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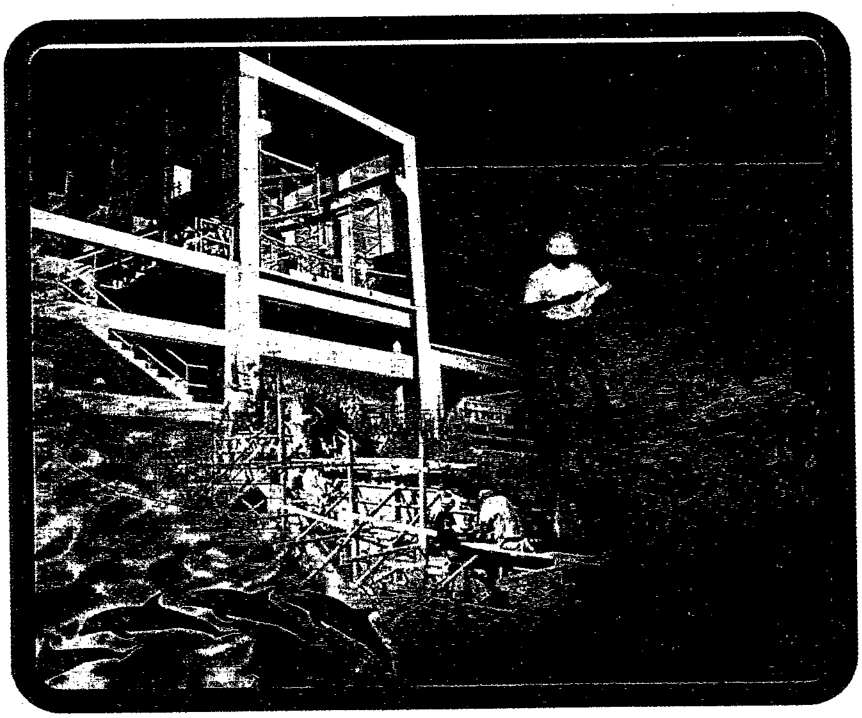
STATUS REPORT ON THE WATER-WASTEWATER INFRASTRUCTURE PROGRAM FOR THE US-MEXICO BORDERLANDS



Acronyms

Acronyms used in this report are :

(ADEQ)	Arizona Department of Environmental Quality
(BECC)	Border Environment Cooperation Commission
(BEIF)	Border Environmental Infrastructure Fund
(CRWQCB)	California Regional Water Quality Control Board
(CDC)	Center for Disease Control
(CWA)	Clean Water Act
(CEC)	Commission on Environmental Cooperation
(EPA)	Environmental Protection Agency and its Office of Water
(FUMEC)	George E. Brown U.S.-Mexico Foundation for Science
(IBWC)	International Boundary and Water Commission and its U.S. and Mexican Sections
(IWTP)	International Wastewater Treatment Plant
(mgd)	Million Gallons per Day
(CNA)	National Water Commission of Mexico a part of SEMARNAP
(NMED)	New Mexico Environment Department
(NAAEC)	North American Agreement on Environment Cooperation
(NADBank)	North American Development Bank
(NAFTA	North American Free Trade Agreement
(PAHO)	Pan American Health Organization
(PDAP)	Project Development Assistance Program
(SEMARNAP)	Secretariat of the Environment, Natural Resources and Fisheries
(SBIWTP)	South Bay International Wastewater treatment Plant
(TNRCC)	Texas Natural Resource Conservation Commission
(FUMEC)	U.S.-Mexico Science Foundation
(USBR)	United States Bureau of Reclamation
(USGS)	United States Geological Survey

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EXECUTIVE SUMMARY

This status report of the water and wastewater infrastructure program for the US-Mexico border area emphasizes water quality and public health conditions. The report also analyzes the current (2000) and future (2020) water and wastewater infrastructure needs for the increasing population along the border and highlights the accomplishments achieved by the binational water groups which the U.S. Environmental Protection Agency (EPA), through its Office of Water, and Mexico's Secretariat of the Environment, Natural Resources and Fisheries (SEMARNAP), through its National Water Commission (CNA), Border Environment Cooperation Commission (BECC), North American Development Bank (NADBank) and International Boundary Water Commission (IBWC). This group along with state and municipal governments cooperate in the management of the water resources along the border area.

Environmental problems have been compounded by rapid population growth in the sister cities, all of which are the main gateway for trade and travel between Mexico and the U.S. The strategic positions of these cities attract industry and investment; however, it also carries problems including pollution and its impact on the health conditions of the people living in the border area. The growth in population has overwhelmed the infrastructure capacity, overloading the existing treatment facilities and causing partly treated or untreated direct wastewater discharges to the surface water bodies along the border. The population along the U.S.-Mexico Border is expected to further increase from 12.6 million in the year 2000 to about 21 million in 2020.

Surface water quality monitoring data contained in this report were gathered, compiled, and analyzed for all the boundary area water bodies. The results are compared to the U.S. and Mexico water quality standards, for fecal coliform and dissolved oxygen concentrations. The sampling data results indicate that in the majority of the sampling locations the water quality standards for fecal coliform and dissolved oxygen are not met, typically because of partially treated or untreated wastewater discharges in all seven border watershed basins.

Public health problems along the border are exacerbated by the impact of cross-border travel and commerce. Primarily, the waterborne diseases are created by unsanitary conditions or lack of treatment facilities. The report analyzes the following waterborne diseases: Amebiasis, Hepatitis A, Shigellosis and Typhoid Fever. Along the border in both the U.S. and Mexico the incidence rates for these diseases are higher than the U.S. national average.

The North American Free Trade Agreement (NAFTA) increased binational emphasis on the border area by creating new institutions to manage improvements to the water and wastewater infrastructure. They are the Border Environment Cooperation Commission (BECC) and the North American Development Bank (NADBank). EPA provides funding assistance for water and wastewater infrastructure projects that have been developed and certified by the BECC.
NADBank administers the Border Environmental Infrastructure Fund (BEIF) for EPA and serves as the border financier, arranging affordable financing packages to make infrastructure projects viable. The BEIF Program was established with EPA contributions currently totaling $339 million in early 2001.

EPA has also funded the George E. Brown U.S.-Mexico Foundation for Sciences (FUMEC) and the Border Tribal Assistance Program which has funded 22 tribal projects in California and 3 in Arizona.

EPA, working with its various partners, has partly financed a number of water and wastewater treatment projects along the U.S.-Mexico border. In the Pacific Coastal Basin, major wastewater projects have been the International Wastewater Treatment Plant in San Diego and the San Antonio de los Buenos Plant in Tijuana, Mexico. The New River Basin has on-going projects in Brawley, Heber, Mexicali, and Westmorland. In the Colorado River Basin, the Naco project is almost completed and Nogales and Patagonia projects are just getting started. In the Rio Grande Basin, these are projects in El Paso and Ciudad Juárez. Both are completed and in operation additionally, eleven other projects in the basin are in various stages of completion. In the Gulf of Mexico Coastal Basin there are projects in Brownsville and Matamoros which have received direct funding assistance.

The estimated water and wastewater needs for the border populace through the year 2020 totals $4.5 billion. The projected EPA participation in near-term needs is estimated at $691 million, divided as follows: $342 million in the U.S. and $349 million in Mexico. Long-term needs are estimated at $3.8 billion of which $1.3 billion is needed for the U.S. and $2.5 billion for Mexico.

1. Introduction

Environmental conditions and human health in the U.S.-Mexico border area are influenced to a significant degree by the quality of the available water sources. Many waterways, some originating in Mexico and others in the U.S., flow across or along the binational border. Most of the border region is arid. Shared rivers, aquifers and marine resources are extremely valuable. Population in urban areas along the border has increased significantly over the past few years, influenced by the expansion of the maquiladora industry and relocation of industries from both countries to the area, resulting in an increase in jobs.

The area of concern covers surface water quality and public health issues within the border limits of the United States-Mexico covering the States of California (U.S.), Baja California (Mexico), Arizona (U.S.), Sonora (Mexico), New Mexico (U.S.), Chihuahua (Mexico), Texas (U.S.), Coahuila, (Mexico), Nuevo Leon (Mexico), and Tamaulipas (Mexico).

Along the border, economic activity and population have continued to grow rapidly. However, water and wastewater infrastructure has not kept up, resulting in a deterioration in surface water quality and an increase in the incidence of waterborne diseases. This report summarizes the water quality and public health conditions along the border and evaluates the need and effect of providing an adequate water and wastewater infrastructure for the border area. The report also provides an analysis of the accomplishments of a binational, multi-agency working group. Finally, the report looks at the future water and wastewater infrastructure needed to protect the water environment and serve communities of the border area through the year 2020.

2. The Border Team at Work

Members of the binational multi-agency water working group called the Border Team include the U.S. Environmental Protection Agency (EPA) represented by its Office of Water, Mexico's Secretariat of the Environment Natural Resources and Fisheries (SEMARNAP) represented by its National Water Commission (CNA), International Boundary and Water Commission (IBWC), Border Environment Cooperation Commission (BECC), and the North American Development Bank (NADBank). EPA has and continues to participate with the other organizations to achieve the goal of improving surface water quality and protecting public health in the border area. Their authority and responsibilities fall within the scope of the following treaties.

2.1 La Paz Accord

In 1983 in La Paz, Baja California Sur, Mexico, the *Agreement between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area,* commonly referred to as the *La Paz Accord* was signed. It established a framework for cooperation between the U.S. and Mexico to prevent and eliminate sources of air, water, and land pollution along the border. Work activities under the La Paz Accord are coordinated by EPA and SEMARNAP. The 1983 La Paz Accord defined the 2100 mile (3200 km) stretch of borderland and established the border zone within 62 miles (100 km) on either side of the U.S.-Mexico border.

EPA was established in 1970 as an independent agency of the Executive Branch of the U.S. Government for protecting and regulating use of the nation's land, air and water resources. EPA Water Programs operate under the Clean Water Act (CWA) and the Safe Water Drinking Act. Under Title II of the CWA, Congress authorized the appropriation of funds to plan, design, and construct municipal wastewater treatment plants in the U.S. Over the last several years, EPA has received appropriations for construction of water and wastewater infrastructure along the border. Initially, this funding was focused on projects developed with the assistance of the IBWC.

The Water Quality Act of 1987 constitutes the most comprehensive amendments to the Clean Water Act since its enactment in 1972. Among their many provisions, the 1987 Amendments authorized the State Revolving Loan program, along with a phase out the Construction Grants Program, to increase the sharing of the construction costs by local communities. However, in these Amendments, Congress also included a specific authorization dealing directly with border environmental issues in San Diego, California and Tijuana, Mexico border area. EPA's Construction Grants Program and its successor, the Clean Water State Revolving Fund (CWSRF) Program, have provided $67 billion in financial assistance to help communities improve local water quality, primarily by building or upgrading municipal wastewater treatment plants and sewer systems.

Section 510 of the Water Quality Act of 1987, as revised, provided EPA the authority for the construction of a 25 mgd secondary wastewater treatment facility in the amount of $239.4 million to serve the cities of San Diego and Tijuana.

More recently, a large portion of the border infrastructure construction funds has been placed in the Border Environmental Infrastructure Fund (BEIF). The North American Development Bank (NADBank) acts as EPA's agent for disbursement of BEIF funds as grants for needs that cannot otherwise be fully met by a combination of NADBank loans or Mexican government grants, State and local government or private sector resources.

SEMARNAP was created in 1994 to organize Mexico's environmental policies, programs and fiscal resources into a single federal agency, whose functions are similar to their U.S. counterpart. SEMARNAP has the responsibility to protect, conserve, regulate, and promote environmental resources in cooperation with State and Municipal authorities, other Federal agencies, and individuals to implement state environmental policies in accordance to the National Environmental Policy. SEMARNAP manages the Mexican federal funding support for environmental infrastructure through grant-type subsidies.

EPA designated its Office of Water and SEMARNAP designated its National Water Commission (CNA) to lead their respective agencies on water matters.

In 1993, the U.S. and Mexico announced an interim target of $700 million each in federal grants for planning, design, and construction of water and wastewater facilities over 7 to 10 years. The intent of this grant funding was to make projects affordable by using grants to augment debt capital.

2.2 NAFTA

Although primarily a trade agreement, the November 1993 North American Free Trade Agreement (NAFTA) was supplemented with specific environmental subagreements which provide border communities a greater role in determining and fulfilling their environmental protection needs. These provisions included the North American Agreement on Environment Cooperation (NAAEC), which is to be implemented by the Commission on Environment Cooperation (CEC), as well as the Border Environment Cooperation Commission and the North American Development Bank. CEC, BECC and NADBank are international organizations intended to implement certain environmental aspects of the agreement in communities on both sides of the border.

The BECC, located in Ciudad Juárez, Chihuahua, works with state and local governments to provide financial and technical assistance for development of projects dealing with water, wastewater, and municipal solid waste needs. BECC certification is required for a project to be eligible for financing from the NADBank, which arranges for public and private investment. Certification is based on a set of environmental, health, technical, financial, community participation and sustainable development criteria through a process that includes extensive public participation.

The NADBank, based in San Antonio, Texas, was created to serve as a financial partner and catalyst in financing construction of BECC- certified environmental infrastructure projects. NADBank's capital consists of $3 billion, contributed equally by the U.S. and Mexican governments.

NADBank functions as a financial broker, not only lending its own resources, but arranging loans and grants from others. NADBank administers EPA's Border Environment Infrastructure Fund (BEIF) as part of its duties to supplement its loan and guaranty programs. BEIF funds are to be used as a funding source last resort to make projects viable and affordable for border communities. Currently, each dollar of EPA's BEIF funding has leveraged more than two dollars from other sources.

2.3 Other Border Relationships

The International Boundary and Water Commission (IBWC), consisting of U.S. and Mexican Sections, has expanded binational cooperation under the La Paz Accord, having executed a series of subagreements under their enabling treaties for projects to protect the environment and public health along the border through construction and/or upgrades of water and wastewater infrastructure.

The George E. Brown U.S.-Mexico Foundation for Science (FUMEC) coordinates, promotes, follows up, and evaluates actions aimed at the improvement of scientific and educational cooperation between Mexico and the United States, complementing the tasks of other public and private academic and research institutions in both countries. Currently FUMEC is implementing a Training, Certification and Technical Assistance Program (SCCAT) for the management of water and wastewater projects along the Border area with an EPA funding of $3.5 million has been provided to FUMEC, of which $2.0 million was used to establish an endowment and $1.5 million for other purposes.

There are a total of ten border states which consist of four U.S. Border States (California, Arizona, New Mexico and Texas) and six Mexican States (Baja California, Sonora, Chihuahua, Coahuila, Nuevo León and Tamaulipas.

2.4 Major Data Sources

The surface water quality sampling data obtained for this report was provided by the U.S. Geological Survey (USGS), Texas Natural Resource Conservation Commission (TNRCC), International Boundary Water Commission (IBWC), New Mexico Environment Department (NMED), Arizona Department of Environmental Quality (ADEQ), City of San Diego, and the California Regional Water Quality Control Board (CRWQCB) San Diego Region.

The U.S.Center for Disease Control (CDC), Texas County Health Departments and the Pan American Health Organization (PAHO) provided the public health data cited in this report.

2.5 Public Health

The Center for Disease Control (CDC) maintains a database of waterborne disease occurrences that correlates the cause of waterborne disease with acute gastrointestinal illnesses. Agents which cause the highest incidence of infection are bacterial agents including Shigella, protozoan, including Entamoeba histolytica, and viruses including Hepatitis A. The selected waterborne diseases are reportable infectious illnesses with clear associations to contaminated water, primarily by fecal contamination.

2.5.1 Description of Illnesses

Amebiasis and Shigellosis both result in severe debilitating dysentery and prostration, whereas Hepatitis A symptoms are nausea, diarrhea, abdominal cramps, fever, and chills, and sometimes jaundice.

Entamoeba histolytica, the causative agent of amoebic dysentery or Amebiasis, is the only pathogenic amoeba found in the human intestine. E. histolytica is transmitted between humans through the ingestion of cysts. Some forms of amoebae can infect a person through skin contact with infected water, including swimming. These forms can also infect the blood, brain and spinal cord of a human. The more common severe dysentery can be recurrent.

Shigellosis is also known as bacillary dysentery, which produces an unusually virulent toxin. This illness is a clear indicator of lack of treatment facilities for human waste in the border region because the pathogenic bacilli reside only in the intestines of humans, apes, and monkeys. The Shigella bacteria proliferate to immense numbers in the small intestine, then they produce tissue destruction and scarring in the large intestine. The ulcerations in the intestinal mucus cause severe diarrhea with blood and mucus in the stools, and infected people can have as many as 20 bowel movements a day, resulting in dehydration. Health care (antibiotics and electrolyte replacement) is critical to avoid fatalities. Where good health care is not available, morbidity rates of those infected with the Shigella bacillus can approach 20 percent, with infants and young children especially vulnerable.

Hepatitis A has other modes of transmission in addition to water, which include transmission through contaminated food. Hepatitis A rates may decline through public health education programs that teach people sanitation before handling food. Therefore, declines in infectious disease rates may or may not be directly related to new wastewater treatment plants. However, these investments in public health education should, in time, directly improve public health. Hepatitis A typically enters the body orally, multiplies in the digestive tract, and spreads to the liver, kidneys, and spleen. The virus is found in the feces and is present in greatest numbers before symptoms are present. For this reason, a food handler responsible for spreading the Hepatitis A virus may not feel ill at the time. Additionally, the virus is capable of surviving outside the body for several days on surfaces such as cutting boards. Hepatitis A is resistant to chlorine at levels normally found in tap water used. Another common mode of transmission is in shellfish, especially raw shellfish.

The pathogen that causes Typhoid Fever is found only in the feces of human beings. The characteristics of high fever and constant headaches are followed by diarrhea. In severe cases, there can be perforation of the intestinal wall. The mortality rate in areas with good health care is only one to two percent, but left untreated, mortality can be as high as ten percent. Recovered patients can remain carriers and continue to transmit the infection indefinitely.

2.5.2 Remedial Progress

Even with the progress that has been and is being made, available public health data for the border area indicate high levels of Amebiasis, Shigellosis (amoebic dysentery), Hepatitis A, and other waterborne diseases that can be transmitted by use of, or contact with, untreated or poorly treated drinking water and wastewater. Disease rates are higher in the U.S. border area than in most other areas of the United States.

An outbreak of a disease on one side of the border threatens the other side because of migration of people across the border for a variety of reasons such as visiting family and friends, seeking employment, and/or conducting business on the other side. Therefore, there are some commonalities shown in the health data. Analysis of these data shows there is a demonstrated record of success in improving public health through the completion of wastewater infrastructure projects at the South Bay International Wastewater Treatment Plant (SBIWTP) as indicated on Figure 3-4 by a decrease in fecal coliform concentrations. Moreover, the waterborne disease rates for the San Diego County decreased with the exception of Typhoid Fever. There may be a relationship between the decrease of Amebiasis, Hepatitis A, and Typhoid Fever in the Nogales area and construction of the Nogales International Wastewater Treatment Plant. Generally the level of drinking water and wastewater treatment is less adequate as a general matter along the border compared with the rest of the U.S.

Table 2-1 indicates that the current incidence rates of disease are higher on the U.S.-Mexico border than the rest of the U.S.

