

**COMMITTEE ON BINATIONAL
REGIONAL OPPORTUNITIES (COBRO)**

May 15, 1997

Water Supply in the San Diego and Tijuana Binational Region

At its last meeting, the Committee heard presentations by representatives of the San Diego County Water Authority (CWA), the Mexican counterpart of the International Boundary and Water Commission (CILA), and the State Commission of Public Services of Tijuana (CESPT) regarding water supply issues facing the binational region.

Based on those presentations, and various regional plans including the CWA 1997 Water Resources Plan, the CWA 1995 Annual Report, Tijuana's 1996-98 General Plan, Baja California's 1996-2001 Development Plan, and CESPT's 1996-2001 Institutional Development Plan, staff has prepared the following report on the organizational structure of water supply in our border area. The report consists of an executive summary, staff recommendations to the Committee, and a chart comparing the institutional characteristics of the CWA and CESPT, the two agencies responsible for the provision of water to their respective jurisdictions.

The Committee is asked to discuss its role and potential actions with regard to the binational region's water supply.

EXECUTIVE SUMMARY

Introduction

This report provides the Committee with a brief summary of the binational region's water supply. Currently, our binational region has a combined population of approximately 3.8 million people, of which approximately 68% lives in the San Diego region and 32% lives in Tijuana. Together, we are using roughly 680,000 acre-feet of water to support our residential, commercial, industrial, and agricultural activities.

By the year 2010, our binational region will increase to a combined population of over 5½ million people, of which approximately 60% will live in the San Diego region, and the other 40% in Tijuana. We will need an estimated 848,000 acre-feet of water. This represents a 47% increase in population and a 29% increase in water demand, with the San Diego region using about 85% and Tijuana using the remaining 15% of the projected water demand.

Some factors that help explain the difference of water use between our two cities include:

- The San Diego County Water Authority’s coverage area is substantially larger than that of CESPT, 1,420 square miles compared to 97 square miles, respectively.
- Tijuans live at higher residential densities than San Diegans (on average, 19.3 people per acre vs. 2.8 people per acre, respectively). Higher densities generally promote lower water consumption rates. Residential water consumption is comprised of indoor uses (including sanitation, bathing, laundry, and cooking) and outdoor uses (such as landscaping).
- For single-family homes and rural areas in San Diego, outdoor demands may be as high as 60 percent of total residential use. The general characteristics of single-family housing units or lower densities increase outdoor landscaping and water use.
- The San Diego County Water Authority is the largest agricultural water-consuming agency within the Metropolitan Water District, requiring approximately 50% of MWD’s total agricultural water supply each year. Agricultural water use within the Authority is concentrated mainly in north county member agencies, and will decline from approximately 20% to 10%, since the Authority’s agricultural water demand is expected to remain at its current level of 60,000 acre-feet per year through the year 2010.
- A variety of factors affect water demand and supply, including population, the economy, precipitation rates, water leakage, household size, agricultural demand, and conservation efforts, including behavioral changes and hard-wired installments (ex. ultra-low-flush toilets).

Recommendations

Water is regulated at various governmental levels in both the United States and Mexico. Currently, the California Legislature is considering legislation that would give the County Water Authority and the Metropolitan Water District until July 1, 1997 to reach an agreement allowing San Diego to pump Imperial Valley water through the Colorado River Aqueduct. If this water transfer or other transfers are successful, the binational region’s water dynamics could change. As a result, staff recommends the following actions by the Committee.

1. Form a Water Supply Subcommittee to assess current state and federal legislation on water, consider potential water-related binational infrastructure proposals and improvements, assist in the development of additional binational water infrastructure technological projects, and identify issues for a potential workshop.
2. Sponsor a Binational Water Supply “Confab,” inviting the CWA, CESPT, the IBWC, CILA, MWD, SAHOPE, and the Imperial Valley Irrigation District to discuss potential areas of collaboration between San Diego and Tijuana regarding water supply, and examine whether any of the border region’s proposed water supply

infrastructure projects could be eligible to receive certification by the Border Environmental Cooperation Commission (BECC) and funding by the North American Development Bank (NADBank).

WATER SUPPLY IN SAN DIEGO AND TIJUANA

The following chart provides a general comparison of the water supply infrastructure of the San Diego and Tijuana/Rosarito regions served by the CWA and CESPT, respectively. This is a work in progress. Committee members and agency staff are invited to comment on the chart.

San Diego County Water Authority (CWA) Board of Directors

The San Diego County Water Authority serves as a water wholesaler, providing imported water to its member agencies. The CWA is comprised of 23 member agencies and the County of San Diego as an ex-officio member. Authority member agencies include six cities, four water districts, eight municipal water districts, three irrigation water districts, a public utility, and a federal agency. The City of San Diego, the Authority's largest member agency, has more population, geographical area, and assessed valuation than any other member agency.

