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Mitigating Cross-Border Air Pollution: The Power of A Network



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Cover photo shows the Paso del Norte air basin looking south from the Franklin Mountains north of El Paso. Photo contributed by Victor H. Valenzuela, Texas Commission on Environmental Quality.

Introduction & Overview

The Paso del Norte region is an ideal location to examine the challenges and potential benefits of cross-border efforts to mitigate air pollution. The region is located midway along the U.S.-Mexico border and comprised of portions of two U.S. and one Mexican states: Texas, New Mexico, and Chihuahua (see Figure 1). The region is also an “air shed” or “air basin,” meaning that due to the area’s meteorological and geographic characteristics, its inhabitants share the same air mass. In addition, these same characteristics separate the region’s air mass to some degree from neighboring areas (CEPAARB 2009 and Environment Canada undated). Because they occupy this one air basin, inhabitants in all three states effectively breathe the same air, the quality of which is affected by activities on both sides of the border. Throughout the region, meteorological and geographic conditions combine with both natural and man-made emission sources to impact air quality.

In the Paso del Norte region, air quality monitoring began in the 1970s and 1980s, and air quality was soon identified as a problem due to several violations of federal air quality standards. These violations got the most attention in 1990 when El Paso was declared in violation of air quality standards for three of the six criteria pollutants. Although El Paso had the most obvious air pollution problem, it was clear that the Mexican and New Mexico air basin neighbors were also contributing to what was ultimately a shared problem. Starting with El Paso’s violation of multiple air standards in 1990, the next ten years saw measurable improvement in the region’s air quality. El Paso eventually came into full compliance with air quality standards for the three pollutants causing the previous pollution problem.

What follows is a study of how a diverse mix of individuals and organizations representing two countries, three states, multiple levels of government, private industry, academia, and the public were able to successfully organize and then respond to these violations and ultimately help improve air quality throughout the Paso del Norte region. The focal point of this study is the Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua/El Paso, Texas/Doña Ana County, New Mexico Air Basin (the JAC). It was through the JAC that this diverse mix of key actors were able to navigate the complex web of political, cultural, legal, and economic factors that posed challenges to developing a unified response to this shared air quality problem. The JAC provided a forum where participants came to see themselves as something other than representatives of different organizations, governments, nations, and frequently opposing factions of the air quality issue. Rather, they met as regional neighbors with a shared responsibility for managing the one air basin and who then relied on the authority, expertise, and influence of their organizations to get things done.

This study deals with two questions: (1) What accounts for the successes of the JAC to date? (2) What have we learned about the JAC experience that can be useful in improving air quality in other cross-border air sheds? The answers we provide are based on interviews with nine current and past JAC members and our examination of a wealth of documents available from the JAC and other related organizations. The main research was conducted between November 2008 and June 2009. Our conclusions, though based on a limited period for data collection, suggest that the JAC’s strategies and methods were powerfully shaped by the characteristics of the physical setting and the organizational and political context. Many of these strategies and methods do

have considerable promise for other air sheds, but must be tailored to the unique physical and social situations of each one.

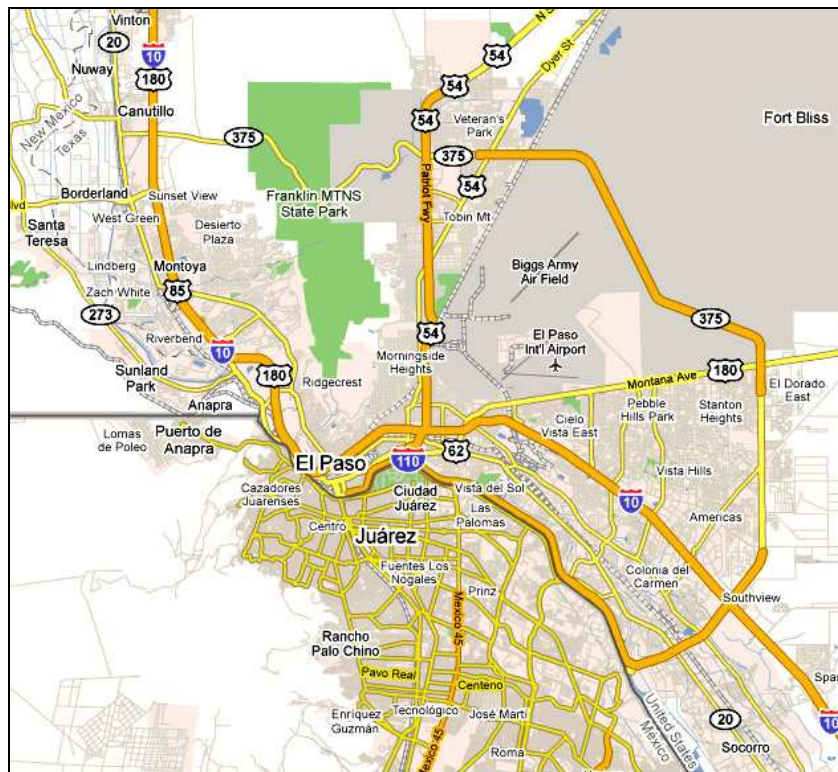


Figure 1. Paso del Norte Region

A Brief History of the Air Quality Issue

Enforcement of Air Quality Standards

By the early 1990s similar air quality standards were in place in both the United States and Mexico. Monitoring of air quality throughout the air basin showed the existence of significant pollution (i.e., violations of the air quality standards throughout the region). However, while similar standards were in place to detect these violations regardless of where they occurred in the region, differing enforcement policies of the two countries influenced the local, state, and federal government responses (Currey and Pumfrey 2006, p. 114).

In the U.S., a non-attainment area is subject to stringent cleanup requirements and may be penalized for failure to meet the requirements specified by the national standards (Rincón et al. 2005, p. 8). The United States Environmental Protection Agency (USEPA) created specific nation-wide categories to describe an area that fails to comply with air quality standards. Under provisions of the Clean Air Act, non-attainment status requires the area where the violations occur to adopt a set of rules and regulations designed to reduce the emissions to the national standards. Ultimately, the USEPA can penalize areas that fail to implement acceptable clean up plans by withholding federal dollars and restricting economic growth (Ketter 1998, p. 15). In terms of managing the monitoring and enforcement of the air quality program, responsibilities

are shared among federal, state, and local governments (Rincón et al. 2005, p. 13 and Currey and Pumfrey 2006, p. 116). This shared responsibility is based on relevant environmental legislation and policies, as well as the United States' decentralized federal governance structure.

