

## OVERVIEW OF THE PRINCIPAL ISSUES AND THEMES

As the U.S.-Mexico border area continues to grow, so does the demand for environmental information and methods of accessing that information. Consequently, tremendous amounts of information about the border environment and public health have been collected and generated by government agencies, academic institutions, nongovernmental organizations, the private sector, and border residents. As more environmental data for the border area become available, greater information management efforts will be necessary to avoid data gaps and duplication of efforts by different entities with like interests along the border.

Some of the recurring issues and themes raised by communities, academic institutions, and other entities include: (1) the need for increased public access to a wide variety of environmental information; (2) the need for information that is presented in a form that is comprehensible and serves the needs of the various users; and (3) the need for a comprehensive analysis of environmental conditions and pressures along the border and the identification of beneficial responses to those pressures.

The Environmental Information Resources (EIR) Workgroup is committed to making existing environmental information easily accessible and useful to a wide variety of audiences. The EIR Workgroup continues to: (1) coordinate the dissemination of environmental information along the border; (2) coordinate with the other eight workgroups to institutionalize effective communication and information sharing; (3) implement and oversee environmental information and education projects; and (4) evaluate the effectiveness of environmental policies along the border.

## OBJECTIVES OF THE ENVIRONMENTAL INFORMATION RESOURCES WORKGROUP AND PROGRESS TOWARD GOALS

Some of the main objectives of the EIR Workgroup include: (1) developing an organized approach to information man-

agement; (2) encouraging horizontal linkages among various groups and agencies along the border; and (3) working with the other eight workgroups to institutionalize effective communication and information sharing. To that end, the EIR Workgroup is committed to developing a systematic approach to the collection and dissemination of border environmental data and information. In 1996, the EIR Workgroup developed a set of goals to set the stage for future information management efforts. Table 8-1 presents a summary of those objectives.

### Environmental Information Resources



#### Objectives

- Establish an inventory of environmental information for the border region.
- Create effective mechanisms for sharing information with government agencies and Border XXI workgroups.
- Improve and increase public access to information.
- Establish a unified GIS system for the U.S.-Mexico border area.
- Promote environmental education opportunities in border communities.
- Assist the Strategic Planning and Evaluation Team in developing environmental indicators for the border region to systematically measure the extent to which environmental policy addresses the most urgent environmental issues.

The objectives listed above may have been paraphrased from the *Framework Document*. For a more detailed description of the objectives, please refer to that report.

The objectives described in this section may be referred to by number. The numbers are intended for ease of reference only and do not imply order of importance.

Table 8-1

### Progress Toward Goals

While much work remains, the EIR Workgroup has made significant progress in addressing environmental information needs along the border. The following projects highlight progress toward meeting the goals and objectives listed above.

#### Establish an Inventory of Environmental Information for the Border Region

The EIR Workgroup, San Diego State University, and the U.S.-Mexico Border Information Institute have collaborated

to create the Border EcoWeb, a web site that provides links to more than 600 other web sites that contain border environmental information.

The Border EcoWeb inventory consists of environmental information, metadata, and databases, as well as information about program activities, grants, and other useful, border-related topics. The inventory identifies the types of relevant environmental data already available over the Internet and establishes a convenient and reliable mechanism to lead users to that information. The web sites can be searched by geographic location, medium (air, water, hazardous waste, and more), agency, or organization.

The Border EcoWeb also contains a directory of useful information about agencies, organizations, groups, and projects. In addition, the directory includes contact information for those agencies, organizations, and groups, as well as descriptions of the projects and activities.

Two advisory panels were established to support the Border EcoWeb project. A border-wide advisory group of key individuals from the border regions of Mexico and the United States was formed. In addition, a regional trans-border advisory board consisting of members from the California-Baja California border area was established to help address user issues. The two boards provided input on all phases of the project and helped test Border EcoWeb products.

In addition, a hard-copy document has been prepared as a tool for border residents who have little or no Internet access or little Internet experience. The Border EcoWeb can be accessed at [www.borderecoweb.sdsu.edu](http://www.borderecoweb.sdsu.edu).

### **Create Effective Mechanisms for Sharing Information with Government Agencies and Among Border XXI Workgroups**

As envisioned in the *1996 U.S.-Mexico Border XXI Program: Framework Document (Framework Document)*, this objective aims to establish compatibility of information infrastructure and connectivity between environmental information systems of both countries. The objective also prescribes subgoals to facilitate general communication and information exchange between Border XXI workgroups and government agencies.

