WORLD SWORDFISH FISHERIES

Volume IV.

Latin America

Part A. South America

Section 2. Atlantic

Segment A. Venezuela, Guyana, Suriname, and French Guiana

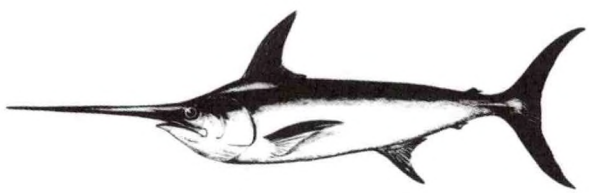
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

WORLD SWORDFISH FISHERIES

An Analysis of Swordfish Fisheries, Market Trends, and Trade Patterns
Past-Present-Future

Volume IV.

Latin America



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Prepared by
The Office of Science and Technology

Dennis M. Weidner
Freddy Arocha
Francesca J. Fontes
William B. Folsom
Julio A. Serrano
Graphics coordinator
Danica R. Starks

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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Silver Spring, Maryland

Prepared by:

Division of International Science and Technology (F/ST3)
The Office of Science and Technology
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway
Silver Spring, Maryland 20910
U.S.A.

Tel: (301) 713-2286
Fax: (301) 713-4057

E-mail: Dennis.Weidner@noaa.gov

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PREFACE

A. Latin American fisheries

The waters off Latin America, especially South America, are major world fishing grounds. The largest fisheries are conducted along the Pacific coast. Fishermen there conduct fisheries both to produce fishmeal and edible products. Two countries (Chile and Peru) routinely report some of the world's largest fishery catches. The Peruvian catch has approached as much as 13 million tons. This massive catch is composed largely of small pelagic species (anchovy, jack mackerel, and sardines) which are reduced to relatively low-value fishmeal. The fisheries along the Atlantic coast are much more limited, although both Brazil and Argentina report catches at or near the 1 million ton level. While much smaller than Pacific-coast fisheries, the Atlantic catches are virtually all edible species with a higher value than the fish used for fishmeal reduction.

Latin American fisheries for edible species until the 1970s were primarily artisanal operations employing traditional methods and in many cases operating at near subsistence levels or producing non-export grade product sold for minimal prices on local markets. Until recently there was a relatively weak demand for seafood in much of Latin America, especially in the inland cities where the region's population has traditionally been centered. Most consumers showed a preference for red meat. In part this was due to the generally poor quality of the available product. Inadequate handling and processing standards meant that the fish available to consumers beyond coastal cities was often poor-quality product.

Latin American countries are gradually modernizing their fisheries. The first modern commercial fisheries were often shrimp trawl fisheries which began to appear in the 1950s. Often foreign fishermen or immigrants, like the Japanese in Brazil and the Italians in Venezuela, have played a major role in developing commercial fisheries. Generally the first commercial fisheries to develop were those aimed at export markets because of the greater availability of funds for needed investments in vessels, gear and processing plants. Fishermen have gradually developed many other commercial and artisanal fisheries deploying a wide variety of gear and methods as well as new aquaculture industries. Many companies in the region now produce high-quality product meeting international standards and market it in both domestic and export markets.

The development of modern commercial and improved artisanal fisheries in Latin America has many economic and commercial implications. The evolving Latin American fishing industries offer opportunities for U.S. shipyards, manufacturers (gear, electronic instruments, and processing equipment), consultants, fishermen, brokers, investors, etc.

Fisheries in Latin America used to be an economic backwater in much of region. That has changed over the past two decades. Many countries in the region now list fishery products as one of their principal export commodities, remarkable considering the fact that there was virtually no commercial development before the 1950s. In many countries the fishing industry has become one of the most dynamically growing sectors of the national economy. The importance of the industry tends to be highest along the Pacific coast (especially in Chile and Peru), but the industry in Atlantic-coast countries is still of some importance.

The fishing industry is creating well-paying jobs, producing food, and increasing export earnings. Several countries have resources that are not yet fully utilized and could permit continued expansion. Many countries report, however, greatly expanded fishing effort and declining yields. Government that just a few years ago were promoting the industry's development are now faced with the need to limit that effort to ensure optimal utilization. With some species, such as highly migratory tunas and other oceanic pelagics like swordfish, effective management will require international cooperation.

Available fishing fleet and catch data graphically show that Latin American fishermen are steadily expanding the fishing industry. Much of the effort has gone into purse seine fisheries for small and large pelagics and trawl fisheries for shrimp and groundfish. Some countries are making enormous progress with aquaculture. A wide variety of other gear and methods are being used on a smaller scale. Some fishermen are using gillnets and driftnets to catch a diverse range of species, including oceanic pelagics like tuna and swordfish. Much of the Latin American effort on oceanic pelagics has focused on tunas and several countries have developed important fisheries (Brazil, Colombia, Ecuador, Mexico, and Venezuela).

B. Swordfish fisheries

Less attention has been devoted to the smaller swordfish resources, although the early Chilean fishery was in effect the regions first large-scale commercial fishery. The first Latin American swordfish fisheries (Chile in the 1930s) and Peru (in the 1940s) were large-scale harpoon fisheries and at the time the most significant fishery operations in the region. These fisheries for a few years dominated the local fishing industry. Since the 1950s, the species off Latin America was fished almost exclusively by foreign fishermen conducting longline operations on the high seas and to a lesser extent through a variety of access arrangements in coastal waters. Foreign fishermen have been active off both the region's Atlantic and Pacific coasts.

Latin American fishermen have conducted a variety of fisheries for swordfish beginning in the Pacific with the Chileans and Peruvians who conducted the large-scale harpoon fisheries during the 1930s and 40s. There was little foreign involvement in these fisheries because the initial development was before freezing facilities were available permitting export shipment or the operations of distant-water vessels. Air lines were in an initial statement of development and air shipments besides mail had not yet developed. In the Atlantic, Argentine, Brazilian, and Cuban fishermen initiated tuna/swordfish longline fisheries during the 1960s, although the conduct and development of those fisheries was quite different in each of the three countries. There was substantial foreign involvement in these early longline fisheries. New driftnet fisheries were initiated in the Pacific (Chile and Mexico) during the 1980s as almost entirely local fisheries. Longline technology in the 1980s also spread to several other countries which have initiated tuna/swordfish fisheries in the Atlantic (Mexico, Uruguay, Venezuela, and various Caribbean islands) and Pacific (Chile, Costa Rica, Ecuador, and Peru). The importance of swordfish as a target species in these longline fisheries varies widely from country to country. The nature of the fishery and involvement of foreign fishermen also varies substantially. Foreign fishermen and vessels have played a major role in the longline fisheries in several of these countries (Brazil, Chile, Costa Rica, Cuba, and Uruguay).

The high value available for swordfish has meant that it is an attractive species for both local and distant-water fishermen. The efficiency of modern fishing gear, however, has also meant that valuable species, like swordfish, are often heavily targeted. This is certainly case of swordfish and the massive effort deployed and declining yields has prompted Atlantic-coast countries to restrict fishing effort in the north Atlantic through the International Commission for the Conservation of Atlantic Tunas (ICCAT) to bring the effort deployed in line with the available resource. Two Latin American countries (Cuba and Venezuela) are especially concerned with north Atlantic swordfish.

Foreign fishermen responded to ICCAT catch limits in the north Atlantic by significantly shifting effort into the south Atlantic which at the time was lightly fished. The Spanish in particular have greatly expanded their swordfish catches in the south Atlantic, reporting much larger catches than the two principal South American countries involved (Brazil and Uruguay). ICCAT has, as a result, implemented a management scheme for the south Atlantic.

The expanded foreign fishing in the south Atlantic is of special concern to two Latin American countries (Brazil and Uruguay). Both countries, however, are concerned about ICCAT efforts to restrict south Atlantic catches. Neither country is satisfied with the ICCAT management regime, especially what they view as restrictive catch quotas on the coastal countries in the south Atlantic. The expanding longline fisheries in both Brazil and Uruguay now account for an important share of the south Atlantic catch. Brazilian fishermen caught over 2,000 tons of swordfish in 1997 and foreign fishermen operating from Brazilian ports also exceeded 2,000 tons. Uruguayan fishermen are approaching 1,000 tons. There is some indications that Argentina is reentering the swordfish fishery, although this may be primarily joint venture activity. Several other Latin American countries (Belize, Honduras, Barbados, and others) operate longliners in the south Atlantic, either national vessels or flag-of-convenience vessels. It is Brazil and Uruguay, however, that will play a key role in any successful ICCAT management regime for the south Atlantic.

The international community is currently addressing many difficult fishery issues, including high-seas fisheries, reflagging, straddling stocks, and responsible fishing. Increasingly world fishery managers are coming to the conclusion that effective management of fisheries requires expanded international cooperation. Talks are underway seeking to establish accepted international norms. These discussions have lead to some agreed international guidelines, but the complexity of the issues and the conflicting interests involved suggest that problems will persist for some time. The data in this and accompanying regional surveys is designed to provide some basic information to the government officials and researchers assessing cooperative efforts.

Biologists from several countries are giving considerable attention to swordfish and other oceanic pelagics. For the most part, however, little research is being conducted in Latin America, primarily because the species has until recently been of little commercial interest in most countries. In addition, research on highly migratory species is often especially difficult and costly, often with no immediate return. Some research is underway in government and university research institutes in each of the principal Atlantic-coast South American fishing countries (Brazil, Uruguay, and Venezuela).

Biologists as a result of the expanding body of research are beginning to better understand basic data about the stock structure and behavior of Atlantic swordfish. While researchers are just at the beginning stage of understanding the swordfish stock structure in the Atlantic, they are beginning to acquire the data needed for effectively manage the species. Much of the research underway has been initiated by Japan, the United States, and Spain and centered on the north Atlantic. Data on the south Atlantic is much more limited. The authors have attempted to summarize the Latin American research efforts as well as other foreign work which may help in the understanding of the species in the Caribbean and western Atlantic.

Environmentalists are also concerned about the status of the swordfish fishery. A consumer boycott was promotes in the United States during 1998 to reduce pressure on stocks. Environmentalists are also concerned with the bycatch associated with swordfish fisheries. Sharks are coming under increased fishing pressure and they are a major part of the bycatch in many tuna and swordfish fisheries, especially the coastal fisheries conducted in Latin America. In several cases they are not precisely a bycatch as the fishermen target them directly, primarily to supply domestic markets. Other bycatch concerns include seabirds, marine mammals, and billfish. Turtles are a special concern because of the precarious state of many species. Some environmentalists believe that the turtle bycatch from tuna/swordfish fisheries may be considerable. The incidence of interaction may be low, but given the heavy fishing effort, the overall impact could be significant. Little actual observer data exists, but the limited available studies suggest that interaction rates may be high--giving cause for concern.

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The authors are also grateful to our colleagues who played valuable roles in the production of this report. **Danica Starks** at American University

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NOTES

The authors stress that this is not a scientific paper. The principal objective of the report is to provide and analyze timely statistical data for U.S. Government officials, company executives, consultants, academic institutions, and environmental groups, and others interested in Latin American fishery developments. The authors have sought to inform U.S. groups as to the full scope of opinions expressed in each country concerning the swordfish and other related fisheries. For this reason unverified press reports have been used extensively because they provide an indication of prevailing opinions and the range of ideas expressed in policy debates.

A timely synthesis of available commercial, economic, and scientific information is needed to fully understand local fishing industries. The time required to prepare a thoroughly evaluated scientific paper would make the economic and commercial data in the report so dated that it would be of little value to U.S. readers, beyond marginal historical interest. The authors have decided instead to provide "snap shots" of selected countries giving the reader data as well as available opinions and projections on this rapidly evolving fishery. In some cases opinions have been presented that can not be substantiated by available data. A wide range of assessments are provided because the authors often do not have adequate data to determine who was correct. In other instances the authors have presented opinions with which they disagree to provide a full spectrum of thought from the region. U.S. businessmen and researchers working in Latin America, need to be aware of the full spectrum of views, even widely held opinions that may not be valid. Knowledge of the discussions currently underway and diversity of opinions among officials, researchers, and businessmen in the region is important to government officials and businessmen planning to work in the region.

The authors have chosen to provide detailed notes to each of the reports in this volume. The level of documentation is admittedly unusual for a Government or even academic paper. The authors have decided to make such elaborate citations for the following reasons:
Further research: Each country report, even the longer chapters, is only a superficial analysis of the local fishery. The references thus provide interested researchers a detailed account of sources which may prove useful in pursuing specific subjects on their own in greater detail.
Evaluation: The authors have often been unable to obtain hard data on specific subjects and countries. In many cases such data simply does not exist. In other cases local,officials are unwilling to release data. Often the authors had to rely on the opinions of local officials and industry leaders. The notes identify those sources to help the reader evaluate the specific statements.
Assessments: The authors have received many varied, and frequently conflicting, appraisals on the current situation from different local observers. In many instances, it was not possible to fully assess those appraisals. As a result, the authors have often presented a synthesis of different reports to give the reader an idea of the range of assessments.
Unpublished: Much of the information did not come from published sources, but rather from telephone conversations and personal interviews, usually in Spanish. As one of the authors is not a native Spanish speakers, this creates the possibility for some misunderstanding. Dealing with the Portuguese spoken in Brazil provided an even greater challenge. Obtaining information over the phone is difficult enough even in English, the intricacies of foreign languages compound the difficulties. The authors, as a result, felt it important to identify the individual source much more thoroughly than if more detailed published information had been available. Each of the interviewees was provided a draft of the report to ensure that their comments were correctly noted.

The reader should not take the information on vessel lists, vessel imports, vessel construction, company catch and processing activities, joint ventures, and other matters as complete lists. While the authors attempt to follow announcements in fishery journals, many such developments are only reported in local newspapers which the authors can rarely obtain. Often such developments are not publicly reported at all. Thus the listings in this study are often incomplete and in many cases dated. While they can not be used as a complete inventory of such developments, they do provide a useful overview of the range and diversity of the activities involved, as well as a reasonably complete list of the established and major companies. The authors have not excluded specific companies, shipyards, joints ventures out of any policy decision, but rather because of the limited information available. In a few cases companies have declined to provide information or representatives asked that they not be cited. Individual companies that think their activities should have been mentioned in possible future assessments are encouraged to provide details on their operations to the authors.

The preparation of this report has been significantly impaired by the paucity of reliable statistical and other published information. This is due to several factors:

New fishery: The swordfish fishery is relatively new in many of the countries of the region, at least the swordfish fishery using modern monofilament line. In most cases it is conducted by individual boat owners or small companies, complicating data collection. Artisanal fishermen participate in several countries (Brazil, Chile, and Costa Rica), making data collection even more difficult. Effective industry trade groups exist in only a few countries and in most cases these groups have little interest in swordfish.

Limited statistical data: The Government agencies in many countries do not publish extensive fisheries data. This is particularly true for small, relatively minor species like swordfish in most countries. Several small countries have particularly limited data collection systems. It is not, however, just a function of the size of the country. Brazil in particular does not publish annual statistical reports. In addition, many countries have reduced data collection services during the 1980s as part of the overall economic retrenchment.

Suspicion: Industry sources in some countries are reluctant to provide information. This is partially due to the concern that such data will be used by Government officials to enforce tax and exchange rate regulations and partly out of a general unwillingness to release information for public dissemination. This reluctance has been exacerbated by trade actions brought by U.S. environmental groups. Many businessmen are concerned with additional such actions in the future. Whatever the reason, their reluctance has made it difficult to obtain accurate information on the swordfish fishery in several countries.

Limited local assessment: General surveys of national swordfish fisheries are rare. Few local observers have published detailed assessments synthesizing available scientific, commercial, economic, and social data.

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SEGMENT C

2.1

VENEZUELA

Venezuelan fishermen report the largest swordfish catch in the Caribbean. The country's longline fishery is primarily conducted by fishermen targeting tunas, but a small number of fishermen also target swordfish or other billfish. The swordfish fishery is conducted mostly in the country's large eastern Caribbean Exclusive Economic Zone, on the slope of the shelf around the country's numerous offshore island groups, but some limited fishing takes place in the Atlantic. Fishermen appear to be fully utilizing the available resource, although no detailed stock assessment has been conducted and fishermen generally avoid the area off the western coast near the Colombian border. Most of the catch is marketed fresh in the United States. Swordfish catch estimates vary widely. Some estimates suggest catches of under 100 metric tons, but catch of 300-400 tons live weight appear more likely in the 1990s. Preliminary data suggests substantial catch declines in late 1997 and 1998. Falling international prices caused fishermen to redirect effort to other species. Export shipments show no clear trends and have ranged from 120-200 tons (product weight) during the 1990s, but declined sharply in 1998 to extremely low levels. Fishermen are marketing an increasing share of their catch domestical, especially small swordfish that cannot be exported. Venezuelan scientists participating in the overall International Commission for the Conservation of Atlantic Tunas research program conduct a small project which includes an observer program to collect data as well as sample and tag fish. The program has focused primarily on billfish, but valuable data has also been collected on swordfish. Venezuelan scientists believe that the waters of the southern Caribbean may be an important nursery area for juvenile swordfish. Venezuelan scientists are currently processing and analyzing the data collected on swordfish to better understand swordfish populations and behavior off the country's coast.

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Venezuela

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Boundary representation is not necessarily authoritative

Figure 1.--Map of Venezuela

Railroad
Road
Airport

I. Fishing Industry Overview

Venezuela has one of the smallest South American fishing industries, but the largest Caribbean fishing industry.[1] Fishermen reported a 358,300 metric ton (t) catch in 1991, little changed from the 1980s. Beginning in 1993, Venezuelan fishermen have began to report substantial catch increases, achieving record results. Catches totaled 390,300 t in 1993, 424,000 t in 1994, and over 500,000 t in 1995 (appendix D1a).

Venezuelan is the leading Caribbean fishing country. Nearly 400,000 t of the country's 1995 catch was taken in the Caribbean. The next largest Caribbean fishery is the Cuban fishery, but that country reported a Caribbean catch of only 50,000 t in 1995. Neighboring Colombia reported only a 23,000 t catch in 1995. All of the Central American countries report relatively small Caribbean catches. Mexico reports a substantial catch along its eastern coast, but mostly in the Gulf of Mexico, rather than the Caribbean. The Caribbean island countries, except for Cuba, have only small fishery catches.

Venezuela's fisheries catch is mostly composed of sardines, tunas, other finfish, shrimp, and shellfish (especially arkshell). The sardine fishery is subject to substantial annual population fluctuations related to climate, but much of the catch increase in recent years has been due to improved sardine catches. The increased catch of this species is primarily due to rising demand. Sardine catches during the 1980s were primarily dependent on demand from the country's canneries, the primary purchaser. As the canneries shifted to tuna, demand for sardines declined and the fishermen reduced effort.

Economic difficulties in the 1990s has increased demand for inexpensive domestically produced food. As a result, a local market for fresh sardines has developed and fishermen have increased their effort on this species. Other increases are due to expanded cultured harvests and increasing utilization of trash fish because of the greater demand for inexpensive seafood products. Improvements in the distribution system have also enabled the fishermen to market more of their catch giving them an inducement to increase fishing effort.

Venezuela has both a commercial and artisanal fleet. As in many other countries, serious conflicts exist between the fishermen over access to coastal grounds. Some of the most difficult conflicts are with the commercial shrimp trawl fishermen. Artisanal and commercial shrimp fishermen differ greatly over access to coastal grounds. The Government, in an effort to resolve the conflict, has established a 3-kilometer (km) coastal zone to protect the artisanal fishermen.[2]

Artisanal: The Venezuelan fishing industry, with the exception of the shrimp trawl fishery, was primarily an artisanal operation, throughout the 1970s and a major part of the industry continues to be artisanal fisheries. The marine artisanal fishery is currently composed primarily of wooden vessels (peñeros). The boats range from 4-12 meters (m) in length and are powered by one or two gasoline outboard engines. They are generally operated by a family group. The maritime artisanal fleet in 1994 totaled 8,975 peñeros, of which nearly half lands their catch along the eastern coast. The fleet uses several types of gear, including hooks and trawlnets and gillnets, depending on the target species. Those fishermen targeting sardines use beach seines or small purse seines. Artisanal fishermen targeting large pelagics fish use gillnets or longlines while those targeting groundfish use bottom traps or hook-and-line.

Commercial: The shrimp trawl fishery which began in the 1950s was one of the country's few commercial

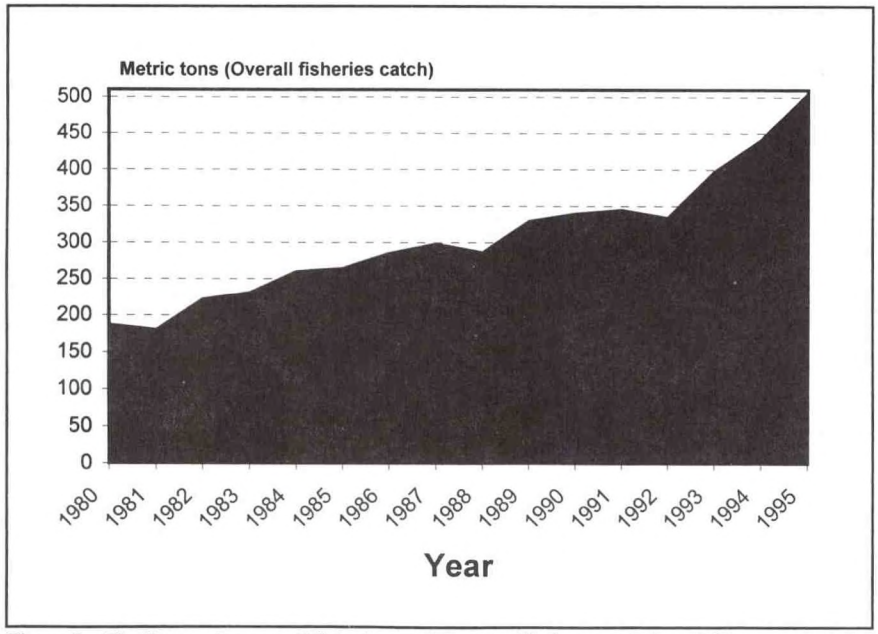

Figure 2.--The Venezuelan overall fisheries catch has steadily increased since 1980 to a record 0.5 million tons in 1995.

fisheries. A small canning industry processing mostly sardines also developed. The country's tuna fishery has emerged as a major industry and Venezuela has become the second leading Latin American tuna fishing country after Mexico. The sardine fishery in eastern Venezuela accounts for a substantial part of the overall catch. Fisheries for snapper, shark, and other species are also of some importance.

The Venezuelan economy during the 1960s and 70s was dominated by the petroleum industry. Revenue from the petroleum industry was invested in a variety of industrial projects, many of which have required Government subsidies. The food production sectors (agriculture, ranching, and fisheries) during the 1960s and 70s were not given high priority by the Government which was intent on developing an industrial economy. Lack of Government support and private investment adversely impacted food production. Even more important was the creation of relatively high paying jobs in the new industries. Low paid agricultural workers flocked to the less arduous and better paying jobs generated directly and indirectly by the petroleum and other industrial sectors in urban areas. These and other factors made it difficult for the agricultural and fishing industries to thrive. This had a serious negative impact on food production which, depending on the commodity, declined or failed to increase in relation to the country's expanding population. As a result, Venezuela became a net importer of many agricultural staples and fishery commodities. This was unusual in Latin America where agricultural and fishery products are more commonly major export commodities.

The economic situation changed dramatically with the oil crisis of the early 1980s. Declining real oil prices has meant that the country could no longer finance massive imports of food and luxury products. Although the fishing industry now faces less competition from imported seafood, other problems such as high interest rates, limited access to investment capital, high interest rates, inflation, a sharp decline in the value of the national currency (the Bolívar), high prices for imported gear and equipment, labor unrest, and other developments have adversely affected the industry.

The Venezuelan fishing fleet is dominated by the shrimp, snapper, and tuna fleets. Shrimp fishermen operate about 450 trawlers.[3] Snapper/grouper fishermen deploy another important fleet, although estimates vary on the number of boats.[4] Tuna fishermen deploy large modern purse seiners which primarily fish in the eastern tropical Pacific (ETP) and smaller baitboats and longliners which operate on both coastal grounds and in the Atlantic.[5] Many of the shrimp and finfish trawlers are reportedly quite old, often over 15 years, and utilize the same methods and gear prevalent during the 1970s. Some of the tuna baitboats are also older vessels. The tuna purse seine fleet is the most modern sector of the Venezuelan fleet and capable of distant-water operations.

Seafood is popular in Venezuela with Italian and other immigrant groups playing a large role in expanding seafood consumption. Local observers, however, report highly varied market sectors which have been significantly affected by the country's current economic difficulties. Low income urban families choose fresh sardines because of the low prices. In coastal areas the same families would fish their own fresh fish and eat it daily. Affluent consumers buy their fresh fish primarily from supermarkets. Economic conditions in Venezuela have forced many once affluent middle-class consumers to severely curtail expenditures. These families now buy inexpensive fresh fish like sardines, which they supplement with canned sardines and tuna and an occasional more expensive fresh fish from the local market. The most popular species are snapper-grouper, king mackerel, shrimp, squid and octopus, and tunas. Consumers strongly prefer fresh or iced whole fish which is then often filleted in the market or supermarket. The key to the Venezuelan consumer is the freshness of the product and the reliability of the "cavero" who is the owner of an ice truck that buys the fish from the fishermen and delivers directly to the local market. (This cavero may also share ownership of some artisanal vessels that are operated by different families in a fishing community).

Venezuelan fishermen have developed one of the principal Latin American fisheries for oceanic pelagics employing purse seines, gillnets, and longlines operations.

Purse seine: Venezuela has developed the largest commercial purse seine fleet of any South American country. The large Venezuelan seiners were deployed in the ETP to target yellowfin tuna. Several seiners, however, also operate in the Caribbean and Western Atlantic, targeting yellowfin and skipjack tuna.

Baitboat: Venezuelan fishermen operate several commercial baitboats throughout the Caribbean and western Atlantic which target primarily yellowfin and skipjack tuna.

Gillnet: Venezuelan artisanal fishermen operating off Playa Verde (La Guaira) and off various different ports along the country's central coast target billfish, utilizing primarily gillnets. This fishery began about 1982. Swordfish are occasionally caught by these fishermen.

Longline: Venezuelan fishermen, both artisanal and

industrial, deploy longliners to target tuna. Some of the commercial vessels, however, target primarily swordfish. Venezuela's longline fleet is primarily based in ports along the country's eastern coast.

The declining fishing industry in the 1970s made it impossible to supply the country's expanding demand for seafood. U.S. exporters in the southeastern United States developed important markets in Venezuela during the late 1970s. This situation intensified despite a variety of Government development efforts and subsidy programs. The oil crisis of 1982 and the resulting decline of the Bolívar, however, made it impossible to continue financing massive imports. The Government promoted exports to generate foreign currency earnings after the 1982 economic crisis. As a result, fishermen increased export shipments to a record $190 million in 1986 (Latin America, appendix E1). Shipments have since been highly variable, ranging from $15 million in 1980 to $100 million in 1994.

Venezuela maintains an important trade in fishery products. While small compared to the major Latin American exporters (Chile, Peru, Argentina, Ecuador, and Mexico), Venezuela is the leading Caribbean exporter of fishery products. Domestic consumption in recent years appears to have expanded as the economy improved.[6] Exports in 1994 totaled nearly $100 million, about seven times more than the $15 million imported in 1988.

Exports: The $100 million exported in 1994 represents a major increase over the $14 million shipped in 1988, but is still only about half of the record $193 million shipped in 1986, not even considering inflation. Exports declined sharply in 1995, however, to only $77 million. Most of the decline was reduced shipments of shrimp, but shipments of frozen finfish also declined. The two leading commodities are frozen shrimp and tuna. The sharp fluctuations in Venezuelan exports are in part due to U.S. regulations protecting dolphins, thus affecting shipments of tuna caught in association with dolphins. The major factor, however, has been domestic economic and fiscal policies. Declining oil export revenue in recent years has required greater exports of other products to earn hard currency.

Imports: Venezuela before the oil crisis of 1982 had become an important importer of U.S. seafood. Economic difficulties associated with falling oil income forced Venezuela to reduce food imports during the 1980s. More recent statistics suggest that import levels have began to increase somewhat during the 1990s. Fishery imports totaled $14.9 million in 1994, more than double the $7.0 shipped in 1992 and nearly 10 times the $1.6 million shipped in 1989. Importers reported a major increase in 1995, purchasing $31.4 million, more than double the amount imported in 1994. Most of the increase was expanded shipments of frozen fish and, to a lesser extent, canned fish.

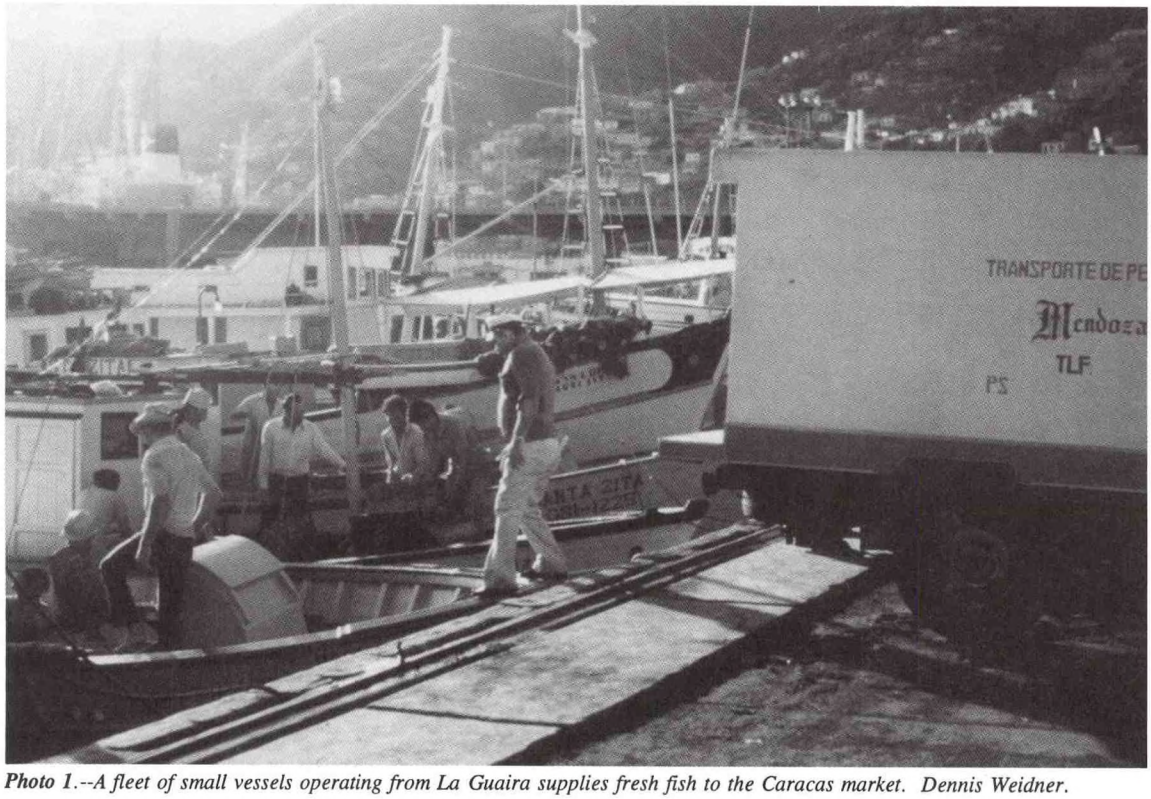

***Photo 1**.--A fleet of small vessels operating from La Guaira supplies fresh fish to the Caracas market. Dennis Weidner.*

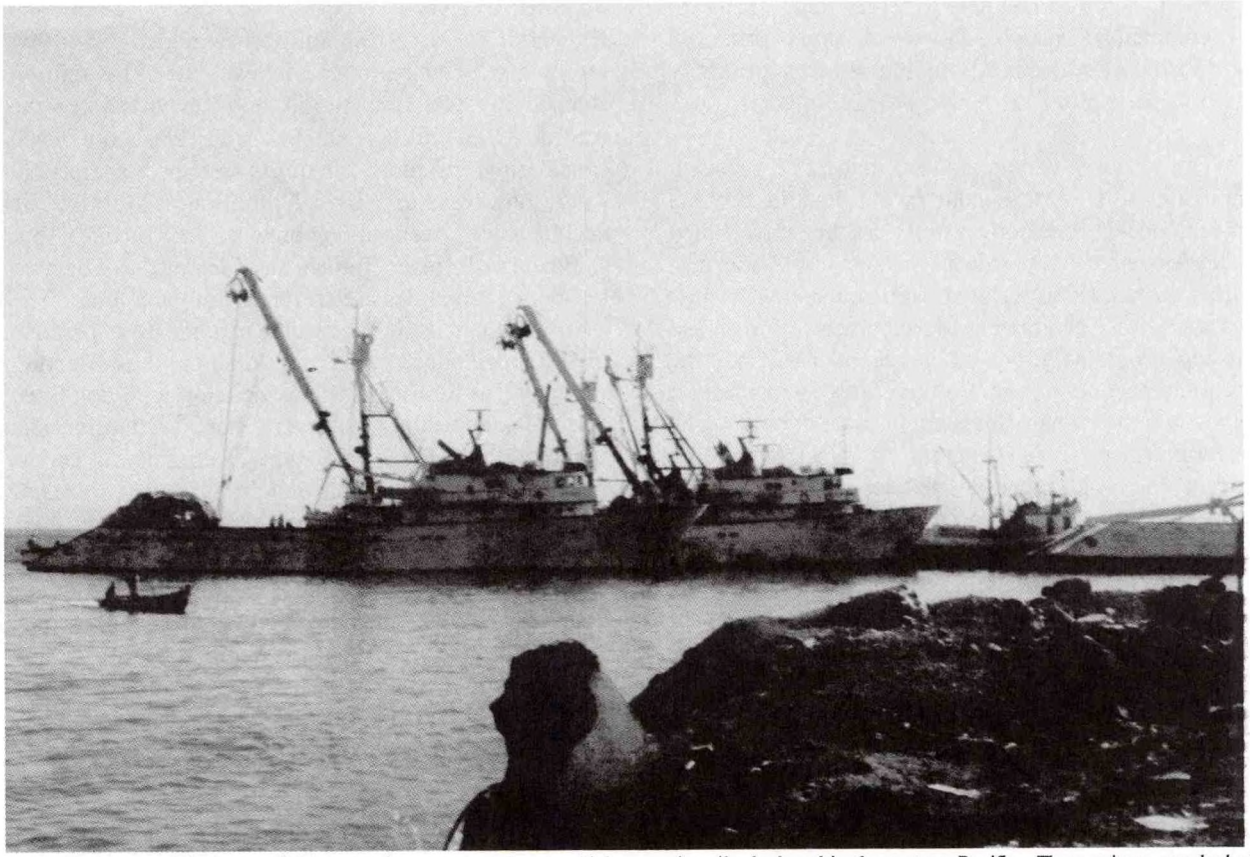

Photo 2.--Venezuela's largest fishing vessels are tuna seiners, which are primarily deployed in the eastern Pacific. These seiners are docked at the FIPACA plant. Freddy Arocha.

The Venezuelan fishery for oceanic pelagics has become a key part of the country's fishing industry.

Purse seine fishery: Private investors initiated a major tuna purse seine fishery in the 1980s and tuna soon surpassed sardines as the principal species processed by the domestic canning industry.[7] Venezuelan tuna fishermen initially targeted export markets, but have had to increasingly rely on local canneries because of problems marketing non-dolphin-safe tuna in major consuming countries. Venezuela has an important canning industry centered in Cumaná, which packs tuna, sardines, and other species for both the domestic market and for export, mostly to other Latin American countries.

Longline fishery: Venezuelan fishermen have also developed a small longline fleet. The Venezuelan longline fishery was initiated during the 1950s as a result of the success of Japanese exploratory fishing in Venezuelan waters. Fishermen initially targeted tunas, primarily for the local market. Fishermen have since expanded the small longline fishery to supply the more lucrative and growing market for fresh tuna and swordfish in the United States. Both commercial and artisanal longline fishermen are active. The Venezuelan fishermen deployed the first longliners targeting swordfish in 1987.[8]

II. Species

A. Distribution

Swordfish are widely distributed throughout the southeastern Caribbean Sea. The species appears to be much less abundant in the southwestern Caribbean off Colombia, although as some observers point out there is a lack of stock assessment data and the low apparent abundance could be due to the lack of directed fishing effort.[9] Venezuelan fishermen, however, have found abundant populations of swordfish in the southwestern Caribbean, which includes most of the 200-mile Venezuelan Exclusive Economic Zone (EEZ). The species appears to most abundant along the shelf slope from Curaçao, along the rim of offshore Venezuelan islands and northward along the Aves Ridge (figures 1 and 23). This assessment is based primarily on the good swordfish catches achieved from longline sets along the slope.[10] Venezuelan biologists believe that downwelling along the slope may be one factor explaining why the slope is such a productive feeding area.[11] Catch rates along the slope appear to be relatively evenly distributed without major variations in productivity, although this has not yet been fully analyzed.[12]

A variety of sources provide information on swordfish distribution off Venezuela:

Research: The Fondo Nacional de Investigaciones Agropecuarias (FONAIAP) and Universidad de Oriente's Instituto Oceanográfico (IO) both have research programs on oceanic pelagics, including swordfish. These swordfish research programs are part of a larger program conducted in cooperation with the National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (F/SEC) in Miami and the International Commission for the Conservation of Atlantic Tunas (ICCAT) in Madrid. Research includes topics on growth, reproduction, distribution and a tagging program sponsored by F/SEC and ICCAT. (See "Research".)

Domestic fishermen: Available literature describing the Venezuelan artisanal and commercial fisheries suggest high availability of swordfish. Fishermen appear to be fully utilizing the resource, although the danger of fishing west of the Paraguana Peninsula mean that unfished resources may be present along the extreme western coast bordering Colombia[13] .

Foreign fishermen: Reports from foreign fishermen also suggest availability of swordfish. Commercial swordfish catches were first reported off Venezuela by the Japanese and Korean longliners during the late 1970s while conducting exploratory fishing operations targeting bigeye tuna.[14] Two U.S. longliners subsequently reported high swordfish yields in the waters off Venezuela during the late 1980s. These two vessels initiated the Venezuelan commercial swordfish fishery.

Recreational fishermen: Recreational fishing for billfish is popular in Venezuela. Serious recreational fishing for billfish began in the late 1950s. Most of the recreational fishery conducted in Venezuela is directed towards sailfish and marlin, and other minor coastal pelagics (such as wahoo and dorado). Experienced recreational fishermen have fished swordfish in Venezuelan waters since 1978, particularly on the La Guaira Bank ("Placer de la Guaira"), an area famous worldwide for its high incidence of billfish.[15]

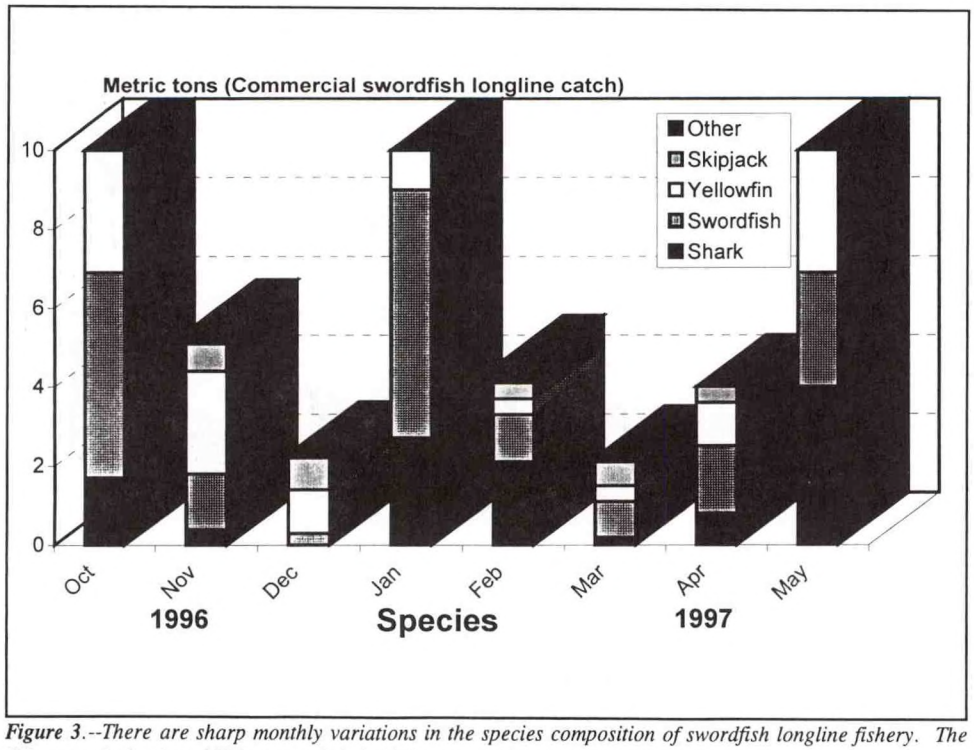

Figure 3.--There are sharp monthly variations in the species composition of swordfish longline fishery. The fishermen during late 1996 reported their highest swordfish and tuna catches in October.

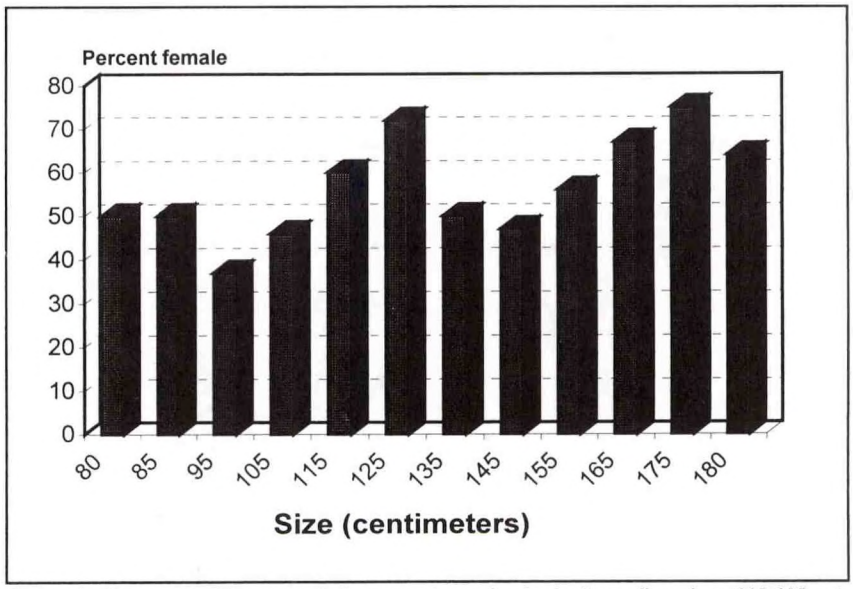

***Figure 4**.--Venezuelan fishermen take large numbers of males in the medium sizes (115-125 cm), but much larger numbers of female in the larger sizes (155 cm).*

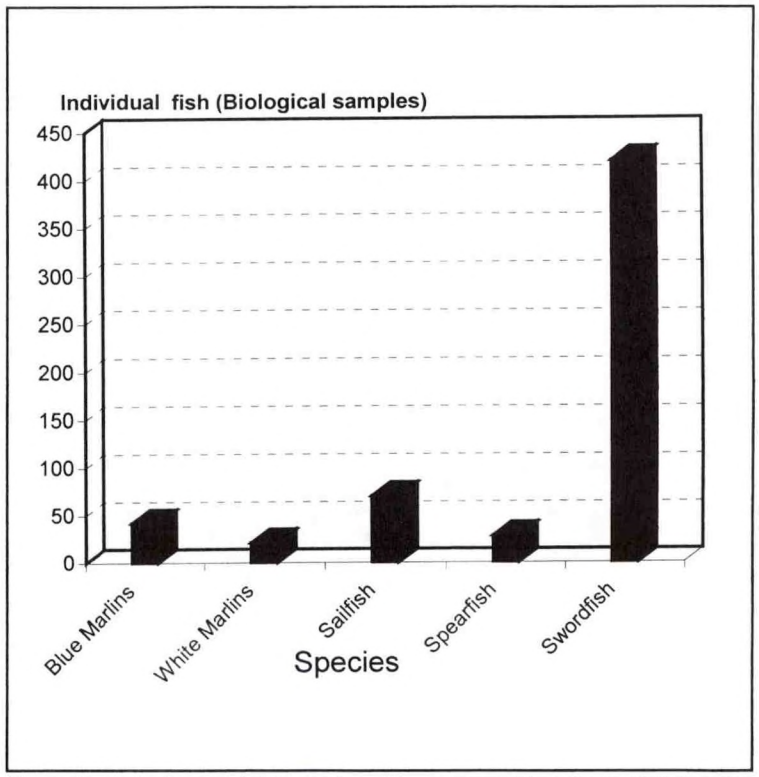

***Figure 5**.--Biologists sampled the catches of the commercial tuna fleet in 1994, focusing primarily on swordfish.*

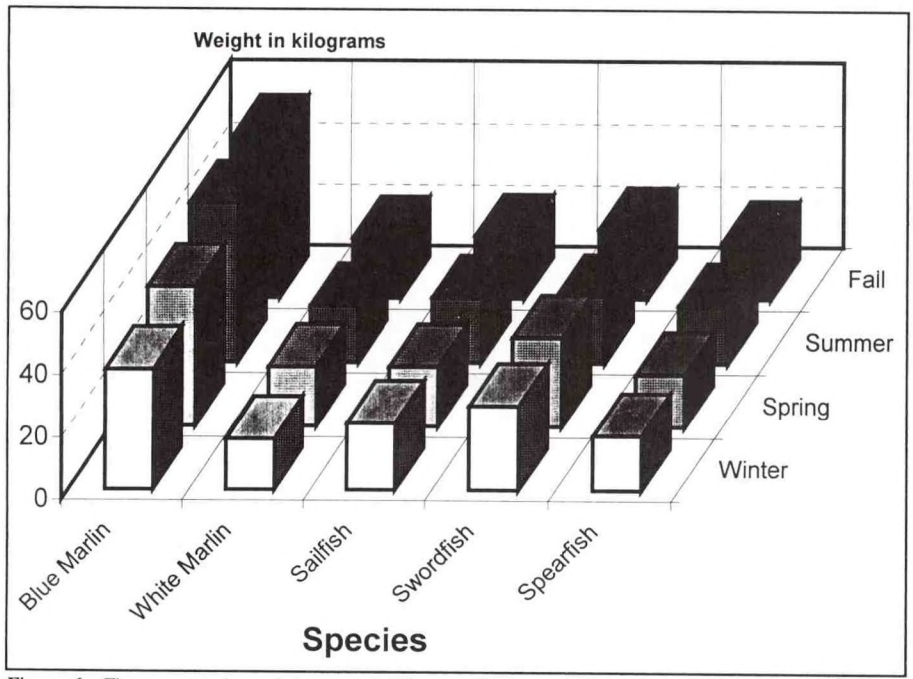

Figure 6.--There were substantial seasonal differences in the swordfish taken off Venezuela during 1987-95. The larger swordfish are taken in the winter and spring.

Fishermen have a chance for an Atlantic grand slam, taking a white and blue marlin and a sailfish on the same trip (appendix D8b). The La Guaira Bank is about 20 km north of La Guaira along Venezuela's central coast. (See "Grounds".) Recreational fishermen report that most of the billfish catches, only occasionall including a swordfish, off La Guaira occur from June to November at depths of 40-130 meters.[16] A few Venezuelan sport fishing companies, however, do offer charters targeting swordfish and some report considerable success.[17] Notably the only super grand slam, a grand slam including a swordfish was out of Caraballeda rather than La Guaira (appendix D8b).

Venezuela also has several related billfish species (sailfish and marlin), as well as a variety of shark species. The presence of billfish and sharks does not mean that swordfish are necessarily present. Their presence, however, is sometimes used as a reference point for the presence of commercially exploitable concentrations of swordfish. Billfish bycatches are also a commercially important component of many swordfish fisheries. In several Latin American countries they comprise an important part of the catch and make a value contribution to the profitability of the fishery.

Billfish: The most common billfish found off Venezuela are sailfish and marlin which are most prevalent along the shelf break from Paraguana Peninsula to La Blanquilla Island. Sailfish is currently the most plentiful billfish species, followed by white marlin. Blue marlin is also frequent but mostly off La Guaira. Longbill and shortbill spearfish are common offshore the northeastern Venezuelan islands (figure 1).

Sharks: Venezuela reports an important shark resource. Observers on board commercial longliners report 31 species along the Caribbean and Atlantic coasts (appendix H2).[18] The 31 species identified include oceanic (14), coastal (8) and cosmopolitan (9) species. The most common species caught by commercial longliners were blue, mako, and thresher sharks. An important portion of the Venezuelan shark catch is presently landed as the by-catch of the country's tuna/swordfish longline fishery, but there are a few dedicated shark longliners.[19]

B. Stock structure

The swordfish occurring off Venezuela are considered by ICCAT researchers as part of the north Atlantic stock, which includes all of the swordfish found in the north Atlantic with the exception of those occurring in the Mediterranean. This conclusion is based on the similarity of catch patterns, limited tag returns, and preliminary genetic studies.

Catch patterns: The homogeneous distribution of catch-per-unit (CPUE) effort across age-classes on both sides of the Atlantic suggests to ICCAT researchers that swordfish in the north Atlantic should be regarded as a single unit stock.[20] Additionally, the similar size distribution of fish caught in the north Atlantic further supports the hypothesis of a common north Atlantic stock. Biologists are currently calculating Venezuelan data to determine how it compares to the existing Atlantic data.[21]

Tag returns: Recorded movement of swordfish in the north Atlantic, based on release and recapture of tagged individuals, are primarily available from fish taken along the U.S. eastern and Gulf of Mexico coasts.[22] The tag returns indicate few examples of trans-Atlantic migration, although one fish tagged off Delaware was captured 2,740 nautical miles to the west off southern Portugal (figure 8).[23] Most of the fish tagged off the U.S. eastern seaboard were also recaptured along the U.S. coast. Nonetheless, the tag returns provide

important details of swordfish movement along the eastern seaboard and across the Gulf. There are also some limited releases and recaptures from the Caribbean, Island passages, and the western central Atlantic that indicate swordfish movement to feeding grounds in the northeastern United States, Grand Banks and adjacent areas.[24] There is, however, only one record of trans-Atlantic movement. This particular specimen was tagged and released in the northeastern U.S. and recaptured east of the Iberian Peninsula a little over a year later providing some support for the hypothesis of a North Atlantic Stock.

Genetic similarity: Genetic research is relatively new and the number of samples assessed from the Atlantic are very limited.[25] The preliminary results of those analyses, however, show no genetic diversity between the northwestern and northeastern Atlantic samples. This suggests that extensive mixing has occurred between these two regions.[26] However, significant diversity was observed with Mediterranean samples. Similar results were obtained from comparisons between the eastern and western Atlantic, which indicated that the samples showed no evidence of independent populations. Thus, the available genetic data add further evidence to the hypothesis of a single north Atlantic stock. It must be noted that due to the low frequency of Atlantic genotypes, detection of any variability in population structure within regions would require a much lager sample size. In addition, since most of the samples were obtained from feeding areas, any population structure could be masked by mixing within these areas. Therefore, some researchers suggest that further analysis from specimens in spawning areas should be a priority in genetic research to confirm existing stock hypothesis. The authors know of no genetic work on swordfish caught off Venezuela. Venezuelan researchers have provided some samples, but no test results are available.[27]

C. Migratory movements

There is little available data on swordfish migratory movement off Venezuela. Many researchers believe that swordfish occurring in Venezuelan waters are new recruits from larvae produced in the main spawning grounds south of the Sargasso Sea. Juveniles appear to enter the Caribbean Sea through the island passages and reside in the productive waters off Venezuela for a few years.[28] Once the individuals reach maturity they appear to migrate north. Spawning may take place in the Caribbean Sea or in the main spawning grounds, where mixing may occur with fish from other areas. The northward movement of the mature fish may relate to a need to find more productive feeding areas that will sustain the mature females's increased bioenergetic requirements, especially the requirements associated with producing massive numbers of eggs.[29] Therefore, the waters off Venezuela appear to be nursery grounds for the swordfish

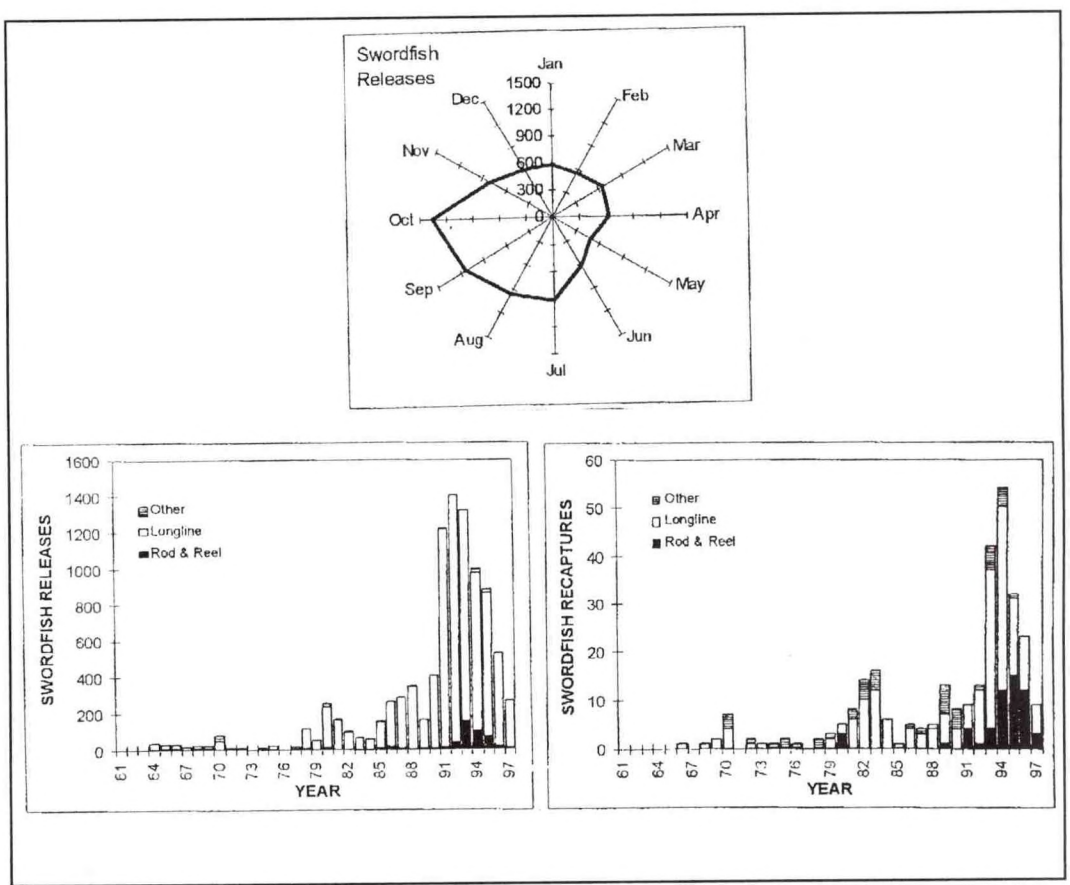

Figure 7.--Tag and release dates compiled by the NMFS Cooperative Tagging Center for 1959-1992. Jones, Ortiz, Judge, and Prince.

spawning population south of the Sargasso Sea.

The only sure way of substantiating such movements is through tagging. Tag returns showing the movement of swordfish between Venezuelan waters and fishing grounds to the north and east of the Antillean where the species is more abundant are scarce. This is in part because most of the fish tagged were tagged off the U.S. coast. There were, however, 22 swordfish tagged off Venezuela during 1994-95.[30] While actual tag returns are very limited, they do tend to confirm the nursery hypothesis. Some tagging has been done by FONAIAP observers on Venezuelan longliners sponsored by ICCAT's Billfish Enhanced Program. There are only three tagged-recaptured specimens that were tagged within the vicinity of Venezuela: 1) north of Aruba, 2) northwest of Grenada, and 3) off western Venezuela near the Orinoco Delta.

Aruba: The specimen tagged off Aruba was recaptured off the southeastern United States (Georgia--31°N) 3 years later.[31]

Grenada: There is no information on the days at large of fish tagged off Grenada, but it was recaptured south of the U.S. Virgin Islands.

Venezuela: There is also no information on the days at large of fish tagged off the eastern Venezuelan coast near the Orinoco Delta, but it was recaptured after a substantial northward migration off the southeastern United States (the Carolinas--33°N).

While tagging data is the only definitive proof of migratory movement, other data provides some circumstantial evidence of migratory movement. Information collected on spawning grounds provides important background. In addition, the swordfish taken off Venezuela are relatively small. (See: "Biological information".) This is important evidence supporting the hypothesis that the waters off Venezuela are a nursery area for the swordfish western Atlantic population south of the Sargasso Sea.

D. Biological information

A variety of biological information has been collected on swordfish off Venezuela.

Size/age: Much of the Venezuelan catch appears to be juvenile fish. Available catch data suggests that during the last two quarters most of the catch is represented by the smallest individuals caught during the year. These small individuals range from about 115-125 cm lower-jaw fork-length measure (LJFL) and the estimated age is about 2-years-old. The specimens caught during the first part of the year, however, do not differ much in size and estimated age since most of the sampled catch is between 120-138 cm LJFL and estimated age of 3 years.[32]. One researcher estimates that about 58 percent of the catch is small swordfish that are not yet sexually mature, but stresses that such estimates are preliminary and based on only limited data. Recent information indicates that more than 80

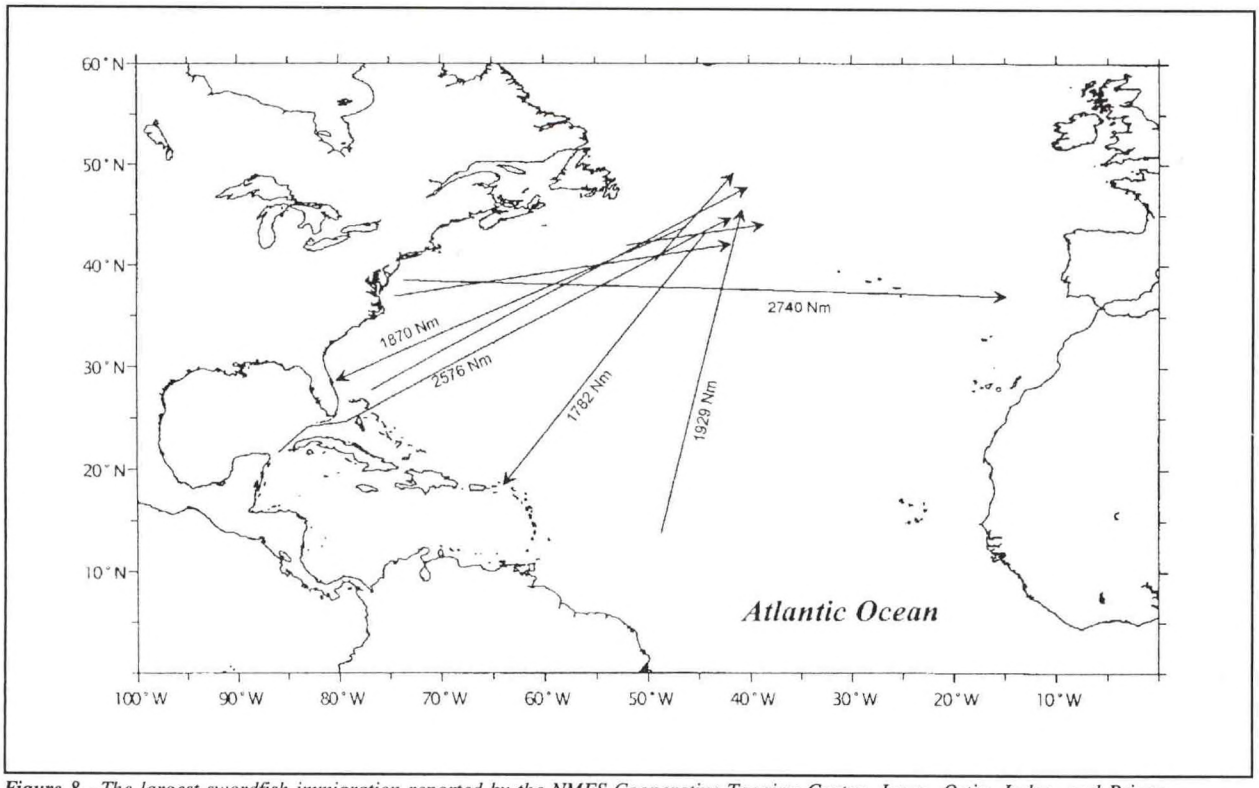

Figure 8.--The largest swordfish immigration reported by the NMFS Cooperative Tagging Center. Jones, Ortix, Judge, and Prince.

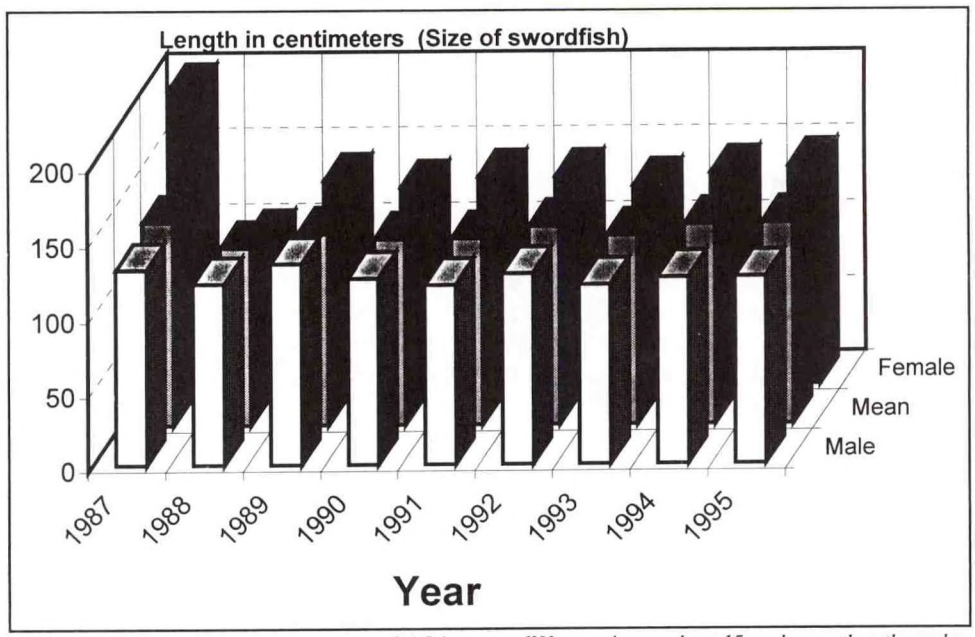

Figure 9.--The swordfish taken by commercial fishermen off Venezuela are about 15 cm longer than the males.

percent of the females sampled are below 50 percent maturity (estimated at 179 cm LJFL) and that more than 55 percent of the male sampled catch are below 50 percent maturity (estimated at 129 cm LJFL).[33] Although there are occasional catches of large adult specimens, the numbers are very limited. Venezuelan biologists are very concerned about these findings and believe that they demonstrate the importance of enforcing ICCAT's minimum size resolution.

Sex ratio: Swordfish catches in the Atlantic show an apparent differential distribution in the sex ratio throughout the different geographical areas. Biologists attribute this to differences in growth and/or natural mortality between the sexes and/or characteristic movement behavior by sex due to spawning and feeding.[34] The specimens caught off Venezuela show a balanced sex ratio (1:1) for individuals up to 150 cm LJFL; thereafter there is an increasing trend that favors the females up to 210 cm LJFL. Larger swordfish are mostly all females. The same trend holds, when the sex ratio is observed by calendar quarters, although with much more uncertainty at larger sizes due to the low number of samples.[35] Earlier studies reported for the area off Venezuela that fish over 165 cm LJFL, for example, were 64-75 percent female (appendix C2a). Smaller fish, on the other hand, tended to be mostly males. The new results for swordfish caught off Venezuela confirms the "typical" pattern for swordfish sex ratio for the northwestern Atlantic that shows a 1:1 ratio for specimens up to 150 cm LJFL; thereafter there is an increasing trend favoring females up to 200 cm LJFL. Larger fish are mostly females. Another study monitored fishing results during 1993 and reported females as large as 83-120 kg (eviscerated weight), while the largest male was only 54 kg (appendix C2b).

Maturity: The female swordfish population in the northwestern Atlantic attains 50 percent maturity at 179 cm LJFL which would be fish about 5 years old. Males attain 50 percent maturity at 129 cm LJFL at age 3.[36] Some preliminary studies indicated that females attain sexual maturity when they reach about 127 cm (LJFL) or about 17 kg (eviscerated weight). Researchers found it was difficult to determine the sex of juvenile fish of less than 80 cm or 8 kilograms. But when Venezuelan biologists analyzed a broader data base of swordfish caught off Venezuela, they estimated that 50 percent of females were mature at 168 and males at 139 cm LJFL.[37] The difference observed between these estimates and those from the overall area (northwestern Atlantic) is caused by the small sample size in an area where most of the fish sampled are sexually immature females and sexually mature males.[38]

Spawning: Reproductively active females (i.e., with ripe eggs in their ovaries) are rare in Venezuelan waters. During the course of a comprehensive study in the area from 1991 through 1996, only 12 reproductively active females were found in the western Caribbean. Of these specimens, only eight were caught in Venezuelan waters.[39] The other two were caught in the proximity of the Anegada Passage on the Caribbean side. All the reproductively active females were caught between November and February, which would indicate that the occasional spawning observed off Venezuelan waters occurs during those months. Therefore, the waters off Venezuela do not appear to be an important spawning ground for north Atlantic swordfish, but rather a nursery area for the spawning population south of the Sargasso Sea.[40] (See "Distribution".) The main swordfish spawning grounds, in the northwestern Atlantic, have been identified based on the presence of females with ripe eggs in their ovaries and on the presence of newly hatched larvae. These grounds are located south of the Sargasso Sea and areas related to major currents such as those present in the Yucatan Channel, the Straits of Florida, the Windward Passage and probably in other deep-water channels between the

Lesser Antilles, including the Anegada passage (figure 10).[41] The major currents from these spawning areas probably help to carry swordfish eggs and newly hatched larvae to rich feeding areas located "downstream", which include the western Caribbean Sea, the Gulf of Mexico, and the southeast coast of the United States. It is from these lines of evidence that the waters off Venezuela are considered nursery areas with occasional spawning during the northern (boreal) winter, usually called the dry season in Venezuela.

Feeding: Swordfish off Venezuela appear to feed primarily on finfish. Actual studies on swordfish diet composition in the region, however, are limited. One Venezuelan study of swordfish stomach contents revealed the fish feed primarily on finfish, but squid, and to a lesser extent crustaceans, are also important. Finfish constituted over 70 percent of the diet and consisted primarily of Bramidae, Dactylopteridae, and Clupeidae species, although a substantial proportion of the prey items could not be identified (appendix C3). Various cephalopods were also reported in considerable quantities. Venezuelan biologists speculate that the abundance of the species in Venezuelan waters makes a suitable nursery habitat for swordfish.[42] There does not appear to be any significant difference in the feeding regimens between males and females.[43]

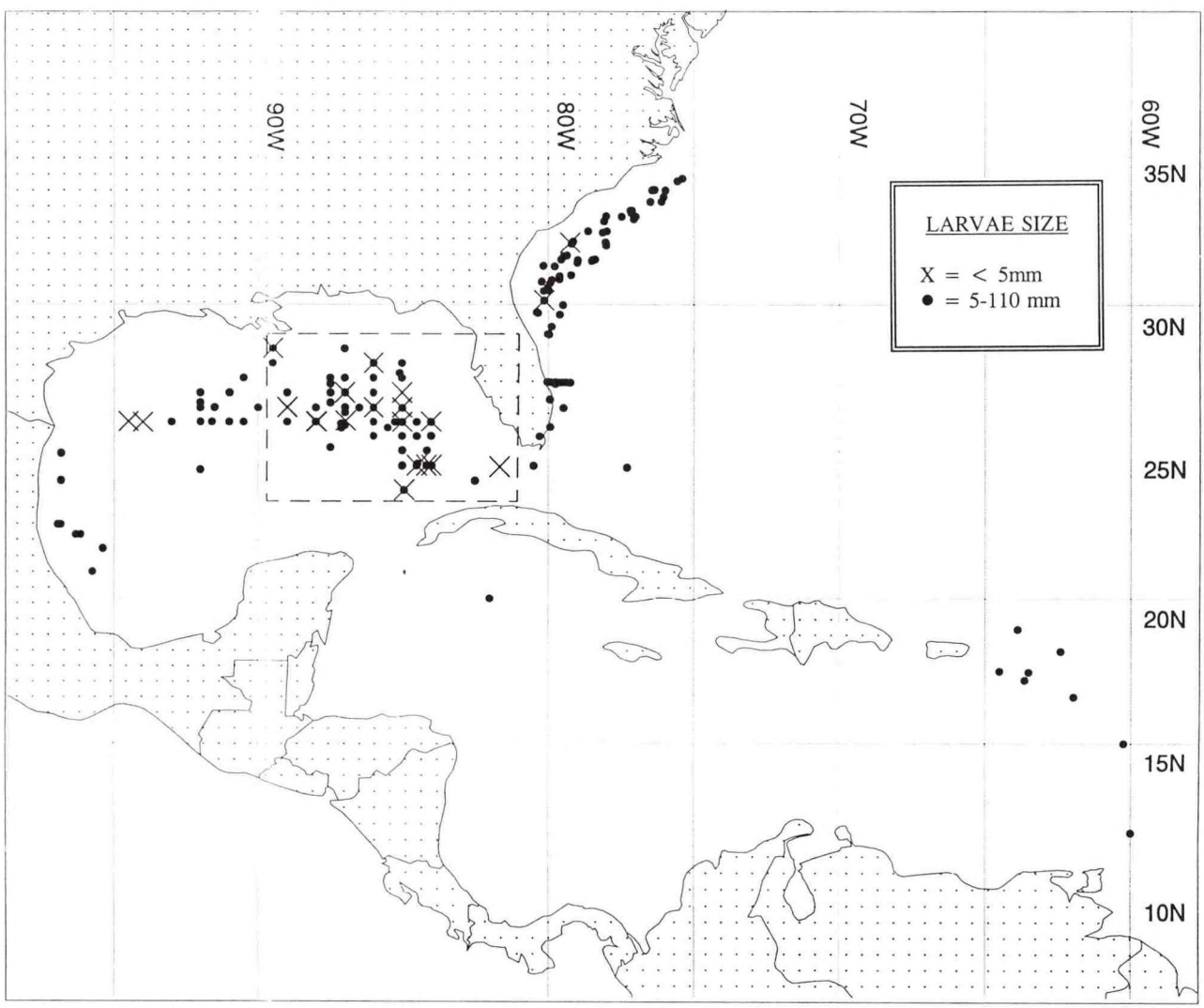

Figure 10.--Swordfish spawning in the Caribbean appears to occur primarily in the northeastern corner around the island passages, based on the presence of larvae. Govoni, Stender, and Pashuk

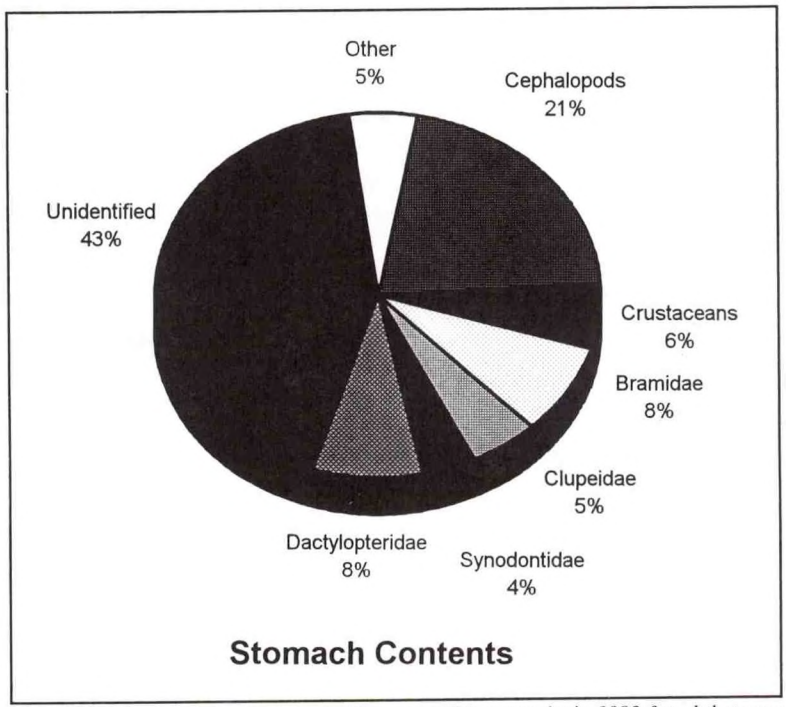

Figure 11.--Venezuelan scientists studying swordfish stomachs in 1993 found that over 40 percent of the contents were unidentified finfish and the remaining 60 percent were cephalopods and crustaceans.

E. Seasonality

Swordfish and other billfish catches off Venezuela are highly seasonal. The actual seasonality varies somewhat by the size of the fish and the gear and methods utilized in different fisheries.

1. Swordfish

The Venezuelan swordfish fishery is highly seasonal, concentrated during the country's dry season from October to March.[44] Assessments of the seasonal pattern, however, vary somewhat. This may be in part due to differing behavior of diversely sized fish as well as the assortment of gear and methods deployed in the commercial and artisanal fisheries. All Venezuelan fishermen, however, report very limited swordfish catches from July through September.

Commercial: The most definitive assessment of the commercial fishery targeting swordfish indicates that during the full year, only about 55 percent of their catch is swordfish. The swordfish proportion, however, varies significantly by season. The commercial swordfish fishermen report that the dry season (October/November-March) is the peak swordfish season, with the species reaching nearly 65-70 percent of the catch. Swordfish then declines to only about 25-30 percent for the rest of the year (appendices D3c and D).[45] Another assessment by the same research group has also reported that swordfish abundance, based on CPUE data, was highest between October-December.[46] More recent assessments of the Venezuelan catch show that there are substantial differences depending on the size of the fish. Small fish (trunks below the <25 kg ICCAT minimum size) were primarily taken from October to December while larger fish are taken from March through October.

Artisanal: Artisanal driftnet fishermen targeting billfish take some swordfish as a bycatch. They report a somewhat differing seasonal pattern for swordfish than reported by the commercial fishermen. These fishermen operate out of La Guaira (along the central coast near Caracas). They report taking swordfish somewhat later than the commercial fishermen. They generally do not begin taking swordfish in any quantity until January, but continue reporting some swordfish through June, several months after the commercial fishery has ended.[47]

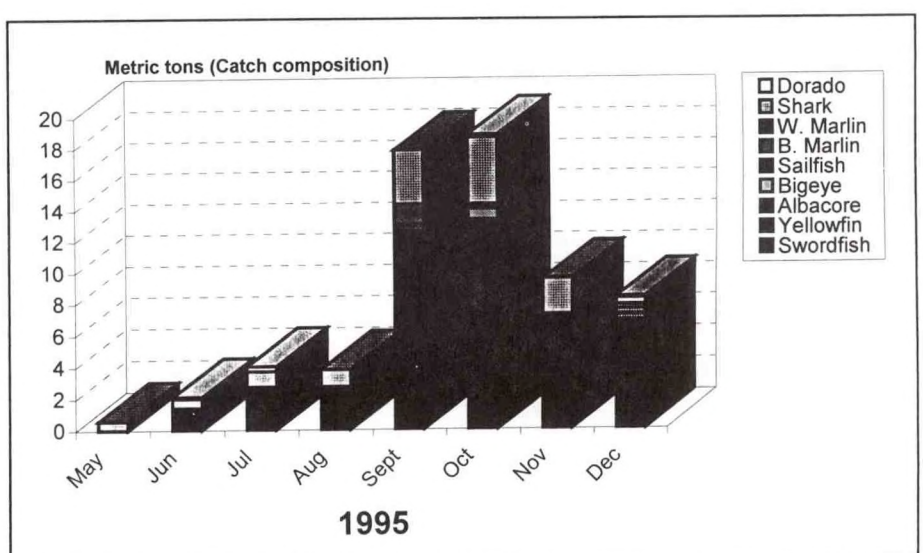

Figure 12.--The catch composition of the Venezuelan commercial swordfish fleet continued to vary seasonally, although, swordfish, yellowfin and shark catches peaked in September/October.

Recreational: Venezuelan recreational fishermen primarily target marlins and sailfish.[48] Some of the charter boats, however, do offer special swordfish trips.

The cause of the seasonal pattern for swordfish off Venezuela is not known with any certainty. It is unclear for example if the limited catches from July to September are due to the absence of fish or the inability of the fishermen to modify gear and methods to access the fish which may change feeding patterns during this period.

Migrations: Swordfish may migrate out of Venezuelan waters, which would explain the seasonal catch pattern. Some observers report that swordfish, during the warmer rainy season (April-August), appear to move away from the Venezuelan coast to more northerly latitudes.[49] The limited tag returns do confirm at least some migratory movement. (See: "Migratory movements".) What is not known is the extent to which the population off Venezuela participates in such migrations.

Behavioral changes: Lower catches alone do not conclusively demonstrate that fish are not present in quantities off Venezuela from July to September. Venezuelan observers report that there is some evidence that swordfish are present to some extent during the July to September period, but are just not being taken by the fishermen. Surface water is warm during the July to September period and the swordfish prey and therefore the swordfish may seek cooler water at greater depths. This may take the swordfish beyond the depths that commercial and artisanal gear is set, explaining why the fish are unavailable to the fishery. (See: "Fleet Operations and Methods".) In addition, fishermen during this period generally report good yellowfin tuna catches, which have caused some fishermen to reduce directed swordfish sets and instead target tuna.[50]

2. Billfish

Substantial stocks of other billfish also occur off Venezuela. The Japanese Caribbean longline fishermen during the 1960s reported good billfish (sailfish and spearfish) catch rates off Venezuela, higher than off the Caribbean island countries to the north, but lower than Colombia to the west or the Guianas to the east.[51] Japanese fishing, after the implementation of Venezuela's 200-mile zone in 1978, was replaced by Venezuelan recreational, artisanal, and commercial fisheries which took billfish. The Venezuelan billfish fishery developed out of La Guaira as both an artisanal gillnet fishery and as a recreational fishery. Artisanal fishermen in the early 1980s initiated another billfish fishery off Margarita Island during the early 1980s. Billfish are also taken as a bycatch of the commercial tuna longline fishery.

The Venezuelan billfish (blue and white marlin, sailfish, and spearfish) fishery appears to be less seasonal than the swordfish fishery. The recreational, artisanal, and commercial fishermen conducting the fishery report somewhat varying seasonal patterns. Several of the fisheries, however, appear to begin in August when most fishermen are reporting minimal swordfish catches. Some of the available catch data showing limited catches from March to July are suspect and do not seem to reflect a corresponding decline in availability. Artisanal longline fishermen, for example, shift to lines ("cordel") during this period to target economically more profitable king mackerel, "carite" (*Scomberomorous*).[52]

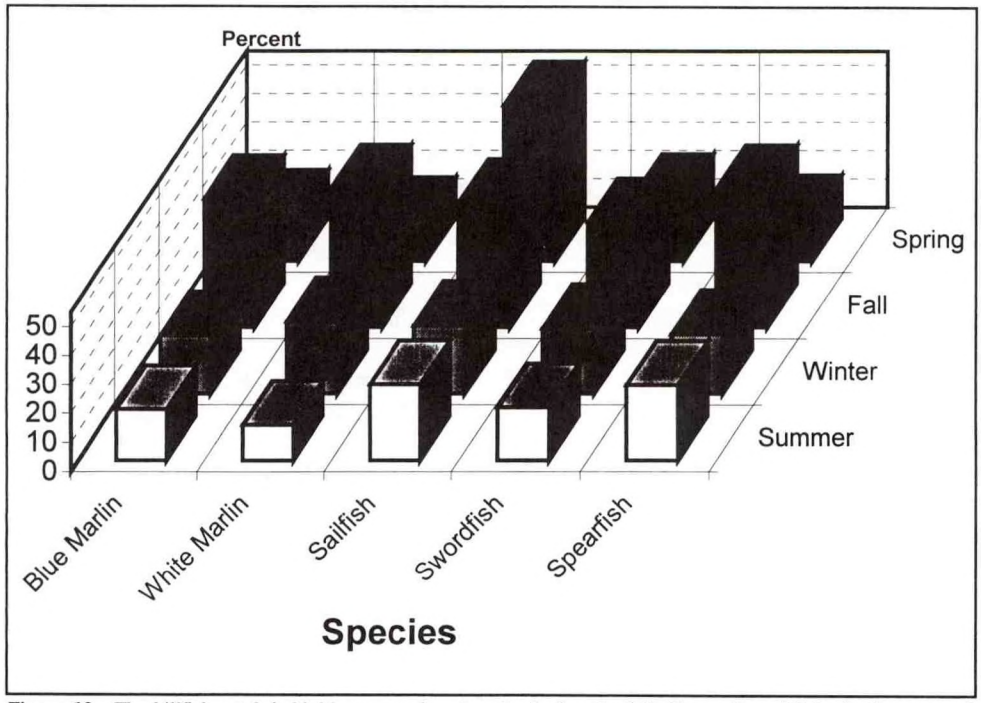

***Figure 13**.--The billfish catch is highly seasonal and peaks during the fall. Except for sailfish, the larger catch are all taken in the fall.*

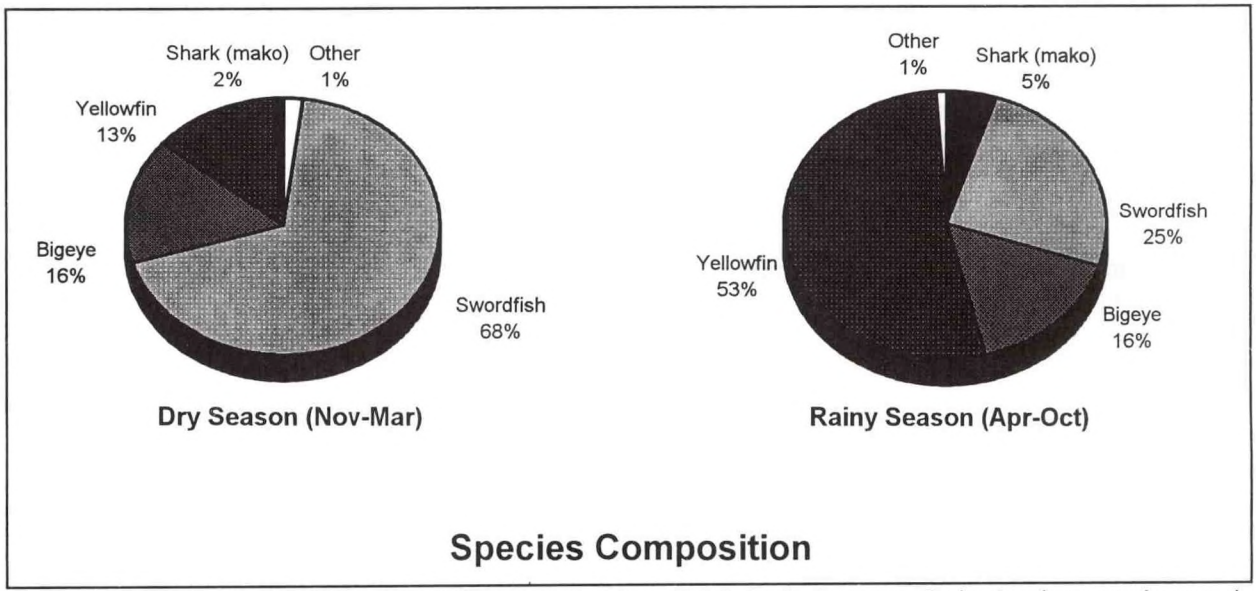

Figure 14.--Venezuelan swordfish fishermen catch larger quantities of swordfish during the dry season. During the rainy season, however, the fishermen catch larger quantities of yellowfin.

Recreational: The Venezuelan recreational billfish fishery is conducted nearly year-round. Sailfish are almost always available. There are definite peaks. January to March is usually the best time for blue marlin. Beginning in June and continuing until October, sailfish are particularly abundant. Then from September through January, white marlin are plentiful.[53]

Artisanal: Venezuelan artisanal fishermen deploying longlines concentrate effort on billfish during the dry season (September-February) around the country's offshore islands along the central and eastern coast.[54]

Commercial: Commercial fishermen do not generally target billfish, which are primarily a bycatch of the tuna longline fishery and the smaller swordfish fishery. The fishermen generally report the highest billfish (marlins and sailfish) from October to December.[55]

Observers report that the billfish seasonality varies by species and fisheries. Available studies reveal some significant discrepancies in reported seasonal patterns. These discrepancies may in part reflect the different target species and thus gear and fishing strategy.

