

## TABLE OF CONTENTS

6.0	DESCRIPTION OF THE SOCIOECONOMIC SITUATION .....	6-1
6.1	Introduction .....	6-1
6.2	Panama -- General Aspects	
6.2.1	Panama – Political and Administrative Organization .....	6-4
6.2.2	Panama – Demography.....	6-4
6.2.3	Panama – Health .....	6-5
6.2.4	Panama – Education .....	6-5
6.2.5	Panama – Economic Activities.....	6-6
6.2.6	Panama – Basic Services and Infrastructure... ..	6-6
6.2.7	Panama– Migration .....	6-8
6.2.8	Panama– Citizen Security.....	6-10
6.3	Current Use of Adjacent Lands Areas .....	6-12
6.3.1	Eastern Pacific Urban Zone .....	6-12
6.3.2	Zone 2 – Western Pacific Urban .....	6-12
6.3.3	Zone 3 – Atlantic Urban .....	6-13
6.3.4	Zone 4 - Transisthmian Corridor .....	6-13
6.3.5	Zone 5 - Gatun Lake and Costa Abajo de Colon .....	6-13
6.3.6	Zone 6 – Taboga Island .....	6-14
6.4	Properties and Infrastructures .....	6-14
6.4.1	Gatun Lake Infrastructures .....	6-14
6.4.1.1	Gatun Lake and Costa Abajo de Colon Zone.....	6-15
6.4.1.2	Transisthmian Corridor Zone .....	6-18
6.4.2	Construction of Locks and Water Reutilization Basins .....	6-19
6.4.2.1	Cocoli.....	6-19
6.4.2.2	Former Gatun Townsite .....	6-19
6.4.2.3	Jose Dominador Bazan.....	6-20
6.5	Population Characteristics .....	6-20
6.4.1	Eastern Pacific Urban Zone .....	6-20
6.4.2	Western Pacific Urban Zone .....	6-21

6.4.3	Atlantic Urban Zone .....	6-22
6.4.4	Transisthmian Corridor Zone.....	6-22
6.4.5	Gatun Lake and Costa Abajo de Colon Zone .....	6-23
6.4.6	Taboga Island Zone .....	6-23
6.6	Education .....	6-23
6.6.1	Eastern Pacific Urban Zone .....	6-26
6.6.2	Western Pacific Urban Zone .....	6-26
6.6.3	Atlantic Urban Zone .....	6-27
6.6.4	Transisthmian Corridor Zone .....	6-27
6.6.5	Gatun Lake and Costa Abajo de Colon Zone .....	6-27
6.6.6	Taboga Island Zone .....	6-28
6.7	Demographic, Social, and Economic Indicators.....	6-28
6.7.1	Eastern Pacific Urban Zone .....	6-31
6.7.1.1	Demography .....	6-31
6.7.1.2	Human Development .....	6-32
6.7.1.3	Indigenous Communities .....	6-32
6.7.2	Western Pacific Urban Zone.....	6-32
6.7.2.1	Demography .....	6-32
6.7.2.2	Human Development .....	6-33
6.7.2.3	Indigenous Communities.....	6-34
6.7.3	Atlantic Urban Zone .....	6-34
6.7.3.1	Demography .....	6-34
6.7.3.2	Human Development .....	6-34
6.7.3.3	Indigenous Communities.....	6-35
6.7.4	Transisthmian Corridor Zone.....	6-35
6.7.4.1	Demography .....	6-35
6.7.4.2	Human Development .....	6-35
6.7.4.3	Indigenous Communities.....	6-36
6.7.5	Gatun Lake and Costa Abajo de Colon Zone .....	6-36
6.7.5.1	Demography .....	6-36
6.7.5.2	Human Development .....	6-37

6.7.5.3	Indigenous Communities.....	6-37
6.7.6	Taboga Island Zone .....	6-37
6.7.6.1	Demography .....	6-37
6.7.6.2	Human Development .....	6-38
6.7.6.3	Indigenous Communities.....	6-38
6.8	Mortality and Morbidity Indicator .....	6-39
6.8.1	Eastern Pacific Urban Zone .....	6-41
6.8.2	Western Pacific Urban Zone .....	6-42
6.8.3	Atlantic Urban Zone .....	6-43
6.8.4	Transisthmian Corridor Zone.....	6-43
6.8.5	Gatun Lake and Costa Abajo de Colon Zone .....	6-44
6.8.6	Taboga Island Zone .....	6-44
6.9	<b>Occupational Indicators and Other Relevant Information</b> .....	6-45
6.9.1	Eastern Pacific Urban Zone .....	6-50
6.9.2	Western Pacific Urban Zone .....	6-50
6.9.3	Atlantic Urban Zone .....	6-52
6.9.4	Transisthmian Corridor Zone .....	6-52
6.9.5	Gatun Lake and Costa Abajo de Colon Zone .....	6-53
6.9.6	Taboga Zone .....	6-53
6.10	<b>Equipment, Services, Infrastructure Works, and Economic Activities</b> .....	6-54
6.10.1	Eastern Pacific Urban Zone .....	6-59
6.10.2	Western Pacific Urban Zone .....	6-59
6.10.3	Atlantic Urban Zone .....	6-60
6.10.4	Transisthmian Corridor Zone .....	6-61
6.10.5	Gatun Lake and Costa Abajo de Colon Zone .....	6-62
6.10.6	Taboga Zone .....	6-63
6.11	<b>Local Perception of the Project, Work, or Activity</b> .....	6-64
6.11.1	Opinions of Socioeconomic Study Area (SESA) Residents.....	6-65
6.11.1.1	Gatun Lake and Costa Abajo de Colon Zone .....	6-65
6.11.1.2	Atlantic Urban Zone .....	6-65
6.11.1.3	Transisthmian Corridor Zone .....	6-65

6.11.1.4	Eastern and Western Pacific Urban and Taboga Zones .....	6-66
6.11.2	Opinions of Representatives from Local and Provincial Governments and Protected Areas .....	6-66
6.11.2.1	Gatun Lake and Costa Abajo de Colon, Atlantic Urban, and Transisthmian Corridor Zones .....	6-66
6.11.2.2	Eastern and Western Pacific Urban and Taboga Zones .....	6-68
6.11.3	Opinions of National or Regional Organizations and Institutions .....	6-69
6.12	<b>Public Forum</b> .....	6-71
6.13	<b>Historical, Archaeological, and Cultural Sites</b> .....	6-72
6.13.1	Work Methodology .....	6-72
6.13.2	Panama: Historical and Cultural Background.....	6-73
6.13.3	Eastern Pacific Urban Zone .....	6-75
6.13.3.1	Pre-Columbian Resources .....	6-75
6.13.3.2	Colonial Resources .....	6-76
6.13.3.3	Historical Resources .....	6-77
6.13.4	Western Pacific Urban Zone .....	6-77
6.13.4.1	Pre-Columbian Resources .....	6-77
6.13.4.2	Colonial Resources .....	6-81
6.13.4.3	Historical Resources .....	6-81
6.13.5	Atlantic Urban Zone .....	6-82
6.13.5.1	Pre-Columbian Resources .....	6-82
6.13.5.2	Colonial Resources .....	6-82
6.13.5.3	Historical Resources .....	6-82
6.13.6	Transisthmian Corridor Zone .....	6-84
6.13.6.1	Pre-Columbian Resources .....	6-84
6.13.6.2	Colonial Resources .....	6-84
6.13.6.3	Historical Resources .....	6-86
6.13.7	Gatun Lake and Costa Abajo de Colon Zone .....	6-86
6.13.7.1	Pre-Columbian Resources .....	6-86
6.13.7.2	Colonial Resources .....	6-88
6.13.7.3	Historical Resources .....	6-90

6.13.8	Taboga Zone .....	6-91
6.13.8.1	Pre-Columbian Resources .....	6-91
6.13.8.2	Colonial Resources .....	6-92
6.13.8.3	Historical Resources .....	6-92
6.14	Landscape .....	6-93
6.14.1	Atlantic Side.....	6-93
6.14.2	Pacific Side .....	6-95

## ANNEXES

Infrastructure Photos

Archaeological Photos

Landscape Photos

## LIST OF TABLES

Table 6-1	Data on Zones, <i>Corregimientos</i> , and Towns of Interest Within the Socioeconomic Study Area (SESA)
Table 6-2	Existing Gatun Lake and Costa Abajo de Colon Zone Infrastructures
Table 6-3	Existing Transisthmian Corridor Zone Infrastructures
Table 6-4	Affected Housing in Former Gatun Townsite
Table 6-5	SESA Education Indicators
Table 6-6	SESA Demographic and Social Indicators
Table 6-7	SESA Birth Rate and Morbidity
Table 6-8	SESA Health Indicators
Table 6-9	Employment and Occupational Indicators
Table 6-10	SESA Equipment and Basic Services
Table 6-11	Consulted Organizations
Table 6-12	Former Human Settlements Identified Within the SESA

## LIST OF FIGURES

Picture 6-1	Socioeconomic Study Area Towns in AI
Picture 6-2	Sites of Cultural Interest

## **6.0 DESCRIPTION OF THE SOCIOECONOMIC SITUATION**

### **6.1 Introduction**

This chapter presents an overview of the socioeconomic and cultural situation of the Socioeconomic Study Area (SESA) as defined in chapter 3, Description of the Project (See Figure 6.1). The information contained herein is based on facts obtained from the compilation and analysis of printed and electronic data available at the Office of the Comptroller General's Statistics and Census Directorate (2000), the United Nations Development Program's National Human Development Report – Panama's Human Development Index (2002), and documentation provided by the ACP, as well as from other secondary sources (See Chapter 12 – Bibliography and Revised Information). For very specific subjects, such as the local perception and archaeological aspects, the analysis was made from secondary sources and complemented by survey and field work.

The purpose of this chapter is to present the general characteristics and conditions of the inhabitants of the Socioeconomic Study Area (SESA), such as land use, population density, health, education, employment, infrastructure, indigenous towns, basic services, and cultural resources, as well as their general perception on the Canal Expansion Program—Third Set of Locks.

Considering the volume of the project and the scope of its execution, it was decided to create a large geographic area, known as the Socioeconomic Study Area (SESA). It has been divided into the following six zones: 1) Eastern Pacific Urban; 2) Western Pacific Urban; 3) Atlantic Side Urban; 4) Transisthmian Corridor; 5) Gatun Lake and Costa Abajo de Colon, and 6) Taboga Island. This division resulted from an analysis made by a multitasking group that, after considering facts such as population density; the proximity to Gatun Lake, to other towns in Costa Abajo de Colon, and to the Transisthmian Corridor, determined which towns might be affected positively or negatively by the project. Once the towns were identified, and for educational purposes (to facilitate the search of information and comprehension of the area), the political—administrative division was used to establish the study zones.

**Table 6-1 Data on Zones, Corregimientos, and Towns of Interest Within the SESA**

<b>ATLANTIC SIDE URBAN ZONE</b>			
Colon Province			
Colon District			
		<i>Corregimientos</i>	Towns of Interest
		BARRIO NORTE	None
		BARRIO SUR	None
<b>GATUN LAKE AND COSTA ABAJO DE COLON ZONE</b>			
Colon Province			
Colon District			
		<i>Corregimientos</i>	Towns of Interest <sup>1</sup>
	CIRICITO		Los Chorros de Ciri, Nuevo Porvenir, La Cauchera, Los Cedros, Ciricito, El Congal, Pablón, Frente a Ciricito, Arrecifral, Nuevo Ciricito, Los Laguitos, Caña Brava, Caño Viviano, Cuipo, La Tagua
	CRISTÓBAL		Gamboá, Gatun, Escobal
	ESCOBAL		Los Negros, Las Cruces, La Valerosa, La Ullama, Caño Victorio, Vino Tinto, Campo Alegre, La Humildad, Coca Cola (finca)
Chagres District			
		<i>Corregimientos</i>	Towns of Interest
		NUEVO CHAGRES (CABECERA)	None
		ACHIOTE	None
		EL GUABO	None
		LA ENCANTADA	None
		PALMAS BELLAS	None
		PIÑA	None
		SALUD	None
Panama Province			
Capira District			
		<i>Corregimientos</i>	Towns of Interest
		CIRÍ DE LOS SOTOS	None
Arraijan District			
		<i>Corregimientos</i>	Towns of Interest
		NUEVO EMPERADOR	None
			Isla del Sonido del Silencio
		SANTA CLARA	encio
La Chorrera District			
		<i>Corregimientos</i>	Towns of Interest
		AMADOR	Lagartera Grande, Lagarterita, Caño del Gigante, Caño Grande, Península Grande, Isla Barro Colorado
		AROSEMENA	None
		EL ARADO	None
		ITURRALDE	Curchirvo, La Arenosa, La Leona
		LA REPRESA	La Laguna, Pueblo Nuevo, Cañito
		MENDOZA	None
<b>TRANSISTHMIAN CORRIDOR ZONE</b>			
Colon Province			
Colon District			
		<i>Corregimientos</i>	Towns of Interest
		BUENA VISTA	None
		CATIVÁ	La Represa
		LIMÓN	Alfajía, Limón
		NUEVA PROVIDENCIA	Nueva Italia, Nueva Providencia
		SABANITAS	Vista Alegre, San José, Campeón
		SAN JUAN	None
		SANTA ROSA	Guayabalito, Santa Rosa
		SALAMANCA	None
Panama Province			
Panama District			
		<i>Corregimientos</i>	Towns of Interest
		CHILIBRE	None

<sup>1</sup> Towns that might be positively or negatively affected by the project



## EASTERN PACIFIC URBAN

Panama Province		
Panama District		
	<i>Corregimientos</i>	Towns of Interest
	ANCÓN	Pedro Miguel, Paraíso, La Boca, Diablo, Altos de Amador, Miraflores
	24 DE DICIEMBRE*	None
	BELLA VISTA	None
	BETANIA	None
	CURUNDÚ	None
	EL CHORRILLO	None
	JUAN DÍAZ	None
	LA EXPOSICIÓN O CALIDONIA	None
	LAS CUMBRES	None
	LAS MAÑANITAS*	None
	PARQUE LEFEVRE	None
	PEDREGAL	None
	PUEBLO NUEVO	None
	RÍO ABAJO	None
	SAN FELIPE	None
	SAN FRANCISCO	None
	SANTA ANA	None
	TOCUMEN	None
San Miguelito District		
	<i>Corregimientos</i>	Towns of Interest
	AMELIA DENIS DE ICAZA	None
	ARNULFO ARIAS	None
	BELISARIO FRÍAS	None
	BELISARIO PORRAS	None
	JOSÉ DOMINGO ESPINAR	None
	MATEO ITURRALDE	None
	OMAR TORRIJOS*	None
	RUFINA ALFARO*	None
	VICTORIANO LORENZO*	None

## WESTERN PACIFIC URBAN

Panama Province		
Arraijan District		
	<i>Corregimientos</i>	Towns of Interest
	ARRAJÁN (CAPITAL)	None
	BURUNGA*	None
	CERRO SILVESTRE*	None
	JUAN DEMÓSTENES AROSEMENA	None
	VERACRUZ	None
	VISTA ALEGRE	None
La Chorrera District		
	<i>Corregimientos</i>	Towns of Interest
	BARRIO BALBOA	None
	BARRIO COLON	None
	EL COCO	None
	FEUILLET	None
	GUADALUPE	None
	PLAYA LEONA	None
	PUERTO CAIMITO	None

## TABOGA

Panama Province		
Taboga District		
	<i>Corregimientos</i>	Towns of Interest
	TABOGA (CAPITAL)	None

Source: URS Holding, Inc with data from the Office of the Comptroller General.

\* *Corregimientos* created after the 2000 Census.

Inasmuch as the *corregimiento* was the basic unit for the establishment of zones, it has also been used as the basis for the present description. In the case of certain variables on which information was not available at that level, district and/or provincial information was used as the basis.

The illustration of the SESA by zone can be seen in Figure 3-19 on the Chapter on Description of the Project.

## **6.2 Panama - General Aspects**

It is necessary to begin the description of the SESA by providing some background information. Following is a brief summary of the principal characteristics of the Republic of Panama.

### **6.2.1 Panama – Political and Administrative Organization**

The Republic of Panama is a sovereign and independent State. Its government is unitary, republican, democratic, and representative, and it is politically and administratively divided into 9 provinces, 75 districts or municipalities, 5 indigenous territories, and 620 *corregimientos*, of which two are indigenous territories. It is a constitutional democracy, with elections held every five years, in which all citizens 18 years of age or older can participate.

### **6.2.2 Panama - Demography**

Panama's estimated population is 3.2 million. The annual population growth rate for the period 1995 to 2000 was 1.6%. In general, the demographic density is low, except for the cities of Panama and Colon. Urban population accounts for approximately 56% of the country's total population, with a clear rising trend prompted by the economic panorama of the Pacific metropolitan region and, to a lower extent, of the Atlantic. Roman Catholic, which is professed by the majority of the population, is the official religion. Other religions such as Protestantism, Buddhism, Hinduism, and Judaism, among others, are also professed. Cults and own beliefs are practiced in indigenous areas, while cults common to the black community are practiced in some Atlantic-side areas. Based on the 2000 Census and the Official Poverty Limit, it is observed that

40.5% of the Panamanian population lives below the poverty line, of which 26.5% live in conditions of extreme poverty<sup>2</sup>.

### **6.2.3 Panama - Health**

The infant mortality rate (IMR) for the year 2004 was 15 deaths per 1,000 live births, in contrast with the 57 deaths per 1,000 live births registered in 1960. The birthrate has been calculated at 20 live births per 1,000 inhabitants, in contrast with a mortality rate of 4.4 per 1,000 inhabitants. Total fertility rate is approximately 2 children per woman<sup>3</sup>.

In the year 2001 the country's morbidity rate<sup>4</sup> was distributed as follows: 25,946.80 cases of diarrhea in children under 5 years of age, 60.60 diagnosed and treated cases of TB (tuberculosis), 3,113.40 cases of high blood pressure, 538.20 cases of diabetes, and 154.70 cases of hypertensive cardiopathy; the last three rates apply to the population 60 years of age and older.

According to 2005 data<sup>5</sup>, there are 854 health centers in the Republic of Panama, 63 of which are fully-equipped hospitals, 260 are health centers and clinics, and the remaining are health subcenters and health stations. The doctor/inhabitant ratio is one doctor per 726 inhabitants, while there is one nurse per 850 inhabitants, and almost 3,500 inhabitants per odontologist.

### **6.2.4 Panama - Education**

According to 2005 data, there are 4,227 teachers for 83,836 preschool students in the Republic, an average of 20 students per teacher. At the elementary school level, numbers increase to 17,751 teachers and 430,152 students, with an average of 24 students per teacher. The amount of

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<sup>2</sup> National Human Development Report Panama 2002

<sup>3</sup> <http://www.contraloria.gob.pa>

<sup>4</sup> [www.contraloria.gob.pa](http://www.contraloria.gob.pa) (Development Indicators Integrated System)

<sup>5</sup> Ministry of Health

teachers for junior high and high school is 16,392 for 256,224 students, an average of 26 students per teacher.

The literacy rate of the total population is 92.6%; divided by sex, the male literacy rate is higher (93.2%) than the female literacy rate (91.9%) (CIA World Factbook). The Gender Development Index (GDI) shows an improvement in the levels of female education and life expectancy; however, inequity persists in employment and income matters. Average years of schooling is 8.6 and high school enrollment rate is 62.2%.

### **6.2.5 Panama – Economic Activities**

Panama's gross domestic product (GDP) (at constant 1996 prices) was 8.1% for the year 2006, estimated at 15,141.90 millions of dollars<sup>6</sup>. Nominal GDP was 17,097.1 millions of dollars, a 10.4% increase when compared to the previous year. The main economic activity is construction (commercial and residential), representing 17.4% of the GDP; followed in importance by transportation, storage, and communications (including the Panama Canal and container ports) with 13%, financial activities with 12.8%, hotels and restaurants with 12.5%, and commerce (including the Colon Free Zone) with 11.3%.

The unemployment rate decreased to 7.3% in March 2007. A similar behavior was observed in the informal employment rate which accounted for 46.3%, the invisible underemployment was established at 15.9%, and the visible underemployment at 3.7 % for the year 2006<sup>7</sup>.

### **6.2.6 Panama – Basic Services and Infrastructure**

The National Waterworks and Sewerage Institute (IDAAN, by its Spanish acronym) has over 420,000 clients and owns a system of approximately 5,000 kilometers of water distribution lines and 1,300 kilometers of sewage lines. In the year 2006, its drinking water production served approximately 69% of the population, while only 35% of the population was served by sewage

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<sup>6</sup> <http://www.asociacionbancaria.com/boletine.htm>

<sup>7</sup> [www.contraloria.gob.pa](http://www.contraloria.gob.pa)

treatment works.<sup>8</sup> For the year 2006, the volume of water distribution reached 126,456.7 million gallons per day (MGD), 72.4% of which was produced by IDAAN (91,368.3 MGD), 21.9% was produced by ACP (27,645.1 MGD), and 5.9% by the Laguna Alta Water Filtration Plant (7,443.3 MGD)<sup>9</sup>. It is important to highlight that, as part of the Water for All Plan, IDAAN is executing projects to improve the quality of life of the population (by augmenting water production and by guaranteeing the supply of this vital liquid). Following are some of these projects: Design and Construction of the Expansion and Rehabilitation of the Federico Guardia Conte Water Filtration Plant (this will increase water production to 250 - MGD); Optimization of Panama, Colon, La Chorrera, and Arraijan Sewage Systems (will produce 12 MGD); as well as the New Drinking Water Supply System for Pacora, Tocumen, and surrounding areas (will produce 12 MGD), among others<sup>10</sup>.

On the other hand, the Ministry of Health is executing programs such as the Panama Bay Sanitation Program, at a cost of 284 million dollars. The project's purpose is to cleanup and recuperate Panama City's rivers and streams, and to establish a sewage collection system as a means to stop the contamination of the bay. It is also expected that this project will improve the quality of life of the population, in addition to having a positive impact on tourism.

According to INDESA (2007), the installed capacity of the National Interconnection System (SIN, by its Spanish acronym) at the end of 2006 was 1,507.9 MW. This figure includes the actual capacity of the ACP's power generation plants (175 MW) and of the Isolated Systems (18.8 MW). It also indicates that 53% of the present installed capacity corresponds to the hydroelectric plants and 47% to thermal plants.

As regards to actual capacity, it was estimated at 1,160.9 MW by the end of 2006. However, it is not until the year 2008 that the new EDEMET's Concepción Hydroelectric Plant with 10 MW capacity will begin operations. For the year 2009, two additional plants will be incorporated into the system: EDEMET's Algarrobos (Hydroelectric) with a 9.7 MW capacity and a coal-thermal unit at Bahia Las Minas with 108 MW capacity. The latter will replace three other less-efficient

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<sup>8</sup> <http://www.pa-digital.com.pa/archive/09292006/enfocot.shtml>

<sup>9</sup> [www.idaan.gob.pa](http://www.idaan.gob.pa)

<sup>10</sup> [www.idaan.gob.pa](http://www.idaan.gob.pa)

thermal units (BLM 1, 2 and 3). It is expected that the SESA's Hydroelectric Changuinola-75, with an additional 106 MW capacity, will begin operating in the year 2010. By the end of 2010, the SIN's actual capacity will be 1,299.7 MW, and will remain the same until the year 2016 since no additional generators are expected.<sup>11</sup>

Taking the above into consideration, studies conducted by INDESA (2007) point out that the power generation sector should expect the country's electricity consumption to continue on the rise, given the start of important construction works and infrastructure projects and the fact that there are no clear indications of economic deceleration.

Concerning telecommunications, 2005 figures report that there were 376,000 fixed telephones in service and 1.35 million cellular phones, approximately 91% of the population use phone cards or prepaid calling cards (Public Services Regulatory Entity). With regards to Internet, it was estimated that by March 2007 there will be a 6.5% increase, for a total 206,200 users.

Other country's infrastructures include a 14,391.10-kilometer highway system, of which approximately 11,593.24 kilometers are highways and roads to production centers, while 2,797.86 kilometers correspond to urban centers<sup>12</sup>.

### **6.2.7 Panama - Migration**

The following information is based on the Study on Rural-Urban Migration to the Metropolitan Region and Adjacent Areas as a Possible Effect of the Canal Expansion, conducted by INTRACORP in 2007. As regards to migration, it is worth noting that Panama has no reliable annual records to accurately establish the levels and trends of internal and international migration.<sup>13</sup>

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<sup>11</sup> Impact of the Panama Canal Expansion Program on Internal Inflation and Markets of Some Goods. INDESA, 2007.

<sup>12</sup> Ministry of Public Works

<sup>13</sup> Statistic and Census Directorate. Estimations and forecast of the Republic of Panama total population by Province and indigenous area, according to sex and age: 1990-2030 period.

Historically, the Province of Panama has played a prevailing role in attracting inhabitants from other provinces or from abroad, resulting in a higher number of people coming into the city than leaving the city to migrate to other provinces or countries. This attraction is supported by the many economic and social activities taking place in the city and by the lack of services in other provinces.

For the period 1985 to 1990, the net migration balance to the Province of Panama was estimated at 28,553 persons, mainly from the interior. Between 1990-95 the net balance increased to 52,307 persons, while for the period 1995 to 2000 the net balance was 57,693 persons. It is important to highlight that both internal as well as international migrations to the country are concentrated in this province. Most migrations from abroad are by men seeking employment and sources of income.

An important situation that increased the migration into the Province of Panama took place during the period 1990-95 when a significant number of Panamanians returned to the country. During that same period there was also a large influx of foreigners coming into the country, taking the inward international migration level to 8,000 persons, with a further increase to 11,000 persons in the period 1995-2000.