The EIR Workgroup has initiated several projects to facilitate information sharing among Border XXI workgroups and

between government agencies. Two such projects include the Border EcoWeb described above, and the Border XXI web site described below. While these two information systems are available to the general public, they also serve as a valuable source of information for U.S. and Mexican government agencies and the nine Border XXI workgroups.

### **Improve and Increase Public Access to Information**

In 1996, the EIR Workgroup created a Border XXI web site to increase public access to information. Currently, the web site includes a number of Border XXI publications, including the *Framework Document*, annual implementation plans, the *1997 United States-Mexico Border Environmental Indicators Report (1997 Indicators Report)*, and the compendiums of U.S. Environmental Protection Agency (EPA) border activities. The site also contains a directory of Border XXI workgroups and information about Border XXI activities. In addition, links to other border-related web sites are provided, and a calendar of events is maintained to announce Border XXI meetings, conferences, and events that are open to the public. Most of the Border XXI documents are available to view and download in both Spanish and English. It is anticipated that all documents will be available in Spanish by late 2000. The web site can be accessed at [www.epa.gov/usmexicoborder](http://www.epa.gov/usmexicoborder).

The workgroup also recognizes that some border communities cannot easily access electronic information. The workgroup therefore continues to work with the EPA border offices in El Paso, Texas and San Diego, California (see Chapter 2) to establish non-electronic information about Border XXI activities. As an example, fact sheets have been created to provide an overview of the goals and objectives of the nine Border XXI workgroups.

In addition, EPA Region 6 publishes a bilingual quarterly newsletter, the *Border Bulletin*, which informs the border community about EPA and environmental issues and activities in the New Mexico-Texas-Mexico border region. More than 2,000 residents, government officials, and other stakeholders receive the newsletter, which is also posted at [www.epa.gov/earth1r6/6bo/eirwgp.html](http://www.epa.gov/earth1r6/6bo/eirwgp.html). Table 8-2 on the following page presents a list of border-related web sites. SEMARNAP recently published the *Reporte del Estado Ambiental y de los Recursos Naturales en la Frontera Norte de México* (State of the Environment and Natural Resources in the

Northern Border of Mexico), which addresses multi-media environmental and natural resource issues. The report summarizes the state of the environment for air, water, solid waste, hazardous waste, pollution prevention, and other envi-

input from the general public and U.S. federally recognized tribes residing in the border region.

At the 1999 National Coordinators Meeting in Ensenada, Baja California, a contact for Mexico was appointed to address issues related to Mexico's release of environmental information.

**Establish a Unified Geographic Information System for the U.S.-Mexico Border Area**

The spatial data bases currently available for the border region vary in detail for each geographic region. In addition, data compatibility across the international and local borders is inconsistent. The Geographic Information System (GIS) Subworkgroup has continued to work on resolving these issues and is hopeful that the data base created through those efforts will serve as the foundation for subsequent binational digital mapping efforts.

The U.S. Geological Survey (USGS) and the EIR Workgroup, in partnership with other entities, are developing a large-scale, high-resolution, vertically-integrated (that is, layers overlay properly) GIS database for the U.S.-Mexico border area. In a GIS, data are managed in a series of layers. Each layer represents a specific theme, such as roads, parcels of land, bodies of water, or specific geographic land features. Currently, USGS has completed about half of a 10- to 12-year, \$30 million GIS project for the U.S. side of the border.

- **U.S. Partnerships** – USGS and the EIR Workgroup have worked to encourage active participation by government agencies, including the U.S. Departments of Agriculture and the Interior (USDA and DOI), the Natural Resources Conservation Service, the Farm Service Agency, and the U.S. Army Corps of Engineers. State and local partners include the Texas Stratmap Program and the San Diego Association of Governments (SANDAG). As a result of these efforts, this project is three to five years ahead of schedule. The partnerships have allowed USGS to better leverage resources and create geospatial products along the border. In particular, DOI has provided millions of dollars to the GIS mapping project.