Sailfish: Some observers report that sailfish can often be found nearly year-round. One study found that artisanal fishermen operating along the central and eastern coast reported the best sailfish yields from August-February/March, but the limited catches from March to April appear to be due to redirecting effort to king mackerel.[56] Thus artisanal longliners reportedly could fish year-round. The artisanal fishermen using gillnets along the central coast reported that sailfish catches were highest from August to December in the waters off La Guaira.[57] Another observer reports that the peak recreational fishing season is from June to October.[58]

Marlins: Artisanal longline fishermen reported good white marlin yields from August to February. Limited catches after February, however, appear to reflect shifting effort to king mackerel.[59] Another observer reports good recreational white marlin fishing from September to January.[60] A recent report indicated that artisanal longliners reported a more seasonal white marlin catch, achieving the best catches from September through November. The artisanal fishermen using gillnets reported that blue marlin catches peaked during April and May in the waters off La Guaira.[61] Another observer reports good recreational blue marlin fishing from January to March.[62] The artisanal longliners reported different results for blue marlin, achieving the best catches from October to March.[63]

Spearfish: The authors know of no study on spearfish seasonality off Venezuela. The existence of two species complicates any seasonal assessment.[64]

F. Stock status

Biologists are concerned about the status of the swordfish population in the north Atlantic. The fish found off Venezuela are part of the larger north Atlantic stock. Venezuela participates in the international effort through ICCAT to manage this stock. ICCAT assessments have found the species to be seriously overfished. Catches in the north Atlantic totaled 16,900 t in 1995 and 17,000 t in 1996. This represents a massive decline since the late 1970s. If that decline was to continue at the current pace, the fishery could theoretically disappear in less than a

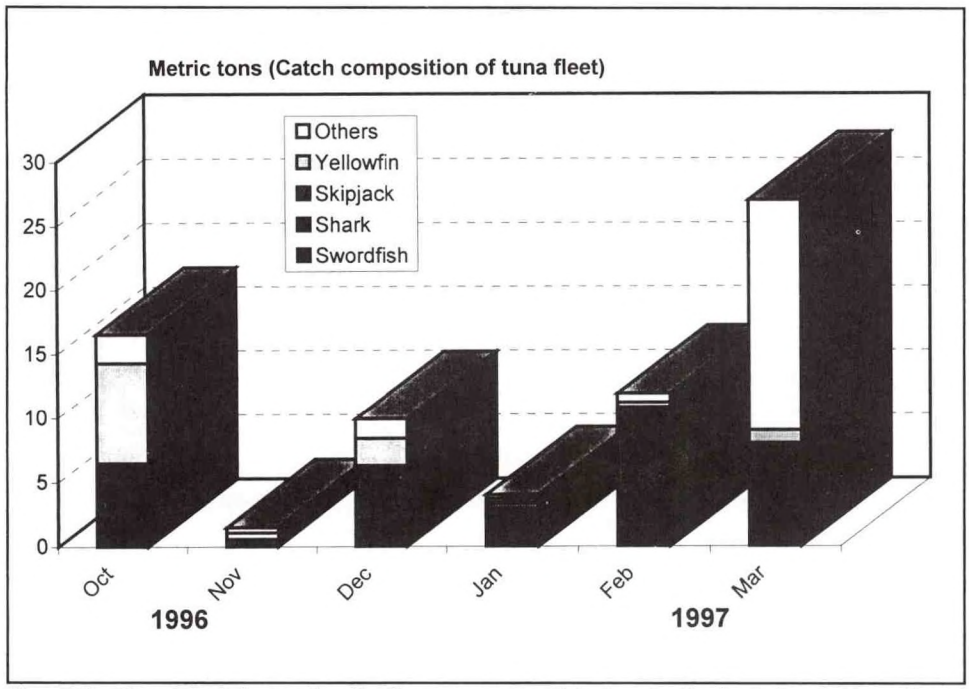

***Figure 15.**--The catch of the tuna longline fleet was mostly skipjack and yellowfin during these months and varied considerably. Only small quantities of swordfish were taken.*

decade. To arrest the decline in the fishery, ICCAT members agreed in 1996 to reduce the total allowable catch to 11,300 t in 1997 and 10,700 t in 1998. Members are hopeful that such catch cuts will stop the decline in the north Atlantic stock.

Available Venezuelan catch data does not provide any insight on stock trends. The available data is incomplete and there are serious discrepancies between available data sets (ICCAT, the Fondo Nacional de Investigaciones Agropecuarias--FONAIAP, and FAO) (appendix D3a1). Available catch data suggests Venezuelan swordfish catches from 2-50 t in most years from 1963-1989. These catches were not a good reflection of the available stock because occasionally catch of 100-190 t were repeated, probably reflecting the temporary entry of a foreign longliner operating with a Venezuelan company. Better data is available for the 1990s, but different sources provide widely different estimates, ranging from 45 to 430 t (appendix D3a1). Import data from major markets (US, EU, and Japan) are probably a better indicator of catch trends. Available import data has fluctuated markedly, however, it does not show any notable decline in shipments from Venezuela during the 1990s (appendix D3a1).

Much of the Venezuelan catch appears to be juvenile fish. Available catch data suggests that over 60 percent of the catch fall in the smallest two size categories (appendix C1a). This small size of the fish does not appear to be an indicator that the stock is being overfished as the small sizes often suggest in other fisheries. The small size of the fish appears to relate to the fact that Venezuela and other Caribbean grounds may be a nursery area for fish spawning in the Sargasso sea. Adequate data does not yet exist to determine time line trends or the size of the fish being taken in the Venezuelan fishery. Recent research has found that most of the females (80 percent) are below 50 percent maturity.[65] Researchers stress that such estimates are still preliminary and based on limited data. Some Venezuelan biologists are concerned about these findings and believe that it may be necessary to develop more selective gear.

III. Fishing Grounds

A. Oceanography

Venezuela has an extensive Caribbean coastline and a small Atlantic coast extending in all about 2,900 kilometers. This extensive coast as well as numerous offshore islands provide Venezuela the largest EEZ in the eastern Caribbean. Claims to a considerable area of the Caribbean off the western coast result from possession of the Archipelago of Los Monjes east of the Guajira Peninsula. The Venezuelan zone is also significantly expanded by the country's jurisdiction over Isla Aves (15°40'23"N - 63°36'59"W), located about 550 km north of the mainland coast and only about 100 km west of Guadalupe. Overall, Venezuela claims an Exclusive Economic Zone (EEZ) of nearly 650,000 square kilometers.[66] Precise estimates are not possible because the marine boundary has not yet been delimited with all of the Caribbean countries involved. Difficulties have been encountered delimiting the EEZ with Colombia, Guyana, and some islands of the Lesser Antilles.[67]

Shelf: Venezuela has the most extensive shelf area in the southern Caribbean with more that 137,000 square kilometers.[68] The continental shelf along the western coast extends about 150 km from the mainland coast, although it narrows markedly off the Paraguaná Peninsula. Along the central coast, the shelf is extremely narrow, sometimes only 10-20 kilometers. An offshore ridge runs from Margarita Island through La Tortuga Island to the coast east of La Guaira (Cabo Codera). This encloses the Cariaco Basin with waters as deep as 1,350 meters. Most of the other offshore islands along the central coast are not connected with the central shelf. Venezuela's most extensive shelf area is located along the country's eastern coast. In this area the bottom depth increases fairly evenly out to the shelf edge (which extends 200 km) at about 200 meters.[69] The shelf includes the large Venezuelan Island of Margarita as well as other small islands. Further east, the shelf encompasses Trinidad and Tobago and extends south to Guyana, where it varies in extension from 40-75 kilometers.

Currents: The dominant oceanographic feature off the Venezuelan coast is the proximity of a major ocean current system. The Guyana Current (and/or North Brazilian Current) retroflection eddies are present most of the year (July through March) along Venezuela's eastern Atlantic coast.[70] The Guyana Current is an extension of the South Equatorial Current and is generally referred to as the Caribbean Current after it enters the Caribbean Sea. The Caribbean Current in the Venezuelan coastal zone is predominantly an extension of the Guyana Current and/or of the water adverted northward once the North Brazilian Current retroflection eddies disintegrate at the 1,000-m ridge between Tobago and Barbados. Further north in the Caribbean Sea the North Equatorial Current has an increasing influence.[71] This current system is not nearly as strong as other currents, like the Peru, Malvinas, or Brazil Currents off other South American countries. In fact, there are occasional flow reversals to the normal westerly patterns of the Caribbean Current. Eastward flows are occasionally encountered instead of the predominantly westward current in the Grenada and Venezuelan basins. Observations on the Aves Ridge, running north from Margarita Island to Isla Aves, have shown intermittent easterly flow of variable strength around 13°N. This flow eventually leaves the Caribbean Sea and enters the Atlantic Ocean as the Caribbean Counter Current around St. Lucia and St. Vincent.[72]

Winds: An additional feature along the Venezuelan coast is the wind regime which plays an important role in the Caribbean and Atlantic. In the Caribbean, the winds are mostly blowing along the coast (parallel to the shore), whereas in the Atlantic, the winds are predominantly blowing onto the coast. The winds along Venezuela's Caribbean coast help to form an upwelling system. The wind regime off the Venezuelan coast is highly seasonal, with strong tradewinds occurring during the dry season (November-June).

Water Density: One of the features of the overall current system along the Venezuelan coast (Atlantic and Caribbean) is the sloping density surfaces (isopycnals) upwards towards the coast, which is normally taken as a sign of upwelling.[73] This feature is present at all times of the year, but is subjected to regional and seasonal disturbances. However, if the structure of the sloping isopycnals is caused by local winds, upwelling in the true sense of the word is taking place. Otherwise, sloping isopycnals may be looked at as a stationary feature, although responsible for the elevation of colder water, normally rich in nutrients, to surface layers.

Upwelling: The northern Venezuelan coast is strongly influenced by upwelling almost all year round. The upwelling is caused by the deflection to the north of the Caribbean Current and the behavior of the wind regime in the Caribbean Sea. The local winds blowing parallel to the coast are the major factor creating the pronounced coastal upwelling occurring along the coast further west as mentioned.

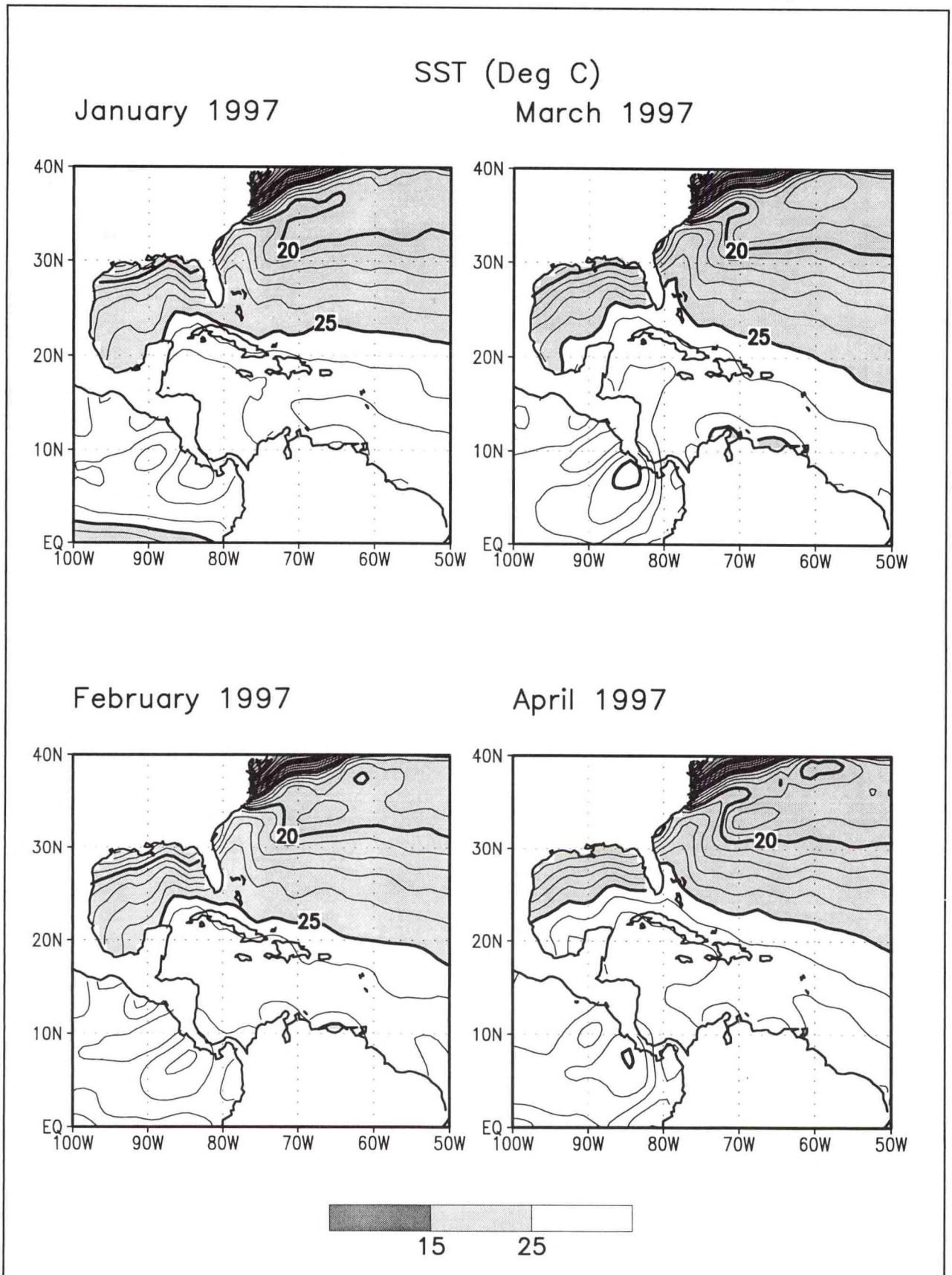

***Figure 16**.--The sea-surface temperatures (SSTs) off the coast of Venezuela tends to be 1° to 2° C cooler than the surrounding Caribbean sea-surface temperatures. Vernon Kousky, NOAA*

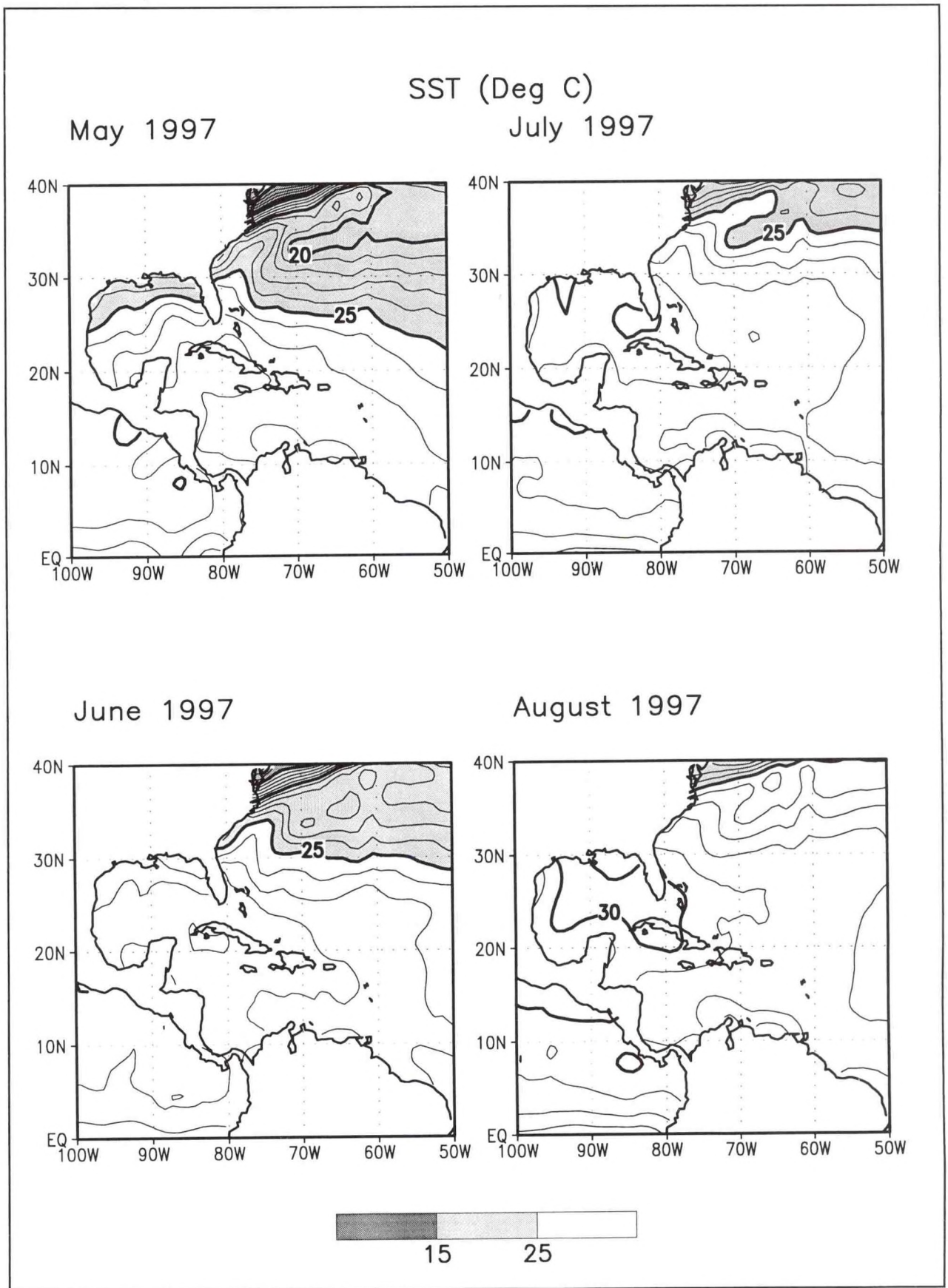

Figure 17.--Warm SSTs in the western central Atlantic begin to move significantly to the north during June and July. Vernon Kousky, NOAA.

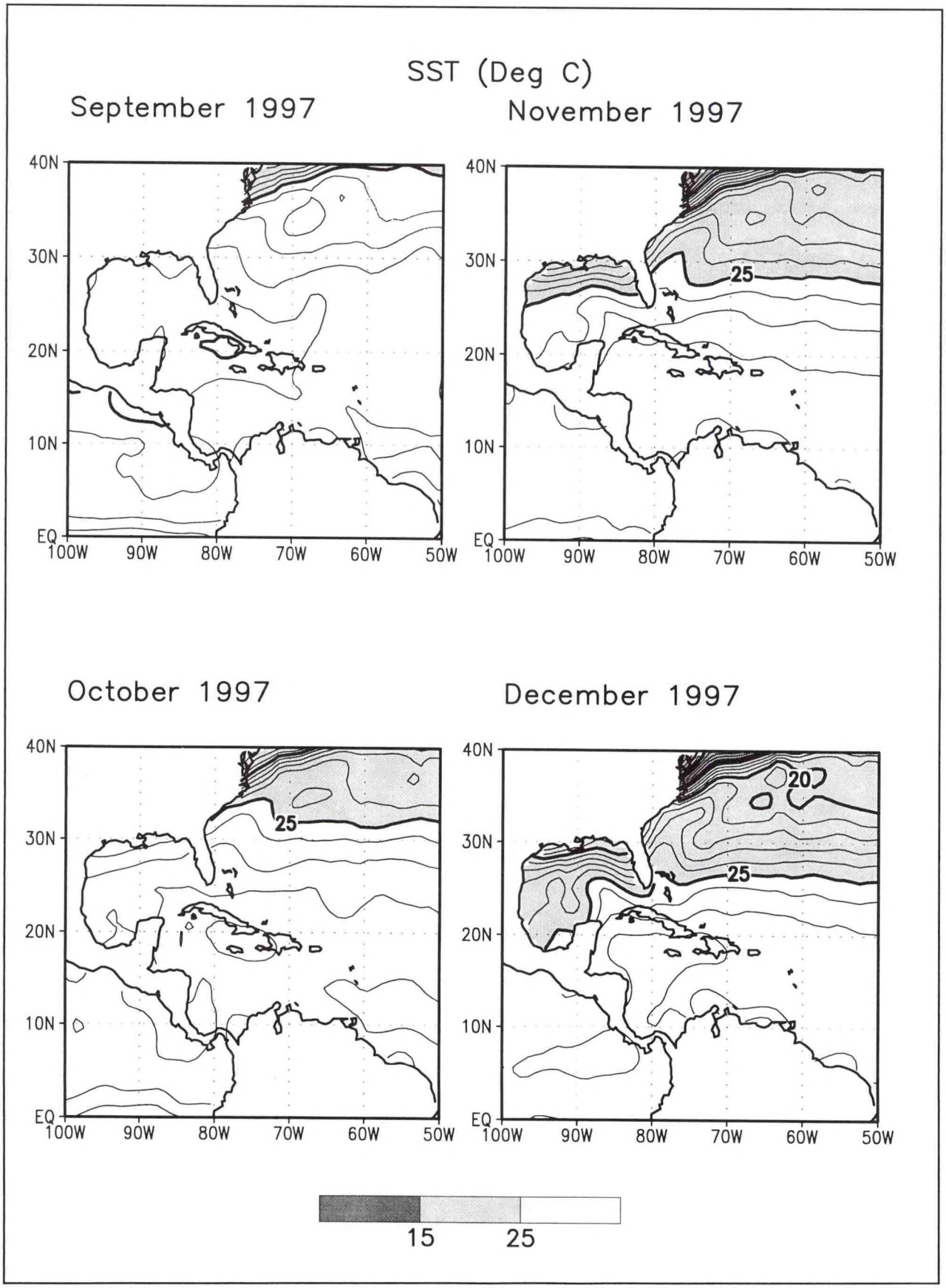

Figure 18.--Cold SSTs in the western Atlantic begin to move south in October, reaching the Gulf of Mexico by November/December. Vernon Kousky, NOAA.

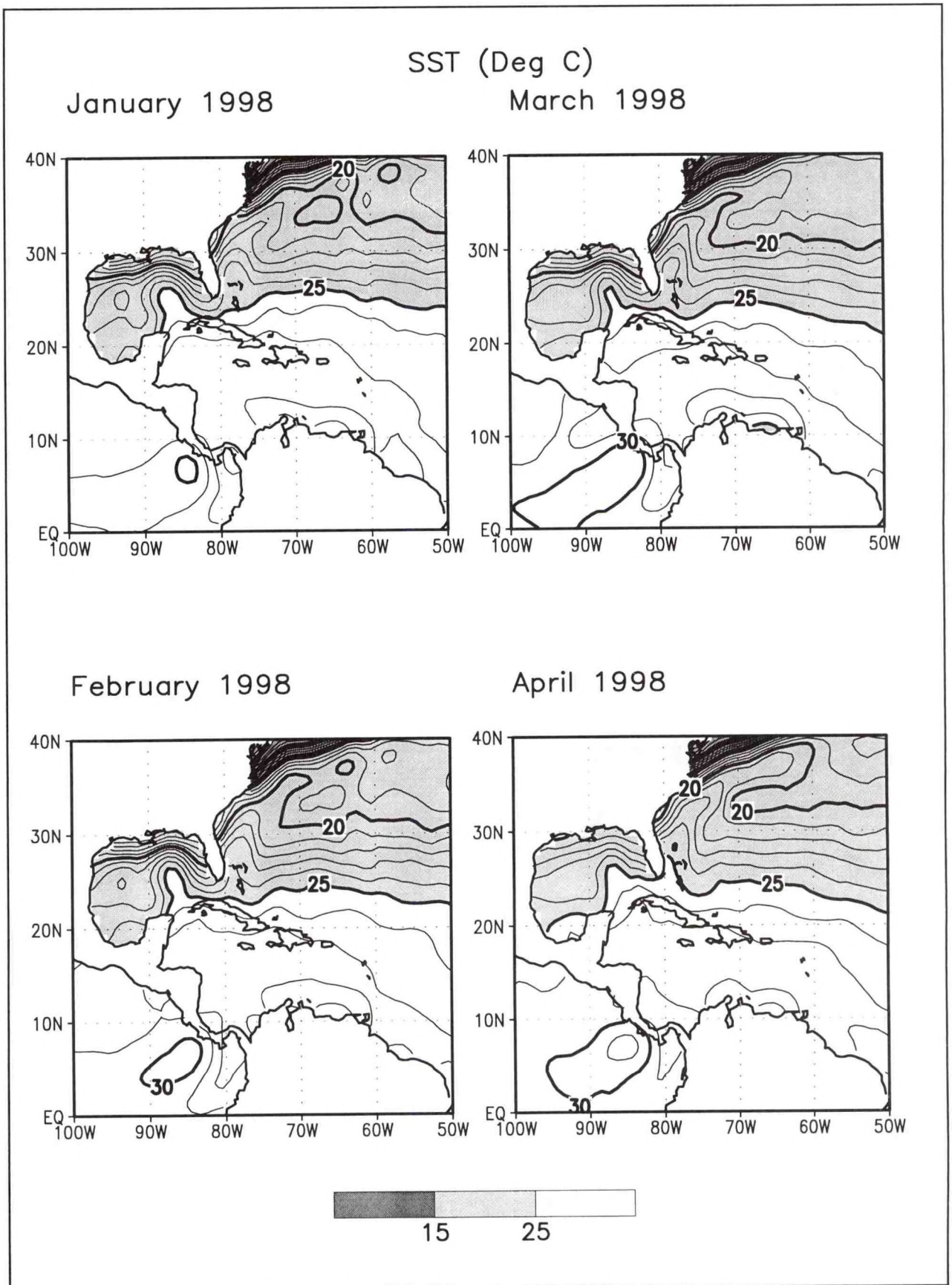

Figure 19.--SSTs in the western central Atlantic are relatively stable during January through April. Note the slightly cooler temperatures off the coast of Venezuela. Vernon Kousky, NOAA.

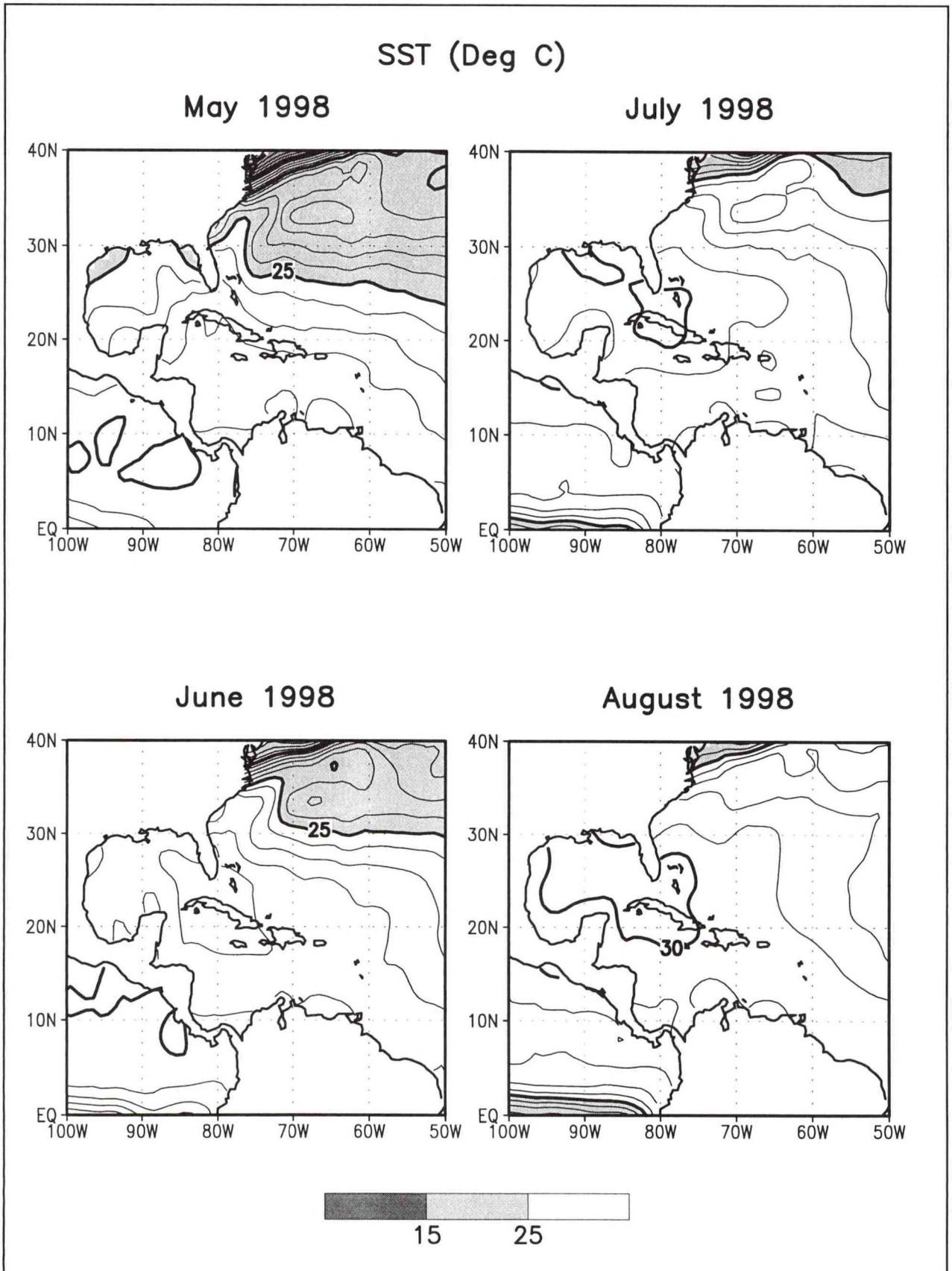

Figure 20.--SSTs made their annual seasonal shift in May and June, and were relatively stable during July and August. Vernon Kousky, NOAA.

The upwelling is most evident along the eastern coast. The Caribbean Current in the east is deflected north relative to the east-west direction of the coastline.[74] The southern edge of the Caribbean Current follows the continental shelf break causing sloping isopycnals. These deep-sloping isopycnals in the area make nutrient-rich cold water available for upwelling along the continental shelf. The upwelling process is directly related to the wind-driven surface current system which flows along Venezuela's eastern coast beginning at Dragon's Mouth (Parka Peninsula). Thus, deflection to the right by the rotation of the earth (coriolis force) is compensated for by vertical uplift of the lower part of the shelf water column. These processes combine to create a strong upwelling system along the eastern coast (figure 21). The strength of the upwelling system is seasonal, corresponding to seasonal wind fluctuations. Coastal upwelling is strongest at the beginning of the year, peaking in January-March. Along the central coast, east of La Guaira (Cabo Codera), some indication of upwelling is observed based on the presence of low sea surface water temperatures ($<25°C$). It occurs in a coastal strip east of La Guaira, likely connected to wakes caused by the particular topography of the area: the sharp bend of the coastline east of Cabo Codera and the rise between La Tortuga and Cabo Codera. Further west, west of Paraguaná Peninsula, seasonal low sea surface water temperatures ($<25°C$) are present, indicating coastal upwelling in the area. Similar conditions are found northwest of the Guajira Peninsula in Colombia (figure 21). The strength of the upwelling system makes the Venezuelan coast the most productive of the southern Caribbean. It supports a large concentration of small pelagics (sardines and anchovies). The population totals an estimated 1.1 million tons.[75] This is particularly important for the longline fisheries. The large concentration of small pelagics along the Venezuelan coast attracts a prey species of various types, demersal and pelagic. This creates a unique ecosystem with a large transfer of biomass attracting larger prey species and apex predators. This is reflected in the considerable concentration of highly migratory species, mainly tunas, billfish, sharks, and swordfish, as indicated by the Venezuelan commercial and recreational catch. The presence of available prey species off Venezuela due to the upwelling system is most likely the primary cause for the abundance of swordfish off Venezuela.

Basins: There are various deep basins within the Caribbean Sea such as the Yucatan, Cayman, Colombian, Venezuelan, and Grenada basins. The Venezuela basin lies north of the Venezuelan offshore islands. Depths in the Venezuelan Basin exceed 5,000 meters. The Bonaire Basin lies to the south of the Venezuelan offshore islands and the Netherlands Antilles. At its greatest depth, the Bonaire Basin south of Isla Aves, is nearly 2,100 meters. A shallower basin, the Cariaco basin, to the east of Isla Tortuga, has waters as deep as 1,400 meters.

Colder water intrusion: These basins are constantly being filled with water coming mainly from the southern Sargasso Sea that moves into the Caribbean Sea through various passages such as the Windward passage, located between Cuba and Haiti, and the Anegada (Jungfern) passage, located near Puerto Rico between the U.S. and British Virgin Islands. Water from different depths and thus temperatures move into the Caribbean through these passages, primarily deep Atlantic water and central water formed in the Sargasso Sea.[76] The introduction of these relatively cold masses of water in the warmer Caribbean creates favorable conditions for swordfish fishing. Swordfish are known to concentrate in areas with temperature fronts or at the boundaries between different water masses with different temperatures. Such conditions are in part created by the Venezuelan basin, which extends as far south as 12°S (about 175 km north of Venezuela's central coast and only about 25-50 km north of Los Roques, Orchila, and La Blanquilla island). The presence of the relatively cold water masses entering the Venezuelan basin so close to warmer and shallower coastal waters help to create such favorable conditions. Most of the Venezuelan swordfish catch is taken north of the Venezuelan offshore islands.[77] The authors believe that it is the presence of these water temperature gradients in the Venezuelan Basin, just north of the Venezuelan offshore islands, which may make these grounds very fertile for swordfish operations.

B. Shelf and islands

The Venezuelan continental shelf is relatively extensive off the country's eastern and western coasts, but very narrow along the central coast.

Western coast: The continental shelf in the western coast extends about 150 km from the mainland coast, although less if measured off the Paraguaná Peninsula.

Central coast: The continental shelf along the central coast is extremely narrow, sometimes only 10-20 kilometers. An offshore ridge runs from Margarita Island through La Tortuga island to the coast east of La Guaira. This encloses the Cariaco Basin with waters as deep as 1,350 meters. Most of the other offshore islands along the central coast are not connected with the central shelf.

Eastern coast: Venezuela's most extensive shelf area is located along the country's eastern shore. The shelf from Margarita Island to Guyana extends about 100 km offshore. The shelf includes the large Venezuelan island of Margarita as well as Trinidad and Tobago.

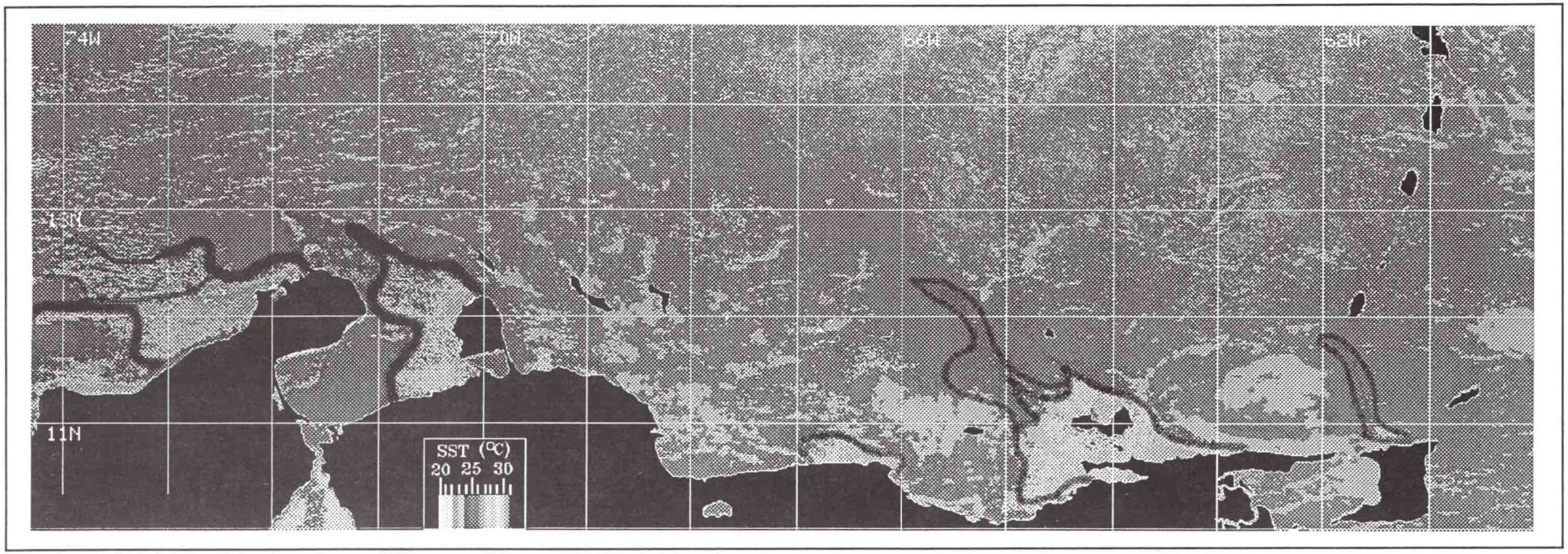

***Figure 21**.-- Satellite image taken on January 18, 1998 showing SST off the coast of Venezuela and Colombia. Upwelling is at its maximum during this time of the year as seen from cold upwelled water (shown encircled by a dark band) in three areas off the Venezuelan coast and the eastern Colombian coast. In Venezuela it is observed, off the Paraguana Peninsula on the west, off Cabo Codera on the central coast and off the Araya Peninsula and Margarita Island on the east. In Colombia, off the Guajira Peninsula on the east. In addition, two frontal zones can be detected (shown encircled by a dark band), one off the northern area of the Island of Trinidad and another one running northwest between the Islands of La Tortuga and La Blanquilla. This last front is probably the one most fishers seek as most of the longline fleet targeting large pelagic fishes is always located in the vicinity of that front when it appears.*

Venezuela has a large number of coastal islands. Most of the islands are located off the central coast (68-63°W) between the Netherlands Antilles and Grenada/Trinidad (figure 1). The islands are located both on and off the shelf and can be divided into shelf and offshore groups.[78] These islands, including the offshore group, are mostly located fairly close to shore. Because of the peculiarities of the Venezuelan shelf, some of the offshore islands are actually closer to the mainland coast than the islands on the shelf. One island (Aves), however, is more than 600 km north of the coast, considerably enlarging the country's EEZ.

Shelf group: The islands forming the shelf group are dominated by the same features as the shelf area as a whole, especially the almost constant upwelling throughout the year along the eastern coast. As explained above, the upwelling is caused by the deflection north of the Caribbean Current and local winds blowing parallel to the coast. The shelf group includes:

Los Monjes: Los monjes (12°22'N, 70°55'W) is a small group of islands (9) located on the Venezuelan shelf between Colombia's Guajira Peninsula and Aruba.

La Tortuga: This island (10°57'N, 65°19'W) is located on a marine ridge connecting Margarita island with the narrow continental shelf east of La Guaira.

Los Frailes-La Sola: This small group of islands is located 14 km northeast of Margarita Island.

Margarita: Isla de Margarita, (11°N, 64°W), is Venezuela's largest island. It is located only about 25 km off Venezuela's Araya Peninsula. With two smaller islands, Cubagua and Coche, in between. The island is located on the country's eastern continental shelf.

Offshore group: The islands forming the offshore group, are not influenced by the coastal upwelling as they are separated from the continental shelf by the relatively deep water of the Bonaire Basin and by valleys between each archipelago (or island). This group of islands has the typical characteristics of oceanic islands, with clear warm oceanic waters with sea surface temperatures of about 25°C during the dry season when strong trade winds prevail and warming to 29°C during the rainy season when the trade winds subside.[79] The waters around the offshore islands show very little primary productivity. Biologists postulate, however, that submarine canyons and valleys along the edge of the continental shelf are productive regions.[80] This also appears to be the case off Venezuela. The Venezuelan offshore islands are practically surrounded by valleys and canyons which are relatively close to nutrient-rich waters originated in the upwelling zones along the coast. Contributing to the productivity of the valleys are the nutrient-rich waters that sink once they pass the area between Cabo Codera and La Orchila Island. The concentration of organisms in this rich environment as a result of turbulence generated by the rough bottom may be the feature that attracts swordfish to the waters over submarine canyons and valleys. Additionally, a few submarine sea mounts off La Guaira (such as El Placer de La Guaira) south of the offshore island chain, do provide substantial primary productivity. This creates a good feeding ground attracting prey species as well as apex predators (including swordfish). The authors believe that the resulting presence of prey over the submarine valleys and sea mounts around the Venezuelan offshore islands attracts swordfish in substantial numbers and explains why most of the country's swordfish catch is taken in the vicinity of these islands. The offshore group includes:

Los Testigos: Los Testigos, (11°N, 63°W) are a group of small islands. They are the most easterly of Venezuela's coastal islands. They are located between Margarita and Trinidad/Tobago, and to the southwest of Grenada.

Las Aves: The Archipelago of Las Aves (12°00'N, 67°28'-37'W) is over 160 km off the coast and separated from the shelf. It is composed of two separate outcroppings located to the east of Bonaire and the Netherlands Antilles.

Los Roques: The Los Roques Archipelago (11°44'-58'N, 66°57'W) is located about 125 km directly north of La Guaira near Caracas. It is composed of a large number of islands and cays (42) and sandbars (about 250) surrounding an internal lagoon.

La Orchila: Isla La Orchila (11°47'N, 66°10'W) itself is 42 square km and is surrounded by a small group of cays located about 35 km north of the coast (Cabo Codera). The small Burgana bank is located about 25 km to the east on a separate outcropping.

La Blanquilla: La Blanquilla (11°51'N, 64°36'W), is located about 170 km northeast of the mainland coast (Puerto La Cruz) but only about 80 km north of Margarita island. It is located on the same outcropping as the small Los Hermanos Islands.

Aves (Bird Cay): Isla Aves (15°40'N, 63°37'W), is located almost 600 km north of the Venezuelan coast, to the west of Guadalupe and Dominica. It is the most northerly of the Venezuelan offshore islands. Isla Aves is connected to the Venezuelan shelf by the Aves Ridge, which separates the Venezuelan and Grenada Basins in the Caribbean. Aves Cay is significant to Venezuela because it provides claim to a very large area of the northeastern Caribbean.

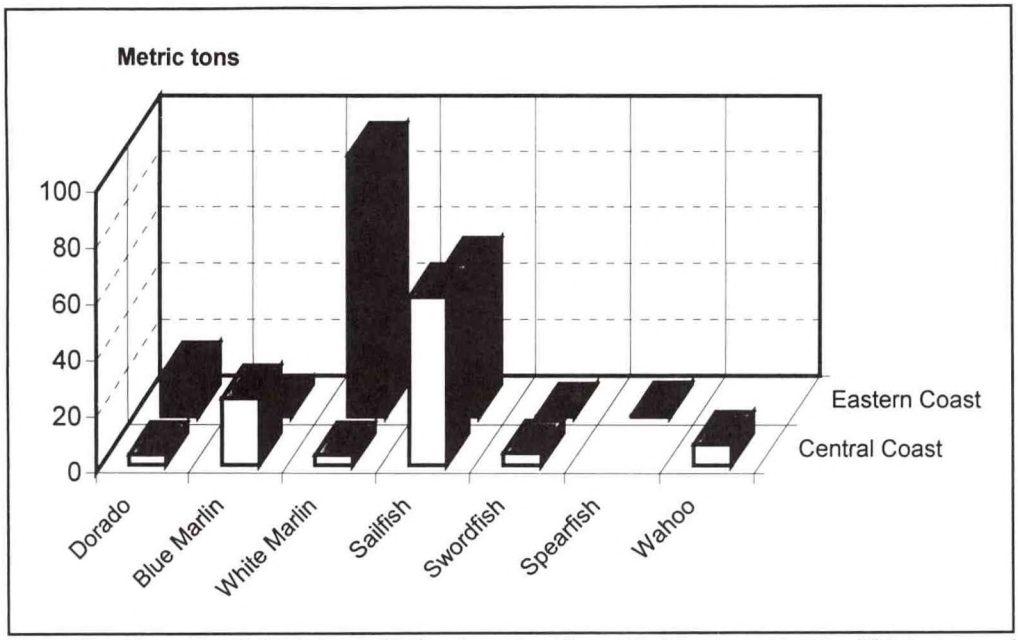

Figure 22.--.The artisanal billfish fleet in 1993 took mostly white marlin (eastern coast) and sailfish (eastern and central coast).

C. Fishing areas

Venezuelan artisanal and commercial longline fishermen appear to primarily operate in the southern Caribbean, on the slope relatively close to the Venezuelan coast. The fishery is primarily conducted off the central coast around the offshore islands from the Paraguaná Peninsula east to Los Testigos.[81] The artisanal fleet targeting tunas and billfish appears to operate along the central coast (to supply the Caracas market) and around the islands located northwest of Margarita Island.[82] The commercial longline fleet also operates to a large extent off the various Venezuelan island groups. The commercial fishermen, however, also appear to fish outside the Venezuelan EEZ, especially west of the Lesser Antilles and on the Guianas Bank in the Atlantic. Recently the fishermen have increased fishing operations northeast of the Antillian Arc (figure 23).

Artisanal grounds: Artisanal fishermen operate small boats which limit operations to short trips on largely coastal grounds. Fishing appears to be concentrated primarily on two grounds.

Central coast: Fishermen based in Playa Verde (near La Guaira) supply the large Caracas market. Their operations, conducted generally with gillnets and trammel nets are primarily centered on the central coast off La Guaira.[83] These fishermen catch a wide variety of demersal species and tuna as well as other oceanic pelagics. There is a small incidental swordfish catch.[84]

Margarita Island: Two groups of artisanal fishermen work out of Margarita Island. The fleet targeting billfish have in recent years acquired larger vessels enabling them to concentrate their effort around Venezuela's offshore island groups (Los Roques, La Blanquilla-Los Hermanos, La Tortuga, Los Hermanos, and Los Testigos), located about 100-250 km off the central and eastern coasts.[85] The fleet targeting snapper, grouper, and other demersal species generally focus on grounds along the northeast coast of South America.[86] These fishermen report little or no incidental catch of oceanic species such as swordfish.

Commercial Grounds: Venezuelan commercial longliners have operated primarily in the country's own Caribbean waters.[87] Much of their effort has been conducted around the offshore Venezuelan islands (including Los Roques, La Blanquilla, La Orchila, and Las Aves). There is also some activity as far north as Aves Island, including areas of the Venezuelan Basin. Some fishing has also been reported off the country's western (around the Netherlands Antilles, east of Aruba and south of Bonaire) and eastern coasts (off Tobago Island).[88] Venezuelan commercial longline fishermen targeting tunas (mostly yellowfin and bigeye) since 1995 have been extending their operations into the Atlantic beyond the Antillian Arc and onto the Guianas Bank. In both areas the fleet takes small numbers of swordfish as a bycatch (figure 23). Fishing operations targeting yellowfin and bigeye generally report a small swordfish bycatch in areas where swordfish are present.

Recreational Grounds: One of the most popular grounds for the recreational fishermen is the La Guaira Bank ("Placer de La Guaira"), located about 20 km north of La Guaira or about a 45-minute trip in the average sport boat. The Bank is in fact a sea mount stretching about 22 km and is about 6-7 km across. This is a major location for the country's recreational billfish fishery, in part because La Guaira is close to the large urban center of Caracas and also convenient to tourists because it is close go the Caracas international airport at Maiquitia.

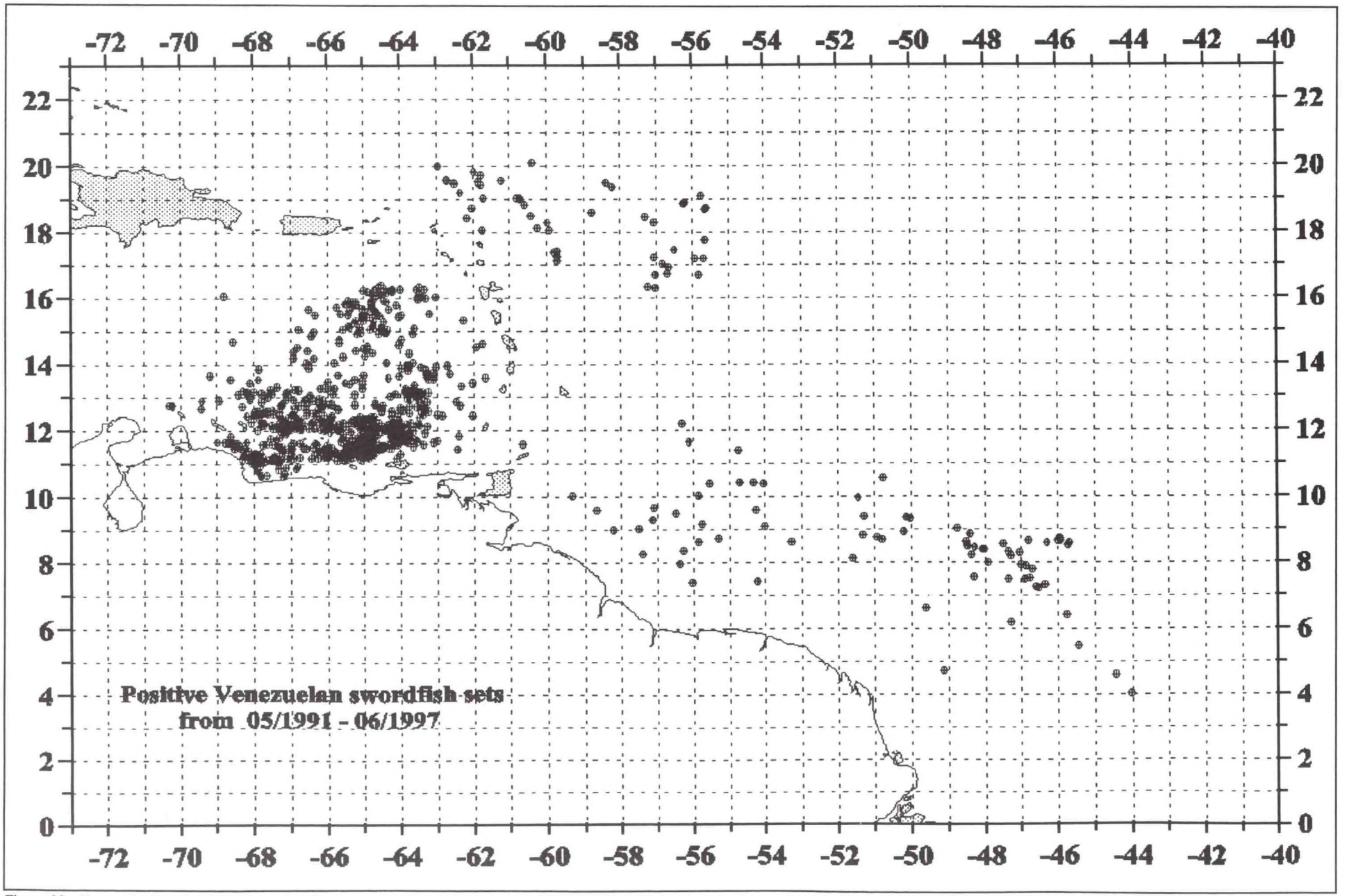

Figure 23.--Venezuelan longline fishermen primarily target grounds within and north of the EEZ, but some activity is also conducted northeast of the Antilles and off the Guianas and Brazil.

IV. Fleet

Venezuela conducts one of the largest Latin American fisheries for highly migratory oceanic pelagic species. The largest Venezuelan domestic fleet is a purse seine fleet, primarily targeting yellowfin tuna in the eastern tropical Pacific (ETP), but the country's fishermen also deploy smaller baitboat and longline fleets.[89] Foreign fishermen associated with Venezuelan companies also deploy longliners. The longline fleet is the smallest of the three Venezuelan fleets targeting oceanic pelagics. As with the other fleets, most Venezuelan longline fishermen target tunas. They also, however, take swordfish, billfish, and sharks. A few Venezuelan longliners specifically target swordfish, but this is a very small part of the longline fleet and overall oceanic pelagic fleet.

A. Purse seiners

Venezuelan fishermen operate the second largest Latin American tuna purse seine fishery. The Venezuelan seiners are mostly large modern vessels, many with carrying capacities of 1,000-1,200 tons. The Venezuelan tuna purse seine ("cerquera") fleet dominates the country's tuna industry. The Venezuelan fleet during the 1990s exceeded 30 seiners with carrying capacities averaging about 25,000 tons. The fleet in 1992 totaled 32 seiners with a carrying capacity exceeding 28,000 metric tons.[90] The Venezuelan purse seine fleet in 1996 consisted of 34 vessels with a carrying capacity of approximately 25,000 tons (appendix A3d1).

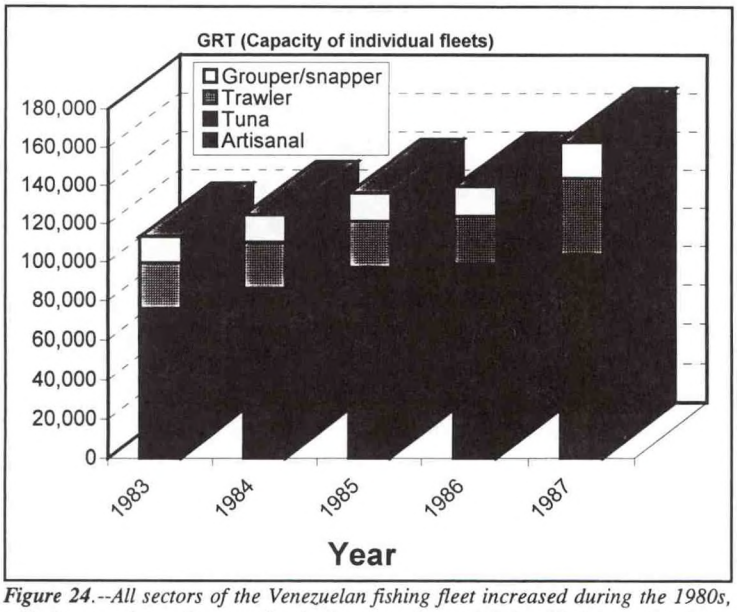

Figure 24.--All sectors of the Venezuelan fishing fleet increased during the 1980s, with the most dramatic expansion in the tuna seine and shrimp/finfish trawler fleets.

The Venezuelan purse seine fleet is normally deployed on Pacific grounds in the ETP. Venezuelan fishermen, since the withdrawal of U.S. seiners in 1990, have operated the second largest tuna purse seine fleet in the ETP. Only the Mexican fleet exceeds the Venezuelan ETP fleet in number and capacity. The fleet is one of the few Latin American distant-water fleets. Venezuelan tuna purse seine fishermen operate some of the largest fishing vessels in Latin America. Only Argentina, Chile, Cuba, and Mexico also operate a significant number of vessels capable of distant-water operations.[91] Half of the Venezuelan tuna fleet is composed of seiners with carrying capacities exceeding 1,000 tons. The Venezuelan vessels range in size from 900 to over 1,500 tons. Some large Venezuelan purse seiners have sunk; one of them, the *Jenny Margot*, was the country's largest seiner at 1,649 GRT (appendix A3d2).

Venezuelan fishermen initially acquired tuna seiners for Caribbean operations along or near the country's coast. The first seiner was leased from a Spanish company in the 1960s. Throughout the 1970s, limited seiner operations were conducted almost entirely in the Caribbean. A ready market existed in Venezuelan as the country's canneries, which focused on sardines, were interested in expanding their product line and competing with imported product. The market, however, was small until the early 1980s. Venezuelan fishing companies and investors new to the industry began acquiring large modern tuna purse seiners in the early 1980s after the prices of used seiners declined sharply on the world market. At first, many of the new seiners were leased, but Venezuelan companies gradually began purchasing the vessels outright. As larger seiners were acquired, the focus of the Venezuelan tuna fishery shifted to more productive grounds in the ETP. Fishermen also began retiring the smaller seiners from the fishery. Since 1986, the bulk of the Venezuelan tuna fishery has been taken in the ETP and the Caribbean has been a secondary fishing area (appendix A3d1). Many tuna fishermen, however, also conduct at least opportunistic Caribbean operations.

Venezuelan fishermen in 1996 operated 25 tuna purse seiners. The fishermen operated 9 tuna purse seiners with a total carrying capacity of approximately 5,500 t operating in the Atlantic Ocean and Caribbean Sea. In addition, 19 tuna purse seiners with a total carrying capacity of approximately 20,000 t were deployed in the ETP (appendix a3D1).

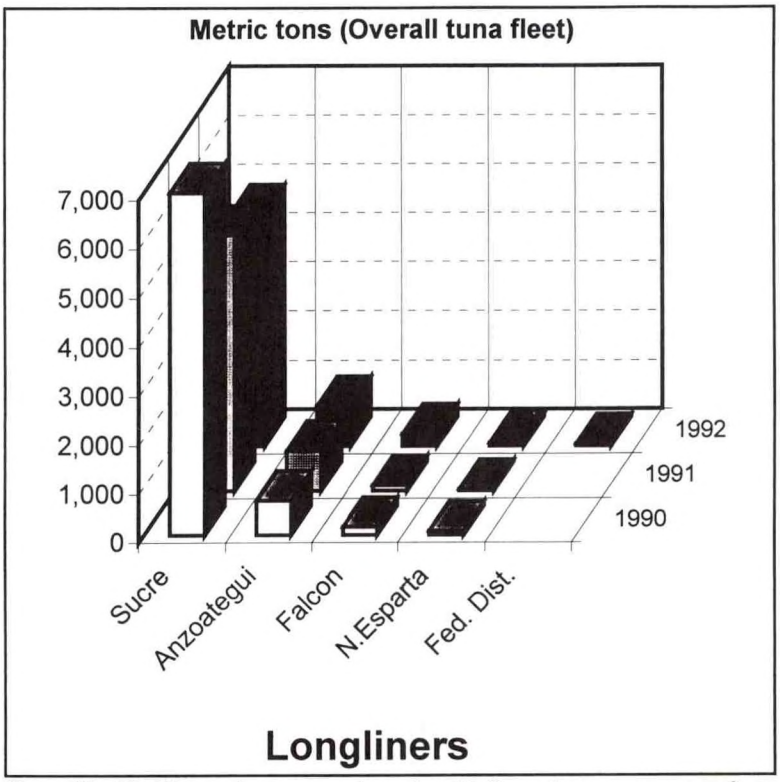

Figure 25.--Most Venezuelan tuna vessels are based in Sucre; however, some vessels are based elsewhere such as Anzoategui and Falcón.

Caribbean: According to ICCAT statistics, the Venezuelan Atlantic purse seine fleet totaled 31 vessels in 1993. No seiners have been reported by ICCAT since 1993 (appendix A3b).

Pacific: Inter-American Tropical Tuna Commission (IATTC) statistics indicate that Venezuela had a total of 19 purse seiners operating in the ETP during the first quarter of 1996 with a total carrying capacity of approximately 20,000 tons.[92]

Venezuela has become the leading Caribbean-coast tuna fishing country in Latin America. This appears somewhat of an anomaly as they have primarily developed by fishing on Pacific-coast grounds (appendix D1a). Venezuela is the only exclusively Atlantic-coast Latin American country to develop a Pacific-coast fishery. Even though Venezuela has no Pacific coast, the country's fishermen have become the second leading Latin American Pacific tuna fishing country.[93]

B. Baitboats

Venezuelan fishermen initiated a baitboat fishery in 1974, but significant tuna catches (mostly yellowfin) were not reported until 1982.[94] The number of vessels has fluctuated significantly from year to year, declining for example in 1991-93, but more current data is unavailable (appendix A2a). The authors have no information explaining these substantial annual fluctuations. Nearly 20 baitboats ("cañeras") were active in Venezuela during 1992, primarily out of Cumaná. The vessels use Cumaná because live sardines, the primary bait, are available locally. A local observer reported in 1996 that the baitboat fleet had declined to only 13 boats, again all based in Cumaná.[95] Another local observer reported a total of 15 baitboats operating in the Atlantic Ocean and Caribbean Sea during 1996 (appendix A3e).

Most of the baitboat fleet is composed of older vessels acquired in Japan.[96] The size of the vessels is unclear. The authors have received varying estimates on the size of the vessels comprising the fleet. One report suggests that these boats do not exceed 50 t and the total capacity is only about 2,300 tons. ICCAT statistics suggest, however, that in 1990 the entire fleet of 17 baitboats was in the 51-150 gross ton size range, and that in 1993 the entire fleet of 14 was in the same size category (appendix A3b).[97] A local observer reported that in 1996 the 13 Venezuelan baitboats were 25-m long, locally built steel-hulled vessels.[98] According to another local observer, the average length and carrying capacity of the 15 vessels reported in 1996 were approximately 30 m and 245 t, respectively (appendix A3e).

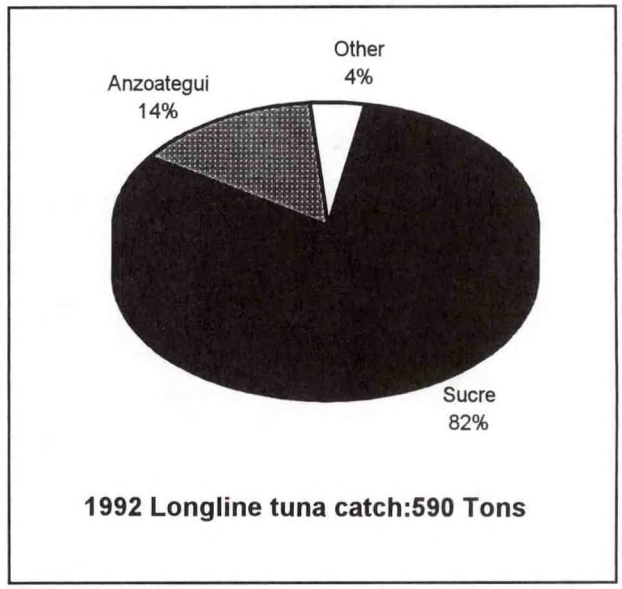

Figure 26.--The Venezuelan longline tuna fleet is mostly based in Sucre, although activities also occur in other states such as Anzoategui.

The baitboat fleet has a relatively limited range. Most vessels make trips of only 10-20 days.[99] The limited range of the vessels restricts the fleet to the southern Caribbean along the Venezuelan coast. The restricted range is due to both the small size of the vessels and the constant requirement to replenish supplies of live bait.[100]

Venezuelan baitboat fishermen have dramatically changed operations in recent years. The fishermen traditionally chum tuna schools, using live bait to attract tuna and drive the fish into a feeding frenzy. The fish are then caught individually with pole and line, making it a relatively labor-intensive method. Baitboat fishermen in recent years have been fishing cooperatively with the tuna seiners. The seiner fishermen often initially sight the tuna schools. Sophisticated sonar equipment and in many cases spotter helicopters enable the seiner fishermen to effectively locate schools. The baitboats are then employed to attract and hold the fast-moving surface schools while the seiners set their nets.[101] The baitboat fishermen then receive a share of the purse seine catch, about 25 percent.[102] One report indicates that a substantial part of the baitboat fleet is currently deployed in this cooperative effort.

The baitboat fleet lands the second largest quantity of tuna of the three Venezuelan tuna fleets, including the second largest quantity of yellowfin. One report suggests that catches are reportedly declining because of the falling yields in the coastal waters where they operate.[103] Available catch data through 1990, however, suggest that catches in recent years (1988-89) have been generally above the 1980s average. The best catch during the 1980s was reported in 1988 when the fishermen took 6,900 tons. This only includes the fish actually taken by the baitboats and not the fish taken by seiner sets in which baitboats cooperated. The Venezuelan Government indicates that the baitboat fleet during the 1990s reported a significant increase in fishing effort (appendix A3c). Actual catch results, however, are complicated by the fact that some of the baitboats are deployed in support roles for seiners actually catching the fish.

C. Longliners

Venezuelan fishermen initiated the longline fishery in the late 1950s. Foreign fishermen played a key role in introducing longline methods to Venezuela. Japanese fishermen helped to introduce longlining to the country during the 1950s. The Koreans during the 1980s played a key role in the development of the modern Venezuelan longline fishery.[104]

Longlining dominated the country's early tuna fishery.[105] At the time the tuna fishery was primarily aimed at supplying canneries. When more labor-efficient seining methods were developed in the late 1950s and early 60s, the longline fishery declined in importance. The development of export markets for high-quality fresh tuna in the 1990s has brought about a revival of the tuna longline fishery and the initiation of a smaller new longline fishery for swordfish.

The longline fleet expanded during the early 90s, but since 1993 appears to have been relatively stable. Assessing the Venezuelan longline fleet, however, has proven difficult. Even Venezuelan observers have reported frustration obtaining data on the fleet. Venezuelan sources report widely varying estimates on the numbers of longliners. A local observer when asked about fleet data replied, "The official statistics are a mess. There is no rime nor reason to the government statistics."[106] Many local observers are convinced that the fishermen under-report their catch, although the reasons for doing so are unclear.[107] The authors have attempted to compile and assess the available data. One respected source indicated that there were 54 Venezuelan longliners ("palangreras") operating in 1987. About the same number (58-60 vessels) were deployed in 1990-91, but the fleet increased in 1992 (appendix A3a).[108] ICCAT reports based on Venezuelan Government statistics, however, show a much smaller number of vessels (appendix A2a). The discrepancies between the available sources are significant (appendix A4a1) and may in part be because ICCAT lists only those longliners targeting tuna, swordfish, and other oceanic pelagics.

1990: Many Venezuelan longliners were apparently not exclusively deployed for tuna. ICCAT statistics indicate that only 18 longliners solely targeted tuna and related species in 1990, but that the number has varied markedly during the 1980s (appendix A3b). Some observers believe that the ICCAT fleet numbers significantly under-report the fleet. One observer reported 54 commercial longliners.[109]

1991: Available data suggests that the Venezuelan tuna longline fleet expanded significantly in 1991. One report estimates a longline fleet of 83 vessels (presumably in 1991), 33 of which were exclusively deployed for tuna and related species.[110] ICCAT reported, however, a more limited fleet of only 35 longliners (appendix A3b). The ICCAT data indicated that 14 larger longliners were active with the small artisanal longliners.

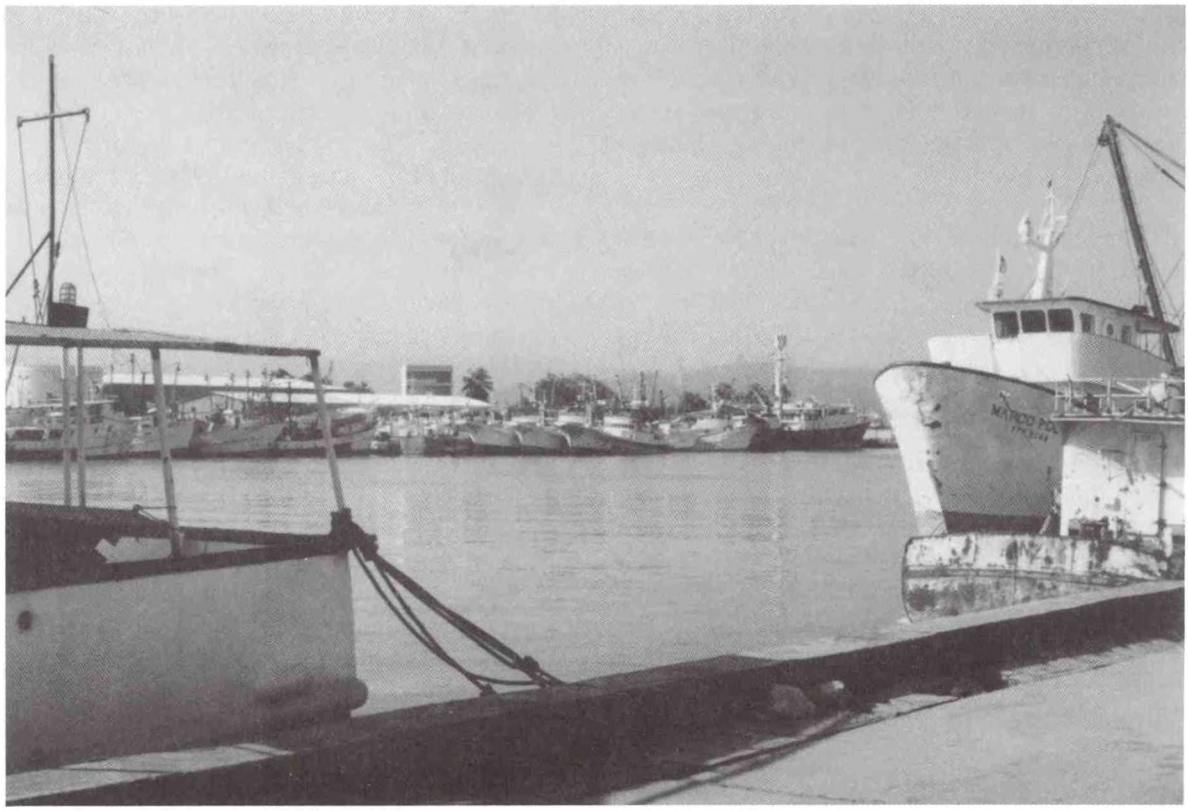

***Photo 3**.--A U.S. fisherman in 1998 obtained permits to operate two tuna longliners off Venezuela after a complicated, lengthy application process. Freddy Arocha.*

***Photo 4**.--A variety of fishing vessels use the CORPORIENTE port, including purse seiners, shrimp trawlers, and Korean-type baitboat/longliners. Freddy Arocha.*

***Photo 5.**--The "Make" targets swordfish and tuna out of Puerto la Cruz. Freddy Arocha.*

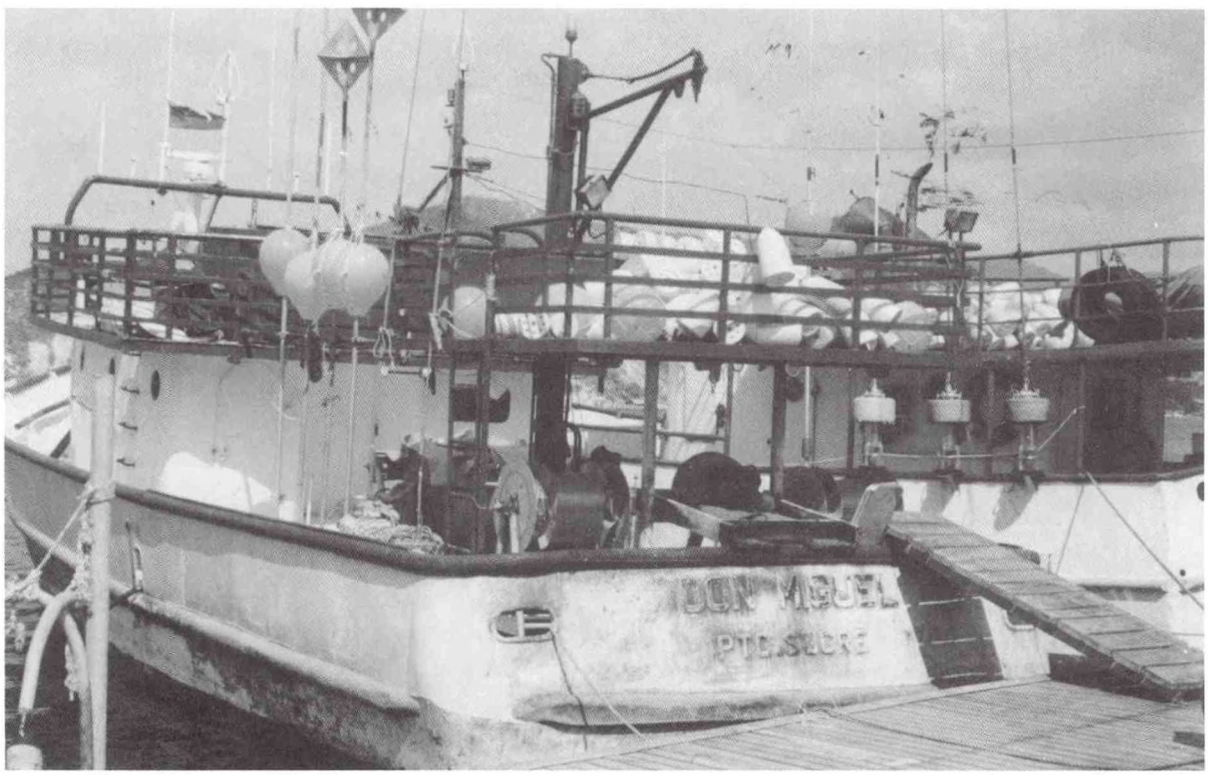

***Photo 6.**--The "Don Miguel" operates from Puerto la Cruz and targets swordfish and tuna. Freddy Arocha.*

1992: Fishermen expanded the fleet to over 80 longliners in 1992, a sharp increase. Many of these new entries into the longline fishery were reportedly converted trawlers.[111] Many were relatively small vessels of less than 100 tons. Despite the increasing number of vessels, the total capacity declined to only 5,900 tons in 1992, slightly below the 6,200 t reported in 1990-91 (appendix A3a).

1993: ICCAT statistics indicate that the longline fleet totaled to 70 vessels in 1993 (appendix A2a). All were relatively small longliners under 50 GRT. This suggests a substantial increase over previous years, but would be a small decline from other data available from MAC (appendix A3a).

1994: Vessel data for 1994 is unavailable. Venezuelan officials have not submitted data on the fleet to ICCAT.

1995: Vessel data for 1994 is unavailable. Venezuelan officials have not submitted data on the fleet to ICCAT.

1996: Local sources informally report that the number of Venezuelan longliners targeting tunas, billfishes, and other oceanic pelagics remains at about 70 vessels, the same as the last available government estimate provided to ICCAT (appendix A2a). Some larger vessels, however, appear to have been added to the fleet. Other observers provide widely varying estimates on the number of commercial longliners. One source estimates that there were 19 commercial tuna longliners operating out of Venezuela during 1996, most of them based off Cumaná.[112] The same local observer reported that there were approximately 27 commercial longliners operating in Venezuela targeting tunas and billfishes (7 which were primarily targeting swordfish) during 1996. According to the same observer, there were an additional 43 artisanal longliners targeting tunas and billfishes in 1996.[113]

1997: The authors have been unable to obtain estimates on 1997 fleet developments.

Assessing the size of the longline fleet is complicated by two factors:

Shifts: Many Venezuelan fishermen have multiple purpose boats and can shift operations seasonally or even for several years, depending on catch rates, market trends, and other factors. This makes computing the number of vessels engaged in longlining at any given time difficult.

Statistical program: The Venezuelan government has made little effort to collect reliable data on the longliner fleet and fishery.

Some fishermen shift fisheries and may occasionally target oceanic pelagics, such as dorado, king and Spanish mackerel, and billfish. Venezuelan fishermen also deploy a large artisanal/commercial[114] fleet targeting demersal species (grouper and snapper), but these fishermen may seasonally shift to oceanic pelagics. The demersal fishermen target grouper and snapper--primarily with hook and lines, although some deploy bottom longlines. These demersal operations generally are conducted off French Guiana and Suriname. However, during periods of high tuna and billfish yields, some of these vessels may shift operations and deploy surface longlines or a combination of longlines and gillnets. Some discrepancies exist concerning the size of this fleet. The Government reports that this fleet between 1989-94 has fluctuated at around 220 vessels, mostly based at Margarita Island ports and Cumaná.[115] One report indicated that this fleet in 1987 was reportedly composed of 721 vessels, which were based at ports in the states of Sucre (158), Nueva Esparta (451), Anzoátegui (4), Distrito Federal (54), and Falcón (54).[116] The primary ports are Juan Griego and Punta Piedras (Nueva

***Photo 7.**--An artisanal longliner targeting billfish in the water around Margarita Island. Note the on-deck hold. Freddy Arocha.*

Esparta-Margarita Island) and Morro de Pto. Santo and Rio Caribe (Sucre). A more recent report indicated that in 1996 there were still approximately 700-800 of these vessels deployed in the fishery. They are small, wooden-hulled artisanal vessels, mostly about 18-23 m in length. There is no clear distinction between the longliners targeting billfish/tunas and those targeting the groupers and snappers. The vessel types are indistinguishable. Many fishermen have experience with both demersal and pelagic fisheries and can change fishing gear seasonally to target the most abundant species.[117] As a general rule, vessels greater than 14 m target grouper and snapper off Suriname and French Guiana. The smaller vessels shift operations seasonally in Venezuelan waters targeting billfish and coastal pelagics (dorado and king and Spanish mackerel).[118]

Venezuela's longline fleet is composed of two segments, an artisanal fleet and a commercial fleet. Some of the commercial vessels deployed during the 1980s were operated in association with Korean (ROK) companies.[119] While the Korean role has declined, it is still present.[120] (See "International.")

Artisanal: Artisanal fishermen use one basic type of longliner to target tunas, billfish, and other oceanic pelagics. Fishermen from Margarita Island have been longlining since the 1960s.[121] The fishermen deploy a large number of small wooden vessels, generally from 7-14 m in length known as "palangreros". All of the artisanal longliners targeting billfish, tuna, and other coastal pelagics (primarily dorado and king and Spanish mackerel) are mostly based at the ports of Juan Griego on Margarita Island.[122] The authors do not have current fleet data, but one now-dated report indicated that there were about 32 such vessels targeting billfish out of Juan Griego and other Margarita Island ports during 1992.[123] Another report indicated that a total of 43 artisanal longliners were targeting billfish during 1993, all operating along the eastern coast.[124] During the early 1990s (1990-93) the number of these longliners increased steadily from 32 vessels in 1990 to 42 vessels in 1993.[125] A more recent report indicated that in 1996 there were about 50 of these vessels targeting billfish off Margarita Island. There are other artisanal longliners targeting grouper and snapper based at Carupano and Güiria. These artisanal longliners deploy small bottom longlines in the coastal areas off Los Testigos and in the Atlantic east of Trinidad.[126]

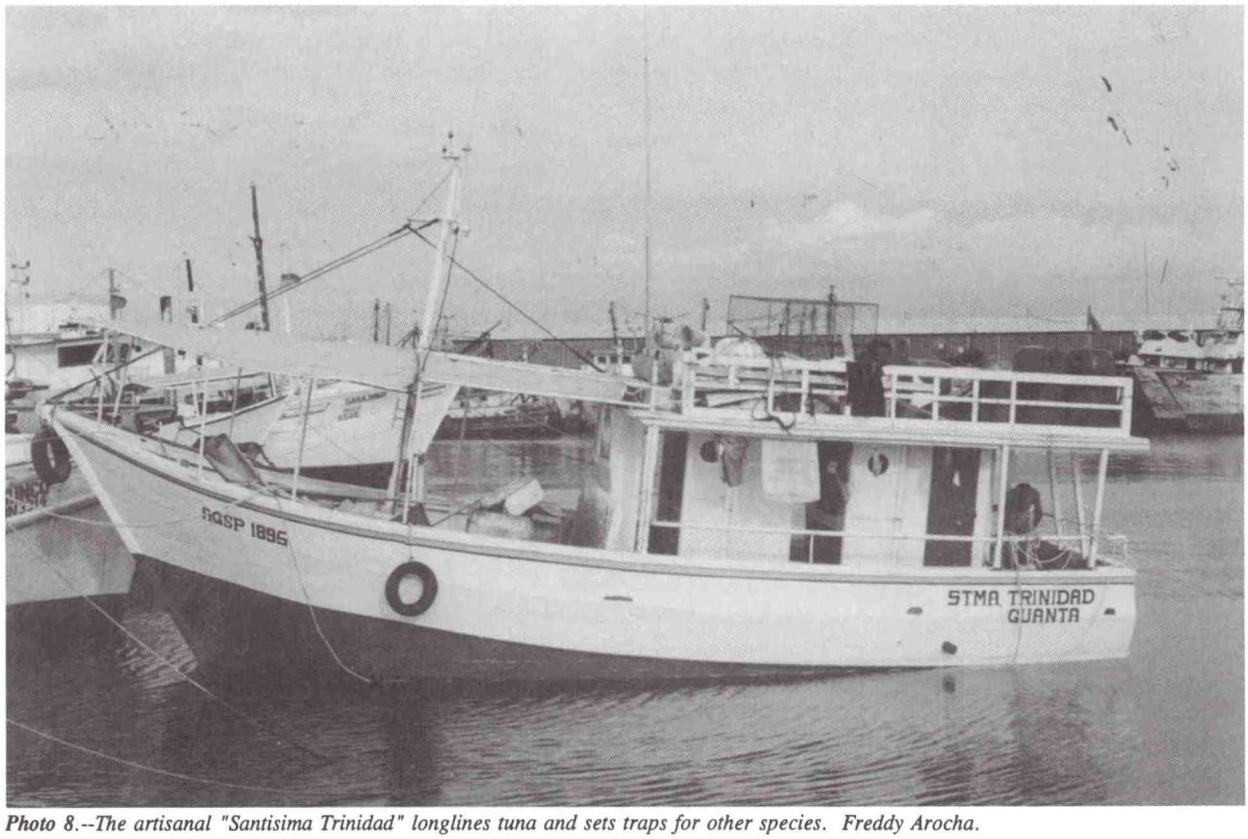

Photo 8.--The artisanal "Santisima Trinidad" longlines tuna and sets traps for other species. Freddy Arocha.

Commercial: Venezuela's domestic commercial fleet is primarily composed of medium-sized longliners, but a few large commercial vessels have also been deployed, mostly by foreign fishermen. The first were introduced as part of a joint venture, but recent reports suggest that Venezuelan companies are now also operating a few larger longliners.

Medium (domestic) vessels: Most of these vessels primarily target tunas.

Tuna: Venezuelan commercial tuna longline fishermen during the 1980s operated a fleet of small (less than 50 GRT) vessels. The number of vessels varied from 14 (1983) to 33 (1986). The commercial longline fleet has traditionally targeted tunas, but there has been a significant shark bycatch. The swordfish catch was extremely limited. One report indicated that in 1986 these longliners landed about 17 percent of the country's tuna catch.[127] A few of these vessels also target swordfish. One local observer reports that several longliners which targeted swordfish were introduced by a U.S. company (Merry) in 1987 (appendix A4b),[128] although ICCAT statistics indicated that the overall tuna longline fleet declined during 1987 (appendix A2a). A Servicio Autónomo de los Recursos Pesqueros y Acuícolas (SARPA) report indicates that the number of Venezuelan commercial longliners increased steadily from 1980 through 1993 and has since fluctuated from 80-115 vessels.[129] Government officials report that 226 longliners were issued commercial permits in 1995. These longliners are under 24 m long and are built locally. The commercial tuna longliners are primarily based in Cumaná and Guanta.[130] Most of the commercial longliners based in Cumaná range from 14-21 meters. Most are wooden-hulled vessels, although there are also some steel-hulls.[131] Most have ice wells, but are not equipped with freezers.

Swordfish: Most of the vessels targeting swordfish are based in Guanta and a smaller number in Cumaná. The number of dedicated swordfish longliners has varied annually from 5-9 vessels. These longliners are generally steel-hulled vessels and are also under 25 m long.[132] The number of swordfish longliners increased to 9 in 1990, but fell to only 5 in 1991. In 1997, about 18 vessels of Venezuela's 115 commercial longliners were equipped to target swordfish but only about 15 have actually conducted operations (appendix A4c1). The most recent available data indicates about 18 longliners were active in 1998 (appendix A4d1).

Large (mostly foreign) vessels: A few large foreign commercial tuna longliners have been deployed off Venezuela, but primarily by foreign fishermen. The initial vessels were Japanese, but the Korean vessels were primarily involved during the 1980s. Only a few foreign vessels have been active during the 1990s. Unconfirmed reports suggest that some Spanish vessels participated in the fishery during the 1990s, but industry reports dismiss these accounts. By 1996 the sole remaining large longliner was deployed in shark fisheries.

1950s: Large foreign commercial longliners have been operating in Venezuela through joint/venture agreements. The first foreign vessels were reported in the 1950s.

1980s: During the 1980s an all-time high of 18 large vessels were operating in Venezuela, out of Carúpano. The vessels were operated by a Venezuelan company associated with a Korean group. (See "International".) These vessels, which ranged from 35-55 m in length, targeted primarily bigeye and yellowfin tuna. Gradually, however, these vessels left the Venezuelan tuna fishery.

1990: A local scientist indicated that in 1990 two Asian vessels of 35 m (all over 200 GRT) were granted permits to fish in Venezuelan waters after they were locally flagged. Another observer reported that the General Sectorial Directorate of Fisheries and Aquaculture (DGSPA) issued a permit to a Spanish swordfish longliner in 1990.[133] It is unclear if the Spanish longliner was required to reflag or was just issued a fishing permit.

1991: Another two Asian vessels (about 30 m) were also flagged in Venezuela and initiated fishery

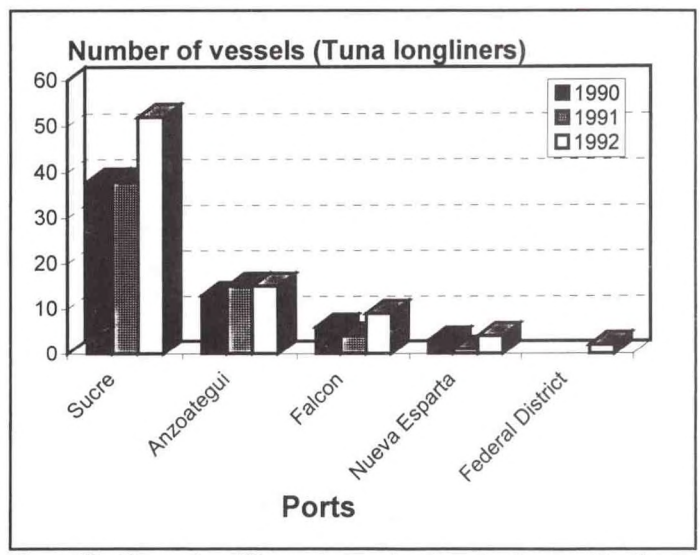

Figure 27.--The number of Venezuelan tuna longliners has increased in all states except Anzoategui.

Photo 9.--The longliner Chimana Grande docked at Puerto La Cruz. Freddy Arocha.

operations. These larger steel-hulled vessels are based in Guanta and are the only large Venezuelan vessels known to be operating in the country's EEZ and in international waters of the western central Atlantic. ICCAT reports, however, that the Venezuelan fishermen reportedly operated nine larger (51-200 GRT) longliners in 1991 for the first time since 1982 (appendix A2a). Few details are available on these larger vessels, but most likely four of these nine longliners were the Asian-origin vessels introduced to the fishery between 1990 and 1991. The General Sectorial Directorate of Fisheries and Aquaculture (DGSPA) reported that almost all of the Venezuelan swordfish catch was taken by five large Asian longliners which operated during 1991.[134]

1992: Only two large longliners (about 60 m) were active in Venezuela during 1992.[135] These vessels were equipped with low temperature freezers and deployed primarily for bigeye and to a lesser extent yellowfin.

1993: The DGSPA reportedly issued permits to two Spanish longliners in 1993.[136] Again it is unclear if the Spanish longliners were required to reflag or were just issued a fishing permit. One report suggests that a substantial number of Spanish longliners were granted permits during the early 1990s in an effort to promote joint ventures with Venezuelan companies.[137] The authors, however, have been unable to confirm these reports with Venezuelan officials. Industry sources also dismiss these reports and the presence of large numbers of Spanish longliners is unlikely.[138] The Spanish unlike the Koreans specifically targeted swordfish. The two Spanish fishermen known to have DGSPA permits experienced unspecified problems and by 1994 terminated operations off Venezuela.[139] (See "International".)

1996: Only one foreign vessel was still operating in Venezuela by 1996. It was deployed out of Carúpano. The vessel, *San Son 76*, had been acquired by a local company and was being deployed in the shark gillnet fishery off Brazil.

V. Shipyards

Venezuelan shipyards do not currently build commercial longliners. Venezuelan yards have primarily built shrimp trawlers and other relatively small commercial and artisanal fishing vessels. Some yards have built small longliners. Since the early 90s, however, economic conditions have caused a slow-down in the industry and no Venezuelan yards in 1996 were building new vessels.[140] Venezuelan artisanal and commercial longliners have not utilized purpose-built longliners but, rather boats converted from trawlers and other vessel types. Most were built in the Cumaná-area shipyards, but Astillero Oriente and other yards have built some longliners.

