The Arizona-Sonora Border Region: Water Quality Challenges and Priorities for the EPA Border 2012 (2020) Program

Water Resources Research Center
Brownbag Seminar
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The U.S.- Mexico Border Region

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Impact of Population Growth

- 2000 population: 11.8 million
  - U.S.: 6.3 million
  - Mexico: 5.5 million
- Estimated current population ~ 14 million
- Projection for 2020: 22 million
  - U.S.: 10 million
  - Mexico: 12 million

90 years later...

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Border Environmental Challenges

- Poor air quality

- Inadequate and insufficient infrastructure (drinking water and wastewater)

- Improper management of hazardous and solid wastes

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A Binational Commitment to the Border

- The La Paz Agreement (1983)
- IBEP-Integrated Border Environmental Plan for the U.S.-Mexico Area (1992-1994)
- Creation of BECC/NADBank (1994)
- EPA's Border Offices open (1994)
- Border XXI (1996-2000)
- Border 2012 (2002-2012)
- Border 2020 (2013-2020)

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Border 2020 Goals

Goal 1
Reduce Conventional Air and Greenhouse Gas Emissions

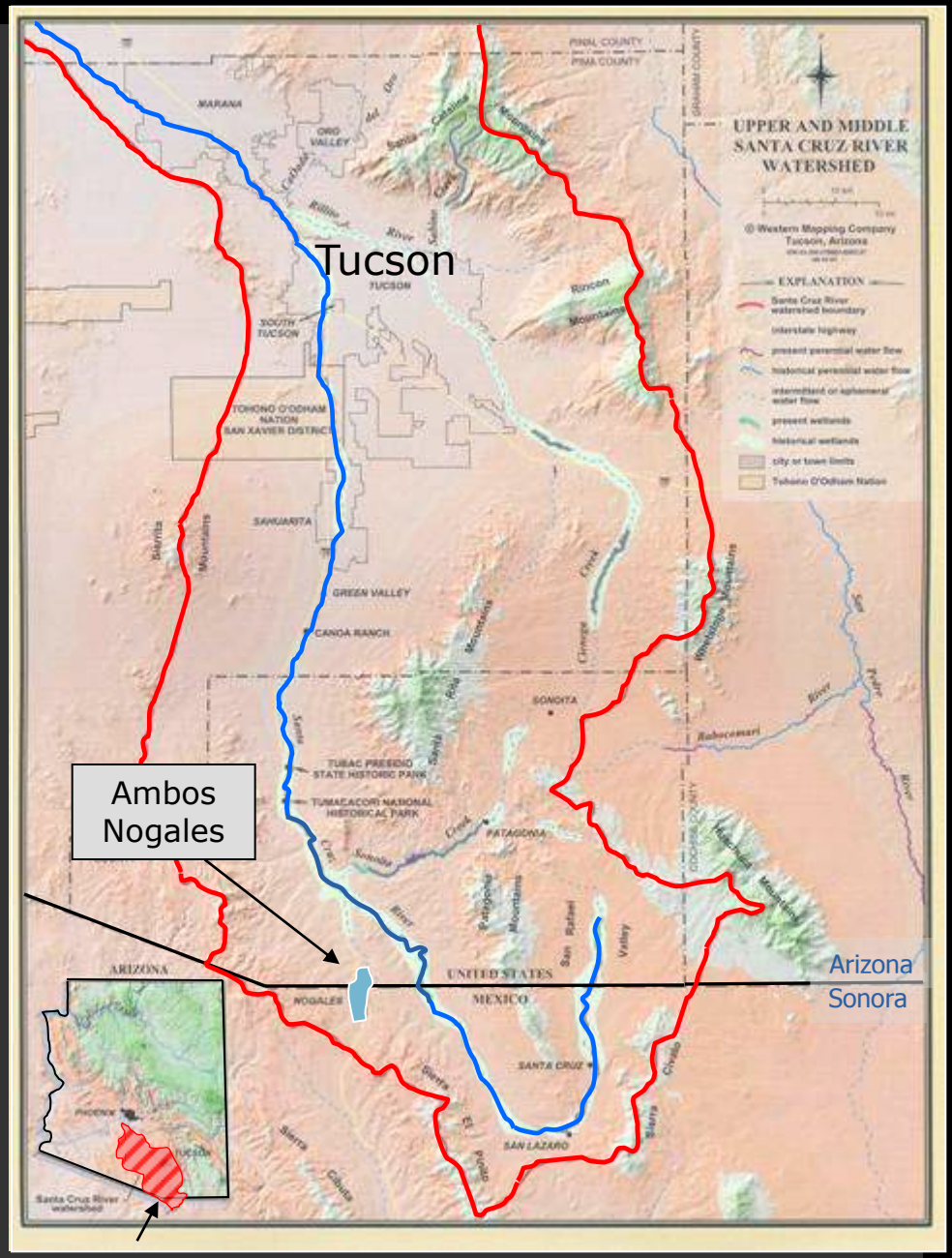
Goal 2
Improve Access to Clean and Safe Water

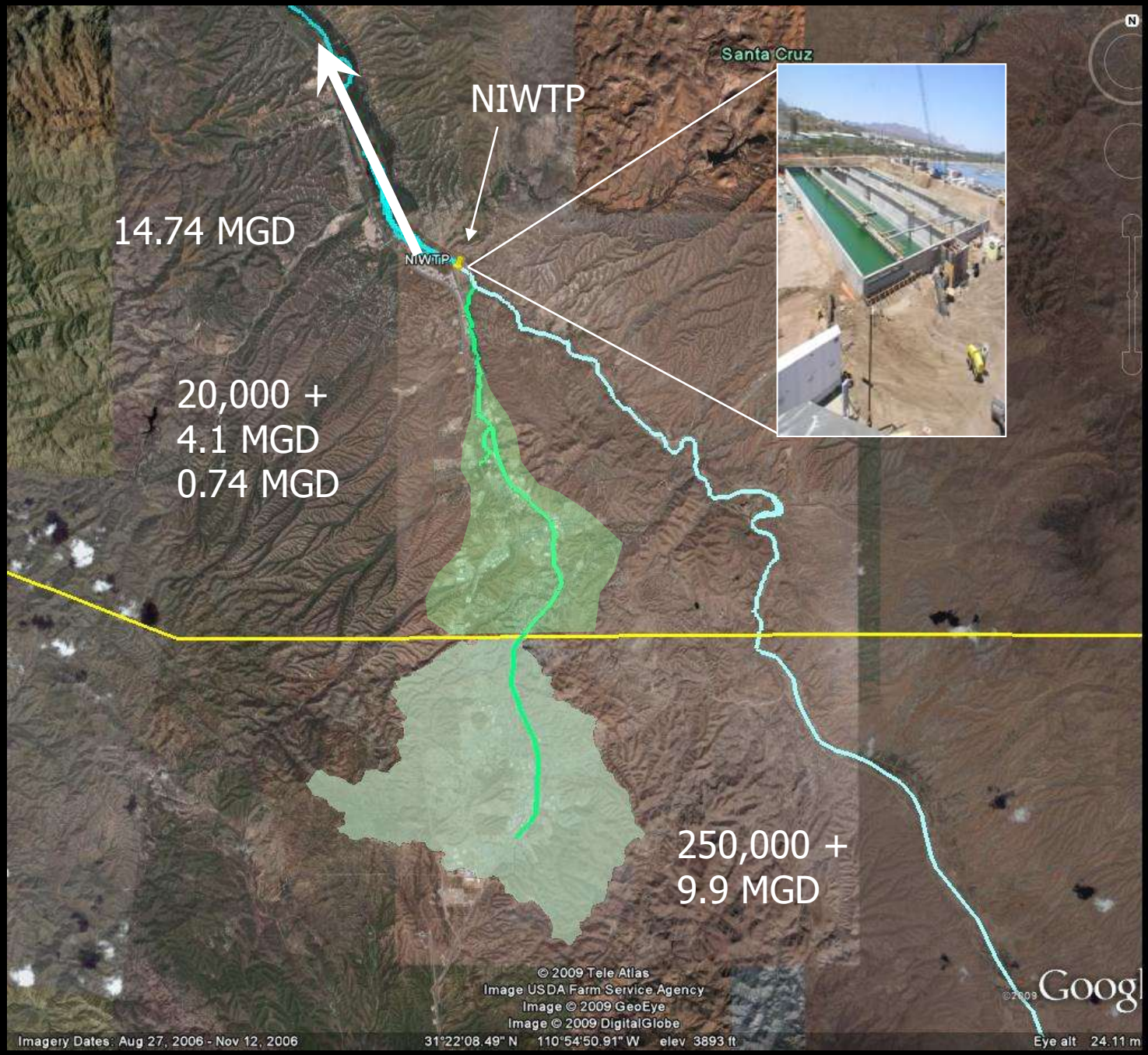
Goal 3
Materials Management and Clean Sites

