Addressing Environmental Challenges on the U.S.-Mexico Border

2024 WRRC Conference, University of Arizona, Tucson, Arizona
March 13, 2024
NADBank

Established in 1994

Mandate
Develop and finance environmental infrastructure along the U.S.-Mexico border to improve well-being of the population:

- Projects located within 100 km north and 300 km south of the border
- Provide loans and grants for their implementation
- Offer technical assistance for project development

Structure
Owned and governed equally by the Governments of the United States and Mexico

Offices
San Antonio, TX and Ciudad Juarez, CHIH

Ratings
Aa1 – Moody's; AA+ – Fitch
NADBank has a ten-member, binational Board of Directors, with an equal number of representatives from each country.

<table>
<thead>
<tr>
<th>U.S. Members</th>
<th>Mexico Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretary of the Treasury</td>
<td>Secretary of Finance and Public Credit (SHCP)</td>
</tr>
<tr>
<td>Secretary of State</td>
<td>Secretary of Foreign Affairs (SRE)</td>
</tr>
<tr>
<td>Administrator of the Environmental Protection Agency</td>
<td>Secretary of the Environment and Natural Resources (SEMARNAT)</td>
</tr>
<tr>
<td>U.S. Border State Representative</td>
<td>Mexican Border State Representative</td>
</tr>
<tr>
<td>U.S. Border Public Representative</td>
<td>Mexican Border Public Representative</td>
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</table>
Jurisdiction

U.S.- Mexico Border Region

◆ Eligible projects must be located within 100 km north and 300 km south of the U.S.-Mexico border

◆ U.S. Border
  ▪ 41 counties in four states
  ▪ Population: 6.34 million (2.05% of U.S. population)

◆ Mexican Border
  ▪ 220 municipalities in six states
  ▪ Population: 16.41 million (14.61% of Mexican population)

<table>
<thead>
<tr>
<th>Geographic Jurisdiction</th>
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Population within Jurisdiction

<table>
<thead>
<tr>
<th>State</th>
<th>Population</th>
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<tbody>
<tr>
<td>United States</td>
<td></td>
</tr>
<tr>
<td>Arizona</td>
<td>912,519</td>
</tr>
<tr>
<td>California</td>
<td>3,197,461</td>
</tr>
<tr>
<td>New Mexico</td>
<td>179,579</td>
</tr>
<tr>
<td>Texas</td>
<td>2,049,360</td>
</tr>
<tr>
<td>Total</td>
<td>6,338,919</td>
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</tbody>
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<table>
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<tr>
<th>State</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td></td>
</tr>
<tr>
<td>Baja California</td>
<td>3,151,135</td>
</tr>
<tr>
<td>Chihuahua</td>
<td>2,974,318</td>
</tr>
<tr>
<td>Coahuila</td>
<td>1,774,565</td>
</tr>
<tr>
<td>Nuevo León</td>
<td>4,614,869</td>
</tr>
<tr>
<td>Sonora</td>
<td>1,646,690</td>
</tr>
<tr>
<td>Tamaulipas</td>
<td>2,248,745</td>
</tr>
<tr>
<td>Total</td>
<td>16,410,322</td>
</tr>
</tbody>
</table>
Eligible Sectors

Project Types

WATER
- Drinking
- Wastewater
- Conservation
- Reuse+Augmentation
- Stormwater

SOLID WASTE
- Municipal
- Industrial
- Recycling

AIR QUALITY
- Mobility
- Paving
- Border crossings
- Industrial emissions

SUSTAINABLE ENERGY
- Generation
- Storage
- Efficient use

SUSTAINABLE CITIES
- Urban development
- Sustainable buildings
- Industrial parks

SUSTAINABLE PRODUCTION
- Green manufacturing and products
- Food value chains

CLIMATE CHANGE
- Mitigation
- Adaptation
Ensenada Desalination Plant:
Water Augmentation Case Study
Ensenada, Baja California

