

## HISTORICAL BLUEFIN TUNA CATCHES FROM SOUTHERN PORTUGAL TRAPS

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### SUMMARY

*Historical data of the bluefin tuna catches in the Portuguese traps were recovered under the GBYP Data Recovery Plan on Historical bluefin tuna. The data recovered includes the Task I and Task II data of the Portuguese trap fishery on bluefin tuna between 1896 and 1972. Complementary information recovered, included daily catches for several traps, in number of fish and corresponding weights for a large number of years, between 1885 and 1972.*

### RÉSUMÉ

*Les données historiques des prises de thon rouge dans les madragues portugaises ont été récupérées dans le cadre du Programme de récupération des données historiques sur le thon rouge du GBYP. Les données récupérées incluent les données de la Tâche I et de la Tâche II de la pêcherie de madragues portugaises de thon rouge entre 1896 et 1972. Les informations complémentaires récupérées comprenaient les prises quotidiennes de plusieurs madragues, en nombre de poissons et poids correspondants pour un grand nombre d'années entre 1885 et 1972.*

### RESUMEN

*En el marco del Plan de recuperación de datos históricos sobre atún rojo del GBYP se han recuperado datos históricos de las capturas de atún rojo de las almadrabas portuguesas. Los datos recuperados incluyen datos de Tarea I y Tarea II de la pesquería de almadrabas portuguesa de atún rojo entre 1896 y 1972. La información complementaria recuperada incluía capturas diarias de varias almadrabas en número de ejemplares y los pesos correspondientes para muchos años entre 1885 y 1972.*

### KEYWORDS

*Bluefin tuna, Portugal, trap fishing, catch statistics,  
fishing effort, historical data*

### 1. Introduction

In April 2011, a contract has been signed between the University of Azores and ICCAT, under the GBYP Data Recovery Plan on Historical Bluefin Tuna (Call for Tenders, Circular no. 320/2011), in order to support the recovery of historical data of the bluefin tuna catches in the Portuguese traps.

The working plan included the recovery of the total and monthly catches (Task I and Task II data) of the bluefin tuna Portuguese trap fishery 1896 and 1971. This objective was fully achieved and the detailed data collected was transmitted to ICCAT. A preliminary presentation of the data recovered was presented at the Bluefin tuna trap symposium in Tangier, Morocco, in May 2011.

During the research done in historical archives, some detailed and complementary information was found and recovered. This recovered complementary information, includes the daily catches for several traps, in number of fish and corresponding weights for a large number of years, between 1876 and 1972.

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## 2. Data sources

The information was found in different publications and locations, including public and private libraries, historical archives, historical municipal archives and some private collections. Some of the public libraries/archives where information was collected are listed below:

- Instituto Nacional de Estadística, Lisbon
- Direcção Geral das Pescas e Aquicultura, Lisbon
- Arquivo Histórico da Direcção Geral das Pescas, Lisbon
- Arquivo do Grémio dos Armadores de Atum (GAPATUM), Lisbon
- Arquivo Distrital de Faro
- Arquivo Municipal de Tavira
- Arquivos da Companhia de Pescarias do Algarve, Faro
- Bibliotecas Municipais da Horta, Ponta Delgada e Tavira

The data are dispersed and for some years and for traps, the catch information of the different sources is contradictory, which required a further validation process.

The sources containing the information are of variable quality, mostly handwritten on paper, given their historical content, centenary data in its majority and their dispersion across the various data sources, such as publications and documents of different types, including statistical bulletins, daily trap records, financial reports of the trap societies and other historical documents. The detailed records from the traps are mostly handwritten with different levels of quality.

Due to the difficulty in the interpretation of the handwritten information and the amount of paper records found, most of the archives were photographed and processed later.

A short summary of the recovered information is presented in the figures and tables included in this document.

## 3. Description of the recovered datasets

Information concerning the historical Portuguese tuna trap catches is now available for a large number of years, with different levels of detail.

The most detailed data concern the period from 1896 to 1972. For this period, the information was obtained for 24 traps, in number of fish caught by commercial category, by month and/or 2 month periods: May/June; July/August, corresponding to the two fishing seasons, the first called “direito” (inward) for the fish migrating to the Mediterranean and the second “revés” (outward) for the fish coming out of the Mediterranean. The first fishing season includes, in some years, catches in April and the outward season could extend to September.

The catches of bluefin tuna are available in number of fish and by commercial category, since the bluefin caught by the Portuguese traps were commonly recorded in number of fish, qualified in four commercial categories (“atum”: > 90 kg; “atuarro”: from 50 to 89 kg; “albacore”: from 30 to 49 kg; “cachorreta”: <30 kg). A fifth category, the “cachorretitas”, used for fish less than 10 kg was also found in the detailed records from some traps. Some traps did not include in their official catch declarations the smaller sizes, i.e., fish under 50 kg, corresponding to the categories “albacore” (from 30 to 49 kg) and “cachorreta” (<30 kg). However, in the cases where the detailed records were available, information on the catches of those small fish was also recovered and it’s now available for some traps/years. The commercial categories used in Portugal for bluefin and their respective weights and sizes limits, are given in **Table 1**.

In the data recovered for some traps/years, different values were found for the total catch of bluefin or for the catches by commercial category. This can be explained by the fact that in some traps, only the large bluefin were recorded or when reporting the total annual catch referred only to large bluefin (“atum” category), the other size categories were converted to atum (2 atuarros, 4 albacoras or 8 cachorretas corresponded to 1 atum). However, since we had the possibility of consulting records from different sources, with several levels of detail, this situation has been corrected in many cases.

For some years and traps it was also possible to recover information on daily catches by commercial category, in number of fish, including information on the respective weights.

The recovered information was transmitted to ICCAT in several files, containing the following information:

- a) Catches in number of fish by commercial categories, by trap, year and month; includes 11 traps and 1042 records.
- b) Catches in number of fish by commercial categories, by trap and year; includes 24 traps and 699 records.
- c) Catches in number of fish by commercial categories, by trap, year and season (bi-monthly); includes 24 traps and 1034 records.
- d) Estimated total catch of bluefin tuna, in weight, by commercial categories from 1896 to 1972.
- e) Daily catches in number of fish and respective weight; includes 5 traps and 4878 records.
- f) All the detailed information collected was merged in a single excel file and transmitted to the ICCAT GBYP.

#### **4. The tuna traps**

The data recovery allowed us to identify 23 traps that were active in the bluefin tuna fishery in the Algarve, from 1876 to 1972. The number of years of activity per trap varies from 1 (Beliche and Penedo do Sono) to 121 years (Medo das Cascas). The details on the number of years of activity of the traps involved in the bluefin fishery are given in **Table 2**.

The number of traps active in each year varied according to the geographical location of the trap and the season. The traps located in the western part of Algarve used to fish primarily for the incoming season, during the months of the migration towards the Mediterranean from mid-April to the end of June. The traps located in the eastern side of the Algarve coast fished in both seasons, but their catches were usually higher during the months of July to early September.

During the period analyzed, the maximum number of traps that operated simultaneously was 19 in 1903, with an average of 17 active traps between 1896 and 1909. The number of active traps decreased in the following years and from 1938 to 1965, only 5 were operating. The trap fishing for bluefin tuna in the coast of Algarve ended in 1972, the year when the last trap operated. **Figure 1** shows the number of traps active from 1986 to 1972, by fishing season. The number of tuna traps that operated between 1876 and 1972, for which information is available on the number of months of operation and the respective the tuna catches in number by commercial category is given in **Table 3**.

#### **5. Recovered information on annual bluefin tuna catches**

The recovery of historical data on the bluefin tuna catches by the Portuguese traps has shown that all the information concerning the catches was recorded in number of fish and by commercial size categories. Five commercial categories were used for bluefin, as described previously, but some of the traps only recorded the captures of large size fish. This practice could explain the lack of information for the tunas of smaller sizes that, only after 1938 are discriminated in the catches of most of the traps. It was also common to report all the catches as large bluefin, the “atum” category, by converting the smaller sizes into large ones. However, in the detailed records of the traps the catches in number of the tunas of the 5 categories are registered separately. The corresponding weights of the tuna caught are also available in the traps records after 1958.

The most complete data set corresponds to the period from 1896 to 1972, for which detailed information is available for all the traps that were active in that period. That information is available for each trap, by month and in number of fish by commercial category. A summary of the annual total bluefin tuna caught in that period is presented in **Table 4** for catches in number and an estimation of those catches in weight is shown in **Table 5**, where the catches in number have been converted to weights using the average weights for each size category.