- **Instituto Nacional de Estadística, Geografía, e Informática** (INEGI, or National Institute of Statistics, Geography, and Information) – USGS has been working with INEGI, the Mexican mapping agency, to

**The Border on the Web**

**A Short List of Border-Related Web Sites**

U.S.-Mexico Border XXI site: <a href="http://www.epa.gov/usmexicoborder">www.epa.gov/usmexicoborder</a>
EPA Region 6 (includes bilingual border information for New Mexico and Texas): <a href="http://www.epa.gov/region6/border">www.epa.gov/region6/border</a>
EPA Region 9 (includes bilingual border information for California and Arizona): <a href="http://www.epa.gov/region9/cross_pr/compendi/index.html">www.epa.gov/region9/cross_pr/compendi/index.html</a>
<i>Instituto Nacional de Ecología</i> (INE, or National Institute for Ecology): <a href="http://www.ine.gob.mx">www.ine.gob.mx</a>
<i>Secretaría de Medio Ambiente, Recursos Naturales y Pesca</i> (SEMARNAP, or Secretariat for Environment, Natural Resources, and Fisheries): <a href="http://www.semarnap.gob.mx">www.semarnap.gob.mx</a>
U.S.-Mexico Information Center on Air Pollution (CICA): <a href="http://www.epa.gov/ttn/catc/cica">www.epa.gov/ttn/catc/cica</a>
U.S.-Mexico Hazardous Waste Tracking System (HAZTRAKS): <a href="http://www.epa.gov/region6/haztraks">www.epa.gov/region6/haztraks</a>
Interagency Coordinating Committee for U.S.-Mexico Border Environmental Health: <a href="http://www.epa.gov/orsearth">www.epa.gov/orsearth</a>

**Table 8-2**

While much work has been done to increase public access to information, no procedure has been developed by all agencies involved in Border XXI to address the release of environmental information. To that end, a cross-media subcommittee (made up of representatives of state and federal agencies of the United States and Mexico) has been formed to make recommendations on the release and exchange of environmental information at all government levels. A key objective of this subcommittee is to seek active participation from a variety of stakeholders, including representatives of Mexico, the four U.S. border states, and the tribal nations.

The subcommittee has held a series of conference calls to address the challenges and issues involved in releasing and sharing environmental information. At the National EIR and Air Workgroups meetings in Tijuana, Baja California (September 1998), discussions of these issues were held to seek public input. Further discussions took place in October 1998 during the Border XXI Cross-Workgroup Meeting held in Dallas, Texas on processes for seeking further participation on the part of federal and state agencies both countries. In addition, in 1999, the U.S. EIR Workgroup co-chair visited several areas along the border to obtain

build GIS data sets along the Mexican side of the border. The two agencies have initiated a joint pilot project to test data-sharing procedures, such as program compatibilities and cross-referencing of key GIS data standards in the El Paso, Texas-Ciudad Juárez, Chihuahua border area. Together, the USGS and INEGI have developed joint standards for the integration of digital elevation data sets. Despite this progress, the economic resources for generating digital map products along the Mexican side of the border have been difficult to obtain. Additional, high-level efforts are needed to ensure that adequate funding is available to INEGI to aid in the development of GIS data mapping of Mexico's border region.

• **Geospatial Products** – To meet the need for large-scale, vertically integrated data, the USGS has made digital and paper map products available to the public. The availability of those data helps provide for geospatial data set consistency along the border and in neighboring areas. Some of the products that are being used or developed for the border area include:

- Color infrared (CIR) aerial photography
- Digital elevation models
- Digital orthophoto quarter quadrangles
- Digital raster graphics (that is, digitized quadrangles maps)
- Digital political boundaries (that is, states, counties, and cities)
- Digital Public Land Survey System (PLSS)
- Digital hydrography (that is, rivers, streams, and lakes)
- Digital transportation (that is, roads, railroads, and powerlines)
- 1:24,000 topographic maps (that is, the basic 7.5-minute quadrangles sheet)

### **Promote Environmental Education Opportunities in Border Communities**

The workgroup recognizes the importance of environmental education in the border region and has made the following objectives the basis of environmental education efforts:

- Work with other Border XXI workgroups and with local communities to (1) identify each border commu-

nity's most important environmental education, training, and capacity needs, and (2) establish regional bases of information to respond to those needs.

- Organize a series of conferences on formal education in the border region to establish an inventory of existing curricula and environmental education resources and identify additional needs.

A binational environmental education strategy has been created to promote environmental education opportunities in the border region. The strategy outlines a process for establishing an effective, binational network of environmental education providers. The providers would work together to identify needs and develop an ongoing, comprehensive, binational program for the U.S.-Mexico border states.

In addition, the Training and Environmental Education Materials (TEEM) model has been incorporated into the binational environmental education strategy. The model has been highly successful throughout Latin America and Mexico in building local capacity and conserving natural resources. The TEEM model proposes to establish a network of environmental education providers in the United States and Mexico. This network would then allow educators, students, community groups, government organizations, businesses, and the public to access environmental information and materials. The network will:

- Identify priority environmental issues and community needs
- Assess requirements for improved environmental education
- Plan environmental education strategies
- Create a broad base of support that will help monitor program progress
- Evaluate impacts of programs and make proper adjustments to ensure future sustainability

The following projects highlight some of the progress that has been made toward promoting environmental education in border communities.

