

U.S. Geological Survey
National Mapping Division

Kenneth Osborn



*United States / Mexico Transboundary
Mapping and GIS Initiative*



Mexico and the United States share many environmental and cultural concerns. By mapping the vast areas along our borders, many of these common issues can begin to be studied and resolved.



**Growth along the United States / Mexico
border continues to increase.**





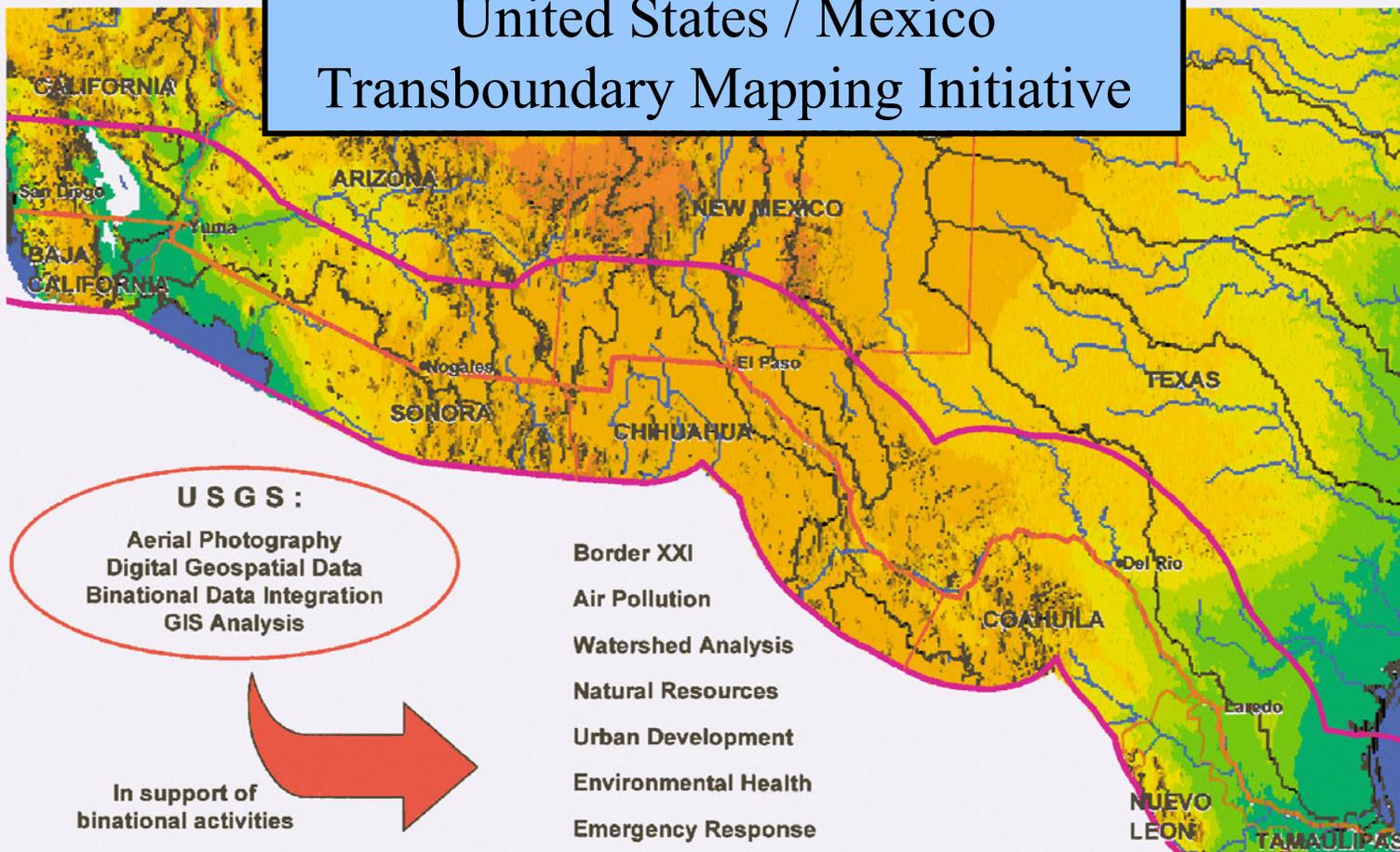
Federal, State, and local organizations require geospatial data on both sides of the border to develop effective and appropriate strategies for addressing these issues.



USGS involvement will insure that these agencies have sound information, data, and the tools to accomplish their goals.



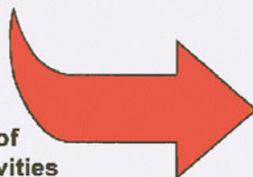
United States / Mexico Transboundary Mapping Initiative



USGS :

Aerial Photography
Digital Geospatial Data
Binational Data Integration
GIS Analysis

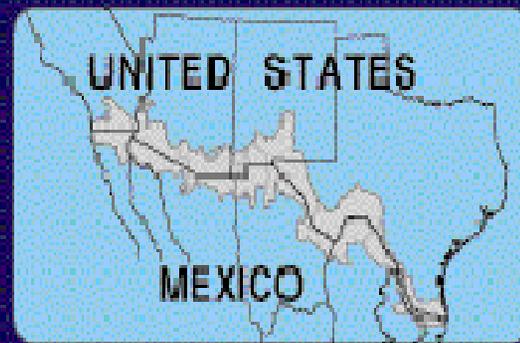
In support of
binational activities



- Border XXI
- Air Pollution
- Watershed Analysis
- Natural Resources
- Urban Development
- Environmental Health
- Emergency Response
- Shared Water Resources



**U.S. - MEXICO BORDER
FIELD COORDINATING COMMITTEE**



**The DOI Field Coordinating Committee
was established to encourage
appropriate and joint involvement
among various bureaus to address
border issues.**