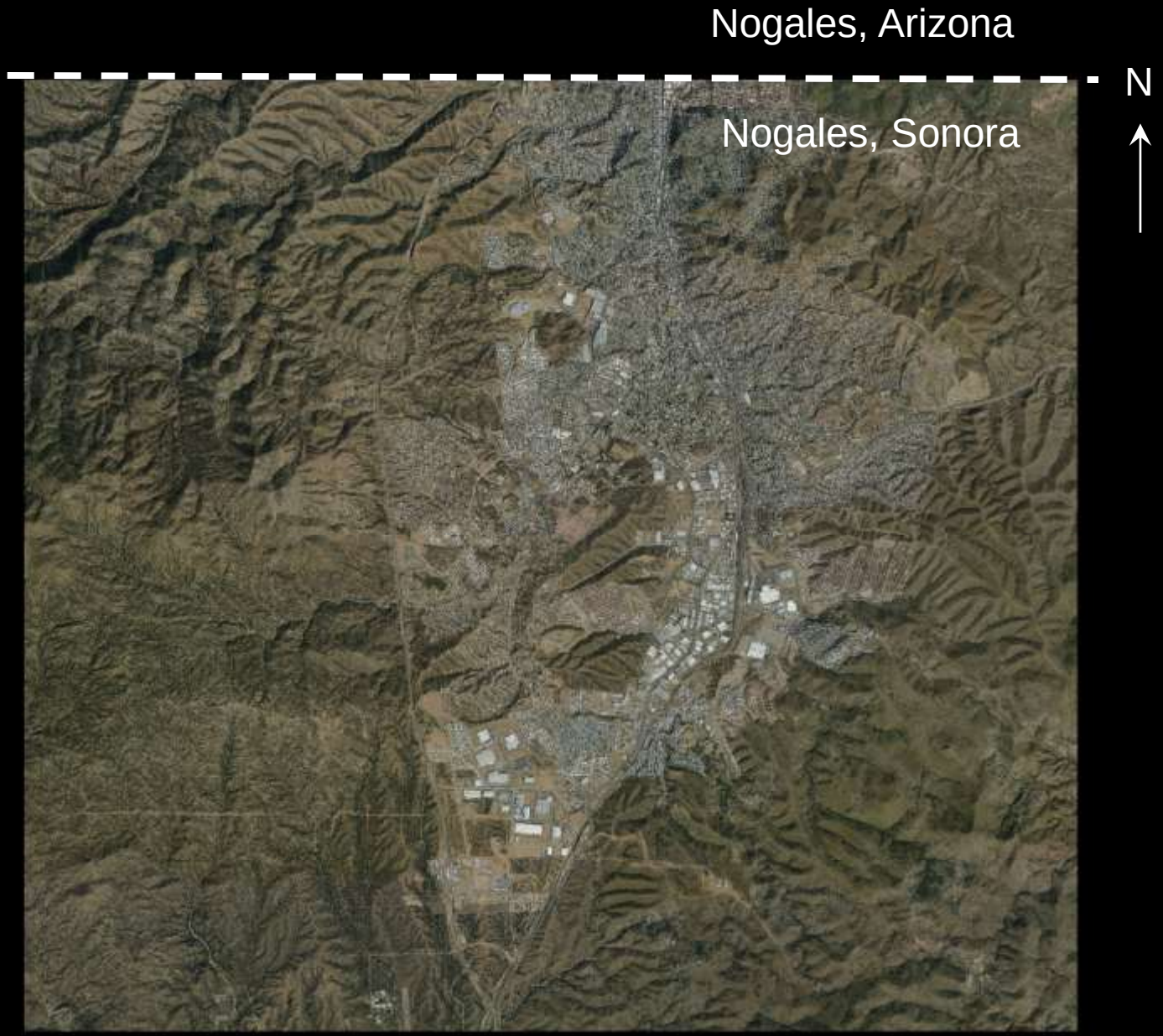
Goal 4
Improve Environment & Public Health through Chemical Safety

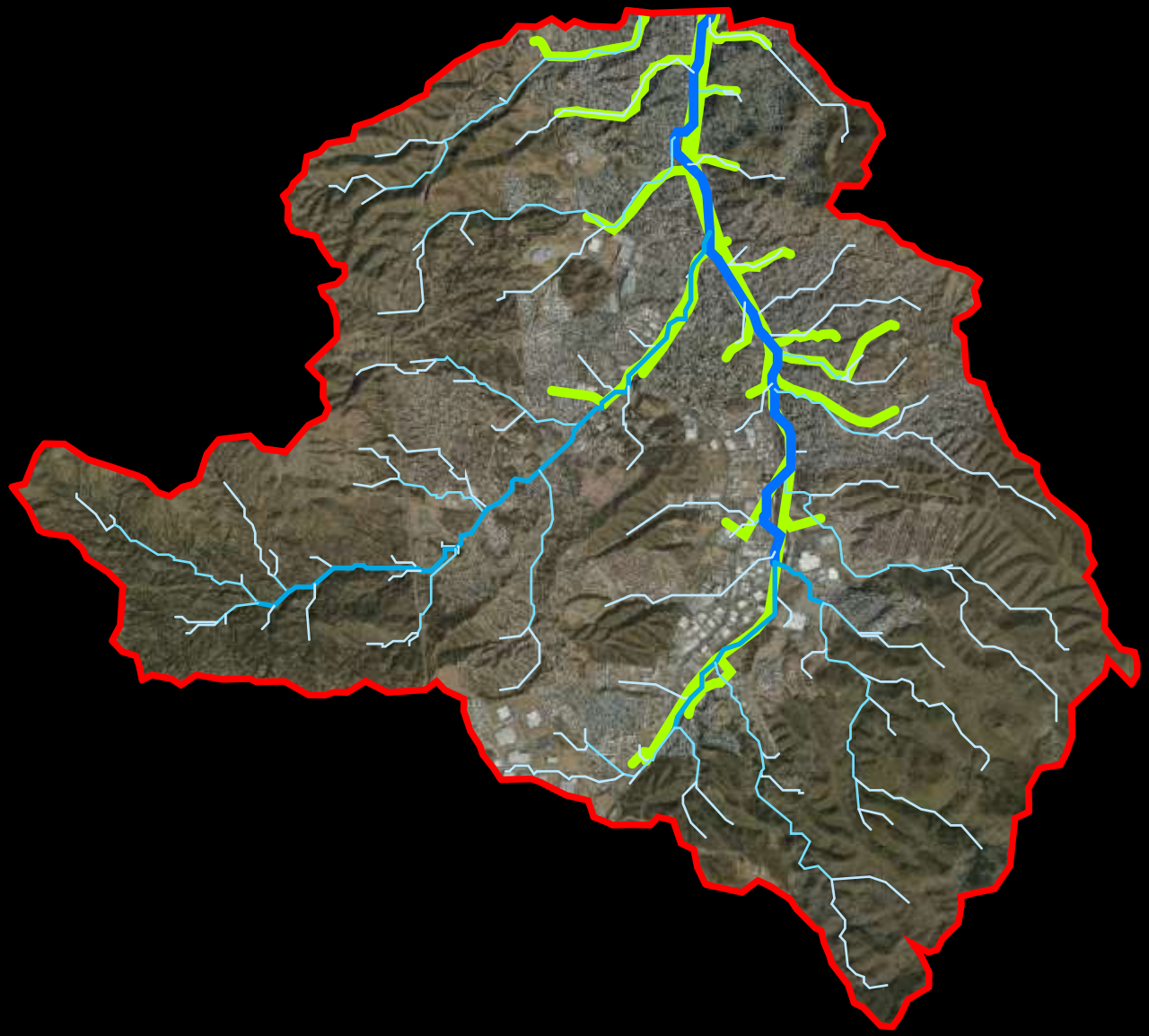
Goal 5
Enhance Joint Preparedness for Environmental Response