- **Rio Grande Watershed Mobile Exhibit** (McAllen, Texas) – The McAllen International Museum is developing an interactive mobile exhibit focused on the Rio Grande watershed. The exhibit and associated materials will be part of the museum's ongoing community

outreach program and will be presented to various schools and communities along the border as a vital, environmental education tool.

- **Project Del Rio** (Del Rio, Texas) – Curricula on pollution, health, and agriculture—specifically related to border water issues—were developed and reviewed by community members and teachers from the border area. The project created a strong binational educational tool that involves students in discussions of sustainability for border communities. The project provides a regional forum for the exchange of ideas and information among environmental educators and has increased the participants' awareness of the Rio Grande international watershed.

- **Agua para Beber** (Laredo, Texas-Nuevo Laredo, Tamaulipas) – This program has had a significant impact on the quality of drinking water for *colonia* residents on both sides of the border. A total of 25 *promotores* (community outreach health workers) from identified *colonias* received 18 hours of training in environmental health and water protection and disinfection techniques. The *promotores* visited 20 households once a week for five weeks to educate household caretakers on proper hygiene practices and ways to improve disposal practices, water protection, and water disinfection.

- **Sabal Palm Audubon Center and Sanctuary** (Brownsville, Texas) – A new binational and bilingual program was developed and implemented to educate school children and families from both sides of the border about the region's unique natural and cultural heritage and to instill a commitment to lifelong bird, wildlife, and habitat conservation.

- **Assessment of Environmental Knowledge on the U.S.-Mexico Border** – Materials and a training program were created to illustrate how to incorporate environmental lessons—on such topics as species organization, the interaction of biological systems, chemical reactions, acid-base principles, and writing and observation skills—into a teaching curriculum. The integration did not require change in the curriculum or the development of new courses. In addition, a questionnaire was developed by the teachers to assess the level of environmental knowledge of students along the U.S.-Mexico border. The questionnaire will be distributed

to students in grades 5 through 9 during the 2000 school year.

- **Border Environmental Education Data Base and Resource Guide** (Texas and New Mexico) – The binational resource guide was developed by the Waste Management Education and Research Consortium at New Mexico State University. This comprehensive guide identifies the environmental education providers for the U.S. states of Texas and New Mexico and the Mexican states of Chihuahua, Coahuila, Nuevo León, and Tamaulipas. The guide includes information about primary missions of environmental education providers, area of coverage, target audience, available resources, and other pertinent information.

- **Tri-City/Tri-State Binational Water Festival** (New Mexico-Texas-Chihuahua) – This water festival will bring together students, teachers, and the general public to increase understanding of how things are interconnected and how individuals can work to become stewards of the Earth and its resources. Children will learn that quantities of surface water and groundwater are limited and must be protected. Various exhibits will be on display to present information about groundwater contamination in aquifers and to illustrate how the Rio Grande is vulnerable to pollution.

- **Learning to be Water Wise and Energy Efficient** – This project will extend the Water Wise Program to the Rio Grande valley to teach students and parents the importance of water conservation and to teach students how to install special water-saving equipment. The project will reach 16,250 students, teachers, and families in the valley. The interdisciplinary Water Wise activities extend to science, mathematics, creative arts, and communication exercises.

- **Environmental Education Planning Seminars for Arizona and Sonora** (Tucson, Arizona) – EPA awarded a cooperative agreement to the Environmental Education Exchange (EE Exchange), a nonprofit organization based in Tucson, to assess environmental education needs and identify environmental education key players, programs, and activities taking place in the Arizona-Sonora region. The objectives of the program were to: (1) strengthen communication among individuals, organizations, and border communities with the

goal of creating new educational strategies that address binational environmental education needs; (2) encourage residents of border communities to exercise their civic responsibility with regard to environmental problems through the development of environmental education programs; and (3) remain sensitive to existing regional environmental education programs to avoid duplication and to foster new binational linkages between environmental education providers.

As part of this effort, three binational environmental education workshops were held in the sister cities of Douglas, Arizona-Agua Prieta, Sonora; Nogales-Nogales; and Yuma, Arizona-San Luis Río Colorado, Sonora. More than 60 educators working along the Arizona-Sonora border participated in the two-day events. Following is an overview of the workshops.