DOI Charter Bureaus and Agencies

Geological Survey
NMD, WRD, GD, BRD

Bureau of Reclamation

National Park Service

Bureau of Indian Affairs



Fish and Wildlife Service

Bureau of Land Management

Minerals Management Service

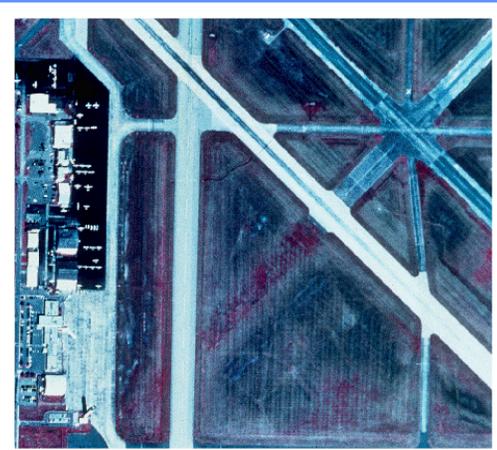


Other Participating Organizations

- Dept of Agriculture - FS, NRCS, FSA
- EPA - Border XXI
- DOI Secretary Office
- State agencies in Texas, New Mexico, Arizona, California
- Transboundary Resource Information Program
- International Boundary and Water Commission
- Mexican Agencies - INEGI, SEMARNAP, CILA

U.S.A. / Mexico Aerial Photography Initiative

Brownsville -S. Padre Airport





Aerial Photography Initiative

The bi-national initiative to acquire aerial photography will be used as the foundation for subsequent bi-national digital mapping efforts.

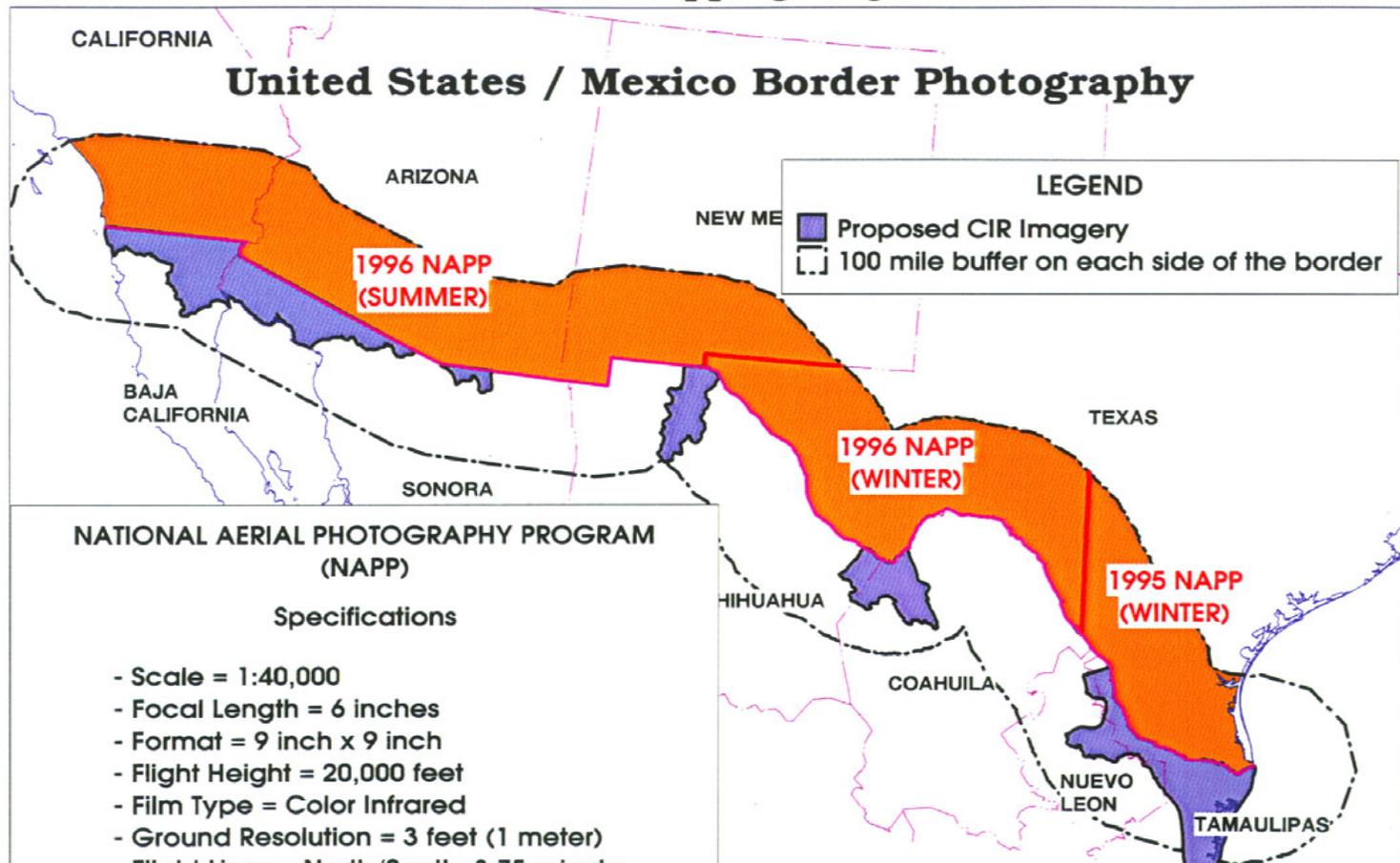
The two types of photography will include:

- 1:40,000-scale color infrared
- 1:75,000-scale black and white.