Varadero Caribe: This Cumaná shipyard was established in 1978. It constructs, maintains, and repairs vessels. Varadero Caribe has built both steel and wooden-hulled vessels. Construction during the 1980s included wooden and steel-hulled 30-m trawlers, 34-m baitboats, and four 32-m longliners. Unfavorable economic conditions have ended the demand for new vessels, so Varadero Caribe has only conducted maintenance and repair services on a variety of vessels, including longliners, since 1992.[141]

Astillero Oriente: This Cumaná-based shipyard was established in 1976. It constructs, maintains, and repairs vessels. Astillero Oriente only builds steel-hulled vessels, such as longliners, trawlers, and tugboats, although the company offers maintenance and repair services for fiberglass, wood, and steel vessels. According to company officials, Astillero Oriente, has since 1992 ceased vessel construction because of the unfavorable economic conditions prevalent in Venezuela. The last Astillero Oriente longline contracts were eight 16-m and two 21-m longliners built in 1987-88 for several Venezuelan fishing companies.[142]

DIPESCA C.A.: This Cumaná-based company was established in 1974. The company constructs, maintains, and repairs vessels. DIPESCA specialized in the construction of 21-m steel-hulled trawlers, although it also built two 14-m longliners for La Atunera, a La Guaira-based fishing company operating vessels from Cumaná. Like other Venezuelan shipyards, DIPESCA currently only offers maintenance and repair services. Due to the unfavorable economic conditions, the company has not built vessels since 1990.[143]

Naviera Industria (NAVINCA): This Cumaná company was established in 1984. It constructs, maintains, and repairs vessels. Many of the vessels built by the company have been fishing vessels, especially trawlers. The company has built 16 steel-hulled trawlers ranging from 18-35 m in length. Also, NAVINCA has converted several trawlers to longliners. As with the other Venezuelan shipyards, the company has not built vessels since the early 1990s due to unfavorable economic conditions. Navinca currently offers maintenance and repair services to a variety of vessels, including the local longliners.[144]

Others yards: There are many other mostly smaller shipyards in Venezuela, especially in the Maracaibo area. The authors do not know, however, of any currently building fishing and other small vessels. There are, for example, several shipyards in Maracaibo which have specialized in the construction of "gabarras," flat bottom boats which are utilized to transport supplies to the oil rigs located along the western coast. There are also various yards in Margarita Island - such as Astillero Nueva Esparta, which build artisanal vessels. According to a local report, the demand for artisanal vessels has also plummeted during recent years.[145]

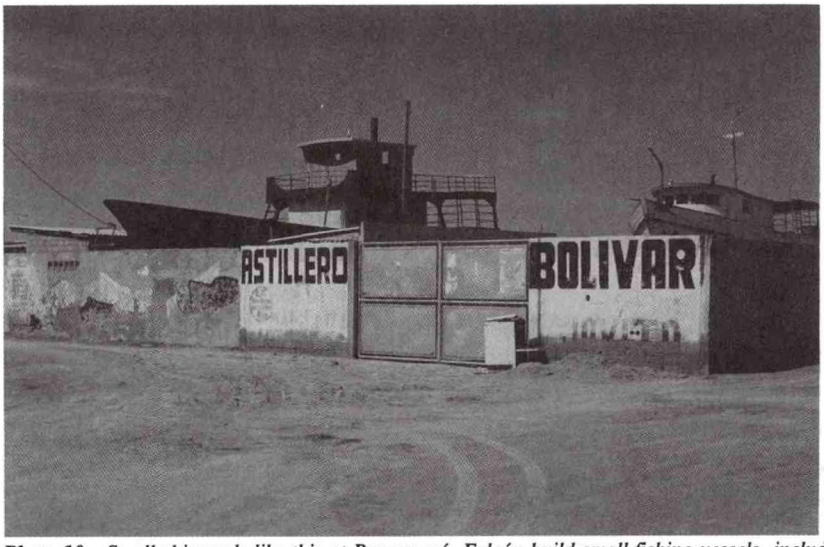

***Photo 10**.--Small shipyards like this at Paraguaná, Falcón build small fishing vessels, including trawlers, seiners, and longliners.*

VI. Fleet Operations and Gear

The Venezuelan longline fleet is primarily based at ports located in the eastern state of Sucre (figure 1). More than 50 longliners, or over 60 percent of the fleet, were based in Sucre ports during 1992 (appendix A3a). Most of the remaining longliners (15 vessels) were based in nearby Anzoátegui (Guanta/Puerto la Cruz). More than 90 percent of the fleet was based in eastern states during 1990-94.[146] The primary ports are Cumaná, Guanta, and Morro de Puerto Santo, but some activity has also been reported at Cumaná, Carúpano, Güiria, and Puerto la Cruz. (See "Ports".) The fishermen do not necessarily land the catch in their home ports. Much of their catch is landed in Cumaná and other Sucre/Anzoátegui ports where the vessels are based, but smaller amounts are also landed at other ports, especially La Guaira and Punto Fijo, or even foreign ports depending on market conditions. (See "Transshipments.")

Domestic longline fishermen primarily target yellowfin tuna, but some fishermen also target swordfish. Most tuna (and to a lesser degree swordfish) operations result in billfish bycatches (appendices D3d and D3e1 and 2). Both commercial and artisanal operations are involved.[147]

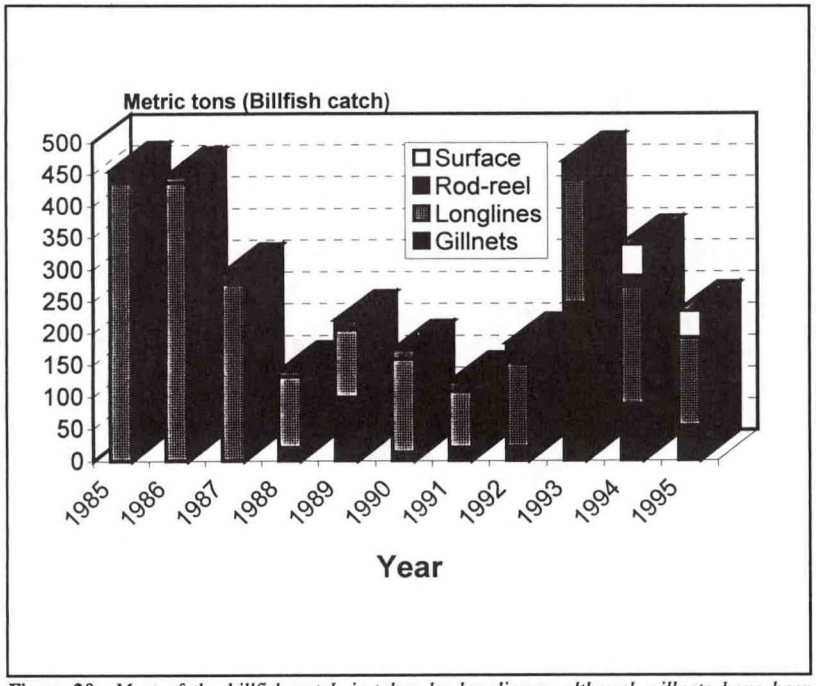

Figure 28.--Most of the billfish catch is taken by longliners, although gillnets have been important in some years--especially 1993.

A. Artisanal

Most of the artisanal billfish catch is taken in directed fisheries by longlines and gillnets. Small quantities are taken by fishermen targeting small tunas and wahoo with handlines and gillnets. Minimal quantities of swordfish are taken in these artisanal operations.

Billfish operations: Two Venezuelan artisanal fisheries report swordfish catches. The eastern artisanal billfish fleet operating out off Isla Margarita utilizing small longlines harvests the largest number of billfish. The central fleet based in La Guaira deploying mostly gillnets, reports only incidental swordfish catches.

Eastern Fleet: The eastern fleet operates out of Isla Margarita and uses 7-14 m longliners which are generally manned by 6-7 fishermen. They are equipped with 3.5-10.0-km surface longlines with 450-600 hooks usually set about 35 m deep. The artisanal longline fishermen report their best billfish catches during the dry season (September-February).[148] The catch is eviscerated at sea and kept in shaved ice. The fishermen generally use live sardines for bait. The fishermen refer to this method as "pesca a la viva". These vessels are equipped with live-bait wells to keep the sardines alive. Fishing trips last from 8-12 days. Usually, the longlines are first deployed around 7:00 am and are pulled-out only 3 hours later. This deployment schedule allows the fishermen to set the longlines more than once per fishing day. A Venezuelan study conducted in 1991-92 reported that approximately 85 percent of these vessels' catch was billfish (mostly white marlin and sailfish). Swordfish catches were minimal or null (appendix D4d). During the rainy season (March-August), when catches decline, the vessels are rigged with hook-and-lines instead, and the target species shifts to scombroids (mackerels and related species).[149]

Central Fleet: The artisanal fleet targeting billfish along the central coast is composed of vessels 8-m in length which operate generally with two outboard engines from 48-75 horsepower. There were 28 such vessels active out off Playa Verde near La Guaira in 1991. Unlike the eastern fleet based at Isla Margarita, most of the Playa Verde-based fleet targeting billfish deploy gillnets rather than longlines. Fishing is concentrated at "Placer La Guaira," a productive fishing ground located

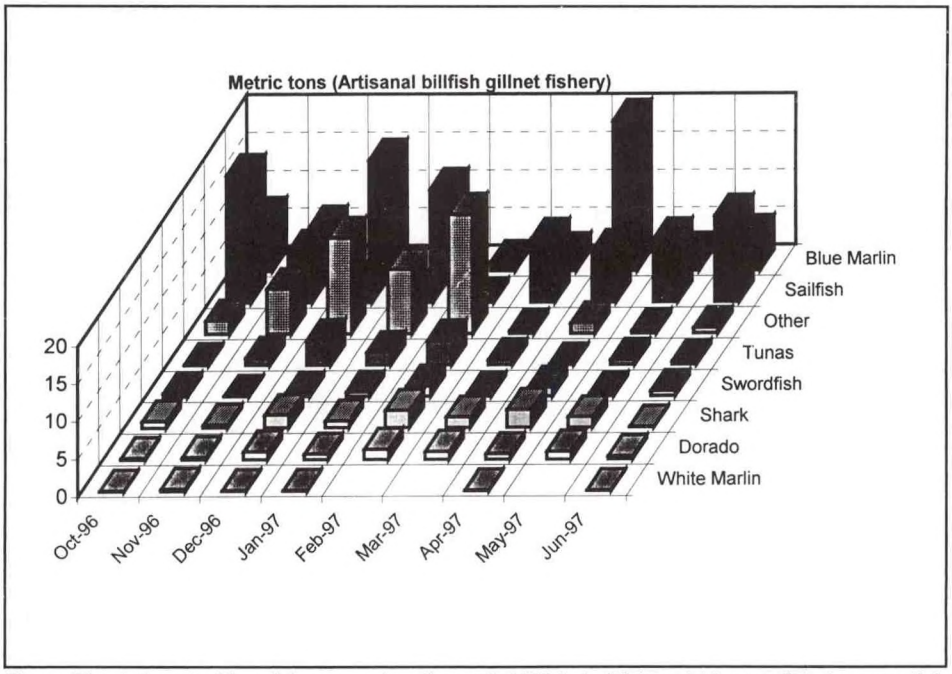

***Figure 29**.--Artisanal gillnet fishermen primarily catch billfish (sailfish and blue marlin), but very little swordfish.*

about 20 km north of La Guaira. Generally, the gillnets are 500-1,500 m long and 11-21 m deep. These vessels, which are mostly manned by three fishermen, make about 8-12 trips lasting 16-18 hours each per month. Usually, the nets are set in the afternoon and allowed to drift over night before being retrieved early the next morning. This fleet targets billfish during the dry season (September-March), and similar to the Isla Margarita-based fleet, it targets scombroids, such as mackerel, during the rest of the year.[150] Only limited catch data is available. The 1993 catch was mostly billfish (primarily sailfish and blue marlin). Swordfish were only about 5 percent of the catch (appendix D4a).

Other Species: Artisanal fishermen using handlines and gillnets report catches of small tunas (various *Scomberomorus* species), dorado (*Coryphaena hippurus*) and wahoo (*Acanthocibium salandri*). Artisanal fishermen operating out of La Guaira and Margarita Island report some billfish catches in their gillnet sets.[151] Some artisanal fishermen also set longlines for billfish - both marlin[152] and swordfish[153]. Some also catch shark.[154] Unconfirmed press reports based on accounts from FUNATROPICS, an environmental group, in the late 1980s charged that the fishermen were using dolphins for shark bait. The Ministerio de Ambiente was reportedly considering regulations to prevent dolphin kills.[155] A commission composed of Ministry officials, fishermen, and FUNDATROPICS was formed.[156] Details on the Commission's findings or actual government steps are unavailable. The

***Photo 11**.--The "Al Cimar", an artisanal billfish longliner operating off Margarita Island, is shown here in port at Por la Mar. Freddy Arocha.*

swordfish catch of the artisanal fishermen catching tunas, dorado, wahoo, sharks and other species is believed to be relatively limited.

Unconfirmed reports suggest that some artisanal fishermen are retaining some of their catch and landing it in various Caribbean islands (primarily Martinique). The species involved are reportedly billfish (primarily sailfish and marlin) and other high-value species such as tuna.[157] The authors have no data to confirm this activity. The distances involved suggest that it may be limited to only a few of the larger vessels. One source indicated that these foreign landings occurred when a temporary government resolution banned billfish fishing along much of the eastern coast. This situation caused several artisanal longliner fishermen who fished off Margarita Island to land their billfish catch illegally at night in the Island or in other close-by Caribbean islands.[158] The artisanal fishermen targeting swordfish were also affected. (See "Transshipments".)

B. Commercial

1. Domestic

Tuna operations: The Venezuelan tuna longline fishermen conduct primarily commercial operations. These operations are mostly conducted from the ports of Cumaná and Guanta. The authors have received widely varying estimates on the number of vessels. (See "Fleet".) Crews usually consist of 7-8 fishermen.[159] The fishermen target tunas, primarily yellowfin, as well as smaller quantities of albacore and bigeye. Although most of the catch is tuna, blue and white marlins, sailfish, sharks, and swordfish are also taken occasionally. According to a study conducted in the early 70s, the commercial longliner's catch is yellowfin (70 percent), sailfish (20 percent), and white marlin (5 percent).[160] The longline fleet lands the most valuable product of the three Venezuelan tuna fleets.[161] The longline fishermen generally handle their catch more carefully than the purse seine fishermen so the catch can be exported as high-quality fresh product. One local source indicates there have been substantial improvements in handling techniques by both the fishermen and processing companies in recent years as they increasingly target the quality-conscious export markets.[162] Another report suggests that as much as 65 percent of the longline catch is exported fresh.[163] There is a strong financial incentive for the fishermen to improve handling procedures. Prices for export-quality product can be five times domestic prices. One observer reports that the better quality product is exported while the small, damaged, or lesser quality fish is marketed domestically. The Venezuelan commercial longline fleet targeting tunas generally deploys longlines which range from 50-120 km, carrying between 500-1,800 hooks.[164] The fishermen use both squid and sardine as bait.[165] The lines set for tuna are generally set early in the morning, between 6:00 and 9:00 am and hauled in late in the evening, between about 5:00 and 6:00 pm.[166] The tuna longliners targeting primarily bigeye and albacore are set fairly deep, approximately at 72 meters. The distance between the buoys and the main line "linea madre" is 46 m and the gangions ("brazoladas") which connect the main line to the hooks are 26 m long. Each section of the longline (main line) has 9 gangions, which are separated from each other by 44 meters. There is a float separating each section of the main line (every 9 hooklines), or every 440 meters. The fishermen targeting yellowfin set at fairly shallow depths (about 42 m), but the hooks and spacings are similar to the deeper albacore/bigeye sets.

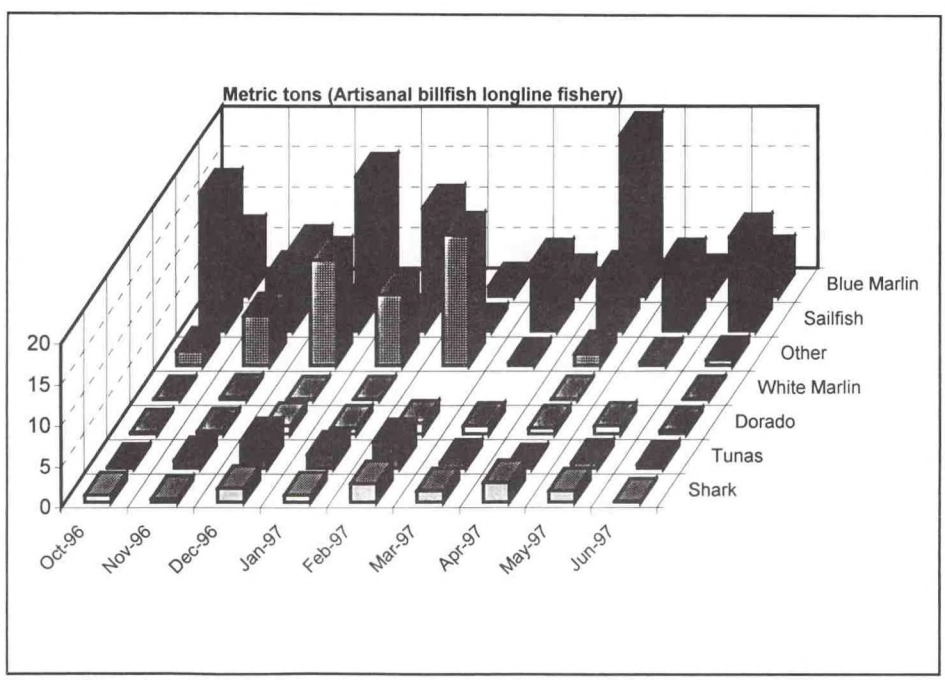

Figure 30.--Artisanal longline fishermen report catches that vary seasonally. Large quantities of billfish are caught in November and sizeable quantities of dorado in June.

***Photo 12**.--Fishermen displaying the gillnet that they use for billfish and other large pelagics off La Guaira. Freddy Arocha.*

***Photo 13**.--Artisanal fishermen unloading billfish at La Guaira. They rarely take swordfish. Freddy Arocha.*

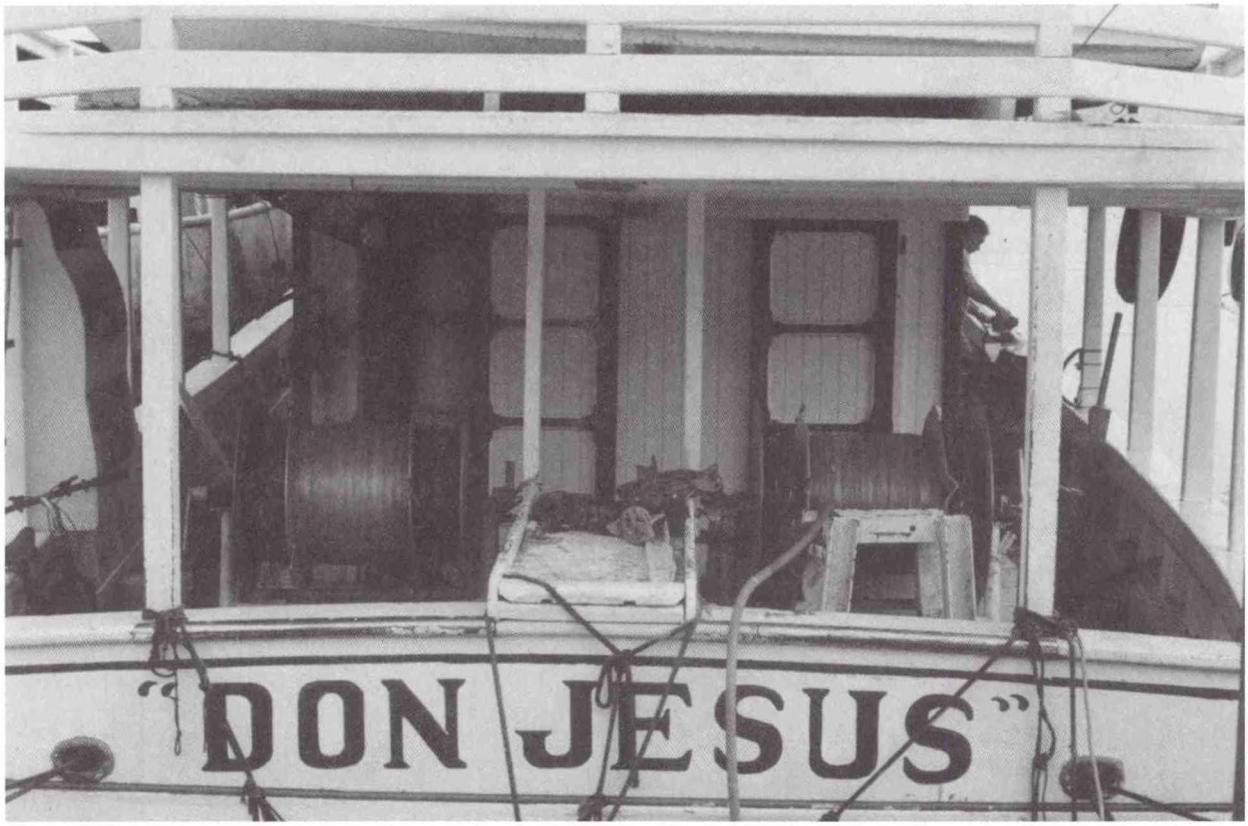

Photo 14.--The "Don Jesus" targets swordfish and tuna out of Cumaná. Note the twin longline monofilament spools. Freddy Arocha.

The fishermen generally use live chub mackerel or sardines for bait. Fishing trips average 15-20 days in length.[167]

Swordfish operations: Only a few vessels actually target swordfish. Operations are conducted from Puerto la Cruz. The longliners, which are mostly steel-hulled 20-24 m vessels are deployed in the southern Caribbean, primarily in Venezuelan waters off la Blanquilla, Isla Orchila, and los Roques (12-15°N). One fisherman indicates his operations are usually relatively close to the mainland or Margarita Island coast.[168] The swordfish fishermen have also operated off western Venezuela around Aruba and the Netherlands Antilles (Bonaire, and Curacao), but they generally avoid the western coast near the Colombian border because of the danger of seizures or attacks by smugglers.[169] The swordfish operations are significantly different

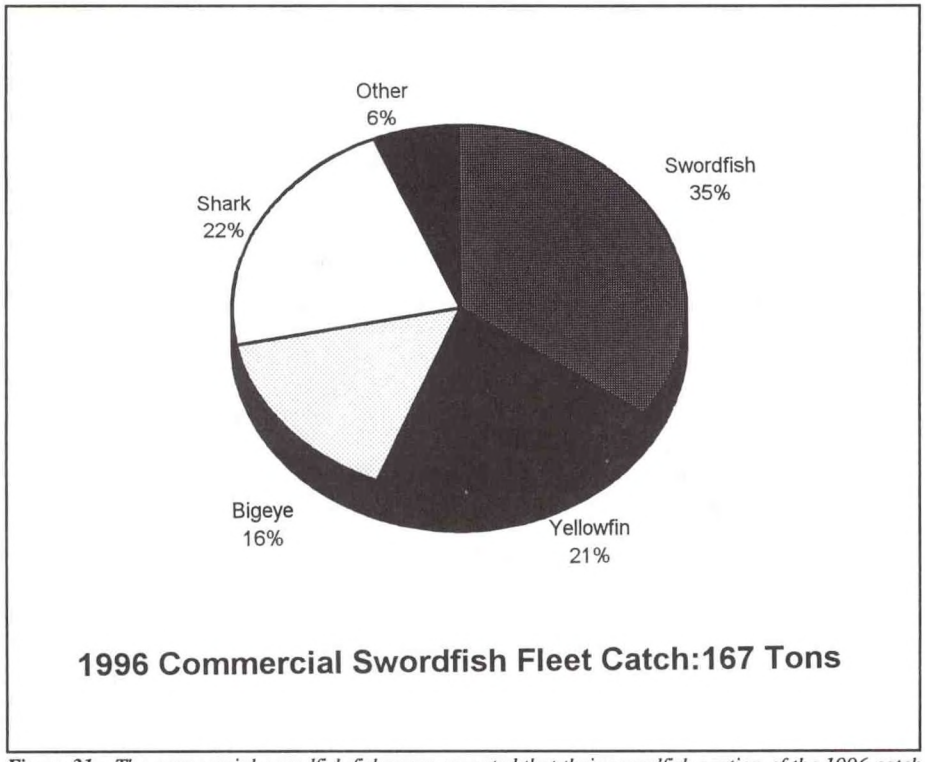

Figure 31.--The commercial swordfish fishermen reported that their swordfish portion of the 1996 catch declined substantially to only 35 percent.

***Photo 15**.--This Venezuelan longliner is in the process of setting its line. Freddy Arocha.*

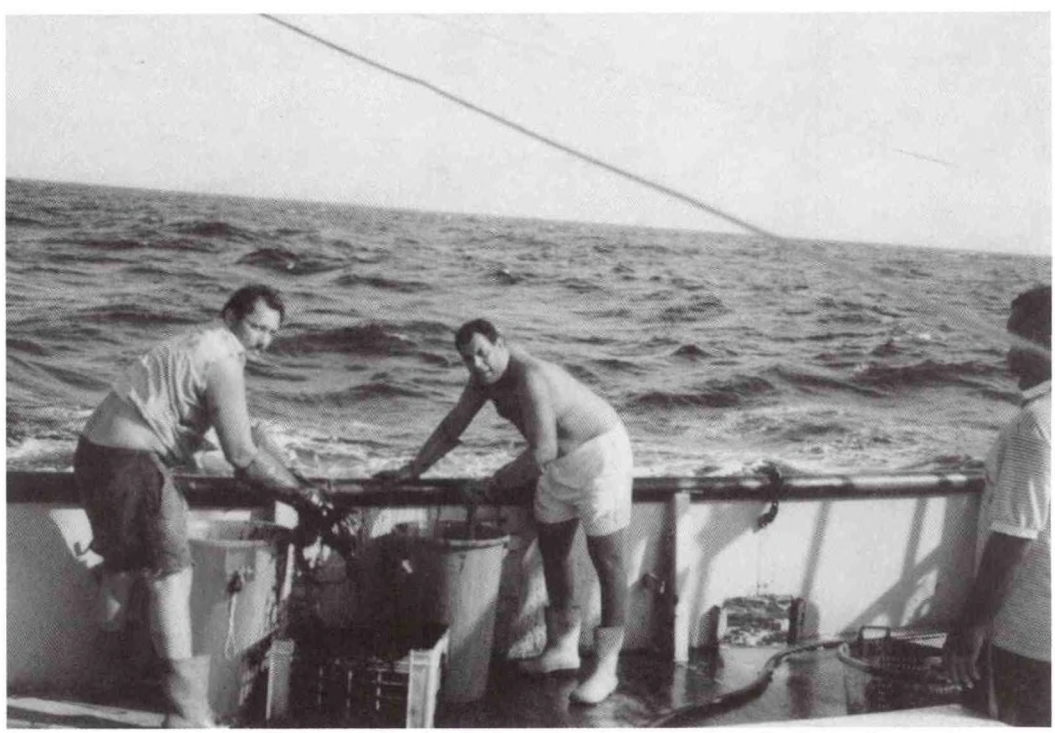

***Photo 16**.--Dying squid in cyalume so that it glows in the water when used as bait. Freddy Arocha.*

from the tuna operations. The hooks are not set asdeep and the lines are shorter with fewer hooks. According to a local source the fishermen use longlines averaging about 30-50 km in length.[170] The longlines used are "American style," with the principal line made out of nylon. Several companies report employing essentially American-style methods and some have employed American fishing technicians.[171] The swordfish longlines are set after dusk, usually about 7:00 to 9:00 pm.[172] There is some variation. One fishermen, for example, indicates that he usually begins setting a little earlier, about 6:00 pm.[173] The fishermen use relatively large whole squid (*Ilex sp.*, 40-50 cm long) as bait. The squid is illuminated by cyalume light sticks, which are placed near the bait or the bait is impregnated in liquid cyalume and hooked. Also, battery-powered lights are placed near the hooks.[174] Some fishermen attach the lightsticks on each hook line.[175]The fishermen normally begin to pull in the 30-50 km longline set with about 600-900 hooks around 6:00 am and the fish are generally stored in the holds by 9:00 or 10:00 am. One 1993 report indicated that most of the swordfish are dead when retrieved from the lines, but as many as 20 percent may still be alive (appendix C1a). Trips are normally 14-21 days, but one 1991 report indicated that fishermen were limiting trips to about 14 days.[176] This probably reflects the growing importance of fresh exports and the need to land higher quality fish.[177] One fisherman in 1998, however, describes trips of 20-25 days.[178] The swordfish fleet, which in 1997 was composed of 15 active vessels, reportedly landed almost all of their catch at Guanta (Puerto La Cruz) on Margarita Island.[179] Compared to the longlines used for targeting tuna (primarily bigeye and albacore) by the larger longliners (>50 GRT), the swordfish longlines are much shorter (30-50 km versus 50-120 km) and have fewer hooks (600-900 versus 800-1,800). The hooks are set shallower at about 62 m (versus 72 m for tuna). Also each section of the swordfish motherline has 4-5 hooks (versus 9 hooks for tuna sets).[180] The hooks, however, are set further apart, about 70 m between gangions ("brazoladas"). The buoys, supporting the motherline are set between every six-hook section or about 270 m apart. The lines that connect the buoys to the main line are approximately 27-m long, and the gangions, joining the motherline to the hooks, are approximately 36-m long.[181]

Other species: Venezuela also has a fleet of about 800-900 medium-sized vessels (7-23 m) which primarily target snapper and grouper with hook and lines and/or short bottom longlines. The fishermen however, shift their fishing operations seasonally to target the most abundant species. The fishermen deploying these vessels target billfish and tunas with surface longlines and small gillnets.[182] The larger vessels (>15 m) target snapper and grouper off French Guiana and Suriname. The smaller vessels (<15 m) are generally restricted to Venezuelan waters. During the peak billfish and tuna season, many of the small snapper boats begin targeting billfish and tuna. In addition, some of the larger vessels operating off the Guianas move back to the Caribbean and operate in Venezuelan waters off La Guaira and the country's offshore islands.[183] The snapper/grouper fleet mainly deploys hook and lines, although several use short bottom longlines. The fishing trips last approximately 1 month, although due to commitments and contracts with the government agencies in French Guiana and Suriname, they may remain on the Guianas Bank for up to 3 months. The fishermen during these extended periods land their catch locally rather than returning to their Venezuelan base ports.[184] The snapper/grouper fishermen re-rig their vessels with surface longlines and/or gillnets to target billfish and tuna. As these fishermen shift their operations to the southern Caribbean off Venezuela, the billfish and tuna operations allow them to shorten

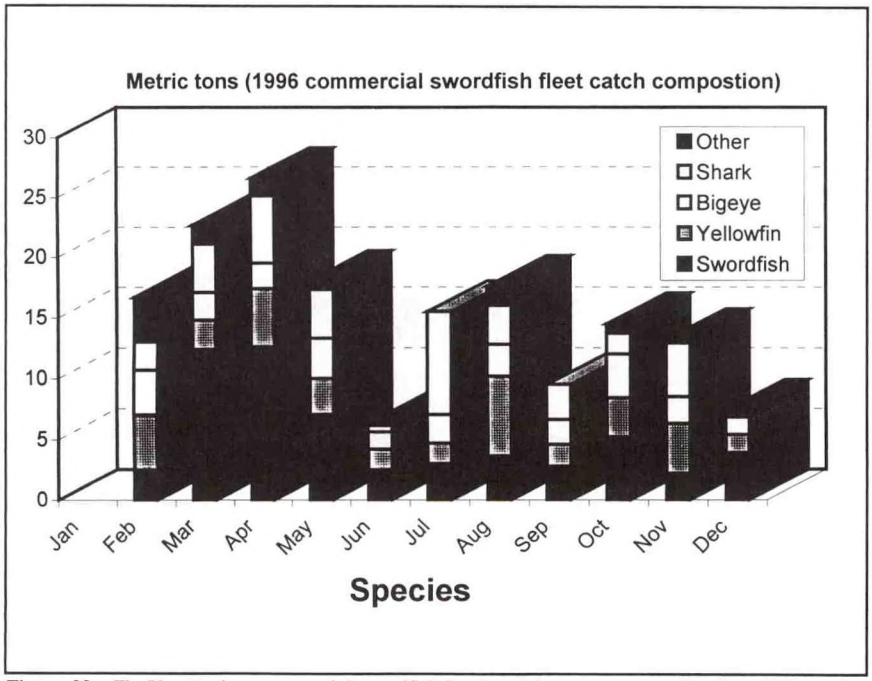

Figure 32.--The Venezuelan commercial swordfish fleet's catches vary seasonally. Swordfish catches peaked in April/March, yellowfin peaked in August/April and sharks peaked in July/April.

their trips to only 10-15 days. This fleet is variously referred to as artisanal and commercial by different authors. Some of the smaller vessels involved in this fishery are only 10-14 m which could be classified as artisanal. All the catch taken by these vessels is maintained fresh in ice holds.

2. Foreign

Fishermen from several foreign countries have operated small numbers of longliners off Venezuela. (For details see "International".)

Korea: Korean fishermen operating under the Venezuelan flag have deployed a few large longliners since the late 1970s. The Koreans primarily targeted yellowfin tuna but incidental catches of shark, swordfish and other billfish were also taken. They operated larger vessels than the domestic fishermen. Reportedly, two large longliners (about 60 m) were active in Venezuela during 1992.[185] They used longlines 50-120 km in length. The crews were mostly Venezuelans, but Koreans were employed in some of the technical positions. One report suggested that the Korean vessels had the capability of making 3-9 month trips, but fishing trips usually were only about 35 days.[186] The vessels were deployed primarily in the western Atlantic, on the Guianas Bank. They were equipped with low temperature freezers and deployed primarily for bigeye and to a lesser extent yellowfin. Most of the high-quality frozen product was exported. The bigeye was exported for the Japanese "sashimi" market. The catch marketed domestically was sold in fresh markets (mostly shark) or canned by PROPISCA in Carúpano or Compañia Castañeda on Margarita Island.

Spain: A small number of Spanish longliners reported worked out of Venezuelan ports during the 1990s. Press reports suggesting larger numbers were probably erroneous. (See: International.") The authors were unable to obtain details on Spanish fleet operations, but were probably similar to overall Spanish operations.[187] Apparently the companies involved had difficulty operating in Venezuela and, while retaining Venezuelan flags in their vessels, landed much of the catch in Trinidad.

Trinidad: Trinidadian longliners are known to operate off eastern Venezuela, especially off La Blanquilla.[188] No specific information is available on their operations off Venezuela, but general fleet operations are available in the Trinidadian chapter of this study.

United States: Some U.S. longliners have worked off Venezuela or adjacent areas in recent years. There appears to have been some limited U.S. effort between the Dominican Republic and Colombia/western Venezuela. U.S. fishermen expanded Caribbean effort in 1996 including areas off western Venezuela.[189] Two U.S.-flagged vessels (*Triple Anthony* and *Triple Chass*) were operating off Venezuelan waters in 1995-1997. They are reportedly working with VENTWO. These boats were prepared to fish for swordfish and yellowfin tuna and were based in Pto. La Cruz. One source indicates that these vessels were permitted to fish in 1995 and 1996, but did not actually fish during 1997.[190] Unconfirmed reports, however, suggest continued activity in 1998.[191]

C. Recreational vessels

Recreational fishing is popular in Venezuela. The oil-based economy of the 1960-1970s enabled many Venezuelans to prosper, causing an increase in the purchase of pleasure and recreational fishing boats. Approximately 120 recreational vessels were reportedly deployed in the billfish sports fishery during 1996. The Venezuelan recreational billfish fishery is centered at La Guaira.[192] La Guaira is important, in part, because it is located close to both the country's largest urban center and capital (Caracas) as well as close to the famous fishing ground known as "Placer de La Guaira". This is the famous La Guaira Banks, an important seamount. The Placer is ranked among the best fishing grounds for white marlin and sailfish in the world. It is one of the few places where fishermen have a realistic chance of an Atlantic grand slam, taking white and blue marlin and a sailfish on the same day (appendix D8b). Due to its reputation as one of the best billfish grounds in the world several travel agencies are marketing and promoting fishing vacations in Venezuela, especially in La Guaira. There is at least one fishing club in La Guaira involved in billfish operations, the La Guaira Gamefish Club. There is a great deal of charter activity out of Caraballeda. Half of the 120 recreational vessels deployed in the billfish sports fishery are based in Club Playa Grande, Catia La Mar (near La Guaira), and the rest are spread throughout other coastal towns such as Punta Cardón, Puerto Cabello, and Puerto La Cruz.[193]

Billfish and swordfish are some of the principal species targeted by the recreational fishermen. No notably large billfish catches, however, were reported to the International Game Fish Association (IGFA) in 1996-97 (appendix D8a). IGFA did report that the largest swordfish taken by recreational fishermen, a 152-kg fish, was taken out of Playa Grande during July 1997 (appendix D8a). While the marlins and sailfish were not among the largest taken in 1997, several fishermen reported taking quite a number of these species and there were four grand slams (white and blue marlin and a sailfish) and one super grand slam (white and blue marlin, a sailfish, and a swordfish).[194] Such abundant, diverse catches do not

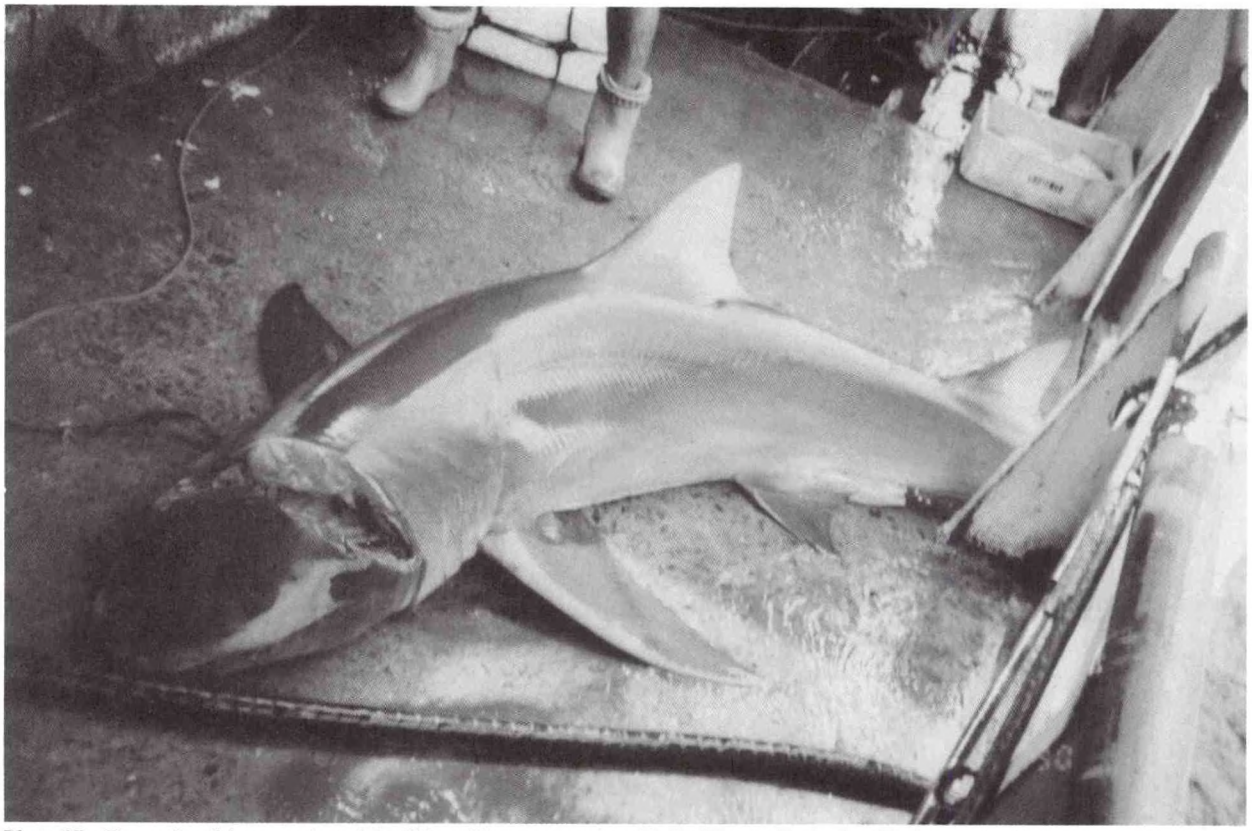

***Photo 17.**--Venezuelan fishermen aboard the "Maresil" are processing this freshly caught shark. Sharks must be bled and gutted as soon as possible after boating them. Freddy Arocha*

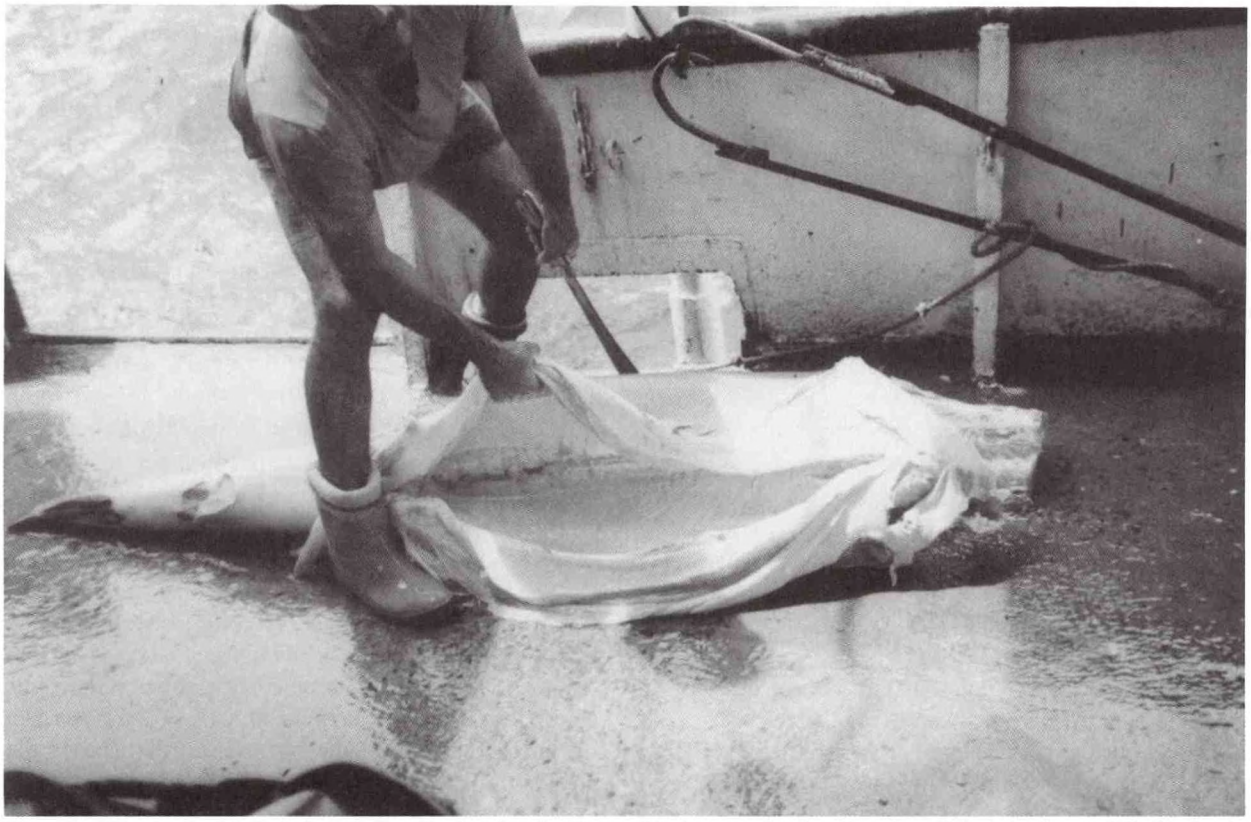

***Photo 18.**--After the shark is bled, the foshermen head and gut it. The trunk is then stored on ice. Note the gaffs in thebackground.Freddy Arocha*

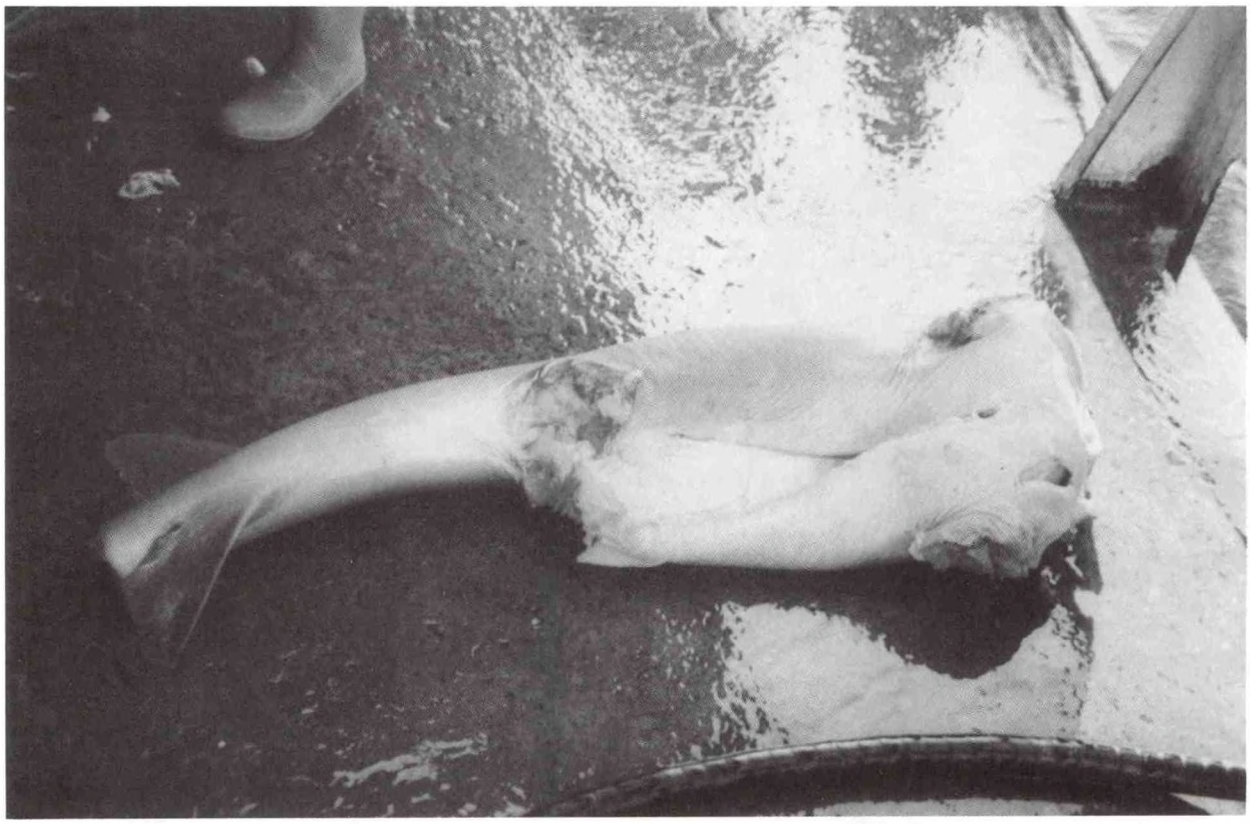

***Photo 19**.--The resulting shark trunk which will be stored on ice in the hold. the trunks are marketed domestically and the fins exported.Freddy Arocha.*

occur anywhere else in the world (appendix D8b).

Billfish: Billfish trips generally leave La Guaira/Marina Mar before 9:00 am and return by 6:00 pm. Venezuelan charter operators offer the possibility of a "grand slam" (blue marlin, white marlin, and sailfish) as well as dorado, wahoo, and yellowfin tuna. They practice catch-and-release billfish fishing unless the fisherman desires to mount the catch or the fish is badly damaged.[195] Running times from the marina for these species are only about 45 minutes to an hour. They generally focus on Placer de La Guaira. The fishermen sometimes target areas a few miles north of the Placer. This distance, especially if the sea is rougher than usual, means that it can take an hour or more to get there. Some operators may venture as far as 50-55 km offshore.[196] One operator describes fishing with four lines baited with live ballyhoo and a fifth line with large dead bait (bonito, mullet, or mackerel). Seasonally, live bonito or lures may be used for blue marlin.[197] Billfish are always available on the Bank, but there are distinct seasonal patterns (appendix C8d).[198]

Swordfish: A few Venezuelan recreational charter operators also offer swordfish. As noted above a 152-kg fish was taken in 1997, the largest reported to IGFA (appendix D8a). Fishing operations are much different than for billfish. The boats targeting swordfish from Caraballeda leave port in the early afternoon to catch the last marlin bite, presumably on the Placer. They then proceed further out, about 45 km offshore, where they set up for swordfish. The principal swordfish bite is about 7:30 pm. The operators generally return to port some time after 11:00 pm.[199] A new technique developed in the Persian Gulf, however, is now being used off Venezuela to target swordfish during the day. This technique during 1996-97 led to an increased interest in swordfish sports fishing operations.[200] The new technique is employed by the fishermen during daylight, as early as 10 am. The fishermen are reportedly fishing with an 80-lb test line, a 1-lb weight, and a light rod. The fishermen hook a fresh squid (*Loligo pealei*) and let it drop to depths of about 400 meters. The boat is maneuvered in a way that keeps the bait in place. A balloon is tied to the line (as a bobber). An IGFA officer reportedly caught seven swordfish in four fishing trips just 5 miles of Playa Grande Club (La Guaira) using this technique.[201] Other operations use up to 130-lb test line with strobe lights. Some fishermen have reported quite spectacular results, claiming to most people's surprise that results are better during the day than at night. The fishermen speculate that because the fish are concentrated on the bottom during the day, rather than spread out over the water column at night foraging for prey, that it is

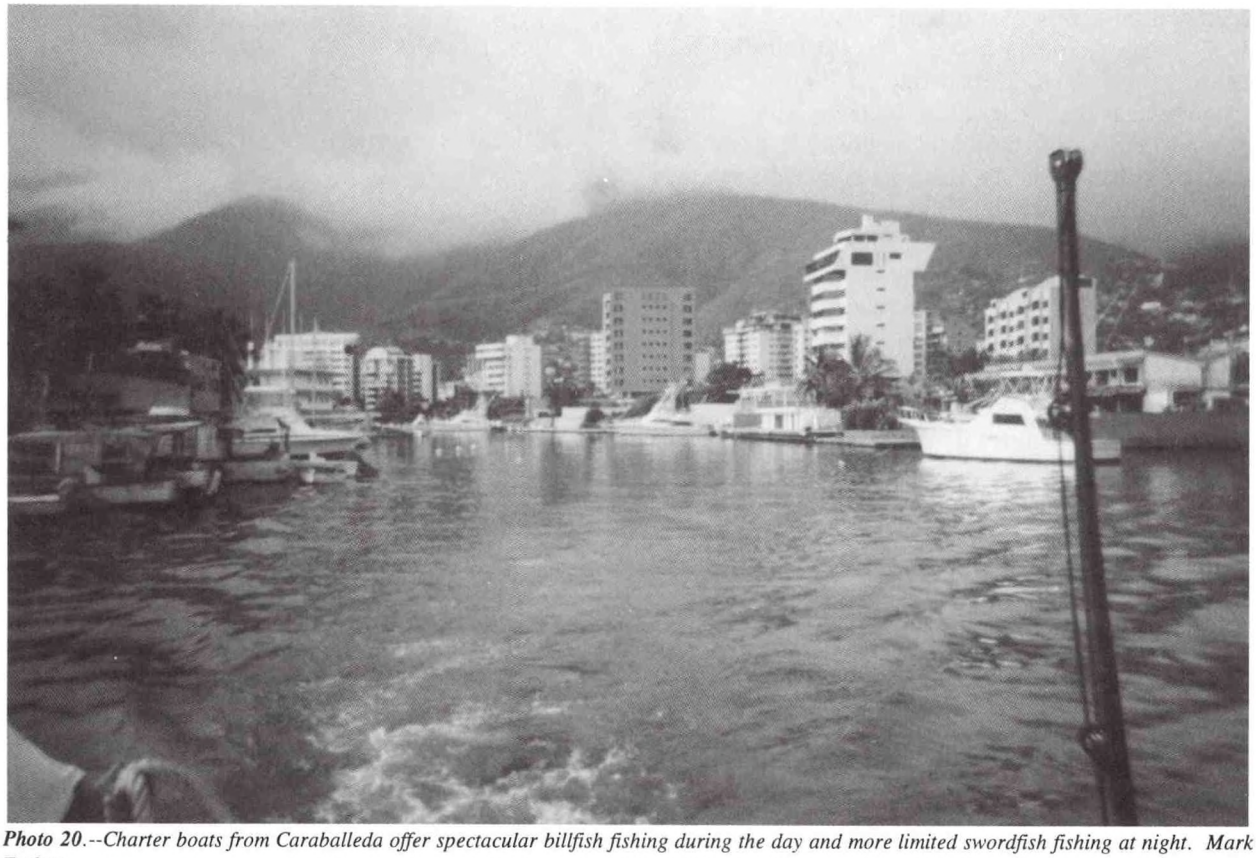

***Photo 20**.--Charter boats from Caraballeda offer spectacular billfish fishing during the day and more limited swordfish fishing at night. Mark Farber*

easier to locate the fish--despite the depths involved.[202] Some of the travel agencies marketing fishing vacations in Venezuela are now offering special arrangements which target swordfish.[203] The seasonal pattern reported by the sports fishermen (appendix C8d) is the same as that reported by the commercial fishermen. (See: "Species: Seasonality.")

The typical vessel used to conduct billfish recreational operations is usually a fiberglass boat 11-13-m in length and equipped with twin diesel inboard engines, electronic equipment, such as global positioning system (GPS). Sport fishing boats have an open stern area which is sometimes equipped with a fighting chair, from where the angler fights the fish. Larger boats are available. One operator offers boats 11-13 m in length.[204] Another operator advertises boats from 10-20 m long for billfish and swordfish fishing.[205]

Billfish tournaments are held annually and data is collected at those tournaments. Venezuelans used to hold as many as 11 billfish tournaments annually at the Club Playa Grande marina and other locations, including Puerto Cabello and Punta Fijo.[206] While billfish are often caught in good numbers, swordfish are rarely landed. Some data on recent tournaments include:

Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades Desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

1991: Venezuelan clubs planned seven tournaments in 1991, but only four were actually held. Reports from two of those tournaments indicated a total of 50 boats participated. Much of the country's billfish recreational fishing takes place during these tournaments when substantial numbers of foreign vessels come to Venezuela for the marlin fishing. The Club Playa Grande has compiled a particularly extensive catch and effort data base.[207]

1993: One 1993 report indicated that the billfish recreational fishing effort in the La Guaira area has shifted from Club Playa Grande marina to the Caraballeda marina.[208]

1996: The 50th Anniversary Marina Mercante Tournament (Playa Grande) on June 15 was not very successful and only one blue marlin was taken, despite participation by 36 fishermen. The First Torneo Dorado (Puerto Cabello) held on June 29 resulted in 27 dorados caught by 51 fishermen.[209] The Grand Slam Tournament was held September 13-15 with 4 teams of 10 anglers participating. They noted 87 billfish bites and released 30 blue marlin, 4 white marlin, and 7

sailfish during 3 days of fishing.[210]

1997: The Clasico Pez Vela (Puerto Cabello) held February 1-2 drew 99 fishermen. While they only caught two sailfish, they took 20 blue marlin. The IX Torneo Peto (El Palito) held February 8-9 was the largest tournament of the year, drawing 124 fishermen and 68 boats. A few billfish were caught, but as the name suggests, the focus was on wahoo and king mackerel. The Clasico de Auja Azul (playa Grande) held April 13-13 drew 33 fishermen who took 11 blue marlin and 2 sailfish. The VIII Toreno Seg. Orinoco (Puerto Cabello) held September 6 drew 39 fishermen, but results were poor. The VII Torneo Familiar (Playa Grande) held September 13-14 was more successful. The tournament drew 72 fishermen who landed 20 white and blue marlin, 5 sailfish, and 50 tunas.[211] The Annual Venezuelan Grand Slam Billfish Tournament, was held October 2-5 from Caraballeda. Several sport fishermen reported grand slams and one a super grand slam during 1997 (appendix D8b).

The Venezuelan recreational fishery involves several billfish species.

Billfish: The fishery appears to target marlins (both blue and white) and sailfish. Venezuelan fishermen targeting billfish are reporting mixed results. Blue marlin catch rates have declined from the peak set in the early 1960s, but through 1990 were above the low levels experienced during the mid-1970s. White marlin catch rates, on the other hand in 1990 were near record low levels. Sailfish catch rates after dropping precipitously from record levels set in 1970 have only recovered slightly from the extremely low levels experienced in the early 1980s.[212] No notably large catches were reported in 1996-97 (appendix D8).

Swordfish: Swordfish catches in the recreational fishery are much less frequent than for the more heavily targeted billfish, marlin, and sailfish. One observer reported that swordfish strikes were rare. Even so, Venezuela is one of the best spots in the world for those sport fishermen who want to add a swordfish to their resume. Swordfish sports fishing is a less popular activity since it is usually a very specialized nocturnal activity, making it less attractive to most recreational fishermen. As mentioned above, however, new day time techniques are achieving considerable success.[213] Venezuela held a swordfish tournament in 1987, but only four vessels participated.[214] A few charter operators, however, report some success with fishing during the evening and the new daytime methods show some promise. The largest swordfish reported to IGFA during 1996-97 was taken off Venezuela in 1997 (Appendix D8a).

VII. Catch

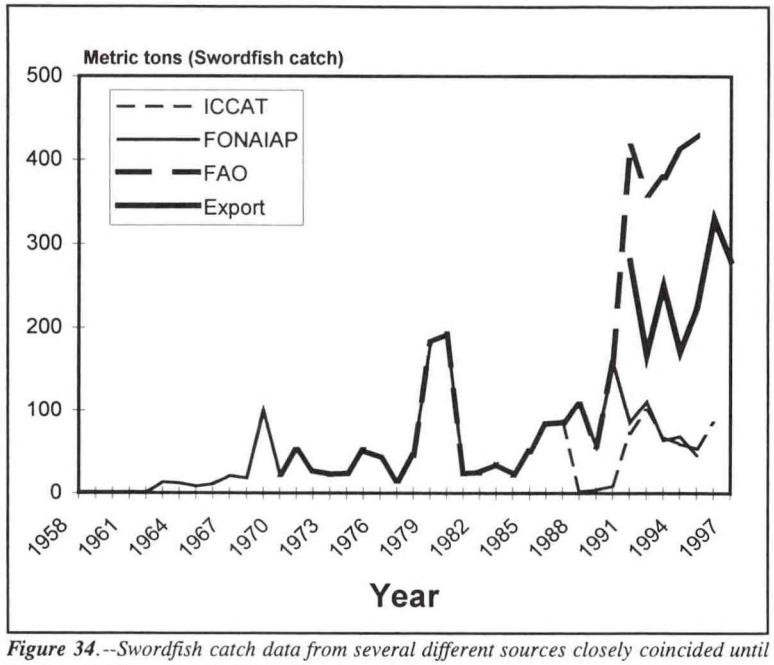

Figure 34.--Swordfish catch data from several different sources closely coincided until the late 1980s and early 1990s.

Venezuela has reported a highly variable swordfish catch. Various sources report substantially different catch levels. FAO reports that in recent years catches ranged from only 57 t (1989) to 430 t (1995).[215] The 1994 catch totaled 379 t (appendix D3a2). Other sources, including ICCAT and domestic Venezuelan observers, however, provide catch data which since 1991 have varied significantly from the FAO data (appendix D3a1). The authors cannot explain these discrepancies as both FAO and ICCAT depend on the Venezuelan Government to supply data. The differences appear to be primarily due to the Governments's lack of support for data collection in general and billfish data specifically. Some verification of available catch data can be achieved through comparison with export data because most of the export-grade product is exported.[216]

1950s: The first longline activity known to the authors was reported in 1959 when a Japanese company deployed the tuna longliner *Bosso Marú* as part of the Productos Mar joint venture. (See: "International".)

1960s: Venezuelan fishermen first reported swordfish catches in 1963. Small catches varying from 8-21 t were reported from 1963 through 1968 (appendix D3a1). The fishermen reported an unusually large catch in 1969, but this appears to have been an anomaly as subsequent catches declined sharply.

1970s: Swordfish catches during the 1970s mostly varied from about 23-50 t in an apparently random pattern. Toward the end of the decade catches fluctuated more widely. The 1977 catch declined to only 15 tons. Inexplicably the catch increased sharply to record levels in 1979 and 1980. The 1979 catch was 182 tons (appendix D3a1).

1980-84: Venezuelan fishermen reported another record swordfish catch of 192 t in 1980. The fishermen reported a significant catch decline during 1981-84 when catches returned to more normal levels. The catch during this period leveled off at 23-35 tons (appendix D3a1). No information is

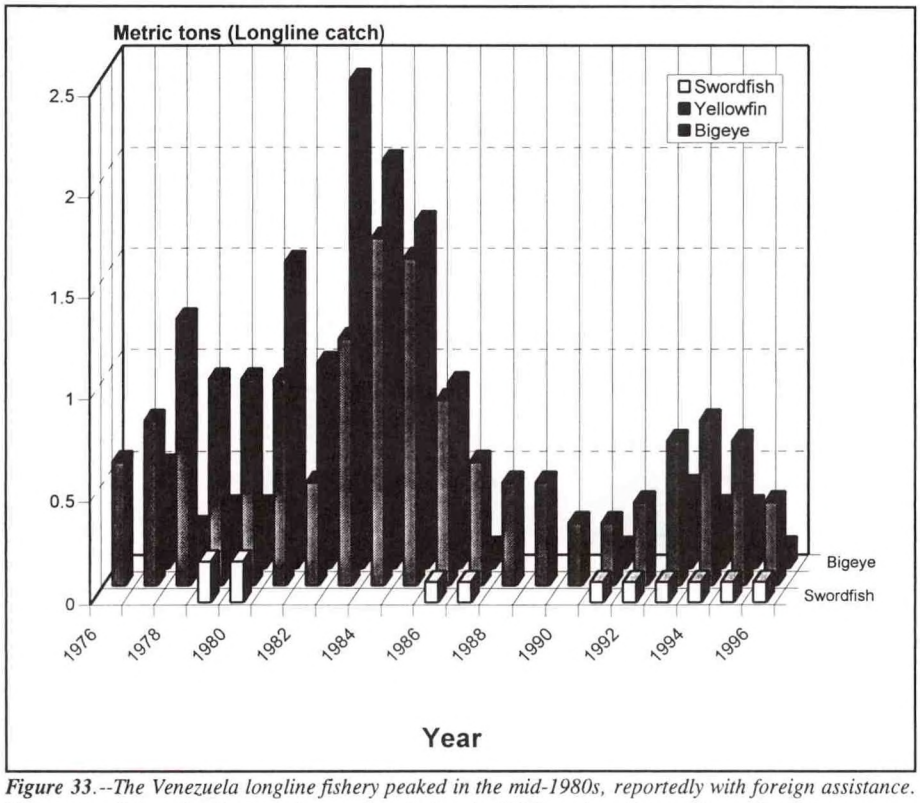

Figure 33.--The Venezuela longline fishery peaked in the mid-1980s, reportedly with foreign assistance. The current fishery has increased somewhat during the 1990s, primarily catching yellowfin.

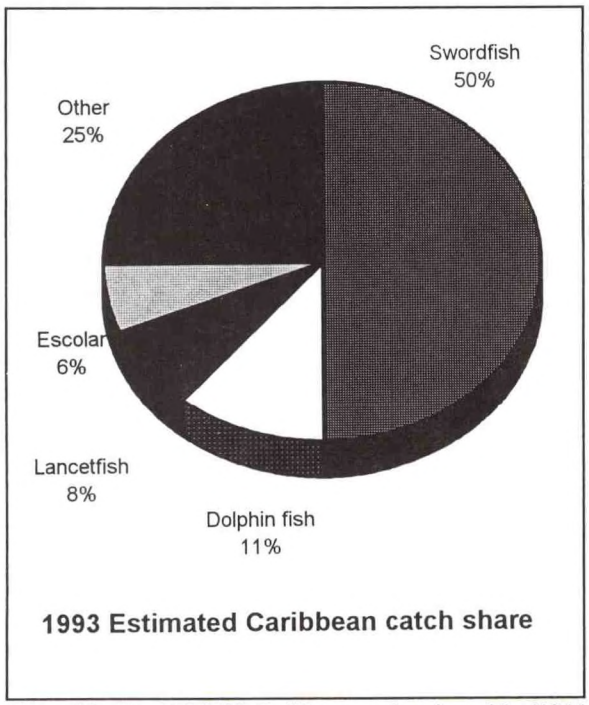

Figure 35.--The U.S.1993 Caribbean catch estimated by NOAA scientists indicated 50 percent swordfish catches.

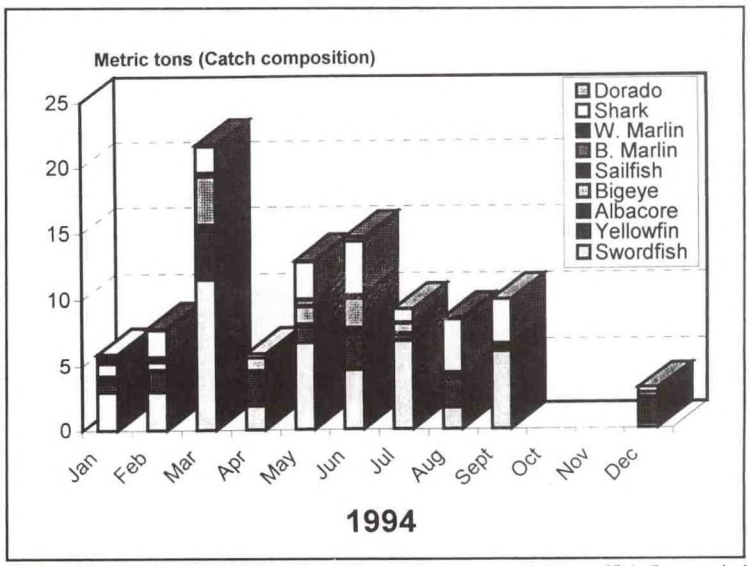

Figure 36.--Catch composition of the Venezuelan commercial swordfish fleet varied seasonally in 1994. Swordfish, yellowfin and bigeye catches peaked in March, while shark catches peaked in June/August.

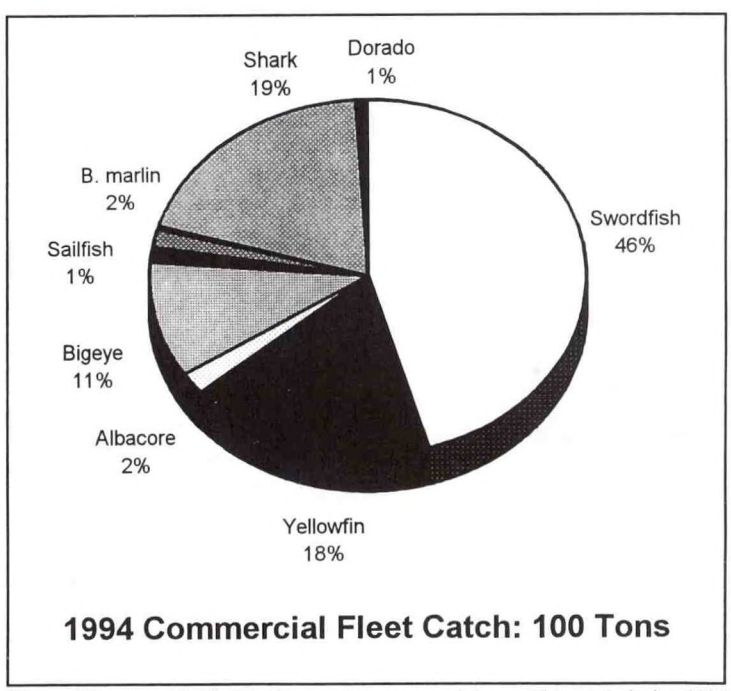

Figure 37.--Almost half of the Venezuelan commercial swordfish catch during 1994 was swordfish, although they also took substantial quantities of shark, yellowfin, and bigeye.

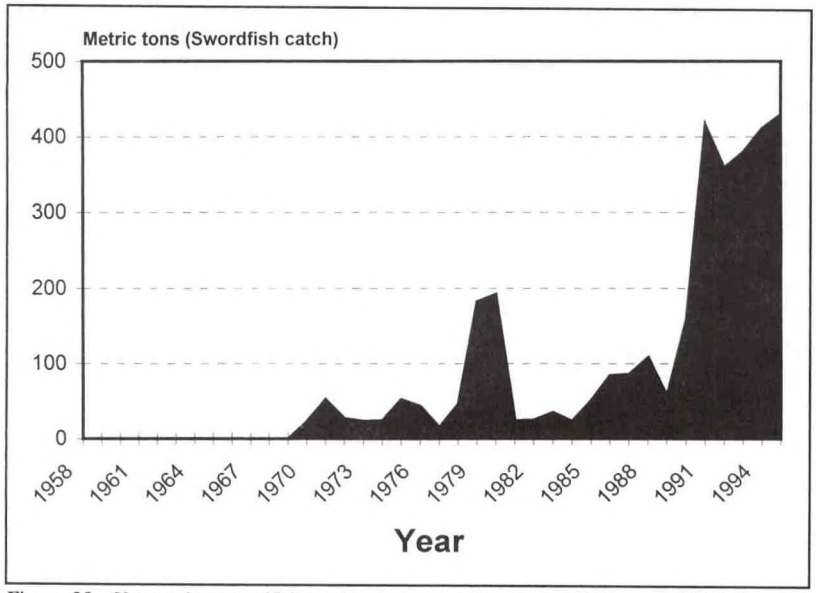

Figure 38.--Venezuelan swordfish catches were not substantial until the early 1990s, because as the primary fishery has been yellowfin.

available explaining the 1981 decline. ICCAT statistics show that 13 medium/large longliners were introduced to the fishery in 1982 (appendix A3b). An historical high of 35 longliners were active in 1984 and 1985, including 18 medium/large longliners. The authors believe that these medium/large vessels were associated with the Korean/Venezuelan tuna joint venture Triopines de Pesca. Most of the swordfish catch was landed as the incidental catch of the tuna longline fishery.

1985-89: Significant longline catch increases were reported during the late 1980s. One observer reports that these increases resulted from an expansion of the longline fleet as several new companies entered the fishery.[217] Fleet data available from ICCAT, however, shows a decline during this period (appendix A3b). A total of 150 t of swordfish bycatch was reported by Venezuelan fishermen in 1986.[218] However, ICCAT statistics indicate that for the same year 84 tons of swordfish were reported by Venezuelan fishermen. The authors cannot explain the discrepancies between these two data sources. Fishermen increased swordfish catches during the later part of the 1980s as longliners targeting swordfish were introduced to the fishery during 1987.[219] Catches reached over 100 t in 1988 (appendix D3a1). While the longline fleet gradually expanded during this period (appendix A3b), there does not appear to be a direct correlation between the number of vessels and swordfish landings. Landings declined to only 57 t in 1989.

1990: ICCAT and FAO data indicate that fishermen increased their swordfish landings to 158 t in 1990, the largest catch since 1980 (appendix D3a1). A Venezuelan source reports that 214 t were caught, primarily because of the expanding number of vessels dedicated to the tuna/swordfish fishery (appendix A4a2)

1991: FAO data indicates the fishermen reported a record swordfish catch of 415 t (appendix D3a1). The sharp catch increase corresponds with the acquisition of nine medium-sized longliners and the arrival of five large Asian longliners (appendix A2a). Export trends confirm a substantial catch (appendix F2a1). A local source estimates a much smaller catch of only 250 t and reports that several of the dedicated swordfish longliners were withdrawn from the fishery. ICCAT statistics, however, indicate that swordfish landings during 1991 totaled 86 tons. The authors cannot explain the discrepancies between the sources.

1992: FAO data indicates that the swordfish catch in 1992 declined somewhat to 359 t (appendix D3a2). However, ICCAT statistics indicate that the swordfish catch totaled 111 t, an increase over the 86 t reported in 1991. Available data on export shipments suggest a substantial decline (appendix F1a). The authors have no details explaining the discrepancies among these sources.

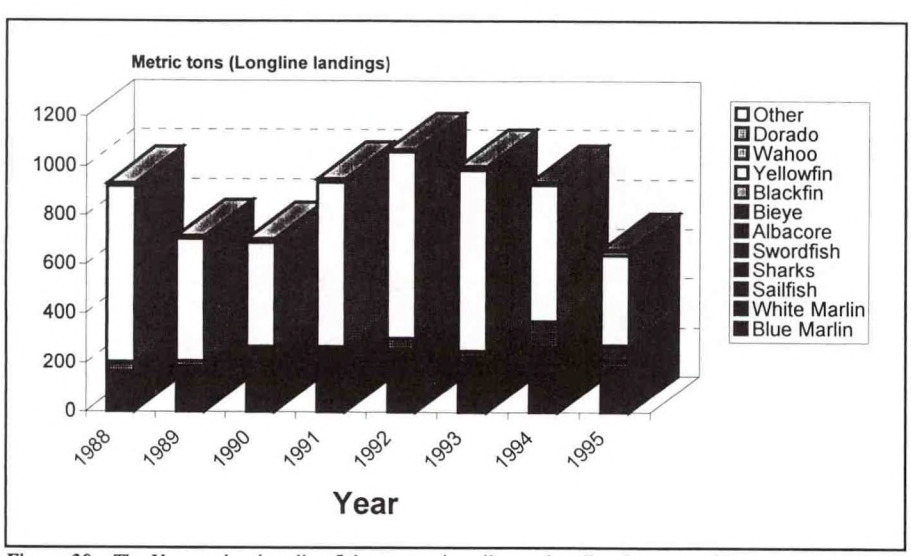

Figure 39.--The Venezuelan longline fishermen primarily catch yellowfin tuna, with a peak in 1992-93, but they also catch shark as well as and blue and white marlins.

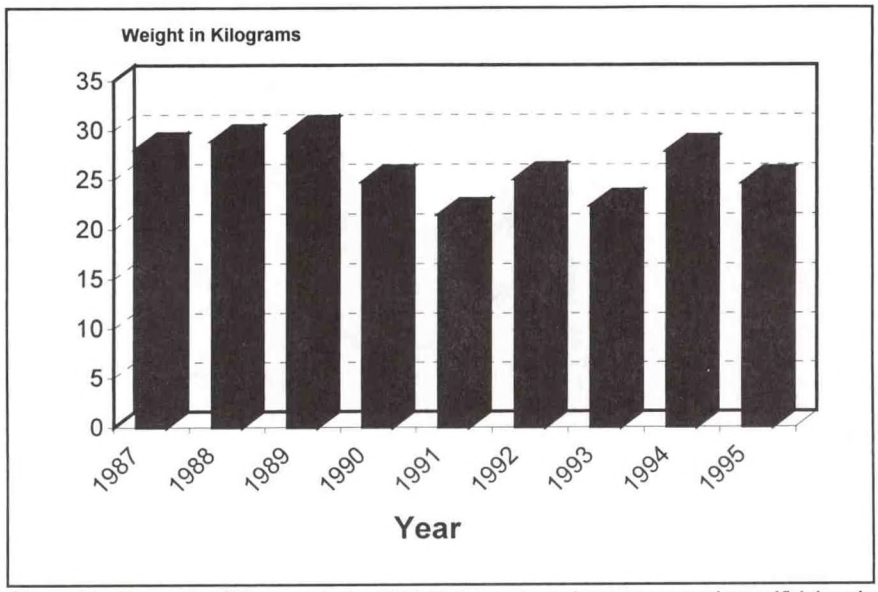

Figure 40.--Venezuelan fishermen during 1987-95 have reported average annual swordfish lengths varying from 22-30 kilograms. The lengths declined in 1990-91, but have varied somewhat since.

1993: Fishermen according to FAO reported slightly improved catches of nearly 380 t of swordfish in 1993 (appendix D3a2). According to FONAIAP statistics, there was a major decline in the fishery and catches fell to only 64 t, although this only included the catch of the country's commercial fleet (appendix D3a1). Export shipments suggest a substantial increase. The authors have no details explaining the discrepancy among these sources (appendix F1a).

1994: Fishermen again reported higher landings, according to FAO statistics catches totaled about 410 t in 1994. FONAIAP reported that the Venezuelan commercial longline fleet caught 69 t of swordfish during the year, about the same as in 1994 (appendix D3a1). Export shipments suggest catches declined to about 1993 levels (appendix F1a).

1995: Venezuelan fishermen, according to FAO, caught a record 430 t of swordfish in 1995. Venezuelan commercial fishermen, however, according to FONAIAP statistics, reported lower catches--taking only 46 t of swordfish (appendix D3a1). Export trends suggest higher catches, but not as high as on 1991 (appendix F1a).

1996: Only data on export shipments is available to the authors for 1996 and it suggests a substantial catch increase (appendix F1a).

1997: Data on export shipments is available to the authors for 1997 and it suggests a modest catch decline from 1996 levels. U.S. import data is probably a good reflection of Venezuelan catch trends. Shipments of 159 t in 1997 reflect a decline of over 15 percent (appendix F1a). While Venezuelan exporters may have shifted their marketing strategy, the most likely explanation is a declining catch. Notably U.S. imports began to decline in July, although they were still above historical levels (appendix F2e). Many of the fishermen reported poor catches and believe that the 1997-98 El Niño event that changed water temperatures (figures 17-19) was at least partly responsible.

1998: Despite concerns over El Niño, sport fishermen report that billfish fishing during the first few months of the year was normal or slightly better than normal.[220] U.S. import data, representing most of Venezuelan shipments, suggest that catches in the first half of the year may have fallen to extremely low levels (appendix F2e). Shipments to the United States declined in the first half of 1998 by nearly 80 percent to only 37 t (appendix F1a). This appears to be due to a substantial decline in catches. Environmental conditions may be partly responsible (figures 17-19). Venezuelan sources indicate that falling prices on the U.S. market have reduced the attractiveness of the fishery. A U.S. restaurant boycott in 1998 helped to reduce prices to below $3.00 per kilogram. Other market factors have affected the price, but the embargo had severe effects and was widely publicized. At prices below $3.00 per kg, several

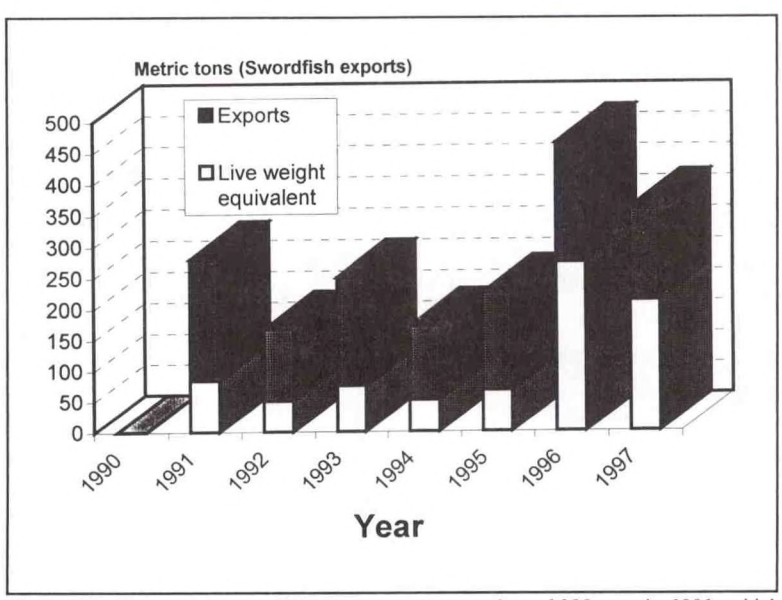

Figure 41.--Venezuelan swordfish exports suggest catches of 280 tons in 1991, which declined to only 224 tons in 1995.

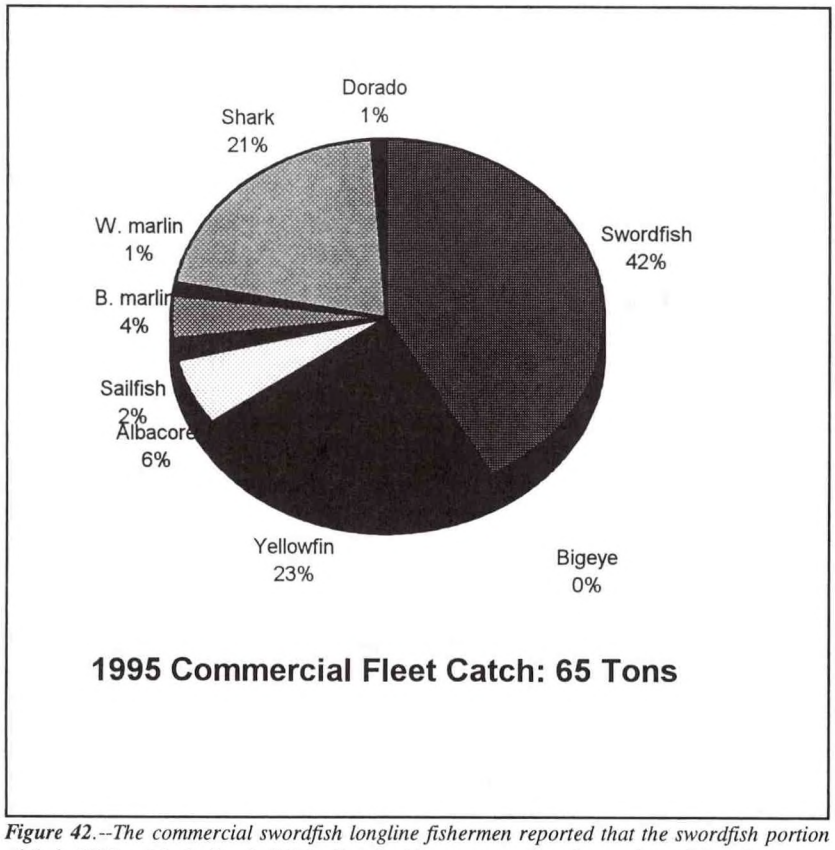

Figure 42.--The commercial swordfish longline fishermen reported that the swordfish portion of their 1995 catch declined slightly, but the bigeye proportion dropped precipitously.

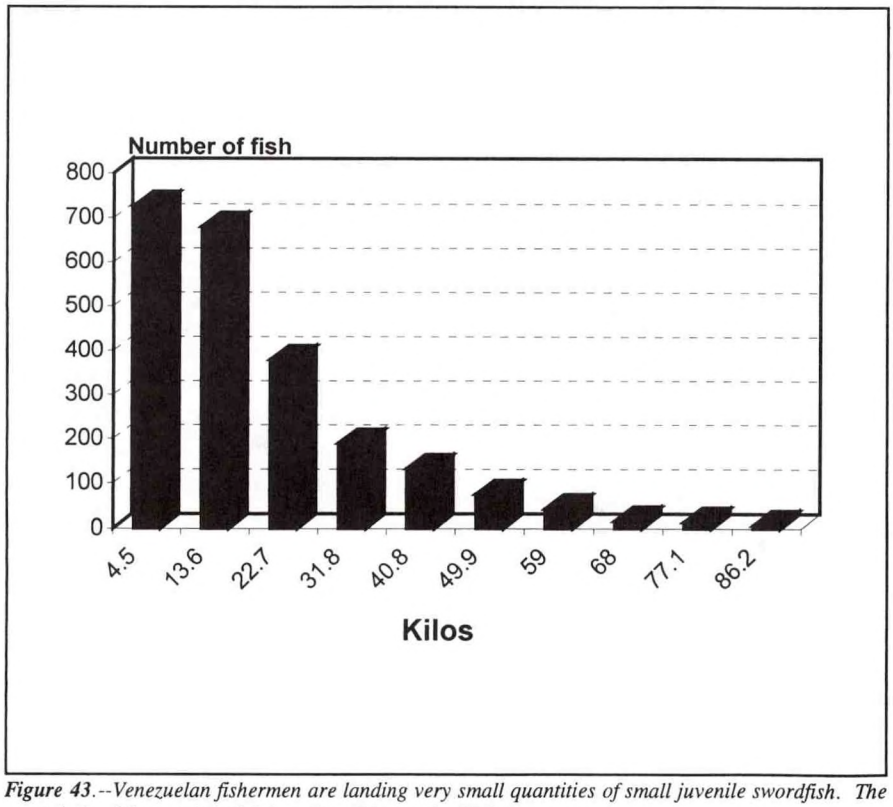

Figure 43.--Venezuelan fishermen are landing very small quantities of small juvenile swordfish. The great bulk of the catch is fish less than 50 pounds (23 kg).

swordfish fishermen apparently decided the fishery was no longer profitable and began looking for alternative fishing. Particularly vexing for the fishermen was the fact that the cost of their bait (squid) increased considerably. As a result, the fishermen were paying more for their bait than they were getting for their swordfish catch. Many have decided to shift operations to target tuna--especially yellowfin. Poor yellowfin catches were reported in the first half of 1998, but much better catches were being reported in the second half of the year--thereby reducing the incentive to fish for swordfish.[221]

Venezuela has made some improvements in its data collection system during the 1980s. The DGA since 1983 has strictly controlled vessel log books. All commercial fishing vessels, including foreign vessels, must have a sailing permit to leave port; to get a permit they are required to provide the log book from the last trip. ICCAT experts have assisted Venezuelan officials with some problems associated with the logbooks, sampling procedures, and statistical analysis of the data, but some problems persist with obtaining the Venezuelan data.[222] These problem, in part, explain the discrepancies among available data on swordfish and other large pelagic catches (appendix D3a1). Several groups of fishermen report swordfish catches in Venezuela.

Small-scale domestic longline fleet: Venezuelan longline fishermen primarily targeting tuna reported that the domestic tuna longliners often report minimal swordfish catches, but the species in some months total as much as half the catch (appendix C6c1). The smaller number of dedicated swordfish longliners report more consistent swordfish

***Photo 21**.--These two longliners were active during the early 1990s. Note the floats and longline drums equipped with monifilimernt lines. Freddy Arocha.*

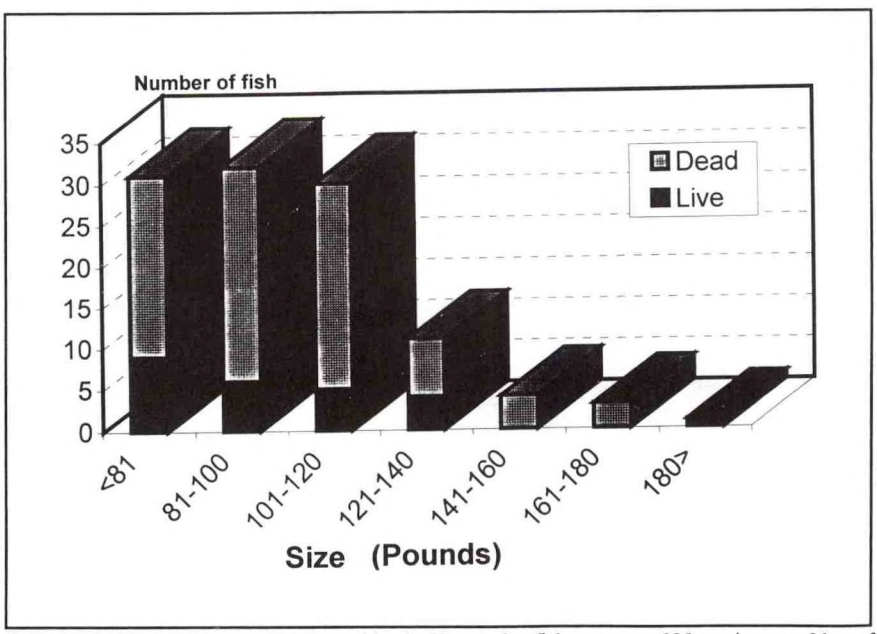

***Figure 44**.--Most of the swordfish boated by the Venezuelan fishermen are 120 centimeters. Most of the swordfish is dead by the time the line is retrieved.*

catches, usually from one-third to half of the total, with most of the remainder either shark or tuna (appendix C6c2).