Table 2-1. Comparison Between U.S.-Mexico Border And U.S.-Nationwide Waterborne Disease Rates (1998). (Incidences per 100,000 People)

Disease	US Border Rates	Mexican Border Rates	US Nationwide Rates
Amebiasis	1.4	798.8	1.4
Hepatitis A	37.1	50.1	12.6
Shigellosis	35.3	No Data Available	10.9
Typhoid Fever	0.4	36.1	0.2

Reference: Pan American Health Organization
website http://www.fep.paho.org/healthprofiles

3 The Watersheds of the Borderlands

3.1 Watershed Basins

The U.S.-Mexico border area is located within seven major surface watershed basins stretching from the Pacific Ocean to the Gulf of Mexico. Each, with one exception is a major water body and they are called the Pacific Coastal, New River, Gulf of California Coastal, Colorado River, Northwest Chihuahua, Rio Grande, and Gulf of Mexico Coastal Basins. From the water environment perspective, each basin is uniquely defined by its geography, hydrology, water quality, public health and existing water and wastewater infrastructure. A U.S.-Mexico Watershed Basins Map is shown on Fig. 3-2.

3.2 Population of the Borderlands

Communities within a watershed basin are interdependent, with the condition of the waters leaving one community potentially affecting the water supply of its neighbor. While the water protection standards set by the two governments for their communities may differ in their form, considerable work has been done by the regulatory agencies to make them complementary in their effect. The total border population is about 12.6 million and is expected to increase to about 21 million in the next two decades, based on estimates presented below. Fig 3-1 shows the population distribution by basin. Growth along the U.S.-Mexico border has increased concerns for environmental and public health issues, including the ability to provide water and wastewater infrastructure for its residents and visitors.

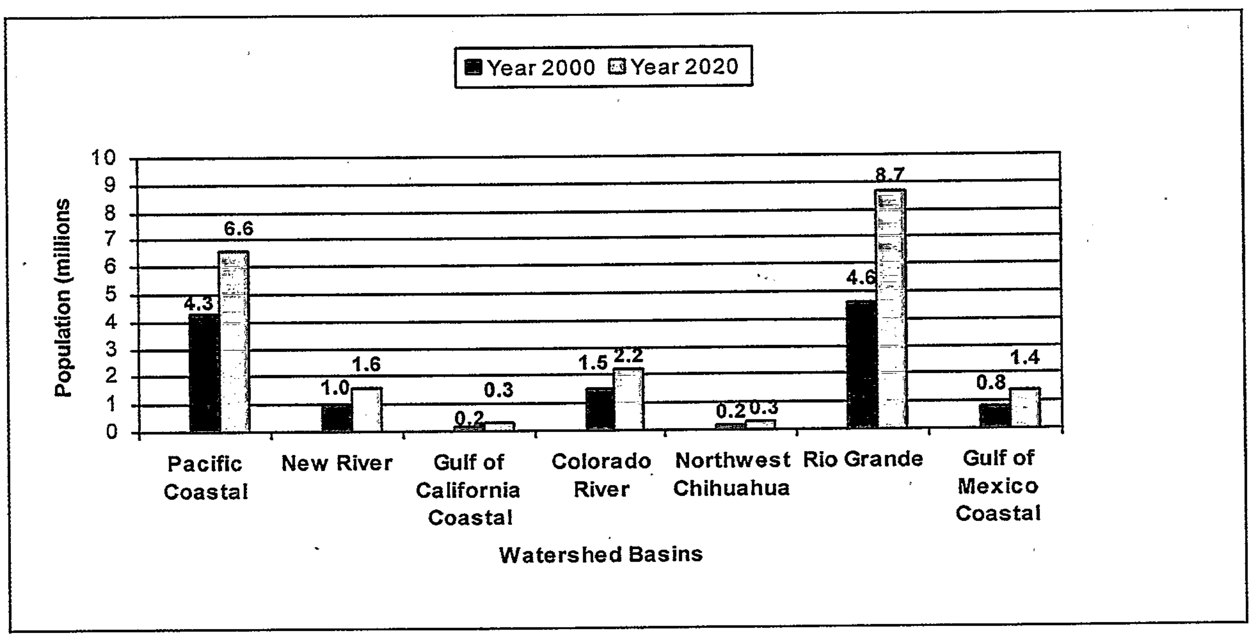

Figure 3-1. U.S-Mexico Border Population by Basin.

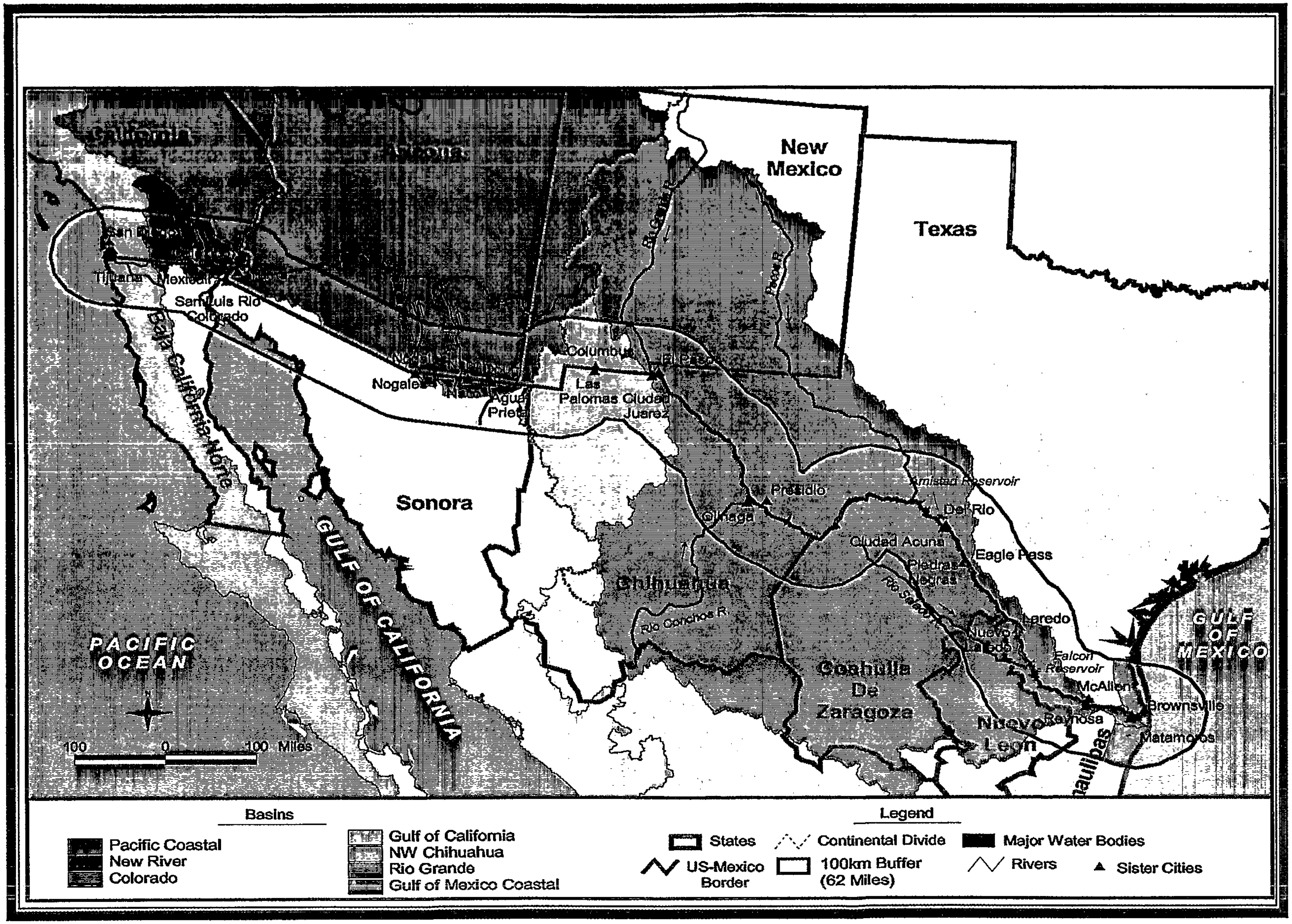

Figure 3-2. U.S.-Mexico Watershed Basins Map.

3.3 Pacific Coastal Basin

3.3.1 Geography

The Pacific Coastal Basin is located along the western coast of California and Baja California. More than 4 million people live here, primarily in the sister cities of San Diego and Tijuana. The basin, which is about 50 miles (80km) wide, extends from Lake Elsinore in Riverside County, California to the city of Ensenada, Baja California and includes the Peninsula and Sierra Juárez mountain ranges. A satellite image of this portion of the border area is shown in Fig.3-3.

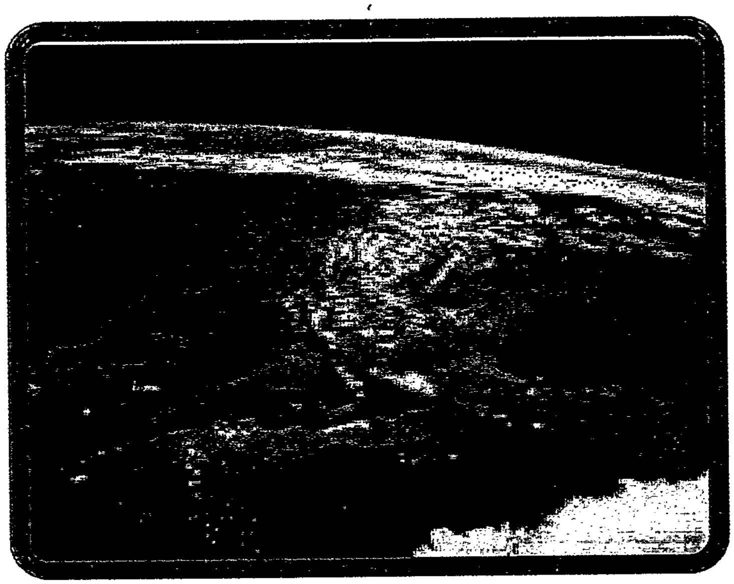

FIGURE 3-3. Satellite Image of partial US-Mexico border looking east of the Pacific Coastal Basin. Gulf of California shown center right .

3.3.2 Hydrology

The Pacific Coastal Basin drains approximately 7,650 square miles (19,800 sq. km), with about half of the drainage area in California and half in Baja California.

The basin has a very dry, semiarid climate with few fresh water sources. Flow in this basin is primarily from east to west, with stream flows originating from precipitation in the mountains flowing toward the Pacific Ocean. The flow in these streams is controlled through a series of hydraulic structures, including reservoirs. Most of these streams are not perennial because of severe drought conditions in the area. The Tijuana River, which drains 1,275 square miles of the basin, is one of the main streams in the basin and one of the City of Tijuana's major natural resources. The river flows northwest through the city of Tijuana before crossing into California near San Ysidro and then flowing into the Pacific Ocean.

3.3.3 Water Quality

One major water quality concern in the Pacific Coastal Basin focuses on fecal coliform and dissolved oxygen levels. Water quality monitoring stations for the Pacific Coastal Basin has been established along the Pacific Coast from Punta Bandera or near the San Antonio de los Buenos wastewater treatment plant outfall north to Carnation Street/Camp Surf at Imperial Beach and at the ocean outfall to the South Bay International Wastewater Treatment Plant (SBIWTP). Start-up of the SBIWTP with advanced primary treatment and discharge has decreased concentrations of fecal coliform bacteria in the Pacific Ocean as indicated in Fig. 3-5. Table 3-1 [Figure 3-4] shows that for receiving waters monitoring in the Pacific Coastal Basin, fecal coliform measurements along the shore remain extremely high, with concentrations consistently exceeding 200 colonies/100 ml. The IBWC and the State of California in its National Water Quality Inventory Section 305(b) Report and the City of San Diego have identified fecal coliform as a concern in the Tijuana River, indicating that more work needs to be done to control unregulated discharges to the river. Conditions at several of the water quality monitoring locations shown, exceed U.S. surface water quality standards.

Another water quality concern in the Pacific Coastal Basin results from soil erosion and sedimentation due to increases in population growth, urbanization, and unregulated development. Due to these conditions, the estuaries and wetlands have been reduced from 20 to 40 percent of their original area. The Tijuana River National Estuarine Research Reserve is the most important estuary in the Pacific Coastal Basin, and an erosion control program has been implemented to ameliorate these problems.

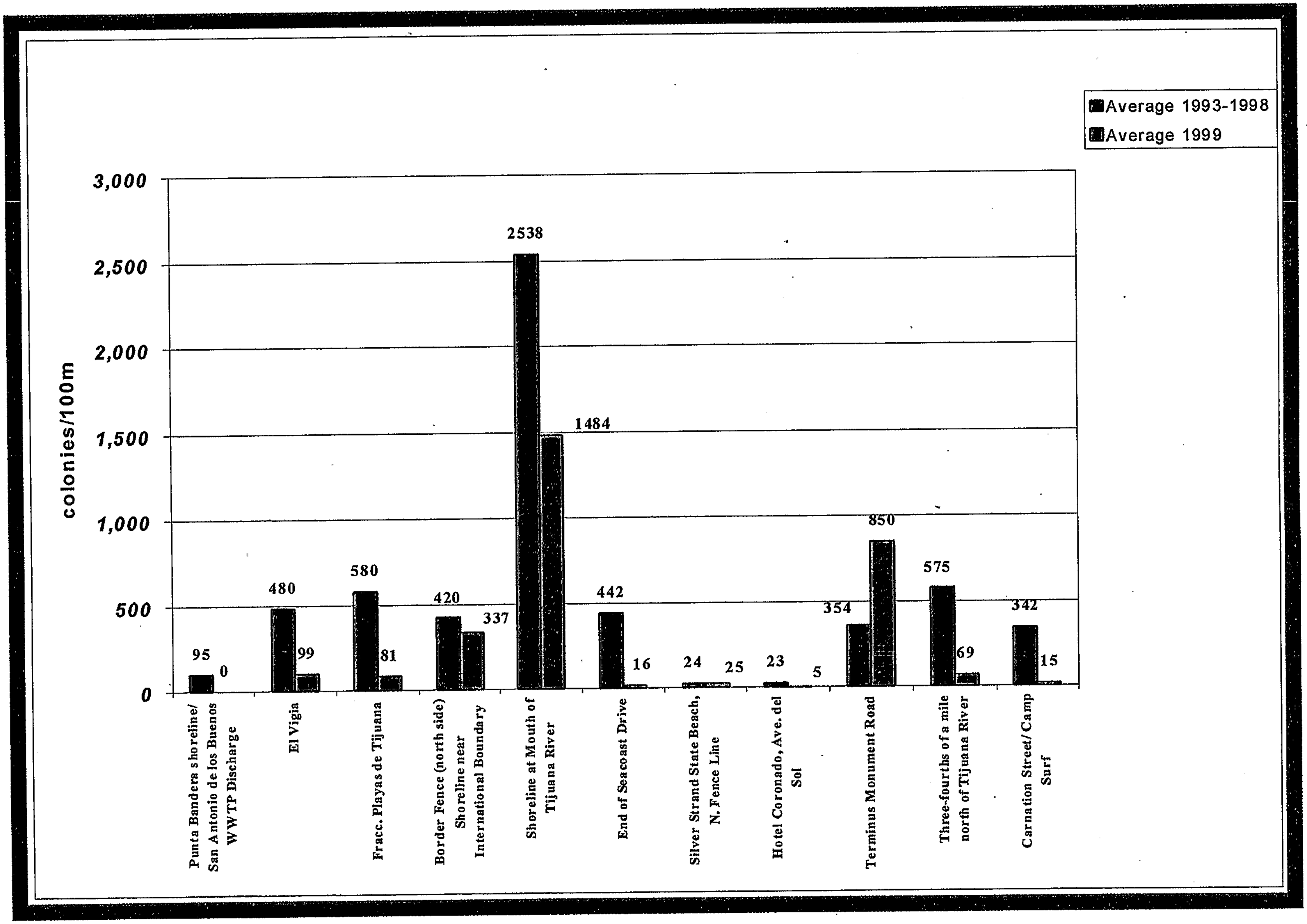

Figure 3-4. Average Fecal Coliform Concentration Before and After Start-Up of the International Wastewater Treatment Plant and Ocean Outfall.

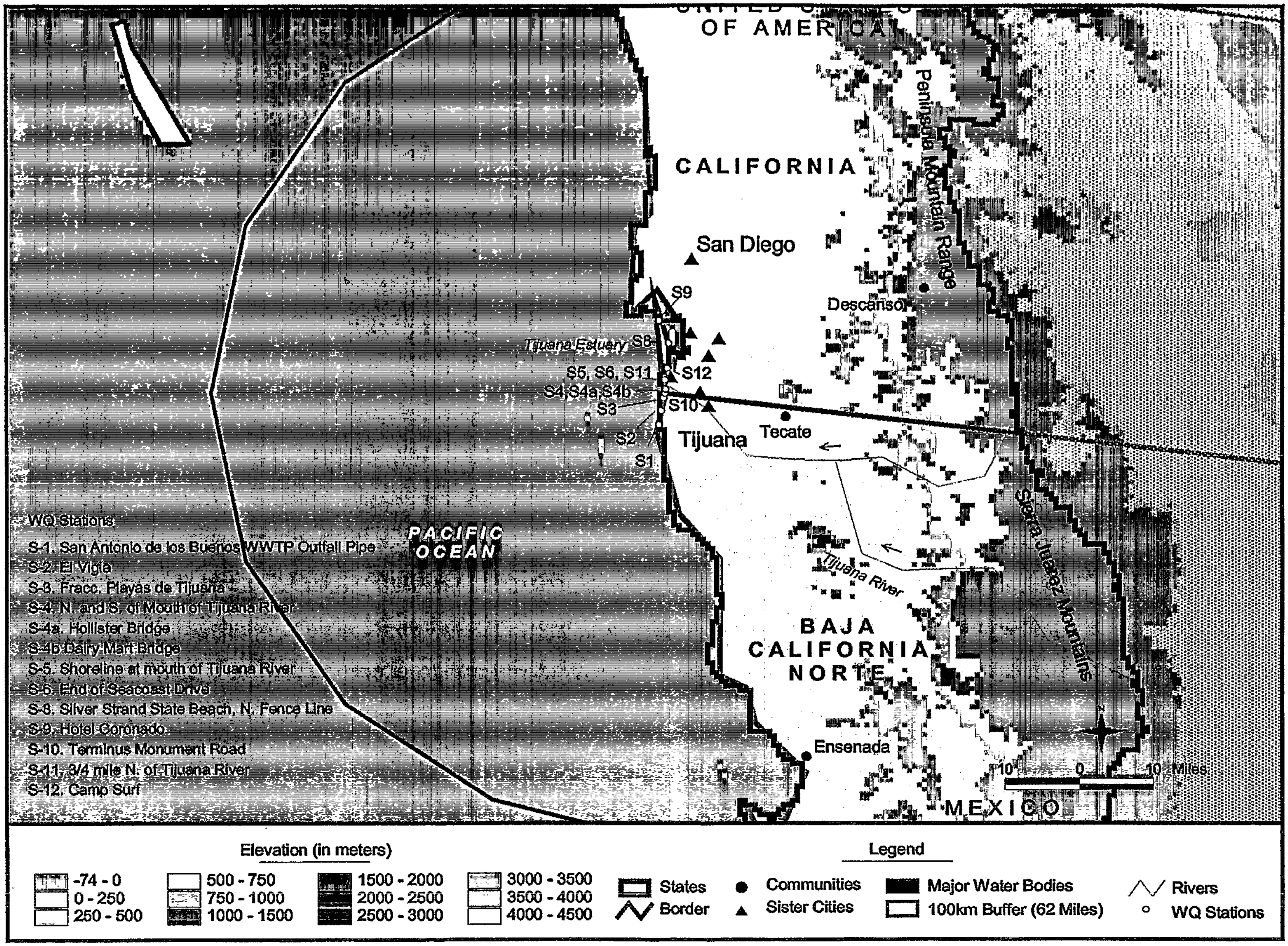

Figure 3-5. Pacific Coastal Basin with Water Quality Monitoring Stations

Table 3-1 Comparison of Surface Water Quality Standards with Sampling Data for the Pacific Coastal Basin.