For the period 2000-05, the international migration rate to the Province of Panama was estimated at 84,000 persons<sup>14</sup>, with males accounting for over 70%; while the net internal migration rate was estimated at 93,000 persons, 51% of them females. For the period 2010-2015, the peak period of Canal expansion operations and activities as well as other related economic activities, forecasts predict a net migration rate of 24 persons per 1,000 inhabitants. A decrease in the net migration rate will then start and will continue until the 2020-25 period, to a rate of 17 per 1,000 inhabitants. For this five-year period, the migration rate is estimated at 152,000 males and 117,000 females.

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<sup>14</sup> The estimate considered that 75% of the total international immigrants stayed in the Province of Panama in each five-year period of the forecast.

Migration rates for the Province of Colon show a negative balance for the period 1980-2000. The magnitude and net migration rates decreased starting in the period 1990-95, during which an estimated 1,000 persons left the country, compared to the first five-year period in the 1980s which showed that approximately 5,000 persons had emigrated.

Migration patterns for the projection period changed the historic and traditional trend of the previous period, and starting with the 2000-05 period the province of Colon became a receiver of migrants from abroad as well as from other provinces, excluding Panama. During this same five-year period, the international migration rate<sup>15</sup> was estimated at 17,000 immigrants, 70% of them males. Internal migration rates for this same period are estimated at 3,000 persons, 54% of them females. The net migration rate was set at 12 per 1,000 inhabitants for this same five-year period of the projection. This rate shows a rising trend up to a value of 16 per 1,000 inhabitants in the 2010-2015 period, to then start a decreasing trend until the end of the forecast period to 11 per 1,000 inhabitants. Net migration rates were estimated at 24 per 1,000 inhabitants, 14 males and 10 females.

### **6.2.8 Panama – Citizen Security**

Criminality has become one of Panama's most serious social problems, although from a quantitative point of view it has not reached such levels so as to trigger a significant social alarm. However, from a qualitative point of view, it is a problem that requires special attention because of its characteristics, violence, aggressiveness, and crime-related technological innovation.<sup>16</sup>

National statistics show that for the year 2000<sup>17</sup> the total rate of detainees was 19.5%. The highest group, or 42%, was between the ages of 20 and 24, while the lowest, or 6.22%, was between the ages of 45 and 49. For the year 2001 the rate of detainees increased slightly, for a total rate of 21% -- 46.08% between the ages of 20 and 24 and 6.9% between the ages of 45 and 49.

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<sup>15</sup> The estimation considered that 10% of total international immigrants stayed in the Province of Colon in every five-year period of the forecast.

<sup>16</sup> [www.defensoriadelpueblo.gob.pa/Miscelaneos/COMISIONDEESTADOPARALAJUSTICIA/27.asp](http://www.defensoriadelpueblo.gob.pa/Miscelaneos/COMISIONDEESTADOPARALAJUSTICIA/27.asp)

<sup>17</sup> [www.contraloria.gob.pa](http://www.contraloria.gob.pa)



The most frequent causes for detention are: theft/burglaries, drugs, domestic violence, and personal injuries, among others. Reports show that for the year 2000, the rate of detainees for theft/burglaries was 24.48%, followed by detentions for drugs accounting for 12.30%, while the remaining registered detentions were under 10%. For the year 2001, 24.16% of detentions were for theft/burglaries, 11.37% were drug-related cases, and less than 9% accounted for the rest.

Recent statistics obtained from the agency in charge of conducting criminal investigations show an increase in crimes against morality, decency, and sexual freedom, whose typification refers to criminal behavior such as rape, sexual abuse, corruption, pimping, sex-slave trade, sexual tourism, child pornography, and others.<sup>18</sup>

Considering the above, it's important to emphasize that during recent years Panama has been working on the development of a national criminal policy, an effort that is being conducted with the participation of several institutions including the Institute of Criminology of the University of Panama (ICRUP, its Spanish acronym), the National Penitentiary System, the Judicial Organ, the Public Ministry, the Citizens' Alliance, and local governments, among others<sup>19</sup>. As a result of an analysis made by the Second Forum Socioeconomic Subcommittee on the First Proposal for the National Criminal Policy, held in February 2005 during the 37<sup>th</sup> anniversary of the ICRUP<sup>20</sup>, several facts or situations observed during the investigations were established, such as unemployment, the inefficient use of the country's resources, the lack of funds for prevention policies, the deterioration of citizen security, and the noncompliance with the social role of education, among others. Likewise, consequences such as the increase in the unemployment rate and poverty levels, the growth of the informal economy, and an upsurge in social problems such as divorces, suicides, school abandonment, and migration, among others, were identified.

This is only a list of some of the socioeconomic factors that may prompt at any given time an increase in criminality rates. For this reason, when analyzing this subject it should not be

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<sup>18</sup> <http://www.ministeriopublico.gob.pa/ArticulodeMarcelinoAguilar.htm>

<sup>19</sup> <http://www.ministeriopublico.gob.pa/ArticulodeDaikaLevy.html>

<sup>20</sup> Institute of Criminology

ignored that criminality is a phenomenon that derives from a series of social, cultural, moral, and political factors, which influence the behavior of the members of a community.

### **6.3 Current Use of Adjacent Land Areas**

#### **6.3.1 Eastern Pacific Urban Zone**

Project activities in the vicinity of the Eastern Pacific Urban Zone include the deepening of the navigational channel and the disposal site known as T4, currently used for the disposal of dry excavated material. The land adjacent to the disposal sites contains secondary forests, underbrushes, and grasslands. The area adjacent to the deepening works is covered by secondary forests, underbrushes, grasslands, and urban zones. Among the urban zones located to the south are Amador, a tourist and residential area; La Boca and Diabolo which are characterized by port services; and Balboa, a low-density residential area; and to the north is the community of Paraíso, also a low-density residential area.

#### **6.3.2 Zone 2 – Western Pacific Urban**

Among the most significant activities to be developed in this Zone are the construction of the new locks; the use of disposal sites in Farfan, Velasquez, Rousseau, Victoria, Cocoli Sur 1, 2, 4, 5, and the T6 for disposing of dredged and dry excavated material. Most of the disposal sites are adjacent to secondary forests, underbrushes, and grasslands. However, four of these sites (Velasquez, Rousseau, Victoria, and Farfan) are adjacent to urban zones. Rodman, which is basically a port zone with piers, industrial buildings, and some currently unoccupied infrastructures, is adjacent to the Farfan disposal site. The other sites are adjacent to the Cocoli area, a former residential area for Canal workers which contains mostly abandoned housing units.

### **6.3.3 Zone 3 –Atlantic Side Urban**

There will be no activities directly related to the project on the Atlantic Side Urban Zone. Most of this Zone is adjacent to the Caribbean sea and to industrial and port services areas. However, these areas are part of the Gatun Lake and Costa Abajo de Colon Zone.

### **6.3.4 Zone 4 – Transisthmian Corridor**

The area of the project adjacent to the Transisthmian Corridor Zone includes the land bordering Gatun Lake, which is covered by secondary forests, underbrushes, and grasslands.

### **6.3.5 Zone 5 – Gatun Lake and Costa Abajo de Colon**

Project activities in the Gatun Lake and Costa Abajo de Colon Zone include the use of disposal sites, the deepening of the navigational channel, the Atlantic-side construction works, as well as areas to be affected by the increase in lake level. Disposal sites in this zone could be land (T3, T5, T2, Mindi, Tanque Negro Norte and Sur) and aquatic (Frijoles, Peña Blanca West, Peña Blanca East, and Monte Lirio). Adjacent to the inland disposal sites are secondary forests, underbrushes, and grasslands. The aquatic disposal sites could have various uses, sites such as Frijoles, Peña Blanca West and East (only the southern area) are adjacent to the Barro Colorado Island Natural Monument; while sites such as Monte Lirio (to the north and in a small area on the east side) and Peña Blanca West (east side) are adjacent to secondary forests.

Areas adjoining the works to deepen the navigational channel include Gatun Lake waters, secondary forests, underbrushes, and the Barro Colorado Island Natural Monument. Bordering the Atlantic side construction works are Canal operating areas; the former Gatun townsite, with a large number of vacant housing units; Cristobal, an industrial and port services area; and the area of Jose Dominador Bazan (former Fort Davis), a former military base currently being used as an area for housing units and government offices.

The land around Gatun Lake is comprised of secondary forests, underbrushes, grasslands, forest plantations, and a few protected zones such as the Barro Colorado Island Natural Monument, the Soberania National Park, the Gatun Lake Recreational Area, the San Lorenzo Protected Forest and Natural Landscape Area, and the Galeta Island Protected Landscape Area.

### **6.3.6 Zone 6 – Taboga Island**

Project activities nearest the Taboga Island Zone include the disposal sites known as Tortolita and Tortolita South, used for the disposal of dredged material. However, these sites are located approximately 14 km from this zone.

## **6.4 Properties and Infrastructures**

### **6.4.1 Gatun Lake Infrastructures**

Of the six zones that comprise the SESA, only two have properties and infrastructures on the banks of Gatun Lake. These are: the Transisthmian Corridor Zone and the Gatun Lake and Costa Abajo de Colon Zone (Figure 6-1).

According to an inventory prepared in March 2006 by personnel from the Environmental Management Division assigned to the Canal Expansion Program Studies (ESM-PAC), there are 66 infrastructures adjacent to Gatun Lake, 9 of which are housing units and 57 are other type of structures (community and private piers, farms, storage areas, community and private water intakes, and government facilities).

#### 6.4.1.1 Gatun Lake and Costa Abajo de Colon Zone

Most of the infrastructures included in the inventory are located in this zone (57 including the 9 houses). The following Table 6-2 presents the location, elevation, coordinates, and type of structure. (See Annex 4 – Infrastructures)

**Table 6-2**  
**Existing Infrastructures in Gatun Lake and Costa Abajo de Colon Zone**

<b>Community</b>	<b>Structure</b>	<b>Elevation</b>	<b>Coordinates</b>
Ciricito	Pier	26.8	601097 997628
Cuipo	Housing	27.08	604164 1003833
	Bathroom 1, Quadrangular Church (4 cubicles)	27.1	604290 1003686
	Bathroom 2, Quadrangular Church (4 cubicles)	26.9	604261 1003691
	Pier	27.04	604262 1003709
	Water intake	26.6	604233 1001718
	Pier	27.1	604493 1003495
	Water intake	26.5	604364 1003395
La Arenosa	Housing	26.6	615438 999610
	Housing	27.1	615283 999612
	Housing	27.1	614611 999014
	Housing	26.9	615395 999289
	Housing	26.8	615505 999494
	Community Board (Terrace)	27.0	615428 999587
	Pier	26.6	615438 999610

<b>Community</b>	<b>Structure</b>	<b>Elevation</b>	<b>Coordinates</b>
	Panama's Merchant Marine Occupational Institute pier	26.5	614843 998909
	Panama's Merchant Marine Occupational Institute pier inland	26.9	614815 998836
	Pier house	26.8	615428 999390
	Water intake	27.0	615573 999301
La Leona	Private pier	26.9	615835 998352
	Private pier	27.1	616003 998304
Coca Cola	Private pier (part of Lake enclosed with buoys)	26.8	
	Private pier	27.1	615195 996866
	Private pier	27.0	616398 997145
Campo Alegre	Housing	27.0	608887 1002963
	Hut	26.0	608882 1002377
Lagarterita	Pier	26.6	619215 1003920
	Storage area	26.6	619215 1003920
	Pier	26.3	618977 1003700
	Pier	27.0	619143 1003879
Escobal	Pier	26.7	614086 1011033
	Pedestrian crossover	26.7	613855 1010929
Los Cedros	Pier	27	602861 1000039
Arrecifal	Pier	26.7	603887 999468
Los Laguitos	Pier	26.8	605487 9943112
	Storage area	26.7	605248 994814

<b>Community</b>	<b>Structure</b>	<b>Elevation</b>	<b>Coordinates</b>
La Represa (La Laguna)	Pier	26.9	627892 999808
	Pier	27.0	627881 999728
	Concrete and wire fence	27.1	627881 999728
	Pier in construction	26.8	627881 999728
	Pier	27.0	627708 999845
	Boat garage (concrete structure)	27.0	627767 999859
	Pier and water intake	27.1	628045 999468
	Ecoforest pier	26.7	628900 1001942
Pueblo Nuevo	Concrete stairs	26.8	628175 998856
	Pier	27.1	628298 998875
	Pier	26.8	628394 998847
Isla del sonido del Silencio	Hut	27.1	633158 1006650
	Hut	27.0	633158 1006650
Isla Barro Colorado (STRI)	Pier	27.1	627786 1013020
	Motor shop and gas station	27.1	627730 101304
	Carpenter shop	27.1	627760 1012997
	Forest ranger's office	27.1	
Península Gigante (STRI)	Pier	26.8	625739 1009043
	Generator booth	26.7	
Caña Brava	Housing	27.1	603890 1002936
Lagartera	Housing	27.1	619471 1007942
<b>TOTAL</b>	<b>57</b>		

Source: Inventory of Infrastructures Located at Level 27.1 m (89 feet) at Gatun Lake, ACP – 2006f. This table does not include ACP’s infrastructures.

#### 6.4.1.2 Transisthmian Corridor Zone

Communities of interest because of their proximity to Gatun Lake established within this zone are: Vista Alegre N°2, La Represa, San Jose, Campeon, Nueva Italia, Nueva Providencia, Limon, Alfajía, Santa Rosa, and Guayabalito. The inventory prepared by ACP personnel (2006f) identified nine (9) infrastructures adjacent to Gatun Lake in the communities of Limon, Nueva Providencia, Santa Rosa, and La Represa (Atlantic). (See Annex 4 – Infrastructures)

**Table 6-3**  
**Existing Infrastructures in the Transisthmian Corridor Zone**

Limón	Concrete and wire fence.	26.8	629974 1023337
	Concrete and wire fence (rear part of house)	26.2	629898 1023307
	Pier (Community)	27.1	629991 1023490
Nueva Providencia	Pier (private)	26.5	629787 1023584
	Pier (private)	26.8	629685 1023652
	Piers (private)	26.8	629626 1024413
	Booth Pier	26.3	629441 1023900
Santa Rosa	Community bus stop	26.7	647918 1015381
La Represa (Atlantic)	Hut	26.9	627904 1031530
<b>TOTAL</b>	<b>9</b>		

Source: Inventory of Infrastructures located at Level 27.1 m (89 feet) at Gatun Lake, ACP – 2006f This table does not include ACP’s infrastructures.



## 6.4.2 Construction of Locks and Water Reutilization Basins

There are some infrastructures (housing units) located within the areas selected for the construction of the new locks and water reutilization basins that will be affected by the construction works. These infrastructures are located in Cocoli, the former Gatun townsite, and Jose Dominador Bazan. Following is a description of their characteristics. (See Annex 4 – Infrastructures.)

### 6.4.2.1 Cocoli

Cocoli is presently an uninhabited area. The only structures in use in the area are owned by the Siervo de Yahve Neocatechumenal Center (awarded by the Ministry of Economy and Finance through rent contract No. 265-05), which is used on weekends by the Catholic Church neocatechumenal movement. The Center has six structures (the celebration hall and five wooden houses).

### 6.4.2.2 Former Gatun Townsite

Four duplex-type housing units (502 A and B, 506 A and B, 507 A and B and 511 A and B) were identified at the former Gatun townsite. These are occupied by eight families (Table 6-4). The Environmental Management Plan includes additional details concerning the occupation of these housing units. (See Annex 4 – Infrastructures)

**Table 6-4**  
**Affected Housing in Former Gatun Townsite**

House Number	Occupancy Date	Number of Years	Occupants
502A	1979	28 years	2 adults
502B	1997	10 years	2 adults
506A	1998	9 years	2 adults 1 minor
506B	1985	22 years	2 adults 1 minor
507 <sup>a</sup> *	-	-	-

House Number	Occupancy Date	Number of Years	Occupants
507B	1977	30 years	3 adults
511A	1996	11 years	3 adults 1 minor
511B	1998	9 years	1 adult

Source ACP. \*Were not in the house during visit.

#### 6.4.2.3 Jose Dominador Bazan

Eights housing units (111 to the 118) located in the Jose Dominador Bazan area (former Fort Davis) were identified among the infrastructures of special interest because of their proximity to the Project area. These are two-story concrete housing units with wood floors owned by the Ministry of Economy and Finance. However, four of the units (111, 112, 113 and 114) are currently occupied by the Ministry of Housing (Colon Regional Directorate) for administrative purposes and as storage area for construction material. (See Annex 4 – Infrastructures).

### 6.5 Population Characteristics (Cultural and Educational Level)

#### 6.5.1 Eastern Pacific Urban Zone

According to Bulletin No. 10 of the Office of the Comptroller General, the population of this zone, located on the eastern part of Panama Province, on the Canal watershed southern slope, is approximately 896,584 inhabitants, including Panama City, the country's capital (Figure 6-1). It is conformed by 18 of the 21 Panama District *corregimientos* and the 9 San Miguelito District *corregimientos*, and covers a total of 616.50 km<sup>2</sup>. Both districts conform Panama's most important urban area and concentrate a population of almost one million, almost a third part of Panama's total population. Population density varies from very low in the Ancon *corregimiento*, 61.8 inhabitants/km<sup>2</sup>, to much higher levels in the Santa Ana *corregimiento*, 26,872.4 inhabitants/km<sup>2</sup>, respectively<sup>21</sup>. There are 5 towns of special interest this zone because of their proximity to the Project area (Paraiso, Pedro Miguel, La Boca, Diablo, and Amador). According

<sup>21</sup> Bulletin No 10. Office of the Comptroller General

to information obtained from the Office of the Comptroller General, the number of residents per housing unit is: Paraiso - 3.8, Pedro Miguel - 3.0, La Boca - 3.2, Diablo - 3.2, and Amador - 2.8.

Historically, Panama Province has had a positive migration flow, becoming the most important population receiver, mostly of persons migrating from the country's interior. For the period 1995-2000, the positive migration rate continued, stabilizing at 8.56 per 1,000 inhabitants. International migrations to the country concentrate in this province (INTRACORP, 2007).

### **6.5.2 Western Pacific Urban Zone**

Separated from the Eastern Pacific Urban Zone by the Panama Canal, the Western Pacific Urban Zone covers an extension of 426.70 km<sup>2</sup>. Its estimated population for the year 2000 was 257,953 inhabitants. It is conformed by 6 of the 8 Arraijan District *corregimientos* and 7 of the 18 La Chorrera District *corregimientos* (Figure 6-1). Most of Arraijan's inhabitants live in the Vista Alegre *corregimiento*, which has a density of 1,699.3 inhabitants/km<sup>2</sup>, while the highest density reported for La Chorrera is concentrated in the Balboa townsite with 4,168.8<sup>22</sup> inhabitants/km<sup>2</sup>. The same data on migration flows recorded for the Eastern Pacific Urban Zone apply to this area since the analysis was made at the provincial level.

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<sup>22</sup> Bulletin N° 10, Office of the Comptroller General  
Environmental Impact Study - Category III  
Panama Canal Expansion Program –  
Third Set of Locks

### 6.5.3 Atlantic Urban Zone

This zone is conformed by two of the 14 Colon District *corregimientos* (Barrio Norte and Barrio Sur), which have a joint estimated population of 42,133 inhabitants, and cover an extension of 2.4 km<sup>2</sup>, representing the smallest SASE zone (Figure 6-1). In spite of its small size, the Atlantic Urban Zone is inhabited by an important number of people, a fact reflected in the population density of the Barrio Norte *corregimiento*, 18,476.7 inhabitants/km<sup>2</sup>, and the Barrio Sur *corregimiento*, 13,081.2 inhabitants/km<sup>2</sup>. Even though it is part of the Metropolitan Region, Colon Province has always registered negative migration rates<sup>23</sup>, Panama Province being the main destination of its inhabitants.

### 6.5.4 Transisthmian Corridor Zone

The Transisthmian Corridor Zone runs parallel to the Canal along the route of the Transisthmian Highway, from the Chilibre *corregimiento* to Sabanitas, adjacent to Colon City. The Zone's estimated population for the year 2000 was 118,734 inhabitants. It encompasses 8 of the 14 Colon District *corregimientos* and one Panama District *corregimiento*, and covers an extension of 141.41 km<sup>2</sup>. It is almost entirely located on the Atlantic side of the Isthmus, north of the Panama Canal, and is the SESA second largest zone. Its population density varies from very low, in the case of Salamanca with 16.3 inhabitants/km<sup>2</sup>, to intermediate, such as the cases of the *corregimientos* of Sabanitas, with 1,686.1 inhabitants/km<sup>2</sup>, and Cativa, with 1,434.8 inhabitants/km<sup>2</sup>.

The population of the 10 special interest towns identified in the Transisthmian Corridor Zone is 3,110 persons, distributed among 893 housing units. Of these, the biggest town is La Represa, with 795 inhabitants, and the smallest is Vista Alegre, with a population of 36 people.

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<sup>23</sup> Related to the socioeconomic and political problems of Panamá (1980-2000) that prompted the relocation of many Panamanians to other provinces, and the Province of Colon was no exception. INTRACORP, 2007

### **6.5.5 Gatun Lake and Costa Abajo de Colon Zone**

This Zone has a population of 65,445 inhabitants, and it includes 3 of the 14 Colon District *corregimientos*, the 7 Chagres District *corregimientos*, 2 of the 8 Arraijan District *corregimientos*, 6 of the 18 La Chorrera District *corregimientos*, and one of the 13 Capira District *corregimientos* (Figure 6-1). The total extension of this zone is 2,072.30 km<sup>2</sup>. It is not only the SESA largest area, but also the one with a less dense population per *corregimiento*, since the population density of most of its 19 *corregimientos* is less than 25 inhabitants/km<sup>2</sup>, being Cristobal with 69.4 inhabitants/km<sup>2</sup> and Nuevo Chagres, with 87.4 inhabitants/km<sup>2</sup> the ones with the highest population density rate.

Current population of the 37 special interest towns identified in the Gatun Lake Zone is 5,359 persons, distributed among 1,497 housing units. The most populated town is Escobal, with 1,653 inhabitants, and the less populated is Arrecifal, with 6 persons.

### **6.5.6 Taboga Island Zone**

This zone includes one Taboga District *corregimiento* (capital). With an extension of 8.50 km<sup>2</sup>, it is the smallest SESA zone. It has an estimated population of 908 inhabitants and an average density of 139.5 inhabitants/km<sup>2</sup>.

## **6.6 Education**

The statistical data used in this section is presented in Table 6-5.

**Table 6-5**

**SESA Education Indicators**

District	<i>Corregimiento</i>	Total Inhabitants per <i>Corregimiento</i>	Literacy	Average Schooling (15 years old and over)	With Less Than Third Grade of Elementary School Approved
<b>EASTERN PACIFIC URBAN</b>					
<b>Panama</b>					
	ANCON	11,169	97.1	11.5	453
	BELLA VISTA	28,421	99.1	13.7	336
	BETANIA	44,409	99.3	13.2	572
	CURUNDU	19,019	96.2	8.1	1,031
	EL CHORRILLO	22,632	98.4	9.4	512
	JUAN DIAZ	88,165	99.2	11.3	1,678
	LA EXPOSICION O CALIDONIA	19,729	98.5	10.8	516
	LAS CUMBRES	92,519	97.6	9.2	3,742
	PARQUE LEFEVRE	37,136	98.9	11.7	876
	PEDREGAL	45,801	98.1	9.2	1,658
	PUEBLO NUEVO	18,161	98.7	12.3	353
	RIO ABAJO	28,714	97.5	10.8	903
	SAN FELIPE	6,928	97.6	9.8	228
	SAN FRANCISCO	35,751	99.4	12.8	579
	SANTA ANA	21,098	98.4	10.1	526
	TOCUMEN	83,187	97.4	8.9	3,419
<b>San Miguelito</b>					
	AMELIA DENIS DE ICAZA	38,522	98.2	10.1	1,242
	ARNULFO ARIAS	30,502	97.2	8.3	1,320
	BELISARIO FRIAS	46,794	98.0	9.1	1,564
	BELISARIO PORRAS	49,802	97.1	8.7	2,313
	JOSE DOMINGO ESPINAR	35,301	99.0	11.9	613
	MATEO ITURRALDE	12,607	98.5	10.3	371
	OMAR TORRIJOS	37,650	98.1	9.9	1,131
	RUFINA ALFARO	25,239	99.3	13.1	314
	VICTORIANO LORENZO	17,328	98.2	10.0	551
<b>WESTERN PACIFIC URBAN</b>					
<b>Arraijan</b>					
	ARRAIJAN (CAPITAL)	64,772	96.1	8.9	2,779
	JUAN DEMOSTENES AROSEMENA	24,792	97.7	10.4	604
	VERACRUZ	16,748	94.3	8.3	968
	VISTA ALEGRE	39,097	98.0	10.6	893
<b>La Chorrera</b>					
	BARRIO BALBOA	29,053	96.7	9.8	913
	BARRIO COLON	26,818	97.3	10.5	689
	EL COCO	14,167	95.8	9.0	487
	FEUILLET	1,745	95.3	8.6	75
	GUADALUPE	26,857	95.4	8.7	1,135
	PLAYA LEONA	6,706	93.5	8.0	429
	PUERTO CAIMITO	7,198	94.5	8.6	347

District	Corregimiento	Total Inhabitants per Corregimiento	Literacy	Average Schooling (15 years old and over)	With Less Than Third Grade of Elementary School Approved
ATLANTIC URBAN					
Colon					
	BARRIO NORTE	24,346	97.9	10.1	756
	BARRIO SUR	17,787	98.1	9.8	564
TRANSISTHMIAN CORRIDOR					
Colon					
	BUENA VISTA	10,428	94.0	7.9	675
	ACTIVA	26,621	97.8	9.7	934
	LIMON	4,092	92.4	7.9	262
	NUEVA PROVIDENCIA	3,065	93.5	7.7	160
	SABANITAS	17,073	97.7	9.9	619
	SAN JUAN	13,325	94.7	8.0	821
	SANTA ROSA	735	93.6	6.8	63
	SALAMANCA	2,920	90.8	6.2	298
Panama					
	CHILIBRE	40,475	96.7	8.2	2,286
GATUN LAKE					
Colon					
	CIRICITO	2,402	94.5	6.3	158
	CRISTOBAL	37,426	98.3	10.2	1,106
	ESCOBAL	2,181	95.8	7.6	117
Chagres					
	NUEVO CHAGRES (CABECERA)	419	91.2	7.8	28
	ACHIOTE	784	87.7	5.2	103
	EL GUABO	1,180	92.4	5.7	92
	LA ENCANTADA	2,523	91.6	5.3	198
	PALMAS BELLAS	1,690	92.1	7.2	130
	PIÑA	700	91.0	6.5	73
	SALUD	1,895	92.4	6.0	167
Capira					
	CIRI DE LOS SOTOS	2,083	86.7	4.7	273
Arraijan					
	NUEVO EMPERADOR	2,765	95.8	8.1	119
	SANTA CLARA	1,744	93.2	7.1	99
La Chorrera					
	AMADOR	2,675	90.4	6.0	221
	AROSEMENA	290	86.3	4.8	41
	EL ARADO	2,012	90.8	6.9	141
	ITURRALDE	927	91.8	6.4	65
	LA REPRESA	696	89.8	5.8	59
	MENDOZA	1,053	95.3	6.4	43
TABOGA ISLAND					
Taboga					
	TABOGA (CAPITAL)	908	98.9	8.5	22

Source: URS Holding based on information from the Office of the Comptroller General.

