The Marine Fisheries of Colombia and Their Statistics

ALEJANDRO CIARDELLI FADUL[1]
Corporación Autónoma Regional de los Valles del Magdalena y Sinú
y
Universidad de Cartagena
Cartagena, Colombia

Abstract

Colombia's Atlantic and Pacific marine fishing areas are divided into zones according to their productivity. A general classification of the fishes landed in the various zones is presented. The location and economic importance of the zones is described and discussed. Local fishing methods are explained, as well as their classification according to the Colombian law. The ways by which fishes are sold or distributed once they have been landed are commented upon. The agencies in charge of the collection of statistics, as well as their jurisdiction, are pointed out. The methods, as well as the problems involved in collecting statistics, are explained with special emphasis on their reliability. A special index with the family, the scientific name, and the Colombian and American vernacular names is presented.

INTRODUCTION

COLOMBIA, located in northwestern South America, has coasts on the Pacific and Atlantic Oceans. The coastlines are approximately 700 miles long in the Pacific and 650 miles long in the Atlantic. In general the fisheries are poorly developed. The most important commercial fishery is located on the Pacific where, as Saenz (1963) points out, a shrimp fishery is able to export 90% of its production.

This report intends to give an idea of the location of the principal sea fisheries in Colombia, species caught, fishing methods, the methods of collecting statistics and their reliability. Most of the data presented for the Atlantic fisheries come from Barranquilla and Cartagena, the only markets surveyed by the CVM (Corporación Autónoma Regional de los Valles del Magdalena y del Sinú) on the Atlantic Coast. The data for the Pacific Coast were obtained from the Ministerio de Agricultura.

Although the present report deals with Atlantic and Pacific fisheries, special emphasis has been placed on the former.

Since all the statistics in Colombia are taken using the vernacular names, which do not always correspond to the American vernacular names, the scientific, and the Colombian and American vernacular names are listed in Table 1.

I wish to thank Dr. Enrique L. Díaz W., Director of the Departamento de Investigaciones Ictiológicas y Faunísticas of the CVM and Capitán Max Rodríguez P., Director of the Sección de Caza y Pesca del Ministerio de

[1]Professor de Biología de la Universidad de Cartagena, Cartagena, Colombia.

Agricultura, who furnished me the statistics from their respective organizations. I thank Capitán Max Rodríguez P. again for permitting me to use the identifications of fishes from the Sección de Caza y Pesca and Dr. George Dahl for the identification of fishes landed at the markets of Cartagena and Barranquilla.

I am especially indebted to Drs. Manuel Muñoz, Jorge E. Mercado Silgado, and to Mr. Octavio Bernal of the CVM who helped with the tables and figures as well as with the research on fishing methods. I am also indebted to Drs. Randall Gossen and Enrique L. Díaz W. for offering suggestions on the manuscript.

The present work has been supported by contract No. AT (26-1) 171 of the Battelle Memorial Institute with the Institute of Marine Sciences of the University of Miami in 1966, and by the CVM in 1967.

ATLANTIC FISHERY

Saenz (1963) groups the Atlantic fisheries in six zones from east to west: Guajira, Santa Marta, Barranquilla, Cartagena, Cartagena to Urbá, and the San Andrés Islands. Since Barranquilla is not a fishing but a commercial center and the main fishing center for the area of Barranquilla and Santa Marta is Ciénaga Grande, I will group them as follows: Guajira, Ciénaga Grande, Cartagena to Urabá, and the islands of San Andrés and Providencia.

Guajira

This is the zone that may offer the greatest opportunities for commercial fishing since, as Saenz (1963) points out, it has the widest continental shelf of the Atlantic coast. At present most of the fishing is done at the subsistence level, except in a few cases in which fishing is done by foreign vessels. This zone is not well known, but there are reports of catches of tunas, jacks, snappers and shrimps.

No statistics are taken at present in this zone.