Sampling Station Number	Water Quality Monitoring Locations	U.S. Standards		Sampling Data		
		Fecal Coliform Colonies /100ml	Dissolved Oxygen mg/l	Fecal Coliform Colonies/ 100ml Geometric Averages	Dissolved Oxygen mg/l Geometric Averages	Reporting Agency and Time Frame
S-1	San Antonio de los Buenos WWTP Outfall Pipe, MX	200	6. 0	96	No Data Available	IBWC 93-98
S-2	El Vigia, MX	200	6. 0	363	No Data Available	IBWC 93-98
S-3	Fracc. Playas de Tijuana, MX	200	6. 0	427	No Data Available	IBWC 93-98
S-4	North And South of Mouth of Tijuana River	200	6. 0	462	No Data Available	IBWC 93-98
S-5	Shoreline at mouth of Tijuana River,U.S.	200	6. 0	2319	No Data Available	IBWC 93-98
S-6	End of Seacoast Dr, U.S. side	200	6. 0	354	No Data Available	IBWC 93-98
S-7	Hollister Bridge, U.S. side	200	6. 0	440	No Data Available	San Diego 99-00
S-7a	Dairy Mart Bridge, U.S. side	200	6. 0	670	No Data Available	San Diego 99-00
S-8	Silver Strand State Beach, N. Fence Line	200	6. 0	25	No Data Available	IBWC 93-98
S-9	Hotel Coronado, U.S. side	200	6. 0	21	No Data Available	IBWC 93-98
S-10	Terminus Monument Road	200	6. 0	469	No Data Available	IBWC 93-98
S-11	3/4 mile north of Tijuana River	200	6. 0	471	No Data Available	IBWC 93-98
S-12	Camp Surf, U.S. side	200	6. 0	275	No Data Available	IBWC 93-98

3.3.4 Public Health Conditions

The health data presented in Table 3-2 are for the four major waterborne diseases which have a direct relation to the surface water quality. The analyzed periods are from 1988-1998 because these are the periods which represent increases and decreases which relates to the building of infrastructure facilities along the border.

Tijuana's disease rates are higher than in San Diego County; however, Tijuana's disease rates were lower than those of most other Mexican border communities, as indicated in Table 2-1.

Table 3-2. Reported Waterborne Diseases in the Pacific Coastal Basin (Incidences per 100,000 People)

Pacific Coastal Basin	Amebiasis			Hepatitis A			Shigellosis			Typhoid Fever		
	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg	1988	1998	% Chg.
U.S. Counties San Diego County	1.4	1	-29	24.3	15.8	-35	25.3	10.1	-60	0	0.3	----
Mexico Cities Tijuana	639.4	4875	662	43.9	113	157	11.0	107	873	10.5	36.0	243

Reference: Pan American Health Organization
website http://www.fep.paho.org/healthprofiles

3.3.5 Existing Water and Wastewater Infrastructure

Descanso, California. Water supply is provided from wells with a high iron and manganese content through an aging water distribution system. The community wastewater is currently treated by individual septic tanks.

Ensenada, Baja California. Water supply is provided from a surface impoundment and wells. The water distribution system covers over 98 percent of the city. Wastewater is collected from about 79 percent of the city and is treated by a 20 mgd oxidation ditch (EPA has not funded infrastructure in Ensenada).

San Diego, California. Water supply is obtained from the Colorado River and some independent wells which serve the entire county. Wastewater is collected and treated from most of the city and county by the Metropolitan Wastewater Department, with some jurisdictions providing for their own collection. The City treats its wastewater in its 140 mgd Point Loma advanced primary wastewater treatment plant with ocean discharge. San Diego is currently constructing additional wastewater treatment capacity. A water reclamation plant has been completed for the North City area.

Tecate, Baja California. Water supply is obtained from the Colorado River and local wells, serving about 95 percent of the city. Wastewater is collected from about 84 percent of the city and treated by trickling filters. The needs of the adjacent small community of Tecate, California are not known.

Tijuana, Baja California. Water supply is from a surface impoundment on the Tijuana River, augmented through an aqueduct from the Colorado River, and serves the entire city. Wastewater is collected from over 60 percent of the city and is treated at either the southerly San Antonio de los Buenos wastewater treatment plant or at the new South Bay International Wastewater Treatment Plant (SBIWTP) in the Tijuana River Valley, both with ocean discharge. The latter was funded in large part by EPA and the Mexican government. The SBIWTP and ocean outfall are shown on Figures 3-6, 3-7, 3-8, and 3-9. The SBIWTP is currently operating at the advanced primary level. The San Antonio plant and its influent pumping station are currently being rehabilitated with construction of a second influent pumping station underway, which was also funded by EPA.

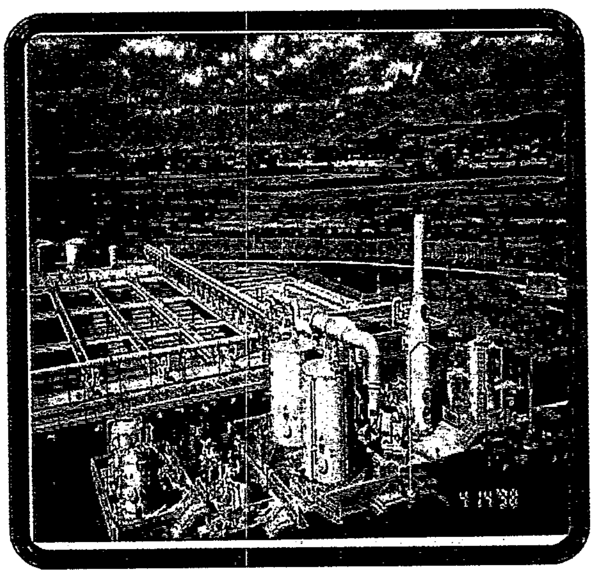

FIGURE 3-6. Completed Advanced Primary Wastewater Treatment Plant (IWTP) in San Diego, California

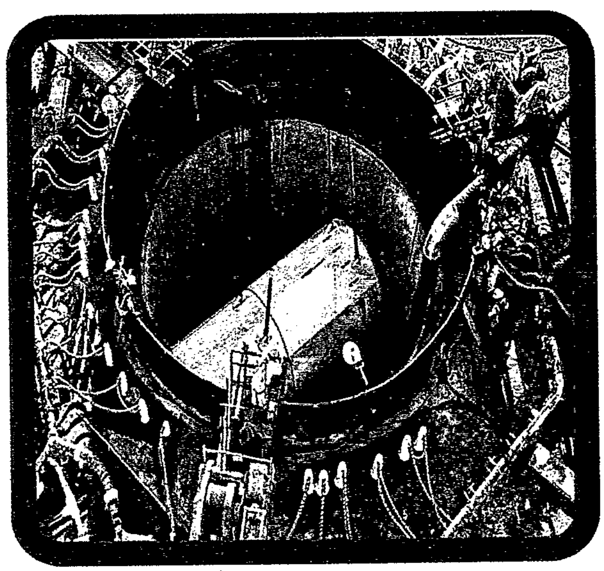

FIGURE 3-7. Construction of Ocean Outfall.

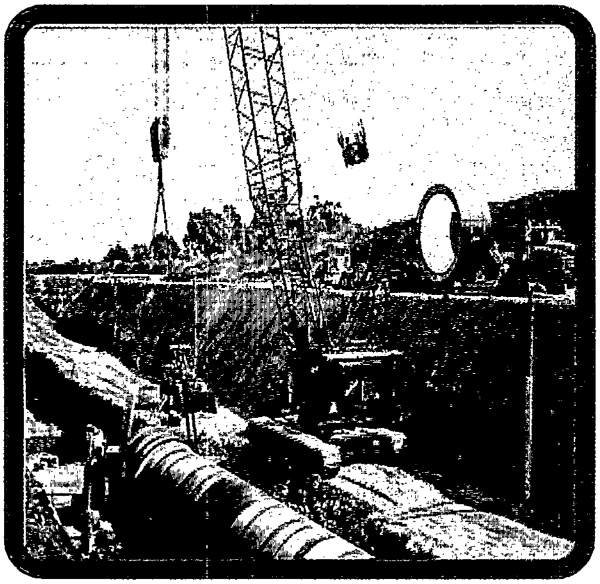

Figure 3-8. Installation of the 12 Foot Diameter Outfall for IWTP.

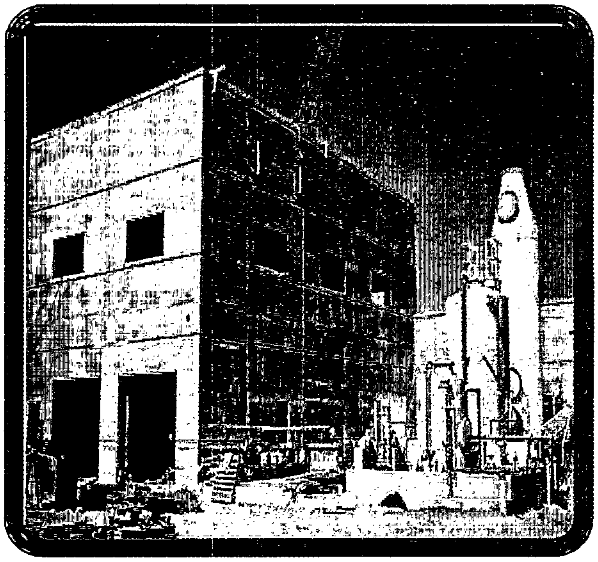

Figure 3-9 Construction of headworks and odor control building at the International Wastewater Treatment Plant.

3.4 New River Basin

3.4.1 Geography

The New River Basin extends north from the northeast section of Baja California to southeastern California, an area of approximately 7,500 square miles (19,425 sq. km). The basin is enclosed by the Chocolate and Santa Rosa mountain ranges that separate it from the Colorado River and Pacific Coastal Basins located to the east and the west, respectively. At the center of the basin is the flat, fertile Imperial/Mexicali Valley which contains the region's agricultural communities. There are several urban areas in the basin including the sister cities of Mexicali, Baja California, and Calexico, California. A satellite image in Figure 3-10 shows the New River Basin including the Imperial / Mexicali Valley with the Salton Sea in the foreground..

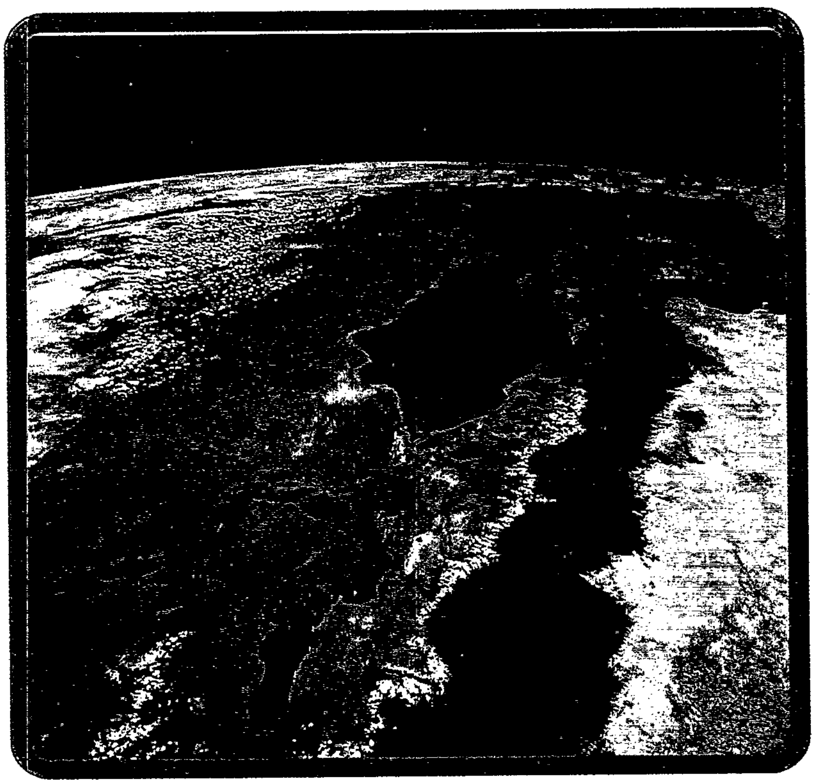

Figure 3-10. Satellite image looking south showing the New River Basin with the Salton Sea.

3.4.2 Hydrology

The primary water bodies in the New River Basin are the New and Alamo Rivers, which flow north from Mexico into a highly saline water body over 200 feet below sea level known as the Salton Sea. The Salton Sea was created in 1905 when the Colorado River breached an irrigation canal during severe floods and filled a natural depression between the Imperial and Coachella Valleys. The New River receives most of its flow in the U.S. from the All American Canal and in Mexico from the Alamo Canal. Figure 3-11 shows the Salton Sea at low water stage.

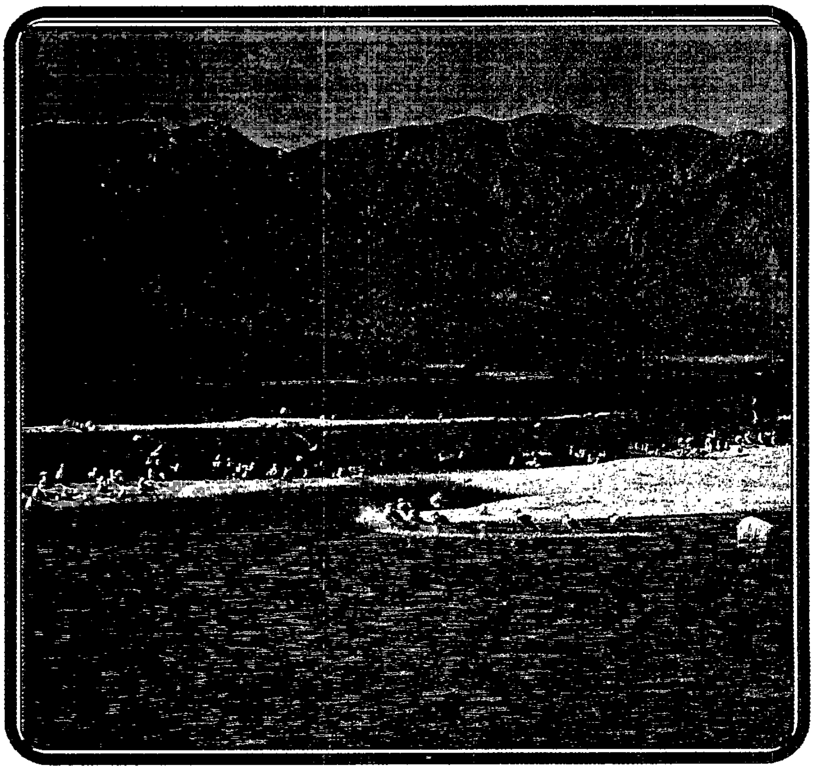

FIGURE 3-11. Salton Sea.

3.4.3 Water Quality

Currently, the New River is considered to be the most polluted water course in the United States. Since 1985, water quality samples have indicated water quality problems in the basin. The 1999 State of California National Water Quality Inventory Section 305(b) report identifies bacteria and sedimentation/siltation as two water quality concerns in the New River Basin.

High levels of fecal coliform bacteria indicate contamination by sewage. The current California water quality criterion for fecal coliform bacteria is 200 colonies/100 ml for waters used for contact recreation such as swimming or bathing. Fecal coliform concentrations are several orders of magnitude greater than this limit and average almost 461,665 colonies per 100 ml in the New River at the Border. Table 3-3 Figure 3-12 and contains sampling stations and data and applicable water quality criteria for various locations on the New River.

Table 3-3. Comparison of Surface Water Quality Standards with Sampling Data for the New River Basin.

Station Number	Water Quality Monitoring Stations	U.S. Standards		Sampling Data		
		Fecal Coliform Colonies /100ml	Dissolved Oxygen mg/l	Fecal Coliform Colonies /100ml Geometric Average	Dissolved Oxygen mg/l Geometric Average	Reporting Agency and Time Frame
1	Alamo River at Delta into Salton Sea	200	5.0	No Data	No Data	EPA
2	New River at outlet (into Salton Sea) near Westmorland, CA	200	5.0	No Data	No Data	USGS
3	Alamo River at Int. Border near Calipatria, Ca	200	5.0	35	5.8	USGS/CRWQCB 88-97
4	New River upstream of Discharge Canal at Mexicali	*30,000	No Data	461,665	No Data	IBWC 88-97 *Minute 264 US-Mexican 1944 Water Treaty.
5	New River at International Border	No Data	5.0	No Data	2.6	IBWC 88-97

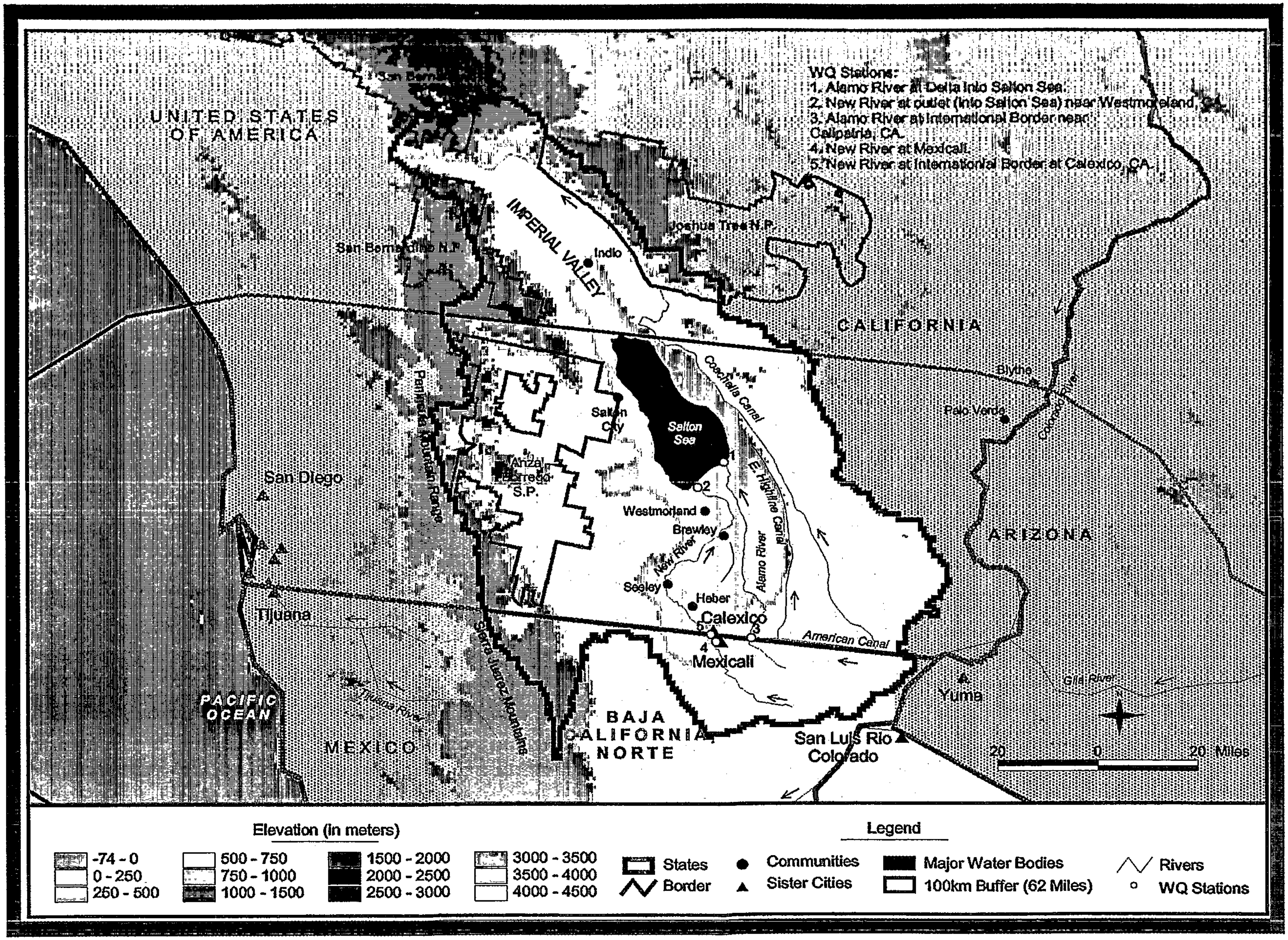

Figure 3-12. New River Basin Map with Water Quality Monitoring Stations

3.4.4 Public Health Conditions

While the New River Basin has some of the worst water quality conditions in the U.S., recent wastewater infrastructure investments in the basin, such as improvements to Mexicali's sanitary sewers, can be correlated with the 1988-1998 decline in Amebiasis, Shigellosis, and Hepatitis rates in Imperial County, California, as indicated in Table 3-4. No incidences were reported for Typhoid Fever.