(Population and Housing National Census 2000 and Bulletin N° 10).

### **6.6.1 Eastern Pacific Urban Zone**

There are about 300 elementary schools and 160 junior high and high schools in this Zone. The literacy rate in all of its *corregimientos* is high when compared to the national average of 95%, with San Francisco having the highest, 99.4%, and Curundu the lowest, 96.2%. This zone includes the country's capital, so it has an important number of higher education centers, among them the University of Panama and the Technological University of Panama, main higher-education public centers, as well as many private centers that offer a wide variety of careers and specialties. The average level of schooling for both districts correspond to the 10<sup>th</sup> grade of high school. Bella Vista, Betania and Rufina Alfaro have the highest level of schooling with more than 13 years, while Curundu, Arnulfo Arias, and Belisario Porras report the lowest with an average of 8 years.

### **6.6.2 Western Pacific Urban Zone**

The districts of Arraijan and La Chorrera have an approximate number of 120 elementary schools and 35 junior high and high schools. A University of Panama Regional Center has been in operation in La Chorrera for several years, offering its programs to the population of the western region. The population's average level of schooling is 9.3 years, with the *corregimientos* of Vista Alegre and Barrio Colon reporting the highest, 10.6 and 10.5 years, respectively, and Veracruz and Playa Leona the lowest, 8.3 and 8 years, respectively. The illiteracy rate in the *corregimientos* of both districts is low, at 3.9, which is lower than the national average of 4.43.

The highest illiteracy rate per number of *corregimiento* inhabitants is reported in Playa Leona in La Chorrera District, where 6.5% of the population 10 years of age and older is illiterate. It is followed by the Veracruz, where 5.7% of the population 10 years of age and older is illiterate. These two *corregimientos* also report the lowest average of school education, with 7.0 years for Playa Leona and 7.3 years for Veracruz.



### **6.6.3 Atlantic Urban Zone**

There were 81 elementary schools and 25 high schools at the district level in Colon in the year 2002. The average school education among the population 15 years of age and older was 10.1 years in Barrio Norte and 9.8 in Barrio Sur, while the literacy rate was 97.9% in the first community and 98.1% in the second, in contrast with the national average of 95.5%. A University of Panama Regional Center and an extension of the Technological University of Panama are in operation in this zone.

### **6.6.4 Transisthmian Corridor Zone**

Sabanitas and Cativa are the two *corregimientos* in this Zone reporting the highest level of education , with 9.9 and 9.7 years of schooling, respectively, while those with the lowest rate are Salamanca, with 6.2 and Santa Rosa, with 6.8 years of schooling. When compared to the national literacy rate average (95.5%) in the population 10 years of age and older, it can be observed that the highest rates are reported for the *corregimientos* of Cativa with 97.8%, and Sabanitas with 97.7%, while the lowest are reported in Limón (92.4%), Nueva Providencia (93.5%), and Santa Rosa (93.7%). There are no higher-education centers located in the Transisthmian Corridor Zone.

### **6.6.5 Gatun Lake and Costa Abajo de Colon Zone**

This zone reports the lowest literacy rate within the SESA. The *corregimientos* of La Represa, Achote, Ciri de los Sotos, and Arosemena report less than 90%, with 89.8%, 87.6%, 86.7% , and 86.3%, respectively; while the Cristobal *corregimiento* reports the highest literacy rate, 98.3%, which is even higher than the national average of 95.5%. As regards to level of schooling, it became evident that there is a close relation between this and the literacy rate, with Cristobal reporting 10.2 years of education and Ciri de los Sotos reporting 4.7 years.

At the special interest towns located in the banks of Gatun Lake, 7 single-grade schools and 11 multigrade schools were identified. Students from the remaining communities (20) attend

schools at Ciricito, Sabanita, rio Rita, Limon, La Chorrera, Cuipo, and Escobal. This means that school-age children from these communities have to walk or travel by cayuco an average of 30 minutes to one hour. In the northern area, only the communities of Cuipo and Escobal have a junior high school, so students have to travel to these areas to attend junior high. Communities in the southwestern area do not have this type of education center, so students must travel to the community of Las Pavas, where the only junior high school in the area is located.

#### **6.6.6 Taboga Zone**

The education level of the population of Taboga District is similar to the national average. The illiteracy rate is 1%, which is lower than the national average (4.43%); the rates are higher at the provincial and national levels, 2.7% in Panama and 7.6% in the rest of the country. There are two schools in the island, but no center for higher-education.

#### **6.7 Demographic, Social, and Economic Indicators**

It is important to emphasize in this section that even though indigenous peoples inhabit different areas within the SESA, they do not live in protected zones or zones under special regulations for human groups. The economic indicators are presented in Section 6.9.1. The statistical information used in this section is presented in Table 6-6.

**Table 6-6  
SESA Demographic and Social Indicators**

PROVINCE	District	Corregimiento	Total Inhabitants per Corregimiento	Population Density (inhabitants per km <sup>2</sup> year 2005)	Male Average	Female Average	Average Population under 15-years of age	Average Population 15-64 years old	Average of population 65 years old and over	Masculinity Indicator (Males per each 100 females)	Total Population Average age	Annual Growth Average Rate (2000-2005)	KUNA Indian Groups Average	NGÖBE Indian Groups Average	BUGLE Indian Groups Average	TERIBE Indian Groups Average	WOUNAN Indian Groups Average	BRI BRI Indian Groups Average	BOKOTA Indian Groups Average	Embera Indian Groups Average		
	EASTERN PACIFIC URBAN																					
	Panama																					
		ANCON	11,169	61.8	54.00	46.00	23.14	69.94	6.82	115.2	31	0.88	8.97	0.20	0.06	0.02	0.04	0.06	0.04	3.93		
		BELLA VISTA	28,421	7,068.4	45.00	55.00	16.16	72.44	11.40	81.3	33	1.66	0.28	0.06	0.05	0.01	0.03	0.05	0.01	0.03		
		BETANIA	44,409	5,515.7	45.00	55.00	15.90	70.78	13.33	80.7	34	0.17	0.17	0.08	0.06	0.02	0.02	0.07	0.01	0.04		
		CURUNDU	19,019	16,904.2	50.00	50.00	34.42	61.63	3.95	99.4	22	0.89	2.01	0.14	0.13	0.02	1.38	0.14	0.04	5.15		
		EL CHORRILLO	22,632	40,970.7	50.00	50.00	28.49	65.37	6.14	98.3	26	1.14	1.09	0.08	0.01	0.00	0.01	0.05	0.00	0.08		
		JUAN DIAZ	88,165	2,927.8	48.00	52.00	24.47	68.80	6.73	91.1	29	1.81	0.78	0.09	0.04	0.01	0.05	0.06	0.01	0.05		
		LA EXPOSICION O CALIDONIA	19,729	12,425.4	47.00	53.00	20.99	68.77	10.24	90.4	31	-0.42	3.43	0.09	0.03	0.01	0.04	0.04	0.02	0.16		
		LAS CUMBRES	92,519	1,080.9	50.00	50.00	32.51	63.86	3.62	100.8	24	3.34	0.63	0.18	0.06	0.02	0.05	0.08	0.01	0.44		
		PARQUE LEFEVRE	37,136	5,828.0	47.00	53.00	21.02	69.41	9.56	87.4	31	0.73	1.06	0.18	0.00	0.00	0.00	0.00	0.00	0.00		
		PEDREGAL	45,801	1,788.4	50.00	50.00	30.36	64.83	4.81	99.6	25	1.27	1.90	1.19	0.02	0.00	0.02	0.05	0.01	0.18		
		PUEBLO NUEVO	18,161	5,996.0	46.00	54.00	20.07	71.29	8.64	86.8	31	-0.24	0.70	0.12	0.07	0.02	0.03	0.04	0.01	0.02		
		RIO ABAJO	28,714	7,656.7	46.00	54.00	21.35	69.61	9.03	86.8	31	0.10	1.01	0.11	0.00	0.01	0.01	0.06	0.00	0.07		
		SAN FELIPE	6,928	21,295.6	54.00	46.00	21.15	70.57	8.29	118.6	30	-3.58	2.66	0.10	0.01	0.03	0.06	0.06	0.01	0.14		
		SAN FRANCISCO	35,751	6,339.9	45.00	55.00	19.85	69.40	10.74	83.2	32	0.89	0.52	0.10	0.03	0.01	0.01	0.03	0.01	0.04		
		SANTA ANA	21,098	26,872.4	50.00	50.00	22.26	69.58	8.16	100.1	30	-0.66	4.61	0.14	0.02	0.01	0.07	0.06	0.00	0.10		
		TOCUMEN	83,187	924.1	50.00	50.00	32.61	64.62	2.76	101.3	24	2.91	2.50	0.66	0.22	0.03	0.15	0.13	0.01	0.20		
			San Miguelito	AMELIA DENIS DE ICAZA	38,522	11,408.4	49.00	51.00	27.08	67.50	5.43	95.2	27	1.56	0.26	0.19	0.06	0.03	0.04	0.11	0.00	0.15
				ARNULFO ARIAS	30,502	5,964.1	50.00	50.00	36.76	61.55	1.68	99.8	21	7.01	1.37	0.10	0.07	0.01	0.11	0.09	0.05	3.77
BELISARIO FRIAS	46,794			14,097.8	49.00	51.00	30.67	66.61	2.72	97.5	23	4.48	0.99	0.07	0.02	0.01	0.04	0.15	0.01	0.46		
BELISARIO PORRAS	49,802			13,165.6	50.00	50.00	30.15	65.99	3.86	101.1	24	0.53	0.40	0.14	0.05	0.02	0.10	0.15	0.04	1.39		
JOSE DOMINGO ESPINAR	35,301			5,506.0	47.00	53.00	26.58	67.64	5.78	87.8	28	1.37	0.20	0.18	0.04	0.03	0.02	0.32	0.02	0.57		
MATEO ITURRALDE	12,607			12,416.5	48.00	52.00	22.56	65.69	11.76	91.8	31	-1.01	0.30	0.13	0.14	0.02	0.02	0.14	0.00	0.03		
OMAR TORRIJOS	37,650			3,282.8	49.00	51.00	25.89	68.74	5.37	96.2	27	-1.56	0.75	0.12	0.04	0.02	0.03	0.17	0.01	0.17		
RUFINA ALFARO	25,239			3,421.1	47.00	53.00	23.06	71.39	5.55	87.1	30	4.44	0.23	0.23	0.04	0.04	0.02	0.26	0.00	0.07		
VICTORIANO LORENZO	17,328			8,838.2	49.00	51.00	24.98	67.05	7.98	95.4	28	0.08	0.48	0.20	0.03	0.03	0.13	0.27	0.02	0.12		
	WESTERN PACIFIC URBAN			ARRAIJAN																		
				ARRAIJAN (CAPITAL)	64,772	536.1	51.00	49.00	33.04	63.43	3.53	102.3	24	3.56	5.32	0.21	0.07	0.04	0.17	0.11	0.01	0.59
		JUAN DEMOSTENES AROSEMENA	24,792	556.7	49.00	51.00	28.63	66.53	4.84	97.7	27	2.32	2.21	0.20	0.10	0.00	0.03	0.16	0.00	0.04		
		VERACRUZ	16,748	414.8	52.00	48.00	34.29	61.42	4.29	108.3	23	3.56	23.80	0.08	0.09	0.01	0.13	0.07	0.01	1.99		
		VISTA ALEGRE	39,097	1,699.3	49.00	51.00	32.55	64.46	2.98	94.9	26	4.78	4.39	0.02	0.03	0.00	0.01	0.15	0.00	0.07		
		La Chorrera	BARRIO BALBOA	29,053	4,168.8	49.00	51.00	28.66	64.89	6.45	97.8	27	1.76	0.32	0.10	0.04	0.00	0.00	0.13	0.02	0.02	
			BARRIO COLON	26,818	2,081.9	49.00	51.00	27.15	66.40	6.44	94.9	28	2.13	0.42	0.12	0.06	0.03	0.01	0.19	0.00	0.07	
			EL COCO	14,167	1,196.0	50.00	50.00	32.79	63.53	3.68	101.0	24	4.04	0.05	0.25	0.20	0.00	0.01	0.11	0.01	0.03	
			FEUILLET	1,745	104.0	52.00	48.00	29.17	64.64	6.19	106.5	25	2.02	0.74	0.00	0.00	0.00	0.40	0.00	0.00		
			GUADALUPE	26,857	1,301.5	50.00	50.00	32.67	63.38	3.95	99.0	24	3.02	0.20	0.15	0.19	0.00	0.04	0.10	0.00	0.01	
PLAYA LEONA	6,706		154.8	51.00	49.00	35.42	60.08	4.50	103.4	23	3.30	0.13	0.18	0.69	0.00	0.00	0.09	0.00	0.00			
	Puerto Caimito	PUERTO CAIMITO	7,198	293.7	51.00	49.00	34.63	62.20	3.17	104.7	24	4.40	0.25	0.35	0.08	0.01	0.14	0.24	0.03	0.15		

PROVINCE	District	Corregimiento	Total Inhabitants per Corregimiento	Population Density (inhabitants per km2 year 2005)	Male Average	Female Average	Average Population under 15 years of age	Average Population 15-64 years old	Average Population 65 years old and over	Masculinity Indicator (Males per each 100 females)	Total Population Average Age	Annual Growth Average Rate (2000-2005)	KUNA Indian Groups Average	NGÓBE Indian Groups Average	BUGLE Indian Groups Average	TERIBE Indian Groups Average	WOUNAN Indian Groups Average	BRI BRI Indian Groups Average	BOKOTA Indian Groups Average	Embera Indian Groups Average	
Colon	ATLANTIC URBAN																				
	Colon																				
		BARRIO NORTE	24,346	18,476.7	48.06	51.94	31.23	62.32	6.50	92.5	25	-2.01	1.31	0.01	0.01	0.00	0.02	0.11	0.00	0.03	
		BARRIO SUR	17,787	13,081.2	51.94	48.06	29.59	63.75	6.70	99.1	26	-2.01	3.80	0.02	0.00	0.01	0.02	0.12	0.00	0.00	
	TRANSISTHMIAN CORRIDOR																				
	Colon																				
		BUENA VISTA	10,428	107.9	51.00	49.00	36.13	59.29	4.57	105.7	22	2.63	0.12	0.48	0.02	0.00	0.07	0.23	0.00	0.00	
		CATIVA	26,621	1,434.8	50.00	50.00	32.92	62.19	4.89	100.5	23	2.69	4.14	0.09	0.01	0.00	0.05	0.14	0.00	0.04	
		LIMON	4,092	63.0	52.00	48.00	37.44	58.16	4.40	109.2	21	2.08	0.20	0.00	0.00	0.02	0.10	0.00	0.02	0.20	
		NUEVA PROVIDENCIA	3,065	238.6	52.00	48.00	40.13	56.93	2.94	108.4	20	5.33	0.26	0.33	0.26	0.00	0.00	0.03	0.00	0.16	
	SABANITAS	17,073	1,686.1	49.00	51.00	31.62	62.72	5.66	97.2	24	1.90	1.15	0.05	0.04	0.01	0.06	0.08	0.04	0.33		
	SAN JUAN	13,325	394.3	52.00	48.00	36.53	59.07	4.40	108.5	22	3.25	0.18	0.08	0.06	0.01	0.02	0.08	0.00	0.69		
	SANTA ROSA	735	32.4	53.00	47.00	34.97	60.27	4.76	113.7	23	2.61	0.14	0.00	0.00	0.00	0.00	0.14	0.00	0.27		
	SALAMANCA	2,920	16.3	54.00	46.00	35.55	57.91	6.54	116.0	22	0.83	0.03	0.03	0.03	0.00	0.03	0.21	0.03	0.10		
Panama	Panama																				
	CHILIBRE	40,475	54.2	51.00	49.00	34.30	61.60	4.11	105.9	23	3.38	0.16	0.23	0.17	0.01	0.04	0.00	0.10	0.61		
Colon	GATUN LAKE																				
	Colon																				
		CIRICITO	2,402	40.0	54.00	46.00	40.55	53.91	5.54	119.0	20	1.20	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		CRISTOBAL	37,426	69.4	51.00	49.00	32.71	63.07	4.19	103.0	24	4.12	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		ESCOBAL	2,181	29.3	54.00	46.00	37.14	57.18	5.69	118.5	22	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Chagres																				
		NUEVO CHAGRES (CABECERA)	419	87.4	49.00	51.00	33.65	57.52	8.83	94.9	22	3.45	2.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
		ACHIOTE	784	20.5	58.00	42.00	41.07	51.15	7.78	136.1	21	0.44	0.13	0.00	0.00	0.00	0.51	0.13	0.00	0.13	
		EL GUABO	1,180	22.4	54.00	46.00	43.31	51.27	5.42	117.3	19	-0.35	0.34	0.00	0.17	0.00	0.08	0.08	0.00	0.17	
		LA ENCANTADA	2,523	19.4	55.00	45.00	43.52	51.13	5.35	124.3	18	0.00	0.12	0.04	0.04	0.00	0.08	0.04	0.00	0.04	
	PALMAS BELLAS	1,690	23.5	53.00	47.00	38.28	55.38	6.33	111.3	21	0.44	0.00	1.00	0.00	0.00	0.00	0.06	0.12	0.05		
	PIÑA	700	24.9	56.00	44.00	39.14	53.86	7.00	125.1	21	0.14	0.71	0.29	0.00	0.00	0.14	0.14	0.00	0.71		
	SALUD	1,895	18.2	56.00	44.00	42.11	51.82	6.07	129.1	19	-0.21	0.16	0.00	0.58	0.00	1.00	0.00	0.00	0.00		
Panama	Capira																				
		CIRI DE LOS SOTOS	2,083	21.9	55.00	45.00	43.78	50.94	5.28	120.4	19	-0.75	0.15	0.10	0.05	0.00	0.05	0.05	0.00	0.05	
	Arraijan																				
		NUEVO EMPERADOR	2,765	26.5	53.00	47.00	30.92	62.93	6.15	111.2	25	1.22	0.07	0.43	0.00	0.00	0.00	0.14	0.00	0.00	
		SANTA CLARA	1,744		54.00	46.00	33.31	60.78	5.91	115.0	24	1.39	0.06	0.17	0.06	0.00	0.00	0.00	0.00	0.06	
	La Chorrera																				
		AMADOR	2,675	15.0	54.00	46.00	37.76	55.63	6.62	116.6	21	2.60	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.04	
		AROSEMENA	290	8.7	55.00	45.00	38.97	55.52	5.52	123.1	22	-1.65	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	
		EL ARADO	2,012	39.9	53.00	47.00	32.60	59.89	7.50	115.0	26	1.52	0.00	1.00	0.00	0.00	0.00	0.34	0.00	0.00	
		ITURRALDE	927	13.1	54.00	46.00	36.46	58.14	5.39	118.6	22	1.40	0.11	0.00	0.00	0.00	0.00	0.34	0.00	0.00	
	LA REPRESA	696	17.2	55.00	45.00	33.91	57.33	8.76	121.0	27	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	MENDOZA	1,053	17.9	53.00	47.00	35.04	56.60	8.36	111.4	23	1.82	0.19	0.00	0.00	0.00	0.00	0.09	0.00	0.00		
TABOGA																					
Taboga																					
	TABOGA (CABECERA)	908	139.5	56.00	44.00	21.26	66.08	12.67	127.6	32	4.96	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.11		

Source URS Holding, Inc. with data from the Office of the Comptroller General (Population and Housing National Census of 2000 and Bulletin N° 10).

## 6.7.1 Eastern Pacific Urban Zone

### 6.7.1.1 Demography

The populations of the *corregimientos* included in this zone are very similar and represent a young population, with a wide base in the 0-4 year-old segment and in the 15-34 year-old segment. In general, it presents a slight balance between genders, even though the masculinity indicator presents a higher proportion of women, 94 males per 100 females, which is a characteristic that can be usually observed in the country's most developed areas. The average age is 28 years of age, with the relatively higher averages found in areas inhabited by people with higher income levels such as Bella Vista and Betania, and not so in popular *corregimientos* such as El Chorrillo, Pedregal, and Arnulfo Arias, among others.

In the District of Panama, 27% of the population is under 15 years of age, while in San Miguelito it is 28%. In both districts, the population between 15 and 59 years of age reaches 64%, while the population 60 years of age and older is 9% in the District of Panama and 7% in San Miguelito. In both districts, the population increased at an important rate, especially in San Miguelito during the period 1980-1990, with an annual population growth of 4.49% in San Miguelito and 2.06% in the District of Panama. Both rates decreased to 1.93% during the 1990-2000 decade. The *corregimientos* of San Felipe, Santa Ana, El Chorrillo, and Calidonia report a continuous decrease in their population, as well as the *corregimiento* of Tocumen, in part because segments of the latter population became part of the new *corregimiento* of Mañanitas.

Birth rates are relatively lower in the Panama City area than in other areas in the country, inasmuch as in the year 2005 the capital area reported a birth rate of 14.7 per 1,000 inhabitants, while other sectors of the country reported rates of 20 per 1,000 inhabitants for the same period. General mortality rate for the year 2005 was 6.3 per 1,000 inhabitants, higher than that in other urban zones, and even higher than in rural zones, which during the last five years has been less than 4 per 1,000 inhabitants. Natural growth in Panama City was reported at 8.4 per 1,000 inhabitants in the year 2005, lower than in other areas.

### 6.7.1.2 Human Development

The Human Development Index (HDI)<sup>24</sup> determined by the United Nations Development Program was used to describe the population development level. Since this information is not available at *corregimiento* level, the district information was used. Therefore, it can be observed that the HDI calculated for the districts of Panama and San Miguelito for the year 2002 is 0.783 and 0.769, respectively, which is slightly higher than the national average of 0.707. It can be concluded that this zone has a medium-high human development.

### 6.7.1.3 Indigenous Communities

Approximately 15,700 indigenous people live in the Eastern Pacific Urban Zone, which represents about 1.75% of the total population. Of these, the largest group is the Kuna Indians, with more than 60%, followed by the Emberá group with 30%, and finally the Wounan and Ngöbe with reduced numbers. The Kuna group is distributed along 16 *corregimientos* in the Zone, with a major concentration in the *corregimientos* of Ancon and San Francisco, while the Embera group is mainly concentrated in Ancon, Curundu, and Arnulfo Arias.

## 6.7.2 Western Pacific Urban Zone

### 6.7.2.1 Demography

This Zone is the second in importance as regards to population. At the *corregimiento* level, Arraijan (capital) has the largest population with 64,772 inhabitants; while Feuillet, with 1,745 inhabitants, has the smallest population. The distribution by gender within this Zone presents similarities, reporting in some cases a larger male presence, while others report a larger female presence. The *corregimientos* with larger male population are: Arraijan (capital) and Veracruz in the Arraijan District, and El Coco, Feuillet, Playa Leona and Puerto Caimito in La Chorrera

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<sup>24</sup> The Human Development Index is based on a statistical index comprised of three parameters: a long and healthy life expectancy calculated at birth; the education, which is measured by the adult literacy rate and the combined average of school enrollment at elementary, high-school and higher education level, and the decent life level, measured by the GDP per capita.

District. Masculinity indicators vary from 108.7 in the *corregimiento* of Veracruz in the Arraijan District, to 95.3 in Barrio Colon.

With regards to age groups, more than 60% of the population from all *corregimientos* fall under the 15-to-64-year-old group; about 30% are in group under 15 years of age; and the rest falls under the over 64-year-old group. Veracruz is the *corregimiento* with the youngest population, with 34.29% of its population in the group of those under 15 years of age. Within the Arraijan District, the one with the highest population in the 15-to-64- year-old group is Juan Demostenes Arosemena, with 66.53%, and the one with the oldest population is Barrio Balboa with 6.45% of its population in the group of persons over 64 years of age.

During the period 2000-2005, the *corregimiento* with the highest growth was Vista Alegre, with an average annual rate of 4.78%, while the one with the lowest growth was Barrio Balboa, with a 1.76% rate. Even though forecasts show that growth rates will increase in different proportions, by the year 2015 the population density in all *corregimientos* studied will follow the same trends reported for the year 2000.

#### 6.7.2.2 Human Development

The Human Development Index calculated by the United Nations Development Program in the year 2000 for Arraijan District was 0.752, slightly higher than that of La Chorrera, 0.734, being both higher than the national index of 0.707. These results indicate a medium to high human development in the Zone's population.

