

# INTERNATIONAL BOUNDARY AND WATER COMMISSION UNITED STATES AND MEXICO



## 2006 ANNUAL REPORT



FRONT COVER: Rio Grande at Little Box Canyon in Texas-Chihuahua

## INTERNATIONAL BOUNDARY AND WATER COMMISSION UNITED STATES AND MEXICO

*“The jurisdiction of the Commission shall extend to the limitrophe parts of the Rio Grande (Rio Bravo) and the Colorado River, to the land boundary between the two countries, and to works located upon their common boundary, each Section of the Commission retaining jurisdiction over that part of the works located within the limits of its own country.”*

Article 2, 1944 Water Treaty



# Message from the Commissioners

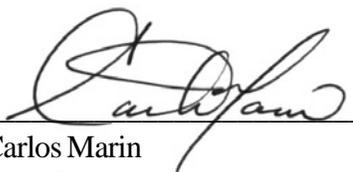
*The International Boundary and Water Commission, United States and Mexico (IBWC), is responsible for applying the boundary and water treaties between the two countries and settling differences that arise in their application. In 2006, the IBWC carried out various activities related to these treaties including boundary demarcation, operation and maintenance of international storage dams and flood control projects, water accounting, and operation of international sanitation projects.*

*The year 2006 was marked by the appointment of Carlos Marin as U.S. Commissioner by President George W. Bush. Marin, a longtime Commission employee, had served as Acting Commissioner since 2005. The Mexican Section of the Commission continued to operate under the leadership of Commissioner Arturo Herrera Solis.*

*The Commission made notable advancements in its boundary work during the year. The Commission completed a Joint Report of the Principal Engineers proposing a program of enhanced boundary demarcation at critical points along the land border between the United States and Mexico. Additionally, significant progress was made on development of new boundary maps, expected to be finalized in 2008, and a Global Positioning System survey of the boundary monuments was initiated in order to obtain more precise data about the location of the monuments.*

*The year was also marked by localized flooding at El Paso, Texas-Ciudad Juarez, Chihuahua following intense summer storms. The storms overwhelmed urban storm drain systems in both cities, flooding thousands of homes and businesses. Flood conditions in the Rio Grande inundated the floodway and put the Commission's river levees to the test. In the wake of the storm, the two Sections of the Commission began work to develop a coordinated plan to clear sediment and debris from the river and raise or rehabilitate levees as needed.*

*These and other activities are described in this report, which has been prepared in conformance with and in fulfillment of Article 24, paragraph (g), of the 1944 Water Treaty.*



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Carlos Marin  
U.S. Commissioner



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J. Arturo Herrera Solis  
Mexican Commissioner

# *International Boundary and Water Commission United States and Mexico*

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## I. DEMARCATION OF THE INTERNATIONAL BOUNDARY

### Maintenance of Boundary Demarcation Features

The Commission is responsible for demarcating the boundary between the United States and Mexico. To do this, the Commission has a program to install and maintain boundary monuments and markers on the land boundary between the two countries. At the international bridges and land ports of entry, the Commission has plaques, pavement markers, and other demarcation features.

At the March 2006 Binational Commission Meeting of Cabinet-level officials from the United States and Mexico, the Border Security and Cooperation Working Group tasked the IBWC with developing recommendations to enhance demarcation of the boundary between the two countries. In response, the Commission prepared the “Joint Report of the Principal Engineers Regarding the Program for the Installation of Additional Markers on the International Land Boundary Between the United States and Mexico.” The report proposes installation of 30-foot (9.14-meter) tall concrete poles to demarcate the international land boundary more clearly in critical areas. The Joint Report further proposes that the IBWC undertake a survey of the existing monuments on the international land boundary using Global Positioning System (GPS) Technology. The IBWC forwarded the report to its respective Governments for consideration. The U.S. Section also initiated a program to conduct the GPS survey of 40 monuments along the Arizona-Sonora border.

As part of its annual program, the Commission inspected and maintained the existing boundary monuments at the U.S.-Mexico land boundary and the boundary demarcation features at the ports of entry. The U.S. Section restored 21 monuments located along the Arizona-Sonora border and restored demarcation plaques and/or pavement markers at 12 ports of entry. The monument work at the Arizona-Sonora border was carried out with the support of the Mexican Section and Mexican police who provided security as needed for U.S. crews working south of the U.S. border security fence. The Commission also undertook monthly inspection and maintenance of the boundary demarcation buoys at Amistad and Falcon Reservoirs.



**Monument No. 122A at Nogales, AZ-Nogales, Son. was restored.**

### Boundary Mapping

In accordance with the 1970 Boundary Treaty, the Commission is responsible for preparing maps of the U.S.-Mexico border. During 2006, the IBWC, in cooperation with the U.S. Geological Survey and Mexico’s mapping agency (INEGI), developed a draft set of photomaps of the Rio Grande boundary. The IBWC acquired the digital ortho-photo quarter-quads with coordinates for the Colorado River limitrophe late in 2006 that will be used for production of the boundary maps for the Colorado River. Final boundary maps in digital and hard copy are scheduled to be completed in 2008.

## II. RIO GRANDE

### Water Deliveries under the 1944 Water Treaty

The 1944 Water Treaty provides for the distribution of the waters of the Rio Grande between the two countries from Fort Quitman, Texas to the Gulf of Mexico. In accordance with that treaty, Mexico delivers water to the United States from six of its Rio Grande tributaries in cycles of five years; water from these tributaries is allotted two-thirds to Mexico and one-third to the United States. The treaty specifies that deliveries to the United States shall be a minimum annual average of 350,000 acre-feet (431 million cubic meters [mcm]) during the course of the five-year cycle. For the water delivery year that concluded in September 2006, Mexico delivered 240,144 acre-feet (296 mcm). The Commission initiated a series of meetings to exchange information regarding hydrologic conditions in the basin related to treaty compliance.

