



*9<sup>th</sup> Meeting of the  
International Scientific Committee  
for Tuna and Tuna-Like Species in the North Pacific Ocean  
Kaohsiung, Taiwan  
July 15-20, 2009*

## **National Report of Mexico<sup>1</sup>**

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**July 2009**

# **International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean**

## **MEXICAN PROGRESS REPORT TO THE 9th ISC (Kaohsiung, Taiwan )**

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## INTRODUCTION

Mexico has been participating since the first meeting of the ISC and in 2004 Mexico joined this organization formally at its 4<sup>TH</sup> annual reunion in Honolulu, Hawaii, U.S.A. During those years Mexico has been reporting fishery statistics to ISC. Before joining the ISC, and until the present, Mexican fishery statistics have been provided on a regionally basis to the Inter American Tropical Tuna Commission (IATTC) and also shared with other international fisheries management bodies to which Mexico is a fully cooperating Party.

This national progress report describes now the recent trends of the Mexican tuna fishery for the yellowfin, bluefin and albacore tunas and also for the swordfish and billfishes. In this new report, the fisheries statistics previously presented for these species are updated and new information is provided.

## FISHERIES AND CATCHES

In Mexico, the National Institute of Aquaculture and Fisheries (Instituto Nacional de Acuicultura y Pesca, INAPESCA, Formerly INP), was created more that forty years ago to systematically conduct scientific work and fisheries research with the marine resources of Mexico. The INAPESCA is responsible for provide the scientific bases for the management advice to the fisheries authorities in México and poses along its coastal states, in both, Pacific and Gulf O Mexico, 14 regional fisheries centers (CRIPS) which are the centers and laboratories in charge with the recognition, data collecting, sampling and monitoring of the main fisheries and aquaculture activities on a regional scale. Since 1992, the INAPESCA incorporated to this effort, the work of the National Tuna-Dolphin Program (Programa Nacional de Aprovechamiento del Atún y Protección del Delfin, PNAAPD), which closely monitored and study the tuna fishery of its purse seine and longline national fleets. The data here reported is based on the combined efforts from these different and unified groups.

In this region the Mexican fleet concentrates mainly in the yellowfin (Thunnus albacares), which is the prime target tuna species. The Mexican tuna purse seine fishery is one of the largest in the (ETP) since the mid 1980's, although recently it has been displaced to second considering all catches of tunas. This tropical tuna represents for its large volumes the main component in the total catches. Other tuna species which are also caught, but contrastingly in lower proportions are: the skipjack, (Katsuwonus pelamis), the bigeye (Thunnus obesus), the black skipjack (Euthynnus lineatus) and more recently, in northerly zones of the Mexican EEZ, the bluefin (Thunnus orientalis) which is targeted and the albacore (Thunnus alalunga).

Fishing operations of the Mexican purse seine fishery comprise a vast area in the EPO, (figure 1).

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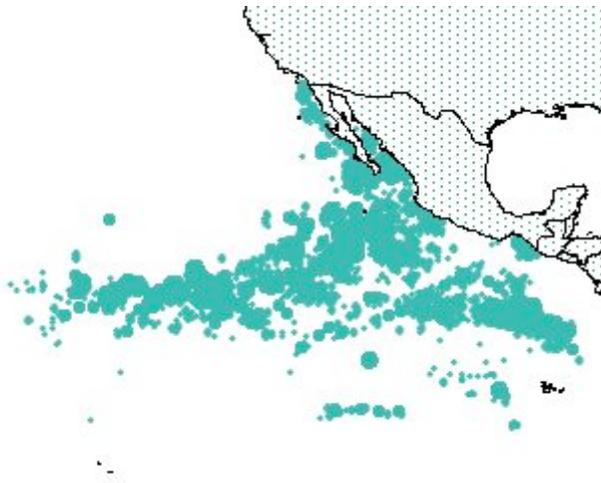


Figure 1. Fishing grounds of the Mexican purse seine fishery.

The recorded levels of tuna captures in the ETP zone by the Mexican fleet from 1980 till 2008 are shown in figure 2.

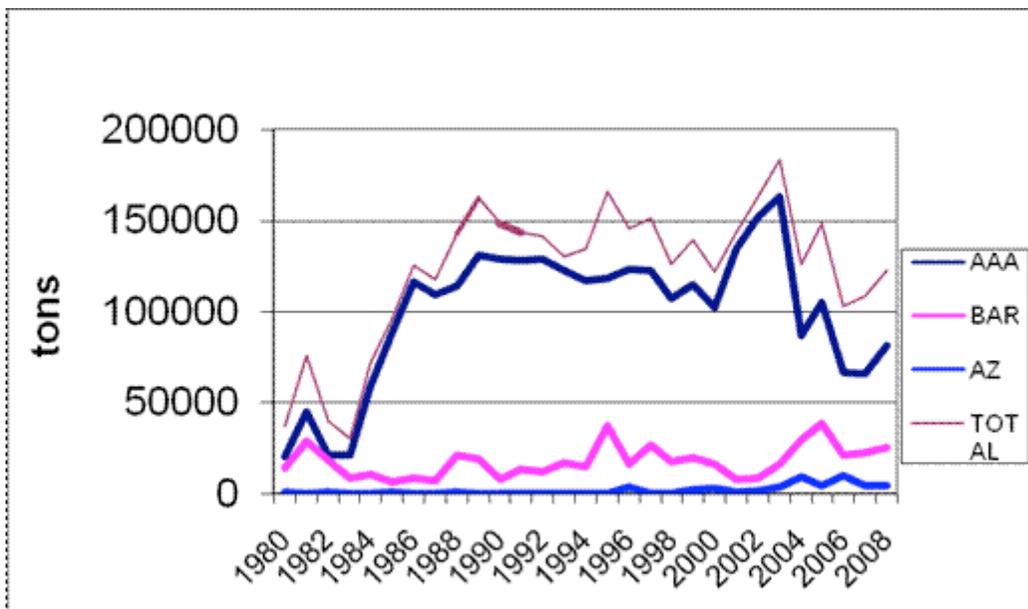


Figure 2. Mexican tuna catch of yellowfin tuna (YFT), skipjack (SKJ) and bluefin tuna (BFT), 1980-2008.

The total tuna landings of Mexico in 2003 were 183199 mt. Value which represents the highest historic record for this fishery and more than a (10 %) increase from the attained level of the year before, in which a total catch of 164048 mt. was reported. Comparatively, the lowest recorded capture in this fishery during recent years was in the 2006 season, with only 102472 mt., value which is closer to the 1980's development phase. During the last year catches of

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yellowfin tuna continue the same lower trend but a slight increase was observed in 2008 and higher catches of yellowfin are expected for 2009. The fleet has compensated partially its catches with skipjack.

These high consistent reported catches are the result of the combination of the fishing experience and performance of the fleet as well as the effect of high recruitments in previous years and are not related with any significant increase in the fishing effort or a greater expansion of its carrying capacity during the corresponding years. Lower catches in 2006 and 2007 are probably related to a decrease in population levels of yellowfin tuna (lower recruitment) and excessive catches of juvenile tunas in coastal areas in the EPO.

The purse seine fleet is subdivided by size in large purse seine vessels, most of them with observers on board all tuna fishing trips and a small quantity of pole and line vessels (Table I). The whole fleet is quite stable in number, composition and carrying capacity since the 1990's.

Yellowfin tuna always has been the primary catch, and skipjack is always second in volume. Other tuna species have high values because the fleet has compensated lower yellowfin catches with other tunas, basically black skipjack but a slight increase is related also with bluefin tuna catches. (Table 2). This tabled information reflects the great importance of the yellowfin tuna in the Mexican catches and the secondary level of all the other tuna species in the total catches obtained by this fleet in the ETP.

**Table I. Total landings, size, composition and carrying capacity of the active Mexican tuna fleet 2007 and 2008**

<b>YEAR</b>	<b>No. of active tuna boats</b>	<b>No. of large PSeiners &gt; 800 m3</b>	<b>No. of m PSeiners &gt; 400 &lt;800 m3</b>	<b>No. of PSeiners &lt; 400 m3</b>	<b>No. of active Bait Boats</b>	<b>Total Carrying Capacity of the Fleet m3</b>
<b>2007</b>	<b>62</b>	<b>40</b>	<b>10</b>	<b>8</b>	<b>4</b>	<b>58239</b>
<b>2008</b>	<b>55</b>	<b>37</b>	<b>7</b>	<b>7</b>	<b>4</b>	<b>53300</b>

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**Table 2. Total tuna landings and the proportions of the different tuna species in the Mexican fishery from 2005-2008**

<b>YEAR</b>	<b>TOTAL LANDINGS All tuna species (mt.)</b>	<b>Yellowfin (mt)</b>	<b>Skipjack (MT.)</b>	<b>Others Species (mt.)</b>
<b>2005</b>	<b>152364</b>	<b>113279</b>	<b>32985</b>	<b>6100</b>
<b>2006</b>	<b>102472</b>	<b>68644</b>	<b>18655</b>	<b>15173</b>
<b>2007</b>	<b>108351</b>	<b>65834</b>	<b>21970</b>	<b>20547</b>
<b>2008*</b>	<b>122568</b>	<b>85517</b>	<b>21931</b>	<b>15111</b>

1) Other species are: albacore (*T. alalunga*), bluefin (*T. orientalis*), bigeye (*T. obesus*) and the black skipjack (*Euthynnus lineatus*). \*2008 data is preliminary.