In Mexico, rules and regulations similar to those in the U.S. were not in place. One of the most important reasons for this less stringent enforcement regime was that the air quality standards established by the Mexican government were viewed more as goals than as requirements (CEC 2004). While Mexico's environmental law required entities to develop plans for correcting air standard violations and improving air quality, the Mexican government did not establish any sanctions or penalty structure that could be applied in the event that the organization did not rectify the violations (CEC 2004). Finally, in Mexico, at least up until the late 1990s and early 2000s, the primary responsibility for enforcing air quality standards and managing plans and programs to improve air quality in specific municipalities resided with the federal government (Rincón et al. 2005, p. 14). Thus, individual states and municipalities had very little authority or funding to support enforcement of air quality standards (Erikson et al. 2004, p. 52). In the Mexican government, this structure of roles and responsibilities is based on relevant national environmental legislation and policies, as well as the more centralized governance structure, which differs from the federated structure found in the United States.

Acknowledgement of a Binational Problem

By the early 1980s, both governments were coming slowly to agreement that air pollution was a shared problem. The United States and Mexico formalized their agreement that binational cooperation was a necessary strategy for dealing with this shared problem by signing the La Paz Agreement in 1983. The La Paz Agreement, also under consideration during the early stages of free trade talks in North America, built upon the 1972 Declaration of the United Nations Conference on the Human Environment. Both the UN declaration and the debate around what eventually would become North American Free Trade Agreement (NAFTA) called for binational and international cooperation to deal with environmental concerns that often crossed borders or impacted those nations least equipped to deal with them (UN 1972 and TED 1992). The La Paz Agreement established a basic framework for cooperation and information exchange between the signatories and empowered the federal environmental authorities in both countries to undertake cooperative initiatives, which would be implemented through multi-year binational programs (USEPA 2008 and TED 1992).

Both countries come to an agreement that air quality was a shared problem; the United States also acknowledged that violations occurring along the U.S. side of the border may be caused in part by emissions in Mexico. As a result, a provision to the 1990 amendment to the Clean Air Act, Section 179B, opened the door to addressing this cross-border issue. In a finding of nonattainment of U.S. air quality standards, Section 179B provides an exception from sanctions when the USEPA is able to determine that the cause of the nonattainment is from an international source of pollution (Erickson et al. 2004, p. 51). For Section 179B to apply, the community must prove that it would be in attainment "but for" the pollution from international sources.

As the 1990 amendments went into effect, the Paso del Norte (PdN) region included localities in violation of both U.S. and Mexican air quality standards. As a result of the stricter U.S. enforcement rules, El Paso was the only community in the US to be classified as being in

“nonattainment” for three of the six criteria pollutants. Therefore, the city found itself under the greatest scrutiny from local, state, and federal authorities, as well as citizens and industry. In addition, while air pollution in the region was generally recognized as a shared U.S.-Mexican problem, differing local, state, and federal rules and policies, in addition to capabilities and resources, made it difficult to respond in a truly collaborative way. This situation confronted a group of concerned citizens, including industry and local, state, and federal government agency representatives, as they tried to devise a plan for improving the air quality throughout the PdN region.

Origins of the JAC

Under the 1990 Clean Air Act Amendments, the states of Texas and New Mexico, along with their associated county and city, and local governments, were required to work together on developing a local plan that included air pollution control programs for nonattainment areas (JAC Strategic Plan 1999, p. 21). From a greater air basin perspective, the three violations in El Paso and the penalty structure in place in U.S. law gave a local focus (i.e., El Paso) to an issue that was in fact a region-wide problem. In addition, the differences between the existing laws and enforcement methods in Mexico combined with fewer and less severe violations in New Mexico created an asymmetrical incentive structure in relation to El Paso, Texas. From a combination of public, state, and federal pressures, El Paso found itself the focal point of the pollution problems throughout the region.¹ While it was generally accepted that air quality was a shared problem throughout the basin in the early 1990s, it was only in El Paso that the combination of risks and costs of inaction provided sufficient incentive to move beyond the status quo.

New Collaboration Initiatives

Within this very dynamic political, economic, and cultural context, a new cross-boundary, collaborative, and multi-jurisdictional way of organizing began to emerge. Over the next several years this collaborative organizing process led to the JAC as it currently functions. The beginnings of the organizing effort involved a partnership based in grassroots activism on the part of some concerned El Paso citizens and local government representatives working with Texas environmental authorities and the USEPA. The state authorities were responsible for working with the locals to devise an air quality improvement plan. All these actors were passionate about both addressing the public health threats being caused by air pollution and avoiding the political and economic penalties resulting from nonattainment. In addition, their shared desire to address the air quality issues in El Paso led them to address air pollution throughout the entire air basin. The state of Texas and the city of El Paso could have spent a significant amount of time and resources trying to reduce emissions within their own jurisdiction.

¹ From the public’s perspective, according to an interview with a former JAC member and current local EPA representative for El Paso, a 1992 study done in El Paso by the Pan American Health Organization identified air pollution as the number one issue or concern of the community. The situation differed somewhat between New Mexico and Texas. In New Mexico, the city of Sunland Park lies just over the Texas border, less than five miles from the center of El Paso. Sunland Park was designated as a marginal nonattainment area for air pollution, so the control requirements as laid out in the Clean Air Act were less stringent than for a more serious nonattainment area such as El Paso (JAC Strategic Plan 1999, p. 27). In addition, New Mexico’s Air Quality Act prevented the state from adopting regulations more stringent than those of the federal government. Since the Sunland Park nonattainment area was not classified as severe or serious, the state of New Mexico could not require the same enforcement actions as Texas was able to require in El Paso, even if it wanted to do so (Currey and Pumfrey 2006, p. 118).

But without addressing the other pollution sources in the entire air basin, major air quality improvements were unlikely. For the state of Texas, there was no alternative to collaboration with key government, citizen, and industry representatives in El Paso and, most importantly, with the governments of Mexico and New Mexico. Therefore, this nascent group set out to overcome this asymmetrical incentive structure and build the necessary binational, tri-state, multi-sectoral collaboration needed to solve the problem.