Industrial foreign longline fleet: The five Asian longliners operating in 1991 reportedly targeted swordfish. They reported a billfish catch of 72 tons, of which over 60 percent or 44 t was swordfish.[223] This level of activity was one factor taken into consideration in attempting to estimate the composition of Japanese billfish imports from Venezuela.[224]

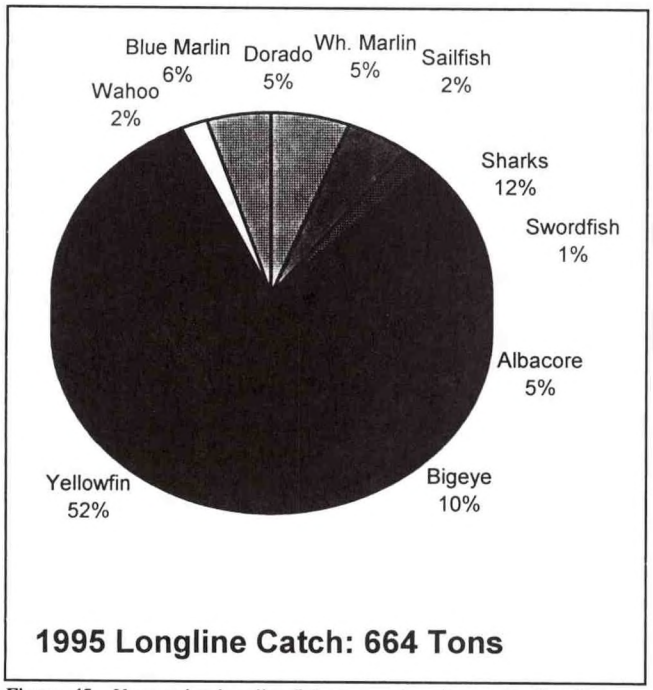

Figure 45.--Venezuelan longline fishermen primarily catch yellowfin tuna, but also take smaller quantities of sharks, bigeye, and other species. Swordfish is a very small portion of the total catch.

Artisanal fleet: The General Sectorial Directorate of Fisheries and Aquaculture (DGSPA) began to sample the catch of the artisanal fleet in 1991. Sampling at Playa Verde (La Guaira) and Juan Griego (Margarita Island) suggest that swordfish are a small part of the artisanal catch (appendix D4c). The artisanal fishermen do not report significant swordfish catches (appendices C6c3-4 and D4a-b). While some swordfish were occasionally landed at Playa Verde along the central coast, no swordfish were landed at Juan Griego off the eastern coast. The artisanal billfish catch is primarily composed of billfish (85 percent), mainly sailfish and to a lesser extent marlins (predominantly white marlin). According to a local study conducted in 1992, about 61 percent of the total billfish catch landed by the Margarita island artisanal fleet was comprised of sailfish, and about 38 percent was comprised of white marlin. As estimated by the study, approximately 150 t of billfish were caught by the Margarita Island-based fleet in 1992.[225]

VIII. Ports

The Venezuelan longliners targeting tuna and swordfish are primarily based at ports along the eastern coast (figure 1). Only limited information is available to the authors on these ports.[226] The authors do not have data on fleet size or landings by ports. Some fleet data, however, is available by state showing that the country's longline fleet is primarily based in Sucre state (appendix A3a). Most of the vessels listed at Sucre are based at Cumaná. Some vessels, however, are based at smaller Sucre ports as well as ports in other states, like Guanta, which is especially important. Most of the Venezuelan swordfish is landed at Guanta. In addition, almost all of the larger Venezuelan tuna seiners land their catch at Guanta.

Most of Venezuela's substantial domestic tuna catch, mostly taken by the large purse seiners, is also landed at the ports in Sucre state. The country's canning industry is centered in Sucre and their primary raw material is tuna. Some seiners, however, are also based in other ports without canneries or with only small canneries. Seven purse seiners, for example, are based in Falcón (Punto Fijo). In addition, some of the catch is landed at ports where none of the seiners are based, such as the Distrito Federal (La Guaira).

Available data on individual ports is as follows:

Caraballeda (Vargas state): Caraballeda is a small town east of La Guaira, where wealthy Caracas boat owners dock their yachts. There is a large marina at Caraballeda, which is used by most of the sport fishing charter boats for billfish. There are also some specialized swordfish charters available in the evening. The La Guaira Bank is about 20-30 km offshore. The Sheraton hotel, where many of the sport fishermen stay, is located close to the marina. Most of the sport fishing trips organized from Miami or other U.S. cities for the famous "grand slam" (taking three different billfish species on one trip) off Venezuela are located in Caraballeda. This mostly involves billfish, but an occasional swordfish for a "super grand slam" is taken (appendix D8b).

Cumaná (Sucre): Cumaná is one of the principal fishing centers in the Caribbean. Cumaná is located at the outlet of the Manzanares River, on the Gulf of Cariacó in Sucre State. The city is located on a coastal plain and is the Sucre state capital. The Port of Sucre is about 1 km to the south of Carenero Point and the Manzanares River outlet. Between Carenero point and Port of Sucre, the water at 0.5 km off shore is about 40-m deep. Immediately to the south of the port shallow water is found further off shore. The port has

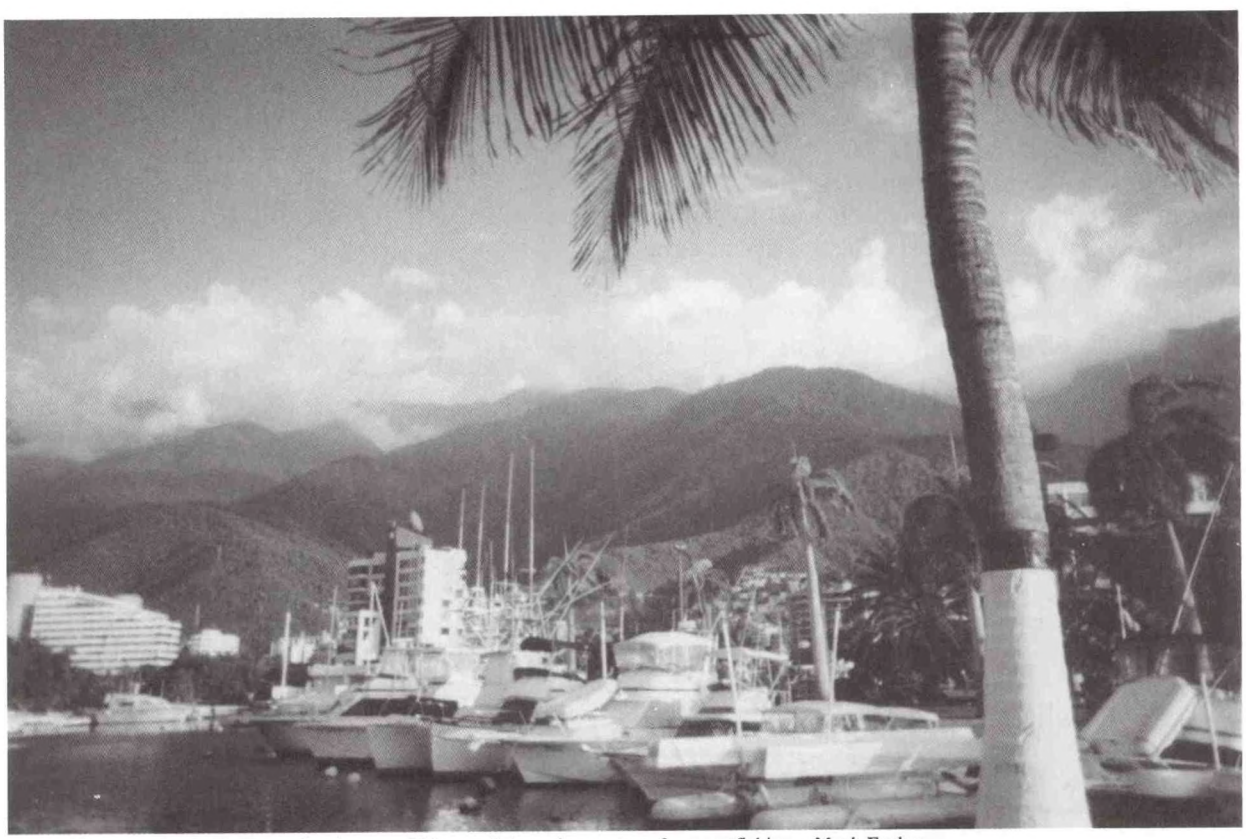

***Photo 22.**--The Caraballeda marina is one of Venezuela's major centers for sportfishing. Mark Farber*

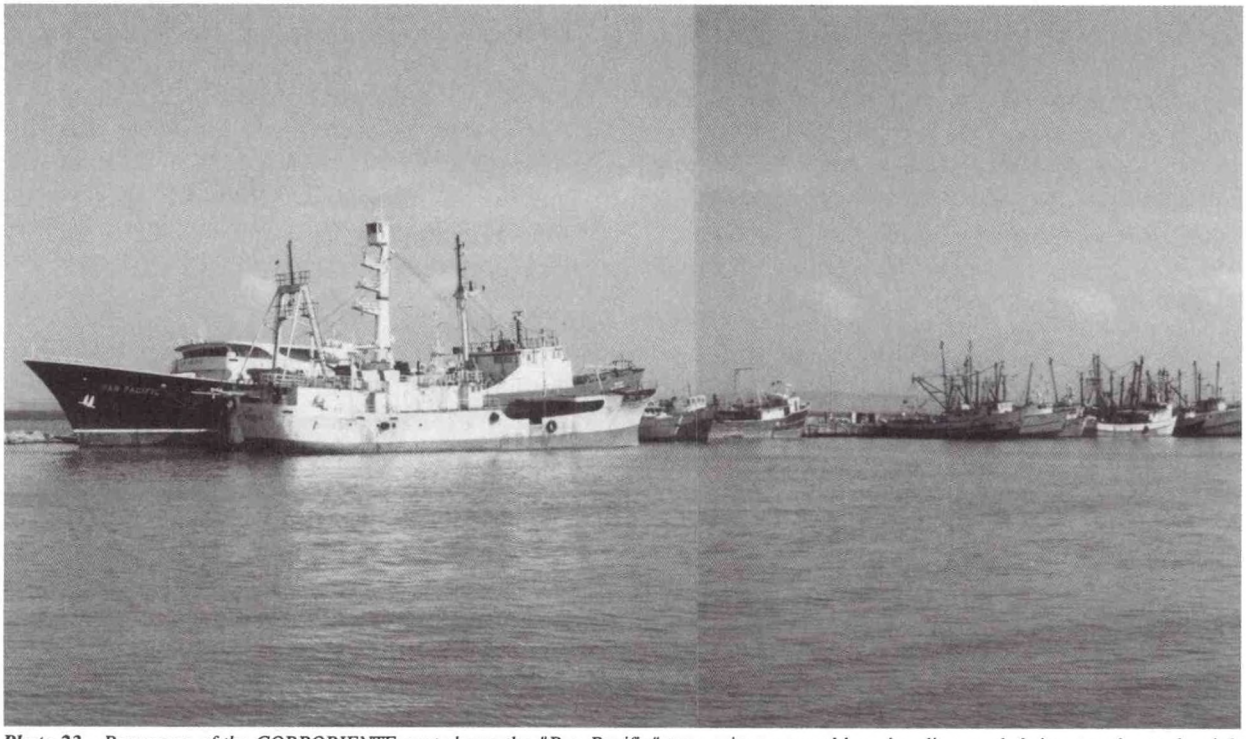

***Photo 23**.--Panorama of the CORPORIENTE port shows the "Pan Pacific" tuna seiner moored by a longliner and shrimp trawler to the right. Freddy Arocha.*

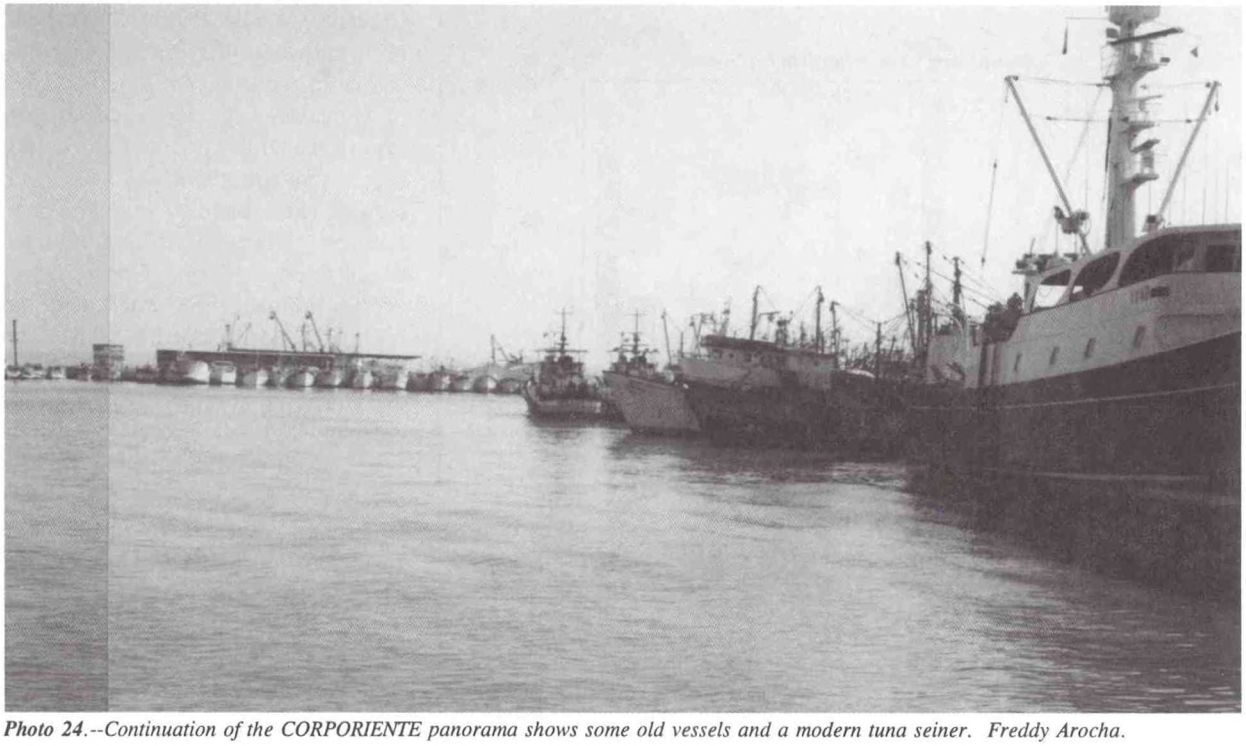

***Photo 24**.--Continuation of the CORPORIENTE panorama shows some old vessels and a modern tuna seiner. Freddy Arocha.*

two berths and an anchorage with deep waters 0.4 km off shore. The anchorage is next to the berths. Thereis a 0.3-km concrete pier which runs east and west and has a southwestern turn. On the south side, there is 80 m of docking space that has water 11 m deep. Large ships use the north side. There is also another pier 0.25 km to the southwest, which is older and now less used than the first one due to more limiting loading services. There are two other berths, one for fishing activities and the other for the Ferry Boat de Araya. Approaching the Port of Sucre during the night is easy due to Cumaná City lights, although pilotage must be used. The pilot gets on board in the anchorage. Pilotage, small repairs, tugboats, phone, pilotage boats, trash collecting, supplies and other services are available 24 hours a day. The maximum high tide is 0.163 m and the minimum low tide is 0.13 meters.[227] Fishery port facilities are the most extensive and modern in the Caribbean, with the exception of Cuba (Havana) and Puerto Rico (Mayaguez).[228] Cumaná is Venezuela's major tuna port. Several of the investor groups operating tuna seiners are associated with the canning companies, explaining why the country's tuna seiners are mostly based in Cumaná--the center of the country' fish canning industry. The Avecaisa (old Productos Mar) cannery is located in Cumaná near the fishing pier and the Gaviota and CAIP canneries are only a few km from the docks. Other canneries are located close to Cumaná. A wide range of vessels are based in the different ports along the coast near Cumaná, including tuna seiners, baitboats, and longliners.[229] Most of Venezuela's longliners targeting tuna operate out of these ports. About 30 longliners targeting tuna and swordfish were reportedly based in Cumaná during 1994.[230] These ports are also an important center the for bottom trawl fleet and a variety of other vessels. The current fishing port of Cumaná, Muelle Pesquero, began operating in 1980. The Muelle Pesquero of Cumaná is managed by the government-owned Corporación de Desarrollo de la Región Nor-Oriental (CORPORIENTE). Among the services provided by CORPORIENTE are the supply of electricity, ice, fuel, and water. CORPORIENTE also leases cold storage space (24,000 cubic meters). One now-dated booklet describing the port indicated that there were 16 cold storage chambers at the Muelle Pesquero.[231] According to CORPORIENTE officials, the Muelle Pesquero, which has an area of approximately four hectares, has three piers called Muelle Sur (South Pier), Muelle Este (East Pier), and Muelle Norte (North Pier). Muelle Sur is 400 m long (with 150 m available for large tuna seiners). Muelle Norte and Muelle Este are 0.3 km and 0.2 km long, respectively. The Muelle Pesquero can accommodate vessels with drafts of up to 7 meters. There are four other private ports along the coast of Cumaná, one of which is a 0.5-km pier dedicated to commercial loading/unloading practices (including fishery products). This pier, which is the oldest in Cumaná (Muelle Puerto Sucre), has been known as the Port of Cumaná, and is currently where tuna is landed or transferred to cargo vessels for export. The other private ports have a single pier of about 0.25-0.30 km each,. These include: Muelle Puerto Cannavo where vessels are repaired or outfitted, Muelle Cristal where vessels unload their catch and are outfitted, and Muelle FIPACA. The Muelle FIPACA is a private dock for large tuna purse-seiners owned by the company Atún FIPACA, which bought the Alimentos Margarita purse-seine fleet.

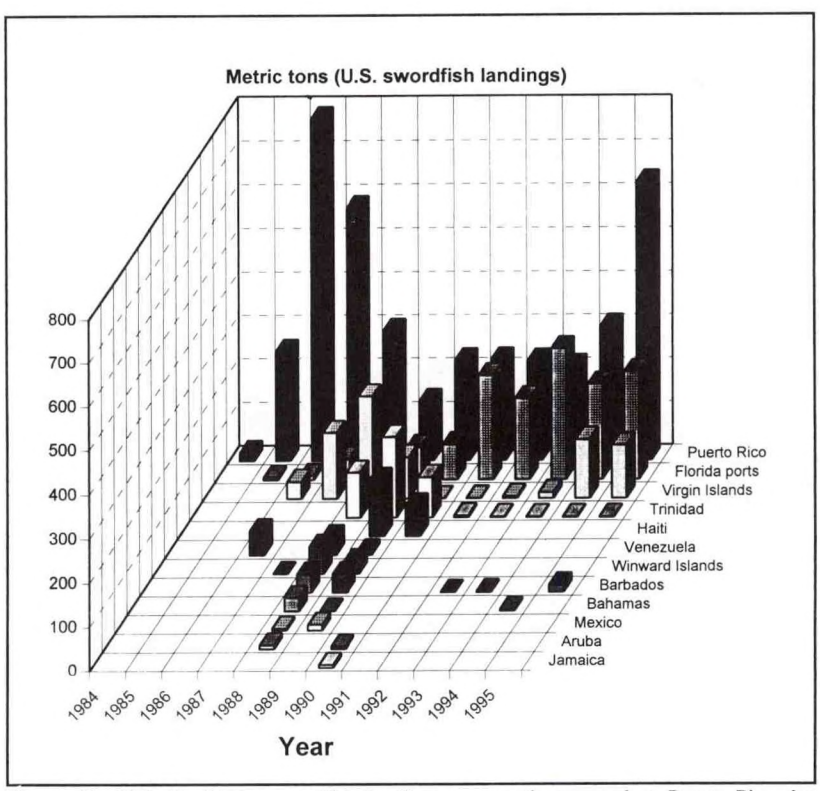

Figure 46.--U.S. Caribbean swordfish landings are mostly reported at Puerto Rico, but swordfish is also landed in the Virgin Islands, Trinidad and Tobago and Florida ports.

Carúpano (Sucre): Carúpano is a small port located about 130 km east of Cumaná. The port has a 128-m pier which can accommodate vessels with drafts of up to 5.5 meters. It serves as a loading/unloading port for both commercial and fishing vessels. There are no cold stores available at Carúpano. The port was much more

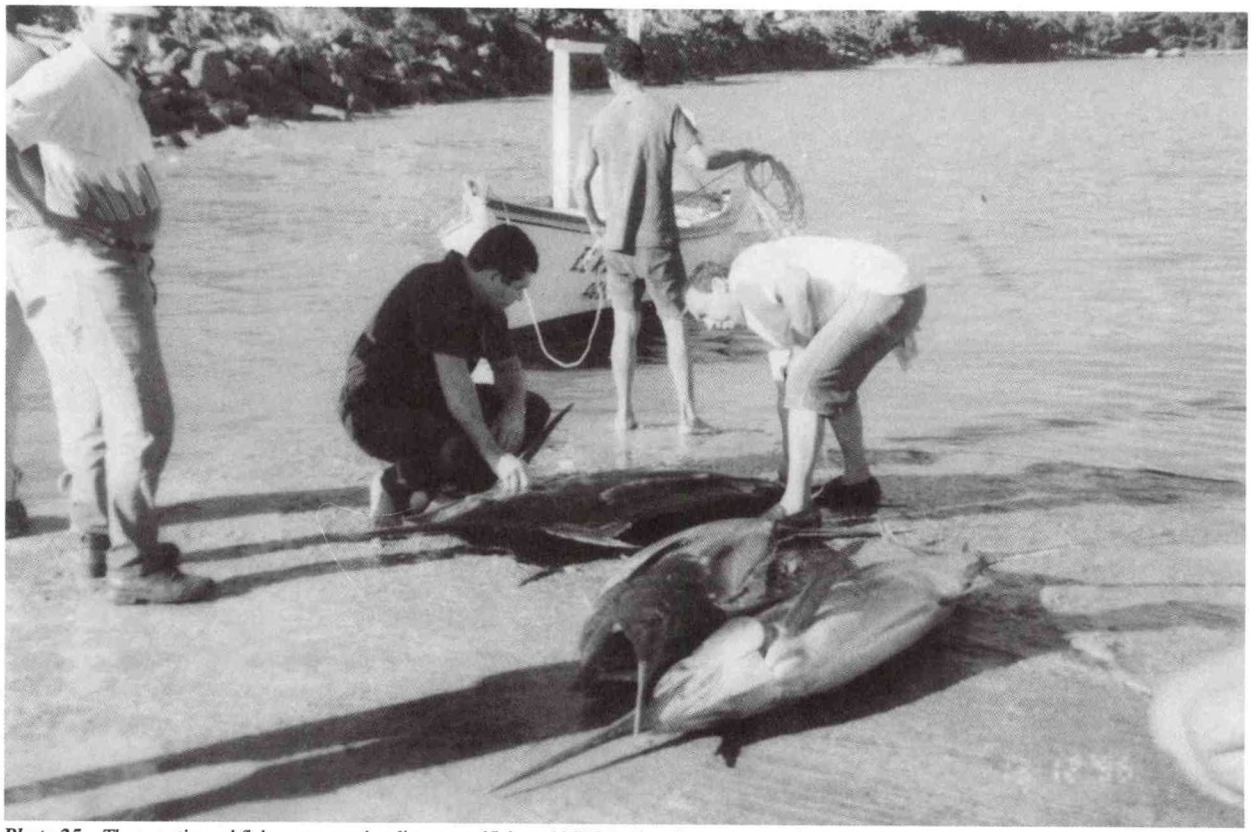

***Photo 25.**--These artisanal fishermen are landing swordfish and billfish directly on the beach at Playa Verde (La Guaira area). Fish landed this way will probably be marketed domestically. F.A.*

active in the mid-1980s when several longline and gillnet vessels were based there.[232] During 1996 only artisanal snapper/grouper vessels are landing their catch at the port.[233] The PROPISCA cannery is located in Carúpano. Some Carúpano-based vessels also land their catch at Compañia Castañeda on Margarita Island.[234] The important Alimentos Margaritas cannery is located between Carúpano and Cumaná. The larger commercial ("industrial") longliners were based here. (See: "Fleet: Longliners".) All of the large industrial longliners owned by Koreans operated from the port in 1994.[235] The authors do not know, however, who owned and operated these vessels in 1994. Only one of those two vessels remained in Venezuela as of 1996. The *Sam Son 76*, a 37-m, steel-hulled vessel, was deployed out of Carúpano in the shark gillnet fishery by a local fishing company. Currently it is however no longer operated as a fishing vessel.[236]

(La) Guaira/Playa Verde (Vargas): La Guaira is the port of Caracas. It is thus the closest port to the large Caracas urban area--the country's most important domestic market. La Guaira is even closer to the Maiquetía International Airport. Thus product landed at La Guaira can be easily air shipped to export markets as well as trucked to domestic markets in the Caracas metropolitan area. La Guaira is Venezuela's most important artisanal port, primarily because of the location close to Caracas. Some commercial fishermen are also based there. Many of the small longliners targeting shark are based in La Guaira.[237] A total of 28 artisanal longliners which targeted billfish were based in La Guaira in 1992.[238] One unconfirmed report suggests that all of the foreign fishermen transshipping tuna through Venezuelan ports now use La Guaira. Two or three tuna longliners that occasionally target swordfish are also based at the port. La Guaira and smaller nearby ports also serve as the base port to the country's recreational fishery.

Guanta/Puerto La Cruz (Anzoátegui): The port of Guanta, located near Puerto La Cruz, is primarily a commercial port. There are, however, two piers in the port dedicated for fishing vessel operations. There is a large 21,000 cubic meter cold store adjacent to the port that can be used to freeze the catch.[239] Several longliners and a few seiners were based here in 1992 (appendix A3a). One of the large Korean longliners was also based in Guanta in 1994.[240] Some fishermen use the port to land shipments destined for the Caracas market or export through the international airport at Maiquetía because of the excellent road link to Caracas/Maiquetía.[241] Most of the commercial longliners targeting swordfish are based at Puerto La Cruz.[242] One company, Zagemar, indicates that it

Photo 26.--The port of Güiria in eastern Venezuela was once an important transshipment point for foreign fishermen, but is now mostly used by the domestic fleet. Dennis Weidner

generally takes about 1 day to land the fish and truck it to the Caracas international airport at Maiquetía.[243] Artisanal fishermen also operate from this port.

Güiria (Sucre): Güiria is a small port built east of Carúpano, along the eastern coast, specifically to serve the fishing industry. The port was opened in 1972 at a cost of $10.5 million as part of the country's fisheries development program.[244] It has eight docks, an ice plant, large cold stores, and service facilities. It has not proven very successful, however, and is still scarcely used, even by Venezuelan fishermen. Utilization is limited by several factors, but the distance from important population centers is the principal reason.[245] Some tuna fishermen, both Venezuelan and foreign, land part of their catch there. Foreign longliners used the port occasionally during the mid-1980s.[246] Some transshipping has reportedly occurred at the port. One observer reports, however, that the use of the port for transshipping by the foreign fishermen has declined sharply since 1988. A few Spanish longliners are believed to have operated from Güiria during the early 1990s.

Juan Griego (and other Isla Margarita ports): Located on the northeastern coast of Isla Margarita, this port is the base for most of the Margarita Island fleet. About half of Venezuela's artisanal billfish catch was landed on Margarita Island during 1991. There was a total of 72 artisanal longliners based in Margarita Island in 1992 and 57 targeted billfish.[247]

Morro/Puerto Santo (Sucre): This port, located about 200 km east of Cumaná is the home port for several of the local commercial tuna longliners.[248]

Playa Verde: See (La) Guaira.

Puerto La Cruz: See Guanta.

Punto Fijo (Falcón): Seven purse seiners and a small number of baitboats and longliners are based at Punto Fijo in the western state of Falcón (appendix A3a). There is no large cannery at Puerto Fijo, but tuna is reportedly loined there. An investment group with fishery activities located in Punto Fijo purchased several tuna seiners and the vessels use the support facilities at Punto Fijo, a major shipping port. The Punto Fijo vessels land some tuna at Punto Fijo (mostly tuna destined for export as frozen product), but part of the catch is also landed at Cumaná and other ports.

Support services for the fleet are generally obtained at the Venezuelan home ports. Major dry docking activities are carried out in Venezuela, but some maintenance for the country's fleet of modern tuna purse seiners may occasionally be contracted at ETP ports--mostly in Panama. Supplies, especially fuel, are purchased in Venezuelan ports whenever possible because of the lower domestic prices. Supplies are also purchased as needed in the ETP (primarily Colombian) where the catch is transshipped.

IX. Transshipments

Available Venezuelan catch and trade data are difficult to analyze because of statistical problems caused by transshipment. Both Venezuelan and foreign fishermen transship tuna which complicates the compilation and assessment of Venezuelan statistics. The patterns are sharply different in the Pacific and Atlantic/Caribbean fisheries.

A. Pacific

Venezuelan fishermen operating in the ETP often transship their tuna catch in Pacific or Caribbean ports for export, instead of returning to Venezuela to land their catch.[249] The purse seine fishermen are able to spend more time on the fishing grounds by transshipping instead of transporting each catch back to Venezuelan ports. Transshipping has the added advantage of enabling the fishermen to avoid a variety of restrictive Venezuelan Government policies.[250] Almost all of the transshipped product is yellowfin tuna and no swordfish or other billfish is involved.[251]

B. Atlantic/Caribbean

Both Venezuelan and foreign fishermen transship Atlantic/Caribbean-caught fish.

Foreign fishermen: Venezuela is a transshipment point for foreign fleets operating in the Caribbean and the Atlantic.[252] Much of this activity is currently believed to take place in La Guaira because of the proximity to the Maiquetía International Airport, thus facilitating easy shipment of fresh product and high-value frozen product. Korean and Taiwan vessels, some registered as Venezuelan vessels, transship yellowfin and bigeye catches. Unconfirmed reports suggest that some U.S. fishermen have also obtained permits to fish off Venezuela and land their catch in Venezuelan ports for export.[253] The U.S. fishermen reported some limited transshipping through Venezuelan ports in the late 1980s. This activity peaked at over 60 t in 1988, but even larger quantities were being shipped out of neighboring Trinidad (appendix F2d). A French press report suggested that Taiwan longliners were fishing bluefin under the Venezuelan flag.[254] This appears to have been Mediterranean fishing operations and it is unlikely that any of the catch was transshipped through Venezuelan ports.[255] Other Taiwan vessels are known to transship tuna through the Caribbean islands and they are currently active in Trinidad.[256] Some Taiwan vessels also appear to transship through Venezuelan ports. Various reports in 1991-92 suggested erroneously that Venezuela was importing tuna from Taiwan.[257] NMFS has since determined that these shipments were in fact Taiwan transshipment through Venezuela.

Venezuelan fishermen: Less is known about transshipment by Venezuelan fishermen, especially longline fishermen. Little data is available to the authors on landings in foreign ports for local sale or export. According to unconfirmed reports, the Venezuelan longline fleet is landing some of its longline catch (marlin, swordfish, and tuna) at different Caribbean islands. Venezuela reported the fishermen may be responding to favorable price levels on the islands. One source indicated that these foreign landings reached especially high levels when a temporary government resolution banned billfish fishing in an area from La Guaira to the eastern coast. Venezuelan enforcement officials immediately seized vessels landing billfish at any port from La Guaira to Margarita Island. This situation caused several artisanal longline fishermen who fished off Margarita Island to land their billfish catch illegally at night in the Island or in various neighboring Caribbean islands.[258] Venezuelan purse seine fishermen are currently transshipping large quantities of tuna through Colombian ports. Some limited data is available on purse seine landings in Colombian ports, but this appears to be mostly Pacific-caught tuna and no swordfish is involved.

X. Processing and Products

Venezuela pursues four principal large pelagic fisheries, for tunas, swordfish, billfish and shark. Vessels and fleet operations vary substantially. (See "Fleet" and "Fleet Operations and Gear".) The processing of these different species also varies substantially.

Tunas: The tuna fishery is the most modern, developed sector of the country's fishing industry. Large modern seiners, primarily operating in the ETP, land fish to supply processing plants producing canned tuna as well as fresh and frozen whole tuna, loins, and fillets. The frozen tuna is mostly exported to the United States and Europe. Longliners operating primarily in the Caribbean land high-quality fresh tuna. The tunas are handled with standard processing procedures. They are gutted aboard the vessels. The product is sold at the dock to a buyer who is assisted by a grader (almost always an Asian) to help set the price. The tuna is then weighed, graded, and packed for air shipment, largely to Asian markets. Venezuelan companies do not process the fish involved in these fresh shipments. The tuna from short trips (along the Caribbean coast) are kept in very cold sea water (between -1.5° and -2.0°C) on board the vessel, while tuna from distant-water operations (east of the Antillean Arc) are frozen. On the dock, once the tuna is landed and before the grader tests for quality, the head is cut off as well as a portion of the tail (up to the lateral keels).[259]

Swordfish: While small compared to tuna shipments, swordfish has become an important commodity for a small group of longliners targeting this species. Venezuelan fishermen process their catch like U.S. fishermen; *i.e.*, the fish is headed, gutted, finned, and the tail removed at sea. The resulting trunks are stored in crushed ice and are sold fresh to the export market with no further processing. Most of the catch is landed at Puerto la Cruz along the eastern coast. It is then trucked to the Caracas international airport at Maiquetía and air-shipped to Miami and New York. Smaller quantities are landed on Margarita Island and air-shipped directly to Miami from there.[260] Undersize swordfish cannot, however, be sold to the export market because of the ICCAT management regime. Thus, an increasing domestic market has developed for fresh undersize swordfish, which is processed fresh and in lions for restaurants. No data is available on the quantities involved, but it appears to be 10-15 percent of the catch.[261] A local company, Procesadora de Alimento Frides, during early 1997 started to process smoked swordfish fillets. The product in 1998 was available in 150-gram air-dryed packs at about $4.00 per package. It is sold mostly as a delicacy in gourmet stores.

Billfish: Venezuelan artisanal fishermen gut their billfish catch at sea. Some occasionally dry part of their catch. No companies or cooperatives are involved in marketing the catch. Most of the catch is simply landed on a beach where a local buyer ("cavero") purchases the fish. The cavero owns a refrigerated truck and delivers it directly to retail outlets. Much of the country's billfish catch is normally marketed fresh (gutted and headed) and marketed in the country's larger cities. It is sold as a substitute for shark meat used in cafeterias for workers operated by large companies, and public schools. In addition, a small part of the artisanal billfish catch is air-dried and salted, and then sold in local markets. When the catch is particularly good and prices drop, the fisherman may cut, salt, and air dry the fish for subsequent sales to caveros. The billfish bycatch (sailfish and marlin) of the tuna longline vessels is processed frozen and sold through the same marketing channels. There is some unconfirmed information that part of that catch is exported to other Caribbean Islands.

Shark: Sharks are headed, gutted, and bled at sea. Otherwise the high urea content of the fish would spoil the meat. Upon landing the fish are cut in whole trunk sections (fish rounds or loins) and sold fresh. Small sharks are sold as whole trunks.

XI. Companies

Venezuela has several large fishing companies involved in a wide range of fisheries, especially tuna longlining, shrimp trawling, and sardine and tuna purse seining and canning.[262] The companies involved in longlining appear to be relatively small operations. Various reports suggest that the operation and ownership of the Venezuelan vessels changes greatly from year to year. As a result it has proven very difficult to get an accurate fix on company and fleet operations. None of the larger, more established companies deploy longliners. Many of the small companies have proven difficult to contact. Others have been reluctant to speak to the authors, in part due to concern over the current U.S. embargo on yellowfin tuna caught by purse seiners in the ETP and apparent belief that the U.S. Government desires to expand the embargo to include other species and fishing methods.[263]

A. Domestic companies

Several small Venezuelan companies and private concerns are involved in the country's swordfish fishery. Most of the companies are either vessel operators or exporters, although a few concerns are involved with both activities. There is virtually no processing of swordfish in Venezuela. The larger Venezuelan fishing companies for the most part do not participate in the fishery. As most of the fishing is done by small companies or individual operators, they generally contract the export of their catch to specialized or more experienced exporting companies.

Information on Venezuelan companies in the swordfish and related fisheries includes:

Agropecuaria Ridan: This company during 1997-98 reportedly operated one longliner targeting swordfish and tuna, the *Orca*. The vessel operated out of La Guaira near Caracas.

Agropesca: This Caracas company handles the export shipment of swordfish. It has had for several years an exemption from the U.S. mandatory examination of swordfish (appendix E3a).[264]

Arrendadora Maracaibo: This company reported operating two longliners in 1998, the *Propesca I* and *II*. Both targeted tuna and swordfish and were operated out of La Guaira.

Belamar: The company has participated in Venezuelan scientific studies on billfish and swordfish. Few current details are available. One observer indicates that the company had four longliners, three of which (*Maresil II*, *Soberana*, and *Veleidosa*) are deployed for operations in the western central Atlantic targeting yellowfin tuna. The vessels landed most of their catch in Trinidad. The fourth vessel was only used as a source of spare parts for the three active vessels. All four vessels were sold to the Caribbean Fleet company in 1996-97.

Carib Fleet: This Venezuelan-registered company is owned by Spanish interests. It primarily operates from Guanta. Carib Fleet acquired one of the Belamar/Caribbean Fleet longliners, the *Maresil II*. Current information is unavailable, but unconfirmed reports suggest the vessel is operating for swordfish and tuna out of Trinidad and landing the catch in Port of Spain. The vessel, however, continues to fly the Venezuelan flag. The company handles its own swordfish export shipments. It received on November 2, 1995, an exemption from the U.S. FDA automatic detention requirement (appendix E3a). It is likely that the company also handles the export marketing for Soberana and Sociedad Mercantil Veleidosa.

Caribbean Fleet: A company known as Caribbean Fleet appears to have been active in the Venezuelan fishery since 1996. The authors have, however, been unable to contact this company. Unconfirmed reports suggest that the company is owned by Spanish nationals resident in Venezuela. The company deployed the three Belmar longliners for swordfish during 1996-97: *Maresil II*, *Soberana*, and *Veleidosa,* and sold the fourth vessel that had been used for spare parts. Subsequently the company encountered legal problems and the owners divided the assets into three different companies, allocating one vessel to each of the three new companies: Carib Fleet, Soberana, and Sociedad Mercantil Veleidosa.

(Compañia) Castañeda: This Margarita Island cannery reportedly canned some of the shark taken by the Korean longliners operating off Venezuela.

CERCENCO: The Cercenco company operated the longliner *Oceanic Caribe* during 1996-97. The vessel is reportedly owned by the Oceanic Fishing Company of Venezuela.

COPESCA: COPESCA has participated in the swordfish fishery, but has not targeted swordfish since June 1997. The company now primarily targets tuna and in addition takes smaller quantities of dorado, mackerel (sierra) and an occasional shark. The company operates one vessel, the *Aquarela*. The *Aquarela* is 18-m long and is 65 GRT with a 34-ton hold. COPESCA generally deploys the vessel once per month. The average length of a voyage is 10 days with the maximum being 16 days. COPESCA uses 400 to 600 hooks set at about 65 m using no light sticks. The main line is approximately 30-km long. The company's peak fishing season is October through April. The owner reports extremely low catches for the last 2½ years. Catches have ranged from 1.1 t to

2.7 t at best. The last three trips have been exceptionally good, however, yielding catches from 4.0 t to 6.8 tons. The company exports primarily to the United States, principally Miami. It does sell a portion of its catch locally, 90 percent of which is sold through wholesalers.[265]

Comercialización de Pescado (COPESCA): See COPESCA.

Conavo: This company deployed the longliner *Antares* for swordfish in 1996-97.

CORPORIENTE: The Corporación de Desarrollo de la Región Nor-Oriental (CORPORIENTE) is a Cumaná-based, Government-owned entity created in 1970 to plan and coordinate the development of Venezuela's northeastern region, including the states of Sucre, Monagas, Anzoátegui, and Nueva Esparta. CORPORIENTE owns and manages the fishing port (Puerto Pesquero) of Cumaná. The facility includes cold stores (24,000 cubic meters), electricity, fuel, ice, docking and landing piers, water, office space and weighing facilities. Fishermen, fishing companies, and fish distributors use the facilities.[266]

DIANCA: This Puerto Cabello company reported that it had dealings with Korean longliners targeting shark in 1985.[267]

Divenal: This Caracas company received on April 19, 1996, an exemption from the U.S. FDA automatic detention requirement (appendix E3a).

Falcon's Fishing Company: This Valencia-based company was founded in 1996 and operates from Puerto La Cruz. It currently focuses mainly on swordfish and tuna, although fishermen report a shark and dorado bycatch. The company operates two vessels, the shrimp trawler *Falcón,* which it is converting to longlining, and the longliner *Rudy L.* The *Rudy L* is a 18.5 m-vessel totaling 68 GRT. The *Falcón* is a 23-m vessel with a 68-t hold. As of mid-1988, the *Falcón* was inactive as it was being re-rigged. The *Rudy L* was actively fishing and carries a crew of six, including the captain and a fishing technician. The company hired an American fishing technician who introduced many of their current methods, but they now have a Venezuelan fishing technician. The company employs basically American-style swordfish longline methods, using light sticks and fewer hooks than employed in Spanish or Japanese-style longlining. Falcón Fishing deploys about 800-1,000 hooks per set. The company's captain set the 50-km main line later than many other Venezuelan companies, about 8-9 pm. The hooks are set at a depth of 45-55 meters. Company spokesmen report no interactions with marine mammals, sea turtles, or birds.[268] Squid is the primary bait. Most of the swordfish and tuna catch is exported fresh, primarily to the United States (Miami). Shipments total about 1.4 t of fresh swordfish and tuna to the United States every 2 weeks. The shark, dorado, and other retained bycatch is mostly marketed domestically. Depending on local market conditions, some swordfish and tuna is sold domestically. Domestic prices can exceed those available in the United States. Falcon sells to wholesalers who then truck the product to Caracas and other cities for sale, mostly in supermarkets and restaurants. The catch destined for the United States is transported by truck from Puerto La Cruz to the International Airport at Maiquetía.[269]

Freshtech de Venezuela Productos Marinos: Freshtech, a Caracas-based company, received on October 24, 1990, an exemption from the U.S. FDA automatic detention requirement (appendix E3a).

(F.) Guiffrida: This Puerto La Cruz-based company has been in operation since early 1996 and focuses mainly on swordfish and tuna--although fishermen also report a dorado, wahoo and blue marlin bycatch. Guiffrida, which the owner prefers to call an "adventure," operates the *Don Miguel*, a 17-m longline vessel with a 50-t hold. According to the owner, the Venezuelan fishing industry has not been very prosperous in the mid-to-late 1990s. Costs exceed $8,000 just to prepare the vessel for sea and $1,800 for bait each trip. He and the country's other 10 to 15 longliners have experienced the effects of El Niño. Fishermen believe that dramatic changes in the water temperature have driven many fish away from Venezuelan waters. As of 1998, however, some fishermen report that the fish are beginning to return to Venezuelan waters. In order to improve the catch, fishermen have been employing the methods used by U.S. fishermen on the *Don Miguel*, such as using light sticks. Guiffrida tends to place the sticks on every other hook. To extend the life of the light stick, fishermen are recharging the sticks by placing them in ice buckets and then storing them in the ice hold. This way they are able to use them more than once. When targeting swordfish, fishermen using cold water squid, set the line at night (usually at 9 or 10 pm), depending on the moon phase. The owner mentioned that the "more moonlight the better" when catching swordfish. When targeting tuna, they set the line in the morning or early afternoon, times when the tuna actually feed. Their catch is 90 percent swordfish and tuna, 10 percent dorado, blue marlin and wahoo. All the swordfish and tuna catch is processed onboard and is exported fresh to New York. The owner has a partner in New York, with whom he visits regularly. There is a small domestic market for shark and smaller fish at local markets and restaurants. The product in the past was shipped by air to Caracas in wooden boxes, but now is shipped in "American" cardboard, styrofoam or jell-pack boxes. Refrigerated trucks deliver fish to the airport in Caracas in from 0.5 to 5.0 hours, depending on the port (0.5 from La Guaira and 5.0 from Puerto

La Cruz).[270]

Inversiones Beseri: This company reportedly operated the *Delfos* during 1997-98.

Inversiones Ethos: This Cumaná concern has exported swordfish to the United States, but does not have an FDA exemption from automatic detention (appendix E3b). This means that the company's shipments will be delayed at least 2 days at the U.S. port of entry for the required inspection.

Inversora Fivenca : This Maracaibo concern handles swordfish export shipments. It received an exemption from the U.S. FDA automatic detention requirement on July 6, 1992 (appendix E3a).

Lisneros group: This Venezuelan financial group planned a fisheries longline joint venture with Taiwan interests. It is unclear if the joint venture ever functioned.

(Thomas) Massey: Thomas Massey III handles swordfish export shipments. He received an exemption from the U.S. FDA automatic detention requirement on July 6, 1992 (appendix E3a). He operates from the Sailing Club (Club de Vela) at El Moro in Anzoategui.

Oceanic Fishing Company of Venezuela: This company owns the longliner *Oceanic Caribe*. It is affiliated with CERCENCO, although the relationship is unclear.

(Antonio) Oteiza: This concern operating from Puerto Santo handles swordfish export shipments. It received on November 2, 1995, an exemption from the U.S. FDA automatic detention requirement (appendix E3a). The authors note, however, that an apparently related concern (Oteyza Representaciones) had shipments of swordfish detained during 1997 (appendix F3b). Unconfirmed reports suggest that Oteiza has recently operated some longliners (*Aquarela*, *Don Miguel, Make*, *Rudy*, and *Triple Chass*) (appendix A4c1). Sr. Oteiza plays an especially important role in the Venezuelan longline fishery. He coordinates port services for most of the vessels fishing out of Puerto La Cruz.

Oteyza Representaciones: See (Antonio) Oteiza. This almost certainly is a spelling error, in the FDA source documents, as "y" and "i" are often used inter-changeable in Spanish.

Pesquera de la Isla: This company is one of the more established firms involved in Venezuela's pelagic longline fishery, The company in 1997-98 operated four longliners (*Chimana Grande, Chimana del Este, Guanta 17*, and *Guante 91*). Pesquera del Isla targets tuna rather than swordfish, but its vessels do experience a small swordfish bycatch. All four vessels are based in Puerto la Cruz. (See "International: Joint Ventures".)

Procesadora de Alimento Frides: This company during early 1997 started to process smoked swordfish fillets. The product in 1998 is available in 150-gram air-dried packs, sold mostly as a delicacy in gourmet stores.

Productora Marina: This company operated the *La Santisima Trinidad* in 1997 and the 17 m *Delfos* (72 GRT) and 17 m *Doña Fortuna* (44 GRT) in 1998. It primarily targets tuna, but reports a small swordfish bycatch. Both vessels are based in Puerto la Cruz. The company normally reports trips of about 12 days, but when fishing is particularly good, trips can be as short as 7 days. It uses Mustad 8 inch hooks and begins to set the line at about 6 pm.[271]

Promociones Marinas 2.000: This company worked with the U.S. longliners that attempted to operate off Venezuela in 1986. The U.S. fishing, however, proved so controversial that the Ministerio de Transporte y Communicaciones (MTC) ordered the U.S. vessels to leave Venezuelan waters.[272]

Propesca: The company operates dedicated swordfish longliners and has participated in Venezuelan scientific studies on billfish and swordfish. The vessels deployed for swordfish were the *Propesca I* and the *Propoesca II*. No current information is available on its operations and in 1998 it appears to have transferred the two longliners to Arrendadora Maracaibo.

PROPISCA: This Carúpano cannery reportedly canned some of the shark taken by the Korean longliners operating off Venezuela. The company also operated dedicated swordfish longliners and has participated in Venezuelan scientific studies on swordfish. This company, with one of its two vessels, participated in exploratory fishing operations in Venezuela's EEZ and had an agreement with the University of Oriente to conduct basic research. Its results were presented in one of ICCAT's scientific meetings in 1989.[273] One observer indicated that the company has since sold both of its longline vessels, and is not currently conducting fishing operations.

Rainbow Sea de Venezuela: This Caracas concern handles swordfish export shipments. It has an exemption from the U.S. FDA automatic detention requirement (appendix E3a).

SDF Trading: This Caracas concern has just begun to handle swordfish export shipments. It obtained an exemption from the U.S. FDA automatic detention requirement on May 12, 1997 (appendix E3a).

Servenco: This Caracas concern has just begun to handle swordfish export shipments. It obtained an exemption from the U.S. FDA automatic detention requirement on January 8, 1998 (appendix E3a). It is probably the same company as Seravenco.

Seravenco: This Maracaibo-based company exports swordfish to the United States, but does not have an FDA exemption to the automatic detention (appendix E3b).[274] This means that the company's shipments will be delayed at least 2 days at the U.S. port of entry for the required inspection. The authors have no

details on the company, but given the similarities in name, location, and detention problem, may be related to Serviacero.

Serviacero: This Maracaibo-based company exports swordfish to the United States, but does not have an FDA exemption to the automatic detention (appendix E3b).[275] This means that the company's shipments will be delayed at least 2 days at the U.S. port of entry for the required inspection. The authors have no details on the company, but given the Spanish name, it may be involved in the steel services industry.

Soberana: This company is registered in Venezuela, but owned by Spanish nationals resident in the country. Soberana acquired one of the Belamar/Caribbean Fleet longliners, the *Soberana*. Current information is unavailable and the authors have been unable to ascertain if the vessel is actively fishing. The company appears to be related to Sociedad Mercantil Veleidosa as the two companies share office facilities in the Puerto La Cruz area.

Sociedad Mercantil Veleidosa: This company is also registered in Venezuela, but owned by Spanish nationals. The company acquired one of the Belamar/Caribbean Fleet longliners, the *Veleidosa*. Current information is unavailable and the authors have been unable to ascertain if the vessel is actively fishing. One report suggests that the vessel currently operates out of Trinidad. The company appears to be related to Soberana because the two companies share office space in the Puerto La Cruz area.

VENTWO: Little information is available on this company. It apparently worked with two U.S. longliners (*Triple Anthony* and *Triple Chass*), which the company has tried to deploy in Venezuelan waters. The vessels have apparently been idled in port for extended periods, but reportedly obtained the needed Venezuelan permits and were able to begin fishing in mid-1998. Initial reports from the *Triple Chass* suggest very good results focusing on yellowfin tuna. Details on the *Triple Anthony* are unavailable at this time.

Venezolana de Pesca: This Cumaná-based company operates the *Antares*, a 23-m, 150-ton longliner with a 76-t ice hold.[276] Venezolana de Pesca principally targets swordfish and tunas (bigeye and yellowfin). Company official reports that the catch composition was unusual in 1997, perhaps because of the El Niño event. The company's 1997 swordfish catch was lower than in past years. The *Antares* was reporting good catches in early February-March 1997 of about 4 t monthly, but then the catch decreased by the year's end. The El Niño-impacted water was unusually warm in 1997 (figures 15-19). The company has generally experienced the best swordfish catches in colder water. Fishing operations involve setting a main line ("linea madre") of approximately 65-80 km The timing and placement of the line depends in part on how strong the currents are. Fishing strategy also takes into account the lunar cycle and the fishermen particularly like to set during the full moon. It uses light sticks of all colors (green, yellow, white) depending primarily on availability rather than any particular preference. All of the swordfish and tuna catch is exported fresh (H&G) to the U.S. (principally NY, Houston, Miami).[277] The company appears to have sold the *Antares* to an unidentified new owner (appendix A4d1).

Venezuelana Internacional de Pesca (VIP): This Puerto La Cruz-based company has one longliner, the *Make,* which is dedicated to the swordfish and tuna fishery (appendix A4d1). The *Make* is 17 m long and is 20 GRT with a 10-ton hold. The company deploys the vessel approximately 18 times per year, although this has declined in 1998 because of poor results. VIP reports that the optimal average length of a voyage is 12 days but trips sometimes last as much as 15 days. Approximately 500 hooks are deployed per set and on every hook the company uses green light sticks. The mainline is usually about 25 km long, but again due to the low catch, the company has shortened it to only 12 km during recent months. The company's catch is usually evenly divided between swordfish and tuna and the catch is processed on the boat into trunks and stored on ice for export as fresh product. VIP reported an excellent catch during 1997, particularly between January and June, but low catches during the first half of 1998. The company primarily exports to the United States, specifically Miami and New York. It also sells some of its catch domestically through fish markets for high-end restaurant use.[278]

Zagemar: Zagemar operated one small longliner out of Puerto la Cruz during 1997-98. The company's vessel (the *Don Jesus*) is a 18-m, 46-GRT longliner with a 20-t ice hold. The crew is normally about eight persons. Zagemar generally operates relatively close to the country's coast, often only about 4 km offshore, but sometimes also operates in offshore areas depending on where the company is able to locate the fish. The company targets both tuna and swordfish using squid for bait when fishing for swordfish, but squid and sardines when setting for tunas. Trips are normally 20-25 days and swordfish catches peak from January to May. The company deploys a mainline of about 40 kilometers. The hook lines are set at depths of up to 50 meters. The captain usually begin setting the line at about 6:00 pm and it takes about 5 hours to deploy. On swordfish sets they begin hauling in the line during the early morning at about 4:00 am. The principal target species were swordfish and tunas and catches average a combined total of about 4 t monthly. Zagemar makes extensive use of lightsticks which have significantly increased catches. The company generally attaches one lightstick to each hook line.[279] All of the swordfish and tuna (yellowfin and bigeye) are

exported fresh to the United States. Miami is the final destination of most of the tuna while New York is the final destination of most of the swordfish. The landings at Puerto la Cruz are trucked to Maiquetía International Airport near Caracas for air shipment to the United States. Landings on Margarita Island are air-shipped directly from the island. It generally takes about 1 day from landing to actual air shipment. The bycatch of shark (especially dogfish) and other species (including dorado and mackerel--"carite") is largely sold domestically. The company reports some interactions with marine mammals, primarily "tiburon toninas" o "guamachin" (probably a false killer whale) feeding on the hooked fish. The captain reports that there are no marine mammal mortalities as a result of company longline operations.[280]

Other: Many of Venezuela's longliners targeting tuna and swordfish are operated by individual fishermen rather than a company. Available reports suggest that ownership and operational control of several vessels have changed hands over the past few years. Owners and vessels active in 1996-98 have included: Alfio Belluso and F. Guiffrida (*Don Miguel*), Cori Christie (*Andrews G*), Daniel Ferrer (*Orca*, *Don Miguel*, *Don Jesus*, and *Le Rudy L*), Henry Lozada (*Donia Foruna*), Randy Pesca (*Acuarella*, *Make*, *Triple Chass*, and *Triple Anthony*), Ronald Pfeffer (*Propesca I* and *II*), Alfio Vellusso (*Delfos*), Roberto and Johnny Zannin Sartor (*Andrew G*) (appendix A4c1-2). Others may have operated their longliners, such as Antonio Oteiza (*Acuarella* and *Makis*), although accounts vary. A 1998 report indicates that private operators included F. Guiffrida (*Don Miguel*), Roberto Zannin (*Andrew G*), and an unknown owner (*Antares*) (appendix A4d2).

B. Joint ventures

A few joint venture companies associated with companies in Japan, Korea, Spain, and Taiwan have been active in Venezuela. These companies have primarily targeted tuna, but also reported a swordfish catch. (For details see "International: Joint ventures.") In addition to these formal associations, there are believed to have been a variety of less formal contacts with foreign fishermen, especially U.S. fishermen.

Atlas Pesquera: This Korean joint venture acquired some longliners in the early 1990s, but went bankrupt after only a few years of operations.

Pesquera de la Isla: This Venezuelan-Taiwan tuna longline joint company is based in Guanta and is apparently the only Venezuelan joint venture currently active.

Productos Mar: This Japanese tuna longline venture was active in the 1960s.

Triopines de Pesca: This Korean tuna longline venture based in Carúpano was active during the late 1980s and early 1990s.

Trinkor Pesquera: This Korean joint venture has operated from both Trinidad and Venezuela. Current operations are believed to be based in Trinidad.

XII. Markets

The Venezuelan longline fishery is basically an export-oriented activity. Almost all of the most valuable species (tuna and swordfish) is exported, as well as some species of sharks and shark products (fins). There exists a strong demand for these species in the major international markets, primarily the United States, but also in the European Union and Japan. Venezuelan fishermen also land some of their fresh tuna and swordfish catch at different Caribbean islands. The marlin, sailfish, some of the shark, and non export-grade product are marketed domestically.

A. Domestic

Seafood is popular in Venezuela, especially along the coast, although beef dominates the domestic market. The per capita seafood consumption rate has shown a gradual increase during the past decades from 10 kg in 1972 to 15 kg in 1995, which is relatively high in comparison to other Latin American countries.[281] Consumption of fresh and frozen fish in Venezuela is mostly limited to Caracas and the coastal cities and towns--where the bulk of the country's population is concentrated. The major Venezuelan seafood market is located in Caracas, the country's capital and largest city. About 20 percent of the population lives in Caracas (approximately 7 million people). Most of the seafood which reaches towns in the interior of the country is canned. Fish is not popular with broad sections of the non-coastal population because traditionally the product available in interior markets was poor quality. The distribution system is improving, but consumption of seafood products in the country's more traditional interior cities continues to be far below that of Caracas and the coastal cities.

Venezuelans have traditionally purchased primarily fresh seafood, either at markets near landing sites or in the seafood section of central markets. Supermarkets have become increasingly important, especially in Caracas and the larger cities. Some of the largest supermarket chains are CADA, Central Madeirense, Gamma Excelcior, Unicas, and Victoria among others. Much of the frozen seafood marketed in Venezuela is sold in the supermarkets, but many companies have also begun installing fresh fish counters. A new chain of hypermarkets (MAKRO) reports gaining increasing market share during 1996 in both fresh and frozen fish. The expanding availability of high-quality seafood has played a major role in increasing seafood consumption in Venezuela. A wide variety of species is available to Venezuelan consumers, including snapper/grouper, mackerels, shark, shrimp, squid, octopus, several bivalve mollusks, and other fish and shellfish.

Most of Venezuela's most valuable longline catch (swordfish and tunas) is usually exported. Seafood is popular among certain segments of the market--especially immigrant families. Sometimes domestic prices can exceed those available on export markets. As a result, companies market some of their catch domestically, depending on market conditions.[282] Some of the other species taken with longlines (such as amberjack, other tunas, marlin, sailfish, and sharks) are also marketed domestically. While of lesser value, these species can constitute a sizeable proportion of the catch.

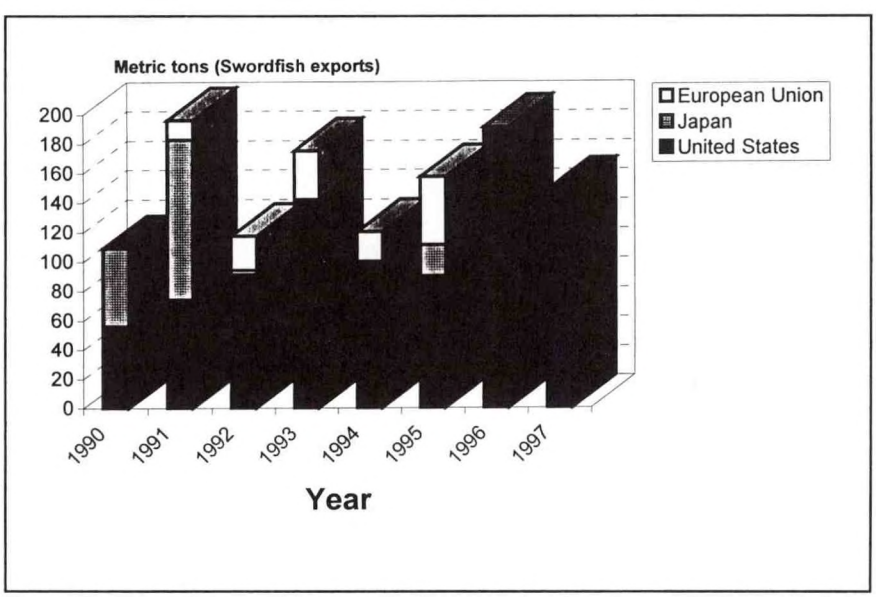

Figure 47.--Venezuelan swordfish exports (foreign import data) have fluctuated substantially during the 1990s. The primary market has been the United States.

Only occasionally has swordfish found in the central markets and supermarkets and even in restaurants it has rarely appeared on menus. Swordfish could be found in central markets, but probably primarily in port markets where the longliners are active.[283] Most of the swordfish which is available domestically is the smaller fish that cannot be exported. One observer estimates that 10-15 percent of the swordfish is extremely small fish and thus marketed domestically.[284] The increasing Venezuelan catch of small swordfish has increased the supply of swordfish in the

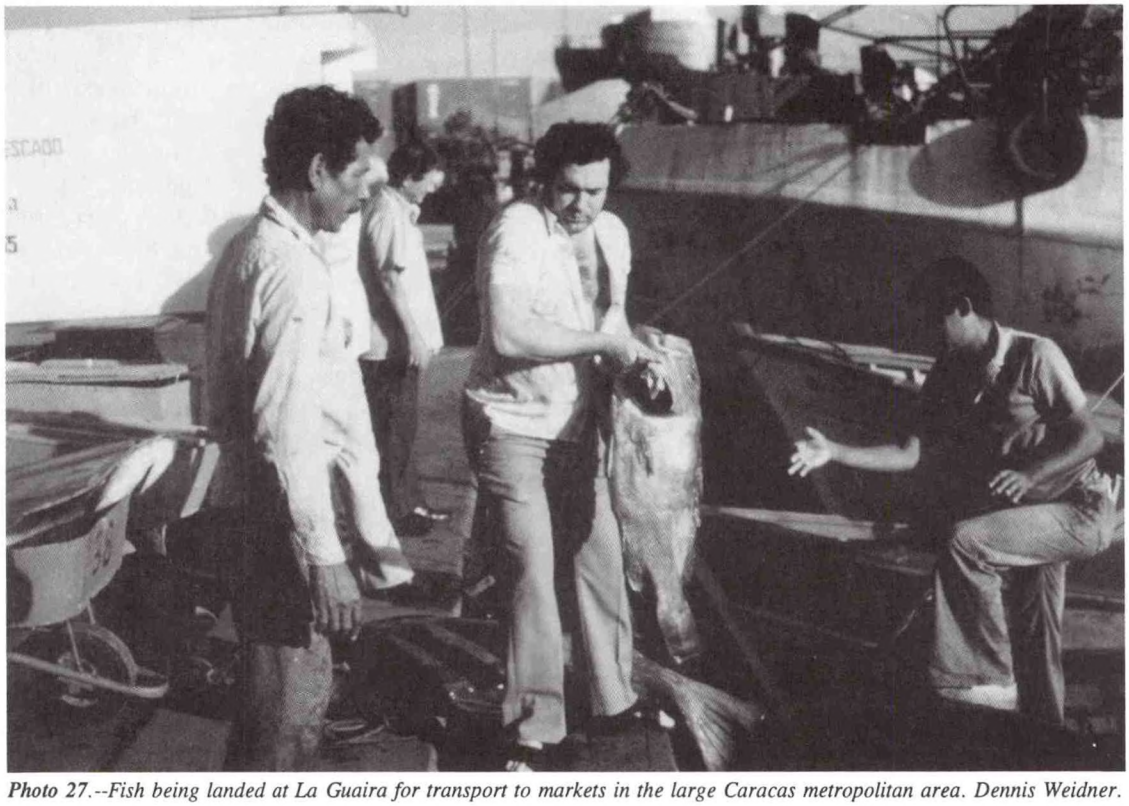

***Photo 27.**--Fish being landed at La Guaira for transport to markets in the large Caracas metropolitan area. Dennis Weidner.*

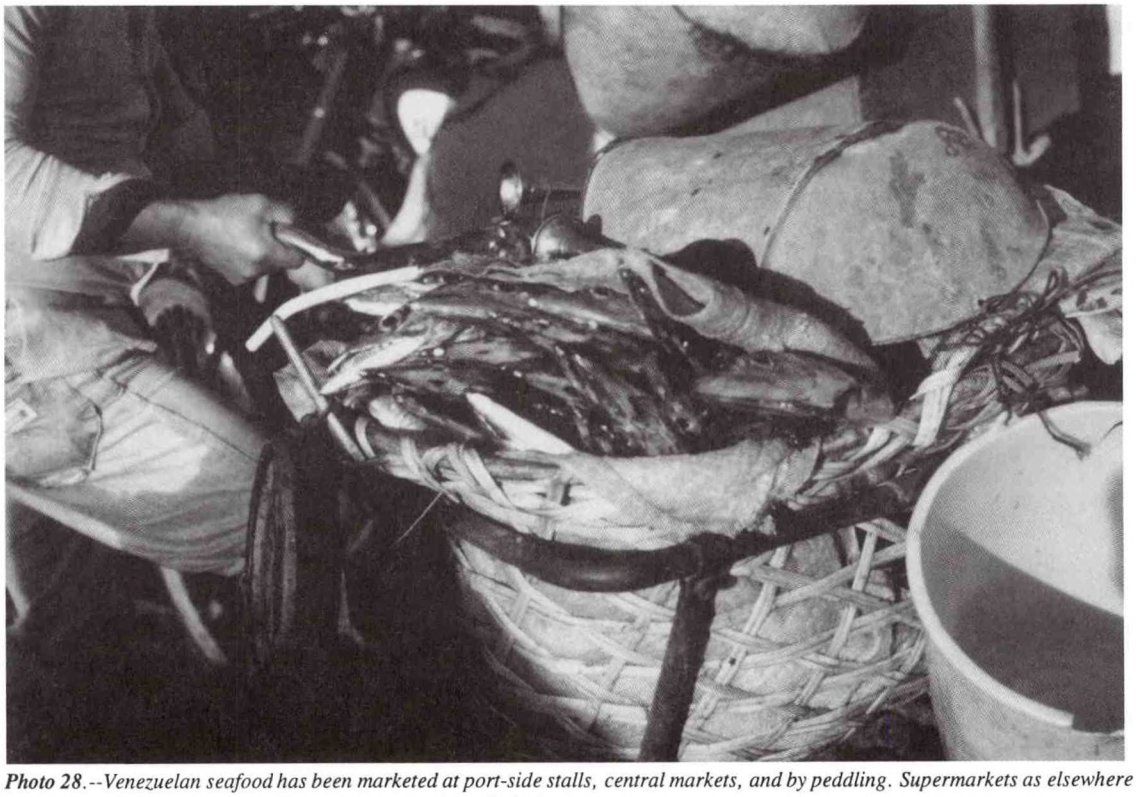

***Photo 28.**--Venezuelan seafood has been marketed at port-side stalls, central markets, and by peddling. Supermarkets as elsewhere in Latin America are now a major market outlet. Dennis Weidner.*

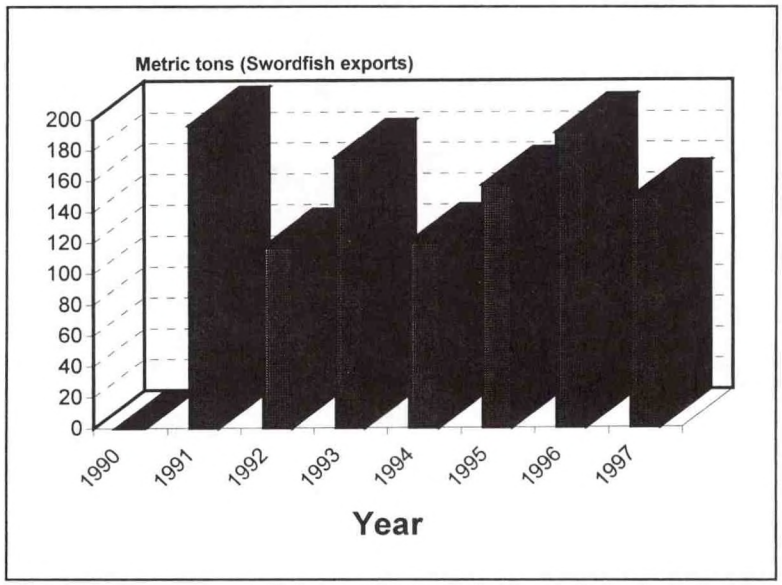

Figure 48.--Venezuelan swordfish exports fluctuated significantly during the 1990s. Some fluctuations reflected price changes with the fishermen changing target species.

domestic market and the fish was much more common in 1997 than has been the case in past years.

B. Trade

Most of the Venezuelan swordfish catch is exported, primarily to the United States.

1. Exports

Venezuelan seafood exports have fluctuated widely during recent years. Shipments reached a record $193 million in 1986, but fell sharply to only $26 million in 1987 (Latin America, appendix F1). Shipments in 1996 totaled $84 million. The level of exports is affected significantly by fluctuations in the bolívar and the need to generate hard currency earnings when the price of petroleum (the primary export commodity) declines on the world market. Oil prices, for example, have been particularly depressed in 1998. Exports have also been affected by the U.S. tuna embargoes associated with dolphin protection. The tuna fishery, primarily conducted in the ETP, has become one of the country's most important fisheries,[285] generating needed export income.

Venezuelan swordfish exports have fluctuated significantly (between 50-200 t) during the 1990s with no clear overall trend apparent (appendix F1a). The primary market is the United States, but there have been significant shipments to Japan in some years. Substantial export increases were reported in 1995 and 1996, due primarily to U.S. purchases. Shipments in 1997 declined somewhat, primarily due to lower shipments since July. Shipments in 1998 continued to decline, reaching the lowest levels of the 1990s. Final year data will probably show less than 50 t were shipped in 1998. Venezuelan sources report that one factor in the catch, and consequent export decline, has been climatic shifts--but market shifts may be even more important. Some fishermen indicated in late 1997 that changing environmental conditions associated with the 1997-98 El Niño may have been a factor. The low prices for swordfish on export market may have been an even more important factor. Preliminary 1998 U.S. import data show that the declining shipments to the United States noted in late 1997 continued into 1998 and shipments for all of 1998 will be the lowest for the decade (appendix F2e). Venezuelan sources report that the fishermen appear to have significantly shifted fishing effort to tuna. A variety of factors may have been involved. Some fishermen reported lower swordfish catch rates, but the authors have no data to substantiate this. More important factors may be the

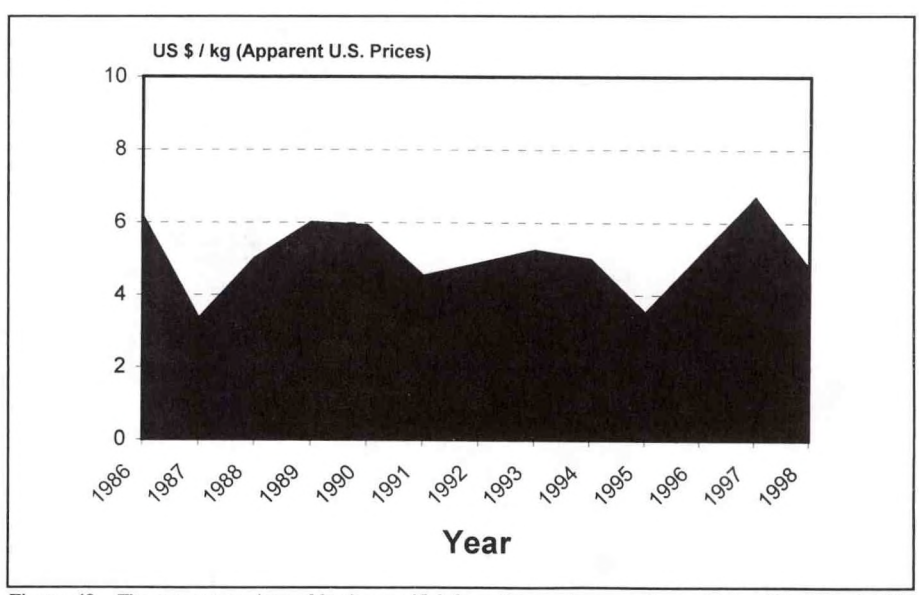

Figure 49.--The apparent prices of fresh swordfish from Venezuela range from a high of $6.15/kg in 1986 to a low of $3.33/kg and $3.50/kg in 1987 and 1995.

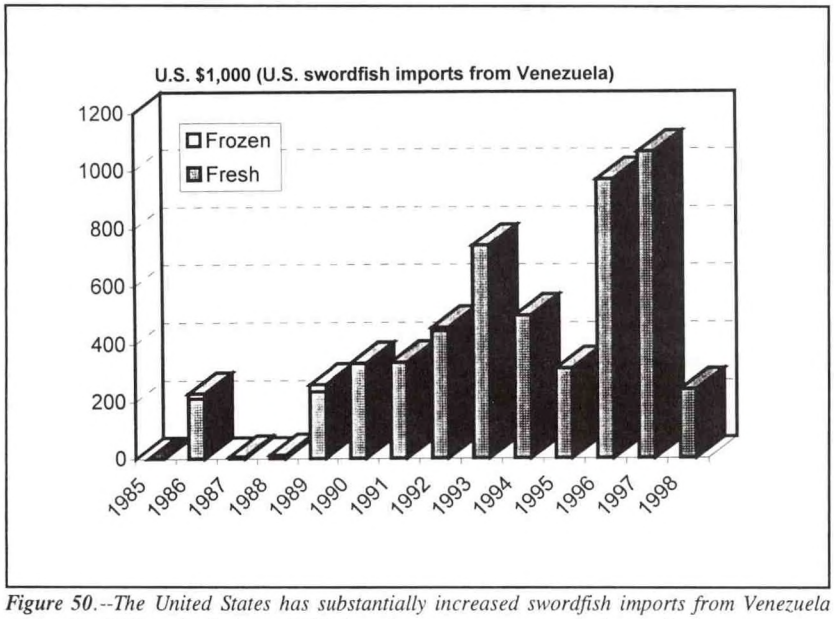

Figure 50.--The United States has substantially increased swordfish imports from Venezuela during the 1990s. Preliminary 1998 data, however, suggests a major decline.

impact of the Asian economic crisis on world seafood markets and a U.S. restaurant boycott at the beginning of 1998. The impact of these two developments as well as other factors caused swordfish prices to plummet. At the same time, the fishermen's costs increased. The price the fishermen had to pay for bait (squid) increased sharply in 1998 and the bait is a major part of overall operating costs. These and other factors caused the fishermen to shift effort to tuna. The lower 1998 swordfish catch appears to be primarily due to reduced fishing effort.[286] (See "Catch".)

United States: The United States is the principal market for Venezuelan swordfish. Fresh swordfish and tuna is generally landed at ports in eastern Venezuela, such as Puerto la Cruz, trucked to the Caracas international airport at Maiquetía, and since 1995 air-shipped primarily to Miami (appendices F2c1-2), where it is then shipped on to other locations throughout the country. Previously most of the catch was air-freighted to New York. Smaller amounts are landed at Margarita Island ports and shipped directly to Miami from there.[287] Venezuelan swordfish exports to the United States fluctuate significantly from year to year. While exports totaled 40 t (1986), they declined to negligible levels (1987 and 1988). Shipments recovered in 1989 to 50 tons and steadily increased until peaking at 142 t (1993). Shipments in 1995 declined to only 90 tons. These fluctuations appear to primarily reflect the availability of product because of fluctuations in the fleet and the resulting catch, although available ICCAT, Venezuelan (FONAIAP) data is somewhat sketchy and has many apparent discrepancies (appendix D3a1). U.S. shipments are also affected by diversion of product to alternate markets (appendix F1a). While the U.S. market dominates the Venezuelan swordfish fishery, substantial quantities have been marketed in Japan and the European Union. There are also domestic sales, although little data exists, Venezuelan sources believe that domestic sales are increasing and may be the major alternative to the U.S. market for the fishermen. Swordfish shipments to the United States after falling to only 90 t (1995) recovered and in the very next year record shipments of 190 t (1996) were made to the United States, reflected important catch increases. The shipments fell to 160 t (1997), but this was still far in excess of earlier years. Shipments have since plummeted. Final year-end data is not yet available, but shipments almost certainly will be less than 50 t (1998), almost all shipped during the first half of the year. The fishermen appear to be redirecting effort at other species as well as redirecting what swordfish they do catch to the domestic market. Almost all of the exports to the United States are shipped as fresh product (appendices F2a1-2). Most of the imports

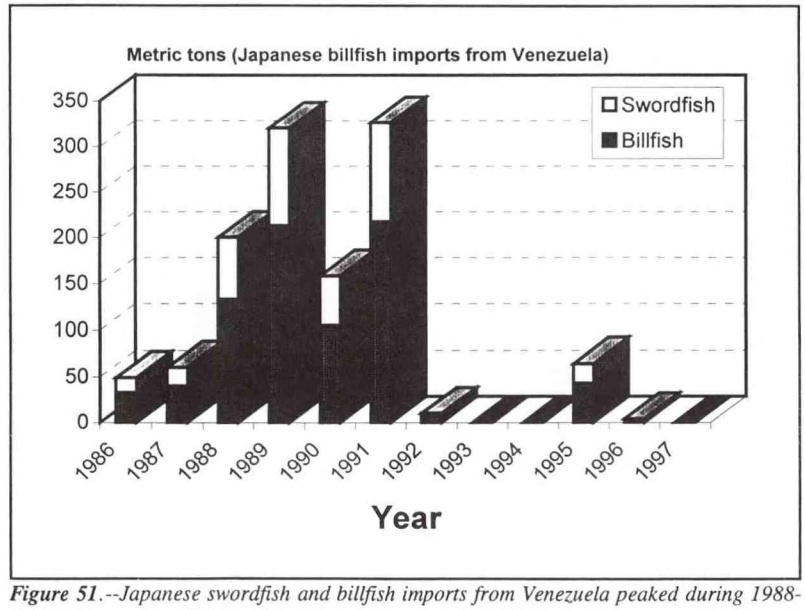

Figure 51.--Japanese swordfish and billfish imports from Venezuela peaked during 1988-1991. The authors believe the shipments are mostly billfish.

during 1995 and 1997 were shipped through Miami, but some product arrives through New York as well (appendices F2c1-2). Shipments in 1996 and 1997 have also been made through Boston. Venezuelan swordfish prices totaled only $3.50 per kg in 1995, the lowest level since 1987. This was a sharp drop from 1994 when swordfish sold for $4.98 per kg--reflecting a general decline in U.S. prices. Venezuelan swordfish sells at lower prices than the premium Canadian product, but at roughly the same price as that commanded by many other Latin American countries (Brazil, appendices G2e1-2). Swordfish prices have fluctuated significantly, plummeting about 33 percent from 1993 to 1995 from $5.22 to $3.50, respectively (appendix F2b). Notably Venezuelan swordfish sells at much higher prices than Brazilian swordfish. Brazil harvests some of its catch in warm tropical waters with temperature levels similar to Venezuela. It is not clear, however, why the Venezuelan product sells at higher prices than the Brazilian product. Notably, U.S. import data suggests very significant price increases since 1995. The apparent prices of fresh U.S. imports from Venezuela have doubled in recent years from $3.50/kg in 1995 to $7.67/kg in 1997 (appendix F2b). The Venezuelan fishermen through 1997 did not experience the low prices reported by Brazilian fishermen (Brazil, appendix G2c). The Venezuelan fishermen have, however experienced very substantial price declines in 1998 (appendix F2b). This has lead many fishermen to redirect efforts to other species. This would be understandable in that the apparent prices received by the fishermen fir sales to the United States has declined in only a few months from $6.67 per kg in 1997 to $4.92 per kg in 1998 (through November) (appendix F2b). Prices in 1998 had dipped below $4.60 per kilogram.

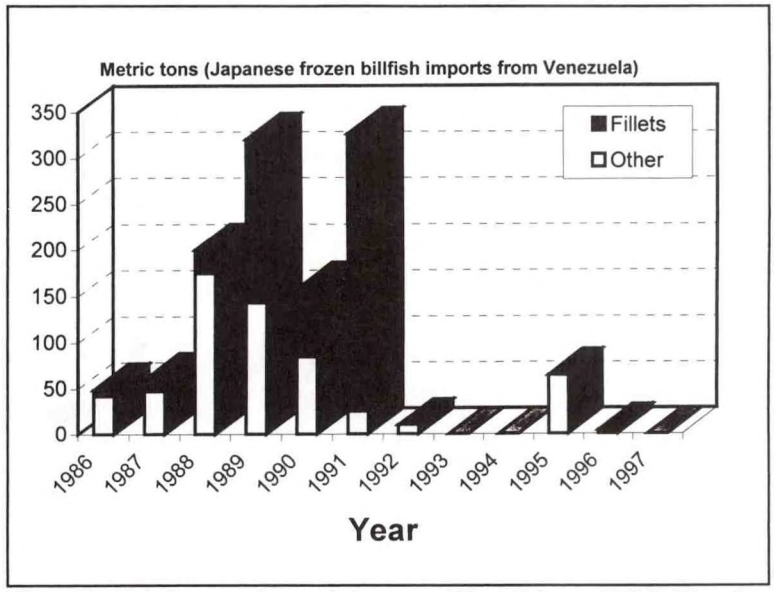

Figure 52.--The Japanese imported large quantities of frozen billfish fillets from Venezuela in 1991, but have since purchased only minor amounts.

Japan: Swordfish and other billfish exports to Japan are almost exclusively frozen product. Shipments have also fluctuated significantly, although the pattern is different than that noted for the United States. Billfish exports have totaled as much as 320 t (1989) and 326 t (1991). The authors noted that several large Korean longliners operating through joint ventures were active out of Carúpano in 1991 (appendix A3b), partially explaining the large shipments in that year. (See "International".) Such export levels probably included about 100-110 t of swordfish (appendix F3a). Exports declined to negligible levels in 1992 and no shipments were reported during 1993 and 1994. Billfish exports to Japan, however, resumed in 1995 and totaled 64 tons. The authors estimate that this amount included about 20 t of swordfish (appendix F3a). The price of frozen billfish marketed in Japan during 1995 averaged $4.97 per kg (appendix F1b).

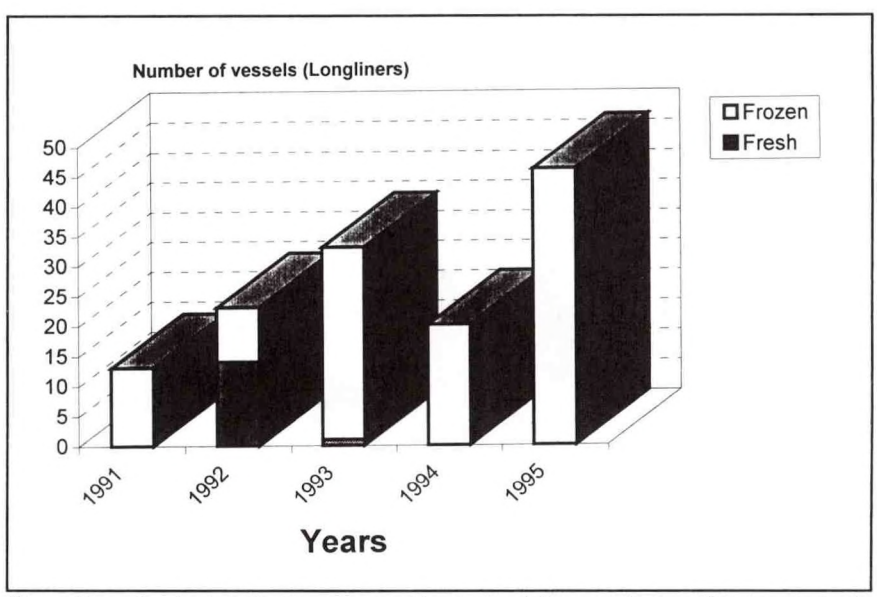

Figure 53.-- The final destination of most, if not all, of Venezuela's swordfish imports to the European Union has been Spain. These imports mostly in frozen form have increased substantially.

European Union: Venezuela has exported limited quantities

of swordfish to the EU during the 1990s. Shipments have ranged from about 15-35 t and amounted to 20 t in 1994 (appendix F4). All the exports have been shipped to Spain, mostly as frozen product. In 1995 the EU reported 46 t of frozen swordfish imports from Venezuela, all going to Spain (appendix F4). The price of frozen swordfish exported to the EU in 1993 averaged $2.72 per kg compared to $3.48 for the fresh product. The price of frozen swordfish increased 75 percent from 1993 to 1994 (from $2.72 to $4.76 per kilogram). The average price of frozen swordfish exported to the EU during 1995 was $4.30 (appendix F1b). No fresh swordfish has been exported by Venezuela to the European Union since 1993.

2. Imports

Venezuela was once one of the most important Latin American importers of seafood products in per capita terms. Fishery imports totaled a record $31 million in 1982, but fell to only $10 million in 1983 after the 1982 oil shock and totaled less than $1 million in 1986. Imports have continued at low levels because of the financial problems experienced in the oil-based economy. Fishery imports in 1993 were only $17 million which in inflation-adjusted terms was only about a quarter of the 1982 level. Venezuela does not import swordfish.

XIII. Government Policy

The Venezuelan fisheries agency is the Servicio Autónomo de los Recursos Pesqueros y Acuícolas (SARPA), formerly the General Sectorial Directorate of Fisheries and Aquaculture (DGSPA). SARPA is responsible for developing and implementing national fisheries and aquaculture policy and managing the country's fishery resources. It is a dependency of the Ministerio de Agricultura y Cría (MAC).

A. Fisheries law

The Venzuelan Government has issued very fe regulations governing fisheries for billfish. One 1988 regulation does cover billfish in general and includes swordfish. The regulation was designed to reserve billfish to the recreational fishery by prohibiting commercial billfish fishing in the La Guaira area (where the recreational fishery is centered) to Tortuga Island. The Government in 1990 modified the area covered to a 50-mile (80-km) radius around La Guaira in which commercial fishing for all istiophorid species (sailfish and marlin) and swordfish. The 1990 regulations also set strict standards for the recreational fishermen, who are prohibited from selling their catch.[288]

The authors are aware of no Venezuelan regulations specifically directed at swordfish. The Venezuelan Government has notably not implemenred the ICCAT minimum size fishing regime. Venezuelan fishery bilogists have repeately recommended this action, but to datethe Governmengt hasdeclined go do so.[289]

B. Limits

Venezuela declared a 12-mile Territorial sea in 1956.[290] The country declared a 200-mile Exclusive Economic Zone (EEZ) in 1978.[291] Marine boundaries have been negotiated with the Dominican Republic (1982);[292] France for Guadeloupe and Martinique (1983); the Netherlands for the Netherlands Antilles (1978); Trinidad and Tobago (1991); and the United States for Puerto Rico and the Virgin Islands (1980). Venezuela has not signed the Law of The Sea Convention.

