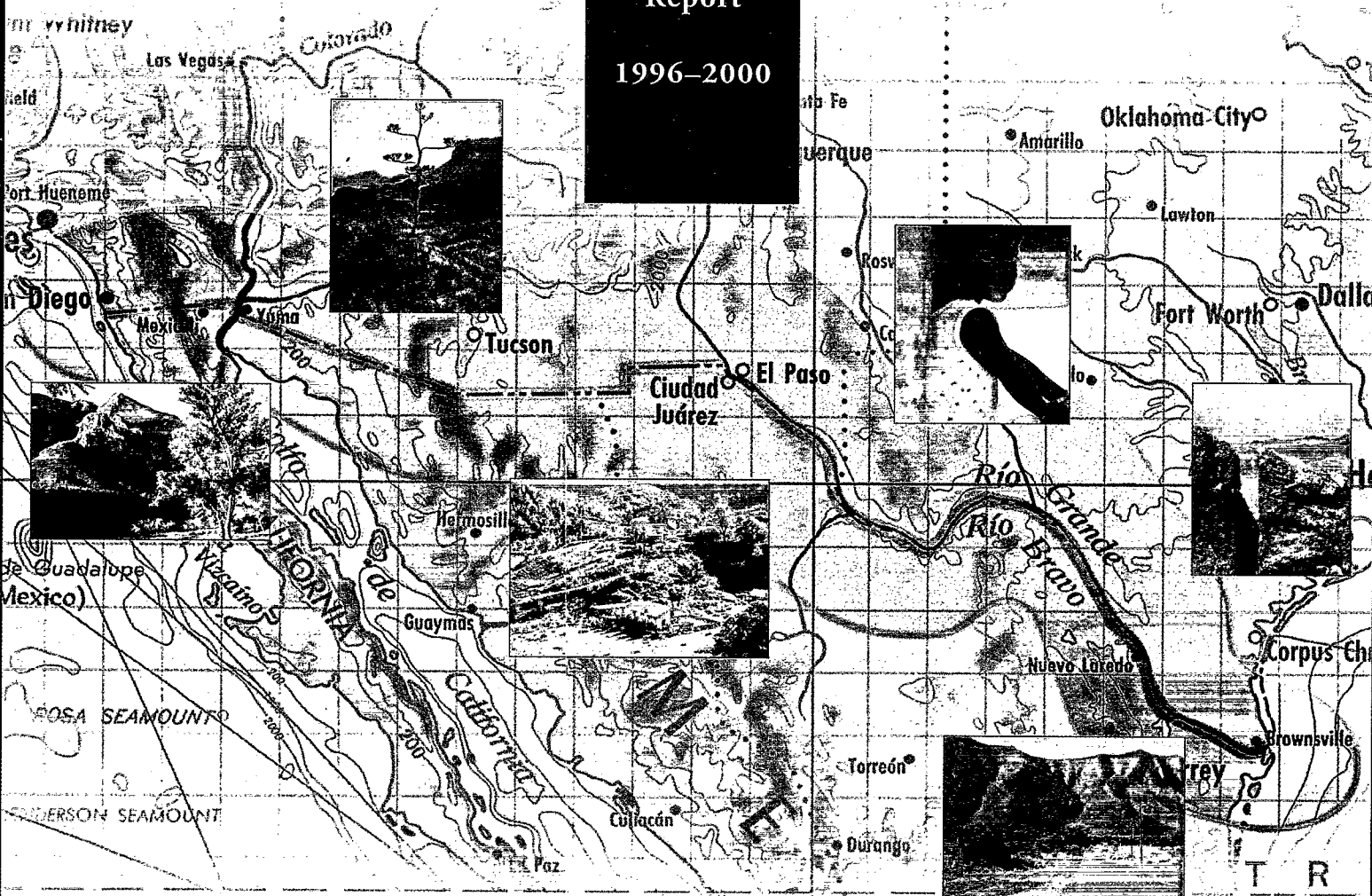


Executive Summary

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U.S.- Mexico Border XXI Program: Progress Report 1996-2000



THE U.S.-MEXICO BORDER XXI PROGRAM: PROGRESS REPORT 1996-2000

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For more information about this publication and the U.S.-Mexico Border XXI Program, please see the contact information provided in this document.

KEY FEDERAL AGENCIES IMPLEMENTING BORDER XXI

Environmental Protection

U.S. Environmental Protection Agency
Mexican Secretariat for Environment, Natural Resources and Fisheries
Mexican Secretariat for Social Development

Natural Resources

U.S. Department of the Interior
U.S. Department of Agriculture
Mexican Secretariat for Environment,
Natural Resources and Fisheries

Border Water Resources

International Boundary and Water Commission
U.S. Department of the Interior
U.S. Environmental Protection Agency

Environmental Health

U.S. Department of Health and Human Services
Mexican Secretariat of Health
U.S. Environmental Protection Agency

Other U.S. federal participants include the U.S. Department of State, the National Oceanic and Atmospheric Administration, the U.S. Agency for International Development, the U.S. Department of Justice, the U.S. Department of Transportation, and the U.S. Department of Energy.

Other Mexican federal participants include the Secretariat of Foreign Relations; the National Institute for Statistics, Geography, and Information; the Secretariat of Interior (Civil Protection); the Secretariat of Communication and Transportation; and the Secretariat of Energy.

THE PURPOSE OF THE PROGRESS REPORT

The *U.S.-Mexico Border XXI Program: Progress Report 1996-2000* describes the advances toward achieving environmental improvements in the border region as a result of Border XXI Program activities. The report also describes the challenges faced in addressing environmental degradation in the transboundary context, as well as specific limitations of the Border XXI Program. It evaluates progress toward achieving the Border XXI mission and objectives and details the achievements made by each of the nine Border XXI workgroups since the program's inception in 1996.

In addition, the report provides quantitative data on indicators used to evaluate the effectiveness of border environmental policy and to measure environmental and human health quality in the border area. The indicators in this report update the information published in the *1997 United States-Mexico Border Environmental Indicators Report (1997 Indicators Report)*.

Since the current border plan concludes at the end of 2000, the lead agencies for Border XXI hope this report will serve as a tool for designing the next phase of binational planning. While many achievements have been made, the governments of both countries recognize that there is room for improvement in several areas. An important step in ensuring further progress is to include state, local, and tribal governments, as well as the public ("public" refers to the residents, industry, and nongovernmental and private organizations that have a stake in the border), in the establishment of (1) priorities for the border region, and (2) activities to address those priorities. This chronicle of achievements and shortcomings of five years of intensive binational coordination will help establish a context for dialogue among federal agencies and other border stakeholders. Through the exchange of ideas and opinions, the federal governments hope to initiate a new phase of stakeholder participation in the development and implementation of the next phase of binational cooperation.

