A GEOGRAPHICAL INVESTIGATION OF THE GUATEMALAN FISHING INDUSTRY

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ABSTRACT

A GEOGRAPHICAL INVESTIGATION OF THE
GUATEMALAN FISHING INDUSTRY

by David M. Jones

This thesis constitutes an analytical survey of the major phases of the Guatemalan fishing industry. Included are the production, distribution, and marketing sectors of the salt-water, brackish-water, and fresh-water fishing industry. Interest is focused upon the possibilities for, and deterrents to, increased production and consumption of fish foods in Guatemala.

The production phase is divided between seafood produced for export and that for domestic consumption. The Pacific Coast is presently the source of about seventy-five percent of the fish and other seafood consumed in Guatemala and almost 100 percent of the exports. Production is oriented chiefly toward exports of high-value shrimp to markets in the United States. However, fish caught in the shrimping operations are directed to domestic markets in increasing quantities.

Most typical of the fisheries in Guatemala are small producers with very limited means. These are clustered

about the brackish lagoons bordering the Pacific Coast and along the Caribbean shore. The volume of local and regional production is closely related to available transportation. Fresh and dried fish from inland lakes are distributed over extensive areas, but in very limited quantities, while fish from ponds have not yet been produced on a commercial scale.

Fish in some form are distributed to even the most remote areas, especially during Holy Week. However, the largest markets center upon the principal urban agglomerations. Individual entrepreneurs distribute most of the fish and other seafood marketed on the national level. Individual buyers usually obtain small quantities of fish from a given village. The fish are then iced and transported via local bus lines to one of the regional markets. Here the fish are sold at high per-unit profits.

Excessively high prices and low quality characterize the sale of fish anywhere outside of the immediate producing area. This is due chiefly to the very small volume of trade and to inadequate means of transportation and marketing. Annual consumption of seafood is minimal, only slightly more than one pound per capita. Peak consumption coincides with Holy Week, a period of little meat consumption. Thus, low-volume production, high prices, and a negative consumption habit militate against expansion of the industry. Increased volumes of fish entering the Guatemala City market and new efforts to reduce prices, however, are beginning to effect

some change in this picture. The expansion of ocean fisheries, plus new efforts to exploit brackish waters effectively, offer some hope for an improved and cheaper diet for Guatemalans.

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By

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PREFACE

Advance planning is particularly necessary for effective research outside of the United States. Due chiefly to the stateside and in-country (Guatemala) efforts of my academic and thesis advisor, Dr. Clarence W. Minkel, the groundwork for this study was established carefully prior to departure. Our mutual concern for "development" in Latin America was directed toward research that would be both of interest and of possible use within Guatemala. Thus, attempts were made to assure the involvement of appropriate Guatemalan and international agencies within the republic. The extent to which these attempts were successful was reflected in the high degree of cooperation and enthusiasm encountered.

The support of several Guatemalan agencies was particularly valuable throughout the research period. Three agencies offered direct assistance and participation in the study: 1) the National Geographic Institute offered its physical facilities, transportation, an assistant, and publication of the report in Spanish, 2) the Wildlife Division of the Ministry of Agriculture offered full cooperation in office work, and 3) the Center for Industrial Development and Productivity made office space and secretarial help available. The staff

of the United States Agency for International Development (A.I.D.) in Guatemala was also very helpful. Other agencies which aided the research were the National Economic Planning Council, the Department of Public Works, and the Institute of Production Development (INFOP).

Plans were originally designed for a three month research period, beginning April 1, 1966, and financed with personal funds. A Ford Foundation grant administered through the Latin American Studies Center of Michigan State University permitted the project to be extended through August, 1966. For this financial aid, and to the people who made it possible, the author is extremely grateful. The additional months of field research allowed a more thorough and comprehensive investigation.

Transportation within the country was a primary concern prior to arrival in Guatemala. It was here that the material aid of Guatemalan agencies was perhaps most beneficial. The National Geographic Institute provided a vehicle and driver during much of the study, particularly on the Pacific Coast and in the eastern highlands. Thanks are extended to Dr. Arthur L. Burt, Coordinator for Maps and Publications, U.S. Department of State, for encouraging my participation in a tourism study of Guatemala which afforded extensive market coverage in less accessible areas of the country. He and his son, Al, aided greatly in gathering fishing data for me at the same time. Mention

must also be made of the assistance given by Dr. Oscar H. Horst, and his students from Western Michigan University, in the Quezaltenango area.

Many individuals helped to make the five-month period of field research both profitable and enjoyable. Special thanks go to Dr. Don Hoy, Dr. Gene Martin, and Mr. Robert N. Thomas in the Agency for International Development program; Ing. Alfredo Obiols G., Ing. Manuel Castillo B., and Rudolfo Velasquez R. of the National Geographic Institute; Dn. Mario A. Saavedra of the Wildlife Division, Ministry of Agriculture; Dr. Luis Schlesinger, Ing. Einar Klanderud, and Ing. Hector Sánchez Latour of the Center for Industrial Development and Productivity; and Ing. José López Toledo of the Department of Public Works.

During the period of writing and thesis preparation, numerous people aided my progress. The author appreciates the financial support as a graduate assistant of the Michigan State University geography department. The many hours spent with Dr. Clarence W. Minkel, a friend as well as advisor, will surely never be forgotten by either party, and the thorough second reading by Dr. Paul C. Morrison is also gratefully acknowledged. Parental concern and backing throughout the endeavor could not have been substituted. Finally, the aid and understanding of my fiancé, Julie, provided a necessary stabilizing force.

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CHAPTER I

INTRODUCTION

World food problems are notably difficult to solve or even ameliorate. Food production on a world-wide basis has fluctuated greatly, due to natural and human causes, while population growth has constantly strained productive capabilities. Especially acute is the situation in most developing sectors of the world. The 1966 annual report of the United Nations Food and Agricultural Organization (FAO) indicates that 1965 food production in Africa, the Far East, and Latin America dropped two percent from the previous year. This, as part of an equal drop in total world production, was the worst setback per capita since World War II. Yet, these startling figures tend to indicate only one aspect of the problem.

Latin American concern centers about the quality of food intake, rather than the bulk. Nutritional deficiencies constitute an endemic human condition throughout most of the region. High quality protein foods are especially expensive, and thus unavailable to the vast majority of the population. Within this picture, the production and consumption of fish and other seafoods are particularly underdeveloped. The

recent, spectacular development of the fish meal industry in Peru has focused international attention upon one specialized phase of the fishing industry. The Peruvian catch increased from 31,000 tons in 1947 to over 6.9 million tons in 1963, and surpassed that of Japan, formerly the world's largest producer.[1] This production is oriented chiefly toward obtaining necessary foreign exchange, and is thus used only indirectly to feed the local populace. Fish for human consumption remains a neglected resource in most of the Latin American countries.

Conditions in Guatemala illustrate the general pattern. A known deficiency of animal proteins exists in the average diet. Guatemala occupies the lowest position among the Central American republics in caloric, protein, and fat consumption, as is shown in Table 1.

Table 1.--Daily food consumption per capita in Central America.

	Calories	Proteins (Grams)	Fats (Grams)
Costa Rica	2,520	63.1	63.8
Honduras	2,330	61.1	40.4
Nicaragua	2,190	62.1	55.7
El Salvador	2,000	53.8	47.2
Guatemala	1,970	50.0	34.7
Central America	2,450	60.0	42.0

Source: El Gráfico, of Guatemala, August 10, 1966, quoting the Inter-American Committee for Agricultural Development.

[1] Francis T. Christy, Jr., and Anthony Scott, The Common Wealth in Ocean Fisheries, (Baltimore: John Hopkins Press, 1965), p. 146.

The actual quantity of food consumed is deemed sufficient for daily needs by United Nations standards, but protein intake is considerably below recommended levels. Fish would, ideally, provide an economical food to help overcome this imbalance. Yet, Guatemala is probably the country in Central America which has most neglected its fishery resources.[2] With frontage on both the Caribbean and the Pacific, a considerable potential would seem to exist.

Among the important prerequisites to rational development of uncharted resources are related investigations and some stimuli for exploitation. The available information concerning Guatemalan fisheries is very sketchy. Interest in the industry's potential is mounting, however, and with it the need for pertinent information.

Objectives

The immediate concern of this research is to provide an analytical survey of the major phases of the Guatemalan fishing industry. Included has been the investigation of production, distribution, marketing, and consumption. Interest has been focused upon the possibilities for, and deterrents to, increased production and consumption of fish

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[2]U.S., Department of Interior, Fish and Wildlife Service, The Fisheries and Fishery Resources of the Caribbean Area, by R. H. Fiedler, M. J. Lobell, and C. R. Lucas, revised by J. A. Smyth, Fishery Leaflet 259, (Washington, D.C.: Government Printing Office, 1957), p. 122.

food within Guatemala. The working hypothesis is that increased consumption of fish products is entirely possible and intrinsically desirable in the national picture. Study objectives have been two-fold: 1) to provide a report useful for planning purposes within the Republic of Guatemala, and 2) to fulfill thesis requirements for the Master's degree in Geography at Michigan State University.

Procedures

A survey of related research was undertaken at Michigan State University prior to field work and was continued in Guatemala. There is a paucity of literature directly concerned with Guatemalan fisheries, and many of the works that are available are general in nature. A comprehensive bibliography is included in this study.

Interviews with knowledgeable and interested United States, Guatemalan, and international officials assured a basis of support and information within the country. Close working arrangements were established with the National Geographic Institute of Guatemala, the Wildlife Division of the Ministry of Agriculture, and the Center for Industrial Development and Productivity. Once a base of operation was assured, the actual field work was greatly facilitated.

No systematic, sector-by-sector, modus operandi was possible, since movement about the country was determined in large part by the availability and patterns of local

transportation. Nevertheless, all phases of the industry were observed and studied firsthand whenever possible.

The principal techniques used in obtaining information were critical observation and personal interviews. An integrated approach was used within each region investigated. That is, productive areas served as foci for the field study, but the local distribution, marketing, and consumption patterns were noted at the same time.

The field work within producing zones was divided areally among, 1) the Pacific Coast, 2) the Caribbean shores, 3) the interior lakes and rivers, and 4) the widely distributed fish pond developments. All fishing villages bordering the Pacific Coast which were accessible by a rugged, four-wheel-drive truck were investigated. In addition, a boat was used for a portion of the Chiquimulilla Canal. Coverage on the Caribbean side was more limited, as bus transportation was used to Puerto Barrios and local water transportation from there to Livingston and Lake Izabal. All major fresh-water sources of fish, with the exception of the Lago de Güija, were personally investigated, and activities along the larger rivers were also noted. Fish pond and stocking activities were observed selectively in most sections of the country. Personal observations and investigations were supplemented by secondary sources in certain instances to amplify the areal coverage.

In each fishing center information was obtained through interviews with fishermen and townspeople, and by personal observation. Interviewing techniques varied with the circumstances, but a formal questionnaire was used only in the case of the largest fishing concern. Desired information included: equipment and methods of catch, numbers of fishermen, types of fish caught, methods of processing and preservation, prevailing prices, and the marketing procedures and consumption at the site. Information concerning the historical development of fishing was also gathered wherever possible.

Distribution routes and modes of transportation from the fishing zones to the rest of the republic were traced through interviews at the production and marketing points. Precautions taken to preserve fish quality were determined in the same manner. Interviews with personnel of the several large distributing companies in Guatemala City aided in obtaining information on practices for bulk shipments.

Focal points for the marketing sector of the study were the public markets. The plan was to investigate the market place in each town having a population exceeding 2,000, and any other significant regional market. Data was obtained from 102 of the 117 towns meeting this criterion (1964 Census). Within the weekly or daily markets, fish and other seafood sellers were searched out and questioned as to: 1) the place of origin of the fish, 2) the

approximate quantities sold on a weekly or daily basis, and 3) the prices and varieties of fish. Depending upon the rapport established with the seller, additional information concerning consumer preference, social class differences in buying habits, and historical aspects of the business were ascertained. Within the larger urban centers, seafood stores and restaurants were checked for sales and general consumption patterns. In addition, a number of families along Pacific Coast transportation routes were interviewed to determine consumption habits near the sources of fish.

Related Research

A major study of fisheries in Central America is presently underway. The agreement for a six-year United Nations Food and Agricultural Organization project was signed, after some delay, in 1966. The goal of the project is to increase production and consumption of ocean and brackish water seafood in the entire region. The project consists of four principal segments: 1) the consolidation of fisheries administration and planning, 2) the development and management of a diversified fishing industry, 3) the investigation of fishery resources, and 4) the improvement of processing and marketing procedures. All of the Central American republics and Panama are included in the study, and the project headquarters is in El Salvador.[3] A proposed

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[3]Panama, Ministerio de Agricultura, Commercio e Industrias, Proyecto para el desarrollo pesquero en Centroamerica, Anexo A-54, (Panama: 1966).

study of brackish waters in the Republic of Guatemala has been canceled, at least temporarily, due to a lack of funds.

Summary of Findings

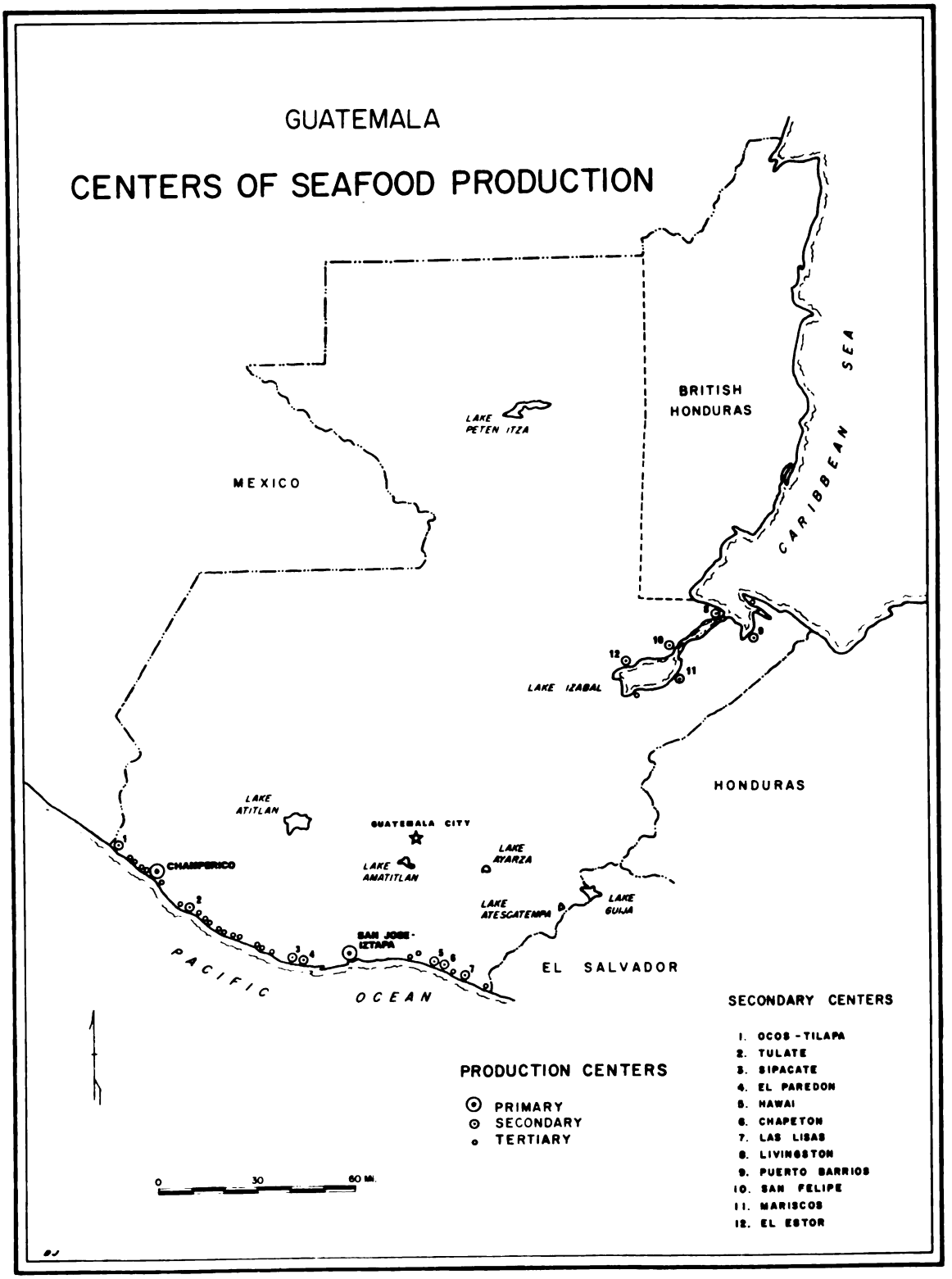
The development of commercial fisheries has been a very recent occurance in Guatemala. Surplus fish from interior lakes, and dried fish from selected sites on the coast, have a long history of minor trade, but only with improved transportation and storage facilities have salt water fish been marketed throughout the republic.

Present production is still characterized by the small producer with very limited means. Not until 1959 was there any ocean-going vessel operating from Guatemalan shores. Since that time, development of ocean resources has been sporadic, and thirty shrimp boats now constitute the entire Guatemalan fishing fleet. Thus, the fishing industry has attained no great importance in either internal or external trade, even in comparison with that of neighboring countries. However, recent interest in the industry indicates a potential change in the situation. Plans for a still-water fishing port on the Pacific appear likely to be implemented in the near future, expansion into fish meal production by the largest fishing concern in Guatemala is imminent, and several schemes for increasing productivity in the extensive brackish waters along the Pacific are in the planning stage.

Production now centers along the Pacific Coast. Champerico and San José-Iztapa (Map 1) are the major producers for both the domestic and export markets. Commercial fishing fleets at these locations are concerned mainly with the export shrimp market but also serve a growing Guatemalan market for fish and other seafood. External distribution from these centers is directed almost entirely to the United States market, while internal distribution focuses upon Guatemala City.

Most of the small fishing villages of Guatemala are also along the Pacific Coast. The small-scale producers at these locations use rudimentary methods to obtain seafood for sale to middlemen and actually provide most of the fish found in local and regional markets throughout the country. Production is seasonal, as many fishermen "turn farmer" with the advent of the rainy season. Two general classes of fish, first and second-class, have developed according to consumer acceptance. In addition to fresh fish, much of the catch is crudely salted and dried. Fish are distributed outside of producing areas only in times of substantial surplus, or in periods of high demand. These facts of production also characterize fishing villages on the Caribbean shores.

The inland lakes of the highlands are significant producers only on a limited local and regional scale. Fish from Lakes Atitlán, Amatitlán, Atescatempa, and Güija reach


GUATEMALA
CENTERS OF SEAFOOD PRODUCTION
MEXICO
BRITISH HONDURAS
CARIBBEAN SEA
LAKE PETEN ITZA
LAKE IZABAL
HONDURAS
LAKE ATITLAN
GUATEMALA CITY
LAKE AMATITLAN
LAKE AYARZA
LAKE ATESCATEMPA
LAKE GUIJA
CHAMPERICO
SAN JOSE-ESCUINTLA
EL SALVADOR
PACIFIC OCEAN
PRODUCTION CENTERS
PRIMARY
SECONDARY
TERTIARY
0 30 60 MI.
SECONDARY CENTERS
1. OCOS - TILAPA
2. TULATE
3. SIPACATE
4. EL PAREDON
5. HAWAI
6. CHAPETON
7. LAS LISAS
8. LIVINGSTON
9. PUERTO BARRIOS
10. SAN FELIPE
11. MARISCOS
12. EL ESTOR

MAP 1

a surprisingly extensive area, but in minimal quantities. Rivers in the republic rarely attain more than local importance as sources of fish. Subsistence-level production is the general rule at these locations.

Distribution of seafood from Guatemalan production zones occurs on two levels. Export items are carefully packaged and frozen then taken by modern refrigerated trucks to the Caribbean port of Matías de Galvez or loaded directly on the Pacific side. Cities along the east coast of the United States are the chief markets for shrimp. Internal movement of fish occurs mostly on a small scale, with little quality control. Much of the transportation is by bus. The volumes involved are thus dependent to a large degree upon local road patterns and conditions, and the frequency of bus service.

The largest urban agglomerations are primary centers for the distribution of fish. All roads lead to Guatemala City, so to speak, with Quezaltenango a weak second. The principal regional markets, most of them department capitals, also serve as minor centers of distribution. Fish in some form are sold in the most remote areas, but the general pattern shows extremely small quantities involved in such movement. Buyers generally obtain twenty-five to fifty pounds of fish from several fishermen in a given fishing village. The fish are then iced and carried via local bus lines to one of the regional markets. Here the fish are

sold for twice the price paid at the fishing site. Dried fish are transported in approximately the same manner and volume. Larger shipments of fish are destined chiefly for the Guatemala City market.

Individual entrepreneurs market most of the fish and other seafood on the national as well as the local level. An exception to this small-scale trade is in the Guatemala City area, where several large distribution and marketing firms account for much of the total volume of trade. Packaged goods can be found in most of the supermarkets, but the majority of the populace obtains fish in the open market place, if at all. The varieties of fish acceptable to the consumer are increasing, but local preference is still for the traditional snook (róbalo) and red snapper (pargo).

Excessively high prices characterize the sale of fish anywhere outside of the immediate producing areas, and quality is doubtful. This is due chiefly to the very small volume of trade and to inadequate means of transportation and marketing. Consumption of seafoods is thus minimal, under one pound of fish per capita per year![4] Peak consumption coincides with Holy Week (Semana Santa), a period of little meat consumption by the predominantly Catholic

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[4]Ramiro Bolaños Yela, Los recursos pesqueros de Guatemala, fuente atractiva de inversion, Thesis, Facultad de Ciencias Económicas, (Universidad de San Carlos de Guatemala: 1964), p. 84.

population. Thus, low-volume production, high prices, and a negative consumption habit militate against the industry. Increased volumes of fish are entering the Guatemala City market, and efforts to reduce prices are beginning to make some headway. Expansion of the ocean fisheries, plus efforts to exploit brackish waters effectively, offer hope for an improved and cheaper diet for the people of Guatemala.

CHAPTER II

PRODUCTION AND PROCESSING: THE PACIFIC COAST

The development of fishery resources has been of minor significance to date in the economy of Guatemala. This has been due in part to the interior location of population centers, a relative abundance of agricultural land for subsistence crops, the poor transportation facilities, and the highly perishable nature of seafoods. Any feeling of urgency for the expansion of fisheries was perhaps most negated by the predominantly agricultural orientation of the country. It could be hypothesized that nations have turned to the sea for sustenance only when arable land proved insufficient relative to population, as illustrated by Norway or Japan. However, this need not be the case. A balanced approach to resource development in Guatemala must challenge the above hypothesis.

National self-sufficiency in seafood has not yet been attained. During the recent past, dried fish have been transported by pack mule from Tapachula, Mexico, to serve the seasonal market for seafood in Guatemala.[1] In

[1]Felix W. McBryde, Cultural and Historical Geography of Southwest Guatemala, Smithsonian Institution, Institute for Sociology and Anthropology, Publication No. 4, (Washington, D.C.: Government Printing Office, 1947), p. 79.

addition, dried varieties, chiefly cod, are still significant imports from Europe.[2] Salvadorian resources have also been tapped for fresh and processed fish.[3] The gradual growth of a domestic ocean-going fishing fleet dates only from 1959, and the commercial processing of seafood within Guatemala has likewise been a recent phenomenon.

The present production and processing activities of the Guatemalan industry can be divided conveniently into four general aspects: 1) the Pacific Coast fisheries, 2) Caribbean Coast fisheries, 3) inland fisheries, and 4) inland fish pond and stocking activities. This chapter deals specifically with production and processing as related to the Pacific Coast fisheries, while Chapter III is concerned with that of the Caribbean and inland waters. The coastal fishery sites on both the Pacific and Caribbean are classified as primary, secondary, or tertiary according to the equipment used, numbers of persons involved, volume of production, and market accessibility.

Pacific Coast fishing provides an estimated seventy-five percent of the fish and other seafood consumed domestically, and almost 100 percent of the exports. However, this dominance is an occurance of recent years. Of the

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[2]Guatemala, Ministerio de Economía, Dirección General de Estadística, Anuario de comercio exterior, 1965, (Guatemala: 1966).

[3]John Thompson, "The Fisheries Industry of El Salvador," Journal of Inter-American Studies, Vol. 3, No. 3 (1961), p. 438.

three major geographical divisions, Pacific, Caribbean, and inland waters, the Pacific waters were the last to be exploited significantly. Considering the proximity of this coast to the major population centers, mere distance cannot have been the dominant factor in this slow development. The most likely explanation centers upon the physical nature of the coast itself.

The unarticulated coastline provides no protected anchorages for boats of any type along the entire 160 miles from the Mexican border to that of El Salvador. The steep gradient of the shore and the resulting heavy surf also discouraged early sea-going attempts. Associated with these conditions is a very narrow continental shelf, which has restricted the number of fish varieties readily available. These negative factors were overcome only by the allure of high-value shrimp along the coast which were first exploited by United States, Mexican, and Salvadorian fishermen. Prior to 1959, fishing by Guatemalans was practiced almost exclusively in easily navigable brackish waters.[4] Here, a series of lagoons and estuaries still permits significant local fishing. Subsistence-level production also continues in the numerous rivers flowing from the mountains of the interior.

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[4]An attempt at ocean fishing in 1950 was reported by José Furlán in, Informe sobre posibilidades de organizar una cooperativa de pescadores en Iztapa, Instituto de Fomento de la Producción, Guatemala, 1950.

