Tijuana River Wastewater Spill Investigation February 2017

U. S. International Boundary and Water Commission

Introduction

- USIBWC received multiple complaints of wastewater odors in the Tijuana River Valley in the US during the month of February 2017. The USIBWC requested information from its counterpart, the IBWC Mexican Section, several times on the source of these odors. The strong odors were confirmed by U.S. Section personnel several times during the period, the last time being February 17, 2017.
- Mexican Section of IBWC informed the US Section on February 23, 2017 that a sewer main had collapsed in the vicinity of the confluence of the Rios Tijuana and Alamar, a bypass was created to repair the line and that work was complete.

Introduction

- USIBWC informed the US stakeholders of the event and filed a spill report with the Regional Board. Spill discharge was based on limited information, stating as much as 143 million gallons had been discharged to the river.
- USIBWC informed the stakeholders that a formal investigation would look into and report the results of the situation.

Background

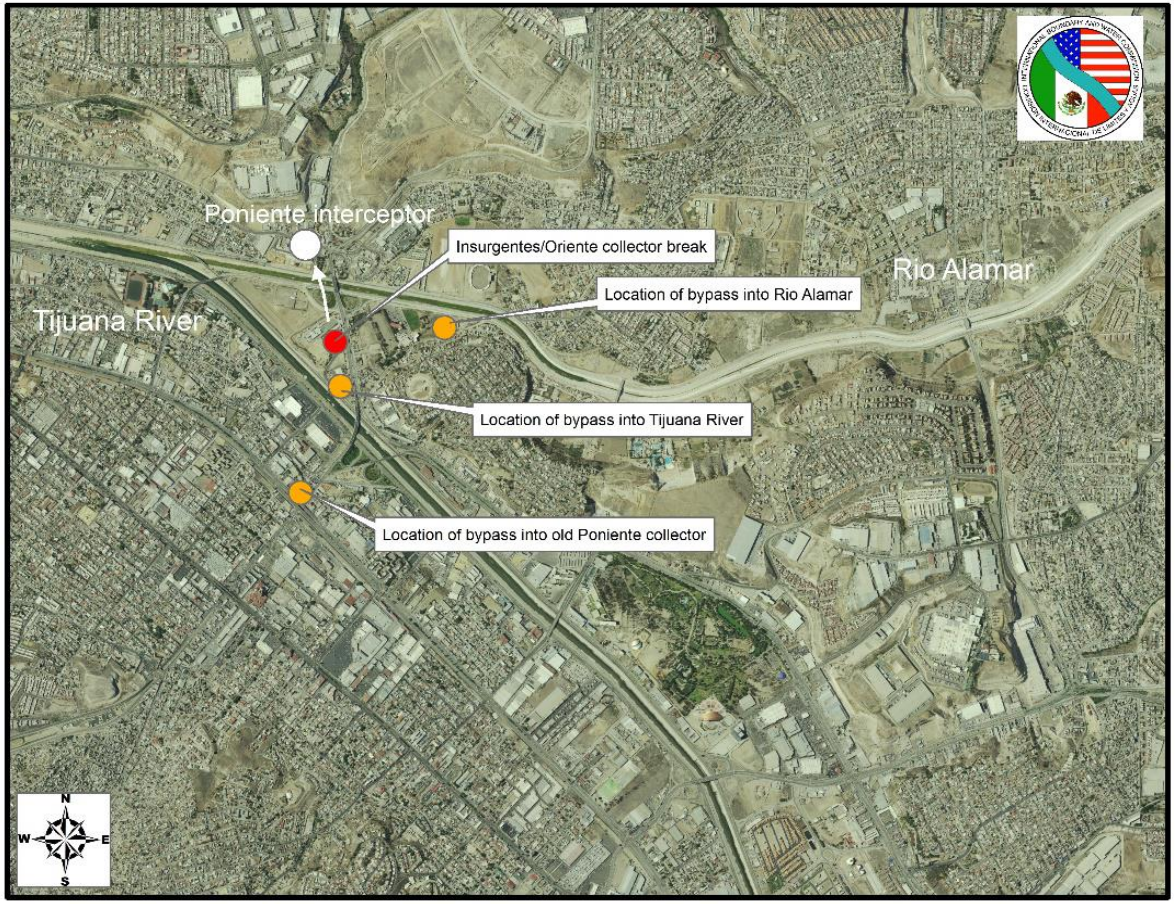
- During rain events, the collection system receives infiltration from runoff that is sediment and trash laden, creating plugs at manholes that result in wastewater system overflows to the river. The water quality during wet weather flows normally exceeds safe human contact standards, even though highly diluted by rainfall volumes at times.
- The wastewater infrastructure in the City is aging and pipe collapses are becoming more common. Concrete pipe is typically used for construction of sewer pipes, and hydrogen sulfide corrosion results in eventual complete destruction of concrete pipes above the normal flow line
- Heavy rainfall occurred in the Tijuana River Watershed during the last half of December 2016.

Investigation of the February spill

- A binational meeting was held on March 9, 2017 at CESPT offices with members of the Minute 320 Water Quality Workgroup.
- CESPT reported that high volumes of stormwater entered the City of Tijuana wastewater collection system during winter rains, causing damage to several collectors. It also caused blockages of many other lines resulting in sewer overflows that drain to the Tijuana River.
- CESPT identified seven areas in the wastewater collection system that sustained some degree of damage. Six were repaired and were made operational without discharges to the river.

Investigation of the February spill

- CESPT provided the following information at the meeting:
- On January 1, 2017, there was a collapse of the 48-inch diameter *Insurgentes/Oriente* Collector in the vicinity of the confluence of the Alamar River and Tijuana River. This resulted in a sinkhole that caused the sidewalk and a bus shelter to collapse into the sinkhole.
- January 2, 2017- Work to clear the area began with demolition of the pavement, testing to determine extent of damage, excavation, and then bypassing of flows to the old *Poniente* Collector until the section that collapsed could be operated as an open channel. Work was compound by rain events, abandoned underground structures, the failure of a new bus shelter, overhead and buried power lines, and heavy traffic loads in the area.


