7th Meeting of the ISC
July 25-30, 2007
Busan, Korea

Mexican Progress Report to the ISC [1]
July 2007

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FISHERIES AND CATCHES

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 has been 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). This paper describes the recent trends of the Mexican tuna fishery for bluefin and albacore tuna and also for the swordfish (Xiphias gladius). It updates the statistics for those species in reports presented before at the 4th, 5th and 6th ISC.

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

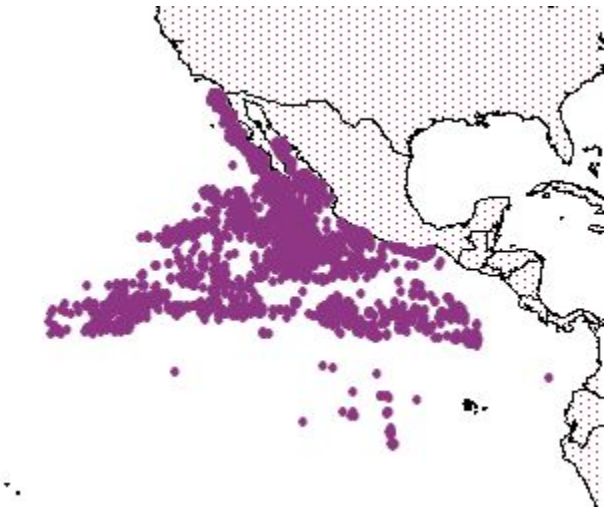

Figure 1. Fishing grounds of the Mexican purse seine fishery in 2006

The recorded levels of tuna captures in the ETP zone by the Mexican fleet from 1992 till 2006 are shown in figure 2. This information has been reported on a yearly base to the regional fisheries bodies, such as the Inter American Tropical Tuna Commission (IATTC) and in the Northern Pacific region, to the International Scientific Committee (ISC).

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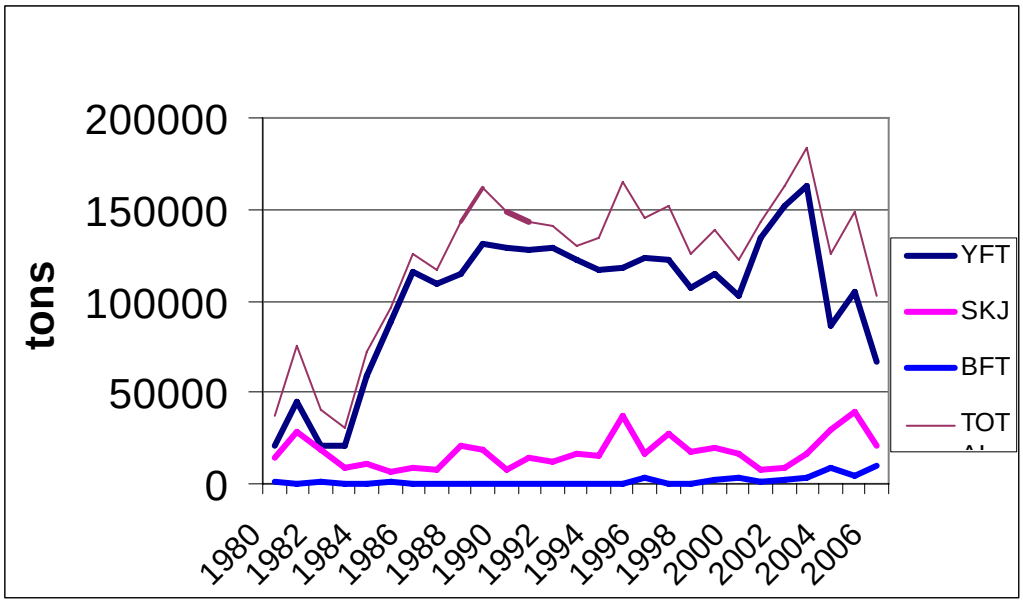

Figure 2. Mexican tuna catch of yellowfin tuna (YFT), skipjack (SKJ) and bluefin tuna (BFT), 1980-2006.

