

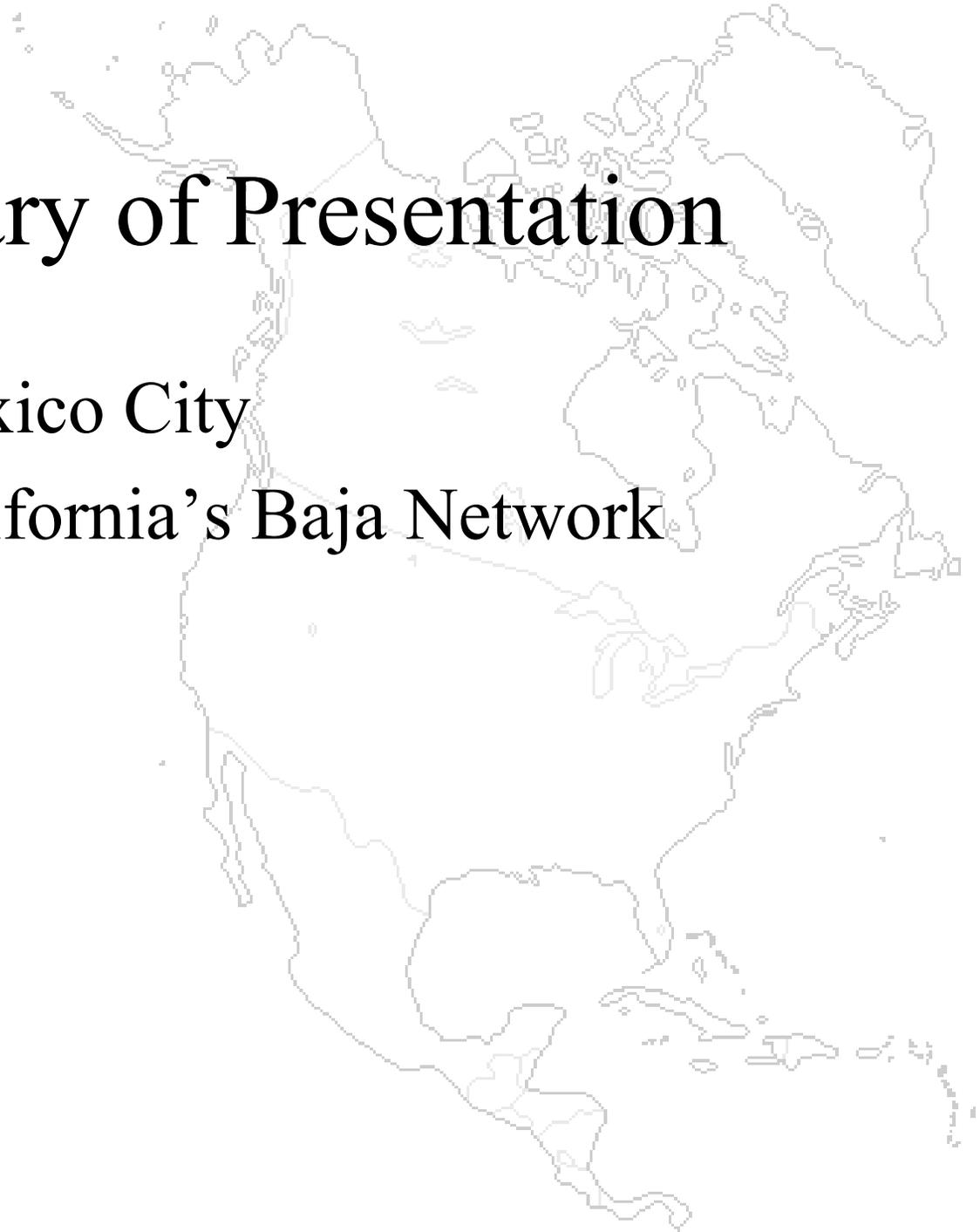
An outline map of North America, showing the United States, Canada, and Mexico. The map is positioned in the background of the slide, with a green vertical bar on the left side.

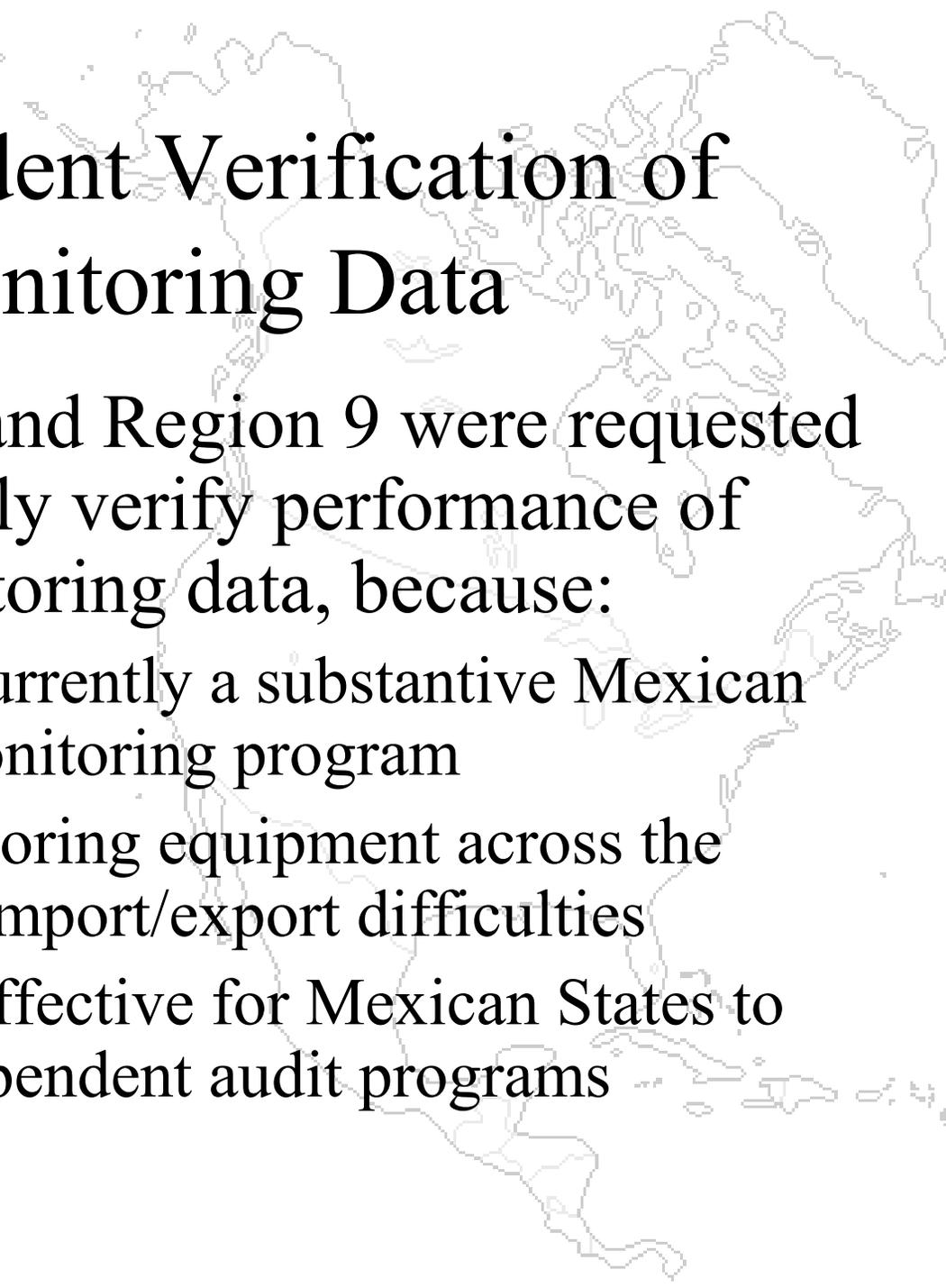
**International Cooperation on the
Implementation of Independent
Performance Evaluations for the State of
Baja, and the State of Mexico**