Poniente Interceptor
Insurgentes/Oriente collector break
Location of bypass into Rio Alamar
Rio Alamar
Tijuana River
Location of bypass into Tijuana River
Location of bypass into old Poniente collector
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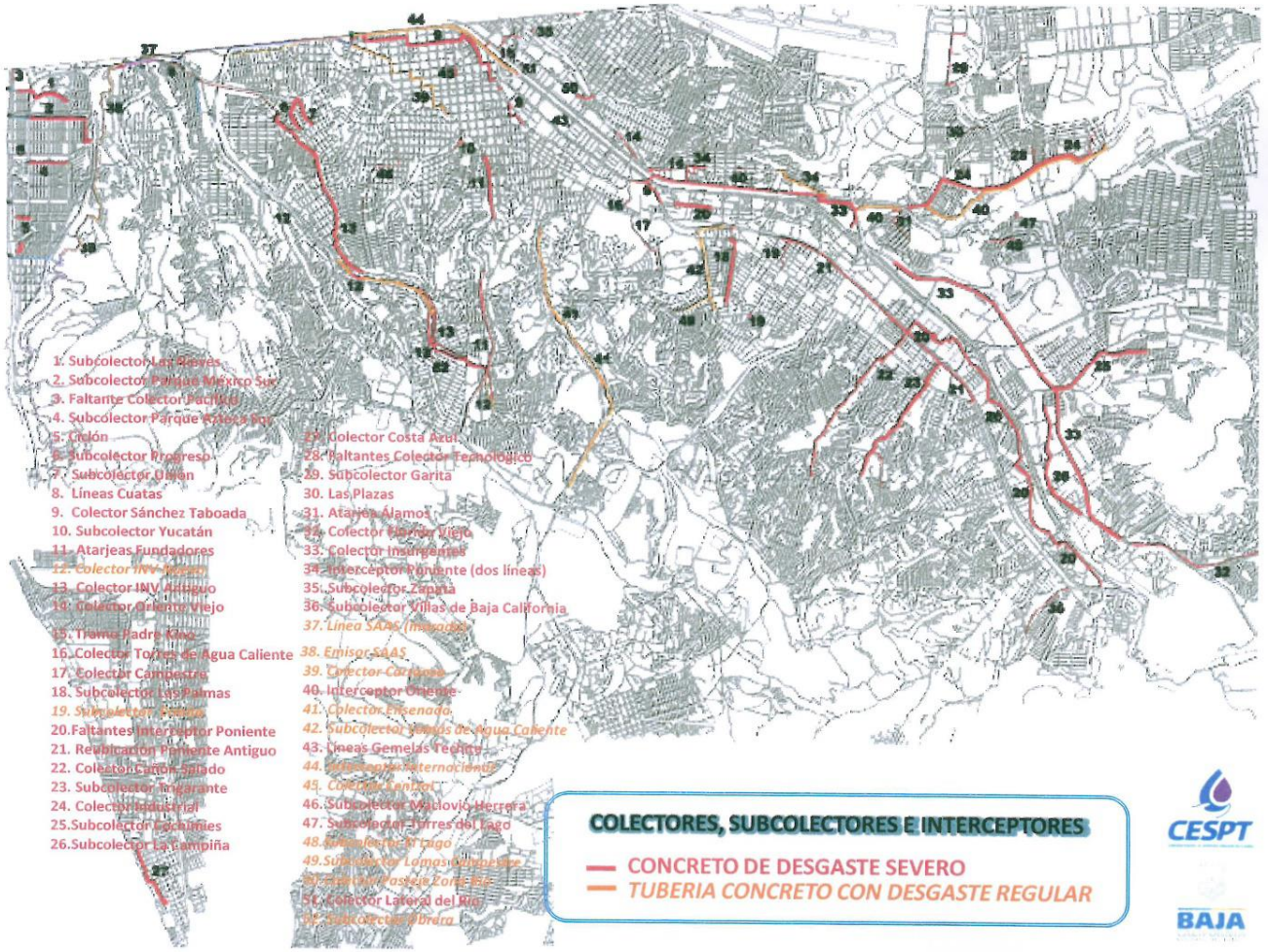
Investigation of the February spill

- On February 1, 2017, emergency repairs were undertaken. During this time, flow was bypassed from two 24-inch pipes; one into the Alamar River and one into the Tijuana River, just upstream of their confluence. These bypasses could have been made with pumping equipment to maintain the wastewater within the collection system, however CESPT lacked pumps of sufficient capacity to handle the flow.
- Repairs on the broken section of pipe concluded on February 4, 2017 and the bypasses were removed. CESPT informed the group that the bypasses were estimated to total 300 lps or 7 million gallons per day (MGD) for an approximate total of up to 28 million gallons (MG) into the Tijuana River. The *Insurgentes/Oriente* line was repaired using polyvinyl chloride (PVC) piping with a corrugated metal tube sheath to protect the PVC pipe inside.

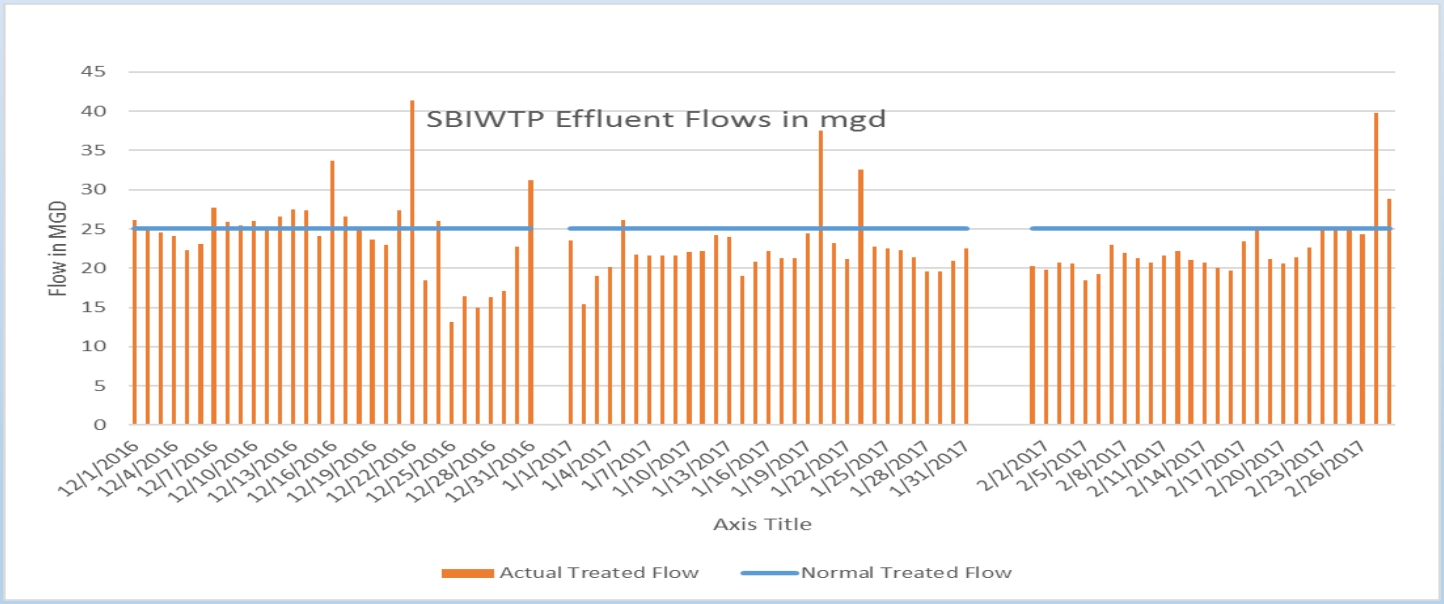
Investigation of the February spill

- During the meeting, CESPT identified 5 critical areas and 35 other pipeline reaches that are in near critical condition. These are pipelines that were installed in the 1970s and 1980s, some as late as 1992. Their estimate to rehab is $590M pesos or $33M USD.
- CESPT noted that they prepared a proposal of emergency declaration to request assistance from the City of Tijuana and CONAGUA. (CESPT currently has approx. $6M USD to repair work on 5 collectors, including the *Insurgentes/Oriente* collector. CESPT has ordered and received a large truck mounted bypass pump to allow manhole to manhole bypasses for future work.)
- Thus far no additional funding has been made available for Mexico infrastructure improvements.


