Good Neighbor Environmental Board

Water Resources Management on the U.S.-Mexico Border





Eighth Report to the President and the Congress of the United States

GNEB
The Good Neighbor Environmental Board

February 2005

About the Board

The Good Neighbor Environmental Board is an independent U.S. Presidential advisory committee that operates under the Federal Advisory Committee Act (FACA). Its mission is to advise the President and Congress of the United States on "good neighbor" environmental and infrastructure practices along the U.S. border with Mexico. The Board does not carry out border-region environmental activities of its own, nor does it have a budget to fund border projects. Rather, its unique role is to step back as an expert, nonpartisan advisor to the President and Congress and recommend how the federal government can most effectively work with its many partners to improve the environment along the U.S.-Mexico border. Under Presidential Executive Order, its administrative activities were assigned to the U.S. Environmental Protection Agency (EPA) and are carried out by the EPA Office of Cooperative Environmental Management.

Membership on the Board is extremely diverse. It includes senior officials from a number of U.S. federal government agencies and from each of the four U.S. Border States - Arizona, California, New Mexico and Texas. It also includes representatives from the tribal; local government; non-profit; ranching and grazing; business; and academic sectors. The Board also maintains dialogue with its counterpart Mexican environmental agency advisory groups, the Consejos Consultivos para el Desarrollo Sustenable (CCDS), referred to as Consejos, to help ensure that it remains informed about issues on the Mexico side of the border.

The Board meets three times each calendar year in various U.S. border communities and in Washington, D.C. Its advice is submitted to the U. S. President and Congress in the form of annual reports that contain recommendations for action. These recommendations are submitted after consensus is reached across the entire membership. They are shaped by the combined expertise of the Board members, by the Board's ongoing dialogue with its Consejo counterpart groups, and by the speakers and concerned citizens from both sides of the border who attend its meetings in border communities. The Board also occasionally issues Comment Letters during the year to provide input on timely topics. One of the most frequently recurring themes in its advice is that support for cross-border cooperation is essential if sustained progress is to be made on environmental issues along the U.S.-Mexico border.

All meetings of the Good Neighbor Environmental Board are open to the public. For more information, see the Board website at www.epa.gov/ocem or contact the Designated Federal Officer, Elaine Koerner, at (202) 233-0069.

Notice

This report was written to fulfill the mission of the Good Neighbor Environmental Board (the Board); a public advisory committee authorized under Section 6 of the Enterprise for the Americas initiative Act, 7 USC, Section 5404. It is the Board's Eighth Report to the President and Congress of the United States. The U.S. Environmental Protection Agency (EPA) manages the operations of the Board. However, this report has not been reviewed for approval by EPA and, hence, the report's contents and recommendations do not necessarily represent the views and policies of EPA, nor of other agencies in the Executive Branch of the federal government, nor does mention of trade names nor commercial products constitute a recommendation for use.

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5) Elephant Butte Reservoir — Source: NOAA

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GNEB
The Good Neighbor Environmental Board

March 8, 2005

The President
The Vice President
The Speaker of the House of Representatives

On behalf of the Board, your advisor on environmental and infrastructure conditions along the U.S.-Mexico border, I am pleased to submit to you the Eighth Report of the Good Neighbor Environmental Board.

For our report this year, we focus on the continued conundrum of how to most effectively manage the border region's water resources as the need for solutions becomes more urgent. We first survey the numerous institutions currently charged with water resources management and recommend approaches for increasing cross-institutional partnerships. We also assess the current status of water resources data gathering and data sharing, with special attention on groundwater. In the third section, we turn to strategic planning and binational collaboration, which must be the foundation of water resources management work across the entire border region. Finally, to round out our examination, we include a tribal perspective on this complex topic.

Our advice to you can be summarized as three key actions:

Institutions Clarify current responsibilities held by U.S.-Mexico border-region institutions responsible for managing its water resources. Identify jurisdictional gaps and overlaps, interpret missions to reflect changing circumstances, and leverage opportunities for stronger cross-institutional collaboration.

Data Develop and sign formal U.S.-Mexico border-region water resources data agreements. Such agreements should support the collection, analysis and sharing of compatible data across a wide range of uses so that border-region water resources can be more effectively managed.

Strategic Planning Implement a 5-year U.S.-Mexico border-region integrated water resources planning process. Using a stakeholder-driven watershed approach, address immediate concerns in critical areas while pursuing collaborative longer-term strategies.

The Good Neighbor Environmental Board appreciates the opportunity to offer these recommendations to you and respectfully requests a response. We welcome continued dialogue with the Executive Branch and Congress on implementation of our advice.

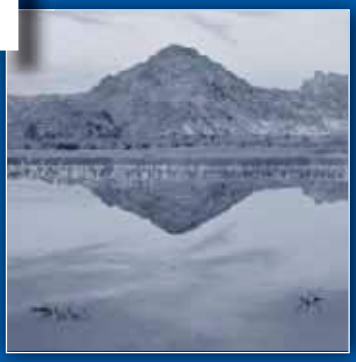
Respectfully yours,

Paul Ganster
Chair

Good Neighbor Environmental Board Eighth Report Recommendations at a Glance

In order to more efficiently and effectively manage water resources throughout the U.S.-Mexico border region, the Good Neighbor Environmental Board recommends that the U.S. President and Congress, in full cooperation with Mexican authorities as appropriate, enable the following recommendations to be carried out:

1



Institutions

Clarify current responsibilities held by U.S.-Mexico border-region institutions responsible for managing its water resources. Identify jurisdictional gaps and overlaps, interpret missions to reflect changing circumstances, and leverage opportunities for stronger cross-institutional collaboration.

2

Data

Develop and sign formal U.S.-Mexico border-region water resources data agreements. Such agreements should support the collection, analysis and sharing of compatible data across a wide range of uses so that border-region water resources can be more effectively managed.

3

Strategic Planning

Implement a five-year U.S.-Mexico border-region integrated water resources planning process. Using a stakeholder-driven watershed approach, address immediate concerns in critical areas while pursuing collaborative longer-term strategies.

U.S.-Mexico Border Map Highlighting Water Supplies Pertinent to this Report

Water Resources Management on the U.S.-Mexico Border

Eighth Report of the Good Neighbor Environmental Board to the President and Congress

THE TOPIC FOR THIS YEAR'S REPORT TO THE PRESIDENT AND CONGRESS is management of the U.S.-Mexico border's water resources. After considerable deliberation, the Board selected this topic despite the level of its complexity, and with the clear sense that there would be no easy answers, no simple advice. The Board also was aware that other seminal border institutions have tackled this subject in recent years and provided valuable insights to policy makers. In fact, several of these institutions are cited in the pages that follow.

At the same time, the Board views its own assessment of the situation, and the recommendations that have emerged, as a much-needed additional voice in the debate. To its knowledge, it is the only U.S.-Mexico border environmental advisory group in the United States that operates by consensus and reflects perspectives from virtually every sector: private; academic; local, state, and federal government; tribal; and non-governmental, including health groups and environmental organizations. Moreover, its meetings in border communities each year give members an opportunity to supplement their own expertise and experience with the perspectives of community residents, first-hand.

In selecting this topic, the Board decided from the start that it would primarily concentrate its advice on how best to work within the current scenario. While it recognizes that some border-region environmental analysts are calling for major institutional reform and sweeping changes to existing law, the Board's view is that much can be done within the current regime, and that supporting good work under way should also receive its due. Therefore, the pages that follow contain many examples of collaborative work *(see Projects and Partnerships sections)* already taking place. It also has opted, in many cases, to call for actions *(see Next Steps sections)* that build on current successes and are incremental rather than all encompassing.

One notable exception is the Board's call for a region-wide integrated water resources planning process, using a stakeholder-driven watershed approach. In the view of the Good Neighbor Environmental Board, institutionalization of such a process is absolutely essential if sustainable management of U.S.-Mexico border water resources is ever to be achieved.

Recommendation 1

Clarify current responsibilities held by U.S.-Mexico border-region institutions responsible for managing its water resources. Identify jurisdictional gaps and overlaps, interpret missions to reflect changing circumstances, and leverage opportunities for stronger cross-institutional collaboration.





"We encourage further development of new binational water quantity and ground water management institutional arrangements at key locations along the border."

— Second Annual Report of the Good Neighbor Environmental Board Annual Report, April 1997

1 Institutions

NUMEROUS BORDER-REGION water management institutions have sprung up over the years to help determine how its scarce water resources can best be used, and their quality best safeguarded. These commissions, agencies, districts, and other entities continue to carry out responsibilities that are a reflection of the political and cultural concerns of the era during which they were established. Some came into existence over a century ago, by treaty, such as the precursor to the International Boundary and Water Commission (IBWC, 1896). Others are more recent, such as the U.S. Environmental Protection Agency (USEPA 1970) and its counterpart federal Mexican environment agency, which was founded in 1972 and now is called the Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT).

In Mexico, a fairly homogeneous system of laws and institutions exists for both surface and ground water management. Water is owned by the nation and regulated by the National Water Law, which is administered primarily by the National Water Commission (Spanish acronym is CNA). Water management remains largely a federal responsibility, although CNA has delegated some functions, such as wastewater treatment and potable water delivery, to state agencies and municipalities. Mexican legislation has established a national system of watershed councils, initially for the larger basins such as the Río Conchos and the Río Colorado.

In the United States, groundwater management is the jurisdiction of the states, and surface water management responsibilities generally also reside within state government. Each of the four U.S. border states has a management system that differs somewhat from the other three. In addition to state involvement, the U.S. system also involves tribal, federal, regional, and local governments. Local entities may include irrigation districts, publicly regulated utilities such as public water supply systems, and domestic water users. Often, the responsibilities of supply planning and regulation overlap. Newer management approaches, such as integrated watershed management, are emerging in U.S. border states such as California.

As demand for the region's scarce water continues to grow, many institutions charged with responsibility for particular aspects of water resource management find their missions stretched well beyond the original intentions. Moreover, new issues of concern have arisen in recent decades that may affect institutional responsibilities related to water resources management, such as climate change and variation. Some feel that the Southwest will be disproportionately affected by this phenomenon, with increased temperatures, reduced snow pack, and shifting of rainfall patterns. The implications of these potential changes for water resources management institutions could be far-reaching.

Even if institutional resources were available to carry out broader interpretations of responsibilities and incorporate new issues, a number of gaps in management responsibilities would nevertheless remain. Moreover, while these gaps are difficult enough to close between states within one nation, they present even greater challenges in the trans-boundary context. Many border institutions continue to demonstrate a willingness to grow and change with the times, and some very good work is being done, both by individual entities and through collaborative initiatives. But the challenge is great, and there are limits to what can be accomplished. The time has come to focus greater attention on how best to enable these key actors to carry out their charge.

WHO MANAGES WATER RESOURCES ALONG THE U.S.-MEXICO BORDER?

Managing the border region's water resources touches government at all levels as well as many other types of organizations. Overall, the U.S. institutional framework tends to be much more decentralized than that in Mexico. Binational institutions also play a key role in short and longer-term management, be they comprised of both federal governments (such as IBWC), state governments (such as the Arizona-Mexico Commission), university consortia (such as the Southwest Consortium for Environmental Research and Policy [SCERP]), or others. The following section provides an overview of U.S. and Mexican institutions with water resources responsibilities. Note that its contents are representative and not necessarily inclusive.

U.S. INSTITUTIONS

FEDERAL DEPARTMENTS AND AGENCIES

Federal government institutions in the United States play a major role in carrying out water quantity and quality management responsibilities. They develop large-scale water projects as well as oversee water quality and quantity issues. In some cases, they have direct management responsibilities, while in others, they provide water quality and quantity information for managers.

U.S. Army Corps of Engineers (Corps) is responsible for flood control projects, building and operating flood control reservoirs that have a water supply component. *www.usace.army.mil*

U.S. Bureau of Reclamation (USBR) works with utilities to operate the canals, aqueducts, reservoirs, and power generation facilities over which they have jurisdiction. All USBR efforts are related to surface water supplies. *www.usbr.gov*

U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) plays an active role in managing and mitigating agricultural non-point source pollution. NRCS conservation specialists assist individual operators through technical assistance and cost-sharing programs that help users develop best management practices (BMPs) to reduce water quality/quantity impacts. *www.nrcs.usda.gov*

U.S. Department of Agriculture, Forest Service (USFS) manages several million acres of watersheds within the National Forests at the headwaters of the Colorado and Rio Grande Rivers, located primarily outside of the border states. These watersheds are managed both for quality and quantity. *www.fs.fed.us*

U.S. Department of the Interior, Geological Survey (USGS) has responsibility for providing reliable, impartial stream gaging and water quality monitoring of both surface and ground water to enhance and protect the quality of life, and to contribute to wise economic development as well as a sustainable future. *www.usgs.gov*

U.S. Environmental Protection Agency (EPA) has federal oversight over the implementation of surface water and drinking water quality programs. EPA is also the only federal agency with a regulatory role in governing some facilities that affect groundwater; this groundwater role deals with oversight of state efforts regulating solid waste landfills, hazardous waste sites, and underground storage tanks. EPA oversees the Border Environment Infrastructure Fund (BEIF), and works closely with BECC and NADB in the development of potable water and wastewater projects within 100 km of the U.S.-Mexico border. EPA, along with its counterpart in Mexico, SEMARNAT, oversees the Border 2012 program, which is devoting considerable resources to water-related issues along the border. *www.epa.gov*

U. S. Section of the International Boundary and Water Commission (USIBWC) ensures that the U.S. complies with the Convention of 1906 and the1944 Water Treaty. *(see Mexican Institutions for activities of the Mexican Section)* These treaties address allocation and delivery of surface waters (not groundwater). To carry out these responsibilities, the USIBWC maintains gaging stations on the rivers it manages. Its headquarters are in El Paso, Texas. *www.ibwc.state.gov*

USIBWC also undertakes water-related projects in each U.S. border state. Details follow:

California: USIBWC regularly monitors discharges into the New River at Mexicali, Baja California and has supported wastewater infrastructure development in

Mexicali. It is also responsible for the Tijuana River Flood Control Project that spans the border between San Diego, California and Tijuana, Baja California. More recently, the South Bay International Wastewater Treatment Plant, which treats sewage from Tijuana at a U.S. plant, was constructed. IBWC has also been involved in binational issues related to the delivery of Colorado River water to San Diego and Tijuana.

Arizona: USIBWC manages binational flood control and sanitation projects that span Nogales, Arizona and its sister city, Nogales, Sonora. The USIBWC operates the Nogales International Wastewater Treatment Plant, which treats sewage from both countries. Along the Lower Colorado River, USIBWC coordinates with USBR to ensure delivery of Colorado River water to Mexico. It also works on other binational issues such as flood control, salinity, and aquatic weeds.

New Mexico: In New Mexico, USIBWC manages the Rio Grande Canalization Project for 105 miles, from Percha Dam, New Mexico to El Paso, Texas. This project is a water delivery and flood control project to ensure delivery of Rio Grande water to users in the United States and to Mexico under the Convention of 1906.

Texas: Here, USIBWC manages two international reservoirs, the Amistad and the Falcon reservoirs. Responsibilities include releasing waters for Texas users at the request of the Rio Grande Watermaster of the Texas Commission on Environmental Quality (TCEQ). It also manages flood control projects. In addition, the U.S. Section works on water quality projects including wastewater treatment plants and surface water quality monitoring of the Rio Grande.

STATE GOVERNMENTS

State agencies in the United States also can develop large-scale water projects and oversee water quality and quantity issues. States administer water rights, set water quality standards (subject to U.S. Environmental Protection Agency review), and sometimes also manage groundwater supplies. Among the four U.S. border states, differences in management approaches are apparent. For instance, in three of the four states — Arizona, California and New Mexico — surface water quality and water quantity management are shared between two separate agencies. In Texas, by contrast, although one agency is in charge of both of these functions, water planning falls to a completely different agency. Groundwater also is managed differently from state to state. In Texas and California, for example, groundwater withdrawal is essentially

The Citizens Congressional Task Force on the New River has undertaken a pilot wetlands project to reduce agricultural pollutants in the river, thereby improving the quality of water it discharges into the Salton Sea. Rows of bulrush reeds filter the water as it flows from pond to pond.

(Source: New River Wetland Project Progress Report, Eldon R. Caldwell, Imperial Valley College)

a private property right and has little or no regulation, while Arizona and New Mexico have stricter levels of management.

CALIFORNIA

California Environmental Protection Agency (CalEPA) is the state-level agency with responsibility for environmental and human health protection. *www.calepa.ca.gov*

California Department of Health Services (DHS) has regulatory responsibility for control of the quality of utilities providing drinking water from either surface or groundwater sources. *www.dhs.ca.gov*

California Department of Water Resources (DWR) is the state's main water utility. It operates the California Water Project, which serves water to the San Francisco Bay area, the Central Coast, and Southern California. The DWR has broad powers to study and plan for large (regional) future water supply needs. *www.dwr.water.ca.gov*

California Public Utilities Commission (PUC) supervises investor-owned utilities furnishing drinking water. While it generally is concerned with rate structure, its broad authorities often lead it into water supply planning. *www.cpuc.ca.gov*

California State Water Resources Control Board (SWRCB) has broad regulatory responsibility over both surface and groundwater, including supervision of all appropriative surface water rights instituted after 1914.

It is charged with protecting the quality of both sources through regulatory programs. *www.swrcb.ca.gov*

ARIZONA

Arizona Department of Environmental Quality (ADEQ) Core responsibilities include pollution control; monitoring and assessment; compliance management; cleanups of contaminated soil and water; education and outreach; financial assistance; and policy development. It issues permits, approvals and certifications to ensure that facilities are legally constructed and operated. Regulatory controls are implemented to ensure that any discharges to the air, water and soil are within established standards. ADEQ planning specialists develop management practices and control strategies in areas where standards are not being met. The agency also issues permits for effluent reuse, aquifer recharge projects, and ensures that discharges to aquifers or stream beds comply with water quality standards. It also oversees the removal and cleanup of contaminated soil and water. The agency's emergency responders also help local fire and police efforts to contain and clean up hazardous chemical releases including those that can threaten surface water or groundwater. *www.azdeq.gov*

Arizona Department of Water Resources (ADWR) was established to administer the provisions of the Arizona Groundwater Management Code. It administers and enforces Arizona's groundwater code and surface water rights laws (except those related to water quality); negotiates with external political entities to protect Arizona's Colorado River water supply; oversees the use of surface and groundwater resources under state jurisdiction; and represents Arizona in discussions of water rights with the federal government. *www.water.az.gov/adwr*

Water Infrastructure Finance Authority (WIFA) is an independent state agency authorized to finance drinking water, wastewater, wastewater reclamation, and other water quality facilities and projects. Generally, WIFA offers borrowers below-market interest on loans for one hundred percent of eligible project costs. WIFA's principal tools for providing low interest financial assistance include the Clean Water Revolving Fund and the Drinking Water Revolving Fund. Both funds are capitalized by contributions from the state and the U.S. Congress. WIFA also manages a Technical Assistance (TA) program. *www.azwifa.gov*

Arizona Water Banking Authority (AWBA) promotes and facilitates full use of Arizona's allocation of Colorado River water. It was created to store unused Arizona Colorado River water to meet future needs. Responsibilities also include assuring adequate supply to municipal and industrial users; meeting the management plan objectives of the Arizona Groundwater Code; and assisting in the settlement of Indian water rights claims. *www.awba.state.az.us*

NEW MEXICO

New Mexico Environment Department (NMED) Comparable to CalEPA and ADEQ, NMED's mission is to promote a safe, clean, and productive environment throughout the state. The agency is composed of five sections including its Water and Waste Management Division, which primarily addresses water quality issues. This Division includes four bureaus, with the Ground Water Quality Bureau (GWQB) and the Surface Water Quality Bureau (SWQB) overseeing water quality regulations. *www.nmenv.state.nm.us*

New Mexico Interstate Stream Commission (ISC) and **New Mexico Office of the State Engineer (OSE)** are separate, but companion, agencies charged with administering the state's water resources. They have power over the supervision, measurement, appropriation and distribution of almost all surface and ground water in New Mexico, including streams and rivers that cross state boundaries. *www.seo.state.nm.us*

New Mexico Office of Natural Resources Trustee (ONRT) Appointed by the governor, ONRT represents the state's interest in the recovery of damages incurred by natural resources on state land under two federal statutes, the Water Pollution Control Act and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). ONRT is housed within NMED. *http://legis.state.nm.us/04BudgetWeb/668.pdf*

New Mexico Water Quality Control Commission (NMWQCC) is the state water pollution control agency for New Mexico under the federal Clean Water Act. It also oversees state compliance with the wellhead protection and sole source aquifer programs of the federal Safe Drinking Water Act.
www.nmenv.state.nm.us/OOTS/wqcc.htm

TEXAS

Texas Commission on Environmental Quality (TCEQ) Like its counterparts CalEPA, ADEQ, and NMED, TCEQ is the state's official environmental agency. It oversees water rights and sets state water quality standards to protect public health, recreation, and aquatic life. It also has broad oversight for surface water and ground water quality, as well as for safe drinking water management and enforcement. *www.tceq.state.tx.us*

Texas Groundwater Protection Committee Chaired

by the TCEQ, TGPC was created by the Texas Legislature in 1989. It coordinates groundwater quality protection activities among state agencies and the Texas Association of Groundwater Districts. TGPC also documents groundwater contamination in its annual Joint Groundwater Monitoring and Contamination Report. *www.tgpc.state.tx.us*

Texas Parks and Wildlife Department (TPWD) monitors water quality with an emphasis on protecting the health of aquatic life and its habitat. TPWD also is responsible for wetlands protection and for investigating fish kills or any other instances of pollution that harm or threaten wildlife. *www.tpwd.state.tx.us*

Texas State Soil and Water Conservation Board is responsible for controlling and reducing state agricultural non-point source (NPS) and water pollution. It also administers federal grants for projects that control agricultural non-point sources of water pollution such as fertilizer run-off. *www.tsswcb.state.tx.us*

Texas Water Development Board (TWDB) is responsible for developing a State Water Plan through regional water planning groups. It also conducts research on aquifers, water availability, and environmental flow needs, as well as periodic surveys of groundwater use. Other responsibilities include providing technical and financial assistance, including administering the Drinking Water State Revolving Fund for Texas. *www.twdb.state.tx.us*

ANCILLARY STATE AGENCIES

Even though they are not primarily responsible for water resources management, an additional set of state agencies encounter water management issues in the course of carrying out their missions. Several examples:

Department of Toxic Substances Control (California)

Department of Pesticide Regulation (California)

Integrated Waste Management Board (California)

Energy, Minerals and Natural Resources Department (New Mexico)

Office of Rural and Community Affairs (Texas)

Railroad Commission (Texas)

REGIONAL SPECIAL DISTRICTS

In some cases, special districts operate and maintain regional water supplies and wastewater treatment projects. These special entities have broad powers related to managing supplies. Their domain may include planning, procurement either through developing or contracting necessary supplies; operating storage and conveyance facilities, and securing revenues to fund the systems. They also may handle both surface and groundwater supplies that are used for municipal as well as agricultural use. Special districts commonly function as water supply utilities in the border region. Examples include:

Metropolitan Water District of Southern California (California)

Imperial Irrigation District (California)

Central Arizona Groundwater Replenishment District (Arizona)

Salt River Project (Arizona)

Elephant Butte Irrigation District, New Mexico (New Mexico)

Hidalgo County Irrigation District No. 2, Lower Rio Grande Valley, Texas (Texas)

INTERSTATE COMPACTS AND AGREEMENTS

The Rio Grande and Colorado River Compacts ensure deliveries of waters from those rivers to participating states. Rio Grande Compact states are Colorado, New Mexico, and Texas. For the Colorado River Compact, they are Wyoming, Colorado, Arizona, California, Nevada, New Mexico, and Utah.