The first important effort came in the spring of 1993 with the formation of the Paso del Norte Air Quality Task Force. The Task Force evolved out of a series of meetings beginning in May 1993. The Texas Air Control Board chairman, Kirk Watson, asked one of its members, Dr. Elaine Barrón, an El Paso physician and public health advocate, to convene and chair an advisory group for the Paso del Norte region. The driving principle of the Task Force was that Paso del Norte air quality needed to be managed binationally and at the local level to achieve significant air quality improvements (JAC Web Site undated). The first meeting of the Task Force included government officials, environmentalists, business leaders, and other concerned citizens from both sides of the U.S.-Mexican border, along with officials from Texas and New Mexico governments and the USEPA. Although some of these government officials “had coordinated their efforts on an informal basis for many years, the Task Force represented a new, more structured way of encouraging coordination and cooperation across the border and among interested parties” (Ketter 1998, p. 17).

At this point, however, the Task Force lacked international sanction or authority. The strategy that developed was to amend the La Paz agreement to authorize a binational body to work on air pollution mitigation. That effort resulted in an amendment (*Appendix I* of Annex V) of the La Paz Agreement creating the JAC as a binational, basin-wide advisory group. That process is described in more detail on p. 11.

From its very beginning, the Task Force’s and eventually the JAC’s air quality improvement strategy pursued two paths in parallel. One was to immediately take advantage of the relationships and expertise of the members involved and establish programs to start improving air quality. The other focused on expanding upon and formalizing the cross-boundary and multijurisdictional collaboration among the key stakeholders in the air basin.

Barriers to collaboration and coalitions formation

The multiplicity of overlapping jurisdictions is central to the problem. There are ten separate legal and political jurisdictions involved in the PdN air quality problem. On the Mexican side there are the national government, represented by the Secretariat of Environment and Natural Resources (SEMARNAT), the state of Chihuahua, and the municipality of Cd. Juárez. On the U.S. side there are the U.S. federal government, represented by the USEPA, the county and municipality of El Paso, the State of Texas, Sundland Park, Doña Anna County, and the State of New Mexico. The USEPA has overall authority for air quality policy on the US side, but the states and local governments have jurisdiction over many of the policies affecting pollution sources and mitigation efforts. As a result, there was no way to impose an overall hierarchical structure that could exert control over all the relevant entities.

Aside from the jurisdictional and authority issues, the necessary knowledge, financial, and technical resources to analyze and mitigate the air pollution problems were distributed over many organizations and individuals. Mobilizing and employing these resources in an effective way requires collaboration and coordination, which in turn requires sufficient trust among the players to negotiate agreements and protocols among themselves. These were not in place at the beginning of the collaboration.

Virtually all mitigation strategies available to the Task Force in the beginning involved commitments of resources and exchanges among separate government organizations and across the borders. The conditions did not exist for these kinds of exchanges to occur. Without a structure for collaborating and sharing resources through some form of joint decision making, these kinds of exchanges can occur only through some form of quid-pro-quo, as in a market. Market conditions are not likely to be met in an areas with such large wealth disparities among the organizations and jurisdictions. Moreover the differences in air pollution enforcement sanctions between Mexico and the United States creates a highly asymmetrical incentive environment. The exchange barriers are further complicated by issues of national sovereignty.

Many of these barriers were removed or lowered in the process of moving from an informal group of individual activists and environmental officials to a new binational, basin-wide organizational structure. this case study analyzes that process from the perspective of the JAC as an emerging interorganizational network. The analysis focuses on the main problem areas or barrier identified above and how solutions emerged. The main problem areas discussed are (1) acquiring authority and legitimacy; (2) creating trust and effective mechanisms for coordinated action and decision making; and (3) dealing with economic and political disparities across the region and asymmetrical incentives and barriers to resource sharing.

Before undertaking that analysis, however, it is useful to present an example of JAC activity that was made possible by the emerging interorganizational network. The example of the brick kiln project and the related pollution credit trading illustrates the possibilities of the JAC. The participation in this project of government, industry, and research institutions from the United States and Mexico shows the potential of an effective network to identify creative solutions and mobilize action. The project has been documented in detail elsewhere (for example, see TCEQ 2002), so the description below focuses on the main events and results as illustrative of interorganizational collaboration.

The Network at Work: Reducing Brick Kiln Emissions

In Mexico, small-scale traditional brick kilns are a well-known informal sector source of urban air pollution (Blackman and Bannister 1998, p. 2). According to the TCEQ, there were approximately 335 brick kilns located in Ciudad Juárez in 2002 (TCEQ 2002, p. 5), but in 2004 the Cd. Juarez newspaper *El Diario* reported there was 325 brick kilns in the city. These kilns are fired with a variety of cheap, highly polluting fuels, including plastic refuse, used tires, manure, wood scrap, and used motor oil. In many cities such as Cd. Juárez, brick kilns are a leading source of air pollution (Blackman and Bannister 1998, p. 2). In the PdN region, pollution created by the Mexican brick kilns affects the air quality of the entire air basin. Efforts made by Mexico to reduce the pollution emitted by these kilns in the early 1990s by substituting propane and natural gas for the more polluting fuels had only limited success (Blackman and Bannister 1998

and TECQ 2002). However, beginning in the late 1990s, the JAC played a crucial role in a potentially more successful project to improve the emissions of the Mexican brick kilns. The story of this project, though not yet fully successful, illustrates the power and influence of the JAC as an interorganizational network resource for improving air quality in the PdN region.

An opportunity for new mitigation strategies arose in Texas in 1999 when the legislature passed Texas Senate Bill 7. That bill introduced additional requirements for El Paso Electric (EPE) to reduce its nitrogen oxide emissions. El Paso Electric had several power stations in the region that the legislation affected, almost all of which were scheduled for retirement. Their configuration made the addition of pollution controls very expensive and of limited long-term value. Therefore, the company decided to look into options that would allow it to not modify these existing stations, yet still meet the intention of the legislation.

During this same period, researchers from New Mexico State University were developing a prototype dual brick kiln system. The new system has a filtering/condensation section between the two kilns where the pollutants are absorbed onto the clay filter with water that condenses in the system. This system had proven to reduce emission of carcinogenic and other toxic compounds dramatically (over 80%) in preliminary tests. EPE was aware of this research and once SB 7 came into the picture, the company decided to investigate the brick kilns as an alternative way to reduce overall pollution in the region by updating the brick kilns in Mexico, rather than retrofitting their own power stations in Texas. Of course, the company realized that any effort to use the brick kiln research as a way to develop a legitimate cross-border pollution trading plan would involve close collaboration with key stakeholders in Mexico and Texas, as well as eventual sanctioning by the Texas government. EPE and the researchers at NMSU identified this solution, but the JAC played a necessary role as the network that facilitated the parties working through the various legal, economic, and cultural hurdles.

