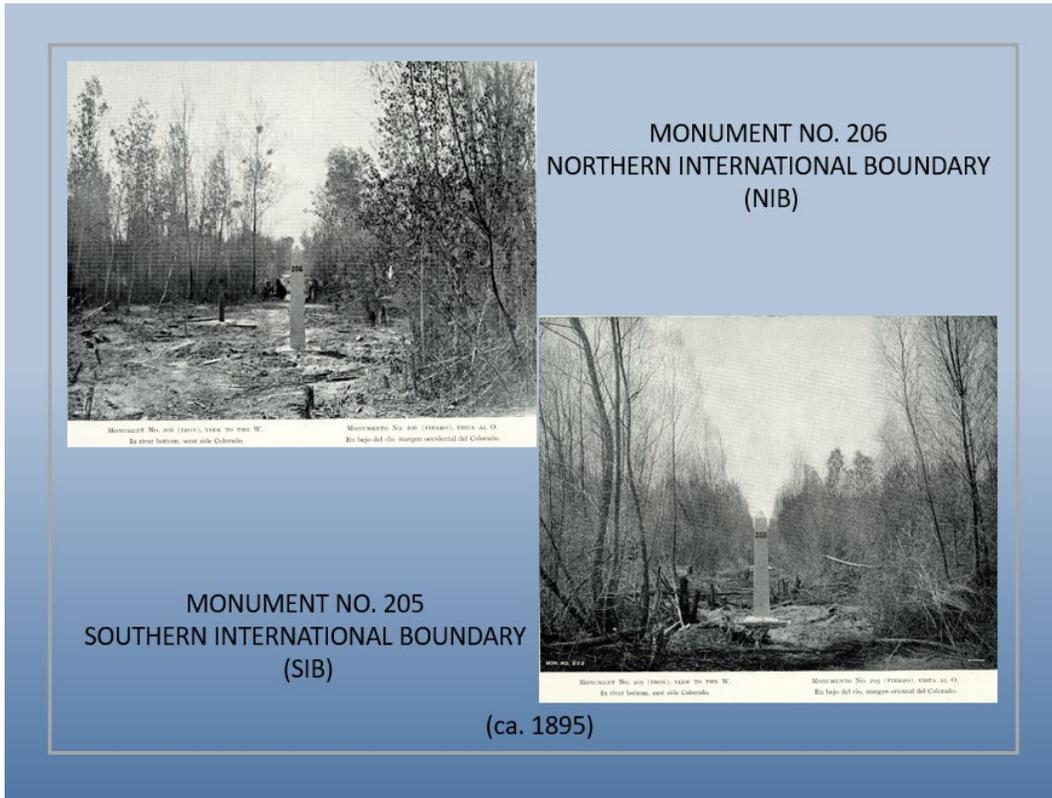


**COLORADO RIVER SALINITY OPERATIONS UNDER  
INTERNATIONAL BOUNDARY AND WATER COMMISSION  
MINUTE No. 242**

**JANUARY 1, 2020 to DECEMBER 31, 2023**



**W. C. “Chad” McIntosh  
United States Commissioner  
International Boundary and Water Commission  
United States Section  
February 26, 2026**



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## INTRODUCTION

This report presents annual salinity levels in the lower Colorado River water as it is being delivered to Mexico. In accordance with the 1944 Water Treaty between the United States of America and Mexico, *Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande*, the United States is obligated to deliver 1,500,000 acre-feet (af) of Colorado River water to Mexico annually. On August 30, 1973, the International Boundary and Water Commission (IBWC), United States and Mexico, approved Minute No. 242, *Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River*, to implement measures to address salinity for waters delivered to Mexico at the Northerly International Boundary (NIB), groundwater pumping in the vicinity of San Luis, and the diversion of discharges of saline water into the Wellton-Mohawk drain that helped create the Santa Clara Wetland.

In 1973, the Governors of the seven basin states of the Colorado River formed the Colorado River Basin Salinity Control Forum (Forum) to recommend and provide oversight on political support and funding to ensure maintenance of water quality in the Colorado River Basin and to develop standards and a plan to implement salinity control to be approved by the United States Environmental Protection Agency. In 1974, the Forum, in coordination with the State Department and the Department of Interior worked with Congress to enact the Colorado River Basin Salinity Control Act (Act) authorizing the construction, operation and maintenance of salinity control works in the Colorado River Basin. Title I of the Act addresses the United States salinity commitments to Mexico. Title II of the Act created the Colorado River Basin Salinity Control Program (Program) which focuses on improving the water quality of the Colorado River to United States users above Imperial Dam. The Forum's purview and objectives are solely related to the Title II provisions of the Act. Operations under Minute No. 242 first began on June 25, 1974, immediately following approval of the Act, Public Law 93-320 that was signed one day earlier, on June 24, 1974. Implementation of the Program has led to the reduction of the annual salt load of the Colorado River by more than 1.2 million tons.

On June 13, 1972, IBWC signed Minute No. 240 titled *Emergency Deliveries of Colorado River Waters for Use in Tijuana* which permitted emergency deliveries of a portion of Colorado River water allotted to Mexico at the international land boundary between San Diego County, California and Tijuana, Baja California under specific conditions. Minute No. 240 was extended or modified by Minute Nos. 243, 246, 252, 256, 259, 260, 263, 266, 267, 280, 287, 310, 314, 322, and 327. Colorado River water emergency deliveries are governed by Minute Nos. 322 or 327 for the years in this report. For salinity calculations, emergency deliveries to Tijuana are included in delivery volumes at the NIB as detailed below.

On November 20, 2012, IBWC signed Minute No. 319, Interim International Cooperative Measures in the Colorado River Basin through 2017 and Extension of Minute No. 318 Cooperative Measures to Address the Continued Effects of the April 2010 Earthquake in the Mexicali Valley, Baja California. This Minute provided for the development of infrastructure improvements and environmental enhancements and included provisions on salinity and other aspects.

On September 21, 2017, IBWC signed Minute No. 323 titled *Extension of Cooperative Measures and Adoption of a Binational Water Scarcity Contingency Plan in the Colorado River Basin*, extending the goals of Minute No. 319 to Minute No. 323 through 2026. With the signing of Minute No. 323 and Intentionally Created Mexican Allocation (ICMA) provisions, delivery and salinity calculations were modified to take into account water delivery deferments from Mexico, creating "Mexico's Water Reserve". See below for more detail or refer to the Minutes identified above.

*The 1944 Water Treaty may be viewed at: <https://www.ibwc.gov/treaties/>  
IBWC Minutes may be viewed at: <https://www.ibwc.gov/minutes/>*

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## ACRONYMS AND SHORT TITLES