The New Mexico-Texas Water Commission was formed as part of a 1991 settlement agreement after a protracted dispute over water supplies in the El Paso/Las Cruces area. Participants include local government, water utilities, irrigation districts, and universities in El Paso County, Texas and southern New Mexico.

The Pecos River Compact Commission oversees the **Pecos River Compact** between New Mexico and Texas. The terms provide for the equitable distribution of the waters of the Pecos River, a Rio Grande tributary.

The Upper Colorado River Commission, comprising the States of Colorado, New Mexico, Utah, and Wyoming,

administers the **Upper Colorado River Basin Compact.** This compact addresses the uses and deliveries of the water of the Upper Basin of the Colorado River, which is defined as the portion upstream of Lee Ferry. The State of Arizona also receives water allotments under this compact.

INDIAN TRIBES

The U.S. portion of the border region includes 27 Indian tribes.

COURTS

Courts continue to play a major role in surface water adjudication and in groundwater appropriations. For example, California state courts have the responsibility for resolving disputes regarding surface water appropriations that predate 1914, almost all groundwater appropriations, and issues of riparian use. In Texas, most groundwater pumping is based on case law. However, in instances where Indian rights, interstate compacts, or federal rights are concerned, the issues may fall under the federal court system.

COUNTY GOVERNMENTS

In some cases, county governments have some regulatory authority. In Texas, for example, they can operate water and wastewater treatment plants, and in California, they have some authority to regulate the quality of local drinking water supplies.

LOCAL AGENCIES AND PRIVATE UTILITIES

Many municipalities serve as their own water utility and, as such, have the same development and operational powers listed for regional and special districts. This scenario also applies to private utilities that operate water supply systems under state regulation, whether it be from the TCEQ in Texas or the PUC in California.

NON-GOVERNMENTAL ORGANIZATIONS

U.S. non-governmental organizations (NGOs) track the activities of groups with water resources management responsibilities, commenting on their work and sometimes instigating litigation. In other cases, they carry out their own community projects and research. Some NGOs specifically work to ensure that ecosystems "rights" receive their due in policy discussions. Examples of U.S. NGOs working on water issues in the border region include the National Wildlife Federation, Environmental Defense, Texas Center for Policy Studies, and the Sonoran Environmental Research Institute.

MEXICAN INSTITUTIONS

FEDERAL DEPARTMENTS AND AGENCIES

The Mexican system for managing its water resources is, comparatively, much more centralized than that in the U.S. In Mexico, the federal government administers water rights and sets water quality standards. Article 27 of the Mexican Constitution states that Mexico's water resources belong to the nation (public).

The federal government in Mexico still plays a major role in water management and financing water infrastructure. Historically, water there has been heavily subsidized and users are accustomed to paying little for it. Local governments tend to have weak finances and limited expertise in managing water systems, although this scenario is changing, particularly in the northern border states. Rapid urban and population growth, along with inadequate budgets, are factors that prevent local governments from fully managing water.

In December 2004, Mexico enacted reforms to its National Water Law of 1992. The reforms support an evolution toward decentralization, and the formation of the Consejos de Cuenca (Watershed Councils). Provisions focus on watershed-specific issues, with water scarcity a primary concern for watersheds in the northern border states. The reforms also give local authorities a greater role in enforcing water quality regulations.

Mexican Section of the International Boundary and Water Commission (Mexican Section, IBWC) is linked administratively to Mexico's Ministry of Foreign Relations (Secretaría de Relaciones Exteriores). The Mexican Section, jointly with its U.S. counterpart, is responsible for applying the boundary and water treaties between the United States and Mexico, and for settling any differences that arise in the application of the treaties. Within this context, the Mexican Section is responsible for assuring and exercising Mexico's sovereign rights over the water resources and territorial boundaries with the United States. It operates some projects jointly with the U.S. Section, including Amistad and Falcon international storage dams on the Rio Grande. It also is responsible for accounting for the national ownership of waters of the Colorado River and the Rio Grande, operating and maintaining flood control projects, addressing border sanitation problems, and conducting studies and investigations. The Mexican Section has its headquarters in Ciudad Juarez, Chihuahua with field offices in Mexican border cities from Tijuana, Baja California to Reynosa, Tamaulipas. Together with the U.S. Section, the Mexican section has the authority to conclude international agreements, known as Minutes, subject to the approval of the governments of both countries.

National Water Commission (Comisión Nacional del Agua—CNA) is housed within the Ministry for Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales—SEMARNAT). CNA was created in 1989 as a federal agency designated by law to manage the nation's water and coordinate its investment programs. It has central offices in Mexico City, 13 regional offices, and offices in every Mexican state. Because water functions are much more centralized in Mexico, CNA's mission and responsibilities are much greater than those of corresponding federal agencies in the U.S. Its scope includes the following activities:

- Integrate water planning and management;
- Guarantee adequate institutional coordination among the three levels of government;
- Reinforce the role of government as a regulator and in the decentralization of responsibilities;
- Design and build water infrastructure;
- Define and implement financial mechanisms to support the development of water resources and to promote greater participation of users and society as a whole;
- Promote efficient use of water in the agricultural sector;
- Promote an increase in water coverage and the quality of water, sewage, and sanitation services;
- Achieve sustainable and integral management of water in watersheds and aquifers;
- Promote the technical, administrative, and financial development of the hydraulic sector;
- Strengthen the participation of users and civil society in water management and in the promotion of a water culture; and
- Provide risk management to address the effects of floods and droughts.

STATE GOVERNMENTS

Many Mexican states have retained much of the responsibility for day-to-day management of water resources although, according to Article 115 of the Mexican Constitution, local governments (municipalities) are responsible for water and sanitation services. These state agencies are in charge of the construction and maintenance of water infrastructure in each municipality.

BAJA CALIFORNIA

State Water Commission for Baja California (Comisión Estatal del Agua, Baja California) **(CEA)** is responsible for planning and coordinating activities related to water and wastewater management throughout the state. It is also responsible for water quality and distribution.

State Water Services Commission (Comisión de Servicios de Agua del Estado) (COSAE) is responsible for water management at the state level and for water distribution to the state public services commissions in Baja California. COSAE also is responsible for operating and maintaining the state's aqueducts, and is an intermediary in water purchases.

SONORA

State Water Commission for Sonora (Comision Estatal del Agua) **(CEA)** has similar responsibilities to those of the Baja California CEA.

State Commission for Potable Water and Sewerage (Comision Estatal de Agua Potable y Alcantarillado del Estado de Sonora) (COAPAES) is responsible for management of water and wastewater infrastructure systems. It manages systems statewide and, in particular, communities where the responsibility has not been delegated for municipal control. With a trend of increasing delegation of this state responsibility to municipalities, the duties are shifted to municipal entities called OOMAPAS (Municipal Operating Agencies for Potable Water, Sewerage, and Sanitation).

CHIHUAHUA

Central Water and Sanitation Board of Chihuahua (Junta Central de Agua y Saneamiento, Chihuahua) (JCAS) is the state-level agency, and the Junta Municipal de Agua y Saneamiento de Ciudad Juárez provides water and wastewater services at the local level.

COAHUILA

State Commission for Water and Sanitation of Coahuila (Comisión Estatal de Aguas y Saneamiento de Coahuila) (with branches in Piedras Negras and Cd. Acuña, Coahuila)

NUEVO LEON

Water and Drainage Services of Monterrey (Servicios de Agua y Drenaje de Monterrey)

TAMAULIPAS

State Office of Water Resources (Dirección General del Recurso de Agua) has two units, one for watersheds and the other for potable water and sewage.

WATERSHED COUNCILS

This past year's reforms to Mexico's National Water Law include a call for the formation of Watershed Councils (Consejos de Cuenca). For each watershed, stakeholder groups, CNA, federal, state and local agencies, and representatives of water users are tasked with creating and implementing programs and activities that support the health of that watershed. Other intended results include improved management practices, infrastructure and services.

INTERSTATE COMPACTS AND AGREEMENTS

In 2002, Mexican President Vicente Fox and the Governors of the States of Chihuahua, Nuevo Leon, and Tamaulipas signed an **Agreement for the Sustainable Use of Surface Water in the Rio Grande Basin** (Acuerdo Para El Uso Sustentable Del Agua Superficial En La Cuenca Del Rio Bravo). The agreement discusses plans to implement water conservation projects, revise surface water distribution regulations, and re-establish balance in the basin.

LOCAL IRRIGATION DISTRICTS

A number of Mexican irrigation districts exist in the northern border states, including Distrito de Riego 009 Valle de Juárez in Chihuahua, Distrito de Riego 025 Bajo Río Bravo in Tamaulipas, and Distrito de Riego 14 Río Colorado in Baja California, to name a few. Annual water allotments to the irrigation districts are authorized by CNA.

NON-GOVERNMENTAL ORGANIZATIONS

Mexican NGOs have become increasingly involved in water issues in recent years and are making their voices heard among policymakers in Mexico. In general, the NGO sector in Mexico is not as well-established or well-funded as that in the United States. A number of the Mexican NGOs have magnified their impact by partnering with organizations across the border. For example the Border Environmental Education Project (Proyecto Fronterizo de Educación Ambiental) collaborates with the Center for Latin American Studies at the University of Arizona to organize the Conference on the Border Environment, a bi-annual gathering of border environmental organizations and government agencies from both countries. Substantial transboundary cooperation among NGOs has existed to address water management and environmental issues in the Conchos River Basin in Chihuahua involving groups such as ProFauna, A.C. and BioDesert, A.C, as well as the Texas Center for Policy Studies and World Wildlife Fund (Mexico and U.S.). The Ecological Association of the Users of the Hardy and Colorado Rivers (Asociación Ecológica de Usuarios del Río Hardy y Colorado AEURHYC) has worked closely with other NGOs in both countries on issues related to the Colorado River Delta region.

While some of these groups focus on habitat restoration and watershed management, others, like Aqua 21 in Ciudad Juarez, Chihuahua, promote water resources issues such as conservation, safe drinking water, and environmental awareness through educational activities.

OTHER ORGANIZATIONS AND GROUPS

Mexican courts, indigenous groups, and other entities also play a role in water management activities.

PROJECTS AND PARTNERSHIPS

In keeping with its practice of including noteworthy collaborative work in its annual reports, the Board wishes to cite the following examples of 2004 institutional projects and partnerships:

International Boundary and Water Commission (IBWC)

A long-standing feature of water resources management in the border region, the International Boundary and Water Commission, United States (U.S.) and Mexico (IBWC), is responsible for applying boundary and water treaties between the two countries. Its mission includes the operation and maintenance of Falcon and Amistad Dams on the Rio Grande; flood control projects on the Rio Grande, Colorado and Tijuana Rivers; determination of the national ownership of the waters of the boundary rivers; water quality monitoring and salinity control; operation of international wastewater treatment plants; and mission-relevant studies and planning efforts.

During 2004, IBWC implemented a significant internal realignment and deployed additional staff to USIBWC field offices. The changes are intended to boost agency efficiency and effectiveness while increasing communication with stakeholders. A major focus was the issue of Mexico's deficit in Rio Grande water deliveries to the United States under the 1944 Water Treaty. Persistent negotiations and increased precipitation in the basin led to a significant reduction in the deficit; Mexico delivered more than 900,000 acre-feet during the water delivery year that ended September 30, 2004 — 260% of the annual average required under the treaty. Another accomplishment was the signing of Minute No. 311, "Recommendations for Secondary Treatment in Mexico of the Sewage Emanating from the Tijuana River Area in Baja California, Mexico." This Minute advances efforts to construct a wastewater treatment plant to provide secondary treatment of effluent from IBWC's advanced primary treatment plant in San Diego through a public-private partnership.

The Commission also continued to operate and maintain its flood control projects. It moved ahead on its program to evaluate the stability of its Rio Grande flood control levees. The evaluation will enable IBWC to prioritize levee segments to be repaired or rehabilitated.

In other 2004 activities, public outreach was a priority for the U.S. Section of the Commission. Through its Citizens' Forum program, USIBWC held quarterly informational public meetings in the Lower Rio Grande (TX), El Paso (TX) - Las Cruces (NM), Southeast Arizona, Colorado River (AZ-CA) and San Diego (CA). Community board members assisted in identifying meeting topics and speakers. Discussions took place on topics such as USIBWC's Environmental Impact Statements; the status of Commission sanitation projects; the Cocopah Tribe vision for the boundary segment (limitrophe) of the Colorado River; development of an informal binational watershed alliance in the San Pedro River basin; and binational watershed management for the Tijuana River Watershed.

To further expand its outreach work, the IBWC established a new U.S.-Mexico advisory group for the Colorado River Delta under the terms of its Minute No. 306, an agreement that provides a conceptual framework for cooperation concerning the riparian and estuarine ecology of the Colorado River in its limitrophe section and delta. *(For more on this advisory group, see the Data Section Projects and Partnerships of this report.)*

Mexican Institutions Responsible for Water Management

Agency level	*Name*
Binational	IBWC
Federal	National Water Commission (Comisión Nacional del Agua) (CNA)
Regional	Watershed Councils (Consejos de Cuenca) CNA regional offices
State	State Water Commission for Baja California (CEA) State Water Services Commission (COSAE) (Baja California) State Water Commission for Sonora (CEA) State Commission for Potable Water and Sewerage (COAPES) (Sonora) Central Water and Sanitation Board of Chihuahua State Commission for Water and Sanitation of Coahuila Water and Drainage Services of Monterrey (Nuevo Leon) State Office of Water Resources (Tamaulipas)
Interstate Compacts and Agreements	Agreement for the Sustainable Use of Surface Water in the Rio Grande Basin
NGOs	numerous

Border Environment Cooperation Commission (BECC) and the North American Development Bank (NADB)

The year 2004 saw significant changes in two other major water border-region infrastructure institutions, the BECC and the NADB. Created in 1995, these organizations are responsible for planning and financing border-region environmental infrastructure projects to provide potable water treatment and distribution, and wastewater collection and treatment for cities and communities. BECC is responsible for certifying that projects meet certain criteria, such as environmental and financial sustainability, while NADB administers the Border Environment Infrastructure Fund (BEIF), a U.S. U.S. Environmental Protection Agency grant program that supplements local resources and loans to make BECC-certified projects more affordable. By the end of FY'04, the NADB, which has been in operation since 1997, had disbursed $276 million in grants through the BEIF for border water projects, benefiting 3,810,655 people. Last year, wastewater projects were under construction in El Sásabe, Sonora (population 1081), Mexicali, Baja California (658,185), Patagonia, Arizona (881) and Eagle Pass, Texas (45,878). (In addition to working through the BEIF, U.S. EPA and CNA have additional programs that support projects to improve water management throughout the border region.)

Improved performance for both NADB and BECC was the focus for 2004. In response to a recommendation from a group of stakeholders including the U.S. border governors, NADB hired consultants to conduct a comprehensive Business Process Review. This review included interviews with project sponsors, states, funding agencies and others. The report's recommendations were released at the end of 2004 for public comment.

In addition, the passage of U.S. and Mexican legislation during the year resulted in widening the arena in which the Bank is able to develop projects; it now can make grants and non-market rate loans out of its paid-in capital resources, with the approval of its board. The legislation also amends the definition of "border region" to extend to 300 kilometers within Mexico, while it retains the 100-kilometer area within the United States. (Please note that the use of BEIF funds will continue to be limited to within 100 kilometers in both countries.) Moreover, the law creates a common BECC-NADB Board of Directors, and calls for NADB support to develop qualified water conservation projects. This change permits the Bank to support strategic water management efforts.

BECC operations also were made more strategic through development of a prioritization process for ranking the applications it receives for water and wastewater projects. The need for such a process attests to the success of the BEIF program as well as the reality of limited funds. With the approval of the certification of projects at the BECC Board

WATER RESOURCES MANAGEMENT IN BORDER-REGION COLONIAS

Colonias is the term used for unauthorized residential subdivisions that usually are located in unincorporated areas of a U.S. county. They frequently lack basic services such as drainage, paved roads, and public utility services, including water and wastewater services. Colonias vary in size from a few dwellings to 100 or more. The family's water supply either is hand-carried from another site, arrives by truck, or is drawn from shallow wells that may be contaminated by wastewater from pit privies or poorly maintained septic tanks. This water often is stored in used barrels and containers. The result is that poor quality drinking water and insufficient water for proper sanitation practices may be part of daily life for residents.

Colonias face many obstacles in obtaining safe drinking water and wastewater treatment services. Water resources issues are multi- jurisdictional, and the complex coordination at all levels of government can hinder or delay projects. For instance, public right-of-way issues can stall or even prevent water and sewer lines from being laid that connect a colonia to the local municipal water system. In the case of the La Union, a New Mexico colonia, the need to obtain an easement to permit a right-of-way delayed the provision of wastewater treatment infrastructure for 8 months.

Problems with qualifying for grants may also prevent some colonias from obtaining ready access to municipal water. Some are built in floodplains, restricting the use of federal funds, while other funding sources require incorporation before qualifying for assistance, a complex paperwork exercise with which colonias residents may have no experience.

Fortunately, the year 2004 witnessed some improvements in colonias water management practices, due in large part to infrastructure projects coming to fruition. For instance, officials working on a large BECC- NADB wastewater water project in Dona Ana County, New Mexico reported completion of sewer systems for three communities; the project had been certified in 1998. Other projects, these funded through U.S. federal and state agencies, also were realized. For example, the Rural Utilities Service of USDA has a colonias fund, as does the state of Texas, through the Texas Water Development Board (TWDB). Although smaller colonias may get overlooked because of economies of scale, these subdivisions often are good candidates for self-help projects. One good example is the Vecinos Unidos project in McAllen, Texas, completed in August 2004. In this project, neighbors worked together to lay pipe; as a result of their sweat equity, 45 homes were connected to McAllen's sewer service, with support from the Renssellaerville Institute's Small Town Environment Program and the TWDB.

meeting in September 2003, the Border Environment Infrastructure Fund (BEIF) had allocated all available Congressionally-appropriated funds. In anticipation of EPA's Fiscal Year 2005 appropriations, and given the backlog of proposed projects seeking BEIF grants, EPA responded to the situation by establishing what it called "an impacts-based priority ranking system" to select projects for limited Project Development Assistance Program (PDAP) and BEIF resources. BECC published the prioritization criteria, invited applications to compete for the Fiscal Year 2005 funding cycle, and held community workshops. Proposed projects that were already in the process of development with PDAP support were automatically considered in the funding competition alongside new applications.

Border 2012

The history of this binational program began several decades ago with the La Paz Agreement, signed by Presidents Reagan and de la Madrid in La Paz, Baja California, in 1983. This agreement committed the two countries to working together to solve border environmental problems. Border 2012 is the current iteration of the program. Under the leadership of the EPA and Mexico's SEMARNAT, this program involves the 10 U.S.-Mexico border states and the 27 U.S. Indian border tribes as full partners, using a bottom-up binational approach.

An organization consisting of local and region-wide groups (Task Forces, Work Groups, and Policy Forums) has been created to address the following issues: water, air, land (solid and hazardous waste), environmental health, emergency response (chemical releases and acts of terrorism), compliance, enforcement, pollution prevention, and environmental stewardship.

Within the Border 2012 program, several binational water task forces have been formed along geographic lines to promote effective management of the region's water resources. The goal is to reduce water contamination by documenting achievement of the following milestones: 1) By 2012, promote a 25% increase in the number of homes connected to potable water supply and wastewater collection and treatment systems; 2) By 2012, assess significant shared and transboundary surface waters and achieve a majority of water quality standards currently being exceeded in those waters; 3) By 2006, implement a monitoring system for evaluating coastal water quality at the international border beaches. By the end of 2006, establish a 2012 objective toward meeting coastal water quality standards of both countries; and 4) By 2005, promote the assessment of water system conditions in 10% of the existing water systems in border cities to identify opportunities for improvement in overall system efficiencies.

Collaborative work is under way by a coalition of stakeholders to develop a bosque park, or wetland, along a three-mile reach of the Rio Grande near the town of Mesilla, New Mexico.

