

*14<sup>th</sup> Annual Emission Inventory Conference  
Las Vegas, Nevada, April 14, 2005*

---

***Developing a Baseline and  
Projections Emissions Inventory  
for the Border 2012 Program***

---

*Presented by:*

Paula Fields

Eastern Research Group, Sacramento, CA



# Project Sponsors and Authors

---

- **U.S. EPA –**

- Christine Vineyard
- Sarah Sowell

- **Western Governors' Association**

- Rich Halvey

- **SEMARNAT –**

- Sergio Sánchez
- Enrique Rebolledo
- Hugo Landa
- Alberto Cruzado

- **INE**

- Adrian Fernández
- Verónica Garibay
- Leonora Rojas
- Arnoldo Matus

- **ERG**

- Paula Fields
- Marty Wolf

# What is Border 2012?

---

- **10-year, binational environmental program for the U.S.-Mexico border region**
- **Implemented under the La Paz Agreement (1983)**
- **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



**100 km U.S.-Mexico Border Zone**

# Overall Approach for 1999 Baseline

---

- **1999 U.S. NEI + 1999 Mexico NEI**
- **Point, area, on-road motor vehicle, nonroad sources**
- **GIS for identifying sources and emissions located in the 100 km border zone**
- **Examination and explanation of differences in source categorization between U.S. and Mexico**
- **2002 and 2012 projections**
- **4 km x 4 km gridded inventory for 1999**

# GIS Procedure

---

- **Determined which counties/ municipalities lied entirely or partially within the border zone**
- **Determined fraction of emissions within the border zone**
  - **UTMs for point sources**
    - **Gap filled missing UTM's in Mexico using centroid of municipality or specific locality**
  - **Spatial surrogates for area, on-road, nonroad sources**

# Spatial Surrogates

---

## ● United States:

- Population
- Agricultural land
- Forest land
- Airports
- Railroads
- Ports

## ● Mexico

- Population
- Agricultural land
- Forest land
- Airports
- Railroads
- Ports
- Border crossings

# Analysis of Source Categories

---

## ● U.S. NEI

- No min. threshold for point sources
- SIC codes
- Range of area source categories (e.g., TX = 126; CA = 139)
- 500 on-road MV subcategories
- 228 nonroad subcategories

## ● Mexico NEI

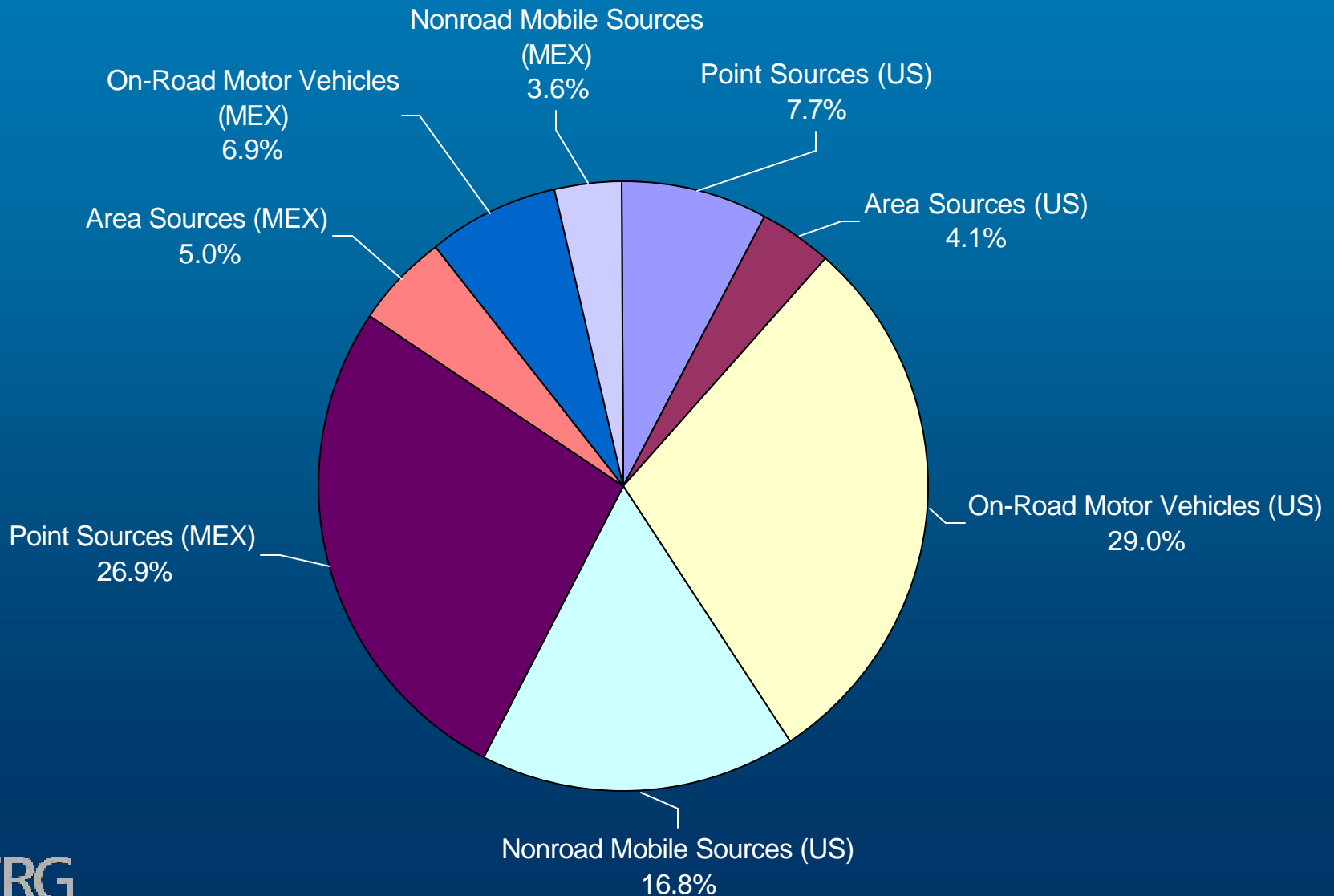
- Point sources = (federal + state) > 10 Mg/year
- NAICS codes
- 50 area source categories
- 7 on-road MV classifications
- 2 nonroad categories (agriculture, construction)



