

2.4 Waterway Transportation System in Orinoco Delta

(1) Historical Background

The existence of the Orinoco river was first noticed by Cristopher Columbus during his third voyage. He reached its delta and was impressed by the amount of fresh water introduced into the sea.

The development of the Orinoco river has been historically linked with the development of the Venezuelan mining industry in this basin. The beginning of the exploitation of iron in large scale was the discovery of an important iron deposit in El Pao. In 1933, the Bethlehem Steel Corp. constituted its subsidiary, the Iron Mines Co. of Venezuela to take care of the development and exploitation of El Pao. Camps, roads, railroad and port were projected and construction began in 1941. Unfortunately, the works were stopped due to the World War II and restarted soon after its end in 1945. Five years later, the facilities became planned operational.

In 1944 the steel producer consortium United States Steel Corporation (USS) decided to develop a vast exploration program in search of iron ore preferentially in the Atlantic Basin. After discovering one of the biggest iron deposits in the world in Cerro Bolivar it established the subsidiary Orinoco Mining Co. in 1949, to take care of the exploitation and exportation of the mineral in large scale.

The purpose of both, the Iron Mines Co. of Venezuela and the Orinoco Mining Co. was the export of iron ore to their main factory in North America. Therefore, the transportation of the mineral was one of the key issues for the success of their operations. In this context, the Orinoco river was the natural way to take the product out, but transit of large vessels was not possible due to inadequate navigable depth.

The situation was confronted differently by each company. The Iron Mines Co. built Puerto de Hierro in Peninsula of Paria, in the Caribbean Sea with capacity to receive vessels over 26 thousand tons. Specially built barges transported the mineral through the Macareo channel and transferred their loads to larger vessels crossing to North America. The Orinoco Mining Co. constructed the railroad from Cerro Bolivar to Puerto Ordaz, located in the estuary of the Caroni river, and the export port too. Channeling works were undertaken in the Orinoco and Caroni rivers to allow the entrance of large vessels under the supervision of the National Institute of Canalization (INC).

Historically, the products of the Orinoco Basin had been exported through the Manamo and Macareo Canals in the Orinoco Delta. In 1959, due to the increased volume of export, a new

channel through Rio Grande was opened for larger vessels. Currently, navigation through the other canals has been abandoned.

At the beginning, Rio Grande canal made Venezuela advantageous conditions for the transportation of its products. However, usage of large vessels in the iron industry has been increased nowadays and they can not easily navigate through the Orinoco river. Moreover, the maintenance of the channel has become a heavy burden to the government due to the sediment transportation and the drift sand along the east coast.

In 1988, a transfer vessel station was installed at Boca de Serpiente, with a storage capacity of 220,000dwt and a water access depth of 50ft. This station is served by cargo capacity of 65,000 tons class two shuttle vessels to transfer iron ore to the station. The capacity of Boca Grande waterway, Atlantic entrance to the Rio Grande, has been increased to receive 65,000 dwt vessels with 42-feet draft.

(2) Present Navigation System

Venezuela is much dependent on the fluvial axis that crosses the territory and facilitates the communication among economic complementary regions and the Atlantic ocean. A multimodal transportation system based on the Orinoco-Apure axis and the existing and projected infrastructure is considered to serve as the means of the integration of the Venezuelan territory.

The navigable spans in the Study Area are located along three rivers, Orinoco, Apure and Portuguesa as shown in Fig. 2-4-1. The Orinoco river consists on three navigable spans that extend from Puerto Ayacucho to Boca Grande whereas four navigable spans are recognized in Apure and Portuguesa rivers. The lengths of the navigable spans in Orinoco, Apure and Portuguesa are 632 km, 665 km and 301 km respectively. The details on the type of navigable vessels and their respective spans are given in the Table 2.4.1.

The navigation along the Apure river is considered generally to be possible 8 months a year by means of a set of four barges, 1,000 DWT each in general. The draft, length and width of the grouped barges are 1.8 m, 140 m and 30 m respectively. Navigation along Portuguesa river is possible under natural conditions with self-moved equipment or pushed barges (1.75 m draft, 80 m length, and 15 m width) within 6 or 7 months a year.⁴

⁴ PROA, Eje Orinoco – Apure, MARNR, Special Publication DGSPROA/PE/01, November 1991