Goal 6
Compliance Assurance and Environmental Stewardship

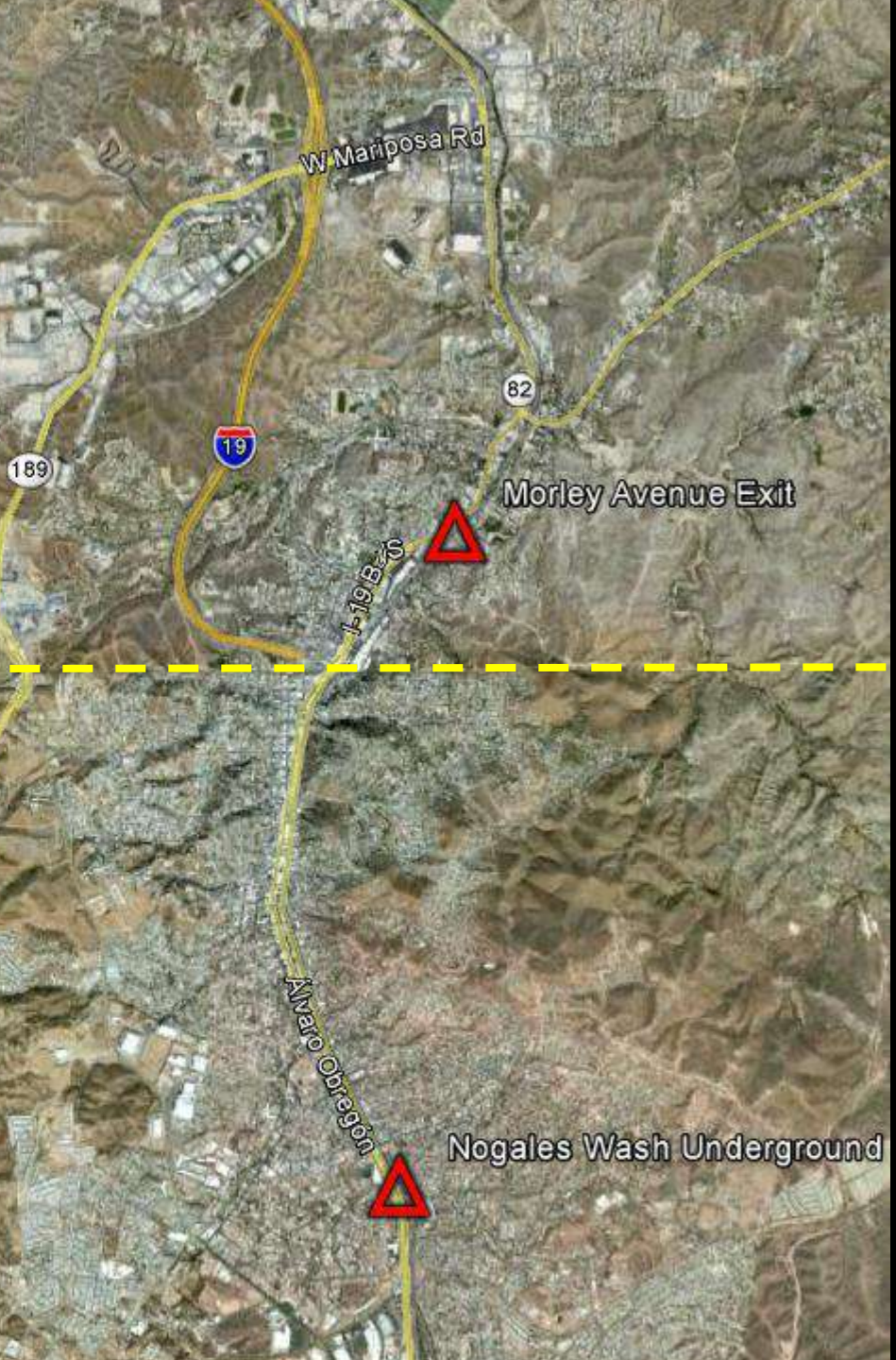

UPPER AND MIDDLE SANTA CRUZ RIVER WATERSHED
Tucson
Ambos Nogales
Arizona
Sonora
UNITED STATES
MEXICO
ARIZONA
NOGALES
SONOITA
PATAGONIA
SANTA CRUZ
SAN LAZARO
GREEN VALLEY
SAHUARITA
CANOA RANCH
TUBAC PRESIDIO STATE HISTORIC PARK
TUMACACORI NATIONAL HISTORICAL PARK
TOHONO O'ODHAM NATION
SAN XAVIER DISTRICT
SOUTH TUCSON
ORO VALLEY
MARANA
PHOENIX
TUCSON
Santa Cruz River watershed


Santa Cruz
NIWTP
14.74 MGD
NIWTP
20,000 +
4.1 MGD
0.74 MGD
250,000 +
9.9 MGD
© 2009 Tele Atlas
Image USDA Farm Service Agency
Image © 2009 GeoEye
Image © 2009 DigitalGlobe
Imagery Dates: Aug 27, 2006 - Nov 12, 2006
31°22'08.49" N 110°54'50.91" W elev 3893 ft
Eye alt 24.11 m


Nogales, Arizona
N
Nogales, Sonora

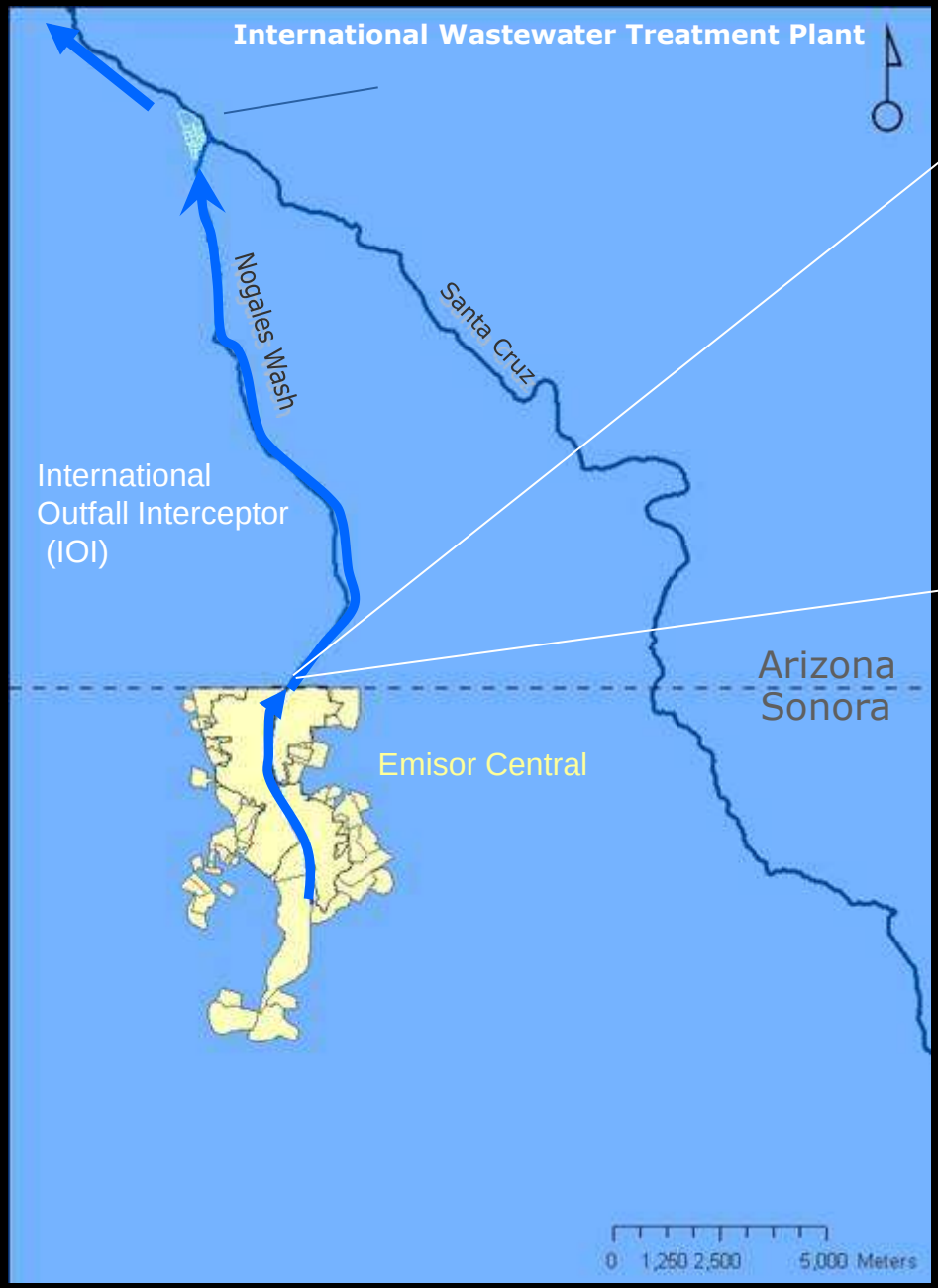


Cortesía de la Municipalidad de Nogales, Sonora


W Mariposa Rd
82
19
189
Morley Avenue Exit
I-19 Bdg
Alvaro Obregón
Nogales Wash Underground