Executive

Summary

THE NEED FOR BINATIONAL COOPERATION

The U.S.-Mexico border area is a dynamic region, with a distinct composition that is as much differentiated by social, economic, and political contrasts as it is bound by cultural fusion and the unique interdependency of its transborder city pairs. It is also one of the most rapidly growing regions in both countries. Today, the border region is home to more than 10.6 million people, with about 5.8 million people in the United States and 4.8 million in Mexico.¹ Population along the border is projected to increase from 5 to 12 million people during the period 2000 to 2020. Many factors associated with this growth, such as increased commercial activity, greater traffic congestion, and increased consumption of natural resources, have been linked to environmental degradation and a deterioration in the quality of life. Given the complex structure of stakeholders having border interests—two sovereign countries, 10 border states, several municipalities and counties, tribal nations, national and international organizations, and the residents of the border region—attempts to address these concerns require a coordinated binational response.

THE U.S.-MEXICO BORDER XXI PROGRAM: 1996-2000

Under the Border XXI Program, the United States and Mexico collaborate on projects to protect the environment and natural resources of the border region, as well as the health of its residents. The program is an innovative, binational effort to coordinate environment and natural resources management in the border region. Border XXI works to: (1) alleviate or avoid negative environmental pressures associated with development and (2) foster forms of social and economic growth that are less damaging to the environment.

With the principal goal of promoting sustainable development, the Border XXI Program seeks a balance among social and economic factors and environmental protection in border communities and natural areas. Three strategies were

¹ Peach, James and James Williams. "Population and Economic Dynamics on the U.S.-Mexican Border: Past, Present, and Future." *The U.S.-Mexican Border Environment: A Road Map to a Sustainable 2020*. Paul Ganster, ed. Southwest Center for Environmental Research and Policy (SCERP), Monograph Series, No. 1, 40.

outlined in the *1996 U.S.-Mexico Border XXI Program: Framework Document (Framework Document)* to accomplish that goal:

- **Ensure Public Involvement**
- **Build Capacity and Decentralize Environmental Management**
- **Ensure Interagency Cooperation**

The Border XXI Program serves as a coordinating mechanism to bring together federal, tribal, state, and local entities from both countries to work cooperatively toward achieving those objectives. The lead agencies on Border XXI are the U.S. Environmental Protection Agency (EPA) and Mexico's *Secretaría de Medio Ambiente, Recursos Naturales y Pesca* (SEMARNAP, or Secretariat of Environment, Natural Resources, and Fisheries). In the United States, the U.S. Department of the Interior (DOI) serves as the lead agency for natural resources activities coordinated under Border XXI, and the U.S. Department of Health and Human Services (HHS) shares the coordination lead with EPA on environmental health activities. In Mexico, the *Secretaría de Salud* (SSA, or Secretariat of Health) is responsible for coordinating environmental health activities, and the *Secretaría de Desarrollo Social* (SEDESOL, or Secretariat of Social Development) helps coordinate activities related to solid waste.

Nine binational workgroups implement the Border XXI Program by developing projects to address specific objectives. Each workgroup operates under the guidance of two chairpersons, or "co-chairs," one representing the United States and one representing Mexico. Six of the workgroups have a long-standing history of binational cooperation in the areas of (1) water, (2) air, (3) hazardous and solid waste, (4) pollution prevention, (5) contingency planning and emergency response, and (6) cooperative enforcement and compliance. In 1996, three additional workgroups were created under the Border XXI Program to provide a more comprehensive approach to border environmental concerns. Those workgroups focus on issues related to (7) environmental information resources, (8) natural resources, and (9) environmental health.

THE BASIS OF U.S.-MEXICO BORDER RELATIONS

The level of positive cooperation that exists between the two countries on environmental matters reflects the importance of the U.S.-Mexico relationship on environmental issues. After a long history of formal coordination between the two countries, particularly on water and water infrastructure issues, the United States and Mexico formally broadened cooperation on border environmental issues by signing the *La Paz Agreement* in 1983.² The *La Paz Agreement* established a general framework for developing cooperative environmental efforts to reduce, eliminate, or prevent sources of air, water, and land pollution. The *La Paz Agreement* also defined the U.S.-Mexico border region as the area extending more than 3,100 kilometers (almost 2,000 miles), from the Gulf of Mexico to the Pacific Ocean, and 100 kilometers, or 62.5 miles, on either side of the U.S.-Mexico boundary.

In February 1992, the environmental authorities of both federal governments released the *Integrated Border Environmental Plan for the U.S.-Mexican Border Area* (IBEP). The IBEP, a two-year plan, was the first binational federal initiative created under the assumption that increased trade liberalization would place additional stress on the environment and human health along the border.

The tri-lateral *North American Free Trade Agreement* (NAFTA) was signed in December 1992 and entered into force in 1994. In November 1993, the presidents of the United States and Mexico signed a bilateral agreement establishing the Border Environment Cooperation Commission (BECC) and the North American Development Bank (NADB) to help develop and finance solid waste, water supply, and wastewater infrastructure in the U.S.-Mexico border area. The primary role of the BECC has been to provide technical assistance to border communities and to certify environmental infrastructure projects in the border region for consideration for financing by the NADB and other government and private sources. The NADB's primary role has been to facilitate financing for the implementation of projects certified by the BECC.

The United States and Mexico also have a history of cooperation on natural resources issues that includes a num-

² The Agreement between the United States of America and the United Mexican States on Cooperation for the Protection and Improvement of the Environment in the Border Area was signed in La Paz, Baja California Sur, Mexico on August 14, 1983, and entered into force on February 16, 1984.

ber of agreements and initiatives to protect migratory birds, native habitats, and marine resources and to reduce degradation or exploitation of forests, air, soil, and natural areas.

In 1996, the Border XXI Program was initiated to build on experiences from and improve specific efforts undertaken under the IBEP and earlier environmental agreements. Border XXI also includes the BECC and the NADB as full partners in water, wastewater, and solid waste infrastructure activities.

BORDER ENVIRONMENTAL AND PUBLIC HEALTH ISSUES

The border area faces many binational environmental challenges, such as limited water supply and poor water quality, sewage treatment that is inadequate or lacking, air pollution, little or no treatment and disposal of hazardous and industrial waste, potential for chemical emergencies, incidence of infectious diseases, and inadequacy in or lack of verification of compliance in the transboundary shipment of hazardous wastes. The depletion of natural resources presents another environmental challenge for the border. The destruction of native habitats through population growth and the resulting expansion of urban areas, ranching and agricultural activities, mining, recreation, and tourism have seriously impacted the natural resource base in the border region. These challenges continue to affect the environmental and economic vitality of the region.

Increased levels of domestic and industrial water consumption and the border region's largely arid climate have made maintaining an adequate water supply one of the most serious environmental challenges on the border. It is predicted that the problem will worsen, and many communities face grave problems with the greater demand for water that projected population growth would bring. Groundwater and surface water contamination are also problems, since supplies are often threatened by agricultural runoff and the discharge of raw sewage and industrial pollution into the rivers and aquifers along the border.