### Convention of 1906

In accordance with the Convention of 1906, the United States delivered Rio Grande water to Mexico at Ciudad Juarez, Chihuahua – water that was released from Elephant Butte and Caballo Dams in New Mexico for use by Mexico for irrigation in the Juarez Valley. During 2006, Mexico was authorized a proportionally reduced allotment of 33,895 acre-feet (41.8 mcm) equivalent to 56% of a full allotment. However, due to abundant rainfall in August and September, Mexico was not able to use its full allotment and requested the early suspension of deliveries such that a volume of 27,117 acre-feet (33.4 mcm) was actually diverted. The early cut-off of releases from the upstream reservoirs allowed additional water to be stored for the benefit of all users in 2007.



**International Dam diverts Rio Grande water to Mexico at Ciudad Juarez, Chihuahua.**

To implement the treaty effectively, the Commission conducted periodic meetings with the participation of the U.S. Bureau of Reclamation, Mexico's National Water Commission, and irrigation districts in both countries. The meetings allowed all parties to receive updated information regarding changing runoff and storage conditions to maximize the efficiency of deliveries by coordinating delivery schedules among different users. To effect deliveries, the Commission operated the two diversion dams at El Paso, Texas-Ciudad Juarez, Chihuahua (American Dam and International Dam) and measured and monitored the volumes delivered.



## **Flood Control, Upper Rio Grande**

In El Paso, Texas-Ciudad Juarez, Chihuahua, 2006 will be remembered as the year of the big flood. Intense local rainfall in August and September caused the river to overflow its banks and rise along the flood control levees protecting the sister cities. Commission staff moved into flood operations, taking additional flow measurements, providing regular updates to stakeholders, and inspecting the levees and repairing eroded segments. On August 1, just downstream from American Dam, flow of 7769 cubic feet per second (220 cubic meters per second [cms]) was recorded, the highest in 49 years. Staff opened the gates of American and International Dams to allow the floodwaters to flow downstream. On the U.S. side, the levees were close to overtopping in some areas but they held, preventing further property damage. Although the Rio Grande levees did their job, both cities experienced widespread local flooding due to overwhelmed off-river drainage systems.

Following the flood season, both Sections assessed work that needed to be done to restore or improve the flood control system, identifying areas for sediment removal, levee repair, and levee raising. The two Sections intend to prepare a report in 2007 outlining the work that each Section will undertake to repair the levees and restore the Rio Grande channel.

The Commission also addressed flood concerns beyond the scope of the Rio Grande flood control project. In Ciudad Juarez, at the request of the U.S. Consulate in that city, the IBWC inspected a dike near the river that appeared to be on the verge of collapse. La Montada Dike, an earthen embankment and stormwater detention basin designed to capture flows in an arroyo tributary to the Rio Grande, had filled to overflowing. As the water spilled over the top, it created deep erosion furrows in the embankment, raising fears that the



**International Dam at El Paso, TX-Ciudad Juarez, Chih. during August 1, 2006 flood**

unreinforced structure could collapse, sending a wall of water to the river. Fearing that a dike break could cause flooding across the river in El Paso, Mayor John Cook ordered the evacuation of downtown and a nearby residential neighborhood. Mexican authorities began diverting and pumping water from the impoundment until it was brought down to a safe level. IBWC engineers who inspected La Montada recommended that it be taken out of service to prevent future risks. Work to do this was expected to begin in 2007.

A portion of the Anapra area of Ciudad Juarez near the U.S. border also flooded. Mexican residents complained that a drainage pipe under the U.S. railroad embankment had been plugged or filled in, preventing water from draining from their neighborhood. IBWC engineers assessed the situation, provided pumping equipment to help remove the floodwaters, and coordinated with Union Pacific Railroad to locate and re-open the old drainage structure.

Likewise, on Mexico's Conchos River, a major tributary to the Rio Grande, major Mexican reservoirs were spilling floodwaters following heavy precipitation in the second half of the year. In September, Rio Grande flow at Presidio, Texas-Ojinaga, Chihuahua downstream of the Conchos River confluence exceeded 7063 cubic feet per second (cfs) (200 cubic meters per second [cms]) for several days. By contrast, flow during September 2005 was typically less than 106 cfs (3 cms).

### **Flood Control, Lower Rio Grande**

As it does every year prior to hurricane season, the Commission in June conducted flood control workshops at both Falcon and Amistad Dams and for the Lower Rio Grande Flood Control Project. The purpose of the annual workshops is to ensure Commission competency in the projects' flood operation criteria. The U.S. National Weather Service participated in the exercises. Additionally, the IBWC coordinated with authorities in both countries to exchange information and strengthen preventive measures to address flood emergencies in the Rio Grande.

The U.S. Section provided information to the Mexican Section about work that was planned or undertaken to raise Lower Rio Grande flood control levees in the United States. The work is being carried out to restore U.S. levees to ensure the ability to continue to pass flood flows safely.



**Brownsville gaging station, Lower Rio Grande Flood Control Project**



## **Operation and Maintenance of Amistad Dam**

Amistad Dam, located on the Rio Grande near Del Rio, Texas-Ciudad Acuña, Coahuila, is operated jointly by the two Sections of the IBWC. The dam provides water storage, flood control, and hydroelectric power for both countries. At the end of 2006, joint storage was 2.58 million acre-feet (3167 mcm) or 82% of capacity, similar to end-of-year storage in 2005.



**Amistad Dam at Del Rio, Texas-Ciudad Acuña, Coahuila**

The Commission jointly operated Amistad Dam, releasing water to users in both countries for urban consumption, irrigation, and generation of electricity, among other uses. The Commission also carried out required preventive maintenance and repair of the equipment, components, facilities, instruments, and structure of the dam itself as well as the dam's electromechanical components.

The silt survey of Amistad Reservoir that was completed by the U.S. Section in 2005 was under review by the Mexican Section in 2006.

## **Operation and Maintenance of Falcon Dam**

The IBWC's other large storage reservoir on the Rio Grande is Falcon Dam, located upstream from Roma, Texas-Ciudad Miguel Aleman, Tamaulipas. Like Amistad Dam, Falcon provides water storage, flood control, and hydroelectric power generation for both countries. At the end of 2006, joint storage was 1.06 million acre-feet (1312 mcm) or 40% of capacity, significantly less than the year before when storage was at 61% of capacity. In 2006, the normal program of monitoring and maintenance of the structural and mechanical elements of the dam continued. Additionally, the IBWC conducted operational activities to release volumes of water as requested by each country.