### 6.7.2.3 Indigenous Communities

The indigenous population of this Zone is composed of 10,050 persons, representing 3.9% of the total inhabitants, with the Kuna Yala group representing close to 90% of this total. This group is mainly concentrated in the *corregimientos* of Veracruz, Arraijan (capital), Vista Alegre, and Ancon. Of the remaining indigenous groups, the Embera is concentrated mostly in the *corregimientos* of Veracruz and Arraijan (capital), and the Ngöbe Buglé in Playa Leona.

## 6.7.3 Atlantic Urban Zone

### 6.7.3.1 Demography

This zone's population pyramid presents an ample base in the 0-4 year-old group. In general terms, the 15-64 year-old group, which represents the economically active population, constitutes approximately 60% of the population; the economically dependent population represents 37%. These two *corregimientos* report a slight prevalence of females over the male population, with the masculinity indicator of the population being approximately 95 males per 100 females. The average age of the population is 26 years.

Although the population of Colon increases annually, according to estimates of the Directorate of Statistics and Census of the Office Comptroller General, the population of Colon City is gradually decreasing, reporting values of 1.39% in Barrio Norte and 1.38% in Barrio Sur, a decrease that will continue for the next 15 years. On the other hand, an estimated growth of 2.43% is expected for the same period in the rest of Colon District.

### 6.7.3.2 Human Development

The Human Development Index for Colon District is 0.74, which corresponds to a medium-high development level, relatively higher than the national of 0.70. The Human Poverty Index for Colon District is 6.7, lower than 9.2 for Colon Province and 10.8 for the rest of the country. It



is important to note that almost all human poverty indicators for Colon District are lower than those reported for the province and the country.

### 6.7.3.3 Indigenous Communities

Only a reduced number of Kuna indians live in *corregimientos* in this Zone, representing 4% of the inhabitants of Barrio Norte, and only 1% of Barrio Sur inhabitants.

## 6.7.4 Transisthmian Corridor Zone

### 6.7.4.1 Demography

The distribution per age in the Transisthmian Corridor Zone shows a balanced distribution as regards to the different groups, since approximately 35% of the population is in the 0-14 year-old group, except for the extreme cases reported in the *corregimiento* of Nueva Providencia, where it is 40%, and 31% in Sabanitas,. In the group of those in the ages between 15 and 59, the numbers show an average percentage of 59% and only the *corregimiento* of Limon reports a relatively lower percentage with 56%. For the 60 and over age group, the average was 6.8%, with extreme percentages of 6.4% in Chilibre and 9.4% in Salamanca.

With regards to the distribution per gender, the masculinity index in this Zone's *corregimientos* was 106 males per 100 females, and only the *corregimiento* of Sabanitas reports a lower index of 97 males per 100 females. Santa Rosa reports the highest rate, with 114 males per 100 females.

According to information from the 2000 census, the total population of Colon District -- 8 of its *corregimientos* are included in this Zone -- was 181,181 inhabitants. This district concentrates nearly 85% of the province's total population. It is estimated that this growth trend will continue until the year 2010.

### 6.7.4.2 Human Development

Since 8 of the 9 *corregimientos* assigned to this Zone are part of Colon District, the human development information presented for the Atlantic Side Urban Zone was also used in this section, which for the entire district is 0.74 and corresponds to a medium to high development level, slightly higher than the national average of 0.70. The Human Poverty Index calculated for the district is 6.7, which is low when compared to the national index of 10.8.

#### 6.7.4.3 Indigenous Communities

Current indigenous population in this Zone is 1,368 persons, representing 1.15% of the Transisthmian Corridor total population. Of this total, 84% corresponds to the Kuna Indian group, mainly concentrated in the *Cativa corregimiento* and, to a lesser degree, in Sabanitas. The other 16% corresponds to the Embera indian group, concentrated in the San Juan *corregimiento*.

### 6.7.5 Gatun Lake and Costa Abajo de Colon Zone

#### 6.7.5.1 Demography

According to the 2000 Population and Housing National Census, the Zone's population reaches 65,445 persons distributed among 50 communities located in the lake banks. Most of these communities have a century-old history, although there is evidence of the establishment of new communities as well as a trend towards a steady population growth. The most important town, taking into consideration its population, is Escobal, capital of the *corregimiento* by the same name, with 1,653 inhabitants. In general, this is a population engaged in activities linked to the primary sector, especially agriculture, cattle ranch, and fishing.

A male predominance is evident in almost all of the Zone's age groups, especially in the 14 to 39 age group and the 45 to 79 age group. The *corregimiento* of Nuevo Chagres is the exception. Only in the 40 to 44 age group and in the 55 to 59 age group is the masculinity index lower than 100. The index for the total population is 119 males per 100 females. The annual average growth rate is negative in the *corregimientos* of El Guabo, Salud, Ciri de los Sotos, and

Arosemena, and it is less than 1% in seven other *corregimientos*, while relatively high for Cristobal, Nuevo Chagres, and Amador.

#### 6.7.5.2 Human Development

Since this Zone includes 5 different districts, the Human Development Index for each district will be used to estimate the current development level in the Gatun Lake and Costa Abajo de Colon Zone. The district with the highest Human Development Index is Arraijan with 0.752, followed by Colon with 0.740, and La Chorrera with 0.734; all of them fall within a medium to high development level. Next is Capira District with a Human Development Index of 0.623, and Chagres with 0.595, both considered as having a medium development level. In spite of the fact that more than 80% of the Zone's population lives in districts with a Human Development Index over 0.700, it is not correct to conclude that the Human Development Index for the entire Zone is medium to high since the conditions observed in the 37 previously identified towns of special interest correspond to a much lesser human development level.

#### 6.7.5.3 Indigenous Communities

The Zone's total indigenous population is 1,297 persons, representing 1.98% of the total inhabitants of the Gatun Lake and Costa Abajo de Colon Zone, with members of the Kuna and Embera indian groups representing 36% and 27%, respectively, of the total population. The Ngöbe Indians are next with 18%, followed by the Buglé and Wounan, both with 9%. The indigenous population is distributed along the entire Zone, but it is somewhat more concentrated in Nuevo Chagres and Cristobal, where these groups represent 3% and 2%, respectively, of the population.

### 6.7.6 Taboga Zone

#### 6.7.6.1 Demography

Taboga presents a very particular age and gender structure, in which the male prevalence is evident in almost every age group. In fact, the masculinity index reports 135 males per 100 females in every group.

The Taboga Zone is the capital of the district by the same name; it covers an extension of only 8.5 km<sup>2</sup> and, according to the 2000 census, has a population of 908 persons. The population of the Taboga Zone decreased during the past few years from 1,199, according to the 1990 census, to 1,402 inhabitants, according to 2000 figures.

#### 6.7.6.2 Human Development

As regards to Human Poverty Indicators, those proposed by the United Nations Development Program give Taboga a Human Development Index of 0.749, slightly over the national index of 0.707. Hence, it can be concluded that this Zone has a human development level of medium to high.

#### 6.7.6.3 Indigenous Communities

There is no indigenous presence in Taboga or neighboring islands. In fact, according to available statistical data, there is no percentage of indigenous population in this Zone.

## 6.8 Mortality and Morbidity Indicators

The statistical information used to develop this section is presented in Tables 6-7 and 6-8.

**Table 6-7**  
**SESA Birth Rate and Morbidity**

Zone	WESTERN PACIFIC URBAN ZONE		EASTERN PACIFIC URBAN ZONE		ATLANTIC ZONE URBAN
Ministry of Health Regional	Western Panama Regional		Panama and San Miguelito Regional		Colon Province Regional
Districts	Arraijan	La Chorrera	Panama	San Miguelito	Colon
<b>Mortality Rate (2005)</b>	<b>3.2</b>	<b>3.9</b>	<b>4.8</b>	<b>3.8</b>	<b>5.2</b>
<b>MORBIDITY (2002)</b>	<b>Arraijan</b>	<b>Chorrera</b>	<b>Metropolitan Panama</b>		<b>Colon</b>
Malignant Tumors	82	81	659		142
Ischemic Heart Diseases	0	46	437		92
Accidents/Self-inflicted Injuries and Assaults	66	46	379		150
AIDS	54	0	348		98
Diabetes Mellitus	34	25	265		0
Affections Originating in the Perinatal Period	53	0	0		0
Cardiovascular Disease	68	0	0		106
Chronic Respiratory Tract Diseases	0	0	0		0
Pneumonia	0	0	0		0

Zone	Transisthmian Corridor Zone		GATUN LAKE AND COSTA ABAJO DE COLON ZONE					TABOGA ZONE
Ministry of Health	Health Metropolitan Region for the Province of Colon and Metropolitan Panama		Health Regional for Metropolitan Panama, Western Panama and Colon Provinces of Panama and Colon					Health Regional for East Panama
Districts	Colon	Panama	Colon	Panama	Capira	Arraijan	La Chorrera	Taboga
<b>Mortality Rate (2005)</b>	<b>5.2</b>	<b>4.8</b>	<b>5.2</b>	<b>4.8</b>	<b>4.2</b>	<b>3.2</b>	<b>3.9</b>	<b>2.4</b>
<b>MORBIDITY (2002)</b>	<b>Colon</b>	<b>Panama</b>	<b>Colon</b>	<b>Panama</b>	<b>Capira</b>	<b>Arraijan</b>	<b>Chorrera</b>	<b>Taboga</b>
Malignant Tumors	142	659	142	659	15	82	81	
Ischemic Heart Disease	92	437	92	437	5	0	46	0
Accidents/Self-inflicted Injuries and Assaults	150	379	150	379	23	66	46	0
AIDS	98	348	98	348	0	54	0	0
Diabetes Mellitus	0	265	0	265	5	34	25	0
Affections Originating in the Perinatal Period	0	0	0	0	0	53	0	0
Cardiovascular Disease	106	0	106	0	9	68	0	0
Chronic Respiratory Tract Diseases	0	0	0	0	0	0	0	0
Pneumonia	0	0	0	0	0	0	0	0

Source: Ministry of Health Statistical Data [www.minsa.gob.pa](http://www.minsa.gob.pa)  
 Data obtained from the Comptroller's General Office Year 2005.  
 URS Holdings, Inc. 2004. Final Scientific Study and Regulations to Control offensive Odors, Nov. 2002

**Table 6-8**  
**SESA Health Indicators**

<b>Zone</b>	<b>WESTERN PACIFIC URBAN ZONE</b>		<b>EASTERN PACIFIC URBAN ZONE</b>		<b>ATLANTIC URBAN ZONE</b>
<b>Ministry of Health Regional</b>	<b>Western Panama Regional</b>		<b>Panama and San Miguelito Regional</b>		<b>Province of Colon Regional</b>
<b>Districts</b>	<b>Arraijan</b>	<b>La Chorrera</b>	<b>Panama</b>	<b>San Miguelito</b>	<b>Colon</b>
Total Number of Physicians	336		2,126	322	188
Rate Physicians/Inhabitants	8.8		33.8	6.6	8.3
Total Number of Odontologists	120		298	73	42
Rate Odontologist/Inhabitants	3.1		4.7	1.5	1.8
Total Number of Nurses	259		1,638	174	210
Rate Nurses/Inhabitants	6.8		26.1	3.6	9.2
Total Number of Facilities	13	20	68	11	28
Hospitals	2	1	7	2	3
Specialized Institutes	0	0	1	0	0
Polyclinics	1	1	5	2	1
Total Number of Health Centers	3	4	18	7	6
Health Centers (without beds)	3	4	0	0	6
Health Centers (with beds)	0	0	2	0	0
Polycenters	0	0	1	0	0
Promotion Centers	0	0	2	0	0
Health Subcenters	2	1	1	0	7
Health Stations	1	12	4	0	10
Local Health Primary Attention Unit (ULAPS, its Spanish acronym)	1	1	3	0	0
Peripheral Health Primary Attention Center (CAPPS, its Spanish acronym)	3	0	5	0	0

Zone	Transisthmian Corridor Zone		GATUN LAKE AND COSTA ABAJO DE COLON ZONE					TABOGA ZONE
Ministry of Health	Health Metropolitan Region for the Province of Colon and Metropolitan Panama		Health Regional for Metropolitan Panama, Western Panama and Colon Provinces of Panama and Colon					Health Regional for East Panama
Districts	Colon	Panama	Colon	Panama	Capira	Arraijan	La Chorrera	Taboga
Total Number of Physicians	188	2,126	188	2,126	336			0
Rate Physicians/Inhabitants	8.3	33.8	8.3	33.8	8.8			0
Total Number of Odontologists	42	298	42	298	120			0
Rate Odontologists/Inhabitants	1.8	4.7	1.8	4.7	3.1			0
Total Number of Nurses	210	1,638	210	1,638	259			0
Rate Nurses/Inhabitants	9.2	26.1	9.2	26.1	6.8			0
Total Number of Facilities	28	68	28	68	21	13	20	1
Hospitals	3	7	3	7	0	2	1	0
Specialized Institutes	0	1	0	1	0	0	0	0
Polyclinics	1	5	1	5	0	1	1	0
Total Number of Health Centers	6	18	6	18	2	3	4	0
Health Centers (without beds)	6	0	6	0	2	3	4	0
Health Centers(with beds)	0	2	0	2	0	0	0	0
Polycenters	0	1	0	1	0	0	0	0
Promotion Centers	0	2	0	2	1	0	0	0
Health Subcenters	7	1	7	1	4	2	1	0
Health Stations	10	4	10	4	13	1	12	0
Local Health Primary Attention Unit (ULAPS)	0	3	0	3	0	1	1	0
Peripheral Health Primary Attention Center (CAPPS)	0	5	0	5	1	3	0	0
Dispensaries and Satellite Clinics	1	18	1	18	0	0	0	0

Source: Ministry of Health Statistical Data [www.minsa.gob.pa](http://www.minsa.gob.pa)

Data obtained from the Office of the Comptroller General, Year 2005.

URS Holdings, Inc. 2004. Final Scientific Study and Regulations to Control offensive Odors, Nov. 2004

### 6.8.1 Eastern Pacific Urban Zone

According to 2005 available information, the districts of Panama and San Miguelito have a mortality rate of 4.8% and 3.8%, respectively. The main morbidity cases in the District of Panama in the year 2002 were, in order of importance, malignant tumors with 659 cases, followed by ischemic heart diseases with 427 cases reported for that year. Following are Acquired Immunodeficiency Syndrome (AIDS) with 348 cases, and diabetes with 265 cases.

Almost half of the country's 2,248 available physicians provide care in this zone, as well as 1,812 nurses, and 371 odontologists. This represents, for the entire zone, an approximate number of 220 inhabitants per physician, 300 inhabitants per nurse, and 1,500 inhabitants per odontologist. The relation physician/inhabitant is the highest in the country, with an average of 726 inhabitants per physician. Both districts have the highest number of currently available health facilities. In the year 2005, there were 79 health facilities, including 9 hospitals, 32 health centers and polyclinics, and 28 health subcenters, including the Social Security System satellite clinics and dispensaries available in districts of this Zone.

### **6.8.2 Western Pacific Urban Zone**

With regards to death and mortality rates identified in some of the Zone's *corregimientos*, it is observed that the death rate in the Burunga *corregimiento* was 1.1% in the year 2004, or 38 deaths, and 5.0% in the Playa Leona *corregimiento* in the year 2005, or 41 deaths. At a district level, statistics show a mortality rate of 3.2% in Arraijan and 3.9% in La Chorrera. The most important morbidity cases for the districts of Arraijan and La Chorrera for the year 2002 were malignant tumors, with 82 and 81 cases respectively. Following are cardiovascular diseases with 68 cases, AIDS with 54 cases, and perinatal affections with 53 cases reported in Arraijan.

There are 330 physicians, 120 odontologists, 260 nurses, and some 280 emergency medical technicians available in the zone. There are 33 health infrastructures in the zone, 3 of which are health subcenters; 10 are health centers and polyclinics, including subpolyclinics, Local Health Primary Attention Unit (ULAPS), and the Health Attention, Prevention, and Promotion Centers; and 3 hospitals, one of them, the Nicolas Solano Hospital, located in La Chorrera, is the most important hospital in the entire Panama Province western region.



### 6.8.3 Atlantic Urban Zone

Available statistics show that at the district level the mortality rate in Colon is 5.2%. Main morbidity cases identified in Colon District in the year 2002 were malignant tumors with 142 cases, cardiovascular diseases with 106 cases, AIDS with 98 cases, and ischemic heart diseases with 92 cases.

One hundred and eighteen physicians, 136 nurses, and 13 odontologists provide care in this zone. There are 3 attention centers in the Barrio Sur *corregimiento*: 1 hospital, 1 private clinic, and 1 specialized center, and there are 3 health centers and 1 private clinic in the Barrio Norte *corregimiento*. Both *corregimientos* have Local Health Primary Attention Units (ULAPS), as well as Social Security System Health Attention, Prevention, and Promotion Centers. As regards to hospitals, the district reported the availability of nearly 380 beds in the year 2005, which represented a rate of 10.1 bed per 1,000 inhabitants, the highest rate in the country.

### 6.8.4 Transisthmian Corridor Zone

The mortality rates registered in the districts of Panama and Colon were 4.8% and 5.2%, respectively. Since there were no records available at the *corregimiento* level, the morbidity statistics are similar to those presented for the Eastern Pacific Urban Zone and Atlantic Urban Zone,

Colon City reported some 66 public health centers for the year 2005; of these 27 corresponded to the District of Colon, and included hospitals, health centers and subcenters, and polyclinics. Sabanitas is the only *corregimiento* that has a health center with bed availability, the Sabanitas Integrated Medical Center.

### **6.8.5 Gatun Lake and Costa Abajo de Colon Zone**

The mortality rate in this Zone is calculated by using the average mortality rate in each of its districts. For the year 2002 it was 4.2% in Capira, 3.2% in Arraiján, 3.9% in La Chorrera and 5.2% in Colon; this information is not available for the Chagres District. The main morbidity cases observed in the zone during the year 2002 correspond to, in order of importance, malignant tumors with 142 cases in Colon, 82 in Arraijan, 15 in Capira, 81 in La Chorrera, and 5 in Chagres. Following are cardiovascular diseases with 106 cases in Colon, 6 in Chagres, 9 in Capira, and 68 in Arraiján, as well as diabetes with 5 cases reported in Capira, 34 in Arraiján, and 25 cases reported in La Chorrera.

Of the towns of special interest within the zone, 5 have health facilities: 1 health center at Cuipo, and another at Escobal; one clinic provides first aid care at Ciricito, and two health posts at Lagarterita and La Arenosa. The rest of the population has to commute to these centers by foot, cayuco, or public transportation for 25 minutes to an hour to seek medical attention. Currently, the Cuipo health center is not in service, which means that members of the communities who use this center (La Cauchera, Los Cedros, Caño Viviano, among others) now have to travel to Escobal to seek medical attention. Health coverage in this area is reduced.

### **6.8.6 Taboga Zone**

The mortality rate in Taboga District was 2.4% for the year 2002, less than the national average. Since most conditions are treated at other locations, mainly in the District of Panama, there is no statistical information available in this regard for Taboga District.

Although, as previously mentioned, the district's population has access to Panama City's health centers because of their proximity, there is one health center and health station on the island. As regards to medical/technical health personnel, Taboga only has one physician and one odontologist, in addition to one emergency medical technician.

## **6.9 Occupational Indicators and Others Relevant Information Concerning the Quality of Life in Affected Communities**

The statistical information used to develop this section is presented in Table 6-9.

**Table 6-9  
Employment and Labor Occupation Indicators**

District	Corregimiento	Total Inhabitants per Corregimiento	Annual Average Income per Person (in Balboas)	Average Monthly Income of Employed Population 10 years of age and older	Percentage of Unemployed	Percentage of Persons Engaged in Agriculture	Percentage of Persons Engaged in Fishing	Percentage of Persons Engaged in Mining Exploitation	Percentage of Persons Engaged in the Manufacturing Industry	Percentage of Persons Engaged in Electricity	Percentage of Persons Engaged in Construction	Percentage of Persons Engaged in Commercial Activities	Percentage of Persons Engaged in Hotels/Restaurants	Percentage of Persons Engaged in Transportation Activities	Percentage of Persons Engaged in Financial Activities	Percentage of Persons Engaged in Real Estate Activities	Percentage of Persons Engaged in Public Administration	Percentage of Persons Engaged in Teaching	Percentage of Persons Engaged in Social Services Activities	Percentage of Persons Engaged in Community Activities	Percentage of Persons Working in Private Homes	Percentage of Persons Working for International Organisms
<b>EASTERN PACIFIC URBAN</b>																						
<b>Panama</b>																						
	ANCON	11,169	6,980.00	564.5	14.9	2.0	1.00	0.0	7.0	1.0	5.0	16.0	4.00	13.00	4.00	9.00	12.00	5.0	4.0	6.0	6.0	1.0
	BELLA VISTA	28,421	11,810.00	912.4	5.9	0.0	0.00	0.0	6.0	1.0	3.0	19.0	4.00	7.00	9.00	14.00	6.00	5.0	6.0	5.0	11.0	1.0
	BETANIA	44,409	8,762.00	683.7	9.8	0.0	0.00	0.0	8.0	1.0	4.0	20.0	3.00	9.00	9.00	10.00	9.00	7.0	7.0	5.0	5.0	1.0
	CURUNDU	19,019	1,606.00	242.2	22.2	0.0	1.00	0.0	10.0	1.0	9.0	23.0	8.00	5.00	1.00	7.00	9.00	3.0	2.0	8.0	8.0	0.0
	EL CHORRILLO	22,632	2,035.00	280.6	21.8	0.0	1.00	0.0	9.0	1.0	7.0	22.0	7.00	7.00	2.00	6.00	14.00	4.0	3.0	9.0	6.0	0.0
	JUAN DIAZ	88,165	4,182.00	444.4	13.3	0.0	0.00	0.0	11.0	1.0	5.0	21.0	4.00	11.00	6.00	6.00	10.00	7.0	5.0	6.0	3.0	0.0
	LA EXPOSICION O CALIDONIA	19,729	3,866.00	366.2	13.7	0.0	0.00	0.0	8.0	1.0	4.0	20.0	9.00	7.00	4.00	8.00	12.00	6.0	4.0	8.0	4.0	0.0
	LAS CUMBRES	92,519	2,489.00	304.4	13.9	1.0	0.00	0.0	13.0	1.0	13.0	22.0	5.00	8.00	2.00	5.00	6.00	4.0	3.0	4.0	9.0	0.0
	PARQUE LEFEVRE	37,136	5,822.00	488.4	12.3	0.0	0.00	0.0	9.0	1.0	5.0	19.0	5.00	10.00	7.00	8.00	9.00	5.0	6.0	6.0	6.0	1.0
	PEDREGAL	45,801	2,739.00	289.8	16.3	2.0	0.00	0.0	15.0	1.0	9.0	22.0	6.00	8.00	2.00	5.00	7.00	4.0	3.0	6.0	6.0	0.0
	PUEBLO NUEVO	18,161	7,288.00	555.0	9.7	0.0	0.00	0.0	9.0	1.0	4.0	21.0	5.00	9.00	8.00	9.00	8.00	6.0	6.0	6.0	6.0	1.0
	RIO ABAJO	28,714	3,901.00	384.9	15.3	0.0	0.00	0.0	10.0	1.0	6.0	20.0	7.00	10.00	4.00	7.00	9.00	6.0	5.0	7.0	4.0	0.0
	SAN FELIPE	6,928	2,964.00	305.0	16.0	0.0	1.00	0.0	9.0	1.0	6.0	23.0	10.00	6.00	2.00	6.00	13.00	4.0	3.0	8.0	6.0	0.0
	SAN FRANCISCO	35,751	9,685.00	645.8	8.3	0.0	1.00	0.0	7.0	1.0	4.0	20.0	4.00	7.00	8.00	11.00	7.00	5.0	6.0	5.0	11.0	1.0
	SANTA ANA	21,098	2,990.00	323.8	14.8	0.0	1.00	0.0	9.0	1.0	5.0	26.0	10.00	6.00	3.00	7.00	11.00	4.0	4.0	8.0	4.0	0.0
	TOCUMEN	83,187	2,193.00	300.2	13.2	1.0	0.00	0.0	14.0	1.0	11.0	22.0	7.00	9.00	2.00	6.00	6.00	4.0	3.0	5.0	8.0	0.0
<b>San Miguelito</b>																						
	AMELIA DENIS DE ICAZA	38,522	3,577.00	335.4	14.9	1.0	0.00	0.0	12.0	1.0	10.0	22.0	5.00	8.00	3.00	6.00	8.00	5.0	4.0	5.0	7.0	0.0
	ARNULFO ARIAS	30,502	1,566.00	251.3	15.9	1.0	1.00	0.0	11.0	0.0	14.0	21.0	7.00	6.00	1.00	6.00	6.00	3.0	2.0	6.0	11.0	0.0
	BELISARIO FRIAS	46,794	1,942.00	282.2	16.9	0.0	1.00	0.0	13.0	1.0	11.0	22.0	6.00	8.00	2.00	6.00	7.00	5.0	3.0	5.0	8.0	0.0
	BELISARIO PORRAS	49,802	1,852.00	272.9	17.7	1.0	0.00	0.0	14.0	1.0	14.0	23.0	6.00	6.00	1.00	6.00	6.00	3.0	3.0	5.0	9.0	0.0
	JOSE DOMINGO ESPINAR	35,301	5,163.00	530.8	10.7	0.0	0.00	0.0	9.0	2.0	6.0	20.0	3.00	11.00	7.00	7.00	10.00	8.0	6.0	5.0	4.0	0.0
	MATEO ITURRALDE	12,607	3,248.00	360.6	15.2	0.0	0.00	0.0	12.0	1.0	8.0	23.0	4.00	9.00	4.00	6.00	10.00	7.0	4.0	6.0	3.0	0.0
	OMAR TORRIJOS	37,650	2,812.00	332.2	15.4	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0
	RUFINA ALFARO	25,239	6,992.00	700.7	9.5	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0