The availability of border environmental infrastructure is another prominent issue. On both sides of the border, growth in many areas has surpassed basic infrastructure capacity. The problem is particularly acute along the border in Mexico, where many communities lack wastewater treatment, transportation systems are inadequate or nonexistent, and

energy demand is high. Further, resources for additional infrastructure development are scarce.

In poor, unplanned, and generally unincorporated settlements along both sides of the U.S.-Mexico border, infrastructure deficiencies are particularly acute. Many of those settlements, known in the United States as *colonias* and in Mexico as *asentamientos irregulares* (because of their unauthorized use of land), have sprung up without formally sanctioned local governance and have traditionally been unable to gain access to individual or community services. In most cases, the settlements have developed without water supplies, wastewater treatment, or solid waste collection. Such practices as illegally dumping or burning waste contribute to serious environmental degradation and have been associated with health problems.

Indigenous communities and U.S. border tribes are also negatively impacted by various transborder environmental problems, including air pollution from off-reservation activity, traffic congestion, extraction of natural resources, and burning or illegal dumping of solid and hazardous waste. Several binational rivers or groundwater basins lie within, near, or under U.S. Indian reservations, and pollution in these waters is a concern to several tribal communities. In addition, tribal communities have expressed concern about limited emergency response capabilities, lack of training and equipment to respond to hazardous waste transportation spills and accidents, and risks that may be attributable to a lack of information about transport of hazardous waste through their reservations lands.

Some border residents suffer from other public health problems, such as asthma and high blood lead levels. Emissions from vehicles, industrial sources, burning of trash, and residential heating and dust from unpaved roads all contribute to poor air quality and threaten the health of border residents. Moreover, the wastes generated by industrial activity are also potentially dangerous, especially when they are inappropriately disposed of in sewer systems, on the ground, or in ravines. Surface water contamination from industrial pollution and agricultural chemicals is also a serious problem in many areas. Another concern is the danger to border residents posed by exposure to pesticides through pesticide residues on food and the spraying of pesticides on fields that are located near homes and schools.

PROMOTION OF SUSTAINABLE DEVELOPMENT ALONG THE BORDER: CHALLENGES AND ACCOMPLISHMENTS

As stated in the *Framework Document*, the goal of the Border XXI Program is to "promote sustainable development in the border region by seeking a balance among social and economic factors and the protection of the environment in border communities and natural areas . . ." (Chapter 1, Page 1 [I.1]). Although Border XXI has made notable advances, there have been challenges in achieving the goal. These include: (1) lack of recognition of the range of elements that affect sustainability, (2) limitations of workgroup activities, and (3) insufficiency of efforts to engage local-level participants.

The first challenge was to recognize the broad range of elements that impact sustainability. The strength of the Border XXI Program is that it primarily focuses on addressing the environmental and natural resources elements of sustainable development, as well as social factors as they pertain to environmental health. It also provides a point of departure for economic and technological considerations by promoting pollution prevention and the use of clean technologies. However, the scope of the current program does not account for all the factors that contribute to sustainable development in the border region.

One of the challenges of promoting the concept through workgroup activities is that those activities address only certain elements of sustainable development. The workgroups have focused much of their efforts on analyzing and remediating environmental, natural resource, and public health problems resulting from previous unsustainable practices. However, sustainable development also implies the development of strategies that both prevent replication of existing problems in the future and anticipate entirely new ones.

While the two federal governments acknowledged in the *Framework Document* that attempts to address sustainable development would require local-level participation, the progress of efforts to engage border communities has been slow. It has been only recently that the federal governments have begun to join with individual communities to discuss the concept in terms of local-level priorities and conditions and to determine how best to work in partnership with local entities to approach sustainability on a community-by-community basis.

Examples of activities to promote sustainable development include:

- **Border Institutes:** Held in Rio Rico, Arizona in December 1998, Border Institute I provided a forum for dialogue on the future of the border region in terms of economic, demographic, and ecological problems and trends related to the sustainability of the border region.³ Border Institute II, held in April 2000 in Rio Rico, focused on identifying actions and policy alternatives for achieving a healthy environment in border communities.
- **Sustainable Development Community Workshops in Mexico:** SEMARNAP has conducted a series of sustainable development workshops along the border. The workshops are designed to provide local planners and city officials with a forum for building consensus on what sustainable development means for their communities. The workshops involved facilitated breakout discussions and a series of exercises related to the following themes: (1) Population, Housing and Land Use; (2) Urban Development, Infrastructure, and Equipment; (3) Industry, Transportation, and Contamination; and (4) Natural Resources, Water, and Soils. The workshops helped participants focus on local-level implications of development and reinforced their prominent role in shaping the future of their communities.
- **BECC/NADB Sustainable Development Criteria:** The BECC has adopted sustainable development criteria to evaluate infrastructure projects and has integrated these principles into an extensive public outreach and participation program.

Future efforts will be aimed at creating additional partnerships that facilitate the development of more comprehensive, local-level approaches to sustainable development. Those efforts could benefit from: (1) building on SEMARNAP's approach of working at the local level—by examining local efforts in the context of binational approaches and the interdependence of border communities; (2) expanding on the strategies of public participation and decentralization to achieve true community empowerment in decision making; (3) addressing the relationship between the environment, natural resources, and

³ Summary and full reports of the meeting titled *The U.S.-Mexican Border Environment: A Road Map to a Sustainable 2020* were published by SCERP and are available from that organization.

human health and such other factors as economy, education, health, land use, municipal management, and energy use; and (4) employing those factors in the development and implementation of Border XXI workgroup activities.

BORDER XXI STRATEGIES

ENSURE PUBLIC INVOLVEMENT

As stated in the *Framework Document*, the first strategy is to "ensure public involvement in the development and implementation of the Border XXI Program . . ." (II.1). As was stated further, "Both governments aim to engage the creativity, ideas, and energy of border residents in the evolution and ongoing implementation of the long-term objectives . . ." (II.1).

Examples of public involvement activities include:

- During the development of the *Framework Document*, public meetings held in the border region proved to be an important opportunity for the governments to listen to the concerns and recommendations of border residents. In the United States, more than 20 public meetings were held in border cities during 1995 and 1996. In Mexico, four regional and several state-level public meetings were held during that same time period. In addition, three binational meetings were hosted by the two federal governments, one in Tijuana, Baja California; one in Nogales, Arizona; and one in Ciudad Juárez, Chihuahua. The historic meetings provided the first forums for border residents to engage in dialogue with officials of both countries at the same time.

- Public meetings are held periodically to update border communities on workgroup objectives, annual implementation plans for the upcoming year, and summaries of accomplishments for the previous year. Implementation plans have been published for 1996 to 2000.

