UPDATE OF INPUT DATA (CATCH AND SIZE) FOR THE ATLANTIC BLUE SHARK (*PRIONACE GLAUCA*) STOCK ASSESSMENT MODELS 2023

M. Ortiz, A. Kimoto, C. Palma, and C. Mayor

SUMMARY

The Sharks Species Group (SHKSG) is scheduled to evaluate the North and South Atlantic blue shark stocks in 2023. During the Data Preparatory meeting, the SHKSG requested that the Secretariat provide input catch and size data until 2021 for Stock Synthesis and Surplus Production models based on the preliminary fleet structure used in 2016. This document summarizes the revision and update of the available detailed catch and size data per fleet up to 2021.

RÉSUMÉ

Il est prévu que le Groupe d'espèces sur les requins (SHKSG) évalue les stocks de requin peau bleue de l'Atlantique Nord et Sud en 2023. Au cours de la réunion de préparation des données, le SHKSG a demandé au Secrétariat de fournir les données d'entrée de captures et de tailles jusqu'en 2021 pour le modèle Stock Synthesis et le modèle de production excédentaire, basées sur la structure préliminaire des flottilles utilisée en 2016. Le présent document résume la révision et la mise à jour des données détaillées de capture et de taille disponibles par flottille jusqu'en 2021.

RESUMEN

Está previsto que el Grupo de especies de tiburones (SHKSG) evalúe los stocks de tiburón azul del Atlántico norte y sur en 2023. Durante la reunión de preparación de datos, el SHKSG solicitó a la Secretaría que facilitase datos de entrada de captura y talla hasta 2021 para el modelo Stock Synthesis y el modelo de producción excedente sobre la base de la estructura preliminar de la flota utilizada en 2016. Este documento resume la revisión y la actualización de los datos detallados disponibles de captura y talla por flota hasta 2021

KEYWORDS

Catch, fleet structure, blue shark, size, Stock Synthesis

Introduction

One of the main 2023 objectives of the Sharks Species Group (SHKSG) is to carry out an assessment evaluation of the North and South Atlantic blue shark (BSH) stocks (Anon., 2021a). These stocks were last evaluated in 2015 with catch and indices of abundance data until 2013. (Anon., 2016). The SHKSG assessment's workplan included using Surplus Production and Catch integrated (Stock Synthesis) statistical models, for which a fleet structure similar to the one used in 2015 has been initially proposed.

Data and Methods

This document used the fleet structure shown in **Table 1** based on a preliminary version used in the 2015 North Atlantic blue shark (N-BSH) fleet structure (Anon., 2016). The fleets include the main gear type longline (99.4%) used for catching blue shark in both stocks, few catches have been reported with other fishing gears which were pooled into a single fleet "others". The longline catches were separated by main flag fleets, considering whether blue sharks are a target or a bycatch species. During previous assessments (Anon., 2016) the SHKSG has thoroughly reviewed the official catch reports (Task 1 NC) and estimated the total removals for both north and south BSH stocks until 2013. The Group decided to use the 2016 Stock assessment estimates of total removals and add from 2014 to 2021 the catches reported in Task 1 NC, no additional reviews or estimations were done by the Group. However, the Group recommended that CPCs revise their Task 1 catch series and submit updates if necessary, prior to the assessment meeting. **Tables 2** and **3** show the total catch removals for north and south BSH, respectively and **Figure 1** presents a comparison of the official Task 1 NC reports (1971 – 2021) compared with the SHKSG estimated total removal by stock unit.

For the N-BSH 10 fleets were initially considered (**Table 1**) with fleet FN10 including all other gears and catches not included in Fleets FN1 to FN9. The fleets of EU-Spain and EU-Portugal were split following the Group recommendation during the data preparatory meeting (Anon., 2023). Figures 2 and 3 show the catch distribution by fleet for the N-BSH and S-BSH, respectively. Total removals represent the catch information available until May 30th, 2023, and were provided to the modelers team for the initial analyses.

The ICCAT Secretariat has received data on size from blue shark fisheries from 1992 to 2021 (Task 2SZ), a total of 266,046 records that represent 1,194,818 measured individuals. **Figure 4** shows an overall distribution of BSH size data by year and flag, while **Figure 5** shows the spatial distribution of these size samples. Only size observations from the north and south stocks were included. Since 2000, reports of fisheries statistics both catches and size distribution has improved, including recent updates of sex information as requested by the SCRS (**Figure 6**).

During the 2015 blue shark assessment, the SHKSG also reviewed extensively the size data and compiled size information from national observer programs not previously available. At the data preparatory meeting, it was discussed the available size data and the Group recommended:

- To use the 2015 stock assessment size input data as a primary source of data if no else is available for the period 1971 – 2013.
- For CPCs that have submitted reviews and updates on BSH size data, use this information as a primary source. These included updates from EU-Spain, Brazil, Venezuela, Japan, and Chinese Taipei.
- After 2014, size data should be from the ICCAT Task 2SZ information, if no other source is available.

Following these indications, the BSH size data was compiled including the size matrices from the 2015 stock assessment, ICCAT Task 2Sz, and the updates provided by CPCs during and after the data preparatory meeting (Figure 7). As indicated in Figure 7 there is an overlap between blue shark size data from different sources, therefore, to avoid potential duplication of information, a decision algorithm (Figure 8) was implemented following the Group's recommendations to create the size frequency input by fleet and year for the Stock Synthesis.

Results and Discussions

Atlantic blue sharks have been exploited since the 1970s by longline fleets mainly as target species or as a bycatch of the high-seas longline fleets (**Figure 6**). However, the official reports of shark catches as a general group or by species (i.e. Task 1 NC), started really after the 1990s following the specific request by the ICCAT Commission. Therefore, during previous assessments catch history of sharks in particular of blue sharks by stock unit has been estimated by the SHKSG using different methodologies (Anon., 2016; Anon., 2016b). The Group decided that the

catch series estimated for the 2015 assessment (1971 - 2013) represented the best estimate of total removals for both the north and south BSH stocks. After 2010 the catch series from Task 1 NC and the Group's estimates match closely, thus for the period 2014 to 2021, it was agreed to use the official reports of Task 1 NC removals without further estimations.

For the N-BSH stock about 70 to 80% of the catches are from the Fleet ID FN1 (EU-Spain) where blue shark is a target species, followed by the catches of fleets FN2 (Japan) and FN10 (Others) with about 10% catches by each fleet, while the rest of the fleets account for about 5 to 8% of the removals. With the S-BSH stock, catches are more evenly distributed among fleets, with the fleet ID FS1 (EU-Spain) accounting for about 35 to 40% of the catches since 1987, while Fleet FS3 (Chinese Taipei) and FS4 (Japan) account on average 50% to 70% in the early years (1971 - 1987), and about 20% thereafter. In the South Atlantic, other fleets 'catches are on average 10 to 15% of the annual removals, noticeable is the increase percent of catches from the fleet FS11 (EU-Portugal) since 2000.

The available size data for blue sharks includes over 1,87 million measurements since 1992. However, the different sources of BSH size data overlap in years with a clear potential for duplicated information. During the data preparatory meeting, the SHKSG agreed to a protocol for selecting blue shark size data, as indicated in the data section. The size data matrices used in the 2015 assessment were extensively reviewed by the Group and were included as provided, similarly for blue shark size data provided by CPCs during or after the data preparatory meeting were also included as provided, standardizing to a common measurement unit of straight fork length SFL. Finally, the size data from the ICCAT Task 2SZ database were reviewed, and standardized, and outliers were excluded. Size frequency samples by fleet-year were generated when 30 or more measures were available for a given stock and fleet-year combination.

After combining all size data sources, the algorithm for inclusion (**Figure 8**) was applied to generate the size frequency matrix for inputs by stock, fleet ID, sex, and year in 5 cm bin size (lower limit) from 15 to 425 cm size range. The SHKSG requested two size-matrix types by sex; a) combined all sex (including unknown sex specimens) and b) by sex males and females only. Sex identification is more prevalent for size data of the N-BSH stock, about 80% of size records have the gender of the shark measured, while for the S-BSH only 62% of the size data provide the gender (**Figure 9**). **Figure 10** shows the annual size trends (all fleets) by sex and stock from the ICCAT task 2SZ information. For the N-BSH there are minor differences in the mean size of males and females, while the variance is much larger, for individuals of unknown sex, mean size shows higher annual variability, but the overall dispersion is similar to the size data with sex information. In the S-BSH, also minor differences in the mean annual size by sex between male and female sharks were seen, while more noticeable is the annual mean size variation for unknown-sex individuals.

