

Monitoring *Colonias* Along the U.S.-Mexico Border

The U.S. Geological Survey (USGS) and the U.S. Department of Housing and Urban Development (HUD), in cooperation with the Mexican Instituto Nacional De Estadística Geografía E Informática (INEGI) have developed a joint project to create Internet-enabled geographic information systems (GIS) that will help cities along the U.S. - Mexico border deal with issues related to urban growth and housing developments.

HUD defines *colonias* as rural neighborhoods within 150-miles of the U.S.-Mexico border region that lack adequate infrastructure or housing, as well as other basic services. They typically have high poverty rates that make it difficult for residents to pay for roads, sanitary water and sewer systems, decent housing, street lighting, and other services.

The *colonias* are scattered along the U.S.-Mexico border as ad hoc settlements, often on private land. These communities have grown up without formally sanctioned governance and the collective services it customarily provides. Due to the extreme poverty and uncertain tenure of the new immigrants who populate *colonias*, they have traditionally found it difficult to gain access to the individual and community services they need.



Figure 1. Photo of Colonia Bachicuy -- Agua Prieta, Sonora.



Figure 2. The sister cities of Eagle Pass/Piedras Negras, El Paso/Juarez, Douglas/Agua Prieta, and Nogales/Nogales were chosen as project sites because of their location on the border and their international manufacturing and commerce feasibility, which has led to rapid spread of *colonias*.

This project delineated *colonias*, developed geospatial databases describing the infrastructure and land use, and established a framework for distributing Web-based GIS decision support systems for the sister cities areas. The bi-national integration of data from the USGS's *The National Map* and Mexico's national mapping agency for the twin city areas provides web based planning tools to evaluate local infrastructure needs and derive quality of life measures for urban areas. The USGS worked with local partners in developing the Web-based GIS databases, including Federal, State, county, and town representatives, as well as interested youth and advocacy groups.

Each Web based mapping site has common base data layers provided by the USGS, INEGI, and the U.S. Census Bureau. These layers include: Transportation, Digital Orthophoto Quadrangles (DOQs), Digital Raster Graphics (DRGs), Landsat Imagery, Colonia

Boundaries, Hydrography, Census 2000, and Geographic Names.

Purpose:

- The application provides Web-based planning tools for estimating development costs for the *colonias*.
- Includes the integration of existing bi-national geospatial, statistical, and demographic data.
- Provides geographic analysis tools that will enhance the decision-making process of the city and county planning departments.
- Local government and non-profit agencies can employ this system to facilitate applying for grants to improve living conditions in *colonias*.

Based on local partnership opportunities, each sister city pair has additional layers to facilitate planning urban growth and colonias infrastructure needs.

El Paso/Ciudad Juarez

This Web based GIS database was developed under local partnership with the Paso Del Norte bi-national group, presided over by the University of Texas, El Paso, and the Instituto Municipal de Investigacion y Planeacion, Juarez. Local data layers include critical infrastructure such as police, fire stations, hospitals, schools, boundaries for enterprise communities, empowerment zones, police, school, voter, and irrigation districts. Future plans include incorporation of local data from Dona Ana county, New Mexico, and geospatial database access to the most current El Paso County Colonias Regional Water and Wastewater plan.



Figure 3. Water and wastewater lines in El Paso, Texas.

Eagle Pass/Piedras Negras

Local partner contributions of data include the Middle Rio Grande Council of Governments, Texas Water Development Board, and the City of Eagle Pass. Specific data layers include parcel ownership, water and sewer lines, and critical infrastructure features. Future plans include incorporating zoning information, transportation development plans, and Maverick County Colonias master annexation plans.

Douglas/Agua Prieta

Partners contributed geospatial data to develop base maps for this project including the Border Environment Cooperation Commission -- La Comisión de

Cooperación Ecológica Fronteriza (BECC/COCEF), Cochise County, Ariz., The City of Douglas, Ariz. and the Municipal de Agua Prieta, Sonora. With the help of community members in the cities of Douglas and Agua Prieta, waterlines, sewer lines, inadequate housing structures and colonias were identified and digitized. These can be viewed in concert with resources identified by local youth group and other reference information describing the locality.

Nogales/Nogales

Our many partners contributed geospatial data to develop base maps for this project. This includes the Secretaría de Infraestructura Urbana y Ecología (SIUE) Arizona Department of Environmental Quality (ADEQ), Instituto del Medio Ambiente y el Desarrollo Sustentable (IMADES), La Comisión de Agua Potable y Alcantarillado del Estado de Sonora (COAPAES), The University of Arizona Udall Center for Studies in Public Policy, The City of Nogales, Ariz., and the Municipio de Nogales, Sonora. Community members in the cities used the waterlines, sewer lines, inadequate housing structures to help identify colonias. Those areas identified by community members of Nogales, Sonora, were also identified by the SIUE, as neighborhoods that are either "Popular Dwellings", or "Precarious Constructions" and these homogenous areas can be visualized online.

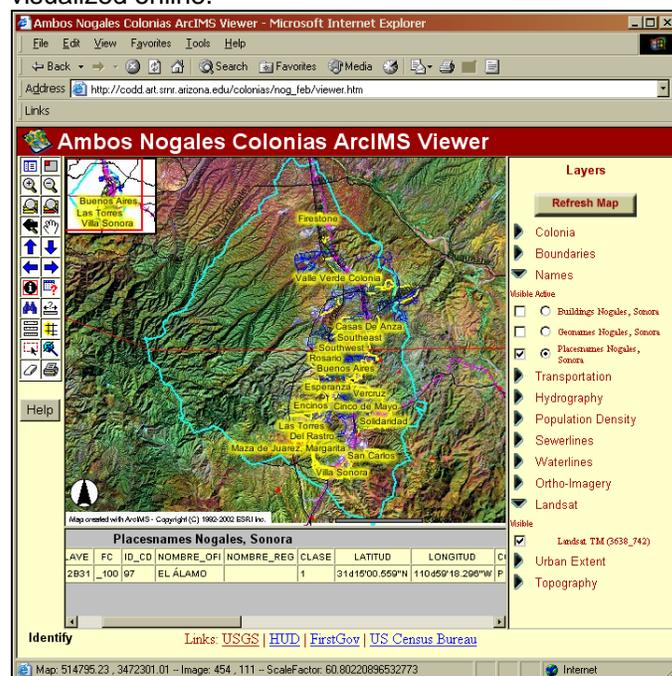


Figure 4. Web-based GIS decision support system established for Nogales/Nogales.

http://tx.usgs.gov/geography/prj_HUD.htm
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