- Binational subworkgroups have been created to facilitate dialogue at the regional and local levels or to address a specific border-wide topic. Some of the subworkgroups have been meeting every 6 to 12 months to provide project updates, discuss policy and implementation issues, and engage stakeholders in overall workgroup planning.

- Border XXI has sought additional input on border

needs and development through interaction with the federal advisory councils of both governments, the Good Neighbor Environmental Board (GNEB), and Mexico's *Consejo Consultivo para el Desarrollo Sustentable, Región 1* (CCDS, or Region 1 Advisory Council for Sustainable Development).

- The EPA El Paso, Texas and San Diego, California border liaison offices were established in 1994 and serve as the principal vehicle for providing outreach on the Border XXI Program and facilitating access to environmental information in border communities. A satellite office is located in Brownsville, Texas. The public has electronic access to environmental information through the following mechanisms: (1) computer work stations that have been installed in the El Paso and San Diego border liaison offices (see below), and (2) the Border EcoWeb, an Internet site that provides links to existing border information.

- SEMARNAP hosted six public meetings in 1997 to discuss the proposed environmental indicators for each Border XXI workgroup. The purpose of the meetings was to provide a forum for border residents, as well as representatives of state and local governments, the private sector, and academic institutions, to offer their perspectives on the proposed indicators before they were finalized. After the *1997 Indicators Report* was published, SEMARNAP organized follow-up workshops in each of the six Mexican border states.

Recommendations

Despite the challenges, it is clear that the public should be more involved in the Border XXI Program than is currently the case. Outreach could be made more effective by: (1) providing more opportunities for public input to Border XXI; (2) revising the structure of the workgroup and National Coordinators meetings to include a well-defined public participation component; (3) establishing stronger links between the workgroups and government representatives in charge of conducting outreach and soliciting input from border communities; (4) developing partnerships with border state agencies to strengthen and facilitate public outreach; and (5) expanding and diversifying environmental information activities to better inform the public about Border XXI.

BUILD CAPACITY AND DECENTRALIZE ENVIRONMENTAL MANAGEMENT

The second strategy of the Border XXI Program, as identified in the *Framework Document*, is to "build capacity and decentralize environmental management in order to augment the participation of state and local institutions . . ." (II.1).

The Border XXI Program has worked to build the capacity of state, local, and tribal governments, as well as that of other border stakeholders, through: (1) technical assistance and training; (2) funding; and (3) strengthening of partnerships and sharing of information. In the United States, emphasis has been placed on building the capabilities of federally recognized tribes, especially as they are related to infrastructure needs and operations. In addition, capacity-building efforts under the Border XXI Program have extended to such areas as environmental education, environmental justice, and industry participation.

Building Capacity through Technical Assistance and Training

The projects described below illustrate some of the capacity-building efforts of the Border XXI Program in the areas of technical assistance and training.

- The Contingency Planning and Emergency Response Workgroup has assisted cities along the border in the development of six sister city contingency plans that set forth in detail coordinated, standard procedures for responding to emergencies involving hazardous substances.
- The Environmental Health Workgroup has helped increase local capacity by developing several health education programs and a health resource data base to maintain quality health care and respond to environmental health emergencies in the border region.
- The Hazardous and Solid Waste and Cooperative Enforcement and Compliance workgroups have enhanced local capacity by developing a range of training programs for state and local officials on various aspects of environmental enforcement and sponsoring compliance seminars for transporters of *maquiladora* hazardous waste.

Building Capacity through Funding

The projects described below illustrate some of the capacity-building efforts of the Border XXI Program that have been realized through funding assistance.

- The BECC has initiated substantial technical assistance efforts related to the development and financing of water, wastewater, and solid waste projects. The efforts are aided by the BECC's Project Development Assistance Program (PDAP). The NADB has approved \$11.6 million to assist 60 communities through the Institutional Development Cooperation Program (IDP).
- The World Bank's *Programa Ambiental de la Frontera Norte de México* (PAFN, or Program for the Northern Border of Mexico) has helped strengthen the capacity of the six Mexican border states and 10 of the municipalities in those states.
- The Border XXI Program has established a U.S.-Mexico Community Grants Program to build capacity for environmental and natural resource protection at the local level by empowering communities to develop area-specific solutions to environmental problems and local environmental education efforts. The border communities were notified of grant opportunities through various media.
- EPA has also provided grant funding to U.S. states to help build capacity in border communities and the industry sector. The states have helped carry out much of the Border XXI work through projects and programs on pollution prevention, water conservation, and air quality monitoring.

Building Capacity through Strengthening of Partnerships and Sharing of Information

The projects described below illustrate some of the capacity-building efforts achieved through partnerships and information cooperation.

- The Environmental Information Resources Workgroup and the border liaison offices have supported capacity building in the border region through the creation and sponsorship of several environmental education initiatives, including: (1) a new border-wide environmental education strategy and five binational cooperative agreements to create a number of environmental education activities along the border region; (2) two guides on environmental education in the border area; (3) a council of educators; and (4) five environmental education binational conferences.
- EPA has made a concerted effort to more effectively engage U.S. border tribes in the Border XXI Pro-

gram. In addition to acknowledging the important environmental and natural resources conservation role of the border tribes in the *Coordination Principles between the Border XXI National Coordinators and the U.S. and Mexican Border States and U.S. Tribes for the Border XXI Program (Coordination Principles)*, EPA has also provided several grants to the tribes to build capacity, with a special emphasis on training.

- To address environmental justice concerns in border communities, EPA is taking a four-pronged approach, which consists of:

- Empowering communities and building local capacity to participate in environmental decision-making and binational activities.
- Ensuring EPA's responsiveness to environmental justice concerns, including development of a strategy to integrate environmental justice into all aspects of the Border XXI Program and other binational activities.
- Assuming a leadership role working with federal, state, and tribal agencies to encourage integration of environmental justice into their border programs.
- Reducing risk, exposure, and other adverse environmental impacts in the border region by ensuring compliance with environmental laws and the clean-up of natural resources.

- Although the SEMARNAP-initiated process of decentralizing environmental management in the six border states in Mexico attained some small achievements, that principal objective has not been met. One of the primary obstacles to broader success has been the fact that only a few limited functions have been placed under state authority, without the provision of the necessary resources to carry them out.

- From 1995 to 1999, SEMARNAP and the northern Mexican border states signed 163 decentralization agreements.

Recommendations

Both governments recognize that much more remains to be done to strengthen the capacity of state, local, and tribal governments and to decentralize environmental management. Future efforts should focus on: (1) facilitating further decentralization through the next border program, including increasing authority and resources at the state

and local levels, particularly in Mexico; (2) enabling the full participation of all border states and U.S. tribes in the Border XXI program; (3) continuing to implement and expand the environmental capacity-building program for Mexican states and municipalities under PAFN; and (4) through training and education, continuing to build state- and local-level capacity related to the promotion of sustainable development.