1. Subcolector Las Reyes
2. Subcolector Parque México Sur
3. Faltante Colector Pacífico
4. Subcolector Parque México Sur
5. Ciclón
6. Subcolector Progreso
7. Subcolector Unión
8. Líneas Cuatas
9. Colector Sánchez Taboada
10. Subcolector Yucatán
11. Atarjeas Fundadores
12. Colector INV. Negro
13. Colector INV. Antiguo
14. Colector Oriente Viejo
15. Tramo Padre Kino
16. Colector Torres de Agua Caliente
17. Colector Campestre
18. Subcolector Las Palmas
19. Subcolector Zapata
20. Faltantes Interceptor Poniente
21. Reubicación Poniente Antiguo
22. Colector Cañón Salado
23. Subcolector Rigarante
24. Colector Industrial
25. Subcolector Escalinies
26. Subcolector La Campiña
27. Colector Costa Azul
28. Faltantes Colector Tecnológico
29. Subcolector Garita
30. Las Plazas
31. Atarjea Álamos
32. Colector Garita Viejo
33. Colector Insurgentes
34. Interceptor Poniente (dos líneas)
35. Subcolector Zapata
36. Subcolector Villas de Baja California
37. Línea SAAS (Inhabitada)
38. Emisor SAAS
39. Colector Cardenas
40. Interceptor Oriente
41. Colector Ensenada
42. Subcolector Torres de Agua Caliente
43. Líneas Gemelas Tecate
44. Cruce con Internacional
45. Colector Central
46. Subcolector Maclovio Herrera
47. Subcolector Torres del Lago
48. Subcolector El Lago
49. Subcolector Lomas Hipódromo
50. Cruce con Prolong. Zona Río
51. Colector Lateral del Río
52. Subcolector Obrera
COLECTORES, SUBCOLECTORES E INTERCEPTORES
CONCRETO DE DESGASTE SEVERO
TUBERIA CONCRETO CON DESGASTE REGULAR
CESPT
BAJA

Investigation of the February spill

- Flow records from the SBIWTP and flow data from CESPT indicate that approximately 256 MG of wastewater was not received at the SBIWTP or SABWTP during the months of January and February 2017.



CESPT
COMISIÓN ESTATAL DE SERVICIOS PÚBLICOS DE TIJUANA

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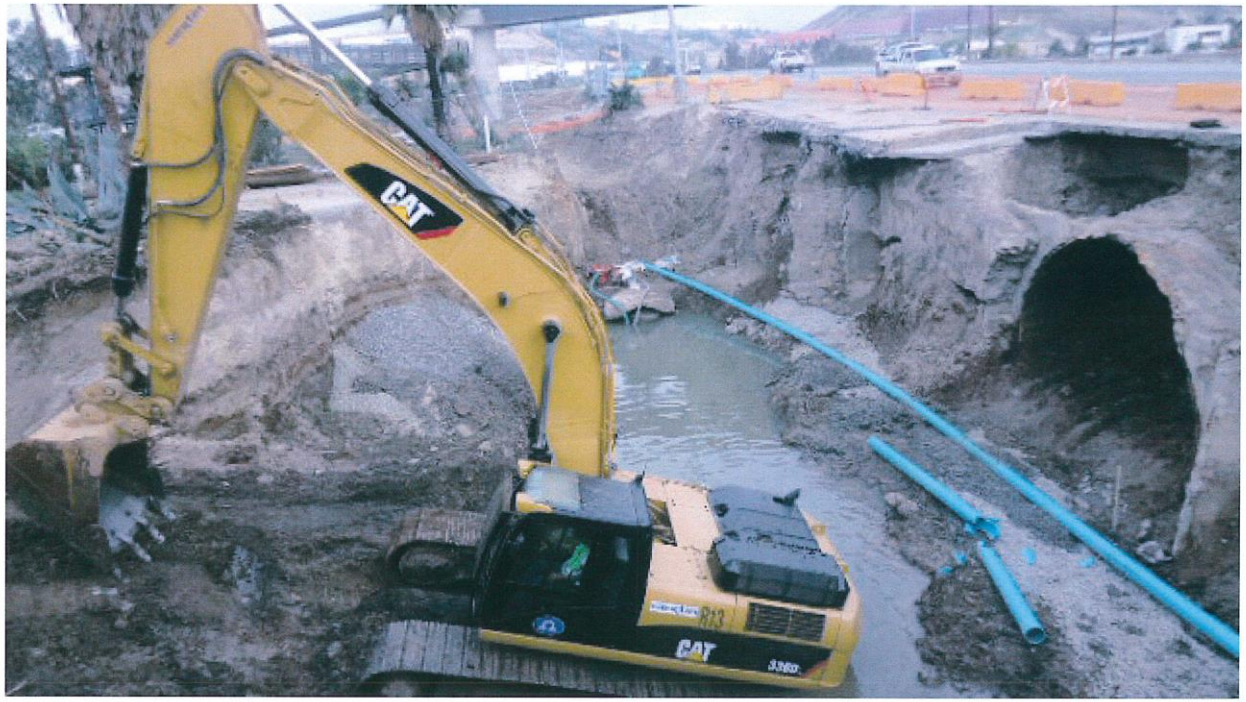

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Site Visit

- CESPT provided a tour of the area where the break had occurred and where the bypass had sent water to the *Poniente* collector which runs along the north side of the Rio Alamar. CESPT noted that at that location there is a 40-inch line and a 42-inch line connecting to the junction box that sends the combined flow down a 60-inch line. The area downstream of the junction box has also collapsed and this 60-inch line will need to be repaired in the upcoming dry season.

Repair of 60 inch Line

- Repair of the 60” line began in March and was completed in April of 2017.


