



## *State of the Border Region*

### ***BORDER 2012: US MEXICO ENVIRONMENTAL PROGRAM Indicators Report 2005***



**Final Draft - April 19, 2006**

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The Border 2012 Indicators Report 2005 is published by the United States Environmental Protection Agency (EPA), the Mexican Secretariat of Environment and Natural Resources (SEMARNAT), the Border 2012 Program National Coordinators, and the Border Indicators Task Force (BITF).

The Border 2012 coordinating bodies provided the indicator data. Special thanks to BITF members for helping to develop and organize this report.

\* **This report is available at the Border 2012 Web site:** <http://www.epa.gov/border2012/>.  
For more information about this publication and the Border 2012 Program, see the contact information provided at the end of this document.

### *Note from the National Coordinators and BITF Co-chairs*

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# Report Overview

## Informing the Public: Getting Started

The purpose of the *State of the Border Region* Indicators Report is to start informing the border communities and stakeholders about the state of the environment and progress made under the Border 2012: US-Mexico Environmental Program. The six goals of Border 2012 are outlined in the program’s Framework Document, signed on April 4, 2003.\* Thus, where appropriate and feasible, 2003 is used as the baseline year. This report presents available information to aid in understanding the status of the region, identifying data gaps, and better preparing policy makers to address the needs of the communities they serve.

The report incorporates environmental and public health information in the corresponding Border 2012 media and program sections: Water, Air, Land, Emergency Preparedness and Response, and Enforcement and Compliance. The indicator information is presented in an easy to understand format with brief data source information below each indicator. Complete underlying data and details will be available on-line in a supporting document.\*

**Border 2012 Goals**

1. Reduce water contamination
2. Reduce air pollution
3. Reduce land contamination
4. Improve environmental health
5. Reduce exposure to chemicals
6. Improve environmental performance

NOTE: Given the challenges involved in developing indicators for the border region, this initial report presents information on a limited number of indicators, representing specific objectives under each goal. As data comparability improves among the multiple data sources and data availability increases for the region, future reports will continue to improve upon the content and detail of this effort. This report is also intended to complement the information presented in the *Biennial Implementation Report*.\*

## Border 2012: A Binational Effort

Border 2012 is a ten-year cooperative program designed “to protect the environment and public health in the US-Mexico border region, consistent with the principles of sustainable development.” Federal, state, tribal and local institutions and agencies collaboratively work to produce prioritized and sustained actions that consider the needs of the border communities. The actions implemented under Border 2012 are guided through a series of results-oriented goals and objectives, and measured by environmental and performance indicators.

Border 2012 is the latest cooperative initiative implemented under the 1983 La Paz Agreement and builds upon the previous efforts, particularly Border XXI, which marked the first binational attempt to develop environmental indicators.<sup>1</sup> More information about the Border 2012 program is available at the Border 2012 Web site.\*



## Border Indicators

In cooperation with the various entities operating under the Border 2012 program, the Border Indicators Task Force (BITF) develops and reports on environmental and performance indicators to communicate important information about the border region and to demonstrate progress towards meeting Program goals and objectives.

Each of the indicators presented in this report is classified according to the Driving Forces-Pressures-State-Impact-Response (DPSIR) Framework.

DPSIR is based on the idea that socio-economic Driving forces lead to natural or human-induced Pressures, which lead to a State, which generates Impacts (sub-divided into Exposure and Effect) that evoke Responses. The Responses compartment feeds back into every other compartment, showing that interventions can occur at each point along the causal spectrum. For more information see the *Strategy for Indicator Development*.\*

### Definitions

**Indicators** are a single variable or output value from a set of data that describes the state of the border region in a way that is meaningful for stakeholders. More specifically:

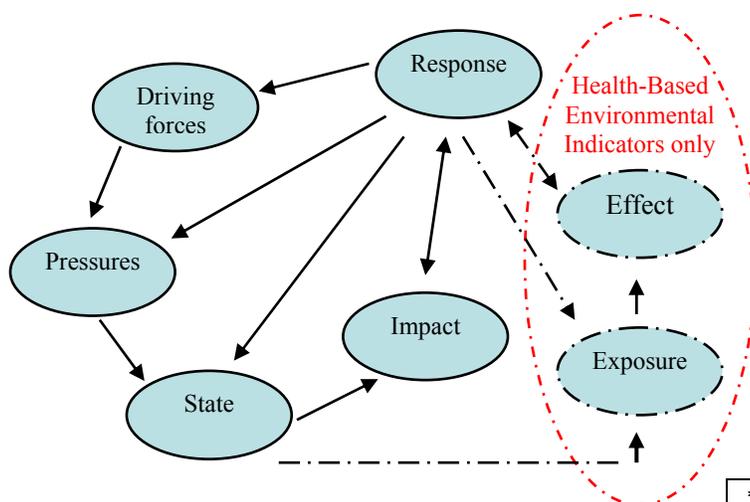
**Environmental indicators** communicate information regarding the region's environmental and health conditions.

Classification: Driving Forces, Pressures, State, or Impacts

**Performance indicators** communicate information regarding environmental management activities and targeted response measures.

Classification: Response

### DPSIR Framework



A representative, integrated set of binational indicators helps to describe the overall system, increasing understanding of the US-Mexico border region, assisting in highlighting data gaps, and providing a basis on which to make well informed decisions. As such, the BITF aspires to improve and expand upon the indicators presented in this initial report.

\* Available at the Border 2012 Web site:  
<http://www.epa.gov/border2012/>

<sup>1</sup> US-Mexico Environmental Indicators 1997 and a Summary of Selected Environmental Indicators, December 2000.



## What Are the Indicators Included in this Initial Report?

The report begins by presenting general indicators to provide more contextual information about border region characteristics such as population, demographics, language, trade, and biodiversity. This introduction leads to five report sections that present indicators that align to specific Program goals and objectives (see blue text box). The report attempts to present binational border-wide indicators. However, in some instances, this was not possible and proxy indicators were used. In this regard, the intent of the report is to aid in identifying gaps in order to work towards acquiring more comparable data, thus enabling the development of more meaningful indicators. These indicators together represent the initial set of border indicators that will continue to be refined and expanded over time.

### US-Mexico Border Region

1. Population Projections for the US-Mexico Border Region
2. Native American Population on the US Side of the Border Region
3. Languages Spoken at Home in the US Side of the Border Region
4. US-Mexico Trade

#### Water

5. Percentage of Households in the US-Mexico Border Region with Access to Piped Water
6. Percentage of Households in the US-Mexico Border Region with Access to Sewerage Service
7. Number of Wastewater Treatment Plants and Installed Capacity in the Mexican Side of the Border Region
8. Rates of Reported Water-Borne Diseases in the California and Arizona Border Region

#### Air

9. Number of Days Exceeding Air Quality Standards
10. Ozone Concentrations in the Border Region
11. Particulate Matter (PM10) Concentrations in the Border Region
12. Prevalence of Physician Diagnosed Asthma

#### Land

13. Estimated Abandoned Waste Tire Piles in the Border Region
14. Amount of Pesticide Use in the US-Mexico Border Region
15. Number of Farmworkers Trained in Safe Pesticide Use in the US Side of the Border Region
16. Cumulative Number of Farmworkers Trained in Safe Pesticide Use in the Border Region

#### Emergency Preparedness and Response

17. Number of Emergency Incident Notifications Received by NRC
18. Number of Emergency Incident Notifications Received by COATEA
19. Progression of Signed Sister City Plans

#### Enforcement and Compliance

20. Regulated US Facilities within 100 km of the US-Mexico Border
21. Number of Enforcement Actions in the US Side of the Border Region
22. Compliance for Mexican Border Facilities
23. Pollution Reduction from Federal Enforcement Actions in the US Side of the Border Region
24. Number of Inspections of Facilities in the US-Mexico Border Region
25. Penalties in Number and Dollar Value in the US Side of the Border Region

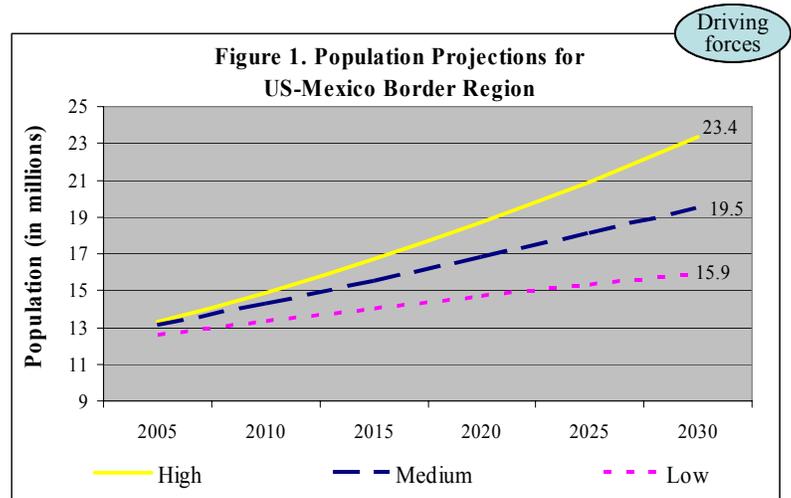
**Note:** Environmental public health indicators are included in the corresponding media section.