ENSURE INTERAGENCY COOPERATION

The third strategy of the Border XXI Program, as identified in the *Framework Document*, is to "ensure interagency cooperation to maximize available resources and avoid duplicative efforts on the part of government and other organizations, and reduce the burden that coordination with multiple entities places on border communities" (II.1). This strategy was developed as a direct response to public criticism that federal environment and health activities along the border were implemented in an uncoordinated fashion, often resulting in a duplication of efforts.

Federal-to-Federal Cooperation

The emphasis on binational interagency coordination through Border XXI has helped encourage involvement of a full range of other federal agencies, each participating on a project-by-project basis. The Border XXI Program is also linked to other NAFTA-related institutions such as the Commission for Environmental Cooperation (CEC), the BECC, the NADB, and the International Boundary and Water Commission (IBWC).

State, Local, and Tribal Cooperation

In addition to extensive federal-to-federal cooperation, intergovernmental coordination and cooperation with border states and U.S. tribes has been a key achievement of the Border XXI Program. The partnership role that those entities play was recently formalized through agreement on the *Coordination Principles*. At the National Coordinators Meeting in Ensenada, Mexico in May 1999, all 10 border state environmental agencies, EPA, and SEMARNAP signed the document. Present at the special session during which the document was signed were representatives of 14 U.S. federally recognized border tribes. The *Coordination Principles*

are intended to strengthen partnerships to further enhance the ability of border state agencies and tribes to plan an integral role in the Border XXI Program, including the development of the next border plan.

Although participation has been limited, local governments have played a role in the Border XXI Program. For example, local governments have been involved in the development of binational sister city contingency and emergency plans and recommendations for binational air pollution abatement strategies in specific areas, such as the El Paso County-Ciudad Juárez-Dofia Ana County, New Mexico air basin and the San Diego County-Tijuana region.

Some EPA-supported state initiatives in the border region are not currently part of the Border XXI Program. For example, work being done on pesticides use and exposure is not explicitly covered by any Border XXI workgroup. However, with EPA funding, the four U.S. border states sponsored several information exchange conferences for U.S. and Mexican officials to improve working relationships with agencies responsible for pesticide regulations in Mexico. In the next phase of border planning, pesticides issues may receive more focused attention.

The states play a critical role in helping to address border environmental and natural resource management issues, and EPA encourages continued support for such cooperative efforts.

Cross-Workgroup Cooperation

As each of the Border XXI workgroups' programs developed, it became apparent that many of the individual programs could benefit from collaborative interaction. The benefits of collaboration were especially evident in the case of the Environmental Health Workgroup, which found synergistic opportunities with the Air, Hazardous and Solid Waste, Environmental Information Resources, and Water Workgroups. Since many of the health problems occurring along the border are the result of water- or air-based vectors, it became evident that measured changes in air and water quality were an ideal test bed for measuring changes in health status.

As a result of joint efforts between the Air and Environmental Health Workgroups, preliminary air measurements made by EPA's Office of Research and Development (ORD), in collaboration with the Texas Natural Resource Conservation Commission (TNRCC), concluded that a children's pul-

monary health study would be feasible. The Air and Environmental Health Workgroups continue to work with local agencies to design a study in El Paso County to further analyze the problem.

As a result of joint efforts between the Water and Environmental Health Workgroups, several projects are under way to identify key water bodies for which joint studies could be developed. Projects could be implemented in Nuevo Laredo, Nuevo León; Reynosa, Tamaulipas; El Paso; and Del Rio, Texas as a result of those efforts. In addition, the Environmental Health and Water Workgroups have jointly implemented the *Agua Limpia en Casa* (Clean Water in Homes) program, which is described in the Environmental Health Workgroup segment of the next section.

Coordination between the Cooperative Enforcement and Compliance Workgroup and the Hazardous and Solid Waste Workgroup has resulted in the streamlining of both workgroups. Joint subworkgroup meetings are held regularly, and information is exchanged on case-specific investigations related to the transboundary movement of hazardous wastes between the United States and Mexico. The two workgroups also participate in joint training sessions on regulations related to illegal shipments of hazardous waste, as well as import and export regulations governing hazardous waste and materials. They also train hazardous waste inspectors.

Public- and Private-Sector Cooperation

Federal, state, tribal, and local agencies involved in the Border XXI Program have been working to cultivate strong public and private partnerships with industry.

In March 1999, EPA and the *Procuraduría Federal de Protección al Ambiente* (PROFEPA, or Mexico's Federal Attorney General for the Environment) sponsored the *Environmental Auditing and Pollution Prevention in the Maquiladora Industry* conference, held in San Francisco, California for *maquiladora* parent companies and trade associations. The purpose of the conference was to increase awareness of environmental stewardship and to encourage corporate executives to augment their roles as environmental stewards.

In 1999, EPA and SEMARNAP signed the *Seven Principles of Environmental Stewardship for the 21st Century* (*Seven Principles*) with the U.S.-Mexico Chamber of Commerce (USMCOC) and the BECC. The *Seven Principles* advance the notion of corporate environmental stewardship

and seek to promote sustainable development through the enhancement of environmental compliance and implementation of economically efficient and effective environmental measures. A comprehensive strategy for promoting the effort is currently being developed.

Recommendations

As a result of the efforts and experiences gained, both governments recognize that much more remains to be done to facilitate further binational cooperation at all levels. The following efforts and changes could be considered under the next border program: (1) either refine the program mission for the next phase of border cooperation so that it better reflects the jurisdictions of the environmental and health agencies in both countries (that is, so that it is focused only on those activities over which the environmental and health agencies have influence) or expand the scope of the border program to include other federal agencies in the next phase of the border program; (2) continue to strengthen overall coordination efforts with border states and tribes; (3) initiate mechanisms that will more fully involve local government; (4) continue efforts to promote cross-linkages between workgroups; (5) boost efforts to more closely coordinate with other NAFTA-related institutions; and (6) involve states, tribes, and local governments in the development, quantification, and evaluation of environmental indicators.

THE U.S.-MEXICO BORDER XXI WORKGROUPS: KEY ACCOMPLISHMENTS

This section highlights the major accomplishments of the nine Border XXI Workgroups and provides a brief overview of the program efforts from 1996 to 2000 to preserve the border environment and the health of border residents and to protect the region's natural resources. Although much work remains, the Border XXI Program has made great strides in preventing further environmental deterioration through projects that have fostered improvements in environmental stewardship. This binational cooperation has enabled significant improvements to be made in both the continuity and the uniformity of natural ecosystem and biodiversity preservation. Following are summaries of some of the most relevant accomplishments of each workgroup.⁴

Air

The Border XXI Air Workgroup has advanced knowledge about air quality conditions in principal border sister cities. The workgroup also has coordinated with other agencies to help monitor, prevent, and control air pollution. In addition, progress has been made in Mexico on identifying significant contamination sources through the establishment of the Emission Inventory Development Program.