Ciénaga Grande

This is perhaps the best fishing center of the Atlantic coast at present, but is fished only at the subsistence level. The fishes caught in this area are mullet, tarpon, mojarra, snappers, sea trout and jacks. The records from Barranquilla in Figure 1 are mainly comprised of catches from Ciénaga Grande. Unfortunately, some fishes brought from the zone of Cartagena are included in these statistics.

Most of the sport fishermen who operate in this zone come from Barranquilla by way of a canal that connects the Ciénaga with the Magdalena River. This is the same canal used by the commercial fishermen to travel between Barranquilla and Ciénaga Grande.

Fishes are either sent to Barranquilla or Santa Marta or sold to travelers passing by.

Cartagena

This area is potentially one of the richest fishing grounds on the Atlantic coast. It has several salt and brackish water lagoons; the beaches alternate between mangrove and sand. Since the "ciguatera poisoning" is not present in the reefs, many reef species are eaten. The species and quantities of fresh

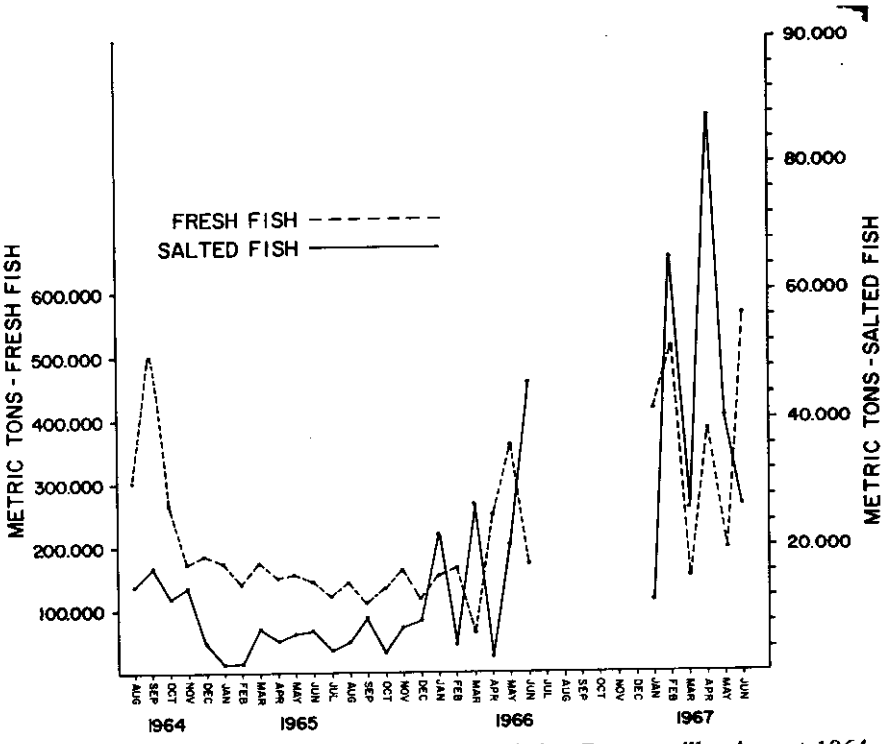

FIG. 1. Fresh and salted fish (metric tons) landed at Barranquilla, August 1964-June 1966 and January-June 1967.

fish landed at the market during January 1966 to June 1967 are shown in Figure 2.

In addition to the fish landed at the market, a large amount is fish caught along the shores, which is sold directly to the consumer. Among these fishes, bonito, crevalle jack and blue runner are usually found.

Also a large number of sport fishermen fish for tarpon, jacks, snook, barracuda, snappers, groupers and mackerel.

Cartagena to Uraba

This area is very poorly known; virtually no statistical data are found for the area. According to Saenz (1963), the area offers possibilities for future development of the fishing industry, and fishermen from Curacao and Venezuela fish in this section with the permission of the Colombian government.

The species reported as landed at Turbo (in the Gulf of Urabá) are sardines, tarpon, jacks, pompano, mackerel, crevalle jack, snapper and snook.