District	Corregimiento	Total Inhabitants per Corregimiento	Annual Average Income per Person (in Balboas)	Average Monthly Income of Employed Population 10 years of age and older	Percentage of Unemployed	Percentage of Persons Engaged in Agriculture	Percentage of Persons Engaged in Fishing	Percentage of Persons Engaged in Mining Exploitation	Percentage of Persons Engaged in the Manufacturing Industry	Percentage of Persons Engaged in Electricity	Percentage of Persons Engaged in Construction	Percentage of Persons Engaged in Commercial Activities	Percentage of Persons Engaged in Hotels/Restaurants	Percentage of Persons Engaged in Transportation Activities	Percentage of Persons Engaged in Financial Activities	Percentage of Persons Engaged in Real Estate Activities	Percentage of Persons Engaged in Public Administration	Percentage of Persons Engaged in Teaching	Percentage of Persons Engaged in Social Services Activities	Percentage of Persons Engaged in Community Activities	Percentage of Persons Working in Private Homes	Percentage of Persons Working for International Organizations
<b>WESTERN PACIFIC URBAN</b>																						
Arraijan																						
	ARRAIJAN (CAPITAL)	64,772	2,128.00	296.7	12.0	2.0	1.00	0.0	12.0	1.0	14.0	21.0	7.00	7.00	2.00	4.00	7.00	4.0	3.0	5.0	8.0	0.0
	JUAN DEMOSTENES AROSEMENA	24,792	3,034.00	372.6	11.6	1.0	1.00	0.0	12.0	1.0	9.0	21.0	6.00	9.00	4.00	5.00	9.00	7.0	5.0	5.0	4.0	0.0
	VERACRUZ	16,748	1,773.00	261.6	15.9	1.0	3.00	0.0	13.0	1.0	11.0	18.0	13.00	6.00	1.00	6.00	6.00	3.0	4.0	4.0	9.0	0.0
	VISTA ALEGRE	39,097	2,973.00	379.2	11.3	1.0	1.00	0.0	12.0	1.0	7.0	22.0	6.00	10.00	4.00	5.00	11.00	6.0	5.0	5.0	4.0	0.0
La Chorrera																						
	BARRIO BALBOA	29,053	2,481.00	318.6	13.5	1.0	1.00	0.0	13.0	1.0	11.0	23.0	5.00	8.00	2.00	4.00	8.00	8.0	5.0	5.0	5.0	0.0
	BARRIO COLON	26,818	3,163.00	372.5	11.9	2.0	1.00	0.0	12.0	1.0	10.0	20.0	5.00	9.00	4.00	4.00	8.00	9.0	6.0	5.0	4.0	0.0
	EL COCO	14,167	1,895.00	288.5	11.4	2.0	1.00	0.0	13.0	1.0	16.0	21.0	5.00	9.00	1.00	3.00	6.00	5.0	3.0	5.0	7.0	0.0
	FEUILLET	1,745	1,904.00	261.3	12.9	8.0	0.00	0.0	15.0	0.0	15.0	21.0	5.00	9.00	2.00	2.00	7.00	3.0	3.0	5.0	5.0	0.0
	GUADALUPE	26,857	1,964.00	283.3	12.5	2.0	1.00	0.0	14.0	1.0	15.0	23.0	5.00	8.00	2.00	3.00	6.00	5.0	3.0	4.0	8.0	0.0
	PLAYA LEONA	6,706	1,769.00	258.6	8.8	7.0	4.00	0.0	13.0	1.0	15.0	21.0	5.00	8.00	1.00	2.00	5.00	4.0	2.0	5.0	6.0	0.0
	PUERTO CAIMITO	7,198	2,094.00	249.0	8.6	3.0	17.00	0.0	18.0	1.0	8.0	16.0	4.00	5.00	2.00	3.00	6.00	4.0	3.0	4.0	6.0	0.0

URS Holding, Inc. based on data from the Republic of Panama's Office of the Comptroller General. (2000 Census and Bulletin No. 10)

District	Corregimiento	Total Inhabitants per Corregimiento	Annual Average Income per Person (in Balboas)	Average Monthly Income of Employed Population 10 years of age and older	Percentage of Unemployed	Percentage of Persons Engaged in Agriculture	Percentage of Persons Engaged in Fishing	Percentage of Persons Engaged in Mining Exploitation	Percentage of Persons Engaged in the Manufacturing Industry	Percentage of Persons Engaged in Electricity	Percentage of Persons Engaged in Construction	Percentage of Persons Engaged in Commercial Activities	Percentage of Persons Engaged in Hotels/Restaurants	Percentage of Persons Engaged in Transportation Activities	Percentage of Persons Engaged in Financial Activities	Percentage of Persons Engaged in Real Estate Activities	Percentage of Persons Engaged in Public Administration	Percentage of Persons Engaged in Teaching	Percentage of Persons Engaged in Social Services Activities	Percentage of Persons Engaged in Community Activities	Percentage of Persons Working in Private Homes	Percentage of Persons Working for International Organizations
<b>ATLANTIC URBAN</b>																						
Colon																						
	BARRIO NORTE	24,346	2,604.00	298.7	23.9	0.0	0.00	0.0	6.0	1.0	5.0	29.0	5.00	14.00	2.00	6.00	5.00	5.0	4.0	5.0	6.0	0.0
	BARRIO SUR	17,787	2,381.00	921.2	19.1	0.0	0.00	0.0	5.0	1.0	4.0	30.0	8.00	15.00	1.00	6.00	5.00	5.0	3.0	5.0	5.0	0.0
<b>TRANSISTHMIAN CORRIDOR</b>																						
Colon																						
	BUENA VISTA	10,428	1,619.00	259.4	14.4	6.0	0.00	0.0	12.0	1.0	15.0	27.0	3.00	11.00	1.00	3.00	4.00	3.0	2.0	3.0	7.0	0.0
	CATIVA	26,621	2,556.00	312.6	16.9	1.0	0.00	0.0	6.0	1.0	8.0	28.0	4.00	19.00	2.00	6.00	4.00	6.0	3.0	4.0	5.0	0.0
	LIMON	4,092	1,467.00	233.8	19.0	8.0	1.00	1.0	6.0	1.0	14.0	27.0	3.00	14.00	0.00	2.00	5.00	3.0	1.0	4.0	8.0	0.0
	NUEVA PROVIDENCIA	3,065	1,413.00	230.3	11.9	5.0	0.00	0.0	7.0	1.0	16.0	33.0	3.00	8.00	0.00	4.00	4.00	2.0	1.0	4.0	10.0	0.0
	SABANITAS	17,073	2,617.00	313.0	15.3	1.0	0.00	0.0	6.0	1.0	8.0	34.0	4.00	16.00	2.00	5.00	4.00	6.0	3.0	5.0	6.0	0.0
	SAN JUAN	13,325	1,628.00	268.3	13.5	5.0	0.00	0.0	12.0	1.0	17.0	28.0	4.00	9.00	1.00	2.00	3.00	3.0	2.0	4.0	6.0	0.0
	SANTA ROSA	735	1,269.00	206.8	11.8	25.0	0.00	5.0	9.0	0.0	11.0	15.0	1.00	4.00	0.00	1.00	8.00	2.0	2.0	7.0	7.0	0.0
	SALAMANCA	2,920	1,133.00	182.0	15.4	32.0	1.00	0.0	10.0	0.0	14.0	15.0	3.00	4.00	0.00	1.00	3.00	2.0	2.0	3.0	7.0	0.0
Panama																						
	CHILIBRE	40,475	1,868.00	283.5	16.3	5.0	0.00	0.0	13.0	1.0	15.0	21.0	5.00	10.00	1.00	4.00	5.00	3.0	2.0	4.0	9.0	0.0
<b>GATUN LAKE AND COSTA ABAJO DE COLON</b>																						
Colon																						
	CIRICITO	2,402	879.00	117.9	15.1	38.0	0.00	0.0	2.0	0.0	5.0	19.0	1.00	7.00	0.00	1.00	5.00	3.0	2.0	4.0	7.0	0.0
	CRISTOBAL	37,426	2,781.00	343.2	18.9	1.0	0.00	0.0	5.0	1.0	5.0	27.0	4.00	19.00	2.00	6.00	7.00	6.0	4.0	4.0	4.0	0.0
	ESCOBAL	2,181	1,349.00	241.7	17.2	22.0	1.00	0.0	3.0	1.0	12.0	20.0	1.00	12.00	0.00	4.00	6.00	4.0	2.0	4.0	3.0	0.0
Chagres																						
	NUEVO CHAGRES (CAPITAL)	419	1,696.00	190.4	15.9	13.0	6.00	0.0	2.0	0.0	8.0	17.0	3.00	12.00	0.00	1.00	16.00	6.0	5.0	7.0	3.0	0.0
	ACHIOTE	784	778.00	133.3	22.5	58.0	0.00	0.0	3.0	0.0	6.0	8.0	1.00	3.00	2.00	4.00	0.00	0.0	1.0	5.0	5.0	0.0
	EL GUABO	1,180	676.00	86.4	4.7	59.0	0.00	0.0	2.0	0.0	4.0	12.0	1.00	2.00	0.00	1.00	1.00	3.0	1.0	5.0	6.0	0.0
	LA ENCANTADA	2,523	456.00	75.9	7.1	82.0	0.00	0.0	1.0	0.0	1.0	5.0	0.00	1.00	0.00	0.00	1.00	2.0	1.0	2.0	2.0	0.0
	PALMAS BELLAS	1,690	1,327.00	184.2	19.9	29.0	1.00	1.0	5.0	0.0	9.0	20.0	1.00	4.00	0.00	2.00	5.00	6.0	4.0	3.0	5.0	0.0
	PIÑA	700	1,055.00	187.5	28.9	33.0	1.00	9.0	1.0	2.0	11.0	16.0	2.00	7.00	3.00	0.00	4.00	2.0	1.0	2.0	0.0	0.0
	SALUD	1,895	778.00	124.7	21.1	45.0	0.00	0.0	2.0	0.0	7.0	17.0	1.00	6.00	0.00	1.00	2.00	3.0	1.0	3.0	5.0	0.0
Capira																						
	CIRI DE LOS SOTOS	2,083	255.00	64.2	7.3	84.0	0.00	0.0	1.0	0.0	2.0	0.0	6.00	1.00	0.00	0.00	1.00	2.0	0.0	0.0	2.0	0.0
Arraijan																						

District	Corregimiento	Total Inhabitants per Corregimiento	Annual Average Income per Person (in Balboas)	Average Monthly Income of Employed Population 10 years of age and older	Percentage of Unemployed	Percentage of Persons Engaged in Agriculture	Percentage of Persons Engaged in Fishing	Percentage of Persons Engaged in Mining Exploitation	Percentage of Persons Engaged in the Manufacturing Industry	Percentage of Persons Engaged in Electricity	Percentage of Persons Engaged in Construction	Percentage of Persons Engaged in Commercial Activities	Percentage of Persons Engaged in Hotels/Restaurants	Percentage of Persons Engaged in Transportation Activities	Percentage of Persons Engaged in Financial Activities	Percentage of Persons Engaged in Real Estate Activities	Percentage of Persons Engaged in Public Administration	Percentage of Persons Engaged in Teaching	Percentage of Persons Engaged in Social Services Activities	Percentage of Persons Engaged in Community Activities	Percentage of Persons Working in Private Homes	Percentage of Persons Working for International Organizations
	NUEVO EMPERADOR	2,765	1,866.00	247.2	16.9	18.0	0.00	0.0	10.0	2.0	16.0	13.0	2.00	9.00	1.00	2.00	6.00	3.0	3.0	5.0	10.0	0.0
	SANTA CLARA	1,744	1,601.00	232.7	51.0	21.0	0.00	0.0	9.0	1.0	17.0	10.0	2.00	6.00	1.00	4.00	8.00	2.0	2.0	4.0	10.0	0.0
La Chorrera																						
	AMADOR	2,675	751.00	133.6	15.2	49.0	1.00	0.0	4.0	0.0	9.0	7.0	2.00	1.00	0.00	4.00	3.00	1.0	0.0	7.0	11.0	0.0
	AROSEMENA	290	1,111.00	175.0	12.0	54.0	0.00	0.0	6.0		17.0	3.0	1.00	1.00	0.00	1.00	3.00	3.0	1.0	4.0	7.0	0.0
	EL ARADO	2,012	1,450.00	194.7	65.0	37.0	0.00	0.0	10.0	1.0	8.0	11.0	3.00	7.00	0.00	3.00	5.00	3.0	1.0	5.0	6.0	0.0
	ITURRALDE	927	1,161.00	144.7	44.0	47.0	3.00	0.0	5.0	1.0	9.0	6.0	4.00	1.00	0.00	3.00	2.00	1.0	1.0	4.0	11.0	0.0
	LA REPRESA	696	837.00	137.5	25.0	42.0	2.00	0.0	4.0	0.0	10.0	10.0	2.00	4.00	0.00	1.00	0.00	1.0	0.0	12.0	8.0	0.0
	MENDOZA	1,053	1,164.00	168.7	50.0	36.0	1.00	0.0	3.0	1.0	14.0	8.0	3.00	2.00	1.00	1.00	5.00	2.0	1.0	12.0	12.0	0.0
<b>TABOGA</b>																						
Taboga																						
	TABOGA (CAPITAL)	908	2,719.00	229.9	15.7	2.0	19.00	0.0	7.0	4.0	8.0	7.0	12.00	8.00	2.00	6.00	7.00	1.0	3.0	2.0	11.0	0.0

URS Holding, Inc. Based on data from the Republic of Panama's Office of the Comptroller General. (2000 Census and Bulletin No.10)

### 6.9.1 Eastern Pacific Urban Zone

The Zone's annual income includes the average income of the districts of Panama, \$4,092, and San Miguelito, which is lower. This income is higher than the national average of \$2,377 and slightly higher than the one in urban areas (\$3,224 ). At the *corregimiento* level, income fluctuates between \$11,810 in Bella Vista and \$1,606 in Curundu. The *corregimientos* of Rufina Alfaro and Jose Domingo Espinar in San Miguelito District report the highest incomes, with \$6,992 and \$5,163, respectively. The lowest incomes reported correspond to the *corregimientos* of Arnulfo Arias and Belisario Porras with \$1,566 and \$1,852 respectively. The highest unemployment rate reported corresponds to the *corregimientos* of Curundu and El Chorrillo, with 22.15% and 21.78%, respectively, while the *corregimiento* with the lowest unemployment rate is Bella Vista with 5.88%. In other areas, the unemployment rate ranges between 10% and 16%.

Main economic activities in this zone include commerce, services, and the Canal. It is estimated that more than half of the country's GDP is originated in this Zone. The best qualified labor force, in addition to the infrastructures, and the basic utility services required by investors are centralized in the capital. The City of Panama hosts the biggest Latin American International Financial Center with more than 87 banks, of which 54 are part of the National Banking System, 24 are part of International Banking, and 9 fall under the representation category.

Hotel business activities are low; the highest representation of persons dedicated to this activity come from the neighborhoods of San Felipe and Santa Ana, with 10% each, and from La Exposición in Calidonia, with 9%. Agricultural activities in this Zone are almost nonexistent; the highest representation is located in the areas of Pedregal and Ancon with 2% each. The highest percentage of fishing activities was reported in areas such as Ancon, Curundu, El Chorrillo, San Felipe, Santa Ana, San Francisco, Arnulfo Arias, and Belisario Frias with 1% each.

### 6.9.2 Western Pacific Urban Zone



In the year 2000 the average annual incomes in current values in this Zone were: \$2,239 in La Chorrera District and \$2,448 in Arraijan District. For comparison purposes, the national average annual income for that same period was \$2,377. The unemployment rate in the *corregimientos* that conform the Western Pacific Urban Zone ranges from 8.57% in Puerto Caimito in La Chorrera District, to 15.86% in Veracruz in Arraijan District. In all these *corregimientos*, with the exception of Playa Leona and Puerto Caimito, the unemployment rate is higher than the national average of 12.3%. The average monthly income of the population 10 years of age and older is between \$249.0 and \$379.2, in the *corregimientos* of Puerto Caimito, La Chorrera District; and Vista Alegre, Arraijan District, respectively. At a home level, the monthly income ranges between \$370.8 and \$685.7, which corresponds to the *corregimientos* of Playa Leona in La Chorrera, and Juan Demostenes Arosemena in Arraijan, respectively.

La Chorrera District is considered a commuter town. A great part of the district's labor force commutes daily to Panama City. The labor force is the district's main source of income. Consequently, the most significant economic activity is the commercial movement, which is conducted primarily in the area of Barrio Balboa and Guadalupe with 23%. Evidence of this activity are the new branches opened in this area by the country's main supermarket chains.

The hotel business has its principal representation in the area of Veracruz with 13% of its inhabitants engaged in this activity. Agricultural and fishing activities are conducted within this sector. The highest percentage of persons engaged in these activities is found in Feuillet with 8%, in contrast with communities such as Barrio Balboa, Vista Alegre, Veracruz, and Juan Demostenes Arosemena, which only reported 1%. Important under this item is the harvest of golden pineapples for export to the United States and Europe. Fishing activities are important in some communities such as Puerto Caimito with 17%.

### 6.9.3 Atlantic Urban Zone

The average annual income in the *corregimientos* of Barrio Norte and Barrio Sur is \$2,604, higher than the average of \$2,337 in the district and province of Colon. Current unemployment rate for both *corregimientos* is actually higher than that reported for the other of *corregimientos* in the zone, with 23.91% for Barrio Norte and 19.12% for Barrio Sur. The Colon Free Zone, located in this zone, includes an important network of related services such as: exports, loadings, sales, and customs services, among others. According to available statistical information, it can be observed that the main economic activity in this Zone is commerce. Reports show that 29% of the Barrio Norte population and 30% of the Barrio Sur population are engaged in this activity, followed in order of importance by the transportation activity with the 14% of the Barrio Norte population and 15% of the Barrio Sur population. Other economic activities such as hotel business and services, manufacturing, construction, real estate, and public administration report figures between 4% and 8% in both *corregimientos*. It is important to highlight that, according to the 2000 Population and Housing National Census, there are no reports of people engaged in agriculture and fishing activities in this zone.

### 6.9.4 Transisthmian Corridor Zone

The Zone's average annual income shows a relative dispersion between \$2,617 in Sabanitas to \$1,133 in Salamanca. This Zone reports the most uniform average unemployment rate in the whole SESA, from 11.76% in Santa Rosa to 16.30% in Chilibre. Commerce is the economic activity that engages the vast majority of the Zone's population, an average of 28% of the total population. The best examples are the *corregimientos* of Sabanitas and Nueva Providencia, where 34% and 33% of the population, respectively, are engaged in this activity. Construction is the second source of employment in the zone, with 14%, mainly because of the easy access to the districts of Panama and Colon through the Transisthmian Highway. It is estimated that, as an average, 10% of the Zone's population works in agriculture, mainly subsistence, especially in Salamanca and Santa Rosa, with 32% and 25% of their total population engaged in this activity. Fishing represents 1% of the economic activity of the Limon and Salamanca populations; this activity is not practiced in other parts of the Zone. Hotel business activities do not represent a

significant source of employment for the Zone's inhabitants; the highest average, 5%, is reported in Chilibre.

### **6.9.5 Gatun Lake and Costa Abajo de Colon Zone**

The Zone's average annual income is uneven. Cristobal's average income is \$2,781, ten times higher than Cirí de Los Sotos' average of \$255. The unemployment rates in the Zone's *corregimientos* are high, with 50% of the economically active population unemployed in certain areas, such as Santa Clara, El Arado, Iturralde, and Mendoza, which report unemployment rates of 51%, 65%, 44% and 50%, respectively. Of the remaining *corregimientos*, 9 have unemployment rates between 12% and 28%, higher than the national average, while El Guabo with 4.69%, La Encantada with 7.13%, and Cirí de los Sotos with 7.32%, are the only *corregimientos* reporting rates lower than the national average.

Approximately 40% of the Zone's economically active population is engaged in agriculture, while a much lower percentage of the population is engaged in subsistence fishing activities. The principal fishing communities are located in Nuevo Chagres, 6%, and Iturralde, 3%. Other common sources of employment are construction and commerce, engaging an average of 8.95% and 9.05% of the population, respectively. Hotel business activities are present in all *corregimientos* with Cirí de Los Sotos reporting the highest percentage (6%) of inhabitants engaged in this activity.

### **6.9.6 Taboga Zone**

The percentages of low income, child malnourishment, and lack of basic utility services are relatively lower in Taboga than those at the national level. The average annual income in Taboga is \$2,719, higher than the national average of \$2,377. The unemployment rate is 15.7%.

Agricultural and commercial activities are very low, 2% and 7%, respectively. Fishing is Taboga's main economic activity, engaging 19% of its population, followed by tourism-related

activities such as hotel and restaurant customer service, with 12%, and domestic services with 11%.

## **6.10 Equipment, Services, Infrastructure Works, and Economic Activities**

The statistical information used in this section is presented in Table 6-10. It is important to point out that information related to economic activities was presented in the previous section.

**Table 6-10**  
**SESA Equipment and Basic Services**

District	Corregimiento	IDAAN Public Aqueduct	Community Public Aqueducts	Private Aqueducts	Sanitary Wells	Unprotected Curb	Water/rainwater	Superficial Wells	River/stream	Other	Percentage of Houses with Public Electricity	Percentage of Houses Using Kerosene/Diesel Lighting	Percentage of Houses Using Gas Lighting	Percentage of Houses with Own Power Plant	Percentage of Houses Using Community Electric Lighting	Other	Percentage of Waste Collected by the Public Sector	Percentage of Waste Collected by the Private Sector	Percentage of Waste Collected in Vacant Lots	Percentage of Waste Dumped into Rivers and Streams	Percentage of Waste Incinerated or Buried	Percentage of Waste Buried (in the ground)	Percentage of Alternate Waste Collection Methods
<b>EASTERN PACIFIC URBAN</b>																							
<b>Panama</b>																							
	ANCON	86.0	4.0	0.0	1.0	0.0	3.0	3.0	0.0	1.0	91.0	7.0	0.0	0.0	0.00	2.00	83.00	0.00	3.00	0.00	11.00	1.00	1.00
	BELLA VISTA	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	99.00	1.00	0.00	0.00	0.00	0.00	0.00
	BETANIA	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	99.00	1.00	0.00	0.00	0.00	0.00	0.00
	CURUNDU	94.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	95.00	1.00	1.00	2.00	0.00	0.00	0.00
	EL CHORRILLO	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	99.00	1.00	0.00	0.00	0.00	0.00	0.00
	JUAN DIAZ	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	99.00	0.00	0.00	0.00	0.00	0.00	1.00
	LA EXPOSICION O CALIDONIA	99.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	99.00	0.00	0.00	0.00	0.00	0.00	0.00
	LAS CUMBRES	93.0	4.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	96.0	2.0	0.0	0.00	0.00	2.00	57.00	3.00	2.00	1.00	34.00	2.00	1.00
	PARQUE LEFEVRE	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	99.00	1.00	0.00	0.00	0.00	0.00	0.00
	PEDREGAL	91.0	6.0	0.0	1.0	0.0	0.0	0.0	1.0	0.0	98.0	1.0	0.0	0.00	1.00	82.00	1.00	1.00	0.00	14.00	1.00	0.00	0.00
	PUEBLO NUEVO	99.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	99.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	RIO ABAJO	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	99.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	SAN FELIPE	99.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	99.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
	SAN FRANCISCO	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	99.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
	SANTA ANA	99.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	99.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	TOCUMEN	87.0	5.0	1.0	1.0	0.0	0.0	0.0	6.0	0.0	98.0	1.0	0.0	0.00	1.00	86.07	1.21	1.27	0.43	9.84	0.65	0.55	
<b>San Miguelito</b>																							
	AMELIA DENIS DE ICAZA	99.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.0	1.0	0.0	0.00	0.00	97.00	1.00	0.00	0.00	1.00	0.00	1.00	
	ARNULFO ARIAS	90.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	99.0	0.0	0.0	0.00	1.00	84.00	1.00	5.00	1.00	8.00	1.00	1.00	
	BELISARIO FRIAS	97.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	93.00	1.00	2.00	0.00	2.00	0.00	1.00	
	BELISARIO PORRAS	93.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.0	0.0	0.0	0.00	1.00	93.00	1.00	1.00	1.00	4.00	0.00	1.00	
	JOSE DOMINGO ESPINAR	98.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.0	0.0	0.0	0.00	0.00	96.00	1.00	1.00	0.00	1.00	0.00	0.00	

