



## **Establishment of Data Acquisition and Monitoring Systems for the BELIZE SHRIMP FISHERY**

### **A Description of the Belize Shrimp Fishery**

Prepared by

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## TABLE OF CONTENTS

1.0	The Importance of Belize Shrimp Fishery.....	3
2.0	Description of the Industrial Shrimp Trawl Fishery .....	4
2.1	Fleet Description.....	4
2.2	Fishing Grounds .....	5
2.3	Landing Sites .....	5
2.4	Landing Procedures .....	5
2.4.1	Shrimp Trawling .....	5
2.4.2	Handling of Catch On-board vessel .....	6
2.4.3	Off-loading Procedure.....	7
2.4.4	In-plant Processing.....	7
3.0	Description of the Coastal Artisanal Shrimp Fishery .....	8
3.1	Fleet Description.....	8
3.2	Fishing Grounds .....	9
3.3	Landing Sites .....	9
3.4	Landing Procedures .....	10
3.4.1	Shrimp Capture .....	10
3.4.2	Handling of the Catch On-board Vessel .....	10
3.4.3	Off-loading Procedures .....	10
5.0	References.....	12

### List of Figures

- Figure 1: Picture of Northern t -oneof the shrimp trawlers operating in Belizean waters  
Figure 2: General Model of Double-Outrigger Trawl  
Figure 3: Diagrammatic Representation of Cast Net or Sprat  
Figure 4: Diagrammatic Representation of Drag Net or Manual  
Figure 5: Fishing Grounds for the Industrial Shrimp Fishery  
Figure 6: Fishing Grounds for the Artisanal Shrimp Fishery

## 1.0 The Importance of Belize Shrimp Fishery

The Shrimp Fishery is made up of an Industrial Shrimp Trawl Fishery, a Coastal Artisanal Shrimp Fishery and Shrimp Culture. This fishery is second in importance to the Lobster Fishery (Auil 1993).

In 1995, almost 50% of the total fisheries production was from shrimp, with fanned shrimp contributing about 90% to total shrimp production. The trawled shrimp<sup>1</sup>, on the other hand, contributed less than lobster, conch and finfish to the total fisheries production for that year. In fact, as the following table will show, this trend has been consistent over the past six years.

**TABLE 1**

**PRODUCTION STATISTICS**  
**For the Four Major Types of Fisheries in Belize**  
**FROM 1991 – 1996**

Fishery Type	Y E A R					
	1991	1992	1993	(994	1995	1996
Finfish	780,000	613,000	420,000	259,000	325,000	829,000
Lobster	604,000	491,000	442,000	844,000	862,000	612,000
Conch	458,000	462,000	464,000	416,000	302,000	325,000
Pink shrimp*	142,000	106,000	63,000	75,000	108,000	83,000
Farmed Shrimp	436,000	1,083,000	1,071,000	1,311,000	1,214,000	1,574,000

\* The figures presented in the above table do not include production from the Coastal artisanal Shrimp Fishery.

<sup>1</sup> Trawled shrimp is made up almost exclusively of the pink shrimp (*Penaeus notialis*)

## 2.0 Description of the Industrial Shrimp Trawl Fishery

In 1984, the Industrial Shrimp Trawl Fishery began on a commercial basis utilizing four industrial trawlers. During 1986, the Government of Belize as part of its fishery development policy, provided incentives to have more shrimp trawlers operate in Belize, which led to an expansion of the fleet a total fleet of eleven trawlers(Auil, 1993). The trawlers, which were owned by Hondurans, were operated through joint venture agreements with the local fishing cooperatives. At present, most of the trawlers in operation (which can only trawl during the open season for shrimp which runs from July 15 of any given year to March 14 the following year) are locally owned and the government is encouraging local cooperatives to purchase their own vessels by assisting them in obtaining loans.