PRECAUCION CESAR


CAT
R22
325D LRR
CAT
CAT
03.31.2017


R22
CAT
CAT
Sextin
03.31.2017

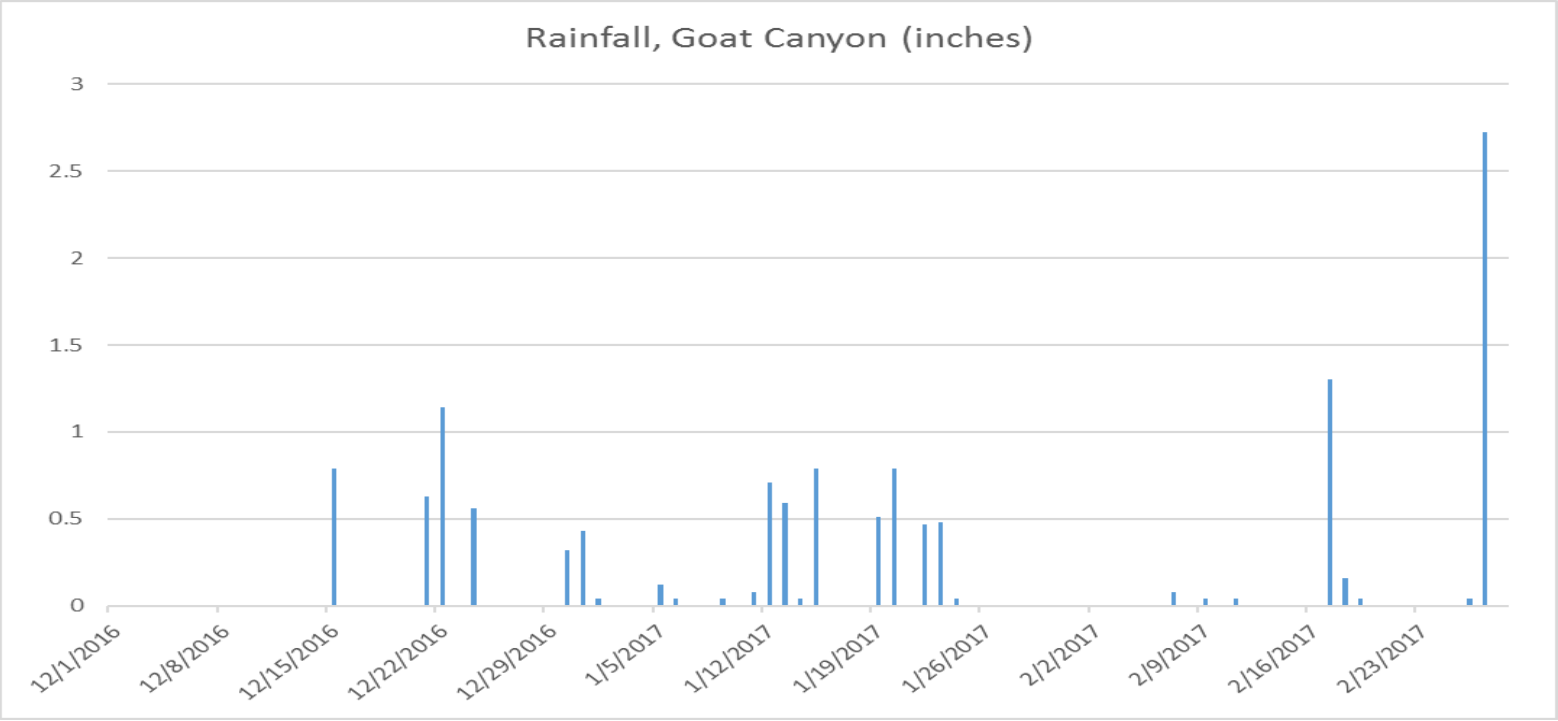
Recommendations - Investigative Report

- Equipment needed to address emergency situations.
  - Bypass pumps have been ordered and will be used in future. These have been received and are in use.
- CESPT Emergency Process
  - Currently bypasses to river are not acceptable, CESPT protocol was not followed. Update CESPT protocol – pending
- Communication.
  - Binational Protocol, Minute 320 Working Group on Spill Notification Process – draft was circulated and comments received on 5-23-17. MOU between State of Baja California and MXIBWC pending.
- Infrastructure Assessment (CESPT)
  - Updated plan to address aging infrastructure, plan has been drafted by CESPT, with assistance from BECC/NADBANK.

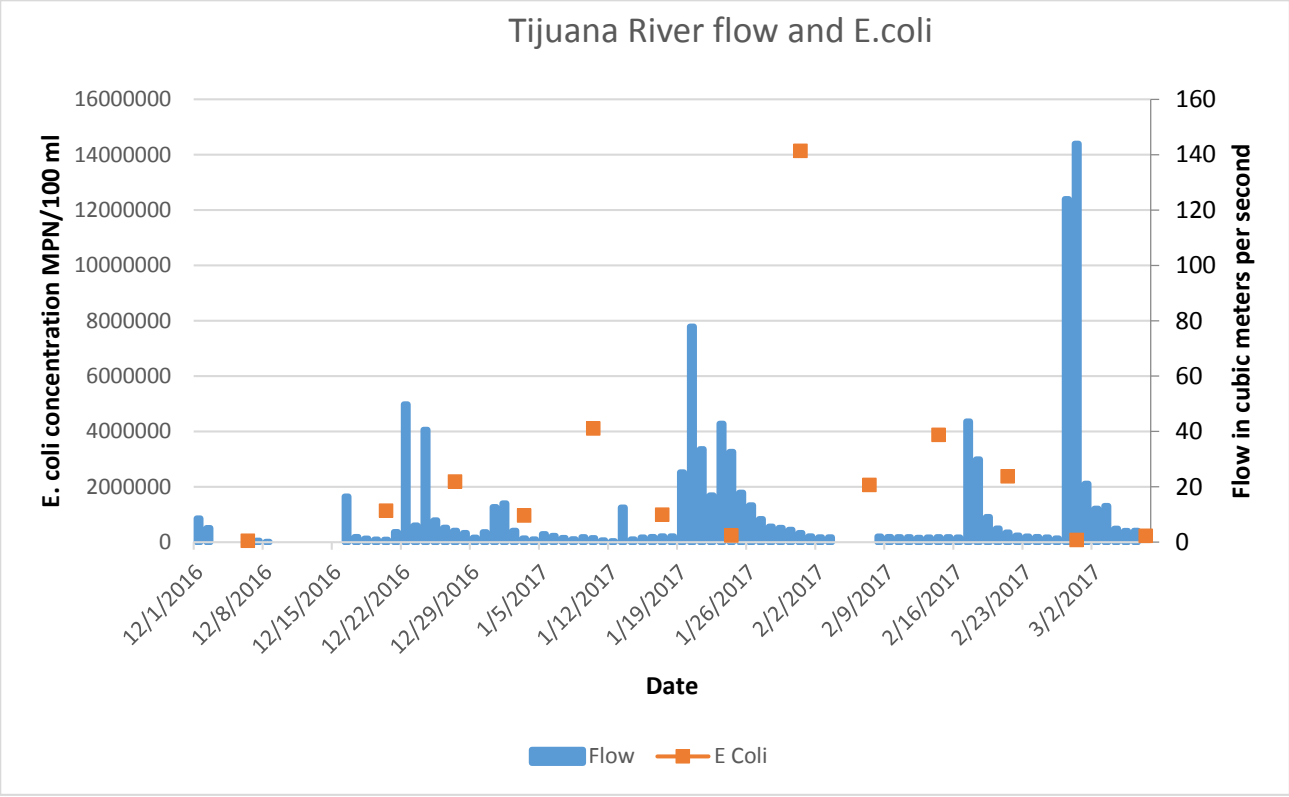
Continued Monitoring

- Quarterly River Inspection
  - River Inspection conducted on April 12, 2017. Noted several drains with discharges, Mexico will be officially requested to correct these problem areas. On April 6, 2017 Mexico notified the US that they had constructed a temporary weir in Canon del Sainz to capture discharges and convey them to other collectors. This effectively eliminated discharge from Canon del Sainz to the Tijuana River.
- Pump Station CILA Metering and Notification
  - Work should be completed in 2 months
- US Side Infrastructure
  - Proposed draft scope of work to study improvements to PS CILA and additional pumping infrastructure on US side – in process
- Data Collection
  - Additional water quality sampling and flow measurement in the Tijuana River