# The US-Mexico Border Region

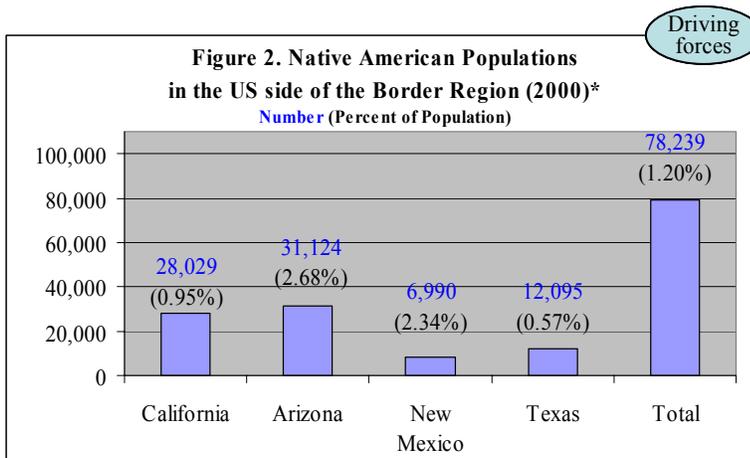
The US-Mexico border region, as defined by the 1983 La Paz Agreement<sup>2</sup>, is the area within 100 kilometers (about 62.5 miles) on either side of the international border and extends 3,141 km (1,952 miles) from the Gulf of Mexico to the Pacific Ocean. The border region is comprised of 10 states (4 US and 6 Mexican) and 26 US tribes.

Ninety percent of the border population resides in 15 paired, inter-dependent sister cities. Over the last 20 years, population has grown rapidly in the border region to more than 11.8 million people. This figure is expected to reach 19.5 million by 2030 according to medium population projections. From 1990 to 2000, population growth in the border region was over two times that observed for either respective country nationwide.



Source: Medium Projections from J. Peach and J. Williams. 2003. "Population Dynamics of the U.S.-Mexican Border Region." Unpublished, SCERP Monograph.

The remaining ten percent of the border population resides in rural areas. A major challenge will be providing services to these communities, especially *colonias* and tribal and indigenous communities, which may have substandard housing and unsafe public drinking water or wastewater systems.



\* US Census reports tribal population number for American Indians and Alaskan Natives as one statistic.  
Source: <http://factfinder.census.gov>

Native Americans compose a total of 1.20% of the total US border region population. Tribal lands are predominantly located in the western half of the border region in California and Arizona. The most populous area is Arizona with tribal people composing 2.68% of Arizona's border population. On the Mexican side of the border region, there are several indigenous communities, such as Pápagos, Kikapúes, Cochiní, Cucapá, Kiliwa, Kumiai, and Paipai, some of which share extensive family and cultural ties to US tribes.

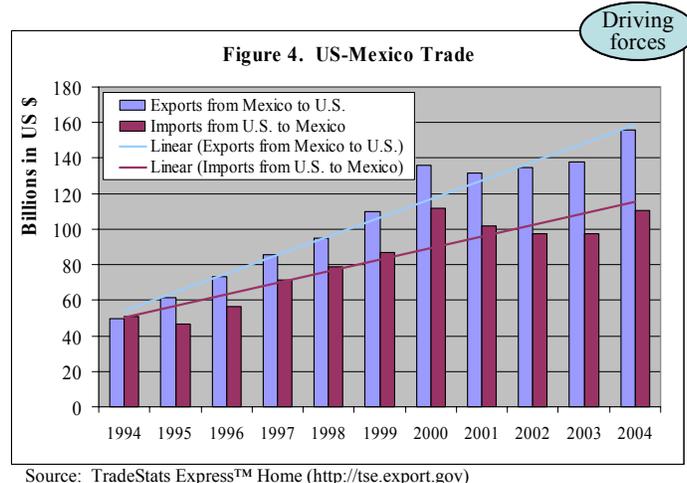
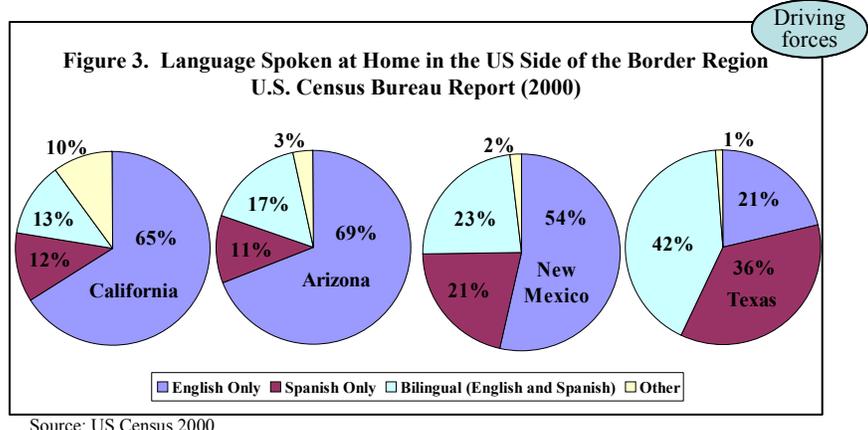
<sup>2</sup> "Agreement between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area"



The US-Mexico Border Region is characterized by many social, economic, and political contrasts between the people who share the natural resources of the area.

Languages spoken at home in the US side of the border region are predominantly English. The exception is Texas where 78% of the border population speaks Spanish and 42.6% of this population is bilingual.

Trade between the US and Mexico has been substantially increasing over the past 10 years. Since industry (maquiladoras) located in Mexican border municipalities produce a large percentage of export products, trade translates into increased trucking of products across the border. This can contribute to elevated vehicular emissions and affects air quality for residents on both sides of the border.



**Biodiversity in the US-Mexico Border Region**

**Four Primary Types of Habitat**  
 Sonoran Desert  
 California coastal sage & chaparral  
 Chihuahuan Desert  
 Tamaulipan mezquital

**10 Globally Endangered Species**  
 Blunt-nosed leopard lizard (*Gambelia sila*)  
 San Esteban Island mouse (*Peromyscus stephani*)  
 Coachella Valley Fringe-toed lizard (*Uma inornata*)  
 Marbled murrelet (*Brachyramphus marmoratus*)  
 Bryant's woodrat (*Neotoma bryanti*)  
 Ashy Stormpetrel (*Oceanodroma homochroa*)  
 Mexican long-nosed bat (*Leptonycteris nivalis*)  
 Worthen's sparrow (*Spizella wortheni*)  
 Coahuilan box turtle (*Terrapene coahuila*)  
 Black-spotted newt (*Notophthalmus meridionalis*)

**Two Critically Endangered Species**  
 Island gray fox (*Urocyon littoralis*)  
 Flat-headed myotis (*Myotis planiceps*)

Source: 2004 IUCN Red List of Threatened Species.  
<http://Redlist.org>

In the border region, trade is also compounded by increasing population, production, and unplanned city expansion, which leads to greater environmental effects. This suggests that many border residents may be subject to unhealthy air, contaminated water, and lack of wastewater treatment.

The US-Mexico Border Region is also characterized by great biological diversity including many rare and native species. According to the International Union for the Conservation of Nature and Natural Resources (IUCN), there are four primary types of habitat composing most of the US-Mexico border region. Within these habitats there are 2,143 animal species of which ten are listed as globally endangered species and two are critically endangered.

# WATER

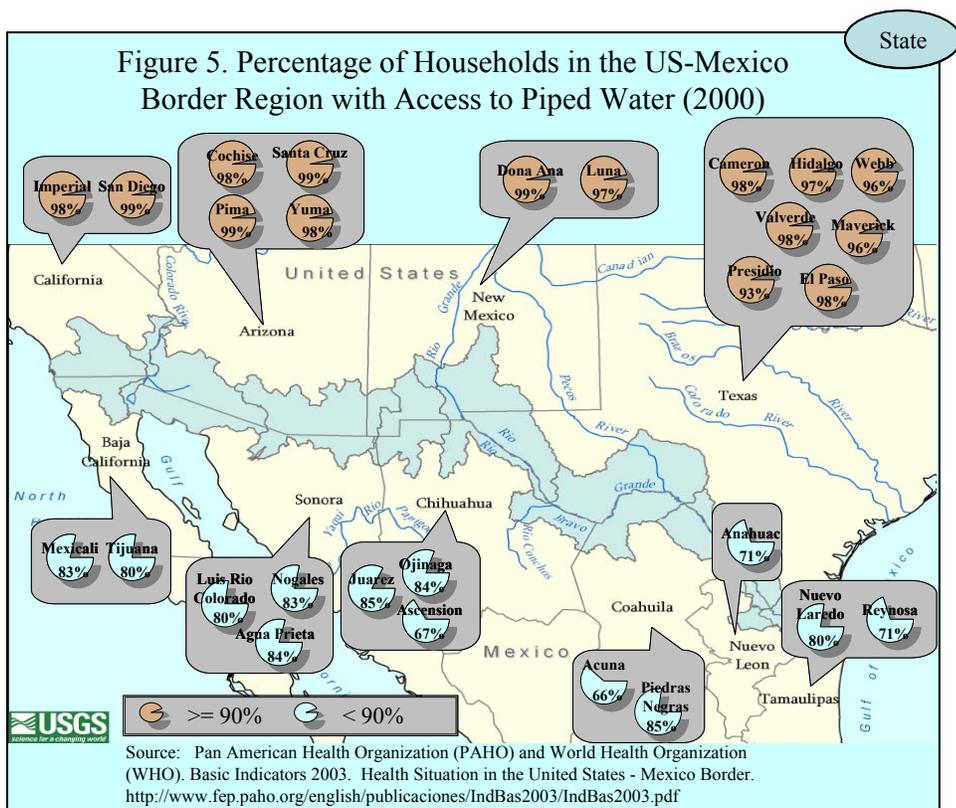
Population and industrial growth along the border has created large demands for clean and safe drinking water. Water is also the most limited resource in this primarily arid region, further emphasizing the need to protect it through means such as adequate infrastructure and efficient and responsible use.