Venezuela is having major difficulties negotiating some marine boundary agreements with neighboring countries. Some have been resolved (Netherlands Antilles and Trinidad). The major marine boundaries (with Colombia and Guyana) will probably defy resolution for years and be a continual irritant to bilateral relations.

Colombia: The marine boundary dispute with Colombia is a legacy from the land boundary dispute. Venezuela claimed the entire Guajira Peninsula and many Venezuelans are convinced that their country had a clear historic claim to it. When the two countries could not reach an agreement, the question was submitted to international arbitration. This resulted in an award by the Queen of Spain of most of the Peninsula to Colombia--extending Colombia's border to the Gulf of Venezuela.[293] Most Venezuelans believe that their borders should be larger than they actually are and that the current boundaries are the result of incompetent officials and poor diplomacy. As a result, current political leaders are reluctant to make further compromises and concessions on either the Colombian or Guyanan borders. Much is at stake for the two countries. The marine boundary and resulting 200-mile zones could have enormous economic consequences. While fishery resources are a minor factor, the value of possible offshore oil reserves could be substantial. Venezuela's major difficulty in marine boundary negotiations with Colombia is that country's insistence on extending the current land boundary on the equi-distant principle. This would give Colombia a considerable portion of the Gulf of Venezuela, a policy which Venezuela finds unacceptable.[294] In addition, Colombia has refused to accept Venezuela's claim to a 200-mile zone around Los Monjes islands (figure 1). Colombian authorities even considered reversing their recognition of Venezuelan jurisdiction over Los Monjes. The possession of the islands has a major effect on possible 200-mile projections into the Caribbean.[295] The Colombian policy on Los Monjes is perplexing to the Venezuelans because Colombia has used its 200-mile zone around several Caribbean islands to lay claim to a huge share of the western Caribbean. Colombia has already formalized these claims with agreements signed with Panama and Costa Rica. (Colombia has not yet signed an agreement with Nicaragua, which claims some of the islands now under Colombian jurisdiction, most of which are closer to Nicaragua than to Colombia.) A Colombian Congressional resolution questioned Venezuela's claim to Los Monjes in 1979, but after sensational press articles, the Colombian Government reaffirmed a diplomatic note of 1952 recognizing Venezuelan sovereignty. A Venezuelan-Colombian commission, composed of five persons from each country, has agreed on a *modus operandi* for future talks. Many Venezuelans feel that a considerable amount of territory, to which Venezuela has an historical claim, has been lost to Colombia. As a result, Venezuela is in no mood to make significant concessions--especially given the possible oil resources in the disputed areas of

the Gulf. A further problem is the press, which in recent months published numerous sensational articles about the mistreatment of Colombian nationals in Venezuela that have inflamed Colombian public opinion against Venezuela. In fact, many of the press articles probably accurately report the situation. Venezuela has a problem with illegal Colombian immigrants coming to Venezuela seeking jobs as Venezuelan wages have traditionally been much higher than wages for Colombian workers. Some are apparently badly treated or even killed when arrested by the Venezuelan National Guard. The two countries made a major effort in the early 1980s to negotiate a treaty and had made considerable progress. The failure of the ratification process, however, has left many felling that settling on a marine boundary may be years in the future.

Guyana: Fishery and marine boundary agreements with Guyana have been paralyzed because of Venezuela's claim to a considerable portion of Guyana --the Essequibo. All Venezuelan maps show the area as "zona en reclamación". A temporary arrangement based on the *status-quo* is unacceptable to the Venezuelans because any such agreement would give credence to Guyana's claim.[296] The Venezuelan claims are so extensive that it is unlikely that any Guyanese government will ever agree to them.

Netherlands Antilles: The marine boundary agreement with the Netherlands Antilles is based primarily on the equidistant principle, with two basic concessions to Venezuela. One concession is in the west for sea lanes important to Venezuela and another concession is to the north of the Netherlands Antilles where the island's zone is cone-shaped as a result of Venezuela's larger land mass. Venezuela in return gave the Netherlands Antilles jurisdiction over potentially productive fishing grounds off Falcon state which could have been claimed by Venezuela.[297] The agreement also includes a marine border between Aves Island and the Dutch islands in the Lesser Antilles. The concessions by the Dutch probably reflect the realization of the small population on the islands that it was not in their best interest to inflame public opinion in their much larger neighbor to the south by negotiating a marine boundary that would have greatly reduced Venezuelan 200-mile projections into the western Caribbean.

Trinidad: Marine boundary talks with Trinidad have proven difficult. Unlike the continuing difficulties with Colombia and Guyana, however, the two counties were eventually able to resolve their differences.[298] An agreement was finally reached in 1991. Trinidad's insistence on the equidistant principle was the main stumbling block because it would have sharply restricted Venezuela's Atlantic coast zone.[299]

C. Fisheries policy

After establishing its 200-mile zone in 1978, Venezuela announced a three-pronged policy to ensure the utilization of the resources in the zone.[300] Several administrations attempted aggressive negotiating efforts to implement this policy.[301]

Attract foreign fishing and investment: The Government sought to attract foreign fishermen, at least to help assess available resources. Some foreign fishermen did attempt to gain access, but most found that the conditions set by the Venezuelans were not attractive. Venezuelan authorities also found that access for foreign fishermen, even if just for trial fishing, was not well received by the domestic fishing community and press.[302] Foreign investment was discouraged by the foreign debt crisis and Andean pact regulations.[303]

Regulate foreign fishing: The Government set out to regulate foreign fishing, but in fact the impact of the regulations imposed was to virtually prohibit foreign fishing with very few exceptions.

Obtain reciprocal fishing rights: The Government sought to gain access for Venezuelan fishermen off neighboring countries as well as distant grounds. Venezuela's relatively large fleet and growing population have forced the country's fishing industry to seek offshore grounds.[304] Several initiatives were unsuccessful, but they did obtain access to waters off the Guianas and French Caribbean islands.

D. Foreign fishing regulations

Venezuela has relatively restrictive provisions concerning access to its fishing grounds. This is in part due to the fact that the country has the largest Caribbean fishing industry and many important resources are already heavily fished by domestic fishermen.

Access to Venezuelan waters: All foreign vessels have only restricted access to fishing waters under Venezuelan sovereignty. With the exception of scientific and certain sport fishing vessels, the Venezuelan Government requires that all foreign ships desiring to fish commercially in Venezuelan waters obtain permits. The Government would like such arrangements to be formalized as part of reciprocal commercial fishing agreements between the Venezuelan Government and the fishing vessel's flag country. Access can be granted, however, without such an umbrella agreement for investors, joint ventures, and charter arrangements.[305] The Venezuelan Government can restrict any foreign fishing vessel's activities to a specific area. The Government can also approve commercial leasing contracts between foreign boat owners and Venezuelan boat outfitters. The

Government can also permit the registration of a joint venture in the fishing sector, thus permitting foreign companies to operate their vessels under such arrangements with Venezuelan companies. All the vessels licensed have to communicate by radio with the Coast Guard or port Captain prior to entering Venezuelan waters.[306]

Fishing licenses: In addition to obtaining a permit for entering Venezuelan waters, foreign fishermen also need to obtain a fishing license. All types of commercial fishing activities in Venezuela require commercial fishing licenses granted by MAC. To obtain such licenses, a bond for 20 percent of the vessel's total value must be submitted with the application form. Venezuelan officials indicate that this is to cover possible administrative or judicial sanctions, which can be imposed on the vessels's owner or captain for damages to the natural environment during fishing activities or for other violations of Venezuelan fishing laws. MAC can impose certain specific conditions after granting a license, such as place and conditions for landing the catch, training of Venezuelan personnel aboard the vessels, and technology transfer and technical assistance.[307]

XIV. Research

Venezuelan researchers begun studying tuna and related species in 1972, but most of the work has been done since 1984. The research has expanded to cover various related species in recent years: billfish (1987), small tunas (1988), and swordfish (1991). Venezuelan government agencies, (SARPA, FONAIAP, and the Instituto Oceanográfico of the Universidad de Oriente), are the primary groups conducting research on highly migratory species including swordfish.

Centro de Investigaciones Agropecuarias Pesqueras (CIAP): See FONAIAP.

Estación de Investigaciones Marinas de Margarita (EDIMAR): EDIMAR is the marine research and training institute of the Fundación La Salle de Ciencias Naturales (FLASA), a private teaching/research foundation operated by a Catholic religious brotherhood. The Fundación is Venezuela's most active non-governmental organization involved in marine research. Its institute is located on Margarita Island. Some of EDIMAR's more important fisheries work has been cataloging and inventorying marine species. EDIMAR has reportedly done some work on tunas, but no details are available. EDIMAR recently acquired a small 34-m fiberglass (GRP) research/training vessel, the *Hermano Ginés*, which among other activities will do some work with longlines.[308] EDIMAR has, since 1981, evaluated the fishery resources and has promoted the development of the fishing industry in Margarita Island.

The Fondo Nacional de Investigaciones Agropecuarias (FONAIAP): FONAIAP is the Government's principal fisheries research unit. It has for several years conducted research on tunas and tuna-like species including swordfish and other billfish.[309] Fisheries research is conducted by FONAIAP and SARPA at the Centro de Investigaciones Agropecuarias Pesqueras (CIAP) in Cumaná. The research is part of the ICCAT Enhanced Billfish Program, which includes several activities such as, a large-pelagic observer program aboard tuna and swordfish longliners, port sampling for billfish, sampling in billfish tournaments in addition to sampling the recreational billfish fishery. At-sea sampling has been conducted since 1989.[310] Some billfish tagging is done through the cooperation of companies operating recreational fishing boats and a sport fishing club. The research program expanded the collection of billfish data beyond the recreational fishery to the commercial longline fishery (port sampling and at-sea observers) and the artisanal driftnet fishery. CIAP began a sampling program in 1991 for swordfish (which included hard parts and reproductive organs) as part of broader study on the reproductive dynamics of this species in the northwestern Atlantic. Some problems were experienced, but the researchers and vessel owners are working to resolve the difficulties encountered.[311] Collection of hard parts continues as part of a study on age and growth of swordfish caught in tropical waters.[312] The FONAIAP observers aboard longliners started tagging juvenile swordfish in 1997. FONAIAP officials hope to continue the tagging program with support from NMFS Southeast Fisheries Science Center (F/SEC).

Fundación La Salle de Ciencias Naturales (FLASA): FLASA's activities involve research on a wide variety of natural resource topics. The marine work is conducted at EDIMAR.

Instituto Oceanográfico de Venezuela (IO): The Instituto Oceanográfico, located in Cumaná, is part of Universidad del Oriente (UDO). The Instituto did some work during the 1980s and 90s related to both tuna and billfish fisheries, such as analyzing catch data.[313] A few of the studies have focused on swordfish.[314] The IO's highly migratory species group is actively collaborating with the ICCAT Enhanced Billfish Program and has participated in the ICCAT-sponsored FONAIAP Observer Program aboard swordfish longliners.[315] IO has supported one of its scientists in research on the reproductive dynamics of swordfish in the northwestern Atlantic. Presently, a study on the age and growth of tropical-caught swordfish is in progress, as well as a reproductive dynamics study on yellowfin tuna. Both studies are conducted in cooperation with CIAP/FONAIAP and the United States NMFS F/SEC.

Sectorial Directorate of Fisheries and Aquaculture (SARPA): SARPA in MAC is the Government agency responsible for collecting fishery statistics and thus plays an important role in the Venezuelan research program. SARPA collects catch and effort data from the major commercial fishing ports. Data collection is concentrated at the ports of Carúpano, Cumaná, and Guanta (where most of the baitboats, longliners, and purse seiners land much of their catch). Some data is also collected at some artisanal communities, but most of this is done by FONAIAP staff. A special commission was created in 1989 to improve the collection of tuna statistics. As a result, substantial improvements in data collection, including procedures suggested by ICCAT (logbook systems and multi-species sampling), were made, and by 1990 the system had been computerized and the port sampling increased. SARPA participated in the ICCAT Yellowfin Year Program with support from FONAIAP. SARPA is expanding collection of billfish data beyond the recreational fishery to the commercial longline fishery (port sampling and at-sea observers) and the artisanal driftnet fishery. SARPA also began

Photo 29.--Freddy Arocha in process of examining mature swordfish gonads at FONAIAP Lab in Cumaná.

exploratory swordfish operations, deploying observers on trips in the Venezuelan EEZ.[316] SARPA also conducts fisheries research at several regional laboratories. Some tagging work is being done. The DGSPA in March and April 1992, reported tagged some billfish: blue marlin (31), white marlin (11), and sailfish (14), but no swordfish.[317] DGSPA researchers have published a variety of reports on tuna and billfish, but the authors know of no studies specifically on swordfish.[318]

Universidad de Oriente Margarita Island Institute: The UDO operates a marine science institute on Margarita Island. The institute is administered by UDO's Nucleo (Campus) de Nueva Esparta. A UDO scientist and a graduate student in the late 1980s worked on samples taken from one of the first Venezuelan vessels to target swordfish. The sampling lasted less than 2 years. The project was designed to assess age, growth, and reproduction. The samples they obtained, however, were not sufficient to provide any new scientific knowledge and UDO terminated the project.

Several foreign and international groups are promoting research on highly migratory species in Venezuela:

International Commission for the Conservation of Atlantic Tunas (ICCAT): ICCAT has been working with Venezuelan officials for years to help improve the collection of statistics on highly-migratory species.[319] ICCAT has cooperated with various Venezuelan groups, including SARPA and FONAIAP. ICCAT's principal responsibility is tunas, but ICCAT also follows other highly migratory, large pelagic species like swordfish and billfish. ICCAT and Venezuela agreed in April 1987 to establish a program of intensified research on billfish. The work, which is partially financed by ICCAT, involves an on-board observer program and port sampling. Cruises have also been conducted.[320] The work has included both at-sea sampling and port sampling at Cumaná. During 1991 the observers collected information from seven longliners targeting tuna and seven others targeting swordfish.[321] ICCAT is also hoping to acquire some at-sea observer data.[322] ICCAT officials indicated in 1991 that they had arranged to initiate a swordfish/billfish observer program with the country's expanding swordfish fleet. The program emphasized collecting data on sex-at-size, biological sampling of gonads, and sampling anal spines and otoliths as well as the collection of basic data.[323] Some interesting

tagging data has been reported from Venezuela in recent years.[324] ICCAT regularly publishes data from the observer program. While the primary focus is billfish, a substantial amount of data on swordfish and physical samples has also been collected (series C appendices).[325]

National Marine Fisheries Service (NMFS): U.S. fisheries biologists have for years worked through ICCAT to assist Venezuelan officials with data collection and analysis on large pelagic, highly migratory species.[326] The NMFS Southeast Fisheries Science Center (F/SEC) and the DGSPA discussed a possible joint research cooperation program to focus on highly migratory species. After a change of administration in 1995, however, Venezuelan officials decided not to pursue the formal cooperative program under consideration. Nevertheless, active cooperative efforts between the NMFS F/SEC and the IO highly migratory group and the CIAP (both located in Cumaná) continues.

Institut de Recherche pour le Developpement (IRD): The French Institut de Recherche pour le Developpement is the new name for the Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM). The IRD/ORSTOM has a research agreement with Venezuelan research groups (FONAIAP, IOV, and IIC) focusing primarily on tropical tunas (skipjack and yellowfin) and billfish.[327] ORSTOM experienced difficulties obtaining Venezuelan research permits. It planned to deploy to do two tagging trips during the ICCAT Yellowfin Year Program. The research vessel *Nizery* was deployed in 1986. Only one tagging trip was possible because of time constraints. Some work was conducted with the Fundación La Salle de Ciencias Naturales (FLASA), but this did not deal with tunas and billfish. The ORSTOM work focused primarily on yellowfin tuna.[328] The ORSTOM research is not believed to have involved swordfish, but it offered some support for Propesca's exploratory swordfish operations conducted from late 1989 to early 1991.

ORSTOM helped the IIC (UDO Nueva Esparta) with the Propesca swordfish project. The project involved not only an assessment of swordfish spatial/temporal distribution, but also bycatches.[329] ORSTOM has also developed fisheries biology programs with FLASA aimed at using acoutical methods to evaluate Venezuela's fishery resources. They have also worked with FLASA on small-scale artisanal fisheries. ORSTOM researchers have cooperated with Venezuelan researchers on a variety of subjects and co-authored several studies.[330]

Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM): See the Institut de Recherche pour le Developpement.

XV. Bycatch

The authors know of no detailed overall assessment of the Venezuelan longline bycatch. Government officials have reported, however, that they are beginning to acquire the needed data to compile a detailed report. Almost all of the existing data is for species of commercial value that are retained. There is virtually no data on interactions with turtles, marine mammals, and sea birds.

Available information indicates that the bycatch of the Venezuela longline fleet is an important part of the catch and contributes significantly to the overall profitability. Swordfish is in fact a bycatch of the overall longline fleet, but catches are not large.
On the other hand, bycatches of tuna and sharks are an important to the smaller fleet of dedicated vessels. Bycatch data for both fleets need be used with considerable caution as an index of abundance. Fishermen can and do adjust the target species and fishing strategy depending on market conditions.

The bycatch of the country's overall longline fleet is quite different from that of the dedicated swordfish vessels. Venezuelan commercial longliners primarily target yellowfin tuna, but a few longliners also target swordfish.
Overall fleet: Commercial tuna longliners and artisanal longliners report only a minimal swordfish bycatch (appendices C6c1-2 and D4a-d).
Swordfish fleet: Dedicated swordfish longliners, however, report that over a third of the retained catch is swordfish (appendix D2c).[331] Some vessels report much higher proportions, with swordfish amounting to more than half of the catch (appendix D3d). This appears to be unusual; one observer reports a more normal proportion of the catch at 35-45 percent.[332] The proportion of swordfish, however, is highly seasonal (appendices D3c1-2), although the actual seasonal fluctuations have not yet been thoroughly assessed. (See "Species".) The rest of the catch is primarily tuna and shark. Tunas, especially yellowfin, also make up a substantial portion of the catch. Available data suggest that tuna can be about 30-40 percent of the catch (appendices D3c-d). The tuna bycatch is especially important during the spring and summer (April to October).[333] Some reports suggest shark catches are also important, but accounts vary.

Available information on the bycatch reported in the swordfish fishery is limited to a few studies. The various scattered reports obtained by the authors suggest:
Tunas: Venezuela's longline fleet primarily targets tunas. Tunas can total 65-85 percent of the total longline catch (appendices C2 and D2b). Tuna is also important to the small number of fishermen targeting swordfish. Swordfish fishermen report that their most valuable bycatch is tuna. The tuna bycatch can exceed that of the swordfish catch. The primary species taken is yellowfin, but important quantities of bigeye are also taken in addition to small amounts of albacore. One report reveals yellowfin constitutes about 25 percent of the catch and bigeye about 15 percent (appendices D3c-d). A local observer indicates yellowfin catches of from 18-23 percent are normal.[334] The yellowfin catch is highly seasonal, one report suggesting it constitutes an especially important part of the catch during spring and summer (April through October) when it may account for more than half of the catch (appendix D3d). Bigeye and albacore

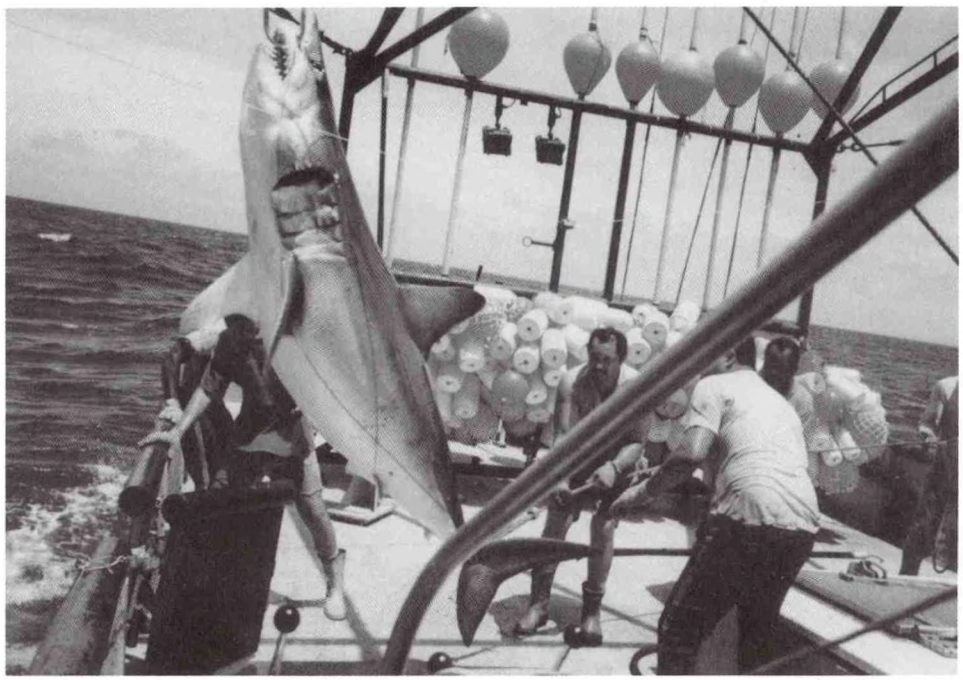

***Photo 30**.--A mako shark being boated as bycatch as part of swordfish operations. Makos are one of the more marketable shark species. Freddy Arocha.*

catches vary throughout the year with no clear seasonality.[335]

Sharks: The shark bycatch of the swordfish fleet is also important. Venezuelan swordfish longliners appear to experience a much larger shark bycatch than the larger tuna longline fleet, although available data is limited and in some cases contradictory (appendices D2b and D3c). Available data suggest that sharks may constitute about 20 percent of the total catch of the swordfish longliners (appendix D3c). Like swordfish the shark bycatch appears to be highly seasonal. Other observers report shark bycatches of about 20 percent are common (appendices D3e1-2).[336] The shark bycatches are highest during the second half of the year and consist mostly of blues, makos, and threshers (appendix H2). All these species except for the blue sharks are retained. The fins are exported and the trunks mostly sold in the local market.[337] Venezuela's overall catch of sharks and rays has been expanding in recent years (appendices D6a1-2).

Billfish: Billfish off Venezuela is taken by both recreational and artisanal fishermen. Artisanal longline fishermen operating off the central and eastern coasts can take over 200 t of billfish annually, primarily sailfish and white and blue marlin (appendices D5b series). Catches have exceeded 450 t, but in recent years have averaged about 200 t (appendix D5b5). Tuna and swordfish longline fishermen report a small, highly seasonal, bycatch of marlin and sailfish (appendices C8a-b). The incidental billfish bycatch is highest in the fall and winter months and falls off sharply during the late spring and summer months.[338] Available studies indicate 1993 billfish bycatches of about 3-5 percent for both tuna and swordfish longline fishermen (appendices D2b and D3c). A Venezuelan observer assessing data compiled for 1993-96 suggests billfish were less than 10 percent of the catch.[339]

Other: A variety of other species (especially dorado/mahi-mahi) are also taken in the fishery. The authors have no details on the Venezuelan finfish bycatch. Data available for U.S. fishermen operating in the wider Caribbean, however, may offer some insights about what the Venezuelan bycatch may include (appendices C6a and D7d).

Sea turtles: Venezuela, with its many lightly-populated offshore islands, is a major Caribbean location for sea turtle nesting and foraging in the Caribbean. Sea turtles (including greens, *Chelonia mydas*, hawksbills, *Eretmochelys imbricata*, loggerheads, *Caretta caretta*, ridleys, *Lepidochelys olivacea*, and leatherbacks, *Dermochelys coriacea*) are present in Venezuelan waters.[340] Of these species, the greens, hawksbills, and loggerheads are the most common in Venezuela. The turtles off Venezuela either have a limited range (greens and hawksbills) or move out into the north Atlantic (loggerheads, ridleys, and leatherbacks). There is no known movement into the south Atlantic[341]. Venezuelan researchers are in the process of preparing an inventory of sea turtle occurrence off the country to prepare a population assessment. Some work has been completed along the northwestern coast.[342] Except for the ridleys, all of the other species nest along the Venezuelan coast and off Venezuelan islands or archipelagos, such as Isla de Aves, La Tortuga, Los Roques, and Los Testigos.[343] Artisanal fishermen in the past targeted sea turtles and small catches were reported, for example 4 t in 1974. The Government closed the turtle fishery in 1979, although catches had declined to minimal levels even before the closure.[344] There has been no directed take reported since the closure (appendix D7a). Reports from Venezuela, however, indicate that artisanal fishermen continue to take them.[345] The incidental longline take of turtles in the western Atlantic was first reported by the Japanese bluefin turtle fleet in the early 1980s.[346] The problem was then noted aboard U.S. longliners.[347] Interactions vary by species. Leatherbacks generally do not take

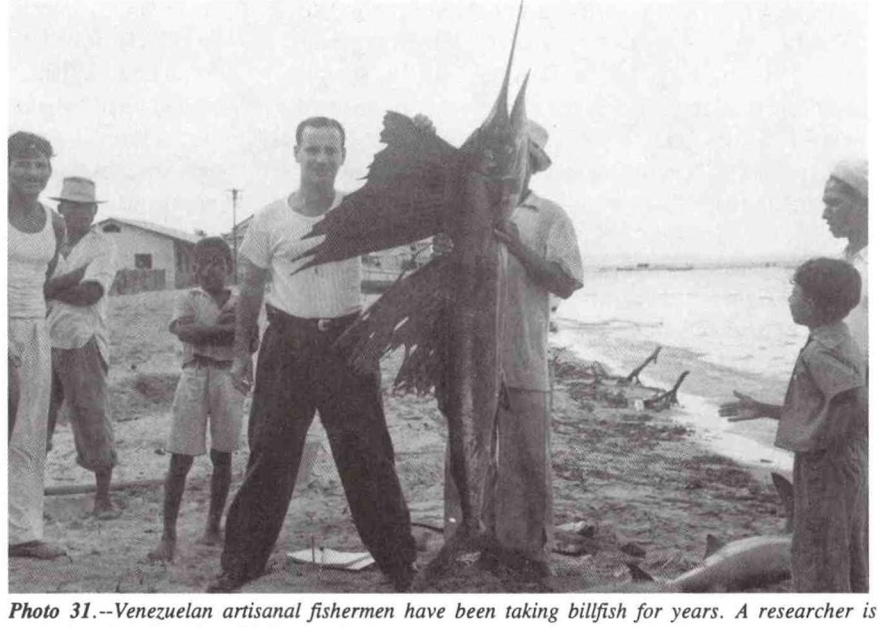

***Photo 31.**--Venezuelan artisanal fishermen have been taking billfish for years. A researcher is recording data for this sailfish taken in the early 1950s.*

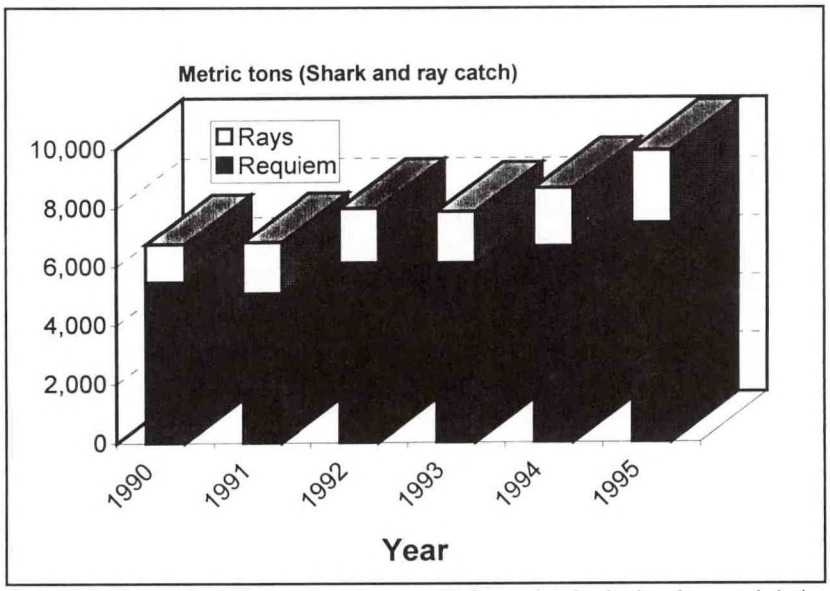

Figure 54.--Venezuelan fishermen have been steadily increasing the shark and ray catch during the 1990s.

the bait, but rather get entangled in the main and branch lines.[348] Loggerheads, on the other hand, do commonly take the baits.[349] The authors have little information on Venezuela's longline fleet turtle bycatch. Data from Venezuela is very limited. No data on the dimensions of the turtle problem off Venezuela are available. The lack of information may reflect the nominally small numbers of turtles involved or the reluctance of fishermen to discuss sensitive bycatch issues. Available data includes:

ICCAT: ICCAT has been collecting information on bycatch (appendix D7b). The Venezuelan Government submission to the ICCAT study suggested that most of the turtle bycatch was leatherbacks which became entangled in the lines.[350]

Venezuela: Venezuelan fishermen do not report turtle bycatches.[351] Some Venezuelan longliners carry researchers tagging and collecting billfish samples. The observers aboard tuna longliners only occasionally mention turtles and there is no species identification data available. Valid data on the interactions cannot be computed from the available Venezuelan observer data.[352]

Foreign countries: Limited foreign data provides some useful insights on possible interactions off Venezuela. Mexican researchers report low levels of interactions in the Gulf of Mexico.[353]

United States: U.S. tuna/swordfish fishermen operating in the Atlantic, and to a much lesser extent the Caribbean, also report interactions with turtles (appendix D7d). Assessing the available observer data is difficult, especially as it is highly variable.[354] U.S. fishermen operating in the overall Caribbean report that outside of finfish, the principal bycatch was turtles, especially loggerheads, but also some leatherbacks (appendix D7e1).[355] There is also some U.S. observer data. The observers confirm that some turtles are taken in the longline fishery. One estimate suggests that about 44 turtles were taken in 1994, about equal numbers of leatherbacks and loggerheads. Most were taken alive, but many had injuries or other trauma and the survival rate is unknown.[356] U.S. observer data from Caribbean operations show a small number of turtle interactions, but a relatively high turtle bycatch rate, which if extrapolated out would be a considerable number of turtles. The rates appear higher than in longline bycatch in several other areas (appendix D7e3).[357] The U.S. results do not necessarily mean that Venezuelan longline fishermen are experiencing the same level of activity. There are differences in methods, fishing strategies, and grounds. The U.S. data is for the Caribbean as a whole and fishermen have shifted grounds within the Caribbean from year to year. The U.S. data does, however, suggest possible levels of interactions that the Venezuelans may be experiencing as their tuna and swordfish operations have been heavily influenced by U.S. fishermen. The Venezuelan longline fishery is concentrated more in the southern Caribbean than the U.S. fishery. The Venezuelans fish extensively around the country's offshore islands and archipelagos where the turtles nest. This suggests that Venezuelan fishermen could be experiencing an even higher level of turtle interactions than reported by the U.S. observers. Venezuelan observers, however, report relatively low levels of turtle interactions in another commercial fishery.[358] Given that sea turtles are an endangered species and that some localized nesting populations have declined to critically low levels, the possible bycatch levels are of concern. Some U.S. environmentalists focusing on the sea turtle issue are especially concerned about the growing use of light sticks, which appears to attract the turtles and increase interactions with the longline fishery.[359]

Marine mammals: Marine mammal interactions could occur in a variety of ways. Some species like killer whales could feed on the hooked fish. Smaller cetaceans may be attracted by the bait or the accumulation of species attracted to the hooked catch. Dolphins and porpoises, for example, could find some success by feeding on the species attracted to the catch. The marine mammals are rarely taken by the hooks, but they do occasionally become entangled in the lines. The Venezuelan Government's submission to the

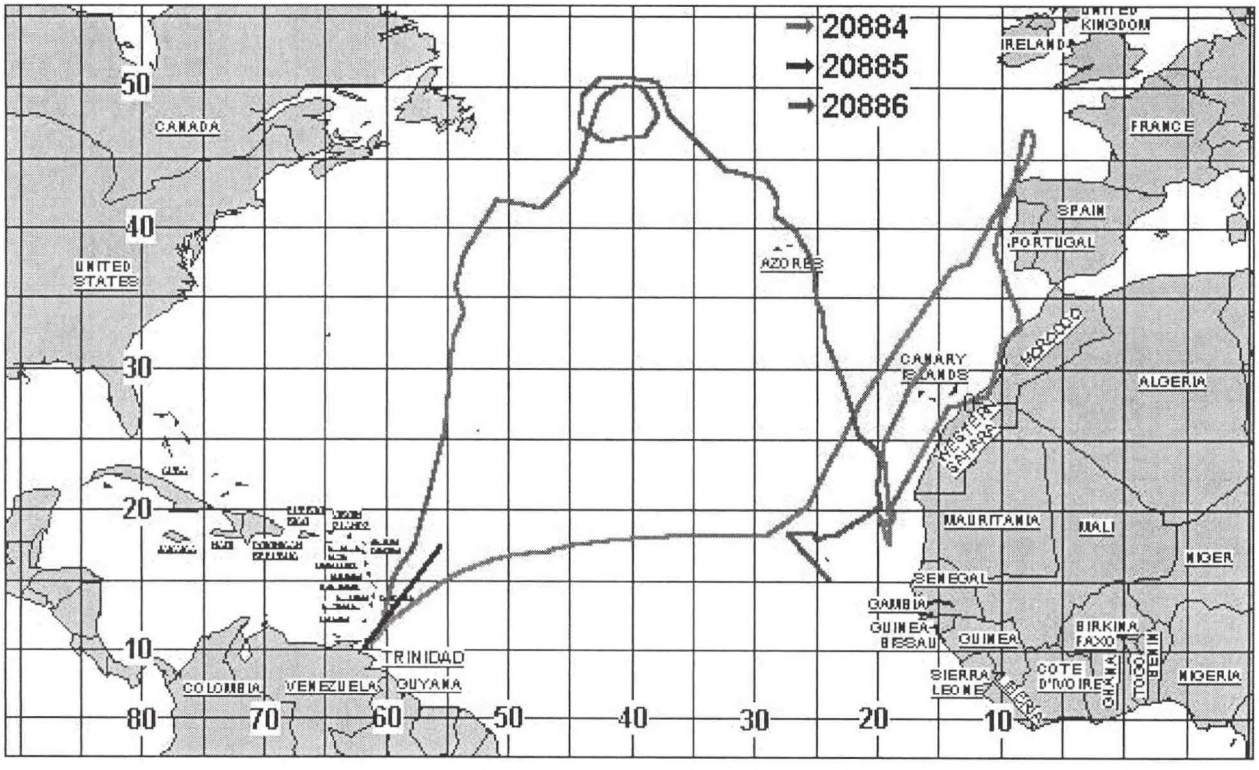

Figure 55.--This graphic shows the movement of leatherbacks after nesting off Venezuela. None of the turtles are known to move into the south Atlantic. Scott Eckert.

ICCAT bycatch questioner reported that there is no incidental take of marine mammals.[360] The Venezuelan observers aboard commercial tuna longliners, however, do report a small number of interactions with marine mammals. One observer reported a false killer whale ("guamachin" or "tiburon tonina"). Mammals are, however, only noted infrequently. [361] One longline fisherman told the authors that there are no marine mammal mortalities from his swordfish/tuna operations, but that false killer whales ("tibiron tonina") feed on the hooked fish before the catch can be boated.[362] The authors have been unable to develop any further information from the fishery. Obtaining information on marine mammals is complicated because of the sensitive nature of the issues involved in Venezuela.[363] The authors note, however, that U.S. swordfish longline fishermen operating in the Caribbean also did not report marine mammal bycatches.[364] Other available data on the U.S. tuna/swordfish longline fishery in the Gulf of Mexico
and Atlantic coast suggests that limited marine mammal interactions are possible off Venezuela. One U.S. bycatch study reported only 88 marine mammals from over 2,900 sets from the Atlantic, Gulf, and Caribbean. Almost all of the marine mammal mortalities, however, were in an area of the U.S. mid-Atlantic bite. Most of the species involved were pilot whales and a few grampus in the Gulf of Mexico. Only a few dolphins were killed.[365] This species mix was confirmed in the responses to the ICCAT bycatch questionnaire for the wider ICCAT area (appendix D7b). A very low level of U.S. marine mammal interactions in the Caribbean has been confirmed by U.S. observers who during 6 years (1992-97) observed only two, pilot whales that were released alive (appendix D7a2). Comparable data from a Pacific fishery (the Hawaiian longline fishery), also show relatively limited interactions, but the principal species were dolphins.[366]

Seabirds: The authors have been able to obtain virtually no Venezuelan data on longline interactions with seabirds. ICCAT has identified several species of seabirds, reportedly caught incidentally in Atlantic longline fisheries, including albatrosses, gulls, fulmars, petrels, and shearwaters. The birds are attracted by the baited hooks, especially when the line is being set and before it drops in the water column. Little information, however, is currently available specifically on seabird interactions in the Caribbean and virtually no information specifically on interactions off Venezuela. The Venezuelan observers aboard the longliners do not record data on bird interactions.[367] Informal discussions with the observers suggest very limited interactions with birds. One of the observers in his 6-year experience indicated that he has not seen any sea bird interaction when fishing within the Caribbean. In the Atlantic (east of the Antillean Arc) he recalls

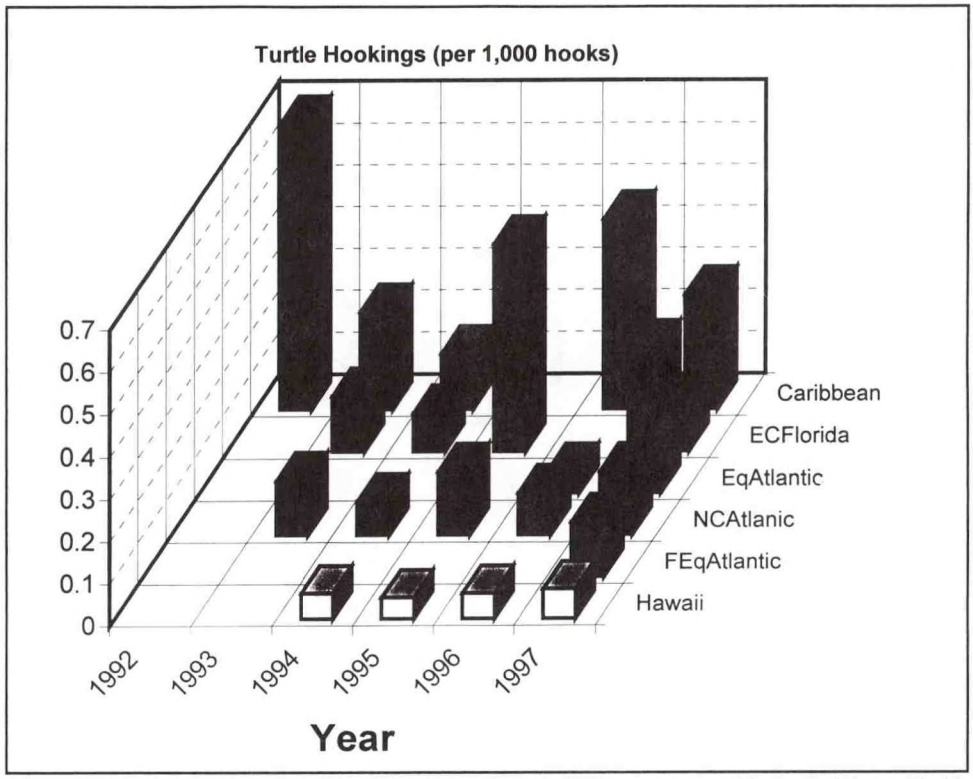

***Figure 56**.--Larger numbers of turtle hookings during the early 1990s were reported in the Caribbean, Florida east coast, and north central Atlantic.*

four times that birds had taken the bait from hooks being set, and on a few occasions birds have died. The observers are not trained for collecting data on birds and thus have no expertise on what species of sea birds are attracted by setting or hauling the lines.[368] Seabird mortalities of the swordfish longline fisheries appear to be limited by several factors:

Set timing: The fishermen, especially the swordfish fishermen, generally set after dusk. This tendency of the swordfish and some tuna longline fishermen to set lines at dusk or at night when seabird interactions are fewer appears to be a significant factor limiting seabird interactions.[369] Artisanal longliners targeting tuna, billfish, sharks, snappers, and other species may have higher bird kills as the sets are often earlier in the day. While the swordfish fishermen generally set after dusk (7:00-9:00 pm), the tuna fishermen often set in the morning (6:00-9:00 am).[370] Other Venezuelan longline fishermen also set during the day. Many species of sharks appear to feed actively at dusk. Apparently they are especially attuned to light contrast. As a result, fishermen targeting sharks often set earlier than those targeting swordfish.[371] The Venezuelan artisanal longline fishermen targeting billfish, both the eastern and central fleet, set during the day.[372] There is also a large snapper/grouper demersal longline fishery which may have seabird interactions.

Seabird populations: Seabird populations in the Caribbean and tropics in general are not as large as in colder temperate and sub-Arctic/Antarctic waters at higher latitudes. The larger fish stocks at higher latitudes support larger bird populations, making interactions with fisheries more likely. There is a general sense that the sea bird problem in the northern and central Atlantic is not as big a problem as in the areas where the problem has been looked at in more detail and bird populations are more dense. The authors stress, however, that bird/fishery interactions in the Caribbean have not been carefully studied and little reliable data is available.

Bird species/behavior: Species vary greatly in reported interactions with fisheries. Some larger, more aggressive birds are the most likely to interact with fisheries. Many of the species which have acquired the habit of following and feeding around fishing vessels, including many of the species environmentalists are most concerned with, occur primarily at higher latitudes, thus reducing possible interactions in tropical water like the Caribbean. The tropical species (such as terns, boobys, frigates, and others) generally do not appear to have developed the strategy of following fishing boats as part of their foraging repetoir.[373] This is not to say categorically that seabird interactions do not occur in the Caribbean and other tropical waters. The range of many seabird species is phenomenal. Albatrosses, for example, frequent tropical waters off Peru, Ecuador, and Brazil, and there appear to be substantial interactions with longliners.[374]

Industry characteristics: The nature of the fishing industry in tropical waters provides less productive opportunities for birds. The large schools of fish at the higher latitudes support substantial commercial fisheries which permit the deployment of large commercial vessels. These large vessels offer various feeding opportunities for birds. The

generally more diverse, artisanal character of fisheries and the smaller boats involved in tropical fisheries offer fewer opportunities. One of the most significant tropical fisheries, however, is the deployment of large distant-water longliners which do provide potentially rich feeding opportunities for seabirds.

The authors stress that little actual information is available from Caribbean fisheries in general, and Venezuelan fisheries in particular, to definitively show that seabird interactions are not a problem.[375] Thus while Caribbean interactions appear minimal, they should not be dismissed out of hand. Much of the attention, and thus available data, on seabirds off Latin America has focussed on the longline fishery in the south Atlantic and Antarctic--especially the longline fishery for Patagonian toothfish and other demersal species.[376] The lack of data on seabird interactions off Venezuela is not unusual. Little published information exists on seabird interactions in tropical waters around the world.[377] Foreign data provides, however, some insights into possible seabird interactions off Venezuela.

United States Caribbean operations: Logbook data prepared by fishermen cover the entire U.S. fleet. Data developed from the longline logbooks show few interactions with seabirds. The data for one representative year, for example, showed no Caribbean interactions and only a few in the U.S. fishery overall. A detailed assessment of the logbooks submitted by the fishermen is currently underway, but preliminary assessments also suggest that Caribbean seabird interactions are not a major problem.[378] While not a major U.S. fishing area, the level of Caribbean fishing is not inconsiderable and has been expanding in recent years (appendix D9). Logbook data submitted by the fishermen, however, can be questioned in that some fishermen may decline to report interactions with birds and various protected species. A good check on the logbook data is available in observer reports. While the observer data because of the limited coverage may not be statistically valid in calculating catch rates, it does provide a way of testing the accuracy of logbook data. U.S. observers since 1992 aboard U.S. swordfish longliners in the Caribbean report no seabirds interactions (appendix D7e2). The negative logbook reports and the absence of a single reported seabird mortality in over 6 years by observers strongly suggests that the swordfish longline fishery is a clean one and that seabird interactions in the Caribbean are not a major problem.

Brazil Atlantic fisheries: Some scattered reports are available on the Brazilian tuna/swordfish longline fishery. There are interactions with both commercial and artisanal fisheries. No firm conclusions at this time can be drawn because of the limited data. The available data suggests that a relatively small number of bird mortalities occur from interactions with domestic pelagic longlines, but demersal longlining was more of a problem. At least one of the affected species (spectacled petrel) is endangered.[379]

Pacific countries: Some reports from the Pacific suggest that seabird mortalities in tropical waters may not be a serious problem.[380] The possibility of significant seabird mortalities in tropical longline fisheries, however, cannot be dismissed out of hand. Some observers have expressed concern over specific species.[381] Some apprehension has been expressed, for example, over the impact of the Hawaiian swordfish/tuna longline fishery. NMFS indicates that observers aboard swordfish longliners report mortalities of albatrosses, but the interactions appear to occur primarily at temperate latitudes, well north of the Hawaiian Islands.[382]

There are some indirect concerns about Caribbean seabirds. Two mid-Atlantic/Caribbean species that worry environmentalists are shearwaters and Bermuda petrels.[383] Shearwaters have a close relationship with tunas. They feed on the pelagic finfish and squid that the tunas drive to the surface while feeding. The impact of the Caribbean tuna/swordfish longline fisheries (the Venezuelan fishery is the largest) in removing tunas could thus indirectly impact shearwaters.[384]

XVI. International

A. International Relations

The country has conducted an active program of discussions with neighboring countries on fishing issues. Most of these contacts have been over boundaries or access arrangements for shrimp, demersal trawlers, or snapper/grouper fishermen. Venezuela has few bilateral government-to-government contacts on issues involving highly migratory species such as tuna and tuna-like species. Foreign-flag tuna vessels operated from Venezuelan ports during the mid-1980s. Some of the foreign landings were reported as Venezuelan catch, causing some double reporting and confusion over actual Venezuelan catch data.[385]

1. Multilateral

The principal multilateral organization involved with highly-migratory species is ICCAT and Venezuela is an ICCAT member.

ICCAT: Venezuela's primary concern in the Commission proceedings has been with tunas. ICCAT has, however, also promoted a variety of projects on swordfish and billfish. Budget constraints have limited Venezuela's participation in ICCAT regulation recommendations and programs. Venezuelan participation in the enhanced billfish research program, for example, has required ICCAT funding. Despite the budget limitations, ICCAT has played an important role in supporting Venezuelan statistical programs and research efforts on highly migratory species. (See: "Research.")

2. Bilateral

A few countries have distant-water fishermen that have deployed tuna or swordfish longliners off Venezuela or have transshipped oceanic pelagics through Venezuelan ports. This activity was significantly reduced after Venezuela declared a 200-mile limit in 1978. Some minor foreign fishing, however, continues--both legal and illegal.

Barbados: Venezuela as part of its overall effort to promote relations with Caribbean countries signed a cooperation agreement with Barbados in 1972. The agreement included cooperation in fisheries.[386] The authors know, however, of no significant activities flowing from the agreement and no interactions concerning oceanic pelagics.

Brazil: Brazilian and Venezuelan officials in 1991 signed a letter of intent providing for possible access for the Venezuelan tuna fleet to Brazilian fishing grounds. At least half of the catch would have to be landed in Brazil.[387] The agreement appears to refer to tuna purse seiners, but no details are available on actual implementation.

Colombia: Colombia administers the largest foreign fishing licensing programs in Latin America.[388] The Colombian Government actively promotes the licensing program. Incentives change from year to year, but in some years low-cost fuel was available to the foreign fishermen.[389] Several Venezuelan shrimp trawlers and tuna purse seiners take advantage of this opportunity. Colombian officials report that 17 Venezuelan seiners participated in the program during 1996 and 1997 (Colombia, appendices A5b and A6c). The authors know, however, of no Venezuelan longliners participating in the Colombian fishery.[390]

European Union: European Union (EU) officials have expressed an interest in negotiating a fisheries access agreement with Venezuela.[391] Few details are available on the Venezuelan response. Officials reported in 1993 that such discussions were at a preliminary stage.[392] The authors know of no significant access or other arrangements flowing from the preliminary conversations.

France: Venezuela reached an unwritten understanding in 1987 with France allowing artisanal fishermen from the French overseas departments (Martinique and Guadeloupe) and Venezuela to operate off Martinique (France) and Aves Island (Venezuela). This informal agreement is still valid.[393]

Grenada: Grenada and Venezuela signed an umbrella cooperation agreement in 1979.[394] The authors know, however, of no resulting fisheries cooperation.

Guyana: Venezuelan claims to western Guyana (the Essequibo) have made reciprocal fishing rights and other commercial exchanges impossible to negotiate.

Japan: Japanese distant-water longline fishermen reported stocks of billfish in the Caribbean off Venezuela during the 1960s. Japanese fishermen were active in the Caribbean during the 1960s and 1970s. The Japanese, however, reported no billfish and swordfish fishing off Venezuela during the early 1990s, but some swordfish catches were reported to the west off neighboring Colombia.[395]

Korea: Korea publishes details on the longline tuna fishery. While no data is available specifically on swordfish, the overall Korean longline fishing pattern is of interest. Korean longliners operated on the Guianas Banks during 1988 and 1989, but do not appear to have conducted significant operations off Venezuela. The Koreans only fished as far west as 60°W which is approximately the border with Guyana. Korean longliners shifted operations in 1990 even more to the east, only venturing as far west as 50°W, and this shift to the east continued in 1991 and 1992, the latest year for which data is available. Korean Atlantic

tuna operations in 1988-92 were all reported at tropical waters between the Guianas/Brazil and West Africa.[396]

Spain: There has been Spanish fishing activity off Venezuela since the 1970s. Details are, however, sketchy at best. One 1978 press report indicated an unidentified Venezuelan company chartered five Spanish fishing boats (from Lequeito) for 6 months. The charter contract included extension provisions if results were profitable.[397] Subsequent report indicated 10 more Spanish vessels from nearby ports were departing for Venezuela.[398] Details are not available on the results, but press reports indicate several fishermen lost money.[399] Despite the losses additional vessels were deployed to Venezuelan waters, including the tuna vessels, *Albacora VII* and *VIII*. Spanish officials promoted a possible bilateral fisheries agreement with Venezuela.[400] A 1979 press report indicated Canary Island fishermen were pursuing possible access arrangements with the Venezuelan officials.[401] Spanish fishermen in 1993 reported no swordfish fishing off Venezuela.[402] Some press reports have suggested extensive Spanish fishing off Venezuela.[403] Such large-scale Spanish fishing, however, appears unlikely. Large numbers of foreign vessels would quickly be observed by Venezuelan fishermen. Venezuelan industry sources deny this report and insist that there are no foreign longliners fishing inside Venezuela's EEZ except for vessels from countries which have bilateral fishing agreements.[404] Venezuelan Government officials also deny the reports of extensive Spanish fishing. Venezuelan officials report that the Government, with few exceptions, does not permit foreign fishing vessels to operate within Venezuela's EEZ unless there is a reciprocity agreement (as in the case with France because Venezuelan vessels fish inside Martinique's territorial waters).[405] Several factors probably explain the rumors of extensive Spanish fishing. First, there has been some Spanish fishing.[406] Two Spanish vessels (*Pro Uno* and *Pro Dos*) did receive Venezuelan permits for operations from 1991-95. The vessels operated from Güiria, an eastern Venezuelan port close to Trinidad. Much of their catch was landed in Trinidad. These operations ceased in 1995 when the vessels were sold to Venezuelan interests and deployed from western Venezuelan ports for non-fishery activities. Second, a third Spanish longliner (*Ibsa V*) received permits for swordfish/tuna operations during 1991-93. The vessel subsequently was withdrawn from the fishery and no information is available on its subsequent disposition. Third, the Venezuelan company Belamar sold its longliners. Some were sold to Caribbean Fleet, a Venezuelan company owned by Spanish interests. Caribbean Fleet experienced legal problems and broke up into three smaller companies. The vessels in 1998 still have Venezuelan flags. One is reportedly based in Trinidad where the company lands its catch. Information on the other vessels is unavailable. Fourth, the Venezuelan Government as recently as 1995 issued fishing permits to two Spanish tuna seiners. Artisanal fishermen and journalists may have confused these vessels with longliners.[407]

Suriname: Suriname permits Venezuelan fishermen to deploy shrimp trawlers and finfish vessels under a series of bilateral agreements. The first was signed in 1977.[408] Venezuela and Surinam signed a 2-year agreement in 1986 allowing continued Venezuelan access to Surinamese grounds. The agreement allowed 100 finfish vessels and 16 shrimp trawlers, a substantial increase, to operate in waters deeper than 30 meters. The primary target was snapper, but tuna, shark, and mackerel was reported in the bycatch. The Venezuelans pay 35 percent of the value of the catch and make payments to the Surinamese Government, as well sell a substantial part of the catch in Suriname.[409] The agreement was renewed again in 1990. The Venezuelans may deploy up to 100 finfish vessels and 18 shrimp trawlers in Surinamese waters. The agreement requires Venezuelan fishermen to land and process at least part of their catch in Suriname. The Surinamese Government protects the country's artisanal fishermen by prohibiting Venezuelan fishermen from entering a coastal zone (waters less than 30 m deep). There are no reciprocal rights for Surinamese fishermen.[410] Under this agreement, the Surinamese limit the maximum number of licenses issued to Venezuelans at 100. Besides setting the price of the licenses, the agreement limits Venezuelan finfish fishermen to using vertical lines. The agreement expired in 1993 and was not renewed again until 1998. In the interim Venezuelan fishermen reportedly continued to fish off Suriname under the same terms as established by the agreement.[411]

Taiwan: Taiwan longliners were active in the 1970s out of the port of Güiria. The Taiwan activity subsequently shifted to Port of Spain in nearby Trinidad.[412] Taiwan longlining appears to be limited in the Caribbean. The authors do not have access to an extensive annual data on Taiwan operations. Information available for 1992, however, shows no longlining within the Caribbean, but there was some activity to the north and east of the Caribbean islands from April through June.[413] Billfish, including swordfish, yields around the islands were only reported in May and June.[414] The bulk of the Taiwan activity is further south off Brazil and Uruguay. Recently, the authors have received reports of unusual Taiwan activity in the Gulf of Paria. A Trinidad source reported on January 28, 1997, that a large number of Taiwan longliners (possibly 14) were unloading to Japanese transport vessels. The activity was conducted

at night and the National Fishery Dock in Port of Spain, now wholly owned by a Taiwan company, was not used. The reason for this activity is unknown. The Trinidad source conjectures that it may be an effort to avoid import and/or dock transfer fees or an examination of the catch as a result of recent ICCAT actions involving Trinidad.[415]

Trinidad: A bilateral fisheries agreement between Venezuela and Trinidad and Tobago was signed in 1977 establishing reciprocal fishing rights. The agreement, which has been renewed several times, gives fishermen of both countries limited access to the each other's EEZ. It also requires that at least 50 percent of the catch be landed in the country where it was taken. While the agreement is reciprocal, it primarily deals with the Trinidadian fishermen catching shrimp in the Venezuelan area of the Gulf of Paria.[416] Disputes between Venezuelan and Trinidadian fishermen are handled by a joint fishing commission, although incidents continue to be an ongoing irritant to bilateral relations. The current agreement expired in December 1993, but was renewed for 2 years.[417] That renewal expired in 1995 and some serious incidents have since occurred leading Trinidad in 1997 to file charges at the Organization of American States (OAS).[418] Observers aboard Venezuelan longliners in recent years have noted some Trinidad longliners operating in Venezuelan waters. Trinidadian operations are especially common off La Blanquilla Island. All of these vessels are operating illegally without Venezuelan permits.[419] The Trinidadian Government estimates that the Venezuelans were taking about $24 million worth of fish in Trinidadian waters annually, although the species breakdown is not available.[420] A new agreement was signed on May 15, 1997, but it still needs to be ratified by the two governments. The provisions are much more restrictive than the previous agreements. While the fishermen from both countries are restricted to their own jurisdictional waters, the agreement does, however, provide for a jointly managed "common area" that straddles the maritime border in the middle of the Gulf of Paria--the Colombus Channel ("Chanel de Colon") which separates the two countries. Previously Trinidad fishermen were allowed to fish along the Venezuelan coast and Venezuelan fishermen off the northern and eastern coast of Trinidad.[421] Trinidad and Venezuela, after 17 years of negotiations, also concluded a treaty in 1990 delimiting their marine boundary.[422]

United States: U.S. swordfish longliners reportedly operated off Venezuela during the late 1980s.[423] Some of their catch was apparently transshipped through Venezuelan ports during 1987-89. These shipments peaked at over 60 t in 1988 (appendix F2d). U.S. fishing in the Caribbean has been minor in recent years, but scattered reports indicate that some activity has occurred in Venezuelan waters. Venezuelan officials reported in 1993 that such operations were illegal because they have not licensed any U.S. vessels.[424]

In 1992, there was some effort south of Puerto Rico, some of it to the north of eastern Venezuela near the Lesser Antilles. In 1993, U.S. Caribbean sets were much reduced. In 1994 fishing south of Puerto Rico resumed and activity increased south of the Lesser Antilles. While most of the effort was off the northern-most islands of the Lesser Antilles, there was some activity west of the southern islands near Grenada and St. Vincent. Some of these sets may have been in or near Venezuelan waters. In 1995 there was somewhat more U.S. activity in the Caribbean. U.S. sets were reported north of western Venezuela, but not in Venezuelan waters because Colombian territory and the Netherlands Antilles limits the Venezuelan 200-mile projection into the Caribbean. There was more U.S. activity off eastern Venezuela, south of Puerto Rico and west of the Lesser Antilles.[425] It is possible that some of these sets were in Venezuelan waters. U.S. Caribbean activity, while still small, intensified in 1996 and moved closer to the Venezuelan coast.[426] Venezuelan sources report that two U.S. swordfish longliners (*Triple Anthony* and *Triple Chass*) in 1996 were fishing off Puerto La Cruz, but ceased operations in mid-1997. Through much of 1997 and 1998 they were idled, docked in a marina at Puerto La Cruz.[427] The owner finally obtained a special license in mid-1998 and reported an excellent trip in July 1998. They primarily targeted yellowfin tuna.[428]

B. Joint ventures

The authors are aware of only a few joint ventures between Venezuelan and foreign companies involving highly migratory species. The joint ventures that have been conducted mostly targeted tunas.

Japan: At least one large Japanese longliner was deployed for tuna off Venezuela from 1959 through 1968. The longliner, *Bosso Marú*, was operated by the Japanese/Venezuelan joint venture Productos Mar, established in 1959.[429]

Korea: Large Korean longliners were deployed from Cumaná during the 1980s and early 1990s. Korean officials, for example, reported 7 tuna longliners were working out of Cumaná in mid-1981.[430] No details are available on the commercial arrangements. The Koreans are believed to have primarily targeted yellowfin tuna, but there was probably a substantial swordfish bycatch. The Koreans have also showed considerable interest in the shark fishery.[431] Some limited information is available on individual companies:

Triopines de Pesca: This Venezuelan-Korean joint venture operated up to 18 large commercial tuna longliners during the 1980s. The vessels, which were registered under the Venezuelan flag, were between 35-55 m long. According to a local observer, these vessels, which operated from the port of Carúpano for about 3 years (from 1987-1990), were gradually withdrawn from the Venezuelan tuna fishery. Disappointing results seem to have prompted the exit of these longliners. The authors do not know what happened to the company, but it appears to have ceased operations. The company's longliners were mostly sold to foreign companies and only two remained in Venezuela.

Atlas Pesquera: Two of the Triopines de Pesca longliners were purchased by another Korean joint venture, Atlas Pesquera, which was based in Carupano. Atlas Pesquera, however, also experienced difficulties and went bankrupt. One of the company's longliners, the *Sam Son 76*, a 37-m vessel which was seized by a bank, was sold to a local company and is now being deployed in the shark gillnet fishery.[432]

Trinkor Pesquera: This Venezuelan-Korean company was originally based in Trinidad and moved to Venezuela in the mid-1980s because of the low labor costs at that time. The debt crisis of the early 1980s caused a massive drop in the bolívar, reducing the cost of Venezuelan operations to foreign companies. The company primarily targeted yellowfin and bigeye tuna for the export market, but by 1989 the company ceased Venezuelan-based operations because they were no longer profitable.[433]

Spain: The authors have recorded a variety of reports about Spanish activity in Venezuela. The Venezuelan Government, according to one Venezuelan journalist, has issued 35 fishing permits to Spanish longliners through special agreements which require that the Spanish companies operating the vessels form joint ventures with local companies. The authors have not been able to confirm the issuance of these permits or subsequent formation of any large number of joint ventures. The journalistic reports appear highly exaggerated. The authors have confirmed that a permit was issued in 1991 for two Spanish longliners (*Pro Uno* and *Pro Dos*) to target swordfish. The vessels were based in Güiria, a Gulf of Paria port, and conducted fishing operations in Venezuelan waters.[434] The vessels by 1995 had been redeployed and no longer operate with Venezuelan permits.[435] Unconfirmed reports suggest they may be operating out of Trinidad. There also seems to be at least one active Spanish joint venture. The Venezuelan company Belamar sold its longliners; some were sold to Spanish interests including Spanish nationals resident in Venezuela. The company involved experienced legal problems and shifted its operations to Trinidad. The vessels in 1998 still have Venezuelan flags and fished in Venezuelan waters, but are based in Trinidad where they land their catch. The vessels have been divided among the investors.

Taiwan: The authors know of two joint ventures with Taiwan interests.

Lisneros project: The Venezuelan Government approved a Taiwan-Venezuela tuna longline joint venture in 1981. Through this joint venture, the Venezuelan Lisneros group was to establish a joint venture with a Taiwan fishing company. According to the proposal the Taiwan vessels would be allowed to operate six longliners within Venezuela's 200-mile EEZ. The Taiwan fishermen were to pay $125 for each ton of fish caught by the vessels. Also, the Taiwan vessels were to be allowed to use any port in Venezuela and to buy fuel at domestic Venezuelan prices. The catches were supposed to be available for sale on the international market as well as on the domestic market in Venezuela. The contract was supposed to last a minimum of three and a maximum of 5 years. The authors do not know, however, if this joint venture was ever formally constituted and conducted operations.

Pesquera de la Isla: This Guanta-based company which was established in 1990 is involved in fishing and exporting. The company is a joint venture of Venezuelan and Taiwan interests. It has five 40-t steel-hulled longliners built in Taiwan: The *Chimana Chica*, *Chimana Este*, *Chimana Grande*, *Guanta 17*, and the *Guanta 91*, each measuring 22 meters. These vessels are manned by a crew of 15 fishermen and are equipped with 1,500-hook longlines. The company's primary target species is yellowfin tuna, which is mainly taken in the Caribbean and exported fresh to the United States. Pesquera de la Isla generally catches and exports about 300 t of tuna per year. Company officials estimate the catch composition as 60 percent tuna, 20 percent sharks, and 20 percent other species. Swordfish is not normally taken by the company's longliners, although some incidental catches occur when setting for albacore.[436]

XVII. Enforcement

Occasional fishing incidents are reported with neighboring countries. Some Venezuelan fishing boats have been seized by Caribbean island countries as well as Guyana. The most serious difficulties are reported with Colombia and Trinidad and primarily involve shrimp trawlers. Venezuelan officials in the early 1990s reported seizing about 20 foreign vessels.[437] No details are available on the nationality or type of vessels. The maximum fine under Venezuelan law is about $100 (Bs/10,000), but the confiscation of the catch and lost fishing time are much more costly. The authors do not have a complete list of incidents, but the selected list of incidents detailed below indicates the enforcement effort conducted by Venezuelan authorities and the experience of Venezuelan fishermen off other countries.

Colombia: Reports of vessel seizures regularly appear in the Colombian and Venezuelan press, primarily involving shrimp trawlers.[438] Some tuna vessels are also involved, such as the Colombian seizure of the Venezuelan tuna seiner *Las Piedras* in 1982. The problem is complicated by the failure of the two countries to reach agreement on the marine boundary. (See Government Policy: "Limits".) Fisheries enforcement along the Colombian border is further complicated by many other issues, including illegal immigration, vessel hijacking and killings, and drug smuggling. The incidents can be serious. Various encounters involving gun fire and mortalities are reported along the Arauca River.[439] Two Colombian fishermen as well as several Venezuelans were killed in 1988 at El Amparo, a fishing village. The circumstances of this incident have never been fully revealed. Three more Colombians were killed along the border.[440] Both patrol boats and helicopters have fired on fishermen.[441] The Colombian Vikingos company complained during September 1995, that one of its vessels (*Redes 9*) was hit 31 times by fire from a Venezuelan patrol boat while fishing in Colombian waters. Venezuelan authorities denied the charge, insisting that the boat was in Venezuelan waters and that they only fired warning shots.[442]

France: Venezuelan officials in 1986 seized several French fishing vessels which were targeting tuna. The Venezuelans insisted that the French fishermen were claiming to be sport fishermen, but in reality were conducting commercial operations.[443] The French patrol boat *La Fougueuse* seized the 45-m Venezuelan fishing vessel *Kubagua 1* on November 4, 1987, for operating along the coast of French Guiana without a French permit. The 20 t of shark aboard was auctioned off after the boat was brought to Cayenne. French officials were considering a fine of up to $50,000.[444]

Grenada: Grenada has seized some Venezuelan fishing vessels. Prime Minister Maurice Bishop complained of extensive Venezuelan fishing off Grenada in 1981.[445] Grenadian authorities seized the tuna vessel *Linda Rosa* on August 30, 1981. Unconfirmed reports suggest that Venezuelan officials have intervened privately to convince the Grenadian officials to release the fishermen without legal action.

Guyana: Fishery relations with Guyana remain difficult, as in most areas, because of the continuing Essequibo dispute which overshadows economic and commercial matters. Because of these differences, small seemingly inconsequential enforcement actions like fishing vessel seizures have the potential of becoming serious incidents. Guyanese fishermen arrested in 1981, for example, were accused of espionage.[446] The Guyanese Government has seized Venezuelan fishing vessels as they passed through disputed waters on the way to and from fishing grounds off Suriname and French Guiana. Venezuelan fishermen complain that they must extend voyages up to 40 hours to avoid the disputed waters.[447]

Japan: Venezuelan authorities seized two Japanese fishing (type unknown) vessels (*Caribbean Star 8* and *23*) in October 1985. The vessels were working for a Colombian company (Consalvi) and claim to have been in Colombian waters when seized.[448]

Korea: Venezuelan fishermen reported in 1985 that seven Korean longliners (*Kao Ya 1, 2, 3, 6, 21,* and *23*) were fishing off the Paraguaná Peninsula, but complained that the authorities were taking no action against them.[449] The Koreans were reportedly transshipping their catch through Aruba. The authors know of no resulting seizures. The National Guard did seize the *Sam Song*, working with Triopines de Pesca. Authorities reported there were almost no Venezuelan crew members and the vessel paperwork was not in order.[450]

Netherlands Antilles: Venezuelan and Netherlands Antilles fishermen have traditionally operated in each other's waters for years. Officials from both countries apparently see no need to address the complications that would arise from vessel seizures and bilateral negotiations. The authors have not noted any formal seizures. An irate Aruban fishermen, upset over Venezuelan fishing and without authorization from the Netherlands Antilles Government, reportedly seized some Venezuelan fishing boats in 1988 on his own initiative. For a brief period the Venezuela National Guard harassed some Netherlands Antilles fishermen operating along the Venezuelan coast in retaliation. This was, however, an aberration to the generally more low-key approach officials have preferred.

Panama: Venezuelan authorities seized a Panamanian fishing (type unknown) vessel (*Makandra Star 15*) in October 1985. The vessels were working for a Colombian company (Consalvi) and claim to have been in Colombian waters when seized.[451]

Suriname: Venezuela and Suriname currently have a bilateral fisheries agreement. There have been a few seizures, especially before a bilateral agreement was negotiated. Surinamese officials seized several vessels (types unknown) in early 1981. Interestingly some were Venezuelan-owned and Spanish-flagged and others were Spanish-owned and Venezuelan-flagged vessels. Some of the Venezuelan-flagged vessels had all-Korean crews.[452] Surinamese officials seized another four to six (accounts vary) trawlers in June 1981, each with a crew of 12 men.[453] Surinamese authorities initially tried to charge the crew members with criminal violations, seize the catch, and confiscate, the vessels. A special Venezuelan representative negotiated the release of the boats upon payment of fines rumored to have totaled $2.5 million.[454] Suriname later seized 3 Venezuelan fishing vessels and held them for 2 months in 1981. Fines totaling $116,000 were assessed.[455]

Trinidad: Reports of vessel boardings and seizures regularly appear in the Venezuelan and Trinidadian press.[456] Venezuelan authorities in one celebrated incident on May 14, 1979, seized 27 Trinidadian boats. In some incidents officials appear to have conducted reprisal seizures and arrests.[457] One Venezuelan patrol boat opened fire on 11 Trinidadian artisanal fishing boats in 1981.[458] For several years, fishery relations between the two countries were regularized by a fishing agreement between Trinidad and Venezuela which helped to reduce, but not eliminate, such incidents. A certain number of Venezuelan vessels targeting snapper and grouper were allowed to fish in the waters north and east of Trinidad and artisanal Trinidadian fishermen to fish for shrimp in Venezuelan waters (Gulf of Paria) close to the Orinoco Delta. Conflicts arose whenever more than the number of vessels permitted were captured by either country or operated in closed areas. Other issues such as drug smuggling further complicate the relationship.[459] The Trinidadian fishermen complain of very rough treatment.[460] The incidents can be sometimes very serious. Most are related to the Trinidadian shrimp fishing in the Gulf of Paria.[461] The expiration of Trinidad's bilateral agreement with Venezuela in 1995 has meant more incidents between the two countries, primarily Trinidadian artisanal shrimp fishermen being seized by the Venezuelan Guardia Nacional. One particularly serious incident occurred on May 21, 1997, near Soldado Rock in which shots were fired and four Trinidadian boats seized after a Trinidadian Coast Guard vessel had departed the area. As a result of this incident, Trinidadian officials decided to submit the dispute to the Organization of American States.[462] Press reports indicate 18 fishermen and 4 small boats from the southern Trinidad villages of Moruga and Icacos were arrested on September 2, 1997, by the Guardia Nacional. Several other vessels eluded the Venezuelan patrol boat and returned to Trinidad. The Trinidadians were fishing in Venezuelan waters near the mouth of the Orinoco River, which is only a few km from Trinidad waters. Shots were fired by the Venezuelan patrol boats in the incident.[463] Some Trinidadian fishermen are hopeful that the new 1997 agreement with Venezuela will solve such problems, but this is unlikely as it does not open coastal Venezuelan grounds to the Trinidadian fishermen.

United States: Venezuela has seized several U.S. fishing boats. A number of tuna seiners and other vessels were seized during 1979-80: *Apollo II* (May 1979), *Virgo V* (July 12, 1979), *Sea Royal* (October 1979), and *Sandra C* (October 7, 1980).[464] Several U.S. longline fishermen operated extensively in Venezuelan waters during 1986. The U.S. activity was sharply criticized in the Venezuelan media. The U.S. and other foreign fishermen were charged with "desiring to convert the Caribbean into a great marine desert."[465] Some of the U.S. fishermen (the Merritt group operating the *Alice Mary* and *No Problem*) attempted to get U.S. licenses and operate out of Pampatar on Margarita Island.[466] The possibility of U.S. fishing, however, proved so politically controversial that they were ordered to leave by the Ministerio de Transporte y Communicaciones (MTC).[467] Venezuelan officials on February 26, 1986, seized two U.S. fishing vessels (*Bright Star* and *Eagle 8*) fishing near Aves Island without a license.[468] Two other U.S. vessels (*Eyelander* and *Eagle Eye*) were subsequently seized on February 28, about 50 miles south of Aves Island, with 3.5 t of fish aboard. These two vessels were released March 12, 1986, after paying fines of $520 each.[469] Additional longline seizures were reported in December 1986.

XVII. Future Trends

The Venezuelan swordfish fishery is unlikely to expand significantly in the near future. The primary constraining factor is the limited availability of the resource. The size of the swordfish population in the southern Caribbean probably precludes any major expansion. Market price trends in 1998 are currently a significant limiting factor. Market trends can change in a short period of time and future prices could provide a strong incentive for the fishermen to expand effort on swordfish. The fishermen have the capability of expanding the fishery if prices increase. They have developed considerable expertise and technical capability as well as contacts with foreign fishermen to acquire needed new technology. While significantly increasing Venezuelan effort at this time is unlikely, the notable tendency of the Venezuelan fishermen to land juvenile swordfish is a matter of concern--especially if future landings increase.

Venezuelan biologists believe there is only a limited availability of swordfish off Venezuela and the southern Caribbean in general. The general feeling is that the catch can not be significantly expanded. The authors, however, know of no detailed scientific population study off Venezuela. The experience of fishermen in recent years suggests that the population probably will not support any significant expansion of the fishery. While fishery-based assessments are hardly definite, given the level of effort by Venezuelan and foreign fishermen in recent years--the results from the fishery are important evidence.

The relatively limited availability of swordfish in Venezuelan waters, and in the southern Caribbean generally, suggests it is unlikely that there will be an significant increase in the number of Venezuelan vessels targeting swordfish. Venezuelan sources also report that longline fishermen currently targeting swordfish appear to have an unwritten commitment from the Government not to approve new swordfish permits in the longline fishery. The number of active vessels targeting swordfish since 1990 has been no more than 10 vessels within any given year and this is unlikely to change in the near future.

Some Venezuelan observers caution that limited catches may reflect current fishing techniques. One observer believes that the domestic fishermen may be setting their gear at shallow depths and thus catching only small individuals. The Venezuelan fleet targeting tuna makes more shallow sets than those targeting swordfish specifically. Thus the great bulk of Venezuelan longline sets are currently at shallow depths. This means that there is relatively little information available from the fishery on deep-water sets.

One of the factors limiting the Venezuelan fishery is that Venezuelan waters may be a nursing area for swordfish in the western central Atlantic. An increasing body of scientific data suggests that the southern Caribbean is an important nursery ground for swordfish. This would appear to explain why most of the catch consists of under-size individuals which are not export-grade in the international market. Venezuela has not implemented the ICCAT minimun size regulations. Most of the non-export grade swordfish, however, are marketable. They are sold in the domestic market where they have reportedly been well received. Swordfish has been welcomed as a profitable new product by fish merchants. Venezuela appears to consume more of its swordfish catch domestically than any other Latin American country with a directed fishery. The impact on the population of removing large numbers of juveniles is not known.

An important factor affecting effort on swordfish is prices. The sharply lower prices in 1998 are causing fishermen to withdraw from the fishery. The reason for the price declines are not fully understood, but probably involve the deteriorating economic conditions in Asia, environmentally motivated consumer boycotts in the United States, and other factors. As long as prices continue at 1998 levels, there is unlikely to be a significant expansion of the fishing. Fishermen in 1998 have substantially reduced effort and redirected it to other species--primarily tunas. This appears to be the major reason for the substantial decline in export shipments during 1998.

One unstudied aspect of the Venezuelan swordfish fishery is the potential bycatch problem. Virtually no information is available on the interactions with non-commercial species. Scattered reports suggest that the interactions with marine mammals and seabirds are not severe, but there may be substantial interactions with turtles that merit investigation.

* * * *

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* * * *

Note: This chapter was designed and formatted by Martha Graham and Michael Doe.

Ms. Graham, who also assisted in the research for this publication, has graduated from the University of Maryland with a degree in Government and Politics, after which time she studied Spanish and taught English in Bogotá, Colombia. She is currently employed by National Institute of Standards and Technology. She hopes to publish her comedic adventure stories and continue free-lance writing.

Mr. Doe, who also prepared many of the graphics, worked with NMFS during the summer of 1998 as part of the District of Colombia Metropolitan Consortium for Minorities in Engineering (METCON). He is currently a senior at Laurel High School and plans to become a neurologist and an international soccer player.

ENDNOTES

SECTION I. (General Background)

1. Good reviews of the fishing industry during the 1980s were prepared by the U.S. Embassy. See for example Adam M. Shub, "1992 Venezuela fisheries report," *U.S. Embassy Report: SRP-404*, May 26, 1993.

2. U.S. Embassy, Caracas, December 13, 1991.

3. Ministerio de Agricultura y Cría as cited by the U.S. Embassy, Caracas, May 26, 1993. The trawler fleet increased significantly during the 1980s from 272 vessels in 1985 to 433 in 1989, about evenly dispersed between the eastern and western fisheries. An excellent review of the Venezuelan trawl fishery and fleet is available in Luis Marcano, "Análisis de la situación de la industria de la pesca de arrastre durante el periodo, 1985-1989," *Resultados de Talleres Sobre la Pesca en Venezuela,* (Ministerio de Agricultura y Cría: Caracas, 1990), pp.25-52.

4. Estimates vary widely on the number of snapper/grouper vessels. Ministerio de Agricultura y Cría (MAC) sources estimate a fleet of about 240 boats. Ministerio de Agricultura y Cría as cited by the U.S. Embassy, Caracas, May 26, 1993. Another observer estimates that about 550-600 boats participate in the fishery. Dr. Joaquín Buitrago, Director, Estación de Investigaciones de Margarita (EDIMAR), Fundación La Salle de Ciencias Naturales, personal communications, November 10, 1993.

5. For details see Dennis Weidner, "Venezuelan tuna industry," *International Fishery Reports*, (IFR-93/17R), May 7, 1993.

6. U.S. Embassy, Caracas, May 26, 1993.

7. Details on the Venezuelan tuna fishery are available in Dennis Weidner, "Venezuelan tuna fishery," *International Fisheries Report* (IFR-93/17R), May 7, 1993.

8. L.W. González and D. Gaertner, "Análisis preliminar de las campañas de pesca exploratoria del pez espada en la ZEE de Venezuela," *ICCAT Collective Volume of Scientific Papers*, Vol. XXXIX No. 3, SCRS 91/68, (ICCAT: Madrid, Spain, 1993), 643p.

SECTION II. (Species)

9. For details see the Colombian chapter of this report. For organizational simplicity Colombia, including the country's Caribbean coast, was addressed along with the other Pacific coast South American countries in Volume IV, Part A, Section 1, Segment A.

10. F. Arocha and L. Marcano. "Population structure of swordfish, *Xiphias gladius*, in Venezuela and adjacent waters," *Proceedings 47th Annual Meeting, Gulf and Caribbean Fisheries Institute*, November, 1994, Margarita Island, Venezuela.

11. The downwelling occurs as a result of the coastal upwelling, the nutrients brought to the warm surface layer support plankton blooms which enrich the downwelled water. This appears to support stocks that the swordfish prey on either directly or indirectly. The precise oceanic mechanism and the relation to swordfish, however, have not yet been assessed in detail off Venezuela.

12. Arocha, *op. cit.*, January 5, 1997.

13. Freddy Arocha, Universidad de Oriente. Personal communications, January 5, 1997.

14. Unfortunately the authors know of no published assessment of the Korean and Japanese operations.

15. R. Jaen and M. Jaen. *Migraciones de los Istioforidos en el Caribe. Un estudio de diez años (1983-1992)* (Caracas: 1994), 82p.

16. Arocha, *op. cit.*, January 5, 1997.

17. La Jolla Charters, *op. cit.*, May 11, 1998 and Dave Ferrell, "In broad daylight," *Marlin*, January 1999, pp. 56-59.

18. H. Yegres, J. Alio, L. Marcano, J. Marcano. "Analisis preliminar de la pesqueria y biologia de tiburones en Venezuela," *ICCAT, Col. Vol. Sci. Pap.* Vol.45 (3), 1996, pp. 309-315.

19. Three Venezuelan longliners targeted shark in 1997. Two were 27-29 m and one was 35 meters. The vessels were based in the eastern ports of Cumaná (2) and Carupano (1). They fish fairly distant grounds off northern Brazil, Nicaragua (Caribbean coast), and occasionally the slopes of the Venezuelan offshore islands. The sharks are finned and the trunks marketed fresh. The species involved are the same ones taken as a bycatch in the swordfish fishery. Arocha, *op. cit.*, January 5, 1997.

20. ICCAT, "Background document for the 1994 Atlantic Swordfish stock assessment," *ICCAT, Col. Vol. Sci. Pap.*, Vol. 44(3), 1995, pp. 34-108.

21. Arocha hopes to have this data ready for the October 1998 ICCAT meeting. Arocha, *op. cit.*, January 5, 1997.

22. There are active swordfish fisheries conducted off Europe and West Africa. See the Spanish chapter of this report for details. Spanish fishery officials and fishermen, however, are not conducting such an active tagging program.

23. Christopher D. Jones, David S. Rosenthal, Thomas L. Jackson, Michael T. Judge, and Eric D. Prince, "Cooperative Tagging Center Annual Newsletter: 1996," *NOAA Technical Memorandum* NMFS-SEFSC-391, September, 1996, pp. 6-7.

24. C. Jones, D. Rosenthal, T. Jackson, M. Judge and E. Prince, "Cooperative Tagging Center Newsletter, 1996," *NOAA Tech. Mem.* NMFS-SEFSC-391, 24p.

25. For details on genetic work on Pacific fish see the Chilean chapter of this report.

26. B. Alvarado, J. Mejuto, and B. Ely. "Global population structure of the swordfish (*Xiphias gladius L.*) as revealed by the analysis of the mitochondrial control region," *ICCAT, Col.Vol.Sci.Pap.* Vol. 44 (3), 1994, pp. 206-216.

27. Arocha, *op. cit.*, January 5, 1997.

28. F. Arocha and L. Marcano. "Population structure of swordfish, *Xiphias gladius*, in Venezuela and adjacent waters," *Proceedings 47th annual meeting, GCFI,* November 1994, Margarita Island, Venezuela.

29. F. Arocha, "The reproductive dynamics of swordfish *Xiphias gladius L.* and management implications in the northwestern Atlantic. Ph.D. Dissertation. University of Miami, 1997, 384p.

30. Jones *et. al.*, "Cooperative Tagging Center ..., 1996," p. 6.

31. C. Brown, "Preliminary examination of size and location data for U.S. tagged and recaptured swordfish," *ICCAT, Col. Vol. Sci. Pap.*, Vol. 44 (3), 1995, pp. 217-224.

32. F. Arocha, "The reproductive dynamics of swordfish Xiphias gladius L. and management implications in the northwestern Atlantic," Ph.D. Dissertation, University of Miami, 1997, p. 384.

33. F. Arocha, recently compiled data and on-going research.

34. J. Mejuto, J. M. de la Serna, and B. Garcia, "An overview of the sex ratio at size of the swordfish (*Xiphias gladius*) around the world: similarity between different strata," *ICCAT, Col. Vol. Sci. Pap.*, Vol. 44 (3), 1995, pp. 197-205.

35. F. Arocha, "The reproductive dynamics of swordfish Xiphias gladius L. and management implications in the northwestern Atlantic," Ph.D. Dissertation. University of Miami, 1997, p. 384.

36. Arocha, "The reproductive dynamics ...," *op. cit.*

37. Arocha and Marcano, "Population structure ...," *op. cit.*

38. Freddy Arocha, personal communications, September 15, 1997.

39. F. Arocha, D. Lee, and J. Grubich. "Observation on sex ratio, maturity stages, and fecundity of swordfish, *Xiphias gladius*, in the Northwest Atlantic Ocean," *ICCAT, Col. Vol. Sci. Pap.*, Vol. 42 (1), 1994, pp. 309-318 and Arocha and Marcano, "Population structure ...," *op. cit.*

40. Arocha, "The reproductive dynamics ...." *op. cit.*

41. Arocha, "The reproductive dynamics ...," *op. cit.* and G. Markle, "Distribution of larval swordfish in the Northwest Atlantic Ocean," *NOAA Tech. Rep.* NMFS-SSRF-675, Part 2. pp. 252-260. Another excellent study is John Jeffrey Govoni, Bruce W. Stender, and Oleg Pashuk, "Distribution of larval swordfish, *Xiphias gladius*, and probable spawning off the southeastern United States," paper submitted to *Fisheries Bulletin*. Advanced copy provided to the authors on October 25, 1998. Govoni, Stender, and Pashuk found the Gulf of Mexico and U.S. southeastern Atlantic coast to be an especially important spawning area based on the presence of larvae.

42. Barreto, *et.al.*, "Alimentación de pez espada...," *op. cit.*, pp. 337-342 and F. Arocha and D. Lee, "Preliminary observations on sex ratio and maturity stages of swordfish, *Xiphias gladius* in the northwest Atlantic," *ICCAT Collective Volume of Scientific Papers*, Vol. XL, No. 1 (ICCAT: Madrid, Spain, 1993), pp. 425-432.

43. María A. Barreto C., L. Marcano, J. Alió, X. Gutiérrez, and A. Zerpa, "Alimentación de pez espada, *Xiphias gladius*, en el area del Caribe Venezolano," SCRS/95/65, pp. 1-12.

44. The primary seasonal patterns in Venezuela are the dry and rainy seasons. As Venezuela is located near the equator the normal summer and winter temperature variations as experienced in more northern and southern latitudes while not as extreme, are still prevalent.

45. González and D. Gaertner, "Análisis preliminar...," *op. cit.*, *ICCAT Coll. Vol. Sci. Pap.*, (SCRS/91) in press as cited in J.J. Alió M., L.A. Marcano, H. Salazar, X. Gutiérrez, and O. Rodriguez, "Notas sobre la estructura poblacional del pez espada, *Xiphias gladius*, en Venezuela," *ICCAT Collective Volume of Scientific Papers*, Vol. XL, No. 1 (ICCAT: Madrid, Spain, 1993), pp. 323. The tuna fishermen report that about 95 percent of their swordfish catch is taken during the October-March period (appendix D2b).

46. González and D. Gaertner, "Análisis preliminar...," *op. cit.*, *ICCAT Coll. Vol. Sci. Pap.*, SCRS/91, pp. 645.

47. Arocha, *op. cit.*, September 15, 1997.

48. Arocha, *op. cit.*, January 20, 1998.

49. ICCAT, "Report of the swordfish assessment workshop," (April 1986, Miami, Florida) *ICCAT Collective Scientific Papers*, Vol. XXVI, SCRS/86/25, (ICCAT: Madrid, Spain, 1987), pp. 339-395.

50. Arcocha, *op. cit.*, September 15, 1997.

51. Y. Uozumi, "Preliminary analysis on the distribution of sailfish and longbill spearfish in the Atlantic Ocean in 1993 based on the logbook data," *ICCAT Collective Volume of Scientific Papers* (ICCAT: Madrid, Spain, 1995), p. 29.

52. L.A. Marcano, J.J. Alió, X. Gutiérrez, R.A. Guzmán, "Análisis preliminar de la pesquería artesanal de peces de pico en la región nororiental de Venezuela," *ICCAT, Collective Volume of Scientific Papers*, Vol XLII (2), SCRS/93/78 (ICCAT: Madrid, 1994), p. 322.