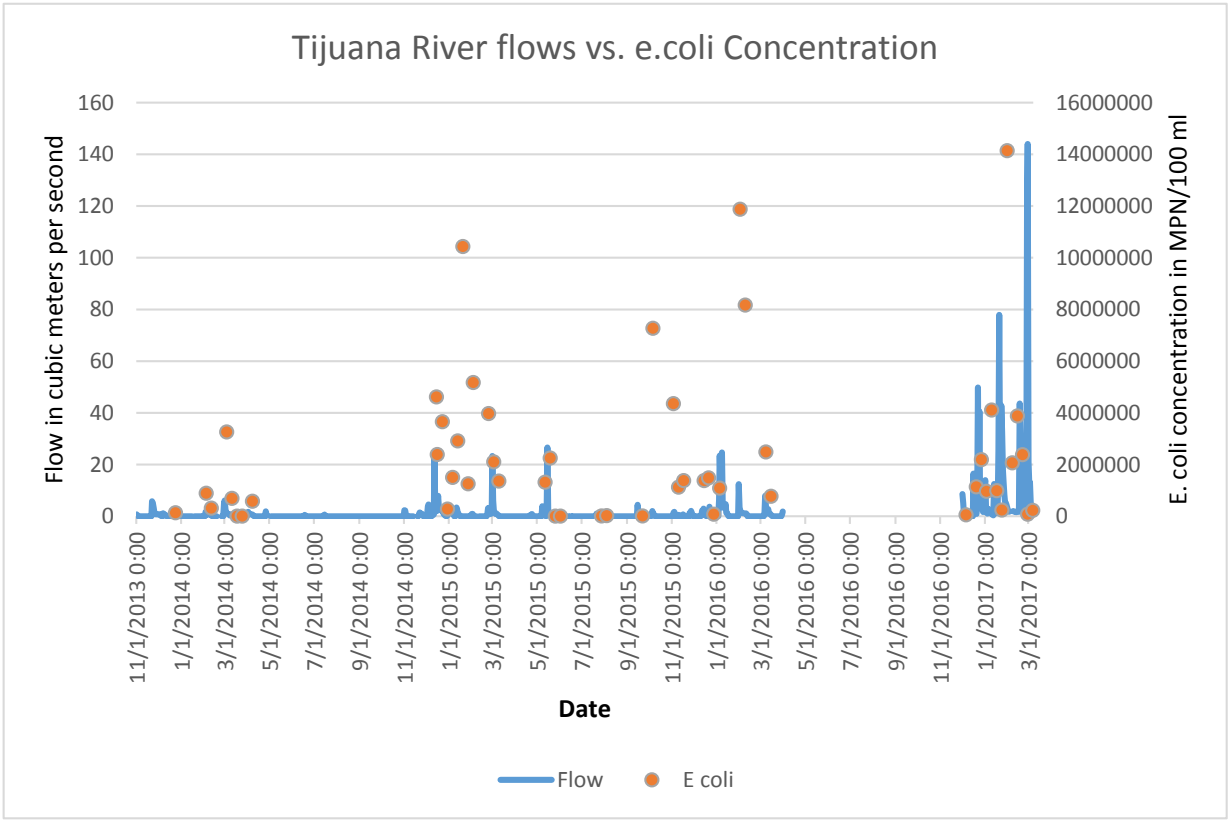
High Rainfall Events



River Flow vs Bacteria Levels During Spill (DM Bridge)



River Flow vs Bacteria Levels – Historical (DM Bridge)



Data Collection

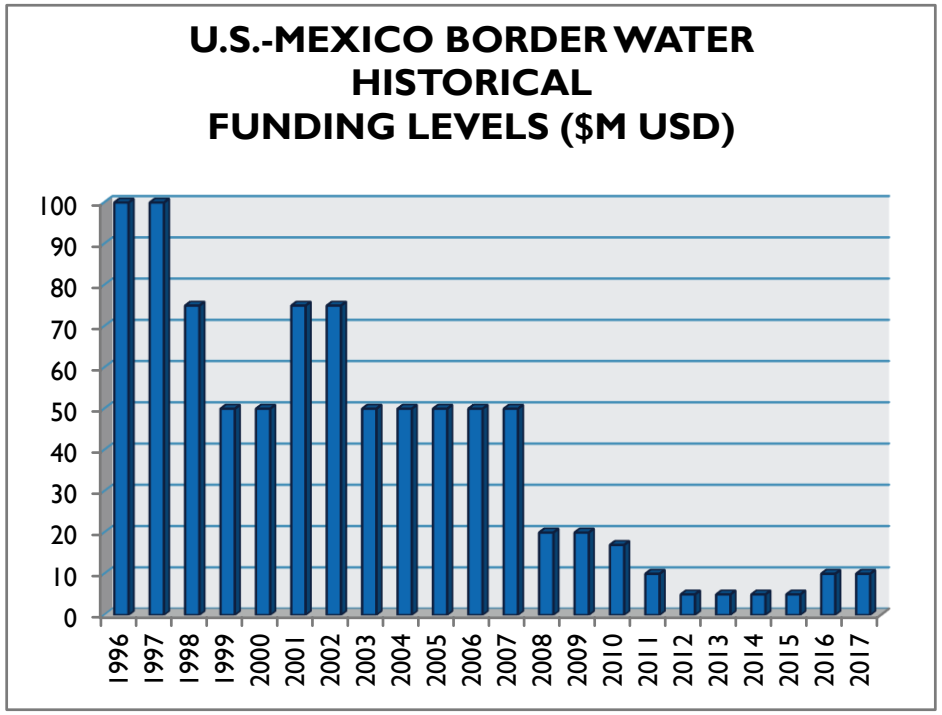
- Surf samples taken once per week at 8 locations in the US, 3 in Mexico by the City of San Diego under contract with USIBWC per NPDES permit.
- Sample at Dairymart Bridge taken once per week by the City of San Diego under contract with USIBWC on the same day as the surf samples are taken.
- Samples are tested for enterococcus, fecal coliform and total coliform in accordance with the permit.
- County of San Diego DEH monitors beaches once a week during summer at IB pier and twice a week in winter at 7 locations.
- Helen Yu of the Regional Board has performed recent testing at select locations in the river valley.
- USIBWC spends $1M annually for ocean monitoring of the discharges from the South Bay Ocean Outfall. Analysis of the data obtained over many years has never shown that there is a detrimental effect on the ocean or beaches from these secondary effluent discharges.

1983 LA PAZ AGREEMENT AND BORDER 2020

- EPA and SEMARNAT identified as "National Coordinators."
- Identifies Tijuana watershed as one of 4 high priority watersheds.
- Allows for collaboration between stakeholders through binational public meetings.
- Funds small pilot projects, studies, and community outreach/education (non-infrastructure).
- $1.5M invested in Tijuana and Tecate (restoration, trash removal, sediment modeling).

BORDER ENVIRONMENT INFRASTRUCTURE FUND (BEIF)

- Congressional line-item
- Must have U.S.-side benefit
- Administered by BECC/NADB
- Partnership with CONAGUA
- Provides incentive for Mexico to invest in Border Region (90% WW coverage in Border vs 40% average)
- Funded WWTPs, collector repairs, connections, etc.