Mathew C. Plate
USEPA Region 9

Summary of Presentation

- Audits of Mexico City
- Audits of California's Baja Network
- Conclusions



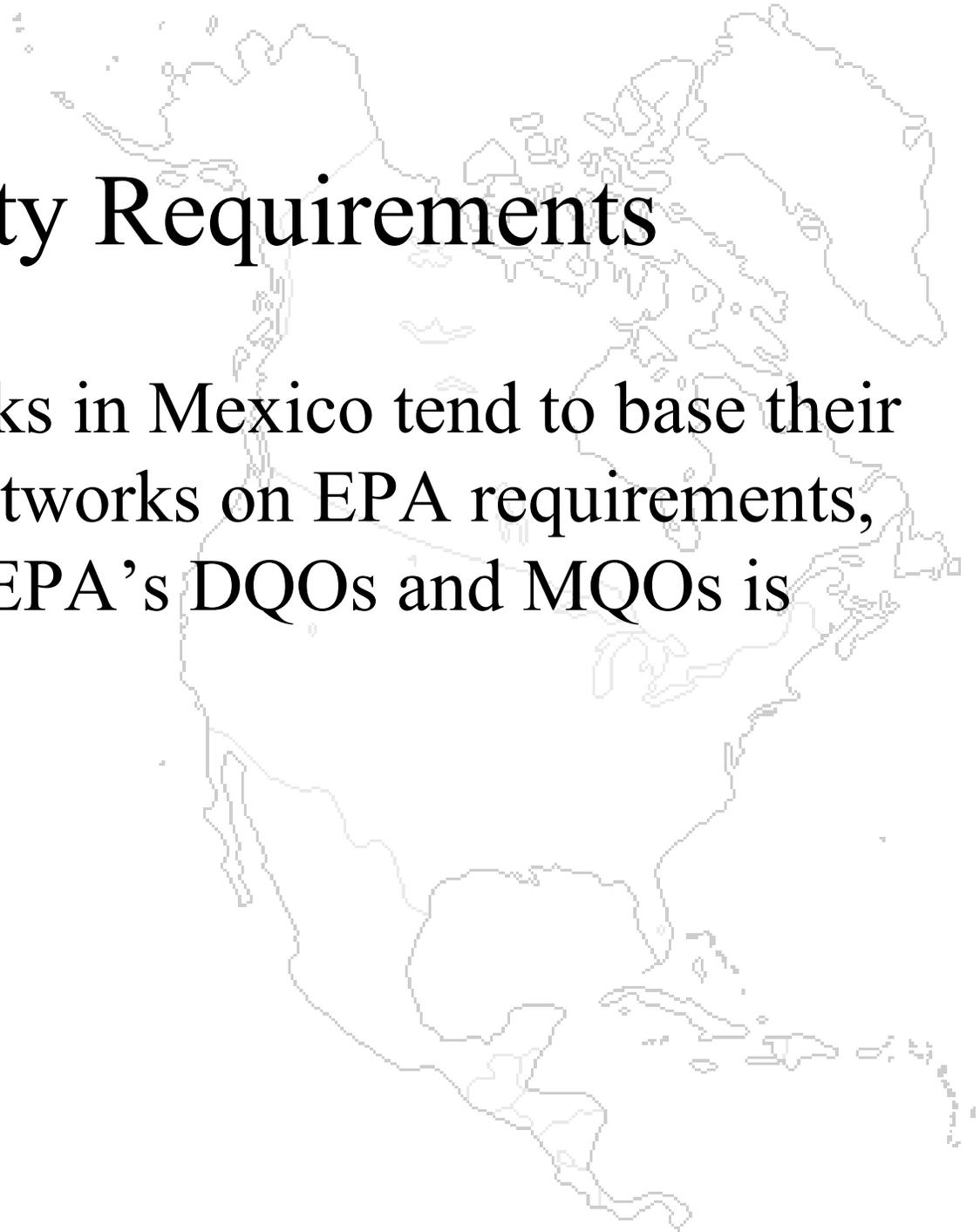


Independent Verification of Monitoring Data

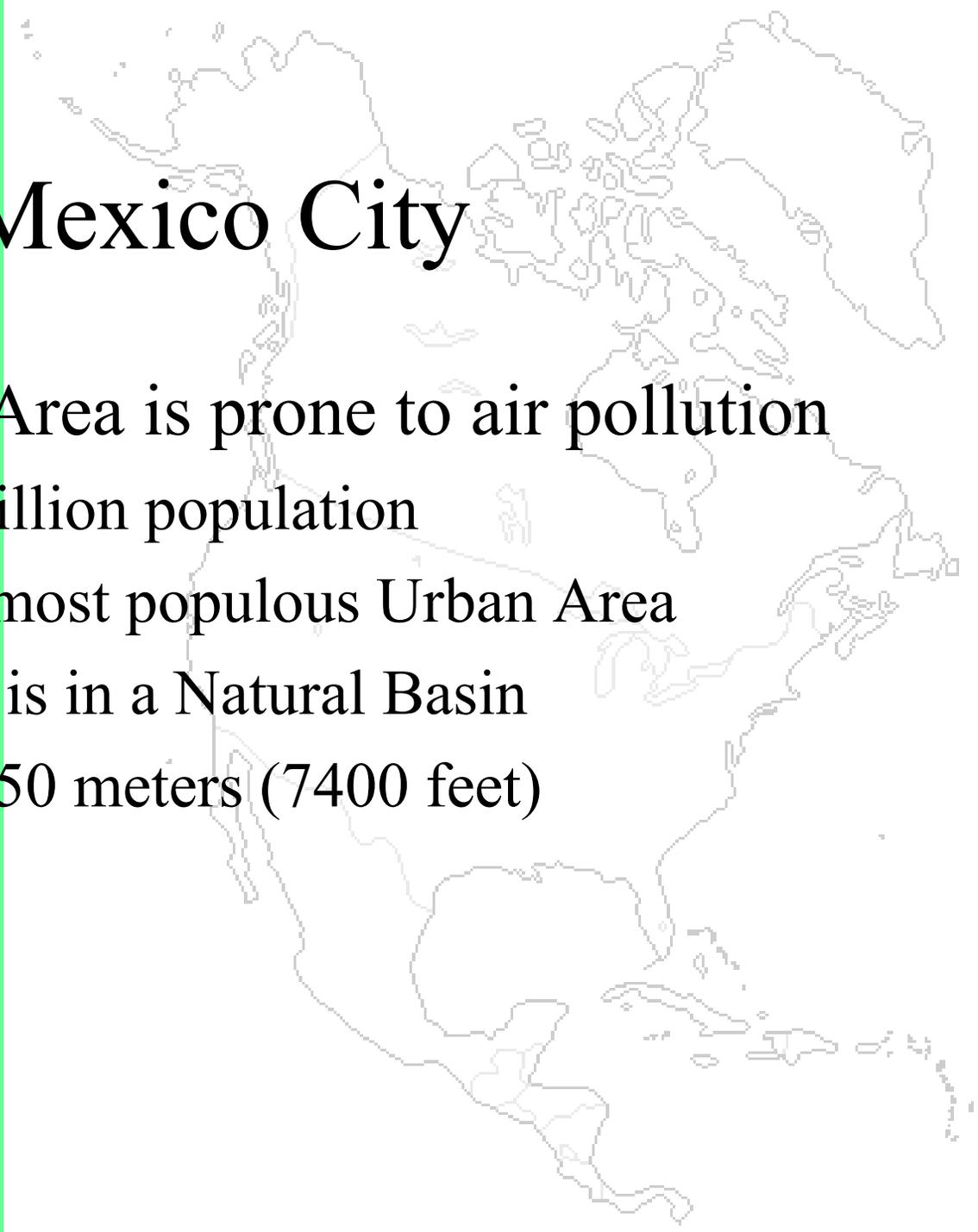
- EPA OAQPS and Region 9 were requested to independently verify performance of Mexican monitoring data, because:
 - There is not currently a substantive Mexican Federal air monitoring program
 - Moving monitoring equipment across the border poses import/export difficulties
 - It is not cost effective for Mexican States to establish independent audit programs

Quality Requirements

- While networks in Mexico tend to base their monitoring networks on EPA requirements, adherence to EPA's DQOs and MQOs is not required



Mexico City

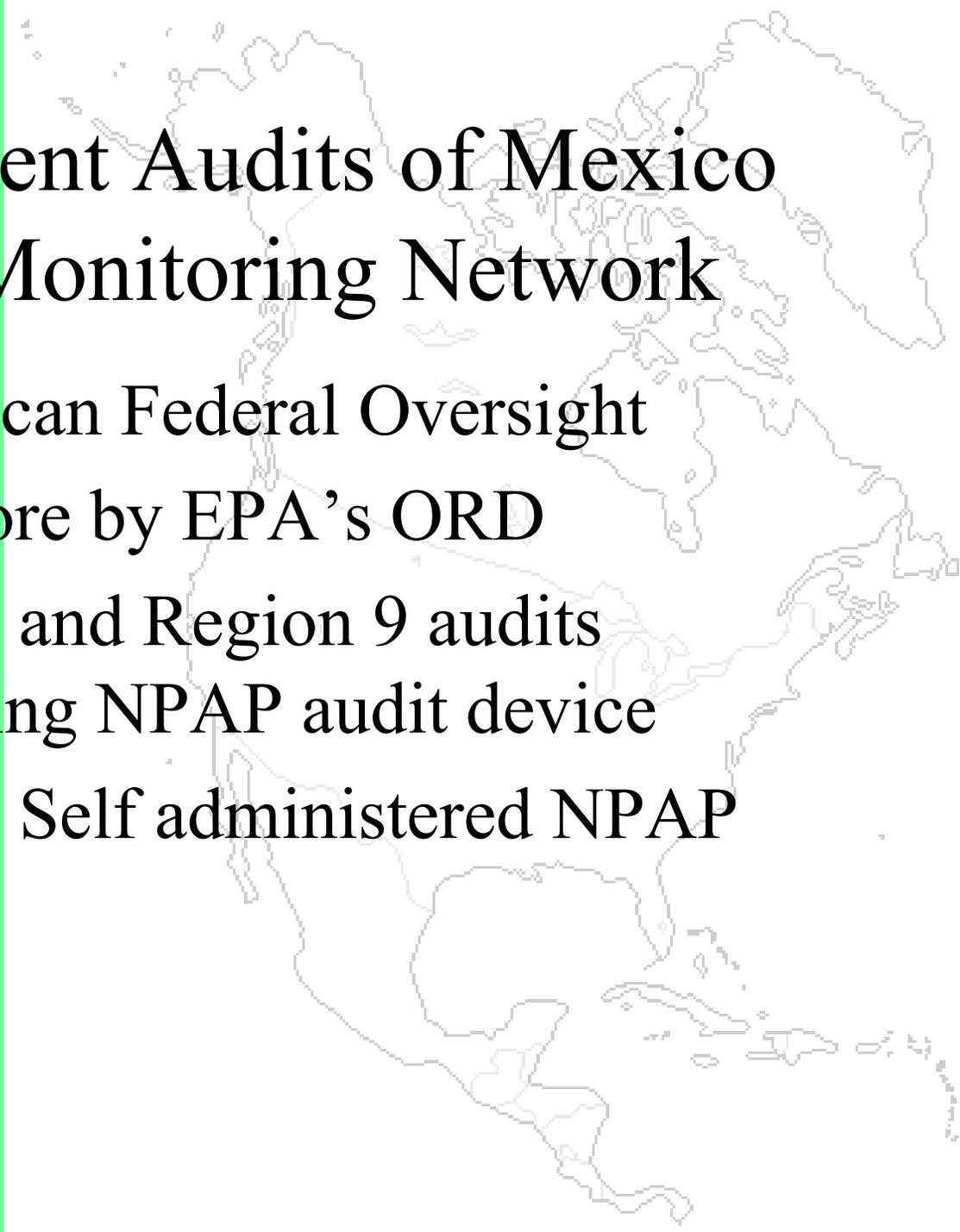
An outline map of Mexico and Central America, showing the borders of the countries. The map is positioned in the background of the slide, with the title and list of facts overlaid on it.

- Mexico City Area is prone to air pollution
 - Aprox. 20 million population
 - World's 2nd most populous Urban Area
 - Mexico City is in a Natural Basin
 - Elevation 2250 meters (7400 feet)

Mexico City Monitoring

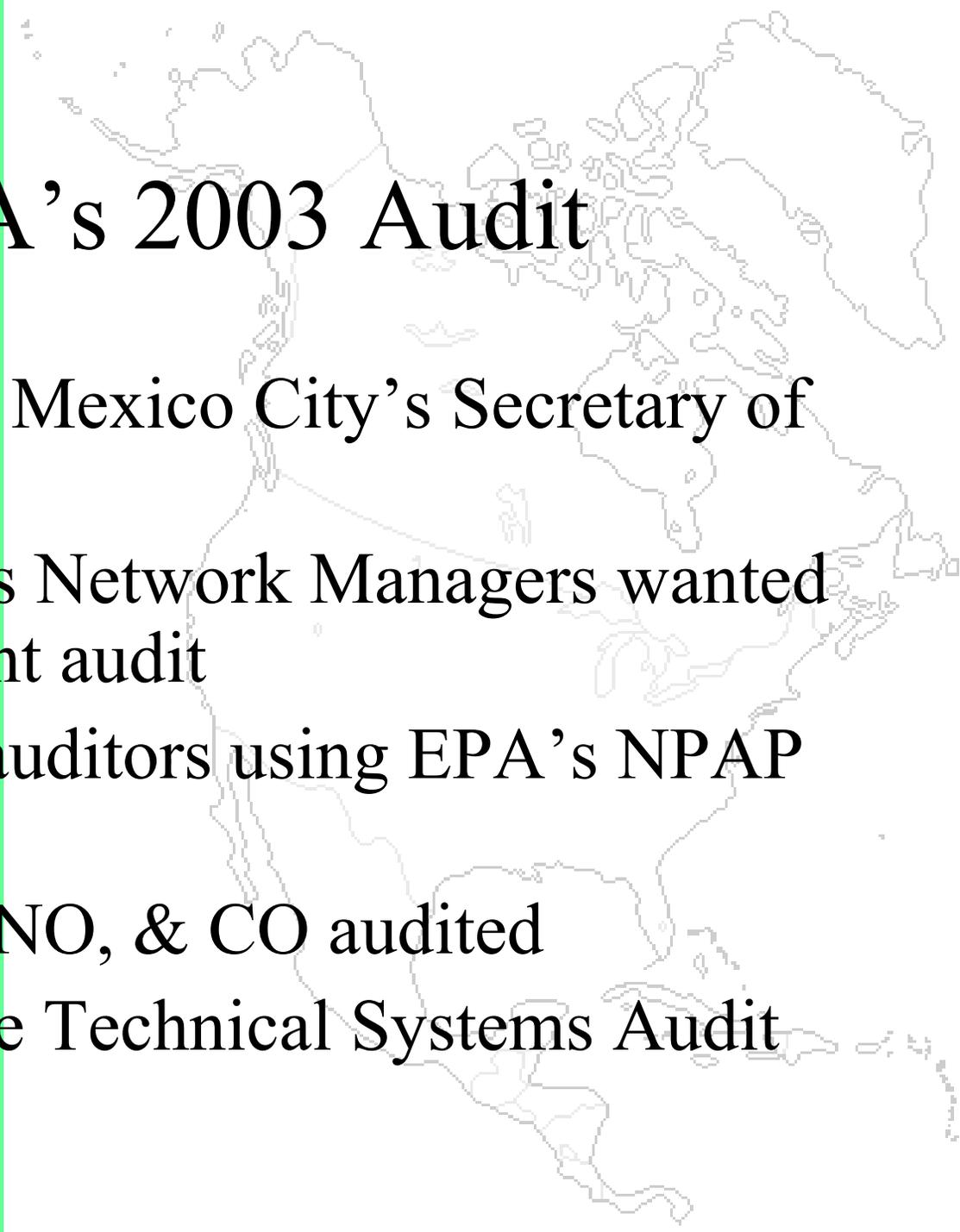


- Mexico City has one of the most extensive networks in the Americas
 - Over 50 monitoring stations
 - Monitoring data used to notify public of episodes and as the basis of stringent control measures
- Similar in magnitude to the Los Angeles, California Monitoring Network



Independent Audits of Mexico City's Monitoring Network

- Limited Mexican Federal Oversight
- 2001 and before by EPA's ORD
- 2003 OAQPS and Region 9 audits performed using NPAP audit device
- 2004 & 2005 Self administered NPAP
- Future?

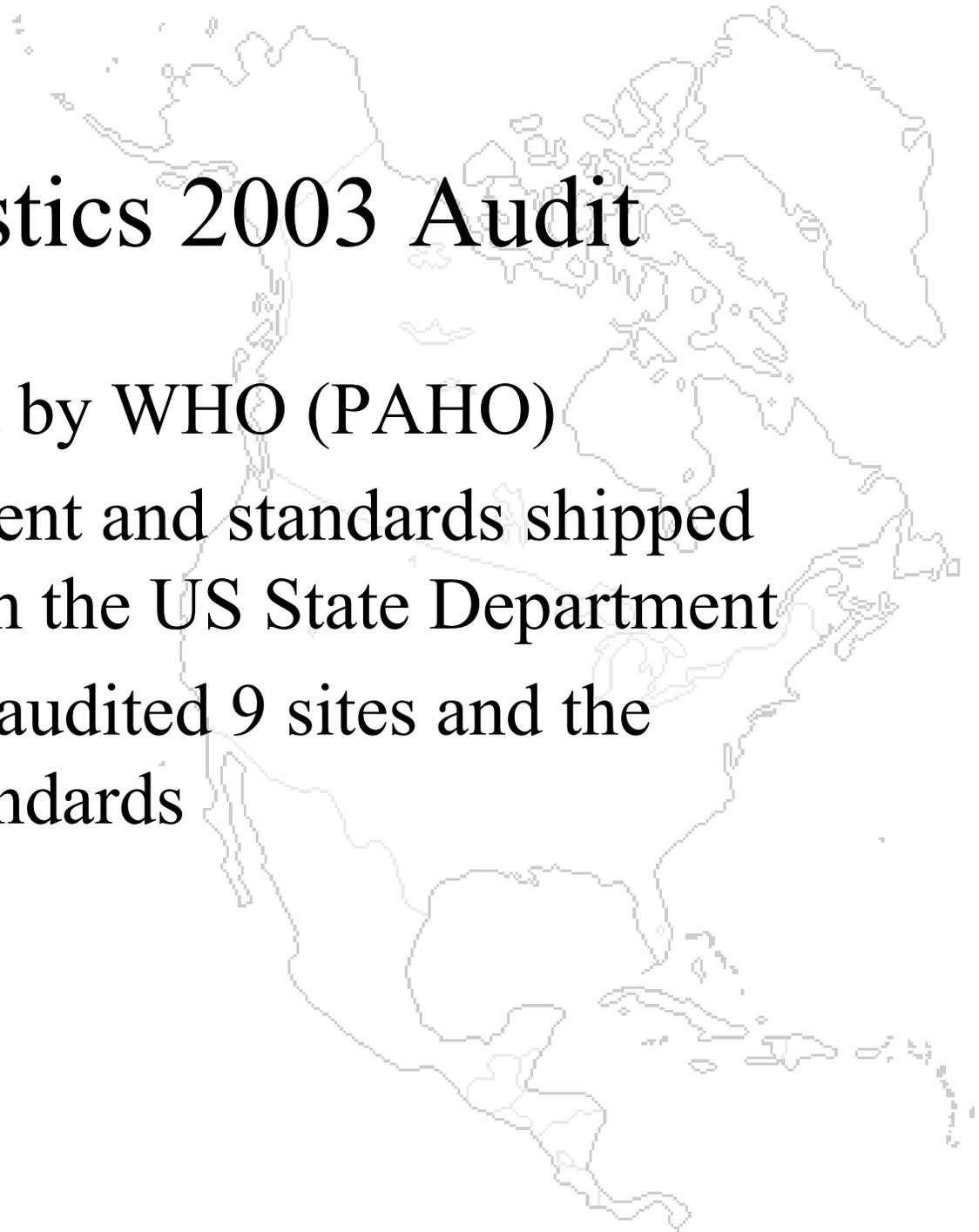


EPA's 2003 Audit

- Requested by Mexico City's Secretary of Environment
- Mexico City's Network Managers wanted an independent audit
- Independent auditors using EPA's NPAP device
- Ozone, SO₂, NO, & CO audited
- Limited Scope Technical Systems Audit