### **Bluefin tuna (T. orientalis)**

All the fishing zones for bluefin tuna used by the Mexican fleet are located in the Northwest side of the Baja California peninsula, inside the ZEE of Mexico (figure 3), closer to the ranching locations. The fishing season usually runs five months, from May to September, which is the time in which the transpacific migration of this stock is closer to the Mexican Pacific coast, due to oceanographic factors. In 2006 the fishing season started earlier, in March. Sea conditions together with the presence of the specie permitted the development of this new fishery predominantly related to ranching activities in the Mexican Northwestern coastal area. Temperature is an important factor defining areas where BFT is to be found.

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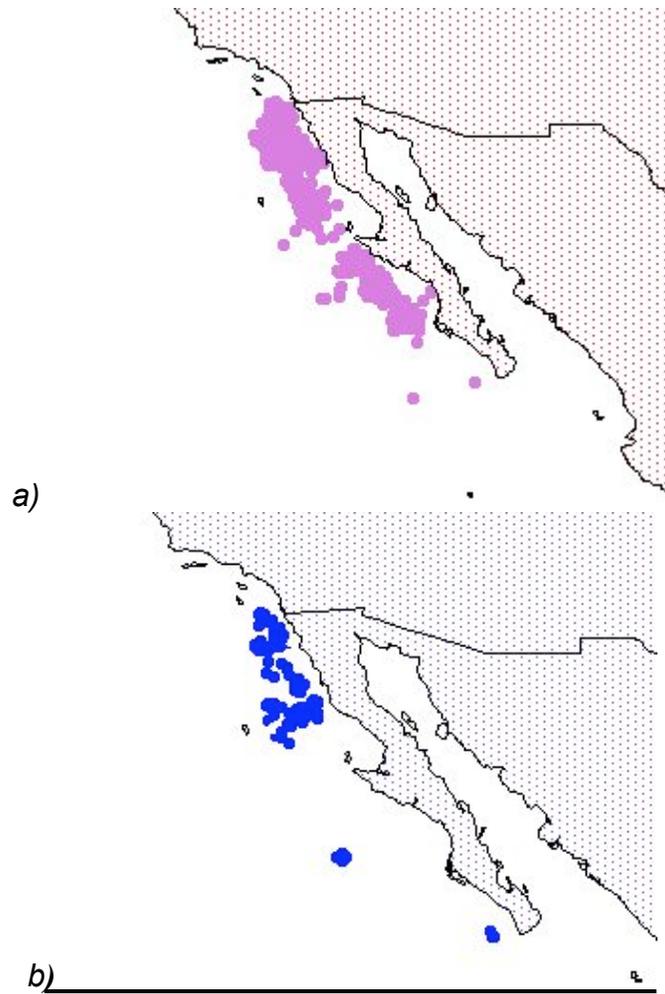


Figure 3. Fishing Zones for bluefin tuna in the Northwest region of Mexico, offshore the Baja California peninsula, a) 1992-2006 and b) during 2008

The time series of bluefin tuna captured by the Mexican tuna purse seine boats from 1995-2007 is presented respectively in Table 3 to see the period related to ranching activities that started in 1996 and fully developed since 1999. In figure 4 a larger time series since 1980 can be seen. This catch represents only a very small proportion of the total tuna caught by the Mexican fleet with an average catch of 3200 mt for the entire period. This represents a small proportion of the Mexican tuna catch, although very valuable. The 3,700 mt. reported in 1996 was the first historic highest record for this fishery and the first year bluefin tuna has been targeted by the fleet. Again, in 2004 and 2006 new records were established for this tuna specie in Mexico. In 2007 the catch returned closer to the average. The catch in the Eastern Pacific nevertheless is below the historic highs observed in the 1960's and 1970's. The information provided makes clear that fishing for bluefin has not being a foremost significant activity in Mexico for many years. It also shows that even in some fishing seasons there were no captures on this stock, or those were only of low levels. Therefore, it is clear that

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fishing bluefin in Mexico was considered only incidental. However, more recently, in the years (1996-to present time) there has been a greater interest devoted to this species, mainly for the ranching activities developed in the Northwest region of Mexico.

**Table 3. Bluefin tuna catch of Mexico, 1995-2008. (\*preliminary)**

<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>10</b>	<b>3700</b>	<b>367</b>	<b>1</b>	<b>2369</b>	<b>3025</b>	<b>863</b>	<b>1708</b>	<b>3211</b>	<b>8880</b>	<b>4542</b>	<b>9806</b>	<b>4147</b>	<b>4398*</b>

The catches of bluefin for ranching are performed only with commercial purse seiners (normally searching for YFT). Some times, the holding nets with the bluefin tunas are transferred to tugboats, which then, make slowly the trip to the enclosures and fattening nets located in the Baja California peninsula.

### **Ranching Activities**

This new tuna fishery component or modality has been the trigger of higher proportional catches of bluefin. In 2005, the catch came down to 4542 from a high pick in 2004, increasing again in 2006 with very low catches this year, again making evident that oceanographic conditions and the eastern distribution of the specie are limiting factors for the Mexican bluefin fishery. Most of the catch is utilized for fattening. In 2005, 2006 an estimated 80% of the catch was transported to the ranching companies and the other 20% went to the Mexican market. In 2007 and 2008 almost all BFT was directed to ranching. This activity represents an economic incentive for the Mexican tuna fishery and has a regional economic impact especially in northwestern Mexico.

The ranching activities are limited in several ways. They depend on the fishing vessels already in the fishery, by the amount of area they have devoted for aquaculture purposes, by law defining in many cases the amount the companies can growth each year, oceanographic conditions and EEZ's.

The Mexican yearly progress reports to ISC from 2004 to 2008 synthesize the history the fishery and ranching activities for bluefin.

### **Management**

All major fisheries are required by law to have developed a Management Plan that pinpoints major characteristics of the fishery, problematic, possible solutions, research needed, data that has to be submitted to the government by the participants in the fishery and management objectives and procedures. In the

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case of the Bluefin tuna fishery, INAPESCA finished and submitted a document to CONAPESCA for review and discussion in order to adjust and approve this plan in order to be operational. Based on Bluefin tuna working group results, INAPESCA own analysis and the ISC plenary advice also the recommendation was given not to increase fishing mortality and to set a catch limit, lower than the 2006 record catch.

### **Albacora (*T. alalunga*)**

The related Mexican information for this fishery has been reported constantly to ISC and IATTC. Catches are limited to a small area in northern Mexico (figure 4), data from 2000-2007 period. Table 4 shows the total catch reported for Mexico.



Figure 4. Albacore fishing ground for the Mexican purse seine fishery.

**Table 4. Mexican albacore tuna catches from 1980-2007. \*2008 data is preliminary**

<b>YEAR</b>	<b>MEXICAN CATCH</b>
<b>1980</b>	<b>31</b>
<b>1981</b>	<b>8</b>
<b>1982</b>	<b>0</b>
<b>1983</b>	<b>0</b>
<b>1984</b>	<b>113</b>
<b>1985</b>	<b>49</b>
<b>1986</b>	<b>3</b>
<b>1987</b>	<b>7</b>
<b>1988</b>	<b>15</b>
<b>1989</b>	<b>2</b>
<b>1990</b>	<b>2</b>

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<b>1991</b>	<b>2</b>
<b>1992</b>	<b>10</b>
<b>1993</b>	<b>11</b>
<b>1994</b>	<b>6</b>
<b>1995</b>	<b>5</b>
<b>1996</b>	<b>21</b>
<b>1997</b>	<b>53</b>
<b>1998</b>	<b>8</b>
<b>1999</b>	<b>57</b>
<b>2000</b>	<b>103</b>
<b>2001</b>	<b>23</b>
<b>2002</b>	<b>28</b>
<b>2003</b>	<b>28</b>
<b>2004</b>	<b>104</b>
<b>2005</b>	<b>0</b>
<b>2006</b>	<b>109</b>
<b>2007</b>	<b>40</b>
<b>2008</b>	<b>10*</b>

Besides this, the Sport Fishing Association of California also cooperated gently with information of their annual catches of albacore by their commercial passenger fishing fleet operating under permits in Mexican north Pacific zones. This represents a valuable piece of new information which is provided in this report for the first time. Their records however are reported as the number of fish caught by year and not by weight (figure 5 and table 5). This catch is not monitored by Mexico, since they depart and return to a US port.