### 2.1 Fleet Description

Currently, the trawling fleet consists of five vessels whose age ranges from 13-25. Four of the trawlers are the Gulf of Mexico type (RDA Int., 1991), 22 metres in length. They are steel hulled with gross tonnage ranging from 68 to 103, and net tonnage from 34 to 70. Propulsion is by 365 HP engines. The refrigerated holding capacity is estimated to be 40,000 lbs and they are equipped with depth sounders and GPS. SSB and VHF radios are used for radio communication. The fifth trawler differs from the others in that it is a fiberglass boat 17 metres in length which is propelled by a 350 HP engine.



**Figure 1:** Northern 1 -One of the Shrimp trawlers operating in Belizean Waters.

While two of the trawlers are equipped with a pair of double-outrigger trawls, the others are equipped with two pairs of double-outriggers. Trawl nets generally have a mesh size of 1/4 inch.

## **2.2 Fishing Grounds**

The main shrimp habitat and trawling areas are the soft sand-mud bottom of the Inner (or Main) Channel and Victoria Channel (Figure 5.). The Inner Channel which is about 4 miles wide and 60 ft deep lies adjacent to the coastline, with trawling concentrated between Colson Point and Placencia Point 32 miles to the South. At times, some trawling is carried out between Colson Point and Southern Grennels Channel to the north, while in transit to or from Belize City or San Pedro for unloading the catch. Victoria Channel, which is 8 miles long by 1 mile wide, and mostly 120 ft deep, lies seaward of the Inner Channel off the Placencia peninsula. The Victoria Channel represents less than 10% of the total area of the Inner Channel Grounds, so less trawling occurs there (RDA Int. Inc., 1991). The trawlers utilize approximately 694 km<sup>2</sup> of fishing area. (See **Map 1 - Appendix A**).

## **2.3 Landing Sites**

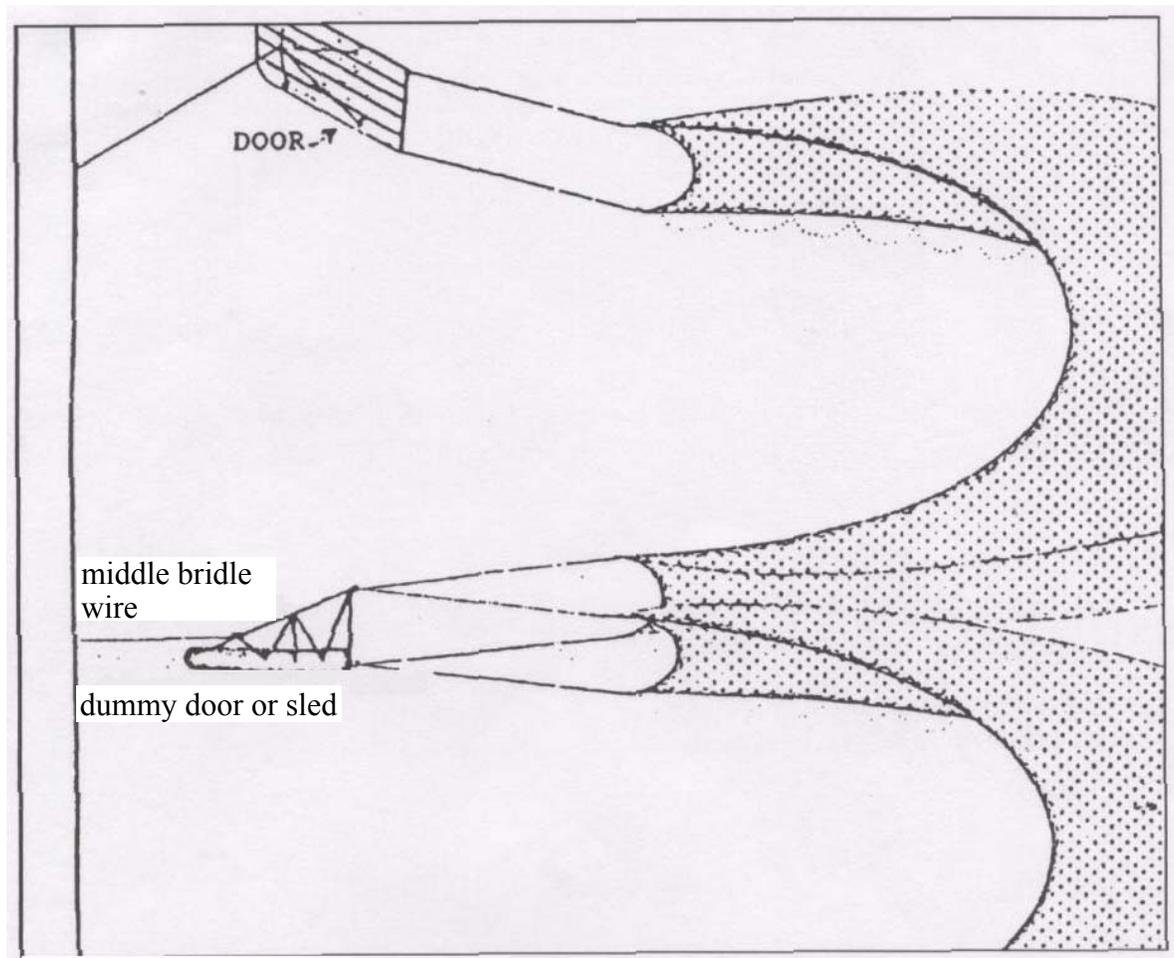
Generally, the trawlers dock outside the harbour in Dangriga or other coastal township after a night of trawling. At present, trawlers land their shrimp and fish at the wharves of the National Fishermen's Cooperative and the Northern Fishermen's Cooperative in Belize City.