Table 3-4.Reported Waterborne Diseases in the New River Basin (Incidences 100,000 People)

New River Basin	Amebiasis			Hepatitis a			Shigellosis			Typhoid Fever		
	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.
U.S. Counties												
Imperial County	1	0	-100	19	16	-16	63.7	13.2	-79	0	0	0
Mexican Cities												
Mexicali	544	1910	251	34.2	154	350	10.6	18	70	20.6	107	419

Reference: Pan American Health Organization website http://www.fep.paho.org/healthprofiles.

3.4.5 Existing Water and Wastewater Infrastructure

Blythe, California. Water supply is obtained from wells containing high concentrations of iron and manganese. The city provides for wastewater collection and treatment.

Brawley, California. The city operates a 1.7 mgd water treatment plant. The wastewater treatment plant consists of primary clarifiers, aerated lagoons and sludge digesters. EPA has provided funding for the water treatment plant.

Calexico, California. Water supply is obtained from the Colorado River and it is treated in a 10 mgd water treatment plant. Treatment of the wastewater is provided by a 2.1 mgd capacity plant. Both facilities are being expanded and EPA has provided funding for the water treatment plant.

Heber, California. The city has an existing water treatment plant with a capacity of 1.7 mgd. The water distribution system and wastewater collection system are being upgraded with funding participation from EPA.

Mexicali, Baja California. Water supply is obtained its from sources connected to the Colorado River. The water treatment plant serves 98 percent of the city. Wastewater collection and treatment is performed by stabilization ponds located in two service areas. The Mexicali I area is 96 percent sewered and Mexicali II is 80 percent sewered. The two systems treat almost 100 percent of the service area. EPA is participating in the funding of the improvements.

Palo Verde, California. Water is obtained from municipal wells. Wastewater is treated by individual septic tanks.

Salton, California. No information on water supply was provided. Wastewater is treated by stabilization/percolation ponds which are reported to produce high total dissolved solids in the groundwater.

Seeley, California. Water and wastewater infrastructure information was not provided.

Westmorland, California. Municipal water supply is obtained from Brawley, but there is no additional information about the distribution system. Wastewater is treated by stabilization ponds. EPA is participating in the funding of replacement of the existing wastewater treatment facility with an oxidation ditch facility.

3.5 Gulf of California Coastal Basin

3.5.1 Geography

The Gulf of California Coastal Basin, which has an area of approximately 5,800 square miles (15,000 sq. km) covering portions of the states of Baja California, Arizona, Sonora and Chihuahua as indicated on Fig. 3-13, consisting of horseshoe-shaped lowlands flanked by the Sierra Juarez and the Sierra San Pedro Martir mountain ranges to the west, and the Desierto de Altar (Sonoran Desert) and the Northwest Chihuahua highlands to the east. The Basin extends to the eastern part of Baja California and the north and northwest parts of Sonora. The principal communities in this basin are the cities of Caborca, Magdalena de Kino and Puerto Peñasco located in the State of Sonora in Mexico, Lukeville and Douglas in the State of Arizona.

3.5.2 Hydrology

The major surface waters in this basin are the lower Colorado River delta, and the Laguna Salada. From the north, the Colorado River flows into the basin through heavily urbanized areas near Yuma, Arizona, and San Luis Rio Colorado, Sonora and then through wetlands before flowing into the Gulf of California. At one time, the Colorado delta at the Gulf of California was a vast area of wetlands and salt flats that covered over 3,800 square miles (4,280 sq. km) and served as an important estuary. However, this delta region has been altered substantially by human activity. Most notably, upstream waters have been drawn off and diverted for municipal and industrial use, and for agricultural irrigation. Presently, there is little perennial flow in the lower Colorado River, most of the water that the delta receives coming from agricultural drainage from the U.S. and Mexico. In addition, smaller streams drain from the higher elevations to the east and west of the basin and then flow directly into the Gulf of California.

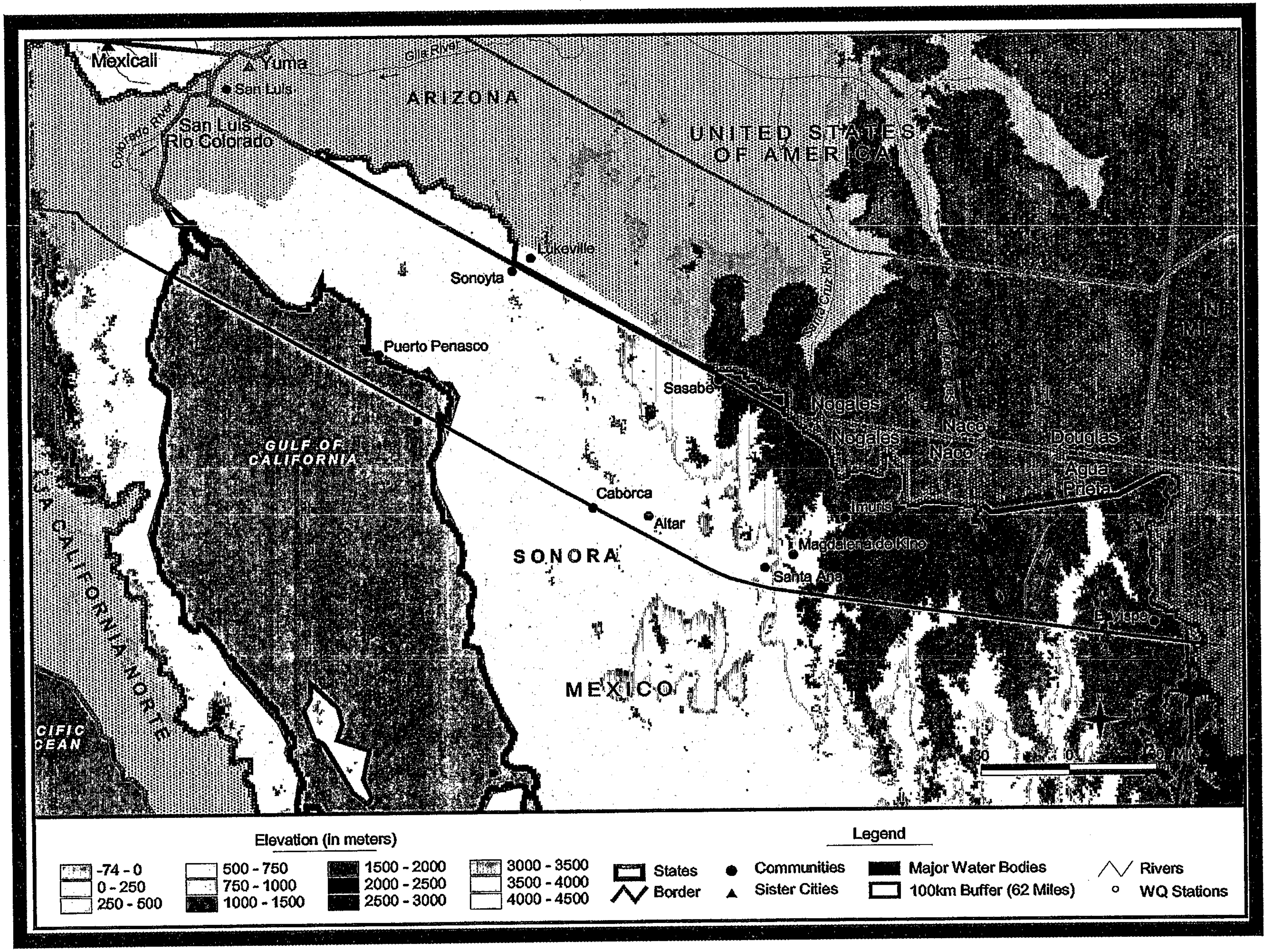

Figure 3-13. Gulf of California Coastal Basin Map.

3.5.3 Water Quality

Most of the water used for agricultural purposes flows back into the river, contributing to high salinity, solids, and nutrients from agricultural fertilizers. High salinity and solids levels in the Lower Colorado River are carried into the northern Gulf of California. No water quality data was available in this basin; no monitoring stations are shown on Fig. 3-13 Gulf of california Basin map.

3.5.4 Public Health Conditions

Public health data in the Gulf of California Basin within the State of Sonora, Mexico for the years 1999-2000 is included in Table 3-5. It encompassed the communities of Sonoyta, Puerto Peñasco, Caborca, Altar, Santa Ana, Magdalena de Kino, Imuris and Bavispe.

Table 3-5. Reported Waterborne Diseases in The Gulf of California Coastal Basin. (Incidences per 100,000 People)

Gulf of California Coastal Basin	Amebiasis			Hepatitis A			Shigellosis			Typhoid Fever		
Mexican States	1999	2000	% Chg.	199 9	2000	% Chg.	1999	2000	% Chg .	1999	2000	% Chg
Sonora	23,708	22,747	-4	196	86	-56	44	68	55	1	3	200

Reference: Pan American Health Organization
website http://www.fep.paho.org/healthprofiles.

3.5.5 Existing Water and Wastewater Infrastructure

Altar, Sonora. Water supply is obtained from seven wells which provide service for 92 percent of the service area and the remaining population is served by water trucks. The wastewater collection and an oxidation pond treatment system serves for about 70 percent of the service area.

Bavispe, Sonora. Water supply is obtained from seven wells providing service for 96 percent of the service area. Wastewater collection is provided for about 77 percent of the service area with wastewater treatment provided by a stabilization pond.

Caborca, Sonora. Water supply serves 97 percent of the city from 8 foot deep wells and a water treatment plant with chlorination facilities. The wastewater collection system covers 92 percent of the city with the remaining population served by septic tanks and privies. Wastewater is treated in a stabilization pond.

Imuris, Sonora. Water supply is obtained from wells serving about 96 percent of the service area. Sewer lines have been installed in about 75 percent of the community, but only 40 percent are connected. Wastewater treatment is achieved by oxidation ponds.

Magdalena de Kino, Sonora. Water supply is obtained from wells near the Magdalena River, with a water treatment facility providing chlorination. The water distribution system serves 98 percent of the city. The wastewater collection system covers 91 percent of the city and wastewater is treated by a stabilization pond system.

Puerto Peñasco, Sonora. Water supply is obtained from two well fields some distance from the city with significant infiltration of sand into the transmission piping. Wastewater is collected from 82 percent of the city, and is treated in an oxidation pond system.

Santa Ana, Sonora. Water supply is obtained from wells and treated in a water treatment plant. Water distribution serves 81 percent and wastewater collection covers 54 percent of the city. No information on wastewater treatment systems has been reported.

Sásabe, Sonora. Water is obtained from wells. There is no municipal wastewater collection or treatment. Cesspools, septic tanks and privies are widely used.

Sonoyta, Sonora. Water supply is drawn from wells. A wastewater collection and treatment system includes a stabilization pond. No information for nearby Lukeville, Arizona is available.

3.6 Colorado River Basin

3.6.1 Geography

The Colorado River Basin runs from the Rocky Mountains of northern Colorado for 1,200 miles (1,920 km) to the delta at the Gulf of California as indicated on Fig. 3-14. The river basin drains approximately 246,000 square miles (637,000 sq. km) which covers the states of Wyoming, Utah, Colorado, Nevada, California, New Mexico and Arizona. The sister city pairs for this basin are: Yuma, Arizona/San Luis Rio Colorado, Sonora; Nogales, Arizona/Nogales, Sonora; Douglas, Arizona/Agua Prieta; Sonora; and Naco, Arizona/Naco, Sonora.

3.6.2 Hydrology

The Colorado River Basin major waterways are the Colorado River, the Gila River, the Santa Cruz River, and the San Pedro River. The Santa Cruz River flow, which drains an area of 8,200 square miles (21,240 sq. km), originates in Arizona, flows south across the border through the urban areas of Nogales, Sonora, and Nogales, Arizona, crossing back into the U.S. flows north into the Gila. The San Pedro River flows north across the international boundary before flowing into the Gila.

The lower Colorado River is the main water supply source for much of the southwestern U.S., as well as for northern Baja California and northwestern Sonora. Current agreements on water usage allot 8.5 million acre-feet per year (105 trillion liters per year) of water to the lower Colorado basin of the U.S., and 1.5 million acre-feet per year (18.5 trillion liters per year) to Mexico. Several dams and reservoirs are used for water storage significantly altering the natural river flow and reducing it to an ephemeral stream.

The lower Gila River flows east to west across southern Arizona. The entire Gila watershed drains approximately 57,900 square miles before joining the Colorado River near Yuma; 8200 square miles of this watershed is within the lower Colorado River area. Most of the Gila River is ephemeral and flows only when it rains or when water is released from the dams.

3.6.3 Water Quality

Water quality problems in the lower Colorado River Basin are due to an increase in sediment, salinity, and fecal coliform concentrations. High salinity and solids concentrations in the river and its tributaries are thought to be caused in part by water diversion and reuse. Some communities in the basin discharge untreated or partially treated wastewater into the Colorado River and produce high fecal coliform concentrations in the basin.

According to the State of Arizona National Water Quality Inventory Section 305(b) reports, fecal coliform concentrations have been found to exceed both U.S. and Mexican Standards at several water quality monitoring stations as indicated in Table 3-6 [Figure 3-14]. For example, fecal coliform concentrations in the East Nogales Wash, which flows into the Santa Cruz River in Nogales, Arizona, has been extremely high, exceeding the State of Arizona and Mexican standards of 200 colonies/100 ml. Fecal coliform contamination in the Wash is thought to result from periodic overflows of the sewer system, which is old and overloaded.

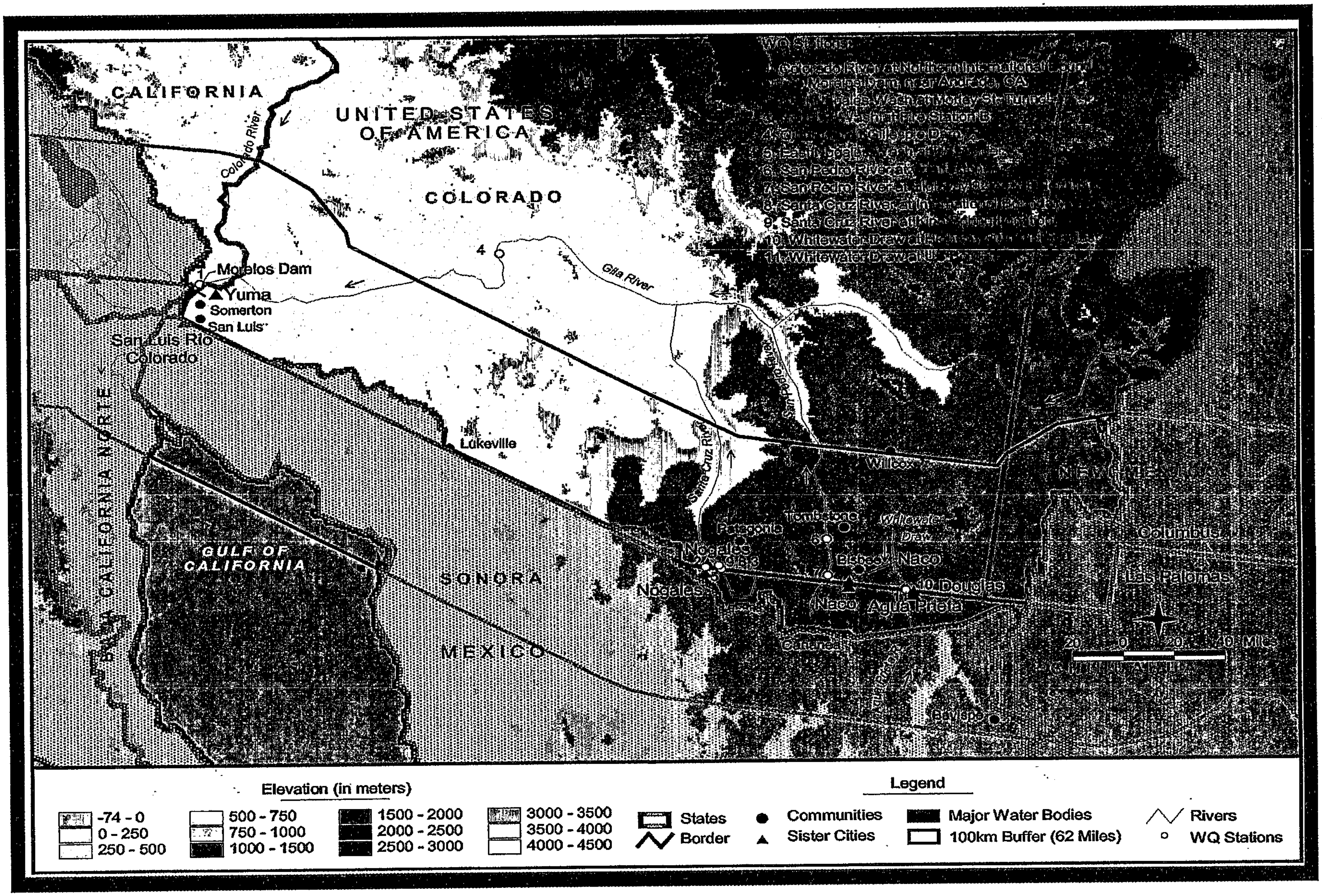

Figure 3-14. Colorado River Basin Map with Water Quality Monitoring Stations

Table 3-6. Comparison of Surface Water Quality Standards with Sampling Data For The Colorado River Basin

Station Number	Water Quality Monitoring Stations	U.S. Standards		Sampling Data		
		Fecal Coliform Colonies/ 100ml	Dissolved Oxygen mg/l	Fecal Coliform Colonies/100 ml Geometric Average	Dissolved Oxygen mg/l Geometric Average	Reporting Agencies and Time Frame
1	Colorado River at No. International Boundary above Morelos Dam	200	6.0	No Data	8.1	USBR 89-98
2	East Nogales Wash at Morley St	200	6.0	52,355	7.2	ADEQ 86-99
3	Nogales Wash at Fire Station	200	6.0	800	8.5	ADEQ 86-87
4	Gila River at Gillespie Dam	200	6.0	1296	76.8	USGS 88-97
5	East Nogales Wash at U.S. Border	200	6.0	No Data	No Data	ADEQ 86
6	San Pedro River at Charleston, AZ	200	6.0	688	89.0	USGS 88-93
7	San Pedro River at Highway 92 Palominas	200	6.0	323	8.1	ADEQ 88-99
8	Santa Cruz River at International Boundary	200	6.0	289	No Data	ADEQ 90-98
9	Santa Cruz River at Kino Spring location	200	6.0	No Data	6.5	ADEQ 86
10	Whitewater Draw at Highway 80	200	6.0	No Data	8.2	ADEQ 87-88
11	Whitewater Draw at U.S. Border	200	6.0	788	6.0	USGS 88-93

3.6.4 Public Health Conditions

Yuma, Pima, Santa Cruz and Cochise counties in Arizona had very high incidences of Hepatitis A, and Shigellosis. Table 3-7 contains incidences for this basin from 1988 to 1998. Hepatitis A decreased in Santa Cruz, Yuma and Cochise County , but increased in Pima County. Shigellosis decreased in all four counties, while there were no reported cases of Typhoid Fever.