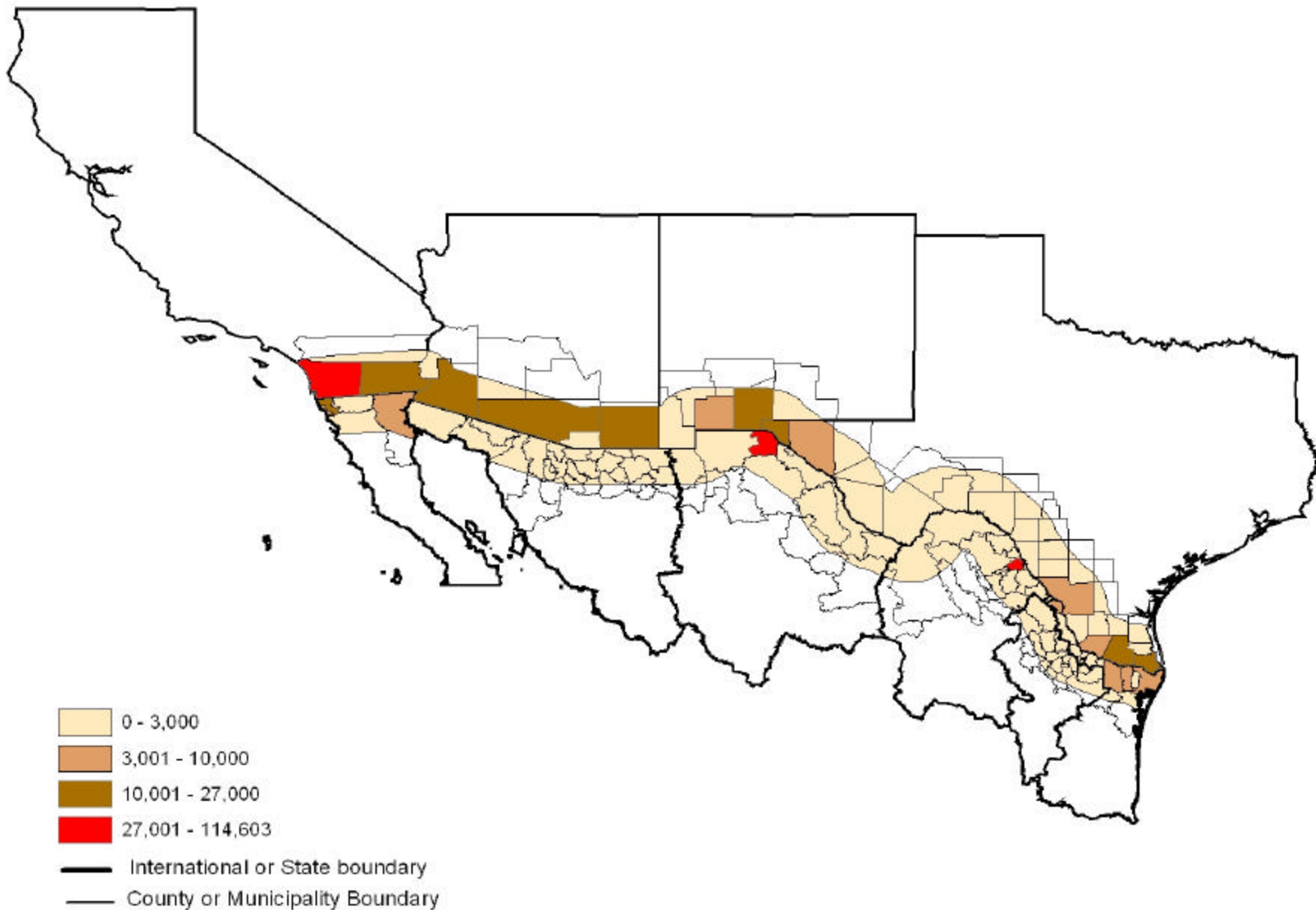
# 1999 Baseline Inventory (1,000 TPY)