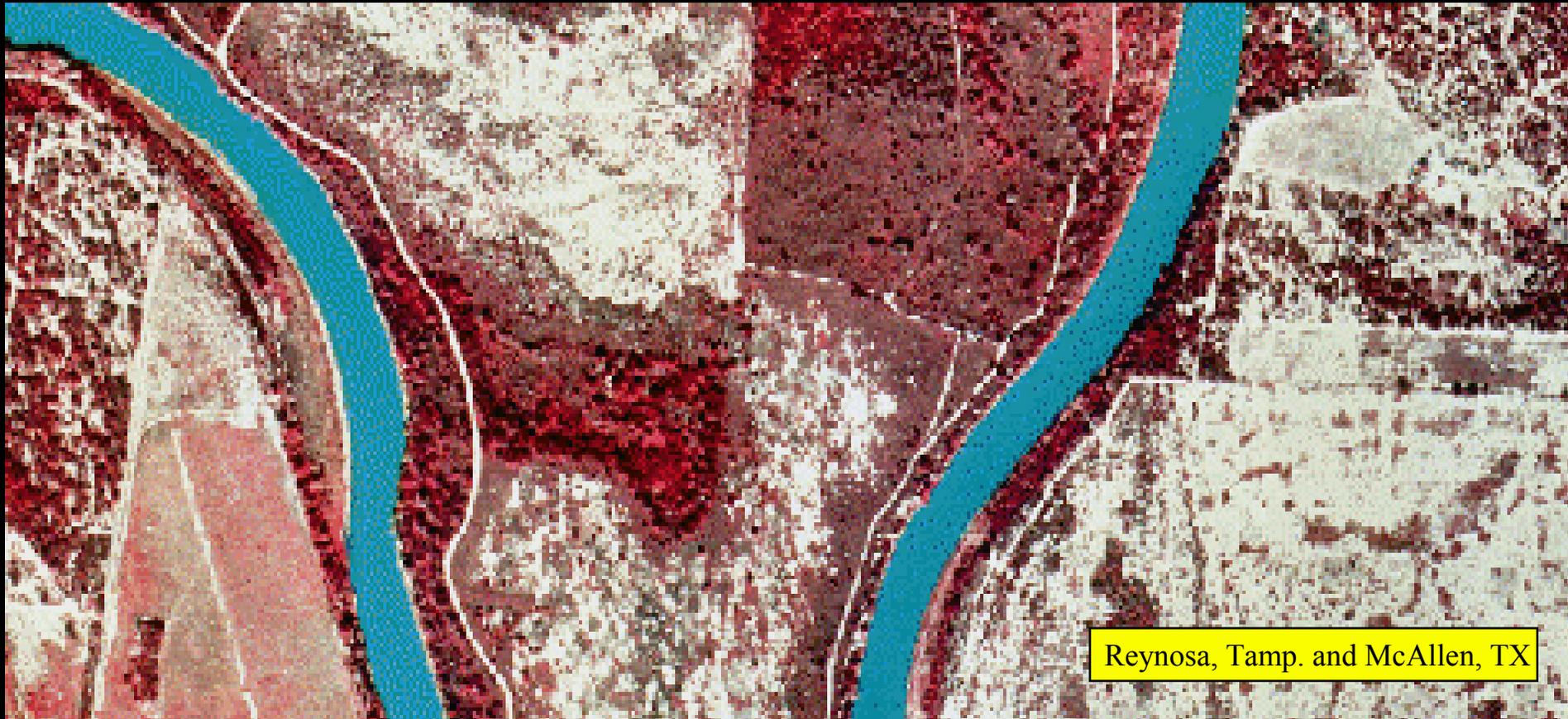
United States / Mexico Transboundary Mapping and GIS Initiative

U.S. Geological Survey National Mapping Program



Color Infrared Photography

- Can derive black & white and color products
- Film of choice for natural resource analysis



Reynosa, Tamp. and McAllen, TX



Application:

**Land water
interface
studies.**

**Mouth of the
Rio Grande / Rio Bravo**



Vegetation species classification and disease detection

**World Wildlife Refuge,
McAllen TX, Reynosa Tamp.**



Groundwater discharge analysis

Laguna Mar Negro,
south of Rio Grande / Rio Bravo



Change over time, analysis/urban planning

**Brownsville, TX,
Matamoros, Tamp**



Soil Analysis

Golf course in Brownsville, TX



A Digital Orthophoto Quadrangle (DOQ) is a digital image of an aerial photograph in which displacements caused by the camera angle and the terrain have been removed. DOQ's combine the image characteristics of a photograph with the geometric qualities of a map.