## **2.4 Landing Procedures**

### **2.4.1 Shrimp Trawling**

The trawler crew starts working at about 5:00 pm. The trawl nets ( Figure 2.) are set out at about 6:00 p.m. The trial net is then hauled every half hour for two hours. If at least 10 Ibsof shrimp is caught in the trial net during this period, this area is considered good for trawling.

At 11:30 p.m. both nets are pulled in by a winch, and the contents deposited on the stern deck.



**Figure 5:** General Model of a DOUBLE OUTRIGGER SHRIMP TRAWL NET.

#### **2. 4. 2 Handling of Catch On-board vessel**

Undamaged shrimp are removed from the catch and may be sorted into large and small size groups on board the vessel. The shrimp are subsequently de-headed and placed in buckets. The shrimp tails are later washed and packaged in fifty-pound plastic bags. Commercially important fish species of acceptable size as well as spiny lobsters ( during their open season) are also retained and cleaned. The rest of the catch is discarded- The shrimp and other products are stored in the freezer until they are off-loaded from the vessel in Belize City at the end of the trip, which would normally last for 30 days.

It appears as if at least one cooperative has been using the opportunity to explore possibilities for other types of fishing. During this study, we found out that Northern Fishermen's Cooperative

has been looking at the fishing potential for squids, sea horses and scallops - all by-catch caught along with shrimp by the industrial shrimp trawlers.

### **2.4.3 Off-loading Procedure**

The trawler sails to the Belize City Harbour where the catch is off-loaded onto a smaller vessel and transported to the processing plant operated by the fishing cooperative. The shrimp and incidental catch is landed at the cooperative and weighed in the presence of the trawler's captain and a senior employee of the cooperative.

Unless processing begins immediately, the shrimp is placed in the freezer room at the processing facility.