Figures 11 and **12** show the mean size annual trend by fleet for the north and south blue shark stocks, respectively. The N-BSH fleets FN1, FN2, FN4, FN5, FN9, and FN10 have relatively good coverage by years of size information, while fleets FN8 and FN7 have only a few years of size information. Overall there is large dispersion, e.g. size range expands from 50 to 300 SFL cm for most of the fleets in almost all years, with some differences in the mean size among fleets. In the S-BSH fleets FS1, FS4, FS5, and FS3 have a higher number of years with size information, while fleet FS7 and FS9 have only a few years of size data. There is also a wide size range for most fleets, with sizes from 50 to 350 SFL cm and some variability in mean size by year. Mean size trends are shown in **Figure 13** for fleets with a sufficient number of years of size data, for the N-BSH the smallest mean size is reported from Fleet FN1 (EU-Spain) with an average of mean size around 140 cm SFL, while the FN9 (EU-Portugal) and FN5 (Venezuela) overall catch the largest mean size blue sharks. For the S-BSH, annual mean size trends indicate that fleets FS5 (Uruguay) and FS4 (Japan) catch on average the smallest size blue sharks, while fleets FS1 (EU-Spain) and FS3(Chinese Taipei) catch the largest mean-size blue sharks (**Figure 13**). Finally, **Figures 14** and **15** show the annual size distribution trends of blue sharks by sex and fleet for the North and South stocks, respectively.

References

- Anon. 2016. Report of the 2015 ICCAT blue shark stock assessment session (Oceanario de Lisboa, Lisbon Portugal 27 31 July 2015). SCRS/2015/018 Collect. Vol. Sci. Pap. ICCAT, 72(4): 866-1019 (2016).
- Anon. 2016b. 2015 Blue shark data preparatory meeting. (Tenerife, Spain March 23 to 27, 2015). Collect. Vol. Sci. Pap. ICCAT, 72(4): 793-865.
- Anon. 2023. Report of the ICCAT 2023 Blue Shark Data Preparatory Meeting (Hybrid, Olhão, Portugal, 17-21 April 2023). Collect. Vol. Sci. Pap. ICCAT, 80(4): 1-82.

Stock	Fleet ID	Gear	Flags		
North	FN1	LL	EU Spain		
	FN2	LL	Japan		
	FN3	LL	Chinese Taipei		
	FN4	LL	USA		
	FN5	LL	Venezuela		
	FN6	LL	Canada		
	FN7	LL	China		
	FN8	LL	Belize		
	FN9	LL	EU Portugal		
	FN10	LL/Other	Others		
South	FS1	LL	EU Spain		
	FS2	LL	Brazil		
	FS3	LL	Chinese Taipei		
	FS4	LL	Japan		
	FS5	LL	Uruguay		
	FS6	LL	Namibia		
	FS7	LL	China		
	FS8	LL	South Africa		
	FS9	LL	Belize		
	FS10	LL / Oth	Others		
	FS11	LL	EU Portugal		

Table 1. Fleet structure for North and South Atlantic blue shark proposal for use with assessment models based on the fleet structure used in 2015.