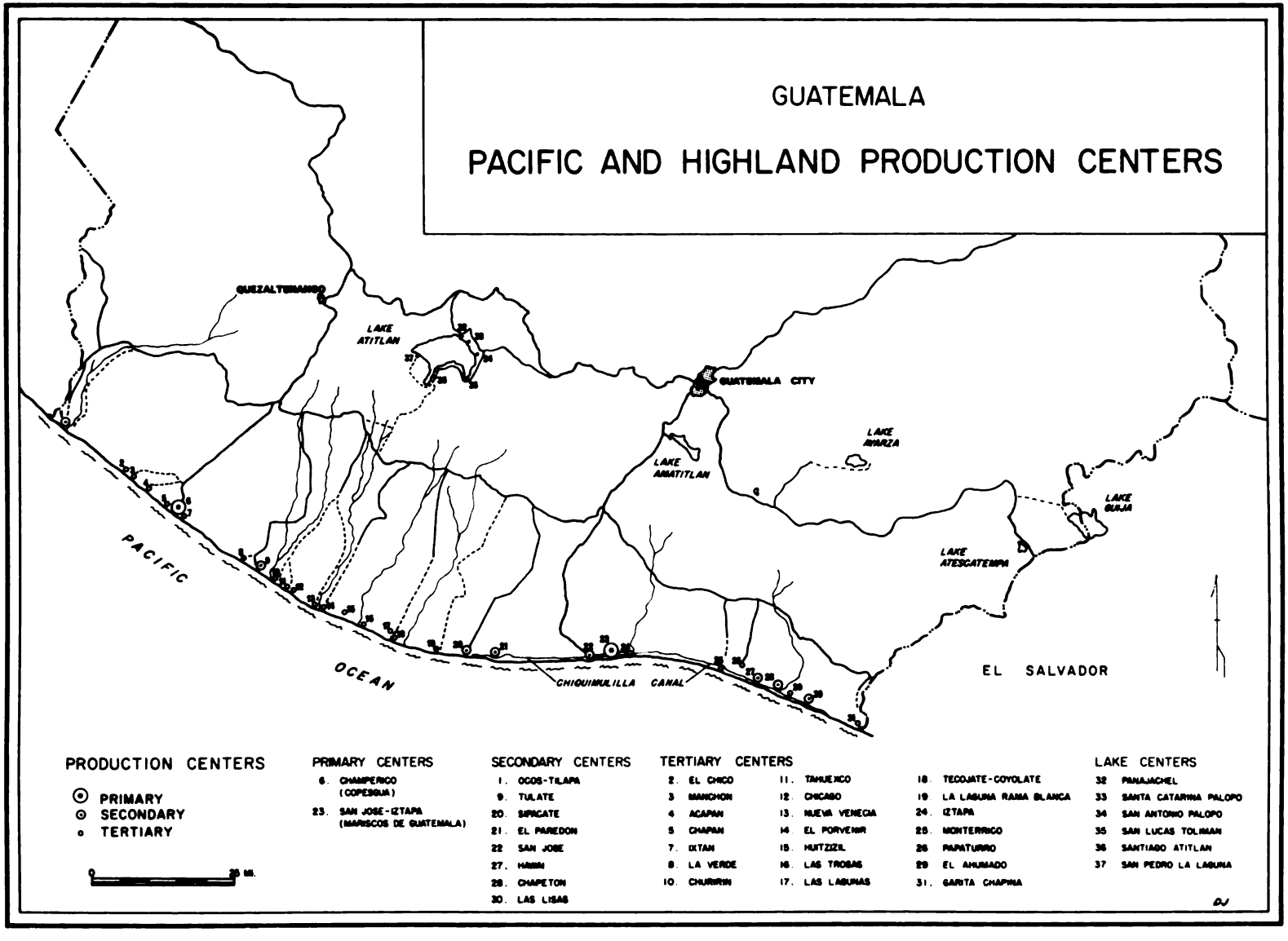
Production centers along the Pacific may be classified according to the level and intensity of fishing endeavors. Three degrees of significance are noted: 1) primary production sites, which actively exploit the resources of the open sea and have the concomitant benefits of large-scale production, 2) secondary centers in which a smaller percentage of manpower and time is devoted to fishing activities, yet that have a significant daily catch and are endowed with year-round transportation facilities, and 3) tertiary villages, in which only sporadic production occurs and from which fish enter only slightly into regional trade. The location and relative significance of Pacific Coast production centers are shown on Map 2.

Primary Production Centers

Primary fishing centers in Guatemala are found only on the Pacific Coast. The only vessels and plants used for harvesting and processing ocean resources are based at Champerico and near Iztapa or San José. These sites are unrivaled in their importance for local and external trade in seafoods.

Champerico

Champerico is the most significant production and processing site in Guatemala. The Compañía Pesquera de Guatemala (COPESGUA) and Pesca, S.A., a joint Guatemalan-Japanese enterprise, was established here in 1961. Ownership


GUATEMALA
PACIFIC AND HIGHLAND PRODUCTION CENTERS
QUEZALTENANGO
LAKE ATITLAN
GUATEMALA CITY
LAKE AMATITLAN
LAKE AYARZA
LAKE GUIJA
LAKE ATESCATEMPA
PACIFIC
OCEAN
CHIQUIMULILLA CANAL
EL SALVADOR
PRODUCTION CENTERS
PRIMARY
SECONDARY
TERTIARY
25 MI.
PRIMARY CENTERS
6. CHAMPERICO (COPESBUA)
23. SAN JOSE-IZTAPA (MARISCOS DE GUATEMALA)
SECONDARY CENTERS
1. OCOS-TILAPA
9. TULATE
20. SIPACATE
21. EL PAREDON
22 SAN JOSE
27. HAMM
28. CHAPETON
30. LAS LISAS
TERTIARY CENTERS
2. EL CHICO
3 MANCHON
4 ACAPAN
5 CHAPAN
7. IXTAN
8. LA VERDE
10. CHURRIN
11. TAHUEXCO
12. CHICAGO
13. NUEVA VENECIA
14. EL PORVENIR
15. HUITZIZIL
16. LAS TROJAS
17. LAS LAGUNAS
18. TECOJATE-COYOLATE
19 LA LAGUNA RAMA BLANCA
24. IZTAPA
25. MONTERRICO
26 PAPATURRO
29 EL AHUMADO
31. GARITA CHAPINA
LAKE CENTERS
32 PANAJACHEL
33 SANTA CATARINA PALOPO
34 SAN ANTONIO PALOPO
35 SAN LUCAS TOLIMAN
36 SANTIAGO ATITLAN
37 SAN PEDRO LA LAGUNA

MAP 2

is sixty percent Guatemalan, while the administration is largely Japanese. This company purchased and expanded a small shrimp processing plant and imported a number of boats from Mexico. The fleet now includes twenty small vessels, ranging from fifty-two to eighty-four tons each.

The open roadstead of Champerico provides only a rough offshore anchorage. From this port the boats, with a standard crew of five men, ply the entire coastline for their catch. Shrimp are the desired species, and the vessels may range up to twenty-five miles from shore in following the shrimp migration. Each boat is equipped with two otter-trawl nets which capture rather indiscriminately. Thus, lobster, squid, and a variety of fish are netted in addition to the shrimp. The lower-valued fish now provide "fill-in" during the last several days of each two-week voyage. The percentage of marketable fish caught has increased from ten percent of the total catch by weight in 1962, the first full year of operation, to nineteen percent of the catch in 1965. Lobster and squid account for one percent or less of the total catch.

Five classes of shrimp are harvested: blue, white, brown, pink, and chacalín. The blue, white and chacalín shrimp are generally found nearest the coast, the brown at ten to twenty miles from shore, and the pink at twenty to twenty-five miles out. Standard procedure is to fish near shore during the day and drift seaward in the evening. All

fish caught incidentally are tossed overboard until the last several days of the trip. Then, marketable white-fleshed varieties are used to fill the holds. Varieties normally retained for the commercial market include: grouper, red snapper, croaker, goby, sole, cabrilla, and ratón (Appendix A). Species with no present market value are tossed back into the sea, usually lifeless.

Some seasonality of catch can be noted. The peak period of commercial shrimping occurs during October, November and December, while minimal catches are associated with June and July.[5] Each shrimp variety has a slightly different cycle, but the above statement indicates the general pattern. Little is known about the variability of fish species caught during the year.

Initial processing of the catch occurs on shipboard. The shrimp are sorted according to class, deheaded, and washed before being placed into the cooling compartments in the hold. Other high-value seafood such as lobster and squid may be placed in a separate compartment. Fish kept are selected and cleaned on the decks before they join the rest of the catch in the hold.

The COPESGUA boats are usually sent on thirteen-day voyages and arrive at the pier from Monday through Thursday.

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[5]The Mexican catch also corresponds to this cycle. See Mercados y Productos section of Comercio Exterior, Vol. 17, No. 8, (Mexico: 1967), p. 663.

Unloading the catch at the Champerico pier is a relatively slow, labor-intensive process. The shrimp and fish are pailed from the hold into old oil drums which are transferred to the pier by a power winch. Railway flatcars convey the filled drums to the shore, where they are transferred to an open pick-up truck. This vehicle transports the drums to the processing plant only minutes away. The entire unloading process takes two to three hours per boat, and usually includes a minimum of two tons of seafood.

The processing of the catch is a straightforward and simple procedure, given the proper equipment. When the drums of shrimp, already roughly sorted by class on shipboard, arrive at the plant they are emptied into an ice-cold brine. Then the shrimp are fed along a conveyor belt where the removal of damaged and odd varieties occurs. The remaining shrimp, now consistently of one class, are then machine-graded by size.[6] Two grading machines may be used. Packers place the sorted shrimp neatly into standard five-pound cartons, water is added, and the shrimp are placed into the freezer. Relatively small amounts are packaged in one-pound polyethylene bags for local consumption. Most of the shrimp are packaged in their shells. A limited operation for deshelling and cleaning shrimp occurs during several afternoons,

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[6]Shrimp size is calculated by the number of equal-sized shrimp in one pound; e.g., size fifteen indicates fifteen shrimp to one pound.

but this is an almost insignificant sideline. Lobster and squid are similarly packaged in cartons of five or ten pounds before entering the freezers.

The products are kept in the blast freezer several days and then transferred to the cold storage area. Fish are maintained under freezing conditions without further processing until distribution to Guatemala City, where additional preparation for sale may occur. Freezing facilities at Champerico include a 25,000-pound blast freezer and space for 120,000 pounds of frozen storage. Equipment is also available to make up to five tons of ice per day.

The entire operation from catch through processing employs approximately 340 persons, including about 100 women who are employed exclusively in the plant. In addition, the main office of COPESGUA, in Guatemala City, employs twenty to twenty-five persons.[7] A summary of COPESGUA landings is presented in Table 2.

Table 2.--COPESGUA landings (ocean catch, in pounds).

	Oct.-Dec. 1961	1962	1963	1964	1965	Jan.-June 1966
Shrimp	388,162	1,177,455	1,898,016	2,859,052	1,940,451	1,305,645
Fish	32,657	143,266	236,142	439,866	480,323	366,065
Lobster	425	10,069	22,605	37,295	16,306	13,787
Squid		1,390	9,848	8,251	11,105	combined
TOTALS	421,244	1,332,180	2,166,611	3,344,464	2,448,185	1,685,497

Source: COPESGUA, Guatemala City.

[7]Interview with Dr. José López Iza, COPESGUA, Guatemala City, April 6, 1966.

The 1965 decline in shrimp catch can perhaps be attributed to a low period in the shrimp cycle. Half-year totals for 1966 would indicate a catch approaching the 1964 peak. The drop in lobster production was not explained. The increasing fish catch shown is perhaps the most significant item in the table.

Iztapa

The only commercial seafood processing plant other than that at Champerico is located midway between San José and Iztapa. With its recent return to operation, an element of competition again entered the picture. The Mariscos de Guatemala plant, directed by three brothers, Guatemalans of Chinese extraction, was founded originally in 1961. Mexican boats and crews were used and these operated in Guatemalan waters with government permits, until they were revoked in 1963. Then the factory stood idle for nearly three years, until the Siu brothers gathered enough capital to finance their own boats.

Renewal of operations at this site near the Chiquimulilla Canal began in May, 1966. Ten boats are now based here, near the Barra de Iztapa. These vessels were built in Mexico of modern steel construction and average fifty-nine feet in length and eighty-five tons in weight. Techniques of catch and processing are similar to those of COPESGUA at Champerico. The boats average fourteen days

per run on the open sea. Four refrigerated compartments with capacities of one metric ton each are standard equipment on all of the boats. In preparation for a voyage one tank is filled with fresh water for drinking and cooking purposes, while in another tank the water is frozen so that fresh food can be kept for the crew. For fish and shrimp preservation the water in the remaining tanks is maintained at approximately 32°F.

Mexican nationals again play a significant role in the fishing operations. Due to the lack of trained Guatemalans, each of the ten vessels is captained by a Mexican fisherman. The crews are obtained locally, however, and have yet to develop responsibility and efficient operational skills. The schedule of thirteen to fifteen days "on" and two days "off" necessitates some dedication! A systematic training program for interested Guatemalans is a "must" if the industry is to expand with a firm national base.

The zone of catch parallels the entire Pacific coastline of Guatemala. The prime item of exploitation is the high-value shrimp, as is the case with Champerico's COPESGUA organization. The most fruitful shrimping grounds are found offshore from the estuaries of the numerous rivers discharging into the Pacific. Even in these areas, however, the greater percentage of seafood netted consists of fish. In fact, up to ninety-five percent of the catch may be fish,

and most of these are thrown overboard.[8] Not until the last several fishing days are selected species put into the freezing compartments to fill out the catch. According to one Siu brother, a graduate of a California university, each boat normally unloads about 1,000 pounds of commercial fish after each two-week voyage.[9] This would account for approximately twenty-five percent of the "standard" catch by weight. If one then considers the quantities of fish lost through rough handling, and exposure during the early portions of the fishing trips, the waste is substantial. This, however, is an unfortunate characteristic of shrimping operations throughout the world.[10] Some kind of integrated fishing operation would be needed to alleviate this recognized problem.

The lack of suitable unloading facilities on the Pacific Coast is well illustrated in the plight of the small Mariscos de Guatemala fleet. Two options are open, each with its dangers and advantages: 1) the pier facilities at San José may be used, or 2) the outlet of the Chiquimulilla Canal at Iztapa may be entered for the

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[8]Interview with Carlos Siu, Mariscos de Guatemala, Iztapa, August 10, 1966.

[9]Ibid.

[10]Maurice Stansby, ed., Industrial Fishery Technology, (New York: Reinhold Publishing Corporation, 1963), p. 67.

unloading process. That this choice must be made between less-than-optimum sites only accentuates the need for a still-water port with facilities for various-sized vessels. The fishing industry of the Pacific Coast cannot really be efficient and effective until modern facilities are available.

The first alternative, the San José pier, was observed during the unloading of the second catch destined for the newly re-opened plant. The pier itself extends slightly beyond the breakers but is still subject to considerable wave and swell action. In a heavy sea, even the unloading of sturdy lighters is extremely dangerous, if not impossible. The antiquated pier facilities compound the problem. Thus, the unloading of shrimp is extremely slow, and painful to observe. A system of ropes and pulleys is used to transfer the drums of shrimp and fish from the bobbing deck of the small boat to the floor of the pier, some thirty to forty feet above the water. The efficiency level is such that one or two drums are raised at approximately ten-minute intervals. Once on the pier, the contents are poured into wire-bottomed crates, weighed, and tallied. The entire unloading occupies nearly three hours, during which time the shrimp are exposed excessively to the warm air and sunlight. From the shore a truck transports the catch ten to fifteen miles to the processing plant. The entire operation is not only time consuming but also wasteful of shrimp quality.

Use of the narrow barra, the other alternative, has numerous advantages for the Mariscos plant. The relatively sheltered waters of the interior canal offer more favorable unloading conditions than does the open sea at San José, and direct transfer from the deck to a waiting truck greatly simplifies the process. The proximity of the plant to the canal, only a few hundred yards, also facilitates quality control. These positive aspects are tempered, however, by the tricky and dangerous entrance to, and exit from, the canal. The fishing boats must await high tide to enter or leave, and thus they have to combat the maximum speed and roughness of the tidal currents. The ocean surf must also be traversed in the process. This alternative, therefore, presupposes a sturdy boat construction and a skillful captain. The wooden boats used during the initial period of operation in 1961-63 did not fare well, but the steel construction of the present fleet provides a partial answer to these difficulties.

By August, 1966, all of the boats were using the narrow breach into the Chiquimulilla Canal. Only one boat had encountered serious trouble while entering the barra and fortunately escaped damage. Consequently, it appears that the ease of unloading and transporting the catch from the canal site more than compensates for the problems associated with the tidal outlet.

Processing operations at the Mariscos de Guatemala plant are essentially the same as at COPESGUA, though there are slight differences in plant capacity and equipment. The COPESGUA plant has greater capacity, but the handling of seafood is similar. In a new operation the "breaking-in" period is always the most difficult, especially when a pool of skilled or experienced help is non-existent. Four or five varieties of shrimp, which appear much alike to the layman, must be sorted by hand. Training an efficient team, women in this case, to sort and package the shrimp was one of the primary problems. Fortunately, a sufficiently large number of women eager to earn extra money assured at least minimal selection standards.

Within the plant approximately twenty-five workers are employed in selection, washing, and packaging. Following separation by type, the shrimp are moved along a conveyor belt and machine-graded. Packaging in five-pound cardboard cartons then occurs, after which the shrimp are frozen and placed in cold storage.

Freezing and storage facilities consist of a 2,500-pound compression-plate freezer, a 20,000 pound blast freezer, and 80,000 pounds of frozen storage. The smaller freezer has the capacity to freeze a load of shrimp within four hours, while the larger chamber requires eight to ten hours. The freezing time is important in quality control and, thus, the quick freezer is a prize possession.

The relatively small quantities of lobster and squid are packaged and frozen with the shrimp. Although some fish may be bagged, the bulk of the fish catch is made available immediately and without further processing to local buyers.

Secondary Production Centers

For purposes of this study, secondary production sites are defined by the following criteria: 1) fish production exceeds 100 pounds daily, 2) the number of part and full-time fishermen exceeds fifteen, 3) equipment used for the catch includes several large nets or trasmallos, and 4) year-round transportation links with interior market areas are available. Included in this category are towns bordering brackish waters, for the most part, but also one place, namely San José, oriented toward ocean fishing.

San José

San José serves as a focal point for both large and small-scale fishing. This is perhaps inevitable considering its role as a port, or roadstead, with excellent highway connections to interior population centers. However, under present conditions no large-scale fishing concern uses the port facilities. Earlier fishing data usually listed the Mariscos de Guatemala fleet as being of

San José[11] but, as has been seen, this is no longer technically accurate while the barra is in use. Even without large-scale fishing by boats, however, significant use is made of the ocean frontage at San José.

Small open fishing boats and numerous pier fishermen provide the ocean catch. Approximately fifty men purchased licenses to fish in the open sea in 1966, and another 150 had licenses to fish from the pier.[12] The combined production from the two methods supplies most of the fish consumed in San José. This is a unique situation, since most coastal towns, including Champerico, are served from the neighboring brackish waters.

Fishermen may own a small inboard or outboard boat privately or cooperatively. The operators of these craft generally travel short distances from shore in the evening or early morning hours to cast their lines or small toss-nets. Ten to fifteen boats are involved and operate in a rough rotation, following a routine fishing schedule during "normal" times. The catch, from fifty to 300 pounds daily per boat, is generally cleaned upon return to shore, and the fish are strung together and carried to the market areas

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[11]U.S., Department of Interior, Fish and Wildlife Service, Fisheries Survey of Shrimp Fisheries in Guatemala, El Salvador, and Mexico, Market News Leaflet 74, (Washington, D.C.: Government Printing Office, 1962), p. 12.

[12]The license requirement for pier fishermen was revoked by the new government in the summer of 1966.

nearby. Most of the fish caught are ranked as second-class, but a wide range in size and type is common. Some of the most frequently harvested varieties include croaker, goby, sole, mulet, juilín, and sardine.

The quantity of fish caught from the pier also plays an important role at San José. Productive fishing generally occurs in the evening and morning, but even during the day thirty to forty fishermen of all ages can be observed on the pier. Most of these use a simple hook and line, baited with small sardines, pieces of shrimp, or other lures. The bare line may be held in the hand or between the toes depending upon one's habit or affluence! When a bite is felt, the line is drawn up hand-over-hand. This can be painful to the neophyte, or even to the veteran, if the fish is of any size. In addition to the hook and line, most of the serious fishermen own small cast nets, or atarrayas, and may catch fifteen to twenty pounds of fish in a good evening. Small sardines are often taken in this manner and may provide a reasonable cash return. The sardines are usually dried in the sun and then put into bags to be transported to interior markets.

Small-scale fishing such as this from boats and pier, is extremely sporadic. Good fishing may last several days or a week and be followed by a period of varying duration with a minimal catch. Opportunistic fishermen swell the numbers involved during favorable periods, while only a hard-core remains active during less productive times.

Other Secondary Centers

Villages located on brackish waters which have a steady annual production of fish are few and of little consequence individually. Seven are considered to have a slightly greater production in comparison with other brackish-area communities. Enumerated from west to east, these are: Ocós-Tilapa, Tulate, Sipacate, El Paredón, Hawai, Chapetón, and Las Lisas. Following a description and analysis of brackish-water fishing in general, these sites will be considered individually.

The Pacific Coast, although almost completely unarticulated, is paralleled by numerous interior estuaries and lagoons. These waters are brackish because they are influenced by both river flow and ocean tide. Their depth and extent vary greatly during the year. In the rainy season, May to October, an expansion in area occurs, and the water is less saline than during the dry season. The biological fertility of such waters is well documented: "They are frequently referred to as biological soup, constantly enriched by material carried down rivers from inland and brought from the deeps by marine currents and tides."[13] Exploitation of the fauna is facilitated by the protected

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[13]Anthony D. Scott, "Food and the World Fisheries Situation," in Natural Resources and International Development, Resources for the Future, Inc., (Baltimore: John Hopkins Press, 1964), p. 140.

nature of the waters, small craft being used and manipulated easily in the harvest. A ready supply of fish and ease of navigation assured a relatively early and continuous exploitation.

Small settlements along the coast use the seafood resources as a cash crop, as well as for subsistence. However, few of these villages are dedicated solely to fishing. Shifting agriculture plays a dominant role during the rainy season. During the dry season, numerous sites associated with the brackish lagoons along the Pacific account for the bulk of the nation's salt production.

Villages are widely scattered and maintain little contact with each other. Although roads radiate from the interior to the coast, only a few are all-weather connections. Moreover, there are no regular surface communications parallel to the coast to facilitate travel and interaction between the villages. Contact by coastal water routes is available only where interlocking canal or river systems are found, such as in the Chiquimulilla Canal. The construction of a road close to and paralleling the coast would integrate the region and greatly stimulate the fishing industry.

The present level of technology used in fishing the brackish waters is suited only for small-scale operations. Dugout canoes, or cayucos, provide the most common means of navigation, and these are rarely fitted with outboard motors.

Customary fishing gear includes the hook and line; a small circular casting net, or atarraya; and a long, narrow gill net, or trasmallo. Most frequently used by the average commercial fishermen is the atarraya, while trasmallos are generally owned by the wealthier fishermen. Of this gear, only the latter net requires more than one individual, three men normally being required to manipulate its length.

The fishing is usually coordinated with tidal movements. The best catch occurs before and after the peak of high tide. Favored fishing hours are in the evening and early morning, but limited daytime fishing also occurs.

Scientific harvesting methods are unknown, or at least, not understood. Due to either custom or the lack of capital, planned rotation of fishing grounds and experimentation with different nets and techniques of catch are not practiced. Modifications in the traditional activity have been accepted only slowly.

The intensity of fishing throughout the coastal zone is highly irregular. The number of fishermen varies greatly with the season and the immediate run of fish. Peak production coincides with the advent of Holy Week, or Semana Santa, when all available hands become fishermen to take advantage of the expanded market and high prices. In contrast, only the hard-core fishermen are active during the invierno or rainy months. This, in effect, indicates a six to seven month fishing season in much of the area.

The chief factor modifying the effective length of the fishing season, as well as overall production, is the availability of transportation. Fishermen can be employed continuously, and produce a significant volume of fish, only where year-round transportation is available. Without ready transportation during the rainy season, fishermen must dry and salt all of their surplus catch and wait for an occasional buyer to arrive on horseback or on foot. Thus, the most significant production centers are the ones served by all-weather roads, followed in importance by those sites connected by interior waterways, and finally by those having little or no communication for parts of the year.

The types of fish caught for commercial purposes in brackish waters include: snook, red snapper, mulet, croaker, mojarra, juilín, and marine catfish. Only the snook and red snapper bring constant first-class prices. Other species taken, but that enter the market infrequently, are shark, grouper, pinchincha, ojuda, aleta, tacasonte, tarpon, dentón, and camiseta. Shrimp, crabs, oysters, snails, and clams are also caught in marketable quantities. The shrimp (camarones and camaroncillos) are by far the most important of the latter group.

Techniques for the preservation and processing of the catch have remained simple. The dugout canoes are not fitted with preservation chambers of any kind. Banana leaves may provide the catch with its only protection from

the heat and sun during the several hours of fishing. When landed, the catch may be sold "fresh" or may be "processed" further. If sold fresh, the fish are merely cleaned and perhaps scaled. A simple salting and drying process takes place when no buyer for the fresh product arrives. The large fish are split open and numerous knife cuts made in the flesh. Then, crude salt is rubbed into the cuts, and the fish are placed on racks in the sun to dry, or are merely air-dried during the rainy season. The smaller fish are treated similarly, but the cuts are made through the skin after the fish have been scaled. In either case, the resultant product is usually only partially salt-cured and thus of poor quality.

Each secondary fishing site is a significant regional producer of seafood. Yet, the level of fishing technology involved and the volume of catch indicate a marginal economic activity. These towns are distinguished from lesser centers in various ways: 1) a year-round fishing season, each village having some form of all-weather connection with the interior; 2) an average daily harvest exceeding 100 pounds of seafood; 3) fifteen or more part and full-time fishermen; and 4) more subtle indicators of relatively intensive fishing, such as significant numbers of drying fish nets, "parked" cayucos, and hileras, or simple coolers.

Ocós-Tilapa

Ocós and Tilapa are situated on opposite sides of the mouth of the Río Naranjo, only a short distance from the Guatemalan-Mexican border. With an "urban" population of approximately 600 people, Ocós is the fourth largest community on the Pacific Coast. Formerly a port of some national importance, it has declined greatly in this regard since the eruption of the volcano Santa María and the related earthquake in 1902 caused the pier at Ocós to be located some distance from the sea. Ships continued to call, anchoring off-shore, however, until 1929. A railway line still serves the town, with three trains weekly, and provides the only sure all-weather transportation. The road reaching Ocós from Tecún Umán is deep in dust during the summer dry season (November to May) and impassable during much of the rainy season. Tilapa is a much smaller village, with eighty-five inhabitants, and has its own seasonal road connection on the eastern side of the river. However, much of the winter catch of fish is boated across to Ocós to be freighted out by train.

Fishing activities at Ocós-Tilapa focus on the mouth of the Río Naranjo and adjacent estuarine areas. The municipal secretary lists thirty-five to forty fishermen in Ocós and eight to ten in Tilapa, but others estimate the total as high as eighty to 110. The majority of these men fish from dugouts, and the elite may have a four or five-horsepower

outboard motor to give added range and prestige. One ambitious person is building a larger wooden boat that may be suitable for ocean fishing, but the customary fishing range is limited to enclosed waters.

The "normal" catch includes snook, red snapper, grouper, mulet, croaker, sardine, shark, pinchincha, ojuda, aleta, tacasonte, and mojarra. The first three of these species are favored and bring the highest prices. The estimated daily take averages about 300 pounds in Ocós and eighty pounds in Tilapa. However, the daily or weekly variance is considerable. In addition to fish, a seasonal catch of river shrimp is obtained at the beginning of the rainy season. These blue shrimp are noted throughout the country for their size and flavor.