### **2. 4. 4 In-plant Processing**

During in-plant processing of shrimp (which is manual) the following takes place:

- Step 1: The tails are thawed and placed in troughs which contain a water/ice mixture treated with chlorine (2- 5 ppm). At this point quality control inspection is done by the Fisheries Department.
- Step 2: They are then graded into three size categories: small, medium and large.
- Step 3: The tails are further graded by number of individuals per pound.
- Step 4: Virtually all the shrimp retained for the market are the pink shrimp and on accumulating approximately twenty pounds of a size category, shrimp are taken to a drainage tray, weighed and placed into five pound boxes.
- Step 5: Next, the boxed tails are placed in the blast freezers. At this point, additional quality control inspection is carried out by the Fisheries Department.
- Step 6: Twelve hours later they are placed by size categories into 50 lbs boxes (10 x 5 pound boxes) and cold stored mainly for export-Fish of assorted species and sizes is boxed in 50 pound quantities and placed in the freezer Those that are large enough for the export and domestic markets are kept and sold by the cooperative. As the fish are generally too small to attract buyers, it is normally distributed to institutions at a later date as part of the by-catch utilization program.

### **3.0 Description of the Coastal Artisanal Shrimp Fishery**

The Coastal Artisanal Fishery has been in existence for far longer than the Industrial Shrimp Trawl Fishery as several generations of local fishermen have been harvesting shrimp from our coastal waters. There are specific times that fishermen go out to catch shrimp. Fishermen claim that the wind and water clarity are the two key elements that help them to determine when shrimp can be found in the area.

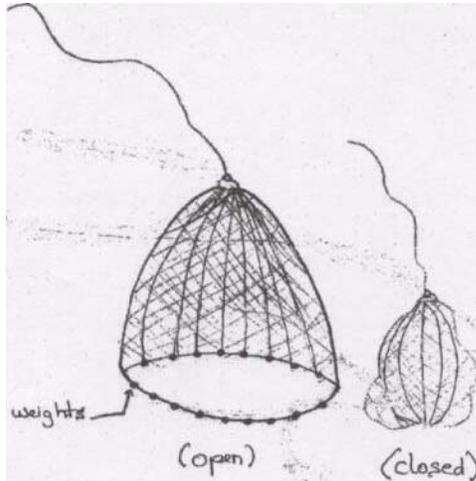
This fishery is currently regulated by a closed season from the 15 March to the 15 July. However, we know (from anecdotal information), that due to the lack of enforcement of this regulations, most of the artisanal fishermen fish for shrimp continually throughout the year with most of the activity occurring between April and October, during the rainy season, when it is thought that the adults are inshore (Phillips & Richards, 1996).

Fishermen who target species of finfish may also fish for shrimp. For example, when fishing for bait or "sprat" (one or more species of the family CLUPEIDAE) shrimp may be caught incidentally. If they are of reasonable size, then fishermen continue to catch shrimp since its value per pound is much higher than that for finfish. At other times, when they know that shrimp are available, fishermen may go out especially to fish for shrimp.

Because fishermen tend to respond to the availability of shrimp (which is not continual), and because shrimp availability cannot be predicted well in advance, it has been difficult to gather information on the catch and landings from this fishery. It is also difficult to determine exactly how many fishermen are involved in the fishery or how many boats operate in it because (based on anecdotal information from fishermen in Belize City and Punta Gorda) it is unlikely that it is the primary fishery for many. We do know, however, that the population of fishermen does overlap significantly with those for the artisanal finfish fishery. The Belize National Frame Survey of the Fisheries (to be conducted by the Belize Fisheries Department in 1997) should allow us to determine this type of information. It will also allow us to better document what is known about the Coastal Artisanal Shrimp Fishery.

#### **3.1 Fleet Description**

The fleets for all the communities engaged in the fishery are similar; they are comprised of small wooden vessels, either canoes or launches 6-7 feet wide and 15 - 20 feet long. These are equipped with small outboard motors, usually 25 HP or less. The primary gear type for this fishery is the cast net (Figure 3.) used also for catching bah or "sprat." Small manual trawls called drag nets (Figure 4.) are also used. While the mesh size for the cast net is 1/8 - 1/4 of an inch, that of the drag net tends to be 1/4 of an inch.