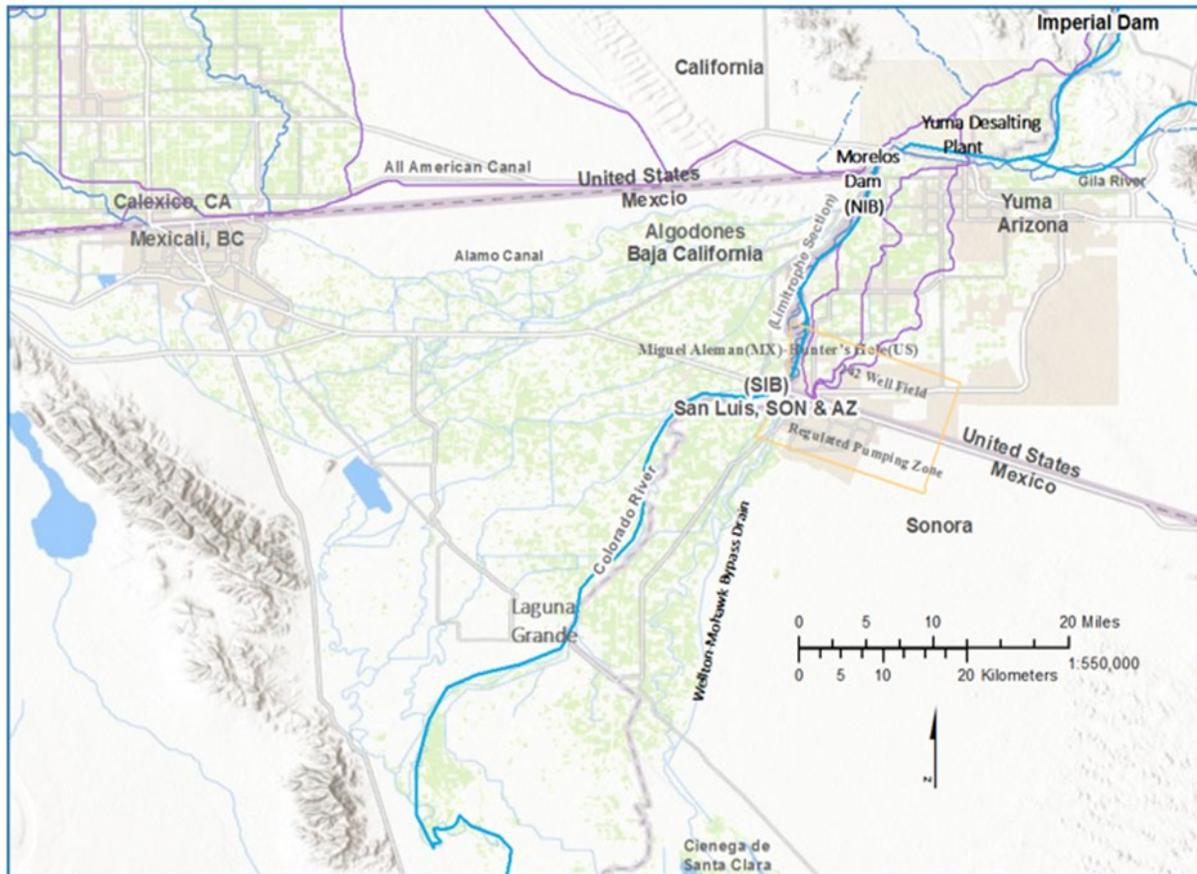
<b>af</b>	acre-feet
<b>BWSCP</b>	Binational Water Scarcity Contingency Plan
<b>CONANP</b>	Comisión Nacional de Áreas Naturales Protegidas
<b>DCP</b>	Drought Contingency Plan
<b>IBWC</b>	International Boundary and Water Commission, U.S. and Mexican Sections
<b>ICMA</b>	Intentionally Created Mexican Allocation
<b>mcm</b>	million cubic meters
<b>MODE</b>	Main Outlet Drain Extension
<b>MxIBWC</b>	Mexican Section of the IBWC
<b>NIB</b>	Northerly International Boundary
<b>ppm (p.p.m.)</b>	parts per million
<b>Reclamation</b>	U.S. Bureau of Reclamation
<b>SIB</b>	Southerly International Boundary
<b>tcm</b>	thousand cubic meters
<b>TDS</b>	total dissolved solids
<b>U.S.</b>	United States
<b>USGS</b>	U.S. Geological Survey
<b>USIBWC</b>	U.S. Section of the IBWC

## COLORADO RIVER SALINITY OPERATIONS UNDER IBWC MINUTE No. 242

January 1 Through December 31, for the Years 2020-2023

Resolution 1(a) of IBWC Minute No. 242 provides that:

*“The United States shall adopt measures to assure that the approximately 1,360,000 acre-feet (1,677,545,000 cubic meters) delivered to Mexico upstream of Morelos Dam, have an annual average salinity of no more than 115 p.p.m.  $\pm$  30 p.p.m. U.S. count (121 p.p.m.  $\pm$  30 p.p.m. Mexican count) over the annual average salinity of Colorado River waters which arrive at Imperial Dam...”*



**Figure 1: Reference Map of Lower Colorado River Area**

This report presents the results of the operations from January 1, 2020 through December 31, 2023, under Minute No. 242. This report is based on United States Section of the IBWC (USIBWC) records on water flows and salinity levels determined jointly by the United States and Mexican Sections of the IBWC, as well as flow-monitoring data from the U.S. Geological Survey (USGS) and volume and chemical investigations data from the U.S. Bureau of Reclamation (Reclamation). Figure 1 shows the locations referred to in this report. **The 2020-2023 records show that the United States operations of the lower Colorado River resulted in compliance (130-140 ppm, within range of 115 +/- 30) with Minute No. 242 based on the U.S. count. The differential for 2021 based on the Mexican count exceeded the established differential by 1 PPM.**

## WATER DELIVERIES AND SALINITY DIFFERENTIAL

### WATERS ARRIVING AT IMPERIAL DAM

The volumes of water arriving at Imperial Dam upstream of the NIB are summarized in Table 1. Imperial Dam serves users in the United States counties of Yuma and Imperial and the country of Mexico. The volume and salinity of water arriving at Imperial Dam are used in the calculation of annual salinity differentials stipulated in Minute No. 242 and described in detail in later sections of this report.

**Table 1. Annual Volumes of Colorado River Water arriving at Imperial Dam (2020-2023)**

Flows Arriving at Above Imperial Dam		
Year	tcm	af
2020	6,550,431	5,310,500
2021	6,789,111	5,504,000
2022	6,612,846	5,361,100
2023	5,984,507	4,851,700

### EMERGENCY WATER DELIVERIES TO TIJUANA, MEXICO

Under IBWC Minute No. 240 as extended by subsequent Minutes, emergency deliveries are made to Tijuana, Baja California, during periods of shortages. These deliveries are made at the international land boundary between San Diego County, California and Tijuana, Baja California. Water from Parker Dam is provided through the All-American Canal to Otay Mesa in San Diego, California. The 2020-2023 Tijuana water delivery volumes are included in Table 2. These deliveries are calculated into the total deliveries made at NIB detailed below and for this report period are governed by IBWC Minutes No. 322 (January 19, 2017 through January 19, 2022) and Minute No. 327 (January 28, 2022 through January 27, 2027).

**Table 2. Annual Volumes of Emergency Deliveries to Tijuana (2020-2023)**

Quantities of Emergency Volumes to Tijuana		
Year	tcm	af
2020	1,853	1,502
2021	0	0
2022	3,419	2,772
2023	3,392	2,750

### IBWC MINUTE No. 242 WATER DELIVERIES TO MEXICO

The volumes of water scheduled for delivery and the actual deliveries to Mexico at all delivery points are summarized in Table 3. The quantities requested by Mexico to be delivered during the years 2020-2023 were in accordance with Articles 10 and 15 of the 1944 Water Treaty. The volumes of Mexico's annual allocations were reduced in 2022 and 2023 pursuant to the provisions in Section III.A. of Minute No. 323 based on the results of the prior year August 24-Month Study. Additionally, volumes were designated for Mexico's Water Reserve and for the Binational Water Scarcity Contingency Plan (BWSCP) during the report period and are included as "Volume of ICMA created" or "Volume of ICMA delivered" in the volume and salinity calculations below (see section titled "Activities in the Lower Colorado River Limitrophe and Delta" for descriptions of these programs). Deliveries were made at the NIB located at the

riverbed above Morelos Diversion Dam, and across the Southerly International Boundary (SIB) located at the southern land boundary near San Luis, Arizona. Deliveries across the SIB include the water diversions made into the limitrophe of the river below Morelos Dam. Other water arriving in the limitrophe of the Colorado River (Table 3) are deliveries not scheduled by Mexico.