The total tuna landings of Mexico in 2003 were 183,199 mt. Value which represents the highest historic record for this fishery since 1992 and more than a (10 %) increase from the attained level of the year before, in which a total catch of 164, 048 mt. was reported. Comparatively, the lowest recorded capture in this fishery during recent years was in the 2006 season, with only 97,015 mt., value which is closer to the 1980's development phase.

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 are probably related to lower population levels of yellowfin tuna.

Being one of the largest fleets in the EPO in numbers, the Mexican tuna fleet is not diverse in terms of fishing gear, mobility, scale operation and species targeting. It consists only of two main fisheries. These includes: a greater component of purse seiners which is the largest and a comparative small portion of Bait boats vessels.

The purse seine fleet is subdivided for management and conservation purposes in three different categories: type I, those boats larger than 1000 metric tons, and representing 47 % of the total fleet. Type II corresponds to medium to small size ships, more than 363 mt., but less than 1000 mt. with a 20 % of the total and

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finally, the type III category, in which the small size vessels, less than 363 mt. are grouped and which represents 28%.
The second tuna fishery identified is composed by bait boats, from which in the period reported in here, from 1992-2006, there has been from 2 to 12 active fishing ships. Of this category, in 2006, only 2 bait boats were reported active (3% of the fleet, Table 1). It can be seen that the whole fleet is quite stable in number, composition and carryng capacity.

Yellowfin tuna always has been the primary catch, in recent years it represents from 68% to 92% of total catch. Skipjack (second in volume) goes from 10% to 23% in the same period and other tuna species from 1% to 9% when bluefin tuna catches have been relatively high. (Table 2). This tabled information reflects the great importance of the yellowtfin 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 Mexican tuna fleet from 1992-2006.

YEAR	No. of active tuna boats	No. of large PSeiners >1000 mt.	No. of m PSeiners >363 mt. <1000 mt.	No. of PSeiners ≤363 mt.	No. of active Bait Boats	Total Carrying Capacity of the Fleet (mt.)
1992	52	29	14	4	5	43,158
1993	47	23	12	6	6	37,553
1994	54	24	14	11	5	38,670
1995	55	22	15	12	6	38,255
1996	62	22	15	12	6	37,302
1997	63	27	14	12	10	42,836
1998	63	25	14	12	12	41,330
1999	66	25	15	14	12	41,690
2000	64	25	14	16	9	42,035
2001	64	24	12	18	10	41,427
2002	59	23	13	18	5	41,004
2003	62	24	15	19	4	43,601
2004	60	26	13	19	2	44,532
2005	61	27	14	17	3	46674
2006	59	28	12	17	2	46240

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Table 2. Total tuna landings and the proportions of the different tuna species in the Mexican fishery from 2000-2006

YEAR	TOTAL LANDINGS All tuna species (mt.)	Yellowfin (mt.) and (%)	Skipjack (MT.) and (%)	Others Species (mt.) and (%)
2000	119,962	100,261 (83.57%)	15,635 (13.03%)	3,434 (2.86%)
2001	147,960	136,390 (92.18%)	10,410 (7.04%)	661 (0.45%)
2002	164,048	151,833 (92.25%)	9,844 (6.0%)	1,884 (1.2%)
2003	183, 199	159,521 (87.07%)	19,971 (10.9%)	2,739 (1.49%)
2004	128,914	88,732 (68.83%)	30,414 (23.59%)	9772 (7.58%)
2005	152030	117364 (77.19%)	28566 (18.78%)	6101 (4.01%)
2006	97015	66732 (68.78%)	21121 (21.77%)	9162 (9.44%)

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

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 were BFT is to be found.