The Air Workgroup has initiated and conducted binational air program activities in the sister cities of San Diego County, California-Tijuana, Baja California; Imperial County, California-Mexicali, Baja California; Nogales, Arizona-Nogales, Sonora; Douglas, Arizona-Agua Prieta, Sonora; and El Paso County-Ciudad Juárez-Doña Ana County. Recent efforts have concentrated on establishing and operating air quality monitoring networks in Tijuana and Mexicali, similar to those operating in San Diego County and Imperial County and in El Paso County-Ciudad Juárez-Doña Ana County.

In May 1996, the Joint Advisory Committee (JAC) for the Improvement of Air Quality in the El Paso County-Ciudad Juárez-Doña Ana County Air Basin was created to provide locally based recommendations to the Air Workgroup on how to manage air quality in the region. In May 1999, the JAC completed a strategic plan that includes 26 priorities for improving air quality.

Other accomplishments of the Air Workgroup include the development of (1) the *Ciudad Juárez Air Quality Management Program 1998-2002* (published in May 1998), and (2) the *Program to Improve Air Quality in Mexicali 2000-2005* (published in February 2000). Both programs were developed with the participation of various community sectors. It is expected that the *Air Quality Program for Tijuana* will be released in 2000.

The Air Workgroup, in collaboration with the Western Governors' Association (WGA), initiated the Emissions Inventory Development Program to strengthen Mexico's capacity for completing this important air quality planning activity. The cornerstone of the program has been the development of a series of 10 guidance manuals that Mexico's *Instituto Nacional de Ecología* (INE, or National Institute of Ecology) will use as a reference in the development of its revised emissions inventory program. Currently, five manuals have been completed

⁴ The subsections are presented in alphabetical order by workgroup name. In the translation of this *Executive Summary*, the subsections appear in alphabetical order by workgroup name in Spanish.

in both Spanish and English while, at the time this report was prepared, completion of the other five was expected in 2000. INE, in conjunction with the WGA, selected Mexicali as the first city to produce an emissions inventory under the new program. This pilot program for Mexicali began in 1997. The second pilot program for Tijuana began in 1999. Its completion is expected by the end of 2000.

The U.S.-Mexico *Centro de Información sobre Contaminación de Aire para la Frontera México-EUA* (CICA, or Border Information Center on Air Pollution) has been a strong supporter of the workgroup's activities and has provided technical assistance in evaluating air pollution conditions along the border.

In addition, in the spirit of the Border XXI Program, the workgroup formed two specialized subworkgroups to address issues related to (1) energy and (2) vehicle congestion at border crossings.

Contingency Planning and Emergency Response

The U.S.-Mexico Joint Contingency Plan for responding to hazardous material leaks or spills along the border was modified in June 1999 to reflect the institutional and legislative changes that have occurred in both countries. The modified plan changed the binational notification system to ensure timely notification of the appropriate counterpart officials when a chemical accident occurs in the border region.

The Computer-Aided Management of Emergency Operations (CAMEO) system was successfully translated into Spanish for use in the border region. CAMEO is a software system that facilitates chemical emergency response and planning.

In addition, six contingency plans were signed for the following sister city pairs: Eagle Pass, Texas-Piedras Negras, Coahuila; Brownsville, Texas-Matamoros, Tamaulipas; Laredo, Texas-Nuevo Laredo, Tamaulipas; San Luis, Arizona-San Luis Río Colorado, Sonora; McAllen, Texas-Reynosa; and Nogales, Arizona-Nogales, Sonora. The plans address international coordination requirements for responding to emergencies involving hazardous substances.

Cooperative Enforcement and Compliance

The Cooperative Enforcement and Compliance Workgroup formed five regional subworkgroups to strengthen enforcement and compliance strategies and improve coordination

among local, state, and federal agencies on both sides of the border. The first three subworkgroups were established for Texas, New Mexico, and Chihuahua; California and Baja California; and Arizona and Sonora. In 1998, two additional subworkgroups were established for Coahuila and Texas and Nuevo León, Tamaulipas, and Texas.

The regional subworkgroups have cooperated binationally on various investigations, joint inspections, and other specific incidents. Such binational cooperation occurred on the following occasions: (1) an incident involving the import to Mexico of a material identified as enhanced soil; (2) a case involving Alco Pacifico of Mexico; and (3) an incident involving the import to Mexico of empty drums that formerly contained hazardous materials or waste. In addition, the exchange of information has facilitated the detection of illegal shipments to and from the United States and Mexico.

The workgroup has supported a capacity-building training program designed to educate border personnel on environmental enforcement programs. Federal, state, and local environmental officials from Mexico and the United States have participated in this program, along with customs personnel from both countries. As a result, hundreds of individuals have been trained on the legal aspects related to cross-border transportation of hazardous substances, chemicals, and pesticides and the illegal commerce in ozone-depleting substances and flora and fauna.

EPA, PROFEPA, and the border states have collaborated to promote environmental auditing. Since its inception, Mexico's National Environmental Audit Program has enlisted more than 1,345 businesses, 395 of which are located in Mexico's northern border states and 81 of which represent the *maquiladora* industry. In addition, PROFEPA issued 412 Clean Industry Certificates from 1997 to 1999. The certificates were issued to those companies that exhibited timely compliance with action plans established as a result of environmental audits. Each certificate is valid for two years and is renewable for another two-year period.

EPA has worked with PROFEPA to promote environmental auditing efforts among the U.S. parent companies of *maquiladoras*. For example, EPA issued letters to parent companies encouraging those companies to take part in PROFEPA's environmental audit program. EPA also has distributed an informative video that presents environmental audit-

ing as a tool for ensuring compliance and identifying pollution prevention opportunities. Acknowledging the globalization of today's industries, EPA and PROFEPA held a conference for twin plants in March 1999 to promote increased levels of environmental compliance and pollution reduction.

Environmental Health

Some adverse health effects seen along the U.S.-Mexico border appear to be caused by environmental contamination of air, water, and soil by chemical and biological pollutants. The Environmental Health Workgroup has established numerous activities to address these issues and improve the quality of life on the border. Highlights of those activities include:

The **Lower Rio Grande Valley Cross-Border Air Pollution Project** found that transboundary transportation of emissions originating in Mexico did not appear to cause noticeable deterioration of air quality on the U.S. side of the lower Rio Grande Valley border.

As part of the **Pediatric Lead Exposure Initiative**, a laboratory for blood lead analysis was established at the *Hospital Municipal de Tijuana* (Tijuana Municipal Hospital). Local personnel and community members were trained to recognize symptoms of lead poisoning. As a result, not only are children with elevated blood lead levels receiving care, but the sources of the lead exposure are being determined as well. A separate Centers for Disease Control and Prevention/National Center for Environmental Health study in the Arizona-Sonora border region in March 1998 identified no major sites of concern on the basis of the sample population.