In Mexico, gastrointestinal disease is prevalent in the Colorado River Basin, and it is one of the six leading causes of infant mortality in Nogales and Agua Prieta, Sonora. Public health data for San Luis Rio Colorado, Nogales, and Agua Prieta indicate that disease rates are higher there than in border counties in the U.S. Between 1988 and 1998, Hepatitis A rates for Nogales, Agua Prieta, and San Luis Rio Colorado decreased significantly. Amebiasis rates were also lower in all three cities. Typhoid fever rates decreased, but Shigellosis rates were not reported.

Table 3-7. Reported Waterborne Diseases in The Colorado River Basin (Incidences per 100,000 People)

Colorado River Basin	Amebiasis			Hepatitis A			Shigellosis			Typhoid Fever		
	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.
U.S. Counties												
Yuma, AZ	0	0	0	40.2	25.7	-36	25.8	6.0	-77	0	0	0
Pima, AZ	0.5	0.6	20	22.5	29	29	41.3	24.2	-41	0	0	0
Santa Cruz, AZ	3.7	18.4	397	74.4	42.0	-44	26.1	23.6	-10	0	0	0
Cochise County, AZ	0	9.0	---	74.8	17.8	-76	11.4	3.6	-68	0	0	0
Mexican Cities												
Nogales, SN	956	757	-21	54.4	5.0	-91	No Data	1.0	---	2.8	1.0	-64
Agua Prieta, SN	956	63.0	-93	54.4	5.0	-91	No Data	1.0	---	2.8	0	-100
San Luis Colorado, SN	787	318	-60	28.4	10.0	-65	No Data	5.0	---	8.4	0	-100

Reference. Pan American Health Organization website http://www.fep.paho.org/healthprofiles.

3.6.5 Existing Water and Wastewater Infrastructure

Agua Prieta, Sonora. Water supply is obtained from two water supply wells providing service to 95 percent of the population. Wastewater collection coverage is about 60 percent which is treated in an oxidation pond.

Bisbee, Arizona. Water is obtained from two wells. There is a municipal wastewater collection system and treatment is by two stabilization pond systems and one trickling filter at three separate locations.

Cananea, Sonora. Water supply is obtained from fourteen wells in El Rio and Ojo de Agua basins, serving 98 percent of the community. The system had been maintained by a mining company until the beginning of 1999. Municipal wastewater collection system serves about 98 percent of the population. Wastewater is treated by a stabilization pond facility.

Douglas, Arizona. Water supply is provided by two reservoirs with a combined capacity of 5 mgd. The city provides wastewater collection and treatment at a 2 mgd activated sludge plant

Naco, Sonora. Water supply is obtained from two wells with provisions for chlorination. The water distribution system provides service to about 98 percent of the town. Wastewater that is collected from about 91 percent of the service area is treated in two stabilization ponds. EPA is participating in the financing for an upgrade of the two-pond system.

Nogales, Arizona. Water supply is obtained from wells, one of which has been impacted by volatile organic compounds. The water distribution system covers the entire service area. Wastewater collection and treatment serves 85 percent of the population. Wastewater treatment is provided by a package plant and by the Nogales International Wastewater Treatment Plant which is owned jointly by the city of Nogales and the U.S. Section of the IBWC who also operates the facility.

Nogales, Sonora. Water supply is drawn from wells which serve 85 percent of the population. Wastewater collection serves 85 percent of the population. Wastewater is treated at the Nogales International Wastewater Treatment Plant through an agreement with IBWC.

Patagonia, Arizona. Water supply is obtained from wells. The city provides wastewater treatment. EPA is participating in the funding of improvements to the wastewater treatment facility.

San Luis, Arizona. Water supply is obtained from one well. The city provides for wastewater collection and treatment.

San Luis Rio Colorado, Sonora. Water supply is drawn from 17 wells with provision for chlorination. The water distribution system serves 97 percent of the community and water trucks provide for the remainder. The city currently does not have a wastewater treatment facility. Wastewater collectors serving about 35 percent of the population discharge directly into the Colorado River.

Somerton, Arizona. Municipal water supply is obtained from wells with disinfection and is treated for iron and manganese. Wastewater treatment is provided by three stabilization ponds.

Tombstone, Arizona. Municipal water supply is obtained from a reservoir and two wells which is then conveyed by a 26-mile long aqueduct to the city. Wastewater is treated at an oxidation ditch facility.

Willcox, Arizona has a municipal wastewater treatment plant. No information was provided on water supply.

Yuma, Arizona. Municipal water supply is drawn from wells and chlorinated providing service to 99 percent of the population, with the remainder being served by water trucks. Wastewater treatment for the city of Winterhaven, California, and a U.S. Marine Corps base is provided by a 20 mgd city plant. There are also several private wastewater treatment facilities in the city.

3.7 Northwest Chihuahua Basin

3.7.1 Geography

The Northwest Chihuahua Basin is a high plateau that extends across the continental divide both in the U.S. and Mexico, covering about 32,000 square miles (83,000 sq. km) in the States of New Mexico, Chihuahua and Sonora. Cities in the basin include Columbus, New Mexico, and Las Palomas, Ascension, Janos, and Nuevo Casas Grandes in the State of Chihuahua.

3.7.2 Hydrology

The Northwest Chihuahua Basin, unlike the other major basins that span the U.S.-Mexico Border has no perennial streams flowing across it. Very few perennial streams flow within the basin, which is considered to be hydrologically landlocked. During wet weather, some transboundary streams such as Wamels Draw flow for short periods; nevertheless, they do not flow out of the basin before they dry out and completely disappear. The basin's only reliable water source is groundwater. The four major groundwater aquifers are the Mimbres, Animas Valley, Playas Valley, and Nutt-Hockett. Fig. 3-15 shows a typical watershed.

FIGURE 3-15 . Typical watershed basin showing ridges and valleys in the Northwest Chihuahua Basin.

3.7.3 Water Quality

Since this basin exhibits the dry to semi-dry conditions as shown in Fig. 3-17 and there are no continually available surface water sources, the quality of water existing in this basin is critically important. When rains create ephemeral flows in dry streambeds, accumulated pollutants are washed downstream and may enter the groundwater aquifer. Because groundwater is the main water source in the basin, groundwater pollution is a major concern. Also, groundwater pumping currently exceeds the estimated replenishment rate. No water quality sampling has been done in this basin; so no monitoring stations are shown on Fig. 3-17, Northwest Chihuahua Basin map.

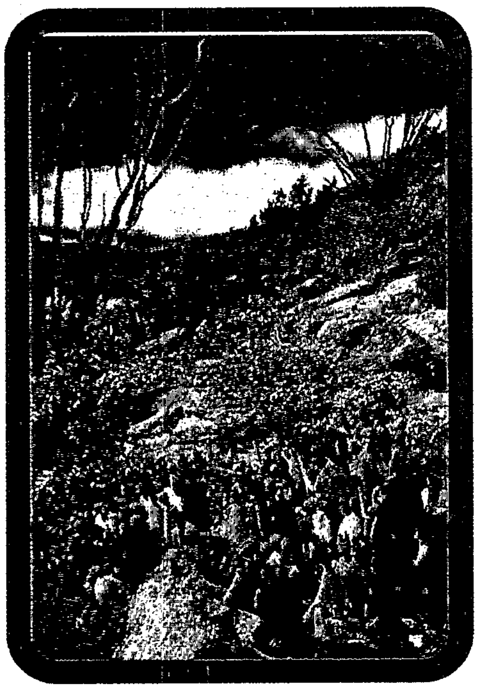

FIGURE 3-16. Typical semi-desert conditions in NW Chihuahua basin.

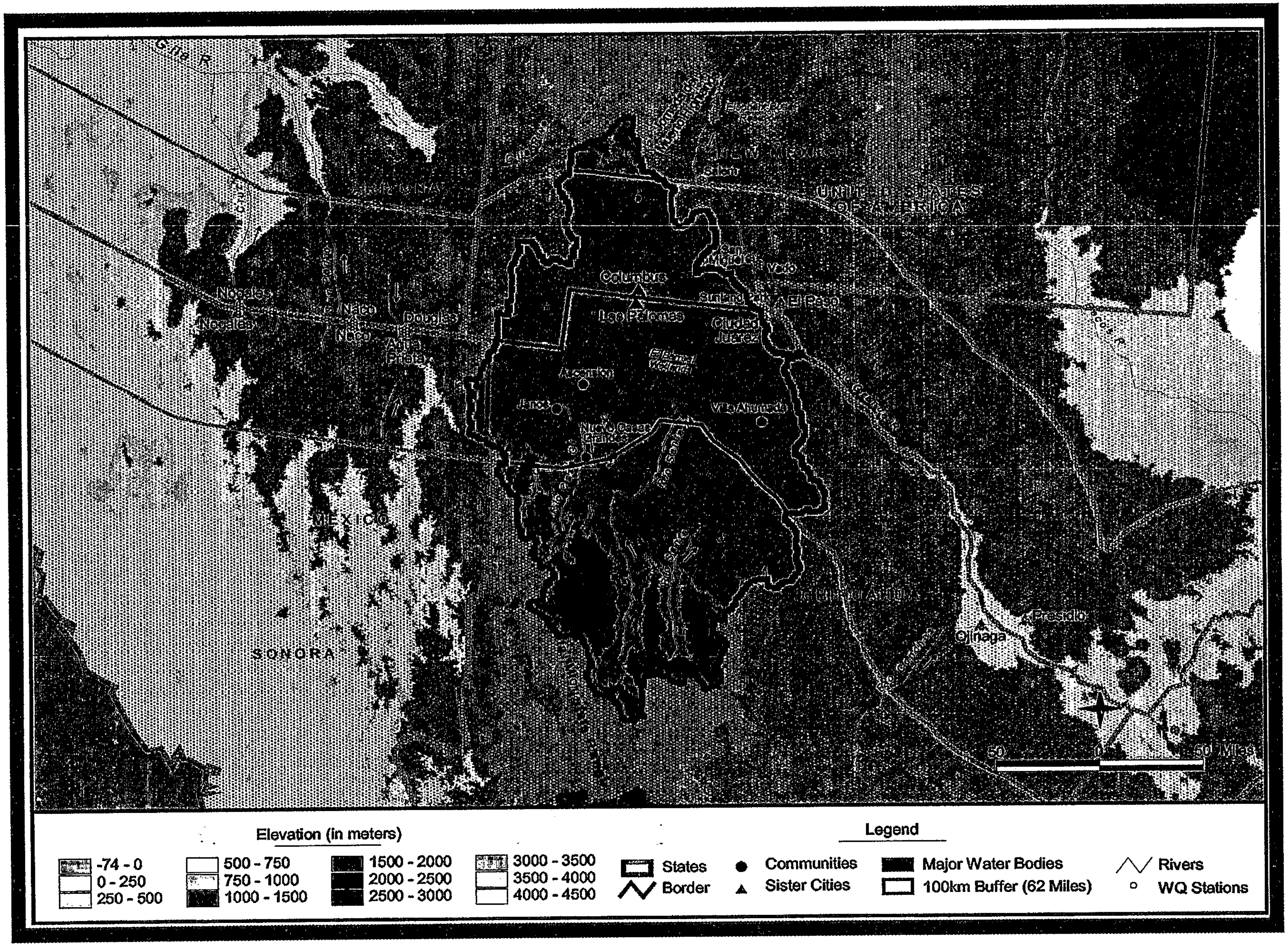

Figure 3-17. Northwest Chihuahua Basin Map.

3.7.4 Public Health Conditions

Available public health data for Luna, Doña Ana, and Hidalgo Counties in New Mexico indicate no reportable cases of Amebiasis, Hepatitis A, Shigellosis or Typhoid Fever in 1998 as indicated on Table 3-8. There were some reported cases of these diseases in 1988. No available data on incidence rates exist for the community of Las Palomas, Chihuahua.

Table 3-8. Reported Waterborne Diseases in the Northwest Chihuahua Basin (Incidences per 100,000 People)

Northwest Chihuahua Basin	Amebiasis			Hepatitis A			Shigellosis			Typhoid Fever		
	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.
U.S. Counties												
Luna	5.7	0	-100	0	0	0	17.0	0	-100	0	0	0
Doña Ana	0	0	0	15.4	0	-100	30.8	0	-100	0.7	0	-100
Hidalgo	0	0	0	0	0	0	0	0	0	0	0	0
Mexican Cities												
Las Palomas	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

Reference: Pan American Health Organization
website http://www.fep.paho.org/healthprofiles.

3.7.5 Existing Water and Wastewater Infrastructure

Ascension, Chihuahua. Water supply is obtained from five wells, serving about 83 percent of the community. Wastewater is collected from 44 percent of the community and discharged to an unlined treatment pond facility.

Columbus, New Mexico. Water supply is obtained from wells that serve the entire community. Wastewater treatment is provided by oxidation ponds serving the entire population.

Janos, Chihuahua. Water supply is obtained from three wells, only one of which is fully operational. Wastewater collection serves 25 percent of the community with an untreated discharge to the San Pedro River.

Nuevo Casas Grandes, Chihuahua. Water supply is obtained from wells serving about 97 percent of the community. Wastewater is collected from 41 percent of the population; no wastewater treatment available.

Las Palomas, Chihuahua. Water supply is obtained from wells with a high fluoride content. Municipal wastewater collection serves about 25 percent of the population; no wastewater treatment is provided.

Villa Ahumada, Chihuahua. Water supply serves about 98 percent of the population. Wastewater collection system serves about 38 percent of the community; no wastewater treatment is provided.

3.8 Rio Grande Basin

3.8.1 Geography

The Rio Grande Basin extends 1,896 miles (3,051 km) from the river's headwaters in the San Juan Mountains of southern Colorado to near its mouth in the Gulf of Mexico. (The Gulf of Mexico Coastal Basin covers the delta of the Rio Grande immediately adjacent to the Gulf of Mexico). The Rio Grande drains an area of approximately 182,215 square miles (471,937 sq. km) in the three U.S. States of Colorado, New Mexico and Texas and the five Mexican States of Chihuahua, Coahuila, Durango, Nuevo Leon and Tamaulipas. Mountain ranges dominate the landscape, and include the Sierra de la Ensenada and Huachuca Ranges. Major cities along the lower Rio Grande, which is a part of the U.S.-Mexico binational boundary include five sister city pairs, which are El Paso, TX/Ciudad Juarez,CH, Presidio,TX/Ojinaga, CH, Del Rio/Ciudad Acuña,CO, Eagle Pass,TX/Piedras Negras,CO and Laredo,TX/Nuevo Laredo,TM.

3.8.2 Hydrology

The primary water courses in the basin are the Rio Grande and its tributaries, including the Rios Conchos, Salado, and San Rodrigo in Mexico, and the Pecos and Devil's Rivers in Texas. On the main stream are the Amistad and the Falcon Reservoirs. The Rio Grande, which in Mexico is known as the Rio Bravo, defines the international boundary from El Paso, Texas/Ciudad Juaréz, Chihuahua, to its delta on the Gulf of Mexico.

Most flows in the upper Rio Grande Basin originate from precipitation in the Rocky Mountains. Flow contributions into the Rio Grande are from the Guadalupe, Davis, Santiago, and Sierra Madre Occidental mountain ranges of western Texas and northeast Chihuahua and Coahuila. A hydrographic feature of the region is the extent of control on the natural flow of the river including dams, reservoirs, canals and diversions for water supply and flood control. The water control structures have altered the river flow in the basin, and have made flow in the lower Rio Grande dependent on controlled releases and "return flows" back to the river from agricultural and other commercial water uses.

3.8.3 Water Quality

The Rio Grande is impacted by discharges from communities and industries along its banks and tributaries and by agricultural runoff as shown on Fig. 3-18. U.S. Colonia communities are located close to the river and to a public water supply or wastewater systems.

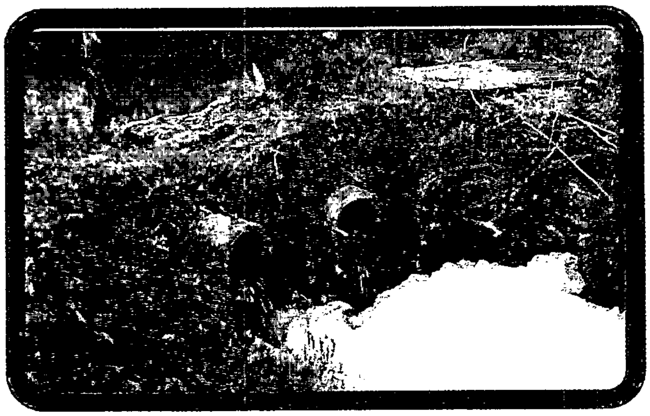

FIGURE 3-18. Sewage discharge to a waterway containing foaming detergents near Rio Grande.

Fecal coliform bacteria concentrations are a concern in all of the major urban centers. For instance, fecal coliform concentrations averaged 1,518 colonies/100 ml below Laredo/Nuevo Laredo, exceeding both Texas water quality standards and Mexican Standards of 200 colonies/100 ml for contact recreation water. As indicated on Table 3-9 most of the water quality monitoring stations shown on Figs. 3-19 and 3-20 met the minimum dissolved oxygen requirement of 5 mg/l.