Pursuant to IBWC agreements, the Mexican Section continued with the analysis of information from a silt survey conducted at the reservoir in order to calculate the elevation-area capacity curve of the Falcon Reservoir.

The U.S. Section continued to take steps to protect cultural resources at the dam site. In 2006, a survey and feature salvage report on archaeological resources on 400 acres (162 hectares) was completed.

### **Power Generation at Amistad and Falcon Dams**

Both countries operate hydroelectric power plants at Amistad and Falcon Dams, which generate electricity equally for both countries. At Amistad, the two Sections operate the plants while at Falcon, the U.S. Section and Mexico's Federal Electricity Commission are responsible.

Discussions initiated in 2005 regarding the sharing of power generation between the two countries during hours of peak demand led to the development of draft rules, which were implemented in 2006. The electric cooperatives in the United States had previously asked the IBWC to review the practice whereby Mexico generated power during the evening hours while the United States generated electricity during the morning hours. The draft rules, which were implemented in April 2006, provided for the two countries to alternate generation of electricity during the hours of peak demand; at Amistad, the adjustment is done on a weekly basis while Falcon switches daily. As the calendar year ended, this arrangement to alternate generation between the two countries during high-demand periods was working successfully.



**U.S. Power Plant at Falcon Dam**

### **Maintenance of Anzalduas and Retamal Dams**

Both Sections of the IBWC carried out preventive maintenance on the Anzalduas and Retamal International Diversion Dams in the Lower Rio Grande Valley of Texas and Tamaulipas. The IBWC performed annual maintenance on gates #3 and #4 at Anzalduas Dam, which is operated to control downstream irrigation and municipal water flows, to divert water to Mexico's irrigation canal (the Anzalduas Canal), and to divert floodwaters into the U.S. interior floodway. In accordance with international agreement, maintenance is performed on two of the six gates each year. In addition, work to upgrade the controls in the Pier #4 control room was begun. Work was also initiated to upgrade the emergency backup power system in order to maintain dam operations during power outages.

At Retamal Dam, which is downstream from Anzalduas Dam and is used to divert floodwaters into Mexico's interior floodway and to control downstream flood releases, annual maintenance was performed on all three gates. In addition to the normal spot sandblasting and painting of the gates, the brake on the U.S. side gate was replaced.



## **Water Conservation Projects in the Mexican Irrigation Districts**

In accordance with Minute 309, the Commission reviewed the 2004-2005 report by Mexico's National Water Commission on the progress of the modernization and improved technology projects in the irrigation districts in the Conchos River Basin, a Rio Grande tributary. The Minute provides for IBWC review of volumes of water conserved through the modernization projects and conveyance of conserved waters to the Rio Grande beginning in January of each year. During the period March through May 2006, the waters saved from these projects were delivered, with approximately 48,643 acre-feet (60 mcm) reaching the Rio Grande. From this volume, each country was allotted its share in accordance with the 1944 Water Treaty and Minute 309. In December 2006, the Commission conducted a joint field visit to the Conchos River irrigation districts to observe the progress on works and investments corresponding to the 2005-2006 agricultural season.

### **Rio Grande at Presidio, Texas-Ojinaga, Chihuahua**

U.S. Section personnel removed a sediment plug at the confluence of the Rio Grande and the Alamito Creek. The Alamito Creek channel was recontoured so that water flows could comingle with Rio Grande flows more smoothly. The work took approximately 2.5 months. Otherwise, operations were routine for the international flood control project at Presidio, Texas-Ojinaga, Chihuahua. The project, consisting of levees and floodways on both sides of the river, was developed in 1975.



**Channel maintenance was performed at the confluence of Alamito Creek and the Rio Grande.**

### **Control of Invasive Plants**

In August, the U.S. and Mexican Sections participated in a binational aquatic weed task force meeting to discuss the status of the triploid grass carp stocking between Falcon and Anzalduas Dams, and the tracking procedures for a movement study involving approximately 30 fish. The sterilized carp are used to eat hydrilla (*Hydrilla verticillata*), an invasive aquatic weed that has affected this reach of the Rio Grande. A Texas Parks and Wildlife scientist presented a timeline for stocking the fish later in the calendar year. Mexico expressed interest in assisting with a survey of the release areas to determine the density of hydrilla prior to the release of the fish and to accompany U.S. personnel should there be a need to track any of the fish within Mexican tributaries.

The task force concluded that there was a definite need for annual monitoring of the grass carp release area. In addition, continued comprehensive vegetation surveys and the development of a comprehensive invasive weed management plan downstream of Amistad Dam should be pursued.

In December, 20,000 grass carp were released in the Rio Grande below Falcon Dam. The radio-tagged grass carp for the movement study were scheduled for release in early 2007.

At the August meeting, the task force also considered two invasive riparian plants — salt cedar (*Tamarix spp.*) and a species of arundo known as carrizo or giant rivercane (*Arundo donax*) — and agreed to further discussion regarding biological controls for these species.

In November, a binational meeting was held to discuss a U.S. plan to control salt cedar on private land along the Rio Grande in Hudspeth and Presidio Counties, Texas. The project proposes aerial application of herbicides and biological controls using the Asian leaf beetle (*Diorhabda elongata*), which feeds on the invasive form of salt cedar. As a result of the meeting, information about the project was exchanged. Another binational meeting about the effort was scheduled for March 2007.



**Preparations are underway to enclose this segment of El Morillo Drain.**

### **Operation and Maintenance of El Morillo Drain**

El Morillo Drain is a binational water quality project of the IBWC. Extending for 75 miles (121 km) through Tamaulipas, the drain diverts saline irrigation return flows to the Gulf of Mexico, preventing degradation of Rio Grande water quality. In 2005, the United States Environmental Protection Agency transferred \$625,000 to the U.S. Section for construction of Morillo Drain improvements. During 2006, Mexico completed the design and preparations were underway to initiate construction in 2007. The improvements consist of enclosing a 1,000-foot (300-meter) segment of the drain in a 6-foot (1.83-meter) diameter pipe in a high-bank area near Anzalduas Dam that is subject to

erosion. When completed, the pipe project will reduce maintenance requirements in this reach. The Commission also coordinated routine maintenance, such as vegetation removal along the diversion channel, and repair of Pump #3, which had been out of service for an extended period. Periodic binational meetings involving both Sections of the IBWC and Mexico's National Water Commission were held to provide oversight of operation and maintenance of the project.