**Figure 2** gives the recovered information on the catches of bluefin tuna, in number of fish, caught by the Portuguese traps in Algarve, from 1852 to 1972. It should be noted that before 1896 the recovered catches are from a limited number of traps. Those annual catches in number of fish, when plotted by size category show a regular pattern of periods of high and low catches, more evident in the catches of large bluefin but also in the smaller sizes (**Figure 3**).

In the catch tables, different levels of catches are observed along the recovered years. The first period from 1886 to 1906, is characterized by high catches, with an average of 70 000 tunas per year. In the following years the total catch begins a slow decrease to 41 000 tunas in the years 1907 to 1915 and then fluctuates around 16 000 tunas until 1956. In the final period, starting in 1957 a strong decrease is observed and the last trap closed its activity in 1972.

The catches in number of fish of bluefin tuna, by fishing season from 1896 to 1972 and the number of active traps in each season is given in **Table 6**.

A short series is also available for the traps fishing in the area off the city of Lagos, concerning the catches and the number of active traps in 1789 and 1808 to 1835. In 1810, the catch of 5 traps reached the maximum in that period with a catch of 32145 bluefin and decreased in the following years. The number of active traps in the area also decreased and in 1835 only two traps were active (**Figure 4**).

Complementary information was also recovered concerning the catches of a smaller number of traps and a variable number of years, prior to 1896. This information is available for 4 traps: “Abóbora”(1885-1965), “Barril” (1867-181966), Sr<sup>a</sup> do Livramento (1876-1969) and “Medo das Cascas” (1837-1972). **Figure 5** shows the available information concerning the catches of large bluefin tuna (>90 kg) taken by those 4 traps.

## 6. Fishing effort and daily catches

The information on the fishing effort exerted by the traps operating in Algarve is available in different units: number of traps active per year, number of traps active per month and number of traps fishing by tuna season, targeting the bluefin migrating to the Mediterranean, the inward season (May and June) and the tuna returning to the Atlantic after the spawning, the outward season (July and August). The average catch of large bluefin (>90 kg) by trap, during the two fishing season in the period 1896 to 1972, shows that the yield per trap was higher during the outward season with annual mean catches 2 to 3 times higher than the inward season (**Figure 6**).

Detailed data on the daily fishing operations is also available for a restricted number of traps and a variable number of years, catches by commercial category, in number of fish, including the information on the respective weights. This information on the catches in number of fish and the respective weights is available for 1 trap from 1958 to 1972 and for 4 traps from 1962 to 1967 (**Table 4**). This detailed records of the daily catches allowed the estimation of daily average weights for the different size categories of bluefin tuna caught in south Portugal, from 1958 to 1972. The most complete series belongs to the “Medo das Cascas” trap, for two periods, 1876-1883 and 1942-1972. This nominal CPUE (number of bluefin tuna/number of daily fishing operations) is given in **Figure 7**.

For some traps the detailed records include the daily catches of bluefin tuna (in number of fish), for the different commercial categories. The higher number of records is for Medo das Cascas trap, with daily records of catches in two periods, from 1876 to 1882 and from 1942 to 1972. Similar data from other 4 traps are also available from 1962 to 1965. **Figure 8** gives those daily catches, from 1876 to 1882 and figure 9 the daily catches of bluefin tuna (in number of fish), in two commercial categories (CC5: atum > 90 kg; CC4: atuarro: >50 < 90 kg), from 1962 to 1965 in 5 Portuguese tuna traps.

## 7. Size of fish caught

The bluefin tuna caught by the Portuguese traps was recorded in commercial categories (**Table 1**) in which the fish of similar sizes were grouped for sale. Until 1958, the sales records only have information on the number of fish by category, but after that year the weight of individual fish or batches of fish of similar size sold together were recorded. Those records were recovered for some traps and it was possible to calculate the individual weights or the mean weights for some of those sets, since the number and the corresponding weights are known. Those estimated weights can be converted to lengths and an approximated size composition of the bluefin caught can be calculated. **Table 7** gives the estimated monthly mean weights for 3 commercial categories of bluefin tuna caught in the traps of southern Portugal from 1958 to 1972 and the corresponding estimated annual size frequencies of bluefin tuna (>10 kg) are given in **Figure 10**. This information also allows confirming the accuracy of the commercial categories used and the annual variability of the mean weights for each category (**Figure 11**).

## 8. Conclusion

The large amount of historical data has been recovered on the activity of the Portuguese traps that operated in Algarve shows the importance that this bluefin fishery had in the past. Several data sets have been recovered, with different levels of detail from annual to daily catches, including detailed information on the number of fish caught and respective weights. The volume of data recovered demonstrates the importance of data mining to better understand the long term fluctuations in the abundance of bluefin tuna.

**Table 1.** Commercial categories for bluefin tuna used in the Portuguese statistics.

Portugal - Commercial Categories (BFT)			
CCatID	CCatName	Description	MeanWprev(kg)
CC1	Small (< 10kg)	<b>Cachorretitas</b>	5
CC2	Small (< 30kg)	<b>Cachorretas (&lt; 1.00 m)</b>	20
CC3	Medium (30>= X < 50 kg)	<b>Albacora (1.00 m&gt;= X &lt; 1.30 m)</b>	40
CC4	Medium (50>= X < 90 kg)	<b>Atuarros (1.30 m&gt;= X &lt; 1.90 m)</b>	70
CC5	Large (>= 90 kg)	<b>Atum &gt; 1.90 m</b>	150

**Table 2.** Historical tuna traps in southern Portugal (Algarve coast) and years for which data on bluefin catches were recovered.

Trap	Period	Nb years
Abóbora	1896-1965; 1970	82
Barril (3 Irmãos)	1867-1966	100
Beliche	1905	1
Bias	1896; 1898-1899; 1901-1909; 1914-1921	20
Burgau	1903-1904	2
Cabeço	1896-1897	2
Cabo de St <sup>a</sup> Maria	1896-1903; 1905-1910; 1912-1965; 1967	69
Farol	1898-1903; 1905-1910; 1914	13
Forte Novo	1896-1918; 1920	24
Medo Branco	1903-1904; 1907-1915; 1922	12
Medo das Cascas	1852-1972	121
Olhos de Água	1896-1919	24
Pedra da Galé	1894-1904	9
Penedo do Sono	1910	1
Ramalhete	1896-1921; 1923-1930	34
Sr <sup>a</sup> da Rocha	1897-1919	23
Sr <sup>a</sup> do Livramento	1876-1969	94
Sul da Ponta Baleeira	1902-1926	25
Sul da Ponta do Zavial	1897-1911	15
Sul do Cabo Carvoeiro	1896-1913; 1915-1917	21
Torre Alta	1896-1904	9
Torre Alinha	1896-1909	14
Torre da Barra	1897-1917	21
Vau	1896; 1898; 1899	3
<b>Total</b>		<b>739</b>

**Table 3.** Number of tuna traps with monthly catch data recovered (catch in number of bluefin tunas, by commercial category).

Year	Month							Total
	3	4	5	6	7	8	9	
1876				1	1	1		3
1877				1	1	1		3
1878				1	1	1		3
1879			1	1	1	1		4
1880			1	1	1	1		4
1881			1	1	1	1		4
1882			1	1	1	1		4
1883			1	1	1	1		4
1898			2	2	2	2		8
1918			11	9	5	5	2	32
1919			7	10	5	5		27
1920			8	9	5	5		27
1921			8	8	7	6		29
1922			7	7	5	5		24
1923			6	7	4	5		22
1924			7	7	5	5		24
1925			7	7	6	5		25
1926			7	7	5	4		23
1927			6	6	5	4		21
1928			6	6	5	4	2	23
1929			6	6	4	4		20
1930			6	6	4	4	1	21
1931		1	5	5	4	4		19
1932			5	5	4	4		18
1933			5	5	4	4		18
1934			5	5	4	4		18
1935			5	5	4	3		17
1936			5	5	4	4		18
1937			5	5	4	4		18
1938			5	5	4	3		17
1939			5	5	4	4		18

Year	Month							Total
	3	4	5	6	7	8	9	
1940			5	5	4	4		18
1941			4	5	5	4		18
1942			5	5	4	4		18
1943			5	5	4	4		18
1944			5	5	4	4		18
1945			5	5	4	4		18
1946			5	5	4	4		18
1947			5	5	4	4		18
1948			5	5	4	4		18
1949			5	5	4	4		18
1950			5	5	4	4		18
1951			5	5	4	4		18
1952			5	5	4	4		18
1953			5	5	4	4		18
1954			5	5	5	4		19
1955			5	5	4	4		18
1956			5	5	5	4		19
1957			5	5	4	4		18
1958			5	5	4	4		18
1959			5	5	4	4		18
1960			5	5	4	4		18
1961			5	5	4	4		18
1962			5	5	4	4		18
1963			5	5	4	4	1	19
1964	1	1	5	5	4	4	2	22
1965			5	5	4	3	1	18
1966			2	3	3	4		12
1967		1	3	3	3	1		11
1968			2	2	2	2		8
1969			2	2	2	2	1	9
1970			2	2	2	2		8
1971						1		1
1972					1	1		2
Total	1	3	284	292	231	221	10	1042

**Table 4.** Recovered information of the catches of bluefin tuna, in number by commercial category, and number of annual active tuna traps from 1896 to 1972, in the southern coast of Portugal (Algarve). (bluefin commercial categories: CC2: < 30 kg; CC3: 30-49 kg; CC4: 50-90 kg; CC5: > 90 kg).

