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Mexican Progress Report to the 12th ISC[1]

Michel Dreyfus[2], Luis A. Fleischer[2], Pedro A. Ulloa Ramírez[2], José Leonardo Castillo-Géniz[2], Luis Vicente González-Ania[2], Alejandro Liedo-Galindo[2], Javier Tovar-Ávila[2], and J. Fernando Márquez-Farías[3]

[2] Instituto Nacional de Pesca (INAPESCA)

[3] Universidad Autónoma de Sinaloa (UAS)

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[1]Prepared for the Twelfth Meeting of the International Scientific committee on Tuna and Tuna-like Species in the North Pacific Ocean (ISC), 18-23 July 2012, Sapporo, Hokkaido, Japan. Document should not be cited without permission of the authors.

INTRODUCTION

Mexico has been participating since the first meeting of the ISC and in 2004 Mexico joined this organization formally at its 4TH 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 regionally 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, albacore tunas, swordfish and sharks.

In Mexico, the National Institute of Aquaculture and Fisheries (Instituto Nacional de Acuacultura 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 of 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 Delfín, 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.

Tunas

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 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).

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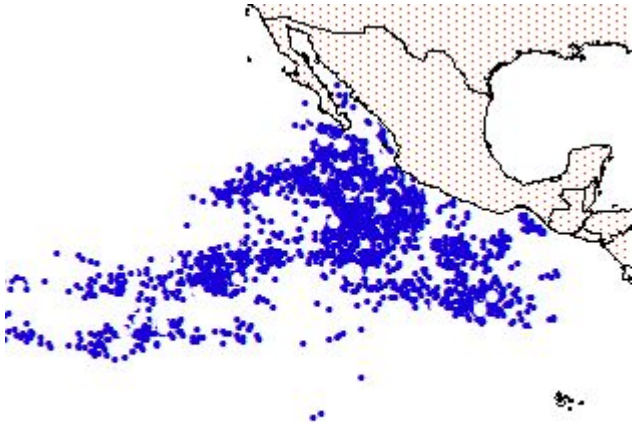
Fishing operations of the Mexican purse seine fishery comprise a vast area in the EPO, (figure 1).



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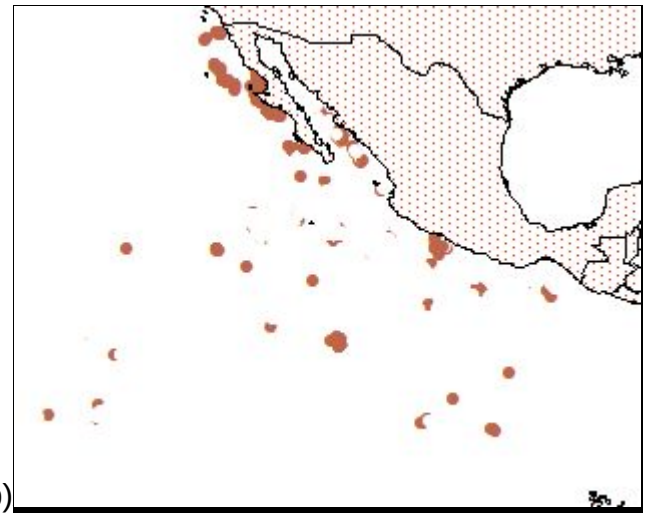

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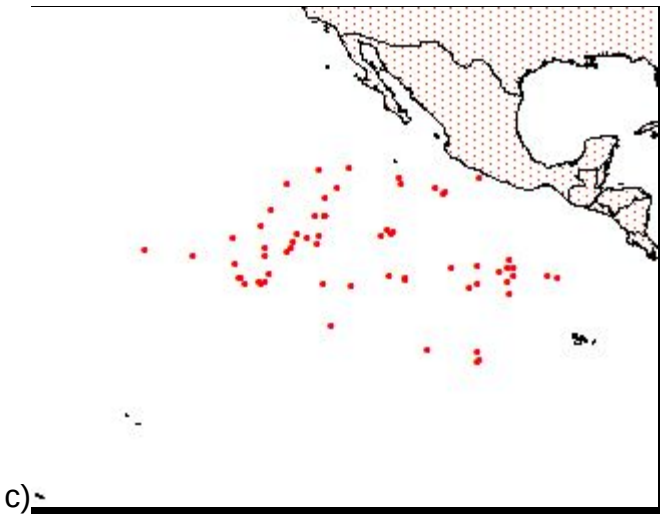


Figure 1. Fishing grounds of the Mexican purse seine fishery (a dolphin sets, b) free swimming schools, c) log sets). 2011

The recorded levels of tuna catches in the ETP zone by the Mexican fleet from 1980 till 201| are shown in figure 2.