(Source: New Mexico State Park Division)

Each Border 2012 water task force tailors its activities to the needs and priorities of the communities it serves. For instance, applying the program's bottom-up approach, the Arizona/Sonora Water Task Force met four times during 2004 in different border-region towns to hear residents' concerns. The ideas gathered during these meetings will help shape the Task Force work plan for the coming year. In the meantime, the Task Force already is setting up an interactive website; users are invited to submit documents that contain information about their area's water supplies. The objective is to have a water quality/quantity document repository that is continually updated.

Besides this work being carried out by the **IBWC, BECC-NADB,** and **Border 2012,** the Board also notes the following collaborative institutional work that has recently been completed or is under way:

Citizens Congressional Task Force on the New River

Under the Salton Sea Reclamation Act of 1998, funding was authorized to support the efforts of a group called the Citizens Congressional Task Force on the New River. Conditions in the Salton Sea — a large water body within California that provides an important stopover for migratory birds in Southern California — and the New River are closely linked: the New River originates in Mexico and flows north into the United States. Along the way, the river acquires nutrients, silt, selenium and pesticides from agricultural drainage and sewage in Mexico and the U.S. It eventually empties into the Salton Sea, thus contributing to the degradation of the Sea's water quality and the ecosystem it provides to migratory birds.

To improve water quality in the New River and, ultimately, the Salton Sea as well, the Task Force is carrying out what

U.S. State-by-State Comparison of Institutions Responsible for Water Management

Binational	IBWC	IBWC	IBWC	IBWC
Federal	Corps USBR NRCS USFS USGS EPA	Corps USBR NRCS USFS USGS EPA	Corps USBR NRCS USFS USGS EPA	Corps USBR NRCS USFS USGS EPA
Multi-State	Colorado River Compact	Rio Grande Compact Pecos River Compact Commission New Mexico-Texas Water Commission	Rio Grande and Colorado River Compacts Upper Colorado River Commission Pecos River Compact Commission New Mexico-Texas Water Commission	Colorado River Compact Upper Colorado River Basin Compact
State	Cal EPA other agencies	TCEQ other agencies	NMED other agencies	ADEQ other agencies
Local (City, County, District, other)	irrigation districts, local agencies & private utilities	irrigation districts, local agencies, & private utilities	irrigation districts, local conservancies, agencies, & private utilities	irrigation districts, local agencies, & private utilities
Indian Tribes	Indian tribes	Indian tribes	Indian tribes	Indian tribes
Courts	federal, state-level	federal, state-level	federal, state-level	federal, state-level
NGOs	numerous	numerous	numerous	numerous

is called the New River Wetlands Project. Two pilot-project wetlands have been constructed in Imperial, California (38 acres) and Brawley, California (7 acres) to break down and filter pollutants while providing wildlife habitat. Monitoring results to date show improvement in water quality, especially in the reduction of pathogenic bacteria. Continued monitoring for contaminants is an important feature of the project. Plans are under way to construct additional wetlands at wastewater treatment plants in the cities of Brawley, Holtville, and Westmorland, California.

Mesilla Valley Bosque Park

Work also is under way to develop a wetland or bosque park along a three-mile reach of the Rio Grande near the town of Mesilla, New Mexico. A good example of water resources management collaboration across sectors, community groups such as the Southwest Environmental Center and the Trust for Public Land have worked with the City of Las Cruces and New Mexico State Parks Division on the river restoration project. The state park will feature a variety of natural habitats, trails, wildlife viewing areas, interpretive signs, and a visitor center.

When fully developed, the Park will include about 300 acres on the west side of the Rio Grande as well as up to 1500 acres of adjacent uplands managed by the Bureau of Land Management. In 2004, a master plan was developed and the legislature and governor approved $1.875 million for land acquisition and development.

REMAINING BARRIERS, NEXT STEPS

Transboundary water resources management would benefit from a strengthened institutional framework to enhance cooperation and coordination in the following areas:

Barrier 1

Lack of management framework for groundwater. No legal regimes or institutions currently exist for managing water quality, supply, or pumping of aquifers that cross the border, and existing United States-Mexico water treaties do not regulate the distribution of groundwater between the two countries.

Next Steps

Promote binational sharing of information about transboundary aquifers. Groundwater pumping in the United States is the domain of the states, and in Mexico it lies under the jurisdiction of the federal government. In order to form a unified U.S.-Mexico border groundwater policy, the legislatures of the four U.S. border states would have to agree on groundwater withdrawal policy, an unlikely prospect. A more probable next step is to encourage sharing between the U.S. and Mexico of information about transboundary aquifers in the border region. *(see Data section of this report)*.

Barrier 2

Binational funding challenges. In the nine years since they were created, the BECC and NADB have seen, at first hand, that the demand for environmental infrastructure on the border greatly exceeds the available funding. Federal, state, and local agencies in both countries also express concern that their funding is insufficient to implement many worthy water projects in the border region.

BEIF resources are supporting water and wastewater project development and construction in communities all along the border. U.S., Mexican and binational projects have been awarded $426 million in grants, matched by funds and loans from other federal, state and local sources. The total cost of these projects is $2.1 billion. As of December 2004, the BECC had certified 105 environmental infrastructure projects, 69 in the U.S., 36 in Mexico. Clearly, the funding obstacles to working binationally can be overcome.

Economic asymmetries between the United States and Mexico further complicate funding for border water infrastructure. Sufficient funding is dependent upon continued binational commitment to fund contributions. Resources available in the United States for border water projects, in general, historically have greatly exceeded resources available in Mexico. From the Mexican perspective, the border region enjoys the most favorable economic position among its states. Even when there is strong binational consensus to develop a joint water project, limited matching resources can complicate or delay efforts to initiate or complete the project.

Differences in banking and tax rules, currency conversions, budget processes and timing have caused delays, frustration and a perception that the program is moving too slowly. Over time, however, the institutional and economic barriers to working together on infrastructure have been overcome.

Next Steps

Restore the annual Border Environment Infrastructure Fund appropriation (BEIF) at $100 million dollars. The needs of the border for water and wastewater infrastructure funding continue to be great. For the last several years, however, the line item in EPA's budget for the BEIF, passed through to NADB for border water/wastewater funding, has been reduced to only $50 million, even though the projected needs of BECC projects "in the pipeline" is more than $600 million. In May 2003 the Board recommended in a letter to the President that the BEIF be increased to $100 million *(see "Seventh Report of the Good Neighbor Environmental Board, February 2004, " page 31),* the original amount when this fund was established.

Encourage NADB to develop additional lending vehicles. NADB has developed innovative ways to increase the amount of capital it can lend for border infrastructure such as the Low Interest Rate Lending Facility (LIRF). However, as of December 22, 2004, it had only lent $104 million of a possible $305 million. As an institution with a binational board, NADB is well positioned to continue to develop pioneering methods to maximize the use of the bank's assets.

Barrier 3

Different legal and institutional frameworks. Not only do the United States and Mexico have different frameworks for water management, even among U.S. border states, significant differences exist. For example, laws concerning ground water rights, permitting, or water quality can vary significantly. What works along the Texas-Tamaulipas border may not be appropriate for the California-Baja California border due to the unique legal and institutional framework of each region.

These different legal and institutional frameworks create difficulties in transporting equipment, supplies, and personnel across the international boundary. Equipment or vehicles owned by a government entity in one country

Major Events in the Evolution of U.S.-Mexico Water Resource Management Institutions

Year	*Event*	*Objectives*
1848 **1853**	Treaty of Guadalupe Hidalgo; Gadsen Treaty	Definition of the international boundary between the U.S. and Mexico, assignment of administrative obligations, and settlement of boundary related claims.
1889	Boundary Convention	Established the International Boundary Commission and stipulated procedures for the adjustment of boundary disputes in the international reach of the boundary rivers drawing on the rules of the Boundary Treaties of 1848 and 1853, and the1884 Convention.
1906	The Convention of May 21, 1906	Provides for the distribution between the United States and Mexico of the waters of the Rio Grande in the international reach of the river between the El Paso-Juárez Valley and Fort Quitman, Texas.
1944	The Water Treaty of February 3, 1944 - Treaty for "Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande"	Allocates the waters of the Colorado and the Rio Grande rivers between the two countries; provides for the construction of reclamation works on the main channel of the international reach of the Rio Grande; provides a mechanism for reaching solutions to border sanitation problems, and establishes the International Boundary and Water Commission with authority to apply and interpret the terms of the Treaty with the consent of the governments.
1983	Agreement for the Protection and Improvement of the Environment in the Border Area (La Paz Agreement)	Establishes a binational mechanism for regular consultation on border region environmental problems; provides for the participation of a broad range of government levels in both countries, and non-governmental organizations, in the design and implementation of trans-boundary environmental solutions. Defines the border region as the area lying 100 kilometers to the north and south of the international boundary.
1992	Creation of the Good Neighbor Environmental Board	Advises the President and Congress on border related environmental and infrastructure issues in the U.S. states bordering Mexico.
1992	Development of the Integrated Border Environmental Plan (IBEP) by the USEPA and SEDUE	Initial steps at implementing the goals of the La Paz Agreement through the establishment of an integrated binational environmental management plan. The IBEP seeks to improve coordination and cooperation toward solving problems related to air, soil, water quality and hazardous wastes.
1993	Creation of the Border Environment Cooperation Commission (BECC) and the North American Development Bank (NADB)	Assists communities on both sides of the border in developing and financing environmental infrastructure projects.
1996	Development and release of the Border XXI Environmental Program	Implements the La Paz Agreement by coordinating and supporting governmental and-governmental activities for environmental improvement based on the principles of sustainable development, public participation, administrative transparency, administrative decentralization.
2002	Development and release of the Border 2012 U.S.-Mexico Environmental Program	Bilateral agreement based on the La Paz Protocol to build on Border XXI, yet with a greater focus on a decentralized process involving the states, municipalities, and tribal governments in the border region.

Source: based on IBWC 2004, USEPA 1992, and Mumme, Brown, and McNaughton 2004

often cannot be taken to the other country due to internal regulations, concerns over insurance, etc. In some cases, even sending personnel to a meeting in a sister city can become complicated because of concerns about driving a vehicle in the other country or the trip itself, which is considered "foreign travel." In more serious instances, equipment needed to address an emergency (such as a break or blockage in a sewer line) is not permitted to be used across the border. Confusion also exists about the legal requirements for transboundary transport of laboratory samples, supplies, or equipment for water quality assessments or other scientific projects. These barriers can make it difficult to participate in binational projects.

Next Steps

Fully exploit current institutional missions and the current legal framework. We must find new ways to interpret provisions that reflect changing conditions. For example, BECC can certify, and NADB can now provide funding (loans) for, projects within 300 kilometers of the U.S. border in Mexico, three times more than the 100 kilometers that was previously allowed. This reflected infrastructure needs in Mexico and that NADB could loan more of its capital.

Increase institutional flexibility and collaborative efforts. In dealing with binational issues, sovereignty must always be recognized. However, new ways of resolving problems with local stakeholders must be explored, supported by the public and the governments. For example, the Region M Water Planning Group in Texas—which covers the Rio Grande from Maverick County to the Gulf of Mexico, or more than 400 river miles—has always had invited guests from the International Boundary and Water Commission, Mexico Section, and Mexico's CNA . When Mexico starts holding meetings of its Río Bravo Watershed Council (Consejo de Cuenca), it is hoped that it will invite U.S. stakeholders to attend meetings as observers.

Recommendation 2

Develop and sign formal U.S.-Mexico border-region water resources data agreements. Such agreements should support the collection, analysis and sharing of compatible data across a wide range of uses so that border-region water resources can be more effectively managed.





"We recommend that information gaps and accessibility be addressed as a high priority. Existing data should be identified.... Standards and methods for collection and analysis of data should be coordinated binationally.... Data, analyses, and options should be disseminated widely to government decision makers, organized interest groups, and affected communities generally."

— First Annual Report of the Good Neighbor Environmental Board, October 1995

2 Data

NEARLY A DECADE AGO, in its first annual report to the President and Congress, the Good Neighbor Environmental board recommended that environmental data gaps and data accessibility be addressed as a high priority. The Board reiterates that recommendation today, specifically within the context of water data. If the U.S.-Mexico border region's water resources are to be managed sustainably, the foundation for all such work must be a set of reliable, bi-nationally integrated databases that are widely accessible.

U.S.-Mexico border water data are needed by water resources managers at many levels. First, it is essential to have data in hand that help with understanding overarching forces that continue to affect the fate of the region's water resources. Examples include data about how land is being used and predictions on how it is likely to be used. This broad information can be used to project likely scenarios such as demand by different types of users and, thereby, to guide strategic planning. Alongside this type of data, water resource managers also require comprehensive, detailed data on the water resources themselves, both surface and underground, both their quantity and their quality. This more specific information may include hydrologic, geologic, water use, and water quality data. Federal, state and local agencies maintain hydrologic data networks and carry out a wide variety of water-resources investigations to monitor ground water conditions. The results of these investigations are indispensable tools for those involved in water-resources planning and management. For example, using these data, agencies allocate surface water resources to water rights holders.

In recent years, water data collection work has increased on both sides of the border. Within the United States, those with data management responsibilities include federal and state agencies, tribes, counties, water districts, water supply corporations, academia, and non-governmental organizations. On the federal level, the U.S. Section of the International Boundary and Water Commission (USIBWC), as well as the U.S. Geological Survey (USGS) and the Bureau of Reclamation (USBR) (both within the Department of the Interior (DOI), have major responsibilities. For instance, the USGS surface-water data program includes information on stream levels and stream flow. Information on the quantity and timing of the stream flow in the rivers of the border region is a vital asset that safeguards lives and property. USGS data also include reservoir and lake levels, surface-water quality, and rainfall. The data are collected by automatic recorders and manual measurements at field installations across the nation. The four U.S. border states also collect data, either in response to federal mandates or to meet their own resource management needs. And on the community level, non-profit groups in the border region such as Friends of the Santa Cruz River and school-sponsored projects such as Global Learning and Observation to Benefit the Environment (GLOBE) and Project Water Education for Teachers (WET) carry out water quality monitoring projects.

Mexican entities also have stepped up their water data-gathering efforts along the border. By contrast with the U.S. system, the Mexican data collection system generally is more centralized; the Mexican National Water Commission, (CNA) is the primary entity responsible for collecting water data. That being said, recent changes to the Mexican water laws provide for a transition from federal to regional management of water resources within watersheds, through the formation of watershed councils (consejos de cuenca), irrigation districts, and municipal water councils.

In practice, the actual transition to regional management has been slow due to funding and personnel shortages,

and data collection still remains primarily in the hands of regional district CNA offices. Besides CNA, the Mexican Section of the IBWC, the six northern border states, public utilities, non-governmental organizations, and educational and research institutions also get involved in water resources data collection in Mexico.

Although this progress deserves to be noted, policy makers also should be aware that border-region water resources managers remain handicapped by data deficiencies and lack of binational collaboration. Within both countries, many essential data still are not in hand, especially groundwater data. Insufficient funding and staff to fill data gaps, and a tendency by some to closely guard data details are just a few of the challenges still to be overcome.

In addition, data may lack accompanying information about how it was collected and for what purpose. Moreover, the analytical methods used may not be specified, meaning the results cannot be compared with similar studies; and there may be no information about the quality of the data. Without this background information, the data may be of limited use, and scarce resources must be spent on duplicative data collection. Moreover, on a broader, bi-national level, although both countries agree on the need to share data within watersheds that span the border, problems such as incompatibility and inaccessibility across collection and storage systems continue to plague efforts by managers intent on working with their counterparts across the international boundary.

One site-specific example of the complexities involved in cross-border water data-gathering work is the Upper San Pedro Basin, which lies both in Arizona and also across the border in Sonora. Scientists on the U.S. side of the basin have been assembling data and establishing comprehensive databases relating to the aquifers underlying the basin for many years. Using this information, models have been created to predict both surface and subterranean flows, including responses to duration, location, and timing of rainfall and droughts.

Across the border, the Sonoran portion of the basin has not had the benefit of this level of study and funding support. In addition, because the headwaters of the San Pedro lie within the domain of the economically and politically powerful Cananea, Mexico copper-mining complex, data on withdrawals, flows, and contamination historically have not been accessible to the public. More recently, CNA mine officials have opened the data reports to U.S. scientists, but interpretation still is needed. This large gap in data availability has hindered efforts to characterize, in particular, the Mexican portion of the aquifer. As a result, bi-national management of the river and the underlying groundwater has been impeded.

PROJECTS AND PARTNERSHIPS

Real progress in building and maintaining strong databases for effective water resources management in the U.S.-Mexico border region will depend upon federal resources being strategically applied, both to fill gaps and to bolster existing good work. It also will entail continued collaboration across many organizations, some of which are noted below. The Good Neighbor Environmental Board applauds the following types of efforts that have been recently completed or are under way:

Rio Grande Toxic Substances Study

Under IBWC Minute 289, the U.S and Mexican sections of the Commission have coordinated several bi-national water quality monitoring programs in recent years. One of them was the Rio Grande Toxics Substances Study, which entailed screening the river for the presence and impact of toxic chemicals. This EPA-funded study was conducted in three phases beginning in 1992: Phase I covered the river from El Paso, Texas-Ciudad Juarez, Chihuahua to Brownsville, Texas-Matamoros, Tamaulipas. Subsequent phases focused on regions of concern identified in the first phase. The study concluded that chemicals found in the river's water, sediment, and fish do not pose an immediate threat to human or aquatic life. Besides IBWC, participants included Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, Texas Department of Health, Environmental Protection Agency (EPA), National Park Service, USBR, CNA, and the Mexican Ministry of Social Development. Noteworthy in terms of data integration, participants agreed upon data collection protocols and criteria for reviewing and accepting the results at the front end of the study.

The effects of drought: Morena Lake, a rain-fed reservoir in east San Diego County and the Tijuana River Watershed, is shown at less than 8 percent capacity in July 2004.

(Source: Paul Ganster)

Lower Colorado and New Rivers Toxic Substances Study

Under protocols similar to that for the Rio Grande Toxic Substances Study, the IBWC coordinated a study for the Lower Colorado and New Rivers, published in 2003. Other participating agencies included EPA, United States Geological Survey, Arizona Department of Environmental Quality(ADEQ), Arizona Department of Game and Fish, California Department of Game and Fish, California Regional Water Quality Control Board (Colorado River Basin), California State Water Resources Control Board (SWRCB), and CNA. Agency participants investigated the analyzed toxic substances in water, bed sediment, suspended sediment, and fish tissue. Data collected indicated that total dissolved solids, trace elements, and nutrients from agricultural, domestic, and industrial activities, and some general water quality indicators, are of greatest concern.

Transboundary Aquifers and Groundwater Database Study for El Paso-Ciudad Juarez.

This multi-agency data project has consisted of three projects: The initial binational data collection and exchange study began in 1997 and was published the following year. Coordinated by the U.S. and Mexican sections of the IBWC, participants also included the Texas Water Development Board (TWDB), the New Mexico Water Resources Research Institute (NMWRRI), EPA, CNA, and the Municipal Water and Sanitation Commission of Ciudad Juarez (JMAS).

Information from this initial study laid the groundwork for a second bi-national project completed in 2002: *Simulation Ground Water Flow in the Hueco Bolson, and Alluvial-Basin Aquifer System near El Paso, Texas* (US study) and *Modelo Matemático de Simulación Hidrodinámica del Sistema Acuífero del Bolson del Hueco* (Mexican study). Two compatible models were developed. From the United States, participating agencies included the USIBWC, TWDB, New Mexico Office of the State Engineer, USGS, and El Paso Water Utilities. Participating Mexican agencies were CNA, JMAS, and the Mexico Section of the IBWC. The first study also laid the groundwork for a third binational project -- a hydro geologic and water quality study of the aquifer carried out in 2002 (publication pending) with collaboration from the California State University (Los Angeles), NMWRRI, New Mexico State University, University of Texas at El Paso, University of Arizona, EPA, the Autonomous University of Ciudad Juarez, and the United Nations University from Mexico.

Arizona-Sonora Clearinghouse for Border Water-Related Environmental Studies.

The Sonoran office of CNA, the State of Sonora's Tecnological Institute (ITSON), and the ADEQ are collaborating to develop a Spanish-language web-accessible clearinghouse for studies and data related to water quality and quantity studies in Mexico and the binational border region. The website was developed by CNA and ITSON, and acts as a portal for CNA staff to submit metadata about water quality and quantity studies generated by its engineers. In addition, the site contains metadata about CNA-generated geographic information system (GIS) covers, including well inventories and water quality data.

Development of the site was financed by World Bank monies to (1) help CNA water system engineers have access to data necessary for decision making; and (2) to make infor-

TYPES OF WATER DATA

WATER USE

Data on water use can provide valuable information on which sectors are placing demands on which supplies. Examples follow: well pump and energy usage (allows comparison of efficiency, permits examination of data credibility and serves as an indication of depth to water); surface water diversions; irrigation deliveries to individual farmers; irrigated acreage and crops grown; in-stream flows; reservoir releases, customer deliveries for municipal uses (allows calculation of municipal losses and leakage); and industrial use (mining, metal smelting, electrical power generation, golf courses, sand and gravel mines, large-scale cooling facilities, and petro-chemical facilities and maquiladoras).

In the United States, water use data are collected at all levels of government as well as by water conservation, supply, and improvement districts. Since 1950, the U.S. Geological Survey (USGS) has compiled data at five-year intervals on the amount of water used in homes, businesses, industries and on farms throughout the United States. These reports document water use changes over time. States also track this type of data; for example, the Texas Water Development Board collects water use data and performs long-range water use planning. And at the local level, cities and municipalities also collect use data.