## Do border communities have access to clean water?

Objective 1.1

Data on the percentage of households in the US-Mexico border region with access to piped water within their house is available for some communities. The data are from the most recent census from the year 2000 (for both countries).

In US border communities, access to piped water within their house is 90% or higher. Access in Mexican communities is lower, ranging from a low of 66% in Acuña to a high of 85% in Ciudad Juarez and Piedras Negras. These percentages are not representative of all cities or of outlying rural areas, which may have little or no access to piped water.



Mexico's National Water Commission (CNA) defines coverage as the number of people living in private homes that have running water within the home or on the lot or who have access to a public water intake or hydrant. The data are based on reports from drinking water service providers and show that clean water access increased from 1995 to 2004. This statistic differs from the one reported above in that it includes access to piped water either within the house, on the lot or from a public hydrant.

**Access to Potable Water on the Mexican Side of the Border Region**

Number of habitants with access to potable water divided by the total number of habitants in private homes. Expressed as a percentage of service coverage:

Year	1995	2000	2004
Percentage	88%	91%	93%

Source: CNA's Department for Drinking Water and Sanitation in Rural Zones.



## Do border communities have wastewater collection services?

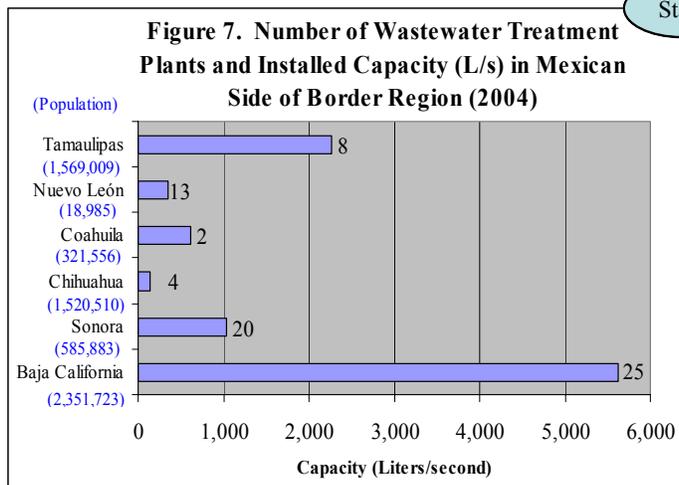
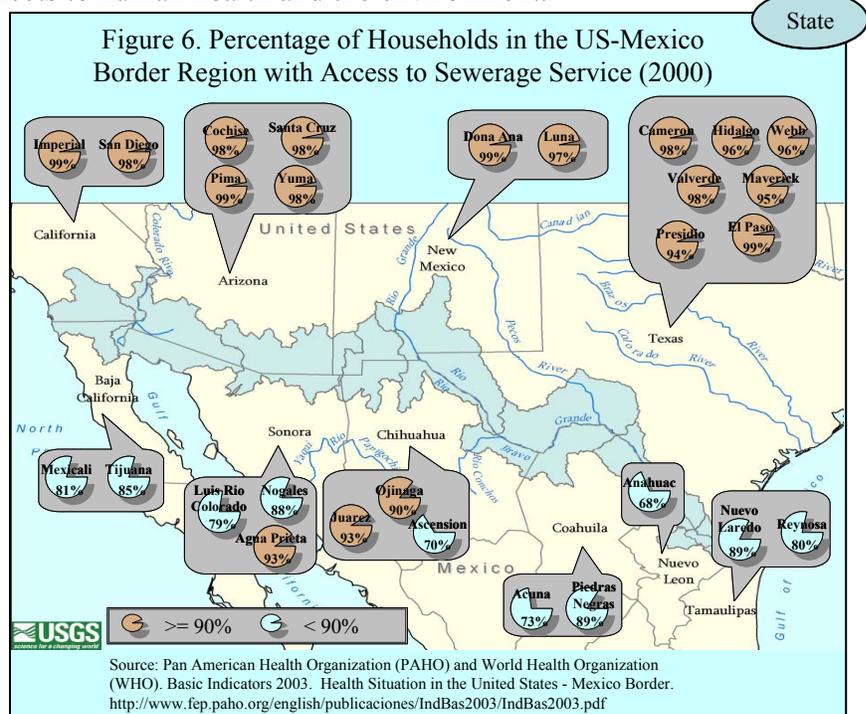
### Objective 1.1

Access to wastewater collection services (sewerage service) in the border region is important as it prevents adverse effects to human health from exposure to excreta and the microorganisms that it contains. Subsequent treatment of the collected sewage is equally important as it prevents discharge of untreated waters to surface water and groundwater, preventing further detrimental effects to human health and the environment.

In 2000, access to sewerage services was 90% or higher in US border communities.

Access was much lower in the Mexican border communities with the lowest reported in Anahuac (68%).

These statistics may or may not include subsequent treatment of the collected sewage. Improving both the collection and treatment of wastewater are priorities of the Border 2012 program.



Source: CNA, 2004. Inventario Nacional de Plantas Municipales de Potabilización y de Tratamiento de Aguas Residuales en Operación. [http://www.cna.gob.mx/eCNA/Espaniol/Publicaciones/InventarioNacional04/pt\\_general02.pdf](http://www.cna.gob.mx/eCNA/Espaniol/Publicaciones/InventarioNacional04/pt_general02.pdf)  
 J. Peach and J. Williams. 2003. "Population Dynamics of the U.S.-Mexican Border Region." Unpublished, forthcoming SCERP Monograph. San Diego: SCERP/SDSU Press. Based on projections for 2005.

Mexico's National Water Commission (CNA) reports that as of December of 2004 the number of wastewater treatment plants in the six Mexican Border States totaled 72 with a total treatment capacity of 10,031 liters per second. The higher density of treatment plants in Baja California is probably reflective of the higher population density in this region.

To meet objective 1.1, Border 2012 will be using 2003 for its baseline year. Preliminary data identifies:

- 98,515 homes (24,418-US and 74,097-Mexico) lack access to safe drinking water.
- 690,723 homes (24,418-US and 666,305-Mexico) lack access to wastewater sanitation facilities.

Source: CNA's Department for Drinking Water and Sanitation in Rural Zones and DRAFT Reporting and Tracking of Connections of US Homes to Water and Sewer Systems in the US-Mexico Border Area., Prepared for US EPA, OWM by Parsons, 9/30/05



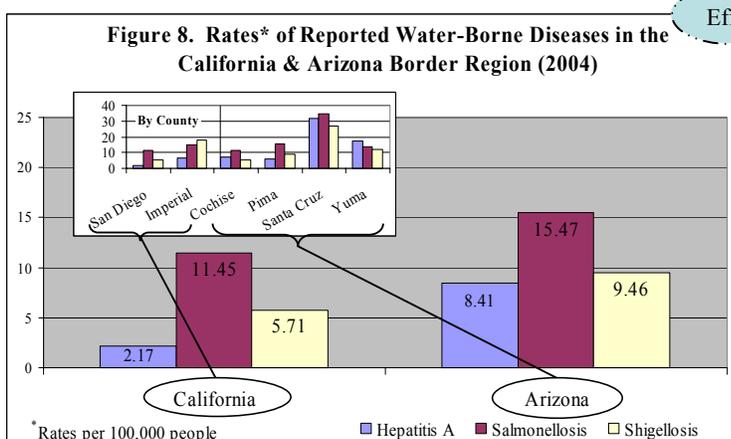
## Are there health problems possibly associated with water quality?

### Objective 4.2

Numerous environmental health problems can be associated with the lack of access to clean water necessary for good hygiene and food handling practices, and from the absence of wastewater treatment, which can expose people to raw sewage and contaminate water supplies. Based on available data, three diseases are presented here that may be associated with the lack of access to clean water. However, it is important to note that these diseases can be contracted through both contaminated water and food. Hepatitis A is a highly contagious virus that attacks the liver. Salmonellosis is a bacterial infection that usually affects the gastrointestinal system (the stomach and intestines). Shigellosis is a bacterial infection affecting the intestinal tract.