Arizona

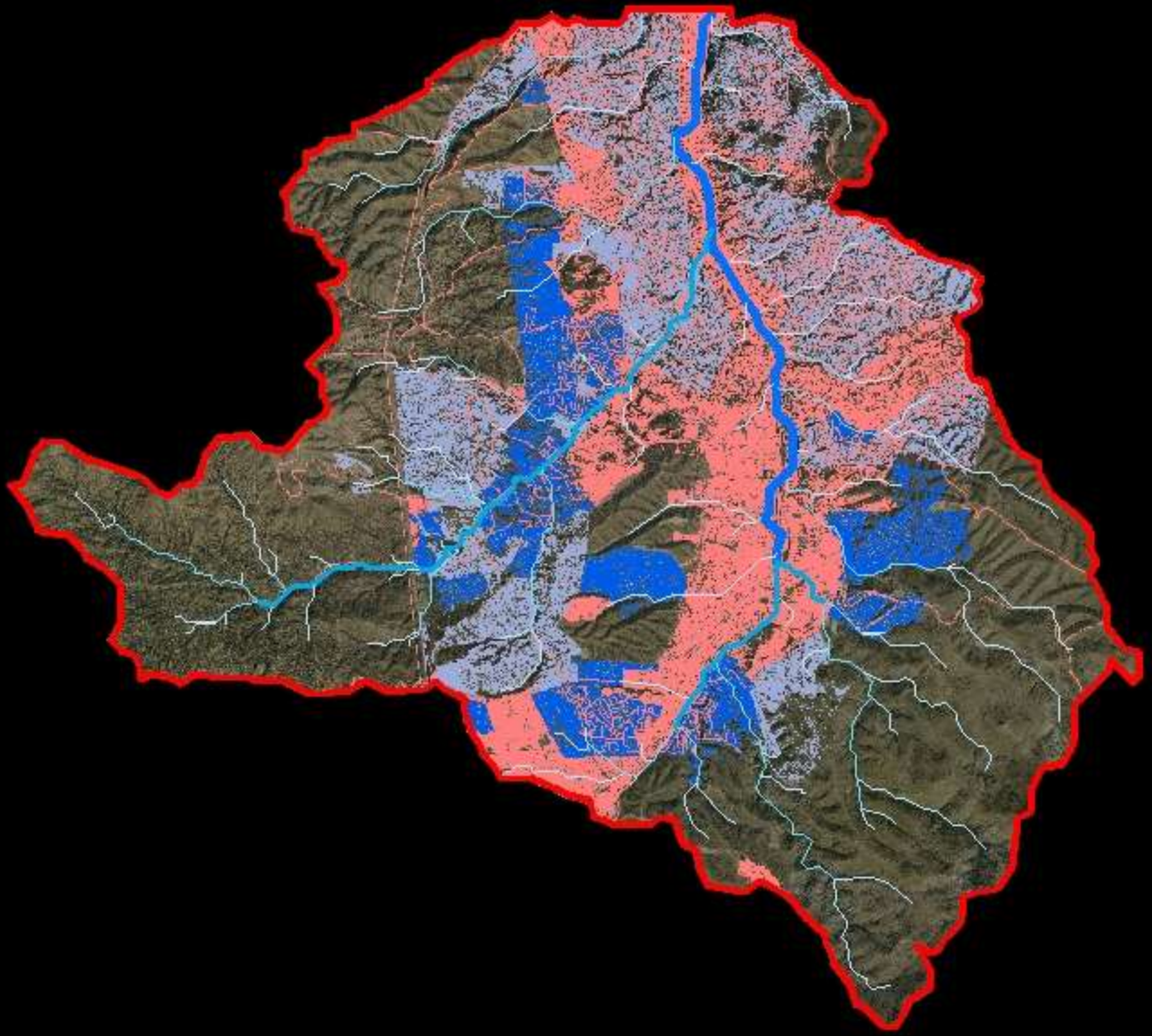

Sonora


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


11 4 2005

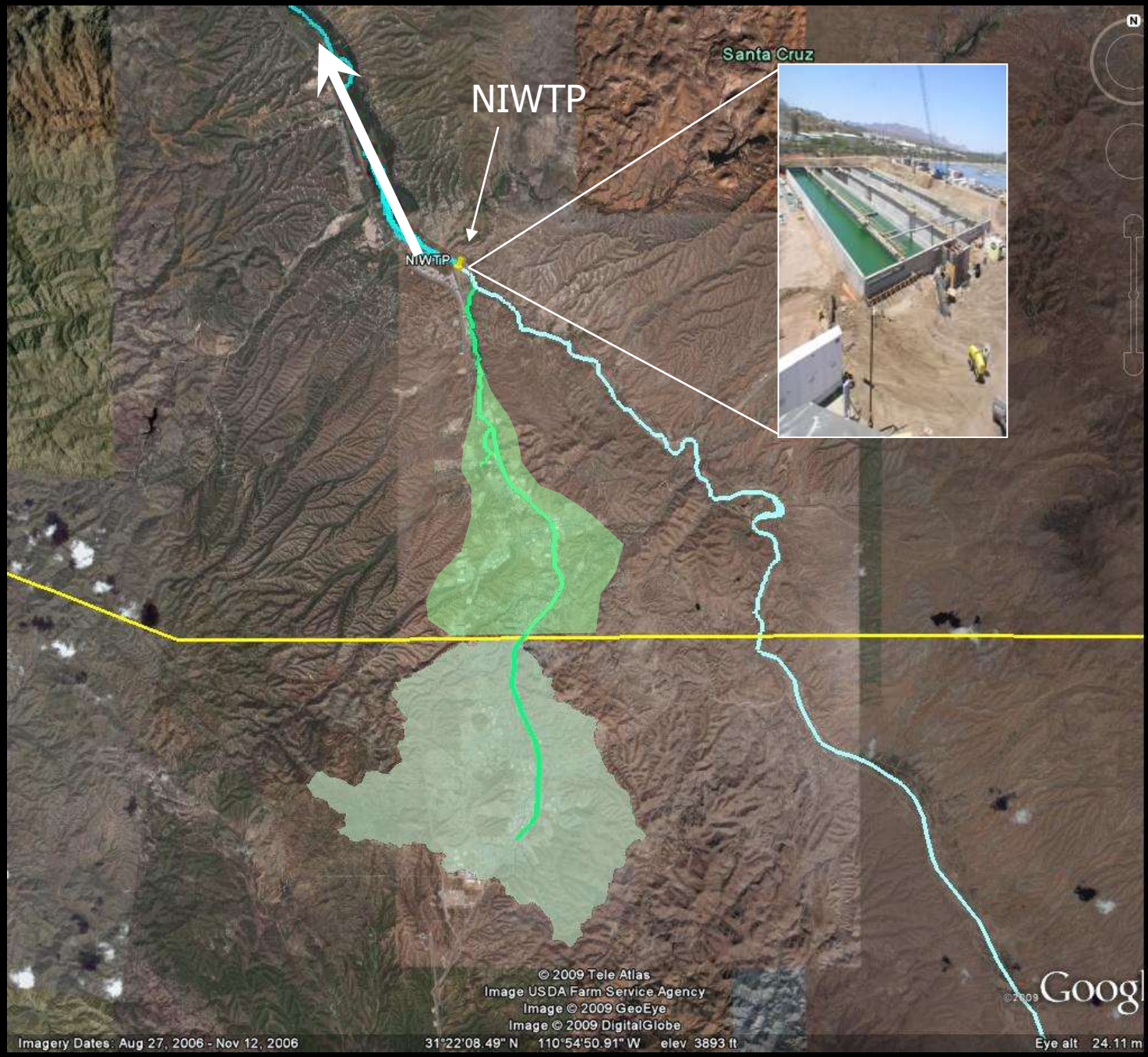
Nogales Wash, Sonora

Nogales Wash, Arizona



Photos courtesy of City of Nogales, Sonora.