SinckVencPNL <t< th=""><th>Sum of O</th><th>ty_t</th><th>Fleet_ID_SS3</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th colspan="2"></th></t<>	Sum of O	ty_t	Fleet_ID_SS3											
ATN 1971 1.4.085.24 1.25.87 73.79 - 1.50 1.50 1.50 1.50 1.50 1.50 1.70 1.7 - - - - - - - - - 1.00	Stock	YearC	FN1	FN2	FN3	FN4	FN5	FN6	FN7	FN8	FN9	FN10	Grand Total	
1972 13,360.99 1,674.82 92.29 - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - 15.2 - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - - 15.2 - - 15.2 15.2 15.2	ATN	1971	14,085.24	1,257.87	737.79	-	-	-	-	-	-	0	16,080.90	
1973 15,954.11 653.64 901.07 - - 1.0 - - 0 15,025.49 1975 15,596.15 4,380.49 658.98 - - 11.37 - - 0 16,205.49 1976 11,721.05 1,365.01 800.47 - - 85.67 - - - 0 1,365.20 1978 15,030.08 3,865.20 742.17 - - 85.67 - 1.2.00 0 0 1,665.65 1990 15,558.38 4,902.49 648.92 - - 1,366.15 - 1 1.0.00 0 2,731.44 1981 15,673.35 3,31.14 880.00 155.62 - 410.93 - 8.80 0 2,731.44 1982 18,553.13 5,31.14 880.00 155.62 - 410.93 - 8.00 0 2,731.44 30.00 2,731.44 30.00 2,731.44 30.00 2,731.44 30.00 2,731.44 30.00 2,731.44 30.00 2,731.44 30.00<		1972	13,360.99	1,674.82	932.29	-	-	-	-	-	-	0	15,968.10	
1974 12,041.54 3,421.98 740.45 - 1.52 - - 1.0 10 10,651.90 1976 11,721.05 1,130.01 800.47 - 1.137 - - - 0 10,662.90 1977 13,773.06 3,265.02 742.17 - - 7.44 - - 4.00 0 20,880.99 1979 15,030.83 490.24 648.92 - 1,356.15 - 112.00 00 2,771.42 1981 16,703.32 6,342.45 404.00 20,472 - 410.93 - 8.80 0 2,774.162 1982 18,955.13 5,331.14 880.00 155.65 - 14.00 3.00 6,244528 3,037.82 1986 30,300.8 365.04 868.00 40.08 - 41.99 - 3.00 162.444528 3,037.82 1986 30,930.81 2,855.01 970.00 160.57 - 777.89 1.99 - 3.00 162.444528 3,037.82 1988 39		1973	15,954.11	653.64	901.07	-	-	-	-	-	-	0	17,508.82	
1975 15, 396.15 4, 30.45 658.98 - - 11.37 - - 0 20, 651.00 1977 13, 772.06 3, 295.02 742.17 - 8, 67 - - 1.0 0 1, 565.33 1978 15, 030.08 3, 862.9 742.11 - - 2, 75.76 - 1.2.00 00 1, 665.65 1980 15, 583.38 4, 90.24 648.92 - - 1, 360.15 - 1.2.00 00 2, 73.14 1982 18, 955.13 5, 34.46.67 191.00 155.62 - 41.0.93 - 8.80 0 3, 273.14 1982 18, 955.13 5, 34.16.67 191.00 165.27 - 727.84 - 8.80 0 3, 273.14 1982 1985 3,030.08 3,650.34 860.00 - 1.1.0.00 - 50.00 1.66.4452.83 3,072.23 1985 3,030.08 3,550.27 1.65.00 75.02 8.62 978.00 - 91.00 24.3452.83 3,073.23		1974	12,041.54	3,421.98	740.45	-	-	1.52	-	-	-	0	16,205.49	
1976 11,721.05 1,1301 80.047 - - 11.37 - - 0 13,652.90 1977 13,7306 3,295.00 742.11 - - 8,567 - - 0 12,895.93 1979 10,747.07 94.00 701.74 - - 2,251.76 - - 11.00 0 2,2731.94 1981 15,653.83 4,902.46 648.92 - 1,405.15 - 11.00 0 2,2731.94 1982 18,955.13 3,800.67 919.00 605.27 - 727.84 - 8.80 0 2,574.162 1985 30,930.08 3,650.34 868.00 340.98 - 416.99 - 39.00 64.34528 36,07.82 1986 30,930.08 3,650.34 868.00 340.98 - 416.99 - 90.00 64.34528 36,07.82 1986 30,930.08 3,650.34 86.00 1.00 1.407.14 17.8 14700 - 67.00 90.05 54.31.31 198		1975	15,596.15	4,380.45	658.98	-	-	15.92	-	-	-	0	20,651.50	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		1976	11,721.05	1,130.01	800.47	-	-	11.37	-	-	-	0	13,662.90	
1978 15,030.08 3,368.29 734.21 - - 1,754.40 - - 1400 00 02,090.09 1979 10,747.07 924.00 701.74 - 2,251.76 - 12.00 00 14,636.56 1981 16,503.32 6,342.45 404.00 204.27 - 410.93 - - 8.00 0 2,741.62 1983 25,52.35 3,640.67 919.00 605.27 - 727.84 - - 8.00 0 5,771.42 1985 30,300.83 3,650.34 888.00 154.00 - 416.99 - - 39.00 62,43452.83 5,433.13 1986 40,424.29 2,928.40 1,175.00 1,112.34 10.61 320.00 - - 1100 215.555.43.13 1988 39,958.11 2,388.19 248.00 776.09 8.19 968.00 - - 132.06 148.74.73.34.97.3.927.55.44.93.44.97.3.929.2 1,44.00 + 14.00 1215.396.3 3,499.71.99.99.2.9.2.9.92.9.2.9.2.9.2.9.2.9.2.2.9.2.2.9.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.		1977	13,773.06	3,295.02	742.17	-	-	85.67	-	-	-	0	17,895.93	
1979 10,747.07 924.00 701.74 - - 2,251.76 - - 12.00 0 14,665.65 1980 15,585.38 4,902.49 648.92 - 1,360.15 - - 11.00 0 24,074.97 1982 18,955.33 5,331.41 880.00 155.62 - 410.93 - - 8.00 0 25,731.44 1984 26,284.95 2,455.01 970.00 106.97 - 352.55 - - 14.00 22,471.63 30,307.22 1986 40,424.29 2,928.40 1,175.00 1,112.34 10.61 320.00 - - 91.00 2547.3275 46,984.91 1987 46,343.09 2,757.58 440.00 1,400.477 14.78 147.00 - - 181.00 122.60 138.39 31,489 31,489 - - 132.60 138.39 31,489 31,489 - - 132.60 138.53,43 46,984.91 <td></td> <td>1978</td> <td>15,030.08</td> <td>3,368.29</td> <td>734.21</td> <td>-</td> <td>-</td> <td>1,754.40</td> <td>-</td> <td>-</td> <td>4.00</td> <td>0</td> <td>20,890.99</td>		1978	15,030.08	3,368.29	734.21	-	-	1,754.40	-	-	4.00	0	20,890.99	
1980 15,858.38 4902.49 648.92 - - 1,360.15 - - 12.00 0 2,471.94 1981 16,703.32 6,342.45 404.00 204.27 - 410.93 - - 8.80 0 24,074.97 1983 29,552.35 3,640.67 915.00 605.27 - 727.84 - - 8.80 0 5,573.14 1985 30,930.08 3,550.34 865.00 340.98 - 416.99 - - 57.01 400.237.512 106.1 320.00 - - 57.00 49.83.56 50.78.2 58.25 - - 1.00 254.73.257 6.984.91 1988 39,558.11 2,388.19 24.80.0 77.69 8.19 968.00 - - 132.60 132.757 6.984.91 1999 2,707.95 3,579.02 1,670.01 128.61 97.40 - - 132.60 138.7 31.685.64 1999<		1979	10,747.07	924.00	701.74	-	-	2,251.76	-	-	12.00	0	14,636.56	
1981 16,703.32 6,342.45 400.00 204.27 - 410.93 - - 10.00 0 24,774.62 1982 18,955.13 5,331.14 880.00 155.62 - 410.93 - - 8.00 0 35,273.44 1984 29,523.83 3,660.67 91.00 160.57 - 352.55 - - 14.00 29.1361246 30,212.61 1986 40,424.29 2,928.40 1,175.00 1,112.34 10.61 320.00 - - 67.00 4095.7066 5,483.13 1988 39,551 1,383.19 248.00 77.00 8.19 968.00 - - 11.02 125.372.63 31.439.11 1988 39,551 1,383.19 248.00 77.00 8.62 978.00 - - 188.00 225.77 37.640.82 1999 2,643.479 4,900.07 2,055.00 3.992.01 2.341 1,77.00 - 277.00 - <td< td=""><td></td><td>1980</td><td>15,858.38</td><td>4,902.49</td><td>648.92</td><td>-</td><td>-</td><td>1,360.15</td><td>-</td><td>-</td><td>12.00</td><td>0</td><td>22,781.94</td></td<>		1980	15,858.38	4,902.49	648.92	-	-	1,360.15	-	-	12.00	0	22,781.94	
1982 18,955.13 5.33.1.14 880.00 15.5c2 - 410.33 - - 8.80 0 25.71.62 1983 29,552.35 3,460.67 919.00 665.27 - 727.84 - - 8.00 20,357.31.4 1985 30,930.08 3,550.34 866.00 340.98 - 416.99 - - 31.00 62.434552 35.07.82 1987 46.43.02 2.952.40 1,175.00 1,172.00 1,172.00 1,172.00 - - 61.00 126.435252 56,037.82 1988 39,958.11 2,386.10 165.00 750.52 8.62 978.00 - - 81.00 1225.737.53 46,964.91 1999 2,367.479 3,599.22 1,174.00 12.83 1,702.00 - - 81.00 1225.737.16 36,528.99 1999 2,660.44 5,942.43 1,486.07 12.20.0 - 32.20.0 443.43 36,528.99 1999		1981	16,703.32	6,342.45	404.00	204.27	-	410.93	-	-	10.00	0	24,074.97	
1983 29,552.35 3,460.67 919.00 605.27 - 727.84 - - 8.00 0 35,73.14 1984 26,284.95 2,455.01 970.00 106.97 - 352.55 - - 1.00 29.136124 30.01 62.4345528 36,307.82 1986 40,424.29 2,978.40 1,175.00 1,112.34 10.61 320.00 - - 50.00 166.71188 47,885.36 1987 46,343.09 297.50 1,660.0 750.52 8.62 978.00 - - 81.00 122.63 13.87 31,485.64 1990 23,674.47 3,599.60 2,675.00 1,080.14 7.14 774.00 - - 1387 31,685.64 3,242.01 1387 31,685.64 1991 2,6,63.44 5,942.43 1,428.00 148.16.37 2.283 1,702.00 - - 128.00 128.73 3,460.67 1994 2,6,605.44 5,942.43 1,428.00		1982	18,955.13	5,331.14	880.00	155.62	-	410.93	-	-	8.80	0	25,741.62	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		1983	29,552.35	3,460.67	919.00	605.27	-	727.84	-	-	8.00	0	35,273.14	
