Successes, Challenges and Opportunities in Border Sanitation

Presenter

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Water Infrastructure Engineer

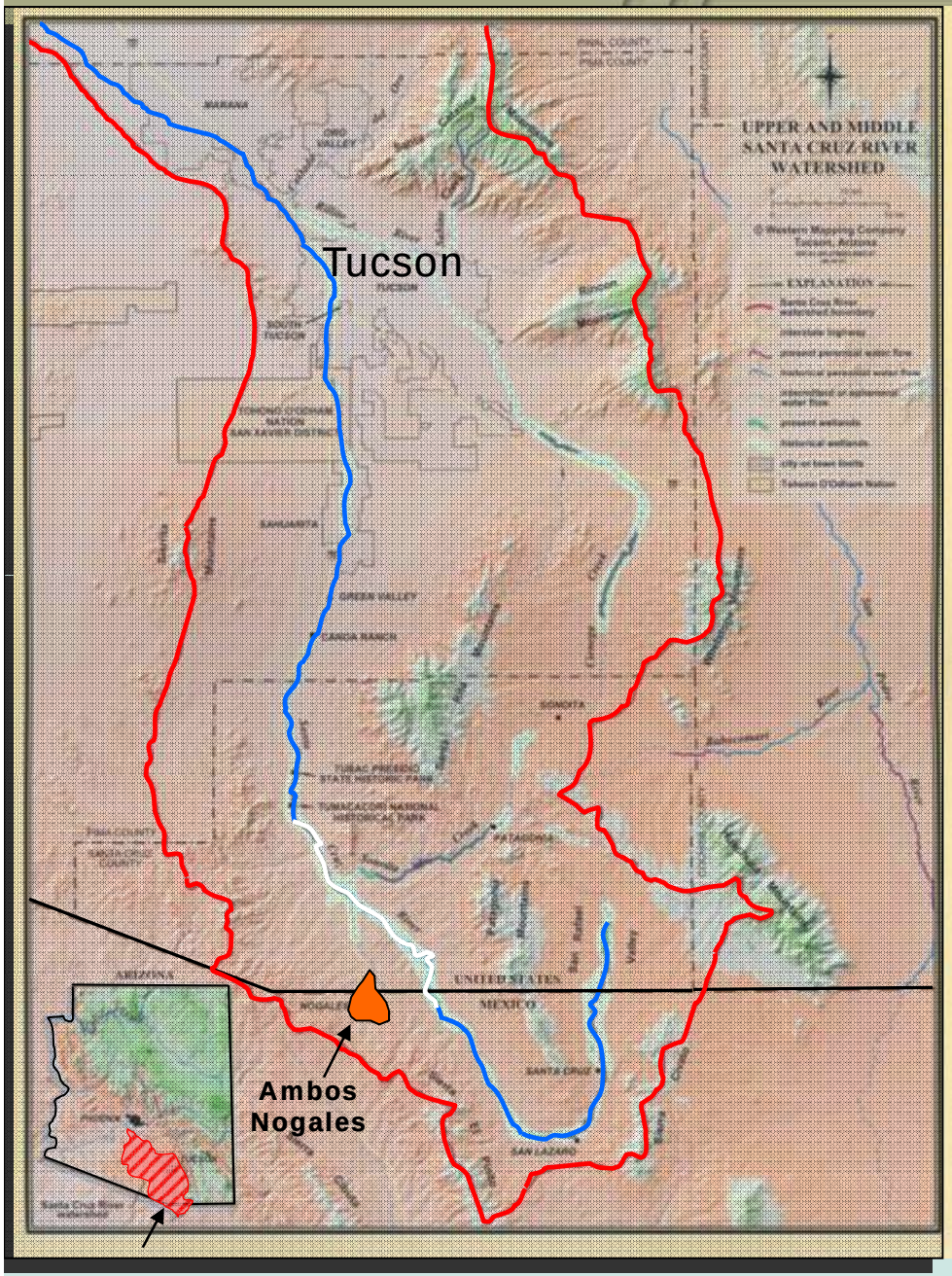
Office of Border Environmental Protection

With the Assistance of Esteemed Colleagues

Craig Tinney, Ph.D., P.E.

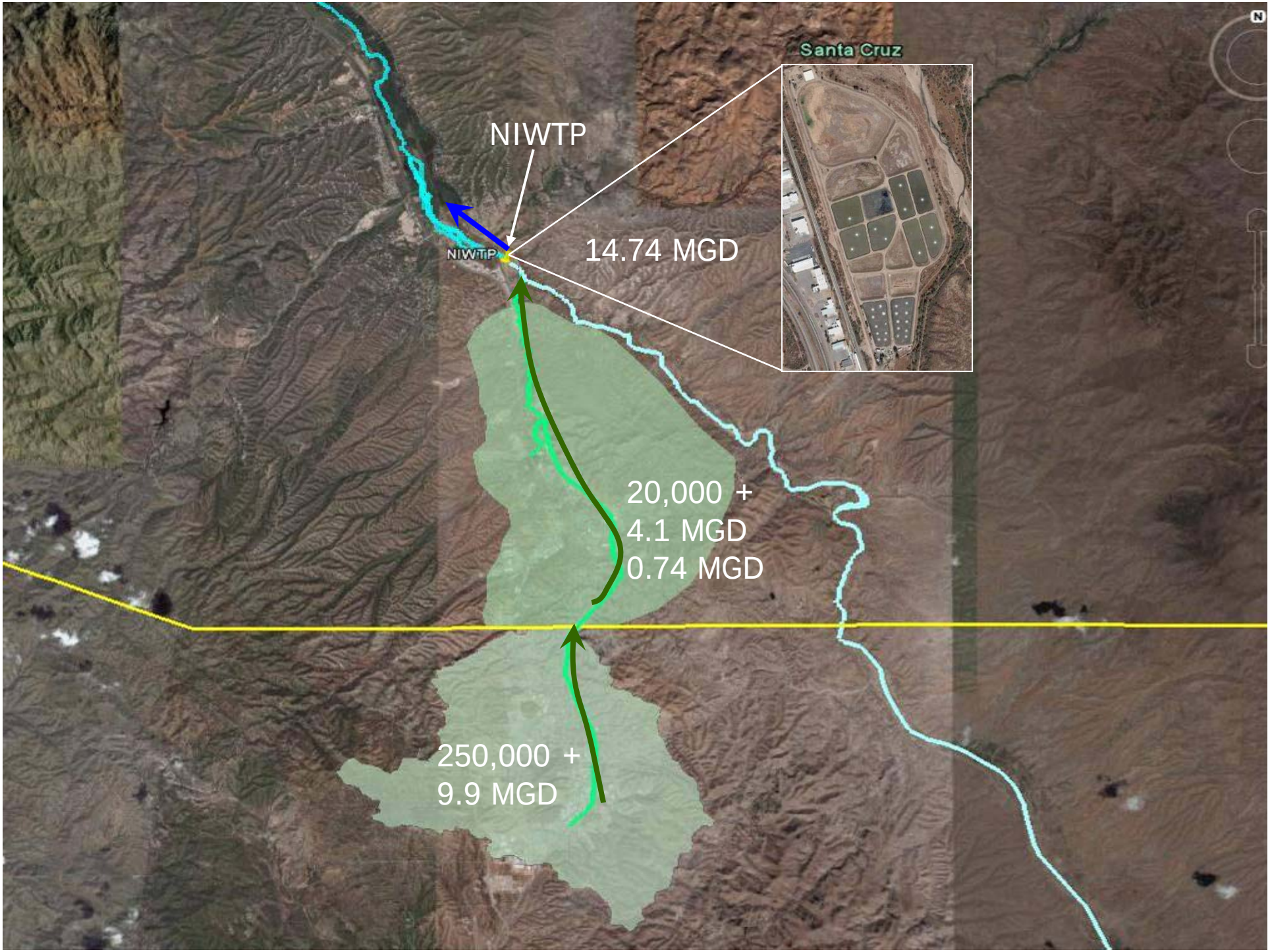
and

Hans Huth, M.S.