### **Brownsville, Texas - Matamoros, Tamaulipas Weir**

Several stakeholder meetings were convened to discuss the Brownsville-Matamoros Weir. The proposed weir across the Rio Grande would enhance the municipal water supply for both cities. Discussions focused on the potential impact of the weir on groundwater levels. In response to comments by Mexico, the U.S. project proponent—the Brownsville Public Utilities Board—prepared an unsteady-state groundwater model. By year's end, consensus still had not been reached regarding a site for the proposed weir.



## **Water Gaging and Weather Observation Network**

To fulfill its treaty obligations to account for the national ownership of waters of the boundary rivers, the Commission operates and maintains more than 60 gaging stations on the Colorado River, Rio Grande, and tributaries. Each Section operates and maintains the gaging stations on tributaries in its country. Most stations use satellite telemetry to provide near real-time flow data. The Commission collects hydrometric and weather data, which is processed and used in binational water accounting computations, dam operations, and real-time flood operations. The data is compiled and published in the annual Water Bulletins – the Rio Grande Water Bulletin and the Western Boundary Water Bulletin.



**Rio Grande gaging station near Presidio, TX-Ojinaga, Chih.**



**The Ft. Quitman gaging station on the Rio Grande uses satellite telemetry.**

## **Binational Rio Grande Summit**

The Commission worked on follow-up to the 2005 Binational Rio Grande Summit, which was held in McAllen, Texas-Reynosa, Tamaulipas. Sponsored by the IBWC, the Summit objective was to convene experts and water users from the basin to develop recommendations for consideration by the Governments of the United States and Mexico related to sustainable management of the basin. Summit presentations were made available to the public on the web pages of each Section. The two Sections also met to discuss the recommendations of Summit participants and to consider those that might be appropriate for implementation by the Commission. The recommendations focused on four broad conference themes: Legal and Institutional Aspects, Binational Basin Management, Environment and Water Quality, and Finance.

### III. COLORADO RIVER

#### Water Deliveries, Operation and Maintenance of Morelos Dam

In accordance with the stipulations of the 1944 Water Treaty, the United States delivered a full allotment of Colorado River water to Mexico in 2006. To effect these deliveries, the Mexican Section of the Commission operated the Morelos Diversion Dam near Yuma, Arizona-Los Algodones, Baja California, assuring diversion of Mexico's share of water to Colorado River Irrigation District 014. Additionally, the Mexican Section continued its program of sampling for suspended sediments that arrive at Morelos Dam. In accordance with its maintenance program, the Mexican Section also continued with improvements such as the installation of cathodic protection on 12 radial gates and the diversion structure, replacement of the electromechanical and hoisting components of some of the gates, concrete repairs, and electrical work on the controls.

The Commission, along with technical experts from the U.S. Army Corps of Engineers and Mexico's National Water Commission, conducted a dam safety inspection of Morelos Dam in April. The inspection found that sediment accumulation upstream and downstream of the dam and on top of the spillway is a significant concern. The sediment is a serious obstruction to channel flow, which considerably reduces the spillway efficiency and strongly impacts the hydrologic safety of the dam. The U.S. Section, in coordination with the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers, continued efforts to develop a plan and apply for a permit to remove silt from upstream of Morelos Dam. The work would be conducted by the United States and the sediment disposed of in Mexico. Inspectors also found significant deficiencies with the radial gates, including corrosion, missing parts, and improper tension on the lifting cables. Because of the problems, they recommended that consideration be given to changing the project's classification from Low Hazard Potential to Significant or High Hazard Potential.



Morelos Dam diverts Colorado River water for Mexico.

#### Binational Coordination Meetings

In February, the IBWC convened a binational interagency meeting to discuss Colorado River issues on the agenda of both countries. Representatives of the U.S. Department of the Interior, U.S. Bureau of Reclamation, Mexico's National Water Commission, and Mexico's Secretariat of Foreign Relations joined Commission staff for the discussion. Participants addressed a broad range of issues affecting both countries in the Colorado River Basin.



A follow-up meeting held in June 2006 focused on the Environmental Impact Statement being prepared by the U.S. Bureau of Reclamation for Lower Basin Shortage Guidelines and Coordinated Reservoir Operations. The study considers options for managing the Lower Colorado River Basin in the United States in the event of shortage conditions. In September, the Bureau of Reclamation hosted Mexican officials on a tour of Colorado River Basin infrastructure in the United States to enhance the Mexican delegation's understanding of water operations in the United States. By year's end the IBWC and Bureau of Reclamation had committed to continuing binational technical meetings and policy discussions regarding shortage criteria in 2007.

### **Operation and Maintenance of the Wellton-Mohawk Drain**

The Wellton-Mohawk Drain bypasses saline irrigation return flows from the United States to improve the quality of Colorado River water delivered to Mexico. Maintenance performed under Minute 284 was limited in 2006 due to budget constraints. It included clearing and vegetation removal for a length of 16.5 miles (26.6 km) from the international boundary and replacement of concrete panels on the side slopes.

### **Salinity**

In accordance with Minute 242, the salinity of waters delivered to Mexico must be similar to that delivered to U.S. users at Imperial Dam as indicated by a salinity differential established in that agreement. For 2006, the salinity differential between Imperial Dam and Morelos Dam was 146 parts per million (ppm) according to the Mexican standards and 131 ppm according to United States standards, meeting the levels stipulated in Minute 242.



**Wellton-Mohawk Drain at U.S.-Mexico border, dry Colorado River channel at right.**

During 2006, the IBWC continued to address discrepancies between U.S. and Mexican laboratory results for salinity levels in water samples. Meetings were held throughout the year to review sampling techniques, testing methodology, and the results of tests performed by both countries. The purpose of these efforts was to standardize the results from the salinity analyses performed by the two countries.