1985 30,930.08 3,650.34 868.00 340.98 - 416.99 - - 530.00 62.4345528 36,307.82 1986 40,424.29 2,928.40 1,175.00 1,112.34 10.61 320.00 - - 50.00 186.71188 47,885.36 1988 39,958.11 2,388.19 248.00 776.09 8.19 968.00 - - 91.00 2547.32975 46,984.91 1999 23,784.47 3,592.02 1,750.00 1,826.8 91.66 680.00 - - 188.00 12257 37,660.82 1990 23,847.97 3,599.60 2,675.00 1,080.14 7.14 774.00 - - 188.00 22257 37,660.82 1991 2,676.62 2,526.12 2,684.00 601.09 18.30 1,260.00 - 323.44 4669 37,242.51 1995 28,919.68 2,813.01 1,569.00 641.04 15.62 1,494.00 65.60 - 2		1984	26.284.95	2.455.01	970.00	106.97	-	352.55	-	-	14.00	29.1361246	30.212.61	
1986 40,424.29 2,928.40 1,175.00 1,112.34 10.61 320.00 - - 50.00 1864.71198 47,885.36 1987 46,34.300 2,975.08 440.00 1,400.47 14.78 147.00 - - 67.00 4095.70666 55,481.31 1988 39,581 2,388.10 288.50 - - 181.00 1215.39263 31,439.71 1990 22,797.99 3,575.00 2,675.00 1080.14 71.44 77.400 - - 188.00 2257 764.082 1992 26,645.44 5,942.43 1,428.00 1,816.37 22.83 1,702.00 - 232.00 5726 43,587.07 1995 28,919.68 2,813.01 1,569.00 641.04 15.62 1,494.00 68.00 - 228.22 4722 40,523.71 1996 22,971.75 4,179.26 2,004.00 398.12 27.34 831.00 23.20 - 214.50 2630.3 4,828.02		1985	30.930.08	3.650.34	868.00	340.98	-	416.99	-	-	39.00	62.4345528	36.307.82	
1987 46,343.09 2,975.08 440.00 1,400.47 14.78 147.00 - - 67.00 4095.70666 53,483.13 1988 39,958.11 2,388.19 248.00 776.09 8.19 968.00 - - 81.00 125.3263 31,439.11 1990 23,874.97 3,599.22 1,174.00 828.68 9.16 680.00 - - 132.60 1387 31,685.64 1991 2,647.47 4,500 2,675.00 1,080.14 7.14 774.00 - - 188.00 2257 37,640.82 1992 26,643.47 4,590.07 2,025.03 1,260.00 460.0 - 321.00 572.6 43,587.07 1995 28,919.68 2,813.01 1,569.00 661.04 15.61 1,490.00 - 321.43 4669 37,242.05 1995 28,919.64 2,813.01 1,569.00 661.04 15.61 1,040.00 - 322.00 1,244.50 1,063.03 <t< td=""><td></td><td>1986</td><td>40.424.29</td><td>2.928.40</td><td>1.175.00</td><td>1.112.34</td><td>10.61</td><td>320.00</td><td>-</td><td>-</td><td>50.00</td><td>1864.71198</td><td>47.885.36</td></t<>		1986	40.424.29	2.928.40	1.175.00	1.112.34	10.61	320.00	-	-	50.00	1864.71198	47.885.36	
1988 39,958.11 2,388.19 248.00 776.09 8.19 968.00 - - 91.00 2547.32975 46,984.91 1999 23,778.48 4,552.70 165.00 750.52 8.62 978.00 - - 81.00 1215.39263 31,439.71 1990 23,874.97 3,599.00 2,675.00 1,080.14 7.14 774.00 - - 188.00 2257 37,640.82 1992 26,634.4 5,942.43 1,428.00 1,816.37 22.83 1,702.00 - 322.00 5726 43,587.07 1994 25,086.20 2,556.12 2,680.00 61.00 18.80 1,260.00 46.00 - 321.34 4669 37,242.05 20.551.71 1995 28,919.68 2,813.01 1,569.00 641.04 15.62 1,494.00 65.00 - 282.02 44843 35,865.86 1997 24,497.43 1,191.43 1,479.00 391.12 27.34 831.00 23.20 - 214.40 13.00.03 4.069.03 1.00.03 - 24.92.69		1987	46.343.09	2.975.08	440.00	1.400.47	14.78	147.00	-	-	67.00	4095.70666	55.483.13	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		1988	39.958.11	2.388.19	248.00	776.09	8.19	968.00	-	-	91.00	2547.32975	46.984.91	
1990 23,874.97 3,599.22 1,174.00 828.68 9.16 680.00 - - 132.60 1387 31,685.64 1991 27,079.95 3,579.60 2,675.00 1,080.14 7,14 774.00 - - 188.00 2257 37,640.82 1992 26,634.74 4,599.07 2,025.00 399.20 23.94 1,770.00 - 277.00 - 322.00 572.6 43,587.07 1994 25,066.20 2,526.12 2,684.00 601.09 18.30 1,260.00 46.00 - 351.34 4669 37,242.05 1995 22,971.75 4,179.26 2,004.00 986.75 55.1 528.00 65.60 - 282.00 44843 3,565.86 1997 24,497.43 4,191.43 1,479.00 391.12 27.34 831.00 73.20 - 166.30 2440.401 36.65.91 1998 21,811.7 3,149.95 1,177.00 316.77 47.40 54.700 128.00 - 481.88 222.65.92 9.885.50 20001 <td< td=""><td></td><td>1989</td><td>23.708.48</td><td>4.532.70</td><td>165.00</td><td>750.52</td><td>8.62</td><td>978.00</td><td>-</td><td>-</td><td>81.00</td><td>1215.39263</td><td>31.439.71</td></td<>		1989	23.708.48	4.532.70	165.00	750.52	8.62	978.00	-	-	81.00	1215.39263	31.439.71	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		1990	23.874.97	3.599.22	1.174.00	828.68	9.16	680.00	-	-	132.60	1387	31.685.64	
1992 26,434.79 4,509.07 2,025.00 399.20 23.94 1,277.00 - - 277.00 1583 36,528.99 1993 26,605.44 5,942.43 1,428.00 1,816.37 22.83 1,702.00 46.00 - 322.00 5726 43,587.07 1994 25,066.20 2,564.12 2,684.00 601.09 18.80 1,260.00 46.00 - 351.34 4669 37,424.05 1995 28,915.68 2,813.01 1,569.00 641.04 15.62 1,494.00 66.00 - 282.82 4722 40,525.17 1996 22,971.75 4,179.26 2,004.00 986.75 5.51 528.00 65.00 - 282.00 4843 35,668.62 1997 24,497.43 4,191.43 1,479.00 316.77 47.40 547.00 128.00 - 481.88 2226.59 29,885.50 2000 24,81.192 2,738.80 1,157.00 428.52 43.34 624.00 136.00 - 446.80 20.43 3,866.97 2000 15,665.91 </td <td></td> <td>1991</td> <td>27.079.95</td> <td>3.579.60</td> <td>2.675.00</td> <td>1.080.14</td> <td>7.14</td> <td>774.00</td> <td>-</td> <td>-</td> <td>188.00</td> <td>2257</td> <td>37.640.82</td>		1991	27.079.95	3.579.60	2.675.00	1.080.14	7.14	774.00	-	-	188.00	2257	37.640.82	
1993 26,605.44 5,942.43 1,428.00 1,816.37 22.83 1,702.00 22.00 - 322.00 5726 43,587.07 1994 25,066.20 2,526.12 2,684.00 601.09 18.30 1,260.00 66.00 - 351.34 4669 37,242.05 1995 28,917.55 1,717.26 2,004.00 986.75 5.51 528.00 65.60 - 282.00 4843 3,565.86 1997 24,497.43 4,191.43 1,479.00 391.12 27.34 831.00 23.20 - 214.50 2630 34,285.02 1998 22,504.26 3,460.87 933.00 446.96 7.31 612.00 - 418.88 2226.59 29,885.00 2000 14,111.92 3,845.01 1157.00 428.2 43.34 624.00 136.00 - 446.80 2081.3866.97 2001 17,361.73 2,723.72 906.00 145.24 47.11 1,162.00 - 712.72 2264.6		1992	26,434,79	4.509.07	2.025.00	399.20	23.94	1.277.00	-	-	277.00	1583	36.528.99	
1994 25,086.20 2,526.12 2,684.00 601.09 18.30 1,260.00 46.00 - 351.34 4669 37,242.05 1995 28,919.68 2,813.01 1,569.00 641.04 15.62 1,494.00 68.00 - 282.82 4722 40,525.17 1996 22,971.75 4,179.26 2,004.00 986.75 5.51 528.00 65.60 - 282.00 4843 35,865.86 1997 24,497.43 4,191.43 1,479.00 391.12 27.34 831.00 23.20 - 166.30 2440.401 30,604.30 1999 21,811.27 3,149.59 1,177.00 316.77 47.40 547.00 128.00 - 481.88 2226.59 29,885.50 2000 14,113 2,737.12 906.00 145.24 47.11 1,162.00 300.00 - 289.37 210.99 25,045.08 2002 15,665.91 1,890.3 1,108.00 67.67 29.04 33.46.00 166.00 - 712.72 226.46 22,742.17 2003 15,974.		1993	26.605.44	5.942.43	1.428.00	1.816.37	22.83	1.702.00	22.00	-	322.00	5726	43.587.07	
1995 28,919.68 2,813.01 1,569.00 641.04 15.62 1,494.00 68.00 - 282.82 4722 40,525.17 1996 22,971.75 4,179.26 2,004.00 986.75 5.51 528.00 65.60 - 282.00 4843 35,865.86 1997 24,497.43 4,191.43 1,479.00 391.12 27.34 831.00 23.00 - 214.50 263.03 34288.02 1998 22,504.26 3,460.87 893.00 446.69 7.31 616.00 2440.01 30,604.30 1999 24,111.27 3,149.59 1,177.00 316.77 47.40 547.00 128.00 - 481.88 2226.59 29,885.50 2000 12,665.91 1,890.03 1,108.00 67.87 290.4 85.00 168.00 - 71.72 2264.6 27,42.17 2003 15,974.54 3,997.72 1,449.00 - 39.55 346.00 240.00 - 715.72 226.65		1994	25.086.20	2,526,12	2,684,00	601.09	18.30	1,260,00	46.00	-	351.34	4669	37,242,05	
1996 22,971.75 4,179.26 2,004.00 986.75 5.51 528.00 65.60 - 222.00 4483 35,865.86 1997 24,497.43 4,191.43 1,479.00 391.12 27.34 831.00 23.20 - 214.50 2630 34,285.02 1998 22,504.26 3,460.87 893.00 446.96 7.31 612.00 73.20 - 166.30 2440.401 30,60.30 1999 21,811.27 3,149.59 1,177.00 316.77 47.40 547.00 128.00 - 481.88 2226.59 29,885.50 2000 24,111.92 2,838.40 1,157.00 428.52 43.34 662.00 165.00 - 289.37 2109.9 25,045.08 2001 17,361.73 2,723.72 906.00 145.24 47.11 1,162.00 - 712.72 2264.6 22,742.17 2003 15,974.54 3,907.72 1,449.00 - 395.50 645.00 240.0 -		1995	28,919,68	2,813,01	1,569,00	641.04	15.62	1,494,00	68.00	-	282.82	4722	40.525.17	