The catch is usually sold fresh. Little processing, other than the cleaning of fish, occurs here. Small quantities of fish, perhaps forty to eighty pounds weekly, are smoked, whereas the more common salting process elsewhere is apparently not practiced. Indicative of the relative importance of the fresh fish trade is the large number of coolers or hileras used. Nine people own the coolers in Ocós. Generally of tight wooden construction, these rectangular boxes of about home-freezer size provide some insulation from the tropical heat. The fish are placed in the hilera and partially packed with ice for preservation.

Amounts of ice used are minimal, due chiefly to the high cost. The ice is generally trucked in from

Pajapita, and costs $1.80 per hundredweight. In a situation of marginal profits, the owners of the coolers often "cut corners" on the ice. In reasonably well-packed ice, however, the fish will usually keep for at least four days in the hileras.

Production problems enumerated at Ocós were reflected in complaints about the poor road connection, lack of decent fishing equipment, and the indiscriminant use of insecticides on the nearby cotton farms. The shifting nature of the sand bar and the river outlet also affects the steadiness of the catch. These variables are commonly associated with low-level production sites throughout the fishing zones of Guatemala.

Tulate

The recent fortunes of this coastal village have been linked intimately with those of La Máquina agricultural colony, begun in 1957.[14] As the redistribution of land gradually resulted in permanent settlement, an all-weather road was built to connect with the immediate coast at Tulate. For Tulate this provided year-round transportation and ready access to an expanded market. The town increased in size, and its function as a fishing and recreational site was enhanced. Tulate is now chiefly a

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[14]Ross Pearson, "Zones of Agricultural Development in Guatemala: An Experiment in Land Reform," The Journal of Geography, Vol. 62, No. 1 (1963), p. 13.

fishing village, with very minor agricultural interests. Approximately 100 families are clustered near the Río Icán estuary, and most of these fish at least occasionally for both subsistence and commercial gain. An estimated twenty to thirty persons make their livelihood directly from fishing. Part-time fishermen may raise the count to fifty or sixty men during favorable fishing periods. A good tide may yield a single individual up to 100 pounds of fish, but a normal "good" catch ranges from thirty to fifty pounds per day. Shoreline fishers, who include many boys, must generally be satisfied with only ten to fifteen pounds on a good day.

Here, as in Ocós-Tilapa, the trade is in fresh, rather than processed, fish. Hileras, however, are not found in Tulate. This fact may be explained by the extreme ease of transportation. Regularly scheduled buses and trucks assure the ready movement of the highly perishable product so that storage is unnecessary.

Temporary migration to more productive fishing sites is a unique characteristic of Tulate fishermen. Several of the "hard-core" fishermen have on occasion traveled east by cayuco to the Río Icán and then to the village of Churirín, a distance of about twelve miles. If word reaches Tulate of good fishing at Churirín, combined with poor catches near home, the men try their luck in Churirín. Thus, at least occasional communication exists between these

shoreline villages. This migration of fishermen appears to be a lone exception to the rule, but it opens speculation concerning possible effects of a shoreline highway upon cooperative efforts and fish production.

Sipacate

The village of Sipacate is located on the periphery of a zone of cotton cultivation. This fact is particularly significant during the harvest period, when large numbers of laborers migrate to the area. Sipacate then serves as a major supplier of food and place of recreation for the workers. On the ocean front, beach cabins and tables indicate some influx of vacationers, undoubtedly associated with the all-weather road which assures easy access from the interior. In addition to the recreational function, however, a significant fishery exists.

The westernmost navigable segment of the Chiquimulilla Canal begins at Sipacate, and this channel provides a favorable brackish habitat for exploitable varieties of fish and shrimp. An estimated fifteen to twenty full-time fishermen together harvest an average of about 200 pounds daily. One enterprising and relatively well-to-do gentleman in the town owns three transmallos, which are "rented out" to experienced fishermen in the area. With the use of one of these long gill nets, a good catch ranges from 100 to 200 pounds per fishing day. This is divided four

ways: one-fourth to the owner of the net and one-fourth to each of the three fishermen needed to manipulate it. Shrimp provide a secondary crop of considerable significance to Sipacate fishermen. Adult shrimp of good size are caught in the inlet, and the smaller camaroncillo are usually netted by individuals from the shoreline. A man or boy normally casts for five to ten pounds a day, which affords a reasonable daily income at twenty to twenty-five cents per pound. It is estimated that fifty pounds of shrimp approximates the total daily average.

The only processing done in the village relates to the camaroncillo. This small shrimp is generally cooked in brine and then dried to cure and preserve it. The bite-sized crustaceans are eaten as bocas, or snacks, in beer parlors and in the home.

El Paredón

El Paredón is perhaps the community most dedicated to, and dependent upon, fishing. Only a small village of 100 to 150 inhabitants, it lives by fishing. The shore of the Chiquimulilla Canal is here lined with cayucos of all sizes, many with small outboard motors. Within the village, additional small motors may be seen, and numerous fish nets provide a practical decor with an aura of fishing. Fifteen to twenty-five men can be considered full-time fishermen, but nearly all the inhabitants fish at least occasionally.

The activity is confined almost exclusively to an accessible sector of the Chiquimulilla Canal. Due mainly to the position of El Paredón, on the canal distant from any outlet to the ocean, the fishing is areally more extensive than is true of those sites on the barras. Fewer first-class fish migrate to interior canal sectors, so the bulk of the local catch consists of second-class varieties. Mulet and marine catfish form the basis of subsistence and commercial fishing, while snook and red snapper, the first-class types, are extremely limited. At the time of investigation, in May, 1966, fishing was reported to be poor. An average daily catch with an atarraya averaged ten pounds. During good times the catch might be double or triple this amount per fisherman. In addition to cast nets and the hook and line, there are six gill nets in use along the immediate stretch of canal, which is an indication of an intensive fishing effort. Seasonal variation in catch is minimized by the accessability of the San José market. Produce can be shipped by the canal route to San José in thirty to forty minutes by motorized launch.

Hawai, Chapetón and Las Lisas

Each of these sites borders the Chiquimulilla Canal east of San José, and each is maintained chiefly through year-round fishing activities. The navigable canal assures ease of transportation to "break in bulk" points where all-weather roads connect the water route with the interior.

Hawai, where an estimated twenty to twenty-five men harvest a daily catch of 100 to 125 pounds, is the most important of the three canal sites. The cayuco count along the shore and the display of numerous fish nets are indicative of the dependence upon fishing. The presence of the highly regarded snook in some quantity is another indication of better fishing. Here, too, are found the only flat-bottomed motorized launches, which assure steady and economical transportation for perishable produce.

Chapetón is located adjacent to a barra or outlet. This is normally a favorable situation but may also have its disadvantages. Immediately prior to the day of investigation, May 19, 1966, the village of twenty to twenty-five houses felt the rath of an angry sea. The ocean opened a new breach in the sand and washed away a substantial proportion of the thatched bamboo houses. Undaunted, and rather fatalistically, the villagers regrouped and rebuilt a little farther down the beach.

Fishing here is somewhat more seasonal than at Hawai. All families tend a subsistence plot, or milpa, during the rainy season, when fishing becomes a secondary interest. Nevertheless, ten to fifteen men fish during the entire year. During favorable periods fishermen come from considerable distances and may then exceed thirty in number.

Within the village large nets, trasmallos and chinchorros, hang on stakes in front of every habitation,

emphasizing again a heavy dependence upon fishing. The sporadic nature of small-scale fishing was notable on a day in mid-May. Two cayucos went out during high tide, but arrived back after several hours with nothing to show for the efforts of their occupants.

Most of the catch is transported fresh to transshipment points on the canal. The presence of several outboard motors in the community indicates significant surplus sales. Often, however, these outboards remain idle for lack of fuel. Only infrequently are they used in fishing voyages. They are used instead for subsequent transportation of the catch.

Las Lisas is one of the most attractive seashore villages on the Guatemalan Pacific Coast. Relative ease of access, some overnight facilities, and a fairly level beach have made it a popular vacation spot. In addition to its recreational function, the village serves as a fishing center. But here, the importance of fishing is on the wane. Fishermen now travel some distance to the barra, because few fish enter the canal proper. Reports indicate an abundance of fish and shrimp ten years ago, but no explanation other than fate is given for this presumed phenomenon. Most families in the village still depend upon fish for a substantial part of their diet, but surpluses for sale have been curtailed considerably. A specific example of this decline is the recent "bankruptcy" of one of the

local fish retailers. This leaves only one person with an hilera that can store fresh fish for several days. Despite these circumstances an estimated twenty to twenty-five persons are actively engaged in producing about 100 pounds of fish per day.

Table 3 provides summary data for each of the secondary production sites on the Pacific Coast.

Table 3.--Secondary production sites on the Pacific Coast: fishermen and productivity.

Site	Number of Fishermen	Estimated Daily Catch (Pounds)	Yearly Catch (300 Days, Pounds)
San José	75-150	500	150,000
Ocós-Tilapa	40-50	380	114,000
Tulate	20-30	250	75,000
Sipacate	15-20	200	60,000
Paredón	10-25	125	37,500
Hawai	20-25	125	37,500
Chapetón	10-15	100	30,000
Las Lisas	20-25	100	30,000
TOTALS	210-340	1,780	534,000

Tertiary Production Centers

The remainder of the small fishing villages along the Pacific Coast differ from the secondary centers only in a smaller volume of production and a greater degree of isolation. Due chiefly to isolation, these villages are associated with a part-time fishing activity that centers about the high demand period of Semana Santa. This condition is altered slightly in the small production points bordering the Chiquimulilla Canal. Here, the important limiting factor appears to be a paucity of fish. Production in most locations, however, could probably be doubled or tripled with a combination of rapid transportation and an efficient exploitation of the waters. A summary of current production data from tertiary centers is presented in Table 4. It seems apparent that these locations together provide a yearly catch a little under half as large as that of the secondary centers.

Development Planning

The only intensive and modern commercial venture for fishing the brackish lagoons, or esteros, of the Pacific Coast is still in the planning stages. La Verde farm, located slightly northwest of Tulate, is the site of a proposed shrimp operation. A number of lakes and an outlet to the sea make this a fine natural area for shrimp and fish, and the farm was formerly a major supplier for the

Table 4.--Tertiary production of seafood on the Pacific Coast of Guatemala.

Site	Number of Fishermen	Estimated Daily Catch (Pounds)	Yearly Catch (200 Days, Pounds)
Champerico Area (El Chico, Manchón, Acapán, Ixtán, Chapán)	60-70	400	80,000
La Verde	2-4	40	8,000
Churirín	10-15	100	20,000
Tahuesco	10-20	80	16,000
Chicago	10-15	80	16,000
Nueva Venecia	5-10	80	16,000
El Porvenir	8-10	40	8,000
Huitzizil	4	15	3,000
Las Trosas	2-4	10	2,000
Las Lagunas	8-16	80	16,000
Tecojate-Coyolate	8-10	80	16,000
La Laguna Rama Blanca	4	15	3,000
Iztapa	20-25	80	16,000
Monterrico	12-15	75	15,000
Papaturro	2-4	25	5,000
El Ahumado	5-6	50	10,000
Garita Chapina	4-5	25	5,000
TOTALS	174-237	1,275	255,000

local markets. Recently, a number of part-time fishermen have been ejected in order to regulate fishing. If the plan is implemented, a processing plant will be constructed on the farm, and the shrimp will be marketed through the Coruñesa fish store in Guatemala City. The national and Central American markets are professed goals for distribution of this product.

A major port is planned for the Pacific Coast. The construction of a still-water sanctuary with adequate unloading facilities would greatly stimulate the development of an efficient fishing fleet and would yield innumerable other benefits. The site selection for such a port must be evaluated carefully. Economic momentum points to the booming Guatemala City-Escuintla-San José axis, but development goals might well fix the need closer to Champerico and the rich but underdeveloped Mazatenango region. National needs should dictate the final location. The possible construction of another Pacific port associated with a sulfur company in Santa Rosa department[15] might offer some additional facilities.

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[15]U.S., Department of Interior, Bureau of Mines, Mineral Trade Notes, Vol. 64, No. 8 (1967), p. 11.

CHAPTER III

PRODUCTION AND PROCESSING: THE CARIBBEAN AND INLAND WATERS

The Caribbean and inland waters are characterized by small-scale fishing efforts. The historical development of both sectors indicates an early concern for fishing, in contrast to the experience on most of the Pacific Coast. The importance of these fisheries, however, has remained largely local. Yet, the potential for exploitation is considerable. In this chapter the status of the Caribbean Coast fisheries, the inland lake and river fisheries, and the fish pond program will be analyzed.

Caribbean Coast Fisheries

The shores of the Caribbean Sea in Guatemala are much less extensive, and physiographically less formidable, than those of the Pacific Ocean. The Bay of Amatique provides relatively calm waters for navigation and numerous refuges for small craft. The waters along the coast are variable in depth but are everywhere sufficiently shallow for favorable fishing conditions. The Caribbean fisheries were therefore the nation's primary source of seafood until the 1960's. A 1952 report by de Buen indicates the greater

development of Atlantic fishing,[1] while Holloway proclaimed in 1953 that "with the possible exception of shark and tuna, the Caribbean offers more favorable possibilities for fishing."[2] Production figures are even more revealing. The total 1955 harvest of seafood from both oceans was calculated at 208 metric tons, of which the Pacific contributed only twenty tons.[3]

The peak of production activity (about 400,000 pounds) on the Caribbean Coast was reached in 1962, when thirteen shrimp boats were based at Puerto Barrios. Only one small shrimp boat now operates in the area, and it is about to be retired. Factors related to this decline include: 1) an extreme range in reliability of the harvest, 2) sharp coral formations and a rough sea floor which play havoc with fishing nets along the limited shoreline of about seventy miles, 3) variable salinity of Amatique Bay, due to the number of rivers emptying into it, which in turn limits

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[1]Rafael de Buen, "Estudio de la pesca maritima en Guatemala," Monitor del INFOP, Vol. 9, (Guatemala: June, 1952), p. 23.

[2]Ancil D. Holloway, "Recomendaciones para el desarrollo de los recursos pesqueros de Guatemala," Monitor del INFOP, Vol. 12, (Guatemala: January, 1953), p. 46.

[3]Ramiro Bolaños Yela, Anteproyecto de solicitud de préstamo al Banco Interamericano de Desarrollo para el establecimiento de una planta para congelar carne de pescado en la costa del Pacífico, Instituto de Fomento de la Producción, Guatemala, (1961), p. 7.

the variety and "clustering" of sea fauna, and, 4) a lack of trained and dedicated personnel.

The decline of off-shore fishing does not mean that the present production and distribution of seafood in the area is insignificant. It is in exports that the region has regressed. The small-scale producers in this area still play an important role in providing Guatemala itself with fresh and dried fish.

The small-scale methods of catch show little variation throughout the region. Cayucos, or dugout canoes, are used in the open water and only rarely are fitted with small outboard motors. Common equipment includes the simple anzuelo, or hook, the atarraya, or cast net, and the trasmallo, or gill net. Less common are the chinchorro, a long net which is generally manipulated from the shore, the harpoon, and the fish pot or trap. An indication of the minimal efficiency of the above types of gear is given by figures portraying the "average" catch and absolute range for each within the region (Table 5). These figures are the result of interviews with local fishermen and should be viewed as approximations of the yields per unit per day.

All methods are subject to the "luck" of the fishermen, but the harpoon seems to be more dependent upon the skill of the user, and is thus the most efficient gear employed in the area.

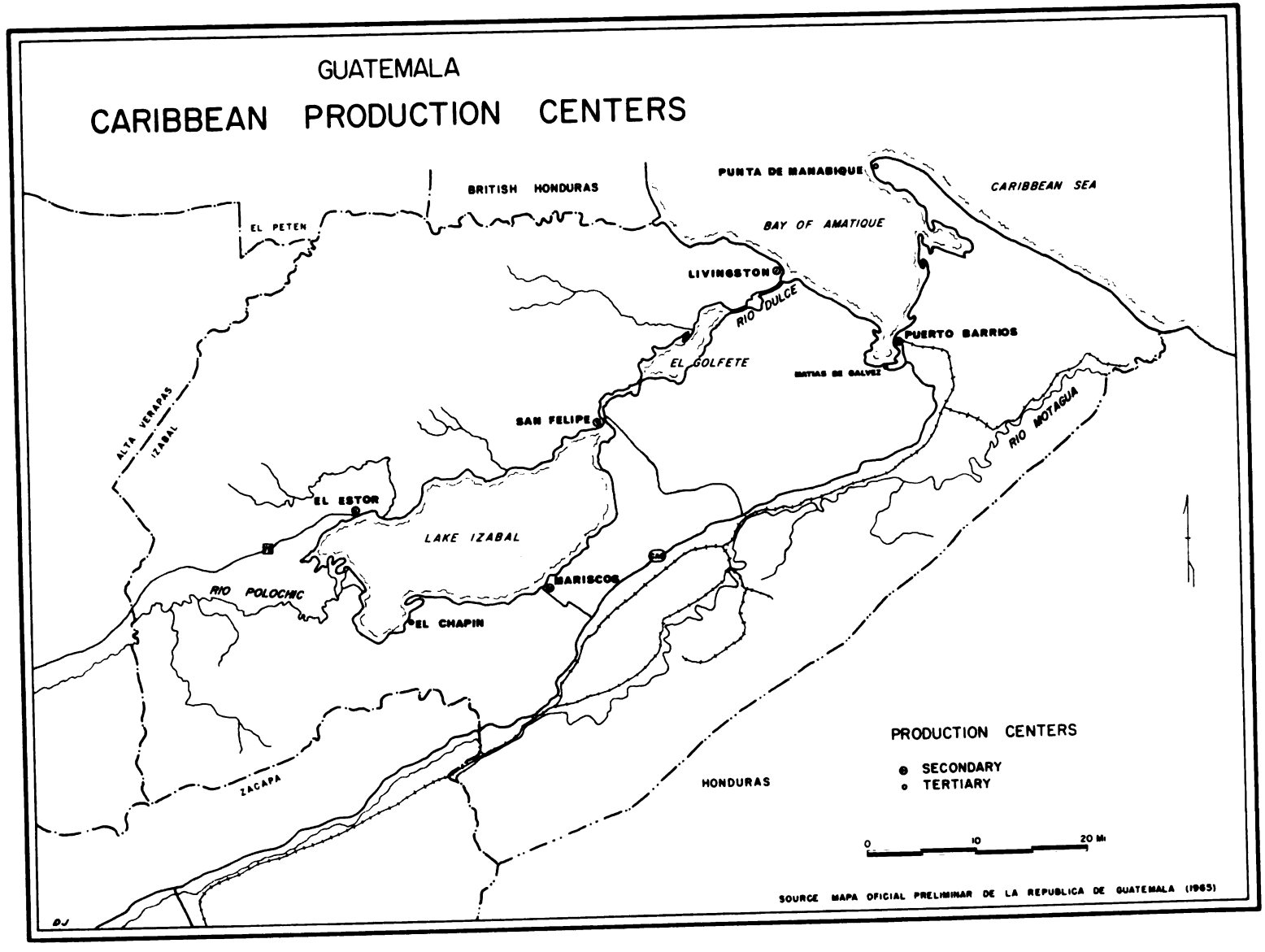
Table 5.--Caribbean Coast yields of seafood, with small-scale fishing gear.

Gear	Average Daily Catch (Pounds per Unit)	Range in Daily Catch (Pounds per Unit)
Hook and Line	2-8	0-20
Fish Trap	6-9	0-30
Cast Net	15-25	0-50
Gill Net	40-60	0-200
Harpoon	50-80	20-300

Three major production zones can be recognized within the Caribbean Coastal region: 1) Puerto Barrios-Punta de Manabique, 2) Livingston, and 3) Río Dulce-Golfete-Lake Izabal. These areas, shown on Map 3, include approximately 200-250 fishermen and can be subdivided according to the scale of production at individual sites. The Caribbean is currently without a primary site employing large-scale methods of catch, but five secondary centers account for a significant total production.

Secondary Production Centers

Secondary centers, when considered on a nation-wide basis, include Livingston, Puerto Barrios, and three villages on Lake Izabal. These centers are important producers on the local and regional level and also serve the national market.


GUATEMALA
CARIBBEAN PRODUCTION CENTERS
BRITISH HONDURAS
EL PETEN
PUNTA DE MANABIQUE
CARIBBEAN SEA
BAY OF AMATIQUE
LIVINGSTON
RIO DULCE
PUERTO BARRIOS
EL GOLFETE
SAN FELIPE
ALTA VERAPAS
IZABAL
RIO MOTAGUA
EL ESTOR
LAKE IZABAL
BARISCOS
RIO POLOCHIC
EL CHAPIN
ZACAPA
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SOURCE MAPA OFICIAL PRELIMINAR DE LA REPUBLICA DE GUATEMALA (1965)

MAP 3

Livingston

The most productive center for fishing on the Caribbean coast of Guatemala is Livingston. Here an estimated 100 persons gain their livelihood chiefly from the sea. Fishing is carried out on a small-scale, labor-intensive basis, but nearly the entire populace is engaged at some point in the process.

The fishing intensity is indicated by the number of small and large cayucos lining the shores near the village and by numerous drying racks for long nets. Fishing methods are similar to those of the Pacific sites, except that the chinchorro is a more common device here. This net is gradually being phased out in favor of the more versatile trasmallo, however. Some fishermen talk of using both types of net as the fish "learn" about the newer net. Harpooning here is also relatively more important than in any other place in the Republic. Four to six men use underwater spear guns with great success. These men may not dive daily, but the harpoon in the hands of a competent user assures a good catch when needed. Fish weighing over ten pounds may be selected visually, and thus the obtaining of first-rate prices is made possible. Fishing with fish pots, or traps, has been eliminated as a significant method of catch in this zone.

A high percentage of the catch consists of the preferred first-class species. Snook and red snapper are taken

in relative abundance throughout much of the year. However, there is some seasonal variation in the catch. The snapper is caught in greatest quantities during June and July, while the snook season is usually at its peak from January through April.[4] Second-class varieties include yellow jack, marine catfish, mackerel, barracuda, king mackerel, tarpon, jew fish, mugil, and dorado. Shrimp and small crustaceans are also harvested in small quantities.

Most of the fish catch is sold fresh. A small ice factory in Livingston supplies most of the local demand. The ice assures reasonable freshness for several days, if adequate precaution has been taken on the boats. Since icing is only a temporary storage method, the fish must be shipped out quickly. Some salting and drying also takes place, this being still the least expensive process for a small-scale fisherman where time and labor are cheap. The salting is accomplished, however, at a low level of efficiency and cleanliness.

The fishermen, mostly of Black-Carib descent, range short distances into the bay and along the coastline, as well as into the Río Dulce area. Occasionally, excursions include the more distant Lake Izabal when prospects there appear to be exceptionally good.

The only fishing cooperative in Guatemala is located at Livingston, and some tradition exists for this development.

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[4]Holloway, op. cit., p. 47.

In 1950 a relatively strong organization with sixty members was operative.[5] The present cooperative has been in existence since 1965 and is composed of thirty members. The recent aid and interest of an American Catholic priest assigned to Livingston has given the organization a new impulse. Bickering among the members has to date hindered the development of a solid program, however, as must also have been the case in the 1950 attempt.

The cooperative buys first-rate fish at the going price from members and non-members alike. The fish, after simple cleaning, are iced and crated and then shipped by regular boat service to Puerto Barrios. There the crates are transferred to the railroad for transport to Guatemala City. An average of four or five crates, containing 150 to 200 pounds each of snook and red snapper, are sent out weekly by the cooperative.

In addition to the cooperative, five or six regular buyers vie for the daily catch. Many fishermen prefer to deal with their traditional buyers instead of the newer cooperative. Including that of these "renegade" producers, the estimated weekly catch at Livingston amounts to 2,000 to 2,500 pounds.

Small-scale production in Guatemala reaches its pinnacle in Livingston. Both in terms of people involved

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[5]de Buen, op. cit., 1952, p. 24.

and volume of catch, Livingston ranks first among the secondary production centers of the country. The tradition of fishing is strongest here, and this would seem to favor any program of expansion. The main obstacles to growth include the limited fishing range and the lack of new and efficient gear. Increased cooperative efforts could aid in solving these and other harvesting and processing problems which ensue from small-scale efforts. Finally, good storage facilities on site and in Puerto Barrios could improve the marketing situation immensely, which would in turn act as a stimulus to production.

Puerto Barrios

Puerto Barrios serves chiefly as a seaport and only secondarily as a fishing center. However, it is the focus for seafood distribution from the area and formerly played an important role in the shrimp export trade. In 1959 the city was the operational base for thirteen shrimp boats and served as the center of the Guatemalan fishing industry. At present no boat is really active. During the period of study, the one available boat was idle due to illness of the captain, a Spaniard, and the lack of a trained person to take his place.

Production was formerly based on the highly-valued blue shrimp which was found in limited sections of Amatique Bay. Normal trolling was impractical due to bottom coral

and other rock formations. These caused frequent equipment damage and apparently contributed to the abandonment of several enterprises. Extremes in the volume of catch also characterized previous attempts at commercial exploitation. One seafood concern shipped a total of 9,400 pounds to Guatemala City in December, 1960, and followed this by a January total of only 400 pounds.[6] In the 1960's shrimp production shifted gradually to the Pacific Ocean.

The municipality of Puerto Barrios issued sixteen fishing licenses for 1966. Each of these specified use of the long, narrow chinchorro or the trasmallo. The chinchorro is often worked from the shore and is dragged in by the fishermen, while the trasmallo is usually worked from a cayuco or is set in the water. Each net needs at least three men for efficient operation. The fishermen range along the nearby coast and average fifty to sixty pounds of fish daily per net. Other part-time fishermen, not included within the license regulations, wade into shallow portions of the Bay to toss their cast nets. This practice yields chiefly a small reddish fish, called colorado. Much of this catch is used on a subsistence basis, but any surplus is sold fresh or salted in the local market. The full-time fishermen supply the hotels and outside markets where the demand for larger fish is greatest. The common

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[6]Interview with José Pérez Lijo, Puerto Barrios, June 2, 1966.

species taken include snook, red snapper, croaker, mulet, tarpon, and grouper.

The Lake Izabal Centers

Fishing in the Lake Izabal complex is non-intensive, although the lake provides breeding grounds for a great variety of commercial as well as "trash" fish. Fifty species were identified by Holloway in 1953.[7] Those of commercial value include snook, snapper, gafftopsail, tarpon, yellow jack, leather jack, juilín, mojarra, and palometa, as well as an occasional shark or manatee. Turtles and crabs provide other commercially exploitable seafoods.

Fishing activities occur year-round but some seasonal variation is notable. Peak production is concentrated from December through April and ends with the Holy Week celebration. Then there is a period when little fishing is done. This usually coincides closely with the commencement of the rainy season, when many of the fishermen devote their time to subsistence agriculture. The principal centers of production on the lake, each of secondary rank on a national basis, are the villages of San Felipe, Mariscos, and El Estor.

