fisheries.

\*\*\* Catch from January 2010 to June 2010.

^ From 2011 to 2014 the advice, TAC, and landings are valid from 1 July to 30 June the following year.

^^ Catch restricted to the last six months of the year of 2014, due to a change in the management calendar.

^^^ Provisional catch in 2019.

# The initial TAC was set to 25 000 t; in June 2016 it was raised to 33 000 t.

## Includes catches from the ICES rectangles 25E4 and 25E5 in Subarea 7, starting in 2010.

### History of the catch and landings

**Table 8** Anchovy in Subarea 8. Catch distribution by fleet in 2018 as estimated by ICES.

| Catch (2018) | Landings          |                    | Discards  |
|--------------|-------------------|--------------------|-----------|
|              | Purse-seiner 97%* | Pelagic trawler 3% |           |
| 30773 tonnes | 30680 tonnes      |                    | 93 tonnes |

\* Including 15 tonnes not landed, but used as live bait by the tuna fishing fleet.

**Table 9** Anchovy in Subarea 8. History of commercial catch and landings; both the official and ICES estimated values are presented. All weights are in tonnes.

| Year | Official catch | ICES catch*** |
|------|----------------|---------------|
| 1960 | 80947          | 58085         |
| 1961 | 89969          | 75494         |
| 1962 | 65295          | 59123         |
| 1963 | 51956          | 48652         |
| 1964 | 80381          | 76973         |
| 1965 | 85296          | 83615         |
| 1966 | 48909          | 48358         |
| 1967 | 41460          | 41175         |
| 1968 | 38429          | 39619         |
| 1969 | 33098          | 36083         |
| 1970 | 23637          | 23485         |
| 1971 | 29086          | 28612         |
| 1972 | 32927          | 33067         |
| 1973 | 28196          | 28009         |
| 1974 | 31312          | 31117         |
| 1975 | 26426          | 26302         |
| 1976 | 36166          | 37261         |
| 1977 | 48319          | 48191         |
| 1978 | 45367          | 45219         |
| 1979 | 22673          | 26349         |
| 1980 | 22256          | 22102         |
| 1981 | 10876          | 10815         |
| 1982 | 4712           | 4991          |
| 1983 | 15699          | 14153         |
| 1984 | 28423          | 35179         |
| 1985 | 10816          | 11486         |
| 1986 | 7698           | 7923          |
| 1987 | 14188          | 15308         |
| 1988 | 14045          | 15581         |
| 1989 | 5898           | 10614         |
| 1990 | 22053          | 34272         |

| Year   | Official catch | ICES catch*** |
|--------|----------------|---------------|
| 1991   | 11581          | 19634         |
| 1992   | 25370          | 37885         |
| 1993   | 29266          | 40393         |
| 1994   | 28474          | 34631         |
| 1995   | 28626          | 30115         |
| 1996   | 25452          | 34373         |
| 1997   | 18179          | 22337         |
| 1998   | 27026          | 31617         |
| 1999   | 15757          | 27259         |
| 2000   | 34567          | 36994         |
| 2001   | 37086          | 40149         |
| 2002   | 19118          | 17507         |
| 2003   | 9964           | 10595         |
| 2004   | 15528          | 16361         |
| 2005   | 1086           | 1128          |
| 2006   | 1807           | 1753          |
| 2007** | 141            | 141           |
| 2008   | 0              | 0             |
| 2009   | 190            | 0             |
| 2010   | 10665          | 10317         |
| 2011   | 14369          | 14530         |
| 2012   | 16636          | 14402         |
| 2013   | 14366          | 14192         |
| 2014   | 20611          | 20126         |
| 2015   | 27562          | 28258         |
| 2016   | 20225          | 20670         |
| 2017   | 25470          | 26450         |
| 2018   | 30756          | 30773         |
| 2019   |                | 26622 *       |

\* Preliminary estimate.

\*\* Experimental fisheries.

\*\*\* Includes catches from the ICES rectangles 25E4 and 25E5 in Subarea 7, starting in 2010.

**Summary of the assessment**

**Table 10** Anchovy in Subarea 8. Assessment summary. Weights are in tonnes. High and low refer to 90% confidence limits.