State	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>
California	120.6	6.2	86.6
Arizona	48.7	11.6	43.1
New Mexico	26.0	20.1	86.1
Texas	96.6	5.6	191.0
Baja California	34.1	45.8	125.3
Sonora	8.5	4.1	50.0
Chihuahua	30.0	40.1	82.0
Coahuila	118.4	168.6	29.1
Nuevo León	1.2	0.3	4.9
Tamaulipas	23.1	22.3	61.0
<b>U.S. Total</b>	<b>291.9</b>	<b>43.5</b>	<b>406.8</b>
<b>Mexico Total</b>	<b>215.3</b>	<b>281.3</b>	<b>352.2</b>
<b>Region Total</b>	<b>507.2</b>	<b>324.8</b>	<b>759.0</b>

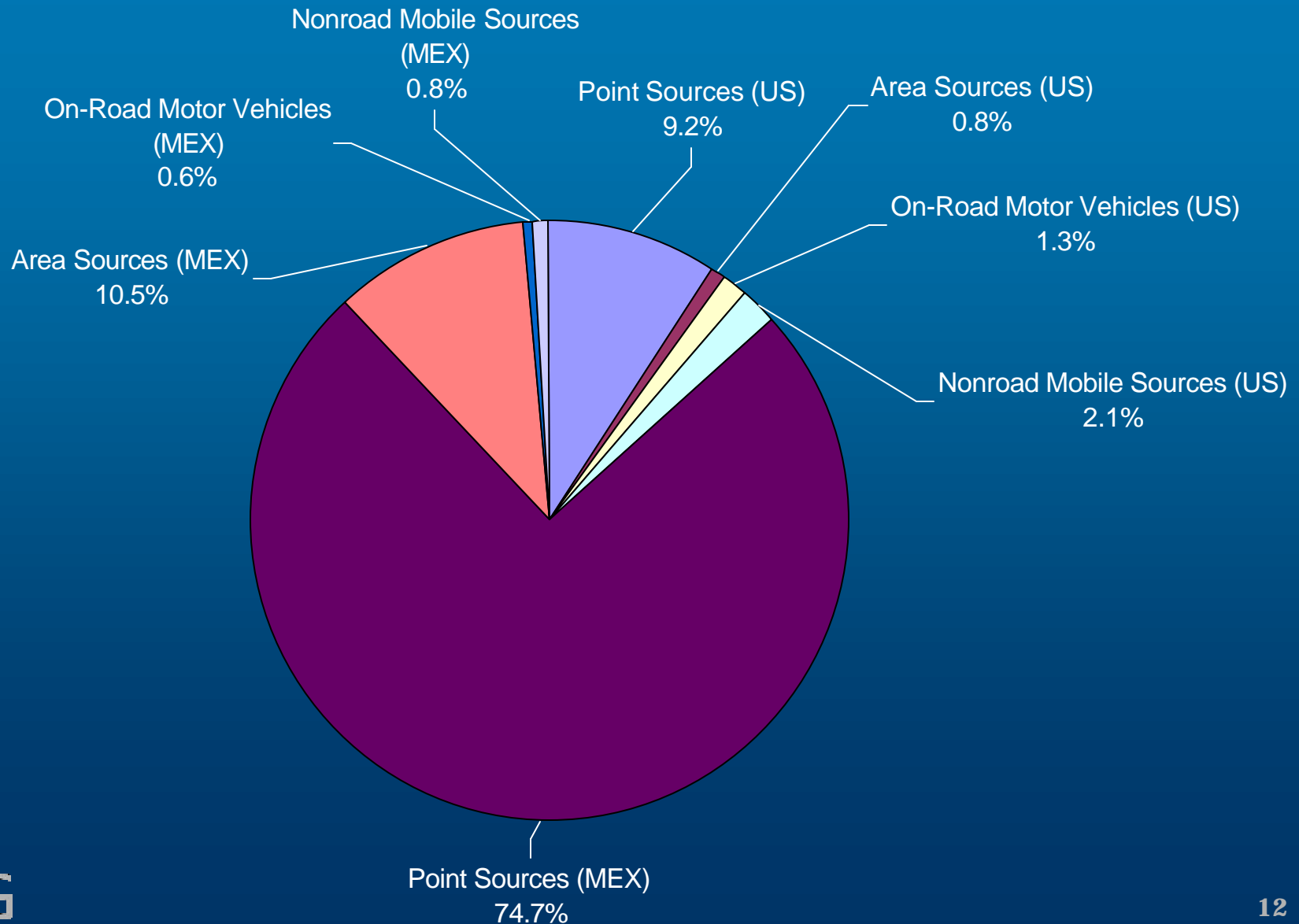
# 1999 NO<sub>x</sub> Contributions



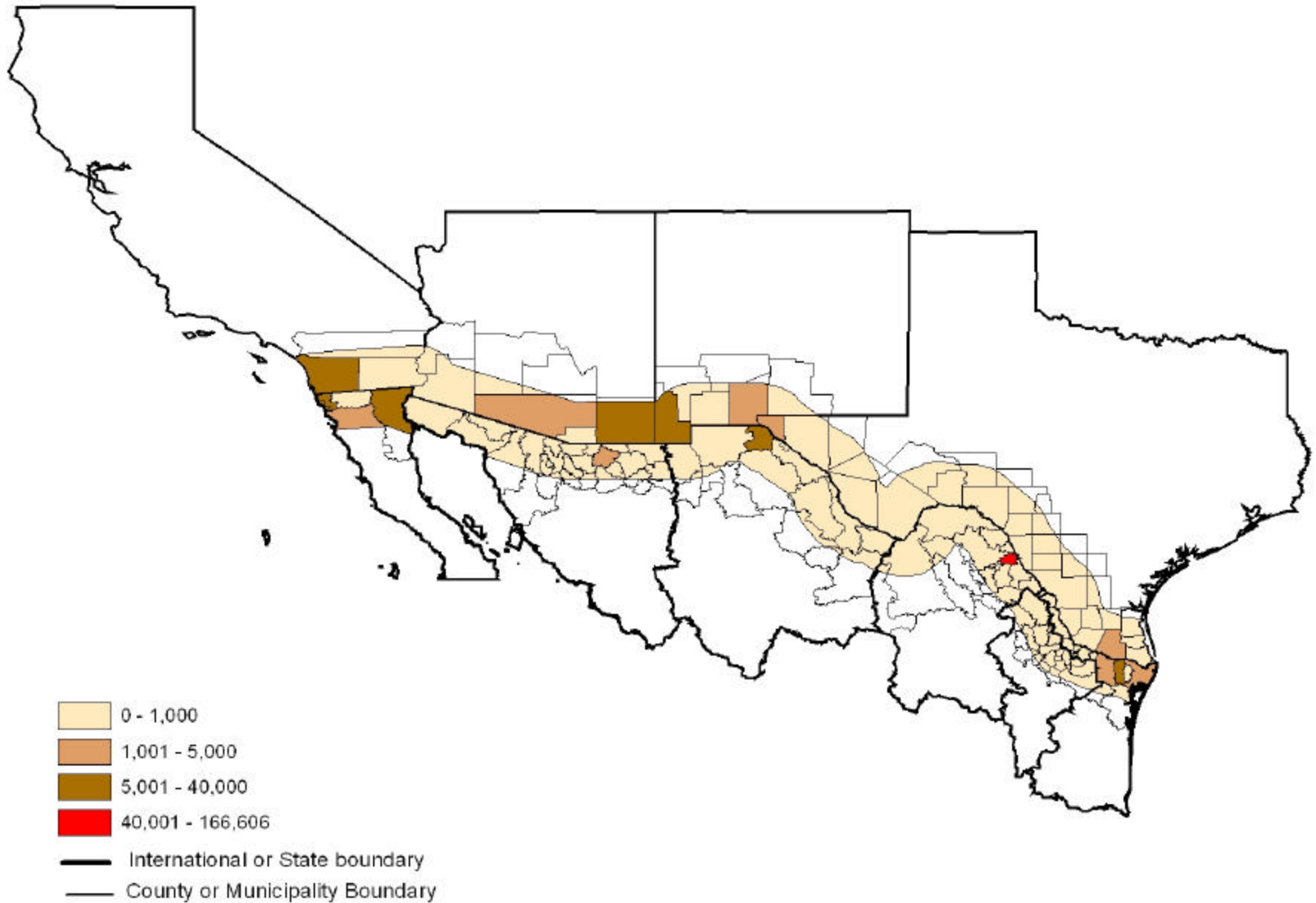
# 1999 Baseline NO<sub>x</sub> Emissions (TPY)