Year	BFT CC5	BFT CC4	BFT CC3	BFT CC2	Total	Nb Traps	Year	BFT CC5	BFT CC4	BFT CC3	BFT CC2	Total	Nb Traps
1896	52001	9099	1361		62461	15	1935	8356	2841	1196	194	12587	6
1897	66806	10039	3333		80178	16	1936	23032	4822	2460	395	30709	6
1898	56569	8540	8500		73609	18	1937	31856	3973	5068	378	41275	6
1899	58617	14397	2770		75784	18	1938	6831	3217	3341	729	14118	5
1900	43032	13112	4307		60451	16	1939	4620	2907	1555	189	9271	5
1901	41244	12062	4341		57647	17	1940	4199	1974	3381	452	10006	5
1902	28679	289.4	20.52		54571	18	1941	7270	2969	1839	1026	13104	5
1903	54744	23104	17769		95617	19	1942	6809	2659	2236	589	12293	5
1904	46459	19684	1516		67659	18	1943	20897	5360	5233	913	32403	5
1905	68904	2457	1694		73055	17	1944	12018	3919	2475	592	19004	5
1906	84030	7809	838		92677	16	1945	8423	5018	3226	894	17561	5
1907	38471	5531	783	519	45304	16	1946	19738	6752	1930	898	29318	5
1908	31294	8098	1904	1577	42873	16	1947	10738	5720	3904	2218	22580	5
1909	22501	9874	3665	2531	38571	16	1948	10846	5204	2782	2280	21112	5
1910	16739	5035	3442	4680	29896	14	1949	12188	4374	2613	816	19991	5
1911	19373	4405	3509	656	27943	13	1950	7732	4509	2537	1921	16699	5
1912	19162	7231	3413	248	30054	13	1951	6846	3816	2999	1029	14690	5
1913	34718	6746	2504		43968	12	1952	10261	6514	4105	633	21513	5
1914	42041	5527	2306		49874	13	1953	15368	5653	2613	837	24471	5
1915	41440	4360	1863	22	47685	13	1954	6369	3411	1101	1057	11938	5
1916	11274	2488	544	91	14397	13	1955	7539	2530	490	318	10877	5
1917	19756	4231	2644	117	26748	13	1956	13838	3199	988	738	18763	5
1918	6440	1938	861	506	9745	11	1957	5353	1648	475	366	7842	5
1919	11124	2250	1358	327	15059	10	1958	4074	1478	147	192	5891	5
1920	20870	2689	4820	1141	29520	9	1959	5199	1410	176	5054	11839	5
1921	12237	1769	954	120	15080	8	1960	8329	504	286	3697	12816	5
1922	6512	1876	1890	593	10871	7	1961	9902	1341	184	3864	15291	5
1923	7956	1178	640	913	10687	7	1962	4490	449	186	695	5820	5
1924	9994	2100	379	158	12631	7	1963	2287	514	184	264	3249	5
1925	5880	1059	728	464	8131	7	1964	2206	200	65	9264	11735	5
1926	6379	1031	551	3059	11020	7	1965	497	287	14	40	838	5
1927	18251	638	6	4	18899	6	1966	30	3	8	3	44	3
1928	22636	1523	451	156	24766	6	1967	1346	260	4	32	1642	3
1929	9801	2950	563	402	13716	6	1968	384	35	1	8	428	2
1930	14148	1824	480	69	16521	6	1969	1857	36	4	2146	4043	2
1931	200.13	2859	1068	259	20245	6	1970	1			117	118	2
1932	13969	905	638	149	15661	6	1971				1	1	1
1933	15886	1842	1373	515	19616	6	1972	1			4846	4847	1
1934	6958	874	571	361	8764	6							

**Table 5.** Estimated catches (t) of bluefin tuna, by commercial categories, caught by the Algarve traps. (bluefin commercial categories: CC2: < 30 kg; CC3: 30-49 kg; CC4: 50-90 kg; CC5: > 90 kg).

Year	BFT CC5	BFT CC4	BFT CC3	BFT CC2	Total	Year	BFT CC5	BFT CC4	BFT CC3	BFT CC2	Total
1896	7800.2	636.9	54.4		8491.5	1935	1253.4	198.9	47.8	3.9	1504.0
1897	10020.9	702.7	133.3		10857.0	1936	3454.8	337.5	98.4	7.9	3898.6
1898	8485.4	597.8	340.0		9423.2	1937	4778.4	278.1	202.7	7.6	5266.8
1899	8792.6	1007.8	110.8		9911.1	1938	1024.7	225.2	133.6	14.6	1398.1
1900	6454.8	917.8	172.3		7544.9	1939	693.0	203.5	62.2	3.8	962.5
1901	6186.6	844.3	173.6		7204.6	1940	629.9	138.2	135.2	9.0	912.3
1902	4301.9	1434.7	215.8		5952.4	1941	1090.5	207.8	73.6	20.5	1392.4
1903	8211.6	1617.3	710.8		10539.6	1942	1021.4	186.1	89.4	11.8	1308.7
1904	6968.9	1377.9	60.6		8407.4	1943	3134.6	375.2	209.3	18.3	3737.3
1905	10335.6	172.0	67.8		10575.4	1944	1802.7	274.3	99.0	11.8	2187.9
1906	12604.5	546.6	33.5		13184.7	1945	1263.5	351.3	129.0	17.9	1761.6
1907	5770.7	387.2	31.3	10.4	6199.5	1946	2960.7	472.6	77.2	18.0	3528.5
1908	4694.1	566.9	76.2	31.5	5368.7	1947	1610.7	400.4	156.2	44.4	2211.6
1909	3375.2	691.2	146.6	50.6	4263.6	1948	1626.9	364.3	111.3	45.6	2148.1
1910	2510.9	352.5	137.7	93.6	3094.6	1949	1828.2	306.2	104.5	16.3	2255.2
1911	2906.0	308.4	140.4	13.1	3367.8	1950	1159.8	315.6	101.5	38.4	1615.3
1912	2874.3	506.2	136.5	5.0	3522.0	1951	1026.9	267.1	120.0	20.6	1434.6
1913	5207.7	472.2	100.2		5780.1	1952	1539.2	456.0	164.2	12.7	2172.0
1914	6306.2	386.9	92.2		6785.3	1953	2305.2	395.7	104.5	16.7	2822.2
1915	6216.0	305.2	74.5		6596.2	1954	955.4	238.8	44.0	21.1	1259.3
1916	1691.1	174.2	21.8	1.8	1888.8	1955	1130.9	177.1	19.6	6.4	1333.9
1917	2963.4	296.2	105.8	2.3	3367.7	1956	2075.7	223.9	39.5	14.8	2353.9
1918	966.0	135.7	34.4	10.1	1146.2	1957	803.0	115.4	19.0	7.3	944.6
1919	1668.6	157.5	54.3	6.5	1887.0	1958	611.1	103.5	5.9	3.8	724.3
1920	3130.5	188.2	192.8	22.8	3534.4	1959	779.9	98.7	7.0	101.1	986.7
1921	1835.6	123.8	38.2	2.4	1999.9	1960	1249.4	35.3	11.4	73.9	1370.0
1922	976.8	131.3	75.6	11.9	1195.6	1961	1485.3	93.9	7.4	77.3	1663.8
1923	1193.4	82.5	25.6	18.3	1319.7	1962	673.5	31.4	7.4	13.9	726.3
1924	1499.1	147.0	15.2	3.2	1664.4	1963	343.1	36.0	7.4	5.3	391.7
1925	882.0	74.1	29.1	9.3	994.5	1964	330.9	14.0	2.6	185.3	532.8
1926	956.9	72.2	22.0	61.2	1112.2	1965	74.6	20.1	0.6	0.8	96.0
1927	2737.7	44.7	0.2	0.1	2782.6	1966	4.5	0.2	0.3	0.1	5.1
1928	3395.4	106.6	18.0	3.1	3523.2	1967	201.9	18.2	0.2	0.6	220.9
1929	1470.2	206.5	22.5	8.0	1707.2	1968	57.6	2.5	0.0	0.2	60.3
1930	2122.2	127.7	19.2	1.4	2270.5	1969	278.6	2.5	0.2	42.9	324.2
1931	1768.1	200.1	42.7	5.2	2016.1	1970	0.2	0.0	0.0	2.3	2.5
1932	2095.4	63.4	25.5	3.0	2187.2	1971	0.0	0.0	0.0	0.0	0.0
1933	2382.9	128.9	54.9	10.3	2577.1	1972	0.2	0.0	0.0	96.9	97.1
1934	1043.7	61.2	22.8	7.2	1134.9						



**Table 6.** Recovered information on the number of active traps and catches in number, by commercial category, of bluefin tuna by the Portuguese tuna traps from 1896 to 1972, during the inward (May-June) and outward (July-August) seasons.