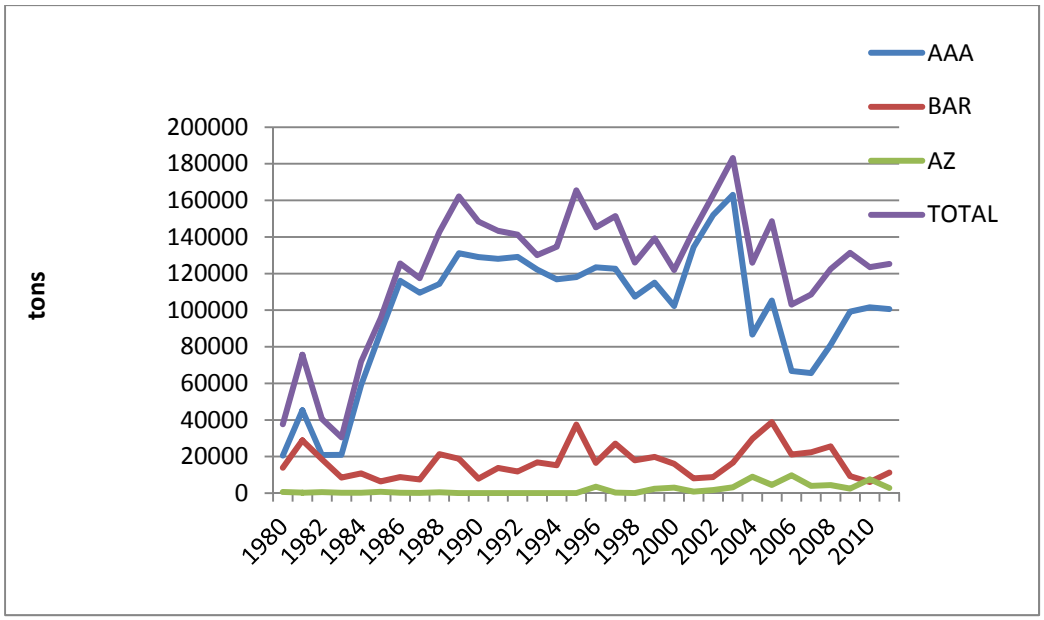


Figure 2. Mexican tuna catch of yellowfin tuna (YFT), skipjack (SKJ) and bluefin tuna (BFT), 1980-2011.

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 yellowfin tuna continue to increase slowly. 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 in 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 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 1. Total landings, size, composition and carrying capacity of the active Mexican tuna fleet 2007 to 2011

YEAR	No. of active tuna boats	No. of m PSeiners > 400 m3	No. of PSeiners < 400 m3	No. of active Bait Boats
2007	55	42	11	2
2008	49	39	8	2
2009	46	38	6	2
2010	42	36	3	3
2011	43	38	3	2

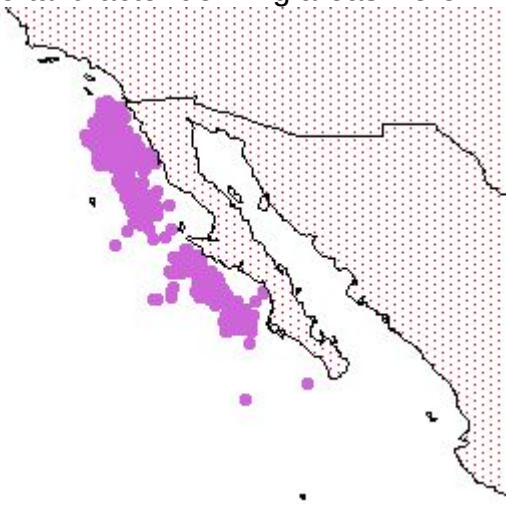
Table 2. Total tuna landings and the proportions of the different tuna species in the Mexican fishery from 2005-2011

YEAR	TOTAL LANDINGS All tuna species (mt.)	Yellowfin (mt	Skipjack (MT.)	Others Species (mt.)
2005	152364	113279	32985	6100
2006	102472	68644	18655	15173
2007	108351	65834	21970	20547
2008	122568	85517	21931	15111
2009	123750	99157	9310	15243
2010	120679	101523	6090	13066
2011	124947	102739	8840	13325

1) Other species are: albacore (T. alalaunga), bluefin (T. orientalis), bigeye (T. obesus) and the black skipjack (Euthynnus lineatus). *2011 data is preliminary.