District	Corregimiento	IDAAN Public Aqueduct	Community Public Aqueducts	Private Aqueducts	Sanitary Wells	Unprotected Curb	Water/rainwater	Superficial Wells	River/stream	Other	Percentage of Houses with Public Electricity	Percentage of Houses Using Kerosene/Diesel Lighting	Percentage of Houses Using Gas Lighting	Percentage of Houses with Own Power Plant	Percentage of Houses Using Community Electric Lighting	Other	Percentage of Waste Collected by the Public Sector	Percentage of Waste Collected by the Private Sector	Percentage of Waste Collected in Vacant Lots	Percentage of Waste Dumped into Rivers and Streams	Percentage of Waste Incinerated or Burned	Percentage of Waste Buried (in the ground)	Percentage of Alternate Waste Collection Methods
	MATEO ITURRALDE	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.00	0.00	99.00	1.00	0.00	0.00	0.00	0.00	1.00
	OMAR TORRIJOS	99.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.0	0.0	0.0	0.0	0.00	1.00	95.00	1.00	1.00	0.00	1.00	0.00	1.00
	RUFINA ALFARO	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.00	0.00	0.00	98.00	1.00	0.00	0.00	1.00	0.00	0.00
	VICTORIANO LORENZO	99.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.0	0.0	0.0	0.00	0.00	0.00	97.00	1.00	1.00	0.00	0.00	0.00	1.00
WESTERN PACIFIC URBAN																							
Arraijan																							
	ARRAIJAN (CAPITAL)	85.0	7.0	0.0	1.0	0.0	1.0	0.0	4.0	1.0	87.0	8.0	0.0	0.0	0.00	5.00	11.00	34.00	1.00	1.00	47.00	3.00	3.00
	JUAN DEMOSTENES AROSEMENA	94.0	2.0	1.0	2.0	0.0	1.0	0.0	0.0	0.0	96.0	3.0	0.0	0.0	0.00	1.00	9.00	74.00	0.00	0.00	14.00	1.00	1.00
	VERACRUZ	83.0	5.0	1.0	2.0	0.0	3.0	1.0	3.0	2.0	90.0	7.0	0.0	0.0	0.00	3.00	21.00	3.00	3.00	1.00	37.00	10.00	3.00
	VISTA ALEGRE	98.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.0	0.0	0.0	0.00	0.00	0.00	4.00	1.00	2.00	0.00	7.00	26.00	1.00
La Chorrera																							
	BARRIO BALBOA	98.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.0	5.0	0.0	0.0	0.00	1.00	24.00	56.00	1.00	0.00	17.00	1.00	1.00
	BARRIO COLON	98.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.0	3.0	0.0	0.0	0.00	1.00	16.00	69.00	1.00	0.00	12.00	1.00	1.00
	EL COCO	77.0	19.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0	82.0	14.0	0.0	0.0	0.00	3.00	27.00	36.00	1.00	1.00	31.00	2.00	1.00
	FEUILLET	3.0	90.0	4.0	0.0	1.0	0.0	1.0	0.0	0.0	92.0	6.0	0.0	0.0	0.00	1.00	31.00	12.00	1.00	2.00	49.00	3.00	2.00
	GUADALUPE	77.0	17.0	0.0	1.0	0.0	0.0	2.0	0.0	1.0	90.0	8.0	0.0	0.0	0.00	1.00	15.00	43.00	1.00	1.00	37.00	2.00	1.00
	PLAYA LEONA	16.0	78.0	2.0	1.0	0.0	0.0	1.0	0.0	1.0	88.0	11.0	0.0	0.0	0.00	0.00	18.00	38.00	2.00	1.00	38.00	2.00	1.00
	PUERTO CAIMITO	97.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	90.0	8.0	0.0	0.0	0.00	2.00	27.00	39.00	1.00	2.00	30.00	1.00	1.00

URS Holding, Inc. based on data from the Republic of Panama's Office of the Comptroller General. (2000 Population and Housing National Census and Bulletin No.10)

District	Corregimiento	IDAAAN Public Aqueduct	Community Public Aqueducts	Private Aqueducts	Sanitary Wells	Unprotected Curb	Water/rainwater	Superficial Wells	River/stream	Other	Percentage of Houses with Public Electricity	Percentage of Houses Using Kerosene/Diesel Lighting	Percentage of Houses Using Gas Lighting	Percentage of Houses with Own Power Plant	Percentage of Houses Using Community Electric Lighting	Other	Percentage of Waste Collected by the Public Sector	Percentage of Waste Collected by the Private Sector	Percentage of Waste Collected in Vacant Lots	Percentage of Waste Dumped into Rivers and Streams	Percentage of Waste Incinerated or Burned	Percentage of Waste Buried (in the ground)	Percentage of Alternate Waste Collection Methods
ATLANTIC URBAN																							
Colon																							
	BARRIO NORTE	94.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.00	0.00	96.00	1.00	2.00	1.00	0.00	0.00	0.00
	BARRIO SUR	95.0	4.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.00	0.00	97.00	1.00	0.00	0.00	0.00	0.00	0.00
TRANSISTHMIAN CORRIDOR																							
Colon																							
	BUENA VISTA	57.0	29.0	1.0	3.0	1.0	0.0	5.0	2.0	1.0	81.0	15.0	0.0	0.0	0.00	3.00	11.00	2.00	3.00	1.00	75.00	6.00	2.00
	CATIVA	95.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	97.0	2.0	0.0	0.0	0.00	1.00	80.00	1.00	5.00	1.00	13.00	0.00	1.00
	LIMON	47.0	24.0	3.0	3.0	0.0	0.0	12.0	8.0	1.0	80.0	18.0	0.0	0.0	0.00	2.00	9.00	1.00	8.00	2.00	74.00	5.00	2.00
	NUEVA PROVIDENCIA	1.0	83.0	3.0	5.0	0.0	0.0	5.0	2.0	1.0	81.0	16.0	0.0	1.0	0.00	2.00	3.00	1.00	4.00	1.00	87.00	3.00	2.00
	SABANITAS	90.0	5.0	0.0	1.0	0.0	0.0	1.0	2.0	1.0	93.0	5.0	0.0	0.0	0.00	1.00	73.00	1.00	2.00	0.00	21.00	1.00	1.00
	SAN JUAN	92.0	3.0	1.0	1.0	0.0	0.0	1.0	1.0	1.0	85.0	11.0	0.0	0.0	0.00	3.00	3.00	2.00	4.00	1.00	83.00	6.00	1.00
	SANTA ROSA	9.0	83.0	2.0	0.0	0.0	0.0	0.0	5.0	0.0	65.0	29.0	1.0	1.0	0.00	5.00	1.00	7.00	5.00	0.00	76.00	10.00	0.00
	SALAMANCA	2.0	87.0	5.0	1.0	1.0	0.0	1.0	3.0	0.0	56.0	38.0	1.0	1.0	0.00	4.00	1.00	1.00	4.00	2.00	82.00	9.00	1.00
Panama																							
	CHILIBRE	91.0	4.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	87.0	8.0	0.0	0.0	0.00	4.00	15.00	9.00	2.00	1.00	65.00	6.00	1.00
GATUN LAKE																							
Colon																							
	CIRICITO	1.0	50.0	4.0	5.0	1.0	2.0	8.0	23.0	5.0	48.0	50.0	0.0	1.0	0.00	0.00	1.00	1.00	7.00	1.00	86.00	5.00	0.00
	CRISTOBAL	95.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.0	2.0	0.0	0.0	0.00	1.00	80.00	3.00	11.00	0.00	6.00	0.00	0.00
	ESCOBAL	68.0	4.0	0.0	2.0	2.0	0.0	10.0	5.0	6.0	67.0	32.0	1.0	1.0	0.00	1.00	6.00	12.00	10.00	2.00	67.00	3.00	0.00
Chagres																							
	NUEVO CHAGRES (CAPITAL)	1.0	80.0	4.0	10.0	0.0	0.0	2.0	1.0	2.0	85.0	13.0	0.0	0.0	0.00	2.00	0.00	2.00	10.00	42.00	46.00	1.00	0.00
	ACHIOTE	1.0	45.0	7.0	5.0	0.0	1.0	23.0	1.0	0.0	42.0	58.0	0.0	0.0	0.00	0.00	1.00	1.00	10.00	5.00	75.00	9.00	0.00
	EL GUABO	0.0	58.0	1.0	9.0	3.0	0.0	14.0	14.0	0.0	19.0	77.0	1.0	1.0	0.00	2.00	0.00	0.00	15.00	0.00	64.00	19.00	1.00
	LA ENCANTADA	0.0	34.0	12.0	9.0	0.0	1.0	15.0	29.0	0.0	4.0	92.0	1.0	2.0	0.00	1.00	0.00	2.00	28.00	3.00	56.00	10.00	1.00
	PALMAS BELLAS	1.0	72.0	1.0	5.0	0.0	1.0	6.0	13.0	1.0	55.0	41.0	1.0	2.0	0.00	1.00	1.00	1.00	42.00	11.00	35.00	9.00	0.00
	PIÑA	1.0	77.0	1.0	5.0	1.0	8.0	4.0	10.0	0.0	61.0	37.0	1.0	1.0	0.00	1.00	1.00	2.00	27.00	21.00	42.00	7.00	1.00

District	Corregimiento	IDAAN Public Aqueduct	Community Public Aqueducts	Private Aqueducts	Sanitary Wells	Unprotected Curb	Water/rainwater	Superficial Wells	River/stream	Other	Percentage of Houses with Public Electricity	Percentage of Houses Using Kerosene/Diesel Lighting	Percentage of Houses Using Gas Lighting	Percentage of Houses with Own Power Plant	Percentage of Houses Using Community Electric Lighting	Other	Percentage of Waste Collected by the Public Sector	Percentage of Waste Collected by the Private Sector	Percentage of Waste Collected in Vacant Lots	Percentage of Waste Dumped into Rivers and Streams	Percentage of Waste Incinerated or Burned	Percentage of Waste Buried (in the ground)	Percentage of Alternate Waste Collection Methods
	SALUD	0.0	55.0	2.0	12.0	0.0	1.0	13.0	17.0	1.0	39.0	59.0	1.0	1.0	0.00	1.00	1.00	0.00	28.00	5.00	59.00	6.00	0.00
Capira																							
	CIRI DE LOS SOTOS	0.0	33.0	46.0	7.0	1.0	0.0	8.0	4.0	0.0	0.0	95.0	1.0	1.0	2.00	0.00	0.00	0.00	23.00	1.00	65.00	11.00	0.00
Arraijan																							
	NUEVO EMPERADOR	68.0	11.0	6.0	6.0	4.0	2.0	2.0	0.0	1.0	76.0	20.0	0.0	1.0	0.00	3.00	1.00	3.00	1.00	1.00	86.00	5.00	3.00
	SANTA CLARA	51.0	28.0	3.0	4.0	1.0	11.0	1.0	0.0	2.0	68.0	28.0	1.0	0.0	0.00	2.00	0.00	1.00	1.00	1.00	87.00	9.00	1.00
La Chorrera																							
	AMADOR	5.0	69.0	1.0	7.0	2.0	0.0	7.0	7.0	0.0	38.0	59.0	1.0	0.0	0.00	1.00	0.00	1.00	5.00	2.00	84.00	8.00	0.00
	AROSEMENA	0.0	45.0	13.0	6.0	4.0	3.0	20.0	10.0	0.0	44.0	52.0	1.0	3.0	0.00	0.00	0.00	0.00	1.00	4.00	87.00	7.00	0.00
	EL ARADO	3.0	57.0	10.0	8.0	8.0	0.0	11.0	2.0	0.0	58.0	39.0	1.0	1.0	0.00	0.00	4.00	5.00	2.00	0.00	86.00	3.00	1.00
	ITURRALDE	1.0	65.0	7.0	4.0	3.0	0.0	11.0	7.0	0.0	62.0	35.0	1.0	1.0	0.00	1.00	0.00	1.00	4.00	0.00	88.00	6.00	0.00
	LA REPRESA	1.0	65.0	1.0	3.0	9.0	0.0	15.0	6.0	0.0	32.0	60.0	2.0	4.0	0.00	0.00	0.00	0.00	3.00	1.00	92.00	4.00	0.00
	MENDOZA	0.0	90.0	2.0	1.0	1.0	0.0	6.0	0.0	0.0	60.0	38.0	1.0	0.0	0.00	0.00	0.00	0.00	5.00	0.00	91.00	4.00	0.00
TABOGA			57.7								44.7	52.1						1.06	13.19	6.06	71.44	7.38	
Taboga																							
	TABOGA (CABECERA)	94.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.00	0.00	97.00	1.00	0.00	0.00	1.00	0.00	0.00

URS Holding, Inc. based on data from the Republic of Panama's Office of the Comptroller General. (2000 Population and Housing National Census and Bulletin No.10)



### **6.10.1 Eastern Pacific Urban Zone**

Over 95% of housing units are built of acceptable materials. Because of Panama City's cosmopolitan character, in addition to the significant number of high-income inhabitants -- higher than the national average -- the Zone boasts a high concentration of buildings. The use of electrical power in the Zone is almost 100%, with the exception of the following *corregimientos* which belong to Panama District: Ancon, 9%; Las Cumbres, 4% ; Pedregal, 2%; and Tocumen, 2%; where people use kerosene and other alternative sources. Likewise, 1% of the population in the *corregimientos* of Amelia Denis de Icaza, Arnulfo Arias, Belisario Porras, Jose Domingo Espinar, Omar Torrijos, and Victoriano Lorenzo use alternative lighting methods. The Zone's water supply system is also adequate, with almost 100% coverage in *corregimientos* such as Bella Vista, Betania, Juan Diaz, Parque Lefevre, Mateo Iturralde, and Rufina Alfaro. In contrast, residential water supply coverage in other *corregimientos* such as Ancon, Tocumen, and Arnulfo Arias only reach 90% of the population; and inhabitants use alternative methods such as community aqueducts, and even rivers, as in the case of Tocumen where the supply of water only reaches 6% of the population.

The *corregimientos* with the best waste collection coverage, almost 100%, are also those that have complete water supply coverage. The remaining *corregimientos* are served by a complementary waste collection system; these are Las Cumbres (34%), Ancon (14%), Pedregal (11%), and Arnulfo Arias (8%), where collected waste is incinerated.

Fixed and mobile telephone services as well as access to Internet services are widely available to the population. The road infrastructure is the most developed of the entire SESA and includes roads such as the Interamerican Highway, the Omar Torrijos Herrera Avenue, and the road to the Centennial Bridge (eastern side).

### **6.10.2 Western Pacific Urban Zone**

The percentage of housing units built of acceptable material (cement blocks and wood) is relatively high in the Zone's districts, superior to the national average of 83.4%. However, the percentage of housing units with acceptable basic utility services is lower, and, in the case of Arraijan, very close to the national average. Electrical lighting in the Zone is lower than in the Eastern Pacific Urban Zone, with an average of approximately 92%, and the best coverage reported for the *corregimientos* of Vista Alegre (98%), Juan Demostenes (96%), and Barrio Colon (96%), while the ones with less coverage are Playa Leona (88%) and El Coco (82%). The main lighting alternative used in the area is kerosene/diesel.

The vast majority of houses in the Western Pacific Urban Zone are connected to the IDAAN public water supply system; in fact, approximately 83.8% of the 66,549 housing units receive this service, most of them in densely populated urban *corregimientos* such as Arraijan, La Chorrera (Barrio Balboa and Barrio Colon), Vista Alegre, Juan Demostenes Arosemena, Guadalupe, El Coco, and Ancon. Approximately 10.3% of the housing units in other less urbanized *corregimientos* use community public water supply systems as an alternative, while the rest uses different alternative methods including private water supply systems, unprotected curbs, sanitary wells, rainwater, superficial wells, river or stream water, and, as a last option, water from tank trucks. All these alternatives account for a mere 5.1%. In contrast with the Eastern Pacific Urban Zone, where most of the waste is collected by the public sector, in this Zone the task is performed by the private sector. The average waste collection by the public sector in this Zone is about 18%, while 36% falls into the private sector. The remaining daily waste generated, or 30%, is incinerated on site.

Access to Internet services and to fixed and mobile telephone services is high in this Zone. Roads in the Zone include the road to the Centennial Bridge (western side), which links Panama City, the Centennial Bridge, the Bridge of the Americas, and the Miraflores swing bridge. The first two are public use bridges, while the third is operated by the ACP and only opens in case of public need.

### **6.10.3 Atlantic Urban Zone**

Housing units in this Zone are built of a variety of materials, mostly cement blocks and wood for an average of 78% and 18%, respectively. The residential water supply coverage provided by IDAAN as well as other local aqueducts is very high. IDAAN covers 94% of Barrio Norte housing while local aqueducts provide service to 5%. IDAAN covers 95% of the houses in Barrio Sur and local aqueducts provide service to 4%. In addition, 1% is covered by private aqueducts. Public electricity coverage is 100%. Urban waste is collected in both *corregimientos* by the public sector collection service, with a 96% coverage in Barrio Norte and a 97% coverage in Barrio Sur. This service is supported by private waste collection facilities, representing 1% of the collection in each community. Finally, 1% of the waste generated in Barrio Norte is incinerated or dumped into the sea.

This Zone is connected to the Eastern and Western Pacific Urban zones through the Transisthmian Highway, a railroad, an air terminal, and the Panama Canal. In addition, this Zone has an important port infrastructure, which facilitates the movement of persons and merchandise. Internet services as well as fixed and mobile telephone services have ample coverage in the Zone.

#### **6.10.4 Transisthmian Corridor Zone**

Of the housing units in Zone, 80% are built of cement blocks. IDAAN residential water supply coverage is uneven, ranging from 95% coverage in the Cativa *corregimiento* to 9% coverage in the Santa Rosa *corregimiento*, 2% in Salamanca, and 1% in Nueva Providencia. The lack of proper coverage in these *corregimientos* has been supplemented by local water supply systems, which in the above-mentioned areas provide the following additional coverage: 87% in Salamanca and 83% in Santa Rosa and Nueva Providencia. In the remaining 5 *corregimientos* residential water supply is provided from both sources in similar percentages. But part of the population still does not receive this service from either source and has to use alternate water supply sources. The best example is Limon, where 12% of its population gets water from superficial wells and an additional 8% gets its water from rivers.

The average public electricity coverage in this Zone is 80%, with the highest coverage in the *Cativa corregimiento* (97%) and Sabanitas (93%), and the lowest in the *corregimientos* of Santa Rosa (65%) and Salamanca (56%). Approximately 15.78% of the total population uses kerosene/diesel for lighting, and the percentage is as high as 29% in Santa Rosa and 38% in Salamanca. With the exception of Cativa and Sabanitas, there is no waste collection service in the area. An average of 77% of waste generated in the other 7 *corregimientos* is incinerated.

Road transportation is provided by the Transisthmian Highway, which unites the cities of Panama and Colon. This is the only land route between the entire area and the cities of Panama and Colon and the rest of the country. Once in service, the Panama-Colon Highway will provide an alternate route. Telephone and Internet services are also available in this Zone.

#### **6.10.5 Gatun Lake and Costa Abajo de Colon Zone**

Most housing units are built of semi-permanent and mixed building materials: dirt and cement floors; concrete, wood, thatch or zinc walls. This is mostly the case in areas to the west, southeast, and northeast of Gatun Lake. It can be concluded that this is due to the residents' socioeconomic conditions (lack of resources hindering the population's access to proper sanitation, safety, and comfort ) and the difficult access to the main road, the Transisthmian Highway.

In general, the houses in the 9 communities adjacent to the Transisthmian and part of the western sector (Vista Alegre, Campeon, San Jose, Nueva Italia, La Represa, Nueva Providencia, Limon, Arenosa, Lagarterita) are adequate; most are built of durable material (cement floors and walls and zinc roofs), and have better access to the Transisthmian Highway. Most of the houses along the river banks have dirt or cement floors; cement, wood, thatch or zinc walls; and range from extremely humble rudimentary housing to better-finished houses for higher-income families.

Residential water supply provided by IDAAN is deficient, since only a few *corregimientos* have coverage. Cristobal has the highest, with 95% coverage; Escobal and Nuevo Emperador have 68% coverage each; and Santa Clara's coverage is 51%. IDAAN's coverage in the other 16

*corregimientos* ranges from 0% to 5%. This lack of coverage has been supplemented to certain extent by local water supply systems providing an average of 57% coverage in the entire zone. But there are several *corregimientos* that depend to a great extent on other sources such as wells and rivers: Achiote 24%, El Guabo 28%, La Encantada 44%, Salud 30%, and Arosemena 30%. Cristóbal also boasts the highest average (97%) of public electric power coverage, followed by Nuevo Chagres (85%). But there is a completely different reality in other *corregimientos* such as Ciri de los Sotos with zero coverage and La Encantada with a mere 4% coverage. To summarize, the average power supply coverage in the Zone is 44.69%, while 52.06% of the population has to use kerosene/diesel. Similar to the situation described for the Transisthmian Corridor Zone, an average of 71.44% of the Zone's waste is incinerated, while at Nuevo Chagres, Palmas Bellas and Piñas an important percentage of waste, 42%, 11% and 21%, is also dumped into rivers and streams.

Fixed telephone service is available in the area, but coverage is low.

The Transisthmian Highway and Gatun Lake are the principal means of transportation in the area. Gatun Road, which begins after the Gatun Locks crossing and leads to the San Lorenzo community, constitutes another means of road transport.

#### **6.10.6 Taboga Zone**

The vast majority of houses in Taboga, 98.7% -- higher than the national average -- are built of acceptable materials (cement blocks and wood). The percentage of houses in Taboga without access to drinking water is minimum when compared to the rest of the country. This service is provided by two water supply systems: IDAAN which provides water to 94% of the houses, and the local water systems which covers an additional 2%. In contrast, almost 20% of houses lacks basic sanitation, although the coverage is higher than that at the provincial and national levels. The public waste collection service covers 97% of Taboga; an additional 1% is covered by the private sector, and another 1% is incinerated. Electrical power coverage in the Zone is 100%.

The Island of Taboga is only accessible by sea. There is a daily 50-minute ferry service between the island and Panama City. Once in the city, Taboga residents have access to all the services available in the Eastern Pacific Urban Zone. Internet service is available through two concessionaries, Broadband Wireless Connection and Cable & Wireless Panama. Basic telephone coverage is low.

## **6.11 Local Perception of the Project, Work, or Activity**

The perception of the population was obtained from information gathered during the citizens' participation process whose methodology was presented in the Environmental Management Plan.

For such purposes, the population was consulted taking into consideration three basic attributes:

- i) as SESA residents,
- ii) as local or community leaders or as representatives who promote opinion at local or community level (key individuals who represent the local sociocultural and economic reality of the community), and
- iii) as regional or national leaders or as representatives who promote opinions at regional or national level (key individuals who represent the social, political, and socioeconomic reality of the SESA and beyond its boundaries).

For the first attribute, a series of standard polls were conducted in homes in the various SESA communities (See Table 8-10). For the other two attributes, direct polls were conducted on an individual basis as well as in groups.

From this point, the following step was a series of public inquiries with representatives from different organizations and institutions, as well as with key individuals who represent the opinion of their communities or who actively promote opinions within their communities as they maintain close ties on a daily basis and somehow influence the community and national development.

### **6.11.1 Opinions of SESA Residents**

For the purpose of integrating the SESA population, a total of 670 polls were conducted with heads of family in the various *corregimientos* comprising the SESA. The details of this information were reported in the Citizen Participation Plan, which includes the methodology, polls distribution, and results.

#### 6.11.1.1 Gatun Lake and Costa Abajo de Colon Zone

The results obtained from polls conducted in this Zone reflect the different opinions of its inhabitants concerning the impact of the Project on their community. At the family and community levels, most individuals consulted do not believe job generation to be the Project's main impact. However, the concern expressed at the community level was the risk of flooding as a result of the elevation of Gatun Lake's water level. At the national level, the generation of jobs is considered the biggest benefit to be derived from the Project.

#### 6.11.1.2 Atlantic Urban Zone

The increase in job opportunities was perceived among the Zone residents as the principal benefit expected at the national, community, and family levels. In addition to the increase in job opportunities, the most frequent response from Zone residents was that the Project will neither benefit nor affect their families. From an environmental point of view, the most frequently voiced concern was the possible negative impact on the flora and fauna.

#### 6.11.1.3 Transisthmian Corridor Zone

Most of the individuals polled in the Transisthmian Corridor Zone perceive that the Project will bring benefits to the nation and the community. However, they did not expect any favorable impact on their families. As regards to the impact on the environment, they believe the Project might result in the destruction of the flora and fauna in nearby areas.

#### 6.11.1.4 Eastern and Western Pacific Urban Zones and Taboga

Responses obtained from the polls conducted in the Eastern and Western Pacific Urban Zones were very similar, and were thus grouped.. However, where specific observations were made, these were specified by SESA zone. It is worth mentioning that since the parameters established in the global sample estimation only assigned one poll to the Taboga Zone, this was applied to another area. The Environment Management Plan presents more details regarding the distribution.

Opinions regarding the Project range from expected benefits such as the increase in job opportunities to no real impact at the national, community, or family levels. This observation was particularly emphasized by residents of the districts of Arraijan and La Chorrera. With regards to the impact on the environment, concerns expressed include the destruction of the flora and fauna as well as deforestation.

In general, opinions from SESA residents focused on offering specific mechanisms to guarantee transparency and the hiring of local labor. When asked whether the Project was favorable or not, most residents perceived its execution as positive. With regards to the Project's possible environmental impact, responses included the risk of flooding as a result of the elevation of Gatun Lake's water level, deforestation, and the destruction of the flora and fauna.

### **6.11.2 Opinions of Representatives from Local and Provincial Governments and Protected Areas**

The “focal group” modality was the methodology used to interview key individuals in order to seek their opinions from a qualitative point of view. Two events were organized to conduct the interviews and attendees were invited taking into consideration both their home place and place of business.

#### 6.11.2.1 Gatun Lake and Costa Abajo de Colon, Atlantic Urban, and Transisthmian Corridor Zones



The event including these zones took place in Colon Province, where most of the invitees either live or work. Invitees included representatives from provincial and community governments and civil and religious community leaders who expressed their favorable opinion regarding the Project's impact on their communities and organizations. They believe that as the Project progresses, employment opportunities will increase, commercial and economic activities will improve; however, not all foresee a social improvement as a byproduct of economic improvement.

Representatives from the Gatun Lake and Costa Abajo de Colon Zone, specifically from the *corregimientos* of Escobal and Ciricito and even from the Governor's Office, expressed concern over the negative impact that the elevation of Gatun Lake waters might have on communities. With regards to expected benefits, participants indicated that the Canal expansion will have both negative and positive impacts, inasmuch as it will create tourism opportunities, improve marine traffic administration, set new competitive horizons, and productivity and efficiency will be enhanced.

As regards to its impact on the environment, participants indicated that certain areas will be impacted due to the disappearance of nature in some areas and, therefore, suggested the affected population become involved in more dialogues and discussions, as well as increased commitment on their part.

Most of the participants expressed that the impact at the national level will be positive inasmuch as Panama will gain a position among the world leaders in technological advancement. The Project will also : allow the construction of the Costa Abajo bridge, play an important role in land valorization, and increase job opportunities, resulting in the improvement of the population's quality of life, especially of Colon residents.