The Islands of San Andrés and Providencia

These islands are located in the Caribbean Sea approximately 120 miles from Nicaragua and about 400 miles from the Colombian mainland. They are a group of islands and reefs, of which San Andrés and Providencia are

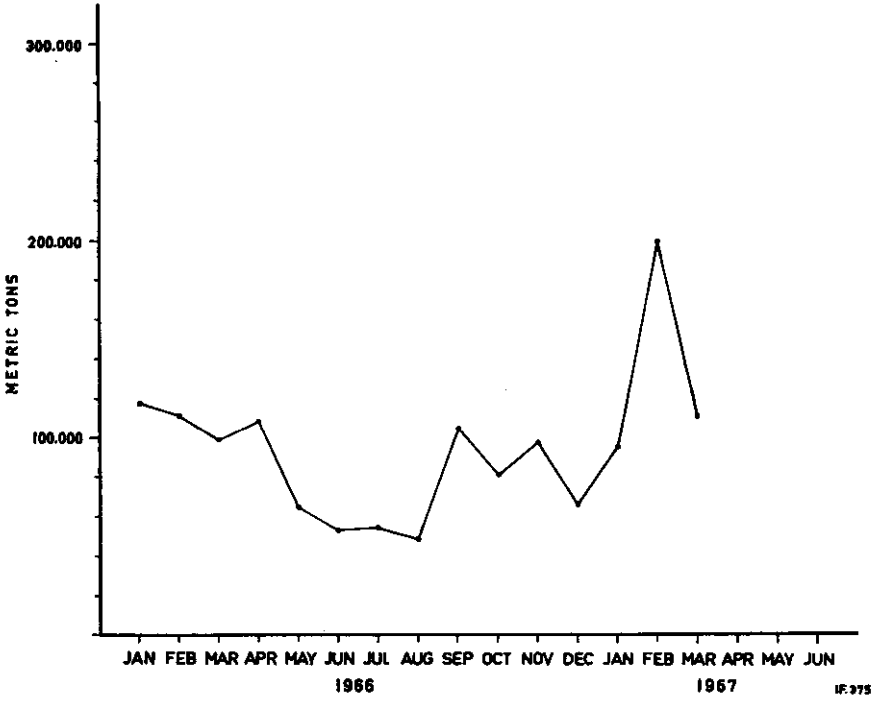

FIG. 2. Fresh fish (metric tons) landed at Cartagena from January-June 1967 (April and May 1967 are missing).

the largest.

These islands, declared free ports by the Colombian government, are expanding very rapidly as a tourist attraction. However, fisheries in the islands are all at the subsistence level, and the fish trade at the market is very poor.

Fish captured in the area include snappers, groupers, jacks, pompano, mackerel, and spiny lobster *(Panulirus argus)*, the latter captured by diving.

These islands could become a good port for tuna fisheries in the Caribbean area, which is at present exploited by Japanese longliners (Shomura, 1966).

PACIFIC FISHERY

The Pacific coast of Colombia, especially the northern part, has a very humid and rather unpleasant climate. Because of the climate, and other causes, the population of the area is much smaller than that of the Atlantic coast. Most of the fishing is done at the subsistence level. However, some of the largest fish companies in Colombia are located here, including large shrimp and tuna fisheries.

Saenz (1963) divided the fishing areas of the Pacific as follows: Tumaco, Buenaventura and Bahía de Solano.