Bluefin tuna

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 were BFT is to be found.



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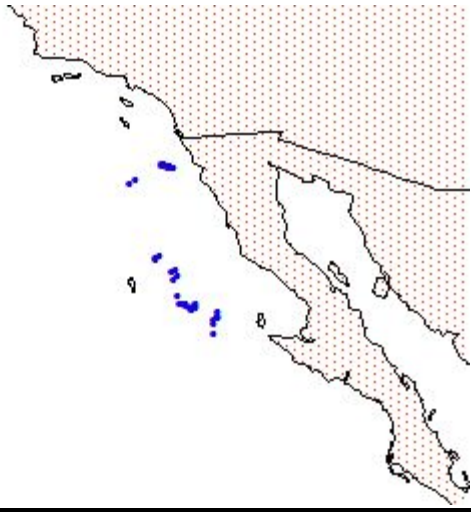

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Figure 3. Fishing Zones for bluefin tuna in the Northwest region of Mexico, offshore the Baja California peninsula, a) 1992-2006 and b) during 2011

The time series of bluefin tuna captured by the Mexican tuna purse seine boats from 1994-2010 is presented respectively in Table 3 to see the period related to ranching activities that started in 1996 and fully developed since 2001. This catch represents only a very small proportion of the total tuna caught by the Mexican fleet with an average catch of 3612 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. In 2009 due to the international economic crisis many companies did not operate and catches were below average. In 2010 catches increased and in 2011were relatively small. 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 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, 1994-2011*. (*preliminary)

1994	65
1995	11
1996	3700
1997	367
1998	1
1999	2404
2000	3118
2001	863
2002	1710
2003	3254
2004	8894
2005	4542
2006	9928
2007	4147
2008	4407
2009	3019
2010	7745
2011	2730

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

There is also a US sport fishery that operates in Mexican EEZ that is reported by the US.

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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, 2008 and 2009 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 the amount the companies can growth each year, oceanographic conditions and EEZ's.

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 case of the Bluefin tuna fishery, INAPESCA finished a document that was recently reviewed with the Mexican fishery ministry (CONAPESCA) in order to adjust and approve this plan to be operational. This was based on INAPESCA own analysis and the ISC plenary advice.
Recently a conservation measure has been agreed in IATTC for 2012 and 2013.

Albacore (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 5). Table 4 shows the total catch reported for Mexico from 1980 to 2011.

Figure 5. Albacore fishing ground for the Mexican purse seine fishery.

Table 4. Mexican albacore tuna catches from 1980-2011. *2011 data is preliminary

YEAR	MEXICAN CATCH
1980	31
1981	8
1982	0
1983	0
1984	113
1985	49
1986	3
1987	7
1988	15
1989	2
1990	2
1991	2
1992	10
1993	11
1994	6
1995	5
1996	21
1997	53
1998	8
1999	57
2000	103
2001	23
2002	28
2003	28
2004	104
2005	0
2006	109
2007	40
2008	10
2009	17
2010	25
2011	0

There is also a US sport fishery that operates in Mexican EEZ that reports albacore catch.

Bycatch

Billfishes and shark bycatch from the purse seine fishery is estimated and presented in table 5.

Table 5. Estimated billfish and shark bycatch in the purse seine fishery in number of organisms for 2011

Species	2011
sharks	5575
Blue Marlin	94
Black Marlin	78
Stripped Marlin	352
Swordfish	8
Sail fish	174

Shark fisheries in the Mexican Pacific

The seasonal abundance of diverse shark species along the coastal and oceanic waters of the Mexican Pacific, including the Gulf of California, has permitted the development of artisanal and pelagic shark fisheries along the coastal states of Mexico. Shark meat (national human consumption) and fins (international trade) have been the principal products obtained from sharks. Important regions for shark fisheries are the Gulf of California, Gulf of Tehuantepec and the west coast of the Baja California peninsula. Shark fisheries in Mexico provide valuable sources of food, employment and profits for local and regional economies. In terms of production, the national shark fishery occupied the eighth place nationally with 29,775 t and the seventh in terms of economic value (SAGARPA, 2011). Several Mexican fisheries targeting sharks directly and in other fisheries represent an important by-catch. Those fisheries target coastal and pelagic sharks in different regions of the Mexican Pacific. The principal shark fisheries in the region are: 1) the longline fishery of Ensenada, Baja California, 2) the longline shark fishery of Mazatlán, Sinaloa; 3) the longline shark fishery of Manzanillo, Colima and 4) diverse gillnet and longline artisanal fisheries along the coastline of the Mexican Pacific, among which one of the most extended is the Chiapas shark artisanal fishery. With the exception of the northern region of the Pacific, the shark fisheries in the Central and southern Pacific, including the Gulf of California, have been sustained by tropical shark species, specially carcarhinids characterized by a slow growth rate, a low reproductive potential