Based on self-reporting by health practitioners in the two states, in 2004 rates of these diseases per 100,000 people were higher in the Arizona border region as compared to California. Also note that incidence of Hepatitis A, salmonellosis, or shigellosis may not be a representative indicator of exposure to unclean water because, at least in the US, there is a concerted effort to use vaccinations to prevent these diseases.

Additional data for the New Mexico and Texas border region are available, but only for non-comparable dates, and therefore, are not included for this indicator. Environmental health data for Mexico is available from a national reporting system, but it is not publicly available at the municipal level.



Sources: [www.azdhs.gov/phs/oids/stats/pdf/t1cases\\_by\\_county2004.pdf](http://www.azdhs.gov/phs/oids/stats/pdf/t1cases_by_county2004.pdf),  
[www.dhs.ca.gov/ps/dcdc/html/cdtables.htm](http://www.dhs.ca.gov/ps/dcdc/html/cdtables.htm),  
<http://borderhealth.cr.usgs.gov/datatables.html>.

For more information on Environmental Health see [http://www.epa.gov/ehwg/projects\\_publications.html](http://www.epa.gov/ehwg/projects_publications.html)

### Reporting Diseases

**United States.** In the US, the Centers for Disease Control and Prevention maintains a National Notifiable Diseases Surveillance System. Data are reported at the county or regional level (within states) to the state departments of health, which submit the data electronically through the National Electronic Telecommunications System for Surveillance (NETSS). Reporting by the states is voluntary at the federal level and may be mandated at the state level. Due to voluntary reporting, the statistics for these diseases are likely lower than actual conditions due to under-reporting. The list of diseases that are notifiable varies by state. Data are also maintained differently by each state (i.e., some may report at the state level and others to the county level).

**Mexico.** For Mexico, data are available through Sistema Unico de Informacion para la Vigilancia Epidemiologica (SUIVE), Secretaria de Salud. The data are reported electronically at the level of jurisdiction through el Sistema Nacional de Epidemiologia (SINAVE). Reporting to municipal, state, and federal agencies is mandatory at the time of diagnosis.

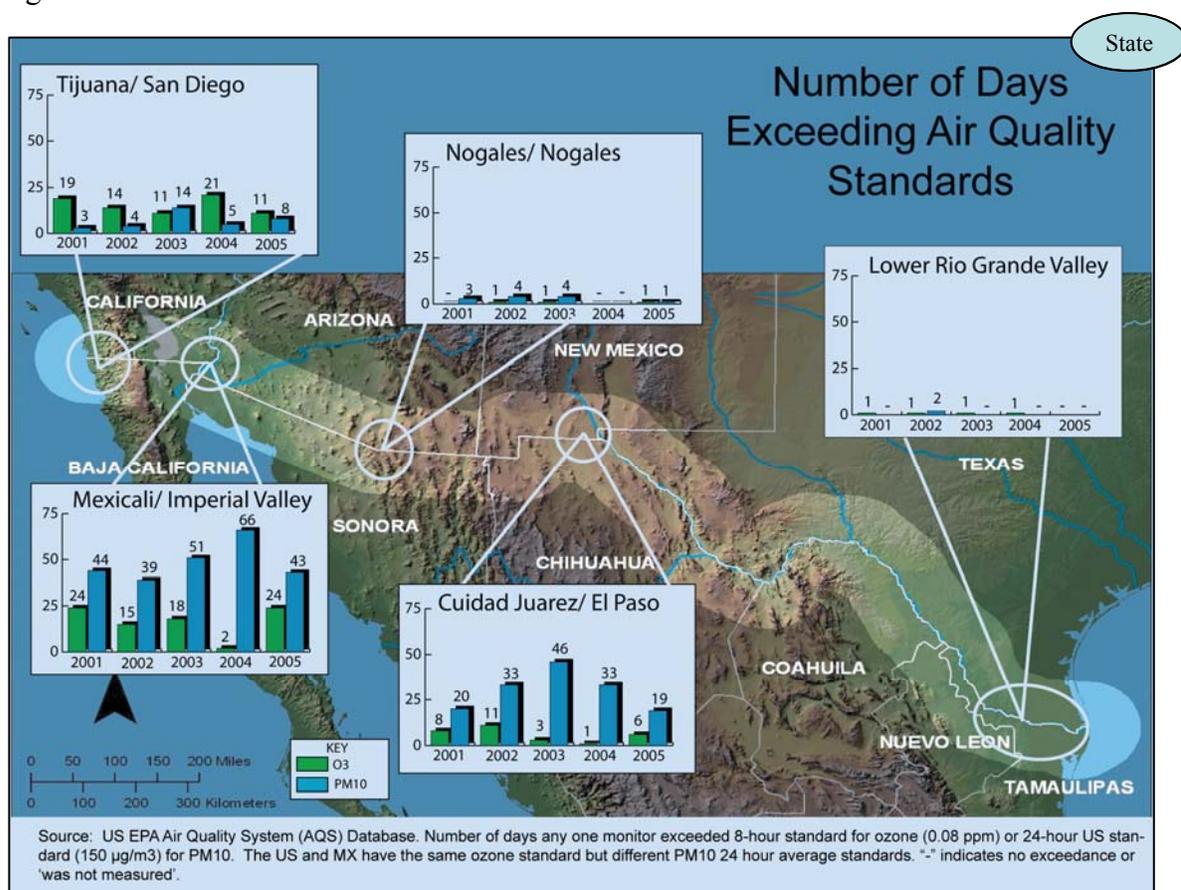


# AIR

Air quality is a major concern throughout the border region. Pollutants from a number of sources including motor vehicles, power plants and industrial facilities, agricultural operations, dust from unpaved roads, and open burning of trash affect urban and regional air quality in the border region.

## What is the quality of the air?

**Objective 2.1** Air quality standards are set to protect people from potential harmful exposures to air pollutants. Air quality can be assessed by examining the number of days that a standard is exceeded within a monitored area. Air quality data are presented for five regional monitoring areas with monitors located on both sides of the border. The most persistent and pervasive pollutants found in the sister cities are ozone and particulate matter (PM10), which is why these are highlighted.



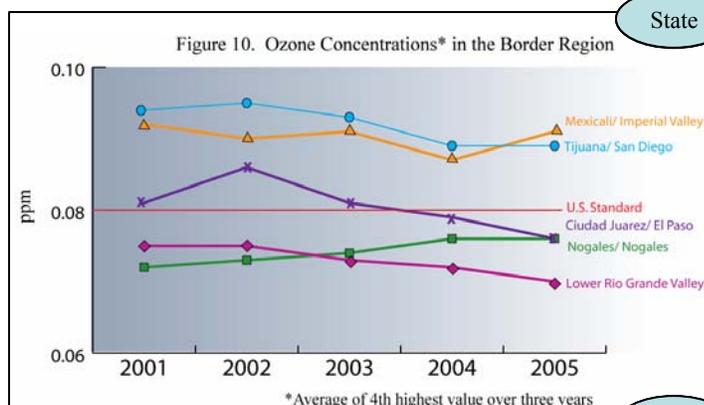
Based on examination of the number of days where standards were exceeded (days when any one monitor in a region exceeded a standard) for ozone and PM10, air quality has improved in some of the border regions. The regions of Tijuana/San Diego and Mexicali/Imperial Valley had the highest number of days exceeding the standard for ozone. The regions of Mexicali/Imperial Valley and Ciudad Juarez/El Paso have the highest number of days exceeding the standard for PM10. In contrast, Nogales/Nogales and the Lower Rio Grande Valley had better air quality with only a few days where standards were exceeded over a five year period.



## What is in the air?

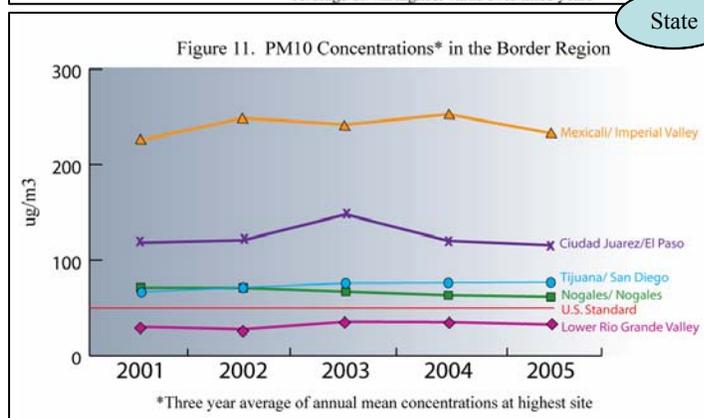
### Objective 2.1

Once released into the air from emission sources, pollutants may remain stable or be transformed into other compounds. They can be located near the point of release, moved long distances by wind, or transferred to other environmental media resulting in soil or water pollution. Once in the environment, air pollutants may remain for hours, days, or years. Emissions sources, pollutant properties, and atmospheric conditions influence how pollutants are distributed in the atmosphere, which are typically measured as concentrations.