Photo courtesy of City of Nogales


NIWTP
Santa Cruz
NIWTP
© 2009 Tele Atlas
Image USDA Farm Service Agency
Image © 2009 GeoEye
Image © 2009 DigitalGlobe
Imagery Dates: Aug 27, 2006 - Nov 12, 2006
31°22'08.49" N 110°54'50.91" W elev 3893 ft
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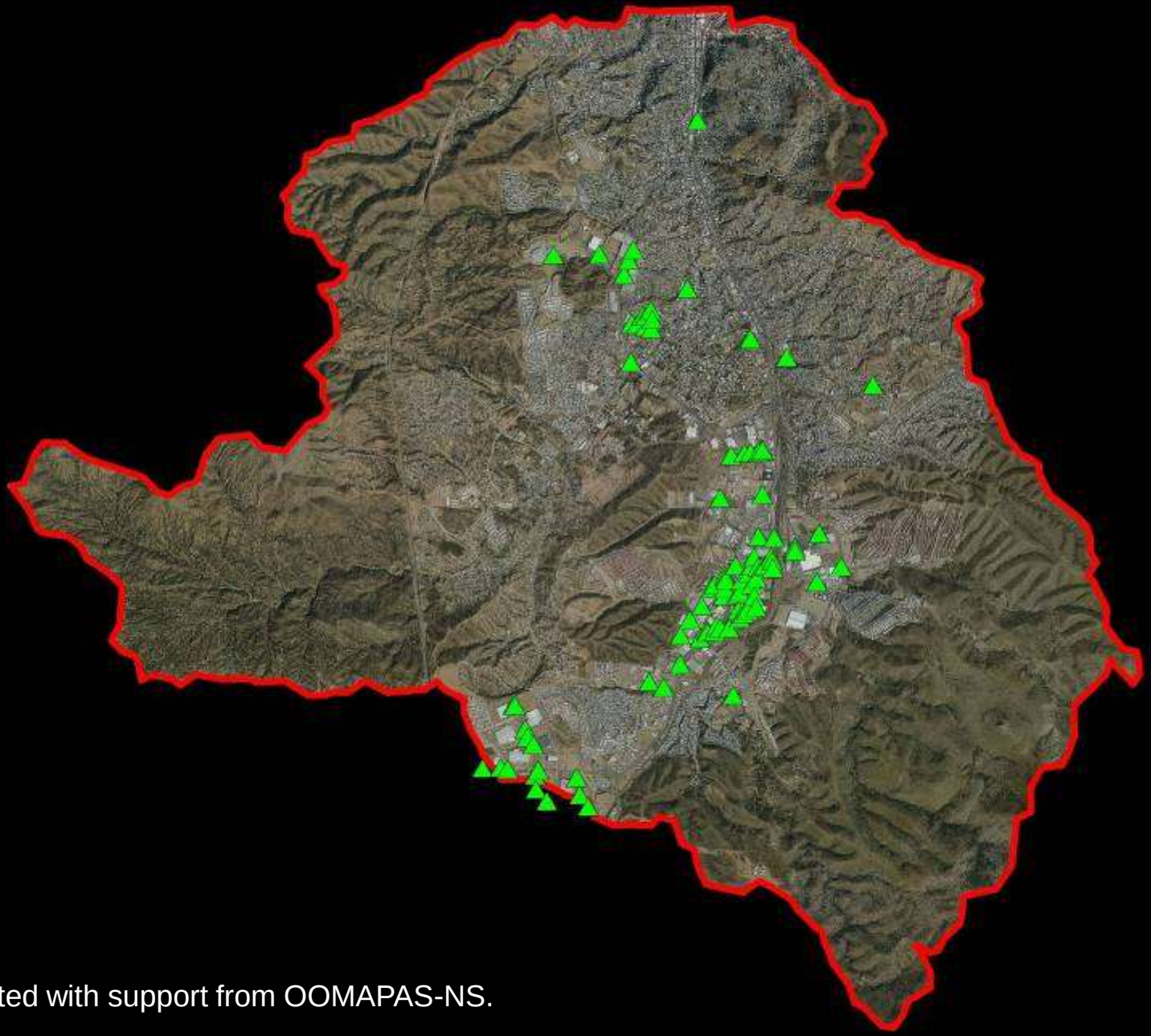
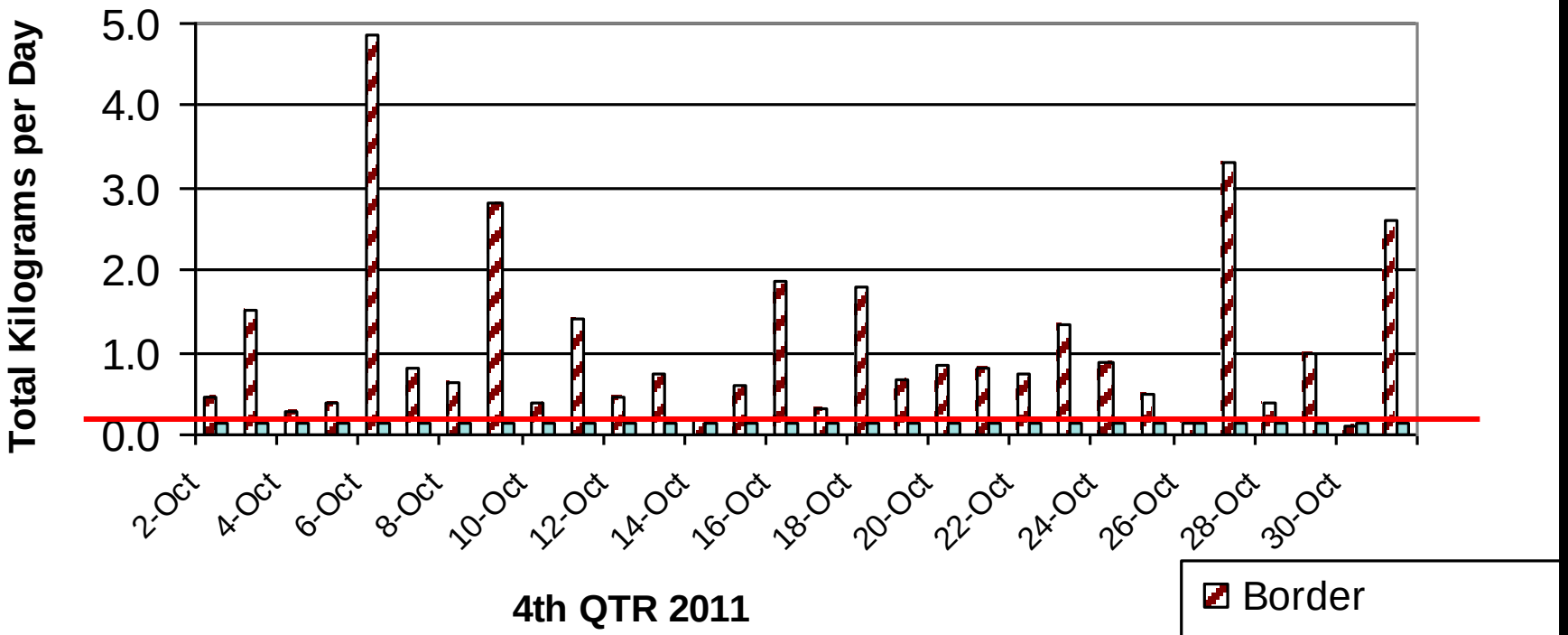


Map generated with support from OOMAPAS-NS.