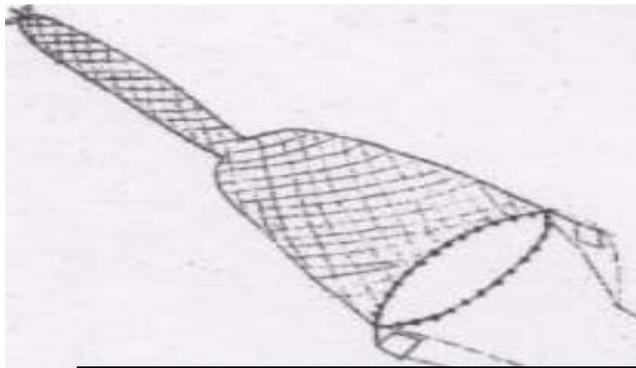


Major differences in usage of the cast net and drag net are -:

1. Cast net is used when water is 3 feet deep; drag net can be used in water as deep as 35 feet of water.
2. Capacity of cast net is between 20 -30 lbs; capacity of drag nets is between 75 - 100 lbs.

*NOTE: The sprat net is so named because it is used by fishermen to fish for sprat or bail to capture finfish.*

3-. Diagrammatic representation of a cast net  
Or SPRAT NET.



### 3.2 Fishing Grounds

Most of the fishing is said to occur 2-3 miles from the coast- The range spans from Belize City, near the mouth of the Belize River, all the way down to the Sarstoon area in Toledo - the southern most district in Belize. See Figure 6.

**Figure 4:** Diagrammatic representation of a drag net or MANUAL TRAWL

### 3.3 Landing Sites

The shrimp, along with whatever fishes are captured, are taken to the markets of villages and sold whole and fresh. Some of the fishermen take their shrimp produce directly to restaurants or hotels for which they fish exclusively.

#### *Ports of Operations*

The Artisanal Shrimp Fishery currently functions out of several southern coastal communities; these include Dangriga, Hopkins, Seine Bight, Placencia and its surroundings, Monkey River, and Punta Gorda as well as Belize City.

### **3.4 Landing Procedures**

#### **3.4.1 Shrimp Capture**

Fishing trips for this fishery tend to last only a day. Artisanal fishermen who fish for shrimp may do so early in the morning or late in the afternoon. For example, fishermen may fish from as early as 4:00 am.

#### **3.4.2 Handling of the Catch On-board Vessel**

When the net is hauled in, usable bait, food fish and shrimp are retained and the rest of the catch is discarded. Since the trips are short, the products are stored on ice in ice boxes until they are landed.

#### **3.4.3 Off-loading Procedures**

Products from the same vessel may be landed at a number of different places. For example, Punta Gorda fishermen who fish in the Sarstoon area may sell their fish to villages in that area but land their shrimp at Punta Gorda where they sell them at the market or to restaurants.

#### **4.0 Conclusions & Recommendations**

The Shrimp Capture Fishery of Belize, even though it is of lesser economic importance than the Shrimp Culture Fishery, does earn several thousands of dollars in revenue for the country of Belize (**Table 1.**) In addition to its economic importance, the Shrimp Capture Fishery is important because it has the potential of unlocking the mystery of the dynamics that occur among organisms that thrive in Belize's coastal waters.

The diversity of the catch in both the artisanal and industrial portions of this fishery is a good indicator that important biological, ecological and systematic information can be obtained by a detailed study of the fishery. Such a study can also equip fisheries biologists with the knowledge they need to assess, monitor and manage the fishery properly.

The mandate of the Belize Fisheries Department is to be the leader in the management of Belize's fisheries - the Shrimp Fishery included. Under the stewardship of the CARICOM Fisheries Resource Assessment and Management Program (CFRAMP), the Shrimp and Groundfish Sub-project was implemented in Belize in 1996 because of the realization that this important fishery must continue to operate in a sustainable manner.

