

**Fig. 7-6-2 Aquatic Life and Fisheries Study Area**

- The main species captured by volume are: coporo, catfish, rayao, morocoto and curvinata.
- Most important fishing locations are: Mariche and the Tórtola channel.
- Fishing activity is the main source of income of riverside communities.

The detail observations on the study of aquatic life and fisheries are shown below.

#### <Overview>

Fishing at the Orinoco River as a commercial activity has an essential importance for the local economy of the communities distributed along both banks of the Orinoco River.

According to the empirical models proposed by Novoa (1982), the fishing potential of the Orinoco River is approximately 45,000 t/year. Out of the potential, approximately 20,000 t/year is currently exploited.

This potential is not that uniform along the river. There are two main areas: The Orinoco Delta and the so-called Internal delta, located around Caicara-Cabruta, where the tributary gries of the Orinoco River, such as Apure, Arauca, Meta, Cuchivero, etc. discharge.

The essential reason for such high fishing potential are the wide and extensive flood plains used as space distribution zones by the aquatic fauna, with higher possibility of dispersion of the natural populations. During the rainy season the plains are flooded and the flooded spot covers large spaces that are colonized by the most diverse species of fishes that find there refuge and food in it.

During low water level, these species go to the main channel to continue the upstream migration during the so-called "ribazones" or massive movements of the shoals of different species of fishes that extend for months, travelling hundreds of kilometers along the channel.

This adaptation of fishes to the hydraulic dynamics of the Orinoco Basin has been known for centuries by the local fishermen, who adopt efficient exploitation strategies of the resources. Thus since the beginning of low tide or low river level, in October, and until the end of that period in April, the fishermen chase the shoal of fishes of different species that successively move along the channel by combining the different fishing gears. During the flooding period, these producers operate mainly in lagoons, savannas or "cattle ranges" and caños of the flooding plain.

The best season of the year for fishing activities is during the dry months, when the large migrations of fishes and the greatest relative "concentration" of the biomass take place, when the water volume of the fluvial system decreases considerably.

#### <Importance of Barrancas in the fishing activity>

In Barrancas del Orinoco, main populated center of the area of study, and also in the main river channel close to Barrancas, the largest proportion of fish production of the Orinoco Delta is concentrated. In effect, it is currently estimated that 80% of the catch at the delta is stored in Barrancas, Tucupita and Volcán while the remaining 20%, where there is a predominance of marine species, is concentrated in the surroundings of Pedernales, and is then transported to Güiria and Maturín.

Officially, between 1991 and 1996, the disembarkation reported in Barrancas varied between 2,000 and 3,300 tons. As it can be observed, in comparative terms, Barrancas is one of the most important centers of fish unloading at the Orinoco River.

#### <Fishing Methods>

The most widely used fishing gears at the Orinoco River are the gill nets or hammocks, the cast line, palangre or "espiniel" and line or rope. The gill net is the most popular fishing gear. It is mainly used during the low water season, both in the main channel and in the flooded lagoons. The cast line is the most popular fishing gear used during the high water season, especially for the capture of migrating species such as coporo, bocachico, morocoto, palometa, zapuara, etc.

#### <Seasonal Catch>

In general, the commercial fisheries of the Orinoco River are clearly seasonal, registering the highest performance during the low water months, between November and April.

#### <Composition of commercial unloading>

As for the unloading area, there is a predominance of coporo (*Prochilodus mariae*), with a significant share of bagre rayao (*Pseudoplatystoma* sp.), morocoto (*Piaractus brachipomus*) and curvinata (*Plagioscion squamosissimus*). The first three ones are migratory habits, and are distributed both in the main channel and in the lagoons and small rivers of the flooding plain.

### <Migrations>

The strategies and periods of fish migration differ depending on the species. Thus for example, the zapoara leaves the flooded lagoons during the high water months, when the connection of the impounding lagoons and the main channel are established. On the other hand, the coporo, leaves the flooded plain a few weeks later, just like the morocoto, palometa and bagre rayao, when the water level starts decreasing in September. From the Delta, species such as bagres rayao and blanco pobre, that do not get into the lagoons, move at that same period, feeding on the above mentioned small pelagians.

## **(3) Socio-economic Environment**

### 1) Objective

The fundamental objective of the study is the characterization of the socioeconomic and cultural conditions of the population and the set of activities developed in the direct and indirect area of influence of the Project, with the purpose of determining their current situation and identifying the possible negative environmental impacts that the execution and development of the work could generate.

### 2) Methodology

- i) Review and analysis of the information of previous studies on the area and/or official sources of information.
- ii) Field study through the direct observation of information gathering.