For the arid U.S.-Mexico border region, water use data highlights the many, diverse pressures on the area's limited supplies. Traditional, officially recognized users have included domestic and municipal, agricultural, hydroelectric, industrial, navigational, and recreational. Another type of user, the flora and fauna of the region's fragile ecosystems, has sometimes been overlooked by policy makers. Management of actual and predicted traditional types of demands relied on manipulating and redirecting existing freshwater sources. This "supply management" approach resulted in the building of large dams such as Amistad and Falcon on the Rio Grande River, as well as construction of the conveyance systems to move the water to the point of need. More recently, as the era of dam building is coming to a close due to limited fiscal and water resources, as well as a growing concern for environmental impacts, managers and planners are developing other models as tools for allocation decisions.

DATA, DROUGHT, AND FLOODS

Despite increased rainfall in some areas of the Southwest during the end of 2003 and the beginning of 2004, current conditions of below normal rainfall and elevated temperatures are part of a longer-term drought forecast projected for large portions of the U.S.-Mexico border region. This forecast also includes the source waters for both of the region's major surface water bodies, the Colorado River and the Rio Grande River. Specific locales within the region provide sobering cases in point: Elephant Butte Reservoir, located in southern New Mexico on the Rio Grande, serves as a primary water source for the City of El Paso and a variety of downstream agricultural interests. As of September 30, 2004, data showed that reservoir capacity was at a mere 5.6 percent— 96,000 acre-feet in a reservoir of two million acre-feet.

Ironically, although such circumstances could cause water management organizations to redouble their efforts to leverage expertise and work to find solutions, the opposite scenario may just as likely occur. Drought and ever-dwindling supplies could break apart the very coalitions needed to find a way through the conundrum. For example, continued conflict between Mexico and the United States over Rio Grande waters owed to the United States under terms of the 1944 Water Treaty has sharpened differences among different types of water users in different locales. This tension was highlighted by the August 27, 2004 demand from irrigators and farmers in the Lower Rio Grande Valley of Texas to sue Mexico for damages because of its failure to release water, thus accumulating a "water debt" on the Rio Grande of up to 1.5 million acre-feet.

Limited water supplies, coupled with an increasing demand for water resources, have lead to competition and sometimes animosity. The desire to drill more and more individual wells to withdraw supplies from aquifers that have yet to be characterized can only grow stronger under such drought conditions. Some water managers and individuals working and observing current water use trends along the border believe this will lead to a "bi-national water-supply crisis." From the perspective of the Good Neighbor Environmental Board, the risks associated with data sharing are trivial compared with the risks of water management decisions made with poor and/or inadequate data.

At the opposite end of the inadequate water supply scenario is the issue of occasional devastating floods. For example, in April 2004, the Río Escondido, an intermittent stream that had been dry for more than 30 years, overflowed its banks in Piedras Negras, a city of more than 130,000 across the border from Eagle Pass, Texas. At least 34 were killed and thousands were left homeless. Several years earlier, in1998, a 500-year rainfall event (18 inches of rain in 12 hours) in the San Felipe Creek of Del Rio, Texas, resulted in the deaths of six people, 120 destroyed homes, and more than 1,000 damaged buildings.

The inevitable recurrence of such events underscores the need for current data that would allow a detailed floodplain mapping exercise to be conducted. The project also should include an inventory of present day land use in order to implement new and responsible zoning restrictions. To its credit, during 2004, the U.S. Federal Emergency Management Agency (FEMA) initiated a floodplain map modernization program. Through this five-year program, subject to annual appropriations, maps showing floodplain risk are slated to be updated for all counties in the United States. These maps, however, will not include data for Mexican portions of watersheds or stream courses.

In addition, the USIBWC has announced it will hold Public Scoping Meetings on a proposed Programmatic Environmental Impact Statement (PEIS) for the Rio Grande and Tijuana River Flood Control Projects in New Mexico, Texas and California. The Commission will analyze flood protection measures and alternatives to current management practices, including watershed-based approaches. The projects also could support restoration of native riparian and aquatic habitats.

mation readily available to the public to increase awareness of water quality and quantity issues. ADEQ is looking into translating the materials on the site into English. This endeavor would enable the CNA site repository to be fully accessible to entities on both sides of the border who currently lack an effective means of creating inventories of reports and GIS layers. It also would create a uniform clearinghouse for binational studies. The site is expected to be made public in 2005.

Upper San Pedro Partnership

This consortium of 21 agencies, including Fort Huachuca, the Nature Conservancy, Cochise County, and the Arizona Department of Water Resources, continues to collect data about the San Pedro River along the Arizona-Sonora border. Studies have included groundwater modeling, a computer program that allows decision-makers to see the potential impact of specific water management scenarios, studies to determine the feasibility and cost/yield benefit for using new sources of water, and reuse and recharge feasibility studies. In the recent past, interest has been expressed in extending the effort across the border to include representatives from Mexican entities such as the Cananea and Naco town councils; CNA; Mexican state water agencies, including COAPAES and OOMAPAS; environmental NGOs; the University of Sonora; and the Colegio de Sonora.

Paso del Norte Watershed Council Water Resources Database

Formed to work toward a healthy watershed in the Rio Grande sub-basin between Elephant Butte Dam and Fort Quitman, Texas, this Council serves in an advisory capacity to the New Mexico-Texas Water Commission. Participants include area universities, municipal governments, state and

To promote water conservation by preventing over-delivery, this stage recorder monitors the water flow in an irrigation canal in the Rio Grande.

(Source: Texas Water Resources Institute)

federal agencies, non- governmental organizations, the USIBWC, and Mexican agencies. To assist with providing timely Internet access to data, the Council has recently developed a project called the Coordinated Water Resources Database and GIS. Financial support is provided by the El Paso Water Utilities and U.S. Army Corps of Engineers.

Colorado River Delta Advisory Committee

This bi-national group, established by the IBWC in 2003, is developing an online databank of information about the Colorado River Delta, including existing biological, hydrologic, groundwater, and engineering studies and papers from both countries. This effort reflects the interest of the Governments of Mexico and the United States in preserving the riparian and estuarine ecology of the Colorado River Delta, which has been affected by decreased Colorado River flows in this reach. A related effort, the Colorado River Delta Information Exchange, was initiated by the Sonoran Institute. The Institute also is collaborating with the Mexican NGO, Pronatura, and the University of California-Berkeley to develop a hydrologic model based on IBWC data for the lower Rio Grande River, in Mexico.

Other Binational Data Studies in Recent Years

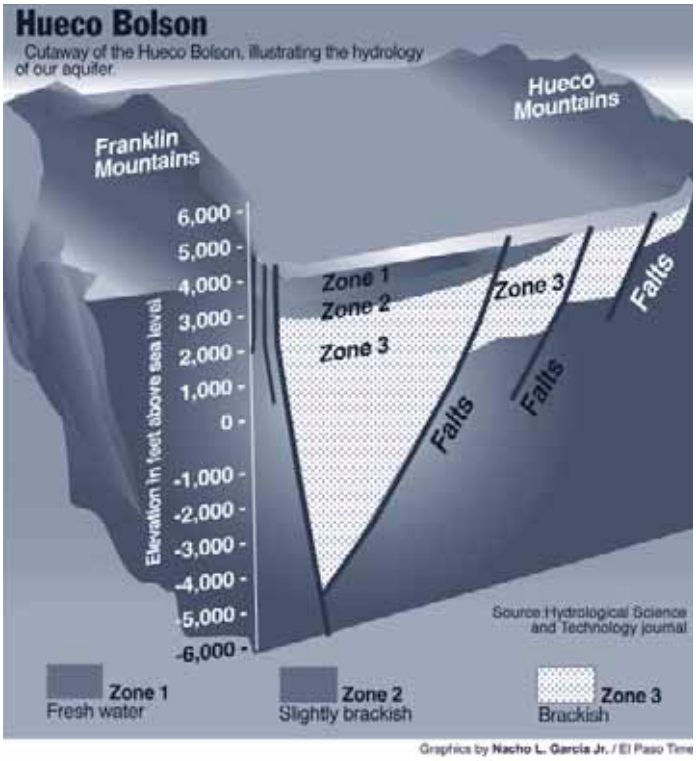
Binational collaboration involving IBWC and numerous partners has resulted in other border-region water quality studies that deserve mention: the 2002 Characterization of the Tijuana, Baja California Wastewater System; the 2002 Characterization of the Tecate, Baja California Wastewater System (note that these first two projects were carried out through California Environmental Protection Agency/Comision Estatal del Agua (CEA) of Baja California agreements); the 2001 Nogales Wash Groundwater Monitoring Program; and the 2000 Monitoring Project for the Rio Grande near Laredo, Texas and its Mexican sister city, Nuevo Laredo, Tamaulipas.

Water Data-Focused Events

Because individual events can be the precursor to more detailed studies and follow-on actions, the Board wishes to note the following water data-focused events that took place over the last year or two:

West Texas Roundtable

Six organizations came together for this event: Sul Ross State University, the Environmental Science Institute at the University of Texas-Austin, the groundwater conservation districts of Jeff Davis, Brewster, and Presidio counties; and the Environmental Defense Fund. Instigated in part by a



Hydrologic and geologic data enhance our understanding of phenomena such as the interaction between ground and surface water, and the direction and rate of movement.

(Source: El Paso Times)

Here, a water quality analyzer is being used to determine the chemical composition of Rio Grande River water.

(Source: Texas Water Resources Institute)

lease application to mine groundwater on state lands in West Texas, the outcome was a call by participants for more good scientific data on groundwater resources to guide policy decisions.

Transboundary Aquifers of the Americas Workshop.

This international scientific workshop, held in November 2004, was hosted by the IBWC in El Paso. It was sponsored by the Internationally Shared Aquifer Resources Management (ISARM) Americas Programme. ISARM, in turn, is supported by the United Nations Educational Scientific and Cultural Organization (UNESCO) and the Organization of American States (OAS). Recommendations that resulted: improved sharing of water supply, demand, and quality information in the form of data, models, and forecasts.

The 2003 report of the U.S.-Mexico Binational Council, "U.S.-Mexico Transboundary Water Management," was developed from a draft provided to the U.S. Department of State and to Mexico's Foreign Relations Secretariat (SRE) in preparation for the cabinet-level **U.S.-Mexico Binational Commission November 2002 meeting** held in Mexico City. This report recommended, "...an accurate and harmonious system of data collection would serve as a fundamental starting point for cross-border management."

REMAINING BARRIERS, NEXT STEPS

Barrier 1

Data Gaps on Water Quantity and Quality, Especially Groundwater.

SURFACE WATER SUPPLIES — Data on surface water supplies in the U.S. are compiled into a national inventory. While the data on these supplies are quite extensive, level of detail varies by state and location within each state. In Mexico, CNA collects surface water information for the states, including such data as reservoir levels; data for the six northern Mexican states tend to be incomplete.

GROUND WATER SUPPLIES — Knowledge about groundwater resources in the border region lags far behind what is known about surface waters. And yet, in the meantime, there are sizable areas throughout the arid southwest where ground water is being withdrawn at rates that some consider alarming. Within the U.S.-Mexico border region, it is estimated that some 18-20 shared aquifers exist; the imprecision in total number is indicative of the problem. And although several individual aquifers are being studied in conjunction with specific needs, a coordinated program for transboundary aquifer analysis is essentially non-existent at the present time.

WATER QUALITY DATA — A significant body of water quality data is available for U.S. supplies, although groundwater quality data lags behind. By contrast, in Mexico, both surface water and ground water quality data historically have been difficult to obtain.

Next Steps

Devote More Resources to Data Collection, Especially Groundwater Data. Place special emphasis on the collection and dissemination of ground water data, including more focus on transboundary aquifers. Develop short-term and long-range plans to fill gaps in existing surface and groundwater inventories in both countries.

Of note, the U.S. General Accounting Office (GAO) released a report in 2004 citing the need to better coordinate the collection of water nationwide. It recommends that Congress formally designate a lead organization for this purpose. In addition, the Texas Commission on Environmental Quality (TCEQ) pointed out that in a 2002 report that U.S. state and federal agencies to work together "to improve the characterization of groundwater quality and availability" in aquifers along the Rio Grande. [TCEQ, "State of the Rio Grande and the Environment of the Border Region, Strategic Plan Vol. 3", 2002]

Barrier 2

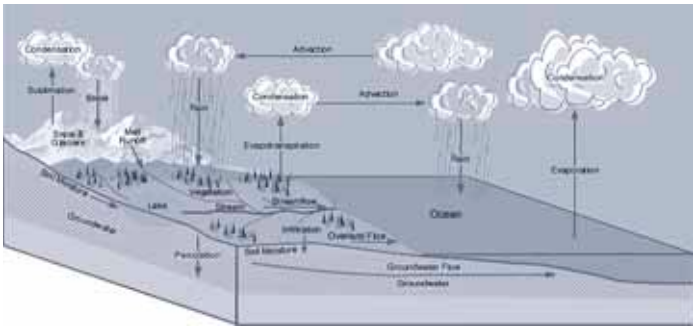
Different Methods, Inability to Compare. Even if a potential user has access to different sets of data, they may not be comparable: lack of consensus for approaches to investigations; a lack of agreement on data collection protocols; variability in laboratory methodologies; lack of data base management documentation and reporting systems; and a lack of agreement on data interpretation methods all can cause problems.

For example, in the United States, a state and a federal agency may be collecting data along one stream segment at the same time. The two groups may use different collection methods (protocols) under diverse conditions, apply distinct analytical methods, and send samples to separate laboratories for analysis. The result is two data sets for the same river reach that cannot be compared to one another. Or it might be that the details about the conditions under which the data was gathered (the metadata) is not included with the raw data, which means the data are of very limited use.

Using different units of measurement can further complicate data integration. For instance, engineers, chemists and biologists may all use different units to describe the same natural world. Converting units is not difficult, but problems may arise if measurements are not made on the same scale or at the same detection limit. And finally, within a transboundary framework, all of the above scenarios may apply, as well as the added challenge of sharing data across national political boundaries. There are good Mexican laboratories, but their aggregate capabilities, including quality assurance plans, are not well known, so their data may not be directly comparable with data from U.S. labs. The result is that in some cases, border-region organizations charged with hydrologic data collection and management responsibilities may be reluctant to rely on data from sources other than their own institutions, since there is not a recognized need and agreement to develop a common set of metadata and appropriate indicators.

The IBWC operates 79 gauging stations in the Rio Grande Basin, the Tijuana River and the Lower Colorado River. The 55 stations in the United States (like the one shown here) provide real time streamflow (discharge), reservoir storage, and precipitation information, which is available online. The USGS also collects surface water data in the border region as part of a national program that captures stream levels, streamflow, reservoir and lake levels, surface water quality, and rainfall.

(Source: US IBWC)



Understanding the hydrologic cycle is essential for effective management of a region's water resources, including data collection and management. Water is continuously moving from one reservoir to another by way of processes such as evaporation, condensation, precipitation, deposition, runoff, infiltration, sublimation, transpiration, melting, and groundwater flow. The hydrologic cycle models the storage and movement of water among different reservoirs, such as oceans, lakes, rivers, soils, glaciers, snow packs, groundwater and the atmosphere.

(Source: Created by Dr. Michael Pidwirny, Department of Geography, Okanagan University College. *Fundamentals of Physical Geography,* Copyright © 1999-2004 Michael Pidwirny.)

Next Steps

Develop Binational Data Protocols and Apply Them. Develop a memorandum of understanding on working toward transfer of data that is compatible in form, with a quality assurance project plan (QAPP) between the two nations being the ultimate goal. Some promising work already is being carried out. For example, the U.S. National Water Quality Monitoring Council (NWQMC) is exploring the design of an optimum water-monitoring program that can meet any given set of data objectives, including comparability. The NWQMC, as well as the Methods and Data Comparability Board and the Advisory Committee on Water Information, are all authorized under the Office of Management and Budget Memorandum No.l M-92-01. This memorandum requires U.S. federal executive agencies to collaborate with all levels of government and the private sector in conducting water information activities.

To strengthen these efforts, other organizations should be brought into the dialogue, including those working on data protocols for other environmental media. For instance, the Commission on Environmental Cooperation recently released the first comparability report on emissions data from over 1000 individual fossil-fuel power plants in Canada, Mexico and the United States, a first step towards the possible development of a shared emissions inventory for North America. Another candidate may be the U.S.-Mexico Foundation for Science, whose mission is to improve bi-national collaboration. And on an international level, groups such as the European Union are working on the data protocol issue as well. The Board recommends that efforts on all levels be tracked and considered for use where appropriate.

TYPES OF WATER DATA

HYDROLOGIC AND GEOLOGIC

Hydrologic data tell us where water is located, how it moves to and from the surface and underground, what its chemical properties are and, in general, help characterize a particular watershed's water cycle.

Geologic conditions affect the movement, storage, quantity and quality of water in a region. The movement of water on the land surface as rivers and streams is relatively easy to understand, but how the underlying geology affects the movement of ground water is not so obvious. Clearly, precipitation is relatively easy to measure as it falls onto the land surface. Once it infiltrates the earth, some of it remains close to the land surface and re-emerges as discharge into streambeds, where it also can be measured. However, another portion sinks deeper into the ground. Once this water meets the water table, the zone below which the ground is saturated, it can move either vertically or horizontally. If it encounters dense and water-resistant non-porous rocks such as lava or other massive rocks, it begins to flow horizontally, generally towards streams, the ocean, or deeper into the ground. To measure this water that lies further underground, geologists drill holes at varying depths and collect samples, which gives them an understanding of the volume of water, the rate and direction of water movement, and the degree to which the water can be captured in a watershed.

Hydrologic and geologic data are important tools for water resource managers. They enhance understanding of river characteristics, the interaction between ground and surface water, the amount of ground water in storage, the direction and rate of movement, and the quality of the water. The data also form the foundation for policy decisions in that scientists can then assess the availability of water at a particular site, the long-term availability of that water, and the quality of that water. This information can form the basis for decisions such as whether it may be too expensive to tap into a particular water supply that is too deep or too salty for domestic consumption or agricultural use.

Barrier 3

Inaccessibility of Data. Even assuming that data have been collected and are in a form that makes comparison and integration possible, the data may still not be easily accessible for a variety of reasons. For instance, given the urgent nature of water shortages, it is not surprising that those with information about particular water supplies, their availability, and their condition might be less than enthusiastic about releasing that information. True, most water quality data in the United States is available readily, and if not, it can be accessed by state or federal law; it also can be accessed through public information laws. And in Mexico, revisions to the Mexican Water Law (December, 2003) stress the need to collect water data and make them available. Nevertheless, in the view of some border-region water resources specialists, the tendency to hold data close has been their experience. In their eyes, different water user sectors such as industry and residential may be reluctant to share data across the border for fear of losing their current water shares to water users in the other portion of the binational watershed due to different national or local water priorities.

The issue of sovereignty also contributes to an understandable reluctance to share data between the two nations. The history of U.S.-Mexico relations, including gain and loss of land and water, remains an irrefutable backdrop to discussions between the two nations, and water resources are no exception. In Mexico, water is regarded as a national patrimony. Where a transboundary watershed exists, knowledge of water data can be regarded as part of that national patrimony and is often zealously guarded. Only at a more informal level, where water managers and other water stakeholders know each other personally, are the conditions more optimal to agree on data-sharing and collaborative management.

Yet another factor that affects data accessibility is a shortage of resources. For example, data may be gathered and stored in a rudimentary manner that makes it difficult to transfer the information readily to end-users. Or the data is available, but due to limited time, funds, and communications networks, others may not have been made aware of its existence. Delays in the release of reports containing new data often are attributable to the lack of agency staff and resources to actually sit down and do the work. Eventually, when these reports are released, the value of the data may have diminished, with duplication of effort in other resource-strapped organizations another regrettable result.

Next Steps

Build Capacity, Trust. U.S. federal institutions should collaborate with border-region institutions on both sides of the border that have data management responsibilities; the result would have both regional and national benefits. Specifically, the goal should be to ensure that surface and groundwater data along the U.S.-Mexico border is made available as soon as appropriate after collection and quality assurance. In the past, state agencies including TCEQ, ADEQ, and California's SWRCB have provided training to surface water quality monitoring staff of Mexican state agencies and CNA; such efforts should be supported and replicated with national support. In addition, the academic sector is well-positioned to play a liaison role between sectors and on a transboundary level. For example, work carried out by the U.S. National Water Quality Monitoring Council, which includes EPA and USGS, could be used in academic settings within the U.S. and then made avail-

able to counterpart Mexican academic institutions. Also, in the past, the Water Environment Federation carried out training for water and wastewater operators; such outreach should be commended and continued.

Underlying this capacity building should be more public education about the decision making benefits of making data available — greater conservation and ecological health, with its accompanying benefits, to name just a few. Education about the benefits, a better understanding of the reasons behind any reluctance to share data, and the introduction of incentives for making data more accessible all would be worthy next steps.

Barrier 4

Limited, Ad Hoc Data Exchange Systems. Even if the three barriers named above were overcome, there still would be a key hurdle to overcome: the lack of a formal agreement to regularly exchange border-region water resources data.

Next Steps

Establish an Annual U.S.-Mexico Water Quality Data Exchange. The federal governments of the United States and Mexico should agree to exchange water quality data on border region water bodies on a yearly basis. This ongoing regular exchange would be in addition to the limited water quality data contained in the useful "Flow of the Rio Grande" annual water bulletins of the IBWC. To build momentum for this formalized exchange, the current limited exchange of surface water and ground water data under specific projects should receive wide distribution and review, which would lead to additional formal steps to interchange more information. An eventual goal should be an online directory, with links to federal, state and local water quality data sites in both countries. The Board is pleased to note that the IBWC, EPA, SEMARNAT (Mexico's environmental agency), and CNA have begun to work on a project through the Border 2012 Program to establish a GIS-based bi-national water quality database. EPA has hired a contractor working in both countries to determine what information is available and then incorporate it into a database. The partners then will concentrate on identifying the data gaps and filling them. This effort should be strongly supported.