This group of key individuals believe the Project will have a positive impact and suggested that their recommendations for the success of the Project be taken into consideration; that is, hiring local workers, relocation of affected populations to better areas, promotion of commercial

growth, and participation by the government and provincial technical boards in solving unemployment and other issues in affected communities.

Finally, they expressed some concern regarding national and international immigration to populated areas of the metropolitan region, specifically the District of Colon, since this district does not have the necessary public services to even fulfill the current demand.

They also voiced their concern regarding the lack of mechanisms of their local governments to generate income from such works or any other sources to respond to the growing social demands resulting from migrations due to the Project.

#### 6.11.2. Eastern and Western Pacific Urban Zones and Taboga

The event including this zones took place in the Province of Panama because of its proximity to the participants' activities. Attendees from these zones believe the Project will have a positive impact because of the economic benefits to be derived, as well as the increased generation of jobs, especially indirect employments, which will in turn generate a number of formal and informal jobs.

Their concern is associated with the possibility that trained workers from affected areas will not be taken into consideration and given priority for jobs. They also expressed their concern regarding the potential consequences of immigration. The latter was emphasized by representatives from the *corregimientos* of Santa Clara, Veracruz, and Nuevo Emperador, in Arraijan District.

As regards to environmental issues, deforestation and damage to the fauna and flora were foreseen as a necessary or unavoidable evil.

### 6.11.3 Opinions by National or Regional Organizations and Institutions

Thirty-eight organizations, among them seven labor organizations (including taxi drivers), four religious groups, three governmental, 10 non-governmental organizations, six commercial, five business associations, and two professional associations were consulted (Table 6-11).

**Table 6-11  
Consulted Organizations**

Type of Organization	Organization Name	Opinion
Labor	Canal Workers' Union, National Organized Workers' Council (CONATO, its Spanish acronym), Teachers in Action Movement (FAM, its Spanish acronym), United Workers' Central (CUT, its Spanish acronym), Unified Construction Workers' Union (SUNTRACS, its Spanish acronym), National Taxi Services Union (SNTT, its Spanish acronym).	YES
	Independent National Workers' Union Confederation (CONUSI, its Spanish acronym)	NO
Religious	Hossana Christian Assembly, God's Assembly	YES
	Panama Archdiocese	NO
Governmental	Ministry of Work	YES
	Ministry of Health, IDAAN, Ministry of Economy and Finance	NO
Non-Governmental	National Association for Nature Conservation (ANCON, its Spanish acronym), Natura Foundation, Smithsonian Institute, National Society for the Development of Rural Enterprises and Areas (SONDEAR, its Spanish acronym), Center for Popular Legal Assistance (CEALP, its Spanish acronym), Panamanian Center for Social Studies and Actions (CEASPA, its Spanish acronym), Justice and Peace Commission	YES
	Peace Corps, World Wildlife Fund, Biological Corridor	NO
Commercial	Panama Ports, Edemet Edechi, ETESA	YES
	Evergreen, Cable and Wireless, Elektra Noreste	NO
Business Associations	Panamanian Association of Business Executives (APEDE, its Spanish acronym), Colon Duty-Free Zone	YES
	SIP, CAPAC, CONEP	NO
Professional Associations	Panamanian Association of Engineers and Architects (SPIA, its Spanish acronym), College of Agronomist Engineers	YES

Source: URS Holdings, Inc. Interviews with key individuals from local, regional, metropolitan, and national governments, districts of Arraijan, Capiro, Colon, La Chorrera, Panama, and San Miguelito, April 2007.

Among the different points of view that came up during this consultation process with the organizations and institutions is that the Canal Expansion Project will bring benefits since it will generate employment and, therefore, increased incomes for the population.

Those who expressed that the Project will have negative impacts presented three arguments: political interests, fear from been evacuated from their neighborhoods, and the possibility that

jobs be given to foreigners.

A few organizations thought the Project will have no impact whatsoever. This was the case of non-governmental entities that indicated that their work will continue to be the same either with or without the Expansion Project.

Regardless of their beliefs as regards to the type of impact the Expansion Project will have on them, those organizations opposing the Project believe its execution will have a negative impact because of the ecological damage it will cause, the effects of the lake's salinity, and deforestation. To counter these impacts, they suggested measures such as reforestation, recreate the affected ecosystems, transparency in information management, and the conduct of all required technical studies.

As regards the perception of these organizations and institutions on the possible impacts of the Canal Expansion on the nation, they expect both positive and negative impacts. Among the positive impacts of the construction works are an increase in fiscal revenues, more Panamanian labor and, therefore, more wealth -- hopefully well distributed. They also indicated that increased wealth could carry negative impacts such as the migration of people to the capital city, aggravated by concerns that the condition of public services will remain unimproved, and that the number of jobs generated will not be as high as that estimated by the ACP prior to the referendum.

Another concern voiced was that the Project's actual cost may exceed initial cost estimates with a resulting increase in national indebtedness. One of the persons interviewed indicated that the Project is not necessary since the current modernization works will suffice to permit the transit of larger vessels through the Canal.

Religious groups as well as labor organizations believe the Project will have both negative and positive impacts on the country, while environmental groups, business and professional organizations coincide in that the Project will only have a positive impact on the nation.

In conclusion, the search for the perception of the local community revealed that those consulted believe the Project will strengthen the economy and will generate more job opportunities. However, it is not clear to them how they will benefit directly, either through their families or their communities.

Some authorities, in particular from Colon City and the Western Pacific Urban Zone, voiced their concern regarding the management of the possible migratory flow into their areas of responsibility, considering that the existing resources are insufficient to cover the new additional demand for basic and social services.

As to the Project's negative impact on the environment, the participants expressed their concern regarding a decrease in forest cover which, in turn, would either concomitantly or subsequently reduce or affect the fauna and flora.

Given the types of impacts expected by the population, they emphasized the need to implement mitigation measures such as: transparency and public information, the hiring of local labor, and the efficient management of resources.

In summary, it is most likely that the population will favor rather than oppose the Project's implementation even if they perceive some possible type of adverse impact on the environment, while at the same time they expect political and institutional measures be taken to equitably enhance the benefits to the corresponding communities and families of the residents and key individuals.

## **6.12 Public Forum**

The activities related to the public forum will be developed during the evaluation phase of the Environmental Impact Study. Considering the extension of the project, two public forums will be held, one in Panama City and the one in Colon City.

## 6.13 Historical, Archaeological, and Cultural Sites

### 6.13.1 Work Methodology

Bibliographical material published on colonial, modern, and contemporary history as well as studies on ethnohistory, archaeology, and paleobotany have been used to collect information on the archaeological, historical, and cultural resources. In addition, colonial, historical, and current Panama Canal Zone maps have been used as a documentary base. These were obtained using the Geographical Information Systems software ArcView 3.2. The archaeological and historical data were placed over base maps with topographic, hydrographic, and aerial and satellite information since there is sufficient data that can be used taking into consideration the physiographic location of archaeological sites. This system was also useful in locating the geographical coordinates of towns and other prehispanic, colonial, and historical ancient sites related to the construction of the Canal.

The superimposition of current Canal engineering maps, where the engineering structures as well as the limit of flooded areas appear, with historical and archaeological information interest maps will allow the observation of areas to be affected by the Canal Expansion Project—Third Set of Locks -- and to assess the impact on those areas.

To this effect, those cultural remnants dating prior to 1821, year of Panama's independence from Spain, will be classified as historical archaeological material. At this point, it is important to highlight that in archaeology the elements resulting from human activities are valued in themselves and in their context, independently of their uniqueness, and historical or artistic value. Therefore, the remnants of ancient machinery or the structures or quarters from the 19<sup>th</sup> century and the beginning of the 20<sup>th</sup> century are valuable sources for archaeological studies. In this regard, during the middle of the last century, a new branch of archaeological studies was founded in England, named "Industrial Archaeology" (RIX, Michael). Neil Cossons defines it as: "the study of remnants from industrial areas to go beyond the importance of their role within the society as historical evidence of a system that transformed humankind." From this point of view, the remnants of French Canal construction (1879-1888), the structures of the 1939 Canal

expansion project—Third Set of Locks, and the railroad line (1850-1855), are, in themselves, archaeological sites that are part of the Panama Canal construction history.

### **6.13.2 Panama: Historical-Cultural Background**

Panama has more than 15,000 years of history. Since the date of the first settlement to the present, many towns have been established in Panama. After an initial stage of nomadism, hunting, wild fruit collection, and first attempts at plant domestication, toward the 1000 B.C. the first great towns were settled in the Isthmus. Sources for past pre-hispanic research are archaeology, paleobotany, and ethnohistory. Paleobotany research at the Canal watershed<sup>25</sup> proofs the occurrence of important changes in weather and vegetation as of the year 11,300 B.C. Many of them took place at the end of the Pleistocene and the beginning of the Holocene, and are anthropogenic products derived from human interaction with nature. The analysis of some samples from the Chagres River, which were studied by Piperno (1985), demonstrates that at the 11,300 B.P. and the 9,000 B.P. (before present) the medium-to-high channeled zone of the river was covered by mature tropical forest. Later, toward the 9,000-7,300 B.P. the presence of mangrove swamps and freshwater vegetation (7,300-4,200 B.P.) were detected, and toward the 3,300 B.P. the intentional burning of forest to clear seed-planting fields is noticed, which could be interpreted as the full adaptation to the present agricultural slash-and-burn clearing method, an event that could lead to the establishment of the first villages and/or settlements. However, there is not enough archaeological evidence to ascertain which was the settlement distribution pattern in the Canal area. There are only a few comprehensive studies such as the Cooke (1973), Bird and Cooke (1977;1978) or the one from Ranere and Cooke (1995), on the groups of hunters-collectors who inhabited the zone, thanks to the finding of a series of fluted points and wood carving rests. The other known pre-columbian sites -- Playa Venado, Farfan, Palo Seco, Old Panama, Cocoli, among others, date from prior to or 700 A.C., a date which marks the beginning of chieftainships.

Centuries later, after the arrival of Spaniards to solid ground, the Isthmus gained preponderance as an obligated route of the commercial network between the South American pacific coast

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<sup>25</sup> Bartlett an Barghoorn (1973) also conducted previous studies with similar samples.

(mainly the port of Guayaquil) and the Iberian Peninsula. The Chagres River and the Las Cruces and Real trails served as communication and commercial routes between Europe and the ports of the South Sea. The Spaniards founded towns and control posts along these interoceanic communication routes to fulfill their logistics needs. Colonial maps from the XVI-XVIII centuries show the location of some of these settlements. Many of them survived as archaeological sites well into the XIX century while others were inundated in 1914 or affected by Canal construction works (excavations, dam water level management, channel widening, among others) (See Table 6-12). All cultural remnants, artifacts or structures, dating from 1502, year in which Christopher Columbus explored Panamanian coasts from the West to the East looking for a “sea passage,” to the year 1821, when Panama attained its independence from Spain, will be considered colonial archaeological material.

Another landmark in the history of the canal region is the beginning of the Panama Canal construction, which left many artifacts of special interest for industrial archaeology experts. The events to celebrate the inauguration of construction works were held on January 1, 1880 (1880-1904) even though works actually began two years later. In charge was the French Interoceanic Canal Universal Company, under the supervision of Ferdinand de Lesseps, the builder of the Suez Canal. With the beginning of works and until 1888, when the company filed for bankruptcy, Panama enjoyed a prosperous economic period. With the arrival of a new labor force to the country, the high level of mortality became the most troubled subject. The worst year was 1884, when 7% of the workforce died. A total of 6,283 workers, more than 1/3 of them French, died mainly from tuberculosis and malaria. Finally, the Universal Company filed for bankruptcy and works came to a halt. Taking advantage of the situation, the United States abandoned the project to build a Canal through Nicaragua and purchased all construction rights to resume the building of the Panama Canal. This event is closely related to the establishment of Panama as an independent country. Through the Hay-Bunau Varilla Treaty of November 18, 1903, the United States agreed to guarantee and maintain the independence of the newly created Republic of Panama, and, in turn, obtained ample concessions to build, maintain, operate, and defend the Canal.



Construction works started in 1904 and were finished in 1914. Again, a massive arrival of workers from different European, Caribbean and Asian countries took place to undertake labor needs. Many of these workers had to deal with racism, since a two-class segregation regime was created: the *Gold Roll*, for U.S. Canal workers, and the *Silver Roll* for all others disregarding the color of their eyes or hair.

After 1914 the Canal area landscape dramatically changed with the flooding and creation of Gatun Lake. Many hectares, including entire towns, some of them directly related to the French and U.S. Canal construction, were buried under the waters in 1914. Some of these towns, located at the banks of Chagres River (Palo Horquete, Palo Matias, Barbacoa, Barro Colorado, Vamos Vamos, Tabernilla, Palenquillo, Cruces, among others) were founded during the colonial period, while others were established during the construction of the first railroad and the Canal (Aletier, Dominica, Culebra, Emperador, among others). Panamanian writer Gil Blas Tejeira (1901-1975) referred to all these settlements covered by the waters of Gatun Lake, as the “lost towns.”

The history of the occupancy of the canal area is, as it can be seen, extensive and filled with important historical and cultural events. This study aims at recuperating, as much as possible, all the information about the location of archaeological sites, not only from pre-hispanic or colonial times, but also the historical, which have withstood the 19<sup>th</sup> and 20<sup>th</sup> centuries Canal construction works, but that might be affected by the Panama Canal Expansion Project—Third Set of Locks.

Before initiating the analysis of the Canal area archaeological and historical resources, it should be observed that this division was not established following archaeological criteria. This is an artificial division according to the socioeconomic patterns of present communities, which was only followed to facilitate the compilation of archaeological data. (Figure 6-2)

### **6.13.3 Eastern Pacific Urban Zone**

#### **6.13.3.1 Pre-Columbian Resources**

Old Panama is one of the most important sites from the South coast of Gran Darien. The site has a pre-columbian component, which is older than the colonial, of only 152 years. The variety of pottery found in this zone presents characteristics typical to the Gran Darien cultural region, even though there are some pieces where the influence from Colombian neighboring zones and central provinces is evident. Old Panama pre-columbian pottery is mostly plain, but some pieces are painted in red pigments. The decoration is mostly modeled or incised (Martín-Rincón, 2002), but there are also examples of pottery painted in black and white on a pre-fired slip red painting, similar to the Cubita from Gran Cocle, or over light colors, similar and contemporary to the Hatillo pottery from Cocle (Annex 4 - Archaeology, photos 1 and 2). Most of the artifacts found at this site – plain red pottery – are undecorated and rustic vessels; however, there is a group of artistic pieces, delicately finished and of an uncommon beauty, which were probably created for religious use (Annex 4 - Archaeology,- Photo 3) (Martín-Rincón, 2002).

As it was previously mentioned, on this site (Old Panama) some pieces, very similar in style to others from surrounding Chocoe areas and the central provinces or Gran Darien, Western Panama, have been found. Photo 2 is a good example of the technical and stylistic resemblance of the Old Panama's black over red background pottery with the Cubita style pottery from Gran Cocle. Likewise, some pieces from Old Panama are very similar to others found at the Cupica site in Colombia,. This is so because the Canal Zone is located at an intermediate area between the cultural regions of Gran Darien and Gran Cocle.

#### 6.13.3.2 Colonial Resources

The Panama City was founded by Pedrarias Dávila on August 15, 1519, over the remnants of a cemetery and pre-columbian town. In 1671 privateer Henry Morgan destroyed it. Panama was the crossroad from where conqueror expeditions sailed to Central and South (**Arango**, 2006). According to a 1609 map, the extension of the city was 1400 *varas* [an old Spanish and Portuguese unit of length equal to 36 inches] from East to West. The city had seven streets running from North to South, four streets running from East to West, and three *plazas*, two small and a big one, 22 public and religious buildings, 300 wooden tile-roof houses, 40 small housing units, 120 straw-bale ranches, two bridges, and a public market (Deagan, 1991). Its decay began

in 1630. By that time, old Panama City had more than 7,500 inhabitants (Castillero Calvo, 2006). The cathedral tower is well known among the architectural remnants of the city, although it is only a part of a great city which is currently under study (Annex 4 - Archaeology, Photos 4 and 5).

#### 6.13.3.3 Historical Resources

After the 1673 destruction of Panama City, it was relocated and rebuilt 2 km to the southeast of its original location. This location is currently known as Casco Viejo (San Felipe). By the year 1790 Panama City had regained its population of 7,000 inhabitants. The 1849 California Gold Rush brought an increase in the number of travelers crossing the Isthmus on their way to the U.S. West Coast, and, in turn, a boom in Panama City. The Panama Railroad began operations in 1855. By that time, the population had reached 12,000 inhabitants. Between 1850 and 1855, almost 375,000 persons crossed the Isthmus from the Atlantic to the Pacific and 225,000 the other way. This activity prompted the prosperity of the city during this period, and with the beginning of the French Canal construction works in the 1880s, the population of the city reached 25,000 inhabitants.

### 6.13.4 Western Pacific Urban Zone

#### 6.13.4.1 Pre-Columbian Resources

Known resources in this zone include the sites of Cocolí, El Faro, Farfan, Playa Venado, Playa Kobbe I y II, Punta Bruja I y II and Palo Seco.

#### **Playa Venado**

Playa Venado is a funerary-type site, nearby the town of Veracruz and of the Farfan site on the Pacific, at the former Fort Kobbe. On this site, human remnants representing 369 individuals have been recovered, 102 of them were recovered in 1951 by the University of Harvard Peabody Museum and 167 remnants were recovered by Neville A. Harte (unpublished). The remnants

were located at a depth of 10 feet, although the original depth should have been 15 feet. Objects such as pottery, some of them very similar to others found at the Conte and Cerro Juan Diaz sites (Sánchez, 2000), as well as beautifully decorated shell objects of the *Spondylus spp.* and *Strombus spp* (Lothrop *et al*, 1957) species have been recovered.

## **Farfan**

The University of Harvard Peabody Museum owns two collections of archaeological material from Farfan Beach. The first collection was donated by U.S. Army engineer Mr. Frederick Jonson in 1931. There is no stratigraphic or other data available. The second collection was recovered by Dr. Stout in a nearby area. By that time, Farfan Beach was a Panama Canal employees' recreational area. The site lies about 500 feet from the mouth of the Farfan River. There is a 300-foot-long by 100-foot-wide oval shaped shelly deposit on this site. The deposit has a thickness of no more than 2.5 feet. Many fragments of pottery and some charcoal traits have been found here. Some groups of vessels and two funerary urns containing secondary interments have been recovered from this site. This site was heavily disturbed by machinery and workers.

Regarding archaeological artifacts, some high-footed, tripod-type pre-columbian vessels have been recovered from this site. They have rounded or flattened rims, while others present the typical drooped rim. In all cases, the rims were painted in red, with incised decorations or painted. As for their sizes, they range from 5-inches miniatures to 15-inches vessels, and up to 18-inches funerary urns. Regarding decorating techniques, Marshall (1949) reports modeling and incising (puncture and incision) techniques and applications. The incisions include naturalistic designs rather than geometrical. Examples of polychrome pottery were also found. He was able to identify two styles with designs painted using black and red lines over white paste or on a pre-fired slip red painting. Additives such as sand were used, although some pieces contain a shell additive. Marshall (1949) detected traces of soot inside some vessels, which he interpreted as denoting a domestic use. Some *mano* grinding tools pieces and stone axes were also recovered.

## **Palo Seco**

This site is located two km to the Northeast of Venado Beach. The site was heavily disturbed during the military occupation. Gaber (1987) determined the extension of the site, which he considers linked to the Venado Beach cemetery. The pottery, mano grinding tools, and stone metates belong to the 4th and 5th periods (Gaber 1987).

## **Cocoli**

The other known archaeological sites on the Western Pacific Urban Zone are located close to the townsite of Cocoli. The Panama Canal Authority tasked the Louis Berguer Group with the preparation of an archaeological field survey report over a 8,500 m x 200 m polygon on this area. To cover the transect a visual inspection of the site was made and 24 test pits were excavated of which two presented archaeological artifacts. In June 2005, the ACP requested additional archaeological studies to Dr. John Griggs and to licentiate Luis Sánchez. In their report, the authors confirm the presence of archaeological pre-columbian and historical sites in a 200 x 1200 m<sup>2</sup> polygon, concluding that “the archaeological remnants are mainly located at the uplands and plains and foothills of the explored polygon” (Griggs *et al*, 2006) and that the whole area of study is covered by a large deposit consisting of an old agriculture village and a cemetery both corresponding to the period between the 6<sup>th</sup> and 10<sup>th</sup> centuries after Christ.

In addition, Griggs and his team located 6 historical settlements – Las Palmas, Balso, Metatón, Jobo, Bella Vista and Calabaza – so named by the author. The settlements are small villages of groups of West-Indian, U.S. construction period Canal workers and their families (Griggs *et al*, 2006). The author recommended the rescue excavation of Cocoli and Calabaza sites. This work was assigned to Julia Mayo and Carlos Mayo. At the Cocoli deposit (CO1) three large excavations were conducted (Mayo and Mayo 2007a - Annex 4 - Archaeology, Photo 6).

During the first excavation, an elongated feature object called R1 (features 1) was found. It comprises eleven (11) groups of pottery fragments from a minimum of six (6) vessels (NMI) (Annex 4 - Archaeology, Photos 7, 8, and 9). It is worth mentioning that in addition to these,

other objects such as one (1) small gold tubular bead and one (1) basalt ax, and a large urn were found, which helped to interpret the feature as a burial site. Traces of soot were detected inside some of these objects, which permitted conducting a C14 analysis.

The C14 analysis proved that findings have a Cal AD 1270-1320 (Cal BP80 to 630) and Cal AD 1350- 1390 (Cal BP 600 to 560) so the objects have an approximate antiquity of 680 +/- 40 years (Mayo and Mayo, 2007b). In addition, one of them, an earthenware long-necked incised bowl has patterns very similar to those reported in vessels found by Cooke at the Miraflores site, in the banks of the Bayano River (Cooke, 1973), which suggests that this zone is culturally linked to the one in Darien. Also, some of the vases that have been recuperated on this site are very similar to others that have been found at Old Panama, suggesting, likewise, a cultural relationship between both sites.

### **El Faro Site**

This deposit, with a pre-columbian and historical component, is located at the initial section of K2 Street, close to the abandoned Cocoli lighthouse. Julia Mayo evaluated this deposit in 2007, based, among others, on the analysis of material from samples that were collected in a 0.5 x 0.5 m area, which contains the following:

-Twenty-six (26) pre-columbian pottery fragments (Annex 4 – Archaeology, Photo 10), three (3) of them between 5 and 7 cm long and from 4 to 5 cm height; four 4 x 3 cm and 19 fragments of less than 2 cm. These dimensions indicate the high fragmentation level of the material. All fractures are very old and the material has been heavily scattered. This type of material is similar to those found in settlements.

- A small point of an arrow made from a chip of stone. (Annex 4 - Archaeology, Photo 11 a)
- A micronucleus. (Annex 4 - Archaeology, Photo 11).
- Eight (8) chips of stone of white, green, and purple jaspers (Annex 4 - Archaeology, Photo 11 c).

Because of the dispersion of the materials, the type of fracture in pottery fragments, and their size, it is believed that this is a settlement type deposit (town). This site is, therefore, different from the one that Dr. Mayo and her team excavated at Cocoli in 2007, but it is possible that there is some kind of connection between them because of their proximity and the fact that the materials belong to the same period.

### **Other Sites**

At the Mandinga River watershed, Gaber (1987) documented three sites with pre-columbian material (Sites 17, 19 and 20) very similar to those he found at the Playa Venado and Palo Seco sites, most of them from the 4th period.

#### 6.13.4.2 Colonial Resources

Garber archaeological prospections (1987) discovered a colonial deposit of majolica pottery at the Mandinga River watershed (site 18). This deposit has also a pre-columbian component of the Pre-Pottery Period (IIB Period).

#### 6.13.4.3 Historical Resources

The 2005 prospections by John Griggs at Cocoli located a total of six historical sites that were inhabited at the beginning of the 20<sup>th</sup> century and that “illustrate the daily life of the U.S. construction period worker” (Griggs *et al*, 2006). Metal artifacts – structural parts of modest houses and fragments of furniture, among others – a variety of shaped pottery related to the Spanish earthenware, tableware from the Ola-El Tigre variety, thin red pottery, and glazed pottery were found (Griggs *et al*, 2006).

Julia Mayo and her team opened four (4) excavations at the historical site of Calabaza located at point 653305 long / 995222 North latitude (Mayo and Mayo, 2007a). The site presents geomorphological characteristics similar to those of the Cocoli site at only 300 m. It is a small elevation, which is part of a group of small hills separated by seasonal streams and covered with

secondary forest. Previously, John Griggs had conducted some shovel/probing tests and small excavations on this area. During the tests and excavations, a good amount of S-345, S-646, U-746H, U-747H, U-156 and S-115H remnants of historical material as well as some samples of chips of stone and pre-columbian pottery were found, however, emphasizing the historical component (Griggs *et al*, 2006).

The excavations by Dr. Mayo's team identified two well-defined areas. One of them is the room area, which was located thanks to the distribution of the cooking range area, and a garbage disposal area at the foot of the room. An old access ramp should be added to these two areas. The first excavation was made nearby a visible cooking range. Even though no traces of poles were located, remnants of small zinc laminas were found. From this site, a small amount of materials, as compared to open excavations at the garbage disposal areas, was recovered. This, in addition to the fact that it is located at the most elevated area, demonstrates that it is the house bedroom.

Another important historical resource of the zone is the 1939 third set of locks project engineering structure, which as was previously explained, has its Atlantic side counterpart. Some remnants of the machinery used for this project are visible in the proximity of these excavations.

### **6.13.5 Atlantic Urban Zone**

#### 6.13.5.1 Pre-Columbian Resources

There are no known pre-columbian resources in this zone.

#### 6.13.5.2 Colonial Resources

There are no known colonial resources in this zone.