- The workshops fostered communication at the binational level and permitted educators to share experiences and ideas about formal and non-formal environmental education.
- Regional sister city action plans were developed proposing the following: (1) a Sonoran Desert training workshop for educators in Yuma, with trainers from Sonora; (2) a project focusing on conservation and restoration of urban green spaces adjacent to school grounds in Nogales-Nogales; and (3) an educational training workshop and pilot plan for reforestation in Naco, Sonora.

• **Imperial/Mexicali Valleys Environmental Education Coalition (IMVEEC) Binational Environmental Education Project (Calexico, California and Mexicali, Baja California)** – In 1999, EPA awarded a cooperative agreement to Imperial Valley College to implement an environmental education program in the Imperial and Mexicali valleys. The objectives of the program are to: (1) establish a core binational planning committee to plan tasks for the project; (2) develop and present a workshop for teacher and media representatives from both sides of the border on water, air pollution, and hazardous material and waste; (3) develop a binational field trip for students, with an emphasis on water pollution; (4) establish two binational community education forums; and (5) develop a bilingual newsletter to address community envi-

ronmental concerns and to provide a directory of environmental contacts.

Accomplishments of this ongoing project include:

- The creation of a planning committee, which includes the participation of *Centro Regional de Estudios Ambientales* (CREAS, or Regional Center for Environmental Studies), a nongovernmental organization located in Mexicali, Baja California, and the Environmental Health Binational Council of the sister cities of Calexico, California and Mexicali
- An information and training workshop on environmental issues for media representatives from the city of Mexicali, conducted in August 1999
- **The Environmental Education Blueprint of the Californias (San Diego and Tijuana Region)** – The San Diego Natural History Museum received a cooperative agreement from the EPA to develop the Environmental Education Blueprint of the Californias, an environmental education plan that would foster communication and plan activities among educators in the San Diego-Tijuana border region. The objectives of the project were to: (1) develop an environmental education action plan for local environmental educators working in the San Diego-Tijuana region; (2) focus the plan on finding and coordinating environmental education programs and ideas; and (3) create an information and action network to implement strategies to provide improved delivery of environmental information and community access to resources.

Following is an overview of the four phases of the project.

- Phase I: Creation of an inventory of existing environmental education programs and a resource matrix
- Phase II: Coordination of environmental education binational conferences that reviewed the matrix to identify gaps and overlaps in environmental education
- Phase III: Creation of a regional action plan for environmental education for the region
- Phase IV: Creation of the Environmental Education Council of the Californias (EECC)

### **Conduct Environmental Education with Tribal Communities**

- **Environmental Education Reform in the Cal-**

**ifornia/Baja California Border Region (Campo and other Indigenous Communities in Baja California Norte)**

– EPA awarded the Campo Band of Mission Indians a cooperative agreement to expand environmental education opportunities in the tribal community of Campo and five indigenous communities of Baja California Norte. The objectives of the project are to: (1) provide trilingual environmental education materials for the schools of the Indian communities in the California-Baja California region; (2) reinforce mechanisms for transmitting traditional environmental management concepts from elders to youth; and (3) establish new environmental education partnerships among teachers, students, and elders.

Accomplishments of this ongoing project include:

- Enviro-Fair for students and teachers (May 1999): The focus was on environmental education, and some of the activities included art and essay contests for students.
- Enviro-Scape (July 1999): The focus was on information-sharing, with an emphasis on water and its relation to natural resources.
- Star-Gathering Celebration: More than 200 participants took part in the 509 Grunion Celebration. Students, teachers, tribal elders, and members of the Viejas and Bishop reservations came together to celebrate the relation of stars, air, and the ocean to the Kumeyaa-Kumiaia culture.
- An environmental education symposium: School teachers, administrators, and elementary school-aged youth from native tribes received instruction in the development of environmental education-specific art and literary work.
- An environmental education curriculum: The curriculum was translated into English, Spanish, and the Kumeyaa-Kumiaia languages.

• **Environmental Education Planning Seminars with the Tohono O’odham Nation (Tucson and the Tohono O’odham Nation)** – The EE Exchange received additional support from EPA in 1998 to increase environmental education work with the Environmental Office of the Tohono O’odham Nation. The project will begin the process of environmental

education program assessment, planning, and development in the nation. The objectives and tasks of the project are:

- Task 1: Hire an environmental education coordinator to work with both the EE Exchange and the Tohono O’odham Environmental Office.
- Task 2: Develop a comprehensive survey form and interview teachers from every school on the nation.
- Task 3: Develop a comprehensive survey form and interview environmental resource people from the nation.
- Task 4: Prepare a summary of findings of the above surveys that identifies specific needs in the schools and specific opportunities with community environmental resources.
- Task 5: On the basis of findings of the surveys, select an environmental education project or projects and assist the environmental office in the implementation of the project(s).
- Task 6: Provide follow-up and technical support for selected environmental education projects
- Task 7: Develop a final project report for the Tohono O’odham community and EPA.