Logistics 2003 Audit

- Travel funded by WHO (PAHO)
- Audit equipment and standards shipped with help from the US State Department
- Two auditors audited 9 sites and the laboratory standards



Mexico City Audits



- The Mexico City equipment appears to be well maintained
- Mexico City's Environmental Program Management expressed a commitment to producing quality data
- The monitoring stations were of a consistent design

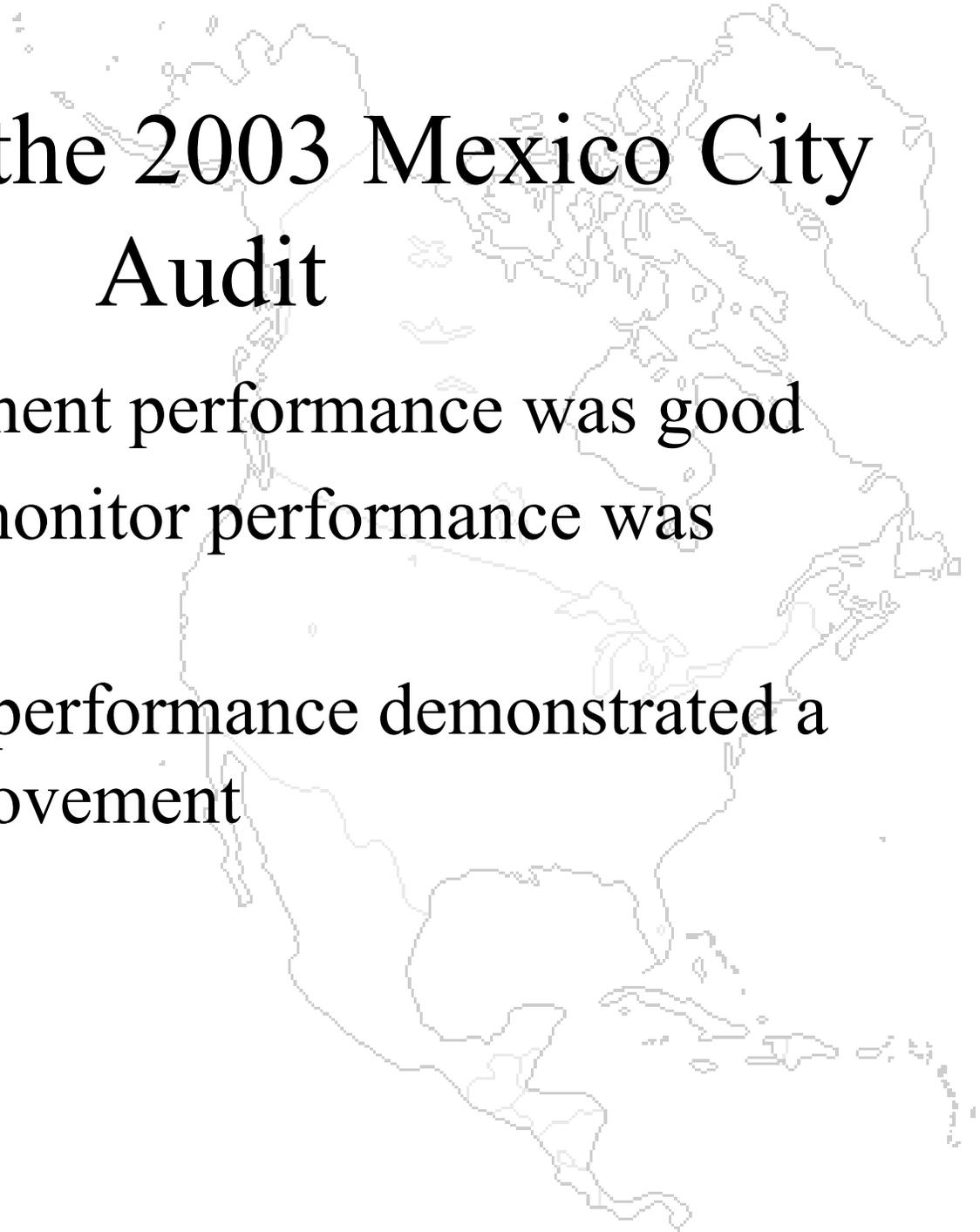
Mexico City Audits



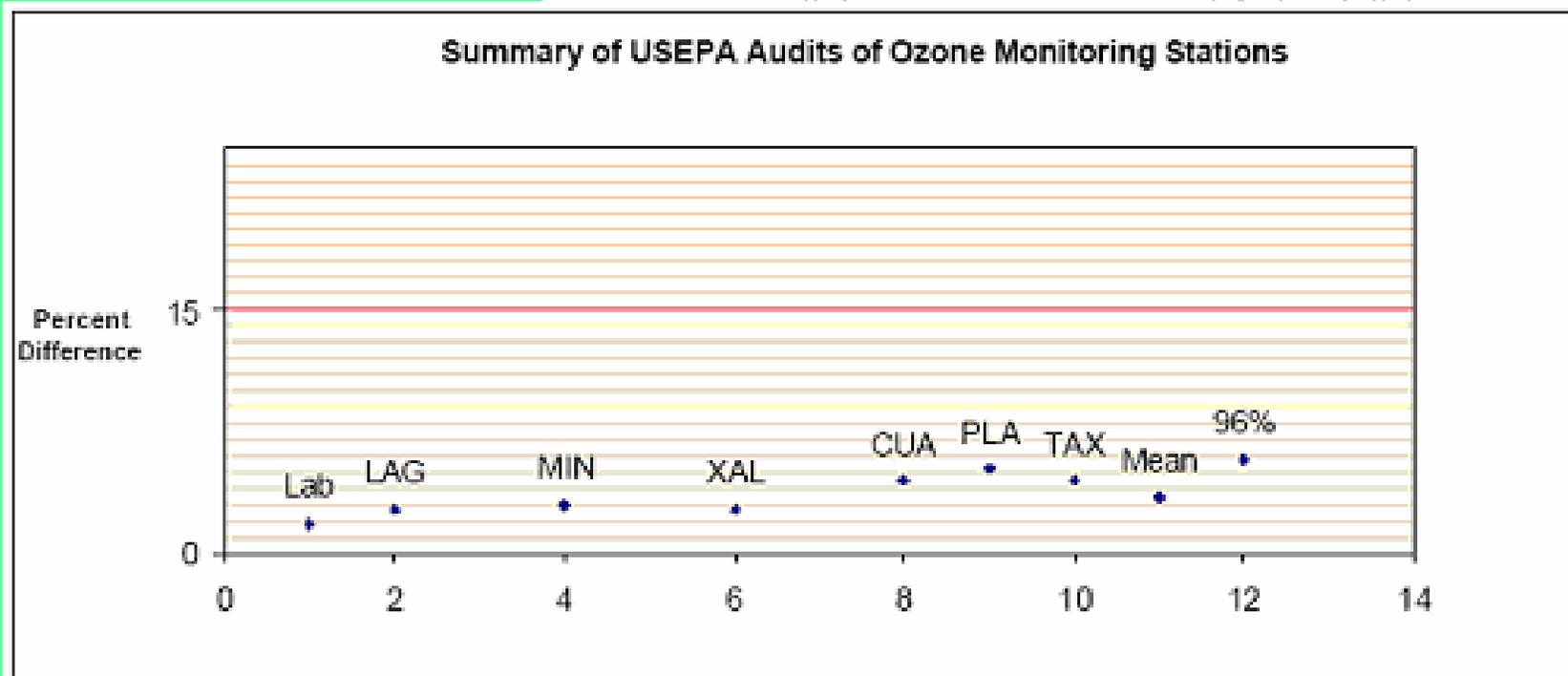
- Because the auditors were independent “real time” results were available
- A summary report was issued on the closing day of the audits
- The final audit reports were issued several months after the audits

Results of the 2003 Mexico City Audit

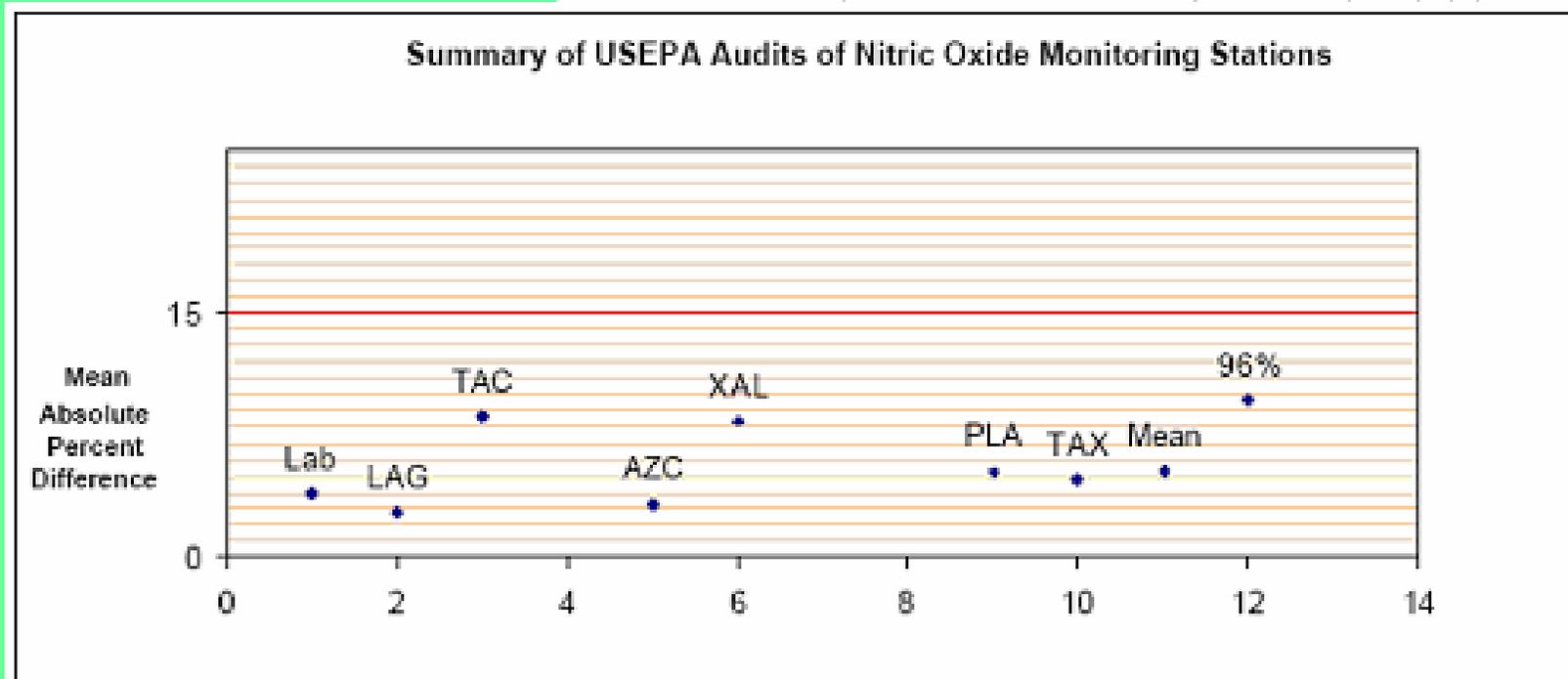
- Ozone instrument performance was good
- CO and NO monitor performance was acceptable
- SO₂ monitor performance demonstrated a need for improvement