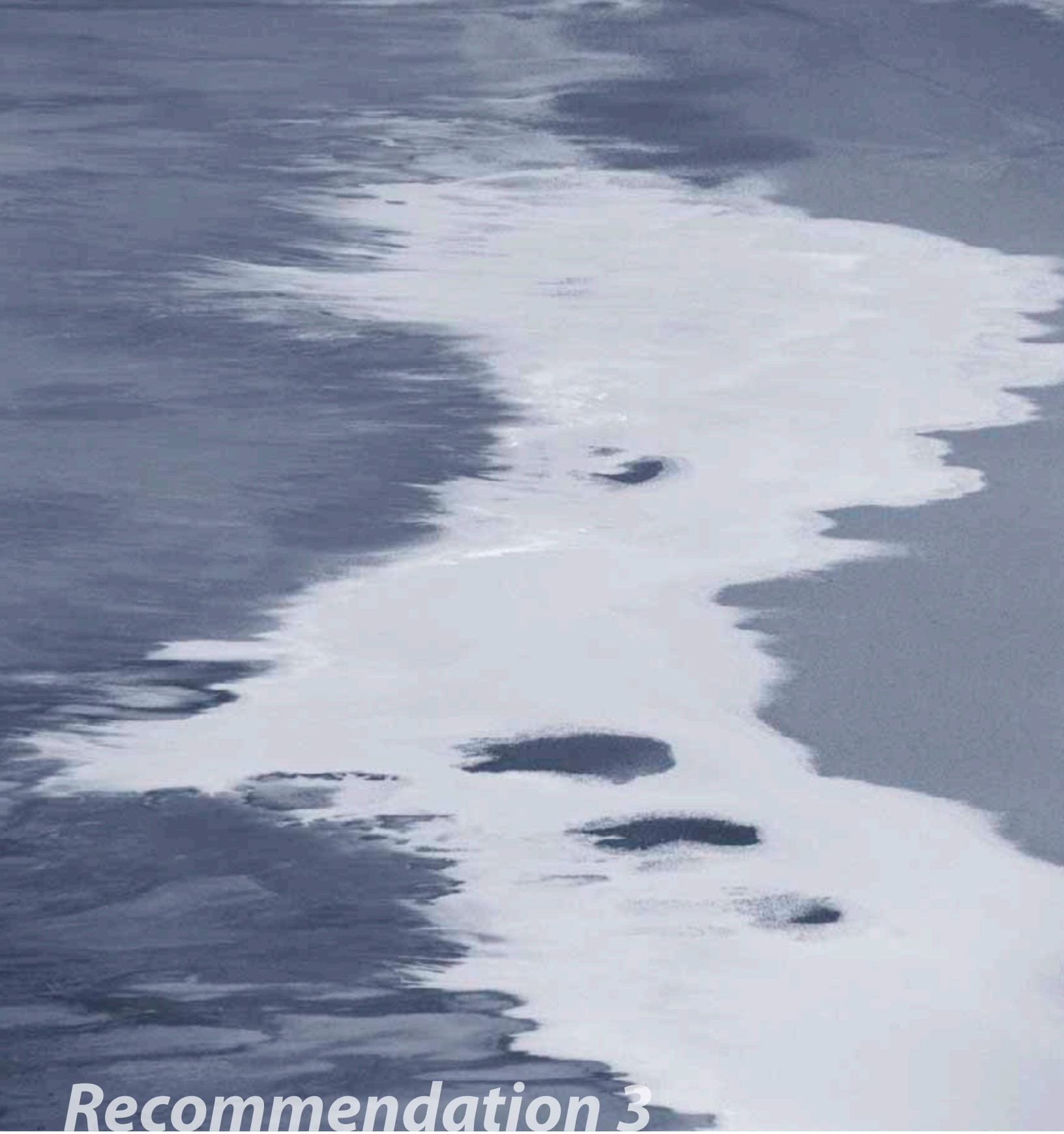
The IBWC could play a pivotal role in moving this process forward. Historically, the Commission has enacted a number of what are called Minutes (binding agreements made by the U.S. and Mexican governments) that have included provisions on data exchange. Examples include Minute 289 on the Rio Grande Toxic Substances Study; Minute 298 on San Diego-Tijuana sanitation and joint monitoring program of coastal water quality; Minute 301 on a joint aqueduct feasibility study; Minute 306 on a framework for studies of the Colorado River Delta; Minute 308 on increased data exchange about hydrological systems in both countries; and Minute 309 on Rio Conchos irrigation projects. A new IBWC Minute on regular transfer of water data may be the best way to institutionalize regular water data exchange along the border

TYPES OF WATER DATA

WATER QUALITY

Water quality data convey information about its chemical, physical, and biological characteristics. The ultimate objective of determining water quality often is to assess its suitability for a particular use. Such information is used by water resources managers to ensure that standards for particular uses, such as drinking water, are met. With the passage of the Clean Water Act (1972) and Safe Drinking Water Act (1972), it was acknowledged that waters of the U.S. must be of a certain standard to be of "beneficial use" for humans and for the environment. Water destined for human consumption and treated wastewater that is returned to water bodies must meet a number of numeric and descriptive standards for such pollutants as pathogenic (to humans) bacteria, turbidity, biological and chemical oxygen demand, dissolved salts, nutrients (nitrogen and phosphorus), pesticides and other constituents. U.S. agencies responsible for delivering drinking water and treating wastewater must monitor and publish the results of water quality testing to their customers and regulatory agencies on a regular basis. Mexican water quality standards, which relate to similar contaminants and water quality characteristics, are called Norms.

Water quality data can be used by water resources managers to develop strategies that most efficiently and effectively allocate water supplies among different users. For instance, water that may not be fit for human consumption may still be suitable for irrigation or industrial use.



Recommendation 3

Implement a five-year U.S.-Mexico border-region integrated water resources planning process. Using a stakeholder-driven watershed approach, address immediate concerns in critical areas while pursuing collaborative longer-term strategies.





"We believe there is a need for development of a long-term land use plan along the border incorporating sustainability concerns. Industrial, agricultural, human, and natural and biological realities all need to be considered in economic decision-making. Industrial development strategies as well as agricultural practices need to take into account the sustainability of the natural resources..."

— Second Annual Report of the Good Neighbor Environmental Board, April 1997

3 Strategic Planning

HISTORICALLY, entities responsible for day-to-day management of water resources along the U.S.-Mexico border often had only limited authority to influence broader planning decisions related to municipal, agricultural, or industrial growth. Often they were responding to an immediate need: meeting current supply demand, managing current infrastructure, overseeing water quality, or perhaps identifying how to fulfill the latest short-term projection for increased demand.

In recent years there has been a shift toward involving managers, along with other stakeholder groups, in broader discussions that consider issues in the long-term and are more strategically focused. But many projects at the local level, for a variety of reasons, still are carried out with insufficient planning. For instance, community needs may not be integrated into construction or operational management decisions. Projections may not have been made to precisely quantify the amount of water a community will need, and site surveys may not have been undertaken to determine the magnitude of a water quality or water treatment problem. In other cases, due to lack of funds, a detailed analysis of the infrastructure required to put a successful project into place and keep it well maintained may be lacking. Moreover, local circumstances that could pose potential barriers to a successful ongoing operation are not identified, circumstances that could cause long delays or even cancellation of the project if not identified early on and addressed. For example, cuts in city budgets could mean that a community will not be able to purchase or properly maintain high-quality infrastructure.

As binational programs mature, we are beginning to see changes in the way local agencies do business. While programs such as the Border Environment Infrastructure Fund begin to work with a community only after an environmental problem is identified, the Border Environment Cooperation Commission (BECC) certification process and the North American Development Bank (NADB) financial review build in institutional strengthening of the sponsoring agencies so that they will be able to maintain operations, as well as plan for short-, medium- and long-term projects.

Other forces outside a local agencies' control may further reduce strategic options, or at least make strategic action more difficult. Treaties, water rights law, and multiple political and institutional jurisdictions may limit the choices that can be considered by water resources managers. On the other hand, an absence of guidance can be equally problematic. For example, both nations have published water quality standards, but, with the exception of the salinity requirement of Colorado River water delivered by the United States to Mexico, there are no international standards applicable to transboundary waters. And although standards may be similar, the level of compliance and enforcement varies considerably. For example, while an effective industrial pretreatment program exists in Nuevo Laredo, Tamaulipas, pretreatment programs are not well developed in other border communities. Another example: the California Regional Water Quality Control Board, Colorado River Basin, has adopted a Total Maximum Daily Load for pathogens in the New River, setting a U.S. standard for water quality at the international border.

Finally, market forces and their economic impacts may also compromise strategic management. For example, border-region farmers may opt to discontinue farming and sell their land when faced with policy decisions to transfer water from agriculture to municipal use. Such a decision has a direct effect on land use in the region. Alternatively, farming activities may be undertaken specifically to establish or maintain water rights. In either case, good water resources management and the consequent land use decisions that should follow may be compromised.

At the same time, demand for a share of the scarce resource continues to grow – from industry, agriculture, public health, recreation, representatives for ecosystem needs, and other user groups. Moreover, the U.S.-Mexico border region faces additional challenges: an arid climate, a rapidly growing population, a high percentage of people living below the poverty line, and water bodies that cross international and tribal lines. These conditions threaten the survival of some of the region's most important environmental assets, for example, the Colorado River Delta ecosystem, and its shared aquifers, to name just two. Although the need for strategic approaches is especially great, so is the challenge to work successfully under so many constraining conditions.

Long-term approaches can help defuse highly charged, and heated political conflicts by deferring or gradually introducing sacrifices over long periods of time. For example, in 1980, Arizona's legislature adopted the landmark Groundwater Management Act to help reduce and eliminate serious groundwater depletion that was occurring in parts of the state during the prior 40 years of development in the desert. These critical groundwater areas were given until the year 2025 to attain their goals in five successive water management periods.

WATER CONSERVATION RECOMMENDED AS PRIORITY FOR INDUSTRY

Dependable infrastructure is a necessary prerequisite to draw investment to the border region. To attract new commercial interests, a region must invest in reliable infrastructure to support the demands of manufacturing, its supply chain network and other private enterprise. The private sector is not typically bound by geography, and will seek to invest its capital in regions that offer stability.

Therefore, regions should invest in infrastructure that makes water supplies certain/secure for industry. Soliciting corporate support of water conservation measures can be successful provided the supply can be relied upon to be constant over time. "Developed Water" projects such as desalination, that provide a steady supply at relative constant cost, can be budgeted from year to year and should be considered in regions where water is not in surplus from year to year. Tax incentives for innovative technology such as dry cooling towers, which would reduce the consumption of water while performing as well as traditional technology, could attract investment in this sector. Supporting these efforts would benefit the local business community and reduce the impact on the water resource. Use of tax incentives to encourage investment in innovative technologies will also help shorten the Return on Investment (ROI) time period required to justify additional expense. The local community can justify the incentive by quantifying the savings accrued through conservation of a local water resource.

Industry can help sustain water supplies within its own system through aggressive water conservation techniques such as using reclaimed water and promoting conservation in the community. It should be noted that the cost of water for a manufacturing plant is far less than the other operational costs such as labor, utilities, capital depreciation, raw materials, and others. However, should the supply of water be interrupted, the plant would suffer tremendous per hour losses. Once the water stops, production stops, but the other costs continue to accrue.

Aggressive water conservation can involve an applied research and development program for conservation measures (e.g., Bass Brothers in the San Joaquin Valley). The application of best available and latest techniques should be considered and employed when the ROI is of acceptable duration.

Many industrial applications do not require water of extremely high purity. In low tech applications, such as irrigation or cooling towers, the use of reclaimed water or a secondary use of water can reduce operation costs. Using the same water two or three times effectively reduces the cost of the resource.

The best opportunity for establishing water saving processes in a new facility is during the design and permitting stage. It is very expensive, and usually cost prohibitive, to retrofit a building. Costs are minimized when the parallel systems for gray water and other secondary use types of plumbing are installed during construction.

At the same time, industry could work with local authorities to develop and promote conservation and reuse programs in the community. To reduce the local water burden, companies could invest in the community conservation program if that turns out to be the easier and more cost effective application. This would have the impact of reducing the demand on the overall system, while satisfying the needs of all sectors of the community.

In summary, both local jurisdiction and private interests have options and interest in minimizing water demands in a water-scarce region. Tax incentives can help justify the higher costs of water efficient technology. Long term permits can be issued, with both sides held accountable for performance measures, provided planning is adequate and expansion opportunities are considered. When citing an industrial facility, the actual water cost is not one of the primary significant costs under consideration. However, the stability of the water supply is of the utmost importance.

PROJECTS AND PARTNERSHIPS

As it did for the Institutions and Data sections of this report, the Good Neighbor Environmental Board wishes to cite examples of good work already under way. For the listing that follows, the entries include strategic planning initiatives as well as sustainable approaches to water management such as conservation and adoption of a watershed approach. The examples selected include projects, events, and influential reports published during the year.

Binational Partnerships

In California and Baja California, the **Tijuana River Watershed Vision Project** is being carried out by a diverse binational stakeholder group that is developing a binational approach to addressing the problems and opportunities of the watershed. In Arizona and Sonora, other groups of stakeholders are working together to improve the quality of the Santa Cruz and San Pedro rivers and to institute basin-wide planning.

And in Texas, New Mexico, and Chihuahua, the **Paso del Norte Water Task Force,** established in 1999, is continuing its work to promote a tri-state, binational perspective on local water issues. The partnership is made up of water managers, water users, experts and citizens from Las Cruces, New Mexico; El Paso, Texas; and Ciudad Juárez, Chihuahua. The Task Force is charged with determining which water issues should have the greatest priority, such as need to coordinate water use plans with land use plans. It also proposes regional water policies and submits its policy recommendations to authorities in the United States and Mexico.

In Arizona and Sonora, groups of stakeholders are working together to improve the quality of the Santa Cruz River (headwaters shown here) and to institute basin-wide planning.

(Source: Geography of Arizona and the Southwest, Alex Oberle, Arizona State University)

Elephant Butte Reservoir water levels were at about 5.6 % storage capacity as of September 2004 (note drought rings).

(Source: NOAA)

Federal Partnership

The **U.S. Army Corps of Engineers** and the **U.S. Environmental Protection Agency** (EPA) signed an agreement to establish a collaborative watershed partnership. Objectives include enhancing data exchange and promoting the development of innovative approaches to water resource and watershed management.

Academic sector

The **Utton Transboundary Resources Center,** based in the School of Law at the University of New Mexico, dedicated some of its resources to work on establishing a water management plan for the Endangered Species Act Collaborative Program. It also launched a project to design a model water compact, and supported a computer modeling project by Sandia National Laboratories that will assist the Middle Rio Grande's Water Assembly's public participation process. Other university-based programs have contributed to research and outreach in the border region. Among the most active have been the Udall Center for Studies in Public Policy at the University of Arizona, the Institute for Regional Studies of the Californias at San Diego State University, and the Lyndon B. Johnson School of Public Affairs at the University of Texas.

Local government

The San Diego County Water Authority provided subsidies for the replacement of old toilets with more efficient models and for the purchase of high-efficiency clothes washers. It also provided information on landscape water efficiency and related matters. In addition, the **El Paso Water Utilities (EPWU)** reported that during 2004, it met its target goal of reducing per capita water use to 140 gallons per day by 2010, six years early, using a variety of methods, including turf replacement, water-efficient washing ma-

The South Bay Water Reclamation Plant has the capacity to treat 15 MGD of wastewater from the South Bay District of San Diego County to meet tertiary treatment standards. Reuse of treated wastewater can help relieve the heavy demand on limited resources.

(Source: Paul Ganster)

chines, and greater use of reclaimed water. And an EPWU estimate of the fresh groundwater in the Texas portion of the Hueco Bolson (the transboundary aquifer used by both El Paso and Ciudad Juárez) concludes that the Hueco Bolson can "provide an adequate supply of fresh groundwater for 70 years," or about 50 years more than previously thought. ["Review and Interpretation of the Hueco Bolson Groundwater Model," Bredehoeft, *et al*, March 2004.]

Finally, the State Commission for Public Services for the city of **Tecate, Baja California,** provided information to users on how to more efficiently use their local water resources; it also carried out educational programs for children.

State-level

The Texas Water Development Board (TWBD) approved up to $10 million for agricultural water conservation demonstration projects in the High Plains and the Rio Grande Valley. The two funded projects were "An Integrated Approach to Water Conservation in the Texas Southern High Plains" and "Maximization of On-Farm Surface Water Use Efficiency by Integration of On-Farm Application and District Delivery Systems." Also of note, in Texas, state law now requires all water rights applicants to submit a water conservation plan with reasonable water conservation measures.

Events

The **Valley Water Summit** was held in February 2004 in Harlingen, Texas. Participants prioritized the three most pressing needs identified: inefficient water delivery systems; conflicts among agricultural, municipal, and environmental water needs; and a lack of water supply. In their view, enforcing the water treaty with Mexico was the best option for increasing supplies and maintaining at least minimal in-stream flows in the Rio Grande. Other goals identified: establishing regional partnerships and cooperative financing mechanisms among all stakeholder groups; coordinating federal and state funding; improving efficiency of water delivery systems, particularly by rehabilitating canal infrastructure and instituting on-farm conservation measures; and resolving treaty issues.

Also, prior to 2004 but of note, the **Southwest Consortium for Environmental Research and Policy (SCERP) Border Institute IV** took place in Rio Rico, Arizona, in May of 2002; the SCERP monograph for the event was published in 2003. It was sponsored by SCERP, EPA, the U.S.-Mexico Chamber of Commerce and the Border Trade Alliance. Border-region experts from different sectors identified the following priority water issues: binational water management, use of local waters, drought management, conservation, equity of distribution, database development, and education programs. Recommendations call for tackling the problems collectively; promoting widespread conservation; investing the resources needed; and ensuring that U.S. and Mexican governments take the lead.

Reports

The **Western Governors' Association** produced a draft report, "A Drought Early Warning System for the 21st Century," and sought public comment.

Environmental Defense, a non-governmental organization, and Gerardo Jimenez Gonzalez of the **Autonomous University of Chihuahua (UACH)** released a report about

The Imperial Irrigation District is entitled to use 70% of California's allotment of Colorado River water for agriculture.

(Source: Paul Ganster)

water use and agriculture in the lower Rio Conchos basin called, "The Ojinaga Valley: at the Confluence of the Lower Rio Conchos and the Rio Bravo."

On a national level, an independent advisory committee to EPA called the **Science Advisory Board's Drinking Water Committee** issued a report advising EPA to shift its focus on drinking water issues. It recommended that the Agency concentrate more of its resources in areas such as watershed protection, water reuse, and desalinization. And to support cost-effective management options, EPA published a Water Quality Trading Assessment Handbook designed to help managers determine if trading is a cost-effective tool to achieve pollutant reductions. The handbook illustrates how to assess the relative costs of controlling key pollutants, and provides guidance on determining whether trading would be financially attractive to watershed project participants.

Finally, the **Mexico Institute at the Woodrow Wilson International Center for Scholars** and **Environmental Defense** released proceedings from their May 2004 binational Conference on Agricultural Production Trends in the Transboundary Rio Grande Basin. The document presents findings on production and water use in the basin's major irrigated crops, including alfalfa, pecans and sugar cane.

Healthy riparian vegetation (above) that provides critical desert habitat depends upon flows in the San Pedro River. Ecosystem needs must be included in deliberations on competing demands.

(Source: EPA)

GUIDELINES FOR WATER PLANNING

Scarcity of water resources often is confused with "not enough." Instead of the typical solution of "finding more," the Good Neighbor Environmental Board suggests that a rational approach be taken on a variety of scales and timeframes within the US-Mexico border region to examine how much there is, where it is, and how much is going to be used in the future. However this critical planning involves difficult challenges and requires cooperation across domestic and international political boundaries.

Water management solutions are rarely just supply or demand problems, hence they must be tackled on both fronts in a strategic, goal-oriented approach that embodies long-term vision, and recognizes that sacrifices will be necessary in pursuit of sustainable water use for the greater good of all. Obviously, stakeholder participation is a core element of long-term water management planning. This participation and consensus can be facilitated with factual information regarding the current status versus anticipated projections.

The steps needed to achieve the highest degree of consensus on equity decisions at a local scale are as follows:

1) Determination of goals that include immediate issues as well as long-term issues;
2) Definition of regions for planning/integrated management needs to take into account hydrological units and potential synergies from cooperation on a regional basis, including across the international boundary;
3) A working knowledge of the necessary water budgets, which provide basic information required for water planning, including present and projected supply and demand to provide realistic projections for water availability and use in a region;
4) Determination of the water resources that are available, including surface water, groundwater, and reclaimed water as well as legal and administrative constraints that prevent sustainable use of those resources; and
5) Determination of the water (and projected) demands, including use by sector (municipal, industrial, agricultural, and environmental).

Summary: A large number of considerations are involved in designing a blueprint for local water planning. Some border areas are better prepared than others. There is a pressing need, however, to prioritize border region basins since fiscal resources are limited, requiring focus in the most critical areas.

Ultimately, what is at stake is the future of communities and economies along the length of the border, in some sense, the future of U.S.-Mexico international relations. The possibility of declining communities along the border due to water shortages will be a looming reality unless water resources planning is undertaken in a binationally-cooperative manner, with a view of the long-term implications of inaction.

STRATEGIC PLANNING AND AGRICULTURAL WATER USE

Agriculture is a major water user in the border region. In fact, according to information contained in SCERP Monograph Series, no. 8, *The U.S.-Mexican Border Environment: Binational Water Management Planning,* crop irrigation alone accounts for 60–80% or more of the water consumed in the region. It also is a significant economic contributor in the border region. In rural border counties of New Mexico, for example, farm sales typically represent between 10 and 20% of countywide earnings. With much of the border region's economy and a large part of its water in agricultural use, the importance of understanding opportunities and barriers for strategic management in this sector cannot be overstated.