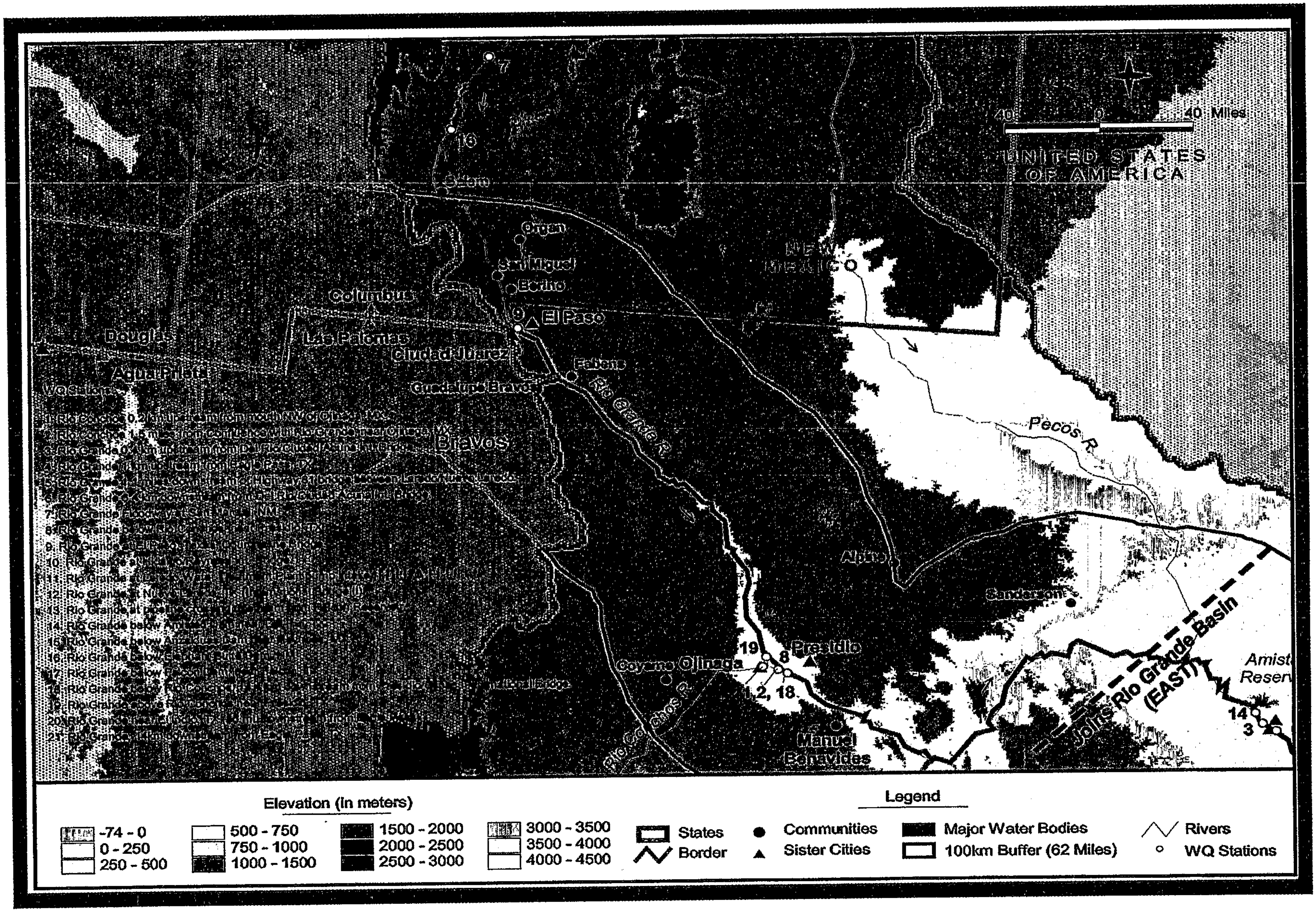

Figure 3-19. Rio Grande Basin Map with Water Quality Monitoring Stations (Northwest Section)

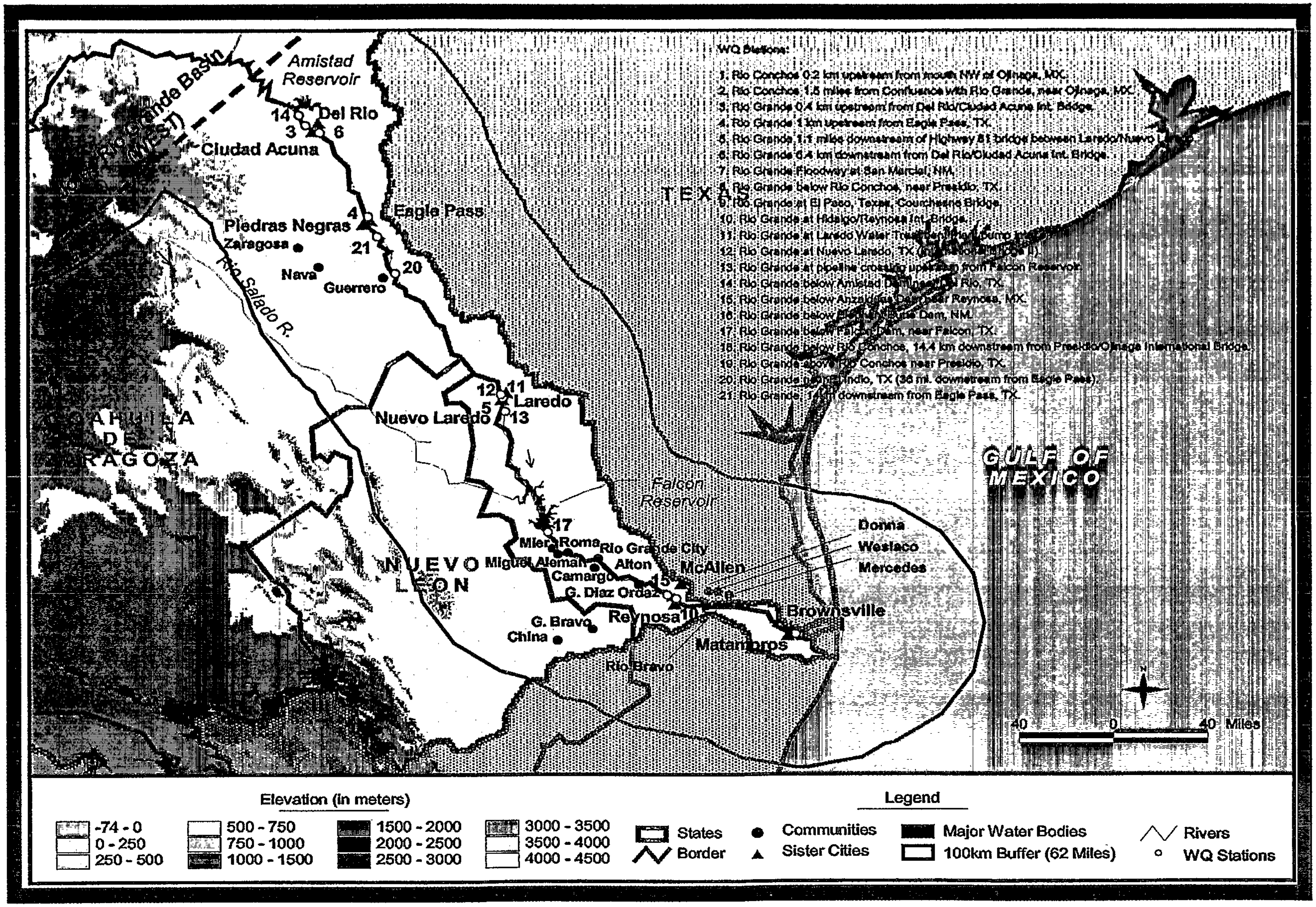

Figure 3-20. Rio Grande Basin Map with Water Quality Monitoring Stations (Southeast Section)

Table 3-9 Comparison of Surface Water Quality Standards with Sampling Data for the Rio Grande Basin

Station Numbers	Water Quality Monitoring Stations	U.S. Standards		Sampling Data		
		Fecal Coliform Colonies/ 100ml	Dissolved Oxygen mg/l	Fecal Coliform Colonies /100ml Geometric Average	Dissolved Oxygen mg/l Geometric Average	Reporting Agency and Time Frame
1	Rio Conchos 0.2 Km upstream from mouth NW of Ojinaga, Mexico	200	5.0	No Data	7.6	IBWC 92
2	Rio Conchos, 1.5 miles from confluence with Rio Grande, near Ojinaga, Mexico	200	5.0	No Data	ND	USGS
3	Rio Grande 0.4 km upstream from Del Rio/Ciudad Acuña International bridge	200	5.0	No Data	8.2	TNRCC 91-92
4	Rio Grande 1 km upstream of Eagle Pass	200	5.0	705	8.2	IBWC 93-98
5	Rio Grande 1.1 miles downstream of Highway 81 bridge between Laredo/Nuevo Laredo	200	5.0	1518	11.3	TNRCC 89-94
6	Rio Grande 6.4 Km below Del Rio/Ciudad Acuña International bridge	200	5.0	330	7.7	TNRCC 88-92
7	Rio Grande Floodway at San Marcia, NM	1000	6.0	576	9.2	USGS and NM WRD
8	Rio Grande below Rio Conchos near Presidio,TX.	200	5.0	No Data	11.7	TNRCC 92-98
9	Rio Grande at El Paso, TX Courchesne Bridge	200	5.0	No Data	8.0	USGS 92
11	Rio Grande at Laredo Water Treatment Plant pump intake	200	5.0	105	11.9	TNRCC 88-97

Table 3-9 Comparison of Surface Water Quality Standards with Sampling Data for the Rio Grande Basin

Station Numbers	Water Quality Monitoring Stations	U.S. Standards		Sampling Data		
		Fecal Coliform Colonies/ 100ml	Dissolved Oxygen mg/l	Fecal Coliform Colonies /100ml Geometric Average	Dissolved Oxygen mg/l Geometric Average	Reporting Agency and Time Frame
12	Rio Grande at Nuevo Laredo at International Bridge II	200	3.0	690	8.7	USGS 88
13	Rio Grande at pipeline crossing upstream from Falcon Reservoir	200	5.0	10,529.00	7.3	TNRCC USGS 88-98
14	Rio Grande below Amistad Dam near Del Rio, TX	200	5.0	No Data	6.3	USGS 93
15	Rio Grande below Anzalduas dam near Reynosa, MX	200	5.0	No Data	No Data	USGS 93
16	Rio Grande below Elephant Butte Dam, NM	1000	5.0	No Data	8.9	USGS 92 NMWRD
17	Rio Grande below Falcon dam Near Falcon, TX	200	5.0	No Data	69.0	USGS 99
18	Rio Grande below Rio Conchos, 14.4 km downstream of Presidio/Ojinaga International Bridge	200	5.0	235	No Data	TNRCC 88-98
19	Rio Grande below Rio Conchos near Presidio, TX	200	5.0	No Data	No Data	USGS
20	Rio Grande near El India, TX (36 miles down from Eagle Pass)	200	5.0	94	8.2	USGS 88-93
21	Rio Grande 14 Km down of Eagle Pass	200	5.0	623	7.9	TNRCC 88-9

Note: No water quality monitoring station 10 shown . Monitoring station is shown in the Gulf Coastal Basin

3.8.4 Public Health Conditions

The shared water resources of the Rio Grande and the migration of people across the U.S.-Mexico Border for personal or business purposes represent a major mode of cross-border disease transmission. The public health conditions in the Texas counties bordering the Rio Grande in 1988 and 1998 are indicated on Table 3-10.

Amebiasis rates on the U.S. side of the border have been almost insignificant over a 10 year period, while the Mexican side has increased at an astonishing rate.

Hepatitis A is also a problem in the border area. On the U.S. side of the border, incidence rates have generally increased over the 10 year period; however, on the Mexican side it has decreased. The 1988 rate of Hepatitis A in the border area was about three times the average U.S. rate.

Shigellosis has increased in the majority of the U.S. and Mexico border communities. It is interesting to note that El Paso had an increase of 63 percent and Ciudad Juaréz a 900 percent increase over a 10 year period.

Typhoid Fever in U.S. border communities has been almost eradicated, but Mexico border communities still have a higher incidence rate.

Table 3-10 Reported Waterborne Diseases in the Rio Grande Basin (Incidences per 100,000 people).

Rio Grande Basin	Amebiasis			Hepatitis A			Shigellosis			Typhoid Fever		
US Counties	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.
Brewster	0	0	0	23.1	123.7	436	0	11.2	---	0	0	0
El Paso	1.2	0	-92	43.2	18.2	-58	10.7	17.4	63	0	0	0
Hidalgo	0.8	0.2	-75	2.5	69.9	2696	9.9	41.9	323	0.2	0	-100
Hudspeth	0	0	0	0	30.8	---	0	30.8	---	0	0	0
Jeff Davis	0	0	0	53.4	0	-100	0	0	0	0	0	0
Kinney	0	0	0	0	0	0	34.8	0	-100	0	0	0
Maverick	2.8	0	-100	219.0	4.2	-98	16.9	22.9	36	0	0	0
Starr	2.6	1.8	-31	36.3	42.9	18	2.6	7.2	177	0	0	0
Terrell	0	0	0	0	0	0	0	0	0	0	0	0
Val Verde	0	0	0	2.5	11.4	356	2.5	45.6	1724	0	0	0
Webb	0	0	0	43.5	13.3	-69	29.2	8.5	-71	0.8	0	-100
Willacy	0	0	0	32.9	30.6	-7	0	30.6	---	0	0	0
Zapata	0	0	0	11.1	87	684	0	34.8	---	0	0	0
Mexican Cities												
Ciudad Juárez	315	1711	443	38.3	34	-11	1.5	15	900	1.5	225	14900
Ciudad Acuña	1478	2858	93	25.5	10	-61	4.9	36.0	635	9.7	9	-7
Piedras Negras	1318	1805	37	90.9	19	-79	0	78	---	86.7	35	-60
Sabinas Hidalgo	3091	No Data	---	93.7	No Data	---	87.8	No Data	---	70.3	No Data	No Data
Nuevo Laredo	1099	1248	14	55.7	44	-21	10.3	7.0	-32	18.7	337	1702
Reynosa	1370	3798	177	143	220	54	0	50	---	278.0	237	-15

Reference: Pan American Health Organization

website http://www.fep.paho.org/healthprofiles.

3.8.5 Existing Water and Wastewater Infrastructure

Alpine, Texas. Water supply is obtained from wells serving the entire population. The community has an existing wastewater treatment plant.

Alton, Texas. A municipal water, wastewater treatment, and a collection system serve the community. Improvements are being made with EPA funds.

Camargo, Tamaulipas. Water supply is obtained from the Rio Grande without treatment and from two wells with chlorination to supply over 96 percent of the city. Wastewater collection covers 60 percent of the city, but only 35 percent of the population is connected. Wastewater treatment is provided by a stabilization pond.

China/General Bravo, Nuevo Leon. Water supply is obtained from a surface impoundment with treatment; 75 percent of China and 96 percent of General Bravo are served. Wastewater collection serves 20 percent of China, but without treatment.

Ciudad Acuña, Coahuila. Water supply is obtained from the Rio Grande and treated. About 82 percent of the population is served by a water distribution system and the remainder of the population is served by water trucks. Wastewater is treated by an activated sludge system. Wastewater is collected from 60 percent of the city, the remainder served by septic tanks or cesspool systems. EPA has participated in funding these facilities and a system-needs study. Figs. 3-21 and 3-22 show the wastewater collection system under construction.

Figure 3-21. Sewer Installation in Ciudad Acuña, Coahuila, Mexico.

Figure 3-22 Sewer Inspection in Ciudad Acuña, Coahuila , Mexico

Ciudad Juárez, Chihuahua. Water supply is obtained from wells which supply the entire population. Two wastewater treatment plants, named North and South, have been completed and are in operation. Figs. 3-23 and 3-24 show portions of the wastewater treatment plant under construction. EPA has participated in funding of improvements to the wastewater collection system and one pump station in coordination with construction of the treatment plants.

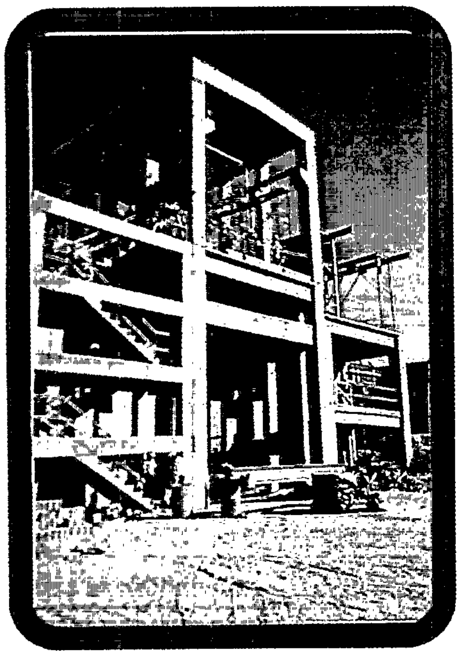

Figure 3-23. Pump Station under construction at Ciudad Juárez, Mexico.

Figure 3-24. Wastewater Treatment Plant at Ciudad Juárez, Chihuahua, Mexico.

Coyame, Chihuahua. Water supply is obtained from wells which serve about 90 percent of the community. Wastewater collection serves about 25 percent of the population; however, no treatment is provided.

Del Rio, Texas. Water supply is obtained from the San Felipe Springs. The city is served by a wastewater collection and treatment system. EPA has participated in the funding of treatment for the water supply and improvements to storage and distribution facilities.

Donna, Texas. Water supply is obtained from the Rio Grande and treated in a 4.5 mgd water treatment plant. The entire population and 20 Colonias are served. Wastewater treatment is provided in a 2.7 mgd activated sludge plant. EPA has participated in funding replacement of the city water treatment plant, as well as water supply and wastewater collection for the Colonias. Fig. 3-25 shows a colonia housing along the border .

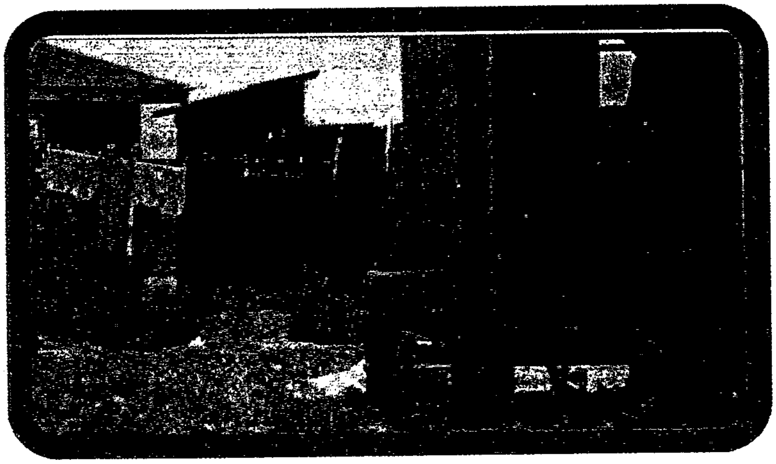

Figure 3-25. Colonia housing showing privy in the background.

Eagle Pass, Texas. The city has a water supply system and a request has been received from the nearby Colonia of Pueblo Nuevo for extending water service, wastewater collection and treatment.

El Paso, Texas. Water supply is obtained from several well fields and from the Rio Grande. The surface water is treated in a water treatment facility which serves the entire population, with additional treatment in the planning stage. Wastewater treatment is provided by four plants that serve the entire community, as well as Colonias located adjacent to the city. EPA has participated in the funding of planning and construction for water supply improvements for the city and the Colonias.

Fabens, Texas. Water supply is obtained from wells with a high iron and manganese content. No information was provided on wastewater treatment.

Gustavo Díaz Ordaz, Tamaulipas. Water is supplied to 97 percent of the city, the remainder of the population relying on shallow wells or water trucks for drinking water needs. Wastewater is collected from 30 percent of the city and treated in a stabilization pond, with the remainder using septic tanks and latrines.

Guadalupe Bravos, Chihuahua. Water supply is obtained from two wells, with a high total dissolved solids content. About 50 percent of the population is served by a wastewater collection system; however, no wastewater treatment is provided.

Laredo, Texas. Water supply is obtained from the Rio Grande and treated in two water treatment plants. Water is distributed to the entire city except to the Colonias, which are served by water trucks. Wastewater treatment is provided by five plants. A wastewater collection system serves the entire community. Colonias are served by septic tanks. Typical Colonias are shown in Figs. 3-26 and 3-27.

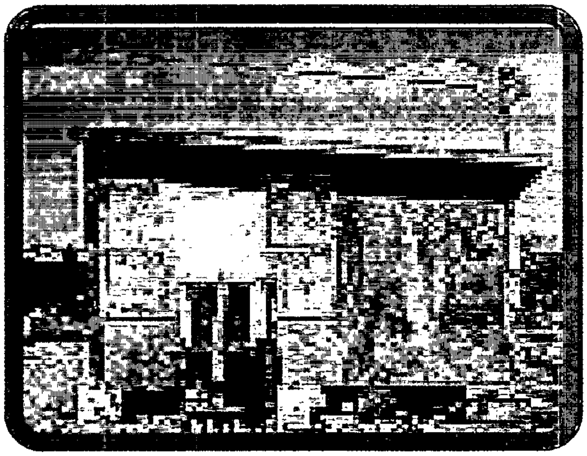

Figure 3-26. Colonia Housing along the border.

Figure 3-27 Typical U.S. Colonia..

Manuel Benavides, Chihuahua. Water distribution is to about 65 percent of the population. About 25 percent of the population is served by a wastewater collection system, but without treatment.