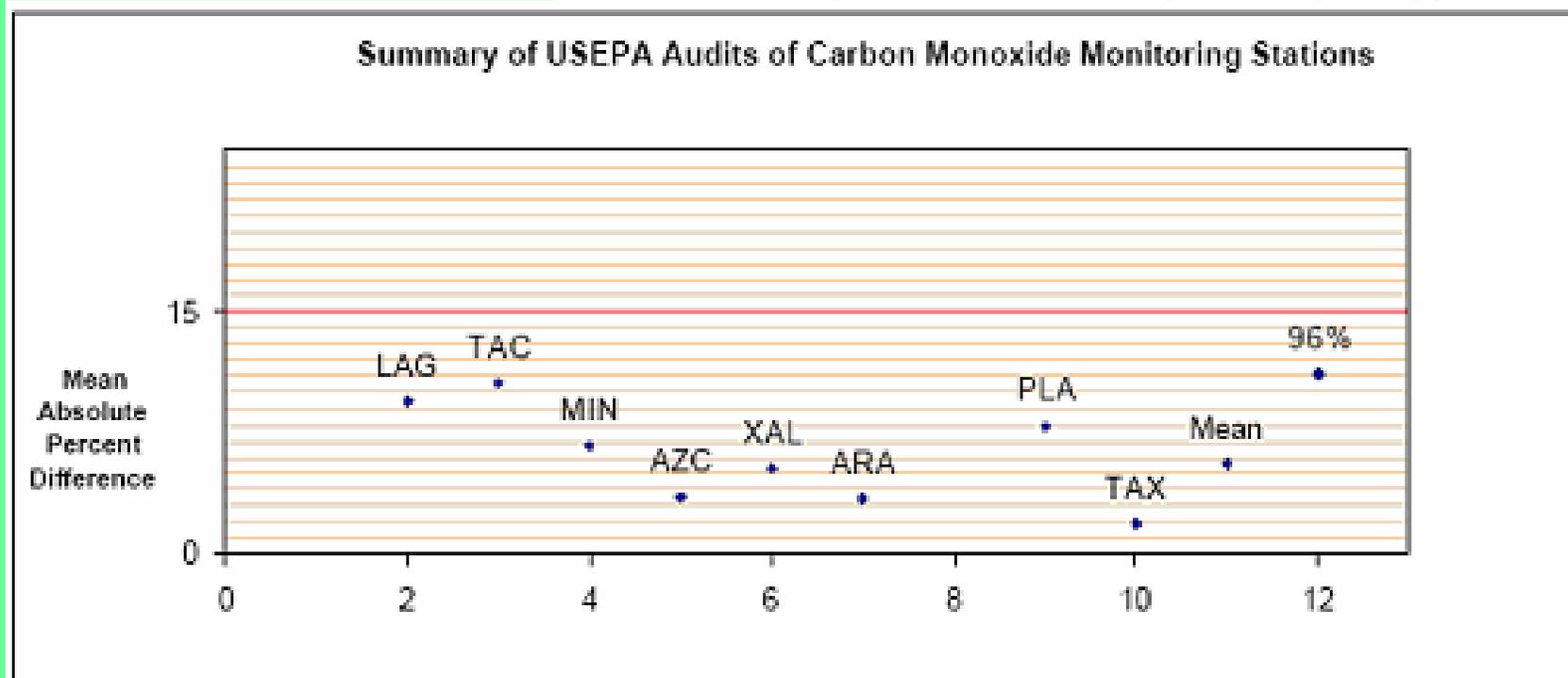
Ozone Averages vs. NPAP Criterion of 15% Difference



NO Averages vs. NPAP Criterion of 15% Difference

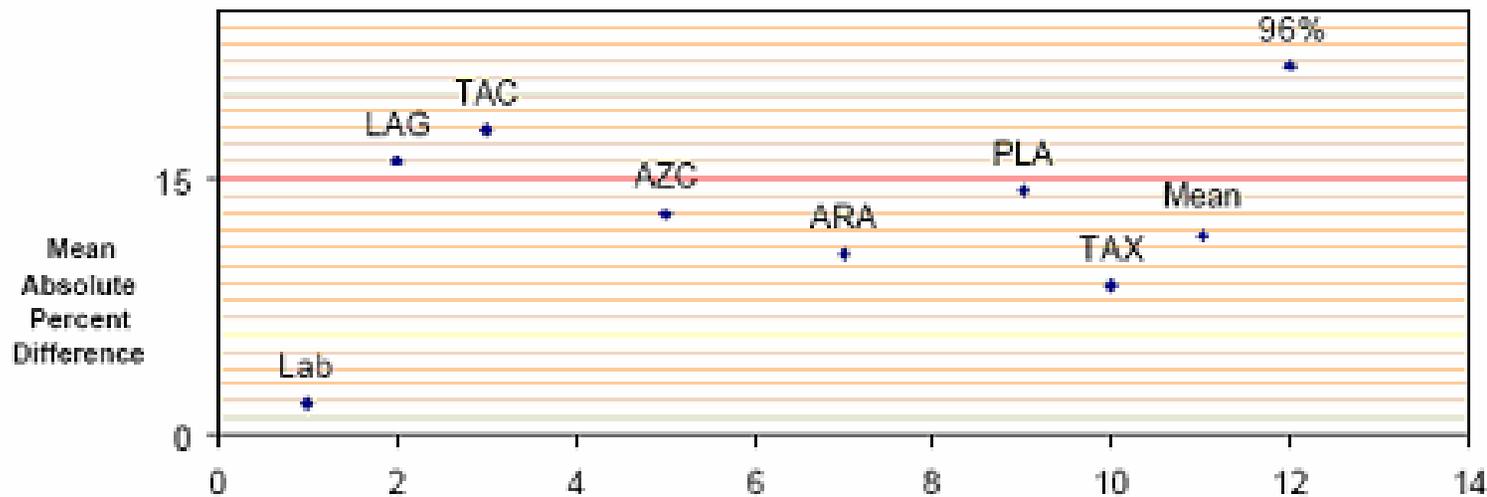


CO Averages vs. NPAP Criterion of 15% Difference

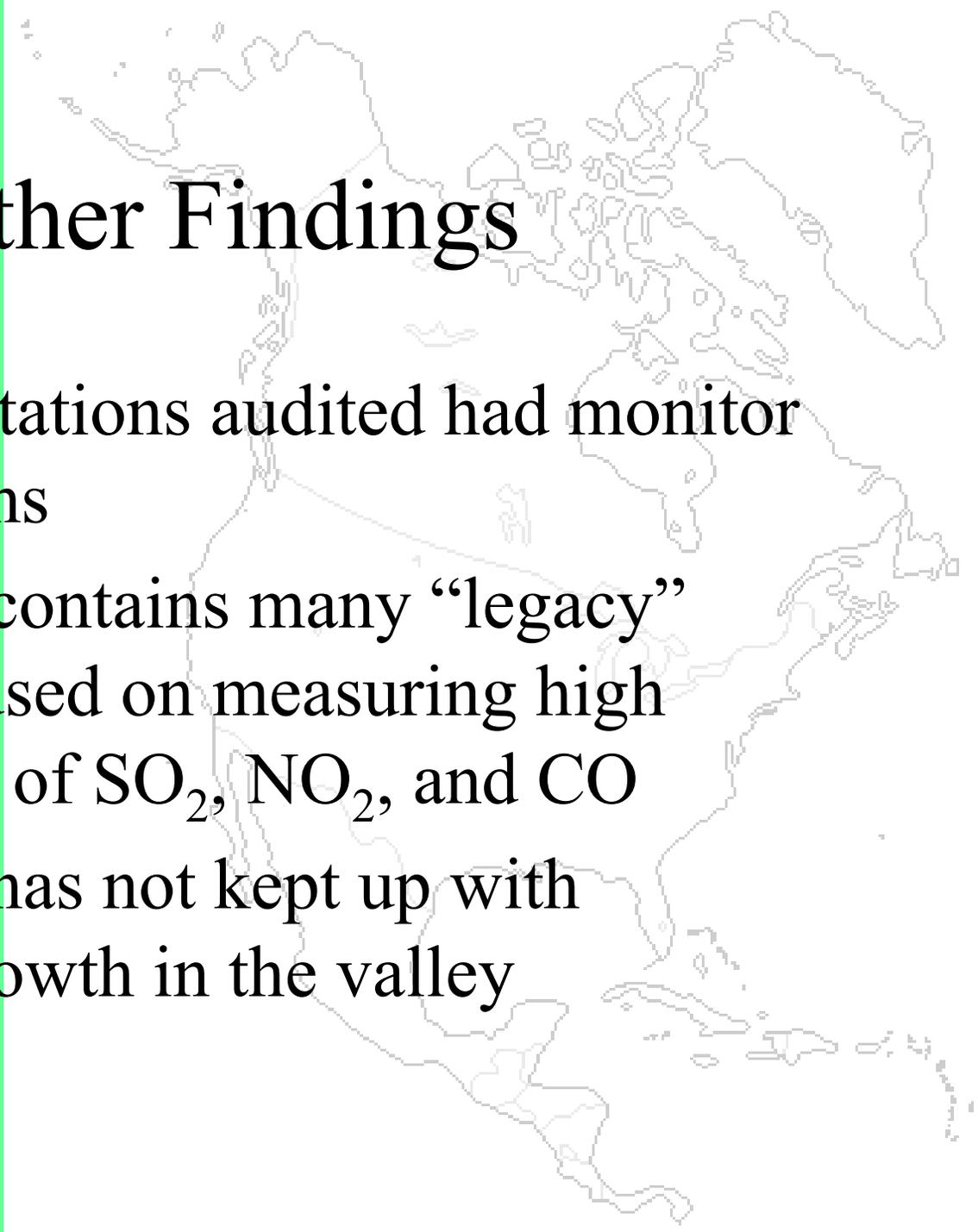


□ SO₂ Averages vs. NPAP Criterion of 15% Difference

Figure 5: Summary of USEPA Audits of Sulfur Dioxide Monitoring Stations



Other Findings



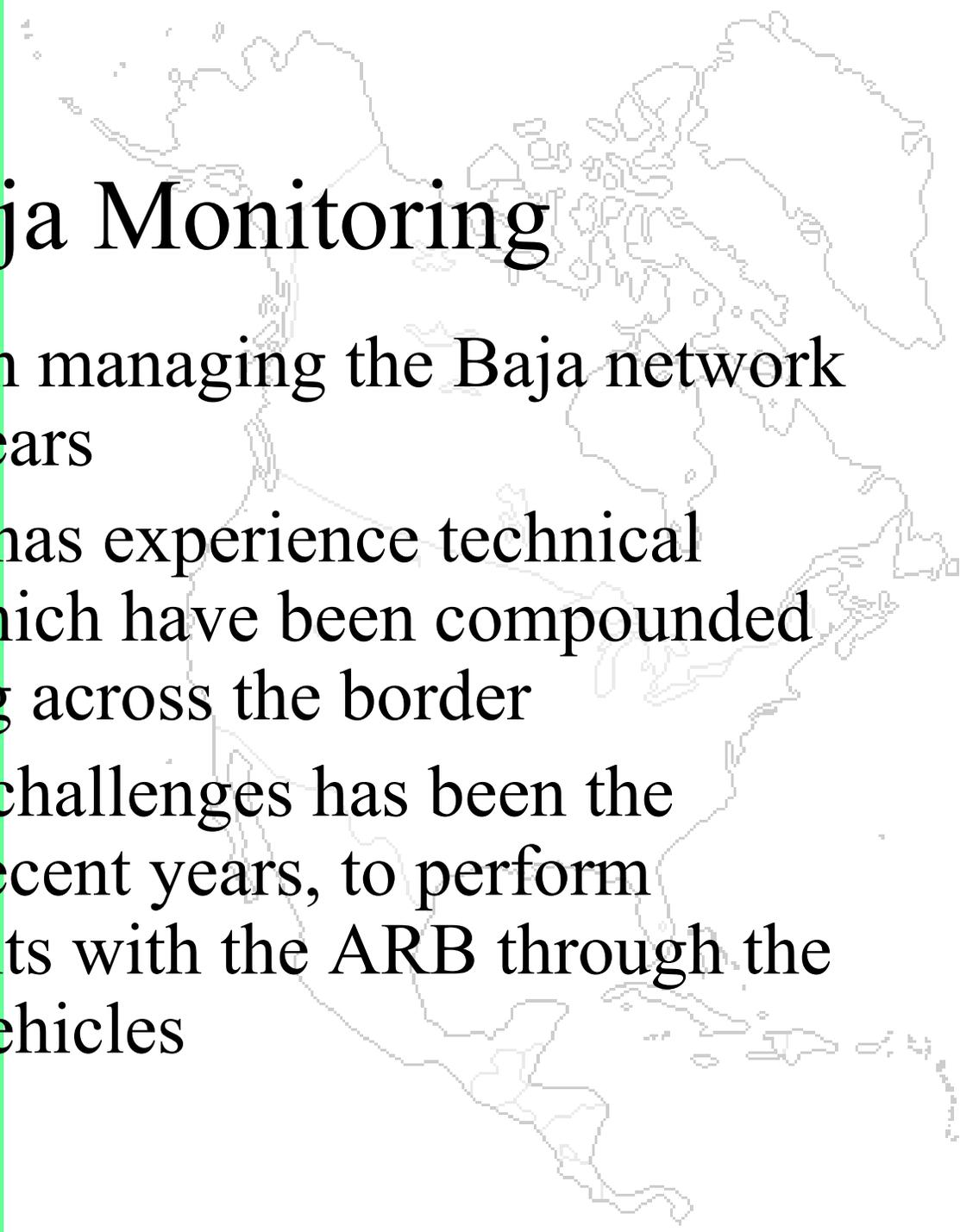
- Some of the stations audited had monitor siting problems
- The network contains many “legacy” monitors focused on measuring high concentration of SO₂, NO₂, and CO
- The network has not kept up with population growth in the valley

Baja California



- EPA and the California Air Resources Board (ARB) established monitoring in Baja California to understand border air quality
- Recently EPA and ARB entered into an agreement with Mexico to transfer monitoring to the State Government of Baja California

Baja Monitoring



- ARB has been managing the Baja network for over 10 years
- The network has experience technical challenges which have been compounded by monitoring across the border
- One of these challenges has been the inability, in recent years, to perform quarterly audits with the ARB through the probe audit vehicles