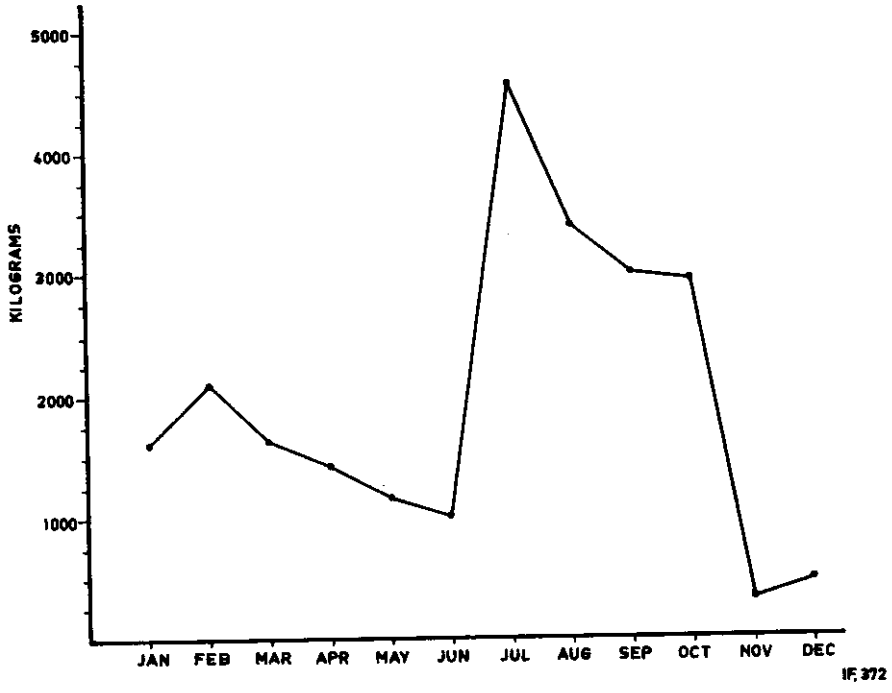

FIG. 3. Total landings (kilograms) for Bahía de Solano, January-December 1966.

Buenaventura

It is the center of the shrimp fishery, followed in importance by Tumaco. There are also, in Buenaventura, a commercial tuna fishery and a canning industry. Other fishing in the area is almost entirely at the subsistence level.

Bahia de Solano

It is located north of Buenaventura in the best natural harbor of the Colombian Pacific coast. Practically speaking the zone lacks a shelf area. Therefore most of the fishing is for pelagic species such as tuna, mackerel, dolphin and shark. Here a small commercial fishery operates a freezer. The total amount of fish landed is shown in Figure 3.

This area probably offers good possibilities for industrial fisheries, but the lack of air, sea, and land transportation and other difficulties have prevented any further development.

FISHING METHODS

Atlantic

Since most of the fishing is done at the subsistence level, most of the methods used are also primitive. Fernández B. and Jaraba Q. (1965) report the following gear used: gill nets, harpoons, small trawler nets, "zangarreo", "barbasco"

and dynamite; other fishing gear not mentioned by them are "lámparas de carburo", hook and line, "palangre" (long line), "atarraya" (cast net), beach seine and diving.

The "zangarreo" method consists of agitating sandy or muddy bottoms to produce murky water which causes asphyxia to some fishes by clogging the gills. This method was declared unlawful in 1954.

The "barbasco" is a plant that when pressed into the water liberates a substance that produces vasoconstriction of the blood vessels of fishes causing asphyxia. It was declared illegal in 1954. This decree also forbids the use of poison as a fishing method.

Dynamite, although its use was declared unlawful, is widely used. It has been perfected to the extent that several explosions can be produced in succession. Another way of using it is to produce two explosions: the first, to kill small fish, the second to kill the big fish that come to feed on the small fish killed in the first explosion. This method of fishing has caused great damage to the reef areas of Cartagena and in some bays of the National Park of the Taironas (near Santa Marta).

Lámparas de Carburo: This method of fishing is a night lighting system. The name comes from the apparatus used to produce the light which is acetylene gas produced by the reaction of CaC_2 with water. The gas is burned in a small reflector on the head of the fisherman who captures the fish (usually mullet) by harpooning. This method of fishing was declared unlawful in 1954. However, a recent work by Díaz et al. (Ms), showed this method to be highly selective when used to catch mullet. This work may induce a modification of the decree and allow the fishermen to use it legally since the decree did not stop its use.

Diving is mainly used to catch oysters, clams and spiny lobster.

Hook and line, as well as "palangre" (longline), are used for snappers, groupers, jacks, mackerel and snook.

Pacific

The shrimp industry uses methods similar to those used by the shrimpers of the Gulf of Mexico (Saenz, 1963). The tuna fishery employs live bait and purse seine nets. The other methods are similar to those of the Atlantic.