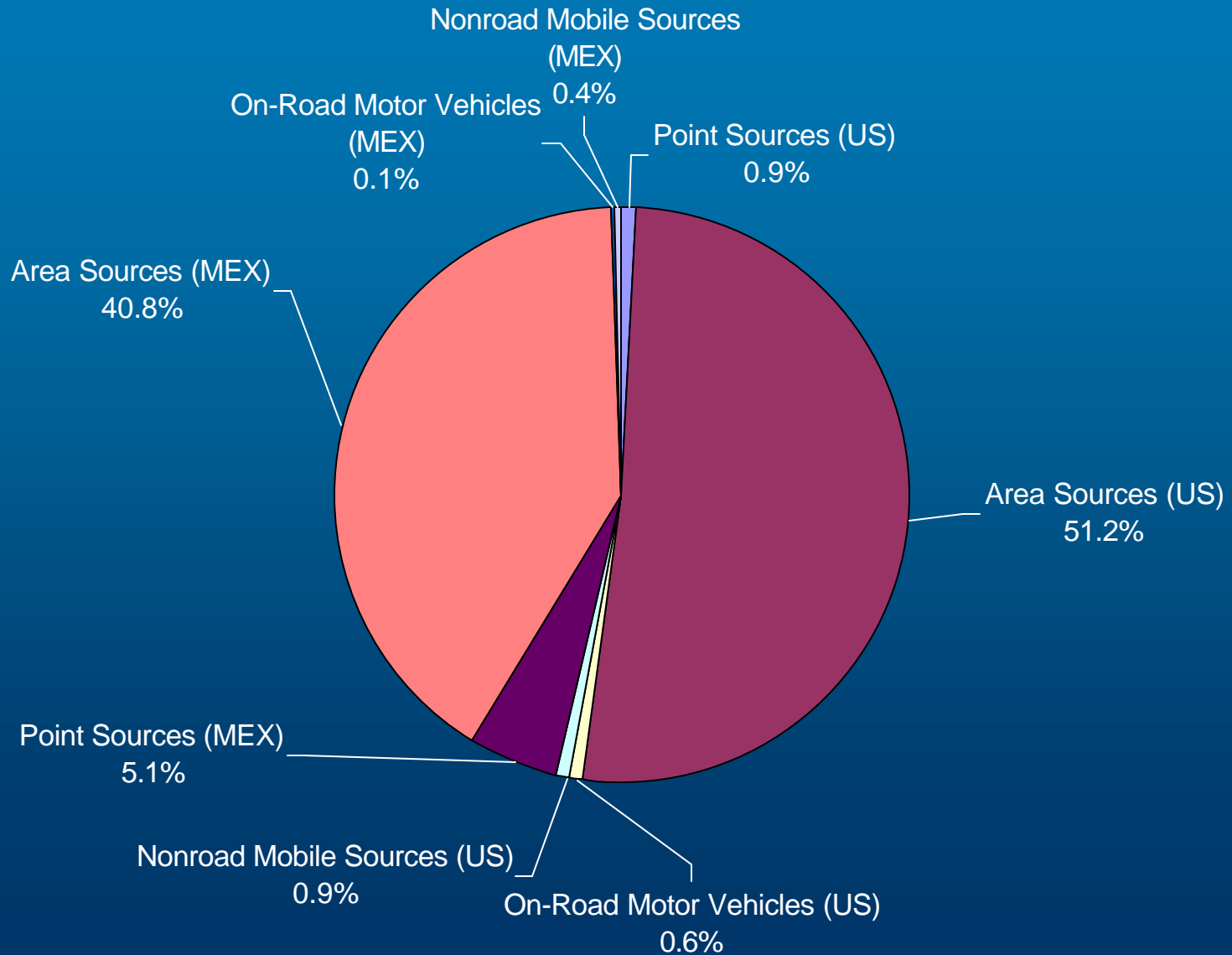
# 1999 SO<sub>x</sub> Contributions



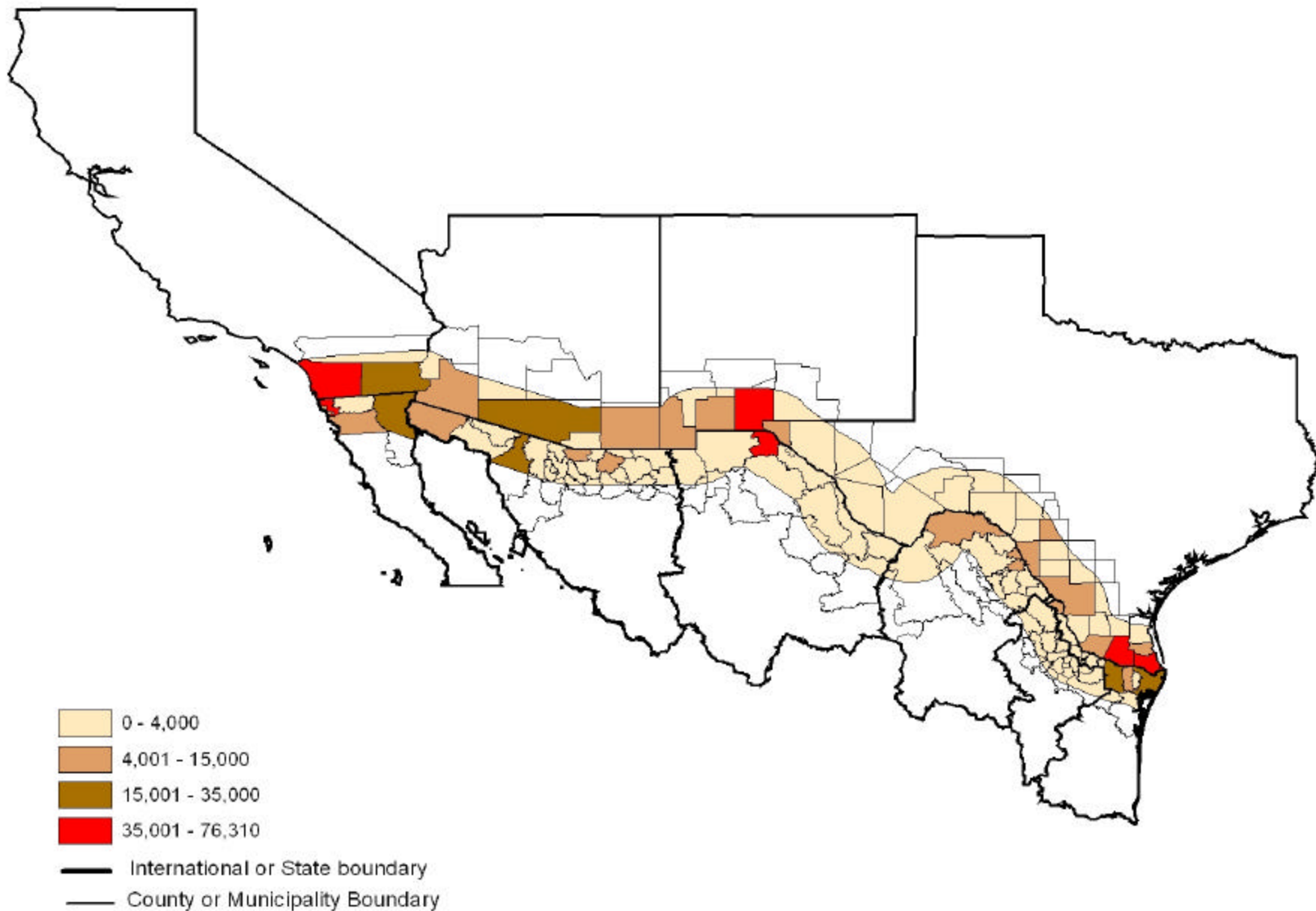
# 1999 Baseline SO<sub>x</sub> Emissions (TPY)