San Felipe.--San Felipe is located west of the Golfete, at the entrance to Lake Izabal. Surface water in this area is slightly salty, since winds can easily generate currents of salt water up the entire length of the Río Dulce

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[7]Holloway, op. cit., p. 55.

and Golfete from the sea.[8] There is little level land suitable for permanent settlement along the Río Dulce, but at San Felipe the area is more conducive to agglomerated settlement. Here fifteen to thirty trasmallos may be set in the evenings. Within the town of San Felipe at least six fishermen use trasmallos and together obtain an average daily catch of fifty pounds. Catches may range from zero to 150 pounds, depending upon daily "luck."

More fish are dried and salted in San Felipe than are sold fresh. In 1966 one buyer was attempting to collect the first-class catch of the area for bulk sale. Major problems included the lack of ice and the relative scarcity of first-class fish varieties, but by June, 1966, he had taken four loads to Mariscos at weekly intervals. The load on one trip included 1,300 pounds of fish, of which 600 pounds were fresh and 700 dried. These figures are clearly indicative of a productive fishing region.

Mariscos.--In Mariscos, on the southeastern shore of Lake Izabal, four fishermen own trasmallos and set them each evening. Two years ago this more efficient net could not have been found.[9] Setting a net every evening usually results in at least a small catch. A representative catch for one net during the slack season might be similar to one

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[8] Ibid., p. 40.

[9] Interview with Carlos Moscoso, Mariscos, June 6, 1966.

observed by the writer in June, 1966. This was comprised of six tarpons, two gafftopsails, and four chuntes or juilín. These are all second-class fish which are salted and dried for sale at perhaps $15 per hundredweight. The family to which the net belonged earns about $500 annually from its fish catch. In addition to the few wealthier fishermen with trasmallos, there are approximately ten to fifteen part-time fishermen in the village.

Almost the entire catch of the immediate area is salted and dried, although some fresh fish may be taken out on the local bus line or by an occasional trucker. A road connection, rough as it is, assures Mariscos of a relatively important role in local and regional distribution of seafood. Fish from Mariscos and San Felipe reach markets in such places as Morales and Bananera, and occasionally farther away.

El Estor.-- El Estor has a reputation for good fishing and is a steady supplier for its tributary area and for the national market. The abundance of fish at this site is due largely to the added fertility of the waters caused by the discharge of the Río Polochic. Reports indicate that six or seven trasmallos are in use in the immediate vicinity. The catch is purchased chiefly by one local buyer who trucks it to Guatemala City. Although much of the catch is transported fresh, dried fish remain a significant percentage. In addition to the commercial

catch, the potential for sport fishing in the area is excellent.[10]

Tertiary Production Centers

While numerous other places in the Caribbean coastal area are at least superficially connected with fishing, only two are considered of sufficient significance to rank even as tertiary production centers. These are at Punta de Manabique, a sand spit near Puerto Barrios, and El Chapín, a tiny village on Lake Izabal.

Punta de Manabique.--Due to its proximity to Puerto Barrios, the area around the Punta de Manabique could legitimately be considered an extension of the Puerto Barrios fishing grounds. Much of the small, dried sardina sold throughout the country originates here. The number of fishermen is estimated at only ten to fifteen. The small fish caught in the area are dried and salted before being bagged for distribution. The dried product is boated to Puerto Barrios, then distributed to other sections of the country. The relative isolation of this part of the coast and the lack of large boats to exploit the off-shore waters militate against really significant production. The coastline from the Punta de Manabique to the mouth of the Río Motagua lacks the shelter necessary for small craft and thus has not

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[10]Erwin A. Bauer, "Adventure in Latin America: Part II, Guatemala," Outdoor Life, Vol. 137, No. 3, (1966), p. 89.

developed much fishing. Apparently the waters hold potential for the shark fisherman but little else.[11]

El Chapín.--El Chapín typifies the small-scale Lake Izabal production center. It is a village of perhaps thirty or forty families, located on the southwest shore of the lake. Here, two small trasmallos, eighty to 100 feet in length, are employed by one family. Production is largely concentrated just before the high demand period of Holy Week, when 1,200 to 1,500 pounds of dried fish may be sent out. Within the village very little fish is sold or bartered. Each family fishes for subsistence whenever necessary or desired. Surplus catches are dried and sent to Mariscos or across the lake to El Estor for marketing.

Table 6 indicates the estimated production for the Caribbean Coast fisheries:

Table 6.--Fish production on the Caribbean Coast.

	Number of Fishermen	Daily Catch (Pounds)	Yearly Catch (Pounds)
Secondary Centers*(300-day Season)			
Livingston	100-110	400-500	120,000-150,000
Puerto Barrios	20-40	200-300	60,000- 90,000
San Felipe	20-30	100-150	30,000- 45,000
Mariscos	10-15	100	30,000
El Estor	10-20	100+	30,000+
Tertiary Centers*(200-day Season)			
Punta de Manabique	10-15	50-60	10,000- 12,000
El Chapín	4-6	20-25	4,000- 4,500
TOTAL	174-236	970-1,235	284,000-361,500

*There are no primary production centers on the Caribbean Coast

[11]Holloway, op. cit., p. 47.

Inland Lake and River Fisheries

Among the numerous lakes and rivers included in the Guatemalan national territory, few have attained more than local importance as sources of animal protein. Nevertheless, fresh-water bodies have served as sources for fish since early times. With improved transportation facilities, the significance of lakes and rivers as food suppliers, actual or potential, has also been magnified.

Few sections of Guatemala are distant from some fresh-water lake or stream. Scattered throughout the highland region are a series of relatively large lakes. Although the lack of level shoreline has usually restricted lake-front settlement, significant population clusters have developed at suitable sites around Lakes Atitlán and Amatitlán. In addition to the lakes within the mountainous sector of the country, the coastal regions contain numerous large and small lakes and many traversing streams. The extensive Petén region also contains numerous fresh-water rivers and lakes, and probably offers the greatest potential for interior fisheries development.

The technology of fisheries exploitation has remained primitive in this fresh-water realm. Subsistence-level fishing predominates, but pockets of small-scale commercial production are also found. The fishing is done chiefly by persons of limited means, and advancements in techniques have therefore been extremely slow. The great

bulk of the catch from the lakes is obtained by using canoes and a hook and line or small throw net. The small quantities produced at any given site naturally limit participation in regional or national trade.

Human influence is much more significant in relation to interior water fisheries than to the coastal zones. The introduction of new fish species to existing lakes began in the 1920's and has continued sporadically since. When the Wildlife Division of the Ministry of Agriculture was created in 1952, further impetus was given to rearing and stocking, and new efforts were made in conservation programs. The success of particular stocking efforts has depended upon local conditions, both physical and human, but introduced species now dominate the catches throughout the highland region. Fishing regulations, with periods of closed seasons, or vedas, are now "enforced" in most of the lakes.

Lake Fisheries

Only the specific investigation of individual lakes can determine the significance of each in relation to the total national scene. Three lakes, Izabal, Atitlán, and Amatitlán, can be considered consequential sources of fish for the Guatemala City and national markets. Two major regional suppliers are Atescatempa and Güija, while smaller regional sources include the lakes Ayarza, Lemoa, San Cristóbal,

Pino, and Petén Itzá. The major lakes and rivers of Guatemala are shown on Map 4.

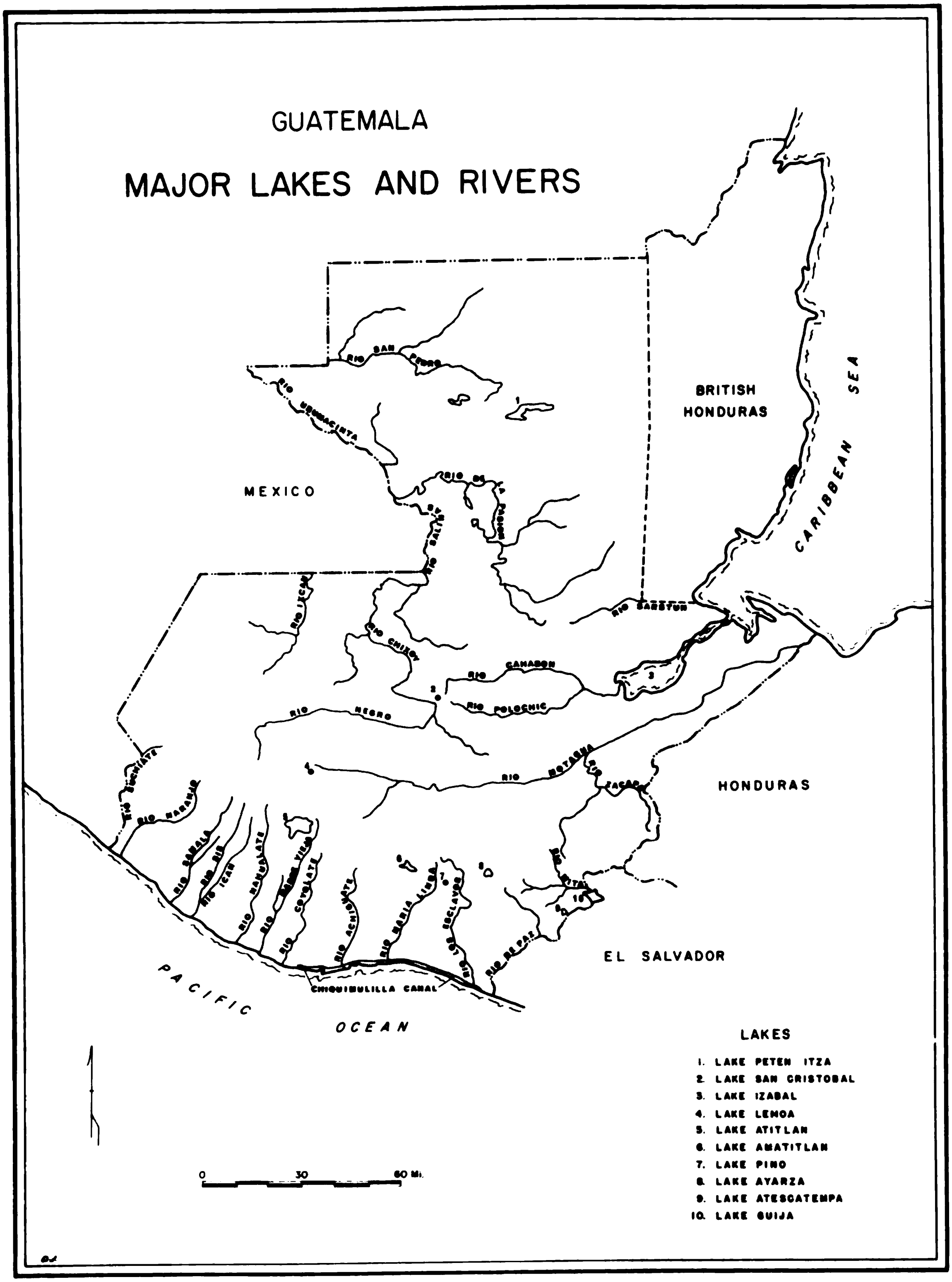
Lake Izabal

Lake Izabal is the largest lake and most significant fresh-water source of fish in Guatemala. Production is still on a small scale, however, the total annual yield being estimated at 90,000 to 120,000 pounds. As previously noted in the discussion of the Caribbean area fisheries, the major fishing centers on the lake are San Felipe, Mariscos, and El Estor.

Lake Atitlán

The second largest and the most scenic of the lakes in Guatemala, Lake Atitlán, also has the longest documented history of fisheries activity. Indian settlements crowd the shoreline wherever sufficient level land permits and where offshore depths are less abrupt. The generally steep shoreline, however, is indicative of the plunging depths in most sections of the lake. The limited area of shallow water naturally affects adversely the extent of vegetative growth and development of fresh-water fauna.

Lake Atitlán is presently the site of a most flagrant violation of the natural bio-ecological balance. The introduction of the voracious black bass to the lake in 1958-60 has contributed to a radical decline in other water


GUATEMALA
MAJOR LAKES AND RIVERS
MEXICO
BRITISH HONDURAS
CARIBBEAN SEA
HONDURAS
EL SALVADOR
PACIFIC OCEAN
RIO SAN PEDRO
RIO USUMACINTA
RIO DE LA PASION
RIO SALINAS
RIO IXCAN
RIO CHIXOY
RIO CAHABON
RIO POLOCHIC
RIO NEGRO
RIO SARSTUN
RIO MOTAGUA
RIO SUCHIATE
RIO NARANJO
RIO SAMALA
RIO ICAN
RIO NAHUALATE
RIO COYOLATE
RIO ACHIGUATE
RIO MARIA LINDA
RIO LOS ESCLAVOS
RIO DE PAZ
CHIQUIMULILLA CANAL
0 30 60 MI.
LAKES
1. LAKE PETEN ITZA
2. LAKE SAN CRISTOBAL
3. LAKE IZABAL
4. LAKE LEMOA
5. LAKE ATITLAN
6. LAKE AMATITLAN
7. LAKE PINO
8. LAKE AYARZA
9. LAKE ATESCATEMPA
10. LAKE GUIJA

MAP 4

fauna. This, in turn, has directly affected the livelihood of a surprisingly large number of people.

Evidence gathered through interviews, and from records of fishing licenses issued, indicates that fishing was of substantial regional importance even ten years ago. At least four varieties of small fish were found in abundance: pupo, gulumina, pepesca, and mojarra.[12] The smallest of these, the pepesca, had apparently gained the most acceptance. These fish became a type of delicacy here. Fishing was done by corrals, or weirs, built along the shore, into which the small fish were driven or enticed. Then it was a simple matter of scooping out the harvest. In three or four days 100 to 200 pounds were not an uncommon catch for a single weir.[13] Of even greater importance than fishing was the crabbing industry, with a catch approximating 110 pounds daily in the apogee of the season.[14]

The contrast of this pleasant-sounding past with the present situation is striking. In addition to the

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[12]U.N., Food and Agricultural Organization, Segundo informe al Gobierno de Guatemala sobre el fomento de la pesca continental, by S. Yen Lin, Informe 1719, (Rome: 1963), pp. 4-5.

[13]Interview with William Douglas, Santiago Atitlán, July 13, 1966.

[14]U.N., Food and Agricultural Organization, El fomento de la pesca continental; informe al Gobierno de Guatemala, by S. Yen Lin, Informe 574, (Rome: 1957), p. 29.

introduction of black bass, the protective feeding grounds of the fish have been depleted by the harvest of reeds and other plant life. The latter may, however, be a direct consequence of the decline in fish population. Stocking with exotic species began in 1930, with the introduction of carp, but no noticeable change was achieved until the seeding of black bass in 1958.[15] In 1959 and 1960, the number of bass introduced annually totaled 4,000. The rationale for doing this was to increase sport fishing in connection with the tourist trade. For the first four years this strategy did result in increased harvests for all concerned, but then the bass literally ate themselves out of existence. Tilapia were seeded in an attempt to achieve a food balance for the bass. In a continued attempt to counterbalance the bass dominance, an indeterminant number of mojarra were added in 1965. Even with these attempts there is no present indication of any improvement in the fishing situation.

The decrease in fishing yields can be documented indirectly by noting the decline in fishing licenses issued in the village of Santiago Atitlán over a ten-year period (See Table 7).

Lin noted in 1963 that fish abundance continued through 1962, with the large bass forming a new basis for tourist and indigenous fishing.[16] Then the bass population

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[15] Ibid., p. 4.

[16] Lin, op. cit., 1963, p. 6.

Table 7.--Fishing licenses issued in Santiago Atitlán, Guatemala, 1956-1965.

Year	Licenses	Year	Licenses
1956	224	1961	131
1957	211	1962	95
1958	203	1963	60
1959	170	1964	158
1960	141	1965	73

Source: Municipality of Santiago Atitlán.

diminished, and the simultaneous disappearance of the smaller fish species was also noted. The renewed importance in 1964 was probably the second stage of bass development and only a momentary phenomenon.

During the period of study, the black bass were not the only "disruptive" force at work on the lake. A program to save a unique species of duck from extinction was also underway. In the attempts to clear a refuge area for this Pato Zambullidor, a poison was applied on a limited area to eliminate fish which were competing for food with the ducks. Due to widespread misunderstanding the word quickly spread that the entire lake was being poisoned, and sightings of dead fish were commonplace!

Despite the many-faceted decline in fishing, the lake still serves the immediate area with fish and even sends a surplus to the larger urban centers. Chief among the fishing villages are Santiago Atitlán, Santa Catarina Palopó, and San Pedro La Laguna (Map 2, p. 18).

Santiago Atitlán.--A large fleet of canoes dominates the shoreline at the village of Santiago Atitlán. Many of these dugouts are used merely for transportation across a shallow, lagoon-like arm of the lake to hillside milpas, but most also double as fishing craft. Up to 100 men from Atitlán, as the village is called, fish and sell any surplus that is caught. The hook and line is the most common fishing device, but a small net may occasionally be used. The usual catch consists of small bass and perch or crappie, about five or six to the pound. Reports indicate that larger bass exist but do not bite! Most fishing is done in the quiet evening and morning hours. By early afternoon the lake is generally too rough for small craft navigation.

A three-month period, from May to June, is closed for fishing. During the remainder of the year most of the catch is handled fresh for the local and regional markets. Some crude drying and smoking of fish does occur, however, for the more distant markets.

Santa Catarina Palopó.--The small village of Santa Catarina Palopó, huddled on the north shore of the lake, is perhaps the most intensive fishing site in the area. About twenty men harvest fish and crabs for subsistence and as a medium of exchange or for cash sale. Numerous dugouts line the reed-filled shore, and the shallow little inlet of the townsite would seem to offer relatively favorable fishing. What fishing is done is almost exclusively at night, when the fish approach closer to shore.

Santa Catarina was formerly the leading producer of crabs on the lake and also supplied fish to much of the north shore. At present even the crabs have apparently been driven to deeper waters by the bass and are smaller in average size. Thus, in historical context, a decline in fishing importance is also found here.

San Pedro La Laguna.--Very little fishing is now done from San Pedro La Laguna. The "good old days" for the fishermen were apparently interrupted by the introduction of the bass, and only minimal amounts of smaller fish are caught at three to four-week intervals under current conditions. Several harpoon fishermen still try for the larger bass, which generally lurk in the depths, but this merely constitutes sport fishing. These changing conditions have lead naturally to an increasing dependence upon small subsistence and specialized garden plots.

Other Lakeshore Villages.--Subsistence-level fishing predominates at other small communities dispersed around the lake. San Antonio Palopó and San Lucas Tolimán are each the home of several fishermen but none that really catch fish for a commercial end. Both places formerly had numerous fishing weirs, but now their residents must even buy dried ocean fish for Holy Week!

Panajachel has little area appropriate for fishing, and the number of weekend pleasure boats and water skiers detract still further from any serious attempts. Some

fishing with hook and line is done along the shore, and by the river mouth, but this is either subsistence or pleasure fishing. Fresh fish are generally unavailable even in the daily market.

Despite all the problems enumerated, fish from Lake Atitlán still reach many parts of the republic. It would seem, however, that commercial fishing here is doomed as a means of economic livelihood. The fishing that is done will be increasingly oriented toward tourism and for sport.

Lake Amatitlán

Proximity to Guatemala City has aided the development of fishing in medium-sized, attractive Lake Amatitlán. However, the structure of fishing has changed greatly in recent times. Professional fishermen are now far outnumbered by sportsmen, especially on weekends. It is possible on Sundays to count up to 1,000 persons of both sexes, and of all ages, fishing from the shore with makeshift fishing rods. This shift has been due in large part to the continued stocking, since 1959, of guapote tigre.[17] As in many lakes of the United States, water sports have not been confined to fishing. Speed boats with accompanying water skiers vie for space with the fishermen.

Actual fishing villages are not the dominant mode of settlement about the lake. Rather, most fishermen migrate from villages somewhat removed from the lake, such

[17]Holloway, op. cit., p. 36.

as Amatitlán and Villa Canales. Nets are prohibited on the lake, so the catch is almost solely by hook and line.[18] The yield is predominantly small fish weighing less than one-half pound each, chiefly mojarra and guapote. If sold in either the local or regional market, the fish are usually unprocessed. That is, they are sold fresh with only simple cleaning. Small quantities may also be dried and smoked.

Lake Atescatempa

Lake Atescatempa, near the Salvadorian border, is one of the shallower lakes in Guatemala, and its water level fluctuates significantly. A rich vegetative growth supports considerable numbers of fish. Seeding has given the lake a varied, commercially-exploitable fauna, chiefly the mojarra, guapote tigre, and tilapia. Fishing is conducted from cayucos, small rafts, and from the shore. A full range of equipment, from gill nets to throw nets and hook and line is used. Regulations, which prohibit fishing during the spawning period, have recently been enforced. This period is about four months long, from May to August.

Atescatempa is among the most intensively fished of the interior lakes, in part because its location adjacent to the Inter-American Highway provides easy accessibility. On good days there may be 200 fishermen on or about the lake. Forty or fifty of these can be considered regulars,

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[18]Lin, op. cit., (1957), p. 14.

while the others are sporadic, opportunistic, or sport fishermen. A normal daily catch for one person is about a dozen fish, weighing one-fourth to one-half pound each, while a maximum of fifty or sixty fish is possible. The normal catch provides only a meager earning for the fisherman who has no other source of income.

Most of the marketable fish are sold in fresh form. Very little is dried or otherwise processed. The lake's position on a main route to El Salvador facilitates movement of the fresh product, so processing is unnecessary.

Lake Güija

The large and relatively shallow Lake Güija is divided between Guatemala and El Salvador. Accessibility to the smaller Guatemalan portion is limited to several seasonal roads, but a line of the International Railways of Central America skirts the Salvadorian shore, as does an unpaved highway. Despite its relatively isolated location, fresh and dried fish from this source reach a surprisingly extensive area. The railroad provides a steady, year-round access route to northeastern Guatemala, which constitutes a substantial regional market. The fish caught for commercial sale are chiefly guapote and mojarra, and several smaller species.

Lake Ayarza

The beautiful volcanic Lake Ayarza is one of the most isolated bodies of water in Guatemala. During the

rainy season access is possible only by four-wheel-drive vehicles or by horseback, and the trip is arduous even in the dry season. The difficulty of the journey gives some premonition of the limited extent of fishing on the lake!

The extremely steep slopes bordering the lake are continued within the lake basin itself, and thus the area of shallow water is limited. Within three or four yards of the water's edge the lake bottom slopes abruptly into the depths.[19] This lack of shallows propitious for fish breeding, in addition to the isolation of the site, have relegated commercial fishing activities at Lake Ayarza to a very insignificant level.

It is estimated that only five to ten persons are involved more than casually in fishing at Lake Ayarza, but this number may increase substantially during the high-demand period of Holy Week. Interviews indicate that fishermen from surrounding areas arrive irregularly to augment the number. Small dugout canoes are used along the shoreline for transportation and for fishing. Strong winds and the extreme depth of the lake make navigation a dangerous proposition much of the time. In addition, the amazing clearness of the water makes daytime fishing difficult, as the fish take fright easily at the sight of their intended captor.

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[19]Lin, in his 1957 study of Guatemalan continental fisheries, indicates 1,148 feet as the depth of Ayarza, while Atitlán has been measured at 1,050 feet.

The mojarra negra and guapote tigre have been seeded in Lake Ayarza. These have replaced the smaller natural varieties and a species of crab which provided most of the catch up to the major stocking in 1959.[20]

Lake Lemoa

The small Lake Lemoa, about thirty acres in extent, is located midway between Chichicastenango and Quiché. It has been seeded with various species since 1935, but major stocking has been only recent.[21] According to fishermen at the lake, the catch consists chiefly of guapote. These fish are "relatively small but fat," as one little boy described them. The local government of San Sebastian Lemoa issues licenses for fishing by the day, at a price of twenty-five to thirty cents, which discourages fishing by the indigenous peoples of the area. Obviously the lake and its products are meant for the more well-to-do, and more for pleasure than for subsistence. Secondary sources indicate that sport fishing is quite good at this site.

Lake San Cristóbal

In north-central Guatemala, near Cobán, is the small Lake San Cristóbal. It occupies about 125 acres and

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[20]Lin, op. cit., (1963), p. 7.

[21]Ibid., p. 8.

was first seeded in 1940 with carp and more recently with bass and guapote.[22] The lake appears to be neither heavily fished nor subject to proper care. Its marshy and reed-filled margins limit the amount of fishing that can be done from the shore itself. Thus, most of the fishing must be done from boats. A few outboard motor boats are used, but their primary function appears to be as pleasure craft and not for commercial or subsistence fishing. A small concrete pier in the municipality of San Cristóbal has fallen into disrepair and is of no present use. Fish from the lake reach only a limited local market.

Lake Pino

Lake Pino occupies about sixty acres and provides the immediate area of Santa Rosa Department with fish for food. It serves secondarily as a center for sport fishing. Fish species present are the mojarra, guapote, pepesca, and carp. Fishing is done mostly with hook and line, but a few cast nets are seen, and there are reports of a gill net also being used. Small wooden docks on either side of the lake indicate some developmental interest. The lake itself is a minor tourist attraction, as many people come from Escuintla and Guatemala City to enjoy a picnic and perhaps a swim.

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[22] Ibid., p. 8.

Lake Petén Itzá

Lake Petén Itzá, a large lake in the Department of El Petén, has not yet been exploited commercially. Some species have been stocked, but the productivity of the waters is low.[23] The population around the lake engages in fishing only on a subsistence basis. If demand should necessitate it, however, the lake could certainly support a limited commercial fishery.

Other Lakes

There are many other lakes of the republic which may provide an occasional change in diet for a nearby resident, but little more during most of the year. Added interest in fishing occurs, however, with the advent of Holy Week.

River Production

Fish production from rivers has been, and is presently, conducted chiefly on a subsistence basis. Only with the high waters of the rainy season are there serious attempts to harvest the streams for commercial purposes. Each river may be of considerable significance locally during certain periods of the year, such as Holy Week, but fishing is otherwise of a sporadic nature and conducted with

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[23] Ibid., p. 7.

small cast nets or fish traps. Families living near the streams often attempt to augment their diet by these devices or through the use of poisons, small charges of explosives, or by temporary damming of the stream to create shallows. The lack of enforced fishing regulations has resulted in a serious depletion of the fish population in many rivers.

The greatest potential for river fishing lies in the major streams tributary to the Caribbean Sea and the Gulf of Mexico. Included are the Motagua, the Polochic, the Pasión, and the Chixoy. Especially the Río de la Pasión, in the Petén, seems to offer a significant possibility for increased production. Several streams on the Pacific slope also have some potential but are dependent chiefly upon stocking. The Esclavos, the Grande de Mita, the Madre Vieja, the Nahualate, and the Samalá seem worthy of attention.

Two types of river production that occur in Guatemala can be illustrated by an example on the Pacific side and another on the Caribbean. These are the Río Nahualate and the Río Motagua, respectively.