The CWA purchases its water from the Metropolitan Water District of Southern California (MWD). The County Water Authority is only one of 27 MWD member agencies from the counties of Ventura, Los Angeles, Orange, San Bernardino, Riverside, and San Diego. The Authority is the largest agency in terms of water purchases, purchasing approximately 25% of MWD's delivered water since 1990. Through contracts with the US Department of the Interior, California is entitled to 4.4 million acre-feet (5.4 billion cubic meters) of Colorado River water per year. From this, the MWD is entitled to 500,000 acre-

State Commission of Public Services of Tijuana - Comisión Estatal de Servicios Públicos en Tijuana (CESPT)

The State Commission of Public Services of Tijuana, or CESPT, by its acronym in Spanish, is the government body in charge of providing Tijuana and Rosarito with water and sewerage services. Its Board of Directors, or Administration Council, consists of the Governor of the State of Baja California, the Secretary of the State's Public Works Department, the Mayor of Tijuana, CESPT's Planning and Budget Director, and two representatives of the private sector.

CESPT is the agency in Tijuana responsible for implementing and operating the water and sewerage projects assigned to it by the National Water Commission (Comisión Nacional de Agua) and the Public Works Commission for the State of Baja California (SAHOPE). Additionally, CILA, the Mexican counterpart of the IBWC, is the entity in charge of supervising the allocation of the 1.5 million acre-feet (1.8 billion cubic meters) of water granted to Mexico from the Colorado River by the 1944 US/Mexico Treaty. The water from the treaty is distributed among Mexicali, Tecate, and Tijuana.

feet, and has priority over any unused agricultural water available to California. Additionally, California receives 50% of any surplus water available among the lower basin states.

Geography and Population

The Authority's service area encompasses 1,420 square miles (3,678 square kilometers), approximately the western third of the land area of San Diego County, serving approximately 2.6 million people. The Authority's boundaries extend from the international border in the south to the Orange and Riverside county lines in the north, and from the Pacific Ocean on the west to the foothills on the east.

Average population density in the service area is 2.8 people per acre.

The service area for CESPT encompasses 97 square miles (225 square kilometers), and serves approximately 1.2 million people. The service area includes Tijuana and Rosarito, extending from the international border in the north to La Misión in the south, and from the Pacific Ocean on the west to the Tecate boundary on the east.

Average population density in the service area is 19.3 people per acre.

Water Sources

There are 24 surface reservoirs within the Authority's service area. Of these, the fifteen largest reservoirs have a combined storage capacity of 553,080 acre-feet (681.9 million cubic meters). Seven of these are connected to the Authority aqueduct system. The Authority delivers its imported water through five pipelines in two rights of way called the San Diego Aqueducts. Eight member agencies own and operate treatment plants within the service area.

It is the Authority's goal to meet 100% of annual water requests 90% of the time, 90% of the requests 98% of the time, and never less than 80% of the requests.

The State of Baja California collects and stores water through three primary reservoirs: the Abelardo L. Rodríguez Reservoir in Tijuana; the Emilio Zamora Reservoir in Ensenada; and the Carrizo Reservoir in Tecate, which combined, have an estimated storage capacity of 191.28 million cubic meters (155,134 acre-feet). The State has 11 aqueducts and nine water treatment plants, which provide potable water for approximately 90% of the population in the State's five municipalities. Two of the treatment plants are located in Tijuana: El Florido and A.L. Rodríguez.

It is CESPT's goal to maintain 95% minimum service coverage between the 1996-2001 planning period.

On average, 90% of the region's water supply is imported, and 10% is obtained from local sources. The Authority purchases all of its imported water from the Metropolitan Water District of Southern California. The Metropolitan Water District obtains its imported supplies from two sources:

1. Water from the Colorado River Aqueduct (CRA), which is transported from Lake Havasu on the Arizona/California border to Lake Mathews in Riverside County. Before reaching Lake Mathews, a portion of the water is diverted to Lake Skinner, which is the major storage facility for the San Diego Canal with a storage capacity of 44,000 acre-feet (54 million cubic meters). In 1995, approximately 87% of the San Diego region's imported water was supplied by the Colorado River.
2. Water from the State Water Project (SWP), which is delivered to Metropolitan at Lake Perris, the terminus of the California Aqueduct. From there, water flows to the San Diego Canal, where it is blended with Colorado River water and then flows into Lake Skinner. In 1995, approximately 13% of total water deliveries were State Project water.

Although Tijuana has four water sources, two surface water sources (the Colorado River and the Rodríguez Reservoir) provide virtually the entire water supply to Tijuana. The four sources are:

1. Water from the Colorado River, which is transferred from Mexicali to Tijuana through an aqueduct. This water is stored in the Carrizo Reservoir, which has a storage capacity of up to 40 million cubic meters (32,441 acre-feet). Between 79 and 94% of Tijuana's water is supplied by the Colorado River.
2. Water from the Tijuana and Las Palmas Rivers, which is stored in the Rodríguez Reservoir with a storage capacity of 137 million cubic meters (111,111 acre-feet). Although this reservoir has considerable storage volume, this source is considered unreliable due to the area's variable rainfall rates. Tijuana depends upon the Rodríguez Reservoir for up to 15% of the City's water.
3. Water from the Tijuana River/Alamar River's 30 wells, which, combined with the groundwater sources listed below, provide up to 5% of the City's water.
4. Water from the Mission River's 4 wells near Rosarito (approximately 1%).