**Table 3. Annual Volumes of Minute No. 242 Water Deliveries to Mexico (2020-2023)**

Delivery Site	Year	Scheduled Deliveries <sup>1</sup>		Actual Deliveries Made	
		(tcm)	(af)	(tcm)	(af)
NIB (“at the riverbed above Morelos Dam”) <sup>2,3</sup>	2020	1,678,234	1,360,561	1,705,697	1,382,826
	2021	1,678,234	1,360,561	1,708,361	1,384,985
	2022	1,615,871	1,310,003	1,645,336	1,333,890
	2023	1,591,201	1,290,002	1,621,904	1,314,894
SIB (“across the land boundary near San Luis, Arizona,” includes water flows through the limitrophe of the river below Morelos Dam) <sup>4</sup>	2020	172,000	139,442	121,880	98,809
	2021	172,000	139,442	116,423	94,385
	2022	172,689	140,000	145,290	117,788
	2023	172,689	140,000	145,179	117,698
Mexico Water Reserve Created Pursuant to Minute No. 323 Section V (Downward Delivery Adjustment) <sup>3</sup>	2020	83,130	67,394	83,130	67,394
	2021	48,059	38,962	48,059	38,962
	2022	6,362	5,158	6,362	5,158
	2023	21,342	17,302	21,342	17,302
Mexico Water Reserve Delivered Pursuant to Minute No. 323 Section V (Upward Delivery Adjustment) <sup>3</sup>	2020	0	0	0	0
	2021	43,200	35,023	43,200	35,023
	2022	43,144	34,977	43,144	34,977
	2023	0	0	0	0
Mexico Recoverable Water Savings contributed to BWSCP Pursuant to Minute No. 323 Section IV (Downward Delivery Adjustment) <sup>3</sup>	2020	0	0	0	0
	2021	50,573	41,000	50,573	41,000
	2022	37,005	30,000	37,005	30,000
	2023	37,005	30,000	37,005	30,000
Mexican Allocation: 1944 Water Treaty Article 10(a) volume less Minute No. 323 Section III reduction (excludes Minute No. 323 Section IV and V Adjustments)	2020	1,850,234	1,500,003	1,831,464	1,484,786
	2021	1,850,234	1,500,003	1,880,969	1,524,920
	2022 <sup>5</sup>	1,788,560	1,450,003	1,799,371	1,458,768
	2023 <sup>5</sup>	1,763,890	1,430,000	1,774,587	1,438,676
Other water delivered [arriving] to Mexico in the Limitrophe Section <sup>6</sup> (included in NIB volumes)	2020	--	--	64,360	52,177
	2021	--	--	35,594	28,856
	2022	--	--	11,034	8,945
	2023	--	--	69,045	55,975

<sup>1</sup>Source: Mexico schedule

<sup>2</sup>Sources (volumes in tcm): NIB + Cooper Wasteway + Tijuana + Volume of ICMA created + Wellton Mohawk Drain diversions – Volume of ICMA delivered

<sup>3</sup>Downward and upward adjustments are included in “Volume of ICMA created” and “Volume of ICMA delivered” volumes, respectively.

<sup>4</sup>Sources (volumes in tcm): SIB Combined Flow (East Main Canal Wasteway, West Main Canal Wasteway, Main Drain, 242-Lateral) + 11-Mile Wasteway + 21-Mile Wasteway - Diversion Channel. Diversion Channel is subtracted only for the months of Sept.-Dec. under Minute No. 323 (previously Jan., Oct., Nov., and Dec. under Minute No. 319), when flows are diverted into the Wellton-Mohawk Bypass Drain.

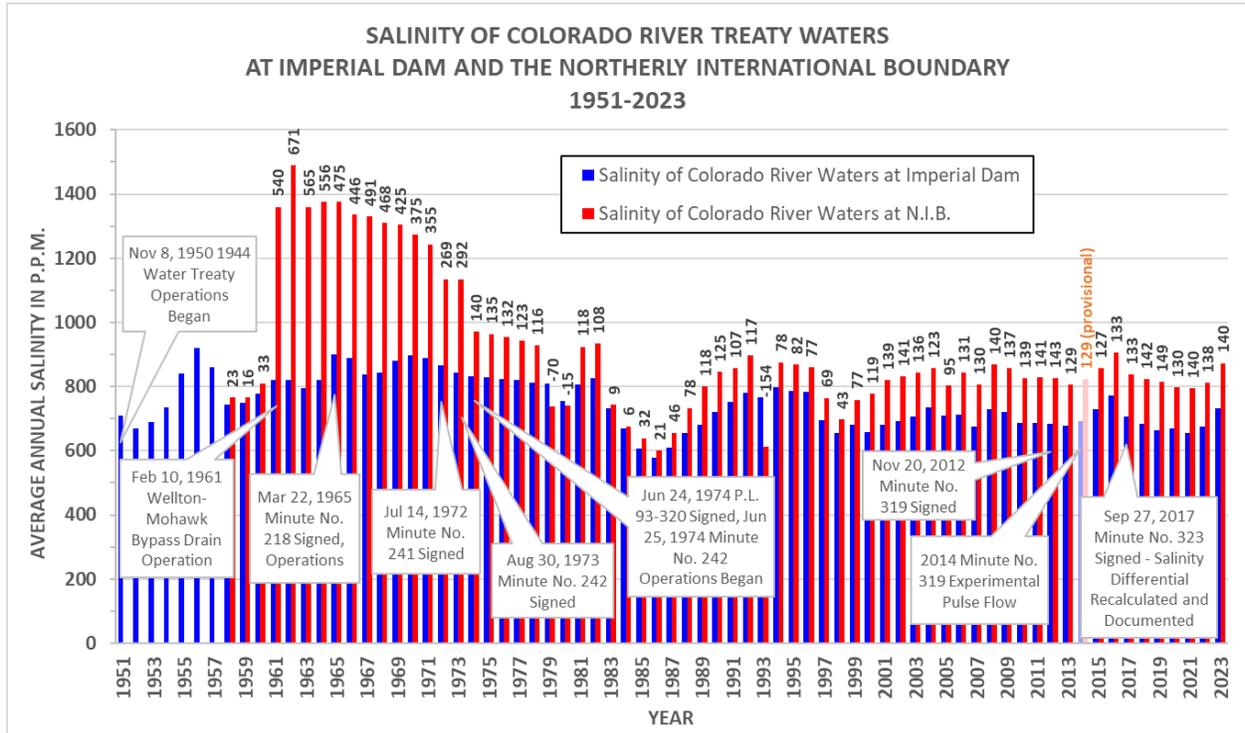
<sup>5</sup>Mexican Allocation reduced pursuant to Minute No. 323 section III - 50,000 af in 2022, 70,000 af in 2023.

<sup>6</sup>Source: USIBWC Yuma Field Office calculations.