From the JAC perspective, the brick kiln project had the potential to contribute to two of the network's strategic objectives: to accomplish effective cross-border trading of pollution credits and to reduce brick kiln emissions in Mexico. The JAC provided the venue where EPE staff and others involved in the brick kiln research could interact with JAC members from the USEPA, Texas Commission on Environmental Quality, Mexico's SEMARNAT, and researchers and environmental experts from Cd. Juárez. The JAC provided the interorganizational forum where members could connect the necessary dots and transform EPE and NMSU's willingness to produce new brick kilns in Mexico that met the requirements under Texas state law and helped improve the air quality of the PdN region.

Through efforts facilitated by JAC members, EPE worked closely with state senator Eliot Shapleigh to author new legislation, Texas Senate Bill 1561. That bill, passed in May of 2001, allowed EPE to meet Texas requirements for nitrogen oxide reductions with cross-border, multi-pollutant trading. EPE provided funding for a test kiln on EPE property as proof of concept and additional funds for replacing some traditional brick kilns in the Ciudad Juárez area with the new kilns designed by the researchers at NMSU (US-Mexico Border 2012 Program: 2005 National Coordinators Meeting Summary of Accomplishments March 8-10, 2005, p. 2). In the summer of 2002, the JAC also facilitated letters of support for the brick kilns construction project from Mexican environmental regulators such as PROFEPA and SEMARNAT. By November of 2002,

TCEQ approved EPE's proposal for building the brick kilns in Ciudad Juárez (El Paso Electric Company presentation undated). That same month construction began on the first of 60 kilns. By May 2003, EPE had built 20 production brick kilns and one for training. However, because of delays in working with kiln owners and a deadline for compliance with the Texas law, the company ended up having to retrofit one of its conventional generation facilities. EPE then filed a report to the TCEQ that showed that a combination of five kilns and the retrofit would fulfill its obligation. As of late 2008, 28 new brick kilns are in operation in Ciudad Juárez.

Acceptance of the new kiln design has been hampered to some degree by economic issues in the Ciudad Juárez area and resistance from some local brick makers. The Juárez *El Diario* reported in 2004 that some brick producers stopped using the new kilns because of design flaws and poor construction. In addition, the new kilns were not as profitable as the old ones since the new ones produced fewer bricks. The article also mentions problems due to poor maintenance of the new kilns and lack of continuity in the training provided to operators. Politicization further hampered the project. City officials, led by PAN (National Action Party), supported the project since it began. Jorge Vazquez, a union leader affiliated with the opposing Institutional Revolutionary Party was a fervent opponent of the project. Nonetheless the program continues to be a point of focus of the JAC. In addition, other states in Mexico have reached out to members of the JAC for help in building similar kilns in other regions of the country.

The JAC as an Interorganizational Network

That JAC efforts over the past 13 years have been so successful, especially in such a difficult environment, raises an important question: is this a special case or a model for other border areas? Cross-border collaborations of any kind are difficult, especially in this case where they involve many government and private actors. Moreover the complexity of the pollution problems in the Paso del Norte air basin have been especially daunting (see, for example, Alvarez 2002). In spite of these difficulties, however, the air quality in the region has improved markedly over the JAC time span and the Committee has laid a foundation for further gains. Therefore, the question of whether this model can be generalized deserves analysis.

That analysis takes the form here of viewing the formation and operation of the JAC as an emergent organizational network. In this view, the JAC has some of the characteristics of a more formal bureaucracy, having acquired rules, procedures, and some limited authority. It does not, however, have authority over individual members or the organizations and constituencies they represent. Neither is it an independent actor, able to take positions or sponsor projects without the assent and collaboration of the members and their organizations.

In more general terms, such an organizational network falls somewhere along a continuum between two extremes. At one end are fully laissez faire markets or market-like competitive arenas, such as politics. In markets, individuals or single organizations interact in short-term transactions based on reasonably clear knowledge of a transaction's value and their own risk calculations. At the other end are hierarchies, or legally-based bureaucracies, in which the parties interact within an integrated system of formal rules and structures, long term codified relationships, and less certainty about the value of individual transactions (Williamson 1991; Williamson 1999). In between these extremes are structures of organizations and persons who work as a network, with some characteristics of hierarchy, but only partial integration. Members

retain individual identities and have limited commitments to the network (Human & Provan 2000). Using this perspective we can describe how the individuals and organizations came together to form the network, what accounts for that process, and what the analysis implies for air pollution mitigation in other border areas.

Collaboration and network formation among organizations is not an altogether natural act, both in general and in the specific case of environmental protection. It requires incentives, ways of overcoming barriers, and mitigating risks. Prior to the early 1990s, the barriers to broad collaboration for air quality control were substantial, potential costs and thus risks for pollution mitigation were high, and incentives were weak. The policy environment for environmental issues and U.S.-Mexican collaboration was not conducive to cross-border initiatives or network formation. National sovereignty issues were a barrier to intergovernmental collaboration. The La Paz Agreement, in place since 1983, provided a conceptual framework for environmental cooperation and an annual meeting, but provided no specific authority or resources. NAFTA did not come into being until 1994. The most stringent enforcement provisions of the US Clean Air act did not appear until the 1990 Amendments went into effect. Progress at the institutional level was slow at best.

Prior to the 1990s, many individuals at the local level recognized air pollution as a serious problem; efforts at improvement had been underway for some time. Air quality monitoring began in the 1970s. The monitoring showed a steadily increasing number of days with El Paso in violation of one or more air quality standards. Although the USEPA and Texas authorities lacked the authority for region-wide efforts, they were encouraging grass roots efforts to take on quality improvements. These efforts involved organizations with an environmental protection mission or individuals with a personal commitment to improving air quality. Research and monitoring was undertaken by the local Texas Air Control Board and projects at the University of Texas-El Paso. Environmental advocates such as the Environmental Defense Fund (EDF) and Sierra Club were active, as were some local members of the professional and business community. At the point that the 1990 Clean Air Act Amendments were passed, there was much local awareness of the seriousness of the problem and mitigation efforts underway, but no integrating organizational structure.