# 1999 PM<sub>10</sub> Contributions



# 1999 Baseline PM<sub>10</sub> Emissions (TPY)



# Projections Methodology

---

## ● United States

- Point sources
  - EGAS (growth, only)
- Area sources
  - EGAS
  - Population growth
- On-road MV
  - Draft 2002 NEI
  - 2012 projection factors from WRAP
- Nonroad
  - NONROAD2004

## ● Mexico

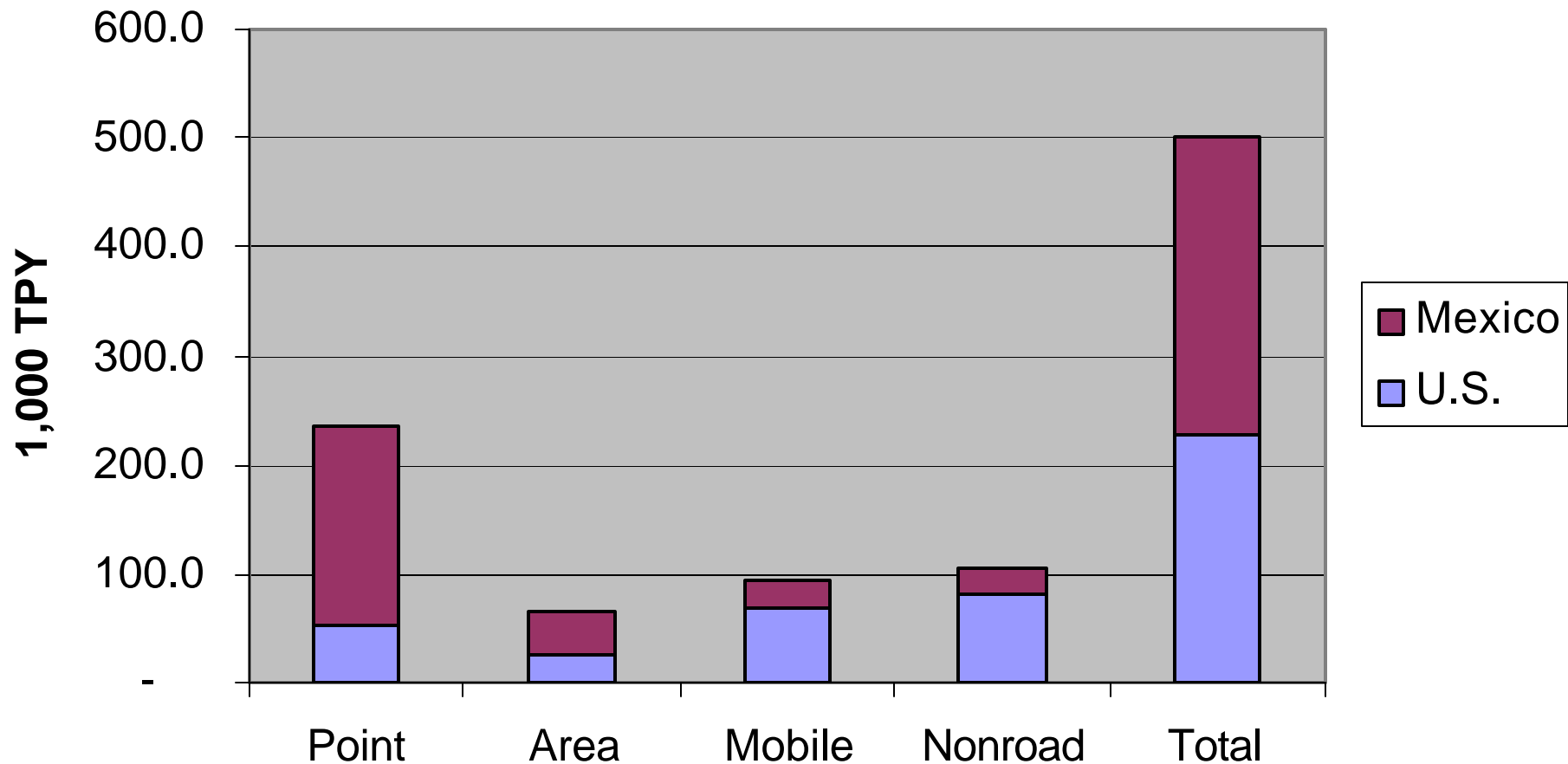
- Point sources
  - OECD (industrial growth)
  - SENER (power plants)
- Area sources
  - Regional energy demand forecasts
  - Ag and livestock for 10 years (1993-2002)
  - Population forecasts
- On-road MV
  - MOBILE6-Mexico (+ controls)
- Nonroad
  - Fuel demand forecasts (ag and construction)