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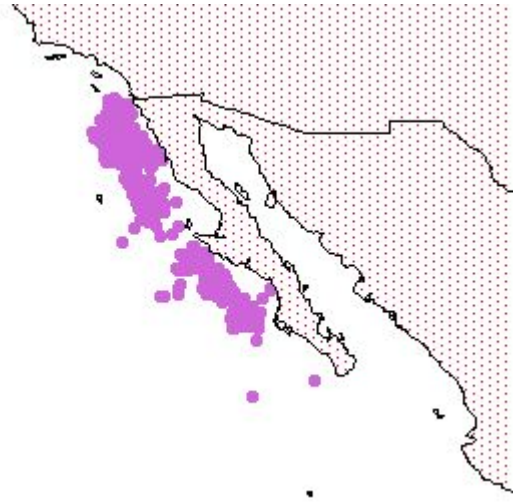

Figure 3. Fishing Zones for bluefin tuna in the Northwest region of Mexico, offshore the Baja California peninsula. 1992-2006.

The time series of bluefin tuna captured by the Mexican tuna purse seine boats from 1995-2006 is presented respectively in Table 3 and figure 4. 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 3700 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. 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, 1995-2006.

1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
10	**3700**	**368**	**1**	**2369**	**3020**	**863**	**1709**	**3211**	**8880**	**4542**	**9789**

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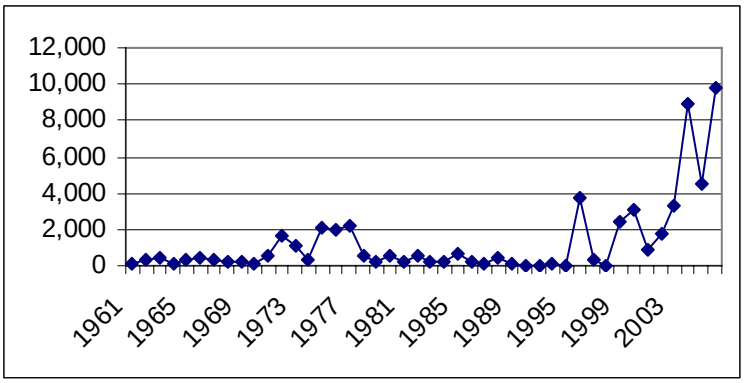

Figure 4. Bluefin tuna catch from 1961-2006, Mexican fleet

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 4545 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 and 2006 an estimated 80% of the catch was transported to the ranching companies and the other 20% went to the Mexican market. 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 progress reports to ISC (Dreyfus and Ulloa, 2004; Dreyfus, Fleisher, Robles and Ulloa, 2005; Fleisher, Dreyfus, Robles and Ulloa, 2006) synthesize the history the fishery and ranching activities for bluefin.

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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 5), data from 2000-2006 period. Table 4 shows the total catch reported for Mexico. The data indicates that albacore is a non target specie catches are sporadic. Consequently, no data is available for the effort.

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

Table 4. Mexican albacore tuna catches from 1980-2006.

YEAR	MEXICAN CATCH
1980	**0**
1981	**10**
1982	**0**
1983	**0**
1984	**179**
1985	**54**
1986	**0**
1987	**0**
1988	**0**
1989	**0**
1990	**0**
1991	**0**
1992	**0**
1993	**0**

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1994	**2**
1995	**4**
1996	**0**
1997	**0**
1998	**8**
1999	**0**
2000	**70**
2001	**0**
2002	**28**
2003	**28**
2004	**104**
2005	**0**
2006	**109**

Swordfish (X. gladius):

In accordance with (FAO, 2000) the total world captures of swordfish are about 90,000 mt. each year. From those, 25,000 mt. are taken from the Pacific Ocean and the Mexican fleet since year 2000 contributes to those with an average of 711t per season. This represents only (2.8%) of the total Pacific ocean captures. 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 longliners indicates that the stock it 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 with the available information.

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 gillnets. The main ports used by this fishery are: Ensenada, San Carlos, and some times, La Paz, in the Baja California peninsula and Mazatlán, across the Gulf of California, on the mainland Mexico.

The comercial swordfish fishery is regulated by a special Mexican 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, the swordfish fishery was 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 for tose years aboard the longliners and the gillnet ships, which operated outside the 50 miles protected zone for the sport fisheries operations.