Accomplishments of this ongoing project include:

- EE Exchange coordinated an environmental education needs assessment with the nation. Information gathered through interviews was used to create an abbreviated list titled *Environmental Education Opportunities on the Tohono O’odham Nation*. The list was provided to teachers at the Tohono O’odham Nation Conference on Education.
- In conjunction with the Environmental Office, the EE Exchange assisted in the development of an environmental education survey for teachers on the nation. An interim report on the nation’s schools was prepared. The report is also part of a comprehensive assessment, which will include informal education and community, district, and tribal activities.

**Other Environmental Education Projects from Border XXI Grants**

- The EE Exchange, located in Tucson, developed the

*Border Environmental Education Resource Guide* (1998) to disseminate information about border environmental education programs and activities being conducted and educators working in the Arizona-Sonora and California-Baja California regions. The guide was designed to assist educators in program planning and development by helping them locate environmental education programs that could be adapted for use in other border localities. An expanded version is available on the EE Exchange web site at [www.eeexchange.org](http://www.eeexchange.org).

- The San Diego Natural History Museum, in collaboration with the *Proyecto Bio-regional de Educación Ambiental* (PROBEA, or Bio-regional Environmental Education Project) a consortium of non-profit organizations in the San Diego-Tijuana region, developed the *Teacher Training Model for Binational Watershed and Water Quality Education and Monitoring* to provide training materials and activities related to watersheds and monitoring to teachers on both sides of the border.

### Assist the Strategic Planning and Evaluation Team in the Development of Environmental Indicators for the Border Region

The EIR Workgroup has assumed the role of coordinating the development of environmental indicators for the border area to (1) address concerns raised by border communities about evaluating environmental conditions and pressures along the border, and (2) assess the overall effectiveness of environmental policies aimed at the border region.

Environmental indicators serve as a tool for determining whether U.S.-Mexico environmental policies and implementation efforts are adequately addressing the most urgent environmental, human health, and natural resource issues. In addition, environmental indicators provide an objective assessment of status and trends in the environment’s ability to support human and ecological health. These indicators also serve as a gauge of whether environmental programs are meeting their intended goals along the border.

Each of the nine workgroups developed environmental indicators for its specific area. Environmental indicators are developed binationally, and input is requested from border communities, states, tribes, and other entities having interest in the border. The *1997 Indicators Report* was published in 1998 in English and Spanish. The report is the first of its kind for the Border XXI Program and is a

significant first step toward evaluating environmental, human health, and natural resource conditions along the border.

Given the significant resources needed to develop, obtain, analyze, and update the necessary environmental data, the Indicators Report will be published once every two years. It is anticipated that the EIR Workgroup will publish a brief pamphlet periodically to present an update on existing environmental indicators and to highlight new indicators developed by the nine Border XXI workgroups.

## ENVIRONMENTAL INDICATORS

As previously stated, much of the effort conducted by the EIR Workgroup includes coordination with other workgroups, agencies, organizations, and communities to increase the availability of environmental information along the border. Therefore, there are few EIR Workgroup milestones

Types of Environmental Indicators	
<b>P</b>	PRESSURE: ACTIONS OR ACTIVITIES THAT INDUCE PRESSURE ON THE ENVIRONMENT
<b>S</b>	STATE: ENVIRONMENTAL AND NATURAL RESOURCE QUALITY AND QUANTITY
<b>R</b>	RESPONSE: ACTIONS TAKEN TO RESPOND TO ENVIRONMENTAL AND NATURAL RESOURCE PRESSURES

<b>S</b>	NUMBER OF HITS ON BORDER XXI WEB SITE
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that can be quantitatively measured in a meaningful way. For that reason, environmental indicators were developed for two projects, the U.S.-Mexico Border XXI web site and the geospatial/GIS digital data collection effort.

<b>S</b>	AMOUNT OF UPDATED GEOGRAPHIC INFORMATION SYSTEM DATA
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Figure 8-1 on the following page shows the number of hits on the Border XXI web site from January 1998 through September 1999.

USGS has been leading an effort to update the geospatial data available for the border area. To date, all U.S. border region 1:24,000-scale digital elevation models, digital raster graphics, PLSS, and boundary digital data files have been completed.