AMBOS NOGALES

- Binational Wastewater
- Recent WWTP Upgrade
- Partnerships for Success
- Industrial Wastewater
- International Conveyance


Santa Cruz
NIWTP
NIWTP
14.74 MGD
20,000 +
4.1 MGD
0.74 MGD
250,000 +
9.9 MGD

Nogales Wastewater Technical Committee

Formed in October 2003

- Early Attempts at Upgrade Failed (Committee Maintained Progress)
- Conflict Resolution (Was IOI or NIWTP the Priority)
- Confusion about Roles & Responsibilities
- Funding Concerns (Funding Avail. < Estimated Costs)

- $59.5M In EPA Funds Set Aside
- 4 Teams Established
  - Design (Technical Committee)
  - Legal Ownership Rights
  - Binational
  - Funding
- Within 6 Months Technical Committee Became the Forum to Address Issues
- 36 Meetings Held Over 6-Year Period

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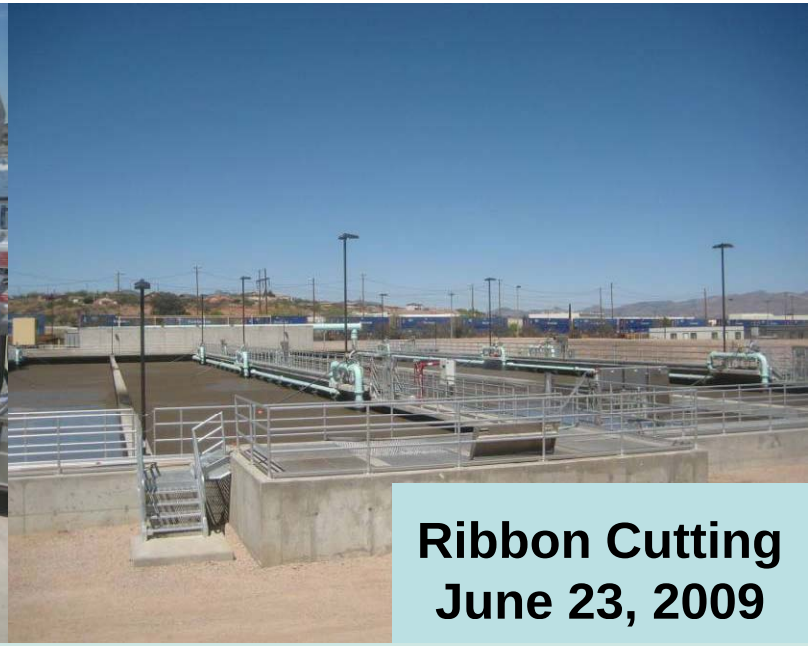
May 2007 Groundbreaking

Modified Ludzack Ettinger (MLE) process

Two-step biological nitrification/denitrification process that uses aeriobic and anaerobic zones to achieve nutrient removal.



Ribbon Cutting
June 23, 2009

FOSCR Monitoring ~ 7/2007 – 11/2010

Date	Nitrogen-NH3 (Total N, mg/l)	Nitrate-Nitrite (Total N, mg/l)	Nitrogen, Kjeldahl, (Total, mg/l)	Phosphorous, Total (Total P, mg/l)
7/31/07	16.00	1.60	18.00	36.00
10/30/07	24.00	1.70	30.00	76.00
2/26/08	26.00	0.95	30.00	7.10
4/30/08	16.00	0.92	39.00	7.00
7/29/08	15.00	1.60	20.00	4.10
10/28/08	20.00	1.20	24.00	5.80
1/26/09	21.00	ND	37.00	7.30
4/28/09	0.33	13.00	2.00	5.40
7/28/09	0.21	6.40	1.70	4.40
10/27/09	ND	8.10	0.85	1.20
1/26/10	0.68	14.00	1.80	2.40
4/29/10	1.50	6.00	3.60	3.90
8/25/10	0.174	4.84	1.32	2.60
11/23/10	0.113	9.55	1.36	2.97

Other Relationships Built Through Technical Committee & Border 2012

- FOSCR
  (Friends of the Santa Cruz River)
  (Los Amigos del Rio Santa Cruz)
  - Voluntary Organization that performs sampling and monitors the conditions of the River
- OOMAPAS-NS
  (Organismo Operador Municipal de Aqua Potable Alcantarillado y Saneamiento de Nogales, Sonora)
  (Nogales, Sonora Potable Water and Wastewater Utility)
- AMS
  (Asociacion de Maquiladoras de Sonora)
  (Association of Border Industry Plants of Sonora)
- APSA
  (Association of Environmental Safety Engineers)
  (Associacion de Profesionales de Seguridad Ambiental)

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Longfin dace nesting sites on Santa Cruz River

Longfin dace
Threatened Species in AZ

Site 100238

Located 2 miles downstream of the NIWWTP

Rio Rico Bridge – October 28, 2008

Rio Rico Bridge – April 28, 2009

Funding for Lab Costs Expired Yesterday

- FOSCR Activities:
  - Provide a historical record of water quality on the Santa Cruz River.
  - Provide a foundation for the AMC action item on source characterization and mitigation of metals in Ambos Nogales wastewater.
  - Monitor the river with significant amounts of volunteer hours.
  - Educate the public about the importance of the river.

March 16, 2011 was the last day that FOSCR was able to submit invoices for water quality analysis for metals and nutrients.

OOMAPAS-NS

Organismo Operador Municipal de Aqua Potable Alcantarillado y Saneamiento de Nogales, Sonora

Nogales, Sonora Potable Water and Wastewater Utility

OOMAPAS-NS has established a municipal pretreatment program

Investigates sources of industrial wastewater contamination

Monitors wastewater streams to ensure protection of the NIWTP Infrastructure

Is considering local limits for users to meet the needs of the NIWTP

OOMAPAS-NS

Organismo Operador Municipal de Aqua Potable Alcantarillado y Saneamiento de Nogales, Sonora
Nogales, Sonora Potable Water and Wastewater Utility

Lab Funded by OOMAPAS/Border 2012

- Construction completed February 2006
- OOMAPAS invested $130,000 for lab
- Promotes municipal pretreatment program
- Work continues to be funded by wastewater permit revenue fees
- OOMAPAS-NS is seeking lab certification for legitimacy
- Will be the first certified lab in the border region of Sonora
- Border 2012 provided $60K as cost match for spectrometer for metals analysis
- Lab tests for Cu, Fe, Mn, Hg, Pb, Zn, Cd, Cr, Ni, TSS, BOD, oil, and grease in wastewater

Veronica Meranza and Selma Valenzuela from OOMAPAS-NS receive training from a Perkins Elmer representative.

For an
Industrial Pretreatment Program
to be
‘Successful & Sustainable’
it needs coordination with the wastewater treatment facility, buy in and support from the regulated community,
and
FUNDING

Improved Communications Among Binational Stakeholders

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OOMAPAS
Nogales, Sonora

APSA

Recent Challenges

Allowable Headworks Loadings (AHL) for Cadmium
Permisibles Lodos de Entrada (AHL) para Cadmio

Final Report (revision 1)

Nogales International Wastewater Treatment Plant Maximum Allowable Headworks Loading Development

Prepared for

United States Section, International Boundary and Water Commission (USIBWC)