State

From 2001 to 2005, concentrations of ozone were higher than the binational standard of 0.08 ppm in Mexicali/Imperial Valley and Tijuana/San Diego. Ozone concentrations in Ciudad Juarez/El Paso improved during the past five years decreasing to below the standard in 2004 and 2005. Ozone concentrations in the Lower Rio Grande Valley were also lower than the standard.



State

Annual mean concentrations of PM10 (mean for year of interest with the two prior years) from 2001 to 2005 in Lower Rio Grande Valley were lower than the binational annual standard of 50  $\mu\text{g}/\text{m}^3$ . Concentrations in the other four border monitoring areas exceeded the standard with the highest concentrations observed in Mexicali/Imperial Valley.

Source: Data from the EPA Air Quality Systems (AQS) Database  
<http://www.epa.gov/ttn/airs/airsaqs/sysoverview.htm>

### Selected Air Quality Pollutants

#### Ozone (O<sub>3</sub>)

Ozone is a photochemical oxidant and the major component of smog formed through complex chemical reactions between precursor emissions of volatile organic compounds (VOC) and oxides of nitrogen (NO<sub>x</sub>) in the presence of sunlight. These pollutants are emitted by transportation and industrial sources. O<sub>3</sub> is reactive and damages lung tissue, reduces lung function, and increases sensitivity to other irritants.

US Standard = 8 hour average = 0.08 ppm  
 Mexican Standard = 8 hour average = 0.08 ppm

#### Particulate Matter (PM)

Particulate matter (PM) with an aerodynamic diameter of 10 microns or less (PM10) consists of ground geologic material entrained into the air by agricultural processes, unpaved roadways, and quarry and cement manufacturing. Fine PM (diameter of 2.5 microns or less) or PM2.5 consists of sulfates, nitrates, other gases, soot and finer ground geologic materials. Exposure to PM is a major human health concern including effects on breathing, aggravation of respiratory and cardiovascular disease and premature death.

US Standard = 24-hour average = 150  $\mu\text{g}/\text{m}^3$   
 US Standard = annual standard = 50  $\mu\text{g}/\text{m}^3$   
 Mexican Standard = 24-hour average = 120  $\mu\text{g}/\text{m}^3$   
 Mexican Standard = annual standard = 50  $\mu\text{g}/\text{m}^3$

For more information on US-Mexico Air Quality and other air pollutants (CO, NO<sub>2</sub>, SO<sub>2</sub>) see [http://www.epa.gov/ttn/catc/cica/airq\\_e.html](http://www.epa.gov/ttn/catc/cica/airq_e.html).



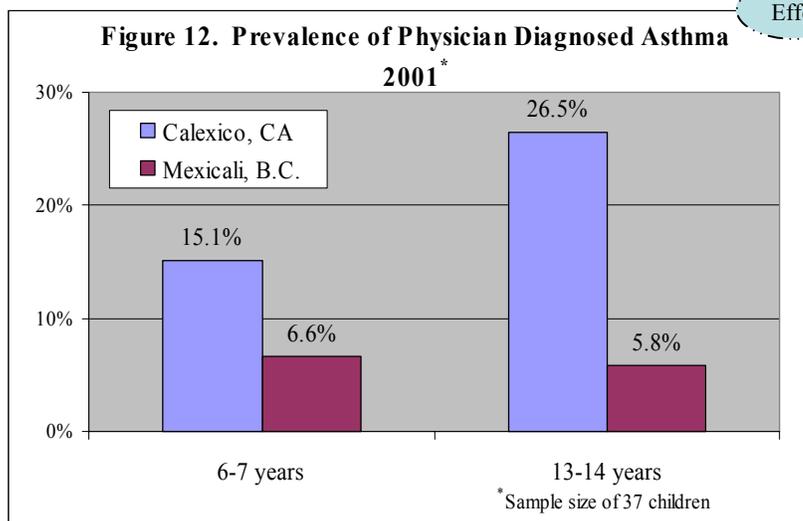
## Are there health problems possibly associated with air quality?

### Objective 4.1

While air quality standards provide a platform to understand current air quality conditions, it is important to understand the possible impact of air pollution on human health. Long-term exposure to elevated air pollution is associated with diminished lung function and cardiovascular disease. Vulnerable groups (children, the sick and elderly) are more likely to suffer ill effects. A number of epidemiologic studies have linked changes in air pollutant concentrations with increased risk of pneumonia, respiratory infections, and exacerbation of asthma. For example, evidence indicates that exposure to vehicle emissions aggravates or triggers asthmatic symptoms and airway reactivity. Asthma is a complex disease and multiple factors are implicated in the development and exasperation of this disease, thus at this time it is not possible to directly relate air pollution to the onset of asthma.

Despite a surplus of information regarding asthma prevalence, data are not reported in a standardized format. Reporting mechanisms and disease definitions vary considerably between border states and countries, limiting the ability to make comparisons.

The data shown in this graph represent a small sample study of school aged children to assess the prevalence of asthma diagnosis within one sister city pair. However, asthma may result from a combination of air quality and other contributing factors.



Source: Department of Health and Human Services. 2001. *U.S.-Mexico Border Environmental Health Surveillance Demonstrations Phase Two*. September 2001.

For more information on US-Mexico air quality see <http://www.epa.gov/usmexicoborder/org.htm#air> and for Environmental Health information see [http://www.epa.gov/ehwg/projects\\_publications.html](http://www.epa.gov/ehwg/projects_publications.html).



# LAND

Land absorbs contaminants from the air, water and human/industrial activities. People live on land and generate both solid and liquid waste. Land is affected by construction, transport, agriculture and pesticide use, housing, and unplanned development. Pressing concerns of the Border 2012 program are the presence of tire piles and the use of pesticides along the border region for they pose both environmental and health problems.

## Are the waste tire piles being cleaned up?

Objective 3.3

Throughout the border region, millions of scrap tires have accumulated in several waste tire piles. Composed of tires from both Mexico and the US, the piles tend to result from a robust market for partially used tires. The exact number of tires at some locations is not known. Border 2012 is working on a strategy to help reduce future tire piles and cleanup existing ones (abandoned and poorly managed). The program is focusing on clean-up at three of the largest piles in Mexico (INNOR, El Centinela, and Ciudad Juárez) as their relative size and proximity to more densely populated areas increase the risks to human health and the environment.

Tire piles create ideal breeding grounds for mosquitoes, rodents, and other vectors of disease, which leads to a potential increase in the incidence of malaria, dengue fever, and West Nile Virus, and encephalitis. Further, tire pile fires are difficult to extinguish and can burn for months, emitting noxious fumes and generating liquid wastes that contaminate soil, groundwater, and surface water.

Through the combined efforts of EPA, SEMARNAT, regional waste task forces, affected states, and Tribes, tire piles are being cleaned up. Thus far, over 2 million tires have been removed from the border region in 4 locations, and clean-up is complete at the INNOR site in Mexicali. In addition, other areas such as the Pala Band of Mission Indians are working to remove tires from their reservation. In 2003, they removed 34,000 tires with the assistance of the California Integrated Waste Management Board. Tires removed are being put to productive uses as part of Border 2012's commitment to recycling and reuse. Tires removed are used in cement kilns as tire derived fuel, in asphalt as crumb rubber, and in erosion control embankments in bales, among other creative uses.

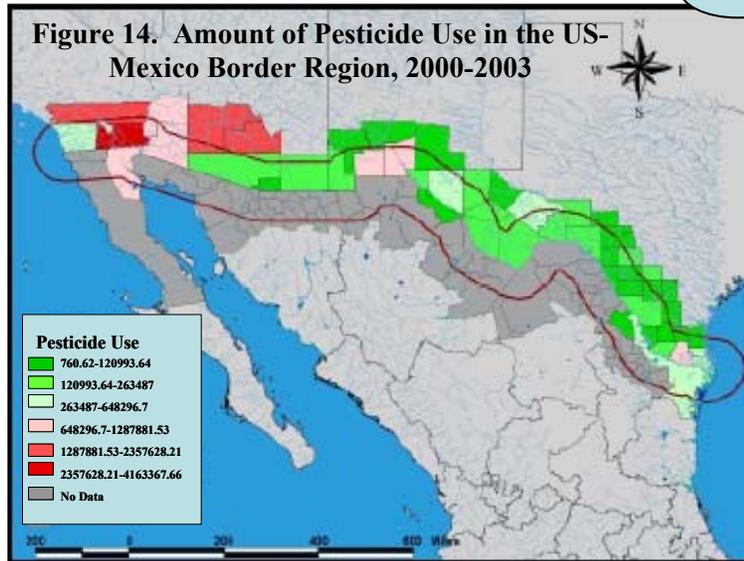


\* Estimates on original number of tires piles are not available. Number removed is shown. Source: SEMARNAT. Subsecretaria de Fomento y Normatividad Ambiental. 2005.