Río Nahualate

An example of a site devoted to the capture of river shrimp is found on the Río Nahualate at its junction with the main coastal highway. For a period of only about

one month during May to June, at the beginning of the rainy season, a large river shrimp is abundant. Bamboo traps are erected across the river in several places. These traps together provide an average daily catch of from ten to fifteen pounds and a daily maximum of 100 pounds. Within the month, 300 to 400 pounds are caught and sold at premium prices. In the markets of San Antonio Suchetepéquez and Mazatenango these shrimp bring $3.00 per dozen.

Río Motagua

The Río Motagua serves as a local source of fish throughout most of its course. Most of the activity is at a subsistence level, but a few villages are dedicated to commercial fishing at least part of the year. Such a village is Chispán, north of the city of Zacapa. When the fishing is good the entire village joins in the harvest. This generally coincides with the rainy season when the turbulent water brings down the fish and shrimp. Most families have milpas, or subsistence plots, to rely upon when fishing is poor.

Residents of Chispán fish primarily with cast nets, or atarrayas, but a few traps and the simple hook and line are also used. The varieties caught include mojarra, mountain mullet, tarpon, and catfish. Shrimp are taken, but not in great quantities. When the catch is abundant much of the fish is salted and dried, but the normal catch is sold fresh.

Table 8 provides an estimate of production from the principal lakes and rivers of Guatemala.

Table 8.--Fish production from principal Guatemalan lakes and rivers.

Lake or River	Number of Fishermen*	Annual Catch* (Pounds, 200-250 Days)
Lake Izabal	100-120	90,000
Lake Atitlán	100-120	20,000
Lake Amatitlán	90-100	20,000
Lake Atescatempa	40- 50	10,000
Lake Güija	20- 30	5,000
Lake Ayarza	5- 6	2,000
Lake Lemoa	5- 10	1,000
Lake Pino	5- 10	1,000
Lake San Cristóbal	4- 5	1,000
Lake Petén Itzá	**	**
SUB-TOTAL	369-451	150,000
Río Motagua	200-300	30,000
Other Caribbean and Gulf Tributaries	50-150	20,000
Pacific Tributaries	100-150	40,000
SUB-TOTAL	350-600	90,000
GRAND TOTAL	719-1051	240,000

*Estimated.

**No basis for estimate.

Fish Pond Production

The development of a national fish-rearing and stocking program in Guatemala has been a slow and sporadic process. Individual farm, or finca, owners were the first to use private ponds for the provision of fish stock, chiefly to satisfy sporting interests. The first documented introduction of a foreign species, carp, was in 1926, and since that time fish culture has increased slowly.[24]

National recognition of the value of ponds in providing local supplies of high protein food occurred during the 1950's. Enough interest and concern was generated to contract for a United Nations Food and Agricultural Organization study in 1954, which included an analysis of fish culture possibilities on the national level. Follow-up on this study was rapid, as a Department of Hunting and Fishing (Caza y Pesca) was created in 1955 and since then has been concerned chiefly with a fish pond program. In the years 1955-1959, an experimental fish culture station was constructed at Bárcenas, near Lake Amatitlán, to further research and the dissemination of both knowledge and fish.

Bárcenas Experimental Station

The experimental station at Bárcenas is now equipped with twenty-three ponds in which six species of fish are

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[24]Lin, op. cit., (1957), p. 34.

cultivated. After some years of trial and error, the species most propitious for local conditions were selected for primary attention. These were carp, tilapia, black bass, guapote, mojarra de Atescatempa, and goldfish, the latter obviously for ornamental rather than commercial purposes. Primary emphasis is on the carp and the tilapia. Carp has the highest and most efficient growth rate, while the tilapia is the most prolific species. Research undertaken at Bárcenas indicates that carp can be grown to a marketable one-pound size in approximately 120 days, at a cost of from ten to twelve cents per pound. Extension work from this site is quite limited, due chiefly to a lack of personnel. However, any Guatemalan who has a pond is entitled to obtain both fish and advice from this station.

San Jerónimo Sub-Station

Five fish ponds are located at San Jerónimo, in the department of Baja Verapaz. No experimental work is done here, but fish can be more easily distributed to central Guatemala from this sub-station. Tilapia and carp are the only two species presently stocked.

Current Status of Production

Fish pond production is not presently on a commercial basis at any site. In 1963 Lin reported two farms

which were in commercial production from fish ponds,[25] but this activity has since been discontinued. An estimated 600 to 700 fish ponds have been constructed throughout the republic, but due to a lack of follow-up support most of these are presently in a state of semi-abandonment.

Another problem is the dispersed pattern of operations. Construction and stocking of ponds has occurred in widely scattered parts of the republic. Such a development is quite natural during the initial stages of a program, since interest must be cultivated where individuals are receptive to innovation, and these people are not likely to be conveniently concentrated. However, it does extend the area to be covered by a limited staff of workers. More intensive efforts will be necessary within restricted areas before any substantial improvement in dietary patterns will appear. This approach is already in the planning stage. The Division of Wildlife (División de Fauna), formerly the Division of Hunting and Fishing, has submitted a four-year plan to concentrate efforts in eight departments where population pressures are great and relative isolation prohibits the obtaining of seafood at reasonable costs. The goal is to produce 1,600,000 pounds of fish per year in about 800 ponds. This, it is estimated, will provide food for about 100,000 people, at relatively low cost.

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[25]Lin, op. cit., (1963), pp. 47-48.

CHAPTER IV

DISTRIBUTION

The distribution system for fish and seafood within Guatemala reflects the marginal nature of the fishing industry. Most of the product is transferred to market in minimum quantities by individual entrepreneurs. The trade is neither extensive nor very profitable for the most part. Yet, fish in some form do reach most of the republic.

Seafood has been a minor trade item throughout the history of Guatemala. Accounts of prehistoric Indian life indicate some trade in fish and shellfish from coastal waters and inland lakes to interior population centers, such as Tikal. The perishability of the product, however, limited its range of distribution.

Neglect of the coastal regions characterized most of the colonial period. After Pedro de Alvarado built his small armada in the region of Iztapa, in the 1530's, some trade existed between the highlands and coast. But, this quickly declined as a result of the restrictive Spanish commercial policy. Throughout the nearly 300-year colonial era all official trade was conducted through Acajutla, El Salvador. Only with the rehabilitation of Iztapa, in 1824,

were relatively permanent connections made between the coast and the highlands. Some fresh fish were traded in the 1820's, but most of the movement of seafood must have been in small quantities of dried fish.[1] With the further development of ports and roads the importance of fisheries increased.

Present trade routes are molded by the existing road patterns. Distribution is, by definition, linked with a means and mode of transportation. Highly productive areas are associated with good transportation facilities and the unproductive zones with little or none. Viewing the extant transportation network, one is struck by the paucity of good roads extending to the coastal zones. The so-called Pacific Coastal Highway extends across the piedmont and has only two paved "spurs" to the ocean, at Champerico and San José-Iztapa. Numerous unpaved roads exist, but only a few of these are passable throughout the year. Much of the coastal region is inaccessible except by horse or on foot.

Domestic seafood distribution is directly related to centers of population. The larger urban centers create the greatest demand and likewise support the largest numbers of bulk distributors. Most small regional markets are served by individual suppliers with limited volumes of fish and less dependable schedules.

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[1]Manuel Rubio Sánchez, "Puerto de Iztapa o de la Independencia: (Primera parte)," Antropología e Historia de Guatemala, Vol. 5, No. 2 (1953), p. 29.

The present process of distribution is relatively simple and routine. Certain families have been involved in the fish trade for several generations and have developed a personalized business. This pattern has been altered in some production centers where large-scale processing and distribution patterns have developed, but such operations involve only a small percentage of the people engaged in the total fishing industry.

The most important distinctions identifiable in the distribution process include differences between the export and domestic trade and between the marketing of fresh and dried varieties of fish. This study emphasizes the expanding fresh fish segment of the domestic trade. In over-all distribution, however, dried varieties are nearly ubiquitous, whereas fresh seafood is considerably limited in range. Each of the two classes presents a different pattern of distribution.

It is in the distributive stage of the fishing industry that the least information is available. What happens to the fish after it is caught? Does the product stay within the immediate zone, or is it dispensed over a wide area? To what extent is it exported? What is the trade area of a small production center as compared with a large one? What is the distribution pattern for dried fish as compared with fresh fish, and of coastal production as compared with that from inland lakes?

Distribution to the Exterior

Seafood exports from Guatemala are limited almost exclusively to frozen shrimp, and this from processing plants at the Pacific Coast communities of Champerico and Iztapa. The predominance of these centers, in both production and distribution, is in large part related to their accessibility by paved highways.

Champerico

Up to eighty percent of the shrimp processed at Champerico is transported by refrigerated trailer truck to Matías de Gálvez on the Caribbean coast for export. The attraction of this distant port is its accessibility to the East Coast markets of the United States, chiefly Miami and New York, and to San Juan, Puerto Rico. The remaining export is from the Champerico pier to the West Coast cities of Los Angeles and San Francisco, and to Japan. The shrimp are shipped mainly in five-pound cartons, deheaded but not peeled or deveined. Fish do not presently enter the export trade, but small shipments of lobster and squid have been made.

Transportation of packaged seafood from the COPESGUA plant is provided by trailer trucks of the Coordinated Caribbean Transport Company (CCT), which operates from a main office in Guatemala City. At Matías de Gálvez the trailers are loaded directly onto one of the two sea-going ferries

sailing every five days between the Guatemalan port and Miami. "In 1964 CCT estimated its northbound cargo at about one-third beef, one-third frozen shrimp, and the rest plantains for the New York, Chicago, Miami and Tampa colonies of Latin Americans."[2] The frequency of shipment from the COPESGUA plant varies greatly, but an average of one or two trucks with shrimp are dispatched weekly.

As shown in Table 9, exports have varied greatly in both quantity and destination. Except for 1962, however, the East Coast of the United States has received the bulk of exported shrimp. The fluctuating volume of shrimp harvests in the Pacific waters of Mexico may account at least partially for the variation in Guatemalan exports to the West Coast markets of the United States.

Iztapa

Because it had only recently reopened, the distribution of seafood products from the Mariscos de Guatemala plant was minimal during the summer of 1966, but up to ninety-five percent of the catch by value was planned for export. However, since commercial fish licenses issued by the Guatemalan government require companies to distribute ten percent of the shrimp catch and sixty percent of the

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[2]James J. Parsons, "Cotton and Cattle in the Pacific Lowlands of Central America," Journal of Inter-American Studies, Vol. 7, No. 2 (1965), p. 157.

Table 9.--Exports from COPESGUA, 1961-1965, by port and destination (pounds).

	1961	1962	1963	1964	1965
Exports From:					
Champerico	126,650	624,000	474,850	533,642	545,642
Matías de Gálvez	236,280	513,350	1,151,168	2,039,695	999,210
Exports To:					
Miami	37,680	102,050	62,980	140,113	81,862
New York	198,600	408,050	1,059,930	1,704,400	651,800
Puerto Rico	-	3,250	28,258	195,182	265,548
Los Angeles	84,250	463,300	333,350	171,000	320,292
San Francisco	42,400	53,000	133,500	142,500	176,300
Seattle	-	58,150	8,000	-	-
Vancouver	-	49,550	-	-	-
Japan	-	-	-	220,142	49,050
TOTAL	362,930	1,137,350	1,626,018	2,573,337	1,544,852

Source: COPESGUA, Guatemala City.

fish catch within the country, this estimate may have to be revised.[3] The familiar five-pound cartons are stamped in English, so it can be assumed that the United States market is expected to absorb most of the catch. Shrimp will be the primary item of export, while fish are sold directly at the plant for the local market.

Domestic Distribution

The patterns of fish distribution within Guatemala are perhaps the least documented segment of the fishing industry. Because of the multitude of small entrepreneurs involved in the transport of fish domestically, it is extremely difficult to make a definitive analysis. The surplus of production can only become of value when it is transferred to areas of demand. This movement in Guatemala has thus far originated chiefly in the small-scale secondary and tertiary producing areas. However, the primary production centers, as described in the chapters on production, are playing an increasingly important role in supplying the domestic market.

Pacific Coast

The most prolific production zone in the republic should presumably generate the heaviest domestic traffic

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[3] U.S., Department of Interior, op. cit., Market News Leaflet 74, (1962), p. 9.

in fish, and such is indeed the case. Distribution from the Pacific zone covers most of the heavily populated areas of the country. The large-scale operations at Champerico and Iztapa are again in a class by themselves.

Champerico

The COPESGUA plant at Champerico has distributed an increasing volume of fish to the national market, as illustrated in Table 10.

Table 10.--Domestic distribution of seafood from COPESGUA, 1961-1965 (pounds).

Seafood Type	1961	1962	1963	1964	1965
Shrimp	12,012	250,039	195,176	357,362	312,033
Fish	31,585	137,384	237,128	393,119	488,004
Lobster	-	16,776	16,428	13,436	6,483
Squid	-	1,365	7,973	12,650	-
TOTAL	43,597	405,564	456,705	776,567	806,520

Source: COPESGUA, Guatemala City.

The associated distributor for COPESGUA within Guatemala is Productios Fresquitos, formerly SILSA. One truck with cooler tanks makes two trips weekly from Champerico to Guatemala City. These deliveries have averaged 7,000 to 8,000 pounds of shrimp and fish per week, with fish predominant by weight. The seafood is taken to a

central storage building on the southwestern outskirts of Guatemala City, where it is placed in cold storage while awaiting further distribution. The fish, most of it croaker, is distributed in a deheaded form or packaged as filets. Approximately sixty percent is sold as it is brought in, while the remainder is processed into filets. Of the sixteen employees, five are women who filet the fish and package them in clear plastic bags. Distribution from Fresquitos is chiefly within the city, although small quantities of seafood are also sent to Escuintla and Antigua. Three panel trucks are used to supply approximately forty-five major outlets in the city, chiefly restaurants, hotels, and supermarkets.

The movement of seafood from Champerico includes small quantities of fish not marketed directly by the COPESGUA organization. One retailer in Champerico has been given exclusive rights of marketing COPESGUA-caught seafood on the coast, but his business is in small quantities during most of the year. Only during Holy Week does he do a truly significant business.

Much of western Guatemala receives small shipments of fish from the general area of Champerico. The fish are caught in brackish waters paralleling the coast and are brought to the Champerico highway for distribution. Thus, fish may originate in Manchón, El Chico, Acapán, or Ixtán, yet be considered a product of Champerico by the ultimate

buyer. Much of this catch from tertiary production centers is sent via the paved highway to Quezaltenango, with some sales en route at Retalhuleu and Mazatenango. Most of Retalhuleu, Suchitepéquez, and Quezaltenango departments are included in this supply area.

Iztapa

An internal pattern of distribution had not yet evolved for the new operation at Iztapa by the time of investigation. The entire fish catch was made available at the plant to individual buyers, so no further distributive function was carried out by the Mariscos organization. Initial contacts had been made with several fish stores in Guatemala City, but distribution plans were to remain flexible until regular outlets could be established.

Secondary and Tertiary Centers

The process of distribution from small-scale centers is quite uniform throughout most of the republic. Fishermen seldom engage in the transport of fish beyond the fishing village itself. If buyers are present the transfer may take place directly from the boat. Otherwise, some storage procedure is necessary. If the fish are to be sold fresh, they may be stored in hileras, or coolers, up to four days before being sold to the distributor. If the catch is salted and dried, preservation is extended indefinitely and the need for a ready buyer is decreased. The

important point is that the initial buyer generally goes to the source of production. He may live in the fishing village itself or may travel some distance to reach the source of production. If the buyer lives in the area he is commonly a relatively well-to-do person and has some ready means of transport at his disposal. In these cases, fish are often collected from the surrounding area to assure a full load to the interior. Buyers from the outside are usually persons of lesser wealth. These individuals arrive at the production sites by means of local transportation and purchase from regular suppliers. This arrangement has often been developed over a period of time, during which mutual confidence has been established, and has been continued as a matter of custom.

Small-scale deliveries are accomplished with little ceremony. Fresh fish are packed into wicker baskets or metal tubs, most of which have a capacity of from seventy-five to 100 pounds. Banana leaves or plastic sheets may be placed at the bottom, and the fish are then packed in layers with chopped ice scattered throughout. The fish are roughly sorted by class, but there is little concern for quality control. The use of ice is generally so conservative that even a short trip in the hot sun may convert the ice to a luke-warm puddle of water by the journey's end.

Prices paid at the source average ten cents per pound for second-class and fifteen cents for first-class

fish. The catch from the brackish areas along the Pacific Coast seems predominantly second-class varieties, so in certain areas any fish weighing over one pound each gains the first-class price. Prices generally rise five cents per pound during the high demand period of Holy Week.

Dried fish receive even less careful handling than the readily perishable fresh fish. Piles of grayish, rather unsavory looking and ill-smelling fish are tied and then wrapped with leaves or a large cloth. The quantities transported per load may range up to several hundred pounds, but loads of fifty to one hundred pounds are more common. One hundredweight of fish brings no more than $15 during most of the year, but the price soars to $30 for second-class varieties and $60 for first-class fish during the Holy Week marketing period.

Another phenomenon peculiar to the Lenten season is a migration of residents from highland communities to the coast to catch fish to supplement both diet and income. The extent of this practice is not known but is assumed to be small. Documentation is limited to one source, and to one town northwest of Quezaltenango. "Many of the inhabitants of Cajolá travel to the Pacific Coast during the closing weeks of March and the first few weeks of April to obtain fish, which are dried on the coast and transported back to the highlands and sold in the market."[4]

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[4]John G. Hehr, Charcoal: Its Multifarious Effect in a Rural Guatemalan Community, thesis, Western Michigan University (1967), p. 56.

Transportation efficiency from the producing sites is quite disparate. Normal modes are by bus, open-bed truck and private vehicles, while in some areas horses and bicycles may be used. The bus is the most common carrier, with fresh or dried fish piled on top and transported for a small fee. Long-distance bus lines may have regulations prohibiting the transport of fish in any form because of the objectionable odor. This in itself suggests a lack of freshness at the beginning of the journey. Open trucks may operate on indefinite schedules, yet provide an alternative outlet for areas that cannot support adequate bus service. Transportation by horse is significant in isolated areas during the rainy season. Trade with such areas may be limited entirely to this slow method of transport during two to six months of the year. Bicycles are used in the fish trade only where substantial populations are located adjacent to producing zones and within urbanized areas. This condition exists primarily on the Pacific Coast only where cotton fincas use a seasonal labor force which provides a nearby market for fish during part of the year.

A rough pattern of marketing from the Pacific Coast can be sketched as follows: 1) the coastal zones where fish are readily available, 2) a gap in distribution between the immediate coast and the piedmont, 3) a string of market towns on the piedmont along the Pacific Coastal Highway, and 4) the larger population centers of the highlands.

Along the coast itself there is very little lateral movement of marine produce. Villages fronting the ocean are generally self-sufficient in seafoods. Thus, except for a minor flow to collecting points along the shore, the distribution pattern is at right angles to the coast, following the dominant road pattern.

Distribution from the coast is chiefly to major centers of population. Most cities in Guatemala are located in the interior of the country, leaving a population gap in the lower coastal plain. Thus, the volume of fish distributed does not increase gradually in relation to distance from the coast but abruptly in relation to urban population densities, both on the piedmont and in the highlands.

The destination of most fish and seafood for the domestic market is Guatemala City. The capital also serves as a redistribution point for much of the highland area, and particularly so for dried fish products. For example, much of the dried fish arriving in Quezaltenango has been shipped via Guatemala City. Likewise, smaller quantities are bought in the Quezaltenango market for redistribution to local markets in the western highlands. Fresh fish, on the other hand, are generally shipped directly to individual markets. This trade is in small quantities to meet the immediate demand of the smaller urban centers.

Ocós-Tilapa.--This site is somewhat of an anomaly among the fishing villages, since Ocós is served by both road and railroad. As previously noted, only the railroad provides a year-round connection with the interior. During the dry summer period fish are shipped three times per week by bus, chiefly to Coatepeque, San Pedro Sacatepéquez, and Quezaltenango, and occasionally to Guatemala City. Although the road is in poor condition a shipment reaches Coatepeque in 1-1/2 hours, whereas the same trip requires about three hours by train. When the road is impassable because of winter rains, the thrice weekly train is used to transport the bundled fish. Thus, by one means or the other, fish are sent out at least three times weekly throughout the year.

Within Ocós itself fishermen sell their catch to owners of hileras, or coolers, who in turn sell to buyers from other communities or handle the subsequent distribution themselves. If the distribution from Ocós is attempted by the six or seven hilera owners themselves, outside marketing contacts must be maintained. Therefore, the majority prefer to deal with buyers arriving from the outside. In addition to the trade in fresh fish, a thriving business is done in smoked fish (including garfish) during the Holy Week period.

The trade area of Ocós includes much of southwestern Guatemala. Fresh fish from Ocós are directed first to Tecún

Umán, where approximately 100 pounds are marketed weekly. The bulk of the catch, however, continues by rail or highway to Coatepeque or Malacatán. From these larger centers limited quantities may be redistributed to highland communities. The smoked fish attain a wider distribution. These "delicacies" are especially conspicuous in the markets of Quezaltenango and environs.

Tulate.--A good all-weather road connects Tulate with La Máquina agricultural colony and the Pacific Coastal Highway farther inland. At least five scheduled buses leave Tulate daily, assuring adequate transportation facilities. Three regular buyers use the bus lines to transport fish, chiefly to Tiquisate and Mazatenango. In addition, fish are distributed to La Máquina on bicycles by at least five enterprising individuals. The bicyclists haul an average of fifty pounds per trip and sell on a house-to-house basis. One female seller delivers small quantities to the agricultural colony but takes larger amounts, one hundred pounds or more, to the Mazatenango market. This practice of delivering larger-than-normal quantities longer distances to more attractive markets is commonly encountered along the seaboard.

Paredón.--The village of Paredón has a seasonal road connection with Sipacate and a year-round water route to San José. Considerable quantities of fish are distributed to cotton farms by a pick-up truck when the harvest is in

progress. At that time 300 to 400 pounds may be sold weekly. During most of the year, however, the road is little used and the more important distribution route is the Chiquimulilla Canal. At least two distributors make weekly trips east on the canal by motorized launch to San José, with several hundred pounds of fish on each voyage. There the fish are sold for distribution to the nearby regional markets and Guatemala City.

San José.--The port of San José serves as a collection and distribution center for a significant segment of the Chiquimulilla Canal. Fish are collected from the west as far as Paredón, and from the east to Iztapa. In San José a small unloading zone with an adjacent covered market serves as the collecting point for fish and other produce to be sent to the interior. Regular buyers await the loads of incoming fish, most of which come from Paredón. Several semi-permanent hileras are stationed in the market area and are kept stocked with ice. The three or four major buyers take their fish to the Guatemala City market and can afford to be selective when purchasing. Snook, snapper and shrimp are preferred, and the second-class fish are often left for the smaller distributors. Three to four hundred pounds of fish and fifty to 100 pounds of shrimp are transported in ice on a weekly or bi-weekly basis by each "volume" buyer. Once in the capital city, the fish are resold to established vendors in the market place. Thus, several middlemen are

involved and the prices reflect it! In the city markets the price per pound is at least ten cents higher than that at the point of production.

Hawai.--Fish from the attractive little village of Hawai, on the Chiquimulilla Canal, are taken regularly by the canal route to the collection point, La Avellana. Motorized launches from the village transport fish and other produce such as coconuts, to the outside three times a week. An average of 500 to 600 pounds of fish is transported weekly by the one launch operating on a regular schedule. Several others haul fish periodically but without fixed schedules. The fish are iced before the half-hour trip, and upon arrival some additional ice may be added. Buses leave La Avellana three times daily and transport most of the production to Guatemala City, with stops en route at Taxisco and Escuintla. The launches, meanwhile, return to Hawai with 600 to 800 pounds of ice and various consumer goods for the community.

El Ahumado.--The small canal village of El Ahumado has problems of distribution that are typical of those in many other tertiary centers. Intermittent fishing is done throughout the year, but the major activity is concentrated prior to the Lenten season when nearly all of the catch is shipped to the Guatemala City market. During this peak season 500 to 600 pounds of fish are transported weekly, and the local distributor must compete in the cut-throat

city market for his sales. Another problem is that of obtaining sufficient ice for the catch, with the result that approximately forty percent of the annual fish catch must be salted and dried. The development of markets in nearby urban centers would help to solve both the marketing and preservation problems, but lower prices must also be established through more efficient operation.

Garita Chapina.--The village of Garita Chapina is located in an isolated coastal area east of the Chiquimulilla Canal and maintains closer commercial ties with El Salvador than with Guatemala. No all-weather road reaches the ocean at this point, and therefore local produce is carried along the beach into El Salvador. Fish caught in the small interior lakes of the region, as well as from the brackish lagoons near-by, also follow this pattern. Established trade routes lead especially to Sonsonate, El Salvador, which offers a nearer and more profitable market than do the closest Guatemalan cities. This trade, however, is entirely in smoked or sun-dried fish, since the journey is slow and destructive of fish quality.

The Caribbean Coast

The distribution pattern of the Caribbean fisheries focuses upon two trade routes. One of these, composed of the railroad and the paved Atlantic Highway, connects Guatemala City with Puerto Barrios and carries most of the

commercial fish produced in the zone. The other originates at El Estor, on the northwest shore of Lake Izabal, and also leads to Guatemala City.

Livingston

The regularity and quality of seafood distribution from Livingston surpasses all but that from the two primary centers on the Pacific Coast. Preservation of fresh fish is greatly facilitated by the availability of block ice, which is made in the town. Even with this advantage, however, the catch must still be transported shortly after it is caught, irrespective of prevailing market conditions for fresh fish. The significance of the lack of freezing facilities in relation to the distribution and marketing phases can hardly be exaggerated.

Distribution has been influenced considerably by the formation of a fishing cooperative at Livingston. The twenty fishermen involved in the organization act collectively to distribute their catch. Under present marketing conditions, only the first-class species are selected for crating and shipment to Puerto Barrios, and an average of four or five crates, each containing 150 to 200 pounds of snook and snapper, are transported weekly by the co-op. Once at Puerto Barrios, after a boat trip of 1-1/4 hours, the crates are transferred to railway cars for the trip to Guatemala City. Fish that arrive at the port in the early

morning hours are normally received in Guatemala City the same evening or at the latest the following morning. Thus, the fish have generally been in ice for 1-1/2 days before being sold or frozen. Finding an outlet in Guatemala City was the main obstacle for the cooperative at the beginning of its operations, but now the COPESGUA-Mariscos Fresquitos distribution agency absorbs all the first-class fish that can be supplied. Fish from Livingston currently provide two to five percent of the fish distributed by this firm to the Guatemala City market.