| Year | Recruitment<br>(Age 1) | High   | Low   | SSB    | High   | Low    | Total<br>catches | Harvest<br>rate<br>(Ages 2+) | High   | Low    |
|------|------------------------|--------|-------|--------|--------|--------|------------------|------------------------------|--------|--------|
|      | tonnes                 |        |       |        |        |        |                  |                              |        |        |
| 1987 | 16055                  | 21452  | 12045 | 21047  | 27458  | 16032  | 15308            | 0.68                         | 0.90   | 0.52   |
| 1988 | 30900                  | 38056  | 25730 | 29048  | 36312  | 23808  | 15581            | 0.50                         | 0.61   | 0.40   |
| 1989 | 9192                   | 12951  | 6586  | 15762  | 22053  | 11171  | 10614            | 0.52                         | 0.74   | 0.37   |
| 1990 | 67208                  | 78549  | 58629 | 53542  | 63866  | 46060  | 34272            | 0.63                         | 0.73   | 0.53   |
| 1991 | 22898                  | 30450  | 17468 | 30041  | 39911  | 22732  | 19634            | 0.60                         | 0.80   | 0.45   |
| 1992 | 86754                  | 109965 | 68761 | 72089  | 93511  | 54683  | 37885            | 0.52                         | 0.68   | 0.40   |
| 1993 | 63569                  | 78532  | 50315 | 72865  | 87773  | 60794  | 40393            | 0.54                         | 0.65   | 0.45   |
| 1994 | 41035                  | 50989  | 32907 | 47655  | 59360  | 38533  | 34631            | 0.71                         | 0.87   | 0.57   |
| 1995 | 45327                  | 59494  | 34237 | 40797  | 55908  | 29190  | 30115            | 0.71                         | 1.00   | 0.52   |
| 1996 | 49943                  | 61865  | 39860 | 47179  | 58336  | 38770  | 34373            | 0.70                         | 0.85   | 0.56   |
| 1997 | 39442                  | 51428  | 30510 | 45007  | 58792  | 34698  | 22337            | 0.45                         | 0.59   | 0.35   |
| 1998 | 90893                  | 118123 | 70367 | 90773  | 117921 | 70156  | 31617            | 0.35                         | 0.45   | 0.27   |
| 1999 | 43812                  | 62030  | 29839 | 68202  | 88184  | 51921  | 27259            | 0.38                         | 0.50   | 0.29   |
| 2000 | 89002                  | 108560 | 72228 | 91606  | 110418 | 75477  | 36994            | 0.40                         | 0.49   | 0.33   |
| 2001 | 73425                  | 87331  | 61603 | 89961  | 104638 | 77956  | 40149            | 0.45                         | 0.51   | 0.38   |
| 2002 | 13132                  | 18484  | 9444  | 38870  | 47598  | 32105  | 17507            | 0.45                         | 0.54   | 0.37   |
| 2003 | 19343                  | 24513  | 15288 | 27489  | 33915  | 22341  | 10595            | 0.38                         | 0.47   | 0.31   |
| 2004 | 29925                  | 37376  | 24340 | 30549  | 38532  | 24487  | 16361            | 0.53                         | 0.66   | 0.42   |
| 2005 | 3896                   | 5773   | 2547  | 14169  | 19323  | 10295  | 1128             | 0.080                        | 0.109  | 0.058  |
| 2006 | 16970                  | 23196  | 12417 | 20474  | 27156  | 15310  | 1753             | 0.086                        | 0.115  | 0.065  |
| 2007 | 21859                  | 29840  | 16014 | 30782  | 40186  | 23544  | 141              | 0.0046                       | 0.0060 | 0.0035 |
| 2008 | 8968                   | 12785  | 6338  | 24378  | 31387  | 18955  | 0                | 0.00                         | 0.00   | 0.00   |
| 2009 | 10076                  | 14035  | 7156  | 20308  | 25878  | 15753  | 0                | 0.00                         | 0.00   | 0.00   |
| 2010 | 46760                  | 60717  | 36127 | 48206  | 61767  | 37511  | 10317            | 0.21                         | 0.27   | 0.163  |
| 2011 | 109175                 | 138430 | 86888 | 116057 | 145317 | 93556  | 14530            | 0.125                        | 0.155  | 0.100  |
| 2012 | 45263                  | 59040  | 34810 | 96790  | 119491 | 79259  | 14402            | 0.148                        | 0.181  | 0.120  |
| 2013 | 37695                  | 49665  | 28605 | 68386  | 85833  | 54511  | 14192            | 0.21                         | 0.26   | 0.164  |
| 2014 | 68844                  | 89393  | 51949 | 83421  | 105626 | 64028  | 20126            | 0.23                         | 0.31   | 0.185  |
| 2015 | 116494                 | 149669 | 91943 | 132856 | 166825 | 106993 | 28258            | 0.21                         | 0.26   | 0.169  |
| 2016 | 56581                  | 75543  | 42830 | 105794 | 135311 | 83155  | 20670            | 0.183                        | 0.23   | 0.143  |
| 2017 | 71719                  | 94252  | 54959 | 96808  | 125701 | 74865  | 26450            | 0.27                         | 0.35   | 0.21   |
| 2018 | 123661                 | 164542 | 93135 | 141030 | 185370 | 105442 | 30773            | 0.22                         | 0.29   | 0.166  |
| 2019 | 98195                  | 142412 | 68320 | 144834 | 201916 | 103047 | 26622*           | 0.184                        | 0.26   | 0.132  |
| 2020 | 33706                  | 64193  | 17342 |        |        |        |                  |                              |        |        |

\*Preliminary estimate.

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