### <Definition of the sample and elaboration of survey>

To make the field work, as a measure to supplement the socioeconomic information obtained from the official sources (Census of Population and Housing, 1990 and others) and for the purpose of characterizing in greater depth the communities that make up the space environment of the area of analysis of this study, a sampling plan was designed based on the following guidelines:

#### i) Sampling population

The inhabitants of the communities located in the area of direct influence of the Project (area of study) were used as base population for making the sample framework. It includes the city

of Barrancas del Orinoco (capital Sotillo Municipality of Monagas State) and a group of neighboring communities.(refer to Fig. 7-6-3)

- From Sotillo Municipality (Monagas State)
  - Los Barrancos de Barrancas
  - Apartadero
  - Sabaneta
  - Macarena
  - Muro de Guaiguapo
- From asacoima Municipality (Delta Amacuro State)
  - Caratal de Tórtola
  - La Chivera I
  - La Chivera II
  - Manacal de Tórtola
  - Mata-Mata
  - Tórtola Abajo
  - Tortola Arriba
  - Varadero de Yaya
  - Mariche

ii) Sampling Type

A simple random sampling was used, proportionally considering the population weight.

iii) Sample Size

To obtain a representative sample it was estimated to make a total of one hundred and twenty seven polls (127) distributed as follows: eighty seven (87) in Barrancas and forty (40) in the remaining communities, according to their population weight.