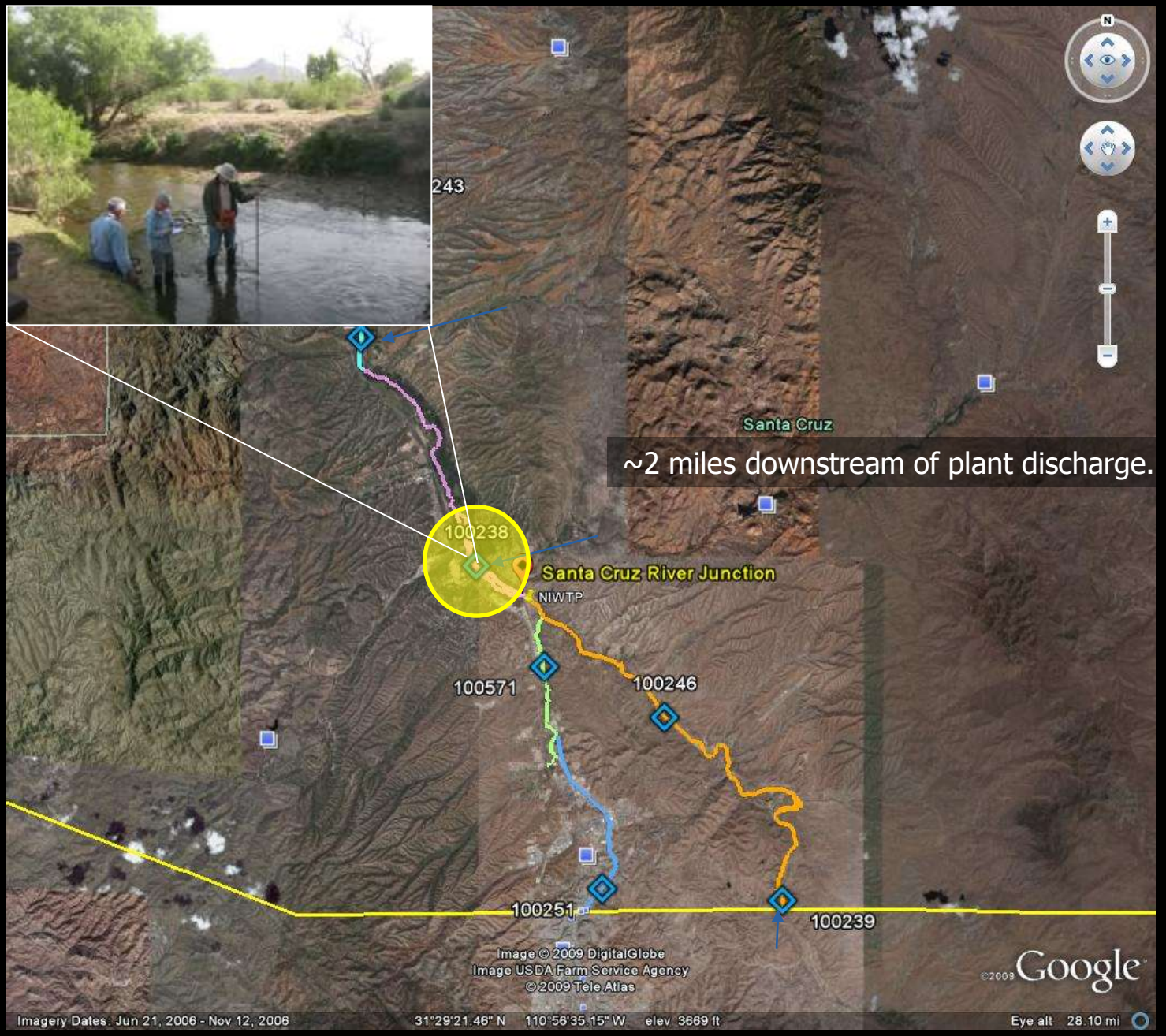

100244
100243
100247
100238
Santa Cruz River Junction
NIWTP
100571
100246
100251
100239
Image © 2009 DigitalGlobe
Image USDA Farm Service Agency
© 2009 Tele Atlas
©2009 Google
Imagery Dates: Jun 21, 2006 - Nov 12, 2006
31°29'21.46" N 110°56'35.15" W elev 3669 ft
Eye alt 28.10 mi

FIGURE 2: Cadmium (Cd) Daily Loading NIWTP Border Station



Total: 32.88 kg vs 5.55 kg allowable


Biosolids


243
Santa Cruz
~2 miles downstream of plant discharge.
100238
Santa Cruz River Junction
NIWTP
100571
100246
100251
100239
Image © 2009 DigitalGlobe
Image USDA Farm Service Agency
© 2009 Tele Atlas
©2009 Google
Imagery Dates: Jun 21, 2006 - Nov 12, 2006
31°29'21.46" N 110°56'35.15" W elev 3669 ft
Eye alt 28.10 mi

FOSCR Monitoring Cadmium

Date	Total Cd (ug/l)	Dis. Cd (ug/l)	Hardness[a] Ca+Mg (ppm)	Standard (ug/l)	Exceedance
1/26/10	ND	ND	153	0.75	No
4/29/10	4.1	3.5	147	0.73	Yes
8/25/10	ND	ND	160	0.78	No
10/27/10	2.31	2.06	170	0.81	Yes
2/23/11	ND	ND	153**	0.75	No
5/25/11	ND	ND	146	0.73	No
8/31/11	1.7	1.6	143	0.72	Yes
11/30/11	ND	ND	145	0.73	No

Latest samples collected this morning.