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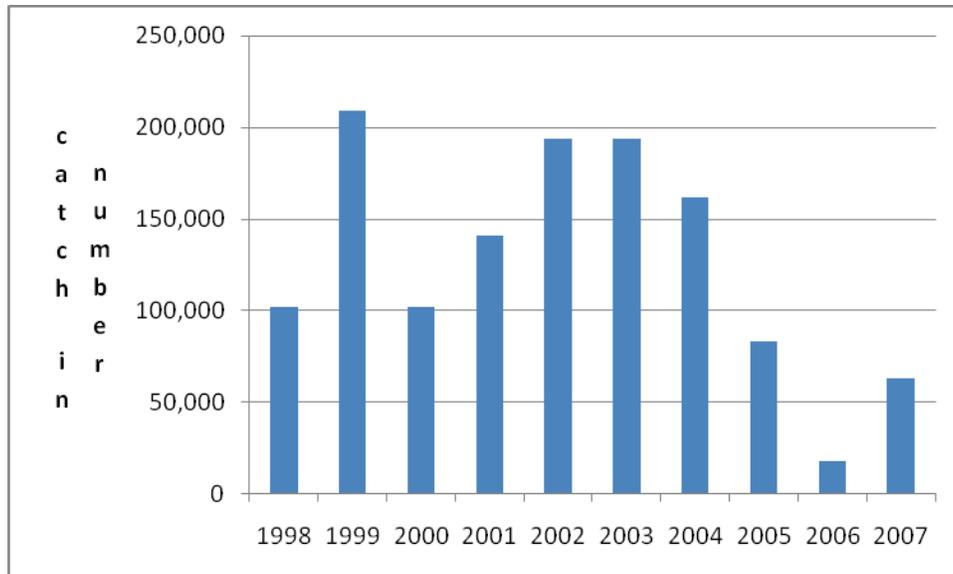


Figure 5. Albacore catch (number of fish) by the US sport fishery in Mexico

### **Swordfish (Xiphias gladius)**

The development of the swordfish fishery in Mexico has two different historical periods. One started in 1964, using long liners, the second began in 1986, with some gillnets. The fleet nowadays operates seasonally, principally in the Autumn and Winter along the western coast of the Baja California peninsula, between the 21° 30' N and 32° 20' N. They fish from September-October to February. Captures decline after that period and is very scarce in the hot summer months of July and August. The greater fishing effort is concentrated in two areas in the western coast of the Baja California peninsula, between the latitudes 21° 30'N and 32° 20'N. One is south of Punta Eugenia to the 23°N and the other fishing zone, from the 30° parallel, to the northern limit of the Mexican ZEE (Sosa et. al. 1992; Castro, et. al. 1995). The operational zone is restricted to an area outside the 50 miles protected region for the sport fisheries operations from the entire Mexican pacific coast line (Fig. 6).

The commercial swordfish fishery it has been regulated in Mexican waters by an administrative regulation (NOM-017-PESC-1994) which mandates that logbooks should be submitted by the fleet to the fishery agency in Mexico, (CONAPESCA). Besides this, it has been closely monitored from 1998 till 2000 by special trained observers of the Programa Nacional de Aprovechamiento del Atún y Protección a los Delfines, (Mexican Tuna-Dolphin Program-PNAAPD). They worked during those years aboard the long liners and the gillnet ships, which operated outside the 50 miles protected zone decreed for the sport fisheries operations. In 2007 and in the current 2008, an observer program was directed to the long line shark

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fisheries and the observers aboard has been taken information on incidental captures of sword fishes during those operations.

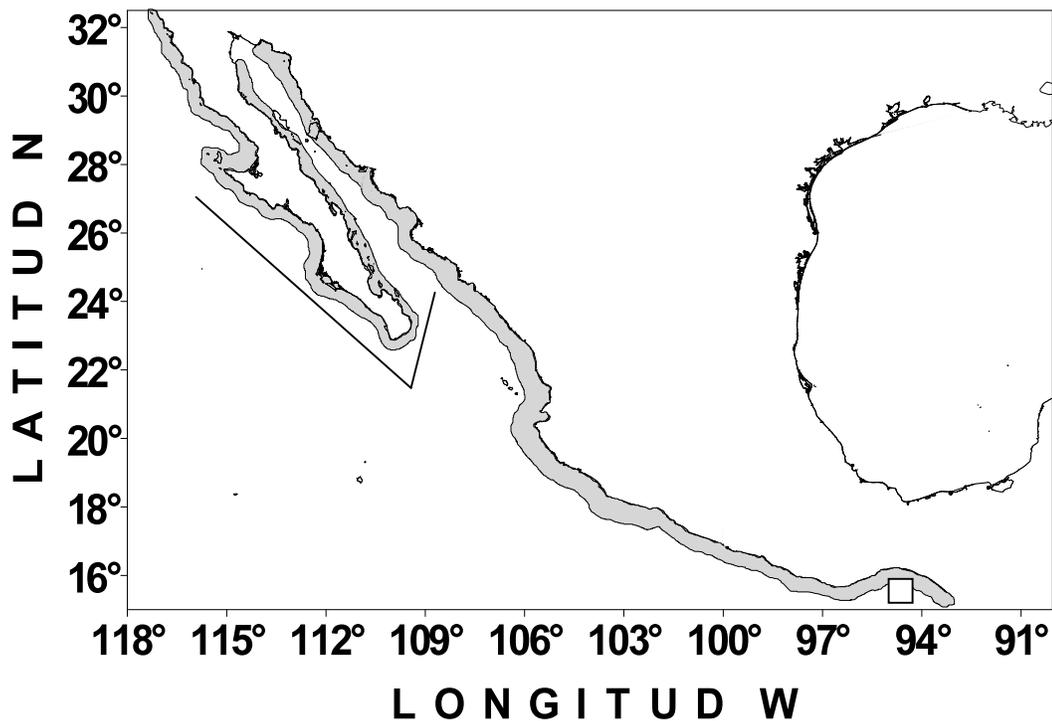


Figure 6. Sport fisheries restricted to an area outside the 50 miles in the entire Mexican pacific coast line.

In 1992 the swordfish fleet was integrated by 27 boats. From those, only 24 were active fishing boats. In 1995, the fleet reduced its size to 22 fishing ships, number which did not changed for many years. More recently, in 2006, 29 boats fished in the Mexican Pacific catching different species during the year, including in some months the swordfish. The growth in numbers of the ships is explained because some of them have also permits for different species, (multiple fisheries), pending on the availability of the fish species by seasons. Therefore, not all cached swordfish. In 2007 17 boats were only actively reported in the fishery, 13 were long liners and 4 with gillnets. Its size ranged from 15.9 to 24 mts, (Table 5).

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Their operative distributions by gear type are presented respectively in Figs 7 and 8.

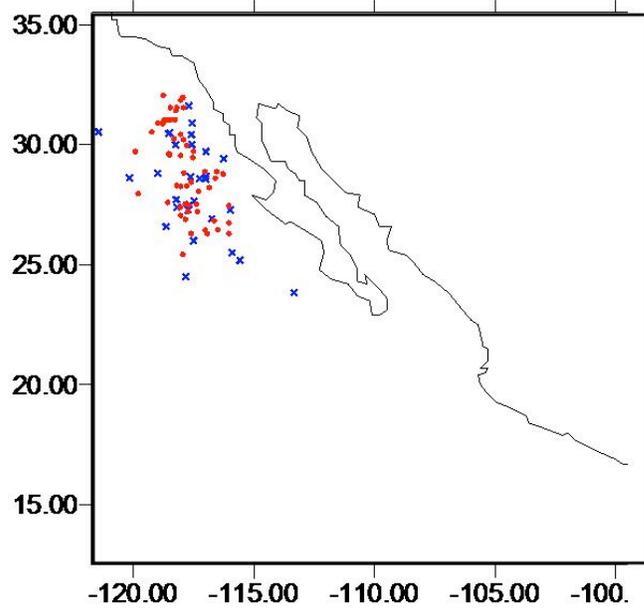


Figure 7. Geographic distribution of the long liners fishing trips during 2006-2007. (Notes: red is 2006 and blue is 2007)