Water Usage

Total water use for 1994-95 in the Authority's service area was 526,053 acre-feet (648.6 million cubic meters) with the following distribution.

- Residential: 54%
- Industrial/commercial: 27%
- Agricultural: 19%

Total water usage for Tijuana for 1993 was approximately 71 million cubic meters (57,583 acre-feet) with the following distribution.

- Residential: 71%,
- Industrial/commercial: 24%
- Government: 5%

Water Demand

In 1995, total population in the Authority's service area was 2.6 million people. The San Diego region is expected to grow by approximately 1 million people by the year 2015, representing an annual average increase of 50,000 people for an annual growth rate of 2%. The projected water demand for Authority member agencies between 1995 and 2015 adjusted for water conservation is:

- 1995: 614,100 a-f (or 757 million m³) (Actual 1995 usage was 526,053 a-f)
- 2000: 635,600 a-f (or 784 million m³)
- 2005: 684,800 a-f (or 844 million m³)
- 2010: 733,600 a-f (or 905 million m³)
- 2015: 786,900 a-f (or 970 million m³)

In 1995, per-capita water use in the San Diego region was .18 acre-feet. In the year 2010, it is projected to be approximately .209 acre-feet per person.

In 1995-96, total population in CESPT's service area was approximately 1.2 million people. CESPT's water infrastructure served about 92% of Tijuana's population. Tijuana's population is expected to exceed 3 million people by the year 2017 for an annual growth rate of 5%. By 2015, Tijuana will use 50% of Baja California's water. The projected water demand for Tijuana between 1996 and 2010 adjusted for water conservation and reductions in leakage is:

- 1996: 83 million m³ (or 67,315 a-f)
- 1997: 88 million m³ (or 71,370 a-f)
- 1998: 91 million m³ (or 73,803 a-f)
- 1999: 93 million m³ (or 74,425 a-f)
- 2000: 95 million m³ (or 77,048 a-f)
- 2010: 141 million m³ (or 114,355 a-f)

In 1996, per-capita water use in Tijuana was approximately .063 acre-feet. In the year 2010, it is projected to be approximately .053 acre-feet per person.

Total Water Demand for the Binational Region in 2010

By 2010, approximately 3.5 million people will live in the San Diego region and 2.15 million people will live in Tijuana. This is an estimated total population of about 5½ million people, with an expected demand of approximately **847,955 acre-feet or 1.05 billion m³** of water. Compared to current figures, this represents a 47% increase in population and a 29% increase in water demand. The San Diego region will use about 85% and Tijuana, the remaining 15%, of the projected acre-feet. This translates into a projected per-capita use in San Diego of .209 acre-feet per person, and in Tijuana, .053 acre-feet per person.

Ongoing and Future Water Projects/Plans

In February 1997, the Authority released its 1996 Water Resources Plan. The 1993 Plan sought to enhance reliability by diversifying the sources of supply and

Given Tijuana's average 5% annual growth rate, CESPT has promoted several strategic plans to meet its needs beyond the year 2002, including:

reducing dependence on the Metropolitan Water District. The biggest difference between the 1993 and 1996 plans is the emphasis placed on the potential use of water transfers as a normal year (vs. dry-year) supply option in the 1996 Plan. Six alternatives are considered in the 1996 Plan.

- Existing Strategy Alternative - This baseline alternative would continue the strategy recommended in the 1993 Plan with minor modifications.
- Maximum Local Supply Alternative - This alternative would determine the costs and benefits of developing the maximum amount of local supplies, including recycling, repurification, groundwater, and sea water desalination.
- Maximum Local Supply With Transfers Alternative - This alternative is based on the above alternative with two changes: transfers of up to 200,000 acre-feet per year would be developed and sea water desalination would not be pursued.
- Intermediate Transfers Alternative - This alternative would develop an intermediate level of normal-year transfers, defined as transfers of up to 200,000 acre-feet per year.
- Maximum Transfers Alternative - This alternative explores the maximum anticipated level of transfer without constructing new, separate facilities. A transfer amount of 500,000 acre-feet per year was modeled.
- Colorado River Facilities Alternative - This alternative proposes the construction of a conveyance facility from San Diego County to the Imperial Valley to transport 500,000 acre-feet per year.

- Continued leak repairs
- Desalination
- Expansion of local infrastructure projects
- An additional aqueduct from the Colorado River, and
- Potential water transfers from agricultural areas.

Specific projects include:

- Infrastructure Project Tijuana I, a hydraulic infrastructure project composed of aqueducts, regulating tanks, collectors, interconnecting lines, etc., to overcome existing deficiencies;
- Improvements to the Colorado-Tijuana River Aqueduct, increasing the supply of water pumped from Colorado River through Mexicali to Tijuana by more than 65%;
- El Florido Potable Water Treatment Plant interconnecting with the Rodríguez Reservoir, allowing for additional treatment of water;
- Potable Water and Wastewater Network, Tijuana II, intended to meet 95% of potable water needs and 80% of wastewater needs; and
- Hydroelectric Tecate Project, allowing the state to reduce electricity costs resulting from the operation of the Colorado-Tijuana River Aqueduct.