The context for organizing in the PdN region changed dramatically in the early years of the 1990s. One major change was at the national level in the United States with the passing of the 1990 Clean Air Act Amendments. These Amendments substantially increased incentives for more strenuous pollution control efforts. Economic sanctions and permit requirements imposed on nonattainment areas had potentially serious consequences for Texas and El Paso governments, as well as local industry. Loss of federal funding to state and local projects was just one of the possible consequences of nonattainment. The Amendments substantially increased planning requirements for the states and enforcement authority of the USEPA. These provisions could have a major impact on the Texas side, with El Paso in nonattainment status for three of the six monitored pollutants: ozone, carbon monoxide, and particulates. El Paso was the only metropolitan area in the United States with nonattainment in more than two criteria measures.

Along with impending Clean Air Act sanctions, grassroots pressure was building for a way to deal with the air quality problems for the air basin as a whole. The Environmental Defense Fund

attracted funding from the Houston and Ford Foundations to support local coordination efforts and lobbying national and state authorities to support a bottom-up approach to dealing with air quality problems in the basin. Negotiations over NAFTA underway in the early 1990s brought national attention to this border region as a place for increased commerce and economic development, which would be hindered by poor environmental conditions and Clean Air Act sanctions.

In terms of this analysis, the situation in the early 1990s was one of strong interests and incentives for organized, coordinated basin-wide action to address the pollution problems. The term “one air basin” had been in use for some time and represented a kind of rallying cry for treating the air quality problems in a unified way. Victor Valenzuela, JAC administrative liaison, explains this sense of community:

“It’s not very recent; that concept ‘one basin’ came out like in 1988. It is already ten years old. But before that the whole premise of the JAC was that we share a single air shed and air pollution respects no boundaries. What is generated here goes to Mexico and what it is generated in Mexico comes here. And unfortunately Sunland park takes the brunt of a lot of the air pollution because it is only a community of 16,000 people, with a community of two million in one side and 800,000 in the other side, and they are just right there, so we are all combined in this little soup.” (V. Valenzuela interview, 12/6/08)

The necessary organizing mechanisms to support and coordinate unified action, however, were lacking. The wealth disparities and institutional constraints were such that market-type negotiated agreements and exchanges among the many parties were not feasible. Neither was there the necessary overall legal or hierarchical structure to supply the necessary coordination, legitimation, and authority for extensive basin-wide mitigation efforts. Annex V of the 1983 La Paz Agreement recognized the PdN border region as a unit and the need for cross-border air quality improvements, but provided no specific organizational or legal support. The spirit was willing, so to speak, but the organizational flesh was weak. This is the typical setting for the emergence of interorganizational networks.

A basin-wide group of concerned individuals and organizations took the initial major step in network formation: the acquisition of legitimacy and some basic resources for communication and planning. They worked with the Texas Air Control Board to form a quasi official cross-border group to take on some of the organizing and coordinating tasks. As described by Dr. Elaine Barrón, JAC private sector representative:

“I was on the Texas Air Quality Control Board. I was appointed by Governor Anne Richardson. That was in 1994. Kirk Watson who was and still is active in politics in Austin was our Chairman. He appointed me to start the air quality task force here in El Paso because we were a non-attainment area because of our unique border situation. They knew it was not going to happen without having more cooperation with Sunland Park, New Mexico, and Cd. Juárez, Mexico. So, I was the first chairman of the Pas del Norte [Air Quality] Task Force. This was before we formed the JAC.” (E. Barrón interview, 12/4/08)

The USEPA also assisted in this initial step. According to Mr. Bill Luthans, JAC U.S. Co-Chair, legitimacy was an important early goal of the Task Force:

“I wasn’t there in the very beginning. You heard that they had a grassroots organization known as the Paso del Norte Air Quality Task Force. My version of the story is that that organization wanted to have standing like the air quality management districts in California, a local organization that had quasi-regulatory authority. There was a person on my staff named Matt Witosky who began working on that concept of forming some sort of quasi regulatory binational body. The preliminary work stalled quickly because of sovereignty issues and other things that were going to be an almost impossible feat to achieve. They decided to work on the next best thing, which was a binational advisory committee.” (B. Luthans interview, 12/5/08)

As important a step as this was, it did not provide a sufficient legal framework to support the Task Force’s efforts. Although the Task Force involved participants from both side of the border, it was primarily a Texas initiative; it did not have the official sanction of either national governments. To remedy that lack of official sanction, the Task Force members drafted an amendment to the La Paz Agreement that would create an official basin-wide air quality improvement organization. The initial draft was developed and proposed in 1993, modeled on the South Coast Air Quality Management District in the Los Angeles area. That structure was not acceptable in its original form, but did result in the ultimate development of *Appendix I* of Annex V of the La Paz Agreement, which created the formal authority for the JAC as a binational, basin-wide advisory group (*Appendix I*, 1996).

Four characteristics of *Appendix I* are central to the further development of an effective interorganizational network. As part of a long standing and significant international agreement, *Appendix I* confers both substantial legitimacy and binational visibility to the JAC, which further enhances incentives for participation by individuals and agencies. In addition, *Appendix I* establishes key elements of a more formal organizational structure. The *Appendix* specifies the as the group composition of 10 members from each side of the border, including high ranking Mexican and US government officials. Although the JAC’s role is advisory, rather than regulatory, the presence of representatives from both national governments establishes indirect but meaningful authority and potential access to agency resources. Thirdly, the *Appendix* identifies a very broad scope for the JAC’s advisory functions. The list includes analytical, educational, and direct intervention projects, and ends with “such other air quality improvement issues as the Committee may deem to be pertinent to the air basin and as may be recommended by the Parties (*Appendix I*, 1996).” Lastly, the *Appendix* specifies an inclusive membership, equal numbers from each country and required representation of the major stakeholders: environmental groups, industry, local governments, NGOs, and private citizens who reside in the region.

This membership structure for the JAC is critical with respect to one requirement for such networks to function: a favorable risk/reward assessment. Participation in an interorganizational network involves both cost and risk. Participation consumes resources and introduces risks of

compromising interests, loss of some competitive advantage, or loss of control of valued assets or information. In the PdN case, the stakes involved in air quality improvements are potentially very high, in terms of both economic and political impacts. To bear the costs and accept the risks, participants must recognize the potential rewards and ways to control costs and risks. Such a broad, balanced JAC membership indicates that deliberations are not likely to be dominated by single interests and that positions or actions are unlikely to be extreme or poorly conceived. Such a structure provides a framework for balanced and reasonable actions that suggests a favorable risk/reward assessment is possible. A sound risk/reward assessment is made more likely by the members' sophisticated understanding of the science and policy of the air quality issues. Developing that understanding began with many information meetings of the Air Quality Task Force and continues in the JAC agenda today. This level of technical literacy is uncommon in other groups on the border.