Testing and calibration continued in January 2006 of the system installed at the Southerly International Boundary to improve the salinity of the water delivered to Mexico at this site. The system is expected to be fully operational by late 2007. This system includes a diversion channel to divert Yuma Valley agricultural drainage waters into the Wellton-Mohawk Bypass Drain and a variable speed pump installed at the Main Drain Pumping Plant to reduce the large fluctuations in flow during the four months of the year specified by Mexico (October, November, December, and January), thereby decreasing the salinity spikes. An improvement in the salinity of the water delivered at the SIB has been observed during the critical months mentioned.

## Lining of the All-American Canal

At several meetings during the year, officials from the IBWC and other representatives of the United States and Mexican governments discussed international aspects related to the All-American Canal lining project. The Canal, located near the international boundary in the United States, conveys U.S. Colorado River water for irrigation in California. A U.S. plan to line a reach of the canal with concrete to reduce seepage and conserve U.S. water has raised objections from Mexico. As a result of the meetings, officials agreed that the IBWC should re-activate a binational Work Group to address Mexico's concerns.

In spite of positive results from bilateral talks early in the year, during the second half of the year court proceedings were the focus of activity on this issue. In the summer, as the U.S. construction contractor geared up to begin work, the United States Court of Appeals for the 9<sup>th</sup> District issued an injunction barring construction from beginning until a hearing could be held regarding a lawsuit attempting to block the project. Shortly thereafter, Mexico's Secretariat of Foreign Relations filed a brief supporting the efforts of the Mexicali Economic Development Council and Citizens United for Resources and the Environment to fight the project in court. Given these developments, attorneys for the United States advised that it would not be appropriate for the IBWC Work Group to undertake efforts while the U.S. Government was the subject of litigation on the matter. Then in December, the U.S. Congress passed a law directing that the All-American Canal lining be carried out without delay, notwithstanding any other provision of law.

## Environmental Preservation of the Colorado River Delta

The IBWC redoubled its efforts related to Minute 306, "Conceptual Framework for United States-Mexico Studies for Future Recommendations Concerning the Riparian and Estuarine Ecology of the Limitrophe Section of the Colorado River and its associated Delta." A number of meetings of the Binational Advisory Group established in furtherance of Minute 306 were held during the year. The group identified 18 priority projects for restoration and conservation proposed by various agencies and non-governmental organizations from both countries. The group is facilitating international cooperation and information exchange on these projects. The group also initiated discussions on the development of a hydraulic model that would allow the simulation of flow conditions and the identification of habitat restoration zones under different flow scenarios in the Colorado River from Morelos Dam to the mouth at the Gulf of California.



**The ecosystem of the Colorado River limitrophe has been affected by low flow.**



## **Water Supply for the City of Tijuana**

The IBWC continued to coordinate deliveries of water to Mexico within the framework of Minute 310, a 2003 Commission agreement. In accordance with the Minute, emergency deliveries of a portion of Mexico's Colorado River allotment are made to Tijuana through the Southern California Aqueduct System. In 2006, a volume of 211 acre-feet (260,000 cubic meters) was originally scheduled for delivery via the emergency connection at Otay but Mexico reduced the amount to an actual delivery of 36 acre-feet (44,000 cubic meters). Under the terms of Minute 310, Mexico compensates the affected entities in the United States for all costs associated with the emergency deliveries.

## **Silt in the Colorado River**

Weekly sediment sampling of the Colorado River at the Northerly International Boundary (NIB) continued in 2006. Since there was no flooding during the year, sediment conditions were normal at the NIB. In May, the U.S. Bureau of Reclamation completed desilting works in the area of Imperial Dam, 18 miles (29 km) upstream of Yuma, Arizona, removing approximately 1.0 million cubic yards (764,555 cubic meters) of silt. The settling basin constructed in 2001 in the Colorado River immediately upstream of Morelos Dam continued to function well, preventing large volumes of silt from entering Mexico's canal system in the Mexicali Valley.

## **Lower Colorado River Boundary and Capacity Preservation Project**

The Lower Colorado River Boundary and Capacity Preservation Project is an effort to study and implement a channel configuration that preserves the Colorado River international boundary line, ensures sufficient capacity to convey floodwaters through the river's international reach, and considers environmental impacts. The U.S. Section suspended development of the Environmental Impact Statement (EIS) for the Project in 2006 until the U.S. Bureau of Reclamation in cooperation with the IBWC can complete flood frequency and conveyance capacity studies, and the U.S. and Mexico can reach agreement regarding the conveyance capacity and design flood flow that should be established in the river's international reach.



**Colorado River at the Northerly International Boundary**

## Aquatic Weeds

The IBWC continued international coordination to address the problem of giant salvinia (*Salvinia molesta*), an invasive plant that has affected the Lower Colorado River, clogging water intakes, degrading water quality for aquatic species, and impeding recreational activities. During 2006, both Sections participated in joint meetings to study the control of giant salvinia and propose future actions. In coordination with the United States Department of Agriculture and Mexico's Colorado River Irrigation District 014, the Commission considered the need to reinforce existing control programs for other weeds, such as hydrilla, with the goal of applying them to control giant salvinia.

## IV. SANITATION AND WATER QUALITY

### Sanitation at San Diego, California – Tijuana, Baja California

The IBWC operates the South Bay International Wastewater Treatment Plant (SBIWTP) in San Diego, which provides advanced primary treatment of wastewater generated in Tijuana. Talks continued during the year regarding implementation of Minute 311, a framework for a public-private arrangement to construct in Mexico a secondary treatment plant to provide a higher level of treatment for SBIWTP effluent and to treat additional raw sewage from Tijuana. In February, the U.S. Section signed a Development Agreement with Bajagua, LLC for planning, design, and construction of secondary treatment facilities in Mexico. Technical discussions continued between the two Sections regarding the treatment plant site and type of treatment technology. Late in the year, Bajagua issued a Request for Qualifications for a Design-Build-Operate contractor.



**South Bay International Wastewater Treatment Plant**

Both Sections coordinated during the year to respond to uncontrolled transboundary wastewater discharges into the Tijuana River and nearby canyons in the vicinity of the SBIWTP and to ensure maintenance of the CILA Pump Station. These actions minimized the threat to public health and the environment from dry-weather sewage flows.