1997 24,497.43 4,191.43 1,479.00 391.12 27.34 831.00 23.20 - 214.50 2630 34,285.02 1998 22,504.26 3,460.87 893.00 446.96 7.31 612.00 73.20 - 166.30 2440.01 30,604.30 1999 21,811.27 3,149.59 1,177.00 316.77 47.40 547.00 128.00 - 481.88 2226.59 29,885.50 2000 24,111.92 2,838.40 1,157.00 428.52 43.34 624.00 136.00 - 481.68 2206.51 3,666.97 2001 17,361.73 2,727.7 906.00 145.24 47.11 1,162.00 300.00 - 289.37 2109.9 25,045.08 2002 15,665.91 1,890.03 1,08.00 67.87 29.04 836.00 168.00 - 712.72 2264.6 22,742.17 2003 15,974.54 3,979.72 1,449.00 - 39.55 366.00 240.00 <td></td> <td>1996</td> <td>22,971,75</td> <td>4,179,26</td> <td>2,004,00</td> <td>986.75</td> <td>5.51</td> <td>528.00</td> <td>65.60</td> <td>-</td> <td>282.00</td> <td>4843</td> <td>35,865,86</td>		1996	22,971,75	4,179,26	2,004,00	986.75	5.51	528.00	65.60	-	282.00	4843	35,865,86	
1998 22,504.26 3,460.87 893.00 44.96 7.11 612.00 73.20 - 166.30 2440.01 30,604.30 1999 21,811.27 3,149.59 1,177.00 316.77 47.40 547.00 128.00 - 481.88 2226.59 29,885.50 2000 24,111.92 2,838.40 1,157.00 428.52 43.34 624.00 136.00 - 446.80 2081 31,866.97 2000 17,361.73 2,723.72 906.00 165.77 29.04 886.00 168.00 - 712.72 2264.6 22,742.17 2003 15,655.91 1,890.03 1,08.00 67.87 29.94 886.00 168.00 - 712.72 2264.6 22,742.17 2003 15,906.08 3,530.98 857.00 67.90 27.73 1,134.00 232.00 - 126.72 4027.016 25,094.33 2006 15,463.63 2,824.18 364.00 46.98 116.3 977.00 256.00 </td <td></td> <td>1997</td> <td>24,497,43</td> <td>4 191 43</td> <td>1,479,00</td> <td>391.12</td> <td>27.34</td> <td>831.00</td> <td>23.20</td> <td>-</td> <td>214.50</td> <td>2630</td> <td>34,285,02</td>		1997	24,497,43	4 191 43	1,479,00	391.12	27.34	831.00	23.20	-	214.50	2630	34,285,02	
1999 21,811.27 3,149.59 1,177.00 316.77 47.40 547.00 128.00 - 481.88 2226.55 92,9885.50 2000 24,111.92 2,838.40 1,157.00 428.52 43.34 624.00 136.00 - 446.80 2081 31,866.97 2001 17,361.73 2,723.72 906.00 145.24 47.11 1,162.00 300.00 - 289.37 2109.9 25,045.08 2002 15,655.91 1,890.03 1,108.00 67.87 29.04 836.00 168.00 - 712.72 2264.6 22,742.17 2003 15,974.54 3,097.72 1,449.00 - 39.55 965.00 192.00 - 115.65 2024.645.48 25,265.52 2005 15,066.08 3,530.98 857.00 67.90 27.73 1,134.00 232.00 - 126.72 4027.016 25,094.33 2006 15,463.63 2,824.18 364.00 46.98 116.3 977.00		1998	22,504,26	3,460,87	893.00	446.96	7.31	612.00	73.20	-	166.30	2440,401	30,604,30	
2000 24,111.92 2,838.40 1,157.00 428.52 43.34 674.00 136.00 - 446.80 2008 31,866.97 2001 17,361.73 2,723.72 906.00 145.24 47.11 1,162.00 300.00 - 289.37 2109.9 25,045.08 2002 15,665.91 1,890.03 1,108.00 67.87 29.04 836.00 168.00 - 712.72 2264.6 22,742.17 2003 15,974.54 3,997.72 1,449.00 - 39.55 346.00 240.00 - 70.96 5642.796 26,860.58 2004 17,313.89 3,194.83 1,378.00 77.17 9 965.00 192.00 - 115.65 2024.64548 25,265.52 2006 15,463.63 2,824.18 364.00 46.98 11.63 977.00 256.00 - 358.03 4337.882 24,639.33 2007 17,038.47 2,270.99 292.00 54.32 197.52 84.00 113.82 <td></td> <td>1999</td> <td>21.811.27</td> <td>3,149,59</td> <td>1,177,00</td> <td>316.77</td> <td>47.40</td> <td>547.00</td> <td>128.00</td> <td>-</td> <td>481.88</td> <td>2226.59</td> <td>29,885,50</td>		1999	21.811.27	3,149,59	1,177,00	316.77	47.40	547.00	128.00	-	481.88	2226.59	29,885,50	
1000 17,361,73 2,723,72 906.00 145,24 47.11 1,162.00 300.00 - 289.37 2109.9 25,045.08 2002 15,665.91 1,890.03 1,108.00 67.87 29.04 836.00 168.00 - 712.72 2264.6 22,742.17 2003 15,974.54 3,097.72 1,449.00 - 39.55 346.00 240.00 - 70.96 5642.796 26,860.58 2004 17,313.89 3,194.83 1,378.00 71.57 9.95 965.00 192.00 - 115.65 2024.64548 25,265.52 2005 15,060.08 3,530.98 857.00 67.90 27.73 1,134.00 232.00 - 126.72 4027.016 25,094.33 2006 15,463.63 2,824.18 364.00 46.98 116.3 977.00 256.00 - 358.03 4337.882 24,639.33 2007 17,038.47 2,921.04 72.91 137.32 81.4 - 109.00 <td></td> <td>2000</td> <td>24,111,92</td> <td>2,838,40</td> <td>1,157.00</td> <td>428.52</td> <td>43.34</td> <td>624.00</td> <td>136.00</td> <td>-</td> <td>446.80</td> <td>2081</td> <td>31,866,97</td>		2000	24,111,92	2,838,40	1,157.00	428.52	43.34	624.00	136.00	-	446.80	2081	31,866,97	
2000 15,65:91 1,800.03 1,008.00 67.87 29.04 836.00 168.00 - 712.72 2264.6 22,742.17 2003 15,974.54 3,097.72 1,449.00 - 39.55 346.00 240.00 - 70.96 5642.796 26,860.58 2004 17,313.89 3,194.83 1,378.00 71.57 9.95 965.00 192.00 - 115.65 2024.64548 25,265.52 2005 15,006.08 3,530.98 857.00 67.90 27.73 1,134.00 232.00 - 126.72 4027.016 25,009.43 2006 15,663.63 2,824.18 364.00 46.98 11.63 977.00 256.00 - 358.03 4337.882 24,693.33 2007 17,038.47 2,270.99 292.00 54.32 192.5 843.00 113.82 2,00.99 651.55978 36,134.81 2010 26,094.31 2,755.04 98.51 176.11 75.04 - 52.84 460.		2001	17.361.73	2,723,72	906.00	145.24	47.11	1.162.00	300.00	-	289.37	2109.9	25.045.08	
1 1		2002	15 665 91	1 890 03	1 108 00	67.87	29.04	836.00	168.00	_	712 72	2264.6	22 742 17	
2003 17,313.89 3,194.83 1,378.00 71.57 9.55.05 965.00 192.00 - 115.65 2024.64548 25,055.52 2004 17,313.89 3,194.83 1,378.00 67.90 27.73 1,134.00 232.00 - 126.72 4027.016 25,099.43 2005 15,066.03 2,824.18 364.00 46.98 11.63 977.00 256.00 - 358.03 4337.882 24,639.33 2007 17,038.47 2,270.99 292.00 54.32 19.25 843.00 367.00 - 1,108.46 5283.25778 27,276.75 2008 20,787.81 3,186.59 109.57 137.32 8.14 - 109.00 - 873.77 6166.767 31,378.98 2009 24,465.47 2,942.14 72.94 107.11 72.77 - 88.00 113.82 2,020.99 6251.55978 36,134.81 2010 26,094.31 2,755.04 98.51 176.11 75.04 - <td< td=""><td></td><td>2003</td><td>15 974 54</td><td>3 097 72</td><td>1 449 00</td><td>-</td><td>39 55</td><td>346.00</td><td>240.00</td><td>-</td><td>70.96</td><td>5642 796</td><td>26 860 58</td></td<>		2003	15 974 54	3 097 72	1 449 00	-	39 55	346.00	240.00	-	70.96	5642 796	26 860 58	
2007 17,921.03 3,931.03 171.03 111.03 <td></td> <td>2003</td> <td>17 313 89</td> <td>3 194 83</td> <td>1 378 00</td> <td>71 57</td> <td>9.95</td> <td>965.00</td> <td>192.00</td> <td>-</td> <td>115.65</td> <td>2024 64548</td> <td>25,265,52</td>		2003	17 313 89	3 194 83	1 378 00	71 57	9.95	965.00	192.00	-	115.65	2024 64548	25,265,52	
2006 15,063.63 2,824.18 364.00 46.98 11.63 977.00 256.00 - 358.03 4337.882 24,639.33 2007 17,038.47 2,270.99 292.00 54.32 19.25 843.00 367.00 - 1,108.46 5283.25778 27,76.75 2008 20,787.81 3,186.59 109.57 137.32 8.14 - 109.00 - 873.77 616.767 31,378.98 2009 24,465.47 2,942.14 72.94 107.11 72.77 - 88.00 113.82 2,020.96 6251.55978 36,134.81 2010 26,094.31 2,755.04 98.51 176.11 75.04 - 52.84 460.53 198.29 8261.08292 38,171.76 2011 27,988.17 2,147.89 148.30 271.31 117.80 - 108.83 1,039.17 676.35 6509.1274 39,006.94 2012 28,665.76 2,256.35 115.12 162.27 98.39 - 97.62 902.52 538.96 3767.776 36,604.76 2013 2		2005	15 006 08	3 530 98	857.00	67.90	27 73	1 134 00	232.00	-	126 72	4027 016	25,205.52	
2000 10,703.63 2,270.99 292.00 54.32 19.25 843.00 367.00 - 1,108.46 5283.25778 27,276.75 2008 20,787.81 3,186.59 109.57 137.32 8.14 - 109.00 - 873.77 6166.767 31,378.98 2009 24,465.47 2,942.14 72.94 107.11 72.77 - 88.00 113.82 2,020.99 6251.55978 36,134.81 2010 26,094.31 2,747.89 148.30 271.31 117.60 - 52.84 460.53 198.29 8261.08292 38,171.76 2011 27,988.17 2,147.89 148.30 271.31 117.80 - 108.83 1,039.17 676.55 6509.1274 39,006.94 2011 27,988.17 2,147.89 148.30 271.31 117.80 - 108.83 1,039.17 67.55 6509.1274 39,006.94 2012 28,652.01 1,353.72 135.02 263.77 51.61 - 326.72 1,216.15 1,144.52 3694.375 36,747.90 2014 <td></td> <td>2006</td> <td>15 463 63</td> <td>2 824 18</td> <td>364.00</td> <td>46.98</td> <td>11 63</td> <td>977.00</td> <td>256.00</td> <td>-</td> <td>358.03</td> <td>4337 882</td> <td>24 639 33</td>		2006	15 463 63	2 824 18	364.00	46.98	11 63	977.00	256.00	-	358.03	4337 882	24 639 33	