53. Arocha, *op. cit.*, January 20, 1998.

54. Marcano *et. al.*, "Análisis preliminar ...," *op. cit.*, p. 321.

55. L. Marcano, R. Guzman. J. Marcano, G. Gomez, and J. Alio, "Pesquerías de peces de pico en Venezuela," *Proceedings of the 47th Annual Meeting of the Gulf and Caribbean Fisheries Institute*, Margarita Island, November, 1994, 47p.

56. Marcano *et. al.*, "Análisis preliminar ...," *op. cit.*, pp. 322 and 326.

57. Marcano *et. al.*, "Pesquerías de peces de pico en Venezuela," *op. cit.*

58. Arocha, *op. cit.*, January 20, 1998.

59. Marcano *et. al.*, "Análisis preliminar ...," *op. cit.*, pp. 322 and 326.

60. Arocha, *op. cit.*, January 20, 1997.

61. Marcano *et. al.*, "Pesquerías de peces de pico en Venezuela," *op. cit.*

62. Arocha, *op. cit.*, January 20, 1997.

63. Marcano *et. al.*, "Pesquerías de peces de pico en Venezuela," *op. cit.*

64. Arocha, *op. cit.*, January 20, 1998.

65. Arocha, *op. cit.*, recently compiled data and ongoing research. Also see Alió, *et.al.*, "Notas ...," *op. cit.*, p. 324.

SECTION III. (Fishing Grounds)

66. F. Cervigón, *Las Dependencias Federales* (Editorial Ex Libris, Caracas: 1992), 156p.

67. J. Fenwick, *International Profiles on Marine Scientific Research* (WHOI Sea Grant Program: 1992), 202p.

68. "Reports on surveys with R/V Dr. Fridtjof Nansen," *Surveys of the Fish Resources in the Shelf Areas between Suriname and Colombia* (Institute of Marine Research, Bergen, 1988), p. 135.

69. "Reports on surveys with R/V Dr. Fridtjof Nansen," *op. cit.*

70. P. Richardson, "Giant eddies of South Atlantic water invade the north," *Oceanus*, 1994, 37(1):19-21]),

71. "Reports on surveys with R/V Dr. Fridtjof Nansen, *Surveys of the Fish Resources in the shelf areas between Suriname and Colombia* (Institute of Marine Research: Bergen, 1988), p. 135.

72. Matthias Tomczak and J. Stuart Godfrey, *Regional Oceanography: An Introduction* (Pergamon: London, 1994), p. 314.

73. "Reports on surveys with R/V Dr. Fridtjof Nansen," *Surveys of the Fish Resources in the shelf areas between Suriname and Colombia, op. cit.*

74. "Reports on surveys with R/V Dr. Fridtjof Nansen," *Surveys of the fish resources in the shelf areas between Suriname and Colombia, op. cit.*

75. "Reports on surveys with R/V Dr. Fridtjof Nansen," *Surveys of the Fish Resources in the shelf areas between Suriname and Colombia, op. cit.*

76. Tomczak and Godfrey, *Regional Geography, op. cit.*, p. 311.

77. Freddy Arocha, personal communications, February 11, 1997.

78. F. Cervigón, *Las Dependencias Federales* (Editorial ExLibris: Caracas, 1992), p 146.

79. H. Gines, *Carta Pesquera de Venezuela* (Fundación La Salle de Ciencias Naturales: Caracas, 1992), p. 226.

80. Guillermo Podesta, "Aspects of swordfish oceanography in the Atlantic," Second International Pacific Symposium, Turtle Bay, Hawaii, March 4, 1997.

81. Dr. Arocha indicates that he has seen no reports describing swordfish catches west of the Paranaguá Peninsula. Freddy Arocha, Universidad del Oriente, personal communications, February 4, 1997.

82. Marcano, *et. al.*, "Análisis preliminar...," *op. cit.*, p. 319.

83. Barreto, *et. al.*, *op. cit.*, figure 1.

84. Alió, J.J., L.A. Marcano, X. Gutiérrez, and R. Fontiveros, "Descriptive analysis of the artisanal fishery of billfish in the central coast of Venezuela," *ICCAT Coll. Vol. Sci. Pap.*, Vol XLI, SCRS/94, (ICCAT: Madrid, 1994) p. 253.

85. Marcano, *et. al.*, "Análisis preliminar....," *op. cit.*, p. 321, and Jesús Segura, Biological Technician, Departamento de Bilogia Pesquera, Estación de Investigaciones Marinas (EDIMAR), personal communications, September 13, 1996.

86. This fleet fishes between Margarita Island and Trinidad, but the greatest effort is off French Guiana and Suriname. José Alió, FONAIAP, personal communications, August 6, 1996. Details on licensing regulations are available in Weidner and Hall, "Latin America," *op. cit.*. Segura, *op. cit.*, September 13, 1996.

87. At least one source indicates some effort in the Pacific, but the authors believe that this was unusual and may be a confused reference to the seiners which do operate extensively in the Pacific. "National report of Venezuela," 1987 *ICCAT Report*, 1987, Part II, (ICCAT: Madrid, Spain, 1988), p. 297.

88. Barreto, *et. al.*, "Alimentación del pez espada...," *op. cit*, figure 1.

SECTION IV. (Fleet)

89. For details see Weidner, "Venezuelan tuna fishery," *op. cit.*

90. The actual size of the Venezuelan tuna fleet may be larger. Unconfirmed reports suggest some Venezuelan investors have registered their vessels in other countries. U.S. Embassy, Caracas, September 7, 1990. This is probably to obtain access to costal waters of the important ETP grounds, but may also be an attempt to evade Venezuelan fiscal and fishing regulations. Actual data on Venezuelan ownership of vessels registered in other countries is not available.

91. Argentine fishermen operate some longliners (mostly for domestic species) capable of distant-water operations, but many of the larger vessels are operated by joint ventures. See the Argentine chapter of this report. Chilean fishermen currently operate a few longliners targeting toothfish and an even smaller number targeting swordfish in the south Atlantic. The Cuban distant-water fishing company (FLOCUBA) acquired a major fleet of distant-water trawlers during the late 1970s, but sharply curtailed distant-water operations in 1991 because of the country's fuel crisis. Mexico acquired a large tuna purse seine fleet during the 1980s capable of distant-water operations, but has deployed it mostly in ETP operations in domestic and Central American waters.

92. *IATTC*, Quarterly Report, First Quarter, 1996. p. 29.

93. For details see Weidner, "Venezuelan tuna fishery, *op. cit.*

94. Gaertner and Browder, *op. cit.*, p.4.

95. José Alió, FONAIAP, personal communications, August 15, 1996.

96. Rolf Juhl, NMFS, memorandum, March 25, 1988.

97. The category is a standard ICCAT size range and does not mean that any Venezuelan vessels were as large as 150 tons.

98. Alió, *op. cit.*, August 15, 1996.

99. P.M. Miyake and E.P. Holzapfel, "Special ICCAT project to assist Venezuela in developing biological sampling system for commercial tuna fishery," ICCAT SCRS 86/15, p. 1.

100. Antonio Ginez, "Venezuelan fisheries," The report of the data preparation meeting for southwest Atlantic tuna and tuna-like fisheries, July 1-7, 1992, Recife, Pernambuco, Brazil, ICCAT document COM-SCRS/92/15.

101. Miyake and Hozapfel, "Special ICCAT...," *op. cit.*, p. 1. The joint operations are discussed in more detail in Medina-Gaertner and Gaertner, "Factores ambientales ..." *op. cit.*

102. D. Gaertner and J. Browder, "Review of various national fisheries on yellowfin tuna in the western Atlantic," *Collected Volumes of ICCAT Papers*, Vol. 38, (ICCAT: Madrid, 1992), p. 3.

103. U.K. Department of Trade and Industry, *op. cit.*, p. 27.

104. Miyake and Holzapfel, *op. cit.*, p. 2. Current information on the current involvement is unavailable.

105. A good historical review is available in T. Mihara and R.C. Griffiths, "La flota atunera venezolana," *Informe Técnico*, No. 26, (Caracas: MAC/PNUD/FAO, 1971). Another good historical review is available in C.E. Giménez, *El Atún: Base Cierta de una Actividad Industrial*, (Italgráfica, S.R.L.: Caracas, Venezuela), p. 160.

106. The lack of good government data probably reflects the lack of priority officials give to fisheries data collection generally and data for ICCAT and the tuna/swordfish fishery specifically. Some administrations have been more interested than others in collecting needed fleet data. Many administrations have assigned such data collection low priority. As a result, when the time for reporting comes, the assignment is apparently handed to a junior employee who knows nothing about the subject. He gathers whatever data is readily available and submits it, with little review by senior officials. Errors are occasionally noted and corrected, but some errors have not been noted and carried as official data for years. In recent years data has simply not been submitted. As a result, fleet and catch data reported by SARPA (previously DGSPA), FONAIAP, ICCAT, FAO, and other sources often contain striking discrepancies. Collecting accurate data is no easy undertaking in this fishery. Government officials have no system in place to know which of the registered vessels are actually fishing in any given year and if so for what species. The swordfish fishery is a very volatile fishery. Vessels are frequently bought and sold and thus ownership is in a constant flux. Target species and operations can change radically from year to year as well as between seasons. Thus when officials need accurate fleet data, there is no system established to do so. In addition, the accuracy of

the catch data is further compromised by the tendency of the fishermen to under-report their catch. Anonymous source, personal communications, October 21, 1997.

107. Unlike many other countries, there are no tax consequences in Venezuela as a result of increased catches. Agriculture, husbandry, and fishery activities in Venezuela are tax exempt. In recent years, the Government has proposed various taxes and fees, but has not yet done so. The Government continues to subsidize fuel. One observer speculates that the fishermen fear future taxes or government actions to restrict effort if they report their actual catch. Arocha, *op. cit.*, March 9, 1998.

108. Giménez, "El Atún: Base...," *op. cit.*, p. 87.

109. Marcano, *op. cit.*, August 12, 1996.

110. Ginez, op. cit. Thirteen longliners, for example, were deployed for shark and about 90 percent of their catch is shark. This fishery thus produces about 4 percent of the country's overall fish catch. In addition about 3,600 artisanal craft take small quantities of shark. Many have begun to supplemental traditional gear with small longlines or small gillnets (less than 1.5 km). "General discussion of shark fisheries," the report of the data preparation meeting for southwest Atlantic tuna and tuna-like fisheries, July 1-7, 1992, Recife, Pernambuco, Brazil, ICCAT document COM-SCRS/92/15.

111. Arocha, *op. cit.*

112. Alió, *op. cit.*, August 6, 1996.

113. Alió, *op. cit.*, August 6, 1996.

114. Some local observers report these vessels as artisanal (based on their annual catch levels), however, other observers consider these vessels to be commercial, based on the modern devices used on board, such as navigational gear like Global Positioning System (GPS) receivers.

115. SARPA, *La Actividad Pesquera-Acuicola en Venezuela* (SARPA: Caracas, 1996), 105p.

116. Giménez, "El atún: Base...'"*op. cit.*, p. 88p.

117. Pastor López, fisheries journalist, personal communications, August 22, 1996.

118. Jeremy Mendoza, Instituto Oceanográfico, personal communications, August 11, 1997.

119. Gaertner and Browder, *op. cit.*, p. 4.

120. One observer reports that two large Korean-type longliners were still based in Venezuela during 1992. While the vessels are Venezuelan-owned, the Koreans still help manage operations. Freddy Arocha, personal communications, November 30, 1992.

121. For details on shark longlining see Tsunetoshi Mihara and Agustin Brito Leron, "Observaciones sobre la pesca del tiburon con palangre de fondo y la del pargo a cordel en el oriente de Venezuela," *Informe Técnico*, No. 4 (MAC/PNUD/FAO: Caracas, 1970), 15p.

122. Alió, *op. cit.*, August 15, 1996.

123. Marcano, *et. al.*, "Análisis preliminar....," *op. cit.*, p. 319.

124. "National report of Venezuela," *ICCAT Report*, 1994/95 Part I, (ICCAT: Madrid, Spain, 1995), p. 277.

125. L. Marcano, R. Guzman, J. Marcano, G. Gomez, and J. Alio, "Pesqueria de peces de pico en Venezuela," *GCFI Proceedings: 47th Annual Meeting*, Margarita Island, November 1994.

126. Alió, *op. cit.*, August 15, 1996.

127. "National report of Venezuela," *ICCAT Report*, 1986/87 Part II, (ICCAT: Madrid, Spain, 1988), p. 299.

128. Alió, *et.al*, "Notas ...," *op. cit.*, p. 321.

129. SARPA, *La Actividad ...*, 1996, *op. cit.*

130. Jose Alió, FONAIAP, personal communications, August 15, 1996.

131. Adoldo Hernández, Sales Manager, DIPESCA C.A., personal communications, August 9, 1996.

132. Alió, *op. cit.*, August 6, 1996.

133. Marcano, *op. cit.*, August 12, 1997.

134. DGSPA, "National report ...," 1992, *op. cit.*, p. 373.

135. In the mid-1960s several of these large Korean longliners operated out of Carúpano.

136. Marcano, *op. cit.*, August 12, 1997.

137. Pastor López, Cumaná journalist, personal communications, September 5, 1996.

138. See "Spain" in the "International" chapter.

139. Marcano, *op. cit.* August 12, 1997.

SECTION V. (Shipyards)

140. Victor Sánchez, Manager, Varadero Caribe, personal communications, August 9, 1996.

141. Sánchez, *op. cit.*, August 9, 1996.

142. Ruth Faria, Chief of Technical Projects, Astillero Oriente, personal communications, August 9, 1996.

143. Hernández, *op. cit.*, August 9, 1996.

144. Patricia Neri, Vice-President, NAVINCA, personal communications, August 9, 1996.

145. Segura, cit., September 13, 1996.

SECTION VI. (Fleet Operations and Gear)

146. SARPA, *La Actividad Pesquera-Acuícola en Venezuela* (Ministerio de Agricultura y Cría: Caracas, 1996), 106p.

147. Prince, "Progress of the ICCAT enhanced research program ...," *op. cit.*, p. 8.

148. ICCAT, "Quarterly highlight report of the ICCAT Enhanced Research Program for Billfish," January -March, 1993, p. 3 and ICCAT, "Quarterly highlight report of the ICCAT Enhanced Research Program for Billfish," July-September, 1993, p. 3.

149. "Análisis preliminar", *op. cit.*, 1992.

150. Alió, *et. al.*, "Descriptive analysis....," *op. cit.*, p. 256.

151. Ministerio de Agricultura y Cría (MAC) and Dirección General Sectorial de Pesca y Acuicultura (DGSPA), "National report of Venezuela - 1991," *ICCAT Report*, 1990-91, Part II, (ICCAT: Madrid, Spain, 1992), p. 293.

152. ICCAT, "Report of the meeting of the standing committee on research and statistics," *ICCAT Report* Part II, 1992-93 (ICCAT: Madrid, Spain, 1994), p. 171.

153. ICCAT, "Quarterly highlight report of the ICCAT Enhanced Research Program for Billfish," October-December, 1993, p. 3.

154. Historical information on artisanal shark longlining is available in Mihara and Brito Leon, "Observaciones sobre ...," *op. cit.*, 15p. A more recent report is J.J. Alio, L.A. Marcano, and X. Gutierrez, "La pesca de tiburones en Venezuela," *ICCAT Collected Scientific Papers*, 1993, Vol. 42, pp. 452-453.

155. "Matan 7,000 delfines al año en Venezuela," *Diario las Americas*, August 19, 1989.

156. U.S. Embassy, Caracas, "Alleged killing of dolphins by shark fishermen: Request for clarification of Marine Mammal Protection Act applicability," message number 78, January 4, 1990.

157. J. López, *op. cit.*, October 1, 1996.

158. Marcano, personal communications, August 6, 1997,

159. Javier Marín, Zagemar, personal communications, March 25, 1998.

160. Nemoto, "Análisis de los muestreos...," 1975 *op. cit.*, p. 491.

161. Venezuelan fishermen also conduct purse siene and baitboat operations for tuna.

162. Arocha, *op. cit.* Some of the catch, however, is still sold to the canneries as it does not yet meet the standards required for export shipment.

163. Novoa, *op. cit.*, pp. 17-18.

164. Alió, *op. cit.*, August 15, 1996 and Marcano, *op. cit.*, August 12, 1997.

165. Javier Marín, *op. cit.*, March 25, 1998.

166. Arocha, *op. cit.*, March 10, 1998.

167. Marcano, *op. cit.*, August 6 and 12, 1997 and Arocha, *op. cit.*, January 5, 1997.

168. Jerónimo Marín, Owner, Zagemar, personal communications, March 13, 1998.

169. Alió, *op. cit.*, August 16, 1996 and Arocha, *op. cit.*, January 5, 1997.

170. Arocha, *op. cit.*, August 12, 1997.

171. Antonio Carrera, associate, Falcon's Fishing Company, personal communications, May 20, 1998.

172. Arocha, *op. cit.*, March 10, 1998.

173. Javier Marín, *op. cit.*, March 25, 1998.

174. Luis Marcano, Fishery Scientist, FONAIAP, personal communications, August 6, 1997.

175. Javier Marín, *op. cit.*, March 25, 1998.

176. ICCAT, "Program plan for the ICCAT Enhanced Research Program for Billfish - 1991," *ICCAT Report*, 1990-91, Part I (ICCAT: Madrid, Spain, 1991), p. 396.

177. Alió, *op. cit.*, August 6, 1996.

178. Javier Marín, *op. cit.*, March 25, 1998.

179. Marcano, *op. cit.*, August 6, 1997.

180. J. López, *op. cit.*, October 1, 1996 and Marcano, *op. cit.*, August 6, 1997.

181. José Alió, FONAIAP, personal communications, October 4, 1996 and Marcano, *op. cit.*, August 6, 1997.

182. Venezuelan law requires that these gillnets have to be under 1,500 m when their yields are high.

183. J. López, *op. cit.*, August 15, 1996 and Asdrubal Lares, FONAIAP, Margarita Island, August 14, 1997.

184. Alió, *op. cit.*, August 16, 1996. Also see Weidner and Hall "Latin America," *op. cit.*

185. In the late-1970s several of these large Korean longliners operated out of Carúpano. Another local observer reported that these vessels were 30-40 m long.

186. One source indicates that trips were limited because the Venezuelan crew members objected to longer trips which keep them at sea for extended periods.

187. For details on Spanish operations see Folsom, "Spain," *op. cit.*

188. Arocha, *op. cit.*, January 20, 1998.

189. Jean Cramer and Heather Adams, "Large pelagic logbook newsletter-1996," *NOAA Technical Memorandum*, NMFS-SEFSC-407, January 1998, p. 3.

190. Marcano, *op. cit.*, August 14, 1997.

191. Arocha, *op. cit.*, March 9, 1998.

192. ICCAT, "Progress of the Enhanced Research Program for Billfish during 1989," *ICCAT Report*, 1988-89, Part I, (ICCAT: Madrid, Spain, 1989), p. 239.

193. Alió, *op. cit.*, August 8, 1996.

194. IGFA, "Recent additions to IGFA special clubs," *The International Angler*, January-February, 1998, pp. 15-16.

195. Venezuela Fishing Tours, internet page (http://www.worldwidefishing.com/b109.htm), May 11, 1998.

196. Pesca Liquida, internet posting (http://www.bluemarlin.com.faqsfish.html), posted August 26, 1996.

197. La Jolla Charters, internet page (http://www.worldwidefishing.com/b107.htm), May 11, 1998.

198. Gary Laden, "La Guaira Bank billfish bonanza," posted on the FBN internet website (http://fbnonline.com/salt/guaira1.htm), May 11, 1998.

199. La Jolla Charters, *op. cit.*, May 11, 1998 and Pesca Liquida, internet posting (http://www.bluemarlin.com/faqsfish.html), posted August 26, 1996.

200. Victor Vazquez, sport fisherman, personal communications, July 28, 1997.

201. "Swordfish reported striking in Venezuela", *The International Angler*, September-October, 1996.

202. Ferrell, "In broad daylight," *op. cit.*, pp. 56-59.

203. "Venezuela: Fishing destination," *Fishing International* (advertising brochure), distributed February 1997.

204. La Jolla Charters, *op. cit.*, May 11, 1998.

205. La Jolla Charters, *op. cit.*, May 11, 1998.

206. Prince, "Progress of the ICCAT enhanced research program ...," *op. cit.*, p. 8., and Alió, *op. cit.*, August 8, 1996. Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

207. MAC/DGSPA, "National report of Venezuela - 1991," *op. cit.*, p. 293.

208. ICCAT, "Quarterly highlight report of the ICCAT Enhanced Research Program for Billfish," October-December, 1993, p. 3.

209. Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades Desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

210. Pesca Liquida, internet posting (http://www.bluemarlin.com/tourn96.html), posted September 16, 1996.

211. L. Marcano, Arocha, and J. Marcano, "Actividades desarrolladas ...," *op. cit.*

212. ICCAT, "Report of the meeting of panel 4," *ICCAT Report*, Part I, 1990-91 (ICCAT: Madrid, Spain, 1991), p. 75 and ICCAT, "SCRS figures," *ICCAT Report*, Part I, 1991-92 (ICCAT: Madrid, Spain, 1993), p. 266, 270, and 274.

213. Ferrell, "In broad daylight," *Marlin* January 1999, pp.56-59.

214. Alió, *op. cit.*, August 6, 1996.

SECTION VII. (Catch)

215. FAO publishes data provided by each individual government. The FAO data for Venezuela was provided by the DGSPA.

216. Arocha, *op. cit.*, March 12, 1998.

217. R. Guzmán, "National report of Venezuela," *ICCAT Report*, 1988-89, Part I, (ICCAT: Madrid, Spain, 1989), p. 332. [332-334]

218. L.W. González and D. Gaertner, "Análisis preliminar...", *op. cit.*, 1992, p. 643.

219. Alió, *et.al*, "Notas ...," *op. cit.*, p. 321 and MAC/DGSPA, "National report of Venezuela - 1991," *op. cit.*, p. 293.

220. Pesca Liquida, internet posting (http://www.bluemarlin.com/flash.html), posted April 19, 1998.

221. Arocha, *op.cit.*, September 4, 1998.

222. ICCAT, "Secretariat report on statistics and coordination of research," *ICCAT Report* Part II, 1984-85 (ICCAT: Madrid, Spain, 1986), pp. 26-27 and ICCAT, "Secretariat report on statistics and coordination of research," *ICCAT Report* Part I, 1986-87 (ICCAT: Madrid, Spain, 1987), p. 36-37.

223. DGSPA, "National report ...," 1992, *op. cit.*, p. 373.

224. The Japanese have a basket category for swordfish and billfish and there is no way of determining the precise composition of those shipments.

225. Alió, *et.al*, "Notas ...," *op. cit.*, p. 325.

SECTION VIII. (Ports)

226. A review of the ports was prepared as part of an FAO project in 1972. George Turner, "Los puertos pesqueros y mercados portuarios de venezuela," *Informe Técnico* (MAC/PNUD/FAO: Caracas, 1972), p.49. The authors know of no more recent review.

227. "Sucre Port," FIS web page (http://www.sea-world.com/fis/companies/venezuela/ports/sucre/ports.htm), May 6, 1998.

228. Juhl, *op. cit.*, March 25, 1988.

229. Miyake and Holzapfel, *op. cit.*, p.5.

230. Eric D. Prince, "Progress of the ICCAT enhanced research program for billfish in the Western Atlantic Ocean during 1994," *ICCAT Collective Volume of Scientific Papers* (ICCAT: Madrid, Spain, 1995), p. 6.

231. DGSDP/MAC, *Lonja Pesquera de Cumaná*, (MAC: no date, probably 1982).

232. During the mid-1980s about 16 longliners were based at Carúpano. One was used as a training vessel and four were converted for gillnetting sharks, with incidental tuna catches. The remaining vessels were operated as longliners, eight of which were equipped with low-temperature freezers (-45-50°). The vessels were all registered in Venezuela, but with Korean crews, especially the key members. Miyake and Holzapfel, *op. cit.*, p.3.

233. Angel Figueroa, Assistant Port Captain, Carúpano, personal communications, August 23, 1996.

234. Miyake and Holzapfel, *op. cit.*, p.3. Porlamar, the major port on Margarita Island is about the same distance from both Cumaná and Carúpano.

235. Prince, "Progress of the ICCAT enhanced research program ...," *op. cit.*, p.6.

236. Figeroa, *op. cit.*, August 23, 1996.

237. ICCAT, "Program plan for the ICCAT Enhanced Research Program for Billfish - 1991," *ICCAT Report*, 1990-91, Part I (ICCAT: Madrid, Spain, 1991), p. 396.

238. Alió, *et. al.*, "Descriptive....," *op. cit.*, p. 253.

239. Milagros Gómez, Manager, Pesquera de la Isla, personal communications, August 20, 1996.

240. Prince, "Progress of the ICCAT enhanced research program ...," *op. cit.*, p. 8.

241. Cumaná is reportedly only a little further east, but the highway between Cumaná and Guanta is poor. As a result, some fishermen shipping to Caracas or the international airport near Caracas land their catch at Guanta.

242. MAC/DGSPA, "National report of Venezuela - 1991," *op. cit.*, p. 293.

243. Javier Marín, *op. cit.*, March 25, 1998.

244. Dennis Weidner, "International fishing port at Güiria, Venezuela," NMFS memo, February 15, 1980.

245. This makes it necessary to truck products some distance over poor roads to major markets and limits transportation links for export shipment. In addition, the fishermen tend to prefer larger, more urban centers.

246. ICCAT, "Report of the Sub-Committee on Statistics," *ICCAT Report* Part II, 1985 (ICCAT: Madrid, Spain, 1986), p. 201.

247. Marcano, *et. al.*, "Análisis preliminar....," *op. cit.*, p. 321.

248. Alió, *op. cit.*, August 15, 1996.

SECTION IX. (Transshipments)

249. Most of the tuna was initially transshipped through Panamanian ports with but smaller amounts are also transshipped through Colombian, Costa Rican, and other ports. In recent years with the development of a Colombian tuna processing industry, increasing amounts have been landed in Colombia for loining and transshipment to foreign buyers.

250. U.S. Embassy, Caracas, August 26, 1987.

251. For details on Venezuelan Pacific tuna transshipment see Weidner, "Venezuelan tuna fishery," *op. cit.*

252. Franciso Herrera, Director General Sectoral de Pesca y Acuicultura, MAC, personal communications, March 18, 1992.

253. One U.S. company indicates that operations off Venezuela are highly seasonal and that they deploy longliners only during the winter months.

254. Dominique Orin, "Greenpeace à l'assaut des pirates," *Le Marin*, May 25, 1990.

255. ICCAT has not reported a Taiwan Atlantic bluefin catch since 1986. ICCAT, *Statistical Bulletin*, 1990, Vol. 21, p.93

256. For details see the Trinidadian chapter of this study.

257. This was the reason the United States imposed an intermediary embargo January 31, 1992 (appendix E1). After the Venezuelan Government certified that the shipments were actually transshipments, the embargo was removed (April 24, 1992).

258. Marcano, personal communications, August 6, 1997,

SECTION X. (Processing and Products)

259. Arocha, *op. cit.*, March 9, 1998.

260. Javier Marín, *op. cit.*, March 25, 1998.

261. Arocha, *op. cit.*, March 9, 1998.

SECTION XI. (Companies)

262. For details on the companies involved in the Venezuelan tuna and canning industries see Weidner, "Venezuelan tuna fishing." *op. cit.*

263. There is no plan by U.S. authorities to expand the embargo which is designed to protect dolphins in the ETP. Even so, many Venezuelan company representatives are very reluctant to describe the operations of their companies.

264. Information on the FDA regulations concerning methyl mercury is available at the FDA internet site (http://www.fda.gov/ora/fiars/ora_import_ia1608.html).

265. Robert Blakenship, owner, COPESCA, personal communications, June 15, 1998.

266. José Mujica, Manager, Puerto Pesquero de Cumaná, CORPORIENTE, personal communications, September 6, 1996.

267. U.S. Embassy, Caracas, "Request for shark fishery information," message number 6959, July 25, 1985.

268. Antonio Carrera, associate, Falcon's Fishing Company, personal communications, June 1, 1998.

269. Carrera, *op. cit.*, May 20, 1998.

270. F. Guiffrida, owner, Guiffrida, personal communications, June 9, 1998.

271. Irida (last name unavailable), Productora Marina, personal communications, May 18, 1998.

272. José Gómez López, "Los pescadores protestan la flota norteamericana," *El Nacional*, August 18, 1986; "Ordenada la salida de la flota pesquera norte americana," *El Nacional*, August 23, 1986; and "Barcos pesqueros norteamericanos entraron a Venezuela por convenio," *El Nacional*, August 26, 1986.

273. L. Gonzalez and D. Gaertner, "Analisis preliminar de las campañas de pesca exploratoria del pez espada en la ZEE de Venezuela," *ICCAT Col.Vol.Sci.Pap.*, 1991.

274. FDA internet posting (http://www.fda.gov.ora/oasis/12/ora_oasis_c_ve.html), retrieved May 12, 1998.

275. FDA, internet postings (http://www.fda.gov.ora/oasis/8/ora_oasis_c_ve.html and http://www.fda.gov.ora/oasis/1/ora_oasis_c_ve.html), retrieved May 12, 1998.

276. One apparently erroneous report indicated that the *Antares* had sunk, but company representatives assure the authors that this is not the case.

277. Roberto, Venezolana de Pesca, personal communications, March 17, 1998. Roberto did not provide his last name.

278. Henry Aguilera, owner, Venezuelana Internacional de Pesca, personal communications, June 10, 1998

279. Javier Marín, *op. cit.*, March 25, 1998.

280. Jeronimo Marín, Owner, Zagemar, personal communications, March 12, 1998.

SECTION XII. (Markets)

281. FAO, *Fishery Country Profile*, December, 1989, and National Marine Fisheries Service, *Fisheries of the United States 1995*, July 1996.

282. Carrera, *op. cit.*, May 20, 1998.

283. One report from the Puerto la Cruz area indicates swordfish were available in the local market. Sandra Snow Ellsworth, "!Vamos al mercado! Compass Publishing internet posting (http://www.begos.com/compass/archive/Mercado.htm), posted 1997.

284. Arocha, *op. cit.*, March 9, 1998.

285. Weidner, "Venezuelan tuna fishery," *op. cit.* and Giménez, *El Atún*, *op. cit.*

286. Arocha, *op.cit.*, September 4, 1998.

287. J. Marin, *op. cit.*, March 25, 1998.

SECTION XIII. (Government Policy)

288. ICCAT, "Report of the meeting of panel 4," *ICCAT Report* Part II, 1992-93 (ICCAT: Madrid, Spain, 1994), p. 101.

289. Arocha, *op. cit.*, January 19, 1999.

290. Territorial Sea Law, July 27, 1956.

291. Law Establishing an Exclusive Economic Zone, July 27, 1978.

292. The treaty was signed in 1979. "Dominican Republic, Venezuela sign treaty," *El Universal*, March 4, 1979, and Rosendo Sepulveda, "Estudian delimitación de area marina Dominico-Venezolana," *Diario las Americas*, October 3, 1980. There is apparently a small triangle of sea where the Dominican, Venezuelan, and Colombian 200-mile zones converge. The Venezuelans have acceded to the Dominican claim, but final resolution will require agreement with the Colombians. U.S. Embassy, Santo Domingo, "Status of Dominican/Venezuelan Boundary," message number 372, January 17, 1983.

293. The boundary dispute has quite a lengthy, checkered history. Colombia in the 19th Century apparently tried to give the Gulf of Venezuela and adjoining territory to Venezuela, but then according to some sources reneged on the various offers, pressing for more territory. Mediation by the Spanish Crown in the late 19th Century failed when the point of demarcation the arbitrators settled upon could never be found by a subsequent Colombian-Venezuelan Commission. A Swiss arbitrator determined the current border in 1922. His decision awarded Colombia land they had not even claimed.

294. Jean-Francois Pulvenis, Dirección de Fronteras, Ministerio de Relaciones Exteriores, personal communications, October 5, 1979.

295. U.S. Embassy, Caracas, "Venezuela--Reactions to Colombian reconsideration of Los Monjes Islands," message number 1670, February 23, 1989.

296. Pulvenis, *op. cit.*, October 5, 1979.

297. Pulvenis, *op. cit.*, October 5, 1979.

298. A. Francis, "Treaty between the Republic of Trinidad and Tobago and the Republic of Venezuela on the delimitation of the marine and submarine areas: An analysis," *Caribbean Marine Studies*, vol. I, no. 2, pp. 77-87.

299. Pulvenis, *op. cit.*, October 5, 1979.

300. Dennis Weidner, "Venezuela's fisheries policy," *International Fishery Reports* (IFR-80/95), May 29, 1980.

301. See for example U.S. Embassy Caracas, "Priorities of new GOV fisheries team," message number 4964, June 7, 1984.

302. See for example Mery Mogollón, "En peligro de desaparecer riqueza pesquera venezolana, *El Mundo*, September 2, 1986.

303. U.S. Embassy Caracas, "Priorities of new GOV fisheries team," message number 4964, June 7, 1984.

304. Hermano Gines, Fundación La Salle, personal communications, December 3, 1979.

305. U.S. Embassy, Caracas, "U,S. boats fishing in Venezuelan waters," message number 10634, November 3, 1986

306. As issued in the Venezuelan official Gazette N° 34.608, on December 4, 1990, under decree N° 1.306 of November 28, 1990. U.S. Embassy, Caracas, "IMI-Venezuela: Commercial fishing license," October 6, 1994.

307. Venezuelan official Gazette N° 34.608, on December 4, 1990, under decree N° 1.306 of November 28, 1990. U.S. Embassy, Caracas, *op. cit.*, October 6, 1994.

SECTION XIV. (Research)

308. "Venezuela trains the young", *Fishing News International*, October 1995, pp. 30-31.

309. H. Salazar y J. Marcano, "Análisis de los muestreos realizados de la pesquería de atún con palangre en Venezuela entre 1988-1990", *ICCAT Collective Volume of Scientific Papers*, Vol. XLI, SCRS/92/78 (ICCAT: Madrid, 1994), pp. 490-498; Marcano, L., Alió J., Gutiérrez, S., and R. Guzmán, "Análisis preliminar de la pesquería artesanal....", *op. cit.*; Alió, J., Marcano, L., Gutiérrez, X., and R. Fontiveros, "Descriptive analysis of the artisanal....", *op. cit.*; Guzmán, R., Salazar, H., and L. Astudillo, "Análisis de la captura y el esfuerzo de la pesquería atunera de pequeños palangreros en el Caribe venezolano: 1983-1991", *ICCAT Standing Committee of Research and Statistics*, SCRS/93/79, pp. 232-336; Gaertner, D., and J. Alió, "Changes in the apparent abundance indices of billfishes in the Venezuelan recreational fishery off Playa Grande (1961-1990), central Venezuelan coast," *ICCAT Collective Volume of Scientific Papers*, Vol. XLI, SCRS/92/74 (ICCAT: Madrid, 1994), pp. 473-489.

310. Tuna is also sampled at the canneries which process tuna. MAC/DGSPA, "National report of Venezuela - 1991," *op. cit.*, p. 293. A good description of the observer program's 1996-97 is available in Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades Desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

311. MAC/DGSPA, "National report of Venezuela - 1991," *op. cit.*, p. 294.

312. DGSPA, "National report ...," 1992, *op. cit.*, p. 373. See for example Barreto *et.al.*, "Alimentación ...," *op. cit.* and ICCAT, "Progress of the Enhanced Research Program for Billfish during 1989," *ICCAT Report*, 1988-89, Part I, (ICCAT: Madrid, Spain, 1989), p. 241.

313. ICCAT, "Progress of the Enhanced Research Program for Billfish during 1988," *ICCAT Report*, 1988-89, Part I, (ICCAT: Madrid, Spain, 1989), p. 239 and M. Pagavino and D. Gaertner, "Variación espacio-temporal de las capturas de atunes aleta amarilla y listado realizadas por la flota venezolana de superficie en el Mar Caribe, entre 1988 y 1992," *ICCAT Standing Committee Research Statistics*, SCRS/93/131, pp. 314-318 and D. Gaertner y M.

Medina-Gaertner, "Apperrçu sur les relations entre les thons et les objects flottants dans le sud de la Mer des Caraïbes, *ICCAT Interim Workshop on Fishing for Tunas Associated with Floating Objects*, La Jolla, California, February 11-14, 1992, p. 20.

314. A few studies have also focused specifically on swordfish, González y Gaertner, " Análisis preliminar de las campañas ...," *op. cit.*

315. ICCAT, "Program plan for the ICCAT Enhanced Research Program for Billfish - 1991," *ICCAT Report*, 1990-91, Part I (ICCAT: Madrid, Spain, 1991), p. 397.

316. ICCAT, "Report of the Standing Committee on Research and Statistics," *ICCAT Report* Part I, 1990-91, (ICCAT: Madrid, Spain, 1991), p. 144.

317. DGSPA, "National report ...," 1992, *op. cit.*, p. 374.

318. See for example Alió, Marcano, Gutiérrez, and Fontiveros, "Descriptive analysis of the artisanal fishery of billfish ...," *op. cit.*

319. See for example, ICCAT, "Secretariat report on statistics and coordination of research," *ICCAT Report* Part II, 1985 (ICCAT: Madrid, Spain, 1986), pp. 26-27.

320. "National report of Venezuela," 1987, *op. cit.*, p. 298.

321. Size sampling of tunas (492), marlins (140), and swordfish (720) were reported. DGSPA, "National report ...," 1992, *op. cit.*, p. 373-374.

322. ICCAT, "Program plan for the ICCAT Enhanced Research Program for Billfish - 1991," *ICCAT Report*, 1990-91, Part I (ICCAT: Madrid, Spain, 1991), p. 396.

323. ICCAT, "Program plan for the ICCAT Enhanced Research Program for Billfish - 1991," *ICCAT Report*, 1990-91, Part I (ICCAT: Madrid, Spain, 1991), p. 397.

324. Fishermen reported 24 tag recaptures to FONAIAP in the fourth quarter of 1993 alone; most were billfish (primarily marlin and sailfish, but also some sharks). One particularly interesting recapture was a sailfish caught and tagged off the Islas Mujeres in Mexico and retaken 3 years later by a Venezuelan artisanal longliner off Margarita Island along the eastern coast of Venezuela. ICCAT, "Quarterly highlight report of the ICCAT Enhanced Research Program for Billfish," October-December, 1993, p. 3.

325. L. Marcano, Arocha, and J. Marcano, "Actividades desarrolladas ...," *op. cit.*

326. See for example, ICCAT, "Secretariat report on statistics and coordination of research," *ICCAT Report* Part II, 1985 (ICCAT: Madrid, Spain, 1986), p. 27.

327. "National report of France," *ICCAT Report*, 1987, Part II, (ICCAT: Madrid, Spain, 1988), p. 261 and Daniel Gaertner, Institut de Recherche pour le Developpment, personal communications, November 12, 1998.

328. "National report of Venezuela," 1987, *op. cit.*, p. 298 and Gaertner, *op. cit.*, November 12, 1998.

329. Pagavino and Gaertner, " Variación espacio-temporal ...," *op. cit.* and Gaertner, *op. cit.*, November 12, 1998.

330. See for example Pagavino and Gaertner, " Variación espacio-temporal ...," *op. cit.*; Gaertner and Alió, "Changes in the apparent abundance ...," *op. cit.*; and González and Gaertner, "Análisis preliminar de las campañas ...," *op. cit.*

SECTION XV. (Bycatch)

331. Note that the catch composition data in this report refers to the retained catch. There is a small catch of unmarketable species which is either consumed by the crew or discarded at sea. Most of the sharks are retained with the exception of blue sharks. The entire shark catch is recorded by the FONAIP/ICCAT observers. Freddy Arocha, *op. cit.*, March 12, 1998.

332. Arocha, *op. cit.*, January 5, 1997.

333. Alió, *et.al*, "Notas ...," *op. cit.*, p. 323.

334. Arocha, *op. cit.*, January 5, 1997.

335. The two principal statistical studies on bycatch available to the authors, for example, provide varying seasonal trends (appendices D2c and D2d).

336. Arocha, *op. cit.*, January 5, 1997.

337. Arocha, *op. cit.*, March 12, 1998.

338. "Program of the Enhanced Research Program for Billfish during 1988," *ICCAT Report*, 1988-89, Part I, (ICCAT: Madrid, Spain, 1989), p. 231.

339. Arocha, *op. cit.*, January 5, 1997.

340. "Playas de nidificación, areas de alimentación, épocas de reproducción de las tortugas marinas en las costas de Venezuela," *Fundación para la Defensa de la Naturaleza (FUDENA)*, Reunión Problemática Tortuga/Camarón, Caracas, August 21-23, 1991.

341. Peter Dutton, Pacific Turtle Coordinator, personal communications, August 18, 1998

342. Tito Barros, Lenin Parra, Mayra Matos, and Lizbeth Caceres, "Antecedents of the presence of sea turtles in the Venezuelan Gulf. Bases for a prliminary diagnosis," 18th International Symposium on Sea turtle Biology and Conservation, Mazatlán, Sinaloa, Mexico, March 3-7, 1998.

343. "Playas de nidificanción...," *op. cit.*, August, 1991, "Tortugas marinas en el Parque Nacional Archipiélago de los Roques," (*Fundación Científica Los Roques*: Informe Proyecto de Investigación). 23 pp., and Joaquin Buitrago, "Observaciones sobre la anidación de tortugas marinas en Los Roques (Venezuela) y evaluación de medidas para su protección," (*Estación de Investigaciones Marinas de Margarita, Fundación La Salle de Ciencias Naturales*: Venezuela, 1987). pp. 137-153.

344. Resoloción Oficial # 95, November 28, 1979.

345. A. Fallabrino, A Rodríguez-Ferraro, A. Trujillo, and J. Marcano, "Green turtle (*Chelonia mydas*) capture by artisanal fishermen in La Blanquilla Island, Venezuela," paper presented at the 18th International Symposium on Sea Turtle Biology and Conservation, Mazatlán, Sinaloa, Mexico, March 3-7, 1998.

346. W.N. Witzell, "The incidental capture of sea turtles in the Atlantic U.S. Fishery Conservation Zone by the Japanese tuna longline fleet, 1978-81," *Marine Fisheries Review*, Vol. 46, 1984, pp. 56-58.

347. Wayne Witzel, "The incidental capture of sea turtles by the U.S. pelagic longline fleet in the western Atlantic Ocean," in "Pelagic longline fishery-sea turtle interactions," *NOAA Technical Memorandum* NMFS-OPR-7, February 1996, pp. 32-33.

348. Most authors believe that interactions with fisheries primarily result from entanglements on a wide variety of fishing gear rather than feeding on baited hooks. Some assessments of entanglements on pelagic longlines have been made. W.N. Witzel, "The incidental capture of sea turtles in the Atlantic U.S. Fishery Conservation Zone by the Japanese tuna longline fleet, 1978-81," *Marine Fisheries Review*, 1984, Vol. 46 (3), pp. 56-58 and W. Tobias, "Incidental catch a continuing problem in the Mediterranean," *Marine Turtle Newsletter*, 1991, Number 51, pp. 10-12. At least one author, however, has reported leatherbacks off Hawaii ingesting bait (squid), probably attracted by lightsticks. Robert A. Skillman and George H. Balazas, "Leatherback turtle captured by ingestion of squid bait on swordfish longline," *Fisheries Bulletin*, 1992, Vol. 90, pp. 807-808.

349. Witzel, "The incidental capture of sea turtles by the U.S. pelagic...," *op. cit.*, p. 32.

350. Venezuelan Government response to ICCAT bycatch questionnaire as reported by Arocha, *op. cit,* January 5, 1998.

351. Arocha, *op. cit.*, January 5, 1997.

352. Thomas Jackson, Southeast Fisheries Science Center, NMFS, personal communication, March 3, 1998.

353. Pedro A. Ulloa Ramírez and Luis Vicente González Ania, "Incidence of marine turtles in the Mexican long-line tuna fishery in the Gulf of Mexico," paper presented at the 18th International Symposium on Sea Turtle Biology and Conservation, Mazatlán, Sinaloa, Mexico, March 3-7, 1998.

354. One assessment of bycatch found that 50 percent of the turtle interactions occurred in 5 percent of the catches. Many were associated with warm core rings along the Gulf Stream. Many of the turtles are boated live, except those taken in the warm core rings. Hoey, *op. cit.*, February 24, 1998. Other observers have also noted the substantial variations. Witzell, "The incidental capture ...," *op. cit.*, p.32.

355. The turtle bycatch data was for 1993, Cramer, "Large pelagic logbook ..., 1994," *op. cit.*, p. 32.

356. G.P Scott and C.A. Brown, "Estimates of marine mammal and marine turtle catch by the U.S. Atlantic pelagic longline fleet in 1994-1995," *Miami Laboratory Contribution* MIA-86/97-28 and NMFS, "Draft environmental assessment and regulatory impact review on alternatives for implementation of an Atlantic offshore cetacean take reduction plan," October 1997.

357. The raw observer data showing high turtle bycatch rates which could mean substantial numbers of interactions in the Caribbean. At this time, however, the data should be treated with caution. NMFS has contracted an assessment of the Atlantic bycatch data, which should be available by May 1998. A thorough assessment of the U.S. Hawaiian longline fishery is being conducted. Robert A. Skillman, Jerry A. Wetherall, and Gerard T. Dinardo, "Recommendations for scoping the sea turtle observer program for the Hawaii-based longline fishery," *Southwest Fisheries Center Administrative Report*, H-96-02, August 1996, 12p. The results of the Hawaiian assessments appear to show a much lower rate of interactions than in the Atlantic. Results for several years are now available. Hilda Diaz-Soltero, "Annual Report on Implementation of a Biological Opinion," NMFS memos, various years (Hawaiian data). Also see Russel Ito and Walter A. Machado, "Annual report of the Hawaii-based longline fishery for 1996," *Southwest Fisheries Science Center Administrative Report*, H-97-12, December, 1997, p. 48. The high Caribbean rates may reflect multiple catches of the same animal. Fishermen focus on thermal fronts to set their lines and turtles may associate with discrete pockets of warm water, causing them to be caught multiple times. This has been observed especially in the Gulf Stream along the U.S. coast. Witzel, "The incidental capture ...," *op. cit.*, p. 33. Whether specific phenomenon occur in the Caribbean causing multiple catches is unknown at this time, but such an assessment is needed to accurately interpret the available observer data.

358. One Venezuelan study suggests that shrimp fishermen experience relatively low turtle interactions. Luis A. Marcano, José J. Alió, "Incidental capture of sea turtles by the industrial shrimp fleet off northeastern Venezuela," paper presented at the 18th International Symposium on Sea Turtle Biology and Conservation, Mazatlán, Sinaloa, Mexico, March 3-7, 1998. This study is of some interest because the results in terms of interactions, mortality rates, and shrimp loss vary so markedly with similar U.S. studies.

359. Debby Crouse, Center for Marine Conservation, personal communications, March 12, 1998.

360. Venezuelan Government response to ICCAT bycatch questionnaire as reported by Arocha, *op. cit.*, January 5, 1998.

361. Jackson, *op. cit.*, March 3, 1998.

362. Marín, *op. cit.* March 12, 1998.

363. The United States tuna embargo associated with efforts to protect dolphins has been sharply criticized in Venezuela. Domestic and international environmental groups working to protect dolphins have also been roundly criticized. In one celebrated case, a Venezuelan environmentalist had to flee the country when he was accused of treason by the press and an arrest by the government appeared imminent amid a confusing swirl of issues, including charges that he attempted to stage a video. As a result, Venezuelan industry and government representatives are reluctant to discuss marine mammal bycatch issues, especially with representatives of the U.S. Government.

364. Cramer, "Large pelagic logbook ..., 1994," *op. cit.*

365. The pilot whales appear to be feeding in the area of the sets. Some of the mortalities appear to have resulted from the whales feeding on the longline catch and in the process becoming entangled. The fishermen find some hooked fish that are just lips and plate. The pilot whales appear to even suck the brain and other soft tissue from the skulls. It is unclear why dolphin mortalities are limited. Preying on the longline catch appears to be learned behavior. It could reflect the depth of the sets, distance offshore, area or time of sets, the unfamiliarity of the longline catch (tuna, swordfish, and shark) as prey items, or a variety of other factors. Hovey, *op. cit.*, February 24, 1998.

366. Ito and Machado, "Annual report of the Hawaii-based longline fishery for 1996," *op. cit.*, p. 15.

367. None of the Venezuelan observers have ever mentioned seabird interactions on their reporting sheets. Thomas Jackson, Southeast Fisheries Science Center, NMFS, personal observations, March 5, 1998.

368. Arocha, *op. cit.*, March 10, 1998.

369. Environmentalists caution, however that some seabirds feed at night. Winegard, *op. cit.*, February 24, 1998. One of the most significant birds take at night is procellaria petrels, but that occurs in the Southern Ocean, and even that species is less affected at night than during the day. John Cooper, BirdLife International, personal communications, March 2, 1998. Some tuna fishermen, however, experience substantial seabird mortalities. The Japanese southern bluefin tuna fishery off Australia reported significant seabird mortalities before mediation measures were introduced.

370. Arocha, *op. cit.*. March 10, 1998.

371. Hoey, *op. cit.*, February 24, 1998.

372. See "Fishing Operations" for details on setting and hauling.

373. Flint, *op. cit.*, March 3, 1998.

374. Graham Robertson, Australian Antarctic Division, personal communication, March 4, 1998.

375. Angela Somma, NMFS Seabird Coordinator, personal communications, February 19, 1998.

376. See the Argentine and Uruguayan chapters of this report for details.

377. An excellent review of the literature is being prepared by John Cooper and Ross Wanless, "The incidental bycatch of seabirds in specific longline fisheries: A worldwide review," which will be published by FAO in 1998.

378. NMFS has funded a major study which is being conducted by a National Fisheries Institute researcher. His review of over 2,900 U.S. sets in the Caribbean, Gulf of Mexico, and Atlantic seaboard indicated only 40 seabird mortalities, almost all along the U.S. mid-Atlantic coast. Data on seabird species are not available, but appear to be mostly shearwaters. John Hoey, National Fisheries Institute (NFI), personal communications, February 24, 1998.

379. For details see the Brazilian chapter of this report.

380. Reports from Pacific fisheries generally indicate that seabird mortalities mostly occur at higher latitudes (southern Atlantic/Pacific and the Antarctic). The data suggests that the seabird problem primarily relates to colder waters at higher latitudes, although actual data from tropical waters is lacking. Kevin Bailey, Peter G. Williams, and David Itano, "By-catch and discards in western Pacific tuna fisheries: A review of SPC data holdings and literature," *Oceanic Fisheries Programme Technical Report*, No. 34 (South Pacific Commission: Noumea, New Caledonia, 1996), p. 4.11. The limited information available to the authors suggests that the swordfish longline fishery along the Pacific coast of South America is limited. Available reports, however, are somewhat contradictory. Some observers report that there are no significant seabird mortalities. One Peruvian company known to conduct both demersal and pelagic longline operations in 1997 informed the authors that they have no reports of seabird interactions. Eduardo Pastor, SIPESCA, personal communications, February 25, 1998.

381. R. Gales, *Co-operative Mechanisms for the Conservation of Albatross*, (Australian Nature Conservation Agency and the Antarctic Foundation: Hobart, 1993), 132p; L.B. Spear, D.G. Ainley, and S.W. Webb, "Distribution, abundance and behavior of Buller's, Chatham Island, Salvin's albatrosses off Chile and Peru: Potential interaction with longliners," *First International Conference on the Biology and Conservation of Albatrosses* (Australian Antarctic Division and National Parks & Wildlife Division, 1995), 25p; and Robertson, *op. cit.*, March 4, 1998.

382. Skillman and Flint report that Laysan and black-footed albatrosses are being killed, during interactions with longline gear of boats fishing for tuna and swordfish in the central North Pacific, at rates comparable to or exceeding hooking rates for seabirds on longlines in the southern ocean. NMFS observers recorded interactions of marine mammals, turtles, and birds on 4 percent of the longline fishing trips taken by boats registered in Hawaii during 1994-95. Laysan albatross were hooked at a rate of 0.113 birds per 1,000 hooks. Estimates ($\pm$ standard errors) of total take made, using a design stratified by fish target species, were 1,020 $\pm$ 639 Laysans taken in 1994 and 1,942 $\pm$2435 taken in 1995. They estimated that 2,135 $\pm$970 blackfoots were hooked in 1994 and 1,796 $\pm$1,498 in 1995. The number of northern hemisphere albatrosses being killed in the fishery are part of the overall mortality due to pelagic longlining by other nations and demersal longlining in Alaska. Estimates of mortality for black-footed albatrosses (world population = 58,000 breeding pairs) have triggered concern in the managing agencies and the U.S. Western Pacific Regional fishery Management Council. Robert Skillman and E.N. Flint, "Mortality of Laysan and black-footed albatrosses in the Hawaii pelagic longline fishery," paper presented at the 24th Annual Meeting of the Pacific Seabird Group, January 8-12, 1997, in Portland, Oregon and published in *Pacific Seabirds*, 1997, 24:23. The consensus among observers suggests that the take of black-footed albatross is because of its relatively small population. The take of Laysan albatross is not generally regarded as detrimental because of its larger population. If a short-tail albatross were to be observed in the incidental mortalities, the bycatch problem would be of greater concern because the species is gravely endangered. Robert Skillman, NMFS Honolulu Lab, personal communications, March 3, 1998. The albatross interactions, however, are mostly well north of the Hawaiian Islands at temperate latitudes from 30°-40°N. Interactions at tropical latitudes are very limited. Beth Flint, Fish and Wildlife Service, personal communications, March 3, 1998 and Russel Y. Ito and Walter A. Machado, "Annual report of the Hawaii-based longline fishery for 1996," *Southwest Fisheries Center Administrative Report* H-97-12, December, 1997, p. 48.

383. Gerald Winegard, American Bird Conservency, personal communications, February 24, 1998.

384. BirdLife, *Global Impacts of Fisheries on Seabirds*: A paper presented by BirdLife International for the London Workshop on Environmental Science, Comprehensiveness and Consistency in Global Decisions on Ocean Issues ED/kc(aquaunit/EDGLOBAL/1853(w6), November 1995, p.18.

SECTION XVI. (International)

385. ICCAT, "Secretarial report on statistics and coordination of research," *ICCAT Report*, 1987, Part II, SCRS/87/13/Amended (ICCAT: Madrid, Spain, 1988), pp. 32-33.

386. U.S. Embassy, Bridgetown, "Venezuelan officials visit the eastern Caribbean," message number A-91, July 5, 1972.

387. INFOPESCA, "Firma de carta intención entre Venezuela y Brasil para el acceso de la flota atunera venezolana en aguas territoriales brasileras," *Noticias Comerciales*, June 5, 1991.

388. For details see Weidner and Hall, "Latin America," *op. cit.*

389. INFOFISH, "Tuna landings encouraged at Cartagena," *Trade News*, June 16, 1991.

390. For details see Weidner and Serrano, "1.1 Colombia," *op. cit.*

391. "EC to negotiate fisheries pacts with Ecuador and Venezuela," *Eurofish Report*, November 21, 1991.

392. Herrera, *op. cit.*, September 1, 1993.

393. U.S. Embassy, Caracas, July 23, 1987; Herrera, *op. cit.*, September 1, 1993; and Alió, *op. cit.*, August 6, 1996.

394. "Venezuela-Grenada sign cooperation agreement," *El Nacional*, November 28, 1979.

395. Uozumi, "Preliminary analysis ...," *op. cit.*, p. 29 and ICCAT, "1994 SWO background document: Figures," *ICCAT Collective Volume of Scientific Papers* (ICCAT: Madrid, Spain, 1995), p. 91.

396. Korean National Fisheries Research and Development Agency, *Fishery Statistics and Fishing Grounds for the Korean Tuna Long Line Fishery, 1988-1992* (NFRDA: Seoul, December, 1993), pp. 87-434.

397. "Venezuela charter venture," *Fishing News International*, July 1978.

398. "Parte de la flora vasca se traslada a Venezuela," *España Pesquero*, May 1978, p. 19.

399. "Dos pesqueros Bermeanos parten para Venezuela," *España Pesquera*, January 19, 1979.

400. "Official proposes fishing agreement with Venezuela," Madrid domestic service, 2100 GMT, February 13, 1978.

401. "Sobre relaciones pesqueras con Venezuela," *Industrias Pesqueras*, September 1, 1979.

402. ICCAT, "1994 SWO background document: Figures," *op. cit.*, p. 91.

403. According to one unconfirmed journalistic source, the DGSPA has issued fishing permits, under special agreements, to 35 Spanish longliners which allow the vessels to operate within the country's 200-mile EEZ since 1994. Apparently, the Venezuelan Government issues these fishing permits to foreign companies that establish joint ventures with local fishing companies. However, according to the local observer, the joint venture companies that have been established to justify the issuance of these permits are not exactly Spanish/Venezuelan joint ventures but rather Spanish-owned companies with a Venezuelan partner utilized only as a name/legal fiction. According to this source, during 1996 there were approximately 10 Spanish longliners (30-40 m in length) operating under these permits. Details on the operations of these vessels is limited because the vessels are not landing the catch (presumably swordfish) at Venezuelan ports, but instead in Trinidad. López Pastor, Cumaná journalist, September 5, 1996. This level of Spanish activity appears unlikely as other Venezuelan reports do not report such extensive

Spanish effort. There may have been a smaller number of Spanish vessels operating off Venezuela or perhaps these reports refer to Spanish-owned but Venezuelan flagged vessels.

404. Alió, *op. cit.*, August 6, 1996.

405. Alió, *op. cit.*, August 6, 1996.

406. Herrera, *op. cit.*, September 1, 1993.

407. Arocha, *op. cit.*, January 20, 1998.

408. For details on the Suriname access agreement see the Suriname chapter of this report.

409. U.S. Embassy, Paramaribo, "Fishing agreement: Venezuelan boats to fish Suriname's waters," message number 759, March 14, 1986; "Cancilleres de Venezuela y Suriname instalaron II reunión de comisión pesquera," *El Universal*, May 14, 1987, and "Marcha bien el acuerdo pesquero con Suriname," *El Universal*, May 19, 1987.

410. U.S. Embassy, Caracas, July 23, 1987.

411. Arocha, *op. cit.*, March 9, 1998.

412. For details see the Trinidad chapter of this report.

413. Taiwan Tuna Research Center, *Annual Catch Statistics of Taiwanese Tuna Longline Fishery* (Taipei: Tuna Research Center, December 1993), pp. F5-8.

414. Taiwan Tuna Research Center, *Annual Catch Statistics of Taiwanese Tuna Longline Fishery*, *op. cit.*, pp. F21-24.

415. Anonymous Trinidadian source.

416. Dennis Weidner, "Venezuela and Trinidad and Tobago sign a fisheries agreement," *International Fisheries Report*, (IFR-78/15), January 20, 1978.

417. U.S. Embassy, Caracas, May 26, 1993. Venezuelan officials are uncertain as to possible new terms to be included in a revised agreement. Herrera, *op. cit.*, September 1, 1993.

418. "Venezuela: Fishery dispute said to strain relations with Trinidad," Madrid EFE, 099 GMT, June 18, 1997.

419. Arocha, *op. cit.*, January 20, 1997.

420. U.S. Embassy, Port of Spain, "TT/Venezuela successfully negotiate new fishing agreement," message number 886, September 15, 1997.

421. U.S. Embassy, Port of Spain, "More arrests of TT fishermen," message number 1536, September 15, 1997.

422. For a detailed discussion of the international legal implications of this treaty see Anselm Francis, "Treaty between the Republic of Trinidad and Tobago and the Republic of Venezuela on the delimitation of the marine and submarine areas: An analysis," *Caribbean Marine Studies*, Vol. 1(2), 1990, pp. 71-88.

423. ICCAT, "Progress of the Enhanced Research Program for Billfish during 1989," *ICCAT Report*, 1988-89, Part I, (ICCAT: Madrid, Spain, 1989), p. 241.

424. Herrera, *op. cit.*, September 1, 1993.

425. Jean Cramer, "Large Pelagic Logbook Newsletter" *NOAA Technical Memorandum*, NMFS-SEFSC-378, November, 1995, p. 3 and Jean Cramer, "Large Pelagic Logbook Newsletter" *NOAA Technical Memorandum*, NMFS-SEFSC-394, November, 1996, p. 3.

426. Cramer and Adams, "Large pelagic logbook newsletter-1996," *op. cit.*, p. 3.

427. Marcano, personal communications, September 15, 1997.

428. Arocha, *op.cit.*, September 4, 1998.

429. Carlos E. Gimenez, *El Atún: Base Cierta de una Actividad Industrial* (Caracas, 1990), 160p.

430. Korean Fisheries Administration, personal communications, July 27, 1981.

431. U.S. Embassy, Caracas, "Request for shark fishery information," message number 6959, July 25, 1985.

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SECTION XVII. (Enforcement)

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456. See for example "Attacks on fishermen," *Trinidad Guardian*, July 29, 1982 and "Fishing incidents discussed with Venezuela," Bridgetown CANA, 1834 GMT, February 2, 1988.

457. "Venezuelan fishermen held: relations tense," Panama City ACAN, 2249 GMT, May 3, 1981.

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463. U.S. Embassy, Port of Spain, "More arrests of TT fishermen," message number 1536, September 15, 1997.

464. U.S. Embassy, Caracas, "Seizure of U.S, tuna vessel," message number 9537, October 27, 1980.

465. Iris Castellanos, "Quieren covirtir al Caribe en un gran desierto marino," *El Nacional*, September 6, 1986.

466. The vessels were apparently able to qualify for fishing permits because they operated in association with a Venezuelan company, Promociones Marinas 2000 (incorrectly reported as Maritima 2.000). José Gómez López, "Los pescadores protestan la flota norteamericana," *El Nacional*, August 18, 1986 and "Barcos pesqueros norteamericanos entraron a Venezuela por convenio," *El Nacional*, August 26, 1986.

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APPENDICES

Series A: Fleet
Series B: Fishermen
Series C: Biological/effort data
- C1: Size
- C2: Sex
- C3: Diet
- C4: Sampling
- C5: Effort
- C6: Composition
- C7: Effort
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Series D: Catch
- D1: Overall fisheries catch
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Series E: Processing
Series F: Trade
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Series G: Agencies/companies
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- H1: Acronyms
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Series A Appendices: Fleet
Series A1: Overall
Series A2: Pelagic
Series A3: Tuna
Series A4: Longline

Appendix A1.--Venezuela. National fishing fleet, 1974-1994.

Year	Fleet Type				Total
	Tuna*	Trawler	Grouper**	Coastal***	
1974	25	305	200	5,700	6,230
1975	8	275	160	5,000	5,443
1976	11	260	190	5,000	5,461
1983	60	227	378	7,128	7,793
1984	79	232	410	7,420	8,141
1985	98	256	466	7,010	7,830
1986	106	287	561	8,511	9,465
1987	NA	NA	NA	NA	NA
1988	NA	NA	NA	NA	NA
1989	78	433	213	12,899	13,623
1990	103	446	187	13,825	14,561
1991	114	449	238	15,804	16,605
1992	122	415	220	16,190	16,947
1993	159	405	258	15,505	16,327
1994	128	373	258	16,067	16,826

* Includes purse seiners, baitboats and longliners.
** Includes fresh and saltwater artisanal vessels.
Source: SARPA, *La Actividad Pesquera-acuícola en Venezuela*, 1996.

Appendix A1b.--Venezuela. Capacities of individual fleets, 1983-1987.

Year	Fishery Type							
	Artisanal*		Tuna		Trawler		Grouper/snapper	
	# Vessels	GRT	#Vessels	GRT	#Vessels	GRT	#Vessels	GRT
1983	8108	24,177	76	51,420	239	23,700	404	13,680
1984	8128	25,537	93	60,600	250	24,000	566	14,340
1985	8191	26,897	99	69,900	272	24,300	592	15,000
1986	8689	28,257	106	70,740	284	24,800	597	15,660
1987	8775	28,536	118	75,049	319	40,165	721	18,912

Source: Ministerio de Agricultura y Cría

Appendix A2a.--Venezuela. Fishing vessels targeting large pelagics, 1982-1995.

Year	Longliner**				Bait boat		Purse seiner	Troller	Rod\ reel	Hand-line	Other***	Total
	0-50	51-200	201-500	501	Icewell	Freezer						
							Number of vessels					
1982	15	4	8	5	-	16	15	-	-	-	-	63
1983	14	-	-	-	3	12	16	-	-	-	-	45
1984	17	-	13	5	3	12	18	-	-	-	-	68
1985	17	-	13	5	3	12	18	-	-	-	-	68
1986	33	-	-	-	-	17	31	-	-	-	-	81
1987	19	-	-	-	-	17	33	-	-	-	-	69
1988	18	-	-	-	-	18	5	-	-	-	-	41
1989	26	-	-	-	-	16	10	-	-	-	-	52
1990	18	-	-	-	-	17	28	-	-	-	-	63
1991	21	9	5	-	-	14	21	-	-	-	-	70
1992*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	70	-	-	-	-	14	31	-	-	-	23	138
1994*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1995*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1996	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA - Not available
* No data was submitted by the Venezuelan Government to ICCAT for these years.
** By vessel size (GRT) categories.
*** Unclassified
Source: ICCAT, *Statistical Bulletin*, various years.

Appendix A2b.--Venezuela. Foreign fishing vessels targeting large pelagics, 1982-1995.

Year	Longliner				Bait boat		Purse seiner	Troller	Rod\ reel	Hand-line	Other***	Total
	0-50	51-200	201-500	501	Icewell	Freezer						
							Number of vessels					
1982	-	-	-	-	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	4	12	-	-	-	-	16
1985	-	-	-	-	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-	-	-	-	-
1987	-	-	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	-	-	-	-	-	-	-	-
1991	-	-	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-	-	-

Source: ICCAT, *Statistical Bulletin*, various years.

Appendix A3a.-- Venezuela. Overall tuna fleet**, 1990-92

Type/ State	1990		1991		1992*	
	Vessel Numbers	Capacity Metric Tons	Vessel Numbers	Capacity Metric Tons	Vessel Numbers	Capacity Metric Tons
Purse Seine						
Sucre	18	15,018	24	18,835	22	19,151
Falcon	7	5,630	7	5,630	7	6,700
Anzoátegui	-	-	-	-	3	2,248
Total	25	20,648	31	24,465	32	28,099
Bait Boats						
Sucre	17	1,892	14	1,338	18	2,218
Falcon	1	117	1	117	1	117
Total	18	2,009	15	1,455	19	2,335
Longliners**						
Sucre	38	5,211	38	5,211	52	4,730
Anzoátegui	13	714	15	824	15	824
Falcon	6	171	4	114	9	260
Nueva Esparta	3	84	1	28	4	70
Federal District	-	-	-	-	2	47
Total	60	6,180	58	6,177	82	5,931
Total	103	28,837	104	32,097	133	36,365

* Figures through May

** Only a few of the longliners are deployed exclusively for tuna. See appendix A2A for a better indication of the longliners targeting primarily tuna.

Note: Purse seine fleet data does not agree with appendix A1a-A1c. This is probably because not all of the Venezuelan seiners are deployed in the Eastern Pacific. It could also be because MAC data may include vessels owned by Venezuelans, but registered in other countries.

Sources: Ministry of Agriculture and Livestock (MAC) and Association of Venezuelan Tuna Fisheries as reported by the U.S. Embassy, Caracas.

Appendix A3b.--Venezuela. Atlantic tuna fleet, 1980-95

Fleet/size	Year																
	1980	1981	1982	1983	1984*	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Gross tons	Number of vessels																
Longline																	
<50	NA	NA	15	14	17	17	33	19	18	26	18	21	-	70	NA	NA	NA
51-200	-	-	4	-	-	-	-	-	-	-	-	9	-	-	NA	NA	NA
201-500	-	-	8	-	13	13	-	-	-	-	-	5	-	-	NA	NA	NA
501>	-	-	5	-	5	5	-	-	-	-	-	-	-	-	NA	NA	NA
Total	NA	NA	27	14	35	35	33	19	18	26	18	35	-	70	NA	NA	NA
Baitboats																	
Icewell	-	-	-	3	3	3	-	-	-	-	-	-	-	-	NA	NA	NA
Freezer																	
<50	-	-	-	-	-	-	-	-	-	-	-	5	-	-	NA	NA	NA
51-150	-	-	7	9	9	9	17	17	18	16	17	4	-	14	NA	NA	NA
151>	-	-	9	3	3	3	-	-	-	-	-	5	-	-	NA	NA	NA
Total	-	-	16	15	15	15	17	17	18	16	17	14	-	14	-	-	-
Purse seiners																	
<50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA
51-100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA
101-200	-	-	1	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA
201-300	-	-	1	-	-	-	-	-	-	-	-	1	-	-	NA	NA	NA
301-400	-	-	1	1	1	1	-	-	-	-	-	-	-	-	NA	NA	NA
401>	-	-	12	15	17	17	31	33	5	10	28	20	-	31	NA	NA	NA
	-	-	15	16	18	18	31	33	5	10	28	21	-	31	NA	NA	NA
Total	NA	NA	63	45	68	68	81	69	41	52	63	70	-	115	NA	NA	NA

* During 1984, 16 foreign-flagged vessels operated in Venezuela: 4 baitboats and 12 purse seiners.
Source: ICCAT, *Statistical Bulletin*, 1990, p.70, and 1994, p.82.

Appendix A3c.--Venezuela. Atlantic tuna fleet effort, 1989-91.

Gear	Year		
	1989	1990	1991
	Vessel days at sea		
Baitboat	1,490	1,829	2,190
Longline	NA	NA	NA
Purse seine	703	985	1,605

NA- Not available
Source: GSPA/MAC, "Informe Nacional de Venezuela" ICCAT 1992 SCRS meeting, ICCAT document SCRS/92/79, October 29, 1992.

Appendix A3d1--Venezuela. Eastern Pacific and Atlantic tuna purse seine fleet, 1996

Ocean/ Vessel name	Length	Capacity
	Meters	GRT
Eastern Tropical Pacific		
Amazonas	66	916
Calypso	66	990
Canaima	58	913
Carirubana	66	873
Caroni	65	916
Cayude	63	958
Conquista	59	918
Don Abel	63	1,028
Falcon	67	973
Jane	66	1,091
Jenny Margot II	69	1,815
Joifer I	58	1,158
Judibiana	62	994
La Foca	66	1,091
La Parrula	56	705
Lucile	59	993
Napoleon	61	1,619
Orinoco II	60	1,010
Taurus I	60	1,054
Subtotal, Pacific	NA	20,015
Atlantic Ocean and Caribbean		
Cervantes	52	630
Genesis	48	674
Guayacan	49	630
Guirintal	49	630
Inti	36	453
Pericantar	52	630
Rocinante	52	630
Tunantal	49	630
Tunapuy	49	630
Subtotal, Atlantic	NA	5,537
Total	NA	25,552

NA - Not applicable
Source: Jon Celaya, Executive Director, AVATUN, personal communications, September 18, 1996.

Appendix A3d2.--Venezuela. Eastern Pacific tuna purse seine fleet, 1996

Vessel	Size	Class size
	GRT	
Amazonas	NA	6
Calypso	995	6
Canaima	1,245	6
Carirubana	958	6
Cayude	1,156	6
Conquista	971	6
Don Abel	996	6
Don Quijote	NA	5
Falcon	958	6
Flamarca VII	971	6
Flamarca VIII	916	6
Intrepido*	(908)	6
Jane	1,039	6
Jenny Margot*	(1,649)	6
Jenny Margot II	1,499	6
Judibana	1,073	6
La Foca	1,092	6
La Parrula	NA	6
Lucile	1,091	6
Orinoco*	(963)	6
Napoleon	1,146	6
Taurus I	NA	6
Total	NA	

* Sunk, not included in total
NA - Not available
Source: IATTC, *Quarterly Report*, various issues.

Appendix A3e.--Venezuela. Baitboat tuna fishing fleet, 1996

Vessel Name	Length	Capacity
	Meters	GRT
Ann Mary	33	199
Atantico	28	221
Audace	30	380
Costa Blanca	29	179
Costa Brava	25	119
Costa del Sol	25	178
Costa Dorada	29	179
De la Mancha	32	220
Dulcinea	43	311
El Popeye	29	180
Linda Rose	24	248
Santa Maria II	29	400
Taurus	32	196
Viriginia del Mar	31	244
Total		3,254

Source: Jon Celaya, Executive Director, AVATUN, personal communications, September 18, 1996.

Appendix A4a1.--Venezuela. Longline fleet, 1990-96

Year	Artisanal			Commercial		
	ICCAT*	MAC**	NMFS***	ICCAT****	MAC**	NMFS***
			Number of vessels			
1990	18	60		NA	NA	
1991	21	64		14	NA	
1992	-#	73		NA	NA	
1993	70	NA	43	NA	NA	27
1994	-#	NA		NA	NA	27E
1995	NA	NA		NA	NA	27E
1996	NA	NA		NA	NA	NA

* ICCAT vessel category of 0-50 tons. This will include some vessels classified as commercial by the Venezuelans.
** Ministerio de Agricultura y Cría (MAC), SARPA, and OECI as reported by the U.S. Embassy. The data is for the total number of longliners which the authors have entered into the artisanal column. Most of the vessels are artisanal and there is no detailed breakdown.
*** Various reports by NMFS officials.
**** ICCAT vessel category for vessels 51 t and larger.
# The authors believe it is unlikely that there were no small longliners operating in these years and the entry probably should be "not available."
Sources: ICCAT, Venezuelan Ministerio de Agricultura y Cría, and National Marine Fisheries Service sources.

Appendix A4a2.--Venezuela. Atlantic longline tuna fleet, 1988-95

Year	Carrying (Hold) Capacity Category in Metric tons							Total
	0-50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	
				Number of vessels					
1988	16	-	-	-	-	1	-	-	18
1989	20	2	-	-	-	1	-	-	23
1990	21	2	2	-	-	2	-	-	27
1991	19	2	2	-	-	-	1	-	24
1992	27	2	3	-	-	-	1	1	34
1993	24	3	3	1	-	-	-	1	32
1994	29	5	4	-	-	-	-	1	38
1995	33	4	6	-	-	-	-	1	43

Source: J.S. Marcano, H. Salazar, L.A. Marcano, and X Gutiérrez, "Estadísticas de la flota palangera venezolana en el Atlántico, período 1988-1995," *ICCAT Collected Volume of Scientific Papers*, Vol. 46 (4) (ICCAT: Madrid, 1997), p. 166.

Appendix A4b.--Venezuela. Swordfish first longline fleet, 1987.

Company/ vessel name
Merry Co.
Maresil
Miss Karen*
No Problem*
Soberana
Veleidosa

* Other sources report that these vessels were not used to target swordfish off Venezuela
Source: José Alió, FONAIAP, personal communications, October 4, 1996.

Appendix A4c1.--Venezuela. Swordfish longline fleet, 1996-97

Owner/ vessel name	Length	Size	
		GRT	Hold
	Meters	Metric tons	
Companies			
Caribbean Fleet			
Maresil II			
Soberana			
Veleidosa			
CERCENCO C.A.			
Oceanic Caribe			
Conavo			
Antares	23	150	76
Propesca			
Propesca I			
Propoesca II			
Individuals			
Christie, Cori			
Andrews G			
Danial Ferrer			
Orca			
Don Miguel			
Don Jesus	18	46	20
Rudy L	18.5	68	
Lozada, Henry			
Donia Foruna			
Oteiza, Antonio			
Acuarella*			
Makis*			
Pesca, Randy			
Acuarella			
Make			
Triple Chass			
Triple Anthony			
Vellusso, Alfio			
Delfos	17	72	

*One report indicates that these longliners were not being deployed for swordfish.
Source: José Alió, FONAIAP, personal communications, October 4, 1996 and Luis Marcano, FONAIAP, personal communications, October 15, 1997.

Appendix A4c2--Venezuela. Commercial swordfish and tuna longliners, 1997-98

Fishery / Ownership / Vessel name	Length	Size	
		GRT	Hold
	Meters	Metric tons	
Swordfish and tuna			
Companies			
Agropecuaria Ridan			
Orca			
Comercialización de Pescado			
Aquarella			
Falcon's Fishing Company			
Rudy L	18.5	68	
Falcón*	23	68	
Inversiones Beseri			
Delfos	17	72	
Venezolana de Pesca			
Antares	23	150	76
Venezolana Interdepesca			
Make			
Zagemar			
Don Jesus	18	46	20
Individuals			
Belluso, Alfio and F. Guiffrida			
Don Miguel			
Pfeffer, Ronald			
Propesca I			
Propesca II			
Zannin Sartor, Roberto and Johny			
Andrew-G			
Tuna only			
Companies			
Pesquera de la Isla			
Chimana Chica			
Chimana del Este			
Chimana Grande			
Guanta 17			
Guante 91			
Productora Marina			
La Santisima Trinidad			
Individuals			
No vessels listed			

* The Falcón is a shrimp trawler which in mid-1998 was being re-rigged for longlining.
Source: SARPA, March 2, 1998 and various company representatives.

Appendix A4d1.--Venezuela. Longline fleet, by fishery and vessel name, 1998

Vessel	Company	Contact	Port
Longliners targeting swordfish and tuna			
Aquarela	COPESCA C.A.	Robert Blakenship	Pto. La Cruz
Andrew G		Roberto Zannin	Pto. La Cruz
Antares		Unknown new owner	Cumana
Delfos	Productora Marina RR-90 C.A	Hernán Ruíz	Pto. La Cruz
Don Jesus	ZAGEMAR C.A.	Javier Marin	Cumana
Don Miguel		F. Guiffrida	Pto. La Cruz
Doña Fortuna	Productora Marina RR-90 C.A	Hernán Ruíz	Francisco Botin
Falcón	Falcon's Fishing Company	Francisco Botin	Pto. La Cruz
Make	Venezoelana Int. de Pesca	Henry Aguilera	Pto. La Cruz
Maresil II	Carib Fleet C.A.	Francisco Villaroel	Trinidad
Orca	Agropecuaria Ridan C.A.	Daniel Rodan	La Guaira
Propesca I	Arrendadora Maracaibo C.A.	Ronald Pfeffer	La Guaira
Propesca II	Arrendadora Maracaibo C.A.	Ronald Pfeffer	La Guaira
Rudy L	Falcon's Fishing Company	Francisco Botin	Pto. La Cruz
Soberana	Soberana S.A.	Francisco Villaroel	Trinidad
Veleidosa	Sociedad Mercantil Veleidos	Robert C. Adair	Trinidad
Triple Anthony	Ventwo Inc.	Jan Duane Bragg	Pto. La Cruz
Triple Chass	Ventwo Inc.	Jan Duane Bragg	Pto. La Cruz
Longliners targeting tuna			
Chimana Chica	Pesquera de la Isla C.A.	Millie Gomez Sucre	Pto. La Cruz
Chimana del Este	Pesquera de la Isla C.A.	Millie Gomez Sucre	Pto. La Cruz
Chimana Grande	Pesquera de la Isla C.A.	Millie Gomez Sucre	Pto. La Cruz
Guanta 17	Pesquera de la Isla C.A.	Millie Gomez Sucre	Pto. La Cruz
Guanta 91	Pesquera de la Isla C.A.	Millie Gomez Sucre	Pto. La Cruz

Source: Freddy Arocha and Luis Marcano, personal communications, May 6, 1998.

Appendix A4d2.--Venezuela. Longline fleet, by company 1998

Company/ vessel	Fishery	Contact	Port
Agropecuaria Ridan C.A.			
Orca	Swordfish and tuna	Daniel Rodan	La Guaira
Arrendadora Maracaibo C.A.			
Propesca I	Swordfish and tuna	Ronald Pfeffer	La Guaira
Propesca II	Swordfish and tuna	Ronald Pfeffer	La Guaira
Carib Fleet C.A.			
Maresil II	Swordfish and tuna	Francisco Villaroel	Trinidad
Comercialización de Pescado (COPESCA)			
Aquarela	Swordfish and tuna	Robert Blakenship	Pto. La Cruz
Falcon's Fishing Company			
Falcón	Swordfish and tuna	Francisco Botin	Pto. La Cruz
Rudy L	Swordfish and tuna	Francisco Botin	Pto. La Cruz
Pesquera de la Isla C.A.			
Chimana Chica	Tuna	Millie Gomez Sucre	Pto. La Cruz
Chimana del Este	Tuna	Millie Gomez Sucre	Pto. La Cruz
Chimana Grande	Tuna	Millie Gomez Sucre	Pto. La Cruz
Guanta 17	Tuna	Millie Gomez Sucre	Pto. La Cruz
Guanta 91	Tuna	Millie Gomez Sucre	Pto. La Cruz
Productora Marina RR-90 C.A.			
Delfos	Swordfish and tuna	Hernán Ruíz	Pto. La Cruz
Doña Fortuna	Swordfish and tuna	Hernán Ruíz	Pto. La Cruz
Soberana S.A.			
Soberana	Swordfish and tuna	Francisco Villaroel	Trinidad
Sociedad Mercantil Veleidos			
Veleidosa	Swordfish and tuna	Robert C. Adair	Trinidad
Ventwo Inc.			
Triple Anthony	Swordfish and tuna	Jan Duane Bragg	Pto. La Cruz
Triple Chass	Swordfish and tuna	Jan Duane Bragg	Pto. La Cruz
Venezoelana Internacional de Pesca			
Make	Swordfish and tuna	Henry Aguilera	Pto. La Cruz
Zagemar			
Don Jesus	Swordfish and tuna	Javier Marin	Cumana
Private owners			
Andrew G	Swordfish and tuna	Roberto Zannin	Pto. La Cruz
Antares	Swordfish and tuna	Unknown new owner	Cumana
Don Miguel	Swordfish and tuna	F. Guiffrida	Pto. La Cruz

Source: Freddy Arocha and Luis Marcano, personal communications, May 6, 1998.

Appendix A4d3.--Venezuela. Longline fleet, by fishery and vessel name, 1998

Vessel	Length	Size	
		GRT	Hold
	Meters	Metric tons	
Longliners targeting swordfish and tuna			
Aquarela			
Andrew G			
Antares	23	150	76
Delfos	17	72	
Don Jesus	18	46	20
Don Miguel			
Doña Fortuna	17	44	
Falcón	23	68	
Make			
Maresil II			
Orca			
Propesca I			
Propesca II			
Rudy L	18.5	68	
Soberana			
Veleidosa			
Triple Anthony			
Triple Chass			
Longliners targeting tuna			
Chimana Chica			
Chimana del Este			
Chimana Grande			
Guanta 17			
Guanta 91			

Source: Freddy Arocha and Luis Marcano, personal communications, May 6, 1998 and various company representatives.

Appendix B Series: Fishermen

Appendix B.--Venezuela. Tuna fishermen by fleet, 1989-90

Fleet	Year	
	1989	1990
	Individuals	
Baitboat	300	1,200E
Purse seine	658	525E
Longline	680	360E
Total	1,638	2,085

E - Estimated
Source: DGSPA/MAC as reported by the U.S. Embassy, Caracas, December 6, 1991.

Appendix C Series: Biological and effort data
- Series C1: Size
- Series C2: Sex
- Series C3: Diet
- Series C4: Sampling
- Series C5: Effort
- Series C6: Composition
- Series C7: Effort
- Series C8: Seasonality
- Series C9: Stock status

Appendix C1a.--Venezuela. Size and condition of swordfish catches* caught by longliners dedicated to the swordfish fishery

Condition	Size**							Total
	<81	81-100	101-120	121-140	141-160	161-180	180>	
	Number of fish							
Live	9	6	5	4	-	-	1	25
Dead	22	26	25	7	4	3	-	87
Total	31	32	30	11	4	3	1	112

* Swordfish brought aboard longliners targeting the species.
** LJFL in centimeters
Source: J.J. Alió M., L.A. Marcano, H. Salazar, X. Gutiérrez, and O. Rodriguez, "Notas sobre la estructura poblacional del pez espada, *Xiphias gladius*, en Venezuela," *ICCAT Collective Volume of Scientific Papers*, Vol. XL, No. 1 (ICCAT: Madrid, Spain, 1993), pp. 323.

Appendix C1b.--Venezuela. Sizes of swordfish caught by longliners dedicated to the swordfish fishery

Size*		Frequency	
		Number	Proportion
Pounds	Kilos	Fish	Percent
10	4.5	728	32
30	13.6	680	30
50	22.7	380	17
70	31.8	190	8
90	40.8	133	6
110	49.9	75	3
130	59.0	43	2
150	68.0	16	1
170	77.1	14	1
190	86.2	7	Negl
200>	90.7>	30	1

* Eviscerated (dressed) weight
N = 2,295
Source: J.J. Alió M., L.A. Marcano, H. Salazar, X. Gutiérrez, and O. Rodriguez, "Notas sobre la estructura poblacional del pez espada, *Xiphias gladius*, en Venezuela," *ICCAT Collective Volume of Scientific Papers*, Vol. XL, No. 1 (ICCAT: Madrid, Spain, 1993), pp. 326.

Appendix C1b.--Venezuela. Sizes of swordfish taken by commercial longliners, 1987-96

Entry	Units	Year									Total/ average
		1987	1988	1989	1990	1991	1992	1993	1994	1995	
Catch	Individuals	16	20	156	90	154	912	1,299	587	578	3,919
Weight											
Mean	Kilograms	28.1	28.9	29.8	24.8	21.5	25.1	22.4	27.9	24.7	NA
Total	Kilograms	450	578	4,646	2,229	3,224	20,526	28,893	14,509	14,198	92,027
Length*											
Male	Centimeters	130.7	121.3	134.5	124.8	120.3	127.7	120.3	124.9	125.3	123.9
Female	Centimeters	197.0	100.0	136.7	132.1	138.9	138.8	132.7	140.9	145.3	138.0
Mean	Centimeters	135.8	118.7	128.0	124.3	124.7	132.4	126.3	133.5	134.3	130.3

NA - Not available
* Average lower jaw fork length (cm)
Source: Thomas L. Jackson and Mark I. Farber, "Summary of the at-sea sampling of the Western Atlantic Ocean, 1987-95, by international longline vessels fishing out of the port of Cumana, Venezuela: ICCAT Enhanced Research Program for billfish," ICCAT Working Document, SCRS/96/98 (in press) and Thomas L. Jackson, Southeast Fisheries Science Center, NMFS, personal communication, March 10, 1998.

Appendix C2a.--Brazil. Proportion of females, by size class

Size*	Proportion female
Centimeters	Percent
<80	50
85	50
95	37
105	46
115	60
125	72
135	50
145	47
155	56
165	67
175	75
180>	64

* LJFL
N = 206
Note: Data entries estimated visually from a graphic. Fish caught by longliners dedicated to the swordfish fishery.
Source: J.J. Alió M., L.A. Marcano, H. Salazar, X. Gutiérrez, and O. Rodriguez, "Notas sobre la estructura poblacional del pez espada, *Xiphias gladius*, en Venezuela," *ICCAT Collective Volume of Scientific Papers*, Vol. XL, No. 1 (ICCAT: Madrid, Spain, 1993), pp. 326.