Even though there is a considerable amount of information available on the industrial component of the fishery, there is little documentation of the artisanal shrimp fishery. This document will serve as a base on which to build as it is currently the only detailed documentation that provides a description of the Shrimp Capture Fishery of Belize. Nonetheless, there is still much more information that can be obtained on the fishery.

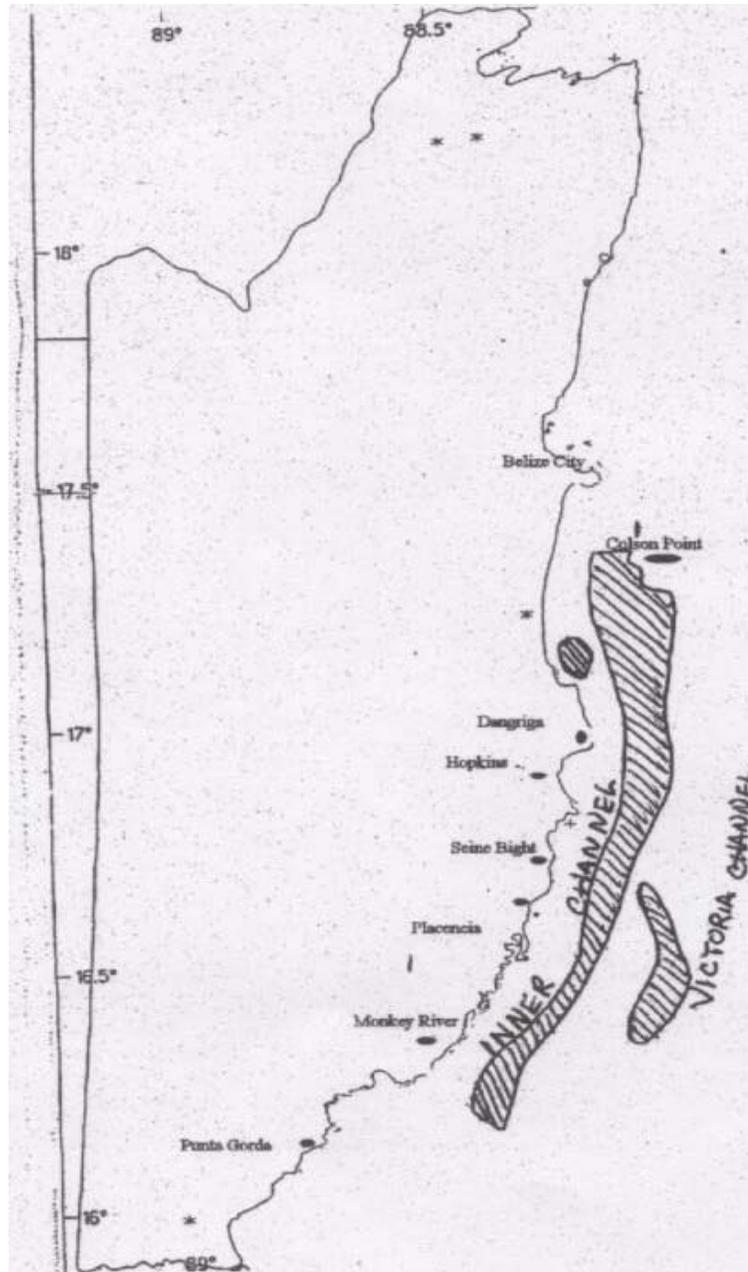
It is recommended that more information be sought, especially on the artisanal fishery. As more information becomes available, whether it be from more visits on board the trawlers, visits to landing sites, or through interviews like those that will be conducted under the Frame Survey of the Belize Fisheries, the information should be properly documented so that the vital information obtained will be available to those who can utilize it to sustainably manage the Belize Shrimp Capture Fishery.