Baja Audits



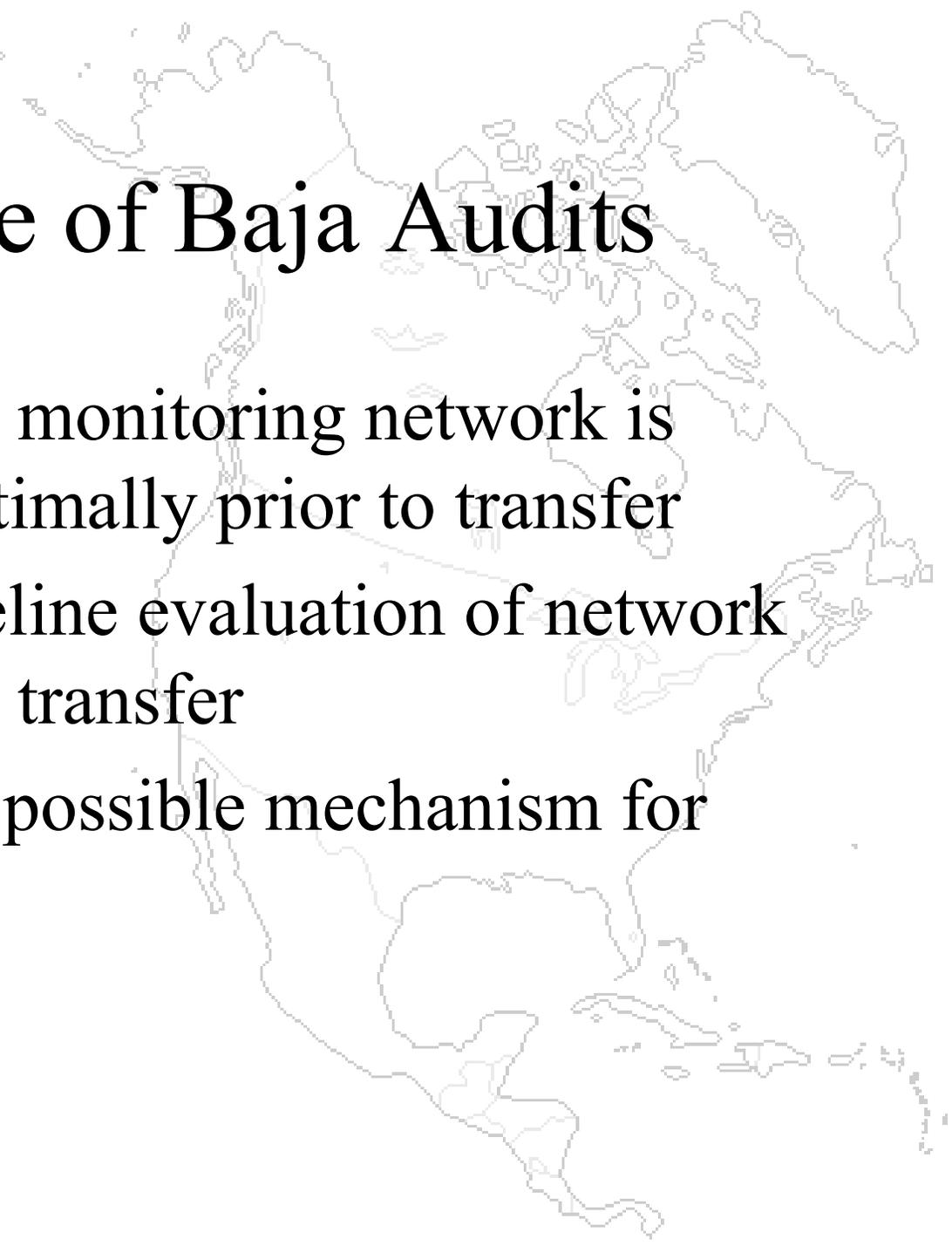
- Most of the Baja sites are located at Schools
- The Mexican contract staff are knowledgeable and have been with the program many years
- The State of Baja has supported and relied on this monitoring program

Baja Audits

- The State of Baja arranged for special permission to temporarily import EPA Region 9's TTP trailer

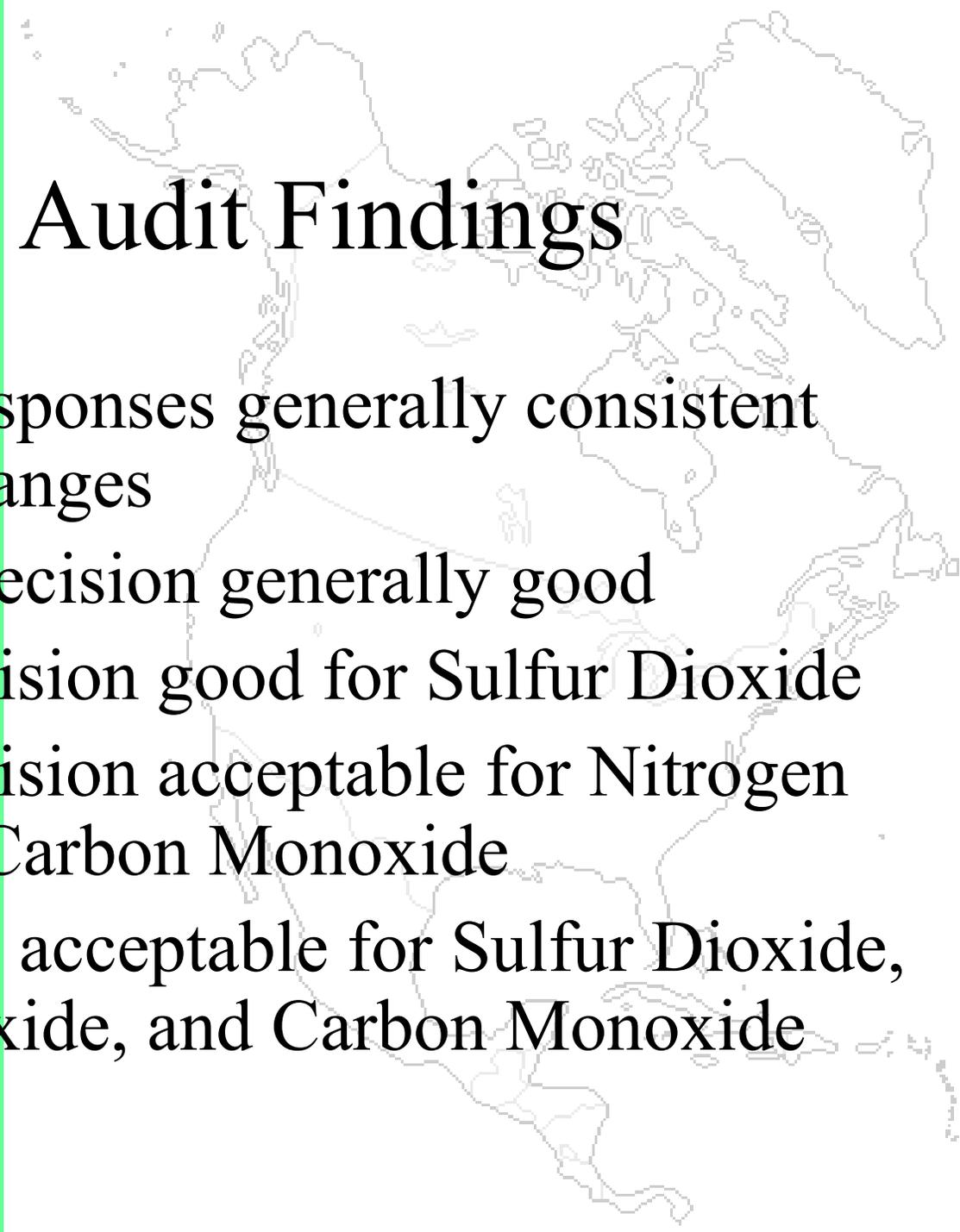


Purpose of Baja Audits



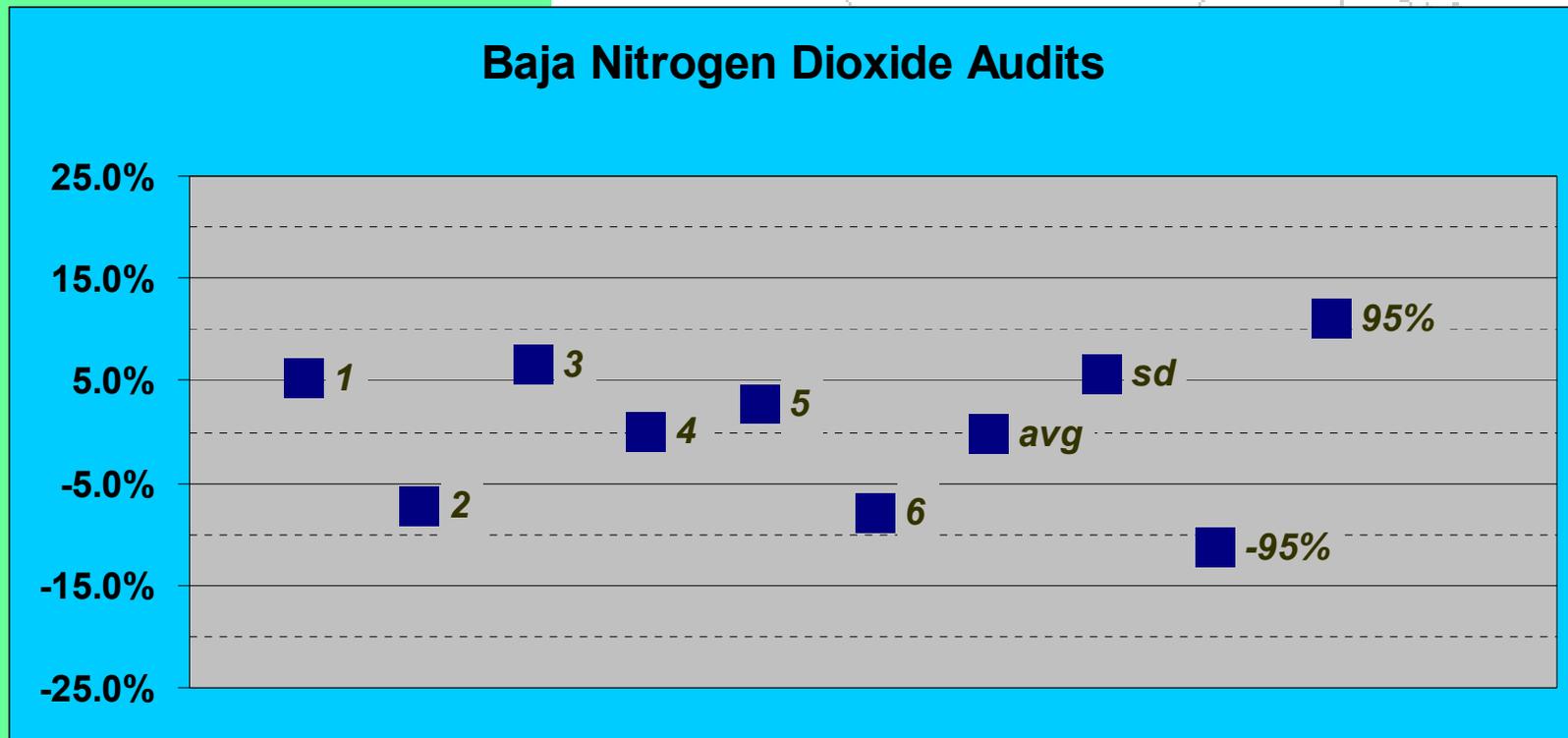
- Ensure that the monitoring network is functioning optimally prior to transfer
- Develop a baseline evaluation of network quality prior to transfer
- Demonstrate a possible mechanism for future audits