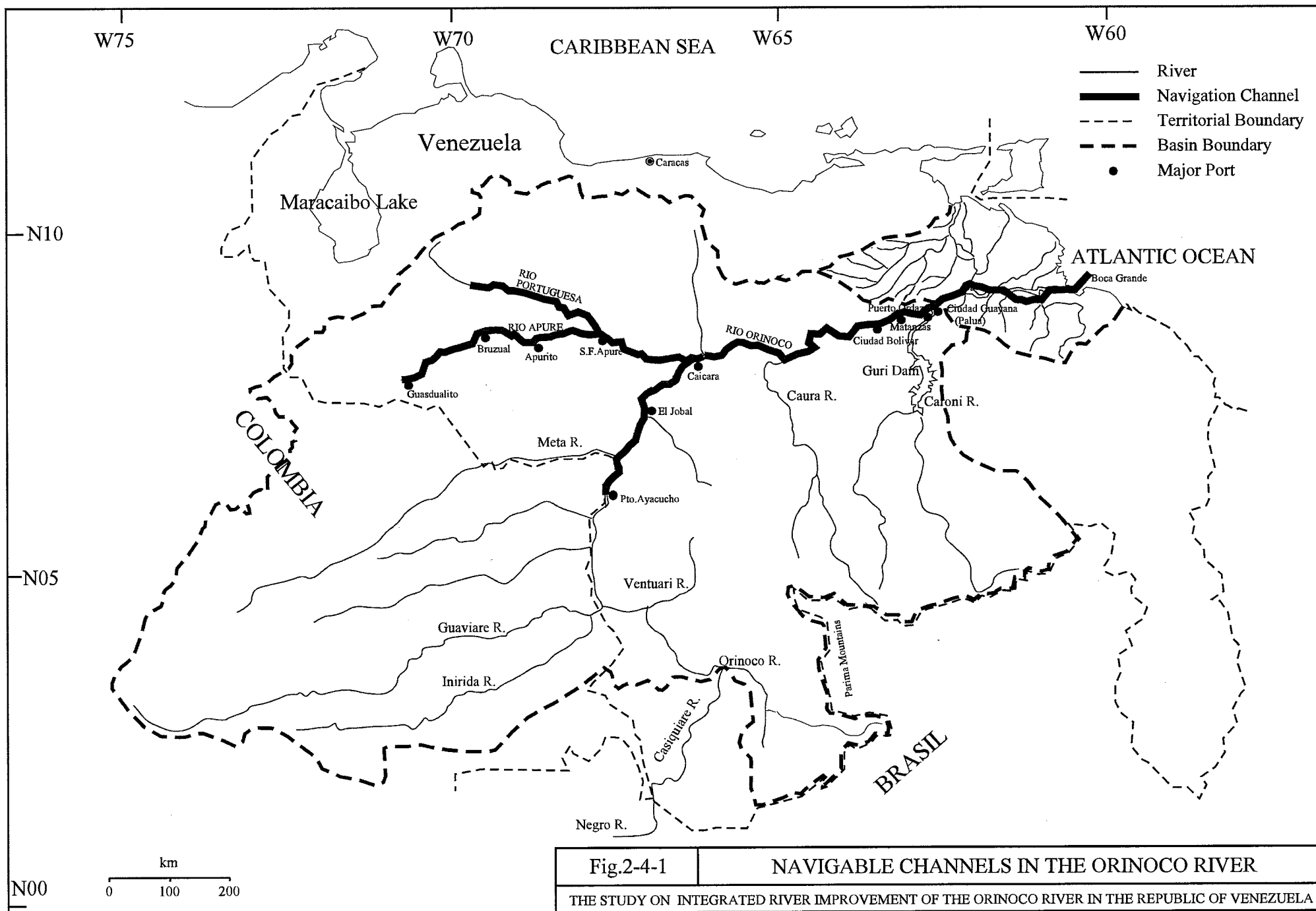


Table 2.4.1 Navigation Channel Characteristics in Orinoco, Apure and Portuguesa Rivers

River	Navigable span	Length (km)	Remarks
Orinoco River	Boca Grande - Matanzas	360	Water level varies in the range of 12m. Allowed sized of vessel under the guaranteed depth of 32ft is 15,000 dwt. However, average vessel size circulate is 40,000 dwt. Max. vessel size is Panamax 65,000dwt.
	Matanzas – El Jobal	650	Flow velocity is high due to the rock outcrops.
	El Jobal – Puerto Ayacucho	194	Water level varies in the range of 10m. Navigation is limited to the month of high waters, 8 months in a year. Barge size is up to 2m- draft, 60m-length and 15m-width)
Sub total length of Navigable span		1,204	
Apure River	Outlet of Orinoco River – San Fernando	183	Well defined and stable.
	San Fernando – Apurito	137	Receives the discharge of Portuguesa river. Sinuous and deltatic.
	Apurito - Bruzual	124	Consists islands due to sediment deposition
	Bruzual - Guas dualito	221	Receives most of its liquid and solid loads from upstream of Bruzual. Sinuous, braid shaped and consists with shoals and islands.
Sub total length of Navigable span		665	
Portuguesa River	Outlet of Apure river – Poblacion de Camaguan	44	Water level variation is 6m. Depth is only 2m for a period of 7 months.
	Poblacion de Camaguan – La Union	35	Main inflow is from Guanare river. It has a well defined river bed, stable shores and a good alignment for navigation.
	La Union – Sitio Jobalito	111	Receives discharge from Tiznado, Pao and Igues rivers. Average water level variation is 7.1m.
	Sitio Jobalito – La Portuguesa	59	Receives discharge of Cojedes river. Water level variation is 3.75m.
Sub total length of Navigable span		249	
Total length of Navigable span		2,118	

* Source: PROA (Programa Orinoco-Apure)