The **Advanced Training Project** is part of a binational program to strengthen environmental health capabilities of individuals and institutions in the areas of environmental and occupational toxicology, epidemiology, engineering, and risk communication in the U.S.-Mexico border region. To date, four scholarships have been awarded to public health workers to obtain masters degrees in environmental epidemiology, and several short courses covering epidemiological themes have been conducted.

The **Environmental Health Alert and Communication Project** facilitates access to quality health and environmental information for border communities, health providers, and health officials. In collaboration with the four U.S. border states, the *Environmental Health Yellow Pages*, a resource tool to help identify agencies responsible for specific environmental health issues, have been compiled.

The **Retrospective Study on Pediatric Asthma and Air Quality** focused on children between the ages of 1 and 17 residing in the Paso del Norte airshed who visited an emergency room for asthma treatment. The study showed that there was a positive correlation between levels of particulate matter less than 10 microns in diameter (PM-10) and the incidence of asthma.

The **Toxicology Center Development Project** helps strengthen the ability of Mexican regional, state, and local toxicology centers to respond to environmental emergencies and the clinical needs of poisoned patients. The project also helps improve the capacity of environmental health officials to identify potentially hazardous places and industries. To date, toxicology centers have been established in Hermosillo, Sonora and Ciudad Juárez. A third is being established in Reynosa.

Identifying priorities for the Environmental Health Workgroup and cross-referencing these priorities with other workgroups, particularly those for Water, Air, Hazardous and Solid Waste, and Environmental Information Resources, has allowed Border XXI to ensure that the protection of human health remains the most important goal of the program.

As an example, the Environmental Health Workgroup, together with the Water Workgroup, developed the pilot program Clean Water in Homes in some border communities in Chihuahua and Sonora. The objective was to improve the health conditions of residents of small, impoverished communities that lack basic infrastructure. Such communities often have high infant mortality rates (rates for children under one year) because of gastroenteritis.

Major accomplishments of the program include:

- A decrease (13.2 percent) in enteric diseases
- An increase (13 percent) in water purification awareness

- An increase in water purification practices (between 3.5 and 20 percent)
- An increase (between 3 and 5 percent) in vegetable disinfection

The external assessment conducted by Mexico's *Fundación de México-Estados Unidos para la Ciencia* (FUMEC, or Mexico-United States Foundation for Science) concurred with the program by noting the significant decrease in gastrointestinal diseases in the community.

The program has been highly successful, achieving good results with few resources. The current plan is to extend the program to both sides of the border on a permanent basis.

Environmental Information Resources

With respect to environmental information, the Border XXI Program has made significant progress in developing information systems to facilitate a deeper understanding of the environment. These systems also have helped promote better-informed public participation.

Following is an overview of several projects the Environmental Information Resources Workgroup has implemented.

The **border environmental indicators** are used to measure environmental performance and to provide a basis for assessing both the progress and of Border XXI activities and their impacts on the environment. The indicators are also used to help inform the public about conditions of and pressures on the environment and natural resources and the effectiveness of actions taken to address those concerns. The *1997 Indicators Report* was developed with input from the public. An update of the information published in that report is provided in the individual workgroup chapters of this document.

The **Border EcoWeb** is an environmental inventory being developed for use on the Internet. The multiyear project was undertaken in response to the growing demand for environmental information in the border communities. Border EcoWeb includes environmental information, project lists, and points of contact for environmental border activities.

The *Reporte del Estado Ambiental y de los Recursos Naturales en la Frontera Norte de México* (Report on the State of the Environment and Natural Resources in the Northern Border of Mexico) describes the economic, social,

demographic, natural, environmental, and institutional conditions in Mexico's northern border region. The report also establishes an objective baseline of scientific information related to those parameters.

A **geographic information system** (GIS), developed cooperatively between Mexico's *Instituto Nacional de Estadística, Geografía e Informática* (INEGI, or National Institute of Statistics, Geography, and Information) and the U.S. Geological Survey (USGS), produces aerial photographs and specialized maps of the border region. To date, aerial coverage of the U.S. border has been completed, while aerial coverage of regions in Mexico is still underway. A binational digital map, as well as a variety of GIS applications, will be developed on the basis of the results of the project.

Hazardous and Solid Waste

EPA and INE operated the Hazardous Waste Tracking System (HAZTRAKS) for several years. In 1998, HAZTRAKS was replaced in Mexico with INE's version of a hazardous waste tracking system, known as *Sistema de Rastreo de Residuos Peligrosos* (SIRREP, or Tracking System for Hazardous Wastes). The use of both systems has considerably improved the ability to monitor transboundary hazardous waste shipments in the U.S.-Mexico border region. It is worth noting that a 1999 study carried out by TNRCC determined that the operation of SIRREP and the HAZTRAKS system is the most effective way of tracking the movement of hazardous wastes between the two countries.

Another relevant accomplishment of the Border XXI Hazardous and Solid Waste Workgroup was the negotiation and recent agreement on the *Consultative Mechanism for the Exchange of Information on New and Existing Facilities for the Management of Hazardous and Radioactive Waste within 100 Kilometers of the U.S.-Mexico Border*. The mechanism addresses public concern on both sides of the border related to the siting and operation of hazardous and radioactive waste facilities in the border region. The agreement will allow the two countries to exchange data and other information about new and existing treatment, storage, and disposal facilities in the border region that handle hazardous or radioactive wastes.

Natural Resources

The Natural Resources Workgroup has implemented numerous activities related to biodiversity and natural protected areas. The principal activities were carried out under a letter of intent (LOI) signed in June 1997 between SEMARNAP and DOI. The LOI broadened cooperation to preserve contiguous natural protected areas along the border in two pilot regions, the Sonoran Desert and the Chihuahuah Desert. The agreement established a basis for managing the areas as shared ecosystems. Compatible management systems provide the continuity needed for protection activities and research efforts on both sides of the border. Several projects of common interest have already been implemented in these shared protected natural areas, including: (1) exchange of personnel; (2) capacity building through training; (3) development of species inventories; and (4) cooperation on cultural resources.

In June 1999, SEMARNAP and DOI signed a joint declaration to increase binational cooperation in activities related to the upper San Pedro River basin. The declaration focuses on improving and conserving the basin's natural and cultural resources, including the river and its riparian zone. The agreement includes provisions for policy coordination, instrument formulation, research, transboundary species study, and information exchange.

One of the foremost accomplishments achieved in Mexico has been the establishment of a management system for six natural protected areas in the border region. The system provides for the development of management plans and ensures the availability of personnel, equipment, vehicles, and financial resources for the natural protected areas. In addition, Mexico has identified habitats for species that require special protection, such as the bighorn sheep, the black bear, the pronghorn, the ironwood, and various cacti.