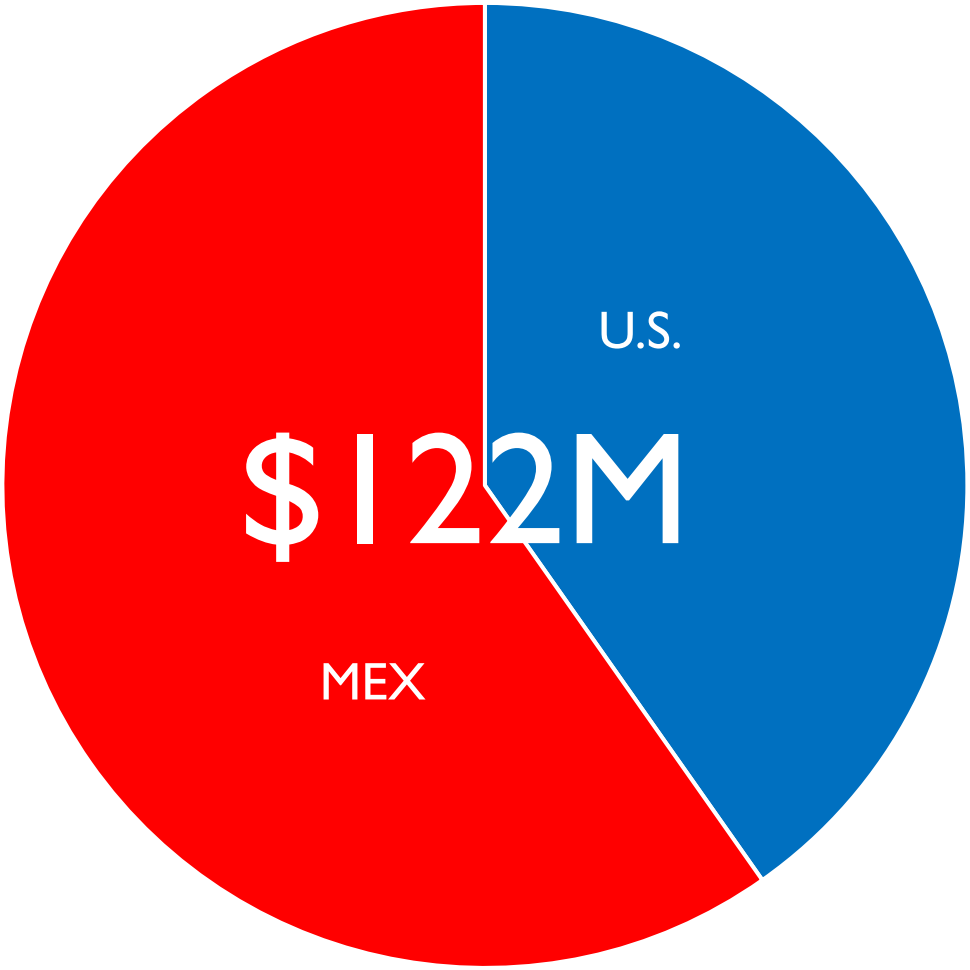
CONAGUA
Comisión Nacional del Agua

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

North American Development Bank
Banco de Desarrollo de América del Norte

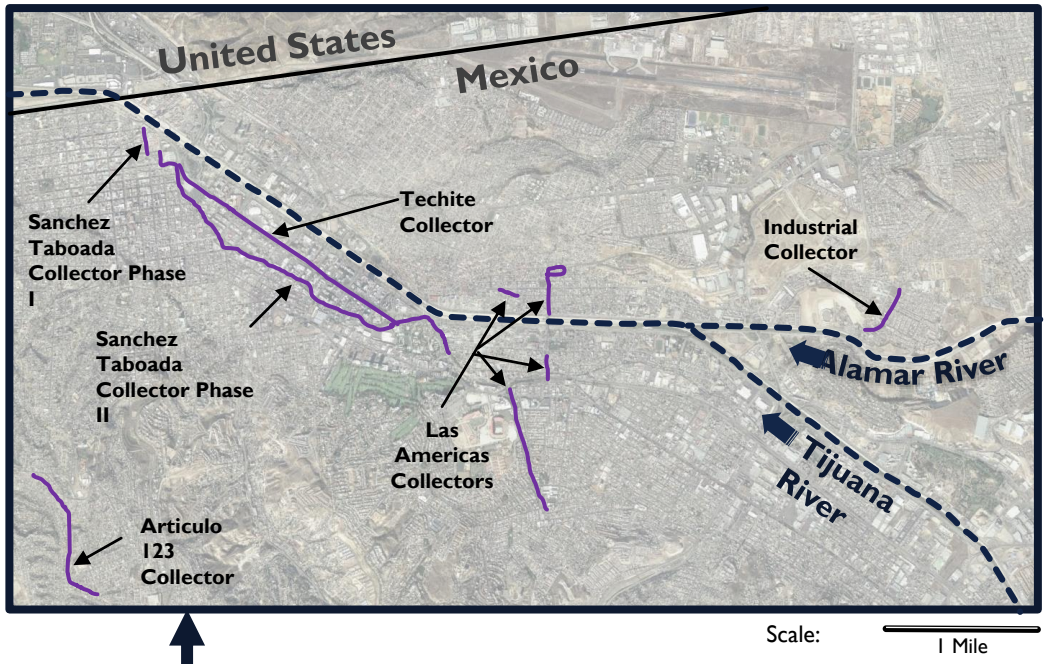
BECC
COCEF

EPA INVESTMENT IN TIJUANA, TECATE, ROSARITO*



*Excluding $240 million EPA investment for International Wastewater Treatment Plant