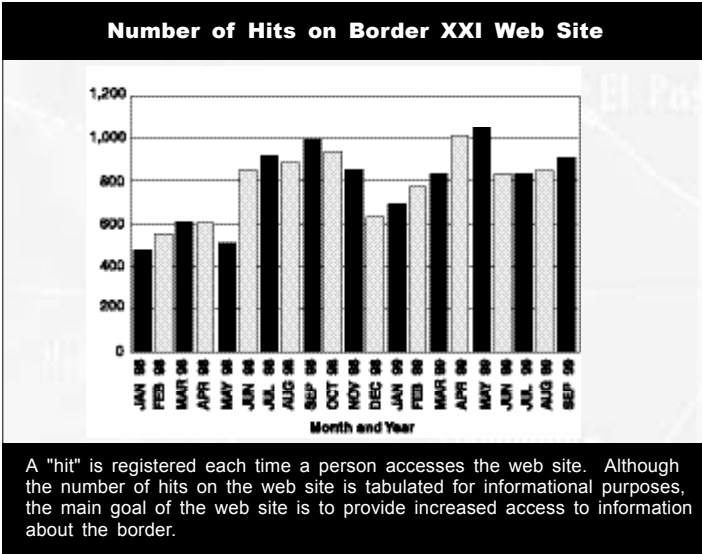


Figure 8-1

The time frames for collecting and revising the hydrography and transportation vector data themes and updated graphic maps and topographic maps will largely depend on funding availability. However, for planning purposes, a goal of 2005 has been established to complete all USGS-supported digital data themes for the 2,581 7.5-minute quad-

Status of Updated U.S. GIS Data		
Geospatial Data Product	Total	Complete
Digital elevation models	2,581	100%
Digital raster graphics	2,581	100%
CIR photography	12,000	100%
CIR digital orthophoto quadrangles	10,324	80%
PLSS (California, Arizona, and New Mexico only)	1,240	100%
Political boundaries	2,581	100%
Hydrography (rivers, lakes, and streams)	2,581	10%
Transportation (roads, railroads, and other facilities)	2,581	5%
Topographic map sheets	2,581	5%

Source: USGS

Table 8-3

ranges considered to be in the U.S. part of the border region. Table 8-3 shows the status of the GIS update effort.

This indicator presents an update of the data completion efforts to date for the U.S. side of the border. The data can be obtained on the USGS's United States/Mexico Transboundary Mapping and GIS Initiative web site at [rmmcweb.cr.usgs.gov/public/usm/index.html](http://rmmcweb.cr.usgs.gov/public/usm/index.html). Figure 8-2 is an example of a GIS map of the border region.