and extended longevity, traits that make them highly vulnerable to intense and prolonged exploitation rates (Castillo-Géniz 1992, Castillo-Géniz, *et al*. 1998).

The National Fisheries Institute of Mexico (INAPESCA) has conducted intermittently since 1960's scientific and technological research on shark fisheries in both Pacific and Gulf of Mexico waters, providing the scientific bases for management advice to the fisheries authorities in the country. In 1993 the Ministry of Fisheries considering the results of a regional artisanal shark study conducted by the INAPESCA (Rodríguez de la Cruz *et al*., 1996; Castillo-Géniz *et al*., 1998), set up a moratorium on the issuing of new commercial shark permits, with the objective to stop fishery effort increase. That moratorium was extended to the industrial shark fisheries in 1998 (Castillo-Géniz *et al.*, 1998). Several efforts have been made during last decades in Mexico to manage shark fisheries. In response to the International Plan of Action for Conservation and Management of Shark (IPOA-Sharks), a National Plan of Action (PANMCT) and a national management legal instrument have been developed (NOM-029-PESC-2006) (CONAPESCA-INP 2004, SAGARPA DOF 2007). The new law limits the type and use of shark fishing gears (allowing only the use of longlines in medium-size boat fleets), prohibits shark finning and fishing in certain areas as whale sanctuaries, turtle nesting beaches and areas identified as important shark nursery grounds and restrict fishing to 15 nautical miles away from shore for small boats and 50 nautical miles for larger vessels (Tovar-Ávila, *et al*., 2011). The law also states that catches of each species have to be reported in the ship's log books whereas in the artisanal shark fisheries, permit holders must submit statistical monthly summaries of their shark catches by species and numbers. Finally, the law gives total protection against catch for any reason to vulnerable species of sharks and rays (white, whale and basking sharks, and mobulid rays and sawfish).

Mexico's participation in the ISC Shark Working Group

During the 10th ISC Plenary, held in Victoria, B.C. Canada from 21-26 July 2010 the Plenary agreed to dissolve its Bycatch Working Group and create a Shark Working Group (SWG) in order to implement the recommendations of its Shark Task Force Group (STFG). The STFG noted that ICS member countries seem to have enough information for the stock assessment of key shark species in the North Pacific Ocean (NPO), specially blue and shortfin mako sharks. The STFG also noted that there was sufficient interest and expertise to conduct these assessments. Finally STFG prepared a list of key shark species captured on the NPO fisheries. The new SWG will be responsible for conducting stock assessment and other scientific studies as required. The new SWG is to focus on monitoring shark fisheries particularly blue, shortfin mako, bigeye thresher, pelagic thresher, silky, oceanic whitetip, hammerhead and any other shark species for which stock assessment may be needed.

[Escribir texto]

Participation of Mexico's representative, the INAPESCA in the SWG can be summarized in the follow:

- In the ISC Shark Working Group Workshop held in Shimizu, Japan, from 18-March, 2011, Mexico participated submitting a working paper titled: *"Outline of new available catch and effort data of pelagic sharks caught by the Mexican shark longline fishery in the North Pacific"*, prepared by Tovar-Avila, J., González-Ania, L.V., Liedo-Galindo, A., Márquez-Farias, J. F. ISC/11/SHARKWG-1/8
- An INAPESCA shark specialist participated in the intercessional workshop (SHARKWG) of ISC held in La Jolla California, USA from November 28 through December 3 2011. INAPESCA submitted a paper titled "*Swordfish and shark longline fishery of Baja California (Ensenada) Mexico, INAPESCA*", presented by José Leonardo Castillo-Géniz (ISC/11/SHARKWG-2/INFO-1).
- Japan is conducting a genetic analysis of blue sharks to estimate their stock structure and phylogeography within the Pacific Ocean using microsatellite and mitochondrial markers. Japan requested assistance from Mexico representative to collect genetic samples from blue shark and mako sharks from Mexican coastlines (Pacific and Gulf of Mexico). INAPESCA accepted to collaborate in this effort providing to Japan genetic samples from these species but requested to Japan representatives the possibility that Mexican genetic specialists could be involve more actively in the project. In April 2012 INAPESCA sent to Japan 16 tissue samples from blue sharks collected from artisanal catches obtained from Sebastián Vizcaíno Bay in BC.
- The representative of INAPESCA also participated in the Workshop titled : "Age and Growth of Pelagic Sharks" organized by the Southwest Fisheries Science Center of La Jolla of the National Marine Fisheries Service (SWFSC) and sponsored by the SHARKWG of the ISC, held at the SWFSC-La Jolla, from December 5-6, 2012.