Aside from the cooperative's activities, five or six individual buyers purchase directly from Livingston fishermen and transport the fish themselves. Their sales are oriented toward the Puerto Barrios hotel trade and extend to the United Fruit Company operations in Bananera. These distributors naturally oppose the cooperative, and this situation has lead to minor price wars. "Normal" prices for first-class fish range from thirteen to fifteen cents per pound on site, but immediately rise by at least ten cents per pound when the fish reach Puerto Barrios.

Dried fish are greatly exceeded by fresh varieties in volume of shipment from Livingston, yet the trade is not insignificant. The dried fish are distributed widely along the main highway to Guatemala City, and a major part is destined for the city market itself. From the central market in the capital, Livingston fish may be redistributed in small quantities throughout the republic.

Puerto Barrios

Puerto Barrios serves as the center from which most of the Caribbean fish catch is distributed. Highway and railroad lines connect this seaport with interior population centers, and the truck and train provide the dominant modes of transportation for shipments of fish. On short trips local buses may also serve as carriers, but for long trips, such as to Guatemala City, the distance and heat combine to make the odor of fish objectionable to passengers. Therefore, most bus companies prohibit the transportation of either fresh or dried fish. In so doing they considerably limit the potential number of seafood buyers and distributors since buses are the most convenient and quickest means of delivery. Most large consignments are packed on the train and arrive in the capital city after a twelve to fourteen hour journey.

Practically the entire harvest of fresh, first-class fish is sent directly to the Guatemala City market, where prices are favorable enough to pay for the transportation and still allow a good profit. Intra-departmental trade on the other hand is limited chiefly to small transactions in second-class fish. Dried varieties receive a wide distribution because of their relative imperishability and ease of transportation, but also are primarily directed toward Guatemala City. There they may be redistributed, in part, to the various regional centers.

A semi-isolated segment of the lower Río Motagua lies slightly south of Puerto Barrios. Here, the extensive range of marketing dried fish is perhaps best illustrated. A buyer-distributor from Quezaltenango, among others, journeys to the mouth of the Motagua twice a month and carries away an average of 3,000 pounds of dried fish on each trip. These fish, chiefly catfish, are transshipped at least ten times before arriving in Quezaltenango. There, about half of the cargo is left to be sold in the central market, while the remainder is transported to markets in small towns of the surrounding area.

Mariscos

The village of Mariscos is one of two collecting and shipping points for Lake Izabal fish. Fishermen of nearby lakeshore communities usually dry their small surpluses and transport them in dugout canoes to Mariscos whenever the quantity warrants a journey. Fresh fish seldom enter into this trade, since it is only when over one hundred pounds are accumulated that it is profitable to transport the fish any distance. Thus, the producing sites must have access to good fishing grounds and a supply of ice if fresh fish are to be sold. Only two villages qualify in this regard, Mariscos itself and San Felipe. Even in San Felipe more fish are salted and dried than are shipped fresh, but at least one buyer is attempting to distribute

a fresh product from the zone. Ice is transported from Mariscos to stock a cooler in San Felipe, but problems arise in keeping sufficient ice and in gathering adequate volumes of first-class fish. Both the fresh and dried catch are carried by motorized launch across the lake to Mariscos on a weekly basis, but this procedure will probably soon change with the completion of a direct highway connection to San Felipe from the existing Atlantic Highway near Morales.

An unpaved road of poor quality connects Mariscos with the Atlantic Highway. Three daily buses are scheduled, and a private pick-up truck is also used to transport the fish from Mariscos on this route. Local distributors, as well as buyers from Morales and Bananera, serve the immediate area along the highway but only occasionally visit the Guatemala City market.

El Estor

Unlike the situation at Mariscos, the fish transported from El Estor are caught chiefly within a limited distance of the town. One buyer accumulates most of the first-class fish and transports this catch personally to the Guatemala City market, where it is distributed among various sellers. Reportedly, he makes the trip once or twice weekly, with 1,000 to 2,000 pounds of fish on each trip. A pick-up truck is used for the day-long drive to

Guatemala City and the fish are packed in ice to withstand the trip. Formerly, the Cobán market was also served with about one hundred pounds of fish weekly, but this minor trade has been discontinued. Some local trade in fish is carried by buses leaving El Estor twice daily, but any significant movement is limited to the high demand period surrounding Holy Week.

Inland Lakes

Fish from interior lakes reach a surprisingly extensive area. However, this movement is usually in small quantities to markets of limited local or regional importance. The only lakes from which fish are distributed to Guatemala City are Izabal, Atitlán, and Amatitlán. Lakes Atescatempa and Güija are the other fresh-water lakes serving extensive market areas. First-class fish species are found only in Lake Izabal, for which the distribution patterns have been discussed above, while small Central American and introduced species are found in the other lakes. The latter fish are distinctive in appearance and therefore relatively easy to trace in the market place. The distribution patterns from the various lakes are not complex, but their extent and importance do vary considerably.

Lake Atitlán

Distribution patterns from Lake Atitlán are still in a state of flux. Established trade routes of ten years

ago have been severely disrupted with the decline of the native fish population, as discussed in Chapter 3. Formerly extensive distribution of a tiny dried fish, pepesca, has been replaced by a less widespread and smaller trade in fresh fish. Though in limited quantities, fish from this lake reach the large Guatemala City and Quezaltenango markets and are even found in a few Pacific piedmont towns.

Only two of the lake-shore villages, Santiago Atitlán and Santa Catarina Palopó, are major producers of fish, and only Santiago Atitlán supplies the distant markets. From Santa Catarina, fish are transported by boat or road to Panajachel. There, they may be distributed on a house-to-house basis or may be shipped about five miles to the Sololá market. Every three or four days fishermen at Santiago Atitlán pool the fresh catch that is not sold in the local market place, pack it in ice, and send it by bus or truck to Guatemala City and intermediate points. Three distribution routes may be used: 1) by water to Panajachel on the northern lake-shore, from which point buses carry the fish to Quezaltenango and Guatemala City, 2) by road, skirting the southern and eastern shores of the lake until meeting the paved highway to Guatemala City, or 3) by a seasonal road leading south and joining the Pacific Coastal Highway at San Antonio Suchitepéquez. The trip entirely by road to Guatemala City is the one favored in terms of volume carried to market.

Lake Amatitlán

Fish distribution from Lake Amatitlán occurs in small lots but reaches an extensive and populous area. Since fishing is done with hook and line, individual buyer-distributors must collect the fresh catch of at least several fishermen in order to make a profitable trip. A good transportation network surrounds the lake, so distribution to Escuintla, Guatemala City, and Antigua, the largest consuming sites, is easily achieved. As is true from the larger lakes, more fresh than dried fish are distributed, although small amounts of the latter are also involved.

Lake Atescatempa

The area supplied from Lake Atescatempa includes much of the eastern highlands. Distribution follows the Inter-American Highway west from the Salvadorian border to Jutiapa and branches north from there to Jalapa. To the east some fish enter El Salvador and probably reach at least to Santa Ana. Fishermen also line the highway skirting the lake and sell to individual motorists going in either direction. All of this distribution is in very small quantities, probably not exceeding thirty to forty pounds per distributor for any one shipment. Strings of fish are often sent by bus to nearby markets without any cooling or icing, since transportation is so rapid and readily available.

Thus, most of the fish are shipped fresh, although small amounts are dried for later sale.

Lake Güija

Fish from Lake Güija sell in competition with those of Atescatempa in the east-central department of Jutiapa but are also distributed to parts of Jalapa and Chiquimula departments where other fish seldom reach. Transportation to the west is by a seasonal road leading to the Inter-American Highway. Thus, during the rainy season the horse is the principal carrier. Transportation north by the Guatemalan-Salvadorian railroad is year-round, and fish are hauled as far as Chiquimula. Chiquimula and Ipala are the leading markets of the area, and here the fresh fish distribution terminates. Dried varieties are transshipped to many of the smaller regional markets by bus.

The Distribution Pattern

Distribution patterns for seafood have a two-fold division, the export trade and that directed to the domestic market. Shrimp from the commercial fishing ports of Champerico and Iztapa are destined chiefly for the United States. The shrimp are carefully packaged and frozen, then transported by refrigerated trailer truck to Matías de Gálvez on the Caribbean or shipped directly from the Pacific roadsteads. About eighty-five percent of the shrimp caught, plus most of the lobster and squid, are exported.

Domestic distribution is generally on a smaller scale, with much less concern for quality. Exceptions to this rule are again the commercial firms at Champerico and Iztapa, which package some shrimp and freeze their entire secondary fish catch for the Guatemala City market. The other fishing villages sell their entire surplus domestically. The Pacific coast supplies perhaps three-fourths of the total domestic trade, while the remaining one-fourth is divided between the Caribbean coastal fisheries and those on the inland lakes.

The domestic trade involves both fresh and dried fish. Distribution of fresh fish is limited mainly to those villages with rapid and reliable means of transportation. The fresh product is usually distributed in small quantities, except that destined for the Guatemala City market, which generally receives shipments exceeding 100 pounds. The distribution of fresh fish is increasing relative to dried varieties as transportation and storage facilities improve. Dried fish are sold throughout the country. Even the most remote village is likely to receive small amounts of dried sardines, because of their relative imperishability and lack of bulk. Much of the dried fish is shipped to the Guatemala City market, or to other large regional centers, and is then transshipped throughout the republic.

The catch is shipped by individual distributors on the available public transportation. Buses are the most

common carrier, but are seldom used for long-distance hauls in the warm coastal areas because of the odor. The trade is oriented toward municipal markets for the most part, and the largest population centers attract the greatest volume.

CHAPTER V

MARKETING AND CONSUMPTION

The marketing and consumption phases of Guatemalan fisheries provide the closest links to the family dinner table. It has been noted that relatively small amounts of seafood actually enter the domestic trade, and some of the factors bearing upon this situation have been discussed in the previous chapters. Bottlenecks restricting the industry are also found in the market place, however, and in consumer buying patterns. A circular relationship between production and consumption is often cited to partially "explain" low levels of trade in seafood. The exploitation of any resource is directly related to the demand for that product. With a low level of demand, the immediate incentive for increased production is lacking. A limited seafood market leads to restricted capital investment in fishing equipment, and these factors result in an underdeveloped fishing industry. Potential consumers thus remain unaware of the product or are unable to afford its purchase.

This "vicious circle" is being breached in Guatemala largely as a result of the foreign demand for shrimp. Commercial seafood exploitation centered initially upon shrimp

for numerous reasons, the most important of which were attractive prices and a ready world market. H. R. Padgett has listed a number of additional factors which emphasize the appeal of shrimping to a developing nation: 1) the mass capture of shrimp is relatively easy, 2) the edible part of the shrimp is large in relation to total weight, 3) only a low level of processing is required, and mechanical equipment is available and simple, 4) the marketing of shrimp is possible in canned, frozen, or fresh forms, and 5) shrimp reach commercial size the same year they are spawned.[1] As a high-value product, shrimp has been produced in Guatemala primarily for export, but spin-off effects from this industry are also greatly influencing the domestic scene.

The Export Market

Guatemala depends almost exclusively upon the United States as the external market for shrimp. Demand for this crustacean has increased steadily in the stateside market. In the last three decades consumption has quintupled, growing from 60,240,000 pounds in 1931 to 317,588,000 pounds in 1963. The United States imported only 1.8 percent of its needs in 1931, but this figure had risen to 52.8 percent by

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[1] H. R. Padgett, "The Sea Fisheries of the Southern United States," The Geographical Review, Vol. 53, No. 1 (1963), p. 36.

1963.[2] The Guatemalan share of these imports averaged about one percent of the total during the four-year period 1963-1966. Thus, little leverage for higher prices can be exerted from Guatemala, but any increased production could be easily marketed.

Shrimp from Guatemalan waters command good prices in the United States market. Pricing is based upon wholesale buying figures of dealers in the New York metropolitan area, and quotations are published and distributed weekly in the so-called "Green Sheet." Specific entries for shrimp from Guatemala are included in the sheet and are listed by type and size. Prices vary slightly according to the season. A sample quotation from the listing indicates something of the value of the exports.

Table 11.--Frozen shrimp buying prices of wholesale dealers in the New York market, June 14, 1967.

Shrimp Type	Size (No. per Pound)	Price (Per Pound)
White	under 10	$1.50
White	under 15	1.37
White	21 to 25	1.25
Brown	under 15	1.35
Brown	21 to 25	1.23
Brown	31 to 35	1.00

Source: Daily Market News Service, Fishery Products Report, June 14, 1967.

[2]Costa Rica, Banco Central De Costa Rica, Programa pesquero: primera parte, (Costa Rica: 1965), (Appendix), Table 8.

It should be noted that prices are in relation to size, the larger shrimp commanding a more favorable price. White shrimp are the preferred type and are also generally larger than the others. Quoted prices may vary slightly from the list price, according to port of entry.

Exporting procedures are similar for both the Guatemalan exporters, COPESGUA and Mariscos de Guatemala. At least two marketing arrangements are open to these firms: 1) shrimp may be shipped at the company's expense to a United States port, where all unspoiled shrimp receive the list price at the time of delivery, or 2) the shrimp can be purchased by a U.S. buyer at the Guatemalan port. The shrimp price there is less than that quoted in the Green Sheet, but the buyer is then responsible for transportation charges. Frozen shrimp are shipped chiefly by "fishy-back" ferry from Matías de Gálvez to Miami. From this point the marketing is in the hands of United States wholesalers.

The Domestic Market

Marketing and consumption of seafood within Guatemala can be described as weak but developing. Low levels of consumption, under one pound per capita annually, are especially serious. Illustrative of this point are the dietary habits of the Guatemalan Indians: "The average Indian workingman eats two pounds of corn daily in the form of tortillas, tamales, and atole (gruel). By weight, corn

constitutes about 75 to 85 percent of his diet; the remainder consists of beans, sugar, chili peppers, coffee, salt, a few garden vegetables, wild herbs, and occasionally a little meat."[3] It is likely that some fish enter the diet, if only during Holy Week. Despite the over-all pattern of underdevelopment, an expanding use of seafood seems to be taking place. Familiarity with fresh fish is increasing, while the wide-spread sale of dried fish varieties assures a steady, if small-quantity, market. In addition to the consumption of domestic seafood, canned and dried fish have been traditional imports. These products attain greatest use during the Lenten season.

Protein consumption has been chiefly a matter of individual preference or habit, as determined by purchasing power and tradition. The influence of government planning has not yet been effective in increasing the availability and use of fish protein. Indeed, to "plan" diet improvement on a national scale is extremely difficult.

> It has become abundantly clear that it is extremely difficult to change fixed food habits. Market research and feasibility studies must give proper attention both to family income and to existing habits and taboos. It has been demonstrated that dietary customs can be changed. . . . but success in any such undertaking requires time and a carefully prepared program of consumer education. In summary, any program to remedy malnutrition which involves changing traditional

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[3] E. C. Higbee, "The Agricultural Regions of Guatemala," The Geographical Review, Vol. 37, No. 2 (1947), p. 181.

> food habits is highly likely to be ineffective in the short-run and even a long range plan must be carefully programmed for the specific local situation.[4]

Seafood under present conditions is, without doubt, low on the list of food preferences in Guatemala. Knowledge of the relationship between income and food habits that determines this status would be useful in the planning process. However, the variables are many and complex. Negative habits revolve chiefly around the obvious unfamiliarity with, and distrust of, fresh seafood. It is a conclusion of this study, however, that considerable increase in fish consumption could be obtained by lowering retail prices. This would be the most direct way to confront the negative consumption pattern, although this approach alone might not provide a panacea.

Some agreement with the monetary approach to increasing consumption is found in the literature: "They seem to eat fish . . . the small and salted ones . . . . The need is to reduce costs, so that ten to twenty cents can provide enough for a family."[5] "The use of fish in quantity probably depends partly on taste, but chiefly on wealth."[6] An even more specific corroborative statement

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[4]U.S., President's Science Advisory Committee, The World Food Problem-Volume I, (Washington, D. C.: Government Printing Office, 1967), p. 17.

[5]Lin, op. cit., (1963), p. 32.

[6]Sol Tax, Penny Capitalism, A Guatemalan Indian Economy, Smithsonian Institution, Institution of Social Anthropology, Publication No. 16, (Washington, D.C.: Government Printing Office, 1953), p. 172.

concerns the Salvadorian fisheries: "It is the better endowed economic classes and the fishermen who account for most of the consumption of fisheries products. Other groups, chiefly urban, regard fish and crustaceans as luxuries; ordering or serving them mainly during religious and other festive occasions."[7]

A Venezuelan example illustrates what may be done to influence dietary habits:

> When the first of the present dairy organizations attempted to sell cartons of pasteurized milk in Caracas, they found few buyers. Milk was not among the major items in the Venezuelan diet. Again foreign influences, for the most part, brought rapid change. The companies proceeded to give away their entire production for a few weeks, and the consumption of milk increased enormously. Today, in any of the larger urban communities of Venezuela, fresh milk is one of the most widely consumed food items.[8]

The domestic retailing of seafood occurs chiefly in public markets. Of 117 towns with urban populations exceeding 2,000 people (1964 Census), ninety-four were observed personally, while secondary sources provided information on other communities (See Appendix B). General patterns of marketing and consumption of fish thus became apparent. It is not surprising that large urban agglomerations generate the most sales, while small towns draw only an occasional traveling merchant.

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[7]Thompson, op. cit., p. 437.

[8]Minkel, Clarence W., The Industrial Development of the Basin of Valencia, Venezuela, Dissertation (Syracuse University: May, 1960), pp. 166-167.

Guatemala City

Guatemala City's 577,100 inhabitants comprise less than 15 percent of the total population of Guatemala, but consume thirty to forty percent of the domestically distributed fish catch. This dominance is quite recent and reflects the improved accessibility to both coasts attained since World War II. A high proportion of the fresh or frozen fish are retailed in the city, while dried fish sales may be greater outside of the capital. The predominance of fresh fish is due, in part, to availability of modern storage facilities, plus a more "sophisticated" consumer in the big city.

The system for marketing seafood has grown with the city. Municipal open markets continue to provide the food needs of most city dwellers, but establishment of additional sources, such as supermarkets and seafood stores, has broadened the sales base.

The Municipal Markets

The greatest volume of seafood sales in Guatemala City occurs in the municipal markets. These open markets have traditionally provided the widest selection of consumer goods at the lowest prices, and this remains essentially the case today. Fisheries products are a small part of the total sales of merchandise, yet it is here that most consumers come in contact with this food.

Guatemala City has fourteen municipal markets. The service area for each of these varies considerably, ranging from small neighborhoods to essentially the entire city. Likewise, the demand for individual commodities in different markets has a wide variance. Two or three markets have by far the greatest volume of fish sales, while the remaining centers have little or none. The major markets for seafood, as well as in total sales, are the Central and Terminal Markets. These two mercados also best exemplify a specialization in source of fish supply. The majority of Caribbean fish are distributed from the Central Market, while the chief outlet for Pacific and fresh-water species is the Terminal Market. Each market seems to have one chief supply area, although numerous minor production sites may be represented. This distribution pattern appears to be the result of a slow evolution. Distributors from particular production centers were able to stake out claims in market centers, and these connections have remained relatively stable.

The working relationship between distributor and retailer has also developed over considerable time. Many of the established retailers once participated as direct buyers and retailers, and some even began as fishermen, but eventually graduated to a fixed sales position in the capital. Most have been involved in the business for at least ten years, and thus their contacts have had time to mature.

These retailers seem to have a firm allegiance to their steady suppliers, who in turn attempt to maintain their regular outlets above all else. In this manner a mutual confidence is reached, although some of the ground rules might change with new competitive conditions. Not all sellers depend upon distributors, however, some retaining a dual role as distributor and retailer. The majority are small-volume operators who may bring in for sale a basket of twenty-five to fifty pounds of fish once or twice a week. Such operators are the most characteristic among fish vendors within the city and throughout the republic.

Retailing space for seafood within the markets is generally limited and the facilities rudimentary. Permanent stalls or simple cleared areas are rented to each retailer, and fees are assessed by the municipality according to the type and size of each "store." The fixed stalls are generally located in the meat section of the market, where they are greatly outnumbered by beef and pork stands. These stalls are in the preferred locations, however, and are generally rented on a monthly or annual basis by the established retailers. The occasional seller must be content with a moveable stand, or simply a place to squat and display his wares, for which he pays a correspondingly lower daily rental fee.

Little care is taken in the display and storage of the product. The fish and other seafoods are offered in

open baskets and may be partially covered with chopped ice. No mechanical refrigeration is used, but the larger dealers usually have a wooden cooler, or hilera, which is kept stocked with ice. Fish may be kept two or three days, which, when added to the distribution time, does little to preserve the quality. A customer may choose the entire fish or a smaller portion of his liking, filets and cross-sectional slices being the favored cuts. Snook and red snapper remain the preferred species, although a greater acceptance of new fish types is developing among the consumers. The fish is selected, after a check of the gills for relative freshness. It is then scaled with a wire brush, cut on a chopping block, and neatly wrapped in newspaper.

Present pricing is unfavorable for volume sales. The cheaper cuts of beef are directly competitive in most locations and have a greater consumer demand. Only the middle and upper classes can afford enough fish for a complete meal. Even so, most of them buy no more than one pound, which is perhaps used to season a soup. Fish heads are a popular and relatively cheap item for this purpose. Use of good quality fish as the basis for a meal is still relatively rare.

Table 12 indicates the estimated sales volumes within selected Guatemala City markets. The numbers and values present a very generalized picture, however, since they are based upon observations made only during a certain period of the year and during a certain time of the day.

Table 12.--Estimated fresh seafood sales in selected municipal markets of Guatemala City.

Market	Number of Retailers	Weekly Sales (Pounds)	Annual Sales (Pounds)	Source of Seafood
Central	6-10	500	25,000	Livingston Atitlán San José
Terminal	20-25	750	37,500	Iztapa Amatitlán Atitlán San José
Martí	6-10	150	7,500	Livingston Iztapa Amtitlán
Mercado #2	8-10	200	10,000	San José Livingston Ocós Atitlán
Mercado #3	4-6	100	5,000	Puerto Barrios San José
El Presidente	3-5	150	7,500	San José Atitlán
TOTAL	47-66	1,850	92,500	

Private Markets

Most seafood sold through retail outlets other than municipal markets in the city is supplied directly or indirectly by the two fishing concerns, COPESGUA and Mariscos de Guatemala. Only the former has its own distributing agency, Productos Fresquitos, while the latter depends upon individual buyer-distributors. The Coruñesa seafood store

is also a major retailer-distributor, but much of the seafood it sells is obtained from Productos Fresquitos. Supermarkets, stores, and restaurants are the chief recipients from these sources and, in turn, are major retailers in the city.

Productos Fresquitos.--The Productos Fresquitos company, a COPESGUA affiliate, obtains approximately 95 to 98 percent of its seafood from Champerico. Of the total, fish comprise seventy-five percent by weight, while the remainder is chiefly shrimp. The supply is received in a frozen state, for the most part, and may be redistributed immediately or placed in cold storage for sale during periods of low production or high demand.

Sales by this wholesale concern are made to retailers and others throughout the city. At least forty-five steady customers are served, including fish stores, supermarkets, restaurants, and hotels. An average monthly sale of 60,000 to 70,000 pounds of fish and shrimp has been reached, including both unprocessed and packaged goods. The packaged products are sold primarily to supermarkets and restaurants, while seafood stores often buy only the whole frozen fish. Daily deliveries are made from the storage site, since no direct retail outlet is associated with the operation.

Coruñesa.--The two retail outlets associated with Coruñesa have a slightly international source of supply. Seafood sold here is chiefly from the national Pacific

Coast fisheries, but perhaps ten percent by weight is trucked from La Unión, El Salvador. Importing fresh fish is apparently advantageous, because of considerably lower purchase prices in El Salvador. The Salvadorian product may be obtained for as little as five cents per pound, for example, as opposed to about sixteen cents in Guatemala. The owner of Coruñesa also imports small quantities of lobster from his cay off the coast of British Honduras.

Monthly sales total $7,000 to $9,000 on an average of 15,000 to 20,000 pounds of fish and 4,000 to 5,000 pounds of shrimp handled. Sales to individual consumers account for less than half of the total. Stores, restaurants, and various institutions make the bulk purchases. The owner, being of Spanish origin, has a natural advantage in selling to the eight to ten Spanish-owned restaurants in Guatemala City, yet these sales are small in comparison with those made to institutions such as the Casa de los Niños orphanage and the National Army.

Preservation and processing procedures are undertaken as part of the business. Each of the two Coruñesa outlets has several home freezers, while the main store boasts a cold storage room where considerable quantities may be preserved. Fresh fish are not only sold whole, but in a processed form. On major delivery days twenty people may be occupied in the back of the store preparing filets; ten women in a morning shift and ten military personnel in

the afternoon. Regular filets are sliced and bagged, small quantities of shrimp and filets are breaded, and some cebiche, or chopped seafood, is packaged for sale.

Table 13 illustrates the expensive nature of seafood. Beef prices at the same time ranged from about forty-five cents per pound for the cheaper cuts to eighty-five or ninety cents for the most expensive ones. The competitive position for fish, therefore, cannot be considered good.

Table 13.--Selected Coruñesa seafood prices, June 11, 1966.

Item	Price (Per Pound)	Item	Price (Per Pound)
Giant Shrimp	$1.10	Snook Steaks	$0.50
Medium Shrimp	0.75	Snook, Entire	0.45
"Extra" Filets	0.65	Squid	0.45
Coruñesa Filets	0.60	Sole	0.20
Small Shrimp	0.55	Croaker	0.20

The owner of Coruñesa has ambitious plans to expand his business. Two of the more promising are: 1) the operation of ten shrimp boats in Pacific waters once the proposed new fishing port has been constructed, and 2) development of a brackish-water area on the Pacific Coast for the cultivation of shrimp and shellfish. The latter proposal has been

submitted to the Inter-American Development Bank (IDB) for funding consideration. If established, the facility could provide a source of supply for seafood sales in all parts of the Central American Common Market.

Mariscos Frescos.--The only retail establishment that has customarily received all its fish and shrimp supplies from non-Guatemalan sources is Mariscos Frescos. Refrigerated trucks formerly delivered fish from El Triunfo, El Salvador, on a bi-weekly basis. At the time of investigation, no trips had been made for nearly five months, and the management was phasing out seafood sales in favor of a meat and sausage business. One minor exception was a fish sausage being produced experimentally with an eye toward exporting. Several factors might account for the desire to close out the sale of fish. These include increasing competition; decreasing profits, which may be related in part to more stringent import licenses; and a greater profit from the sale of beef products than from fish. All of these reasons were implied during the interview.

Estimates of previous sales indicated an annual volume of about 36,000 pounds of fish and shrimp. This total was entirely to the Guatemala City market and reached a seasonal peak during Holy Week, when 4,000 to 6,000 pounds were marketed.