## IBWC MINUTE No. 242 SALINITY LEVELS AND SALINITY DIFFERENTIALS

Resolution 1(a) of Minute No. 242 stipulates that:

*“The United States shall adopt measures to assure ... annual average salinity of no more than 115 p.p.m.  $\pm$  30 p.p.m. U.S. count (121 p.p.m.  $\pm$  30 p.p.m. Mexican count) over the annual average salinity of Colorado River waters which arrive at Imperial Dam...”*



**Figure 2. Flow-Weighted Annual Average Salinity Levels of Water Arriving at Imperial Dam since 1951 and Delivered at NIB since 1958.**

*The first full year of deliveries to Mexico under the 1944 Water Treaty was 1951. Numbers above the columns indicate the annual salinity differentials. A full-page image of this graph is in Appendix B.*

For 2020-2023 the salinity and differential for Colorado River waters at Imperial Dam and the NIB were similar in magnitude and variation to recent history (Figure 2). Compared to 1944 Water Treaty and Minute stipulated guidelines:

- Both United States and Mexican values are between acceptable ranges as agreed to in Minute No. 242 for 2020, 2022, and 2023.
- While the 2021 United States count salinity differential is within the Minute No. 242 guidelines by 5 ppm, the 2021 Mexican count salinity differential exceeds the Minute No. 242 guidelines by 1 ppm.

**Table 4. U.S. and Mexico NIB and Imperial Dam Salinity Levels and Differentials (2020-2023)**

*Minute No. 242, Resolution 1(a) 115 ppm ± 30 ppm U.S. count, 121 ppm ± 30 ppm Mexican count*

<b>Waters</b>	<b>Year</b>	<b>U.S. Count (ppm)</b>	<b>Mexican Count (ppm)</b>
Arriving Upstream of Morelos Diversion Dam at NIB	2020	798	895
	2021	795	912
	2022	811	922
	2023	873	956
Arriving at Imperial Dam	2020	668	761
	2021	655	760
	2022	674	775
	2023	733	816
Salinity Differential	2020	130	134
	2021	140	152
	2022	138	147
	2023	140	140

**Table 5. U.S. Annual Average Minute No. 242 Flow-Weighted Salinity Levels and Differentials (2020-2023)**

<b>Year<sup>1</sup></b>	<b>Annual Average Salinity (U.S. Count) as TDS (ppm)</b>		<b>Salinity Differential (U.S. Count) (ppm)</b>
	<b>At Imperial Dam</b>	<b>Upstream of Morelos Dam</b>	
2020	668	798	130
2021	655	795	140
2022	674	811	138
2023	733	873	140

<sup>1</sup>A complete record starting in 1974 is available in Appendix A.

USIBWC collects samples at NIB, tests and distributes samples to MxIBWC and Reclamation. USIBWC sends samples twice a month to Reclamation to conduct a complete chemical analysis. From the complete analysis, a factor is produced that is used to convert the electrical conductivity to the corresponding salinity value as Total Dissolved Solids (TDS) in milligrams per liter (MG/L). IBWC and Reclamation results must not differ by more than 30 micro-Siemens/deciliter, otherwise resampling is required. Reclamation collects samples at Imperial Dam and distributes samples to MxIBWC and USIBWC and samples are tested, and results compared. Reclamation staff at Imperial Dam produce a salinity factor twice a month for this location. The NIB and Cooper flows come from USIBWC measurements and records, and the Imperial Dam flows come from USGS.

The calculation for the annual average salinity of the Colorado River waters delivered to Mexico under Minute No. 323 is by the calculation below. Differences between the United States and Mexico are due to laboratory methods.

Sum of the volumes upstream of Morelos Dam\*salinity used for the salinity calculation =  
 Volume delivered to NIB\*salinity at NIB  
 +Volume of ICMA Created\*salinity at Imperial Dam  
 -Volume of ICMA Delivered\*salinity at Imperial Dam  
 +Volume at Cooper Lateral\*salinity of Imperial Dam  
 +Volume Delivered to Tijuana\*salinity at Imperial Dam  
 +Volume diverted into the Wellton-Mohawk Drain\*salinity at the point of delivery into the Wellton-Mohawk Drain.

### **DELIVERIES AT THE SOUTHERLY INTERNATIONAL BOUNDARY (SIB)**

Resolution 1(b) of Minute No. 242 provides that:

*“The United States will continue to deliver to Mexico on the land boundary at San Luis and in the limitrophe section of the Colorado River downstream from Morelos Dam approximately 140,000 acre-feet (172,689,000 cubic meters) annually with a salinity substantially the same as that of the waters customarily delivered there.”*

The annual volumes of water delivered to Mexico on the land boundary at San Luis through the Sanchez Mejorada Canal and in the limitrophe section of the river below Morelos Dam under Minute No. 242 began on June 25, 1974. Results for 2020-2023 for this report are shown below. To view the complete record, see Appendix A. These volumes exclude the Wellton-Mohawk drainage water that was bypassed in accordance with Minute No. 242 delivery volumes on the land boundary at San Luis and in the limitrophe section made in 2020-2023 and was less than the annual volume of 172,689 tcm (140,000 af) referred to in IBWC Minute No. 242. The quantity of water to make up the difference was delivered in the bed of the Colorado River above Morelos Dam, as stipulated in Resolution 1(c) of IBWC Minute No. 242, which states: *“Any decrease in deliveries under point 1(b) will be made up by an equal increase in deliveries under point 1(a)”* (Point 1(a) is referenced above).

**Table 6. Annual Volumes of Water Delivered to Mexico at SIB (2020-2023)**

Year <sup>1</sup>	Annual Volume Delivered	
	(tcm)	(af)
2020	121,880	98,809
2021	116,423	94,385
2022	145,290	117,788
2023	145,179	117,698

<sup>1</sup>A complete record starting in 1974 is available in Appendix A.

**Table 7. Annual Average Flow-Weighted Salinity of Water Delivered to Mexico at SIB (2020-2023)**

Year <sup>1</sup>	Annual Average Flow-Weighted Salinity (U.S. Count)
2020	1,171
2021	1,142
2022	1,162
2023	1,199

<sup>1</sup>A complete record starting in 1974 is available in Appendix A.

Deliveries for NIB and SIB are calculated as follows:

- **Actual deliveries at NIB (Minute No. 319, volumes in tcm)** = NIB + Cooper Wasteway + Tijuana
- **Actual deliveries at NIB (Minute No. 323, volumes in tcm)** = NIB + Volume of ICMA Created– Volume of ICMA Delivered + Cooper Wasteway + Tijuana + Diversions into the Wellton-Mohawk Bypass Drain
- **Actual deliveries at SIB** = SIB Combined Flow (East Main Canal Wasteway, West Main Canal Wasteway, Main Drain, 242 Lateral) + 11-Mile Wasteway + 21-Mile Wasteway – Diversion Channel

*(Diversion Channel is subtracted only for the months of Jan., Oct., Nov., and Dec. for Minute No. 319 and Sep.-Dec. for Minute No. 323, when flows are diverted into the Wellton-Mohawk Bypass)*

## QUANTITIES OF UNITED STATES BYPASS DRAIN WATER

The Yuma Desalting Plant, which is located four miles west of Yuma, was built to reduce the salinity of pumped drainage water from the Wellton-Mohawk Irrigation and Drainage District before the water is returned to the Colorado River. Pending completion and operation of desalting projects, the United States adopted an interim measure to achieve the agreed-upon salinity differential. This measure consisted of discharging all Wellton-Mohawk pumped drainage water into the Wellton-Mohawk Bypass Drain, which conveys these waters to the Santa Clara Slough in Mexico now commonly referred to as the Ciénega de Santa Clara (see section titled “Ciénega de Santa Clara”), the largest wetland in the Colorado River Delta. These volumes also include diversions by the Main Outlet Drain Extension (MODE) 3, below Morelos Dam, into the Limitrophe. A MODE improvement project diverted flows below Morelos Dam into the Limitrophe while halting flows to the Bypass Drain Extension and to the Ciénega de Santa Clara for approximately four months at the end of 2019 and into 2020 (see section titled “MODE Diversion Structure Project”). The project impacted United States Wellton-Mohawk Bypass Drain water delivered at SIB in 2020 (Table 8).