MARKETING

Atlantic

Most of the fish landed are sold at the markets of the big cities in the area, which are in order of importance: Barranquilla, Cartagena and Santa Marta. Retailers in the markets within the cities distribute the fish to the consumer. A large amount of fish is sold directly to the consumer by the fishermen at the beaches, or by peddlers in the streets. Fish sold in the streets are usually under legal size or have been dynamited.

Fish are packed in ice, transported by truck and sold fried, salted, smoked or frozen. They can also be sold as "filete" or "posta" (transversal cuts) which can be fresh or fried.

The fish are sold at the markets by the unit, not by weight.

There are a few canneries in Barranquilla and in Santa Marta that buy fish from the local fishermen. There is also a large freezing industry operating in Barranquilla.

Pacific

Most of the produce of the shrimp fishery is exported. The tuna fishery cans most of its landings and distributes them through the country. The rest of the fish is sold locally at the market.

COLLECTION OF FISHERY STATISTICS AND THEIR RELIABILITY

Collection

The collection of fishery statistics is accomplished by the Ministry of Agriculture and by the Corporación Autónoma Regional de los Valles del Magdalena y del Sinú (CVM).

The CVM collects statistics of the following Departments for the Atlantic coast: Atlántico (capital, Barranquilla), Bolívar (capital, Cartagena), Magdalena (capital, Santa Marta), Córdoba (capital, Montería) and Sucre (capital Sincelejo). The Ministry of Agriculture collects the statistics in the remaining Departments.

Reliability

The statistics collected by the Ministry of Agriculture are not considered reliable for the following reasons:

(1) The personnel in charge do not receive much training.
(2) The personnel in charge of collecting the statistics usually have little schooling (normally only a few years of elementary school).
(3) One person is responsible for collecting fishing and hunting statistics daily, making the legal dispositions, giving hunting and fishing permits, and enforcing fishing and hunting laws in the area.
(4) When data from an area does not arrive, an estimate is included in the statistics.
(5) A 30% increase is added to the total statistics to account for the places in which statistics are not taken, and since they are taken only in the largest centers of the region, this increase is likely to be an error.
(6) The estimates of some of the Inspectors are in many instances calculated without having the actual data, i.e. the age old practice of "cooking."
(7) The statistics of crustaceans and of molluscs for both oceans are tabulated together (Fig. 4).

This data should also be taken cautiously for the following reasons:

The data is not collected by the scientific name of the species, but by the vernacular names; thus in certain cases, a number of species belonging to the same family (or to different families) are grouped as a unit; for instance, in general the species of the family Lutjanidae are called "pargo", and those of the family Pomadasydae are called "ronco." As an example of species of different families given together under the same vernacular names, we have *Trachinotus carolinus* (Carangidae), *Trachinotus falcatus* (Carangidae) and *Peprilus paru* (Stromateidae) grouped under the name of "palometa."

In certain cases fresh water fishes are given as marine fishes because they have the same vernacular name; for instance under the "mojarra" are grouped fishes from the family Gerridae and Cichlidae (usually the genus *Petenia* of the latter).

Due to the mass arrival of the fishermen at the market and to the scarcity of personnel, most of the weighing is done by eye and is therefore liable to errors. Since the species fished with dynamite are confiscated by CVM Inspectors at the markets of Barranquilla and Cartagena, most of these fishes are sold by