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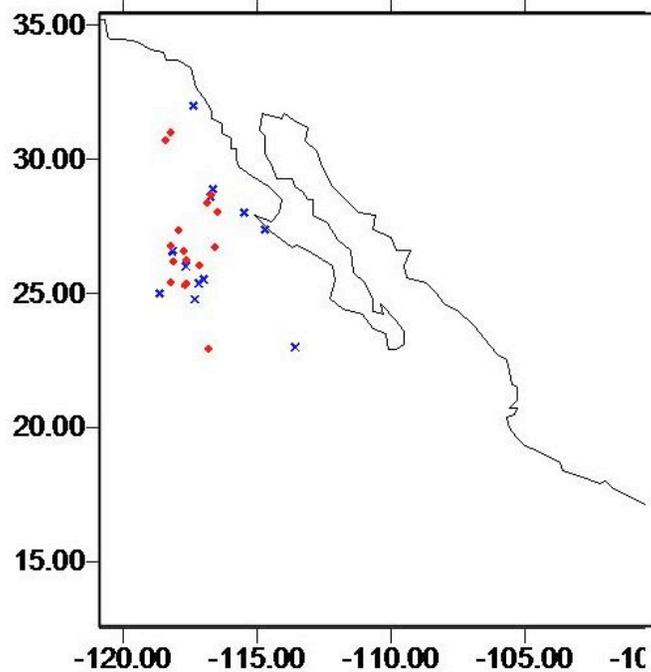


Figure 8. Geographic distribution of the gillnets fishing trips during 2006-2007. (Notes: red is 2006 and blue is 2007)

**TABLE 5. LIST AND CHARACTERISTICS OF THE CURRENT MEXICAN SWORD FISH FISHING BOATS BASED IN ENSENADA, BAJA CALIFORNIA**

SHIP	SIZE (MTS)	GEAR
CONQUISTADOR II	17.9	LONG LINER
CHRIS	24	LONG LINER
EL VETERANO	24	LONG LINER
EL VENCEDOR	20	LONG LINER
PUNTA ABREOJOS II	22	LONG LINER
THOR	20	LONG LINER
FANTASMA DEL MAR	17.8	LONG LINER
YUMANO	22	LONG LINER
PROGRESO I	22.6	LONG LINER
GUERRERO DEL MAR	22.9	LONG LINER
EL MORO	17.9	LONG LINER
PUNTA ABREOJOS III	18.2	LONG LINER
ILEANA	21.9	LONG LINER
CORINA DEL MAR	15.9	GILLNET
ISLA DE TODOS	15.9	GILLNET
SAN JACINTO	20.5	GILLNET
VICTORIA EUGENIA	17.8	GILLNET

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### Swordfish Catches (Category I Data):

The main ports used by this fishery are: Ensenada in the northern part of the peninsula, Other alternative ports used for the landings are: San Carlos in the southern region of the peninsula and Mazatlán, across the Gulf of California, on the mainland Mexico, although the captures in these southern regions are less significant. Captures of the sword fish in the recreational fishery is not to significant at the present time with an average of 41 fish per year.

The historic record of the swordfish fishery of the Mexican fleet is presented in figure 9 and table 6. These indicate three different pick periods. The first in 1981 yielded 1, 575t. This catches later declined till 1985. Later an increment was observed reaching 2, 650t in 1990. After that, an other decline was observed again obtaining 428t. The next pick was in 1998 with 3, 603t, which is the historic highest record. In 2003 a little increment was obtained with 671t. During 2004 and 2005 the captures have been around 300t for the Ensenada fleet and 347 in 2006 as a reflection of the increased number of fishing ships. In 2007 again a lower level was reported with only 250t. The variation is attributed to the changes in the two fishery methods described above and also a reflection of the fishing effort pending on the availability of the resource in the fishing areas and also the price in the markets and the fact that the fleet has permits for other resources.

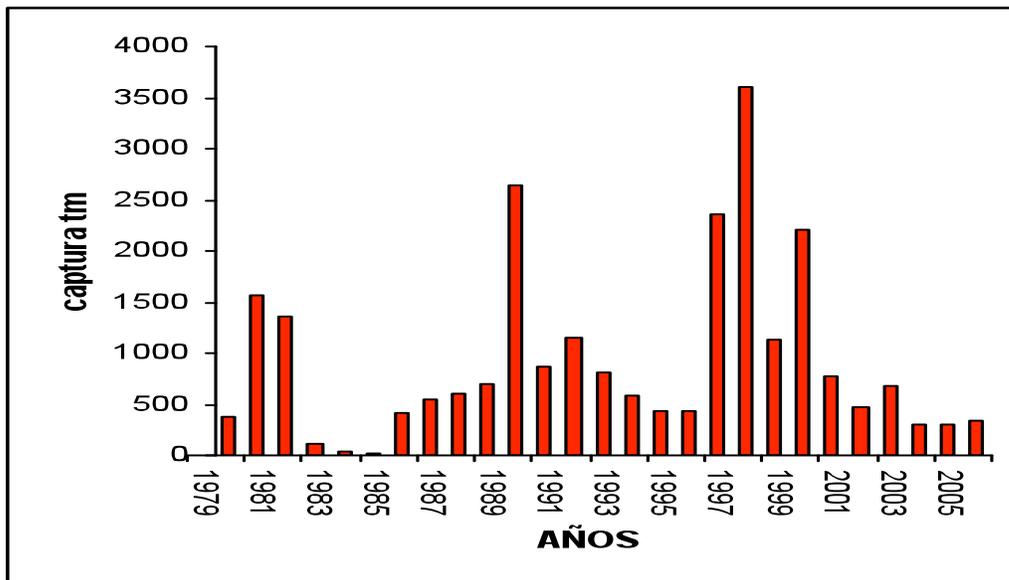


Figure 9. Catches of sword fish from 1979-2007 (Sources FAO, INAPESCA- CONAPESCA- PNAAPD-México).

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## CPUE

In the Eastern Tropical Pacific (ETP), the swordfish shows since 1965 a stable CPUE and it is estimated that it can sustain an annual yield of 2,800t (Bartoo and Coan, 1989; Joseph, 1981). Still there is no model which reflects the condition of the swordfish stock in the entire Pacific Ocean. The Japanese data from the long liners indicates that the stock is subjected to a low catch rate and that there are still possibilities of increasing its harvest. Therefore, the data collection process for this exercise is a mandatory as identified by the SWOWG of ISC and México is contributing for this effort with the available information.

## Long Liners Data

During the period 1998-2000, time in which the PNAAPD observers program operated aboard the long liner fleet, it was found that the biggest average rate of captures was obtained using 700 hooks by long liner. This number of hooks yielded 24 fishes/1000 hooks. However, the use of 800-900 hooks at that time predominant in the fleet, yielded only 17 or 12 fish/1,000 hokes respectively.

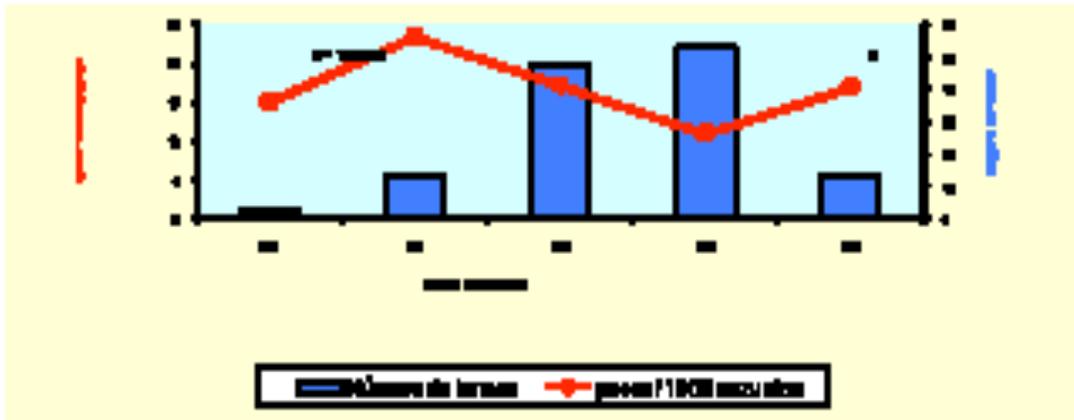


Figure.10. Number of sets, hooks and catches of sword fish/1000hookes (Data from 1998-2000 PNAAPD).

Data of 2006 and 2007 was collected in the main landing port of Ensenada described before. In 2006 there were 544 sets with yielded 150t of sword fish with a CPUE estimated of 341Kg/1000 hooks and an fishing effort of 480, 000 hooks.