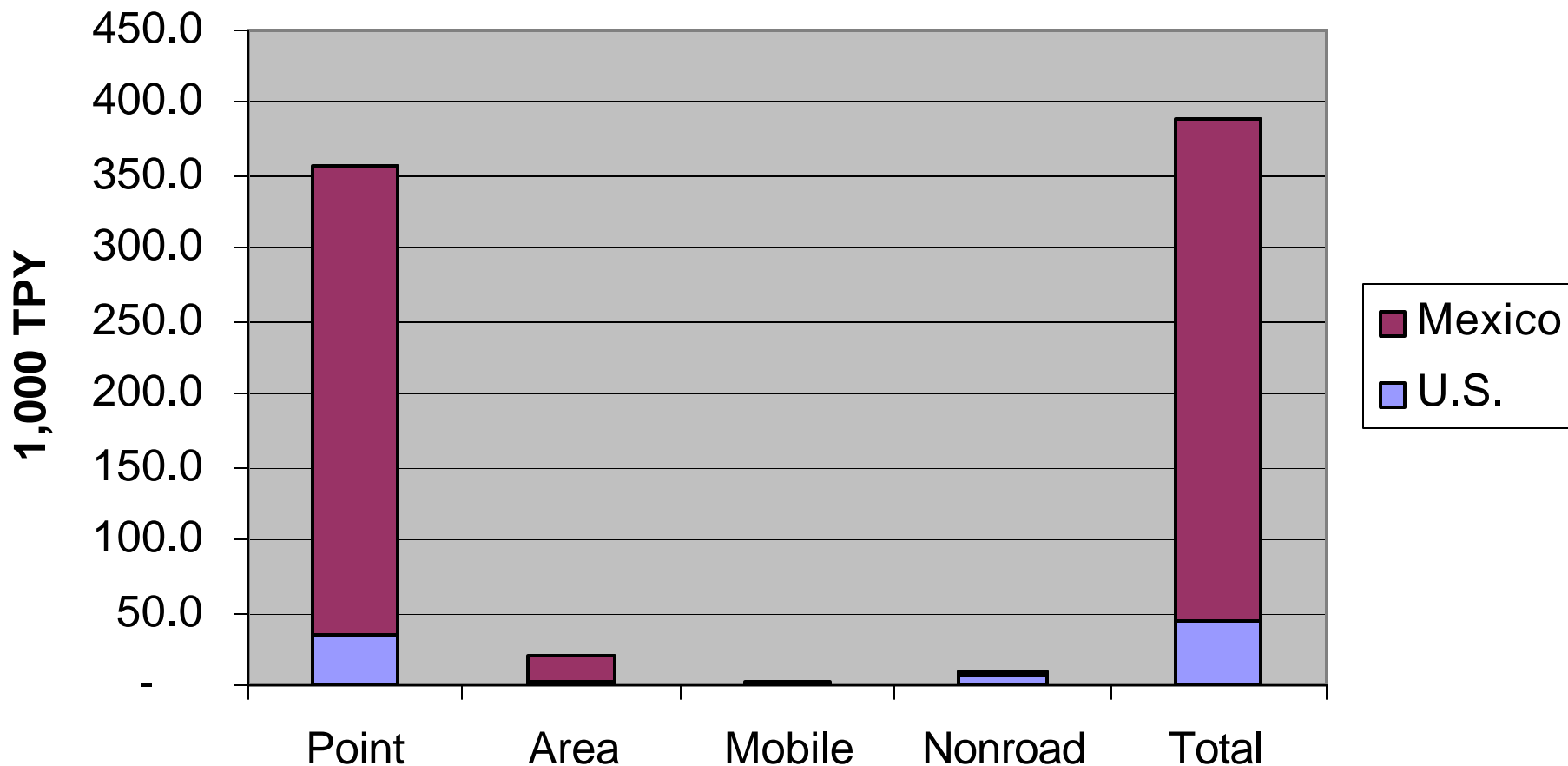
# 2012 Baseline Inventory (1,000 TPY)