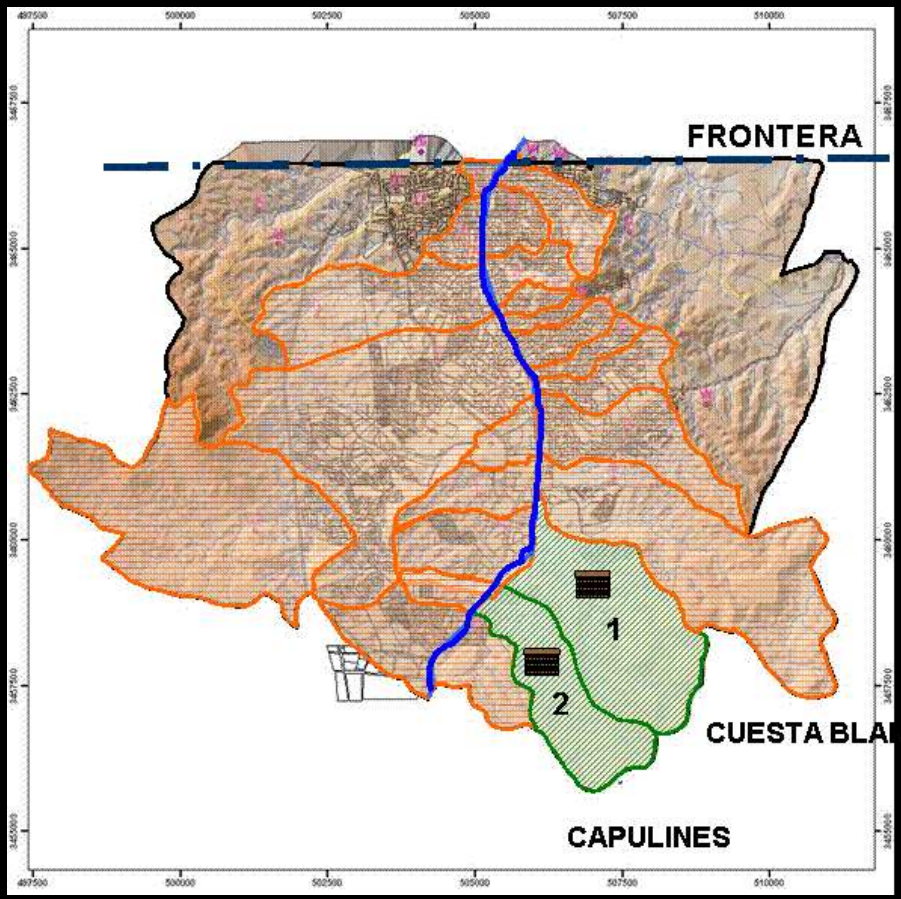
Water Task Force Projects

Stormwater Detention Features for Nogales, Sonora

Photo courtesy of City of Nogales, Sonora

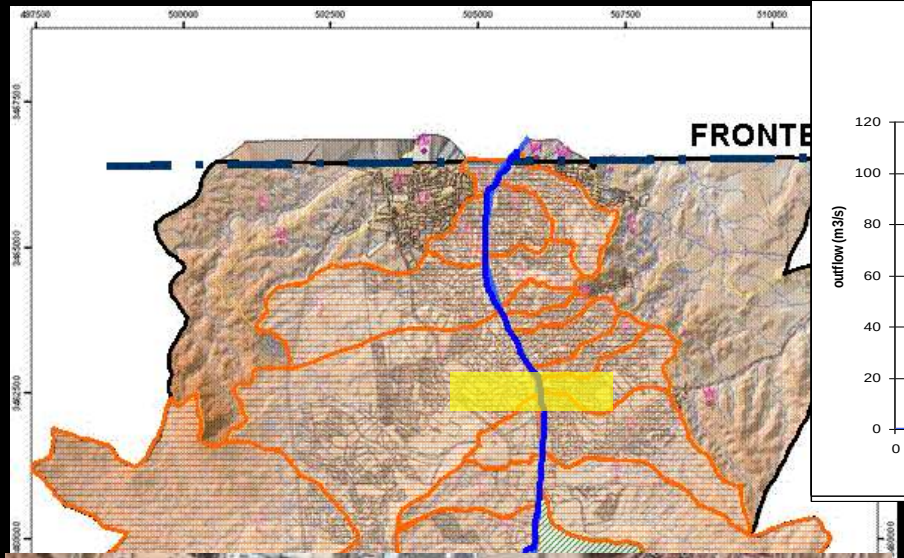
Purpose: Diminish impacts of flooding and sedimentation on wastewater infrastructure with the goal of reducing the incidence of sanitary sewer overflows.

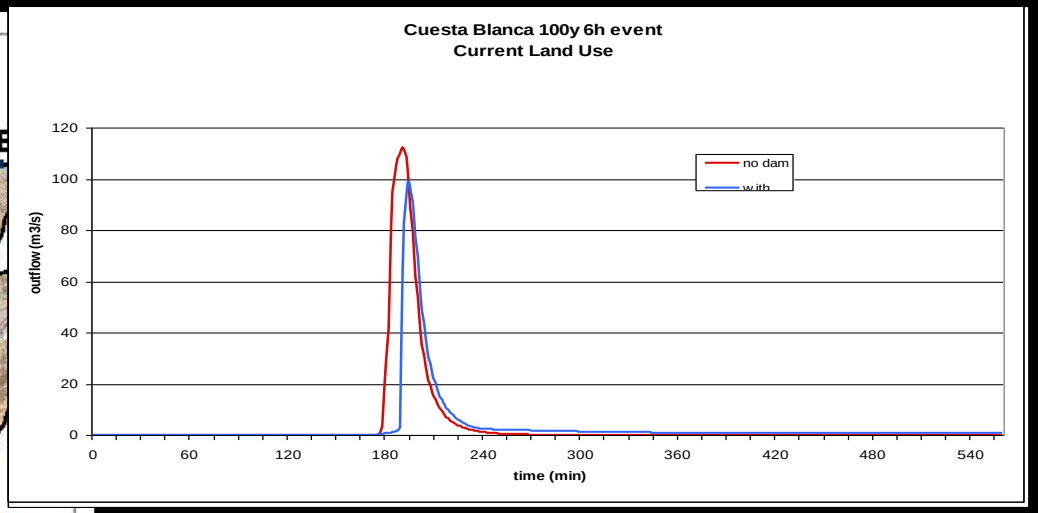
Stormwater Detention Features for Nogales, Sonora



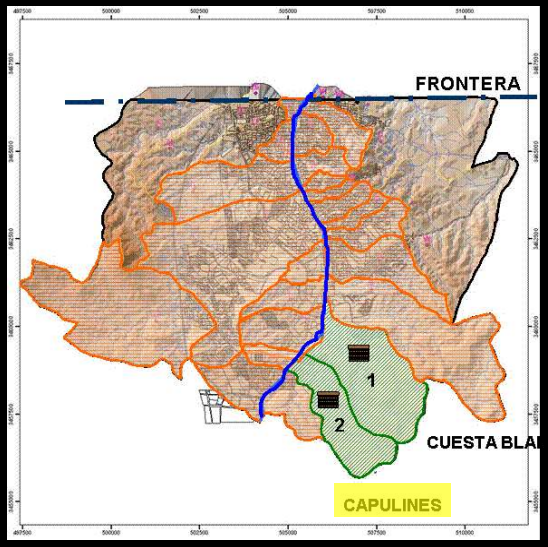
Map courtesy of City of Nogales, Sonora.

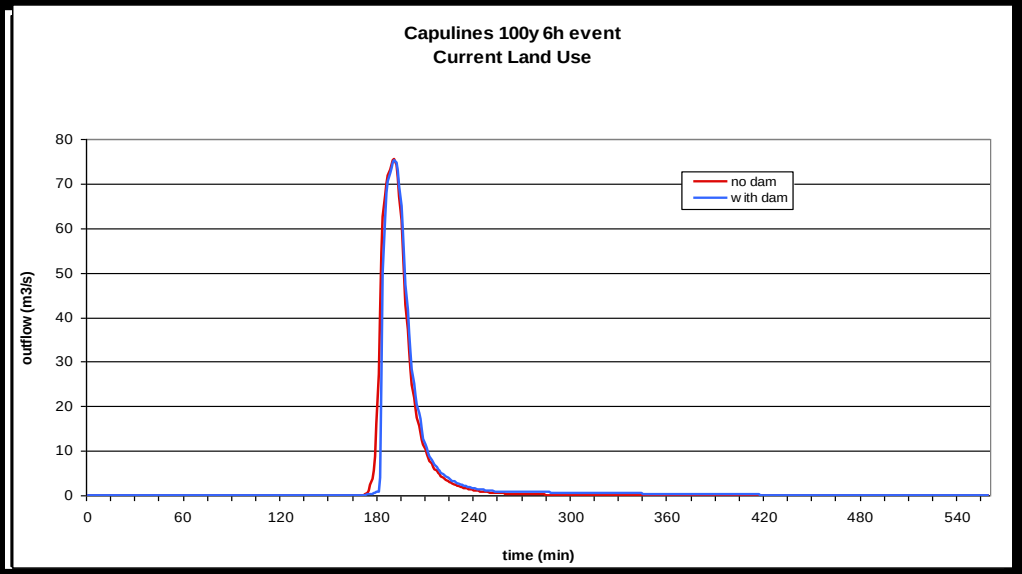
Stormwater Detention Features for Nogales, Sonora





Stormwater Detention Features for Nogales, Sonora





Stormwater Detention Features for Nogales, Sonora

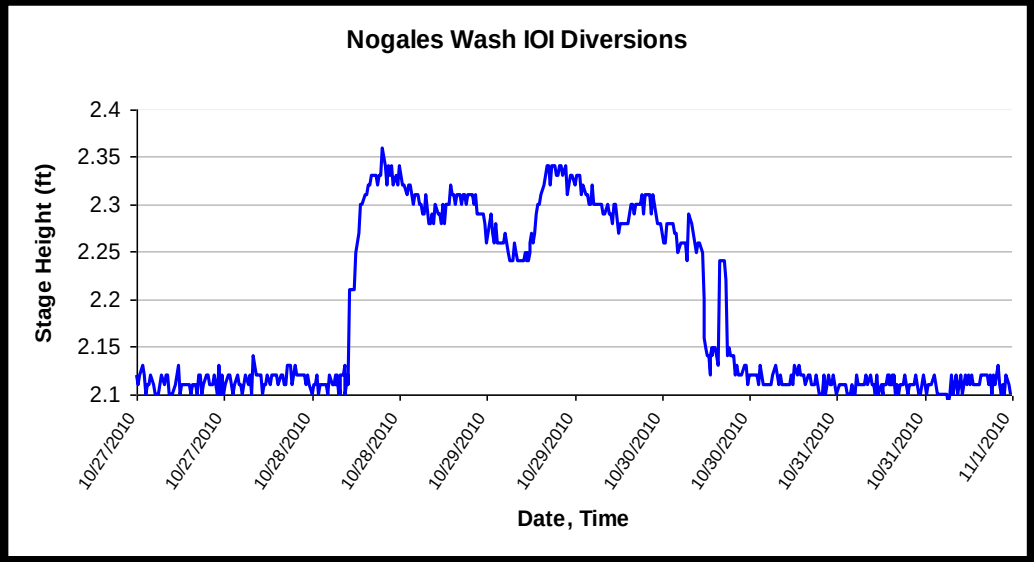
Sediment yield (kg), 25 year, 6 hour event

Channel Impacts	Cuesta Blanca	Capulines
w/out feature	8,518,604	9,268,617
w/ feature	2,964,995	3,869,279
Difference	5,553,609	5,399,338

Flood Warning and Stream Discharge Monitoring
Nogales Wash, Arizona

Purpose: Provide real-time status of Nogales Wash flow conditions via the Internet.