**Table 8. Annual Volumes of U.S. Bypass Drain Water Delivered at SIB (2020-2023)**

Year <sup>1</sup>	Annual Volume Discharged	
	(tcm)	(af)
2020	161,665	131,063
2021	165,947	134,535
2022	173,725	140,841
2023	145,530	117,983

<sup>1</sup>A complete record starting in 1974 is available in Appendix A.

## GROUNDWATER – MINUTE No. 242 WELL FIELD

Point 5 of Minute No. 242 provides that:

*“Pending the conclusion by the Governments of the United States and Mexico of a comprehensive agreement on groundwater in the border areas, each country shall limit pumping of groundwaters in its territory within five miles (eight kilometers) of the Arizona-Sonora boundary near San Luis to 160,000 acre-feet (197,358,000 cubic meters) annually.”*

MxIBWC reports to the USIBWC the annual volumes of water pumped from the San Luis Mesa Well Field within Mexico. The 2020-2023 volumes pumped within Mexico are reported in Table 9.

**Table 9: Annual Volumes Pumped by Mexico from its San Luis Mesa Well Field (2020-2023)**

*From locations within five miles (eight kilometers) of the Arizona-Sonora boundary near San Luis.*

Year <sup>1</sup>	Annual Volume Pumped	
	(tcm)	(af)
2020	146,647	118,889
2021	160,306	129,962
2022	167,383	135,699
2023	120,635	97,800

<sup>1</sup>A complete record starting in 1975 is available in Appendix A.

Part of Reclamation’s Protective and Regulatory Pumping Unit, the 242 Well Field, consists of 21 groundwater wells within a five-mile strip adjacent to the international boundary near San Luis, AZ commonly referred to as the Minute No. 242 Well Field. Table 10 provides the annual quantities pumped by the United States from the Minute No. 242 Well Field and the total water pumped within five miles of the boundary near San Luis from 2020 through 2023 (limited to 160,000 acre-feet [197,358,000 cubic meters] for each country pursuant to Minute No. 242). Water from these wells is then delivered to Mexico at the SIB in partial satisfaction of the 1944 Water Treaty as substitution for Main Drain water diverted to the United States Bypass Drain. In 2020-2023, all 21 wells were pumped. To view the complete record, see Appendix A.

**Table 10: Total Volumes Pumped by the United States from the 242 Well Field (2020-2023)**

Year <sup>1</sup>	Total Volume Pumped <sup>2</sup>		242 Well Field Volume Pumped	
	(tcm)	(af)	(tcm)	(af)
2020	33,588	27,230	24,811	20,155
2021	62,152	50,388	52,644	42,695
2022	84,866	68,802	75,131	60,910
2023	71,158	57,688	61,380	49,761

<sup>1</sup>A complete record starting in 1975 is available in Appendix A.

<sup>2</sup>Provisional data, total volume pumped is partially estimated.

## ACTIVITIES IN THE LOWER COLORADO RIVER LIMITROPHE AND DELTA

### MINUTE Nos. 319/323

On November 20, 2012, IBWC signed Minute No. 319, *Interim International Cooperative Measures in the Colorado River Basin through 2017 and Extension of Minute No. 318 Cooperative Measures to Address the Continued Effects of the April 2010 Earthquake in the Mexicali Valley, Baja California*. This Minute provided for the development of infrastructure improvements and environmental enhancements and included provisions on salinity and other studies to increase efficiency in the region. Minute No. 323 *Extension of Cooperative Measures and Adoption of a Binational Water Scarcity Contingency Plan in the Colorado River Basin* was signed September 21, 2017. Minute No. 323 further develops the work accomplished under Minute No. 319 and continues to explore the potential for future conservation studies and projects while implementing binational water conservation measures.

Minute No. 319 allowed Mexico to defer water deliveries through adjustments to its annual schedule. Water deliveries could be deferred either through a program of ICMA or through the cooperative measures established under Minute No. 318 to address the continued effects of the April 2018 earthquake in the Mexicali Valley, Baja California. Water for the ICMA program would come from conservation projects or new water sources which would be subsequently available under terms that are consistent with drought preventative measures. Replacing and extending the measures from Minute No. 319, Minute No. 323 allows Mexico to continue to defer water deliveries for storage in one of three categories. These deferred volumes are stored as Emergency Storage, Revolving Account, or ICMA. Collectively these are referred to as Mexico's Water Reserve and include waters deferred under Minute Nos. 318 and 319. Volumes for the report period are included in Table 3. A description of the processes to create or use Mexico Water Reserves and the terms for storage and deliveries are outlined in Minute Nos. 318, 319, and 323. For purposes of salinity and volume delivery calculations, Emergency Storage, Revolving Account, ICMA volumes, and Recoverable Savings under the BWSCP are combined into the "Volume of ICMA created" or "Volume of ICMA delivered" terms in the formulas included above that were developed by the Binational Salinity Work Group. Water conservation projects are reviewed and evaluated for future development on a continual basis.

Under Minute No. 319 restoration sites were established with ~1200 acres of riparian habitat along the approximately 100 miles below Morelos Dam to maintain the Pacific Flyway to benefit migratory birds. Minute No. 319 also included \$18 million in infrastructure improvements to Irrigation District 014, including canal linings, gate structures, laser leveling of fields all to improve efficiency and conserve water. An experimental pulse flow of approximately 132 million cubic meters (mcm) was released from Morelos Dam during March 23 - May 18, 2014 into the dry Colorado River channel below and briefly re-established the historical connection between the Colorado River and the Sea of Cortez. Under Minute No. 323 water deliveries to restoration sites were achieved and infrastructure projects designed to increase the efficiency of these water deliveries were implemented allowing for the maintenance of three existing restoration sites along the channel of the Colorado River in Mexico. An extensive monitoring program is in place through the Environmental Work Group to assess restoration and water delivery efforts. Detailed implementation and monitoring reports for Minute No. 319 and Minute No. 323 activities will be published as they are completed at: <https://www.ibwc.gov/reports-studies/>.

### DROUGHT CONTINGENCY PLAN (DCP)

On May 20, 2019, representatives from all seven United States Colorado River Basin states signed the DCP (<https://www.usbr.gov/dcp/docs/final/Companion-Agreement-Final.pdf>), an historical and important accomplishment, designed to reduce risks from ongoing drought to Colorado River water users in the Western United States and Mexico. It was a collaborative effort of local, state, and federal agencies, Tribes,

and governmental and non-governmental organizations. The DCP was authorized by the United States Congress on April 16, 2019 via H.R.2030 (<https://www.congress.gov/bill/116th-congress/house-bill/2030>). Several Minute No. 323 BWSCP components rely on the Drought Contingency Plan and the combined authorization of Minute No. 323 and the Drought Contingency Plan facilitate continued efforts to address water scarcity in the United States and Mexico including compliance with provisions of the 1944 Water Treaty and Minute No. 242 as described in this report. Volumes conserved by Mexico in accordance with the BWSCP are included in Table 3 and are combined into the “Volume of ICMA created” or “Volume of ICMA delivered” terms in the formulas included above that were developed by the Binational Salinity Work Group.

## **POST-2026 COLORADO RIVER OPERATIONS PLANNING**

Some of the current Colorado River operational guidelines are set to expire at the end of 2026. A multi-agency stakeholder team led by Reclamation is planning for Post-2026 Colorado River operations using a multi-year National Environmental Policy Act review process. Information on the overall process and the current status can be obtained through the Reclamation website at: <https://www.usbr.gov/ColoradoRiverBasin/post2026/index.html>.