Having an institutional structure for collaboration does not guarantee, however, that the parties will actually collaborate. The institutional structure provided for the JAC by *Appendix I* does not provide the positive interpersonal regard and trust relationships that are just as important for effective collaboration. In this case, some of the original JAC members had already been working together for some time, though some of the group was new. The existing social capital facilitated the formation of the network. As Bill Luthans explained:

“To me, this would have been a whole lot more difficult if it had not been for the prior existence of a local will to do this. The federal and state governments didn't come to the community and say “Create a JAC.” The local people here said we want a binational committee that has some teeth; we'd like it to have regulatory authority.... So, we had the luxury of coming in and helping to enhance something that sort of already existed, where all of those issues of relationships and trust had already sort of started to build. We had people locally who were already invested and saw the need for what we were able to enhance.”

(B. Luthans interview, 12/5/08)

Much of that further network development came in the process of crafting the JAC's bylaws. That process was long and complex, but according to some JAC members, a vitally important one. As Carlos Rincón, former JAC member, described it:

“It took 18 months to write the bylaws. Two lessons from this: It doesn't take that long to write bylaws, but all of us that were involved appreciated all of those sessions and meetings because it helped us feel that we were a member of the JAC beyond just someone representing a member agency.”

(C. Rincón interview, 12/4/08)

Such a process builds commitment to participation in the network, adopting a shared identity, and better trust relationships. Bob Currey commented:

“Any single member of the JAC can speak for the entire committee. We don't need to have presentations from the US side and the Mexican side—there is only a JAC side. We model this at annual meetings of the Border 2012 Air Policy

Forum—other regions have multiple presenters. The JAC has one.” (B. Currey interview, 12/4/08)

A similar view was described by Dr. Elaine Barrón:

“Having the ability to show each member that their country is equally represented and their position is equally represented in the bylaws. At the same time you’re changing them and shaping them to bring them along to the major goal of the JAC. The process there is important. You have to go through that.
(E. Barrón interview, 12/4/08)

In this way, the institutional structure established in *Appendix I* provided a foundation for collaboration. The JAC members work on the bylaws built up the structure of collaborative relationships and trust needed to take on improvement projects as a functioning network organization.

Six workgroups provide additional institutional structure within the JAC: Climate Change & Greenhouse Gases, Data, Emerging Issues, Mobile Sources, Particulate Matter, and Ways and Means.² These groups meet separately and have ongoing project and research agendas. In accordance with the JAC bylaws, membership in these workgroups is not restricted to JAC members. This provides for increased public involvement by allowing anyone to participate at the workgroup level. The groups and the overall JAC have additional support in the form of two administrative liaisons: Biologist Gerardo Tarín from Mexico’s SEMARNAT, and Mr. Victor Valenzuela from the Texas Commission on Environmental Quality, Region 6, Border Air Quality Program.

The positive relationships and commitment to the JAC’s initial structure appear to have persisted and grown. In discussing JAC successes and current projects, the members we interviewed were uniformly positive in their comments and emphasized the mutual respect among members. The effectiveness of current collaboration was evident in the JAC meeting we observed as well. Prior to the formal part of the meeting, there was free-flowing conversation among the members and other observers present. Once underway, the meeting proceeded in a very orderly manner, following the prepared agenda. During the meeting, reports and comments by members were moderated by the chair and were uniformly calm, courteous, and focused on the agenda topics. Some comments reflected clear differences of opinion, but were expressed without rancor. The two technical reports on the agenda included carefully prepared research and monitoring material prepared since the previous meeting and elicited detailed comments from the JAC members. The conduct and content of meeting was a clear manifestation of a high functioning interorganizational network.

The meeting content also illustrated the effectiveness of the JAC at mobilizing resources from member and other organizations. The reports at the meeting reflected a large amount of work performed since the previous quarterly meeting. This work was not directly supported by the JAC, which has no budget for staff, research, or other expenses. These efforts were supported by

² See <http://www.jac-ccc.org/Workgroups.htm> for listing and description of workgroups.

the JAC members and their home organizations. Such staff and research work is vital to the success of the JAC's policy proposals and mitigation initiatives, which have come to be highly credible and backed by broad support.

Prospects for Continued JAC Success

In regard to the question of the JAC's future viability as an interorganizational network, the prospects for stability and continued operation seem very strong. The legal and institutional structure is well established and functional. The political reputation of the JAC is reportedly highly credible and influential, both locally and at the national level in both countries. The norms and relationships among members are positive and constructive. And the list of air quality issues and problems for JAC to take on remains unhappily long.

In spite of this positive current picture, the prospects are not all positive. Several JAC members pointed out that past successes have been based on relatively low cost strategies and the more tractable problem areas, such as seasonally adjusted gasoline distribution, commuter lanes for border crossing, and improved brick kiln designs. Future improvements in air quality may require much more expensive and complex strategies to attack pollution generated by small scale human activity. That may require tackling very difficult underlying causes, such as high poverty levels in Cd. Juárez and relative wealth disparities between the United States and Mexico. Getting high emission vehicles off the roads instead of trading across the border, eliminating tire burning, and cutting particulate levels by paving dirt roads are as much wealth as air quality problems. Continuing success with these kinds of problems may require new strategies and resources for the JAC. Even so, based on the past record of success it seems likely that the JAC members and their organizations can rise to the challenge.

Meeting that challenge may depend in part on how succession is handled for changes in JAC members. Many of the current participants and supporters are founding or longtime members. Their knowledge, experience, and political relationships will be hard to replace. To maintain the strength of the current JAC membership it will be important to maintain a mix of newer members with the founders. It would also be useful to sustain a systematic program of involving members of other local and national organizations in JAC activities as a way of maintaining broad base of support and attracting future participants.

Generalizability

Based on the above discussion, our answer to the question of whether the JAC is a viable model for other border regions is a qualified *yes*. The answer is yes in part because there appears to be nothing in the circumstances and events in the story of this emergent organizational network that are so unusual or unlikely as to make replication impossible. The answer is yes in part also because there do not appear to have been changes in the political, economic, or physical environment of the United States and Mexico since the JAC's emergence that would preclude a similar development elsewhere in the border region. Environmental concerns are even higher on both country's political agendas than in the early 1990s. In addition, many of the same participants and organizations involved in the JAC would be involved in other areas along the US-Mexican border, especially in Texas and New Mexico (District 6 states), though the local contexts are distinct.