**Mexican and U.S.A.
Digital
Orthophotos
can be mosaicked
together for
digital collection of
vector data.**

El Paso, TX 1:24000-scale

Ciudad Juarez 1:50000-scale

Integrating Data Across the Border



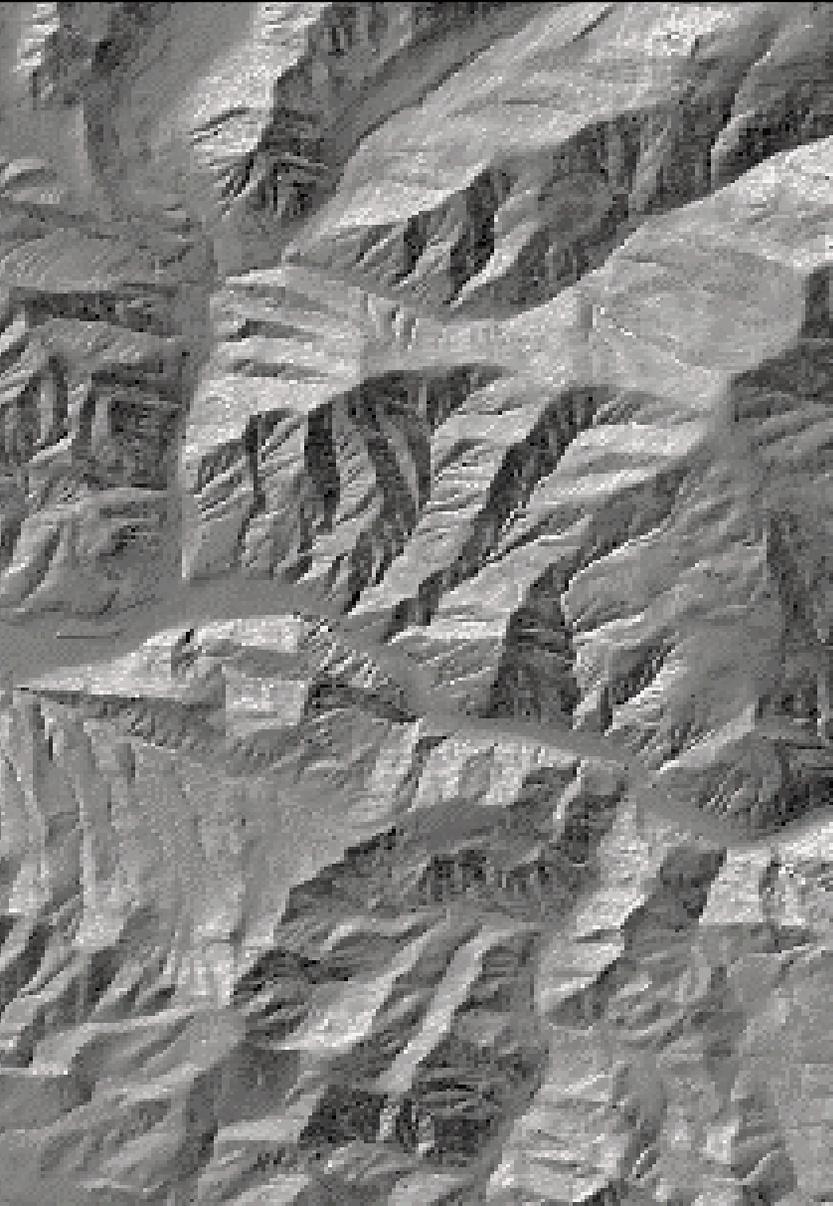
United States

Mexico

**Imperial Beach DOQ
U.S.-Mexico border at the Pacific Ocean**

Digital Elevation Models (DEMs) are digital records of terrain elevations for ground positions at regularly spaced intervals.

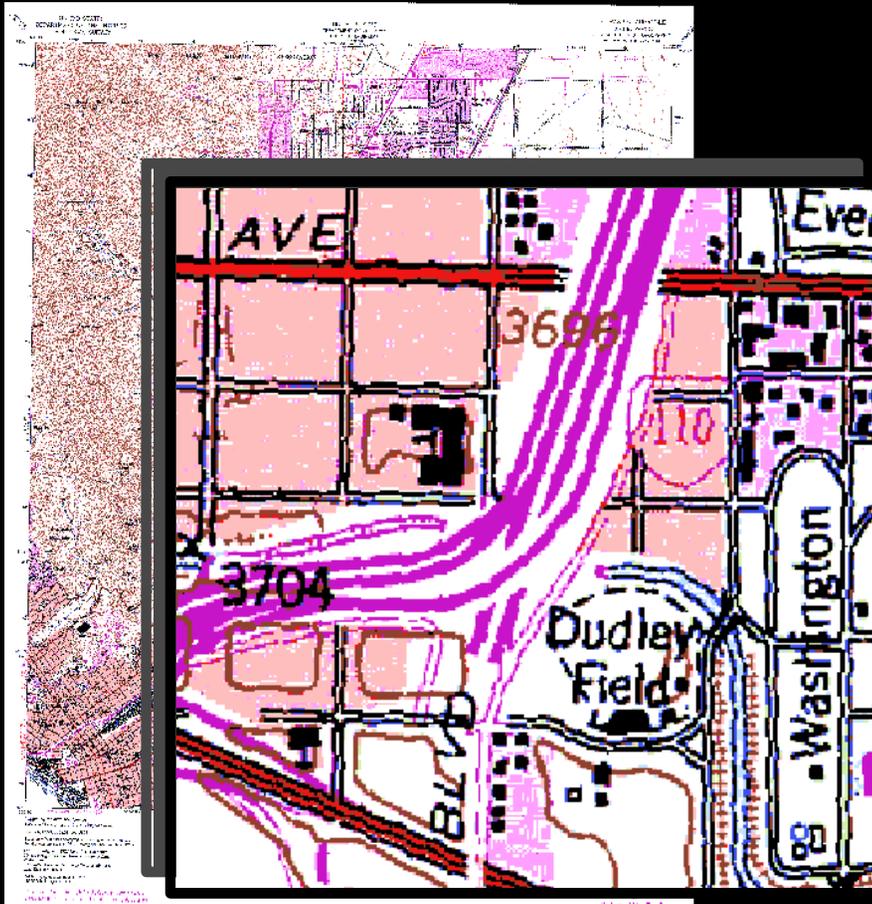
**DEMs are primarily derived from
USGS
topographic maps.**