Any effort to manage irrigation water use must recognize that at least three major issues are inexorably tied to agricultural water use:

- Government management of water storage and delivery infrastructure is a huge part of the large percentages of water use associated with agriculture
- State and federal laws directly affect producers' production and location decisions, which, in turn, affects water use
- Individual producer decisions about production techniques, crops and other production choices are largely dictated by external factors and costs, including the cost of water.

Existing infrastructure investments and management systems contribute to high levels of agricultural water use. Water managers at federal and local (district) levels typically manage available surface water to meet water right obligations, but have limited opportunities to improve storage and delivery systems. For example, canals deliver between 50 and 80% of the water they receive (though they have other environmental benefits), and dams are managed to optimize deliveries during the irrigation season, without attempting to manage evaporation losses (estimated to be between 10 and 30%, depending upon temperatures and depth of their storage).

Legislation often has unintended effects on water use and/or water quality. State and federal regulation indirectly affects producers' location choices, as illustrated by the movement of dairies from California to Texas and, more recently, to New Mexico, likely resulting from federal dairy buyouts and differences in state environmental regulations. The "use or lose" doctrine of western water law also plays a major role in production decisions, dictating that producers utilize their water rights in order to maintain them.

Individual agricultural water users are faced with more personal, but no less difficult, obstacles. They must either:

- Find ways to improve their water use efficiency (to accommodate declining or irregular supplies), or
- Sell their land and/or water rights and confront the necessity of relocating or changing professions. Though this is one of the most difficult issues to address, it is a very real reason that agriculture persists in areas often readily deemed "unfit for farming" by outsiders.

Improving on-farm agricultural water use is technologically feasible, but expensive. The least efficient irrigation systems, like surface flooding, deliver water with only about 30–40% efficiency, while highly efficient sub-surface drip systems are more than 90% efficient. Crop choices (e.g. cotton vs. vegetables) and selection of operations (e.g. dairies vs. irrigated agricultural) also influence water consumption.

In the border region, some individual irrigation districts are reporting good success with conservation measures. For instance, the Imperial Irrigation District (IID) in California has invested hundreds of millions of dollars in conservation and efficiency efforts. Data from the United States Bureau of Reclamation show that IID's conveyance and distribution system efficiency along the lower Colorado River is now about 90 percent. And the California Department of Water Resources rates Imperial Valley farm efficiency at approximately 79 percent, as compared to the statewide goal of 73 percent.

The North American Development Bank (NADB) also is assisting with conservation through efficient irrigation. During 2004, it approved $16.4 million in grants from the Water Conservation Investment Fund for six projects. The projects will be carried out in the following irrigation districts: Cameron County, TX (2); Delta Lake near Edinburgh, TX; Hidalgo County, TX; and Imperial, CA. In addition, one grant will be for a canal improvement project sponsored by the Yuma County, Arizona Water Users' Association. NADB estimates that these projects will save more than 38,600 acre-feet of water annually.

Many of the recommendations advanced elsewhere in this report would also benefit agriculture, as would some more sector-specific actions:

- Legislative reform is needed to address the complexities of western water law; due to the inter-state and international aspects of water management in the border region, additional federal involvement (either financial or advisory) might be warranted. Encouraging adjudication (in states with prior appropriations law, more water rights are held on paper than actually exist, so courts are asked to determine allocations) and water banking (allowing farmers to keep their water rights by selling them to banks, who then either sell them to others or store them) are two concepts which appear to have unrealized potential.
- Planning at various levels, both watershed and larger, is needed to help manage the unintentional effects of seemingly unrelated legislation (e.g. dairy relocations), and develop meaningful locally acceptable land management scenarios.
- On-farm efficiency can be enhanced via continued or enhanced funding of existing programs (e.g. Environmental Quality Incentives Program and the Conservation Security Program) or via other (untested) economic incentive or disincentive programs tied to improving water use efficiency. For example, a short-term lease program could be used to reduce pumping in dry years (as pumping reduces water availability and can adversely affect soil productivity due to salt content).

REMAINING BARRIERS, NEXT STEPS

Barrier 1

Limited number of programs promoting water efficiency, conservation. An insufficient number of programs exist for promoting water use efficiency or water conservation along the border, be it for industrial, domestic, or agricultural use. There are no border wide water use efficiency standards. Yet the need is apparent. For instance, with the dramatic increase in growth of desert cities entitled to Colorado River water in states outside of California, and the continued growth of California's coastal cities, the need for extensive water conservation programs is obvious. Instead, current efforts primarily depend upon local water agencies in U.S. border communities and on the state water commissions in the Mexican municipalities. A prolonged drought in the Southwest—witness levels in Elephant Butte reservoir at 20 year lows—has made the point even more clearly. Although some noteworthy projects have been carried out or are under way *(see Projects and Partnerships section above),* this work should be intensified.

Next Steps

Identify opportunities to build conservation and efficiency into existing vehicles. One example is a recommendation from the binational Paso del Norte Water Task Force, already cited in Projects and Partnerships above. The task force has recommended allowing Mexico's water under the Water Convention of 1906 (water treaty), currently required to be used solely for agricultural purposes, to be used for municipal use as well. Also in Texas, in the Lower Rio Grande Valley, some local municipalities and water utilities, including the Brownsville Public Utilities Board, recently created the Southmost Regional Water Authority, which built a reverse osmosis drinking water plant to treat brackish groundwater and diminish the reliance on the Rio Grande.

The Tecate Aquifer, being tapped via this well, provides about 15% of the potable water for the city.

(Source:Paul Ganster)

Agricultural irrigation efficiency can continue to be improved via existing U.S. Department of Agriculture programs (e.g. Environmental Quality Incentives Program, Technical Assistance, and the Conservation Security Program). These programs are successfully providing farmers technical and financial assistance to improving their irrigation efficiency (and realize other local and national conservation goals). If employed in concert with changes to state water law, these types of programs might be expanded to provide direct financial incentives to farmers to fallow land in periods of drought.

Promote successful water conservation practices. Best management practices that result in utilities saving water should be highlighted and promoted all along the U.S.-Mexico border. Examples such as El Paso's success in meeting municipal conservation goals six years in advance *(also see above)* need to be highlighted and disseminated throughout the region.

Barrier 2

Lack of information on best practices, or prioritization systems, to resolve conflicting values and demands. According to William Nitze of Gemstar and the Center for Strategic and International Studies (*"Meeting the Water Needs of the Border Region,"* SCERP Monograph Series, no. 8), there has been no systematic attempt to prioritize competing needs for water services according to any calculus of social welfare. Mexican law does provide that drinking water should have the highest priority, a provision Nitze says has been used by the National Water Commission to cut off supplies to irrigators during drought; it does not provide for a more specific allocation among competing uses.

Next Steps

Promote dialogue, innovation, and market incentives. Increase public understanding of different types of needs for water, using vehicles such as local public hearings to discuss topics such as the relationship between surface water and groundwater. Starting at the local level, use these dialogues as the foundation for broader discussions, including informal agreements on prioritization of use. At the same time, explore new and existing technology as potential tools. To help create a system in which users are most efficiently matched to their water needs, apply market incentives such as adjusting costs to encourage treated wastewater and drinking water to be channeled appropriately. To promote conservation, implement tiered water

CONDITIONS, ATTITUDES AFFECT VALUATION OF THE REGION'S WATER RESOURCES

Effective management of water resources is less than straightforward virtually everywhere, but in the U.S.-Mexico border region, it might be said that the task is particularly challenging. An arid climate, the presence of poverty, rapid population growth, aging infrastructure, an international border, and laws in both countries that were put into place in earlier times under different circumstances are just a few of the potential roadblocks.

Moreover, the region's history has had an impact on individual attitudes. For example, the seeming relative ease with which water was imported from other areas in the past may continue to affect assumptions by even long-time residents about how shortages can and should be met. Livelihoods also affect the equation: a rancher, a maquiladora (border-region parts assembly facility) plant operator, a border control official, and a state parks official each may have different views on how water should be allocated, or how much to factor in its habitat value. In addition, the region has seen increased migration from the interior of Mexico and beyond, as well as newcomers from the central and eastern parts of the United States. As a result, not only is demand on supplies increased, but, in some cases, some residents, both newer and long-time, may not fully appreciate the seriousness of water scarcity and make consumer choices such as landscaping with turf and other water-loving plants.

tariffs where the unit price increases as consumption rises.

Factor different viewpoints into policy deliberations, especially strategic planning. Throughout the border region, strong feelings and attitudes will continue to prevail about water resources and their allocation and management. Perspectives and sensitivities toward the resource should be carefully considered and respected during discussions of water resources allocation and management in the borderlands. An appreciation for divergent opinions can help better inform decisions.

Investigate international fora and initiatives. Existing vehicles such as Internationally Shared/Transboundary Aquifer Resources Management (ISARM), and the European Union's Convention on the Protection and Use of Transboundary Waters, have guidelines for monitoring and assessment. Determine if their work is applicable to the U.S.-Mexico border region.

Encourage best practices across border states. For example, New Mexico is to be commended for creating a State Engineer position whose responsibility is to protect groundwater and surface water. Communities are required to prepare 40-year water plans, and the Engineer tabulates the water budget and how much people are using, as well as how much they are allowed.

At the same time, New Mexico can learn from the other border states in other areas. For instance, its Anthony Sanitation and Water District sewage treatment plant was designed so that water could be used by the golf course located adjacent to the plant. Yet the golf course doesn't take advantage of this situation because, under Western Water Law and its prior appropriations law, which essentially entails "use it or lose it," the golf course must use its onsite water supply or lose it. And the small town of Santa Teresa, right on the border with Mexico, has extensive water rights that they need to maintain; the result includes several golf courses as well as a sod farm.

By contrast, within the Active Management Areas (AMA) of neighboring Arizona, golf courses are subject to stringent conservation requirements (to the degree they use any groundwater). Uses of groundwater in Arizona are not subject to "use it or lose it" provisions, and within the AMA's golf courses, irrigated agriculture and municipal providers are all subject to conservation requirements. In most cases, these conservation requirements are separate from the users' water rights.

Two other innovative programs in Arizona are the Assured Water Supply Rules and Water Banking. Under the assured water supply program, within AMA, a developer must show a 100-year supply of renewable water before land can be subdivided. Golf courses included within a subdivision are also subject to this requirement to provide a renewable supply.

Under the Arizona Water Banking Authority, the state uses general funds and groundwater-use tax revenues to purchase and store otherwise unused portions of the state's Colorado River entitlement through groundwater recharge. These supplies can then be recovered through during shortages. One of the means of "recharging" Colorado River supplies is through a Groundwater Savings Program. Under this program farmers who use groundwater agree to take Colorado River water at a reduced price, then the AZ Water Banking Authority or a city that has subsidized the price of the Colorado River water for the farmer gets a "recharge" credit for the water the farmer has left in the ground. These credits can be recovered and used to demonstrate an assured water supply (development cannot proceed within Arizona without a guaranteed supply of water), or to firm Arizona's junior rights to the Colorado River (the "use it or lose it" provision of the Law of the River).

Utilize information obtained under existing prioritization systems. For example, the BECC and NADB prioritization process will continue to be carried out every two years *(see Institutions section)*. Under this system, projects submitted for funding will be prioritized according to specific

THE MIMBRES BASIN

A POSSIBLE PILOT PROJECT FOR APPLYING GROUNDWATER MANAGEMENT APPROACHES IN THE U.S.-MEXICO BORDER REGION

In the view of the Good Neighbor Environmental Board, a relatively minor aquifer that spans both sides of the border — the Mimbres Basin in Southern New Mexico and Northern Chihuahua — offers a good opportunity to study and employ water resource management strategies which could be applied elsewhere in the region. Initial discussion regarding this groundwater resource has begun at the local level. The New Mexico Environment Department (NMED) has facilitated the creation of a Rural New Mexico/Chihuahua Multimedia Task Force under the Border 2012 program. Water was one of the priorities identified by the task force; a subcommittee is discussing how to effectively manage the Mimbres Basin as a binational resource. The Board commends this initial effort and calls on appropriate institutions to assist with moving it forward.

Brief background: The Mimbres Basin stretches from southwestern New Mexico south across the border into north central Chihuahua. Two communities — Palomas in Chihuahua, and Columbus in New Mexico — are completely dependent upon this aquifer for all their water needs. The health of this resource provides a strong incentive for these two neighboring communities to discuss how to jointly care for it.

A number of current circumstances contribute to a promising outcome:

- Both communities have seen extensive recent growth. Columbus' population tripled in the decade from 1990 to 2000, from 669 to 1765, with the County population expected to increate at the rate of 2.57 during the next five years. Likewise, the population of the area in which Palomas is located has more than doubled in the past 30 years, with such a trend expected to continue.
- Increased border trade has warranted interest in a new commercial port.
- Plans for water use could include activities such as a 240-lot subdivision having been plotted just north of the border, and construction of a golf course has been mentioned on a newly purchased 30,000-acre former farm.
- Agriculture, which contributes significantly to the social and economic makeup of the area, accounts for substantial withdrawals and depletions from the aquifer.
- Additional municipal wells are being drilled in Palomas to serve increasing needs.
- Both communities have recently upgraded their water and wastewater infrastructure, with expansions planned.
- Both have experienced increasing fluoride content in their water, a result most likely due to increasing extractions.
- Due in part to events such as the Festival de Agua, rainwater harvesting projects and other educational efforts, public awareness has grown about water quantity, quality and conservation.
- Regional water planning is underway in Luna County, which includes Columbus.
- For the first time, funds have been requested to review the feasibility of compatibility among various land use ordinances within the four jurisdictions – Luna County, Deming, Columbus and the extra-territorial zone (3-5 mile region surrounding an incorporated community).
- The recent state and municipal elections in Chihuahua provide an auspicious opportunity to initiate a dialogue.
- All water rights on the New Mexico/U.S. side of the Mimbres have been adjudicated.
- The absence of surface water supplies, although a minus in terms of supply, eliminates an additional variable when discussing water management options.
- Mexico and the U.S. have no treaty with respect to groundwater, hence no water compacts would be affected.
- Historically, friendly relations have existed between the State Governments of Chihuahua and New Mexico.
- The economies, demographics, and relevant administrative units are relatively conventional on both sides of the frontier.

Like other transboundary aquifers, two different groundwater systems govern the management of the Mimbres Basin. The New Mexico State Engineer and Mexico's National Water Commission develop plans strictly for their own users. Systematic gathering of geologic and hydrologic data using similar classifications, as well as past and future trend measurements for demographic and economic behavior, has not taken place, nor has there been a formal sharing of existing data and information. However, experts say that the resource conditions can be determined with sufficient reliability; the reaction and impact to pumping and recharge can be determined; and the resource can be studied, determined, monitored, and managed.

A first step toward binational management of the basin would be to share information and data, and to work toward a simple, common, set of objectives. Community members and agency personnel could discuss their development plans, water needs, and projections for use; as mentioned, preliminary discussions already are under way. They also could look for success stories in the international arena with elements that could serve as blueprints for Mimbres Basin activities and approaches.

Furthermore, in the view of Stephen P. Mumme of Colorado State University, if participants were so inclined, these informal discussions could lead to cooperation in areas of appropriation and quality management to protect the common resource, operating on the basis of the "precautionary principle," even before further studies were undertaken: "I also see no reason why, proceeding from that basis, Luna County, the Village of Columbus, and the State of New Mexico, facilitated by the IBWC, could not enter into discussions concerning conjunctive and concurrent management plans that would benefit the aquifer and both communities in the short run, with the prospective of reaching a more formal and perhaps elaborated agreement that would be based on a reasonable and locally-supported arrangement by all property owners and municipal authorities with the sanction of the state," he says.

Regardless of the specifics, Mumme says, strong local stakeholder support would be essential, as would designs for management that work within the context of state water law. He adds that success in the Mimbres Basin project could provide a stepping-stone to similar projects in other border-region basins such as the Sonoyta and Tijuana.

The United States Section of the International Boundary and Water Commission has established citizen forums throughout the region to promote exchange of information with the public about Commission projects. Above, Colorado River Citizens' Forum meeting in El Centro, California.

(Source: IBWC)

criteria. This identification of needs could be made available to water resource managers for other projects such as watershed-based planning.

Barrier 3

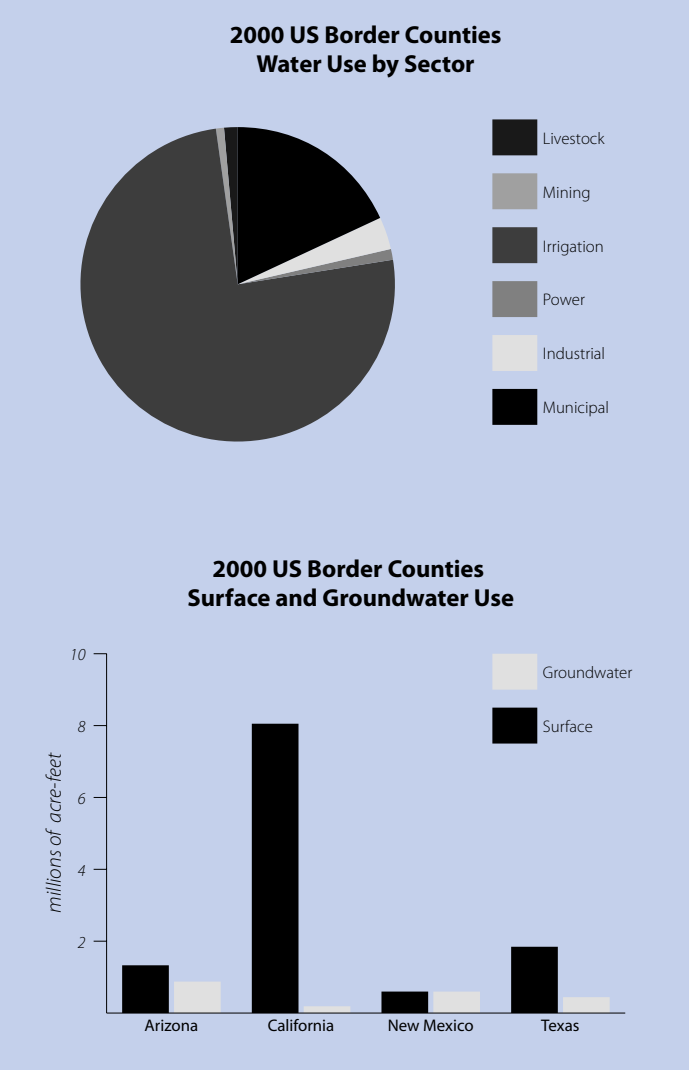
Piecemeal implementation of watershed projects. The Good Neighbor Environmental Board's Fourth Report to the President and Congress called for a watershed approach to become the standard operating procedure for all projects that deal with water resources management along the border. Five years later, it is pleased to report substantial progress has been made in selected locations *(see Projects and Partnerships)*. However, the Board must also point out that this progress has not yet reached the point of becoming institutionalized. It reiterates its call now for an institutionalized approach.

Next Steps

Enhance binational watershed planning. In the U.S.-Mexico border region, rapid population growth, industrial and agricultural development, cycles of drought and flood, invasive exotic plants, and inadequate water and wastewater infrastructure pose particular threats to watersheds — watersheds at continuing risk of overexploitation and environmental degradation. Increased federal, state, and local support for binational watershed planning can provide tools to address these threats more effectively.

Improve data exchange and transparency for large watersheds covering multiple states and jurisdictions. The GNEB recognizes that a "one size fits all" approach may not be appropriate for binational watershed planning. In large watersheds such as the Colorado River and Rio Grande, planning efforts would greatly benefit from improved data exchange and increased transparency so that water managers in each affected political subdivision have a greater understanding of practices and plans in other jurisdictions. This increased sharing of information will significantly enhance watershed planning in these complex systems.

Increase institutional support for local planning efforts in smaller watersheds. In smaller watersheds, such as the Tijuana and San Pedro rivers, efforts to improve watershed management would benefit from increased institutional support and transboundary cooperation. In some cases, substantial local interest exists for establishing a binational framework for watershed management. However, lack of institutional capacity or legal authority to engage in substantive binational watershed management are impediments. Local watershed planning efforts would benefit from a strengthened institutional framework.



Aggregating and analyzing water resources data across the entire border region (above) can support effective strategic planning decisions. Often, data are available only for individual communities or counties.

(Data source: USGS Circular 1268. Data compiled by Erika Felix.)

A Tribal Perspective on U.S.-Mexico Border Region Water Management Issues

The following section offers the perspective of Ned Norris Jr., Vice-Chairman of the Tohono O'odham Nation and Good Neighbor Environmental Board member, on water management issues in the border region. It also serves as an invitation to other border tribes to comment and add their perspectives to the dialogue on this topic.

INTRODUCTION

Participation of U.S. border tribes in environmental issues within the U.S.-Mexico border region was minimal until May 13, 1999 when the "Coordination Principles" document was signed in Ensenada, Mexico by the U.S. Environmental Protection Agency (EPA), Mexico's Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT), and the Ten Border States Environmental Directors. Through these Coordination Principles, the right of Tribes to participate in the U.S.-Mexico Border Program was recognized. The key statement in the document reads: "U.S. Indian Tribes are sovereign nations, and all Indian communities in the border area have a long tradition of stewardship of the border region, which calls for their active participation in the Border 2012 Program, workgroups, and task forces." Assured water supply and quality is a major environmental concern to border tribes. Effective tribal collaboration and coordination with the pertinent water management and regulatory agencies in Mexico and the U.S. is the key for the resolution and prevention of water supply and quality issues affecting tribes in the border region.