100017,087,8117,186,59109,57137,328.14-109,00-873,776166,76731,378,98200924,465,472,942,1472,94107,1172,77-88.00113.822,020,996251,5597836,134.81201026,094,312,755,0498,51176,1175,04-52.84460,53198.298261,0829238,171,76201127,988,172,147,89148.30271,31117,80-108.831,039,17676,356509,127439,006,94201228,665,762,256,35115,12162,2798,39-97,62902,52538,963767,77636,604,76201328,562.011,353,72135.02263,7751,61-326,721,216,151,144,523694,37536,747,90201429,041,143,286,8883,14165,79115,680.64177,7231,861,810,853059,52638,133,22201530,078,304,011,13238,07114,15130,425.541.244.281,748,493859,15540,190,77201629,018,734,217.09286,5674.05117,4716.0327,285.742,503,537819,0137544,085,49201727,316,484,443,8575,6366,2751,6432,012,44201092,094,355664,24640,004,46201821,684,724,111,12153,1030,14112,4470,91 <t< td=""><td></td><td>2007</td><td>17.038.47</td><td>2,270,99</td><td>292.00</td><td>54.32</td><td>19.25</td><td>843.00</td><td>367.00</td><td>-</td><td>1,108,46</td><td>5283,25778</td><td>27,276,75</td></t<>		2007	17.038.47	2,270,99	292.00	54.32	19.25	843.00	367.00	-	1,108,46	5283,25778	27,276,75	
1000 10000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 1000000 10000000 10000000 10000000 100000000 100000000 100000000 1000000000 100000000000 1000000000000 100000000000000 1000000000000000000000000 1000000000000000000000000000000000000		2008	20,787,81	3,186,59	109.57	137.32	8.14	-	109.00	-	873.77	6166.767	31,378,98	
2000 20,00,01 <th< td=""><td></td><td>2009</td><td>24 465 47</td><td>2,942,14</td><td>72.94</td><td>107.11</td><td>72.77</td><td>-</td><td>88.00</td><td>113.82</td><td>2 020 99</td><td>6251,55978</td><td>36,134,81</td></th<>		2009	24 465 47	2,942,14	72.94	107.11	72.77	-	88.00	113.82	2 020 99	6251,55978	36,134,81	
2010 27,98.17 2,147.89 148.30 271.31 117.80 - 108.83 1,039.17 676.35 6509.1274 39,006.94 2011 27,988.17 2,147.89 148.30 271.31 117.80 - 108.83 1,039.17 676.35 6509.1274 39,006.94 2012 28,665.76 2,256.35 115.12 162.27 98.99 - 97.62 902.52 538.96 3767.776 36,604.76 2013 28,562.01 1,353.72 135.02 263.77 51.61 - 326.72 1,216.15 1,144.52 3694.375 36,747.90 2014 29,041.14 3,286.88 83.14 165.79 115.68 0.64 177.72 39.186 1,810.85 3059.526 38,133.22 2015 30,078.30 4,011.13 238.07 114.15 130.42 5.54 1.24 4.28 1,748.49 3859.15 40,190.77 2016 29,018.73 4,217.09 286.56 74.05 117.76 36.03 </td <td></td> <td>2010</td> <td>26.094.31</td> <td>2,755.04</td> <td>98.51</td> <td>176.11</td> <td>75.04</td> <td>-</td> <td>52.84</td> <td>460.53</td> <td>198.29</td> <td>8261.08292</td> <td>38,171,76</td>		2010	26.094.31	2,755.04	98.51	176.11	75.04	-	52.84	460.53	198.29	8261.08292	38,171,76	
2011 27,316.48 2,474.35 145.35 147.35 156.1 - 326.72 1,216.15 1,144.52 3694.375 36,747.90 2014 29,041.14 3,286.88 83.14 165.79 115.68 0.64 177.72 319.86 1,810.85 3059.526 38,132.22 2015 30,078.30 4,011.13 238.07 114.15 130.42 5.54 1.24 4.28 1,748.49 3859.15 40,190.77 2016 29,018.73 4,217.09 286.56 74.05 117.47 16.03 27.42 5.53.37 7819.01375 44,085.49 2017 27,316.48 4,443.85 75.63 66.68 107.68 32.01 2.44 201		2011	27 988 17	2 147 89	148 30	271 31	117.80	-	108.83	1 039 17	676 35	6509 1274	39,006,94	
2011 20,003,10 2,003,10 2,003,10 113,12 121,12 131,02 263,77 51,61 - 326,72 1,216,15 1,144,52 3694,375 36,747,90 2014 29,041,14 3,286,88 83,14 165,79 115,68 0.64 177,72 391,86 1,810,85 3059,526 38,133,22 2015 30,078,30 4,011,13 238,07 114,15 130,42 5.54 1.24 4.28 1,748,49 3859,15 40,190,77 2016 29,018,73 4,217.09 286,56 74.05 117,47 16.03 27,28 5.74 2,503,53 7819,01375 44,085,49 2017 27,316,48 4,443,85 75,63 66,68 107,68 32,01 2,44 20109 2,094,35 5664,246 40,004,46 2018 21,684,72 4,111,12 153,10 30,14 112,44 70.91 5.69 316.60 2,299,44 5194,57301 33,978,73 2019 16,314,20 3,855,22 <		2011	28 665 76	2,256.35	115 12	162 27	98.39	-	97.62	902 52	538.96	3767 776	36 604 76	
2015 20,02,01 1,036,12 100,02 100,01 00,01		2012	28 562 01	1 353 72	135.02	263 77	51.61	-	326.72	1 216 15	1 144 52	3694 375	36 747 90	
2014 20,014.14 3,820.26 30,078.30 4,011.13 238.07 114.15 130.42 5.54 1.24 4.28 1,748.49 3859.15 40,190.77 2015 30,078.30 4,217.09 286.56 74.05 117.47 16.03 27.28 5.74 2,503.53 7819.01375 44,085.49 2017 27,316.48 4,443.85 75.63 66.68 107.68 32.01 2.44 2010 2,094.35 5664.246 40,004.46 2018 21,684.72 4,111.12 153.10 30.14 112.44 70.91 5.69 316.60 2,299.44 5194.57301 33,978.73 2019 16,314.20 3,855.22 38.49 36.27 55.96 3.91 17.93 368.90 2,014.08 4507.32858 27,212.29 2020 12,324.85 2,289.79 73.60 32.17 59.01 193.31 65.44 300.68 1,972.23 3836.27505 21,147.36 2020 12,324.85 2,289.79 73.60 32.17 59.01 193.31 65.44 300.68 1,972.23 3836.27505 </td <td></td> <td>2013</td> <td>29 041 14</td> <td>3 286 88</td> <td>83.14</td> <td>165.79</td> <td>115.68</td> <td>0.64</td> <td>177 72</td> <td>391.86</td> <td>1 810 85</td> <td>3059 526</td> <td>38 133 22</td>		2013	29 041 14	3 286 88	83.14	165.79	115.68	0.64	177 72	391.86	1 810 85	3059 526	38 133 22	
2013 55,070.50 4,01113 235.07 114.15 135.42 3.34 1.14 4.15 1,74.05 553315 40,351.77 2016 29,018.73 4,217.09 286.56 74.05 117.47 16.03 27.28 5.74 2,503.53 7819.01375 44,085.49 2017 27,316.48 4,443.85 75.63 66.68 107.68 32.01 2.44 20109 2,094.35 5664.246 40,004.46 2018 21,684.72 4,111.12 153.10 30.14 112.44 70.91 5.69 316.60 2,299.44 5194.57301 33,978.73 2019 16,314.20 3,855.22 38.49 36.27 55.96 3.91 17.93 368.90 2,014.08 4507.32858 27,212.99 2020 12,324.85 2,289.79 73.60 32.17 59.01 193.31 65.44 300.68 1,972.23 3836.27505 21,147.36 2021 13,124.58 1,985.26 53.37 34.45 10.97 173.		2014	30 078 30	4 011 13	238.07	114 15	130.42	5.54	1.24	4 28	1 748 49	3859 15	40 190 77	
2013 22,010.73 4,117.05 220.75 74.63 117.47 10.05 127.16 17.47 10.05 117.47 117.47 117.47 117.47 117.47 117.47 117.55 117.55 </td <td></td> <td>2015</td> <td>29 018 73</td> <td>4 217 09</td> <td>236.56</td> <td>74.05</td> <td>117.47</td> <td>16.03</td> <td>27.29</td> <td>5.74</td> <td>2 503 53</td> <td>7819 01375</td> <td>44 085 49</td>		2015	29 018 73	4 217 09	236.56	74.05	117.47	16.03	27.29	5.74	2 503 53	7819 01375	44 085 49	
2013 21,512.50 4,5535 30.00 107.00 32.01 2.44 201.05 2,299.45 5004.240 40,004.40 2018 21,684.72 4,111.12 153.10 30.14 112.44 70.91 5.69 316.60 2,299.44 5194.57301 33,978.73 2019 16,314.20 3,855.22 3.89 36.27 55.90 3.91 17.93 368.90 2,014.08 4507.32858 27,212.29 2020 12,324.85 2,289.79 73.60 32.17 59.01 193.31 65.44 300.68 1,972.23 3836.27505 21,147.36 2021 13,124.58 1,985.26 53.37 34.45 10.97 173.18 2.21 349.43 1.814.70 4299.98405 21,848.13		2010	23,010.73	4 442 85	75.62	66.62	107.69	22 01	27.20	201.00	2,003.03	5664 246	40 004 46	
2010 21,007.72 7,1111 155.10 36.17 112.44 70.31 55.05 310.00 2,253.44 3194.37301 33,376.73 2019 16,314.20 3,855.22 38.49 36.27 55.96 3.91 17.93 366.90 2,014.08 457.32858 27,212.29 2020 12,324.85 2,289.79 73.60 32.17 59.01 193.31 65.44 300.68 1,972.23 3836.27505 21,147.36 20201 13,124.58 1,985.26 53.37 34.45 10.97 173.18 2.21 349.43 1.814.70 4299.98405 21,484.13		2017	21 684 72	4 111 17	152 10	20.08	112 44	70 01	5 60	316 60	2,034.33	5194 57201	22 978 72	
2013 10,514.20 3,555.22 36.45 30.27 35.56 3.51 17.55 366.50 2,014.08 4307.52638 27,112.25 2020 12,324.85 2,289.79 73.60 32.17 59.01 193.31 65.44 300.68 1,972.23 3836.27505 21,147.36 2021 13.124.58 1.985.26 53.37 34.45 10.97 173.18 2.21 349.43 1.814.70 4299.98405 21.848.13		2018	16 314 20	3 855 22	38 /0	36.14	55 06	3 01	17 02	368 00	2,235.44	4507 32858	27 212 20	
2021 13 124 58 1 985 26 53 37 34 45 10 97 173 18 2 21 349 43 1 814 70 4299 98405 21 848 13		2019	12 22/ 25	2 280 70	72 60	22 17	50.50	102 21	65 44	300.50	1 972 22	3836 27505	21,212.29	
		2020	13,124 58	1.985.26	53.37	34.45	10.97	173.18	2.21	349.43	1.814.70	4299,98405	21,848,13	