## **Sanitation at Calexico, California – Mexicali, Baja California**

The Mexicali II sanitation project neared completion in 2006. The project is a wastewater collection and treatment project being constructed by CESP, the public services utility of Mexicali, Baja California. As part of this project, the Las Arenitas wastewater treatment plant was substantially completed with test operations expected to begin in early 2007. Construction of Mexicali II follows many years of work in both countries, including significant early leadership by the IBWC. The lack of adequate sanitation infrastructure in Mexicali has contributed to contamination of the New River, which flows north into the United States at Calexico, California. Throughout the year, both Sections continued to coordinate a binational technical committee with representatives from government agencies to address Mexicali sanitation issues. The committee met on a regular basis to obtain information on the progress of the Las Arenitas wastewater treatment plant and to discuss future sanitation projects that will improve New River water quality.

In 2006, the monthly sanitation inspection visits of the New River continued. Coordinated by IBWC, the visits include the participation of various agencies from the United States and Mexico. These field visits are conducted for the purpose of observing the water quality conditions of the river and its tributaries, the existence of uncontrolled wastewater discharges, and the sanitation conditions in these water bodies and adjacent areas.

## **Sanitation at Nogales, Arizona – Nogales, Sonora**

Work advanced to upgrade the Nogales International Wastewater Treatment Plant (NIWTP). Located in Rio Rico, Arizona, the NIWTP was originally constructed in 1972 within the framework of IBWC Minute 227 to treat wastewater from the sister cities of Nogales, Arizona and Nogales, Sonora. In November 2006, the City of Nogales, Arizona issued a Design-Build contract for the NIWTP upgrade. The \$51 million upgrade consists of the construction of improved headworks, new aeration basins and clarifiers, and a sludge dewatering system. These improvements will be completed in late 2009, allowing the plant to comply with established water quality effluent standards.



**A contract was awarded to upgrade the Nogales International Wastewater Treatment Plant.**

For the 12-month period ending September 2006, the NIWTP treated a volume of 5,075 million gallons (19.2 million cubic meters [mcm]) of wastewater, with 3,699 million gallons (14 mcm) of this coming from Mexico and 1,376 million gallons (5.2 mcm) from the United States. Mexico's expense to treat this volume amounted to \$513,108.43. During the year, the USIBWC contracted for the removal of 1,920 dry tons of biosolids from the NIWTP partial mix lagoons to be applied on land at several area ranches at a cost of over \$1 million.

Two Binational Work Group meetings were held in 2006 on the subject of pretreatment for the sister cities of Nogales, Arizona and Nogales, Sonora. Pretreatment refers to the effort to control the discharge of contaminants into the sewer system – contaminants that can disrupt the treatment process at the NIWTP. The goal of the meetings was to consider cooperative actions to advance pretreatment.

A number of meetings were held to discuss issues related to Nogales Wash, a drainage channel that flows from Nogales, Sonora through central Nogales, Arizona. At a binational meeting, the Arizona Department of Environmental Quality provided an update on its Nogales Wash database that tracks chlorination of the wash in Mexico, chlorine residuals in the United States, and fecal coliform bacteria. Additionally, results were released of a study by the Arizona Department of Health Services that showed significant impacts to private potable water wells from contaminants in the Nogales Wash. The IBWC also participated in two tests of the emergency notification procedure for spills or other problems affecting the wash. The exercises were helpful for enhancing coordination efforts.

Other binational meetings discussed the Comprehensive Sanitation Project for Nogales, Sonora; long-term water and wastewater planning for the City of Nogales, Arizona; and legal issues related to use of Mexican effluent that is discharged into the Santa Cruz River in the United States.

Throughout the year, the IBWC coordinated delivery to the Nogales, Sonora utility of calcium hypochlorite to disinfect the surface water in the Nogales Wash. Overall, incidences of elevated fecal bacteria counts in the wash were down 90% as compared to the previous year. Nonetheless, there were several incidents during the year that affected water quality in the Nogales Wash.

In August, the Santa Cruz County Emergency Contingency Plan was activated following a sewer line break in Nogales, Sonora. At the request of the City of Nogales, Arizona, the IBWC delivered 800 pounds of calcium hypochlorite to treat the wash on the U.S. side. The Mexican Section of the Commission reported that the Nogales, Sonora sewer collection system suffered substantial damage during summer floods. While repairs were underway, the Nogales, Sonora utility, OOMAPAS, applied high doses of chlorine to Nogales Wash.

Earlier in the year, a tractor trailer crashed into the Nogales Wash in Arizona upstream of the NIWTP and spilled approximately 175 gallons of fuel into the wash. IBWC staff assisted emergency responders by placing containment booms in the wash.

### **Sanitation at Naco, Arizona-Naco, Sonora**

The IBWC provides oversight of transboundary sanitation issues affecting Naco, Arizona-Naco, Sonora and for a number of years has supported improvements to sanitary works in Naco, Sonora. During the year, the IBWC conducted joint quarterly inspections of the wastewater treatment system at Naco, Sonora in order to observe conditions of the east lagoons and the pumping plant that sends wastewater to the west lagoons. In August, a force main at Mexico's lift station failed, sending sewage north across the border at the Naco Port of Entry. The U.S. and Mexican Sections coordinated to address the problem and the transboundary sewage flow stopped the next day.



### **Sanitation at El Paso, Texas-Ciudad Juarez, Chihuahua**

The IBWC continued follow-up in 2006 regarding actions undertaken by the Ciudad Juarez utility in response to reports from U.S. residents and agencies about odors near the Ciudad Juarez North Wastewater Treatment Plant. Investigations were proposed to determine the source of the problem and identify possible solutions.

### **Sanitation at Presidio, Texas-Ojinaga, Chihuahua**

In September, personnel from both Sections of the IBWC, the Border Environment Cooperation Commission, the U.S. Environmental Protection Agency, and Chihuahua state water officials inspected the new wastewater treatment plant in Ojinaga, Chihuahua to learn the status of construction and the likely date for plant operations to begin. The plant was about 99% complete with only a few construction details pending. The plant began operating during the final quarter of the year.