From my perspective, the key border tribal water issues include:

Environmental Issues

- Continuation of the EPA Border Tribes Infrastructure Program and expansion to assist tribal communities on the Mexico side of the border region. This is an area where border tribes have enjoyed success, with EPA funding many priority projects in the past few years. Fifteen tribes have received funds for improvement of their environmental infrastructure systems. In addition, two projects for tribal communities in Mexico have been funded, one in the Arizona-Sonora border region, and one in the California-Baja California border region.
- Assured water supplies, along with monitoring, and protection of shared aquifers, is a major concern. This especially applies to the lower Colorado River, the Tijuana River watershed, and the shared aquifer in the Tohono O'odham Nation (TON).
- The restoration of the Salton Sea; different scenarios under consideration could have adverse impacts on the Torres Martinez Desert Cahuilla Indian Tribe.
- High arsenic levels in border tribes' public water systems, and the treatment costs associated with meeting the new U.S. standard for arsenic.

Institutional Issues

- Communication and sharing information on water projects affecting border tribes needs to be maintained and improved. This is especially true for those water management agencies that are planning new or improved water extraction and conveyance systems near, or adjacent to, tribal lands. In addition there is a need for the continued development and sharing of binational water quality and quantity databases with the goal of identifying data gaps along the border region.
- Use of the databases to identify water issues relating to public health, environmental quality, and sustainable resource management, including a focus on drought conditions and vulnerabilities in the border region.
- Sharing of water quality and quantity management program information from both sides of the border, including basic frameworks as well as modeling efforts within binational watersheds
- Implementing binational collaboration projects to enhance water quantity and quality characterizations related to specific binational watersheds and basins.
- Identification and promotion of critical small-scale and self-help community projects for potable water issues as well as wastewater treatment and reuse. This issue includes the identification of funding sources for such projects.

PROJECTS AND PARTNERSHIPS

Tribal progress and success in the resolution of water supply and quality issues in the border region requires collaboration and participation in environmental projects and partnerships that result in the betterment of public health and quality of life. For these reasons, border tribes have consistently advocated for continuation of, and increasing their share of, the EPA Border Environmental Infrastructure Fund (BEIF). Border tribes also have expressed the need for increased monitoring and research on shared surface and ground waters. This request is a direct result of their communities expressing concerns on potential environmental contamination and, often times, lack of water data. Progress in assuring water quantity and quality for all tribal communities is tied to adequate financial resources and technical and administrative capacity within tribal governments to manage their water supply and systems.

The following are the types of border tribes water projects and other efforts that have been recently completed or are under way:

Safe Drinking Water in Quitovac, Mexico

The Tohono O'odham Nation (TON), pursuant to the EPA Border 2012 Tribal Assurances, submitted a proposal and received EPA Border 2012 grant funding to improve the potable water system for the small Mexico O'odham community of Quitovac. The Tribal Assurances document states that EPA will support one or two demonstration projects to explore how a sister U.S. tribe could help build infrastructure with a sister Mexican tribe for the provision of safe drinking water and limited wastewater treatment.

The community of Quitovac is located in northwestern Sonora, Mexico, approximately 20 miles south of the Lukeville international port of entry. Community residents currently utilize contaminated shallow hand-dug wells for their water supply. A small, on-site school for indigenous children also has substandard water storage and distribution capacity. The $92,000 project will provide the community with proper groundwater supply and storage / distribution systems. The school's water storage and distribution system also will be improved. EPA grant funding was awarded on September 2004, and the project has been initiated. The TON is working with Mexico's water agency, Comisión Estatal del Agua (CNA), to facilitate implementation of this project.

Water Systems Assessment in Baja California

The second project funded through an EPA Border 2012 grant will assess the water infrastructure needs for six indigenous communities in Baja California. The assessment is being carried out by the Pala Band of Mission Indians in partnership with Aqualink, a non-profit organization specializing in water issues based in San Diego, California. Aqualink is collaborating with the Native Cultures Institute of Baja California (CUNA), a Mexican non-governmental organization that works on indigenous environmental issues in Baja California. The assessment is under way, with water infrastructure surveys and water sampling conducted. The project is scheduled to be completed in 2005.

Water Quality Assessment, Tohono O'odham Communities in Northern Sonora, Mexico

The Tohono O'odham Nation (TON) submitted a proposal and received funding for a limited water-monitoring project in several Tohono O'odham (TO) communities located in Mexico. The Mexican TO communities are located in a water basin shared by the TON and the Republic of Mexico. The shared water basin is known in the U.S. as the Vamori Basin, named for a large wash that originates in Mexico, flows into the TON, and then returns to Mexico. The quality of the binational waters has always been a concern for the O'odham people. One other Mexican TO community, not located in the shared water basin, was chosen for water monitoring because that community (Quitovac, Sonora, Mexico) is a sacred site, which draws many O'odham for religious ceremonies. This project has been completed, and a report on the findings has been prepared and shared with the Mexican TO communities. The results of the monitoring in the shared water basin generally indicate good quality, except for bacteriological contamination due to substandard construction and maintenance of water facilities

EPA Tribal Border Infrastructure Projects

Indian tribes along the U.S.-Mexico border have significant needs for improvements to drinking water and wastewater infrastructure. Many tribes rely on drinking water systems that are susceptible to contamination and wastewater systems that endanger public health and the environment. For example, in the Tohono O'odham Nation, members face serious deficiencies in their drinking water and wastewater systems. About 20 % of the Nation's homes are not served with potable water, and about 40% of homes have serious deficiencies in their drinking water and/or wastewater systems. A comparison of the incidence of four water-related diseases is shown in the following table. The chart shows 1992 outpatient data and compares the information for the service population in the Tucson Area (26,000) versus the United States population (255 million).

Since 1996, EPA has provided $28.4 million for the Tribal Border Infrastructure Program, which was established to address the high-priority water and wastewater needs of tribes along the border. The program is funded by set-asides from special appropriations used to construct infrastructure for communities along the border. Unmet tribal

Table 1

Communicable Diseases (1992 Data)	*Tucson Area (Pop. 26,000)*		*U.S. (Pop. 255 million)*		*Ratio of Tucson Area/ U.S. Pop.*
	Total No.	*No. per 10,000 Pop.*	*Total No.**	*No. per 10,000 Pop.*	
Bacillary Dysentery	13	5.0	23,931**	0.9	5.6
Gastroenteritis Diarrhea	982	377.7	2,455,000	96.3	3.9
Ectoparasitic	434	166.9	132,600**	5.2	32.1
Other Infectious Parasites	1,012	389.2	890,000	34.9	11.2

* Data provided by the National Center for Health Statistics (NCHS), Center for Disease Control, U.S. Public Health Service (PHS)

** According to NCHS incidences of less than 400,000 are of questionable accuracy.

These figures show that the reported incidence is approximately four (4) times greater for gastroenteritis to thirty-two (32) times greater for ectoparasitic infestation for the Tucson-area Native American service population than for the general U.S. population.

border infrastructure needs are approximately $49 million, according to surveys prepared by the Indian Health Service (IHS). Much work remains to be done.

Of the 25 eligible Tribes within the border region in Arizona and California, to date, the following 15 Tribes have received funding.

California

Barona Band of Mission Indians
La Jolla Band of Luiseno Indians
Manzanita Band of Mission Indians
Mesa Grande Band of Mission Indians
Pala Band of Mission Indians
Pauma Band of Mission Indians
Pechanga Indian Reservation of the
Temecula Band of Luiseno Mission Indians
Rincon, San Luiseno Band of Mission Indians
San Pasqual Band of Mission Indians
Santa Ysabel Band of Diegueno Indians
Sycuan Band of Mission Indians
Torres Martinez Desert Cahuilla Indians

Arizona

Cocopah Indian Tribe
Quechan Indian Tribe
Tohono O'odham Nation

EPA has funded 36 projects and plans to award another three projects, providing basic sanitation and/or access to safe drinking water for 8,094 homes at a cost of $3,464 per home. Of the awarded projects, 24 are complete or under construction, four are being designed and eight are in the planning phase.

All projects are for the planning, design and construction of either drinking water or wastewater systems. Project budgets typically range from $300,000 to over $1.5 million. The following types of projects have been funded.

Drinking water projects

- New wells to replace contaminated sources
- New tanks to provide needed storage capacity
- Treatment/disinfection systems to ensure compliance with the Safe Drinking Water Act
- New distribution systems to replace old, small diameter lines susceptible to contamination

Wastewater projects

- Collection systems to replace failing individual septic tanks and pit privies
- Wastewater treatment lagoons
- Repair of leaking sewer lines

The Tribal Border Infrastructure Program has achieved greater public health and environmental protection benefits by leveraging resources and funding available from other federal, tribal, and non-profit organizations. In addition to designing and managing many of the projects, the IHS has provided matching funds for some projects. The U.S. Department of Agriculture (USDA) Rural Development Program and several tribes also contributed funds for several projects. In addition, the U.S. Department of Housing and Urban Development (HUD) and Rural Development provided grants to construct needed indoor plumbing and bathroom facilities at Tohono O'odham. Finally, the Rural

Community Assistance Corporation, a non-profit organization providing assistance to rural utilities, has provided extensive training for tribes on how to properly operate and maintain the newly constructed facilities.

Drinking Water and Wastewater Infrastructure Needs Assessment

An assessment of border tribes' drinking water and wastewater infrastructure needs was one of the Good Neighbor Environmental Board's recommendations in an earlier report to the President and Congress. That assessment is well under way. The EPA Regional Tribal Operations Committee, with funding assistance from the U.S. EPA, is currently implementing a drinking water and wastewater infrastructure needs assessment for all tribes located in the EPA Region 9 area. The assessment is being conducted utilizing a survey form that solicits direct information from tribes on their infrastructure needs. The survey form has been prepared with input gathered from tribes in Arizona and California. The assessment is expected to present the first comprehensive compilation of tribal infrastructure needs in EPA Region 9, and will be used for planning future funding requests. Information also will be separated out to complete specific assessments of individual border tribes' infrastructure needs. This effort is slated to be completed in 2005.

COLORADO RIVER

WATER SUPPLY

The Southwest's largest and most important river, the Colorado River, once flowed past several tribal lands and villages on its way to the Gulf of California in Mexico. For decades, the river has only reached the Yuma, Arizona area where its remaining flows are diverted to cities like Tijuana and San Diego, and to the large farming area located in the Yuma and Imperial Valleys. The consequences of water diversion have resulted in adverse impacts on the border tribes and members who inhabit the region.

In a matter of a few decades, the Cienega de Santa Clara (Colorado River Delta), the delta at the river's mouth, has drastically changed from a lush habitat to a desolate wasteland. The marshes and riparian areas that formerly framed the riverbanks have all but vanished, drying up along with the shrinking river. The wildlife has all but disappeared. Tribal communities, who lived off the river's bounteous ecosystem for centuries, have to look elsewhere for their livelihoods, for fish to catch, and for water for irrigation. In spite of these environmental impacts, there are still a few remaining pockets of wetlands and riparian areas scattered from the delta to the Yuma, Arizona area. These scattered green areas are fed by agricultural wastewater, water leaking from area canals, and occasional wet years (surplus) in the Colorado River basin. Although thought of as very small, they are a critical part of the ecosystem, supporting a variety of birds, waterfowl, and other animal and plant species.

The Cocopah and Quechan border tribes have special interest in the regulation of flows in the Colorado River because they depend greatly on the river's water for their extensive agricultural operations. In addition, a significant number of their members reside in Mexico where they are impacted by the scarcity of water. There also is a concern for a share of water for the ecosystem. The Cocopah Tribe, which shares about twelve miles of riverbank with the Republic of Mexico (Baja California), is very concerned about the riparian reaches of the river. The riparian reaches are now fed by water leaking from the water canals carrying water west to the farms and cities of Southern California and Baja California. Plans to line those water canals will greatly affect the river's riparian areas. Plans for recycling of domestic and agricultural wastewaters also will affect the remaining green areas.

The Colorado River's entire supply is allocated by treaty among seven U.S. states and Mexico. Because of the continuing population and industrial growth in the affected border region, and also because of the prolonged drought conditions, the regulation of the river's water supply will need to be tightened more and more. Tribes are very aware of the need to carefully allocate such water, and know that the solutions are not going to be simple, but there is great concern about the need to find water to protect the remaining delta and riparian areas of the river. Affected tribes need to be consulted and participate in actions contemplated or planned by the various local, state, and federal agencies that manage the Colorado River water supply. Some agencies, such as the International Boundary and Water Commission (IBWC) through its Colorado River Delta Advisory Committee, strive to involve stakeholders, including the Cocopah and Quechan border tribes, but many do not. The Delta Advisory Committee is a good example of binational collaboration. It provides a needed avenue for stakeholders to share information and concerns among U.S. and Mexico governmental agencies and other organizations regarding Delta environmental issues.

WATER QUALITY

The lower Colorado River, which provides water for more than 20 million people in Arizona, California, and Nevada, is contaminated by a chemical used to make solid propellant for rockets, missiles, and fireworks. This contaminant is ammonium perchlorate. Perchlorate contamination was caused by discharges from an industrial operation located outside of Las Vegas, Nevada. Sampling conducted by the

Arizona Department of Environmental Quality (ADEQ) found levels of the chemical at about 6 parts per billion at Lake Havasu and near Yuma. Arizona has a risk guideline of 14 parts per billion. There is no federal water standard, although EPA has prepared a draft toxicity assessment that currently is undergoing review by the National Academy of Sciences. Once the assessment is finalized, the reference dose will be used in EPA's ongoing efforts to address the perchlorate problem. EPA also is collecting information to determine if a water standard is needed to further efforts to protect the public health.

An Interagency Perchlorate Steering Committee (IPSC) has been formed, with participation by various affected government agencies. Its main purpose is to ensure an integrated approach to addressing perchlorate issues, and to inform and involve stakeholders about developments. The Cocopah and Quechan border tribes, as well as other Colorado River Indian tribes, are participants in this important committee. As users of the Colorado River waters, these tribes are duly concerned about the impacts on public health, and efforts to mitigate the problem.

REMAINING BARRIERS, NEXT STEPS

Barrier 1

There are 27 border tribes in the U.S.-Mexico border region, 25 of which are located in Arizona and California, and two in Texas. Border tribes' land ranges from a few hundred acres to over 2.8 million acres, which belongs to the Tohono O'odham Nation (TON) in Arizona. Population also ranges from a few hundred members to approximately 28,000 members of the TON. Tribes are sovereign nations, and therefore tribal governments must fulfill roles of federal, state, and local governments in the United States. This situation means that the biggest impediment for tribal participation in the U.S.-Mexico Border Program is a question of resources.

Tribal governments have many competing priorities for their time and resources. Although EPA has provided funding for border tribal coordination programs in Arizona and California, this effort has only improved information dissemination and participation in the Border Program's various workgroups and taskforces. There is still a large deficit in technical and administrative capacities to address border- region environmental issues. This deficit is especially true in the water management arena. Border tribes have environmental and water management agencies and departments, but the existing resources are stressed just to maintain oversight of water issues within their tribal lands, let alone having to keep abreast of water issues and developments outside of tribal lands that may have impacts on their jurisdictions.

Next Steps

There is a need for emphasis in seeking more resources for border tribes' water management and environmental programs. Federal assistance is needed to address the resource problem faced by border tribal governments to adequately address environmental and water issues.

Barrier 2

The presence of a large number of tribes in the border region, with different priorities and issues, results in a very complex system for coordination of border water issues. Some tribes are located adjacent to the U.S.-Mexico border and have a vital interest in participation in border-region water issues and projects. Other tribes are located at some distance from the border such that border water issues are not a concern. These varying differences make it very difficult to reach consensus on approaches to address regional water issues and needs.

Next Steps

There is a need for emphasis on seeking participation of border tribes with a vital interest in border-region water issues and projects that may affect their tribal lands. Although coordination of border water issues needs to be done with all border tribes, a subset of those tribes most affected by border water issues needs to identified, and increased efforts should be taken to ensure that pertinent water issues information and projects are coordinated with those tribes.

This report on Border Tribes water management issues and projects was prepared by staff supporting Good Neighbor Environmental Board member Ned Norris, Jr.

MEETINGS

During 2004, the Good Neighbor Environmental Board held its annual Strategic Planning meeting in Washington, D.C. and two public meetings in towns located along the U.S.-Mexico border. The public meetings in border towns were organized around particular environmental themes and included presentations from local speakers, public comment sessions, and updates from the Board's counterpart Mexican advisory group, referred to as the Consejo. Each of these meetings also included a business meeting component and an optional field trip to learn more, first-hand, about environmental issues in that portion of the border region.

The first meeting took place on February 24th and 25th in Washington, D.C. It began with a special session called Border Environmental Forecast 2004, with Council on Environmental Quality (CEQ) Chair James Connaughton as the keynote speaker. The Forecast session consisted of an expert panel discussion on border-region environmental policy, as well as presentations on water management issues. The Strategic Planning Session enabled Board members to determine the theme for the Eighth Report as well as assess and refine its techniques for outreach. The Board also released its Seventh Report to the President and Congress, which was preceded by a press and constituent group briefing *(see details in Reports section)*.

On June 9th and 10th, the Board traveled to McAllen, Texas for the first of two border-community meetings during the year. The theme for this meeting was water resources management. McAllen Mayor Leo Montalvo gave the opening remarks, followed by presentations from local experts including the following: Carlos Rubinstein, Rio Grande Water Master; Arturo Herrera, CILA Commissioner; Oscar Cabra, NADB Technical Services Director; Genoveva Gomez, Brownsville Utility Board; Glenn Jarvis, Law Offices of Glenn Jarvis; Randy Blankinship, Texas Parks & Wildlife; and Tyrus Fain, Rio Grande Institute President. Attendees also heard a special report from Andres Ochoa, Mexico's Secretaría de Medo Ambiente y Recursos Naturales (SEMARNAT) Northeast Consejo advisory committee member. A business meeting was held on the second day.

The final meeting of 2004 took place in Douglas, Arizona on October 27th and 28th. Meeting themes included air quality, drought, emergency response and environmental impacts of immigration. The meeting opened with an official welcome from Eric Mapp, Economic Development Director for the City. Speakers included Gerardo Monroy, Arizona Department of Environmental Quality (ADEQ); Gregg Garfin; University of Arizona; Mario Novoa, Douglas Fire Department; Reese Woodling, Malpai Borderlands Group; Board member Ned Norris, Jr., Vice Chair, Tohono O'Odham Nation; and Beau McClure, Bureau of Land Management. Consejo news was conveyed by Rene Cordoba, SEMARNAT Northwest Consejo advisory committee member. As in McAllen, a business meeting was held on the second day.

At the time of the publication of this report, the Board will have held its first meeting of 2005, on February 16th and 17th in Eagle Pass, Texas. The second meeting of 2005 is scheduled to take place in Washington, D.C. on May 10th and 11th. The final meeting of the year will be held October 17th through 19th on Tohono O'odham Nation land near Tucson, Arizona.

MEMBERSHIP CHANGES

Chair

Existing Board member Paul Ganster, Director of the Institute for Regional Studies of the Californias at San Diego State University, was appointed by EPA Administrator Michael Leavitt to serve a one-year term as the new Chair of the Board, effective October 29, 2004. He succeeded Placido dos Santos, Border Environmental Manager, Arizona Department of Environmental Quality.

Non-Federal Members

In addition, four new non-federal members were appointed during the year: Gary Gillen, President, Gillen Pest Control, Richmond, Texas; Ned Norris, Vice Chair, Tohono O'Odham Nation; Robert Varady, Director, Environmental Programs, Udall Center for Studies in Public Policy, University of Arizona, Tucson; and Ann Marie Wolf, President, Sonoran Environmental Research Institute, Tucson, Arizona.

Three existing non-federal members were re-appointed to an additional two-year term: Larry Allen, Malpai Borderlands Group; Gedi Cibas, Manager of Border Programs, New Mexico Environment Department; and Diane Rose, Mayor, Imperial Beach, California.

In addition to Chair dos Santos stepping down, four other non-federal members' terms came to an end. They in-

cluded: Karen Chapman, Environmental Defense; Valecia Gavin, President, Border Environmental Health Coalition; Ed Ranger, ADEQ; and Nancy Sutley, California State Water Resources Control Board (SWRCB).

Federal Members

Federal agency membership changes in 2004 included the appointment of A. Leonard Smith as the Commerce Department representative; Arturo Duran as the U.S.IBWC representative, replacing Carlos Ramirez; and John Ritchie as the State Department representative, replacing Dennis Linskey.

In addition, three existing Federal members named official Alternates during the year. U.S. IBWC Commissioner Arturo Duran named Sally Spener; U.S. Department of Commerce representative Leonard Smith named Jacob Macias; and Environmental Protection Agency representative Laura Yoshii named two Alternates: Paul Michel, Manager, Southwest Border Office, Water Division, Region 9, for meetings in California and Arizona; and William Luthans, Deputy Director, Multi-Media Planning and Permitting, Region 6, for meetings in New Mexico and Texas.

PUBLICATIONS

Seventh Report to the President and Congress

The Board released its Seventh Report to the President and Congress on February 24th, 2004. Entitled "Children's Environmental Health: Spotlight on the U.S.-Mexico Border," the report contains four recommendations: 1) institutionalize a bilingual environmental and environmental health education campaign throughout border-region school systems and community groups; 2) promote data gathering and analysis of border-region children's environmental health issues as the foundation for informed strategic actions; 3) support environmental health programs and projects that especially benefit children as an age group; and 4) continue to support environmental infrastructure projects along the entire U.S.-Mexico border.

The Chair met with EPA Administrator Michael Leavitt prior to the launch of the report to present him with an advance copy. Approximately 4,500 copies were distributed to Congressional representatives, border-region officials, and members of the public.

Comment Letter, "Round Up" Newsletter

In October 2004, the Board issued a Comment Letter expressing concern about the presence of aquatic invasive species in the border region, and requesting that federal policymakers direct more attention toward this issue *(see full text of Letter elsewhere in this section)*.

The Board also continued to publish a monthly electronic newsletter called the "Round Up". The newsletter provides information on recent Board activities; a summary of local, regional and national environmental news that affects the border-region; and a calendar of upcoming events. It is distributed at meetings, posted to list-servs, and sent out or forwarded to several hundred recipients each month, including former members and senior officials in border-region institutions. Readership continues to increase.