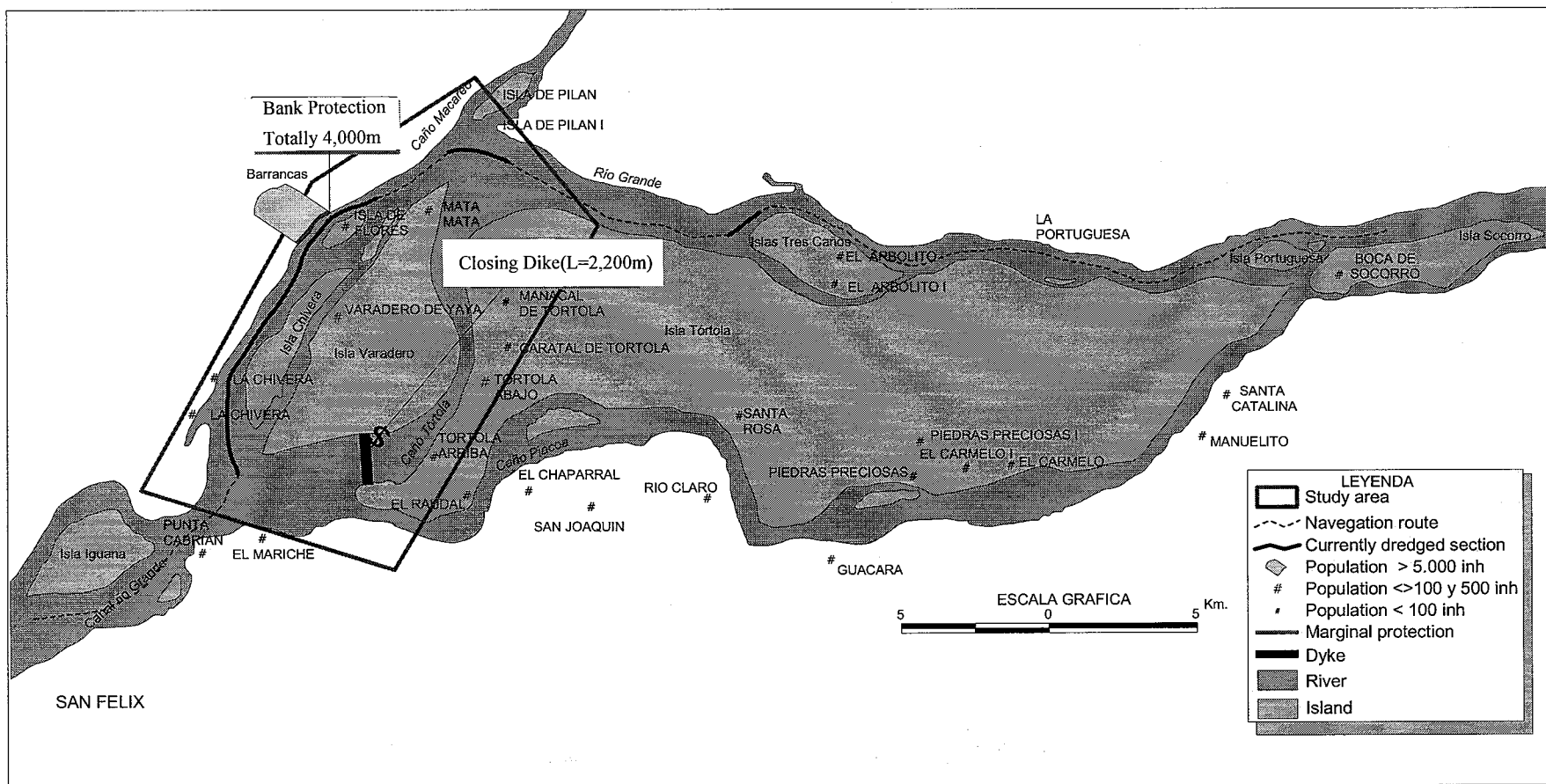


Fig. 7-6-3 Socio Economic Study Area

### 3) Results of the study

The results obtained through this study are outlined as below,

- Very young population (under 30 years of age) where there is approximately the same number of men and women, with a small group of immigrant population coming from British Guyana which has managed to become incorporated into the socioeconomic dynamic of the zone. This is with an indigenous settlement in Barrancas in serious state of insalubrity and totally excluded from the dynamic of the area.
- Low level of education, in most cases covering only basic education with a high propensity to school abandonment.
- In the case of Barrancas the economy turns around the agricultural and live stock activities, and the public sector. In the case of the remaining communities, there is a clear agricultural and fishing orientation. In both cases, the dependency of the economic activity on the river is very important.
- The masculine population works mainly in agriculture and fishing, and the feminine population is mainly dedicated to housework, or works in shops and offices.
- There are few possibilities of health care, since although there is a hospital in Barrancas and public clinics in some rural communities, the care paid is only of primary assistance for non serious cases.
- There is a high definition toward the catholic religion, although there is a significant group of evangelical, and in the case of the rural communities even atheism.
- In Barrancas there is a predominance of the consolidated owned home and with access to basic services, but at the rural communities most of them are of very precarious and unstable structure.
- There is an average of 6 members per each home, and where the member or members that work have to share their income with at least 5 persons, the per capita income estimate is quite low.
- The socioeconomic dynamic relies upon around the river, mainly at the rural communities, where the river is the only communication mean among them and to nearby populated centers.

The detail observations on socioeconomic survey are shown below.

- Population

Table 7.6.2 shows the total population and homes of the communities located in the area of direct influence of the Project. Among these communities, Barrancas del Orinoco is the main city, with a total of 1,817 homes and 9,579 inhabitants. The area of direct influence also covers a total of 15 communities with less than 200 inhabitants each, located in neighboring areas to Barrancas.

**Table 7.6.2 Total Population and Homes for The Communities of the Area**

Populated Center	State	Municipality for the '90 census	Municipality starting on 1994	Total Homes	Total inhabitants	Total men	Total women
Barrancas del Orinoco	Monagas	Sotillo	Sotillo	1,817	9,479	4,753	4,726
Communities North of the navigation Channel							
Muro de Gualguapo	Monagas	Sotillo	Sotillo	4	4	3	1
Marcanera	Monagas	Sotillo	Sotillo	28	113	54	59
Apostadero	Monagas	Sotillo	Sotillo	36	179	99	80
Los Barrancos de Barrancas	Monagas	Sotillo	Sotillo	31	179	92	87
Sabaneta	Monagas	Sotillo	Sotillo	28	148	83	65
Saladero	Monagas	Sotillo	Sotillo	11	88	49	39
Communities South of the Navigation Channel							
Mata Mata	Delta	Tucupita	Casacoima	7	25	15	10
Varadero de Yaya	Delta	Tucupita	Casacoima	32	175	98	77
La Chivera I	Delta	Tucupita	Casacoima	3	22	11	11
La Chivera II	Delta	Tucupita	Casacoima	6	30	17	13
Communities of Tórtola Caño							
Caratal de Tórtola	Delta	Tucupita	Casacoima	9	21	9	12
Manacal de Tórtola	Delta	Tucupita	Casacoima	16	98	51	47
Tórtola Abajo	Delta	Tucupita	Casacoima	33	198	110	88
Tórtola Arriba	Delta	Tucupita	Casacoima	7	20	12	8
El Mariche	Delta	Tucupita	Casacoima	4	17	9	8

Source: OCEI, Nomenclature of Populated Centers, 1990.

- Ethnic Groups

The presence of indigenous population in the area of study is not very significant. Although the Delta Amacuro State is the one that concentrates the largest percentage of indigenous population nationwide, the Warao ethnic group which is the most numerous one is mainly located at the lower and medium Delta and not in the area of study. It was then possible to know that both in Barrancas and in the studied rural communities, the primitive indigenous population ratio ("non adapted to the "Creole way") is significant. Most inhabitants of this



area are half-caste, product of the union of Indians and Creoles, or Indians already incorporated to the civilization, although generally in precarious conditions.

- Education

In terms of education, it should be pointed out that both in the rural communities and in Barrancas, approximately half of the population of school age does not study. But in general, school abandonment takes place between the completion of elementary school and the beginning of high school.

- Economic activity

Interpreting the data and adding it to the field observation made at the zone where it can be said that the economic dynamic of Barrancas is supported on two factors: agriculture and livestock and the public sector. Concerning the agriculture and livestock activity, Barrancas is a gathering and distribution center of the products of the zone, where the inhabitants of the close-by communities sell their products (fish catch and crops) and they buy food and other products, while on the other hand, a high percentage of the population directly or indirectly depends on the public sector.

The economic dynamic of the rural communities is very different from that of Barrancas, since in said city the economic activities are more stable and represent a more stable income, while the agricultural and fishing activities developed in the communities are subject to the climatic and seasonal effects.

- Existing Infrastructure

It should be emphasized that the majority of the rural communities, with the exception of Mariche, Saladero and Muro de Gualguapo, have teaching facilities.

As it can be seen in the Table 7.6.3 given below, only Barrancas has access to almost all the infrastructure that could be expected from a fairly architecturally planned community. 44% of the communities have public clinics or ambulatory centers.