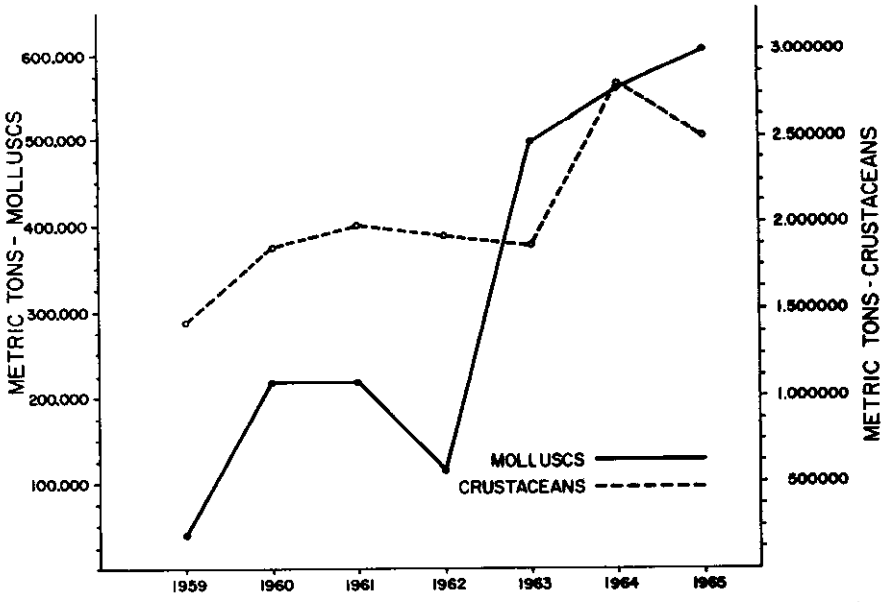

FIG. 4. Total landings of crustaceans and molluscs (metric tons) for the Atlantic and Pacific Oceans, 1959-1965.

peddling in the streets. These fishes, along with the fishes caught by the fishermen along the shores, are not included in the statistics.

There are species that are fished and eaten, but usually not sold commercially, and therefore do not appear in the statistics, for instance, *Lactophrys tricornis* and *L. bicaudalis* (*Ostraciidae*).

The statistics of a large freezing industry that has been operating in Barranquilla since 1948 are not included. This industry operates from La Guajira to Urabá.

Although the system of collecting statistics has been slowly improving, obstacles remain which must be overcome. The major problem is that fishing in Colombia has mainly developed only at the subsistence level; therefore, precise data is unlikely to be obtained.

Some of the methods by which the CVM is trying to improve the collection of data are:

(1) by selecting their personnel so that Inspectors would have at least one or two years of secondary schooling,

(2) by giving instruction to the Inspectors so that they can recognize the species and give statistical data utilizing the scientific names,

(3) by performing socio-economic research of fishermen and their villages to study their living conditions, methods of capture, marketing and transportation,

(4) by using data obtained from the fishermen's cooperatives organized by CVM, and

(5) by conducting scientific studies of the efficiency of the fishing methods utilized by the fishermen.

DISCUSSION AND CONCLUSIONS

The statistics collected by the Ministerio de Agricultura tend to show that fish landings in the Atlantic, after reaching a maximum in 1961, have been fluctuating between 21,000 and 29,000 metric tons, with a tendency to diminish rather than to increase (Fig. 5). In the Pacific, the tendency has been to increase slowly, except for the year of 1966, which shows a marked decrease in the catches (Fig. 5). However, due to the errors that are made