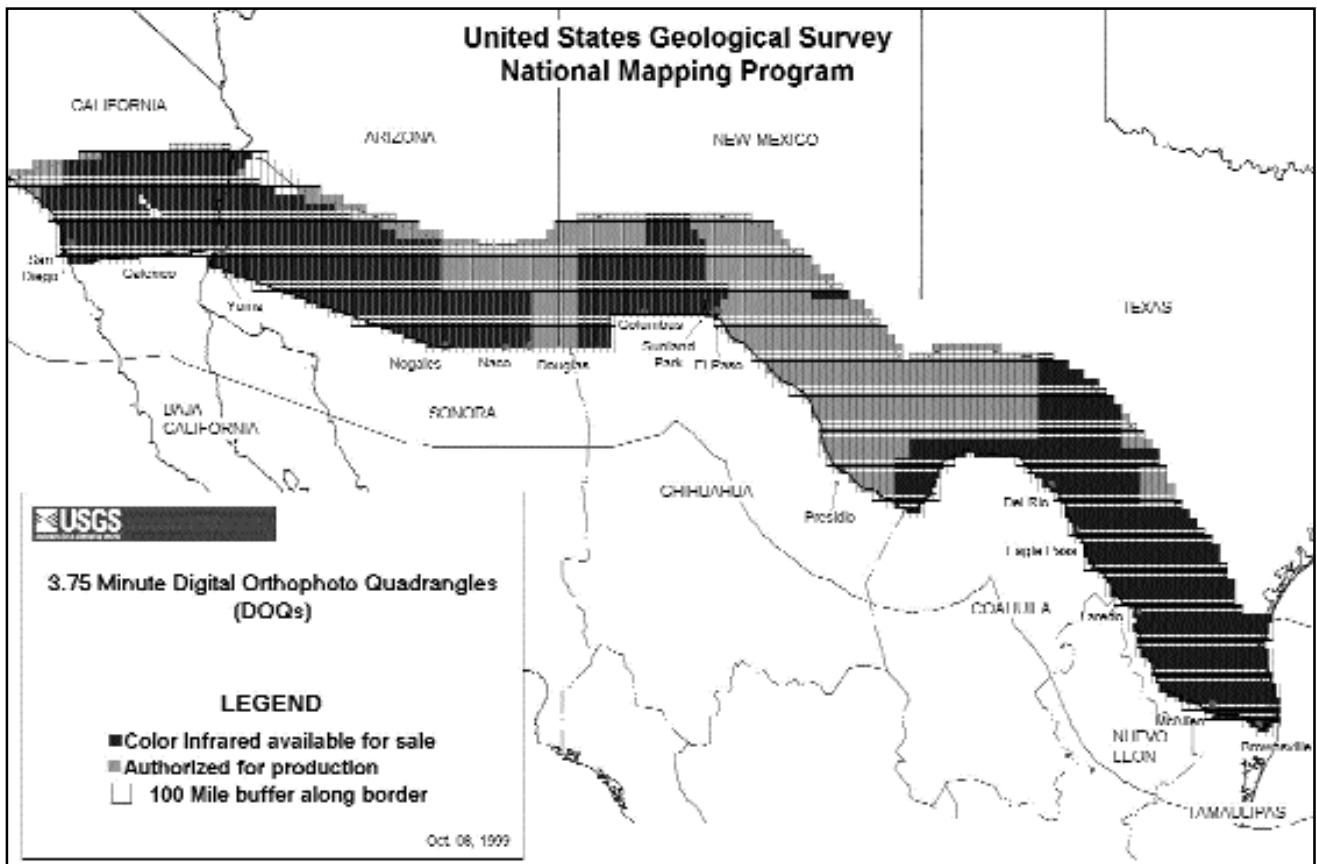


Figure 8-2

## OTHER NOTABLE ACTIVITIES AND ACHIEVEMENTS

In addition to the basic production of geospatial data sets, some unforeseen benefits have emerged. Through partnerships with the state of Texas, USGS, and the Texas Stratmap Program, a seamless, digital elevation model has been created. The result is that GIS users no longer have to merge elevation data before they can use it in their GISs. Further, through other collaborative efforts with state and federal agencies, GIS users can now access state data, USGS geospatial data sets, and Mexican maps of areas along the Texas-Mexico border. This information is provided by the Borderlands Information Center, the statewide data clearinghouse agency that is part of the Texas Natural Resources Information System. Currently, USGS is evaluating the use of CIR digital orthophoto quadrangles to produce transboundary photo image maps.

## FUTURE PERSPECTIVES

The EIR Workgroup will continue to provide the border population with environmental information and promote cross-workgroup linkages to enhance the progress of the Border XXI Program. Two binational EIR Workgroup meetings will be held each year to keep the public informed of progress and to obtain input from stakeholders and the public. One meeting will coincide with the annual National Coordinators Meeting, and the second will be held approximately six months later. The EIR Workgroup will continue to encourage public participation in the meetings and to seek greater participation on the part of states, local governments, tribes, nongovernmental organizations, and industry.

The EIR Workgroup will focus more efforts on establishing links with the other Border XXI workgroups and ensuring frequent, consistent, and effective communication of environmental information among workgroups and other gov-

ernment agencies. In addition, more resources should be devoted to: (1) establishing connectivity between environmental information systems of both countries; (2) ensuring compatibility of information channels between government agencies; and (3) establishing data compatibility standards for collecting and disseminating information. The workgroup will work toward completing this challenging task and will conduct binational workgroup meetings and seek public input on this issue.

The Subworkgroup on the Release/Exchange of Information Project will continue working to increase public access to important border-related environmental information. Progress will continue on outreach, non-electronic dissemination of information in both English and Spanish, and environmental education. The subworkgroup will continue to work on these issues and will develop recommendations on the steps necessary to move forward.

The EIR Workgroup will continue to facilitate the development of environmental indicators and will work with each of the workgroups to develop and refine environmental indicators to (1) accurately reflect the pressures on and quality of the border environment, natural resources, and human health and (2) measure the effectiveness of the efforts undertaken to alleviate those pressures. The workgroup will also continue to seek input from entities and individuals having interests in the border to make the environmental indicators meaningful and useful to the border community.

The workgroup will also continue to work with the USGS and its partners to update the hydrography layers, transportation layers, and topographic maps and to encourage continued progress in developing a comprehensive GIS database for the border region. In addition, further experimentation will be performed on the use of new geospatial technologies to enhance future data sets along the border. The EIR Workgroup and USGS will continue to promote the use of GIS among the Border XXI work groups, their partners, and INEGI.