Table 2. Catch (t) by fleet ID for the North Atlantic blue shark stock 1971 - 2021. This matrix represents the Group best estimates of total removals, see text for details.

Sum of Q	ty t	Fleet ID SS3											
Stock	YearC	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8	FS9	FS10	FS11	Grand Tota
ATS	1971	-	87.04	3,512.92	1,132.36	-	-	-	-	-	-	-	4,732.32
	1972	-	68.39	4,439.01	759.70	-	-	-	-	-	-	-	5,267.10
	1973	-	90.99	4,290.35	2,478.94	-	-	-	-	-	-	-	6,860.29
	1974	-	262.81	3,525.59	666.01	-	-	-	-	-	-	-	4,454.40
	1975	-	290.50	3,137.68	643.08	-	-	-	-	-	-	-	4,071.27
	1976	-	206.29	3,811.35	488.87	-	-	-	-	-	-	-	4,506.51
	1977	-	217.03	3,533.80	5,764.68	-	-	-	-	-	-	-	9,515.50
	1978	-	207.42	3,495.90	6,800.44	-	-	-	-	-	-	-	10,503.76
	1979	-	293.89	3,341.26	7,627.67	-	-	-	-	-	-	-	11,262.82
	1980	-	892.41	3.089.75	8.655.38	-	-	-	-	-	-	-	12.637.55
	1981	-	369.62	3.048.00	4,441,91	64.45	-	-	-	-	-	-	7.923.99
	1982	-	575 35	3 187 00	9 579 35	233.90	-	-	-	-	-	-	13 575 59
	1983	-	441 40	2 235 00	2 813 28	460.01	-	-	-	-	-	-	5 949 69
	1984	-	263.94	1 438 00	7 601 39	655.49	-	-	-	-	-	-	9 958 82
	1985	-	317.63	1,450.00	6 155 67	361 54	-	-	-	-	-	-	8 500 83
	1986	-	425.01	3 733 00	7 716 97	128.04	-	-	-	-	-	-	12 003 02
	1987	-	535.22	4 260 00	4 706 75	84.62	-	-	-	-	-	-	9 586 59
	1988	5 19/ 88	656.73	3 992 00	7 016 24	68.09	-	-	-	-	-	-	16 927 93
	1980	9 135 08	660.12	5 338 00	6 806 85	56.84	-		_	-	-	-	21 996 89
	1990	7 291 51	958 53	8 798 00	8 058 33	78 57	-		_		-	-	25 184 95
	1001	6 811 40	7/1 51	7 066 00	6 550 07	10.16	-	-	-	-			21 210 22
	1002	6 682 50	1 474 54	10 217 00	1 7/9 22	106.96	-		-				21,219.33
	1002	8 247 00	1 127 60	5 702 00	7 822 06	24.09	-	22.00	-				23,229.13
	1993	0 295 79	227 20	8 636 00	7,659,91	82.76	-	69.00	-				25,127.74
	1994	12 250 92	1 112 20	7 794 00	7,030.01	65.70	-	102.00	-	-	-	-	20,721.24
	1995	11 279 25	1,115.59	11 629 00	J, JJJJ. J/	250.03	-	08.40	-	-	-	847.00	20,009.45
	1990	E 272 42	2 217 21	0 559 00	4,051.01	190.00	-	30.40	-	-	10.00	1 225 00	22 105 92
	1009	5,272.42	2,317.21	9,556.00	4,590.52	247.94	-	100.90	-	-	20.22	1,335.90	25,105.62
	1990	5,575.95	2,172.33	8 200 00	3,720.34	110 10	-	109.60	-	-	216.07	1 110 00	21,501.00
	1999	6 050 70	2,000.10	0,004.00	3,133.30	110.10	-	192.00	-	-	210.07	1,110.00	23,001.23
	2000	0,950.70	1,082.50	9,064.00	2,950.82	60.52	-	204.00	-	-	22.19	2,134.40	23,089.14
	2001	7,742.58	2,173.40	0,001.00	1,000.07	00.32	-	450.00	-	-	30.14	2,562.40	20,808.51
	2002	5,308.08	1,970.50	8,445.00	1,440.59	84.70	-	252.00	-	-	2,2/5.93	2,323.50	22,100.29
	2003	6,626.11	2,165.76	7,228.00	5,469.22	480.01	-	360.00	-	-	2,549.57	1,840.80	26,719.47
	2004	7,366.30	1,667.36	6,005.00	2,680.30	462.45	-	288.00	-	36.64	2,033.45	1,863.17	22,402.68
	2005	6,410.13	2,523.27	5,045.00	1,660.23	375.80	-	348.00	-	259.25	6,787.14	3,184.26	26,593.07
	2006	8,724.38	2,591.33	2,433.00	3,281.84	231.72	-	384.00	-	184.14	3,864.40	2,751.23	24,446.04
	2007	8,941.77	2,645.28	2,177.00	3,653.30	337.48	-	585.00	-	236.45	3,501.79	4,493.50	26,571.56
	2008	9,615.26	2,012.58	1,842.56	5,521.34	358.88	-	39.90	-	109.03	2,475.50	4,866.39	26,841.44
	2009	13,098.70	1,273.50	1,356.25	3,768.00	941.81	-	109.00	-	175.99	340.10	5,358.23	26,421.58
	2010	13,953.44	1,500.50	1,625.49	5,335.59	207.93	-	40.60	-	2/2./6	2,699.47	6,338.02	31,973.79
	2011	16,978.10	1,979.53	2,141.55	4,242.17	724.56	-	130.80	-	242.94	3,602.97	7,642.33	37,684.94
	2012	14,348.00	1,607.26	2,146.88	4,447.36	432.75	-	83.56	-	483.46	1,761.18	2,424.06	27,734.50
	2013	10,473.49	1,008.13	2,286.73	3,509.40	129.87	-	64.47	-	234.02	1,446.84	1,646.17	20,799.11
	2014	11,446.72	2,551.41	2,239.94	3,232.00	-	2,470.60	47.72	525.27	170.64	1,946.22	1,622.30	26,252.81
	2015	10,133.28	2,420.47	1,853.53	2,277.42	-	2,136.60	20.47	401.59	105.42	729.55	2,420.14	22,498.48
	2016	10,107.30	1,334.30	1,991.79	2,127.30	-	2,774.90	30.49	355.91	167.37	918.12	5,609.21	25,416.69
	2017	11,487.60	2,176.72	2,053.32	3,111.65	-	1,356.61	282.71	418.20	200.36	805.03	6,662.68	28,554.88
	2018	13,515.41	3,010.73	1,372.27	3,495.36	-	3,290.43	126.82	403.44	221.63	1,062.60	8,015.30	34,513.99
	2019	18,496.71	3,784.27	861.45	2,513.27	-	2,473.98	52.45	291.75	164.68	2,016.40	6,753.01	37,407.98
	2020	14,716.98	3,434.90	1,337.92	2,116.49	-	4,120.02	44.82	51.81	15.09	685.86	7,349.51	33,873.40
	2021	16,777.87	4,629.16	1,051.77	1,639.42	-	3,237.31	15.47	180.93	21.48	683.99	5,523.80	33,761.19