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Preliminary data till September 2007 indicated 318 sets, with a CPUE of 100kg/1000 hooks and an fishing effort of 280, 000 hooks. Here the data from winter still is in process (figure 11).

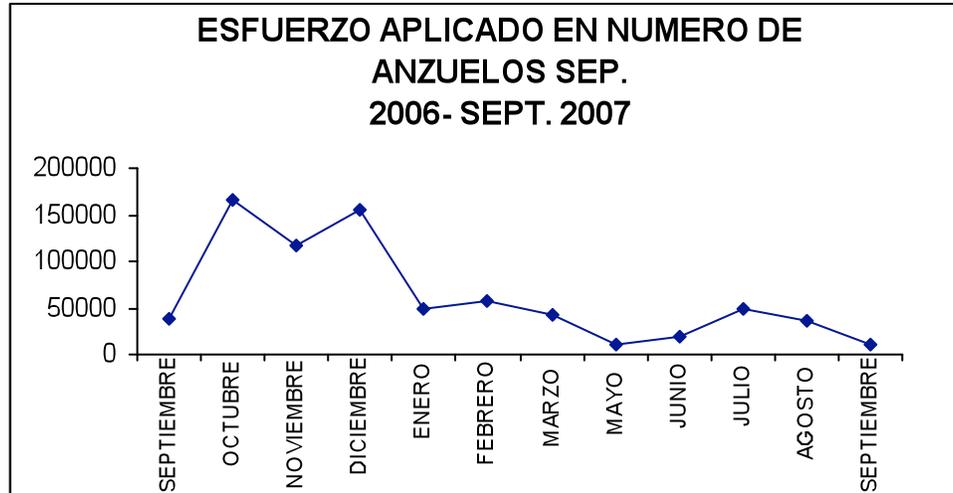


Figure 11. Fishing effort expressed as the number of hooks deployed in 2006 and 2007 by the Mexican long liner sword fish fleet

### Gill Net Data

In 2006 and 2007 they were only four boats actively fishing sword fish with gill nets in Mexican waters. Their sizes ranged from 15.9 to 20.5 mts (Table 5). These boats produced respectively during 2006 195 sets, yielding a capture of 65t of sword fish. This represents 20% of the total captures of sword fish in Mexican waters that year. Comparatively in 2007, (data only from January till September) a total of 154 sets with 26t of sword fish.

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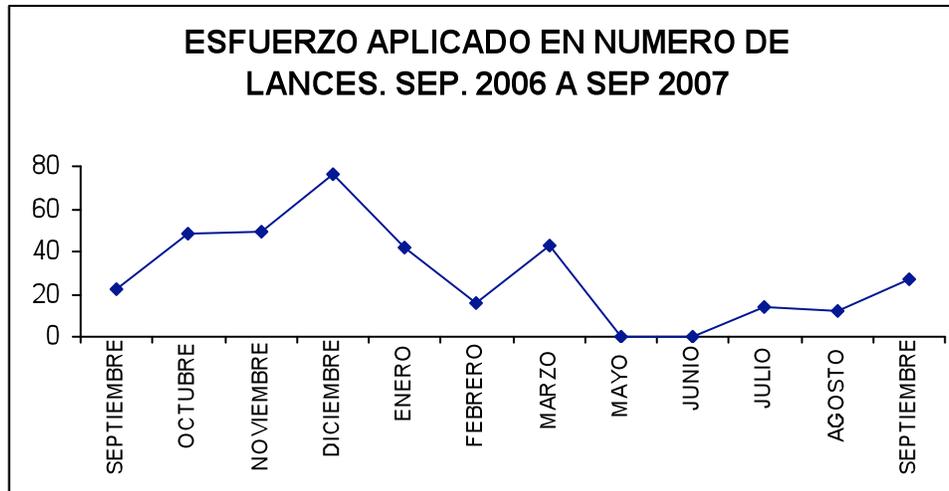


Figure 12. Effort as number of sets in the gill net sword fish fishery in Mexican waters during 2006 and part of 2007.

### Catch Composition

Sosa et al., 1992 reports preliminary information of the gillnet fishery from México. He mentions that the catches are composed by 88% of sharks species, several other commercial species, like the sun fish and tunas and being the swordfish only the 12 % of the total. The INAPESCA reviewed the long line fishery data from the observers from the PNAAPD and found that among the shark, the blue shark was the (61%) of the reported captures. The swordfish represented (19%) and the complementary (20%) was formed by other 10 fish species, encompassing the dolphin fish, yellow fin tuna and other shark species. In both studies, the sharks were without doubt, the dominant species caught, followed by the swordfish which has a comparative greater percentage in the long line fishery

The data from 2006 and 2007 confirms the previous information showing that sharks are still the main species captured by the long liners and the gill net fleet in Baja California. From those the blue shark with 63% still is again the more abundant, followed by the sword fish with 23 % of the captures and 3% of mako sharks. Other pelagic fish species combined yielded the other 11%. (figure 13).

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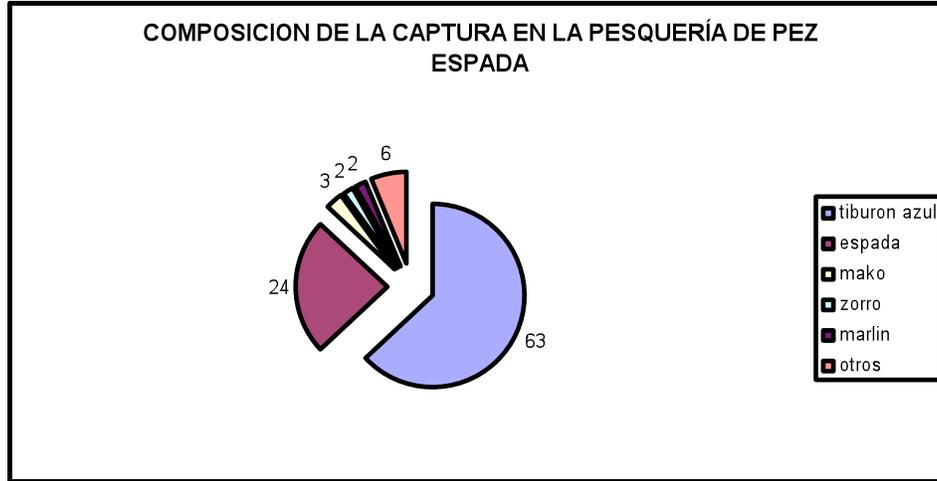


Figure 13. Catch composition of large pelagics in the Mexican sword fish fishery (Data from 2006, 2007)

**Table 6. Historic records of the Mexican swordfish fishery from 1979-2007. (Data sources from FAO- INAPESCA-CONAPESCA-PNAAPD-México).**

YEARS	FAO and CONAPESCA Metric Tones
1979	7
1980	380
1981*	1575
1982	1365
1983	120
1984	47
1985	18
1986	422
1987	550
1988	613
1989	690
1990*	2650
1991	861
1992	1160
1993	812
1994	581
1995	437
1996	439
1997	2365
1998**	3603
1999	1136
2000	2216

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2001	780
2002	465
2003	671
2004	270.1
2005	234.5
2006	347.2
2007***	250

Notes:

\*High picks

\*\*High Historic record

\*\*\* Preliminary

### **Billfishes in Mexican Waters:**

Six species of billfishes are recorded commonly in the Mexican Pacific waters. Given their relative abundances, the most important is by large the marlin (Tetrapturus audax). The other three marlin species which are present although in very small numbers are: the blue (Makaira nigricans), the black (M. indica) and the short bill spearfish (T. angustirostris). Besides these, the sail fish (Istiophorus platypterus), and the swordfish (Xiphias gladius) are also the other two billfishes species distributed in the Pacific side of México. As explained before, from those billfishes species found in México, only the swordfish is currently subject in some degree to some commercial catches and all the others are reserved totally for the recreational fisheries.

The sport fisheries activities along the Mexican Pacific coast are developed and concentrated in a specific designated fishing zone, which extends parallel to the Mexican Pacific coast, up to 50 nautical miles (nm) from the shore line. This area was officially established in 1983, as a reserve zone only for the recreational fishing activities, excluding the commercial catches (Diario Oficial, 1983). Later in 1987, for their relative importance, two other zones were established to complement the exclusion zones for the commercial operations. One is around the coast and tip of the state of Baja California Sur and the other, off the Gulf of Tehuantepec in the South of México (figure14).