Other Seafood Outlets.--Supermarkets and a variety of other stores serve as outlets for packaged shrimp and

fish, some entire frozen fish, and imported canned seafood. The filets prepared by Productos Fresquitos and Coruñesa can be found displayed in freezers just as similar products are in the United States. In Guatemala City, too, the attraction of quick preparation foods has reached the middle and upper classes. Such stores as supermarkets serve to acquaint a growing number of people with a clean, well-prepared and well-preserved food item. At the time of this study several of the larger stores were also participating in a publicity and market drive, backed by the Ministry of Agriculture, to sell ocean fish at fifteen cents per pound. Generally small and unfamiliar fish were involved, but at least it seemed to indicate some concern and appreciation for the problem of protein availability.

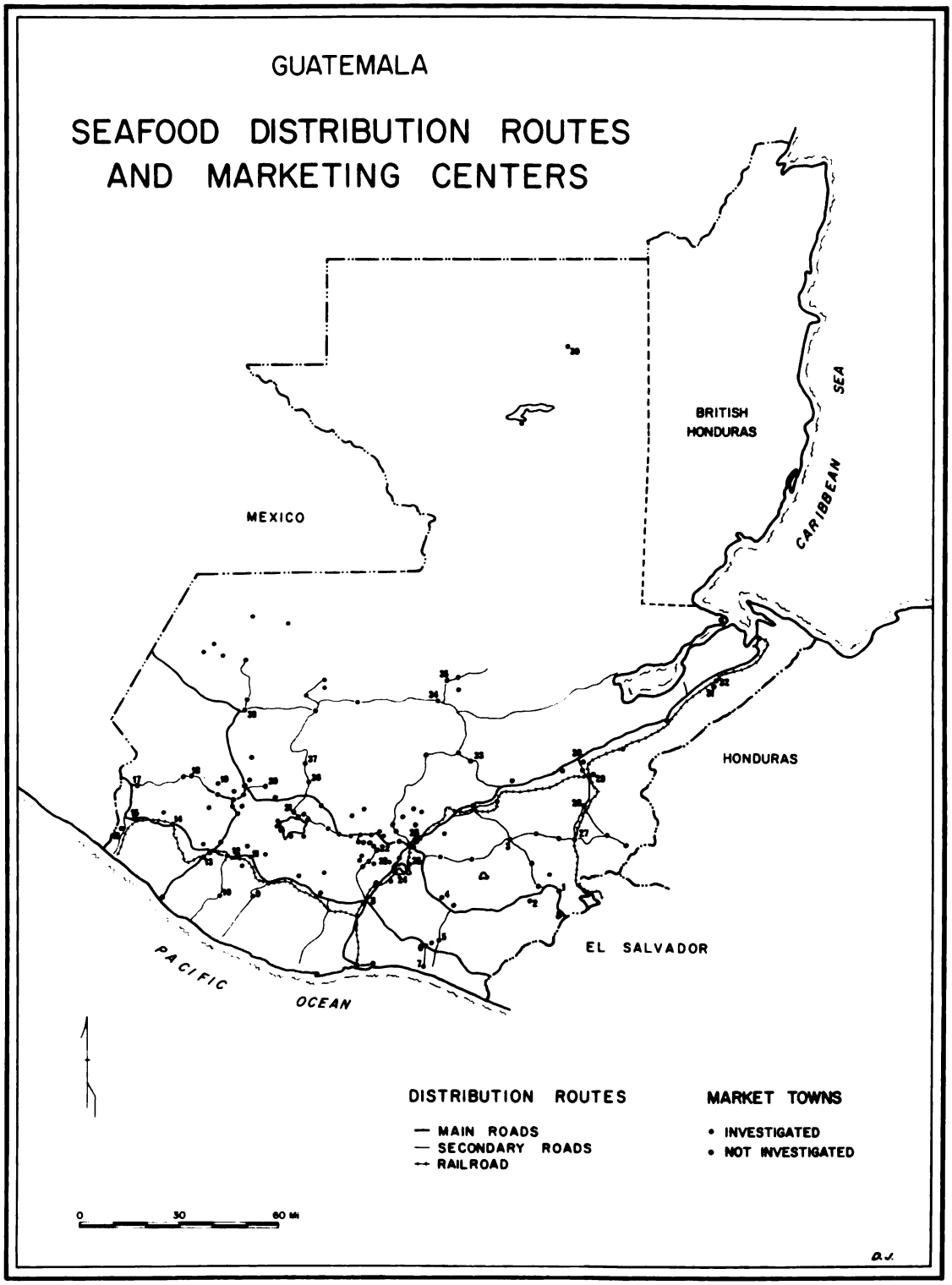
Even the smallest general store may carry some canned seafood. Since no fish canning operation exists in Guatemala, this seafood is imported from other parts of the world. Sales are very slow during much of the year, and the prices are high, but considerable turnover occurs during the Lenten season. It is this period that accounts for most of the consumption of imported seafoods.

Secondary Market Centers

Outside of Guatemala City the demand for fish drops abruptly. Since the Guatemalan market system centers upon the public market place, the volume of food items sold quite

naturally depends upon the population hinterland of each town and the effective demand of the people drawn to its market. In general, the larger the overall market the greater the food sales, and this is particularly the case for a marginal item like seafood. Thus, regional centers such as Quezaltenango, Escuintla, Mazatenango and Retalhuleu provide the major set of secondary outlets for fish. Since still smaller markets reflect few dissimilarities to the general pattern of the regional ones, they can also be included in the characterization of the secondary centers (Map 5 and Table 14).

The public market serves as the major sales point for fish throughout the country. Many variables combine to give each market place its own personality. It may be held in a special building, or may simply occupy the main plaza of the town. Thus, great variation exists in the facilities available to the individual vendor. Fixed stalls may be rented for periods of time in the larger markets, while the smaller ones are organized on the basis of available space and the first-come-first-served principle. Overflow from the plaza or market building may sprawl haphazardly through nearby streets of the town on particularly busy days. Another variable concerns the market day or days. Larger centers are able to support daily markets, but in such cases one or two days are generally more notable for their volume of sales. Smaller towns have only a weekly


GUATEMALA
SEAFOOD DISTRIBUTION ROUTES
AND MARKETING CENTERS
BRITISH HONDURAS
CARIBBEAN SEA
MEXICO
HONDURAS
EL SALVADOR
PACIFIC OCEAN
DISTRIBUTION ROUTES
— MAIN ROADS
— SECONDARY ROADS
-+- RAILROAD
MARKET TOWNS
• INVESTIGATED
• NOT INVESTIGATED
0 30 60 MI

MAP 5

Table 14.--Principal market towns of Guatemala and their 1964 populations.

Region--Department	*	Town	Population
Region I			
Jutiapa	2	Jutiapa	7,747
		El Progreso	2,991
		Santa Catarina Mita	3,011
	1	Asunción Mita	6,341
Jalapa	3	Jalapa	10,035
		San Luis Jilotepeque	5,795
		Monjas	2,857
		Mataquescuintla	2,709
Santa Rosa		Cuilapa	3,657
	4	Barberena	2,982
	5	Chiquimulilla	5,412
		Guazacapán	3,956
	7	La Avellana	**
Region II			
Escuintla	8	Escuintla	24,832
		Santa Lucía Cotzumal-guapa	9,104
	9	Tiquisate	10,348
		San José (Puerto)	5,771
		Palín	5,583
		San Vicente Pacaya	2,528
Region III			
Suchitepéquez	12	Mazatenango	19,506
		Cuyotenango	3,109
		Santo Domingo Suchitepéquez	2,147
		Samayac	3,771
	11	San Antonio Suchitepéquez	3,938
		Chicacao	2,727
		Patulul	3,632
		Río Bravo	2,242

Table 14 (Continued)

Region--Department	*	Town	Population
Region III (Continued)			
Retalhuleu	13	Retalhuleu	14,366
		San Sebastián	4,769
		San Felipe	2,916
		Champerico	3,823
		Nuevo San Carlos	4,0053
	10	La Máquina	**
Region IV			
San Marcos		San Marcos	5,569
	18	San Pedro Sacatepéquez	9,210
		Nuevo Progreso	2,479
	17	Malacatán	4,843
	16	Ayutla (Tecún Umán)	3,017
	15	Pajapita	1,728
Quezaltenango		Quezaltenango	45,195
		Salcajá	5,271
		Olintepeque	2,277
		Ostuncalco	5,244
		Almolonga	3,735
		Cantel	2,412
		Zunil	2,848
	14	Coatepeque	13,657
	19	Cajolá	749
Totonicapán	20	Totonicapán	7,292
		San Cristóbal Totonicapán	3,186
		San Francisco El Alto	1,992
		Momostenango	3,148
Sololá	21	Sololá	3,957
		Nahualá	1,369
		San Andrés Semetabaj	809
		Panajachel	2,932
		San Lucas Tolimán	3,810
		San Pedro La Laguna	3,663
		Santiago Atitlán	9,300

Table 14 (Continued)

Region--Department	*	Town	Population
Region V			
Chimaltenango		Chimaltenango	9,077
		San Martín Jilotepeque	2,806
		Comalapa	9,202
		Tecpán Guatemala	5,350
		Patzún	6,854
		Patzicía	6,223
		San Andrés Itzapa	5,243
		Parramos	2,199
		Zaragoza	3,338
Sacatepéquez	22	Antigua Guatemala	13,576
		Jocotenango	2,249
		Pastores	2,175
		Sumpango	6,110
		Santo Domingo Xenacoj	2,321
		Santiago Sacatepéquez	4,591
		Santa María de Jesus	5,735
		Ciudad Vieja	5,721
		San Miguel Dueñas	2,225
		Alotenango	4,718
		San Antonio Aguas Calientes	2,708
Guatemala		Guatemala City	572,937
		Santa Catarina Pinula	2,186
		San José Pinula	2,531
		Palencia	3,017
	26	Chinautla	2,471
		San Pedro Ayampuc	3,363
		Mixco	7,705
		San Pedro Sacatepéquez	3,894
		San Juan Sacatepéquez	5,362
		Chuarrancho	3,342
	24	Amatitlán	12,225
		Villa Nueva	6,062
	25	Villa Canales	3,544
		San Miguel Petapa	2,035
	23	Bárcenas	**
El Progreso		El Progreso	3,458
		San Agustin Acasaguastlán	3,113
		Sanarate	5,581

Table 14 (Continued)

Region--Department	*	Town	Population
Region VI			
Chiquimula	28	Chiquimula	14,760
		Esquipulas	5,508
		Quezaltepeque	2,578
	27	Ipala	3,190
Zacapa	29	Zacapa	11,173
		Estanzuela	2,897
		Gualán	4,425
		Teculután	1,723
	30	Chispán	**
Izabal		Puerto Barrios	22,242
		Livingston	3,026
	32	Morales	1,710
		Los Amates	1,131
	31	Bananera	**
Region VII			
Baja Verapaz		Salamá	4,442
		Rabinal	4,155
	33	San Jerónimo	1,498
Alta Verapaz	35	Cobán	9,073
	34	San Cristóbal Verapaz	4,379
		San Pedro Carchá	3,966
		San Juan Chamelco	1,924
Region VIII			
Huehuetenango	38	Huehuetenango	10,185
		Chiantla	2,143
		Jacaltenango	3,873
		San Mateo Ixtatán	2,892
		Concepción	2,242
		San Antonio Huista	2,222
El Quiché	37	Santa Cruz del Quiché	6,472
		Chajul	4,187
	36	Santo Tomás Chichicastenango	2,099
		San Juan Cotzal	3,653
		Nebaj	5,185

Table 14 (Continued)

Region--Department	*	Town	Population
Region IX			
El Petén		San Benito	2,870
	39	Tikal	**

*Numbers refer to Map 5.

**Official population not available.

market, for the most part, while a few of those investigated had no market at all. The latter places were generally located adjacent to major market centers, as in the case of Chinautla, just north of Guatemala City. The merchandise in a market varies greatly, depending upon the time of year and other factors. For example, the heaviest concentration of seafood is present during the Lenten season, and, depending upon the harvests, this period may or may not catch the public with ready cash to spend. Cultural factors also influence the character of the market. The public market as an institution is strongest in the heavily Indian sectors of the country, where market days serve both a commercial and a social function.

Each market place provides an individual example of seafood sales, but essential similarities outweigh the differences. Every market visited, with only minor and explicable exceptions, had fish for sale in some form and

quantity. Throughout most of the country the retailers serve as both distributors and vendors of the produce. In other words, they travel to the production site to buy the fish they sell in the market. However, some vendors purchase fish in the larger regional centers for resale in smaller markets in the vicinity. A prime example of this practice is in the Quezaltenango area, where relatively heavy traffic occurs between Quezaltenango and the surrounding towns. Frequently the retailers have been in the seafood business for a number of years. One woman contacted in the Totonicapán market had been selling fresh or dried fish in that market for thirty-six years. People involved in the sale of seafood are generally mestizos, although Indian women from Lake Atitlán and other lakes often sell in the larger markets. Most vendors are quite willing to discuss the problems of their business, although greater reticence and suspicion is displayed in the western, more Indian section of the country. Depending upon the gregariousness of the salesman interviewed, one can rapidly gain insights into the local market situation or leave with nothing more than a head count of sellers and a guess at the volume of sales.

The main division of seafood in the market place is between fresh and dried products. Dried fish are clearly dominant in terms of volume available and numbers of sellers, but the turn-over is extremely slow. Thus, most vendors of

dried fish also have numerous other food and non-food items displayed for sale. For instance, small piles of dried sardines may occupy a bin or piece of canvas adjacent to chili peppers and rice. There are usually at least two sizes of sardines and perhaps three sizes of dried shrimp available. Larger dried fish may also be sold during at least part of the year, but these are most often stocked by vendors who sell only seafood. Quality of the dried product is extremely variable. The smaller varieties look and smell rather innocuous, but the larger fish tend to be less well cured. One positive aspect of these fish is that they are boneless. Sales are made by weight, number, or the measure. Tiny dried sardines are usually sold by the ounce, or by a small measure such as a jar lid, so it is obvious that large quantity sales seldom occur. Small lake or river fish are sold by the string or by weight, and the larger ocean species are invariably sold by the pound. Individual sales generally are very small, one pound or less, and a vendor is fortunate to average several pounds per week. This pattern changes radically during the Lenten season, however, when fish becomes a popular item.

Fresh seafood has entered rather recently into many regional markets and generally at the expense of the dried product. Fish are predominant among the fresh items available, but shrimp, crabs, and clams are also sold. Retailers of these products seldom engage in the sale of any other

merchandise. Ten to fifty pounds of fish are displayed in baskets with small amounts of chopped ice as a preservative. Sales are usually by the pound, but may also be by the string or the individual fish. Seldom does a purchase exceed one pound, so daily quantities sold per vendor are small. Most sellers of fresh fish may average five to ten pounds per day and up to 100 pounds or more during Holy Week.

Bargaining is usually very much a part of the market system, but very little is attempted in buying fish. Sellers rarely drop prices in order to increase sales. Current prices seem to be set at the upper limit of acceptability, and the goal is apparently to sell a little at substantial profit rather than greater quantities for less gain per unit. The variation in retail prices is slight throughout the country. The prices per pound for fresh fish are fixed at about twenty-five cents for second-class species and thirty-five cents for first-class ones. Prices for dried varieties also seem quite stable, but have a greater range according to size and type. The larger dried fish sell for fifteen to thirty-five cents a pound, depending upon species and quality of preservation. Since beef can compete directly with the best quality fish, the fish vendors often market their product only on days when cattle have not been slaughtered.

Regional Sketches

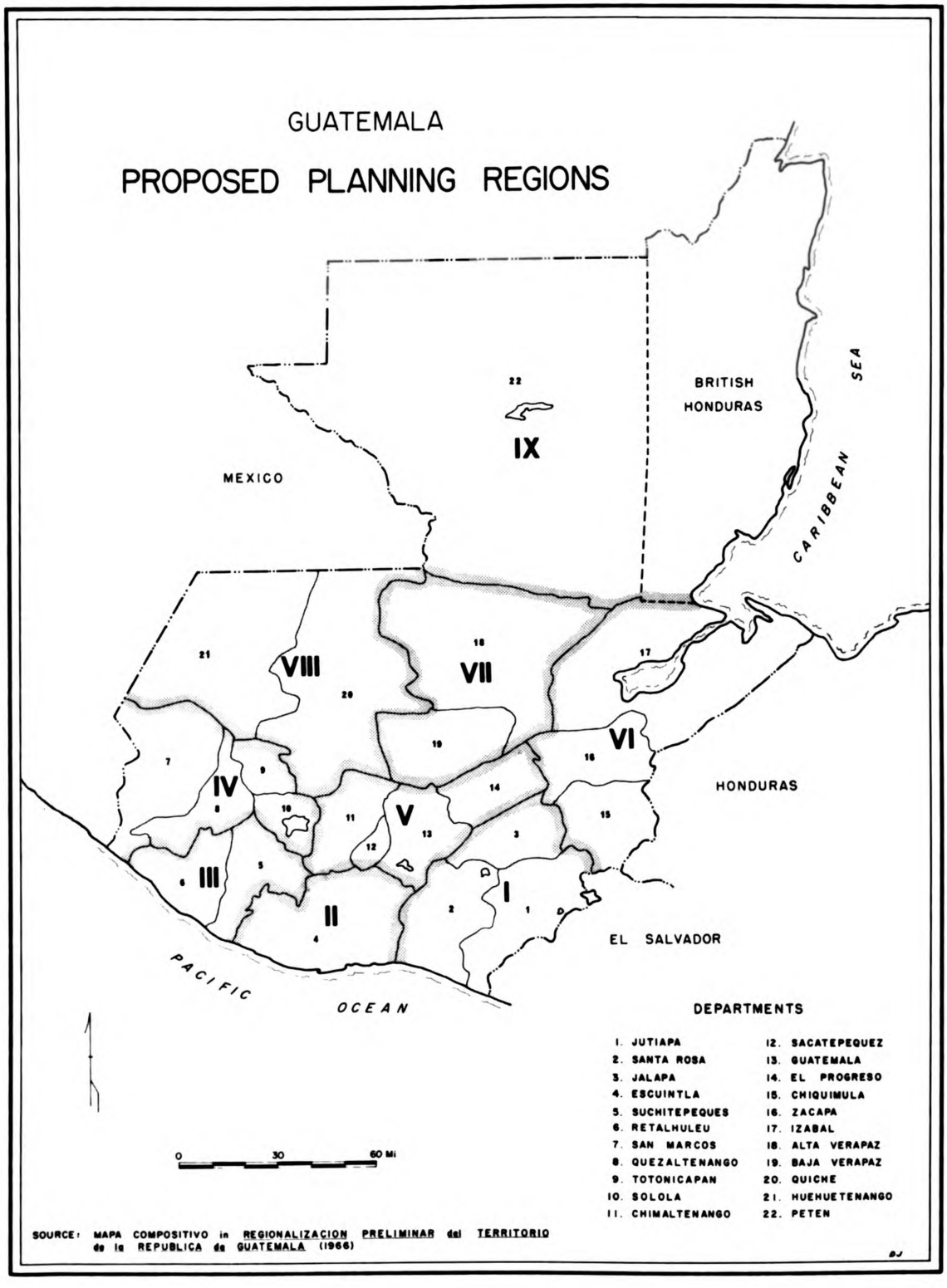
A proposed set of planning regions for Guatemala, as shown in Map 6, provides an appropriate framework in which to outline specific market patterns. Reference is also made to Appendix B, which gives sales information on selected markets and indicates the surpluses available during the period of investigation.

Region I--Jutiapa, Santa Rosa, and Jalapa Departments

The main centers of fish consumption in Region I are Asunción Mita, Jutiapa, Chiquimulilla, Barberena and Jalapa, (Map 6) but none averages more than about 100 pounds of fresh fish weekly. Fresh water sources such as Lake Atescatempa and the Río de los Esclavos provide most of these sales, but ocean fish also reach the markets, especially the nearer ones, from the south coast. The distribution of fish is widespread in these departments, but only in small quantities.

Region II--Escuintla Department

The two leading markets for fish in Escuintla Department are Escuintla and San José, the latter place having the highest per capita consumption by far since it is also a major production site. Most of the fish from this port are destined for the Guatemala City market, but Escuintla is an important intermediary stop. Two market


GUATEMALA
PROPOSED PLANNING REGIONS
MEXICO
BRITISH HONDURAS
CARIBBEAN SEA
HONDURAS
EL SALVADOR
PACIFIC OCEAN
I
II
III
IV
V
VI
VII
VIII
IX
0 30 60 Mi
DEPARTMENTS
1. JUTIAPA
2. SANTA ROSA
3. JALAPA
4. ESCUINTLA
5. SUCHITEPEQUES
6. RETALHULEU
7. SAN MARCOS
8. QUEZALTENANGO
9. TOTONICAPAN
10. SOLOLA
11. CHIMALTENANGO
12. SACATEPEQUEZ
13. GUATEMALA
14. EL PROGRESO
15. CHIQUIMULA
16. ZACAPA
17. IZABAL
18. ALTA VERAPAZ
19. BAJA VERAPAZ
20. QUICHE
21. HUEHUETENANGO
22. PETEN
SOURCE: MAPA COMPOSITIVO in REGIONALIZACION PRELIMINAR del TERRITORIO de la REPUBLICA de GUATEMALA (1966)

MAP 6

buildings are located in Escuintla and the seafood is segregated according to fresh-water or salt-water sources. Each group of vendors maintains that the public prefers its line of goods. In addition to the aforementioned centers, Tiquisate and the several agricultural colonies within the department provide steady, if small, markets for fish and other seafood.

Region III--Retalhuleu and Suchitepéquez Departments

Quantities of fish sold in Region III are very small. The average is about five to ten pounds per seller per day. The maximum sold per vendor in larger markets such as Mazatenango is about fifty pounds daily. Fish are available every day in Mazatenango and Retalhuleu, but as a rule only once a week in the smaller towns. The greatest per-capita consumption takes place in Champerico, which is the leading production center in the republic. Prices average twenty to twenty-five cents for second-class fish and thirty to thirty-five cents for the first-class species.

Region IV--San Marcos, Quezaltenango, Totonicapán and Sololá Departments

Much more dried fish is sold throughout Region IV than in any other. In addition to fish, this region is also notable for the amounts of smoked lagarto, or small alligator, that are sold in the markets. The source for

this delicacy is the Ocós zone. Quezaltenango is by far the largest market in Region IV for both fresh and dried fish, while Ocós and some of the small towns around Lake Atitlán, lead in per capita consumption. This region is quite densely populated, however, and per capita consumption is low. This is also mainly an Indian zone, and the inhabitants have eating habits that include fish only during the Lenten season.

Region V--Chimaltenango, Sacatepéquez, Guatemala, and El Progreso Departments

Consumption levels for seafood in the departments of Region V are also very low. Only the larger centers, Guatemala City and Antigua, maintain significant steady markets for fish. Subsistence fishing occurs in Lake Amatitlán and along the Río Motagua, and some fish also enter the commercial trade from these sources. Much of the fresh and dried fish sold in the region is first purchased in Guatemala City for resale in the smaller towns.

Region VI--Chiquimula, Zacapa and Izabal Departments

The capital cities of Chiquimula and Zacapa departments constitute small but steady markets for fresh and dried fish. Each is dependent to a large extent upon freshwater sources, chiefly the Río Motagua. Outside of the two main cities little fish is seen, except in areas of subsistence fishing as along the Motagua. In contrast, the

department of Izabal has probably the heaviest per-capita consumption in the nation. With Lake Izabal, the Río Motagua, and the Caribbean waters to provide fish, it is amply supplied with subsistence and commercial yields. Livingston literally lives from fishing and has one of the highest levels of fish consumption in the country, while Puerto Barrios is not far behind.

Region VII--Alta Verapaz and Baja Verapaz Departments

Fresh fish reach Alta Verapaz and Baja Verapaz departments only in small quantities, but dried fish are marketed throughout the area. The fresh product available is either from Lake Izabal or from a local lake or river, rather than from the ocean. The Department of Wildlife plans to greatly intensify the fish pond program in this region.

Region VIII--Huehuetenango and Quiché Departments

Consumption of fresh fish in Region VIII is limited chiefly to the city of Huehuetenango, where perhaps 100 pounds are sold weekly. During the Lenten season even fish from the Petén reach this market, but the normal supply comes from Champerico, via Quezaltenango. The large Indian markets of Chichicastenango and Quiché are well supplied with dried fish, but little or no fresh fish is found.

Huehuetenango and Quiché are also departments where the fish pond program is to be promoted vigorously.

Region IX--El Petén Department

There are numerous rivers and lakes in the Petén, and subsistence fishing is common. However, there is little commercial production. This region holds perhaps the greatest possibilities for expansion of fresh-water fishing.

Consumption

Little is really known about seafood consumption in Guatemala except that it is low. Numerous estimates have been made, and most indicate a national consumption of less than one pound of fish per person annually. A 1966 Ministry of Agriculture report portrays the daily consumption per person in urban areas as three-tenths of an ounce, and even less in rural areas.[9] The same report indicates a peak consumption of seventy-two grams daily in the municipality of Livingston. Personal estimates based upon overall production and import figures indicate a total national consumption of at least 4,600,000 pounds annually, or a per-capita figure of about 1.1 pounds.

The structure of the consumption pattern is almost completely unknown. It is presumed that per-capita consumption

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[9]Guatemala, Ministerio de Agricultura, División de Fauna, Informe de la economía pesquera en Guatemala, Guatemala, 1966, p. 7.

is highest in the producing zones. In addition to the Ministry of Agriculture figures on Livingston, the example of Champerico is documented. Fifty families, with a total of 282 members, were interviewed in 1965 on a house-to-house basis and asked about their use of seafood. The families ate fish on an average of twice a week. The average consumption was 4.7 pounds weekly, or 0.72 pounds per person. Of the total, 26 percent of the families ate one pound or less per week and 34 percent ate five pounds or more.[10]

In contrast to the pattern in Livingston and Champerico, a personal survey of thirty-six families in the coastal area to the north of Champerico showed a near opposite condition. These families are located along two roads radiating toward the coast from Mazatenango, on direct distribution routes from small production centers. Twenty-one of the families eat no fish, fourteen eat small amounts, perhaps once a month, and only one family consumes fish on a weekly basis. These families are all at low income levels, and most report that fish is available but too expensive to buy.

There are five principal uses of fish in Guatemala: 1) bits of fish, especially fish heads, are used in flavoring soups, 2) fish are cooked with rice to give added flavor and

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[10]Guatemala, Dirección General de Obras Públicas, Sección de Estudios Geográficos, Estudio Geográfico Champerico, Guatemala, 1965, p. 45.

food value to an inexpensive meal, 3) fish and other seafood are noted as being good for hang-overs, and small bocas of salted and dried shrimp are eaten while imbibing, 4) relatively small amounts of fried fish are eaten by the upper classes as a main course, and, 5) shrimp and other seafood are consumed frequently by cultural minorities, such as the Chinese.