### **Sanitation at Nuevo Laredo, Tamaulipas**

Constructed in the 1990s within the framework of the Commission, the Nuevo Laredo International Wastewater Treatment Plant (NLIWTP) is a binational project to address Rio Grande water quality in the area of Laredo, Texas-Nuevo Laredo, Tamaulipas. Located in Mexico, the NLIWTP treats sewage from Nuevo Laredo. In accordance with Minute 297, the IBWC determined the U.S. share of operations and maintenance (O&M) costs for the NLIWTP for the year. The total O & M costs for the year were \$2,395,398.98 of which the United States contributed \$300,000. The IBWC continued its oversight of the project, conducting weekly joint inspections of the NLIWTP and preparing associated reports.

### **Water Quality Monitoring**

The IBWC undertook water quality monitoring in conformance with the Joint Memorandum of Engineers, "Recommendation of an Initial International Program for Observation of the Quality of International Waters of the United States and Mexico," dated July 5, 1977.

The IBWC routinely compiles and exchanges water quality information for the international reach of the Rio Grande along the major urban areas such as El Paso, Texas-Ciudad Juarez, Chihuahua; Del Rio, Texas-Ciudad Acuña, Coahuila; Eagle Pass, Texas-Piedras Negras, Coahuila; Roma, Texas-Ciudad Miguel Aleman, Tamaulipas; Hidalgo, Texas-Reynosa, Tamaulipas; and Brownsville, Texas-Matamoros, Tamaulipas.



**IBWC monitors Rio Grande water quality at Brownsville, Texas-Matamoros, Tamaulipas.**

The U.S. Section's Texas Clean Rivers Program for the Rio Grande conducts this effort for the United States in coordination with the Texas Commission on Environmental Quality. The data indicate that high total dissolved solids affected the upper international reach of the river from downtown El Paso, Texas-Ciudad Juarez, Chihuahua to Amistad Dam, while fecal coliform bacteria are a water quality concern in most of the upper reach and downstream of some urban areas.

For El Paso, Texas-Ciudad Juarez, Chihuahua, the United States receives monthly reports on the quality of the influent and effluent from the Ciudad Juarez North and South Wastewater Treatment Plants that drain into Mexico's irrigation canal system; the canal empties into the Rio Grande below Fort Quitman, Texas. Sampling points within the canal system include monitoring stations above and below the treatment plants. Likewise, data from El Paso's four wastewater treatment plants are provided to Mexico for review.



**Total dissolved solids and fecal coliform bacteria affect the Rio Grande at El Paso, TX-Cd. Juarez, Chih.**

The IBWC also compiled monthly water quality data for the influent and effluent from the Nogales International Wastewater Treatment Plant (NIWTP) at Nogales, Arizona-Nogales, Sonora. NIWTP effluent that exceeds the U.S. permit limits for Ammonia-nitrogen and turbidity is an ongoing concern; however, this problem should be resolved once the NIWTP upgrade is completed in 2009.

In accordance with Minute 264, the water quality of the New River, which flows from Mexicali, Baja California into Calexico, California, is monitored for various parameters. During 2006, the Minute 264 standard for dissolved oxygen was not met, raising the risk of fish kills, harm to aquatic communities, and odor. Local communities have expressed concern regarding the levels of bacteria that could potentially affect the health of people who come into contact with the waters of the New River.

The IBWC also monitors water quality in the San Diego, California-Tijuana, Baja California region for the Pacific Ocean at Imperial Beach, California and at the Tijuana beaches. The program includes monitoring related to the Commission's South Bay International Wastewater Treatment Plant (SBIWTP) in San Diego and the South Bay Ocean Outfall — the pipeline that discharges SBIWTP effluent 3.5 miles (5.6 km) offshore in the Pacific Ocean. The IBWC South Bay Ocean Monitoring Program includes over 35 stations along the shore and offshore to monitor water quality and aquatic communities. At the international boundary in the Pacific Ocean, high bacterial concentrations have led to beach closures in the San Diego region. Data on the influent and effluent from the SBIWTP and the San Antonio de los Buenos Wastewater Treatment Plant in Tijuana were also compiled and exchanged on a monthly basis in 2006.



## V. OTHER PROJECTS

### Shared Groundwaters

The IBWC exchanged data on Yuma Valley wells in Arizona and the San Luis Rio Colorado Aquifer in the Colorado River Basin. Information was presented on the aquifer in the area of the Imperial Valley, California-Mexicali Valley, Baja California that would be impacted by the lining of the All-American Canal. Quarterly drilling was done in water table sample wells in the area of Amistad Dam.

### International Bridges

The biennial inspection of the Cordova International-Bridge of the Americas at El Paso, Texas-Ciudad Juarez, Chihuahua by officials from the Texas Department of Transportation, the Chihuahua Ministry of Communications and Transportation, and the IBWC was conducted in December 2006. The Texas Department of Transportation Bridge Inspection Record rates the deck, superstructure, substructure, and approaches of bridges on a scale from 0 (failed condition – bridge closed and beyond repair) to 9 (excellent condition). The bridge, which was built by IBWC in 1998, received a rating of 7 (good condition – some minor problems) for all parts of the structure. The problems include some cracks and other minor wear and tear. Each Section of the IBWC inspects and maintains its side of the bridge up to the international boundary.

The IBWC reviewed modifications to the original conceptual plans for the proposed new Anzalduas International Bridge downstream of the Anzalduas International Dam near Mission, Texas-Reynosa, Tamaulipas. Approval of the changes was expected in early 2007.



**Cordova International-Bridge of the Americas in El Paso, Texas-Ciudad Juarez, Chihuahua**

### Land Ports of Entry

The IBWC provided support to the Arizona Department of Transportation (ADOT) for construction of a FAST Lane at the Mariposa Port of Entry at Nogales, Arizona-Nogales, Sonora. So that the ADOT contractor could undertake construction activities in both countries, the U.S. Section issued Commission identification cards to contractor employees. In addition to constructing the FAST Lane on the U.S. side to expedite entry into the U.S., the contractor worked on the guard rail, fencing, and shoulder on the Mexican side.

At the Naco, Arizona-Naco, Sonora Port of Entry, the IBWC provided international coordination for drainage improvements undertaken by Mexican officials to eliminate the ponding of stormwater near Mexican Customs facilities. To address the problem, Mexican officials installed new drainage grates and a pipe to connect to a drainage ditch in the United States that runs parallel to the international boundary.