Baja Audit Findings

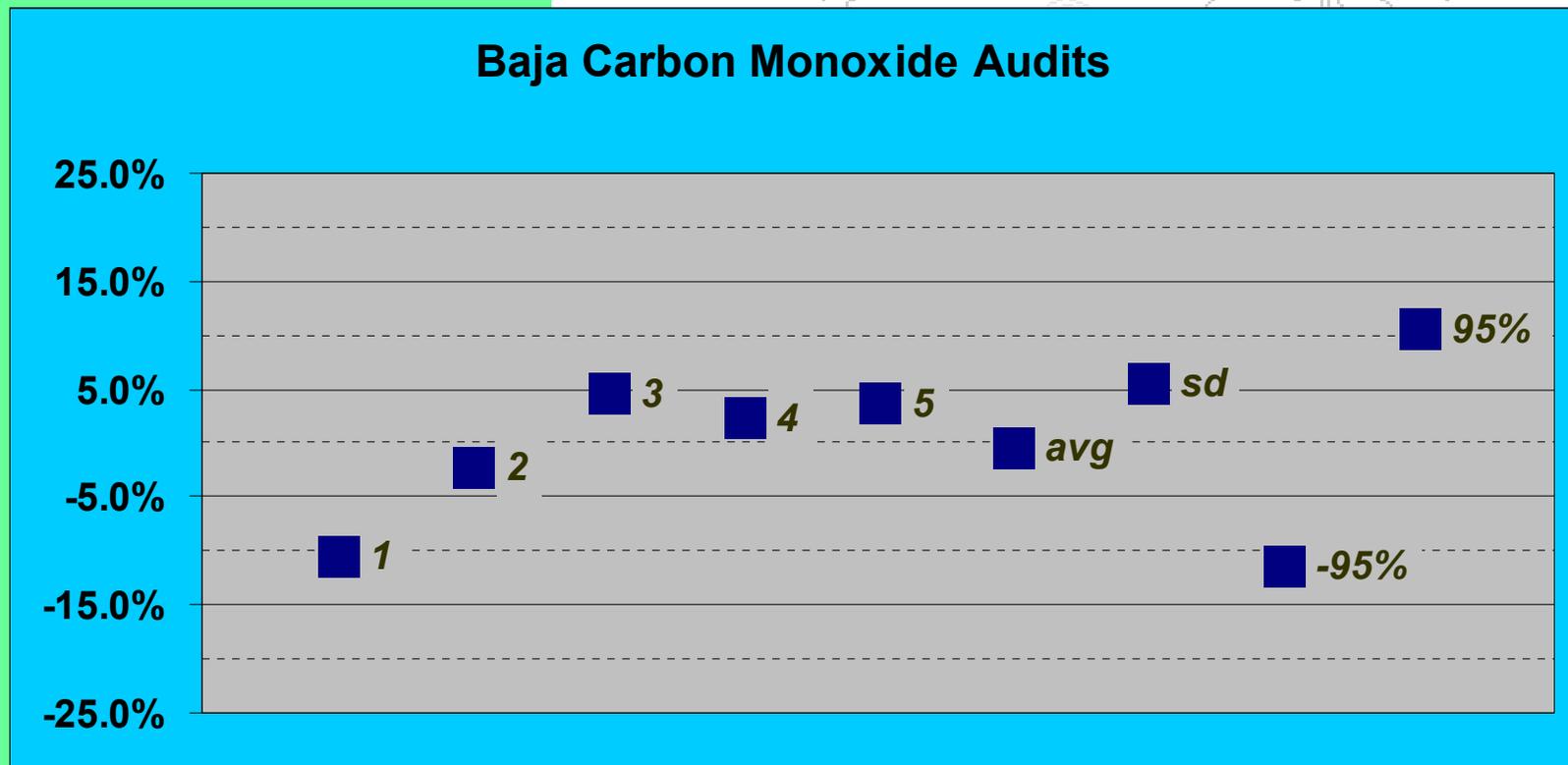


- Instrument responses generally consistent across audit ranges
- Instrument precision generally good
- Network precision good for Sulfur Dioxide
- Network precision acceptable for Nitrogen Dioxide and Carbon Monoxide
- Network Bias acceptable for Sulfur Dioxide, Nitrogen Dioxide, and Carbon Monoxide

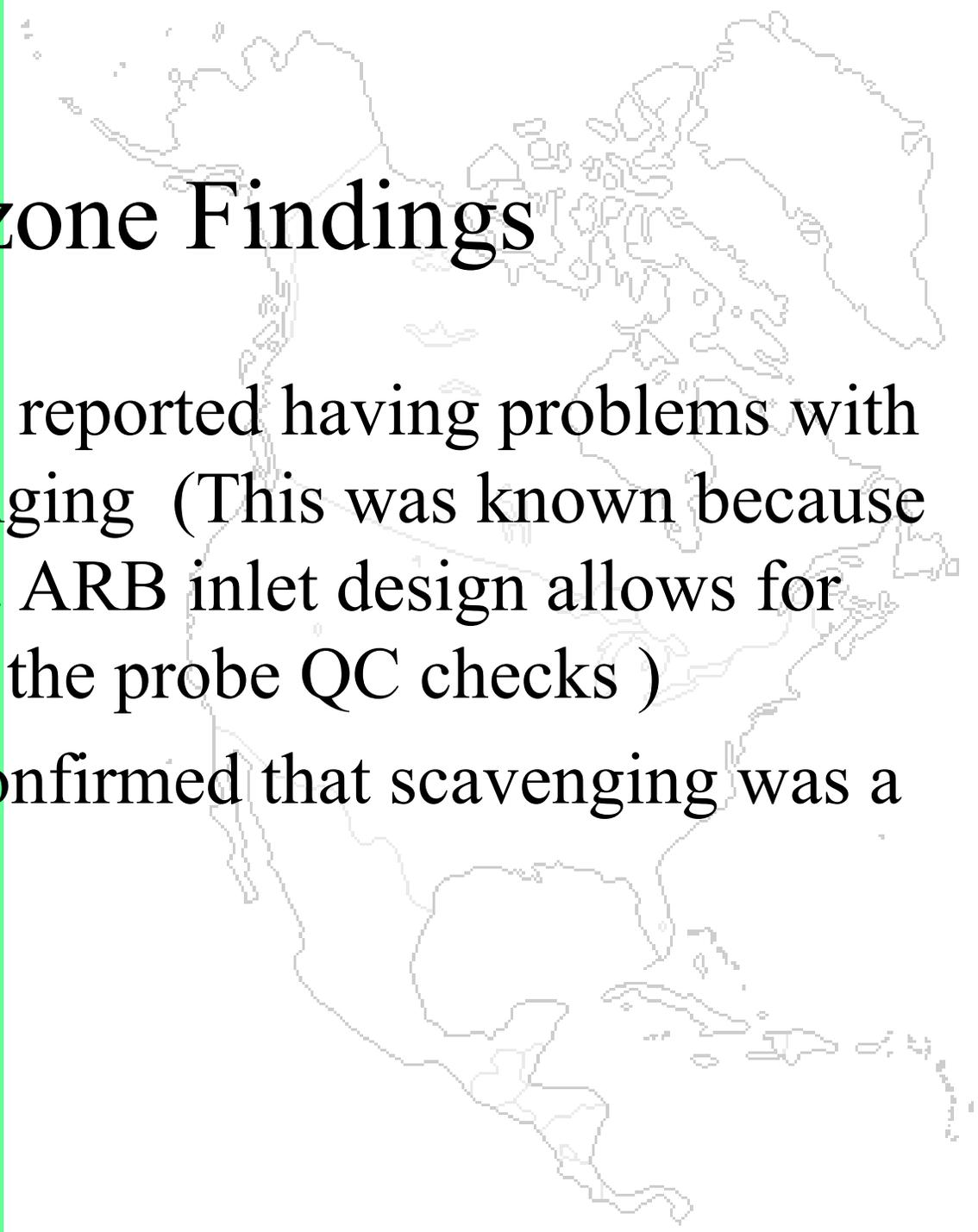
Average Response NO₂



Average Response CO

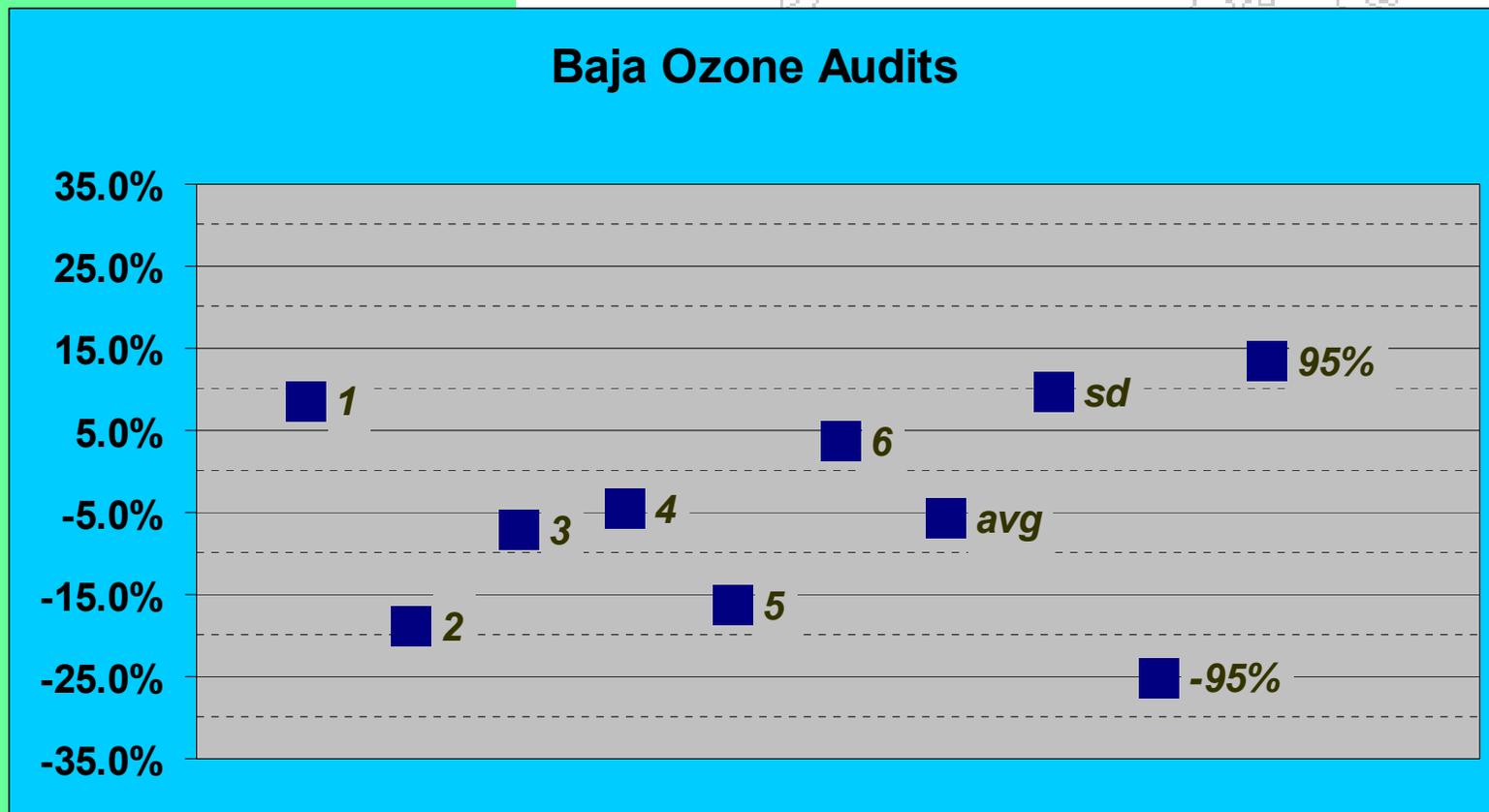


Ozone Findings

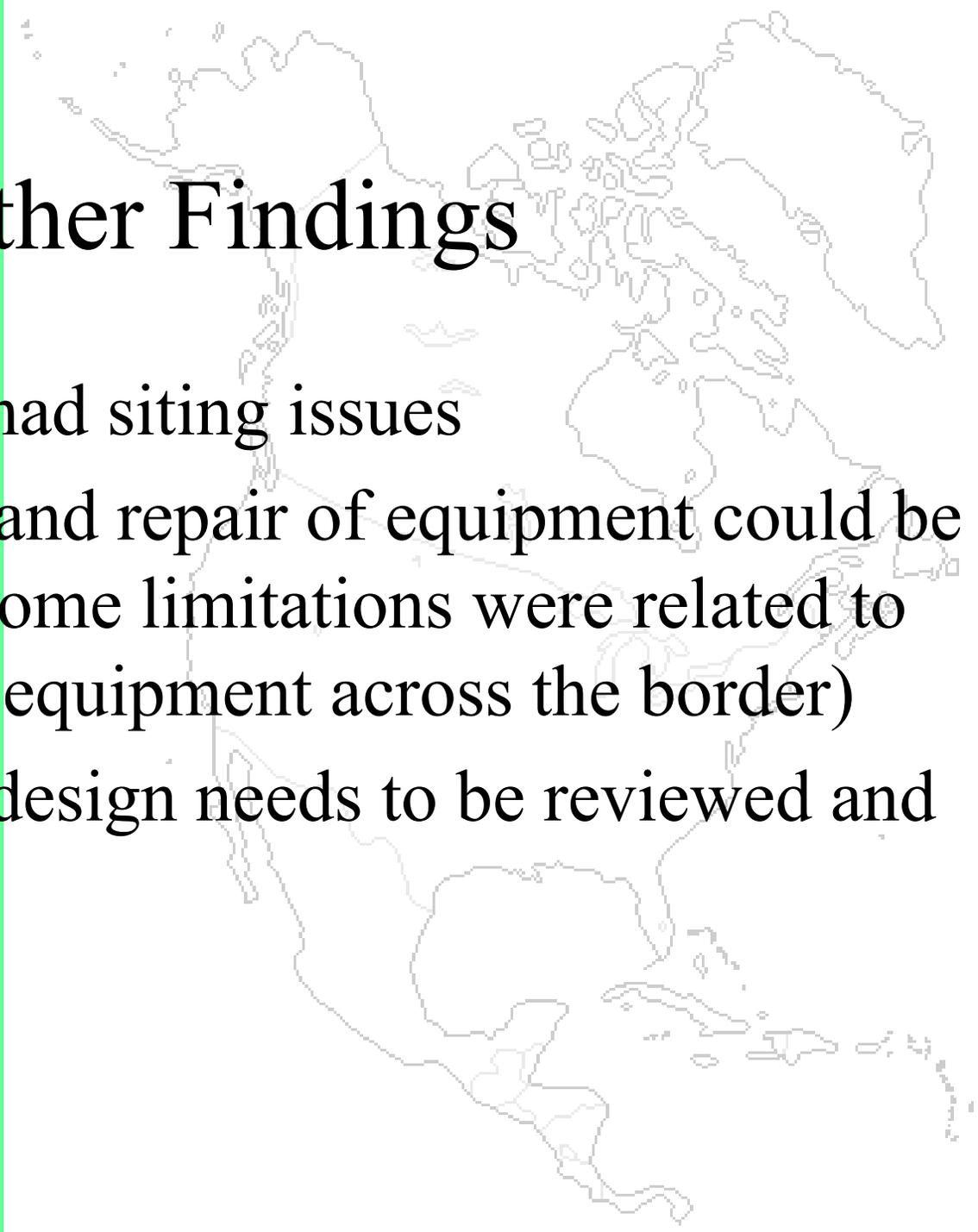


- Site operators reported having problems with Ozone scavenging (This was known because the California ARB inlet design allows for daily through the probe QC checks)
- The Audits confirmed that scavenging was a problem