FISHERIES AND CATCHES

Historical trends

Mexico's shark catches have showed a typical historical trend similar to the other shark-fishing nations worldwide, following in some way the phenomenon of "boom and bust fisheries", a rapid growth in catches and effort during a short period of time, followed by a marked fall in the catches. The precautionary measures applied by the Mexican government during the 90's have prevented the depletion of shark stocks exploited in Mexican waters.

In Mexico shark landings are splitted in two major statistical nominal categories, "tiburón" for large sharks (>1.5 m or > 5 kg in weight) and "cazón" for small sharks (< 1.5 m or < 5 kg). During the first "boom" of the Mexican shark fishery, triggered by the US demand of Vitamin A obtained from shark livers during the II World War, the Mexican shark catches peaked near five thousand t, mostly from the northern Pacific. Subsequently shark catches began to increase following the

growing demographic grow rate of Mexican population. In a short period the shark production almost quintuplicated (figure 6). The first national historical shark production record was in 1981, with 35,264 t, followed by the highest record in 1990: 36,737; in 1993 the shark catches were also considerably, 36,309 t. In the last decade (2000-2010) national and regional shark catches showed a steady decrease, particularly in the Gulf of Mexico. The national average shark production was 26,669.6 ± 652.5 t. In the Pacific the highest shark production record was observed also in 1990 with 13,801 t; in 1993 the production reached 13,801 t. During 1991-2010 the Pacific average "tiburón" production (large sharks) was 16,266.8 ± 605 t; the lowest recorded capture (11,958 t) was in 1997, and the largest one was documented in 2004 with 23,930 t. In 2010 the catches were 19,245 t in the Pacific (SAGARPA, 2011) (figure 7).

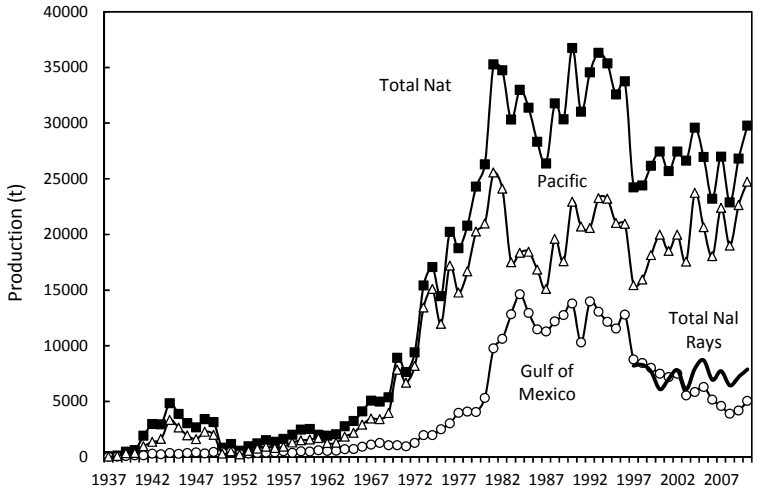

Figure 6. Historical Mexican national and regional shark production period 1937-2010. The shark total production showed is composed by the sum of the categories of large sharks (tiburón) and small sharks (cazón). Source: Mexican National Fisheries Statistical Yearbooks.

Although precise data are lacking, more elasmobranch tonnage is estimated to be landed in the Gulf of California than in any other Mexican faunal region. Elasmobranch landings from the four states bordering on the Gulf of California (Baja California, Baja California Sur, Sonora, and Sinaloa) averaged 15,367 t per year from 1986–2003, accounting for 41.7% of the national total (CONAPESCA, unpub.). The great majority of these landings were derived from the Gulf of California (Bizzarro *et al*., 2007). Important shark fishery grounds in the Pacific region (northern Mexico including the Gulf of California) have provided historically the largest shark landings. In the period 1991-2010 it accounted for 65.5% of the total national shark production (Table 6).