McAllen, Texas. Water supply is obtained from the Rio Grande and the entire population is served by the distribution system. Wastewater treatment is performed at two activated sludge plants having a total capacity of 16 mgd and a wastewater collection system that covers about 90 percent of the city.

Mercedes, Texas. Water supply is obtained from a well and the Rio Grande and treated. Water is distributed to the entire city. Wastewater treatment is provided by an activated sludge plant; wastewater collection covers 98 percent of the city. EPA has participated in the funding of water supply and wastewater system improvements.

Mier, Tamaulipas. Water supply is drawn from Rio Grande and treated. Water is distributed to 90 percent of the community. Wastewater treatment is provided by an activated sludge plant. Colonias outside the city are not served by the water and wastewater treatment systems.

Miguel Alemán, Tamaulipas. Water is obtained from the Rio Grande and treated with distribution to 90 percent of the service area. Wastewater is collected from 80 percent of the population and treated by stabilization ponds.

Nava, Coahuila. Water supply is obtained from twenty-one wells and distributed to 93 percent of the population. Wastewater is collected from about 27 percent of the service area, including Estación Rio Escondido and La Sauceda, but with no treatment.

Nueva Ciudad Guerrero, Tamaulipas. Water supply is drawn from Falcon Reservoir and distributed to about 90 percent of the population. Wastewater is collected from about 61 percent of the population and the treatment system is an Imhoff tank, which is currently out of service.

Nuevo Laredo, Tamaulipas. Water supply is obtained from the Rio Grande, treated by two plants and distributed to about 90 percent of the city. Wastewater is collected from about 85 percent of the population and treated by an activated sludge plant. EPA has participated in the funding of facilities and a system-needs study.

Ojinaga, Chihuahua. Water supply is obtained from six wells and distributed to 98 percent of the population. Wastewater is collected from 55 per cent of the population and treated in an oxidation pond facility.

Piedras Negras, Coahuila. Water supply is obtained from the Rio Grande and treated. Wastewater is collected from the entire city and treatment is provided in a stabilization pond. EPA has participated in the funding of facilities and a system-needs study.

Presidio, Texas. The city has a municipal water supply and distribution system. Wastewater is collected and pumped to stabilization ponds for treatment.

Reynosa, Tamaulipas. Water supply is obtained from the Rio Grande, treated by two water treatment plants and distributed to approximately 93 percent of the city. Wastewater is collected from 70 percent of the population and treated, but there are two untreated discharge points. EPA has participated in the funding of some facilities and a needs study, as well as the construction of improvements to the wastewater treatment and collection system.

Rio Bravo, Tamaulipas. Water is obtained from the Rio Grande and treated. Distribution is to about 95 percent of the community. Wastewater collection serves 50 percent of the population and treatment is provided by an activated sludge plant. Nearby Colonias are not served.

Rio Grande, Texas. The city has a municipal water supply, treatment and distribution system, as well as a wastewater collection and treatment system.

Roma, Texas. Water supply is drawn from the Rio Grande, with 1.5 mgd of treatment capacity. Wastewater is collected from about 25 percent of the population and treated at an activated sludge plant. EPA is participating in funding of a new wastewater treatment plant and of water distribution and wastewater collection for Colonias.

Sanderson, Texas. Water is supplied to the entire community. Wastewater is treated in septic tanks and cesspools.

Weslaco, Texas. No information was provided on the water supply. Wastewater treatment exists, but further information was not provided.

Zaragoza, Coahuila. Water supply is obtained from eight wells, treated and distributed to 86 percent of the population. There is no wastewater treatment, although collection covers 75 percent of the community and 41 percent is served.

3.9 Gulf of Mexico Coastal Basin

3.9.1 Geography

The Gulf of Mexico Coastal basin is defined as the delta area between Brownsville and Matamoros and the coastline along these two cities which drains directly into the Gulf of Mexico.

The major cities are Matamoros and Valle Hermoso in Tamaulipas, Mexico, and Brownsville, Texas, as shown in Fig 3-27.

3.92 Hydrology

The Rio Grande in the Gulf of Mexico Coastal Basin widens into a flood plain area near the sister cities of Brownsville, Texas, and Matamoros, Tamaulipas. The river flows through wetlands, salt marshes and open waters until it finally reaches the Laguna Madre and drains into the Gulf of Mexico

3.9.3 Water Quality

Water quality in the Gulf of Mexico Coastal Basin is impacted by increasing population growth, urbanization, and industrialization, which will place a high demand on the water resources available in the basin.

High concentrations of solids and other substances are related to industrial pollution; bacteriological contamination is due to raw or partially treated sewage discharges. As indicated in Table 3-11, fecal coliform concentrations in Brownsville below El Jardin Pumping Station exceeded Texas water quality criteria of 200 colonies/100 ml for contact recreation, as well as Mexican standards.

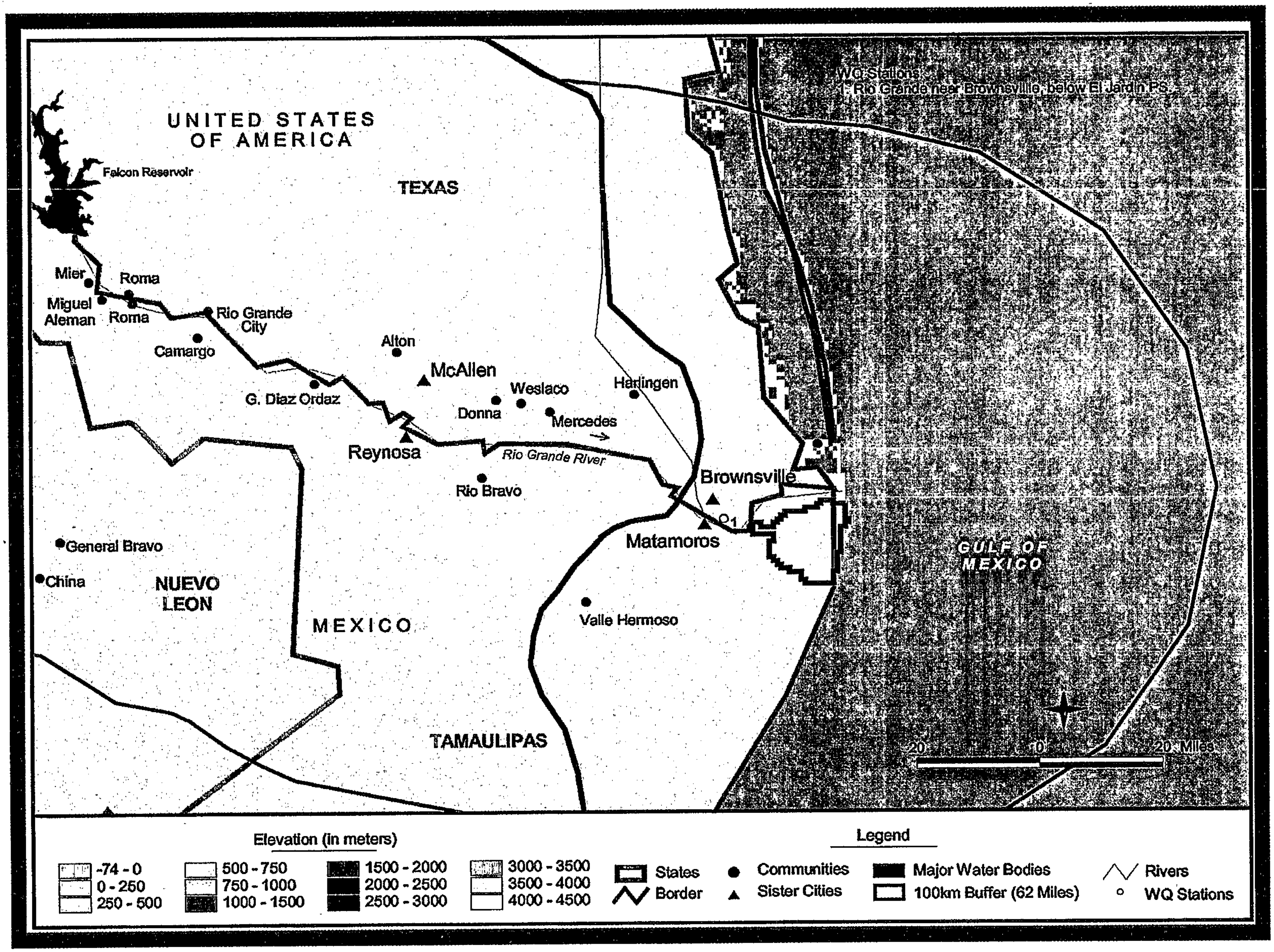

FIGURE 3.27. Gulf of Mexico Coastal Basin Map With Water Quality Monitoring Stations

Table 3-11 Comparison of Surface Water Quality Standards with Sampling Data for Gulf of Mexico Coastal Basin.

Station Numbers	Water Quality Monitoring Stations	U.S. Standard		Sampling Data		
		Fecal Coliform colonies/ 100ml	Dissolved Oxygen mg/l	Fecal Coliform colonies/ 100ml Geometric Average	Dissolved Oxygen mg/l Geometric Average	Reporting Agencies and Time Frame
1	Rio Grande near Brownsville below Jardin Pumping Station	200	5.0	1574	7.70	USGS 88-95

3.9.4 Public Health Conditions

Incidence rates in 1988 and 1998 for Amebiasis, Hepatitis, Shigellosis and Typhoid Fever for Cameron County, Texas and Matamoros, Tamaulipas are indicated on Table 3-12 below.

Table 3-12 Reported Waterborne Diseases in the Gulf of Mexico Coastal Basin (Incidences per 100,000 people)

Gulf of Mexico Coastal Basin	Amebiasis			Hepatitis A			Shigellosis			Typhoid Fever		
	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.	1988	1998	% Chg.
U.S. Counties												
Cameron County,TX	14.2	6.1	-57	22.8	66.5	1916	19.7	41	108	0.8	0.6	-25
Mexican Cities												
Matamoros, TM	1029	2477	141	50	332	564	16.1	24	49	22	40	82

Reference: Pan American Health Organization
website http://www.fep.paho.org/healthprofiles.

3.9.5 Existing Water and Wastewater Infrastructure

Brownsville, Texas. Water supply is obtained from the Rio Grande, treated in two water treatment plants and distributed to the entire city. Wastewater is collected and treated by two activated sludge plants with a total capacity of 22.8 mgd. EPA has participated in the funding of planning for water supply improvements.

Matamoros, Tamaulipas. Water supply is obtained from the Rio Grande, treated in four water treatment plants with about 32 mgd total capacity and distributed to 90 percent of the city. Wastewater is conveyed untreated in open channels through the Laguna Madre to the Gulf of Mexico. Collector sewers serve 85 percent of the city. EPA has participated in funding some facilities and system-needs study.

Valle Hermoso, Tamaulipas. Water supply is obtained from the Rio Grande, treated and distributed to approximately 98 percent of the city. Wastewater is conveyed by open channels through agricultural fields and the Laguna Madre to the Gulf of Mexico. Wastewater is collected from 55 percent of the city, but no treatment is provided. The remaining wastewater is treated by septic tanks or latrines.

4 Current Water and Wastewater Infrastructure Needs

While many U.S.-Mexico border communities are currently addressing their water and wastewater infrastructure needs, there is still much work to be done in order to provide adequate human health and environmental protection. Water supply and wastewater treatment infrastructure in the border area, as is the case elsewhere, varies from community to community. There are systems which have capacity to serve essentially the entire populace and those without significant public systems, in which case individual homes and commercial/industrial facilities in the community have made their own provision for service. Financial supplements to limited local budgets are necessary to expedite the resource-intensive building, expansion or rehabilitation of water treatment plants, water distribution networks, wastewater treatment plants and sewer systems.

The needs are not only for the people now living in the border area, but to keep up with the growth of the communities. For that reason, the current needs have been estimated for two different time frames. The Near-term needs are those that the communities have identified as essential to provide or maintain adequate service for the populace today. Long-term needs are those that, while they should be started as soon as possible, are based on the commonly used public works planning period of 20 years to provide for the additional burden of maintaining service into the future.

Near-term needs descriptions and projections for these endeavors have been taken from individual community profiles developed at the BECC by the Project Managers, under the direction of the Technical Director, who are in direct contact with local government officials. In some cases, the Near-term needs are not in the profiles. Because these profiles generally reflect a known deficiency or potential health or environmental hazard, the near-term is considered the time frame within which municipal officials can implement a project development process. That is, the Near-term needs estimate represents a two to three year time frame within which it is reasonable to expect a community to complete its program, but many can be expected to be completed sooner and others will undoubtedly require a longer period to reach completion. Projects which have been certified by the BECC, are being readied for construction and have already identified financing are not included as Near-term needs in the tables 4-1 thru 4-7.

Long-term water and wastewater infrastructure needs have been estimated from the projected Year 2020 populations of the watersheds and generally consist of substantial rehabilitation of the existing systems where available as well as addition of capacity to provide for population growth. The 20-year planning horizon is common in long-range public works management plans, but many factors would affect the actual pace of development used in the long-range estimates. Allowance has been made for the value of portions of existing facilities that should remain serviceable in 20 years, mitigated by the cost of rehabilitation to include them in upgrades where possible.

The EPA Drinking Water Needs Survey and Clean Water Needs Survey cost curves were used to calculate the Year 2020 needs for water supply filtration plants and distribution lines and wastewater treatment plants and collection systems respectively. Development of impoundments, reservoirs and aqueducts are not included in the estimates for water supply. Wastewater treatment facility estimates are based on stabilization pond technology unless there is an existing plant utilizing another technology. The long-term estimates are for service to the entire estimated population of the community and, for wastewater treatment, attainment of secondary treatment. Within each watershed, extension of the needs identified in the profiles have been supplemented with estimates based on the population of areas outside of identified communities.

4.1 Pacific Coastal Basin

Descanso, California. Improvements to the municipal water supply and treatment system include the replacement of obsolete water distribution lines, construction of a new storage tank and installation of filtration units at the three water supply wells. A municipal wastewater treatment plant and collection system might be expected to be constructed in the future.

Ensenada, Baja California. Improvements to the water and wastewater systems may include the possibility of water reuse.

Tecate, Baja California. Water distribution system and wastewater collection system may expand to the entire city as well as upgrading of the existing wastewater treatment plant.

Tijuana, Baja California. A significant portion of the wastewater collection system is in need of replacement.

San Diego County, California. Other near-term needs include improvements to the water supply system in the Sweetwater District.

Table 4-1 Near-and Long-term Needs in the Pacific Coastal Basin

Community	Year 2000 Population	Year 2020 Population	Near-term Capital Cost ($millions)	Long-term Capital Cost ($millions)
Descanso, CA	900	1,100	2	2
Ensenada, BC	325,000	617,300	10	145
San Diego, CA	1,248,200	1,496,900	0	127
Tecate, BC	74,500	134,300	9	46
Tijuana, BC	1,260,100	2,676,700	7	402
Unincorporated and Other Areas of San Diego County, CA	1,421,900	1,693,000	93	103
Total	4,330,600	6,619,300	121	825

4.2 New River Basin

Blythe, California. The community is considering a centralized water production and treatment facility. Water mains are envisioned to serve the nearby areas of Ripley and Mesa Verde.

Brawley, California. The community has received a notice of non-compliance from the California Regional Water Resources Control Board mandating the upgrade and expansion of its existing wastewater treatment plant. The city is also considering replacement of water supply piping for additional capacity and improvements to the wastewater collection system and pumping stations.

Calexico, California. The community is expanding the existing water and wastewater treatment plants.

Heber, California. The community expects to complete improvements to and expand the existing water treatment plant and wastewater collection system.

Mexicali, Baja California. The community needs to identify, evaluate and select alternatives for wastewater treatment using natural systems for four communities in the Mexicali Valley. The feasibility for water reuse could be included in the evaluation.

Palo Verde, California. The community needs to develop a wastewater facility plan for possible construction of a wastewater collection system and treatment plant to replace individual septic tanks.

Salton, California. The community is considering rehabilitation of its wastewater collection system and replacement of its wastewater treatment plant.

Seeley, California. The community needs to evaluate its water supply and wastewater systems.

Westmorland, California. The community is to complete a replacement of its wastewater treatment plant.

Table 4-2 Near and Long-term Needs in the New River Basin.

Community	Year 2000 Population	Year 2020 Population	Near-term Capital Cost ($millions)	Long-term Capital Cost ($millions)
Blythe, CA	14,200	26,700	12	15
Brawley, CA	24,000	44,900	14	18
Calexico, CA	28,500	53,500	0	32
Heber, CA	3,600	6,700	0	4
Mexicali, BC	794,400	1,233,000	4	85
Palo Verde, CA	13,900	26,100	2	20
Salton, CA	500	1,000	3	2
Seeley, CA	500	900	6	2
Westmorland, CA	1,900	3,500	0	3
Unincorporated and other Areas of Imperial County, CA	91,700	171,900	No Data	27
Total	973,200	1,568,200	41	208

4.3 Gulf of California Coastal Basin

Altar, Sonora. The community needs to expand its water distribution system to serve the balance of the city, provide chlorination, refurbish all water supply production wells and expand the delivery system to adjacent areas. It also needs to expand the wastewater collection system to provide citywide service and to expand and rehabilitate the existing oxidation pond.

Bavispe, Sonora. The community needs to upgrade or replace its water supply production wells and its water distribution facilities, expand its wastewater collection system and provide additional treatment capacity.

Caborca, Sonora. The community needs to rehabilitate its public water distribution system.

Imuris, Sonora. The community needs to rehabilitate and upgrade its water supply production wells and expand the water distribution system, rehabilitate or replace the wastewater collection lines and upgrade the wastewater treatment plant.

Magdalena de Kino, Sonora. The community needs to improve its water and wastewater systems.

Puerto Peñasco, Sonora. The community has short-term needs to improve its water system, expand and rehabilitate its wastewater system. This will require the expansion of the wastewater collection system, the wastewater treatment plant and the water distribution system.

Santa Ana, Sonora. The community needs to construct a wastewater treatment plant, expand the wastewater collection system and make improvements to the potable water system.

Sásabe, Sonora. The community needs to construct a wastewater collection and treatment system.

Sonoyta, Sonora. The community needs to make improvements to the public water supply system and to the wastewater collection and treatment facilities, including rehabilitation and expansion. Lukeville, Arizona, is an adjacent small community of less than 100 people and its needs estimates are included with those of Sonoyta.

Table 4-3 Near and Long-term Needs in the Gulf of California Coastal Basin

Community	Year 2000 Population	Year 2020 Population	Near-Term Capital Cost ($Millions)	Long-Term Capital Cost ($Millions)
Altar, SN	7,900	11,500	No Data	7
Bavispe, SN	2,000	3,500	1	4
Caborca, SN	70,900	100,800	No Data	45
Imuris, SN	12,400	22,200	1	17
Magdalena de Kino, SN	42,900	76,500	5	30
Puerto Peñasco, SN	39,500	49,900	12	21
Santa Ana, SN	13,400	23,900	4	20
Sásabe, SN	1,400	2,500	1	3
Sonoyta, SN/Lukeville, AZ	16,500	29,500	2	15
Total	206,900	320,300	26	162

4.4 Colorado River Basin

Agua Prieta, Sonora. The community needs rehabilitation of its water distribution system, expansion of its water storage capacity and expansion of both the wastewater collection system and treatment plant.

Bisbee, Arizona. The community needs improvements to the wastewater collection system including correction of excessive inflow and infiltration in two areas and treatment facilities.

Cananea, Sonora. The community needs to create a public water utility, install water meters, increase water storage capacity, expand water distribution and wastewater collection systems and rehabilitate its wastewater treatment facilities.

Douglas, Arizona. The community needs to upgrade its water supply and wastewater systems.