- Ensenada is located 110 km (75 mi) south of the US-Mexico border.
- It is the largest municipality in Mexico.
- 3rd largest city in the State of Baja California with current population of 443,000, but expected to grow to 534,000 over the next 20 years (CAGR ~ 0.93%). Represents approximately 12.4% of Baja California State population.
- Main economic activities: port services, tourism and wine industry.
- The city is located in a semi-arid region that has experienced the worst drought in Mexico in the recent years. Due to climate change and with an expected 30% reduction in rainfall, this condition is just expected to worsen.
- NADBank estimates that energy efficiency is greater by desalinating in Ensenada rather than bringing water from the Colorado River (3.43 kwh/m3 vs 4.5 kwh/m3) thus contributing to less generation of Green House Gas emissions.
Water demand and supply

- Currently, Ensenada does not have sufficient water sources, and those that could be exploited, are not adequate for human consumption.

- CESPE has been receiving temporarily water from the Colorado River Aqueduct.

- Mexican Standard for drinking water is set by NOM-127-SSA1-1994 which sets a maximum level on Total Dissolved Solids (TDS) of 1,000 ppm. Because of saline intrusion, TDS in overexploited aquifers are above 3,000 ppm.

- With the desalination plant in operation water supply in 2018 will total 760 lps. At current water consumption levels, this source will meet the city’s demand requirement until 2037.
The Desalination Plant Project

Project scope includes design, construction and operation of a desalination plant that will provide 250 lps (5.7 mgd) of drinking water which includes:

- Direct offshore seawater intake
- Pretreatment, pump station and water main
- A reverse osmosis seawater treatment plant
- Post treatment facilities
- Conveyance system to discharge brine into the ocean
- Storage tank, pump stations and conveyance lines to connect to Ensenada’s drinking water system
- Ancillary civil works (buildings, roads, etc.)
PTAR SAB
(Cap. 1,100 l/s)
1987-2003

PTAR A. Herrera
(Cap. 460 l/s)
2008

PB Cila
(Cap. 1,300 l/s)
1991

PB 1A y B, otros
(Cap. 4000 l/s)
1965-2003

PITAR Internacional
(Cap. 1,100 l/s)
1997

PTAR Tecate
(Cap. 150 l/s)

EGAB
800 l/s

Océano Pacífico

Emisor Submarino
(Cap. 7.7 m3/s)

San Ysidro, CA

Imperial Beach, CA

Tijuana, BC

1,800 l/s

DESCARGAS de AR
(Approx. 1,000 l/s)

USA

Mexico

Rio Tijuana

PTAR La Morita
(Cap. 254 l/s)
2010

PTAR A. Herrera
(Cap. 460 l/s)
2008

PB Cila
(Cap. 1,300 l/s)
1991

PB 1A y B, otros
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1,800 l/s

DESCARGAS de AR
(Approx. 1,000 l/s)
Descargas de AR al río Nuevo por colapsos en colectores y fallas en plantas de bombeo:

<table>
<thead>
<tr>
<th>Año</th>
<th>Flujo (m³)</th>
<th>Causa</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>184,011</td>
<td>Fallas en PBAR #1 y #5</td>
</tr>
<tr>
<td>2015</td>
<td>54,405</td>
<td>Fallas en PBAR #1 y #6</td>
</tr>
<tr>
<td>2016</td>
<td>75,560</td>
<td>Fallas en PBAR #1 y #2 y reparación de colapso colector</td>
</tr>
<tr>
<td>2017</td>
<td>496,620</td>
<td>Fallas en PBAR #1 y Emisor PBAR#7</td>
</tr>
<tr>
<td>2018</td>
<td>6,398</td>
<td>Fallas en PBAR #2, #4 y Emisor PBAR#3</td>
</tr>
<tr>
<td>2019</td>
<td>72,766</td>
<td>Fallas en PBAR #2 y Vandalismo Colector Sur</td>
</tr>
<tr>
<td>2020</td>
<td>720</td>
<td>Reparación de colapso colector</td>
</tr>
</tbody>
</table>