The general phenomenon of interorganizational network formation has been widely studied (see, for example, Aldrich, 1976; Cresswell, Pardo, Thompson, & Zhang 2002; Hardy & Phillips 1998; Lawrence, Hardy, & Phillips, 2002) and is sufficiently common to suggest replication of a JAC-like organizational form is feasible. The factors of incentives, legitimacy, and trust we saw as important in this case are also generally important in interorganizational network formation. These commonalities reinforce the judgment of feasibility.

However, the answer to the replication question is a *qualified* yes. There was certainly nothing inevitable about the emergence of the JAC or its successes. A number of the parts of the JAC story are sufficiently unusual to suggest forming similar network organizations elsewhere may be quite difficult. First, the economic importance of the PdN basin and border area is very high. The Cd. Juárez-El Paso crossing is the second or third busiest on the US-Mexican border, depending on the measure (for example, see RITA 2009). Cd. Juárez is Mexico's fifth largest city and largest on the border, though only slightly larger than Tijuana (INEGI 2009). Therefore the resources and interest in cross-border collaboration may be higher than other areas. The air pollution problems in the PdN basin were severe, providing strong incentives for action, and the basin topography of the region is unique among border cities. This combination of population size, commercial importance, and severity of air pollution is not matched elsewhere on the US-Mexican border. Whether the pressures and incentives would be strong enough elsewhere to overcome collaboration barriers is an open question.

Some elements in the JAC story are not likely to be easily repeated elsewhere, particularly with regard to individuals who played a major role. Dr. Elaine Barrón, for example, was already a member of the Texas Air Quality Control Board when the initiative for a cross-border group began with the Paso del Norte Air Quality Task Force. Her political relationships and record of activism were key resources in moving from the Task Force to the JAC. Carlos Rincón's position with the EDF and later USEPA brought critically important resources and expertise to the process. The serendipity that made the brick kiln project possible would be hard to repeat elsewhere, especially having the research capability of New Mexico State University so close to the credit trading needs in El Paso. The importance of proximity to available human resources was described clearly by Bill Luthans:

“One of the key things about the JAC is that it's got citizens like Bob Currey and Elaine Barrón and so forth. It's got people who in their day jobs can work on things of interest to the JAC. That's another key ingredient if you want to form a JAC: You have to have the commitment of people whose responsibility it is between meetings to be working on these issues. It can't just be a group of people who live there and go away from a meeting and get involved with their lives and don't follow up on things. You've got to have some follow-up mechanism to keep things happening between meetings.” (B. Luthans interview, 12/5/08)

These human resources have clearly been available for the JAC and would be of comparable importance for any similar cross-border organizational network.

Existing achievements of the JAC provide a somewhat easier path for other like groups to form. Foremost is the precedent of *Appendix I* (Annex V) in the La Paz Agreement. This

provision for sanctioned international collaboration can presumably be used in any other Mexico-U.S. border area. The established precedent for cross-border credit trading can provide an advantage for other areas. In addition, the extensive documentation of the JAC's development and projects is a valuable source of lessons for network development and mitigation efforts. Officials in the US and Mexican governments have acquired experience in these collaborations that can guide cross-border collaborations elsewhere.

Prospects for Cross-Border Organizational Networks for Air Quality Improvement

The view developed above of the JAC as an interorganizational network suggests a set of requirements for similar developments in other border areas. Several requirements appear to be the most important, at least as far as the JAC is concerned:

- **Legitimacy** – The potential legal and institutional barriers to effective cross-border collaboration are not likely to be breached without clear and widely recognized legitimacy. The legal framework of *Appendix I* is one important component of this legitimacy, but should be accompanied by the acceptance and sanction of state and local institutions as well. Acquiring this legitimacy in the JAC case was the result of a considerable history of grass roots organizing and advocacy, plus eventual sanctioning from the two respective national governments.
- **Committed, capable, and diverse human resources** – The JAC has been able to draw on a large pool of experienced and motivated persons in the local region and government agencies to sustain the high level of effort needed for effective programs and committee maintenance. Each of these individuals, while extremely passionate about the quality of the air shed, are also experts in their field and can draw on much needed capabilities and resources in their day jobs. These champions are critical to success.
- **Incentives for organizational investment** – Robust enforcement policies and sanctions are basic incentives for action, but may not be sufficient. The rewards for organizational investment also must be sufficient to overcome the risks and costs of network participation. Risks of network participation are reduced or limited by agreements and institutional structures that limit exposure and through trusted social relationships and processes. JAC members also cited the border benefits of poverty reduction and improved public health as important incentives, particularly for the low-income areas on both sides of the border.
- **Social Capital** – Positive social relationships, trust, and collaborative norms are fundamental to solving the complex problems and dealing with the divergent interests inherent in this kind of interorganizational network. However, building such social capital tends to be a gradual process that takes time and repeated positive interaction.
- **Effective organizational structure and legal framework** – In addition to committed, capable, and diverse human resources, a good part of the success of the JAC is a result of the well-designed and politically influential membership. The balanced representation from both countries, multiple levels of government,

and inclusion of major stakeholders promotes problem solving instead of conflict and contention. The participation of the key government agencies ensures authoritative decisions and the necessary communication and implementation channels to carry them out. The inclusion of research institutions and their research capabilities (e.g., scientific expertise, data collection, access, and analysis) helps manage some of the tension among government agencies, industry, and civic organizations. The inclusion of industry helps bring critical market considerations to the table and identify opportunities for turning ongoing research into practice.

- **Sufficient financial and analytical resources** – Organizations that participate in JAC-like networks typically limit the resources they commit to the control of the network itself. Therefore, the network is dependent to some degree on access to resources that remain under the control of the constituent organizations. For more autonomous action, the network will need resources under its own control, mobilized from external sources. In the JAC case, a relatively small but important amount of funding was provided by the USEPA to the Texas Commission on Environmental Quality to help with the management of JAC related logistics and other issues (e.g., Web site, meeting organization and logistics, translation services). In addition, JAC members obtained funding from foundations and they (with many non-members) made considerable investments of their own time and other in-kind contributions. Similar access to resources is important to autonomous network initiatives elsewhere.
- **Integration with existing organizations and projects** – The JAC brought together several key existing air quality related groups. Other border regions also have existing air quality initiatives and related organizations and advocates. Formation of new collaborative relationships could be seen as challenging or competing with those already in place. The resulting conflict could interfere with effective projects, waste resources, and slow the development of greater collaboration. New network development should therefore include strategies to build on existing relationships and programs.
- **Strong and clearly defined binational identity** – The phrase “one air shed” or “one air basin” is much more than a description of the geography. It is clearly part of the symbolic identity or unique organizational culture of the JAC. It is also the core rationale for taking actions in the shared interest rather than individual or factional interests. This organizational culture includes a variety of roles for the JAC that emphasize what one interviewee described as being an “integrator,” “nagger,” “reminder,” “promoter,” and “advocate.” As such, the JAC is at times able to coordinate with various levels of government and other organizations on both sides of the border more easily than others like the USEPA or Mexico’s SEMARNAT, where sovereignty and other political issues can make it difficult.