Under Contract IBM04D0005, Task Order IBM08T0035

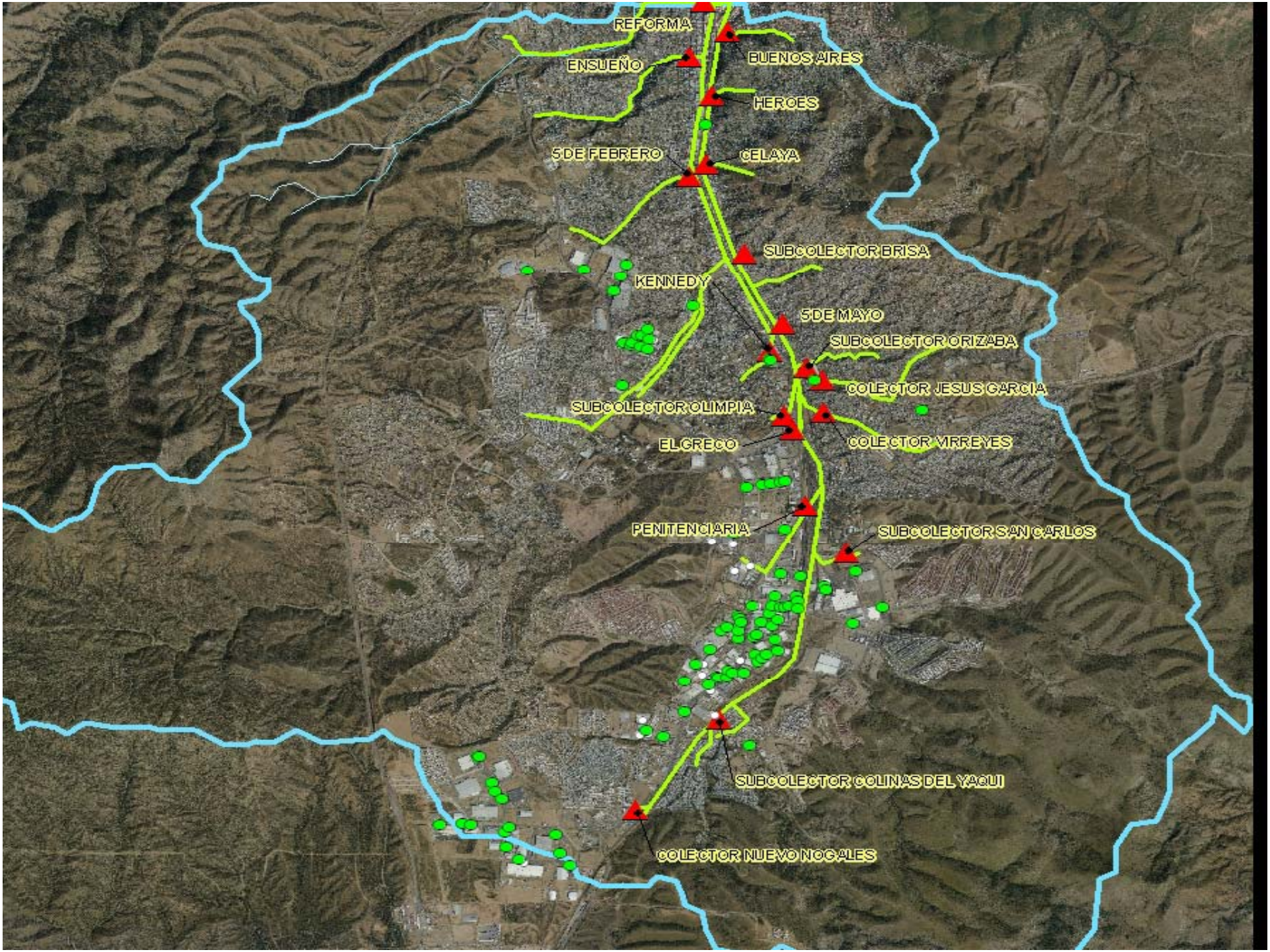
November 2009

CH2MHILL
445 Executive Center Blvd., Suite 110
El Paso, TX 79902

290 kg Cd /day

0.25 kg Cd /day

0.82 kg Cd/day


REFORMA
BUENOS AIRES
ENSUEÑO
HEROES
5 DE FEBRERO
CELAYA
SUBCOLECTOR BRISA
KENNEDY
5 DE MAYO
SUBCOLECTOR ORIZABA
COLECTOR JESUS GARCIA
SUBCOLECTOR OLIMPIA
EL GRECO
COLECTOR VIRREYES
PENITENCIARIA
SUBCOLECTOR SAN CARLOS
SUBCOLECTOR COLINAS DEL YAQUI
COLECTOR NUEVO NOGALES

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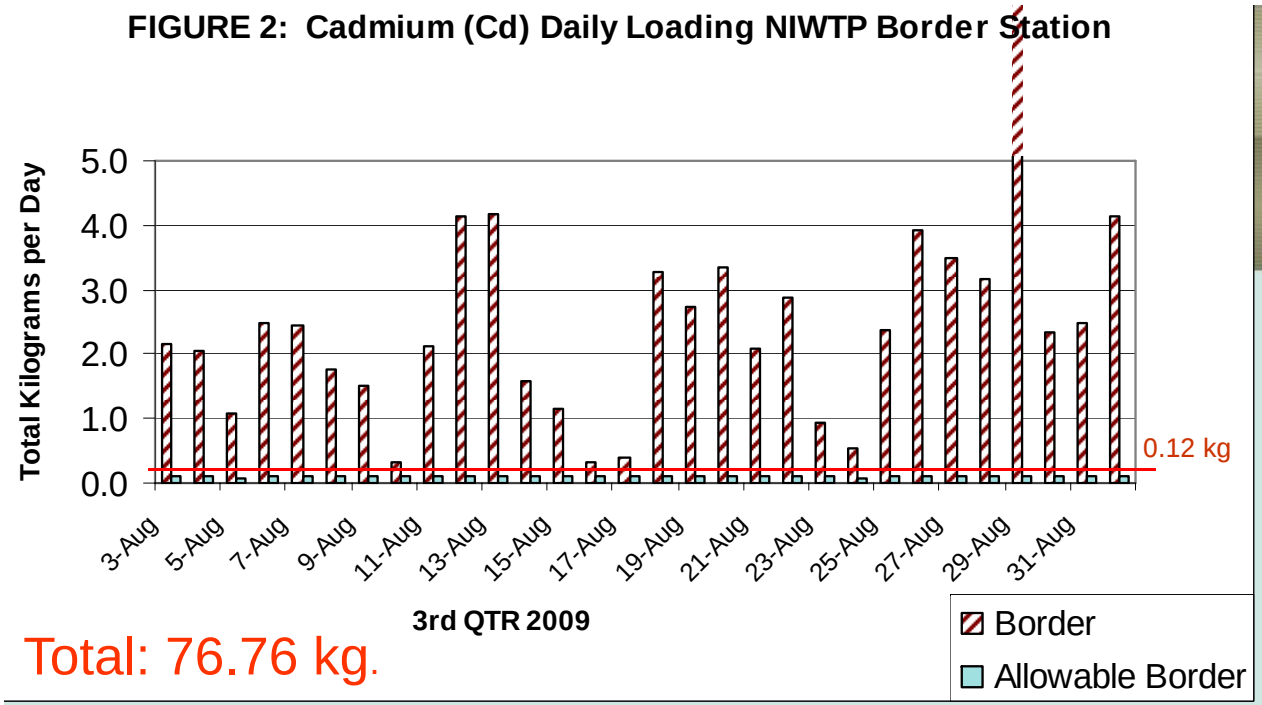
OOMAPAS-NS

Organismo Operador Municipal de Aqua Potable Alcantarillado y Saneamiento de Nogales, Sonora

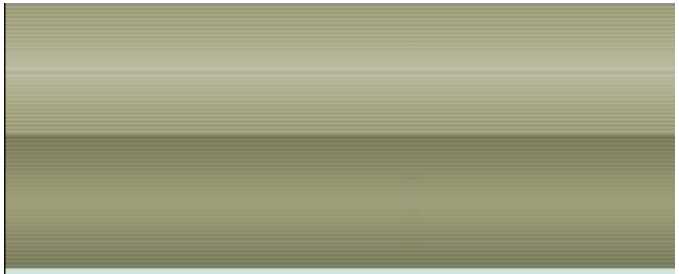
Nogales, Sonora Potable Water and Wastewater Utility

Monitoring the International Outfall Interceptor north of the international border

Monitoreando el Emisor Central al norte de la frontera internacional



Total: 76.76 kg.