Average Response O₃

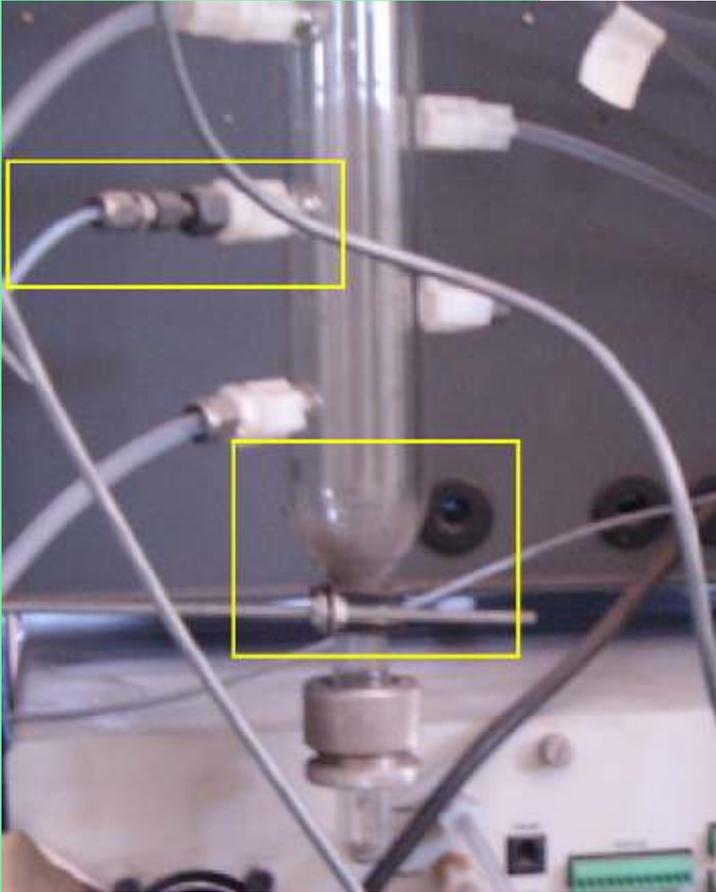


Other Findings



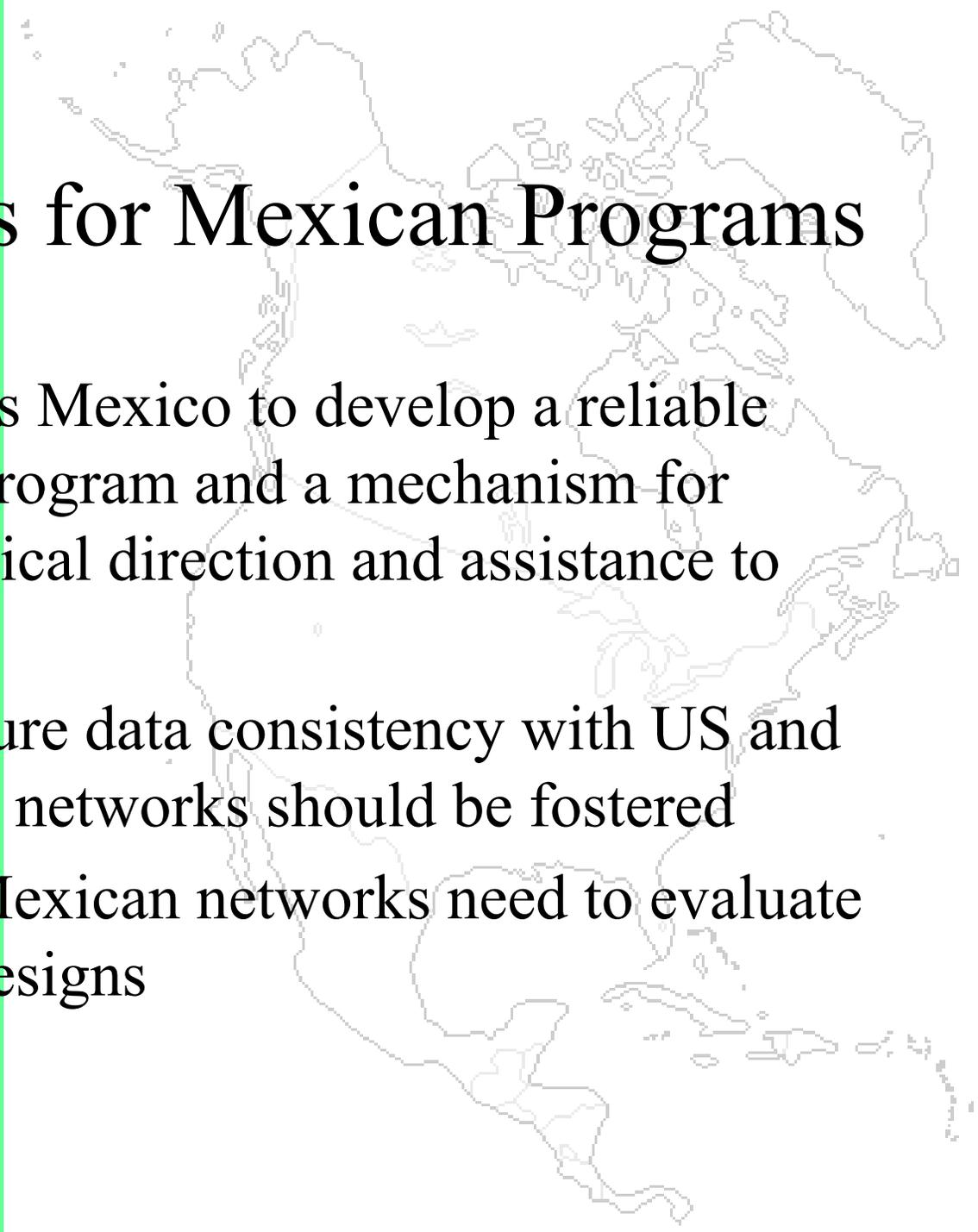
- Several sites had siting issues
- Maintenance and repair of equipment could be improved (Some limitations were related to movement of equipment across the border)
- The network design needs to be reviewed and updated

Baja Findings Example



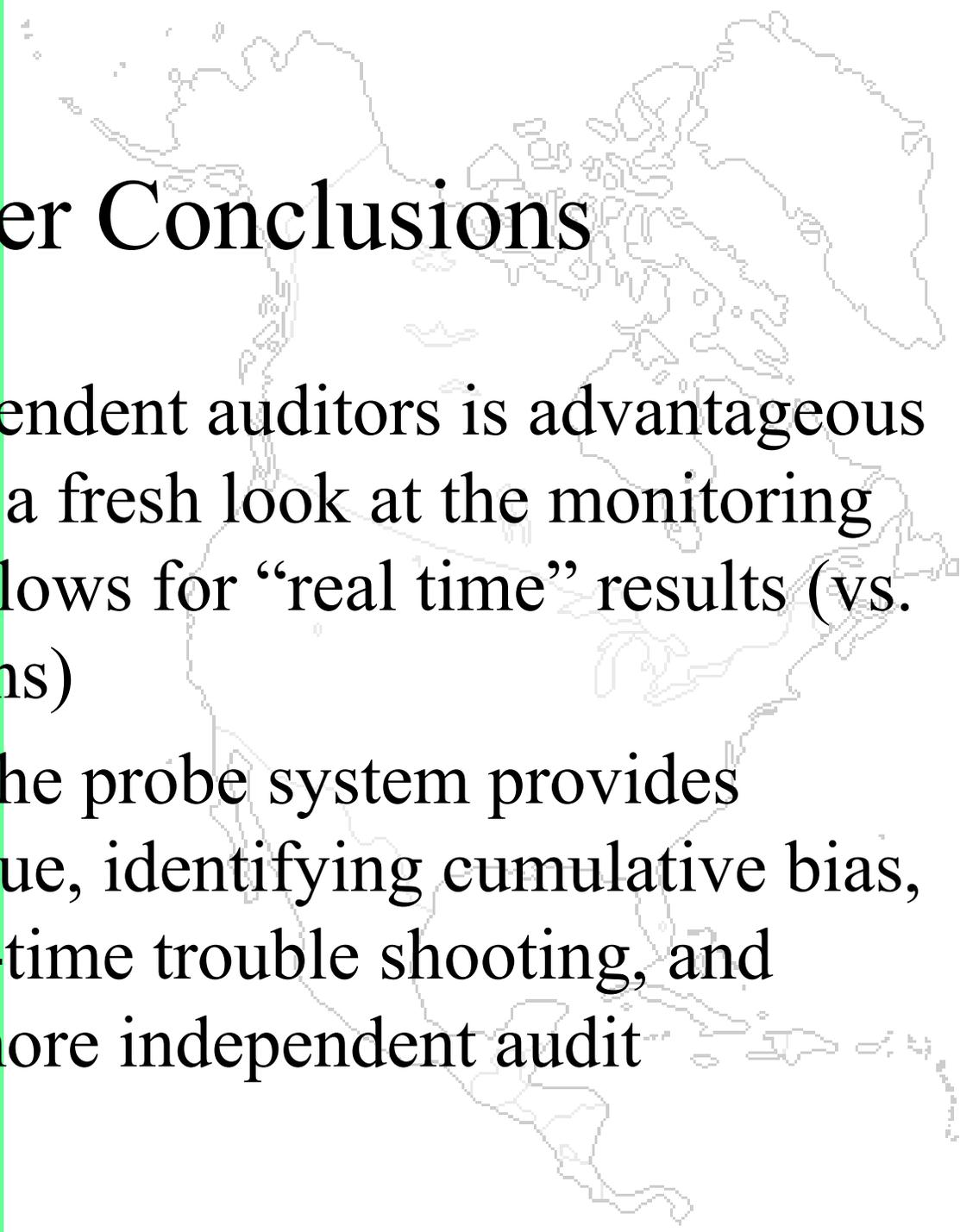
- This manifold displays several problems
- The Ozone monitor was being served by an 1/8 inch line, which impacted instrument flow
- The bottom of the manifold was noticeably dirty

Conclusions for Mexican Programs

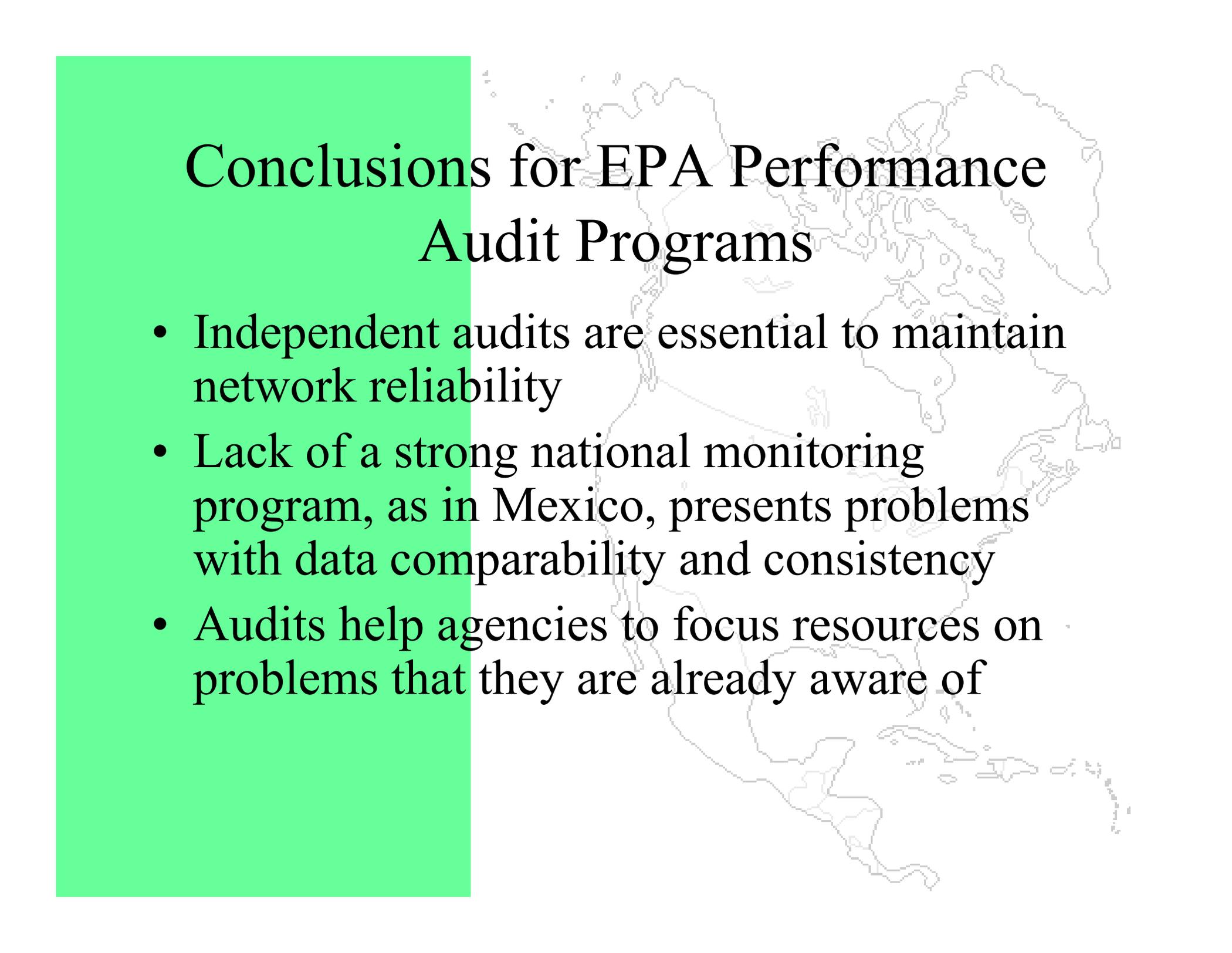


- EPA encourages Mexico to develop a reliable national audit program and a mechanism for providing technical direction and assistance to State agencies
- Methods to ensure data consistency with US and Latin American networks should be fostered
- As in the US, Mexican networks need to evaluate their network designs