## Are farm workers trained on pesticide safety?

### Objective 4.3

Communities along the border are confronted with a host of environmental problems, including pollution from agricultural activities. Border residents may suffer health problems related to environmental factors including the improper management of toxics, hazardous and solid wastes, and pesticides.



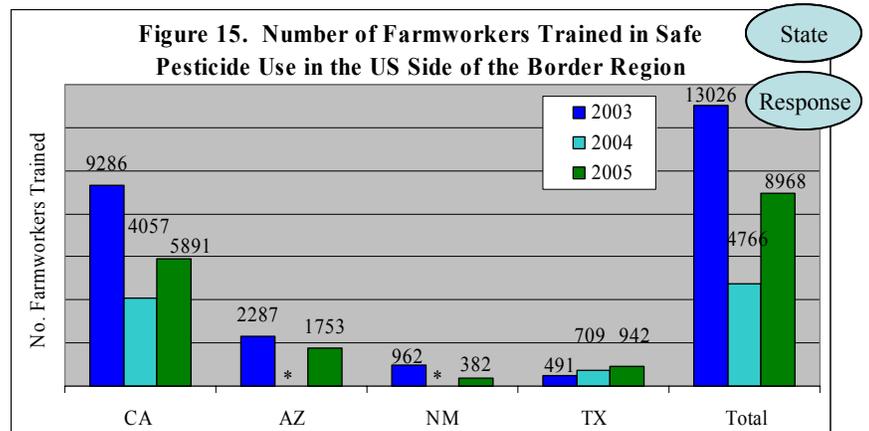
Source: Pan American Health Organization (PAHO). Final Report Inventory of Agricultural Pesticides Used In The United States - Mexico Border Region. U.S.-Mexico Border Field Office.

### Pressures

This inventory appears to show significant variation in the amount of pesticides used in the border region. However, this map may not be completely representative of the situation, as data were difficult to collect and often lacking due to reporting practices. For example, data were often lacking for Texas and Mexican states.

Pesticide exposure can cause a variety of occupational illnesses in farm workers, including eye injuries, cancer, respiratory illnesses and dermatitis. Proper training in pesticide handling and use results in the protection of workers and their families from potential exposures and adverse health effects.

Both the US and Mexico have instituted various programs to train workers and instructors in the safe handling of pesticides. In the US side of the border region, 26,760 farm workers were trained from 2003 to 2005 with the majority in California. Data are based on attendance at training sessions in several cities offered by the Association of Farmworker Opportunity Programs (AFOP) in California, Arizona, and New Mexico, and by the Texas Department of Agriculture in Texas. California's PROTEUS Program provided supplemental data for training conducted in 2004.



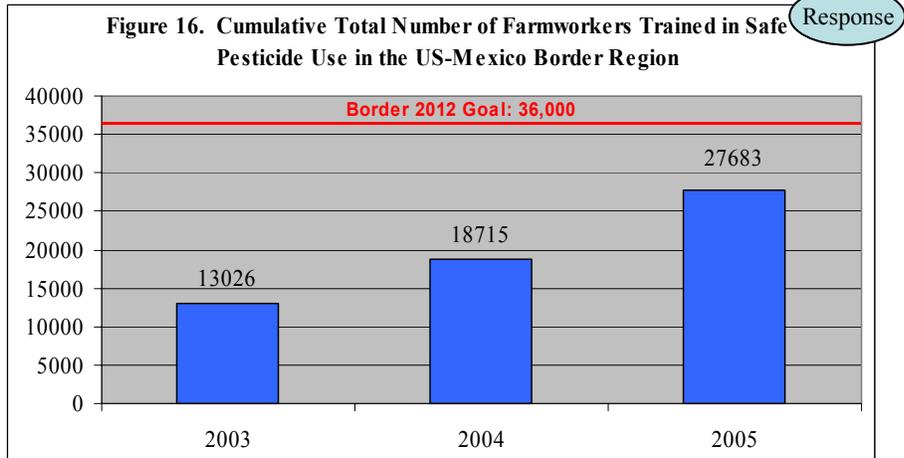
\* Data not reported for that year (2004 in AZ and NM)

Source: Data for CA, AZ, & NM from AFOP/AmeriCorps, including Proteus data. Data for TX provided by the Texas Department of Agriculture.



In Mexico, the *Programa Nacional Contra Los Riesgos Por el Uso De Plaguicidas* conducts training courses throughout the country. In 2004, courses were provided in Ensenada and Mexicali, training a total of 850 workers and 73 trainers (600 workers and 38 trainers in Ensenada and 250 workers and 35 trainers in Mexicali). The persons attending these training sessions include field workers, growers, and handlers, pest control advisors, employees of pesticide distributors, and members of the public.

If the number reported as trained in the US and Mexico border region are added together, then a total of 27,683 workers were trained. As the Border 2012 goal is to train 36,000 farmers, this sum represents 76.9% of the goal.



Source: Data for CA, AZ, & NM from AFOP/AmeriCorps, including Proteus data; Data for TX from the Texas Department of Agriculture; Data for BC from the California Department of Pesticide Regulation.

For more information on the Waste Policy Forum see <http://epa.gov/border2012/org.htm#forums>.

## EMERGENCY PREPAREDNESS AND RESPONSE

Preparing for a potential environmental or hazardous emergency improves the probability of adequately responding to incidents and protecting the environment and public from exposure to potentially harmful contaminants and possible serious environmental or health impacts.

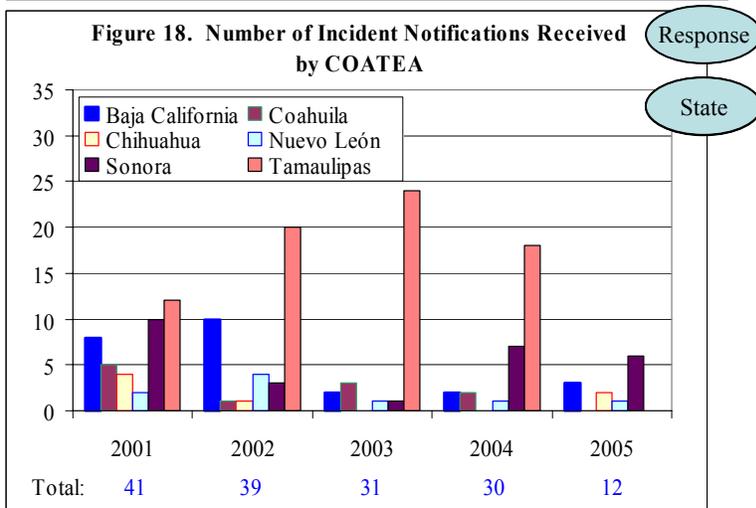
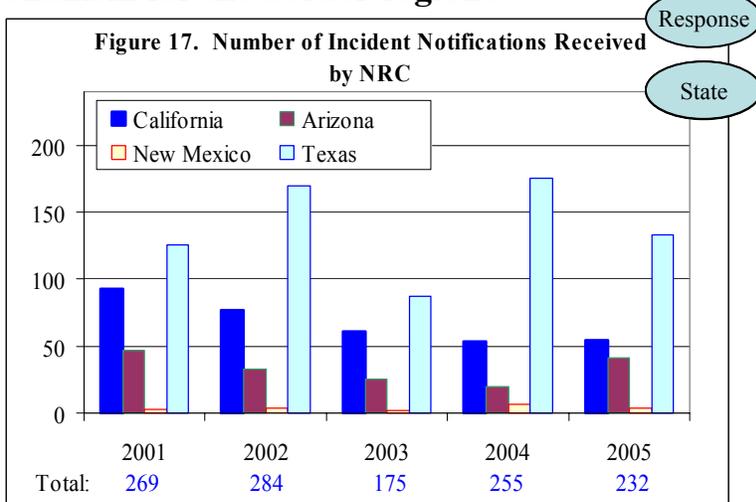
The US-Mexico Joint Response Team (JRT), established by the La Paz Agreement, is composed of representatives from US and Mexico federal, state and local agencies responsible for emergency prevention, preparedness, and response in the border region. The JRT developed a Joint Contingency Plan (JCP) that established a federal mechanism for cooperation for responding effectively to polluting incidents that may pose a significant threat to both countries or affects one to an extent that justifies a request for assistance. The first JCP was issued in 1988, revised in 1999, and is currently being updated.

### Is there an advisory communication mechanism for the border region?

#### Objective 5.1.

A notification system was established as part of the JCP. Any actual or threatened spill, release, fire or explosion that has the potential to affect the other country is reported to either the National Response Center (NRC) in the US ([www.nrc.uscg.mil](http://www.nrc.uscg.mil)) and/or the National Communications Center (CENACOM) in Mexico. Both centers run 24 hours a day, 7 days a week. In Mexico, the Center for Environmental Emergencies (COATEA), SEMARNAT's emergency office within the Procuraduria Federal de Protección al Ambiente (PROFEPA) also receives notifications and runs from 9-6 pm Monday-Friday. In the near future, COATEA will also be in full operation (24/7).