DEM Applications

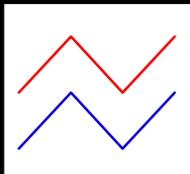
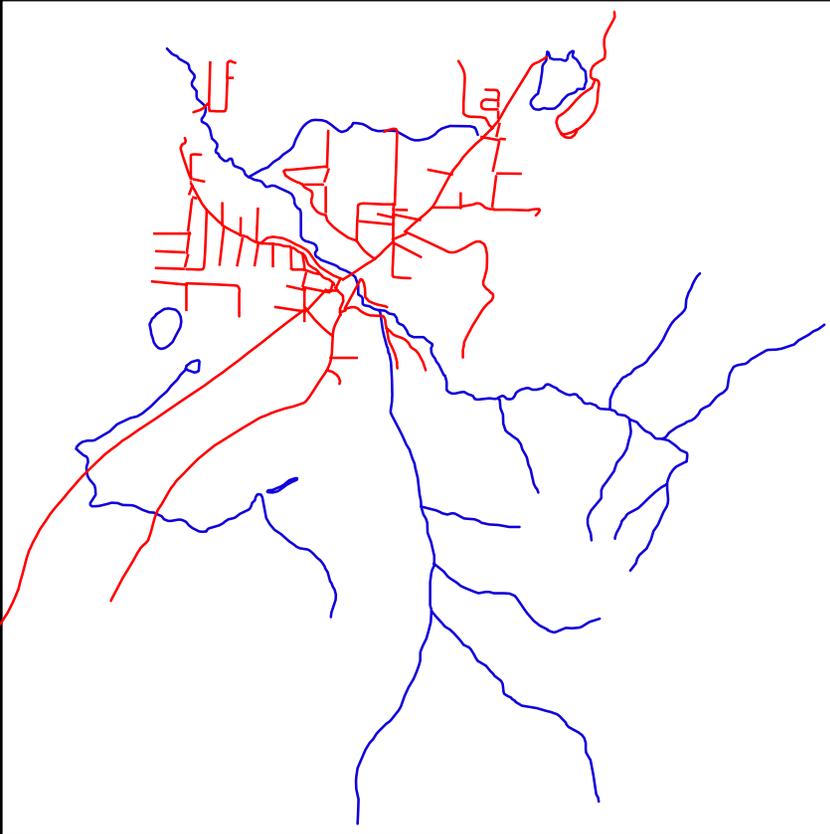
- Sediment Transport Models
- Slope / Aspect
- Habitat Models
- Vegetative Analysis
- Land Surface Characteristics
- Watershed Analysis

DIGITAL RASTER GRAPHIC



A digital raster graphic is a scanned image of a U.S. Geological Survey topographic map. The scanned image includes all map collar information. The image inside the map neatline is georeferenced to the surface of the earth.

El Paso, TX 1:24,000-scale



Roads
Hydrography

Digital Line Graph (DLG) data are digital representations of cartographic information (lines, areas and points from maps and related sources).

DLGs can be used separately, or can be combined for integrated analysis. USGS currently produces 6 DLG overlays.

Data Applications



Texas Natural Resources Conservation Commission WRD Texas:

TMDL - Hydrologic Simulation
Program

DOQs - LULC - estimate runoff
and chemical load

DEMs - watershed
characteristics

DLG - Hydro layer, stream flow

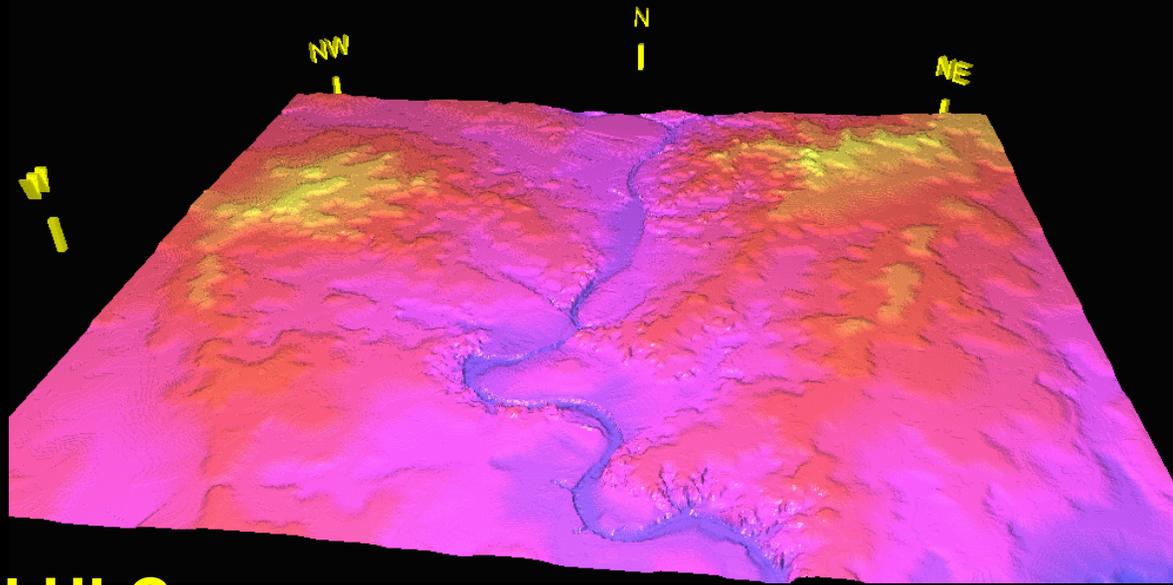
National Watersheds Texas Case Study

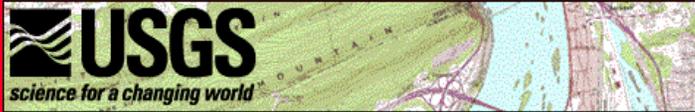
**USGS - Watershed delineation and database integration
Lower Rio Grande/Rio Bravo**