Ongoing Cadmium Issue

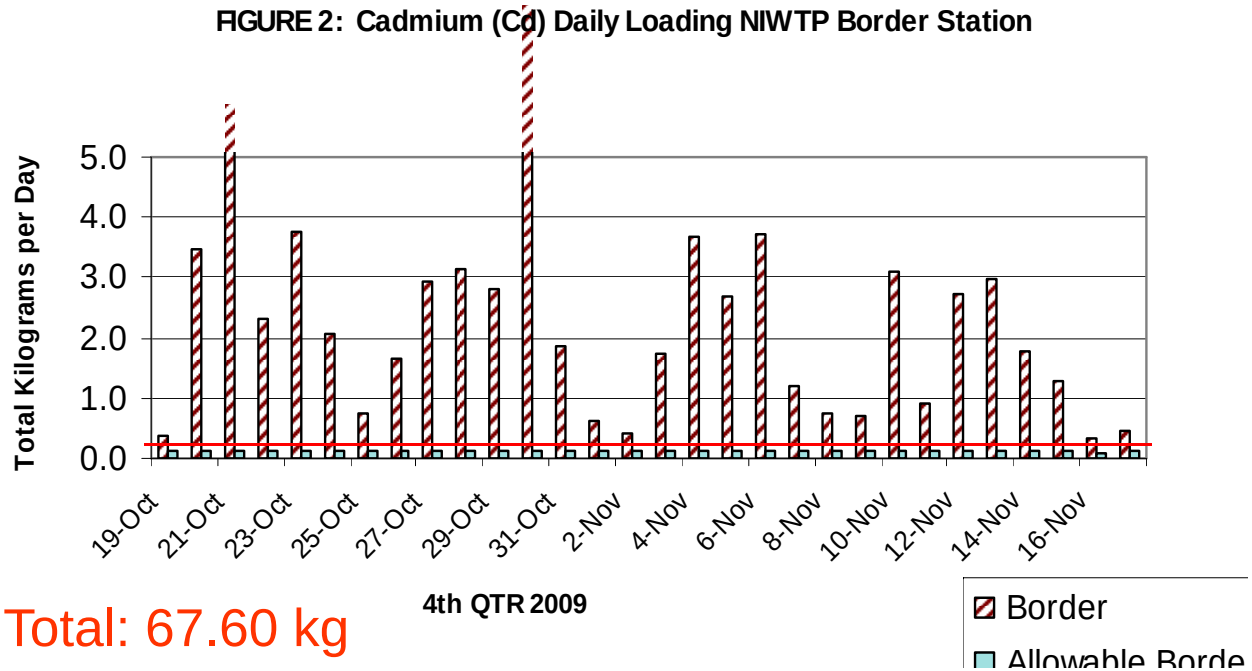
-No pretreatment at plant

-Allowable loading: 0.19 kg/Day

-Sonora limit varies as *f*(flow)

FOSCR's monitoring downstream of the NIWTP led to:

December 10, 2009: Arizona-Mexico Commission action item approved



Total: 67.60 kg

Raising Awareness About the Challenge

Noviembre 17, 2009: Presentación “Detección de Metales Pesados en Ambos Nogales” para la Asociación de Profesionales de Seguridad Ambiental (APSA) en Nogales, Sonora.

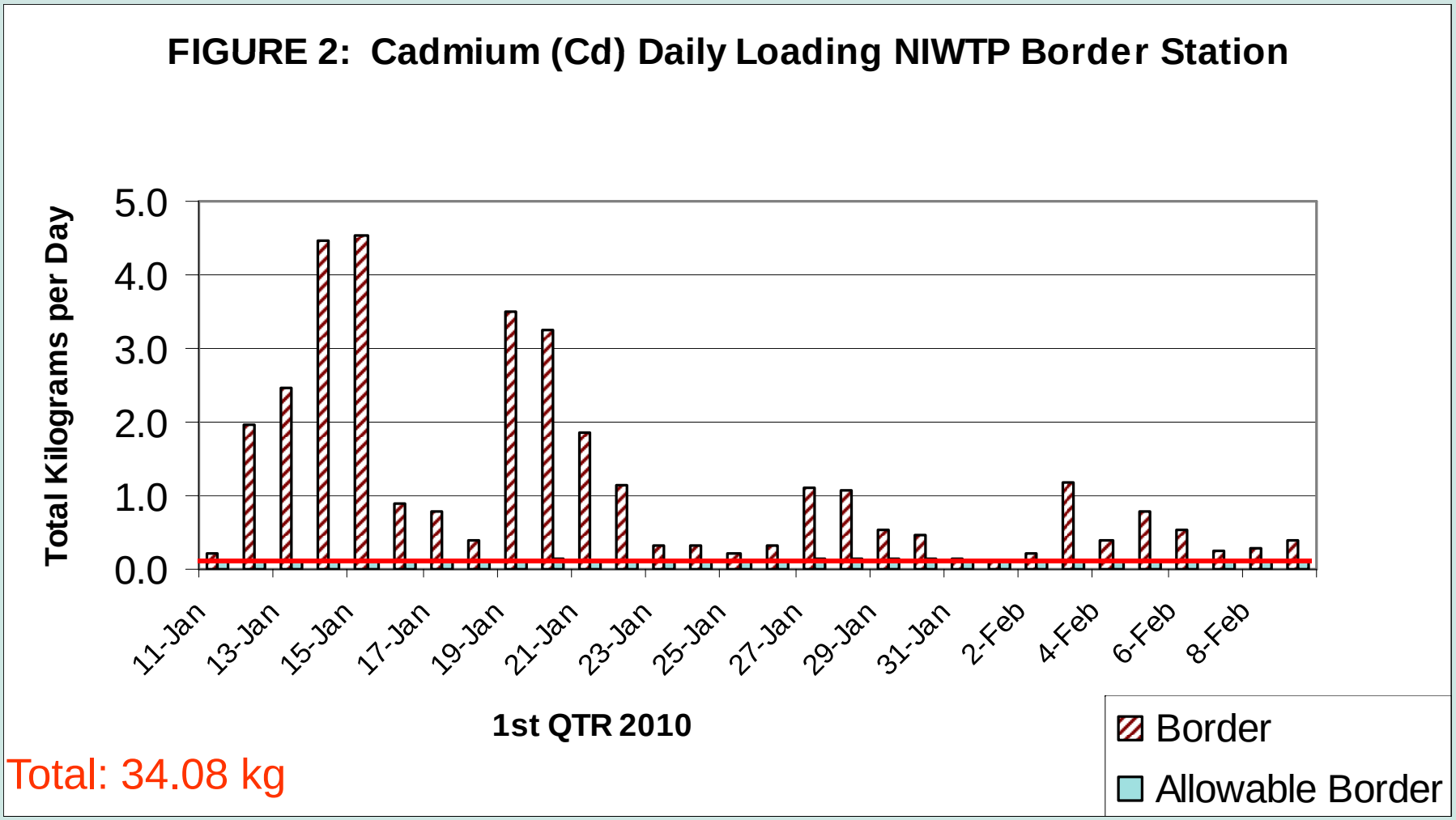
Noviembre 25, 2009: Presentación “Evaluación de Metales Pesados en las Aguas Residuales en Nogales” para el Grupo de Trabajo de Residuos y Aplicación de la Ley, Frontera 2012 en Nogales, Sonora.

Febrero 10, 2010: Presentación “Evaluación de Metales Pesados en las Aguas Residuales en Nogales (Actualización)” para la Asociación de Profesionales de Seguridad Ambiental (APSA) en Nogales, Sonora.

Marzo 3, 2010: Presentación “Evaluación de Metales Pesados en las Aguas Residuales de Ambos Nogales” para la Asociación de Maquiladoras de Sonora (AMS) en Nogales, Sonora.