North American Development Bank
Nogales, Sonora

PTAR Los Alisos (2013)
- Capacidad: 220 l/s (5 mgd)
- Día: 24-36"

EB Estadio (2013)
- Capacidad: 450 l/s

PITARN Rio Rico (2009)
- Capacidad: 690 l/s (15.7 mgd)

1 MW

Mexico

USA

Rio Santa Cruz Cuerpo de agua impactado

<table>
<thead>
<tr>
<th>Año</th>
<th>Población</th>
<th>Dotación</th>
<th>Aguas Residuales (80%)</th>
<th>Flujos de AR Tratados (L/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>lhd</td>
<td>L/s</td>
<td>Los Alisos</td>
</tr>
<tr>
<td>2020</td>
<td>264,879</td>
<td>327</td>
<td>1,002</td>
<td>802</td>
</tr>
<tr>
<td>2030</td>
<td>310,445</td>
<td>327</td>
<td>1,175</td>
<td>940</td>
</tr>
<tr>
<td>2040</td>
<td>363,849</td>
<td>327</td>
<td>1,377</td>
<td>1,102</td>
</tr>
</tbody>
</table>

Nota: Se asume que la dotación se mantiene constante y que se construye la ampliación a Los Alisos
Naco WW Discharges:
Wastewater discharges Case Study (Reuse?)
Collaborative Efforts in the Border Region

Collaborating Agencies

- NADB
- IBWC/CILA
- State Environmental Agency
- CONAGUA
- State Water Commission
- EPA

Border Env. Infra. Fund (BEIF)

- Administer EPA funds of more than US$700 million, 136 projects; 69 in US & 67 in Mexico

AZ Dept. of Env. Quality

- Worked with communities and agencies along the AZ-SON border to mitigate and permanently eliminate transboundary spills.

TX Commission on Env. Quality

- Manage a binational fund aimed at improving air quality monitoring capabilities in the Paso del Norte air basin.
Rio San Pedro
(Cuerpo de agua impactado)

Naco, Sonora
USA
Mexico

Naco, Arizona
40 l/s

Colector Oeste
Dia 12"
Colector Este
Dia 12"
Interceptor Internacional
Dia 18"
Colector Sur
Dia 8"

Lagunas Este
40 l/s

Aduana
Emisor a Terrenos Agrícolas

North American Development Bank
SN Naco (WWC & WWTP) TB flows

1. NACO WW FLOWS

- NACO WW FLOWS
- MH#1 Bad Muro
- 0.5 MGD LPS
- 56%
- 0.16 MGD
- 7 LPS
- 17%
- 0.24 MGD
- 11 LPS
- 27%

- Divert ~50% Flows

Google Earth
SN Naco (WWC & WWTP) TB flows

Divert ~50% Flows

1. MH#1 Bad Muro
2. NACO WW FLOWS
3. East Manhole

- 0.5 MGD LPS 56%
- 0.16 MGD 7 LPS 17%
- 0.24 MGD 11 LPS 27%
- 40 LPS MGD
North West WWC Area Interceptor Bypass

SN Naco (WWC & WWTP) TB flows

Possible DW Infiltration

Original Flow Diversion Idea

ADUANA Pump Station

Bypass Data
PVC Clase 20
10-inch
128 lps capacity
SN Naco (WWC & WWTP) TB flows

Status March 5, 2019
SN Naco (WWC & WWTP) TB flows

Status March 5, 2019
SN Naco (WWC & WWTP) TB flows

East Lagoon System – BATHYMETRY Study
Conclusions

1. Continuous infrastructure issues will require a more agile response from binational agencies (establishment of emergency funds).
2. Binational agreements to improve environmental enforcement and incentives are also required.
3. With limited resources and an aging infrastructure, NADBANK foresees Public-Private Partnerships as a viable scheme to continue financing water infrastructure.
4. Because of water scarcity in the region, the development of desalination and reuse projects will continue to grow to meet water demand.