RECENT EPA INVESTMENT IN TIJUANA COLLECTORS

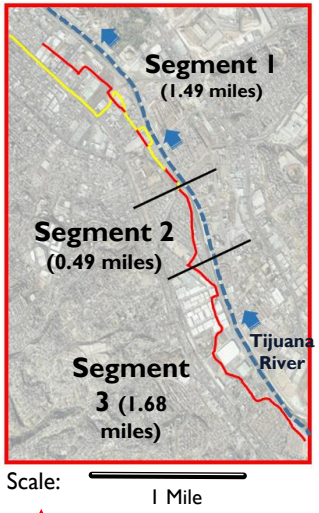


Phase I

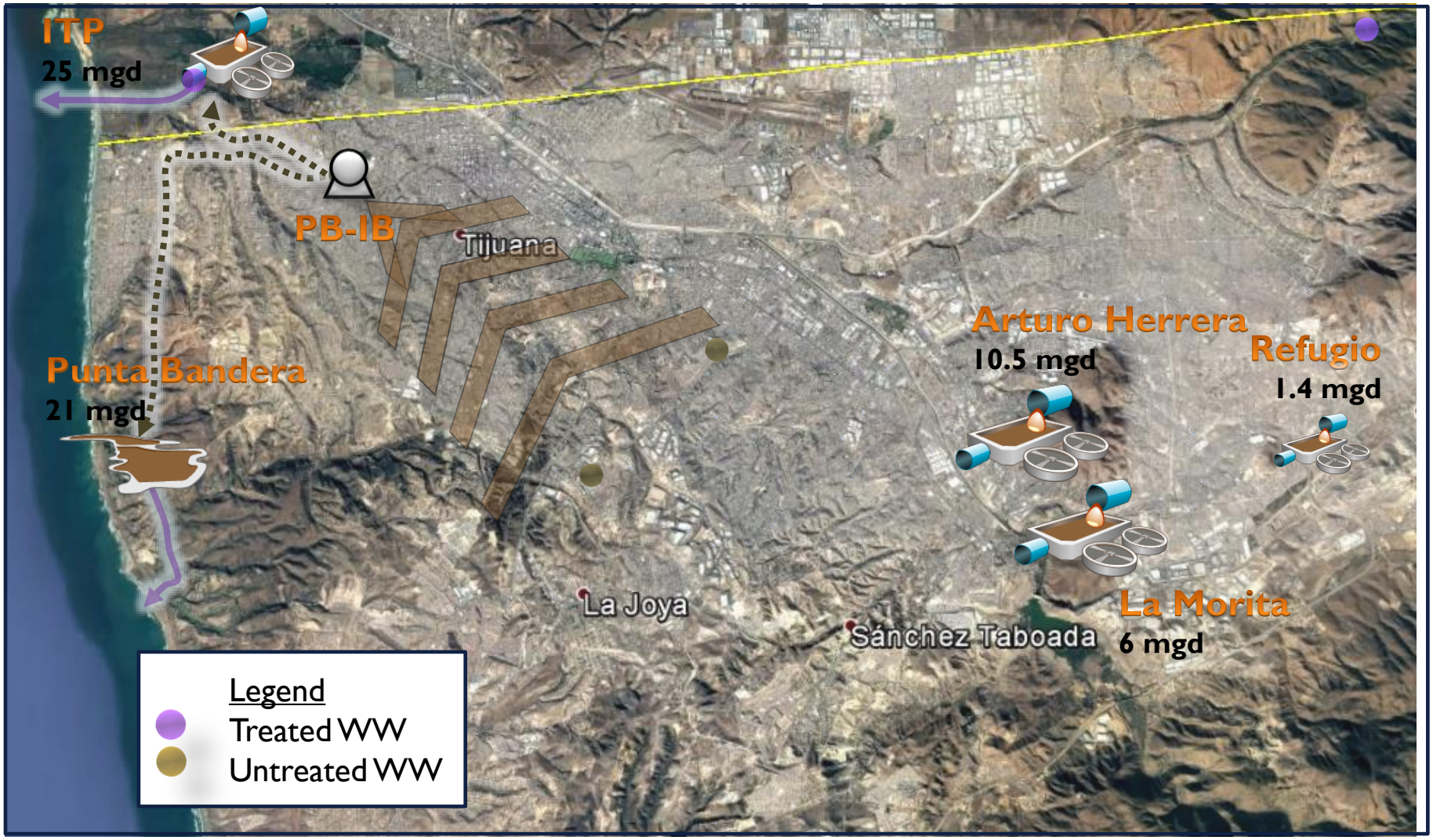
- Nearly Complete
- Mexico: $4M
- U.S.: $3M
- 10 km repaired
- 30 manholes rehabilitate

Phase II-Poniente

- In Design
- Total estimated cost: $9M



OVERVIEW OF TIJUANA WASTEWATER TREATMENT



OVERVIEW OF TIJUANA RIVER DIVERSION

Wet-weather: Tijuana River flows exceed 23 mgd and PS CILA/Diverter is shut down

U.S. Naval A

ITP
25 mgd

PS 1/1a

PS CILA <23 mgd

Pump S

Jan spill
(7 mgd)

U.S.

MEX.

Playas De Tijuana

Tijuana

La Mesa

SAB WWTP
21 mgd

Tijuana

© 2016 Google

2.28 mi

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2016 INEGI

Google e

COLLECTOR COLLAPSE IN JANUARY, 2017

NEXT STEPS

Fix:

- Develop new infrastructure projects through BEIF program
- Work with partners on Strategic Plan

Study:

- Improve science to measure fate and transport, and level of contamination (Scripps, SCCWRP)
- Increase inspections to Tijuana's WW system (both physical and virtual)

Communicate:

- Improve public notice of spills and operations of PBCILA
- Improve partnership with Border Patrol

Comprehensive Wastewater and Reuse Plan




Tijuana River Watershed Meeting, San Francisco, CA.
April 19, 2017

This updated plan was developed in meetings with BECC/NADBANK and various officials over a period from November 12, 2016 to March 14, 2017 and included discussion with:

Mayor of Imperial Beach, Serge Dedina
Governor of Baja California, Francisco Vega
Federal Environment and Natural Resources Secretary
Director of the National Water Commission

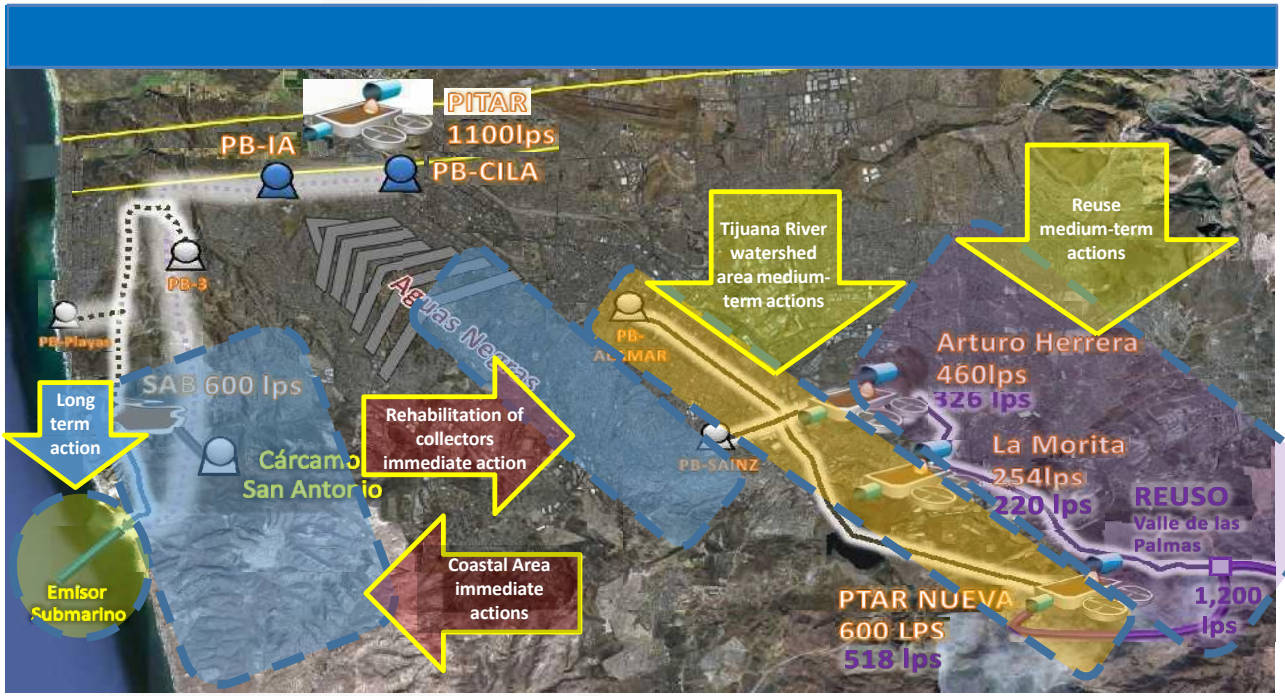
On of the immediate actions, after rehabilitation of major collectors in the river zone, is preliminary engineering required for the addressing the construction of a new wastewater treatment facility at San Antonio de Los Buenos through a public-private partnership with potential grant funding from FONADIN who has already committed funding for up to 50% of the costs of the studies development of this project.