**DEMs - delineations,
flow direction, slope**

**NHD - Hi resolution,
hydrologic navigation
EPA reach data**

**DOQs - Hydro revision, LULC
DRG's - QA/QC of boundary
delineation**



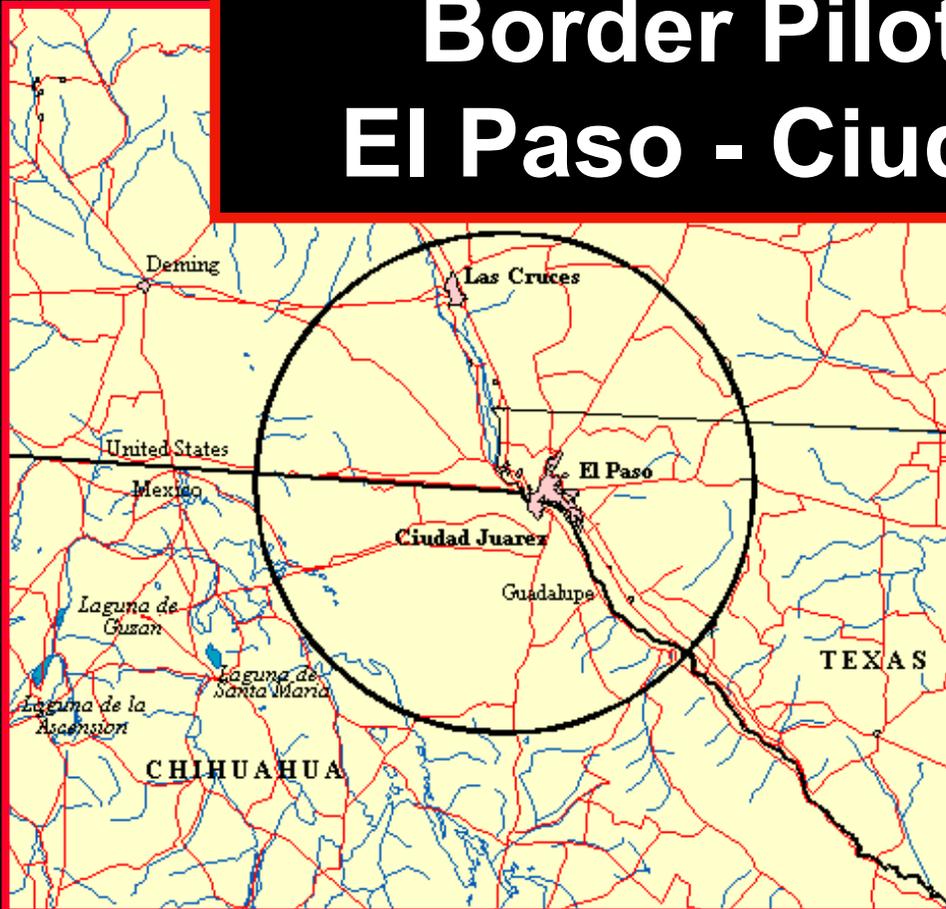


**Border Pilot Project
El Paso - Ciudad Juarez**

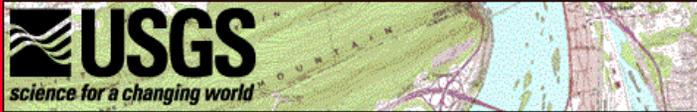


MEXICO

Border Pilot Project El Paso - Ciudad Juarez



**The Project
examines the
feasibility of
exchanging
digital data
between Mexico
and the U.S.**



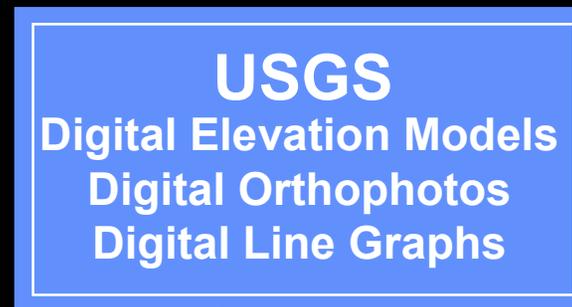
**Border Pilot Project
El Paso - Ciudad Juarez**