BFT Season: Inward (direito)						BFT Season: Outward (revés)					
Year	Atum >90 kg	Atuarro (50-90 kg)	Albacora (30-50 kg)	Cachorreta (<30kg)	Nb Traps	Year	Atum >90 kg	Atuarro (50-90 kg)	Albacora (30-50 kg)	Cachorreta (<30kg)	Nb Traps
1896	18688	4794	1315		14	1896	33313	4305	46		7
1897	22883	3996	2953		15	1897	43923	6043	380		9
1898	30638	5287	8177		17	1898	25931	3253	323		11
1899	21575	4393	1118		17	1899	37042	10004	1652		9
1900	9779	2783	1766		15	1900	33253	10329	2541		8
1901	27661	5324	1439		16	1901	13583	6738	2902		8
1902	7899	4513	2357		16	1902	20780	15983	3039		9
1903	13848	6556	4834		17	1903	40896	16548	12935		12
1904	25553	11751	1098		15	1904	20906	7933	418		12
1905	21420	4957	1609	893	15	1905	47484	4117	119		10
1906	26628	3001	319		14	1906	57402	4808	519		9
1907	19333	4808	599	374	14	1907	19138	723	184	145	8
1908	14311	5465	1176	195	14	1908	16983	1125	500	23	9
1909	9347	4345	3036	2489	15	1909	13154	5529	629	42	9
1910	10099	2521	3126	4629	13	1910	6640	2514	316	51	7
1911	5969	2123	1675	656	12	1911	13404	2282	1834		7
1912	7174	3634	2371	198	12	1912	11988	3597	1042	50	6
1913	8829	2194	2655	2343	12	1913	25889	3272	502	56	6
1914	25797	2417	1252	1999	13	1914	16244	3138	1082	799	5
1915	17234	3096	1258		14	1915	14383	310	162	8	7
1916	5165	1628	317	115	13	1916	5683	1031	209	145	6
1917	7272	2163	521	989	13	1917	11098	1759	1847	223	6
1918	1757	518	462	209	12	1918	4480	1303	557	1979	5
1919	3220	588	200	771	11	1919	7457	1816	884	264	5
1920	6637	714	723	695	10	1920	13238	1953	3817	106	5
1921	3838	917	538	116	9	1921	7020	818	345	21	8
1922	2522	1714	1108	506	8	1922	3387	490	264	302	5
1923	904	665	445	777	8	1923	6939	604	222	121	5
1924	4947	964	350	7765	8	1924	3265	1104	85	51	5
1925	3889	540	378	518	8	1925	1029	519	67	3	6
1926	2598	831	502	4181	8	1926	3294	357	63	0	5
1927	12913	1069	44	18	7	1927	2352	136	19	2	5
1928	9109	955	307	133	7	1928	11774	546	90	98	6
1929	3322	1317	379	501	7	1929	5480	1257	173	84	4
1930	5584	702	380	166	7	1930	7344	1130	170	3	4
1931	7399	1922	859	221	5	1931	4388	898	66	78	4
1932	5655	627	436	132	5	1932	8314	278	202	17	4
1933	9468	1135	820	260	5	1933	3931	424	194	42	4
1934	2759	389	329	82	5	1934	4199	329	349	279	4
1935	2393	1296	593	147	5	1935	3837	523	220	17	4
1936	7680	2059	1292	281	5	1936	8157	2733	410	52	4
1937	8752	1756	3439	236	5	1937	23104	2217	1629	142	4
1938	4995	2907	3089	719	5	1938	1836	310	252	10	4
1939	3333	2225	1377	189	5	1939	1287	682	178		4
1940	3041	1432	2624	413	5	1940	1158	542	757	39	4
1941	4931	2429	1537	983	5	1941	2339	540	302	43	5
1942	3882	1837	1868	270	5	1942	2927	822	368	319	4
1943	9842	2932	3503	323	5	1943	11055	2428	1730	590	4
1944	9436	2854	1868	221	5	1944	2524	1004	543	371	4
1945	4751	3552	2759	542	5	1945	3584	1426	434	283	4
1946	3905	1858	1256	631	5	1946	15833	4894	674	267	4
1947	3142	1944	1825	243	5	1947	7596	3776	2079	1975	4
1948	4423	3131	1580	566	5	1948	6423	2073	1202	1714	4
1949	4294	2942	2160	732	5	1949	7894	1432	453	84	4
1950	3124	2453	1500	240	5	1950	4608	2056	1037	1681	4
1951	4145	2653	2231	455	5	1951	2701	1163	768	574	4
1952	4345	3102	2368	74	5	1952	5916	3412	1737	559	4
1953	3830	2859	1308	130	5	1953	11538	2794	1305	707	4
1954	1755	1580	559	640	5	1954	4614	1831	542	417	5
1955	2822	798	202	45	5	1955	4717	1732	288	273	4
1956	2566	1186	609	555	5	1956	11272	2013	379	183	5
1957	1684	813	256	193	5	1957	3669	835	219	173	4
1958	3236	1269	89	181	5	1958	838	209	58	11	4
1959	1977	798	119	118	5	1959	3222	612	57	4936	4
1960	5058	332	245	42	5	1960	3271	172	41	3655	4
1961	4629	1011	118	114	5	1961	5273	330	66	26	4
1962	2970	371	175	29	5	1962	1445	78	11	666	4
1963	1416	454	169	4	5	1963	871	60	15	260	4
1964	519	144	46	53	5	1964	1687	56	19	9211	4
1965	250	187	6	4	5	1965	217	97	8	36	4
1966					3	1966	30	3	8	3	3
1967	313	110	1	27	3	1967	1033	150	3	5	2
1968	105	7	1		2	1968	279	28		8	2
1969	32	5		30	2	1969	1825	31	4	2116	2
1970					2	1970	1			117	2
1971						1971					1
1972						1972	1			4846	1

**Table 7.** Tuna traps and years for which daily catches in number of bluefin tunas, by commercial category and corresponding weights, were recovered.

Year	Trap									
	Abobora		Barril		Cabo Stª Maria		Medo das Cascas		Srª do Livramento	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
1958							861	15430		
1959							5592	90199		
1960							2092	65449		
1961					1765		2578	86483		
1962	666	97548	1011	150023	1626	217185	731	100513	675	90921
1963	429	56676	729	91784	719	105268	640	70064	513	67701
1964	4479	42849	1967	124649	167	23187	2764	113522	2059	94677
1965	89	10327	263	34229	109	11494	261	30198	77	10518
1966			1807	39607			1024	91367	273	22503
1967							1179	165532	95	12887
1968							213	35286		
1969							6251	326334		
1970	39	5827					452	13854		
1971							1	8		
1972							4847	11547		
Total	5702	213227	5777	440292	4386	357134	29486	1215786	3692	299207