Other Conclusions

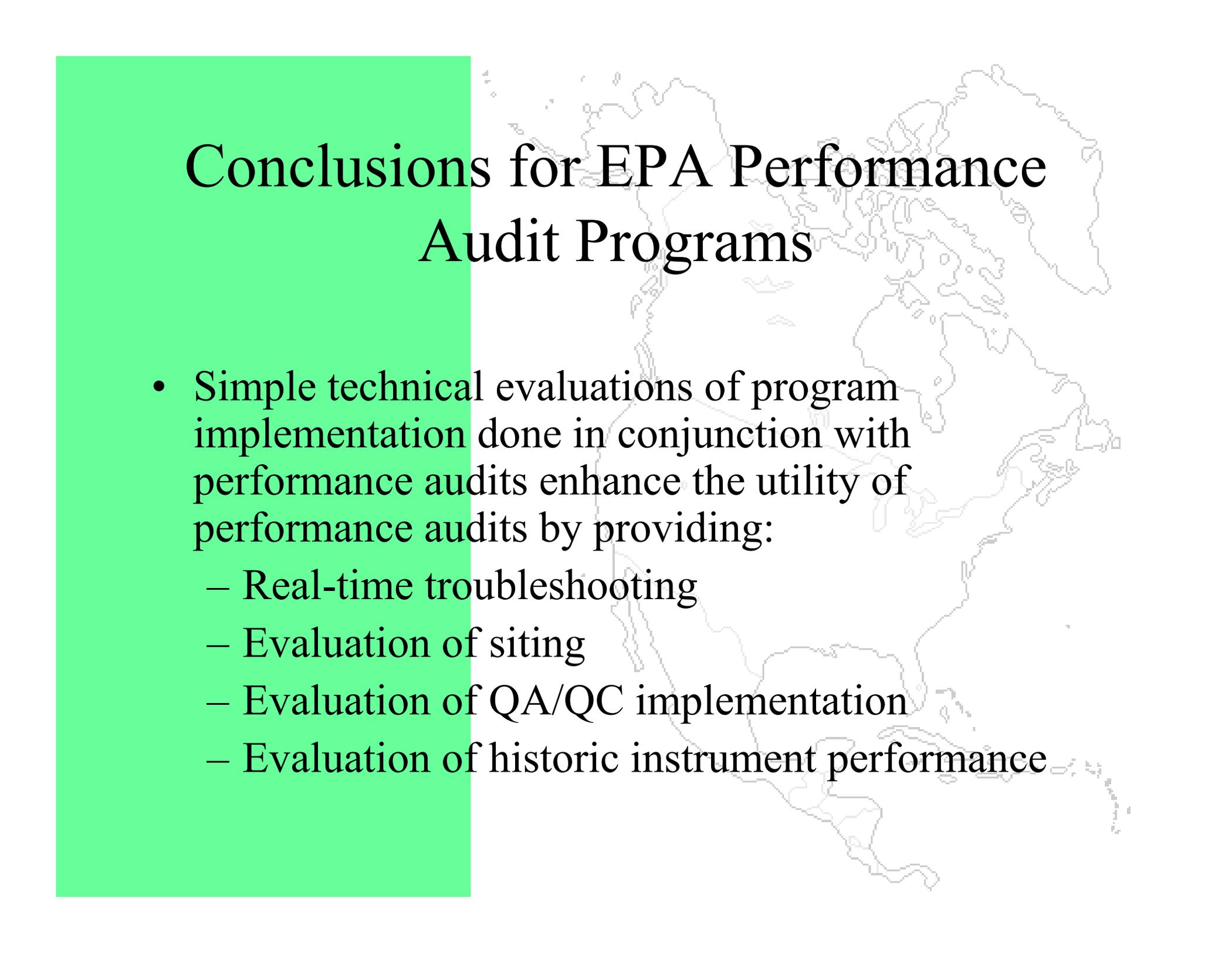


- Having independent auditors is advantageous as it provides a fresh look at the monitoring system and allows for “real time” results (vs. waiting months)
- The through the probe system provides additional value, identifying cumulative bias, allowing real-time trouble shooting, and providing a more independent audit



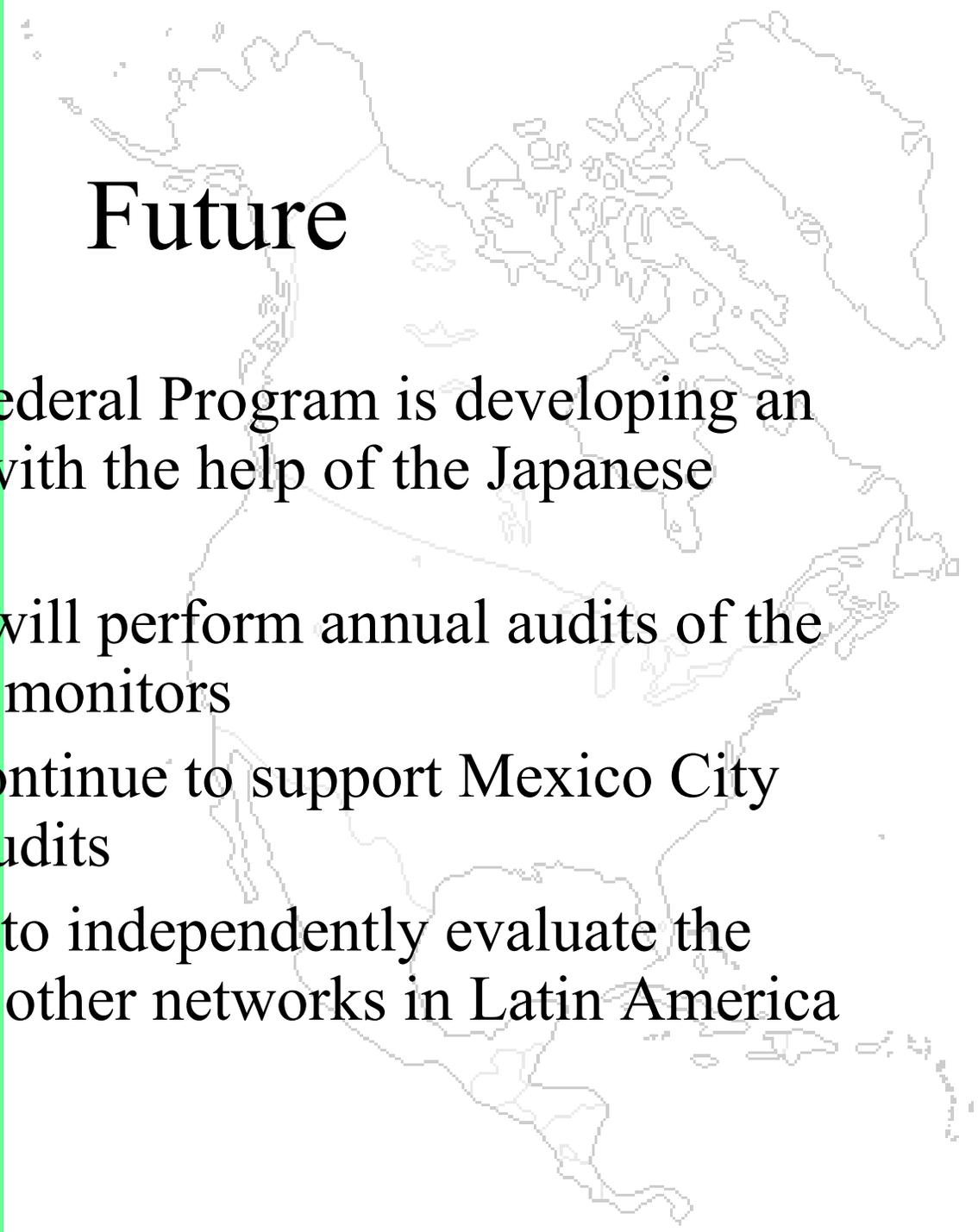
Conclusions for EPA Performance Audit Programs

- Independent audits are essential to maintain network reliability
- Lack of a strong national monitoring program, as in Mexico, presents problems with data comparability and consistency
- Audits help agencies to focus resources on problems that they are already aware of



Conclusions for EPA Performance Audit Programs

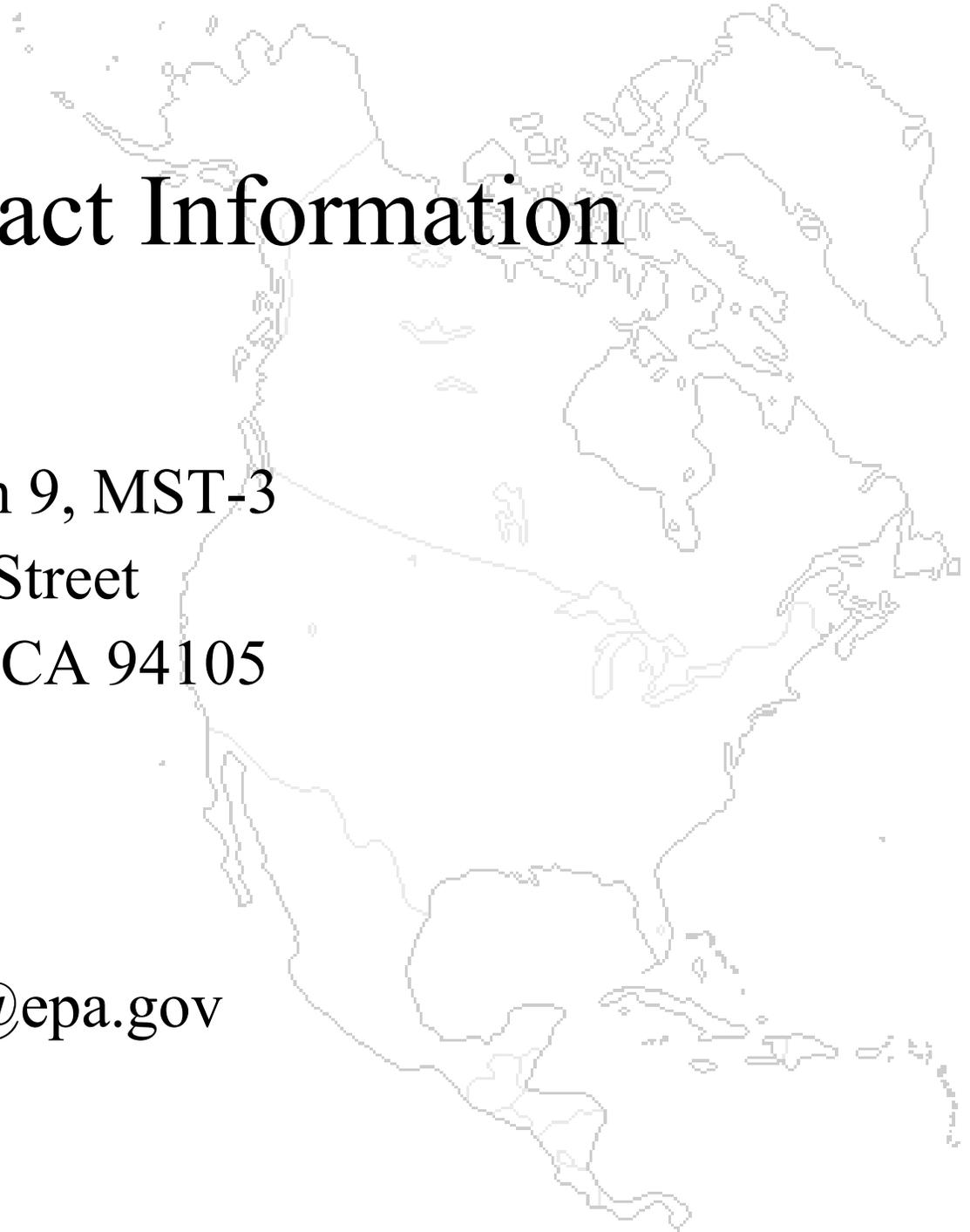
- Simple technical evaluations of program implementation done in conjunction with performance audits enhance the utility of performance audits by providing:
 - Real-time troubleshooting
 - Evaluation of siting
 - Evaluation of QA/QC implementation
 - Evaluation of historic instrument performance



Future

- The Mexican Federal Program is developing an audit program with the help of the Japanese Government
- EPA Region 9 will perform annual audits of the Baja California monitors
- OAQPS may continue to support Mexico City with mail-out audits
- There is a need to independently evaluate the performance of other networks in Latin America

Contact Information

A faint, white outline map of North America, including the United States, Canada, and Mexico, is positioned in the background on the right side of the slide.

- Mathew Plate
USEPA Region 9, MST-3
75 Hawthorne Street
San Francisco, CA 94105

415 972-3799

Plate.Mathew@epa.gov