Along this extensive sport fishing area the marlin catches are basically concentrated mainly in three places. These sites are located on both sides of the entrance of the Gulf of California. The two more important, in terms of the numbers of fish caught by year are: Cabo San Lucas and Buenavista, in the state of Baja California Sur (B.C.S), which are located at the tip of the Baja California peninsula. Undoubtedly, they constitute the prime sport fishing locations for billfishes on the whole Pacific coast of Mexico, accounting for almost 90% of the total billfishes caught every year. The corresponding 10% is from the other location, placed across the Gulf of California, at the mainland Mexico, in the port of Mazatlán, Sinaloa.

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As explained above, besides the regulations with exempt the billfishes species present in Mexican waters for commercial fisheries operations since 1983. In 1995, the sport fisheries activities were ruled also by a specific new norm (NOM-017-Pesc-1994; D.O.F. 9/05/95). In our previous Mexican Progress reports presented to ISC, or those other contributions directly reported to the Marlin WG, such as: Ulloa, Fleischer, Dreyfus y Vaca (2004); Dreyfus, Fleischer, Robles y Ulloa (2005); Fleischer (2005); Fleischer, Dreyfus, Robles y Ulloa, (2006), Dreyfus, Fleischer, Klett , Ulloa y Robles, (2007), Dreyfus. Fleischer, Ulloa y Robles. (2008), we complemented the history of the billfishes management and regulations existing in Mexico.

Marlin species are also in some degree subject to incidental catches in some Mexican long line fishery and by the gillnets operations directed to sharks and the swordfish. Recently the Mexican Government issued the NOM-029-Pesc-2007, directed to regulated the shark fishery and therefore, to prevent further the by catch problem with these and other non-target species. At the present, there is still no reliable information on the incidental catches for the marlins derived from these two national commercial fisheries acting in the Mexican Pacific waters. However, as reported before, Macías-Zamora (1992) and Macías-Zamora, Vidaurri-Sotelo and Santana Hernández (1994) reported some reliable information related with the sail fish incidental catch in Mexican fisheries.

The swordfish, which is the only commercially targeted billfish, is also taken incidentally by the recreational fishery directed to the marlin species, although this occurs in very low numbers. Here some data on the low level catches of this species are presented confirming the low level of incidentally which occurs in the sport fishing activities in Mexico.

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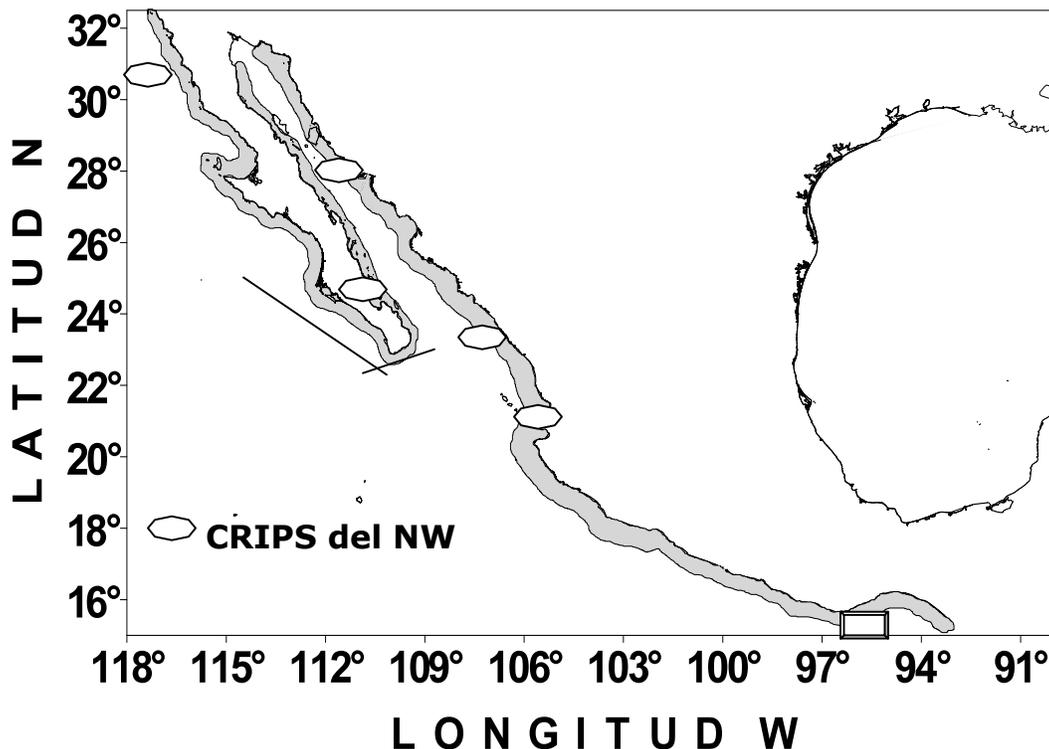


Figure 14. Exclusive sport fishery zone of 50 nm miles from the coast, location of the two additional billfish protection zones in the Mexican Pacific and geographical position of the CRIPS-INAPESCA from the NW.

As reported in previous contributions, all the sport fishing trips are required by Mexican law to carry logbooks and specific forms, (NOM-017-Pesc-1994;D.O.F 9/05/95). Besides this, the INAPESCA scientists based at the listed CRIPS, regularly sample the fishing localities, piers, boat ramps, weight stations, and marinas, complementing with their direct observations, the data collection and the different data sources provided by the existing fleets. In contrast, the swordfish, which is the only billfish subjected in México to commercial catches, requires for the nature of its fishery to fill logbooks and special forms which are requested by the Mexican fishing authorities. This separated information is reported after each fishing trip to the local fisheries authorities of the Comisión Nacional de Pesca (CONAPESCA). Therefore, the commercial data here presented was collected by the cooperation of the scientific personal from the regional CRIPS and the fishing authorities from CONAPESCA.

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### **Marlins Total Catch and Catch and Effort (ISC-Categories I and II Data):**

Reported catch are the basis for the analysis used in the INAPESCA-CRIPS for this fisheries. Catch is defined as the number of fish caught. This includes the fish which is hooked and released, as well as, the fish which dies and are retained. The rate of catch/release in the Mexican recreational fishing zones reported by the different fleets combined is high. In 2008 it was reported of 93.5% and for the same year, a value of 75% was monitored directly by the INAPESCA-CRIPS scientists on the different fishing sites routinely surveyed. However, no data is still available at the present on the survival rates of the fish released by the recreational fishery Mexican waters. Recently, Domeier, Dewar and Nasby-Lucas (2003) reported a mortality rate of 26.2 % for the striped marlin caught with recreational fishing tackle used in Magdalena Bay in BCS, a locality which is not traditionally used for this activities. In this report we tabled for the first time, data on catch and release from the sport fishery encompassing the years 1998-2008.

The effort in turn is defined as the number of fishing trips. Therefore, CPUE is the number of fish reported caught per boat per day. The average catch rate here reported (monthly or annual) is the number of fish caught by the number of trips.

Table 7, taken from the CNP-INP, 2004, CNP-INP, 2006 and complemented by the new data from SPFM-CRIP-LA PAZ. It shows the total and average number of sport fishing trips recorded at the three main sport fishing locations in the Mexican Pacific coast from 1990 till 2008. However, the information for the year 2008 is still preliminary, since they are fleets which are still reporting to the SPFM-INAPESCA-CRIP-LA PAZ.

The number of sport fishing trips in the 19 years series presented in Table **xxx**, yielded a total average of 39, 755. From those, 35, 721 or (89.85%) were based at the two Baja California Sur main fishing areas (Los Cabos and Buenavista) and the corresponding, 4, 032 (10. 144%) were in the mainland area, in Mazatlán. This confirms the importance for the sport fishing activities of the two main locations placed at the southern part of Baja California peninsula.

With this data a graph is produced showing a steady increase in the associated effort observed in Los Cabos area since 1995 to the present (figure 15). In comparison, Buenavista and Mazatlán had more stability in their historic number of trips. The total effort associated to this recreational fishery in the region of the mouth of the Gulf of California has increased since 1995 from 25, 307 trips per year to 56, 760 trips in 2005, (CNP-INP, 2004; CNP-INP, 2006 and recent data generated by the (CRIP-LA PAZ).

The data provided in Table 8 presents the corresponding information for all the marlin species caught at the combined three locations in Mexico. It is evident in terms of their relative numbers, the clear dominance of the striped marlin with of the total catches, among the marlin species in the entire area. It is followed by  
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the sail fish, then the blue marlin. For, the black marlin, one of the less abundant billfishes in the Mexican Pacific waters, the average for the entire time series only represented 40 specimens and likewise, only an average of 36 sword fishes have been reported caught in the recreational fisheries in the entire time series presented. This information is also graphed in figure 16.