Naco, Arizona/Sonora. Additional needs information for this community was not made available.

Nogales, Arizona. The community needs to upgrade its water distribution system, wastewater collection system and its share of the international wastewater treatment plant.

Nogales, Sonora. The community needs to upgrade municipal water supply and distribution, wastewater collection and its share of the international wastewater treatment plant.

Patagonia, Arizona. The community needs to upgrade its wastewater treatment plant because of upcoming revision of effluent limits and to rehabilitate its wastewater collection system to reduce excessive inflow and infiltration.

San Luis, Arizona. The community needs to increase its water supply and storage capacity as well as rehabilitate its wastewater collection system.

San Luis Rio Colorado, Sonora. The community needs to provide a wastewater treatment plant, expand its wastewater collection system and upgrade its water system.

Somerton, Arizona. The community needs additional wastewater treatment plant capacity as well as replacement of undersized and deteriorating asbestos cement water mains and obsolete water meters.

Tombstone, Arizona. The community needs improvements to its water supply and distribution system, expansion of the wastewater collection system and upgrading of its wastewater treatment plant.

Willcox, Arizona. The community needs to upgrade its wastewater treatment plant.

Yuma, Arizona. The community needs to extend its water distribution and wastewater collection systems.

Table 4-4 Near- and Long-term Needs in the Colorado River Basin.

Community	Year 2000 Population	Year 2020 Population	Near-term Capital Cost ($millions)	Long-term Capital Cost ($million)
Agua Prieta, SN	76,400	198,400	3	73
Bisbee, AZ	6,400	8,500	10	4
Cananea, SN	31,900	44,000	3	16
Douglas, AZ	15,500	20,600	10	6
Naco, AZ/SN	6,300	8,500	No Data	4
Nogales, AZ/SN	183,500	337,400	55	82
Patagonia, AZ	1,000	1,700	2	2
San Luis, AZ	14,100	19,500	2	7
San Luis Rio Colorado, SN	157,300	272,400	17	92
Somerton, AZ	7,300	10,100	3	4
Tombstone, AZ	1,500	2,000	5	2
Willcox, AZ	3,800	5,000	2	3
Yuma, AZ	63,800	88,200	72	21
Unincorporated and Other Areas of Cochise County, AZ	71,900	95,500	No Data	19
Unincorporated and Other Areas of Pima County, AZ	743,500	980,200	No Data	75
Unincorporated and Other Areas of Santa Cruz County, AZ	19,400	32,300	No Data	10
Unincorporated and Other Areas of Yuma County, AZ	60,000	83,000	No Data	18
Total	1,463,600	2,207,300	184	438

4.5 Northwest Chihuahua Basin

Ascensión, Chihuahua. The community needs to upgrade or replace its water distribution and storage system, expand its wastewater collection system and provide for wastewater treatment facilities.

Columbus, New Mexico. The community needs minor improvements at its municipal wells and completion of the third phase of its wastewater treatment plant.

Janos, Chihuahua. The community needs to rehabilitate and upgrade the municipal wells and water distribution system and to provide a wastewater treatment plant.

Nuevo Casa Grandes, Chihuahua. The community needs to expand and upgrade its water supply and distribution system and provide a wastewater treatment plant.

Palomas, Chihuahua. The community needs to rehabilitate or replace its water supply and distribution system as well as upgrade or replace the wastewater collection system and provide a treatment plant.

Villa Ahumada, Chihuahua. The community needs to rehabilitate and upgrade the water distribution system, expand wastewater collection to the entire community and provide a wastewater treatment plant.

Table 4-5 Near- and Long-term Needs in the Northwest Chihuahua Basin.

Community	Year 2000 Population	Year 2020 Population	Near-term Capital Cost ($millions)	Long-term Capital Cost ($million)
Ascensión, CH	23,400	42,300	2	26
Columbus, NM	1,000	1,700	1	3
Janos, CH	11,100	14,100	No Data	11
Nuevo Casas Grandes, CH	67,800	128,700	No Data	55
Las Palomas, CH	7,200	14,700	No Data	11
Villa Ahumada, CH	13,600	25,700	2	19
Unincorporated and Other Areas of Hidalgo County, NM	5,900	6,800	No Data	4
Unincorporated and Other Areas of Luna County, NM	25,800	41,400	No Data	12
Total	155,800	275,400	5	141*

* Value is different than in the Status report (Summary Report) EPA -832-R-00-007 Page 6 published May 2000 because the report was preliminary.

4.6 Rio Grande Basin

Alpine, Texas. The community needs to upgrade its water supply production wells, storage capacity and water distribution system. The wastewater treatment plant needs to be upgraded and a new interceptor line provided.

Alton, Texas. The community needs to expand its water distribution system. An alternative is being considered for connecting its system to the McAllen municipal water supply system.

Camargo, Tamaulipas. The community needs to upgrade its wastewater collection system.

China/General Bravo, Nuevo Leon. The community needs to expand its wastewater collection system and provide wastewater treatment.

Ciudad Acuña, Coahuila. The community has a wastewater treatment plant under construction and needs to upgrade its wastewater collection system.

Ciudad Juaréz, Chihuahua. The community needs to expand both the water and the wastewater systems to serve the metropolitan area.

Coyame, Chihuahua. The community needs to rehabilitate and upgrade its water supply and distribution system and provide a wastewater treatment plant.

Del Rio, Texas. The community is rehabilitating its water storage and distribution system, water supply wells and pumping station.

Donna, Texas. The community is replacing and upgrading the existing wastewater collection system.

Eagle Pass, Texas. The community needs to upgrade its water distribution system and may consider expanding it to serve neighboring Pueblo Nuevo, Texas. The existing wastewater treatment plant needs to be upgraded or replaced and extension of the collection system to Pueblo Nuevo may be considered.

El Paso, Texas. The community needs to include long-term planning for water supply.

Fabens, Texas. The community needs to install a water treatment system for high iron and manganese removal.

Gustavo Díaz Ordaz, Tamaulipas. The community needs to upgrade its wastewater collection system.

Guadalupe Bravos, Chihuahua. The community needs to provide for water system improvements, wastewater treatment and expansion of its wastewater collection system.

Laredo, Texas. The community is considering expansion of its water distribution and wastewater collection systems for nearby Colonias.

Manuel Benavides, Chihuahua. The community needs to and upgrade and expand its water distribution system, expand its wastewater collection system and provide for wastewater treatment.

McAllen, Texas. The community needs to expand its wastewater collection system including service to Colonias outside of the city limits.

Mercedes, Texas. The community may need to expand its wastewater treatment plant and collection systems.

Mier, Tamaulipas. The community needs to rehabilitate and expand its water treatment plant.

Miguel Alemán, Tamaulipas. The community needs to extend its wastewater collection system and upgrade its treatment facilities.

Nava, Coahuila. The community needs to upgrade its water supply and distribution system, including additional storage, to improve and expand the wastewater collection system and to provide a wastewater treatment plant. The community of Estación Rio Escondido needs upgrading of the water supply system. Provisions of water supply and wastewater collection system is being considered for the community of La Sauceda.

Nueva Ciudad Guerrero, Tamaulipas. The community needs to expand its wastewater collection and provide an operational wastewater treatment facility.

Nuevo Laredo, Tamaulipas. The community needs to upgrade its water distribution and wastewater collection systems. Correction of Inflow/Infiltration problems is being considered for improving its wastewater collection system

Ojinaga, Chihuahua. The community needs to construct a water distribution system and storage facilities, upgrade wastewater treatment and expand its wastewater collection system.

Piedras Negras, Coahuila. The community plans to upgrade or replace its wastewater stabilization ponds with an activated sludge system as well as to upgrade and extend the wastewater collection system.

Presidio, Texas. The community needs upgrading or replacement of its wastewater treatment plant.

Reynosa, Tamaulipas. The community needs to upgrade part of its water supply system and upgrade and expand its wastewater collection system. Bioremediation of Laguna La Escondida, is being considered as well as the development of a treated wastewater sludge management plan.

Rio Bravo, Tamaulipas. The community needs to upgrade its water treatment plant and is considering extension of wastewater collection to a nearby Colonia.

Rio Grande, Texas. The community is considering water treatment plant upgrading and expansion of the wastewater collection system to a Colonia.

Roma, Texas. The community is making water and wastewater improvements including extension of service to a Colonia.

Sanderson, Texas. The community is considering wastewater collection and treatment facilities.

Weslaco, Texas. The community needs upgrading of its wastewater collection and treatment systems, with possible extension of service to a Colonia.

Zaragoza, Coahuila. The community needs to upgrade its water distribution system and provide for adequate storage capacity. Wastewater needs include expansion of the wastewater collection system to the full service area and provision of a wastewater treatment plant.

Table 4-6 Near - and Long-term Needs in the Rio Grande Basin

Community	Year 2000 Population	Year 2020 Population	Near-term Capital Cost ($millions)	Long-term Capital Cost ($millions)
Alpine, TX	5,800	6,600	7	2
Alton, TX	4,000	7,300	No Data	7
Camargo, TM	15,800	18,900	2	13
China/General Bravo, NL	17,000	23,000	2	17
Ciudad Acuña, CO	81,206	294,900	81	43
Ciudad Juárez, CH	1,239,900	2,395,000	No Data	437
Coyame, CH	2,100	4,000	No Data	4
Del Rio, TX	36,100	47,600	0	14
Donna, TX	15,800	28,500	0	11
Eagle Pass, TX	30,700	53,500	No Data	15
El Paso, TX	640,000	923,400	No Data	121
Fabens, TX	500	700	No Data	1
Guadalupe Bravos, CH	10,300	14,000	No Data	12
Gustavo Díaz Ordáz, TM	14,600	13,300	2	9
Laredo, TX	189,000	360,500	11	85
Manuel Benavides, CH	2,100	1,700	No Data	2
McAllen, Texas	112,500	202,300	No Data	62
Mercedes, TX	15,000	26.,900	6	14
Mier, TM	6,500	7,900	5	7
Miguel Alemán, TM	23,800	31,500	4	9
Nava, CO	24,500	45,700	13	30
Nueva Cd Guerrero, TM	3,900	4,200	No Data	3
Nuevo Laredo, TM	358,500	898,000	13	151
Ojinaga, CH	24,000	27,700	4	12
Piedras Negras, CO	142,300	270,000	58	80
Presidio, TX	5,000	7,400	4	7
Reynosa, TM	533,400	1,138,000	29	155
Rio Bravo, TM	108,400	147,200	5	55

Community	Year 2000 Population	Year 2020 Population	Near-term Capital Cost ($millions)	Long-term Capital Cost ($millions)
Rio Grande, TX	10,400	19,700	5	17
Roma, TX	12,000	22,800	0	14
Sanderson, TX	1,200	1,100	4	1
Weslaco, TX	28,900	51,900	5	28
Zaragoza, CO	19,200	39,400	4	26
Unincorporated and Other Areas of Brewster County, TX	2,900	3,200	No Data	2
Unincorporated and Other Areas of Doña Ana County, NM	141,600	213,100	No Data	32
Unincorporated and Other Areas of El Paso County, TX	124,500	179,700	No Data	28
Unincorporated and Other Areas of Hidalgo County, TX	484,500	935,600	No Data	63
Unincorporated and Other Areas of Maverick County, TX	23,500	40,900	No Data	12
Unincorporated and Other Areas of Presidio County, TX	3,900	5,700	No Data	3
Unincorporated and Other Areas of Starr County, TX	54,200	103,.000	No Data	20
Unincorporated and Other Areas of Terrell County, TX	100	100	No Data	1
Unincorporated and Other Areas of Val Verde County, TX	10,400	13,700	No Data	6
Unincorporated and Other Areas of Webb County, TX	24,400	46,600	No Data	13
Total	4,603,900	8,656,200	264	*1,644

* Value is different than in the Status report (Summary Report) EPA -832-R-00-007 Page 6 published May 2000 because the report was preliminary.

4.7 Gulf of Mexico Coastal Basin

Brownsville, Texas. The community proposes to build a reverse osmosis system to treat wastewater to "bottled water" quality for use by the Port of Brownsville and nearby industries.

Matamoros, Tamaulipas. The community needs to rehabilitate or replace its wastewater collection system and complete the construction of a wastewater pump station.

Valle Hermoso, Tamaulipas. The community needs to upgrade its water distribution and wastewater collection system as well as to provide for a wastewater treatment plant.

Table 4-7 Near-and Long-term Needs in the Gulf Of Mexico Coastal Basin

Community	Year 2000 Population	Year 2020 Population	Near-term Capital Cost ($millions)	Long-term Capital Cost ($millions)
Brownsville, TX	145,600	227,200	34	128
Matamoros, TM	427,700	736,900	6	181
Valle Hermoso, TM	60,100	83,200	10	38
Unincorporated and Other Areas of Cameron County, TX	202,400	315,800	No Data	39
Total	835,800	1,363,100	50	??

* Value is different than in the Status Report (Summary Report) EPA -832-R-00-007 Page 6 published May 2000 because the city of Reynosa was originally included in the Gulf of Mexico Coastal basin due to changes in the limits of the watershed basin.

5 Accomplishments

The EPA role in the funding of water and wastewater infrastructure projects in the U.S. - Mexico Border for communities was initially in cooperation with the IBWC and more recently with the NADBank. In addition, EPA has funded an infrastructure Project Development Assistance Program (PDAP), the development of programs by the George E. Brown U.S.-Mexico Foundation for Science (FUMEC), as well as assistance to border tribal governments in order for them to accomplish the same result as the communities. The EPA financial commitments to date for these needs are shown in Table 5-1.

Table 5-1. Current EPA Participation in U.S.-Mexico Border Infrastructure Needs

Basins	Total Project Value (In $ Millions)	EPA Share (In $ Millions)
Pacific Coastal Basin *	190	86
New River Basin	113	58
Gulf of California Coastal Basin	0	None
Colorado River Basin	60	20
Northwest Chihuahua Basin	0	None
Rio Grande Basin	445	120
Gulf of Mexico Coastal Basin	7	7
PDAP FUMEC Tribal	37	37
Total	852	328

* Does not include IWTP prior to Fiscal Year 1995.

5.1 BEIF

EPA currently places its grant funds into the Border Environment Infrastructure Fund (BEIF) account at the NADBank for assistance in making jointly-funded projects viable and affordable for border communities. The Bank administers grant resources provided by EPA as its share of construction costs directly as capital cost contributions, as transition payments, or both. It should be noted that EPA funding eligibility criteria require the requesting community to seek out available funding from all other sources before a contribution is made from the BEIF account. In addition, the EPA share of BEIF-funded projects in Mexico require an equal match of Mexican grant funds.

5.2 PDAP

PDAP funding is used for providing grants for preliminary engineering and design studies by many communities which would not otherwise be able to prepare these for the detailed application for BECC certification. Activities include project-specific capacity building to address certification criteria, preliminary engineering studies, environmental assessments, technical and economical feasibility studies, project management studies, preliminary design, and development of operation and maintenance plans.

5.3 FUMEC

The FUMEC has begun its pilot programs for inventorying available human resources and developing training programs in areas where the human resource inventories show that there is a need.

5.4 Border Tribal Assistance

Border tribal governments for recognized U.S. tribes with lands in the border area receive infrastructure funding directly or through the Indian Health Service.

6. Future of Water Infrastructure Management in the Border Area

After many years of growth in the border area spurred on by an agreeable climate and employment opportunities, the need for binational federal attention on protection of water quality and its effect on public health was recognized and the first steps taken. The La Paz Accord, signed in 1983 and the NAFTA side agreements, followed by creation of new binational infrastructure development institutions and appropriations from the Mexican and U.S. governments, have had a significant impact on the lives of those who live and work in the border area by protecting public health and improving surface water quality.

New long-term integrated planning mechanisms have been created and supported for the water infrastructure needs of the communities. Oversight, assistance in technology-sharing and funding, enhanced public participation in local governmental decisions and encouragement of binational communities to work out solutions based on the needs of all have been established.

At this time, at least 9 percent of the border populace is still without public water supply, as much as 23 percent are without wastewater collection and up to 40 percent without treatment of wastewater. The watersheds still need improvements in environmental and public health safeguards. Each community is making progress according to its own needs and abilities, but the work is considerably less than complete.

6.1 Summary of Near- and Long-Term Water and Wastewater Infrastructure Needs

Across all seven watershed basins, the estimated water supply and wastewater treatment infrastructure capital needs for communities and recognized tribes under consideration through the year 2020 in the U.S. part of the border area are estimated at $1.7 billion and for Mexico at $2.8 billion. The binational total of $4.5 billion is in addition to the current commitments shown in Table 5-1.

These needs are summarized by watershed basin in Table 6-1, with a breakdown between those in the U.S. and those in Mexico.

Table 6-1. Summary of Near- and Long-term Water and Wastewater Infrastructure Needs.

Basin	Near-term Needs ($millions)			Long-term Needs ($millions)		
	U.S.	Mexico	Total	U.S.	Mexico	Total
Pacific Coastal	95	26	121	232	593	825
New River	37	4	41	123	85	208
Gulf of California Coastal	0	26	26	0	162	162
Colorado River	133	51	184	216	222	438
NW Chihuahua	1	4	5	19	122	* 141
Rio Grande	42	222	264	517	1065	* 1644
Gulf of Mexico Coastal	34	16	50	229	219	* 386
Total	342	349	691	1336	2468	3804

6.2 EPA and Other Needs Estimates

A number of the border institutions, including the BECC and NADBank have made needs estimates for border water infrastructure development and those have been compared to the ones presented here. The results, as expected, are closely comparable because the same existing facilities and future population information were utilized for all the estimates. These population estimates were taken from the January 22, 1999, draft of a paper entitled *Population and Economics on the US-Mexico Border: Past, Present and Future* by James Peach, Professor of Economics and International Business, and James Williams, Professor of Sociology, both of New Mexico State University.

6.3 Next Steps

As part of the NAFTA negotiations, the U.S. and Mexican governments each pledged $700 million in grant funding to help make projects affordable in the border communities. EPA has received $550 million of these funds in appropriations to date (including FY 2001) which are being committed on both sides of the border. Mexican projects with an EPA share must provide a U.S. benefit. Based on these current estimates, the $700 million target from each nation will not complete the construction or upgrading of all communities water and wastewater facilities.

Expectations are that the border area communities will make progress on building the institutional capacity to operate, maintain, repair and build up the financial reserves to upgrade and enlarge their water supply and wastewater treatment facilities over the next 20 years. Each community would be expected to proceed on its own schedule related to the size and condition of existing facilities, other municipal priorities and the local economic situation.

Currently, funding for U.S. Border projects consist of community resources, borrowing from the NADBank or a State Revolving Funds and subsidies or grants from state and federal sources. The terms of each financing package are researched, analyzed and negotiated by the Bank. It is the expectation of both CNA and EPA that the communities will approach self-sufficiency as their institutional capacity increases, that rates and general fund allowances will rise to total operating and maintenance costs and that the work to build a complete modern infrastructure system for the existing populace will continue even after support from the federal agencies will have been completed. However, the regulatory roles which are now a part of the responsibilities of both federal agencies will continue in order to ensure that each border community operates its facilities adequately with its own resources, but it will take time, for this capability to develop. The U.S. and Mexican governments must determine how long and to what level to continue the current program to provide for the remaining existing needs and for development of future capacity.

7. Information Resources

This publication is produced by the Office of Wastewater Management (OWM) and is available free of charge, to the end of supply, from the following source:

U.S. EPA Headquarters
Office of Water Resource Center (RC-4100)
1200 Pennsylvania Avenue, Ariel Rios Building
Washington, D.C. 20460
Tel. (202) 260-7780 Fax (202) 260-0386 e-mail center water-resource@epa.gov

Publication can be downloaded from the EPA internet website :
http//www.epa.gov/owm/mexican.htm

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