Appendix C2b.--Venezuela. Swordfish distribution by sex, 1993

Month	Females			Males			Total
	Individuals	Length*	Weight**	Individuals	Length*	Weight**	
	Number	Cm	Kg	Number	Cm	Kg	Number
January	2	107-110	9.5-17.3	-	-	-	2
February	16	90-175	9.5-48.0	6	102-170	7.0-40.0	22
March	9	68-232	1.4-70.0	3	75-137	6.0-19.4	12
April	10	116-183	15.0-31.5	6	96-141	2.9-25.0	16
May	14	96-203	12.9-83.3	4	110-185	14.0-54.1	18
June	3	108-195	9.1-56.8	2	75-125	3.0-15.0	5
July	2	147-162	13.0-51.0	5	108-147	10.0-40.0	7
August	-	-	-	2	88-115	4.0-14.0	2
September	2	90-129	5.9-20.0	-	-	-	2
October	6	94-116	5.0-30.0	7	103-161	5.0-30.0	13
November	3	109-244	7.5-120.0	6	100-157	6.0-30.0	9
December	3	103-178	9.5-53.0	3	99-173	6.5-34.0	6
Total	70	68-244	1.4-120.0	44	75-185	3.0-54.1	114

* LJFL
** Eviscerated
Source: María A. Barreto C., L. Marcano, J. Alió, X. Gutiérrez, and A. Zerpa, "Alimentación de pez espada, *Xiphias gladius*, en el area del Caribe Venezolano," *ICCAT Collected Volume of Scientific Papers* SCRS/95/65, table 1, p.340.

Appendix C3.--Venezuela. Swordfish stomach contents, occurrence of prey species, 1993

Species	Prey items		Swordfish		Assessment
	Individuals	Proportion	Individuals	Proportion	
	Number	Percent	Number	Percent	
Cephalopods					
Squid (*Illex*)	2	0.5	2	1.8	Secondary
Unidentified	86	20.4	52	45.6	Accidental**
Subtotal	88	20.9	52*	45.6*	
Crustaceans	26	6.2	12	10.5	Secondary
Fin fish					
Bramidae	34	8.1	14	12.3	Primary
Clupeidae	23	5.5	7	6.1	Secondary
Scombridae	3	0.7	1	0.9	Accidental
Synodontidae	15	3.6	4	3.5	Accidental
Percichthydae	3	0.7	1	0.9	Accidental
Dactylopteridae	34	8.1	6	5.3	Accidental
Alepisauridae	10	2.4	3	2.6	Accidental
Carangidae	6	1.4	3	2.6	Accidental
Unidentified	180	42.7	53	46.5	Accidental
Subtotal	308	73.0	83	72.8	
Total#	422	100.0	147	100.0	

* Totals as reported in source.
** It is unclear why the authors have classified such a large occurrence as accidental.
# Percent totals may not add due to rounding.
Source: María A. Barreto C., L. Marcano, J. Alio, X. Gutiérrez, and A. Zerpa, "Alimentación de pez espada, *Xiphias gladius*, en el area del Caribe Venezolano," *ICCAT Collected Volume of Scientific Papers* SCRS/95/65, table 2, p. 341.

Appendix C4a.--Venezuela. Biological sampling of tunas and billfish of the industrial tuna fleet, 1993

Species	Gear			Total
	Purse seine	Baitboat	Longliner	
		Individuals		
Tunas				
Albacore	47	-	122	169
Bigeye	253	74	-	344
Blackfin	657	65	-	722
Frigate	1,277	-	-	1,277
Skipjack	10,630	523	-	11,153
Yellowfin	5,424	791	568	6,783
Marlins				
Blue	-	-	69	69
White	-	-	149	149
Sailfish	-	-	59	59
Spearfish	-	-	41	41
Swordfish	-	-	48	48

Source: ICCAT, "National Report of Venezuela," *Report for Biennial Period*, 1994-1995, Vol 1: 281 pp.

Appendix C4b.--Venezuela. Biological sampling of tunas and billfish of the industrial tuna fleet, 1994

Species	Gear			Total
	Purse seine	Baitboat	Longliner	
		Individuals		
Tunas				
Albacore	52	-	46	98
Bigeye	306	56	105	467
Blackfin	535	99	-	634
Frigate	1,027	-	-	1,027
Yellowfin	4,298	1,447	368	6,883
Skipjack	5,346	232	-	5,578
Marlins				
Blue	-	-	42	42
White	-	-	21	21
Sailfish	-	-	70	70
Spearfish	-	-	28	28
Swordfish	-	-	420	420

Source: *ICCAT*, "Informe Nacional de Venezuela, *Informe del Periodo Bienal* 1994-1995, II Parte (1995), Vol. 2: 236.

Appendix C4c.--Venezuela. Biological sampling of tunas and billfish of the eastern artisanal fleet (Juan Griego) and the central coastal fleet (Playa Verde), 1993.

Species	Location		Total
	Juan Griego	Playa Verde	
	Individuals		
Dolphin	49	174	223
Marlin			
Blue	17	274	291
White	450	190	640
Sailfish	623	1,915	2,538
Spearfish	9	-	9
Swordfish	-	12	12
Total	1,148	2,565	3,713

Source: ICCAT, "National report of Venezuela," *Report for Biennial Period*, 1994-1995, Vol 1: 281 pp.

Appendix C4d.--Venezuela. Biological sampling of tunas and billfish of the eastern artisanal fleet (Juan Griego) and the central coastal fleet (Playa Verde), 1994.

Species	Location		Total
	Juan Griego	Playa Verde	
	Individuals		
Dolphin	-	262	262
Marlins			
Blue Marlin	146	713	838
White Marlin	319	486	1,005
Sailfish	368	1,377	1,745
Spearfish	7	-	7
Swordfish	-	273	273
Total	1,039	3,111	4,150

Source: ICCAT, "Informe nacional de Venezuela," *Informe del Periodo Bienal* 1994-1995, Parte II (1995) Vol. 2, p. 236.

Appendix C5.--Venezuela. Atlantic tuna fleet effort, 1989-91

Gear	Year		
	1989	1990	1991
	Vessel days at sea		
Baitboat	1,490	1,829	2,190
Longline	NA	NA	NA
Purse seine	703	985	1,605

NA- Not available
Source: GSPA/MAC, "Informe Nacional de Venezuela" ICCAT 1992 SCRS meeting, ICCAT document SCRS/92/79, October 29, 1992.

Appendix C6a.--United States. Estimated fish catch in Caribbean longline fishing effort, 1993

Area	Species		Individuals*	Kept	Discarded		Catch
	Common Name	Scientific Name			Dead	Alive	share
			Number		Percent		
Caribbean							
	Swordfish	Xiphias gladius	16,887	0.86	0.09	0.05	49.50
	Dolphin fish	Coryphaenidae	3,865	0.83	0.01	0.16	11.36
	Lancetfish	Alephisauridae	2,716	0.88	0.88	0.12	7.96
	Escolar	Lepidocybium Flavobrunneum	2,072	0.50	0.33	0.17	6.07
	Blue shark	Prionace glauca	1,184	0.01	0.07	0.91	3.47
	Silky shark	Carcharhinus falciformis	1,027	0.03	0.61	0.36	3.01
	Bigeye tuna	Thunnus obesus	1,027	0.34	0.14	3.01	3.01
	Yellowfin tuna	Thunnus albacares	800	0.70	0.22	0.09	2.36
	Albacore tuna	Thunnus alalunga	678	0.97	0.03	0.00	1.98
	White marlin	Tetrapturus albidus	575	0.00	0.27	0.73	1.68
	Blue marlin	Makaira nigercans	539	0.00	0.26	0.74	1.59
	Oil fish	Ruvetus pretiosus	417	0.38	0.29	0.33	1.23
	Longnose spearfish	Tetrapterus pfluergri	383	0.00	0.50	0.50	1.13
	Atlantic sailfish	Istophorus platypterus	244	0.00	0.57	0.43	0.72
	Ocean whitetip shark	Carcharhinus longlimanus	227	0.00	0.54	0.46	0.66
	Shark	Carcharinidea	191	0.00	0.00	1.00	0.56
	Bigeye thresher shark	Alopias superciliosus	174	0.20	0.40	0.40	0.51
	Wahoo	Acanthocybium solandri	156	0.78	0.11	0.11	0.46
	Skates/rayes	Chondrichthyes	156	0.00	0.11	0.89	0.46
	Barracuda	Sphyraenidae	122	0.00	0.29	0.71	0.36
	Spearfish	Tetrapterus spp	87	0.20	0.80	0.00	0.26
	Tiger shark	Galeocerdo cuvieri	70	0.25	0.00	0.75	0.20
	Snack machera	Trichiuridae	52	0.00	1.00	0.00	0.15
	Shortfin mako	Isurus oxyrinchus	52	0.33	0.00	0.67	0.15
	Tuna		52	0.00	0.33	0.67	0.15
	Bigeye cigarfish	Cupiceps spp	34	1.00	0.00	0.00	0.10
	Puffer	Tetraodontidea	34	0.00	0.50	0.50	0.10
	Dusky shark	Carcharhinus obscurus	34	0.00	0.00	1.00	0.10
	Scallop hammerhead	Sphyrna lewini	34	0.00	0.00	1.00	0.10
	Skipjack tuna	Katsuwonus pelamis	34	0.00	1.00	0.00	0.10
	Blackfin tuna	Thunnus atlanticus	34	0.00	1.00	0.00	0.10
	Squid	Myopsidae	17	0.00	0.00	1.00	0.05
	Other fish		17	0.00	0.00	1.00	0.05
	Longfin mako	Isurus paucus	17	0.00	1.00	0.00	0.05
	Bonito	Sarda sarda	17	0.00	0.00	1.00	0.05

* 1993 catch estimated from observer catch rates and reported effort.
Source: Jean Cramer, "Large pelagic logbook newsletter - 1994," *NOAA Technical Memorandum*, NMFS-SEFSC-378 (NMFS, Southeast Fisheries Science Center: Miami, November, 1995), p. 29.

Appendix C6b.--Venezuela. Species reported in field data by "at-sea" observers on commercial tuna/swordfish longliners, 1987-95

Family	Scientific	English common name
SCOMBRIDAE	Thunnus albacares	Yellowfin tuna
	Thunnus alalunga	Albacore
	Thunnus obesus	Bigeye tuna
	Thunnus thynnus	Bluefin tuna
	Thunnus atlanticus	Blackfin tuna
ISTIOPHORIDAE	Makaira nigricans	Blue marlin
	Tetrapterus albidus	White marlin
	Tetrapterus pfleugeri	Spearfish
	Istiophorus platypterus	Sailfish
XIPHIIDAE	Xiphias gladius	Swordfish
CORYPHAENIDAE	Coryphaena sp.	Dolphin/dorado
CHONDRICHTHYS	Various taxa	Sharks*
	Various taxa	Rays*

* Shark and ray taxa are grouped together and represented by cumulative gross number and gross weight in the field data.
Source: Thomas Jackson, NMFS Southeast Fisheries Center based on data compiled by Venezuelan observers aboard Venezuelan commercial longliners operating out of Cumana.

Appendix C6c1.--Venezuela. Catch composition and effort of the tuna longline fleet, 1996-97

Species	1996			1997		
	Oct	Nov	Dec	Jan	Feb	Mar
	Metric tons					
Billfish						
Marlin						
Blue	0.5	0.1	0.5	0.1	0.2	0.4
White	0.2	-	0.1	Negl	0.3	0.4
Sailfish	0.1	-	0.1	Negl	Negl	0.1
Spearfish	Negl	-	Negl	0.1	0.2	0.3
Dorado	Negl	-	-	-	Negl	0.1
Shark	1.9	0.1	2.9	0.6	3.7	5.1
Swordfish	0.1	Negl	0.2	2.2	0.2	0.5
Tuna						
Albacore/Albacora	1.3	0.3	0.8	0.1	0.1	0.9
Skipjack/Patudo	4.5	0.5	3.2	0.6	6.9	2.4
Yellowfin/Rabil	7.8	0.5	2.1	0.3	0.4	1.0
Wahoo	Negl	-	Negl	-	-	-
Totals						
Catch	16.5	1.5	9.9	4.0	11.9	27.0
Vessels (number)	2	1	1	1	2	3
Trips (number)	2	1	1	1	2	3
Hooks (1,000s)	55.1	9.3	44.0	5.2	1.6	31.5

Note: Data is from observed trips which is presumed to reflect overall fleet operations.
Source: Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

Appendix C6c2.--Venezuela. Catch composition and effort of the commercial swordfish longline fleet, 1996-97

Species	1996			1997				
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
	Metric tons							
Billfish								
Marlin								
Blue	1.0	0.1	0.1	0.2	0.2	-	-	0.5
White	0.3	0.1	Negl	Negl	Negl	-	-	0.2
Sailfish	0.1	0.1	Negl	Negl	-	-	-	0.2
Spearfish	-	-	-	-	-	-	-	-
Dorado	-	-	-	Negl	0.2	-	Negl	Negl
Shark	1.7	0.4	-	2.7	2.1	0.2	0.8	4.0
Swordfish	5.2	1.4	0.3	6.3	1.2	0.9	1.7	2.9
Tuna								
Albacore/Albacora	0.3	Negl	-	0.5	Negl	0.1	Negl	Negl
Skipjack/Patudo	3.6	0.7	0.8	1.8	0.4	0.6	0.4	0.4
Yellowfin/Rabil	3.2	2.6	1.1	3.9	0.4	0.4	1.1	3.8
Wahoo	-	-	-	-	-	-	Negl	-
Other								
Totals								
Catch	15.3	5.6	2.3	15.4	4.6	2.3	3.8	12.1
Vessels (number)	4	3	1	3	3	1	2	3
Trips (number)	4	3	1	3	3	1	2	3
Hooks (1,000s)	29.5	7.6	4.2	15.6	11.4	2.5	5.9	11.7

Note: Data is from observed trips which is presumed to reflect overall fleet operations.
Source: Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades Desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

Appendix C6c3.--Venezuela. Catch composition and effort of the artisanal billfish gillnet (trasmallo) fleet operating off the central coast (Playa Verde), 1996-97

Species	1996			1997					
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
	Metric tons								
Billfish									
Marlin									
Blue	7.1	5.9	14.8	10.9	10.7	1.3	19.9	2.3	4.6
White	0.1	0.3	0.1	0.1	0.1	Negl	0.1	Negl	0.1
Sailfish	17.0	6.9	2.8	1.6	1.3	0.4	6.9	8.4	11.5
Spearfish	-	-	-	-	-	-	-	-	-
Dorado	0.2	0.3	1.0	0.7	0.9	1.3	0.7	1.0	0.4
Shark	0.9	0.4	1.7	0.9	1.5	2.3	2.4	1.4	1.1
Swordfish	0.5	0.1	0.5	0.6	0.2	1.4	1.2	0.4	0.7
Tunas	0.2	1.0	3.3	1.7	3.2	3.2	0.1	0.7	0.5
Other	1.8	6.0	12.8	8.6	16.1	15.9	1.4	0.4	0.7
Totals									
Catch	27.9	20.9	37.1	25.1	33.9	25.8	32.7	14.9	19.4
Vessels (number)	27	26	30	32	33	30	30	29	30
Trips (number)	280	240	272	225	245	205	214	168	76

Note: Data is from observed trips which is presumed to reflect overall fleet operations.
Source: Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades Desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

Appendix C6c4.--Venezuela. Catch composition and effort of the artisanal billfish longline fleet operating off the eastern coast, 1996-97

Species	1996			1997					
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
	Metric tons								
Billfish									
Marlin									
Blue	2.1	-	0.2	0.4	-	0.8	1.2	-	-
White	8.7	24.8	8.2	0.5	2.0	5.8	1.8	0.3	-
Sailfish	9.5	13.3	5.2	0.9	6.7	3.2	2.1	1.9	0.6
Spearfish	-	-	-	-	-	-	-	-	-
Dorado	4.2	2.4	6.7	1.4	4.9	12.8	12.1	10.7	27.3
Shark	-	-	-	0.2	1.6	1.6	0.5	0.2	0.4
Swordfish	-	-	-	-	-	-	-	-	-
Tunas	3.3	2.0	2.8	0.5	2.8	1.4	2.3	2.7	1.6
Wahoo	-	-	-	0.2	0.6	0.2	0.4	0.8	1.3
Other	1.4	0.3	0.3	-	-	0.3	1.5	0.8	0.1
Totals									
Catch	29.1	42.8	23.5	4.2	18.6	26.2	22.0	17.4	31.3
Trips (number)	27	17	13	4	14	16	18	19	13
Hooks (1,000s)	72.5	38.6	34.4	10.9	48.3	58.4	70.3	53.6	31.9

Note: Data is from observed trips which is presumed to reflect overall fleet operations.
Source: Luis A. Marcano, Freddy Arocha, and Jesus Marcano, "Actividades Desarrolladas en el programa expandidio de ICCAT para peces de pico en Venezuela, periodo: 1996-97," ICCAT Working Document SCRS/97/30.

Appendix C7a.--Venezuela. Commercial fishing effort and billfish catch, 1987-96

Effort/ results	Units*	Year										
		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Trips	Number	3	3	3	7	16	32	37	34	40	170	
Sets	Number	23	37	34	43	99	265	488	320	466	1,845	
Hooks/set	Average	1,171	1,225	2,439	1,552	1,646	1,036	1,231	1,125	1,611	1,335	
Length/set	Kilometers	57	58	42	46	39	47	50	47	78	56	
Catch**												
BUM	Individuals	38	13	11	34	59	87	96	174	302	863	
WHM	Individuals	144	60	47	69	60	92	242	266	779	1,799	
SAI	Individuals	30	7	18	19	94	148	250	144	343	1,090	
SPF	Individuals	0	0	0	8	36	31	66	111	245	535	

* The above entries refer to the numbers of trips and sets, average number of hooks-per-set and longline length-per-set (km), numbers of billfish caught, and estimated mortality of billfish brought alongside the boat for at-sea sampling in Venezuela, 1987-1996.
** Species
BUM - blue marlin
WHM - white marlin
SAI - sailfish
SPF - spearfish
Source: Thomas L. Jackson and Mark I. Farber, "Summary of the at-sea sampling of the Western Atlantic Ocean, 1987-95, by international longline vessels fishing out of the port of Cumana, Venezuela: ICCAT Enhanced Research Program for billfish," ICCAT Working Document, SCRS/96/98 (in press) and Thomas L. Jackson, Southeast Fisheries Science Center, NMFS, personal communication, March 10, 1998.

Appendix C7b.--Venezuela. Number of fish, sets, and trips, by target species, 1987-95

Target	Catch	Sets	Trips
	Individuals	Number	Number
Yellowfin tuna	10,620	5.8	101
Swordfish	3,919	2.1	45
Billfish	NA	NA	8
Mixed*	NA	NA	14

NA - Not available
* Yellowfin and billfish/swordfish
Source: Thomas L. Jackson and Mark I. Farber, "Summary of the at-sea sampling of the Western Atlantic Ocean, 1987-95, by international longline vessels fishing out of the port of Cumana, Venezuela: ICCAT Enhanced Research Program for billfish," ICCAT Working Document, SCRS/96/98 (in press) and Thomas L. Jackson, Southeast Fisheries Science Center, NMFS, personal communication, March 10, 1998.

Appendix C8a.--Venezuela. Catch statistics for billfish caught, 1987-95.

Species	Individuals caught	Catch rate	Mean weight	Catch rank*
	Number	Number/set	Kilograms	Season*
Marlins				
Blue	863	0.5	47.9	F, W, SP, SU
White	1,799	1.0	18.5	F, W, SP, SU
Sailfish	1,090	0.6	20.4	F, SU, W, SP
Swordfish	3,919	2.1	24.3	F, W, SP, SU
Spearfish	535	0.3	17.8	F, SU, W, SP
All species	8,206	NA	NA	F, W, SU/SP

NA - Not applicable
* Season catch rank equals the percentage of the seasonal catch ranked by decreasing seasonal order.
F - fall,
W - winter,
SP - spring,
SU - summer
Source: Thomas L. Jackson and Mark I Farber, "Summary of the at-sea sampling of the Western Atlantic Ocean, 1987-95, by international longline vessels fishing out of the port of Cumana, Venezuela: ICCAT Enhanced Research Program for billfish," ICCAT Working Document, SCRS/96/98 (in press) and Thomas L. Jackson, Southeast Fisheries Science Center, NMFS, personal communication, March 10, 1998.

Appendix C8b.--Venezuela. Seasonality of commercial billfish catch, 1987-95.

Species	Season									
	Fall		Winter		Spring		Summer		Total	
	Share	Fish*	Share	Fish*	Share	Fish*	Share	Fish*	Share	Fish*
	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Marlin										
Blue	45.0	388	20.1	180	16.8	145	17.4	150	100	863
White	48.7	877	24.9	448	14.3	257	12.1	217	100	1,799
Sailfish	43.7	476	23.6	257	6.7	73	26.1	284	100	1,090
Swordfish	36.8	1,441	22.6	887	22.5	883	18.1	708	100	3,919
Spearfish	48.6	260	20.6	110	15.0	80	25.9	85	100	535
Total	41.9	3,442	22.9	1,882	17.5	1,438	17.6	1,444	100	8,206

* Individual fish
Source: Thomas L. Jackson and Mark I. Farber, "Summary of the at-sea sampling of the Western Atlantic Ocean, 1987-95, by international longline vessels fishing out of the port of Cumana, Venezuela: ICCAT Enhanced Research Program for billfish," ICCAT Working Document, SCRS/96/98 (in press) and Thomas L. Jackson, Southeast Fisheries Science Center, NMFS, personal communication, March 10, 1998.

Appendix C8c.--Venezuela. Number of fish per set and mean weights (kg) per season for all billfish species, 1987-1995.

Species	Season									
	Fall		Winter		Spring		Summer		Total	
	Fish	Weight*	Fish	Weight*	Fish	Weight*	Fish*	Weight*	Fish	Weight*
	Number	Kg	Number	Kg	Number	Kg	Number	Kg	Number	Kg
Marlins										
Blue	0.7	52.3	0.6	38.5	0.3	44.4	0.3	51.3	0.5	47.9
White	1.5	19.6	1.5	16.3	0.4	19.0	0.4	18.1	1.0	18.5
Sailfish	0.8	20.4	0.8	21.4	0.2	19.1	0.5	20.8	0.6	20.6
Swordfish	2.5	22.7	2.9	27.0	2.1	28.4	1.3	21.2	2.1	24.6
Spearfish	0.5	18.5	0.4	17.5	0.2	16.8	0.2	18.5)	0.3	17.8

* Mean weight in kilograms
Source: Thomas L. Jackson and Mark I Farber, "Summary of the at-sea sampling of the Western Atlantic Ocean, 1987-95, by international longline vessels fishing out of the port of Cumana, Venezuela: ICCAT Enhanced Research Program for billfish," ICCAT Working Document, SCRS/96/98 (in press) and Thomas L. Jackson, Southeast Fisheries Science Center, NMFS, personal communication, March 10, 1998.

Appendix C8d.--Venezuela. Sport fishing seasons

Species	Peak season
Marlin	
Blue	Feb-Jun and Nov/Dec
White	Aug-Nov
Sailfish	Aug-Nov and Feb-Apr
Swordfish	May-Dec*
Grand slam**	Aug-Dec

* Available all year
** Catching three billfish species on one trip
Source: Pesca Liquida, internet posting (http://www.bluemarlin.com/bbest.html), posted March 31, 1996.

Appendix C9.--Atlantic. Swordfish yield summary, 1997

Factor	Atlantic swordfish	
	North	South
Quantitative (metric ton) data		
Maximum sustainable yield (MSY)	13,000 t (5,300-16,500 t)*	14,200 t (5,200-16,900 t)*
Preliminary 1996 yield	14,763 t	17,983 t
1996 replacement yield	11,360 t (7,120-16,710 t)	14,620 t (8,400-17,140 t)
Ratios		
Relative biomass (B_{1996}/B_{MSY})*	0.58 (0.41-1.04)	0.99 (0.82-1.18)
Relative fishing mortality		
F_{1995}/F_{MSY}*	2.05 (1.07-3.82)	1.24 (0.94-1.93)
F_{1995}/F_{max}**	2.4	Not estimated****
$F_{1995}/F_{0.1}$**	3.5	Not estimated****
Other		
Management measures in effect	25 kg minimum size and country specific quotas	Limit catch to 1993 or 1994 levels

kg - kilograms
t - metric tons
* Base case production model results based on 1950-95 catch data.
** Base case VPA results based on catch data available through 1995.
*** 80 percent confidence intervals are shown.
**** Production model results do not provide basis for these estimates.
Source: ICCAT-SCRS, *Report on the Standing Committee on Research and Statistics*, (COM/97/17) Madrid, October 20-24, 1997, p. 82.

Series D Appendices: Catches
Series D1: Overall fisheries catch
Series D2: Longline
Series D3: Swordfish
Series D4: Billfish
Series D5: Tuna
Series D6: Sharks and rays
Series D7: Bycatch

Appendix D1a.--Venezuela. Fisheries catch

Year	Catch					Total
	Inland	Atlantic*		Pacific*		
		North	Central	Central	South	
	Metric tons					
1980	15.9	-	161.6	9.0	-	186.6
1981	13.3	-	159.6	3.0	9.8	179.7
1982	15.0	-	188.3	18.0	-	221.3
1983	20.0	-	197.9	2.2	10.3	230.4
1984	21.1	-	219.1	6.5	12.8	259.4
1985	16.2	-	217.5	16.1	14.0	263.6
1986	20.2	-	222.6	31.3	10.5	284.6
1987	27.8	-	223.7	30.2	16.2	297.9
1988	31.1	-	203.8	42.0	9.0	285.9
1989	23.2	-	245.3	45.4	15.3	329.2
1990	18.8	-	259.7	42.7	18.0	339.2
1991	21.4	1.2	270.5	39.4	11.8	344.3
1992	20.7	-	257.5	37.3	17.8	333.4
1993	29.2	-	317.7	39.6	10.6	397.0
1994	38.9	-	354.3	36.9	10.6	440.7
1995	61.6	-	390.4	42.7	10.1	504.8

* FAO Areas: Atlantic
North (west): Area 21
Central (west): Area 31
Pacific
Central (east): Area 77
South (east): Area 87

Source: FAO. *Yearbook of Fishery Statistics*, various years.

Appendix D1b.--Venezuela. Fishery production by fleet, 1983-1995

Year	Fishery			
	Artisanal*	Tuna	Trawler	Grouper**
			Metric Tons	
1983	136,889	43,608	20,772	5,626
1984	139,168	61,272	25,979	6,952
1985	144,447	83,466	29,819	6,167
1986	161,065	86,632	30,263	6,236
1987	171,858	80,745	31,001	6,329
1988	NA	NA	NA	NA
1989	NA	NA	NA	NA
1990	320,123	81,663	37,022	21,825
1991	322,233	77,829	42,443	4,841
1992	311,377	82,075	29,852	2,198
1993	366,171	80,058	31,273	6,109
1994	399,503	75,938	38,800	2,353
1995	440,065	72,324	30,280	4,768

* Artisanal landings for 1990-1991 include finfish, mollusks and crustaceans.
** And snappers
Source: SARPA, Estadisticas del Subsector Pesquero y Acuicola de Venezuela, Vol. 1, No.1. (1990-95 data).

Appendix D2a.--Venezuela. Longline catch, 1958-95

Year	Catch		
	Swordfish	Yellowfin	Bigeye
	1,000 Metric tons		
1958	-	-	-
1959	-	-	-
1960	-	-	-
1961	-	-	-
1962	-	-	-
1963	Negl	-	-
1964	Negl	-	-
1965	Negl	-	-
1966	Negl	-	-
1967	Negl	-	-
1968	Negl	-	-
1969	0.1	-	-
1970	Negl	1.6	-
1971	0.1	1.5	-
1972	Negl	1.9	-
1973	Negl	1.9	-
1974	Negl	1.2	-
1975	0.1	0.6	-
1976	Negl	0.6	Negl
1977	Negl	0.8	0.5
1978	Negl	1.3	0.2
1979	0.2	1.0	0.3
1980	0.2	1.0	0.3
1981	Negl	1.0	1.5
1982	Negl	0.5	1.0
1983	Negl	1.2	2.4
1984	Negl	1.7	2.0
1985	Negl	1.6	1.7
1986	0.1	0.9	0.9
1987	0.1	0.6	0.1
1988	Negl	0.5	Negl
1989	Negl	0.5	Negl
1990	Negl	0.3	Negl
1991	0.1	0.3	0.1
1992	0.1	0.4	Negl
1993	0.1	0.7	0.4
1994	0.1	0.8	0.3
1995	0.1	0.7	0.3

Note: Statistical discrepancies with appendix D2b are unexplained.
Source: ICCAT, "Report of the Standing Committee on Research and Statistics," *ICCAT Report*, Part I, 1990-91 (ICCAT: Madrid, Spain, 1991), p 233-235 and ICCAT, "Report of the Standing Committee on Research and Statistics," *ICCAT Report*, Part II, 1992-93 (ICCAT: Madrid, Spain, 1994), pp. 228 and 235, and ICCAT, *Statistical Bulletin*, 1995, pp 203-204.

Appendix D2b.--Venezuela. Catches taken by the Venezuelan commercial tuna longline fleet in the Atlantic Ocean, 1993.

Species	Quarter				Total	Proportion
	I	II	III	IV		
	Metric tons					Percent
Dolphin	0.9	0.6	0.9	0.7	3.1	Negl
Marlins						
Blue	4.2	6.6	1.0	3.4	15.2	2
White	1.7	3.1	0.7	3.4	8.9	1
Sailfish	0.6	1.6	-	1.3	3.5	Negl
Sharks	20.0	16.8	15.9	13.5	66.2	8
Spearfish	0.2	0.8	-	0.3	1.3	Negl
Swordfish	3.0	0.2	0.2	-	3.4	Negl
Tunas						
Yellowfin	79.6	154.6	146.3	310.5	691.6	84
Albacore	5.2	6.1	3.3	3.0	17.6	2
Bigeye	0.8	2.3	1.2	1.0	5.3	1
Wahoo	0.1	2.9	3.1	1.4	7.5	1
Total	116.3	195.6	173.2	338.5	823.6	100

* Numbers may not add due to rounding.
Source: ICCAT, "National Report of Venezuela," *Report for biennial period*, 1994-95, Vol 1: (ICCAT: Madrid, 1995). 279 pp.

Appendix D2c1.--Venezuela. Longline landings, 1991

Species	Year							
	1988	1989	1990	1991	1992	1993	1994	1995
					Metric tons			
Billfish								
Marlin								
Blue	53	42	50	68	31	17	29	38
White	23	14	28	18	8	11	30	36
Sailfish	37	23	21	29	8	7	20	12
Sharks	48	33	76	64	95	103	127	81
Swordfish	2	57	68	70	99	67	57	10
Tunas**								
Albacore	32	15	14	12	14	19	57	35
Bigeye	8	22	11	6	48	28	52	64
Blackfin	-	1	-	-	Negl	Negl	Negl	Negl
Frigate								
Skipjack	-	-	-	-	Negl	Negl	-	Negl
Yellowfin	714	497	420	667	755	733	553	364
Wahoo	9	3	6	3	2	8	5	16
Dorado#	1	6	6	9	5	4	6	5
Other	2	2	4	3	2	4	-	-
Total	929	715	706	955	1,070	1,002	936	664

** Taken in larger quantities by the baitboat and purse seine fleets.
# Also referred to as mahi-mahi and dolphin fish.
Sources: J.S. Marcano, H. Salazar, L.A. Marcano, and X Gutiérrez, "Estadísticas de la flota palangera venezolana en el Atlántico, período 1988-1995," *ICCAT Collected Volume of Scientific Papers*, Vol. XLVI (4) (ICCAT: Madrid, 1997, p. 166.

Appendix D2c2.--Venezuela. Longline landings, 1991

Species	Year							
	1988	1989	1990	1991	1992	1993	1994	1995
	Percent							
Billfish								
Marlin								
Blue	6	6	7	7	3	2	3	6
White	3	2	4	2	1	1	3	5
Sailfish	4	3	3	3	1	1	2	2
Spearfish	-	-	Negl	1	Negl	Negl	-	Negl
Sharks	5	5	11	7	9	10	14	12
Swordfish	Negl	8	10	7	9	7	6	2
Tunas**								
Albacore	3	2	2	1	1	2	6	5
Bigeye	1	3	2	1	5	3	6	10
Blackfin								
Frigate								
Skipjack								
Yellowfin	77	70	59	70	71	73	59	55
Wahoo	1	Negl	1	Negl	Negl	1	1	2
Dorado#	Negl	1	1	1	1	Negl	1	1
Other	Negl	Negl	1	Negl	-	Negl	-	-
Total	100	100	100	100	100	100	100	100

** Taken in larger quantities by the baitboat and purse seine fleets.
# Also referred to as mahi-mahi and dolphin fish.
Sources: J.S. Marcano, H. Salazar, L.A. Marcano, and X Gutiérrez, "Estadísticas de la flota palangera venezolana en el Atlántico, período 1988-1995," *ICCAT Collected Volume of Scientific Papers*, Vol. XLVI (4) (ICCAT: Madrid, 1997, p. 166.

Appendix D3a1.--Venezuela. Swordfish catch, 1958-95

Year	Catch			
	ICCAT	FONAIAP	FAO	Export**
	Metric tons			
1958	-	-	-	
1959	-			
1960	-	-	-	
1961	-	-	-	
1962	-	-	-	
1963	13	13	NA	
1964	12	12	NA	
1965	8	8	NA	
1966	11	11	NA	
1967	21	21	NA	
1968	18	18	NA	
1969	100	100	NA	
1970	23	23	23	
1971	52	52	52	
1972	27	27	27	
1973	23	23	23	
1974	24	24	24	
1975	52	52	52	
1976	43	43	43	
1977	15	15	15	
1978	46	46	46	
1979	182	182	182	
1980	192	192	192	
1981	24	24	24	
1982	25	25	25	
1983	35	35	35	
1984	23	23	23	
1985	51	51	51	
1986	84	84	84	
1987	86	86	86	
1988	2	108	108	
1989	4	57	57	
1990	9	158	158	NA
1991	68	86	416	280
1992	103	111	359	167
1993	73	64*	379	250
1994	69	69*	411	171
1995	54	46*	430	224
1996	85		497	330E
1997	NA		NA	280E

* These totals include only catches by the Venezuelan commercial longline fleet.
Note: Foreign import data (appendix F1a) suggests that catches are much higher than FONAIAP or ICCAT data indicates, but not as high as suggested by FAO, unless there is substantial domestic consumption.
** Live-weight (catch) equivalent of exported swordfish, based on import data of major importers (appendix F1a)
Source: ICCAT, "Report of the Standing Committee on Research and Statistics," *ICCAT Report*, Part I, 1990-91 (ICCAT: Madrid, Spain, 1991), p 233-235 and ICCAT, "Report of the Standing Committee on Research and Statistics," *ICCAT Report*, Part II, 1992-93 (ICCAT: Madrid, Spain, 1994), pp. 259-260, ICCAT, *Statistical Bulletin*, various years (ICCAT data); and J.J. Alió, personal communications, August 6, 1996 (FONAIAP data); FAO, *Yearbook of Fishery Statistics*, various years (FAO data); and appendix F1a (export equivalent data).
NA: Not Available

Appendix D3a2.--Venezuela. Swordfish catch, 1980-95

Year	Catch
	Metric tons
1980	192
1981	24
1982	25
1983	35
1984	23
1985	51
1986	84
1987	86
1988	108
1989	57
1990	158
1991	415
1992	35
1993	377
1994	411
1995	430
1996	497

Source: FAO, *Yearbook of Fishery Statistics*, various years.

Appendix D3b.--Venezuela. Swordfish live-weight equivalent* of exported product 1990-95

Year	Exports**	Live-weight equivalent#
	Metric tons	
1990	NA	NA
1991	196	280
1992	117	167
1993	175	250
1994	120	171
1995	157	224
1996	191	273
1997	148	211

* The live-weight equivalent of swordfish trunks are about 70 percent.
** Venezuelan export data is unavailable. The authors have instead used the import data of major market countries (appendix F1a).
# Live-weight or catch equivalent of exports.
Available data suggests a major increase in exports as a result of sharply expanded shipments to the United States. Actual exports, however, cannot be calculated because EU data is not yet available. Based on past shipments to the EU the live-weight equivalent of 1996 exports probably exceeded 330 tons.
Source: Appendix F1a

Appendix D3c.--Venezuela. Catches taken by the Venezuelan commercial swordfish longline fleet in the Atlantic Ocean, 1993.

Species	Quarter				Total	Proportion
	I	II	III	IV		
	Metric tons					Percentage
Dolphin	0.1	0.1	0.7	0.3	1.2	1
Marlins						
Blue Marlin	0.9	4.1	0.1	0.5	5.6	3
White Marlin	0.2	0.1	0.2	1.5	2.0	1
Sailfish	0.8	0.1	0.2	2.2	3.3	2
Sharks	8.5	3.2	10.8	14.8	37.3	20
Swordfish	20.1	8.8	13.5	21.2	63.6	35
Tunas						
Yellowfin	17.5	2.1	5.8	17.4	42.8	24
Albacore	5.2	6.1	3.3	3.0	17.6	2
Bigeye tuna	6.7	0.6	3.0	14.7	25.0	14
Total	60.0	25.2	37.6	75.6	198.8	100*

* Numbers may not add up to 100 due to rounding.
Source: ICCAT, "National Report of Venezuela," *Report for Biennial Period*, 1994-1995, Vol 1, 279 pp.

Appendix D3d.--Venezuela. Species composition of longliners dedicated to the swordfish fishery

Species	Seasonal#		Annual
	Nov-Mar	Apr-Oct	
	Percent*		
Shark (mako)	1.5	4.5	2.5
Swordfish	69.0	25.4	55.4
Tunas			
Bigeye	16.5	15.5	16.2
Yellowfin	12.6	53.4	25.3
Other**	0.4	1.2	0.6
Total	100.0	100.0	100.0

Note: Data based on operations of one vessel
\# Seasons: dry season (November to March); rainy season (April to October). Cooler water temperatures are reported during the dry season.
* Proportion in terms of weight
** Marlins, sailfish, dorado, and other species
Source: L.W. Gonzalez and D. Gaertner, "Análisis preliminar de las campañas de pesca exploratoria del pez espada en la ZEE de Venezuela," *ICCAT Coll. Vol. Sci. Pap.*, SCRS/91, in press, as cited in J.J. Alió M., L.A. Marcano, H. Salazar, X. Gutiérrez, and O. Rodriguez, "Notas sobre la estructura poblacional del pez espada, *Xiphias gladius*, en Venezuela," *ICCAT Collective Volume of Scientific Papers*, Vol. XL, No. 1 (ICCAT: Madrid, Spain, 1993), pp. 325.

Appendix D3e1.--Venezuela. Commercial swordfish fleet catch composition, 1993

Month	Species									Total	Proportion				
	Swordfish	Yellowfin	Albacore	Bigeye	Sailfish	B. marlin	W. marlin	Shark	Dorado		Swordfish	Yellowfin*	Tuna	Shark	Billfish
	Metric tons										Percent				
Jan	4.1	5.3	0.1	2.4	-	0.1	-	0.7	0.1	12.9	32	42	61	5	1
Feb	5.4	2.8	0.1	1.9	0.2	0.3	0.1	4.9	Negl	15.7	34	18	31	31	4
Mar	10.6	9.4	0.2	2.5	0.6	0.5	0.1	2.9	0.1	26.7	40	35	45	11	5
Apr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	0.1	-	0.1	-	3.8	-	-	-	4.0	-	3	5	-	95
Jun	8.8	1.9	0.1	0.6	Negl	0.3	0.1	3.2	0.1	15.1	59	13	17	21	2
Jul	4.5	1.1	-	0.7	-	-	0.2	0.2	0.6	7.1	63	15	24	2	2
Aug	7.0	2.9	0.2	1.1	0.1	0.1	Negl	10.3	0.2	21.8	32	13	19	47	1
Sep	2.0	1.8	Negl	1.3	0.1	-	-	0.3	-	5.5	37	32	56	6	2
Oct	3.5	0.8	0.1	1.8	1.5	0.2	1.5	7.6	Negl	16.9	20	5	16	45	19
Nov	11.8	12.7	0.3	8.8	0.2	0.2	Negl	6.6	0.2	40.9	29	31	53	16	1
Dec	5.8	3.9	0.1	4.1	0.5	0.2	-	0.6	-	15.2	38	25	53	4	5
Total	63.6	42.7	1.1	25.1	3.2	5.5	2.0	37.2	1.4	181.8	35	24	38	21	6

* Listed separately because of its importance, but included in the tuna entry.
Source: Freddy Arocha, Universidad de Oriente, March 9, 1998.

Appendix D3e2.--Venezuela. Commercial swordfish fleet catch composition, 1994

Month	Species									Total	Proportion				
	Swordfish	Yellowfin	Albacore	Bigeye	Sailfish	B. marlin	W. marlin	Shark	Dorado		Swordfish	Yellowfin*	Tuna	Shark	Billfish
	Metric tons										Percent				
Jan	2.9	0.8	0.5	1.0	0.3	0.2	0.1	.2	Negl	6.0	50	14	38	4	9
Feb	2.9	1.6	0.2	0.6	0.1	0.2	-	2.0	0.1	7.3	40	22	32	23	3
Mar	11.5	3.7	0.4	3.7	0.1	0.2	Negl	2.0	0.1	22.0	53	17	36	9	1
Apr	1.8	2.7	0.1	1.0	Negl	-	-	.3	Negl	6.0	30	45	64	5	Negl
May	6.7	1.3	0.1	1.3	0.1	0.4	0.1	2.8	0.1	13.0	52	10	21	22	5
Jun	4.6	2.8	0.4	2.2	0.3	Negl	Negl	4.0	0.3	15.0	31	19	37	28	2
Jul	6.8	0.6	-	0.7	Negl	0.1	-	1.0	-	9.0	76	7	15	8	1
Aug	1.6	2.2	Negl	0.2	0.2	0.2	Negl	4.0	0.1	9.0	19	26	29	46	5
Sep	6.0	0.3	-	Negl	Negl	0.3	-	3.3	Negl	10.0	60	3	4	33	3
Oct	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nov	-	-	-	-	-	-	-	-	-	-	-				
Dec	0.3	2.0	-	-	-	0.4	-	0.4	-	3.0	8	67	67	13	12
Total	45.2	18.2	1.8	10.6	1.2	1.7	0.3	19.3	0.8	99.1	46	18	31	20	3

* Listed separately because of its importance, but included in the tuna entry.
Source: Freddy Arocha, Universidad de Oriente, March 9, 1998.

Appendix D3e3.--Venezuela. Commercial swordfish fleet catch composition, 1995

Month	Species									Total	Proportion				
	Swordfish	Yellowfin	Albacore	Bigeye	Sailfish	B. marlin	W. marlin	Shark	Dorado		Swordfish	Yellowfin*Tuna		Shark	Billfish
	Metric tons										Percent				
Jan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	Negl	-	Negl	Negl	-	-	-	0.6	Negl	0.7	10	-	4	85	-
Jun	1.1	Negl	0.3	-	-	Negl	-	0.6	0.1	2.1	51	3	15	26	3
Jul	2.3	0.2	0.2	-	-	-	-	1.0	0.3	4.0	58	6	10	25	-
Aug	1.5	1.2	-	-	Negl	-	-	1.1	-	4.0	39	31	31	29	1
Sep	7.7	4.5	0.4	-	0.4	1.3	Negl	3.5	-	17.8	43	25	27	19	10
Oct	8.5	3.9	0.8	-	0.1	0.7	0.3	4.3	0.2	18.8	45	20	25	23	6
Nov	3.8	1.7	1.3	-	Negl	0.1	0.3	2.3	-	9.6	40	18	32	24	5
Dec	2.7	3.0	1.1	-	0.4	0.3	0.3	0.4	0.1	8.3	33	37	50	4	12
Total	27.7	14.7	4.1	Negl	1.0	2.5	0.9	13.6	0.7	65.2	43	23	29	21	7

* Listed separately because of its importance, but included in the tuna entry.
Source: Freddy Arocha, Universidad de Oriente, March 9, 1998.

Appendix D3e4.--Venezuela. Commercial swordfish fleet catch composition, 1996

Month	Species									Total	Proportion				
	Swordfish	Yellowfin	Albacore	Bigeye	Sailfish	B. marlin	W. marlin	Shark	Dorado		Swordfish	Yellowfin*Tuna		Shark	Billfish
	Metric tons										Percent				
Jan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb	2.5	4.5	0.8	3.7	0.3	0.8	0.8	2.3	1.0	17.8	16	29	57	15	12
Mar	12.4	2.4	0.8	2.3	0.2	0.3	0.1	4.0	0.2	22.0	57	11	22	18	3
Apr	12.6	4.8	0.4	2.1	Negl	0.5	0.1	5.6	0.5	26.5	48	18	28	21	2
May	7.0	3.0	0.5	3.3	-	Negl	-	4.0	0.2	18.2	39	17	38	22	1
Jun	2.5	1.7	0.2	1.4	-	-	-	0.5	-	6.2	40	27	52	8	-
Jul	3.0	1.7	-	2.3	-	-	-	8.5	-	15.4	20	11	26	55	-
Aug	3.6	6.6	0.1	2.6	0.3	1.1	Negl	3.2	0.1	17.6	20	38	53	18	8
Sep	2.8	1.8	Negl	2.0	-	-	-	2.9	-	9.5	30	19	40	30	-
Oct	5.2	3.2	0.3	3.6	Negl	0.1	0.4	1.7	-	15.3	34	21	46	11	9
Nov	2.2	4.1	Negl	2.2	0.1	0.1	0.1	4.4	-	13.3	17	31	48	33	3
Dec	3.9	1.5	-	1.4	Negl	Negl	Negl	.3	-	7.2	54	21	40	4	2
Total	57.7	35.5	2.3	26.7	1.0	3.9	1.6	37.3	1.1	167.0	35	21	39	22	4

* Listed separately because of its importance, but included in the tuna entry.
Source: Freddy Arocha, Universidad de Oriente, March 9, 1998.

Appendix D3f.--Venezuela. Swordfish fleet* and catch, 1987-91

Year	Vessels*	Catch**
	Number	Metric tons
1986	-#	-
1987	2	100
1988	3	132
1989	5	160
1990	9	214
1991	5	250##

Note: Discrepancies with FAO and ICCAT catch data (appendices D3a1) are unexplained.
* Longliners dedicated to the swordfish fishery.
** Catch of the longliners dedicated to the swordfish fishery.
# NMFS believes that before 1987 there were no longliners dedicated to the swordfish fishery.
Estimated
Source: MAC-DGSPA as cited in J.J. Alió M., L.A. Marcano, H. Salazar, X. Gutiérrez, and O. Rodriguez, "Notas sobre la estructura poblacional del pez espada, *Xiphias gladius*, en Venezuela," *ICCAT Collective Volume of Scientific Papers*, Vol. XL, No. 1 (ICCAT: Madrid, Spain, 1993), pp. 323.

Appendix D4a.--Venezuela. Catches taken by the artisanal billfish fleet off the central coast* of Venezuela, 1993.

Species	Quarter I	II	III	IV	Total	Proportion*
	Metric tons					Percentage
Dolphin	0.4	1.5	1.2	0.6	3.7	4
Marlin						
Blue	3.9	12.8	3.8	3.3	23.9	25
White	0.1	0.8	1.8	1.0	3.7	4
Sailfish	2.3	13.6	27.5	16.6	60.0	63
Swordfish	0.5	1.8	1.8	0.3	4.4	5
Wahoo	0.1	2.9	3.1	1.4	7.5	1
Total*	7.2	30.5	36.2	21.8	95.7	100

* Totals may not agree due to rounding.
Source: SARPA and FONAIAP, "National Report of Venezuela", *ICCAT: Report for Biennial Period*, 1994-95, Vol 1: (ICCAT: Madrid, 1995), p. 280.

Appendix D4b.--Venezuela. Catches taken by the artisanal billfish fleet off the eastern coast* of Venezuela, 1993.

Species	Quarter I	II	III	IV	Total	Proportion*
	Metric tons					Percent
Dolphin	2.1	0.7	8.0	3.8	14.6	9
Marlin						
Blue	-	-	-	2.0	2.0	1
White	7.3	0.2	10.9	74.7	93.1	57
Sailfish	11.9	1.1	10.9	27.9	51.8	32
Swordfish	0.1	-	-	-	0.1	Negl
Spearfish	-	-	-	0.6	0.6	Negl
Total*	21.4	2.0	29.8	109.0	162.2	100.00

* Totals may not agree due to rounding.
Source: SARPA and FONAIAP, "National Report of Venezuela," *ICCAT: Report for biennial period*, 1994-1995, Vol 1: (ICCAT: Madrid, 1995). p. 280.

Appendix D4c.--Venezuela. Species composition of artisanal fishery, January-September, 1992

Species	Site	
	Playa Verde*	Juan Griego**
	Individuals	
Marlin		
Blue	295	2
White	102	693
Sailfish	1,113	1,265
Spearfish	-	8
Swordfish	93	-
Wahoo	-	279
Total	1,605#	2,247

The Playa Verde totals is as it appears in the source; it is unclear why it does not add.
* Near La Guaira, the port of Caracas
** Margarita Island
Source: Sampling of artisanal landings by the General Sectorial Directorate for Fisheries and Aquaculture (DGSPA), "National report of Venezuela," *ICCAT Report*, Part I, 1992 (ICCAT: Madrid, Spain, 1993), p. 374.

Appendix D4d.--Venezuela. Catch composition of artisanal longliners targeting billfish.

Species	Proportion#
	Percentage
Billfish	
Marlin	
White	32.7
Blue	Negl
Sailfish	52.0
Spearfish	Negl
Swordfish	Negl
Total Billfish	84.9*
Dorado	5.6
Tuna**	5.5
Others***	4.0
Total*	100.0

* Numbers may not add due to rounding.
** Includes albacore, yellowfin and blackfin tuna.
*** Includes shark, wahoo, among other species.
# Share of retained catch
Source: Marcano, et. al., "Análisis preliminar de la pesquería artesanal de peces de pico en la región nororiental de Venezuela," *ICCAT, Collective Volume of Scientific Papers*, Vol XLII (2), SCRS/93/78 (ICCAT: Madrid, 1994), p. 322.

Appendix D5a.--Venezuela. Tuna and tuna-like catch (species taken by longlines), 1980-95

Year	Species	
	Albacore	Bigeye
	Metric tons	
1980	755	727
1981	331	72
1982	137	999
1983*	823	4,284
1984*	1,076	4,142
1985*	467	2,918
1986	172	955
1987	26	85
1988	137	309
1989	41	56
1990	391	155
1991	163	473
1992	200	68
1993	295	28
1994	278	457
1995	276	5
1996	328	105

* The unusually high 1983-85 catch is unexplained, but may have involved unusually high seiner catches.
Note: FAO does not release catch data by gear. It is likely, however, that nearly all of Venezuela's albacore and most of its bigeye catch taken in the Caribbean and adjacent areas (FAO area 31) is taken by longlines.
Source: FAO, *Yearbook of Fishery Statistics*, various years.

Appendix D5b1.--Venezuela. Billfish catches, 1963-69

Species/ fishery	Year									
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
	Metric tons									
Marlin										
Blue										
Longline	NA	NA	NA	101	74	36	35	62	96	43
Rod & reel	NA	NA	NA	3	3	2	7	6	6	6
White										
Longline	NA	NA	NA	55	78	63	93	104	107	268
Rod & reel	NA	NA	NA	2	4	3	11	10	11	22
Sailfish										
Longline	NA	NA	NA	31	36	93	61	113	79	89
Rod & reel	NA	NA	NA	2	4	3	11	10	11	22
Total	NA	NA	NA	194	199	200	218	305	310	450

Source: ICCAT, *ICCAT Report*, 1992-93, Part II, (ICCAT: Madrid, Spain, 1993), pp. 254-258.

Appendix D5b2.--Venezuela. Billfish catches, 1970-79

Species/ fisheries	Year									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
	Metric tons									
Marlin										
Blue										
Longline	30	178	188	124	83	82	78	79	93	132
Rod & reel	6	4	2	1	2	1	1	1	1	2
White										
Longline	15	82	258	170	114	113	107	108	127	181
Rod & reel	12	12	10	5	7	4	5	2	2	2
Sailfish										
Longline	428	326	91	86	77	56	54	54	64	91
Rod & reel	12	12	10	5	7	4	5	2	2	2
Total	503	614	559	391	290	260	250	246	289	410

Source: ICCAT, *ICCAT Report*, 1992-93, Part II, (ICCAT: Madrid, Spain, 1993), pp. 254-258.

Appendix D5b3.--Venezuela. Billfish catches, 1980-89

Species/ fisheries	Year									
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
	Metric tons									
Marlin										
Blue										
Longline	79	102	81	167	107	214	214	55	14	20
Rod & reel	2	4	2	5	10	5	4	5	3	5
White										
Longline	110	140	112	230	148	148	148	148	38	38
Rod & reel	3	2	1	4	7	7	3	6	3	5
Sailfish										
Longline	55	70	56	115	74	74	74	74	19	19
Rod & reel	3	2	1	4	7	7	3	6	3	5
Total	252	320	253	525	353	455	446	294	80	92

Source: ICCAT, *ICCAT Report*, 1992-93, Part II, (ICCAT: Madrid, Spain, 1993), pp. 254-258.

Appendix D5b4.--Venezuela. Billfish catches, 1990-92

Species/ fishery	Year 1990	1991	1992
	Metric tons		
Marlin			
Blue			
Longline	20	39	81
Rod & reel	5	5	12
White			
Longline	38	38	64
Rod & reel	5	5	9
Sailfish			
Longline	19	19	36
Rod & reel	5	5	10
Total	92	111	212

Source: ICCAT, *ICCAT Report*, 1992-93, Part II, (ICCAT: Madrid, Spain, 1993), pp. 254-258.

Appendix D5b5.--Venezuela. Billfish catches, 1985-95

Year	Catch* Gillnets	Longlines	Rod-reel	Surface**	Total
	Metric tons				
1985	-	436X	19E	-	455
1986	-	436E	10E	-	446
1987	-	277E	17E	-	294
1988	20E	111E	9E	-	140
1989	99E	106E	15E	-	220
1990	13E	145E	15G	-	173
1991	20E	88X	15G	-	124
1992	21E	132X	31A	-	184
1993	24E	193X	30E	-	247
1994	87P	184P	18A	49P	338
1995	53P	139P	-***	42P	234

A - Official data
E - ICCAT SCRS estimate
P - Preliminary
X - More than one source of information
* 1987 and 1989-94 data may include some catches by foreign vessels.
** Unclassified surface fisheries
*** There had to be a rod and reel catch, but the category was not listed for 1995 by ICCAT. It may be included in the general surface category.
Note: Discrepancies with D5b3-4 are unexplained.
Source: ICCAT, *Statistical Bulletin*, various years.

Appendix D6a1.--Venezuela. Shark landings, 1993-94

Species/product		Year	
English	Spanish	1993	1994
		Metric tons	
Shark*	Tiburón	1,660	1,606
Tiger	Tintorera**	25	63
Dogfish	Viuda	120	306
NA	Vieiras	4,127	3,832
Fins	Fins	132	141
Total		6,065	5,949

NA - Not available
* Various species
** The Spanish name of this species varies widely from country to country. The Spanish word for tiger ("tigre") is often used but there are many other names as well.
Source: INFOPESCA, *Noticias Comerciales*, October 5, 1995.

Appendix D6a2.--Venezuela. Shark and ray catch, 1990-95

Year	Species		Total
	Requiem	Rays*	
	Metric tons		
1990	5,466	1,296	6,762
1991	5,076	1,735	6,811
1992	6,103	1,867	7,970
1993	6,101	1,748	7,849
1994	6,656	1,994	8,650
1995	7,468	2,450	9,918
1996	6,979	1,812	8,791

*Skates, rays, and mantas
Source: FAO, *Yearbook of Fishery Statistics*, various years.

Appendix D7a.--Venezuela. Sea turtle catch, 1980-95

Year	Marine				Fresh water	Total
	Green	Hawksbill	Loggerhead	Other*		
	Metric tons					
1974	Negl	Negl	Negl	4	6	10
1975	Negl	Negl	Negl	Negl	-	-
1976	Negl	Negl	Negl	Negl	2	2
1977	Negl	Negl	Negl	Negl	5	5
1978	Negl	Negl	Negl	Negl	2	2
1979	Negl	Negl	Negl	Negl	3	3
1980	Negl	Negl	Negl	Negl	Negl	Negl
1981	Negl	Negl	Negl	Negl	Negl	Negl
1982	Negl	Negl	Negl	Negl	Negl	Negl
1983	Negl	Negl	Negl	Negl	Negl	Negl
1984	Negl	Negl	Negl	Negl	Negl	Negl
1985	Negl	Negl	Negl	Negl	Negl	Negl
1986	Negl	Negl	Negl	Negl	Negl	Negl
1987	Negl	Negl	Negl	Negl	Negl	Negl
1988	Negl	Negl	Negl	Negl	Negl	Negl
1989	Negl	Negl	Negl	Negl	Negl	Negl
1990	Negl	Negl	Negl	Negl	Negl	Negl
1991	Negl	Negl	Negl	Negl	Negl	Negl
1992	Negl	Negl	Negl	Negl	Negl	Negl
1993	Negl	Negl	Negl	Negl	Negl	Negl
1994	Negl	Negl	Negl	Negl	Negl	Negl
1995	Negl	Negl	Negl	Negl	Negl	Negl
1996	Negl	Negl	Negl	Negl	Negl	Negl

* Or unspecified
Source: FAO, *Yearbook of Fishery Statistics*, various years.

Appendix D7b.--Atlantic. Selected responses to ICCAT 1995 by-catch questionnaire

Country	Area	Year	Target species	Gear	Observers*						Logbooks		
					Q1	Q2	Q3	Q4	Q5	Q6	Share**	Major	Other
											Percent		Species
Bermuda	West Atl	1993-94	Tunas	Longline+	y	y	y	y	y	y	NA	Sharks;	Other fish
Brazil	SW Atl	1987-90	Tunas++	Longline	y	y	y	y	n	n	10	Sharks;	Birds
Japan	Atlantic	1994	Tunas	Longline	n			y	y		NA	Sharks	
Mexico	G. of Mexico	1994	Yellowfin	Longline	y	y	y	y	n	n	20	Billfish;	Other finfish
Spain	Atlantic	1991-94	Swordfish	Longline	y	n	n	n			NA		Blue and mako shark
USA	Caribbean	1993	Swordfish#	Longline	y	y	y	y	y	y	41.5	Dorado;	Shark, other fish, and turtles
Uruguay	SW Atl	No questionnaire submitted to ICCAT											
Venezuela	WestTrAtl##	1993-95	Swordfish	Longline	y	y	y	y	y	y	5-20	Sharks	

* Questions
Q1: Are scientific observer data available for the fishery?
Q2: Can the scientific observer data be used to estimate bycatch?
Q3: Are scientific observer data used to estimate bycatch for this report?
Q4: Are fishing logbook data available for this fishery?
Q5: Can logbook data be used to estimate bycatch?
Q6: Are logbook data used to estimate bycatch for this report?

** Reported percentages of bycatch (non-target) species by number or weight. In some cases such bycatch may have substantial value and is not an unwanted byproduct. Readers should be alerted that comparisons between countries and gear are not appropriate since these reports vary widely in the level of detailed information on which they are based.

And tunas

Western tropical Atlantic (including the Caribbean)

+ And rod and reel sports fishing

++ And swordfish

Source: Based on national submissions, published by ICCAT for the Shark Working Group of the SCRS Sub-Committee on By-catches, Miami, February 26-28, 1996.

Appendix D7c.--ICCAT. Non-finfish bycatch in the Atlantic (ICCAT area), 1994-96

English	Scientific
Sea turtles	
Greens	Chelonia mydas
Loggerheads	Caretta caretta
Leather backs	Dermochelys coriacea
Sea birds	
Albatrosses	Diomedea sp.
???	D. chlorhychos
Black-browed	D. melanophris
Wandering	D. exulans
Gull	Larus sp.
Petrel	
White chinned	Procelaria aequinoctialis aequinoctialis
????	Procelaria aequinoctialis conspicillata
Shearwater	
Greater	Puffinus grabis
Marine mammals	
Dolphin	
Bottlenose	Tursiops truncatus
Grampus	Grampus griseus
Pilot whale	Globicephala melaena

Source: ICCAT compilation of national responses to bycatch questionnaire in ICCAT, "Report of the Working Group on Sharks," ICCAT Sub-Committee on By-Catch,
COM-SCRS/97/12, Shimizu, Japan, March 11, 1997.

Appendix D7d1.--United States. Estimated catch of marine mammals, marine turtles, and birds in longline fishery,* 1993

Area	Species		Individuals*	Kept	Discarded		Catch
	Common Name	Scientific Name			Dead	Alive	share
			Number	Percent			
Caribbean							
	Loggerhead turtle	Caretta caretta	70	0.00	0.00	1.00	0.20
	Leatherback turtle	Dermochelys coriacea	17	0.00	0.00	1.00	0.05
Grand Banks							
	Leatherback turtle	Dermochelys coriacea	306	0.00	0.00	1.00	0.34
	Loggerhead turtle	Caretta caretta	131	0.00	0.00	1.00	0.15
	Bottlenose dolphin	Tursiops truncatus	15	0.00	0.00	1.00	0.02
	Green turtle	Chelonia mydas	15	0.00	0.00	1.00	0.02
Gulf of Mexico							
	Leatherback turtle	Dermochelys coriacea	158	0.00	0.00	1.00	0.19
	Green turtle	Chelonia mydas	13	0.00	0.00	1.00	0.02
	Loggerhead turtle	Caretta caretta	13	0.00	0.00	1.00	0.02
	Grampus	Grampus griseus	13	0.00	1.00	0.00	0.02
	Turtle spp		13	0.00	0.00	1.00	0.02
Northeastern Coastal							
	Leatherback turtle	Dermochelys coriacea	328	0.00	0.00	1.00	0.37
	Pilot whale	Globicephala sp	164	0.00	0.00	1.00	0.19
	Loggerhead turtle	Caretta caretta	59	0.00	0.00	1.00	0.07
	Grampus	Grampus griseus	23	0.00	0.00	1.00	0.03
	Gull	Larus sp	12	0.00	0.00	1.00	0.01
	Turtle spp		12	0.00	-	-	0.01
Southeastern							
	Loggerhead turtle	Caretta caretta	86	0.00	0.25	0.75	0.12
	Leatherback turtle	Dermochelys coriaces	86	0.00	0.00	1.00	0.12
	Pilot whale	Globicephala sp	21	0.00	0.00	1.00	0.03

Note: Effort data for evaluating Caribbean catch rates is detailed in appendix D7e2. Data for other areas is available in the source for this appendix. The data in this appendix includes surface and demersal sets for sharks. As a result, the bycatch levels differ than those for the swordfish sets reported in appendix D7e1.

* 1993 catch estimated from observer catch rates and reported effort

Source: Source: Jean Cramer, "Large pelagic logbook newsletter - 1994," *NOAA Technical Memorandum*, NMFS-SEFSC-378 (NMFS, Southeast Fisheries Science Center: Miami, November, 1995), p. 32.

Appendix D7d2.--United States. Longline turtle, mammal, and seabird bycatch reported by U.S. observers in the Caribbean and adjacent areas, 1992-97

Year	Area#	Turtles*		Marine mammals*		Seabirds		Total animals	Sets	
		Alive	Dead	Alive	Dead	Alive	Dead		Hooks	Hauls
				Number					1,000 hooks	Number
1992	Caribbean	2	1	-	-	-	-	3	4.4	11
	Florida east coast	-	-	-	-	-	-	-	9.4	39
1993	Caribbean	4	-	-	-	-	-	4	17.6	40
	Florida east coast	3	1	1**	-	-	-	5	31.0	85
	North central Atlantic	1	-	-	-	-	-	1	33.1	52
1994	Caribbean	2	-	-	-	-	-	2	14.9	35
	Florida east coast	2	-	-	-	-	-	2	22.1	84
	North central Atlantic	1	-	-	-	-	-	1	12.0	19
1995	Caribbean	-	-	-	-	-	-	-	21.4	48
	Florida east coast	6	-	1**	-	-	-	7	12.3	37
	North central Atlantic	9	-	-	-	-	-	9	60.3	83
1996	Caribbean	1	-	-	-	-	-	1	2.2	6
	Florida east coast	-	-	-	-	-	-	-	8.7	28
	North central Atlantic	3	-	-	-	-	-	3	30.7	41
	Equatorial Atlantic##	1	-	-	-	-	-	1	18.2	27
1997	Caribbean	1	-	-	-	-	-	1	3.7	9
	Florida east coast	2	-	-	-	-	-	2	18.3	49
	North central Atlantic	2	-	-	-	-	-	2	13.2	19
	Equatorial Atlantic##	1	-	-	-	-	-	1	2.9	4
	Far Equatorial Atlantic+	2	-	-	-	-	-	2	15.9	21

See map on page 1 of annual issue of NMFS/NOAA "Large Pelagic Logbook". The latest issue is Jean Cramer and Heather Adams, "Large pelagic logbook," *NOAA Technical Memorandum* (NMFS-SEFSC-407) January 1998, p. 1.
Referred to as "Tuna north" in the source.
+ Referred to as "Tuna south" in the source.
* Species indicated in appendix D7e1.
** Pilot whale released alive.
Source: Dennis Lee, computer run of observer data, March 3, 1998.

Appendix D7e1.--United States. Estimated catch of marine turtles in Caribbean longline fisheries, 1992-95

Area	Species		Year			
	Common Name	Scientific Name	1992	1993	1994	1995*
			Number			
Caribbean						
Turtles						
	Loggerhead	Caretta caretta	2	4	3	6
	Leatherback	Dermochelys coriacea	16	10	5	11
	Hawksbill	Eretmochelys coriacea	2	-	1	-
	Green	Chelonia mydas	1	-	2	3
	Kemps Ridley	Lepidochelys kempi	-	1	1	1
	Unknown		6	-	1	-
	Total		27	15	13	21

Note: Effort data for evaluating Caribbean catch rates is detailed in appendix D7e2. Data for other areas is available in the source for appendix D7e2. The data in this appendix does not agree with appendix D7d2 as only swordfish sets were computed.
* Increased U.S. activity was noted on the Caribbean during 1995, including areas off western Venezuela and south of Haiti and the Dominican Republic.
Source: Jean Cramer, "Species reported caught in the U.S. commercial pelagic longline, gillnet, and pair trawl fisheries from 1987 to 1995," *Miami Laboratory Contribution* (95/96-38), May 1996, pp. 54-88.

Appendix D7e2.--United States. Reported Caribbean longline effort, 1987-95

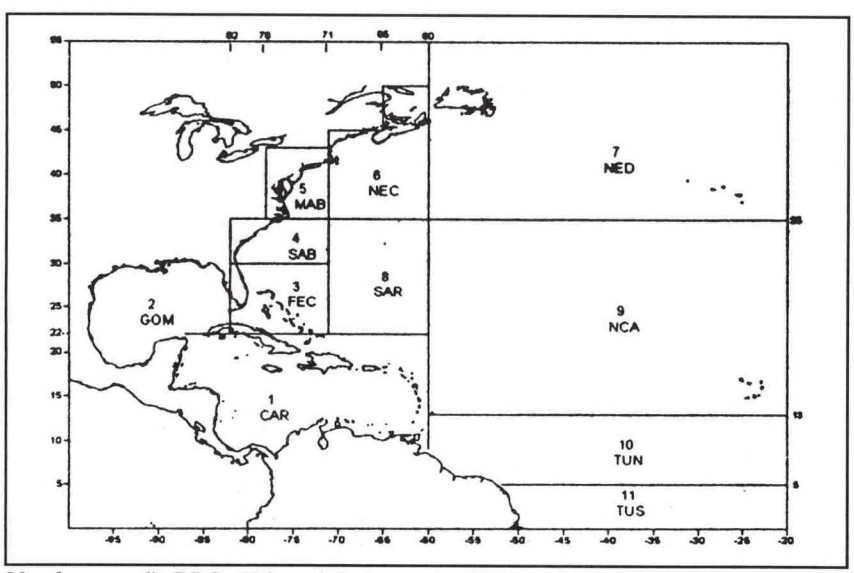
Year/	Quarter	Effort		Hooks per set
		Sets	Hooks	
		Number	1,000 hooks	Number
1987	1	875	320	366
	2	531	188	354
	3	-	-	-
	4	335	118	352
1988	1	839	310	369
	2	619	228	369
	3	355	132	372
	4	521	203	370
1989	1	927	357	365
	2	393	145	369
	3	29	8	276
	4	412	155	376
1990	1	896	348	388
	2	248	99	399
	3	81	29	358
	4	353	142	402
1991	1	674	263	390
	2	135	50	370
	3	10	3	300
	4	237	104	439
1992	1	511	233	456
	2	114	43	377
	3	2	Negl	NA
	4	176	68	386
1993	1	528	211	400
	2	173	67	387
	3	17	7	412
	4	291	219	753
1994	1	463	212	458
	2	229	114	498
	3	81	33	407
	4	267	115	431
1995	1	505	220	436
	2	211	95	343
	3	153	65	425
	4	28	11	393

Source: Source: Jean Cramer, "Species reported caught in the U.S. commercial pelagic longline, gillnet, and pair trawl fisheries from 1987 to 1995," *Miami Laboratory Contribution* (95/96-38), May 1996, pp. 2-6.

Appendix D7e3.--United States. Turtle interaction comparisons, 1992-97

Year	Areas*					
	Caribbean	ECFlorida	NCAtlantic	EqAtlantic	FEqAtlantic	Hawaii**
	Turtle hookings per 1,000 hooks deployed					
1992	0.68	-	NO	NO	NO	NA
1993	0.23	0.13	0.13	NO	NO	NA
1994	0.13	0.09	0.08	NO	NO	0.06***
1995	-	0.49	0.15	NO	NO	0.05
1996	0.45	-	0.10	0.05	NO	0.06
1997	0.27	0.11	0.15	0.34	0.13	0.07

NA - Not available
NO - No observations
Note: For level of activity and absolute number of interactions see appendix D7d2. The observers report that many of the hooked turtles are released alive, but data on survival rates are unavailable.
* Areas: Are based on the standard areas adopted by the observer program. See attached map.
ECFlorida - Florida East Coast
NCAtlantic - Northcentral Atlantic
EqAtlantic - Equatorial Atlantic (Tuna 1)
FEqAtlantic - Far Equatorial Atlantic (Tuna 2)
** The turtle bycatch rates indicated here come from a through assessment of the Hawaiian longline fishery and should be given greater credence than the raw observer data available for the Atlantic areas mentioned. NMFS has contracted an assessment of turtle interactions along the Atlantic and that data should be available by May 1998.
*** February 24, 1994 - February 23, 1995. Subsequently restated to 0.05.
Sources: Dennis Lee, computer run of Atlantic observer data, March 3, 1998 (Atlantic data) and Hilda Diaz-Soltero, "Annual Report on Implementation of a Biological Opinion," N M F S memos, various years (Hawaiian data).



Map for appendix D7e3.--U.S. statistical areas for fishing and bycatch data.

Appendix D8a.--Latin America. IGFA fishing contest winners, selected marine species

Country/ Species	Weight	Place	Location	Date
	Kilograms			
Bahamas				
Jack (Horseeye)	2.8	Third	West End/Grand Bahamas	October 25, 1996
Scombrops (Atlantic)	9.4	Second	Bimini	July 13, 1997
Shark (Gulper)	7.3	First	Bimini	July 13, 1997
Bermuda (United Kingdom)				
Wahoo	12.9	Second	Challenger Bank	July 22, 1997
Brazil*				
Queenfish (Doublespotted)	7.4	First	Rio de Janeiro#	May 3, 1997
Marlin (White)	60.2	First	Rio de Janeiro	December 14, 1996
Scorpionfish (Spotted)	1.6	First	Rio de Janeiro##	May 25, 1997
Tuna (Yellowfin)	109.0	First	Guarapari	December 15, 1997
"	97.0	Second	Guarapari	December 18, 1997
Clipperton Island (France)				
Runner (Rainbow)	5.2	Third	Clipperton Island	March 21, 1997
Trevally (Bluefin)	10.4	Second	Clipperton Island	March 22, 1997
Colombia**				
Costa Rica**				
Roosterfish	11.8	Second	Papagayo Gulf	September 25, 1997
Snapper (Mullet)	14.7	First	Drake Bay	January 21, 1997
"	13.6	Second	Cano Island	December 1, 1996
Trevally (Bigeye)	5.4	Third	Drake Bay	January 9, 1997
Ecuador				
Grouper (Broomtail)	40.4	First	El Muerto Island	June 20, 1997
Mexico				
Dorado (Dolphin)	33.6	First	Cabo San Lucas, BCS	08/14/96
Grouper (Gulf)	50.3	First	Uncle Sam Bank, BCS	10/24/96
Grouper (Olive)	16.9	First	Clarion Island, BC	01/13/97
Jack (Horse-eye)	10.9	First	Puerto Aventuras	04/16/97
Jack (Pacific crevalle)	10.9	First	Cabo San Lucas, BCS	02/04/97
"	10.6	Second	Todos Santos, BCS	12/05/96
"	10.3	Third	Todos Santos, BCS	12/05/96
Mackerel (Cero)	4.8	Third	Puerto Aventuras	04/16/97
Mackerel (Frigate)	0.5	Second	Cabo San Lucas, BCS	05/26/97
Pampano (Gaftopsail)	1.3	First	Cabo San Lucas, BCS	04/16/97
"	1.0	Second	Cabo San Lucas, BCS	04/02/97
Roosterfish	13.3	First	Los Frailes, BC	05/02/97
"	10.1	Third	Los Frailes, BC	04/02/97
Skipjack (Black)	6.5	First	Todos Santos, BC	12/05/96
"	6.5	Second	Todos Santos, BC	12/05/96
"	6.2	Third	Todos Santos, BC	12/05/96
Tuna (Skipjack)	20.5	First	Flathead Bank, BC	11/16/96
Tuna (Yellowfin)	5.6+	Third	Todos Santos, BC	12/05/96
Panama				
Marlin (Black)	153.3	First	Pintas Bay	02/03/97
Sailfish (Pacific)	43.5	Second	Piñas Bay	03/31/97
Puerto Rico (United States)				
Spearfish (Longbill)	11.8	Third	San Juan	01/01/97
Venezuela**				
Swordfish	152.0	First	Playa Grande	07/05/97

Note: The International Game Fish Association has for more than 20 years conducted an international fishing contest. As review of the results provides some indication of recreational fishing activity in Latin America.
* There was extensive freshwater activity in Brazil, including native species that only occur in Brazil and a few neighboring species.
** Some freshwater activity
+ This appears to be an error.
# Guanabara Bay
Angra Dor Reis Bay
Source: IGFA, "22nd annual IGFA fishing contest winners," *The International Angler*, January-February, 1998, pp. 8-14.

Appendix D8b.--Latin America. IGFA fishing contest winners, selected marine species

Club/ Country	Species	Weight	Location	Date
		Pounds		
5 to 1 Club*				
Bahamas	Dorado (Dolphin)	47	Freeport, Grand Bahamas	05/19/97
Mexico	Marlin (Striped)	145	Cabo San Lucas, BCS	04/02/97
"	"	168	Sea of Cortez, BCS	06/21/97
Trinidad Tobago	Marlin (Blue)	339	Tobago	04/18/97
10 to 1 Club*				
Panama	Sailfish (Pacific)	94	Pinas Bay	04/17/97
Puerto Rico	Marlin (Blue)	896	San Juan	08/17/97
15 to 1 Club*				
Panama	Sailfish (Pacific)	78	Pinas Bay	04/15/97
Grand Slam Club--Offshore				
Brazil	Sa/Wm/Bm#	NA	Vitoria	10/15/97
Venezuela	Wm/Bm/Sa	NA	La Guaira	10/13/97
"	Bm/Wm/Sa	NA	Caraballeda	10/05/97
"	Wm/Bm/Sa	NA	La Guaira	09/26/97
"	Bm(2)/Wm(2)/Sa(2)	NA	La Guaira	09/22/97
"	Bm/Wm/Sa	NA	La Guaira	10/22/97
Super Grand Slam Club--Offshore				
Venezuela	Bm/Wm/Sa/Sp/Sw	NA	Caraballeda	10/21/97

NA - Not available
* Refers to catches that are 5-20 times the test strength of the line.
# Species code
Bm - Blue marlin
Sa - Sailfish
Sp - Spearfish
Sw - Swordfish
Wm - White marlin
Source: IGFA, "22nd annual IGFA fishing contest winners," *The International Angler*, January-February, 1998, pp. 15-16.

Appendix D9.--United States. Proportion of swordfish caught in the Caribbean and other southern offshore areas,* 1989-96

Year	Fishing areas		Total
	S. offshore**	Other	
	Percent		
1989	13	87	100
1990	15	85	100
1991	16	84	100
1992	15	85	100
1993	18	82	100
1994	28	72	100
1995	26	74	100
1996	32	68	100

** Includes all southern offshore areas south of 35°N, including the Caribbean Guianas Banks, areas off Brazil, but also the Sargasso Sea and the North Central Atlantic.
Source: Jean Cramer and Heather Adams, "Large pelagic logbook newsletter-1996," *NOAA Technical Memorandum*, NMFS-SEFSC-407 (NMFS, Southeast Fisheries Science Center: Miami, January, 1998), p. 26.

Appendix E1.--Venezuela. Fishery product types.

Product Type	Proportion of total
	Percentage
Fresh	58
Dried/salted	4
Canned	25
Fish Meal	10
Headed crustaceans	2
Pasteurized	1
Total	100

Source:

Appendix E2.--Venezuela. Fishery exports and national consumption figures.

Product Type	Market	
	National	Export
	Percentage	
Fresh	64	36
Canned	72	28
Crustaceans	14	86
Dried/Salted	99	1
Pasteurized	7	93

Source:

Appendix E3a--United States. List of Venezuelan swordfish shippers exempt from automatic detention, May 7, 1998

Company	Exemption issued
Agropesca	NA
Antonio Oteiza	11/02/95
Caribfleet	09/13/93
Divenal	04/19/96
Fishtech de Venezuela Productos Marinos	10/24/90
Inversiones Fivenca	07/06/92
Thomas Massey III	05/17/94
Rainbow Sea de Venezuela	NA
SDF Trading	05/12/97
Servenco	01/08/98

NA - Date of exemption not available, but these are the older exemptions before FDA began noting the date on their internet site.
Note: These companies will theoretically have the best quality fresh product as other companies will have to have their shipments tested upon arrival in the United States. The testing process usually takes at least 2 days.
Updates: Updates of this list are available at the following FDA internet address.
Source: FDA, "Detention without physical examination of swordfish for methyl mercury," IA#16-08, attachment listing shippers/manufacturers exempt from automatic detention, internet posting (http://www.fda.gov/ora/fiars/ora_import_ia1608.html), revised May 7, 1998.

Appendix E3b.--Venezuela. Companies shipping swordfish to the United States without automatic detention exemption, 1997-98

Company(location)/ detention date	Product	Entry	Detention type
Caribfleet (Guanta, Estado Anzoategui)			
04/18/97	Swordfish	Florida	A
Inversiones Ethos (Cumana)			
02/06/97	Swordfish	Florida	A
03/21/97	Fresh swordfish	Florida	A
Oteyza Representaciones (Estado Anzoategui)			
03/13/97	Fresh swordfish	Florida	A
04/22/97	Fresh swordfish	New York	A
SDF Trading (Caracas)			
03/10/97	Fresh swordfish	Florida	A
05/05/97	Swordfish	Florida	A
Seravenco (Maracaibo)			
12/22/97	Swordfish	Florida	NA
Serviacero (Caracas)			
03/14/97	Swordfish	Florida	A
05/05/97	Fresh swordfish	Florida	A
08/26/97	Swordfish H&G	Florida	NA

A - Automatic alert
D - Regular
H&G - Headed and gutted
NA - Not available
Source: FDA, "Monthly detections," internet posting (http://www.fda.gov/ora/ids), updated monthly by FDA and individual OASIS postings.

Series F Appendices: Trade
Series F1: Overall
Series F2: United States
Series F3: Japan
Series F4: European Union

Appendix F1a.--Venezuela. Swordfish exports by destination, 1991-96

Destination	Year								
	1990	1991	1992	1993	1994	1995	1996	1997	1998
				Metric tons					
United States	56	74	91	142	100	90	190	159	44#
Japan*	53	109	3	-	-	21	1	-	-##
European Union	NA	13	23	33	20	46	-	-	-##
Others**	NA	NA	NA	NA	NA	NA	NA	-	NA
Total	NA	196	117	175	120	157	191	159	44###

* Estimated swordfish portion of billfish shipments
** Swordfish shipments to other countries are believed to be non-existent or negligible
# Through November
Through March
Through March (EU/Japan) and through November (U.S.)
Source: Various.

Appendix F1b.--Venezuela. Swordfish export prices, 1993-95

Commodity/ destination	Apparent price					
	1993	1994	1995	1996	1997	1998
			US$/Kg			
Fresh						
United States	5.22	4.98	3.50	5.09	6.67	4.72*
Japan	NA	NA	NA	NA	NA	NA
European Union	3.48	NA	NA	NA	NA	NA
Frozen						
United States	NA	NA	NA	NA	NA	NA
Japan	NA	NA	4.97	NA	NA	NA
European Union	2.72	4.76	4.30	NA	NA	NA

EU exchange rates:
* Through August
1993 = 1 ECU= US$1.16
1994 = 1.19
1995 = 1.30
Source: Various.

Appendix F2a1.--United States. Swordfish imports from Venezuela, 1975-97

Year	Commodity		Total
	Fresh	Frozen	
	Metric tons		
1975	-	-	-
1976	-	-	-
1977	-	-	-
1978	-	-	-
1979	NA	NA	0.7
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	-	-	-
1984	-	-	-
1985	-	-	-
1986	34.3	6.1	40.4
1987	2.1	-	2.1
1988	2.6	-	2.6
1989	39.2	11.0*	50.2
1990	56.2	-	56.2
1991	74.4	-	74.4
1992	91.2	1.7	92.9
1993	141.5	-	141.5
1994	99.9	-	99.9
1995	89.8	-	89.8
1996	190.0*	-	190.0*
1997	159.3	-	159.3

* Record high
Source: U.S. Bureau of the Census

Appendix F2a2.--United States. Swordfish imports from Venezuela, 1975-96

Year	Commodity		Total
	Fresh	Frozen	
	U.S.$1,000		
1975	-	-	-
1976	-	-	-
1977	-	-	-
1978	-	-	-
1979	NA	NA	2
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	-	-	-
1984	-	-	-
1985	-	-	-
1986	211	17	228
1987	7	-	7
1988	13	-	13
1989	235	23*	258
1990	332	-	332
1991	336	-	336
1992	444	12	456
1993	738	-	738
1994	497	-	497
1995	314	-	314
1996	968	-	968
1997	1,063*	-	1,063*

* Record high.
Source: U.S. Bureau of the Census

Appendix F2b.--United States. Apparent prices of fresh swordfish imports from Venezuela, 1980-97

Year	Import		Apparent price
	Quantity	Value	
	Metric tons	US$1,000	US$/kg
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	-	-	-
1984	-	-	-
1985	-	-	-
1986	34.3	211	6.15
1987	2.1	7	3.33
1988	2.6	13	5.00
1989	39.2	235	5.99
1990	56.2	332	5.91
1991	74.4	336	4.52
1992	91.2	444	4.87
1993	141.5	738	5.22
1994	99.9	497	4.98
1995	89.8	314	3.50
1996	190.0	968	5.09
1997	159.3	1,063	6.67
1998*	43.5**	220	4.92*

* Through November. This is even an increase over earlier in the year when prices fell below $4.60.
** Includes a small quantity of processed product (steaks).
Source: U.S. Bureau of the Census

Appendix F2c1.--United States. Swordfish imports from Venezuela by Customs District, 1994-95

Customs District	1994			1995		
	Quantity	Value	Price*	Quantity	Value	Price*
	M. tons	US$1,000	US$/kg	M. tons	US$1,000	US$/kg
Fresh						
Miami	36.0	195.4	5.43	51.4	175.4	3.40
New York	63.9	302.0	4.72	38.3	139.0	3.62
Subtotal**	99.9	497.4	4.98	89.8	314.4	3.50
Frozen	-	-	-	-	-	-

* Apparent prices derived from dividing the total import value by quantity.
** Totals may not agree due to rounding.
Source: U.S. Bureau of the Census.

Appendix F2c2.--United States. Swordfish imports from Venezuela by Customs District, 1994-95

Customs District	1996			1997		
	Quantity	Value	Price*	Quantity	Value	Price*
	M. tons	US$1,000	US$/kg	M. tons	US$1,000	US$/kg
Fresh						
Boston	31.6	148.6	4.70	14.5	141.8	9.78
Miami	125.1	690.9	4.52	136.9	857.9	6.27
New York	33.7	128.5	3.81	7.9	63.7	8.06
Subtotal**						
Frozen	-	-	-	-	-	-

* Apparent prices derived from dividing the total import value by quantity.
** Totals may not agree due to rounding.
Source: U.S. Bureau of the Census.

Appendix F2d.--United States. Swordfish landings at Caribbean sites*, 1984-95

Year	Country												Total
	Puerto Rico	Virgin Islands	Florida ports*	Aruba	Bahamas	Barbados	Haiti	Jamaica	Mexico#	Trinidad	Venezuela	Windward Islands	
	Metric tons												
1984**	18.1***	-	-	-	-	-	-	-	-	-	-	-	18.1
1985	250.4	-	5.3	-	-	-	-	-	-	-	-	-	255.7
1986	782.4	38.1	8.9	-	-	-	-	-	-	-	54.9	-	884.3
1987	579.4	148.8	45.8	-	-	-	-	-	-	-	-	0.3	774.3
1988	297.3	231.9	81.2	8.7	30.9	41.3	-	-	4.1	100.7	41.3	61.6	899.0
1989	135.3	92.9	73.1	-	1.8	42.5	126.8	-	12.6	181.1	8.5	28.7	703.3
1990	229.4	0.2	79.0	5.6	-	-	69.0	6.6	-	90.0	-	-	479.8
1991	230.9	0.4	236.3	-	-	-	-	-	-	3.5	-	-	471.1
1992	227.7	4.5	183.3	-	-	0.7	-	-	-	1.3	-	-	417.5
1993	214.3	13.2	298.0	-	-	2.2	-	-	-	1.0	-	-	528.7
1994	306.5	132.0	215.7	-	3.9	-	-	-	-	0.5	-	-	658.6
1995##	637.3	118.9	244.4	-	-	16.9	-	-	-	0.6	-	-	1,018.7
1996													
1997													

Note: Not all Caribbean-caught swordfish by U.S. fishermen can be assigned to a specific port of first landing. The above totals, although not complete, represent a high proportion (80 percent or more) of the reported U.S. Caribbean region swordfish catch.
* Some swordfish taken in the Caribbean-region may be landed in Miami or other, mostly Florida, U.S. ports.
** First U.S. longline catches reported for the Caribbean region during December 1984. The United States instituted mandatory reporting of fishing locations during mid-1986. Data was previously (1984-86) compiled from voluntary reporting of fishing locations and may not as accurately reflect first port of landings totals available in more recent years (1987-95).
*** Unconfirmed reports suggest that actual landings could have exceeded 450 tons.
# Caribbean ports
Preliminary data
Source: NMFS. F/SEC. Computer data runs.