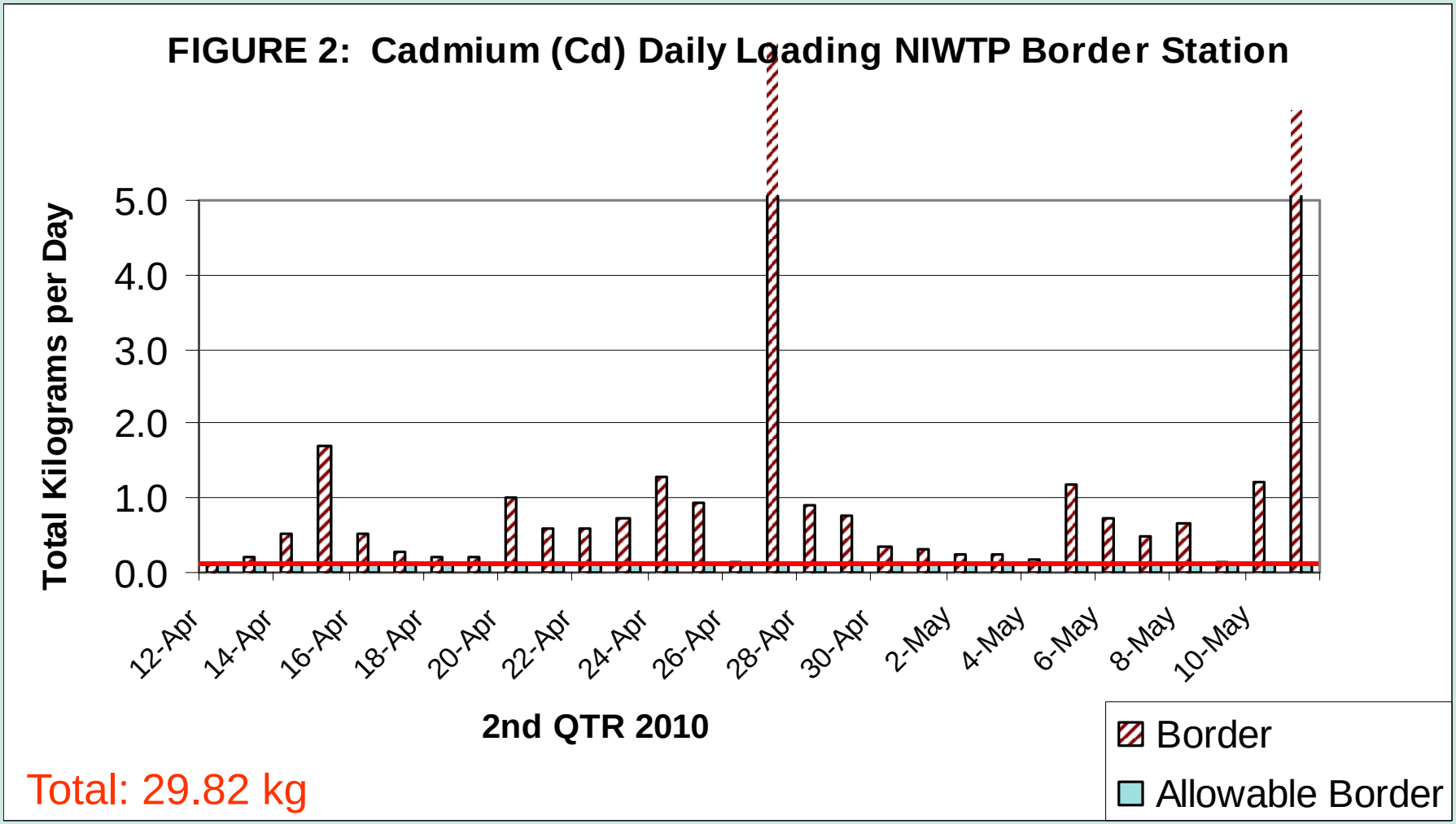
Abril 8, 2010: Presentación “Evaluación de Metales Pesados en las Aguas Residuales de Ambos Nogales para El Grupo de Trabajo de Agua de Frontera 2012 en Tucson, Arizona.