**Table 8.** Monthly mean weights for 3 commercial categories of bluefin tuna caught in the traps of southern Portugal.

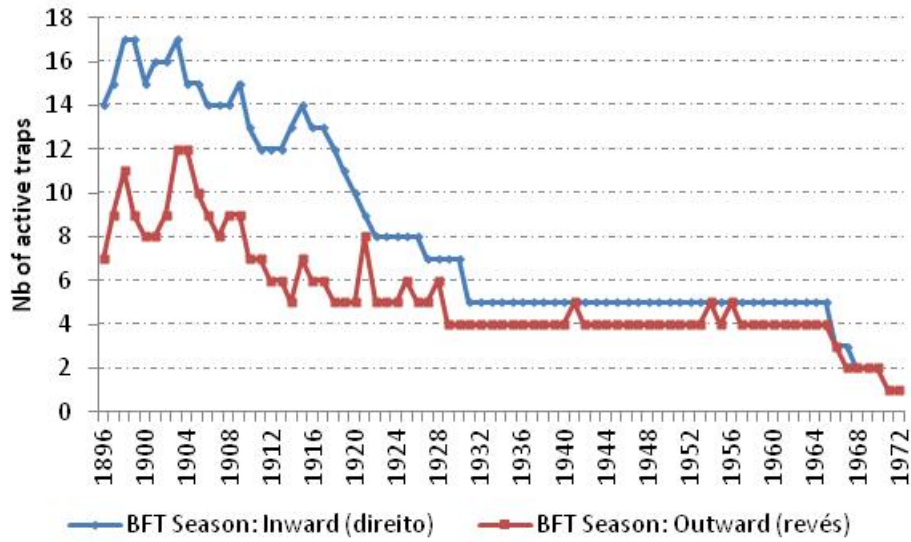
BFT Category: CC5 (atum: >= 90 kg)						
Year	Month					Total
	5	6	7	8	9	
1958	141.3	121.0	148.2	162.8		148.1
1959	194.0	133.0	156.3	139.8		152.0
1960	134.3	127.4	122.6	118.5		127.4
1961	156.0	142.9	141.2	120.8		140.1
1962	145.0	150.0	146.1	142.9		146.5
1963	165.1	151.3	157.2	139.2	175.0	154.4
1964	167.6	166.4	171.1	170.5		169.5
1965	172.6	146.1	153.6	175.5		158.2
1966	137.0	137.6	155.6	157.9		149.8
1967	149.4	163.5	149.0	153.8		152.2
1968	123.0	173.3	150.5			158.8
1969		150.5	178.6	166.9	157.0	171.5
1970	380.0	137.4	154.8	120.8		147.7
1972			176.0			176.0
Total	156.3	149.8	159.0	154.0	169.0	155.2

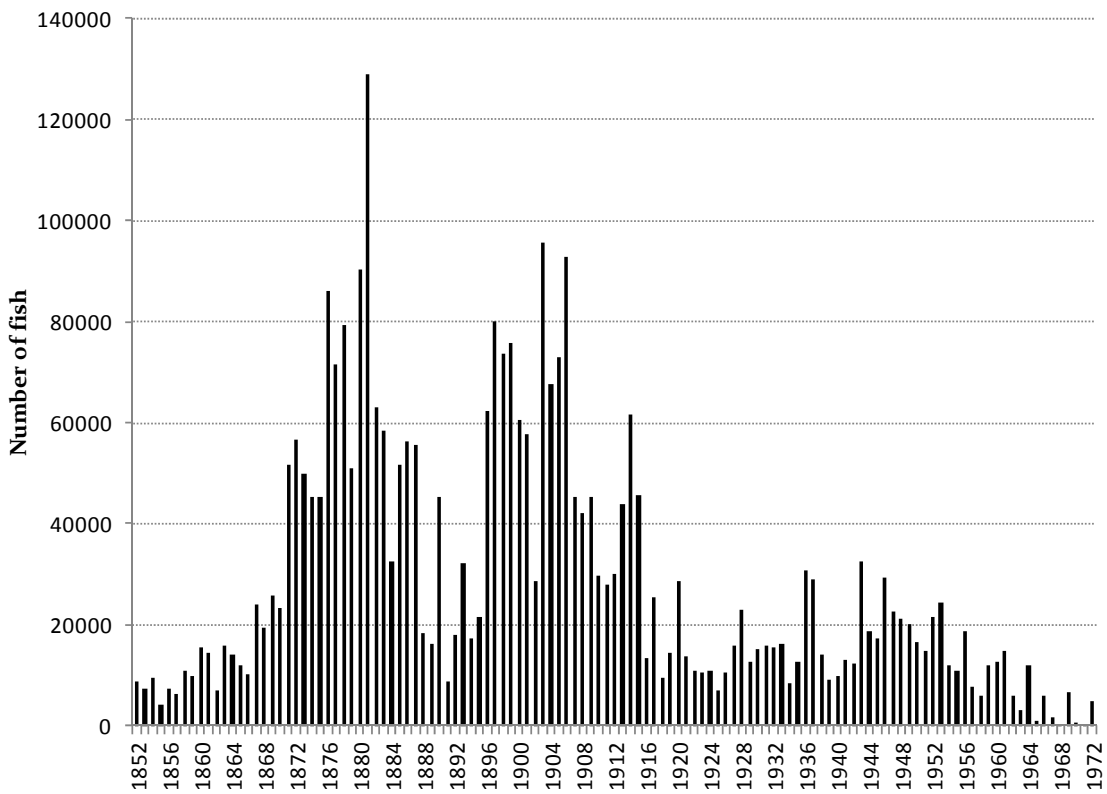
BFT Category: CC4 (atuarro: 50>= X < 90 kg)						
Year	Month					Total
	5	6	7	8	9	
1958		80.0	87.0	94.0	85.8	89.1
1959		88.0	72.5	79.3	71.4	76.2
1960		69.3	74.0	78.3	79.7	75.2
1961		65.0	65.2	61.2	66.2	64.3
1962		72.1	60.0	63.6	73.8	68.4
1963		65.3	63.5	69.3	68.3	65.7
1964	53.0	69.0	62.7	72.0	71.0	68.1
1965		71.0	75.3	71.2	66.3	71.7
1966		71.0	64.2	68.2	73.6	67.9
1967		69.5	71.6	72.5	74.6	71.7
1968			73.0	83.5		77.2
1969			69.0	57.0	69.7	66.6
1970			72.5	82.2		79.4
Total	53.0	69.9	67.9	71.4	71.5	70.2

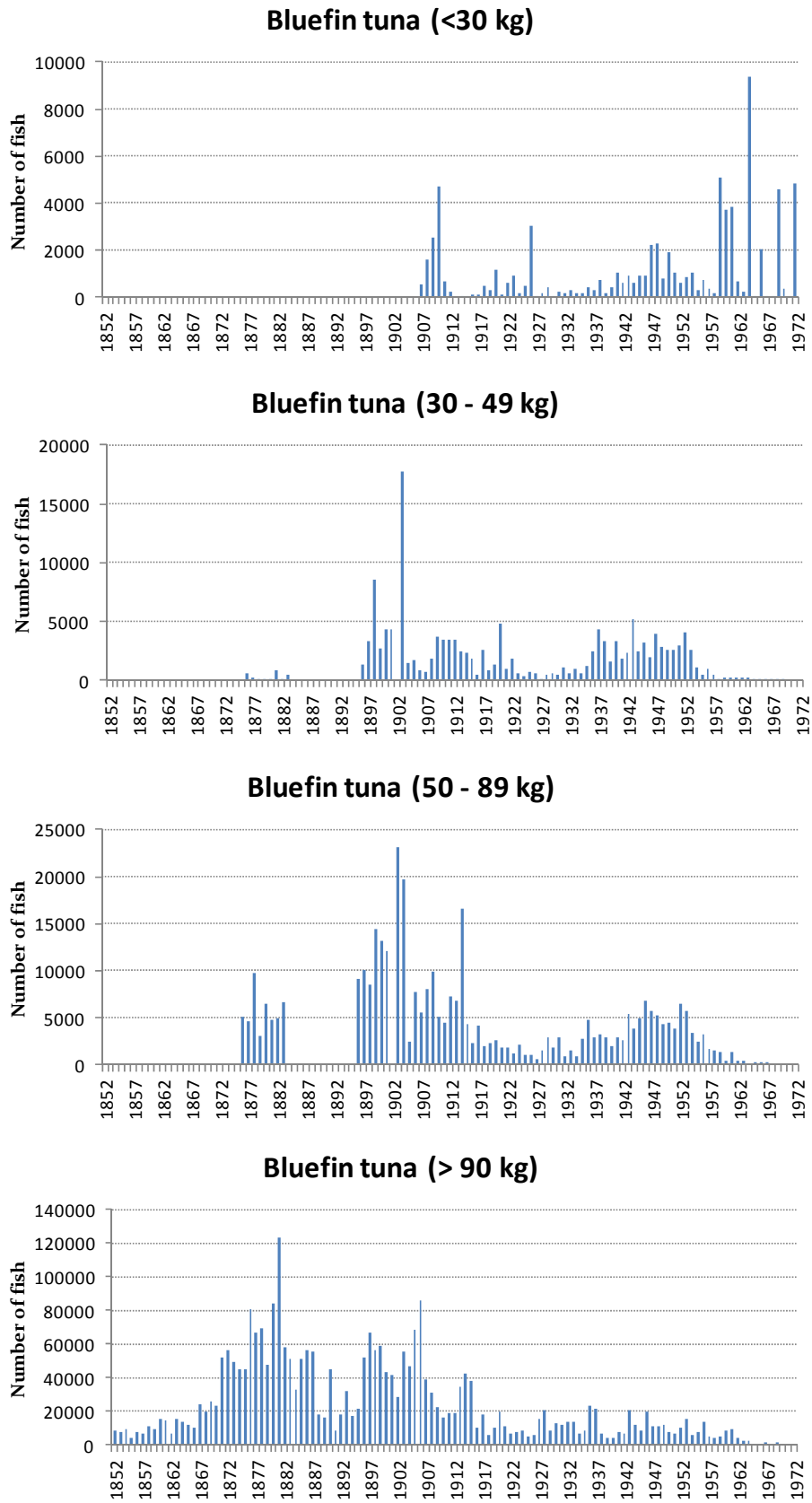
BFT Category: CC3 (albacora: 30>= X < 50 kg)						
Year	Month					Total
	5	6	7	8	9	
1958			53.0	56.0		54.0
1959	51.0	34.7	45.0	41.8		41.8
1960	46.3	47.5	52.3			48.9
1961	41.0	47.0	58.0			45.8
1962	41.7	38.8				40.6
1963	42.4	39.2	48.0	31.0		39.8
1964	40.0	40.5	44.4			42.4
1965	42.0	38.0		41.5		41.0
1966	45.0	46.8	42.3	42.0		44.4
1967		49.0				49.0
1968	30.0					30.0
Total	42.8	41.7	47.4	41.1		43.2