Table 3. Catch (t) by fleet ID for the South Atlantic blue shark stock 1971 - 2021. This matrix represents the Group best estimates of total removals, see text for details.



Figure 1. Yearly catch (t) of North and South Atlantic blue sharks as estimated by the Sharks Species Group and the Task 1 NC reports 1971 - 2021.



Figure 2. Yearly catch (t) by fleet North Atlantic blue shark 1971 – 2021.



Figure 3. Yearly catch (t) by fleet South Atlantic blue shark 1971 – 2021.



Figure 4. Summary of the blue shark size information provided to ICCAT (Task 2SZ) by CPCs.



Figure 5. Blue shark size data geographic distributions by stock as submitted in the Task 2SZ data.



Figure 6. Annual distribution of blue shark size by stock and sex as available in the ICCAT database.



Figure 7. Number of blue shark size samples by stock from different data sources available for the stock assessment model inputs.

(FLEET ID SS3	== _{"FN10"}	& DataSource	==_"OBS2015" & Fleet == "EU-POR"	⇒,)
			==		==	⇒.	
			FLEET_ID_SS3	"FN10"	& DataSource	"Task2Sz" & Year - 2014	´ 1
			FLEET_ID_SS3	== "FN1"	& DataSource	== "Task2Sz"	⇒ ₁
			FLEET_ID_SS3	== "FN2"	& DataSource	=="JPN_BSH_New5" & Fleet =="JPN"	⇒ ₁
			FLEET_ID_SS3	== "FN3"	& DataSource	== _{"CTP_BSH_New5"} & Fleet ⁼⁼ "CTP"	⇒ ₁
			FLEET_ID_SS3	== _{"FN4"}	& DataSource	== _{"Task2Sz"}	⇒ ₁
Stock	== _{"ATN"}	⇒ _{If}	FLEET_ID_SS3	== "FN5"	& DataSource	== _{"OBS2015" & Year} < ₂₀₁₄	⇒ ₁
			FLEET_ID_SS3	== "FN5"	& DataSource	$=$ "Task2Sz" & Year \geq 2014	⇒ ₁
			FLEET_ID_SS3	== "FN7"	& DataSource	== _{"Task2Sz"}	⇒ ₁
			FLEET_ID_SS3	== "FN8"	& DataSource	== "Task2Sz"	⇒ ₁
			FLEET_ID_SS3	== "FN9"	& DataSource	== _{"OBS2015" & Year} < ₂₀₁₄	⇒ ₁
			FLEET_ID_SS3	== "FN9"	& DataSource	== _{"Task2Sz" & Year} ≥ ₂₀₁₄	⇒ ₁
			else				⇒₀/
		s, ⇒It	FLEET_ID_SS3	== "FS11"	& DataSource	== "OBS2015" & Fleet == "EU-POR"	⇒1
			FLEET_ID_SS3	== "FS11"	& DataSource	== _{"Task2Sz"} & Year ≥ ₂₀₁₄	⇒ ₁
			FLEET_ID_SS3	== "FS1"	& DataSource	== _{"Task2Sz"}	⇒ ₁
			FLEET_ID_SS3	== "FS2"	& DataSource	== _{"BRZ_BSH_New5"}	⇒ ₁
			FLEET_ID_SS3	== "FS3"	& DataSource	=="CTP_BSH_New5" & Fleet == "CTP"	⇒ ₁
			FLEET_ID_SS3	== _{"FS4"}	& DataSource	==-JPN_BSH_New5" & Fleet == "JPN"	⇒ ₁
Stock	== "ATS"		FLEET_ID_SS3	== "FS5"	& DataSource	=="URY_BSH_New5" & Fleet =="URY"	⇒ ₁
			FLEET_ID_SS3	== "FS6"	& DataSource	== _{"Task2Sz"}	⇒ ₁
			FLEET_ID_SS3	== _{"FS7"}	& DataSource	== _{"Task2Sz"}	⇒ ₁
			FLEET_ID_SS3	== _{"FS8"}	& DataSource	== _{"Task2Sz"}	⇒1
			FLEET_ID_SS3	== _{"FS9"}	& DataSource	== _{"Task2Sz"}	⇒ 1
			FLEET_ID_SS3	== _{"FS10"}	& DataSource	== "Task2Sz"	⇒1
			else				⇒₀/
else		⇒₀					

Figure 8. A decision algorithm for selecting the input BSH size data by fleet (FLEET_ID) and stock. Values of 1 indicate to use of the data, and 0 excludes the size data.



Figure 9. Blue shark sex information distribution by stock within the compiled size data for all years.



Figure 10. Blue shark annual size distributions by sex and stock unit from the ICCAT Task 2SZ dbase.



Figure 11. Annual north blue shark size (SFL, 5 cm bin size low limit) distribution by fleets. This size matrix represents the compilation of size information from different sources following the SHKSG decisions.



Figure 12. Annual south blue shark size (SFL, 5 cm bin size low limit) distribution by fleets. This size matrix represents the compilation of size information from different sources following the SHKSG decisions.



Figure 13. Mean annual blue shark size (SFL) trend by fleet ID and stock unit.



Figure 14. Annual north blue shark size (SFL, 5 cm bin size low limit) distribution by fleets. This size matrix represents the compilation of size information from different sources following the SHKSG decisions



Figure 15. Annual south blue shark size (SFL, 5 cm bin size low limit) distribution by sex and fleets. This size matrix represents the compilation of size information from different sources following the SHKSG decisions.