Objectives:

- Reduce water discharges to the Pacific Ocean
- Reduce power consumption
- Increase the use of treated water
- Provide for potential groundwater repletion.

Strategies:

- Immediate actions in the Coastal Area
- Immediate actions – Tijuana River Watershed, Rehabilitation of collectors in the primary wastewater collection system
- Medium-term actions – Tijuana River Watershed
- Medium-term actions – Reuse
- Medium-term actions - WW Sludge Management
- Long-term actions – Ocean outfall


PITAR
1100lps
PB-IA
PB-CILA
PB-3
PB-Playas
Aguas Negras
PB-ALAMAR
PB-SAINZ
SAB 600 lps
Cárcamo
San Antonio
Emisor Submarino
Long term action
Rehabilitation of collectors immediate action
Coastal Area immediate actions
Tijuana River watershed area medium-term actions
Reuse medium-term actions
Arturo Herrera
460lps
326 lps
La Morita
254lps
220 lps
REUSO
Valle de las Palmas
1,200 lps
PTAR NUEVA
600 LPS
518 lps

Rehabilitation of Collectors – Immediate Actions:

- Rehabilitation of collectors in critical conditions in Tijuana´s primary WW collection system: Cañón del Sainz, Insurgentes, INV Nuevo, Poniente Antiguo, and Oriente. $6.5 Million US in emergency funding has been authorized and is available to CEPST for this work.

Coastal Area – Immediate Actions:

The following actions will prevent untreated and/or non-compliant water discharges from the SAB WWTP.

- Construction of a new 13.7 MGD SAB WWTP and temporary rehabilitation of existing lagoons to produce 6.85 MGD, in compliance with the NOM-001 standard. Coordinate with FONADIN to obtain funding for preliminary studies and the final design (50%)
- Construction of a Coastal Main to convey wastewater from the San Antonio de los Buenos watershed to the Rosarito Norte WWTP.
- Construction of a lift station and conveyance of wastewater from the Tecolote-La Gloria watershed.
- Construction of a lift station and conveyance of wastewater from the Cañon Del Sainz collector to the Arturo Herrera WWTP to reduce wastewater flows to the SAB WWTP.

Tijuana River Watershed Area – Medium-term Actions:

The following actions must be implemented jointly to divert treated wastewater for agricultural use to Valle de las Palmas and prevent discharges to the Tijuana River.

- Lift station and raw wastewater conveyance from the Alamar PS to La Morita WWTP.
- Construction of a new 13.7 MGD WWTP in the premises of La Morita.

Reuse - Medium-term Actions:

- Pumping station and treated wastewater conveyance from La Morita and Arturo Herrera WWTPs to the 27.4 MGD Valle de Las Palmas facility.
- Construction of a new water storage dam in Valle de las Palmas.

Sludge Management - Medium-term Action

Ocean Outfall – Long-term Actions:

These actions will help displace treated wastewater approximately 5 km away from the San Antonio del Mar coast to avoid potential contamination of local beaches.

- Construction of an Ocean Outfall in San Antonio del Mar.

Uses and Sources (MXN Million)

PROJECTS	CESPT	CONAGUA	FONADIN	PRIVATE	TOTAL
REHABILITATION OF SEWAGE AND EQUIPMENT	$690	$330	$0	$0	**$1,021**
COASTAL ZONE	$595	$156	$175	$190	**$1,117**
RIVER ZONE	$240	$120	$275	$172	**$807**
REUSE NO DAM	$287	$247	$580	$353	**$1,454**
REUSE WITH DAM	$517	$445	$1,043	$636	**$2,615**
SLUDGE MANAGEMENT	$559	$559	$0	$0	**$1,119**
WATER	$575	$144	$0	$0	**$718**
TOTAL (REUSE NO DAM)	**$2,947**	**$1,557**	**$1,030**	**$716**	**$6,236**
TOTAL (REUSE WITH DAM)	**$3,177**	**$1,754**	**$1,494**	**$998**	**$7,397**

CESPT's Estimated Annual Required Funds

MXN Million

	Investment	2017	2018	2019	2020	2021	2022	2023	2024 2026	2025	
REHABILITATION OF SEWAGE AND EQUIPMENT	**$690**	$189	$191	$184	$42	$42	$42				
Urgent	**$70**	$70									
Sewage lines collapsed	**$6**	$6									
Sewage lines at risk	**$31**	$31									
Desilt of collectors	**$9**	$9									
Replacement collectors short term	$261		$130	$130							
Replacement subcollectors short term	$108		$54	$54							
Replacement collectors and subcollectors medium term	$126				$42	$42	$42				
Equipment	**$72**	$72									
Backing equipment PB CILA	**$7**		$7								
COASTAL ZONE	**$595**		$218	$44	$113	$84	$51	$80	$40	$41	$42
San Antonio de los Buenos WWTP	$153		$0	$0	$35	$36	$37	$38	$40	$41	$42
Coastal Collector	**$338**		$197	$44	$36	$47	$14				
LS & Conveyance line Tecolote La Gloria to SAB WWTP	**$42**				$42						
LS & Conveyance line Cañón del Sainz to A. Herrera	**$21**		$21								
WWTP Submarine outfall	**$41**							$41			
RIVER ZONE	**$240**							$55	$57	$59	$60
Sanitation East Zone (LS, Conveyance line & La Morita II WWTP)	$240					$0	$0	$55	$57	$59	$60
REUSE	**$287**								$84	$87	$89
Reuse in Valle de las Palmas (no dam)	$287					$0	$0	$82	$84	$87	$89
Reuse in Valle de las Palmas (with dam)	$517					$0	$0	$147	$151	$156	$161
SLUDGE MANAGEMENT	**$559**				$71	$73	$76	$78	$80	$83	$85
Construction, transportation, operation	$559		$0	$0	$71	$73	$76	$78	$80	$83	$85
WATER	**$575**	$58	$46	$42	$80	$88	$68	$59	$64	$58	$11
New infrastructure	**$408**	$43	$33	$33	$60	$71	$44	$41	$38	$45	
Replacements	**$167**	$15	$14	$9	$20	$17	$23	$18	$26	$14	$11
CESPT TOTAL INVESTMENT (WITHOUT DAM)	**$2,947**	**$247**	**$455**	**$270**	**$306**	**$287**	**$237**	**$272**	**$325**	**$327**	**$288**
CESPT TOTAL INVESTMENT (WITH DAM)	**$3,177**	**$247**	**$455**	**$270**	**$306**	**$287**	**$237**	**$419**	**$392**	**$396**	**$359**

PPP Projects during operation PPP Projects during construction