Various types of incident notifications ranging from releases of contaminants from non-mobile machinery, refineries, manufacturing plants, and other fixed facilities were received. The notifications were subsequently responded to in an appropriate manner through the execution of local response plans (Sister City Plans) and the US-Mexico Joint Contingency Plan.



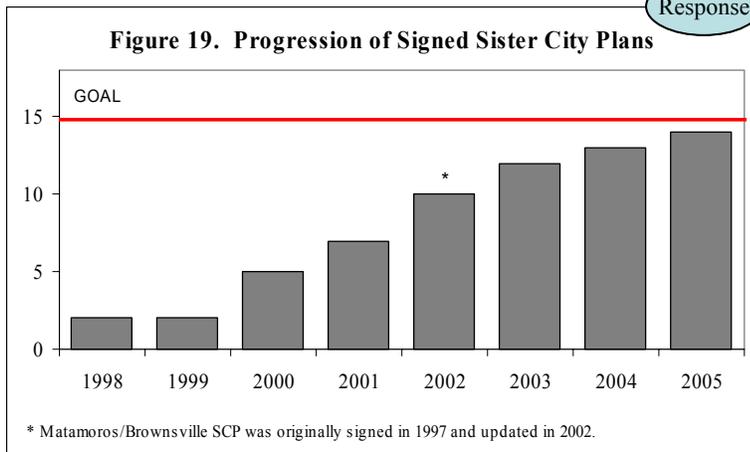
Source: National Response Center. [www.nrc.uscg.mil](http://www.nrc.uscg.mil). 2005 / COATEA (Centro de Orientación para la Atención de Emergencias Ambientales). PROFEPA, 2005. Dirección General de Inspección de Fuentes de Comunicación



## Do border cities have an emergency plan in place?

Objective 5.2.

The JCP recognizes that chemical emergencies affect the local community first, and thus, provides the foundation for establishing Sister City Binational Emergency Response Plans (SCP). Fourteen sister city pairs were originally identified by the JCP along the US-Mexico border. At a later date an additional sister city pair was added for Rio Bravo –Weslaco.



Source: <http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/ip-bilateral.htm#mexicoborder>; PROFEPA, 2005. Dirección General de Inspección de Fuentes de Comunicación

Response

The plans provide local emergency response communities with the mechanism for addressing issues and concerns, consisting of cooperative measures and recommendations, including emergency response planning, exercises, and training. Considerable progress has been made since 1998 in establishing the SCPs. Two plans were signed in 1998 and by 2005, 14 plans were in place. Ciudad Juarez/ El Paso is currently pending. Adding Rio Bravo-Weslaco increased the Border 2012 goal to 15.

To ensure that both the Joint Contingency Plan and the 15 Sister City Plans are up to date and can be implemented during emergencies, binational exercises are conducted by federal, state and local agencies. The most likely scenarios are developed and the agencies in charge simulate a response, either in the field or indoors (table top exercise). Also, phone advisory tests verify that all required parties receive adequate notice. Results are used to prepare reports, which set the stage for JCP and SCP revisions. Since 2001, Mexico and the US conducted 12 binational emergency exercises. *"Amigos in Peligro,"* a 2005 binational exercise is described in <http://www.epaosc.net/operacionaguila>.

For more information on Emergency Preparedness and Response, see [http://www.epa.gov/border2012/epr\\_bwwg.htm](http://www.epa.gov/border2012/epr_bwwg.htm) and <http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/ip-bilateral.htm#mexicoborder>



# ENVIRONMENTAL COMPLIANCE

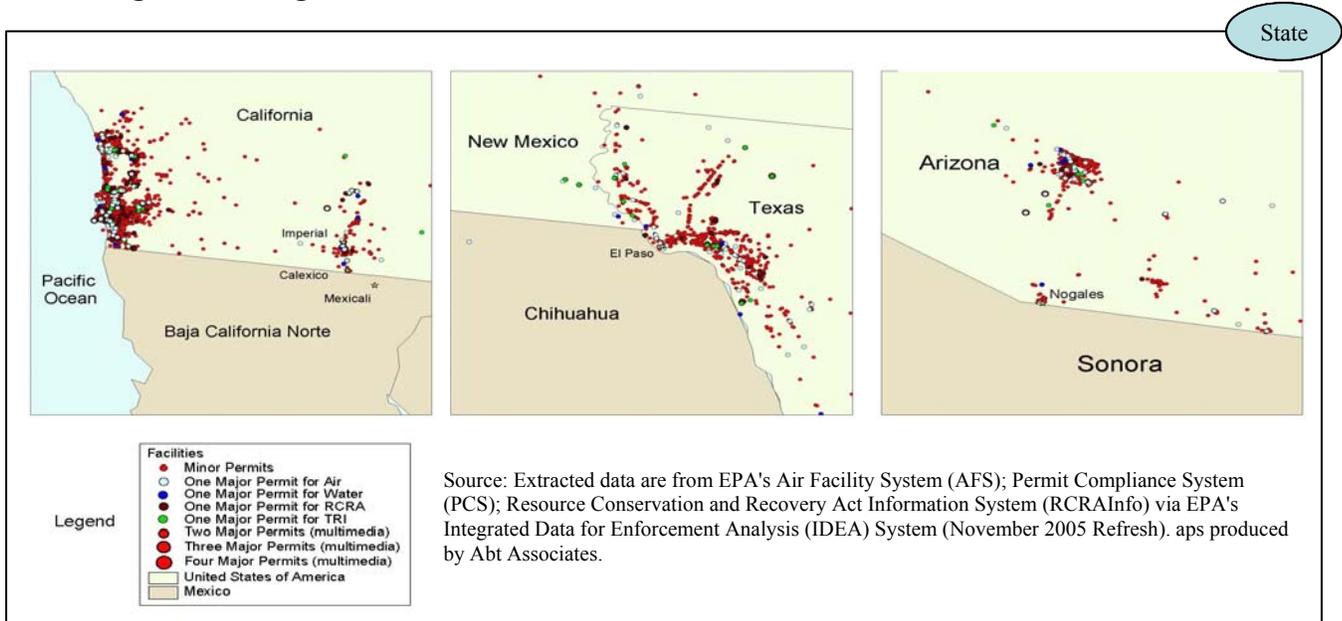
Environmental laws exist on both sides of the border to regulate issues such as chemical production, pollutant discharge to air and surface waters, and the generation, transportation, storage, and treatment of hazardous wastes. These environmental regulations are complex, but have a simple aim of protecting human health and the environment. On both sides of the border these laws and their implementing regulations are enforced by federal governments with many authorities delegated to States and in some cases municipalities.

## How many facilities are in my community?

Objective 6.2

There are at least 19,000 regulated facilities in the US-Mexico border region with an estimated number of 8,689 facilities in the US<sup>3</sup> and 11,059 facilities in Mexico.<sup>4</sup> As shown geographically, most facilities in the US are located near cities with the highest number near San Diego followed by El Paso. 49% of the facilities are located in the California border region followed by Texas (31.2%), Arizona (15.4%), and New Mexico (4.1%).<sup>3</sup> The majority of the facilities in both the US and Mexico are regulated for handling hazardous waste.

**Figure 20. Regulated US Facilities within 100 km of the US-Mexico Border**



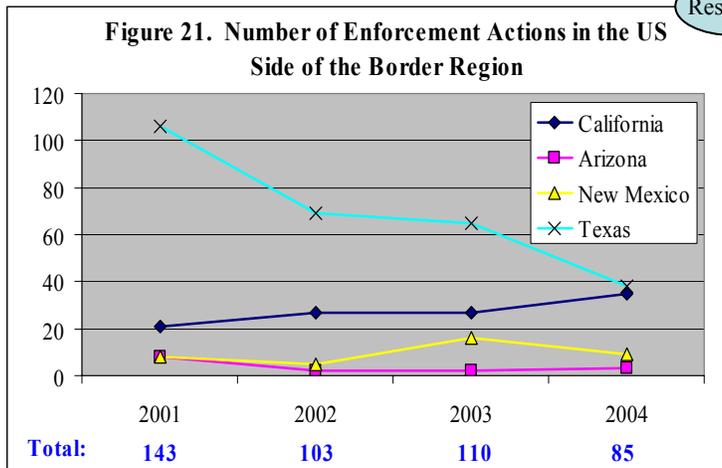
Facilities in the US are regulated through permits issued under the Clean Air Act or Clean Water Act for possible impacts to air and water; for the generation, storage, treatment, or disposal of hazardous waste under the Resource, Conservation, and Recovery Act (RCRA); and/or, the reporting of pollutant releases under the Toxic Release Inventory (TRI).

<sup>3</sup> US EPA IDEA System, 2005.  
<sup>4</sup> PROFEPA, 2006.