Several medium-size longline fleets and innumerable artisanal small fiber glass outboard-motor boats operate along the Pacific Mexican region. The shark landings reported for the Pacific are composed mainly by two shark assemblages. In northern Mexico Pacific shark catches are sustained in large proportion by temperate shark species like blue, mako and thresher sharks, whereas in central and southern Pacific areas shark catches are composed mainly by tropical carcharhinid sharks (Carcharhinidae) , and hammerhead sharks (Sphyrnidae). In the Gulf of California shark fisheries target small sharks (cazones) as smoothhounds of genus *Mustelus*, angel sharks and a diverse group of batoids.

With the new national shark management legal instrument (NOM-029-PESC-2006), a scientific observer program began to operate in 2006 on board the commercial medium-size shark vessels in the northern Mexican Pacific. This shark observer program (SOP) was technically designed by the INAPESCA and implemented by the National Program for Tuna Exploitation and Dolphin Protection (PNAAPD-FIDEMAR). The shark scientific observers operated in different fleets, based at the Mexican fishing ports of Ensenada (BC), San Carlos (BCS), Puerto Peñasco (Sonora), and Mazatlán (Sinaloa). The geographical and seasonal distribution, as well as the abundance (number of individuals) of shark species caught by the different fleets in northern Mexican Pacific were recorded by the PNAAPD observers during 2006-2008 in an initial stage. The data provided by the SOP during 2006-2008 include information of 280 fishing trips and 5,353 sets (figure 8). From the

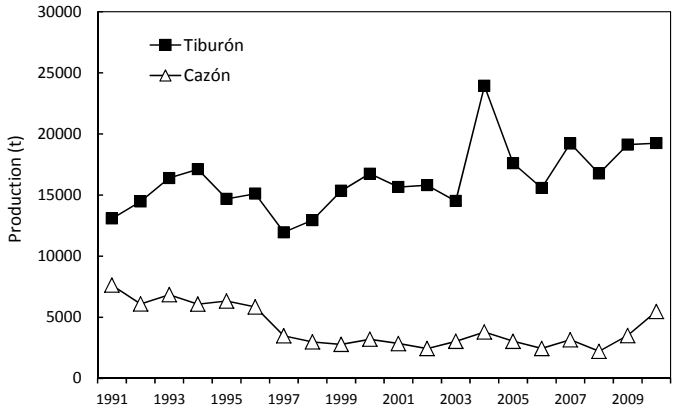

Figure7. Mexico's Pacific shark production splitted by "Tiburón (large sharks) and "Cazón" (small sharks) generic categories of the period 1991-2010. Source: Mexican National Fisheries Statistical Yearbooks.

Table 6. Mexican national total shark production by region, during the period 1991-2010. Production in metric tons (t). Source: Mexican Official Fisheries Statistics Yearbooks.

Year	National (t)	Pacific (t)	Gulf of Mexico (t)
1991	31018	20714	10304
1992	34543	20567	13976
1993	36309	23248	13061
1994	35355	23197	12158
1995	32575	21023	11552
1996	33755	20959	12796
1997	24220	15441	8779
1998	24383	15940	8443
1999	26164	18140	8024
2000	27443	19965	7478
2001	25695	18513	7182
2002	27443	19965	7478
2003	26610	17545	5535
2004	29580	23729	5846
2005	26948	20649	6300
2006	23205	18035	5170
2007	26984	22390	4593
2008	22877	18983	3894
2009	26807	22634	4173
2010	29774	24726	5048

total sets monitored by SOP 1,947 (36.5%) were carried out between 20° and 28°N. During this period 60% were gillnet sets, whereas 35% were longline sets.

INAPESCA is compiling and reviewing CONAPESCA's fishery statistical instruments "administrative logbooks" and "fishery logbooks" from the shark fishery fleets with the objective to estimate the total shark catch and effort in terms of number of sharks by species and total number of hooks deployed in the principal shark medium-size fleets. It is a priority for INAPESCA to estimate such indices for blue, mako and silky sharks.

Swordfish and shark longline fishery of Baja California (Ensenada)

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The Mexican swordfish and shark drift gillnet fishery in the west coast of Baja California peninsula began in 1986. The fleet began with a small number of vessels (13), with lengths 18-25 m and made of fiberglass or Steel, with a capacity of 50-70 t. The gillnets were 2-3.5 km length, with a maximum of 4.8 km and fishery grounds were between 21° 30' N and 32° 20' N. The annual catch is presented in figure 9.