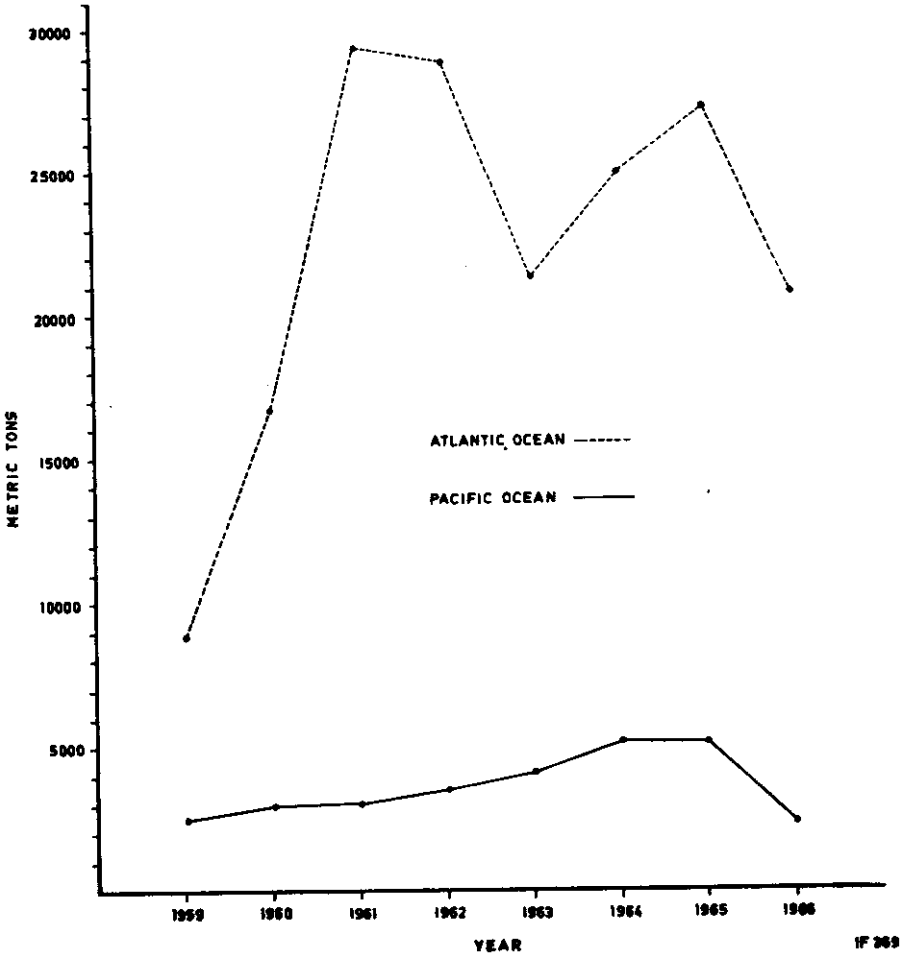

FIG. 5 Total landings (metric tons) from the Atlantic and Pacific Oceans, 1959-1966.

in the collection of statistics, it is doubtful that these figures would give a real approximation of the total amount of fish landed. If we assume that the same errors have been committed every year, the statistics could probably reflect an approximation of fish landings; that is, on the Atlantic, more or less stable landings with alternate years of good and bad catches, but with a tendency to decrease (Fig. 5). In the Pacific, there has been a tendency to increase the catches except for the year of 1966, in which catches dropped sharply, probably not because of a decrease in the catch itself, but because of the increased deficiencies in the collection of statistics during that year. The statistics collected by the CVM from August 1964 to June 1965 tend to confirm those of the Ministerio for the years of 1964 and 1965. But they differ markedly for the year of 1966, in which, although the data from July to December is missing, the general tendency is to increase, if we examine the data from January to June 1967. Since the landings from the market of Cartagena were more or less stable for 1966, it will tend to confirm an error in the statistics given for the Atlantic in 1966 by the Ministerio de Agricultura, although it is impossible to determine if catches are increasing or decreasing based on present statistics.

The collection of statistics has been improved by giving instruction to the Inspectors, the introduction of socio-economics by scientific studies on the efficiency of the fishing methods and from the data obtained from the recently organized cooperatives. It is expected that these improvements will give a much more accurate picture of the Colombian fisheries in the near future.

It is possible that the marine resources are misused due mainly to the fishing methods that are used in Colombia. Most of the species caught are shallow-water schooling species that can be fished with the primitive methods ("barbasco", dynamite, and small mesh nets) which in most instances are depleting the shallow water resource. Nevertheless, Colombian fisheries have not been touched since the methods used so far only allow for shallow water fishing, usually in waters of less than 5 meters depth.

TABLE 1

COLOMBIAN AND AMERICAN VERNACULAR NAMES AND SCIENTIFIC NAMES OF THE FISHES EATEN ON THE ATLANTIC COAST OF COLOMBIA

COLOMBIAN	AMERICAN	SCIENTIFIC NAME
Anchova	Fantail mullet	*Mugil Trichodon*
Atún	Jacks, scads, pompano	
Bacalao	Cobia	*Rachycentron canadum*
Bagre de mar		*Galeichthys felis*
Baillete	Tarpon, snook	*Centropomus pectinatus*
Bonito	Atlantic bonito	*Sarda sarda*
Cofre	Spotted trunkfish	*Lactophrys bicaudalis*
Carito	King mackerel	*Scomberomorus cavalla*
Casabito	Bumper	*Chloroscombrus chrysurus*
Cherna	Nassau grouper	*Epinephelus striatus*
Chino	Lane snapper	*Lutjanus synagris*
Chivo Blanco		*Bagre bagre*
Chivo Cabezón		*Galeichthys bonilla*
Chivo Mapalé		*Arius spixii*
Cobia	Cobia	*Rachycentron canadum*