**Table 7. Total and average number of sport fishing trips at the three main sport fisheries locations at the Mexican Pacific coast: Los Cabos, Buenavista, B.C.S. and Mazatlán, Sin. Mexico, from 1990-2008\*. (Data taken from the CNP-INP, 2004, 2006 and SFMP-CRIP-LA PAZ, \*data from 2008 still is preliminary).**

<b>YEAR</b>	<b>Los Cabos</b>	<b>Buenavista</b>	<b>Mazatlán</b>	<b>Areas Combined</b>
<b>1990</b>	<b>13589</b>	<b>9276</b>	<b>8649</b>	<b>31514</b>
<b>1991</b>	<b>19462</b>	<b>10157</b>	<b>5715</b>	<b>35334</b>
<b>1992</b>	<b>16576</b>	<b>9127</b>	<b>4320</b>	<b>30023</b>
<b>1993</b>	<b>15385</b>	<b>9313</b>	<b>4545</b>	<b>29243</b>
<b>1994</b>	<b>14845</b>	<b>9961</b>	<b>4421</b>	<b>29227</b>
<b>1995</b>	<b>13472</b>	<b>8619</b>	<b>3216</b>	<b>25307</b>
<b>1996</b>	<b>15315</b>	<b>9365</b>	<b>4368</b>	<b>29048</b>
<b>1997</b>	<b>20611</b>	<b>9694</b>	<b>2318</b>	<b>32623</b>
<b>1998</b>	<b>23501</b>	<b>8106</b>	<b>3321</b>	<b>34928</b>
<b>1999</b>	<b>25783</b>	<b>9948</b>	<b>4313</b>	<b>40044</b>
<b>2000</b>	<b>28211</b>	<b>9555</b>	<b>4074</b>	<b>41840</b>
<b>2001</b>	<b>24939</b>	<b>9300</b>	<b>3793</b>	<b>38032</b>
<b>2002</b>	<b>27618</b>	<b>12909</b>	<b>3828</b>	<b>44355</b>
<b>2003</b>	<b>34651</b>	<b>9361</b>	<b>3622</b>	<b>47634</b>
<b>2004</b>	<b>32780</b>	<b>12522</b>	<b>3554</b>	<b>48856</b>
<b>2005</b>	<b>37434</b>	<b>15288</b>	<b>4038</b>	<b>56760</b>
<b>2006</b>	<b>40888</b>	<b>11408</b>	<b>3679</b>	<b>55975</b>
<b>2007</b>	<b>40600</b>	<b>11619</b>	<b>3226</b>	<b>55445</b>
<b>2008*</b>	<b>37467</b>	<b>10073</b>	<b>1618</b>	<b>49158</b>
<b>AVERAGE</b>	<b>25,427</b>	<b>10,294</b>	<b>4,032</b>	<b>39,755</b>

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### Número de Operaciones de Pesca Deportiva

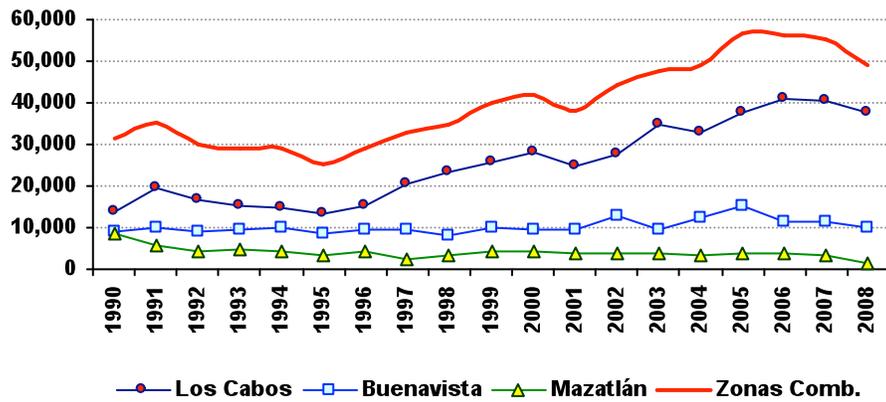


Figure 15. Number of sport fishing trips at the three main locations at the Mexican Pacific coast: Los Cabos, Buenavista, B.C.S. and Mazatlán, Sin. Mexico, from 1990-2008\*. (Data from the CNP-INP, 2004, 2006 and SFMP-CRIP LA PAZ, \* data from 2008 still is preliminary).

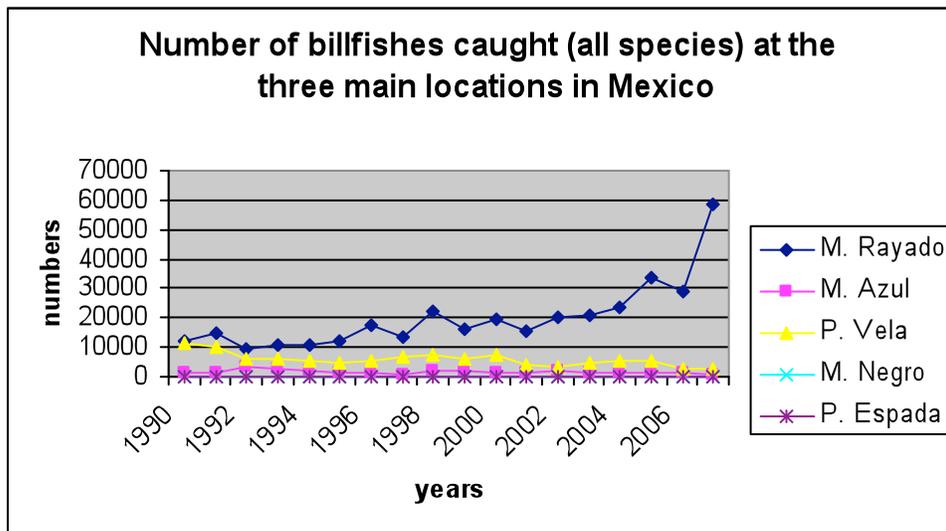


Figure 16. Number of all billfishes species caught at the three main locations combined in the Mexican Pacific from 1990-2007. (Data taken from the CNP-INP, 2004, 2006 and SFMP-CRIP-LA PAZ,\*data from 2008 still is preliminary).

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**Table 8. Number of billfish caught by species at the three main locations at the Mexican Pacific coast: Los Cabos, Buenavista, B.C.S. and Mazatlán, Sin. Mexico, from 1990-2008\*. (Data from the CNP-INP, 2004, 2006 and SFMP-CRIP LA PAZ ; \*data from 2008 still is preliminary).**

YEAR	MARLIN	BLUE MARLIN	SAIL FISH	BLACK MARLIN	SWORD FISH
1990	12375	1514	11345	27	98
1991	15120	1535	10079	31	37
1992	9463	3347	6117	46	1
1993	10950	2444	6031	78	5
1994	11083	1709	5101	52	36
1995	11974	1285	4592	34	21
1996	17354	1268	5389	25	18
1997	13302	752	6771	36	99
1998	22458	2083	7257	44	48
1999	16465	2351	6107	45	65
2000	19350	1630	7728	62	77
2001	15468	1561	3775	37	43
2002	19864	1754	3300	14	5
2003	20977	1156	4492	47	18
2004	23546	1214	5577	38	34
2005	33318	1544	5209	36	39
2006	29010	1294	2642	62	15
2007	58409	858	2403	26	16
2008*	59,213	507	3,515	10	18

### **Biological Data (Category III Data):**

Pick concentrations for the striped marlin in the Mexican Pacific zones have been correlated with sea water temperatures. This normally occurs from December to June, when the temperature is 22° C to 25°C (Howard and Ueyanagi, 1965). Also, Ortega-García et al. (2003), reported more recent, a similar range of temperatures from 22°C to 24°C. Other works, like Squire (1974, 1985 and 1987), have discussed the catch distribution of the marlin and its relationship with surface isotherm temperatures.

At the present there is some evidence of reproduction of the marlin in the Baja California waters. González-Armas, Sosa-Nishizaki, Funes-Rodríguez and Levy-

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Pérez (1999) confirmed the presence of marlin larvae in the entrance of the Gulf of California, from June to November. This finding was associated with warmer temperatures ranging from 27-8<sup>0</sup>C to 31.5<sup>0</sup>C. The study suggested that females have to stay in warmer waters because of its reproductive activity. Reproduction is also assumed to occur while migrating to the Pacific southern latitudes, during the months from July to October, (CNP-INP, 2004).

Ortega-García et al. (2003), reported the average lengths of marlin from Los Cabos area (B.C.S.). They sampled a data set with a total of 4,646 fishes caught from 1990-1999. From these, 2,524 (54.32%) were males and 2,122 (45.68%) females respectively. The average eye-fork length derived from this important regional study was 175 cm. The minimum size was recorded by them in 1996, with 167 cm and the maximum length reported in this study was 182 cm. significant length and weights differences were also found by these authors for males and females.