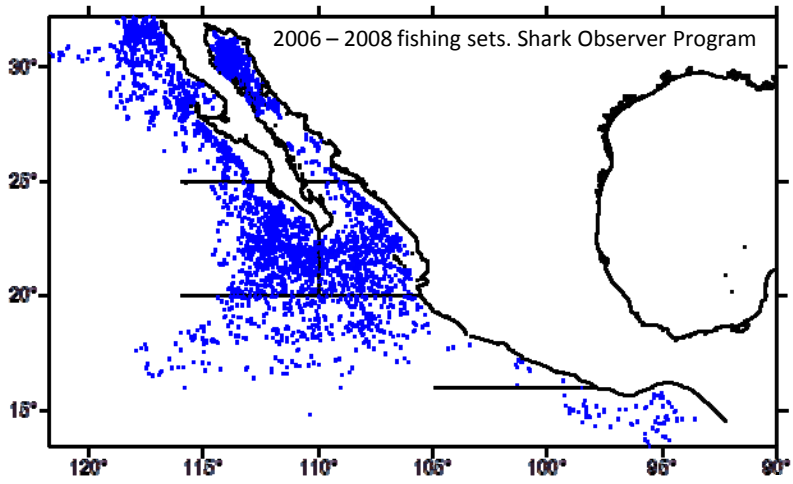

Figure 8. Spatial distribution of shark fishery sets in the Mexican Pacific EEZ during 2006-2008 (n= 5,353 fishing sets). Source: Shark Observer Program INAPESCA-FIDEMAR.

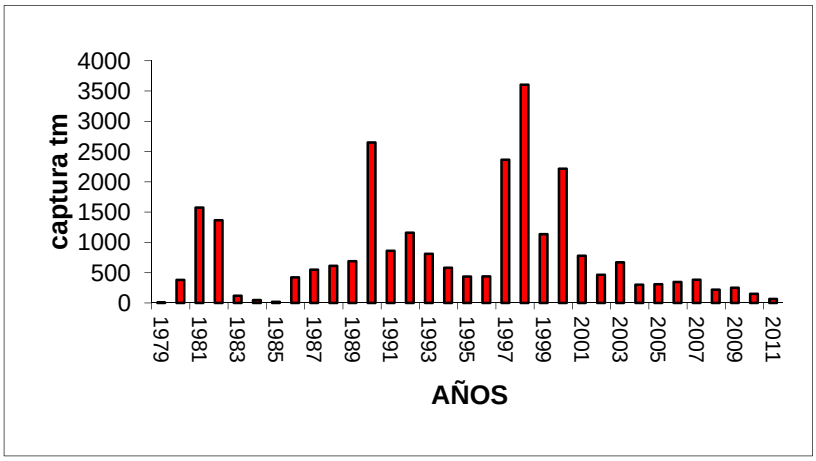

Figure 9. Swordfish catch.

The drift gillnet fishery in 1990 was 85.5% swordfish, 11.2% sharks, 1.7% tuna-like fishes and 1.6% other. The shark by-catch composition included blue, thresher and mako sharks principally. Escobedo-Olvera (2009) reported a by-catch of 22 species in swordfish gillnet operations during 1999-2008. In his by-catch analysis of 997 swordfish sets he found blue shark (26.3%), pelagic thresher (14.2%) and mako sharks (12.1%) were the most representative

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species. In 1998 as a result of an experimental fishing gear selectivity program conducted by INAPESCA, 9 gillnet vessels switched to surface longlines. In 2009 the NOM-029-PESC-2006 banned the use of gillnets in medium size commercial vessels in Mexican waters, measure which conducted the whole fleet to a 100% conversion to longline. Using the "administrative logbooks" ("avisos de arribo") and official logbooks in 2007 it was possible to estimate that the Ensenada fleet conducted 164 longline fishery trips, with an estimated total catch in weight of 1,500 t. The catch species composition was: blue shark 79%, swordfish 11%, thresher shark 5%, mako 3% and other species 2%. The species composition catch for 2011 is presented in figure 10.