## What happens when a facility violates environmental law?

### Objective 6.3

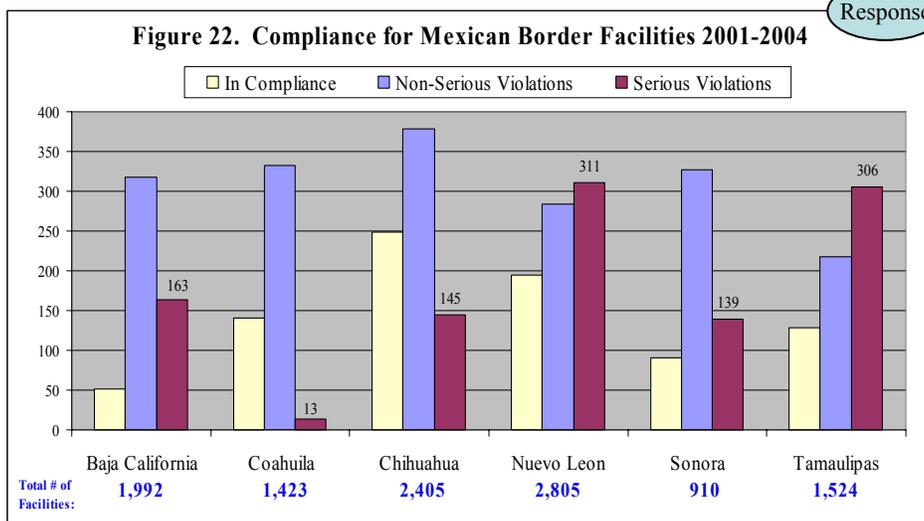
When a facility violates environmental law, the regulating agency may impose actions to enforce compliance and may also impose monetary penalties and/or criminal sanctions. Enforcement actions cannot be imposed unless a violation has occurred and has been detected by the regulatory agency. There is, however, not always a clear connection between a facility polluting the environment and compliance with the law as facilities may legally pollute under the conditions of a permit and violations may not always result in releases.



\* Does not include criminal enforcement actions

Source: USEPA Integrated Data for Enforcement Analysis (IDEA) System (Includes Federal and State data reported to the data system)

Formal enforcement actions in the US may be administrative, civil judicial or criminal actions. In aggregate, the number of formal enforcement actions in the US side of the border region has decreased from 2001 to 2004, with differences within individual border states. When examining trends over time and differences among States, it is important to consider factors such as: federal, state, and local environmental priorities; the number and type of facilities operating in each state; and other environmental management activities not reflected in this enforcement action measure, such as compliance assistance and informal enforcement actions (eg. notices of violations).



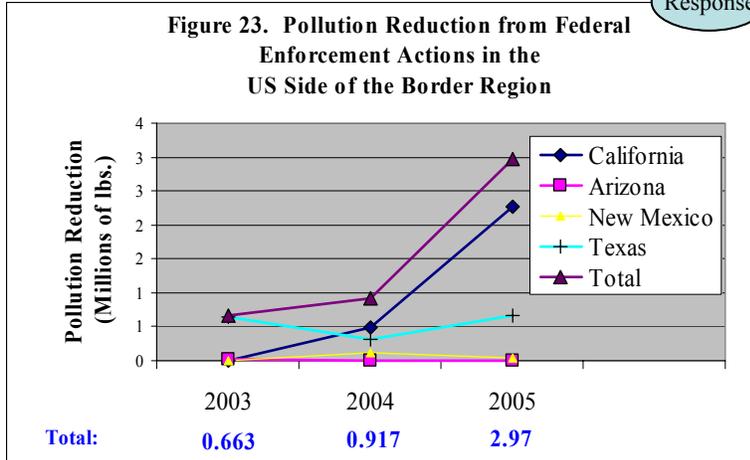
Source: PROFEPA, Secretaria de Medio Ambiente, Recursos Naturales y Pesca. Subprocuraduria de Auditoria Ambiental.

In Mexico, the inspection and monitoring policy for industrial and service establishments under federal jurisdiction is conducted through a national Annual Program of Inspection. Inspections result in the classification of facilities to be in compliance or not in compliance. This may result in a determination of non-serious or serious violations, which may lead to temporary, partial, or total closure of

facilities.



Response



In order to protect human health and the environment and to enforce environmental laws, regulatory agencies may enforce actions that result in pollution reduction activities by regulated facilities. Amounts of pollution reduction are a function of the number and type of enforcement actions.

\*Pollution reduction amounts are from Federal actions only.  
Source: USEPA Integrated Compliance Information System (ICIS)

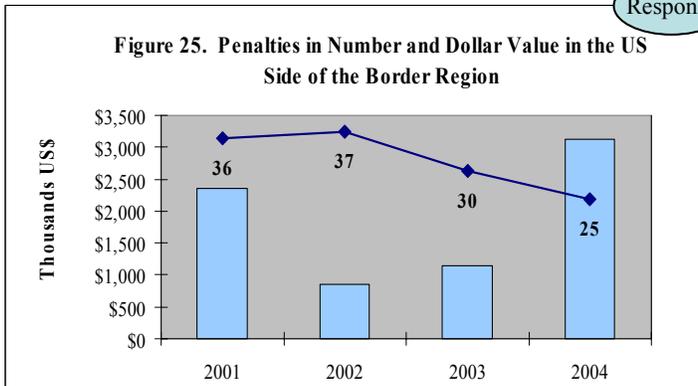
Regulatory agencies may also conduct inspections to verify a facility's compliance status, while companies may conduct their own audits to ensure environmental compliance and to improve pollution prevention. Due to the different regulatory policies and legal systems between the US and Mexican governments, the information on enforcement actions, compliance, pollution reduction, inspections, and penalties as presented cannot be directly compared.

**Figure 24. Number of State and Federal Inspections of Facilities in US-Mexico Border Region**

2002-2004				
Baja California				1036
Coahuila	For Mexican states			909
Chihuahua	inspections are			1267
Nuevo León	combined across			1215
Sonora	2001-2004			649
Tamaulipas				1079
		<b>2001</b>	<b>2002</b>	<b>2003</b>
California		146	132	300
Arizona		69	76	70
New Mexico		44	17	31
Texas		134	150	211

Source: USEPA Integrated Data for Enforcement and Analysis (IDEA) System; Semarnat, Procuraduría Federal de Protección al Ambiente, PROFEPA. México, May 2005.

Response



Source: USEPA Integrated Data for Enforcement Analysis (IDEA) System (Includes Federal and State data reported to the data system)

Penalties are monetary assessments paid by a regulated entity in response to a violation or noncompliance. Not all enforcement actions require a penalty and may require other remedies. Penalties act as deterrence to violating the law, and an incentive for staying in compliance with the environmental statutes and regulations. Penalties are designed to recover the economic benefit of noncompliance as well as to account for the seriousness of the violation.

For more information on the Border 2012 Enforcement and Compliance Borderwide Workgroup, see <http://www.epa.gov/usmexicoborder/org.htm#borderwide>



## About the Border Indicator Development Process

This first binational indicators report developed under the Border 2012 program represents an initial effort to provide important information about the region. The report marks the completion of the first quarter of the Program, 2003 to 2005. It presents an initial set of indicators, identified after a comprehensive review of potential indicators and consensus building. For more information about the border indicator selection and development process up to date, please visit [www.epa.gov/border2012/indicators.htm](http://www.epa.gov/border2012/indicators.htm).

## Acknowledgments

Border 2012 thanks Salvador Sanchez, the former Border Indicators Task Force co-chair, for initiating and supporting the development of a binational set of indicators, and welcomes Armando Yañez as the new co-chair.

We would also like to thank the Border 2012 coordinating bodies for their assistance in developing this publication: Regional Workgroups, Border-wide Workgroups, Policy Fora, and local task forces.

Specifically, we would like to thank the active members of the Border Indicators Task Force.

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## Future Direction

Production of a subsequent, more comprehensive indicator report covering up to the Program's mid-term (2003 to 2007) is anticipated for release in 2008. This next report will provide a more complete view of the environmental and public health conditions of the border region and progress made towards meeting Program goals and objectives. Work towards the next report as well as other future reports will result in an improved and expanded binational indicator set. In order to accomplish this, BITF's goal is to further refine the existing indicators and continue to identify and develop optimal, quality indicators while increasing transparency and seeking harmonization across the various entities.

Broad participation and representation is essential for developing and reporting indicators that are relevant and beneficial to border communities. Stakeholder input was instrumental in the development of this initial report, and the Border Indicators Task Force will continue to count on their involvement. However, more awareness and participation is needed as there are many data gaps and research needs for ongoing development of binational indicators. Through the Program's outreach efforts, Border 2012 will build relationships with and invite citizens, governmental and non-governmental entities, tribes, academia, the private sector, and others to be partners in this indicators initiative. Data from all these sources are vital to building a sustainable long-term effort that effectively measures and reports on the environmental and public health conditions of the US- Mexico border region.

Future indicator reports will continue to be available in both electronic and print formats to provide stakeholders with broader access to US-Mexico border information. Supporting documentation will also be available at [www.epa.gov/border2012/indicators.htm](http://www.epa.gov/border2012/indicators.htm).

## Comments?

The Border Indicators Task Force welcomes your comments to help improve future editions. Please contact us via email at: *(insert box address)*

Additional information about the Border 2012 program is available at [www.epa.gov/border2012](http://www.epa.gov/border2012)

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