A Caveat

Since these conclusions are based primarily on a single case study, they must be regarded as tentative at best. The record of JAC’s development is reasonably clear and well-documented; we are confident in the analysis of the basic JAC story. However it is a complex story, covering almost two decades of events, and it is not possible to cover all

the details. More importantly, a single case study provides only a limited basis for hypotheses about what might work in other locations, under different contextual conditions. The analysis presented here nonetheless provides some directions for further inquiry and potentially useful lessons for new network development.

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References

- Agranoff, R., & McGuire, M. (2001). Big questions in public network management research. *Journal of Public Administration Research and Theory*, , 11, 295-326.
- Allee, V. (2008). Value Network Analysis and Value Conversion of Tangible and Intangible Assets. *Journal of Intellectual Capital*, 9(1), 5-24.
- Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, 18(4), 543-571.
- Appendix I, Section V. (1996). *La Paz Agreement*. Signed in May 1996 in Mexico City, Mexico. Found on the JAC Web site at <http://www.jac-ccc.org/Appendix1.htm>.
- Brunet-Jailly, E. (2005). Theorizing Borders: An Interdisciplinary Perspective. . *Geopolitics*, 10, 633-649.
- California Environmental Protection Agency Air Resources Board (CEPAARB). (2009). Last updated April 19, 2009. Available at <http://www.arb.ca.gov/ei/maps/statemap/abmap.htm>.
- Commission for Environmental Cooperation (CEC). (2004). "North American Air Quality and Climate Change Standards, Regulations, Planning and Enforcement at the National, State/Provincial and Local Levels." Prepared for the CEC Secretariat by M.J. Bradley and Associates, Inc. May 17.
- Currey, Bob, & Pumfrey, Ross. (2006). "Improving Air Quality in Paso del Norte." In Pumfrey, R. (ed.) *The U.S.-Mexican border environment: Binational Air Quality Management*. (pp. 109-122). Southwest Center for Environmental Research and Policy Monograph Series, no. 14. San Diego: San Diego State University Press.
- Dawes, S. S. (1996). Interagency information sharing: Expected benefits, manageable risks. *Journal of Policy Analysis and Management*. 15(3), 377-394.
- Environment Canada. (undated). Available at http://www.pyr.ec.gc.ca/airshed/index_e.htm.
- Erickson, Christopher A., Molina, David, & Ghosh, Soumen N. (2004). *The U.S.-Mexican border environment: Improving Transboundary Air Quality with Binational Emission Reduction Credit Trading*. Southwest Center for Environmental Research and Policy Monograph Series, no. 10. San Diego: San Diego State University Press.

- Faerman, S., McCaffrey, D. P., Van Slyke, & David, M. (2001). Understanding Interorganizational Cooperation: Public Private Collaboration in Regulating Financial Market Innovation. *Organization Science*, 12(3), 372-388.
- Hales, C. (2002). Bureaucracy-lite' and continuities in managerial work. *British Journal of Management*, 13, 51-66.
- Instituto Nacional de Estadística y Geografía (INEGI). (2009). INEGI Web site in Spanish at <http://www.inegi.org.mx/inegi/default.aspx?s=geo&e=08>. Accessed August 21, 2009.
- Joint Advisory Committee for the Improvement of Air Quality Paso del Norte Web site (JAC Web site). (undated). Establishment. <http://www.jac-ccc.org/Establishment.htm>. Accessed June 22, 2009.
- Ketter, Ronald G. (1998). *Paso del Norte Air Quality Task Force: A Case Study*. Report prepared for the Paso del Norte Air Quality Task Force under an grant from The Ford Foundation. March.
- Quinn, R. E., Faerman, S. R., Thompson, M. P., & McGrath, M. R. (2003). *Becoming a master manager: A competency framework*. Hoboken, NJ: John Wiley & Sons.
- Research and Innovative Technology Administration (RITA). (2009). Bureau of Transportation Statistics Web Site. <http://www.transtats.bts.gov/BorderCrossing.aspx>. Accessed August 21, 2009.
- Rincón, C.A., Anderson, J. R., Bang, J. J., Greenlee, J. C., Kelly, K. E., and Li, W.-W. (2005). "Background and Recent Research on Particulate Matter in the Paso del Norte Border Region." In Currey, Robert M., Kelly, Kerry E., Meuzelaar, Henk L., & Sarofim, Adel F. (eds.). *The U.S.-Mexican border environment: Integrated Approach to Defining Particulate Matter Issues in the Paso del Norte Region*. Southwest Center for Environmental Research and Policy Monograph Series, no. 12. San Diego: San Diego State University Press.
- Strategic Plan for the Joint Advisory Committee for the Improvement of Air Quality in the Ciudad Juárez, Chihuahua / El Paso, Texas / Doña Ana County, New Mexico Air Basin (JAC Strategic Plan). (1999). Prepared by members of the JAC Strategic Plan Technical Commission. Found on the JAC Web site at <http://www.jac-ccc.org/JAC-Strat%20Plan-1999.pdf>.
- Texas Commission on Environmental Quality (TCEQ). (2002). "A Study of Brick-Making Processes along the Texas Portion of the U.S.-Mexico Border: Senate Bill 749." TCEQ Border Affairs Division. December.
- Trade and Environment Database (TED). (1992). "US-Mexico La Paz Agreement on Waste Exports." *Trade and Environment Database (TED) Case Studies*, Volume 1, Number 1. The Mandela Project. American University, the School of International Service. September. Online journal available at <http://www1.american.edu/TED/lapaz.htm>.
- United Nations (UN). (1972). Declaration of the United Nations Conference on the Human Environment. United Nations Conference on Human Environment. Stockholm, Sweden. June 5-16.
- United States Environmental Protection Agency (USEPA). (2008). "What is Border 2012?" US-Mexico Border 2012 Program. Last updated on Monday, November 17th, 2008. Available at <http://www.epa.gov/usmexicoborder/framework/background.html>.

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