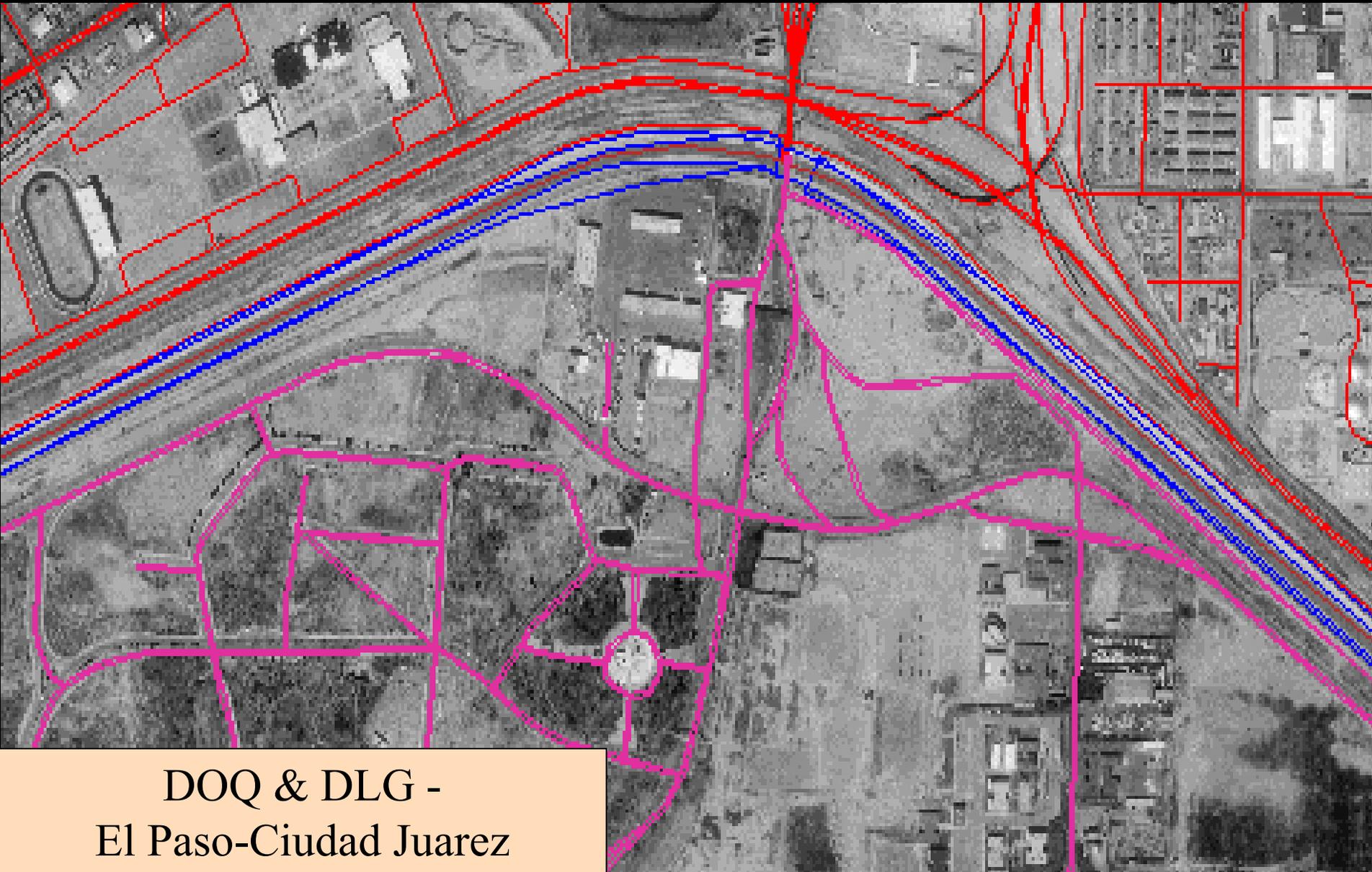
MEXICO

The Border Pilot Project covers:

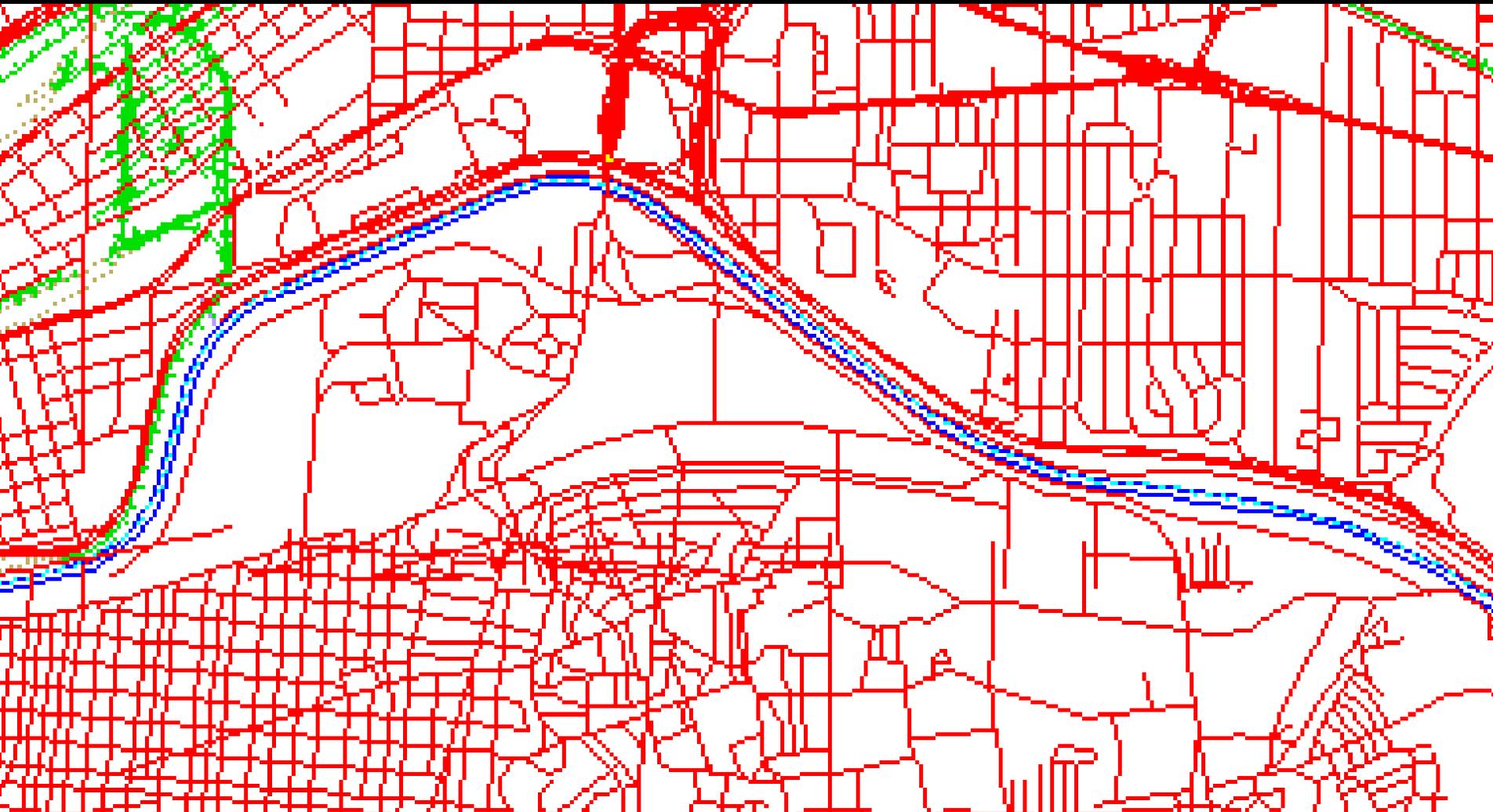
- **Six USGS 1:24000-scale quadrangles**
- **One INEGI 1:50,000-scale quadrangle**
- **Vector and raster data products**