Much more information is needed concerning general consumption habits. In-depth studies should be undertaken to pinpoint the more specific obstacles to increased consumption of fish and other seafood.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

This investigation of the Guatemalan fishing industry was conducted in a five month period, from April to September of 1966. During this time it was possible for the writer to become familiar with the major phases of the industry and to learn something of its importance in the life of Guatemalan people. As a result of the study certain conclusions have been reached and a number of recommendations formulated.

Conclusions

The development of fisheries has been a slow process in Guatemala. Not until 1959 was an effort made to more efficiently exploit the ocean resources with a seagoing fishing fleet. Before that time exploitation of brackish and fresh waters, plus the importation of dried cod, adequately met the small demand. With the development of a national shrimping fleet new impetus was given to fisheries as a whole.

The production activity can be divided between fish produced for export and fish destined for domestic consumption.

The Pacific Coast is currently the source of about seventy-five percent of the fish and other seafood consumed in Guatemala and almost 100 percent of that exported. The open roadsteads of Champerico and San José-Iztapa are the home ports for the entire Guatemalan ocean-going fleet, a total of thirty shrimp boats. The operation of this fleet is oriented chiefly toward the export of high-value shrimp to markets in the United States. However, all of the fish caught by the shrimpers are directed to domestic markets, and in increasing amounts. A significant expansion of ocean fisheries is dependent upon the construction of a protected port, which is now in the planning stage.

More typical of the fisheries in Guatemala, and most numerous, are the small producers with very limited means. Their villages are clustered around the brackish lagoons bordering the Pacific Coast and along the Caribbean shore. The volume of local and regional production is closely related to available transportation. The trade of villages with all-weather connections is on a year-round basis, while more isolated communities are restricted to seasonal sale, mostly of dried and salted fish. Fresh and dried fish from inland lakes are distributed over extensive areas, but in very limited quantities, while fish from ponds are not currently produced on a commercial scale. Considerable expansion in productivity seems possible, especially in the brackish areas, and several private schemes

in the planning stage are directed toward this end. Increased experimentation with stocking procedures in rivers and lakes, and the development of working fish ponds, also offer considerable promise on the local level.

The distribution of fish in some form includes even the most remote areas, especially during Holy Week. However, the greatest market areas are naturally the large urban agglomerations. Guatemala City is the destination for much of the fresh fish, while Quezaltenango is the leading secondary center. Regional centers, usually the departmental capitals, serve as redistribution points for much of the surrounding country.

Individual entrepreneurs distribute most of the fish and other seafood marketed in Guatemala. This movement is on an extremely small scale for the most part. Buyers may obtain twenty-five to fifty pounds of fish from a given production site. The fish are then iced and transported via local bus lines to one of the regional markets. There, the fish are sold at approximately twice the price paid at the fishing site. The same process, with minor variations, occurs in the distribution of dried and salted varieties.

The great majority of seafood sales occur in public or municipal markets. A stable and traditional system is encountered here. Fish vendors have usually been in the business for years, and the prices favor high profit-low volume sales. Excessively high prices characterize the

sale of fish anywhere outside of the immediate producing area, and quality is doubtful. Thus, low consumption levels are to be expected, and national estimates indicate that per capita consumption of seafoods approximates one pound per year. The period of maximum use coincides with the Lenten season, when prices also reach their peak.

To break the cycle of low production and high prices is very difficult, especially with the seemingly negative consumption habit characteristic throughout most of the Republic. Slow but steady increases in the volume of fish entering the Guatemala City market in particular may eventually alter the picture there. The chief hope, however, centers about the expansion of the ocean fisheries which offer promise for rapid production increases.

Recommendations

It appears logical and practical that more emphasis should be placed on developing the fishing potential that exists within Guatemala. The following are some recommendations that should aid in this development. The listings are not necessarily in order of importance, and obviously the implementation of a recommendation for improvement within one aspect of the industry may also have a positive effect upon others.

Production

1. Greater knowledge concerning the exact nature of the ocean resources along the Guatemalan coasts is of prime

importance to the development of a more intensive fishing industry. An inventory of the types and quantities of fish and seafood available is basic to any expansion of efforts. A detailed survey of the ocean floor, with an accompanying map showing the bottom configuration, would also be of great value for commercial ventures. Hopefully, the United Nations Food and Agricultural Organization survey of Central American fisheries will provide such information.

2. The expansion of ocean-going fleets should be planned to most effectively exploit the available resources on a long-term basis. A small, deep-sea fishing fleet of four or five ships should be supported easily on the Caribbean, even with present inadequate knowledge of the fishing grounds.

3. Better, more efficient fishing methods should be employed by the small-scale producers. Present production could be greatly increased merely with the addition of small motors to the boats to give added range to fishing efforts. Rotation of the fishing grounds would also raise yields. Various types of nets should be tested to determine relative efficiencies.

4. The organization of working cooperatives in fishing communities would offer the obvious benefits of pooled effort. Working together to improve both fishing methods and distribution of the catch could have far-reaching effects.

5. A training program for fishermen would aid in forming a sense of union among the producers. Notions concerning all phases of catching and marketing seafood could be discussed. Careful treatment after catch should be stressed to assure greater quality control, and instruction in methods of improving the salting and drying process would also be useful. Dried fish production has perhaps the greatest potential for expansion under present transportation and storage systems, and the product could be improved greatly in quality and appearance.

6. On the Caribbean, the sand bar limiting access to the port of Livingston and the Río Dulce should be dredged. This would open Lake Izabal to larger commercial efforts, as well as increased sport fishing.

7. Possibilities for increased stocking of major rivers and lakes, such as the Río Motagua and Lake Izabal, should be investigated. This would necessarily mean the enforcement of some fishing regulations, but could significantly increase both regional consumption and national distribution.

8. The construction of a canning or freezing plant for fish and shrimp on the Caribbean Coast would provide a great incentive to production.

9. As is currently being effected in Brazil, special incentives might be granted to the fishing industry. Exemptions from import regulations and taxes are included

to stimulate investment and research.[1] Such changes in the legal structure are extremely important as a stimulant to investment.

Distribution

1. Storage facilities for fish and other items should be located strategically throughout the country. The availability and distribution of ice should also be expanded. With a means of preserving the fish during times of surplus, the entire supply system would be improved greatly and production would be stimulated.

2. Establishment of new and improved transportation facilities could significantly affect distribution and stimulate production. On the Pacific Coast a shoreline highway linking Champerico and San José, for example, would aid not only fishing but also agriculture, the salt industry, and tourism. This project should be given very serious thought. A road from Matías de Gálvez to Livingston would open an attractive beach area for fishing and tourism, and would stimulate farming along the Caribbean shore. Improved connections between principal markets and the El Estor and Mariscos areas, on Lake Izabal, and a road into the Petén region, would also have immediate and favorable effects.

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[1]Brazil, "Guide to Investing: Industrial Incentives Noted," Brazilian Bulletin, Vol. 23, No. 486, (Brazil: 1967), p. 4.

3. Use of a few refrigerated trucks with regular routes would greatly increase production and improve distribution. Small pick-ups could be used to distribute fresh fish throughout the republic and in this way combat the negative consumption habit.

4. The present distribution process could be improved by the addition of some simple but more efficient means of transporting the fresh catch. Fiber glass insulating containers, for example, would assure better preservation of the fish en route. Better care of the fresh and dried fish to assure quality at all phases is of utmost importance in extending the range of distribution.

5. An organization of distributors, those middlemen who buy from producers and sell to the consumers, could assure a steadier and more complete coverage of the country. Regular schedules for collection and transport could also significantly increase the efficiency of production and distribution.

Marketing and Consumption

1. In-depth consumption studies in various parts of the country are necessary for the understanding of present dietary habits. Special attention should be given to the effect of the Holy Week peak period upon consumption during the remainder of the year.

2. A general and drastic lowering of retail fish prices is necessary to significantly increase consumption

in those areas which are most in need of animal protein. Ideally, prices should be lowered to fifteen or twenty cents a pound. Through increased and steady production, and additional storage facilities, some of the excess price could be reduced. Common complaints of high transportation and icing costs should also be investigated. If necessary, some type of price control might be necessary to break down the traditional low volume-high profit complex.

3. A reasonable guarantee of freshness and quality is necessary for good consumer acceptance. Especially in hot coastal areas, fish are very susceptible to spoilage. Care at the fishing village and along the distribution route is necessary to assure quality. Here again educational efforts are important.

4. Improved marketing practices should be instigated. The fish should be well covered by ice while in the market place, instead of lying exposed in small baskets. Some attempt at making the catch attractive to the eye could also improve sales.

5. A full-scale educational program directed toward greater consumption of seafoods is necessary. This can be accomplished in the newspapers, on the radio, and by an active poster campaign. A national fish week or month might be considered. The school systems and the military establishment would be appropriate institutions in which to promote fish consumption.

The importance of world-wide fishery resources is increasingly recognized, and production from the seas is expanding rapidly.

> The estimated world production of fish has more than doubled in the last two decades, from less than 20 million tons in 1948 to more than 50 million tons in 1965. This growth, which is considerably faster than that of either the human population or the overall production of food, means that fish are making an increasingly important contribution to the world's supply of animal protein. In the world as a whole fish contribute about 10 percent of the total animal protein intake but considerably more in some areas such as the Far East. An increasing proportion of the total catch is not used directly for human consumption but is converted to fish meal. . .[2]

The total catch of marine fish in Latin America increased at an annual rate of twenty-six percent between 1960 and 1964, or from 4.6 million to 11.5 million liveweight tons.[3] During this same period the Guatemalan catch grew by nearly forty-five percent annually, but the total harvest has since been maintained at approximately the 1964 level.

Although concern for overfishing is already being voiced in many areas, most of Latin America has no immediate problem in this regard. Perhaps greater concern should be given to developing the fish resources for the

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[2]United Nations, Food and Agricultural Organization, The State of Food and Agriculture 1967, (Rome: 1967), p. 119.

[3]Inter-American Development Bank, Agricultural Development in Latin America: The Next Decade, (Washington, D.C.: 1967), p. 133.

benefit of the local populations. Fisheries will never provide the panacea for low protein diets but could constitute an important element in their improvement.

The Guatemalan situation has illustrated some of the problems, as well as partial solutions, to the further evolution of fisheries. Despite the many obstacles, it is maintained in this study that Guatemala is an appropriate place for an intensified development of fisheries, inland as well as marine.

APPENDIX A

COMMON FISHES AND SEAFOOD OF GUATEMALA

English	Spanish	Scientific
I. Ocean and Brackish Waters		
Grouper	Mero	Epinephilus mystacinus
Jew fish	Mero	Promicrops itaira
Red snapper	Pargo	Lutjanus colorado
Croaker	Corvina	Stellifer sp.
Goby	Guavina	Dormitator maculatus & sp.
Sole	Lenguade	Achirus sp.
Mulet	Lisa	Mugil cephalus
Sardine	Sardina	Sardinella sp.
Snook	Róbalo	Centropomus undecimalis Centropomus ensiferus
Marine catfish	Bagre	Galeichthys assimilis (Gunther) Galeichthys caerulescens
Shark	Tiburón	Carcharhinus sp.
Tarpon	Sábalo	Tarpon atlanticus Megalop atlanticus
Yellow jack	Jurel	Caranx bartholomaei
Skipjack	Jurel	Caranx hippos
Leather jack	Zapatero	Hegoplites sauras
Spanish mackerel	Sierra	Sierra cavalla
Sawfish	Pez sierra	Pristis sp.
Barracuda	Picuda	Sphyraena barracuda
Squirrel fish	Dorado	Holocentrus sp.
Gafftopsail	Pez vaca	Bagre marinus (Mitchell)
Garfish	Machora	Lepisoteus tropicus (Gill)
*	Juilín, Chunte	Rhamdia guatemalensis
*	Mojarra	Cichlasoma maculicaudum Gerres cinereus & sp.

Appendix A (Continued)

English	Spanish	Scientific
*	Palomita	Cichlasoma spilurum
*	Cabrilla	*
*	Ratón	*
*	Pinchincha	*
*	Ojuda	*
*	Aleta	*
*	Tacasonte	*
*	Dentón	*
*	Camiseta	*
Manatee	Manatí	Trichechus manatus
Shrimp	Camarón Camaroncillo	Panaeus stylirostris Panaeus schmitti & sp.
Lobster	Langosta	Homarus sp.
Squid	Calamar	Loligo sp.
Conch	Caracol	Strombus sp.
Crab	Congrejo	*
II. Lakes, Rivers, and Ponds		
Carp	Carpa	Ciprinus carpio
Tilapia	Tilápia	Tilapia mossambica
Black bass	Lobina negra	Micropterus salmoides
Mountain mullet	Tepemechín	Agnonostomus monticola
*	Pupo	Mellienesia sphenops
*	Gulumina	Profundulus guatemalensis
*	Pepesca	Astyanax fasciatus
*	Guapote	Cichlasoma motaguense
*	Chumbimba	Cichlasoma maculicaudum

*Uncertain

APPENDIX B

INVENTORY OF FISH SALES AT PRINCIPAL MARKET TOWNS IN GUATEMALA

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
Region I				
1. Taxisco	Fresh	1-2	0-25	Las Lisas, La Avellana.
	Dried	2-3	*	**
2. Guazacapán	F	1-2	20-30	Las Lisas.
	D	3-4	*	**
3. Chiquimulilla	F	3-5	100-200	Papaturro, Las Lisas, Río Los Esclavos.
	D	3-4	*	**
4. Cuilapa	F	0-1	0-10	Puerto San José.
	D	0-1	*	**
5. Barbarena	F	1-2	50-100	Río Los Esclavos, San José, Paredón.
	D	2-3	*	San José, Puerto Barrios.
6. Jutiapa	F	1-3	25-35	Lake Atescatempa, Lake Güija.
	D	1-2	*	Lake Atescatempa, Lake Güija.
7. Asunción Mita	F	2-4	30-50	Lake Atescatempa, Lake Güija.
	D	4-5	*	San José, Las Lisas.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
8. El Progreso	Fresh	1-2	10-15	Lake Atescatempa.
	Dried	0-1	*	Lake Atescatempa.
9. Las Monjas	F	0-2	0-5	Lake Atescatempa, Río Grande.
	D	0-2	*	Lake Atescatempa.
10. Jalapa	F	1-2	25-35	Lake Atescatempa, Lake Achiotes.
	D	6-8	30-40	Puerto Barrios, Livingston, Lake Güija.
11. San Pedro Pinula	F	1-2	0-5	Rivers.
	D	1-2	5-10	Jalapa.
12. San Luis Jilotepeque	F	*	*	**
	D	1-2	5-20	Lake Güija.
Region II				
13. Palín	F	2-6	150-200	Tecojate, Huitzizil, La Laguna.
	D	5-7	*	Barra Madre Vieja.
14. Escuintla	F	5-8	150-200	Rivers, Las Lisas, San José.
	D	7-10	*	**
15. San José	F	10-15	200-300	San José, Paredon.
	D	*	*	San José.
16. Iztapa	F	4-5	50-100	Chiquimulilla Canal.
	D	*	*	**

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
17. Santa Lucía Cotzumalguapa	Fresh	1-2	10-20	San José.
	Dried	4-5	*	San José.
18. Tiquisate	F	2-6	150-200	Tecojate, Huitzizil, La Laguna, Barra Madre Vieja.
	D	5-7	*	Tecojate, San José.
19. El Semillero	F	3-4	20-30	El Porvenir.
	D	*	*	**
Region III				
20. Patulul	F	1-2	25-30	Tiquisate.
	D	10-15	*	Tahuexco, Livingston, San José.
21. Río Bravo	F	0-1	0-5	Mazatenango.
	D	2-4	*	Mazatenango.
22. Chicacao	F	1-2	25-40	Mazatenango.
	D	7-8	*	Tahuexco, Livingston, San José.
23. San Antonio Suchitepéquez	F	1-4	50-75	Champerico, Mazatenango, Santiago Atitlán.
	D	4-5	*	Champerico, Tahuexco.
24. Samayac	F	1-2	20-25	Tulate.
	D	4-6	*	Retalhuleu.
25. Santo Domingo Suchitepéquez	F	1-2	20-25	Champerico.
	D	*	*	**

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
26. Mazatenango	Fresh	3-5	100-150	Manchón, Champerico.
	Dried	10-12	*	Tahuexco, Tulate, Puerto Barrios.
27. Cuyotenango	F	3-4	20-30	Mazatenango, La Verde.
	D	*	*	**
28. San Felipe	F	1-2	5-10	Champerico, Retalhuleu.
	D	1-2	*	Champerico.
29. San Sebastián	F	1-2	20-30	Tulate, Champerico.
	D	2-3	*	Champerico.
30. Retalhuleu	F	5-7	100-150	Tulate.
	D	6-7	*	Champerico, Livingston.
31. La Máquina	F	1-2	25-35	Tulate.
	D	1-2	*	Tulate.
32. Champerico	F	3-7	150-250	Champerico.
	D	3-4	*	Manchón.
Region IV				
33. Coatepeque	F	4-5	75-100	Ocós, Champerico.
	D	5-6	*	Quezaltenango, Champerico, Livingston.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
34. Tecún Umán	Fresh	2-3	50-100	Ocós.
	Dried	3-4	*	Ocós.
35. Malacatán	F	2-3	25-30	Ocós.
	D	3-4	*	Champerico, Ocós.
36. Nuevo Progreso	F	0-1	0-5	Ocós, Coatepeque.
	D	1-2	*	Ocós, Coatepeque.
37. San Marcos	F	0-1	0-5	Quezaltenango, Ocós.
	D	1-2	*	Quezaltenango.
38. San Pedro Sacatepéquez	F	1-3	20-25	Ocós.
	D	7-8	*	Ocós, Tapachula (Mexico).
39. San Juan Ostuncalco	F	1-2	10-20	Quezaltenango.
	D	10-20	*	Quezaltenango, Ocós.
40. San Martin Sacatepéquez	F	0-1	0-4	Quezaltenango.
	D	0-1	*	Quezaltenango.
41. Quezaltenango	F	5-8	150-200	Champerico.
	D	20-30	*	Tapachula (Mexico), Champerico, Ocós, Puerto Barrios.
42. Zunil	F	*	*	Quezaltenango.
	D	2-4	*	Quezaltenango.
43. Almolonga	F	*	*	Quezaltenango.
	D	1-2	*	Quezaltenango.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
44. Cantel	Fresh	*	*	Quezaltenango.
	Dried	1-2	*	Quezaltenango.
45. Olintepeque	F	0-1	0-5	Quezaltenango.
	D	1-2	*	Quezaltenango.
46. Salcajá	F	0-1	0-5	Quezaltenango.
	D	4-5	30-40	Punta de Manabique, Río Motagua, Quezaltenango.
47. San Cristóbal Totonicapán	F	1-2	10-20	Quezaltenango, Champerico.
	D	4-5	*	Quezaltenango.
48. San Francisco El Alto	F	0-2	0-10	Quezaltenango.
	D	15-20	*	Guatemala City, Quezaltenango.
49. Momostenango	F	0-1	0-5	Quezaltenango.
	D	5-7	*	Quezaltenango.
50. Totonicapán	F	2-4	20-30	Champerico, Quezaltenango.
	D	10-25	*	Champerico, Quezaltenango.
51. Nahualá	F	*	*	**
	D	3-5	*	Guatemala City, San José, Champerico, Quezaltenango.
52. Sololá	F	3-4	30-40	Lake Atitlán.
	D	4-5	*	Lake Atitlán, Guatemala City.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
53. Panajachel	Fresh	1-2	20-30	Lake Atitlán.
	Dried	2-3	*	Lake Atitlán, Guatemala City, Quezaltenango.
54. Santa Catarina Palopó	F D	No formal market		--
55. San Andrés Semetabaj	F	0-1	0-5	Santa Catarina Palopó.
	D	0-1	*	Santa Catarina Palopó.
56. San Antonio Palopó	F D	No formal market		--
57. San Lucas Tolimán	F	1-2	10-20	Lake Atitlán.
	D	1-2	*	Lake Atitlán, Guatemala City.
58. Santiago Atitlán	F	6-10	50-100	Lake Atitlán.
	D	5-7	*	Lake Atitlán.
59. San Pedro La Laguna	F D	No formal market		--
Region V				
60. Patzun	F	0-1	0-5	Lake Atitlán.
	D	1-2	*	Lake Atitlán.
61. Patzicía	F	0-1	0-5	Lake Atitlán.
	D	0-1	*	Lake Atitlán.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
62. Tecpán Guatemala	Fresh	0-1	10-20	Guatemala City.
	Dried	0-2	*	Guatemala City.
63. Zaragoza	F	No formal market		--
	D			
64. Comalapa	F	0-1	0-5	Guatemala City, Amatitlán.
	D	4-5	*	Lake Amtitlán.
65. Chimaltenango	F	1-3	5-10	Guatemala City.
	D	4-5	*	Guatemala City.
66. San Andrés Itzapa	F	0-1	0-5	Guatemala City, Lake Amtitlán.
	D	3-4	*	Lake Amatitlán.
67. El Tejar	F	1-2	5-10	Guatemala City (San José, Champerico).
	D	4-5	*	Guatemala City.
68. Pastores	F	1-2	5-10	Guatemala City.
	D	2-3	*	Guatemala City.
69. Sumpango	F	1-2	5-10	Guatemala City.
	D	1-2	*	Guatemala City.
70. Santiago Sacatepéquez	F	1-2	5-10	Guatemala City.
	D	2-3	*	Guatemala City.
71. Mixco	F	*	*	Guatemala City.
	D	1-2	*	Guatemala City.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
72. Antigua Guatemala	Fresh	7-10	150-200	Lake Amatitlán, San José, Guatemala City.
	Dried	10-15	*	Lake Amatitlán, San José.
73. Ciudad Vieja	F	*	*	Antigua Guatemala.
	D	*	*	Antigua Guatemala.
74. Alotenango	F	1-2	5-10	Guatemala City.
	D	0-1	*	Guatemala City.
75. Guatemala City	F	50-100	2,500	San José, Livingston, Champerico, Republic.
	D	100-150	*	Republic
76. Villa Nueva	F	1-2	5-30	Guatemala City, Lake Amatitlán, Las Lisas.
	D	2-3	*	Guatemala City.
77. Amatitlán	F	3-4	100-150	Lake Amatitlán.
	D	4-5	*	Lake Amatitlán.
78. Villa Canales	F	1-2	10-20	Lake Amatitlán.
	D	1-2	*	Lake Amatitlán.
79. San Pedro Sacatepéquez	F	*	*	Guatemala City.
	D	3-4	*	Guatemala City.
80. San Juan Sacatepéquez	F	1-2	10-15	Guatemala City.
	D	7-8	*	Guatemala City, Lake Amatitlán.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
81. San Raimundo	Fresh	0-1	5-15	Guatemala City.
	Dried	4-5	*	Guatemala City.
82. Chuarrancho	F	1-2	5-10	Río Motagua.
	D	0-1	*	Guatemala City.
83. Chinautla	F	No formal market		Guatemala City.
	D			
84. Sansarate	F	0-1	0-5	Río Los Plátanos, Guatemala City.
	D	1-2	*	Guatemala City.
85. El Progreso	F	1-2	10-20	Río Motagua, Guatemala City.
	D	2-3	*	Rio Motagua.
86. San Agustín Acasaguastlán	F	1-2	5-10	Río Motagua.
	D	1-2	*	Guatemala City, Puerto Barrios.
Region VI				
87. Zacapa	F	3-15	50-60	Río Motagua, Río Zacapa.
	D	2-7	*	Livingston, Lake Güija.
88. Estanzuela	F	No formal market		Zacapa.
	D			

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pound)	Source of Fish
89. Teculután	Fresh	0-2	0-5	Río Motagua.
	Fried	1-2	5-10	Río Motagua, Mariscos.
90. Chiquimula	F	3-6	40-50	Puerto Barrios, Zacapa.
	D	3-5	*	Livingston, Lake Güija.
91. Ipala	F	1-2	10-20	Lake Güija.
	D	1-2	*	Lake Güija.
92. Quezaltepeque	F	0-2	0-10	Lake Güija.
	D	0-2	*	Lake Güija, Puerto Barrios.
93. Escuipulas	F	0-2	0-20	Lake Güija, Puerto Barrios.
	D	0-2	*	Lake Güija.
94. Gualán	F	2-3	10-15	Río Motagua.
	D	3-4	*	Rio Motagua, Puerto Barrios.
95. Los Amates	F	1-2	20-30	Mariscos, Río Motagua.
	D	2-3	*	Puerto Barrios, Mariscos.
96. Morales	F	1-2	30-40	Puerto Barrios, Río Motagua, Rio San Francisco.
	D	2-4	*	Puerto Barrios.
97. Bananera	F	1-2	30-40	Puerto Barrios, Río Motagua.
	D	2-3	*	Puerto Barrios, Rio Motagua.
98. Puerto Barrios	F	5-10	200-300	Livingston, Puerto Barrios.
	D	4-5	*	Puerto Barrios.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
99. Livingston	Fresh	6-10	200-300	Livingston.
	Dried	1-2	*	Livingston.
Region VII				
100. Rabinal	F	0-1	0-5	Río Chixoy Tributary.
	D	2-4	*	Guatemala City.
101. Salamá	F	1-2	10-20	Guatemala City, San José.
	D	1-3	*	El Estor.
102. San Cristóbal Verapaz	F	2-3	10-20	Lake San Cristóbal, El Estor.
	D	0-1	*	El Estor.
103. Cobán	F	3-4	30-40	El Estor, San Cristóbal.
	D	4-5	*	El Estor, Guatemala City.
104. San Pedro Carchá	F	0-1	0-5	El Estor.
	D	0-2	*	El Estor, Guatemala City.
105. San Juan Chamelco	F	0-1	0-5	El Estor.
	D	0-2	*	Guatemala City.
106. Huehuetenango	F	4-5	50-100	Champerico, Quezaltenango.
	D	5-7	*	Champerico, Guatemala City, Ocós, El Petén.

Appendix B (Continued)

Markets	Fish Type	No. of Vendors	Est. Weekly Sales (Pounds)	Source of Fish
107. Chiantla	Fresh	0-1	0-5	Huehuetenango.
	Dried	1-2	*	Huehuetenango.
108. San Juan Ixcoy	F	*	*	**
	D	1-2	*	Huehuetenango.
109. Chichicastenango	F	0-2	0-10	Lake Atitlán.
	D	10-15	*	Guatemala City, Lake Atitlán.
110. Santa Cruz del Quiché	F	0-1	*	Quezaltenango.
	D	6-10	*	Guatemala City, Quezaltenango.
111. Sacapulas	F	1-2	5-10	Río Chixoy.
	D	1-2	*	Rio Chixoy.
Region IX				
112. Tikal	No formal market			Sayaxché.
TOTALS	F	196-399	5,556-7,359	
	D	411-637	*	

*No estimate made; minimal quantities or numbers in most cases.

**Data not obtained.

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