Results from Engagement



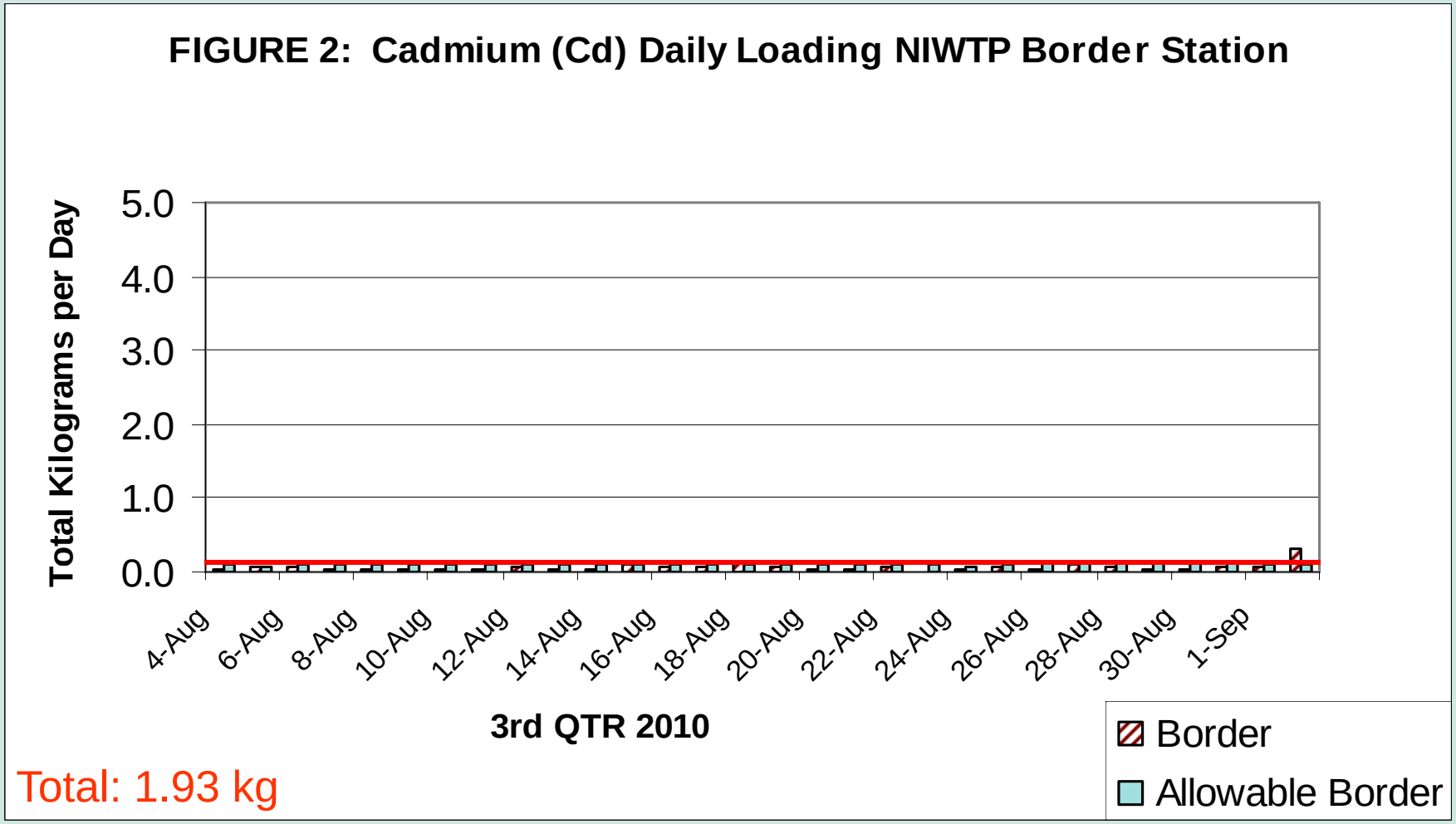
Total: 34.08 kg

Results from Engagement

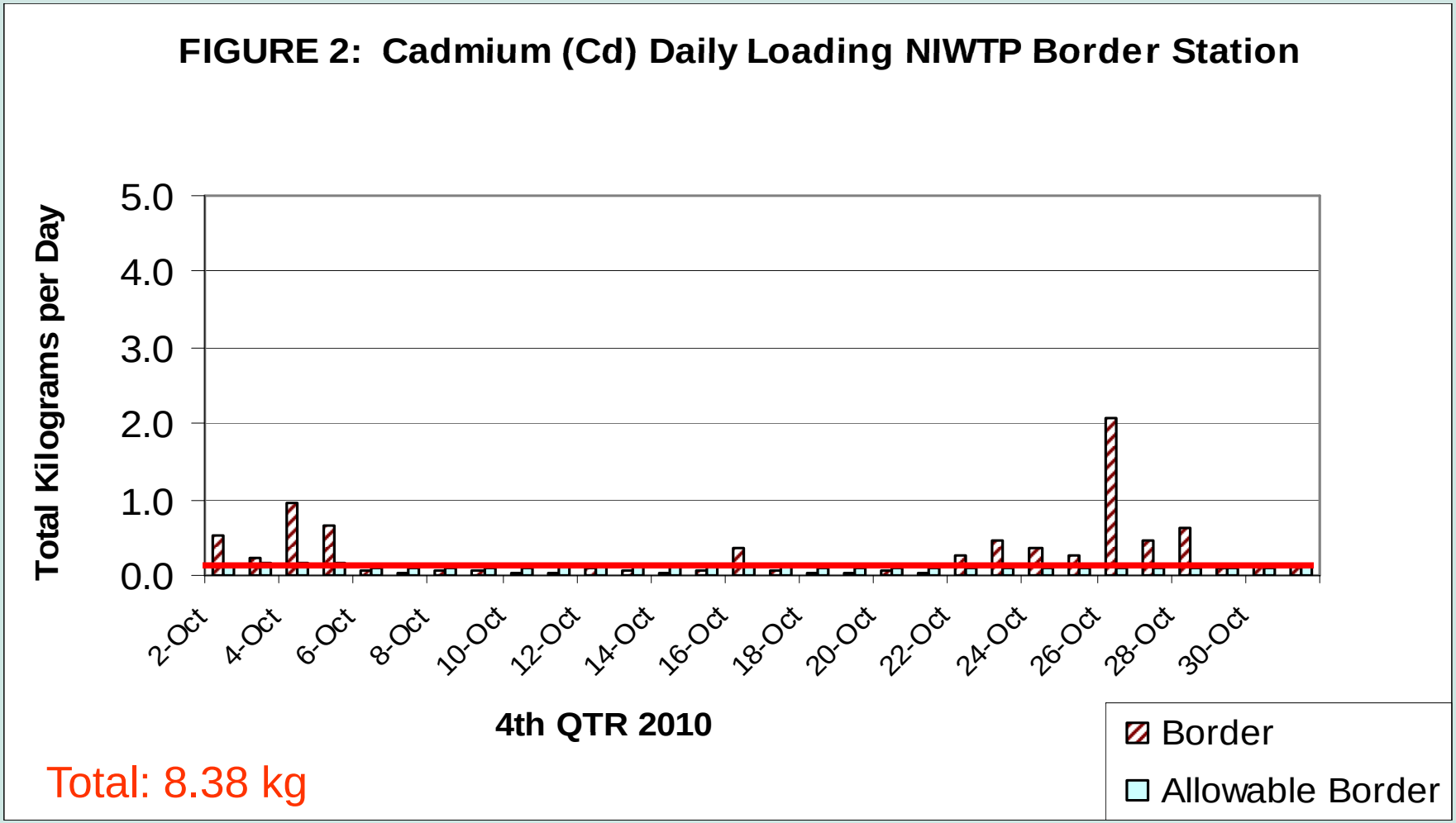


Total: 29.82 kg

Results from Engagement



Results from Engagement



Results from engagement

Allowable Headworks Loading for Cadmium: 0.19 kg/day
Permissible Total de cadmio: 0.19 kg/dia

Month, Year Mes, Año	Average Concentration Promedio de concentración (ppb)	Average Daily Loading Promedio de lodo (kg/day)	Standard Deviation Desviación Media (kg/day)	Monthly Loading Lodo Mensual (kg)
August, 2009	59	2.65	2.02	76.76
October, 2009	50	2.25	1.66	67.60
January, 2010	25	1.14	1.28	34.08
April, 2010	27	0.99	1.60	29.82
August, 2010	1.5	0.06	0.05	1.93
October, 2010	7.2	0.28	0.41	8.38

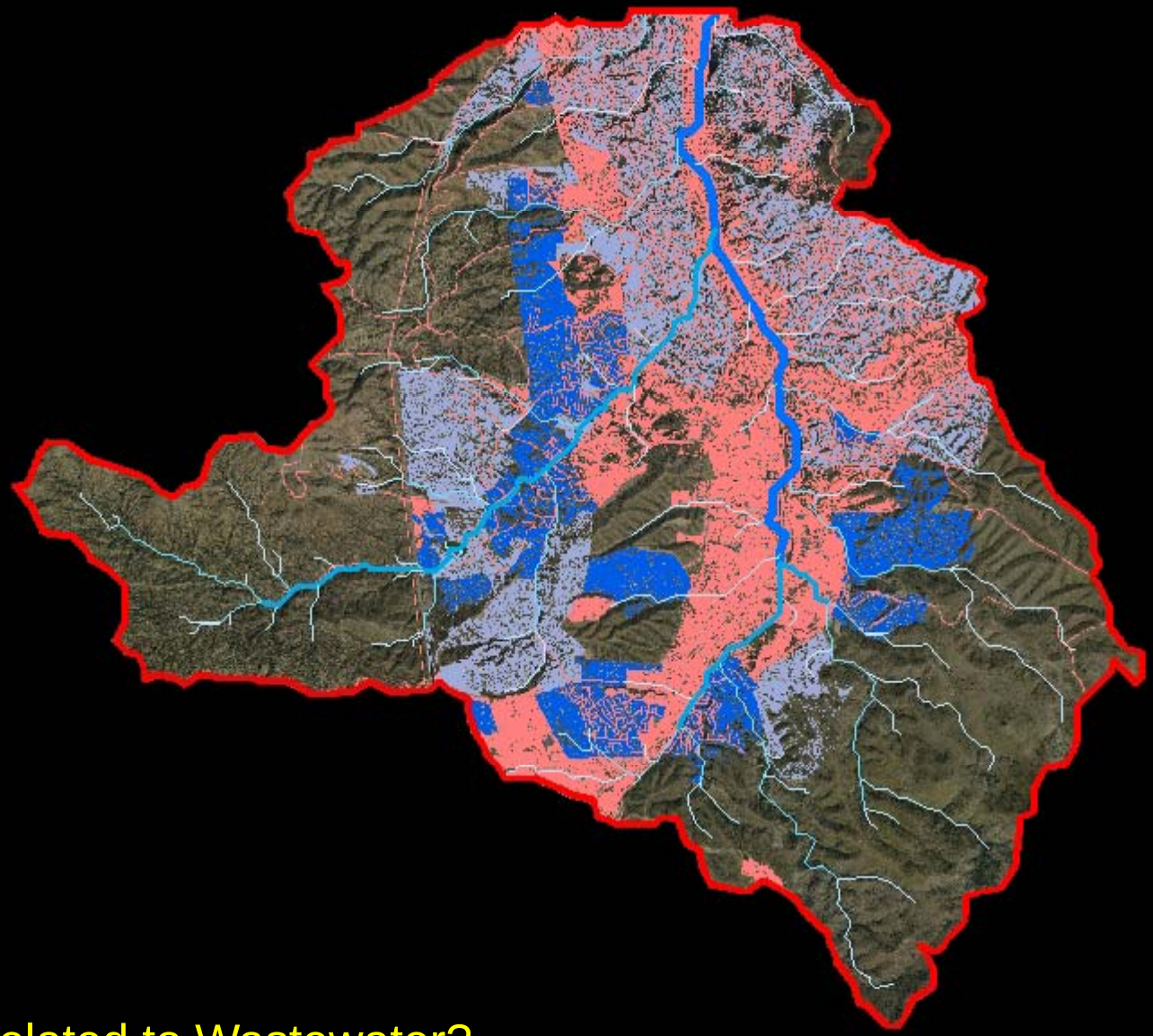
Sustainability is a consideration.
Sostenibilidad es una consideración.

IBWC Bills the Municipalities For the Expense of Biosolids Disposal

August 4, 2010: ADEQ receives IBWC notification that biosolids are impacted with high levels of cadmium.

Foto cortesía de Ciudad de Nogales, Sonora.
Photos courtesy of City of Nogales, Sonora.