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In 1992 the swordfish the nominal fleet was integrated by 27 boats. But from those, only 24 were really active fishing boats. In 1995, the fleet was reduced to 22 fishing ships, number which did not change for many years. More recently, in 2006, the number reported is 29 boats. The growth in numbers of the ships is explained because some of them have permits for different species, (multiple fisheries), pending on the availability of the species by season and the presence or not of some species during the year. As a whole 213 fishing trips were performed in 2006 but not all of them caught swordfish (Figure 6).

The sword fish fleet operates mainly from September-October to February. in the Autumn and Winter seasons. The swordfish catches decline after that period and is very scarce in the 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^{o} 30'N and 32^{o} 20'N. One is south of Punta Eugenia to the 23^{o}N and the other fishing zone, from the 30^{o} parallel, to the northern limit of the Mexican ZEE (Sosa et. al. 1992; Castro, et. al. 1995) (figure 7).
Also, as it was mentioned before, although in very low numbers, the swordfish is some times caught in the recreational fisheries, with an average number per year of 41 fish.

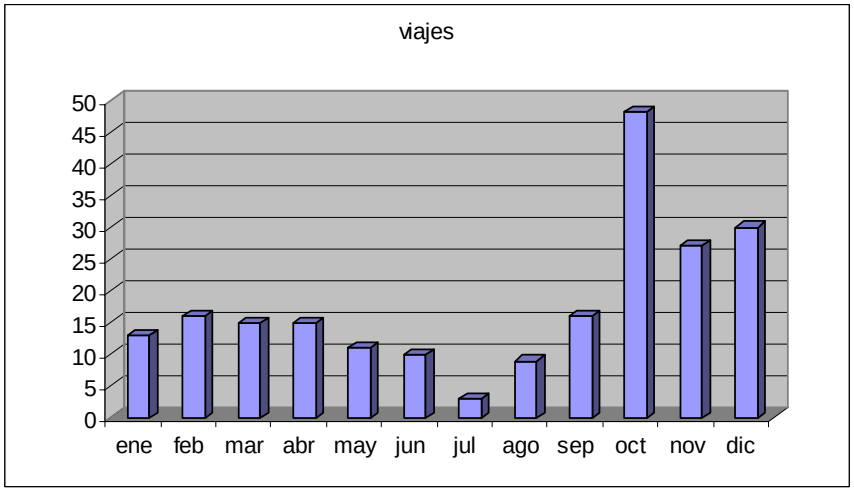

Figure 6. Monthly number of fishing trips of the swordfish fleet from Ensenada during 2006

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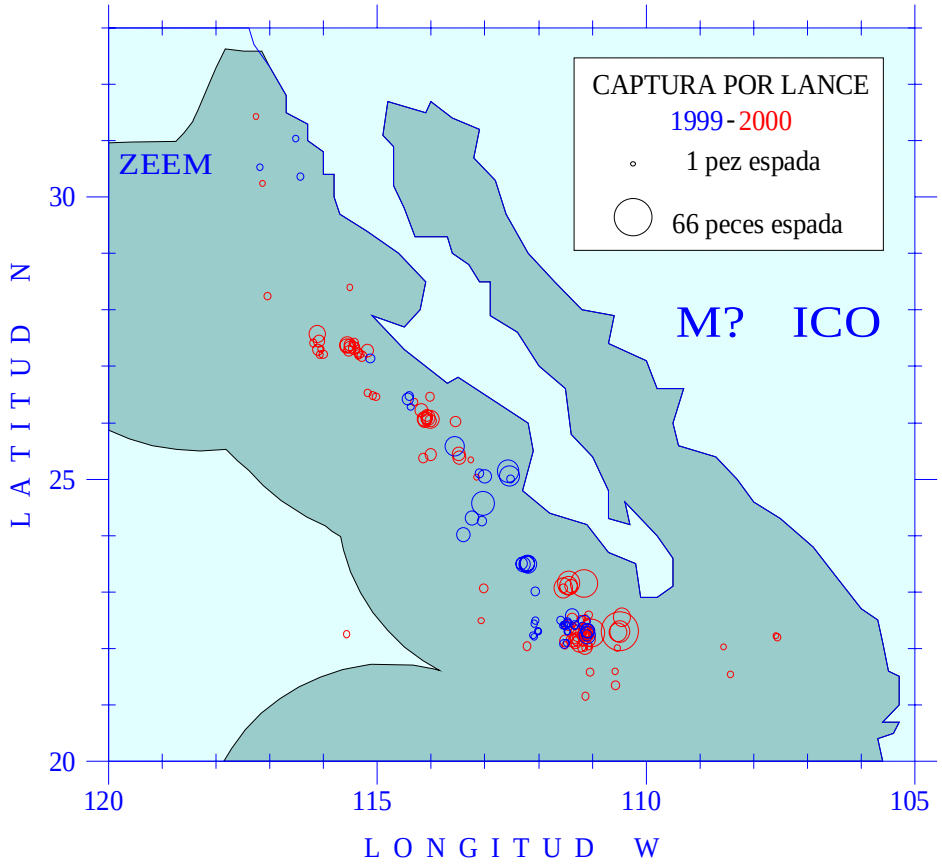