## **MODE DIVERSION STRUCTURE PROJECT**

Reclamation began a project in September 2019 to replace the Diversion Structure at the MODE including construction of a reinforced concrete diversion structure, pipe connection well and two Outlet transitions. Work was located in the Wellton-Mohawk Irrigation and Drainage District, Colorado River Front Work and Levee System, approximately 3 miles east of Yuma, Arizona. This project halted the flow to the Ciénega de Santa Clara for approximately four months (September 5, 2019 - January 5, 2020) which was monitored by teams that were in the region performing Minute No. 323 monitoring studies. This was a Binational effort by scientists from the Universidad Autonoma de Baja California (Autonomous University of Baja California, UABC) and the University of Arizona in Tucson.

## **CIÉNEGA DE SANTA CLARA**

The Ciénega de Santa Clara is the largest wetland (approximately 15,000 acres) in the Colorado River Delta and one of the largest within the entire Colorado River Basin that provides critical habitat for resident and migratory wildlife. The origins of the Ciénega date back to 1977 with the beginning of the disposal of brackish groundwater from the Wellton-Mohawk Irrigation and Drainage District in Arizona into the region now known as the Ciénega de Santa Clara. The Ciénega is a protected area managed by Mexico's natural lands protection commission, Comisión Nacional de Áreas Naturales Protegidas (CONANP). The Ciénega vegetation is dominated by cattail, with some stands of common reed, and bulrush. These species of plants are tolerant of the saline conditions. The Ciénega has flourished under these conditions and benefited from the brackish discharges.

The Ciénega provides habitat for over 260 species of birds, including marsh birds, shorebirds, waterfowl, and migratory birds, as well as dozens of fish species. Two listed species inhabit the Ciénega: the Yuma clapper rail and the desert pupfish. Both are listed as endangered in the United States, while the pupfish is classified as endangered, and the clapper rail is classified as threatened in Mexico. Habitat of this type in the West has become fragmented or eliminated, making this area vital for both resident and migratory species. The Ciénega has also become an important resource for the local economy for fishing, building materials and ecotourism.

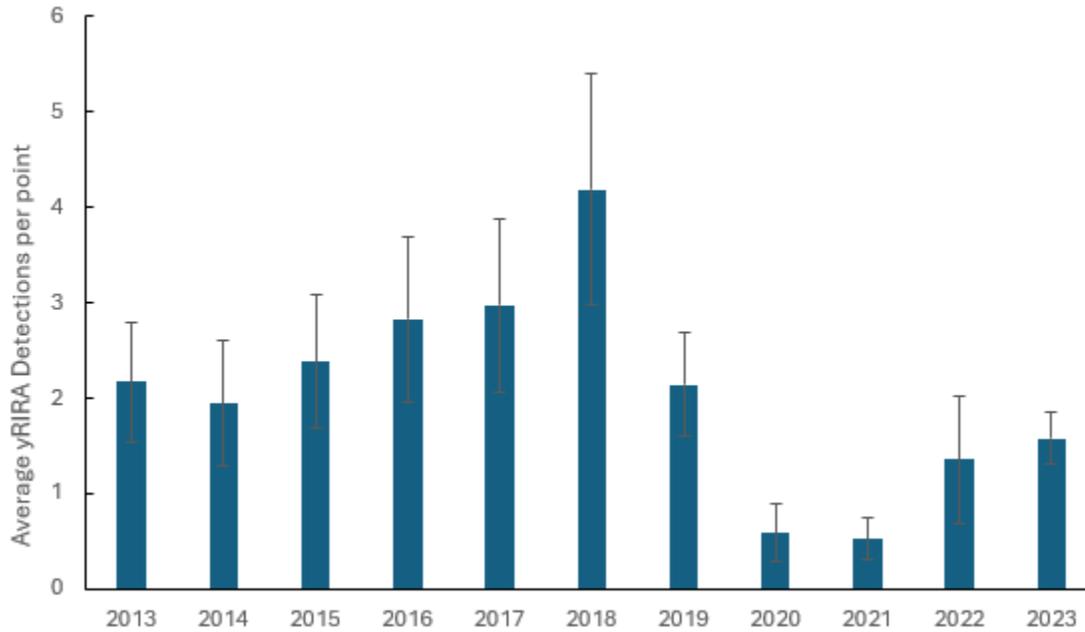


Photos taken by IBWC, Yuma Field Office staff.

For annual volumes delivered to the Ciénega, see the section titled “Quantities of United States Bypass Drain Water” above. Deliveries through the Wellton-Mohawk Bypass Drain started in 1974 and are listed in Table 8 for the report period. Completion of the Wellton-Mohawk Bypass Drain extension to the Santa Clara Slough in Mexico occurred in 1977. Daily discharge data has been collected for the Wellton-Mohawk Bypass Drain at the Southerly International Boundary since June 1977 and daily discharge data is available in Flow of the Colorado River and W. Boundary Streams Water Bulletins from 1977 - 2006 on the IBWC website at <https://www.ibwc.gov/water-data/>. Due to pending equipment upgrades, more recent discharge data is available on request through the USIBWC Yuma Field Office: <https://www.ibwc.gov/field-offices/#western-land>.

Since 1999, Pronatura Noroeste with the support of Mexico’s CONANP Upper Gulf of California and Colorado River Delta Biosphere Reserve have surveyed for wetland birds in the Ciénega de Santa Clara. The monitoring efforts utilize call-response surveys to monitor secretive marsh birds at 130 survey points twice per year during breeding season and since 2003 have followed the Standardized Protocols for Monitoring Marsh Birds in North America, targeting Black Rail (BLRA), Least Bittern (LEBI), Sora (SORA), Virginia Rail (VIRA), Yuma Ridgway’s (clapper) Rail (yRIRA) and American Bittern (AMBI).

The yRIRA was listed as endangered on March 11, 1967, pursuant to the Endangered Species Act of 1966. California lists yRIRA as threatened. Arizona classified yRIRA in 1978 as a species of special concern, similar to the Federal status of endangered. Nevada classifies the yRIRA as endangered, and it is listed as threatened in Mexico. The Ciénega provides habitat to approximately 70-75% of the endangered species. Generally, yRIRA detections at different points fluctuate throughout the monitoring period, ranging on average from 1 to 4 records per point each year, with an overall 24-year average of 2.05 rails per point (Figure 3). The lowest number of detections occurred in 2021, with an average total of 64.5 Yuma Ridgway’s Rails detected (Table 11, 0.52 average rails per point).



**Figure 3. Average yRIRA Detections Per Point in the Ciénega de Santa Clara (2013-2023)**

Detections of all marsh birds similarly varied from 2013-2023 (Table 11) with the two lowest average detections of all marsh birds occurring in 2021 and 2020 respectively.

**Table 11. Average Detections of Marshbirds in the Ciénega de Santa Clara (2013-2023)**

Year	AMBI	BLRA	LEBI	yRIRA	SORA	VIRA	Total
2013	23	4	199	333	47	221	<b>826</b>
2014	14	2	218	222	118	146	<b>717</b>
2015	11	14	321	280	82	214	<b>921</b>
2016	10	4	250	327	80	196	<b>863</b>
2017	20	12	271	320	86	190	<b>899</b>
2018	21	8	246	479	81	146	<b>980</b>
2019	14	6	147	260	75	92	<b>592</b>
2020	4	8	162	74	97	37	<b>380</b>
2021	1	3	117	65	40	62	<b>286</b>
2022	3	0	167	134	55	70	<b>428</b>
2023	3	5	176	205	44	55	<b>487</b>

## ACKNOWLEDGMENTS

The full cooperation of the U.S. Geological Survey and the U.S. Bureau of Reclamation, as reported herein, is acknowledged with appreciation. This cooperation enabled compliance with the 1944 Water Treaty and with the salinity agreement with Mexico.