**Figure 1.** Number of tuna traps active in Algarve, by fishing season, from 1896 to 1972.

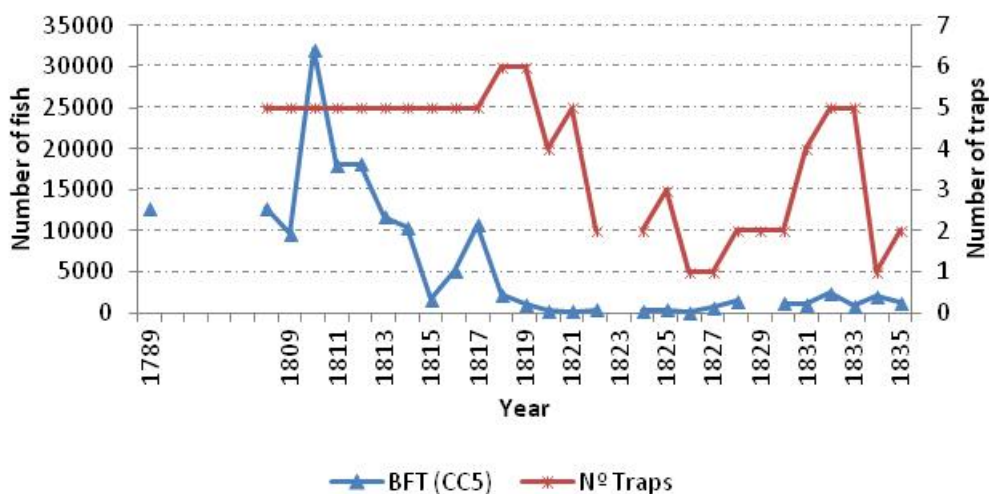


**Figure 2.** Recovered information on the number of bluefin tuna caught in the southern Portugal (Algarve) traps, from 1852 to 1972 (limited number of traps before 1896).

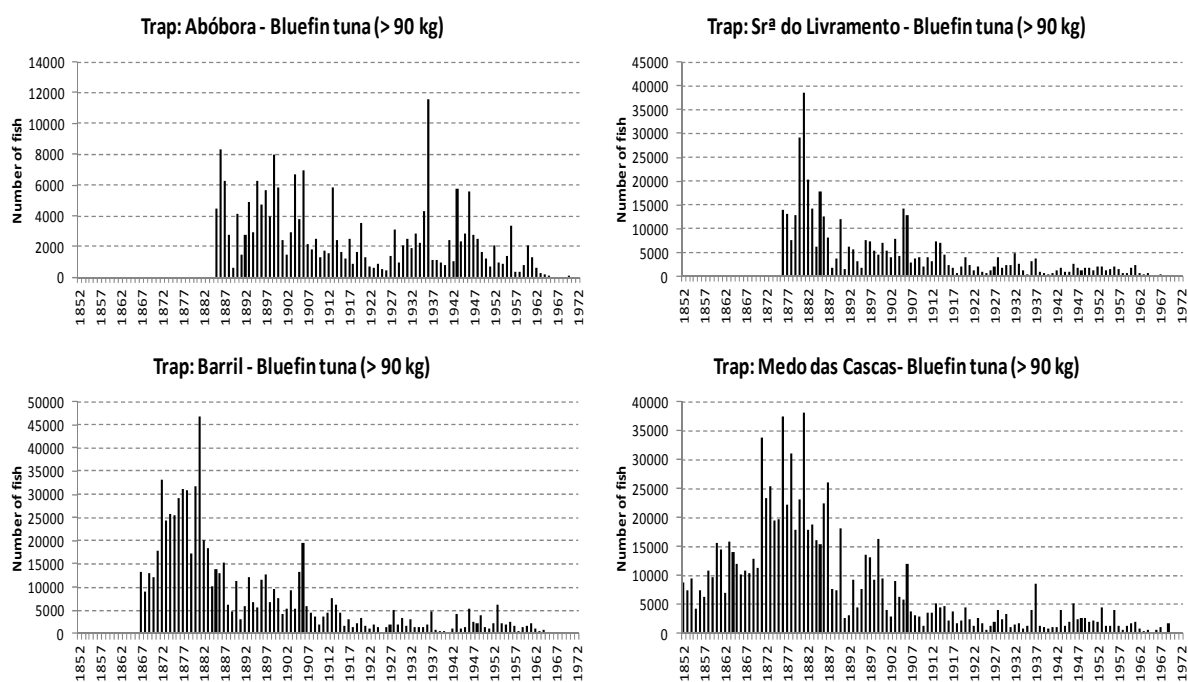


**Figure 3.** Recovered annual catches of bluefin tuna in the southern Portugal (Algarve) traps, from 1896 to 1972, in number of fish by size categories (limited number of traps before 1896).

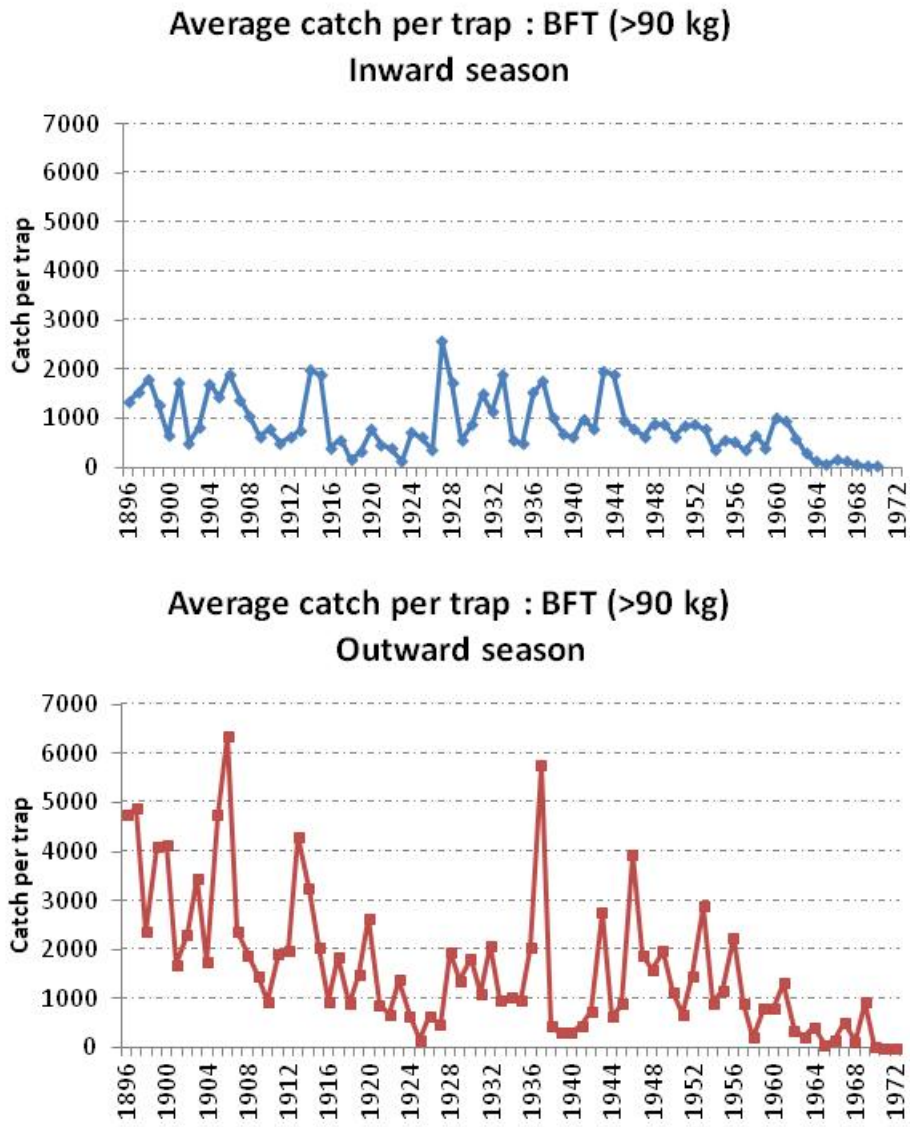
### BFT catches (Lagos traps)