Landuse cover developed by Dr. Laura Norma,
United States Geological Survey, 2010



How is this related to Wastewater?

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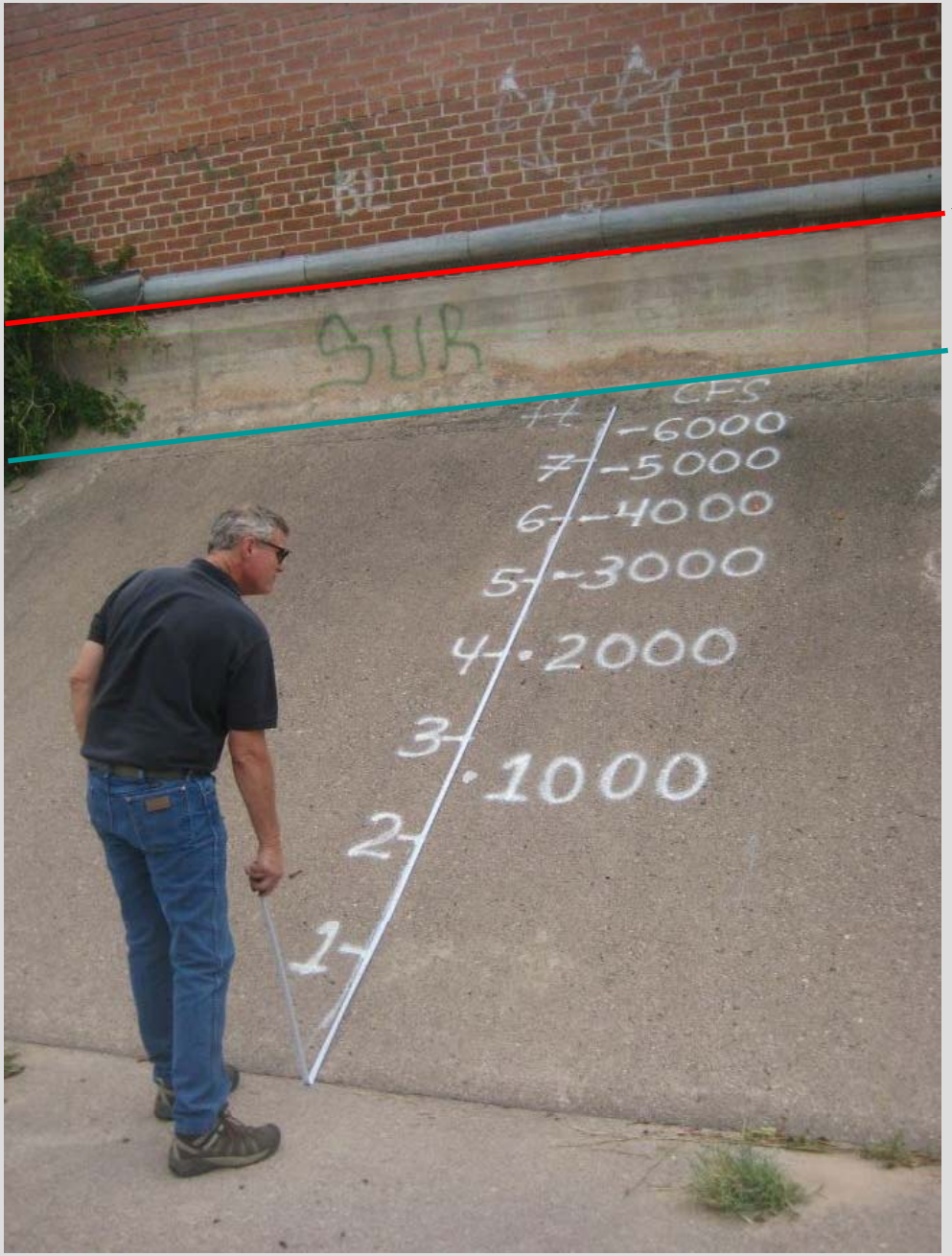


9,960 cfs @ 20 fps

6,720 cfs @ 20 fps

ADEQ
Arizona Department of Environmental Quality

Photo courtesy of City of Nogales, Arizona

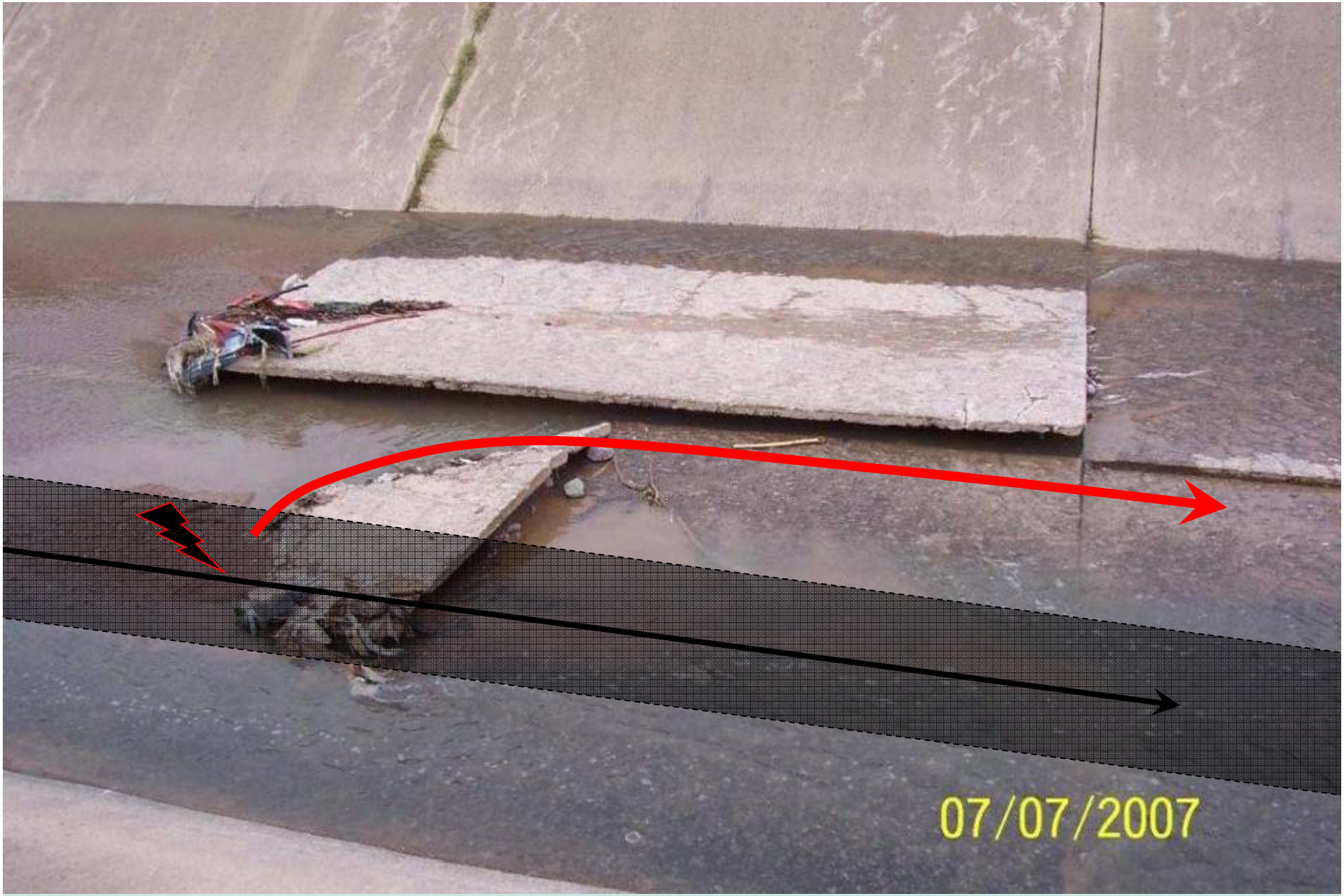


Photo courtesy of City of Nogales

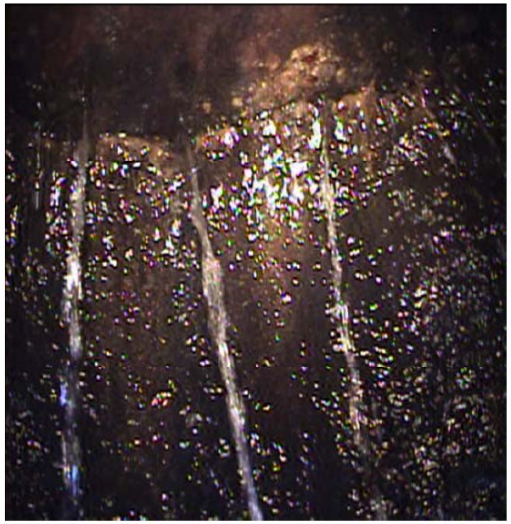


PHOTO 2-1
INFLOW WITHIN MANHOLES IN THE NOGALES WASH
(TYPICAL CONDITION OF MANHOLES 16 THROUGH 33)