## APPENDIX A: HISTORY (1974.5-2023) FOR TABLES 5 THROUGH 10

*Minute No. 242 became effective on June 25, 1974*

*Note that 2014 data has not been mutually approved by both Sections of the IBWC and is provisional.*

*\*TCM units converted using a conversion of 1 acre-foot= 1233.489 cubic meters*

<b>Table 5. Annual Average Flow-Weighted Salinities of the water of the Colorado River delivered upstream of Morelos Diversion Dam [at Northerly International Boundary] and at Imperial Dam [Resulting from Operations under IBWC Minute No. 242, since the Colorado River Salinity Control Act, as amended, became effective on June 24, 1974]</b>			
Year	Annual Average Salinity (U.S. Count) as TDS (ppm)		Differential (U.S. Count) (ppm)
	At Imperial Dam	Upstream of Morelos Dam	
1974 (Effective 6/25-12/31)	832	972	140
1975	829	964	135
1976	823	955	132
1977	820	943	123
1978	812	928	116
1979	809	739	-70
1980	755	740	-15
1981	806	924	118
1982	825	933	108
1983	733	742	9
1984	670	676	6
1985	607	639	32
1986	579	600	21
1987	610	656	46
1988	655	733	78
1989	682	800	118
1990	721	846	125
1991	751	858	107
1992	781	898	117
1993	767	613	-154
1994	797	875	78
1995	787	869	82
1996	782	859	77
1997	695	764	69
1998	655	698	43
1999	681	758	77
2000	659	778	119
2001	681	820	139
2002	691	832	141
2003	706	842	136
2004	735	858	123
2005	708	803	95
2006	713	844	131
2007	675	805	130

**Table 5. Annual Average Flow-Weighted Salinities of the water of the Colorado River delivered upstream of Morelos Diversion Dam [at Northerly International Boundary] and at Imperial Dam [Resulting from Operations under IBWC Minute No. 242, since the Colorado River Salinity Control Act, as amended, became effective on June 24, 1974]**

Year	Annual Average Salinity (U.S. Count) as TDS (ppm)		Differential (U.S. Count) (ppm)
	At Imperial Dam	Upstream of Morelos Dam	
2008	728	868	140
2009	721	858	137
2010	686	825	139
2011	687	828	141
2012	683	826	143
2013	677	806	129
2014 <sup>5</sup>	693	822	129
2015	729	856	127
2016	772	905	133
2017	705	838	133
2018	683	824	142
2019	665	814	149
2020	668	798	130
2021	655	795	140
2022	674	811	138
2023	733	873	140

<sup>5</sup>Due to Minute No. 319 experimental flows, binational data for 2014 has not been made official and is provisional.

**Table 6. Annual Volumes of Water scheduled (actually delivered) to the Sanchez Meiorada Canal, at the Southerly International Boundary near San Luis, Arizona, and in the Limitrophe Section of the Colorado River below Morelos Dam (Under IBWC Minute No. 242, since the Colorado River Salinity Control Act, as Amended; effective on June 24, 1974)**

Year	Annual Volume Delivered	
	(tcm)	(af)
1974 (June 25 – Dec. 31)	70,377	57,055
1975	133,377	107,916
1976	133,328	108,090
1977	115,034	93,259
1978	99,409	80,592
1979	108,263	87,770
1980	126,058	102,196
1981	143,077	115,994
1982	134,843	107,697
1983	120,616	97,784
1984	138,007	111,884
1985	138,091	111,952
1986	153,974	124,829
1987	145,581	118,025

**Table 6. Annual Volumes of Water scheduled (actually delivered) to the Sanchez Mejorada Canal, at the Southerly International Boundary near San Luis, Arizona, and in the Limitrophe Section of the Colorado River below Morelos Dam (Under IBWC Minute No. 242, since the Colorado River Salinity Control Act, as Amended; effective on June 24, 1974)**

Year	Annual Volume Delivered	
	(tcm)	(af)
1988	138,832	112,553
1989	167,355	135,677
1990	165,169	133,905
1991	166,289	134,813
1992	157,069	127,338
1993	139,929	113,442
1994	155,091	125,734
1995	144,663	117,279
1996	144,331	117,010
1997	142,013	115,131
1998	159,782	129,537
1999	164,643	133,477
2000	169,577	137,478
2001	164,736	133,553
2002	151,919	123,162
2003	141,523	114,734
2004	160,957	130,488
2005	157,437	127,634
2006	155,992	126,465
2007	168,661	136,735
2008	165,841	134,449
2009	175,567	142,334
2010	154,688	125,407
2011	167,242	135,585
2012	153,895	124,764
2013	157,930	128,036
2014	162,940	132,097
2015	184,931	149,925
2016	176,927	143,436
2017	164,390	133,272
2018	159,983	129,700
2019	144,931	117,497
2020	121,880	98,809
2021	116,423	94,385
2022	145,290	117,788
2023	145,179	117,698

**Table 7. Annual Average Flow-Weighted Salinities of the water delivered to Mexico at the Southerly International Boundary** (Under IBWC Minute No. 242, since the Colorado River Basin Salinity Control Act, as amended, became effective on June 24, 1974)

<b>Year</b>	<b>Annual Average Flow-Weighted Salinity (U.S. Count) as TDS (ppm)</b>
1974 (Effective 6/25 – 12/31)	1,515
1975	1,500
1976	1,480
1977	1,510
1978	1,470
1979	1,538
1980	1,582
1981	1,572
1982	1,470
1983	1,434
1984	1,487
1985	1,513
1986	1,496
1987	1,431
1988	1,488
1989	1,300
1990	1,333
1991	1,223
1992	1,312
1993	1,306
1994	1,299
1995	1,313
1996	1,358
1997	1,341
1998	1,214
1999	1,242
2000	1,173
2001	1,192
2002	1,166
2003	1,094
2004	1,155
2005	1,103
2006	995
2007	984
2008	1,032
2009	1,116
2010	1,103
2011	1,157
2012	1,142

**Table 7. Annual Average Flow-Weighted Salinities of the water delivered to Mexico at the Southerly International Boundary** (Under IBWC Minute No. 242, since the Colorado River Basin Salinity Control Act, as amended, became effective on June 24, 1974)

<b>Year</b>	<b>Annual Average Flow-Weighted Salinity (U.S. Count) as TDS (ppm)</b>
2013	1,146
2014	1059
2015	1,146
2016	1,070
2017	1,136
2018	1,069
2019	1,029
2020	1,171
2021	1,142
2022	1,162
2023	1,199

**Table 8. United States Bypass Drain Water delivered at Southerly International Boundary (SIB)**  
(Extension from the Bypass Drain to the Santa Clara Slough was not complete until 1977)

<b>Year</b>	<b>Annual Volume Discharged</b>	
	<b>(tcm)</b>	<b>(af)</b>
1974 (6/25 – 12/31)	140,180	113,645
1975	264,866	214,729
1976	253,353	205,395
1977	255,113	206,822
1978	224,540	182,036
1979	219,472	177,928
1980	190,735	154,630
1981	183,082	148,426
1982	184,651	149,698
1983 <sup>6</sup>	2,209,881	1,791,571
1984 <sup>7</sup>	1,549,442	1,256,152
1985	159,987	129,704
1986	135,747	110,052
1987	120,562	97,741
1988	158,103	128,176
1989	170,990	138,624
1990	164,900	133,690
1991	173,583	140,726
1992	124,716	101,109
1993 <sup>8</sup>	757,843	614,393
1994	156,477	124,435
1995	154,772	125,475
1996	138,632	112,390
1997	109,971	89,155