Pollution Prevention

The Pollution Prevention Workgroup has worked to establish pollution prevention, energy efficiency, and recycling as practical methods of achieving economic growth and environmental protection along the U.S.-Mexico border. INE has established a pollution prevention office within the agency; partnerships have been initiated among INE, EPA, the states, industries, and educational institutions along the border. EPA and the states have worked with PROFEPA

to promote pollution prevention as a means of achieving compliance. Highlights have included pollution prevention workshops, held with the cooperation of local governments, industry, and educational institutions, on topics that best suit the needs of the communities.

Three pollution prevention roundtables have been initiated to further promote pollution prevention and energy efficiency as a cost-effective and sustainable way to achieve economic growth while preserving the border environment. Roundtable members consider the concerns and needs of the *maquiladora* industry and view local academic institutions as a way to address those needs through the establishment of sustainable cooperative programs.

By increasing efficiency and promoting pollution prevention as a cost-effective environmental compliance tool, workgroup members have joined together to provide technical assistance along the border. In California-Baja California, technical assistance was provided through a series of workshops targeting the electronic and textile sectors. The workshops educated the industries on methods that would reduce air pollution.

Through the Arizona-Mexico International Green Organization (AMIGO) program, manufacturers, trade associations, and government agencies in the Arizona-Sonora region are invited to participate in AMIGO activities, including the sharing of information about successful waste reduction activities and technology transfer. For their participation in the program, *maquiladora* facilities were presented with awards for environmental excellence.

Along the Texas-Mexico border, TNRCC, in conjunction with PROFEPA's voluntary auditing program, completed 21 on-site technical assistance visits to *maquiladoras*. Reports from participating *maquiladoras* indicated annual reductions of 9,600 tons of hazardous waste, 88,600 pounds of volatile organic compounds (VOC), and 57,400 tons of nonhazardous waste. Further, 37 million gallons of water and 77 million kilowatt hours of electrical energy had been conserved. Through pollution prevention and energy conservation methods, the *maquiladoras* had realized annual savings of almost \$10.1 million.

Rather than leaving costly remediation for future generations, the Pollution Prevention Workgroup endeavors to achieve economic growth and a healthy environment through the prevention of environmental problems. The workgroup

relies heavily on the work of and its partnership with the border states as they continue to collaborate with industry and educational institutions in local communities to carry out pollution prevention efforts.

Water

After five years, the Border XXI Program has made significant progress in implementing infrastructure that addresses water needs in the border regions.

The main improvement in Mexico has been the increase in potable water services between 1995 and 2000 from 88 percent of the population served to 93 percent served. The availability of sewage services also has increased from 60 percent served in 1995 to 75 percent served in 2000, while wastewater treatment improved from 34 percent to 75 percent served. Most border communities in the United States now have 100 percent water and sewage coverage, with the exception of the communities known as *colonias*. However, in most of the *colonias* as well as in other areas, funds have already been allocated for improving systems operations and for increasing water and sewage coverage.

The three levels of government from both countries, as well as binational agencies, have participated in the program. The United States-Mexico Border Infrastructure Cooperation Committee is made up of participants representing EPA, Mexico's *Comisión Nacional del Agua* (CNA, or National Water Commission), both sections of the IBWC, the BECC, and the NADB. Through the committee, the partners work closely to develop policies for implementing potable water and sanitation projects in the region, thereby increasing institutional coordination, streamlining decision making, and optimizing available resources.

The BECC and the NADB were created to collaborate on the preparation, development, implementation, and funding of border infrastructure projects. Since September 1995, the BECC has certified 36 water or sanitation projects on both sides of the border.⁵ Some of the projects have already been completed, while others are in progress or still in the planning stage. Certified projects might receive funding from EPA's Border Environmental Infrastructure Fund (BEIF). The BEIF, which is managed by the NADB, provides grants equal to those provided by federal, state, and local governments. To date,

the BEIF has provided significant funding for several certified projects. In addition, loans are available through the NADB.

Among the many projects in the planning stages are specific programs to provide services to *colonias* and various Indian tribes on the U.S. side of the border. In addition, Indian tribes in the U.S. border area have received funding for sewage and potable water projects through both the Environmental Infrastructure Program for Indian Tribes and the Border Grant Program.

EPA, CNA, BECC, NADB, IBWC, and FUMEC have collaborated on various studies focused on strengthening water utilities. The studies have assisted the utilities in improving the design and planning of various projects, as well as in watershed monitoring.

Special emphasis has also been placed on border watershed management, mainly of the Colorado River and the Rio Grande. Binational committees have been established to address technical problems and collaboration issues. The committees have worked to characterize water quality, with the goal of determining the correlation between the development and maintenance of environmental infrastructure and the water quality of the two rivers.

In addition, the Water Workgroup has helped build capacity in communities on both sides of the border. Most notably, EPA has provided resources to support workshops and the development of training manuals for utility operators.

CLOSING REMARKS

This report provides the first comprehensive account of the efforts over the past five years of the U.S.-Mexico Border XXI Program to improve environmental, health, and natural resource conditions and promote sustainable development in the U.S.-Mexico border region. Through an evaluation of the progress and the limitations of the Border XXI Program, the federal governments of the United States and Mexico hope that the reader will learn more about not only the strengths and weaknesses of the Border XXI Program, but also the complexity of the endeavor and the scale of the challenges that remain. While this report is retrospective, it also marks the beginning of a forward-looking process for augmenting the participation of border resi-

⁵ Number of projects certified as of March 2000.

dents, increasing local-level capacity, and creating additional public and private partnerships to meet the needs of the border region.

The Border XXI partnership has achieved notable successes, among them a vastly increased level of infrastructure development, innovative and wide-reaching mechanisms for addressing border clean-up, accords with border states and tribes, and an ambitious agenda for work with the private sector. The indicators project, updated in this report, provides the public with qualitative and quantitative assessments of those and other aspects of the program. In addition, the Border XXI Program has provided an important mechanism for increasing the depth of public involvement in environmental protection and has provided more information and better tools for doing so than existed before the program began.

Despite substantial efforts and important advances, serious environmental problems remain. Water pollution, poor air quality, lack of infrastructure, exposure to toxics, outbreaks of infectious diseases, and problems related to the

transboundary shipment of hazardous material are just some of the issues that border communities continue to face. Many of the difficulties in addressing these problems are attributable to the area's staggering growth, a growth that, even by the most conservative projections, will result in the near-doubling of the region's population to 19 million people by 2020. This explosive population growth, coupled with unplanned development, has challenged both institutional and infrastructural capacity. Responding to various environmental and health concerns in a vast area experiencing almost limitless growth and having very limited resources, and across cultures, languages, and political systems, has proven to be among the most challenging aspects of the implementation of the program.

The two federal governments acknowledge the seriousness and magnitude of the work that lies ahead and hope that this report helps to spur further dialogue about not only the design and scope of the next border cooperation framework, but also the form and function of future collaborative opportunities.

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