The Commission also reviewed and approved plans for construction of the San Luis, Arizona-San Luis Rio Colorado, Sonora II International Port of Entry.

### **Projects on the International Boundary and Rio Grande Floodplain**

In 2006, the Commission approved the following projects within the Rio Grande floodplain:

- Construction of an 8-inch pipeline for light naphtha (a liquid used in production of gasoline, petrochemicals, and solvents) crossing the Rio Grande and a metering station adjacent to the United States levee near Peñitas, Texas.
- Construction of a force main from Pump Station No. 10 to the proposed Wastewater Treatment Plant No. 3 within the floodplain of the Rio Grande in Reynosa, Tamaulipas.
- Installation of a new water intake structure with associated piping, grit tank, and pumping wet well within the floodplain on the Mexican side of the river in Piedras Negras, Coahuila.
- Construction of an embankment as a water retention structure for wildlife habitat enhancement in the vicinity of Mission, Texas-Reynosa, Tamaulipas.
- Proposed improvements to an existing roadway along the Rio Grande in Eagle Pass, Texas.

### **Tijuana River Flood Control Project**

The IBWC continued to operate the binational Tijuana River Flood Control Project, which includes a concrete-lined river channel, levees, and a related flood warning system. The Tijuana River flows north from Tijuana, Baja California into San Diego County, California. The telemetry system to measure water elevation and rainfall at Rodriguez Dam, located on the Tijuana River in Mexico, was operational throughout the year. Planning work continued on the proposal to install Sutron satellite telemetry at the other Mexican reservoir, Carrizo; this component of the flood warning system should be installed in 2007, making data available on the internet.

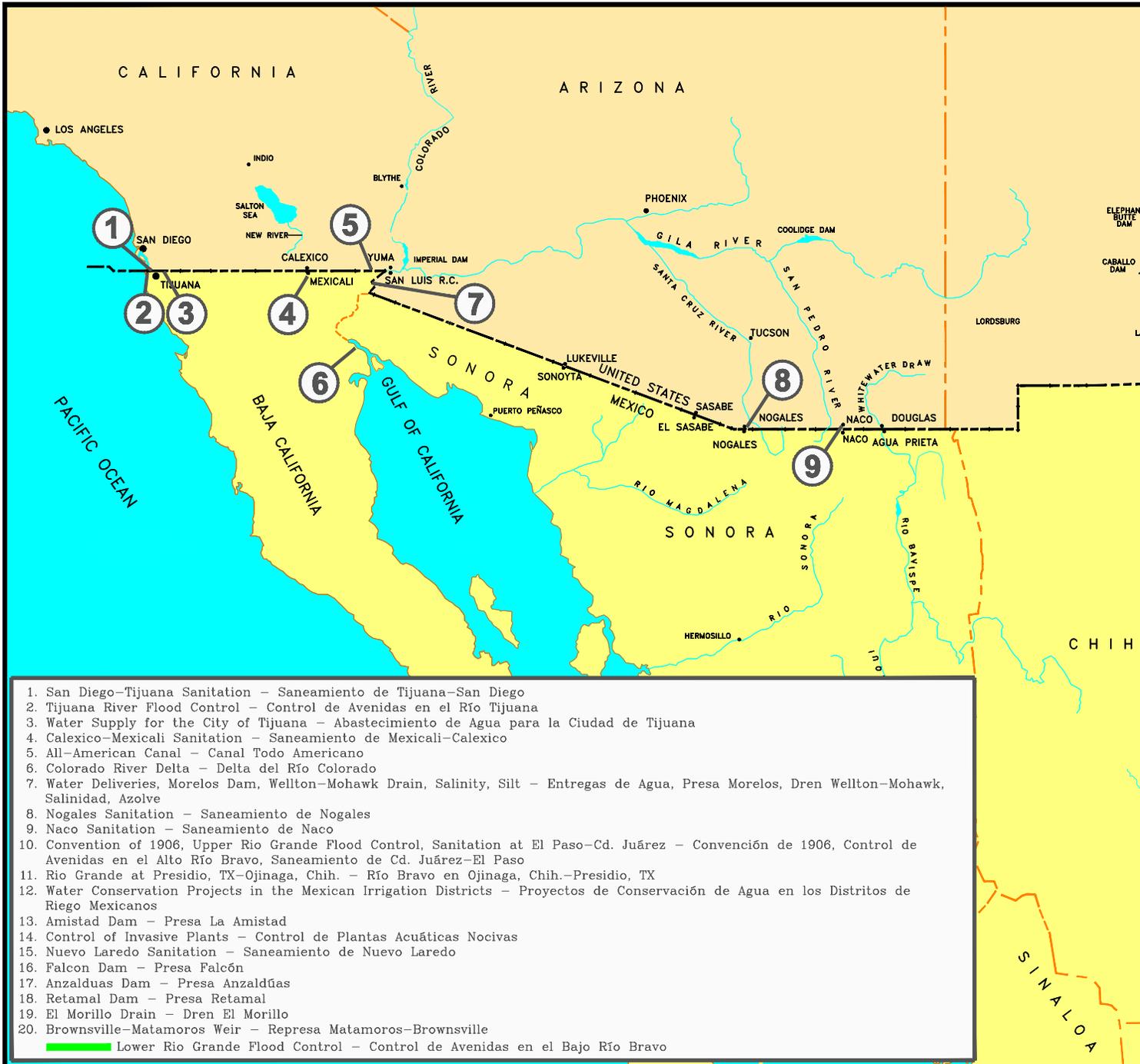


**Tijuana River flood control channel at the U.S.-Mexico border**

In accordance with a Memorandum of Understanding with the U.S. Section, the U.S. Border Patrol resurfaced the north levee road in the United States and performed vegetation control in the flood channel in the United States twice during the year. Due to below-average rainfall in the region, it was not necessary to remove sediment from the low-flow channel – an activity that, under normal precipitation conditions, is performed annually.



**Projects of the International Boundary and Water Commission Included in the 2006 Annual Report**



Report / Proyectos de la Comisión Internacional de Límites y Aguas Incluidos en el Informe Anual 2006