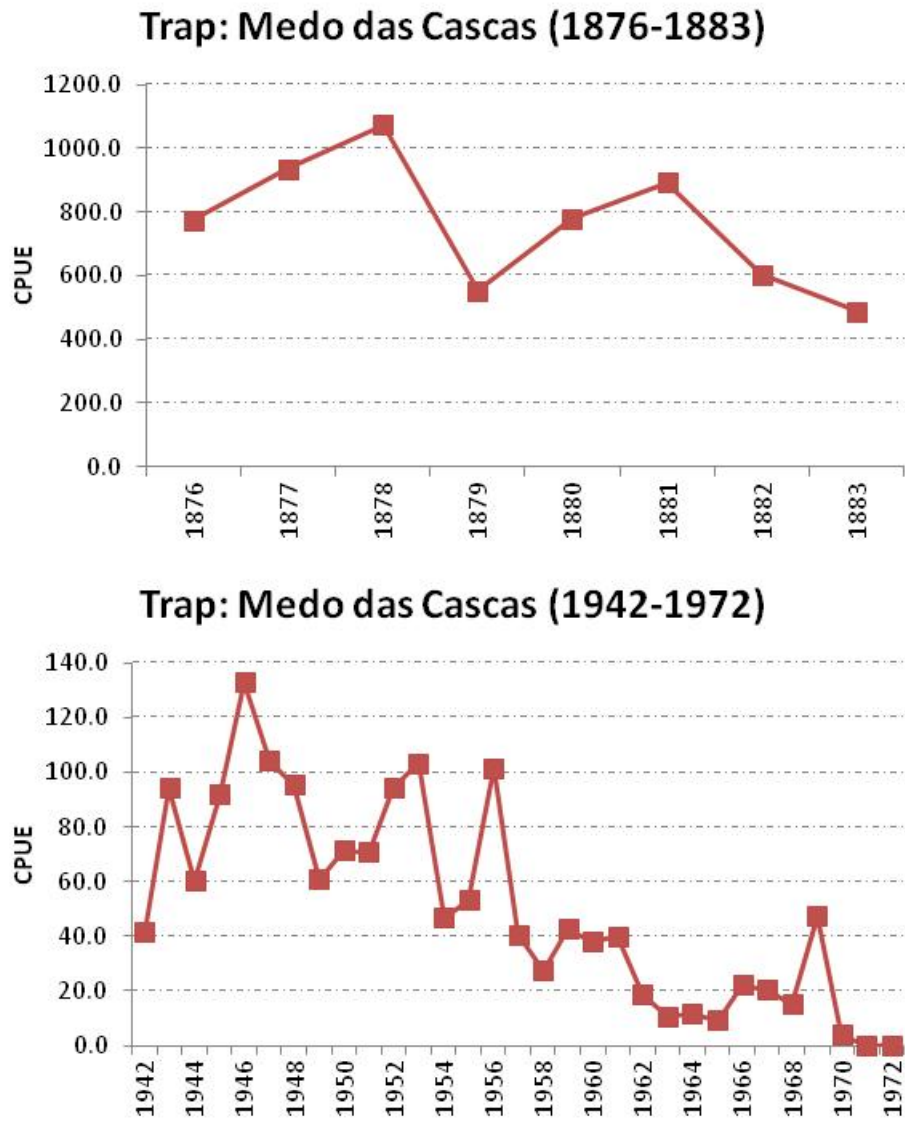
**Figure 4.** Annual catches of large bluefin tuna (CC5:>90 kg) and number of active traps in area of Lagos (Algarve), in 1789 and from 1808 to 1835.