PHOTO 2-8
EXPOSED AGGREGATE AND SURCHARGED
MANHOLES (TYPICAL CONDITION OF
MANHOLES 96 TO NIWTP)

PHOTO 2-4
CONSTRUCTION DEBRIS IN FLOW PATH
(MANHOLE 48)

PHOTO 2-13
INFILTRATION AND INFLOW

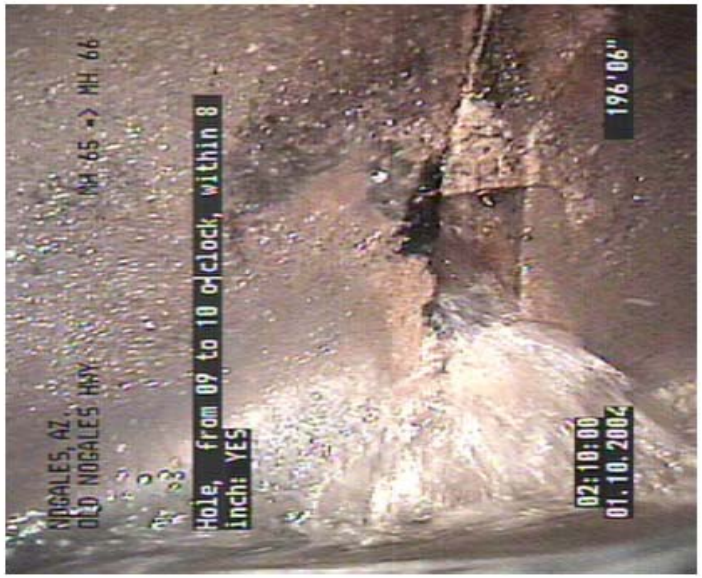
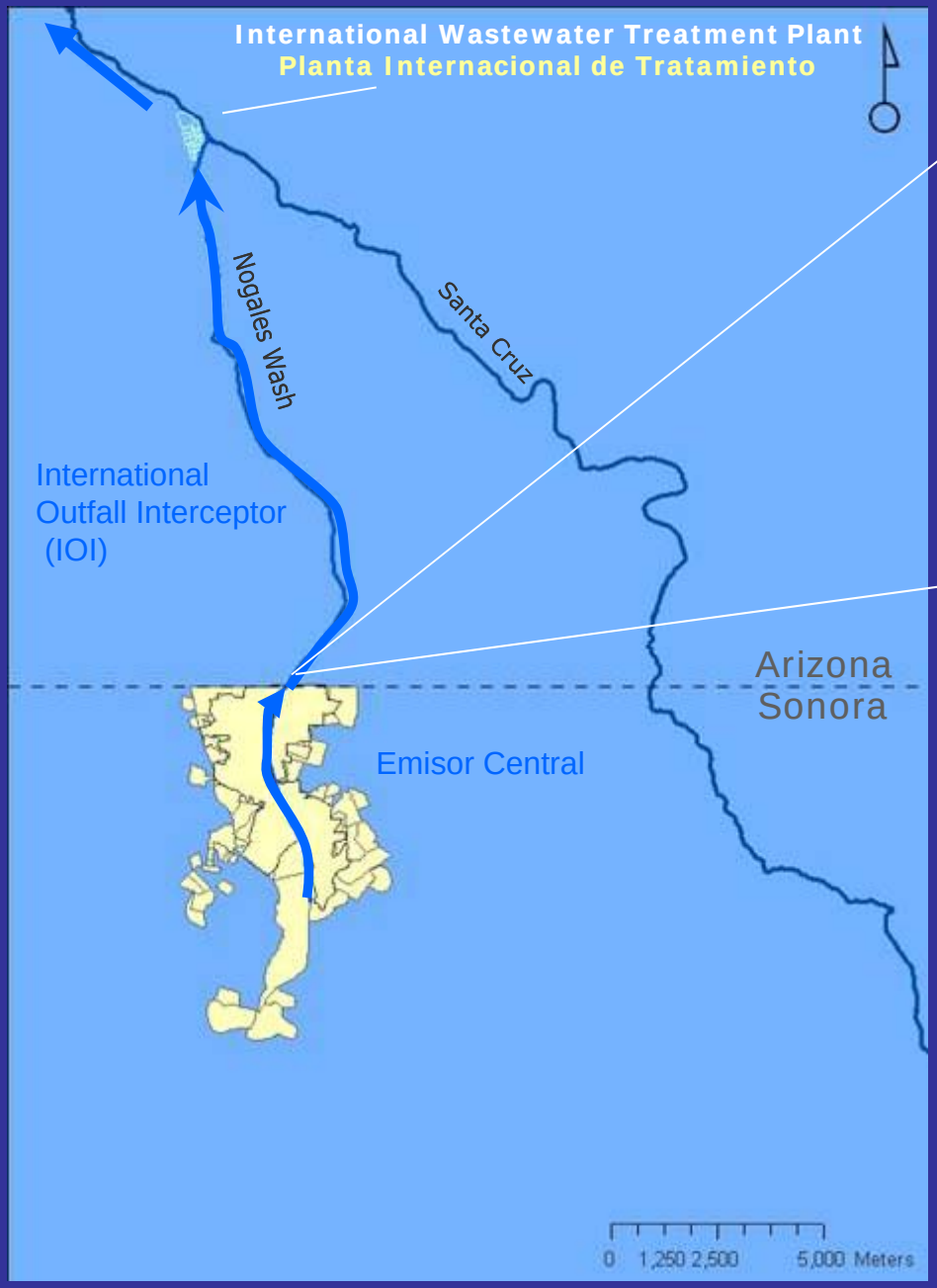


PHOTO 2-14
HOLES

Other Challenges

Inflow and infiltration of stormwater introduced into the sewers contributes to sanitary sewer overflows.


International Wastewater Treatment Plant
Planta Internacional de Tratamiento
Nogales Wash
Santa Cruz
International
Outfall Interceptor
(IOI)
Arizona
Sonora
Emisor Central
0 1,250 2,500 5,000 Meters

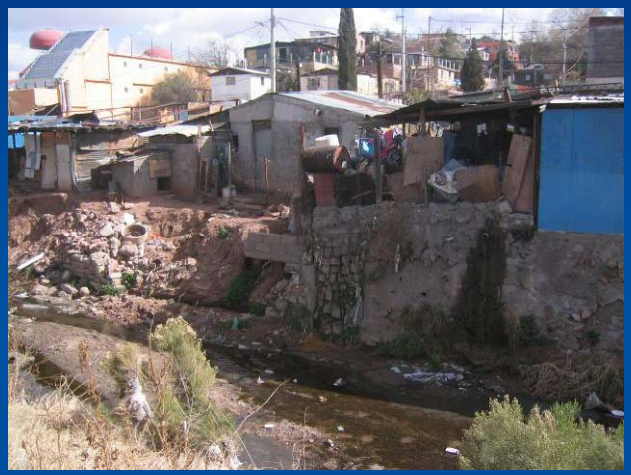
16/01/2010

Additional Binational Challenges

Disinfection Station Maintenance

Additional Binational Challenges

Flimsy / Illegal Hookups and Direct Discharges



Additional Binational Challenges

Solid Waste Disposal

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