Figure 7. Swordfish fishing grounds in Mexico and catches by set

Catches (Category I 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, yielding 17 or12 fish/1,000 hooks respectively.

Catch Composition

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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 INP 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 dorado, yellow fin tuna and other sharks species. In both studies, the sharks were undoutbtly, the dominant species caught, followed by the swordfish which has a comparative greater percentage in the long line fishery..

The historic records of the swordfish fishery of the Mexican fleet is presented in the Table 5 and figure 8.

This indicates 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, another decline was observed again obtaining 428t. The next pick was in 1998 with 3,603t, which is the historic highest record. The variation observed between the periods is attributed to the changes in the two fishery methods described above. For 2003 a little increment was obtained again with 671t. During 2004 and 2005 the captures have been around 300t for the Ensenada fleet and 347t were reported in 2006, perhaps as a reflection of the increased number of fishing ships.

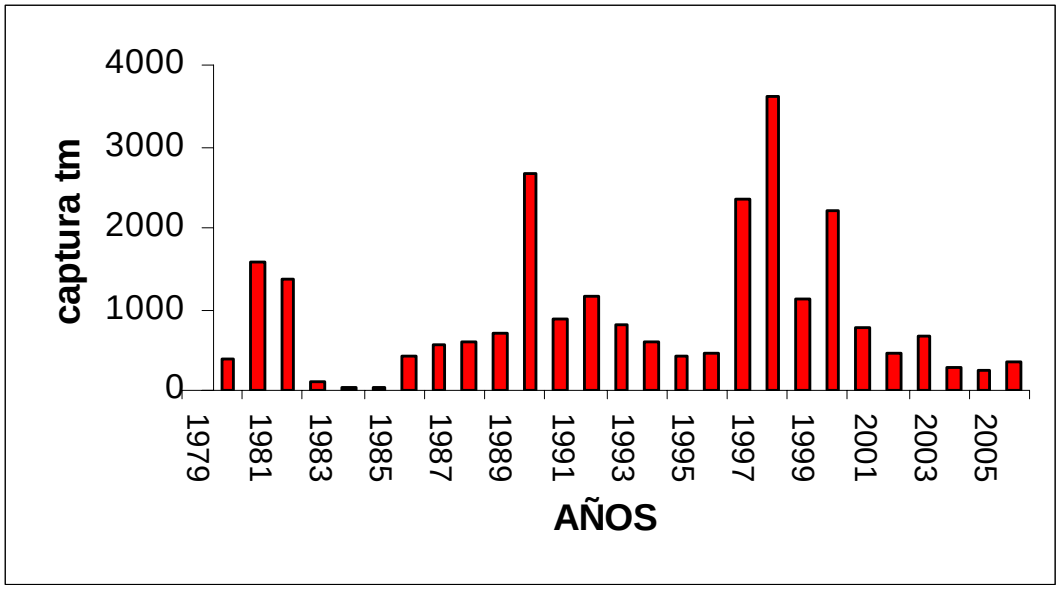

Figure 8. Swordfish catches from 1979-2006.
(FAO, CONAPESCA-Subdelegación de Pesca en Ensenada BC)

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Table 5. Historic records of the Mexican swordfish fishery from 1979-2003.
Data sources from INP-CONAPESCA-México.