IMPACT OF BOARD'S RECOMMENDATIONS

Although it is generally felt that the Board's effectiveness continues to grow, no specific measures have been established to track its effectiveness. In response to the Board's interest in more closely assessing its visibility and influence as a Presidential and Congressional advisor, a Performance Measures working group was created in the middle of the year. The goal of the group, which is comprised of a subset of Board members, is to identify appropriate indicators to measure the effectiveness of the Board in specific areas, and then present a "straw" proposal to the full Board for its consideration. Examples of areas to be measured may include the quality and usefulness of the annual reports; the effectiveness of the Board in informing Congress, the Administration, and communities about environmental and infrastructure issues; impacts of its recommendations on policy over the medium and long term; and resulting awareness of key border issues among the groups that the Board serves. Possible indicators may include data on annual report distribution, and mention of the Board's work and recommendations in the media or in publications.

Besides its original charge to measure existing activities, the Performance Measures working group also decided to explore the concept of modifying some of the Board's current activities so as to enable it to be more effective in fulfilling its mission.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

May 13, 2004

Good Neighbor Environmental Board
c/o Placido dos Santos, Chair
Border Environmental Manager
Arizona Department of Environmental Quality
400 West Congress Street, Suite 521
Tucson, Arizona 85701

Dear Members of the Good Neighbor Environmental Board:

Thank you for providing me with an advance copy of the *Seventh Report of the Good Neighbor Environmental Board to the President and Congress of the United States*. It was good to meet with your Chair, and I appreciated the opportunity to learn more about the Board and its work. On behalf of the Executive Office of the President, I submit the following remarks in response to the report.

Your recommendations are timely in that new approaches and mechanisms are being put into place to address environmentally related health concerns along the U.S.-Mexico border. For example, the binational Border 2012 program has established approaches, such as regional workgroups, to help ensure strong community-based input on key issues, including children's environmental health. Similarly, the establishment of a border-specific U.S.-Mexico Border Health Commission and its activities over the past three years have provided another prominent mechanism for addressing health issues. Moreover, to leverage efforts between these two entities, discussions have been initiated to consider the Border 2012 Environmental Health Workgroup as the environmental health technical arm of the Commission.

More specifically, the Border 2012 program already is taking steps that begin to address several of the recommendations in your Seventh Report. One example is your call for better environmental health education. Under the auspices of the EHWG, a collaborative partnership between the U.S. Environmental Protection Agency and the Health Services Resources Administration is providing bilingual environmental health education to border-region health care personnel, in schools, and in homes. In response to your recommendation for more research on children's unique susceptibilities, it should be noted that the Office of Research and Development within EPA and its partners in the EHWG are continuing to research the effects of air pollution on asthma in school-age children, as well as potential exposures and health risks in agricultural settings.

Moreover, the Pan American Health Organization's El Paso Field Office, in collaboration with the Southwest Center for Environmental Research and Policy and other EHWG members, is looking into developing environmental public-health indicators, with special emphasis on children. Although more needs to be done on a number of fronts, the Border 2012 program and other existing entities already are making significant inroads.

The Bush Administration continues to value your considered advice, which reflects the diverse composition of the membership as well as your practice of meeting in border communities to gain first-hand input for your deliberations. The Administration also appreciates your continued commitment to remain actively involved despite your demanding schedules as senior border-region environmental policy officials.

Our sincere thanks for the valuable public service you provide. Best wishes in your preparation of the *Eighth Report of the Good Neighbor Environmental Board to the President and Congress of the United States*. We look forward to receiving your recommendations on water management, an issue that remains a major concern of the Administration.

Sincerely,

Michael O. Leavitt

The border region's other major transboundary waterway, the Colorado River, also has suffered from invasive species infestations. In addition to salt cedar, a floating fern called giant salvinia (Salvinia molesta) has become an increasing problem on the lower portion of the river. First detected there in 1999, the invasive fern since has spread rapidly. Thick mats of the plant reduce oxygen content, degrading water quality for aquatic species. The mats also impede recreational activities such as boating and fishing, and clog water intakes for irrigation.

Examples such as those just cited underscore the need to implement an effective binational strategy fueled by federal support and resources that are available for use in both countries. Unlike many issues surrounding water resources in the border region, the issue of invasive aquatic and riparian species largely is noncontentious and noncontroversial: virtually all stakeholders and economic sectors in both countries agree that invasive species pose a growing problem that needs to be stemmed. In view of this consensus, addressing the problem may offer a rare opportunity for binational collaboration toward a common goal that includes all stakeholder groups.

The Good Neighbor Environmental Board appreciates the opportunity to bring this timely issue to the attention of the Administration. The Board is available to provide additional information if requested.

(Note on the Board: The GNEB is a federal advisory committee created to advise the President and Congress on environmental and infrastructure issues and needs within the states contiguous to Mexico. It was created by the Enterprise for the Americas Initiative Act of 1992 (EAIA 7 U.S. Code Section 5404).

Sincerely,

Placido dos Santos, Chair

cc:

Kathleen Clarke, Director
U.S. Bureau of Land Management

John W. Keys, III, Commissioner
U.S. Bureau of Reclamation

Michael Leavitt, Administrator
U.S. Environmental Protection Agency

Gale A. Norton, Secretary of the Interior
U.S. Department of the Interior

Secretariat,
North American Commission on
Environmental Cooperation

Ann M. Veneman, Secretary
U.S. Department of Agriculture

Steven A. Williams, Director
U.S. Fish & Wildlife Services

Lori Williams, Staff Director
National Invasive Species Council

GOOD NEIGHBOR ENVIRONMENTAL BOARD MEMBERSHIP ROSTER

Note: List below includes all members who served during 2004. Asterisk(*) indicates individuals who completed their service during the year. See website for most recent membership list (www.epa.gov/ocem/gneb).

NON-FEDERAL MEMBERS (NON-GOVERNMENTAL, STATE, LOCAL, TRIBAL)

(appointed by EPA Administrator)

Paul Ganster, Ph.D., Chair
Director, Institute for Regional Studies of the Californias
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-4403
619-594-5423; 594-5474 fax
email: *pganster@mail.sdsu.edu*

Placido dos Santos (former Chair)*
Border Environmental Manager
Arizona Department of Environmental Quality
400 W. Congress Street, Suite 433
Tucson, AZ 85701
520 628-6744; 770-3540 fax
email: *pds@adeq.gov*

Amanda Aguirre
CEO/President
Regional Center for Border Health, Inc.
P. O. Box 1669
San Luis, AZ 85349
928-627-9222; 627-8315 fax
email: *amanda@wahec.com*

Dora Alcala
Mayor, Del Rio
109 W. Broadway
Del Rio, TX 78840
830-774-8558
email: *mayor@wcsonline.net*

Larry S. Allen
Board of Directors
Malpai Borderlands Group
PO Box 66736
Albuquerque, NM 87193
505-898-3424
email: *Larry9869@msn.com*

Diana Borja
Director, Border Affairs (MC 121)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3077
512-239-3603; 239-3515 fax
email: *dborja@tceq.state.tx.us*

Karen M. Chapman*
Water & Wildlife Analyst
Environmental Defense &
Research Fellow
Cross Border Institute for Regional Development
500 East St. Charles St.
Brownsville TX 78520
956- 466-4655; 983-7574 fax
email: *kchapman@environmentaldefense.org*

Gedi Cibas, Ph.D.
Manager, Border Programs
New Mexico Environment Department
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
505 827-2176; 827-2836 fax
email: *Gedi_Cibas@nmenv.state.nm.us*

Valecia Gavin*
President, Border Environmental Health Coalition
P.O. Box 224
Fairacres, NM 88033
505-524-3154
email: *valeciagavin@aol.com*

Gary Gillen
President, Gillen Pest Control
907 Morton St
Richmond, TX 77469
281-342-6969
email: *gary@gillenpestcontrol.com*

Ned L. Norris, Jr.
Vice Chairman
Tohono O'odham Nation
P.O. Box 837
Sells, Arizona 85634
520-383-2028; 383-3379 (fax)
email: *ned.norrisjr@tonation-nsn.gov*

Jerry Paz
Corporate Vice-President
Molzen-Corbin & Associates, P.A.
1122 Commerce Drive, Suite F
Las Cruces, NM 88011
505-522-0049x102; 522-7884 fax
email: *jpaz@molzencorbin.com*

Kenneth Ramirez
Bracewell & Patterson
111 Congress Ave. Suite 2300
Austin, Texas 78701
512-494-3611; 479-3911 fax
email: *kramirez@bracepatt.com*

Ed Ranger*
Special Counsel
Arizona Department of Environmental Quality
1110 West Washington St.
Phoenix, AZ 85007
602-771-2212; 771-2251 fax
email: *ranger.edward@ev.state.az.us*

Diane Rose
Mayor, Imperial Beach
825 Imperial Beach Boulevard
Imperial Beach, California 91932
619- 423-8303; 429-9770 fax
email: *dianehomeloans@yahoo.com*

Douglas S. Smith
Director, Corporate Environmental Safety and Health
Sony Electronics, Inc.
16450 West Bernardo Drive
San Diego, CA 92127
858-942-2729
email: *Douglas.Smith@am.sony.com*

Nancy H. Sutley*
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100
916-341-5607; 341-5620 fax
email: *nsutley@swrcb.ca.gov*

Robert Varady, Ph.D
Deputy Director
Udall Center for Studies in Public Policy
The University of Arizona
803 East First Street
Tucson, AZ 85719
520-884-4393; 884-4702 fax
email: *rvarady@email.arizona.edu*

Ann Marie A. Wolf
President
Sonoran Environmental Research Institute (SERI), Inc.
3202 E. Grant Road
Tucson, AZ 85716
520-321-9488
email: *aawolf@seriaz.org*

FEDERAL MEMBERS

(appointed by Agency Secretary)

Department of Agriculture

Rosendo Trevino III
State Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
6200 Jefferson Street, Northeast
Albuquerque, NM 87109-3734
505-761-4401; 761-4481 fax
email: *Rosendo.Trevino@nm.usda.gov*

Department of Commerce

A. Leonard Smith
Regional Director - Seattle
Economic Development Administration
U.S. Department of Commerce
915 Second Ave., Suite 1856
Seattle, WA 98174
206-220-7660
email: *lsmith7@eda.doc.gov*

Department of Health and Human Services

Richard Walling
Director, Office of the Americas
and the Middle East
Office of Global Health Affairs
U.S. Department of Health and Human Services
Room 18-74, Parklawn Building
Rockville, MD 20857
301-443-4010; 443-6288 fax
email: *rwalling@osophs.dhhs.gov*

Department of Housing and Urban Development

Shannon H. Sorzano
Deputy Asst. Secy. for International Affairs
U.S. Department of Housing and Urban Development (HUD)
451 7th St. S.W. - Room 8118
Washington, D.C. 20410
202-708-0770; 708-5536 fax
email: *shannon_h._sorzano@hud.gov*

Department of the Interior

John Klein
Associate Regional Hydrologist
U. S. Geological Survey, DOI
520 North Park Avenue
Room 106 C
Tucson, AZ 85719
520 670-5018; 670-5006 fax
email: *jmklein@usgs.gov*

Department of Transportation

Linda L. Lawson
Director, Safety, Energy and the Environment
U.S. Department of Transportation
400 Seventh Street S.W.
Washington, DC 20590
202 366-4416; 366–7618 fax
email: *linda.lawson@ost.dot.gov*

Department of State

John Ritchie
Border Coordinator
Office of Mexico Affairs
U.S. Department of State, Room 4258-MS
2201 C Street N.W.
Washington, D.C. 20520
202-647-8529; 647-5752 fax
email: *RitchieJA@state.gov*

Dennis Linskey*
Office of Mexico Affairs
U.S. Department of State, Room 4258-MS
2201 C Street N.W.
Washington, D.C. 20520
202-647-8529; 647-5752 fax
email: *linskeydm@state.gov*

Environmental Protection Agency

Laura Yoshii
Deputy Regional Administrator
US Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901
415-947-8702; 977-3537 fax
email: *Yoshii.Laura@epa.gov*

International Boundary and Water Commission

Arturo Duran
U.S. Section Commissioner
International Boundary and Water Commission (IBWC)
4171 N. Mesa, Suite C-100
El Paso, TX 79902
915-832-4101; 832-4191 fax
email: *arturoduran@ibwc.state.gov*

DESIGNATED FEDERAL OFFICERS

Elaine M. Koerner
Designated Federal Officer
Good Neighbor Environmental Board
U.S. Environmental Protection Agency
655 15th St. N.W. (at G St.)
Suite 800 – Mail Code 1601A
Washington, D.C. 20005
202-233-0069; 233-0060 fax
email: *koerner.elaine@epa.gov*

Oscar Carrillo*
Associate Designated Federal Officer
Good Neighbor Environmental Board
655 15th St. N.W. (at G St.)
Suite 800 – Mail Code 1601A
Washington, D.C. 20005
202-233-0072; 233-0060 fax
email: *carrillo.oscar@epa.gov*

RESOURCE SPECIALISTS

(non-Board members who work closely with the Board)

Federal Agency Alternates

Manuel Ayala
Natural Resource Manager
Natural Resources Conservation Service
U.S. Department of Agriculture
1400 Independence Avenue SW, Room 4237-S
Washington, D.C. 20250-1081
202-720-1883; 202-720-0668 fax
email: *Manuel.Ayala@usda.gov*

William Luthans
Deputy Director
Multi-Media Planning and Permitting
US EPA, Region 6
1445 Ross Avenue
Suite 1200 Mail Code 6PD
Dallas, Texas 75202
214-665-8154; 665-7263 fax
email: *luthans.william@epa.gov*

Christina Machion Quilaqueo
Program Analyst
U.S. Department of Housing and Urban Development (HUD)
Office of International Affairs - Policy, Development and Research
451 7th St. S.W. - Room 8118
Washington, D.C. 20410
202-708-0770; 708-5536 fax
email: *christina_a._machion@hud.gov*

Jacob Macias
Economic Development Representative for Arizona
Economic Development Administration
Seattle Regional Office
U.S. Department of Commerce
Room 1890
915 2nd Avenue, Room 1890
Seattle, WA 98174
206-220-7666; 220-7657 (fax)
email: *Jmacias@eda.doc.gov*

Thomas Mampilly
International Program Officer
Office of Global Health Affairs
Office of the Secretary
U.S. Department of Health and Human Services
5600 Fishers Lane Room 18C-17
Rockville, MD 20857
301-443-3656; 443-6288 fax
email: *tmampilly@osophs.dhhs.gov*

Paul Michel
Manager, Southwest/Border Office
U.S. EPA Region 9
75 Hawthorne Street (WTR-4)
San Francisco, CA 94105-3901
415-972-3417; 947-3537 fax
email: *michel.paul@epa.gov*

Benjamin Muskovitz
Office of Mexico Affairs
U.S. Department of State, Room 4258-MS
2201 C Street N.W.
Washington, D.C. 20520
202-647-8529; 647-5752 fax
email: *muskovitzbi@state.gov*

Sally Spener
Public Affairs Officer
International Boundary and Water Commission
4171 N. Mesa, Suite C-100
El Paso, TX 79902
915-832-4175; 832-4195 fax
email: *sallyspener@ibwc.state.gov*

EPA REGIONAL OFFICE CONTACTS

Region 9

Nancy Woo
US EPA, Region 9
Acting Associate Director, Water Division
75 Hawthorne Street (WTR-1)
San Francisco, CA 94105-3901
415-972-3409; 947-3537 fax
email: *Woo.Nancy@epa.gov*

Tomas Torres
U.S.-Mexico Border Program Coordinator and Director, San Diego Border Office
U.S. EPA Region 9
610 W. Ash Street, Suite 905
San Diego, CA 92101-3901
619-235-4775; 235-4771 fax
email: *torres.tomas@epa.gov*

Region 6

Gina Weber
US-Mexico Border Program Coordinator
U.S. EPA Region 6
1445 Ross Avenue, 12th Floor
Dallas, TX 75202-2733
214-665-8188; 665-7263 fax
email: *weber.gina@epa.gov*

Norma Duran
Director, El Paso Border Office
U.S. EPA Region 6
4050 Rio Bravo
Suite 100
El Paso, TX 79902
915-533-7273; 533-2327 fax
email: *duran.norma@epa.gov*

Carlos Rivera*
Director, El Paso EPA Border Office (former affiliation)
International Boundary and Water Commission (current affiliation)
United States Section
4171 North Mesa, Suite C-100
El Paso, TX 79902-1441
915 832-4157
email: *carlosrivera@ibwc.state.gov*

NOTE OF THANKS

In addition to the Board Members, Alternates, and Resource Specialists listed in the Membership Roster for 2004, the following individuals either served on the team of their respective Board Member, or were contacted as experts, and made valuable contributions to this report: Anne Browning-Aiken; Erika Felix; Seth Fiedler; Elaine Hebard, Ph.D.; Eugenia McNaughton, Ph.D.; Steve Mumme, Ph.D.; Steve Niemeyer, and Gary Wolinsky. Translation was carried out by Gerardo Monroy and design by CAL INC and Words Pictures Ideas.

The Board also continues to appreciate the ongoing support of EPA staff at headquarters and in Regions 6 and 9 for meeting logistics and other administrative activities, especially EPA's border offices in San Diego, California and El Paso, Texas.

Glossary of Acronyms and Terms

ADEQ	Arizona Department of Environmental Quality
AEURHYC	Asociación Ecológica de Usarios del Río Hardy-Colorado, A.C. *(Ecological Association of Users of the Hardy and Colorado Rivers)*
ADWR	Arizona Department of Water Resources
AWBA	Arizona Water Banking Authority
BECC	Border Environment Cooperation Commission
BEIF	Border Environment Infrastructure Fund
BMP	Best Management Practices
CalEPA	California Environmental Protection Agency
CEA	Comisión Estatal del Agua, (Baja California and Sonora) *(State Water Commission, (Baja California and Sonora)*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CNA	Comisión Nacional del Agua *(Mexico's National Water Commission)*
COAPAES	Comisión de Agua Potable y Alcantarillado del Estado de Sonora *(Potable Water and Sewerage Comission of the State of Sonora)*
COSAE	Comisión de Servicios de Agua del Estado, Baja California *(State Water Services Commission, State of Baja California)*
CORPS	U.S. Army Corps of Engineers
CUNA	Native Cultures Institute of Baja California
DHS	Department of Health Services
DOI	U.S. Department of the Interior
DWR	Department of Water Resources
EPWU	El Paso Water Utilities
FEMA	U.S. Federal Emergency Management Agency
GAO	U.S. General Accounting Office *(effective 7/7/04, name changed to Government Accountability Office)*
GIS	Geographic Information System
GLOBE	Global Learning and Observations to Benefit the Environment
GNEB	Good Neighbor Environmental Board

GWQB	Ground Water Quality Bureau
HUD	U.S. Department of Housing and Urban Development
IBEP	Integrated Border Environmental Plan
IBWC	International Boundary and Water Commission
IHS	Indian Health Service
IID	Imperial Irrigation District
IPSC	Inter-Agency Perchlorate Steering Committee
ISARM	Internationally Shared Aquifer Resources Management
ISC	Interstate Stream Commission
ITSON	Instituto Tecnologico de Sonora *(State of Sonora's Technological Institute)*
JCAS	Junta de Agua y Saneamiento, Chihuahua *(Central Water and Sanitation Board of Chihuahua)*
JMAS	Junta Municipal de Agua y Saneamiento de Ciudad Juárez *(Municipal Water and Sanitation Board of Ciudad Juárez)*
LIRF	Low Interest Rate Lending Facility
Mexican IBWC	Mexican Section of the International Boundary and Water Commission
NADB	North American Development Bank
NCHS	National Center for Health Statistics *(U.S. Department of Health and Human Services)*
NGO	Non-Governmental Organization
NMED	New Mexico Environment Department
NMWQCC	New Mexico Water Quality Control Commission
NMWRRI	New Mexico Water Resources Research Institute
NOAA	U.S. National Oceanic and Atmospheric Administration
NPS	Non-Point Source
NRCS	Natural Resource Conservation Service *(U.S. Department of Agriculture)*
NWQMC	U.S. National Water Quality Monitoring Council
OAS	Organization of American States
ONRT	Office of the Natural Resources Trustee
OOMAPAS	Organismos Operador Municipal de Agua Potable, Alcantarillado y Saneamiento *(Municipal Operating Agency for Potable Water, Sewerage, and Sanitation)*
OSE	Office of the State Engineer
PDAP	Project Development Assistance Program
PEIS	Programmatic Environmental Impact Statement

PHS	U.S. Public Health Service
PUC	Public Utilities Commission
QAPP	Quality Assurance Project Plan
SCERP	Southwest Consortium for Environmental Research and Policy
SEDUE	Secretaría de Desarrollo Urbano y Ecología *(Mexico's Secretariat of Urban Development and Ecology)*
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales *(Mexico's Secretariat of Environment and Natural Resources)*
SRE	Secretaría de Relaciones Exteriores *(Mexico's Secretariat of Foreign Relations)*
SWQB	Surface Water Quality Bureau
SWRCB	State Water Resources Control Board
TCEQ	Texas Commission on Environmental Quality
TGPC	Texas Groundwater Protection Committee
TO	Tohono O'odham (Mexican)
TON	Tohono O'odham Nation (U.S.)
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
UACH	Universidad Autónoma de Chihuahua *(Autonomous University of Chihuahua)*
UNESCO	United Nations Educational, Scientific and Cultural Organization
USDA	U.S. Department of Agriculture
USBR	U.S. Bureau of Reclamation (U.S. Department of the Interior)
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey (U.S. Department of the Interior)
USIBWC	U.S. Section of the International Boundary and Water Commission
WET	Water Education for Teachers
WIFA	Water Infrastructure Finance Authority