Appendix F2e.--United States. Fresh swordfish imports from Venezuela, 1990-98

Month	Year								
	1990	1991	1992	1993	1994	1995	1996	1997	1998
	Metric tons								
January	3.5	3.0	-	8.3	10.2	1.8	10.1	12.6	4.0
February	8.6	7.2	5.2	27.5	4.1	-	11.7	11.4	0.7
March	10.0	4.2	6.6	9.3	18.1	5.5	24.1	28.8	5.8
April	Negl	30.5	14.3	11.8	4.9	3.4	21.4	12.8	10.0*
May	-	2.5	17.0	14.7	9.4	5.1	11.0	22.4	7.6
June	-	22.2	10.5	12.7	6.7	-	24.9	26.8	7.6
July	6.3	0.4	1.8	5.3	12.8	9.0	20.7	13.8	3.2
August	11.9	-	5.9	5.8	14.9	16.1	10.1	8.7	-
September	4.1	-	3.9	9.4	11.8	11.6	14.9	2.3	-
October	5.9	1.5	1.6	10.4	2.0	10.1	9.9	2.8	4.5
November	4.2	-	9.6*	12.0	1.2	15.0	11.2	5.3	-
December	1.7	2.9	14.8	14.2	3.9	12.4	20.5	11.7	NA
Total	56.2	74.4	91.2	141.5	99.9	89.8	190.4	159.3	50.0P

NA - Not available
P - NMFS projection based on January through November shipments. The shipments could be as low as 44 tons.
*Some frozen product also shipped.
Source: U.S. Bureau of the Census

Appendix F3a.--Japan. Swordfish and marlin imports from Venezuela, 1986-97

Year	Quantity		Total
	Billfish	Swordfish	
	Metric tons		
1986	33	16E	49
1987	40	20E	60
1988	133	67E	200
1989	213	107E	320
1990	105	53E	158
1991	217	109E	326
1992	7	3E	10
1993	-	-	-
1994	-	-	-
1995	43	21E	64
1996	3	1E	4
1997	-	-	-

E - Estimated swordfish proportion of billfish imports.
Source: Japan Tariff Association, *Japan Exports & Imports*, various years.

Appendix F3b.--Japan. Billfish (including swordfish) imports from Venezuela, 1986-97.

Year	Product form			Total*
	Fresh	Frozen		
		Fillets**	Other	
		Metric tons		
1986	-	7	42	49
1987	-	13	47	60
1988	-	25	175	200
1989	-	177	143	320
1990	-	74	84	158
1991	-	301	25	326
1992	-	-	10	10
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	64	64
1996	-	-	4	4
1997	-	-	-	-

* Totals may not agree due to rounding.
** Until 1993 the fillets category included some tuna fillets.
Source: Japan Tariff Association, *Japan Exports & Imports*, various years.

Appendix F3c.--Japan (including swordfish) imports from Venezuela, 1986-1997

Year	Billfish*		Fillets****	Estimated swordfish#
	With fillets**	Without fillets***		
		Metric tons		
1986	49	42	7	16
1987	60	47	13	20
1988	200	175	25	67
1989	320	143	177	107
1990	158	84	74	53
1991	326	25	301	109
1992	10	10	-	3
1993	-	-	-	-
1994	-	-	-	-
1995	64	64	-	21
1996	-	4	-	1
1997	-	-	-	-

Note: There is no separate Japanese tariff category for swordfish which is included in a general basket category for billfish. For most countries only about one-third of the product in this category is swordfish.
* Almost all billfish imports from Latin America are frozen.
*** Includes the fillet category only from 1993-1995 when it was composed only of swordfish fillets.
**** Fillet category which for most countries included primarily tuna (1986-92), but was later separated to include only swordfish fillets (1993-95).
# NMFS estimate of quantity of swordfish in billfish basket category (about one third of this category is swordfish).

Appendix F4.--European Union. Swordfish imports from Venezuela, 1991-98

Country	Commodity	Year							
		1991	1992	1993	1994	1995	1996	1997	1998
		Metric tons							
Spain	Fresh	-	14	1	-	-	-	-	-#
	Frozen	13	9	32	20	46			
Total		13	23	33	20	46	-	-	-#

*Through March
Source: EU. Eurostat data.

Appendix G.--Venezuela. Agencies and companies

Telephone country Code: 58
City Code:
Caracas: 2
Carúpano: 94
Coro: 68
Cumaná: 93
Guanta: 81
La Guaira: 31
Margarita Island: 95
Puerto La Cruz: 81

Government Agencies:

Capitanía de Puerto de Carúpano
Carúpano
VENEZUELA
Tel: 311-224

Capitanía de Puerto de La Guaira
La Guaira
VENEZUELA
Tel: 27-985
Fax: 20-051

Centro de Investigaciones Pesqueras y Agropecuarias (CIPA)
Fondo Nacional de Investigaciones Agropecuarias (FONAIAP)
Ministrio de Agricultura y Cría (MAC)
Caiguire
Apt. Postal 236
Cumaná 6101
VENEZUELA
Tel: 317-557
Fax: 317-612

Dirección General de Fronteras
División de Fronteras Marítimas
Ministerio de Relaciones Exteriores
Torre MRE, esq. Carmelitas, Piso 13
Caracas
VENEZUELA

División de Pesca y Acuicultura
Estado de Anzoátegui
Ministerio de Agricultura y Cría
Calle Monagas, No. 20
Sector Los Cocos
Puerto La Cruz
VENEZUELA
Tel: 22-157

Div. de Pesca y
Acuicultura/Estado de Falcón
Ministerio de Agricultura y Pesca
Av. Independencia
Edif. Galaxia
Coro, Edo. Falcón
Venezuela
Tel: 513-209

Producción y Control
Ministerio de Agricultura y Cría
Dirección General Sectorial de Pesca y Acuicultura
Parque Central, Torre este, Piso 10
Caracas
VENEZUELA
Tel: 509-0383, 509-0384, 509-0385, 509-0297, 509-0279, 578-1855
Fax: 574-3587

Servicos Autónomos de los Recursos Pesqueros y Acuícolas (SARPA)
Centro de Investigaciones Agropecuarias del Estado Sucre, Calguire
MAC-DGSPA
Apt. 236
Cumaná 6101
VENEZUELA
Tel: 317-656

Companies:

CORPORIENTE
Cumaná
VENEZUELA
Tel: 310-443
Fax: 314-483

Naviera Industrial
Av. Venezuela, El Rosal
Torre Clemente, Nivel Jardin
Aptdo. 1802
Caracas
VENEZUELA
Tel: 951-0122

Pesquera La Isla
Guanta
VENEZUELA
Tel: 682-812, 682-159
Fax: 683-431

Research Institutions:

Centro de Investigaciones Pesqueras y Agropecuarias (CIPA)
FONAIAP
Apt. 236
Cumaná 6101
VENEZUELA
Tel: 317-557
Fax: 317-612

EDIMAR
Isla Margarita
VENEZUELA
Tel: 98-051

Departmanento de Biología Aplicada
IUT-Cumaná
Carretera Cumaná-Cumanacoa, Km. 4
Apdo. 255
Cumaná 6101
VENEZUELA

Instituto Oceanográfico de Venezuela
Library
Universidad de Oriente
Apt. de Correos 245
Cumaná
VENEZUELA
Tel: 515-065, 515-368, 514-658 (ext 211)
Tel/FAX: 512-276

ORSTOM
B.P. 5045
Montpellier Cédex 01
FRANCE

Other organizations:

Asociación Venezolana de Armadores Atuneros
(AVATUN)
Avenida Casanova
Edificio CEDIAS
Torre Este Piso # 11, Oficina #113
Caracas
VENEZUELA
Tel: 762-8105

AVATUN Regional Office
Cumaná
VENEZUELA
Tel: 323-256
Fax: 317-756

FENAPESCA
Cruz de Candelaria a Ferrenguin
Edif. Astro, Of. no. 6
Caracas
VENEZUELA

Comisionado Presidencial para la Pesca
c/Meta
Colinas Bello Monte
La Montaña, Caracas 1041
VENEZUELA

Series H Appendices: Glossaries
Seies H1: Acronyms
Seies H2: Species

Appendix H1.--Venezuela. Acronym glossary

Acronym	Extension
CPUE	Catch per unit effort
DGSPA	Dirección General Servicios de Pesca y Acuicultura*
EDIMAR	Estación de Investigaciones Marinas de Margarita
FAO	Food and Agriculture Organization
FONAIAP	Fondo Nacional de Invtigaciones Agropecuarias
ICCAT	International Commission for the Conservation of Atlantic Tunas
LJFL	Lower jaw fork length
MAC	Ministerio de Agricultura y Cría
NMFS	National Marine Fisheries Service
ORSTOM	Office de la Recherche Scientifique et Technuque Outre-Mer

* MAC unit.
Source: Various.

Appendix H2--Venezuela. Species glossary

Spanish	English	Scientific
Atunes	Tunas	Thunnus sp.
Atún blanco/albacora	Albacore	T. alalunga
Atún aleta negra	Blackfin	T. atlanticus
Atún azul	Bluefin	T. thynus
Atún aleta amarilla	Yellowfin	T. albacares
Atún ojo gordo	Bigeye	T. obesus
Bonito/barrilete	Skipjack	Katsuwonus pelamis
Bonito pata seca	Black skipjack	Euthinnus alleteratus/lineatus
Cabaña blanca	Atlantic bonito	Sarda sarda
Cabaña negra	Frigate tuna	Auxis thazard
Cachorreta	Chub mackerel	Scomber japonicus
Carite	Mackerels	Scomberomorus sp.
Lucio (cabaña)	King mackerel	S. cavalla
Sierra pinta	Cero	S. regalis
Chinigua	Serra Spanish mackerel	S. brasiliensis
Pintado	Spotted Spanish mackerel	S. maculatus
Colorado	Gulfconey seabass	Epinephelus acanthistius
Dorado	Dorado/mahi mahi#	Coryphaena equiselis and hippurus
Jureles	Crevalle jack	Caranx hippos
Jurelete	Jacks	Caranx sp.
Marlines	See peces de pico	
Meros	Groupers	Serranidae sp.
Pargos	Snappers	Lutjanidae sp.
Peto (Sierra wohoo)	Wahoo	Acanthocybium solandri
Peces de pico/agujaa	Billfish	Various species
Palgar/aguja** blanca	White marlin	Tetrapturus albidus
Aguja corta	Longbill spearfish	T. pfluegeri
Palagar/aguja** azul	Blue Marlin	Makaira nigricans
Pez vela/palagar	Atlantic sailfish	Istiophorus albicans
Pez espada	Swordfish	Xiphias gladius
Sábalo	Tarpon	Megalops atlanticus Valenciennes
Sierra	Wahoo	Acanthocybium solandri
Tiburones	Sharks	Carcharhinus sp. and others
Aleta blanca	Ocean whitetip	C. longimanus
Aleta negra	Blacktip shark	C. limbatus
Azul	Blue	Prionace glauca
Baboso	Bignose	C. altimus
Carite	Porbeagle	Lamna nasus
Cazón	Blacknose	C. acronotus
Cazón trozo	Sandbar	C. plumbeus

NA	Dusky	C. obscurus
NA	Night	C. signatus
Cazón	Smooth dogfish	Mustelus sp.
Viuda	Smoothounds	M. canis
Viuda amarilla	Florida smooth-hound	M. norrisi
Cazón	Reef	C. perezi
Cazón amarilla	Blacknose shark	C. acronatus
Cazón chino	Caribbean sharpnose	Rhizoprionodon porosus
Cazón playón	Caribbean sharpnose	R. lalandei
Cazón tozo	Sandbar	C. plumbeus***
Cornúa	Scalloped hammerhead	Sphyrna lewini
Cornua (cazón)	Bonnethead	S. tiburo
Gris	Grey	C. springeri
Jaquetón	Silky	C. falciformis
Macuira	Blacktip	C. limbatus
Mako	Shortfin mako	Isurus oxyrinchus
Martillo	Hammarheads	Sphyrna sp.
Cachona	Scalloped	S. lewini
???	Great	S. phyrna makarran
???	Bonnethead	S. phyrna tiburo
???	Smooth	S. zygaena
Rabón	Thresher	Alopias spp.
Tintorera	Tiger	Galeocerdo cuvieri
Toro	Bull	C. leucas
Zorro	Common thresher	Alopias vulpinis
Zorro ojón	Bigeye thresher	A. superciliosus

Note: Venezuelan authors vary somewhat as to the scientific names for various Colombian (Spanish language) names. This is especially true for carite and sierra *Scomberomorus sp.*) as well as several shark species.
* The genus Carcharhinus includes several different species, including spinner, silky, bull, blacktip, oceanic whitetip, dusky, reef, sandbar, and others.
** Also known as marlines.
*** Sometimes identified as *C. milberti*.
# Also dolphin fish
NA - Not available
Source: Various

2.2

GUYANA

Guyana does not target swordfish or other oceanic pelagics. The country's fishermen conduct primarily a coastal artisanal fishery. The artisanal fishery, which is almost entirely coastal, does not report a swordfish bycatch. The only significant commercial fishery is a shrimp trawl fishery which also has no swordfish bycatch. There is some foreign longlining off Guyana, but effort is limited and swordfish catches are believed to be small. The foreign fishermen are not transshipping their catch through Guyana. There are no significant Guyanan swordfish imports or exports. The authors know of no plans by Guyanese fishermen to initiate a pelagic longline fishery.

TABLE OF CONTENTS

Figure 1.--Map of Guyana

I. Fishing Industry Overview

Guyana's small fishing industry is composed of both commercial and artisanal sectors. The overall fisheries catch totaled only about 40,000 metric tons (t) in 1991, but this represented a substantial increase over the 24,000t taken in 1980 (Latin America, appendix C2a1). The commercial fleet primarily targets *Penaeid* shrimp, but there is also a significant catch of small shrimp (seabobs) and a substantial finfish bycatch. The commercial shrimp companies caught 4,400 t of *Penaeid* shrimp and 1,500 t of seabobs with an export value of $13.6 million in 1992. The companies also landed a 2,300t finfish bycatch, including sea trout, red snapper, and marine catfish. The artisanal fleet produced about 34,100 t of finfish, including red snapper and sea trout.

The fishing industry is important to the small Guyanese economy. Fishery products (mainly shrimp) are one of the country's major export commodities. The fishing industry also provides about 8,000 jobs (fishermen and workers) and makes an important contribution to overall protein food production. While most of the high-quality product produced by the commercial fishermen is exported, much of the finfish bycatch and the artisanal catch is marketed domestically.

Local officials are concerned with the shrimp fishery as reported catches have declined in recent years. The causes of the catch declines are unclear, but are probably due primarily to resource problems caused by over fishing, illegal foreign fishing, and local artisanal fishermen taking juveniles in coastal estuaries. Restrictions imposed by neighboring countries have limited trawling to Guyana's own Exclusive Economic Zone (EEZ).[1] Other activities may be adversely affecting reported landings in Guyana, even though fishermen are actually catching the shrimp giving the appearance of poor catches.[2] Licensed foreign fishermen may be transferring some of their catch at sea or landing it in foreign ports to avoid Guyanese landing taxes. Guyanese fishermen are reportedly selling some of their catch at sea to Caribbean schooners which provide spare parts and other supplies in exchange for shrimp.[3] The Government does not permit new entries into the fishery.

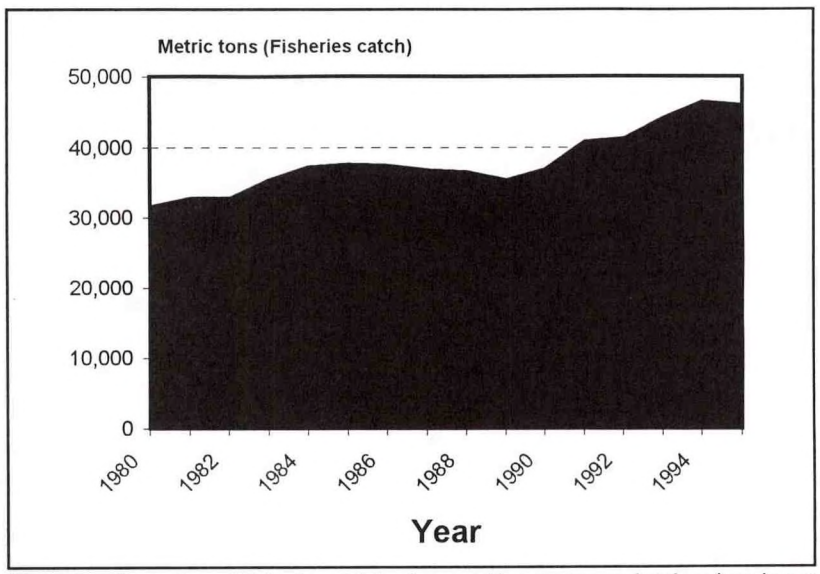


Figure 2.--Guyana's small fisheries catch has increased in recent years, but there is no known swordfish catch.

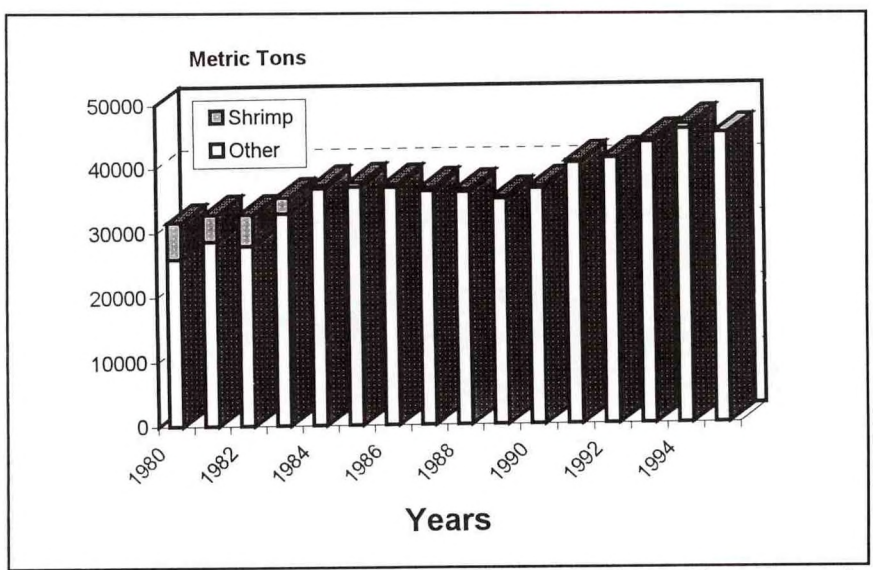


Figure 3.--Most of the Guyana's fishery catch is shrimp. Catch has fluctuated in recent years, but the overall trend is increasing.

Guyana's coastal fishing fleet in 1993 is composed of 106 commercial trawlers and approximately 1,300 small artisanal fishing boats.

Commercial: The commercial fleet is composed entirely of shrimp trawlers using active gear (trawls) and includes 47 Guyanese-owned vessels and 59 foreign-owned vessels. The fleet has declined due to falling yields in the shrimp fishery and high Government taxes on fuel. The Government charges a 50-percent tax on the diesel fuel used by shrimp trawlers. As fuel is the single-most important cost in shrimp trawling, often as much as 50 percent of total operating costs, this tax has had a debilitating impact on the companies involved.[4]

Artisanal: The artisanal boats, operated by private Guyanese fishermen, range from 7-19 m in length and use mostly passive gears such as beach seines, Chinese seines, and gill nets.

Guyana exports most of the export-grade fisheries production. The major species exported is shrimp. Fishery exports peaked at $27 million in 1987 and have since fluctuated irregularly (Latin America, appendix E1). Shipments totaled an estimated $18 million in 1991. While this amount is relatively modest, it is one of Guyana's most important export commodities.

II. Species

The authors know of no research articles describing swordfish abundance, distribution, or behavior off Guyana.

III. Fishing Grounds

A. Oceanography

The northeasterly flowing warm Guyana Current has not been well researched. Some believe it to be a continuation of the North Brazil Current.[5] Eddies related to flow instability have been reported, but some researchers doubt that the Guyana current exists as a permanent feature.[6] The weakness of the current means that the associated temperature fronts are much less pronounced than other currents associated with South American coastal waters (Brazil, Humboldt, and Malvinas currents). These temperature fronts are often associated with productive swordfish grounds. Thus the waters off Guyana do not appear especially conducive to swordfish.

B. Fishing grounds

The authors have no information specifically related to swordfish off Guyana. Significant billfish stocks during the 1960's were reported off the Guianas by Japanese distant-water longline fishermen.[7]

IV. Fleet

The authors know of no pelagic longliners operated by Guyanese fishermen.

V. Shipyards

Guyana has no shipyards capable of constructing longliners nor does it have shipyards capable of servicing a large, modern longliner.

VI. Fleet Operations and Gear

Guyanese commercial and artisanal fishermen do not conduct swordfish operations or deploy longline gear capable of taking swordfish. There appears to be little recreational fishing activity of any kind in Guyana. No notable recreational catches of any species were reported in 1996-97(Latin America, appendix C6a).[8]

VII. Catch

Little data is available on the species composition of the Guyanese fisheries catches. The country has not provided either FAO or ICCAT species-specific catch data (appendix A1). This lack of reporting, however, suggests that actual swordfish catches are non-existent or minimal.

VIII. Ports

Guyana's principal fishing port is Port Georgetown. The important shrimp fleet lands at two wharves on the Demerara River.

IX. Transshipments

The authors know of no swordfish transshipments by foreign fishermen through Guyana.

X. Processing and Products

Swordfish is not processed in Guyana.

XI. Companies

No Guyanese companies are involved in the swordfish fishery.

XII. Markets

A. Domestic

Swordfish is not landed by domestic or foreign fishermen and the species is not marketed in the country.

B. Trade

1. Exports

There are no significant swordfish exports from Guyana (appendix C).

2. Imports

Guyana does not import swordfish.

XIII. Government Policy

The Guyana agency responsible for fisheries is the Fisheries Department, Ministry of Agriculture.

A. Fisheries law

The Guyanese Government with FAO assistance is currently in the process of redrafting existing fishery laws and regulations.[9] The Government hopes to have a new law in place sometime in 1998.

B. Limits

Guyana established a 12-mile Territorial Sea in 1977.[10] The same decree also established a 200-mile Fishing Zone (FZ). Guyana signed the Law of the Sea Convention in 1982 and ratified it in 1993.

XIV. Research

There is no known Guyanese research on swordfish or other oceanic pelagics. One international organization, however, has provided some assistance with collecting data needed for research and management.

CARICOM: The Caribbean Community's (CARICOM) Fisheries Resource Assessment and Management Program (CFRAMP) initiated a biological data collection program for large pelagics in 1995.[11]

XV. Bycatch

As there is no Guyanese swordfish fishery, there is no resulting bycatch from the domestic fishery. There is some bycatch, however, from the limited foreign fishing which occurs off Guyana.

Seabirds: The authors have no information on seabird interactions off Guyana. The discussion of seabird interactions in the Venezuelan and Brazilian chapters, however, may provide some suggestion of possible interactions off Guyana.

Turtles: Guyana has legally protected sea turtles since 1957 when *The Fisheries Act of 1957* made it illegal and established sanctions for anyone found catching and killing sea turtles. Enforcement of the law, however, has not been vigorous, primary because of the potential cost of a substantial enforcement effort. The Government plans to increase the penalties for killing turtles.[12] Guyana in 1994 initiated a Turtle Excluder Device (TED) program to prevent mortalities from shrimp trawling.[13] Shrimp trawling is Guyana's principal commercial fishery and over 100 trawlers were active in 1997. The Guyanese Government also supports a Turtle Conservation Program conducted by the Florida Audubon Society at Shell Beach in the Essquibo Region; one of the principal turtle nesting sites in Guyana. The Government plans to expand its turtle protection program, stiffening the penalties for killing turtles and initiating an observer program for the shrimp trawl fleet.[14]

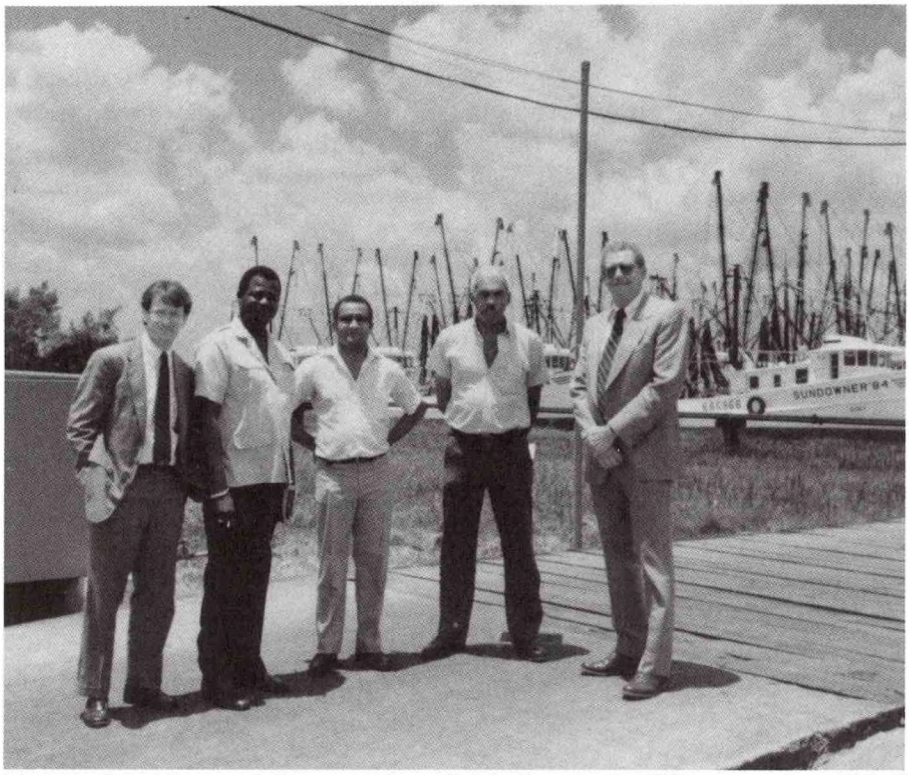


***Photo 1.**--United States and Guyanese fishery officials discussing the TED program to avoid turtle mortalities in the shrimp fishery. Fred Beaudry*

XVI. International

A. International Relations

1. Multilateral

Guyana does not participate in the import of any multilateral organizations addressing highly migratory pelagic species.

2. Bilateral

Japan: The Japanese reported very high billfish catch rates off the Guianas during the 1960's, but no or very limited billfish or swordfish fishing effort during the 1990s.[15] Japanese fishing in the Atlantic is mostly at mid ocean longitudes and the northeast and southeast Atlantic off Africa (Brazil, figure 6).

Korea: Korea publishes details on the longline tuna fishery. While no data is available specifically on swordfish, the overall Korean Atlantic longline fishing pattern is of interest. Korean longliners operated on the Guianas Banks during 1988 and 1989, including areas off Guyana. Relatively high tuna Catch Per Unit of Effort (CPUEs) were reported off Guyana and Suriname in 1988. The Koreans only fished as far west as 60°W which is approximately the western border with Venezuela. Korean longliners shifted operations in 1990 more to the east, only venturing as far west as 50°W which is off Brazil, but east of all three of the Guianas. This shift to the east continued in 1991 and 1992, the latest year for which data is available. Korean tuna Atlantic tuna operations in 1988-92 were all reported at tropical waters between the Guianas/Brazil and West Africa.[16]

Spain: Spanish fishermen through most of the 1990s have reported no swordfish fishing off Guyana.[17] The Spanish have been active in the north Atlantic at latitudes off the Guianas, but primarily in the mid-Atlantic or in the Gulf of Guinea off Africa (Brazil, figure 4).

Taiwan: Taiwan longliners are active in the western tropical Atlantic, but little longlining fishing appears to take place off Guyana. The Taiwan fishing in the area appears to be centered primarily to the east off northeastern Brazil. The authors do not have access to extensive annual data on Taiwan operations. Information available for 1992 shows Taiwan longline activity near the Guianas Banks during April and May and in offshore areas from June through September (Brazil, figures 12-13).[18] Taiwan fishermen report billfish, including swordfish, being taken off Brazil's northeastern coast--especially during April, some limited results near the Guianas Banks in May, and offshore billfish catches from June to September (Brazil, figures 12-13).[19] There is considerable Taiwan activity at the nearby Trinidadian port of Port of Spain.[20]

United States: There appears to be some limited U.S. longlining off the Guianas, outside the 200-mile limit. Limited U.S. fishing in 1994 was reported off Guyana and Suriname. Fishing activity expanded significantly in 1995, but in areas east of the Antilles (primarily east of 55°E) and off the Surinamese coast. Most of the U.S. activity was at some distance northeast of the Guyanan coast (primarily from 10°-20°N). U.S. fishing along northeastern South America, outside the 200-mile limit, was less concentrated in 1995, extending all along the Guianas, but reaching into new areas off the Brazilian coast for the first time.[21] Some foreign longlining takes place off Guyana, but such effort during the 1990s appears limited.

Venezuela: Venezuela's longline fleet does deploys some effort on the Guianas Bank, but activity is limited (French Guiana, figure 4).

B. Joint ventures

There are no joint venture fishing companies involved in a swordfish fishery.

XVII. Enforcement

Guyana officials report continuing enforcement problems. These difficulties are primarily with neighboring countries, involving artisanal fishermen or commercial fishermen targeting shrimp and snapper. The authors know of no incidents involving seizures of tuna or swordfish longliners, even though there is some unlicensed fishing in offshore areas.

Suriname: Occasional incidents involving artisanal fishermen are the principal enforcement issue with Suriname.

Trinidad: Trinidadian fishermen have been experiencing declining yields in coastal fisheries. As a result, many have attempted to fish in waters off neighboring countries like Guyana. Guyana newspapers reported on September 4, 1997, that the Coast Guard encountered several Trinidad fishermen setting traps about 80 km off the Demerara River. Guyana Coast Guard officials report seizing three vessels, but were unable to seize several other Trinidadian vessels that were operating in the area.[22]

Venezuela: The Venezuelan claim to eastern Guyana (the Essequibo) complicates all bilateral relations between the two countries. There is Venezuelan fishing activity all along the Guianas Banks. The authors however, know of no seizures of Venezuelan longliners.

XVIII. Future Trends

Guyana has only a small commercial fishing industry, focusing primarily on shrimp trawling. The country's fishermen have no experience with commercial longlining. Swordfish is present in off-shore areas, but the activity of foreign fishermen suggests that it may not be particularly plentiful. There is no indication that Guyanese fishermen have any plans or the capability to initiate a domestic longline fishery targeting swordfish or other large pelagics.

Note: This chapter was designed and formatted by Christopher Koenig, a senior at John F. Kennedy High School in Silver Spring, Maryland. He has also prepared the computer graphics. Mr. Koenig worked with the National Marine Fisheries Service as part of the Montgomery County High School/Hi-tech Program. He hopes to pursue a career of writing science fiction and other novel genres.

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1. Previously Guyanese fishermen were fishing off Suriname and French Guiana.

2. W.H.L. Allsopp, UNDP Consultant, personal communications, October 10, 1993.

3. Spare parts and other imported goods are difficult to obtain in Guyana.

4. U.S. Embassy, Georgetown, July 15, 1993.

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6. Matthias Tomczak and J. Stuart Godfrey, *Regional Oceanography: An Introduction* (Pergamon: London, 1994), pp. 271-272.

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8. IGFA, "22nd annual IGFA fishing contest winners," *The International Angler*, January-February 1998, pp. 8-14 and IGFA, "Recent additions to IGFA special clubs," *The International Angler*, January-February 1998, pp. 15-16. The Latin American appendix C6 is available in abbreviated form in the Venezuela chapter of this study (appendix D8a).

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9. U.S. Embassy, Georgetown, "GOG TEDs certification statement," message number 422, March 18, 1997.

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11. CARICOM/CFRAMP, "Statement by the CARICOM (Caribbean Community) Fisheries Resource Assessment and Management Program (CFRAMP)," ICCAT Doc. No. 018, November 13, 1995.

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20. See the Trinidad chapter of this report for details.

21. Jean Cramer and Heather Adams, "Large pelagic logbook newsletter-1996," *NOAA Technical Memorandum*, NMFS-SEFSC-407, January 1998, p.26.

SECTION XVII. (Enforcement)

22. U.S. Embassy, Port of Spain, "More arrests of TT fishermen," message number 1536, September 15, 1997.

APPENDICES

Appendix A.--Guyana. Fisheries catch, 1980-96

Year	Catch
	Metric tons
1980	23,610
1981	23,372
1982	25,805
1983	27,630
1984	37,242
1985	37,594
1986	37,383
1987	36,751
1988	36,510
1989	35,324
1990	36,892
1991	40,741
1992	41,252
1993	44,123
1994	46,367
1995	44,430F
1996	44,810F

F - FAO estimate; NA - Not available
Sources: FAO *Yearbook of Fishery Statistics*, various years.

Appendix B1.--Guyana. Fisheries catch, 1980-96

Year	Catch		Total
	Shrimp	Other	
	Metric tons		
1980	5,662	17,948	23,610
1981	4,251	19,121	23,372
1982	4,929	20,876	25,805
1983	4,339	23,291	27,630
1984	2,408	34,834	37,242
1985	3,241	34,353	37,594
1986	3,080	34,303	37,383
1987	2,893	33,858	36,751
1988	4,175	32,335	36,510
1989	3,834	31,490	35,324
1990	3,884	33,008	36,892
1991	4,676	36,065	40,741
1992	3,335	37,917	41,252
1993	6,172	37,951	44,123
1994	7,445	38,922	46,367
1995	6,730F	37,700F	44,430F
1996	6,660F	38,150F	44,810F

F - FAO estimate; NA - Not available
Sources: FAO *Yearbook of Fishery Statistics*, various years.

Appendix B2.--Guyana. Tuna and swordfish catch, 1990-96

Year	FAO		ICCAT	
	Swordfish	Tunas	Swordfish	Tunas
	Metric tons			
1990	NA	NA	NA	NA
1991	NA	NA	NA	NA
1992	NA	NA	NA	NA
1993	NA	NA	NA	NA
1994	NA	NA	NA	NA
1995	NA	NA	NA	NA
1996	NA	NA	NA	NA

NA - FAO: No breakdown of finfish by species available
ICCAT: Guyana not listed in the annaual *Statistical Bulletin*, suggesting that the catch of swordfish and tunas is minimal.
Sources: FAO *Yearbook of Fishery Statistics*, various years and ICCAT, *Statistical Bulletin*, various years.

Appendix C1.--Guyana. Swordfish exports by destination, 1991-98

Destination	Years								
	1990	1991	1992	1993	1994	1995	1996	1997	1998
	Metric tons								
United States	-	-	-	-	-	-	-	-	-#
Japan*	-	-	-	-	-	-	-	-	-#
European Union	NA	-	-	-	-	-	-	-	-#
Others**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	-	-	-	-	-	-	-	-	-#

Through March
* Estimated swordfish portion of billfish shipments
** Swordfish shipments to other countries are believed to be non-existent or negligible
Source: Various

Appendix C2.--United States. Swordfish imports from Guyana, 1975-97

Year	Commodity		Total
	Fresh	Frozen	
	Metric tons		
1975	-	-	-
1976	-	-	-
1977	-	-	-
1978	-	-	-
1979	-	-	-
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	-	-	-
1984	-	-	-
1985	-	-	-
1986	-	-	-
1987	-	-	-
1988	-	-	-
1989	-	-	-
1990	-	-	-
1991	-	-	-
1992	-	-	-
1993	-	-	-
1994	-	-	-
1995	-	-	-
1996	-	-	-
1997	-	-	-
1998*	-	-	-

* Through November
Source: U.S. Bureau of the Census

2.3

SURINAME

Suriname does not target swordfish or other oceanic pelagics. The country's fishermen conduct primarily a coastal artisanal fishery. The artisanal fishery, which is almost entirely coastal does not report a swordfish bycatch. The only significant commercial fishery is a shrimp trawl fishery which also has no swordfish bycatch. There is some foreign longlining off Suriname, but effort is limited and swordfish catches are believed to be small. The foreign fishermen are not transshipping their catch through Guyana. There are no Surinamese swordfish imports or exports. The authors know of no plans by Surinamese fishermen to initiate a pelagic longline fishery.

TABLE OF CONTENTS

Figure 1.--Map of Suriname

I. Fishing Industry Overview

Suriname has only a small, mostly artisanal fishing industry. The overall catch, including the catch of the foreign vessels, was less than 10,000 metric tons (t) in 1993 (appendix A). The only significant commercial fisheries are trawl fisheries for shrimp and snappers in which foreign interests play a major role. The artisanal fishery supplies most of the fish consumed in the country.

A. Artisanal fisheries

The artisanal fishermen conduct coastal, estuarine, lagoon, and river fisheries.

Coastal: Fishermen operate primarily on inshore waters in depths from 0-20 meters (m). The fishermen mostly use driftnets, but some longlines and purse seiners are also used. The gillnets are generally 1-4 kilometers (km) long and use mesh of 6-8 inches (stretched). The catch includes various species including catfish.

Estuarine: Fishermen primarily deploy Chinese seines using tidal flows to catch shrimp (mostly seabobs) and small pelagic species.

Lagoon: Brackish water lagoons exist all along the coast, especially in Nickerie and Commewijne districts. The fishermen mostly use fixed gillnets. The species harvested include snook (*Centropomus spp.*), mullet/gueriman (*Mugil spp.*), and tilapia (*Oreochromis mossambica*). Most of the catch is cured (dried and smoked) for sale in the local market.

River: River fishermen deploy longlines and encircling nets. The most important species harvested is a freshwater Sciaenid.[1]

B. Commercial fisheries

Suriname has three commercial fisheries, targeting shrimp, snapper, and other finfish, all of which are primarily marketed overseas.[2] Many of the commercial vessels are foreign vessels operating under Surinamese licenses.

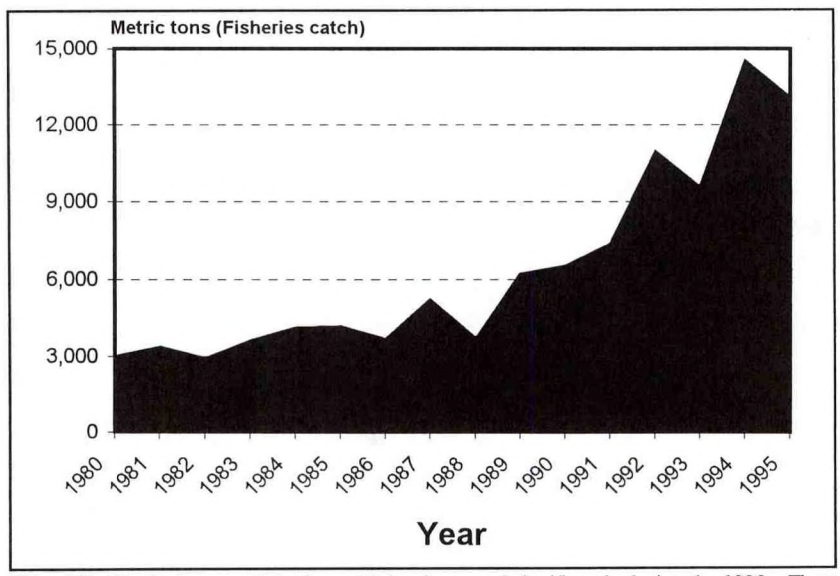

Figure 2.--The Surinamese fisheries catch has increased significantly during the 1990s. There is no known swordfish catch.

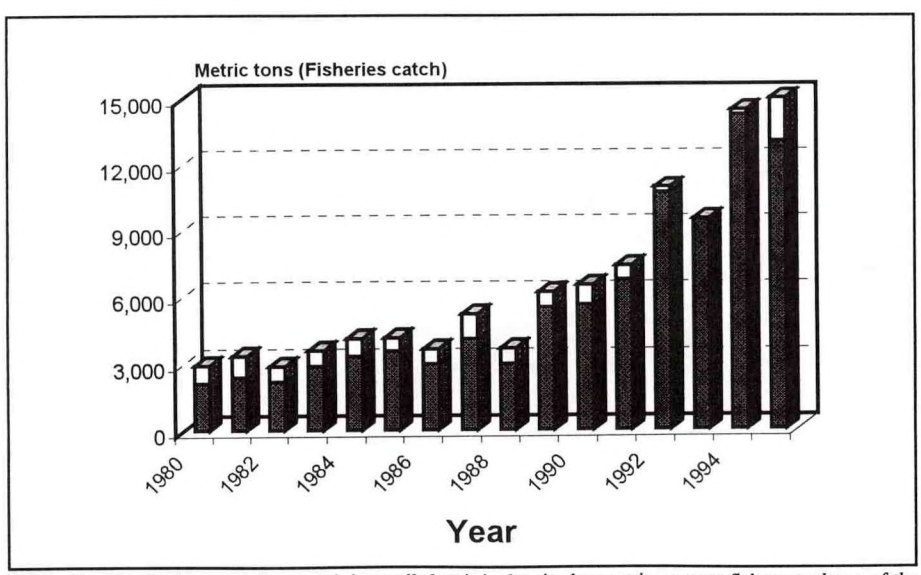

Figure 3.--The Suriname shrimp catch is small, but it is the single most important fishery and one of the country's major export commodities.

Shrimp: The shrimp trawl fishery is Suriname's principal commercial fishery. Shrimp fishermen primarily target white (*Penaus subtilis*) and pink shrimp (*P. brasilensis*). The catch is processed at the country's principal commercial fishing companies, SAIL and SUJAFI.

Snapper: The snapper fishery is conducted by 50-100 Venezuelans using

lines. They are required to land part of their catch in Paramaribo; which they usually do about midway through their trip when they call for ice. Normally trips are about 15-18 days and they fish at depths of from 40-80 meters.

Other finfish: The finfish trawler fleet has increased in recent years from six vessels in 1991 to 23 vessels in 1993. The vessels take a variety of finfish on grounds that often overlap with the shrimp fleet. They generally conduct three to seven day trips in depths of from 10-40 meters.[3]

II. Species

Significant billfish stocks during the 1960s were reported off the Guianas by Japanese distant-water longline fishermen.[4] The authors have no current information on swordfish abundance off Suriname. The limited foreign fishery effort suggests that abundance is limited.

III. Fishing Grounds

A. Oceanography

The northeasterly flowing warm Guyana Current has not been well-researched. Some believe it to be a continuation of the North Brazil Current.[5] Eddies related to flow instability have been reported, but some researchers doubt that the Guyana current exists as a permanent feature.[6] The weakness of the current means that the associated temperature fronts are much weaker than other currents associated with South American coastal waters (Brazil, Humboldt, and Malvinas currents). These temperature fronts are often associated with productive swordfish grounds. Thus the waters off Suriname do not appear especially conducive to swordfish.

B. Fishing grounds

Surinamese fishermen do not target swordfish off their coast.

IV. Fleet

Artisanal and commercial fisheries are conducted in Suriname. The Surinamese fishermen generally conduct the artisanal operations while foreign fishermen dominate the commercial fisheries.

A. Artisanal

Artisanal fishermen operate a variety of small craft, depending on the fishery:

Coastal: The coastal boats are mostly open and closed "Guyana-type" boats. The smaller open boats are about 13-m long and have outboard motors ranging from 35-55 horsepower. The closed boats average about 16 m with inboard motors ranging from 75-155 horsepower. A few of these artisanal fishermen using open Guyana boats deploy longlines.

Estarine: Fishermen operating in Surinamese estuaries use canoes about six m long with outboard motors.

River: The river fishermen use canoes like the estuarine fishermen.[7]

B. Commercial

Much of Suriname's commercial fleet is conducted by foreign companies. The authors know of no commercial highseas longlining for tunas and swordfish.

1. Shrimp trawlers

Both foreign (Japanese and Korean) and domestic fishermen deploy shrimp trawlers. The fishermen use traditional double-rigged "Florida" or "Gulf of Mexico" trawlers.

2. Snapper boats

Venezuelan fishermen conduct the snapper fishery. The Venezuelan fishermen deploy 50-100 boats equipped with vertical lines.

3. Finfish trawlers

Fishermen have been expanding trawling operations for finfish. One report indicates that the number of trawlers have increased from six in 191 to 23 in 1993.[8]

4. Suriname has no highseas commercial longliners.

V. Shipyards

Suriname does not have shipyards capable of building or serving commercial longliners.

VI. Fleet Operations and Gear

There is no directed Surinamese swordfish fishery. The coastal artisanal fleet may occasionally take a swordfish, but their mostly inshore operations suggest that such catches are extremely limited.

A. Artisanal fleet

Nearly half of the catch is landed by artisanal fishermen deploying gillnets, and both open and closed Guyana-type boats. Another quarter of the catch is taken by fishermen employing fyke-nets.

B. Commercial fleet

1. Shrimp trawlers

The shrimp trawlers are deployed in waters 20-80 m deep. The fishermen make extended trips of 50-100 days. Much of the catch is frozen aboard the vessels. Most of the catch is *Penaeus brasilensis* and *P. subtilis*.

2. Snapper boats

The Venezuelan fishermen operating off Suriname deploy vertical lines, usually at depths of from 40-80 meters. Licensing arrangements require these boats to land their bycatch in Suriname for sale in the local market. This is usually done midway through the trip so that the vessel can also take on ice. Trips are usually about 15-18 days.

3. Finfish boats

The finfish trawlers take mostly medium-sized demersal species. The grounds overlap somewhat with the shrimp trawl fleet in waters from 10-40 m deep. The finfish fishermen make much shorter trips, usually about 3-7 days. Few of these vessels are equipped with onboard freezing equipment.[9]

C. Recreational fleet

There appears to be little recreational fishing activity of any kind in Suriname. No notable recreational catches of any species were reported in 1996-97 (Latin America, appendix C6a).[10]

VII. Catch

There is no reported Surinamese swordfish catch. Small quantities of swordfish were shipped to the United States in 1990 (appendix B2). The authors do no know the source of those shipments.

VIII. Ports

The principal Surinamese port is Paramaribo, which is used by almost all of the commercial fishermen. Artisanal fishermen use Paramaribo a more than 25 major landing sites all along the coast. The largest artisanal port is New Nickerie.

IX. Transshipments

The authors know of no swordfish transshipments by foreign fishermen through Suriname.

X. Processing and Products

Surinamese companies do not process swordfish. There are few seafood companies in Suriname. The two largest companies (SAIL and SUJAFI) focus primarily on freezing shrimp for export markets.

***Photo 1.**--Paramaribo, the principle Surinamese port.*

XI. Companies

Surinamese companies do not handle swordfish.

XII. Markets

A. Domestic

Suriname's small population of less than 0.5 million inhabitants provides only a small domestic market. Relatively low income levels means that much of the catch of the most desirable species such as shrimp is exported. Seafood is, however, an important component of the Surinamese domestic protein supply. Most of the seafood is sold directly by artisanal fishermen or by shrimp trawler fishermen who land some of their finfish market. Almost all of fish marketed domestically is sold fresh, either at landing sites are in local markets. About two-thirds of Suriname's population lives along the Atlantic coast, facilitating the handling of fresh product. Swordfish is not marketed in Suriname, although one may appear occasional in domestic markets.

B. Trade

1. Exports

Small swordfish shipments from Suriname were reported in 1990 to the United States (appendix B2a). These were probaby landed by a foreign vessel, but no details are available.

2. Imports

Suriname does not import swordfish.

XIII. Government Policy

The Surinamese agency responsible for fisheries is the Fisheries Department (FD) in the Ministry of Agriculture, Fisheries, and Animal Husbandry.

A. Fisheries law

There are no Surinamese fishery regulations governing swordfish.

B. Limits

Suriname declared a 12-mile Territorial Sea in

1978.[11] Under the terms of this law, Suriname also declared a 200-mile Exclusive Economic Zone (EEZ). Suriname signed the Law of the Sea Convention in 1982.

C. Licensing

The Government requires licenses for both domestic and foreign fishermen. The Government began licensing small-scale domestic fishermen in 1971. The current licensing system for domestic and foreign shrimp trawlers began in 1986. Fees have to be paid in U.S. dollars.[12]

D. Promotion

Suriname is one of the few Latin American countries, besides Cuba, that continues to operate a state fishing company. The company (STIVI) works with artisanal fishermen and in 1996 received funds from the Japanese Government to assist the fishermen purchase outward motors.[13] The authors know of no interest in swordfish.

XIV. Research

No research is conducted on swordfish in Suriname. International organizations, however, have provided some assistance with collecting data needed for research and management.

CARICOM: The Caribbean Community's (CARICOM) Fisheries Resource Assessment and Management Program (CFRAMP) initiated a biological data collection program for large pelagics in 1995. European funding permitted CARICOM to extend the program to Haiti in 1996.[14]

XV. Bycatch

As there is no directed Surinamese swordfish fishery there is no bycatch.

XVI. International

A. International Relations

1. Multilateral

2. Bilateral

Foreign fishermen have been active on the Guianan Bank. The current longliner activity, however, appears limited.

Japan: The Japanese reported very high billfish catch rates off the Guianas during the 1960s. The Japanese reported no billfish or swordfish fishing off Suriname in 1993.[15]

Korea: Korea publishes details on the longline tuna fishery. While no data is available specifically on swordfish, the overall Korean longline fishing pattern is of interest. Korean longliners operated on the Guianas Banks during 1988 and 1989, including areas off Suriname. Relatively high tuna CPUEs were reported off Guyana and Suriname in 1988. The Koreans only fished as far west as 60°W including the entire coast and offshore areas off Suriname. Korean longliners shifted operations in 1990 more to the east, only venturing as far west as 50°W, which is off Brazil, but east of all three of the Guianas. This shift to the east continued in 1991 and 1992, the latest year for which data is available Korean Atlantic tuna operations in 1988-92 were all reported at tropical waters between the Guianas/Brazil and West Africa.[16]

Spain: Spanish fishermen in 1993 reported no swordfish fishing off Belize.[17]

Taiwan: Taiwan longliners are active in the western tropical Atlantic, but little longline fishing appears to take place off Suriname. The Taiwan fishing in the area appears to be centered primarily to the east off northeastern Brazil. The authors do not have access to extensive annual data on Taiwan operations. Information available for 1992 shows Taiwan longline activity near the Guianas Banks during April and May and in offshore areas from June through September.[18] Taiwan fishermen report billfish, including swordfish, being taken off Brazil's northeastern coast, especially during April, some limited results near the Guianas Banks in May, and offshore billfish catches from June to September.[19] There is considerable Taiwan activity at the nearby Trinidadian port of Port of Spain.[20]

United States: There appears to be some limited U.S. longlining off the Guianas, outside the 200-mile limit. Limited U.S. fishing in 1994 was reported off Guyana and Suriname. Fishing activity expanded significantly in 1995 in areas east of the Antilles (primarily east of

55°E) and off the Surinamese coast. Most of the U.S. activity was at some distance north of the Surinamese coast (primarily from 10°-20°N). U.S. fishing along northeastern South America, outside the 200-mile limit, was less concentrated in 1995, extending all along the Guianas Bank, but extending into new areas off the Brazilian coast for the first time.[21]

Venezuela: Venezuela's longline fleet does operate off the Guiana Bank, but it is limited (French Guyana, figure 4).

B. Joint ventures

Foreign companies working through joint ventures have played an important role in the country's shrimp trawl fishery. The joint ventures, however, are not involved with swordfish.

XVIII. Future Trends

Suriname has only a small commercial fishing industry, focusing primarily on shrimp trawling. The country's fishermen have no experience with commercial longlining. Swordfish is present in offshore areas, but the activity of foreign fishermen suggests that it may not be particularly plentiful. There is no indication that Surinamese fishermen have any plans or the capability to initiate a domestic longline fishery targeting swordfish or other large pelagics.

Note: This chapter was designed and formatted by Christopher Koenig, a senior at John F. Kennedy High School in Silver Spring, Maryland. He has also prepared the computer graphics. Mr. Koenig worked with the National Marine Fisheries Service as part of the Montgomery County High School/Hi-tech Program. He hopes to pursue a career of writing science fiction and other novel genres.

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2. Surimae's uses the term "industrial" when referring to commercial fisheries.

3. Matroos, "The fisheries industry in Suriname, *op. cit.*, pp. 6-8.

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4. Y. Uozumi, "Preliminary analysis on the distribution of sailfish and longbill spearfish in the Atlantic Ocean in 1993 based on the logbook data," *ICCAT Collective Volume of Scientific Papers* (ICCAT: Madrid, Spain, 1995), p.29.

SECTION III. (Fishing Grounds)

5. For details on the North Brazil Current, see the Brazilian chapter of this report.

6. Matthias Tomczak and J. Stuart Godfrey, *Regional Oceanography: An Introduction* (Pergamon: London, 1994), pp. 271-272.

SECTION IV. (Fleet)

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SECTION VI. (Fleet Operations and Gear)

9. Matroos, "The fisheries industry in Suriname, *op. cit.*, pp. 6-8.

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17. ICCAT, "1994 SWO background document: Figures," *op. cit.*, p. 91.

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20. See the Trinidad chapter of this report for details.

21. Jean Cramer and Heather Adams, "Large pelagic logbook newsletter-1996," *NOAA Technical Memorandum*, NMFS-SEFSC-407, January 1998, p. 3.

APPENDICES

Appendix A1.--Suriname. Fisheries catch, 1980-96

Year	Catch
	Metric tons
1980	2,960
1981	3,354
1982	2,890
1983	3,592
1984	4,102
1985	4,141
1986	3,651
1987	5,187
1988	3,684
1989	6,188
1990	6,500
1991	7,358
1992	10,930
1993	9,500
1994	14,465
1995	12,999F
1996	13,149F

F - FAO estimate
Source: FAO, *Yearbook of Fishery Statistics*, various years

Appendix A2.--Suriname. Fisheries catch, 1980-96

Year	Catch		Total
	Shrimp	Other	
	Metric tons		
1980	835	2,125	2,960
1981	974	2,380	3,354
1982	697	2,193	2,890
1983	714	2,878	3,592
1984	764	3,338	4,102
1985	591	3,550	4,141
1986	684	2,967	3,651
1987	1,107	4,080	5,187
1988	706	2,978	3,684
1989	710F	2,990	3,700F
1990	900F	5,600	6,500F
1991	637	6,721	7,358
1992	261	10,669	10,930
1993	59	9,441	9,500
1994	231	14,234	14,465
1995	235F	12,764F	12,999F
1996	235F	12,914F	13,149F

F - FAO estimate
* Prior to 1984, FAO classified all shrimp species in a basket category. As of 1984, a separate category (Penaeus shrimp) was instituted.
Source: FAO, *Yearbook of Fishery Statistics*, various years

Appendix B1.--Suriname. Swordfish exports by destination, 1990-98

Destination	Year								
	1990	1991	1992	1993	1994	1995	1996	1997	1998
	Metric tons								
United States	2	-	-	-	-	-	-	-	-#
Japan*	-	-	-	-	-	-	-	-	-#
European Union	-	-	-	-	-	-	-	-	-#
Others**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total	2	-	-	-	-	-	-	-	-#

Through March
* Estimated swordfish portion of billfish shipments
** Swordfish shipments to other countries are believed to be non-existent or negligible
Source: Various

Appendix B2a.--United States. Swordfish imports from Suriname, 1975-97

Year	Commodity		Total
	Fresh	Frozen	
	Metric tons		
1975	-	-	-
1976	-	-	-
1977	-	-	-
1978	-	-	-
1979	-	-	-
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	-	-	-
1984	-	-	-
1985	-	-	-
1986	-	-	-
1987	-	-	-
1988	-	-	-
1989	-	-	-
1990	2.1	-	2.1
1991	-	-	-
1992	-	-	-
1993	-	-	-
1994	-	-	-
1995	-	-	-
1996	-	-	-
1997	-	-	-
1998	-#	-#	-#

Through November
Source: U.S. Bureau of the Census

Appendix B2b.--United States. Swordfish imports from Suriname, 1975-97

Year	Commodity		Total
	Fresh	Frozen	
	U.S.$1,000		
1975	-	-	-
1976	-	-	-
1977	-	-	-
1978	-	-	-
1979	-	-	-
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	-	-	-
1984	-	-	-
1985	-	-	-
1986	-	-	-
1987	-	-	-
1988	-	-	-
1989	-	-	-
1990	5	-	5
1991	-	-	-
1992	-	-	-
1993	-	-	-
1994	-	-	-
1995	-	-	-
1996	-	-	-
1997	-	-	-
1998	-#	-#	-#

Through November
Source: U.S. Bureau of the Census

Appendix B3.--Japan. Swordfish and marlin imports from Suriname, 1986-97

Year	Quantity	
	Billfish	Swordfish*
	Metric tons	
1986	-	-
1987	-	-
1988	-	-
1989	-	-
1990	-	-
1991	-	-
1992	-	-
1993	-	-
1994	-	-
1995	-	-
1996	-	-
1997	-	-

Source: Japan Tariff Association, *Japan Exports & Imports*, various years.

2.4

FRENCH GUIANA

French Guiana has no fishery for swordfish. The species does not appear to inhabit the country's coastal waters, although it is caught off the coast of Guiana in neighboring Brazil, Venezuela and elsewhere in the waters of the Caribbean. There is a reference to swordfish inhabiting the waters off French Guiana in U.S. Department of Commerce publication that appeared in December 1968. There are no records of swordfish being landed or transshipped through French Guiana. The European Union (EU) reports no imports of swordfish from French Guiana. There are no known foreign fishing fleets fishing inside Guiana's Exclusive Economic Zone(EEZ), although it is possible that fishing takes place without the knowledge of local authorities. There are reports that Venezuelan flag vessels may be catching swordfish beyond the 200 mile EEZ. Local fishing involves artisanal canoe fisheries, line fishing for snappers, or commercial shrimp trawling; none of these methods catch swordfish. There are no known longliners based in or operating out of French Guiana. There is a possibility that French swordfish vessels operating from Saint Martin in the Caribbean may sail into French Guiana for supplies or to unload their catch, but this is not known to have happened.

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French Guiana

Figure 1.--Map of French Guiana.

I. Fishing Industry Overview

The Department of Guyana[1] is an overseas department of France.[2] The country is located along the northern coast of South America between the Oyapock River to the south (along the border with Brazil) and the Maroni River (along the nation's northern border with Suriname). French Guiana has a 378-kilometer (km) coastline and claims a 200-mile Exclusive Economic Zone (EEZ). The capital, Cayenne, is the largest port in the country. The economy of the country is closely tied to that of France.

Commercial shrimp fishing and forestry are the most important economic activities (besides the French space center at Kourou) and exports of fishery products (mostly shrimp) account for more than 50 percent of total export earnings.

Although fishing is important to the economy, the industry employs fewer than a thousand workers. Official statistics produced in the early 1980's indicated that 150 people were employed in French Guiana's fisheries with an additional 550 to 650 employed in fisheries on a seasonal basis or in a support capacity.

French Guiana has been an important fishing base for shrimp companies since 1962 when an U.S. venture began fishing for shrimp. Commercial shrimping expanded quickly in the next few years. By 1970, a joint venture company called Pecheries Internationales de Guyane (PIDEG) operated 42 shrimp trawlers - all flying the U.S. flags. The company included 80-percent ownership by Borden's. The production of the PIDEG fleet was 3.7 million pounds of heads-off shrimp valued at just under $5 million.[3] Another American company, Sea Farms, also had profitable shrimp fishing operations.

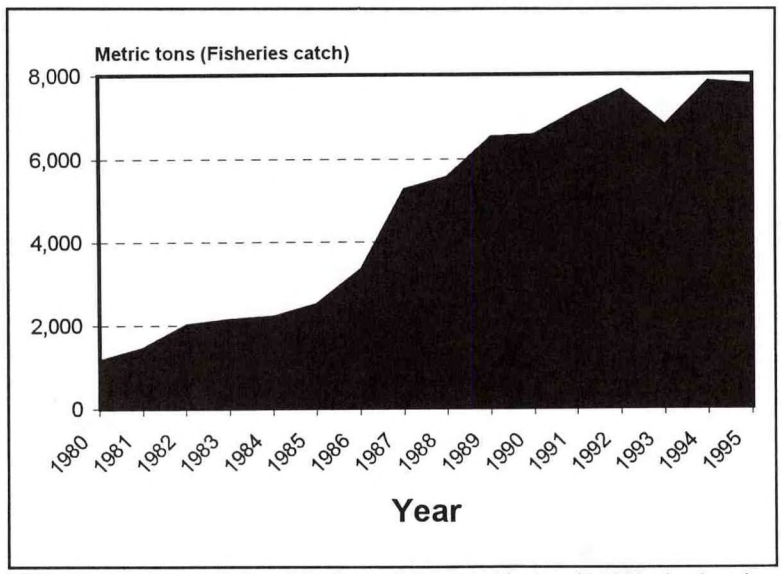

***Figure 2.**--The French Guiana fisheries catch increased in the mid-1980s, but has since leveled off.*

The rapid growth of foreign-flag shrimp fishing off the coast of Guiana was not lost on the Government of France. In 1984, the French Minister of the Seas visited French Guiana and announced a program to expand the role of French companies involved in the commercial shrimp fishing fleet. The process took several years and the elimination of the issuance of fishing licenses to all foreign-flag vessels by 1990.[4] The United States was an important partner in commercial fishing operations and exports of shrimp from French Guiana to the United States peaked at nearly 2,300 metric tons valued at nearly $27 million in 1982. Exports to the United States gradually declined until only 305 tons worth $2.4 million were exported in 1990 when U.S. shrimpers were forced to leave French Guiana's waters.[5]

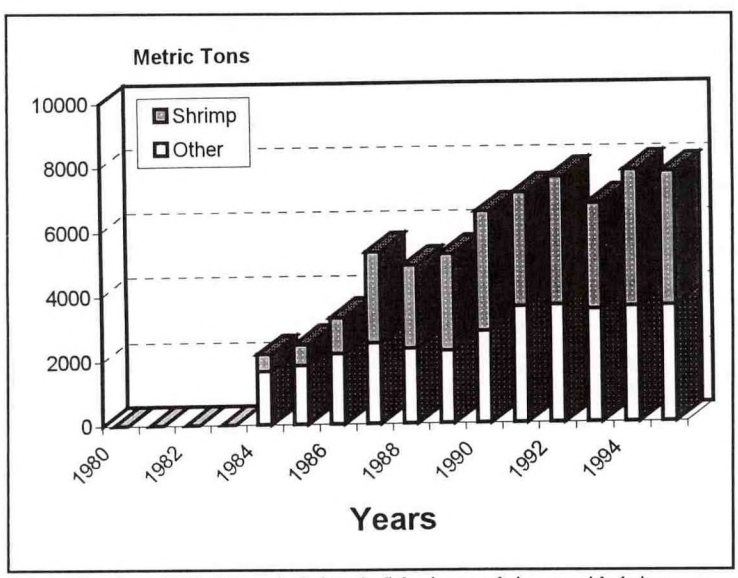

***Figure 3.**--About half of French Guiana's fisheries catch is penaeid shrimp.*

II. Species

There are few, if any, swordfish reported landed in French Giuana's waters. Neither the artisanal nor the commercial fishing fleets are equipped to fish for swordfish. There appears to be little recreational fishing for swordfish. No recreational catches of any billfish species were reported in 1996-97.[6] The authors knew of no French research on swordfish off the Guianas. Accordingly, there is not a great deal of information about the migration, seasonality, and stocks of swordfish in French Guiana's waters. During the research for the project the author found only one reference to swordfish, that stated:

> "The seas bordering on French Guiana abound in turtles, shellfish of all kinds, mullet, tuna, swordfish and a great variety of shrimp."[7]

Fishing for swordfish does, however, take place well offshore, beyond 200 miles.[8] There appears to have been a fishery involving U.S. and Venezuelan vessels that has gradually shifted its fishing for swordfish to include waters well off the coast of French Guiana during the years 1992-96. Taiwanese tuna longliners have reported catching billfish (swordfish is not specifically cited in their reports) off both Brazil and Uruguay.[9] Republic of Korea (ROK) tuna longliners have fished both north and south of the equator between the coast of South America and West Africa for many years. Swordfish is commonly caught in this fishery, but the area off French Guiana is not identified as particularly significant.[10] Japanese distant-water longline fishermen reported significant billfish stocks off the Guyanas during the 1960s. The Japanese do not have a fishery for swordfish in the waters off French Guiana.

A survey conducted by observers in the eastern United States and Venezuela and by captains and crews of commercial fishing vessels between April 1990 and June 1995 revealed that swordfish reproduce in the area north of 13 degrees North and off the eastern part of the Antillean Arc. These areas are well beyond the range of most fishing vessels in French Guiana.

Swordfish are also caught in abundance well to the south of French Guiana in waters off Brazil and Uruguay. Many European and Asian-flag longliners operate in these waters and land their catch in Montevideo, Uruguay for transshipment back to European or Asian markets.

III. Fishing Grounds

A. Fishing grounds

French Guiana has excellent inshore grounds for shrimp and other shallow-water species. The coastline is characterized by swamp-land fed by tropical forrest. There are thousands of small freshwater ponds or lagoons connected to the ocean through narrow channels. These provide nurseries for the fish and shellfish that form the basis for French Guiana's fisheries. The Mana swamps, to the east of the Maroni River, are especially important nursery grounds for brown shrimp (Penaeus aztecus).

Further offshore, Venezuelan-flag fishermen have found lucrative snapper stocks along the edge of the Continental Shelf.

B. Oceanography

The northeasterly flowing warm Guyana Current has not been well researched. Some believe it to be a continuation of the North Brazil Current. Eddies related to flow instability have been reported, but some researchers doubt that the Guyana current exists as a permanent feature.[11] The weakness of the current means that the associated temperature fronts are much weaker than other currents associated with South American coastal waters (Brazil, Humboldt, and Malvinas currents). These temperature fronts are often associated with productive swordfish grounds. Thus the waters off French Guiana do not appear especially conducive to swordfish.

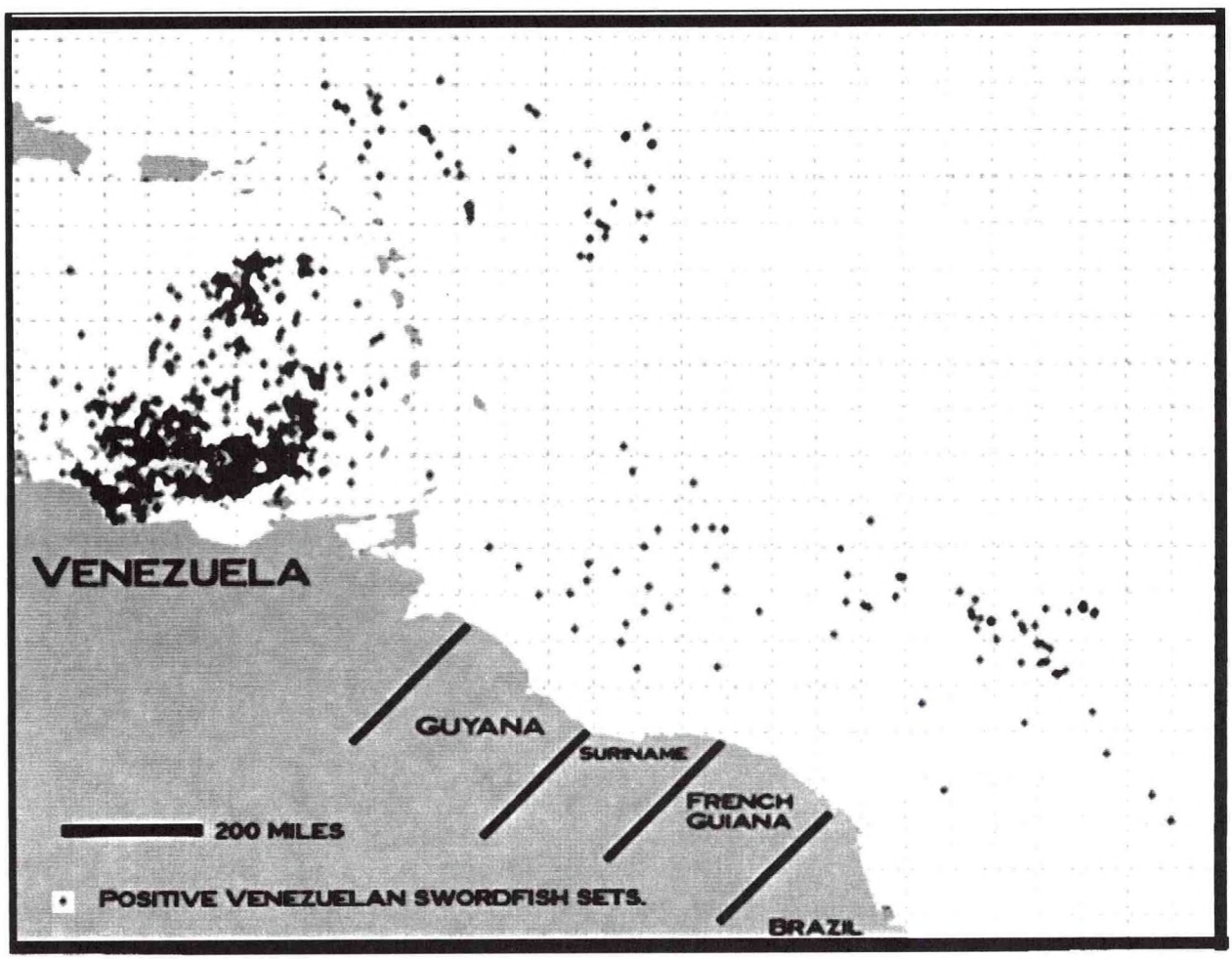

Figure 4.--Offshore areas along the Guianas coasts showing positive Venezuelan swordfish sets.

IV. Fleet

The artisanal fishing fleet in French Guiana consisted of 50 registered canoes (seven to 10 m in length) and equipped with outboard motors in the 1970s. There were also five larger vessels called "tapuyas" that are 15-18 m in length. These "Brazilian-type" boats are equipped with 60 to 120 horsepower (hp) diesel engines. There were perhaps another 150 unregistered canoes in the fleet. By 1984, there were 252 canoes registered in the artisanal fishing fleet.[12] This increased to 276 canoes by 1986.[13]

There is also a fleet of Venezuelan vessels that are allowed to fish for red snapper (Lutjanus purpureus).[14] These are mostly wooden vessels in the 21- to 22-m range. They carry a crew of 10 to 12 and fish with handlines only. They fish along the Continental Shelf and remain at sea for up to two months at a time. There were 25 Venezuelan-flag vessels registered in French Guiana in 1986.[15]

In 1986, the commercial shrimp fleet operating out of French Guiana numbered 78 vessels, including 42 US-flag shrimpers, 13 Japanese-flag vessels, and 23 French-flag trawlers.[16] Desco Marine (fiberglass hull and wood house construction), Rockport Yacht and Supply Company of Rockport, Texas, Steiner Shipyard, Inc of Bayou La Batre, Alabama, and Thompson Trawlers of Titusville, Florida built many of the commercial shrimp trawlers used in French Guiana's commercial shrimp fisheries. Some of the last ships built for foreign-flag companies by Steiner Shipyard, Inc. for French Guyana included the Yutaka Maru #32, 33, and 35.[17] These three vessels and two others (La Francaise and La Guyanaise) were delivered in 1987 just three years before the Government of France ceased issuing licenses to foreign-flag fishing companies wishing to shrimp in local waters.

V. Shipyards

Operating shrimp vessels in tropical conditions requires constant maintenance. Thus, it is likely that each company, and probably all the larger fishing ports, have facilities to undertake repairs. Construction of small boats and canoes takes place in local fishing villages.

VI. Fleet Operations and Gear

Artisanal canoes and tapuyas use mostly gillnets. Local fishermen sometimes build weirs (called barrière brésilienne) which catch croakers (scianidae), snook (centropomidae), and sea catfish (ariidae species) close to the shoreline.[18] The tapuyas also use stake seines and Chinese nets for catching shrimp and finfish. The tapuyas fish mostly for sciaenids and marine catfish. Shrimp trawlers employ traditional shrimp trawl gear. There are no known longline operations in French Guiana that could harvest swordfish.

Japanese fishermen reported catching good quantities of billfish off the Guianas during the 1960's. However, no swordfish fisheries were ever established. The Japanese reported no harvests of swordfish or other billfish in their west Atlantic Ocean fisheries during 1993.

Spain also operates a large fleet of longliners targeting tunas and swordfish in the southern Atlantic Ocean. Spanish vessels frequently call at Montevideo, Uruguay. Although these fleets are very effective in catching these highly mobile species, Spanish fishermen reported no swordfish fishing off French Guiana in 1993.

United States longliners engaged in some limited longlining off the Guianas, outside the 200-mile limit in 1994 off Guyana and Suriname. Fishing activity expanded significantly in 1995, in areas east of the Antilles (primarily east of 55°E) and off the coast of Suriname and to a lesser extent the French Guiana coast. Most of the U.S. activity was at some distance north of French Guiana (primarily from 10-20°N). U.S. fishing along northeastern South America, outside the 200-mile limit, was less concentrated in 1995, extending all along the Guianas Bank, and extending into new areas off the Brazilian coast for the first time. A recent report by Venezuela indicates that fishermen from that country are catching minor quantities of swordfish outside of Guiana's 200-mile zone.

VII. Catch

French Guiana's catch has grown steadily since 1960 when about 200 tons were caught. A decade later, 1,241 tons were caught. In 1980, the catch was 1,150 tons, but then increased quickly. The nation's harvest has ranged between 6,500 and 7,800 metric tons (t) within the past decade. The bulk of this harvest includes penaeid shrimp and marine shrimp.[19] The shrimp harvest includes brown shrimp while the catch of marine fish includes marine catfish, mullets, sciaenids, sharks, snappers, snook, and tarpon, and tripletails.

The catch of snappers has grown significantly since 1980 when 45 tons of red snapper were landed by five Venezuelan hand-line vessels fishing inside the EEZ under licenses issued by the European Union.[20] The catch reached an estimated 1,040 tons caught by 35 Venezuelan hand-lines in 1990. Some quantities of Spanish mackerel are also caught in this fishery.[21]

The shrimp fishery is the most lucrative and accounts for significant earnings for the country. Harvests consist of Atlantic seabobs (Xiphopenaeus kroyeri), brown shrimp (P. aztecus), spotted pink shrimp (P. brasiliensis), southern pink shrimp (P. notialis), pink shrimp (P. duorarum), and white shrimp (P. schmitti). Other species include P. subtilis, Palaemon schmitti and Hippolysmata oplothoroides.[22] Seabobs are caught from April through October while brown shrimp are harvested between November and April. Seabobs are usually caught with Chinese seines placed in estuaries at the mouths of rivers. There are usually 10 to 15 Chinese seines in operation off Cayenne.

The U.S. Bureau of Commercial Fisheries undertook a series of research cruises off the coast of French Guiana, using the OREGON; in 1957 and 1958.[23] The results were positive. In 1962, Pêcherie Internationale de Guyane (PIDEG) was established including the Groupe Rotschile-Compagnie des Gares et Frigorifiques; an investor from Texas and an individual from Florida. A flourishing shrimp business began that continued through 1977 when the operations began to diminish and a change in shares took place that resulted in French ownership of PIDEG. By the late 1970s the company had 45 boats operating at Cayenne. In addition, another fleet of 14 US-flag shrimpers worked for a second American company. A Japanese joint venture company identified as YOKATA operated 15 vessels and a second Japanese joint venture firm worked with another seven Japanese-flag vessels. Finally, two French companies operated five vessels.[24]

Foreign-flag shrimp fishing operations continued through the 1980's until the effort of the French Government to transform the fishing industry resulted in the gradual reduction of the issuance of licenses to non-French companies. In 1989, the EU sent the United States Mission an Aide Memorire reducing from ten to four the number of temporary licenses issued to Sahlman Seafoods, Inc. of Tampa, Florida. The reduction became effective on July 1, 1989. The reason for the reduction was the anticipated arrival of six new, French-flag shrimp trawlers. The French government, at that time, was investing $28.7 million to modernize and expand Guiana's industrial shrimp fishing fleet. The program called for all fishing to be conducted by EU-flag vessels by 1991.[25]

French Guiana reports no catches of swordfish.

VIII. Ports

There are three major ports in French Guiana: Cayenne, Dégrad des Cannes, and Saint-Laurent du Maroni. The primary commercial fishing port is Larivot, which is about 15-km from Cayenne. Smaller fishing ports include Aoura, Ile de Cayenne, Iracoubo, Kaw, Kourou, Mana, Montsinery, Organabo, Régina, Roura, Saint-Georges, Sinnamary, Tonate, and Tracoubo. There are many other artisanal landing sites on beaches next to small coastal villages and along the nation's inland waterways. Most of the shrimp fleet operates out of the port of Larivot.[26]

IX. Transshipments

There are no reports on foreign-flag or French-flag tuna longliners calling at ports in French Guiana to unload their catch for transshipment to distant markets. There are no known restrictions to this practice and the practice might be encouraged as it might contribute to the local economy.

X. Processing and Products

There are no swordfish landed in French Guiana and thus there is no processing of any swordfish products.

XI. Companies

Sea Farms was one of the first commercial shrimp fishing companies established in St. Laurent, Guiana. By company went into decline in the mid-1970's leaving PIDEG, which was owned by American interests, as the country's leading shrimper.[27] Other early investors included Henderson's Portion Pak of Coral Gables, Florida (24 vessels), Mr. J.D. Welborn of Ingleside, Texas (four vessels), Johnson & Bedre (four vessels), Mr. T.J. Johnson, of Rockport, Texas (two vessels) and Welborn's Trawlers, Inc. of Arkansas Pass, Texas (three vessels). These vessels were built by Rockport Yacht and Supply Company of Rockport, Texas. However, the shrimp industry continued to grow and by 1980, the Compagnie Française de Pêche (CFP) was one of the country's largest shrimp processing companies along with PIDEG, which operated 45 shrimp trawlers.[28] Sahlman Seafoods of Tampa, Florida was active in French Guiana's shrimp fishery in the 1980s to the 1990s when foreign-flag fishing was phased out.

Armement de mareyage de Guyane (ARMAG) and Société nouvelle des pêches lointaies (SNPL) were two other French-owned companies operating shrimp trawlers in the early 1980s.[29] The AMG purchased a shrimper from Desco in 1982-83.[30] In recent years other companies have been involved in Guiana's shrimp fisheries, including Guya-pêche and Codépec.[31] A total of 70 shrimp trawlers operated in Guiana in 1990, of which 55 belonged to ARMAG, Guya-pêche and Codépec.[32]

There are three companies that were actively processing red snapper in French Guiana in 1991. They included la Sociéte Abchee, la CODEPEG, and Pêcheries Internationales de Guyane Française (PIDEG). These companies have very limited production and freezing facilities and export most of their production to the Antilles and to mainland France.[33]

XII. Markets

A. Domestic

Little is known about the market for swordfish in French Guiana. Since it is not landed, it is unlikely that many of the 145,999 inhabitants of the country know much about swordfish. If any swordfish is imported, it is likely frozen swordfish processed in mainland France and exported to luxury-class hotels or used to feed European scientists and technicians at the European Space Agency in Kourou. Most towns have fish markets, but they generally sell freshly-caught fish and shellfish; Village Chinois in Cayenne has a fish market and Javanese food stalls.

B. Trade

French Guiana imports and exports approximately the same quantities of fish. Since 1970, for example, imports have ranged between 2,000 and 4,000 tons, as have exports. In some cases, processors have imported raw shrimp for processing into a higher value product that is then exported.

1. Exports

In 1992, exports amounted to $59 million worth of shipments. These included shrimp, timber, rum, and rosewood essence. Most of French Guiana's exports of fish are shipped to Martinique and Guadeloupe in the Antilles. Shrimp are shipped to France (over half of total exports), other EU countries (such as Spain), and the United States. There are no known swordfish exports from French Guiana.

2. Imports

French Guiana imported $1.5 billion in 1992, including significant quantities of food, consumer goods, and petroleum. France, Germany, and the United States were the primary suppliers of these imports.

There are no known imports of swordfish into French Guiana. If there were legitimate imports (e.g., from neighboring Brazil), then those imports should be shown as French imports from Brazil - and not French Guiana's imports. That is because French Guiana is considered part of mainland France. In practice, however, local statistics may reflect imports, but such statistics were not available to the author during the preparation of this report.

XIII. Government Policy

French authorities in mainland France are responsible for administering policies that are established by the EU in Brussels. The EU has the authority to establish fishery policies for member states and since French Guiana is considered an integral part of France any laws established by the EU for France, apply equally to French Guiana.

A. Fisheries law

France is a member of the International Commission for the Conservation of Atlantic Tunas (ICCAT) as is the EU. Both abide by the decisions of ICCAT. In practice, however, these management obligations have little impact on the fishing community in French Guiana, since no fishing for swordfish takes place.

B. Limits

France claimed a 12-mile Territorial Sea in 1971 and a 200-mile EEZ on October 1, 1977. Marine boundary agreements have been negotiated with Brazil. France signed the Law of the Sea Convention in 1982 with declarations.

XIV. Research

The Institute Scientifique et Technique des Pêches Maritimes, Laboratore de Cayenne, conducts research in French Guiana. In addition, the Institut Francais pour la Recherche de l'Exploitation de la Mer (IFREMER) is available to provide research assistance. IFREMER has done considerable work on swordfish and is active in shrimp aquaculture in French Guiana. IFREMER's research vessel Andre Nizery conducted a survey of the EEZ between March 9-16, 1990. The effort focused on the status of red snapper stocks, which was being fished by 35 Venezuelan hand-liners. The Andre Nizery was based out of the IFREMER research facility in Lorient, France.[34] The author knows, however, of no IFREMER research surveys on swordfish off French Guiana.

XV. Bycatch

There is no French Guiana swordfish fishery and, consequently, no bycatch. Little information is available on the EU and Asian-flag bycatch off French Guiana. Some limited information on U.S. bycatch is available.[35]

XVI. International Relations/Joint Ventures

A. International Relations

The EU is responsible for conducting international relations of member states. As such, the EU negotiates international agreements for France (both bilateral and multilateral). There are no agreements that have any direct impact on swordfish operations in French Guiana, since there is no swordfish fishing. However, the EU does manage and conserve fishery resources and access of non-member countries inside the 200-nautical-mile EEZ of the country.[36] One EU member in particular, Spain, has a large swordfish fleet. Overall quotas on swordfish in the north Atlantic, however, are set by the ICCAT and access to French Guiana's waters would pose little difficulty to the Spanish.

B. Joint ventures

There is a long history of joint venture shrimp fishing in French Guiana, but foreign-flag operations were phased out in the early 1990s.

XVII. Enforcement

There are no known problems associated with enforcing on swordfish fishing since there is no fishing for this species. This is not to say that there never have been problems of enforcement of fishery regulations. In 1977, for example, six Republic of Korea shrimp trawlers were seized by French authorities for fishing inside the nation's newly-declared 200-nautical-mile EEZ. Prior to October 1, 1977, approximately 230 ROK shrimp trawlers had fished in waters outside of French Guiana's former limit.[37] Other nations, including the United States, have run afoul of French authorities for infractions of fishing regulations.

XVIII. Future Trends

French vessels operating in the Indian Ocean have discovered that swordfish fishing is a lucrative business. One of those companies operates two catamarans out of Saint Martin. If that company is able to develop a profitable business, it is possible that expansion of the fishery may take place. There is a possibility that the vessels operating from Saint Martin may sail into French Guiana for supplies or to unload their catch, but this is not
known to have happened.

Note: This chapter was designed and formatted by Christopher Koenig, a senior at John F. Kennedy High School in Silver Spring, Maryland. He has also prepared the computer graphics. Mr. Koenig worked with the National Marine Fisheries Service as part of the Montgomery County High School\Hi-tech Program. He hopes to pursue a career of writing science fiction and other novel genres.

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ENDNOTES

SECTION I. (Industry Overview)

1. Commonly called French Guiana or Guyane Française in French.

2. As an Overseas Department of France, French Guiana is no different than any other region of Metropolitan France, just as Hawaii is an integral part of the United States. Thus, all swordfish caught by, landed I, or shipped from French Guiana, should be considered as "French" product. In practice, however, French Guiana is treated as a separate entity and fishery landings and trade date are reported apart from Mainland France.

3. U.S. Embassy, Mexico City. Undated.

4. Lengagne, Guy. "Développer une coopératopm" Giuane-Antilles," *La Marin*, May 25, 1984, p. 14.

5. Weidner, Dennis. World Shrimp Culture, Volume 2, Part Three, South America, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, Silver Spring, MD, September 1992, p. 964.

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SECTION XIV. (Research)

34. Cruise Report 90011011GUYVIV IV. http://www.ifremer.fr/sismer/catal/campagne/htm_an/90011011.htm.

SECTION XV. (Bycatch)

35. See the chapter on Venezuela and Brazil where bycatch is discussed in some detail. Bycatch trends on those countries may provide some indications of the situation off French Guiana. Sea turtles nest in French Guiana and can be found in their EEZ. Thus sea turtle interaction beyond French Guiana's 200-mile EEZ could be of some importance.

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APPENDICES

Appendix A.--French Guiana. Fisheries catch, 1980-96

Year	Catch
	Metric tons
1980	1,150
1981	1,436
1982	1,992
1983	2,500
1984	2,679
1985	3,035
1986	3,305
1987	5,320
1988	4,890
1989	5,237
1990	6,548
1991	7,119
1992	7,617
1993	6,771
1994	7,813
1995	7,737
1996	7,977

Sources: FAO *Yearbook of Fishery Statistics*, various years.

Appendix B.--French Guiana. Fisheries catch, 1980-96

Year	Catch		Total
	Shrimp	Other	
	Metric tons		
1980	138	1,012	1,150
1981	339	1,097	1,436
1982	534	1,458	1,992
1983	830	1,670	2,500
1984	1,015	1,664	2,679
1985	1,200	1,835	3,035
1986	1,109	2,196	3,305
1987	2,795	2,525	5,320
1988	2,541	2,349	4,890
1989	2,977	2,260	5,237
1990	3,680	2,868	6,548
1991	3,525	3,594	7,119
1992	3,987	3,630	7,617
1993	3,271	3,500	6,771
1994	4,235	3,578	7,813
1995	4,137	3,600	7,737
1996	4,377	3,600	7,977

NA - Not available
Sources: FAO *Yearbook of Fishery Statistics*, various years.