TABLE 1 — continued

Cojinua	Blue runner	*Caranx crysos*
Corbinata		*Umbrina* sp.
Jorobado	Lookdown	*Selene vomer*
Jorobado	Atlantic moonfish	*Vomer setapinnis*
Juancho Juancho	Guaguanche	*Sphyraena gauchancho*
Jurel	Crevalle jack	*Caranx hippos*
Lebranche		*Mugil brasiliensis*
Lisa	White mullet	*M. curema*
		M. incilis
Macabí	Ladyfish	*Elops saurus*
Machuelo	Atlantic thread herring	*Opisthonema oglinum*
Mero	Red grouper	*Epinephelus morio*
	Warsaw grouper	*E. negritus*
Mojarra Blanca	Yellowfin mojarra	*Gerres cinereus*
Mojarra		
Ojo Gordo	Horse-eye jack	*Caranx latus*
	Bar jack	*C. ruber*
Palometa	Pompano	*Trachinotus carolinus*
	Permit	*T. falcatus*
	Palometa	*T. glaucus*
Pampano	Northern harvestfish	*Peprilus paru*
	Pompano	*Trachinotus carolinus*
		T. glaucus
Pargo	Snappers	
Pargo rojo	Mutton snapper	*Lutjanus analis*
Pejepuerco	Queen triggerfish	*Balistes vetula*
Pez Espada	Largetooth fish	*Pristis perotteti*
Picuda	Great barracuda	*Sphyraena barracuda*
Robalo	Snook	*Centropomus undecimalis*
	Little snook	*C. parallelus*
	Swordspine snook	*C. enciferus*
		C. robalito
	Tarpon snook	*C. pectinatus*
Ronco	Grunts	*Haemulon* sp.
Sábalo	Tarpon	*Megalops atlanticus*
Sable	Atlantic cutlassfish	*Trichiurus lepturus*
Saltona	Yellowtail snapper	*Ocyurus chrysurus*
Sardina Española		*Clupea pilchardus*
Sardinas	(mixture of small fishes)	
Sierra	Spanish mackerel	*Scomberomorus maculatus*
Tiburón	Tiger shark	*Galeocerdo cuvieri*
	Lemon shark	*Negaprion brevirostris*
	Whale shark	*Rhincodon typus*
Tollo	Atlantic sharpnose shark	*Scoliodon terranovae*
Torito	Requiem shark	*Lachtophrys* sp.

A list of the Pacific fishes is not included, because it was impossible to obtain their identification. The Ministerio de Agricultura uses the same vernacular names for both Atlantic and Pacific fishes because they assume that they are of the same family and sometimes of the same genus.

LITERATURE CITED

Díaz, Enríque L., Lúmar Quintero S. and Manuel Muñoz P.
1967. La pesca con lámpara de carburo y arpón en la Ciénaga Grande de Santa Marta. CVM, Ms, 1967.

FERNÁNDEZ, B., MARÍA DEL S. AND ARISTÍDES JARABA Q.
1965. La comercialización del pescado en la ciudad de Barranquilla. Thesis, CVM, Bogotá, Colombia.

MINISTERIO DE AGRICULTURA
1963. Legislación Nacional de pesca y caza vigente. Imprenta Nacional, p. i-xi, 1-212.

SAENZ, WILLIAM
1963. Fisheries progress in Colombia. Proc. Gulf and Caribb. Fish. Inst., 15th Ann. Sess., 1962, p. 140-145.

SHOMURA, RICHARD S.
1966. The Atlantic tuna fisheries, 1963. Comm. Fish. Rev., *28* (2): 1-11.