**Table 8. United States Bypass Drain Water delivered at Southerly International Boundary (SIB)**  
(Extension from the Bypass Drain to the Santa Clara Slough was not complete until 1977)

Year	Annual Volume Discharged	
	(tcm)	(af)
1998	140,332	113,769
1999	97,044	78,675
2000	132,530	107,443
2001	127,969	103,746
2002	150,176	121,749
2003	141,523	114,734
2004	121,883	98,812
2005	132,519	107,433
2006	132,617	107,514
2007	131,914	106,944
2008	142,387	115,435
2009	141,567	114,770
2010	144,892	117,465
2011	161,108	130,612
2012	155,697	126,225
2013	136,805	110,910
2014	178,364	144,601
2015	187,478	151,990
2016	185,260	150,192
2017	156,285	126,702
2018	151,188	122,569
2019 <sup>9</sup>	99,123	80,360
2020	161,665	131,063
2021	165,947	134,535
2022	173,725	140,841
2023	145,530	117,983

<sup>6</sup> Includes undetermined volume of floodwater from bypass canal levee breaks in the United States

<sup>7</sup> Includes Gila River water.

<sup>8</sup>Low flows due to damage on drainage canal by Gila River floodwater. Drainage water entered the Gila River, Feb. 21, 1993 - Jan. 18, 1994 and was diluted by high flows.

<sup>9</sup>Low flows due to MODE repairs requiring water to be diverted into the Limitrophe below Morelos Dam.

**Table 9. Mexico pumping from its San Luis Mesa Well Field located within five miles (Eight Kilometers) of the Arizona-Sonora boundary near San Luis**

Year	Annual Volume Pumped	
	(tcm)	(af)
1975	131,030	106,227
1976	120,722	97,870
1977	159,905	129,636
1978	121,172	98,235
1979	29,063	23,562

**Table 9. Mexico pumping from its San Luis Mesa Well Field located within five miles (Eight Kilometers) of the Arizona-Sonora boundary near San Luis**

Year	Annual Volume Pumped	
	(tcm)	(af)
1980	17,735	14,378
1981	148,742	120,586
1982	162,498	131,738
1983	22,437	18,190
1984	8,963	7,266
1985	37,373	30,299
1986	13,308	10,789
1987	64,453	52,253
1988	157,374	127,585
1989	173,551	140,700
1990	167,848	136,077
1991	153,227	124,223
1992	81,374	65,971
1993 <sup>10</sup>	7,237	5,867 <sup>12</sup>
1994	76,281	61,841
1995	48,830	39,587
1996	81,039	65,699
1997	36,576	29,653
1998 <sup>11</sup>	0	0
1999 <sup>11</sup>	0	0
2000 <sup>11</sup>	0	0
2001	67,173	54,458
2002	135,687	110,003
2003	174,747	141,669
2004	182,994	148,355
2005	153,762	124,655
2006	174,778	141,693
2007	191,221	155,025
2008	165,113	133,859
2009	194,717	157,859
2010	117,180	94,999
2011	153,515	124,457
2012	161,360	130,816
2013	166,893	135,302
2014	182,493	147,949
2015	190,666	154,575
2016	196,816	159,560
2017	180,900	146,657
2018	166,860	135,275

**Table 9. Mexico pumping from its San Luis Mesa Well Field located within five miles (Eight Kilometers) of the Arizona-Sonora boundary near San Luis**

Year	Annual Volume Pumped	
	(tcm)	(af)
2019	128,719	104,354
2020	146,647	118,889
2021	160,306	129,962
2022	167,383	135,699
2023	120,635	97,800

<sup>10</sup>The reduced pumping was due to excess delivery from the Gila River flood flows.

<sup>11</sup>No Pumping required due to adequate flows in the Colorado River.

**Table 10. Total volume pumped by the United States and volume pumped at the Minute No. 242 Well Field<sup>12</sup> (Limited to 160,000 acre-feet for each country as per Minute No. 242)**

Year	Total Volume Pumped		242 Well Field Volume Pumped <sup>12</sup>	
	(tcm)	(af)	(tcm)	(af)
1975	33,401	26,787	n/a	n/a
1976	28,047	22,738	n/a	n/a
1977	28,358	22,990	n/a	n/a
1978 <sup>12</sup>	22,079	17,900	106	86
1979	31,353	25,418	201	163
1980	35,188	28,527	2,244	1,819
1981	47,443	38,463	23,361	18,939
1982	50,516	40,954	29,036	23,540
1983	20,608	16,707	4,856	3,937
1984	19,078	15,467	3,721	3,017
1985	16,818	13,635	2,531	2,952
1986	32,497	26,346	3,358	2,723
1987	33,213	26,926	4,215	3,417
1988	29,512	23,096	3,073	2,491
1989	63,020	51,091	35,430	28,724
1990	71,721	58,145	38,050	30,848
1991	53,000	42,968	38,461	31,181
1992	38,696	31,371	28,319	22,958
1993	18,473	14,976	8,001	6,486
1994	40,478	32,816	23,738	19,245
1995	38,879	31,520	15,354	12,448
1996	21,546	17,468	8,055	6,530
1997	9,776	7,926	550	446
1998	20,592	16,694	6,337	5,138
1999	14,107	11,437	4,884	3,960
2000	14,311	11,602	5,240	4,248
2001	13,329	10,806	2,788	2,260
2002	17,576	14,249	4,402	3,569

**Table 10. Total volume pumped by the United States and volume pumped at the Minute No. 242 Well Field<sup>12</sup>**  
(Limited to 160,000 acre-feet for each country as per Minute No. 242)

Year	Total Volume Pumped		242 Well Field Volume Pumped <sup>12</sup>	
	(tcm)	(af)	(tcm)	(af)
2003	31,589	25,609	18,727	15,182
2004	37,605	30,487	27,797	22,536
2005	53,466	43,345	36,906	29,920
2006	56,710	45,975	40,548	32,872
2007	78,803	63,886	62,864	50,964
2008	81,594	66,149	68,812	55,787
2009	73,299	59,424	56,385	45,712
2010	61,984	50,251	41,756	33,852
2011	53,499	43,372	36,013	29,196
2012	41,277	33,464	26,234	21,268
2013	45,817	37,144	31,980	25,927
2014	51,707	41,919	37,053	30,039
2015	69,675	56,486	49,640	40,244
2016	53,119	43,064	42,962	34,830
2017	40,224	32,610	32,089	26,015
2018	58,078	47,084	49,194	39,882
2019	46,243	37,490	37,058	30,043
2020	33,588 <sup>13</sup>	27,230 <sup>13</sup>	24,811	20,155
2021	62,152 <sup>13</sup>	50,388 <sup>13</sup>	52,644	42,695
2022	84,866 <sup>13</sup>	68,802 <sup>13</sup>	75,131	60,910
2023	71,158 <sup>13</sup>	57,688 <sup>13</sup>	61,380	49,761

<sup>12</sup>Minute No. 242 Well Field was constructed and put into operation in 1978.

<sup>13</sup>Provisional data, total volume pumped is partially estimated.

APPENDIX B: FULL PAGE FIGURE 2

FIGURE 2. SALINITY OF COLORADO RIVER TREATY WATERS  
AT IMPERIAL DAM AND THE NORTHERLY INTERNATIONAL BOUNDARY  
1951-2023