## **5.0 References**

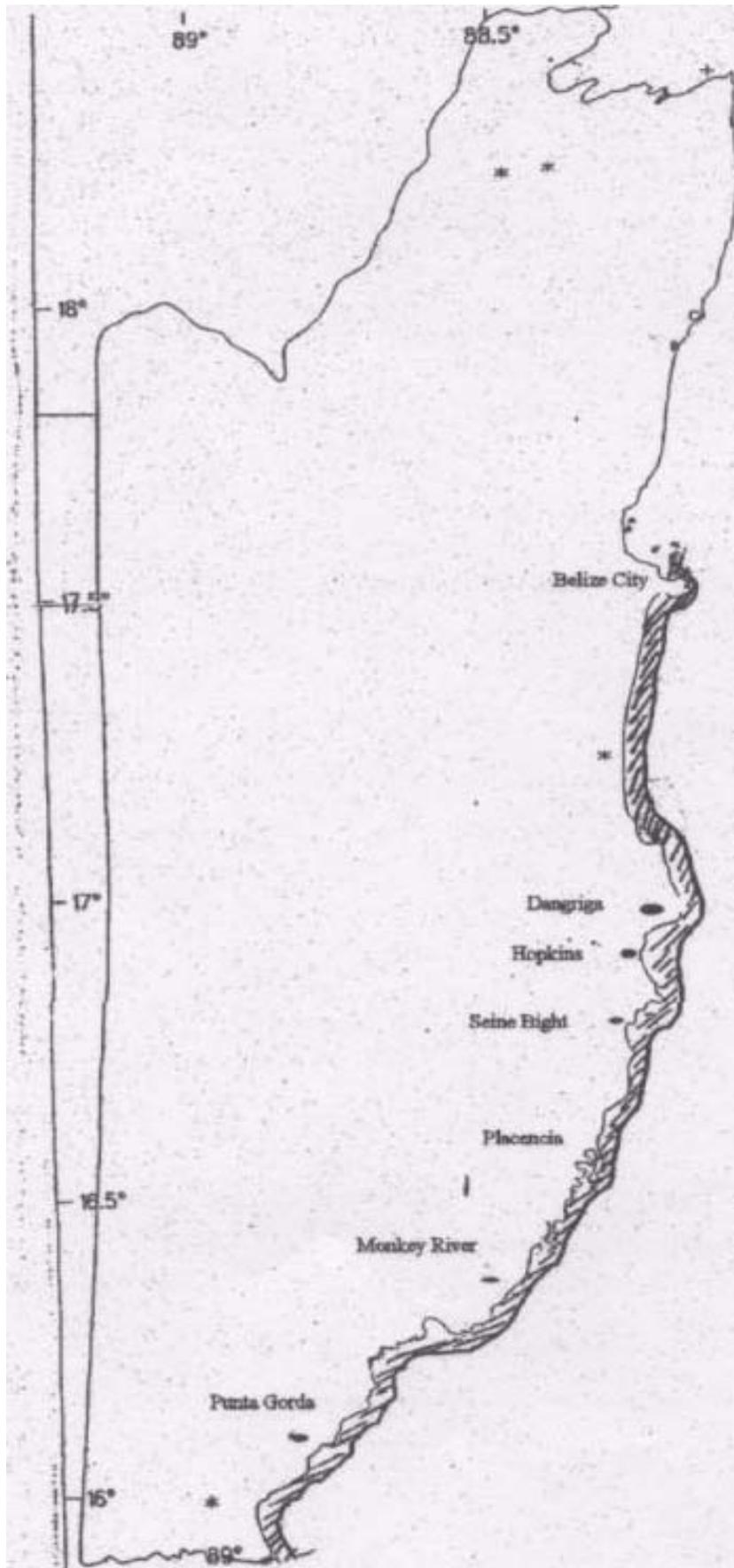
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**Figure 5:** FISHING GROUNDS FOR INDUSTRIAL SHIMP FISHING.



**Figure 6:** FISHING GROUNDS FOR THE ARTISANAL SHRIMP FISHERY.