YEARS	FAO y 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
2001	780
2002	465
2003	671
2004	270.1
2005	234.5
2006	347.2

Notes:
*High picks
**High Historic record

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FISHERIES MONITORING, DATA COLLECTING AND REPORTING

The National Institute of Fisheries of Mexico (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.

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).

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RESEARCH

Since 1998 the INP 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, or from the INP-PNAAPD sources. Here we summarize the original titles (in Spanish) of the most recent papers presented on November 2006.

List of the Scientific Papers of Tuna and billfishes presented at the IX National Forum celebrated in La Paz, BCS, Mexico:

Captura y captura por lance de túnidos por la flota cerquera atunera mexicana con observadores del PNAAPD. Juan Guillermo Vaca Rodríguez, Héctor Pérez y Marina Eva Hernández González
Predicción del reclutamiento al stock del atún aleta amarilla en el Pacifico oriental. Michel Jules Dreyfus León
Análisis comparativo de los hábitos alimenticios del atún aleta amarilla *Thunnus albacares* y barrilete *Katsuwonus pelamis* en el Océano Pacífico Oriental Tropical. Vanessa Guadalupe Alatorre Ramírez, Felipe Galván Magaña y Robert J. Olson
Patrones espacio-temporales de las pesquerías pelágicas de palangre en el Golfo de México. Craig Brown y Karina Ramírez López
Distribución de la captura de atún aleta azul por la flota atunera cerquera mexicana en el OPO. Héctor Pérez
Alimentación del atún aleta azul (*Thunnus thynnus*) en la costa occidental de Baja California Sur. Arturo Tripp Valdez, Sofía Ortega García, Rubén Rodríguez Sánchez y Marcela S. Zúñiga Flores
Distribución de tortugas avistadas por la flota cerquera mexicana en el océano Pacífico Oriental en el periodo de 1992-2005. Marina Eva Hernández González
Del atún-delfín al camarón–tortuga. Luis Alfonso Calvillo
Relaciones tróficas de los peces pelágicos asociados a la pesquería del atún en el océano Pacífico oriental. Noemí Bocanegra Castillo, Felipe Galván Magaña, Robert Olson y Vanessa G. Alatorre Ramírez
Estado del conocimiento de la pesca artesanal de pelágicos mayores en el Pacífico sur mexicano. Genoveva Cerdenares Ladrón de Guevara, Gabriela González Medina, Carmen Alejo Plata y Samuel Ramos Carrillo
Análisis espacio-temporal de la captura incidental de picudos asociada a la pesquería del atún con red de cerco por la flota mexicana en el Océano Pacifico Oriental de 1998 a 2004. Iván Abiut Leyva García, Juan Guillermo Vaca Rodríguez, Michel Dreyfus León y Oscar Sosa Nishizaki

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Variación espacio-temporal de la abundancia relativa del marlín rayado (Tetrapturus audax) en el noroeste del Pacífico mexicano. Shelley Salcedo Bojórquez, Sofía Ortega García, Víctor Manuel Gómez Muñoz y Heriberto Santana Hernández
Espectro trófico de tres especies de peces de la familia Xiphiidae del área de Mazatlán Sinaloa, México. Dana Isela Arizmendi Rodríguez, Leonardo Andrés Abitia Cárdenas, Felipe Galván Magaña y Ofelia Escobar Sánchez
Muestreo de zooplancton y la aplicación de marcas satelitales en peces adultos de marlin rayado Tetrapturus audax, en el sur del Golfo de California. Rogelio González Armas, Michael I. Domeier, Norma Alejandra Sánchez Reyes y M. C. Peñaloza Mayorazgo
Aprovechamiento de ojos de atún para la extracción de aceites ricos en omega-3. Eloísa Matus Nivón, Sonia Futema Jiménez, Celene Navarro Hurtado, Bertha Arredondo Vega, Laura Carreón Palau, Pedro González Ramírez, Mauricio Contreras Olguín y Benjamín Anguas Vélez
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