Similarly, the heaviest fish recorded on this data series (Loc. cit.) was reported in the spring. The figure 9 (page 487) of their report, noted a lower number of fishes during the summer, but heavier females during this period were found. The sex ratio obtained in the cited study which encompasses ten years of data was 1: 1.19, with more males landed, but they again noted that females were more frequent during the summer months.

Complementary to the published information on size and weights of the marlins caught at Mexico, we present IN OUR MUST RECENT Progress report to the ISC WG the new information collected by the CRIP La PAZ-INAPESCA. These were presented in detail by species and by sexes in the following series of 21 tables. Sizes there reported is from lower jaw to fork. For the striped marlin Tables 3 to 8 of that report summarizes the available length and weight information, as well as the same detailed information by sex. In turn, Tables 9 to 14 presented comparable information for the blue marlin. Tables 15 to 20 showed the corresponding for the sword fish and tables 21 to 24 for the black marlin. Here this tables are not presented again, but with, this information figure 17 was constructed for the lengths of principal marlin species caught in the Pacific waters of Mexico.

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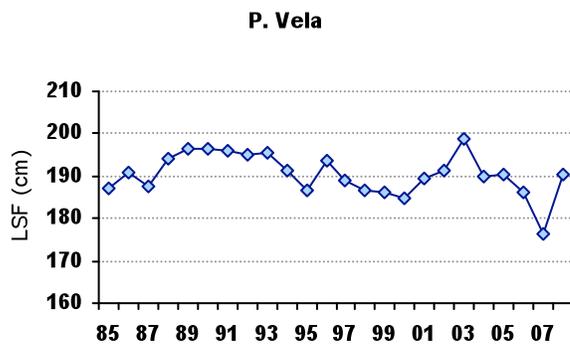
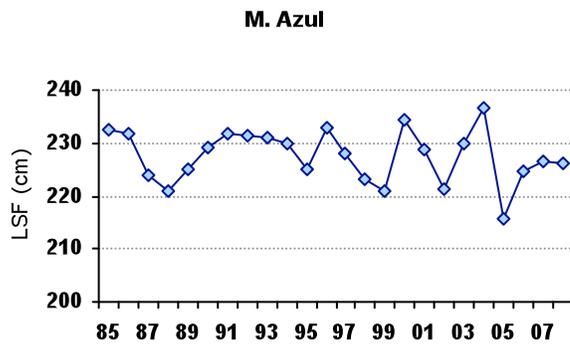
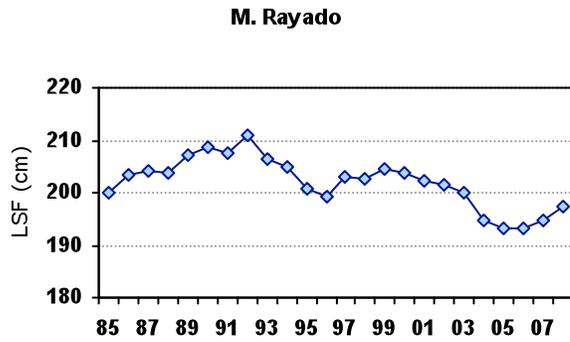


Figure 17. Lengths from lower jaw to fork of the different species of billfishes caught in the sport fisheries operations from 1985-2007. (Data from the CNP-INP, 2004, 2006 and SFMP-CRIP LA PAZ).

Tables 25 and 26 of that report showed for the first time, data on catch and release data derived from the sport fishery at the two main fishing areas of

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Mexico. This data encompassed 10 years from 1998-2008 of comparative analysis between the catch and release rates reported by the fleets and the data collected directly by the SFMP-INAPESCA-CRIP-LA PAZ. The overall average from both sources combined is of 78.25%. However, the fleets reported separately and average of 80.19% and respectively, the monitored data 75.62% for los Cabos area. For los Barriles the reported rate by the fleets was 81.42%. As it was said, at the present there is not information on the survival rate of the fish released. With this information figure 18 is constructed and it shows, the tendency of the fleets data to report a little higher than the sampling data collected directly during the monitoring operations.

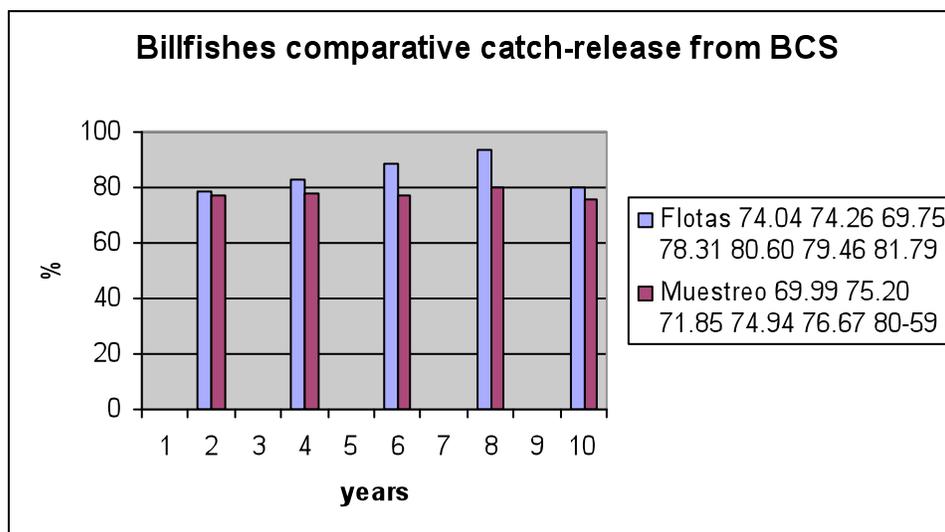


Figure 18. Comparative catch and release rates for the different billfishes caught in the Los Cabos, BCS, Mexico from 1998-2008. ( fleet data compared with monitored data)

## FISHERIES MONITORING, DATA COLLECTING AND REPORTING

The National Institute of Aquaculture and Fisheries of Mexico (INAPESCA), formerly INP (Instituto Nacional de la Pesca, INP-Mexico) conducts systematic scientific work and has developed fisheries, aquaculture and technological research for more than 40 years. Since 1992, it has also incorporated to this effort, the monitoring and research work of their National Tuna-Dolphin program, PNAAPD (Programa Nacional para el Aprovechamiento del Atún y Protección de

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los Delfines ), to monitor and study the tuna fishery of their large commercial fleet.

### **Purse seine and live bait ship fisheries:**

Catch and effort data and the purse seine tuna fishery performance had been closely monitored with a 100% coverage by scientific observers aboard all the large commercial Mexican tuna ships. From this monitoring program, 50% are observers from the Mexican National Program (PNAAPD) and the remaining trips are covered by the IATTC international observers program. Pertinent data from the two observers programs has been available to the IATTC, ISC and other regional meetings. There is also a national administrative regulation (Norma Oficial Mexicana-EM-002-PESC-1999) which regulates in Mexico the tuna fisheries operations and Mexico complies with management measures that are taken in IATTC organization. Besides this, logbooks are submitted by the fleet to the Fishery agency in Mexico, CONAPESCA (Comisión Nacional de Pesca), Ministry of Agriculture, Live stock and Fisheries). Landings are obtained from each vessel with (100% coverage). Fish are measured for fork length by PNAAPD observers on board. The IATTC Secretariat in close coordination with the INP-PNAAD continues to compile the data and related effort, catch and statistics from all the Mexican tuna fleet operations and the PNAAPD covers those vessels which are not monitored by the IATTC.

### **Swordfish fishery**

The swordfish fishery was also monitored since 1998 till 2000 by the observers of PNAAPD, aboard the long liners and the gillnet ships which operated outside the 50 miles defined zone. Also logbooks are submitted by the fleet to the Fishery agency in Mexico CONAPESCA This fishery is also regulated by a special Mexican administrative regulation (NOM-017-PESC-1994). Since 2007 and 2008 the long liners fleet directed to the Shark fishery in the Baja California region, has observers aboard to monitor those captures and to record the incidental captures of other large pelagic fish species.

### **RESEARCH**

Since 1998 the INAPESCA and the PNAAPD have also organized an annual scientific meeting in Mexico to review the research activities developed by Mexican and other scientists. These studies are related with tunas, large pelagic and other oceanic species. Available information of those seven scientific meetings could be obtained directly from the authors listed in the journal "El Vigia" of the PNAAPD (see [www.fidemar.org](http://www.fidemar.org)) that lists the abstracts every year,

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or from the INP-PNAAPD sources. The most recent meeting took place in November 2008 in Mazatlan, Mexico.

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