**Figure 5.** Annual catches of large bluefin tuna (>90 kg) at 4 traps in south Portugal (Algarve)

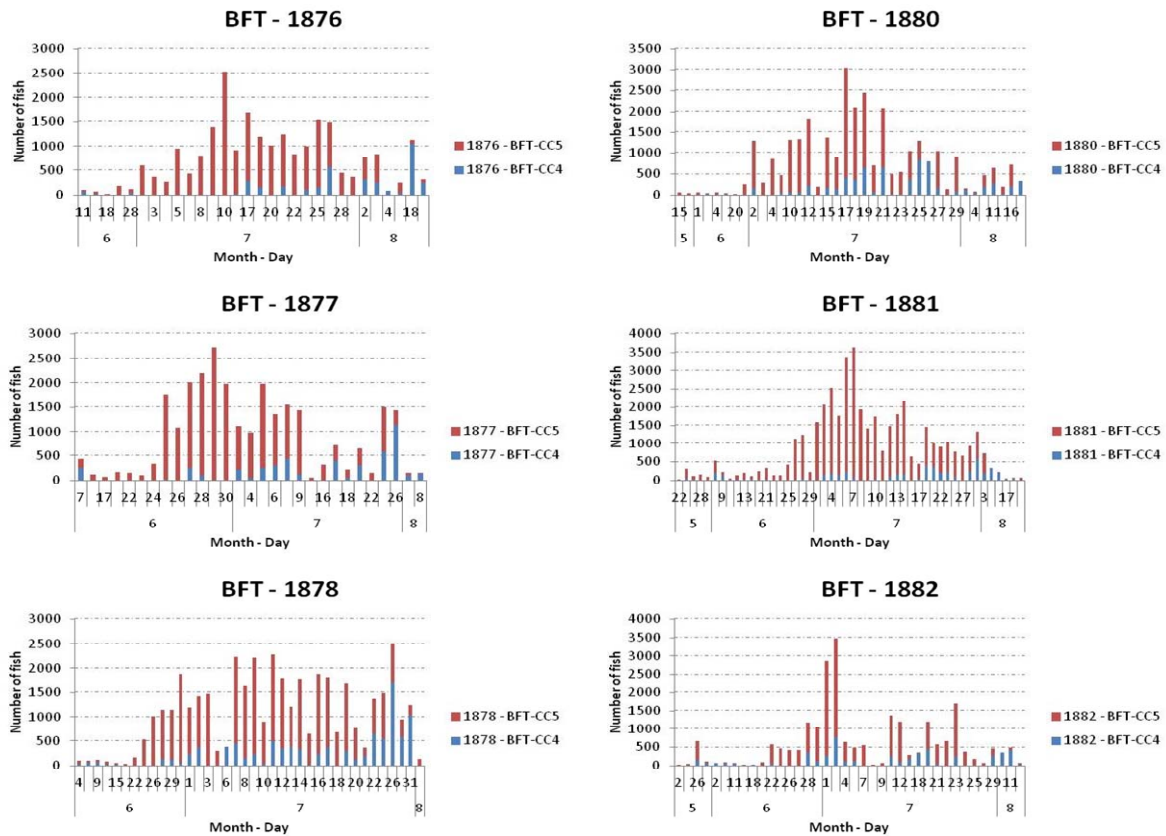


**Figure 6.** Average catch of large Bluefin tuna (>90 kg) per trap during the two fishing seasons, from 1896 to 1972.

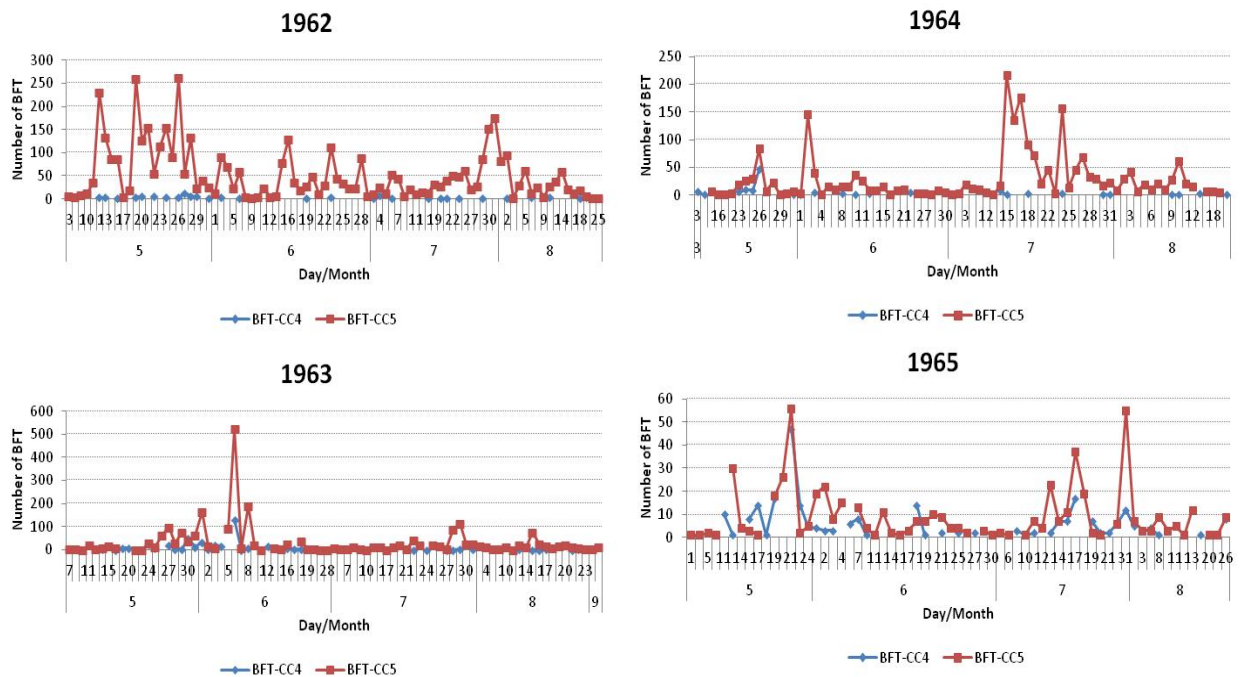


**Figure 7.** Nominal CPUE of large bluefin tuna (>90 kg) caught at “Medo das Cascas” trap, in two periods, 1876-1883 and 1942-1972. (Nominal CPUE: number of bluefin tuna/number of fishing operations)





**Figure 8.** Daily catches of bluefin tuna (in number of fish), of 2 commercial categories (CC5: atum > 90 kg; CC4: atuarro: >50 < 90 kg), from 1876 to 1882, at Medo das Cascas trap.



**Figure 9.** Daily catches of bluefin tuna (in number of fish), of 2 commercial categories (CC5: atum > 90 kg; CC4: atuarro: >50 < 90 kg), from 1962 to 1965 in 5 Portuguese tuna traps.

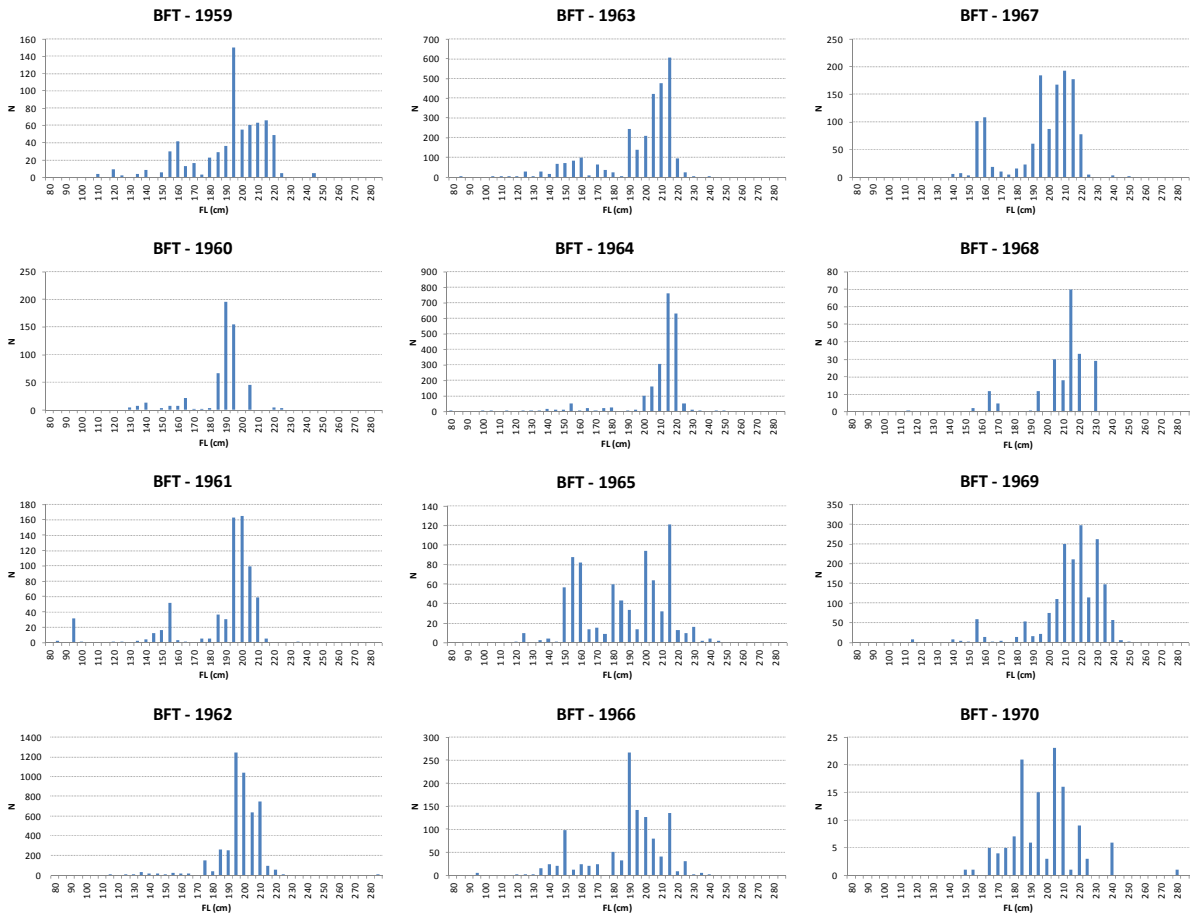


Figure 10. Size frequencies of bluefin tuna (> 10 kg) caught in the Portuguese traps from 1959 to 1970.

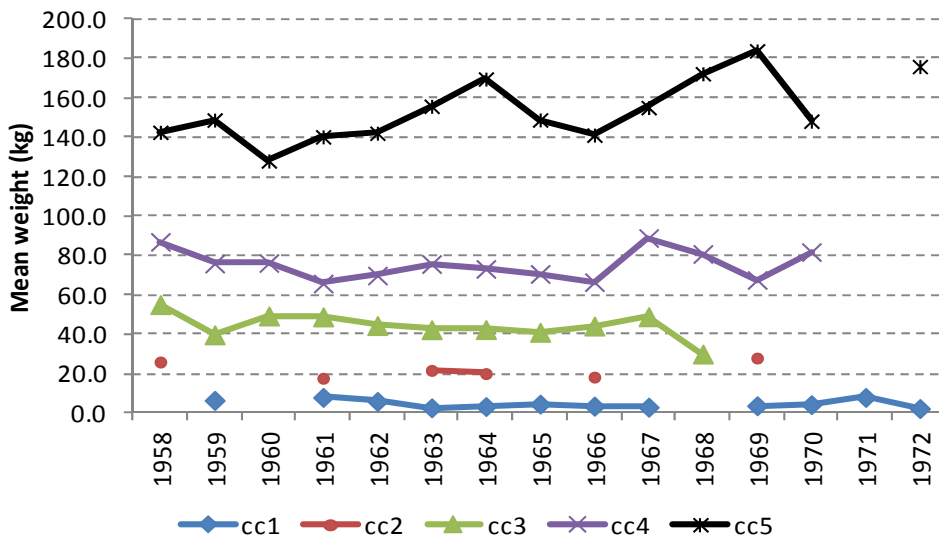


Figure 11. Bluefin annual mean weight, by commercial category, in the Portuguese traps from 1958 to 1972 (CC5 - > 90 kg; CC4 - 50>= X < 90 kg; CC3 - 30>= X < 50 kg; CC2 - 10>= X < 30 kg; CC1 - < 10 kg).