Location	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>
<b>2012</b>			
U.S. Total	228.3	45.2	515.8
Mexico Total	271.2	343.1	481.5
Region Total	499.5	388.3	997.2
<b>Change from 1999 (%)</b>			
U.S.	-21.8	+3.9	+26.8
Mexico	+26.0	+22.0	+36.7
Region	-1.5	+19.6	+31.4

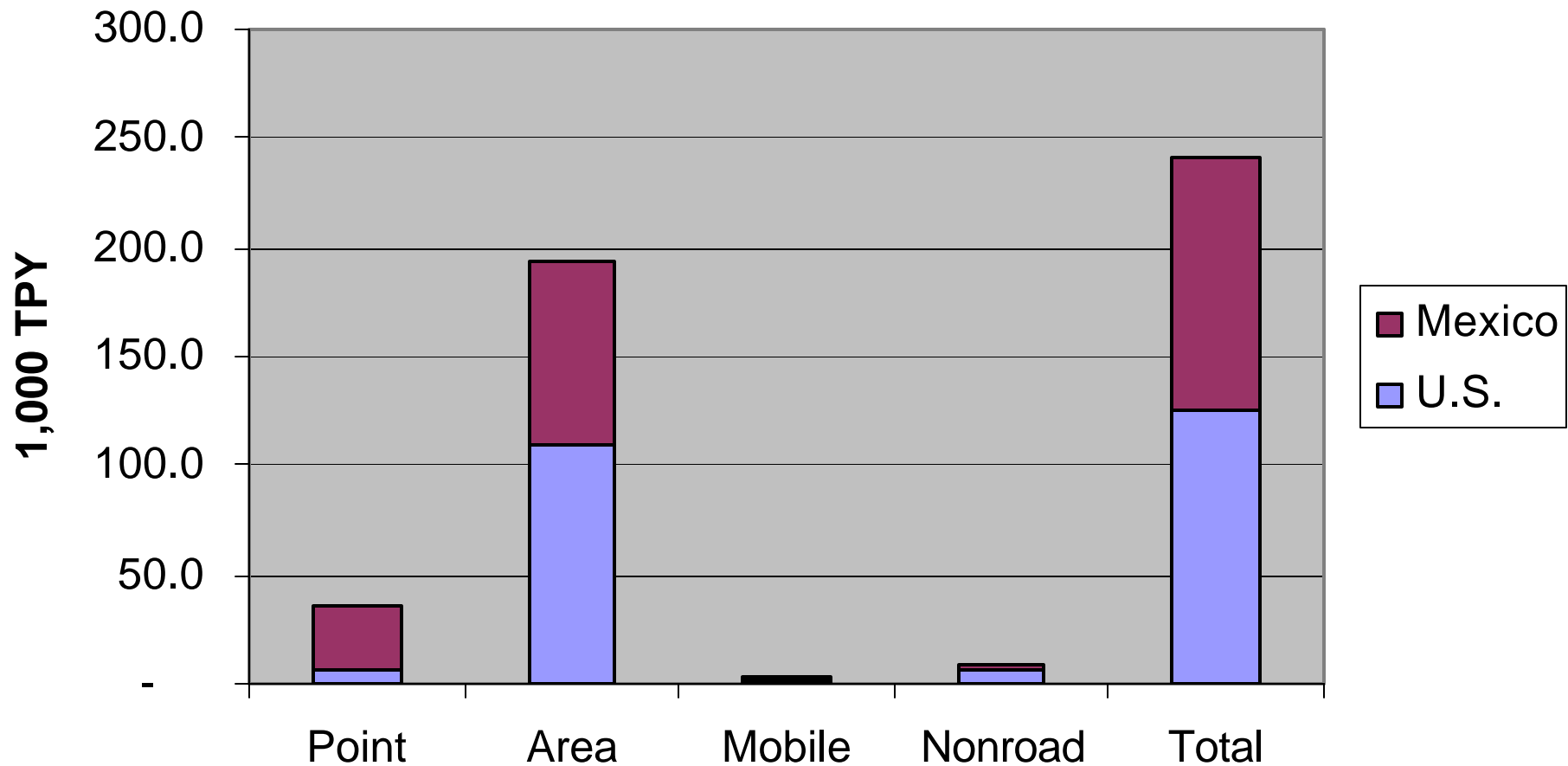
# 2012 NO<sub>x</sub> Emissions



# 2012 SO<sub>x</sub> Emissions



# 2012 PM<sub>2.5</sub> Emissions



# Overall Conclusions

---

- **Good summary of overall criteria pollutant emissions for the border region**
- **Take care in comparing state-to-state, and source type-to-source type**
- **Projections give baseline emissions (growth, no control)**
- **Policy tool for implementing future control strategies in the border region**