GEOGRAPHIC ANALYSIS



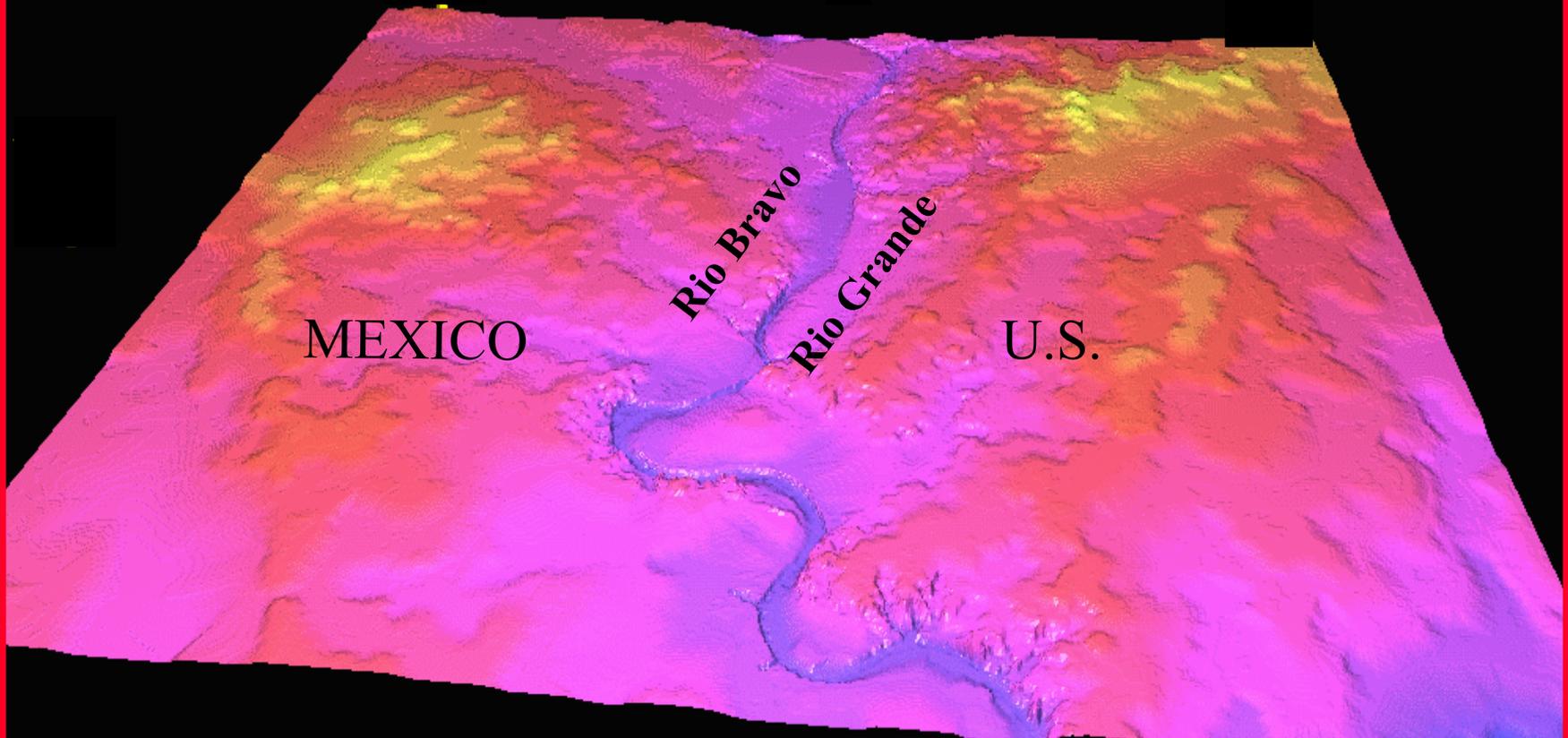
DOQ & DLG -
El Paso-Ciudad Juarez



DLG -
El Paso-Ciudad Juarez

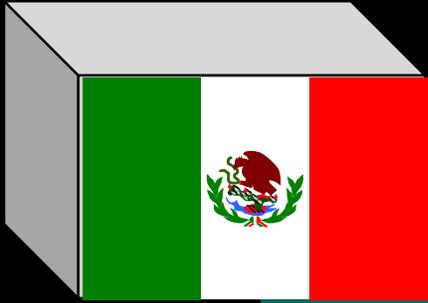
USGS / INEGI Data Exchange

A 3-D perspective of DEM data looking north along the border near Nuevo Laredo/Laredo

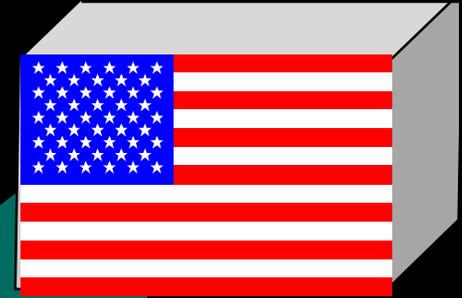
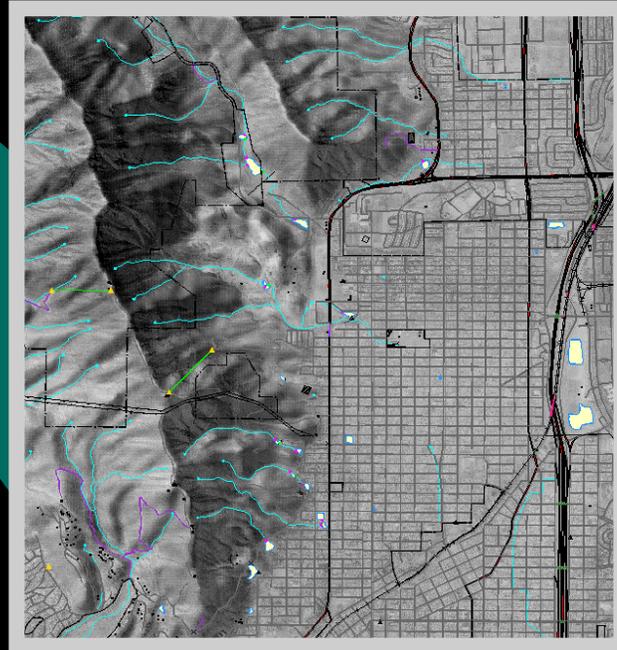




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Mexico



U.S.A.

**working together to create base map
products for GIS analysis on the border.**