Flood Warning and Stream Discharge Monitoring
Nogales Wash, Arizona



http://waterdata.usgs.gov/az/nwis/uv/?site_no=09481000&agency_cd=USGS&amp

Purpose: Provide real-time status of Nogales Wash flow conditions via the Internet.

Flame AA for Nogales, Sonora Pretreatment Laboratory

Purpose: Leverage the Nogales, Sonora Wastewater Utility laboratory with equipment required for Mexican certification in metals analysis.

Leverage Nogales, Sonora Pretreatment

Metrics Related to Binational Efforts

Allowable headworks loading for cadmium: 0.19 kg/day

Month, Year	Average Daily Concentration (ppb)	Average Daily Loading (kg/day)	Standard Deviation (kg/day)	Monthly Loading (kg)
August, 2009	59	2.65	2.02	76.76
October, 2009	50	2.25	1.66	67.60

Ambos Nogales Biodiesel Capacity Building

Purpose: Build binational capacity and demonstrate the economic potential for the recycling of used oil and grease in Ambos Nogales for the production of biodiesel.

Ambos Nogales Biodiesel Capacity Building

ITN Laboratory and Testing Facility, Sonora

First Batch of biodiesel produced by ITN in Sonora

Public event demonstrating use in Nogales, Sonora

Rio Rico Fire District Facility Completed, Arizona

Building Community Capacity to Implement Stormwater Harvesting Practices In the Arizona Border Region





Purpose: Build community capacity to reduce water contamination through green infrastructure practices in two transboundary waters, the Santa Cruz River and Nogales Wash.

Building Community Capacity to Implement Stormwater Harvesting Practices In the Arizona Border Region

Border 2020 Goals, Objectives, Timelines

Border 2020 Program Goal 2:

Improve Water Quality and Water Infrastructure Sustainability And Reduce Exposure to Contaminated Water

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Objective 2: Help drinking water and wastewater utilities in the border region to implement sustainable infrastructure practices to reduce operating costs, improve energy efficiency, use water efficiently and adapt to climate change.

Sub-objective 2a: Incorporate sustainable infrastructure elements, as feasible and appropriate, in US-Mexico Border Water Infrastructure Program BECC certified projects.

Sub-objective 2b: Improve energy efficiency and efficient water use at border drinking water and wastewater utilities.

Sub-objective 2c: Build operational, managerial and financial capacity at border drinking water and wastewater utilities through training.

Border 2020 Program Goal 2:

Improve Water Quality and Water Infrastructure Sustainability And Reduce Exposure to Contaminated Water

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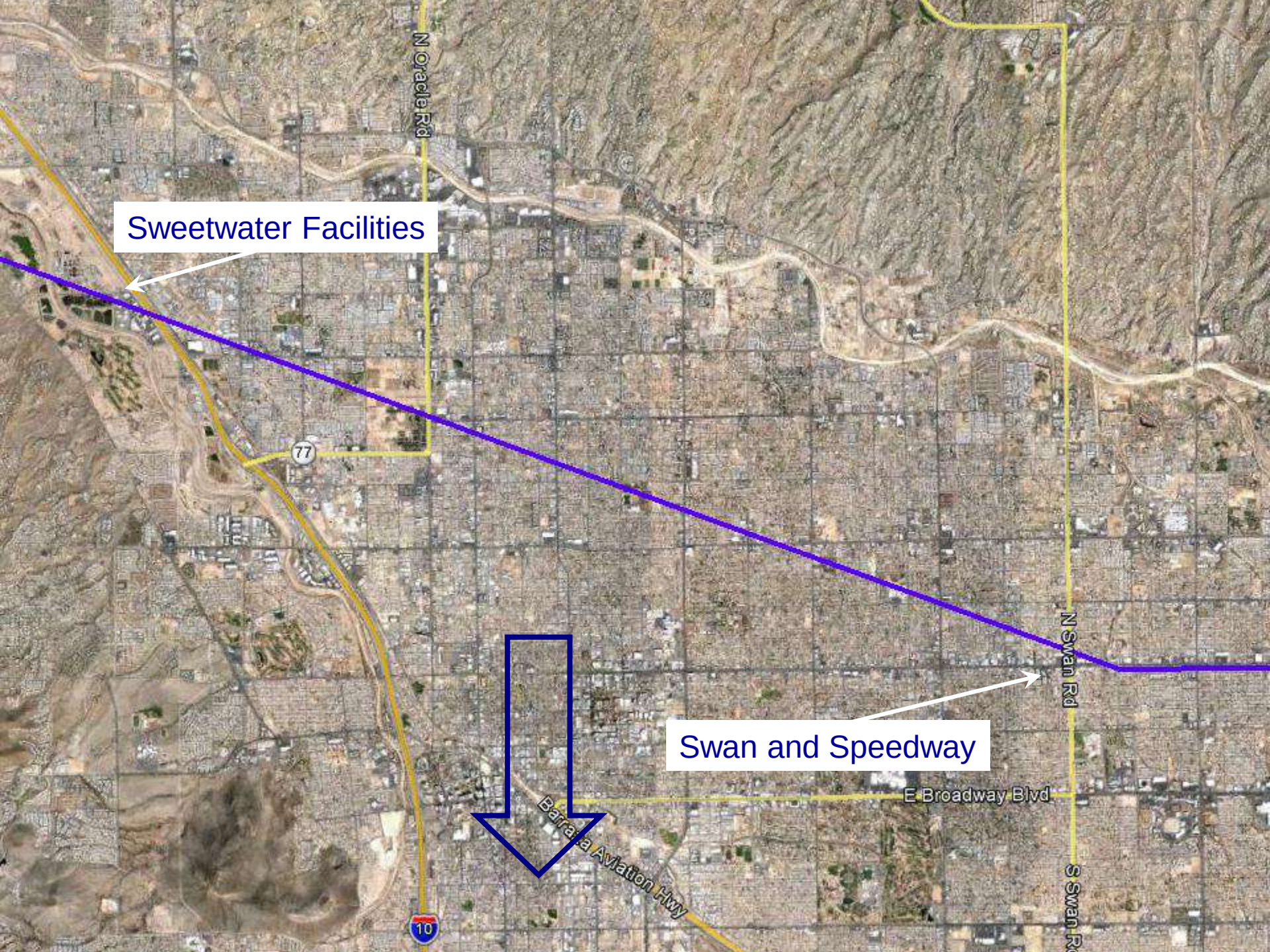
Objective 3: Work binationaly to identify and reduce surface water contamination in specific high priority waterbodies or watersheds.

Sub-objective 3b: Every two years identify and implement at least one project to reduce the level of heavy metals, sediment, and/or bacteria entering the Santa Cruz River and/or the Nogales Watershed.

Examples of potential projects include industrial source control (pretreatment), inspector training, and construction of stormwater retention and water harvesting devices.

Border 2020 Program
Timelines

- **Draft Framework Document finalized mid-April/May**
- **Signing Ceremony with EPA and SEMARNAT expected August, 2012**
- **Request for Proposals in September, 2012**
- **Selected Projects will receive money in early fiscal year 2013**


Sweetwater Facilities
Swan and Speedway
N Oracle Rd
N Swan Rd
S Swan Rd
E Broadway Blvd
Barraza Aviation Hwy
77
10

Thank you for your attention

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Additional information for Water Task Force members available at:
http://216.104.40.250/~biodcom1/public/2012H2O/
Username: 2012
Password: 2012