#### 6.13.5.3 Historical Resources



The most important historical resource on the Atlantic Urban Zone is, undoubtedly, Colon City. Likewise Panama, the history of Colon City is closely connected to the construction of the Panama Railroad. The Panama Railroad Company needed an Atlantic-side terminal for the first new world interoceanic railroad, so it was built on the 263-hectares Manzanillo Island on the East side of Limon Bay. The cleaning of the area to begin building the Atlantic-side terminal began in May 1850, where the then future Colon City would be located. No ceremony was held to celebrate the beginning of the effort; workers found themselves in an untouched marsh, full of mosquitoes around the clock. During the following months, work on the island was not easy since the rainy season was coming and laborers were getting sick from malaria and dysentery.

For two years, the Atlantic Terminal on the Manzanillo Island remained nameless. John Lloyd Stephens suggested the name of Aspinwall, in honor of William Henry Aspinwall, one of the directors of *Pacific Mail*, the company that was financing the Panama Railroad Company. On February 2, 1852, the city was formally christened and founded with the name of Colon. A marshy section of the island was filled up, streets and buildings were built, and a pure water storage tank was installed. A great part of the city was burned down during the 1885 Colombian civil war, and later on during the 1915 fire. In 1900 its population was 3,000 persons, but it substantially grew as a result of the Panama Canal construction until reaching 31,203 inhabitants in 1920.

The houses that were left in Colon from the French Canal period, or those that were built afterward present a clear French influence with elements typical to the Panamanian architecture. This gave a well-defined architectural aspect to this city with houses with colonnades forming covered walkways on the ground floor. Some elements, such as galleries or walkways, were incorporated to the design or structures of the houses and blocks because of weather conditions. With the initiation of the U.S. Canal construction effort at the beginning of last century, the houses and buildings followed the same architectural pattern with slight differences such as the placement of a series of mosquito nets, like big draperies, hanging over the structures.

### 6.13.6 Transisthmian Corridor Zone

#### 6.13.6.1 Pre-Columbian Resources

The earliest evidences of the Canal Zone have been found at Madden or Alhajuella Lake. A total of eight (8) Paleo-Indian fluted points were recovered on its eroded banks (Bird and Cooke 1977;1978). Of these, one is a “cintura restringida” point, and the others are fishtail-type fluted points (Ranere and Cooke, 1995). The first evidences were found on Macapale Island (ZF-200-B site), as reported by the Archaeological Society of Panama. Sanders (1959,1964) found a basic section of a fluted point on Butler Island (ZF-200-P site), located at 800 meters to the Southeast of Macapalé. At Marcelito Island (ZF-200-W site) another point was recovered. The La Loma site is located at 1500 to the Northeast of Butler Island (ZF-200-Q) (Norr, 1996).

In addition, a bifacial point shop from the Pre-Pottery Period (Ranere and Cooke, 1995) was found at East Alhajuella, and a second shop (West Alhajuella lake shop), located 300 meters to the West of East Alhajuella is full of bifacial thinning flakes, and a thin elongated preform bigger than those recovered from the West-Mula (Ranere and Cooke, 1995).

Concerning the formative and pottery periods, there is evidence of an early appearance of pottery at Butler Island, on the mid course of Chagres River (Alhajuella Lake), a site with a date of  $1990 \pm 40$  before present (60 cal a.C.-90 cal d.C.) (Cooke and Sánchez 2004:28) in which some pottery fragments with “certain traces of plastic decoration, triangular type vessels of the Honguillo type, and bichromal bowls with a decoration similar to those of the Giron and Cobobo type” (Griggs et al, 2006) were recovered. In addition, the sites of La Tranquilla (a village) very close to the Camino Real, and Tumba Vieja (a burial site), both from the Pottery Period (Mitchell 1961; 1964) have been registered.

#### 6.13.6.2 Colonial Resources

The Transisthmian Corridor colonial resources are linked with the old idea of building a canal. A little after the discovery of the South Sea (1513) by Vasco Núñez de Balboa, the idea of

building a passage to unite both oceans started to take form. King Charles V of Spain ordered the first topographic survey for a proposed canal taking advantage of the Chagres and Grande rivers. For many reasons, mainly economic and logistics, Canal works were started only until the second half of the 19th century, but this did not prevent Panama from playing an important role as an interoceanic connection.

Construction of the Camino Real (1530-1596) was started under Pedro Arias de Ávila as governor of “Castilla del Oro” (Golden Castille). This trail would join the two coasts from Panama City, which was founded in 1519, to Nombre de Dios, for the purpose of using it to transport the most wanted Asian products to Europe. After the defeat of the Inca Empire (1533) by a group of Spaniards under the leadership of Francisco de Pizarro, the strategic and commercial importance of the Isthmus was on the rise, since it became the path to transport gold from Peru to Spain. On the 16<sup>th</sup> century a system of “Fairs” was established and the cities were fortified to protect them from the constant attacks of buccaneers and pirates, who were going after the Spanish riches and were also trying to interrupt the commercial traffic with the metropolis. In 1533 a new Transisthmian route from Panama City to Cruces and from here to San Lorenzo was opened. This trail was named the Camino de Cruces and was used during the rainy season, while the Camino Real was used during the dry season. The Panama “Fairs” were held twice a year at Portobelo and Nombre de Dios taking advantage of favorable cycles to bring about a commercial boom.

Riches from the Potosi Mines, currently Bolivia, the finest and most elegant European goods, or the sturdiest and healthiest African slaves were all gathered in heavily escorted fleets so as to avoid looting, and crossed the Isthmus either way through the Camino Real and/or the Camino de Cruces. Regarding their structures, both trails were different. The Camino de Cruces was paved with granite pebbles, while the Camino Real was paved with sedimentary rocks, mainly calcite. The Camino de Cruces was 2.5 m wide and the Camino Real was 1.3 (Bohn and Joly, 1974).

The ruins of Venta de Cruces are inside the Soberania National Park. Most of the ruins are covered by heavy vegetation, but many of them are still visible. No in depth investigations have

been conducted here. The Fairs of Portobelo were suspended in the 18<sup>th</sup> century, bringing the Camino de Cruces into disuse until the so called “Gold Rush” when it got back in use (Norr, 1996).

#### 6.13.6.3 Historical Resources

There are no known historical resources in this zone.

### 6.13.7 Zone del Lago Gatun y Costa Abajo de Colon

#### 6.13.7.1 Pre-Columbian Resources

As it is mentioned at the beginning of this report, the analysis, and the ethno historical and archaeological documentation, are sources of information of the prehispanic period. In the 1980s Dolores Pipernos analyzed some samples of sediments<sup>26</sup> from Gatun Lake, which had been collected by Bartlett and Barghoorn in 1973. The study of pollen shows changes in the landscape from 11300 before the present, approximate date of the arrival of man on the Isthmus. According to the sample, the oldest stages are characterized by a mature tropical forest. Later on, toward the year 3300 before the human presence, and more specifically before the deliberate burning of forest to open planting trails, the study detected the presence of mangrove swamps and freshwater vegetation.

#### 11300 b.p. to 9000 b.p. Tropical Rainforest

The pollen that was deposited during the period belongs to tropical forest trees, such as *Phytelephas*, *Bursera* and some of the *Bombacaceae*. By that time, temperature was 2.5 °C lower considering the abundance of pollen from trees such as the *Iriartea*, *Symplocas* and *Ericaceae*. Concerning phytoliths, there is an abundance of those from *Arecaceae*, *Marantaceae* and *Bromeliaceae*

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<sup>26</sup> A total of 20 samples from different sediments were processed. Ten samples were obtained for radiocarbon dating.

### **9000-7300 b.p.**

This period is characterized by an abundance of the *Rhizophora* pollen. There is still a heavy presence of pollen from the tropical rainforest. The abundance of spicules (marine indicators) demonstrates that the sediment was periodically underwater. During this period there is a decrease in the number of *Palmae* and *Marantaceae* phytoliths, which proves that the forest is not too big, while there is an increase in grassland.

### **7300-4200 b.p.**

During this period a change from mangrove swamp to freshwater swamp vegetation took place. The *Rhizophora* pollen is no longer present in samples. There is an abundance of *Cyperaceae*, *Gramineae*, *Typha* and *Polygonum* pollen. There is also an abundance of *Melastomataceae* and *Malphiaceae* pollen. The sponge spicules also appear during this period. Likewise, there is an increase in grass phytoliths. Toward the 4850 there is evidence of the slash-and-burn method to clear the forest.

### **4200 to the present**

Corn pollen appears between 3340 and 4750 before the present, at a depth of between 10 and 42 feet, which could be dated as 4000 or 3300 before the present. *Manihot* pollen appears at a depth of 3 feet, toward the 1800 before the present. All this points out that toward the 3300 before the present agriculture was well established in the region. There is an increase in phytoliths from herbaceous plants, and the traces of coal in phytoliths indicate an intensification in the slash-and-burn method.

### **Other Studies in the Zone**

In 1975, Richard Cooke reports some pre-columbian remnants at the de Lesseps Island, Mamei Curve, and at the San Juan, Gorgona and Santa Cruz islands. Among the findings, there is a burial site and a vessel from 1100 A.C. (Cooke, 1975).

In 2005 an extensive, no systematic prospection was conducted in an area located to the Southeast of the 1939 expansion project at Gatun (Louis Berguer, 2004). In this area, six (6) shovel tests up to 10 cm in depth were done and no pre-columbian archaeological remnants were recuperated. The author points out that the only archaeological objects are historical, related to the 1939 excavation works. It is unknown if at any point there was a pre-columbian component on this site (Southwest of the 1939 excavation). On this regard, it is possible that on this location and on the surrounding area the same pre-hispanic settlement scheme, which is found in areas with similar climate, vegetation, and physiographic characteristics, could have taken place.

#### 6.13.7.2 Colonial Resources

Fort San Lorenzo is the most important and known historical site on the Atlantic side to the West of the Canal. This fortress is located atop a cliff on the mouth of the Chagres River and functioned as a link between Venta de Cruces and Nombre de Dios and later on Portobelo. The construction phases of Fort San Lorenzo were documented by architect Juan Manuel Zapatero (1985). Between 1587 and 1588 some gun trenches were opened. The first construction began in 1545 and continued through 1599. In addition to San Lorenzo, there is a fortress on the mouth of Trinidad River (Cooke, 1975).

There were other colonial towns on Limon Bay (towns of Gatun and Mindi) and along down the course of the Chagres River. The old town of colonial Gatun was a key point in the trade route that connected Panama City with the port of Chagres on the mouth of Chagres River, but it was abandoned only to be refounded on the 19th century at a location close to the Panama Railroad Company railroad route. Something similar happened to the town of Mindi, located on the bank of Limon Bay from the 16th through the 18th centuries and that in the 19th century was relocated to the South, close to the railroad route (Table 6-12)

**Table 6-12  
Old Human Settlements Within the SESA**

Towns XVI-XVIII century	Towns XIX century	Towns XX century (after 1914)	Towns lost in 1914	Longitude	Latitude
Chagres					
	Aspinwall	Aspinwall		620153	1034872
	Monkey Hill	Monkey Hill		621164	1031141
Mindi	Mindi	Mindi		619340	1027845
Gatun	Gatun		Gatun	618900	1023723
Palo Horquete	Palo Horquete		Palo Horquete	620842	1016323
Palo Matías	Palo Matías		Palo Matías	622102	1015966
Vamos Vamos					
Peña Blanca	Peña Blanca		Peña Blanca	624611	1014559
Barro Colorado	Barro Colorado Arriba		Barro Colorado	628496	1013530
Palenquillo	Palenquillo		Palenquillo	629839	1011829
Tabernilla	Tabernilla		Tabernilla	631743	1008843
San Pablo	San Pablo		San Pablo	634577	1007319
Barbacoa				633509	1007732
Baila Mono	Baila Mono		Baila Mono	636100	1006864
Limon					
Juan Grande					
Gorgona	Gorgona		Gorgona	640562	1007672
Cerro Pelado					
Rio Obispo	Alto Obispo	Alto Obispo		644024	1006128
	Bajo Obispo		Bajo Obispo	643420	1006979
Cruces	Cruces	Cruces		644601	1008837
Sabana Grande					
Agua Buena					
Guayabal	Guayabal	Guayabal		655184	998915
Toque					
La Boca	La Boca	La Boca		657179	990674
	Rio Indio			614458	1025373
	Dominica			654544	998401
	Ahorca Lagarto		Ahorca Lagarto	624410	1017514
	Buena Vista		Buena Vista	627913	1014296
	Bohio Soldado		Bohio Soldado	627016	1015279
	Emperador	Emperador		646554	1001624
	Culebra	Culebra		647950	1000123
	Rio Grande	Rio Grande		649053	998831
	Río Grande Inf	Río Grande Inf		655121	995398
	Paraíso	Paraíso		651058	998474
	Pedro Miguel	Pedro Miguel		652423	997173
	Luis Sobrano	Luis Sobrano		649326	993445
	Herrera	Herrera		646249	994800
	La Isla	La Isla		655919	991451
	El Cangrejo	El Cangrejo		659940	994369
	San Miguel	San Miguel		659363	993372
	Corozal	Corozal		656444	993876
	Juan Dios	Juan Dios		659048	994695
	Far Fan	Farfán		656675	987660
	Aletier		Aletier	641189	1007609
	Juan Maria		Juan Maria	631488	1009740
	Frijoles		Frijoles	630633	1013399
	Miraflores		Miraflores	617934	1021698
	Matachín		Matachín	641861	1007527
	Loma del Tigre		Loma del Tigre	620964	1020234
	La Bruja		La Bruja	617619	1018969
	Lion Hill		Lion Hill	622417	1018853
	Dos Hermanos (oeste)		Dos Hermanos	646176	1008333
	Monte Lira		Monte Lira	623267	1021352
	La Peñita		La Peñita	624411	1021520
	Las Cascadas	Las Cascadas		644864	1005215
	Gamboa	Gamboa		643961	1007441
	Mamei		Mamei	636328	1007590
	Dos Hermanos (Este)	Dos Hermanos (Este)		619634	1016081

Source: Wyse, Lucien Napolen-Bonaparte, 1877, *Canal Interocéanique 1876-77. Rapport Sur les Études de la Comisión Internationale d'Exploration de l'Isthme du Darien*. A. Chaix et Cie., Paris.1886 *Le Canal de Panama, l'Isthme Américain*. Explorations, Comparaison des Tracés Étudiés; Négociations; Etat des Travaux. Hachette et Cie., Paris.

There were other colonial towns such as Palo Horqueta, Palo Matías, Barro Colorado, Palenquillo, Bailamono, among others, located along the Chagres River watershed<sup>27</sup> to the South of Gatun and Mindi. Most of them were buried under water in 1914. However, today it is possible to find remnants of the colonial towns of Gorgona and Cruces.

#### 6.13.7.3 Historical Resources

Here the situation is very similar to the previous one. Many of the towns located on the banks of the Chagres River, especially on its middle point, continued being inhabited during the historical period, especially after the construction of the railroad at the end of the 19<sup>th</sup> century. Loma del Tigre, Ahorca Lagarto, Mamei, Gorgona, and Matachín are the towns, with a historical, colonial, and pre-columbian component, whose remnants could be recovered over the water. Richard Cooke recommends in his 1975 report (Cooke, 1975) the preservation of the Gorgona deposit as a special interest site for industrial archaeology specialists.

To the North of Gatun Lake, next to the 1939 excavation site and to the old town of Gatun, Julia Mayo and her team (Mayo and Mayo, 2007c) report the following historical remnants:

- Site 1: Strip of land that keeps the Gatun Lake waters away from the 1939 expansion project excavation area. Archaeological units: A section of the old and abandoned railroad (Annex 4 - Archaeology, Photo 12).
- Site 2: A section longitudinal to the old expansion excavation works. Archaeological units: a motor vehicle cemetery (Annex 4 - Archaeology, Photo 13), spillway zone, storage zone (Annex 4 – Archaeology, Photo 14) and water filtration plant (Annex 4 - Archaeology, Photos 15 and 16).

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<sup>27</sup> This report compiles, thanks to a GIS reconstruction, the chronological sequence of these towns location. This, in addition, made it possible to create a table with all of their coordinates, nowadays potential archaeological sites. The UTM coordinates presented in the following table are approximations that should be contrasted with field work.



- Site 3: Heavily disturbed area with a small amount of vegetation, many trails, and secondary entries. Archaeological units: A section of the old and abandoned railroad.
- Site 4: A section longitudinal to the east section of the old canal expansion works. Archaeological units: residential area (Annex 4 – Archaeology, Photos 17 - 20).
- Site 5: A plain 2 kilometers to the North, named *Ruins* in old military maps. Archaeological units: residential area (Annex 4 - Archaeology, Photo 21).
- Zone 6: Old town of Gatun. Archaeological units: cemetery (Annex 4 – Archaeology, Photos 22 and 23) and section of the old and abandoned railroad.

In October 2003 the World Monuments Fund (WMF) included the whole Canal area in its list of endangered sites because of its high cultural and historical importance. According to the organization, “the pressure of the development, combined with real estate privatization and the lack of an adequate regulatory frame, is endangering the area in the long run.” The UNESCO has written a proposal to protect a series of sites including some structures, manmade and natural landscapes, industrial artifacts, and cultural monuments<sup>28</sup>.

The towns of Emperador and Culebra are preserved to the South of Gatun Lake, on the West bank of Culebra cut, as well as a section of the Panama Railroad. Goethals relocated the headquarters of the Department of Engineering to the towns of Culebra, Emperador, Paraíso and Pedro Miguel. The other towns were workers camps. Many of them were destroyed and moved to other areas with the cut widening project. It might be possible to locate archaeological remnants of some of them like Culebra or Emperador.

### **6.13.8 Taboga Zone**

#### **6.13.8.1 Pre-columbian Resources**

There are some pre-columbian archaeological sites at Taboga (Taboga 1-4 site), Urabá (Urabá 1 site) and Taboguilla islands (Taboguilla 1-3 site) (Stirling 1964). Taboga 1 and 2 sites and

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<sup>28</sup> World Monumental Found ([http://wmf.org/resources/sitepages/panama\\_panama\\_canal\\_area.html](http://wmf.org/resources/sitepages/panama_panama_canal_area.html))

Taboguilla 1 site are shelly deposits with similar characteristics and pottery components. The vessels from Taboga 1 and 2 sites included globular and sub-globular bowls with restricted rim (similar to those described by Dr. Mayo in her report on Cocoli and with a date of Cal BC 1270 to 1320 [Cal BP80 to 630] and Cal BC 1350 to 1390 [Cal BP 600 to 560], and others from Old Panama), hemispheric and curved rim bowls or simply long-necked bowls. Concerning decoration, there are some vases with incised decoration or painted with black and white designs over an orange background, or with engobe applied over the whole surface or only on the border. The predominantly plastic decoration is the incision. At Taboga 4 the designs of vases included black lines over a red engobe. Taboga deposits number 3 and 5, Taboguilla 3 and the Uraba deposit are rocky shelters probably used as burial sites.

Archaeological deposits of Taboguilla (Taboguilla 1 y 2) site are shelly deposits that contain a similar pottery. The Stirlings took samples from both sites, paying special attention to Taboguilla, where the cultural remnants were recovered at a depth of one meter. This site's pottery collection is particularly important since it shows a close similarity to early components from other sites located to the east, as well as sites from the Gran Cocle, including those from the Atlantic spurs, which contain some plastic decoration characteristics, triangular rim vessels of the Honguillo type and two-colored bowls with designs certainly similar to those of the Giron and Cocobo types (Griggs et al, 2006).

#### 6.13.8.2 Colonial Resources

There are no known colonial resources on this zone.

#### 6.13.8.3 Historical Resources

There are no known colonial resources on this zone.

## 6.14 Landscape

This section presents the principal characteristics of the SESA landscape, emphasizing on the areas next to the project. It was determined that some towns will have no visibility of the works because of the distance between them and the project and for topographic reasons.

Because of the landscaping resemblance within these zones, it was decided to divide them into two sectors: Atlantic and Pacific. In general terms, the landscape of the zone in study is dominated by elements related to Canal operation and presents several types such as the industrial, the natural, and the urban. Following are the characteristic traits of the SESA landscape.

### 6.14.1 Atlantic Sector (Gatun Lake and Costa Abajo de Colon, Transisthmian Corridor and Atlantic Urban)

**Industrial:** It includes elements which are typical to port areas of heavy activity (transiting vessels, anchorage areas, floating equipment such as dredges, etc.), and it is, undoubtedly, a major element in the landscape along the projected route of the project. The port facilities of Cristobal, Manzanillo International, Colon Container Terminal, all of them for handling cargo, and the Colon 2000 cruiseship port facility, which is a port of call for many tourists traveling to the Caribbean, are all important port elements of the landscape of this area. The Colon free duty Zone and the ACP's Industrial Shipyard are also located in this sector.

The Gatun Locks Visitors Center is another important point in this sector. From here, visitors can observe Canal operations. Likewise, another industrial-type observation point is the passage through Gatun Locks, which joins the old town of Gatun with the area of Sherman and some housing units of the town of Jose Dominador Bazán (Annex 4 – Landscape, Photo 1). At the Gatun Lake area, the industrial-type landscape is directly related to the steady transit of vessels through the Canal.

The town of Gamboa is the only important visual point to the Canal channel. Even though there are other towns located at the banks of Gatun Lake, most of them do not have direct visual contact to the industrial landscape because they are away from the channel. Other sites that can be seen at long distances are the housing units of the *corregimientos* of Barrio Colon, Barrio Balboa and Cristobal.

**Natural:** The landscape in these zones is typical to litoral plains regions, with low hills and slopes. The Galeta Island Protected Landscape, the San Lorenzo Protected Forest, the Gatun Lake Recreation Area, the Portobelo National Park, the Chagres National Park, the Barro Colorado Natural Monument, and the Soberania National Park are all protected areas located in this zone. The natural landscape of this zone is used for tourist activities, with two important hotels, the Melía Panama Canal and the Gamboa Rainforest Resort, whose main attraction is their closeness to the tropical rainforest, located in the area. Water is an abundant element in this zone, which is complemented with many islets and underwater vegetation visible in some areas of Gatun Lake (Annex 4 – Landscape, Photo 2). It is important to highlight that the project direct impact areas are relatively far from the previously mentioned protected areas; except for Barro Colorado where there is and will continue to be a dredged material disposal site. Regarding the lacustrine natural landscape, it can be seen from the different towns located at the banks of Gatun Lake.

**Urban:** Colon City is the main urban area of the sector. In spite of its important commercial activity, derived from the ports and the Colon free duty Zone, the city presents poor socioeconomic conditions which are reflected in the high level of unemployment and a low quality of life. The architectural value of the city, which includes buildings from the 19th and 20th centuries, is seriously endangered by poor maintenance conditions. Concerning the housing units of the old town of Gatun, most of them have been abandoned or are used for Canal related activities (Annex 4 – Landscape, Photo 3). The picturesque town of Gamboa, which maintains the last century's american architecture, with two-story wooden houses, lushy gardens, wide sidewalks, and well defined streets, is a special highlight in the zone. The fact that the expansion project works will be carried out in Canal operation areas, far from existing urban centers, prevents a direct impact on existing landscape.

#### 6.14.2 Pacific Sector (Eastern Pacific Urban, Western Pacific Urban, and Taboga)

**Industrial:** The Pacific sector, just like the Atlantic, is dominated by port facilities. This includes the Balboa port zone, owned by Panama Ports Company, the Rodman area Parque Industrial Marítimo de Panamá (PIMPISA) bunkering facility, and the cruiseship and pleasure boats facility at Amador. Industrial-type landscape observation points include the Miraflores Visitors Center, from where visitors can observe a canal lockage, as well as the Centennial Bridge and the Bridge of the Americas (Annex 4 – Landscape, Photos 4 and 5), which are all areas of heavy traffic. Canal operation might also be observed from the towns of Paraíso and Pedro Miguel.

**Natural:** Natural landscape includes heavily vegetated slopes (typical of a tropical rainforest climate), especially on the Southeast part of the Canal (Punta Bruja Protected Area). The predominant element in this zone is a large marsh with a strip of mangroves, and some areas fairly covered with secondary forest and *Paja blanca* (a white grass also known as *Paja canalera* or Canal grass). Also, the existence of small islands and islets to the Southeast of the proposed channel (for example Tortolita and Tortolita Sur, Isla Changame, Roca Peña Marca and Isla Venado), further enhance the natural character of the area for its abundant vegetation. This natural component is affected by the presence of some key infrastructures like the Bridge of the Americas, the Centennial Bridge (Annex 4 – Landscape, Photo 6) and urban developments (a new hotel -- the Playa Bonita -- and the Palo Seco long stay hospital). However, water is predominantly the attraction element, which, in certain way, diminishes the visual impact of these big and colored infrastructures. In other words, water, with its movement and luminosity, serves as a visual counterpart. The Camino de Cruces National Park, the Metropolitan Natural Park, and the marine component of the Taboga and Uraba Wildlife Shelter are also located in this zone. The distance between these sites and the project direct impact works obstructs the visual angle between them; except for the Taboga and Uraba Wildlife Shelter, where the open water space increases the sight between the two points.

**Urban:** The main element of the Pacific sector urban landscape is Panama City. It adds a strong urban character to the landscape in general, mainly because of the tall buildings on Balboa Avenue. Also, on the East part, and parallel to the Canal channel, is the Amador Causeway, a former U.S.

military base, which actually joins the islands of Naos, Perico, and Flamenco to the mainland. The Amador Causeway, as well as the islands, have a strong tourist development. Other landscape elements include the Casco Antiguo, which can be seen both from Balboa Avenue and the Amador Causeway, so current canal navigational activities do not interfere with them. Other populated zones in the vicinity include La Boca, Ancon, Howard, Clayton, El Chorrillo, Paraiso, and Pedro Miguel, among others; notwithstanding, the extraordinary development projects considerably limit the sight between these populated neighborhoods and current and future canal operation areas. Toward the West, the closest and most important urban element, considering the activity generated in the area, is Arraijan City; however, the distance obstructs any sight to the project works.