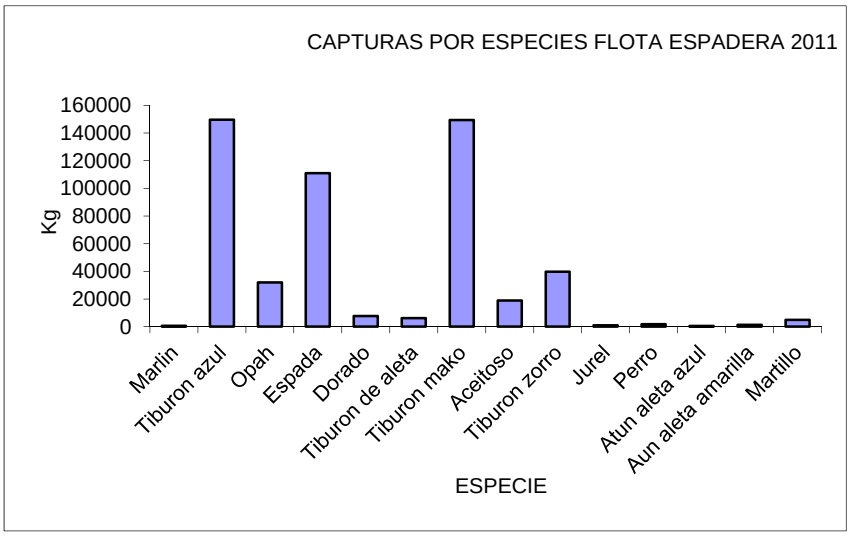

Figure 10. Ensenada's longline shark and swordfish production

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 fore 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 los Delfínes), to monitor and study the tuna fishery of their large commercial fleet as well as the swordfish and shark fisheries.

[Escribir texto]

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 (www.fidemar.org) that lists the abstracts every year, or from the INP-PNAAPD sources. The most recent meeting took place in November 2011 in Mazatlan, Sinaloa,, Mexico.

REFERENCES (for shark section)

Bizzarro, J.J., Smith, W.D., Hueter, R.E., Tyminski, J., Márquez–Farías, J.F., Castillo–Géniz, J.L., Cailliet, G.M., Villavicencio–Garayzar, C.J., 2007. The status of shark and ray fishery resources in the Gulf of California: applied research to improve management and conservation. Moss Landing Marine Laboratories Tech. Pub. 2009–01.

Castillo-Géniz, J. L. 1992. Diagnóstico de la pesquería de tiburón en México. Instituto Nacional de la Pesca, Secretaría de Pesca, México. 72 p.

Castillo, J. L., Márquez, J. F., Rodriguez de la Cruz, M. C., Cortés, E. y Cid del Prado, A. 1998. The Mexican artisanal shark fishery in the Gulf of Mexico: towards a regulate fishery". *Mar. Freshwater Res*., 49, 611-620.

CONAPESCA-INP. 2004. Plan de Acción Nacional para el Manejo y Conservación de Tiburones, Rayas y Especies Afines en México. Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, Mazatlán, México. 85 p.

Escobedo-Olvera, M. A. 2009. Análisis biológico-pesquero de la pesquería con red agallera de deriva en la península de Baja California durante el periodo 1999-2008. Tesis para obtener el grado de Maestro en Ciencias (Ecología Marina), CICESE, Ensenada, BC, México. 141 p.

Rodríguez de la Cruz, Ma. C., Castillo-Géniz, J. L. y Márquez-Farías, J. F. 1996. Informe Final Proyecto de Investigación "Evaluación de la Pesquería de Tiburón del Golfo de México". Instituto Nacional de la Pesca. Proyecto financiado por el Consejo Nacional de Ciencia y Tecnología, clave de referencia 116002-5-1314N9206. 198 p.

SAGARPA. 2007. Norma Oficial Mexicana NOM-029-PESC-2006. Pesca Responsable de Tiburones y Rayas. Especificaciones para su

aprovechamiento. Diario Oficial de la Federación (Federal Gazzete) February 14, 2007. http://www.ordenjuridico.gob.mx/Federal/

SAGARPA. 2011. Anuario Estadístico de Acuacultura y Pesca, Edición 2010. Comisión Nacional de Acuacultura y Pesca, 286 p.

Tovar-Avila, J., González-Ania, L.V., Liedo-Galindo, A., Márquez-Farías, J.F. 2011. Outline of new available catch and effort data of pelagic sharks caught by the Mexican shark longline fishery in the North Pacific. Working document submitted to the ISC Shark Working Workshop, 18-20 March 2011, National Research Institute of Far Seas Fisheries, Fishery Research Agency, Shimizu, Japan.